

Appendix D

Geochemical Simulation Reports by EHS

Kanmantoo
Geochemical
Modelling Report
Kanmantoo PHES
Kanmantoo Copper
Mine

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Acronyms

AS	Australian Standard
GL	gigalitres
GMO	Groundwater Management Objective
ha	Hectare
OTD	Old Tailings Dam
m	metres
MP	MP
mV	millivolts
mg/L	milligrammes per litre
PHES	pumped hydro energy storage
RL	rest level
RWD	Return Water Dam
TSF	Tailings Storage Facility



1 Introduction

Kanmantoo Copper Mine is located approximately 40 km south-east of Adelaide, South Australia. The site consists of the MP or Giant Pit which is almost 400 m in depth, the Tailings Storage Facility (TSF) a 40 hectare (ha) pond to the north-west of the MP (MP) and an Old Tailings Dam (OTD) directly to the north of the MP. Two minor pits, Emily Star and Nugent Pits, lie to the south-west and south-east of the MP.

A pumped hydro energy storage (PHES) scheme is proposed for the site. An upper pond located to the north-west of the OTD and the lower pond located in the MP. Hydrogeological modelling by Mining One has demonstrated that groundwater recovery within the MP will be limited and that additional sources of water will be required to attain a maximum elevation of 1,000 metres (m). A combination of potential water sources include: groundwater; Return Water Dam (RWD) water; Mount Barker water; and River Murray water.



2 Objective and Scope

Mining One engaged the services of EHS Support to provide geochemical experience in the assessment of water quality changes when more than two sources of water are mixed together. In addition, the alkaline amendment of acidic Return Water Dam water was explored.

Mining One provided EHS Support with a range of scenarios that could occur during the filling of the MP to rest level (RL) 1,000 m but prior to the commencement of PHES activities. The sequence of events proposed for the scheme are provided in **Table 2-1** and the Scenarios are presented in **Table 2-2**.

Table 2-1 Sequence of Events for the Development of PHES

Sequence	Description
1	The pit is mined until mid-2019 - RL 836 m
2	Pit naturally recovers until mid-2021 - groundwater source mainly (assume 100% no rainfall or evaporation impact) - RL 866 m
3	Mid 2021 to end of 2021 - pit topped up to RL 1000 m using RWD
4	Daily PHES from RL 940 m to RL 1000 m. Water is pumped to the upper pond at night and turbed down during the day
5	The lifespan of PHES is 50 years

Table 2-2 Scenarios of Source Water Mixing

Scenario	Source Water	Description
0	GW	Average and worst-case groundwater quality
1	Base case	Groundwater volume 1 + River Murray 50% & Mt Barker 50% volume 2 to attain 5.1 gigalitres (GL)
2	RWD	Groundwater volume 1 + RWD untreated 4 GL + River Murray 50% & Mt Barker 50% to attain 5.2 GL
3	RWD treated	Groundwater volume 1 + RWD treated 4 GL + River Murray 50% & Mt Barker 50% to attain 5.2 GL

The water mixing Scenarios only cover Sequences 1 to 3, i.e. the mixing of water sources to attain RL 1000 m in the MP prior to the commencement of the PHES.

The objective of this report is to use volumes of the identified water sources to explore the changes in water quality as differing ratios of water sources are mixed. A geochemical modelling program, PHREEQC, has been used to calculate the effects of mixing waters of varying compositions and volumes. PHREEQC is an analytical code developed by the United States Geological Survey. The program uses peer-reviewed thermodynamic constants to calculate changes in soluble speciation, mineral phase saturation and physicochemical properties of water samples. In addition to the mixing scenarios the RWD water, which has elevated metals (aluminium, cobalt, copper, iron, manganese and nickel) and low pH, is treated using calcium hydroxide to increase pH and decrease metal solubility and ultimately concentrations. These metals are elevated with respect to the Groundwater Management Objective (GMO) values provided in **Table 3-1** and **Table 3-4**.



A combination of scenarios were developed to simulate the sequence of events as groundwater recovers within the MP. Supplemental sources of water from Mount Barker, RWD and River Murray are used to increase the volume to 5.2 GL by the end of 2021. The scenarios focus on the timeframes 2019 to mid-2021 (Scenario 0) and mid-2021 to the end of 2021 Scenario 1 to 3):

1. Scenario 0 – groundwater recovery using average and maximum groundwater concentrations;
2. Scenario 1 & 1a – groundwater, River Murray and Mount Barker water;
3. Scenario 2 & 2a - groundwater, untreated RWD, River Murray and Mount Barker water; and
4. Scenario 3 & 3a - groundwater, treated RWD, River Murray and Mount Barker water.

The following geochemical interactions are simulated within the mixed waters using PHREEQC:

1. Speciation of source waters;
2. Mixing of specified ratios of source waters; and
3. Addition of alkali to change pH and metal solubility.

By using the following datasets:

1. Kanmantoo Copper Mine groundwater network (21 monitoring locations) April 2007 to September 2018;
2. Mount Barker December 2014 to September 2018;
3. River Murray January 2017 to October 2018 (minimum, maximum and average data); and
4. RWD water quality March 2012 to September 2018.

A total of 21 groundwater monitoring location datasets were reviewed. Six of these locations were omitted from the review. This was due to either unrepresentative pH readings (KMB028 and KMB031) or located outside of the catchment area of the MP (KMB021, KMB024, KMB025 and KMB029). The pH readings reported for these two wells were greater than pH9 and as high as pH 12.40. Field notes provided with the groundwater analytical results that groundwater pH was potentially affected by bentonite grout chemistry during well installation. KMB021, KMB024, KMB025 and KMB029, are located east of the site and distant from the MP. Groundwater modelling has demonstrated that groundwater in the vicinity of these wells is unlikely to be within the catchment zone of the MP and will not influence the quality of the groundwater recharging the MP.

Speciation of the water samples is not discussed as it is used to check the ionic balance of the sample. All samples are within $\pm 5\%$ cation/anion balance.

Water quality derived from the Scenario outputs is compared against the Groundwater Management Objectives for the site and potentially corrosive parameters (pH, chloride and sulfate) are compared to the guideline criteria sourced from Australian Standard (AS) 2159 (2009).

Redox potential has not been simulated as part of the model inputs as this parameter has not been reported for all the water sources (Mount Barker, River Murray and RWD waters). However, redox potential is an input parameter required for the geochemical modelling. Based on the source of the three waters, the default redox potential of 237 millivolts (mV) from PHREEQC was used.



3 Model Inputs

Mining One provided EHS Support with a range of scenarios that could occur during the filling of the MP to rest level (RL) 1,000 m but prior to the commencement of PHES activities. The sequence of events proposed for the scheme are provided in **Table 2-1** and the Scenarios are presented in **Table 2-2**.



3.1 Scenario 0

Scenario 0 uses the average and maximum concentrations of the dataset collected from 15 groundwater monitoring well locations within the capture zone of the MP (JBS&G, 2017). The groundwater compositions derived from these two datasets are representative of anticipated average and worst-case groundwater quality at mid-2021. Total volume in the MP at this time is estimated as 164,379 m³. The minimum pH value (pH 5.05) was selected as it is below the GMO.

Table 3-1 Average and Maximum Groundwater Concentrations, 2014 to 2018¹

Parameters	Unit	Groundwater Management Objective (GMMP, 2014)	Average Groundwater Quality	Maximum Groundwater Quality
pH Value	pH Unit	Between 6.0-8.5	6.79	<u>5.05</u>
Electrical Conductivity @ 25°C	µS/cm		7,148	45,000
Total Dissolved Solids	mg/L		4,647	29,250
Redox	mV		58	291
Temperature	°C		21	32
Calcium	mg/L		130	590
Magnesium	mg/L		246	1,340
Sodium	mg/L		1,094	5,880
Potassium	mg/L		62	216
Total Alkalinity as CaCO ₃	mg/L		398	872
Sulfate as SO ₄ -	mg/L		1,485	9,110
Chloride	mg/L		1,533	9,420
Aluminium	mg/L	0.13	<u>0.37</u>	<u>5.21</u>
Arsenic	mg/L		not measured	not measured
Barium	mg/L		not measured	not measured
Beryllium	mg/L		not measured	not measured
Boron	mg/L		not measured	not measured
Cadmium	mg/L	0.009	0.003	<u>0.04</u>
Chromium	mg/L		not measured	not measured
Cobalt	mg/L	0.14	<u>2.34</u>	<u>24.20</u>
Copper	mg/L	0.031	<u>0.31</u>	<u>9.29</u>
Iron	mg/L	11	<u>100</u>	<u>937</u>
Lead	mg/L	0.03	0.003	0.01
Manganese	mg/L	3.7	<u>12.20</u>	<u>171</u>
Mercury	mg/L	0.0003	0.0002	<u>0.0004</u>
Molybdenum	mg/L		not measured	not measured
Nickel	mg/L	0.1	<u>0.45</u>	<u>5.57</u>
Selenium	mg/L	0.1	0.03	0.08
Vanadium	mg/L		not measured	not measured
Zinc	mg/L	0.94	0.17	<u>1.78</u>
Total Nitrogen as N	mg/L	21.8	7.35	<u>60</u>
Total Phosphorus as P	mg/L	3.82	0.68	<u>23.60</u>

¹ Exceedances of GMO values are in **bold** and underlined.



3.2 Scenario 1

Scenario 1 is representative of the anticipated volume of groundwater in the MP in mid-2021 with additional sources River Murray and Mount Barker water to make up a MP volume of 5,089,041 m³ (Table 3-2).

Table 3-2 Mean Mount Barker and River Murray Water Concentrations²

Parameters	Unit	Groundwater Management Objective (GMMP, 2014)	Mt Barker	R Murray
pH Value	pH Unit	Between 6.0-8.5	6.18	7.5
Electrical Conductivity @ 25°C	µS/cm		1670	432
Total Dissolved Solids (Calc.)	mg/L		1086	238
Redox	mV		not measured	not measured
Temperature	°C		not measured	17.6
Calcium	mg/L		32	13
Magnesium	mg/L		17	9
Sodium	mg/L		132	49
Potassium	mg/L		25	4
Total Alkalinity as CaCO ₃	mg/L		50	61
Sulfate as SO ₄ - Turbidimetric	mg/L		190	17
Chloride	mg/L		231	79
Aluminium	mg/L	0.13	0.04	<u>1.48</u>
Arsenic	mg/L		0.002	0.0013
Barium	mg/L		0.012	0.0478
Beryllium	mg/L		<0.001	<0.0003
Boron	mg/L		0.088	0.05
Cadmium	mg/L	0.009	<0.0001	0.0007
Chromium	mg/L		0.007	0.0021
Cobalt	mg/L	0.14	0.039	0.0006
Copper	mg/L	0.031	0.022	0.006
Iron	mg/L	11	0.493	1.37
Lead	mg/L	0.03	0.003	0.0012
Manganese	mg/L	3.7	0.046	0.06
Mercury	mg/L	0.0003	<0.0001	0.00008
Molybdenum	mg/L		0.009	0.0003
Nickel	mg/L	0.1	0.011	0.0028
Selenium	mg/L	0.1	0.002	0.0002
Vanadium	mg/L		<0.01	0.0046
Zinc	mg/L	0.94	0.023	0.0164
Total Nitrogen as N	mg/L	21.8	24.3	1.05
Total Phosphorus as P	mg/L	3.82	0.52	0.11

² Exceedances of GMO values are in **bold** and underlined.



3.3 Scenario 2

Scenario 2 uses an additional source of water from the RWD. The volumes of water sourced from Mount Barker and River Murray are reduced and 4 GL of RWD water is used (with groundwater) to make up a MP volume of 5.2 GL (**Table 3-3**).

Table 3-3 Mean RWD Water Concentrations³

Parameters	Unit	Groundwater Management Objective (GMMP, 2014)	RWD
pH Value	pH Unit	Between 6.0-8.5	<u>4.05</u>
Electrical Conductivity @ 25°C	µS/cm		6573
Total Dissolved Solids (Calc.)	mg/L		4283
Redox	mV		not measured
Temperature	°C		not measured
Calcium	mg/L		522
Magnesium	mg/L		88
Sodium	mg/L		343
Potassium	mg/L		245
Total Alkalinity as CaCO ₃	mg/L		23
Sulfate as SO ₄ - Turbidimetric	mg/L		2,222
Chloride	mg/L		490
Aluminium	mg/L	0.13	<u>1.42</u>
Arsenic	mg/L		0.002
Barium	mg/L		0.04
Beryllium	mg/L		0.002
Boron	mg/L		0.10
Cadmium	mg/L	0.009	0.0008
Chromium	mg/L		0.0033
Cobalt	mg/L	0.14	<u>0.72</u>
Copper	mg/L	0.031	<u>6.25</u>
Iron	mg/L	11	<u>24.67</u>
Lead	mg/L	0.03	0.02
Manganese	mg/L	3.7	<u>5.22</u>
Mercury	mg/L	0.0003	<0.0001
Molybdenum	mg/L		0.11
Nickel	mg/L	0.1	<u>0.49</u>
Selenium	mg/L	0.1	0.01
Vanadium	mg/L		<0.01
Zinc	mg/L	0.94	0.49
Total Nitrogen as N	mg/L	21.8	10.07
Total Phosphorus as P	mg/L	3.82	0.29

³ Exceedances of GMO values are in **bold** and underlined.



3.4 Scenario 3

Scenario 3 uses the same volumes of water as Scenario 2, however, the RWD source is treated with calcium hydroxide to lower the acidity, increase the pH and decrease the solubility of metal species (**Table 3-4**). By decreasing the solubility of metals, mineral phases form and precipitate which reduces the concentration of dissolved metals which may exceed the GMO values in **Table 3-3**.

Table 3-4 Mean treated RWD Water Concentrations⁴

Parameters	Unit	Groundwater Management Objective (GMMP, 2014)	RWD
pH Value	pH Unit	Between 6.0-8.5	6.00
Electrical Conductivity @ 25°C	µS/cm		not calculated
Total Dissolved Solids (Calc.)	mg/L		not calculated
Redox	mV		not calculated
Temperature	°C		not calculated
Calcium	mg/L		522
Magnesium	mg/L		88
Sodium	mg/L		343
Potassium	mg/L		245
Total Alkalinity as CaCO ₃	mg/L		23
Sulfate as SO ₄ - Turbidimetric	mg/L		2,222
Chloride	mg/L		490
Aluminium	mg/L	0.13	0.00008
Arsenic	mg/L		0.002
Barium	mg/L		0.04
Beryllium	mg/L		0.002
Boron	mg/L		0.10
Cadmium	mg/L	0.009	0.0008
Chromium	mg/L		0.0033
Cobalt	mg/L	0.14	<u>0.72</u>
Copper	mg/L	0.031	<u>6.25</u>
Iron	mg/L	11	0.02
Lead	mg/L	0.03	0.02
Manganese	mg/L	3.7	0.00001
Mercury	mg/L	0.0003	<0.0002
Molybdenum	mg/L		0.11
Nickel	mg/L	0.1	<u>0.49</u>
Selenium	mg/L	0.1	0.01
Vanadium	mg/L		<0.02
Zinc	mg/L	0.94	0.49
Total Nitrogen as N	mg/L	21.8	10.07
Total Phosphorus as P	mg/L	3.82	0.29

⁴ Exceedances of GMO values are in **bold** and underlined.



The process of adding calcium hydroxide to a solution of RWD water is simulated using PHREEQC. The program input is written so that aluminium, iron and manganese oxyhydroxide mineral phases are allowed to precipitate (if saturation is achieved) and removed from the solution. These three metals have been selected as they are known to form oxyhydroxides with limited solubility as pH increases. It is likely that other metal mineral phases are also removed as the pH increases, however, the mechanism of removal is not as clear and may include sorption to oxyhydroxide surfaces and/or co-precipitation with oxyhydroxides. These additional metals include copper, nickel, cobalt and zinc. Sorption and co-precipitation are not modelled as part of this review.

Mineral phase precipitation assumes that thermodynamic equilibrium is achieved and a mass removal of aluminium, iron and manganese from the solution occurs. In reality, the saturation and precipitation is kinetically constrained and can take days, weeks or months to be achieved. Flocculants can be added to increase the rate of reaction, however, this geochemical simulation assumes instantaneous equilibrium in addition to saturation and precipitation.

The target pH 6 has been selected as the minimum pH to achieve the GMO value. A dosage rate of 104.5 mg calcium hydroxide /L has been simulated (using PHREEQC) as the required amendment mass to achieve reduced concentrations of aluminium, iron and manganese. Calcium hydroxide was selected as the alkaline amendment as it is the most commonly used amendment for acidic waters in the mining industry (Earth Systems, 2012). As presented in **Table 3-3** and **Table 3-4**, reductions in aluminium (1.42 to 0.00008 mg/L), iron (24.67 to 0.02 mg/L) and manganese (5.22 to 0.00001 mg/L) are achieved. The resulting concentrations of aluminium, iron and manganese are below the GMO values.

3.5 Summary

In summary, the source input waters for the filling of the MP to 5.2 GL or an RL of 1,000 m, are groundwater, Mount Barker, River Murray and RWD water (**Table 3-5**).

Table 3-5 Summary of Scenarios (volumes m³)

Scenario	Description	Total Volume	GW Volume	Murray Volume	Mt Barker Volume	RWD Volume
0	Average and worst-case groundwater quality	164,379	-	-	-	-
1	Groundwater volume 0 + River Murray 50% & Mt Barker 50% to achieve 5.09 GL	5,089,041	164,379	2,462,331	2,462,331	-
2	Groundwater volume 0 + RWD untreated 4GL + River Murray 50% & Mt Barker 50% to achieve 5.2GL	5,253,420	164,379	544,521	544,521	4,000,000
3	Groundwater volume 0 + RWD treated 4GL + River Murray 50% & Mt Barker 50% to achieve 5.2GL	5,253,420	164,379	544,521	544,521	4,000,000

Exceedances of GMO values for each source water are provided in Table 3-5 below. Most sources report exceedances which include aluminium, cobalt, copper, iron, manganese and nickel. Only Mount Barker water does not exceed any of the GMO values.



Table 3-6 Summary of Source Water Quality Exceedances of GMO

Source Water	Description	Analytes Exceeding GMO Values
0	Groundwater mean quality	Aluminium, cobalt, copper, iron, manganese, nickel
0	Groundwater maximum quality	Aluminium, cadmium, cobalt, copper, iron, manganese, mercury, nickel, zinc, total nitrogen, total phosphorus, pH
1	River Murray mean quality	Aluminium
2	Mt Barker mean quality	no exceedances
3	RWD untreated	Aluminium, cobalt, copper, iron, manganese, nickel, pH
4	RWD treated	Cobalt, copper, nickel

Reduction of aluminium, iron and manganese concentrations and an increase in pH in RWD water can be achieved by the addition of calcium hydroxide. If 4 GL of RWD water is to be treated, this will require 418 tonnes of calcium hydroxide to achieve the RWD water quality in **Table 3-4**.



4 Model Outputs

A range of Scenarios were provided to EHS Support from Mining One which describe the filling of the MP to rest level (RL) 1,000 metres (m), prior to the commencement of PHES activities (**Table 2-1** and **Table 2-2**).

The model outputs are discussed below as Scenarios 1 through 3 using mean groundwater quality and Scenarios 1a through 3a using worst-case or maximum groundwater quality.



4.1 Scenario 1

Scenario 1 is representative of the anticipated volume of average quality groundwater in the MP in mid-2021 with additional sources River Murray and Mount Barker water. The water quality for Scenario 1 is provided in **Table 4-1**. Aluminium, zinc and total phosphorus exceed the GMO values.

Table 4-1 Scenario 1 Water Quality⁵

Parameters	Unit	Groundwater Management Objective (GMMP, 2014)	Scenario 1
pH Value	pH Unit	Between 6.0-8.5	6.49
Electrical Conductivity @ 25°C	µS/cm		not calculated
Total Dissolved Solids	mg/L		not calculated
Redox	mV		not calculated
Temperature	°C		not calculated
Calcium	mg/L		26
Magnesium	mg/L		20
Sodium	mg/L		121
Potassium	mg/L		16
Total Alkalinity as CaCO ₃	mg/L		54
Sulfate as SO ₄ -	mg/L		48
Chloride	mg/L		197
Aluminium	mg/L	0.13	<u>0.75</u>
Arsenic	mg/L		0.002
Barium	mg/L		0.03
Beryllium	mg/L		0
Boron	mg/L		0.07
Cadmium	mg/L	0.009	0.0004
Chromium	mg/L		0.004
Cobalt	mg/L	0.14	0.1
Copper	mg/L	0.031	0.02
Iron	mg/L	11	4
Lead	mg/L	0.03	0.002
Manganese	mg/L	3.7	0.4
Mercury	mg/L	0.0003	0.00004
Molybdenum	mg/L		0.005
Nickel	mg/L	0.1	0.02
Selenium	mg/L	0.1	0.002
Zinc	mg/L	0.94	0.02
Total Nitrogen as N	mg/L	21.8	12.51
Total Phosphorus as P	mg/L	3.82	0.33

⁵ Exceedances of GMO values are in **bold** and underlined.



4.1.1 Scenario 1a

Scenario 1a is representative of the anticipated volume of worst-case groundwater quality in the MP in mid-2021 with additional sources River Murray and Mount Barker water. The water quality for Scenario 1a is provided in **Table 4-2**. Aluminium, cobalt, copper, iron, manganese, nickel, zinc and total phosphorus exceed the GMO values.

Table 4-2 Scenario 1a Water Quality⁶

Parameters	Unit	Groundwater Management Objective (GMMP, 2014)	Scenario 1a
pH Value	pH Unit	Between 6.0-8.5	6.45
Electrical Conductivity @ 25°C	µS/cm		not calculated
Total Dissolved Solids	mg/L		not calculated
Redox	mV		not calculated
Temperature	°C		not calculated
Calcium	mg/L		40
Magnesium	mg/L		54
Sodium	mg/L		281
Potassium	mg/L		21
Total Alkalinity as CaCO ₃	mg/L		54
Sulfate as SO ₄ -	mg/L		127
Chloride	mg/L		441
Aluminium	mg/L	0.13	<u>0.90</u>
Arsenic	mg/L		0.002
Barium	mg/L		0.03
Beryllium	mg/L		0
Boron	mg/L		0.07
Cadmium	mg/L	0.009	0.0016
Chromium	mg/L		0.004
Cobalt	mg/L	0.14	<u>0.8</u>
Copper	mg/L	0.031	<u>0.30</u>
Iron	mg/L	11	<u>30</u>
Lead	mg/L	0.03	0.002
Manganese	mg/L	3.7	<u>5.3</u>
Mercury	mg/L	0.0003	0.00005
Molybdenum	mg/L		0.005
Nickel	mg/L	0.1	<u>0.18</u>
Selenium	mg/L	0.1	0.004
Zinc	mg/L	0.94	0.07
Total Nitrogen as N	mg/L	21.8	14.16
Total Phosphorus as P	mg/L	3.82	1.03

⁶ Exceedances of GMO values are in **bold** and underlined.



4.2 Scenario 2

Scenario 2 uses an additional source of water from the RWD. The volumes of water sourced from Mount Barker and River Murray are reduced and 4 GL of RWD water is used with average quality groundwater. The water quality for Scenario 2 is provided in **Table 4-3**. Aluminium, cobalt, copper, iron, manganese, nickel, zinc, total phosphorus and pH exceed the GMO values.

Table 4-3 Scenario 2 Water Quality⁷

Parameters	Unit	Groundwater Management Objective (GMMP, 2014)	Scenario 2
pH Value	pH Unit	Between 6.0-8.5	<u>5.50</u>
Electrical Conductivity @ 25°C	µS/cm		not calculated
Total Dissolved Solids	mg/L		not calculated
Redox	mV		not calculated
Temperature	°C		not calculated
Calcium	mg/L		412
Magnesium	mg/L		78
Sodium	mg/L		330
Potassium	mg/L		194
Total Alkalinity as CaCO ₃	mg/L		3
Sulfate as SO ₄ -	mg/L		595
Chloride	mg/L		456
Aluminium	mg/L	0.13	<u>1.26</u>
Arsenic	mg/L		0.002
Barium	mg/L		0.04
Beryllium	mg/L		0.0015
Boron	mg/L		0.09
Cadmium	mg/L	0.009	0.0008
Chromium	mg/L		0.003
Cobalt	mg/L	0.14	<u>0.6</u>
Copper	mg/L	0.031	<u>4.84</u>
Iron	mg/L	11	<u>22</u>
Lead	mg/L	0.03	0.016
Manganese	mg/L	3.7	<u>4.4</u>
Mercury	mg/L	0.0003	0.00001
Molybdenum	mg/L		0.086
Nickel	mg/L	0.1	<u>0.39</u>
Selenium	mg/L	0.1	0.009
Zinc	mg/L	0.94	0.39
Total Nitrogen as N	mg/L	21.8	10.53
Total Phosphorus as P	mg/L	3.82	0.31

⁷ Exceedances of GMO values are in **bold** and underlined.



4.2.1 Scenario 2a

Scenario 2a uses an additional source of water from the RWD. The volumes of water sourced from Mount Barker and River Murray are reduced and 4 GL of RWD water is used with worst-case groundwater quality. The water quality for Scenario 2a is provided in **Table 4-4**. Aluminium, cobalt, copper, iron, manganese, nickel, zinc, total phosphorus and pH exceed the GMO values.

Table 4-4 Scenario 2a Water Quality⁸

Parameters	Unit	Groundwater Management Objective (GMMP, 2014)	Scenario 2a
pH Value	pH Unit	Between 6.0-8.5	<u>5.47</u>
Electrical Conductivity @ 25°C	µS/cm		not calculated
Total Dissolved Solids	mg/L		not calculated
Redox	mV		not calculated
Temperature	°C		not calculated
Calcium	mg/L		426
Magnesium	mg/L		112
Sodium	mg/L		485
Potassium	mg/L		199
Total Alkalinity as CaCO ₃	mg/L		3
Sulfate as SO ₄ -	mg/L		674
Chloride	mg/L		700
Aluminium	mg/L	0.13	<u>1.41</u>
Arsenic	mg/L		0.002
Barium	mg/L		0.04
Beryllium	mg/L		0.0015
Boron	mg/L		0.09
Cadmium	mg/L	0.009	0.0019
Chromium	mg/L		0.003
Cobalt	mg/L	0.14	<u>1.3</u>
Copper	mg/L	0.031	<u>5.11</u>
Iron	mg/L	11	<u>48</u>
Lead	mg/L	0.03	0.016
Manganese	mg/L	3.7	<u>9.3</u>
Mercury	mg/L	0.0003	0.00002
Molybdenum	mg/L		0.086
Nickel	mg/L	0.1	<u>0.55</u>
Selenium	mg/L	0.1	0.010
Zinc	mg/L	0.94	0.44
Total Nitrogen as N	mg/L	21.8	12.17
Total Phosphorus as P	mg/L	3.82	1.02

⁸ Exceedances of GMO values are in **bold** and underlined.



4.3 Scenario 3

Scenario 3 uses the same sources of water as Scenario 2, however, the RWD source is treated with calcium hydroxide to lower the acidity, increase the pH and decrease the solubility of metal species. The water quality for Scenario 3 is provided in **Table 4-5**. Aluminium, cobalt, copper, nickel, zinc and total phosphorus exceed the GMO values.

Table 4-5 Scenario 3 Water Quality⁹

Parameters	Unit	Groundwater Management Objective (GMMP, 2014)	Scenario 3
pH Value	pH Unit	Between 6.0-8.5	6.28
Electrical Conductivity @ 25°C	µS/cm		not calculated
Total Dissolved Solids	mg/L		not calculated
Redox	mV		not calculated
Temperature	°C		not calculated
Calcium	mg/L		412
Magnesium	mg/L		78
Sodium	mg/L		330
Potassium	mg/L		194
Total Alkalinity as CaCO ₃	mg/L		10
Sulfate as SO ₄ -	mg/L		595
Chloride	mg/L		456
Aluminium	mg/L	0.13	<u>0.16</u>
Arsenic	mg/L		0.002
Barium	mg/L		0.04
Beryllium	mg/L		0.0015
Boron	mg/L		0.09
Cadmium	mg/L	0.009	0.0008
Chromium	mg/L		0.003
Cobalt	mg/L	0.14	<u>0.6</u>
Copper	mg/L	0.031	<u>4.84</u>
Iron	mg/L	11	3
Lead	mg/L	0.03	0.016
Manganese	mg/L	3.7	0.4
Mercury	mg/L	0.0003	0.00001
Molybdenum	mg/L		0.086
Nickel	mg/L	0.1	<u>0.39</u>
Selenium	mg/L	0.1	0.009
Zinc	mg/L	0.94	0.39
Total Nitrogen as N	mg/L	21.8	10.53
Total Phosphorus as P	mg/L	3.82	0.31

⁹ Exceedances of GMO values are in **bold** and underlined.



4.3.1 Scenario 3a

Scenario 3a uses the same sources of water as Scenario 2a, however, the RWD source is treated with calcium hydroxide to lower the acidity, increase the pH and decrease the solubility of metal species. The water quality for Scenario 3a is provided in **Table 4-6**. Aluminium, cobalt, copper, iron, manganese, nickel, zinc and total phosphorus exceed the GMO values.

Table 4-6 Scenario 3a Water Quality¹⁰

Parameters	Unit	Groundwater Management Objective (GMMP, 2014)	Scenario 3a
pH Value	pH Unit	Between 6.0-8.5	6.13
Electrical Conductivity @ 25°C	µS/cm		not calculated
Total Dissolved Solids	mg/L		not calculated
Redox	mV		not calculated
Temperature	°C		not calculated
Calcium	mg/L		426
Magnesium	mg/L		112
Sodium	mg/L		485
Potassium	mg/L		199
Total Alkalinity as CaCO ₃	mg/L		9
Sulfate as SO ₄ -	mg/L		674
Chloride	mg/L		700
Aluminium	mg/L	0.13	<u>0.31</u>
Arsenic	mg/L		0.002
Barium	mg/L		0.04
Beryllium	mg/L		0.0015
Boron	mg/L		0.09
Cadmium	mg/L	0.009	0.0019
Chromium	mg/L		0.003
Cobalt	mg/L	0.14	<u>1.3</u>
Copper	mg/L	0.031	<u>5.11</u>
Iron	mg/L	11	<u>29</u>
Lead	mg/L	0.03	0.016
Manganese	mg/L	3.7	<u>5.3</u>
Mercury	mg/L	0.0003	0.00002
Molybdenum	mg/L		0.086
Nickel	mg/L	0.1	<u>0.55</u>
Selenium	mg/L	0.1	0.010
Vanadium	mg/L		0.44
Zinc	mg/L	0.94	0.44
Total Nitrogen as N	mg/L	21.8	12.17
Total Phosphorus as P	mg/L	3.82	1.02

¹⁰ Exceedances of GMO values are in **bold** and underlined.



4.4 Summary

The mixing of various source waters has been qualitatively simulated to produce a water body in the Kanmantoo MP. The source waters include groundwater, surface water and treated and untreated RWD water.

For the initial Scenarios 1 and 1a, groundwater and River Murray water contribute to the exceedances of GMO values. In Scenarios 2 and 2a, RWD water becomes the dominant component and is responsible for the exceedances of GMO values. Treatment of RWD water for Scenarios 3 and 3a does increase pH and lower concentrations of manganese and iron to below the GMO values. However, the contribution of aluminium from groundwater and River Murray water means that these Scenarios still exceed the GMO value. As discussed in Section 3.4, sorption and/or precipitation of metals has not been simulated in the geochemical models. However, it is likely that a reduction of cobalt, copper and nickel concentrations will occur if aluminium, iron and manganese oxyhydroxides precipitate and flocculated from the mixed waters.

Table 4-7 Summary of Scenarios and Water Quality

Scenario	Source Water	% of total volume	Analytes Exceeding GMO Values
1	Groundwater mean quality	4	Aluminium
	River Murray mean quality	48	
	Mt Barker mean quality	48	
1a	Groundwater maximum quality	4	Aluminium, cobalt, copper, iron, manganese, nickel
	River Murray mean quality	48	
	Mt Barker mean quality	48	
2	Groundwater mean quality	4	Aluminium, cobalt, copper, iron, manganese, nickel and pH
	River Murray mean quality	10	
	Mt Barker mean quality	10	
	RWD untreated	76	
2a	Groundwater maximum quality	4	Aluminium, cobalt, copper, iron, manganese, nickel and pH
	River Murray mean quality	10	
	Mt Barker mean quality	10	
	RWD untreated	76	
3	Groundwater mean quality	4	Aluminium, cobalt, copper and nickel
	River Murray mean quality	10	
	Mt Barker mean quality	10	
	RWD treated	76	
3a	Groundwater maximum quality	4	Aluminium, cobalt, copper, iron, manganese and nickel
	River Murray mean quality	10	
	Mt Barker mean quality	10	
	RWD treated	76	

In order to protect the concrete infrastructure of the PHES, it is recommended in AS2159 (2009) that chloride and sulfate should be less than 6,000 mg/L and 1,000 mg/L respectively and pH greater than 5.5. **Table 4-8** below, summarises the values of pH, chloride and sulfate from the scenarios with a comparison against the AS2159 guideline values. The pH values from Scenarios 2 and 2a do potentially represent a corrosive source. This is related to the use of untreated acidic RWD (pH 4.05) water in these two scenarios.



Table 4-8 Potentially Corrosive Analytes

Parameters	Buildings and Structures AS2159 (2009) concentrations	Scenario					
		1	1a	2	2a	3	3a
pH	>5.5	6.49	6.45	<u>5.50</u>	<u>5.47</u>	6.28	6.13
Chloride mg/L	<6,000	197	441	456	700	456	700
Sulfate mg/L	<1,000	48	127	595	674	595	674



5 Conclusions and Recommendations

Geochemical modelling has been used to explore the changes in water quality when different sources of water are mixed in varying volumes. RWD water which is elevated in dissolved metals and has a low pH has been amended with calcium hydroxide to increase pH (to within the GMO range) and reduce the solubility of metals. Untreated and treated RWD water has also been used as a mixing water.

The outcome of the geochemical modelling illustrates the influence the source waters have on the resulting mixed water chemistry. As summarised in **Table 3-6**, most water sources (except Mount Barker) report exceedances of metals in comparison to the GMO values. Treatment of waters reporting elevated metal concentrations and low pH, using calcium hydroxide, is recommended. This review has looked at the amendment of RWD water using calcium hydroxide, but groundwater and River Murray water would benefit treatment using calcium hydroxide to lower aluminium, iron and manganese concentrations, increase pH and possibly enhance sorption potential to reduce the concentrations of cobalt, copper, nickel and zinc. The worst-case scenario using maximum values of groundwater are unlikely to be realised as these concentrations are reported from groundwater monitoring wells KMB010, KMB011 and KMB013. The water quality signatures from these areas will be diluted by groundwater from other areas within the catchment zone which discharges to the MP. The water quality of each Scenario has been summarised in **Table 4-7** which provides the ratio of mixing waters for each Scenario and the analytes which exceed the GMO within each Scenario.

Potentially corrosive parameters (pH, chloride and sulfate) have been compared against AS2159 (2009) guideline criteria to prevent the chemical attack on concrete. Scenarios 2 and 2a which use untreated RWD water have resulting pH values which could cause a deterioration of concrete.

Future management recommendations include:

1. groundwater monitoring well locations, KMB028 and KMB031, are redeveloped to address the elevated pH reported from these two wells. If bentonite grout is responsible for the elevated pH, redevelopment will potentially address the residual grout affecting the pH.
2. To support the future alkaline amendment, total acidity measurements should be added to the analytical suites for all source waters prior to the finalisation of the dosing rate.
3. Alkaline amendment should occur ex-situ to the MP. As part of the alkaline amendment, super-saturation and precipitation of minerals will occur. These mineral phases will require flocculation to reduce the possibility of scaling of the PHES system and/or precipitation of mineral phases within the MP.
4. It is assumed that the PHES is a closed loop scheme and although treatment of RWD is proposed to reduce metal solubility, other sources of water report elevated metal concentrations. Therefore, alkalinity amendment should be applied to all source waters.
5. Ex-situ alkaline amendment should comprise:
 - a. Calcium hydroxide dosing
 - b. Preliminary dosing rate of 105 tonnes per GL water
 - c. Flocculation of insoluble mineral phases (sludge)

It should be noted that the long-term water quality of the water body within the MP after the cessation of the PHES, will be mainly controlled by the quality of the source waters used to make up the 5.2 GL water body volume (or RL 1,000 m). However, this report does not account for changes in water quality that can occur from side wall runoff and evaporation of the water body. Acid rock drainage will continue to occur from the side walls into the water body and evaporation has the potential to increase the salinity of the water. Hydrogeological modelling by Mining One has demonstrated that the MP will act as a groundwater sink for the foreseeable future and presents a



low risk to surrounding groundwater quality. However, the quality of the MP water body should be considered for future health and ecological risk assessments.

5.1 Assumptions and Limitations

Assumptions and potential limitations include:

- Groundwater intersected by the monitoring well screens is assumed to be from the same groundwater body and is within the same catchment zone that discharges to the MP (except KMB021, KMB024, KMB025 and KMB029 which are assumed to be outside the catchment zone and separated from the remaining wells by a groundwater divide).
- The mixing of two or more water chemistries will result in kinetically determined reactions. It is not intended that the geochemical simulations will have the site derived (or measured) kinetic rates to undertake a kinetic assessment. The geochemical simulations will be conducted assuming geochemical equilibrium will be achieved instantaneously between the waters that will be mixed together.
- The geochemical modelling has used average source water qualities and simulated steady-state equilibrium conditions after mixing or alkaline amendment.
- It is assumed that there is no interaction between the waters and the walls of the MP which could modify the resident water chemistry.
- It is assumed that no evaporation of MP water will occur which could result in an increase in electrical conductivity and total dissolved solids (salinity) due to evapoconcentration.
- When amendment of the RWD water is conducted it is assumed that the mineral phases precipitated during the geochemical simulation are flocculated and removed from the water. This is to ensure no dissolution of mineral phases occurs if physico-chemical conditions change (mainly pH and redox potential).
- Acidity characteristics of RWD water have been based on the pH and the potential for acidity generation as metal oxyhydroxides deprotonate as pH is increased by alkali amendment. Total acidity has not been reported so acidity is assumed based on these assumptions.
- The analytical suite for groundwater is not as extensive in groundwater as it is for other water sources (Mount Barker, River Murray and RWD waters).
- Sorption and co-precipitation which results in the removal of cobalt, copper, nickel and zinc have not been modelled as input parameters to control these reactions have not been measured. However, the sorption and co-precipitation (onto aluminium, iron and manganese oxyhydroxides) potential of these metals is high. As demonstrated by the physical studies discussed within Earth Systems (2012).



6 References

Australian Standard (2009) Piling, Design and Installation AS2159

Earth Systems (2012) Chemical Assessment of Pit Water Treatment and Preliminary Treatment and Strategy. Hillgrove Resources Ltd.

JBS&G (2017) 2016 to 2017 Groundwater Compliance Summary Report, Kanmantoo Copper Project. Hillgrove Resources Ltd.



Appendix A PHREEQC Source Water Speciation Inputs

SELECTED_OUTPUT 1

-file Kanmantoo Groundwater.sel
 -totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg Na K
 Alkalinity Cl S(6)

SOLUTION_MASTER_SPECIES

Co Co+3 -1.0 Co 58.9332
 Co(2) Co+2 0.0 Co
 Co(3) Co+3 -1.0 Co
 END

PHASES

CoO
 $\text{CoO} + 2\text{H}^+ = \text{Co}^{+2} + \text{H}_2\text{O}$
 log_k 13.5864
 delta_h -106.295 kJ
 Co(OH)2
 $\text{Co(OH)}_2 + 2\text{H}^+ = \text{Co}^{+2} + 2\text{H}_2\text{O}$
 log_k 13.094
 delta_h -0 kJ
 Co(OH)3
 $\text{Co(OH)}_3 + 3\text{H}^+ = \text{Co}^{+3} + 3\text{H}_2\text{O}$
 log_k -2.309
 delta_h -92.43 kJ
 Co3O4
 $\text{Co}_3\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Co}^{+3} + 4\text{H}_2\text{O}$
 log_k -10.4956
 delta_h -107.5 kJ
 CoFe2O4
 $\text{CoFe}_2\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Fe}^{+3} + 4\text{H}_2\text{O}$
 log_k -3.5281
 delta_h -158.82 kJ
 CoCl2
 $\text{CoCl}_2 = \text{Co}^{+2} + 2\text{Cl}^-$
 log_k 8.2672
 delta_h -79.815 kJ
 CoCl2:6H2O
 $\text{CoCl}_2 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + 2\text{Cl}^- + 6\text{H}_2\text{O}$
 log_k 2.5365
 delta_h 8.0598 kJ
 (Co(NH3)6)Cl3
 $(\text{Co(NH}_3)_6)\text{Cl}_3 + 6\text{H}^+ = \text{Co}^{+3} + 6\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 20.0317
 delta_h -33.1 kJ
 (Co(NH3)5OH2)Cl3
 $(\text{Co(NH}_3)_5\text{OH}_2)\text{Cl}_3 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^- + \text{H}_2\text{O}$
 log_k 11.7351
 delta_h -25.37 kJ
 (Co(NH3)5Cl)Cl2
 $(\text{Co(NH}_3)_5\text{Cl})\text{Cl}_2 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 4.5102
 delta_h -10.74 kJ
 CoCO3
 $\text{CoCO}_3 = \text{Co}^{+2} + \text{CO}_3^{2-}$
 log_k -9.98
 delta_h -12.7612 kJ
 CoSO4
 $\text{CoSO}_4 = \text{Co}^{+2} + \text{SO}_4^{2-}$
 log_k 2.8024
 delta_h -79.277 kJ
 CoSO4:6H2O
 $\text{CoSO}_4 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + \text{SO}_4^{2-} + 6\text{H}_2\text{O}$
 log_k -2.4726
 delta_h 1.0801 kJ
 END

SOLUTION 1

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
-water	1 # kg

SELECTED_OUTPUT 1

-file Kanmantoo Groundwater worst case.sel
 -totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg Na K
 Alkalinity Cl S(6)

SOLUTION_MASTER_SPECIES

Co Co+3 -1.0 Co 58.9332
 Co(2) Co+2 0.0 Co
 Co(3) Co+3 -1.0 Co
 END

PHASES

CoO
 $\text{CoO} + 2\text{H}^+ = \text{Co}^{+2} + \text{H}_2\text{O}$
 log_k 13.5864
 delta_h -106.295 kJ
 Co(OH)2
 $\text{Co(OH)}_2 + 2\text{H}^+ = \text{Co}^{+2} + 2\text{H}_2\text{O}$
 log_k 13.094
 delta_h -0 kJ
 Co(OH)3
 $\text{Co(OH)}_3 + 3\text{H}^+ = \text{Co}^{+3} + 3\text{H}_2\text{O}$
 log_k -2.309
 delta_h -92.43 kJ
 Co3O4
 $\text{Co}_3\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Co}^{+3} + 4\text{H}_2\text{O}$
 log_k -10.4956
 delta_h -107.5 kJ
 CoFe2O4
 $\text{CoFe}_2\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Fe}^{+3} + 4\text{H}_2\text{O}$
 log_k -3.5281
 delta_h -158.82 kJ
 CoCl2
 $\text{CoCl}_2 = \text{Co}^{+2} + 2\text{Cl}^-$
 log_k 8.2672
 delta_h -79.815 kJ
 CoCl2:6H2O
 $\text{CoCl}_2 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + 2\text{Cl}^- + 6\text{H}_2\text{O}$
 log_k 2.5365
 delta_h 8.0598 kJ
 (Co(NH3)6)Cl3
 $(\text{Co(NH}_3)_6)\text{Cl}_3 + 6\text{H}^+ = \text{Co}^{+3} + 6\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 20.0317
 delta_h -33.1 kJ
 (Co(NH3)5OH2)Cl3
 $(\text{Co(NH}_3)_5\text{OH}_2)\text{Cl}_3 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^- + \text{H}_2\text{O}$
 log_k 11.7351
 delta_h -25.37 kJ
 (Co(NH3)5Cl)Cl2
 $(\text{Co(NH}_3)_5\text{Cl})\text{Cl}_2 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 4.5102
 delta_h -10.74 kJ
 CoCO3
 $\text{CoCO}_3 = \text{Co}^{+2} + \text{CO}_3^{2-}$
 log_k -9.98
 delta_h -12.7612 kJ
 CoSO4
 $\text{CoSO}_4 = \text{Co}^{+2} + \text{SO}_4^{2-}$
 log_k 2.8024
 delta_h -79.277 kJ
 CoSO4:6H2O
 $\text{CoSO}_4 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + \text{SO}_4^{2-} + 6\text{H}_2\text{O}$
 log_k -2.4726
 delta_h 1.0801 kJ
 END

SOLUTION 1 #Groundwater worst case maximum values

temp	21
pH	5.05
pe	1
redox	pe
units	mg/l
density	1
Al	5.21
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.04
Co	24.2
Cr	0
Cu	9.29
Fe	937
Pb	0.01
Mn	171
Mo	0
V	0
Zn	1.78
Se	0.08
Ni	5.57
N	60
P	23.6
Ca	590
Mg	1340
Na	5880
K	216
Cl	9420
S(6)	9110
-water	1 # kg

SELECTED_OUTPUT 1

-file Kanmantoo Source 1 Mt Barker.sel
 -totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg Na K
 Alkalinity Cl S(6)

SOLUTION_MASTER_SPECIES

Co Co+3 -1.0 Co 58.9332
 Co(2) Co+2 0.0 Co
 Co(3) Co+3 -1.0 Co
 END

PHASES

CoO
 $\text{CoO} + 2\text{H}^+ = \text{Co}^{+2} + \text{H}_2\text{O}$
 log_k 13.5864
 delta_h -106.295 kJ

Co(OH)2
 $\text{Co(OH)}_2 + 2\text{H}^+ = \text{Co}^{+2} + 2\text{H}_2\text{O}$
 log_k 13.094
 delta_h -0 kJ

Co(OH)3
 $\text{Co(OH)}_3 + 3\text{H}^+ = \text{Co}^{+3} + 3\text{H}_2\text{O}$
 log_k -2.309
 delta_h -92.43 kJ

Co3O4
 $\text{Co}_3\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Co}^{+3} + 4\text{H}_2\text{O}$
 log_k -10.4956
 delta_h -107.5 kJ

CoFe2O4
 $\text{CoFe}_2\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Fe}^{+3} + 4\text{H}_2\text{O}$
 log_k -3.5281
 delta_h -158.82 kJ

CoCl2
 $\text{CoCl}_2 = \text{Co}^{+2} + 2\text{Cl}^-$
 log_k 8.2672
 delta_h -79.815 kJ

CoCl2:6H2O
 $\text{CoCl}_2 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + 2\text{Cl}^- + 6\text{H}_2\text{O}$
 log_k 2.5365
 delta_h 8.0598 kJ

(Co(NH3)6)Cl3
 $(\text{Co(NH}_3)_6)\text{Cl}_3 + 6\text{H}^+ = \text{Co}^{+3} + 6\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 20.0317
 delta_h -33.1 kJ

(Co(NH3)5OH2)Cl3
 $(\text{Co(NH}_3)_5\text{OH}_2)\text{Cl}_3 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^- + \text{H}_2\text{O}$
 log_k 11.7351
 delta_h -25.37 kJ

(Co(NH3)5Cl)Cl2
 $(\text{Co(NH}_3)_5\text{Cl})\text{Cl}_2 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 4.5102
 delta_h -10.74 kJ

CoCO3
 $\text{CoCO}_3 = \text{Co}^{+2} + \text{CO}_3^{2-}$
 log_k -9.98
 delta_h -12.7612 kJ

CoSO4
 $\text{CoSO}_4 = \text{Co}^{+2} + \text{SO}_4^{2-}$
 log_k 2.8024
 delta_h -79.277 kJ

CoSO4:6H2O
 $\text{CoSO}_4 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + \text{SO}_4^{2-} + 6\text{H}_2\text{O}$
 log_k -2.4726
 delta_h 1.0801 kJ

END

SOLUTION 1 #Mean Mt Barker water quality

temp	20
pH	6.18
pe	4
redox	pe
units	mg/l
density	1
Al	0.04
Alkalinity	50
As	0.002
Ba	0.012
Be	0
B	0.088
Cd	0
Co	0.039
Cr	0.007
Cu	0.022
Fe	0.493
Pb	0.003
Mn	0.046
Mo	0.009
Zn	0.023
Se	0.002
Ni	0.011
N	24.3
P	0.52
Ca	32
Mg	17
Na	132
K	25
Cl	231
S(6)	190
-water	1 # kg

SELECTED_OUTPUT 1

-file Kanmantoo Source 2 River Murray.sel
 -totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg Na K
 Alkalinity Cl S(6)

SOLUTION_MASTER_SPECIES

Co Co+3 -1.0 Co 58.9332
 Co(2) Co+2 0.0 Co
 Co(3) Co+3 -1.0 Co
 END

PHASES

CoO
 $\text{CoO} + 2\text{H}^+ = \text{Co}^{+2} + \text{H}_2\text{O}$
 log_k 13.5864
 delta_h -106.295 kJ

Co(OH)2
 $\text{Co(OH)}_2 + 2\text{H}^+ = \text{Co}^{+2} + 2\text{H}_2\text{O}$
 log_k 13.094
 delta_h -0 kJ

Co(OH)3
 $\text{Co(OH)}_3 + 3\text{H}^+ = \text{Co}^{+3} + 3\text{H}_2\text{O}$
 log_k -2.309
 delta_h -92.43 kJ

Co3O4
 $\text{Co}_3\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Co}^{+3} + 4\text{H}_2\text{O}$
 log_k -10.4956
 delta_h -107.5 kJ

CoFe2O4
 $\text{CoFe}_2\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Fe}^{+3} + 4\text{H}_2\text{O}$
 log_k -3.5281
 delta_h -158.82 kJ

CoCl2
 $\text{CoCl}_2 = \text{Co}^{+2} + 2\text{Cl}^-$
 log_k 8.2672
 delta_h -79.815 kJ

CoCl2:6H2O
 $\text{CoCl}_2 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + 2\text{Cl}^- + 6\text{H}_2\text{O}$
 log_k 2.5365
 delta_h 8.0598 kJ

(Co(NH3)6)Cl3
 $(\text{Co(NH}_3)_6)\text{Cl}_3 + 6\text{H}^+ = \text{Co}^{+3} + 6\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 20.0317
 delta_h -33.1 kJ

(Co(NH3)5OH2)Cl3
 $(\text{Co(NH}_3)_5\text{OH}_2)\text{Cl}_3 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^- + \text{H}_2\text{O}$
 log_k 11.7351
 delta_h -25.37 kJ

(Co(NH3)5Cl)Cl2
 $(\text{Co(NH}_3)_5\text{Cl})\text{Cl}_2 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 4.5102
 delta_h -10.74 kJ

CoCO3
 $\text{CoCO}_3 = \text{Co}^{+2} + \text{CO}_3^{2-}$
 log_k -9.98
 delta_h -12.7612 kJ

CoSO4
 $\text{CoSO}_4 = \text{Co}^{+2} + \text{SO}_4^{2-}$
 log_k 2.8024
 delta_h -79.277 kJ

CoSO4:6H2O
 $\text{CoSO}_4 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + \text{SO}_4^{2-} + 6\text{H}_2\text{O}$
 log_k -2.4726
 delta_h 1.0801 kJ

END

SOLUTION 1 #Mean River Murray water quality

temp	20
pH	7.5
pe	4
redox	pe
units	mg/l
density	1
Al	1.48
Alkalinity	61
As	0.0013
Ba	0.0478
Be	0
B	0.05
Cd	0.0007
Co	0.0006
Cr	0.0021
Cu	0.006
Fe	1.37
Pb	0.0012
Mn	0.06
Mo	0.0003
Zn	0.0164
Se	0.0002
Ni	0.0028
N	1.05
P	0.11
Ca	13
Mg	9
Na	49
K	4
Cl	79
S(6)	17
-water	1 # kg

SELECTED_OUTPUT 1

-file Kanmantoo Source 3 RWD.sel
 -totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg Na K
 Alkalinity Cl S(6)

SOLUTION_MASTER_SPECIES

Co	Co+3	-1.0	Co	58.9332
Co(2)	Co+2	0.0	Co	
Co(3)	Co+3	-1.0	Co	

END

PHASES

CoO
 $\text{CoO} + 2\text{H}^+ = \text{Co}^{+2} + \text{H}_2\text{O}$
 log_k 13.5864
 delta_h -106.295 kJ

Co(OH)2
 $\text{Co(OH)}_2 + 2\text{H}^+ = \text{Co}^{+2} + 2\text{H}_2\text{O}$
 log_k 13.094
 delta_h -0 kJ

Co(OH)3
 $\text{Co(OH)}_3 + 3\text{H}^+ = \text{Co}^{+3} + 3\text{H}_2\text{O}$
 log_k -2.309
 delta_h -92.43 kJ

Co3O4
 $\text{Co}_3\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Co}^{+3} + 4\text{H}_2\text{O}$
 log_k -10.4956
 delta_h -107.5 kJ

CoFe2O4
 $\text{CoFe}_2\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Fe}^{+3} + 4\text{H}_2\text{O}$
 log_k -3.5281
 delta_h -158.82 kJ

CoCl2
 $\text{CoCl}_2 = \text{Co}^{+2} + 2\text{Cl}^-$
 log_k 8.2672
 delta_h -79.815 kJ

CoCl2:6H2O
 $\text{CoCl}_2 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + 2\text{Cl}^- + 6\text{H}_2\text{O}$
 log_k 2.5365
 delta_h 8.0598 kJ

(Co(NH3)6)Cl3
 $(\text{Co(NH}_3)_6)\text{Cl}_3 + 6\text{H}^+ = \text{Co}^{+3} + 6\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 20.0317
 delta_h -33.1 kJ

(Co(NH3)5OH2)Cl3
 $(\text{Co(NH}_3)_5\text{OH}_2)\text{Cl}_3 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^- + \text{H}_2\text{O}$
 log_k 11.7351
 delta_h -25.37 kJ

(Co(NH3)5Cl)Cl2
 $(\text{Co(NH}_3)_5\text{Cl})\text{Cl}_2 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 4.5102
 delta_h -10.74 kJ

CoCO3
 $\text{CoCO}_3 = \text{Co}^{+2} + \text{CO}_3^{-2}$
 log_k -9.98
 delta_h -12.7612 kJ

CoSO4
 $\text{CoSO}_4 = \text{Co}^{+2} + \text{SO}_4^{-2}$
 log_k 2.8024
 delta_h -79.277 kJ

CoSO4:6H2O
 $\text{CoSO}_4 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + \text{SO}_4^{-2} + 6\text{H}_2\text{O}$
 log_k -2.4726
 delta_h 1.0801 kJ

END

SOLUTION 1 #Mean RWD water quality

temp	20
pH	4.05
pe	4
redox	pe
units	mg/l
density	1
Al	1.42
Alkalinity	0
As	0.002
Ba	0.04
Be	0.002
B	0.1
Cd	0.0008
Co	0.72
Cr	0.0033
Cu	6.25
Fe	24.67
Pb	0.02
Mn	5.22
Mo	0.11
Zn	0.49
Se	0.01
Ni	0.49
N	10.07
P	0.29
Ca	522
Mg	88
Na	343
K	245
Cl	490
S(6)	2222
-water	1 # kg



Appendix B PHREEQC Source Water Speciation Outputs

Input file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\Kanmantoo
Groundwater.pqi
Output file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\Kanmantoo
Groundwater.pgo
Database file: C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
\minteq.v4.dat

Reading data base.

SOLUTION_MASTER_SPECIES
SOLUTION_SPECIES
SOLUTION_SPECIES
PHASES
PHASES
SURFACE_MASTER_SPECIES
SURFACE_SPECIES
END

Reading input data for simulation 1.

DATABASE C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
\minteq.v4.dat
SELECTED_OUTPUT 1
file Kanmantoo Groundwater.sel
totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg
Na K Alkalinity Cl S(6)
SOLUTION_MASTER_SPECIES
Co Co+3 -1.0 Co 58.9332
Co(2) Co+2 0.0 Co
Co(3) Co+3 -1.0 Co
END

End of simulation.

Reading input data for simulation 2.

PHASES
CoO
CoO + 2H+ = Co+2 + H2O
log_k 13.5864
delta_h -106.295 kJ
Co(OH)2
Co(OH)2 + 2H+ = Co+2 + 2H2O
log_k 13.094
delta_h -0 kJ
Co(OH)3
Co(OH)3 + 3H+ = Co+3 + 3H2O
log_k -2.309
delta_h -92.43 kJ
Co3O4
Co3O4 + 8H+ = Co+2 + 2Co+3 + 4H2O
log_k -10.4956
delta_h -107.5 kJ
CoFe2O4
CoFe2O4 + 8H+ = Co+2 + 2Fe+3 + 4H2O
log_k -3.5281
delta_h -158.82 kJ
CoCl2
CoCl2 = Co+2 + 2Cl-
log_k 8.2672
delta_h -79.815 kJ
CoCl2:6H2O


```

      CoCl2:6H2O = Co+2 + 2Cl- + 6H2O
      log_k 2.5365
      delta_h      8.0598      kJ
(Co(NH3)6)Cl3
      (Co(NH3)6)Cl3 + 6H+ = Co+3 + 6NH4+ + 3Cl-
      log_k 20.0317
      delta_h      -33.1      kJ
(Co(NH3)5OH2)Cl3
      (Co(NH3)5OH2)Cl3 + 5H+ = Co+3 + 5NH4+ + 3Cl- + H2O
      log_k 11.7351
      delta_h      -25.37      kJ
(Co(NH3)5Cl)Cl2
      (Co(NH3)5Cl)Cl2 + 5H+ = Co+3 + 5NH4+ + 3Cl-
      log_k 4.5102
      delta_h      -10.74      kJ
CoCO3
      CoCO3 = Co+2 + CO3-2
      log_k -9.98
      delta_h      -12.7612      kJ
CoSO4
      CoSO4 = Co+2 + SO4-2
      log_k 2.8024
      delta_h      -79.277      kJ
CoSO4:6H2O
      CoSO4:6H2O = Co+2 + SO4-2 + 6H2O
      log_k -2.4726
      delta_h      1.0801      kJ

```

END

End of simulation.

Reading input data for simulation 3.

SOLUTION 1

```

temp      21
pH         6.79
pe         1
redox      pe
units      mg/l
density    1
Al         0.37
Alkalinity 0
As         0
Ba         0
Be         0
B          0
Cd         0.003
Co         2.34
Cr         0
Cu         0.31
Fe         100.34
Pb         0.003
Mn         12.2
Mo         0
V          0
Zn         0.17
Se         0.03
Ni         0.45
N          7
P          0.68
Ca         130
Mg         246
Na         1094
K          62
Cl         1533

```

S(6) 1485
water 1 # kg

Beginning of initial solution calculations.

Initial solution 1.

-----Solution composition-----

Elements	Molality	Moles
Al	1.378e-05	1.378e-05
Ca	3.259e-03	3.259e-03
Cd	2.681e-08	2.681e-08
Cl	4.344e-02	4.344e-02
Co	3.989e-05	3.989e-05
Cu	4.901e-06	4.901e-06
Fe	1.805e-03	1.805e-03
K	1.593e-03	1.593e-03
Mg	1.017e-02	1.017e-02
Mn	2.231e-04	2.231e-04
N	5.021e-04	5.021e-04
Na	4.781e-02	4.781e-02
Ni	7.703e-06	7.703e-06
P	2.206e-05	2.206e-05
Pb	1.455e-08	1.455e-08
S(6)	1.553e-02	1.553e-02
Se	3.817e-07	3.817e-07
Zn	2.612e-06	2.612e-06

-----Description of solution-----

pH	=	6.790
pe	=	1.000
Activity of water	=	0.998
Ionic strength (mol/kgw)	=	9.259e-02
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	6.274e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	21.00
Electrical balance (eq)	=	6.374e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	4.58
Iterations	=	14
Total H	=	1.110158e+02
Total O	=	5.556909e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.061e-07	1.622e-07	-6.686	-6.790	-0.104	0.00
OH-	5.935e-08	4.562e-08	-7.227	-7.341	-0.114	(0)
H2O	5.551e+01	9.980e-01	1.744	-0.001	0.000	18.05
Al	1.378e-05					
Al(OH)4-	8.973e-06	7.024e-06	-5.047	-5.153	-0.106	(0)
Al(OH)2+	2.373e-06	1.884e-06	-5.625	-5.725	-0.100	(0)
Al(OH)3	2.329e-06	2.329e-06	-5.633	-5.633	0.000	(0)
AlOH+2	7.409e-08	2.945e-08	-7.130	-7.531	-0.401	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
Al+3	5.344e-09	6.178e-10	-8.272	-9.209	-0.937	(0)
Al(SO4)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ca	3.259e-03					
Ca+2	2.406e-03	9.221e-04	-2.619	-3.035	-0.416	(0)
CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)

	CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
	CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
	CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
	CaOH+	1.001e-09	8.020e-10	-8.999	-9.096	-0.096	(0)
	Ca (NH3) 2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
	CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
Cd	2.681e-08						
	CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
	Cd+2	7.874e-09	3.018e-09	-8.104	-8.520	-0.416	(0)
	CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
	CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
	Cd (SO4) 2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
	CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
	CdOHC1	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
	CdOH+	1.568e-12	1.100e-12	-11.805	-11.959	-0.154	(0)
	Cd (OH) 2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
	Cd2OH+3	4.264e-19	1.748e-20	-18.370	-19.758	-1.387	(0)
	Cd (SeO3) 2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
	Cd (OH) 3-	3.135e-21	2.198e-21	-20.504	-20.658	-0.154	(0)
	CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
	Cd (OH) 4-2	9.222e-29	2.230e-29	-28.035	-28.652	-0.617	(0)
	CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
	Cd (NO3) 2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cl	4.344e-02						
	Cl-	4.343e-02	3.417e-02	-1.362	-1.466	-0.104	(0)
	CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
	MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
	CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
	CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
	NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
	MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
	ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
	CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
	CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
	ZnOHC1	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
	PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
	ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
	CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
	MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
	PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
	ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
	CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
	NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
	CdOHC1	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
	CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
	PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
	ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
	PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
	CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
	FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
	FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
	CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
	FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
	CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
	CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
	Co (NH3) 5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
	Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co (2)	3.989e-05						
	Co+2	3.225e-05	7.797e-06	-4.491	-5.108	-0.617	(0)
	CoSO4	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
	CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
	CoHPO4	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
	CoOH+	1.375e-08	9.639e-09	-7.862	-8.016	-0.154	(0)
	Co (NH3) +2	7.042e-09	7.703e-09	-8.152	-8.769	-0.617	(0)
	Co (OH) 2	4.744e-11	4.744e-11	-10.324	-10.324	0.000	(0)
	Co (NH3) 2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
	Co2OH+3	9.190e-14	3.766e-15	-13.037	-14.424	-1.387	(0)
	Co (OH) 3-	8.364e-17	5.865e-17	-16.078	-16.232	-0.154	(0)

CoOOH-	5.039e-18	3.533e-18	-17.298	-17.452	-0.154	(0)
Co(NH3) 3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Co4(OH) 4+4	5.041e-22	1.722e-24	-21.297	-23.764	-2.466	(0)
Co(NH3) 4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
Co(OH) 4-2	2.382e-24	5.759e-25	-23.623	-24.240	-0.617	(0)
Co(NH3) 5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
Co(NO3) 2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Co(3)	4.042e-31					
CoOH+2	4.042e-31	9.773e-32	-30.393	-31.010	-0.617	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co+3	2.685e-36	3.104e-37	-35.571	-36.508	-0.937	(0)
Co(NH3) 5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3) 6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3) 6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3) 6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
Cu(1)	4.900e-06					
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
Cu+	1.553e-08	1.089e-08	-7.809	-7.963	-0.154	(0)
Cu(2)	8.967e-10					
Cu+2	6.026e-10	2.310e-10	-9.220	-9.636	-0.416	(0)
CuSO4	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
CuOH+	4.792e-11	3.719e-11	-10.319	-10.430	-0.110	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
Cu(OH) 2	5.595e-13	5.595e-13	-12.252	-12.252	0.000	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
Cu2(OH) 2+2	1.398e-16	3.379e-17	-15.855	-16.471	-0.617	(0)
Cu(OH) 3-	1.014e-16	7.111e-17	-15.994	-16.148	-0.154	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
Cu(OH) 4-2	1.434e-22	3.468e-23	-21.843	-22.460	-0.617	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
Cu(NO2) 2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
Cu(NO3) 2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Fe(2)	1.805e-03					
Fe+2	1.454e-03	3.515e-04	-2.837	-3.454	-0.617	(0)
FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
FeHPO4	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
FeOH+	8.090e-07	6.384e-07	-6.092	-6.195	-0.103	(0)
Fe(OH) 2	2.214e-11	2.214e-11	-10.655	-10.655	0.000	(0)
Fe(OH) 3-	5.296e-13	4.179e-13	-12.276	-12.379	-0.103	(0)
Fe(3)	3.233e-07					
Fe(OH) 2+	3.138e-07	2.491e-07	-6.503	-6.604	-0.100	(0)
Fe(OH) 3	9.382e-09	9.382e-09	-8.028	-8.028	0.000	(0)
Fe(OH) 4-	1.205e-10	9.565e-11	-9.919	-10.019	-0.100	(0)
FeOH+2	2.119e-11	8.217e-12	-10.674	-11.085	-0.411	(0)
FeHPO4+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeSO4+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe+3	2.235e-15	2.584e-16	-14.651	-15.588	-0.937	(0)
Fe(SO4) 2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
Fe2(OH) 2+4	7.548e-19	2.579e-21	-18.122	-20.589	-2.466	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
Fe3(OH) 4+5	6.361e-23	8.906e-27	-22.197	-26.050	-3.854	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
H(0)	3.796e-19					
H2	1.898e-19	1.939e-19	-18.722	-18.712	0.009	(0)
K	1.593e-03					

K+	1.549e-03	1.219e-03	-2.810	-2.914	-0.104	(0)
KSO4-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
KHPO4-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
Mg	1.017e-02					
Mg+2	7.920e-03	3.036e-03	-2.101	-2.518	-0.416	(0)
MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
MgHPO4	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
MgOH+	6.402e-08	5.162e-08	-7.194	-7.287	-0.094	(0)
MgPO4-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
Mn (2)	2.231e-04					
Mn+2	1.882e-04	4.549e-05	-3.725	-4.342	-0.617	(0)
MnSO4	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
MnOH+	6.606e-09	5.213e-09	-8.180	-8.283	-0.103	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Mn (OH) 3-	2.129e-19	1.680e-19	-18.672	-18.775	-0.103	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
Mn (OH) 4-2	8.666e-26	3.361e-26	-25.062	-25.474	-0.411	(0)
MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Mn (3)	9.732e-29					
Mn+3	9.732e-29	1.125e-29	-28.012	-28.949	-0.937	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-65.730	-66.142	-0.411	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-74.661	-74.779	-0.119	(0)
N (-3)	5.021e-04					
NH4+	4.805e-04	3.617e-04	-3.318	-3.442	-0.123	(0)
NH4SO4-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
NH3	9.560e-07	9.560e-07	-6.020	-6.020	0.000	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
Co (NH3) +2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
Ni (NH3) 2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Co (NH3) 2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Ca (NH3) 2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
Co (NH3) 3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Co (NH3) 4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
Co (NH3) 5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
Co (NH3) 5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
N (3)	1.148e-35					
NO2-	1.148e-35	8.735e-36	-34.940	-35.059	-0.119	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
N (5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-48.382	-48.486	-0.104	(0)
CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)

	Cu (NO3) 2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Na	4.781e-02						
	Na+	4.677e-02	3.680e-02	-1.330	-1.434	-0.104	(0)
	NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
	NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
Ni	7.703e-06						
	Ni+2	5.664e-06	2.171e-06	-5.247	-5.663	-0.416	(0)
	NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
	NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
	NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
	NiOH+	1.818e-09	1.275e-09	-8.741	-8.895	-0.154	(0)
	Ni (SO4) 2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
	NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
	Ni (OH) 2	8.335e-12	8.335e-12	-11.079	-11.079	0.000	(0)
	Ni (NH3) 2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
	Ni (OH) 3-	7.365e-16	5.164e-16	-15.133	-15.287	-0.154	(0)
	NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
	NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
O (0)	0.000e+00						
	O2	0.000e+00	0.000e+00	-55.993	-55.984	0.009	(0)
P	2.206e-05						
	H2PO4-	6.634e-06	5.268e-06	-5.178	-5.278	-0.100	(0)
	HPO4-2	5.222e-06	2.025e-06	-5.282	-5.694	-0.411	(0)
	MgHPO4	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
	FeHPO4	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
	FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
	NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
	MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
	CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
	CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
	KHPO4-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
	CoHPO4	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
	CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
	MgPO4-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
	H3PO4	1.150e-10	1.150e-10	-9.939	-9.939	0.000	(0)
	PO4-3	4.196e-11	4.850e-12	-10.377	-11.314	-0.937	(0)
	FeHPO4+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
	FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
Pb	1.455e-08						
	Pb+2	5.480e-09	2.100e-09	-8.261	-8.678	-0.416	(0)
	PbSO4	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
	PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
	PbOH+	4.662e-10	3.269e-10	-9.331	-9.486	-0.154	(0)
	Pb (SO4) 2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
	PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
	PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
	Pb (OH) 2	6.405e-13	6.405e-13	-12.193	-12.193	0.000	(0)
	PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
	Pb2OH+3	2.655e-16	1.088e-17	-15.576	-16.963	-1.387	(0)
	Pb (OH) 3-	5.660e-17	3.969e-17	-16.247	-16.401	-0.154	(0)
	Pb (OH) 4-2	2.491e-21	6.022e-22	-20.604	-21.220	-0.617	(0)
	Pb3 (OH) 4+2	3.779e-23	9.137e-24	-22.423	-23.039	-0.617	(0)
	Pb4 (OH) 4+4	5.175e-26	1.768e-28	-25.286	-27.753	-2.466	(0)
	PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
	Pb (NO3) 2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
S (6)	1.553e-02						
	SO4-2	1.094e-02	4.194e-03	-1.961	-2.377	-0.416	(0)
	MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
	NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
	CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
	FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
	KSO4-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
	MnSO4	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
	NH4SO4-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
	CoSO4	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
	NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
	ZnSO4	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
	Zn (SO4) 2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)

HSO4-	7.527e-08	5.892e-08	-7.123	-7.230	-0.106	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
PbSO4	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
Al (SO4) 2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ni (SO4) 2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
Cd (SO4) 2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
Pb (SO4) 2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
CuSO4	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
FeSO4+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe (SO4) 2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Se (-2)	4.685e-09					
HSe-	4.677e-09	3.279e-09	-8.330	-8.484	-0.154	(0)
H2Se	4.054e-12	4.054e-12	-11.392	-11.392	0.000	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Se-2	6.423e-17	1.553e-17	-16.192	-16.809	-0.617	(0)
Se (4)	3.770e-07					
HSeO3-	3.526e-07	2.472e-07	-6.453	-6.607	-0.154	(0)
SeO3-2	2.442e-08	5.904e-09	-7.612	-8.229	-0.617	(0)
H2SeO3	1.653e-11	1.653e-11	-10.782	-10.782	0.000	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
Cd (SeO3) 2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Se (6)	2.478e-21					
SeO4-2	2.463e-21	9.439e-22	-20.609	-21.025	-0.416	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
HSeO4-	9.645e-27	6.763e-27	-26.016	-26.170	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
Zn	2.612e-06					
Zn+2	1.813e-06	6.948e-07	-5.742	-6.158	-0.416	(0)
ZnSO4	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn (SO4) 2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
ZnOH+	4.520e-09	3.170e-09	-8.345	-8.499	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
Zn (OH) 2	4.227e-11	4.227e-11	-10.374	-10.374	0.000	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
Zn (OH) 3-	1.872e-14	1.313e-14	-13.728	-13.882	-0.154	(0)
Zn (OH) 4-2	1.339e-19	3.238e-20	-18.873	-19.490	-0.617	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2-124.48	-118.20	6.27	(Co (NH3) 5Cl) (NO3) 2	
(Co (NH3) 5Cl) Cl2 -28.70	-24.17	4.54	(Co (NH3) 5Cl) Cl2	
(Co (NH3) 5OH2) Cl3 -35.96	-24.17	11.80	(Co (NH3) 5OH2) Cl3	
(Co (NH3) 6) (NO3) 3-179.81	-161.88	17.93	(Co (NH3) 6) (NO3) 3	
(Co (NH3) 6) Cl3 -40.93	-20.82	20.11	(Co (NH3) 6) Cl3	
(NH4) 2SeO4 -28.36	-27.91	0.45	(NH4) 2SeO4	
Al (OH) 3 (am) 0.09	11.16	11.06	Al (OH) 3	
Al2O3 2.05	22.32	20.27	Al2O3	
Al4 (OH) 10SO4 5.98	28.68	22.70	Al4 (OH) 10SO4	
AlOHSO4 -1.57	-4.80	-3.23	AlOHSO4	
Alunite 6.34	5.44	-0.90	KAl3 (SO4) 2 (OH) 6	
Anglesite -3.24	-11.06	-7.82	PbSO4	
Anhydrite -1.07	-5.41	-4.34	CaSO4	
Antlerite -12.92	-4.13	8.79	Cu3 (OH) 4SO4	

Atacamite	-7.99	-0.37	7.61	Cu ₂ (OH) 3Cl
Bianchite	-6.78	-8.54	-1.76	ZnSO ₄ :6H ₂ O
Birnessite	-18.88	-0.79	18.09	MnO ₂
Bixbyite	-16.81	-17.16	-0.35	Mn ₂ O ₃
Boehmite	2.30	11.16	8.86	AlOOH
Brochantite	-15.89	-0.19	15.71	Cu ₄ (OH) 6SO ₄
Brucite	-6.06	11.06	17.12	Mg(OH) 2
Bunsenite	-4.77	7.92	12.68	NiO
Ca ₃ (PO ₄) 2 (beta)	-2.69	-31.73	-29.05	Ca ₃ (PO ₄) 2
Ca ₄ H(PO ₄) 3:3H ₂ O	-5.80	-52.88	-47.08	Ca ₄ H(PO ₄) 3:3H ₂ O
CaHPO ₄	-1.79	-21.14	-19.35	CaHPO ₄
CaHPO ₄ :2H ₂ O	-2.09	-21.14	-19.05	CaHPO ₄ :2H ₂ O
CaSeO ₃ :2H ₂ O	-5.71	-2.85	2.86	CaSeO ₃ :2H ₂ O
CaSeO ₄ :2H ₂ O	-21.06	-24.06	-3.00	CaSeO ₄ :2H ₂ O
Cd(OH) 2	-8.81	5.06	13.87	Cd(OH) 2
Cd(OH) 2 (am)	-8.88	5.06	13.94	Cd(OH) 2
Cd ₃ (OH) 2 (SO ₄) 2	-23.45	-16.74	6.71	Cd ₃ (OH) 2 (SO ₄) 2
Cd ₃ (OH) 4SO ₄	-23.34	-0.78	22.56	Cd ₃ (OH) 4SO ₄
Cd ₃ (PO ₄) 2	-15.59	-48.19	-32.60	Cd ₃ (PO ₄) 2
Cd ₄ (OH) 6SO ₄	-24.12	4.28	28.40	Cd ₄ (OH) 6SO ₄
CdCl ₂	-10.84	-11.45	-0.61	CdCl ₂
CdCl ₂ :1H ₂ O	-9.78	-11.45	-1.68	CdCl ₂ :1H ₂ O
CdCl ₂ :2.5H ₂ O	-9.52	-11.46	-1.93	CdCl ₂ :2.5H ₂ O
Cdmetal (alpha)	-24.21	-10.52	13.69	Cd
Cdmetal (gamma)	-24.32	-10.52	13.80	Cd
CdOHCl	-6.81	-3.20	3.61	CdOHCl
CdSe	10.17	-10.21	-20.38	CdSe
CdSeO ₄ :2H ₂ O	-27.70	-29.55	-1.85	CdSeO ₄ :2H ₂ O
CdSO ₄	-10.85	-10.90	-0.05	CdSO ₄
CdSO ₄ :1H ₂ O	-9.25	-10.90	-1.65	CdSO ₄ :1H ₂ O
CdSO ₄ :2.67H ₂ O	-9.07	-10.90	-1.83	CdSO ₄ :2.67H ₂ O
Chalcanthite	-9.36	-12.02	-2.65	CuSO ₄ :5H ₂ O
Clausthalite	17.01	-10.37	-27.39	PbSe
Co(OH) 2	-4.62	8.47	13.09	Co(OH) 2
Co(OH) 3	-14.05	-16.14	-2.09	Co(OH) 3
Co ₃ (PO ₄) 2	-3.27	-37.95	-34.69	Co ₃ (PO ₄) 2
Co ₃ O ₄	-13.57	-23.81	-10.24	Co ₃ O ₄
CoCl ₂	-16.50	-8.04	8.46	CoCl ₂
CoCl ₂ :6H ₂ O	-10.56	-8.05	2.52	CoCl ₂ :6H ₂ O
CoFe ₂ O ₄	21.18	18.03	-3.15	CoFe ₂ O ₄
CoHPO ₄	-4.15	-23.21	-19.06	CoHPO ₄
CoO	-5.37	8.47	13.84	CoO
CoSe	9.40	-6.80	-16.20	CoSe
CoSeO ₃	-6.24	-4.92	1.32	CoSeO ₃
CoSeO ₄ :6H ₂ O	-24.61	-26.14	-1.53	CoSeO ₄ :6H ₂ O
CoSO ₄	-10.48	-7.49	2.99	CoSO ₄
CoSO ₄ :6H ₂ O	-5.02	-7.49	-2.48	CoSO ₄ :6H ₂ O
Cotunnite	-6.77	-11.61	-4.84	PbCl ₂
Cu(OH) 2	-4.87	3.94	8.81	Cu(OH) 2
Cu ₂ (OH) 3NO ₃	-56.82	-47.39	9.42	Cu ₂ (OH) 3NO ₃
Cu ₂ Se (alpha)	28.69	-17.62	-46.31	Cu ₂ Se
Cu ₂ SO ₄	-16.40	-18.30	-1.90	Cu ₂ SO ₄
Cu ₃ (PO ₄) 2	-14.69	-51.54	-36.85	Cu ₃ (PO ₄) 2
Cu ₃ (PO ₄) 2:3H ₂ O	-16.42	-51.54	-35.12	Cu ₃ (PO ₄) 2:3H ₂ O
Cu ₃ Se ₂	35.35	-28.95	-64.30	Cu ₃ Se ₂
Cumetal	-0.04	-8.96	-8.93	Cu
CuOCuSO ₄	-18.70	-8.07	10.63	CuOCuSO ₄
Cupricferrite	7.02	13.50	6.49	CuFe ₂ O ₄
Cuprite	-1.24	-2.35	-1.11	Cu ₂ O
Cuprousferrite	12.49	3.61	-8.88	CuFeO ₂
CuSe	22.06	-11.33	-33.39	CuSe
CuSe ₂	22.68	-11.02	-33.70	CuSe ₂
CuSeO ₃ :2H ₂ O	-10.05	-9.46	0.60	CuSeO ₃ :2H ₂ O
CuSeO ₄ :5H ₂ O	-28.23	-30.67	-2.44	CuSeO ₄ :5H ₂ O
CuSO ₄	-15.13	-12.01	3.11	CuSO ₄
Diaspore	4.04	11.16	7.12	AlOOH
Epsomite	-2.75	-4.90	-2.15	MgSO ₄ :7H ₂ O
Fe(OH) 2	-3.44	10.12	13.56	Fe(OH) 2

Fe (OH) 2.7Cl1.3	5.34	2.30	-3.04	Fe (OH) 2.7Cl1.3
Fe2 (OH) 4SeO3	-5.39	-3.84	1.55	Fe2 (OH) 4SeO3
Fe2 (SeO3) 3:2H2O	-10.00	-30.63	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-35.15	-38.31	-3.16	Fe2 (SO4) 3
Fe3 (OH) 8	-0.54	19.68	20.22	Fe3 (OH) 8
Ferrihydrite	1.41	4.78	3.37	Fe (OH) 3
Ferroselite	13.87	-4.84	-18.71	FeSe2
FeSe	5.86	-5.15	-11.00	FeSe
Gibbsite	2.64	11.16	8.52	Al (OH) 3
Goethite	4.15	4.78	0.64	FeOOH
Goslarite	-6.50	-8.54	-2.05	ZnSO4:7H2O
Gypsum	-0.80	-5.41	-4.61	CaSO4:2H2O
H-Jarosite	-6.02	-17.57	-11.55	(H3O) Fe3 (SO4) 2 (OH) 6
H2Se (g)	-10.35	-15.27	-4.92	H2Se
Halite	-4.49	-2.90	1.59	NaCl
Hausmannite	-18.74	43.29	62.03	Mn3O4
Hematite	10.67	9.56	-1.11	Fe2O3
Hercynite	8.80	32.44	23.64	FeAl2O4
Hinsdalite	-6.76	-9.26	-2.50	PbAl3PO4SO4 (OH) 6
Hydroxylapatite	2.00	-42.33	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-7.75	-70.54	-62.79	Pb5 (PO4) 3OH
K-Alum	-11.65	-16.89	-5.24	KAl (SO4) 2:12H2O
K-Jarosite	0.79	-13.70	-14.49	KFe3 (SO4) 2 (OH) 6
K2SeO4	-26.12	-26.85	-0.73	K2SeO4
Langite	-18.07	-0.19	17.88	Cu4 (OH) 6SO4:H2O
Larnakite	-5.77	-6.15	-0.38	PbO:PbSO4
Laurionite	-3.98	-3.35	0.62	PbOHCl
Lepidocrocite	3.41	4.78	1.37	FeOOH
Lime	-22.62	10.54	33.16	CaO
Litharge	-7.95	4.90	12.85	PbO
Maghemite	3.18	9.56	6.39	Fe2O3
Magnesioferrite	3.10	20.62	17.52	Fe2MgO4
Magnetite	15.79	19.69	3.90	Fe3O4
Manganite	-8.31	17.03	25.34	MnOOH
Massicot	-8.15	4.90	13.05	PbO
Melanothallite	-18.98	-12.57	6.41	CuCl2
Melanterite	-3.58	-5.84	-2.26	FeSO4:7H2O
Mg (OH) 2 (active)	-7.73	11.06	18.79	Mg (OH) 2
Mg3 (PO4) 2	-6.90	-30.18	-23.28	Mg3 (PO4) 2
MgHPO4:3H2O	-2.45	-20.62	-18.18	MgHPO4:3H2O
MgSeO3:6H2O	-5.38	-2.34	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-22.35	-23.55	-1.20	MgSeO4:6H2O
Minium	-44.24	30.28	74.53	Pb3O4
Mirabilite	-3.95	-5.25	-1.30	Na2SO4:10H2O
Mn2 (SO4) 3	-59.71	-65.03	-5.32	Mn2 (SO4) 3
Mn3 (PO4) 2	-11.81	-35.65	-23.85	Mn3 (PO4) 2
MnCl2:4H2O	-10.02	-7.28	2.74	MnCl2:4H2O
MnHPO4	2.95	-22.45	-25.40	MnHPO4
MnSe	-9.77	-6.04	3.73	MnSe
MnSeO3	-5.29	-4.16	1.13	MnSeO3
MnSeO3:2H2O	-5.12	-4.16	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-23.32	-25.37	-2.05	MnSeO4:5H2O
MnSO4	-9.46	-6.72	2.74	MnSO4
Monteponite	-10.29	5.06	15.35	CdO
Morenosite	-5.87	-8.05	-2.17	NiSO4:7H2O
Na-Jarosite	-1.38	-12.22	-10.84	NaFe3 (SO4) 2 (OH) 6
Na2SeO3:5H2O	-12.99	-2.69	10.30	Na2SeO3:5H2O
Na2SeO4	-25.17	-23.89	1.28	Na2SeO4
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni (OH) 2	-5.11	7.91	13.02	Ni (OH) 2
Ni3 (PO4) 2	-8.32	-39.62	-31.30	Ni3 (PO4) 2
Ni4 (OH) 6SO4	-16.30	15.70	32.00	Ni4 (OH) 6SO4
NiSe	10.34	-7.36	-17.70	NiSe
NiSeO3:2H2O	-8.37	-5.48	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-25.17	-26.69	-1.52	NiSeO4:6H2O
Nsutite	-18.29	-0.79	17.50	MnO2
O2 (g)	-53.29	31.16	84.45	O2
Pb (OH) 2	-3.39	4.90	8.29	Pb (OH) 2

Pb2 (OH) 3Cl	-7.25	1.55	8.79	Pb2 (OH) 3Cl
Pb2O (OH) 2	-16.39	9.80	26.19	Pb2O (OH) 2
Pb2O3	-35.66	25.38	61.04	Pb2O3
Pb3 (PO4) 2	-5.13	-48.66	-43.53	Pb3 (PO4) 2
Pb3O2SO4	-12.13	-1.25	10.87	Pb3O2SO4
Pb4 (OH) 6SO4	-17.45	3.65	21.10	Pb4 (OH) 6SO4
Pb4O3SO4	-18.55	3.65	22.20	Pb4O3SO4
PbHPO4	-2.98	-26.78	-23.81	PbHPO4
Pbmetal	-14.92	-10.68	4.24	Pb
PbO:0.3H2O	-8.08	4.90	12.98	PbO:0.33H2O
PbSeO4	-22.83	-29.70	-6.88	PbSeO4
Periclase	-10.88	11.06	21.94	MgO
Plattnerite	-29.83	20.48	50.31	PbO2
Plumbgummite	7.80	-24.99	-32.79	PbAl3 (PO4) 2 (OH) 5:H2O
Portlandite	-12.57	10.54	23.11	Ca (OH) 2
Pyrochroite	-6.19	9.24	15.43	Mn (OH) 2
Pyrolusite	-17.21	24.82	42.03	MnO2
Pyromorphite	5.63	-78.80	-84.43	Pb5 (PO4) 3Cl
Retgersite	-6.00	-8.05	-2.05	NiSO4:6H2O
Semetal (am)	7.44	0.31	-7.14	Se
Semetal (hex)	8.05	0.31	-7.75	Se
SeO2	-13.52	-13.40	0.12	SeO2
SeO3	-56.00	-34.60	21.39	SeO3
Spinel	-4.39	33.38	37.77	MgAl2O4
Strengite	-0.53	-26.90	-26.38	FePO4:2H2O
Tenorite	-3.86	3.94	7.80	CuO
Thenardite	-5.59	-5.25	0.34	Na2SO4
Tsumebite	-8.15	-17.94	-9.79	Pb2CuPO4 (OH) 3:3H2O
Vivianite	3.00	-33.00	-36.00	Fe3 (PO4) 2:8H2O
Zincite	-4.13	7.42	11.55	ZnO
Zincosite	-12.66	-8.54	4.13	ZnSO4
Zn (NO3) 2:6H2O	-106.39	-103.14	3.26	Zn (NO3) 2:6H2O
Zn (OH) 2	-4.78	7.42	12.20	Zn (OH) 2
Zn (OH) 2 (am)	-5.25	7.42	12.67	Zn (OH) 2
Zn (OH) 2 (beta)	-4.53	7.42	11.95	Zn (OH) 2
Zn (OH) 2 (epsilon)	-4.31	7.42	11.73	Zn (OH) 2
Zn (OH) 2 (gamma)	-4.31	7.42	11.73	Zn (OH) 2
Zn2 (OH) 2SO4	-8.62	-1.12	7.50	Zn2 (OH) 2SO4
Zn2 (OH) 3Cl	-8.61	6.58	15.19	Zn2 (OH) 3Cl
Zn3 (PO4) 2:4H2O	-5.69	-41.11	-35.42	Zn3 (PO4) 2:4H2O
Zn3O (SO4) 2	-29.18	-9.65	19.53	Zn3O (SO4) 2
Zn4 (OH) 6SO4	-14.68	13.72	28.40	Zn4 (OH) 6SO4
Zn5 (OH) 8Cl2	-17.91	20.59	38.50	Zn5 (OH) 8Cl2
ZnCl2	-16.31	-9.09	7.22	ZnCl2
Znmetal	-34.31	-8.16	26.15	Zn
ZnO (active)	-3.98	7.42	11.40	ZnO
ZnSe	6.61	-7.85	-14.46	ZnSe
ZnSeO4:6H2O	-25.67	-27.19	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-8.00	-8.54	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 4.

End of Run after 0.179 Seconds.

Input file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\Kanmantoo Groundwater Worst case.pqi
Output file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\Kanmantoo Groundwater Worst case.pqi
Database file: C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database\minteq.v4.dat

Reading data base.

SOLUTION_MASTER_SPECIES
SOLUTION_SPECIES
SOLUTION_SPECIES
PHASES
PHASES
SURFACE_MASTER_SPECIES
SURFACE_SPECIES
END

Reading input data for simulation 1.

DATABASE C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database\minteq.v4.dat
SELECTED_OUTPUT 1
file Kanmantoo Groundwater worst case.sel
totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg
Na K Alkalinity Cl S(6)
SOLUTION_MASTER_SPECIES
Co Co+3 -1.0 Co 58.9332
Co(2) Co+2 0.0 Co
Co(3) Co+3 -1.0 Co
END

End of simulation.

Reading input data for simulation 2.

PHASES
CoO
 $\text{CoO} + 2\text{H}^+ = \text{Co}^{+2} + \text{H}_2\text{O}$
log_k 13.5864
delta_h -106.295 kJ
Co(OH)2
 $\text{Co(OH)}_2 + 2\text{H}^+ = \text{Co}^{+2} + 2\text{H}_2\text{O}$
log_k 13.094
delta_h -0 kJ
Co(OH)3
 $\text{Co(OH)}_3 + 3\text{H}^+ = \text{Co}^{+3} + 3\text{H}_2\text{O}$
log_k -2.309
delta_h -92.43 kJ
Co3O4
 $\text{Co}_3\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Co}^{+3} + 4\text{H}_2\text{O}$
log_k -10.4956
delta_h -107.5 kJ
CoFe2O4
 $\text{CoFe}_2\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Fe}^{+3} + 4\text{H}_2\text{O}$
log_k -3.5281
delta_h -158.82 kJ
CoCl2
 $\text{CoCl}_2 = \text{Co}^{+2} + 2\text{Cl}^-$
log_k 8.2672
delta_h -79.815 kJ
CoCl2:6H2O

```

      CoCl2:6H2O = Co+2 + 2Cl- + 6H2O
      log_k 2.5365
      delta_h      8.0598      kJ
(Co(NH3)6)Cl3
      (Co(NH3)6)Cl3 + 6H+ = Co+3 + 6NH4+ + 3Cl-
      log_k 20.0317
      delta_h      -33.1      kJ
(Co(NH3)5OH2)Cl3
      (Co(NH3)5OH2)Cl3 + 5H+ = Co+3 + 5NH4+ + 3Cl- + H2O
      log_k 11.7351
      delta_h      -25.37      kJ
(Co(NH3)5Cl)Cl2
      (Co(NH3)5Cl)Cl2 + 5H+ = Co+3 + 5NH4+ + 3Cl-
      log_k 4.5102
      delta_h      -10.74      kJ
CoCO3
      CoCO3 = Co+2 + CO3-2
      log_k -9.98
      delta_h      -12.7612      kJ
CoSO4
      CoSO4 = Co+2 + SO4-2
      log_k 2.8024
      delta_h      -79.277      kJ
CoSO4:6H2O
      CoSO4:6H2O = Co+2 + SO4-2 + 6H2O
      log_k -2.4726
      delta_h      1.0801      kJ

```

END

End of simulation.

Reading input data for simulation 3.

SOLUTION 1 #Groundwater worst case maximum values

```

temp      21
pH        5.05
pe        1
redox     pe
units     mg/l
density   1
Al        5.21
Alkalinity 0
As        0
Ba        0
Be        0
B         0
Cd        0.04
Co        24.2
Cr        0
Cu        9.29
Fe        937
Pb        0.01
Mn        171
Mo        0
V         0
Zn        1.78
Se        0.08
Ni        5.57
N         60
P         23.6
Ca        590
Mg        1340
Na        5880
K         216
Cl        9420

```

S(6) 9110
water 1 # kgg

Beginning of initial solution calculations.

Initial solution 1.

-----Solution composition-----

Elements	Molality	Moles
Al	1.986e-04	1.986e-04
Ca	1.514e-02	1.514e-02
Cd	3.660e-07	3.660e-07
Cl	2.733e-01	2.733e-01
Co	4.224e-04	4.224e-04
Cu	1.504e-04	1.504e-04
Fe	1.726e-02	1.726e-02
K	5.682e-03	5.682e-03
Mg	5.671e-02	5.671e-02
Mn	3.202e-03	3.202e-03
N	4.406e-03	4.406e-03
Na	2.631e-01	2.631e-01
Ni	9.762e-05	9.762e-05
P	7.837e-04	7.837e-04
Pb	4.964e-08	4.964e-08
S(6)	9.754e-02	9.754e-02
Se	1.042e-06	1.042e-06
Zn	2.800e-05	2.800e-05

-----Description of solution-----

pH	=	5.050
pe	=	1.000
Activity of water	=	0.988
Ionic strength (mol/kgw)	=	4.862e-01
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	1.381e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	21.00
Electrical balance (eq)	=	-9.552e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.26
Iterations	=	14
Total H	=	1.110329e+02
Total O	=	5.590014e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.214e-05	8.913e-06	-4.916	-5.050	-0.134	0.00
OH-	1.292e-09	8.222e-10	-8.889	-9.085	-0.196	(0)
H2O	5.551e+01	9.883e-01	1.744	-0.005	0.000	18.05
Al	1.986e-04					
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Al+3	1.839e-05	1.139e-06	-4.735	-5.943	-1.208	(0)
AlOH+2	4.197e-06	9.786e-07	-5.377	-6.009	-0.632	(0)
Al(OH)2+	1.624e-06	1.128e-06	-5.790	-5.948	-0.158	(0)
Al(OH)3	2.514e-08	2.514e-08	-7.600	-7.600	0.000	(0)
Al(OH)4-	2.040e-09	1.366e-09	-8.690	-8.864	-0.174	(0)
Ca	1.514e-02					
Ca+2	8.161e-03	2.370e-03	-2.088	-2.625	-0.537	(0)
CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)

	CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
	CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
	CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
	CaOH+	5.236e-11	3.715e-11	-10.281	-10.430	-0.149	(0)
	Ca (NH3) 2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
	CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
Cd	3.660e-07						
	CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
	CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
	Cd (SO4) 2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
	CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
	Cd+2	1.502e-08	4.363e-09	-7.823	-8.360	-0.537	(0)
	CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
	CdOHC1	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
	CdOH+	6.462e-14	2.865e-14	-13.190	-13.543	-0.353	(0)
	Cd2OH+3	9.945e-19	6.582e-22	-18.002	-21.182	-3.179	(0)
	Cd (OH) 2	2.726e-19	2.726e-19	-18.564	-18.564	0.000	(0)
	Cd (OH) 3-	4.195e-26	1.860e-26	-25.377	-25.730	-0.353	(0)
	Cd (OH) 4-2	8.799e-35	3.400e-36	-34.056	-35.469	-1.413	(0)
	Cd (SeO3) 2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
	CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
	CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
	Cd (NO3) 2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cl	2.733e-01						
	Cl-	2.729e-01	2.003e-01	-0.564	-0.698	-0.134	(0)
	CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
	MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
	CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
	CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
	NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
	MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
	CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
	ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
	MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
	ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
	CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
	CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
	ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
	CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
	PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
	ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
	NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
	PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
	ZnOHC1	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
	PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
	PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
	CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
	CdOHC1	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
	CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
	FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
	CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
	FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
	FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
	CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
	CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
	Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
	Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co (2)	4.224e-04						
	Co+2	3.644e-04	1.408e-05	-3.438	-4.851	-1.413	(0)
	CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
	CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
	CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
	Co (NH3) +2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
	CoOH+	7.075e-10	3.137e-10	-9.150	-9.504	-0.353	(0)
	Co2OH+3	3.344e-13	2.213e-16	-12.476	-15.655	-3.179	(0)
	Co (NH3) 2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
	Co (OH) 2	2.782e-14	2.782e-14	-13.556	-13.556	0.000	(0)
	Co (NH3) 3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)

Co (OH) 3-	1.398e-21	6.199e-22	-20.854	-21.208	-0.353	(0)
CoOOH-	8.505e-23	3.771e-23	-22.070	-22.424	-0.353	(0)
Co4 (OH) 4+4	8.668e-25	1.932e-30	-24.062	-29.714	-5.652	(0)
Co (NH3) 4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
Co (OH) 4-2	2.839e-30	1.097e-31	-29.547	-30.960	-1.413	(0)
Co (NH3) 5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Co (3)	8.287e-32					
CoOH+2	8.232e-32	3.180e-33	-31.085	-32.498	-1.413	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co+3	9.049e-36	5.605e-37	-35.043	-36.251	-1.208	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
Cu (1)	1.504e-04					
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
Cu+	1.823e-08	8.082e-09	-7.739	-8.092	-0.353	(0)
Cu (2)	1.182e-09					
Cu+2	5.900e-10	1.714e-10	-9.229	-9.766	-0.537	(0)
CuSO4	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
CuOH+	7.604e-13	4.972e-13	-12.119	-12.303	-0.185	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
Cu (OH) 2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
Cu2 (OH) 2+2	1.564e-19	6.042e-21	-18.806	-20.219	-1.413	(0)
Cu (OH) 3-	6.965e-22	3.088e-22	-21.157	-21.510	-0.353	(0)
Cu (OH) 4-2	7.024e-29	2.714e-30	-28.153	-29.566	-1.413	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Fe (2)	1.726e-02					
Fe+2	1.529e-02	5.907e-04	-1.816	-3.229	-1.413	(0)
FeSO4	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
FeOH+	2.826e-08	1.934e-08	-7.549	-7.714	-0.165	(0)
Fe (OH) 2	1.209e-14	1.209e-14	-13.918	-13.918	0.000	(0)
Fe (OH) 3-	6.009e-18	4.111e-18	-17.221	-17.386	-0.165	(0)
Fe (3)	2.087e-10					
Fe (OH) 2+	1.957e-10	1.360e-10	-9.708	-9.867	-0.158	(0)
FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
FeOH+2	1.136e-12	2.489e-13	-11.945	-12.604	-0.659	(0)
Fe (OH) 3	9.228e-14	9.228e-14	-13.035	-13.035	0.000	(0)
FeSO4+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe (SO4) 2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Fe+3	7.010e-15	4.342e-16	-14.154	-15.362	-1.208	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
Fe (OH) 4-	2.440e-17	1.696e-17	-16.613	-16.771	-0.158	(0)
Fe2 (OH) 2+4	1.061e-18	2.365e-24	-17.974	-23.626	-5.652	(0)
Fe3 (OH) 4+5	3.023e-24	4.459e-33	-23.520	-32.351	-8.831	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
H (0)	1.047e-15					
H2	5.235e-16	5.855e-16	-15.281	-15.232	0.049	(0)
K	5.682e-03					

K+	5.178e-03	3.801e-03	-2.286	-2.420	-0.134	(0)
KSO4-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
KHPO4-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
Mg	5.671e-02					
Mg+2	3.360e-02	9.758e-03	-1.474	-2.011	-0.537	(0)
MgSO4	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
MgHPO4	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
MgOH+	4.148e-09	2.990e-09	-8.382	-8.524	-0.142	(0)
MgPO4-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
Mn (2)	3.202e-03					
Mn+2	2.899e-03	1.120e-04	-2.538	-3.951	-1.413	(0)
MnSO4	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
MnOH+	3.381e-10	2.313e-10	-9.471	-9.636	-0.165	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Mn (OH) 3-	3.538e-24	2.421e-24	-23.451	-23.616	-0.165	(0)
Mn (OH) 4-2	3.983e-32	8.727e-33	-31.400	-32.059	-0.659	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Mn (3)	4.471e-28					
Mn+3	4.471e-28	2.769e-29	-27.350	-28.558	-1.208	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-79.028	-79.687	-0.659	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-88.115	-88.325	-0.210	(0)
N (-3)	4.406e-03					
NH4+	3.919e-03	2.335e-03	-2.407	-2.632	-0.225	(0)
NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
NH3	1.123e-07	1.123e-07	-6.950	-6.950	0.000	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
Co (NH3) +2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
Ni (NH3) 2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Co (NH3) 2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Ca (NH3) 2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
Co (NH3) 3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Co (NH3) 4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
Co (NH3) 5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
N (3)	0.000e+00					
NO2-	0.000e+00	0.000e+00	-47.968	-48.177	-0.210	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
N (5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-64.954	-65.088	-0.134	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)

	Cu (NO3) 2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Na	2.631e-01						
	Na+	2.447e-01	1.796e-01	-0.611	-0.746	-0.134	(0)
	NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
	NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
Ni	9.762e-05						
	Ni+2	4.671e-05	1.357e-05	-4.331	-4.867	-0.537	(0)
	NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
	NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
	Ni (SO4) 2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
	NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
	NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
	NiOH+	3.238e-10	1.435e-10	-9.490	-9.843	-0.353	(0)
	Ni (NH3) 2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
	Ni (OH) 2	1.692e-14	1.692e-14	-13.772	-13.772	0.000	(0)
	Ni (OH) 3-	4.261e-20	1.889e-20	-19.371	-19.724	-0.353	(0)
	NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
	NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
O (0)	0.000e+00						
	O2	0.000e+00	0.000e+00	-63.001	-62.952	0.049	(0)
P	7.837e-04						
	H2PO4-	4.270e-04	2.967e-04	-3.370	-3.528	-0.158	(0)
	MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
	FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
	CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
	MgHPO4	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
	HPO4-2	9.473e-06	2.076e-06	-5.024	-5.683	-0.659	(0)
	NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
	FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
	CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
	H3PO4	3.560e-07	3.560e-07	-6.449	-6.449	0.000	(0)
	KHPO4-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
	CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
	CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
	MgPO4-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
	FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
	PO4-3	1.460e-12	9.045e-14	-11.836	-13.044	-1.208	(0)
	FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Pb	4.964e-08						
	PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
	Pb (SO4) 2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
	PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
	PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
	Pb+2	3.636e-09	1.056e-09	-8.439	-8.976	-0.537	(0)
	PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
	PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
	PbOH+	6.682e-12	2.963e-12	-11.175	-11.528	-0.353	(0)
	Pb (OH) 2	1.046e-16	1.046e-16	-15.980	-15.980	0.000	(0)
	Pb2OH+3	7.494e-17	4.960e-20	-16.125	-19.305	-3.179	(0)
	Pb (OH) 3-	2.635e-22	1.168e-22	-21.579	-21.933	-0.353	(0)
	Pb (OH) 4-2	8.268e-28	3.195e-29	-27.083	-28.496	-1.413	(0)
	Pb3 (OH) 4+2	3.173e-30	1.226e-31	-29.499	-30.912	-1.413	(0)
	Pb4 (OH) 4+4	5.352e-31	1.193e-36	-30.271	-35.923	-5.652	(0)
	PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
	Pb (NO3) 2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
S (6)	9.754e-02						
	SO4-2	4.586e-02	1.332e-02	-1.339	-1.875	-0.537	(0)
	MgSO4	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
	NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
	CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
	FeSO4	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
	KSO4-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
	NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
	MnSO4	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
	AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
	CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
	NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
	Al (SO4) 2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)

Zn (SO4) 2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
HSO4-	1.536e-05	1.028e-05	-4.814	-4.988	-0.174	(0)
ZnSO4	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
Ni (SO4) 2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
Cd (SO4) 2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
Pb (SO4) 2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
CuSO4	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
FeSO4+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe (SO4) 2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Se (-2)	1.042e-06					
HSe-	1.012e-06	4.485e-07	-5.995	-6.348	-0.353	(0)
H2Se	3.047e-08	3.047e-08	-7.516	-7.516	0.000	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Se-2	1.000e-15	3.865e-17	-15.000	-16.413	-1.413	(0)
Se (4)	2.708e-15					
HSeO3-	2.690e-15	1.193e-15	-14.570	-14.923	-0.353	(0)
SeO3-2	1.341e-17	5.183e-19	-16.872	-18.285	-1.413	(0)
H2SeO3	4.383e-18	4.383e-18	-17.358	-17.358	0.000	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
Cd (SeO3) 2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
Se (6)	9.467e-35					
SeO4-2	9.354e-35	2.717e-35	-34.029	-34.566	-0.537	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
HSeO4-	2.413e-38	1.070e-38	-37.617	-37.971	-0.353	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn	2.800e-05					
Zn (SO4) 2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
Zn+2	6.051e-06	1.758e-06	-5.218	-5.755	-0.537	(0)
ZnSO4	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
ZnOH+	3.259e-10	1.445e-10	-9.487	-9.840	-0.353	(0)
Zn (OH) 2	3.473e-14	3.473e-14	-13.459	-13.459	0.000	(0)
Zn (OH) 3-	4.384e-19	1.944e-19	-18.358	-18.711	-0.353	(0)
Zn (OH) 4-2	2.236e-25	8.641e-27	-24.650	-26.063	-1.413	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2-161.31	-155.03	6.27	(Co (NH3) 5Cl) (NO3) 2	
(Co (NH3) 5Cl) Cl2 -30.79	-26.25	4.54	(Co (NH3) 5Cl) Cl2	
(Co (NH3) 5OH2) Cl3 -38.05	-26.26	11.80	(Co (NH3) 5OH2) Cl3	
(Co (NH3) 6) (NO3) 3-234.94	-217.01	17.93	(Co (NH3) 6) (NO3) 3	
(Co (NH3) 6) Cl3 -43.95	-23.84	20.11	(Co (NH3) 6) Cl3	
(NH4) 2SeO4 -40.28	-39.83	0.45	(NH4) 2SeO4	
Al (OH) 3 (am) -1.87	9.19	11.06	Al (OH) 3	
Al2O3 -1.87	18.40	20.27	Al2O3	
Al4 (OH) 10SO4 2.10	24.80	22.70	Al4 (OH) 10SO4	
AlOHSO4 0.46	-2.77	-3.23	AlOHSO4	
Alunite 7.17	6.27	-0.90	KAl3 (SO4) 2 (OH) 6	
Anglesite -3.03	-10.85	-7.82	PbSO4	
Anhydrite -0.16	-4.50	-4.34	CaSO4	
Antlerite -19.78	-10.99	8.79	Cu3 (OH) 4SO4	

Atacamite	-12.71	-5.10	7.61	Cu ₂ (OH) 3Cl
Bianchite	-5.90	-7.66	-1.76	ZnSO ₄ :6H ₂ O
Birnessite	-25.46	-7.37	18.09	MnO ₂
Bixbyite	-26.48	-26.83	-0.35	Mn ₂ O ₃
Boehmite	0.34	9.20	8.86	AlOOH
Brochantite	-26.38	-10.67	15.71	Cu ₄ (OH) 6SO ₄
Brucite	-9.04	8.08	17.12	Mg (OH) 2
Bunsenite	-7.46	5.23	12.68	NiO
Ca ₃ (PO ₄) 2 (beta)	-4.91	-33.96	-29.05	Ca ₃ (PO ₄) 2
Ca ₄ H (PO ₄) 3:3H ₂ O	-7.62	-54.70	-47.08	Ca ₄ H (PO ₄) 3:3H ₂ O
CaHPO ₄	-1.37	-20.72	-19.35	CaHPO ₄
CaHPO ₄ :2H ₂ O	-1.68	-20.73	-19.05	CaHPO ₄ :2H ₂ O
CaSeO ₃ :2H ₂ O	-15.37	-12.51	2.86	CaSeO ₃ :2H ₂ O
CaSeO ₄ :2H ₂ O	-34.20	-37.20	-3.00	CaSeO ₄ :2H ₂ O
Cd (OH) 2	-12.14	1.73	13.87	Cd (OH) 2
Cd (OH) 2 (am)	-12.21	1.73	13.94	Cd (OH) 2
Cd ₃ (OH) 2 (SO ₄) 2	-25.45	-18.74	6.71	Cd ₃ (OH) 2 (SO ₄) 2
Cd ₃ (OH) 4SO ₄	-29.34	-6.78	22.56	Cd ₃ (OH) 4SO ₄
Cd ₃ (PO ₄) 2	-18.57	-51.17	-32.60	Cd ₃ (PO ₄) 2
Cd ₄ (OH) 6SO ₄	-33.45	-5.05	28.40	Cd ₄ (OH) 6SO ₄
CdCl ₂	-9.14	-9.76	-0.61	CdCl ₂
CdCl ₂ :1H ₂ O	-8.09	-9.76	-1.68	CdCl ₂ :1H ₂ O
CdCl ₂ :2.5H ₂ O	-7.84	-9.77	-1.93	CdCl ₂ :2.5H ₂ O
Cdmetal (alpha)	-24.05	-10.36	13.69	Cd
Cdmetal (gamma)	-24.16	-10.36	13.80	Cd
CdOHCl	-7.62	-4.01	3.61	CdOHCl
CdSe	10.72	-9.66	-20.38	CdSe
CdSeO ₄ :2H ₂ O	-41.09	-42.94	-1.85	CdSeO ₄ :2H ₂ O
CdSO ₄	-10.19	-10.24	-0.05	CdSO ₄
CdSO ₄ :1H ₂ O	-8.59	-10.24	-1.65	CdSO ₄ :1H ₂ O
CdSO ₄ :2.67H ₂ O	-8.42	-10.25	-1.83	CdSO ₄ :2.67H ₂ O
Chalcanthite	-9.01	-11.67	-2.65	CuSO ₄ :5H ₂ O
Clausthalite	17.11	-10.27	-27.39	PbSe
Co (OH) 2	-7.86	5.24	13.09	Co (OH) 2
Co (OH) 3	-19.03	-21.12	-2.09	Co (OH) 3
Co ₃ (PO ₄) 2	-5.95	-40.64	-34.69	Co ₃ (PO ₄) 2
Co ₃ O ₄	-26.74	-36.97	-10.24	Co ₃ O ₄
CoCl ₂	-14.71	-6.25	8.46	CoCl ₂
CoCl ₂ :6H ₂ O	-8.80	-6.28	2.52	CoCl ₂ :6H ₂ O
CoFe ₂ O ₄	7.95	4.80	-3.15	CoFe ₂ O ₄
CoHPO ₄	-3.88	-22.95	-19.06	CoHPO ₄
CoO	-8.60	5.24	13.84	CoO
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO ₃	-16.04	-14.72	1.32	CoSeO ₃
CoSeO ₄ :6H ₂ O	-37.92	-39.45	-1.53	CoSeO ₄ :6H ₂ O
CoSO ₄	-9.72	-6.73	2.99	CoSO ₄
CoSO ₄ :6H ₂ O	-4.28	-6.76	-2.48	CoSO ₄ :6H ₂ O
Cotunnite	-5.53	-10.37	-4.84	PbCl ₂
Cu (OH) 2	-8.48	0.32	8.81	Cu (OH) 2
Cu ₂ (OH) 3NO ₃	-78.91	-69.49	9.42	Cu ₂ (OH) 3NO ₃
Cu ₂ Se (alpha)	28.83	-17.48	-46.31	Cu ₂ Se
Cu ₂ SO ₄	-16.16	-18.06	-1.90	Cu ₂ SO ₄
Cu ₃ (PO ₄) 2	-18.54	-55.39	-36.85	Cu ₃ (PO ₄) 2
Cu ₃ (PO ₄) 2:3H ₂ O	-20.28	-55.40	-35.12	Cu ₃ (PO ₄) 2:3H ₂ O
Cu ₃ Se ₂	35.75	-28.55	-64.30	Cu ₃ Se ₂
Cumetal	-0.17	-9.09	-8.93	Cu
CuOCuSO ₄	-21.94	-11.31	10.63	CuOCuSO ₄
Cupricferrite	-6.60	-0.11	6.49	CuFe ₂ O ₄
Cuprite	-4.98	-6.09	-1.11	Cu ₂ O
Cuprousferrite	5.61	-3.27	-8.88	CuFeO ₂
CuSe	22.32	-11.06	-33.39	CuSe
CuSe ₂	23.34	-10.36	-33.70	CuSe ₂
CuSeO ₃ :2H ₂ O	-20.25	-19.65	0.60	CuSeO ₃ :2H ₂ O
CuSeO ₄ :5H ₂ O	-41.92	-44.36	-2.44	CuSeO ₄ :5H ₂ O
CuSO ₄	-14.76	-11.64	3.11	CuSO ₄
Diaspore	2.08	9.20	7.12	AlOOH
Epsomite	-1.77	-3.92	-2.15	MgSO ₄ :7H ₂ O
Fe (OH) 2	-6.70	6.86	13.56	Fe (OH) 2

Fe (OH) 2.7Cl.3	1.09	-1.95	-3.04	Fe (OH) 2.7Cl.3
Fe2 (OH) 4SeO3	-21.97	-20.42	1.55	Fe2 (OH) 4SeO3
Fe2 (SeO3) 3:2H2O	-39.73	-60.36	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-33.19	-36.35	-3.16	Fe2 (SO4) 3
Fe3 (OH) 8	-13.82	6.41	20.22	Fe3 (OH) 8
Ferrihydrite	-3.59	-0.23	3.37	Fe (OH) 3
Ferroselite	14.88	-3.83	-18.71	FeSe2
FeSe	6.48	-4.53	-11.00	FeSe
Gibbsite	0.67	9.19	8.52	Al (OH) 3
Goethite	-0.86	-0.22	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4:7H2O
Gypsum	0.10	-4.51	-4.61	CaSO4:2H2O
H-Jarosite	-13.07	-24.62	-11.55	(H3O) Fe3 (SO4) 2 (OH) 6
H2Se (g)	-6.47	-11.40	-4.92	H2Se
Halite	-3.04	-1.44	1.59	NaCl
Hausmannite	-31.51	30.53	62.03	Mn3O4
Hematite	0.67	-0.44	-1.11	Fe2O3
Hercynite	1.62	25.26	23.64	FeAl2O4
Hinsdalite	-8.96	-11.46	-2.50	PbAl3PO4SO4 (OH) 6
Hydroxylapatite	-2.88	-47.21	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-16.18	-78.97	-62.79	Pb5 (PO4) 3OH
K-Alum	-6.93	-12.18	-5.24	KAl (SO4) 2:12H2O
K-Jarosite	-7.50	-21.99	-14.49	KFe3 (SO4) 2 (OH) 6
K2SeO4	-38.68	-39.41	-0.73	K2SeO4
Langite	-28.56	-10.68	17.88	Cu4 (OH) 6SO4:H2O
Larnakite	-9.35	-9.73	-0.38	PbO:PbSO4
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.59	-0.22	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.73	1.12	12.85	PbO
Maghemite	-6.83	-0.44	6.39	Fe2O3
Magnesioferrite	-9.88	7.64	17.52	Fe2MgO4
Magnetite	2.53	6.43	3.90	Fe3O4
Manganite	-13.15	12.19	25.34	MnOOH
Massicot	-11.93	1.12	13.05	PbO
Melanothallite	-17.57	-11.16	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeSO4:7H2O
Mg (OH) 2 (active)	-10.71	8.08	18.79	Mg (OH) 2
Mg3 (PO4) 2	-8.84	-32.12	-23.28	Mg3 (PO4) 2
MgHPO4:3H2O	-1.94	-20.12	-18.18	MgHPO4:3H2O
MgSeO3:6H2O	-14.96	-11.91	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-35.41	-36.61	-1.20	MgSeO4:6H2O
Minium	-59.08	15.45	74.53	Pb3O4
Mirabilite	-2.11	-3.42	-1.30	Na2SO4:10H2O
Mn2 (SO4) 3	-57.42	-62.74	-5.32	Mn2 (SO4) 3
Mn3 (PO4) 2	-14.09	-37.94	-23.85	Mn3 (PO4) 2
MnCl2:4H2O	-8.11	-5.37	2.74	MnCl2:4H2O
MnHPO4	3.36	-22.04	-25.40	MnHPO4
MnSe	-8.98	-5.25	3.73	MnSe
MnSeO3	-14.95	-13.82	1.13	MnSeO3
MnSeO3:2H2O	-14.80	-13.83	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-36.49	-38.54	-2.05	MnSeO4:5H2O
MnSO4	-8.56	-5.83	2.74	MnSO4
Monteponite	-13.62	1.73	15.35	CdO
Morenosite	-4.60	-6.78	-2.17	NiSO4:7H2O
Na-Jarosite	-9.47	-20.31	-10.84	NaFe3 (SO4) 2 (OH) 6
Na2SeO3:5H2O	-21.69	-11.39	10.30	Na2SeO3:5H2O
Na2SeO4	-37.34	-36.06	1.28	Na2SeO4
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni (OH) 2	-7.80	5.22	13.02	Ni (OH) 2
Ni3 (PO4) 2	-9.39	-40.69	-31.30	Ni3 (PO4) 2
Ni4 (OH) 6SO4	-23.08	8.92	32.00	Ni4 (OH) 6SO4
NiSe	11.53	-6.17	-17.70	NiSe
NiSeO3:2H2O	-17.64	-14.75	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-37.94	-39.46	-1.52	NiSeO4:6H2O
Nsutite	-24.87	-7.37	17.50	MnO2
O2 (g)	-60.26	24.19	84.45	O2
Pb (OH) 2	-7.18	1.11	8.29	Pb (OH) 2

Pb2 (OH) 3Cl	-12.31	-3.52	8.79	Pb2 (OH) 3Cl
Pb2O (OH) 2	-23.96	2.23	26.19	Pb2O (OH) 2
Pb2O3	-46.71	14.33	61.04	Pb2O3
Pb3 (PO4) 2	-9.49	-53.02	-43.53	Pb3 (PO4) 2
Pb3O2SO4	-19.49	-8.61	10.87	Pb3O2SO4
Pb4 (OH) 6SO4	-28.61	-7.51	21.10	Pb4 (OH) 6SO4
Pb4O3SO4	-29.70	-7.50	22.20	Pb4O3SO4
PbHPO4	-3.26	-27.07	-23.81	PbHPO4
Pbmetal	-15.22	-10.98	4.24	Pb
PbO:0.3H2O	-11.86	1.12	12.98	PbO:0.33H2O
PbSeO4	-36.67	-43.54	-6.88	PbSeO4
Periclase	-13.86	8.08	21.94	MgO
Plattnerite	-37.09	13.21	50.31	PbO2
Plumbgummite	5.12	-27.67	-32.79	PbAl3 (PO4) 2 (OH) 5:H2O
Portlandite	-15.65	7.46	23.11	Ca (OH) 2
Pyrochroite	-9.29	6.14	15.43	Mn (OH) 2
Pyrolusite	-23.79	18.24	42.03	MnO2
Pyromorphite	-0.28	-84.71	-84.43	Pb5 (PO4) 3Cl
Retgersite	-4.72	-6.77	-2.05	NiSO4:6H2O
Semetal (am)	7.84	0.70	-7.14	Se
Semetal (hex)	8.45	0.70	-7.75	Se
SeO2	-20.09	-19.97	0.12	SeO2
SeO3	-66.05	-44.66	21.39	SeO3
Spinel	-11.29	26.48	37.77	MgAl2O4
Strengite	-2.04	-28.42	-26.38	FePO4:2H2O
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.71	-3.37	0.34	Na2SO4
Tsumebite	-15.85	-25.64	-9.79	Pb2CuPO4 (OH) 3:3H2O
Vivianite	0.19	-35.81	-36.00	Fe3 (PO4) 2:8H2O
Zincite	-7.21	4.34	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnSO4
Zn (NO3) 2:6H2O	-139.22	-135.96	3.26	Zn (NO3) 2:6H2O
Zn (OH) 2	-7.87	4.33	12.20	Zn (OH) 2
Zn (OH) 2 (am)	-8.33	4.33	12.67	Zn (OH) 2
Zn (OH) 2 (beta)	-7.62	4.33	11.95	Zn (OH) 2
Zn (OH) 2 (epsilon)	-7.39	4.33	11.73	Zn (OH) 2
Zn (OH) 2 (gamma)	-7.40	4.33	11.73	Zn (OH) 2
Zn2 (OH) 2SO4	-10.80	-3.30	7.50	Zn2 (OH) 2SO4
Zn2 (OH) 3Cl	-12.26	2.93	15.19	Zn2 (OH) 3Cl
Zn3 (PO4) 2:4H2O	-7.95	-43.37	-35.42	Zn3 (PO4) 2:4H2O
Zn3O (SO4) 2	-30.45	-10.92	19.53	Zn3O (SO4) 2
Zn4 (OH) 6SO4	-23.03	5.37	28.40	Zn4 (OH) 6SO4
Zn5 (OH) 8Cl2	-28.31	10.19	38.50	Zn5 (OH) 8Cl2
ZnCl2	-14.37	-7.15	7.22	ZnCl2
Znmetal	-33.91	-7.76	26.15	Zn
ZnO (active)	-7.06	4.34	11.40	ZnO
ZnSe	7.41	-7.05	-14.46	ZnSe
ZnSeO4:6H2O	-38.83	-40.35	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.10	-7.64	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 4.

End of Run after 0.222 Seconds.

Input file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\Kanmantoo Mt Barker.pqi
Output file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\Kanmantoo Mt Barker.pqi
Database file: C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
\minteq.v4.dat

Reading data base.

SOLUTION_MASTER_SPECIES
SOLUTION_SPECIES
SOLUTION_SPECIES
PHASES
PHASES
SURFACE_MASTER_SPECIES
SURFACE_SPECIES
END

Reading input data for simulation 1.

DATABASE C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
\minteq.v4.dat
SELECTED_OUTPUT 1
file Kanmantoo Source 1 Mt Barker.sel
totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg
Na K Alkalinity Cl S(6)
SOLUTION_MASTER_SPECIES
Co Co+3 -1.0 Co 58.9332
Co(2) Co+2 0.0 Co
Co(3) Co+3 -1.0 Co
END

End of simulation.

Reading input data for simulation 2.

PHASES
CoO
CoO + 2H+ = Co+2 + H2O
log_k 13.5864
delta_h -106.295 kJ
Co(OH)2
Co(OH)2 + 2H+ = Co+2 + 2H2O
log_k 13.094
delta_h -0 kJ
Co(OH)3
Co(OH)3 + 3H+ = Co+3 + 3H2O
log_k -2.309
delta_h -92.43 kJ
Co3O4
Co3O4 + 8H+ = Co+2 + 2Co+3 + 4H2O
log_k -10.4956
delta_h -107.5 kJ
CoFe2O4
CoFe2O4 + 8H+ = Co+2 + 2Fe+3 + 4H2O
log_k -3.5281
delta_h -158.82 kJ
CoCl2
CoCl2 = Co+2 + 2Cl-
log_k 8.2672
delta_h -79.815 kJ
CoCl2:6H2O
CoCl2:6H2O = Co+2 + 2Cl- + 6H2O
log_k 2.5365

```

      delta_h      8.0598      kJ
( Co(NH3)6)Cl3
      ( Co(NH3)6)Cl3 + 6H+ = Co+3 + 6NH4+ + 3Cl-
      log_k 20.0317
      delta_h      -33.1      kJ
( Co(NH3)5OH2)Cl3
      ( Co(NH3)5OH2)Cl3 + 5H+ = Co+3 + 5NH4+ + 3Cl- + H2O
      log_k 11.7351
      delta_h      -25.37      kJ
( Co(NH3)5Cl)Cl2
      ( Co(NH3)5Cl)Cl2 + 5H+ = Co+3 + 5NH4+ + 3Cl-
      log_k 4.5102
      delta_h      -10.74      kJ
CoCO3
      CoCO3 = Co+2 + CO3-2
      log_k -9.98
      delta_h      -12.7612      kJ
CoSO4
      CoSO4 = Co+2 + SO4-2
      log_k 2.8024
      delta_h      -79.277      kJ
CoSO4:6H2O
      CoSO4:6H2O = Co+2 + SO4-2 + 6H2O
      log_k -2.4726
      delta_h      1.0801      kJ
END

```

End of simulation.

Reading input data for simulation 3.

```

SOLUTION 1 #Mean Mt Barker water quality
temp      20
pH         6.18
pe         4
redox      pe
units      mg/l
density    1
Al         0.04
Alkalinity 50
As         0.002
Ba         0.012
Be         0
B          0.088
Cd         0
Co         0.039
Cr         0.007
Cu         0.022
Fe         0.493
Pb         0.003
Mn         0.046
Mo         0.009
Zn         0.023
Se         0.002
Ni         0.011
N          24.3
P          0.52
Ca         32
Mg         17
Na         132
K          25
Cl         231
S(6)      190
water     1 # kgg

```

Beginning of initial solution calculations.

Initial solution 1.

-----Solution composition-----

Elements	Molality	Moles
Al	1.484e-06	1.484e-06
Alkalinity	8.200e-04	8.200e-04
As	2.671e-08	2.671e-08
B	8.146e-06	8.146e-06
Ba	8.744e-08	8.744e-08
Ca	7.990e-04	7.990e-04
Cl	6.520e-03	6.520e-03
Co	6.622e-07	6.622e-07
Cr	1.347e-07	1.347e-07
Cu	3.464e-07	3.464e-07
Fe	8.834e-06	8.834e-06
K	6.399e-04	6.399e-04
Mg	6.999e-04	6.999e-04
Mn	8.379e-07	8.379e-07
Mo	9.387e-08	9.387e-08
N	1.736e-03	1.736e-03
Na	5.746e-03	5.746e-03
Ni	1.876e-07	1.876e-07
P	1.680e-05	1.680e-05
Pb	1.449e-08	1.449e-08
S (6)	1.979e-03	1.979e-03
Se	2.535e-08	2.535e-08
Zn	3.520e-07	3.520e-07

-----Description of solution-----

pH	=	6.180
pe	=	4.000
Activity of water	=	1.000
Ionic strength (mol/kgw)	=	1.387e-02
Mass of water (kg)	=	1.000e+00
Total carbon (mol/kg)	=	1.948e-03
Total CO2 (mol/kg)	=	1.948e-03
Temperature (°C)	=	20.00
Electrical balance (eq)	=	-1.692e-04
Percent error, 100*(Cat- An)/(Cat+ An)	=	-0.78
Iterations	=	12
Total H	=	1.110238e+02
Total O	=	5.552069e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	7.433e-07	6.607e-07	-6.129	-6.180	-0.051	0.00
OH-	1.171e-08	1.038e-08	-7.931	-7.984	-0.052	(0)
H2O	5.551e+01	9.997e-01	1.744	-0.000	0.000	18.05
Al	1.484e-06					
Al (OH) 2+	9.360e-07	8.356e-07	-6.029	-6.078	-0.049	(0)
Al (OH) 3	2.540e-07	2.540e-07	-6.595	-6.595	0.000	(0)
Al (OH) 4-	1.663e-07	1.479e-07	-6.779	-6.830	-0.051	(0)
AlOH+2	7.824e-08	4.969e-08	-7.107	-7.304	-0.197	(0)
AlSO4+	3.549e-08	3.158e-08	-7.450	-7.501	-0.051	(0)
Al+3	1.309e-08	4.532e-09	-7.883	-8.344	-0.461	(0)
Al (SO4) 2-	4.624e-10	4.114e-10	-9.335	-9.386	-0.051	(0)
AlMo6O21-3	4.906e-34	1.428e-34	-33.309	-33.845	-0.536	(0)
As (3)	1.676e-13					
H3AsO3	1.675e-13	1.675e-13	-12.776	-12.776	0.000	(0)

H2AsO3-	1.235e-16	1.077e-16	-15.908	-15.968	-0.060	(0)
H4AsO3+	6.290e-20	5.484e-20	-19.201	-19.261	-0.060	(0)
HAsO3-2	2.065e-22	1.193e-22	-21.685	-21.923	-0.238	(0)
AsO3-3	2.009e-29	5.847e-30	-28.697	-29.233	-0.536	(0)
As (5)	2.671e-08					
H2AsO4-	2.145e-08	1.870e-08	-7.669	-7.728	-0.060	(0)
HAsO4-2	5.262e-09	3.040e-09	-8.279	-8.517	-0.238	(0)
H3AsO4	2.038e-12	2.045e-12	-11.691	-11.689	0.001	(0)
AsO4-3	4.448e-14	1.294e-14	-13.352	-13.888	-0.536	(0)
B	8.146e-06					
H3BO3	8.139e-06	8.165e-06	-5.089	-5.088	0.001	(0)
H2BO3-	7.437e-09	6.563e-09	-8.129	-8.183	-0.054	(0)
CaH2BO3+	1.795e-10	1.584e-10	-9.746	-9.800	-0.054	(0)
MgH2BO3+	1.002e-10	8.839e-11	-9.999	-10.054	-0.054	(0)
NaH2BO3	5.773e-11	5.773e-11	-10.239	-10.239	0.000	(0)
H5 (BO3) 2-	5.334e-14	4.707e-14	-13.273	-13.327	-0.054	(0)
BaH2BO3+	1.215e-14	1.072e-14	-13.915	-13.970	-0.054	(0)
H8 (BO3) 3-	3.769e-17	3.326e-17	-16.424	-16.478	-0.054	(0)
Ba	8.744e-08					
Ba+2	8.709e-08	5.435e-08	-7.060	-7.265	-0.205	(0)
BaHCO3+	3.501e-10	3.132e-10	-9.456	-9.504	-0.048	(0)
BaCO3	1.148e-12	1.148e-12	-11.940	-11.940	0.000	(0)
BaNH3+2	7.754e-14	4.480e-14	-13.110	-13.349	-0.238	(0)
BaH2BO3+	1.215e-14	1.072e-14	-13.915	-13.970	-0.054	(0)
BaOH+	2.669e-15	2.379e-15	-14.574	-14.624	-0.050	(0)
BaNO3+	1.252e-37	1.092e-37	-36.902	-36.962	-0.060	(0)
C (4)	1.948e-03					
H2CO3	1.134e-03	1.134e-03	-2.945	-2.945	0.000	(0)
HCO3-	8.028e-04	7.166e-04	-3.095	-3.145	-0.049	(0)
CaHCO3+	5.603e-06	5.013e-06	-5.252	-5.300	-0.048	(0)
MgHCO3+	3.121e-06	2.771e-06	-5.506	-5.557	-0.052	(0)
NaHCO3	2.248e-06	2.248e-06	-5.648	-5.648	0.000	(0)
CO3-2	7.369e-08	4.599e-08	-7.133	-7.337	-0.205	(0)
FeHCO3+	3.932e-08	3.517e-08	-7.405	-7.454	-0.048	(0)
CuCO3	3.016e-08	3.016e-08	-7.521	-7.521	0.000	(0)
CaCO3	2.814e-08	2.814e-08	-7.551	-7.551	0.000	(0)
CoHCO3+	1.894e-08	1.651e-08	-7.723	-7.782	-0.060	(0)
MgCO3	1.368e-08	1.368e-08	-7.864	-7.864	0.000	(0)
NiHCO3+	8.938e-09	7.793e-09	-8.049	-8.108	-0.060	(0)
MnHCO3+	6.750e-09	6.017e-09	-8.171	-8.221	-0.050	(0)
NaCO3-	5.601e-09	5.000e-09	-8.252	-8.301	-0.049	(0)
CuHCO3+	5.224e-09	4.555e-09	-8.282	-8.342	-0.060	(0)
ZnHCO3+	4.406e-09	3.842e-09	-8.356	-8.415	-0.060	(0)
PbHCO3+	2.579e-09	2.249e-09	-8.589	-8.648	-0.060	(0)
PbCO3	6.455e-10	6.455e-10	-9.190	-9.190	0.000	(0)
ZnCO3	4.960e-10	4.960e-10	-9.304	-9.304	0.000	(0)
BaHCO3+	3.501e-10	3.132e-10	-9.456	-9.504	-0.048	(0)
CoCO3	2.546e-10	2.546e-10	-9.594	-9.594	0.000	(0)
NiCO3	1.673e-10	1.673e-10	-9.776	-9.776	0.000	(0)
Cu (CO3) 2-2	6.462e-12	3.734e-12	-11.190	-11.428	-0.238	(0)
BaCO3	1.148e-12	1.148e-12	-11.940	-11.940	0.000	(0)
Pb (CO3) 2-2	1.482e-13	8.562e-14	-12.829	-13.067	-0.238	(0)
Ca	7.990e-04					
Ca+2	6.907e-04	4.311e-04	-3.161	-3.365	-0.205	(0)
CaSO4	1.024e-04	1.024e-04	-3.990	-3.990	0.000	(0)
CaHCO3+	5.603e-06	5.013e-06	-5.252	-5.300	-0.048	(0)
CaHPO4	2.128e-07	2.128e-07	-6.672	-6.672	0.000	(0)
CaH2PO4+	1.242e-07	1.109e-07	-6.906	-6.955	-0.049	(0)
CaCO3	2.814e-08	2.814e-08	-7.551	-7.551	0.000	(0)
CaNH3+2	1.227e-09	7.089e-10	-8.911	-9.149	-0.238	(0)
CaPO4-	8.600e-10	7.677e-10	-9.066	-9.115	-0.049	(0)
CaH2BO3+	1.795e-10	1.584e-10	-9.746	-9.800	-0.054	(0)
CaOH+	9.423e-11	8.430e-11	-10.026	-10.074	-0.048	(0)
Ca (NH3) 2+2	6.381e-16	3.686e-16	-15.195	-15.433	-0.238	(0)
CaNO3+	5.947e-34	5.185e-34	-33.226	-33.285	-0.060	(0)
Cl	6.520e-03					
Cl-	6.520e-03	5.795e-03	-2.186	-2.237	-0.051	(0)
CuCl2-	5.238e-08	4.651e-08	-7.281	-7.332	-0.052	(0)

CuCl	3.795e-08	3.795e-08	-7.421	-7.421	0.000	(0)
CoCl+	7.428e-09	6.476e-09	-8.129	-8.189	-0.060	(0)
MnCl+	3.540e-09	3.156e-09	-8.451	-8.501	-0.050	(0)
ZnCl+	2.961e-09	2.629e-09	-8.529	-8.580	-0.052	(0)
NiCl+	1.636e-09	1.426e-09	-8.786	-8.846	-0.060	(0)
CuCl+	1.088e-09	9.662e-10	-8.963	-9.015	-0.052	(0)
PbCl+	1.037e-09	9.043e-10	-8.984	-9.044	-0.060	(0)
CuCl3-2	8.950e-11	5.651e-11	-10.048	-10.248	-0.200	(0)
ZnOHC1	5.442e-11	5.442e-11	-10.264	-10.264	0.000	(0)
MnCl2	2.583e-11	2.583e-11	-10.588	-10.588	0.000	(0)
PbCl2	2.288e-11	2.288e-11	-10.640	-10.640	0.000	(0)
ZnCl2	1.943e-11	1.943e-11	-10.712	-10.712	0.000	(0)
CrCl+2	1.984e-12	1.146e-12	-11.703	-11.941	-0.238	(0)
CuCl2	1.517e-12	1.517e-12	-11.819	-11.819	0.000	(0)
ZnCl3-	9.866e-14	8.761e-14	-13.006	-13.057	-0.052	(0)
PbCl3-	6.398e-14	5.578e-14	-13.194	-13.253	-0.060	(0)
MnCl3-	4.626e-14	4.123e-14	-13.335	-13.385	-0.050	(0)
NiCl2	4.219e-14	4.219e-14	-13.375	-13.375	0.000	(0)
CrOHC12	9.427e-16	9.427e-16	-15.026	-15.026	0.000	(0)
FeCl+2	7.064e-16	4.460e-16	-15.151	-15.351	-0.200	(0)
CrCl2+	4.641e-16	4.046e-16	-15.333	-15.393	-0.060	(0)
ZnCl4-2	3.862e-16	2.438e-16	-15.413	-15.613	-0.200	(0)
PbCl4-2	2.375e-16	1.372e-16	-15.624	-15.863	-0.238	(0)
CuCl3-	8.442e-17	7.496e-17	-16.074	-16.125	-0.052	(0)
FeCl2+	1.517e-17	1.352e-17	-16.819	-16.869	-0.050	(0)
FeCl3	7.837e-21	7.837e-21	-20.106	-20.106	0.000	(0)
CuCl4-2	4.088e-21	2.581e-21	-20.388	-20.588	-0.200	(0)
CrO3Cl-	6.803e-34	5.932e-34	-33.167	-33.227	-0.060	(0)
Cr (NH3) 6Cl+2	4.721e-34	2.728e-34	-33.326	-33.564	-0.238	(0)
CoCl+2	2.383e-35	1.377e-35	-34.623	-34.861	-0.238	(0)
Co (NH3) 5Cl+2	4.164e-39	2.406e-39	-38.380	-38.619	-0.238	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-50.953	-51.191	-0.238	(0)
Co (2)	6.622e-07					
Co+2	5.668e-07	3.275e-07	-6.247	-6.485	-0.238	(0)
CoSO4	6.815e-08	6.815e-08	-7.167	-7.167	0.000	(0)
CoHCO3+	1.894e-08	1.651e-08	-7.723	-7.782	-0.060	(0)
CoCl+	7.428e-09	6.476e-09	-8.129	-8.189	-0.060	(0)
CoHPO4	3.779e-10	3.779e-10	-9.423	-9.423	0.000	(0)
CoCO3	2.546e-10	2.546e-10	-9.594	-9.594	0.000	(0)
Co (NH3) +2	1.392e-10	8.044e-11	-9.856	-10.095	-0.238	(0)
CoOH+	1.142e-10	9.955e-11	-9.942	-10.002	-0.060	(0)
Co (OH) 2	1.205e-13	1.205e-13	-12.919	-12.919	0.000	(0)
Co (NH3) 2+2	4.961e-15	2.866e-15	-14.304	-14.543	-0.238	(0)
Co2OH+3	5.615e-18	1.634e-18	-17.251	-17.787	-0.536	(0)
Co (NH3) 3+2	8.158e-20	4.713e-20	-19.088	-19.327	-0.238	(0)
Co (OH) 3-	4.201e-20	3.662e-20	-19.377	-19.436	-0.060	(0)
CoOOH-	1.757e-21	1.532e-21	-20.755	-20.815	-0.060	(0)
CoSeO4	1.414e-22	1.414e-22	-21.850	-21.850	0.000	(0)
Co (NH3) 4+2	5.592e-25	3.231e-25	-24.252	-24.491	-0.238	(0)
CoNO2+	5.547e-28	4.836e-28	-27.256	-27.316	-0.060	(0)
Co (OH) 4-2	1.531e-28	8.843e-29	-27.815	-28.053	-0.238	(0)
Co (NH3) 5+2	1.212e-30	7.004e-31	-29.916	-30.155	-0.238	(0)
Co4 (OH) 4+4	1.759e-31	1.960e-32	-30.755	-31.708	-0.953	(0)
CoNO3+	2.182e-37	1.902e-37	-36.661	-36.721	-0.060	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-66.848	-66.848	0.000	(0)
Co (3)	1.747e-30					
CoOH+2	1.747e-30	1.009e-30	-29.758	-29.996	-0.238	(0)
Co+3	3.766e-35	1.304e-35	-34.424	-34.885	-0.461	(0)
CoCl+2	2.383e-35	1.377e-35	-34.623	-34.861	-0.238	(0)
Co (NH3) 5Cl+2	4.164e-39	2.406e-39	-38.380	-38.619	-0.238	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-46.993	-47.052	-0.060	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-50.953	-51.191	-0.238	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.021	-52.260	-0.238	(0)
Cr (2)	2.965e-21					
Cr+2	2.965e-21	1.713e-21	-20.528	-20.766	-0.238	(0)
Cr (3)	1.347e-07					
Cr (OH) +2	7.386e-08	4.267e-08	-7.132	-7.370	-0.238	(0)
Cr (OH) 2+	5.309e-08	4.628e-08	-7.275	-7.335	-0.060	(0)

CrOHSO4	6.448e-09	6.448e-09	-8.191	-8.191	0.000	(0)
Cr+3	6.279e-10	1.827e-10	-9.202	-9.738	-0.536	(0)
CrSO4+	4.304e-10	3.752e-10	-9.366	-9.426	-0.060	(0)
Cr(OH) 3	2.649e-10	2.649e-10	-9.577	-9.577	0.000	(0)
CrCl+2	1.984e-12	1.146e-12	-11.703	-11.941	-0.238	(0)
CrH2PO4+2	8.321e-13	4.807e-13	-12.080	-12.318	-0.238	(0)
CrO2-	2.185e-13	1.905e-13	-12.661	-12.720	-0.060	(0)
Cr(OH) 4-	1.843e-13	1.607e-13	-12.735	-12.794	-0.060	(0)
Cr2(OH) 2SO4+2	2.519e-14	1.455e-14	-13.599	-13.837	-0.238	(0)
CrOHC12	9.427e-16	9.427e-16	-15.026	-15.026	0.000	(0)
Cr2(OH) 2(SO4) 2	9.408e-16	9.408e-16	-15.027	-15.027	0.000	(0)
CrCl2+	4.641e-16	4.046e-16	-15.333	-15.393	-0.060	(0)
Cr(NH3) 5OH+2	1.771e-27	1.023e-27	-26.752	-26.990	-0.238	(0)
Cr(NH3) 6+3	1.279e-32	3.722e-33	-31.893	-32.429	-0.536	(0)
Cr(NH3) 6Cl+2	4.721e-34	2.728e-34	-33.326	-33.564	-0.238	(0)
CrNO3+2	0.000e+00	0.000e+00	-41.487	-41.725	-0.238	(0)
Cr(6)	4.667e-26					
HCrO4-	2.786e-26	2.429e-26	-25.555	-25.615	-0.060	(0)
CrO4-2	1.845e-26	1.152e-26	-25.734	-25.939	-0.205	(0)
NaCrO4-	3.332e-28	2.905e-28	-27.477	-27.537	-0.060	(0)
KCrO4-	2.771e-29	2.416e-29	-28.557	-28.617	-0.060	(0)
CrO3HPO4-2	1.861e-30	1.075e-30	-29.730	-29.968	-0.238	(0)
H2CrO4	1.008e-32	1.008e-32	-31.996	-31.996	0.000	(0)
CrO3SO4-2	9.338e-33	5.395e-33	-32.030	-32.268	-0.238	(0)
CrO3Cl-	6.803e-34	5.932e-34	-33.167	-33.227	-0.060	(0)
CrO3H2PO4-	3.925e-34	3.422e-34	-33.406	-33.466	-0.060	(0)
Cr2O7-2	0.000e+00	0.000e+00	-49.394	-49.632	-0.238	(0)
Cu(1)	9.639e-08					
CuCl2-	5.238e-08	4.651e-08	-7.281	-7.332	-0.052	(0)
CuCl	3.795e-08	3.795e-08	-7.421	-7.421	0.000	(0)
Cu+	5.967e-09	5.202e-09	-8.224	-8.284	-0.060	(0)
CuCl3-2	8.950e-11	5.651e-11	-10.048	-10.248	-0.200	(0)
Cu(2)	2.501e-07					
Cu+2	1.785e-07	1.114e-07	-6.748	-6.953	-0.205	(0)
CuCO3	3.016e-08	3.016e-08	-7.521	-7.521	0.000	(0)
CuSO4	2.616e-08	2.616e-08	-7.582	-7.582	0.000	(0)
CuHCO3+	5.224e-09	4.555e-09	-8.282	-8.342	-0.060	(0)
CuOH+	4.723e-09	4.194e-09	-8.326	-8.377	-0.052	(0)
CuNH3+2	4.229e-09	2.443e-09	-8.374	-8.612	-0.238	(0)
CuCl+	1.088e-09	9.662e-10	-8.963	-9.015	-0.052	(0)
Cu(OH) 2	1.631e-11	1.631e-11	-10.788	-10.788	0.000	(0)
Cu(CO3) 2-2	6.462e-12	3.734e-12	-11.190	-11.428	-0.238	(0)
CuCl2	1.517e-12	1.517e-12	-11.819	-11.819	0.000	(0)
Cu2(OH) 2+2	7.389e-13	4.269e-13	-12.131	-12.370	-0.238	(0)
Cu(OH) 3-	5.847e-16	5.097e-16	-15.233	-15.293	-0.060	(0)
CuCl3-	8.442e-17	7.496e-17	-16.074	-16.125	-0.052	(0)
CuCl4-2	4.088e-21	2.581e-21	-20.388	-20.588	-0.200	(0)
Cu(OH) 4-2	1.058e-22	6.112e-23	-21.976	-22.214	-0.238	(0)
CuNO2+	2.803e-27	2.444e-27	-26.552	-26.612	-0.060	(0)
CuNO3+	1.523e-37	1.328e-37	-36.817	-36.877	-0.060	(0)
Cu(NO2) 2	0.000e+00	0.000e+00	-47.281	-47.281	0.000	(0)
Cu(NO3) 2	0.000e+00	0.000e+00	-68.225	-68.225	0.000	(0)
Fe(2)	8.637e-06					
Fe+2	7.461e-06	4.311e-06	-5.127	-5.365	-0.238	(0)
FeSO4	1.090e-06	1.090e-06	-5.963	-5.963	0.000	(0)
FeHCO3+	3.932e-08	3.517e-08	-7.405	-7.454	-0.048	(0)
FeH2PO4+	2.668e-08	2.382e-08	-7.574	-7.623	-0.049	(0)
FeHPO4	1.815e-08	1.815e-08	-7.741	-7.741	0.000	(0)
FeOH+	1.998e-09	1.781e-09	-8.699	-8.749	-0.050	(0)
Fe(OH) 2	1.389e-14	1.389e-14	-13.857	-13.857	0.000	(0)
Fe(OH) 3-	7.166e-17	6.388e-17	-16.145	-16.195	-0.050	(0)
Fe(3)	1.964e-07					
Fe(OH) 2+	1.950e-07	1.740e-07	-6.710	-6.759	-0.049	(0)
Fe(OH) 3	1.394e-09	1.394e-09	-8.856	-8.856	0.000	(0)
FeHPO4+	3.605e-11	3.218e-11	-10.443	-10.492	-0.049	(0)
FeOH+2	3.488e-11	2.202e-11	-10.457	-10.657	-0.200	(0)
Fe(OH) 4-	4.526e-12	4.040e-12	-11.344	-11.394	-0.049	(0)
FeSO4+	3.443e-14	3.069e-14	-13.463	-13.513	-0.050	(0)

Fe+3	8.622e-15	2.985e-15	-14.064	-14.525	-0.461	(0)
FeH2PO4+2	9.841e-16	6.250e-16	-15.007	-15.204	-0.197	(0)
Fe(SO4) 2-	8.526e-16	7.433e-16	-15.069	-15.129	-0.060	(0)
FeCl+2	7.064e-16	4.460e-16	-15.151	-15.351	-0.200	(0)
FeCl2+	1.517e-17	1.352e-17	-16.819	-16.869	-0.050	(0)
FeHSeO3+2	2.518e-19	1.455e-19	-18.599	-18.837	-0.238	(0)
Fe2(OH) 2+4	1.724e-19	1.921e-20	-18.763	-19.717	-0.953	(0)
FeCl3	7.837e-21	7.837e-21	-20.106	-20.106	0.000	(0)
Fe3(OH) 4+5	1.414e-24	4.585e-26	-23.850	-25.339	-1.489	(0)
FeNO3+2	0.000e+00	0.000e+00	-43.612	-43.850	-0.238	(0)
H(0)	6.481e-24					
H2	3.240e-24	3.251e-24	-23.489	-23.488	0.001	(0)
K	6.399e-04					
K+	6.351e-04	5.645e-04	-3.197	-3.248	-0.051	(0)
KSO4-	4.737e-06	4.229e-06	-5.324	-5.374	-0.049	(0)
KHPO4-	5.074e-09	4.530e-09	-8.295	-8.344	-0.049	(0)
KCrO4-	2.771e-29	2.416e-29	-28.557	-28.617	-0.060	(0)
Mg	6.999e-04					
Mg+2	6.224e-04	3.884e-04	-3.206	-3.411	-0.205	(0)
MgSO4	7.392e-05	7.392e-05	-4.131	-4.131	0.000	(0)
MgHCO3+	3.121e-06	2.771e-06	-5.506	-5.557	-0.052	(0)
MgHPO4	2.647e-07	2.647e-07	-6.577	-6.577	0.000	(0)
MgH2PO4+	2.388e-07	2.132e-07	-6.622	-6.671	-0.049	(0)
MgCO3	1.368e-08	1.368e-08	-7.864	-7.864	0.000	(0)
MgOH+	1.649e-09	1.478e-09	-8.783	-8.830	-0.048	(0)
MgH2BO3+	1.002e-10	8.839e-11	-9.999	-10.054	-0.054	(0)
MgPO4-	1.211e-11	1.081e-11	-10.917	-10.966	-0.049	(0)
Mn(2)	8.379e-07					
Mn+2	7.487e-07	4.326e-07	-6.126	-6.364	-0.238	(0)
MnSO4	7.886e-08	7.886e-08	-7.103	-7.103	0.000	(0)
MnHCO3+	6.750e-09	6.017e-09	-8.171	-8.221	-0.050	(0)
MnCl+	3.540e-09	3.156e-09	-8.451	-8.501	-0.050	(0)
MnCl2	2.583e-11	2.583e-11	-10.588	-10.588	0.000	(0)
MnOH+	1.265e-11	1.128e-11	-10.898	-10.948	-0.050	(0)
MnCl3-	4.626e-14	4.123e-14	-13.335	-13.385	-0.050	(0)
MnSeO4	9.893e-23	9.893e-23	-22.005	-22.005	0.000	(0)
Mn(OH) 3-	2.664e-23	2.375e-23	-22.574	-22.624	-0.050	(0)
MnSe	3.564e-30	3.564e-30	-29.448	-29.448	0.000	(0)
Mn(OH) 4-2	1.850e-30	1.168e-30	-29.733	-29.933	-0.200	(0)
MnNO3+	2.882e-37	2.513e-37	-36.540	-36.600	-0.060	(0)
Mn(NO3) 2	0.000e+00	0.000e+00	-66.631	-66.631	0.000	(0)
Mn(3)	2.658e-28					
Mn+3	2.658e-28	9.203e-29	-27.575	-28.036	-0.461	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-61.272	-61.471	-0.200	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-67.123	-67.177	-0.053	(0)
Mo	9.387e-08					
MoO4-2	9.311e-08	5.811e-08	-7.031	-7.236	-0.205	(0)
HMoO4-	7.636e-10	6.657e-10	-9.117	-9.177	-0.060	(0)
H2MoO4	4.421e-12	4.421e-12	-11.354	-11.354	0.000	(0)
AlMo6O21-3	4.906e-34	1.428e-34	-33.309	-33.845	-0.536	(0)
Mo7O24-6	0.000e+00	0.000e+00	-44.274	-46.418	-2.144	(0)
HMo7O24-5	0.000e+00	0.000e+00	-44.752	-46.242	-1.489	(0)
H2Mo7O24-4	0.000e+00	0.000e+00	-46.695	-47.648	-0.953	(0)
H3Mo7O24-3	0.000e+00	0.000e+00	-50.040	-50.576	-0.536	(0)
N(-3)	1.736e-03					
NH4+	1.715e-03	1.514e-03	-2.766	-2.820	-0.054	(0)
NH4SO4-	1.980e-05	1.765e-05	-4.703	-4.753	-0.050	(0)
NH3	9.134e-07	9.134e-07	-6.039	-6.039	0.000	(0)
CuNH3+2	4.229e-09	2.443e-09	-8.374	-8.612	-0.238	(0)
CaNH3+2	1.227e-09	7.089e-10	-8.911	-9.149	-0.238	(0)
NiNH3+2	1.878e-10	1.085e-10	-9.726	-9.965	-0.238	(0)
Co(NH3) +2	1.392e-10	8.044e-11	-9.856	-10.095	-0.238	(0)
BaNH3+2	7.754e-14	4.480e-14	-13.110	-13.349	-0.238	(0)
Ni(NH3) 2+2	4.818e-14	2.784e-14	-13.317	-13.555	-0.238	(0)
Co(NH3) 2+2	4.961e-15	2.866e-15	-14.304	-14.543	-0.238	(0)
Ca(NH3) 2+2	6.381e-16	3.686e-16	-15.195	-15.433	-0.238	(0)

Co (NH3) 3+2	8.158e-20	4.713e-20	-19.088	-19.327	-0.238	(0)
Co (NH3) 4+2	5.592e-25	3.231e-25	-24.252	-24.491	-0.238	(0)
Cr (NH3) 5OH+2	1.771e-27	1.023e-27	-26.752	-26.990	-0.238	(0)
Co (NH3) 5+2	1.212e-30	7.004e-31	-29.916	-30.155	-0.238	(0)
Cr (NH3) 6+3	1.279e-32	3.722e-33	-31.893	-32.429	-0.536	(0)
Cr (NH3) 6Cl+2	4.721e-34	2.728e-34	-33.326	-33.564	-0.238	(0)
Co (NH3) 5Cl+2	4.164e-39	2.406e-39	-38.380	-38.619	-0.238	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-46.993	-47.052	-0.060	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-50.953	-51.191	-0.238	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.021	-52.260	-0.238	(0)
N (3)	2.370e-22					
NO2-	2.370e-22	2.096e-22	-21.625	-21.679	-0.053	(0)
CuNO2+	2.803e-27	2.444e-27	-26.552	-26.612	-0.060	(0)
CoNO2+	5.547e-28	4.836e-28	-27.256	-27.316	-0.060	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-47.281	-47.281	0.000	(0)
N (5)	4.129e-31					
NO3-	4.123e-31	3.665e-31	-30.385	-30.436	-0.051	(0)
CaNO3+	5.947e-34	5.185e-34	-33.226	-33.285	-0.060	(0)
MnNO3+	2.882e-37	2.513e-37	-36.540	-36.600	-0.060	(0)
CoNO3+	2.182e-37	1.902e-37	-36.661	-36.721	-0.060	(0)
ZnNO3+	2.043e-37	1.781e-37	-36.690	-36.749	-0.060	(0)
CuNO3+	1.523e-37	1.328e-37	-36.817	-36.877	-0.060	(0)
BaNO3+	1.252e-37	1.092e-37	-36.902	-36.962	-0.060	(0)
NiNO3+	1.030e-37	8.978e-38	-36.987	-37.047	-0.060	(0)
PbNO3+	2.864e-38	2.497e-38	-37.543	-37.603	-0.060	(0)
CrNO3+2	0.000e+00	0.000e+00	-41.487	-41.725	-0.238	(0)
FeNO3+2	0.000e+00	0.000e+00	-43.612	-43.850	-0.238	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-66.631	-66.631	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-66.848	-66.848	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-67.783	-67.783	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-67.899	-67.899	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-68.225	-68.225	0.000	(0)
Na	5.746e-03					
Na+	5.710e-03	5.076e-03	-2.243	-2.295	-0.051	(0)
NaSO4-	3.300e-05	2.946e-05	-4.481	-4.531	-0.049	(0)
NaHCO3	2.248e-06	2.248e-06	-5.648	-5.648	0.000	(0)
NaHPO4-	7.066e-08	6.308e-08	-7.151	-7.200	-0.049	(0)
NaCO3-	5.601e-09	5.000e-09	-8.252	-8.301	-0.049	(0)
NaH2BO3	5.773e-11	5.773e-11	-10.239	-10.239	0.000	(0)
NaCrO4-	3.332e-28	2.905e-28	-27.477	-27.537	-0.060	(0)
Ni	1.876e-07					
Ni+2	1.563e-07	9.752e-08	-6.806	-7.011	-0.205	(0)
NiSO4	2.035e-08	2.035e-08	-7.691	-7.691	0.000	(0)
NiHCO3+	8.938e-09	7.793e-09	-8.049	-8.108	-0.060	(0)
NiCl+	1.636e-09	1.426e-09	-8.786	-8.846	-0.060	(0)
NiNH3+2	1.878e-10	1.085e-10	-9.726	-9.965	-0.238	(0)
NiCO3	1.673e-10	1.673e-10	-9.776	-9.776	0.000	(0)
NiOH+	1.502e-11	1.310e-11	-10.823	-10.883	-0.060	(0)
Ni (SO4) 2-2	1.321e-12	7.633e-13	-11.879	-12.117	-0.238	(0)
Ni (NH3) 2+2	4.818e-14	2.784e-14	-13.317	-13.555	-0.238	(0)
NiCl2	4.219e-14	4.219e-14	-13.375	-13.375	0.000	(0)
Ni (OH) 2	2.264e-14	2.264e-14	-13.645	-13.645	0.000	(0)
Ni (OH) 3-	3.956e-19	3.449e-19	-18.403	-18.462	-0.060	(0)
NiSeO4	3.876e-23	3.876e-23	-22.412	-22.412	0.000	(0)
NiNO3+	1.030e-37	8.978e-38	-36.987	-37.047	-0.060	(0)
O (0)	0.000e+00					
O2	0.000e+00	0.000e+00	-46.715	-46.713	0.001	(0)
P	1.680e-05					
H2PO4-	1.398e-05	1.248e-05	-4.855	-4.904	-0.049	(0)
HPO4-2	1.858e-06	1.173e-06	-5.731	-5.931	-0.200	(0)
MgHPO4	2.647e-07	2.647e-07	-6.577	-6.577	0.000	(0)
MgH2PO4+	2.388e-07	2.132e-07	-6.622	-6.671	-0.049	(0)
CaHPO4	2.128e-07	2.128e-07	-6.672	-6.672	0.000	(0)
CaH2PO4+	1.242e-07	1.109e-07	-6.906	-6.955	-0.049	(0)
NaHPO4-	7.066e-08	6.308e-08	-7.151	-7.200	-0.049	(0)
FeH2PO4+	2.668e-08	2.382e-08	-7.574	-7.623	-0.049	(0)
FeHPO4	1.815e-08	1.815e-08	-7.741	-7.741	0.000	(0)
KHPO4-	5.074e-09	4.530e-09	-8.295	-8.344	-0.049	(0)

H3PO4	1.098e-09	1.098e-09	-8.959	-8.959	0.000	(0)
CaPO4-	8.600e-10	7.677e-10	-9.066	-9.115	-0.049	(0)
CoHPO4	3.779e-10	3.779e-10	-9.423	-9.423	0.000	(0)
FeHPO4+	3.605e-11	3.218e-11	-10.443	-10.492	-0.049	(0)
MgPO4-	1.211e-11	1.081e-11	-10.917	-10.966	-0.049	(0)
PO4-3	1.950e-12	6.752e-13	-11.710	-12.171	-0.461	(0)
CrH2PO4+2	8.321e-13	4.807e-13	-12.080	-12.318	-0.238	(0)
FeH2PO4+2	9.841e-16	6.250e-16	-15.007	-15.204	-0.197	(0)
CrO3HPO4-2	1.861e-30	1.075e-30	-29.730	-29.968	-0.238	(0)
CrO3H2PO4-	3.925e-34	3.422e-34	-33.406	-33.466	-0.060	(0)
Pb	1.449e-08					
Pb+2	7.481e-09	4.669e-09	-8.126	-8.331	-0.205	(0)
PbHCO3+	2.579e-09	2.249e-09	-8.589	-8.648	-0.060	(0)
PbSO4	2.489e-09	2.489e-09	-8.604	-8.604	0.000	(0)
PbCl+	1.037e-09	9.043e-10	-8.984	-9.044	-0.060	(0)
PbCO3	6.455e-10	6.455e-10	-9.190	-9.190	0.000	(0)
PbOH+	2.050e-10	1.787e-10	-9.688	-9.748	-0.060	(0)
Pb (SO4) 2-2	2.825e-11	1.632e-11	-10.549	-10.787	-0.238	(0)
PbCl2	2.288e-11	2.288e-11	-10.640	-10.640	0.000	(0)
Pb (CO3) 2-2	1.482e-13	8.562e-14	-12.829	-13.067	-0.238	(0)
Pb (OH) 2	8.609e-14	8.609e-14	-13.065	-13.065	0.000	(0)
PbCl3-	6.398e-14	5.578e-14	-13.194	-13.253	-0.060	(0)
PbCl4-2	2.375e-16	1.372e-16	-15.624	-15.863	-0.238	(0)
Pb2OH+3	4.544e-17	1.322e-17	-16.343	-16.879	-0.536	(0)
Pb (OH) 3-	1.504e-18	1.312e-18	-17.823	-17.882	-0.060	(0)
Pb (OH) 4-2	8.471e-24	4.894e-24	-23.072	-23.310	-0.238	(0)
Pb3 (OH) 4+2	5.409e-25	3.125e-25	-24.267	-24.505	-0.238	(0)
Pb4 (OH) 4+4	1.253e-28	1.396e-29	-27.902	-28.855	-0.953	(0)
PbNO3+	2.864e-38	2.497e-38	-37.543	-37.603	-0.060	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-67.783	-67.783	0.000	(0)
S (6)	1.979e-03					
SO4-2	1.744e-03	1.088e-03	-2.758	-2.963	-0.205	(0)
CaSO4	1.024e-04	1.024e-04	-3.990	-3.990	0.000	(0)
MgSO4	7.392e-05	7.392e-05	-4.131	-4.131	0.000	(0)
NaSO4-	3.300e-05	2.946e-05	-4.481	-4.531	-0.049	(0)
NH4SO4-	1.980e-05	1.765e-05	-4.703	-4.753	-0.050	(0)
KSO4-	4.737e-06	4.229e-06	-5.324	-5.374	-0.049	(0)
FeSO4	1.090e-06	1.090e-06	-5.963	-5.963	0.000	(0)
MnSO4	7.886e-08	7.886e-08	-7.103	-7.103	0.000	(0)
CoSO4	6.815e-08	6.815e-08	-7.167	-7.167	0.000	(0)
HSO4-	6.789e-08	6.040e-08	-7.168	-7.219	-0.051	(0)
ZnSO4	4.277e-08	4.277e-08	-7.369	-7.369	0.000	(0)
AlSO4+	3.549e-08	3.158e-08	-7.450	-7.501	-0.051	(0)
CuSO4	2.616e-08	2.616e-08	-7.582	-7.582	0.000	(0)
NiSO4	2.035e-08	2.035e-08	-7.691	-7.691	0.000	(0)
CrOHSO4	6.448e-09	6.448e-09	-8.191	-8.191	0.000	(0)
PbSO4	2.489e-09	2.489e-09	-8.604	-8.604	0.000	(0)
Zn (SO4) 2-2	7.323e-10	4.231e-10	-9.135	-9.374	-0.238	(0)
Al (SO4) 2-	4.624e-10	4.114e-10	-9.335	-9.386	-0.051	(0)
CrSO4+	4.304e-10	3.752e-10	-9.366	-9.426	-0.060	(0)
Pb (SO4) 2-2	2.825e-11	1.632e-11	-10.549	-10.787	-0.238	(0)
Ni (SO4) 2-2	1.321e-12	7.633e-13	-11.879	-12.117	-0.238	(0)
FeSO4+	3.443e-14	3.069e-14	-13.463	-13.513	-0.050	(0)
Cr2 (OH) 2SO4+2	2.519e-14	1.455e-14	-13.599	-13.837	-0.238	(0)
Cr2 (OH) 2 (SO4) 2	9.408e-16	9.408e-16	-15.027	-15.027	0.000	(0)
Fe (SO4) 2-	8.526e-16	7.433e-16	-15.069	-15.129	-0.060	(0)
CrO3SO4-2	9.338e-33	5.395e-33	-32.030	-32.268	-0.238	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-46.993	-47.052	-0.060	(0)
Se (-2)	1.522e-24					
HSe-	1.515e-24	1.321e-24	-23.820	-23.879	-0.060	(0)
H2Se	6.623e-27	6.623e-27	-26.179	-26.179	0.000	(0)
MnSe	3.564e-30	3.564e-30	-29.448	-29.448	0.000	(0)
Se-2	2.485e-33	1.436e-33	-32.605	-32.843	-0.238	(0)
Se (4)	2.535e-08					
HSeO3-	2.512e-08	2.190e-08	-7.600	-7.660	-0.060	(0)
SeO3-2	2.207e-10	1.275e-10	-9.656	-9.895	-0.238	(0)
H2SeO3	5.915e-12	5.915e-12	-11.228	-11.228	0.000	(0)
FeHSeO3+2	2.518e-19	1.455e-19	-18.599	-18.837	-0.238	(0)

Se (6)	1.500e-18						
SeO4-2	1.499e-18	9.357e-19	-17.824	-18.029	-0.205	(0)	
CoSeO4	1.414e-22	1.414e-22	-21.850	-21.850	0.000	(0)	
MnSeO4	9.893e-23	9.893e-23	-22.005	-22.005	0.000	(0)	
NiSeO4	3.876e-23	3.876e-23	-22.412	-22.412	0.000	(0)	
HSeO4-	3.034e-23	2.645e-23	-22.518	-22.578	-0.060	(0)	
ZnSeO4	2.716e-23	2.716e-23	-22.566	-22.566	0.000	(0)	
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-40.351	-40.589	-0.238	(0)	
Zn	3.520e-07						
Zn+2	3.003e-07	1.874e-07	-6.522	-6.727	-0.205	(0)	
ZnSO4	4.277e-08	4.277e-08	-7.369	-7.369	0.000	(0)	
ZnHCO3+	4.406e-09	3.842e-09	-8.356	-8.415	-0.060	(0)	
ZnCl+	2.961e-09	2.629e-09	-8.529	-8.580	-0.052	(0)	
Zn (SO4) 2-2	7.323e-10	4.231e-10	-9.135	-9.374	-0.238	(0)	
ZnCO3	4.960e-10	4.960e-10	-9.304	-9.304	0.000	(0)	
ZnOH+	2.231e-10	1.945e-10	-9.651	-9.711	-0.060	(0)	
ZnOHCl	5.442e-11	5.442e-11	-10.264	-10.264	0.000	(0)	
ZnCl2	1.943e-11	1.943e-11	-10.712	-10.712	0.000	(0)	
Zn (OH) 2	6.895e-13	6.895e-13	-12.161	-12.161	0.000	(0)	
ZnCl3-	9.866e-14	8.761e-14	-13.006	-13.057	-0.052	(0)	
ZnCl4-2	3.862e-16	2.438e-16	-15.413	-15.613	-0.200	(0)	
Zn (OH) 3-	6.039e-17	5.265e-17	-16.219	-16.279	-0.060	(0)	
Zn (OH) 4-2	5.527e-23	3.193e-23	-22.257	-22.496	-0.238	(0)	
ZnSeO4	2.716e-23	2.716e-23	-22.566	-22.566	0.000	(0)	
ZnNO3+	2.043e-37	1.781e-37	-36.690	-36.749	-0.060	(0)	
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-40.351	-40.589	-0.238	(0)	
Zn (NO3) 2	0.000e+00	0.000e+00	-67.899	-67.899	0.000	(0)	

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2	-87.46	-81.19	6.27	(Co (NH3) 5Cl) (NO3) 2
(Co (NH3) 5Cl) Cl2	-29.34	-24.80	4.54	(Co (NH3) 5Cl) Cl2
(Co (NH3) 5OH2) Cl3	-36.61	-24.80	11.81	(Co (NH3) 5OH2) Cl3
(Co (NH3) 6) (NO3) 3	-123.96	-106.03	17.93	(Co (NH3) 6) (NO3) 3
(Co (NH3) 6) Cl3	-41.57	-21.44	20.13	(Co (NH3) 6) Cl3
(NH4) 2CrO4	-31.96	-31.58	0.38	(NH4) 2CrO4
(NH4) 2SeO4	-24.12	-23.67	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	-0.94	10.20	11.13	Al (OH) 3
Al2 (MoO4) 3	-41.54	-38.39	3.15	Al2 (MoO4) 3
Al2O3	-0.03	20.39	20.43	Al2O3
Al4 (OH) 10SO4	2.76	25.46	22.70	Al4 (OH) 10SO4
AlAsO4:2H2O	-6.29	-1.49	4.80	AlAsO4:2H2O
AlOHSO4	-1.90	-5.13	-3.23	AlOHSO4
Alunite	3.65	2.87	-0.77	KAl3 (SO4) 2 (OH) 6
Anglesite	-3.47	-11.29	-7.83	PbSO4
Anhydrite	-1.99	-6.33	-4.34	CaSO4
Antlerite	-7.89	0.90	8.79	Cu3 (OH) 4SO4
Aragonite	-2.44	-10.70	-8.26	CaCO3
Arsenolite	-48.16	-51.10	-2.94	As4O6
Artinite	-11.76	-1.80	9.96	MgCO3:Mg (OH) 2:3H2O
As2O5	-30.15	-23.38	6.77	As2O5
Atacamite	-5.27	2.40	7.67	Cu2 (OH) 3Cl
Azurite	-6.55	-23.17	-16.62	Cu3 (OH) 2 (CO3) 2
Ba (OH) 2:8H2O	-19.46	5.09	24.56	Ba (OH) 2:8H2O
Ba3 (AsO4) 2	0.85	-8.09	-8.94	Ba3 (AsO4) 2
BaCrO4	-23.43	-33.20	-9.77	BaCrO4
BaHPO4	-5.84	-25.62	-19.77	BaHPO4
BaMoO4	-7.51	-14.50	-6.99	BaMoO4
Barite	-0.18	-10.23	-10.05	BaSO4
BaSeO3	-10.54	-8.74	1.79	BaSeO3
BaSeO4	-17.77	-25.29	-7.53	BaSeO4
Bianchite	-7.93	-9.69	-1.76	ZnSO4:6H2O
Birnessite	-17.41	0.68	18.09	MnO2
Bixbyite	-18.72	-18.99	-0.27	Mn2O3
Boehmite	1.27	10.20	8.93	AlOOH
Brochantite	-9.53	6.30	15.83	Cu4 (OH) 6SO4

Brucite	-8.24	8.95	17.18	Mg (OH) 2
Bunsenite	-7.40	5.35	12.74	NiO
Ca3 (AsO4) 2:4H2O	-18.70	3.60	22.30	Ca3 (AsO4) 2:4H2O
Ca3 (PO4) 2 (beta)	-5.36	-34.44	-29.08	Ca3 (PO4) 2
Ca4H (PO4) 3:3H2O	-9.07	-56.15	-47.08	Ca4H (PO4) 3:3H2O
CaCrO4	-27.12	-29.30	-2.19	CaCrO4
CaHPO4	-2.35	-21.72	-19.37	CaHPO4
CaHPO4:2H2O	-2.65	-21.72	-19.06	CaHPO4:2H2O
Calcite	-2.25	-10.70	-8.46	CaCO3
CaMoO4	-2.66	-10.60	-7.94	CaMoO4
CaSeO3:2H2O	-7.72	-4.85	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-18.40	-21.39	-3.00	CaSeO4:2H2O
Cerussite	-2.46	-15.67	-13.20	PbCO3
CH4 (g)	-59.32	-101.14	-41.81	CH4
Chalcanthite	-7.26	-9.92	-2.66	CuSO4:5H2O
Claudetite	-47.87	-51.10	-3.23	As4O6
Clausthalite	1.43	-26.03	-27.46	PbSe
Co (BO2) 2	-31.37	-4.30	27.07	Co (BO2) 2
Co (OH) 2	-7.22	5.87	13.09	Co (OH) 2
Co (OH) 3	-14.31	-16.35	-2.03	Co (OH) 3
CO2 (g)	-1.54	-19.70	-18.16	CO2
Co3 (AsO4) 2	-18.79	-5.75	13.03	Co3 (AsO4) 2
Co3 (PO4) 2	-9.11	-43.80	-34.69	Co3 (PO4) 2
Co3O4	-16.64	-26.82	-10.17	Co3O4
CoCl2	-19.46	-10.96	8.51	CoCl2
CoCl2:6H2O	-13.47	-10.96	2.51	CoCl2:6H2O
CoCO3	-3.88	-13.82	-9.94	CoCO3
CoFe2O4	16.96	13.90	-3.05	CoFe2O4
CoHPO4	-5.77	-24.84	-19.06	CoHPO4
CoMoO4	-6.03	-13.72	-7.69	CoMoO4
CoO	-8.03	5.88	13.90	CoO
CoSe	-7.98	-24.18	-16.20	CoSe
CoSeO3	-9.28	-7.96	1.32	CoSeO3
CoSeO4:6H2O	-22.98	-24.51	-1.53	CoSeO4:6H2O
CoSO4	-12.49	-9.45	3.04	CoSO4
CoSO4:6H2O	-6.97	-9.45	-2.48	CoSO4:6H2O
Cotunnite	-7.95	-12.80	-4.86	PbCl2
Cr (OH) 2	-19.33	-8.41	10.93	Cr (OH) 2
Cr (OH) 3	-2.58	-1.15	1.42	Cr (OH) 3
Cr (OH) 3 (am)	-0.40	-1.15	-0.75	Cr (OH) 3
Cr2O3	-0.10	-2.31	-2.21	Cr2O3
CrCl2	-39.66	-25.24	14.42	CrCl2
CrCl3	-41.88	-26.41	15.48	CrCl3
Crmetal	-59.76	-28.77	31.00	Cr
CrO3	-35.10	-38.30	-3.19	CrO3
Cu (OH) 2	-3.44	5.41	8.84	Cu (OH) 2
Cu2 (OH) 3NO3	-35.27	-25.80	9.47	Cu2 (OH) 3NO3
Cu2Se (alpha)	12.17	-34.27	-46.44	Cu2Se
Cu2SO4	-17.64	-19.53	-1.89	Cu2SO4
Cu3 (AsO4) 2:2H2O	-13.26	-7.16	6.10	Cu3 (AsO4) 2:2H2O
Cu3 (PO4) 2	-8.35	-45.20	-36.85	Cu3 (PO4) 2
Cu3 (PO4) 2:3H2O	-10.08	-45.20	-35.12	Cu3 (PO4) 2:3H2O
Cu3Se2	5.59	-58.92	-64.51	Cu3Se2
CuCO3	-2.79	-14.29	-11.50	CuCO3
CuCrO4	-27.45	-32.89	-5.44	CuCrO4
Cumetal	-3.31	-12.28	-8.97	Cu
CuMoO4	-1.08	-14.19	-13.11	CuMoO4
CuOCuSO4	-15.22	-4.51	10.71	CuOCuSO4
Cupricferrite	6.82	13.44	6.62	CuFe2O4
Cuprite	-3.17	-4.21	-1.04	Cu2O
Cuprousferrite	10.78	1.91	-8.87	CuFeO2
CuSe	8.81	-24.65	-33.46	CuSe
CuSe2	-0.57	-34.35	-33.79	CuSe2
CuSeO3:2H2O	-9.05	-8.43	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-22.54	-24.98	-2.44	CuSeO4:5H2O
CuSO4	-13.07	-9.92	3.16	CuSO4
Diaspore	3.02	10.20	7.18	AlOOH
Dolomite (disordered)	-5.05	-21.45	-16.40	CaMg (CO3) 2

Dolomite (ordered)	-4.48	-21.45	-16.97	CaMg (CO ₃) ₂
Epsomite	-4.21	-6.37	-2.16	MgSO ₄ :7H ₂ O
Fe (OH) ₂	-6.57	6.99	13.56	Fe (OH) ₂
Fe (OH) 2.7Cl _{1.3}	4.53	1.49	-3.04	Fe (OH) 2.7Cl _{1.3}
Fe ₂ (OH) 4SeO ₃	-7.36	-5.81	1.55	Fe ₂ (OH) 4SeO ₃
Fe ₂ (SeO ₃) ₃ :2H ₂ O	-12.86	-33.49	-20.63	Fe ₂ (SeO ₃) ₃ :2H ₂ O
Fe ₂ (SO ₄) ₃	-34.93	-37.94	-3.01	Fe ₂ (SO ₄) ₃
Fe ₃ (OH) ₈	-5.20	15.02	20.22	Fe ₃ (OH) ₈
FeAsO ₄ :2H ₂ O	-8.07	-7.67	0.40	FeAsO ₄ :2H ₂ O
FeCr ₂ O ₄	-2.93	4.69	7.62	FeCr ₂ O ₄
FeMoO ₄	-2.54	-12.60	-10.06	FeMoO ₄
Ferrihydrite	0.60	4.01	3.41	Fe (OH) ₃
Ferroselite	-14.03	-32.76	-18.74	FeSe ₂
FeSe	-12.06	-23.06	-11.01	FeSe
Gibbsite	1.62	10.20	8.58	Al (OH) ₃
Goethite	3.34	4.01	0.67	FeOOH
Goslarite	-7.64	-9.69	-2.05	ZnSO ₄ :7H ₂ O
Gypsum	-1.72	-6.33	-4.61	CaSO ₄ :2H ₂ O
H-Jarosite	-7.19	-18.60	-11.41	(H ₃ O) Fe ₃ (SO ₄) ₂ (OH) ₆
H ₂ MoO ₄	-6.57	-19.60	-13.02	H ₂ MoO ₄
H ₂ Se (g)	-25.14	-30.06	-4.91	H ₂ Se
Halite	-6.12	-4.53	1.59	NaCl
Hausmannite	-23.94	38.35	62.29	Mn ₃ O ₄
Hematite	9.06	8.03	-1.03	Fe ₂ O ₃
Hercynite	3.56	27.39	23.83	FeAl ₂ O ₄
Hinsdalite	-8.92	-11.42	-2.50	PbAl ₃ PO ₄ SO ₄ (OH) ₆
Huntite	-13.30	-42.95	-29.65	CaMg ₃ (CO ₃) ₄
Hydrocerussite	-8.54	-27.31	-18.77	Pb ₃ (OH) ₂ (CO ₃) ₂
Hydromagnesite	-25.93	-34.04	-8.11	Mg ₅ (CO ₃) ₄ (OH) ₂ :4H ₂ O
Hydroxylapatite	-2.83	-47.16	-44.33	Ca ₅ (PO ₄) ₃ OH
Hydroxylpyromorphite	-9.20	-71.99	-62.79	Pb ₅ (PO ₄) ₃ OH
K-Alum	-12.26	-17.52	-5.26	KAl (SO ₄) ₂ :12H ₂ O
K-Jarosite	-1.26	-15.67	-14.41	KFe ₃ (SO ₄) ₂ (OH) ₆
K ₂ Cr ₂ O ₇	-53.25	-70.73	-17.48	K ₂ Cr ₂ O ₇
K ₂ CrO ₄	-31.87	-32.44	-0.57	K ₂ CrO ₄
K ₂ MoO ₄	-17.00	-13.73	3.27	K ₂ MoO ₄
K ₂ SeO ₄	-23.80	-24.53	-0.73	K ₂ SeO ₄
Langite	-11.68	6.30	17.98	Cu ₄ (OH) ₆ SO ₄ :H ₂ O
Larnakite	-6.90	-7.26	-0.37	PbO:PbSO ₄
Laurionite	-5.01	-4.39	0.62	PbOHCl
Lepidocrocite	2.64	4.01	1.37	FeOOH
Lime	-24.28	8.99	33.28	CaO
Litharge	-8.86	4.03	12.89	PbO
Maghemite	1.64	8.03	6.39	Fe ₂ O ₃
Magnesioferrite	-0.71	16.98	17.69	Fe ₂ MgO ₄
Magnesite	-3.23	-10.75	-7.52	MgCO ₃
Magnetite	11.00	15.02	4.03	Fe ₃ O ₄
Malachite	-3.35	-8.88	-5.53	Cu ₂ (OH) ₂ CO ₃
Manganite	-9.16	16.18	25.34	MnOOH
Massicot	-9.06	4.03	13.09	PbO
Melanothallite	-17.87	-11.43	6.45	CuCl ₂
Melanterite	-6.06	-8.33	-2.27	FeSO ₄ :7H ₂ O
Mg (OH) ₂ (active)	-9.84	8.95	18.79	Mg (OH) ₂
Mg ₃ (PO ₄) ₂	-11.29	-34.57	-23.28	Mg ₃ (PO ₄) ₂
MgCr ₂ O ₄	-10.10	6.64	16.74	MgCr ₂ O ₄
MgCrO ₄	-35.00	-29.35	5.65	MgCrO ₄
MgHPO ₄ :3H ₂ O	-3.59	-21.76	-18.18	MgHPO ₄ :3H ₂ O
MgMoO ₄	-8.80	-10.65	-1.85	MgMoO ₄
MgSeO ₃ :6H ₂ O	-7.93	-4.89	3.04	MgSeO ₃ :6H ₂ O
MgSeO ₄ :6H ₂ O	-20.24	-21.44	-1.20	MgSeO ₄ :6H ₂ O
Minium	-42.34	32.45	74.78	Pb ₃ O ₄
Mirabilite	-6.20	-7.55	-1.35	Na ₂ SO ₄ :10H ₂ O
Mn ₂ (SO ₄) ₃	-59.74	-64.96	-5.22	Mn ₂ (SO ₄) ₃
Mn ₃ (AsO ₄) ₂ :8H ₂ O	-17.89	-5.39	12.50	Mn ₃ (AsO ₄) ₂ :8H ₂ O
Mn ₃ (PO ₄) ₂	-19.58	-43.43	-23.85	Mn ₃ (PO ₄) ₂
MnCl ₂ :4H ₂ O	-13.59	-10.84	2.75	MnCl ₂ :4H ₂ O
MnHPO ₄	0.69	-24.71	-25.40	MnHPO ₄
MnSe	-27.86	-24.06	3.79	MnSe

MnSeO3	-8.97	-7.84	1.13	MnSeO3
MnSeO3:2H2O	-8.80	-7.84	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-22.34	-24.39	-2.05	MnSeO4:5H2O
MnSO4	-12.10	-9.33	2.78	MnSO4
MoO3	-11.60	-19.60	-8.00	MoO3
Morenosite	-7.79	-9.98	-2.18	NiSO4:7H2O
Na-Jarosite	-3.97	-14.72	-10.75	NaFe3(SO4)2(OH)6
Na2Cr2O7	-58.86	-68.83	-9.96	Na2Cr2O7
Na2CrO4	-33.52	-30.53	2.99	Na2CrO4
Na2Mo2O7	-14.66	-31.42	-16.76	Na2Mo2O7
Na2MoO4	-13.34	-11.82	1.52	Na2MoO4
Na2MoO4:2H2O	-13.05	-11.83	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-16.37	-6.07	10.30	Na2SeO3:5H2O
Na2SeO4	-23.90	-22.62	1.28	Na2SeO4
Nantokite	-3.66	-10.52	-6.86	CuCl
Natron	-10.42	-11.93	-1.51	Na2CO3:10H2O
Nesquehonite	-6.15	-10.75	-4.60	MgCO3:3H2O
Ni(OH)2	-7.73	5.35	13.08	Ni(OH)2
Ni3(AsO4)2:8H2O	-23.03	-7.33	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-14.07	-45.37	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-25.93	6.07	32.00	Ni4(OH)6SO4
NiCO3	-7.60	-14.35	-6.75	NiCO3
NiMoO4	-3.10	-14.25	-11.15	NiMoO4
NiSe	-7.01	-24.71	-17.70	NiSe
NiSeO3:2H2O	-11.40	-8.49	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-23.52	-25.04	-1.52	NiSeO4:6H2O
Nsutite	-16.82	0.68	17.50	MnO2
O2(g)	-44.08	40.72	84.80	O2
Pb(BO2)2	-12.71	-6.15	6.57	Pb(BO2)2
Pb(OH)2	-4.30	4.03	8.32	Pb(OH)2
Pb10(OH)6O(CO3)6	-69.13	-77.89	-8.76	Pb10(OH)6O(CO3)6
Pb2(OH)3Cl	-9.15	-0.36	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-18.13	8.06	26.19	Pb2O(OH)2
Pb2O3	-32.62	28.42	61.04	Pb2O3
Pb2OCO3	-11.20	-11.64	-0.44	Pb2OCO3
Pb3(AsO4)2	-17.09	-11.29	5.80	Pb3(AsO4)2
Pb3(PO4)2	-5.80	-49.33	-43.53	Pb3(PO4)2
Pb3O2CO3	-18.96	-7.61	11.35	Pb3O2CO3
Pb3O2SO4	-14.16	-3.24	10.92	Pb3O2SO4
Pb4(OH)6SO4	-20.31	0.79	21.10	Pb4(OH)6SO4
Pb4O3SO4	-21.49	0.79	22.28	Pb4O3SO4
PbCrO4	-21.54	-34.27	-12.73	PbCrO4
PbHPO4	-2.88	-26.68	-23.81	PbHPO4
Pbmetal	-20.57	-16.33	4.24	Pb
PbMoO4	0.21	-15.57	-15.78	PbMoO4
PbO:0.33H2O	-8.95	4.03	12.98	PbO:0.33H2O
PbSeO4	-19.47	-26.36	-6.88	PbSeO4
Periclase	-13.09	8.95	22.04	MgO
Phosgenite	-8.66	-28.47	-19.81	PbCl2:PbCO3
Plattnerite	-26.10	24.39	50.49	PbO2
Plumbgummite	5.99	-26.80	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-14.19	8.99	23.19	Ca(OH)2
Pyrochroite	-9.49	6.00	15.48	Mn(OH)2
Pyrolusite	-15.84	26.36	42.19	MnO2
Pyromorphite	4.03	-80.40	-84.43	Pb5(PO4)3Cl
Retgersite	-7.92	-9.97	-2.05	NiSO4:6H2O
Rhodochrosite	-3.13	-13.70	-10.57	MnCO3
Semetal(am)	-2.56	-9.70	-7.14	Se
Semetal(hex)	-1.94	-9.70	-7.76	Se
SeO2	-13.96	-13.84	0.12	SeO2
SeO3	-51.87	-30.39	21.48	SeO3
Siderite	-2.51	-12.70	-10.19	FeCO3
Smithsonite	-4.11	-14.06	-9.95	ZnCO3
Spinel	-8.67	29.34	38.01	MgAl2O4
Strengite	-0.32	-26.70	-26.37	FePO4:2H2O
Tenorite	-2.43	5.41	7.84	CuO
Thenardite	-7.90	-7.55	0.35	Na2SO4
Thermonatrite	-12.59	-11.93	0.67	Na2CO3:H2O

Tsumebite	-7.46	-17.25	-9.79	Pb2CuPO4 (OH) 3:3H2O
Vivianite	-4.44	-40.44	-36.00	Fe3 (PO4) 2:8H2O
Witherite	-6.02	-14.60	-8.58	BaCO3
Zincite	-5.97	5.63	11.60	ZnO
Zincosite	-13.87	-9.69	4.18	ZnSO4
Zn(BO2) 2	-12.83	-4.54	8.29	Zn(BO2) 2
Zn(NO3) 2:6H2O	-70.84	-67.60	3.24	Zn(NO3) 2:6H2O
Zn(OH) 2	-6.57	5.63	12.20	Zn(OH) 2
Zn(OH) 2 (am)	-7.08	5.63	12.71	Zn(OH) 2
Zn(OH) 2 (beta)	-6.37	5.63	12.00	Zn(OH) 2
Zn(OH) 2 (epsilon)	-6.15	5.63	11.78	Zn(OH) 2
Zn(OH) 2 (gamma)	-6.10	5.63	11.73	Zn(OH) 2
Zn2 (OH) 2SO4	-11.56	-4.06	7.50	Zn2 (OH) 2SO4
Zn2 (OH) 3Cl	-12.34	2.85	15.19	Zn2 (OH) 3Cl
Zn3 (AsO4) 2:2.5H2O	-20.13	-6.48	13.65	Zn3 (AsO4) 2:2.5H2O
Zn3 (PO4) 2:4H2O	-9.10	-44.52	-35.42	Zn3 (PO4) 2:4H2O
Zn3O (SO4) 2	-33.43	-13.75	19.68	Zn3O (SO4) 2
Zn4 (OH) 6SO4	-21.19	7.21	28.40	Zn4 (OH) 6SO4
Zn5 (OH) 8Cl2	-27.17	11.33	38.50	Zn5 (OH) 8Cl2
ZnCl2	-18.47	-11.20	7.27	ZnCl2
ZnCO3:1H2O	-3.80	-14.06	-10.26	ZnCO3:1H2O
Znmetal	-40.97	-14.73	26.25	Zn
ZnMoO4	-3.87	-13.96	-10.09	ZnMoO4
ZnO (active)	-5.82	5.63	11.45	ZnO
ZnSe	-9.95	-24.43	-14.48	ZnSe
ZnSeO4:6H2O	-23.24	-24.76	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-9.18	-9.69	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
 For ideal gases, phi = 1.

 End of simulation.

 Reading input data for simulation 4.

 End of Run after 0.177 Seconds.

Input file: C:\Users\rebecca.fraser\Projects\Valenza\Kamantoo\Kamantoo River
Murray.pqi
Output file: C:\Users\rebecca.fraser\Projects\Valenza\Kamantoo\Kamantoo River
Murray.pqi
Database file: C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
\minteq.v4.dat

Reading data base.

SOLUTION_MASTER_SPECIES
SOLUTION_SPECIES
SOLUTION_SPECIES
PHASES
PHASES
SURFACE_MASTER_SPECIES
SURFACE_SPECIES
END

Reading input data for simulation 1.

DATABASE C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
\minteq.v4.dat
SELECTED_OUTPUT 1
file Kanmantoo Source 2 River Murray.sel
totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg
Na K Alkalinity Cl S(6)
SOLUTION_MASTER_SPECIES
Co Co+3 -1.0 Co 58.9332
Co(2) Co+2 0.0 Co
Co(3) Co+3 -1.0 Co
END

End of simulation.

Reading input data for simulation 2.

PHASES
CoO
CoO + 2H+ = Co+2 + H2O
log_k 13.5864
delta_h -106.295 kJ
Co(OH)2
Co(OH)2 + 2H+ = Co+2 + 2H2O
log_k 13.094
delta_h -0 kJ
Co(OH)3
Co(OH)3 + 3H+ = Co+3 + 3H2O
log_k -2.309
delta_h -92.43 kJ
Co3O4
Co3O4 + 8H+ = Co+2 + 2Co+3 + 4H2O
log_k -10.4956
delta_h -107.5 kJ
CoFe2O4
CoFe2O4 + 8H+ = Co+2 + 2Fe+3 + 4H2O
log_k -3.5281
delta_h -158.82 kJ
CoCl2
CoCl2 = Co+2 + 2Cl-
log_k 8.2672
delta_h -79.815 kJ
CoCl2:6H2O

```

CoCl2:6H2O = Co+2 + 2Cl- + 6H2O
log_k 2.5365
delta_h      8.0598      kJ
(Co(NH3)6)Cl3
(Co(NH3)6)Cl3 + 6H+ = Co+3 + 6NH4+ + 3Cl-
log_k 20.0317
delta_h     -33.1      kJ
(Co(NH3)5OH2)Cl3
(Co(NH3)5OH2)Cl3 + 5H+ = Co+3 + 5NH4+ + 3Cl- + H2O
log_k 11.7351
delta_h     -25.37      kJ
(Co(NH3)5Cl)Cl2
(Co(NH3)5Cl)Cl2 + 5H+ = Co+3 + 5NH4+ + 3Cl-
log_k 4.5102
delta_h     -10.74      kJ
CoCO3
CoCO3 = Co+2 + CO3-2
log_k -9.98
delta_h     -12.7612      kJ
CoSO4
CoSO4 = Co+2 + SO4-2
log_k 2.8024
delta_h     -79.277      kJ
CoSO4:6H2O
CoSO4:6H2O = Co+2 + SO4-2 + 6H2O
log_k -2.4726
delta_h      1.0801      kJ

```

END

End of simulation.

Reading input data for simulation 3.

SOLUTION 1 #Mean River Murray water quality

```

temp      20
pH        7.5
pe        4
redox     pe
units     mg/l
density   1
Al        1.48
Alkalinity 61
As        0.0013
Ba        0.0478
Be        0
B         0.05
Cd        0.0007
Co        0.0006
Cr        0.0021
Cu        0.006
Fe        1.37
Pb        0.0012
Mn        0.06
Mo        0.0003
Zn        0.0164
Se        0.0002
Ni        0.0028
N         1.05
P         0.11
Ca        13
Mg        9
Na        49
K         4
Cl        79
S (6)     17

```

water 1 # kgg

Beginning of initial solution calculations.

Initial solution 1.

-----Solution composition-----

Elements	Molality	Moles
Al	5.487e-05	5.487e-05
Alkalinity	9.999e-04	9.999e-04
As	1.736e-08	1.736e-08
B	4.626e-06	4.626e-06
Ba	3.481e-07	3.481e-07
Ca	3.244e-04	3.244e-04
Cd	6.229e-09	6.229e-09
Cl	2.229e-03	2.229e-03
Co	1.018e-08	1.018e-08
Cr	4.040e-08	4.040e-08
Cu	9.444e-08	9.444e-08
Fe	2.454e-05	2.454e-05
K	1.023e-04	1.023e-04
Mg	3.704e-04	3.704e-04
Mn	1.092e-06	1.092e-06
Mo	3.128e-09	3.128e-09
N	7.498e-05	7.498e-05
Na	2.132e-03	2.132e-03
Ni	4.772e-08	4.772e-08
P	3.552e-06	3.552e-06
Pb	5.793e-09	5.793e-09
S (6)	1.770e-04	1.770e-04
Se	2.534e-09	2.534e-09
Zn	2.509e-07	2.509e-07

-----Description of solution-----

pH	=	7.500
pe	=	4.000
Activity of water	=	1.000
Ionic strength (mol/kgw)	=	4.384e-03
Mass of water (kg)	=	1.000e+00
Total carbon (mol/kg)	=	8.307e-04
Total CO2 (mol/kg)	=	8.307e-04
Temperature (°C)	=	20.00
Electrical balance (eq)	=	3.069e-04
Percent error, 100*(Cat- An)/(Cat+ An)	=	4.34
Iterations	=	11
Total H	=	1.110151e+02
Total O	=	5.551033e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
OH-	2.330e-07	2.169e-07	-6.633	-6.664	-0.031	(0)
H+	3.394e-08	3.162e-08	-7.469	-7.500	-0.031	0.00
H2O	5.551e+01	9.999e-01	1.744	-0.000	0.000	18.05
Al	5.487e-05					
Al (OH) 4-	5.036e-05	4.694e-05	-4.298	-4.328	-0.031	(0)
Al (OH) 3	3.857e-06	3.857e-06	-5.414	-5.414	0.000	(0)
Al (OH) 2+	6.505e-07	6.071e-07	-6.187	-6.217	-0.030	(0)
AlOH+2	2.277e-09	1.728e-09	-8.643	-8.763	-0.120	(0)
Al+3	1.426e-11	7.540e-12	-10.846	-11.123	-0.277	(0)
AlSO4+	6.366e-12	5.934e-12	-11.196	-11.227	-0.031	(0)
Al (SO4) 2-	9.367e-15	8.732e-15	-14.028	-14.059	-0.031	(0)

AlMo6O21-3	0.000e+00	0.000e+00	-52.596	-52.898	-0.301	(0)
As (3)	3.031e-18					
H3AsO3	2.988e-18	2.988e-18	-17.525	-17.525	0.000	(0)
H2AsO3-	4.335e-20	4.013e-20	-19.363	-19.397	-0.033	(0)
HAsO3-2	1.264e-24	9.286e-25	-23.898	-24.032	-0.134	(0)
H4AsO3+	5.056e-26	4.681e-26	-25.296	-25.330	-0.033	(0)
AsO3-3	1.904e-30	9.510e-31	-29.720	-30.022	-0.301	(0)
As (5)	1.736e-08					
HAsO4-2	1.407e-08	1.033e-08	-7.852	-7.986	-0.134	(0)
H2AsO4-	3.286e-09	3.043e-09	-8.483	-8.517	-0.033	(0)
AsO4-3	1.840e-12	9.193e-13	-11.735	-12.037	-0.301	(0)
H3AsO4	1.591e-14	1.592e-14	-13.798	-13.798	0.000	(0)
B	4.626e-06					
H3BO3	4.542e-06	4.547e-06	-5.343	-5.342	0.000	(0)
H2BO3-	8.215e-08	7.636e-08	-7.085	-7.117	-0.032	(0)
CaH2BO3+	1.090e-09	1.013e-09	-8.963	-8.994	-0.032	(0)
MgH2BO3+	7.768e-10	7.220e-10	-9.110	-9.141	-0.032	(0)
NaH2BO3	2.626e-10	2.626e-10	-9.581	-9.581	0.000	(0)
BaH2BO3+	6.446e-13	5.992e-13	-12.191	-12.222	-0.032	(0)
H5 (BO3) 2-	3.281e-13	3.050e-13	-12.484	-12.516	-0.032	(0)
H8 (BO3) 3-	1.291e-16	1.200e-16	-15.889	-15.921	-0.032	(0)
Ba	3.481e-07					
Ba+2	3.464e-07	2.610e-07	-6.460	-6.583	-0.123	(0)
BaHCO3+	1.611e-09	1.505e-09	-8.793	-8.822	-0.030	(0)
BaCO3	1.153e-10	1.153e-10	-9.938	-9.938	0.000	(0)
BaH2BO3+	6.446e-13	5.992e-13	-12.191	-12.222	-0.032	(0)
BaNH3+2	2.781e-13	2.043e-13	-12.556	-12.690	-0.134	(0)
BaOH+	2.559e-13	2.387e-13	-12.592	-12.622	-0.030	(0)
BaNO3+	4.082e-25	3.779e-25	-24.389	-24.423	-0.033	(0)
C (4)	8.307e-04					
HCO3-	7.685e-04	7.172e-04	-3.114	-3.144	-0.030	(0)
H2CO3	5.433e-05	5.433e-05	-4.265	-4.265	0.000	(0)
CaHCO3+	2.954e-06	2.759e-06	-5.530	-5.559	-0.030	(0)
MgHCO3+	2.090e-06	1.947e-06	-5.680	-5.711	-0.031	(0)
CO3-2	1.276e-06	9.617e-07	-5.894	-6.017	-0.123	(0)
NaHCO3	8.795e-07	8.795e-07	-6.056	-6.056	0.000	(0)
CaCO3	3.236e-07	3.236e-07	-6.490	-6.490	0.000	(0)
MgCO3	2.008e-07	2.008e-07	-6.697	-6.697	0.000	(0)
CuCO3	6.481e-08	6.481e-08	-7.188	-7.188	0.000	(0)
NaCO3-	4.379e-08	4.087e-08	-7.359	-7.389	-0.030	(0)
MnHCO3+	1.164e-08	1.086e-08	-7.934	-7.964	-0.030	(0)
ZnCO3	9.487e-09	9.487e-09	-8.023	-8.023	0.000	(0)
FeHCO3+	9.148e-09	8.545e-09	-8.039	-8.068	-0.030	(0)
ZnHCO3+	3.799e-09	3.517e-09	-8.420	-8.454	-0.033	(0)
PbCO3	2.909e-09	2.909e-09	-8.536	-8.536	0.000	(0)
NiHCO3+	2.779e-09	2.573e-09	-8.556	-8.590	-0.033	(0)
BaHCO3+	1.611e-09	1.505e-09	-8.793	-8.822	-0.030	(0)
NiCO3	1.154e-09	1.154e-09	-8.938	-8.938	0.000	(0)
PbHCO3+	5.238e-10	4.849e-10	-9.281	-9.314	-0.033	(0)
CuHCO3+	5.060e-10	4.684e-10	-9.296	-9.329	-0.033	(0)
CoHCO3+	3.770e-10	3.490e-10	-9.424	-9.457	-0.033	(0)
Cu (CO3) 2-2	2.284e-10	1.678e-10	-9.641	-9.775	-0.134	(0)
BaCO3	1.153e-10	1.153e-10	-9.938	-9.938	0.000	(0)
CoCO3	1.125e-10	1.125e-10	-9.949	-9.949	0.000	(0)
CdCO3	8.551e-11	8.551e-11	-10.068	-10.068	0.000	(0)
Pb (CO3) 2-2	1.098e-11	8.067e-12	-10.959	-11.093	-0.134	(0)
CdHCO3+	6.223e-12	5.761e-12	-11.206	-11.239	-0.033	(0)
Cd (CO3) 2-2	8.298e-14	6.096e-14	-13.081	-13.215	-0.134	(0)
Ca	3.244e-04					
Ca+2	3.146e-04	2.370e-04	-3.502	-3.625	-0.123	(0)
CaSO4	6.357e-06	6.357e-06	-5.197	-5.197	0.000	(0)
CaHCO3+	2.954e-06	2.759e-06	-5.530	-5.559	-0.030	(0)
CaCO3	3.236e-07	3.236e-07	-6.490	-6.490	0.000	(0)
CaHPO4	1.634e-07	1.634e-07	-6.787	-6.787	0.000	(0)
CaPO4-	1.319e-08	1.231e-08	-7.880	-7.910	-0.030	(0)
CaH2PO4+	4.366e-09	4.075e-09	-8.360	-8.390	-0.030	(0)
CaH2BO3+	1.090e-09	1.013e-09	-8.963	-8.994	-0.032	(0)
CaOH+	1.037e-09	9.688e-10	-8.984	-9.014	-0.030	(0)

	CaNH3+2	5.039e-10	3.702e-10	-9.298	-9.432	-0.134	(0)
	Ca (NH3) 2+2	2.488e-16	1.828e-16	-15.604	-15.738	-0.134	(0)
	CaNO3+	2.220e-22	2.055e-22	-21.654	-21.687	-0.033	(0)
Cd	6.229e-09						
	Cd+2	5.178e-09	3.901e-09	-8.286	-8.409	-0.123	(0)
	CdCl+	8.299e-10	7.683e-10	-9.081	-9.114	-0.033	(0)
	CdSO4	1.059e-10	1.059e-10	-9.975	-9.975	0.000	(0)
	CdCO3	8.551e-11	8.551e-11	-10.068	-10.068	0.000	(0)
	CdOHC1	8.913e-12	8.913e-12	-11.050	-11.050	0.000	(0)
	CdOH+	7.309e-12	6.767e-12	-11.136	-11.170	-0.033	(0)
	CdCl2	6.560e-12	6.560e-12	-11.183	-11.183	0.000	(0)
	CdHCO3+	6.223e-12	5.761e-12	-11.206	-11.239	-0.033	(0)
	Cd (SO4) 2-2	2.538e-13	1.864e-13	-12.596	-12.730	-0.134	(0)
	Cd (CO3) 2-2	8.298e-14	6.096e-14	-13.081	-13.215	-0.134	(0)
	Cd (OH) 2	1.982e-14	1.982e-14	-13.703	-13.703	0.000	(0)
	CdCl3-	8.847e-15	8.191e-15	-14.053	-14.087	-0.033	(0)
	Cd (OH) 3-	4.164e-19	3.855e-19	-18.380	-18.414	-0.033	(0)
	Cd2OH+3	2.817e-19	1.408e-19	-18.550	-18.852	-0.301	(0)
	CdSeO4	5.758e-22	5.758e-22	-21.240	-21.240	0.000	(0)
	Cd (SeO3) 2-2	2.869e-22	2.108e-22	-21.542	-21.676	-0.134	(0)
	Cd (OH) 4-2	2.735e-26	2.009e-26	-25.563	-25.697	-0.134	(0)
	CdNO3+	4.067e-27	3.766e-27	-26.391	-26.424	-0.033	(0)
	Cd (NO3) 2	0.000e+00	0.000e+00	-45.365	-45.365	0.000	(0)
Cl	2.229e-03						
	Cl-	2.229e-03	2.077e-03	-2.652	-2.683	-0.031	(0)
	MnCl+	2.186e-09	2.040e-09	-8.660	-8.690	-0.030	(0)
	CuCl	1.397e-09	1.397e-09	-8.855	-8.855	0.000	(0)
	ZnCl+	9.250e-10	8.616e-10	-9.034	-9.065	-0.031	(0)
	CdCl+	8.299e-10	7.683e-10	-9.081	-9.114	-0.033	(0)
	CuCl2-	6.588e-10	6.136e-10	-9.181	-9.212	-0.031	(0)
	ZnOHC1	3.727e-10	3.727e-10	-9.429	-9.429	0.000	(0)
	NiCl+	1.821e-10	1.686e-10	-9.740	-9.773	-0.033	(0)
	PbCl+	7.542e-11	6.982e-11	-10.123	-10.156	-0.033	(0)
	CoCl+	5.294e-11	4.901e-11	-10.276	-10.310	-0.033	(0)
	CuCl+	3.819e-11	3.558e-11	-10.418	-10.449	-0.031	(0)
	CdOHC1	8.913e-12	8.913e-12	-11.050	-11.050	0.000	(0)
	CdCl2	6.560e-12	6.560e-12	-11.183	-11.183	0.000	(0)
	MnCl2	5.982e-12	5.982e-12	-11.223	-11.223	0.000	(0)
	ZnCl2	2.282e-12	2.282e-12	-11.642	-11.642	0.000	(0)
	PbCl2	6.331e-13	6.331e-13	-12.199	-12.199	0.000	(0)
	CuCl3-2	3.528e-13	2.671e-13	-12.452	-12.573	-0.121	(0)
	CuCl2	2.001e-14	2.001e-14	-13.699	-13.699	0.000	(0)
	CdCl3-	8.847e-15	8.191e-15	-14.053	-14.087	-0.033	(0)
	ZnCl3-	3.958e-15	3.686e-15	-14.403	-14.433	-0.031	(0)
	MnCl3-	3.668e-15	3.421e-15	-14.436	-14.466	-0.030	(0)
	NiCl2	1.787e-15	1.787e-15	-14.748	-14.748	0.000	(0)
	CrCl+2	8.838e-16	6.492e-16	-15.054	-15.188	-0.134	(0)
	PbCl3-	5.973e-16	5.530e-16	-15.224	-15.257	-0.033	(0)
	FeCl+2	5.123e-17	3.879e-17	-16.290	-16.411	-0.121	(0)
	ZnCl4-2	4.856e-18	3.677e-18	-17.314	-17.435	-0.121	(0)
	CrOHC12	3.999e-18	3.999e-18	-17.398	-17.398	0.000	(0)
	PbCl4-2	6.635e-19	4.874e-19	-18.178	-18.312	-0.134	(0)
	FeCl2+	4.518e-19	4.215e-19	-18.345	-18.375	-0.030	(0)
	CuCl3-	3.804e-19	3.544e-19	-18.420	-18.451	-0.031	(0)
	CrCl2+	8.871e-20	8.213e-20	-19.052	-19.086	-0.033	(0)
	FeCl3	8.752e-23	8.752e-23	-22.058	-22.058	0.000	(0)
	CuCl4-2	5.775e-24	4.372e-24	-23.238	-23.359	-0.121	(0)
	CrO3Cl-	3.021e-29	2.797e-29	-28.520	-28.553	-0.033	(0)
	Cr (NH3) 6Cl+2	1.542e-37	1.133e-37	-36.812	-36.946	-0.134	(0)
	CoCl+2	1.419e-37	1.042e-37	-36.848	-36.982	-0.134	(0)
	Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-40.718	-40.852	-0.134	(0)
	Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-53.313	-53.447	-0.134	(0)
Co (2)	1.018e-08						
	Co+2	9.417e-09	6.917e-09	-8.026	-8.160	-0.134	(0)
	CoHCO3+	3.770e-10	3.490e-10	-9.424	-9.457	-0.033	(0)
	CoSO4	1.626e-10	1.626e-10	-9.789	-9.789	0.000	(0)
	CoCO3	1.125e-10	1.125e-10	-9.949	-9.949	0.000	(0)
	CoCl+	5.294e-11	4.901e-11	-10.276	-10.310	-0.033	(0)

CoOH+	4.747e-11	4.394e-11	-10.324	-10.357	-0.033	(0)
CoHPO4	1.115e-11	1.115e-11	-10.953	-10.953	0.000	(0)
Co(NH3)+2	2.196e-12	1.613e-12	-11.658	-11.792	-0.134	(0)
Co(OH) 2	1.111e-12	1.111e-12	-11.954	-11.954	0.000	(0)
Co(NH3) 2+2	7.431e-17	5.459e-17	-16.129	-16.263	-0.134	(0)
Co(OH) 3-	7.626e-18	7.060e-18	-17.118	-17.151	-0.033	(0)
CoOOH-	3.189e-19	2.952e-19	-18.496	-18.530	-0.033	(0)
Co2OH+3	3.049e-20	1.524e-20	-19.516	-19.817	-0.301	(0)
CoNO2+	1.822e-20	1.686e-20	-19.740	-19.773	-0.033	(0)
CoSeO4	2.530e-21	2.530e-21	-20.597	-20.597	0.000	(0)
Co(NH3) 3+2	1.160e-21	8.524e-22	-20.935	-21.069	-0.134	(0)
Co(OH) 4-2	4.850e-25	3.563e-25	-24.314	-24.448	-0.134	(0)
Co(NH3) 4+2	7.554e-27	5.549e-27	-26.122	-26.256	-0.134	(0)
CoNO3+	3.128e-27	2.896e-27	-26.505	-26.538	-0.033	(0)
Co(NH3) 5+2	1.555e-32	1.142e-32	-31.808	-31.942	-0.134	(0)
Co4(OH) 4+4	2.555e-33	7.440e-34	-32.593	-33.128	-0.536	(0)
Co(NO3) 2	0.000e+00	0.000e+00	-44.808	-44.808	0.000	(0)
Co (3)	6.065e-31					
CoOH+2	6.065e-31	4.456e-31	-30.217	-30.351	-0.134	(0)
Co+3	5.207e-37	2.754e-37	-36.283	-36.560	-0.277	(0)
CoCl+2	1.419e-37	1.042e-37	-36.848	-36.982	-0.134	(0)
Co(NH3) 5Cl+2	0.000e+00	0.000e+00	-40.718	-40.852	-0.134	(0)
Co(NH3) 6SO4+	0.000e+00	0.000e+00	-49.776	-49.810	-0.033	(0)
Co(NH3) 6OH+2	0.000e+00	0.000e+00	-52.616	-52.750	-0.134	(0)
Co(NH3) 6Cl+2	0.000e+00	0.000e+00	-53.313	-53.447	-0.134	(0)
Cr (2)	3.686e-24					
Cr+2	3.686e-24	2.708e-24	-23.433	-23.567	-0.134	(0)
Cr (3)	4.040e-08					
Cr(OH) 2+	3.452e-08	3.196e-08	-7.462	-7.495	-0.033	(0)
Cr(OH) 3	3.822e-09	3.822e-09	-8.418	-8.418	0.000	(0)
Cr(OH) +2	1.919e-09	1.410e-09	-8.717	-8.851	-0.134	(0)
CrO2-	6.201e-11	5.740e-11	-10.208	-10.241	-0.033	(0)
Cr(OH) 4-	5.233e-11	4.845e-11	-10.281	-10.315	-0.033	(0)
CrOHSO4	2.406e-11	2.406e-11	-10.619	-10.619	0.000	(0)
Cr+3	5.783e-13	2.889e-13	-12.238	-12.539	-0.301	(0)
CrSO4+	7.237e-14	6.700e-14	-13.140	-13.174	-0.033	(0)
CrCl+2	8.838e-16	6.492e-16	-15.054	-15.188	-0.134	(0)
CrH2PO4+2	6.914e-17	5.079e-17	-16.160	-16.294	-0.134	(0)
CrOHC12	3.999e-18	3.999e-18	-17.398	-17.398	0.000	(0)
Cr2(OH) 2SO4+2	2.442e-18	1.794e-18	-17.612	-17.746	-0.134	(0)
CrCl2+	8.871e-20	8.213e-20	-19.052	-19.086	-0.033	(0)
Cr2(OH) 2 (SO4) 2	1.310e-20	1.310e-20	-19.883	-19.883	0.000	(0)
Cr(NH3) 5OH+2	3.552e-29	2.609e-29	-28.450	-28.583	-0.134	(0)
CrNO3+2	2.920e-33	2.145e-33	-32.535	-32.669	-0.134	(0)
Cr(NH3) 6+3	8.634e-36	4.314e-36	-35.064	-35.365	-0.301	(0)
Cr(NH3) 6Cl+2	1.542e-37	1.133e-37	-36.812	-36.946	-0.134	(0)
Cr (6)	9.578e-19					
CrO4-2	8.783e-19	6.617e-19	-18.056	-18.179	-0.123	(0)
HCrO4-	7.214e-20	6.679e-20	-19.142	-19.175	-0.033	(0)
NaCrO4-	7.047e-21	6.524e-21	-20.152	-20.185	-0.033	(0)
KCrO4-	2.530e-22	2.342e-22	-21.597	-21.630	-0.033	(0)
CrO3HPO4-2	2.689e-25	1.976e-25	-24.570	-24.704	-0.134	(0)
H2CrO4	1.327e-27	1.327e-27	-26.877	-26.877	0.000	(0)
CrO3SO4-2	1.091e-28	8.018e-29	-27.962	-28.096	-0.134	(0)
CrO3Cl-	3.021e-29	2.797e-29	-28.520	-28.553	-0.033	(0)
CrO3H2PO4-	3.251e-30	3.009e-30	-29.488	-29.522	-0.033	(0)
Cr2O7-2	2.400e-37	1.763e-37	-36.620	-36.754	-0.134	(0)
Cu (1)	2.634e-09					
CuCl	1.397e-09	1.397e-09	-8.855	-8.855	0.000	(0)
CuCl2-	6.588e-10	6.136e-10	-9.181	-9.212	-0.031	(0)
Cu+	5.774e-10	5.346e-10	-9.239	-9.272	-0.033	(0)
CuCl3-2	3.528e-13	2.671e-13	-12.452	-12.573	-0.121	(0)
Cu (2)	9.181e-08					
CuCO3	6.481e-08	6.481e-08	-7.188	-7.188	0.000	(0)
Cu+2	1.519e-08	1.145e-08	-7.818	-7.941	-0.123	(0)
CuOH+	9.669e-09	9.007e-09	-8.015	-8.045	-0.031	(0)
Cu(OH) 2	7.320e-10	7.320e-10	-9.135	-9.135	0.000	(0)
CuHCO3+	5.060e-10	4.684e-10	-9.296	-9.329	-0.033	(0)

CuNH3+2	3.245e-10	2.384e-10	-9.489	-9.623	-0.134	(0)
CuSO4	3.036e-10	3.036e-10	-9.518	-9.518	0.000	(0)
Cu (CO3) 2-2	2.284e-10	1.678e-10	-9.641	-9.775	-0.134	(0)
CuCl+	3.819e-11	3.558e-11	-10.418	-10.449	-0.031	(0)
Cu2 (OH) 2+2	2.680e-12	1.969e-12	-11.572	-11.706	-0.134	(0)
Cu (OH) 3-	5.164e-13	4.781e-13	-12.287	-12.321	-0.033	(0)
CuCl2	2.001e-14	2.001e-14	-13.699	-13.699	0.000	(0)
Cu (OH) 4-2	1.631e-18	1.198e-18	-17.788	-17.922	-0.134	(0)
CuNO2+	4.478e-19	4.146e-19	-18.349	-18.382	-0.033	(0)
CuCl3-	3.804e-19	3.544e-19	-18.420	-18.451	-0.031	(0)
CuCl4-2	5.775e-24	4.372e-24	-23.238	-23.359	-0.121	(0)
CuNO3+	1.062e-26	9.835e-27	-25.974	-26.007	-0.033	(0)
Cu (NO2) 2	1.468e-30	1.468e-30	-29.833	-29.833	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-45.498	-45.498	0.000	(0)
Fe (2)	1.480e-06					
Fe+2	1.424e-06	1.046e-06	-5.846	-5.980	-0.134	(0)
FeSO4	2.988e-08	2.988e-08	-7.525	-7.525	0.000	(0)
FeOH+	9.684e-09	9.034e-09	-8.014	-8.044	-0.030	(0)
FeHCO3+	9.148e-09	8.545e-09	-8.039	-8.068	-0.030	(0)
FeHPO4	6.152e-09	6.152e-09	-8.211	-8.211	0.000	(0)
FeH2PO4+	4.140e-10	3.864e-10	-9.383	-9.413	-0.030	(0)
Fe (OH) 2	1.473e-12	1.473e-12	-11.832	-11.832	0.000	(0)
Fe (OH) 3-	1.517e-13	1.415e-13	-12.819	-12.849	-0.030	(0)
Fe (3)	2.306e-05					
Fe (OH) 2+	1.977e-05	1.845e-05	-4.704	-4.734	-0.030	(0)
Fe (OH) 3	3.089e-06	3.089e-06	-5.510	-5.510	0.000	(0)
Fe (OH) 4-	2.004e-07	1.870e-07	-6.698	-6.728	-0.030	(0)
FeOH+2	1.476e-10	1.117e-10	-9.831	-9.952	-0.121	(0)
FeHPO4+	1.169e-11	1.091e-11	-10.932	-10.962	-0.030	(0)
Fe+3	1.370e-15	7.246e-16	-14.863	-15.140	-0.277	(0)
FeSO4+	9.021e-16	8.414e-16	-15.045	-15.075	-0.030	(0)
FeCl+2	5.123e-17	3.879e-17	-16.290	-16.411	-0.121	(0)
FeH2PO4+2	1.336e-17	1.014e-17	-16.874	-16.994	-0.120	(0)
Fe (SO4) 2-	2.486e-18	2.301e-18	-17.605	-17.638	-0.033	(0)
Fe2 (OH) 2+4	1.697e-18	4.942e-19	-17.770	-18.306	-0.536	(0)
FeCl2+	4.518e-19	4.215e-19	-18.345	-18.375	-0.030	(0)
FeHSeO3+2	4.463e-21	3.279e-21	-20.350	-20.484	-0.134	(0)
Fe3 (OH) 4+5	8.596e-22	1.251e-22	-21.066	-21.903	-0.837	(0)
FeCl3	8.752e-23	8.752e-23	-22.058	-22.058	0.000	(0)
FeNO3+2	3.361e-33	2.469e-33	-32.474	-32.607	-0.134	(0)
H (0)	1.488e-26					
H2	7.440e-27	7.447e-27	-26.128	-26.128	0.000	(0)
K	1.023e-04					
K+	1.022e-04	9.526e-05	-3.990	-4.021	-0.031	(0)
KSO4-	8.635e-08	8.059e-08	-7.064	-7.094	-0.030	(0)
KHPO4-	1.143e-09	1.067e-09	-8.942	-8.972	-0.030	(0)
KCrO4-	2.530e-22	2.342e-22	-21.597	-21.630	-0.033	(0)
Mg	3.704e-04					
Mg+2	3.619e-04	2.727e-04	-3.441	-3.564	-0.123	(0)
MgSO4	5.861e-06	5.861e-06	-5.232	-5.232	0.000	(0)
MgHCO3+	2.090e-06	1.947e-06	-5.680	-5.711	-0.031	(0)
MgHPO4	2.594e-07	2.594e-07	-6.586	-6.586	0.000	(0)
MgCO3	2.008e-07	2.008e-07	-6.697	-6.697	0.000	(0)
MgOH+	2.319e-08	2.168e-08	-7.635	-7.664	-0.029	(0)
MgH2PO4+	1.072e-08	1.000e-08	-7.970	-8.000	-0.030	(0)
MgH2BO3+	7.768e-10	7.220e-10	-9.110	-9.141	-0.032	(0)
MgPO4-	2.373e-10	2.214e-10	-9.625	-9.655	-0.030	(0)
Mn (2)	1.092e-06					
Mn+2	1.062e-06	7.802e-07	-5.974	-6.108	-0.134	(0)
MnSO4	1.606e-08	1.606e-08	-7.794	-7.794	0.000	(0)
MnHCO3+	1.164e-08	1.086e-08	-7.934	-7.964	-0.030	(0)
MnCl+	2.186e-09	2.040e-09	-8.660	-8.690	-0.030	(0)
MnOH+	4.556e-10	4.250e-10	-9.341	-9.372	-0.030	(0)
MnCl2	5.982e-12	5.982e-12	-11.223	-11.223	0.000	(0)
MnCl3-	3.668e-15	3.421e-15	-14.436	-14.466	-0.030	(0)
Mn (OH) 3-	4.191e-19	3.909e-19	-18.378	-18.408	-0.030	(0)
MnSeO4	1.512e-19	1.512e-19	-18.821	-18.821	0.000	(0)
Mn (OH) 4-2	5.307e-25	4.018e-25	-24.275	-24.396	-0.121	(0)

MnNO3+	3.528e-25	3.267e-25	-24.452	-24.486	-0.033	(0)
MnSe	1.498e-37	1.498e-37	-36.824	-36.824	0.000	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-42.659	-42.659	0.000	(0)
Mn (3)	3.139e-28					
Mn+3	3.139e-28	1.660e-28	-27.503	-27.780	-0.277	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-50.534	-50.655	-0.121	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-56.329	-56.360	-0.031	(0)
Mo	3.128e-09					
MoO4-2	3.126e-09	2.355e-09	-8.505	-8.628	-0.123	(0)
HMoO4-	1.395e-12	1.292e-12	-11.855	-11.889	-0.033	(0)
H2MoO4	4.105e-16	4.105e-16	-15.387	-15.387	0.000	(0)
AlMo6O21-3	0.000e+00	0.000e+00	-52.596	-52.898	-0.301	(0)
Mo7O24-6	0.000e+00	0.000e+00	-65.519	-66.724	-1.205	(0)
HMo7O24-5	0.000e+00	0.000e+00	-67.030	-67.867	-0.837	(0)
H2Mo7O24-4	0.000e+00	0.000e+00	-70.058	-70.594	-0.536	(0)
H3Mo7O24-3	0.000e+00	0.000e+00	-74.541	-74.842	-0.301	(0)
N (-3)	7.498e-05					
NH4+	7.402e-05	6.880e-05	-4.131	-4.162	-0.032	(0)
NH3	8.673e-07	8.673e-07	-6.062	-6.062	0.000	(0)
NH4SO4-	9.714e-08	9.062e-08	-7.013	-7.043	-0.030	(0)
CaNH3+2	5.039e-10	3.702e-10	-9.298	-9.432	-0.134	(0)
CuNH3+2	3.245e-10	2.384e-10	-9.489	-9.623	-0.134	(0)
NiNH3+2	4.626e-11	3.398e-11	-10.335	-10.469	-0.134	(0)
Co (NH3) +2	2.196e-12	1.613e-12	-11.658	-11.792	-0.134	(0)
BaNH3+2	2.781e-13	2.043e-13	-12.556	-12.690	-0.134	(0)
Ni (NH3) 2+2	1.127e-14	8.280e-15	-13.948	-14.082	-0.134	(0)
Ca (NH3) 2+2	2.488e-16	1.828e-16	-15.604	-15.738	-0.134	(0)
Co (NH3) 2+2	7.431e-17	5.459e-17	-16.129	-16.263	-0.134	(0)
Co (NH3) 3+2	1.160e-21	8.524e-22	-20.935	-21.069	-0.134	(0)
Co (NH3) 4+2	7.554e-27	5.549e-27	-26.122	-26.256	-0.134	(0)
Cr (NH3) 5OH+2	3.552e-29	2.609e-29	-28.450	-28.583	-0.134	(0)
Co (NH3) 5+2	1.555e-32	1.142e-32	-31.808	-31.942	-0.134	(0)
Cr (NH3) 6+3	8.634e-36	4.314e-36	-35.064	-35.365	-0.301	(0)
Cr (NH3) 6Cl+2	1.542e-37	1.133e-37	-36.812	-36.946	-0.134	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-40.718	-40.852	-0.134	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-49.776	-49.810	-0.033	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.616	-52.750	-0.134	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-53.313	-53.447	-0.134	(0)
N (3)	3.719e-13					
NO2-	3.719e-13	3.460e-13	-12.430	-12.461	-0.031	(0)
CuNO2+	4.478e-19	4.146e-19	-18.349	-18.382	-0.033	(0)
CoNO2+	1.822e-20	1.686e-20	-19.740	-19.773	-0.033	(0)
Cu (NO2) 2	1.468e-30	1.468e-30	-29.833	-29.833	0.000	(0)
N (5)	2.838e-19					
NO3-	2.836e-19	2.642e-19	-18.547	-18.578	-0.031	(0)
CaNO3+	2.220e-22	2.055e-22	-21.654	-21.687	-0.033	(0)
BaNO3+	4.082e-25	3.779e-25	-24.389	-24.423	-0.033	(0)
MnNO3+	3.528e-25	3.267e-25	-24.452	-24.486	-0.033	(0)
ZnNO3+	1.268e-25	1.174e-25	-24.897	-24.930	-0.033	(0)
NiNO3+	2.306e-26	2.135e-26	-25.637	-25.671	-0.033	(0)
CuNO3+	1.062e-26	9.835e-27	-25.974	-26.007	-0.033	(0)
PbNO3+	4.189e-27	3.878e-27	-26.378	-26.411	-0.033	(0)
CdNO3+	4.067e-27	3.766e-27	-26.391	-26.424	-0.033	(0)
CoNO3+	3.128e-27	2.896e-27	-26.505	-26.538	-0.033	(0)
FeNO3+2	3.361e-33	2.469e-33	-32.474	-32.607	-0.134	(0)
CrNO3+2	2.920e-33	2.145e-33	-32.535	-32.669	-0.134	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-42.659	-42.659	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-44.222	-44.222	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-44.734	-44.734	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-44.808	-44.808	0.000	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-45.365	-45.365	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-45.498	-45.498	0.000	(0)
Na	2.132e-03					
Na+	2.130e-03	1.984e-03	-2.672	-2.702	-0.031	(0)
NaSO4-	1.394e-06	1.301e-06	-5.856	-5.886	-0.030	(0)
NaHCO3	8.795e-07	8.795e-07	-6.056	-6.056	0.000	(0)

	NaCO3-	4.379e-08	4.087e-08	-7.359	-7.389	-0.030	(0)
	NaHPO4-	3.689e-08	3.443e-08	-7.433	-7.463	-0.030	(0)
	NaH2BO3	2.626e-10	2.626e-10	-9.581	-9.581	0.000	(0)
	NaCrO4-	7.047e-21	6.524e-21	-20.152	-20.185	-0.033	(0)
Ni		4.772e-08					
	Ni+2	4.270e-08	3.217e-08	-7.370	-7.493	-0.123	(0)
	NiHCO3+	2.779e-09	2.573e-09	-8.556	-8.590	-0.033	(0)
	NiCO3	1.154e-09	1.154e-09	-8.938	-8.938	0.000	(0)
	NiSO4	7.582e-10	7.582e-10	-9.120	-9.120	0.000	(0)
	NiCl+	1.821e-10	1.686e-10	-9.740	-9.773	-0.033	(0)
	NiOH+	9.752e-11	9.028e-11	-10.011	-10.044	-0.033	(0)
	NiNH3+2	4.626e-11	3.398e-11	-10.335	-10.469	-0.134	(0)
	Ni (OH) 2	3.261e-12	3.261e-12	-11.487	-11.487	0.000	(0)
	Ni (NH3) 2+2	1.127e-14	8.280e-15	-13.948	-14.082	-0.134	(0)
	Ni (SO4) 2-2	4.372e-15	3.212e-15	-14.359	-14.493	-0.134	(0)
	NiCl2	1.787e-15	1.787e-15	-14.748	-14.748	0.000	(0)
	Ni (OH) 3-	1.122e-15	1.038e-15	-14.950	-14.984	-0.033	(0)
	NiSeO4	1.083e-20	1.083e-20	-19.965	-19.965	0.000	(0)
	NiNO3+	2.306e-26	2.135e-26	-25.637	-25.671	-0.033	(0)
O (0)		0.000e+00					
	O2	0.000e+00	0.000e+00	-41.434	-41.433	0.000	(0)
P		3.552e-06					
	HPO4-2	2.163e-06	1.637e-06	-5.665	-5.786	-0.121	(0)
	H2PO4-	8.935e-07	8.339e-07	-6.049	-6.079	-0.030	(0)
	MgHPO4	2.594e-07	2.594e-07	-6.586	-6.586	0.000	(0)
	CaHPO4	1.634e-07	1.634e-07	-6.787	-6.787	0.000	(0)
	NaHPO4-	3.689e-08	3.443e-08	-7.433	-7.463	-0.030	(0)
	CaPO4-	1.319e-08	1.231e-08	-7.880	-7.910	-0.030	(0)
	MgH2PO4+	1.072e-08	1.000e-08	-7.970	-8.000	-0.030	(0)
	FeHPO4	6.152e-09	6.152e-09	-8.211	-8.211	0.000	(0)
	CaH2PO4+	4.366e-09	4.075e-09	-8.360	-8.390	-0.030	(0)
	KHPO4-	1.143e-09	1.067e-09	-8.942	-8.972	-0.030	(0)
	FeH2PO4+	4.140e-10	3.864e-10	-9.383	-9.413	-0.030	(0)
	MgPO4-	2.373e-10	2.214e-10	-9.625	-9.655	-0.030	(0)
	PO4-3	3.724e-11	1.969e-11	-10.429	-10.706	-0.277	(0)
	FeHPO4+	1.169e-11	1.091e-11	-10.932	-10.962	-0.030	(0)
	CoHPO4	1.115e-11	1.115e-11	-10.953	-10.953	0.000	(0)
	H3PO4	3.512e-12	3.512e-12	-11.454	-11.454	0.000	(0)
	CrH2PO4+2	6.914e-17	5.079e-17	-16.160	-16.294	-0.134	(0)
	FeH2PO4+2	1.336e-17	1.014e-17	-16.874	-16.994	-0.120	(0)
	CrO3HPO4-2	2.689e-25	1.976e-25	-24.570	-24.704	-0.134	(0)
	CrO3H2PO4-	3.251e-30	3.009e-30	-29.488	-29.522	-0.033	(0)
Pb		5.793e-09					
	PbCO3	2.909e-09	2.909e-09	-8.536	-8.536	0.000	(0)
	Pb+2	1.335e-09	1.006e-09	-8.874	-8.997	-0.123	(0)
	PbOH+	8.692e-10	8.047e-10	-9.061	-9.094	-0.033	(0)
	PbHCO3+	5.238e-10	4.849e-10	-9.281	-9.314	-0.033	(0)
	PbCl+	7.542e-11	6.982e-11	-10.123	-10.156	-0.033	(0)
	PbSO4	6.058e-11	6.058e-11	-10.218	-10.218	0.000	(0)
	Pb (CO3) 2-2	1.098e-11	8.067e-12	-10.959	-11.093	-0.134	(0)
	Pb (OH) 2	8.102e-12	8.102e-12	-11.091	-11.091	0.000	(0)
	PbCl2	6.331e-13	6.331e-13	-12.199	-12.199	0.000	(0)
	Pb (SO4) 2-2	6.108e-14	4.487e-14	-13.214	-13.348	-0.134	(0)
	Pb (OH) 3-	2.786e-15	2.579e-15	-14.555	-14.588	-0.033	(0)
	PbCl3-	5.973e-16	5.530e-16	-15.224	-15.257	-0.033	(0)
	Pb2OH+3	2.568e-17	1.283e-17	-16.590	-16.892	-0.301	(0)
	PbCl4-2	6.635e-19	4.874e-19	-18.178	-18.312	-0.134	(0)
	Pb (OH) 4-2	2.738e-19	2.011e-19	-18.563	-18.697	-0.134	(0)
	Pb3 (OH) 4+2	8.117e-22	5.963e-22	-21.091	-21.225	-0.134	(0)
	Pb4 (OH) 4+4	1.971e-26	5.739e-27	-25.705	-26.241	-0.536	(0)
	PbNO3+	4.189e-27	3.878e-27	-26.378	-26.411	-0.033	(0)
	Pb (NO3) 2	0.000e+00	0.000e+00	-44.734	-44.734	0.000	(0)
S (6)		1.770e-04					
	SO4-2	1.632e-04	1.229e-04	-3.787	-3.910	-0.123	(0)
	CaSO4	6.357e-06	6.357e-06	-5.197	-5.197	0.000	(0)
	MgSO4	5.861e-06	5.861e-06	-5.232	-5.232	0.000	(0)
	NaSO4-	1.394e-06	1.301e-06	-5.856	-5.886	-0.030	(0)
	NH4SO4-	9.714e-08	9.062e-08	-7.013	-7.043	-0.030	(0)

KSO4-	8.635e-08	8.059e-08	-7.064	-7.094	-0.030	(0)
FeSO4	2.988e-08	2.988e-08	-7.525	-7.525	0.000	(0)
MnSO4	1.606e-08	1.606e-08	-7.794	-7.794	0.000	(0)
ZnSO4	4.418e-09	4.418e-09	-8.355	-8.355	0.000	(0)
NiSO4	7.582e-10	7.582e-10	-9.120	-9.120	0.000	(0)
HSO4-	3.503e-10	3.265e-10	-9.456	-9.486	-0.031	(0)
CuSO4	3.036e-10	3.036e-10	-9.518	-9.518	0.000	(0)
CoSO4	1.626e-10	1.626e-10	-9.789	-9.789	0.000	(0)
CdSO4	1.059e-10	1.059e-10	-9.975	-9.975	0.000	(0)
PbSO4	6.058e-11	6.058e-11	-10.218	-10.218	0.000	(0)
CrOHSO4	2.406e-11	2.406e-11	-10.619	-10.619	0.000	(0)
Zn (SO4) 2-2	6.720e-12	4.936e-12	-11.173	-11.307	-0.134	(0)
AlSO4+	6.366e-12	5.934e-12	-11.196	-11.227	-0.031	(0)
Cd (SO4) 2-2	2.538e-13	1.864e-13	-12.596	-12.730	-0.134	(0)
CrSO4+	7.237e-14	6.700e-14	-13.140	-13.174	-0.033	(0)
Pb (SO4) 2-2	6.108e-14	4.487e-14	-13.214	-13.348	-0.134	(0)
Al (SO4) 2-	9.367e-15	8.732e-15	-14.028	-14.059	-0.031	(0)
Ni (SO4) 2-2	4.372e-15	3.212e-15	-14.359	-14.493	-0.134	(0)
FeSO4+	9.021e-16	8.414e-16	-15.045	-15.075	-0.030	(0)
Fe (SO4) 2-	2.486e-18	2.301e-18	-17.605	-17.638	-0.033	(0)
Cr2 (OH) 2SO4+2	2.442e-18	1.794e-18	-17.612	-17.746	-0.134	(0)
Cr2 (OH) 2 (SO4) 2	1.310e-20	1.310e-20	-19.883	-19.883	0.000	(0)
CrO3SO4-2	1.091e-28	8.018e-29	-27.962	-28.096	-0.134	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-49.776	-49.810	-0.033	(0)
Se (-2)	1.592e-33					
HSe-	1.592e-33	1.474e-33	-32.798	-32.832	-0.033	(0)
H2Se	3.537e-37	3.537e-37	-36.451	-36.451	0.000	(0)
MnSe	1.498e-37	1.498e-37	-36.824	-36.824	0.000	(0)
Se-2	0.000e+00	0.000e+00	-40.341	-40.475	-0.134	(0)
Se (4)	2.534e-09					
HSeO3-	2.197e-09	2.034e-09	-8.658	-8.692	-0.033	(0)
SeO3-2	3.367e-10	2.473e-10	-9.473	-9.607	-0.134	(0)
H2SeO3	2.629e-14	2.629e-14	-13.580	-13.580	0.000	(0)
FeHSeO3+2	4.463e-21	3.279e-21	-20.350	-20.484	-0.134	(0)
Cd (SeO3) 2-2	2.869e-22	2.108e-22	-21.542	-21.676	-0.134	(0)
Se (6)	1.052e-15					
SeO4-2	1.052e-15	7.926e-16	-14.978	-15.101	-0.123	(0)
MnSeO4	1.512e-19	1.512e-19	-18.821	-18.821	0.000	(0)
ZnSeO4	2.105e-20	2.105e-20	-19.677	-19.677	0.000	(0)
NiSeO4	1.083e-20	1.083e-20	-19.965	-19.965	0.000	(0)
CoSeO4	2.530e-21	2.530e-21	-20.597	-20.597	0.000	(0)
HSeO4-	1.158e-21	1.072e-21	-20.936	-20.970	-0.033	(0)
CdSeO4	5.758e-22	5.758e-22	-21.240	-21.240	0.000	(0)
Zn (SeO4) 2-2	2.303e-35	1.691e-35	-34.638	-34.772	-0.134	(0)
Zn	2.509e-07					
Zn+2	2.276e-07	1.714e-07	-6.643	-6.766	-0.123	(0)
ZnCO3	9.487e-09	9.487e-09	-8.023	-8.023	0.000	(0)
ZnSO4	4.418e-09	4.418e-09	-8.355	-8.355	0.000	(0)
ZnOH+	4.016e-09	3.718e-09	-8.396	-8.430	-0.033	(0)
ZnHCO3+	3.799e-09	3.517e-09	-8.420	-8.454	-0.033	(0)
ZnCl+	9.250e-10	8.616e-10	-9.034	-9.065	-0.031	(0)
ZnOHCl	3.727e-10	3.727e-10	-9.429	-9.429	0.000	(0)
Zn (OH) 2	2.754e-10	2.754e-10	-9.560	-9.560	0.000	(0)
Zn (SO4) 2-2	6.720e-12	4.936e-12	-11.173	-11.307	-0.134	(0)
ZnCl2	2.282e-12	2.282e-12	-11.642	-11.642	0.000	(0)
Zn (OH) 3-	4.748e-13	4.395e-13	-12.324	-12.357	-0.033	(0)
ZnCl3-	3.958e-15	3.686e-15	-14.403	-14.433	-0.031	(0)
Zn (OH) 4-2	7.584e-18	5.571e-18	-17.120	-17.254	-0.134	(0)
ZnCl4-2	4.856e-18	3.677e-18	-17.314	-17.435	-0.121	(0)
ZnSeO4	2.105e-20	2.105e-20	-19.677	-19.677	0.000	(0)
ZnNO3+	1.268e-25	1.174e-25	-24.897	-24.930	-0.033	(0)
Zn (SeO4) 2-2	2.303e-35	1.691e-35	-34.638	-34.772	-0.134	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-44.222	-44.222	0.000	(0)

-----Saturation indices-----

Phase SI** log IAP log K(293 K, 1 atm)

(Co(NH3)5Cl)(NO3)2	-65.98	-59.71	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-32.46	-27.92	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-39.73	-27.92	11.81	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-90.20	-72.27	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-44.71	-24.58	20.13	(Co(NH3)6)Cl3
(NH4)2CrO4	-26.88	-26.50	0.38	(NH4)2CrO4
(NH4)2SeO4	-23.88	-23.43	0.45	(NH4)2SeO4
Al(OH)3(am)	0.25	11.38	11.13	Al(OH)3
Al2(MoO4)3	-51.28	-48.13	3.15	Al2(MoO4)3
Al2O3	2.33	22.75	20.43	Al2O3
Al4(OH)10SO4	3.90	26.60	22.70	Al4(OH)10SO4
AlAsO4:2H2O	-7.22	-2.42	4.80	AlAsO4:2H2O
AlOHSO4	-4.30	-7.53	-3.23	AlOHSO4
Alunite	0.56	-0.21	-0.77	KAl3(SO4)2(OH)6
Anglesite	-5.08	-12.91	-7.83	PbSO4
Anhydrite	-3.20	-7.54	-4.34	CaSO4
Antlerite	-6.52	2.27	8.79	Cu3(OH)4SO4
Aragonite	-1.38	-9.64	-8.26	CaCO3
Arsenolite	-67.16	-70.10	-2.94	As4O6
Artinite	-8.11	1.85	9.96	MgCO3:Mg(OH)2:3H2O
As2O5	-34.37	-27.60	6.77	As2O5
Atacamite	-3.74	3.93	7.67	Cu2(OH)3Cl
Azurite	-4.24	-20.86	-16.62	Cu3(OH)2(CO3)2
Ba(OH)2:8H2O	-16.14	8.42	24.56	Ba(OH)2:8H2O
Ba3(AsO4)2	6.60	-2.35	-8.94	Ba3(AsO4)2
BaCrO4	-14.99	-24.76	-9.77	BaCrO4
BaHPO4	-5.01	-24.79	-19.77	BaHPO4
BaMoO4	-8.22	-15.21	-6.99	BaMoO4
Barite	-0.44	-10.49	-10.05	BaSO4
BaSeO3	-9.57	-7.78	1.79	BaSeO3
BaSeO4	-14.16	-21.68	-7.53	BaSeO4
Bianchite	-8.91	-10.68	-1.76	ZnSO4:6H2O
Birnessite	-11.87	6.22	18.09	MnO2
Bixbyite	-10.29	-10.56	-0.27	Mn2O3
Boehmite	2.45	11.38	8.93	AlOOH
Brochantite	-6.50	9.32	15.83	Cu4(OH)6SO4
Brucite	-5.75	11.44	17.18	Mg(OH)2
Bunsenite	-5.24	7.51	12.74	NiO
Ca3(AsO4)2:4H2O	-15.77	6.53	22.30	Ca3(AsO4)2:4H2O
Ca3(PO4)2(beta)	-3.21	-32.29	-29.08	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-7.04	-54.12	-47.08	Ca4H(PO4)3:3H2O
CaCrO4	-19.62	-21.80	-2.19	CaCrO4
CaHPO4	-2.46	-21.83	-19.37	CaHPO4
CaHPO4:2H2O	-2.77	-21.83	-19.06	CaHPO4:2H2O
Calcite	-1.19	-9.64	-8.46	CaCO3
CaMoO4	-4.31	-12.25	-7.94	CaMoO4
CaSeO3:2H2O	-7.69	-4.82	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-15.73	-18.73	-3.00	CaSeO4:2H2O
Cd(BO2)2	-13.93	-4.09	9.84	Cd(BO2)2
Cd(OH)2	-7.34	6.59	13.93	Cd(OH)2
Cd(OH)2(am)	-7.40	6.59	13.99	Cd(OH)2
Cd3(OH)2(SO4)2	-24.76	-18.05	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-21.70	0.86	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-14.04	-46.64	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-20.95	7.45	28.40	Cd4(OH)6SO4
CdCl2	-13.17	-13.77	-0.60	CdCl2
CdCl2:1H2O	-12.10	-13.77	-1.67	CdCl2:1H2O
CdCl2:2.5H2O	-11.84	-13.77	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-30.15	-16.41	13.74	Cd
Cdmetal(gamma)	-30.25	-16.41	13.84	Cd
CdMoO4	-2.83	-17.04	-14.21	CdMoO4
CdOHCl	-7.22	-3.59	3.63	CdOHCl
CdSe	-13.31	-33.74	-20.43	CdSe
CdSeO4:2H2O	-21.66	-23.51	-1.85	CdSeO4:2H2O
CdSO4	-12.30	-12.32	-0.02	CdSO4
CdSO4:1H2O	-10.69	-12.32	-1.63	CdSO4:1H2O
CdSO4:2.67H2O	-10.50	-12.32	-1.82	CdSO4:2.67H2O
Cerussite	-1.81	-15.01	-13.20	PbCO3

CH4 (g)	-71.20	-113.02	-41.81	CH4
Chalcanthite	-9.19	-11.85	-2.66	CuSO4:5H2O
Claudetite	-66.87	-70.10	-3.23	As4O6
Clausthalite	-6.87	-34.33	-27.46	PbSe
Co (BO2) 2	-30.91	-3.84	27.07	Co (BO2) 2
Co (OH) 2	-6.25	6.84	13.09	Co (OH) 2
Co (OH) 3	-12.03	-14.06	-2.03	Co (OH) 3
CO2 (g)	-2.86	-21.02	-18.16	CO2
Co3 (AsO4) 2	-20.11	-7.08	13.03	Co3 (AsO4) 2
Co3 (PO4) 2	-11.20	-45.89	-34.69	Co3 (PO4) 2
Co3O4	-11.11	-21.28	-10.17	Co3O4
CoCl2	-22.03	-13.53	8.51	CoCl2
CoCl2:6H2O	-16.04	-13.53	2.51	CoCl2:6H2O
CoCO3	-4.24	-14.18	-9.94	CoCO3
CoFe2O4	24.61	21.56	-3.05	CoFe2O4
CoHPO4	-7.31	-26.37	-19.06	CoHPO4
CoMoO4	-9.10	-16.79	-7.69	CoMoO4
CoO	-7.06	6.84	13.90	CoO
CoSe	-17.29	-33.49	-16.20	CoSe
CoSeO3	-10.67	-9.35	1.32	CoSeO3
CoSeO4:6H2O	-21.73	-23.26	-1.53	CoSeO4:6H2O
CoSO4	-15.11	-12.07	3.04	CoSO4
CoSO4:6H2O	-9.59	-12.07	-2.48	CoSO4:6H2O
Cotunnite	-9.50	-14.36	-4.86	PbCl2
Cr (OH) 2	-19.49	-8.57	10.93	Cr (OH) 2
Cr (OH) 3	-1.42	0.00	1.42	Cr (OH) 3
Cr (OH) 3 (am)	0.75	0.00	-0.75	Cr (OH) 3
Cr2O3	2.22	0.01	-2.21	Cr2O3
CrCl2	-43.36	-28.93	14.42	CrCl2
CrCl3	-46.02	-30.54	15.48	CrCl3
Crmetal	-62.56	-31.57	31.00	Cr
CrO3	-29.98	-33.18	-3.19	CrO3
Cu (OH) 2	-1.78	7.06	8.84	Cu (OH) 2
Cu2 (OH) 3NO3	-21.43	-11.96	9.47	Cu2 (OH) 3NO3
Cu2Se (alpha)	2.56	-43.88	-46.44	Cu2Se
Cu2SO4	-20.56	-22.45	-1.89	Cu2SO4
Cu3 (AsO4) 2:2H2O	-12.52	-6.42	6.10	Cu3 (AsO4) 2:2H2O
Cu3 (PO4) 2	-8.39	-45.24	-36.85	Cu3 (PO4) 2
Cu3 (PO4) 2:3H2O	-10.12	-45.24	-35.12	Cu3 (PO4) 2:3H2O
Cu3Se2	-12.64	-77.15	-64.51	Cu3Se2
CuCO3	-2.46	-13.96	-11.50	CuCO3
CuCrO4	-20.68	-26.12	-5.44	CuCrO4
Cumetal	-4.30	-13.27	-8.97	Cu
CuMoO4	-3.46	-16.57	-13.11	CuMoO4
CuOCuSO4	-15.51	-4.79	10.71	CuOCuSO4
Cupricferrite	15.16	21.78	6.62	CuFe2O4
Cuprite	-2.51	-3.54	-1.04	Cu2O
Cuprousferrite	14.46	5.59	-8.87	CuFeO2
CuSe	0.19	-33.27	-33.46	CuSe
CuSe2	-16.82	-50.60	-33.79	CuSe2
CuSeO3:2H2O	-9.75	-9.13	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-20.60	-23.04	-2.44	CuSeO4:5H2O
CuSO4	-15.01	-11.85	3.16	CuSO4
Diaspore	4.20	11.38	7.18	AlOOH
Dolomite (disordered)	-2.82	-19.22	-16.40	CaMg (CO3) 2
Dolomite (ordered)	-2.25	-19.22	-16.97	CaMg (CO3) 2
Epsomite	-5.31	-7.48	-2.16	MgSO4:7H2O
Fe (OH) 2	-4.54	9.02	13.56	Fe (OH) 2
Fe (OH) 2.7Cl1.3	7.35	4.31	-3.04	Fe (OH) 2.7Cl1.3
Fe2 (OH) 4SeO3	-3.03	-1.47	1.55	Fe2 (OH) 4SeO3
Fe2 (SeO3) 3:2H2O	-13.23	-33.86	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-39.00	-42.01	-3.01	Fe2 (SO4) 3
Fe3 (OH) 8	3.52	23.74	20.22	Fe3 (OH) 8
FeAsO4:2H2O	-6.84	-6.44	0.40	FeAsO4:2H2O
FeCr2O4	1.41	9.03	7.62	FeCr2O4
FeMoO4	-4.55	-14.61	-10.06	FeMoO4
Ferrihydrite	3.95	7.36	3.41	Fe (OH) 3
Ferroselite	-29.91	-48.64	-18.74	FeSe2

FeSe	-20.31	-31.31	-11.01	FeSe
Gibbsite	2.80	11.38	8.58	Al(OH)3
Goethite	6.69	7.36	0.67	FeOOH
Goslarite	-8.62	-10.68	-2.05	ZnSO4:7H2O
Gypsum	-2.92	-7.54	-4.61	CaSO4:2H2O
H-Jarosite	-4.33	-15.74	-11.41	(H3O)Fe3(SO4)2(OH)6
H2MoO4	-10.61	-23.63	-13.02	H2MoO4
H2Se(g)	-35.42	-40.33	-4.91	H2Se
Halite	-6.98	-5.39	1.59	NaCl
Hausmannite	-12.61	49.68	62.29	Mn3O4
Hematite	15.75	14.72	-1.03	Fe2O3
Hercynite	7.94	31.77	23.83	FeAl2O4
Hinsdalite	-9.48	-11.98	-2.50	PbAl3PO4SO4(OH)6
Huntite	-8.74	-38.39	-29.65	CaMg3(CO3)4
Hydrocerussite	-5.26	-24.03	-18.77	Pb3(OH)2(CO3)2
Hydromagnesite	-18.78	-26.89	-8.11	Mg5(CO3)4(OH)2:4H2O
Hydroxylapatite	1.59	-42.74	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-6.81	-69.60	-62.79	Pb5(PO4)3OH
K-Alum	-17.70	-22.97	-5.26	KAl(SO4)2:12H2O
K-Jarosite	2.15	-12.26	-14.41	KFe3(SO4)2(OH)6
K2Cr2O7	-41.92	-59.40	-17.48	K2Cr2O7
K2CrO4	-25.65	-26.22	-0.57	K2CrO4
K2MoO4	-19.94	-16.67	3.27	K2MoO4
K2SeO4	-22.41	-23.14	-0.73	K2SeO4
Langite	-8.66	9.32	17.98	Cu4(OH)6SO4:H2O
Larnakite	-6.54	-6.91	-0.37	PbO:PbSO4
Laurionite	-4.80	-4.18	0.62	PbOHCl
Lepidocrocite	5.99	7.36	1.37	FeOOH
Lime	-21.90	11.37	33.28	CaO
Litharge	-6.89	6.00	12.89	PbO
Maghemite	8.33	14.72	6.39	Fe2O3
Magnesioferrite	8.46	26.16	17.69	Fe2MgO4
Magnesite	-2.06	-9.58	-7.52	MgCO3
Magnetite	19.71	23.74	4.03	Fe3O4
Malachite	-1.37	-6.90	-5.53	Cu2(OH)2CO3
Manganite	-4.95	20.39	25.34	MnOOH
Massicot	-7.09	6.00	13.09	PbO
Melanothallite	-19.75	-13.31	6.45	CuCl2
Melanterite	-7.62	-9.89	-2.27	FeSO4:7H2O
Mg(OH)2(active)	-7.36	11.44	18.79	Mg(OH)2
Mg3(PO4)2	-8.82	-32.10	-23.28	Mg3(PO4)2
MgCr2O4	-5.29	11.44	16.74	MgCr2O4
MgCrO4	-27.39	-21.74	5.65	MgCrO4
MgHPO4:3H2O	-3.60	-21.77	-18.18	MgHPO4:3H2O
MgMoO4	-10.34	-12.19	-1.85	MgMoO4
MgSeO3:6H2O	-7.80	-4.76	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-17.47	-18.67	-1.20	MgSeO4:6H2O
Minium	-33.77	41.01	74.78	Pb3O4
Mirabilite	-7.96	-9.32	-1.35	Na2SO4:10H2O
Mn2(SO4)3	-62.07	-67.29	-5.22	Mn2(SO4)3
Mn3(AsO4)2:8H2O	-13.42	-0.92	12.50	Mn3(AsO4)2:8H2O
Mn3(PO4)2	-15.88	-39.73	-23.85	Mn3(PO4)2
MnCl2:4H2O	-14.22	-11.47	2.75	MnCl2:4H2O
MnHPO4	1.09	-24.31	-25.40	MnHPO4
MnSe	-35.23	-31.44	3.79	MnSe
MnSeO3	-8.43	-7.30	1.13	MnSeO3
MnSeO3:2H2O	-8.26	-7.30	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-19.16	-21.21	-2.05	MnSeO4:5H2O
MnSO4	-12.80	-10.02	2.78	MnSO4
Monteponite	-8.82	6.59	15.41	CdO
MoO3	-15.63	-23.63	-8.00	MoO3
Morenosite	-9.22	-11.40	-2.18	NiSO4:7H2O
Na-Jarosite	-0.20	-10.94	-10.75	NaFe3(SO4)2(OH)6
Na2Cr2O7	-46.80	-56.76	-9.96	Na2Cr2O7
Na2CrO4	-26.57	-23.58	2.99	Na2CrO4
Na2Mo2O7	-20.90	-37.66	-16.76	Na2Mo2O7
Na2MoO4	-15.55	-14.03	1.52	Na2MoO4
Na2MoO4:2H2O	-15.26	-14.03	1.22	Na2MoO4:2H2O

Na2SeO3:5H2O	-16.90	-6.60	10.30	Na2SeO3:5H2O
Na2SeO4	-21.79	-20.51	1.28	Na2SeO4
Nantokite	-5.10	-11.95	-6.86	CuCl
Natron	-9.91	-11.42	-1.51	Na2CO3:10H2O
Nesquehonite	-4.98	-9.58	-4.60	MgCO3:3H2O
Ni(OH)2	-5.57	7.51	13.08	Ni(OH)2
Ni3(AsO4)2:8H2O	-20.77	-5.07	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-12.59	-43.89	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-20.88	11.12	32.00	Ni4(OH)6SO4
NiCO3	-6.76	-13.51	-6.75	NiCO3
NiMoO4	-4.97	-16.12	-11.15	NiMoO4
NiSe	-15.12	-32.82	-17.70	NiSe
NiSeO3:2H2O	-11.59	-8.68	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-21.07	-22.59	-1.52	NiSeO4:6H2O
Nsutite	-11.28	6.22	17.50	MnO2
O2(g)	-38.80	46.00	84.80	O2
Otavite	-2.43	-14.43	-12.00	CdCO3
Pb(BO2)2	-11.25	-4.68	6.57	Pb(BO2)2
Pb(OH)2	-2.32	6.00	8.32	Pb(OH)2
Pb10(OH)6O(CO3)6	-57.32	-66.08	-8.76	Pb10(OH)6O(CO3)6
Pb2(OH)3Cl	-6.97	1.82	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-14.18	12.01	26.19	Pb2O(OH)2
Pb2O3	-26.03	35.01	61.04	Pb2O3
Pb2OCO3	-8.58	-9.01	-0.44	Pb2OCO3
Pb3(AsO4)2	-15.39	-9.59	5.80	Pb3(AsO4)2
Pb3(PO4)2	-4.87	-48.40	-43.53	Pb3(PO4)2
Pb3O2CO3	-14.36	-3.01	11.35	Pb3O2CO3
Pb3O2SO4	-11.83	-0.90	10.92	Pb3O2SO4
Pb4(OH)6SO4	-16.00	5.10	21.10	Pb4(OH)6SO4
Pb4O3SO4	-17.18	5.10	22.28	Pb4O3SO4
PbCrO4	-14.44	-27.18	-12.73	PbCrO4
PbHPO4	-3.40	-27.20	-23.81	PbHPO4
Pbmetal	-21.24	-17.00	4.24	Pb
PbMoO4	-1.84	-17.63	-15.78	PbMoO4
PbO:0.3H2O	-6.98	6.00	12.98	PbO:0.33H2O
PbSeO4	-17.21	-24.10	-6.88	PbSeO4
Periclase	-10.60	11.44	22.04	MgO
Phosgenite	-9.57	-29.38	-19.81	PbCl2:PbCO3
Plattnerite	-21.48	29.00	50.49	PbO2
Plumbgummite	6.51	-26.28	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-11.81	11.37	23.19	Ca(OH)2
Pyrochroite	-6.59	8.89	15.48	Mn(OH)2
Pyrolusite	-10.30	31.89	42.19	MnO2
Pyromorphite	4.64	-79.79	-84.43	Pb5(PO4)3Cl
Retgersite	-9.35	-11.40	-2.05	NiSO4:6H2O
Rhodochrosite	-1.55	-12.12	-10.57	MnCO3
Semetal(am)	-10.19	-17.33	-7.14	Se
Semetal(hex)	-9.58	-17.33	-7.76	Se
SeO2	-16.31	-16.19	0.12	SeO2
SeO3	-51.58	-30.10	21.48	SeO3
Siderite	-1.81	-12.00	-10.19	FeCO3
Smithsonite	-2.83	-12.78	-9.95	ZnCO3
Spinel	-3.82	34.19	38.01	MgAl2O4
Strengite	0.53	-25.85	-26.37	FePO4:2H2O
Tenorite	-0.78	7.06	7.84	CuO
Thenardite	-9.66	-9.32	0.35	Na2SO4
Thermonatrite	-12.09	-11.42	0.67	Na2CO3:H2O
Tsumebite	-4.35	-14.14	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	-3.35	-39.35	-36.00	Fe3(PO4)2:8H2O
Witherite	-4.02	-12.60	-8.58	BaCO3
Zincite	-3.37	8.23	11.60	ZnO
Zincosite	-14.85	-10.68	4.18	ZnSO4
Zn(BO2)2	-10.74	-2.45	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-47.16	-43.92	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-3.97	8.23	12.20	Zn(OH)2
Zn(OH)2(am)	-4.48	8.23	12.71	Zn(OH)2
Zn(OH)2(beta)	-3.77	8.23	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-3.54	8.23	11.78	Zn(OH)2

Zn (OH) 2 (gamma)	-3.50	8.23	11.73	Zn (OH) 2
Zn2 (OH) 2SO4	-9.94	-2.44	7.50	Zn2 (OH) 2SO4
Zn2 (OH) 3Cl	-8.91	6.29	15.19	Zn2 (OH) 3Cl
Zn3 (AsO4) 2:2.5H2O	-16.54	-2.89	13.65	Zn3 (AsO4) 2:2.5H2O
Zn3 (PO4) 2:4H2O	-6.29	-41.71	-35.42	Zn3 (PO4) 2:4H2O
Zn3O (SO4) 2	-32.80	-13.12	19.68	Zn3O (SO4) 2
Zn4 (OH) 6SO4	-14.37	14.03	28.40	Zn4 (OH) 6SO4
Zn5 (OH) 8Cl2	-17.70	20.80	38.50	Zn5 (OH) 8Cl2
ZnCl2	-19.40	-12.13	7.27	ZnCl2
ZnCO3:1H2O	-2.52	-12.78	-10.26	ZnCO3:1H2O
Znmetal	-41.01	-14.77	26.25	Zn
ZnMoO4	-5.30	-15.39	-10.09	ZnMoO4
ZnO (active)	-3.22	8.23	11.45	ZnO
ZnSe	-17.62	-32.10	-14.48	ZnSe
ZnSeO4:6H2O	-20.35	-21.87	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-10.17	-10.68	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 4.

End of Run after 0.18 Seconds.

Input file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\Kanmantoo RWD.pqi
Output file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\Kanmantoo RWD.pqi
Database file: C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
\minteq.v4.dat

Reading data base.

SOLUTION_MASTER_SPECIES
SOLUTION_SPECIES
SOLUTION_SPECIES
PHASES
PHASES
SURFACE_MASTER_SPECIES
SURFACE_SPECIES
END

Reading input data for simulation 1.

DATABASE C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
\minteq.v4.dat
SELECTED_OUTPUT 1
file Kanmantoo Source 3 RWD.sel
totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg
Na K Alkalinity Cl S(6)
SOLUTION_MASTER_SPECIES
Co Co+3 -1.0 Co 58.9332
Co(2) Co+2 0.0 Co
Co(3) Co+3 -1.0 Co
END

End of simulation.

Reading input data for simulation 2.

PHASES
CoO
CoO + 2H+ = Co+2 + H2O
log_k 13.5864
delta_h -106.295 kJ
Co(OH)2
Co(OH)2 + 2H+ = Co+2 + 2H2O
log_k 13.094
delta_h -0 kJ
Co(OH)3
Co(OH)3 + 3H+ = Co+3 + 3H2O
log_k -2.309
delta_h -92.43 kJ
Co3O4
Co3O4 + 8H+ = Co+2 + 2Co+3 + 4H2O
log_k -10.4956
delta_h -107.5 kJ
CoFe2O4
CoFe2O4 + 8H+ = Co+2 + 2Fe+3 + 4H2O
log_k -3.5281
delta_h -158.82 kJ
CoCl2
CoCl2 = Co+2 + 2Cl-
log_k 8.2672
delta_h -79.815 kJ
CoCl2:6H2O
CoCl2:6H2O = Co+2 + 2Cl- + 6H2O
log_k 2.5365

```

      delta_h      8.0598      kJ
(Co(NH3)6)Cl3
      (Co(NH3)6)Cl3 + 6H+ = Co+3 + 6NH4+ + 3Cl-
      log_k 20.0317
      delta_h      -33.1      kJ
(Co(NH3)5OH2)Cl3
      (Co(NH3)5OH2)Cl3 + 5H+ = Co+3 + 5NH4+ + 3Cl- + H2O
      log_k 11.7351
      delta_h      -25.37      kJ
(Co(NH3)5Cl)Cl2
      (Co(NH3)5Cl)Cl2 + 5H+ = Co+3 + 5NH4+ + 3Cl-
      log_k 4.5102
      delta_h      -10.74      kJ
CoCO3
      CoCO3 = Co+2 + CO3-2
      log_k -9.98
      delta_h      -12.7612      kJ
CoSO4
      CoSO4 = Co+2 + SO4-2
      log_k 2.8024
      delta_h      -79.277      kJ
CoSO4:6H2O
      CoSO4:6H2O = Co+2 + SO4-2 + 6H2O
      log_k -2.4726
      delta_h      1.0801      kJ
END

```

End of simulation.

Reading input data for simulation 3.

SOLUTION 1 #Mean RWD water quality

```

temp      20
pH        4.05
pe        4
redox     pe
units     mg/l
density   1
Al        1.42
Alkalinity 0
As        0.002
Ba        0.04
Be        0.002
B         0.1
Cd        0.0008
Co        0.72
Cr        0.0033
Cu        6.25
Fe        24.67
Pb        0.02
Mn        5.22
Mo        0.11
Zn        0.49
Se        0.01
Ni        0.49
N         10.07
P         0.29
Ca        522
Mg        88
Na        343
K         245
Cl        490
S(6)     2222
water     1 # kgg

```

Beginning of initial solution calculations.

Initial solution 1.

-----Solution composition-----

Elements	Molality	Moles
Al	5.284e-05	5.284e-05
As	2.680e-08	2.680e-08
B	9.287e-06	9.287e-06
Ba	2.924e-07	2.924e-07
Be	2.228e-07	2.228e-07
Ca	1.308e-02	1.308e-02
Cd	7.145e-09	7.145e-09
Cl	1.388e-02	1.388e-02
Co	1.227e-05	1.227e-05
Cr	6.372e-08	6.372e-08
Cu	9.874e-05	9.874e-05
Fe	4.435e-04	4.435e-04
K	6.291e-03	6.291e-03
Mg	3.635e-03	3.635e-03
Mn	9.539e-05	9.539e-05
Mo	1.151e-06	1.151e-06
N	7.218e-04	7.218e-04
Na	1.498e-02	1.498e-02
Ni	8.382e-06	8.382e-06
P	9.400e-06	9.400e-06
Pb	9.691e-08	9.691e-08
S (6)	2.322e-02	2.322e-02
Se	1.271e-07	1.271e-07
Zn	7.523e-06	7.523e-06

-----Description of solution-----

pH	=	4.050
pe	=	4.000
Activity of water	=	0.999
Ionic strength (mol/kgw)	=	7.235e-02
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	-1.741e-04
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	20.00
Electrical balance (eq)	=	-3.291e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	-3.64
Iterations	=	12
Total H	=	1.110168e+02
Total O	=	5.559979e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.112e-04	8.913e-05	-3.954	-4.050	-0.096	0.00
OH-	9.765e-11	7.686e-11	-10.010	-10.114	-0.104	(0)
H2O	5.551e+01	9.988e-01	1.744	-0.001	0.000	18.05
Al	5.284e-05					
AlSO4+	4.325e-05	3.456e-05	-4.364	-4.461	-0.097	(0)
Al+3	5.995e-06	8.162e-07	-5.222	-6.088	-0.866	(0)
Al(SO4) 2-	3.425e-06	2.737e-06	-5.465	-5.563	-0.097	(0)
AlOH+2	1.549e-07	6.629e-08	-6.810	-7.179	-0.369	(0)
Al(OH) 2+	1.021e-08	8.256e-09	-7.991	-8.083	-0.092	(0)
Al(OH) 3	1.859e-11	1.859e-11	-10.731	-10.731	0.000	(0)
Al(OH) 4-	1.003e-13	8.018e-14	-12.999	-13.096	-0.097	(0)
AlMo6O21-3	3.639e-15	2.171e-16	-14.439	-15.663	-1.224	(0)

As (3)	2.521e-08					
H3AsO3	2.521e-08	2.521e-08	-7.598	-7.598	0.000	(0)
H4AsO3+	1.523e-12	1.113e-12	-11.817	-11.953	-0.136	(0)
H2AsO3-	1.643e-13	1.201e-13	-12.784	-12.920	-0.136	(0)
HAsO3-2	3.453e-21	9.864e-22	-20.462	-21.006	-0.544	(0)
AsO3-3	6.008e-30	3.584e-31	-29.221	-30.446	-1.224	(0)
As (5)	1.588e-09					
H2AsO4-	1.567e-09	1.145e-09	-8.805	-8.941	-0.136	(0)
H3AsO4	1.662e-11	1.690e-11	-10.779	-10.772	0.007	(0)
HAsO4-2	4.832e-12	1.380e-12	-11.316	-11.860	-0.544	(0)
AsO4-3	7.304e-19	4.357e-20	-18.136	-19.361	-1.224	(0)
B	9.287e-06					
H3BO3	9.287e-06	9.443e-06	-5.032	-5.025	0.007	(0)
H2BO3-	7.274e-11	5.627e-11	-10.138	-10.250	-0.111	(0)
CaH2BO3+	1.376e-11	1.065e-11	-10.861	-10.973	-0.111	(0)
MgH2BO3+	2.559e-12	1.980e-12	-11.592	-11.703	-0.111	(0)
NaH2BO3	1.131e-12	1.131e-12	-11.947	-11.947	0.000	(0)
H5 (BO3) 2-	6.034e-16	4.668e-16	-15.219	-15.331	-0.111	(0)
BaH2BO3+	2.636e-16	2.039e-16	-15.579	-15.691	-0.111	(0)
H8 (BO3) 3-	4.932e-19	3.815e-19	-18.307	-18.418	-0.111	(0)
Ba	2.924e-07					
Ba+2	2.924e-07	1.205e-07	-6.534	-6.919	-0.385	(0)
BaNH3+2	8.904e-16	2.544e-16	-15.050	-15.595	-0.544	(0)
BaH2BO3+	2.636e-16	2.039e-16	-15.579	-15.691	-0.111	(0)
BaOH+	4.857e-17	3.908e-17	-16.314	-16.408	-0.094	(0)
BaNO3+	0.000e+00	0.000e+00	-58.243	-58.379	-0.136	(0)
Be	2.228e-07					
Be+2	1.589e-07	6.549e-08	-6.799	-7.184	-0.385	(0)
BeSO4	5.495e-08	5.495e-08	-7.260	-7.260	0.000	(0)
Be (SO4) 2-2	3.956e-09	1.130e-09	-8.403	-8.947	-0.544	(0)
BeOH+	3.590e-09	2.942e-09	-8.445	-8.531	-0.086	(0)
BeCl+	1.430e-09	1.151e-09	-8.845	-8.939	-0.094	(0)
Be (OH) 2	2.095e-13	2.095e-13	-12.679	-12.679	0.000	(0)
Be2OH+3	1.919e-13	3.197e-14	-12.717	-13.495	-0.778	(0)
Be3 (OH) 3+3	3.696e-18	6.156e-19	-17.432	-18.211	-0.778	(0)
Be (OH) 3-	7.246e-19	5.938e-19	-18.140	-18.226	-0.086	(0)
Be (OH) 4-2	9.377e-29	4.228e-29	-28.028	-28.374	-0.346	(0)
Ca	1.308e-02					
Ca+2	8.199e-03	3.380e-03	-2.086	-2.471	-0.385	(0)
CaSO4	4.877e-03	4.877e-03	-2.312	-2.312	0.000	(0)
CaH2PO4+	5.618e-07	4.544e-07	-6.250	-6.343	-0.092	(0)
CaHPO4	6.463e-09	6.463e-09	-8.190	-8.190	0.000	(0)
CaNH3+2	4.981e-11	1.423e-11	-10.303	-10.847	-0.544	(0)
CaH2BO3+	1.376e-11	1.065e-11	-10.861	-10.973	-0.111	(0)
CaOH+	6.009e-12	4.895e-12	-11.221	-11.310	-0.089	(0)
CaPO4-	2.137e-13	1.729e-13	-12.670	-12.762	-0.092	(0)
Ca (NH3) 2+2	6.632e-20	1.894e-20	-19.178	-19.723	-0.544	(0)
CaNO3+	0.000e+00	0.000e+00	-54.018	-54.154	-0.136	(0)
Cd	7.145e-09					
Cd+2	2.961e-09	1.221e-09	-8.529	-8.913	-0.385	(0)
CdSO4	1.783e-09	1.783e-09	-8.749	-8.749	0.000	(0)
CdCl+	1.752e-09	1.281e-09	-8.757	-8.893	-0.136	(0)
Cd (SO4) 2-2	5.911e-10	1.689e-10	-9.228	-9.772	-0.544	(0)
CdCl2	5.825e-11	5.825e-11	-10.235	-10.235	0.000	(0)
CdCl3-	5.300e-13	3.875e-13	-12.276	-12.412	-0.136	(0)
CdOHC1	5.266e-15	5.266e-15	-14.279	-14.279	0.000	(0)
CdOH+	1.026e-15	7.503e-16	-14.989	-15.125	-0.136	(0)
Cd (OH) 2	7.790e-22	7.790e-22	-21.108	-21.108	0.000	(0)
Cd2OH+3	8.185e-23	4.883e-24	-22.087	-23.311	-1.224	(0)
Cd (SeO3) 2-2	5.753e-26	1.643e-26	-25.240	-25.784	-0.544	(0)
Cd (OH) 3-	7.346e-30	5.370e-30	-29.134	-29.270	-0.136	(0)
CdSeO4	3.576e-31	3.576e-31	-30.447	-30.447	0.000	(0)
Cd (OH) 4-2	3.472e-40	0.000e+00	-39.459	-40.004	-0.544	(0)
CdNO3+	0.000e+00	0.000e+00	-60.413	-60.549	-0.136	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-113.111	-113.111	0.000	(0)
Cl	1.388e-02					
Cl-	1.381e-02	1.106e-02	-1.860	-1.956	-0.096	(0)
CuCl2-	2.907e-05	2.306e-05	-4.537	-4.637	-0.101	(0)

CuCl	9.858e-06	9.858e-06	-5.006	-5.006	0.000	(0)
MnCl+	3.569e-07	2.872e-07	-6.447	-6.542	-0.094	(0)
CuCl+	3.164e-07	2.510e-07	-6.500	-6.600	-0.101	(0)
CoCl+	1.315e-07	9.612e-08	-6.881	-7.017	-0.136	(0)
CuCl3-2	1.276e-07	5.349e-08	-6.894	-7.272	-0.378	(0)
NiCl+	8.574e-08	6.268e-08	-7.067	-7.203	-0.136	(0)
ZnCl+	6.136e-08	4.867e-08	-7.212	-7.313	-0.101	(0)
PbCl+	7.379e-09	5.395e-09	-8.132	-8.268	-0.136	(0)
MnCl2	4.488e-09	4.488e-09	-8.348	-8.348	0.000	(0)
CdCl+	1.752e-09	1.281e-09	-8.757	-8.893	-0.136	(0)
BeCl+	1.430e-09	1.151e-09	-8.845	-8.939	-0.094	(0)
CuCl2	7.521e-10	7.521e-10	-9.124	-9.124	0.000	(0)
ZnCl2	6.866e-10	6.866e-10	-9.163	-9.163	0.000	(0)
PbCl2	2.606e-10	2.606e-10	-9.584	-9.584	0.000	(0)
CrCl+2	6.429e-11	1.836e-11	-10.192	-10.736	-0.544	(0)
CdCl2	5.825e-11	5.825e-11	-10.235	-10.235	0.000	(0)
MnCl3-	1.700e-11	1.367e-11	-10.770	-10.864	-0.094	(0)
ZnOHC1	7.463e-12	7.463e-12	-11.127	-11.127	0.000	(0)
ZnCl3-	7.451e-12	5.911e-12	-11.128	-11.228	-0.101	(0)
NiCl2	3.540e-12	3.540e-12	-11.451	-11.451	0.000	(0)
PbCl3-	1.659e-12	1.213e-12	-11.780	-11.916	-0.136	(0)
CdCl3-	5.300e-13	3.875e-13	-12.276	-12.412	-0.136	(0)
CuCl3-	8.945e-14	7.096e-14	-13.048	-13.149	-0.101	(0)
ZnCl4-2	7.493e-14	3.140e-14	-13.125	-13.503	-0.378	(0)
FeCl+2	4.146e-14	1.738e-14	-13.382	-13.760	-0.378	(0)
PbCl4-2	1.993e-14	5.694e-15	-13.700	-14.245	-0.544	(0)
CrCl2+	1.693e-14	1.238e-14	-13.771	-13.907	-0.136	(0)
CdOHC1	5.266e-15	5.266e-15	-14.279	-14.279	0.000	(0)
FeCl2+	1.250e-15	1.006e-15	-14.903	-14.997	-0.094	(0)
CrOHC12	2.136e-16	2.136e-16	-15.670	-15.670	0.000	(0)
CuCl4-2	1.113e-17	4.664e-18	-16.954	-17.331	-0.378	(0)
FeCl3	1.113e-18	1.113e-18	-17.954	-17.954	0.000	(0)
CoCl+2	7.155e-34	2.044e-34	-33.145	-33.690	-0.544	(0)
CrO3Cl-	0.000e+00	0.000e+00	-44.667	-44.803	-0.136	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-47.366	-47.910	-0.544	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-49.862	-50.406	-0.544	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-65.026	-65.570	-0.544	(0)
Co (2)	1.227e-05					
Co+2	8.914e-06	2.546e-06	-5.050	-5.594	-0.544	(0)
CoSO4	3.220e-06	3.220e-06	-5.492	-5.492	0.000	(0)
CoCl+	1.315e-07	9.612e-08	-6.881	-7.017	-0.136	(0)
CoHPO4	1.139e-11	1.139e-11	-10.944	-10.944	0.000	(0)
CoOH+	7.843e-12	5.734e-12	-11.106	-11.242	-0.136	(0)
Co (NH3) +2	5.605e-12	1.601e-12	-11.251	-11.796	-0.544	(0)
Co (OH) 2	5.139e-17	5.139e-17	-16.289	-16.289	0.000	(0)
Co2OH+3	1.226e-17	7.317e-19	-16.911	-18.136	-1.224	(0)
Co (NH3) 2+2	5.113e-19	1.461e-19	-18.291	-18.835	-0.544	(0)
Co (OH) 3-	1.583e-25	1.157e-25	-24.801	-24.937	-0.136	(0)
Co (NH3) 3+2	2.153e-26	6.150e-27	-25.667	-26.211	-0.544	(0)
CoOOH-	6.625e-27	4.844e-27	-26.179	-26.315	-0.136	(0)
CoSeO4	1.849e-27	1.849e-27	-26.733	-26.733	0.000	(0)
Co (NH3) 4+2	3.778e-34	1.079e-34	-33.423	-33.967	-0.544	(0)
Co4 (OH) 4+4	3.238e-35	2.156e-37	-34.490	-36.666	-2.177	(0)
Co (OH) 4-2	7.245e-36	2.070e-36	-35.140	-35.684	-0.544	(0)
Co (NH3) 5+2	0.000e+00	0.000e+00	-41.678	-42.223	-0.544	(0)
CoNO2+	0.000e+00	0.000e+00	-43.791	-43.927	-0.136	(0)
CoNO3+	0.000e+00	0.000e+00	-57.457	-57.593	-0.136	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-109.483	-109.483	0.000	(0)
Co (3)	2.050e-31					
CoOH+2	2.035e-31	5.813e-32	-30.691	-31.236	-0.544	(0)
Co+3	7.446e-34	1.014e-34	-33.128	-33.994	-0.866	(0)
CoCl+2	7.155e-34	2.044e-34	-33.145	-33.690	-0.544	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-49.862	-50.406	-0.544	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-60.792	-60.928	-0.136	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-65.026	-65.570	-0.544	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-68.505	-69.050	-0.544	(0)
Cr (2)	5.033e-20					
Cr+2	5.033e-20	1.438e-20	-19.298	-19.842	-0.544	(0)

Cr (3)	6.372e-08					
CrSO4+	2.618e-08	1.914e-08	-7.582	-7.718	-0.136	(0)
Cr+3	2.571e-08	1.534e-09	-7.590	-8.814	-1.224	(0)
Cr(OH)+2	9.288e-09	2.653e-09	-8.032	-8.576	-0.544	(0)
CrOHSO4	2.437e-09	2.437e-09	-8.613	-8.613	0.000	(0)
CrCl+2	6.429e-11	1.836e-11	-10.192	-10.736	-0.544	(0)
Cr(OH) 2+	2.915e-11	2.131e-11	-10.535	-10.671	-0.136	(0)
CrH2PO4+2	7.383e-12	2.109e-12	-11.132	-11.676	-0.544	(0)
CrCl2+	1.693e-14	1.238e-14	-13.771	-13.907	-0.136	(0)
Cr2(OH) 2SO4+2	1.197e-15	3.419e-16	-14.922	-15.466	-0.544	(0)
Cr(OH) 3	9.036e-16	9.036e-16	-15.044	-15.044	0.000	(0)
CrOHC12	2.136e-16	2.136e-16	-15.670	-15.670	0.000	(0)
Cr2(OH) 2(SO4) 2	1.343e-16	1.343e-16	-15.872	-15.872	0.000	(0)
CrO2-	6.593e-21	4.820e-21	-20.181	-20.317	-0.136	(0)
Cr(OH) 4-	5.552e-21	4.059e-21	-20.256	-20.392	-0.136	(0)
Cr(NH3) 5OH+2	0.000e+00	0.000e+00	-40.611	-41.155	-0.544	(0)
Cr(NH3) 6+3	0.000e+00	0.000e+00	-45.831	-47.056	-1.224	(0)
Cr(NH3) 6Cl+2	0.000e+00	0.000e+00	-47.366	-47.910	-0.544	(0)
CrNO3+2	0.000e+00	0.000e+00	-62.020	-62.564	-0.544	(0)
Cr (6)	3.419e-40					
HCrO4-	3.419e-40	2.500e-40	-39.466	-39.602	-0.136	(0)
CrO4-2	0.000e+00	0.000e+00	-41.671	-42.056	-0.385	(0)
CrO3SO4-2	0.000e+00	0.000e+00	-42.797	-43.341	-0.544	(0)
NaCrO4-	0.000e+00	0.000e+00	-43.159	-43.295	-0.136	(0)
KCrO4-	0.000e+00	0.000e+00	-43.667	-43.803	-0.136	(0)
CrO3HPO4-2	0.000e+00	0.000e+00	-43.693	-44.237	-0.544	(0)
H2CrO4	0.000e+00	0.000e+00	-43.854	-43.854	0.000	(0)
CrO3Cl-	0.000e+00	0.000e+00	-44.667	-44.803	-0.136	(0)
CrO3H2PO4-	0.000e+00	0.000e+00	-45.469	-45.605	-0.136	(0)
Cr2O7-2	0.000e+00	0.000e+00	-77.063	-77.607	-0.544	(0)
Cu (1)	4.003e-05					
CuCl2-	2.907e-05	2.306e-05	-4.537	-4.637	-0.101	(0)
CuCl	9.858e-06	9.858e-06	-5.006	-5.006	0.000	(0)
Cu+	9.682e-07	7.078e-07	-6.014	-6.150	-0.136	(0)
CuCl3-2	1.276e-07	5.349e-08	-6.894	-7.272	-0.378	(0)
Cu (2)	5.872e-05					
Cu+2	3.676e-05	1.515e-05	-4.435	-4.819	-0.385	(0)
CuSO4	2.163e-05	2.163e-05	-4.665	-4.665	0.000	(0)
CuCl+	3.164e-07	2.510e-07	-6.500	-6.600	-0.101	(0)
CuOH+	5.328e-09	4.227e-09	-8.273	-8.374	-0.101	(0)
CuNH3+2	2.979e-09	8.511e-10	-8.526	-9.070	-0.544	(0)
CuCl2	7.521e-10	7.521e-10	-9.124	-9.124	0.000	(0)
Cu2(OH) 2+2	1.518e-12	4.336e-13	-11.819	-12.363	-0.544	(0)
Cu(OH) 2	1.218e-13	1.218e-13	-12.914	-12.914	0.000	(0)
CuCl3-	8.945e-14	7.096e-14	-13.048	-13.149	-0.101	(0)
CuCl4-2	1.113e-17	4.664e-18	-16.954	-17.331	-0.378	(0)
Cu(OH) 3-	3.855e-20	2.818e-20	-19.414	-19.550	-0.136	(0)
Cu(OH) 4-2	8.762e-29	2.503e-29	-28.057	-28.602	-0.544	(0)
CuNO2+	0.000e+00	0.000e+00	-41.845	-41.981	-0.136	(0)
CuNO3+	0.000e+00	0.000e+00	-56.370	-56.506	-0.136	(0)
Cu(NO2) 2	0.000e+00	0.000e+00	-80.152	-80.152	0.000	(0)
Cu(NO3) 2	0.000e+00	0.000e+00	-109.617	-109.617	0.000	(0)
Fe (2)	4.435e-04					
Fe+2	3.080e-04	8.798e-05	-3.511	-4.056	-0.544	(0)
FeSO4	1.352e-04	1.352e-04	-3.869	-3.869	0.000	(0)
FeH2PO4+	3.142e-07	2.541e-07	-6.503	-6.595	-0.092	(0)
FeHPO4	1.436e-09	1.436e-09	-8.843	-8.843	0.000	(0)
FeOH+	3.346e-10	2.692e-10	-9.475	-9.570	-0.094	(0)
Fe(OH) 2	1.556e-17	1.556e-17	-16.808	-16.808	0.000	(0)
Fe(OH) 3-	6.584e-22	5.298e-22	-21.182	-21.276	-0.094	(0)
Fe (3)	2.581e-10					
Fe(OH) 2+	2.410e-10	1.949e-10	-9.618	-9.710	-0.092	(0)
FeOH+2	7.944e-12	3.329e-12	-11.100	-11.478	-0.378	(0)
FeSO4+	4.732e-12	3.807e-12	-11.325	-11.419	-0.094	(0)
FeHPO4+	3.147e-12	2.545e-12	-11.502	-11.594	-0.092	(0)
Fe(SO4) 2-	7.664e-13	5.603e-13	-12.116	-12.252	-0.136	(0)
Fe+3	4.475e-13	6.093e-14	-12.349	-13.215	-0.866	(0)
FeCl+2	4.146e-14	1.738e-14	-13.382	-13.760	-0.378	(0)

FeH2PO4+2	1.558e-14	6.667e-15	-13.807	-14.176	-0.369	(0)
Fe(OH) 3	1.156e-14	1.156e-14	-13.937	-13.937	0.000	(0)
FeCl2+	1.250e-15	1.006e-15	-14.903	-14.997	-0.094	(0)
FeHSeO3+2	4.294e-17	1.227e-17	-16.367	-16.911	-0.544	(0)
FeCl3	1.113e-18	1.113e-18	-17.954	-17.954	0.000	(0)
Fe(OH) 4-	3.068e-19	2.482e-19	-18.513	-18.605	-0.092	(0)
Fe2(OH) 2+4	6.591e-20	4.389e-22	-19.181	-21.358	-2.177	(0)
Fe3(OH) 4+5	2.953e-27	1.173e-30	-26.530	-29.931	-3.401	(0)
FeNO3+2	0.000e+00	0.000e+00	-63.759	-64.303	-0.544	(0)
H(0)	1.164e-19					
H2	5.818e-20	5.915e-20	-19.235	-19.228	0.007	(0)
K	6.291e-03					
K+	6.020e-03	4.823e-03	-2.220	-2.317	-0.096	(0)
KSO4-	2.715e-04	2.196e-04	-3.566	-3.658	-0.092	(0)
KHPO4-	1.854e-10	1.500e-10	-9.732	-9.824	-0.092	(0)
KCrO4-	0.000e+00	0.000e+00	-43.667	-43.803	-0.136	(0)
Mg	3.635e-03					
Mg+2	2.461e-03	1.015e-03	-2.609	-2.994	-0.385	(0)
MgSO4	1.173e-03	1.173e-03	-2.931	-2.931	0.000	(0)
MgH2PO4+	3.599e-07	2.911e-07	-6.444	-6.536	-0.092	(0)
MgHPO4	2.678e-09	2.678e-09	-8.572	-8.572	0.000	(0)
MgOH+	3.488e-11	2.859e-11	-10.457	-10.544	-0.086	(0)
MgH2BO3+	2.559e-12	1.980e-12	-11.592	-11.703	-0.111	(0)
MgPO4-	1.003e-15	8.112e-16	-14.999	-15.091	-0.092	(0)
Mn(2)	9.539e-05					
Mn+2	7.219e-05	2.062e-05	-4.142	-4.686	-0.544	(0)
MnSO4	2.285e-05	2.285e-05	-4.641	-4.641	0.000	(0)
MnCl+	3.569e-07	2.872e-07	-6.447	-6.542	-0.094	(0)
MnCl2	4.488e-09	4.488e-09	-8.348	-8.348	0.000	(0)
MnCl3-	1.700e-11	1.367e-11	-10.770	-10.864	-0.094	(0)
MnOH+	4.948e-12	3.981e-12	-11.306	-11.400	-0.094	(0)
MnSe	3.144e-17	3.144e-17	-16.503	-16.503	0.000	(0)
MnSeO4	7.932e-27	7.932e-27	-26.101	-26.101	0.000	(0)
Mn(OH) 3-	5.717e-28	4.600e-28	-27.243	-27.337	-0.094	(0)
Mn(OH) 4-2	3.999e-37	1.676e-37	-36.398	-36.776	-0.378	(0)
MnNO3+	0.000e+00	0.000e+00	-56.548	-56.684	-0.136	(0)
Mn(NO3) 2	0.000e+00	0.000e+00	-108.478	-108.478	0.000	(0)
Mn(3)	3.223e-26					
Mn+3	3.223e-26	4.387e-27	-25.492	-26.358	-0.866	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-76.457	-76.834	-0.378	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-82.432	-82.540	-0.108	(0)
Mo	1.151e-06					
MoO4-2	4.714e-07	1.943e-07	-6.327	-6.712	-0.385	(0)
HMoO4-	4.107e-07	3.003e-07	-6.386	-6.522	-0.136	(0)
H2MoO4	2.690e-07	2.690e-07	-6.570	-6.570	0.000	(0)
AlMo6O21-3	3.639e-15	2.171e-16	-14.439	-15.663	-1.224	(0)
HMo7O24-5	1.001e-20	3.977e-24	-20.000	-23.400	-3.401	(0)
H2Mo7O24-4	3.158e-21	2.103e-23	-20.501	-22.677	-2.177	(0)
Mo7O24-6	1.548e-21	1.962e-26	-20.810	-25.707	-4.897	(0)
H3Mo7O24-3	5.612e-23	3.348e-24	-22.251	-23.475	-1.224	(0)
N(-3)	7.218e-04					
NH4+	6.757e-04	5.228e-04	-3.170	-3.282	-0.111	(0)
NH4SO4-	4.605e-05	3.705e-05	-4.337	-4.431	-0.094	(0)
CuNH3+2	2.979e-09	8.511e-10	-8.526	-9.070	-0.544	(0)
NH3	2.338e-09	2.338e-09	-8.631	-8.631	0.000	(0)
CaNH3+2	4.981e-11	1.423e-11	-10.303	-10.847	-0.544	(0)
NiNH3+2	2.238e-11	6.394e-12	-10.650	-11.194	-0.544	(0)
Co(NH3) +2	5.605e-12	1.601e-12	-11.251	-11.796	-0.544	(0)
BaNH3+2	8.904e-16	2.544e-16	-15.050	-15.595	-0.544	(0)
Ni(NH3) 2+2	1.471e-17	4.201e-18	-16.833	-17.377	-0.544	(0)
Co(NH3) 2+2	5.113e-19	1.461e-19	-18.291	-18.835	-0.544	(0)
Ca(NH3) 2+2	6.632e-20	1.894e-20	-19.178	-19.723	-0.544	(0)
Co(NH3) 3+2	2.153e-26	6.150e-27	-25.667	-26.211	-0.544	(0)
Co(NH3) 4+2	3.778e-34	1.079e-34	-33.423	-33.967	-0.544	(0)
Cr(NH3) 5OH+2	0.000e+00	0.000e+00	-40.611	-41.155	-0.544	(0)
Co(NH3) 5+2	0.000e+00	0.000e+00	-41.678	-42.223	-0.544	(0)

Cr (NH3) 6+3	0.000e+00	0.000e+00	-45.831	-47.056	-1.224	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-47.366	-47.910	-0.544	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-49.862	-50.406	-0.544	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-60.792	-60.928	-0.136	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-65.026	-65.570	-0.544	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-68.505	-69.050	-0.544	(0)
N (3)	8.441e-40					
NO2-	8.441e-40	6.589e-40	-39.074	-39.181	-0.108	(0)
CuNO2+	0.000e+00	0.000e+00	-41.845	-41.981	-0.136	(0)
CoNO2+	0.000e+00	0.000e+00	-43.791	-43.927	-0.136	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-80.152	-80.152	0.000	(0)
N (5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-52.103	-52.199	-0.096	(0)
CaNO3+	0.000e+00	0.000e+00	-54.018	-54.154	-0.136	(0)
CuNO3+	0.000e+00	0.000e+00	-56.370	-56.506	-0.136	(0)
MnNO3+	0.000e+00	0.000e+00	-56.548	-56.684	-0.136	(0)
NiNO3+	0.000e+00	0.000e+00	-57.311	-57.448	-0.136	(0)
ZnNO3+	0.000e+00	0.000e+00	-57.389	-57.525	-0.136	(0)
CoNO3+	0.000e+00	0.000e+00	-57.457	-57.593	-0.136	(0)
BaNO3+	0.000e+00	0.000e+00	-58.243	-58.379	-0.136	(0)
PbNO3+	0.000e+00	0.000e+00	-58.735	-58.871	-0.136	(0)
CdNO3+	0.000e+00	0.000e+00	-60.413	-60.549	-0.136	(0)
CrNO3+2	0.000e+00	0.000e+00	-62.020	-62.564	-0.544	(0)
FeNO3+2	0.000e+00	0.000e+00	-63.759	-64.303	-0.544	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-108.478	-108.478	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-109.483	-109.483	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-109.617	-109.617	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-110.438	-110.438	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-110.814	-110.814	0.000	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-113.111	-113.111	0.000	(0)
Na	1.498e-02					
Na+	1.447e-02	1.160e-02	-1.839	-1.936	-0.096	(0)
NaSO4-	5.058e-04	4.091e-04	-3.296	-3.388	-0.092	(0)
NaHPO4-	6.904e-10	5.584e-10	-9.161	-9.253	-0.092	(0)
NaH2BO3	1.131e-12	1.131e-12	-11.947	-11.947	0.000	(0)
NaCrO4-	0.000e+00	0.000e+00	-43.159	-43.295	-0.136	(0)
Ni	8.382e-06					
Ni+2	5.447e-06	2.245e-06	-5.264	-5.649	-0.385	(0)
NiSO4	2.847e-06	2.847e-06	-5.546	-5.546	0.000	(0)
NiCl+	8.574e-08	6.268e-08	-7.067	-7.203	-0.136	(0)
Ni (SO4) 2-2	2.272e-09	6.490e-10	-8.644	-9.188	-0.544	(0)
NiNH3+2	2.238e-11	6.394e-12	-10.650	-11.194	-0.544	(0)
NiCl2	3.540e-12	3.540e-12	-11.451	-11.451	0.000	(0)
NiOH+	3.055e-12	2.233e-12	-11.515	-11.651	-0.136	(0)
Ni (OH) 2	2.859e-17	2.859e-17	-16.544	-16.544	0.000	(0)
Ni (NH3) 2+2	1.471e-17	4.201e-18	-16.833	-17.377	-0.544	(0)
Ni (OH) 3-	4.413e-24	3.226e-24	-23.355	-23.491	-0.136	(0)
NiSeO4	1.501e-27	1.501e-27	-26.824	-26.824	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-57.311	-57.448	-0.136	(0)
O (0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.241	-55.234	0.007	(0)
P	9.400e-06					
H2PO4-	8.064e-06	6.522e-06	-5.093	-5.186	-0.092	(0)
CaH2PO4+	5.618e-07	4.544e-07	-6.250	-6.343	-0.092	(0)
MgH2PO4+	3.599e-07	2.911e-07	-6.444	-6.536	-0.092	(0)
FeH2PO4+	3.142e-07	2.541e-07	-6.503	-6.595	-0.092	(0)
H3PO4	7.741e-08	7.741e-08	-7.111	-7.111	0.000	(0)
HPO4-2	1.084e-08	4.544e-09	-7.965	-8.343	-0.378	(0)
CaHPO4	6.463e-09	6.463e-09	-8.190	-8.190	0.000	(0)
MgHPO4	2.678e-09	2.678e-09	-8.572	-8.572	0.000	(0)
FeHPO4	1.436e-09	1.436e-09	-8.843	-8.843	0.000	(0)
NaHPO4-	6.904e-10	5.584e-10	-9.161	-9.253	-0.092	(0)
KHPO4-	1.854e-10	1.500e-10	-9.732	-9.824	-0.092	(0)
CoHPO4	1.139e-11	1.139e-11	-10.944	-10.944	0.000	(0)
CrH2PO4+2	7.383e-12	2.109e-12	-11.132	-11.676	-0.544	(0)
FeHPO4+	3.147e-12	2.545e-12	-11.502	-11.594	-0.092	(0)
CaPO4-	2.137e-13	1.729e-13	-12.670	-12.762	-0.092	(0)
FeH2PO4+2	1.558e-14	6.667e-15	-13.807	-14.176	-0.369	(0)

MgPO4-	1.003e-15	8.112e-16	-14.999	-15.091	-0.092	(0)
PO4-3	1.424e-16	1.939e-17	-15.846	-16.712	-0.866	(0)
CrO3HPO4-2	0.000e+00	0.000e+00	-43.693	-44.237	-0.544	(0)
CrO3H2PO4-	0.000e+00	0.000e+00	-45.469	-45.605	-0.136	(0)
Pb	9.691e-08					
PbSO4	4.727e-08	4.727e-08	-7.325	-7.325	0.000	(0)
Pb+2	3.540e-08	1.459e-08	-7.451	-7.836	-0.385	(0)
PbCl+	7.379e-09	5.395e-09	-8.132	-8.268	-0.136	(0)
Pb (SO4) 2-2	6.595e-09	1.884e-09	-8.181	-8.725	-0.544	(0)
PbCl2	2.606e-10	2.606e-10	-9.584	-9.584	0.000	(0)
PbOH+	5.657e-12	4.136e-12	-11.247	-11.383	-0.136	(0)
PbCl3-	1.659e-12	1.213e-12	-11.780	-11.916	-0.136	(0)
PbCl4-2	1.993e-14	5.694e-15	-13.700	-14.245	-0.544	(0)
Pb2OH+3	1.603e-17	9.564e-19	-16.795	-18.019	-1.224	(0)
Pb (OH) 2	1.476e-17	1.476e-17	-16.831	-16.831	0.000	(0)
Pb (OH) 3-	2.278e-24	1.666e-24	-23.642	-23.778	-0.136	(0)
Pb (OH) 4-2	1.611e-31	4.603e-32	-30.793	-31.337	-0.544	(0)
Pb3 (OH) 4+2	1.005e-31	2.870e-32	-30.998	-31.542	-0.544	(0)
Pb4 (OH) 4+4	6.014e-34	4.005e-36	-33.221	-35.397	-2.177	(0)
PbNO3+	0.000e+00	0.000e+00	-58.735	-58.871	-0.136	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-110.814	-110.814	0.000	(0)
S (6)	2.322e-02					
SO4-2	1.605e-02	6.614e-03	-1.795	-2.180	-0.385	(0)
CaSO4	4.877e-03	4.877e-03	-2.312	-2.312	0.000	(0)
MgSO4	1.173e-03	1.173e-03	-2.931	-2.931	0.000	(0)
NaSO4-	5.058e-04	4.091e-04	-3.296	-3.388	-0.092	(0)
KSO4-	2.715e-04	2.196e-04	-3.566	-3.658	-0.092	(0)
FeSO4	1.352e-04	1.352e-04	-3.869	-3.869	0.000	(0)
HSO4-	6.197e-05	4.952e-05	-4.208	-4.305	-0.097	(0)
NH4SO4-	4.605e-05	3.705e-05	-4.337	-4.431	-0.094	(0)
AlSO4+	4.325e-05	3.456e-05	-4.364	-4.461	-0.097	(0)
MnSO4	2.285e-05	2.285e-05	-4.641	-4.641	0.000	(0)
CuSO4	2.163e-05	2.163e-05	-4.665	-4.665	0.000	(0)
Al (SO4) 2-	3.425e-06	2.737e-06	-5.465	-5.563	-0.097	(0)
CoSO4	3.220e-06	3.220e-06	-5.492	-5.492	0.000	(0)
NiSO4	2.847e-06	2.847e-06	-5.546	-5.546	0.000	(0)
ZnSO4	2.521e-06	2.521e-06	-5.598	-5.598	0.000	(0)
Zn (SO4) 2-2	5.305e-07	1.515e-07	-6.275	-6.819	-0.544	(0)
BeSO4	5.495e-08	5.495e-08	-7.260	-7.260	0.000	(0)
PbSO4	4.727e-08	4.727e-08	-7.325	-7.325	0.000	(0)
CrSO4+	2.618e-08	1.914e-08	-7.582	-7.718	-0.136	(0)
Pb (SO4) 2-2	6.595e-09	1.884e-09	-8.181	-8.725	-0.544	(0)
Be (SO4) 2-2	3.956e-09	1.130e-09	-8.403	-8.947	-0.544	(0)
CrOHSO4	2.437e-09	2.437e-09	-8.613	-8.613	0.000	(0)
Ni (SO4) 2-2	2.272e-09	6.490e-10	-8.644	-9.188	-0.544	(0)
CdSO4	1.783e-09	1.783e-09	-8.749	-8.749	0.000	(0)
Cd (SO4) 2-2	5.911e-10	1.689e-10	-9.228	-9.772	-0.544	(0)
FeSO4+	4.732e-12	3.807e-12	-11.325	-11.419	-0.094	(0)
Fe (SO4) 2-	7.664e-13	5.603e-13	-12.116	-12.252	-0.136	(0)
Cr2 (OH) 2SO4+2	1.197e-15	3.419e-16	-14.922	-15.466	-0.544	(0)
Cr2 (OH) 2 (SO4) 2	1.343e-16	1.343e-16	-15.872	-15.872	0.000	(0)
CrO3SO4-2	0.000e+00	0.000e+00	-42.797	-43.341	-0.544	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-60.792	-60.928	-0.136	(0)
Se (-2)	6.740e-11					
HSe-	4.510e-11	3.297e-11	-10.346	-10.482	-0.136	(0)
H2Se	2.230e-11	2.230e-11	-10.652	-10.652	0.000	(0)
MnSe	3.144e-17	3.144e-17	-16.503	-16.503	0.000	(0)
Se-2	9.300e-22	2.657e-22	-21.032	-21.576	-0.544	(0)
Se (4)	1.271e-07					
HSeO3-	1.238e-07	9.049e-08	-6.907	-7.043	-0.136	(0)
H2SeO3	3.297e-09	3.297e-09	-8.482	-8.482	0.000	(0)
SeO3-2	1.367e-11	3.905e-12	-10.864	-11.408	-0.544	(0)
FeHSeO3+2	4.294e-17	1.227e-17	-16.367	-16.911	-0.544	(0)
Cd (SeO3) 2-2	5.753e-26	1.643e-26	-25.240	-25.784	-0.544	(0)
Se (6)	3.837e-24					
SeO4-2	3.818e-24	1.574e-24	-23.418	-23.803	-0.385	(0)
HSeO4-	8.207e-27	6.000e-27	-26.086	-26.222	-0.136	(0)
MnSeO4	7.932e-27	7.932e-27	-26.101	-26.101	0.000	(0)

CoSeO4	1.849e-27	1.849e-27	-26.733	-26.733	0.000	(0)
NiSeO4	1.501e-27	1.501e-27	-26.824	-26.824	0.000	(0)
ZnSeO4	4.430e-28	4.430e-28	-27.354	-27.354	0.000	(0)
CdSeO4	3.576e-31	3.576e-31	-30.447	-30.447	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-50.607	-51.151	-0.544	(0)
Zn	7.523e-06					
Zn+2	4.410e-06	1.818e-06	-5.356	-5.740	-0.385	(0)
ZnSO4	2.521e-06	2.521e-06	-5.598	-5.598	0.000	(0)
Zn (SO4) 2-2	5.305e-07	1.515e-07	-6.275	-6.819	-0.544	(0)
ZnCl+	6.136e-08	4.867e-08	-7.212	-7.313	-0.101	(0)
ZnCl2	6.866e-10	6.866e-10	-9.163	-9.163	0.000	(0)
ZnOH+	1.911e-11	1.397e-11	-10.719	-10.855	-0.136	(0)
ZnOHCl	7.463e-12	7.463e-12	-11.127	-11.127	0.000	(0)
ZnCl3-	7.451e-12	5.911e-12	-11.128	-11.228	-0.101	(0)
ZnCl4-2	7.493e-14	3.140e-14	-13.125	-13.503	-0.378	(0)
Zn (OH) 2	3.669e-16	3.669e-16	-15.435	-15.435	0.000	(0)
Zn (OH) 3-	2.838e-22	2.075e-22	-21.547	-21.683	-0.136	(0)
ZnSeO4	4.430e-28	4.430e-28	-27.354	-27.354	0.000	(0)
Zn (OH) 4-2	3.263e-30	9.322e-31	-29.486	-30.031	-0.544	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-50.607	-51.151	-0.544	(0)
ZnNO3+	0.000e+00	0.000e+00	-57.389	-57.525	-0.136	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-110.438	-110.438	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2	-142.78	-136.51	6.27	(Co (NH3) 5Cl) (NO3) 2
(Co (NH3) 5Cl) Cl2	-40.56	-36.02	4.54	(Co (NH3) 5Cl) Cl2
(Co (NH3) 5OH2) Cl3	-47.83	-36.02	11.81	(Co (NH3) 5OH2) Cl3
(Co (NH3) 6) (NO3) 3	-203.91	-185.98	17.93	(Co (NH3) 6) (NO3) 3
(Co (NH3) 6) Cl3	-55.38	-35.25	20.13	(Co (NH3) 6) Cl3
(NH4) 2CrO4	-49.00	-48.62	0.38	(NH4) 2CrO4
(NH4) 2SeO4	-30.82	-30.37	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	-5.07	6.06	11.13	Al (OH) 3
Al2 (MoO4) 3	-35.46	-32.31	3.15	Al2 (MoO4) 3
Al2O3	-8.30	12.12	20.43	Al2O3
Al4 (OH) 10SO4	-8.74	13.96	22.70	Al4 (OH) 10SO4
AlAsO4:2H2O	-9.51	-4.71	4.80	AlAsO4:2H2O
AlOHSO4	-0.99	-4.22	-3.23	AlOHSO4
Alunite	0.13	-0.64	-0.77	KAl3 (SO4) 2 (OH) 6
Anglesite	-2.19	-10.02	-7.83	PbSO4
Anhydrite	-0.31	-4.65	-4.34	CaSO4
Antlerite	-9.23	-0.44	8.79	Cu3 (OH) 4SO4
Arsenolite	-27.45	-30.39	-2.94	As4O6
As2O5	-28.32	-21.54	6.77	As2O5
Atacamite	-7.12	0.55	7.67	Cu2 (OH) 3Cl
Ba (OH) 2:8H2O	-23.38	1.18	24.56	Ba (OH) 2:8H2O
Ba3 (AsO4) 2	-9.06	-18.00	-8.94	Ba3 (AsO4) 2
BaCrO4	-39.21	-48.97	-9.77	BaCrO4
BaHPO4	-7.91	-27.68	-19.77	BaHPO4
BaMoO4	-6.64	-13.63	-6.99	BaMoO4
Barite	0.95	-9.10	-10.05	BaSO4
BaSeO3	-11.71	-9.91	1.79	BaSeO3
BaSeO4	-23.20	-30.72	-7.53	BaSeO4
Be (OH) 2 (alpha)	-5.98	0.92	6.89	Be (OH) 2
Be (OH) 2 (am)	-6.28	0.92	7.19	Be (OH) 2
Be (OH) 2 (beta)	-5.58	0.92	6.49	Be (OH) 2
BeMoO4	-12.28	-13.90	-1.61	BeMoO4
BeSeO4:4H2O	-28.05	-30.99	-2.94	BeSeO4:4H2O
Bianchite	-6.16	-7.92	-1.76	ZnSO4:6H2O
Birnessite	-24.25	-6.16	18.09	MnO2
Bixbyite	-28.14	-28.42	-0.27	Mn2O3
Boehmite	-2.87	6.06	8.93	AlOOH
Brochantite	-12.99	2.84	15.83	Cu4 (OH) 6SO4
Brucite	-12.08	5.11	17.18	Mg (OH) 2
Bunsenite	-10.29	2.45	12.74	NiO
Ca3 (AsO4) 2:4H2O	-26.96	-4.66	22.30	Ca3 (AsO4) 2:4H2O

Ca3 (PO4) 2 (beta)	-11.76	-40.84	-29.08	Ca3 (PO4) 2
Ca4H (PO4) 3:3H2O	-16.99	-64.07	-47.08	Ca4H (PO4) 3:3H2O
CaCrO4	-42.34	-44.53	-2.19	CaCrO4
CaHPO4	-3.87	-23.23	-19.37	CaHPO4
CaHPO4:2H2O	-4.17	-23.23	-19.06	CaHPO4:2H2O
CaMoO4	-1.24	-9.18	-7.94	CaMoO4
CaSeO3:2H2O	-8.34	-5.47	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-23.28	-26.28	-3.00	CaSeO4:2H2O
Cd (BO2) 2	-20.70	-10.86	9.84	Cd (BO2) 2
Cd (OH) 2	-14.74	-0.81	13.93	Cd (OH) 2
Cd (OH) 2 (am)	-14.80	-0.81	13.99	Cd (OH) 2
Cd3 (OH) 2 (SO4) 2	-29.71	-23.00	6.71	Cd3 (OH) 2 (SO4) 2
Cd3 (OH) 4SO4	-35.28	-12.72	22.56	Cd3 (OH) 4SO4
Cd3 (PO4) 2	-27.57	-60.17	-32.60	Cd3 (PO4) 2
Cd4 (OH) 6SO4	-41.94	-13.54	28.40	Cd4 (OH) 6SO4
CdCl2	-12.22	-12.83	-0.60	CdCl2
CdCl2:1H2O	-11.16	-12.83	-1.67	CdCl2:1H2O
CdCl2:2.5H2O	-10.89	-12.83	-1.93	CdCl2:2.5H2O
Cdmetal (alpha)	-30.65	-16.91	13.74	Cd
Cdmetal (gamma)	-30.76	-16.91	13.84	Cd
CdMoO4	-1.42	-15.62	-14.21	CdMoO4
CdOHCl	-10.45	-6.82	3.63	CdOHCl
CdSe	5.08	-15.35	-20.43	CdSe
CdSeO4:2H2O	-30.87	-32.72	-1.85	CdSeO4:2H2O
CdSO4	-11.08	-11.09	-0.02	CdSO4
CdSO4:1H2O	-9.46	-11.09	-1.63	CdSO4:1H2O
CdSO4:2.67H2O	-9.28	-11.09	-1.82	CdSO4:2.67H2O
Chalcanthite	-4.34	-7.00	-2.66	CuSO4:5H2O
Claudetite	-27.16	-30.39	-3.23	As4O6
Clausthalite	13.19	-14.27	-27.46	PbSe
Co (BO2) 2	-34.61	-7.54	27.07	Co (BO2) 2
Co (OH) 2	-10.59	2.50	13.09	Co (OH) 2
Co (OH) 3	-19.81	-21.85	-2.03	Co (OH) 3
Co3 (AsO4) 2	-27.06	-14.03	13.03	Co3 (AsO4) 2
Co3 (PO4) 2	-15.52	-50.21	-34.69	Co3 (PO4) 2
Co3O4	-31.01	-41.18	-10.17	Co3O4
CoCl2	-18.01	-9.51	8.51	CoCl2
CoCl2:6H2O	-12.02	-9.51	2.51	CoCl2:6H2O
CoFe2O4	3.43	0.37	-3.05	CoFe2O4
CoHPO4	-7.30	-26.36	-19.06	CoHPO4
CoMoO4	-4.61	-12.31	-7.69	CoMoO4
CoO	-11.40	2.51	13.90	CoO
CoSe	4.17	-12.03	-16.20	CoSe
CoSeO3	-9.91	-8.59	1.32	CoSeO3
CoSeO4:6H2O	-27.87	-29.40	-1.53	CoSeO4:6H2O
CoSO4	-10.81	-7.77	3.04	CoSO4
CoSO4:6H2O	-5.30	-7.78	-2.48	CoSO4:6H2O
Cotunnite	-6.89	-11.75	-4.86	PbCl2
Cr (OH) 2	-22.67	-11.74	10.93	Cr (OH) 2
Cr (OH) 3	-8.05	-6.62	1.42	Cr (OH) 3
Cr (OH) 3 (am)	-5.87	-6.62	-0.75	Cr (OH) 3
Cr2O3	-11.04	-13.24	-2.21	Cr2O3
CrCl2	-38.18	-23.75	14.42	CrCl2
CrCl3	-40.11	-24.64	15.48	CrCl3
Crmetal	-58.84	-27.84	31.00	Cr
CrO3	-46.96	-50.16	-3.19	CrO3
Cu (OH) 2	-5.56	3.28	8.84	Cu (OH) 2
Cu2 (OH) 3NO3	-59.16	-49.69	9.47	Cu2 (OH) 3NO3
Cu2Se (alpha)	27.71	-18.73	-46.44	Cu2Se
Cu2SO4	-12.59	-14.48	-1.89	Cu2SO4
Cu3 (AsO4) 2:2H2O	-17.80	-11.70	6.10	Cu3 (AsO4) 2:2H2O
Cu3 (PO4) 2	-11.03	-47.88	-36.85	Cu3 (PO4) 2
Cu3 (PO4) 2:3H2O	-12.76	-47.88	-35.12	Cu3 (PO4) 2:3H2O
Cu3Se2	34.52	-29.98	-64.51	Cu3Se2
CuCrO4	-41.44	-46.88	-5.44	CuCrO4
Cumetal	-1.18	-10.15	-8.97	Cu
CuMoO4	1.58	-11.53	-13.11	CuMoO4
CuOCuSO4	-14.43	-3.72	10.71	CuOCuSO4

Cupricferrite	-5.47	1.15	6.62	CuFe2O4
Cuprite	-3.17	-4.20	-1.04	Cu2O
Cuprousferrite	5.70	-3.17	-8.87	CuFeO2
CuSe	22.21	-11.25	-33.46	CuSe
CuSe2	24.10	-9.68	-33.79	CuSe2
CuSeO3:2H2O	-8.44	-7.81	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-26.19	-28.63	-2.44	CuSeO4:5H2O
CuSO4	-10.16	-7.00	3.16	CuSO4
Diaspore	-1.12	6.06	7.18	AlOOH
Epsomite	-3.02	-5.18	-2.16	MgSO4:7H2O
Fe(OH)2	-9.52	4.04	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	0.17	-2.87	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-14.78	-13.23	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-14.79	-35.41	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-29.96	-32.97	-3.01	Fe2(SO4)3
Fe3(OH)8	-18.31	1.91	20.22	Fe3(OH)8
FeAsO4:2H2O	-12.24	-11.84	0.40	FeAsO4:2H2O
FeCr2O4	-16.82	-9.20	7.62	FeCr2O4
FeMoO4	-0.71	-10.77	-10.06	FeMoO4
Ferrihydrite	-4.48	-1.07	3.41	Fe(OH)3
Ferroselite	9.82	-8.92	-18.74	FeSe2
FeSe	0.52	-10.49	-11.01	FeSe
Gibbsite	-2.52	6.06	8.58	Al(OH)3
Goethite	-1.74	-1.07	0.67	FeOOH
Goslarite	-5.87	-7.92	-2.05	ZnSO4:7H2O
Gypsum	-0.04	-4.65	-4.61	CaSO4:2H2O
H-Jarosite	-12.35	-23.76	-11.41	(H3O)Fe3(SO4)2(OH)6
H2MoO4	-1.79	-14.81	-13.02	H2MoO4
H2Se(g)	-9.62	-14.53	-4.91	H2Se
Halite	-5.48	-3.89	1.59	NaCl
Hausmannite	-35.95	26.34	62.29	Mn3O4
Hematite	-1.10	-2.13	-1.03	Fe2O3
Hercynite	-7.67	16.17	23.83	FeAl2O4
Hinsdalite	-18.20	-20.70	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-14.11	-58.44	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-22.48	-85.27	-62.79	Pb5(PO4)3OH
K-Alum	-7.51	-12.77	-5.26	KAl(SO4)2:12H2O
K-Jarosite	-7.62	-22.02	-14.41	KFe3(SO4)2(OH)6
K2Cr2O7	-79.36	-96.85	-17.48	K2Cr2O7
K2CrO4	-46.12	-46.69	-0.57	K2CrO4
K2MoO4	-14.62	-11.34	3.27	K2MoO4
K2SeO4	-27.71	-28.44	-0.73	K2SeO4
Langite	-15.14	2.84	17.98	Cu4(OH)6SO4:H2O
Larnakite	-9.38	-9.75	-0.37	PbO:PbSO4
Laurionite	-6.37	-5.74	0.62	PbOHCl
Lepidocrocite	-2.44	-1.07	1.37	FeOOH
Lime	-27.65	5.63	33.28	CaO
Litharge	-12.63	0.26	12.89	PbO
Maghemite	-8.52	-2.13	6.39	Fe2O3
Magnesioferrite	-14.72	2.97	17.69	Fe2MgO4
Magnetite	-2.11	1.91	4.03	Fe3O4
Manganite	-13.88	11.46	25.34	MnOOH
Massicot	-12.83	0.26	13.09	PbO
Melanothallite	-15.18	-8.73	6.45	CuCl2
Melanterite	-3.97	-6.24	-2.27	FeSO4:7H2O
Mg(OH)2(active)	-13.69	5.11	18.79	Mg(OH)2
Mg3(PO4)2	-19.13	-42.41	-23.28	Mg3(PO4)2
MgCr2O4	-24.87	-8.14	16.74	MgCr2O4
MgCrO4	-50.70	-45.05	5.65	MgCrO4
MgHPO4:3H2O	-5.58	-23.76	-18.18	MgHPO4:3H2O
MgMoO4	-7.86	-9.71	-1.85	MgMoO4
MgSeO3:6H2O	-9.03	-5.99	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-25.60	-26.80	-1.20	MgSeO4:6H2O
Minium	-57.89	16.89	74.78	Pb3O4
Mirabilite	-4.70	-6.06	-1.35	Na2SO4:10H2O
Mn2(SO4)3	-54.03	-59.25	-5.22	Mn2(SO4)3
Mn3(AsO4)2:8H2O	-23.81	-11.31	12.50	Mn3(AsO4)2:8H2O
Mn3(PO4)2	-23.63	-47.48	-23.85	Mn3(PO4)2

MnCl2:4H2O	-11.35	-8.60	2.75	MnCl2:4H2O
MnHPO4	-0.05	-25.45	-25.40	MnHPO4
MnSe	-14.91	-11.12	3.79	MnSe
MnSeO3	-8.81	-7.68	1.13	MnSeO3
MnSeO3:2H2O	-8.64	-7.68	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-26.44	-28.49	-2.05	MnSeO4:5H2O
MnSO4	-9.64	-6.87	2.78	MnSO4
Monteponite	-16.23	-0.81	15.41	CdO
MoO3	-6.81	-14.81	-8.00	MoO3
Morenosite	-5.65	-7.83	-2.18	NiSO4:7H2O
Na-Jarosite	-10.90	-21.64	-10.75	NaFe3(SO4)2(OH)6
Na2Cr2O7	-86.12	-96.08	-9.96	Na2Cr2O7
Na2CrO4	-48.92	-45.93	2.99	Na2CrO4
Na2Mo2O7	-8.63	-25.39	-16.76	Na2Mo2O7
Na2MoO4	-12.10	-10.58	1.52	Na2MoO4
Na2MoO4:2H2O	-11.81	-10.58	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-17.17	-6.87	10.30	Na2SeO3:5H2O
Na2SeO4	-28.95	-27.67	1.28	Na2SeO4
Nantokite	-1.25	-8.11	-6.86	CuCl
Ni(OH)2	-10.63	2.45	13.08	Ni(OH)2
Ni3(AsO4)2:8H2O	-29.89	-14.19	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-19.07	-50.37	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-32.48	-0.48	32.00	Ni4(OH)6SO4
NiMoO4	-1.21	-12.36	-11.15	NiMoO4
NiSe	5.62	-12.08	-17.70	NiSe
NiSeO3:2H2O	-11.55	-8.64	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-27.93	-29.45	-1.52	NiSeO4:6H2O
Nsutite	-23.66	-6.16	17.50	MnO2
O2(g)	-52.60	32.20	84.80	O2
Pb(BO2)2	-16.35	-9.78	6.57	Pb(BO2)2
Pb(OH)2	-8.06	0.26	8.32	Pb(OH)2
Pb2(OH)3Cl	-14.27	-5.48	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-25.66	0.53	26.19	Pb2O(OH)2
Pb2O3	-44.41	16.63	61.04	Pb2O3
Pb3(AsO4)2	-26.55	-20.75	5.80	Pb3(AsO4)2
Pb3(PO4)2	-13.40	-56.93	-43.53	Pb3(PO4)2
Pb3O2SO4	-20.41	-9.49	10.92	Pb3O2SO4
Pb4(OH)6SO4	-30.33	-9.23	21.10	Pb4(OH)6SO4
Pb4O3SO4	-31.51	-9.22	22.28	Pb4O3SO4
PbCrO4	-37.16	-49.89	-12.73	PbCrO4
PbHPO4	-4.79	-28.60	-23.81	PbHPO4
Pbmetal	-20.08	-15.84	4.24	Pb
PbMoO4	1.23	-14.55	-15.78	PbMoO4
PbO:0.3H2O	-12.72	0.26	12.98	PbO:0.33H2O
PbSeO4	-24.75	-31.64	-6.88	PbSeO4
Periclase	-16.93	5.11	22.04	MgO
Plattnerite	-34.12	16.36	50.49	PbO2
Plumbgummite	-6.49	-39.28	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-17.56	5.63	23.19	Ca(OH)2
Pyrochroite	-12.07	3.41	15.48	Mn(OH)2
Pyrolusite	-22.68	19.51	42.19	MnO2
Pyromorphite	-6.84	-91.27	-84.43	Pb5(PO4)3Cl
Retgersite	-5.78	-7.83	-2.05	NiSO4:6H2O
Semetal(am)	8.71	1.57	-7.14	Se
Semetal(hex)	9.32	1.57	-7.76	Se
SeO2	-11.21	-11.09	0.12	SeO2
SeO3	-53.38	-31.90	21.48	SeO3
Spinel	-20.78	17.23	38.01	MgAl2O4
Strengite	-3.56	-29.93	-26.37	FePO4:2H2O
Tenorite	-4.56	3.28	7.84	CuO
Thenardite	-6.40	-6.05	0.35	Na2SO4
Tsumebite	-15.27	-25.06	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	-9.60	-45.60	-36.00	Fe3(PO4)2:8H2O
Zincite	-9.24	2.36	11.60	ZnO
Zincosite	-12.10	-7.92	4.18	ZnSO4
Zn(BO2)2	-15.98	-7.69	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-113.38	-110.14	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-9.84	2.36	12.20	Zn(OH)2

Zn(OH)2(am)	-10.36	2.36	12.71	Zn(OH)2
Zn(OH)2(beta)	-9.64	2.36	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-9.42	2.36	11.78	Zn(OH)2
Zn(OH)2(gamma)	-9.38	2.36	11.73	Zn(OH)2
Zn2(OH)2SO4	-13.06	-5.56	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-16.48	-1.29	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-28.12	-14.47	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-15.23	-50.65	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-33.17	-13.48	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-29.24	-0.84	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-38.72	-0.22	38.50	Zn5(OH)8Cl2
ZnCl2	-16.92	-9.65	7.27	ZnCl2
Znmetal	-39.99	-13.74	26.25	Zn
ZnMoO4	-2.36	-12.45	-10.09	ZnMoO4
ZnO(active)	-9.09	2.36	11.45	ZnO
ZnSe	2.30	-12.17	-14.48	ZnSe
ZnSeO4:6H2O	-28.03	-29.55	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.41	-7.92	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 4.

End of Run after 0.243 Seconds.



Appendix C PHREEQC Source Water Mixing Inputs

SELECTED_OUTPUT 1

-file Kanmantoo Scenario 1 mixing.sel
 -totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg Na K
 Alkalinity Cl S(6) Hg

SOLUTION_MASTER_SPECIES

Co	Co+3	-1.0	Co	58.9332
Co(2)	Co+2	0.0	Co	
Co(3)	Co+3	-1.0	Co	

END

PHASES

CoO
 $\text{CoO} + 2\text{H}^+ = \text{Co}^{+2} + \text{H}_2\text{O}$
 log_k 13.5864
 delta_h -106.295 kJ

Co(OH)2
 $\text{Co(OH)}_2 + 2\text{H}^+ = \text{Co}^{+2} + 2\text{H}_2\text{O}$
 log_k 13.094
 delta_h -0 kJ

Co(OH)3
 $\text{Co(OH)}_3 + 3\text{H}^+ = \text{Co}^{+3} + 3\text{H}_2\text{O}$
 log_k -2.309
 delta_h -92.43 kJ

Co3O4
 $\text{Co}_3\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Co}^{+3} + 4\text{H}_2\text{O}$
 log_k -10.4956
 delta_h -107.5 kJ

CoFe2O4
 $\text{CoFe}_2\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Fe}^{+3} + 4\text{H}_2\text{O}$
 log_k -3.5281
 delta_h -158.82 kJ

CoCl2
 $\text{CoCl}_2 = \text{Co}^{+2} + 2\text{Cl}^-$
 log_k 8.2672
 delta_h -79.815 kJ

CoCl2:6H2O
 $\text{CoCl}_2 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + 2\text{Cl}^- + 6\text{H}_2\text{O}$
 log_k 2.5365
 delta_h 8.0598 kJ

(Co(NH3)6)Cl3
 $(\text{Co(NH}_3)_6)\text{Cl}_3 + 6\text{H}^+ = \text{Co}^{+3} + 6\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 20.0317
 delta_h -33.1 kJ

(Co(NH3)5OH2)Cl3
 $(\text{Co(NH}_3)_5\text{OH}_2)\text{Cl}_3 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^- + \text{H}_2\text{O}$
 log_k 11.7351
 delta_h -25.37 kJ

(Co(NH3)5Cl)Cl2
 $(\text{Co(NH}_3)_5\text{Cl})\text{Cl}_2 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 4.5102
 delta_h -10.74 kJ

CoCO3
 $\text{CoCO}_3 = \text{Co}^{+2} + \text{CO}_3^{-2}$
 log_k -9.98
 delta_h -12.7612 kJ

CoSO4
 $\text{CoSO}_4 = \text{Co}^{+2} + \text{SO}_4^{-2}$
 log_k 2.8024
 delta_h -79.277 kJ

CoSO4:6H2O
 $\text{CoSO}_4 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + \text{SO}_4^{-2} + 6\text{H}_2\text{O}$
 log_k -2.4726
 delta_h 1.0801 kJ

END

SOLUTION 1 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

SOLUTION 2 #Mean River Murray water quality

temp	20
pH	7.5
pe	4
redox	pe
units	mg/l
density	1
Al	1.48
Alkalinity	61
As	0.0013
Ba	0.0478
Be	0
B	0.05
Cd	0.0007
Co	0.0006
Cr	0.0021
Cu	0.006
Fe	1.37
Pb	0.0012
Mn	0.06
Mo	0.0003
Zn	0.0164
Se	0.0002
Ni	0.0028
N	1.05
P	0.11
Ca	13
Mg	9
Na	49
K	4
Cl	79
S(6)	17
Hg	0.00008

-water 1 # kg

SOLUTION 3 #Mean Mt Barker water quality

temp	20
pH	6.18
pe	4
redox	pe
units	mg/l
density	1
Al	0.04
Alkalinity	50
As	0.002
Ba	0.012
Be	0
B	0.088
Cd	0
Co	0.039
Cr	0.007
Cu	0.022
Fe	0.493
Pb	0.003
Mn	0.046
Mo	0.009
Zn	0.023
Se	0.002
Ni	0.011
N	24.3
P	0.52
Ca	32
Mg	17
Na	132
K	25
Cl	231
S(6)	190
Hg	0
-water	1 # kg

MIX 1

1	0.03
2	0.485
3	0.485

SELECTED_OUTPUT 1

-file Kanmantoo Scenario 1a mixing.sel
 -totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg Na K
 Alkalinity Cl S(6) Hg

SOLUTION_MASTER_SPECIES

Co Co+3 -1.0 Co 58.9332
 Co(2) Co+2 0.0 Co
 Co(3) Co+3 -1.0 Co
 END

PHASES

CoO
 $\text{CoO} + 2\text{H}^+ = \text{Co}^{+2} + \text{H}_2\text{O}$
 log_k 13.5864
 delta_h -106.295 kJ
 Co(OH)2
 $\text{Co(OH)}_2 + 2\text{H}^+ = \text{Co}^{+2} + 2\text{H}_2\text{O}$
 log_k 13.094
 delta_h -0 kJ
 Co(OH)3
 $\text{Co(OH)}_3 + 3\text{H}^+ = \text{Co}^{+3} + 3\text{H}_2\text{O}$
 log_k -2.309
 delta_h -92.43 kJ
 Co3O4
 $\text{Co}_3\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Co}^{+3} + 4\text{H}_2\text{O}$
 log_k -10.4956
 delta_h -107.5 kJ
 CoFe2O4
 $\text{CoFe}_2\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Fe}^{+3} + 4\text{H}_2\text{O}$
 log_k -3.5281
 delta_h -158.82 kJ
 CoCl2
 $\text{CoCl}_2 = \text{Co}^{+2} + 2\text{Cl}^-$
 log_k 8.2672
 delta_h -79.815 kJ
 CoCl2:6H2O
 $\text{CoCl}_2 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + 2\text{Cl}^- + 6\text{H}_2\text{O}$
 log_k 2.5365
 delta_h 8.0598 kJ
 (Co(NH3)6)Cl3
 $(\text{Co(NH}_3)_6)\text{Cl}_3 + 6\text{H}^+ = \text{Co}^{+3} + 6\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 20.0317
 delta_h -33.1 kJ
 (Co(NH3)5OH2)Cl3
 $(\text{Co(NH}_3)_5\text{OH}_2)\text{Cl}_3 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^- + \text{H}_2\text{O}$
 log_k 11.7351
 delta_h -25.37 kJ
 (Co(NH3)5Cl)Cl2
 $(\text{Co(NH}_3)_5\text{Cl})\text{Cl}_2 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 4.5102
 delta_h -10.74 kJ
 CoCO3
 $\text{CoCO}_3 = \text{Co}^{+2} + \text{CO}_3^{2-}$
 log_k -9.98
 delta_h -12.7612 kJ
 CoSO4
 $\text{CoSO}_4 = \text{Co}^{+2} + \text{SO}_4^{2-}$
 log_k 2.8024
 delta_h -79.277 kJ
 CoSO4:6H2O
 $\text{CoSO}_4 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + \text{SO}_4^{2-} + 6\text{H}_2\text{O}$
 log_k -2.4726
 delta_h 1.0801 kJ
 END

SOLUTION 1 #Groundwater worst case maximum values

temp	21
pH	5.05
pe	1
redox	pe
units	mg/l
density	1
Al	5.21
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.04
Co	24.2
Cr	0
Cu	9.29
Fe	937
Pb	0.01
Mn	171
Mo	0
V	0
Zn	1.78
Se	0.08
Ni	5.57
N	60
P	23.6
Ca	590
Mg	1340
Na	5880
K	216
Cl	9420
S(6)	9110
Hg	0.0004
-water	1 # kg

SOLUTION 2 #Mean River Murray water quality

temp	20
pH	7.5
pe	4
redox	pe
units	mg/l
density	1
Al	1.48
Alkalinity	61
As	0.0013
Ba	0.0478
Be	0
B	0.05
Cd	0.0007
Co	0.0006
Cr	0.0021
Cu	0.006
Fe	1.37
Pb	0.0012
Mn	0.06
Mo	0.0003
Zn	0.0164
Se	0.0002
Ni	0.0028
N	1.05
P	0.11
Ca	13
Mg	9
Na	49
K	4
Cl	79
S(6)	17

Hg 0.00008
-water 1 # kg

SOLUTION 3 #Mean Mt Barker water quality

temp 20
pH 6.18
pe 4
redox pe
units mg/l
density 1
Al 0.04
Alkalinity 50
As 0.002
Ba 0.012
Be 0
B 0.088
Cd 0
Co 0.039
Cr 0.007
Cu 0.022
Fe 0.493
Pb 0.003
Mn 0.046
Mo 0.009
Zn 0.023
Se 0.002
Ni 0.011
N 24.3
P 0.52
Ca 32
Mg 17
Na 132
K 25
Cl 231
S(6) 190
Hg 0
-water 1 # kg

MIX 1
1 0.03
2 0.485
3 0.485

SELECTED_OUTPUT 1

-file Kanmantoo Scenario 2 mixing.sel
 -totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg Na K
 Alkalinity Cl S(6) Hg

SOLUTION_MASTER_SPECIES

Co Co+3 -1.0 Co 58.9332
 Co(2) Co+2 0.0 Co
 Co(3) Co+3 -1.0 Co
 END

PHASES

CoO
 $\text{CoO} + 2\text{H}^+ = \text{Co}^{+2} + \text{H}_2\text{O}$
 log_k 13.5864
 delta_h -106.295 kJ
 Co(OH)2
 $\text{Co(OH)}_2 + 2\text{H}^+ = \text{Co}^{+2} + 2\text{H}_2\text{O}$
 log_k 13.094
 delta_h -0 kJ
 Co(OH)3
 $\text{Co(OH)}_3 + 3\text{H}^+ = \text{Co}^{+3} + 3\text{H}_2\text{O}$
 log_k -2.309
 delta_h -92.43 kJ
 Co3O4
 $\text{Co}_3\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Co}^{+3} + 4\text{H}_2\text{O}$
 log_k -10.4956
 delta_h -107.5 kJ
 CoFe2O4
 $\text{CoFe}_2\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Fe}^{+3} + 4\text{H}_2\text{O}$
 log_k -3.5281
 delta_h -158.82 kJ
 CoCl2
 $\text{CoCl}_2 = \text{Co}^{+2} + 2\text{Cl}^-$
 log_k 8.2672
 delta_h -79.815 kJ
 CoCl2:6H2O
 $\text{CoCl}_2 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + 2\text{Cl}^- + 6\text{H}_2\text{O}$
 log_k 2.5365
 delta_h 8.0598 kJ
 (Co(NH3)6)Cl3
 $(\text{Co(NH}_3)_6)\text{Cl}_3 + 6\text{H}^+ = \text{Co}^{+3} + 6\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 20.0317
 delta_h -33.1 kJ
 (Co(NH3)5OH2)Cl3
 $(\text{Co(NH}_3)_5\text{OH}_2)\text{Cl}_3 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^- + \text{H}_2\text{O}$
 log_k 11.7351
 delta_h -25.37 kJ
 (Co(NH3)5Cl)Cl2
 $(\text{Co(NH}_3)_5\text{Cl})\text{Cl}_2 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 4.5102
 delta_h -10.74 kJ
 CoCO3
 $\text{CoCO}_3 = \text{Co}^{+2} + \text{CO}_3^{-2}$
 log_k -9.98
 delta_h -12.7612 kJ
 CoSO4
 $\text{CoSO}_4 = \text{Co}^{+2} + \text{SO}_4^{-2}$
 log_k 2.8024
 delta_h -79.277 kJ
 CoSO4:6H2O
 $\text{CoSO}_4 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + \text{SO}_4^{-2} + 6\text{H}_2\text{O}$
 log_k -2.4726
 delta_h 1.0801 kJ
 END

SOLUTION 1 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

SOLUTION 2 #Mean River Murray water quality

temp	20
pH	7.5
pe	4
redox	pe
units	mg/l
density	1
Al	1.48
Alkalinity	61
As	0.0013
Ba	0.0478
Be	0
B	0.05
Cd	0.0007
Co	0.0006
Cr	0.0021
Cu	0.006
Fe	1.37
Pb	0.0012
Mn	0.06
Mo	0.0003
Zn	0.0164
Se	0.0002
Ni	0.0028
N	1.05
P	0.11
Ca	13
Mg	9
Na	49
K	4
Cl	79
S(6)	17

Hg 0.00008
-water 1 # kg

SOLUTION 3 #Mean Mt Barker water quality

temp 20
pH 6.18
pe 4
redox pe
units mg/l
density 1
Al 0.04
Alkalinity 50
As 0.002
Ba 0.012
Be 0
B 0.088
Cd 0
Co 0.039
Cr 0.007
Cu 0.022
Fe 0.493
Pb 0.003
Mn 0.046
Mo 0.009
Zn 0.023
Se 0.002
Ni 0.011
N 24.3
P 0.52
Ca 32
Mg 17
Na 132
K 25
Cl 231
S(6) 190
Hg 0
-water 1 # kg

SOLUTION 4 #Mean RWD water quality

temp 20
pH 4.05
pe 4
redox pe
units mg/l
density 1
Al 1.42
Alkalinity 0
As 0.002
Ba 0.04
Be 0.002
B 0.1
Cd 0.0008
Co 0.72
Cr 0.0033
Cu 6.25
Fe 24.67
Pb 0.02
Mn 5.22
Mo 0.11
Zn 0.49
Se 0.01
Ni 0.49
N 10.07
P 0.29
Ca 522
Mg 88
Na 343
K 245

C1	490
S(6)	2222
Hg	0
-water	1 # kg

MIX	1	
	1	0.03
	2	0.1
	3	0.1
	4	0.77

SELECTED_OUTPUT 1

-file Kanmantoo Scenario 2a mixing.sel
 -totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg Na K
 Alkalinity Cl S(6) Hg

SOLUTION_MASTER_SPECIES

Co Co+3 -1.0 Co 58.9332
 Co(2) Co+2 0.0 Co
 Co(3) Co+3 -1.0 Co
 END

PHASES

CoO
 $\text{CoO} + 2\text{H}^+ = \text{Co}^{+2} + \text{H}_2\text{O}$
 log_k 13.5864
 delta_h -106.295 kJ
 Co(OH)2
 $\text{Co(OH)}_2 + 2\text{H}^+ = \text{Co}^{+2} + 2\text{H}_2\text{O}$
 log_k 13.094
 delta_h -0 kJ
 Co(OH)3
 $\text{Co(OH)}_3 + 3\text{H}^+ = \text{Co}^{+3} + 3\text{H}_2\text{O}$
 log_k -2.309
 delta_h -92.43 kJ
 Co3O4
 $\text{Co}_3\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Co}^{+3} + 4\text{H}_2\text{O}$
 log_k -10.4956
 delta_h -107.5 kJ
 CoFe2O4
 $\text{CoFe}_2\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Fe}^{+3} + 4\text{H}_2\text{O}$
 log_k -3.5281
 delta_h -158.82 kJ
 CoCl2
 $\text{CoCl}_2 = \text{Co}^{+2} + 2\text{Cl}^-$
 log_k 8.2672
 delta_h -79.815 kJ
 CoCl2:6H2O
 $\text{CoCl}_2 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + 2\text{Cl}^- + 6\text{H}_2\text{O}$
 log_k 2.5365
 delta_h 8.0598 kJ
 (Co(NH3)6)Cl3
 $(\text{Co(NH}_3)_6)\text{Cl}_3 + 6\text{H}^+ = \text{Co}^{+3} + 6\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 20.0317
 delta_h -33.1 kJ
 (Co(NH3)5OH2)Cl3
 $(\text{Co(NH}_3)_5\text{OH}_2)\text{Cl}_3 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^- + \text{H}_2\text{O}$
 log_k 11.7351
 delta_h -25.37 kJ
 (Co(NH3)5Cl)Cl2
 $(\text{Co(NH}_3)_5\text{Cl})\text{Cl}_2 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 4.5102
 delta_h -10.74 kJ
 CoCO3
 $\text{CoCO}_3 = \text{Co}^{+2} + \text{CO}_3^{-2}$
 log_k -9.98
 delta_h -12.7612 kJ
 CoSO4
 $\text{CoSO}_4 = \text{Co}^{+2} + \text{SO}_4^{-2}$
 log_k 2.8024
 delta_h -79.277 kJ
 CoSO4:6H2O
 $\text{CoSO}_4 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + \text{SO}_4^{-2} + 6\text{H}_2\text{O}$
 log_k -2.4726
 delta_h 1.0801 kJ
 END

SOLUTION 1 #Groundwater worst case maximum values

temp	21
pH	5.05
pe	1
redox	pe
units	mg/l
density	1
Al	5.21
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.04
Co	24.2
Cr	0
Cu	9.29
Fe	937
Pb	0.01
Mn	171
Mo	0
V	0
Zn	1.78
Se	0.08
Ni	5.57
N	60
P	23.6
Ca	590
Mg	1340
Na	5880
K	216
Cl	9420
S(6)	9110
Hg	0.0004
-water	1 # kg

SOLUTION 2 #Mean River Murray water quality

temp	20
pH	7.5
pe	4
redox	pe
units	mg/l
density	1
Al	1.48
Alkalinity	61
As	0.0013
Ba	0.0478
Be	0
B	0.05
Cd	0.0007
Co	0.0006
Cr	0.0021
Cu	0.006
Fe	1.37
Pb	0.0012
Mn	0.06
Mo	0.0003
Zn	0.0164
Se	0.0002
Ni	0.0028
N	1.05
P	0.11
Ca	13
Mg	9
Na	49
K	4
Cl	79
S(6)	17

Hg 0.00008
-water 1 # kg

SOLUTION 3 #Mean Mt Barker water quality

temp 20
pH 6.18
pe 4
redox pe
units mg/l
density 1
Al 0.04
Alkalinity 50
As 0.002
Ba 0.012
Be 0
B 0.088
Cd 0
Co 0.039
Cr 0.007
Cu 0.022
Fe 0.493
Pb 0.003
Mn 0.046
Mo 0.009
Zn 0.023
Se 0.002
Ni 0.011
N 24.3
P 0.52
Ca 32
Mg 17
Na 132
K 25
Cl 231
S(6) 190
Hg 0
-water 1 # kg

SOLUTION 4 #Mean RWD water quality

temp 20
pH 4.05
pe 4
redox pe
units mg/l
density 1
Al 1.42
Alkalinity 0
As 0.002
Ba 0.04
Be 0.002
B 0.1
Cd 0.0008
Co 0.72
Cr 0.0033
Cu 6.25
Fe 24.67
Pb 0.02
Mn 5.22
Mo 0.11
Zn 0.49
Se 0.01
Ni 0.49
N 10.07
P 0.29
Ca 522
Mg 88
Na 343
K 245

C1	490
S(6)	2222
Hg	0
-water	1 # kg

MIX	1	
	1	0.03
	2	0.1
	3	0.1
	4	0.77

SELECTED_OUTPUT 1

-file Kanmantoo Scenario 3 mixing.sel
 -totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg Na K
 Alkalinity Cl S(6) Hg

SOLUTION_MASTER_SPECIES

Co Co+3 -1.0 Co 58.9332
 Co(2) Co+2 0.0 Co
 Co(3) Co+3 -1.0 Co
 END

PHASES

CoO
 $\text{CoO} + 2\text{H}^+ = \text{Co}^{+2} + \text{H}_2\text{O}$
 log_k 13.5864
 delta_h -106.295 kJ
 Co(OH)2
 $\text{Co(OH)}_2 + 2\text{H}^+ = \text{Co}^{+2} + 2\text{H}_2\text{O}$
 log_k 13.094
 delta_h -0 kJ
 Co(OH)3
 $\text{Co(OH)}_3 + 3\text{H}^+ = \text{Co}^{+3} + 3\text{H}_2\text{O}$
 log_k -2.309
 delta_h -92.43 kJ
 Co3O4
 $\text{Co}_3\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Co}^{+3} + 4\text{H}_2\text{O}$
 log_k -10.4956
 delta_h -107.5 kJ
 CoFe2O4
 $\text{CoFe}_2\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Fe}^{+3} + 4\text{H}_2\text{O}$
 log_k -3.5281
 delta_h -158.82 kJ
 CoCl2
 $\text{CoCl}_2 = \text{Co}^{+2} + 2\text{Cl}^-$
 log_k 8.2672
 delta_h -79.815 kJ
 CoCl2:6H2O
 $\text{CoCl}_2 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + 2\text{Cl}^- + 6\text{H}_2\text{O}$
 log_k 2.5365
 delta_h 8.0598 kJ
 (Co(NH3)6)Cl3
 $(\text{Co(NH}_3)_6)\text{Cl}_3 + 6\text{H}^+ = \text{Co}^{+3} + 6\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 20.0317
 delta_h -33.1 kJ
 (Co(NH3)5OH2)Cl3
 $(\text{Co(NH}_3)_5\text{OH}_2)\text{Cl}_3 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^- + \text{H}_2\text{O}$
 log_k 11.7351
 delta_h -25.37 kJ
 (Co(NH3)5Cl)Cl2
 $(\text{Co(NH}_3)_5\text{Cl})\text{Cl}_2 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 4.5102
 delta_h -10.74 kJ
 CoCO3
 $\text{CoCO}_3 = \text{Co}^{+2} + \text{CO}_3^{-2}$
 log_k -9.98
 delta_h -12.7612 kJ
 CoSO4
 $\text{CoSO}_4 = \text{Co}^{+2} + \text{SO}_4^{-2}$
 log_k 2.8024
 delta_h -79.277 kJ
 CoSO4:6H2O
 $\text{CoSO}_4 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + \text{SO}_4^{-2} + 6\text{H}_2\text{O}$
 log_k -2.4726
 delta_h 1.0801 kJ
 END

SOLUTION 1 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

SOLUTION 2 #Mean River Murray water quality

temp	20
pH	7.5
pe	4
redox	pe
units	mg/l
density	1
Al	1.48
Alkalinity	61
As	0.0013
Ba	0.0478
Be	0
B	0.05
Cd	0.0007
Co	0.0006
Cr	0.0021
Cu	0.006
Fe	1.37
Pb	0.0012
Mn	0.06
Mo	0.0003
Zn	0.0164
Se	0.0002
Ni	0.0028
N	1.05
P	0.11
Ca	13
Mg	9
Na	49
K	4
Cl	79
S(6)	17

Hg 0.00008
-water 1 # kg

SOLUTION 3 #Mean Mt Barker water quality

temp 20
pH 6.18
pe 4
redox pe
units mg/l
density 1
Al 0.04
Alkalinity 50
As 0.002
Ba 0.012
Be 0
B 0.088
Cd 0
Co 0.039
Cr 0.007
Cu 0.022
Fe 0.493
Pb 0.003
Mn 0.046
Mo 0.009
Zn 0.023
Se 0.002
Ni 0.011
N 24.3
P 0.52
Ca 32
Mg 17
Na 132
K 25
Cl 231
S(6) 190
Hg 0
-water 1 # kg

SOLUTION 4 #Mean RWD water quality TREATED

temp 20
pH 4.75
pe 4
redox pe
units mg/l
density 1
Al 0.00008
Alkalinity 0
As 0.002
Ba 0.04
Be 0.002
B 0.1
Cd 0.0008
Co 0.72
Cr 0.0033
Cu 6.25
Fe 0.02
Pb 0.02
Mn 0.00001
Mo 0.11
Zn 0.49
Se 0.01
Ni 0.49
N 10.07
P 0.29
Ca 522
Mg 88
Na 343
K 245

C1	490
S(6)	2222
Hg	0
-water	1 # kg

MIX	1	
	1	0.03
	2	0.1
	3	0.1
	4	0.77

SELECTED_OUTPUT 1

-file Kanmantoo Scenario 3a mixing.sel
 -totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg Na K
 Alkalinity Cl S(6) Hg

SOLUTION_MASTER_SPECIES

Co Co+3 -1.0 Co 58.9332
 Co(2) Co+2 0.0 Co
 Co(3) Co+3 -1.0 Co
 END

PHASES

CoO
 $\text{CoO} + 2\text{H}^+ = \text{Co}^{+2} + \text{H}_2\text{O}$
 log_k 13.5864
 delta_h -106.295 kJ
 Co(OH)2
 $\text{Co(OH)}_2 + 2\text{H}^+ = \text{Co}^{+2} + 2\text{H}_2\text{O}$
 log_k 13.094
 delta_h -0 kJ
 Co(OH)3
 $\text{Co(OH)}_3 + 3\text{H}^+ = \text{Co}^{+3} + 3\text{H}_2\text{O}$
 log_k -2.309
 delta_h -92.43 kJ
 Co3O4
 $\text{Co}_3\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Co}^{+3} + 4\text{H}_2\text{O}$
 log_k -10.4956
 delta_h -107.5 kJ
 CoFe2O4
 $\text{CoFe}_2\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Fe}^{+3} + 4\text{H}_2\text{O}$
 log_k -3.5281
 delta_h -158.82 kJ
 CoCl2
 $\text{CoCl}_2 = \text{Co}^{+2} + 2\text{Cl}^-$
 log_k 8.2672
 delta_h -79.815 kJ
 CoCl2:6H2O
 $\text{CoCl}_2 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + 2\text{Cl}^- + 6\text{H}_2\text{O}$
 log_k 2.5365
 delta_h 8.0598 kJ
 (Co(NH3)6)Cl3
 $(\text{Co(NH}_3)_6)\text{Cl}_3 + 6\text{H}^+ = \text{Co}^{+3} + 6\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 20.0317
 delta_h -33.1 kJ
 (Co(NH3)5OH2)Cl3
 $(\text{Co(NH}_3)_5\text{OH}_2)\text{Cl}_3 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^- + \text{H}_2\text{O}$
 log_k 11.7351
 delta_h -25.37 kJ
 (Co(NH3)5Cl)Cl2
 $(\text{Co(NH}_3)_5\text{Cl})\text{Cl}_2 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 4.5102
 delta_h -10.74 kJ
 CoCO3
 $\text{CoCO}_3 = \text{Co}^{+2} + \text{CO}_3^{-2}$
 log_k -9.98
 delta_h -12.7612 kJ
 CoSO4
 $\text{CoSO}_4 = \text{Co}^{+2} + \text{SO}_4^{-2}$
 log_k 2.8024
 delta_h -79.277 kJ
 CoSO4:6H2O
 $\text{CoSO}_4 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + \text{SO}_4^{-2} + 6\text{H}_2\text{O}$
 log_k -2.4726
 delta_h 1.0801 kJ
 END

SOLUTION 1 #Groundwater worst case maximum values

temp	21
pH	5.05
pe	1
redox	pe
units	mg/l
density	1
Al	5.21
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.04
Co	24.2
Cr	0
Cu	9.29
Fe	937
Pb	0.01
Mn	171
Mo	0
V	0
Zn	1.78
Se	0.08
Ni	5.57
N	60
P	23.6
Ca	590
Mg	1340
Na	5880
K	216
Cl	9420
S(6)	9110
Hg	0.0004
-water	1 # kg

SOLUTION 2 #Mean River Murray water quality

temp	20
pH	7.5
pe	4
redox	pe
units	mg/l
density	1
Al	1.48
Alkalinity	61
As	0.0013
Ba	0.0478
Be	0
B	0.05
Cd	0.0007
Co	0.0006
Cr	0.0021
Cu	0.006
Fe	1.37
Pb	0.0012
Mn	0.06
Mo	0.0003
Zn	0.0164
Se	0.0002
Ni	0.0028
N	1.05
P	0.11
Ca	13
Mg	9
Na	49
K	4
Cl	79
S(6)	17

Hg 0.00008
-water 1 # kg

SOLUTION 3 #Mean Mt Barker water quality

temp 20
pH 6.18
pe 4
redox pe
units mg/l
density 1
Al 0.04
Alkalinity 50
As 0.002
Ba 0.012
Be 0
B 0.088
Cd 0
Co 0.039
Cr 0.007
Cu 0.022
Fe 0.493
Pb 0.003
Mn 0.046
Mo 0.009
Zn 0.023
Se 0.002
Ni 0.011
N 24.3
P 0.52
Ca 32
Mg 17
Na 132
K 25
Cl 231
S(6) 190
Hg 0
-water 1 # kg

SOLUTION 4 #Mean RWD water quality TREATED

temp 20
pH 4.75
pe 4
redox pe
units mg/l
density 1
Al 0.00008
Alkalinity 0
As 0.002
Ba 0.04
Be 0.002
B 0.1
Cd 0.0008
Co 0.72
Cr 0.0033
Cu 6.25
Fe 0.02
Pb 0.02
Mn 0.00001
Mo 0.11
Zn 0.49
Se 0.01
Ni 0.49
N 10.07
P 0.29
Ca 522
Mg 88
Na 343
K 245

C1	490
S(6)	2222
Hg	0
-water	1 # kg

MIX	1	
	1	0.03
	2	0.1
	3	0.1
	4	0.77



Appendix D PHREEQC Source Water Mixing Inputs

Input file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\PHREEQC\2 Mixing
\Kanmantoo Scenario 1 mixing.pqi
Output file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\PHREEQC\2 Mixing
\Kanmantoo Scenario 1 mixing.pqi
Database file: C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
\minteq.v4.dat

Reading data base.

SOLUTION_MASTER_SPECIES
SOLUTION_SPECIES
SOLUTION_SPECIES
PHASES
PHASES
SURFACE_MASTER_SPECIES
SURFACE_SPECIES
END

Reading input data for simulation 1.

DATABASE C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
\minteq.v4.dat
SELECTED_OUTPUT 1
file Kanmantoo Scenario 1 mixing.sel
totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg
Na K Alkalinity Cl S(6) Hg
SOLUTION_MASTER_SPECIES
Co Co+3 -1.0 Co 58.9332
Co(2) Co+2 0.0 Co
Co(3) Co+3 -1.0 Co
END

End of simulation.

Reading input data for simulation 2.

PHASES
CoO
CoO + 2H+ = Co+2 + H2O
log_k 13.5864
delta_h -106.295 kJ
Co(OH)2
Co(OH)2 + 2H+ = Co+2 + 2H2O
log_k 13.094
delta_h -0 kJ
Co(OH)3
Co(OH)3 + 3H+ = Co+3 + 3H2O
log_k -2.309
delta_h -92.43 kJ
Co3O4
Co3O4 + 8H+ = Co+2 + 2Co+3 + 4H2O
log_k -10.4956
delta_h -107.5 kJ
CoFe2O4
CoFe2O4 + 8H+ = Co+2 + 2Fe+3 + 4H2O
log_k -3.5281
delta_h -158.82 kJ
CoCl2
CoCl2 = Co+2 + 2Cl-
log_k 8.2672
delta_h -79.815 kJ
CoCl2:6H2O

```

      CoCl2:6H2O = Co+2 + 2Cl- + 6H2O
      log_k 2.5365
      delta_h      8.0598      kJ
(Co(NH3)6)Cl3
      (Co(NH3)6)Cl3 + 6H+ = Co+3 + 6NH4+ + 3Cl-
      log_k 20.0317
      delta_h      -33.1      kJ
(Co(NH3)5OH2)Cl3
      (Co(NH3)5OH2)Cl3 + 5H+ = Co+3 + 5NH4+ + 3Cl- + H2O
      log_k 11.7351
      delta_h      -25.37      kJ
(Co(NH3)5Cl)Cl2
      (Co(NH3)5Cl)Cl2 + 5H+ = Co+3 + 5NH4+ + 3Cl-
      log_k 4.5102
      delta_h      -10.74      kJ
CoCO3
      CoCO3 = Co+2 + CO3-2
      log_k -9.98
      delta_h      -12.7612      kJ
CoSO4
      CoSO4 = Co+2 + SO4-2
      log_k 2.8024
      delta_h      -79.277      kJ
CoSO4:6H2O
      CoSO4:6H2O = Co+2 + SO4-2 + 6H2O
      log_k -2.4726
      delta_h      1.0801      kJ

```

END

End of simulation.

Reading input data for simulation 3.

SOLUTION 1 # Mean Groundwater quality

```

temp      21
pH         6.79
pe         1
redox      pe
units      mg/l
density    1
Al         0.37
Alkalinity 0
As         0
Ba         0
Be         0
B          0
Cd         0.003
Co         2.34
Cr         0
Cu         0.31
Fe         100.34
Pb         0.003
Mn         12.2
Mo         0
V          0
Zn         0.17
Se         0.03
Ni         0.45
N          7
P          0.68
Ca         130
Mg         246
Na         1094
K          62
Cl         1533

```

S(6)	1485
Hg	0.0002
water	1 # kg
SOLUTION 2 #Mean River Murray water quality	
temp	20
pH	7.5
pe	4
redox	pe
units	mg/l
density	1
Al	1.48
Alkalinity	61
As	0.0013
Ba	0.0478
Be	0
B	0.05
Cd	0.0007
Co	0.0006
Cr	0.0021
Cu	0.006
Fe	1.37
Pb	0.0012
Mn	0.06
Mo	0.0003
Zn	0.0164
Se	0.0002
Ni	0.0028
N	1.05
P	0.11
Ca	13
Mg	9
Na	49
K	4
Cl	79
S(6)	17
Hg	0.00008
water	1 # kg
SOLUTION 3 #Mean Mt Barker water quality	
temp	20
pH	6.18
pe	4
redox	pe
units	mg/l
density	1
Al	0.04
Alkalinity	50
As	0.002
Ba	0.012
Be	0
B	0.088
Cd	0
Co	0.039
Cr	0.007
Cu	0.022
Fe	0.493
Pb	0.003
Mn	0.046
Mo	0.009
Zn	0.023
Se	0.002
Ni	0.011
N	24.3
P	0.52
Ca	32
Mg	17
Na	132
K	25
Cl	231

```

S(6)      190
Hg         0
water     1 # kg
MIX 1
1         0.03
2         0.485
3         0.485

```

Beginning of initial solution calculations.

Initial solution 1.

-----Solution composition-----

Elements	Molality	Moles
Al	1.378e-05	1.378e-05
Ca	3.259e-03	3.259e-03
Cd	2.681e-08	2.681e-08
Cl	4.344e-02	4.344e-02
Co	3.989e-05	3.989e-05
Cu	4.901e-06	4.901e-06
Fe	1.805e-03	1.805e-03
Hg	1.002e-09	1.002e-09
K	1.593e-03	1.593e-03
Mg	1.017e-02	1.017e-02
Mn	2.231e-04	2.231e-04
N	5.021e-04	5.021e-04
Na	4.781e-02	4.781e-02
Ni	7.703e-06	7.703e-06
P	2.206e-05	2.206e-05
Pb	1.455e-08	1.455e-08
S(6)	1.553e-02	1.553e-02
Se	3.817e-07	3.817e-07
Zn	2.612e-06	2.612e-06

-----Description of solution-----

```

pH = 6.790
pe = 1.000
Activity of water = 0.998
Ionic strength (mol/kgw) = 9.259e-02
Mass of water (kg) = 1.000e+00
Total alkalinity (eq/kg) = 6.274e-05
Total carbon (mol/kg) = 0.000e+00
Total CO2 (mol/kg) = 0.000e+00
Temperature (°C) = 21.00
Electrical balance (eq) = 6.374e-03
Percent error, 100*(Cat-|An|)/(Cat+|An|) = 4.58
Iterations = 13
Total H = 1.110158e+02
Total O = 5.556909e+01

```

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.061e-07	1.622e-07	-6.686	-6.790	-0.104	0.00
OH-	5.935e-08	4.562e-08	-7.227	-7.341	-0.114	(0)
H2O	5.551e+01	9.980e-01	1.744	-0.001	0.000	18.05
Al	1.378e-05					
Al(OH) 4-	8.973e-06	7.024e-06	-5.047	-5.153	-0.106	(0)
Al(OH) 2+	2.373e-06	1.884e-06	-5.625	-5.725	-0.100	(0)
Al(OH) 3	2.329e-06	2.329e-06	-5.633	-5.633	0.000	(0)
AlOH+2	7.409e-08	2.945e-08	-7.130	-7.531	-0.401	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)

	Al+3	5.344e-09	6.178e-10	-8.272	-9.209	-0.937	(0)
	Al (SO4) 2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ca		3.259e-03					
	Ca+2	2.406e-03	9.221e-04	-2.619	-3.035	-0.416	(0)
	CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
	CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
	CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
	CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
	CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
	CaOH+	1.001e-09	8.020e-10	-8.999	-9.096	-0.096	(0)
	Ca (NH3) 2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
	CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
Cd		2.681e-08					
	CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
	Cd+2	7.874e-09	3.018e-09	-8.104	-8.520	-0.416	(0)
	CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
	CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
	Cd (SO4) 2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
	CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
	CdOHC1	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
	CdOH+	1.568e-12	1.100e-12	-11.805	-11.959	-0.154	(0)
	Cd (OH) 2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
	Cd2OH+3	4.264e-19	1.748e-20	-18.370	-19.758	-1.387	(0)
	Cd (SeO3) 2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
	Cd (OH) 3-	3.135e-21	2.198e-21	-20.504	-20.658	-0.154	(0)
	CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
	Cd (OH) 4-2	9.222e-29	2.230e-29	-28.035	-28.652	-0.617	(0)
	CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
	Cd (NO3) 2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cl		4.344e-02					
	Cl-	4.343e-02	3.417e-02	-1.362	-1.466	-0.104	(0)
	CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
	MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
	CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
	CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
	NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
	MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
	ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
	CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
	CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
	ZnOHC1	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
	PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
	ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
	CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
	MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
	PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
	ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
	CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
	NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
	CdOHC1	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
	CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
	PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
	ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
	PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
	CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
	FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
	FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
	CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
	HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
	HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
	HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
	FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
	HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
	CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
	HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
	CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
	Co (NH3) 5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
	Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)

Co (2)	3.989e-05					
Co+2	3.225e-05	7.797e-06	-4.491	-5.108	-0.617	(0)
CoSO4	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CoHPO4	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CoOH+	1.375e-08	9.639e-09	-7.862	-8.016	-0.154	(0)
Co (NH3) +2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
Co (OH) 2	4.744e-11	4.744e-11	-10.324	-10.324	0.000	(0)
Co (NH3) 2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Co2OH+3	9.190e-14	3.766e-15	-13.037	-14.424	-1.387	(0)
Co (OH) 3-	8.364e-17	5.865e-17	-16.078	-16.232	-0.154	(0)
CoOOH-	5.039e-18	3.533e-18	-17.298	-17.452	-0.154	(0)
Co (NH3) 3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Co4 (OH) 4+4	5.041e-22	1.722e-24	-21.297	-23.764	-2.466	(0)
Co (NH3) 4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
Co (OH) 4-2	2.382e-24	5.759e-25	-23.623	-24.240	-0.617	(0)
Co (NH3) 5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Co (3)	4.042e-31					
CoOH+2	4.042e-31	9.773e-32	-30.393	-31.010	-0.617	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co+3	2.685e-36	3.104e-37	-35.571	-36.508	-0.937	(0)
Co (NH3) 5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
Cu (1)	4.900e-06					
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
Cu+	1.553e-08	1.089e-08	-7.809	-7.963	-0.154	(0)
Cu (2)	8.967e-10					
Cu+2	6.026e-10	2.310e-10	-9.220	-9.636	-0.416	(0)
CuSO4	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
CuOH+	4.792e-11	3.719e-11	-10.319	-10.430	-0.110	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
Cu (OH) 2	5.595e-13	5.595e-13	-12.252	-12.252	0.000	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
Cu2 (OH) 2+2	1.398e-16	3.379e-17	-15.855	-16.471	-0.617	(0)
Cu (OH) 3-	1.014e-16	7.111e-17	-15.994	-16.148	-0.154	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
Cu (OH) 4-2	1.434e-22	3.468e-23	-21.843	-22.460	-0.617	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Fe (2)	1.805e-03					
Fe+2	1.454e-03	3.515e-04	-2.837	-3.454	-0.617	(0)
FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
FeHPO4	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
FeOH+	8.090e-07	6.384e-07	-6.092	-6.195	-0.103	(0)
Fe (OH) 2	2.214e-11	2.214e-11	-10.655	-10.655	0.000	(0)
Fe (OH) 3-	5.296e-13	4.179e-13	-12.276	-12.379	-0.103	(0)
Fe (3)	3.233e-07					
Fe (OH) 2+	3.138e-07	2.491e-07	-6.503	-6.604	-0.100	(0)
Fe (OH) 3	9.382e-09	9.382e-09	-8.028	-8.028	0.000	(0)
Fe (OH) 4-	1.205e-10	9.565e-11	-9.919	-10.019	-0.100	(0)
FeOH+2	2.119e-11	8.217e-12	-10.674	-11.085	-0.411	(0)
FeHPO4+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeSO4+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe+3	2.235e-15	2.584e-16	-14.651	-15.588	-0.937	(0)
Fe (SO4) 2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)

FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
Fe2 (OH) 2+4	7.548e-19	2.579e-21	-18.122	-20.589	-2.466	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
Fe3 (OH) 4+5	6.361e-23	8.906e-27	-22.197	-26.050	-3.854	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
H (0)	3.796e-19					
H2	1.898e-19	1.939e-19	-18.722	-18.712	0.009	(0)
Hg (0)	1.002e-09					
Hg	1.002e-09	1.002e-09	-8.999	-8.999	0.000	(0)
Hg (1)	3.697e-29					
Hg2+2	1.848e-29	4.469e-30	-28.733	-29.350	-0.617	(0)
Hg (2)	2.362e-18					
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
Hg (OH) 2	1.682e-22	1.718e-22	-21.774	-21.765	0.009	(0)
Hg (NH3) 2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
HgOH+	2.768e-26	1.941e-26	-25.558	-25.712	-0.154	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg (NH3) 3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Hg+2	3.648e-29	8.820e-30	-28.438	-29.055	-0.617	(0)
HgSO4	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Hg (OH) 3-	1.911e-30	1.340e-30	-29.719	-29.873	-0.154	(0)
Hg (NH3) 4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Hg (NO3) 2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
K	1.593e-03					
K+	1.549e-03	1.219e-03	-2.810	-2.914	-0.104	(0)
KSO4-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
KHPO4-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
Mg	1.017e-02					
Mg+2	7.920e-03	3.036e-03	-2.101	-2.518	-0.416	(0)
MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
MgHPO4	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
MgOH+	6.402e-08	5.162e-08	-7.194	-7.287	-0.094	(0)
MgPO4-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
Mn (2)	2.231e-04					
Mn+2	1.882e-04	4.549e-05	-3.725	-4.342	-0.617	(0)
MnSO4	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
MnOH+	6.606e-09	5.213e-09	-8.180	-8.283	-0.103	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Mn (OH) 3-	2.129e-19	1.680e-19	-18.672	-18.775	-0.103	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
Mn (OH) 4-2	8.666e-26	3.361e-26	-25.062	-25.474	-0.411	(0)
MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Mn (3)	9.732e-29					
Mn+3	9.732e-29	1.125e-29	-28.012	-28.949	-0.937	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-65.730	-66.142	-0.411	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-74.661	-74.779	-0.119	(0)
N (-3)	5.021e-04					
NH4+	4.805e-04	3.617e-04	-3.318	-3.442	-0.123	(0)
NH4SO4-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
NH3	9.560e-07	9.560e-07	-6.020	-6.020	0.000	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
Co (NH3) +2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)

CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
Ni (NH3) 2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Co (NH3) 2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Ca (NH3) 2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
Co (NH3) 3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Hg (NH3) 2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
Co (NH3) 4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg (NH3) 3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Co (NH3) 5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
Hg (NH3) 4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
Co (NH3) 5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
N (3)	1.148e-35					
NO2-	1.148e-35	8.735e-36	-34.940	-35.059	-0.119	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
N (5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-48.382	-48.486	-0.104	(0)
CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Hg (NO3) 2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
Na	4.781e-02					
Na+	4.677e-02	3.680e-02	-1.330	-1.434	-0.104	(0)
NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
Ni	7.703e-06					
Ni+2	5.664e-06	2.171e-06	-5.247	-5.663	-0.416	(0)
NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
NiCl+	2.677e-07	1.767e-07	-6.572	-6.726	-0.154	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
NiOH+	1.818e-09	1.275e-09	-8.741	-8.895	-0.154	(0)
Ni (SO4) 2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
Ni (OH) 2	8.335e-12	8.335e-12	-11.079	-11.079	0.000	(0)
Ni (NH3) 2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Ni (OH) 3-	7.365e-16	5.164e-16	-15.133	-15.287	-0.154	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
O (0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.993	-55.984	0.009	(0)
P	2.206e-05					
H2PO4-	6.634e-06	5.268e-06	-5.178	-5.278	-0.100	(0)
HPO4-2	5.222e-06	2.025e-06	-5.282	-5.694	-0.411	(0)
MgHPO4	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
FeHPO4	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)

KHPO4-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
CoHPO4	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
MgPO4-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
H3PO4	1.150e-10	1.150e-10	-9.939	-9.939	0.000	(0)
PO4-3	4.196e-11	4.850e-12	-10.377	-11.314	-0.937	(0)
FeHPO4+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
Pb	1.455e-08					
Pb+2	5.480e-09	2.100e-09	-8.261	-8.678	-0.416	(0)
PbSO4	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
PbOH+	4.662e-10	3.269e-10	-9.331	-9.486	-0.154	(0)
Pb (SO4) 2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
Pb (OH) 2	6.405e-13	6.405e-13	-12.193	-12.193	0.000	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
Pb2OH+3	2.655e-16	1.088e-17	-15.576	-16.963	-1.387	(0)
Pb (OH) 3-	5.660e-17	3.969e-17	-16.247	-16.401	-0.154	(0)
Pb (OH) 4-2	2.491e-21	6.022e-22	-20.604	-21.220	-0.617	(0)
Pb3 (OH) 4+2	3.779e-23	9.137e-24	-22.423	-23.039	-0.617	(0)
Pb4 (OH) 4+4	5.175e-26	1.768e-28	-25.286	-27.753	-2.466	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
S (6)	1.553e-02					
SO4-2	1.094e-02	4.194e-03	-1.961	-2.377	-0.416	(0)
MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
KSO4-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
MnSO4	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
NH4SO4-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
CoSO4	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
ZnSO4	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn (SO4) 2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
HSO4-	7.527e-08	5.892e-08	-7.123	-7.230	-0.106	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
PbSO4	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
Al (SO4) 2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ni (SO4) 2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
Cd (SO4) 2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
Pb (SO4) 2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
CuSO4	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
FeSO4+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe (SO4) 2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
HgSO4	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Se (-2)	4.685e-09					
HSe-	4.677e-09	3.279e-09	-8.330	-8.484	-0.154	(0)
H2Se	4.054e-12	4.054e-12	-11.392	-11.392	0.000	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Se-2	6.423e-17	1.553e-17	-16.192	-16.809	-0.617	(0)
Se (4)	3.770e-07					
HSeO3-	3.526e-07	2.472e-07	-6.453	-6.607	-0.154	(0)
SeO3-2	2.442e-08	5.904e-09	-7.612	-8.229	-0.617	(0)
H2SeO3	1.653e-11	1.653e-11	-10.782	-10.782	0.000	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
Cd (SeO3) 2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Se (6)	2.478e-21					
SeO4-2	2.463e-21	9.439e-22	-20.609	-21.025	-0.416	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)

HSeO4-	9.645e-27	6.763e-27	-26.016	-26.170	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
Zn	2.612e-06					
Zn+2	1.813e-06	6.948e-07	-5.742	-6.158	-0.416	(0)
ZnSO4	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn (SO4) 2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
ZnOHC1	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
ZnOH+	4.520e-09	3.170e-09	-8.345	-8.499	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
Zn (OH) 2	4.227e-11	4.227e-11	-10.374	-10.374	0.000	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
Zn (OH) 3-	1.872e-14	1.313e-14	-13.728	-13.882	-0.154	(0)
Zn (OH) 4-2	1.339e-19	3.238e-20	-18.873	-19.490	-0.617	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2-124.48	-118.20	6.27	(Co (NH3) 5Cl) (NO3) 2	
(Co (NH3) 5Cl) Cl2 -28.70	-24.17	4.54	(Co (NH3) 5Cl) Cl2	
(Co (NH3) 5OH2) Cl3 -35.96	-24.17	11.80	(Co (NH3) 5OH2) Cl3	
(Co (NH3) 6) (NO3) 3-179.81	-161.88	17.93	(Co (NH3) 6) (NO3) 3	
(Co (NH3) 6) Cl3 -40.93	-20.82	20.11	(Co (NH3) 6) Cl3	
(NH4) 2SeO4 -28.36	-27.91	0.45	(NH4) 2SeO4	
Al (OH) 3 (am) 0.09	11.16	11.06	Al (OH) 3	
Al2O3 2.05	22.32	20.27	Al2O3	
Al4 (OH) 10SO4 5.98	28.68	22.70	Al4 (OH) 10SO4	
AlOHSO4 -1.57	-4.80	-3.23	AlOHSO4	
Alunite 6.34	5.44	-0.90	KAl3 (SO4) 2 (OH) 6	
Anglesite -3.24	-11.06	-7.82	PbSO4	
Anhydrite -1.07	-5.41	-4.34	CaSO4	
Antlerite -12.92	-4.13	8.79	Cu3 (OH) 4SO4	
Atacamite -7.99	-0.37	7.61	Cu2 (OH) 3Cl	
Bianchite -6.78	-8.54	-1.76	ZnSO4:6H2O	
Birnessite -18.88	-0.79	18.09	MnO2	
Bixbyite -16.81	-17.16	-0.35	Mn2O3	
Boehmite 2.30	11.16	8.86	AlOOH	
Brochantite -15.89	-0.19	15.71	Cu4 (OH) 6SO4	
Brucite -6.06	11.06	17.12	Mg (OH) 2	
Bunsenite -4.77	7.92	12.68	NiO	
Ca3 (PO4) 2 (beta) -2.69	-31.73	-29.05	Ca3 (PO4) 2	
Ca4H (PO4) 3:3H2O -5.80	-52.88	-47.08	Ca4H (PO4) 3:3H2O	
CaHPO4 -1.79	-21.14	-19.35	CaHPO4	
CaHPO4:2H2O -2.09	-21.14	-19.05	CaHPO4:2H2O	
Calomel -14.15	-32.28	-18.13	Hg2Cl2	
CaSeO3:2H2O -5.71	-2.85	2.86	CaSeO3:2H2O	
CaSeO4:2H2O -21.06	-24.06	-3.00	CaSeO4:2H2O	
Cd (OH) 2 -8.81	5.06	13.87	Cd (OH) 2	
Cd (OH) 2 (am) -8.88	5.06	13.94	Cd (OH) 2	
Cd3 (OH) 2 (SO4) 2 -23.45	-16.74	6.71	Cd3 (OH) 2 (SO4) 2	
Cd3 (OH) 4SO4 -23.34	-0.78	22.56	Cd3 (OH) 4SO4	
Cd3 (PO4) 2 -15.59	-48.19	-32.60	Cd3 (PO4) 2	
Cd4 (OH) 6SO4 -24.12	4.28	28.40	Cd4 (OH) 6SO4	
CdCl2 -10.84	-11.45	-0.61	CdCl2	
CdCl2:1H2O -9.78	-11.45	-1.68	CdCl2:1H2O	
CdCl2:2.5H2O -9.52	-11.46	-1.93	CdCl2:2.5H2O	
Cdmetal (alpha) -24.21	-10.52	13.69	Cd	
Cdmetal (gamma) -24.32	-10.52	13.80	Cd	
CdOHC1 -6.81	-3.20	3.61	CdOHC1	
CdSe 10.17	-10.21	-20.38	CdSe	
CdSeO4:2H2O -27.70	-29.55	-1.85	CdSeO4:2H2O	

CdSO4	-10.85	-10.90	-0.05	CdSO4
CdSO4:1H2O	-9.25	-10.90	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-9.07	-10.90	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.36	-12.02	-2.65	CuSO4:5H2O
Clausthalite	17.01	-10.37	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.05	-16.14	-2.09	Co(OH)3
Co3(PO4)2	-3.27	-37.95	-34.69	Co3(PO4)2
Co3O4	-13.57	-23.81	-10.24	Co3O4
CoCl2	-16.50	-8.04	8.46	CoCl2
CoCl2:6H2O	-10.56	-8.05	2.52	CoCl2:6H2O
CoFe2O4	21.18	18.03	-3.15	CoFe2O4
CoHPO4	-4.15	-23.21	-19.06	CoHPO4
CoO	-5.37	8.47	13.84	CoO
CoSe	9.40	-6.80	-16.20	CoSe
CoSeO3	-6.24	-4.92	1.32	CoSeO3
CoSeO4:6H2O	-24.61	-26.14	-1.53	CoSeO4:6H2O
CoSO4	-10.48	-7.49	2.99	CoSO4
CoSO4:6H2O	-5.02	-7.49	-2.48	CoSO4:6H2O
Cotunnite	-6.77	-11.61	-4.84	PbCl2
Cu(OH)2	-4.87	3.94	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.82	-47.39	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.69	-17.62	-46.31	Cu2Se
Cu2SO4	-16.40	-18.30	-1.90	Cu2SO4
Cu3(PO4)2	-14.69	-51.54	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-16.42	-51.54	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	35.35	-28.95	-64.30	Cu3Se2
Cumetal	-0.04	-8.96	-8.93	Cu
CuOCuSO4	-18.70	-8.07	10.63	CuOCuSO4
Cupricferrite	7.02	13.50	6.49	CuFe2O4
Cuprite	-1.24	-2.35	-1.11	Cu2O
Cuprousferrite	12.49	3.61	-8.88	CuFeO2
CuSe	22.06	-11.33	-33.39	CuSe
CuSe2	22.68	-11.02	-33.70	CuSe2
CuSeO3:2H2O	-10.05	-9.46	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-28.23	-30.67	-2.44	CuSeO4:5H2O
CuSO4	-15.13	-12.01	3.11	CuSO4
Diaspore	4.04	11.16	7.12	AlOOH
Epsomite	-2.75	-4.90	-2.15	MgSO4:7H2O
Fe(OH)2	-3.44	10.12	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.34	2.30	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-5.39	-3.84	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-10.00	-30.63	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-35.15	-38.31	-3.16	Fe2(SO4)3
Fe3(OH)8	-0.54	19.68	20.22	Fe3(OH)8
Ferrihydrite	1.41	4.78	3.37	Fe(OH)3
Ferroselite	13.87	-4.84	-18.71	FeSe2
FeSe	5.86	-5.15	-11.00	FeSe
Gibbsite	2.64	11.16	8.52	Al(OH)3
Goethite	4.15	4.78	0.64	FeOOH
Goslarite	-6.50	-8.54	-2.05	ZnSO4:7H2O
Gypsum	-0.80	-5.41	-4.61	CaSO4:2H2O
H-Jarosite	-6.02	-17.57	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-10.35	-15.27	-4.92	H2Se
Halite	-4.49	-2.90	1.59	NaCl
Hausmannite	-18.74	43.29	62.03	Mn3O4
Hematite	10.67	9.56	-1.11	Fe2O3
Hercynite	8.80	32.44	23.64	FeAl2O4
Hg(g)	-7.75	-15.67	-7.93	Hg
Hg(OH)2	-18.27	-21.76	-3.50	Hg(OH)2
Hg2(g)	-16.26	-31.35	-15.09	Hg2
Hg2(OH)2	-21.03	-15.77	5.26	Hg2(OH)2
Hg2HPO4	-22.68	-47.45	-24.77	Hg2HPO4
Hg2SeO3	-24.51	-29.17	-4.66	Hg2SeO3
Hg2SO4	-25.58	-31.73	-6.14	Hg2SO4
HgCl(g)	-36.02	-16.14	19.88	HgCl
HgCl2	-16.76	-38.28	-21.52	HgCl2
Hgmetal(1)	-2.02	-15.67	-13.65	Hg

HgSe	18.66	-37.04	-55.69	HgSe
HgSeO3	-22.73	-35.16	-12.43	HgSeO3
HgSO4	-28.27	-37.72	-9.45	HgSO4
Hinsdalite	-6.76	-9.26	-2.50	PbAl3PO4SO4 (OH) 6
Hydroxylapatite	2.00	-42.33	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-7.75	-70.54	-62.79	Pb5 (PO4) 3OH
K-Alum	-11.65	-16.89	-5.24	KAl (SO4) 2:12H2O
K-Jarosite	0.79	-13.70	-14.49	KFe3 (SO4) 2 (OH) 6
K2SeO4	-26.12	-26.85	-0.73	K2SeO4
Langite	-18.07	-0.19	17.88	Cu4 (OH) 6SO4:H2O
Larnakite	-5.77	-6.15	-0.38	PbO:PbSO4
Laurionite	-3.98	-3.35	0.62	PbOHCl
Lepidocrocite	3.41	4.78	1.37	FeOOH
Lime	-22.62	10.54	33.16	CaO
Litharge	-7.95	4.90	12.85	PbO
Maghemite	3.18	9.56	6.39	Fe2O3
Magnesioferrite	3.10	20.62	17.52	Fe2MgO4
Magnetite	15.79	19.69	3.90	Fe3O4
Manganite	-8.31	17.03	25.34	MnOOH
Massicot	-8.15	4.90	13.05	PbO
Melanothallite	-18.98	-12.57	6.41	CuCl2
Melanterite	-3.58	-5.84	-2.26	FeSO4:7H2O
Mg (OH) 2 (active)	-7.73	11.06	18.79	Mg (OH) 2
Mg3 (PO4) 2	-6.90	-30.18	-23.28	Mg3 (PO4) 2
MgHPO4:3H2O	-2.45	-20.62	-18.18	MgHPO4:3H2O
MgSeO3:6H2O	-5.38	-2.34	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-22.35	-23.55	-1.20	MgSeO4:6H2O
Minium	-44.24	30.28	74.53	Pb3O4
Mirabilite	-3.95	-5.25	-1.30	Na2SO4:10H2O
Mn2 (SO4) 3	-59.71	-65.03	-5.32	Mn2 (SO4) 3
Mn3 (PO4) 2	-11.81	-35.65	-23.85	Mn3 (PO4) 2
MnCl2:4H2O	-10.02	-7.28	2.74	MnCl2:4H2O
MnHPO4	2.95	-22.45	-25.40	MnHPO4
MnSe	-9.77	-6.04	3.73	MnSe
MnSeO3	-5.29	-4.16	1.13	MnSeO3
MnSeO3:2H2O	-5.12	-4.16	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-23.32	-25.37	-2.05	MnSeO4:5H2O
MnSO4	-9.46	-6.72	2.74	MnSO4
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.22	-21.76	-3.55	HgO
Morenosite	-5.87	-8.05	-2.17	NiSO4:7H2O
Na-Jarosite	-1.38	-12.22	-10.84	NaFe3 (SO4) 2 (OH) 6
Na2SeO3:5H2O	-12.99	-2.69	10.30	Na2SeO3:5H2O
Na2SeO4	-25.17	-23.89	1.28	Na2SeO4
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni (OH) 2	-5.11	7.91	13.02	Ni (OH) 2
Ni3 (PO4) 2	-8.32	-39.62	-31.30	Ni3 (PO4) 2
Ni4 (OH) 6SO4	-16.30	15.70	32.00	Ni4 (OH) 6SO4
NiSe	10.34	-7.36	-17.70	NiSe
NiSeO3:2H2O	-8.37	-5.48	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-25.17	-26.69	-1.52	NiSeO4:6H2O
Nsutite	-18.29	-0.79	17.50	MnO2
O2 (g)	-53.29	31.16	84.45	O2
Pb (OH) 2	-3.39	4.90	8.29	Pb (OH) 2
Pb2 (OH) 3Cl	-7.25	1.55	8.79	Pb2 (OH) 3Cl
Pb2O (OH) 2	-16.39	9.80	26.19	Pb2O (OH) 2
Pb2O3	-35.66	25.38	61.04	Pb2O3
Pb3 (PO4) 2	-5.13	-48.66	-43.53	Pb3 (PO4) 2
Pb3O2SO4	-12.13	-1.25	10.87	Pb3O2SO4
Pb4 (OH) 6SO4	-17.45	3.65	21.10	Pb4 (OH) 6SO4
Pb4O3SO4	-18.55	3.65	22.20	Pb4O3SO4
PbHPO4	-2.98	-26.78	-23.81	PbHPO4
Pbmetal	-14.92	-10.68	4.24	Pb
PbO:0.3H2O	-8.08	4.90	12.98	PbO:0.33H2O
PbSeO4	-22.83	-29.70	-6.88	PbSeO4
Periclase	-10.88	11.06	21.94	MgO
Plattnerite	-29.83	20.48	50.31	PbO2
Plumbgummite	7.80	-24.99	-32.79	PbAl3 (PO4) 2 (OH) 5:H2O

Portlandite	-12.57	10.54	23.11	Ca (OH) 2
Pyrochroite	-6.19	9.24	15.43	Mn (OH) 2
Pyrolusite	-17.21	24.82	42.03	MnO2
Pyromorphite	5.63	-78.80	-84.43	Pb5 (PO4) 3Cl
Retgersite	-6.00	-8.05	-2.05	NiSO4:6H2O
Semetal (am)	7.44	0.31	-7.14	Se
Semetal (hex)	8.05	0.31	-7.75	Se
SeO2	-13.52	-13.40	0.12	SeO2
SeO3	-56.00	-34.60	21.39	SeO3
Spinel	-4.39	33.38	37.77	MgAl2O4
Strengite	-0.53	-26.90	-26.38	FePO4:2H2O
Tenorite	-3.86	3.94	7.80	CuO
Thenardite	-5.59	-5.25	0.34	Na2SO4
Tsumebite	-8.15	-17.94	-9.79	Pb2CuPO4 (OH) 3:3H2O
Vivianite	3.00	-33.00	-36.00	Fe3 (PO4) 2:8H2O
Zincite	-4.13	7.42	11.55	ZnO
Zincosite	-12.66	-8.54	4.13	ZnSO4
Zn (NO3) 2:6H2O	-106.39	-103.14	3.26	Zn (NO3) 2:6H2O
Zn (OH) 2	-4.78	7.42	12.20	Zn (OH) 2
Zn (OH) 2 (am)	-5.25	7.42	12.67	Zn (OH) 2
Zn (OH) 2 (beta)	-4.53	7.42	11.95	Zn (OH) 2
Zn (OH) 2 (epsilon)	-4.31	7.42	11.73	Zn (OH) 2
Zn (OH) 2 (gamma)	-4.31	7.42	11.73	Zn (OH) 2
Zn2 (OH) 2SO4	-8.62	-1.12	7.50	Zn2 (OH) 2SO4
Zn2 (OH) 3Cl	-8.61	6.58	15.19	Zn2 (OH) 3Cl
Zn3 (PO4) 2:4H2O	-5.69	-41.11	-35.42	Zn3 (PO4) 2:4H2O
Zn3O (SO4) 2	-29.18	-9.65	19.53	Zn3O (SO4) 2
Zn4 (OH) 6SO4	-14.68	13.72	28.40	Zn4 (OH) 6SO4
Zn5 (OH) 8Cl2	-17.91	20.59	38.50	Zn5 (OH) 8Cl2
ZnCl2	-16.31	-9.09	7.22	ZnCl2
Znmetal	-34.31	-8.16	26.15	Zn
ZnO (active)	-3.98	7.42	11.40	ZnO
ZnSe	6.61	-7.85	-14.46	ZnSe
ZnSeO4:6H2O	-25.67	-27.19	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-8.00	-8.54	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Initial solution 2.

-----Solution composition-----

Elements	Molality	Moles
Al	5.487e-05	5.487e-05
Alkalinity	9.999e-04	9.999e-04
As	1.736e-08	1.736e-08
B	4.626e-06	4.626e-06
Ba	3.481e-07	3.481e-07
Ca	3.244e-04	3.244e-04
Cd	6.229e-09	6.229e-09
Cl	2.229e-03	2.229e-03
Co	1.018e-08	1.018e-08
Cr	4.040e-08	4.040e-08
Cu	9.444e-08	9.444e-08
Fe	2.454e-05	2.454e-05
Hg	3.989e-10	3.989e-10
K	1.023e-04	1.023e-04
Mg	3.704e-04	3.704e-04
Mn	1.092e-06	1.092e-06
Mo	3.128e-09	3.128e-09
N	7.498e-05	7.498e-05
Na	2.132e-03	2.132e-03
Ni	4.772e-08	4.772e-08
P	3.552e-06	3.552e-06
Pb	5.793e-09	5.793e-09
S (6)	1.770e-04	1.770e-04

Se	2.534e-09	2.534e-09
Zn	2.509e-07	2.509e-07

-----Description of solution-----

pH	=	7.500
pe	=	4.000
Activity of water	=	1.000
Ionic strength (mol/kgw)	=	4.384e-03
Mass of water (kg)	=	1.000e+00
Total carbon (mol/kg)	=	8.307e-04
Total CO2 (mol/kg)	=	8.307e-04
Temperature (°C)	=	20.00
Electrical balance (eq)	=	3.069e-04
Percent error, 100*(Cat- An)/(Cat+ An)	=	4.34
Iterations	=	11
Total H	=	1.110151e+02
Total O	=	5.551033e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
OH-	2.330e-07	2.169e-07	-6.633	-6.664	-0.031	(0)
H+	3.394e-08	3.162e-08	-7.469	-7.500	-0.031	0.00
H2O	5.551e+01	9.999e-01	1.744	-0.000	0.000	18.05
Al	5.487e-05					
Al (OH) 4-	5.036e-05	4.694e-05	-4.298	-4.328	-0.031	(0)
Al (OH) 3	3.857e-06	3.857e-06	-5.414	-5.414	0.000	(0)
Al (OH) 2+	6.505e-07	6.071e-07	-6.187	-6.217	-0.030	(0)
AlOH+2	2.277e-09	1.728e-09	-8.643	-8.763	-0.120	(0)
Al+3	1.426e-11	7.540e-12	-10.846	-11.123	-0.277	(0)
AlSO4+	6.366e-12	5.934e-12	-11.196	-11.227	-0.031	(0)
Al (SO4) 2-	9.367e-15	8.732e-15	-14.028	-14.059	-0.031	(0)
AlMo6O21-3	0.000e+00	0.000e+00	-52.596	-52.898	-0.301	(0)
As (3)	3.031e-18					
H3AsO3	2.988e-18	2.988e-18	-17.525	-17.525	0.000	(0)
H2AsO3-	4.335e-20	4.013e-20	-19.363	-19.397	-0.033	(0)
HAsO3-2	1.264e-24	9.286e-25	-23.898	-24.032	-0.134	(0)
H4AsO3+	5.056e-26	4.681e-26	-25.296	-25.330	-0.033	(0)
AsO3-3	1.904e-30	9.510e-31	-29.720	-30.022	-0.301	(0)
As (5)	1.736e-08					
HAsO4-2	1.407e-08	1.033e-08	-7.852	-7.986	-0.134	(0)
H2AsO4-	3.286e-09	3.043e-09	-8.483	-8.517	-0.033	(0)
AsO4-3	1.840e-12	9.193e-13	-11.735	-12.037	-0.301	(0)
H3AsO4	1.591e-14	1.592e-14	-13.798	-13.798	0.000	(0)
B	4.626e-06					
H3BO3	4.542e-06	4.547e-06	-5.343	-5.342	0.000	(0)
H2BO3-	8.215e-08	7.636e-08	-7.085	-7.117	-0.032	(0)
CaH2BO3+	1.090e-09	1.013e-09	-8.963	-8.994	-0.032	(0)
MgH2BO3+	7.768e-10	7.220e-10	-9.110	-9.141	-0.032	(0)
NaH2BO3	2.626e-10	2.626e-10	-9.581	-9.581	0.000	(0)
BaH2BO3+	6.446e-13	5.992e-13	-12.191	-12.222	-0.032	(0)
H5 (BO3) 2-	3.281e-13	3.050e-13	-12.484	-12.516	-0.032	(0)
H8 (BO3) 3-	1.291e-16	1.200e-16	-15.889	-15.921	-0.032	(0)
Ba	3.481e-07					
Ba+2	3.464e-07	2.610e-07	-6.460	-6.583	-0.123	(0)
BaHCO3+	1.611e-09	1.505e-09	-8.793	-8.822	-0.030	(0)
BaCO3	1.153e-10	1.153e-10	-9.938	-9.938	0.000	(0)
BaH2BO3+	6.446e-13	5.992e-13	-12.191	-12.222	-0.032	(0)
BaNH3+2	2.781e-13	2.043e-13	-12.556	-12.690	-0.134	(0)
BaOH+	2.559e-13	2.387e-13	-12.592	-12.622	-0.030	(0)
BaNO3+	4.082e-25	3.779e-25	-24.389	-24.423	-0.033	(0)
C (4)	8.307e-04					
HCO3-	7.685e-04	7.172e-04	-3.114	-3.144	-0.030	(0)
H2CO3	5.433e-05	5.433e-05	-4.265	-4.265	0.000	(0)
CaHCO3+	2.954e-06	2.759e-06	-5.530	-5.559	-0.030	(0)

MgHCO3+	2.090e-06	1.947e-06	-5.680	-5.711	-0.031	(0)
CO3-2	1.276e-06	9.617e-07	-5.894	-6.017	-0.123	(0)
NaHCO3	8.795e-07	8.795e-07	-6.056	-6.056	0.000	(0)
CaCO3	3.236e-07	3.236e-07	-6.490	-6.490	0.000	(0)
MgCO3	2.008e-07	2.008e-07	-6.697	-6.697	0.000	(0)
CuCO3	6.481e-08	6.481e-08	-7.188	-7.188	0.000	(0)
NaCO3-	4.379e-08	4.087e-08	-7.359	-7.389	-0.030	(0)
MnHCO3+	1.164e-08	1.086e-08	-7.934	-7.964	-0.030	(0)
ZnCO3	9.487e-09	9.487e-09	-8.023	-8.023	0.000	(0)
FeHCO3+	9.148e-09	8.545e-09	-8.039	-8.068	-0.030	(0)
ZnHCO3+	3.799e-09	3.517e-09	-8.420	-8.454	-0.033	(0)
PbCO3	2.909e-09	2.909e-09	-8.536	-8.536	0.000	(0)
NiHCO3+	2.779e-09	2.573e-09	-8.556	-8.590	-0.033	(0)
BaHCO3+	1.611e-09	1.505e-09	-8.793	-8.822	-0.030	(0)
NiCO3	1.154e-09	1.154e-09	-8.938	-8.938	0.000	(0)
PbHCO3+	5.238e-10	4.849e-10	-9.281	-9.314	-0.033	(0)
CuHCO3+	5.060e-10	4.684e-10	-9.296	-9.329	-0.033	(0)
CoHCO3+	3.770e-10	3.490e-10	-9.424	-9.457	-0.033	(0)
Cu (CO3) 2-2	2.284e-10	1.678e-10	-9.641	-9.775	-0.134	(0)
BaCO3	1.153e-10	1.153e-10	-9.938	-9.938	0.000	(0)
CoCO3	1.125e-10	1.125e-10	-9.949	-9.949	0.000	(0)
CdCO3	8.551e-11	8.551e-11	-10.068	-10.068	0.000	(0)
Pb (CO3) 2-2	1.098e-11	8.067e-12	-10.959	-11.093	-0.134	(0)
CdHCO3+	6.223e-12	5.761e-12	-11.206	-11.239	-0.033	(0)
Cd (CO3) 2-2	8.298e-14	6.096e-14	-13.081	-13.215	-0.134	(0)
HgCO3	2.918e-18	2.918e-18	-17.535	-17.535	0.000	(0)
Hg (CO3) 2-2	1.208e-20	8.873e-21	-19.918	-20.052	-0.134	(0)
HgHCO3+	1.856e-21	1.718e-21	-20.731	-20.765	-0.033	(0)
Ca	3.244e-04					
Ca+2	3.146e-04	2.370e-04	-3.502	-3.625	-0.123	(0)
CaSO4	6.357e-06	6.357e-06	-5.197	-5.197	0.000	(0)
CaHCO3+	2.954e-06	2.759e-06	-5.530	-5.559	-0.030	(0)
CaCO3	3.236e-07	3.236e-07	-6.490	-6.490	0.000	(0)
CaHPO4	1.634e-07	1.634e-07	-6.787	-6.787	0.000	(0)
CaPO4-	1.319e-08	1.231e-08	-7.880	-7.910	-0.030	(0)
CaH2PO4+	4.366e-09	4.075e-09	-8.360	-8.390	-0.030	(0)
CaH2BO3+	1.090e-09	1.013e-09	-8.963	-8.994	-0.032	(0)
CaOH+	1.037e-09	9.688e-10	-8.984	-9.014	-0.030	(0)
CaNH3+2	5.039e-10	3.702e-10	-9.298	-9.432	-0.134	(0)
Ca (NH3) 2+2	2.488e-16	1.828e-16	-15.604	-15.738	-0.134	(0)
CaNO3+	2.220e-22	2.055e-22	-21.654	-21.687	-0.033	(0)
Cd	6.229e-09					
Cd+2	5.178e-09	3.901e-09	-8.286	-8.409	-0.123	(0)
CdCl+	8.299e-10	7.683e-10	-9.081	-9.114	-0.033	(0)
CdSO4	1.059e-10	1.059e-10	-9.975	-9.975	0.000	(0)
CdCO3	8.551e-11	8.551e-11	-10.068	-10.068	0.000	(0)
CdOHC1	8.913e-12	8.913e-12	-11.050	-11.050	0.000	(0)
CdOH+	7.309e-12	6.767e-12	-11.136	-11.170	-0.033	(0)
CdCl2	6.560e-12	6.560e-12	-11.183	-11.183	0.000	(0)
CdHCO3+	6.223e-12	5.761e-12	-11.206	-11.239	-0.033	(0)
Cd (SO4) 2-2	2.538e-13	1.864e-13	-12.596	-12.730	-0.134	(0)
Cd (CO3) 2-2	8.298e-14	6.096e-14	-13.081	-13.215	-0.134	(0)
Cd (OH) 2	1.982e-14	1.982e-14	-13.703	-13.703	0.000	(0)
CdCl3-	8.847e-15	8.191e-15	-14.053	-14.087	-0.033	(0)
Cd (OH) 3-	4.164e-19	3.855e-19	-18.380	-18.414	-0.033	(0)
Cd2OH+3	2.817e-19	1.408e-19	-18.550	-18.852	-0.301	(0)
CdSeO4	5.758e-22	5.758e-22	-21.240	-21.240	0.000	(0)
Cd (SeO3) 2-2	2.869e-22	2.108e-22	-21.542	-21.676	-0.134	(0)
Cd (OH) 4-2	2.735e-26	2.009e-26	-25.563	-25.697	-0.134	(0)
CdNO3+	4.067e-27	3.766e-27	-26.391	-26.424	-0.033	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-45.365	-45.365	0.000	(0)
Cl	2.229e-03					
Cl-	2.229e-03	2.077e-03	-2.652	-2.683	-0.031	(0)
MnCl+	2.186e-09	2.040e-09	-8.660	-8.690	-0.030	(0)
CuCl	1.397e-09	1.397e-09	-8.855	-8.855	0.000	(0)
ZnCl+	9.250e-10	8.616e-10	-9.034	-9.065	-0.031	(0)
CdCl+	8.299e-10	7.683e-10	-9.081	-9.114	-0.033	(0)
CuCl2-	6.588e-10	6.136e-10	-9.181	-9.212	-0.031	(0)

ZnOHC1	3.727e-10	3.727e-10	-9.429	-9.429	0.000	(0)
NiCl+	1.821e-10	1.686e-10	-9.740	-9.773	-0.033	(0)
PbCl+	7.542e-11	6.982e-11	-10.123	-10.156	-0.033	(0)
CoCl+	5.294e-11	4.901e-11	-10.276	-10.310	-0.033	(0)
CuCl+	3.819e-11	3.558e-11	-10.418	-10.449	-0.031	(0)
CdOHC1	8.913e-12	8.913e-12	-11.050	-11.050	0.000	(0)
CdCl2	6.560e-12	6.560e-12	-11.183	-11.183	0.000	(0)
MnCl2	5.982e-12	5.982e-12	-11.223	-11.223	0.000	(0)
ZnCl2	2.282e-12	2.282e-12	-11.642	-11.642	0.000	(0)
PbCl2	6.331e-13	6.331e-13	-12.199	-12.199	0.000	(0)
CuCl3-2	3.528e-13	2.671e-13	-12.452	-12.573	-0.121	(0)
CuCl2	2.001e-14	2.001e-14	-13.699	-13.699	0.000	(0)
CdCl3-	8.847e-15	8.191e-15	-14.053	-14.087	-0.033	(0)
HgClOH	3.971e-15	3.971e-15	-14.401	-14.401	0.000	(0)
ZnCl3-	3.958e-15	3.686e-15	-14.403	-14.433	-0.031	(0)
MnCl3-	3.668e-15	3.421e-15	-14.436	-14.466	-0.030	(0)
HgCl2	2.065e-15	2.065e-15	-14.685	-14.685	0.000	(0)
NiCl2	1.787e-15	1.787e-15	-14.748	-14.748	0.000	(0)
CrCl+2	8.838e-16	6.492e-16	-15.054	-15.188	-0.134	(0)
PbCl3-	5.973e-16	5.530e-16	-15.224	-15.257	-0.033	(0)
FeCl+2	5.123e-17	3.879e-17	-16.290	-16.411	-0.121	(0)
HgCl3-	4.682e-17	4.335e-17	-16.330	-16.363	-0.033	(0)
ZnCl4-2	4.856e-18	3.677e-18	-17.314	-17.435	-0.121	(0)
CrOHC12	3.999e-18	3.999e-18	-17.398	-17.398	0.000	(0)
PbCl4-2	6.635e-19	4.874e-19	-18.178	-18.312	-0.134	(0)
HgCl4-2	5.108e-19	3.752e-19	-18.292	-18.426	-0.134	(0)
FeCl2+	4.518e-19	4.215e-19	-18.345	-18.375	-0.030	(0)
CuCl3-	3.804e-19	3.544e-19	-18.420	-18.451	-0.031	(0)
HgCl+	1.747e-19	1.617e-19	-18.758	-18.791	-0.033	(0)
CrCl2+	8.871e-20	8.213e-20	-19.052	-19.086	-0.033	(0)
FeCl3	8.752e-23	8.752e-23	-22.058	-22.058	0.000	(0)
CuCl4-2	5.775e-24	4.372e-24	-23.238	-23.359	-0.121	(0)
CrO3Cl-	3.021e-29	2.797e-29	-28.520	-28.553	-0.033	(0)
Cr (NH3) 6Cl+2	1.542e-37	1.133e-37	-36.812	-36.946	-0.134	(0)
CoCl+2	1.419e-37	1.042e-37	-36.848	-36.982	-0.134	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-40.718	-40.852	-0.134	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-53.313	-53.447	-0.134	(0)
Co (2)	1.018e-08					
Co+2	9.417e-09	6.917e-09	-8.026	-8.160	-0.134	(0)
CoHCO3+	3.770e-10	3.490e-10	-9.424	-9.457	-0.033	(0)
CoSO4	1.626e-10	1.626e-10	-9.789	-9.789	0.000	(0)
CoCO3	1.125e-10	1.125e-10	-9.949	-9.949	0.000	(0)
CoCl+	5.294e-11	4.901e-11	-10.276	-10.310	-0.033	(0)
CoOH+	4.747e-11	4.394e-11	-10.324	-10.357	-0.033	(0)
CoHPO4	1.115e-11	1.115e-11	-10.953	-10.953	0.000	(0)
Co (NH3) +2	2.196e-12	1.613e-12	-11.658	-11.792	-0.134	(0)
Co (OH) 2	1.111e-12	1.111e-12	-11.954	-11.954	0.000	(0)
Co (NH3) 2+2	7.431e-17	5.459e-17	-16.129	-16.263	-0.134	(0)
Co (OH) 3-	7.626e-18	7.060e-18	-17.118	-17.151	-0.033	(0)
CoOOH-	3.189e-19	2.952e-19	-18.496	-18.530	-0.033	(0)
Co2OH+3	3.049e-20	1.524e-20	-19.516	-19.817	-0.301	(0)
CoNO2+	1.822e-20	1.686e-20	-19.740	-19.773	-0.033	(0)
CoSeO4	2.530e-21	2.530e-21	-20.597	-20.597	0.000	(0)
Co (NH3) 3+2	1.160e-21	8.524e-22	-20.935	-21.069	-0.134	(0)
Co (OH) 4-2	4.850e-25	3.563e-25	-24.314	-24.448	-0.134	(0)
Co (NH3) 4+2	7.554e-27	5.549e-27	-26.122	-26.256	-0.134	(0)
CoNO3+	3.128e-27	2.896e-27	-26.505	-26.538	-0.033	(0)
Co (NH3) 5+2	1.555e-32	1.142e-32	-31.808	-31.942	-0.134	(0)
Co4 (OH) 4+4	2.555e-33	7.440e-34	-32.593	-33.128	-0.536	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-44.808	-44.808	0.000	(0)
Co (3)	6.065e-31					
CoOH+2	6.065e-31	4.456e-31	-30.217	-30.351	-0.134	(0)
Co+3	5.207e-37	2.754e-37	-36.283	-36.560	-0.277	(0)
CoCl+2	1.419e-37	1.042e-37	-36.848	-36.982	-0.134	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-40.718	-40.852	-0.134	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-49.776	-49.810	-0.033	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.616	-52.750	-0.134	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-53.313	-53.447	-0.134	(0)

Cr (2)	3.686e-24					
Cr+2	3.686e-24	2.708e-24	-23.433	-23.567	-0.134	(0)
Cr (3)	4.040e-08					
Cr (OH) 2+	3.452e-08	3.196e-08	-7.462	-7.495	-0.033	(0)
Cr (OH) 3	3.822e-09	3.822e-09	-8.418	-8.418	0.000	(0)
Cr (OH) +2	1.919e-09	1.410e-09	-8.717	-8.851	-0.134	(0)
CrO2-	6.201e-11	5.740e-11	-10.208	-10.241	-0.033	(0)
Cr (OH) 4-	5.233e-11	4.845e-11	-10.281	-10.315	-0.033	(0)
CrOHSO4	2.406e-11	2.406e-11	-10.619	-10.619	0.000	(0)
Cr+3	5.783e-13	2.889e-13	-12.238	-12.539	-0.301	(0)
CrSO4+	7.237e-14	6.700e-14	-13.140	-13.174	-0.033	(0)
CrCl+2	8.838e-16	6.492e-16	-15.054	-15.188	-0.134	(0)
CrH2PO4+2	6.914e-17	5.079e-17	-16.160	-16.294	-0.134	(0)
CrOHC12	3.999e-18	3.999e-18	-17.398	-17.398	0.000	(0)
Cr2 (OH) 2SO4+2	2.442e-18	1.794e-18	-17.612	-17.746	-0.134	(0)
CrCl2+	8.871e-20	8.213e-20	-19.052	-19.086	-0.033	(0)
Cr2 (OH) 2 (SO4) 2	1.310e-20	1.310e-20	-19.883	-19.883	0.000	(0)
Cr (NH3) 5OH+2	3.552e-29	2.609e-29	-28.450	-28.583	-0.134	(0)
CrNO3+2	2.920e-33	2.145e-33	-32.535	-32.669	-0.134	(0)
Cr (NH3) 6+3	8.634e-36	4.314e-36	-35.064	-35.365	-0.301	(0)
Cr (NH3) 6Cl+2	1.542e-37	1.133e-37	-36.812	-36.946	-0.134	(0)
Cr (6)	9.578e-19					
CrO4-2	8.783e-19	6.617e-19	-18.056	-18.179	-0.123	(0)
HCrO4-	7.214e-20	6.679e-20	-19.142	-19.175	-0.033	(0)
NaCrO4-	7.047e-21	6.524e-21	-20.152	-20.185	-0.033	(0)
KCrO4-	2.530e-22	2.342e-22	-21.597	-21.630	-0.033	(0)
CrO3HPO4-2	2.689e-25	1.976e-25	-24.570	-24.704	-0.134	(0)
H2CrO4	1.327e-27	1.327e-27	-26.877	-26.877	0.000	(0)
CrO3SO4-2	1.091e-28	8.018e-29	-27.962	-28.096	-0.134	(0)
CrO3Cl-	3.021e-29	2.797e-29	-28.520	-28.553	-0.033	(0)
CrO3H2PO4-	3.251e-30	3.009e-30	-29.488	-29.522	-0.033	(0)
Cr2O7-2	2.400e-37	1.763e-37	-36.620	-36.754	-0.134	(0)
Cu (1)	2.634e-09					
CuCl	1.397e-09	1.397e-09	-8.855	-8.855	0.000	(0)
CuCl2-	6.588e-10	6.136e-10	-9.181	-9.212	-0.031	(0)
Cu+	5.774e-10	5.346e-10	-9.239	-9.272	-0.033	(0)
CuCl3-2	3.528e-13	2.671e-13	-12.452	-12.573	-0.121	(0)
Cu (2)	9.181e-08					
CuCO3	6.481e-08	6.481e-08	-7.188	-7.188	0.000	(0)
Cu+2	1.519e-08	1.145e-08	-7.818	-7.941	-0.123	(0)
CuOH+	9.669e-09	9.007e-09	-8.015	-8.045	-0.031	(0)
Cu (OH) 2	7.320e-10	7.320e-10	-9.135	-9.135	0.000	(0)
CuHCO3+	5.060e-10	4.684e-10	-9.296	-9.329	-0.033	(0)
CuNH3+2	3.245e-10	2.384e-10	-9.489	-9.623	-0.134	(0)
CuSO4	3.036e-10	3.036e-10	-9.518	-9.518	0.000	(0)
Cu (CO3) 2-2	2.284e-10	1.678e-10	-9.641	-9.775	-0.134	(0)
CuCl+	3.819e-11	3.558e-11	-10.418	-10.449	-0.031	(0)
Cu2 (OH) 2+2	2.680e-12	1.969e-12	-11.572	-11.706	-0.134	(0)
Cu (OH) 3-	5.164e-13	4.781e-13	-12.287	-12.321	-0.033	(0)
CuCl2	2.001e-14	2.001e-14	-13.699	-13.699	0.000	(0)
Cu (OH) 4-2	1.631e-18	1.198e-18	-17.788	-17.922	-0.134	(0)
CuNO2+	4.478e-19	4.146e-19	-18.349	-18.382	-0.033	(0)
CuCl3-	3.804e-19	3.544e-19	-18.420	-18.451	-0.031	(0)
CuCl4-2	5.775e-24	4.372e-24	-23.238	-23.359	-0.121	(0)
CuNO3+	1.062e-26	9.835e-27	-25.974	-26.007	-0.033	(0)
Cu (NO2) 2	1.468e-30	1.468e-30	-29.833	-29.833	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-45.498	-45.498	0.000	(0)
Fe (2)	1.480e-06					
Fe+2	1.424e-06	1.046e-06	-5.846	-5.980	-0.134	(0)
FeSO4	2.988e-08	2.988e-08	-7.525	-7.525	0.000	(0)
FeOH+	9.684e-09	9.034e-09	-8.014	-8.044	-0.030	(0)
FeHCO3+	9.148e-09	8.545e-09	-8.039	-8.068	-0.030	(0)
FeHPO4	6.152e-09	6.152e-09	-8.211	-8.211	0.000	(0)
FeH2PO4+	4.140e-10	3.864e-10	-9.383	-9.413	-0.030	(0)
Fe (OH) 2	1.473e-12	1.473e-12	-11.832	-11.832	0.000	(0)
Fe (OH) 3-	1.517e-13	1.415e-13	-12.819	-12.849	-0.030	(0)
Fe (3)	2.306e-05					
Fe (OH) 2+	1.977e-05	1.845e-05	-4.704	-4.734	-0.030	(0)

Fe (OH) 3	3.089e-06	3.089e-06	-5.510	-5.510	0.000	(0)
Fe (OH) 4-	2.004e-07	1.870e-07	-6.698	-6.728	-0.030	(0)
FeOH+2	1.476e-10	1.117e-10	-9.831	-9.952	-0.121	(0)
FeHPO4+	1.169e-11	1.091e-11	-10.932	-10.962	-0.030	(0)
Fe+3	1.370e-15	7.246e-16	-14.863	-15.140	-0.277	(0)
FeSO4+	9.021e-16	8.414e-16	-15.045	-15.075	-0.030	(0)
FeCl+2	5.123e-17	3.879e-17	-16.290	-16.411	-0.121	(0)
FeH2PO4+2	1.336e-17	1.014e-17	-16.874	-16.994	-0.120	(0)
Fe (SO4) 2-	2.486e-18	2.301e-18	-17.605	-17.638	-0.033	(0)
Fe2 (OH) 2+4	1.697e-18	4.942e-19	-17.770	-18.306	-0.536	(0)
FeCl2+	4.518e-19	4.215e-19	-18.345	-18.375	-0.030	(0)
FeHSeO3+2	4.463e-21	3.279e-21	-20.350	-20.484	-0.134	(0)
Fe3 (OH) 4+5	8.596e-22	1.251e-22	-21.066	-21.903	-0.837	(0)
FeCl3	8.752e-23	8.752e-23	-22.058	-22.058	0.000	(0)
FeNO3+2	3.361e-33	2.469e-33	-32.474	-32.607	-0.134	(0)
H (0)	1.488e-26					
H2	7.440e-27	7.447e-27	-26.128	-26.128	0.000	(0)
Hg (0)	3.989e-10					
Hg	3.989e-10	3.989e-10	-9.399	-9.399	0.000	(0)
Hg (1)	1.698e-24					
Hg2+2	8.491e-25	6.238e-25	-24.071	-24.205	-0.134	(0)
Hg (2)	7.725e-15					
HgClOH	3.971e-15	3.971e-15	-14.401	-14.401	0.000	(0)
HgCl2	2.065e-15	2.065e-15	-14.685	-14.685	0.000	(0)
Hg (OH) 2	1.620e-15	1.622e-15	-14.791	-14.790	0.000	(0)
HgCl3-	4.682e-17	4.335e-17	-16.330	-16.363	-0.033	(0)
Hg (NH3) 2+2	1.829e-17	1.344e-17	-16.738	-16.872	-0.134	(0)
HgCO3	2.918e-18	2.918e-18	-17.535	-17.535	0.000	(0)
HgCl4-2	5.108e-19	3.752e-19	-18.292	-18.426	-0.134	(0)
HgCl+	1.747e-19	1.617e-19	-18.758	-18.791	-0.033	(0)
HgOH+	3.953e-20	3.660e-20	-19.403	-19.437	-0.033	(0)
Hg (CO3) 2-2	1.208e-20	8.873e-21	-19.918	-20.052	-0.134	(0)
HgNH3+2	2.701e-21	1.984e-21	-20.568	-20.702	-0.134	(0)
HgHCO3+	1.856e-21	1.718e-21	-20.731	-20.765	-0.033	(0)
Hg (NH3) 3+2	1.423e-22	1.045e-22	-21.847	-21.981	-0.134	(0)
Hg (OH) 3-	7.020e-23	6.499e-23	-22.154	-22.187	-0.033	(0)
Hg+2	4.536e-24	3.332e-24	-23.343	-23.477	-0.134	(0)
HgSO4	8.159e-26	8.159e-26	-25.088	-25.088	0.000	(0)
Hg (NH3) 4+2	2.222e-27	1.633e-27	-26.653	-26.787	-0.134	(0)
HgNO3+	0.000e+00	0.000e+00	-42.573	-42.607	-0.033	(0)
Hg (NO3) 2	0.000e+00	0.000e+00	-61.566	-61.566	0.000	(0)
K	1.023e-04					
K+	1.022e-04	9.526e-05	-3.990	-4.021	-0.031	(0)
KSO4-	8.635e-08	8.059e-08	-7.064	-7.094	-0.030	(0)
KHPO4-	1.143e-09	1.067e-09	-8.942	-8.972	-0.030	(0)
KCrO4-	2.530e-22	2.342e-22	-21.597	-21.630	-0.033	(0)
Mg	3.704e-04					
Mg+2	3.619e-04	2.727e-04	-3.441	-3.564	-0.123	(0)
MgSO4	5.861e-06	5.861e-06	-5.232	-5.232	0.000	(0)
MgHCO3+	2.090e-06	1.947e-06	-5.680	-5.711	-0.031	(0)
MgHPO4	2.594e-07	2.594e-07	-6.586	-6.586	0.000	(0)
MgCO3	2.008e-07	2.008e-07	-6.697	-6.697	0.000	(0)
MgOH+	2.319e-08	2.168e-08	-7.635	-7.664	-0.029	(0)
MgH2PO4+	1.072e-08	1.000e-08	-7.970	-8.000	-0.030	(0)
MgH2BO3+	7.768e-10	7.220e-10	-9.110	-9.141	-0.032	(0)
MgPO4-	2.373e-10	2.214e-10	-9.625	-9.655	-0.030	(0)
Mn (2)	1.092e-06					
Mn+2	1.062e-06	7.802e-07	-5.974	-6.108	-0.134	(0)
MnSO4	1.606e-08	1.606e-08	-7.794	-7.794	0.000	(0)
MnHCO3+	1.164e-08	1.086e-08	-7.934	-7.964	-0.030	(0)
MnCl+	2.186e-09	2.040e-09	-8.660	-8.690	-0.030	(0)
MnOH+	4.556e-10	4.250e-10	-9.341	-9.372	-0.030	(0)
MnCl2	5.982e-12	5.982e-12	-11.223	-11.223	0.000	(0)
MnCl3-	3.668e-15	3.421e-15	-14.436	-14.466	-0.030	(0)
Mn (OH) 3-	4.191e-19	3.909e-19	-18.378	-18.408	-0.030	(0)
MnSeO4	1.512e-19	1.512e-19	-18.821	-18.821	0.000	(0)
Mn (OH) 4-2	5.307e-25	4.018e-25	-24.275	-24.396	-0.121	(0)
MnNO3+	3.528e-25	3.267e-25	-24.452	-24.486	-0.033	(0)

MnSe	1.498e-37	1.498e-37	-36.824	-36.824	0.000	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-42.659	-42.659	0.000	(0)
Mn (3)	3.139e-28					
Mn+3	3.139e-28	1.660e-28	-27.503	-27.780	-0.277	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-50.534	-50.655	-0.121	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-56.329	-56.360	-0.031	(0)
Mo	3.128e-09					
MoO4-2	3.126e-09	2.355e-09	-8.505	-8.628	-0.123	(0)
HMoO4-	1.395e-12	1.292e-12	-11.855	-11.889	-0.033	(0)
H2MoO4	4.105e-16	4.105e-16	-15.387	-15.387	0.000	(0)
AlMo6O21-3	0.000e+00	0.000e+00	-52.596	-52.898	-0.301	(0)
Mo7O24-6	0.000e+00	0.000e+00	-65.519	-66.724	-1.205	(0)
HMo7O24-5	0.000e+00	0.000e+00	-67.030	-67.867	-0.837	(0)
H2Mo7O24-4	0.000e+00	0.000e+00	-70.058	-70.594	-0.536	(0)
H3Mo7O24-3	0.000e+00	0.000e+00	-74.541	-74.842	-0.301	(0)
N (-3)	7.498e-05					
NH4+	7.402e-05	6.880e-05	-4.131	-4.162	-0.032	(0)
NH3	8.673e-07	8.673e-07	-6.062	-6.062	0.000	(0)
NH4SO4-	9.714e-08	9.062e-08	-7.013	-7.043	-0.030	(0)
CaNH3+2	5.039e-10	3.702e-10	-9.298	-9.432	-0.134	(0)
CuNH3+2	3.245e-10	2.384e-10	-9.489	-9.623	-0.134	(0)
NiNH3+2	4.626e-11	3.398e-11	-10.335	-10.469	-0.134	(0)
Co (NH3) +2	2.196e-12	1.613e-12	-11.658	-11.792	-0.134	(0)
BaNH3+2	2.781e-13	2.043e-13	-12.556	-12.690	-0.134	(0)
Ni (NH3) 2+2	1.127e-14	8.280e-15	-13.948	-14.082	-0.134	(0)
Ca (NH3) 2+2	2.488e-16	1.828e-16	-15.604	-15.738	-0.134	(0)
Co (NH3) 2+2	7.431e-17	5.459e-17	-16.129	-16.263	-0.134	(0)
Hg (NH3) 2+2	1.829e-17	1.344e-17	-16.738	-16.872	-0.134	(0)
HgNH3+2	2.701e-21	1.984e-21	-20.568	-20.702	-0.134	(0)
Co (NH3) 3+2	1.160e-21	8.524e-22	-20.935	-21.069	-0.134	(0)
Hg (NH3) 3+2	1.423e-22	1.045e-22	-21.847	-21.981	-0.134	(0)
Co (NH3) 4+2	7.554e-27	5.549e-27	-26.122	-26.256	-0.134	(0)
Hg (NH3) 4+2	2.222e-27	1.633e-27	-26.653	-26.787	-0.134	(0)
Cr (NH3) 5OH+2	3.552e-29	2.609e-29	-28.450	-28.583	-0.134	(0)
Co (NH3) 5+2	1.555e-32	1.142e-32	-31.808	-31.942	-0.134	(0)
Cr (NH3) 6+3	8.634e-36	4.314e-36	-35.064	-35.365	-0.301	(0)
Cr (NH3) 6Cl+2	1.542e-37	1.133e-37	-36.812	-36.946	-0.134	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-40.718	-40.852	-0.134	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-49.776	-49.810	-0.033	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.616	-52.750	-0.134	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-53.313	-53.447	-0.134	(0)
N (3)	3.719e-13					
NO2-	3.719e-13	3.460e-13	-12.430	-12.461	-0.031	(0)
CuNO2+	4.478e-19	4.146e-19	-18.349	-18.382	-0.033	(0)
CoNO2+	1.822e-20	1.686e-20	-19.740	-19.773	-0.033	(0)
Cu (NO2) 2	1.468e-30	1.468e-30	-29.833	-29.833	0.000	(0)
N (5)	2.838e-19					
NO3-	2.836e-19	2.642e-19	-18.547	-18.578	-0.031	(0)
CaNO3+	2.220e-22	2.055e-22	-21.654	-21.687	-0.033	(0)
BaNO3+	4.082e-25	3.779e-25	-24.389	-24.423	-0.033	(0)
MnNO3+	3.528e-25	3.267e-25	-24.452	-24.486	-0.033	(0)
ZnNO3+	1.268e-25	1.174e-25	-24.897	-24.930	-0.033	(0)
NiNO3+	2.306e-26	2.135e-26	-25.637	-25.671	-0.033	(0)
CuNO3+	1.062e-26	9.835e-27	-25.974	-26.007	-0.033	(0)
PbNO3+	4.189e-27	3.878e-27	-26.378	-26.411	-0.033	(0)
CdNO3+	4.067e-27	3.766e-27	-26.391	-26.424	-0.033	(0)
CoNO3+	3.128e-27	2.896e-27	-26.505	-26.538	-0.033	(0)
FeNO3+2	3.361e-33	2.469e-33	-32.474	-32.607	-0.134	(0)
CrNO3+2	2.920e-33	2.145e-33	-32.535	-32.669	-0.134	(0)
HgNO3+	0.000e+00	0.000e+00	-42.573	-42.607	-0.033	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-42.659	-42.659	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-44.222	-44.222	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-44.734	-44.734	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-44.808	-44.808	0.000	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-45.365	-45.365	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-45.498	-45.498	0.000	(0)

Hg (NO3) 2	0.000e+00	0.000e+00	-61.566	-61.566	0.000	(0)
Na	2.132e-03					
Na+	2.130e-03	1.984e-03	-2.672	-2.702	-0.031	(0)
NaSO4-	1.394e-06	1.301e-06	-5.856	-5.886	-0.030	(0)
NaHCO3	8.795e-07	8.795e-07	-6.056	-6.056	0.000	(0)
NaCO3-	4.379e-08	4.087e-08	-7.359	-7.389	-0.030	(0)
NaHPO4-	3.689e-08	3.443e-08	-7.433	-7.463	-0.030	(0)
NaH2BO3	2.626e-10	2.626e-10	-9.581	-9.581	0.000	(0)
NaCrO4-	7.047e-21	6.524e-21	-20.152	-20.185	-0.033	(0)
Ni	4.772e-08					
Ni+2	4.270e-08	3.217e-08	-7.370	-7.493	-0.123	(0)
NiHCO3+	2.779e-09	2.573e-09	-8.556	-8.590	-0.033	(0)
NiCO3	1.154e-09	1.154e-09	-8.938	-8.938	0.000	(0)
NiSO4	7.582e-10	7.582e-10	-9.120	-9.120	0.000	(0)
NiCl+	1.821e-10	1.686e-10	-9.740	-9.773	-0.033	(0)
NiOH+	9.752e-11	9.028e-11	-10.011	-10.044	-0.033	(0)
NiNH3+2	4.626e-11	3.398e-11	-10.335	-10.469	-0.134	(0)
Ni (OH) 2	3.261e-12	3.261e-12	-11.487	-11.487	0.000	(0)
Ni (NH3) 2+2	1.127e-14	8.280e-15	-13.948	-14.082	-0.134	(0)
Ni (SO4) 2-2	4.372e-15	3.212e-15	-14.359	-14.493	-0.134	(0)
NiCl2	1.787e-15	1.787e-15	-14.748	-14.748	0.000	(0)
Ni (OH) 3-	1.122e-15	1.038e-15	-14.950	-14.984	-0.033	(0)
NiSeO4	1.083e-20	1.083e-20	-19.965	-19.965	0.000	(0)
NiNO3+	2.306e-26	2.135e-26	-25.637	-25.671	-0.033	(0)
O (0)	0.000e+00					
O2	0.000e+00	0.000e+00	-41.434	-41.433	0.000	(0)
P	3.552e-06					
HPO4-2	2.163e-06	1.637e-06	-5.665	-5.786	-0.121	(0)
H2PO4-	8.935e-07	8.339e-07	-6.049	-6.079	-0.030	(0)
MgHPO4	2.594e-07	2.594e-07	-6.586	-6.586	0.000	(0)
CaHPO4	1.634e-07	1.634e-07	-6.787	-6.787	0.000	(0)
NaHPO4-	3.689e-08	3.443e-08	-7.433	-7.463	-0.030	(0)
CaPO4-	1.319e-08	1.231e-08	-7.880	-7.910	-0.030	(0)
MgH2PO4+	1.072e-08	1.000e-08	-7.970	-8.000	-0.030	(0)
FeHPO4	6.152e-09	6.152e-09	-8.211	-8.211	0.000	(0)
CaH2PO4+	4.366e-09	4.075e-09	-8.360	-8.390	-0.030	(0)
KHPO4-	1.143e-09	1.067e-09	-8.942	-8.972	-0.030	(0)
FeH2PO4+	4.140e-10	3.864e-10	-9.383	-9.413	-0.030	(0)
MgPO4-	2.373e-10	2.214e-10	-9.625	-9.655	-0.030	(0)
PO4-3	3.724e-11	1.969e-11	-10.429	-10.706	-0.277	(0)
FeHPO4+	1.169e-11	1.091e-11	-10.932	-10.962	-0.030	(0)
CoHPO4	1.115e-11	1.115e-11	-10.953	-10.953	0.000	(0)
H3PO4	3.512e-12	3.512e-12	-11.454	-11.454	0.000	(0)
CrH2PO4+2	6.914e-17	5.079e-17	-16.160	-16.294	-0.134	(0)
FeH2PO4+2	1.336e-17	1.014e-17	-16.874	-16.994	-0.120	(0)
CrO3HPO4-2	2.689e-25	1.976e-25	-24.570	-24.704	-0.134	(0)
CrO3H2PO4-	3.251e-30	3.009e-30	-29.488	-29.522	-0.033	(0)
Pb	5.793e-09					
PbCO3	2.909e-09	2.909e-09	-8.536	-8.536	0.000	(0)
Pb+2	1.335e-09	1.006e-09	-8.874	-8.997	-0.123	(0)
PbOH+	8.692e-10	8.047e-10	-9.061	-9.094	-0.033	(0)
PbHCO3+	5.238e-10	4.849e-10	-9.281	-9.314	-0.033	(0)
PbCl+	7.542e-11	6.982e-11	-10.123	-10.156	-0.033	(0)
PbSO4	6.058e-11	6.058e-11	-10.218	-10.218	0.000	(0)
Pb (CO3) 2-2	1.098e-11	8.067e-12	-10.959	-11.093	-0.134	(0)
Pb (OH) 2	8.102e-12	8.102e-12	-11.091	-11.091	0.000	(0)
PbCl2	6.331e-13	6.331e-13	-12.199	-12.199	0.000	(0)
Pb (SO4) 2-2	6.108e-14	4.487e-14	-13.214	-13.348	-0.134	(0)
Pb (OH) 3-	2.786e-15	2.579e-15	-14.555	-14.588	-0.033	(0)
PbCl3-	5.973e-16	5.530e-16	-15.224	-15.257	-0.033	(0)
Pb2OH+3	2.568e-17	1.283e-17	-16.590	-16.892	-0.301	(0)
PbCl4-2	6.635e-19	4.874e-19	-18.178	-18.312	-0.134	(0)
Pb (OH) 4-2	2.738e-19	2.011e-19	-18.563	-18.697	-0.134	(0)
Pb3 (OH) 4+2	8.117e-22	5.963e-22	-21.091	-21.225	-0.134	(0)
Pb4 (OH) 4+4	1.971e-26	5.739e-27	-25.705	-26.241	-0.536	(0)
PbNO3+	4.189e-27	3.878e-27	-26.378	-26.411	-0.033	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-44.734	-44.734	0.000	(0)
S (6)	1.770e-04					

SO4-2	1.632e-04	1.229e-04	-3.787	-3.910	-0.123	(0)
CaSO4	6.357e-06	6.357e-06	-5.197	-5.197	0.000	(0)
MgSO4	5.861e-06	5.861e-06	-5.232	-5.232	0.000	(0)
NaSO4-	1.394e-06	1.301e-06	-5.856	-5.886	-0.030	(0)
NH4SO4-	9.714e-08	9.062e-08	-7.013	-7.043	-0.030	(0)
KSO4-	8.635e-08	8.059e-08	-7.064	-7.094	-0.030	(0)
FeSO4	2.988e-08	2.988e-08	-7.525	-7.525	0.000	(0)
MnSO4	1.606e-08	1.606e-08	-7.794	-7.794	0.000	(0)
ZnSO4	4.418e-09	4.418e-09	-8.355	-8.355	0.000	(0)
NiSO4	7.582e-10	7.582e-10	-9.120	-9.120	0.000	(0)
HSO4-	3.503e-10	3.265e-10	-9.456	-9.486	-0.031	(0)
CuSO4	3.036e-10	3.036e-10	-9.518	-9.518	0.000	(0)
CoSO4	1.626e-10	1.626e-10	-9.789	-9.789	0.000	(0)
CdSO4	1.059e-10	1.059e-10	-9.975	-9.975	0.000	(0)
PbSO4	6.058e-11	6.058e-11	-10.218	-10.218	0.000	(0)
CrOHSO4	2.406e-11	2.406e-11	-10.619	-10.619	0.000	(0)
Zn (SO4) 2-2	6.720e-12	4.936e-12	-11.173	-11.307	-0.134	(0)
AlSO4+	6.366e-12	5.934e-12	-11.196	-11.227	-0.031	(0)
Cd (SO4) 2-2	2.538e-13	1.864e-13	-12.596	-12.730	-0.134	(0)
CrSO4+	7.237e-14	6.700e-14	-13.140	-13.174	-0.033	(0)
Pb (SO4) 2-2	6.108e-14	4.487e-14	-13.214	-13.348	-0.134	(0)
Al (SO4) 2-	9.367e-15	8.732e-15	-14.028	-14.059	-0.031	(0)
Ni (SO4) 2-2	4.372e-15	3.212e-15	-14.359	-14.493	-0.134	(0)
FeSO4+	9.021e-16	8.414e-16	-15.045	-15.075	-0.030	(0)
Fe (SO4) 2-	2.486e-18	2.301e-18	-17.605	-17.638	-0.033	(0)
Cr2 (OH) 2SO4+2	2.442e-18	1.794e-18	-17.612	-17.746	-0.134	(0)
Cr2 (OH) 2 (SO4) 2	1.310e-20	1.310e-20	-19.883	-19.883	0.000	(0)
HgSO4	8.159e-26	8.159e-26	-25.088	-25.088	0.000	(0)
CrO3SO4-2	1.091e-28	8.018e-29	-27.962	-28.096	-0.134	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-49.776	-49.810	-0.033	(0)
Se (-2)	1.592e-33					
HSe-	1.592e-33	1.474e-33	-32.798	-32.832	-0.033	(0)
H2Se	3.537e-37	3.537e-37	-36.451	-36.451	0.000	(0)
MnSe	1.498e-37	1.498e-37	-36.824	-36.824	0.000	(0)
Se-2	0.000e+00	0.000e+00	-40.341	-40.475	-0.134	(0)
Se (4)	2.534e-09					
HSeO3-	2.197e-09	2.034e-09	-8.658	-8.692	-0.033	(0)
SeO3-2	3.367e-10	2.473e-10	-9.473	-9.607	-0.134	(0)
H2SeO3	2.629e-14	2.629e-14	-13.580	-13.580	0.000	(0)
FeHSeO3+2	4.463e-21	3.279e-21	-20.350	-20.484	-0.134	(0)
Cd (SeO3) 2-2	2.869e-22	2.108e-22	-21.542	-21.676	-0.134	(0)
Se (6)	1.052e-15					
SeO4-2	1.052e-15	7.926e-16	-14.978	-15.101	-0.123	(0)
MnSeO4	1.512e-19	1.512e-19	-18.821	-18.821	0.000	(0)
ZnSeO4	2.105e-20	2.105e-20	-19.677	-19.677	0.000	(0)
NiSeO4	1.083e-20	1.083e-20	-19.965	-19.965	0.000	(0)
CoSeO4	2.530e-21	2.530e-21	-20.597	-20.597	0.000	(0)
HSeO4-	1.158e-21	1.072e-21	-20.936	-20.970	-0.033	(0)
CdSeO4	5.758e-22	5.758e-22	-21.240	-21.240	0.000	(0)
Zn (SeO4) 2-2	2.303e-35	1.691e-35	-34.638	-34.772	-0.134	(0)
Zn	2.509e-07					
Zn+2	2.276e-07	1.714e-07	-6.643	-6.766	-0.123	(0)
ZnCO3	9.487e-09	9.487e-09	-8.023	-8.023	0.000	(0)
ZnSO4	4.418e-09	4.418e-09	-8.355	-8.355	0.000	(0)
ZnOH+	4.016e-09	3.718e-09	-8.396	-8.430	-0.033	(0)
ZnHCO3+	3.799e-09	3.517e-09	-8.420	-8.454	-0.033	(0)
ZnCl+	9.250e-10	8.616e-10	-9.034	-9.065	-0.031	(0)
ZnOHCl	3.727e-10	3.727e-10	-9.429	-9.429	0.000	(0)
Zn (OH) 2	2.754e-10	2.754e-10	-9.560	-9.560	0.000	(0)
Zn (SO4) 2-2	6.720e-12	4.936e-12	-11.173	-11.307	-0.134	(0)
ZnCl2	2.282e-12	2.282e-12	-11.642	-11.642	0.000	(0)
Zn (OH) 3-	4.748e-13	4.395e-13	-12.324	-12.357	-0.033	(0)
ZnCl3-	3.958e-15	3.686e-15	-14.403	-14.433	-0.031	(0)
Zn (OH) 4-2	7.584e-18	5.571e-18	-17.120	-17.254	-0.134	(0)
ZnCl4-2	4.856e-18	3.677e-18	-17.314	-17.435	-0.121	(0)
ZnSeO4	2.105e-20	2.105e-20	-19.677	-19.677	0.000	(0)
ZnNO3+	1.268e-25	1.174e-25	-24.897	-24.930	-0.033	(0)
Zn (SeO4) 2-2	2.303e-35	1.691e-35	-34.638	-34.772	-0.134	(0)

Zn(NO3)2 0.000e+00 0.000e+00 -44.222 -44.222 0.000 (0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-65.98	-59.71	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-32.46	-27.92	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-39.73	-27.92	11.81	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-90.20	-72.27	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-44.71	-24.58	20.13	(Co(NH3)6)Cl3
(NH4)2CrO4	-26.88	-26.50	0.38	(NH4)2CrO4
(NH4)2SeO4	-23.88	-23.43	0.45	(NH4)2SeO4
Al(OH)3(am)	0.25	11.38	11.13	Al(OH)3
Al2(MoO4)3	-51.28	-48.13	3.15	Al2(MoO4)3
Al2O3	2.33	22.75	20.43	Al2O3
Al4(OH)10SO4	3.90	26.60	22.70	Al4(OH)10SO4
AlAsO4·2H2O	-7.22	-2.42	4.80	AlAsO4·2H2O
AlOHSO4	-4.30	-7.53	-3.23	AlOHSO4
Alunite	0.56	-0.21	-0.77	KAl3(SO4)2(OH)6
Anglesite	-5.08	-12.91	-7.83	PbSO4
Anhydrite	-3.20	-7.54	-4.34	CaSO4
Antlerite	-6.52	2.27	8.79	Cu3(OH)4SO4
Aragonite	-1.38	-9.64	-8.26	CaCO3
Arsenolite	-67.16	-70.10	-2.94	As4O6
Artinite	-8.11	1.85	9.96	MgCO3:Mg(OH)2·3H2O
As2O5	-34.37	-27.60	6.77	As2O5
Atacamite	-3.74	3.93	7.67	Cu2(OH)3Cl
Azurite	-4.24	-20.86	-16.62	Cu3(OH)2(CO3)2
Ba(OH)2·8H2O	-16.14	8.42	24.56	Ba(OH)2·8H2O
Ba3(AsO4)2	6.60	-2.35	-8.94	Ba3(AsO4)2
BaCrO4	-14.99	-24.76	-9.77	BaCrO4
BaHPO4	-5.01	-24.79	-19.77	BaHPO4
BaMoO4	-8.22	-15.21	-6.99	BaMoO4
Barite	-0.44	-10.49	-10.05	BaSO4
BaSeO3	-9.57	-7.78	1.79	BaSeO3
BaSeO4	-14.16	-21.68	-7.53	BaSeO4
Bianchite	-8.91	-10.68	-1.76	ZnSO4·6H2O
Birnessite	-11.87	6.22	18.09	MnO2
Bixbyite	-10.29	-10.56	-0.27	Mn2O3
Boehmite	2.45	11.38	8.93	AlOOH
Brochantite	-6.50	9.32	15.83	Cu4(OH)6SO4
Brucite	-5.75	11.44	17.18	Mg(OH)2
Bunsenite	-5.24	7.51	12.74	NiO
Ca3(AsO4)2·4H2O	-15.77	6.53	22.30	Ca3(AsO4)2·4H2O
Ca3(PO4)2(beta)	-3.21	-32.29	-29.08	Ca3(PO4)2
Ca4H(PO4)3·3H2O	-7.04	-54.12	-47.08	Ca4H(PO4)3·3H2O
CaCrO4	-19.62	-21.80	-2.19	CaCrO4
CaHPO4	-2.46	-21.83	-19.37	CaHPO4
CaHPO4·2H2O	-2.77	-21.83	-19.06	CaHPO4·2H2O
Calcite	-1.19	-9.64	-8.46	CaCO3
Calomel	-11.39	-29.57	-18.18	Hg2Cl2
CaMoO4	-4.31	-12.25	-7.94	CaMoO4
CaSeO3·2H2O	-7.69	-4.82	2.87	CaSeO3·2H2O
CaSeO4·2H2O	-15.73	-18.73	-3.00	CaSeO4·2H2O
Cd(BO2)2	-13.93	-4.09	9.84	Cd(BO2)2
Cd(OH)2	-7.34	6.59	13.93	Cd(OH)2
Cd(OH)2(am)	-7.40	6.59	13.99	Cd(OH)2
Cd3(OH)2(SO4)2	-24.76	-18.05	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-21.70	0.86	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-14.04	-46.64	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-20.95	7.45	28.40	Cd4(OH)6SO4
CdCl2	-13.17	-13.77	-0.60	CdCl2
CdCl2·1H2O	-12.10	-13.77	-1.67	CdCl2·1H2O
CdCl2·2.5H2O	-11.84	-13.77	-1.93	CdCl2·2.5H2O
Cdmetal(alpha)	-30.15	-16.41	13.74	Cd
Cdmetal(gamma)	-30.25	-16.41	13.84	Cd
CdMoO4	-2.83	-17.04	-14.21	CdMoO4

CdOHC1	-7.22	-3.59	3.63	CdOHC1
CdSe	-13.31	-33.74	-20.43	CdSe
CdSeO4:2H2O	-21.66	-23.51	-1.85	CdSeO4:2H2O
CdSO4	-12.30	-12.32	-0.02	CdSO4
CdSO4:1H2O	-10.69	-12.32	-1.63	CdSO4:1H2O
CdSO4:2.67H2O	-10.50	-12.32	-1.82	CdSO4:2.67H2O
Cerussite	-1.81	-15.01	-13.20	PbCO3
CH4(g)	-71.20	-113.02	-41.81	CH4
Chalcanthite	-9.19	-11.85	-2.66	CuSO4:5H2O
Claudetite	-66.87	-70.10	-3.23	As4O6
Clausthalite	-6.87	-34.33	-27.46	PbSe
Co(BO2)2	-30.91	-3.84	27.07	Co(BO2)2
Co(OH)2	-6.25	6.84	13.09	Co(OH)2
Co(OH)3	-12.03	-14.06	-2.03	Co(OH)3
CO2(g)	-2.86	-21.02	-18.16	CO2
Co3(AsO4)2	-20.11	-7.08	13.03	Co3(AsO4)2
Co3(PO4)2	-11.20	-45.89	-34.69	Co3(PO4)2
Co3O4	-11.11	-21.28	-10.17	Co3O4
CoCl2	-22.03	-13.53	8.51	CoCl2
CoCl2:6H2O	-16.04	-13.53	2.51	CoCl2:6H2O
CoCO3	-4.24	-14.18	-9.94	CoCO3
CoFe2O4	24.61	21.56	-3.05	CoFe2O4
CoHPO4	-7.31	-26.37	-19.06	CoHPO4
CoMoO4	-9.10	-16.79	-7.69	CoMoO4
CoO	-7.06	6.84	13.90	CoO
CoSe	-17.29	-33.49	-16.20	CoSe
CoSeO3	-10.67	-9.35	1.32	CoSeO3
CoSeO4:6H2O	-21.73	-23.26	-1.53	CoSeO4:6H2O
CoSO4	-15.11	-12.07	3.04	CoSO4
CoSO4:6H2O	-9.59	-12.07	-2.48	CoSO4:6H2O
Cotunnite	-9.50	-14.36	-4.86	PbCl2
Cr(OH)2	-19.49	-8.57	10.93	Cr(OH)2
Cr(OH)3	-1.42	0.00	1.42	Cr(OH)3
Cr(OH)3(am)	0.75	0.00	-0.75	Cr(OH)3
Cr2O3	2.22	0.01	-2.21	Cr2O3
CrCl2	-43.36	-28.93	14.42	CrCl2
CrCl3	-46.02	-30.54	15.48	CrCl3
Crmetal	-62.56	-31.57	31.00	Cr
CrO3	-29.98	-33.18	-3.19	CrO3
Cu(OH)2	-1.78	7.06	8.84	Cu(OH)2
Cu2(OH)3NO3	-21.43	-11.96	9.47	Cu2(OH)3NO3
Cu2Se(alpha)	2.56	-43.88	-46.44	Cu2Se
Cu2SO4	-20.56	-22.45	-1.89	Cu2SO4
Cu3(AsO4)2:2H2O	-12.52	-6.42	6.10	Cu3(AsO4)2:2H2O
Cu3(PO4)2	-8.39	-45.24	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-10.12	-45.24	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	-12.64	-77.15	-64.51	Cu3Se2
CuCO3	-2.46	-13.96	-11.50	CuCO3
CuCrO4	-20.68	-26.12	-5.44	CuCrO4
Cumetal	-4.30	-13.27	-8.97	Cu
CuMoO4	-3.46	-16.57	-13.11	CuMoO4
CuOCuSO4	-15.51	-4.79	10.71	CuOCuSO4
Cupricferrite	15.16	21.78	6.62	CuFe2O4
Cuprite	-2.51	-3.54	-1.04	Cu2O
Cuprousferrite	14.46	5.59	-8.87	CuFeO2
CuSe	0.19	-33.27	-33.46	CuSe
CuSe2	-16.82	-50.60	-33.79	CuSe2
CuSeO3:2H2O	-9.75	-9.13	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-20.60	-23.04	-2.44	CuSeO4:5H2O
CuSO4	-15.01	-11.85	3.16	CuSO4
Diaspore	4.20	11.38	7.18	AlOOH
Dolomite(disordered)	-2.82	-19.22	-16.40	CaMg(CO3)2
Dolomite(ordered)	-2.25	-19.22	-16.97	CaMg(CO3)2
Epsomite	-5.31	-7.48	-2.16	MgSO4:7H2O
Fe(OH)2	-4.54	9.02	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	7.35	4.31	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-3.03	-1.47	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-13.23	-33.86	-20.63	Fe2(SeO3)3:2H2O

Fe2 (SO4) 3	-39.00	-42.01	-3.01	Fe2 (SO4) 3
Fe3 (OH) 8	3.52	23.74	20.22	Fe3 (OH) 8
FeAsO4:2H2O	-6.84	-6.44	0.40	FeAsO4:2H2O
FeCr2O4	1.41	9.03	7.62	FeCr2O4
FeMoO4	-4.55	-14.61	-10.06	FeMoO4
Ferrihydrite	3.95	7.36	3.41	Fe (OH) 3
Ferroselite	-29.91	-48.64	-18.74	FeSe2
FeSe	-20.31	-31.31	-11.01	FeSe
Gibbsite	2.80	11.38	8.58	Al (OH) 3
Goethite	6.69	7.36	0.67	FeOOH
Goslarite	-8.62	-10.68	-2.05	ZnSO4:7H2O
Gypsum	-2.92	-7.54	-4.61	CaSO4:2H2O
H-Jarosite	-4.33	-15.74	-11.41	(H3O) Fe3 (SO4) 2 (OH) 6
H2MoO4	-10.61	-23.63	-13.02	H2MoO4
H2Se(g)	-35.42	-40.33	-4.91	H2Se
Halite	-6.98	-5.39	1.59	NaCl
Hausmannite	-12.61	49.68	62.29	Mn3O4
Hematite	15.75	14.72	-1.03	Fe2O3
Hercynite	7.94	31.77	23.83	FeAl2O4
Hg (CH3) 2 (g)	-165.68	-240.82	-75.15	Hg (CH3) 2
Hg (g)	-8.16	-16.10	-7.94	Hg
Hg (OH) 2	-11.29	-14.79	-3.50	Hg (OH) 2
Hg2 (g)	-17.08	-32.20	-15.13	Hg2
Hg2 (OH) 2	-14.47	-9.21	5.26	Hg2 (OH) 2
Hg2CO3	-14.04	-30.22	-16.18	Hg2CO3
Hg2CrO4	-33.68	-42.38	-8.70	Hg2CrO4
Hg2HPO4	-17.64	-42.41	-24.77	Hg2HPO4
Hg2SeO3	-20.74	-25.40	-4.66	Hg2SeO3
Hg2SO4	-21.97	-28.12	-6.15	Hg2SO4
Hg3O2CO3	-35.71	-65.39	-29.68	Hg3O2CO3
HgCl (g)	-34.77	-14.79	19.98	HgCl
HgCl2	-13.57	-35.16	-21.58	HgCl2
Hgmetal (l)	-2.40	-16.10	-13.70	Hg
HgSe	0.57	-55.12	-55.69	HgSe
HgSeO3	-18.55	-30.98	-12.43	HgSeO3
HgSO4	-24.24	-33.70	-9.46	HgSO4
Hinsdalite	-9.48	-11.98	-2.50	PbAl3PO4SO4 (OH) 6
Huntite	-8.74	-38.39	-29.65	CaMg3 (CO3) 4
Hydrocerussite	-5.26	-24.03	-18.77	Pb3 (OH) 2 (CO3) 2
Hydromagnesite	-18.78	-26.89	-8.11	Mg5 (CO3) 4 (OH) 2:4H2O
Hydroxylapatite	1.59	-42.74	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-6.81	-69.60	-62.79	Pb5 (PO4) 3OH
K-Alum	-17.70	-22.97	-5.26	KAl (SO4) 2:12H2O
K-Jarosite	2.15	-12.26	-14.41	KFe3 (SO4) 2 (OH) 6
K2Cr2O7	-41.92	-59.40	-17.48	K2Cr2O7
K2CrO4	-25.65	-26.22	-0.57	K2CrO4
K2MoO4	-19.94	-16.67	3.27	K2MoO4
K2SeO4	-22.41	-23.14	-0.73	K2SeO4
Langite	-8.66	9.32	17.98	Cu4 (OH) 6SO4:H2O
Larnakite	-6.54	-6.91	-0.37	PbO:PbSO4
Laurionite	-4.80	-4.18	0.62	PbOHCl
Lepidocrocite	5.99	7.36	1.37	FeOOH
Lime	-21.90	11.37	33.28	CaO
Litharge	-6.89	6.00	12.89	PbO
Maghemite	8.33	14.72	6.39	Fe2O3
Magnesioferrite	8.46	26.16	17.69	Fe2MgO4
Magnesite	-2.06	-9.58	-7.52	MgCO3
Magnetite	19.71	23.74	4.03	Fe3O4
Malachite	-1.37	-6.90	-5.53	Cu2 (OH) 2CO3
Manganite	-4.95	20.39	25.34	MnOOH
Massicot	-7.09	6.00	13.09	PbO
Melanothallite	-19.75	-13.31	6.45	CuCl2
Melanterite	-7.62	-9.89	-2.27	FeSO4:7H2O
Mg (OH) 2 (active)	-7.36	11.44	18.79	Mg (OH) 2
Mg3 (PO4) 2	-8.82	-32.10	-23.28	Mg3 (PO4) 2
MgCr2O4	-5.29	11.44	16.74	MgCr2O4
MgCrO4	-27.39	-21.74	5.65	MgCrO4
MgHPO4:3H2O	-3.60	-21.77	-18.18	MgHPO4:3H2O

MgMoO4	-10.34	-12.19	-1.85	MgMoO4
MgSeO3:6H2O	-7.80	-4.76	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-17.47	-18.67	-1.20	MgSeO4:6H2O
Minium	-33.77	41.01	74.78	Pb3O4
Mirabilite	-7.96	-9.32	-1.35	Na2SO4:10H2O
Mn2(SO4)3	-62.07	-67.29	-5.22	Mn2(SO4)3
Mn3(AsO4)2:8H2O	-13.42	-0.92	12.50	Mn3(AsO4)2:8H2O
Mn3(PO4)2	-15.88	-39.73	-23.85	Mn3(PO4)2
MnCl2:4H2O	-14.22	-11.47	2.75	MnCl2:4H2O
MnHPO4	1.09	-24.31	-25.40	MnHPO4
MnSe	-35.23	-31.44	3.79	MnSe
MnSeO3	-8.43	-7.30	1.13	MnSeO3
MnSeO3:2H2O	-8.26	-7.30	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-19.16	-21.21	-2.05	MnSeO4:5H2O
MnSO4	-12.80	-10.02	2.78	MnSO4
Monteponite	-8.82	6.59	15.41	CdO
Montroydite	-11.27	-14.79	-3.52	HgO
MoO3	-15.63	-23.63	-8.00	MoO3
Morenosite	-9.22	-11.40	-2.18	NiSO4:7H2O
Na-Jarosite	-0.20	-10.94	-10.75	NaFe3(SO4)2(OH)6
Na2Cr2O7	-46.80	-56.76	-9.96	Na2Cr2O7
Na2CrO4	-26.57	-23.58	2.99	Na2CrO4
Na2Mo2O7	-20.90	-37.66	-16.76	Na2Mo2O7
Na2MoO4	-15.55	-14.03	1.52	Na2MoO4
Na2MoO4:2H2O	-15.26	-14.03	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-16.90	-6.60	10.30	Na2SeO3:5H2O
Na2SeO4	-21.79	-20.51	1.28	Na2SeO4
Nantokite	-5.10	-11.95	-6.86	CuCl
Natron	-9.91	-11.42	-1.51	Na2CO3:10H2O
Nesquehonite	-4.98	-9.58	-4.60	MgCO3:3H2O
Ni(OH)2	-5.57	7.51	13.08	Ni(OH)2
Ni3(AsO4)2:8H2O	-20.77	-5.07	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-12.59	-43.89	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-20.88	11.12	32.00	Ni4(OH)6SO4
NiCO3	-6.76	-13.51	-6.75	NiCO3
NiMoO4	-4.97	-16.12	-11.15	NiMoO4
NiSe	-15.12	-32.82	-17.70	NiSe
NiSeO3:2H2O	-11.59	-8.68	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-21.07	-22.59	-1.52	NiSeO4:6H2O
Nsutite	-11.28	6.22	17.50	MnO2
O2(g)	-38.80	46.00	84.80	O2
Otavite	-2.43	-14.43	-12.00	CdCO3
Pb(BO2)2	-11.25	-4.68	6.57	Pb(BO2)2
Pb(OH)2	-2.32	6.00	8.32	Pb(OH)2
Pb10(OH)6O(CO3)6	-57.32	-66.08	-8.76	Pb10(OH)6O(CO3)6
Pb2(OH)3Cl	-6.97	1.82	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-14.18	12.01	26.19	Pb2O(OH)2
Pb2O3	-26.03	35.01	61.04	Pb2O3
Pb2OCO3	-8.58	-9.01	-0.44	Pb2OCO3
Pb3(AsO4)2	-15.39	-9.59	5.80	Pb3(AsO4)2
Pb3(PO4)2	-4.87	-48.40	-43.53	Pb3(PO4)2
Pb3O2CO3	-14.36	-3.01	11.35	Pb3O2CO3
Pb3O2SO4	-11.83	-0.90	10.92	Pb3O2SO4
Pb4(OH)6SO4	-16.00	5.10	21.10	Pb4(OH)6SO4
Pb4O3SO4	-17.18	5.10	22.28	Pb4O3SO4
PbCrO4	-14.44	-27.18	-12.73	PbCrO4
PbHPO4	-3.40	-27.20	-23.81	PbHPO4
Pbmetal	-21.24	-17.00	4.24	Pb
PbMoO4	-1.84	-17.63	-15.78	PbMoO4
PbO:0.3H2O	-6.98	6.00	12.98	PbO:0.33H2O
PbSeO4	-17.21	-24.10	-6.88	PbSeO4
Periclase	-10.60	11.44	22.04	MgO
Phosgenite	-9.57	-29.38	-19.81	PbCl2:PbCO3
Plattnerite	-21.48	29.00	50.49	PbO2
Plumbgummite	6.51	-26.28	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-11.81	11.37	23.19	Ca(OH)2
Pyrochroite	-6.59	8.89	15.48	Mn(OH)2
Pyrolusite	-10.30	31.89	42.19	MnO2

Pyromorphite	4.64	-79.79	-84.43	Pb5 (PO4) 3Cl
Retgersite	-9.35	-11.40	-2.05	NiSO4:6H2O
Rhodochrosite	-1.55	-12.12	-10.57	MnCO3
Semetal (am)	-10.19	-17.33	-7.14	Se
Semetal (hex)	-9.58	-17.33	-7.76	Se
SeO2	-16.31	-16.19	0.12	SeO2
SeO3	-51.58	-30.10	21.48	SeO3
Siderite	-1.81	-12.00	-10.19	FeCO3
Smithsonite	-2.83	-12.78	-9.95	ZnCO3
Spinel	-3.82	34.19	38.01	MgAl2O4
Strengite	0.53	-25.85	-26.37	FePO4:2H2O
Tenorite	-0.78	7.06	7.84	CuO
Thenardite	-9.66	-9.32	0.35	Na2SO4
Thermonatrite	-12.09	-11.42	0.67	Na2CO3:H2O
Tsumebite	-4.35	-14.14	-9.79	Pb2CuPO4 (OH) 3:3H2O
Vivianite	-3.35	-39.35	-36.00	Fe3 (PO4) 2:8H2O
Witherite	-4.02	-12.60	-8.58	BaCO3
Zincite	-3.37	8.23	11.60	ZnO
Zincosite	-14.85	-10.68	4.18	ZnSO4
Zn (BO2) 2	-10.74	-2.45	8.29	Zn (BO2) 2
Zn (NO3) 2:6H2O	-47.16	-43.92	3.24	Zn (NO3) 2:6H2O
Zn (OH) 2	-3.97	8.23	12.20	Zn (OH) 2
Zn (OH) 2 (am)	-4.48	8.23	12.71	Zn (OH) 2
Zn (OH) 2 (beta)	-3.77	8.23	12.00	Zn (OH) 2
Zn (OH) 2 (epsilon)	-3.54	8.23	11.78	Zn (OH) 2
Zn (OH) 2 (gamma)	-3.50	8.23	11.73	Zn (OH) 2
Zn2 (OH) 2SO4	-9.94	-2.44	7.50	Zn2 (OH) 2SO4
Zn2 (OH) 3Cl	-8.91	6.29	15.19	Zn2 (OH) 3Cl
Zn3 (AsO4) 2:2.5H2O	-16.54	-2.89	13.65	Zn3 (AsO4) 2:2.5H2O
Zn3 (PO4) 2:4H2O	-6.29	-41.71	-35.42	Zn3 (PO4) 2:4H2O
Zn3O (SO4) 2	-32.80	-13.12	19.68	Zn3O (SO4) 2
Zn4 (OH) 6SO4	-14.37	14.03	28.40	Zn4 (OH) 6SO4
Zn5 (OH) 8Cl2	-17.70	20.80	38.50	Zn5 (OH) 8Cl2
ZnCl2	-19.40	-12.13	7.27	ZnCl2
ZnCO3:1H2O	-2.52	-12.78	-10.26	ZnCO3:1H2O
Znmetal	-41.01	-14.77	26.25	Zn
ZnMoO4	-5.30	-15.39	-10.09	ZnMoO4
ZnO (active)	-3.22	8.23	11.45	ZnO
ZnSe	-17.62	-32.10	-14.48	ZnSe
ZnSeO4:6H2O	-20.35	-21.87	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-10.17	-10.68	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Initial solution 3.

-----Solution composition-----

Elements	Molality	Moles
Al	1.484e-06	1.484e-06
Alkalinity	8.200e-04	8.200e-04
As	2.671e-08	2.671e-08
B	8.146e-06	8.146e-06
Ba	8.744e-08	8.744e-08
Ca	7.990e-04	7.990e-04
Cl	6.520e-03	6.520e-03
Co	6.622e-07	6.622e-07
Cr	1.347e-07	1.347e-07
Cu	3.464e-07	3.464e-07
Fe	8.834e-06	8.834e-06
K	6.399e-04	6.399e-04
Mg	6.999e-04	6.999e-04
Mn	8.379e-07	8.379e-07
Mo	9.387e-08	9.387e-08
N	1.736e-03	1.736e-03
Na	5.746e-03	5.746e-03

Ni	1.876e-07	1.876e-07
P	1.680e-05	1.680e-05
Pb	1.449e-08	1.449e-08
S (6)	1.979e-03	1.979e-03
Se	2.535e-08	2.535e-08
Zn	3.520e-07	3.520e-07

-----Description of solution-----

pH	=	6.180
pe	=	4.000
Activity of water	=	1.000
Ionic strength (mol/kgw)	=	1.387e-02
Mass of water (kg)	=	1.000e+00
Total carbon (mol/kg)	=	1.948e-03
Total CO2 (mol/kg)	=	1.948e-03
Temperature (°C)	=	20.00
Electrical balance (eq)	=	-1.692e-04
Percent error, 100*(Cat- An)/(Cat+ An)	=	-0.78
Iterations	=	12
Total H	=	1.110238e+02
Total O	=	5.552069e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	7.433e-07	6.607e-07	-6.129	-6.180	-0.051	0.00
OH-	1.171e-08	1.038e-08	-7.931	-7.984	-0.052	(0)
H2O	5.551e+01	9.997e-01	1.744	-0.000	0.000	18.05
Al	1.484e-06					
Al (OH) 2+	9.360e-07	8.356e-07	-6.029	-6.078	-0.049	(0)
Al (OH) 3	2.540e-07	2.540e-07	-6.595	-6.595	0.000	(0)
Al (OH) 4-	1.663e-07	1.479e-07	-6.779	-6.830	-0.051	(0)
AlOH+2	7.824e-08	4.969e-08	-7.107	-7.304	-0.197	(0)
AlSO4+	3.549e-08	3.158e-08	-7.450	-7.501	-0.051	(0)
Al+3	1.309e-08	4.532e-09	-7.883	-8.344	-0.461	(0)
Al (SO4) 2-	4.624e-10	4.114e-10	-9.335	-9.386	-0.051	(0)
AlMo6O21-3	4.906e-34	1.428e-34	-33.309	-33.845	-0.536	(0)
As (3)	1.676e-13					
H3AsO3	1.675e-13	1.675e-13	-12.776	-12.776	0.000	(0)
H2AsO3-	1.235e-16	1.077e-16	-15.908	-15.968	-0.060	(0)
H4AsO3+	6.290e-20	5.484e-20	-19.201	-19.261	-0.060	(0)
HAsO3-2	2.065e-22	1.193e-22	-21.685	-21.923	-0.238	(0)
AsO3-3	2.009e-29	5.847e-30	-28.697	-29.233	-0.536	(0)
As (5)	2.671e-08					
H2AsO4-	2.145e-08	1.870e-08	-7.669	-7.728	-0.060	(0)
HAsO4-2	5.262e-09	3.040e-09	-8.279	-8.517	-0.238	(0)
H3AsO4	2.038e-12	2.045e-12	-11.691	-11.689	0.001	(0)
AsO4-3	4.448e-14	1.294e-14	-13.352	-13.888	-0.536	(0)
B	8.146e-06					
H3BO3	8.139e-06	8.165e-06	-5.089	-5.088	0.001	(0)
H2BO3-	7.437e-09	6.563e-09	-8.129	-8.183	-0.054	(0)
CaH2BO3+	1.795e-10	1.584e-10	-9.746	-9.800	-0.054	(0)
MgH2BO3+	1.002e-10	8.839e-11	-9.999	-10.054	-0.054	(0)
NaH2BO3	5.773e-11	5.773e-11	-10.239	-10.239	0.000	(0)
H5 (BO3) 2-	5.334e-14	4.707e-14	-13.273	-13.327	-0.054	(0)
BaH2BO3+	1.215e-14	1.072e-14	-13.915	-13.970	-0.054	(0)
H8 (BO3) 3-	3.769e-17	3.326e-17	-16.424	-16.478	-0.054	(0)
Ba	8.744e-08					
Ba+2	8.709e-08	5.435e-08	-7.060	-7.265	-0.205	(0)
BaHCO3+	3.501e-10	3.132e-10	-9.456	-9.504	-0.048	(0)
BaCO3	1.148e-12	1.148e-12	-11.940	-11.940	0.000	(0)
BaNH3+2	7.754e-14	4.480e-14	-13.110	-13.349	-0.238	(0)
BaH2BO3+	1.215e-14	1.072e-14	-13.915	-13.970	-0.054	(0)
BaOH+	2.669e-15	2.379e-15	-14.574	-14.624	-0.050	(0)
BaNO3+	1.252e-37	1.092e-37	-36.902	-36.962	-0.060	(0)

C (4)	1.948e-03					
H2CO3	1.134e-03	1.134e-03	-2.945	-2.945	0.000	(0)
HCO3-	8.028e-04	7.166e-04	-3.095	-3.145	-0.049	(0)
CaHCO3+	5.603e-06	5.013e-06	-5.252	-5.300	-0.048	(0)
MgHCO3+	3.121e-06	2.771e-06	-5.506	-5.557	-0.052	(0)
NaHCO3	2.248e-06	2.248e-06	-5.648	-5.648	0.000	(0)
CO3-2	7.369e-08	4.599e-08	-7.133	-7.337	-0.205	(0)
FeHCO3+	3.932e-08	3.517e-08	-7.405	-7.454	-0.048	(0)
CuCO3	3.016e-08	3.016e-08	-7.521	-7.521	0.000	(0)
CaCO3	2.814e-08	2.814e-08	-7.551	-7.551	0.000	(0)
CoHCO3+	1.894e-08	1.651e-08	-7.723	-7.782	-0.060	(0)
MgCO3	1.368e-08	1.368e-08	-7.864	-7.864	0.000	(0)
NiHCO3+	8.938e-09	7.793e-09	-8.049	-8.108	-0.060	(0)
MnHCO3+	6.750e-09	6.017e-09	-8.171	-8.221	-0.050	(0)
NaCO3-	5.601e-09	5.000e-09	-8.252	-8.301	-0.049	(0)
CuHCO3+	5.224e-09	4.555e-09	-8.282	-8.342	-0.060	(0)
ZnHCO3+	4.406e-09	3.842e-09	-8.356	-8.415	-0.060	(0)
PbHCO3+	2.579e-09	2.249e-09	-8.589	-8.648	-0.060	(0)
PbCO3	6.455e-10	6.455e-10	-9.190	-9.190	0.000	(0)
ZnCO3	4.960e-10	4.960e-10	-9.304	-9.304	0.000	(0)
BaHCO3+	3.501e-10	3.132e-10	-9.456	-9.504	-0.048	(0)
CoCO3	2.546e-10	2.546e-10	-9.594	-9.594	0.000	(0)
NiCO3	1.673e-10	1.673e-10	-9.776	-9.776	0.000	(0)
Cu (CO3) 2-2	6.462e-12	3.734e-12	-11.190	-11.428	-0.238	(0)
BaCO3	1.148e-12	1.148e-12	-11.940	-11.940	0.000	(0)
Pb (CO3) 2-2	1.482e-13	8.562e-14	-12.829	-13.067	-0.238	(0)
Ca	7.990e-04					
Ca+2	6.907e-04	4.311e-04	-3.161	-3.365	-0.205	(0)
CaSO4	1.024e-04	1.024e-04	-3.990	-3.990	0.000	(0)
CaHCO3+	5.603e-06	5.013e-06	-5.252	-5.300	-0.048	(0)
CaHPO4	2.128e-07	2.128e-07	-6.672	-6.672	0.000	(0)
CaH2PO4+	1.242e-07	1.109e-07	-6.906	-6.955	-0.049	(0)
CaCO3	2.814e-08	2.814e-08	-7.551	-7.551	0.000	(0)
CaNH3+2	1.227e-09	7.089e-10	-8.911	-9.149	-0.238	(0)
CaPO4-	8.600e-10	7.677e-10	-9.066	-9.115	-0.049	(0)
CaH2BO3+	1.795e-10	1.584e-10	-9.746	-9.800	-0.054	(0)
CaOH+	9.423e-11	8.430e-11	-10.026	-10.074	-0.048	(0)
Ca (NH3) 2+2	6.381e-16	3.686e-16	-15.195	-15.433	-0.238	(0)
CaNO3+	5.947e-34	5.185e-34	-33.226	-33.285	-0.060	(0)
Cl	6.520e-03					
Cl-	6.520e-03	5.795e-03	-2.186	-2.237	-0.051	(0)
CuCl2-	5.238e-08	4.651e-08	-7.281	-7.332	-0.052	(0)
CuCl	3.795e-08	3.795e-08	-7.421	-7.421	0.000	(0)
CoCl+	7.428e-09	6.476e-09	-8.129	-8.189	-0.060	(0)
MnCl+	3.540e-09	3.156e-09	-8.451	-8.501	-0.050	(0)
ZnCl+	2.961e-09	2.629e-09	-8.529	-8.580	-0.052	(0)
NiCl+	1.636e-09	1.426e-09	-8.786	-8.846	-0.060	(0)
CuCl+	1.088e-09	9.662e-10	-8.963	-9.015	-0.052	(0)
PbCl+	1.037e-09	9.043e-10	-8.984	-9.044	-0.060	(0)
CuCl3-2	8.950e-11	5.651e-11	-10.048	-10.248	-0.200	(0)
ZnOHCl	5.442e-11	5.442e-11	-10.264	-10.264	0.000	(0)
MnCl2	2.583e-11	2.583e-11	-10.588	-10.588	0.000	(0)
PbCl2	2.288e-11	2.288e-11	-10.640	-10.640	0.000	(0)
ZnCl2	1.943e-11	1.943e-11	-10.712	-10.712	0.000	(0)
CrCl+2	1.984e-12	1.146e-12	-11.703	-11.941	-0.238	(0)
CuCl2	1.517e-12	1.517e-12	-11.819	-11.819	0.000	(0)
ZnCl3-	9.866e-14	8.761e-14	-13.006	-13.057	-0.052	(0)
PbCl3-	6.398e-14	5.578e-14	-13.194	-13.253	-0.060	(0)
MnCl3-	4.626e-14	4.123e-14	-13.335	-13.385	-0.050	(0)
NiCl2	4.219e-14	4.219e-14	-13.375	-13.375	0.000	(0)
CrOHCl2	9.427e-16	9.427e-16	-15.026	-15.026	0.000	(0)
FeCl+2	7.064e-16	4.460e-16	-15.151	-15.351	-0.200	(0)
CrCl2+	4.641e-16	4.046e-16	-15.333	-15.393	-0.060	(0)
ZnCl4-2	3.862e-16	2.438e-16	-15.413	-15.613	-0.200	(0)
PbCl4-2	2.375e-16	1.372e-16	-15.624	-15.863	-0.238	(0)
CuCl3-	8.442e-17	7.496e-17	-16.074	-16.125	-0.052	(0)
FeCl2+	1.517e-17	1.352e-17	-16.819	-16.869	-0.050	(0)
FeCl3	7.837e-21	7.837e-21	-20.106	-20.106	0.000	(0)

CuCl4-2	4.088e-21	2.581e-21	-20.388	-20.588	-0.200	(0)
CrO3Cl-	6.803e-34	5.932e-34	-33.167	-33.227	-0.060	(0)
Cr(NH3) 6Cl+2	4.721e-34	2.728e-34	-33.326	-33.564	-0.238	(0)
CoCl+2	2.383e-35	1.377e-35	-34.623	-34.861	-0.238	(0)
Co(NH3) 5Cl+2	4.164e-39	2.406e-39	-38.380	-38.619	-0.238	(0)
Co(NH3) 6Cl+2	0.000e+00	0.000e+00	-50.953	-51.191	-0.238	(0)
Co(2)	6.622e-07					
Co+2	5.668e-07	3.275e-07	-6.247	-6.485	-0.238	(0)
CoSO4	6.815e-08	6.815e-08	-7.167	-7.167	0.000	(0)
CoHCO3+	1.894e-08	1.651e-08	-7.723	-7.782	-0.060	(0)
CoCl+	7.428e-09	6.476e-09	-8.129	-8.189	-0.060	(0)
CoHPO4	3.779e-10	3.779e-10	-9.423	-9.423	0.000	(0)
CoCO3	2.546e-10	2.546e-10	-9.594	-9.594	0.000	(0)
Co(NH3) +2	1.392e-10	8.044e-11	-9.856	-10.095	-0.238	(0)
CoOH+	1.142e-10	9.955e-11	-9.942	-10.002	-0.060	(0)
Co(OH) 2	1.205e-13	1.205e-13	-12.919	-12.919	0.000	(0)
Co(NH3) 2+2	4.961e-15	2.866e-15	-14.304	-14.543	-0.238	(0)
Co2OH+3	5.615e-18	1.634e-18	-17.251	-17.787	-0.536	(0)
Co(NH3) 3+2	8.158e-20	4.713e-20	-19.088	-19.327	-0.238	(0)
Co(OH) 3-	4.201e-20	3.662e-20	-19.377	-19.436	-0.060	(0)
CoOOH-	1.757e-21	1.532e-21	-20.755	-20.815	-0.060	(0)
CoSeO4	1.414e-22	1.414e-22	-21.850	-21.850	0.000	(0)
Co(NH3) 4+2	5.592e-25	3.231e-25	-24.252	-24.491	-0.238	(0)
CoNO2+	5.547e-28	4.836e-28	-27.256	-27.316	-0.060	(0)
Co(OH) 4-2	1.531e-28	8.843e-29	-27.815	-28.053	-0.238	(0)
Co(NH3) 5+2	1.212e-30	7.004e-31	-29.916	-30.155	-0.238	(0)
Co4(OH) 4+4	1.759e-31	1.960e-32	-30.755	-31.708	-0.953	(0)
CoNO3+	2.182e-37	1.902e-37	-36.661	-36.721	-0.060	(0)
Co(NO3) 2	0.000e+00	0.000e+00	-66.848	-66.848	0.000	(0)
Co(3)	1.747e-30					
CoOH+2	1.747e-30	1.009e-30	-29.758	-29.996	-0.238	(0)
Co+3	3.766e-35	1.304e-35	-34.424	-34.885	-0.461	(0)
CoCl+2	2.383e-35	1.377e-35	-34.623	-34.861	-0.238	(0)
Co(NH3) 5Cl+2	4.164e-39	2.406e-39	-38.380	-38.619	-0.238	(0)
Co(NH3) 6SO4+	0.000e+00	0.000e+00	-46.993	-47.052	-0.060	(0)
Co(NH3) 6Cl+2	0.000e+00	0.000e+00	-50.953	-51.191	-0.238	(0)
Co(NH3) 6OH+2	0.000e+00	0.000e+00	-52.021	-52.260	-0.238	(0)
Cr(2)	2.965e-21					
Cr+2	2.965e-21	1.713e-21	-20.528	-20.766	-0.238	(0)
Cr(3)	1.347e-07					
Cr(OH) +2	7.386e-08	4.267e-08	-7.132	-7.370	-0.238	(0)
Cr(OH) 2+	5.309e-08	4.628e-08	-7.275	-7.335	-0.060	(0)
CrOHSO4	6.448e-09	6.448e-09	-8.191	-8.191	0.000	(0)
Cr+3	6.279e-10	1.827e-10	-9.202	-9.738	-0.536	(0)
CrSO4+	4.304e-10	3.752e-10	-9.366	-9.426	-0.060	(0)
Cr(OH) 3	2.649e-10	2.649e-10	-9.577	-9.577	0.000	(0)
CrCl+2	1.984e-12	1.146e-12	-11.703	-11.941	-0.238	(0)
CrH2PO4+2	8.321e-13	4.807e-13	-12.080	-12.318	-0.238	(0)
CrO2-	2.185e-13	1.905e-13	-12.661	-12.720	-0.060	(0)
Cr(OH) 4-	1.843e-13	1.607e-13	-12.735	-12.794	-0.060	(0)
Cr2(OH) 2SO4+2	2.519e-14	1.455e-14	-13.599	-13.837	-0.238	(0)
CrOHC12	9.427e-16	9.427e-16	-15.026	-15.026	0.000	(0)
Cr2(OH) 2(SO4) 2	9.408e-16	9.408e-16	-15.027	-15.027	0.000	(0)
CrCl2+	4.641e-16	4.046e-16	-15.333	-15.393	-0.060	(0)
Cr(NH3) 5OH+2	1.771e-27	1.023e-27	-26.752	-26.990	-0.238	(0)
Cr(NH3) 6+3	1.279e-32	3.722e-33	-31.893	-32.429	-0.536	(0)
Cr(NH3) 6Cl+2	4.721e-34	2.728e-34	-33.326	-33.564	-0.238	(0)
CrNO3+2	0.000e+00	0.000e+00	-41.487	-41.725	-0.238	(0)
Cr(6)	4.667e-26					
HCrO4-	2.786e-26	2.429e-26	-25.555	-25.615	-0.060	(0)
CrO4-2	1.845e-26	1.152e-26	-25.734	-25.939	-0.205	(0)
NaCrO4-	3.332e-28	2.905e-28	-27.477	-27.537	-0.060	(0)
KCrO4-	2.771e-29	2.416e-29	-28.557	-28.617	-0.060	(0)
CrO3HPO4-2	1.861e-30	1.075e-30	-29.730	-29.968	-0.238	(0)
H2CrO4	1.008e-32	1.008e-32	-31.996	-31.996	0.000	(0)
CrO3SO4-2	9.338e-33	5.395e-33	-32.030	-32.268	-0.238	(0)
CrO3Cl-	6.803e-34	5.932e-34	-33.167	-33.227	-0.060	(0)
CrO3H2PO4-	3.925e-34	3.422e-34	-33.406	-33.466	-0.060	(0)

Cr2O7-2	0.000e+00	0.000e+00	-49.394	-49.632	-0.238	(0)
Cu (1)	9.639e-08					
CuCl2-	5.238e-08	4.651e-08	-7.281	-7.332	-0.052	(0)
CuCl	3.795e-08	3.795e-08	-7.421	-7.421	0.000	(0)
Cu+	5.967e-09	5.202e-09	-8.224	-8.284	-0.060	(0)
CuCl3-2	8.950e-11	5.651e-11	-10.048	-10.248	-0.200	(0)
Cu (2)	2.501e-07					
Cu+2	1.785e-07	1.114e-07	-6.748	-6.953	-0.205	(0)
CuCO3	3.016e-08	3.016e-08	-7.521	-7.521	0.000	(0)
CuSO4	2.616e-08	2.616e-08	-7.582	-7.582	0.000	(0)
CuHCO3+	5.224e-09	4.555e-09	-8.282	-8.342	-0.060	(0)
CuOH+	4.723e-09	4.194e-09	-8.326	-8.377	-0.052	(0)
CuNH3+2	4.229e-09	2.443e-09	-8.374	-8.612	-0.238	(0)
CuCl+	1.088e-09	9.662e-10	-8.963	-9.015	-0.052	(0)
Cu (OH) 2	1.631e-11	1.631e-11	-10.788	-10.788	0.000	(0)
Cu (CO3) 2-2	6.462e-12	3.734e-12	-11.190	-11.428	-0.238	(0)
CuCl2	1.517e-12	1.517e-12	-11.819	-11.819	0.000	(0)
Cu2 (OH) 2+2	7.389e-13	4.269e-13	-12.131	-12.370	-0.238	(0)
Cu (OH) 3-	5.847e-16	5.097e-16	-15.233	-15.293	-0.060	(0)
CuCl3-	8.442e-17	7.496e-17	-16.074	-16.125	-0.052	(0)
CuCl4-2	4.088e-21	2.581e-21	-20.388	-20.588	-0.200	(0)
Cu (OH) 4-2	1.058e-22	6.112e-23	-21.976	-22.214	-0.238	(0)
CuNO2+	2.803e-27	2.444e-27	-26.552	-26.612	-0.060	(0)
CuNO3+	1.523e-37	1.328e-37	-36.817	-36.877	-0.060	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-47.281	-47.281	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-68.225	-68.225	0.000	(0)
Fe (2)	8.637e-06					
Fe+2	7.461e-06	4.311e-06	-5.127	-5.365	-0.238	(0)
FeSO4	1.090e-06	1.090e-06	-5.963	-5.963	0.000	(0)
FeHCO3+	3.932e-08	3.517e-08	-7.405	-7.454	-0.048	(0)
FeH2PO4+	2.668e-08	2.382e-08	-7.574	-7.623	-0.049	(0)
FeHPO4	1.815e-08	1.815e-08	-7.741	-7.741	0.000	(0)
FeOH+	1.998e-09	1.781e-09	-8.699	-8.749	-0.050	(0)
Fe (OH) 2	1.389e-14	1.389e-14	-13.857	-13.857	0.000	(0)
Fe (OH) 3-	7.166e-17	6.388e-17	-16.145	-16.195	-0.050	(0)
Fe (3)	1.964e-07					
Fe (OH) 2+	1.950e-07	1.740e-07	-6.710	-6.759	-0.049	(0)
Fe (OH) 3	1.394e-09	1.394e-09	-8.856	-8.856	0.000	(0)
FeHPO4+	3.605e-11	3.218e-11	-10.443	-10.492	-0.049	(0)
FeOH+2	3.488e-11	2.202e-11	-10.457	-10.657	-0.200	(0)
Fe (OH) 4-	4.526e-12	4.040e-12	-11.344	-11.394	-0.049	(0)
FeSO4+	3.443e-14	3.069e-14	-13.463	-13.513	-0.050	(0)
Fe+3	8.622e-15	2.985e-15	-14.064	-14.525	-0.461	(0)
FeH2PO4+2	9.841e-16	6.250e-16	-15.007	-15.204	-0.197	(0)
Fe (SO4) 2-	8.526e-16	7.433e-16	-15.069	-15.129	-0.060	(0)
FeCl+2	7.064e-16	4.460e-16	-15.151	-15.351	-0.200	(0)
FeCl2+	1.517e-17	1.352e-17	-16.819	-16.869	-0.050	(0)
FeHSeO3+2	2.518e-19	1.455e-19	-18.599	-18.837	-0.238	(0)
Fe2 (OH) 2+4	1.724e-19	1.921e-20	-18.763	-19.717	-0.953	(0)
FeCl3	7.837e-21	7.837e-21	-20.106	-20.106	0.000	(0)
Fe3 (OH) 4+5	1.414e-24	4.585e-26	-23.850	-25.339	-1.489	(0)
FeNO3+2	0.000e+00	0.000e+00	-43.612	-43.850	-0.238	(0)
H (0)	6.481e-24					
H2	3.240e-24	3.251e-24	-23.489	-23.488	0.001	(0)
K	6.399e-04					
K+	6.351e-04	5.645e-04	-3.197	-3.248	-0.051	(0)
KSO4-	4.737e-06	4.229e-06	-5.324	-5.374	-0.049	(0)
KHPO4-	5.074e-09	4.530e-09	-8.295	-8.344	-0.049	(0)
KCrO4-	2.771e-29	2.416e-29	-28.557	-28.617	-0.060	(0)
Mg	6.999e-04					
Mg+2	6.224e-04	3.884e-04	-3.206	-3.411	-0.205	(0)
MgSO4	7.392e-05	7.392e-05	-4.131	-4.131	0.000	(0)
MgHCO3+	3.121e-06	2.771e-06	-5.506	-5.557	-0.052	(0)
MgHPO4	2.647e-07	2.647e-07	-6.577	-6.577	0.000	(0)
MgH2PO4+	2.388e-07	2.132e-07	-6.622	-6.671	-0.049	(0)
MgCO3	1.368e-08	1.368e-08	-7.864	-7.864	0.000	(0)
MgOH+	1.649e-09	1.478e-09	-8.783	-8.830	-0.048	(0)
MgH2BO3+	1.002e-10	8.839e-11	-9.999	-10.054	-0.054	(0)

MgPO4-	1.211e-11	1.081e-11	-10.917	-10.966	-0.049	(0)
Mn (2)	8.379e-07					
Mn+2	7.487e-07	4.326e-07	-6.126	-6.364	-0.238	(0)
MnSO4	7.886e-08	7.886e-08	-7.103	-7.103	0.000	(0)
MnHCO3+	6.750e-09	6.017e-09	-8.171	-8.221	-0.050	(0)
MnCl+	3.540e-09	3.156e-09	-8.451	-8.501	-0.050	(0)
MnCl2	2.583e-11	2.583e-11	-10.588	-10.588	0.000	(0)
MnOH+	1.265e-11	1.128e-11	-10.898	-10.948	-0.050	(0)
MnCl3-	4.626e-14	4.123e-14	-13.335	-13.385	-0.050	(0)
MnSeO4	9.893e-23	9.893e-23	-22.005	-22.005	0.000	(0)
Mn (OH) 3-	2.664e-23	2.375e-23	-22.574	-22.624	-0.050	(0)
MnSe	3.564e-30	3.564e-30	-29.448	-29.448	0.000	(0)
Mn (OH) 4-2	1.850e-30	1.168e-30	-29.733	-29.933	-0.200	(0)
MnNO3+	2.882e-37	2.513e-37	-36.540	-36.600	-0.060	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-66.631	-66.631	0.000	(0)
Mn (3)	2.658e-28					
Mn+3	2.658e-28	9.203e-29	-27.575	-28.036	-0.461	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-61.272	-61.471	-0.200	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-67.123	-67.177	-0.053	(0)
Mo	9.387e-08					
MoO4-2	9.311e-08	5.811e-08	-7.031	-7.236	-0.205	(0)
HMoO4-	7.636e-10	6.657e-10	-9.117	-9.177	-0.060	(0)
H2MoO4	4.421e-12	4.421e-12	-11.354	-11.354	0.000	(0)
AlMo6O21-3	4.906e-34	1.428e-34	-33.309	-33.845	-0.536	(0)
Mo7O24-6	0.000e+00	0.000e+00	-44.274	-46.418	-2.144	(0)
HMo7O24-5	0.000e+00	0.000e+00	-44.752	-46.242	-1.489	(0)
H2Mo7O24-4	0.000e+00	0.000e+00	-46.695	-47.648	-0.953	(0)
H3Mo7O24-3	0.000e+00	0.000e+00	-50.040	-50.576	-0.536	(0)
N (-3)	1.736e-03					
NH4+	1.715e-03	1.514e-03	-2.766	-2.820	-0.054	(0)
NH4SO4-	1.980e-05	1.765e-05	-4.703	-4.753	-0.050	(0)
NH3	9.134e-07	9.134e-07	-6.039	-6.039	0.000	(0)
CuNH3+2	4.229e-09	2.443e-09	-8.374	-8.612	-0.238	(0)
CaNH3+2	1.227e-09	7.089e-10	-8.911	-9.149	-0.238	(0)
NiNH3+2	1.878e-10	1.085e-10	-9.726	-9.965	-0.238	(0)
Co (NH3) +2	1.392e-10	8.044e-11	-9.856	-10.095	-0.238	(0)
BaNH3+2	7.754e-14	4.480e-14	-13.110	-13.349	-0.238	(0)
Ni (NH3) 2+2	4.818e-14	2.784e-14	-13.317	-13.555	-0.238	(0)
Co (NH3) 2+2	4.961e-15	2.866e-15	-14.304	-14.543	-0.238	(0)
Ca (NH3) 2+2	6.381e-16	3.686e-16	-15.195	-15.433	-0.238	(0)
Co (NH3) 3+2	8.158e-20	4.713e-20	-19.088	-19.327	-0.238	(0)
Co (NH3) 4+2	5.592e-25	3.231e-25	-24.252	-24.491	-0.238	(0)
Cr (NH3) 5OH+2	1.771e-27	1.023e-27	-26.752	-26.990	-0.238	(0)
Co (NH3) 5+2	1.212e-30	7.004e-31	-29.916	-30.155	-0.238	(0)
Cr (NH3) 6+3	1.279e-32	3.722e-33	-31.893	-32.429	-0.536	(0)
Cr (NH3) 6Cl+2	4.721e-34	2.728e-34	-33.326	-33.564	-0.238	(0)
Co (NH3) 5Cl+2	4.164e-39	2.406e-39	-38.380	-38.619	-0.238	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-46.993	-47.052	-0.060	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-50.953	-51.191	-0.238	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.021	-52.260	-0.238	(0)
N (3)	2.370e-22					
NO2-	2.370e-22	2.096e-22	-21.625	-21.679	-0.053	(0)
CuNO2+	2.803e-27	2.444e-27	-26.552	-26.612	-0.060	(0)
CoNO2+	5.547e-28	4.836e-28	-27.256	-27.316	-0.060	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-47.281	-47.281	0.000	(0)
N (5)	4.129e-31					
NO3-	4.123e-31	3.665e-31	-30.385	-30.436	-0.051	(0)
CaNO3+	5.947e-34	5.185e-34	-33.226	-33.285	-0.060	(0)
MnNO3+	2.882e-37	2.513e-37	-36.540	-36.600	-0.060	(0)
CoNO3+	2.182e-37	1.902e-37	-36.661	-36.721	-0.060	(0)
ZnNO3+	2.043e-37	1.781e-37	-36.690	-36.749	-0.060	(0)
CuNO3+	1.523e-37	1.328e-37	-36.817	-36.877	-0.060	(0)
BaNO3+	1.252e-37	1.092e-37	-36.902	-36.962	-0.060	(0)
NiNO3+	1.030e-37	8.978e-38	-36.987	-37.047	-0.060	(0)
PbNO3+	2.864e-38	2.497e-38	-37.543	-37.603	-0.060	(0)
CrNO3+2	0.000e+00	0.000e+00	-41.487	-41.725	-0.238	(0)

FeNO3+2	0.000e+00	0.000e+00	-43.612	-43.850	-0.238	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-66.631	-66.631	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-66.848	-66.848	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-67.783	-67.783	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-67.899	-67.899	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-68.225	-68.225	0.000	(0)
Na	5.746e-03					
Na+	5.710e-03	5.076e-03	-2.243	-2.295	-0.051	(0)
NaSO4-	3.300e-05	2.946e-05	-4.481	-4.531	-0.049	(0)
NaHCO3	2.248e-06	2.248e-06	-5.648	-5.648	0.000	(0)
NaHPO4-	7.066e-08	6.308e-08	-7.151	-7.200	-0.049	(0)
NaCO3-	5.601e-09	5.000e-09	-8.252	-8.301	-0.049	(0)
NaH2BO3	5.773e-11	5.773e-11	-10.239	-10.239	0.000	(0)
NaCrO4-	3.332e-28	2.905e-28	-27.477	-27.537	-0.060	(0)
Ni	1.876e-07					
Ni+2	1.563e-07	9.752e-08	-6.806	-7.011	-0.205	(0)
NiSO4	2.035e-08	2.035e-08	-7.691	-7.691	0.000	(0)
NiHCO3+	8.938e-09	7.793e-09	-8.049	-8.108	-0.060	(0)
NiCl+	1.636e-09	1.426e-09	-8.786	-8.846	-0.060	(0)
NiNH3+2	1.878e-10	1.085e-10	-9.726	-9.965	-0.238	(0)
NiCO3	1.673e-10	1.673e-10	-9.776	-9.776	0.000	(0)
NiOH+	1.502e-11	1.310e-11	-10.823	-10.883	-0.060	(0)
Ni (SO4) 2-2	1.321e-12	7.633e-13	-11.879	-12.117	-0.238	(0)
Ni (NH3) 2+2	4.818e-14	2.784e-14	-13.317	-13.555	-0.238	(0)
NiCl2	4.219e-14	4.219e-14	-13.375	-13.375	0.000	(0)
Ni (OH) 2	2.264e-14	2.264e-14	-13.645	-13.645	0.000	(0)
Ni (OH) 3-	3.956e-19	3.449e-19	-18.403	-18.462	-0.060	(0)
NiSeO4	3.876e-23	3.876e-23	-22.412	-22.412	0.000	(0)
NiNO3+	1.030e-37	8.978e-38	-36.987	-37.047	-0.060	(0)
O (0)	0.000e+00					
O2	0.000e+00	0.000e+00	-46.715	-46.713	0.001	(0)
P	1.680e-05					
H2PO4-	1.398e-05	1.248e-05	-4.855	-4.904	-0.049	(0)
HPO4-2	1.858e-06	1.173e-06	-5.731	-5.931	-0.200	(0)
MgHPO4	2.647e-07	2.647e-07	-6.577	-6.577	0.000	(0)
MgH2PO4+	2.388e-07	2.132e-07	-6.622	-6.671	-0.049	(0)
CaHPO4	2.128e-07	2.128e-07	-6.672	-6.672	0.000	(0)
CaH2PO4+	1.242e-07	1.109e-07	-6.906	-6.955	-0.049	(0)
NaHPO4-	7.066e-08	6.308e-08	-7.151	-7.200	-0.049	(0)
FeH2PO4+	2.668e-08	2.382e-08	-7.574	-7.623	-0.049	(0)
FeHPO4	1.815e-08	1.815e-08	-7.741	-7.741	0.000	(0)
KHPO4-	5.074e-09	4.530e-09	-8.295	-8.344	-0.049	(0)
H3PO4	1.098e-09	1.098e-09	-8.959	-8.959	0.000	(0)
CaPO4-	8.600e-10	7.677e-10	-9.066	-9.115	-0.049	(0)
CoHPO4	3.779e-10	3.779e-10	-9.423	-9.423	0.000	(0)
FeHPO4+	3.605e-11	3.218e-11	-10.443	-10.492	-0.049	(0)
MgPO4-	1.211e-11	1.081e-11	-10.917	-10.966	-0.049	(0)
PO4-3	1.950e-12	6.752e-13	-11.710	-12.171	-0.461	(0)
CrH2PO4+2	8.321e-13	4.807e-13	-12.080	-12.318	-0.238	(0)
FeH2PO4+2	9.841e-16	6.250e-16	-15.007	-15.204	-0.197	(0)
CrO3HPO4-2	1.861e-30	1.075e-30	-29.730	-29.968	-0.238	(0)
CrO3H2PO4-	3.925e-34	3.422e-34	-33.406	-33.466	-0.060	(0)
Pb	1.449e-08					
Pb+2	7.481e-09	4.669e-09	-8.126	-8.331	-0.205	(0)
PbHCO3+	2.579e-09	2.249e-09	-8.589	-8.648	-0.060	(0)
PbSO4	2.489e-09	2.489e-09	-8.604	-8.604	0.000	(0)
PbCl+	1.037e-09	9.043e-10	-8.984	-9.044	-0.060	(0)
PbCO3	6.455e-10	6.455e-10	-9.190	-9.190	0.000	(0)
PbOH+	2.050e-10	1.787e-10	-9.688	-9.748	-0.060	(0)
Pb (SO4) 2-2	2.825e-11	1.632e-11	-10.549	-10.787	-0.238	(0)
PbCl2	2.288e-11	2.288e-11	-10.640	-10.640	0.000	(0)
Pb (CO3) 2-2	1.482e-13	8.562e-14	-12.829	-13.067	-0.238	(0)
Pb (OH) 2	8.609e-14	8.609e-14	-13.065	-13.065	0.000	(0)
PbCl3-	6.398e-14	5.578e-14	-13.194	-13.253	-0.060	(0)
PbCl4-2	2.375e-16	1.372e-16	-15.624	-15.863	-0.238	(0)
Pb2OH+3	4.544e-17	1.322e-17	-16.343	-16.879	-0.536	(0)
Pb (OH) 3-	1.504e-18	1.312e-18	-17.823	-17.882	-0.060	(0)
Pb (OH) 4-2	8.471e-24	4.894e-24	-23.072	-23.310	-0.238	(0)

Pb3 (OH) 4+2	5.409e-25	3.125e-25	-24.267	-24.505	-0.238	(0)
Pb4 (OH) 4+4	1.253e-28	1.396e-29	-27.902	-28.855	-0.953	(0)
PbNO3+	2.864e-38	2.497e-38	-37.543	-37.603	-0.060	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-67.783	-67.783	0.000	(0)
S (6)	1.979e-03					
SO4-2	1.744e-03	1.088e-03	-2.758	-2.963	-0.205	(0)
CaSO4	1.024e-04	1.024e-04	-3.990	-3.990	0.000	(0)
MgSO4	7.392e-05	7.392e-05	-4.131	-4.131	0.000	(0)
NaSO4-	3.300e-05	2.946e-05	-4.481	-4.531	-0.049	(0)
NH4SO4-	1.980e-05	1.765e-05	-4.703	-4.753	-0.050	(0)
KSO4-	4.737e-06	4.229e-06	-5.324	-5.374	-0.049	(0)
FeSO4	1.090e-06	1.090e-06	-5.963	-5.963	0.000	(0)
MnSO4	7.886e-08	7.886e-08	-7.103	-7.103	0.000	(0)
CoSO4	6.815e-08	6.815e-08	-7.167	-7.167	0.000	(0)
HSO4-	6.789e-08	6.040e-08	-7.168	-7.219	-0.051	(0)
ZnSO4	4.277e-08	4.277e-08	-7.369	-7.369	0.000	(0)
AlSO4+	3.549e-08	3.158e-08	-7.450	-7.501	-0.051	(0)
CuSO4	2.616e-08	2.616e-08	-7.582	-7.582	0.000	(0)
NiSO4	2.035e-08	2.035e-08	-7.691	-7.691	0.000	(0)
CrOHSO4	6.448e-09	6.448e-09	-8.191	-8.191	0.000	(0)
PbSO4	2.489e-09	2.489e-09	-8.604	-8.604	0.000	(0)
Zn (SO4) 2-2	7.323e-10	4.231e-10	-9.135	-9.374	-0.238	(0)
Al (SO4) 2-	4.624e-10	4.114e-10	-9.335	-9.386	-0.051	(0)
CrSO4+	4.304e-10	3.752e-10	-9.366	-9.426	-0.060	(0)
Pb (SO4) 2-2	2.825e-11	1.632e-11	-10.549	-10.787	-0.238	(0)
Ni (SO4) 2-2	1.321e-12	7.633e-13	-11.879	-12.117	-0.238	(0)
FeSO4+	3.443e-14	3.069e-14	-13.463	-13.513	-0.050	(0)
Cr2 (OH) 2SO4+2	2.519e-14	1.455e-14	-13.599	-13.837	-0.238	(0)
Cr2 (OH) 2 (SO4) 2	9.408e-16	9.408e-16	-15.027	-15.027	0.000	(0)
Fe (SO4) 2-	8.526e-16	7.433e-16	-15.069	-15.129	-0.060	(0)
CrO3SO4-2	9.338e-33	5.395e-33	-32.030	-32.268	-0.238	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-46.993	-47.052	-0.060	(0)
Se (-2)	1.522e-24					
HSe-	1.515e-24	1.321e-24	-23.820	-23.879	-0.060	(0)
H2Se	6.623e-27	6.623e-27	-26.179	-26.179	0.000	(0)
MnSe	3.564e-30	3.564e-30	-29.448	-29.448	0.000	(0)
Se-2	2.485e-33	1.436e-33	-32.605	-32.843	-0.238	(0)
Se (4)	2.535e-08					
HSeO3-	2.512e-08	2.190e-08	-7.600	-7.660	-0.060	(0)
SeO3-2	2.207e-10	1.275e-10	-9.656	-9.895	-0.238	(0)
H2SeO3	5.915e-12	5.915e-12	-11.228	-11.228	0.000	(0)
FeHSeO3+2	2.518e-19	1.455e-19	-18.599	-18.837	-0.238	(0)
Se (6)	1.500e-18					
SeO4-2	1.499e-18	9.357e-19	-17.824	-18.029	-0.205	(0)
CoSeO4	1.414e-22	1.414e-22	-21.850	-21.850	0.000	(0)
MnSeO4	9.893e-23	9.893e-23	-22.005	-22.005	0.000	(0)
NiSeO4	3.876e-23	3.876e-23	-22.412	-22.412	0.000	(0)
HSeO4-	3.034e-23	2.645e-23	-22.518	-22.578	-0.060	(0)
ZnSeO4	2.716e-23	2.716e-23	-22.566	-22.566	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-40.351	-40.589	-0.238	(0)
Zn	3.520e-07					
Zn+2	3.003e-07	1.874e-07	-6.522	-6.727	-0.205	(0)
ZnSO4	4.277e-08	4.277e-08	-7.369	-7.369	0.000	(0)
ZnHCO3+	4.406e-09	3.842e-09	-8.356	-8.415	-0.060	(0)
ZnCl+	2.961e-09	2.629e-09	-8.529	-8.580	-0.052	(0)
Zn (SO4) 2-2	7.323e-10	4.231e-10	-9.135	-9.374	-0.238	(0)
ZnCO3	4.960e-10	4.960e-10	-9.304	-9.304	0.000	(0)
ZnOH+	2.231e-10	1.945e-10	-9.651	-9.711	-0.060	(0)
ZnOHC1	5.442e-11	5.442e-11	-10.264	-10.264	0.000	(0)
ZnCl2	1.943e-11	1.943e-11	-10.712	-10.712	0.000	(0)
Zn (OH) 2	6.895e-13	6.895e-13	-12.161	-12.161	0.000	(0)
ZnCl3-	9.866e-14	8.761e-14	-13.006	-13.057	-0.052	(0)
ZnCl4-2	3.862e-16	2.438e-16	-15.413	-15.613	-0.200	(0)
Zn (OH) 3-	6.039e-17	5.265e-17	-16.219	-16.279	-0.060	(0)
Zn (OH) 4-2	5.527e-23	3.193e-23	-22.257	-22.496	-0.238	(0)
ZnSeO4	2.716e-23	2.716e-23	-22.566	-22.566	0.000	(0)
ZnNO3+	2.043e-37	1.781e-37	-36.690	-36.749	-0.060	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-40.351	-40.589	-0.238	(0)

Zn(NO3)2 0.000e+00 0.000e+00 -67.899 -67.899 0.000 (0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-87.46	-81.19	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-29.34	-24.80	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-36.61	-24.80	11.81	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-123.96	-106.03	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-41.57	-21.44	20.13	(Co(NH3)6)Cl3
(NH4)2CrO4	-31.96	-31.58	0.38	(NH4)2CrO4
(NH4)2SeO4	-24.12	-23.67	0.45	(NH4)2SeO4
Al(OH)3(am)	-0.94	10.20	11.13	Al(OH)3
Al2(MoO4)3	-41.54	-38.39	3.15	Al2(MoO4)3
Al2O3	-0.03	20.39	20.43	Al2O3
Al4(OH)10SO4	2.76	25.46	22.70	Al4(OH)10SO4
AlAsO4:2H2O	-6.29	-1.49	4.80	AlAsO4:2H2O
AlOHSO4	-1.90	-5.13	-3.23	AlOHSO4
Alunite	3.65	2.87	-0.77	KAl3(SO4)2(OH)6
Anglesite	-3.47	-11.29	-7.83	PbSO4
Anhydrite	-1.99	-6.33	-4.34	CaSO4
Antlerite	-7.89	0.90	8.79	Cu3(OH)4SO4
Aragonite	-2.44	-10.70	-8.26	CaCO3
Arsenolite	-48.16	-51.10	-2.94	As4O6
Artinite	-11.76	-1.80	9.96	MgCO3:Mg(OH)2:3H2O
As2O5	-30.15	-23.38	6.77	As2O5
Atacamite	-5.27	2.40	7.67	Cu2(OH)3Cl
Azurite	-6.55	-23.17	-16.62	Cu3(OH)2(CO3)2
Ba(OH)2:8H2O	-19.46	5.09	24.56	Ba(OH)2:8H2O
Ba3(AsO4)2	0.85	-8.09	-8.94	Ba3(AsO4)2
BaCrO4	-23.43	-33.20	-9.77	BaCrO4
BaHPO4	-5.84	-25.62	-19.77	BaHPO4
BaMoO4	-7.51	-14.50	-6.99	BaMoO4
Barite	-0.18	-10.23	-10.05	BaSO4
BaSeO3	-10.54	-8.74	1.79	BaSeO3
BaSeO4	-17.77	-25.29	-7.53	BaSeO4
Bianchite	-7.93	-9.69	-1.76	ZnSO4:6H2O
Birnessite	-17.41	0.68	18.09	MnO2
Bixbyite	-18.72	-18.99	-0.27	Mn2O3
Boehmite	1.27	10.20	8.93	AlOOH
Brochantite	-9.53	6.30	15.83	Cu4(OH)6SO4
Brucite	-8.24	8.95	17.18	Mg(OH)2
Bunsenite	-7.40	5.35	12.74	NiO
Ca3(AsO4)2:4H2O	-18.70	3.60	22.30	Ca3(AsO4)2:4H2O
Ca3(PO4)2(beta)	-5.36	-34.44	-29.08	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-9.07	-56.15	-47.08	Ca4H(PO4)3:3H2O
CaCrO4	-27.12	-29.30	-2.19	CaCrO4
CaHPO4	-2.35	-21.72	-19.37	CaHPO4
CaHPO4:2H2O	-2.65	-21.72	-19.06	CaHPO4:2H2O
Calcite	-2.25	-10.70	-8.46	CaCO3
CaMoO4	-2.66	-10.60	-7.94	CaMoO4
CaSeO3:2H2O	-7.72	-4.85	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-18.40	-21.39	-3.00	CaSeO4:2H2O
Cerussite	-2.46	-15.67	-13.20	PbCO3
CH4(g)	-59.32	-101.14	-41.81	CH4
Chalcanthite	-7.26	-9.92	-2.66	CuSO4:5H2O
Claudetite	-47.87	-51.10	-3.23	As4O6
Clausthalite	1.43	-26.03	-27.46	PbSe
Co(BO2)2	-31.37	-4.30	27.07	Co(BO2)2
Co(OH)2	-7.22	5.87	13.09	Co(OH)2
Co(OH)3	-14.31	-16.35	-2.03	Co(OH)3
CO2(g)	-1.54	-19.70	-18.16	CO2
Co3(AsO4)2	-18.79	-5.75	13.03	Co3(AsO4)2
Co3(PO4)2	-9.11	-43.80	-34.69	Co3(PO4)2
Co3O4	-16.64	-26.82	-10.17	Co3O4
CoCl2	-19.46	-10.96	8.51	CoCl2
CoCl2:6H2O	-13.47	-10.96	2.51	CoCl2:6H2O

CoCO3	-3.88	-13.82	-9.94	CoCO3
CoFe2O4	16.96	13.90	-3.05	CoFe2O4
CoHPO4	-5.77	-24.84	-19.06	CoHPO4
CoMoO4	-6.03	-13.72	-7.69	CoMoO4
CoO	-8.03	5.88	13.90	CoO
CoSe	-7.98	-24.18	-16.20	CoSe
CoSeO3	-9.28	-7.96	1.32	CoSeO3
CoSeO4:6H2O	-22.98	-24.51	-1.53	CoSeO4:6H2O
CoSO4	-12.49	-9.45	3.04	CoSO4
CoSO4:6H2O	-6.97	-9.45	-2.48	CoSO4:6H2O
Cotunnite	-7.95	-12.80	-4.86	PbCl2
Cr(OH)2	-19.33	-8.41	10.93	Cr(OH)2
Cr(OH)3	-2.58	-1.15	1.42	Cr(OH)3
Cr(OH)3(am)	-0.40	-1.15	-0.75	Cr(OH)3
Cr2O3	-0.10	-2.31	-2.21	Cr2O3
CrCl2	-39.66	-25.24	14.42	CrCl2
CrCl3	-41.88	-26.41	15.48	CrCl3
Crmetal	-59.76	-28.77	31.00	Cr
CrO3	-35.10	-38.30	-3.19	CrO3
Cu(OH)2	-3.44	5.41	8.84	Cu(OH)2
Cu2(OH)3NO3	-35.27	-25.80	9.47	Cu2(OH)3NO3
Cu2Se(alpha)	12.17	-34.27	-46.44	Cu2Se
Cu2SO4	-17.64	-19.53	-1.89	Cu2SO4
Cu3(AsO4)2:2H2O	-13.26	-7.16	6.10	Cu3(AsO4)2:2H2O
Cu3(PO4)2	-8.35	-45.20	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-10.08	-45.20	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	5.59	-58.92	-64.51	Cu3Se2
CuCO3	-2.79	-14.29	-11.50	CuCO3
CuCrO4	-27.45	-32.89	-5.44	CuCrO4
Cumetal	-3.31	-12.28	-8.97	Cu
CuMoO4	-1.08	-14.19	-13.11	CuMoO4
CuOCuSO4	-15.22	-4.51	10.71	CuOCuSO4
Cupricferrite	6.82	13.44	6.62	CuFe2O4
Cuprite	-3.17	-4.21	-1.04	Cu2O
Cuprousferrite	10.78	1.91	-8.87	CuFeO2
CuSe	8.81	-24.65	-33.46	CuSe
CuSe2	-0.57	-34.35	-33.79	CuSe2
CuSeO3:2H2O	-9.05	-8.43	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-22.54	-24.98	-2.44	CuSeO4:5H2O
CuSO4	-13.07	-9.92	3.16	CuSO4
Diaspore	3.02	10.20	7.18	AlOOH
Dolomite(disordered)	-5.05	-21.45	-16.40	CaMg(CO3)2
Dolomite(ordered)	-4.48	-21.45	-16.97	CaMg(CO3)2
Epsomite	-4.21	-6.37	-2.16	MgSO4:7H2O
Fe(OH)2	-6.57	6.99	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	4.53	1.49	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-7.36	-5.81	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-12.86	-33.49	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-34.93	-37.94	-3.01	Fe2(SO4)3
Fe3(OH)8	-5.20	15.02	20.22	Fe3(OH)8
FeAsO4:2H2O	-8.07	-7.67	0.40	FeAsO4:2H2O
FeCr2O4	-2.93	4.69	7.62	FeCr2O4
FeMoO4	-2.54	-12.60	-10.06	FeMoO4
Ferrihydrite	0.60	4.01	3.41	Fe(OH)3
Ferroselite	-14.03	-32.76	-18.74	FeSe2
FeSe	-12.06	-23.06	-11.01	FeSe
Gibbsite	1.62	10.20	8.58	Al(OH)3
Goethite	3.34	4.01	0.67	FeOOH
Goslarite	-7.64	-9.69	-2.05	ZnSO4:7H2O
Gypsum	-1.72	-6.33	-4.61	CaSO4:2H2O
H-Jarosite	-7.19	-18.60	-11.41	(H3O)Fe3(SO4)2(OH)6
H2MoO4	-6.57	-19.60	-13.02	H2MoO4
H2Se(g)	-25.14	-30.06	-4.91	H2Se
Halite	-6.12	-4.53	1.59	NaCl
Hausmannite	-23.94	38.35	62.29	Mn3O4
Hematite	9.06	8.03	-1.03	Fe2O3
Hercynite	3.56	27.39	23.83	FeAl2O4
Hinsdalite	-8.92	-11.42	-2.50	PbAl3PO4SO4(OH)6

Huntite	-13.30	-42.95	-29.65	CaMg ₃ (CO ₃) ₄
Hydrocerussite	-8.54	-27.31	-18.77	Pb ₃ (OH) ₂ (CO ₃) ₂
Hydromagnesite	-25.93	-34.04	-8.11	Mg ₅ (CO ₃) ₄ (OH) ₂ :4H ₂ O
Hydroxylapatite	-2.83	-47.16	-44.33	Ca ₅ (PO ₄) ₃ OH
Hydroxylpyromorphite	-9.20	-71.99	-62.79	Pb ₅ (PO ₄) ₃ OH
K-Alum	-12.26	-17.52	-5.26	KAl(SO ₄) ₂ :12H ₂ O
K-Jarosite	-1.26	-15.67	-14.41	KFe ₃ (SO ₄) ₂ (OH) ₆
K ₂ Cr ₂ O ₇	-53.25	-70.73	-17.48	K ₂ Cr ₂ O ₇
K ₂ CrO ₄	-31.87	-32.44	-0.57	K ₂ CrO ₄
K ₂ MoO ₄	-17.00	-13.73	3.27	K ₂ MoO ₄
K ₂ SeO ₄	-23.80	-24.53	-0.73	K ₂ SeO ₄
Langite	-11.68	6.30	17.98	Cu ₄ (OH) ₆ SO ₄ :H ₂ O
Larnakite	-6.90	-7.26	-0.37	PbO:PbSO ₄
Laurionite	-5.01	-4.39	0.62	PbOHCl
Lepidocrocite	2.64	4.01	1.37	FeOOH
Lime	-24.28	8.99	33.28	CaO
Litharge	-8.86	4.03	12.89	PbO
Maghemite	1.64	8.03	6.39	Fe ₂ O ₃
Magnesioferrite	-0.71	16.98	17.69	Fe ₂ MgO ₄
Magnesite	-3.23	-10.75	-7.52	MgCO ₃
Magnetite	11.00	15.02	4.03	Fe ₃ O ₄
Malachite	-3.35	-8.88	-5.53	Cu ₂ (OH) ₂ CO ₃
Manganite	-9.16	16.18	25.34	MnOOH
Massicot	-9.06	4.03	13.09	PbO
Melanothallite	-17.87	-11.43	6.45	CuCl ₂
Melanterite	-6.06	-8.33	-2.27	FeSO ₄ :7H ₂ O
Mg(OH) ₂ (active)	-9.84	8.95	18.79	Mg(OH) ₂
Mg ₃ (PO ₄) ₂	-11.29	-34.57	-23.28	Mg ₃ (PO ₄) ₂
MgCr ₂ O ₄	-10.10	6.64	16.74	MgCr ₂ O ₄
MgCrO ₄	-35.00	-29.35	5.65	MgCrO ₄
MgHPO ₄ :3H ₂ O	-3.59	-21.76	-18.18	MgHPO ₄ :3H ₂ O
MgMoO ₄	-8.80	-10.65	-1.85	MgMoO ₄
MgSeO ₃ :6H ₂ O	-7.93	-4.89	3.04	MgSeO ₃ :6H ₂ O
MgSeO ₄ :6H ₂ O	-20.24	-21.44	-1.20	MgSeO ₄ :6H ₂ O
Minium	-42.34	32.45	74.78	Pb ₃ O ₄
Mirabilite	-6.20	-7.55	-1.35	Na ₂ SO ₄ :10H ₂ O
Mn ₂ (SO ₄) ₃	-59.74	-64.96	-5.22	Mn ₂ (SO ₄) ₃
Mn ₃ (AsO ₄) ₂ :8H ₂ O	-17.89	-5.39	12.50	Mn ₃ (AsO ₄) ₂ :8H ₂ O
Mn ₃ (PO ₄) ₂	-19.58	-43.43	-23.85	Mn ₃ (PO ₄) ₂
MnCl ₂ :4H ₂ O	-13.59	-10.84	2.75	MnCl ₂ :4H ₂ O
MnHPO ₄	0.69	-24.71	-25.40	MnHPO ₄
MnSe	-27.86	-24.06	3.79	MnSe
MnSeO ₃	-8.97	-7.84	1.13	MnSeO ₃
MnSeO ₃ :2H ₂ O	-8.80	-7.84	0.96	MnSeO ₃ :2H ₂ O
MnSeO ₄ :5H ₂ O	-22.34	-24.39	-2.05	MnSeO ₄ :5H ₂ O
MnSO ₄	-12.10	-9.33	2.78	MnSO ₄
MoO ₃	-11.60	-19.60	-8.00	MoO ₃
Morenosite	-7.79	-9.98	-2.18	NiSO ₄ :7H ₂ O
Na-Jarosite	-3.97	-14.72	-10.75	NaFe ₃ (SO ₄) ₂ (OH) ₆
Na ₂ Cr ₂ O ₇	-58.86	-68.83	-9.96	Na ₂ Cr ₂ O ₇
Na ₂ CrO ₄	-33.52	-30.53	2.99	Na ₂ CrO ₄
Na ₂ Mo ₂ O ₇	-14.66	-31.42	-16.76	Na ₂ Mo ₂ O ₇
Na ₂ MoO ₄	-13.34	-11.82	1.52	Na ₂ MoO ₄
Na ₂ MoO ₄ :2H ₂ O	-13.05	-11.83	1.22	Na ₂ MoO ₄ :2H ₂ O
Na ₂ SeO ₃ :5H ₂ O	-16.37	-6.07	10.30	Na ₂ SeO ₃ :5H ₂ O
Na ₂ SeO ₄	-23.90	-22.62	1.28	Na ₂ SeO ₄
Nantokite	-3.66	-10.52	-6.86	CuCl
Natron	-10.42	-11.93	-1.51	Na ₂ CO ₃ :10H ₂ O
Nesquehonite	-6.15	-10.75	-4.60	MgCO ₃ :3H ₂ O
Ni(OH) ₂	-7.73	5.35	13.08	Ni(OH) ₂
Ni ₃ (AsO ₄) ₂ :8H ₂ O	-23.03	-7.33	15.70	Ni ₃ (AsO ₄) ₂ :8H ₂ O
Ni ₃ (PO ₄) ₂	-14.07	-45.37	-31.30	Ni ₃ (PO ₄) ₂
Ni ₄ (OH) ₆ SO ₄	-25.93	6.07	32.00	Ni ₄ (OH) ₆ SO ₄
NiCO ₃	-7.60	-14.35	-6.75	NiCO ₃
NiMoO ₄	-3.10	-14.25	-11.15	NiMoO ₄
NiSe	-7.01	-24.71	-17.70	NiSe
NiSeO ₃ :2H ₂ O	-11.40	-8.49	2.91	NiSeO ₃ :2H ₂ O
NiSeO ₄ :6H ₂ O	-23.52	-25.04	-1.52	NiSeO ₄ :6H ₂ O

Nsutite	-16.82	0.68	17.50	MnO2
O2(g)	-44.08	40.72	84.80	O2
Pb(BO2)2	-12.71	-6.15	6.57	Pb(BO2)2
Pb(OH)2	-4.30	4.03	8.32	Pb(OH)2
Pb10(OH)6O(CO3)6	-69.13	-77.89	-8.76	Pb10(OH)6O(CO3)6
Pb2(OH)3Cl	-9.15	-0.36	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-18.13	8.06	26.19	Pb2O(OH)2
Pb2O3	-32.62	28.42	61.04	Pb2O3
Pb2OCO3	-11.20	-11.64	-0.44	Pb2OCO3
Pb3(AsO4)2	-17.09	-11.29	5.80	Pb3(AsO4)2
Pb3(PO4)2	-5.80	-49.33	-43.53	Pb3(PO4)2
Pb3O2CO3	-18.96	-7.61	11.35	Pb3O2CO3
Pb3O2SO4	-14.16	-3.24	10.92	Pb3O2SO4
Pb4(OH)6SO4	-20.31	0.79	21.10	Pb4(OH)6SO4
Pb4O3SO4	-21.49	0.79	22.28	Pb4O3SO4
PbCrO4	-21.54	-34.27	-12.73	PbCrO4
PbHPO4	-2.88	-26.68	-23.81	PbHPO4
Pbmetal	-20.57	-16.33	4.24	Pb
PbMoO4	0.21	-15.57	-15.78	PbMoO4
PbO:0.3H2O	-8.95	4.03	12.98	PbO:0.33H2O
PbSeO4	-19.47	-26.36	-6.88	PbSeO4
Periclase	-13.09	8.95	22.04	MgO
Phosgenite	-8.66	-28.47	-19.81	PbCl2:PbCO3
Plattnerite	-26.10	24.39	50.49	PbO2
Plumbgummite	5.99	-26.80	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-14.19	8.99	23.19	Ca(OH)2
Pyrochroite	-9.49	6.00	15.48	Mn(OH)2
Pyrolusite	-15.84	26.36	42.19	MnO2
Pyromorphite	4.03	-80.40	-84.43	Pb5(PO4)3Cl
Retgersite	-7.92	-9.97	-2.05	NiSO4:6H2O
Rhodochrosite	-3.13	-13.70	-10.57	MnCO3
Semetal(am)	-2.56	-9.70	-7.14	Se
Semetal(hex)	-1.94	-9.70	-7.76	Se
SeO2	-13.96	-13.84	0.12	SeO2
SeO3	-51.87	-30.39	21.48	SeO3
Siderite	-2.51	-12.70	-10.19	FeCO3
Smithsonite	-4.11	-14.06	-9.95	ZnCO3
Spinel	-8.67	29.34	38.01	MgAl2O4
Strengite	-0.32	-26.70	-26.37	FePO4:2H2O
Tenorite	-2.43	5.41	7.84	CuO
Thenardite	-7.90	-7.55	0.35	Na2SO4
Thermonatrite	-12.59	-11.93	0.67	Na2CO3:H2O
Tsumebite	-7.46	-17.25	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	-4.44	-40.44	-36.00	Fe3(PO4)2:8H2O
Witherite	-6.02	-14.60	-8.58	BaCO3
Zincite	-5.97	5.63	11.60	ZnO
Zincosite	-13.87	-9.69	4.18	ZnSO4
Zn(BO2)2	-12.83	-4.54	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-70.84	-67.60	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-6.57	5.63	12.20	Zn(OH)2
Zn(OH)2(am)	-7.08	5.63	12.71	Zn(OH)2
Zn(OH)2(beta)	-6.37	5.63	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-6.15	5.63	11.78	Zn(OH)2
Zn(OH)2(gamma)	-6.10	5.63	11.73	Zn(OH)2
Zn2(OH)2SO4	-11.56	-4.06	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.34	2.85	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-20.13	-6.48	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-9.10	-44.52	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-33.43	-13.75	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-21.19	7.21	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-27.17	11.33	38.50	Zn5(OH)8Cl2
ZnCl2	-18.47	-11.20	7.27	ZnCl2
ZnCO3:1H2O	-3.80	-14.06	-10.26	ZnCO3:1H2O
Znmetal	-40.97	-14.73	26.25	Zn
ZnMoO4	-3.87	-13.96	-10.09	ZnMoO4
ZnO(active)	-5.82	5.63	11.45	ZnO
ZnSe	-9.95	-24.43	-14.48	ZnSe
ZnSeO4:6H2O	-23.24	-24.76	-1.52	ZnSeO4:6H2O

ZnSO4:1H2O -9.18 -9.69 -0.51 ZnSO4:1H2O

**For a gas, $SI = \log_{10}(\text{fugacity})$. Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 1.

Mixture 1.

3.000e-02 Solution 1
4.850e-01 Solution 2
4.850e-01 Solution 3

-----Solution composition-----

Elements	Molality	Moles
Al	2.774e-05	2.774e-05
As	2.137e-08	2.137e-08
B	6.195e-06	6.195e-06
Ba	2.113e-07	2.113e-07
C	1.348e-03	1.348e-03
Ca	6.426e-04	6.426e-04
Cd	3.825e-09	3.825e-09
Cl	5.547e-03	5.547e-03
Co	1.523e-06	1.523e-06
Cr	8.493e-08	8.493e-08
Cu	3.609e-07	3.609e-07
Fe	7.034e-05	7.034e-05
Hg	2.235e-10	2.235e-10
K	4.078e-04	4.078e-04
Mg	8.242e-04	8.242e-04
Mn	7.630e-06	7.630e-06
Mo	4.705e-08	4.705e-08
N	8.934e-04	8.934e-04
Na	5.255e-03	5.255e-03
Ni	3.452e-07	3.452e-07
P	1.053e-05	1.053e-05
Pb	1.027e-08	1.027e-08
S	1.512e-03	1.512e-03
Se	2.497e-08	2.497e-08
Zn	3.707e-07	3.707e-07

-----Description of solution-----

pH	=	6.494	Charge balance
pe	=	4.261	Adjusted to redox equilibrium
Activity of water	=	1.000	
Ionic strength (mol/kgw)	=	1.189e-02	
Mass of water (kg)	=	1.000e+00	
Total alkalinity (eq/kg)	=	8.848e-04	
Total CO2 (mol/kg)	=	1.348e-03	
Temperature (°C)	=	20.03	
Electrical balance (eq)	=	2.580e-04	
Percent error, $100 * (\text{Cat} - \text{An}) / (\text{Cat} + \text{An})$	=	1.40	
Iterations	=	8	
Total H	=	1.110193e+02	
Total O	=	5.551712e+01	

-----Distribution of species-----

Log	Log	Log	mole V

Species	Molality	Activity	Molality	Activity	Gamma	cm ³ /mol
H+	3.582e-07	3.208e-07	-6.446	-6.494	-0.048	0.00
OH-	2.398e-08	2.142e-08	-7.620	-7.669	-0.049	(0)
H2O	5.551e+01	9.997e-01	1.744	-0.000	0.000	18.05
Al	2.774e-05					
Al (OH) 2+	1.170e-05	1.052e-05	-4.932	-4.978	-0.046	(0)
Al (OH) 4-	8.875e-06	7.956e-06	-5.052	-5.099	-0.048	(0)
Al (OH) 3	6.584e-06	6.584e-06	-5.181	-5.181	0.000	(0)
AlOH+2	4.658e-07	3.043e-07	-6.332	-6.517	-0.185	(0)
AlSO4+	8.224e-08	7.371e-08	-7.085	-7.132	-0.048	(0)
Al+3	3.630e-08	1.345e-08	-7.440	-7.871	-0.431	(0)
Al (SO4) 2-	8.414e-10	7.542e-10	-9.075	-9.122	-0.048	(0)
AlMo6O21-3	3.384e-37	1.079e-37	-36.471	-36.967	-0.496	(0)
As (3)	3.877e-15					
H3AsO3	3.871e-15	3.871e-15	-14.412	-14.412	0.000	(0)
H2AsO3-	5.826e-18	5.131e-18	-17.235	-17.290	-0.055	(0)
H4AsO3+	6.987e-22	6.153e-22	-21.156	-21.211	-0.055	(0)
HAsO3-2	1.948e-23	1.172e-23	-22.710	-22.931	-0.221	(0)
AsO3-3	3.715e-30	1.185e-30	-29.430	-29.926	-0.496	(0)
As (5)	2.137e-08					
H2AsO4-	1.434e-08	1.263e-08	-7.843	-7.899	-0.055	(0)
HAsO4-2	7.030e-09	4.230e-09	-8.153	-8.374	-0.221	(0)
H3AsO4	6.690e-13	6.708e-13	-12.175	-12.173	0.001	(0)
AsO4-3	1.164e-13	3.712e-14	-12.934	-13.430	-0.496	(0)
B	6.195e-06					
H3BO3	6.183e-06	6.200e-06	-5.209	-5.208	0.001	(0)
H2BO3-	1.154e-08	1.027e-08	-7.938	-7.988	-0.051	(0)
CaH2BO3+	2.365e-10	2.105e-10	-9.626	-9.677	-0.051	(0)
MgH2BO3+	1.924e-10	1.713e-10	-9.716	-9.766	-0.051	(0)
NaH2BO3	8.330e-11	8.330e-11	-10.079	-10.079	0.000	(0)
H5 (BO3) 2-	6.283e-14	5.592e-14	-13.202	-13.252	-0.051	(0)
BaH2BO3+	4.695e-14	4.178e-14	-13.328	-13.379	-0.051	(0)
H8 (BO3) 3-	3.374e-17	3.003e-17	-16.472	-16.522	-0.051	(0)
Ba	2.113e-07					
Ba+2	2.104e-07	1.353e-07	-6.677	-6.869	-0.192	(0)
BaHCO3+	8.594e-10	7.740e-10	-9.066	-9.111	-0.045	(0)
BaCO3	5.846e-12	5.846e-12	-11.233	-11.233	0.000	(0)
BaNH3+2	1.985e-13	1.194e-13	-12.702	-12.923	-0.221	(0)
BaH2BO3+	4.695e-14	4.178e-14	-13.328	-13.379	-0.051	(0)
BaOH+	1.362e-14	1.223e-14	-13.866	-13.913	-0.047	(0)
BaNO3+	2.796e-32	2.462e-32	-31.554	-31.609	-0.055	(0)
C (4)	1.348e-03					
HCO3-	7.905e-04	7.107e-04	-3.102	-3.148	-0.046	(0)
H2CO3	5.459e-04	5.459e-04	-3.263	-3.263	0.000	(0)
CaHCO3+	4.692e-06	4.226e-06	-5.329	-5.374	-0.045	(0)
MgHCO3+	3.803e-06	3.403e-06	-5.420	-5.468	-0.048	(0)
NaHCO3	2.056e-06	2.056e-06	-5.687	-5.687	0.000	(0)
FeHCO3+	2.833e-07	2.551e-07	-6.548	-6.593	-0.045	(0)
CO3-2	1.462e-07	9.399e-08	-6.835	-7.027	-0.192	(0)
CuCO3	7.004e-08	7.004e-08	-7.155	-7.155	0.000	(0)
MnHCO3+	6.415e-08	5.759e-08	-7.193	-7.240	-0.047	(0)
CaCO3	4.889e-08	4.889e-08	-7.311	-7.311	0.000	(0)
CoHCO3+	4.539e-08	3.998e-08	-7.343	-7.398	-0.055	(0)
MgCO3	3.464e-08	3.464e-08	-7.460	-7.460	0.000	(0)
NiHCO3+	1.699e-08	1.497e-08	-7.770	-7.825	-0.055	(0)
NaCO3-	1.048e-08	9.419e-09	-7.980	-8.026	-0.046	(0)
CuHCO3+	5.831e-09	5.136e-09	-8.234	-8.289	-0.055	(0)
ZnHCO3+	4.805e-09	4.232e-09	-8.318	-8.373	-0.055	(0)
PbHCO3+	1.807e-09	1.592e-09	-8.743	-8.798	-0.055	(0)
CoCO3	1.270e-09	1.270e-09	-8.896	-8.896	0.000	(0)
ZnCO3	1.125e-09	1.125e-09	-8.949	-8.949	0.000	(0)
PbCO3	9.410e-10	9.410e-10	-9.026	-9.026	0.000	(0)
BaHCO3+	8.594e-10	7.740e-10	-9.066	-9.111	-0.045	(0)
NiCO3	6.618e-10	6.618e-10	-9.179	-9.179	0.000	(0)
Cu (CO3) 2-2	2.945e-11	1.772e-11	-10.531	-10.752	-0.221	(0)
BaCO3	5.846e-12	5.846e-12	-11.233	-11.233	0.000	(0)
CdCO3	3.568e-12	3.568e-12	-11.448	-11.448	0.000	(0)

	CdHCO3+	2.769e-12	2.439e-12	-11.558	-11.613	-0.055	(0)
	Pb (CO3) 2-2	4.240e-13	2.551e-13	-12.373	-12.593	-0.221	(0)
	Cd (CO3) 2-2	4.132e-16	2.486e-16	-15.384	-15.604	-0.221	(0)
	HgCO3	5.336e-19	5.336e-19	-18.273	-18.273	0.000	(0)
	HgHCO3+	3.619e-21	3.188e-21	-20.441	-20.497	-0.055	(0)
	Hg (CO3) 2-2	2.636e-22	1.586e-22	-21.579	-21.800	-0.221	(0)
Ca	6.426e-04						
	Ca+2	5.693e-04	3.661e-04	-3.245	-3.436	-0.192	(0)
	CaSO4	6.834e-05	6.834e-05	-4.165	-4.165	0.000	(0)
	CaHCO3+	4.692e-06	4.226e-06	-5.329	-5.374	-0.045	(0)
	CaHPO4	1.995e-07	1.995e-07	-6.700	-6.700	0.000	(0)
	CaH2PO4+	5.616e-08	5.048e-08	-7.251	-7.297	-0.046	(0)
	CaCO3	4.889e-08	4.889e-08	-7.311	-7.311	0.000	(0)
	CaPO4-	1.650e-09	1.484e-09	-8.782	-8.829	-0.046	(0)
	CaNH3+2	1.072e-09	6.448e-10	-8.970	-9.191	-0.221	(0)
	CaH2BO3+	2.365e-10	2.105e-10	-9.626	-9.677	-0.051	(0)
	CaOH+	1.642e-10	1.479e-10	-9.785	-9.830	-0.045	(0)
	Ca (NH3) 2+2	5.968e-16	3.591e-16	-15.224	-15.445	-0.221	(0)
	CaNO3+	4.531e-29	3.991e-29	-28.344	-28.399	-0.055	(0)
Cd	3.825e-09						
	Cd+2	2.590e-09	1.665e-09	-8.587	-8.778	-0.192	(0)
	CdCl+	8.909e-10	7.846e-10	-9.050	-9.105	-0.055	(0)
	CdSO4	3.147e-10	3.147e-10	-9.502	-9.502	0.000	(0)
	CdCl2	1.603e-11	1.603e-11	-10.795	-10.795	0.000	(0)
	Cd (SO4) 2-2	6.404e-12	3.853e-12	-11.194	-11.414	-0.221	(0)
	CdCO3	3.568e-12	3.568e-12	-11.448	-11.448	0.000	(0)
	CdHCO3+	2.769e-12	2.439e-12	-11.558	-11.613	-0.055	(0)
	CdOHCl	8.978e-13	8.978e-13	-12.047	-12.047	0.000	(0)
	CdOH+	3.240e-13	2.854e-13	-12.489	-12.545	-0.055	(0)
	CdCl3-	5.436e-14	4.787e-14	-13.265	-13.320	-0.055	(0)
	Cd (CO3) 2-2	4.132e-16	2.486e-16	-15.384	-15.604	-0.221	(0)
	Cd (OH) 2	8.219e-17	8.219e-17	-16.085	-16.085	0.000	(0)
	Cd2OH+3	7.945e-21	2.533e-21	-20.100	-20.596	-0.496	(0)
	Cd (OH) 3-	1.789e-22	1.576e-22	-21.747	-21.803	-0.055	(0)
	Cd (SeO3) 2-2	1.641e-22	9.875e-23	-21.785	-22.005	-0.221	(0)
	CdSeO4	8.400e-24	8.400e-24	-23.076	-23.076	0.000	(0)
	Cd (OH) 4-2	1.345e-30	8.093e-31	-29.871	-30.092	-0.221	(0)
	CdNO3+	2.293e-34	2.020e-34	-33.640	-33.695	-0.055	(0)
	Cd (NO3) 2	0.000e+00	0.000e+00	-59.536	-59.536	0.000	(0)
	CdHS+	0.000e+00	0.000e+00	-62.477	-62.532	-0.055	(0)
	Cd (HS) 2	0.000e+00	0.000e+00	-117.091	-117.091	0.000	(0)
	Cd (HS) 3-	0.000e+00	0.000e+00	-176.897	-176.953	-0.055	(0)
	Cd (HS) 4-2	0.000e+00	0.000e+00	-236.298	-236.519	-0.221	(0)
Cl	5.547e-03						
	Cl-	5.546e-03	4.967e-03	-2.256	-2.304	-0.048	(0)
	MnCl+	2.907e-08	2.610e-08	-7.537	-7.583	-0.047	(0)
	CuCl2-	2.378e-08	2.128e-08	-7.624	-7.672	-0.048	(0)
	CuCl	2.026e-08	2.026e-08	-7.693	-7.693	0.000	(0)
	CoCl+	1.538e-08	1.354e-08	-7.813	-7.868	-0.055	(0)
	ZnCl+	2.796e-09	2.502e-09	-8.553	-8.602	-0.048	(0)
	NiCl+	2.686e-09	2.366e-09	-8.571	-8.626	-0.055	(0)
	CuCl+	1.052e-09	9.413e-10	-8.978	-9.026	-0.048	(0)
	CdCl+	8.909e-10	7.846e-10	-9.050	-9.105	-0.055	(0)
	PbCl+	6.280e-10	5.531e-10	-9.202	-9.257	-0.055	(0)
	MnCl2	1.831e-10	1.831e-10	-9.737	-9.737	0.000	(0)
	ZnOHC1	1.067e-10	1.067e-10	-9.972	-9.972	0.000	(0)
	CuCl3-2	3.411e-11	2.216e-11	-10.467	-10.654	-0.187	(0)
	CdCl2	1.603e-11	1.603e-11	-10.795	-10.795	0.000	(0)
	ZnCl2	1.587e-11	1.587e-11	-10.799	-10.799	0.000	(0)
	PbCl2	1.200e-11	1.200e-11	-10.921	-10.921	0.000	(0)
	CuCl2	1.268e-12	1.268e-12	-11.897	-11.897	0.000	(0)
	CdOHC1	8.978e-13	8.978e-13	-12.047	-12.047	0.000	(0)
	CrCl+2	3.612e-13	2.173e-13	-12.442	-12.663	-0.221	(0)
	MnCl3-	2.790e-13	2.505e-13	-12.554	-12.601	-0.047	(0)
	ZnCl3-	6.855e-14	6.134e-14	-13.164	-13.212	-0.048	(0)
	NiCl2	5.998e-14	5.998e-14	-13.222	-13.222	0.000	(0)
	CdCl3-	5.436e-14	4.787e-14	-13.265	-13.320	-0.055	(0)
	PbCl3-	2.845e-14	2.506e-14	-13.546	-13.601	-0.055	(0)

HgCl2	2.202e-14	2.202e-14	-13.657	-13.657	0.000	(0)
FeCl+2	7.867e-15	5.112e-15	-14.104	-14.291	-0.187	(0)
HgClOH	1.749e-15	1.749e-15	-14.757	-14.757	0.000	(0)
HgCl3-	1.255e-15	1.106e-15	-14.901	-14.956	-0.055	(0)
CrOHC12	3.170e-16	3.170e-16	-15.499	-15.499	0.000	(0)
ZnCl4-2	2.252e-16	1.464e-16	-15.647	-15.835	-0.187	(0)
FeCl2+	1.478e-16	1.327e-16	-15.830	-15.877	-0.047	(0)
PbCl4-2	8.783e-17	5.285e-17	-16.056	-16.277	-0.221	(0)
CrCl2+	7.487e-17	6.594e-17	-16.126	-16.181	-0.055	(0)
CuCl3-	6.008e-17	5.376e-17	-16.221	-16.270	-0.048	(0)
HgCl4-2	3.804e-17	2.289e-17	-16.420	-16.640	-0.221	(0)
HgCl+	8.197e-19	7.220e-19	-18.086	-18.141	-0.055	(0)
FeCl3	6.593e-20	6.593e-20	-19.181	-19.181	0.000	(0)
CuCl4-2	2.439e-21	1.585e-21	-20.613	-20.800	-0.187	(0)
CrO3Cl-	5.973e-32	5.261e-32	-31.224	-31.279	-0.055	(0)
Cr(NH3) 6Cl+2	1.302e-34	7.837e-35	-33.885	-34.106	-0.221	(0)
CoCl+2	8.740e-35	5.259e-35	-34.059	-34.279	-0.221	(0)
Co(NH3) 5Cl+2	2.160e-38	1.299e-38	-37.666	-37.886	-0.221	(0)
Co(NH3) 6Cl+2	0.000e+00	0.000e+00	-50.209	-50.429	-0.221	(0)
Co(2)	1.523e-06					
Co+2	1.328e-06	7.992e-07	-5.877	-6.097	-0.221	(0)
CoSO4	1.307e-07	1.307e-07	-6.884	-6.884	0.000	(0)
CoHCO3+	4.539e-08	3.998e-08	-7.343	-7.398	-0.055	(0)
CoCl+	1.538e-08	1.354e-08	-7.813	-7.868	-0.055	(0)
CoCO3	1.270e-09	1.270e-09	-8.896	-8.896	0.000	(0)
CoHPO4	1.018e-09	1.018e-09	-8.992	-8.992	0.000	(0)
CoOH+	5.681e-10	5.004e-10	-9.246	-9.301	-0.055	(0)
Co(NH3) +2	3.484e-10	2.096e-10	-9.458	-9.679	-0.221	(0)
Co(OH) 2	1.247e-12	1.247e-12	-11.904	-11.904	0.000	(0)
Co(NH3) 2+2	1.333e-14	8.021e-15	-13.875	-14.096	-0.221	(0)
Co2OH+3	6.285e-17	2.004e-17	-16.202	-16.698	-0.496	(0)
Co(OH) 3-	8.866e-19	7.809e-19	-18.052	-18.107	-0.055	(0)
Co(NH3) 3+2	2.348e-19	1.413e-19	-18.629	-18.850	-0.221	(0)
CoOOH-	3.748e-20	3.301e-20	-19.426	-19.481	-0.055	(0)
CoSeO4	9.993e-21	9.993e-21	-20.000	-20.000	0.000	(0)
CoNO2+	8.535e-24	7.517e-24	-23.069	-23.124	-0.055	(0)
Co(NH3) 4+2	1.724e-24	1.037e-24	-23.764	-23.984	-0.221	(0)
Co(OH) 4-2	6.454e-27	3.883e-27	-26.190	-26.411	-0.221	(0)
Co4(OH) 4+4	9.542e-29	1.251e-29	-28.020	-28.903	-0.883	(0)
Co(NH3) 5+2	4.001e-30	2.408e-30	-29.398	-29.618	-0.221	(0)
CoNO3+	4.777e-32	4.208e-32	-31.321	-31.376	-0.055	(0)
Co(NO3) 2	0.000e+00	0.000e+00	-56.546	-56.546	0.000	(0)
Co(3)	1.538e-29					
CoOH+2	1.538e-29	9.256e-30	-28.813	-29.034	-0.221	(0)
Co+3	1.567e-34	5.805e-35	-33.805	-34.236	-0.431	(0)
CoCl+2	8.740e-35	5.259e-35	-34.059	-34.279	-0.221	(0)
Co(NH3) 5Cl+2	2.160e-38	1.299e-38	-37.666	-37.886	-0.221	(0)
Co(NH3) 6SO4+	0.000e+00	0.000e+00	-46.272	-46.328	-0.055	(0)
Co(NH3) 6Cl+2	0.000e+00	0.000e+00	-50.209	-50.429	-0.221	(0)
Co(NH3) 6OH+2	0.000e+00	0.000e+00	-50.898	-51.119	-0.221	(0)
Cr(2)	3.468e-22					
Cr+2	3.468e-22	2.087e-22	-21.460	-21.681	-0.221	(0)
Cr(3)	8.493e-08					
Cr(OH) 2+	4.954e-08	4.363e-08	-7.305	-7.360	-0.055	(0)
Cr(OH) +2	3.236e-08	1.947e-08	-7.490	-7.711	-0.221	(0)
CrOHSO4	2.319e-09	2.319e-09	-8.635	-8.635	0.000	(0)
Cr(OH) 3	5.143e-10	5.143e-10	-9.289	-9.289	0.000	(0)
Cr+3	1.267e-10	4.039e-11	-9.897	-10.394	-0.496	(0)
CrSO4+	7.409e-11	6.526e-11	-10.130	-10.185	-0.055	(0)
CrO2-	8.647e-13	7.616e-13	-12.063	-12.118	-0.055	(0)
Cr(OH) 4-	7.295e-13	6.425e-13	-12.137	-12.192	-0.055	(0)
CrCl+2	3.612e-13	2.173e-13	-12.442	-12.663	-0.221	(0)
CrH2PO4+2	9.520e-14	5.728e-14	-13.021	-13.242	-0.221	(0)
Cr2(OH) 2SO4+2	3.982e-15	2.396e-15	-14.400	-14.621	-0.221	(0)
CrOHC12	3.170e-16	3.170e-16	-15.499	-15.499	0.000	(0)
Cr2(OH) 2(SO4) 2	1.217e-16	1.217e-16	-15.915	-15.915	0.000	(0)
CrCl2+	7.487e-17	6.594e-17	-16.126	-16.181	-0.055	(0)
Cr(NH3) 5OH+2	1.096e-27	6.595e-28	-26.960	-27.181	-0.221	(0)

Cr (NH3) 6+3	3.913e-33	1.248e-33	-32.408	-32.904	-0.496	(0)
Cr (NH3) 6Cl+2	1.302e-34	7.837e-35	-33.885	-34.106	-0.221	(0)
CrNO3+2	6.285e-38	3.781e-38	-37.202	-37.422	-0.221	(0)
Cr (6)	1.388e-23					
CrO4-2	7.861e-24	5.056e-24	-23.105	-23.296	-0.192	(0)
HCrO4-	5.878e-24	5.177e-24	-23.231	-23.286	-0.055	(0)
NaCrO4-	1.336e-25	1.176e-25	-24.874	-24.929	-0.055	(0)
KCrO4-	7.742e-27	6.819e-27	-26.111	-26.166	-0.055	(0)
CrO3HPO4-2	2.042e-28	1.229e-28	-27.690	-27.911	-0.221	(0)
H2CrO4	1.045e-30	1.045e-30	-29.981	-29.981	0.000	(0)
CrO3SO4-2	7.292e-31	4.387e-31	-30.137	-30.358	-0.221	(0)
CrO3Cl-	5.973e-32	5.261e-32	-31.224	-31.279	-0.055	(0)
CrO3H2PO4-	2.156e-32	1.899e-32	-31.666	-31.722	-0.055	(0)
Cr2O7-2	0.000e+00	0.000e+00	-44.755	-44.975	-0.221	(0)
Cu (1)	4.776e-08					
CuCl2-	2.378e-08	2.128e-08	-7.624	-7.672	-0.048	(0)
CuCl	2.026e-08	2.026e-08	-7.693	-7.693	0.000	(0)
Cu+	3.679e-09	3.241e-09	-8.434	-8.489	-0.055	(0)
CuCl3-2	3.411e-11	2.216e-11	-10.467	-10.654	-0.187	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-115.363	-115.636	-0.272	(0)
CuS4S5-3	0.000e+00	0.000e+00	-116.104	-116.366	-0.262	(0)
Cu (2)	3.131e-07					
Cu+2	1.968e-07	1.266e-07	-6.706	-6.898	-0.192	(0)
CuCO3	7.004e-08	7.004e-08	-7.155	-7.155	0.000	(0)
CuSO4	2.337e-08	2.337e-08	-7.631	-7.631	0.000	(0)
CuOH+	1.099e-08	9.831e-09	-7.959	-8.007	-0.048	(0)
CuHCO3+	5.831e-09	5.136e-09	-8.234	-8.289	-0.055	(0)
CuNH3+2	4.926e-09	2.964e-09	-8.307	-8.528	-0.221	(0)
CuCl+	1.052e-09	9.413e-10	-8.978	-9.026	-0.048	(0)
Cu (OH) 2	7.863e-11	7.863e-11	-10.104	-10.104	0.000	(0)
Cu (CO3) 2-2	2.945e-11	1.772e-11	-10.531	-10.752	-0.221	(0)
Cu2 (OH) 2+2	3.899e-12	2.346e-12	-11.409	-11.630	-0.221	(0)
CuCl2	1.268e-12	1.268e-12	-11.897	-11.897	0.000	(0)
Cu (OH) 3-	5.746e-15	5.061e-15	-14.241	-14.296	-0.055	(0)
CuCl3-	6.008e-17	5.376e-17	-16.221	-16.270	-0.048	(0)
CuCl4-2	2.439e-21	1.585e-21	-20.613	-20.800	-0.187	(0)
Cu (OH) 4-2	2.077e-21	1.250e-21	-20.683	-20.903	-0.221	(0)
CuNO2+	2.008e-23	1.769e-23	-22.697	-22.752	-0.055	(0)
CuNO3+	1.552e-32	1.367e-32	-31.809	-31.864	-0.055	(0)
Cu (NO2) 2	2.416e-40	2.416e-40	-39.617	-39.617	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-58.255	-58.255	0.000	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-166.230	-166.285	-0.055	(0)
Fe (2)	5.920e-05					
Fe+2	5.237e-05	3.151e-05	-4.281	-4.502	-0.221	(0)
FeSO4	6.264e-06	6.264e-06	-5.203	-5.203	0.000	(0)
FeHCO3+	2.833e-07	2.551e-07	-6.548	-6.593	-0.045	(0)
FeHPO4	1.465e-07	1.465e-07	-6.834	-6.834	0.000	(0)
FeH2PO4+	1.039e-07	9.336e-08	-6.984	-7.030	-0.046	(0)
FeOH+	2.993e-08	2.688e-08	-7.524	-7.571	-0.047	(0)
Fe (OH) 2	4.330e-13	4.330e-13	-12.363	-12.363	0.000	(0)
Fe (OH) 3-	4.568e-15	4.101e-15	-14.340	-14.387	-0.047	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-119.076	-119.076	0.000	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-178.745	-178.801	-0.055	(0)
Fe (3)	1.114e-05					
Fe (OH) 2+	1.097e-05	9.865e-06	-4.960	-5.006	-0.046	(0)
Fe (OH) 3	1.635e-07	1.635e-07	-6.786	-6.786	0.000	(0)
Fe (OH) 4-	1.081e-09	9.714e-10	-8.966	-9.013	-0.046	(0)
FeOH+2	9.343e-10	6.072e-10	-9.030	-9.217	-0.187	(0)
FeHPO4+	5.275e-10	4.743e-10	-9.278	-9.324	-0.046	(0)
FeSO4+	3.593e-13	3.226e-13	-12.444	-12.491	-0.047	(0)
Fe+3	1.077e-13	3.989e-14	-12.968	-13.399	-0.431	(0)
FeCl+2	7.867e-15	5.112e-15	-14.104	-14.291	-0.187	(0)
Fe (SO4) 2-	6.970e-15	6.139e-15	-14.157	-14.212	-0.055	(0)
FeH2PO4+2	6.854e-15	4.478e-15	-14.164	-14.349	-0.185	(0)
FeCl2+	1.478e-16	1.327e-16	-15.830	-15.877	-0.047	(0)
Fe2 (OH) 2+4	1.113e-16	1.458e-17	-15.954	-16.836	-0.883	(0)
FeHSeO3+2	3.191e-18	1.920e-18	-17.496	-17.717	-0.221	(0)
FeCl3	6.593e-20	6.593e-20	-19.181	-19.181	0.000	(0)

	Fe3 (OH) 4+5	4.723e-20	1.974e-21	-19.326	-20.705	-1.379	(0)
	FeNO3+2	2.836e-38	1.707e-38	-37.547	-37.768	-0.221	(0)
H (0)	4.590e-25						
	H2	2.295e-25	2.301e-25	-24.639	-24.638	0.001	(0)
Hg (0)	2.235e-10						
	Hg	2.235e-10	2.235e-10	-9.651	-9.651	0.000	(0)
Hg (1)	2.175e-24						
	Hg2+2	1.088e-24	6.544e-25	-23.964	-24.184	-0.221	(0)
Hg (2)	2.515e-14						
	HgCl2	2.202e-14	2.202e-14	-13.657	-13.657	0.000	(0)
	HgClOH	1.749e-15	1.749e-15	-14.757	-14.757	0.000	(0)
	HgCl3-	1.255e-15	1.106e-15	-14.901	-14.956	-0.055	(0)
	Hg (NH3) 2+2	5.261e-17	3.166e-17	-16.279	-16.500	-0.221	(0)
	HgCl4-2	3.804e-17	2.289e-17	-16.420	-16.640	-0.221	(0)
	Hg (OH) 2	2.939e-17	2.948e-17	-16.532	-16.531	0.001	(0)
	HgCl+	8.197e-19	7.220e-19	-18.086	-18.141	-0.055	(0)
	HgCO3	5.336e-19	5.336e-19	-18.273	-18.273	0.000	(0)
	HgOH+	7.658e-21	6.745e-21	-20.116	-20.171	-0.055	(0)
	HgNH3+2	6.960e-21	4.188e-21	-20.157	-20.378	-0.221	(0)
	HgHCO3+	3.619e-21	3.188e-21	-20.441	-20.497	-0.055	(0)
	Hg (NH3) 3+2	4.601e-22	2.769e-22	-21.337	-21.558	-0.221	(0)
	Hg (CO3) 2-2	2.636e-22	1.586e-22	-21.579	-21.800	-0.221	(0)
	Hg+2	1.035e-23	6.225e-24	-22.985	-23.206	-0.221	(0)
	HgSO4	1.062e-24	1.062e-24	-23.974	-23.974	0.000	(0)
	Hg (OH) 3-	1.322e-25	1.164e-25	-24.879	-24.934	-0.055	(0)
	Hg (NH3) 4+2	8.084e-27	4.864e-27	-26.092	-26.313	-0.221	(0)
	HgNO3+	0.000e+00	0.000e+00	-49.180	-49.235	-0.055	(0)
	Hg (NO3) 2	0.000e+00	0.000e+00	-75.095	-75.095	0.000	(0)
	HgHS2-	0.000e+00	0.000e+00	-108.371	-108.426	-0.055	(0)
	Hg (HS) 2	0.000e+00	0.000e+00	-108.526	-108.526	0.000	(0)
	HgS2-2	0.000e+00	0.000e+00	-110.420	-110.640	-0.221	(0)
K	4.078e-04						
	K+	4.054e-04	3.630e-04	-3.392	-3.440	-0.048	(0)
	KSO4-	2.378e-06	2.137e-06	-5.624	-5.670	-0.046	(0)
	KHPO4-	3.578e-09	3.217e-09	-8.446	-8.493	-0.046	(0)
	KCrO4-	7.742e-27	6.819e-27	-26.111	-26.166	-0.055	(0)
Mg	8.242e-04						
	Mg+2	7.479e-04	4.810e-04	-3.126	-3.318	-0.192	(0)
	MgSO4	7.195e-05	7.195e-05	-4.143	-4.143	0.000	(0)
	MgHCO3+	3.803e-06	3.403e-06	-5.420	-5.468	-0.048	(0)
	MgHPO4	3.618e-07	3.618e-07	-6.442	-6.442	0.000	(0)
	MgH2PO4+	1.574e-07	1.415e-07	-6.803	-6.849	-0.046	(0)
	MgCO3	3.464e-08	3.464e-08	-7.460	-7.460	0.000	(0)
	MgOH+	4.189e-09	3.779e-09	-8.378	-8.423	-0.045	(0)
	MgH2BO3+	1.924e-10	1.713e-10	-9.716	-9.766	-0.051	(0)
	MgPO4-	3.389e-11	3.047e-11	-10.470	-10.516	-0.046	(0)
Mn (2)	7.630e-06						
	Mn+2	6.938e-06	4.174e-06	-5.159	-5.379	-0.221	(0)
	MnSO4	5.983e-07	5.983e-07	-6.223	-6.223	0.000	(0)
	MnHCO3+	6.415e-08	5.759e-08	-7.193	-7.240	-0.047	(0)
	MnCl+	2.907e-08	2.610e-08	-7.537	-7.583	-0.047	(0)
	MnOH+	2.502e-10	2.246e-10	-9.602	-9.649	-0.047	(0)
	MnCl2	1.831e-10	1.831e-10	-9.737	-9.737	0.000	(0)
	MnCl3-	2.790e-13	2.505e-13	-12.554	-12.601	-0.047	(0)
	MnSeO4	2.765e-20	2.765e-20	-19.558	-19.558	0.000	(0)
	Mn (OH) 3-	2.230e-21	2.002e-21	-20.652	-20.698	-0.047	(0)
	Mn (OH) 4-2	3.121e-28	2.028e-28	-27.506	-27.693	-0.187	(0)
	MnNO3+	2.495e-31	2.198e-31	-30.603	-30.658	-0.055	(0)
	MnSe	2.482e-32	2.482e-32	-31.605	-31.605	0.000	(0)
	Mn (NO3) 2	0.000e+00	0.000e+00	-55.732	-55.732	0.000	(0)
Mn (3)	4.395e-27						
	Mn+3	4.395e-27	1.628e-27	-26.357	-26.788	-0.431	(0)
Mn (6)	0.000e+00						
	MnO4-2	0.000e+00	0.000e+00	-56.732	-56.919	-0.187	(0)
Mn (7)	0.000e+00						
	MnO4-	0.000e+00	0.000e+00	-62.311	-62.361	-0.050	(0)
Mo	4.705e-08						
	MoO4-2	4.686e-08	3.013e-08	-7.329	-7.521	-0.192	(0)

HM04-	1.905e-10	1.678e-10	-9.720	-9.775	-0.055	(0)
H2MoO4	5.399e-13	5.399e-13	-12.268	-12.268	0.000	(0)
AlMo6O21-3	3.384e-37	1.079e-37	-36.471	-36.967	-0.496	(0)
Mo7O24-6	0.000e+00	0.000e+00	-48.944	-50.929	-1.986	(0)
HM07O24-5	0.000e+00	0.000e+00	-49.687	-51.066	-1.379	(0)
H2Mo7O24-4	0.000e+00	0.000e+00	-51.904	-52.786	-0.883	(0)
H3Mo7O24-3	0.000e+00	0.000e+00	-55.532	-56.028	-0.496	(0)
N(-3)	8.934e-04					
NH4+	8.844e-04	7.871e-04	-3.053	-3.104	-0.051	(0)
NH4SO4-	8.035e-06	7.214e-06	-5.095	-5.142	-0.047	(0)
NH3	9.803e-07	9.803e-07	-6.009	-6.009	0.000	(0)
CuNH3+2	4.926e-09	2.964e-09	-8.307	-8.528	-0.221	(0)
CaNH3+2	1.072e-09	6.448e-10	-8.970	-9.191	-0.221	(0)
NiNH3+2	3.726e-10	2.242e-10	-9.429	-9.649	-0.221	(0)
Co(NH3)+2	3.484e-10	2.096e-10	-9.458	-9.679	-0.221	(0)
BaNH3+2	1.985e-13	1.194e-13	-12.702	-12.923	-0.221	(0)
Ni(NH3)+2+2	1.022e-13	6.150e-14	-12.990	-13.211	-0.221	(0)
Co(NH3)+2+2	1.333e-14	8.021e-15	-13.875	-14.096	-0.221	(0)
Ca(NH3)+2+2	5.968e-16	3.591e-16	-15.224	-15.445	-0.221	(0)
Hg(NH3)+2+2	5.261e-17	3.166e-17	-16.279	-16.500	-0.221	(0)
Co(NH3)+3+2	2.348e-19	1.413e-19	-18.629	-18.850	-0.221	(0)
HgNH3+2	6.960e-21	4.188e-21	-20.157	-20.378	-0.221	(0)
Hg(NH3)+3+2	4.601e-22	2.769e-22	-21.337	-21.558	-0.221	(0)
Co(NH3)+4+2	1.724e-24	1.037e-24	-23.764	-23.984	-0.221	(0)
Hg(NH3)+4+2	8.084e-27	4.864e-27	-26.092	-26.313	-0.221	(0)
Cr(NH3)+5OH+2	1.096e-27	6.595e-28	-26.960	-27.181	-0.221	(0)
Co(NH3)+5+2	4.001e-30	2.408e-30	-29.398	-29.618	-0.221	(0)
Cr(NH3)+6+3	3.913e-33	1.248e-33	-32.408	-32.904	-0.496	(0)
Cr(NH3)+6Cl+2	1.302e-34	7.837e-35	-33.885	-34.106	-0.221	(0)
Co(NH3)+5Cl+2	2.160e-38	1.299e-38	-37.666	-37.886	-0.221	(0)
Co(NH3)+6SO4+	0.000e+00	0.000e+00	-46.272	-46.328	-0.055	(0)
Co(NH3)+6Cl+2	0.000e+00	0.000e+00	-50.209	-50.429	-0.221	(0)
Co(NH3)+6OH+2	0.000e+00	0.000e+00	-50.898	-51.119	-0.221	(0)
N(3)	1.497e-18					
NO2-	1.497e-18	1.335e-18	-17.825	-17.875	-0.050	(0)
CuNO2+	2.008e-23	1.769e-23	-22.697	-22.752	-0.055	(0)
CoNO2+	8.535e-24	7.517e-24	-23.069	-23.124	-0.055	(0)
Cu(NO2)+2	2.416e-40	2.416e-40	-39.617	-39.617	0.000	(0)
N(5)	3.714e-26					
NO3-	3.710e-26	3.322e-26	-25.431	-25.479	-0.048	(0)
CaNO3+	4.531e-29	3.991e-29	-28.344	-28.399	-0.055	(0)
MnNO3+	2.495e-31	2.198e-31	-30.603	-30.658	-0.055	(0)
CoNO3+	4.777e-32	4.208e-32	-31.321	-31.376	-0.055	(0)
BaNO3+	2.796e-32	2.462e-32	-31.554	-31.609	-0.055	(0)
ZnNO3+	2.035e-32	1.792e-32	-31.692	-31.747	-0.055	(0)
NiNO3+	1.788e-32	1.575e-32	-31.748	-31.803	-0.055	(0)
CuNO3+	1.552e-32	1.367e-32	-31.809	-31.864	-0.055	(0)
PbNO3+	1.833e-33	1.614e-33	-32.737	-32.792	-0.055	(0)
CdNO3+	2.293e-34	2.020e-34	-33.640	-33.695	-0.055	(0)
CrNO3+2	6.285e-38	3.781e-38	-37.202	-37.422	-0.221	(0)
FeNO3+2	2.836e-38	1.707e-38	-37.547	-37.768	-0.221	(0)
HgNO3+	0.000e+00	0.000e+00	-49.180	-49.235	-0.055	(0)
Mn(NO3)+2	0.000e+00	0.000e+00	-55.732	-55.732	0.000	(0)
Co(NO3)+2	0.000e+00	0.000e+00	-56.546	-56.546	0.000	(0)
Zn(NO3)+2	0.000e+00	0.000e+00	-57.939	-57.939	0.000	(0)
Pb(NO3)+2	0.000e+00	0.000e+00	-58.015	-58.015	0.000	(0)
Cu(NO3)+2	0.000e+00	0.000e+00	-58.255	-58.255	0.000	(0)
Cd(NO3)+2	0.000e+00	0.000e+00	-59.536	-59.536	0.000	(0)
Hg(NO3)+2	0.000e+00	0.000e+00	-75.095	-75.095	0.000	(0)
Na	5.255e-03					
Na+	5.229e-03	4.683e-03	-2.282	-2.330	-0.048	(0)
NaSO4-	2.376e-05	2.136e-05	-4.624	-4.670	-0.046	(0)
NaHCO3	2.056e-06	2.056e-06	-5.687	-5.687	0.000	(0)
NaHPO4-	7.148e-08	6.426e-08	-7.146	-7.192	-0.046	(0)
NaCO3-	1.048e-08	9.419e-09	-7.980	-8.026	-0.046	(0)
NaH2BO3	8.330e-11	8.330e-11	-10.079	-10.079	0.000	(0)
NaCrO4-	1.336e-25	1.176e-25	-24.874	-24.929	-0.055	(0)
Ni	3.452e-07					

Ni+2	2.935e-07	1.887e-07	-6.532	-6.724	-0.192	(0)
NiSO4	3.096e-08	3.096e-08	-7.509	-7.509	0.000	(0)
NiHCO3+	1.699e-08	1.497e-08	-7.770	-7.825	-0.055	(0)
NiCl+	2.686e-09	2.366e-09	-8.571	-8.626	-0.055	(0)
NiCO3	6.618e-10	6.618e-10	-9.179	-9.179	0.000	(0)
NiNH3+2	3.726e-10	2.242e-10	-9.429	-9.649	-0.221	(0)
NiOH+	5.940e-11	5.232e-11	-10.226	-10.281	-0.055	(0)
Ni (SO4) 2-2	1.516e-12	9.123e-13	-11.819	-12.040	-0.221	(0)
Ni (OH) 2	1.858e-13	1.858e-13	-12.731	-12.731	0.000	(0)
Ni (NH3) 2+2	1.022e-13	6.150e-14	-12.990	-13.211	-0.221	(0)
NiCl2	5.998e-14	5.998e-14	-13.222	-13.222	0.000	(0)
Ni (OH) 3-	6.622e-18	5.832e-18	-17.179	-17.234	-0.055	(0)
NiSeO4	2.173e-21	2.173e-21	-20.663	-20.663	0.000	(0)
NiNO3+	1.788e-32	1.575e-32	-31.748	-31.803	-0.055	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-44.406	-44.405	0.001	(0)
P	1.053e-05					
H2PO4-	7.437e-06	6.686e-06	-5.129	-5.175	-0.046	(0)
HPO4-2	1.992e-06	1.294e-06	-5.701	-5.888	-0.187	(0)
MgHPO4	3.618e-07	3.618e-07	-6.442	-6.442	0.000	(0)
CaHPO4	1.995e-07	1.995e-07	-6.700	-6.700	0.000	(0)
MgH2PO4+	1.574e-07	1.415e-07	-6.803	-6.849	-0.046	(0)
FeHPO4	1.465e-07	1.465e-07	-6.834	-6.834	0.000	(0)
FeH2PO4+	1.039e-07	9.336e-08	-6.984	-7.030	-0.046	(0)
NaHPO4-	7.148e-08	6.426e-08	-7.146	-7.192	-0.046	(0)
CaH2PO4+	5.616e-08	5.048e-08	-7.251	-7.297	-0.046	(0)
KHPO4-	3.578e-09	3.217e-09	-8.446	-8.493	-0.046	(0)
CaPO4-	1.650e-09	1.484e-09	-8.782	-8.829	-0.046	(0)
CoHPO4	1.018e-09	1.018e-09	-8.992	-8.992	0.000	(0)
FeHPO4+	5.275e-10	4.743e-10	-9.278	-9.324	-0.046	(0)
H3PO4	2.857e-10	2.857e-10	-9.544	-9.544	0.000	(0)
MgPO4-	3.389e-11	3.047e-11	-10.470	-10.516	-0.046	(0)
PO4-3	4.146e-12	1.535e-12	-11.382	-11.814	-0.431	(0)
CrH2PO4+2	9.520e-14	5.728e-14	-13.021	-13.242	-0.221	(0)
FeH2PO4+2	6.854e-15	4.478e-15	-14.164	-14.349	-0.185	(0)
CrO3HPO4-2	2.042e-28	1.229e-28	-27.690	-27.911	-0.221	(0)
CrO3H2PO4-	2.156e-32	1.899e-32	-31.666	-31.722	-0.055	(0)
Pb	1.027e-08					
Pb+2	5.179e-09	3.331e-09	-8.286	-8.477	-0.192	(0)
PbHCO3+	1.807e-09	1.592e-09	-8.743	-8.798	-0.055	(0)
PbSO4	1.395e-09	1.395e-09	-8.855	-8.855	0.000	(0)
PbCO3	9.410e-10	9.410e-10	-9.026	-9.026	0.000	(0)
PbCl+	6.280e-10	5.531e-10	-9.202	-9.257	-0.055	(0)
PbOH+	2.981e-10	2.625e-10	-9.526	-9.581	-0.055	(0)
PbCl2	1.200e-11	1.200e-11	-10.921	-10.921	0.000	(0)
Pb (SO4) 2-2	1.195e-11	7.191e-12	-10.923	-11.143	-0.221	(0)
Pb (CO3) 2-2	4.240e-13	2.551e-13	-12.373	-12.593	-0.221	(0)
Pb (OH) 2	2.605e-13	2.605e-13	-12.584	-12.584	0.000	(0)
PbCl3-	2.845e-14	2.506e-14	-13.546	-13.601	-0.055	(0)
PbCl4-2	8.783e-17	5.285e-17	-16.056	-16.277	-0.221	(0)
Pb2OH+3	4.346e-17	1.386e-17	-16.362	-16.858	-0.496	(0)
Pb (OH) 3-	9.282e-18	8.175e-18	-17.032	-17.088	-0.055	(0)
Pb (OH) 4-2	1.044e-22	6.282e-23	-21.981	-22.202	-0.221	(0)
Pb3 (OH) 4+2	3.408e-24	2.051e-24	-23.467	-23.688	-0.221	(0)
Pb4 (OH) 4+4	4.979e-28	6.526e-29	-27.303	-28.185	-0.883	(0)
PbNO3+	1.833e-33	1.614e-33	-32.737	-32.792	-0.055	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-58.015	-58.015	0.000	(0)
Pb (HS) 2	0.000e+00	0.000e+00	-116.732	-116.732	0.000	(0)
Pb (HS) 3-	0.000e+00	0.000e+00	-177.138	-177.194	-0.055	(0)
S(-2)	0.000e+00					
H2S	0.000e+00	0.000e+00	-61.170	-61.170	0.000	(0)
HS-	0.000e+00	0.000e+00	-61.707	-61.762	-0.055	(0)
CdHS+	0.000e+00	0.000e+00	-62.477	-62.532	-0.055	(0)
S5-2	0.000e+00	0.000e+00	-64.524	-64.745	-0.221	(0)
S6-2	0.000e+00	0.000e+00	-64.929	-65.149	-0.221	(0)
S4-2	0.000e+00	0.000e+00	-65.125	-65.346	-0.221	(0)
S3-2	0.000e+00	0.000e+00	-65.940	-66.160	-0.221	(0)
S2-2	0.000e+00	0.000e+00	-66.968	-67.189	-0.221	(0)

S-2	0.000e+00	0.000e+00	-72.528	-72.715	-0.187	(0)
HgHS2-	0.000e+00	0.000e+00	-108.371	-108.426	-0.055	(0)
Hg (HS) 2	0.000e+00	0.000e+00	-108.526	-108.526	0.000	(0)
HgS2-2	0.000e+00	0.000e+00	-110.420	-110.640	-0.221	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-115.363	-115.636	-0.272	(0)
CuS4S5-3	0.000e+00	0.000e+00	-116.104	-116.366	-0.262	(0)
Pb (HS) 2	0.000e+00	0.000e+00	-116.732	-116.732	0.000	(0)
ZnS (HS) -	0.000e+00	0.000e+00	-116.847	-116.902	-0.055	(0)
Cd (HS) 2	0.000e+00	0.000e+00	-117.091	-117.091	0.000	(0)
Zn (HS) 2	0.000e+00	0.000e+00	-117.386	-117.386	0.000	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-119.076	-119.076	0.000	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-166.230	-166.285	-0.055	(0)
Zn (HS) 3-	0.000e+00	0.000e+00	-175.813	-175.868	-0.055	(0)
Cd (HS) 3-	0.000e+00	0.000e+00	-176.897	-176.953	-0.055	(0)
Pb (HS) 3-	0.000e+00	0.000e+00	-177.138	-177.194	-0.055	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-178.745	-178.801	-0.055	(0)
ZnS (HS) 2-2	0.000e+00	0.000e+00	-179.133	-179.354	-0.221	(0)
Cd (HS) 4-2	0.000e+00	0.000e+00	-236.298	-236.519	-0.221	(0)
Zn (HS) 4-2	0.000e+00	0.000e+00	-238.869	-239.090	-0.221	(0)
S (6)	1.512e-03					
SO4-2	1.330e-03	8.553e-04	-2.876	-3.068	-0.192	(0)
MgSO4	7.195e-05	7.195e-05	-4.143	-4.143	0.000	(0)
CaSO4	6.834e-05	6.834e-05	-4.165	-4.165	0.000	(0)
NaSO4-	2.376e-05	2.136e-05	-4.624	-4.670	-0.046	(0)
NH4SO4-	8.035e-06	7.214e-06	-5.095	-5.142	-0.047	(0)
FeSO4	6.264e-06	6.264e-06	-5.203	-5.203	0.000	(0)
KSO4-	2.378e-06	2.137e-06	-5.624	-5.670	-0.046	(0)
MnSO4	5.983e-07	5.983e-07	-6.223	-6.223	0.000	(0)
CoSO4	1.307e-07	1.307e-07	-6.884	-6.884	0.000	(0)
AlSO4+	8.224e-08	7.371e-08	-7.085	-7.132	-0.048	(0)
ZnSO4	3.732e-08	3.732e-08	-7.428	-7.428	0.000	(0)
NiSO4	3.096e-08	3.096e-08	-7.509	-7.509	0.000	(0)
HSO4-	2.574e-08	2.307e-08	-7.589	-7.637	-0.048	(0)
CuSO4	2.337e-08	2.337e-08	-7.631	-7.631	0.000	(0)
CrOHSO4	2.319e-09	2.319e-09	-8.635	-8.635	0.000	(0)
PbSO4	1.395e-09	1.395e-09	-8.855	-8.855	0.000	(0)
Al (SO4) 2-	8.414e-10	7.542e-10	-9.075	-9.122	-0.048	(0)
Zn (SO4) 2-2	4.821e-10	2.901e-10	-9.317	-9.537	-0.221	(0)
CdSO4	3.147e-10	3.147e-10	-9.502	-9.502	0.000	(0)
CrSO4+	7.409e-11	6.526e-11	-10.130	-10.185	-0.055	(0)
Pb (SO4) 2-2	1.195e-11	7.191e-12	-10.923	-11.143	-0.221	(0)
Cd (SO4) 2-2	6.404e-12	3.853e-12	-11.194	-11.414	-0.221	(0)
Ni (SO4) 2-2	1.516e-12	9.123e-13	-11.819	-12.040	-0.221	(0)
FeSO4+	3.593e-13	3.226e-13	-12.444	-12.491	-0.047	(0)
Fe (SO4) 2-	6.970e-15	6.139e-15	-14.157	-14.212	-0.055	(0)
Cr2 (OH) 2SO4+2	3.982e-15	2.396e-15	-14.400	-14.621	-0.221	(0)
Cr2 (OH) 2 (SO4) 2	1.217e-16	1.217e-16	-15.915	-15.915	0.000	(0)
HgSO4	1.062e-24	1.062e-24	-23.974	-23.974	0.000	(0)
CrO3SO4-2	7.292e-31	4.387e-31	-30.137	-30.358	-0.221	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-46.272	-46.328	-0.055	(0)
Se (-2)	5.267e-28					
HSe-	5.256e-28	4.629e-28	-27.279	-27.335	-0.055	(0)
H2Se	1.127e-30	1.127e-30	-29.948	-29.948	0.000	(0)
MnSe	2.482e-32	2.482e-32	-31.605	-31.605	0.000	(0)
Se-2	1.726e-36	1.038e-36	-35.763	-35.984	-0.221	(0)
Se (4)	2.497e-08					
HSeO3-	2.454e-08	2.161e-08	-7.610	-7.665	-0.055	(0)
SeO3-2	4.307e-10	2.592e-10	-9.366	-9.586	-0.221	(0)
H2SeO3	2.835e-12	2.835e-12	-11.547	-11.547	0.000	(0)
FeHSeO3+2	3.191e-18	1.920e-18	-17.496	-17.717	-0.221	(0)
Cd (SeO3) 2-2	1.641e-22	9.875e-23	-21.785	-22.005	-0.221	(0)
Se (6)	4.216e-17					
SeO4-2	4.211e-17	2.708e-17	-16.376	-16.567	-0.192	(0)
MnSeO4	2.765e-20	2.765e-20	-19.558	-19.558	0.000	(0)
CoSeO4	9.993e-21	9.993e-21	-20.000	-20.000	0.000	(0)
NiSeO4	2.173e-21	2.173e-21	-20.663	-20.663	0.000	(0)
ZnSeO4	8.729e-22	8.729e-22	-21.059	-21.059	0.000	(0)
HSeO4-	4.225e-22	3.721e-22	-21.374	-21.429	-0.055	(0)

	CdSeO4	8.400e-24	8.400e-24	-23.076	-23.076	0.000	(0)
	Zn (SeO4) 2-2	3.984e-38	2.397e-38	-37.400	-37.620	-0.221	(0)
Zn	3.707e-07						
	Zn+2	3.236e-07	2.081e-07	-6.490	-6.682	-0.192	(0)
	ZnSO4	3.732e-08	3.732e-08	-7.428	-7.428	0.000	(0)
	ZnHCO3+	4.805e-09	4.232e-09	-8.318	-8.373	-0.055	(0)
	ZnCl+	2.796e-09	2.502e-09	-8.553	-8.602	-0.048	(0)
	ZnCO3	1.125e-09	1.125e-09	-8.949	-8.949	0.000	(0)
	ZnOH+	5.062e-10	4.458e-10	-9.296	-9.351	-0.055	(0)
	Zn (SO4) 2-2	4.821e-10	2.901e-10	-9.317	-9.537	-0.221	(0)
	ZnOHCl	1.067e-10	1.067e-10	-9.972	-9.972	0.000	(0)
	ZnCl2	1.587e-11	1.587e-11	-10.799	-10.799	0.000	(0)
	Zn (OH) 2	3.248e-12	3.248e-12	-11.488	-11.488	0.000	(0)
	ZnCl3-	6.855e-14	6.134e-14	-13.164	-13.212	-0.048	(0)
	Zn (OH) 3-	5.799e-16	5.107e-16	-15.237	-15.292	-0.055	(0)
	ZnCl4-2	2.252e-16	1.464e-16	-15.647	-15.835	-0.187	(0)
	Zn (OH) 4-2	1.060e-21	6.380e-22	-20.975	-21.195	-0.221	(0)
	ZnSeO4	8.729e-22	8.729e-22	-21.059	-21.059	0.000	(0)
	ZnNO3+	2.035e-32	1.792e-32	-31.692	-31.747	-0.055	(0)
	Zn (SeO4) 2-2	3.984e-38	2.397e-38	-37.400	-37.620	-0.221	(0)
	Zn (NO3) 2	0.000e+00	0.000e+00	-57.939	-57.939	0.000	(0)
	ZnS (HS) -	0.000e+00	0.000e+00	-116.847	-116.902	-0.055	(0)
	Zn (HS) 2	0.000e+00	0.000e+00	-117.386	-117.386	0.000	(0)
	Zn (HS) 3-	0.000e+00	0.000e+00	-175.813	-175.868	-0.055	(0)
	ZnS (HS) 2-2	0.000e+00	0.000e+00	-179.133	-179.354	-0.221	(0)
	Zn (HS) 4-2	0.000e+00	0.000e+00	-238.869	-239.090	-0.221	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2	-76.82	-70.55	6.27	(Co (NH3) 5Cl) (NO3) 2
(Co (NH3) 5Cl) Cl2	-28.74	-24.20	4.54	(Co (NH3) 5Cl) Cl2
(Co (NH3) 5OH2) Cl3	-36.01	-24.20	11.81	(Co (NH3) 5OH2) Cl3
(Co (NH3) 6) (NO3) 3	-108.26	-90.33	17.93	(Co (NH3) 6) (NO3) 3
(Co (NH3) 6) Cl3	-40.94	-20.81	20.13	(Co (NH3) 6) Cl3
(NH4) 2CrO4	-29.88	-29.50	0.38	(NH4) 2CrO4
(NH4) 2SeO4	-23.23	-22.78	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	0.48	11.61	11.13	Al (OH) 3
Al2 (MoO4) 3	-41.45	-38.31	3.14	Al2 (MoO4) 3
Al2O3	2.80	23.22	20.42	Al2O3
Al4 (OH) 10SO4	7.68	30.38	22.70	Al4 (OH) 10SO4
AlAsO4:2H2O	-5.36	-0.56	4.80	AlAsO4:2H2O
AlOHSO4	-1.22	-4.45	-3.23	AlOHSO4
Alunite	6.55	5.77	-0.78	KAl3 (SO4) 2 (OH) 6
Anglesite	-3.72	-11.55	-7.83	PbSO4
Anhydrite	-2.17	-6.50	-4.34	CaSO4
Anilite	-37.31	-69.73	-32.42	Cu0.25Cu1.5S
Antlerite	-6.57	2.21	8.79	Cu3 (OH) 4SO4
Aragonite	-2.20	-10.46	-8.26	CaCO3
Arsenolite	-54.71	-57.65	-2.94	As4O6
Artinite	-10.63	-0.68	9.96	MgCO3:Mg (OH) 2:3H2O
As2O5	-31.12	-24.35	6.77	As2O5
Atacamite	-4.29	3.38	7.67	Cu2 (OH) 3Cl
Azurite	-5.14	-21.76	-16.62	Cu3 (OH) 2 (CO3) 2
Ba (OH) 2:8H2O	-18.44	6.12	24.56	Ba (OH) 2:8H2O
Ba3 (AsO4) 2	2.95	-5.99	-8.94	Ba3 (AsO4) 2
BaCrO4	-20.40	-30.16	-9.77	BaCrO4
BaHPO4	-5.40	-25.18	-19.77	BaHPO4
BaMoO4	-7.40	-14.39	-6.99	BaMoO4
Barite	0.11	-9.94	-10.05	BaSO4
BaS	-78.32	-62.14	16.18	BaS
BaSeO3	-9.83	-8.04	1.79	BaSeO3
BaSeO4	-15.91	-23.44	-7.53	BaSeO4
Bianchite	-7.99	-9.75	-1.76	ZnSO4:6H2O
Birnessite	-14.64	3.45	18.09	MnO2
Bixbyite	-14.34	-14.61	-0.27	Mn2O3
BlaubleiI	-39.01	-63.17	-24.16	Cu0.9Cu0.2S

BlaubleiII	-38.92	-66.20	-27.28	Cu0.6Cu0.8S
Boehmite	2.68	11.61	8.93	AlOOH
Brochantite	-7.52	8.30	15.82	Cu4(OH)6SO4
Brucite	-7.51	9.67	17.18	Mg(OH)2
Bunsenite	-6.48	6.26	12.74	NiO
Ca3(AsO4)2·4H2O	-17.99	4.31	22.30	Ca3(AsO4)2·4H2O
Ca3(PO4)2(beta)	-4.86	-33.94	-29.08	Ca3(PO4)2
Ca4H(PO4)3·3H2O	-8.60	-55.68	-47.08	Ca4H(PO4)3·3H2O
CaCrO4	-24.55	-26.73	-2.19	CaCrO4
CaHPO4	-2.38	-21.74	-19.37	CaHPO4
CaHPO4·2H2O	-2.68	-21.74	-19.06	CaHPO4·2H2O
Calcite	-2.01	-10.46	-8.46	CaCO3
Calomel	-10.61	-28.79	-18.18	Hg2Cl2
CaMoO4	-3.01	-10.96	-7.94	CaMoO4
CaSeO3·2H2O	-7.48	-4.61	2.87	CaSeO3·2H2O
CaSeO4·2H2O	-17.01	-20.00	-3.00	CaSeO4·2H2O
Cd(BO2)2	-16.05	-6.21	9.84	Cd(BO2)2
Cd(OH)2	-9.72	4.21	13.93	Cd(OH)2
Cd(OH)2(am)	-9.78	4.21	13.99	Cd(OH)2
Cd3(OH)2(SO4)2	-26.19	-19.48	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-25.99	-3.43	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-17.36	-49.96	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-27.62	0.78	28.40	Cd4(OH)6SO4
CdCl2	-12.78	-13.39	-0.60	CdCl2
CdCl2·1H2O	-11.72	-13.39	-1.67	CdCl2·1H2O
CdCl2·2.5H2O	-11.45	-13.39	-1.93	CdCl2·2.5H2O
Cdmetal(alpha)	-31.04	-17.30	13.74	Cd
Cdmetal(gamma)	-31.14	-17.30	13.84	Cd
CdMoO4	-2.09	-16.30	-14.21	CdMoO4
CdOHCl	-8.22	-4.59	3.63	CdOHCl
CdSe	-9.19	-29.62	-20.43	CdSe
CdSeO4·2H2O	-23.50	-25.35	-1.85	CdSeO4·2H2O
CdSO4	-11.83	-11.85	-0.02	CdSO4
CdSO4·1H2O	-10.21	-11.85	-1.63	CdSO4·1H2O
CdSO4·2.67H2O	-10.03	-11.85	-1.82	CdSO4·2.67H2O
Cerussite	-2.30	-15.50	-13.20	PbCO3
CH4(g)	-64.24	-106.05	-41.81	CH4
Chalcanthite	-7.31	-9.97	-2.66	CuSO4·5H2O
Chalcocite	-36.83	-72.25	-35.42	Cu2S
Chalcopyrite	-86.22	-121.94	-35.71	CuFeS2
Cinnabar	-38.34	-84.79	-46.45	HgS
Claudetite	-54.42	-57.65	-3.23	As4O6
Clausthalite	-1.86	-29.32	-27.46	PbSe
Co(BO2)2	-30.60	-3.52	27.07	Co(BO2)2
Co(OH)2	-6.20	6.89	13.09	Co(OH)2
Co(OH)3	-12.72	-14.76	-2.03	Co(OH)3
CO2(g)	-1.86	-20.01	-18.16	CO2
Co3(AsO4)2	-16.71	-3.68	13.03	Co3(AsO4)2
Co3(PO4)2	-7.23	-41.92	-34.69	Co3(PO4)2
Co3O4	-12.44	-22.62	-10.18	Co3O4
CoCl2	-19.21	-10.71	8.50	CoCl2
CoCl2·6H2O	-13.22	-10.71	2.51	CoCl2·6H2O
CoCO3	-3.18	-13.12	-9.94	CoCO3
CoFe2O4	22.11	19.05	-3.06	CoFe2O4
CoHPO4	-5.34	-24.40	-19.06	CoHPO4
CoMoO4	-5.93	-13.62	-7.69	CoMoO4
CoO	-7.01	6.89	13.90	CoO
CoS(alpha)	-53.93	-61.37	-7.44	CoS
CoS(beta)	-50.30	-61.37	-11.07	CoS
CoSe	-10.74	-26.94	-16.20	CoSe
CoSeO3	-8.59	-7.27	1.32	CoSeO3
CoSeO4·6H2O	-21.14	-22.67	-1.53	CoSeO4·6H2O
CoSO4	-12.20	-9.17	3.04	CoSO4
CoSO4·6H2O	-6.69	-9.17	-2.48	CoSO4·6H2O
Cotunnite	-8.23	-13.09	-4.86	PbCl2
Covellite	-39.58	-62.17	-22.59	CuS
Cr(OH)2	-19.62	-8.69	10.92	Cr(OH)2
Cr(OH)3	-2.29	-0.87	1.42	Cr(OH)3

Cr (OH) 3 (am)	-0.12	-0.87	-0.75	Cr (OH) 3
Cr2O3	0.47	-1.73	-2.21	Cr2O3
CrCl2	-40.71	-26.29	14.42	CrCl2
CrCl3	-42.73	-27.26	15.47	CrCl3
Crmetal	-61.20	-30.20	30.99	Cr
CrO3	-33.09	-36.28	-3.20	CrO3
Cu (OH) 2	-2.75	6.09	8.84	Cu (OH) 2
Cu2 (OH) 3NO3	-29.26	-19.79	9.47	Cu2 (OH) 3NO3
Cu2Se (alpha)	8.62	-37.82	-46.44	Cu2Se
Cu2SO4	-18.15	-20.05	-1.89	Cu2SO4
Cu3 (AsO4) 2:2H2O	-12.18	-6.08	6.10	Cu3 (AsO4) 2:2H2O
Cu3 (PO4) 2	-7.47	-44.32	-36.85	Cu3 (PO4) 2
Cu3 (PO4) 2:3H2O	-9.20	-44.32	-35.12	Cu3 (PO4) 2:3H2O
Cu3Se2	-1.06	-65.56	-64.50	Cu3Se2
CuCO3	-2.42	-13.92	-11.50	CuCO3
CuCrO4	-24.75	-30.19	-5.44	CuCrO4
Cumetal	-3.78	-12.75	-8.97	Cu
CuMoO4	-1.31	-14.42	-13.11	CuMoO4
CuOCuSO4	-14.59	-3.88	10.71	CuOCuSO4
Cupricferrite	11.64	18.25	6.61	CuFe2O4
Cuprite	-2.95	-3.99	-1.04	Cu2O
Cuprousferrite	12.96	4.09	-8.87	CuFeO2
CuSe	5.72	-27.74	-33.46	CuSe
CuSe2	-6.27	-40.06	-33.78	CuSe2
CuSeO3:2H2O	-8.69	-8.07	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-21.03	-23.47	-2.44	CuSeO4:5H2O
CuSO4	-13.12	-9.97	3.16	CuSO4
Diaspore	4.43	11.61	7.18	AlOOH
Djurleite	-37.07	-71.58	-34.51	Cu0.066Cu1.868S
Dolomite (disordered)	-4.41	-20.81	-16.40	CaMg (CO3) 2
Dolomite (ordered)	-3.84	-20.81	-16.97	CaMg (CO3) 2
Epsomite	-4.23	-6.39	-2.16	MgSO4:7H2O
Fe (OH) 2	-5.08	8.49	13.56	Fe (OH) 2
Fe (OH) 2.7Cl.3	6.48	3.44	-3.04	Fe (OH) 2.7Cl.3
Fe2 (OH) 4SeO3	-3.55	-2.00	1.55	Fe2 (OH) 4SeO3
Fe2 (SeO3) 3:2H2O	-9.69	-30.31	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-32.99	-36.00	-3.02	Fe2 (SO4) 3
Fe3 (OH) 8	0.43	20.65	20.22	Fe3 (OH) 8
FeAsO4:2H2O	-6.49	-6.09	0.40	FeAsO4:2H2O
FeCr2O4	-0.86	6.75	7.62	FeCr2O4
FeMoO4	-1.96	-12.02	-10.06	FeMoO4
Ferrihydrite	2.67	6.08	3.41	Fe (OH) 3
Ferroselite	-18.92	-37.66	-18.74	FeSe2
FeS (ppt)	-56.85	-59.77	-2.92	FeS
FeSe	-14.34	-25.34	-11.01	FeSe
Galena	-49.54	-63.75	-14.21	PbS
Gibbsite	3.04	11.61	8.57	Al (OH) 3
Goethite	5.41	6.08	0.67	FeOOH
Goslarite	-7.70	-9.75	-2.05	ZnSO4:7H2O
Greenockite	-49.52	-64.05	-14.52	CdS
Greigite	-207.34	-252.37	-45.03	Fe3S4
Gypsum	-1.89	-6.50	-4.61	CaSO4:2H2O
H-Jarosite	-2.45	-13.87	-11.41	(H3O) Fe3 (SO4) 2 (OH) 6
H2MoO4	-7.49	-20.51	-13.02	H2MoO4
H2S (g)	-60.25	-68.26	-8.01	H2S
H2Se (g)	-28.91	-33.83	-4.91	H2Se
Halite	-6.22	-4.63	1.59	NaCl
Hausmannite	-17.95	44.33	62.28	Mn3O4
Hematite	13.20	12.16	-1.03	Fe2O3
Hercynite	7.88	31.71	23.83	FeAl2O4
Hg (CH3) 2 (g)	-153.50	-228.64	-75.14	Hg (CH3) 2
Hg (g)	-8.41	-16.35	-7.94	Hg
Hg (OH) 2	-13.03	-16.53	-3.50	Hg (OH) 2
Hg2 (g)	-17.58	-32.71	-15.13	Hg2
Hg2 (OH) 2	-16.46	-11.20	5.26	Hg2 (OH) 2
Hg2CO3	-15.03	-31.21	-16.18	Hg2CO3
Hg2CrO4	-38.78	-47.48	-8.70	Hg2CrO4
Hg2HPO4	-17.72	-42.49	-24.77	Hg2HPO4

Hg2S	-67.57	-79.45	-11.88	Hg2S
Hg2SeO3	-20.70	-25.36	-4.66	Hg2SeO3
Hg2SO4	-21.11	-27.25	-6.15	Hg2SO4
Hg3O2CO3	-39.92	-69.61	-29.68	Hg3O2CO3
HgCl(g)	-34.37	-14.40	19.98	HgCl
HgCl2	-12.54	-34.13	-21.58	HgCl2
Hgmetal(l)	-2.65	-16.35	-13.70	Hg
HgSe	5.34	-50.36	-55.69	HgSe
HgSeO3	-18.26	-30.69	-12.43	HgSeO3
HgSO4	-23.12	-32.59	-9.46	HgSO4
Hinsdalite	-5.51	-8.01	-2.50	PbAl3PO4SO4(OH) 6
Huntite	-11.85	-41.50	-29.65	CaMg3(CO3) 4
Hydrocerussite	-7.73	-26.50	-18.77	Pb3(OH) 2(CO3) 2
Hydromagnesite	-23.59	-31.71	-8.12	Mg5(CO3) 4(OH) 2:4H2O
Hydroxylapatite	-1.80	-46.13	-44.33	Ca5(PO4) 3OH
Hydroxylpyromorphite	-8.55	-71.34	-62.79	Pb5(PO4) 3OH
K-Alum	-12.19	-17.45	-5.26	KAl(SO4) 2:12H2O
K-Jarosite	3.60	-10.81	-14.41	KFe3(SO4) 2(OH) 6
K2Cr2O7	-48.98	-66.46	-17.48	K2Cr2O7
K2CrO4	-29.61	-30.18	-0.57	K2CrO4
K2MoO4	-17.67	-14.40	3.27	K2MoO4
K2SeO4	-22.72	-23.45	-0.73	K2SeO4
Langite	-9.68	8.30	17.98	Cu4(OH) 6SO4:H2O
Larnakite	-6.67	-7.04	-0.37	PbO:PbSO4
Laurionite	-4.91	-4.29	0.62	PbOHCl
Lepidocrocite	4.71	6.08	1.37	FeOOH
Lime	-23.72	9.55	33.28	CaO
Litharge	-8.38	4.51	12.89	PbO
Mackinawite	-56.17	-59.77	-3.60	FeS
Maghemite	5.78	12.16	6.39	Fe2O3
Magnesioferrite	4.15	21.83	17.69	Fe2MgO4
Magnesite	-2.83	-10.34	-7.52	MgCO3
Magnetite	16.63	20.65	4.02	Fe3O4
Malachite	-2.30	-7.84	-5.53	Cu2(OH) 2CO3
Manganite	-6.98	18.36	25.34	MnOOH
Massicot	-8.58	4.51	13.09	PbO
Melanothallite	-17.95	-11.51	6.45	CuCl2
Melanterite	-5.30	-7.57	-2.27	FeSO4:7H2O
Metacinnabar	-38.94	-84.79	-45.85	HgS
Mg(OH) 2(active)	-9.12	9.67	18.79	Mg(OH) 2
Mg3(PO4) 2	-10.30	-33.58	-23.28	Mg3(PO4) 2
MgCr2O4	-8.80	7.94	16.73	MgCr2O4
MgCrO4	-32.26	-26.61	5.64	MgCrO4
MgHPO4:3H2O	-3.45	-21.63	-18.18	MgHPO4:3H2O
MgMoO4	-8.99	-10.84	-1.85	MgMoO4
MgSeO3:6H2O	-7.53	-4.49	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-18.69	-19.89	-1.20	MgSeO4:6H2O
Minium	-39.74	35.04	74.77	Pb3O4
Mirabilite	-6.38	-7.73	-1.35	Na2SO4:10H2O
Mn2(SO4) 3	-57.55	-62.78	-5.23	Mn2(SO4) 3
Mn3(AsO4) 2:8H2O	-14.02	-1.52	12.50	Mn3(AsO4) 2:8H2O
Mn3(PO4) 2	-15.91	-39.77	-23.85	Mn3(PO4) 2
MnCl2:4H2O	-12.73	-9.99	2.75	MnCl2:4H2O
MnHPO4	1.71	-23.69	-25.40	MnHPO4
MnS(grn)	-60.91	-60.65	0.27	MnS
MnS(pnk)	-63.99	-60.65	3.34	MnS
MnSe	-30.01	-26.22	3.79	MnSe
MnSeO3	-7.68	-6.55	1.13	MnSeO3
MnSeO3:2H2O	-7.51	-6.55	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-19.90	-21.95	-2.05	MnSeO4:5H2O
MnSO4	-11.22	-8.45	2.78	MnSO4
Monteponite	-11.20	4.21	15.41	CdO
Montroydite	-13.01	-16.53	-3.52	HgO
MoO3	-12.51	-20.51	-8.00	MoO3
Morenosite	-7.61	-9.79	-2.18	NiSO4:7H2O
MoS2	-107.11	-178.53	-71.41	MoS2
Na-Jarosite	1.05	-9.70	-10.75	NaFe3(SO4) 2(OH) 6
Na2Cr2O7	-54.28	-64.24	-9.96	Na2Cr2O7

Na2CrO4	-30.94	-27.96	2.99	Na2CrO4
Na2Mo2O7	-15.92	-32.69	-16.76	Na2Mo2O7
Na2MoO4	-13.70	-12.18	1.52	Na2MoO4
Na2MoO4:2H2O	-13.40	-12.18	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-16.13	-5.83	10.30	Na2SeO3:5H2O
Na2SeO4	-22.51	-21.23	1.28	Na2SeO4
Nantokite	-3.94	-10.79	-6.86	CuCl
Natron	-10.18	-11.69	-1.51	Na2CO3:10H2O
Nesquehonite	-5.75	-10.35	-4.60	MgCO3:3H2O
Ni(OH)2	-6.82	6.26	13.08	Ni(OH)2
Ni3(AsO4)2:8H2O	-21.26	-5.56	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-12.50	-43.80	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-23.00	9.00	32.00	Ni4(OH)6SO4
NiCO3	-7.00	-13.75	-6.75	NiCO3
NiMoO4	-3.10	-14.25	-11.15	NiMoO4
NiS(alpha)	-56.39	-61.99	-5.60	NiS
NiS(beta)	-50.89	-61.99	-11.10	NiS
NiS(gamma)	-49.19	-61.99	-12.80	NiS
NiSe	-9.86	-27.56	-17.70	NiSe
NiSeO3:2H2O	-10.80	-7.90	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-21.77	-23.29	-1.52	NiSeO4:6H2O
Nsutite	-14.06	3.45	17.50	MnO2
O2(g)	-41.77	43.02	84.79	O2
Orpiment	-171.48	-233.59	-62.11	As2S3
Otavite	-3.81	-15.81	-12.00	CdCO3
Pb(BO2)2	-12.47	-5.90	6.57	Pb(BO2)2
Pb(OH)2	-3.81	4.51	8.32	Pb(OH)2
Pb10(OH)60(CO3)6	-66.23	-74.99	-8.76	Pb10(OH)60(CO3)6
Pb2(OH)3Cl	-8.57	0.22	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-17.17	9.02	26.19	Pb2O(OH)2
Pb2O3	-30.51	30.53	61.04	Pb2O3
Pb2OCO3	-10.56	-10.99	-0.44	Pb2OCO3
Pb3(AsO4)2	-16.62	-10.82	5.80	Pb3(AsO4)2
Pb3(PO4)2	-5.53	-49.06	-43.53	Pb3(PO4)2
Pb3O2CO3	-17.83	-6.48	11.35	Pb3O2CO3
Pb3O2SO4	-13.45	-2.53	10.92	Pb3O2SO4
Pb4(OH)6SO4	-19.12	1.98	21.10	Pb4(OH)6SO4
Pb4O3SO4	-20.30	1.98	22.28	Pb4O3SO4
PbCrO4	-19.04	-31.77	-12.73	PbCrO4
PbHPO4	-2.98	-26.78	-23.81	PbHPO4
Pbmetal	-21.24	-17.00	4.24	Pb
PbMoO4	-0.22	-16.00	-15.78	PbMoO4
PbO:0.3H2O	-8.47	4.51	12.98	PbO:0.33H2O
PbSeO4	-18.16	-25.04	-6.88	PbSeO4
Periclase	-12.36	9.67	22.03	MgO
Phosgenite	-8.78	-28.59	-19.81	PbCl2:PbCO3
Plattnerite	-24.46	26.02	50.48	PbO2
Plumbgummite	9.54	-23.25	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-13.64	9.55	23.19	Ca(OH)2
Pyrite	-87.86	-106.52	-18.66	FeS2
Pyrochroite	-7.87	7.61	15.48	Mn(OH)2
Pyrolusite	-13.07	29.12	42.19	MnO2
Pyromorphite	4.30	-80.13	-84.43	Pb5(PO4)3Cl
Realgar	-73.30	-93.42	-20.13	AsS
Retgersite	-7.74	-9.79	-2.05	NiSO4:6H2O
Rhodochrosite	-1.83	-12.41	-10.57	MnCO3
Semetal(am)	-5.18	-12.32	-7.14	Se
Semetal(hex)	-4.56	-12.32	-7.76	Se
SeO2	-14.28	-14.16	0.12	SeO2
SeO3	-51.03	-29.55	21.48	SeO3
Siderite	-1.34	-11.53	-10.19	FeCO3
Smithsonite	-3.76	-13.71	-9.95	ZnCO3
Sphalerite	-50.41	-61.95	-11.54	ZnS
Spinel	-5.11	32.89	38.00	MgAl2O4
Strengite	1.16	-25.21	-26.37	FePO4:2H2O
Sulfur	-44.65	-46.75	-2.10	S
Tenorite	-1.75	6.09	7.84	CuO
Thenardite	-8.08	-7.73	0.35	Na2SO4

Thermonatrite	-12.35	-11.69	0.67	Na2CO3:H2O
Tsumebite	-6.40	-16.19	-9.79	Pb2CuPO4 (OH) 3:3H2O
Vivianite	-1.13	-37.13	-36.00	Fe3 (PO4) 2:8H2O
Witherite	-5.31	-13.90	-8.58	BaCO3
Wurtzite	-52.94	-61.95	-9.01	ZnS
Zincite	-5.29	6.31	11.60	ZnO
Zincosite	-13.92	-9.75	4.17	ZnSO4
Zn(BO2)2	-12.40	-4.11	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-60.88	-57.64	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-5.89	6.31	12.20	Zn(OH)2
Zn(OH)2(am)	-6.41	6.31	12.71	Zn(OH)2
Zn(OH)2(beta)	-5.70	6.31	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-5.47	6.31	11.78	Zn(OH)2
Zn(OH)2(gamma)	-5.43	6.31	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.94	-3.44	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-11.38	3.81	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-19.08	-5.43	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-8.25	-43.67	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-32.87	-13.19	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-19.23	9.17	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-24.57	13.93	38.50	Zn5(OH)8Cl2
ZnCl2	-18.55	-11.29	7.27	ZnCl2
ZnCO3:1H2O	-3.45	-13.71	-10.26	ZnCO3:1H2O
Znmetal	-41.45	-15.20	26.24	Zn
ZnMoO4	-4.11	-14.20	-10.09	ZnMoO4
ZnO(active)	-5.15	6.31	11.45	ZnO
ZnS(am)	-52.85	-61.95	-9.10	ZnS
ZnSe	-13.05	-27.52	-14.48	ZnSe
ZnSeO4:6H2O	-21.73	-23.25	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-9.24	-9.75	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 4.

End of Run after 0.279 Seconds.

Input file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\PHREEQC\2 Mixing
 \Kanmantoo Scenario 1a mixing worst case.pqi
 Output file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\PHREEQC\2 Mixing
 \Kanmantoo Scenario 1a mixing worst case.pqi
 Database file: C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
 \minteq.v4.dat

 Reading data base.

SOLUTION_MASTER_SPECIES
 SOLUTION_SPECIES
 SOLUTION_SPECIES
 PHASES
 PHASES
 SURFACE_MASTER_SPECIES
 SURFACE_SPECIES
 END

 Reading input data for simulation 1.

DATABASE C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
 \minteq.v4.dat
 SELECTED_OUTPUT 1
 file Kanmantoo Scenario 1a mixing.sel
 totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg
 Na K Alkalinity Cl S(6) Hg
 SOLUTION_MASTER_SPECIES
 Co Co+3 -1.0 Co 58.9332
 Co(2) Co+2 0.0 Co
 Co(3) Co+3 -1.0 Co
 END

 End of simulation.

 Reading input data for simulation 2.

PHASES
 CoO
 CoO + 2H+ = Co+2 + H2O
 log_k 13.5864
 delta_h -106.295 kJ
 Co(OH)2
 Co(OH)2 + 2H+ = Co+2 + 2H2O
 log_k 13.094
 delta_h -0 kJ
 Co(OH)3
 Co(OH)3 + 3H+ = Co+3 + 3H2O
 log_k -2.309
 delta_h -92.43 kJ
 Co3O4
 Co3O4 + 8H+ = Co+2 + 2Co+3 + 4H2O
 log_k -10.4956
 delta_h -107.5 kJ
 CoFe2O4
 CoFe2O4 + 8H+ = Co+2 + 2Fe+3 + 4H2O
 log_k -3.5281
 delta_h -158.82 kJ
 CoCl2
 CoCl2 = Co+2 + 2Cl-
 log_k 8.2672
 delta_h -79.815 kJ
 CoCl2:6H2O

```

      CoCl2:6H2O = Co+2 + 2Cl- + 6H2O
      log_k 2.5365
      delta_h      8.0598      kJ
(Co(NH3)6)Cl3
      (Co(NH3)6)Cl3 + 6H+ = Co+3 + 6NH4+ + 3Cl-
      log_k 20.0317
      delta_h      -33.1      kJ
(Co(NH3)5OH2)Cl3
      (Co(NH3)5OH2)Cl3 + 5H+ = Co+3 + 5NH4+ + 3Cl- + H2O
      log_k 11.7351
      delta_h      -25.37      kJ
(Co(NH3)5Cl)Cl2
      (Co(NH3)5Cl)Cl2 + 5H+ = Co+3 + 5NH4+ + 3Cl-
      log_k 4.5102
      delta_h      -10.74      kJ
CoCO3
      CoCO3 = Co+2 + CO3-2
      log_k -9.98
      delta_h      -12.7612      kJ
CoSO4
      CoSO4 = Co+2 + SO4-2
      log_k 2.8024
      delta_h      -79.277      kJ
CoSO4:6H2O
      CoSO4:6H2O = Co+2 + SO4-2 + 6H2O
      log_k -2.4726
      delta_h      1.0801      kJ

```

END

End of simulation.

Reading input data for simulation 3.

SOLUTION 1 #Groundwater worst case maximum values

```

temp      21
pH         5.05
pe         1
redox      pe
units      mg/l
density    1
Al         5.21
Alkalinity 0
As         0
Ba         0
Be         0
B          0
Cd         0.04
Co         24.2
Cr         0
Cu         9.29
Fe         937
Pb         0.01
Mn         171
Mo         0
V          0
Zn         1.78
Se         0.08
Ni         5.57
N          60
P          23.6
Ca         590
Mg         1340
Na         5880
K          216
Cl         9420

```

S(6)	9110
Hg	0.0004
water	1 # kg
SOLUTION 2 #Mean River Murray water quality	
temp	20
pH	7.5
pe	4
redox	pe
units	mg/l
density	1
Al	1.48
Alkalinity	61
As	0.0013
Ba	0.0478
Be	0
B	0.05
Cd	0.0007
Co	0.0006
Cr	0.0021
Cu	0.006
Fe	1.37
Pb	0.0012
Mn	0.06
Mo	0.0003
Zn	0.0164
Se	0.0002
Ni	0.0028
N	1.05
P	0.11
Ca	13
Mg	9
Na	49
K	4
Cl	79
S(6)	17
Hg	0.00008
water	1 # kg
SOLUTION 3 #Mean Mt Barker water quality	
temp	20
pH	6.18
pe	4
redox	pe
units	mg/l
density	1
Al	0.04
Alkalinity	50
As	0.002
Ba	0.012
Be	0
B	0.088
Cd	0
Co	0.039
Cr	0.007
Cu	0.022
Fe	0.493
Pb	0.003
Mn	0.046
Mo	0.009
Zn	0.023
Se	0.002
Ni	0.011
N	24.3
P	0.52
Ca	32
Mg	17
Na	132
K	25
Cl	231

```

S(6)      190
Hg         0
water     1 # kg
MIX 1
1         0.03
2         0.485
3         0.485

```

Beginning of initial solution calculations.

Initial solution 1.

-----Solution composition-----

Elements	Molality	Moles
Al	1.986e-04	1.986e-04
Ca	1.514e-02	1.514e-02
Cd	3.660e-07	3.660e-07
Cl	2.733e-01	2.733e-01
Co	4.224e-04	4.224e-04
Cu	1.504e-04	1.504e-04
Fe	1.726e-02	1.726e-02
Hg	2.051e-09	2.051e-09
K	5.682e-03	5.682e-03
Mg	5.671e-02	5.671e-02
Mn	3.202e-03	3.202e-03
N	4.406e-03	4.406e-03
Na	2.631e-01	2.631e-01
Ni	9.762e-05	9.762e-05
P	7.837e-04	7.837e-04
Pb	4.964e-08	4.964e-08
S(6)	9.754e-02	9.754e-02
Se	1.042e-06	1.042e-06
Zn	2.800e-05	2.800e-05

-----Description of solution-----

```

pH = 5.050
pe = 1.000
Activity of water = 0.988
Ionic strength (mol/kgw) = 4.862e-01
Mass of water (kg) = 1.000e+00
Total alkalinity (eq/kg) = 1.381e-05
Total carbon (mol/kg) = 0.000e+00
Total CO2 (mol/kg) = 0.000e+00
Temperature (°C) = 21.00
Electrical balance (eq) = -9.552e-03
Percent error, 100*(Cat-|An|)/(Cat+|An|) = -1.26
Iterations = 14
Total H = 1.110329e+02
Total O = 5.590014e+01

```

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.214e-05	8.913e-06	-4.916	-5.050	-0.134	0.00
OH-	1.292e-09	8.222e-10	-8.889	-9.085	-0.196	(0)
H2O	5.551e+01	9.883e-01	1.744	-0.005	0.000	18.05
Al	1.986e-04					
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Al+3	1.839e-05	1.139e-06	-4.735	-5.943	-1.208	(0)
AlOH+2	4.197e-06	9.786e-07	-5.377	-6.009	-0.632	(0)
Al(OH)2+	1.624e-06	1.128e-06	-5.790	-5.948	-0.158	(0)

	Al (OH) 3	2.514e-08	2.514e-08	-7.600	-7.600	0.000	(0)
	Al (OH) 4-	2.040e-09	1.366e-09	-8.690	-8.864	-0.174	(0)
Ca		1.514e-02					
	Ca+2	8.161e-03	2.370e-03	-2.088	-2.625	-0.537	(0)
	CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
	CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
	CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
	CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
	CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
	CaOH+	5.236e-11	3.715e-11	-10.281	-10.430	-0.149	(0)
	Ca (NH3) 2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
	CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
Cd		3.660e-07					
	CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
	CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
	Cd (SO4) 2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
	CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
	Cd+2	1.502e-08	4.363e-09	-7.823	-8.360	-0.537	(0)
	CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
	CdOHC1	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
	CdOH+	6.462e-14	2.865e-14	-13.190	-13.543	-0.353	(0)
	Cd2OH+3	9.945e-19	6.582e-22	-18.002	-21.182	-3.179	(0)
	Cd (OH) 2	2.726e-19	2.726e-19	-18.564	-18.564	0.000	(0)
	Cd (OH) 3-	4.195e-26	1.860e-26	-25.377	-25.730	-0.353	(0)
	Cd (OH) 4-2	8.799e-35	3.400e-36	-34.056	-35.469	-1.413	(0)
	Cd (SeO3) 2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
	CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
	CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
	Cd (NO3) 2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cl		2.733e-01					
	Cl-	2.729e-01	2.003e-01	-0.564	-0.698	-0.134	(0)
	CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
	MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
	CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
	CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
	NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
	MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
	CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
	ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
	MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
	ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
	CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
	CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
	ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
	CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
	PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
	ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
	NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
	PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
	ZnOHC1	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
	PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
	PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
	CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
	CdOHC1	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
	CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
	FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
	CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
	HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
	FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
	HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
	HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
	FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
	CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
	HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
	HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
	CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
	Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
	Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)

Co (2)	4.224e-04					
Co+2	3.644e-04	1.408e-05	-3.438	-4.851	-1.413	(0)
CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
Co (NH3) +2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CoOH+	7.075e-10	3.137e-10	-9.150	-9.504	-0.353	(0)
Co2OH+3	3.344e-13	2.213e-16	-12.476	-15.655	-3.179	(0)
Co (NH3) 2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Co (OH) 2	2.782e-14	2.782e-14	-13.556	-13.556	0.000	(0)
Co (NH3) 3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Co (OH) 3-	1.398e-21	6.199e-22	-20.854	-21.208	-0.353	(0)
CoOH-	8.505e-23	3.771e-23	-22.070	-22.424	-0.353	(0)
Co4 (OH) 4+4	8.668e-25	1.932e-30	-24.062	-29.714	-5.652	(0)
Co (NH3) 4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
Co (OH) 4-2	2.839e-30	1.097e-31	-29.547	-30.960	-1.413	(0)
Co (NH3) 5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Co (3)	8.287e-32					
CoOH+2	8.232e-32	3.180e-33	-31.085	-32.498	-1.413	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co+3	9.049e-36	5.605e-37	-35.043	-36.251	-1.208	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
Cu (1)	1.504e-04					
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
Cu+	1.823e-08	8.082e-09	-7.739	-8.092	-0.353	(0)
Cu (2)	1.182e-09					
Cu+2	5.900e-10	1.714e-10	-9.229	-9.766	-0.537	(0)
CuSO4	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
CuOH+	7.604e-13	4.972e-13	-12.119	-12.303	-0.185	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
Cu (OH) 2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
Cu2 (OH) 2+2	1.564e-19	6.042e-21	-18.806	-20.219	-1.413	(0)
Cu (OH) 3-	6.965e-22	3.088e-22	-21.157	-21.510	-0.353	(0)
Cu (OH) 4-2	7.024e-29	2.714e-30	-28.153	-29.566	-1.413	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Fe (2)	1.726e-02					
Fe+2	1.529e-02	5.907e-04	-1.816	-3.229	-1.413	(0)
FeSO4	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
FeOH+	2.826e-08	1.934e-08	-7.549	-7.714	-0.165	(0)
Fe (OH) 2	1.209e-14	1.209e-14	-13.918	-13.918	0.000	(0)
Fe (OH) 3-	6.009e-18	4.111e-18	-17.221	-17.386	-0.165	(0)
Fe (3)	2.087e-10					
Fe (OH) 2+	1.957e-10	1.360e-10	-9.708	-9.867	-0.158	(0)
FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
FeOH+2	1.136e-12	2.489e-13	-11.945	-12.604	-0.659	(0)
Fe (OH) 3	9.228e-14	9.228e-14	-13.035	-13.035	0.000	(0)
FeSO4+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe (SO4) 2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)

Fe+3	7.010e-15	4.342e-16	-14.154	-15.362	-1.208	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
Fe (OH) 4-	2.440e-17	1.696e-17	-16.613	-16.771	-0.158	(0)
Fe2 (OH) 2+4	1.061e-18	2.365e-24	-17.974	-23.626	-5.652	(0)
Fe3 (OH) 4+5	3.023e-24	4.459e-33	-23.520	-32.351	-8.831	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
H (0)	1.047e-15					
H2	5.235e-16	5.855e-16	-15.281	-15.232	0.049	(0)
Hg (0)	2.051e-09					
Hg	2.051e-09	2.051e-09	-8.688	-8.688	0.000	(0)
Hg (1)	9.698e-28					
Hg2+2	4.849e-28	1.874e-29	-27.314	-28.727	-1.413	(0)
Hg (2)	4.726e-15					
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
Hg (NH3) 2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Hg (OH) 2	1.022e-25	1.143e-25	-24.991	-24.942	0.049	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
HgOH+	1.615e-27	7.162e-28	-26.792	-27.145	-0.353	(0)
Hg+2	4.674e-28	1.806e-29	-27.330	-28.743	-1.413	(0)
HgSO4	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Hg (NH3) 3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Hg (OH) 3-	3.623e-35	1.606e-35	-34.441	-34.794	-0.353	(0)
Hg (NH3) 4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Hg (NO3) 2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
K	5.682e-03					
K+	5.178e-03	3.801e-03	-2.286	-2.420	-0.134	(0)
KSO4-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
KHPO4-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
Mg	5.671e-02					
Mg+2	3.360e-02	9.758e-03	-1.474	-2.011	-0.537	(0)
MgSO4	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
MgHPO4	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
MgOH+	4.148e-09	2.990e-09	-8.382	-8.524	-0.142	(0)
MgPO4-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
Mn (2)	3.202e-03					
Mn+2	2.899e-03	1.120e-04	-2.538	-3.951	-1.413	(0)
MnSO4	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
MnOH+	3.381e-10	2.313e-10	-9.471	-9.636	-0.165	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Mn (OH) 3-	3.538e-24	2.421e-24	-23.451	-23.616	-0.165	(0)
Mn (OH) 4-2	3.983e-32	8.727e-33	-31.400	-32.059	-0.659	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Mn (3)	4.471e-28					
Mn+3	4.471e-28	2.769e-29	-27.350	-28.558	-1.208	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-79.028	-79.687	-0.659	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-88.115	-88.325	-0.210	(0)
N (-3)	4.406e-03					
NH4+	3.919e-03	2.335e-03	-2.407	-2.632	-0.225	(0)
NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
NH3	1.123e-07	1.123e-07	-6.950	-6.950	0.000	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
Co (NH3) +2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)

CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
Ni (NH3) 2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Co (NH3) 2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Ca (NH3) 2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
Co (NH3) 3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Hg (NH3) 2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Co (NH3) 4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
Hg (NH3) 3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Co (NH3) 5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
Hg (NH3) 4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
N (3)	0.000e+00					
NO2-	0.000e+00	0.000e+00	-47.968	-48.177	-0.210	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
N (5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-64.954	-65.088	-0.134	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Hg (NO3) 2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
Na	2.631e-01					
Na+	2.447e-01	1.796e-01	-0.611	-0.746	-0.134	(0)
NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
Ni	9.762e-05					
Ni+2	4.671e-05	1.357e-05	-4.331	-4.867	-0.537	(0)
NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
Ni (SO4) 2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
NiOH+	3.238e-10	1.435e-10	-9.490	-9.843	-0.353	(0)
Ni (NH3) 2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Ni (OH) 2	1.692e-14	1.692e-14	-13.772	-13.772	0.000	(0)
Ni (OH) 3-	4.261e-20	1.889e-20	-19.371	-19.724	-0.353	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
O (0)	0.000e+00					
O2	0.000e+00	0.000e+00	-63.001	-62.952	0.049	(0)
P	7.837e-04					
H2PO4-	4.270e-04	2.967e-04	-3.370	-3.528	-0.158	(0)
MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
MgHPO4	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
HPO4-2	9.473e-06	2.076e-06	-5.024	-5.683	-0.659	(0)
NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)

H3PO4	3.560e-07	3.560e-07	-6.449	-6.449	0.000	(0)
KHPO4-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
MgPO4-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
PO4-3	1.460e-12	9.045e-14	-11.836	-13.044	-1.208	(0)
FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Pb	4.964e-08					
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
Pb(SO4) 2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
Pb+2	3.636e-09	1.056e-09	-8.439	-8.976	-0.537	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
PbOH+	6.682e-12	2.963e-12	-11.175	-11.528	-0.353	(0)
Pb(OH) 2	1.046e-16	1.046e-16	-15.980	-15.980	0.000	(0)
Pb2OH+3	7.494e-17	4.960e-20	-16.125	-19.305	-3.179	(0)
Pb(OH) 3-	2.635e-22	1.168e-22	-21.579	-21.933	-0.353	(0)
Pb(OH) 4-2	8.268e-28	3.195e-29	-27.083	-28.496	-1.413	(0)
Pb3(OH) 4+2	3.173e-30	1.226e-31	-29.499	-30.912	-1.413	(0)
Pb4(OH) 4+4	5.352e-31	1.193e-36	-30.271	-35.923	-5.652	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
Pb(NO3) 2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
S(6)	9.754e-02					
SO4-2	4.586e-02	1.332e-02	-1.339	-1.875	-0.537	(0)
MgSO4	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
FeSO4	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
KSO4-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
MnSO4	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
Al(SO4) 2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Zn(SO4) 2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
HSO4-	1.536e-05	1.028e-05	-4.814	-4.988	-0.174	(0)
ZnSO4	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
Ni(SO4) 2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
Cd(SO4) 2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
Pb(SO4) 2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
CuSO4	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
FeSO4+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(SO4) 2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
HgSO4	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Co(NH3) 6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Se(-2)	1.042e-06					
HSe-	1.012e-06	4.485e-07	-5.995	-6.348	-0.353	(0)
H2Se	3.047e-08	3.047e-08	-7.516	-7.516	0.000	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Se-2	1.000e-15	3.865e-17	-15.000	-16.413	-1.413	(0)
Se(4)	2.708e-15					
HSeO3-	2.690e-15	1.193e-15	-14.570	-14.923	-0.353	(0)
SeO3-2	1.341e-17	5.183e-19	-16.872	-18.285	-1.413	(0)
H2SeO3	4.383e-18	4.383e-18	-17.358	-17.358	0.000	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
Cd(SeO3) 2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
Se(6)	9.467e-35					
SeO4-2	9.354e-35	2.717e-35	-34.029	-34.566	-0.537	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
HSeO4-	2.413e-38	1.070e-38	-37.617	-37.971	-0.353	(0)

ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn	2.800e-05					
Zn (SO4) 2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
Zn+2	6.051e-06	1.758e-06	-5.218	-5.755	-0.537	(0)
ZnSO4	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
ZnOH+	3.259e-10	1.445e-10	-9.487	-9.840	-0.353	(0)
Zn (OH) 2	3.473e-14	3.473e-14	-13.459	-13.459	0.000	(0)
Zn (OH) 3-	4.384e-19	1.944e-19	-18.358	-18.711	-0.353	(0)
Zn (OH) 4-2	2.236e-25	8.641e-27	-24.650	-26.063	-1.413	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2-161.31	-155.03	6.27	(Co (NH3) 5Cl) (NO3) 2	
(Co (NH3) 5Cl) Cl2 -30.79	-26.25	4.54	(Co (NH3) 5Cl) Cl2	
(Co (NH3) 5OH2) Cl3 -38.05	-26.26	11.80	(Co (NH3) 5OH2) Cl3	
(Co (NH3) 6) (NO3) 3-234.94	-217.01	17.93	(Co (NH3) 6) (NO3) 3	
(Co (NH3) 6) Cl3 -43.95	-23.84	20.11	(Co (NH3) 6) Cl3	
(NH4) 2SeO4 -40.28	-39.83	0.45	(NH4) 2SeO4	
Al (OH) 3 (am) -1.87	9.19	11.06	Al (OH) 3	
Al2O3 -1.87	18.40	20.27	Al2O3	
Al4 (OH) 10SO4 2.10	24.80	22.70	Al4 (OH) 10SO4	
AlOHSO4 0.46	-2.77	-3.23	AlOHSO4	
Alunite 7.17	6.27	-0.90	KAl3 (SO4) 2 (OH) 6	
Anglesite -3.03	-10.85	-7.82	PbSO4	
Anhydrite -0.16	-4.50	-4.34	CaSO4	
Antlerite -19.78	-10.99	8.79	Cu3 (OH) 4SO4	
Atacamite -12.71	-5.10	7.61	Cu2 (OH) 3Cl	
Bianchite -5.90	-7.66	-1.76	ZnSO4:6H2O	
Birnessite -25.46	-7.37	18.09	MnO2	
Bixbyite -26.48	-26.83	-0.35	Mn2O3	
Boehmite 0.34	9.20	8.86	AlOOH	
Brochantite -26.38	-10.67	15.71	Cu4 (OH) 6SO4	
Brucite -9.04	8.08	17.12	Mg (OH) 2	
Bunsenite -7.46	5.23	12.68	NiO	
Ca3 (PO4) 2 (beta) -4.91	-33.96	-29.05	Ca3 (PO4) 2	
Ca4H (PO4) 3:3H2O -7.62	-54.70	-47.08	Ca4H (PO4) 3:3H2O	
CaHPO4 -1.37	-20.72	-19.35	CaHPO4	
CaHPO4:2H2O -1.68	-20.73	-19.05	CaHPO4:2H2O	
Calomel -11.99	-30.12	-18.13	Hg2Cl2	
CaSeO3:2H2O -15.37	-12.51	2.86	CaSeO3:2H2O	
CaSeO4:2H2O -34.20	-37.20	-3.00	CaSeO4:2H2O	
Cd (OH) 2 -12.14	1.73	13.87	Cd (OH) 2	
Cd (OH) 2 (am) -12.21	1.73	13.94	Cd (OH) 2	
Cd3 (OH) 2 (SO4) 2 -25.45	-18.74	6.71	Cd3 (OH) 2 (SO4) 2	
Cd3 (OH) 4SO4 -29.34	-6.78	22.56	Cd3 (OH) 4SO4	
Cd3 (PO4) 2 -18.57	-51.17	-32.60	Cd3 (PO4) 2	
Cd4 (OH) 6SO4 -33.45	-5.05	28.40	Cd4 (OH) 6SO4	
CdCl2 -9.14	-9.76	-0.61	CdCl2	
CdCl2:1H2O -8.09	-9.76	-1.68	CdCl2:1H2O	
CdCl2:2.5H2O -7.84	-9.77	-1.93	CdCl2:2.5H2O	
Cdmetal (alpha) -24.05	-10.36	13.69	Cd	
Cdmetal (gamma) -24.16	-10.36	13.80	Cd	
CdOHCl -7.62	-4.01	3.61	CdOHCl	
CdSe 10.72	-9.66	-20.38	CdSe	
CdSeO4:2H2O -41.09	-42.94	-1.85	CdSeO4:2H2O	

CdSO4	-10.19	-10.24	-0.05	CdSO4
CdSO4:1H2O	-8.59	-10.24	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-8.42	-10.25	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.01	-11.67	-2.65	CuSO4:5H2O
Clausthalite	17.11	-10.27	-27.39	PbSe
Co(OH)2	-7.86	5.24	13.09	Co(OH)2
Co(OH)3	-19.03	-21.12	-2.09	Co(OH)3
Co3(PO4)2	-5.95	-40.64	-34.69	Co3(PO4)2
Co3O4	-26.74	-36.97	-10.24	Co3O4
CoCl2	-14.71	-6.25	8.46	CoCl2
CoCl2:6H2O	-8.80	-6.28	2.52	CoCl2:6H2O
CoFe2O4	7.95	4.80	-3.15	CoFe2O4
CoHPO4	-3.88	-22.95	-19.06	CoHPO4
CoO	-8.60	5.24	13.84	CoO
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-16.04	-14.72	1.32	CoSeO3
CoSeO4:6H2O	-37.92	-39.45	-1.53	CoSeO4:6H2O
CoSO4	-9.72	-6.73	2.99	CoSO4
CoSO4:6H2O	-4.28	-6.76	-2.48	CoSO4:6H2O
Cotunnite	-5.53	-10.37	-4.84	PbCl2
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.91	-69.49	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.83	-17.48	-46.31	Cu2Se
Cu2SO4	-16.16	-18.06	-1.90	Cu2SO4
Cu3(PO4)2	-18.54	-55.39	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-20.28	-55.40	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	35.75	-28.55	-64.30	Cu3Se2
Cumetal	-0.17	-9.09	-8.93	Cu
CuOCuSO4	-21.94	-11.31	10.63	CuOCuSO4
Cupricferrite	-6.60	-0.11	6.49	CuFe2O4
Cuprite	-4.98	-6.09	-1.11	Cu2O
Cuprousferrite	5.61	-3.27	-8.88	CuFeO2
CuSe	22.32	-11.06	-33.39	CuSe
CuSe2	23.34	-10.36	-33.70	CuSe2
CuSeO3:2H2O	-20.25	-19.65	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-41.92	-44.36	-2.44	CuSeO4:5H2O
CuSO4	-14.76	-11.64	3.11	CuSO4
Diaspore	2.08	9.20	7.12	AlOOH
Epsomite	-1.77	-3.92	-2.15	MgSO4:7H2O
Fe(OH)2	-6.70	6.86	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.09	-1.95	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-21.97	-20.42	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-39.73	-60.36	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-33.19	-36.35	-3.16	Fe2(SO4)3
Fe3(OH)8	-13.82	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.59	-0.23	3.37	Fe(OH)3
Ferroselite	14.88	-3.83	-18.71	FeSe2
FeSe	6.48	-4.53	-11.00	FeSe
Gibbsite	0.67	9.19	8.52	Al(OH)3
Goethite	-0.86	-0.22	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4:7H2O
Gypsum	0.10	-4.51	-4.61	CaSO4:2H2O
H-Jarosite	-13.07	-24.62	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-6.47	-11.40	-4.92	H2Se
Halite	-3.04	-1.44	1.59	NaCl
Hausmannite	-31.51	30.53	62.03	Mn3O4
Hematite	0.67	-0.44	-1.11	Fe2O3
Hercynite	1.62	25.26	23.64	FeAl2O4
Hg(g)	-7.44	-15.36	-7.93	Hg
Hg(OH)2	-21.45	-24.94	-3.50	Hg(OH)2
Hg2(g)	-15.63	-30.73	-15.09	Hg2
Hg2(OH)2	-23.90	-18.64	5.26	Hg2(OH)2
Hg2HPO4	-22.05	-46.82	-24.77	Hg2HPO4
Hg2SeO3	-33.94	-38.60	-4.66	Hg2SeO3
Hg2SO4	-24.46	-30.60	-6.14	Hg2SO4
HgCl(g)	-34.94	-15.06	19.88	HgCl
HgCl2	-14.91	-36.43	-21.52	HgCl2
Hgmetal(l)	-1.71	-15.36	-13.65	Hg

HgSe	19.36	-36.33	-55.69	HgSe
HgSeO3	-32.48	-44.91	-12.43	HgSeO3
HgSO4	-27.45	-36.91	-9.45	HgSO4
Hinsdalite	-8.96	-11.46	-2.50	PbAl3PO4SO4 (OH) 6
Hydroxylapatite	-2.88	-47.21	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-16.18	-78.97	-62.79	Pb5 (PO4) 3OH
K-Alum	-6.93	-12.18	-5.24	KAl (SO4) 2:12H2O
K-Jarosite	-7.50	-21.99	-14.49	KFe3 (SO4) 2 (OH) 6
K2SeO4	-38.68	-39.41	-0.73	K2SeO4
Langite	-28.56	-10.68	17.88	Cu4 (OH) 6SO4:H2O
Larnakite	-9.35	-9.73	-0.38	PbO:PbSO4
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.59	-0.22	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.73	1.12	12.85	PbO
Maghemite	-6.83	-0.44	6.39	Fe2O3
Magnesioferrite	-9.88	7.64	17.52	Fe2MgO4
Magnetite	2.53	6.43	3.90	Fe3O4
Manganite	-13.15	12.19	25.34	MnOOH
Massicot	-11.93	1.12	13.05	PbO
Melanothallite	-17.57	-11.16	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeSO4:7H2O
Mg (OH) 2 (active)	-10.71	8.08	18.79	Mg (OH) 2
Mg3 (PO4) 2	-8.84	-32.12	-23.28	Mg3 (PO4) 2
MgHPO4:3H2O	-1.94	-20.12	-18.18	MgHPO4:3H2O
MgSeO3:6H2O	-14.96	-11.91	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-35.41	-36.61	-1.20	MgSeO4:6H2O
Minium	-59.08	15.45	74.53	Pb3O4
Mirabilite	-2.11	-3.42	-1.30	Na2SO4:10H2O
Mn2 (SO4) 3	-57.42	-62.74	-5.32	Mn2 (SO4) 3
Mn3 (PO4) 2	-14.09	-37.94	-23.85	Mn3 (PO4) 2
MnCl2:4H2O	-8.11	-5.37	2.74	MnCl2:4H2O
MnHPO4	3.36	-22.04	-25.40	MnHPO4
MnSe	-8.98	-5.25	3.73	MnSe
MnSeO3	-14.95	-13.82	1.13	MnSeO3
MnSeO3:2H2O	-14.80	-13.83	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-36.49	-38.54	-2.05	MnSeO4:5H2O
MnSO4	-8.56	-5.83	2.74	MnSO4
Monteponite	-13.62	1.73	15.35	CdO
Montroydite	-21.39	-24.94	-3.55	HgO
Morenosite	-4.60	-6.78	-2.17	NiSO4:7H2O
Na-Jarosite	-9.47	-20.31	-10.84	NaFe3 (SO4) 2 (OH) 6
Na2SeO3:5H2O	-21.69	-11.39	10.30	Na2SeO3:5H2O
Na2SeO4	-37.34	-36.06	1.28	Na2SeO4
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni (OH) 2	-7.80	5.22	13.02	Ni (OH) 2
Ni3 (PO4) 2	-9.39	-40.69	-31.30	Ni3 (PO4) 2
Ni4 (OH) 6SO4	-23.08	8.92	32.00	Ni4 (OH) 6SO4
NiSe	11.53	-6.17	-17.70	NiSe
NiSeO3:2H2O	-17.64	-14.75	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-37.94	-39.46	-1.52	NiSeO4:6H2O
Nsutite	-24.87	-7.37	17.50	MnO2
O2 (g)	-60.26	24.19	84.45	O2
Pb (OH) 2	-7.18	1.11	8.29	Pb (OH) 2
Pb2 (OH) 3Cl	-12.31	-3.52	8.79	Pb2 (OH) 3Cl
Pb2O (OH) 2	-23.96	2.23	26.19	Pb2O (OH) 2
Pb2O3	-46.71	14.33	61.04	Pb2O3
Pb3 (PO4) 2	-9.49	-53.02	-43.53	Pb3 (PO4) 2
Pb3O2SO4	-19.49	-8.61	10.87	Pb3O2SO4
Pb4 (OH) 6SO4	-28.61	-7.51	21.10	Pb4 (OH) 6SO4
Pb4O3SO4	-29.70	-7.50	22.20	Pb4O3SO4
PbHPO4	-3.26	-27.07	-23.81	PbHPO4
Pbmetal	-15.22	-10.98	4.24	Pb
PbO:0.3H2O	-11.86	1.12	12.98	PbO:0.33H2O
PbSeO4	-36.67	-43.54	-6.88	PbSeO4
Periclase	-13.86	8.08	21.94	MgO
Plattnerite	-37.09	13.21	50.31	PbO2
Plumbgummite	5.12	-27.67	-32.79	PbAl3 (PO4) 2 (OH) 5:H2O

Portlandite	-15.65	7.46	23.11	Ca (OH) 2
Pyrochroite	-9.29	6.14	15.43	Mn (OH) 2
Pyrolusite	-23.79	18.24	42.03	MnO2
Pyromorphite	-0.28	-84.71	-84.43	Pb5 (PO4) 3Cl
Retgersite	-4.72	-6.77	-2.05	NiSO4:6H2O
Semetal (am)	7.84	0.70	-7.14	Se
Semetal (hex)	8.45	0.70	-7.75	Se
SeO2	-20.09	-19.97	0.12	SeO2
SeO3	-66.05	-44.66	21.39	SeO3
Spinel	-11.29	26.48	37.77	MgAl2O4
Strengite	-2.04	-28.42	-26.38	FePO4:2H2O
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.71	-3.37	0.34	Na2SO4
Tsumebite	-15.85	-25.64	-9.79	Pb2CuPO4 (OH) 3:3H2O
Vivianite	0.19	-35.81	-36.00	Fe3 (PO4) 2:8H2O
Zincite	-7.21	4.34	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnSO4
Zn (NO3) 2:6H2O	-139.22	-135.96	3.26	Zn (NO3) 2:6H2O
Zn (OH) 2	-7.87	4.33	12.20	Zn (OH) 2
Zn (OH) 2 (am)	-8.33	4.33	12.67	Zn (OH) 2
Zn (OH) 2 (beta)	-7.62	4.33	11.95	Zn (OH) 2
Zn (OH) 2 (epsilon)	-7.39	4.33	11.73	Zn (OH) 2
Zn (OH) 2 (gamma)	-7.40	4.33	11.73	Zn (OH) 2
Zn2 (OH) 2SO4	-10.80	-3.30	7.50	Zn2 (OH) 2SO4
Zn2 (OH) 3Cl	-12.26	2.93	15.19	Zn2 (OH) 3Cl
Zn3 (PO4) 2:4H2O	-7.95	-43.37	-35.42	Zn3 (PO4) 2:4H2O
Zn3O (SO4) 2	-30.45	-10.92	19.53	Zn3O (SO4) 2
Zn4 (OH) 6SO4	-23.03	5.37	28.40	Zn4 (OH) 6SO4
Zn5 (OH) 8Cl2	-28.31	10.19	38.50	Zn5 (OH) 8Cl2
ZnCl2	-14.37	-7.15	7.22	ZnCl2
Znmetal	-33.91	-7.76	26.15	Zn
ZnO (active)	-7.06	4.34	11.40	ZnO
ZnSe	7.41	-7.05	-14.46	ZnSe
ZnSeO4:6H2O	-38.83	-40.35	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.10	-7.64	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Initial solution 2.

-----Solution composition-----

Elements	Molality	Moles
Al	5.487e-05	5.487e-05
Alkalinity	9.999e-04	9.999e-04
As	1.736e-08	1.736e-08
B	4.626e-06	4.626e-06
Ba	3.481e-07	3.481e-07
Ca	3.244e-04	3.244e-04
Cd	6.229e-09	6.229e-09
Cl	2.229e-03	2.229e-03
Co	1.018e-08	1.018e-08
Cr	4.040e-08	4.040e-08
Cu	9.444e-08	9.444e-08
Fe	2.454e-05	2.454e-05
Hg	3.989e-10	3.989e-10
K	1.023e-04	1.023e-04
Mg	3.704e-04	3.704e-04
Mn	1.092e-06	1.092e-06
Mo	3.128e-09	3.128e-09
N	7.498e-05	7.498e-05
Na	2.132e-03	2.132e-03
Ni	4.772e-08	4.772e-08
P	3.552e-06	3.552e-06
Pb	5.793e-09	5.793e-09
S (6)	1.770e-04	1.770e-04

Se	2.534e-09	2.534e-09
Zn	2.509e-07	2.509e-07

-----Description of solution-----

pH	=	7.500
pe	=	4.000
Activity of water	=	1.000
Ionic strength (mol/kgw)	=	4.384e-03
Mass of water (kg)	=	1.000e+00
Total carbon (mol/kg)	=	8.307e-04
Total CO2 (mol/kg)	=	8.307e-04
Temperature (°C)	=	20.00
Electrical balance (eq)	=	3.069e-04
Percent error, 100*(Cat- An)/(Cat+ An)	=	4.34
Iterations	=	11
Total H	=	1.110151e+02
Total O	=	5.551033e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
OH-	2.330e-07	2.169e-07	-6.633	-6.664	-0.031	(0)
H+	3.394e-08	3.162e-08	-7.469	-7.500	-0.031	0.00
H2O	5.551e+01	9.999e-01	1.744	-0.000	0.000	18.05
Al	5.487e-05					
Al (OH) 4-	5.036e-05	4.694e-05	-4.298	-4.328	-0.031	(0)
Al (OH) 3	3.857e-06	3.857e-06	-5.414	-5.414	0.000	(0)
Al (OH) 2+	6.505e-07	6.071e-07	-6.187	-6.217	-0.030	(0)
AlOH+2	2.277e-09	1.728e-09	-8.643	-8.763	-0.120	(0)
Al+3	1.426e-11	7.540e-12	-10.846	-11.123	-0.277	(0)
AlSO4+	6.366e-12	5.934e-12	-11.196	-11.227	-0.031	(0)
Al (SO4) 2-	9.367e-15	8.732e-15	-14.028	-14.059	-0.031	(0)
AlMo6O21-3	0.000e+00	0.000e+00	-52.596	-52.898	-0.301	(0)
As (3)	3.031e-18					
H3AsO3	2.988e-18	2.988e-18	-17.525	-17.525	0.000	(0)
H2AsO3-	4.335e-20	4.013e-20	-19.363	-19.397	-0.033	(0)
HAsO3-2	1.264e-24	9.286e-25	-23.898	-24.032	-0.134	(0)
H4AsO3+	5.056e-26	4.681e-26	-25.296	-25.330	-0.033	(0)
AsO3-3	1.904e-30	9.510e-31	-29.720	-30.022	-0.301	(0)
As (5)	1.736e-08					
HAsO4-2	1.407e-08	1.033e-08	-7.852	-7.986	-0.134	(0)
H2AsO4-	3.286e-09	3.043e-09	-8.483	-8.517	-0.033	(0)
AsO4-3	1.840e-12	9.193e-13	-11.735	-12.037	-0.301	(0)
H3AsO4	1.591e-14	1.592e-14	-13.798	-13.798	0.000	(0)
B	4.626e-06					
H3BO3	4.542e-06	4.547e-06	-5.343	-5.342	0.000	(0)
H2BO3-	8.215e-08	7.636e-08	-7.085	-7.117	-0.032	(0)
CaH2BO3+	1.090e-09	1.013e-09	-8.963	-8.994	-0.032	(0)
MgH2BO3+	7.768e-10	7.220e-10	-9.110	-9.141	-0.032	(0)
NaH2BO3	2.626e-10	2.626e-10	-9.581	-9.581	0.000	(0)
BaH2BO3+	6.446e-13	5.992e-13	-12.191	-12.222	-0.032	(0)
H5 (BO3) 2-	3.281e-13	3.050e-13	-12.484	-12.516	-0.032	(0)
H8 (BO3) 3-	1.291e-16	1.200e-16	-15.889	-15.921	-0.032	(0)
Ba	3.481e-07					
Ba+2	3.464e-07	2.610e-07	-6.460	-6.583	-0.123	(0)
BaHCO3+	1.611e-09	1.505e-09	-8.793	-8.822	-0.030	(0)
BaCO3	1.153e-10	1.153e-10	-9.938	-9.938	0.000	(0)
BaH2BO3+	6.446e-13	5.992e-13	-12.191	-12.222	-0.032	(0)
BaNH3+2	2.781e-13	2.043e-13	-12.556	-12.690	-0.134	(0)
BaOH+	2.559e-13	2.387e-13	-12.592	-12.622	-0.030	(0)
BaNO3+	4.082e-25	3.779e-25	-24.389	-24.423	-0.033	(0)
C (4)	8.307e-04					
HCO3-	7.685e-04	7.172e-04	-3.114	-3.144	-0.030	(0)
H2CO3	5.433e-05	5.433e-05	-4.265	-4.265	0.000	(0)
CaHCO3+	2.954e-06	2.759e-06	-5.530	-5.559	-0.030	(0)

MgHCO3+	2.090e-06	1.947e-06	-5.680	-5.711	-0.031	(0)
CO3-2	1.276e-06	9.617e-07	-5.894	-6.017	-0.123	(0)
NaHCO3	8.795e-07	8.795e-07	-6.056	-6.056	0.000	(0)
CaCO3	3.236e-07	3.236e-07	-6.490	-6.490	0.000	(0)
MgCO3	2.008e-07	2.008e-07	-6.697	-6.697	0.000	(0)
CuCO3	6.481e-08	6.481e-08	-7.188	-7.188	0.000	(0)
NaCO3-	4.379e-08	4.087e-08	-7.359	-7.389	-0.030	(0)
MnHCO3+	1.164e-08	1.086e-08	-7.934	-7.964	-0.030	(0)
ZnCO3	9.487e-09	9.487e-09	-8.023	-8.023	0.000	(0)
FeHCO3+	9.148e-09	8.545e-09	-8.039	-8.068	-0.030	(0)
ZnHCO3+	3.799e-09	3.517e-09	-8.420	-8.454	-0.033	(0)
PbCO3	2.909e-09	2.909e-09	-8.536	-8.536	0.000	(0)
NiHCO3+	2.779e-09	2.573e-09	-8.556	-8.590	-0.033	(0)
BaHCO3+	1.611e-09	1.505e-09	-8.793	-8.822	-0.030	(0)
NiCO3	1.154e-09	1.154e-09	-8.938	-8.938	0.000	(0)
PbHCO3+	5.238e-10	4.849e-10	-9.281	-9.314	-0.033	(0)
CuHCO3+	5.060e-10	4.684e-10	-9.296	-9.329	-0.033	(0)
CoHCO3+	3.770e-10	3.490e-10	-9.424	-9.457	-0.033	(0)
Cu (CO3) 2-2	2.284e-10	1.678e-10	-9.641	-9.775	-0.134	(0)
BaCO3	1.153e-10	1.153e-10	-9.938	-9.938	0.000	(0)
CoCO3	1.125e-10	1.125e-10	-9.949	-9.949	0.000	(0)
CdCO3	8.551e-11	8.551e-11	-10.068	-10.068	0.000	(0)
Pb (CO3) 2-2	1.098e-11	8.067e-12	-10.959	-11.093	-0.134	(0)
CdHCO3+	6.223e-12	5.761e-12	-11.206	-11.239	-0.033	(0)
Cd (CO3) 2-2	8.298e-14	6.096e-14	-13.081	-13.215	-0.134	(0)
HgCO3	2.918e-18	2.918e-18	-17.535	-17.535	0.000	(0)
Hg (CO3) 2-2	1.208e-20	8.873e-21	-19.918	-20.052	-0.134	(0)
HgHCO3+	1.856e-21	1.718e-21	-20.731	-20.765	-0.033	(0)
Ca	3.244e-04					
Ca+2	3.146e-04	2.370e-04	-3.502	-3.625	-0.123	(0)
CaSO4	6.357e-06	6.357e-06	-5.197	-5.197	0.000	(0)
CaHCO3+	2.954e-06	2.759e-06	-5.530	-5.559	-0.030	(0)
CaCO3	3.236e-07	3.236e-07	-6.490	-6.490	0.000	(0)
CaHPO4	1.634e-07	1.634e-07	-6.787	-6.787	0.000	(0)
CaPO4-	1.319e-08	1.231e-08	-7.880	-7.910	-0.030	(0)
CaH2PO4+	4.366e-09	4.075e-09	-8.360	-8.390	-0.030	(0)
CaH2BO3+	1.090e-09	1.013e-09	-8.963	-8.994	-0.032	(0)
CaOH+	1.037e-09	9.688e-10	-8.984	-9.014	-0.030	(0)
CaNH3+2	5.039e-10	3.702e-10	-9.298	-9.432	-0.134	(0)
Ca (NH3) 2+2	2.488e-16	1.828e-16	-15.604	-15.738	-0.134	(0)
CaNO3+	2.220e-22	2.055e-22	-21.654	-21.687	-0.033	(0)
Cd	6.229e-09					
Cd+2	5.178e-09	3.901e-09	-8.286	-8.409	-0.123	(0)
CdCl+	8.299e-10	7.683e-10	-9.081	-9.114	-0.033	(0)
CdSO4	1.059e-10	1.059e-10	-9.975	-9.975	0.000	(0)
CdCO3	8.551e-11	8.551e-11	-10.068	-10.068	0.000	(0)
CdOHC1	8.913e-12	8.913e-12	-11.050	-11.050	0.000	(0)
CdOH+	7.309e-12	6.767e-12	-11.136	-11.170	-0.033	(0)
CdCl2	6.560e-12	6.560e-12	-11.183	-11.183	0.000	(0)
CdHCO3+	6.223e-12	5.761e-12	-11.206	-11.239	-0.033	(0)
Cd (SO4) 2-2	2.538e-13	1.864e-13	-12.596	-12.730	-0.134	(0)
Cd (CO3) 2-2	8.298e-14	6.096e-14	-13.081	-13.215	-0.134	(0)
Cd (OH) 2	1.982e-14	1.982e-14	-13.703	-13.703	0.000	(0)
CdCl3-	8.847e-15	8.191e-15	-14.053	-14.087	-0.033	(0)
Cd (OH) 3-	4.164e-19	3.855e-19	-18.380	-18.414	-0.033	(0)
Cd2OH+3	2.817e-19	1.408e-19	-18.550	-18.852	-0.301	(0)
CdSeO4	5.758e-22	5.758e-22	-21.240	-21.240	0.000	(0)
Cd (SeO3) 2-2	2.869e-22	2.108e-22	-21.542	-21.676	-0.134	(0)
Cd (OH) 4-2	2.735e-26	2.009e-26	-25.563	-25.697	-0.134	(0)
CdNO3+	4.067e-27	3.766e-27	-26.391	-26.424	-0.033	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-45.365	-45.365	0.000	(0)
Cl	2.229e-03					
Cl-	2.229e-03	2.077e-03	-2.652	-2.683	-0.031	(0)
MnCl+	2.186e-09	2.040e-09	-8.660	-8.690	-0.030	(0)
CuCl	1.397e-09	1.397e-09	-8.855	-8.855	0.000	(0)
ZnCl+	9.250e-10	8.616e-10	-9.034	-9.065	-0.031	(0)
CdCl+	8.299e-10	7.683e-10	-9.081	-9.114	-0.033	(0)
CuCl2-	6.588e-10	6.136e-10	-9.181	-9.212	-0.031	(0)

ZnOHC1	3.727e-10	3.727e-10	-9.429	-9.429	0.000	(0)
NiCl+	1.821e-10	1.686e-10	-9.740	-9.773	-0.033	(0)
PbCl+	7.542e-11	6.982e-11	-10.123	-10.156	-0.033	(0)
CoCl+	5.294e-11	4.901e-11	-10.276	-10.310	-0.033	(0)
CuCl+	3.819e-11	3.558e-11	-10.418	-10.449	-0.031	(0)
CdOHC1	8.913e-12	8.913e-12	-11.050	-11.050	0.000	(0)
CdCl2	6.560e-12	6.560e-12	-11.183	-11.183	0.000	(0)
MnCl2	5.982e-12	5.982e-12	-11.223	-11.223	0.000	(0)
ZnCl2	2.282e-12	2.282e-12	-11.642	-11.642	0.000	(0)
PbCl2	6.331e-13	6.331e-13	-12.199	-12.199	0.000	(0)
CuCl3-2	3.528e-13	2.671e-13	-12.452	-12.573	-0.121	(0)
CuCl2	2.001e-14	2.001e-14	-13.699	-13.699	0.000	(0)
CdCl3-	8.847e-15	8.191e-15	-14.053	-14.087	-0.033	(0)
HgClOH	3.971e-15	3.971e-15	-14.401	-14.401	0.000	(0)
ZnCl3-	3.958e-15	3.686e-15	-14.403	-14.433	-0.031	(0)
MnCl3-	3.668e-15	3.421e-15	-14.436	-14.466	-0.030	(0)
HgCl2	2.065e-15	2.065e-15	-14.685	-14.685	0.000	(0)
NiCl2	1.787e-15	1.787e-15	-14.748	-14.748	0.000	(0)
CrCl+2	8.838e-16	6.492e-16	-15.054	-15.188	-0.134	(0)
PbCl3-	5.973e-16	5.530e-16	-15.224	-15.257	-0.033	(0)
FeCl+2	5.123e-17	3.879e-17	-16.290	-16.411	-0.121	(0)
HgCl3-	4.682e-17	4.335e-17	-16.330	-16.363	-0.033	(0)
ZnCl4-2	4.856e-18	3.677e-18	-17.314	-17.435	-0.121	(0)
CrOHC12	3.999e-18	3.999e-18	-17.398	-17.398	0.000	(0)
PbCl4-2	6.635e-19	4.874e-19	-18.178	-18.312	-0.134	(0)
HgCl4-2	5.108e-19	3.752e-19	-18.292	-18.426	-0.134	(0)
FeCl2+	4.518e-19	4.215e-19	-18.345	-18.375	-0.030	(0)
CuCl3-	3.804e-19	3.544e-19	-18.420	-18.451	-0.031	(0)
HgCl+	1.747e-19	1.617e-19	-18.758	-18.791	-0.033	(0)
CrCl2+	8.871e-20	8.213e-20	-19.052	-19.086	-0.033	(0)
FeCl3	8.752e-23	8.752e-23	-22.058	-22.058	0.000	(0)
CuCl4-2	5.775e-24	4.372e-24	-23.238	-23.359	-0.121	(0)
CrO3Cl-	3.021e-29	2.797e-29	-28.520	-28.553	-0.033	(0)
Cr (NH3) 6Cl+2	1.542e-37	1.133e-37	-36.812	-36.946	-0.134	(0)
CoCl+2	1.419e-37	1.042e-37	-36.848	-36.982	-0.134	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-40.718	-40.852	-0.134	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-53.313	-53.447	-0.134	(0)
Co (2)	1.018e-08					
Co+2	9.417e-09	6.917e-09	-8.026	-8.160	-0.134	(0)
CoHCO3+	3.770e-10	3.490e-10	-9.424	-9.457	-0.033	(0)
CoSO4	1.626e-10	1.626e-10	-9.789	-9.789	0.000	(0)
CoCO3	1.125e-10	1.125e-10	-9.949	-9.949	0.000	(0)
CoCl+	5.294e-11	4.901e-11	-10.276	-10.310	-0.033	(0)
CoOH+	4.747e-11	4.394e-11	-10.324	-10.357	-0.033	(0)
CoHPO4	1.115e-11	1.115e-11	-10.953	-10.953	0.000	(0)
Co (NH3) +2	2.196e-12	1.613e-12	-11.658	-11.792	-0.134	(0)
Co (OH) 2	1.111e-12	1.111e-12	-11.954	-11.954	0.000	(0)
Co (NH3) 2+2	7.431e-17	5.459e-17	-16.129	-16.263	-0.134	(0)
Co (OH) 3-	7.626e-18	7.060e-18	-17.118	-17.151	-0.033	(0)
CoOOH-	3.189e-19	2.952e-19	-18.496	-18.530	-0.033	(0)
Co2OH+3	3.049e-20	1.524e-20	-19.516	-19.817	-0.301	(0)
CoNO2+	1.822e-20	1.686e-20	-19.740	-19.773	-0.033	(0)
CoSeO4	2.530e-21	2.530e-21	-20.597	-20.597	0.000	(0)
Co (NH3) 3+2	1.160e-21	8.524e-22	-20.935	-21.069	-0.134	(0)
Co (OH) 4-2	4.850e-25	3.563e-25	-24.314	-24.448	-0.134	(0)
Co (NH3) 4+2	7.554e-27	5.549e-27	-26.122	-26.256	-0.134	(0)
CoNO3+	3.128e-27	2.896e-27	-26.505	-26.538	-0.033	(0)
Co (NH3) 5+2	1.555e-32	1.142e-32	-31.808	-31.942	-0.134	(0)
Co4 (OH) 4+4	2.555e-33	7.440e-34	-32.593	-33.128	-0.536	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-44.808	-44.808	0.000	(0)
Co (3)	6.065e-31					
CoOH+2	6.065e-31	4.456e-31	-30.217	-30.351	-0.134	(0)
Co+3	5.207e-37	2.754e-37	-36.283	-36.560	-0.277	(0)
CoCl+2	1.419e-37	1.042e-37	-36.848	-36.982	-0.134	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-40.718	-40.852	-0.134	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-49.776	-49.810	-0.033	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.616	-52.750	-0.134	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-53.313	-53.447	-0.134	(0)

Cr (2)	3.686e-24					
Cr+2	3.686e-24	2.708e-24	-23.433	-23.567	-0.134	(0)
Cr (3)	4.040e-08					
Cr (OH) 2+	3.452e-08	3.196e-08	-7.462	-7.495	-0.033	(0)
Cr (OH) 3	3.822e-09	3.822e-09	-8.418	-8.418	0.000	(0)
Cr (OH)+2	1.919e-09	1.410e-09	-8.717	-8.851	-0.134	(0)
CrO2-	6.201e-11	5.740e-11	-10.208	-10.241	-0.033	(0)
Cr (OH) 4-	5.233e-11	4.845e-11	-10.281	-10.315	-0.033	(0)
CrOHSO4	2.406e-11	2.406e-11	-10.619	-10.619	0.000	(0)
Cr+3	5.783e-13	2.889e-13	-12.238	-12.539	-0.301	(0)
CrSO4+	7.237e-14	6.700e-14	-13.140	-13.174	-0.033	(0)
CrCl+2	8.838e-16	6.492e-16	-15.054	-15.188	-0.134	(0)
CrH2PO4+2	6.914e-17	5.079e-17	-16.160	-16.294	-0.134	(0)
CrOHC12	3.999e-18	3.999e-18	-17.398	-17.398	0.000	(0)
Cr2 (OH) 2SO4+2	2.442e-18	1.794e-18	-17.612	-17.746	-0.134	(0)
CrCl2+	8.871e-20	8.213e-20	-19.052	-19.086	-0.033	(0)
Cr2 (OH) 2 (SO4) 2	1.310e-20	1.310e-20	-19.883	-19.883	0.000	(0)
Cr (NH3) 5OH+2	3.552e-29	2.609e-29	-28.450	-28.583	-0.134	(0)
CrNO3+2	2.920e-33	2.145e-33	-32.535	-32.669	-0.134	(0)
Cr (NH3) 6+3	8.634e-36	4.314e-36	-35.064	-35.365	-0.301	(0)
Cr (NH3) 6Cl+2	1.542e-37	1.133e-37	-36.812	-36.946	-0.134	(0)
Cr (6)	9.578e-19					
CrO4-2	8.783e-19	6.617e-19	-18.056	-18.179	-0.123	(0)
HCrO4-	7.214e-20	6.679e-20	-19.142	-19.175	-0.033	(0)
NaCrO4-	7.047e-21	6.524e-21	-20.152	-20.185	-0.033	(0)
KCrO4-	2.530e-22	2.342e-22	-21.597	-21.630	-0.033	(0)
CrO3HPO4-2	2.689e-25	1.976e-25	-24.570	-24.704	-0.134	(0)
H2CrO4	1.327e-27	1.327e-27	-26.877	-26.877	0.000	(0)
CrO3SO4-2	1.091e-28	8.018e-29	-27.962	-28.096	-0.134	(0)
CrO3Cl-	3.021e-29	2.797e-29	-28.520	-28.553	-0.033	(0)
CrO3H2PO4-	3.251e-30	3.009e-30	-29.488	-29.522	-0.033	(0)
Cr2O7-2	2.400e-37	1.763e-37	-36.620	-36.754	-0.134	(0)
Cu (1)	2.634e-09					
CuCl	1.397e-09	1.397e-09	-8.855	-8.855	0.000	(0)
CuCl2-	6.588e-10	6.136e-10	-9.181	-9.212	-0.031	(0)
Cu+	5.774e-10	5.346e-10	-9.239	-9.272	-0.033	(0)
CuCl3-2	3.528e-13	2.671e-13	-12.452	-12.573	-0.121	(0)
Cu (2)	9.181e-08					
CuCO3	6.481e-08	6.481e-08	-7.188	-7.188	0.000	(0)
Cu+2	1.519e-08	1.145e-08	-7.818	-7.941	-0.123	(0)
CuOH+	9.669e-09	9.007e-09	-8.015	-8.045	-0.031	(0)
Cu (OH) 2	7.320e-10	7.320e-10	-9.135	-9.135	0.000	(0)
CuHCO3+	5.060e-10	4.684e-10	-9.296	-9.329	-0.033	(0)
CuNH3+2	3.245e-10	2.384e-10	-9.489	-9.623	-0.134	(0)
CuSO4	3.036e-10	3.036e-10	-9.518	-9.518	0.000	(0)
Cu (CO3) 2-2	2.284e-10	1.678e-10	-9.641	-9.775	-0.134	(0)
CuCl+	3.819e-11	3.558e-11	-10.418	-10.449	-0.031	(0)
Cu2 (OH) 2+2	2.680e-12	1.969e-12	-11.572	-11.706	-0.134	(0)
Cu (OH) 3-	5.164e-13	4.781e-13	-12.287	-12.321	-0.033	(0)
CuCl2	2.001e-14	2.001e-14	-13.699	-13.699	0.000	(0)
Cu (OH) 4-2	1.631e-18	1.198e-18	-17.788	-17.922	-0.134	(0)
CuNO2+	4.478e-19	4.146e-19	-18.349	-18.382	-0.033	(0)
CuCl3-	3.804e-19	3.544e-19	-18.420	-18.451	-0.031	(0)
CuCl4-2	5.775e-24	4.372e-24	-23.238	-23.359	-0.121	(0)
CuNO3+	1.062e-26	9.835e-27	-25.974	-26.007	-0.033	(0)
Cu (NO2) 2	1.468e-30	1.468e-30	-29.833	-29.833	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-45.498	-45.498	0.000	(0)
Fe (2)	1.480e-06					
Fe+2	1.424e-06	1.046e-06	-5.846	-5.980	-0.134	(0)
FeSO4	2.988e-08	2.988e-08	-7.525	-7.525	0.000	(0)
FeOH+	9.684e-09	9.034e-09	-8.014	-8.044	-0.030	(0)
FeHCO3+	9.148e-09	8.545e-09	-8.039	-8.068	-0.030	(0)
FeHPO4	6.152e-09	6.152e-09	-8.211	-8.211	0.000	(0)
FeH2PO4+	4.140e-10	3.864e-10	-9.383	-9.413	-0.030	(0)
Fe (OH) 2	1.473e-12	1.473e-12	-11.832	-11.832	0.000	(0)
Fe (OH) 3-	1.517e-13	1.415e-13	-12.819	-12.849	-0.030	(0)
Fe (3)	2.306e-05					
Fe (OH) 2+	1.977e-05	1.845e-05	-4.704	-4.734	-0.030	(0)

Fe (OH) 3	3.089e-06	3.089e-06	-5.510	-5.510	0.000	(0)
Fe (OH) 4-	2.004e-07	1.870e-07	-6.698	-6.728	-0.030	(0)
FeOH+2	1.476e-10	1.117e-10	-9.831	-9.952	-0.121	(0)
FeHPO4+	1.169e-11	1.091e-11	-10.932	-10.962	-0.030	(0)
Fe+3	1.370e-15	7.246e-16	-14.863	-15.140	-0.277	(0)
FeSO4+	9.021e-16	8.414e-16	-15.045	-15.075	-0.030	(0)
FeCl+2	5.123e-17	3.879e-17	-16.290	-16.411	-0.121	(0)
FeH2PO4+2	1.336e-17	1.014e-17	-16.874	-16.994	-0.120	(0)
Fe (SO4) 2-	2.486e-18	2.301e-18	-17.605	-17.638	-0.033	(0)
Fe2 (OH) 2+4	1.697e-18	4.942e-19	-17.770	-18.306	-0.536	(0)
FeCl2+	4.518e-19	4.215e-19	-18.345	-18.375	-0.030	(0)
FeHSeO3+2	4.463e-21	3.279e-21	-20.350	-20.484	-0.134	(0)
Fe3 (OH) 4+5	8.596e-22	1.251e-22	-21.066	-21.903	-0.837	(0)
FeCl3	8.752e-23	8.752e-23	-22.058	-22.058	0.000	(0)
FeNO3+2	3.361e-33	2.469e-33	-32.474	-32.607	-0.134	(0)
H (0)	1.488e-26					
H2	7.440e-27	7.447e-27	-26.128	-26.128	0.000	(0)
Hg (0)	3.989e-10					
Hg	3.989e-10	3.989e-10	-9.399	-9.399	0.000	(0)
Hg (1)	1.698e-24					
Hg2+2	8.491e-25	6.238e-25	-24.071	-24.205	-0.134	(0)
Hg (2)	7.725e-15					
HgClOH	3.971e-15	3.971e-15	-14.401	-14.401	0.000	(0)
HgCl2	2.065e-15	2.065e-15	-14.685	-14.685	0.000	(0)
Hg (OH) 2	1.620e-15	1.622e-15	-14.791	-14.790	0.000	(0)
HgCl3-	4.682e-17	4.335e-17	-16.330	-16.363	-0.033	(0)
Hg (NH3) 2+2	1.829e-17	1.344e-17	-16.738	-16.872	-0.134	(0)
HgCO3	2.918e-18	2.918e-18	-17.535	-17.535	0.000	(0)
HgCl4-2	5.108e-19	3.752e-19	-18.292	-18.426	-0.134	(0)
HgCl+	1.747e-19	1.617e-19	-18.758	-18.791	-0.033	(0)
HgOH+	3.953e-20	3.660e-20	-19.403	-19.437	-0.033	(0)
Hg (CO3) 2-2	1.208e-20	8.873e-21	-19.918	-20.052	-0.134	(0)
HgNH3+2	2.701e-21	1.984e-21	-20.568	-20.702	-0.134	(0)
HgHCO3+	1.856e-21	1.718e-21	-20.731	-20.765	-0.033	(0)
Hg (NH3) 3+2	1.423e-22	1.045e-22	-21.847	-21.981	-0.134	(0)
Hg (OH) 3-	7.020e-23	6.499e-23	-22.154	-22.187	-0.033	(0)
Hg+2	4.536e-24	3.332e-24	-23.343	-23.477	-0.134	(0)
HgSO4	8.159e-26	8.159e-26	-25.088	-25.088	0.000	(0)
Hg (NH3) 4+2	2.222e-27	1.633e-27	-26.653	-26.787	-0.134	(0)
HgNO3+	0.000e+00	0.000e+00	-42.573	-42.607	-0.033	(0)
Hg (NO3) 2	0.000e+00	0.000e+00	-61.566	-61.566	0.000	(0)
K	1.023e-04					
K+	1.022e-04	9.526e-05	-3.990	-4.021	-0.031	(0)
KSO4-	8.635e-08	8.059e-08	-7.064	-7.094	-0.030	(0)
KHPO4-	1.143e-09	1.067e-09	-8.942	-8.972	-0.030	(0)
KCrO4-	2.530e-22	2.342e-22	-21.597	-21.630	-0.033	(0)
Mg	3.704e-04					
Mg+2	3.619e-04	2.727e-04	-3.441	-3.564	-0.123	(0)
MgSO4	5.861e-06	5.861e-06	-5.232	-5.232	0.000	(0)
MgHCO3+	2.090e-06	1.947e-06	-5.680	-5.711	-0.031	(0)
MgHPO4	2.594e-07	2.594e-07	-6.586	-6.586	0.000	(0)
MgCO3	2.008e-07	2.008e-07	-6.697	-6.697	0.000	(0)
MgOH+	2.319e-08	2.168e-08	-7.635	-7.664	-0.029	(0)
MgH2PO4+	1.072e-08	1.000e-08	-7.970	-8.000	-0.030	(0)
MgH2BO3+	7.768e-10	7.220e-10	-9.110	-9.141	-0.032	(0)
MgPO4-	2.373e-10	2.214e-10	-9.625	-9.655	-0.030	(0)
Mn (2)	1.092e-06					
Mn+2	1.062e-06	7.802e-07	-5.974	-6.108	-0.134	(0)
MnSO4	1.606e-08	1.606e-08	-7.794	-7.794	0.000	(0)
MnHCO3+	1.164e-08	1.086e-08	-7.934	-7.964	-0.030	(0)
MnCl+	2.186e-09	2.040e-09	-8.660	-8.690	-0.030	(0)
MnOH+	4.556e-10	4.250e-10	-9.341	-9.372	-0.030	(0)
MnCl2	5.982e-12	5.982e-12	-11.223	-11.223	0.000	(0)
MnCl3-	3.668e-15	3.421e-15	-14.436	-14.466	-0.030	(0)
Mn (OH) 3-	4.191e-19	3.909e-19	-18.378	-18.408	-0.030	(0)
MnSeO4	1.512e-19	1.512e-19	-18.821	-18.821	0.000	(0)
Mn (OH) 4-2	5.307e-25	4.018e-25	-24.275	-24.396	-0.121	(0)
MnNO3+	3.528e-25	3.267e-25	-24.452	-24.486	-0.033	(0)

MnSe	1.498e-37	1.498e-37	-36.824	-36.824	0.000	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-42.659	-42.659	0.000	(0)
Mn (3)	3.139e-28					
Mn+3	3.139e-28	1.660e-28	-27.503	-27.780	-0.277	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-50.534	-50.655	-0.121	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-56.329	-56.360	-0.031	(0)
Mo	3.128e-09					
MoO4-2	3.126e-09	2.355e-09	-8.505	-8.628	-0.123	(0)
HMoO4-	1.395e-12	1.292e-12	-11.855	-11.889	-0.033	(0)
H2MoO4	4.105e-16	4.105e-16	-15.387	-15.387	0.000	(0)
AlMo6O21-3	0.000e+00	0.000e+00	-52.596	-52.898	-0.301	(0)
Mo7O24-6	0.000e+00	0.000e+00	-65.519	-66.724	-1.205	(0)
HMo7O24-5	0.000e+00	0.000e+00	-67.030	-67.867	-0.837	(0)
H2Mo7O24-4	0.000e+00	0.000e+00	-70.058	-70.594	-0.536	(0)
H3Mo7O24-3	0.000e+00	0.000e+00	-74.541	-74.842	-0.301	(0)
N (-3)	7.498e-05					
NH4+	7.402e-05	6.880e-05	-4.131	-4.162	-0.032	(0)
NH3	8.673e-07	8.673e-07	-6.062	-6.062	0.000	(0)
NH4SO4-	9.714e-08	9.062e-08	-7.013	-7.043	-0.030	(0)
CaNH3+2	5.039e-10	3.702e-10	-9.298	-9.432	-0.134	(0)
CuNH3+2	3.245e-10	2.384e-10	-9.489	-9.623	-0.134	(0)
NiNH3+2	4.626e-11	3.398e-11	-10.335	-10.469	-0.134	(0)
Co (NH3) +2	2.196e-12	1.613e-12	-11.658	-11.792	-0.134	(0)
BaNH3+2	2.781e-13	2.043e-13	-12.556	-12.690	-0.134	(0)
Ni (NH3) 2+2	1.127e-14	8.280e-15	-13.948	-14.082	-0.134	(0)
Ca (NH3) 2+2	2.488e-16	1.828e-16	-15.604	-15.738	-0.134	(0)
Co (NH3) 2+2	7.431e-17	5.459e-17	-16.129	-16.263	-0.134	(0)
Hg (NH3) 2+2	1.829e-17	1.344e-17	-16.738	-16.872	-0.134	(0)
HgNH3+2	2.701e-21	1.984e-21	-20.568	-20.702	-0.134	(0)
Co (NH3) 3+2	1.160e-21	8.524e-22	-20.935	-21.069	-0.134	(0)
Hg (NH3) 3+2	1.423e-22	1.045e-22	-21.847	-21.981	-0.134	(0)
Co (NH3) 4+2	7.554e-27	5.549e-27	-26.122	-26.256	-0.134	(0)
Hg (NH3) 4+2	2.222e-27	1.633e-27	-26.653	-26.787	-0.134	(0)
Cr (NH3) 5OH+2	3.552e-29	2.609e-29	-28.450	-28.583	-0.134	(0)
Co (NH3) 5+2	1.555e-32	1.142e-32	-31.808	-31.942	-0.134	(0)
Cr (NH3) 6+3	8.634e-36	4.314e-36	-35.064	-35.365	-0.301	(0)
Cr (NH3) 6Cl+2	1.542e-37	1.133e-37	-36.812	-36.946	-0.134	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-40.718	-40.852	-0.134	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-49.776	-49.810	-0.033	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.616	-52.750	-0.134	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-53.313	-53.447	-0.134	(0)
N (3)	3.719e-13					
NO2-	3.719e-13	3.460e-13	-12.430	-12.461	-0.031	(0)
CuNO2+	4.478e-19	4.146e-19	-18.349	-18.382	-0.033	(0)
CoNO2+	1.822e-20	1.686e-20	-19.740	-19.773	-0.033	(0)
Cu (NO2) 2	1.468e-30	1.468e-30	-29.833	-29.833	0.000	(0)
N (5)	2.838e-19					
NO3-	2.836e-19	2.642e-19	-18.547	-18.578	-0.031	(0)
CaNO3+	2.220e-22	2.055e-22	-21.654	-21.687	-0.033	(0)
BaNO3+	4.082e-25	3.779e-25	-24.389	-24.423	-0.033	(0)
MnNO3+	3.528e-25	3.267e-25	-24.452	-24.486	-0.033	(0)
ZnNO3+	1.268e-25	1.174e-25	-24.897	-24.930	-0.033	(0)
NiNO3+	2.306e-26	2.135e-26	-25.637	-25.671	-0.033	(0)
CuNO3+	1.062e-26	9.835e-27	-25.974	-26.007	-0.033	(0)
PbNO3+	4.189e-27	3.878e-27	-26.378	-26.411	-0.033	(0)
CdNO3+	4.067e-27	3.766e-27	-26.391	-26.424	-0.033	(0)
CoNO3+	3.128e-27	2.896e-27	-26.505	-26.538	-0.033	(0)
FeNO3+2	3.361e-33	2.469e-33	-32.474	-32.607	-0.134	(0)
CrNO3+2	2.920e-33	2.145e-33	-32.535	-32.669	-0.134	(0)
HgNO3+	0.000e+00	0.000e+00	-42.573	-42.607	-0.033	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-42.659	-42.659	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-44.222	-44.222	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-44.734	-44.734	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-44.808	-44.808	0.000	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-45.365	-45.365	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-45.498	-45.498	0.000	(0)

Hg (NO3) 2	0.000e+00	0.000e+00	-61.566	-61.566	0.000	(0)
Na	2.132e-03					
Na+	2.130e-03	1.984e-03	-2.672	-2.702	-0.031	(0)
NaSO4-	1.394e-06	1.301e-06	-5.856	-5.886	-0.030	(0)
NaHCO3	8.795e-07	8.795e-07	-6.056	-6.056	0.000	(0)
NaCO3-	4.379e-08	4.087e-08	-7.359	-7.389	-0.030	(0)
NaHPO4-	3.689e-08	3.443e-08	-7.433	-7.463	-0.030	(0)
NaH2BO3	2.626e-10	2.626e-10	-9.581	-9.581	0.000	(0)
NaCrO4-	7.047e-21	6.524e-21	-20.152	-20.185	-0.033	(0)
Ni	4.772e-08					
Ni+2	4.270e-08	3.217e-08	-7.370	-7.493	-0.123	(0)
NiHCO3+	2.779e-09	2.573e-09	-8.556	-8.590	-0.033	(0)
NiCO3	1.154e-09	1.154e-09	-8.938	-8.938	0.000	(0)
NiSO4	7.582e-10	7.582e-10	-9.120	-9.120	0.000	(0)
NiCl+	1.821e-10	1.686e-10	-9.740	-9.773	-0.033	(0)
NiOH+	9.752e-11	9.028e-11	-10.011	-10.044	-0.033	(0)
NiNH3+2	4.626e-11	3.398e-11	-10.335	-10.469	-0.134	(0)
Ni (OH) 2	3.261e-12	3.261e-12	-11.487	-11.487	0.000	(0)
Ni (NH3) 2+2	1.127e-14	8.280e-15	-13.948	-14.082	-0.134	(0)
Ni (SO4) 2-2	4.372e-15	3.212e-15	-14.359	-14.493	-0.134	(0)
NiCl2	1.787e-15	1.787e-15	-14.748	-14.748	0.000	(0)
Ni (OH) 3-	1.122e-15	1.038e-15	-14.950	-14.984	-0.033	(0)
NiSeO4	1.083e-20	1.083e-20	-19.965	-19.965	0.000	(0)
NiNO3+	2.306e-26	2.135e-26	-25.637	-25.671	-0.033	(0)
O (0)	0.000e+00					
O2	0.000e+00	0.000e+00	-41.434	-41.433	0.000	(0)
P	3.552e-06					
HPO4-2	2.163e-06	1.637e-06	-5.665	-5.786	-0.121	(0)
H2PO4-	8.935e-07	8.339e-07	-6.049	-6.079	-0.030	(0)
MgHPO4	2.594e-07	2.594e-07	-6.586	-6.586	0.000	(0)
CaHPO4	1.634e-07	1.634e-07	-6.787	-6.787	0.000	(0)
NaHPO4-	3.689e-08	3.443e-08	-7.433	-7.463	-0.030	(0)
CaPO4-	1.319e-08	1.231e-08	-7.880	-7.910	-0.030	(0)
MgH2PO4+	1.072e-08	1.000e-08	-7.970	-8.000	-0.030	(0)
FeHPO4	6.152e-09	6.152e-09	-8.211	-8.211	0.000	(0)
CaH2PO4+	4.366e-09	4.075e-09	-8.360	-8.390	-0.030	(0)
KHPO4-	1.143e-09	1.067e-09	-8.942	-8.972	-0.030	(0)
FeH2PO4+	4.140e-10	3.864e-10	-9.383	-9.413	-0.030	(0)
MgPO4-	2.373e-10	2.214e-10	-9.625	-9.655	-0.030	(0)
PO4-3	3.724e-11	1.969e-11	-10.429	-10.706	-0.277	(0)
FeHPO4+	1.169e-11	1.091e-11	-10.932	-10.962	-0.030	(0)
CoHPO4	1.115e-11	1.115e-11	-10.953	-10.953	0.000	(0)
H3PO4	3.512e-12	3.512e-12	-11.454	-11.454	0.000	(0)
CrH2PO4+2	6.914e-17	5.079e-17	-16.160	-16.294	-0.134	(0)
FeH2PO4+2	1.336e-17	1.014e-17	-16.874	-16.994	-0.120	(0)
CrO3HPO4-2	2.689e-25	1.976e-25	-24.570	-24.704	-0.134	(0)
CrO3H2PO4-	3.251e-30	3.009e-30	-29.488	-29.522	-0.033	(0)
Pb	5.793e-09					
PbCO3	2.909e-09	2.909e-09	-8.536	-8.536	0.000	(0)
Pb+2	1.335e-09	1.006e-09	-8.874	-8.997	-0.123	(0)
PbOH+	8.692e-10	8.047e-10	-9.061	-9.094	-0.033	(0)
PbHCO3+	5.238e-10	4.849e-10	-9.281	-9.314	-0.033	(0)
PbCl+	7.542e-11	6.982e-11	-10.123	-10.156	-0.033	(0)
PbSO4	6.058e-11	6.058e-11	-10.218	-10.218	0.000	(0)
Pb (CO3) 2-2	1.098e-11	8.067e-12	-10.959	-11.093	-0.134	(0)
Pb (OH) 2	8.102e-12	8.102e-12	-11.091	-11.091	0.000	(0)
PbCl2	6.331e-13	6.331e-13	-12.199	-12.199	0.000	(0)
Pb (SO4) 2-2	6.108e-14	4.487e-14	-13.214	-13.348	-0.134	(0)
Pb (OH) 3-	2.786e-15	2.579e-15	-14.555	-14.588	-0.033	(0)
PbCl3-	5.973e-16	5.530e-16	-15.224	-15.257	-0.033	(0)
Pb2OH+3	2.568e-17	1.283e-17	-16.590	-16.892	-0.301	(0)
PbCl4-2	6.635e-19	4.874e-19	-18.178	-18.312	-0.134	(0)
Pb (OH) 4-2	2.738e-19	2.011e-19	-18.563	-18.697	-0.134	(0)
Pb3 (OH) 4+2	8.117e-22	5.963e-22	-21.091	-21.225	-0.134	(0)
Pb4 (OH) 4+4	1.971e-26	5.739e-27	-25.705	-26.241	-0.536	(0)
PbNO3+	4.189e-27	3.878e-27	-26.378	-26.411	-0.033	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-44.734	-44.734	0.000	(0)
S (6)	1.770e-04					

SO4-2	1.632e-04	1.229e-04	-3.787	-3.910	-0.123	(0)
CaSO4	6.357e-06	6.357e-06	-5.197	-5.197	0.000	(0)
MgSO4	5.861e-06	5.861e-06	-5.232	-5.232	0.000	(0)
NaSO4-	1.394e-06	1.301e-06	-5.856	-5.886	-0.030	(0)
NH4SO4-	9.714e-08	9.062e-08	-7.013	-7.043	-0.030	(0)
KSO4-	8.635e-08	8.059e-08	-7.064	-7.094	-0.030	(0)
FeSO4	2.988e-08	2.988e-08	-7.525	-7.525	0.000	(0)
MnSO4	1.606e-08	1.606e-08	-7.794	-7.794	0.000	(0)
ZnSO4	4.418e-09	4.418e-09	-8.355	-8.355	0.000	(0)
NiSO4	7.582e-10	7.582e-10	-9.120	-9.120	0.000	(0)
HSO4-	3.503e-10	3.265e-10	-9.456	-9.486	-0.031	(0)
CuSO4	3.036e-10	3.036e-10	-9.518	-9.518	0.000	(0)
CoSO4	1.626e-10	1.626e-10	-9.789	-9.789	0.000	(0)
CdSO4	1.059e-10	1.059e-10	-9.975	-9.975	0.000	(0)
PbSO4	6.058e-11	6.058e-11	-10.218	-10.218	0.000	(0)
CrOHSO4	2.406e-11	2.406e-11	-10.619	-10.619	0.000	(0)
Zn (SO4) 2-2	6.720e-12	4.936e-12	-11.173	-11.307	-0.134	(0)
AlSO4+	6.366e-12	5.934e-12	-11.196	-11.227	-0.031	(0)
Cd (SO4) 2-2	2.538e-13	1.864e-13	-12.596	-12.730	-0.134	(0)
CrSO4+	7.237e-14	6.700e-14	-13.140	-13.174	-0.033	(0)
Pb (SO4) 2-2	6.108e-14	4.487e-14	-13.214	-13.348	-0.134	(0)
Al (SO4) 2-	9.367e-15	8.732e-15	-14.028	-14.059	-0.031	(0)
Ni (SO4) 2-2	4.372e-15	3.212e-15	-14.359	-14.493	-0.134	(0)
FeSO4+	9.021e-16	8.414e-16	-15.045	-15.075	-0.030	(0)
Fe (SO4) 2-	2.486e-18	2.301e-18	-17.605	-17.638	-0.033	(0)
Cr2 (OH) 2SO4+2	2.442e-18	1.794e-18	-17.612	-17.746	-0.134	(0)
Cr2 (OH) 2 (SO4) 2	1.310e-20	1.310e-20	-19.883	-19.883	0.000	(0)
HgSO4	8.159e-26	8.159e-26	-25.088	-25.088	0.000	(0)
CrO3SO4-2	1.091e-28	8.018e-29	-27.962	-28.096	-0.134	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-49.776	-49.810	-0.033	(0)
Se (-2)	1.592e-33					
HSe-	1.592e-33	1.474e-33	-32.798	-32.832	-0.033	(0)
H2Se	3.537e-37	3.537e-37	-36.451	-36.451	0.000	(0)
MnSe	1.498e-37	1.498e-37	-36.824	-36.824	0.000	(0)
Se-2	0.000e+00	0.000e+00	-40.341	-40.475	-0.134	(0)
Se (4)	2.534e-09					
HSeO3-	2.197e-09	2.034e-09	-8.658	-8.692	-0.033	(0)
SeO3-2	3.367e-10	2.473e-10	-9.473	-9.607	-0.134	(0)
H2SeO3	2.629e-14	2.629e-14	-13.580	-13.580	0.000	(0)
FeHSeO3+2	4.463e-21	3.279e-21	-20.350	-20.484	-0.134	(0)
Cd (SeO3) 2-2	2.869e-22	2.108e-22	-21.542	-21.676	-0.134	(0)
Se (6)	1.052e-15					
SeO4-2	1.052e-15	7.926e-16	-14.978	-15.101	-0.123	(0)
MnSeO4	1.512e-19	1.512e-19	-18.821	-18.821	0.000	(0)
ZnSeO4	2.105e-20	2.105e-20	-19.677	-19.677	0.000	(0)
NiSeO4	1.083e-20	1.083e-20	-19.965	-19.965	0.000	(0)
CoSeO4	2.530e-21	2.530e-21	-20.597	-20.597	0.000	(0)
HSeO4-	1.158e-21	1.072e-21	-20.936	-20.970	-0.033	(0)
CdSeO4	5.758e-22	5.758e-22	-21.240	-21.240	0.000	(0)
Zn (SeO4) 2-2	2.303e-35	1.691e-35	-34.638	-34.772	-0.134	(0)
Zn	2.509e-07					
Zn+2	2.276e-07	1.714e-07	-6.643	-6.766	-0.123	(0)
ZnCO3	9.487e-09	9.487e-09	-8.023	-8.023	0.000	(0)
ZnSO4	4.418e-09	4.418e-09	-8.355	-8.355	0.000	(0)
ZnOH+	4.016e-09	3.718e-09	-8.396	-8.430	-0.033	(0)
ZnHCO3+	3.799e-09	3.517e-09	-8.420	-8.454	-0.033	(0)
ZnCl+	9.250e-10	8.616e-10	-9.034	-9.065	-0.031	(0)
ZnOHCl	3.727e-10	3.727e-10	-9.429	-9.429	0.000	(0)
Zn (OH) 2	2.754e-10	2.754e-10	-9.560	-9.560	0.000	(0)
Zn (SO4) 2-2	6.720e-12	4.936e-12	-11.173	-11.307	-0.134	(0)
ZnCl2	2.282e-12	2.282e-12	-11.642	-11.642	0.000	(0)
Zn (OH) 3-	4.748e-13	4.395e-13	-12.324	-12.357	-0.033	(0)
ZnCl3-	3.958e-15	3.686e-15	-14.403	-14.433	-0.031	(0)
Zn (OH) 4-2	7.584e-18	5.571e-18	-17.120	-17.254	-0.134	(0)
ZnCl4-2	4.856e-18	3.677e-18	-17.314	-17.435	-0.121	(0)
ZnSeO4	2.105e-20	2.105e-20	-19.677	-19.677	0.000	(0)
ZnNO3+	1.268e-25	1.174e-25	-24.897	-24.930	-0.033	(0)
Zn (SeO4) 2-2	2.303e-35	1.691e-35	-34.638	-34.772	-0.134	(0)

Zn(NO3)2 0.000e+00 0.000e+00 -44.222 -44.222 0.000 (0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-65.98	-59.71	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-32.46	-27.92	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-39.73	-27.92	11.81	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-90.20	-72.27	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-44.71	-24.58	20.13	(Co(NH3)6)Cl3
(NH4)2CrO4	-26.88	-26.50	0.38	(NH4)2CrO4
(NH4)2SeO4	-23.88	-23.43	0.45	(NH4)2SeO4
Al(OH)3(am)	0.25	11.38	11.13	Al(OH)3
Al2(MoO4)3	-51.28	-48.13	3.15	Al2(MoO4)3
Al2O3	2.33	22.75	20.43	Al2O3
Al4(OH)10SO4	3.90	26.60	22.70	Al4(OH)10SO4
AlAsO4·2H2O	-7.22	-2.42	4.80	AlAsO4·2H2O
AlOHSO4	-4.30	-7.53	-3.23	AlOHSO4
Alunite	0.56	-0.21	-0.77	KAl3(SO4)2(OH)6
Anglesite	-5.08	-12.91	-7.83	PbSO4
Anhydrite	-3.20	-7.54	-4.34	CaSO4
Antlerite	-6.52	2.27	8.79	Cu3(OH)4SO4
Aragonite	-1.38	-9.64	-8.26	CaCO3
Arsenolite	-67.16	-70.10	-2.94	As4O6
Artinite	-8.11	1.85	9.96	MgCO3:Mg(OH)2·3H2O
As2O5	-34.37	-27.60	6.77	As2O5
Atacamite	-3.74	3.93	7.67	Cu2(OH)3Cl
Azurite	-4.24	-20.86	-16.62	Cu3(OH)2(CO3)2
Ba(OH)2·8H2O	-16.14	8.42	24.56	Ba(OH)2·8H2O
Ba3(AsO4)2	6.60	-2.35	-8.94	Ba3(AsO4)2
BaCrO4	-14.99	-24.76	-9.77	BaCrO4
BaHPO4	-5.01	-24.79	-19.77	BaHPO4
BaMoO4	-8.22	-15.21	-6.99	BaMoO4
Barite	-0.44	-10.49	-10.05	BaSO4
BaSeO3	-9.57	-7.78	1.79	BaSeO3
BaSeO4	-14.16	-21.68	-7.53	BaSeO4
Bianchite	-8.91	-10.68	-1.76	ZnSO4·6H2O
Birnessite	-11.87	6.22	18.09	MnO2
Bixbyite	-10.29	-10.56	-0.27	Mn2O3
Boehmite	2.45	11.38	8.93	AlOOH
Brochantite	-6.50	9.32	15.83	Cu4(OH)6SO4
Brucite	-5.75	11.44	17.18	Mg(OH)2
Bunsenite	-5.24	7.51	12.74	NiO
Ca3(AsO4)2·4H2O	-15.77	6.53	22.30	Ca3(AsO4)2·4H2O
Ca3(PO4)2(beta)	-3.21	-32.29	-29.08	Ca3(PO4)2
Ca4H(PO4)3·3H2O	-7.04	-54.12	-47.08	Ca4H(PO4)3·3H2O
CaCrO4	-19.62	-21.80	-2.19	CaCrO4
CaHPO4	-2.46	-21.83	-19.37	CaHPO4
CaHPO4·2H2O	-2.77	-21.83	-19.06	CaHPO4·2H2O
Calcite	-1.19	-9.64	-8.46	CaCO3
Calomel	-11.39	-29.57	-18.18	Hg2Cl2
CaMoO4	-4.31	-12.25	-7.94	CaMoO4
CaSeO3·2H2O	-7.69	-4.82	2.87	CaSeO3·2H2O
CaSeO4·2H2O	-15.73	-18.73	-3.00	CaSeO4·2H2O
Cd(BO2)2	-13.93	-4.09	9.84	Cd(BO2)2
Cd(OH)2	-7.34	6.59	13.93	Cd(OH)2
Cd(OH)2(am)	-7.40	6.59	13.99	Cd(OH)2
Cd3(OH)2(SO4)2	-24.76	-18.05	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-21.70	0.86	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-14.04	-46.64	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-20.95	7.45	28.40	Cd4(OH)6SO4
CdCl2	-13.17	-13.77	-0.60	CdCl2
CdCl2·1H2O	-12.10	-13.77	-1.67	CdCl2·1H2O
CdCl2·2.5H2O	-11.84	-13.77	-1.93	CdCl2·2.5H2O
Cdmetal(alpha)	-30.15	-16.41	13.74	Cd
Cdmetal(gamma)	-30.25	-16.41	13.84	Cd
CdMoO4	-2.83	-17.04	-14.21	CdMoO4

CdOHC1	-7.22	-3.59	3.63	CdOHC1
CdSe	-13.31	-33.74	-20.43	CdSe
CdSeO4:2H2O	-21.66	-23.51	-1.85	CdSeO4:2H2O
CdSO4	-12.30	-12.32	-0.02	CdSO4
CdSO4:1H2O	-10.69	-12.32	-1.63	CdSO4:1H2O
CdSO4:2.67H2O	-10.50	-12.32	-1.82	CdSO4:2.67H2O
Cerussite	-1.81	-15.01	-13.20	PbCO3
CH4(g)	-71.20	-113.02	-41.81	CH4
Chalcanthite	-9.19	-11.85	-2.66	CuSO4:5H2O
Claudetite	-66.87	-70.10	-3.23	As4O6
Clausthalite	-6.87	-34.33	-27.46	PbSe
Co(BO2)2	-30.91	-3.84	27.07	Co(BO2)2
Co(OH)2	-6.25	6.84	13.09	Co(OH)2
Co(OH)3	-12.03	-14.06	-2.03	Co(OH)3
CO2(g)	-2.86	-21.02	-18.16	CO2
Co3(AsO4)2	-20.11	-7.08	13.03	Co3(AsO4)2
Co3(PO4)2	-11.20	-45.89	-34.69	Co3(PO4)2
Co3O4	-11.11	-21.28	-10.17	Co3O4
CoCl2	-22.03	-13.53	8.51	CoCl2
CoCl2:6H2O	-16.04	-13.53	2.51	CoCl2:6H2O
CoCO3	-4.24	-14.18	-9.94	CoCO3
CoFe2O4	24.61	21.56	-3.05	CoFe2O4
CoHPO4	-7.31	-26.37	-19.06	CoHPO4
CoMoO4	-9.10	-16.79	-7.69	CoMoO4
CoO	-7.06	6.84	13.90	CoO
CoSe	-17.29	-33.49	-16.20	CoSe
CoSeO3	-10.67	-9.35	1.32	CoSeO3
CoSeO4:6H2O	-21.73	-23.26	-1.53	CoSeO4:6H2O
CoSO4	-15.11	-12.07	3.04	CoSO4
CoSO4:6H2O	-9.59	-12.07	-2.48	CoSO4:6H2O
Cotunnite	-9.50	-14.36	-4.86	PbCl2
Cr(OH)2	-19.49	-8.57	10.93	Cr(OH)2
Cr(OH)3	-1.42	0.00	1.42	Cr(OH)3
Cr(OH)3(am)	0.75	0.00	-0.75	Cr(OH)3
Cr2O3	2.22	0.01	-2.21	Cr2O3
CrCl2	-43.36	-28.93	14.42	CrCl2
CrCl3	-46.02	-30.54	15.48	CrCl3
Crmetal	-62.56	-31.57	31.00	Cr
CrO3	-29.98	-33.18	-3.19	CrO3
Cu(OH)2	-1.78	7.06	8.84	Cu(OH)2
Cu2(OH)3NO3	-21.43	-11.96	9.47	Cu2(OH)3NO3
Cu2Se(alpha)	2.56	-43.88	-46.44	Cu2Se
Cu2SO4	-20.56	-22.45	-1.89	Cu2SO4
Cu3(AsO4)2:2H2O	-12.52	-6.42	6.10	Cu3(AsO4)2:2H2O
Cu3(PO4)2	-8.39	-45.24	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-10.12	-45.24	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	-12.64	-77.15	-64.51	Cu3Se2
CuCO3	-2.46	-13.96	-11.50	CuCO3
CuCrO4	-20.68	-26.12	-5.44	CuCrO4
Cumetal	-4.30	-13.27	-8.97	Cu
CuMoO4	-3.46	-16.57	-13.11	CuMoO4
CuOCuSO4	-15.51	-4.79	10.71	CuOCuSO4
Cupricferrite	15.16	21.78	6.62	CuFe2O4
Cuprite	-2.51	-3.54	-1.04	Cu2O
Cuprousferrite	14.46	5.59	-8.87	CuFeO2
CuSe	0.19	-33.27	-33.46	CuSe
CuSe2	-16.82	-50.60	-33.79	CuSe2
CuSeO3:2H2O	-9.75	-9.13	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-20.60	-23.04	-2.44	CuSeO4:5H2O
CuSO4	-15.01	-11.85	3.16	CuSO4
Diaspore	4.20	11.38	7.18	AlOOH
Dolomite(disordered)	-2.82	-19.22	-16.40	CaMg(CO3)2
Dolomite(ordered)	-2.25	-19.22	-16.97	CaMg(CO3)2
Epsomite	-5.31	-7.48	-2.16	MgSO4:7H2O
Fe(OH)2	-4.54	9.02	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	7.35	4.31	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-3.03	-1.47	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-13.23	-33.86	-20.63	Fe2(SeO3)3:2H2O

Fe2 (SO4) 3	-39.00	-42.01	-3.01	Fe2 (SO4) 3
Fe3 (OH) 8	3.52	23.74	20.22	Fe3 (OH) 8
FeAsO4:2H2O	-6.84	-6.44	0.40	FeAsO4:2H2O
FeCr2O4	1.41	9.03	7.62	FeCr2O4
FeMoO4	-4.55	-14.61	-10.06	FeMoO4
Ferrihydrite	3.95	7.36	3.41	Fe (OH) 3
Ferroselite	-29.91	-48.64	-18.74	FeSe2
FeSe	-20.31	-31.31	-11.01	FeSe
Gibbsite	2.80	11.38	8.58	Al (OH) 3
Goethite	6.69	7.36	0.67	FeOOH
Goslarite	-8.62	-10.68	-2.05	ZnSO4:7H2O
Gypsum	-2.92	-7.54	-4.61	CaSO4:2H2O
H-Jarosite	-4.33	-15.74	-11.41	(H3O) Fe3 (SO4) 2 (OH) 6
H2MoO4	-10.61	-23.63	-13.02	H2MoO4
H2Se(g)	-35.42	-40.33	-4.91	H2Se
Halite	-6.98	-5.39	1.59	NaCl
Hausmannite	-12.61	49.68	62.29	Mn3O4
Hematite	15.75	14.72	-1.03	Fe2O3
Hercynite	7.94	31.77	23.83	FeAl2O4
Hg (CH3) 2 (g)	-165.68	-240.82	-75.15	Hg (CH3) 2
Hg (g)	-8.16	-16.10	-7.94	Hg
Hg (OH) 2	-11.29	-14.79	-3.50	Hg (OH) 2
Hg2 (g)	-17.08	-32.20	-15.13	Hg2
Hg2 (OH) 2	-14.47	-9.21	5.26	Hg2 (OH) 2
Hg2CO3	-14.04	-30.22	-16.18	Hg2CO3
Hg2CrO4	-33.68	-42.38	-8.70	Hg2CrO4
Hg2HPO4	-17.64	-42.41	-24.77	Hg2HPO4
Hg2SeO3	-20.74	-25.40	-4.66	Hg2SeO3
Hg2SO4	-21.97	-28.12	-6.15	Hg2SO4
Hg3O2CO3	-35.71	-65.39	-29.68	Hg3O2CO3
HgCl (g)	-34.77	-14.79	19.98	HgCl
HgCl2	-13.57	-35.16	-21.58	HgCl2
Hgmetal (l)	-2.40	-16.10	-13.70	Hg
HgSe	0.57	-55.12	-55.69	HgSe
HgSeO3	-18.55	-30.98	-12.43	HgSeO3
HgSO4	-24.24	-33.70	-9.46	HgSO4
Hinsdalite	-9.48	-11.98	-2.50	PbAl3PO4SO4 (OH) 6
Huntite	-8.74	-38.39	-29.65	CaMg3 (CO3) 4
Hydrocerussite	-5.26	-24.03	-18.77	Pb3 (OH) 2 (CO3) 2
Hydromagnesite	-18.78	-26.89	-8.11	Mg5 (CO3) 4 (OH) 2:4H2O
Hydroxylapatite	1.59	-42.74	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-6.81	-69.60	-62.79	Pb5 (PO4) 3OH
K-Alum	-17.70	-22.97	-5.26	KAl (SO4) 2:12H2O
K-Jarosite	2.15	-12.26	-14.41	KFe3 (SO4) 2 (OH) 6
K2Cr2O7	-41.92	-59.40	-17.48	K2Cr2O7
K2CrO4	-25.65	-26.22	-0.57	K2CrO4
K2MoO4	-19.94	-16.67	3.27	K2MoO4
K2SeO4	-22.41	-23.14	-0.73	K2SeO4
Langite	-8.66	9.32	17.98	Cu4 (OH) 6SO4:H2O
Larnakite	-6.54	-6.91	-0.37	PbO:PbSO4
Laurionite	-4.80	-4.18	0.62	PbOHCl
Lepidocrocite	5.99	7.36	1.37	FeOOH
Lime	-21.90	11.37	33.28	CaO
Litharge	-6.89	6.00	12.89	PbO
Maghemite	8.33	14.72	6.39	Fe2O3
Magnesioferrite	8.46	26.16	17.69	Fe2MgO4
Magnesite	-2.06	-9.58	-7.52	MgCO3
Magnetite	19.71	23.74	4.03	Fe3O4
Malachite	-1.37	-6.90	-5.53	Cu2 (OH) 2CO3
Manganite	-4.95	20.39	25.34	MnOOH
Massicot	-7.09	6.00	13.09	PbO
Melanothallite	-19.75	-13.31	6.45	CuCl2
Melanterite	-7.62	-9.89	-2.27	FeSO4:7H2O
Mg (OH) 2 (active)	-7.36	11.44	18.79	Mg (OH) 2
Mg3 (PO4) 2	-8.82	-32.10	-23.28	Mg3 (PO4) 2
MgCr2O4	-5.29	11.44	16.74	MgCr2O4
MgCrO4	-27.39	-21.74	5.65	MgCrO4
MgHPO4:3H2O	-3.60	-21.77	-18.18	MgHPO4:3H2O

MgMoO4	-10.34	-12.19	-1.85	MgMoO4
MgSeO3:6H2O	-7.80	-4.76	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-17.47	-18.67	-1.20	MgSeO4:6H2O
Minium	-33.77	41.01	74.78	Pb3O4
Mirabilite	-7.96	-9.32	-1.35	Na2SO4:10H2O
Mn2(SO4)3	-62.07	-67.29	-5.22	Mn2(SO4)3
Mn3(AsO4)2:8H2O	-13.42	-0.92	12.50	Mn3(AsO4)2:8H2O
Mn3(PO4)2	-15.88	-39.73	-23.85	Mn3(PO4)2
MnCl2:4H2O	-14.22	-11.47	2.75	MnCl2:4H2O
MnHPO4	1.09	-24.31	-25.40	MnHPO4
MnSe	-35.23	-31.44	3.79	MnSe
MnSeO3	-8.43	-7.30	1.13	MnSeO3
MnSeO3:2H2O	-8.26	-7.30	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-19.16	-21.21	-2.05	MnSeO4:5H2O
MnSO4	-12.80	-10.02	2.78	MnSO4
Monteponite	-8.82	6.59	15.41	CdO
Montroydite	-11.27	-14.79	-3.52	HgO
MoO3	-15.63	-23.63	-8.00	MoO3
Morenosite	-9.22	-11.40	-2.18	NiSO4:7H2O
Na-Jarosite	-0.20	-10.94	-10.75	NaFe3(SO4)2(OH)6
Na2Cr2O7	-46.80	-56.76	-9.96	Na2Cr2O7
Na2CrO4	-26.57	-23.58	2.99	Na2CrO4
Na2Mo2O7	-20.90	-37.66	-16.76	Na2Mo2O7
Na2MoO4	-15.55	-14.03	1.52	Na2MoO4
Na2MoO4:2H2O	-15.26	-14.03	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-16.90	-6.60	10.30	Na2SeO3:5H2O
Na2SeO4	-21.79	-20.51	1.28	Na2SeO4
Nantokite	-5.10	-11.95	-6.86	CuCl
Natron	-9.91	-11.42	-1.51	Na2CO3:10H2O
Nesquehonite	-4.98	-9.58	-4.60	MgCO3:3H2O
Ni(OH)2	-5.57	7.51	13.08	Ni(OH)2
Ni3(AsO4)2:8H2O	-20.77	-5.07	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-12.59	-43.89	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-20.88	11.12	32.00	Ni4(OH)6SO4
NiCO3	-6.76	-13.51	-6.75	NiCO3
NiMoO4	-4.97	-16.12	-11.15	NiMoO4
NiSe	-15.12	-32.82	-17.70	NiSe
NiSeO3:2H2O	-11.59	-8.68	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-21.07	-22.59	-1.52	NiSeO4:6H2O
Nsutite	-11.28	6.22	17.50	MnO2
O2(g)	-38.80	46.00	84.80	O2
Otavite	-2.43	-14.43	-12.00	CdCO3
Pb(BO2)2	-11.25	-4.68	6.57	Pb(BO2)2
Pb(OH)2	-2.32	6.00	8.32	Pb(OH)2
Pb10(OH)6O(CO3)6	-57.32	-66.08	-8.76	Pb10(OH)6O(CO3)6
Pb2(OH)3Cl	-6.97	1.82	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-14.18	12.01	26.19	Pb2O(OH)2
Pb2O3	-26.03	35.01	61.04	Pb2O3
Pb2OCO3	-8.58	-9.01	-0.44	Pb2OCO3
Pb3(AsO4)2	-15.39	-9.59	5.80	Pb3(AsO4)2
Pb3(PO4)2	-4.87	-48.40	-43.53	Pb3(PO4)2
Pb3O2CO3	-14.36	-3.01	11.35	Pb3O2CO3
Pb3O2SO4	-11.83	-0.90	10.92	Pb3O2SO4
Pb4(OH)6SO4	-16.00	5.10	21.10	Pb4(OH)6SO4
Pb4O3SO4	-17.18	5.10	22.28	Pb4O3SO4
PbCrO4	-14.44	-27.18	-12.73	PbCrO4
PbHPO4	-3.40	-27.20	-23.81	PbHPO4
Pbmetal	-21.24	-17.00	4.24	Pb
PbMoO4	-1.84	-17.63	-15.78	PbMoO4
PbO:0.3H2O	-6.98	6.00	12.98	PbO:0.33H2O
PbSeO4	-17.21	-24.10	-6.88	PbSeO4
Periclase	-10.60	11.44	22.04	MgO
Phosgenite	-9.57	-29.38	-19.81	PbCl2:PbCO3
Plattnerite	-21.48	29.00	50.49	PbO2
Plumbgummite	6.51	-26.28	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-11.81	11.37	23.19	Ca(OH)2
Pyrochroite	-6.59	8.89	15.48	Mn(OH)2
Pyrolusite	-10.30	31.89	42.19	MnO2

Pyromorphite	4.64	-79.79	-84.43	Pb5 (PO4) 3Cl
Retgersite	-9.35	-11.40	-2.05	NiSO4:6H2O
Rhodochrosite	-1.55	-12.12	-10.57	MnCO3
Semetal (am)	-10.19	-17.33	-7.14	Se
Semetal (hex)	-9.58	-17.33	-7.76	Se
SeO2	-16.31	-16.19	0.12	SeO2
SeO3	-51.58	-30.10	21.48	SeO3
Siderite	-1.81	-12.00	-10.19	FeCO3
Smithsonite	-2.83	-12.78	-9.95	ZnCO3
Spinel	-3.82	34.19	38.01	MgAl2O4
Strengite	0.53	-25.85	-26.37	FePO4:2H2O
Tenorite	-0.78	7.06	7.84	CuO
Thenardite	-9.66	-9.32	0.35	Na2SO4
Thermonatrite	-12.09	-11.42	0.67	Na2CO3:H2O
Tsumebite	-4.35	-14.14	-9.79	Pb2CuPO4 (OH) 3:3H2O
Vivianite	-3.35	-39.35	-36.00	Fe3 (PO4) 2:8H2O
Witherite	-4.02	-12.60	-8.58	BaCO3
Zincite	-3.37	8.23	11.60	ZnO
Zincosite	-14.85	-10.68	4.18	ZnSO4
Zn (BO2) 2	-10.74	-2.45	8.29	Zn (BO2) 2
Zn (NO3) 2:6H2O	-47.16	-43.92	3.24	Zn (NO3) 2:6H2O
Zn (OH) 2	-3.97	8.23	12.20	Zn (OH) 2
Zn (OH) 2 (am)	-4.48	8.23	12.71	Zn (OH) 2
Zn (OH) 2 (beta)	-3.77	8.23	12.00	Zn (OH) 2
Zn (OH) 2 (epsilon)	-3.54	8.23	11.78	Zn (OH) 2
Zn (OH) 2 (gamma)	-3.50	8.23	11.73	Zn (OH) 2
Zn2 (OH) 2SO4	-9.94	-2.44	7.50	Zn2 (OH) 2SO4
Zn2 (OH) 3Cl	-8.91	6.29	15.19	Zn2 (OH) 3Cl
Zn3 (AsO4) 2:2.5H2O	-16.54	-2.89	13.65	Zn3 (AsO4) 2:2.5H2O
Zn3 (PO4) 2:4H2O	-6.29	-41.71	-35.42	Zn3 (PO4) 2:4H2O
Zn3O (SO4) 2	-32.80	-13.12	19.68	Zn3O (SO4) 2
Zn4 (OH) 6SO4	-14.37	14.03	28.40	Zn4 (OH) 6SO4
Zn5 (OH) 8Cl2	-17.70	20.80	38.50	Zn5 (OH) 8Cl2
ZnCl2	-19.40	-12.13	7.27	ZnCl2
ZnCO3:1H2O	-2.52	-12.78	-10.26	ZnCO3:1H2O
Znmetal	-41.01	-14.77	26.25	Zn
ZnMoO4	-5.30	-15.39	-10.09	ZnMoO4
ZnO (active)	-3.22	8.23	11.45	ZnO
ZnSe	-17.62	-32.10	-14.48	ZnSe
ZnSeO4:6H2O	-20.35	-21.87	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-10.17	-10.68	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Initial solution 3.

-----Solution composition-----

Elements	Molality	Moles
Al	1.484e-06	1.484e-06
Alkalinity	8.200e-04	8.200e-04
As	2.671e-08	2.671e-08
B	8.146e-06	8.146e-06
Ba	8.744e-08	8.744e-08
Ca	7.990e-04	7.990e-04
Cl	6.520e-03	6.520e-03
Co	6.622e-07	6.622e-07
Cr	1.347e-07	1.347e-07
Cu	3.464e-07	3.464e-07
Fe	8.834e-06	8.834e-06
K	6.399e-04	6.399e-04
Mg	6.999e-04	6.999e-04
Mn	8.379e-07	8.379e-07
Mo	9.387e-08	9.387e-08
N	1.736e-03	1.736e-03
Na	5.746e-03	5.746e-03

Ni	1.876e-07	1.876e-07
P	1.680e-05	1.680e-05
Pb	1.449e-08	1.449e-08
S (6)	1.979e-03	1.979e-03
Se	2.535e-08	2.535e-08
Zn	3.520e-07	3.520e-07

-----Description of solution-----

pH	=	6.180
pe	=	4.000
Activity of water	=	1.000
Ionic strength (mol/kgw)	=	1.387e-02
Mass of water (kg)	=	1.000e+00
Total carbon (mol/kg)	=	1.948e-03
Total CO2 (mol/kg)	=	1.948e-03
Temperature (°C)	=	20.00
Electrical balance (eq)	=	-1.692e-04
Percent error, 100*(Cat- An)/(Cat+ An)	=	-0.78
Iterations	=	12
Total H	=	1.110238e+02
Total O	=	5.552069e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	7.433e-07	6.607e-07	-6.129	-6.180	-0.051	0.00
OH-	1.171e-08	1.038e-08	-7.931	-7.984	-0.052	(0)
H2O	5.551e+01	9.997e-01	1.744	-0.000	0.000	18.05
Al	1.484e-06					
Al (OH) 2+	9.360e-07	8.356e-07	-6.029	-6.078	-0.049	(0)
Al (OH) 3	2.540e-07	2.540e-07	-6.595	-6.595	0.000	(0)
Al (OH) 4-	1.663e-07	1.479e-07	-6.779	-6.830	-0.051	(0)
AlOH+2	7.824e-08	4.969e-08	-7.107	-7.304	-0.197	(0)
AlSO4+	3.549e-08	3.158e-08	-7.450	-7.501	-0.051	(0)
Al+3	1.309e-08	4.532e-09	-7.883	-8.344	-0.461	(0)
Al (SO4) 2-	4.624e-10	4.114e-10	-9.335	-9.386	-0.051	(0)
AlMo6O21-3	4.906e-34	1.428e-34	-33.309	-33.845	-0.536	(0)
As (3)	1.676e-13					
H3AsO3	1.675e-13	1.675e-13	-12.776	-12.776	0.000	(0)
H2AsO3-	1.235e-16	1.077e-16	-15.908	-15.968	-0.060	(0)
H4AsO3+	6.290e-20	5.484e-20	-19.201	-19.261	-0.060	(0)
HAsO3-2	2.065e-22	1.193e-22	-21.685	-21.923	-0.238	(0)
AsO3-3	2.009e-29	5.847e-30	-28.697	-29.233	-0.536	(0)
As (5)	2.671e-08					
H2AsO4-	2.145e-08	1.870e-08	-7.669	-7.728	-0.060	(0)
HAsO4-2	5.262e-09	3.040e-09	-8.279	-8.517	-0.238	(0)
H3AsO4	2.038e-12	2.045e-12	-11.691	-11.689	0.001	(0)
AsO4-3	4.448e-14	1.294e-14	-13.352	-13.888	-0.536	(0)
B	8.146e-06					
H3BO3	8.139e-06	8.165e-06	-5.089	-5.088	0.001	(0)
H2BO3-	7.437e-09	6.563e-09	-8.129	-8.183	-0.054	(0)
CaH2BO3+	1.795e-10	1.584e-10	-9.746	-9.800	-0.054	(0)
MgH2BO3+	1.002e-10	8.839e-11	-9.999	-10.054	-0.054	(0)
NaH2BO3	5.773e-11	5.773e-11	-10.239	-10.239	0.000	(0)
H5 (BO3) 2-	5.334e-14	4.707e-14	-13.273	-13.327	-0.054	(0)
BaH2BO3+	1.215e-14	1.072e-14	-13.915	-13.970	-0.054	(0)
H8 (BO3) 3-	3.769e-17	3.326e-17	-16.424	-16.478	-0.054	(0)
Ba	8.744e-08					
Ba+2	8.709e-08	5.435e-08	-7.060	-7.265	-0.205	(0)
BaHCO3+	3.501e-10	3.132e-10	-9.456	-9.504	-0.048	(0)
BaCO3	1.148e-12	1.148e-12	-11.940	-11.940	0.000	(0)
BaNH3+2	7.754e-14	4.480e-14	-13.110	-13.349	-0.238	(0)
BaH2BO3+	1.215e-14	1.072e-14	-13.915	-13.970	-0.054	(0)
BaOH+	2.669e-15	2.379e-15	-14.574	-14.624	-0.050	(0)
BaNO3+	1.252e-37	1.092e-37	-36.902	-36.962	-0.060	(0)

C (4)	1.948e-03					
H2CO3	1.134e-03	1.134e-03	-2.945	-2.945	0.000	(0)
HCO3-	8.028e-04	7.166e-04	-3.095	-3.145	-0.049	(0)
CaHCO3+	5.603e-06	5.013e-06	-5.252	-5.300	-0.048	(0)
MgHCO3+	3.121e-06	2.771e-06	-5.506	-5.557	-0.052	(0)
NaHCO3	2.248e-06	2.248e-06	-5.648	-5.648	0.000	(0)
CO3-2	7.369e-08	4.599e-08	-7.133	-7.337	-0.205	(0)
FeHCO3+	3.932e-08	3.517e-08	-7.405	-7.454	-0.048	(0)
CuCO3	3.016e-08	3.016e-08	-7.521	-7.521	0.000	(0)
CaCO3	2.814e-08	2.814e-08	-7.551	-7.551	0.000	(0)
CoHCO3+	1.894e-08	1.651e-08	-7.723	-7.782	-0.060	(0)
MgCO3	1.368e-08	1.368e-08	-7.864	-7.864	0.000	(0)
NiHCO3+	8.938e-09	7.793e-09	-8.049	-8.108	-0.060	(0)
MnHCO3+	6.750e-09	6.017e-09	-8.171	-8.221	-0.050	(0)
NaCO3-	5.601e-09	5.000e-09	-8.252	-8.301	-0.049	(0)
CuHCO3+	5.224e-09	4.555e-09	-8.282	-8.342	-0.060	(0)
ZnHCO3+	4.406e-09	3.842e-09	-8.356	-8.415	-0.060	(0)
PbHCO3+	2.579e-09	2.249e-09	-8.589	-8.648	-0.060	(0)
PbCO3	6.455e-10	6.455e-10	-9.190	-9.190	0.000	(0)
ZnCO3	4.960e-10	4.960e-10	-9.304	-9.304	0.000	(0)
BaHCO3+	3.501e-10	3.132e-10	-9.456	-9.504	-0.048	(0)
CoCO3	2.546e-10	2.546e-10	-9.594	-9.594	0.000	(0)
NiCO3	1.673e-10	1.673e-10	-9.776	-9.776	0.000	(0)
Cu (CO3) 2-2	6.462e-12	3.734e-12	-11.190	-11.428	-0.238	(0)
BaCO3	1.148e-12	1.148e-12	-11.940	-11.940	0.000	(0)
Pb (CO3) 2-2	1.482e-13	8.562e-14	-12.829	-13.067	-0.238	(0)
Ca	7.990e-04					
Ca+2	6.907e-04	4.311e-04	-3.161	-3.365	-0.205	(0)
CaSO4	1.024e-04	1.024e-04	-3.990	-3.990	0.000	(0)
CaHCO3+	5.603e-06	5.013e-06	-5.252	-5.300	-0.048	(0)
CaHPO4	2.128e-07	2.128e-07	-6.672	-6.672	0.000	(0)
CaH2PO4+	1.242e-07	1.109e-07	-6.906	-6.955	-0.049	(0)
CaCO3	2.814e-08	2.814e-08	-7.551	-7.551	0.000	(0)
CaNH3+2	1.227e-09	7.089e-10	-8.911	-9.149	-0.238	(0)
CaPO4-	8.600e-10	7.677e-10	-9.066	-9.115	-0.049	(0)
CaH2BO3+	1.795e-10	1.584e-10	-9.746	-9.800	-0.054	(0)
CaOH+	9.423e-11	8.430e-11	-10.026	-10.074	-0.048	(0)
Ca (NH3) 2+2	6.381e-16	3.686e-16	-15.195	-15.433	-0.238	(0)
CaNO3+	5.947e-34	5.185e-34	-33.226	-33.285	-0.060	(0)
Cl	6.520e-03					
Cl-	6.520e-03	5.795e-03	-2.186	-2.237	-0.051	(0)
CuCl2-	5.238e-08	4.651e-08	-7.281	-7.332	-0.052	(0)
CuCl	3.795e-08	3.795e-08	-7.421	-7.421	0.000	(0)
CoCl+	7.428e-09	6.476e-09	-8.129	-8.189	-0.060	(0)
MnCl+	3.540e-09	3.156e-09	-8.451	-8.501	-0.050	(0)
ZnCl+	2.961e-09	2.629e-09	-8.529	-8.580	-0.052	(0)
NiCl+	1.636e-09	1.426e-09	-8.786	-8.846	-0.060	(0)
CuCl+	1.088e-09	9.662e-10	-8.963	-9.015	-0.052	(0)
PbCl+	1.037e-09	9.043e-10	-8.984	-9.044	-0.060	(0)
CuCl3-2	8.950e-11	5.651e-11	-10.048	-10.248	-0.200	(0)
ZnOHCl	5.442e-11	5.442e-11	-10.264	-10.264	0.000	(0)
MnCl2	2.583e-11	2.583e-11	-10.588	-10.588	0.000	(0)
PbCl2	2.288e-11	2.288e-11	-10.640	-10.640	0.000	(0)
ZnCl2	1.943e-11	1.943e-11	-10.712	-10.712	0.000	(0)
CrCl+2	1.984e-12	1.146e-12	-11.703	-11.941	-0.238	(0)
CuCl2	1.517e-12	1.517e-12	-11.819	-11.819	0.000	(0)
ZnCl3-	9.866e-14	8.761e-14	-13.006	-13.057	-0.052	(0)
PbCl3-	6.398e-14	5.578e-14	-13.194	-13.253	-0.060	(0)
MnCl3-	4.626e-14	4.123e-14	-13.335	-13.385	-0.050	(0)
NiCl2	4.219e-14	4.219e-14	-13.375	-13.375	0.000	(0)
CrOHCl2	9.427e-16	9.427e-16	-15.026	-15.026	0.000	(0)
FeCl+2	7.064e-16	4.460e-16	-15.151	-15.351	-0.200	(0)
CrCl2+	4.641e-16	4.046e-16	-15.333	-15.393	-0.060	(0)
ZnCl4-2	3.862e-16	2.438e-16	-15.413	-15.613	-0.200	(0)
PbCl4-2	2.375e-16	1.372e-16	-15.624	-15.863	-0.238	(0)
CuCl3-	8.442e-17	7.496e-17	-16.074	-16.125	-0.052	(0)
FeCl2+	1.517e-17	1.352e-17	-16.819	-16.869	-0.050	(0)
FeCl3	7.837e-21	7.837e-21	-20.106	-20.106	0.000	(0)

CuCl4-2	4.088e-21	2.581e-21	-20.388	-20.588	-0.200	(0)
CrO3Cl-	6.803e-34	5.932e-34	-33.167	-33.227	-0.060	(0)
Cr(NH3) 6Cl+2	4.721e-34	2.728e-34	-33.326	-33.564	-0.238	(0)
CoCl+2	2.383e-35	1.377e-35	-34.623	-34.861	-0.238	(0)
Co(NH3) 5Cl+2	4.164e-39	2.406e-39	-38.380	-38.619	-0.238	(0)
Co(NH3) 6Cl+2	0.000e+00	0.000e+00	-50.953	-51.191	-0.238	(0)
Co(2)	6.622e-07					
Co+2	5.668e-07	3.275e-07	-6.247	-6.485	-0.238	(0)
CoSO4	6.815e-08	6.815e-08	-7.167	-7.167	0.000	(0)
CoHCO3+	1.894e-08	1.651e-08	-7.723	-7.782	-0.060	(0)
CoCl+	7.428e-09	6.476e-09	-8.129	-8.189	-0.060	(0)
CoHPO4	3.779e-10	3.779e-10	-9.423	-9.423	0.000	(0)
CoCO3	2.546e-10	2.546e-10	-9.594	-9.594	0.000	(0)
Co(NH3) +2	1.392e-10	8.044e-11	-9.856	-10.095	-0.238	(0)
CoOH+	1.142e-10	9.955e-11	-9.942	-10.002	-0.060	(0)
Co(OH) 2	1.205e-13	1.205e-13	-12.919	-12.919	0.000	(0)
Co(NH3) 2+2	4.961e-15	2.866e-15	-14.304	-14.543	-0.238	(0)
Co2OH+3	5.615e-18	1.634e-18	-17.251	-17.787	-0.536	(0)
Co(NH3) 3+2	8.158e-20	4.713e-20	-19.088	-19.327	-0.238	(0)
Co(OH) 3-	4.201e-20	3.662e-20	-19.377	-19.436	-0.060	(0)
CoOOH-	1.757e-21	1.532e-21	-20.755	-20.815	-0.060	(0)
CoSeO4	1.414e-22	1.414e-22	-21.850	-21.850	0.000	(0)
Co(NH3) 4+2	5.592e-25	3.231e-25	-24.252	-24.491	-0.238	(0)
CoNO2+	5.547e-28	4.836e-28	-27.256	-27.316	-0.060	(0)
Co(OH) 4-2	1.531e-28	8.843e-29	-27.815	-28.053	-0.238	(0)
Co(NH3) 5+2	1.212e-30	7.004e-31	-29.916	-30.155	-0.238	(0)
Co4(OH) 4+4	1.759e-31	1.960e-32	-30.755	-31.708	-0.953	(0)
CoNO3+	2.182e-37	1.902e-37	-36.661	-36.721	-0.060	(0)
Co(NO3) 2	0.000e+00	0.000e+00	-66.848	-66.848	0.000	(0)
Co(3)	1.747e-30					
CoOH+2	1.747e-30	1.009e-30	-29.758	-29.996	-0.238	(0)
Co+3	3.766e-35	1.304e-35	-34.424	-34.885	-0.461	(0)
CoCl+2	2.383e-35	1.377e-35	-34.623	-34.861	-0.238	(0)
Co(NH3) 5Cl+2	4.164e-39	2.406e-39	-38.380	-38.619	-0.238	(0)
Co(NH3) 6SO4+	0.000e+00	0.000e+00	-46.993	-47.052	-0.060	(0)
Co(NH3) 6Cl+2	0.000e+00	0.000e+00	-50.953	-51.191	-0.238	(0)
Co(NH3) 6OH+2	0.000e+00	0.000e+00	-52.021	-52.260	-0.238	(0)
Cr(2)	2.965e-21					
Cr+2	2.965e-21	1.713e-21	-20.528	-20.766	-0.238	(0)
Cr(3)	1.347e-07					
Cr(OH) +2	7.386e-08	4.267e-08	-7.132	-7.370	-0.238	(0)
Cr(OH) 2+	5.309e-08	4.628e-08	-7.275	-7.335	-0.060	(0)
CrOHSO4	6.448e-09	6.448e-09	-8.191	-8.191	0.000	(0)
Cr+3	6.279e-10	1.827e-10	-9.202	-9.738	-0.536	(0)
CrSO4+	4.304e-10	3.752e-10	-9.366	-9.426	-0.060	(0)
Cr(OH) 3	2.649e-10	2.649e-10	-9.577	-9.577	0.000	(0)
CrCl+2	1.984e-12	1.146e-12	-11.703	-11.941	-0.238	(0)
CrH2PO4+2	8.321e-13	4.807e-13	-12.080	-12.318	-0.238	(0)
CrO2-	2.185e-13	1.905e-13	-12.661	-12.720	-0.060	(0)
Cr(OH) 4-	1.843e-13	1.607e-13	-12.735	-12.794	-0.060	(0)
Cr2(OH) 2SO4+2	2.519e-14	1.455e-14	-13.599	-13.837	-0.238	(0)
CrOHC12	9.427e-16	9.427e-16	-15.026	-15.026	0.000	(0)
Cr2(OH) 2(SO4) 2	9.408e-16	9.408e-16	-15.027	-15.027	0.000	(0)
CrCl2+	4.641e-16	4.046e-16	-15.333	-15.393	-0.060	(0)
Cr(NH3) 5OH+2	1.771e-27	1.023e-27	-26.752	-26.990	-0.238	(0)
Cr(NH3) 6+3	1.279e-32	3.722e-33	-31.893	-32.429	-0.536	(0)
Cr(NH3) 6Cl+2	4.721e-34	2.728e-34	-33.326	-33.564	-0.238	(0)
CrNO3+2	0.000e+00	0.000e+00	-41.487	-41.725	-0.238	(0)
Cr(6)	4.667e-26					
HCrO4-	2.786e-26	2.429e-26	-25.555	-25.615	-0.060	(0)
CrO4-2	1.845e-26	1.152e-26	-25.734	-25.939	-0.205	(0)
NaCrO4-	3.332e-28	2.905e-28	-27.477	-27.537	-0.060	(0)
KCrO4-	2.771e-29	2.416e-29	-28.557	-28.617	-0.060	(0)
CrO3HPO4-2	1.861e-30	1.075e-30	-29.730	-29.968	-0.238	(0)
H2CrO4	1.008e-32	1.008e-32	-31.996	-31.996	0.000	(0)
CrO3SO4-2	9.338e-33	5.395e-33	-32.030	-32.268	-0.238	(0)
CrO3Cl-	6.803e-34	5.932e-34	-33.167	-33.227	-0.060	(0)
CrO3H2PO4-	3.925e-34	3.422e-34	-33.406	-33.466	-0.060	(0)

Cr2O7-2	0.000e+00	0.000e+00	-49.394	-49.632	-0.238	(0)
Cu (1)	9.639e-08					
CuCl2-	5.238e-08	4.651e-08	-7.281	-7.332	-0.052	(0)
CuCl	3.795e-08	3.795e-08	-7.421	-7.421	0.000	(0)
Cu+	5.967e-09	5.202e-09	-8.224	-8.284	-0.060	(0)
CuCl3-2	8.950e-11	5.651e-11	-10.048	-10.248	-0.200	(0)
Cu (2)	2.501e-07					
Cu+2	1.785e-07	1.114e-07	-6.748	-6.953	-0.205	(0)
CuCO3	3.016e-08	3.016e-08	-7.521	-7.521	0.000	(0)
CuSO4	2.616e-08	2.616e-08	-7.582	-7.582	0.000	(0)
CuHCO3+	5.224e-09	4.555e-09	-8.282	-8.342	-0.060	(0)
CuOH+	4.723e-09	4.194e-09	-8.326	-8.377	-0.052	(0)
CuNH3+2	4.229e-09	2.443e-09	-8.374	-8.612	-0.238	(0)
CuCl+	1.088e-09	9.662e-10	-8.963	-9.015	-0.052	(0)
Cu (OH) 2	1.631e-11	1.631e-11	-10.788	-10.788	0.000	(0)
Cu (CO3) 2-2	6.462e-12	3.734e-12	-11.190	-11.428	-0.238	(0)
CuCl2	1.517e-12	1.517e-12	-11.819	-11.819	0.000	(0)
Cu2 (OH) 2+2	7.389e-13	4.269e-13	-12.131	-12.370	-0.238	(0)
Cu (OH) 3-	5.847e-16	5.097e-16	-15.233	-15.293	-0.060	(0)
CuCl3-	8.442e-17	7.496e-17	-16.074	-16.125	-0.052	(0)
CuCl4-2	4.088e-21	2.581e-21	-20.388	-20.588	-0.200	(0)
Cu (OH) 4-2	1.058e-22	6.112e-23	-21.976	-22.214	-0.238	(0)
CuNO2+	2.803e-27	2.444e-27	-26.552	-26.612	-0.060	(0)
CuNO3+	1.523e-37	1.328e-37	-36.817	-36.877	-0.060	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-47.281	-47.281	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-68.225	-68.225	0.000	(0)
Fe (2)	8.637e-06					
Fe+2	7.461e-06	4.311e-06	-5.127	-5.365	-0.238	(0)
FeSO4	1.090e-06	1.090e-06	-5.963	-5.963	0.000	(0)
FeHCO3+	3.932e-08	3.517e-08	-7.405	-7.454	-0.048	(0)
FeH2PO4+	2.668e-08	2.382e-08	-7.574	-7.623	-0.049	(0)
FeHPO4	1.815e-08	1.815e-08	-7.741	-7.741	0.000	(0)
FeOH+	1.998e-09	1.781e-09	-8.699	-8.749	-0.050	(0)
Fe (OH) 2	1.389e-14	1.389e-14	-13.857	-13.857	0.000	(0)
Fe (OH) 3-	7.166e-17	6.388e-17	-16.145	-16.195	-0.050	(0)
Fe (3)	1.964e-07					
Fe (OH) 2+	1.950e-07	1.740e-07	-6.710	-6.759	-0.049	(0)
Fe (OH) 3	1.394e-09	1.394e-09	-8.856	-8.856	0.000	(0)
FeHPO4+	3.605e-11	3.218e-11	-10.443	-10.492	-0.049	(0)
FeOH+2	3.488e-11	2.202e-11	-10.457	-10.657	-0.200	(0)
Fe (OH) 4-	4.526e-12	4.040e-12	-11.344	-11.394	-0.049	(0)
FeSO4+	3.443e-14	3.069e-14	-13.463	-13.513	-0.050	(0)
Fe+3	8.622e-15	2.985e-15	-14.064	-14.525	-0.461	(0)
FeH2PO4+2	9.841e-16	6.250e-16	-15.007	-15.204	-0.197	(0)
Fe (SO4) 2-	8.526e-16	7.433e-16	-15.069	-15.129	-0.060	(0)
FeCl+2	7.064e-16	4.460e-16	-15.151	-15.351	-0.200	(0)
FeCl2+	1.517e-17	1.352e-17	-16.819	-16.869	-0.050	(0)
FeHSeO3+2	2.518e-19	1.455e-19	-18.599	-18.837	-0.238	(0)
Fe2 (OH) 2+4	1.724e-19	1.921e-20	-18.763	-19.717	-0.953	(0)
FeCl3	7.837e-21	7.837e-21	-20.106	-20.106	0.000	(0)
Fe3 (OH) 4+5	1.414e-24	4.585e-26	-23.850	-25.339	-1.489	(0)
FeNO3+2	0.000e+00	0.000e+00	-43.612	-43.850	-0.238	(0)
H (0)	6.481e-24					
H2	3.240e-24	3.251e-24	-23.489	-23.488	0.001	(0)
K	6.399e-04					
K+	6.351e-04	5.645e-04	-3.197	-3.248	-0.051	(0)
KSO4-	4.737e-06	4.229e-06	-5.324	-5.374	-0.049	(0)
KHPO4-	5.074e-09	4.530e-09	-8.295	-8.344	-0.049	(0)
KCrO4-	2.771e-29	2.416e-29	-28.557	-28.617	-0.060	(0)
Mg	6.999e-04					
Mg+2	6.224e-04	3.884e-04	-3.206	-3.411	-0.205	(0)
MgSO4	7.392e-05	7.392e-05	-4.131	-4.131	0.000	(0)
MgHCO3+	3.121e-06	2.771e-06	-5.506	-5.557	-0.052	(0)
MgHPO4	2.647e-07	2.647e-07	-6.577	-6.577	0.000	(0)
MgH2PO4+	2.388e-07	2.132e-07	-6.622	-6.671	-0.049	(0)
MgCO3	1.368e-08	1.368e-08	-7.864	-7.864	0.000	(0)
MgOH+	1.649e-09	1.478e-09	-8.783	-8.830	-0.048	(0)
MgH2BO3+	1.002e-10	8.839e-11	-9.999	-10.054	-0.054	(0)

MgPO4-	1.211e-11	1.081e-11	-10.917	-10.966	-0.049	(0)
Mn (2)	8.379e-07					
Mn+2	7.487e-07	4.326e-07	-6.126	-6.364	-0.238	(0)
MnSO4	7.886e-08	7.886e-08	-7.103	-7.103	0.000	(0)
MnHCO3+	6.750e-09	6.017e-09	-8.171	-8.221	-0.050	(0)
MnCl+	3.540e-09	3.156e-09	-8.451	-8.501	-0.050	(0)
MnCl2	2.583e-11	2.583e-11	-10.588	-10.588	0.000	(0)
MnOH+	1.265e-11	1.128e-11	-10.898	-10.948	-0.050	(0)
MnCl3-	4.626e-14	4.123e-14	-13.335	-13.385	-0.050	(0)
MnSeO4	9.893e-23	9.893e-23	-22.005	-22.005	0.000	(0)
Mn (OH) 3-	2.664e-23	2.375e-23	-22.574	-22.624	-0.050	(0)
MnSe	3.564e-30	3.564e-30	-29.448	-29.448	0.000	(0)
Mn (OH) 4-2	1.850e-30	1.168e-30	-29.733	-29.933	-0.200	(0)
MnNO3+	2.882e-37	2.513e-37	-36.540	-36.600	-0.060	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-66.631	-66.631	0.000	(0)
Mn (3)	2.658e-28					
Mn+3	2.658e-28	9.203e-29	-27.575	-28.036	-0.461	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-61.272	-61.471	-0.200	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-67.123	-67.177	-0.053	(0)
Mo	9.387e-08					
MoO4-2	9.311e-08	5.811e-08	-7.031	-7.236	-0.205	(0)
HMoO4-	7.636e-10	6.657e-10	-9.117	-9.177	-0.060	(0)
H2MoO4	4.421e-12	4.421e-12	-11.354	-11.354	0.000	(0)
AlMo6O21-3	4.906e-34	1.428e-34	-33.309	-33.845	-0.536	(0)
Mo7O24-6	0.000e+00	0.000e+00	-44.274	-46.418	-2.144	(0)
HMo7O24-5	0.000e+00	0.000e+00	-44.752	-46.242	-1.489	(0)
H2Mo7O24-4	0.000e+00	0.000e+00	-46.695	-47.648	-0.953	(0)
H3Mo7O24-3	0.000e+00	0.000e+00	-50.040	-50.576	-0.536	(0)
N (-3)	1.736e-03					
NH4+	1.715e-03	1.514e-03	-2.766	-2.820	-0.054	(0)
NH4SO4-	1.980e-05	1.765e-05	-4.703	-4.753	-0.050	(0)
NH3	9.134e-07	9.134e-07	-6.039	-6.039	0.000	(0)
CuNH3+2	4.229e-09	2.443e-09	-8.374	-8.612	-0.238	(0)
CaNH3+2	1.227e-09	7.089e-10	-8.911	-9.149	-0.238	(0)
NiNH3+2	1.878e-10	1.085e-10	-9.726	-9.965	-0.238	(0)
Co (NH3) +2	1.392e-10	8.044e-11	-9.856	-10.095	-0.238	(0)
BaNH3+2	7.754e-14	4.480e-14	-13.110	-13.349	-0.238	(0)
Ni (NH3) 2+2	4.818e-14	2.784e-14	-13.317	-13.555	-0.238	(0)
Co (NH3) 2+2	4.961e-15	2.866e-15	-14.304	-14.543	-0.238	(0)
Ca (NH3) 2+2	6.381e-16	3.686e-16	-15.195	-15.433	-0.238	(0)
Co (NH3) 3+2	8.158e-20	4.713e-20	-19.088	-19.327	-0.238	(0)
Co (NH3) 4+2	5.592e-25	3.231e-25	-24.252	-24.491	-0.238	(0)
Cr (NH3) 5OH+2	1.771e-27	1.023e-27	-26.752	-26.990	-0.238	(0)
Co (NH3) 5+2	1.212e-30	7.004e-31	-29.916	-30.155	-0.238	(0)
Cr (NH3) 6+3	1.279e-32	3.722e-33	-31.893	-32.429	-0.536	(0)
Cr (NH3) 6Cl+2	4.721e-34	2.728e-34	-33.326	-33.564	-0.238	(0)
Co (NH3) 5Cl+2	4.164e-39	2.406e-39	-38.380	-38.619	-0.238	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-46.993	-47.052	-0.060	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-50.953	-51.191	-0.238	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.021	-52.260	-0.238	(0)
N (3)	2.370e-22					
NO2-	2.370e-22	2.096e-22	-21.625	-21.679	-0.053	(0)
CuNO2+	2.803e-27	2.444e-27	-26.552	-26.612	-0.060	(0)
CoNO2+	5.547e-28	4.836e-28	-27.256	-27.316	-0.060	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-47.281	-47.281	0.000	(0)
N (5)	4.129e-31					
NO3-	4.123e-31	3.665e-31	-30.385	-30.436	-0.051	(0)
CaNO3+	5.947e-34	5.185e-34	-33.226	-33.285	-0.060	(0)
MnNO3+	2.882e-37	2.513e-37	-36.540	-36.600	-0.060	(0)
CoNO3+	2.182e-37	1.902e-37	-36.661	-36.721	-0.060	(0)
ZnNO3+	2.043e-37	1.781e-37	-36.690	-36.749	-0.060	(0)
CuNO3+	1.523e-37	1.328e-37	-36.817	-36.877	-0.060	(0)
BaNO3+	1.252e-37	1.092e-37	-36.902	-36.962	-0.060	(0)
NiNO3+	1.030e-37	8.978e-38	-36.987	-37.047	-0.060	(0)
PbNO3+	2.864e-38	2.497e-38	-37.543	-37.603	-0.060	(0)
CrNO3+2	0.000e+00	0.000e+00	-41.487	-41.725	-0.238	(0)

	FeNO3+2	0.000e+00	0.000e+00	-43.612	-43.850	-0.238	(0)
	Mn (NO3) 2	0.000e+00	0.000e+00	-66.631	-66.631	0.000	(0)
	Co (NO3) 2	0.000e+00	0.000e+00	-66.848	-66.848	0.000	(0)
	Pb (NO3) 2	0.000e+00	0.000e+00	-67.783	-67.783	0.000	(0)
	Zn (NO3) 2	0.000e+00	0.000e+00	-67.899	-67.899	0.000	(0)
	Cu (NO3) 2	0.000e+00	0.000e+00	-68.225	-68.225	0.000	(0)
Na	5.746e-03						
	Na+	5.710e-03	5.076e-03	-2.243	-2.295	-0.051	(0)
	NaSO4-	3.300e-05	2.946e-05	-4.481	-4.531	-0.049	(0)
	NaHCO3	2.248e-06	2.248e-06	-5.648	-5.648	0.000	(0)
	NaHPO4-	7.066e-08	6.308e-08	-7.151	-7.200	-0.049	(0)
	NaCO3-	5.601e-09	5.000e-09	-8.252	-8.301	-0.049	(0)
	NaH2BO3	5.773e-11	5.773e-11	-10.239	-10.239	0.000	(0)
	NaCrO4-	3.332e-28	2.905e-28	-27.477	-27.537	-0.060	(0)
Ni	1.876e-07						
	Ni+2	1.563e-07	9.752e-08	-6.806	-7.011	-0.205	(0)
	NiSO4	2.035e-08	2.035e-08	-7.691	-7.691	0.000	(0)
	NiHCO3+	8.938e-09	7.793e-09	-8.049	-8.108	-0.060	(0)
	NiCl+	1.636e-09	1.426e-09	-8.786	-8.846	-0.060	(0)
	NiNH3+2	1.878e-10	1.085e-10	-9.726	-9.965	-0.238	(0)
	NiCO3	1.673e-10	1.673e-10	-9.776	-9.776	0.000	(0)
	NiOH+	1.502e-11	1.310e-11	-10.823	-10.883	-0.060	(0)
	Ni (SO4) 2-2	1.321e-12	7.633e-13	-11.879	-12.117	-0.238	(0)
	Ni (NH3) 2+2	4.818e-14	2.784e-14	-13.317	-13.555	-0.238	(0)
	NiCl2	4.219e-14	4.219e-14	-13.375	-13.375	0.000	(0)
	Ni (OH) 2	2.264e-14	2.264e-14	-13.645	-13.645	0.000	(0)
	Ni (OH) 3-	3.956e-19	3.449e-19	-18.403	-18.462	-0.060	(0)
	NiSeO4	3.876e-23	3.876e-23	-22.412	-22.412	0.000	(0)
	NiNO3+	1.030e-37	8.978e-38	-36.987	-37.047	-0.060	(0)
O (0)	0.000e+00						
	O2	0.000e+00	0.000e+00	-46.715	-46.713	0.001	(0)
P	1.680e-05						
	H2PO4-	1.398e-05	1.248e-05	-4.855	-4.904	-0.049	(0)
	HPO4-2	1.858e-06	1.173e-06	-5.731	-5.931	-0.200	(0)
	MgHPO4	2.647e-07	2.647e-07	-6.577	-6.577	0.000	(0)
	MgH2PO4+	2.388e-07	2.132e-07	-6.622	-6.671	-0.049	(0)
	CaHPO4	2.128e-07	2.128e-07	-6.672	-6.672	0.000	(0)
	CaH2PO4+	1.242e-07	1.109e-07	-6.906	-6.955	-0.049	(0)
	NaHPO4-	7.066e-08	6.308e-08	-7.151	-7.200	-0.049	(0)
	FeH2PO4+	2.668e-08	2.382e-08	-7.574	-7.623	-0.049	(0)
	FeHPO4	1.815e-08	1.815e-08	-7.741	-7.741	0.000	(0)
	KHPO4-	5.074e-09	4.530e-09	-8.295	-8.344	-0.049	(0)
	H3PO4	1.098e-09	1.098e-09	-8.959	-8.959	0.000	(0)
	CaPO4-	8.600e-10	7.677e-10	-9.066	-9.115	-0.049	(0)
	CoHPO4	3.779e-10	3.779e-10	-9.423	-9.423	0.000	(0)
	FeHPO4+	3.605e-11	3.218e-11	-10.443	-10.492	-0.049	(0)
	MgPO4-	1.211e-11	1.081e-11	-10.917	-10.966	-0.049	(0)
	PO4-3	1.950e-12	6.752e-13	-11.710	-12.171	-0.461	(0)
	CrH2PO4+2	8.321e-13	4.807e-13	-12.080	-12.318	-0.238	(0)
	FeH2PO4+2	9.841e-16	6.250e-16	-15.007	-15.204	-0.197	(0)
	CrO3HPO4-2	1.861e-30	1.075e-30	-29.730	-29.968	-0.238	(0)
	CrO3H2PO4-	3.925e-34	3.422e-34	-33.406	-33.466	-0.060	(0)
Pb	1.449e-08						
	Pb+2	7.481e-09	4.669e-09	-8.126	-8.331	-0.205	(0)
	PbHCO3+	2.579e-09	2.249e-09	-8.589	-8.648	-0.060	(0)
	PbSO4	2.489e-09	2.489e-09	-8.604	-8.604	0.000	(0)
	PbCl+	1.037e-09	9.043e-10	-8.984	-9.044	-0.060	(0)
	PbCO3	6.455e-10	6.455e-10	-9.190	-9.190	0.000	(0)
	PbOH+	2.050e-10	1.787e-10	-9.688	-9.748	-0.060	(0)
	Pb (SO4) 2-2	2.825e-11	1.632e-11	-10.549	-10.787	-0.238	(0)
	PbCl2	2.288e-11	2.288e-11	-10.640	-10.640	0.000	(0)
	Pb (CO3) 2-2	1.482e-13	8.562e-14	-12.829	-13.067	-0.238	(0)
	Pb (OH) 2	8.609e-14	8.609e-14	-13.065	-13.065	0.000	(0)
	PbCl3-	6.398e-14	5.578e-14	-13.194	-13.253	-0.060	(0)
	PbCl4-2	2.375e-16	1.372e-16	-15.624	-15.863	-0.238	(0)
	Pb2OH+3	4.544e-17	1.322e-17	-16.343	-16.879	-0.536	(0)
	Pb (OH) 3-	1.504e-18	1.312e-18	-17.823	-17.882	-0.060	(0)
	Pb (OH) 4-2	8.471e-24	4.894e-24	-23.072	-23.310	-0.238	(0)

Pb3 (OH) 4+2	5.409e-25	3.125e-25	-24.267	-24.505	-0.238	(0)
Pb4 (OH) 4+4	1.253e-28	1.396e-29	-27.902	-28.855	-0.953	(0)
PbNO3+	2.864e-38	2.497e-38	-37.543	-37.603	-0.060	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-67.783	-67.783	0.000	(0)
S (6)	1.979e-03					
SO4-2	1.744e-03	1.088e-03	-2.758	-2.963	-0.205	(0)
CaSO4	1.024e-04	1.024e-04	-3.990	-3.990	0.000	(0)
MgSO4	7.392e-05	7.392e-05	-4.131	-4.131	0.000	(0)
NaSO4-	3.300e-05	2.946e-05	-4.481	-4.531	-0.049	(0)
NH4SO4-	1.980e-05	1.765e-05	-4.703	-4.753	-0.050	(0)
KSO4-	4.737e-06	4.229e-06	-5.324	-5.374	-0.049	(0)
FeSO4	1.090e-06	1.090e-06	-5.963	-5.963	0.000	(0)
MnSO4	7.886e-08	7.886e-08	-7.103	-7.103	0.000	(0)
CoSO4	6.815e-08	6.815e-08	-7.167	-7.167	0.000	(0)
HSO4-	6.789e-08	6.040e-08	-7.168	-7.219	-0.051	(0)
ZnSO4	4.277e-08	4.277e-08	-7.369	-7.369	0.000	(0)
AlSO4+	3.549e-08	3.158e-08	-7.450	-7.501	-0.051	(0)
CuSO4	2.616e-08	2.616e-08	-7.582	-7.582	0.000	(0)
NiSO4	2.035e-08	2.035e-08	-7.691	-7.691	0.000	(0)
CrOHSO4	6.448e-09	6.448e-09	-8.191	-8.191	0.000	(0)
PbSO4	2.489e-09	2.489e-09	-8.604	-8.604	0.000	(0)
Zn (SO4) 2-2	7.323e-10	4.231e-10	-9.135	-9.374	-0.238	(0)
Al (SO4) 2-	4.624e-10	4.114e-10	-9.335	-9.386	-0.051	(0)
CrSO4+	4.304e-10	3.752e-10	-9.366	-9.426	-0.060	(0)
Pb (SO4) 2-2	2.825e-11	1.632e-11	-10.549	-10.787	-0.238	(0)
Ni (SO4) 2-2	1.321e-12	7.633e-13	-11.879	-12.117	-0.238	(0)
FeSO4+	3.443e-14	3.069e-14	-13.463	-13.513	-0.050	(0)
Cr2 (OH) 2SO4+2	2.519e-14	1.455e-14	-13.599	-13.837	-0.238	(0)
Cr2 (OH) 2 (SO4) 2	9.408e-16	9.408e-16	-15.027	-15.027	0.000	(0)
Fe (SO4) 2-	8.526e-16	7.433e-16	-15.069	-15.129	-0.060	(0)
CrO3SO4-2	9.338e-33	5.395e-33	-32.030	-32.268	-0.238	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-46.993	-47.052	-0.060	(0)
Se (-2)	1.522e-24					
HSe-	1.515e-24	1.321e-24	-23.820	-23.879	-0.060	(0)
H2Se	6.623e-27	6.623e-27	-26.179	-26.179	0.000	(0)
MnSe	3.564e-30	3.564e-30	-29.448	-29.448	0.000	(0)
Se-2	2.485e-33	1.436e-33	-32.605	-32.843	-0.238	(0)
Se (4)	2.535e-08					
HSeO3-	2.512e-08	2.190e-08	-7.600	-7.660	-0.060	(0)
SeO3-2	2.207e-10	1.275e-10	-9.656	-9.895	-0.238	(0)
H2SeO3	5.915e-12	5.915e-12	-11.228	-11.228	0.000	(0)
FeHSeO3+2	2.518e-19	1.455e-19	-18.599	-18.837	-0.238	(0)
Se (6)	1.500e-18					
SeO4-2	1.499e-18	9.357e-19	-17.824	-18.029	-0.205	(0)
CoSeO4	1.414e-22	1.414e-22	-21.850	-21.850	0.000	(0)
MnSeO4	9.893e-23	9.893e-23	-22.005	-22.005	0.000	(0)
NiSeO4	3.876e-23	3.876e-23	-22.412	-22.412	0.000	(0)
HSeO4-	3.034e-23	2.645e-23	-22.518	-22.578	-0.060	(0)
ZnSeO4	2.716e-23	2.716e-23	-22.566	-22.566	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-40.351	-40.589	-0.238	(0)
Zn	3.520e-07					
Zn+2	3.003e-07	1.874e-07	-6.522	-6.727	-0.205	(0)
ZnSO4	4.277e-08	4.277e-08	-7.369	-7.369	0.000	(0)
ZnHCO3+	4.406e-09	3.842e-09	-8.356	-8.415	-0.060	(0)
ZnCl+	2.961e-09	2.629e-09	-8.529	-8.580	-0.052	(0)
Zn (SO4) 2-2	7.323e-10	4.231e-10	-9.135	-9.374	-0.238	(0)
ZnCO3	4.960e-10	4.960e-10	-9.304	-9.304	0.000	(0)
ZnOH+	2.231e-10	1.945e-10	-9.651	-9.711	-0.060	(0)
ZnOHC1	5.442e-11	5.442e-11	-10.264	-10.264	0.000	(0)
ZnCl2	1.943e-11	1.943e-11	-10.712	-10.712	0.000	(0)
Zn (OH) 2	6.895e-13	6.895e-13	-12.161	-12.161	0.000	(0)
ZnCl3-	9.866e-14	8.761e-14	-13.006	-13.057	-0.052	(0)
ZnCl4-2	3.862e-16	2.438e-16	-15.413	-15.613	-0.200	(0)
Zn (OH) 3-	6.039e-17	5.265e-17	-16.219	-16.279	-0.060	(0)
Zn (OH) 4-2	5.527e-23	3.193e-23	-22.257	-22.496	-0.238	(0)
ZnSeO4	2.716e-23	2.716e-23	-22.566	-22.566	0.000	(0)
ZnNO3+	2.043e-37	1.781e-37	-36.690	-36.749	-0.060	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-40.351	-40.589	-0.238	(0)

Zn(NO3)2 0.000e+00 0.000e+00 -67.899 -67.899 0.000 (0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-87.46	-81.19	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-29.34	-24.80	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-36.61	-24.80	11.81	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-123.96	-106.03	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-41.57	-21.44	20.13	(Co(NH3)6)Cl3
(NH4)2CrO4	-31.96	-31.58	0.38	(NH4)2CrO4
(NH4)2SeO4	-24.12	-23.67	0.45	(NH4)2SeO4
Al(OH)3(am)	-0.94	10.20	11.13	Al(OH)3
Al2(MoO4)3	-41.54	-38.39	3.15	Al2(MoO4)3
Al2O3	-0.03	20.39	20.43	Al2O3
Al4(OH)10SO4	2.76	25.46	22.70	Al4(OH)10SO4
AlAsO4:2H2O	-6.29	-1.49	4.80	AlAsO4:2H2O
AlOHSO4	-1.90	-5.13	-3.23	AlOHSO4
Alunite	3.65	2.87	-0.77	KAl3(SO4)2(OH)6
Anglesite	-3.47	-11.29	-7.83	PbSO4
Anhydrite	-1.99	-6.33	-4.34	CaSO4
Antlerite	-7.89	0.90	8.79	Cu3(OH)4SO4
Aragonite	-2.44	-10.70	-8.26	CaCO3
Arsenolite	-48.16	-51.10	-2.94	As4O6
Artinite	-11.76	-1.80	9.96	MgCO3:Mg(OH)2:3H2O
As2O5	-30.15	-23.38	6.77	As2O5
Atacamite	-5.27	2.40	7.67	Cu2(OH)3Cl
Azurite	-6.55	-23.17	-16.62	Cu3(OH)2(CO3)2
Ba(OH)2:8H2O	-19.46	5.09	24.56	Ba(OH)2:8H2O
Ba3(AsO4)2	0.85	-8.09	-8.94	Ba3(AsO4)2
BaCrO4	-23.43	-33.20	-9.77	BaCrO4
BaHPO4	-5.84	-25.62	-19.77	BaHPO4
BaMoO4	-7.51	-14.50	-6.99	BaMoO4
Barite	-0.18	-10.23	-10.05	BaSO4
BaSeO3	-10.54	-8.74	1.79	BaSeO3
BaSeO4	-17.77	-25.29	-7.53	BaSeO4
Bianchite	-7.93	-9.69	-1.76	ZnSO4:6H2O
Birnessite	-17.41	0.68	18.09	MnO2
Bixbyite	-18.72	-18.99	-0.27	Mn2O3
Boehmite	1.27	10.20	8.93	AlOOH
Brochantite	-9.53	6.30	15.83	Cu4(OH)6SO4
Brucite	-8.24	8.95	17.18	Mg(OH)2
Bunsenite	-7.40	5.35	12.74	NiO
Ca3(AsO4)2:4H2O	-18.70	3.60	22.30	Ca3(AsO4)2:4H2O
Ca3(PO4)2(beta)	-5.36	-34.44	-29.08	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-9.07	-56.15	-47.08	Ca4H(PO4)3:3H2O
CaCrO4	-27.12	-29.30	-2.19	CaCrO4
CaHPO4	-2.35	-21.72	-19.37	CaHPO4
CaHPO4:2H2O	-2.65	-21.72	-19.06	CaHPO4:2H2O
Calcite	-2.25	-10.70	-8.46	CaCO3
CaMoO4	-2.66	-10.60	-7.94	CaMoO4
CaSeO3:2H2O	-7.72	-4.85	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-18.40	-21.39	-3.00	CaSeO4:2H2O
Cerussite	-2.46	-15.67	-13.20	PbCO3
CH4(g)	-59.32	-101.14	-41.81	CH4
Chalcanthite	-7.26	-9.92	-2.66	CuSO4:5H2O
Claudetite	-47.87	-51.10	-3.23	As4O6
Clausthalite	1.43	-26.03	-27.46	PbSe
Co(BO2)2	-31.37	-4.30	27.07	Co(BO2)2
Co(OH)2	-7.22	5.87	13.09	Co(OH)2
Co(OH)3	-14.31	-16.35	-2.03	Co(OH)3
CO2(g)	-1.54	-19.70	-18.16	CO2
Co3(AsO4)2	-18.79	-5.75	13.03	Co3(AsO4)2
Co3(PO4)2	-9.11	-43.80	-34.69	Co3(PO4)2
Co3O4	-16.64	-26.82	-10.17	Co3O4
CoCl2	-19.46	-10.96	8.51	CoCl2
CoCl2:6H2O	-13.47	-10.96	2.51	CoCl2:6H2O

CoCO3	-3.88	-13.82	-9.94	CoCO3
CoFe2O4	16.96	13.90	-3.05	CoFe2O4
CoHPO4	-5.77	-24.84	-19.06	CoHPO4
CoMoO4	-6.03	-13.72	-7.69	CoMoO4
CoO	-8.03	5.88	13.90	CoO
CoSe	-7.98	-24.18	-16.20	CoSe
CoSeO3	-9.28	-7.96	1.32	CoSeO3
CoSeO4:6H2O	-22.98	-24.51	-1.53	CoSeO4:6H2O
CoSO4	-12.49	-9.45	3.04	CoSO4
CoSO4:6H2O	-6.97	-9.45	-2.48	CoSO4:6H2O
Cotunnite	-7.95	-12.80	-4.86	PbCl2
Cr(OH)2	-19.33	-8.41	10.93	Cr(OH)2
Cr(OH)3	-2.58	-1.15	1.42	Cr(OH)3
Cr(OH)3(am)	-0.40	-1.15	-0.75	Cr(OH)3
Cr2O3	-0.10	-2.31	-2.21	Cr2O3
CrCl2	-39.66	-25.24	14.42	CrCl2
CrCl3	-41.88	-26.41	15.48	CrCl3
Crmetal	-59.76	-28.77	31.00	Cr
CrO3	-35.10	-38.30	-3.19	CrO3
Cu(OH)2	-3.44	5.41	8.84	Cu(OH)2
Cu2(OH)3NO3	-35.27	-25.80	9.47	Cu2(OH)3NO3
Cu2Se(alpha)	12.17	-34.27	-46.44	Cu2Se
Cu2SO4	-17.64	-19.53	-1.89	Cu2SO4
Cu3(AsO4)2:2H2O	-13.26	-7.16	6.10	Cu3(AsO4)2:2H2O
Cu3(PO4)2	-8.35	-45.20	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-10.08	-45.20	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	5.59	-58.92	-64.51	Cu3Se2
CuCO3	-2.79	-14.29	-11.50	CuCO3
CuCrO4	-27.45	-32.89	-5.44	CuCrO4
Cumetal	-3.31	-12.28	-8.97	Cu
CuMoO4	-1.08	-14.19	-13.11	CuMoO4
CuOCuSO4	-15.22	-4.51	10.71	CuOCuSO4
Cupricferrite	6.82	13.44	6.62	CuFe2O4
Cuprite	-3.17	-4.21	-1.04	Cu2O
Cuprousferrite	10.78	1.91	-8.87	CuFeO2
CuSe	8.81	-24.65	-33.46	CuSe
CuSe2	-0.57	-34.35	-33.79	CuSe2
CuSeO3:2H2O	-9.05	-8.43	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-22.54	-24.98	-2.44	CuSeO4:5H2O
CuSO4	-13.07	-9.92	3.16	CuSO4
Diaspore	3.02	10.20	7.18	AlOOH
Dolomite(disordered)	-5.05	-21.45	-16.40	CaMg(CO3)2
Dolomite(ordered)	-4.48	-21.45	-16.97	CaMg(CO3)2
Epsomite	-4.21	-6.37	-2.16	MgSO4:7H2O
Fe(OH)2	-6.57	6.99	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	4.53	1.49	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-7.36	-5.81	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-12.86	-33.49	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-34.93	-37.94	-3.01	Fe2(SO4)3
Fe3(OH)8	-5.20	15.02	20.22	Fe3(OH)8
FeAsO4:2H2O	-8.07	-7.67	0.40	FeAsO4:2H2O
FeCr2O4	-2.93	4.69	7.62	FeCr2O4
FeMoO4	-2.54	-12.60	-10.06	FeMoO4
Ferrihydrite	0.60	4.01	3.41	Fe(OH)3
Ferroselite	-14.03	-32.76	-18.74	FeSe2
FeSe	-12.06	-23.06	-11.01	FeSe
Gibbsite	1.62	10.20	8.58	Al(OH)3
Goethite	3.34	4.01	0.67	FeOOH
Goslarite	-7.64	-9.69	-2.05	ZnSO4:7H2O
Gypsum	-1.72	-6.33	-4.61	CaSO4:2H2O
H-Jarosite	-7.19	-18.60	-11.41	(H3O)Fe3(SO4)2(OH)6
H2MoO4	-6.57	-19.60	-13.02	H2MoO4
H2Se(g)	-25.14	-30.06	-4.91	H2Se
Halite	-6.12	-4.53	1.59	NaCl
Hausmannite	-23.94	38.35	62.29	Mn3O4
Hematite	9.06	8.03	-1.03	Fe2O3
Hercynite	3.56	27.39	23.83	FeAl2O4
Hinsdalite	-8.92	-11.42	-2.50	PbAl3PO4SO4(OH)6

Huntite	-13.30	-42.95	-29.65	CaMg ₃ (CO ₃) ₄
Hydrocerussite	-8.54	-27.31	-18.77	Pb ₃ (OH) ₂ (CO ₃) ₂
Hydromagnesite	-25.93	-34.04	-8.11	Mg ₅ (CO ₃) ₄ (OH) ₂ :4H ₂ O
Hydroxylapatite	-2.83	-47.16	-44.33	Ca ₅ (PO ₄) ₃ OH
Hydroxylpyromorphite	-9.20	-71.99	-62.79	Pb ₅ (PO ₄) ₃ OH
K-Alum	-12.26	-17.52	-5.26	KAl(SO ₄) ₂ :12H ₂ O
K-Jarosite	-1.26	-15.67	-14.41	KFe ₃ (SO ₄) ₂ (OH) ₆
K ₂ Cr ₂ O ₇	-53.25	-70.73	-17.48	K ₂ Cr ₂ O ₇
K ₂ CrO ₄	-31.87	-32.44	-0.57	K ₂ CrO ₄
K ₂ MoO ₄	-17.00	-13.73	3.27	K ₂ MoO ₄
K ₂ SeO ₄	-23.80	-24.53	-0.73	K ₂ SeO ₄
Langite	-11.68	6.30	17.98	Cu ₄ (OH) ₆ SO ₄ :H ₂ O
Larnakite	-6.90	-7.26	-0.37	PbO:PbSO ₄
Laurionite	-5.01	-4.39	0.62	PbOHCl
Lepidocrocite	2.64	4.01	1.37	FeOOH
Lime	-24.28	8.99	33.28	CaO
Litharge	-8.86	4.03	12.89	PbO
Maghemite	1.64	8.03	6.39	Fe ₂ O ₃
Magnesioferrite	-0.71	16.98	17.69	Fe ₂ MgO ₄
Magnesite	-3.23	-10.75	-7.52	MgCO ₃
Magnetite	11.00	15.02	4.03	Fe ₃ O ₄
Malachite	-3.35	-8.88	-5.53	Cu ₂ (OH) ₂ CO ₃
Manganite	-9.16	16.18	25.34	MnOOH
Massicot	-9.06	4.03	13.09	PbO
Melanothallite	-17.87	-11.43	6.45	CuCl ₂
Melanterite	-6.06	-8.33	-2.27	FeSO ₄ :7H ₂ O
Mg(OH) ₂ (active)	-9.84	8.95	18.79	Mg(OH) ₂
Mg ₃ (PO ₄) ₂	-11.29	-34.57	-23.28	Mg ₃ (PO ₄) ₂
MgCr ₂ O ₄	-10.10	6.64	16.74	MgCr ₂ O ₄
MgCrO ₄	-35.00	-29.35	5.65	MgCrO ₄
MgHPO ₄ :3H ₂ O	-3.59	-21.76	-18.18	MgHPO ₄ :3H ₂ O
MgMoO ₄	-8.80	-10.65	-1.85	MgMoO ₄
MgSeO ₃ :6H ₂ O	-7.93	-4.89	3.04	MgSeO ₃ :6H ₂ O
MgSeO ₄ :6H ₂ O	-20.24	-21.44	-1.20	MgSeO ₄ :6H ₂ O
Minium	-42.34	32.45	74.78	Pb ₃ O ₄
Mirabilite	-6.20	-7.55	-1.35	Na ₂ SO ₄ :10H ₂ O
Mn ₂ (SO ₄) ₃	-59.74	-64.96	-5.22	Mn ₂ (SO ₄) ₃
Mn ₃ (AsO ₄) ₂ :8H ₂ O	-17.89	-5.39	12.50	Mn ₃ (AsO ₄) ₂ :8H ₂ O
Mn ₃ (PO ₄) ₂	-19.58	-43.43	-23.85	Mn ₃ (PO ₄) ₂
MnCl ₂ :4H ₂ O	-13.59	-10.84	2.75	MnCl ₂ :4H ₂ O
MnHPO ₄	0.69	-24.71	-25.40	MnHPO ₄
MnSe	-27.86	-24.06	3.79	MnSe
MnSeO ₃	-8.97	-7.84	1.13	MnSeO ₃
MnSeO ₃ :2H ₂ O	-8.80	-7.84	0.96	MnSeO ₃ :2H ₂ O
MnSeO ₄ :5H ₂ O	-22.34	-24.39	-2.05	MnSeO ₄ :5H ₂ O
MnSO ₄	-12.10	-9.33	2.78	MnSO ₄
MoO ₃	-11.60	-19.60	-8.00	MoO ₃
Morenosite	-7.79	-9.98	-2.18	NiSO ₄ :7H ₂ O
Na-Jarosite	-3.97	-14.72	-10.75	NaFe ₃ (SO ₄) ₂ (OH) ₆
Na ₂ Cr ₂ O ₇	-58.86	-68.83	-9.96	Na ₂ Cr ₂ O ₇
Na ₂ CrO ₄	-33.52	-30.53	2.99	Na ₂ CrO ₄
Na ₂ Mo ₂ O ₇	-14.66	-31.42	-16.76	Na ₂ Mo ₂ O ₇
Na ₂ MoO ₄	-13.34	-11.82	1.52	Na ₂ MoO ₄
Na ₂ MoO ₄ :2H ₂ O	-13.05	-11.83	1.22	Na ₂ MoO ₄ :2H ₂ O
Na ₂ SeO ₃ :5H ₂ O	-16.37	-6.07	10.30	Na ₂ SeO ₃ :5H ₂ O
Na ₂ SeO ₄	-23.90	-22.62	1.28	Na ₂ SeO ₄
Nantokite	-3.66	-10.52	-6.86	CuCl
Natron	-10.42	-11.93	-1.51	Na ₂ CO ₃ :10H ₂ O
Nesquehonite	-6.15	-10.75	-4.60	MgCO ₃ :3H ₂ O
Ni(OH) ₂	-7.73	5.35	13.08	Ni(OH) ₂
Ni ₃ (AsO ₄) ₂ :8H ₂ O	-23.03	-7.33	15.70	Ni ₃ (AsO ₄) ₂ :8H ₂ O
Ni ₃ (PO ₄) ₂	-14.07	-45.37	-31.30	Ni ₃ (PO ₄) ₂
Ni ₄ (OH) ₆ SO ₄	-25.93	6.07	32.00	Ni ₄ (OH) ₆ SO ₄
NiCO ₃	-7.60	-14.35	-6.75	NiCO ₃
NiMoO ₄	-3.10	-14.25	-11.15	NiMoO ₄
NiSe	-7.01	-24.71	-17.70	NiSe
NiSeO ₃ :2H ₂ O	-11.40	-8.49	2.91	NiSeO ₃ :2H ₂ O
NiSeO ₄ :6H ₂ O	-23.52	-25.04	-1.52	NiSeO ₄ :6H ₂ O

Nsutite	-16.82	0.68	17.50	MnO2
O2(g)	-44.08	40.72	84.80	O2
Pb(BO2)2	-12.71	-6.15	6.57	Pb(BO2)2
Pb(OH)2	-4.30	4.03	8.32	Pb(OH)2
Pb10(OH)6O(CO3)6	-69.13	-77.89	-8.76	Pb10(OH)6O(CO3)6
Pb2(OH)3Cl	-9.15	-0.36	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-18.13	8.06	26.19	Pb2O(OH)2
Pb2O3	-32.62	28.42	61.04	Pb2O3
Pb2OCO3	-11.20	-11.64	-0.44	Pb2OCO3
Pb3(AsO4)2	-17.09	-11.29	5.80	Pb3(AsO4)2
Pb3(PO4)2	-5.80	-49.33	-43.53	Pb3(PO4)2
Pb3O2CO3	-18.96	-7.61	11.35	Pb3O2CO3
Pb3O2SO4	-14.16	-3.24	10.92	Pb3O2SO4
Pb4(OH)6SO4	-20.31	0.79	21.10	Pb4(OH)6SO4
Pb4O3SO4	-21.49	0.79	22.28	Pb4O3SO4
PbCrO4	-21.54	-34.27	-12.73	PbCrO4
PbHPO4	-2.88	-26.68	-23.81	PbHPO4
Pbmetal	-20.57	-16.33	4.24	Pb
PbMoO4	0.21	-15.57	-15.78	PbMoO4
PbO:0.3H2O	-8.95	4.03	12.98	PbO:0.33H2O
PbSeO4	-19.47	-26.36	-6.88	PbSeO4
Periclase	-13.09	8.95	22.04	MgO
Phosgenite	-8.66	-28.47	-19.81	PbCl2:PbCO3
Plattnerite	-26.10	24.39	50.49	PbO2
Plumbgummite	5.99	-26.80	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-14.19	8.99	23.19	Ca(OH)2
Pyrochroite	-9.49	6.00	15.48	Mn(OH)2
Pyrolusite	-15.84	26.36	42.19	MnO2
Pyromorphite	4.03	-80.40	-84.43	Pb5(PO4)3Cl
Retgersite	-7.92	-9.97	-2.05	NiSO4:6H2O
Rhodochrosite	-3.13	-13.70	-10.57	MnCO3
Semetal(am)	-2.56	-9.70	-7.14	Se
Semetal(hex)	-1.94	-9.70	-7.76	Se
SeO2	-13.96	-13.84	0.12	SeO2
SeO3	-51.87	-30.39	21.48	SeO3
Siderite	-2.51	-12.70	-10.19	FeCO3
Smithsonite	-4.11	-14.06	-9.95	ZnCO3
Spinel	-8.67	29.34	38.01	MgAl2O4
Strengite	-0.32	-26.70	-26.37	FePO4:2H2O
Tenorite	-2.43	5.41	7.84	CuO
Thenardite	-7.90	-7.55	0.35	Na2SO4
Thermonatrite	-12.59	-11.93	0.67	Na2CO3:H2O
Tsumebite	-7.46	-17.25	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	-4.44	-40.44	-36.00	Fe3(PO4)2:8H2O
Witherite	-6.02	-14.60	-8.58	BaCO3
Zincite	-5.97	5.63	11.60	ZnO
Zincosite	-13.87	-9.69	4.18	ZnSO4
Zn(BO2)2	-12.83	-4.54	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-70.84	-67.60	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-6.57	5.63	12.20	Zn(OH)2
Zn(OH)2(am)	-7.08	5.63	12.71	Zn(OH)2
Zn(OH)2(beta)	-6.37	5.63	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-6.15	5.63	11.78	Zn(OH)2
Zn(OH)2(gamma)	-6.10	5.63	11.73	Zn(OH)2
Zn2(OH)2SO4	-11.56	-4.06	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.34	2.85	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-20.13	-6.48	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-9.10	-44.52	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-33.43	-13.75	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-21.19	7.21	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-27.17	11.33	38.50	Zn5(OH)8Cl2
ZnCl2	-18.47	-11.20	7.27	ZnCl2
ZnCO3:1H2O	-3.80	-14.06	-10.26	ZnCO3:1H2O
Znmetal	-40.97	-14.73	26.25	Zn
ZnMoO4	-3.87	-13.96	-10.09	ZnMoO4
ZnO(active)	-5.82	5.63	11.45	ZnO
ZnSe	-9.95	-24.43	-14.48	ZnSe
ZnSeO4:6H2O	-23.24	-24.76	-1.52	ZnSeO4:6H2O

ZnSO4:1H2O -9.18 -9.69 -0.51 ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 1.

Mixture 1.

3.000e-02 Solution 1
4.850e-01 Solution 2
4.850e-01 Solution 3

-----Solution composition-----

Elements	Molality	Moles
Al	3.329e-05	3.329e-05
As	2.137e-08	2.137e-08
B	6.195e-06	6.195e-06
Ba	2.113e-07	2.113e-07
C	1.348e-03	1.348e-03
Ca	9.991e-04	9.991e-04
Cd	1.400e-08	1.400e-08
Cl	1.244e-02	1.244e-02
Co	1.300e-05	1.300e-05
Cr	8.493e-08	8.493e-08
Cu	4.725e-06	4.725e-06
Fe	5.339e-04	5.339e-04
Hg	2.550e-10	2.550e-10
K	5.304e-04	5.304e-04
Mg	2.220e-03	2.220e-03
Mn	9.698e-05	9.698e-05
Mo	4.705e-08	4.705e-08
N	1.011e-03	1.011e-03
Na	1.171e-02	1.171e-02
Ni	3.043e-06	3.043e-06
P	3.338e-05	3.338e-05
Pb	1.133e-08	1.133e-08
S	3.972e-03	3.972e-03
Se	4.479e-08	4.479e-08
Zn	1.132e-06	1.132e-06

-----Description of solution-----

pH	=	6.445	Charge balance
pe	=	3.482	Adjusted to redox equilibrium
Activity of water	=	0.999	
Ionic strength (mol/kgw)	=	2.628e-02	
Mass of water (kg)	=	1.000e+00	
Total alkalinity (eq/kg)	=	8.855e-04	
Total CO2 (mol/kg)	=	1.348e-03	
Temperature (°C)	=	20.03	
Electrical balance (eq)	=	-2.198e-04	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-0.56	
Iterations	=	8	
Total H	=	1.110198e+02	
Total O	=	5.552705e+01	

-----Distribution of species-----

Log	Log	Log	mole V

Species	Molality	Activity	Molality	Activity	Gamma	cm ³ /mol
H+	4.181e-07	3.587e-07	-6.379	-6.445	-0.067	0.00
OH-	2.246e-08	1.915e-08	-7.649	-7.718	-0.069	(0)
H2O	5.551e+01	9.994e-01	1.744	-0.000	0.000	18.05
Al	3.329e-05					
Al (OH) 2+	1.537e-05	1.327e-05	-4.813	-4.877	-0.064	(0)
Al (OH) 4-	9.346e-06	8.025e-06	-5.029	-5.096	-0.066	(0)
Al (OH) 3	7.429e-06	7.429e-06	-5.129	-5.129	0.000	(0)
AlOH+2	7.724e-07	4.295e-07	-6.112	-6.367	-0.255	(0)
AlSO4+	2.793e-07	2.398e-07	-6.554	-6.620	-0.066	(0)
Al+3	8.435e-08	2.123e-08	-7.074	-7.673	-0.599	(0)
Al (SO4) 2-	5.888e-09	5.056e-09	-8.230	-8.296	-0.066	(0)
AlMo6O21-3	6.510e-37	1.190e-37	-36.186	-36.924	-0.738	(0)
As (3)	1.795e-13					
H3AsO3	1.793e-13	1.793e-13	-12.746	-12.746	0.000	(0)
H2AsO3-	2.567e-16	2.125e-16	-15.591	-15.673	-0.082	(0)
H4AsO3+	3.848e-20	3.186e-20	-19.415	-19.497	-0.082	(0)
HAsO3-2	9.238e-22	4.341e-22	-21.034	-21.362	-0.328	(0)
AsO3-3	2.146e-28	3.923e-29	-27.668	-28.406	-0.738	(0)
As (5)	2.137e-08					
H2AsO4-	1.399e-08	1.158e-08	-7.854	-7.936	-0.082	(0)
HAsO4-2	7.382e-09	3.469e-09	-8.132	-8.460	-0.328	(0)
H3AsO4	6.837e-13	6.879e-13	-12.165	-12.162	0.003	(0)
AsO4-3	1.489e-13	2.722e-14	-12.827	-13.565	-0.738	(0)
B	6.195e-06					
H3BO3	6.183e-06	6.221e-06	-5.209	-5.206	0.003	(0)
H2BO3-	1.089e-08	9.215e-09	-7.963	-8.036	-0.072	(0)
MgH2BO3+	3.871e-10	3.277e-10	-9.412	-9.485	-0.072	(0)
CaH2BO3+	2.713e-10	2.296e-10	-9.567	-9.639	-0.072	(0)
NaH2BO3	1.588e-10	1.588e-10	-9.799	-9.799	0.000	(0)
H5 (BO3) 2-	5.948e-14	5.035e-14	-13.226	-13.298	-0.072	(0)
BaH2BO3+	3.733e-14	3.160e-14	-13.428	-13.500	-0.072	(0)
H8 (BO3) 3-	3.205e-17	2.713e-17	-16.494	-16.567	-0.072	(0)
Ba	2.113e-07					
Ba+2	2.106e-07	1.141e-07	-6.677	-6.943	-0.266	(0)
BaHCO3+	6.970e-10	6.040e-10	-9.157	-9.219	-0.062	(0)
BaCO3	4.080e-12	4.080e-12	-11.389	-11.389	0.000	(0)
BaNH3+2	2.042e-13	9.597e-14	-12.690	-13.018	-0.328	(0)
BaH2BO3+	3.733e-14	3.160e-14	-13.428	-13.500	-0.072	(0)
BaOH+	1.070e-14	9.215e-15	-13.971	-14.035	-0.065	(0)
BaNO3+	5.140e-39	4.255e-39	-38.289	-38.371	-0.082	(0)
C (4)	1.348e-03					
HCO3-	7.619e-04	6.579e-04	-3.118	-3.182	-0.064	(0)
H2CO3	5.651e-04	5.651e-04	-3.248	-3.248	0.000	(0)
MgHCO3+	7.852e-06	6.719e-06	-5.105	-5.173	-0.068	(0)
CaHCO3+	5.488e-06	4.756e-06	-5.261	-5.323	-0.062	(0)
NaHCO3	4.044e-06	4.044e-06	-5.393	-5.393	0.000	(0)
FeHCO3+	1.766e-06	1.530e-06	-5.753	-5.815	-0.062	(0)
MnHCO3+	5.860e-07	5.048e-07	-6.232	-6.297	-0.065	(0)
CoHCO3+	2.829e-07	2.342e-07	-6.548	-6.630	-0.082	(0)
CuCO3	2.043e-07	2.043e-07	-6.690	-6.690	0.000	(0)
CO3-2	1.437e-07	7.782e-08	-6.843	-7.109	-0.266	(0)
NiHCO3+	1.167e-07	9.665e-08	-6.933	-7.015	-0.082	(0)
MgCO3	6.116e-08	6.116e-08	-7.214	-7.214	0.000	(0)
CaCO3	4.920e-08	4.920e-08	-7.308	-7.308	0.000	(0)
CuHCO3+	2.023e-08	1.675e-08	-7.694	-7.776	-0.082	(0)
NaCO3-	1.919e-08	1.657e-08	-7.717	-7.781	-0.064	(0)
ZnHCO3+	1.125e-08	9.313e-09	-7.949	-8.031	-0.082	(0)
CoCO3	6.652e-09	6.652e-09	-8.177	-8.177	0.000	(0)
NiCO3	3.822e-09	3.822e-09	-8.418	-8.418	0.000	(0)
ZnCO3	2.215e-09	2.215e-09	-8.655	-8.655	0.000	(0)
PbHCO3+	1.502e-09	1.243e-09	-8.823	-8.905	-0.082	(0)
BaHCO3+	6.970e-10	6.040e-10	-9.157	-9.219	-0.062	(0)
PbCO3	6.575e-10	6.575e-10	-9.182	-9.182	0.000	(0)
Cu (CO3) 2-2	9.107e-11	4.279e-11	-10.041	-10.369	-0.328	(0)
CdCO3	7.039e-12	7.039e-12	-11.152	-11.152	0.000	(0)
CdHCO3+	6.498e-12	5.380e-12	-11.187	-11.269	-0.082	(0)

	BaCO3	4.080e-12	4.080e-12	-11.389	-11.389	0.000	(0)
	Pb (CO3) 2-2	3.140e-13	1.476e-13	-12.503	-12.831	-0.328	(0)
	Cd (CO3) 2-2	8.642e-16	4.061e-16	-15.063	-15.391	-0.328	(0)
	HgCO3	1.396e-20	1.396e-20	-19.855	-19.855	0.000	(0)
	HgHCO3+	1.126e-22	9.326e-23	-21.948	-22.030	-0.082	(0)
	Hg (CO3) 2-2	7.311e-24	3.436e-24	-23.136	-23.464	-0.328	(0)
Ca		9.991e-04					
	Ca+2	8.217e-04	4.451e-04	-3.085	-3.352	-0.266	(0)
	CaSO4	1.712e-04	1.712e-04	-3.767	-3.767	0.000	(0)
	CaHCO3+	5.488e-06	4.756e-06	-5.261	-5.323	-0.062	(0)
	CaHPO4	5.624e-07	5.624e-07	-6.250	-6.250	0.000	(0)
	CaH2PO4+	1.843e-07	1.591e-07	-6.735	-6.798	-0.064	(0)
	CaCO3	4.920e-08	4.920e-08	-7.308	-7.308	0.000	(0)
	CaPO4-	4.331e-09	3.740e-09	-8.363	-8.427	-0.064	(0)
	CaNH3+2	1.590e-09	7.472e-10	-8.799	-9.127	-0.328	(0)
	CaH2BO3+	2.713e-10	2.296e-10	-9.567	-9.639	-0.072	(0)
	CaOH+	1.854e-10	1.607e-10	-9.732	-9.794	-0.062	(0)
	Ca (NH3) 2+2	8.442e-16	3.967e-16	-15.074	-15.402	-0.328	(0)
	CaNO3+	1.201e-35	9.947e-36	-34.920	-35.002	-0.082	(0)
Cd		1.400e-08					
	Cd+2	7.327e-09	3.969e-09	-8.135	-8.401	-0.266	(0)
	CdCl+	4.850e-09	4.016e-09	-8.314	-8.396	-0.082	(0)
	CdSO4	1.545e-09	1.545e-09	-8.811	-8.811	0.000	(0)
	CdCl2	1.762e-10	1.762e-10	-9.754	-9.754	0.000	(0)
	Cd (SO4) 2-2	8.295e-11	3.898e-11	-10.081	-10.409	-0.328	(0)
	CdCO3	7.039e-12	7.039e-12	-11.152	-11.152	0.000	(0)
	CdHCO3+	6.498e-12	5.380e-12	-11.187	-11.269	-0.082	(0)
	CdOHCl	4.108e-12	4.108e-12	-11.386	-11.386	0.000	(0)
	CdCl3-	1.365e-12	1.130e-12	-11.865	-11.947	-0.082	(0)
	CdOH+	7.343e-13	6.080e-13	-12.134	-12.216	-0.082	(0)
	Cd (CO3) 2-2	8.642e-16	4.061e-16	-15.063	-15.391	-0.328	(0)
	Cd (OH) 2	1.565e-16	1.565e-16	-15.805	-15.805	0.000	(0)
	Cd2OH+3	7.034e-20	1.286e-20	-19.153	-19.891	-0.738	(0)
	Cd (SeO3) 2-2	1.135e-21	5.334e-22	-20.945	-21.273	-0.328	(0)
	Cd (OH) 3-	3.241e-22	2.683e-22	-21.489	-21.571	-0.082	(0)
	CdSeO4	6.673e-25	6.673e-25	-24.176	-24.176	0.000	(0)
	Cd (OH) 4-2	2.622e-30	1.232e-30	-29.581	-29.909	-0.328	(0)
	CdNO3+	1.192e-40	0.000e+00	-39.924	-40.006	-0.082	(0)
	CdHS+	0.000e+00	0.000e+00	-55.092	-55.174	-0.082	(0)
	Cd (NO3) 2	0.000e+00	0.000e+00	-72.535	-72.535	0.000	(0)
	Cd (HS) 2	0.000e+00	0.000e+00	-102.750	-102.750	0.000	(0)
	Cd (HS) 3-	0.000e+00	0.000e+00	-155.549	-155.631	-0.082	(0)
	Cd (HS) 4-2	0.000e+00	0.000e+00	-207.888	-208.215	-0.328	(0)
Cl		1.244e-02					
	Cl-	1.244e-02	1.067e-02	-1.905	-1.972	-0.067	(0)
	CuCl2-	2.429e-06	2.079e-06	-5.615	-5.682	-0.068	(0)
	CuCl	9.214e-07	9.214e-07	-6.036	-6.036	0.000	(0)
	MnCl+	6.162e-07	5.308e-07	-6.210	-6.275	-0.065	(0)
	CoCl+	2.223e-07	1.841e-07	-6.653	-6.735	-0.082	(0)
	NiCl+	4.282e-08	3.545e-08	-7.368	-7.450	-0.082	(0)
	ZnCl+	1.493e-08	1.277e-08	-7.826	-7.894	-0.068	(0)
	CuCl3-2	8.444e-09	4.650e-09	-8.073	-8.333	-0.259	(0)
	CuCl+	8.323e-09	7.123e-09	-8.080	-8.147	-0.068	(0)
	MnCl2	7.999e-09	7.999e-09	-8.097	-8.097	0.000	(0)
	CdCl+	4.850e-09	4.016e-09	-8.314	-8.396	-0.082	(0)
	PbCl+	1.211e-09	1.002e-09	-8.917	-8.999	-0.082	(0)
	ZnOHCl	4.868e-10	4.868e-10	-9.313	-9.313	0.000	(0)
	CdCl2	1.762e-10	1.762e-10	-9.754	-9.754	0.000	(0)
	ZnCl2	1.740e-10	1.740e-10	-9.759	-9.759	0.000	(0)
	PbCl2	4.670e-11	4.670e-11	-10.331	-10.331	0.000	(0)
	MnCl3-	2.728e-11	2.350e-11	-10.564	-10.629	-0.065	(0)
	CuCl2	2.062e-11	2.062e-11	-10.686	-10.686	0.000	(0)
	CdOHCl	4.108e-12	4.108e-12	-11.386	-11.386	0.000	(0)
	NiCl2	1.930e-12	1.930e-12	-11.714	-11.714	0.000	(0)
	ZnCl3-	1.688e-12	1.445e-12	-11.773	-11.840	-0.068	(0)
	CdCl3-	1.365e-12	1.130e-12	-11.865	-11.947	-0.082	(0)
	CrCl+2	1.002e-12	4.710e-13	-11.999	-12.327	-0.328	(0)
	PbCl3-	2.530e-13	2.095e-13	-12.597	-12.679	-0.082	(0)

FeCl+2	2.150e-14	1.184e-14	-13.668	-13.927	-0.259	(0)
ZnCl4-2	1.345e-14	7.404e-15	-13.871	-14.131	-0.259	(0)
HgCl2	3.210e-15	3.210e-15	-14.493	-14.493	0.000	(0)
CuCl3-	2.193e-15	1.877e-15	-14.659	-14.727	-0.068	(0)
PbCl4-2	2.020e-15	9.491e-16	-14.695	-15.023	-0.328	(0)
CrOHC12	1.319e-15	1.319e-15	-14.880	-14.880	0.000	(0)
FeCl2+	7.664e-16	6.602e-16	-15.116	-15.180	-0.065	(0)
HgCl3-	4.182e-16	3.462e-16	-15.379	-15.461	-0.082	(0)
CrCl2+	3.707e-16	3.069e-16	-15.431	-15.513	-0.082	(0)
HgClOH	1.061e-16	1.061e-16	-15.974	-15.974	0.000	(0)
HgCl4-2	3.276e-17	1.539e-17	-16.485	-16.813	-0.328	(0)
FeCl3	7.043e-19	7.043e-19	-18.152	-18.152	0.000	(0)
CuCl4-2	2.158e-19	1.188e-19	-18.666	-18.925	-0.259	(0)
HgCl+	5.918e-20	4.900e-20	-19.228	-19.310	-0.082	(0)
CrO3Cl-	3.243e-34	2.685e-34	-33.489	-33.571	-0.082	(0)
Cr (NH3) 6Cl+2	2.713e-34	1.275e-34	-33.567	-33.895	-0.328	(0)
CoCl+2	2.531e-34	1.189e-34	-33.597	-33.925	-0.328	(0)
Co (NH3) 5Cl+2	4.924e-38	2.314e-38	-37.308	-37.636	-0.328	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-49.871	-50.199	-0.328	(0)
Co (2)	1.300e-05					
Co+2	1.076e-05	5.056e-06	-4.968	-5.296	-0.328	(0)
CoSO4	1.704e-06	1.704e-06	-5.768	-5.768	0.000	(0)
CoHCO3+	2.829e-07	2.342e-07	-6.548	-6.630	-0.082	(0)
CoCl+	2.223e-07	1.841e-07	-6.653	-6.735	-0.082	(0)
CoHPO4	1.494e-08	1.494e-08	-7.826	-7.826	0.000	(0)
CoCO3	6.652e-09	6.652e-09	-8.177	-8.177	0.000	(0)
CoOH+	3.418e-09	2.830e-09	-8.466	-8.548	-0.082	(0)
Co (NH3) +2	2.691e-09	1.264e-09	-8.570	-8.898	-0.328	(0)
Co (OH) 2	6.307e-12	6.307e-12	-11.200	-11.200	0.000	(0)
Co (NH3) 2+2	9.815e-14	4.612e-14	-13.008	-13.336	-0.328	(0)
Co2OH+3	3.923e-15	7.173e-16	-14.406	-15.144	-0.738	(0)
Co (OH) 3-	4.264e-18	3.530e-18	-17.370	-17.452	-0.082	(0)
Co (NH3) 3+2	1.648e-18	7.743e-19	-17.783	-18.111	-0.328	(0)
CoOOH-	1.803e-19	1.493e-19	-18.744	-18.826	-0.082	(0)
CoSeO4	2.108e-21	2.108e-21	-20.676	-20.676	0.000	(0)
Co (NH3) 4+2	1.153e-23	5.420e-24	-22.938	-23.266	-0.328	(0)
Co4 (OH) 4+4	2.626e-25	1.280e-26	-24.581	-25.893	-1.312	(0)
Co (OH) 4-2	3.340e-26	1.570e-26	-25.476	-25.804	-0.328	(0)
CoNO2+	5.319e-28	4.404e-28	-27.274	-27.356	-0.082	(0)
Co (NH3) 5+2	2.553e-29	1.199e-29	-28.593	-28.921	-0.328	(0)
CoNO3+	6.593e-38	5.459e-38	-37.181	-37.263	-0.082	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-69.121	-69.121	0.000	(0)
Co (3)	1.854e-29					
CoOH+2	1.854e-29	8.714e-30	-28.732	-29.060	-0.328	(0)
CoCl+2	2.531e-34	1.189e-34	-33.597	-33.925	-0.328	(0)
Co+3	2.428e-34	6.113e-35	-33.615	-34.214	-0.599	(0)
Co (NH3) 5Cl+2	4.924e-38	2.314e-38	-37.308	-37.636	-0.328	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-46.034	-46.116	-0.082	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-49.871	-50.199	-0.328	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-50.941	-51.269	-0.328	(0)
Cr (2)	2.692e-21					
Cr+2	2.692e-21	1.265e-21	-20.570	-20.898	-0.328	(0)
Cr (3)	8.493e-08					
Cr (OH) 2+	4.249e-08	3.518e-08	-7.372	-7.454	-0.082	(0)
Cr (OH) +2	3.737e-08	1.756e-08	-7.428	-7.755	-0.328	(0)
CrOHSO4	4.310e-09	4.310e-09	-8.365	-8.365	0.000	(0)
Cr (OH) 3	3.708e-10	3.708e-10	-9.431	-9.431	0.000	(0)
Cr+3	2.229e-10	4.075e-11	-9.652	-10.390	-0.738	(0)
CrSO4+	1.638e-10	1.356e-10	-9.786	-9.868	-0.082	(0)
CrCl+2	1.002e-12	4.710e-13	-11.999	-12.327	-0.328	(0)
CrO2-	5.932e-13	4.912e-13	-12.227	-12.309	-0.082	(0)
Cr (OH) 4-	5.002e-13	4.141e-13	-12.301	-12.383	-0.082	(0)
CrH2PO4+2	3.189e-13	1.498e-13	-12.496	-12.824	-0.328	(0)
Cr2 (OH) 2SO4+2	8.546e-15	4.016e-15	-14.068	-14.396	-0.328	(0)
CrOHC12	1.319e-15	1.319e-15	-14.880	-14.880	0.000	(0)
Cr2 (OH) 2 (SO4) 2	4.204e-16	4.204e-16	-15.376	-15.376	0.000	(0)
CrCl2+	3.707e-16	3.069e-16	-15.431	-15.513	-0.082	(0)
Cr (NH3) 5OH+2	9.967e-28	4.684e-28	-27.001	-27.329	-0.328	(0)

Cr (NH3) 6+3	5.167e-33	9.448e-34	-32.287	-33.025	-0.738	(0)
Cr (NH3) 6Cl+2	2.713e-34	1.275e-34	-33.567	-33.895	-0.328	(0)
CrNO3+2	0.000e+00	0.000e+00	-43.779	-44.107	-0.328	(0)
Cr (6)	3.161e-26					
CrO4-2	1.773e-26	9.606e-27	-25.751	-26.017	-0.266	(0)
HCrO4-	1.328e-26	1.100e-26	-25.877	-25.959	-0.082	(0)
NaCrO4-	5.738e-28	4.751e-28	-27.241	-27.323	-0.082	(0)
KCrO4-	1.938e-29	1.605e-29	-28.713	-28.795	-0.082	(0)
CrO3HPO4-2	1.441e-30	6.771e-31	-29.841	-30.169	-0.328	(0)
CrO3SO4-2	4.572e-33	2.148e-33	-32.340	-32.668	-0.328	(0)
H2CrO4	2.483e-33	2.483e-33	-32.605	-32.605	0.000	(0)
CrO3Cl-	3.243e-34	2.685e-34	-33.489	-33.571	-0.082	(0)
CrO3H2PO4-	1.413e-34	1.170e-34	-33.850	-33.932	-0.082	(0)
Cr2O7-2	0.000e+00	0.000e+00	-49.993	-50.321	-0.328	(0)
Cu (1)	3.442e-06					
CuCl2-	2.429e-06	2.079e-06	-5.615	-5.682	-0.068	(0)
CuCl	9.214e-07	9.214e-07	-6.036	-6.036	0.000	(0)
Cu+	8.286e-08	6.861e-08	-7.082	-7.164	-0.082	(0)
CuCl3-2	8.444e-09	4.650e-09	-8.073	-8.333	-0.259	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-100.112	-100.444	-0.332	(0)
CuS4S5-3	0.000e+00	0.000e+00	-100.857	-101.174	-0.317	(0)
Cu (2)	1.283e-06					
Cu+2	8.232e-07	4.459e-07	-6.085	-6.351	-0.266	(0)
CuCO3	2.043e-07	2.043e-07	-6.690	-6.690	0.000	(0)
CuSO4	1.696e-07	1.696e-07	-6.771	-6.771	0.000	(0)
CuOH+	3.618e-08	3.097e-08	-7.442	-7.509	-0.068	(0)
CuNH3+2	2.119e-08	9.956e-09	-7.674	-8.002	-0.328	(0)
CuHCO3+	2.023e-08	1.675e-08	-7.694	-7.776	-0.082	(0)
CuCl+	8.323e-09	7.123e-09	-8.080	-8.147	-0.068	(0)
Cu (OH) 2	2.214e-10	2.214e-10	-9.655	-9.655	0.000	(0)
Cu (CO3) 2-2	9.107e-11	4.279e-11	-10.041	-10.369	-0.328	(0)
Cu2 (OH) 2+2	4.953e-11	2.328e-11	-10.305	-10.633	-0.328	(0)
CuCl2	2.062e-11	2.062e-11	-10.686	-10.686	0.000	(0)
Cu (OH) 3-	1.539e-14	1.274e-14	-13.813	-13.895	-0.082	(0)
CuCl3-	2.193e-15	1.877e-15	-14.659	-14.727	-0.068	(0)
CuCl4-2	2.158e-19	1.188e-19	-18.666	-18.925	-0.259	(0)
Cu (OH) 4-2	5.987e-21	2.813e-21	-20.223	-20.551	-0.328	(0)
CuNO2+	6.970e-28	5.770e-28	-27.157	-27.239	-0.082	(0)
CuNO3+	1.193e-38	9.877e-39	-37.923	-38.005	-0.082	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-49.137	-49.137	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-71.084	-71.084	0.000	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-144.711	-144.793	-0.082	(0)
Fe (2)	5.239e-04					
Fe+2	4.344e-04	2.041e-04	-3.362	-3.690	-0.328	(0)
FeSO4	8.360e-05	8.360e-05	-4.078	-4.078	0.000	(0)
FeHPO4	2.201e-06	2.201e-06	-5.657	-5.657	0.000	(0)
FeH2PO4+	1.816e-06	1.568e-06	-5.741	-5.805	-0.064	(0)
FeHCO3+	1.766e-06	1.530e-06	-5.753	-5.815	-0.062	(0)
FeOH+	1.807e-07	1.556e-07	-6.743	-6.808	-0.065	(0)
Fe (OH) 2	2.242e-12	2.242e-12	-11.649	-11.649	0.000	(0)
Fe (OH) 3-	2.204e-14	1.898e-14	-13.657	-13.722	-0.065	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-104.301	-104.301	0.000	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-156.963	-157.045	-0.082	(0)
Fe (3)	9.973e-06					
Fe (OH) 2+	9.844e-06	8.501e-06	-5.007	-5.071	-0.064	(0)
Fe (OH) 3	1.259e-07	1.259e-07	-6.900	-6.900	0.000	(0)
FeHPO4+	1.373e-09	1.185e-09	-8.862	-8.926	-0.064	(0)
FeOH+2	1.063e-09	5.852e-10	-8.974	-9.233	-0.259	(0)
Fe (OH) 4-	7.747e-10	6.690e-10	-9.111	-9.175	-0.064	(0)
FeSO4+	8.319e-13	7.166e-13	-12.080	-12.145	-0.065	(0)
Fe+3	1.708e-13	4.300e-14	-12.767	-13.367	-0.599	(0)
Fe (SO4) 2-	3.393e-14	2.809e-14	-13.469	-13.551	-0.082	(0)
FeH2PO4+2	2.251e-14	1.251e-14	-13.648	-13.903	-0.255	(0)
FeCl+2	2.150e-14	1.184e-14	-13.668	-13.927	-0.259	(0)
FeCl2+	7.664e-16	6.602e-16	-15.116	-15.180	-0.065	(0)
Fe2 (OH) 2+4	2.778e-16	1.355e-17	-15.556	-16.868	-1.312	(0)
FeHSeO3+2	7.416e-18	3.485e-18	-17.130	-17.458	-0.328	(0)
FeCl3	7.043e-19	7.043e-19	-18.152	-18.152	0.000	(0)

Fe3 (OH) 4+5	1.772e-19	1.580e-21	-18.752	-20.801	-2.050	(0)
FeNO3+2	0.000e+00	0.000e+00	-44.095	-44.423	-0.328	(0)
H (0)	2.065e-23					
H2	1.033e-23	1.039e-23	-22.986	-22.983	0.003	(0)
Hg (0)	2.550e-10					
Hg	2.550e-10	2.550e-10	-9.593	-9.593	0.000	(0)
Hg (1)	1.004e-25					
Hg2+2	5.021e-26	2.359e-26	-25.299	-25.627	-0.328	(0)
Hg (2)	3.770e-15					
HgCl2	3.210e-15	3.210e-15	-14.493	-14.493	0.000	(0)
HgCl3-	4.182e-16	3.462e-16	-15.379	-15.461	-0.082	(0)
HgClOH	1.061e-16	1.061e-16	-15.974	-15.974	0.000	(0)
HgCl4-2	3.276e-17	1.539e-17	-16.485	-16.813	-0.328	(0)
Hg (NH3) 2+2	1.935e-18	9.091e-19	-17.713	-18.041	-0.328	(0)
Hg (OH) 2	7.400e-19	7.445e-19	-18.131	-18.128	0.003	(0)
HgCl+	5.918e-20	4.900e-20	-19.228	-19.310	-0.082	(0)
HgCO3	1.396e-20	1.396e-20	-19.855	-19.855	0.000	(0)
HgNH3+2	2.684e-22	1.261e-22	-21.571	-21.899	-0.328	(0)
HgOH+	2.301e-22	1.905e-22	-21.638	-21.720	-0.082	(0)
HgHCO3+	1.126e-22	9.326e-23	-21.948	-22.030	-0.082	(0)
Hg (NH3) 3+2	1.613e-23	7.580e-24	-22.792	-23.120	-0.328	(0)
Hg (CO3) 2-2	7.311e-24	3.436e-24	-23.136	-23.464	-0.328	(0)
Hg+2	4.186e-25	1.967e-25	-24.378	-24.706	-0.328	(0)
HgSO4	6.917e-26	6.917e-26	-25.160	-25.160	0.000	(0)
Hg (OH) 3-	3.176e-27	2.629e-27	-26.498	-26.580	-0.082	(0)
Hg (NH3) 4+2	2.702e-28	1.270e-28	-27.568	-27.896	-0.328	(0)
HgNO3+	0.000e+00	0.000e+00	-57.342	-57.424	-0.082	(0)
Hg (NO3) 2	0.000e+00	0.000e+00	-89.972	-89.972	0.000	(0)
HgHS2-	0.000e+00	0.000e+00	-95.930	-96.012	-0.082	(0)
Hg (HS) 2	0.000e+00	0.000e+00	-96.063	-96.063	0.000	(0)
HgS2-2	0.000e+00	0.000e+00	-97.947	-98.275	-0.328	(0)
K	5.304e-04					
K+	5.241e-04	4.496e-04	-3.281	-3.347	-0.067	(0)
KSO4-	6.316e-06	5.455e-06	-5.200	-5.263	-0.064	(0)
KHPO4-	1.070e-08	9.238e-09	-7.971	-8.034	-0.064	(0)
KCrO4-	1.938e-29	1.605e-29	-28.713	-28.795	-0.082	(0)
Mg	2.220e-03					
Mg+2	1.894e-03	1.026e-03	-2.723	-2.989	-0.266	(0)
MgSO4	3.161e-04	3.161e-04	-3.500	-3.500	0.000	(0)
MgHCO3+	7.852e-06	6.719e-06	-5.105	-5.173	-0.068	(0)
MgHPO4	1.789e-06	1.789e-06	-5.747	-5.747	0.000	(0)
MgH2PO4+	9.062e-07	7.825e-07	-6.043	-6.106	-0.064	(0)
MgCO3	6.116e-08	6.116e-08	-7.214	-7.214	0.000	(0)
MgOH+	8.290e-09	7.205e-09	-8.081	-8.142	-0.061	(0)
MgH2BO3+	3.871e-10	3.277e-10	-9.412	-9.485	-0.072	(0)
MgPO4-	1.560e-10	1.347e-10	-9.807	-9.871	-0.064	(0)
Mn (2)	9.698e-05					
Mn+2	8.410e-05	3.952e-05	-4.075	-4.403	-0.328	(0)
MnSO4	1.167e-05	1.167e-05	-4.933	-4.933	0.000	(0)
MnCl+	6.162e-07	5.308e-07	-6.210	-6.275	-0.065	(0)
MnHCO3+	5.860e-07	5.048e-07	-6.232	-6.297	-0.065	(0)
MnCl2	7.999e-09	7.999e-09	-8.097	-8.097	0.000	(0)
MnOH+	2.207e-09	1.901e-09	-8.656	-8.721	-0.065	(0)
MnCl3-	2.728e-11	2.350e-11	-10.564	-10.629	-0.065	(0)
Mn (OH) 3-	1.573e-20	1.355e-20	-19.803	-19.868	-0.065	(0)
MnSeO4	8.729e-21	8.729e-21	-20.059	-20.059	0.000	(0)
MnSe	3.259e-26	3.259e-26	-25.487	-25.487	0.000	(0)
Mn (OH) 4-2	2.228e-27	1.227e-27	-26.652	-26.911	-0.259	(0)
MnNO3+	5.153e-37	4.266e-37	-36.288	-36.370	-0.082	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-68.132	-68.132	0.000	(0)
Mn (3)	1.019e-26					
Mn+3	1.019e-26	2.565e-27	-25.992	-26.591	-0.599	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-59.187	-59.446	-0.259	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-65.597	-65.667	-0.071	(0)
Mo	4.705e-08					
MoO4-2	4.685e-08	2.538e-08	-7.329	-7.596	-0.266	(0)

HM04-	1.908e-10	1.580e-10	-9.719	-9.801	-0.082	(0)
H2MoO4	5.686e-13	5.686e-13	-12.245	-12.245	0.000	(0)
AlMo6O21-3	6.510e-37	1.190e-37	-36.186	-36.924	-0.738	(0)
Mo7O24-6	0.000e+00	0.000e+00	-48.111	-51.062	-2.952	(0)
HM07O24-5	0.000e+00	0.000e+00	-49.101	-51.151	-2.050	(0)
H2Mo7O24-4	0.000e+00	0.000e+00	-51.511	-52.823	-1.312	(0)
H3Mo7O24-3	0.000e+00	0.000e+00	-55.278	-56.016	-0.738	(0)
N(-3)	1.011e-03					
NH4+	9.912e-04	8.390e-04	-3.004	-3.076	-0.072	(0)
NH4SO4-	1.839e-05	1.584e-05	-4.735	-4.800	-0.065	(0)
NH3	9.345e-07	9.345e-07	-6.029	-6.029	0.000	(0)
CuNH3+2	2.119e-08	9.956e-09	-7.674	-8.002	-0.328	(0)
NiNH3+2	3.173e-09	1.491e-09	-8.499	-8.827	-0.328	(0)
Co(NH3)+2	2.691e-09	1.264e-09	-8.570	-8.898	-0.328	(0)
CaNH3+2	1.590e-09	7.472e-10	-8.799	-9.127	-0.328	(0)
Ni(NH3)+2+2	8.297e-13	3.899e-13	-12.081	-12.409	-0.328	(0)
BaNH3+2	2.042e-13	9.597e-14	-12.690	-13.018	-0.328	(0)
Co(NH3)+2+2	9.815e-14	4.612e-14	-13.008	-13.336	-0.328	(0)
Ca(NH3)+2+2	8.442e-16	3.967e-16	-15.074	-15.402	-0.328	(0)
Hg(NH3)+2+2	1.935e-18	9.091e-19	-17.713	-18.041	-0.328	(0)
Co(NH3)+3+2	1.648e-18	7.743e-19	-17.783	-18.111	-0.328	(0)
HgNH3+2	2.684e-22	1.261e-22	-21.571	-21.899	-0.328	(0)
Hg(NH3)+3+2	1.613e-23	7.580e-24	-22.792	-23.120	-0.328	(0)
Co(NH3)+4+2	1.153e-23	5.420e-24	-22.938	-23.266	-0.328	(0)
Cr(NH3)+5OH+2	9.967e-28	4.684e-28	-27.001	-27.329	-0.328	(0)
Hg(NH3)+4+2	2.702e-28	1.270e-28	-27.568	-27.896	-0.328	(0)
Co(NH3)+5+2	2.553e-29	1.199e-29	-28.593	-28.921	-0.328	(0)
Cr(NH3)+6+3	5.167e-33	9.448e-34	-32.287	-33.025	-0.738	(0)
Cr(NH3)+6Cl+2	2.713e-34	1.275e-34	-33.567	-33.895	-0.328	(0)
Co(NH3)+5Cl+2	4.924e-38	2.314e-38	-37.308	-37.636	-0.328	(0)
Co(NH3)+6SO4+	0.000e+00	0.000e+00	-46.034	-46.116	-0.082	(0)
Co(NH3)+6Cl+2	0.000e+00	0.000e+00	-49.871	-50.199	-0.328	(0)
Co(NH3)+6OH+2	0.000e+00	0.000e+00	-50.941	-51.269	-0.328	(0)
N(3)	1.455e-23					
NO2-	1.454e-23	1.236e-23	-22.837	-22.908	-0.071	(0)
CuNO2+	6.970e-28	5.770e-28	-27.157	-27.239	-0.082	(0)
CoNO2+	5.319e-28	4.404e-28	-27.274	-27.356	-0.082	(0)
Cu(NO2)+2	0.000e+00	0.000e+00	-49.137	-49.137	0.000	(0)
N(5)	7.952e-33					
NO3-	7.940e-33	6.811e-33	-32.100	-32.167	-0.067	(0)
CaNO3+	1.201e-35	9.947e-36	-34.920	-35.002	-0.082	(0)
MnNO3+	5.153e-37	4.266e-37	-36.288	-36.370	-0.082	(0)
CoNO3+	6.593e-38	5.459e-38	-37.181	-37.263	-0.082	(0)
NiNO3+	2.721e-38	2.253e-38	-37.565	-37.647	-0.082	(0)
CuNO3+	1.193e-38	9.877e-39	-37.923	-38.005	-0.082	(0)
ZnNO3+	1.055e-38	8.733e-39	-37.977	-38.059	-0.082	(0)
BaNO3+	5.140e-39	4.255e-39	-38.289	-38.371	-0.082	(0)
PbNO3+	3.373e-40	2.793e-40	-39.472	-39.554	-0.082	(0)
CdNO3+	1.192e-40	0.000e+00	-39.924	-40.006	-0.082	(0)
CrNO3+2	0.000e+00	0.000e+00	-43.779	-44.107	-0.328	(0)
FeNO3+2	0.000e+00	0.000e+00	-44.095	-44.423	-0.328	(0)
HgNO3+	0.000e+00	0.000e+00	-57.342	-57.424	-0.082	(0)
Mn(NO3)+2	0.000e+00	0.000e+00	-68.132	-68.132	0.000	(0)
Co(NO3)+2	0.000e+00	0.000e+00	-69.121	-69.121	0.000	(0)
Zn(NO3)+2	0.000e+00	0.000e+00	-70.939	-70.939	0.000	(0)
Cu(NO3)+2	0.000e+00	0.000e+00	-71.084	-71.084	0.000	(0)
Pb(NO3)+2	0.000e+00	0.000e+00	-71.465	-71.465	0.000	(0)
Cd(NO3)+2	0.000e+00	0.000e+00	-72.535	-72.535	0.000	(0)
Hg(NO3)+2	0.000e+00	0.000e+00	-89.972	-89.972	0.000	(0)
Na	1.171e-02					
Na+	1.160e-02	9.952e-03	-1.936	-2.002	-0.067	(0)
NaSO4-	1.083e-04	9.354e-05	-3.965	-4.029	-0.064	(0)
NaHCO3	4.044e-06	4.044e-06	-5.393	-5.393	0.000	(0)
NaHPO4-	3.667e-07	3.167e-07	-6.436	-6.499	-0.064	(0)
NaCO3-	1.919e-08	1.657e-08	-7.717	-7.781	-0.064	(0)
NaH2BO3	1.588e-10	1.588e-10	-9.799	-9.799	0.000	(0)
NaCrO4-	5.738e-28	4.751e-28	-27.241	-27.323	-0.082	(0)
Ni	3.043e-06					

Ni+2	2.431e-06	1.317e-06	-5.614	-5.881	-0.266	(0)
NiSO4	4.450e-07	4.450e-07	-6.352	-6.352	0.000	(0)
NiHCO3+	1.167e-07	9.665e-08	-6.933	-7.015	-0.082	(0)
NiCl+	4.282e-08	3.545e-08	-7.368	-7.450	-0.082	(0)
NiCO3	3.822e-09	3.822e-09	-8.418	-8.418	0.000	(0)
NiNH3+2	3.173e-09	1.491e-09	-8.499	-8.827	-0.328	(0)
NiOH+	3.941e-10	3.263e-10	-9.404	-9.486	-0.082	(0)
Ni (SO4) 2-2	5.749e-11	2.702e-11	-10.240	-10.568	-0.328	(0)
NiCl2	1.930e-12	1.930e-12	-11.714	-11.714	0.000	(0)
Ni (OH) 2	1.036e-12	1.036e-12	-11.985	-11.985	0.000	(0)
Ni (NH3) 2+2	8.297e-13	3.899e-13	-12.081	-12.409	-0.328	(0)
Ni (OH) 3-	3.511e-17	2.907e-17	-16.455	-16.537	-0.082	(0)
NiSeO4	5.053e-22	5.053e-22	-21.296	-21.296	0.000	(0)
NiNO3+	2.721e-38	2.253e-38	-37.565	-37.647	-0.082	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-47.717	-47.714	0.003	(0)
P	3.338e-05					
H2PO4-	2.007e-05	1.734e-05	-4.697	-4.761	-0.064	(0)
HPO4-2	5.450e-06	3.001e-06	-5.264	-5.523	-0.259	(0)
FeHPO4	2.201e-06	2.201e-06	-5.657	-5.657	0.000	(0)
FeH2PO4+	1.816e-06	1.568e-06	-5.741	-5.805	-0.064	(0)
MgHPO4	1.789e-06	1.789e-06	-5.747	-5.747	0.000	(0)
MgH2PO4+	9.062e-07	7.825e-07	-6.043	-6.106	-0.064	(0)
CaHPO4	5.624e-07	5.624e-07	-6.250	-6.250	0.000	(0)
NaHPO4-	3.667e-07	3.167e-07	-6.436	-6.499	-0.064	(0)
CaH2PO4+	1.843e-07	1.591e-07	-6.735	-6.798	-0.064	(0)
CoHPO4	1.494e-08	1.494e-08	-7.826	-7.826	0.000	(0)
KHPO4-	1.070e-08	9.238e-09	-7.971	-8.034	-0.064	(0)
CaPO4-	4.331e-09	3.740e-09	-8.363	-8.427	-0.064	(0)
FeHPO4+	1.373e-09	1.185e-09	-8.862	-8.926	-0.064	(0)
H3PO4	8.284e-10	8.284e-10	-9.082	-9.082	0.000	(0)
MgPO4-	1.560e-10	1.347e-10	-9.807	-9.871	-0.064	(0)
PO4-3	1.265e-11	3.184e-12	-10.898	-11.497	-0.599	(0)
CrH2PO4+2	3.189e-13	1.498e-13	-12.496	-12.824	-0.328	(0)
FeH2PO4+2	2.251e-14	1.251e-14	-13.648	-13.903	-0.255	(0)
CrO3HPO4-2	1.441e-30	6.771e-31	-29.841	-30.169	-0.328	(0)
CrO3H2PO4-	1.413e-34	1.170e-34	-33.850	-33.932	-0.082	(0)
Pb	1.133e-08					
Pb+2	5.189e-09	2.811e-09	-8.285	-8.551	-0.266	(0)
PbSO4	2.426e-09	2.426e-09	-8.615	-8.615	0.000	(0)
PbHCO3+	1.502e-09	1.243e-09	-8.823	-8.905	-0.082	(0)
PbCl+	1.211e-09	1.002e-09	-8.917	-8.999	-0.082	(0)
PbCO3	6.575e-10	6.575e-10	-9.182	-9.182	0.000	(0)
PbOH+	2.392e-10	1.981e-10	-9.621	-9.703	-0.082	(0)
Pb (SO4) 2-2	5.482e-11	2.576e-11	-10.261	-10.589	-0.328	(0)
PbCl2	4.670e-11	4.670e-11	-10.331	-10.331	0.000	(0)
Pb (CO3) 2-2	3.140e-13	1.476e-13	-12.503	-12.831	-0.328	(0)
PbCl3-	2.530e-13	2.095e-13	-12.597	-12.679	-0.082	(0)
Pb (OH) 2	1.757e-13	1.757e-13	-12.755	-12.755	0.000	(0)
PbCl4-2	2.020e-15	9.491e-16	-14.695	-15.023	-0.328	(0)
Pb2OH+3	4.825e-17	8.822e-18	-16.316	-17.054	-0.738	(0)
Pb (OH) 3-	5.953e-18	4.929e-18	-17.225	-17.307	-0.082	(0)
Pb (OH) 4-2	7.207e-23	3.387e-23	-22.142	-22.470	-0.328	(0)
Pb3 (OH) 4+2	1.675e-24	7.872e-25	-23.776	-24.104	-0.328	(0)
Pb4 (OH) 4+4	4.335e-28	2.114e-29	-27.363	-28.675	-1.312	(0)
PbNO3+	3.373e-40	2.793e-40	-39.472	-39.554	-0.082	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-71.465	-71.465	0.000	(0)
Pb (HS) 2	0.000e+00	0.000e+00	-102.842	-102.842	0.000	(0)
Pb (HS) 3-	0.000e+00	0.000e+00	-156.241	-156.323	-0.082	(0)
S(-2)	0.000e+00					
H2S	0.000e+00	0.000e+00	-54.140	-54.140	0.000	(0)
HS-	0.000e+00	0.000e+00	-54.699	-54.781	-0.082	(0)
CdHS+	0.000e+00	0.000e+00	-55.092	-55.174	-0.082	(0)
S5-2	0.000e+00	0.000e+00	-57.484	-57.812	-0.328	(0)
S6-2	0.000e+00	0.000e+00	-57.888	-58.216	-0.328	(0)
S4-2	0.000e+00	0.000e+00	-58.085	-58.413	-0.328	(0)
S3-2	0.000e+00	0.000e+00	-58.899	-59.227	-0.328	(0)
S2-2	0.000e+00	0.000e+00	-59.928	-60.256	-0.328	(0)

S-2	0.000e+00	0.000e+00	-65.523	-65.782	-0.259	(0)
HgHS2-	0.000e+00	0.000e+00	-95.930	-96.012	-0.082	(0)
Hg (HS) 2	0.000e+00	0.000e+00	-96.063	-96.063	0.000	(0)
HgS2-2	0.000e+00	0.000e+00	-97.947	-98.275	-0.328	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-100.112	-100.444	-0.332	(0)
CuS4S5-3	0.000e+00	0.000e+00	-100.857	-101.174	-0.317	(0)
ZnS (HS) -	0.000e+00	0.000e+00	-102.530	-102.612	-0.082	(0)
Cd (HS) 2	0.000e+00	0.000e+00	-102.750	-102.750	0.000	(0)
Pb (HS) 2	0.000e+00	0.000e+00	-102.842	-102.842	0.000	(0)
Zn (HS) 2	0.000e+00	0.000e+00	-103.047	-103.047	0.000	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-104.301	-104.301	0.000	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-144.711	-144.793	-0.082	(0)
Zn (HS) 3-	0.000e+00	0.000e+00	-154.465	-154.547	-0.082	(0)
Cd (HS) 3-	0.000e+00	0.000e+00	-155.549	-155.631	-0.082	(0)
Pb (HS) 3-	0.000e+00	0.000e+00	-156.241	-156.323	-0.082	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-156.963	-157.045	-0.082	(0)
ZnS (HS) 2-2	0.000e+00	0.000e+00	-157.754	-158.082	-0.328	(0)
Cd (HS) 4-2	0.000e+00	0.000e+00	-207.888	-208.215	-0.328	(0)
Zn (HS) 4-2	0.000e+00	0.000e+00	-210.460	-210.788	-0.328	(0)
S (6)	3.972e-03					
SO4-2	3.254e-03	1.762e-03	-2.488	-2.754	-0.266	(0)
MgSO4	3.161e-04	3.161e-04	-3.500	-3.500	0.000	(0)
CaSO4	1.712e-04	1.712e-04	-3.767	-3.767	0.000	(0)
NaSO4-	1.083e-04	9.354e-05	-3.965	-4.029	-0.064	(0)
FeSO4	8.360e-05	8.360e-05	-4.078	-4.078	0.000	(0)
NH4SO4-	1.839e-05	1.584e-05	-4.735	-4.800	-0.065	(0)
MnSO4	1.167e-05	1.167e-05	-4.933	-4.933	0.000	(0)
KSO4-	6.316e-06	5.455e-06	-5.200	-5.263	-0.064	(0)
CoSO4	1.704e-06	1.704e-06	-5.768	-5.768	0.000	(0)
NiSO4	4.450e-07	4.450e-07	-6.352	-6.352	0.000	(0)
AlSO4+	2.793e-07	2.398e-07	-6.554	-6.620	-0.066	(0)
ZnSO4	1.828e-07	1.828e-07	-6.738	-6.738	0.000	(0)
CuSO4	1.696e-07	1.696e-07	-6.771	-6.771	0.000	(0)
HSO4-	6.190e-08	5.315e-08	-7.208	-7.275	-0.066	(0)
Zn (SO4) 2-2	6.229e-09	2.927e-09	-8.206	-8.534	-0.328	(0)
Al (SO4) 2-	5.888e-09	5.056e-09	-8.230	-8.296	-0.066	(0)
CrOHSO4	4.310e-09	4.310e-09	-8.365	-8.365	0.000	(0)
PbSO4	2.426e-09	2.426e-09	-8.615	-8.615	0.000	(0)
CdSO4	1.545e-09	1.545e-09	-8.811	-8.811	0.000	(0)
CrSO4+	1.638e-10	1.356e-10	-9.786	-9.868	-0.082	(0)
Cd (SO4) 2-2	8.295e-11	3.898e-11	-10.081	-10.409	-0.328	(0)
Ni (SO4) 2-2	5.749e-11	2.702e-11	-10.240	-10.568	-0.328	(0)
Pb (SO4) 2-2	5.482e-11	2.576e-11	-10.261	-10.589	-0.328	(0)
FeSO4+	8.319e-13	7.166e-13	-12.080	-12.145	-0.065	(0)
Fe (SO4) 2-	3.393e-14	2.809e-14	-13.469	-13.551	-0.082	(0)
Cr2 (OH) 2SO4+2	8.546e-15	4.016e-15	-14.068	-14.396	-0.328	(0)
Cr2 (OH) 2 (SO4) 2	4.204e-16	4.204e-16	-15.376	-15.376	0.000	(0)
HgSO4	6.917e-26	6.917e-26	-25.160	-25.160	0.000	(0)
CrO3SO4-2	4.572e-33	2.148e-33	-32.340	-32.668	-0.328	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-46.034	-46.116	-0.082	(0)
Se (-2)	8.692e-23					
HSe-	8.669e-23	7.178e-23	-22.062	-22.144	-0.082	(0)
H2Se	1.954e-25	1.954e-25	-24.709	-24.709	0.000	(0)
MnSe	3.259e-26	3.259e-26	-25.487	-25.487	0.000	(0)
Se-2	3.064e-31	1.440e-31	-30.514	-30.842	-0.328	(0)
Se (4)	4.479e-08					
HSeO3-	4.395e-08	3.639e-08	-7.357	-7.439	-0.082	(0)
SeO3-2	8.304e-10	3.902e-10	-9.081	-9.409	-0.328	(0)
H2SeO3	5.337e-12	5.337e-12	-11.273	-11.273	0.000	(0)
FeHSeO3+2	7.416e-18	3.485e-18	-17.130	-17.458	-0.328	(0)
Cd (SeO3) 2-2	1.135e-21	5.334e-22	-20.945	-21.273	-0.328	(0)
Se (6)	1.679e-18					
SeO4-2	1.667e-18	9.030e-19	-17.778	-18.044	-0.266	(0)
MnSeO4	8.729e-21	8.729e-21	-20.059	-20.059	0.000	(0)
CoSeO4	2.108e-21	2.108e-21	-20.676	-20.676	0.000	(0)
NiSeO4	5.053e-22	5.053e-22	-21.296	-21.296	0.000	(0)
ZnSeO4	6.918e-23	6.918e-23	-22.160	-22.160	0.000	(0)
HSeO4-	1.675e-23	1.387e-23	-22.776	-22.858	-0.082	(0)

	CdSeO4	6.673e-25	6.673e-25	-24.176	-24.176	0.000	(0)
	Zn (SeO4) 2-2	1.348e-40	0.000e+00	-39.870	-40.198	-0.328	(0)
Zn	1.132e-06						
	Zn+2	9.131e-07	4.946e-07	-6.039	-6.306	-0.266	(0)
	ZnSO4	1.828e-07	1.828e-07	-6.738	-6.738	0.000	(0)
	ZnCl+	1.493e-08	1.277e-08	-7.826	-7.894	-0.068	(0)
	ZnHCO3+	1.125e-08	9.313e-09	-7.949	-8.031	-0.082	(0)
	Zn (SO4) 2-2	6.229e-09	2.927e-09	-8.206	-8.534	-0.328	(0)
	ZnCO3	2.215e-09	2.215e-09	-8.655	-8.655	0.000	(0)
	ZnOH+	1.144e-09	9.474e-10	-8.941	-9.023	-0.082	(0)
	ZnOHCl	4.868e-10	4.868e-10	-9.313	-9.313	0.000	(0)
	ZnCl2	1.740e-10	1.740e-10	-9.759	-9.759	0.000	(0)
	Zn (OH) 2	6.170e-12	6.170e-12	-11.210	-11.210	0.000	(0)
	ZnCl3-	1.688e-12	1.445e-12	-11.773	-11.840	-0.068	(0)
	ZnCl4-2	1.345e-14	7.404e-15	-13.871	-14.131	-0.259	(0)
	Zn (OH) 3-	1.048e-15	8.675e-16	-14.980	-15.062	-0.082	(0)
	Zn (OH) 4-2	2.062e-21	9.688e-22	-20.686	-21.014	-0.328	(0)
	ZnSeO4	6.918e-23	6.918e-23	-22.160	-22.160	0.000	(0)
	ZnNO3+	1.055e-38	8.733e-39	-37.977	-38.059	-0.082	(0)
	Zn (SeO4) 2-2	1.348e-40	0.000e+00	-39.870	-40.198	-0.328	(0)
	Zn (NO3) 2	0.000e+00	0.000e+00	-70.939	-70.939	0.000	(0)
	ZnS (HS) -	0.000e+00	0.000e+00	-102.530	-102.612	-0.082	(0)
	Zn (HS) 2	0.000e+00	0.000e+00	-103.047	-103.047	0.000	(0)
	Zn (HS) 3-	0.000e+00	0.000e+00	-154.465	-154.547	-0.082	(0)
	ZnS (HS) 2-2	0.000e+00	0.000e+00	-157.754	-158.082	-0.328	(0)
	Zn (HS) 4-2	0.000e+00	0.000e+00	-210.460	-210.788	-0.328	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2	-89.94	-83.67	6.27	(Co (NH3) 5Cl) (NO3) 2
(Co (NH3) 5Cl) Cl2	-27.83	-23.28	4.54	(Co (NH3) 5Cl) Cl2
(Co (NH3) 5OH2) Cl3	-35.10	-23.28	11.81	(Co (NH3) 5OH2) Cl3
(Co (NH3) 6) (NO3) 3	-128.43	-110.50	17.93	(Co (NH3) 6) (NO3) 3
(Co (NH3) 6) Cl3	-40.05	-19.92	20.13	(Co (NH3) 6) Cl3
(NH4) 2CrO4	-32.55	-32.17	0.38	(NH4) 2CrO4
(NH4) 2SeO4	-24.65	-24.20	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	0.53	11.66	11.13	Al (OH) 3
Al2 (MoO4) 3	-41.27	-38.13	3.14	Al2 (MoO4) 3
Al2O3	2.90	23.32	20.42	Al2O3
Al4 (OH) 10SO4	8.30	31.00	22.70	Al4 (OH) 10SO4
AlAsO4:2H2O	-5.30	-0.50	4.80	AlAsO4:2H2O
AlOHSO4	-0.75	-3.98	-3.23	AlOHSO4
Alunite	7.57	6.80	-0.78	KAl3 (SO4) 2 (OH) 6
Anglesite	-3.48	-11.31	-7.83	PbSO4
Anhydrite	-1.77	-6.11	-4.34	CaSO4
Anilite	-28.25	-60.67	-32.42	Cu0.25Cu1.5S
Antlerite	-4.81	3.97	8.79	Cu3 (OH) 4SO4
Aragonite	-2.20	-10.46	-8.26	CaCO3
Arsenolite	-48.05	-50.98	-2.94	As4O6
Artinite	-10.15	-0.20	9.96	MgCO3:Mg (OH) 2:3H2O
As2O5	-31.10	-24.32	6.77	As2O5
Atacamite	-3.01	4.66	7.67	Cu2 (OH) 3Cl
Azurite	-3.76	-20.38	-16.62	Cu3 (OH) 2 (CO3) 2
Ba (OH) 2:8H2O	-18.61	5.95	24.56	Ba (OH) 2:8H2O
Ba3 (AsO4) 2	2.46	-6.48	-8.94	Ba3 (AsO4) 2
BaCrO4	-23.19	-32.96	-9.77	BaCrO4
BaHPO4	-5.11	-24.89	-19.77	BaHPO4
BaMoO4	-7.55	-14.54	-6.99	BaMoO4
Barite	0.35	-9.70	-10.05	BaSO4
BaS	-71.46	-55.28	16.18	BaS
BaSeO3	-9.73	-7.94	1.79	BaSeO3
BaSeO4	-17.46	-24.99	-7.53	BaSeO4
Bianchite	-7.30	-9.06	-1.76	ZnSO4:6H2O
Birnessite	-15.42	2.67	18.09	MnO2
Bixbyite	-14.24	-14.51	-0.27	Mn2O3
BlaubleiI	-31.32	-55.48	-24.16	Cu0.9Cu0.2S

BlaubleiII	-30.60	-57.88	-27.28	Cu0.6Cu0.8S
Boehmite	2.73	11.66	8.93	AlOOH
Brochantite	-5.31	10.51	15.82	Cu4(OH)6SO4
Brucite	-7.28	9.90	17.18	Mg(OH)2
Bunsenite	-5.73	7.01	12.74	NiO
Ca3(AsO4)2·4H2O	-18.01	4.29	22.30	Ca3(AsO4)2·4H2O
Ca3(PO4)2(beta)	-3.97	-33.05	-29.08	Ca3(PO4)2
Ca4H(PO4)3·3H2O	-7.26	-54.34	-47.08	Ca4H(PO4)3·3H2O
CaCrO4	-27.18	-29.37	-2.19	CaCrO4
CaHPO4	-1.93	-21.29	-19.37	CaHPO4
CaHPO4·2H2O	-2.23	-21.29	-19.06	CaHPO4·2H2O
Calcite	-2.00	-10.46	-8.46	CaCO3
Calomel	-11.39	-29.57	-18.18	Hg2Cl2
CaMoO4	-3.00	-10.95	-7.94	CaMoO4
CaSeO3·2H2O	-7.22	-4.35	2.87	CaSeO3·2H2O
CaSeO4·2H2O	-18.40	-21.40	-3.00	CaSeO4·2H2O
Cd(BO2)2	-15.76	-5.92	9.84	Cd(BO2)2
Cd(OH)2	-9.44	4.49	13.93	Cd(OH)2
Cd(OH)2(am)	-9.50	4.49	13.99	Cd(OH)2
Cd3(OH)2(SO4)2	-24.53	-17.82	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-24.74	-2.18	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-15.60	-48.20	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-26.09	2.31	28.40	Cd4(OH)6SO4
CdCl2	-11.74	-12.35	-0.60	CdCl2
CdCl2·1H2O	-10.67	-12.35	-1.67	CdCl2·1H2O
CdCl2·2.5H2O	-10.41	-12.35	-1.93	CdCl2·2.5H2O
Cdmetal(alpha)	-29.10	-15.37	13.74	Cd
Cdmetal(gamma)	-29.21	-15.37	13.84	Cd
CdMoO4	-1.79	-16.00	-14.21	CdMoO4
CdOHCl	-7.56	-3.93	3.63	CdOHCl
CdSe	-3.67	-24.10	-20.43	CdSe
CdSeO4·2H2O	-24.60	-26.45	-1.85	CdSeO4·2H2O
CdSO4	-11.14	-11.16	-0.02	CdSO4
CdSO4·1H2O	-9.52	-11.16	-1.63	CdSO4·1H2O
CdSO4·2.67H2O	-9.34	-11.16	-1.82	CdSO4·2.67H2O
Cerussite	-2.46	-15.66	-13.20	PbCO3
CH4(g)	-57.61	-99.42	-41.81	CH4
Chalcanthite	-6.45	-9.11	-2.66	CuSO4·5H2O
Chalcocite	-27.24	-62.66	-35.42	Cu2S
Chalcopyrite	-71.00	-106.71	-35.71	CuFeS2
Cinnabar	-32.91	-79.35	-46.45	HgS
Claudetite	-47.75	-50.98	-3.23	As4O6
Clausthalite	3.21	-24.25	-27.46	PbSe
Co(BO2)2	-29.89	-2.82	27.07	Co(BO2)2
Co(OH)2	-5.50	7.59	13.09	Co(OH)2
Co(OH)3	-12.84	-14.88	-2.03	Co(OH)3
CO2(g)	-1.84	-20.00	-18.16	CO2
Co3(AsO4)2	-14.58	-1.54	13.03	Co3(AsO4)2
Co3(PO4)2	-4.19	-38.88	-34.69	Co3(PO4)2
Co3O4	-11.99	-22.16	-10.18	Co3O4
CoCl2	-17.74	-9.24	8.50	CoCl2
CoCl2·6H2O	-11.75	-9.24	2.51	CoCl2·6H2O
CoCO3	-2.46	-12.41	-9.94	CoCO3
CoFe2O4	22.59	19.53	-3.06	CoFe2O4
CoHPO4	-4.18	-23.24	-19.06	CoHPO4
CoMoO4	-5.20	-12.89	-7.69	CoMoO4
CoO	-6.31	7.59	13.90	CoO
CoS(alpha)	-46.19	-53.63	-7.44	CoS
CoS(beta)	-42.56	-53.63	-11.07	CoS
CoSe	-4.79	-20.99	-16.20	CoSe
CoSeO3	-7.61	-6.29	1.32	CoSeO3
CoSeO4·6H2O	-21.81	-23.34	-1.53	CoSeO4·6H2O
CoSO4	-11.09	-8.05	3.04	CoSO4
CoSO4·6H2O	-5.58	-8.05	-2.48	CoSO4·6H2O
Cotunnite	-7.64	-12.50	-4.86	PbCl2
Covellite	-32.10	-54.69	-22.59	CuS
Cr(OH)2	-18.93	-8.01	10.92	Cr(OH)2
Cr(OH)3	-2.43	-1.01	1.42	Cr(OH)3

Cr (OH) 3 (am)	-0.26	-1.01	-0.75	Cr (OH) 3
Cr2O3	0.19	-2.02	-2.21	Cr2O3
CrCl2	-39.26	-24.84	14.42	CrCl2
CrCl3	-41.73	-26.26	15.47	CrCl3
Crmetal	-58.86	-27.86	30.99	Cr
CrO3	-35.71	-38.91	-3.20	CrO3
Cu (OH) 2	-2.30	6.54	8.84	Cu (OH) 2
Cu2 (OH) 3NO3	-35.00	-25.53	9.47	Cu2 (OH) 3NO3
Cu2Se (alpha)	16.41	-30.03	-46.44	Cu2Se
Cu2SO4	-15.19	-17.08	-1.89	Cu2SO4
Cu3 (AsO4) 2:2H2O	-10.81	-4.71	6.10	Cu3 (AsO4) 2:2H2O
Cu3 (PO4) 2	-5.20	-42.05	-36.85	Cu3 (PO4) 2
Cu3 (PO4) 2:3H2O	-6.93	-42.05	-35.12	Cu3 (PO4) 2:3H2O
Cu3Se2	12.43	-52.08	-64.50	Cu3Se2
CuCO3	-1.96	-13.46	-11.50	CuCO3
CuCrO4	-26.93	-32.37	-5.44	CuCrO4
Cumetal	-1.68	-10.65	-8.97	Cu
CuMoO4	-0.83	-13.95	-13.11	CuMoO4
CuOCuSO4	-13.28	-2.57	10.71	CuOCuSO4
Cupricferrite	11.86	18.48	6.61	CuFe2O4
Cuprite	-0.40	-1.44	-1.04	Cu2O
Cuprousferrite	14.12	5.25	-8.87	CuFeO2
CuSe	11.41	-22.05	-33.46	CuSe
CuSe2	3.00	-30.78	-33.78	CuSe2
CuSeO3:2H2O	-7.97	-7.35	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-21.96	-24.40	-2.44	CuSeO4:5H2O
CuSO4	-12.26	-9.10	3.16	CuSO4
Diaspore	4.48	11.66	7.18	AlOOH
Djurleite	-27.62	-62.14	-34.51	Cu0.066Cu1.868S
Dolomite (disordered)	-4.16	-20.56	-16.40	CaMg (CO3) 2
Dolomite (ordered)	-3.59	-20.56	-16.97	CaMg (CO3) 2
Epsomite	-3.58	-5.74	-2.16	MgSO4:7H2O
Fe (OH) 2	-4.36	9.20	13.56	Fe (OH) 2
Fe (OH) 2.7Cl.3	6.48	3.44	-3.04	Fe (OH) 2.7Cl.3
Fe2 (OH) 4SeO3	-3.50	-1.95	1.55	Fe2 (OH) 4SeO3
Fe2 (SeO3) 3:2H2O	-9.09	-29.71	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-31.98	-34.99	-3.02	Fe2 (SO4) 3
Fe3 (OH) 8	0.91	21.14	20.22	Fe3 (OH) 8
FeAsO4:2H2O	-6.59	-6.19	0.40	FeAsO4:2H2O
FeCr2O4	-0.43	7.18	7.62	FeCr2O4
FeMoO4	-1.23	-11.29	-10.06	FeMoO4
Ferrihydrite	2.56	5.97	3.41	Fe (OH) 3
Ferroselite	-9.39	-28.12	-18.74	FeSe2
FeS (ppt)	-49.11	-52.03	-2.92	FeS
FeSe	-8.38	-19.39	-11.01	FeSe
Galena	-42.68	-56.89	-14.21	PbS
Gibbsite	3.09	11.66	8.57	Al (OH) 3
Goethite	5.30	5.97	0.67	FeOOH
Goslarite	-7.01	-9.06	-2.05	ZnSO4:7H2O
Greenockite	-42.21	-56.74	-14.52	CdS
Greigite	-178.73	-223.76	-45.03	Fe3S4
Gypsum	-1.49	-6.11	-4.61	CaSO4:2H2O
H-Jarosite	-1.97	-13.38	-11.41	(H3O) Fe3 (SO4) 2 (OH) 6
H2MoO4	-7.46	-20.49	-13.02	H2MoO4
H2S (g)	-53.22	-61.23	-8.01	H2S
H2Se (g)	-23.67	-28.59	-4.91	H2Se
Halite	-5.57	-3.97	1.59	NaCl
Hausmannite	-16.96	45.32	62.28	Mn3O4
Hematite	12.97	11.94	-1.03	Fe2O3
Hercynite	8.70	32.52	23.83	FeAl2O4
Hg (CH3) 2 (g)	-141.83	-216.97	-75.14	Hg (CH3) 2
Hg (g)	-8.36	-16.30	-7.94	Hg
Hg (OH) 2	-14.63	-18.13	-3.50	Hg (OH) 2
Hg2 (g)	-17.46	-32.59	-15.13	Hg2
Hg2 (OH) 2	-18.00	-12.74	5.26	Hg2 (OH) 2
Hg2CO3	-16.55	-32.74	-16.18	Hg2CO3
Hg2CrO4	-42.94	-51.64	-8.70	Hg2CrO4
Hg2HPO4	-18.79	-43.57	-24.77	Hg2HPO4

Hg2S	-62.08	-73.96	-11.88	Hg2S
Hg2SeO3	-21.96	-26.62	-4.66	Hg2SeO3
Hg2SO4	-22.24	-28.38	-6.15	Hg2SO4
Hg3O2CO3	-44.70	-74.38	-29.68	Hg3O2CO3
HgCl(g)	-34.76	-14.79	19.98	HgCl
HgCl2	-13.38	-34.96	-21.58	HgCl2
Hgmetal(l)	-2.60	-16.30	-13.70	Hg
HgSe	8.98	-46.72	-55.69	HgSe
HgSeO3	-19.58	-32.01	-12.43	HgSeO3
HgSO4	-24.31	-33.77	-9.46	HgSO4
Hinsdalite	-4.65	-7.15	-2.50	PbAl3PO4SO4(OH)6
Huntite	-11.11	-40.75	-29.65	CaMg3(CO3)4
Hydrocerussite	-8.21	-26.98	-18.77	Pb3(OH)2(CO3)2
Hydromagnesite	-22.37	-30.49	-8.12	Mg5(CO3)4(OH)2·4H2O
Hydroxylapatite	-0.47	-44.80	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-8.01	-70.80	-62.79	Pb5(PO4)3OH
K-Alum	-11.27	-16.53	-5.26	KAl(SO4)2·12H2O
K-Jarosite	4.13	-10.28	-14.41	KFe3(SO4)2(OH)6
K2Cr2O7	-54.14	-71.62	-17.48	K2Cr2O7
K2CrO4	-32.14	-32.71	-0.57	K2CrO4
K2MoO4	-17.56	-14.29	3.27	K2MoO4
K2SeO4	-24.01	-24.74	-0.73	K2SeO4
Langite	-7.47	10.51	17.98	Cu4(OH)6SO4·H2O
Larnakite	-6.60	-6.97	-0.37	PbO:PbSO4
Laurionite	-4.70	-4.08	0.62	PbOHCl
Lepidocrocite	4.60	5.97	1.37	FeOOH
Lime	-23.74	9.54	33.28	CaO
Litharge	-8.55	4.34	12.89	PbO
Mackinawite	-48.43	-52.03	-3.60	FeS
Maghemite	5.55	11.94	6.39	Fe2O3
Magnesioferrite	4.15	21.84	17.69	Fe2MgO4
Magnesite	-2.58	-10.10	-7.52	MgCO3
Magnetite	17.12	21.14	4.02	Fe3O4
Malachite	-1.39	-6.92	-5.53	Cu2(OH)2CO3
Manganite	-6.93	18.41	25.34	MnOOH
Massicot	-8.75	4.34	13.09	PbO
Melanothallite	-16.74	-10.29	6.45	CuCl2
Melanterite	-4.18	-6.45	-2.27	FeSO4·7H2O
Metacinnabar	-33.51	-79.35	-45.85	HgS
Mg(OH)2(active)	-8.89	9.90	18.79	Mg(OH)2
Mg3(PO4)2	-8.68	-31.96	-23.28	Mg3(PO4)2
MgCr2O4	-8.85	7.88	16.73	MgCr2O4
MgCrO4	-34.65	-29.01	5.64	MgCrO4
MgHPO4·3H2O	-2.76	-20.93	-18.18	MgHPO4·3H2O
MgMoO4	-8.73	-10.58	-1.85	MgMoO4
MgSeO3·6H2O	-7.02	-3.98	3.04	MgSeO3·6H2O
MgSeO4·6H2O	-19.83	-21.03	-1.20	MgSeO4·6H2O
Minium	-41.90	32.87	74.77	Pb3O4
Mirabilite	-5.41	-6.76	-1.35	Na2SO4·10H2O
Mn2(SO4)3	-56.22	-61.44	-5.23	Mn2(SO4)3
Mn3(AsO4)2·8H2O	-11.37	1.13	12.50	Mn3(AsO4)2·8H2O
Mn3(PO4)2	-12.35	-36.20	-23.85	Mn3(PO4)2
MnCl2·4H2O	-11.10	-8.35	2.75	MnCl2·4H2O
MnHPO4	3.05	-22.35	-25.40	MnHPO4
MnS(grn)	-53.00	-52.74	0.27	MnS
MnS(pnk)	-56.08	-52.74	3.34	MnS
MnSe	-23.89	-20.10	3.79	MnSe
MnSeO3	-6.53	-5.40	1.13	MnSeO3
MnSeO3·2H2O	-6.35	-5.40	0.96	MnSeO3·2H2O
MnSeO4·5H2O	-20.40	-22.45	-2.05	MnSeO4·5H2O
MnSO4	-9.93	-7.16	2.78	MnSO4
Monteponite	-10.92	4.49	15.41	CdO
Montroydite	-14.60	-18.13	-3.52	HgO
MoO3	-12.49	-20.49	-8.00	MoO3
Morenosite	-6.46	-8.64	-2.18	NiSO4·7H2O
MoS2	-91.38	-162.79	-71.41	MoS2
Na-Jarosite	1.81	-8.94	-10.75	NaFe3(SO4)2(OH)6
Na2Cr2O7	-58.97	-68.93	-9.96	Na2Cr2O7

Na2CrO4	-33.01	-30.02	2.99	Na2CrO4
Na2Mo2O7	-15.32	-32.09	-16.76	Na2Mo2O7
Na2MoO4	-13.12	-11.60	1.52	Na2MoO4
Na2MoO4:2H2O	-12.82	-11.60	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-15.30	-5.00	10.30	Na2SeO3:5H2O
Na2SeO4	-23.33	-22.05	1.28	Na2SeO4
Nantokite	-2.28	-9.14	-6.86	CuCl
Natron	-9.61	-11.12	-1.51	Na2CO3:10H2O
Nesquehonite	-5.50	-10.10	-4.60	MgCO3:3H2O
Ni(OH)2	-6.07	7.01	13.08	Ni(OH)2
Ni3(AsO4)2:8H2O	-19.00	-3.30	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-9.34	-40.64	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-19.61	12.39	32.00	Ni4(OH)6SO4
NiCO3	-6.24	-12.99	-6.75	NiCO3
NiMoO4	-2.33	-13.48	-11.15	NiMoO4
NiS(alpha)	-48.62	-54.22	-5.60	NiS
NiS(beta)	-43.12	-54.22	-11.10	NiS
NiS(gamma)	-41.42	-54.22	-12.80	NiS
NiSe	-3.88	-21.58	-17.70	NiSe
NiSeO3:2H2O	-9.78	-6.87	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-22.41	-23.93	-1.52	NiSeO4:6H2O
Nsutite	-14.83	2.67	17.50	MnO2
O2(g)	-45.08	39.71	84.79	O2
Orpiment	-147.06	-209.17	-62.11	As2S3
Otavite	-3.51	-15.51	-12.00	CdCO3
Pb(BO2)2	-12.64	-6.07	6.57	Pb(BO2)2
Pb(OH)2	-3.99	4.34	8.32	Pb(OH)2
Pb10(OH)60(CO3)6	-67.85	-76.61	-8.76	Pb10(OH)60(CO3)6
Pb2(OH)3Cl	-8.53	0.26	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-17.51	8.68	26.19	Pb2O(OH)2
Pb2O3	-32.51	28.53	61.04	Pb2O3
Pb2OCO3	-10.88	-11.32	-0.44	Pb2OCO3
Pb3(AsO4)2	-17.11	-11.31	5.80	Pb3(AsO4)2
Pb3(PO4)2	-5.12	-48.65	-43.53	Pb3(PO4)2
Pb3O2CO3	-18.33	-6.98	11.35	Pb3O2CO3
Pb3O2SO4	-13.55	-2.63	10.92	Pb3O2SO4
Pb4(OH)6SO4	-19.39	1.71	21.10	Pb4(OH)6SO4
Pb4O3SO4	-20.57	1.71	22.28	Pb4O3SO4
PbCrO4	-21.84	-34.57	-12.73	PbCrO4
PbHPO4	-2.69	-26.49	-23.81	PbHPO4
Pbmetal	-19.76	-15.52	4.24	Pb
PbMoO4	-0.37	-16.15	-15.78	PbMoO4
PbO:0.3H2O	-8.64	4.34	12.98	PbO:0.33H2O
PbSeO4	-19.71	-26.60	-6.88	PbSeO4
Periclase	-12.13	9.90	22.03	MgO
Phosgenite	-8.35	-28.16	-19.81	PbCl2:PbCO3
Plattnerite	-26.29	24.19	50.48	PbO2
Plumbgummite	10.45	-22.34	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-13.65	9.54	23.19	Ca(OH)2
Pyrite	-74.74	-93.40	-18.66	FeS2
Pyrochroite	-7.00	8.49	15.48	Mn(OH)2
Pyrolusite	-13.85	28.34	42.19	MnO2
Pyromorphite	5.21	-79.22	-84.43	Pb5(PO4)3Cl
Realgar	-63.77	-83.90	-20.13	AsS
Retgersite	-6.58	-8.64	-2.05	NiSO4:6H2O
Rhodochrosite	-0.94	-11.51	-10.57	MnCO3
Semetal(am)	-1.59	-8.73	-7.14	Se
Semetal(hex)	-0.98	-8.73	-7.76	Se
SeO2	-14.00	-13.88	0.12	SeO2
SeO3	-52.41	-30.93	21.48	SeO3
Siderite	-0.61	-10.80	-10.19	FeCO3
Smithsonite	-3.46	-13.41	-9.95	ZnCO3
Sphalerite	-43.10	-54.64	-11.54	ZnS
Spinel	-4.77	33.23	38.00	MgAl2O4
Strengite	1.51	-24.86	-26.37	FePO4:2H2O
Sulfur	-39.27	-41.37	-2.10	S
Tenorite	-1.30	6.54	7.84	CuO
Thenardite	-7.11	-6.76	0.35	Na2SO4

Thermonatrite	-11.78	-11.11	0.67	Na2CO3:H2O
Tsumebite	-5.83	-15.62	-9.79	Pb2CuPO4 (OH) 3:3H2O
Vivianite	1.93	-34.07	-36.00	Fe3 (PO4) 2:8H2O
Witherite	-5.47	-14.05	-8.58	BaCO3
Wurtzite	-45.63	-54.64	-9.01	ZnS
Zincite	-5.02	6.58	11.60	ZnO
Zincosite	-13.23	-9.06	4.17	ZnSO4
Zn(BO2)2	-12.12	-3.83	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-73.88	-70.64	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-5.62	6.58	12.20	Zn(OH)2
Zn(OH)2(am)	-6.13	6.58	12.71	Zn(OH)2
Zn(OH)2(beta)	-5.42	6.58	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-5.19	6.58	11.78	Zn(OH)2
Zn(OH)2(gamma)	-5.15	6.58	11.73	Zn(OH)2
Zn2(OH)2SO4	-9.98	-2.48	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-10.44	4.75	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-18.22	-4.57	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-6.49	-41.91	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-31.21	-11.53	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-17.71	10.69	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-22.41	16.09	38.50	Zn5(OH)8Cl2
ZnCl2	-17.51	-10.25	7.27	ZnCl2
ZnCO3:1H2O	-3.15	-13.41	-10.26	ZnCO3:1H2O
Znmetal	-39.51	-13.27	26.24	Zn
ZnMoO4	-3.81	-13.90	-10.09	ZnMoO4
ZnO(active)	-4.87	6.58	11.45	ZnO
ZnS(am)	-45.54	-54.64	-9.10	ZnS
ZnSe	-7.53	-22.00	-14.48	ZnSe
ZnSeO4:6H2O	-22.83	-24.35	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-8.55	-9.06	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 4.

End of Run after 0.344 Seconds.

Input file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\PHREEQC\2 Mixing
 \Kanmantoo Scenario 2 mixing.pqi
 Output file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\PHREEQC\2 Mixing
 \Kanmantoo Scenario 2 mixing.pqi
 Database file: C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
 \minteq.v4.dat

 Reading data base.

SOLUTION_MASTER_SPECIES
 SOLUTION_SPECIES
 SOLUTION_SPECIES
 PHASES
 PHASES
 SURFACE_MASTER_SPECIES
 SURFACE_SPECIES
 END

 Reading input data for simulation 1.

DATABASE C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
 \minteq.v4.dat
 SELECTED_OUTPUT 1
 file Kanmantoo Scenario 2 mixing.sel
 totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg
 Na K Alkalinity Cl S(6) Hg
 SOLUTION_MASTER_SPECIES
 Co Co+3 -1.0 Co 58.9332
 Co(2) Co+2 0.0 Co
 Co(3) Co+3 -1.0 Co
 END

 End of simulation.

 Reading input data for simulation 2.

PHASES
 CoO
 CoO + 2H+ = Co+2 + H2O
 log_k 13.5864
 delta_h -106.295 kJ
 Co(OH)2
 Co(OH)2 + 2H+ = Co+2 + 2H2O
 log_k 13.094
 delta_h -0 kJ
 Co(OH)3
 Co(OH)3 + 3H+ = Co+3 + 3H2O
 log_k -2.309
 delta_h -92.43 kJ
 Co3O4
 Co3O4 + 8H+ = Co+2 + 2Co+3 + 4H2O
 log_k -10.4956
 delta_h -107.5 kJ
 CoFe2O4
 CoFe2O4 + 8H+ = Co+2 + 2Fe+3 + 4H2O
 log_k -3.5281
 delta_h -158.82 kJ
 CoCl2
 CoCl2 = Co+2 + 2Cl-
 log_k 8.2672
 delta_h -79.815 kJ
 CoCl2:6H2O

```

      CoCl2:6H2O = Co+2 + 2Cl- + 6H2O
      log_k 2.5365
      delta_h      8.0598      kJ
(Co(NH3)6)Cl3
      (Co(NH3)6)Cl3 + 6H+ = Co+3 + 6NH4+ + 3Cl-
      log_k 20.0317
      delta_h      -33.1      kJ
(Co(NH3)5OH2)Cl3
      (Co(NH3)5OH2)Cl3 + 5H+ = Co+3 + 5NH4+ + 3Cl- + H2O
      log_k 11.7351
      delta_h      -25.37      kJ
(Co(NH3)5Cl)Cl2
      (Co(NH3)5Cl)Cl2 + 5H+ = Co+3 + 5NH4+ + 3Cl-
      log_k 4.5102
      delta_h      -10.74      kJ
CoCO3
      CoCO3 = Co+2 + CO3-2
      log_k -9.98
      delta_h      -12.7612      kJ
CoSO4
      CoSO4 = Co+2 + SO4-2
      log_k 2.8024
      delta_h      -79.277      kJ
CoSO4:6H2O
      CoSO4:6H2O = Co+2 + SO4-2 + 6H2O
      log_k -2.4726
      delta_h      1.0801      kJ

```

END

End of simulation.

Reading input data for simulation 3.

SOLUTION 1 # Mean Groundwater quality

```

temp      21
pH         6.79
pe         1
redox      pe
units      mg/l
density    1
Al         0.37
Alkalinity 0
As         0
Ba         0
Be         0
B          0
Cd         0.003
Co         2.34
Cr         0
Cu         0.31
Fe         100.34
Pb         0.003
Mn         12.2
Mo         0
V          0
Zn         0.17
Se         0.03
Ni         0.45
N          7
P          0.68
Ca         130
Mg         246
Na         1094
K          62
Cl         1533

```

S(6)	1485
Hg	0.0002
water	1 # kg
SOLUTION 2 #Mean River Murray water quality	
temp	20
pH	7.5
pe	4
redox	pe
units	mg/l
density	1
Al	1.48
Alkalinity	61
As	0.0013
Ba	0.0478
Be	0
B	0.05
Cd	0.0007
Co	0.0006
Cr	0.0021
Cu	0.006
Fe	1.37
Pb	0.0012
Mn	0.06
Mo	0.0003
Zn	0.0164
Se	0.0002
Ni	0.0028
N	1.05
P	0.11
Ca	13
Mg	9
Na	49
K	4
Cl	79
S(6)	17
Hg	0.00008
water	1 # kg
SOLUTION 3 #Mean Mt Barker water quality	
temp	20
pH	6.18
pe	4
redox	pe
units	mg/l
density	1
Al	0.04
Alkalinity	50
As	0.002
Ba	0.012
Be	0
B	0.088
Cd	0
Co	0.039
Cr	0.007
Cu	0.022
Fe	0.493
Pb	0.003
Mn	0.046
Mo	0.009
Zn	0.023
Se	0.002
Ni	0.011
N	24.3
P	0.52
Ca	32
Mg	17
Na	132
K	25
Cl	231

```

S(6)      190
water     1 # kg
SOLUTION 4 #Mean RWD water quality
temp      20
pH        4.05
pe        4
redox     pe
units     mg/l
density   1
Al        1.42
Alkalinity 0
As        0.002
Ba        0.04
Be        0.002
B         0.1
Cd        0.0008
Co        0.72
Cr        0.0033
Cu        6.25
Fe        24.67
Pb        0.02
Mn        5.22
Mo        0.11
Zn        0.49
Se        0.01
Ni        0.49
N         10.07
P         0.29
Ca        522
Mg        88
Na        343
K         245
Cl        490
S(6)     2222
water     1 # kg
MIX 1
1         0.03
2         0.1
3         0.1
4         0.77

```

```

-----
Beginning of initial solution calculations.
-----

```

Initial solution 1.

```

-----Solution composition-----

```

Elements	Molality	Moles
Al	1.378e-05	1.378e-05
Ca	3.259e-03	3.259e-03
Cd	2.681e-08	2.681e-08
Cl	4.344e-02	4.344e-02
Co	3.989e-05	3.989e-05
Cu	4.901e-06	4.901e-06
Fe	1.805e-03	1.805e-03
Hg	1.002e-09	1.002e-09
K	1.593e-03	1.593e-03
Mg	1.017e-02	1.017e-02
Mn	2.231e-04	2.231e-04
N	5.021e-04	5.021e-04
Na	4.781e-02	4.781e-02
Ni	7.703e-06	7.703e-06
P	2.206e-05	2.206e-05
Pb	1.455e-08	1.455e-08
S(6)	1.553e-02	1.553e-02
Se	3.817e-07	3.817e-07

Zn

2.612e-06 2.612e-06

-----Description of solution-----

pH = 6.790
 pe = 1.000
 Activity of water = 0.998
 Ionic strength (mol/kgw) = 9.259e-02
 Mass of water (kg) = 1.000e+00
 Total alkalinity (eq/kg) = 6.274e-05
 Total carbon (mol/kg) = 0.000e+00
 Total CO2 (mol/kg) = 0.000e+00
 Temperature (°C) = 21.00
 Electrical balance (eq) = 6.374e-03
 Percent error, $100 * (Cat - |An|) / (Cat + |An|)$ = 4.58
 Iterations = 13
 Total H = 1.110158e+02
 Total O = 5.556909e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.061e-07	1.622e-07	-6.686	-6.790	-0.104	0.00
OH-	5.935e-08	4.562e-08	-7.227	-7.341	-0.114	(0)
H2O	5.551e+01	9.980e-01	1.744	-0.001	0.000	18.05
Al	1.378e-05					
Al (OH) 4-	8.973e-06	7.024e-06	-5.047	-5.153	-0.106	(0)
Al (OH) 2+	2.373e-06	1.884e-06	-5.625	-5.725	-0.100	(0)
Al (OH) 3	2.329e-06	2.329e-06	-5.633	-5.633	0.000	(0)
AlOH+2	7.409e-08	2.945e-08	-7.130	-7.531	-0.401	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
Al+3	5.344e-09	6.178e-10	-8.272	-9.209	-0.937	(0)
Al (SO4) 2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ca	3.259e-03					
Ca+2	2.406e-03	9.221e-04	-2.619	-3.035	-0.416	(0)
CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CaOH+	1.001e-09	8.020e-10	-8.999	-9.096	-0.096	(0)
Ca (NH3) 2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
Cd	2.681e-08					
CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
Cd+2	7.874e-09	3.018e-09	-8.104	-8.520	-0.416	(0)
CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
Cd (SO4) 2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
CdOH+	1.568e-12	1.100e-12	-11.805	-11.959	-0.154	(0)
Cd (OH) 2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
Cd2OH+3	4.264e-19	1.748e-20	-18.370	-19.758	-1.387	(0)
Cd (SeO3) 2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Cd (OH) 3-	3.135e-21	2.198e-21	-20.504	-20.658	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Cd (OH) 4-2	9.222e-29	2.230e-29	-28.035	-28.652	-0.617	(0)
CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cl	4.344e-02					
Cl-	4.343e-02	3.417e-02	-1.362	-1.466	-0.104	(0)
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)

NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
ZnOHC1	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
CdOHC1	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co (NH3) 5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co (2)	3.989e-05					
Co+2	3.225e-05	7.797e-06	-4.491	-5.108	-0.617	(0)
CoSO4	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CoHPO4	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CoOH+	1.375e-08	9.639e-09	-7.862	-8.016	-0.154	(0)
Co (NH3) +2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
Co (OH) 2	4.744e-11	4.744e-11	-10.324	-10.324	0.000	(0)
Co (NH3) 2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Co2OH+3	9.190e-14	3.766e-15	-13.037	-14.424	-1.387	(0)
Co (OH) 3-	8.364e-17	5.865e-17	-16.078	-16.232	-0.154	(0)
CoOOH-	5.039e-18	3.533e-18	-17.298	-17.452	-0.154	(0)
Co (NH3) 3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Co4 (OH) 4+4	5.041e-22	1.722e-24	-21.297	-23.764	-2.466	(0)
Co (NH3) 4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
Co (OH) 4-2	2.382e-24	5.759e-25	-23.623	-24.240	-0.617	(0)
Co (NH3) 5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Co (3)	4.042e-31					
CoOH+2	4.042e-31	9.773e-32	-30.393	-31.010	-0.617	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co+3	2.685e-36	3.104e-37	-35.571	-36.508	-0.937	(0)
Co (NH3) 5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
Cu (1)	4.900e-06					
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
Cu+	1.553e-08	1.089e-08	-7.809	-7.963	-0.154	(0)
Cu (2)	8.967e-10					

Cu+2	6.026e-10	2.310e-10	-9.220	-9.636	-0.416	(0)
CuSO4	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
CuOH+	4.792e-11	3.719e-11	-10.319	-10.430	-0.110	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
Cu (OH) 2	5.595e-13	5.595e-13	-12.252	-12.252	0.000	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
Cu2 (OH) 2+2	1.398e-16	3.379e-17	-15.855	-16.471	-0.617	(0)
Cu (OH) 3-	1.014e-16	7.111e-17	-15.994	-16.148	-0.154	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
Cu (OH) 4-2	1.434e-22	3.468e-23	-21.843	-22.460	-0.617	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Fe (2)	1.805e-03					
Fe+2	1.454e-03	3.515e-04	-2.837	-3.454	-0.617	(0)
FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
FeHPO4	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
FeOH+	8.090e-07	6.384e-07	-6.092	-6.195	-0.103	(0)
Fe (OH) 2	2.214e-11	2.214e-11	-10.655	-10.655	0.000	(0)
Fe (OH) 3-	5.296e-13	4.179e-13	-12.276	-12.379	-0.103	(0)
Fe (3)	3.233e-07					
Fe (OH) 2+	3.138e-07	2.491e-07	-6.503	-6.604	-0.100	(0)
Fe (OH) 3	9.382e-09	9.382e-09	-8.028	-8.028	0.000	(0)
Fe (OH) 4-	1.205e-10	9.565e-11	-9.919	-10.019	-0.100	(0)
FeOH+2	2.119e-11	8.217e-12	-10.674	-11.085	-0.411	(0)
FeHPO4+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeSO4+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe+3	2.235e-15	2.584e-16	-14.651	-15.588	-0.937	(0)
Fe (SO4) 2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
Fe2 (OH) 2+4	7.548e-19	2.579e-21	-18.122	-20.589	-2.466	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
Fe3 (OH) 4+5	6.361e-23	8.906e-27	-22.197	-26.050	-3.854	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
H (0)	3.796e-19					
H2	1.898e-19	1.939e-19	-18.722	-18.712	0.009	(0)
Hg (0)	1.002e-09					
Hg	1.002e-09	1.002e-09	-8.999	-8.999	0.000	(0)
Hg (1)	3.697e-29					
Hg2+2	1.848e-29	4.469e-30	-28.733	-29.350	-0.617	(0)
Hg (2)	2.362e-18					
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
Hg (OH) 2	1.682e-22	1.718e-22	-21.774	-21.765	0.009	(0)
Hg (NH3) 2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
HgOH+	2.768e-26	1.941e-26	-25.558	-25.712	-0.154	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg (NH3) 3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Hg+2	3.648e-29	8.820e-30	-28.438	-29.055	-0.617	(0)
HgSO4	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Hg (OH) 3-	1.911e-30	1.340e-30	-29.719	-29.873	-0.154	(0)
Hg (NH3) 4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Hg (NO3) 2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
K	1.593e-03					
K+	1.549e-03	1.219e-03	-2.810	-2.914	-0.104	(0)
KSO4-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
KHPO4-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)

Mg	1.017e-02					
Mg+2	7.920e-03	3.036e-03	-2.101	-2.518	-0.416	(0)
MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
MgHPO4	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
MgOH+	6.402e-08	5.162e-08	-7.194	-7.287	-0.094	(0)
MgPO4-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
Mn (2)	2.231e-04					
Mn+2	1.882e-04	4.549e-05	-3.725	-4.342	-0.617	(0)
MnSO4	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
MnOH+	6.606e-09	5.213e-09	-8.180	-8.283	-0.103	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Mn (OH) 3-	2.129e-19	1.680e-19	-18.672	-18.775	-0.103	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
Mn (OH) 4-2	8.666e-26	3.361e-26	-25.062	-25.474	-0.411	(0)
MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Mn (3)	9.732e-29					
Mn+3	9.732e-29	1.125e-29	-28.012	-28.949	-0.937	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-65.730	-66.142	-0.411	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-74.661	-74.779	-0.119	(0)
N (-3)	5.021e-04					
NH4+	4.805e-04	3.617e-04	-3.318	-3.442	-0.123	(0)
NH4SO4-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
NH3	9.560e-07	9.560e-07	-6.020	-6.020	0.000	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
Co (NH3) +2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
Ni (NH3) 2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Co (NH3) 2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Ca (NH3) 2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
Co (NH3) 3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Hg (NH3) 2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
Co (NH3) 4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg (NH3) 3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Co (NH3) 5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
Hg (NH3) 4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
Co (NH3) 5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
N (3)	1.148e-35					
NO2-	1.148e-35	8.735e-36	-34.940	-35.059	-0.119	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
N (5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-48.382	-48.486	-0.104	(0)
CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)

	Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
	Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
	Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
Na		4.781e-02					
	Na+	4.677e-02	3.680e-02	-1.330	-1.434	-0.104	(0)
	NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
	NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
Ni		7.703e-06					
	Ni+2	5.664e-06	2.171e-06	-5.247	-5.663	-0.416	(0)
	NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
	NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
	NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
	NiOH+	1.818e-09	1.275e-09	-8.741	-8.895	-0.154	(0)
	Ni(SO4)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
	NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
	Ni(OH)2	8.335e-12	8.335e-12	-11.079	-11.079	0.000	(0)
	Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
	Ni(OH)3-	7.365e-16	5.164e-16	-15.133	-15.287	-0.154	(0)
	NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
	NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
O(0)		0.000e+00					
	O2	0.000e+00	0.000e+00	-55.993	-55.984	0.009	(0)
P		2.206e-05					
	H2PO4-	6.634e-06	5.268e-06	-5.178	-5.278	-0.100	(0)
	HPO4-2	5.222e-06	2.025e-06	-5.282	-5.694	-0.411	(0)
	MgHPO4	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
	FeHPO4	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
	FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
	NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
	MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
	CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
	CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
	KHPO4-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
	CoHPO4	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
	CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
	MgPO4-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
	H3PO4	1.150e-10	1.150e-10	-9.939	-9.939	0.000	(0)
	PO4-3	4.196e-11	4.850e-12	-10.377	-11.314	-0.937	(0)
	FeHPO4+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
	FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
Pb		1.455e-08					
	Pb+2	5.480e-09	2.100e-09	-8.261	-8.678	-0.416	(0)
	PbSO4	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
	PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
	PbOH+	4.662e-10	3.269e-10	-9.331	-9.486	-0.154	(0)
	Pb(SO4)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
	PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
	PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
	Pb(OH)2	6.405e-13	6.405e-13	-12.193	-12.193	0.000	(0)
	PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
	Pb2OH+3	2.655e-16	1.088e-17	-15.576	-16.963	-1.387	(0)
	Pb(OH)3-	5.660e-17	3.969e-17	-16.247	-16.401	-0.154	(0)
	Pb(OH)4-2	2.491e-21	6.022e-22	-20.604	-21.220	-0.617	(0)
	Pb3(OH)4+2	3.779e-23	9.137e-24	-22.423	-23.039	-0.617	(0)
	Pb4(OH)4+4	5.175e-26	1.768e-28	-25.286	-27.753	-2.466	(0)
	PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
	Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
S(6)		1.553e-02					
	SO4-2	1.094e-02	4.194e-03	-1.961	-2.377	-0.416	(0)
	MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
	NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
	CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
	FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
	KSO4-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
	MnSO4	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
	NH4SO4-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
	CoSO4	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)

NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
ZnSO4	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(SO4) 2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
HSO4-	7.527e-08	5.892e-08	-7.123	-7.230	-0.106	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
PbSO4	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
Al(SO4) 2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ni(SO4) 2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
Cd(SO4) 2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
Pb(SO4) 2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
CuSO4	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
FeSO4+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe(SO4) 2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
HgSO4	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Co(NH3) 6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Se(-2)	4.685e-09					
HSe-	4.677e-09	3.279e-09	-8.330	-8.484	-0.154	(0)
H2Se	4.054e-12	4.054e-12	-11.392	-11.392	0.000	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Se-2	6.423e-17	1.553e-17	-16.192	-16.809	-0.617	(0)
Se(4)	3.770e-07					
HSeO3-	3.526e-07	2.472e-07	-6.453	-6.607	-0.154	(0)
SeO3-2	2.442e-08	5.904e-09	-7.612	-8.229	-0.617	(0)
H2SeO3	1.653e-11	1.653e-11	-10.782	-10.782	0.000	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
Cd(SeO3) 2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Se(6)	2.478e-21					
SeO4-2	2.463e-21	9.439e-22	-20.609	-21.025	-0.416	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
HSeO4-	9.645e-27	6.763e-27	-26.016	-26.170	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Zn(SeO4) 2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
Zn	2.612e-06					
Zn+2	1.813e-06	6.948e-07	-5.742	-6.158	-0.416	(0)
ZnSO4	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(SO4) 2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
ZnOH+	4.520e-09	3.170e-09	-8.345	-8.499	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
Zn(OH) 2	4.227e-11	4.227e-11	-10.374	-10.374	0.000	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
Zn(OH) 3-	1.872e-14	1.313e-14	-13.728	-13.882	-0.154	(0)
Zn(OH) 4-2	1.339e-19	3.238e-20	-18.873	-19.490	-0.617	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
Zn(SeO4) 2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
Zn(NO3) 2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K,	1 atm)
(Co(NH3) 5Cl) (NO3) 2-124.48	-118.20	6.27	(Co(NH3) 5Cl) (NO3) 2	
(Co(NH3) 5Cl) Cl2 -28.70	-24.17	4.54	(Co(NH3) 5Cl) Cl2	
(Co(NH3) 5OH2) Cl3 -35.96	-24.17	11.80	(Co(NH3) 5OH2) Cl3	
(Co(NH3) 6) (NO3) 3-179.81	-161.88	17.93	(Co(NH3) 6) (NO3) 3	
(Co(NH3) 6) Cl3 -40.93	-20.82	20.11	(Co(NH3) 6) Cl3	
(NH4) 2SeO4 -28.36	-27.91	0.45	(NH4) 2SeO4	
Al(OH) 3(am) 0.09	11.16	11.06	Al(OH) 3	
Al2O3 2.05	22.32	20.27	Al2O3	
Al4(OH) 10SO4 5.98	28.68	22.70	Al4(OH) 10SO4	
AlOHSO4 -1.57	-4.80	-3.23	AlOHSO4	

Alunite	6.34	5.44	-0.90	KAl ₃ (SO ₄) ₂ (OH) ₆
Anglesite	-3.24	-11.06	-7.82	PbSO ₄
Anhydrite	-1.07	-5.41	-4.34	CaSO ₄
Antlerite	-12.92	-4.13	8.79	Cu ₃ (OH) ₄ SO ₄
Atacamite	-7.99	-0.37	7.61	Cu ₂ (OH) ₃ Cl
Bianchite	-6.78	-8.54	-1.76	ZnSO ₄ :6H ₂ O
Birnessite	-18.88	-0.79	18.09	MnO ₂
Bixbyite	-16.81	-17.16	-0.35	Mn ₂ O ₃
Boehmite	2.30	11.16	8.86	AlOOH
Brochantite	-15.89	-0.19	15.71	Cu ₄ (OH) ₆ SO ₄
Brucite	-6.06	11.06	17.12	Mg(OH) ₂
Bunsenite	-4.77	7.92	12.68	NiO
Ca ₃ (PO ₄) ₂ (beta)	-2.69	-31.73	-29.05	Ca ₃ (PO ₄) ₂
Ca ₄ H(PO ₄) ₃ :3H ₂ O	-5.80	-52.88	-47.08	Ca ₄ H(PO ₄) ₃ :3H ₂ O
CaHPO ₄	-1.79	-21.14	-19.35	CaHPO ₄
CaHPO ₄ :2H ₂ O	-2.09	-21.14	-19.05	CaHPO ₄ :2H ₂ O
Calomel	-14.15	-32.28	-18.13	Hg ₂ Cl ₂
CaSeO ₃ :2H ₂ O	-5.71	-2.85	2.86	CaSeO ₃ :2H ₂ O
CaSeO ₄ :2H ₂ O	-21.06	-24.06	-3.00	CaSeO ₄ :2H ₂ O
Cd(OH) ₂	-8.81	5.06	13.87	Cd(OH) ₂
Cd(OH) ₂ (am)	-8.88	5.06	13.94	Cd(OH) ₂
Cd ₃ (OH) ₂ (SO ₄) ₂	-23.45	-16.74	6.71	Cd ₃ (OH) ₂ (SO ₄) ₂
Cd ₃ (OH) ₄ SO ₄	-23.34	-0.78	22.56	Cd ₃ (OH) ₄ SO ₄
Cd ₃ (PO ₄) ₂	-15.59	-48.19	-32.60	Cd ₃ (PO ₄) ₂
Cd ₄ (OH) ₆ SO ₄	-24.12	4.28	28.40	Cd ₄ (OH) ₆ SO ₄
CdCl ₂	-10.84	-11.45	-0.61	CdCl ₂
CdCl ₂ :1H ₂ O	-9.78	-11.45	-1.68	CdCl ₂ :1H ₂ O
CdCl ₂ :2.5H ₂ O	-9.52	-11.46	-1.93	CdCl ₂ :2.5H ₂ O
Cdmetal(alpha)	-24.21	-10.52	13.69	Cd
Cdmetal(gamma)	-24.32	-10.52	13.80	Cd
CdOHCl	-6.81	-3.20	3.61	CdOHCl
CdSe	10.17	-10.21	-20.38	CdSe
CdSeO ₄ :2H ₂ O	-27.70	-29.55	-1.85	CdSeO ₄ :2H ₂ O
CdSO ₄	-10.85	-10.90	-0.05	CdSO ₄
CdSO ₄ :1H ₂ O	-9.25	-10.90	-1.65	CdSO ₄ :1H ₂ O
CdSO ₄ :2.67H ₂ O	-9.07	-10.90	-1.83	CdSO ₄ :2.67H ₂ O
Chalcanthite	-9.36	-12.02	-2.65	CuSO ₄ :5H ₂ O
Clausthalite	17.01	-10.37	-27.39	PbSe
Co(OH) ₂	-4.62	8.47	13.09	Co(OH) ₂
Co(OH) ₃	-14.05	-16.14	-2.09	Co(OH) ₃
Co ₃ (PO ₄) ₂	-3.27	-37.95	-34.69	Co ₃ (PO ₄) ₂
Co ₃ O ₄	-13.57	-23.81	-10.24	Co ₃ O ₄
CoCl ₂	-16.50	-8.04	8.46	CoCl ₂
CoCl ₂ :6H ₂ O	-10.56	-8.05	2.52	CoCl ₂ :6H ₂ O
CoFe ₂ O ₄	21.18	18.03	-3.15	CoFe ₂ O ₄
CoHPO ₄	-4.15	-23.21	-19.06	CoHPO ₄
CoO	-5.37	8.47	13.84	CoO
CoSe	9.40	-6.80	-16.20	CoSe
CoSeO ₃	-6.24	-4.92	1.32	CoSeO ₃
CoSeO ₄ :6H ₂ O	-24.61	-26.14	-1.53	CoSeO ₄ :6H ₂ O
CoSO ₄	-10.48	-7.49	2.99	CoSO ₄
CoSO ₄ :6H ₂ O	-5.02	-7.49	-2.48	CoSO ₄ :6H ₂ O
Cotunnite	-6.77	-11.61	-4.84	PbCl ₂
Cu(OH) ₂	-4.87	3.94	8.81	Cu(OH) ₂
Cu ₂ (OH) ₃ NO ₃	-56.82	-47.39	9.42	Cu ₂ (OH) ₃ NO ₃
Cu ₂ Se(alpha)	28.69	-17.62	-46.31	Cu ₂ Se
Cu ₂ SO ₄	-16.40	-18.30	-1.90	Cu ₂ SO ₄
Cu ₃ (PO ₄) ₂	-14.69	-51.54	-36.85	Cu ₃ (PO ₄) ₂
Cu ₃ (PO ₄) ₂ :3H ₂ O	-16.42	-51.54	-35.12	Cu ₃ (PO ₄) ₂ :3H ₂ O
Cu ₃ Se ₂	35.35	-28.95	-64.30	Cu ₃ Se ₂
Cumetal	-0.04	-8.96	-8.93	Cu
CuOCuSO ₄	-18.70	-8.07	10.63	CuOCuSO ₄
Cupricferrite	7.02	13.50	6.49	CuFe ₂ O ₄
Cuprite	-1.24	-2.35	-1.11	Cu ₂ O
Cuprousferrite	12.49	3.61	-8.88	CuFeO ₂
CuSe	22.06	-11.33	-33.39	CuSe
CuSe ₂	22.68	-11.02	-33.70	CuSe ₂
CuSeO ₃ :2H ₂ O	-10.05	-9.46	0.60	CuSeO ₃ :2H ₂ O

CuSeO4:5H2O	-28.23	-30.67	-2.44	CuSeO4:5H2O
CuSO4	-15.13	-12.01	3.11	CuSO4
Diaspore	4.04	11.16	7.12	AlOOH
Epsomite	-2.75	-4.90	-2.15	MgSO4:7H2O
Fe (OH) 2	-3.44	10.12	13.56	Fe (OH) 2
Fe (OH) 2.7Cl.3	5.34	2.30	-3.04	Fe (OH) 2.7Cl.3
Fe2 (OH) 4SeO3	-5.39	-3.84	1.55	Fe2 (OH) 4SeO3
Fe2 (SeO3) 3:2H2O	-10.00	-30.63	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-35.15	-38.31	-3.16	Fe2 (SO4) 3
Fe3 (OH) 8	-0.54	19.68	20.22	Fe3 (OH) 8
Ferrihydrite	1.41	4.78	3.37	Fe (OH) 3
Ferroselite	13.87	-4.84	-18.71	FeSe2
FeSe	5.86	-5.15	-11.00	FeSe
Gibbsite	2.64	11.16	8.52	Al (OH) 3
Goethite	4.15	4.78	0.64	FeOOH
Goslarite	-6.50	-8.54	-2.05	ZnSO4:7H2O
Gypsum	-0.80	-5.41	-4.61	CaSO4:2H2O
H-Jarosite	-6.02	-17.57	-11.55	(H3O) Fe3 (SO4) 2 (OH) 6
H2Se(g)	-10.35	-15.27	-4.92	H2Se
Halite	-4.49	-2.90	1.59	NaCl
Hausmannite	-18.74	43.29	62.03	Mn3O4
Hematite	10.67	9.56	-1.11	Fe2O3
Hercynite	8.80	32.44	23.64	FeAl2O4
Hg(g)	-7.75	-15.67	-7.93	Hg
Hg (OH) 2	-18.27	-21.76	-3.50	Hg (OH) 2
Hg2 (g)	-16.26	-31.35	-15.09	Hg2
Hg2 (OH) 2	-21.03	-15.77	5.26	Hg2 (OH) 2
Hg2HPO4	-22.68	-47.45	-24.77	Hg2HPO4
Hg2SeO3	-24.51	-29.17	-4.66	Hg2SeO3
Hg2SO4	-25.58	-31.73	-6.14	Hg2SO4
HgCl (g)	-36.02	-16.14	19.88	HgCl
HgCl2	-16.76	-38.28	-21.52	HgCl2
Hgmetal (l)	-2.02	-15.67	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSeO3	-22.73	-35.16	-12.43	HgSeO3
HgSO4	-28.27	-37.72	-9.45	HgSO4
Hinsdalite	-6.76	-9.26	-2.50	PbAl3PO4SO4 (OH) 6
Hydroxylapatite	2.00	-42.33	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-7.75	-70.54	-62.79	Pb5 (PO4) 3OH
K-Alum	-11.65	-16.89	-5.24	KAl (SO4) 2:12H2O
K-Jarosite	0.79	-13.70	-14.49	KFe3 (SO4) 2 (OH) 6
K2SeO4	-26.12	-26.85	-0.73	K2SeO4
Langite	-18.07	-0.19	17.88	Cu4 (OH) 6SO4:H2O
Larnakite	-5.77	-6.15	-0.38	PbO:PbSO4
Laurionite	-3.98	-3.35	0.62	PbOHCl
Lepidocrocite	3.41	4.78	1.37	FeOOH
Lime	-22.62	10.54	33.16	CaO
Litharge	-7.95	4.90	12.85	PbO
Maghemite	3.18	9.56	6.39	Fe2O3
Magnesioferrite	3.10	20.62	17.52	Fe2MgO4
Magnetite	15.79	19.69	3.90	Fe3O4
Manganite	-8.31	17.03	25.34	MnOOH
Massicot	-8.15	4.90	13.05	PbO
Melanothallite	-18.98	-12.57	6.41	CuCl2
Melanterite	-3.58	-5.84	-2.26	FeSO4:7H2O
Mg (OH) 2 (active)	-7.73	11.06	18.79	Mg (OH) 2
Mg3 (PO4) 2	-6.90	-30.18	-23.28	Mg3 (PO4) 2
MgHPO4:3H2O	-2.45	-20.62	-18.18	MgHPO4:3H2O
MgSeO3:6H2O	-5.38	-2.34	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-22.35	-23.55	-1.20	MgSeO4:6H2O
Minium	-44.24	30.28	74.53	Pb3O4
Mirabilite	-3.95	-5.25	-1.30	Na2SO4:10H2O
Mn2 (SO4) 3	-59.71	-65.03	-5.32	Mn2 (SO4) 3
Mn3 (PO4) 2	-11.81	-35.65	-23.85	Mn3 (PO4) 2
MnCl2:4H2O	-10.02	-7.28	2.74	MnCl2:4H2O
MnHPO4	2.95	-22.45	-25.40	MnHPO4
MnSe	-9.77	-6.04	3.73	MnSe
MnSeO3	-5.29	-4.16	1.13	MnSeO3

MnSeO3:2H2O	-5.12	-4.16	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-23.32	-25.37	-2.05	MnSeO4:5H2O
MnSO4	-9.46	-6.72	2.74	MnSO4
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.22	-21.76	-3.55	HgO
Morenosite	-5.87	-8.05	-2.17	NiSO4:7H2O
Na-Jarosite	-1.38	-12.22	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-12.99	-2.69	10.30	Na2SeO3:5H2O
Na2SeO4	-25.17	-23.89	1.28	Na2SeO4
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.11	7.91	13.02	Ni(OH)2
Ni3(PO4)2	-8.32	-39.62	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-16.30	15.70	32.00	Ni4(OH)6SO4
NiSe	10.34	-7.36	-17.70	NiSe
NiSeO3:2H2O	-8.37	-5.48	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-25.17	-26.69	-1.52	NiSeO4:6H2O
Nsutite	-18.29	-0.79	17.50	MnO2
O2(g)	-53.29	31.16	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.25	1.55	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-16.39	9.80	26.19	Pb2O(OH)2
Pb2O3	-35.66	25.38	61.04	Pb2O3
Pb3(PO4)2	-5.13	-48.66	-43.53	Pb3(PO4)2
Pb3O2SO4	-12.13	-1.25	10.87	Pb3O2SO4
Pb4(OH)6SO4	-17.45	3.65	21.10	Pb4(OH)6SO4
Pb4O3SO4	-18.55	3.65	22.20	Pb4O3SO4
PbHPO4	-2.98	-26.78	-23.81	PbHPO4
Pbmetal	-14.92	-10.68	4.24	Pb
PbO:0.3H2O	-8.08	4.90	12.98	PbO:0.33H2O
PbSeO4	-22.83	-29.70	-6.88	PbSeO4
Periclase	-10.88	11.06	21.94	MgO
Plattnerite	-29.83	20.48	50.31	PbO2
Plumbgummite	7.80	-24.99	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-12.57	10.54	23.11	Ca(OH)2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-17.21	24.82	42.03	MnO2
Pyromorphite	5.63	-78.80	-84.43	Pb5(PO4)3Cl
Retgersite	-6.00	-8.05	-2.05	NiSO4:6H2O
Semetal(am)	7.44	0.31	-7.14	Se
Semetal(hex)	8.05	0.31	-7.75	Se
SeO2	-13.52	-13.40	0.12	SeO2
SeO3	-56.00	-34.60	21.39	SeO3
Spinel	-4.39	33.38	37.77	MgAl2O4
Strengite	-0.53	-26.90	-26.38	FePO4:2H2O
Tenorite	-3.86	3.94	7.80	CuO
Thenardite	-5.59	-5.25	0.34	Na2SO4
Tsumebite	-8.15	-17.94	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	3.00	-33.00	-36.00	Fe3(PO4)2:8H2O
Zincite	-4.13	7.42	11.55	ZnO
Zincosite	-12.66	-8.54	4.13	ZnSO4
Zn(NO3)2:6H2O	-106.39	-103.14	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.78	7.42	12.20	Zn(OH)2
Zn(OH)2(am)	-5.25	7.42	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.42	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.31	7.42	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.42	11.73	Zn(OH)2
Zn2(OH)2SO4	-8.62	-1.12	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.61	6.58	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-5.69	-41.11	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-29.18	-9.65	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-14.68	13.72	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.91	20.59	38.50	Zn5(OH)8Cl2
ZnCl2	-16.31	-9.09	7.22	ZnCl2
Znmetal	-34.31	-8.16	26.15	Zn
ZnO(active)	-3.98	7.42	11.40	ZnO
ZnSe	6.61	-7.85	-14.46	ZnSe
ZnSeO4:6H2O	-25.67	-27.19	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-8.00	-8.54	-0.53	ZnSO4:1H2O

**For a gas, $SI = \log_{10}(\text{fugacity})$. Fugacity = pressure * phi / 1 atm.
 For ideal gases, phi = 1.

Initial solution 2.

-----Solution composition-----

Elements	Molality	Moles
Al	5.487e-05	5.487e-05
Alkalinity	9.999e-04	9.999e-04
As	1.736e-08	1.736e-08
B	4.626e-06	4.626e-06
Ba	3.481e-07	3.481e-07
Ca	3.244e-04	3.244e-04
Cd	6.229e-09	6.229e-09
Cl	2.229e-03	2.229e-03
Co	1.018e-08	1.018e-08
Cr	4.040e-08	4.040e-08
Cu	9.444e-08	9.444e-08
Fe	2.454e-05	2.454e-05
Hg	3.989e-10	3.989e-10
K	1.023e-04	1.023e-04
Mg	3.704e-04	3.704e-04
Mn	1.092e-06	1.092e-06
Mo	3.128e-09	3.128e-09
N	7.498e-05	7.498e-05
Na	2.132e-03	2.132e-03
Ni	4.772e-08	4.772e-08
P	3.552e-06	3.552e-06
Pb	5.793e-09	5.793e-09
S (6)	1.770e-04	1.770e-04
Se	2.534e-09	2.534e-09
Zn	2.509e-07	2.509e-07

-----Description of solution-----

pH	=	7.500
pe	=	4.000
Activity of water	=	1.000
Ionic strength (mol/kgw)	=	4.384e-03
Mass of water (kg)	=	1.000e+00
Total carbon (mol/kg)	=	8.307e-04
Total CO2 (mol/kg)	=	8.307e-04
Temperature (°C)	=	20.00
Electrical balance (eq)	=	3.069e-04
Percent error, $100 * (\text{Cat} - \text{An}) / (\text{Cat} + \text{An})$	=	4.34
Iterations	=	11
Total H	=	1.110151e+02
Total O	=	5.551033e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
OH-	2.330e-07	2.169e-07	-6.633	-6.664	-0.031	(0)
H+	3.394e-08	3.162e-08	-7.469	-7.500	-0.031	0.00
H2O	5.551e+01	9.999e-01	1.744	-0.000	0.000	18.05
Al	5.487e-05					
Al (OH) 4-	5.036e-05	4.694e-05	-4.298	-4.328	-0.031	(0)
Al (OH) 3	3.857e-06	3.857e-06	-5.414	-5.414	0.000	(0)
Al (OH) 2+	6.505e-07	6.071e-07	-6.187	-6.217	-0.030	(0)
AlOH+2	2.277e-09	1.728e-09	-8.643	-8.763	-0.120	(0)
Al+3	1.426e-11	7.540e-12	-10.846	-11.123	-0.277	(0)
AlSO4+	6.366e-12	5.934e-12	-11.196	-11.227	-0.031	(0)
Al (SO4) 2-	9.367e-15	8.732e-15	-14.028	-14.059	-0.031	(0)

AlMo6O21-3	0.000e+00	0.000e+00	-52.596	-52.898	-0.301	(0)
As (3)	3.031e-18					
H3AsO3	2.988e-18	2.988e-18	-17.525	-17.525	0.000	(0)
H2AsO3-	4.335e-20	4.013e-20	-19.363	-19.397	-0.033	(0)
HAsO3-2	1.264e-24	9.286e-25	-23.898	-24.032	-0.134	(0)
H4AsO3+	5.056e-26	4.681e-26	-25.296	-25.330	-0.033	(0)
AsO3-3	1.904e-30	9.510e-31	-29.720	-30.022	-0.301	(0)
As (5)	1.736e-08					
HAsO4-2	1.407e-08	1.033e-08	-7.852	-7.986	-0.134	(0)
H2AsO4-	3.286e-09	3.043e-09	-8.483	-8.517	-0.033	(0)
AsO4-3	1.840e-12	9.193e-13	-11.735	-12.037	-0.301	(0)
H3AsO4	1.591e-14	1.592e-14	-13.798	-13.798	0.000	(0)
B	4.626e-06					
H3BO3	4.542e-06	4.547e-06	-5.343	-5.342	0.000	(0)
H2BO3-	8.215e-08	7.636e-08	-7.085	-7.117	-0.032	(0)
CaH2BO3+	1.090e-09	1.013e-09	-8.963	-8.994	-0.032	(0)
MgH2BO3+	7.768e-10	7.220e-10	-9.110	-9.141	-0.032	(0)
NaH2BO3	2.626e-10	2.626e-10	-9.581	-9.581	0.000	(0)
BaH2BO3+	6.446e-13	5.992e-13	-12.191	-12.222	-0.032	(0)
H5 (BO3) 2-	3.281e-13	3.050e-13	-12.484	-12.516	-0.032	(0)
H8 (BO3) 3-	1.291e-16	1.200e-16	-15.889	-15.921	-0.032	(0)
Ba	3.481e-07					
Ba+2	3.464e-07	2.610e-07	-6.460	-6.583	-0.123	(0)
BaHCO3+	1.611e-09	1.505e-09	-8.793	-8.822	-0.030	(0)
BaCO3	1.153e-10	1.153e-10	-9.938	-9.938	0.000	(0)
BaH2BO3+	6.446e-13	5.992e-13	-12.191	-12.222	-0.032	(0)
BaNH3+2	2.781e-13	2.043e-13	-12.556	-12.690	-0.134	(0)
BaOH+	2.559e-13	2.387e-13	-12.592	-12.622	-0.030	(0)
BaNO3+	4.082e-25	3.779e-25	-24.389	-24.423	-0.033	(0)
C (4)	8.307e-04					
HCO3-	7.685e-04	7.172e-04	-3.114	-3.144	-0.030	(0)
H2CO3	5.433e-05	5.433e-05	-4.265	-4.265	0.000	(0)
CaHCO3+	2.954e-06	2.759e-06	-5.530	-5.559	-0.030	(0)
MgHCO3+	2.090e-06	1.947e-06	-5.680	-5.711	-0.031	(0)
CO3-2	1.276e-06	9.617e-07	-5.894	-6.017	-0.123	(0)
NaHCO3	8.795e-07	8.795e-07	-6.056	-6.056	0.000	(0)
CaCO3	3.236e-07	3.236e-07	-6.490	-6.490	0.000	(0)
MgCO3	2.008e-07	2.008e-07	-6.697	-6.697	0.000	(0)
CuCO3	6.481e-08	6.481e-08	-7.188	-7.188	0.000	(0)
NaCO3-	4.379e-08	4.087e-08	-7.359	-7.389	-0.030	(0)
MnHCO3+	1.164e-08	1.086e-08	-7.934	-7.964	-0.030	(0)
ZnCO3	9.487e-09	9.487e-09	-8.023	-8.023	0.000	(0)
FeHCO3+	9.148e-09	8.545e-09	-8.039	-8.068	-0.030	(0)
ZnHCO3+	3.799e-09	3.517e-09	-8.420	-8.454	-0.033	(0)
PbCO3	2.909e-09	2.909e-09	-8.536	-8.536	0.000	(0)
NiHCO3+	2.779e-09	2.573e-09	-8.556	-8.590	-0.033	(0)
BaHCO3+	1.611e-09	1.505e-09	-8.793	-8.822	-0.030	(0)
NiCO3	1.154e-09	1.154e-09	-8.938	-8.938	0.000	(0)
PbHCO3+	5.238e-10	4.849e-10	-9.281	-9.314	-0.033	(0)
CuHCO3+	5.060e-10	4.684e-10	-9.296	-9.329	-0.033	(0)
CoHCO3+	3.770e-10	3.490e-10	-9.424	-9.457	-0.033	(0)
Cu (CO3) 2-2	2.284e-10	1.678e-10	-9.641	-9.775	-0.134	(0)
BaCO3	1.153e-10	1.153e-10	-9.938	-9.938	0.000	(0)
CoCO3	1.125e-10	1.125e-10	-9.949	-9.949	0.000	(0)
CdCO3	8.551e-11	8.551e-11	-10.068	-10.068	0.000	(0)
Pb (CO3) 2-2	1.098e-11	8.067e-12	-10.959	-11.093	-0.134	(0)
CdHCO3+	6.223e-12	5.761e-12	-11.206	-11.239	-0.033	(0)
Cd (CO3) 2-2	8.298e-14	6.096e-14	-13.081	-13.215	-0.134	(0)
HgCO3	2.918e-18	2.918e-18	-17.535	-17.535	0.000	(0)
Hg (CO3) 2-2	1.208e-20	8.873e-21	-19.918	-20.052	-0.134	(0)
HgHCO3+	1.856e-21	1.718e-21	-20.731	-20.765	-0.033	(0)
Ca	3.244e-04					
Ca+2	3.146e-04	2.370e-04	-3.502	-3.625	-0.123	(0)
CaSO4	6.357e-06	6.357e-06	-5.197	-5.197	0.000	(0)
CaHCO3+	2.954e-06	2.759e-06	-5.530	-5.559	-0.030	(0)
CaCO3	3.236e-07	3.236e-07	-6.490	-6.490	0.000	(0)
CaHPO4	1.634e-07	1.634e-07	-6.787	-6.787	0.000	(0)
CaPO4-	1.319e-08	1.231e-08	-7.880	-7.910	-0.030	(0)

	CaH ₂ PO ₄ +	4.366e-09	4.075e-09	-8.360	-8.390	-0.030	(0)
	CaH ₂ BO ₃ +	1.090e-09	1.013e-09	-8.963	-8.994	-0.032	(0)
	CaOH+	1.037e-09	9.688e-10	-8.984	-9.014	-0.030	(0)
	CaNH ₃ +2	5.039e-10	3.702e-10	-9.298	-9.432	-0.134	(0)
	Ca (NH ₃) 2+2	2.488e-16	1.828e-16	-15.604	-15.738	-0.134	(0)
	CaNO ₃ +	2.220e-22	2.055e-22	-21.654	-21.687	-0.033	(0)
Cd		6.229e-09					
	Cd+2	5.178e-09	3.901e-09	-8.286	-8.409	-0.123	(0)
	CdCl+	8.299e-10	7.683e-10	-9.081	-9.114	-0.033	(0)
	CdSO ₄	1.059e-10	1.059e-10	-9.975	-9.975	0.000	(0)
	CdCO ₃	8.551e-11	8.551e-11	-10.068	-10.068	0.000	(0)
	CdOHC1	8.913e-12	8.913e-12	-11.050	-11.050	0.000	(0)
	CdOH+	7.309e-12	6.767e-12	-11.136	-11.170	-0.033	(0)
	CdCl ₂	6.560e-12	6.560e-12	-11.183	-11.183	0.000	(0)
	CdHCO ₃ +	6.223e-12	5.761e-12	-11.206	-11.239	-0.033	(0)
	Cd (SO ₄) 2-2	2.538e-13	1.864e-13	-12.596	-12.730	-0.134	(0)
	Cd (CO ₃) 2-2	8.298e-14	6.096e-14	-13.081	-13.215	-0.134	(0)
	Cd (OH) 2	1.982e-14	1.982e-14	-13.703	-13.703	0.000	(0)
	CdCl ₃ -	8.847e-15	8.191e-15	-14.053	-14.087	-0.033	(0)
	Cd (OH) 3-	4.164e-19	3.855e-19	-18.380	-18.414	-0.033	(0)
	Cd2OH+3	2.817e-19	1.408e-19	-18.550	-18.852	-0.301	(0)
	CdSeO ₄	5.758e-22	5.758e-22	-21.240	-21.240	0.000	(0)
	Cd (SeO ₃) 2-2	2.869e-22	2.108e-22	-21.542	-21.676	-0.134	(0)
	Cd (OH) 4-2	2.735e-26	2.009e-26	-25.563	-25.697	-0.134	(0)
	CdNO ₃ +	4.067e-27	3.766e-27	-26.391	-26.424	-0.033	(0)
	Cd (NO ₃) 2	0.000e+00	0.000e+00	-45.365	-45.365	0.000	(0)
Cl		2.229e-03					
	Cl-	2.229e-03	2.077e-03	-2.652	-2.683	-0.031	(0)
	MnCl+	2.186e-09	2.040e-09	-8.660	-8.690	-0.030	(0)
	CuCl	1.397e-09	1.397e-09	-8.855	-8.855	0.000	(0)
	ZnCl+	9.250e-10	8.616e-10	-9.034	-9.065	-0.031	(0)
	CdCl+	8.299e-10	7.683e-10	-9.081	-9.114	-0.033	(0)
	CuCl ₂ -	6.588e-10	6.136e-10	-9.181	-9.212	-0.031	(0)
	ZnOHC1	3.727e-10	3.727e-10	-9.429	-9.429	0.000	(0)
	NiCl+	1.821e-10	1.686e-10	-9.740	-9.773	-0.033	(0)
	PbCl+	7.542e-11	6.982e-11	-10.123	-10.156	-0.033	(0)
	CoCl+	5.294e-11	4.901e-11	-10.276	-10.310	-0.033	(0)
	CuCl+	3.819e-11	3.558e-11	-10.418	-10.449	-0.031	(0)
	CdOHC1	8.913e-12	8.913e-12	-11.050	-11.050	0.000	(0)
	CdCl ₂	6.560e-12	6.560e-12	-11.183	-11.183	0.000	(0)
	MnCl ₂	5.982e-12	5.982e-12	-11.223	-11.223	0.000	(0)
	ZnCl ₂	2.282e-12	2.282e-12	-11.642	-11.642	0.000	(0)
	PbCl ₂	6.331e-13	6.331e-13	-12.199	-12.199	0.000	(0)
	CuCl ₃ -2	3.528e-13	2.671e-13	-12.452	-12.573	-0.121	(0)
	CuCl ₂	2.001e-14	2.001e-14	-13.699	-13.699	0.000	(0)
	CdCl ₃ -	8.847e-15	8.191e-15	-14.053	-14.087	-0.033	(0)
	HgClOH	3.971e-15	3.971e-15	-14.401	-14.401	0.000	(0)
	ZnCl ₃ -	3.958e-15	3.686e-15	-14.403	-14.433	-0.031	(0)
	MnCl ₃ -	3.668e-15	3.421e-15	-14.436	-14.466	-0.030	(0)
	HgCl ₂	2.065e-15	2.065e-15	-14.685	-14.685	0.000	(0)
	NiCl ₂	1.787e-15	1.787e-15	-14.748	-14.748	0.000	(0)
	CrCl+2	8.838e-16	6.492e-16	-15.054	-15.188	-0.134	(0)
	PbCl ₃ -	5.973e-16	5.530e-16	-15.224	-15.257	-0.033	(0)
	FeCl+2	5.123e-17	3.879e-17	-16.290	-16.411	-0.121	(0)
	HgCl ₃ -	4.682e-17	4.335e-17	-16.330	-16.363	-0.033	(0)
	ZnCl ₄ -2	4.856e-18	3.677e-18	-17.314	-17.435	-0.121	(0)
	CrOHC1 ₂	3.999e-18	3.999e-18	-17.398	-17.398	0.000	(0)
	PbCl ₄ -2	6.635e-19	4.874e-19	-18.178	-18.312	-0.134	(0)
	HgCl ₄ -2	5.108e-19	3.752e-19	-18.292	-18.426	-0.134	(0)
	FeCl ₂ +	4.518e-19	4.215e-19	-18.345	-18.375	-0.030	(0)
	CuCl ₃ -	3.804e-19	3.544e-19	-18.420	-18.451	-0.031	(0)
	HgCl+	1.747e-19	1.617e-19	-18.758	-18.791	-0.033	(0)
	CrCl ₂ +	8.871e-20	8.213e-20	-19.052	-19.086	-0.033	(0)
	FeCl ₃	8.752e-23	8.752e-23	-22.058	-22.058	0.000	(0)
	CuCl ₄ -2	5.775e-24	4.372e-24	-23.238	-23.359	-0.121	(0)
	CrO ₃ Cl-	3.021e-29	2.797e-29	-28.520	-28.553	-0.033	(0)
	Cr (NH ₃) 6Cl+2	1.542e-37	1.133e-37	-36.812	-36.946	-0.134	(0)
	CoCl+2	1.419e-37	1.042e-37	-36.848	-36.982	-0.134	(0)

Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-40.718	-40.852	-0.134	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-53.313	-53.447	-0.134	(0)
Co (2)	1.018e-08					
Co+2	9.417e-09	6.917e-09	-8.026	-8.160	-0.134	(0)
CoHCO3+	3.770e-10	3.490e-10	-9.424	-9.457	-0.033	(0)
CoSO4	1.626e-10	1.626e-10	-9.789	-9.789	0.000	(0)
CoCO3	1.125e-10	1.125e-10	-9.949	-9.949	0.000	(0)
CoCl+	5.294e-11	4.901e-11	-10.276	-10.310	-0.033	(0)
CoOH+	4.747e-11	4.394e-11	-10.324	-10.357	-0.033	(0)
CoHPO4	1.115e-11	1.115e-11	-10.953	-10.953	0.000	(0)
Co (NH3) +2	2.196e-12	1.613e-12	-11.658	-11.792	-0.134	(0)
Co (OH) 2	1.111e-12	1.111e-12	-11.954	-11.954	0.000	(0)
Co (NH3) 2+2	7.431e-17	5.459e-17	-16.129	-16.263	-0.134	(0)
Co (OH) 3-	7.626e-18	7.060e-18	-17.118	-17.151	-0.033	(0)
CoOOH-	3.189e-19	2.952e-19	-18.496	-18.530	-0.033	(0)
Co2OH+3	3.049e-20	1.524e-20	-19.516	-19.817	-0.301	(0)
CoNO2+	1.822e-20	1.686e-20	-19.740	-19.773	-0.033	(0)
CoSeO4	2.530e-21	2.530e-21	-20.597	-20.597	0.000	(0)
Co (NH3) 3+2	1.160e-21	8.524e-22	-20.935	-21.069	-0.134	(0)
Co (OH) 4-2	4.850e-25	3.563e-25	-24.314	-24.448	-0.134	(0)
Co (NH3) 4+2	7.554e-27	5.549e-27	-26.122	-26.256	-0.134	(0)
CoNO3+	3.128e-27	2.896e-27	-26.505	-26.538	-0.033	(0)
Co (NH3) 5+2	1.555e-32	1.142e-32	-31.808	-31.942	-0.134	(0)
Co4 (OH) 4+4	2.555e-33	7.440e-34	-32.593	-33.128	-0.536	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-44.808	-44.808	0.000	(0)
Co (3)	6.065e-31					
CoOH+2	6.065e-31	4.456e-31	-30.217	-30.351	-0.134	(0)
Co+3	5.207e-37	2.754e-37	-36.283	-36.560	-0.277	(0)
CoCl+2	1.419e-37	1.042e-37	-36.848	-36.982	-0.134	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-40.718	-40.852	-0.134	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-49.776	-49.810	-0.033	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.616	-52.750	-0.134	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-53.313	-53.447	-0.134	(0)
Cr (2)	3.686e-24					
Cr+2	3.686e-24	2.708e-24	-23.433	-23.567	-0.134	(0)
Cr (3)	4.040e-08					
Cr (OH) 2+	3.452e-08	3.196e-08	-7.462	-7.495	-0.033	(0)
Cr (OH) 3	3.822e-09	3.822e-09	-8.418	-8.418	0.000	(0)
Cr (OH) +2	1.919e-09	1.410e-09	-8.717	-8.851	-0.134	(0)
CrO2-	6.201e-11	5.740e-11	-10.208	-10.241	-0.033	(0)
Cr (OH) 4-	5.233e-11	4.845e-11	-10.281	-10.315	-0.033	(0)
CrOHSO4	2.406e-11	2.406e-11	-10.619	-10.619	0.000	(0)
Cr+3	5.783e-13	2.889e-13	-12.238	-12.539	-0.301	(0)
CrSO4+	7.237e-14	6.700e-14	-13.140	-13.174	-0.033	(0)
CrCl+2	8.838e-16	6.492e-16	-15.054	-15.188	-0.134	(0)
CrH2PO4+2	6.914e-17	5.079e-17	-16.160	-16.294	-0.134	(0)
CrOHC12	3.999e-18	3.999e-18	-17.398	-17.398	0.000	(0)
Cr2 (OH) 2SO4+2	2.442e-18	1.794e-18	-17.612	-17.746	-0.134	(0)
CrCl2+	8.871e-20	8.213e-20	-19.052	-19.086	-0.033	(0)
Cr2 (OH) 2 (SO4) 2	1.310e-20	1.310e-20	-19.883	-19.883	0.000	(0)
Cr (NH3) 5OH+2	3.552e-29	2.609e-29	-28.450	-28.583	-0.134	(0)
CrNO3+2	2.920e-33	2.145e-33	-32.535	-32.669	-0.134	(0)
Cr (NH3) 6+3	8.634e-36	4.314e-36	-35.064	-35.365	-0.301	(0)
Cr (NH3) 6Cl+2	1.542e-37	1.133e-37	-36.812	-36.946	-0.134	(0)
Cr (6)	9.578e-19					
CrO4-2	8.783e-19	6.617e-19	-18.056	-18.179	-0.123	(0)
HCrO4-	7.214e-20	6.679e-20	-19.142	-19.175	-0.033	(0)
NaCrO4-	7.047e-21	6.524e-21	-20.152	-20.185	-0.033	(0)
KCrO4-	2.530e-22	2.342e-22	-21.597	-21.630	-0.033	(0)
CrO3HPO4-2	2.689e-25	1.976e-25	-24.570	-24.704	-0.134	(0)
H2CrO4	1.327e-27	1.327e-27	-26.877	-26.877	0.000	(0)
CrO3SO4-2	1.091e-28	8.018e-29	-27.962	-28.096	-0.134	(0)
CrO3Cl-	3.021e-29	2.797e-29	-28.520	-28.553	-0.033	(0)
CrO3H2PO4-	3.251e-30	3.009e-30	-29.488	-29.522	-0.033	(0)
Cr2O7-2	2.400e-37	1.763e-37	-36.620	-36.754	-0.134	(0)
Cu (1)	2.634e-09					
CuCl	1.397e-09	1.397e-09	-8.855	-8.855	0.000	(0)
CuCl2-	6.588e-10	6.136e-10	-9.181	-9.212	-0.031	(0)

Cu+	5.774e-10	5.346e-10	-9.239	-9.272	-0.033	(0)
CuCl3-2	3.528e-13	2.671e-13	-12.452	-12.573	-0.121	(0)
Cu (2)	9.181e-08					
CuCO3	6.481e-08	6.481e-08	-7.188	-7.188	0.000	(0)
Cu+2	1.519e-08	1.145e-08	-7.818	-7.941	-0.123	(0)
CuOH+	9.669e-09	9.007e-09	-8.015	-8.045	-0.031	(0)
Cu (OH) 2	7.320e-10	7.320e-10	-9.135	-9.135	0.000	(0)
CuHCO3+	5.060e-10	4.684e-10	-9.296	-9.329	-0.033	(0)
CuNH3+2	3.245e-10	2.384e-10	-9.489	-9.623	-0.134	(0)
CuSO4	3.036e-10	3.036e-10	-9.518	-9.518	0.000	(0)
Cu (CO3) 2-2	2.284e-10	1.678e-10	-9.641	-9.775	-0.134	(0)
CuCl+	3.819e-11	3.558e-11	-10.418	-10.449	-0.031	(0)
Cu2 (OH) 2+2	2.680e-12	1.969e-12	-11.572	-11.706	-0.134	(0)
Cu (OH) 3-	5.164e-13	4.781e-13	-12.287	-12.321	-0.033	(0)
CuCl2	2.001e-14	2.001e-14	-13.699	-13.699	0.000	(0)
Cu (OH) 4-2	1.631e-18	1.198e-18	-17.788	-17.922	-0.134	(0)
CuNO2+	4.478e-19	4.146e-19	-18.349	-18.382	-0.033	(0)
CuCl3-	3.804e-19	3.544e-19	-18.420	-18.451	-0.031	(0)
CuCl4-2	5.775e-24	4.372e-24	-23.238	-23.359	-0.121	(0)
CuNO3+	1.062e-26	9.835e-27	-25.974	-26.007	-0.033	(0)
Cu (NO2) 2	1.468e-30	1.468e-30	-29.833	-29.833	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-45.498	-45.498	0.000	(0)
Fe (2)	1.480e-06					
Fe+2	1.424e-06	1.046e-06	-5.846	-5.980	-0.134	(0)
FeSO4	2.988e-08	2.988e-08	-7.525	-7.525	0.000	(0)
FeOH+	9.684e-09	9.034e-09	-8.014	-8.044	-0.030	(0)
FeHCO3+	9.148e-09	8.545e-09	-8.039	-8.068	-0.030	(0)
FeHPO4	6.152e-09	6.152e-09	-8.211	-8.211	0.000	(0)
FeH2PO4+	4.140e-10	3.864e-10	-9.383	-9.413	-0.030	(0)
Fe (OH) 2	1.473e-12	1.473e-12	-11.832	-11.832	0.000	(0)
Fe (OH) 3-	1.517e-13	1.415e-13	-12.819	-12.849	-0.030	(0)
Fe (3)	2.306e-05					
Fe (OH) 2+	1.977e-05	1.845e-05	-4.704	-4.734	-0.030	(0)
Fe (OH) 3	3.089e-06	3.089e-06	-5.510	-5.510	0.000	(0)
Fe (OH) 4-	2.004e-07	1.870e-07	-6.698	-6.728	-0.030	(0)
FeOH+2	1.476e-10	1.117e-10	-9.831	-9.952	-0.121	(0)
FeHPO4+	1.169e-11	1.091e-11	-10.932	-10.962	-0.030	(0)
Fe+3	1.370e-15	7.246e-16	-14.863	-15.140	-0.277	(0)
FeSO4+	9.021e-16	8.414e-16	-15.045	-15.075	-0.030	(0)
FeCl+2	5.123e-17	3.879e-17	-16.290	-16.411	-0.121	(0)
FeH2PO4+2	1.336e-17	1.014e-17	-16.874	-16.994	-0.120	(0)
Fe (SO4) 2-	2.486e-18	2.301e-18	-17.605	-17.638	-0.033	(0)
Fe2 (OH) 2+4	1.697e-18	4.942e-19	-17.770	-18.306	-0.536	(0)
FeCl2+	4.518e-19	4.215e-19	-18.345	-18.375	-0.030	(0)
FeHSeO3+2	4.463e-21	3.279e-21	-20.350	-20.484	-0.134	(0)
Fe3 (OH) 4+5	8.596e-22	1.251e-22	-21.066	-21.903	-0.837	(0)
FeCl3	8.752e-23	8.752e-23	-22.058	-22.058	0.000	(0)
FeNO3+2	3.361e-33	2.469e-33	-32.474	-32.607	-0.134	(0)
H (0)	1.488e-26					
H2	7.440e-27	7.447e-27	-26.128	-26.128	0.000	(0)
Hg (0)	3.989e-10					
Hg	3.989e-10	3.989e-10	-9.399	-9.399	0.000	(0)
Hg (1)	1.698e-24					
Hg2+2	8.491e-25	6.238e-25	-24.071	-24.205	-0.134	(0)
Hg (2)	7.725e-15					
HgClOH	3.971e-15	3.971e-15	-14.401	-14.401	0.000	(0)
HgCl2	2.065e-15	2.065e-15	-14.685	-14.685	0.000	(0)
Hg (OH) 2	1.620e-15	1.622e-15	-14.791	-14.790	0.000	(0)
HgCl3-	4.682e-17	4.335e-17	-16.330	-16.363	-0.033	(0)
Hg (NH3) 2+2	1.829e-17	1.344e-17	-16.738	-16.872	-0.134	(0)
HgCO3	2.918e-18	2.918e-18	-17.535	-17.535	0.000	(0)
HgCl4-2	5.108e-19	3.752e-19	-18.292	-18.426	-0.134	(0)
HgCl+	1.747e-19	1.617e-19	-18.758	-18.791	-0.033	(0)
HgOH+	3.953e-20	3.660e-20	-19.403	-19.437	-0.033	(0)
Hg (CO3) 2-2	1.208e-20	8.873e-21	-19.918	-20.052	-0.134	(0)
HgNH3+2	2.701e-21	1.984e-21	-20.568	-20.702	-0.134	(0)
HgHCO3+	1.856e-21	1.718e-21	-20.731	-20.765	-0.033	(0)
Hg (NH3) 3+2	1.423e-22	1.045e-22	-21.847	-21.981	-0.134	(0)

	Hg (OH) 3-	7.020e-23	6.499e-23	-22.154	-22.187	-0.033	(0)
	Hg+2	4.536e-24	3.332e-24	-23.343	-23.477	-0.134	(0)
	HgSO4	8.159e-26	8.159e-26	-25.088	-25.088	0.000	(0)
	Hg (NH3) 4+2	2.222e-27	1.633e-27	-26.653	-26.787	-0.134	(0)
	HgNO3+	0.000e+00	0.000e+00	-42.573	-42.607	-0.033	(0)
	Hg (NO3) 2	0.000e+00	0.000e+00	-61.566	-61.566	0.000	(0)
K	1.023e-04						
	K+	1.022e-04	9.526e-05	-3.990	-4.021	-0.031	(0)
	KSO4-	8.635e-08	8.059e-08	-7.064	-7.094	-0.030	(0)
	KHPO4-	1.143e-09	1.067e-09	-8.942	-8.972	-0.030	(0)
	KCrO4-	2.530e-22	2.342e-22	-21.597	-21.630	-0.033	(0)
Mg	3.704e-04						
	Mg+2	3.619e-04	2.727e-04	-3.441	-3.564	-0.123	(0)
	MgSO4	5.861e-06	5.861e-06	-5.232	-5.232	0.000	(0)
	MgHCO3+	2.090e-06	1.947e-06	-5.680	-5.711	-0.031	(0)
	MgHPO4	2.594e-07	2.594e-07	-6.586	-6.586	0.000	(0)
	MgCO3	2.008e-07	2.008e-07	-6.697	-6.697	0.000	(0)
	MgOH+	2.319e-08	2.168e-08	-7.635	-7.664	-0.029	(0)
	MgH2PO4+	1.072e-08	1.000e-08	-7.970	-8.000	-0.030	(0)
	MgH2BO3+	7.768e-10	7.220e-10	-9.110	-9.141	-0.032	(0)
	MgPO4-	2.373e-10	2.214e-10	-9.625	-9.655	-0.030	(0)
Mn (2)	1.092e-06						
	Mn+2	1.062e-06	7.802e-07	-5.974	-6.108	-0.134	(0)
	MnSO4	1.606e-08	1.606e-08	-7.794	-7.794	0.000	(0)
	MnHCO3+	1.164e-08	1.086e-08	-7.934	-7.964	-0.030	(0)
	MnCl+	2.186e-09	2.040e-09	-8.660	-8.690	-0.030	(0)
	MnOH+	4.556e-10	4.250e-10	-9.341	-9.372	-0.030	(0)
	MnCl2	5.982e-12	5.982e-12	-11.223	-11.223	0.000	(0)
	MnCl3-	3.668e-15	3.421e-15	-14.436	-14.466	-0.030	(0)
	Mn (OH) 3-	4.191e-19	3.909e-19	-18.378	-18.408	-0.030	(0)
	MnSeO4	1.512e-19	1.512e-19	-18.821	-18.821	0.000	(0)
	Mn (OH) 4-2	5.307e-25	4.018e-25	-24.275	-24.396	-0.121	(0)
	MnNO3+	3.528e-25	3.267e-25	-24.452	-24.486	-0.033	(0)
	MnSe	1.498e-37	1.498e-37	-36.824	-36.824	0.000	(0)
	Mn (NO3) 2	0.000e+00	0.000e+00	-42.659	-42.659	0.000	(0)
Mn (3)	3.139e-28						
	Mn+3	3.139e-28	1.660e-28	-27.503	-27.780	-0.277	(0)
Mn (6)	0.000e+00						
	MnO4-2	0.000e+00	0.000e+00	-50.534	-50.655	-0.121	(0)
Mn (7)	0.000e+00						
	MnO4-	0.000e+00	0.000e+00	-56.329	-56.360	-0.031	(0)
Mo	3.128e-09						
	MoO4-2	3.126e-09	2.355e-09	-8.505	-8.628	-0.123	(0)
	HMoO4-	1.395e-12	1.292e-12	-11.855	-11.889	-0.033	(0)
	H2MoO4	4.105e-16	4.105e-16	-15.387	-15.387	0.000	(0)
	AlMo6O21-3	0.000e+00	0.000e+00	-52.596	-52.898	-0.301	(0)
	Mo7O24-6	0.000e+00	0.000e+00	-65.519	-66.724	-1.205	(0)
	HMo7O24-5	0.000e+00	0.000e+00	-67.030	-67.867	-0.837	(0)
	H2Mo7O24-4	0.000e+00	0.000e+00	-70.058	-70.594	-0.536	(0)
	H3Mo7O24-3	0.000e+00	0.000e+00	-74.541	-74.842	-0.301	(0)
N (-3)	7.498e-05						
	NH4+	7.402e-05	6.880e-05	-4.131	-4.162	-0.032	(0)
	NH3	8.673e-07	8.673e-07	-6.062	-6.062	0.000	(0)
	NH4SO4-	9.714e-08	9.062e-08	-7.013	-7.043	-0.030	(0)
	CaNH3+2	5.039e-10	3.702e-10	-9.298	-9.432	-0.134	(0)
	CuNH3+2	3.245e-10	2.384e-10	-9.489	-9.623	-0.134	(0)
	NiNH3+2	4.626e-11	3.398e-11	-10.335	-10.469	-0.134	(0)
	Co (NH3) +2	2.196e-12	1.613e-12	-11.658	-11.792	-0.134	(0)
	BaNH3+2	2.781e-13	2.043e-13	-12.556	-12.690	-0.134	(0)
	Ni (NH3) 2+2	1.127e-14	8.280e-15	-13.948	-14.082	-0.134	(0)
	Ca (NH3) 2+2	2.488e-16	1.828e-16	-15.604	-15.738	-0.134	(0)
	Co (NH3) 2+2	7.431e-17	5.459e-17	-16.129	-16.263	-0.134	(0)
	Hg (NH3) 2+2	1.829e-17	1.344e-17	-16.738	-16.872	-0.134	(0)
	HgNH3+2	2.701e-21	1.984e-21	-20.568	-20.702	-0.134	(0)
	Co (NH3) 3+2	1.160e-21	8.524e-22	-20.935	-21.069	-0.134	(0)
	Hg (NH3) 3+2	1.423e-22	1.045e-22	-21.847	-21.981	-0.134	(0)
	Co (NH3) 4+2	7.554e-27	5.549e-27	-26.122	-26.256	-0.134	(0)
	Hg (NH3) 4+2	2.222e-27	1.633e-27	-26.653	-26.787	-0.134	(0)

Cr (NH3) 5OH+2	3.552e-29	2.609e-29	-28.450	-28.583	-0.134	(0)
Co (NH3) 5+2	1.555e-32	1.142e-32	-31.808	-31.942	-0.134	(0)
Cr (NH3) 6+3	8.634e-36	4.314e-36	-35.064	-35.365	-0.301	(0)
Cr (NH3) 6Cl+2	1.542e-37	1.133e-37	-36.812	-36.946	-0.134	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-40.718	-40.852	-0.134	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-49.776	-49.810	-0.033	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.616	-52.750	-0.134	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-53.313	-53.447	-0.134	(0)
N (3)	3.719e-13					
NO2-	3.719e-13	3.460e-13	-12.430	-12.461	-0.031	(0)
CuNO2+	4.478e-19	4.146e-19	-18.349	-18.382	-0.033	(0)
CoNO2+	1.822e-20	1.686e-20	-19.740	-19.773	-0.033	(0)
Cu (NO2) 2	1.468e-30	1.468e-30	-29.833	-29.833	0.000	(0)
N (5)	2.838e-19					
NO3-	2.836e-19	2.642e-19	-18.547	-18.578	-0.031	(0)
CaNO3+	2.220e-22	2.055e-22	-21.654	-21.687	-0.033	(0)
BaNO3+	4.082e-25	3.779e-25	-24.389	-24.423	-0.033	(0)
MnNO3+	3.528e-25	3.267e-25	-24.452	-24.486	-0.033	(0)
ZnNO3+	1.268e-25	1.174e-25	-24.897	-24.930	-0.033	(0)
NiNO3+	2.306e-26	2.135e-26	-25.637	-25.671	-0.033	(0)
CuNO3+	1.062e-26	9.835e-27	-25.974	-26.007	-0.033	(0)
PbNO3+	4.189e-27	3.878e-27	-26.378	-26.411	-0.033	(0)
CdNO3+	4.067e-27	3.766e-27	-26.391	-26.424	-0.033	(0)
CoNO3+	3.128e-27	2.896e-27	-26.505	-26.538	-0.033	(0)
FeNO3+2	3.361e-33	2.469e-33	-32.474	-32.607	-0.134	(0)
CrNO3+2	2.920e-33	2.145e-33	-32.535	-32.669	-0.134	(0)
HgNO3+	0.000e+00	0.000e+00	-42.573	-42.607	-0.033	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-42.659	-42.659	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-44.222	-44.222	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-44.734	-44.734	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-44.808	-44.808	0.000	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-45.365	-45.365	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-45.498	-45.498	0.000	(0)
Hg (NO3) 2	0.000e+00	0.000e+00	-61.566	-61.566	0.000	(0)
Na	2.132e-03					
Na+	2.130e-03	1.984e-03	-2.672	-2.702	-0.031	(0)
NaSO4-	1.394e-06	1.301e-06	-5.856	-5.886	-0.030	(0)
NaHCO3	8.795e-07	8.795e-07	-6.056	-6.056	0.000	(0)
NaCO3-	4.379e-08	4.087e-08	-7.359	-7.389	-0.030	(0)
NaHPO4-	3.689e-08	3.443e-08	-7.433	-7.463	-0.030	(0)
NaH2BO3	2.626e-10	2.626e-10	-9.581	-9.581	0.000	(0)
NaCrO4-	7.047e-21	6.524e-21	-20.152	-20.185	-0.033	(0)
Ni	4.772e-08					
Ni+2	4.270e-08	3.217e-08	-7.370	-7.493	-0.123	(0)
NiHCO3+	2.779e-09	2.573e-09	-8.556	-8.590	-0.033	(0)
NiCO3	1.154e-09	1.154e-09	-8.938	-8.938	0.000	(0)
NiSO4	7.582e-10	7.582e-10	-9.120	-9.120	0.000	(0)
NiCl+	1.821e-10	1.686e-10	-9.740	-9.773	-0.033	(0)
NiOH+	9.752e-11	9.028e-11	-10.011	-10.044	-0.033	(0)
NiNH3+2	4.626e-11	3.398e-11	-10.335	-10.469	-0.134	(0)
Ni (OH) 2	3.261e-12	3.261e-12	-11.487	-11.487	0.000	(0)
Ni (NH3) 2+2	1.127e-14	8.280e-15	-13.948	-14.082	-0.134	(0)
Ni (SO4) 2-2	4.372e-15	3.212e-15	-14.359	-14.493	-0.134	(0)
NiCl2	1.787e-15	1.787e-15	-14.748	-14.748	0.000	(0)
Ni (OH) 3-	1.122e-15	1.038e-15	-14.950	-14.984	-0.033	(0)
NiSeO4	1.083e-20	1.083e-20	-19.965	-19.965	0.000	(0)
NiNO3+	2.306e-26	2.135e-26	-25.637	-25.671	-0.033	(0)
O (0)	0.000e+00					
O2	0.000e+00	0.000e+00	-41.434	-41.433	0.000	(0)
P	3.552e-06					
HPO4-2	2.163e-06	1.637e-06	-5.665	-5.786	-0.121	(0)
H2PO4-	8.935e-07	8.339e-07	-6.049	-6.079	-0.030	(0)
MgHPO4	2.594e-07	2.594e-07	-6.586	-6.586	0.000	(0)
CaHPO4	1.634e-07	1.634e-07	-6.787	-6.787	0.000	(0)
NaHPO4-	3.689e-08	3.443e-08	-7.433	-7.463	-0.030	(0)
CaPO4-	1.319e-08	1.231e-08	-7.880	-7.910	-0.030	(0)
MgH2PO4+	1.072e-08	1.000e-08	-7.970	-8.000	-0.030	(0)
FeHPO4	6.152e-09	6.152e-09	-8.211	-8.211	0.000	(0)

CaH2PO4+	4.366e-09	4.075e-09	-8.360	-8.390	-0.030	(0)
KHPO4-	1.143e-09	1.067e-09	-8.942	-8.972	-0.030	(0)
FeH2PO4+	4.140e-10	3.864e-10	-9.383	-9.413	-0.030	(0)
MgPO4-	2.373e-10	2.214e-10	-9.625	-9.655	-0.030	(0)
PO4-3	3.724e-11	1.969e-11	-10.429	-10.706	-0.277	(0)
FeHPO4+	1.169e-11	1.091e-11	-10.932	-10.962	-0.030	(0)
CoHPO4	1.115e-11	1.115e-11	-10.953	-10.953	0.000	(0)
H3PO4	3.512e-12	3.512e-12	-11.454	-11.454	0.000	(0)
CrH2PO4+2	6.914e-17	5.079e-17	-16.160	-16.294	-0.134	(0)
FeH2PO4+2	1.336e-17	1.014e-17	-16.874	-16.994	-0.120	(0)
CrO3HPO4-2	2.689e-25	1.976e-25	-24.570	-24.704	-0.134	(0)
CrO3H2PO4-	3.251e-30	3.009e-30	-29.488	-29.522	-0.033	(0)
Pb	5.793e-09					
PbCO3	2.909e-09	2.909e-09	-8.536	-8.536	0.000	(0)
Pb+2	1.335e-09	1.006e-09	-8.874	-8.997	-0.123	(0)
PbOH+	8.692e-10	8.047e-10	-9.061	-9.094	-0.033	(0)
PbHCO3+	5.238e-10	4.849e-10	-9.281	-9.314	-0.033	(0)
PbCl+	7.542e-11	6.982e-11	-10.123	-10.156	-0.033	(0)
PbSO4	6.058e-11	6.058e-11	-10.218	-10.218	0.000	(0)
Pb (CO3) 2-2	1.098e-11	8.067e-12	-10.959	-11.093	-0.134	(0)
Pb (OH) 2	8.102e-12	8.102e-12	-11.091	-11.091	0.000	(0)
PbCl2	6.331e-13	6.331e-13	-12.199	-12.199	0.000	(0)
Pb (SO4) 2-2	6.108e-14	4.487e-14	-13.214	-13.348	-0.134	(0)
Pb (OH) 3-	2.786e-15	2.579e-15	-14.555	-14.588	-0.033	(0)
PbCl3-	5.973e-16	5.530e-16	-15.224	-15.257	-0.033	(0)
Pb2OH+3	2.568e-17	1.283e-17	-16.590	-16.892	-0.301	(0)
PbCl4-2	6.635e-19	4.874e-19	-18.178	-18.312	-0.134	(0)
Pb (OH) 4-2	2.738e-19	2.011e-19	-18.563	-18.697	-0.134	(0)
Pb3 (OH) 4+2	8.117e-22	5.963e-22	-21.091	-21.225	-0.134	(0)
Pb4 (OH) 4+4	1.971e-26	5.739e-27	-25.705	-26.241	-0.536	(0)
PbNO3+	4.189e-27	3.878e-27	-26.378	-26.411	-0.033	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-44.734	-44.734	0.000	(0)
S (6)	1.770e-04					
SO4-2	1.632e-04	1.229e-04	-3.787	-3.910	-0.123	(0)
CaSO4	6.357e-06	6.357e-06	-5.197	-5.197	0.000	(0)
MgSO4	5.861e-06	5.861e-06	-5.232	-5.232	0.000	(0)
NaSO4-	1.394e-06	1.301e-06	-5.856	-5.886	-0.030	(0)
NH4SO4-	9.714e-08	9.062e-08	-7.013	-7.043	-0.030	(0)
KSO4-	8.635e-08	8.059e-08	-7.064	-7.094	-0.030	(0)
FeSO4	2.988e-08	2.988e-08	-7.525	-7.525	0.000	(0)
MnSO4	1.606e-08	1.606e-08	-7.794	-7.794	0.000	(0)
ZnSO4	4.418e-09	4.418e-09	-8.355	-8.355	0.000	(0)
NiSO4	7.582e-10	7.582e-10	-9.120	-9.120	0.000	(0)
HSO4-	3.503e-10	3.265e-10	-9.456	-9.486	-0.031	(0)
CuSO4	3.036e-10	3.036e-10	-9.518	-9.518	0.000	(0)
CoSO4	1.626e-10	1.626e-10	-9.789	-9.789	0.000	(0)
CdSO4	1.059e-10	1.059e-10	-9.975	-9.975	0.000	(0)
PbSO4	6.058e-11	6.058e-11	-10.218	-10.218	0.000	(0)
CrOHSO4	2.406e-11	2.406e-11	-10.619	-10.619	0.000	(0)
Zn (SO4) 2-2	6.720e-12	4.936e-12	-11.173	-11.307	-0.134	(0)
AlSO4+	6.366e-12	5.934e-12	-11.196	-11.227	-0.031	(0)
Cd (SO4) 2-2	2.538e-13	1.864e-13	-12.596	-12.730	-0.134	(0)
CrSO4+	7.237e-14	6.700e-14	-13.140	-13.174	-0.033	(0)
Pb (SO4) 2-2	6.108e-14	4.487e-14	-13.214	-13.348	-0.134	(0)
Al (SO4) 2-	9.367e-15	8.732e-15	-14.028	-14.059	-0.031	(0)
Ni (SO4) 2-2	4.372e-15	3.212e-15	-14.359	-14.493	-0.134	(0)
FeSO4+	9.021e-16	8.414e-16	-15.045	-15.075	-0.030	(0)
Fe (SO4) 2-	2.486e-18	2.301e-18	-17.605	-17.638	-0.033	(0)
Cr2 (OH) 2SO4+2	2.442e-18	1.794e-18	-17.612	-17.746	-0.134	(0)
Cr2 (OH) 2 (SO4) 2	1.310e-20	1.310e-20	-19.883	-19.883	0.000	(0)
HgSO4	8.159e-26	8.159e-26	-25.088	-25.088	0.000	(0)
CrO3SO4-2	1.091e-28	8.018e-29	-27.962	-28.096	-0.134	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-49.776	-49.810	-0.033	(0)
Se (-2)	1.592e-33					
HSe-	1.592e-33	1.474e-33	-32.798	-32.832	-0.033	(0)
H2Se	3.537e-37	3.537e-37	-36.451	-36.451	0.000	(0)
MnSe	1.498e-37	1.498e-37	-36.824	-36.824	0.000	(0)
Se-2	0.000e+00	0.000e+00	-40.341	-40.475	-0.134	(0)

Se (4)	2.534e-09					
HSeO3-	2.197e-09	2.034e-09	-8.658	-8.692	-0.033	(0)
SeO3-2	3.367e-10	2.473e-10	-9.473	-9.607	-0.134	(0)
H2SeO3	2.629e-14	2.629e-14	-13.580	-13.580	0.000	(0)
FeHSeO3+2	4.463e-21	3.279e-21	-20.350	-20.484	-0.134	(0)
Cd (SeO3) 2-2	2.869e-22	2.108e-22	-21.542	-21.676	-0.134	(0)
Se (6)	1.052e-15					
SeO4-2	1.052e-15	7.926e-16	-14.978	-15.101	-0.123	(0)
MnSeO4	1.512e-19	1.512e-19	-18.821	-18.821	0.000	(0)
ZnSeO4	2.105e-20	2.105e-20	-19.677	-19.677	0.000	(0)
NiSeO4	1.083e-20	1.083e-20	-19.965	-19.965	0.000	(0)
CoSeO4	2.530e-21	2.530e-21	-20.597	-20.597	0.000	(0)
HSeO4-	1.158e-21	1.072e-21	-20.936	-20.970	-0.033	(0)
CdSeO4	5.758e-22	5.758e-22	-21.240	-21.240	0.000	(0)
Zn (SeO4) 2-2	2.303e-35	1.691e-35	-34.638	-34.772	-0.134	(0)
Zn	2.509e-07					
Zn+2	2.276e-07	1.714e-07	-6.643	-6.766	-0.123	(0)
ZnCO3	9.487e-09	9.487e-09	-8.023	-8.023	0.000	(0)
ZnSO4	4.418e-09	4.418e-09	-8.355	-8.355	0.000	(0)
ZnOH+	4.016e-09	3.718e-09	-8.396	-8.430	-0.033	(0)
ZnHCO3+	3.799e-09	3.517e-09	-8.420	-8.454	-0.033	(0)
ZnCl+	9.250e-10	8.616e-10	-9.034	-9.065	-0.031	(0)
ZnOHCl	3.727e-10	3.727e-10	-9.429	-9.429	0.000	(0)
Zn (OH) 2	2.754e-10	2.754e-10	-9.560	-9.560	0.000	(0)
Zn (SO4) 2-2	6.720e-12	4.936e-12	-11.173	-11.307	-0.134	(0)
ZnCl2	2.282e-12	2.282e-12	-11.642	-11.642	0.000	(0)
Zn (OH) 3-	4.748e-13	4.395e-13	-12.324	-12.357	-0.033	(0)
ZnCl3-	3.958e-15	3.686e-15	-14.403	-14.433	-0.031	(0)
Zn (OH) 4-2	7.584e-18	5.571e-18	-17.120	-17.254	-0.134	(0)
ZnCl4-2	4.856e-18	3.677e-18	-17.314	-17.435	-0.121	(0)
ZnSeO4	2.105e-20	2.105e-20	-19.677	-19.677	0.000	(0)
ZnNO3+	1.268e-25	1.174e-25	-24.897	-24.930	-0.033	(0)
Zn (SeO4) 2-2	2.303e-35	1.691e-35	-34.638	-34.772	-0.134	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-44.222	-44.222	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2	-65.98	-59.71	6.27	(Co (NH3) 5Cl) (NO3) 2
(Co (NH3) 5Cl) Cl2	-32.46	-27.92	4.54	(Co (NH3) 5Cl) Cl2
(Co (NH3) 5OH2) Cl3	-39.73	-27.92	11.81	(Co (NH3) 5OH2) Cl3
(Co (NH3) 6) (NO3) 3	-90.20	-72.27	17.93	(Co (NH3) 6) (NO3) 3
(Co (NH3) 6) Cl3	-44.71	-24.58	20.13	(Co (NH3) 6) Cl3
(NH4) 2CrO4	-26.88	-26.50	0.38	(NH4) 2CrO4
(NH4) 2SeO4	-23.88	-23.43	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	0.25	11.38	11.13	Al (OH) 3
Al2 (MoO4) 3	-51.28	-48.13	3.15	Al2 (MoO4) 3
Al2O3	2.33	22.75	20.43	Al2O3
Al4 (OH) 10SO4	3.90	26.60	22.70	Al4 (OH) 10SO4
AlAsO4:2H2O	-7.22	-2.42	4.80	AlAsO4:2H2O
AlOHSO4	-4.30	-7.53	-3.23	AlOHSO4
Alunite	0.56	-0.21	-0.77	KAl3 (SO4) 2 (OH) 6
Anglesite	-5.08	-12.91	-7.83	PbSO4
Anhydrite	-3.20	-7.54	-4.34	CaSO4
Antlerite	-6.52	2.27	8.79	Cu3 (OH) 4SO4
Aragonite	-1.38	-9.64	-8.26	CaCO3
Arsenolite	-67.16	-70.10	-2.94	As4O6
Artinite	-8.11	1.85	9.96	MgCO3:Mg (OH) 2:3H2O
As2O5	-34.37	-27.60	6.77	As2O5
Atacamite	-3.74	3.93	7.67	Cu2 (OH) 3Cl
Azurite	-4.24	-20.86	-16.62	Cu3 (OH) 2 (CO3) 2
Ba (OH) 2:8H2O	-16.14	8.42	24.56	Ba (OH) 2:8H2O
Ba3 (AsO4) 2	6.60	-2.35	-8.94	Ba3 (AsO4) 2
BaCrO4	-14.99	-24.76	-9.77	BaCrO4
BaHPO4	-5.01	-24.79	-19.77	BaHPO4
BaMoO4	-8.22	-15.21	-6.99	BaMoO4
Barite	-0.44	-10.49	-10.05	BaSO4

BaSeO3	-9.57	-7.78	1.79	BaSeO3
BaSeO4	-14.16	-21.68	-7.53	BaSeO4
Bianchite	-8.91	-10.68	-1.76	ZnSO4:6H2O
Birnessite	-11.87	6.22	18.09	MnO2
Bixbyite	-10.29	-10.56	-0.27	Mn2O3
Boehmite	2.45	11.38	8.93	AlOOH
Brochantite	-6.50	9.32	15.83	Cu4(OH)6SO4
Brucite	-5.75	11.44	17.18	Mg(OH)2
Bunsenite	-5.24	7.51	12.74	NiO
Ca3(AsO4)2:4H2O	-15.77	6.53	22.30	Ca3(AsO4)2:4H2O
Ca3(PO4)2(beta)	-3.21	-32.29	-29.08	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-7.04	-54.12	-47.08	Ca4H(PO4)3:3H2O
CaCrO4	-19.62	-21.80	-2.19	CaCrO4
CaHPO4	-2.46	-21.83	-19.37	CaHPO4
CaHPO4:2H2O	-2.77	-21.83	-19.06	CaHPO4:2H2O
Calcite	-1.19	-9.64	-8.46	CaCO3
Calomel	-11.39	-29.57	-18.18	Hg2Cl2
CaMoO4	-4.31	-12.25	-7.94	CaMoO4
CaSeO3:2H2O	-7.69	-4.82	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-15.73	-18.73	-3.00	CaSeO4:2H2O
Cd(BO2)2	-13.93	-4.09	9.84	Cd(BO2)2
Cd(OH)2	-7.34	6.59	13.93	Cd(OH)2
Cd(OH)2(am)	-7.40	6.59	13.99	Cd(OH)2
Cd3(OH)2(SO4)2	-24.76	-18.05	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-21.70	0.86	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-14.04	-46.64	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-20.95	7.45	28.40	Cd4(OH)6SO4
CdCl2	-13.17	-13.77	-0.60	CdCl2
CdCl2:1H2O	-12.10	-13.77	-1.67	CdCl2:1H2O
CdCl2:2.5H2O	-11.84	-13.77	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-30.15	-16.41	13.74	Cd
Cdmetal(gamma)	-30.25	-16.41	13.84	Cd
CdMoO4	-2.83	-17.04	-14.21	CdMoO4
CdOHCl	-7.22	-3.59	3.63	CdOHCl
CdSe	-13.31	-33.74	-20.43	CdSe
CdSeO4:2H2O	-21.66	-23.51	-1.85	CdSeO4:2H2O
CdSO4	-12.30	-12.32	-0.02	CdSO4
CdSO4:1H2O	-10.69	-12.32	-1.63	CdSO4:1H2O
CdSO4:2.67H2O	-10.50	-12.32	-1.82	CdSO4:2.67H2O
Cerussite	-1.81	-15.01	-13.20	PbCO3
CH4(g)	-71.20	-113.02	-41.81	CH4
Chalcanthite	-9.19	-11.85	-2.66	CuSO4:5H2O
Claudetite	-66.87	-70.10	-3.23	As4O6
Clausthalite	-6.87	-34.33	-27.46	PbSe
Co(BO2)2	-30.91	-3.84	27.07	Co(BO2)2
Co(OH)2	-6.25	6.84	13.09	Co(OH)2
Co(OH)3	-12.03	-14.06	-2.03	Co(OH)3
CO2(g)	-2.86	-21.02	-18.16	CO2
Co3(AsO4)2	-20.11	-7.08	13.03	Co3(AsO4)2
Co3(PO4)2	-11.20	-45.89	-34.69	Co3(PO4)2
Co3O4	-11.11	-21.28	-10.17	Co3O4
CoCl2	-22.03	-13.53	8.51	CoCl2
CoCl2:6H2O	-16.04	-13.53	2.51	CoCl2:6H2O
CoCO3	-4.24	-14.18	-9.94	CoCO3
CoFe2O4	24.61	21.56	-3.05	CoFe2O4
CoHPO4	-7.31	-26.37	-19.06	CoHPO4
CoMoO4	-9.10	-16.79	-7.69	CoMoO4
CoO	-7.06	6.84	13.90	CoO
CoSe	-17.29	-33.49	-16.20	CoSe
CoSeO3	-10.67	-9.35	1.32	CoSeO3
CoSeO4:6H2O	-21.73	-23.26	-1.53	CoSeO4:6H2O
CoSO4	-15.11	-12.07	3.04	CoSO4
CoSO4:6H2O	-9.59	-12.07	-2.48	CoSO4:6H2O
Cotunnite	-9.50	-14.36	-4.86	PbCl2
Cr(OH)2	-19.49	-8.57	10.93	Cr(OH)2
Cr(OH)3	-1.42	0.00	1.42	Cr(OH)3
Cr(OH)3(am)	0.75	0.00	-0.75	Cr(OH)3
Cr2O3	2.22	0.01	-2.21	Cr2O3

CrCl2	-43.36	-28.93	14.42	CrCl2
CrCl3	-46.02	-30.54	15.48	CrCl3
Crmetal	-62.56	-31.57	31.00	Cr
CrO3	-29.98	-33.18	-3.19	CrO3
Cu (OH) 2	-1.78	7.06	8.84	Cu (OH) 2
Cu2 (OH) 3NO3	-21.43	-11.96	9.47	Cu2 (OH) 3NO3
Cu2Se(alpha)	2.56	-43.88	-46.44	Cu2Se
Cu2SO4	-20.56	-22.45	-1.89	Cu2SO4
Cu3 (AsO4) 2:2H2O	-12.52	-6.42	6.10	Cu3 (AsO4) 2:2H2O
Cu3 (PO4) 2	-8.39	-45.24	-36.85	Cu3 (PO4) 2
Cu3 (PO4) 2:3H2O	-10.12	-45.24	-35.12	Cu3 (PO4) 2:3H2O
Cu3Se2	-12.64	-77.15	-64.51	Cu3Se2
CuCO3	-2.46	-13.96	-11.50	CuCO3
CuCrO4	-20.68	-26.12	-5.44	CuCrO4
Cumetal	-4.30	-13.27	-8.97	Cu
CuMoO4	-3.46	-16.57	-13.11	CuMoO4
CuOCuSO4	-15.51	-4.79	10.71	CuOCuSO4
Cupricferrite	15.16	21.78	6.62	CuFe2O4
Cuprite	-2.51	-3.54	-1.04	Cu2O
Cuprousferrite	14.46	5.59	-8.87	CuFeO2
CuSe	0.19	-33.27	-33.46	CuSe
CuSe2	-16.82	-50.60	-33.79	CuSe2
CuSeO3:2H2O	-9.75	-9.13	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-20.60	-23.04	-2.44	CuSeO4:5H2O
CuSO4	-15.01	-11.85	3.16	CuSO4
Diaspore	4.20	11.38	7.18	AlOOH
Dolomite(disordered)	-2.82	-19.22	-16.40	CaMg (CO3) 2
Dolomite(ordered)	-2.25	-19.22	-16.97	CaMg (CO3) 2
Epsomite	-5.31	-7.48	-2.16	MgSO4:7H2O
Fe (OH) 2	-4.54	9.02	13.56	Fe (OH) 2
Fe (OH) 2.7Cl.3	7.35	4.31	-3.04	Fe (OH) 2.7Cl.3
Fe2 (OH) 4SeO3	-3.03	-1.47	1.55	Fe2 (OH) 4SeO3
Fe2 (SeO3) 3:2H2O	-13.23	-33.86	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-39.00	-42.01	-3.01	Fe2 (SO4) 3
Fe3 (OH) 8	3.52	23.74	20.22	Fe3 (OH) 8
FeAsO4:2H2O	-6.84	-6.44	0.40	FeAsO4:2H2O
FeCr2O4	1.41	9.03	7.62	FeCr2O4
FeMoO4	-4.55	-14.61	-10.06	FeMoO4
Ferrihydrite	3.95	7.36	3.41	Fe (OH) 3
Ferroselite	-29.91	-48.64	-18.74	FeSe2
FeSe	-20.31	-31.31	-11.01	FeSe
Gibbsite	2.80	11.38	8.58	Al (OH) 3
Goethite	6.69	7.36	0.67	FeOOH
Goslarite	-8.62	-10.68	-2.05	ZnSO4:7H2O
Gypsum	-2.92	-7.54	-4.61	CaSO4:2H2O
H-Jarosite	-4.33	-15.74	-11.41	(H3O) Fe3 (SO4) 2 (OH) 6
H2MoO4	-10.61	-23.63	-13.02	H2MoO4
H2Se(g)	-35.42	-40.33	-4.91	H2Se
Halite	-6.98	-5.39	1.59	NaCl
Hausmannite	-12.61	49.68	62.29	Mn3O4
Hematite	15.75	14.72	-1.03	Fe2O3
Hercynite	7.94	31.77	23.83	FeAl2O4
Hg (CH3) 2 (g)	-165.68	-240.82	-75.15	Hg (CH3) 2
Hg (g)	-8.16	-16.10	-7.94	Hg
Hg (OH) 2	-11.29	-14.79	-3.50	Hg (OH) 2
Hg2 (g)	-17.08	-32.20	-15.13	Hg2
Hg2 (OH) 2	-14.47	-9.21	5.26	Hg2 (OH) 2
Hg2CO3	-14.04	-30.22	-16.18	Hg2CO3
Hg2CrO4	-33.68	-42.38	-8.70	Hg2CrO4
Hg2HPO4	-17.64	-42.41	-24.77	Hg2HPO4
Hg2SeO3	-20.74	-25.40	-4.66	Hg2SeO3
Hg2SO4	-21.97	-28.12	-6.15	Hg2SO4
Hg3O2CO3	-35.71	-65.39	-29.68	Hg3O2CO3
HgCl (g)	-34.77	-14.79	19.98	HgCl
HgCl2	-13.57	-35.16	-21.58	HgCl2
Hgmetal (l)	-2.40	-16.10	-13.70	Hg
HgSe	0.57	-55.12	-55.69	HgSe
HgSeO3	-18.55	-30.98	-12.43	HgSeO3

HgSO4	-24.24	-33.70	-9.46	HgSO4
Hinsdalite	-9.48	-11.98	-2.50	PbAl3PO4SO4 (OH) 6
Huntite	-8.74	-38.39	-29.65	CaMg3 (CO3) 4
Hydrocerussite	-5.26	-24.03	-18.77	Pb3 (OH) 2 (CO3) 2
Hydromagnesite	-18.78	-26.89	-8.11	Mg5 (CO3) 4 (OH) 2 : 4H2O
Hydroxylapatite	1.59	-42.74	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-6.81	-69.60	-62.79	Pb5 (PO4) 3OH
K-Alum	-17.70	-22.97	-5.26	KAl (SO4) 2 : 12H2O
K-Jarosite	2.15	-12.26	-14.41	KFe3 (SO4) 2 (OH) 6
K2Cr2O7	-41.92	-59.40	-17.48	K2Cr2O7
K2CrO4	-25.65	-26.22	-0.57	K2CrO4
K2MoO4	-19.94	-16.67	3.27	K2MoO4
K2SeO4	-22.41	-23.14	-0.73	K2SeO4
Langite	-8.66	9.32	17.98	Cu4 (OH) 6SO4 : H2O
Larnakite	-6.54	-6.91	-0.37	PbO : PbSO4
Laurionite	-4.80	-4.18	0.62	PbOHCl
Lepidocrocite	5.99	7.36	1.37	FeOOH
Lime	-21.90	11.37	33.28	CaO
Litharge	-6.89	6.00	12.89	PbO
Maghemite	8.33	14.72	6.39	Fe2O3
Magnesioferrite	8.46	26.16	17.69	Fe2MgO4
Magnesite	-2.06	-9.58	-7.52	MgCO3
Magnetite	19.71	23.74	4.03	Fe3O4
Malachite	-1.37	-6.90	-5.53	Cu2 (OH) 2CO3
Manganite	-4.95	20.39	25.34	MnOOH
Massicot	-7.09	6.00	13.09	PbO
Melanothallite	-19.75	-13.31	6.45	CuCl2
Melanterite	-7.62	-9.89	-2.27	FeSO4 : 7H2O
Mg (OH) 2 (active)	-7.36	11.44	18.79	Mg (OH) 2
Mg3 (PO4) 2	-8.82	-32.10	-23.28	Mg3 (PO4) 2
MgCr2O4	-5.29	11.44	16.74	MgCr2O4
MgCrO4	-27.39	-21.74	5.65	MgCrO4
MgHPO4 : 3H2O	-3.60	-21.77	-18.18	MgHPO4 : 3H2O
MgMoO4	-10.34	-12.19	-1.85	MgMoO4
MgSeO3 : 6H2O	-7.80	-4.76	3.04	MgSeO3 : 6H2O
MgSeO4 : 6H2O	-17.47	-18.67	-1.20	MgSeO4 : 6H2O
Minium	-33.77	41.01	74.78	Pb3O4
Mirabilite	-7.96	-9.32	-1.35	Na2SO4 : 10H2O
Mn2 (SO4) 3	-62.07	-67.29	-5.22	Mn2 (SO4) 3
Mn3 (AsO4) 2 : 8H2O	-13.42	-0.92	12.50	Mn3 (AsO4) 2 : 8H2O
Mn3 (PO4) 2	-15.88	-39.73	-23.85	Mn3 (PO4) 2
MnCl2 : 4H2O	-14.22	-11.47	2.75	MnCl2 : 4H2O
MnHPO4	1.09	-24.31	-25.40	MnHPO4
MnSe	-35.23	-31.44	3.79	MnSe
MnSeO3	-8.43	-7.30	1.13	MnSeO3
MnSeO3 : 2H2O	-8.26	-7.30	0.96	MnSeO3 : 2H2O
MnSeO4 : 5H2O	-19.16	-21.21	-2.05	MnSeO4 : 5H2O
MnSO4	-12.80	-10.02	2.78	MnSO4
Monteponite	-8.82	6.59	15.41	CdO
Montroydite	-11.27	-14.79	-3.52	HgO
MoO3	-15.63	-23.63	-8.00	MoO3
Morenosite	-9.22	-11.40	-2.18	NiSO4 : 7H2O
Na-Jarosite	-0.20	-10.94	-10.75	NaFe3 (SO4) 2 (OH) 6
Na2Cr2O7	-46.80	-56.76	-9.96	Na2Cr2O7
Na2CrO4	-26.57	-23.58	2.99	Na2CrO4
Na2Mo2O7	-20.90	-37.66	-16.76	Na2Mo2O7
Na2MoO4	-15.55	-14.03	1.52	Na2MoO4
Na2MoO4 : 2H2O	-15.26	-14.03	1.22	Na2MoO4 : 2H2O
Na2SeO3 : 5H2O	-16.90	-6.60	10.30	Na2SeO3 : 5H2O
Na2SeO4	-21.79	-20.51	1.28	Na2SeO4
Nantokite	-5.10	-11.95	-6.86	CuCl
Natron	-9.91	-11.42	-1.51	Na2CO3 : 10H2O
Nesquehonite	-4.98	-9.58	-4.60	MgCO3 : 3H2O
Ni (OH) 2	-5.57	7.51	13.08	Ni (OH) 2
Ni3 (AsO4) 2 : 8H2O	-20.77	-5.07	15.70	Ni3 (AsO4) 2 : 8H2O
Ni3 (PO4) 2	-12.59	-43.89	-31.30	Ni3 (PO4) 2
Ni4 (OH) 6SO4	-20.88	11.12	32.00	Ni4 (OH) 6SO4
NiCO3	-6.76	-13.51	-6.75	NiCO3

NiMoO4	-4.97	-16.12	-11.15	NiMoO4
NiSe	-15.12	-32.82	-17.70	NiSe
NiSeO3:2H2O	-11.59	-8.68	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-21.07	-22.59	-1.52	NiSeO4:6H2O
Nsutite	-11.28	6.22	17.50	MnO2
O2 (g)	-38.80	46.00	84.80	O2
Otavite	-2.43	-14.43	-12.00	CdCO3
Pb(BO2)2	-11.25	-4.68	6.57	Pb(BO2)2
Pb(OH)2	-2.32	6.00	8.32	Pb(OH)2
Pb10(OH)6O(CO3)6	-57.32	-66.08	-8.76	Pb10(OH)6O(CO3)6
Pb2(OH)3Cl	-6.97	1.82	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-14.18	12.01	26.19	Pb2O(OH)2
Pb2O3	-26.03	35.01	61.04	Pb2O3
Pb2OCO3	-8.58	-9.01	-0.44	Pb2OCO3
Pb3(AsO4)2	-15.39	-9.59	5.80	Pb3(AsO4)2
Pb3(PO4)2	-4.87	-48.40	-43.53	Pb3(PO4)2
Pb3O2CO3	-14.36	-3.01	11.35	Pb3O2CO3
Pb3O2SO4	-11.83	-0.90	10.92	Pb3O2SO4
Pb4(OH)6SO4	-16.00	5.10	21.10	Pb4(OH)6SO4
Pb4O3SO4	-17.18	5.10	22.28	Pb4O3SO4
PbCrO4	-14.44	-27.18	-12.73	PbCrO4
PbHPO4	-3.40	-27.20	-23.81	PbHPO4
Pbmetal	-21.24	-17.00	4.24	Pb
PbMoO4	-1.84	-17.63	-15.78	PbMoO4
PbO:0.3H2O	-6.98	6.00	12.98	PbO:0.33H2O
PbSeO4	-17.21	-24.10	-6.88	PbSeO4
Periclase	-10.60	11.44	22.04	MgO
Phosgenite	-9.57	-29.38	-19.81	PbCl2:PbCO3
Plattnerite	-21.48	29.00	50.49	PbO2
Plumbgummite	6.51	-26.28	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-11.81	11.37	23.19	Ca(OH)2
Pyrochroite	-6.59	8.89	15.48	Mn(OH)2
Pyrolusite	-10.30	31.89	42.19	MnO2
Pyromorphite	4.64	-79.79	-84.43	Pb5(PO4)3Cl
Retgersite	-9.35	-11.40	-2.05	NiSO4:6H2O
Rhodochrosite	-1.55	-12.12	-10.57	MnCO3
Semetal(am)	-10.19	-17.33	-7.14	Se
Semetal(hex)	-9.58	-17.33	-7.76	Se
SeO2	-16.31	-16.19	0.12	SeO2
SeO3	-51.58	-30.10	21.48	SeO3
Siderite	-1.81	-12.00	-10.19	FeCO3
Smithsonite	-2.83	-12.78	-9.95	ZnCO3
Spinel	-3.82	34.19	38.01	MgAl2O4
Strengite	0.53	-25.85	-26.37	FePO4:2H2O
Tenorite	-0.78	7.06	7.84	CuO
Thenardite	-9.66	-9.32	0.35	Na2SO4
Thermonatrite	-12.09	-11.42	0.67	Na2CO3:H2O
Tsumebite	-4.35	-14.14	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	-3.35	-39.35	-36.00	Fe3(PO4)2:8H2O
Witherite	-4.02	-12.60	-8.58	BaCO3
Zincite	-3.37	8.23	11.60	ZnO
Zincosite	-14.85	-10.68	4.18	ZnSO4
Zn(BO2)2	-10.74	-2.45	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-47.16	-43.92	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-3.97	8.23	12.20	Zn(OH)2
Zn(OH)2(am)	-4.48	8.23	12.71	Zn(OH)2
Zn(OH)2(beta)	-3.77	8.23	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-3.54	8.23	11.78	Zn(OH)2
Zn(OH)2(gamma)	-3.50	8.23	11.73	Zn(OH)2
Zn2(OH)2SO4	-9.94	-2.44	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.91	6.29	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-16.54	-2.89	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-6.29	-41.71	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-32.80	-13.12	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-14.37	14.03	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.70	20.80	38.50	Zn5(OH)8Cl2
ZnCl2	-19.40	-12.13	7.27	ZnCl2
ZnCO3:1H2O	-2.52	-12.78	-10.26	ZnCO3:1H2O

Znmetal	-41.01	-14.77	26.25	Zn
ZnMoO4	-5.30	-15.39	-10.09	ZnMoO4
ZnO(active)	-3.22	8.23	11.45	ZnO
ZnSe	-17.62	-32.10	-14.48	ZnSe
ZnSeO4:6H2O	-20.35	-21.87	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-10.17	-10.68	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Initial solution 3.

-----Solution composition-----

Elements	Molality	Moles
Al	1.484e-06	1.484e-06
Alkalinity	8.200e-04	8.200e-04
As	2.671e-08	2.671e-08
B	8.146e-06	8.146e-06
Ba	8.744e-08	8.744e-08
Ca	7.990e-04	7.990e-04
Cl	6.520e-03	6.520e-03
Co	6.622e-07	6.622e-07
Cr	1.347e-07	1.347e-07
Cu	3.464e-07	3.464e-07
Fe	8.834e-06	8.834e-06
K	6.399e-04	6.399e-04
Mg	6.999e-04	6.999e-04
Mn	8.379e-07	8.379e-07
Mo	9.387e-08	9.387e-08
N	1.736e-03	1.736e-03
Na	5.746e-03	5.746e-03
Ni	1.876e-07	1.876e-07
P	1.680e-05	1.680e-05
Pb	1.449e-08	1.449e-08
S(6)	1.979e-03	1.979e-03
Se	2.535e-08	2.535e-08
Zn	3.520e-07	3.520e-07

-----Description of solution-----

pH	=	6.180
pe	=	4.000
Activity of water	=	1.000
Ionic strength (mol/kgw)	=	1.387e-02
Mass of water (kg)	=	1.000e+00
Total carbon (mol/kg)	=	1.948e-03
Total CO2 (mol/kg)	=	1.948e-03
Temperature (°C)	=	20.00
Electrical balance (eq)	=	-1.692e-04
Percent error, 100*(Cat- An)/(Cat+ An)	=	-0.78
Iterations	=	12
Total H	=	1.110238e+02
Total O	=	5.552069e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	7.433e-07	6.607e-07	-6.129	-6.180	-0.051	0.00
OH-	1.171e-08	1.038e-08	-7.931	-7.984	-0.052	(0)
H2O	5.551e+01	9.997e-01	1.744	-0.000	0.000	18.05
Al	1.484e-06					
Al(OH)2+	9.360e-07	8.356e-07	-6.029	-6.078	-0.049	(0)
Al(OH)3	2.540e-07	2.540e-07	-6.595	-6.595	0.000	(0)
Al(OH)4-	1.663e-07	1.479e-07	-6.779	-6.830	-0.051	(0)

AlOH+2	7.824e-08	4.969e-08	-7.107	-7.304	-0.197	(0)
AlSO4+	3.549e-08	3.158e-08	-7.450	-7.501	-0.051	(0)
Al+3	1.309e-08	4.532e-09	-7.883	-8.344	-0.461	(0)
Al (SO4) 2-	4.624e-10	4.114e-10	-9.335	-9.386	-0.051	(0)
AlMo6O21-3	4.906e-34	1.428e-34	-33.309	-33.845	-0.536	(0)
As (3)	1.676e-13					
H3AsO3	1.675e-13	1.675e-13	-12.776	-12.776	0.000	(0)
H2AsO3-	1.235e-16	1.077e-16	-15.908	-15.968	-0.060	(0)
H4AsO3+	6.290e-20	5.484e-20	-19.201	-19.261	-0.060	(0)
HAsO3-2	2.065e-22	1.193e-22	-21.685	-21.923	-0.238	(0)
AsO3-3	2.009e-29	5.847e-30	-28.697	-29.233	-0.536	(0)
As (5)	2.671e-08					
H2AsO4-	2.145e-08	1.870e-08	-7.669	-7.728	-0.060	(0)
HAsO4-2	5.262e-09	3.040e-09	-8.279	-8.517	-0.238	(0)
H3AsO4	2.038e-12	2.045e-12	-11.691	-11.689	0.001	(0)
AsO4-3	4.448e-14	1.294e-14	-13.352	-13.888	-0.536	(0)
B	8.146e-06					
H3BO3	8.139e-06	8.165e-06	-5.089	-5.088	0.001	(0)
H2BO3-	7.437e-09	6.563e-09	-8.129	-8.183	-0.054	(0)
CaH2BO3+	1.795e-10	1.584e-10	-9.746	-9.800	-0.054	(0)
MgH2BO3+	1.002e-10	8.839e-11	-9.999	-10.054	-0.054	(0)
NaH2BO3	5.773e-11	5.773e-11	-10.239	-10.239	0.000	(0)
H5 (BO3) 2-	5.334e-14	4.707e-14	-13.273	-13.327	-0.054	(0)
BaH2BO3+	1.215e-14	1.072e-14	-13.915	-13.970	-0.054	(0)
H8 (BO3) 3-	3.769e-17	3.326e-17	-16.424	-16.478	-0.054	(0)
Ba	8.744e-08					
Ba+2	8.709e-08	5.435e-08	-7.060	-7.265	-0.205	(0)
BaHCO3+	3.501e-10	3.132e-10	-9.456	-9.504	-0.048	(0)
BaCO3	1.148e-12	1.148e-12	-11.940	-11.940	0.000	(0)
BaNH3+2	7.754e-14	4.480e-14	-13.110	-13.349	-0.238	(0)
BaH2BO3+	1.215e-14	1.072e-14	-13.915	-13.970	-0.054	(0)
BaOH+	2.669e-15	2.379e-15	-14.574	-14.624	-0.050	(0)
BaNO3+	1.252e-37	1.092e-37	-36.902	-36.962	-0.060	(0)
C (4)	1.948e-03					
H2CO3	1.134e-03	1.134e-03	-2.945	-2.945	0.000	(0)
HCO3-	8.028e-04	7.166e-04	-3.095	-3.145	-0.049	(0)
CaHCO3+	5.603e-06	5.013e-06	-5.252	-5.300	-0.048	(0)
MgHCO3+	3.121e-06	2.771e-06	-5.506	-5.557	-0.052	(0)
NaHCO3	2.248e-06	2.248e-06	-5.648	-5.648	0.000	(0)
CO3-2	7.369e-08	4.599e-08	-7.133	-7.337	-0.205	(0)
FeHCO3+	3.932e-08	3.517e-08	-7.405	-7.454	-0.048	(0)
CuCO3	3.016e-08	3.016e-08	-7.521	-7.521	0.000	(0)
CaCO3	2.814e-08	2.814e-08	-7.551	-7.551	0.000	(0)
CoHCO3+	1.894e-08	1.651e-08	-7.723	-7.782	-0.060	(0)
MgCO3	1.368e-08	1.368e-08	-7.864	-7.864	0.000	(0)
NiHCO3+	8.938e-09	7.793e-09	-8.049	-8.108	-0.060	(0)
MnHCO3+	6.750e-09	6.017e-09	-8.171	-8.221	-0.050	(0)
NaCO3-	5.601e-09	5.000e-09	-8.252	-8.301	-0.049	(0)
CuHCO3+	5.224e-09	4.555e-09	-8.282	-8.342	-0.060	(0)
ZnHCO3+	4.406e-09	3.842e-09	-8.356	-8.415	-0.060	(0)
PbHCO3+	2.579e-09	2.249e-09	-8.589	-8.648	-0.060	(0)
PbCO3	6.455e-10	6.455e-10	-9.190	-9.190	0.000	(0)
ZnCO3	4.960e-10	4.960e-10	-9.304	-9.304	0.000	(0)
BaHCO3+	3.501e-10	3.132e-10	-9.456	-9.504	-0.048	(0)
CoCO3	2.546e-10	2.546e-10	-9.594	-9.594	0.000	(0)
NiCO3	1.673e-10	1.673e-10	-9.776	-9.776	0.000	(0)
Cu (CO3) 2-2	6.462e-12	3.734e-12	-11.190	-11.428	-0.238	(0)
BaCO3	1.148e-12	1.148e-12	-11.940	-11.940	0.000	(0)
Pb (CO3) 2-2	1.482e-13	8.562e-14	-12.829	-13.067	-0.238	(0)
Ca	7.990e-04					
Ca+2	6.907e-04	4.311e-04	-3.161	-3.365	-0.205	(0)
CaSO4	1.024e-04	1.024e-04	-3.990	-3.990	0.000	(0)
CaHCO3+	5.603e-06	5.013e-06	-5.252	-5.300	-0.048	(0)
CaHPO4	2.128e-07	2.128e-07	-6.672	-6.672	0.000	(0)
CaH2PO4+	1.242e-07	1.109e-07	-6.906	-6.955	-0.049	(0)
CaCO3	2.814e-08	2.814e-08	-7.551	-7.551	0.000	(0)
CaNH3+2	1.227e-09	7.089e-10	-8.911	-9.149	-0.238	(0)
CaPO4-	8.600e-10	7.677e-10	-9.066	-9.115	-0.049	(0)

	CaH2BO3+	1.795e-10	1.584e-10	-9.746	-9.800	-0.054	(0)
	CaOH+	9.423e-11	8.430e-11	-10.026	-10.074	-0.048	(0)
	Ca (NH3) 2+2	6.381e-16	3.686e-16	-15.195	-15.433	-0.238	(0)
	CaNO3+	5.947e-34	5.185e-34	-33.226	-33.285	-0.060	(0)
Cl	6.520e-03						
	Cl-	6.520e-03	5.795e-03	-2.186	-2.237	-0.051	(0)
	CuCl2-	5.238e-08	4.651e-08	-7.281	-7.332	-0.052	(0)
	CuCl	3.795e-08	3.795e-08	-7.421	-7.421	0.000	(0)
	CoCl+	7.428e-09	6.476e-09	-8.129	-8.189	-0.060	(0)
	MnCl+	3.540e-09	3.156e-09	-8.451	-8.501	-0.050	(0)
	ZnCl+	2.961e-09	2.629e-09	-8.529	-8.580	-0.052	(0)
	NiCl+	1.636e-09	1.426e-09	-8.786	-8.846	-0.060	(0)
	CuCl+	1.088e-09	9.662e-10	-8.963	-9.015	-0.052	(0)
	PbCl+	1.037e-09	9.043e-10	-8.984	-9.044	-0.060	(0)
	CuCl3-2	8.950e-11	5.651e-11	-10.048	-10.248	-0.200	(0)
	ZnOHC1	5.442e-11	5.442e-11	-10.264	-10.264	0.000	(0)
	MnCl2	2.583e-11	2.583e-11	-10.588	-10.588	0.000	(0)
	PbCl2	2.288e-11	2.288e-11	-10.640	-10.640	0.000	(0)
	ZnCl2	1.943e-11	1.943e-11	-10.712	-10.712	0.000	(0)
	CrCl+2	1.984e-12	1.146e-12	-11.703	-11.941	-0.238	(0)
	CuCl2	1.517e-12	1.517e-12	-11.819	-11.819	0.000	(0)
	ZnCl3-	9.866e-14	8.761e-14	-13.006	-13.057	-0.052	(0)
	PbCl3-	6.398e-14	5.578e-14	-13.194	-13.253	-0.060	(0)
	MnCl3-	4.626e-14	4.123e-14	-13.335	-13.385	-0.050	(0)
	NiCl2	4.219e-14	4.219e-14	-13.375	-13.375	0.000	(0)
	CrOHC12	9.427e-16	9.427e-16	-15.026	-15.026	0.000	(0)
	FeCl+2	7.064e-16	4.460e-16	-15.151	-15.351	-0.200	(0)
	CrCl2+	4.641e-16	4.046e-16	-15.333	-15.393	-0.060	(0)
	ZnCl4-2	3.862e-16	2.438e-16	-15.413	-15.613	-0.200	(0)
	PbCl4-2	2.375e-16	1.372e-16	-15.624	-15.863	-0.238	(0)
	CuCl3-	8.442e-17	7.496e-17	-16.074	-16.125	-0.052	(0)
	FeCl2+	1.517e-17	1.352e-17	-16.819	-16.869	-0.050	(0)
	FeCl3	7.837e-21	7.837e-21	-20.106	-20.106	0.000	(0)
	CuCl4-2	4.088e-21	2.581e-21	-20.388	-20.588	-0.200	(0)
	CrO3Cl-	6.803e-34	5.932e-34	-33.167	-33.227	-0.060	(0)
	Cr (NH3) 6Cl+2	4.721e-34	2.728e-34	-33.326	-33.564	-0.238	(0)
	CoCl+2	2.383e-35	1.377e-35	-34.623	-34.861	-0.238	(0)
	Co (NH3) 5Cl+2	4.164e-39	2.406e-39	-38.380	-38.619	-0.238	(0)
	Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-50.953	-51.191	-0.238	(0)
Co (2)	6.622e-07						
	Co+2	5.668e-07	3.275e-07	-6.247	-6.485	-0.238	(0)
	CoSO4	6.815e-08	6.815e-08	-7.167	-7.167	0.000	(0)
	CoHCO3+	1.894e-08	1.651e-08	-7.723	-7.782	-0.060	(0)
	CoCl+	7.428e-09	6.476e-09	-8.129	-8.189	-0.060	(0)
	CoHPO4	3.779e-10	3.779e-10	-9.423	-9.423	0.000	(0)
	CoCO3	2.546e-10	2.546e-10	-9.594	-9.594	0.000	(0)
	Co (NH3) +2	1.392e-10	8.044e-11	-9.856	-10.095	-0.238	(0)
	CoOH+	1.142e-10	9.955e-11	-9.942	-10.002	-0.060	(0)
	Co (OH) 2	1.205e-13	1.205e-13	-12.919	-12.919	0.000	(0)
	Co (NH3) 2+2	4.961e-15	2.866e-15	-14.304	-14.543	-0.238	(0)
	Co2OH+3	5.615e-18	1.634e-18	-17.251	-17.787	-0.536	(0)
	Co (NH3) 3+2	8.158e-20	4.713e-20	-19.088	-19.327	-0.238	(0)
	Co (OH) 3-	4.201e-20	3.662e-20	-19.377	-19.436	-0.060	(0)
	CoOOH-	1.757e-21	1.532e-21	-20.755	-20.815	-0.060	(0)
	CoSeO4	1.414e-22	1.414e-22	-21.850	-21.850	0.000	(0)
	Co (NH3) 4+2	5.592e-25	3.231e-25	-24.252	-24.491	-0.238	(0)
	CoNO2+	5.547e-28	4.836e-28	-27.256	-27.316	-0.060	(0)
	Co (OH) 4-2	1.531e-28	8.843e-29	-27.815	-28.053	-0.238	(0)
	Co (NH3) 5+2	1.212e-30	7.004e-31	-29.916	-30.155	-0.238	(0)
	Co4 (OH) 4+4	1.759e-31	1.960e-32	-30.755	-31.708	-0.953	(0)
	CoNO3+	2.182e-37	1.902e-37	-36.661	-36.721	-0.060	(0)
	Co (NO3) 2	0.000e+00	0.000e+00	-66.848	-66.848	0.000	(0)
Co (3)	1.747e-30						
	CoOH+2	1.747e-30	1.009e-30	-29.758	-29.996	-0.238	(0)
	Co+3	3.766e-35	1.304e-35	-34.424	-34.885	-0.461	(0)
	CoCl+2	2.383e-35	1.377e-35	-34.623	-34.861	-0.238	(0)
	Co (NH3) 5Cl+2	4.164e-39	2.406e-39	-38.380	-38.619	-0.238	(0)
	Co (NH3) 6SO4+	0.000e+00	0.000e+00	-46.993	-47.052	-0.060	(0)

Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-50.953	-51.191	-0.238	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.021	-52.260	-0.238	(0)
Cr (2)	2.965e-21					
Cr+2	2.965e-21	1.713e-21	-20.528	-20.766	-0.238	(0)
Cr (3)	1.347e-07					
Cr (OH) +2	7.386e-08	4.267e-08	-7.132	-7.370	-0.238	(0)
Cr (OH) 2+	5.309e-08	4.628e-08	-7.275	-7.335	-0.060	(0)
CrOHSO4	6.448e-09	6.448e-09	-8.191	-8.191	0.000	(0)
Cr+3	6.279e-10	1.827e-10	-9.202	-9.738	-0.536	(0)
CrSO4+	4.304e-10	3.752e-10	-9.366	-9.426	-0.060	(0)
Cr (OH) 3	2.649e-10	2.649e-10	-9.577	-9.577	0.000	(0)
CrCl+2	1.984e-12	1.146e-12	-11.703	-11.941	-0.238	(0)
CrH2PO4+2	8.321e-13	4.807e-13	-12.080	-12.318	-0.238	(0)
CrO2-	2.185e-13	1.905e-13	-12.661	-12.720	-0.060	(0)
Cr (OH) 4-	1.843e-13	1.607e-13	-12.735	-12.794	-0.060	(0)
Cr2 (OH) 2SO4+2	2.519e-14	1.455e-14	-13.599	-13.837	-0.238	(0)
CrOHC12	9.427e-16	9.427e-16	-15.026	-15.026	0.000	(0)
Cr2 (OH) 2 (SO4) 2	9.408e-16	9.408e-16	-15.027	-15.027	0.000	(0)
CrCl2+	4.641e-16	4.046e-16	-15.333	-15.393	-0.060	(0)
Cr (NH3) 5OH+2	1.771e-27	1.023e-27	-26.752	-26.990	-0.238	(0)
Cr (NH3) 6+3	1.279e-32	3.722e-33	-31.893	-32.429	-0.536	(0)
Cr (NH3) 6Cl+2	4.721e-34	2.728e-34	-33.326	-33.564	-0.238	(0)
CrNO3+2	0.000e+00	0.000e+00	-41.487	-41.725	-0.238	(0)
Cr (6)	4.667e-26					
HCrO4-	2.786e-26	2.429e-26	-25.555	-25.615	-0.060	(0)
CrO4-2	1.845e-26	1.152e-26	-25.734	-25.939	-0.205	(0)
NaCrO4-	3.332e-28	2.905e-28	-27.477	-27.537	-0.060	(0)
KCrO4-	2.771e-29	2.416e-29	-28.557	-28.617	-0.060	(0)
CrO3HPO4-2	1.861e-30	1.075e-30	-29.730	-29.968	-0.238	(0)
H2CrO4	1.008e-32	1.008e-32	-31.996	-31.996	0.000	(0)
CrO3SO4-2	9.338e-33	5.395e-33	-32.030	-32.268	-0.238	(0)
CrO3Cl-	6.803e-34	5.932e-34	-33.167	-33.227	-0.060	(0)
CrO3H2PO4-	3.925e-34	3.422e-34	-33.406	-33.466	-0.060	(0)
Cr2O7-2	0.000e+00	0.000e+00	-49.394	-49.632	-0.238	(0)
Cu (1)	9.639e-08					
CuCl2-	5.238e-08	4.651e-08	-7.281	-7.332	-0.052	(0)
CuCl	3.795e-08	3.795e-08	-7.421	-7.421	0.000	(0)
Cu+	5.967e-09	5.202e-09	-8.224	-8.284	-0.060	(0)
CuCl3-2	8.950e-11	5.651e-11	-10.048	-10.248	-0.200	(0)
Cu (2)	2.501e-07					
Cu+2	1.785e-07	1.114e-07	-6.748	-6.953	-0.205	(0)
CuCO3	3.016e-08	3.016e-08	-7.521	-7.521	0.000	(0)
CuSO4	2.616e-08	2.616e-08	-7.582	-7.582	0.000	(0)
CuHCO3+	5.224e-09	4.555e-09	-8.282	-8.342	-0.060	(0)
CuOH+	4.723e-09	4.194e-09	-8.326	-8.377	-0.052	(0)
CuNH3+2	4.229e-09	2.443e-09	-8.374	-8.612	-0.238	(0)
CuCl+	1.088e-09	9.662e-10	-8.963	-9.015	-0.052	(0)
Cu (OH) 2	1.631e-11	1.631e-11	-10.788	-10.788	0.000	(0)
Cu (CO3) 2-2	6.462e-12	3.734e-12	-11.190	-11.428	-0.238	(0)
CuCl2	1.517e-12	1.517e-12	-11.819	-11.819	0.000	(0)
Cu2 (OH) 2+2	7.389e-13	4.269e-13	-12.131	-12.370	-0.238	(0)
Cu (OH) 3-	5.847e-16	5.097e-16	-15.233	-15.293	-0.060	(0)
CuCl3-	8.442e-17	7.496e-17	-16.074	-16.125	-0.052	(0)
CuCl4-2	4.088e-21	2.581e-21	-20.388	-20.588	-0.200	(0)
Cu (OH) 4-2	1.058e-22	6.112e-23	-21.976	-22.214	-0.238	(0)
CuNO2+	2.803e-27	2.444e-27	-26.552	-26.612	-0.060	(0)
CuNO3+	1.523e-37	1.328e-37	-36.817	-36.877	-0.060	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-47.281	-47.281	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-68.225	-68.225	0.000	(0)
Fe (2)	8.637e-06					
Fe+2	7.461e-06	4.311e-06	-5.127	-5.365	-0.238	(0)
FeSO4	1.090e-06	1.090e-06	-5.963	-5.963	0.000	(0)
FeHCO3+	3.932e-08	3.517e-08	-7.405	-7.454	-0.048	(0)
FeH2PO4+	2.668e-08	2.382e-08	-7.574	-7.623	-0.049	(0)
FeHPO4	1.815e-08	1.815e-08	-7.741	-7.741	0.000	(0)
FeOH+	1.998e-09	1.781e-09	-8.699	-8.749	-0.050	(0)
Fe (OH) 2	1.389e-14	1.389e-14	-13.857	-13.857	0.000	(0)
Fe (OH) 3-	7.166e-17	6.388e-17	-16.145	-16.195	-0.050	(0)

Fe (3)	1.964e-07					
Fe (OH) 2+	1.950e-07	1.740e-07	-6.710	-6.759	-0.049	(0)
Fe (OH) 3	1.394e-09	1.394e-09	-8.856	-8.856	0.000	(0)
FeHPO4+	3.605e-11	3.218e-11	-10.443	-10.492	-0.049	(0)
FeOH+2	3.488e-11	2.202e-11	-10.457	-10.657	-0.200	(0)
Fe (OH) 4-	4.526e-12	4.040e-12	-11.344	-11.394	-0.049	(0)
FeSO4+	3.443e-14	3.069e-14	-13.463	-13.513	-0.050	(0)
Fe+3	8.622e-15	2.985e-15	-14.064	-14.525	-0.461	(0)
FeH2PO4+2	9.841e-16	6.250e-16	-15.007	-15.204	-0.197	(0)
Fe (SO4) 2-	8.526e-16	7.433e-16	-15.069	-15.129	-0.060	(0)
FeCl+2	7.064e-16	4.460e-16	-15.151	-15.351	-0.200	(0)
FeCl2+	1.517e-17	1.352e-17	-16.819	-16.869	-0.050	(0)
FeHSeO3+2	2.518e-19	1.455e-19	-18.599	-18.837	-0.238	(0)
Fe2 (OH) 2+4	1.724e-19	1.921e-20	-18.763	-19.717	-0.953	(0)
FeCl3	7.837e-21	7.837e-21	-20.106	-20.106	0.000	(0)
Fe3 (OH) 4+5	1.414e-24	4.585e-26	-23.850	-25.339	-1.489	(0)
FeNO3+2	0.000e+00	0.000e+00	-43.612	-43.850	-0.238	(0)
H (0)	6.481e-24					
H2	3.240e-24	3.251e-24	-23.489	-23.488	0.001	(0)
K	6.399e-04					
K+	6.351e-04	5.645e-04	-3.197	-3.248	-0.051	(0)
KSO4-	4.737e-06	4.229e-06	-5.324	-5.374	-0.049	(0)
KHPO4-	5.074e-09	4.530e-09	-8.295	-8.344	-0.049	(0)
KCrO4-	2.771e-29	2.416e-29	-28.557	-28.617	-0.060	(0)
Mg	6.999e-04					
Mg+2	6.224e-04	3.884e-04	-3.206	-3.411	-0.205	(0)
MgSO4	7.392e-05	7.392e-05	-4.131	-4.131	0.000	(0)
MgHCO3+	3.121e-06	2.771e-06	-5.506	-5.557	-0.052	(0)
MgHPO4	2.647e-07	2.647e-07	-6.577	-6.577	0.000	(0)
MgH2PO4+	2.388e-07	2.132e-07	-6.622	-6.671	-0.049	(0)
MgCO3	1.368e-08	1.368e-08	-7.864	-7.864	0.000	(0)
MgOH+	1.649e-09	1.478e-09	-8.783	-8.830	-0.048	(0)
MgH2BO3+	1.002e-10	8.839e-11	-9.999	-10.054	-0.054	(0)
MgPO4-	1.211e-11	1.081e-11	-10.917	-10.966	-0.049	(0)
Mn (2)	8.379e-07					
Mn+2	7.487e-07	4.326e-07	-6.126	-6.364	-0.238	(0)
MnSO4	7.886e-08	7.886e-08	-7.103	-7.103	0.000	(0)
MnHCO3+	6.750e-09	6.017e-09	-8.171	-8.221	-0.050	(0)
MnCl+	3.540e-09	3.156e-09	-8.451	-8.501	-0.050	(0)
MnCl2	2.583e-11	2.583e-11	-10.588	-10.588	0.000	(0)
MnOH+	1.265e-11	1.128e-11	-10.898	-10.948	-0.050	(0)
MnCl3-	4.626e-14	4.123e-14	-13.335	-13.385	-0.050	(0)
MnSeO4	9.893e-23	9.893e-23	-22.005	-22.005	0.000	(0)
Mn (OH) 3-	2.664e-23	2.375e-23	-22.574	-22.624	-0.050	(0)
MnSe	3.564e-30	3.564e-30	-29.448	-29.448	0.000	(0)
Mn (OH) 4-2	1.850e-30	1.168e-30	-29.733	-29.933	-0.200	(0)
MnNO3+	2.882e-37	2.513e-37	-36.540	-36.600	-0.060	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-66.631	-66.631	0.000	(0)
Mn (3)	2.658e-28					
Mn+3	2.658e-28	9.203e-29	-27.575	-28.036	-0.461	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-61.272	-61.471	-0.200	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-67.123	-67.177	-0.053	(0)
Mo	9.387e-08					
MoO4-2	9.311e-08	5.811e-08	-7.031	-7.236	-0.205	(0)
HMoO4-	7.636e-10	6.657e-10	-9.117	-9.177	-0.060	(0)
H2MoO4	4.421e-12	4.421e-12	-11.354	-11.354	0.000	(0)
AlMo6O21-3	4.906e-34	1.428e-34	-33.309	-33.845	-0.536	(0)
Mo7O24-6	0.000e+00	0.000e+00	-44.274	-46.418	-2.144	(0)
HMo7O24-5	0.000e+00	0.000e+00	-44.752	-46.242	-1.489	(0)
H2Mo7O24-4	0.000e+00	0.000e+00	-46.695	-47.648	-0.953	(0)
H3Mo7O24-3	0.000e+00	0.000e+00	-50.040	-50.576	-0.536	(0)
N (-3)	1.736e-03					
NH4+	1.715e-03	1.514e-03	-2.766	-2.820	-0.054	(0)
NH4SO4-	1.980e-05	1.765e-05	-4.703	-4.753	-0.050	(0)
NH3	9.134e-07	9.134e-07	-6.039	-6.039	0.000	(0)
CuNH3+2	4.229e-09	2.443e-09	-8.374	-8.612	-0.238	(0)

CaNH3+2	1.227e-09	7.089e-10	-8.911	-9.149	-0.238	(0)
NiNH3+2	1.878e-10	1.085e-10	-9.726	-9.965	-0.238	(0)
Co(NH3)+2	1.392e-10	8.044e-11	-9.856	-10.095	-0.238	(0)
BaNH3+2	7.754e-14	4.480e-14	-13.110	-13.349	-0.238	(0)
Ni(NH3)2+2	4.818e-14	2.784e-14	-13.317	-13.555	-0.238	(0)
Co(NH3)2+2	4.961e-15	2.866e-15	-14.304	-14.543	-0.238	(0)
Ca(NH3)2+2	6.381e-16	3.686e-16	-15.195	-15.433	-0.238	(0)
Co(NH3)3+2	8.158e-20	4.713e-20	-19.088	-19.327	-0.238	(0)
Co(NH3)4+2	5.592e-25	3.231e-25	-24.252	-24.491	-0.238	(0)
Cr(NH3)5OH+2	1.771e-27	1.023e-27	-26.752	-26.990	-0.238	(0)
Co(NH3)5+2	1.212e-30	7.004e-31	-29.916	-30.155	-0.238	(0)
Cr(NH3)6+3	1.279e-32	3.722e-33	-31.893	-32.429	-0.536	(0)
Cr(NH3)6Cl+2	4.721e-34	2.728e-34	-33.326	-33.564	-0.238	(0)
Co(NH3)5Cl+2	4.164e-39	2.406e-39	-38.380	-38.619	-0.238	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-46.993	-47.052	-0.060	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-50.953	-51.191	-0.238	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.021	-52.260	-0.238	(0)
N(3)	2.370e-22					
NO2-	2.370e-22	2.096e-22	-21.625	-21.679	-0.053	(0)
CuNO2+	2.803e-27	2.444e-27	-26.552	-26.612	-0.060	(0)
CoNO2+	5.547e-28	4.836e-28	-27.256	-27.316	-0.060	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-47.281	-47.281	0.000	(0)
N(5)	4.129e-31					
NO3-	4.123e-31	3.665e-31	-30.385	-30.436	-0.051	(0)
CaNO3+	5.947e-34	5.185e-34	-33.226	-33.285	-0.060	(0)
MnNO3+	2.882e-37	2.513e-37	-36.540	-36.600	-0.060	(0)
CoNO3+	2.182e-37	1.902e-37	-36.661	-36.721	-0.060	(0)
ZnNO3+	2.043e-37	1.781e-37	-36.690	-36.749	-0.060	(0)
CuNO3+	1.523e-37	1.328e-37	-36.817	-36.877	-0.060	(0)
BaNO3+	1.252e-37	1.092e-37	-36.902	-36.962	-0.060	(0)
NiNO3+	1.030e-37	8.978e-38	-36.987	-37.047	-0.060	(0)
PbNO3+	2.864e-38	2.497e-38	-37.543	-37.603	-0.060	(0)
CrNO3+2	0.000e+00	0.000e+00	-41.487	-41.725	-0.238	(0)
FeNO3+2	0.000e+00	0.000e+00	-43.612	-43.850	-0.238	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-66.631	-66.631	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-66.848	-66.848	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-67.783	-67.783	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-67.899	-67.899	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-68.225	-68.225	0.000	(0)
Na	5.746e-03					
Na+	5.710e-03	5.076e-03	-2.243	-2.295	-0.051	(0)
NaSO4-	3.300e-05	2.946e-05	-4.481	-4.531	-0.049	(0)
NaHCO3	2.248e-06	2.248e-06	-5.648	-5.648	0.000	(0)
NaHPO4-	7.066e-08	6.308e-08	-7.151	-7.200	-0.049	(0)
NaCO3-	5.601e-09	5.000e-09	-8.252	-8.301	-0.049	(0)
NaH2BO3	5.773e-11	5.773e-11	-10.239	-10.239	0.000	(0)
NaCrO4-	3.332e-28	2.905e-28	-27.477	-27.537	-0.060	(0)
Ni	1.876e-07					
Ni+2	1.563e-07	9.752e-08	-6.806	-7.011	-0.205	(0)
NiSO4	2.035e-08	2.035e-08	-7.691	-7.691	0.000	(0)
NiHCO3+	8.938e-09	7.793e-09	-8.049	-8.108	-0.060	(0)
NiCl+	1.636e-09	1.426e-09	-8.786	-8.846	-0.060	(0)
NiNH3+2	1.878e-10	1.085e-10	-9.726	-9.965	-0.238	(0)
NiCO3	1.673e-10	1.673e-10	-9.776	-9.776	0.000	(0)
NiOH+	1.502e-11	1.310e-11	-10.823	-10.883	-0.060	(0)
Ni(SO4)2-2	1.321e-12	7.633e-13	-11.879	-12.117	-0.238	(0)
Ni(NH3)2+2	4.818e-14	2.784e-14	-13.317	-13.555	-0.238	(0)
NiCl2	4.219e-14	4.219e-14	-13.375	-13.375	0.000	(0)
Ni(OH)2	2.264e-14	2.264e-14	-13.645	-13.645	0.000	(0)
Ni(OH)3-	3.956e-19	3.449e-19	-18.403	-18.462	-0.060	(0)
NiSeO4	3.876e-23	3.876e-23	-22.412	-22.412	0.000	(0)
NiNO3+	1.030e-37	8.978e-38	-36.987	-37.047	-0.060	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-46.715	-46.713	0.001	(0)
P	1.680e-05					
H2PO4-	1.398e-05	1.248e-05	-4.855	-4.904	-0.049	(0)
HPO4-2	1.858e-06	1.173e-06	-5.731	-5.931	-0.200	(0)
MgHPO4	2.647e-07	2.647e-07	-6.577	-6.577	0.000	(0)

MgH2PO4+	2.388e-07	2.132e-07	-6.622	-6.671	-0.049	(0)
CaHPO4	2.128e-07	2.128e-07	-6.672	-6.672	0.000	(0)
CaH2PO4+	1.242e-07	1.109e-07	-6.906	-6.955	-0.049	(0)
NaHPO4-	7.066e-08	6.308e-08	-7.151	-7.200	-0.049	(0)
FeH2PO4+	2.668e-08	2.382e-08	-7.574	-7.623	-0.049	(0)
FeHPO4	1.815e-08	1.815e-08	-7.741	-7.741	0.000	(0)
KHPO4-	5.074e-09	4.530e-09	-8.295	-8.344	-0.049	(0)
H3PO4	1.098e-09	1.098e-09	-8.959	-8.959	0.000	(0)
CaPO4-	8.600e-10	7.677e-10	-9.066	-9.115	-0.049	(0)
CoHPO4	3.779e-10	3.779e-10	-9.423	-9.423	0.000	(0)
FeHPO4+	3.605e-11	3.218e-11	-10.443	-10.492	-0.049	(0)
MgPO4-	1.211e-11	1.081e-11	-10.917	-10.966	-0.049	(0)
PO4-3	1.950e-12	6.752e-13	-11.710	-12.171	-0.461	(0)
CrH2PO4+2	8.321e-13	4.807e-13	-12.080	-12.318	-0.238	(0)
FeH2PO4+2	9.841e-16	6.250e-16	-15.007	-15.204	-0.197	(0)
CrO3HPO4-2	1.861e-30	1.075e-30	-29.730	-29.968	-0.238	(0)
CrO3H2PO4-	3.925e-34	3.422e-34	-33.406	-33.466	-0.060	(0)
Pb	1.449e-08					
Pb+2	7.481e-09	4.669e-09	-8.126	-8.331	-0.205	(0)
PbHCO3+	2.579e-09	2.249e-09	-8.589	-8.648	-0.060	(0)
PbSO4	2.489e-09	2.489e-09	-8.604	-8.604	0.000	(0)
PbCl+	1.037e-09	9.043e-10	-8.984	-9.044	-0.060	(0)
PbCO3	6.455e-10	6.455e-10	-9.190	-9.190	0.000	(0)
PbOH+	2.050e-10	1.787e-10	-9.688	-9.748	-0.060	(0)
Pb (SO4) 2-2	2.825e-11	1.632e-11	-10.549	-10.787	-0.238	(0)
PbCl2	2.288e-11	2.288e-11	-10.640	-10.640	0.000	(0)
Pb (CO3) 2-2	1.482e-13	8.562e-14	-12.829	-13.067	-0.238	(0)
Pb (OH) 2	8.609e-14	8.609e-14	-13.065	-13.065	0.000	(0)
PbCl3-	6.398e-14	5.578e-14	-13.194	-13.253	-0.060	(0)
PbCl4-2	2.375e-16	1.372e-16	-15.624	-15.863	-0.238	(0)
Pb2OH+3	4.544e-17	1.322e-17	-16.343	-16.879	-0.536	(0)
Pb (OH) 3-	1.504e-18	1.312e-18	-17.823	-17.882	-0.060	(0)
Pb (OH) 4-2	8.471e-24	4.894e-24	-23.072	-23.310	-0.238	(0)
Pb3 (OH) 4+2	5.409e-25	3.125e-25	-24.267	-24.505	-0.238	(0)
Pb4 (OH) 4+4	1.253e-28	1.396e-29	-27.902	-28.855	-0.953	(0)
PbNO3+	2.864e-38	2.497e-38	-37.543	-37.603	-0.060	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-67.783	-67.783	0.000	(0)
S (6)	1.979e-03					
SO4-2	1.744e-03	1.088e-03	-2.758	-2.963	-0.205	(0)
CaSO4	1.024e-04	1.024e-04	-3.990	-3.990	0.000	(0)
MgSO4	7.392e-05	7.392e-05	-4.131	-4.131	0.000	(0)
NaSO4-	3.300e-05	2.946e-05	-4.481	-4.531	-0.049	(0)
NH4SO4-	1.980e-05	1.765e-05	-4.703	-4.753	-0.050	(0)
KSO4-	4.737e-06	4.229e-06	-5.324	-5.374	-0.049	(0)
FeSO4	1.090e-06	1.090e-06	-5.963	-5.963	0.000	(0)
MnSO4	7.886e-08	7.886e-08	-7.103	-7.103	0.000	(0)
CoSO4	6.815e-08	6.815e-08	-7.167	-7.167	0.000	(0)
HSO4-	6.789e-08	6.040e-08	-7.168	-7.219	-0.051	(0)
ZnSO4	4.277e-08	4.277e-08	-7.369	-7.369	0.000	(0)
AlSO4+	3.549e-08	3.158e-08	-7.450	-7.501	-0.051	(0)
CuSO4	2.616e-08	2.616e-08	-7.582	-7.582	0.000	(0)
NiSO4	2.035e-08	2.035e-08	-7.691	-7.691	0.000	(0)
CrOHSO4	6.448e-09	6.448e-09	-8.191	-8.191	0.000	(0)
PbSO4	2.489e-09	2.489e-09	-8.604	-8.604	0.000	(0)
Zn (SO4) 2-2	7.323e-10	4.231e-10	-9.135	-9.374	-0.238	(0)
Al (SO4) 2-	4.624e-10	4.114e-10	-9.335	-9.386	-0.051	(0)
CrSO4+	4.304e-10	3.752e-10	-9.366	-9.426	-0.060	(0)
Pb (SO4) 2-2	2.825e-11	1.632e-11	-10.549	-10.787	-0.238	(0)
Ni (SO4) 2-2	1.321e-12	7.633e-13	-11.879	-12.117	-0.238	(0)
FeSO4+	3.443e-14	3.069e-14	-13.463	-13.513	-0.050	(0)
Cr2 (OH) 2SO4+2	2.519e-14	1.455e-14	-13.599	-13.837	-0.238	(0)
Cr2 (OH) 2 (SO4) 2	9.408e-16	9.408e-16	-15.027	-15.027	0.000	(0)
Fe (SO4) 2-	8.526e-16	7.433e-16	-15.069	-15.129	-0.060	(0)
CrO3SO4-2	9.338e-33	5.395e-33	-32.030	-32.268	-0.238	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-46.993	-47.052	-0.060	(0)
Se (-2)	1.522e-24					
HSe-	1.515e-24	1.321e-24	-23.820	-23.879	-0.060	(0)
H2Se	6.623e-27	6.623e-27	-26.179	-26.179	0.000	(0)

MnSe	3.564e-30	3.564e-30	-29.448	-29.448	0.000	(0)
Se-2	2.485e-33	1.436e-33	-32.605	-32.843	-0.238	(0)
Se (4)	2.535e-08					
HSeO3-	2.512e-08	2.190e-08	-7.600	-7.660	-0.060	(0)
SeO3-2	2.207e-10	1.275e-10	-9.656	-9.895	-0.238	(0)
H2SeO3	5.915e-12	5.915e-12	-11.228	-11.228	0.000	(0)
FeHSeO3+2	2.518e-19	1.455e-19	-18.599	-18.837	-0.238	(0)
Se (6)	1.500e-18					
SeO4-2	1.499e-18	9.357e-19	-17.824	-18.029	-0.205	(0)
CoSeO4	1.414e-22	1.414e-22	-21.850	-21.850	0.000	(0)
MnSeO4	9.893e-23	9.893e-23	-22.005	-22.005	0.000	(0)
NiSeO4	3.876e-23	3.876e-23	-22.412	-22.412	0.000	(0)
HSeO4-	3.034e-23	2.645e-23	-22.518	-22.578	-0.060	(0)
ZnSeO4	2.716e-23	2.716e-23	-22.566	-22.566	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-40.351	-40.589	-0.238	(0)
Zn	3.520e-07					
Zn+2	3.003e-07	1.874e-07	-6.522	-6.727	-0.205	(0)
ZnSO4	4.277e-08	4.277e-08	-7.369	-7.369	0.000	(0)
ZnHCO3+	4.406e-09	3.842e-09	-8.356	-8.415	-0.060	(0)
ZnCl+	2.961e-09	2.629e-09	-8.529	-8.580	-0.052	(0)
Zn (SO4) 2-2	7.323e-10	4.231e-10	-9.135	-9.374	-0.238	(0)
ZnCO3	4.960e-10	4.960e-10	-9.304	-9.304	0.000	(0)
ZnOH+	2.231e-10	1.945e-10	-9.651	-9.711	-0.060	(0)
ZnOHCl	5.442e-11	5.442e-11	-10.264	-10.264	0.000	(0)
ZnCl2	1.943e-11	1.943e-11	-10.712	-10.712	0.000	(0)
Zn (OH) 2	6.895e-13	6.895e-13	-12.161	-12.161	0.000	(0)
ZnCl3-	9.866e-14	8.761e-14	-13.006	-13.057	-0.052	(0)
ZnCl4-2	3.862e-16	2.438e-16	-15.413	-15.613	-0.200	(0)
Zn (OH) 3-	6.039e-17	5.265e-17	-16.219	-16.279	-0.060	(0)
Zn (OH) 4-2	5.527e-23	3.193e-23	-22.257	-22.496	-0.238	(0)
ZnSeO4	2.716e-23	2.716e-23	-22.566	-22.566	0.000	(0)
ZnNO3+	2.043e-37	1.781e-37	-36.690	-36.749	-0.060	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-40.351	-40.589	-0.238	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-67.899	-67.899	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2	-87.46	-81.19	6.27	(Co (NH3) 5Cl) (NO3) 2
(Co (NH3) 5Cl) Cl2	-29.34	-24.80	4.54	(Co (NH3) 5Cl) Cl2
(Co (NH3) 5OH2) Cl3	-36.61	-24.80	11.81	(Co (NH3) 5OH2) Cl3
(Co (NH3) 6) (NO3) 3	-123.96	-106.03	17.93	(Co (NH3) 6) (NO3) 3
(Co (NH3) 6) Cl3	-41.57	-21.44	20.13	(Co (NH3) 6) Cl3
(NH4) 2CrO4	-31.96	-31.58	0.38	(NH4) 2CrO4
(NH4) 2SeO4	-24.12	-23.67	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	-0.94	10.20	11.13	Al (OH) 3
Al2 (MoO4) 3	-41.54	-38.39	3.15	Al2 (MoO4) 3
Al2O3	-0.03	20.39	20.43	Al2O3
Al4 (OH) 10SO4	2.76	25.46	22.70	Al4 (OH) 10SO4
AlAsO4:2H2O	-6.29	-1.49	4.80	AlAsO4:2H2O
AlOHSO4	-1.90	-5.13	-3.23	AlOHSO4
Alunite	3.65	2.87	-0.77	KAl3 (SO4) 2 (OH) 6
Anglesite	-3.47	-11.29	-7.83	PbSO4
Anhydrite	-1.99	-6.33	-4.34	CaSO4
Antlerite	-7.89	0.90	8.79	Cu3 (OH) 4SO4
Aragonite	-2.44	-10.70	-8.26	CaCO3
Arsenolite	-48.16	-51.10	-2.94	As4O6
Artinite	-11.76	-1.80	9.96	MgCO3:Mg (OH) 2:3H2O
As2O5	-30.15	-23.38	6.77	As2O5
Atacamite	-5.27	2.40	7.67	Cu2 (OH) 3Cl
Azurite	-6.55	-23.17	-16.62	Cu3 (OH) 2 (CO3) 2
Ba (OH) 2:8H2O	-19.46	5.09	24.56	Ba (OH) 2:8H2O
Ba3 (AsO4) 2	0.85	-8.09	-8.94	Ba3 (AsO4) 2
BaCrO4	-23.43	-33.20	-9.77	BaCrO4
BaHPO4	-5.84	-25.62	-19.77	BaHPO4
BaMoO4	-7.51	-14.50	-6.99	BaMoO4
Barite	-0.18	-10.23	-10.05	BaSO4

BaSeO3	-10.54	-8.74	1.79	BaSeO3
BaSeO4	-17.77	-25.29	-7.53	BaSeO4
Bianchite	-7.93	-9.69	-1.76	ZnSO4:6H2O
Birnessite	-17.41	0.68	18.09	MnO2
Bixbyite	-18.72	-18.99	-0.27	Mn2O3
Boehmite	1.27	10.20	8.93	AlOOH
Brochantite	-9.53	6.30	15.83	Cu4(OH)6SO4
Brucite	-8.24	8.95	17.18	Mg(OH)2
Bunsenite	-7.40	5.35	12.74	NiO
Ca3(AsO4)2:4H2O	-18.70	3.60	22.30	Ca3(AsO4)2:4H2O
Ca3(PO4)2(beta)	-5.36	-34.44	-29.08	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-9.07	-56.15	-47.08	Ca4H(PO4)3:3H2O
CaCrO4	-27.12	-29.30	-2.19	CaCrO4
CaHPO4	-2.35	-21.72	-19.37	CaHPO4
CaHPO4:2H2O	-2.65	-21.72	-19.06	CaHPO4:2H2O
Calcite	-2.25	-10.70	-8.46	CaCO3
CaMoO4	-2.66	-10.60	-7.94	CaMoO4
CaSeO3:2H2O	-7.72	-4.85	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-18.40	-21.39	-3.00	CaSeO4:2H2O
Cerussite	-2.46	-15.67	-13.20	PbCO3
CH4(g)	-59.32	-101.14	-41.81	CH4
Chalcanthite	-7.26	-9.92	-2.66	CuSO4:5H2O
Claudetite	-47.87	-51.10	-3.23	As4O6
Clausthalite	1.43	-26.03	-27.46	PbSe
Co(BO2)2	-31.37	-4.30	27.07	Co(BO2)2
Co(OH)2	-7.22	5.87	13.09	Co(OH)2
Co(OH)3	-14.31	-16.35	-2.03	Co(OH)3
CO2(g)	-1.54	-19.70	-18.16	CO2
Co3(AsO4)2	-18.79	-5.75	13.03	Co3(AsO4)2
Co3(PO4)2	-9.11	-43.80	-34.69	Co3(PO4)2
Co3O4	-16.64	-26.82	-10.17	Co3O4
CoCl2	-19.46	-10.96	8.51	CoCl2
CoCl2:6H2O	-13.47	-10.96	2.51	CoCl2:6H2O
CoCO3	-3.88	-13.82	-9.94	CoCO3
CoFe2O4	16.96	13.90	-3.05	CoFe2O4
CoHPO4	-5.77	-24.84	-19.06	CoHPO4
CoMoO4	-6.03	-13.72	-7.69	CoMoO4
CoO	-8.03	5.88	13.90	CoO
CoSe	-7.98	-24.18	-16.20	CoSe
CoSeO3	-9.28	-7.96	1.32	CoSeO3
CoSeO4:6H2O	-22.98	-24.51	-1.53	CoSeO4:6H2O
CoSO4	-12.49	-9.45	3.04	CoSO4
CoSO4:6H2O	-6.97	-9.45	-2.48	CoSO4:6H2O
Cotunnite	-7.95	-12.80	-4.86	PbCl2
Cr(OH)2	-19.33	-8.41	10.93	Cr(OH)2
Cr(OH)3	-2.58	-1.15	1.42	Cr(OH)3
Cr(OH)3(am)	-0.40	-1.15	-0.75	Cr(OH)3
Cr2O3	-0.10	-2.31	-2.21	Cr2O3
CrCl2	-39.66	-25.24	14.42	CrCl2
CrCl3	-41.88	-26.41	15.48	CrCl3
Crmetal	-59.76	-28.77	31.00	Cr
CrO3	-35.10	-38.30	-3.19	CrO3
Cu(OH)2	-3.44	5.41	8.84	Cu(OH)2
Cu2(OH)3NO3	-35.27	-25.80	9.47	Cu2(OH)3NO3
Cu2Se(alpha)	12.17	-34.27	-46.44	Cu2Se
Cu2SO4	-17.64	-19.53	-1.89	Cu2SO4
Cu3(AsO4)2:2H2O	-13.26	-7.16	6.10	Cu3(AsO4)2:2H2O
Cu3(PO4)2	-8.35	-45.20	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-10.08	-45.20	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	5.59	-58.92	-64.51	Cu3Se2
CuCO3	-2.79	-14.29	-11.50	CuCO3
CuCrO4	-27.45	-32.89	-5.44	CuCrO4
Cumetal	-3.31	-12.28	-8.97	Cu
CuMoO4	-1.08	-14.19	-13.11	CuMoO4
CuOCuSO4	-15.22	-4.51	10.71	CuOCuSO4
Cupricferrite	6.82	13.44	6.62	CuFe2O4
Cuprite	-3.17	-4.21	-1.04	Cu2O
Cuprousferrite	10.78	1.91	-8.87	CuFeO2

CuSe	8.81	-24.65	-33.46	CuSe
CuSe2	-0.57	-34.35	-33.79	CuSe2
CuSeO3:2H2O	-9.05	-8.43	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-22.54	-24.98	-2.44	CuSeO4:5H2O
CuSO4	-13.07	-9.92	3.16	CuSO4
Diaspore	3.02	10.20	7.18	AlOOH
Dolomite (disordered)	-5.05	-21.45	-16.40	CaMg (CO3) 2
Dolomite (ordered)	-4.48	-21.45	-16.97	CaMg (CO3) 2
Epsomite	-4.21	-6.37	-2.16	MgSO4:7H2O
Fe (OH) 2	-6.57	6.99	13.56	Fe (OH) 2
Fe (OH) 2.7Cl.3	4.53	1.49	-3.04	Fe (OH) 2.7Cl.3
Fe2 (OH) 4SeO3	-7.36	-5.81	1.55	Fe2 (OH) 4SeO3
Fe2 (SeO3) 3:2H2O	-12.86	-33.49	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-34.93	-37.94	-3.01	Fe2 (SO4) 3
Fe3 (OH) 8	-5.20	15.02	20.22	Fe3 (OH) 8
FeAsO4:2H2O	-8.07	-7.67	0.40	FeAsO4:2H2O
FeCr2O4	-2.93	4.69	7.62	FeCr2O4
FeMoO4	-2.54	-12.60	-10.06	FeMoO4
Ferrihydrite	0.60	4.01	3.41	Fe (OH) 3
Ferroselite	-14.03	-32.76	-18.74	FeSe2
FeSe	-12.06	-23.06	-11.01	FeSe
Gibbsite	1.62	10.20	8.58	Al (OH) 3
Goethite	3.34	4.01	0.67	FeOOH
Goslarite	-7.64	-9.69	-2.05	ZnSO4:7H2O
Gypsum	-1.72	-6.33	-4.61	CaSO4:2H2O
H-Jarosite	-7.19	-18.60	-11.41	(H3O) Fe3 (SO4) 2 (OH) 6
H2MoO4	-6.57	-19.60	-13.02	H2MoO4
H2Se(g)	-25.14	-30.06	-4.91	H2Se
Halite	-6.12	-4.53	1.59	NaCl
Hausmannite	-23.94	38.35	62.29	Mn3O4
Hematite	9.06	8.03	-1.03	Fe2O3
Hercynite	3.56	27.39	23.83	FeAl2O4
Hinsdalite	-8.92	-11.42	-2.50	PbAl3PO4SO4 (OH) 6
Huntite	-13.30	-42.95	-29.65	CaMg3 (CO3) 4
Hydrocerussite	-8.54	-27.31	-18.77	Pb3 (OH) 2 (CO3) 2
Hydromagnesite	-25.93	-34.04	-8.11	Mg5 (CO3) 4 (OH) 2:4H2O
Hydroxylapatite	-2.83	-47.16	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-9.20	-71.99	-62.79	Pb5 (PO4) 3OH
K-Alum	-12.26	-17.52	-5.26	KAl (SO4) 2:12H2O
K-Jarosite	-1.26	-15.67	-14.41	KFe3 (SO4) 2 (OH) 6
K2Cr2O7	-53.25	-70.73	-17.48	K2Cr2O7
K2CrO4	-31.87	-32.44	-0.57	K2CrO4
K2MoO4	-17.00	-13.73	3.27	K2MoO4
K2SeO4	-23.80	-24.53	-0.73	K2SeO4
Langite	-11.68	6.30	17.98	Cu4 (OH) 6SO4:H2O
Larnakite	-6.90	-7.26	-0.37	PbO:PbSO4
Laurionite	-5.01	-4.39	0.62	PbOHCl
Lepidocrocite	2.64	4.01	1.37	FeOOH
Lime	-24.28	8.99	33.28	CaO
Litharge	-8.86	4.03	12.89	PbO
Maghemite	1.64	8.03	6.39	Fe2O3
Magnesioferrite	-0.71	16.98	17.69	Fe2MgO4
Magnesite	-3.23	-10.75	-7.52	MgCO3
Magnetite	11.00	15.02	4.03	Fe3O4
Malachite	-3.35	-8.88	-5.53	Cu2 (OH) 2CO3
Manganite	-9.16	16.18	25.34	MnOOH
Massicot	-9.06	4.03	13.09	PbO
Melanothallite	-17.87	-11.43	6.45	CuCl2
Melanterite	-6.06	-8.33	-2.27	FeSO4:7H2O
Mg (OH) 2 (active)	-9.84	8.95	18.79	Mg (OH) 2
Mg3 (PO4) 2	-11.29	-34.57	-23.28	Mg3 (PO4) 2
MgCr2O4	-10.10	6.64	16.74	MgCr2O4
MgCrO4	-35.00	-29.35	5.65	MgCrO4
MgHPO4:3H2O	-3.59	-21.76	-18.18	MgHPO4:3H2O
MgMoO4	-8.80	-10.65	-1.85	MgMoO4
MgSeO3:6H2O	-7.93	-4.89	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-20.24	-21.44	-1.20	MgSeO4:6H2O
Minium	-42.34	32.45	74.78	Pb3O4

Mirabilite	-6.20	-7.55	-1.35	Na2SO4:10H2O
Mn2(SO4)3	-59.74	-64.96	-5.22	Mn2(SO4)3
Mn3(AsO4)2:8H2O	-17.89	-5.39	12.50	Mn3(AsO4)2:8H2O
Mn3(PO4)2	-19.58	-43.43	-23.85	Mn3(PO4)2
MnCl2:4H2O	-13.59	-10.84	2.75	MnCl2:4H2O
MnHPO4	0.69	-24.71	-25.40	MnHPO4
MnSe	-27.86	-24.06	3.79	MnSe
MnSeO3	-8.97	-7.84	1.13	MnSeO3
MnSeO3:2H2O	-8.80	-7.84	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-22.34	-24.39	-2.05	MnSeO4:5H2O
MnSO4	-12.10	-9.33	2.78	MnSO4
MoO3	-11.60	-19.60	-8.00	MoO3
Morenosite	-7.79	-9.98	-2.18	NiSO4:7H2O
Na-Jarosite	-3.97	-14.72	-10.75	NaFe3(SO4)2(OH)6
Na2Cr2O7	-58.86	-68.83	-9.96	Na2Cr2O7
Na2CrO4	-33.52	-30.53	2.99	Na2CrO4
Na2Mo2O7	-14.66	-31.42	-16.76	Na2Mo2O7
Na2MoO4	-13.34	-11.82	1.52	Na2MoO4
Na2MoO4:2H2O	-13.05	-11.83	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-16.37	-6.07	10.30	Na2SeO3:5H2O
Na2SeO4	-23.90	-22.62	1.28	Na2SeO4
Nantokite	-3.66	-10.52	-6.86	CuCl
Natron	-10.42	-11.93	-1.51	Na2CO3:10H2O
Nesquehonite	-6.15	-10.75	-4.60	MgCO3:3H2O
Ni(OH)2	-7.73	5.35	13.08	Ni(OH)2
Ni3(AsO4)2:8H2O	-23.03	-7.33	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-14.07	-45.37	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-25.93	6.07	32.00	Ni4(OH)6SO4
NiCO3	-7.60	-14.35	-6.75	NiCO3
NiMoO4	-3.10	-14.25	-11.15	NiMoO4
NiSe	-7.01	-24.71	-17.70	NiSe
NiSeO3:2H2O	-11.40	-8.49	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-23.52	-25.04	-1.52	NiSeO4:6H2O
Nsutite	-16.82	0.68	17.50	MnO2
O2(g)	-44.08	40.72	84.80	O2
Pb(BO2)2	-12.71	-6.15	6.57	Pb(BO2)2
Pb(OH)2	-4.30	4.03	8.32	Pb(OH)2
Pb10(OH)6O(CO3)6	-69.13	-77.89	-8.76	Pb10(OH)6O(CO3)6
Pb2(OH)3Cl	-9.15	-0.36	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-18.13	8.06	26.19	Pb2O(OH)2
Pb2O3	-32.62	28.42	61.04	Pb2O3
Pb2OCO3	-11.20	-11.64	-0.44	Pb2OCO3
Pb3(AsO4)2	-17.09	-11.29	5.80	Pb3(AsO4)2
Pb3(PO4)2	-5.80	-49.33	-43.53	Pb3(PO4)2
Pb3O2CO3	-18.96	-7.61	11.35	Pb3O2CO3
Pb3O2SO4	-14.16	-3.24	10.92	Pb3O2SO4
Pb4(OH)6SO4	-20.31	0.79	21.10	Pb4(OH)6SO4
Pb4O3SO4	-21.49	0.79	22.28	Pb4O3SO4
PbCrO4	-21.54	-34.27	-12.73	PbCrO4
PbHPO4	-2.88	-26.68	-23.81	PbHPO4
Pbmetal	-20.57	-16.33	4.24	Pb
PbMoO4	0.21	-15.57	-15.78	PbMoO4
PbO:0.3H2O	-8.95	4.03	12.98	PbO:0.33H2O
PbSeO4	-19.47	-26.36	-6.88	PbSeO4
Periclase	-13.09	8.95	22.04	MgO
Phosgenite	-8.66	-28.47	-19.81	PbCl2:PbCO3
Plattnerite	-26.10	24.39	50.49	PbO2
Plumbgummite	5.99	-26.80	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-14.19	8.99	23.19	Ca(OH)2
Pyrochroite	-9.49	6.00	15.48	Mn(OH)2
Pyrolusite	-15.84	26.36	42.19	MnO2
Pyromorphite	4.03	-80.40	-84.43	Pb5(PO4)3Cl
Retgersite	-7.92	-9.97	-2.05	NiSO4:6H2O
Rhodochrosite	-3.13	-13.70	-10.57	MnCO3
Semetal(am)	-2.56	-9.70	-7.14	Se
Semetal(hex)	-1.94	-9.70	-7.76	Se
SeO2	-13.96	-13.84	0.12	SeO2
SeO3	-51.87	-30.39	21.48	SeO3

Siderite	-2.51	-12.70	-10.19	FeCO3
Smithsonite	-4.11	-14.06	-9.95	ZnCO3
Spinel	-8.67	29.34	38.01	MgAl2O4
Strengite	-0.32	-26.70	-26.37	FePO4:2H2O
Tenorite	-2.43	5.41	7.84	CuO
Thenardite	-7.90	-7.55	0.35	Na2SO4
Thermonatrite	-12.59	-11.93	0.67	Na2CO3:H2O
Tsumebite	-7.46	-17.25	-9.79	Pb2CuPO4 (OH) 3:3H2O
Vivianite	-4.44	-40.44	-36.00	Fe3 (PO4) 2:8H2O
Witherite	-6.02	-14.60	-8.58	BaCO3
Zincite	-5.97	5.63	11.60	ZnO
Zincosite	-13.87	-9.69	4.18	ZnSO4
Zn(BO2) 2	-12.83	-4.54	8.29	Zn(BO2) 2
Zn(NO3) 2:6H2O	-70.84	-67.60	3.24	Zn(NO3) 2:6H2O
Zn(OH) 2	-6.57	5.63	12.20	Zn(OH) 2
Zn(OH) 2 (am)	-7.08	5.63	12.71	Zn(OH) 2
Zn(OH) 2 (beta)	-6.37	5.63	12.00	Zn(OH) 2
Zn(OH) 2 (epsilon)	-6.15	5.63	11.78	Zn(OH) 2
Zn(OH) 2 (gamma)	-6.10	5.63	11.73	Zn(OH) 2
Zn2(OH) 2SO4	-11.56	-4.06	7.50	Zn2(OH) 2SO4
Zn2(OH) 3Cl	-12.34	2.85	15.19	Zn2(OH) 3Cl
Zn3(AsO4) 2:2.5H2O	-20.13	-6.48	13.65	Zn3(AsO4) 2:2.5H2O
Zn3(PO4) 2:4H2O	-9.10	-44.52	-35.42	Zn3(PO4) 2:4H2O
Zn3O(SO4) 2	-33.43	-13.75	19.68	Zn3O(SO4) 2
Zn4(OH) 6SO4	-21.19	7.21	28.40	Zn4(OH) 6SO4
Zn5(OH) 8Cl2	-27.17	11.33	38.50	Zn5(OH) 8Cl2
ZnCl2	-18.47	-11.20	7.27	ZnCl2
ZnCO3:1H2O	-3.80	-14.06	-10.26	ZnCO3:1H2O
Znmetal	-40.97	-14.73	26.25	Zn
ZnMoO4	-3.87	-13.96	-10.09	ZnMoO4
ZnO(active)	-5.82	5.63	11.45	ZnO
ZnSe	-9.95	-24.43	-14.48	ZnSe
ZnSeO4:6H2O	-23.24	-24.76	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-9.18	-9.69	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Initial solution 4.

-----Solution composition-----

Elements	Molality	Moles
Al	5.284e-05	5.284e-05
As	2.680e-08	2.680e-08
B	9.287e-06	9.287e-06
Ba	2.924e-07	2.924e-07
Be	2.228e-07	2.228e-07
Ca	1.308e-02	1.308e-02
Cd	7.145e-09	7.145e-09
Cl	1.388e-02	1.388e-02
Co	1.227e-05	1.227e-05
Cr	6.372e-08	6.372e-08
Cu	9.874e-05	9.874e-05
Fe	4.435e-04	4.435e-04
K	6.291e-03	6.291e-03
Mg	3.635e-03	3.635e-03
Mn	9.539e-05	9.539e-05
Mo	1.151e-06	1.151e-06
N	7.218e-04	7.218e-04
Na	1.498e-02	1.498e-02
Ni	8.382e-06	8.382e-06
P	9.400e-06	9.400e-06
Pb	9.691e-08	9.691e-08
S(6)	2.322e-02	2.322e-02
Se	1.271e-07	1.271e-07
Zn	7.523e-06	7.523e-06

-----Description of solution-----

pH = 4.050
 pe = 4.000
 Activity of water = 0.999
 Ionic strength (mol/kgw) = 7.235e-02
 Mass of water (kg) = 1.000e+00
 Total alkalinity (eq/kg) = -1.741e-04
 Total carbon (mol/kg) = 0.000e+00
 Total CO2 (mol/kg) = 0.000e+00
 Temperature (°C) = 20.00
 Electrical balance (eq) = -3.291e-03
 Percent error, 100*(Cat-|An|)/(Cat+|An|) = -3.64
 Iterations = 12
 Total H = 1.110168e+02
 Total O = 5.559979e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.112e-04	8.913e-05	-3.954	-4.050	-0.096	0.00
OH-	9.765e-11	7.686e-11	-10.010	-10.114	-0.104	(0)
H2O	5.551e+01	9.988e-01	1.744	-0.001	0.000	18.05
Al	5.284e-05					
AlSO4+	4.325e-05	3.456e-05	-4.364	-4.461	-0.097	(0)
Al+3	5.995e-06	8.162e-07	-5.222	-6.088	-0.866	(0)
Al (SO4) 2-	3.425e-06	2.737e-06	-5.465	-5.563	-0.097	(0)
AlOH+2	1.549e-07	6.629e-08	-6.810	-7.179	-0.369	(0)
Al (OH) 2+	1.021e-08	8.256e-09	-7.991	-8.083	-0.092	(0)
Al (OH) 3	1.859e-11	1.859e-11	-10.731	-10.731	0.000	(0)
Al (OH) 4-	1.003e-13	8.018e-14	-12.999	-13.096	-0.097	(0)
AlMo6O21-3	3.639e-15	2.171e-16	-14.439	-15.663	-1.224	(0)
As (3)	2.521e-08					
H3AsO3	2.521e-08	2.521e-08	-7.598	-7.598	0.000	(0)
H4AsO3+	1.523e-12	1.113e-12	-11.817	-11.953	-0.136	(0)
H2AsO3-	1.643e-13	1.201e-13	-12.784	-12.920	-0.136	(0)
HAsO3-2	3.453e-21	9.864e-22	-20.462	-21.006	-0.544	(0)
AsO3-3	6.008e-30	3.584e-31	-29.221	-30.446	-1.224	(0)
As (5)	1.588e-09					
H2AsO4-	1.567e-09	1.145e-09	-8.805	-8.941	-0.136	(0)
H3AsO4	1.662e-11	1.690e-11	-10.779	-10.772	0.007	(0)
HAsO4-2	4.832e-12	1.380e-12	-11.316	-11.860	-0.544	(0)
AsO4-3	7.304e-19	4.357e-20	-18.136	-19.361	-1.224	(0)
B	9.287e-06					
H3BO3	9.287e-06	9.443e-06	-5.032	-5.025	0.007	(0)
H2BO3-	7.274e-11	5.627e-11	-10.138	-10.250	-0.111	(0)
CaH2BO3+	1.376e-11	1.065e-11	-10.861	-10.973	-0.111	(0)
MgH2BO3+	2.559e-12	1.980e-12	-11.592	-11.703	-0.111	(0)
NaH2BO3	1.131e-12	1.131e-12	-11.947	-11.947	0.000	(0)
H5 (BO3) 2-	6.034e-16	4.668e-16	-15.219	-15.331	-0.111	(0)
BaH2BO3+	2.636e-16	2.039e-16	-15.579	-15.691	-0.111	(0)
H8 (BO3) 3-	4.932e-19	3.815e-19	-18.307	-18.418	-0.111	(0)
Ba	2.924e-07					
Ba+2	2.924e-07	1.205e-07	-6.534	-6.919	-0.385	(0)
BaNH3+2	8.904e-16	2.544e-16	-15.050	-15.595	-0.544	(0)
BaH2BO3+	2.636e-16	2.039e-16	-15.579	-15.691	-0.111	(0)
BaOH+	4.857e-17	3.908e-17	-16.314	-16.408	-0.094	(0)
BaNO3+	0.000e+00	0.000e+00	-58.243	-58.379	-0.136	(0)
Be	2.228e-07					
Be+2	1.589e-07	6.549e-08	-6.799	-7.184	-0.385	(0)
BeSO4	5.495e-08	5.495e-08	-7.260	-7.260	0.000	(0)
Be (SO4) 2-2	3.956e-09	1.130e-09	-8.403	-8.947	-0.544	(0)
BeOH+	3.590e-09	2.942e-09	-8.445	-8.531	-0.086	(0)
BeCl+	1.430e-09	1.151e-09	-8.845	-8.939	-0.094	(0)
Be (OH) 2	2.095e-13	2.095e-13	-12.679	-12.679	0.000	(0)

	Be2OH+3	1.919e-13	3.197e-14	-12.717	-13.495	-0.778	(0)
	Be3 (OH) 3+3	3.696e-18	6.156e-19	-17.432	-18.211	-0.778	(0)
	Be (OH) 3-	7.246e-19	5.938e-19	-18.140	-18.226	-0.086	(0)
	Be (OH) 4-2	9.377e-29	4.228e-29	-28.028	-28.374	-0.346	(0)
Ca	1.308e-02						
	Ca+2	8.199e-03	3.380e-03	-2.086	-2.471	-0.385	(0)
	CaSO4	4.877e-03	4.877e-03	-2.312	-2.312	0.000	(0)
	CaH2PO4+	5.618e-07	4.544e-07	-6.250	-6.343	-0.092	(0)
	CaHPO4	6.463e-09	6.463e-09	-8.190	-8.190	0.000	(0)
	CaNH3+2	4.981e-11	1.423e-11	-10.303	-10.847	-0.544	(0)
	CaH2BO3+	1.376e-11	1.065e-11	-10.861	-10.973	-0.111	(0)
	CaOH+	6.009e-12	4.895e-12	-11.221	-11.310	-0.089	(0)
	CaPO4-	2.137e-13	1.729e-13	-12.670	-12.762	-0.092	(0)
	Ca (NH3) 2+2	6.632e-20	1.894e-20	-19.178	-19.723	-0.544	(0)
	CaNO3+	0.000e+00	0.000e+00	-54.018	-54.154	-0.136	(0)
Cd	7.145e-09						
	Cd+2	2.961e-09	1.221e-09	-8.529	-8.913	-0.385	(0)
	CdSO4	1.783e-09	1.783e-09	-8.749	-8.749	0.000	(0)
	CdCl+	1.752e-09	1.281e-09	-8.757	-8.893	-0.136	(0)
	Cd (SO4) 2-2	5.911e-10	1.689e-10	-9.228	-9.772	-0.544	(0)
	CdCl2	5.825e-11	5.825e-11	-10.235	-10.235	0.000	(0)
	CdCl3-	5.300e-13	3.875e-13	-12.276	-12.412	-0.136	(0)
	CdOHC1	5.266e-15	5.266e-15	-14.279	-14.279	0.000	(0)
	CdOH+	1.026e-15	7.503e-16	-14.989	-15.125	-0.136	(0)
	Cd (OH) 2	7.790e-22	7.790e-22	-21.108	-21.108	0.000	(0)
	Cd2OH+3	8.185e-23	4.883e-24	-22.087	-23.311	-1.224	(0)
	Cd (SeO3) 2-2	5.753e-26	1.643e-26	-25.240	-25.784	-0.544	(0)
	Cd (OH) 3-	7.346e-30	5.370e-30	-29.134	-29.270	-0.136	(0)
	CdSeO4	3.576e-31	3.576e-31	-30.447	-30.447	0.000	(0)
	Cd (OH) 4-2	3.472e-40	0.000e+00	-39.459	-40.004	-0.544	(0)
	CdNO3+	0.000e+00	0.000e+00	-60.413	-60.549	-0.136	(0)
	Cd (NO3) 2	0.000e+00	0.000e+00	-113.111	-113.111	0.000	(0)
Cl	1.388e-02						
	Cl-	1.381e-02	1.106e-02	-1.860	-1.956	-0.096	(0)
	CuCl2-	2.907e-05	2.306e-05	-4.537	-4.637	-0.101	(0)
	CuCl	9.858e-06	9.858e-06	-5.006	-5.006	0.000	(0)
	MnCl+	3.569e-07	2.872e-07	-6.447	-6.542	-0.094	(0)
	CuCl+	3.164e-07	2.510e-07	-6.500	-6.600	-0.101	(0)
	CoCl+	1.315e-07	9.612e-08	-6.881	-7.017	-0.136	(0)
	CuCl3-2	1.276e-07	5.349e-08	-6.894	-7.272	-0.378	(0)
	NiCl+	8.574e-08	6.268e-08	-7.067	-7.203	-0.136	(0)
	ZnCl+	6.136e-08	4.867e-08	-7.212	-7.313	-0.101	(0)
	PbCl+	7.379e-09	5.395e-09	-8.132	-8.268	-0.136	(0)
	MnCl2	4.488e-09	4.488e-09	-8.348	-8.348	0.000	(0)
	CdCl+	1.752e-09	1.281e-09	-8.757	-8.893	-0.136	(0)
	BeCl+	1.430e-09	1.151e-09	-8.845	-8.939	-0.094	(0)
	CuCl2	7.521e-10	7.521e-10	-9.124	-9.124	0.000	(0)
	ZnCl2	6.866e-10	6.866e-10	-9.163	-9.163	0.000	(0)
	PbCl2	2.606e-10	2.606e-10	-9.584	-9.584	0.000	(0)
	CrCl+2	6.429e-11	1.836e-11	-10.192	-10.736	-0.544	(0)
	CdCl2	5.825e-11	5.825e-11	-10.235	-10.235	0.000	(0)
	MnCl3-	1.700e-11	1.367e-11	-10.770	-10.864	-0.094	(0)
	ZnOHC1	7.463e-12	7.463e-12	-11.127	-11.127	0.000	(0)
	ZnCl3-	7.451e-12	5.911e-12	-11.128	-11.228	-0.101	(0)
	NiCl2	3.540e-12	3.540e-12	-11.451	-11.451	0.000	(0)
	PbCl3-	1.659e-12	1.213e-12	-11.780	-11.916	-0.136	(0)
	CdCl3-	5.300e-13	3.875e-13	-12.276	-12.412	-0.136	(0)
	CuCl3-	8.945e-14	7.096e-14	-13.048	-13.149	-0.101	(0)
	ZnCl4-2	7.493e-14	3.140e-14	-13.125	-13.503	-0.378	(0)
	FeCl+2	4.146e-14	1.738e-14	-13.382	-13.760	-0.378	(0)
	PbCl4-2	1.993e-14	5.694e-15	-13.700	-14.245	-0.544	(0)
	CrCl2+	1.693e-14	1.238e-14	-13.771	-13.907	-0.136	(0)
	CdOHC1	5.266e-15	5.266e-15	-14.279	-14.279	0.000	(0)
	FeCl2+	1.250e-15	1.006e-15	-14.903	-14.997	-0.094	(0)
	CrOHC12	2.136e-16	2.136e-16	-15.670	-15.670	0.000	(0)
	CuCl4-2	1.113e-17	4.664e-18	-16.954	-17.331	-0.378	(0)
	FeCl3	1.113e-18	1.113e-18	-17.954	-17.954	0.000	(0)
	CoCl+2	7.155e-34	2.044e-34	-33.145	-33.690	-0.544	(0)

CrO3Cl-	0.000e+00	0.000e+00	-44.667	-44.803	-0.136	(0)
Cr(NH3) 6Cl+2	0.000e+00	0.000e+00	-47.366	-47.910	-0.544	(0)
Co(NH3) 5Cl+2	0.000e+00	0.000e+00	-49.862	-50.406	-0.544	(0)
Co(NH3) 6Cl+2	0.000e+00	0.000e+00	-65.026	-65.570	-0.544	(0)
Co (2)	1.227e-05					
Co+2	8.914e-06	2.546e-06	-5.050	-5.594	-0.544	(0)
CoSO4	3.220e-06	3.220e-06	-5.492	-5.492	0.000	(0)
CoCl+	1.315e-07	9.612e-08	-6.881	-7.017	-0.136	(0)
CoHPO4	1.139e-11	1.139e-11	-10.944	-10.944	0.000	(0)
CoOH+	7.843e-12	5.734e-12	-11.106	-11.242	-0.136	(0)
Co(NH3) +2	5.605e-12	1.601e-12	-11.251	-11.796	-0.544	(0)
Co(OH) 2	5.139e-17	5.139e-17	-16.289	-16.289	0.000	(0)
Co2OH+3	1.226e-17	7.317e-19	-16.911	-18.136	-1.224	(0)
Co(NH3) 2+2	5.113e-19	1.461e-19	-18.291	-18.835	-0.544	(0)
Co(OH) 3-	1.583e-25	1.157e-25	-24.801	-24.937	-0.136	(0)
Co(NH3) 3+2	2.153e-26	6.150e-27	-25.667	-26.211	-0.544	(0)
CoOOH-	6.625e-27	4.844e-27	-26.179	-26.315	-0.136	(0)
CoSeO4	1.849e-27	1.849e-27	-26.733	-26.733	0.000	(0)
Co(NH3) 4+2	3.778e-34	1.079e-34	-33.423	-33.967	-0.544	(0)
Co4(OH) 4+4	3.238e-35	2.156e-37	-34.490	-36.666	-2.177	(0)
Co(OH) 4-2	7.245e-36	2.070e-36	-35.140	-35.684	-0.544	(0)
Co(NH3) 5+2	0.000e+00	0.000e+00	-41.678	-42.223	-0.544	(0)
CoNO2+	0.000e+00	0.000e+00	-43.791	-43.927	-0.136	(0)
CoNO3+	0.000e+00	0.000e+00	-57.457	-57.593	-0.136	(0)
Co(NO3) 2	0.000e+00	0.000e+00	-109.483	-109.483	0.000	(0)
Co (3)	2.050e-31					
CoOH+2	2.035e-31	5.813e-32	-30.691	-31.236	-0.544	(0)
Co+3	7.446e-34	1.014e-34	-33.128	-33.994	-0.866	(0)
CoCl+2	7.155e-34	2.044e-34	-33.145	-33.690	-0.544	(0)
Co(NH3) 5Cl+2	0.000e+00	0.000e+00	-49.862	-50.406	-0.544	(0)
Co(NH3) 6SO4+	0.000e+00	0.000e+00	-60.792	-60.928	-0.136	(0)
Co(NH3) 6Cl+2	0.000e+00	0.000e+00	-65.026	-65.570	-0.544	(0)
Co(NH3) 6OH+2	0.000e+00	0.000e+00	-68.505	-69.050	-0.544	(0)
Cr (2)	5.033e-20					
Cr+2	5.033e-20	1.438e-20	-19.298	-19.842	-0.544	(0)
Cr (3)	6.372e-08					
CrSO4+	2.618e-08	1.914e-08	-7.582	-7.718	-0.136	(0)
Cr+3	2.571e-08	1.534e-09	-7.590	-8.814	-1.224	(0)
Cr(OH) +2	9.288e-09	2.653e-09	-8.032	-8.576	-0.544	(0)
CrOHSO4	2.437e-09	2.437e-09	-8.613	-8.613	0.000	(0)
CrCl+2	6.429e-11	1.836e-11	-10.192	-10.736	-0.544	(0)
Cr(OH) 2+	2.915e-11	2.131e-11	-10.535	-10.671	-0.136	(0)
CrH2PO4+2	7.383e-12	2.109e-12	-11.132	-11.676	-0.544	(0)
CrCl2+	1.693e-14	1.238e-14	-13.771	-13.907	-0.136	(0)
Cr2(OH) 2SO4+2	1.197e-15	3.419e-16	-14.922	-15.466	-0.544	(0)
Cr(OH) 3	9.036e-16	9.036e-16	-15.044	-15.044	0.000	(0)
CrOHC12	2.136e-16	2.136e-16	-15.670	-15.670	0.000	(0)
Cr2(OH) 2(SO4) 2	1.343e-16	1.343e-16	-15.872	-15.872	0.000	(0)
CrO2-	6.593e-21	4.820e-21	-20.181	-20.317	-0.136	(0)
Cr(OH) 4-	5.552e-21	4.059e-21	-20.256	-20.392	-0.136	(0)
Cr(NH3) 5OH+2	0.000e+00	0.000e+00	-40.611	-41.155	-0.544	(0)
Cr(NH3) 6+3	0.000e+00	0.000e+00	-45.831	-47.056	-1.224	(0)
Cr(NH3) 6Cl+2	0.000e+00	0.000e+00	-47.366	-47.910	-0.544	(0)
CrNO3+2	0.000e+00	0.000e+00	-62.020	-62.564	-0.544	(0)
Cr (6)	3.419e-40					
HCrO4-	3.419e-40	2.500e-40	-39.466	-39.602	-0.136	(0)
CrO4-2	0.000e+00	0.000e+00	-41.671	-42.056	-0.385	(0)
CrO3SO4-2	0.000e+00	0.000e+00	-42.797	-43.341	-0.544	(0)
NaCrO4-	0.000e+00	0.000e+00	-43.159	-43.295	-0.136	(0)
KCrO4-	0.000e+00	0.000e+00	-43.667	-43.803	-0.136	(0)
CrO3HPO4-2	0.000e+00	0.000e+00	-43.693	-44.237	-0.544	(0)
H2CrO4	0.000e+00	0.000e+00	-43.854	-43.854	0.000	(0)
CrO3Cl-	0.000e+00	0.000e+00	-44.667	-44.803	-0.136	(0)
CrO3H2PO4-	0.000e+00	0.000e+00	-45.469	-45.605	-0.136	(0)
Cr2O7-2	0.000e+00	0.000e+00	-77.063	-77.607	-0.544	(0)
Cu (1)	4.003e-05					
CuCl2-	2.907e-05	2.306e-05	-4.537	-4.637	-0.101	(0)
CuCl	9.858e-06	9.858e-06	-5.006	-5.006	0.000	(0)

Cu+	9.682e-07	7.078e-07	-6.014	-6.150	-0.136	(0)
CuCl3-2	1.276e-07	5.349e-08	-6.894	-7.272	-0.378	(0)
Cu (2)	5.872e-05					
Cu+2	3.676e-05	1.515e-05	-4.435	-4.819	-0.385	(0)
CuSO4	2.163e-05	2.163e-05	-4.665	-4.665	0.000	(0)
CuCl+	3.164e-07	2.510e-07	-6.500	-6.600	-0.101	(0)
CuOH+	5.328e-09	4.227e-09	-8.273	-8.374	-0.101	(0)
CuNH3+2	2.979e-09	8.511e-10	-8.526	-9.070	-0.544	(0)
CuCl2	7.521e-10	7.521e-10	-9.124	-9.124	0.000	(0)
Cu2 (OH) 2+2	1.518e-12	4.336e-13	-11.819	-12.363	-0.544	(0)
Cu (OH) 2	1.218e-13	1.218e-13	-12.914	-12.914	0.000	(0)
CuCl3-	8.945e-14	7.096e-14	-13.048	-13.149	-0.101	(0)
CuCl4-2	1.113e-17	4.664e-18	-16.954	-17.331	-0.378	(0)
Cu (OH) 3-	3.855e-20	2.818e-20	-19.414	-19.550	-0.136	(0)
Cu (OH) 4-2	8.762e-29	2.503e-29	-28.057	-28.602	-0.544	(0)
CuNO2+	0.000e+00	0.000e+00	-41.845	-41.981	-0.136	(0)
CuNO3+	0.000e+00	0.000e+00	-56.370	-56.506	-0.136	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-80.152	-80.152	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-109.617	-109.617	0.000	(0)
Fe (2)	4.435e-04					
Fe+2	3.080e-04	8.798e-05	-3.511	-4.056	-0.544	(0)
FeSO4	1.352e-04	1.352e-04	-3.869	-3.869	0.000	(0)
FeH2PO4+	3.142e-07	2.541e-07	-6.503	-6.595	-0.092	(0)
FeHPO4	1.436e-09	1.436e-09	-8.843	-8.843	0.000	(0)
FeOH+	3.346e-10	2.692e-10	-9.475	-9.570	-0.094	(0)
Fe (OH) 2	1.556e-17	1.556e-17	-16.808	-16.808	0.000	(0)
Fe (OH) 3-	6.584e-22	5.298e-22	-21.182	-21.276	-0.094	(0)
Fe (3)	2.581e-10					
Fe (OH) 2+	2.410e-10	1.949e-10	-9.618	-9.710	-0.092	(0)
FeOH+2	7.944e-12	3.329e-12	-11.100	-11.478	-0.378	(0)
FeSO4+	4.732e-12	3.807e-12	-11.325	-11.419	-0.094	(0)
FeHPO4+	3.147e-12	2.545e-12	-11.502	-11.594	-0.092	(0)
Fe (SO4) 2-	7.664e-13	5.603e-13	-12.116	-12.252	-0.136	(0)
Fe+3	4.475e-13	6.093e-14	-12.349	-13.215	-0.866	(0)
FeCl+2	4.146e-14	1.738e-14	-13.382	-13.760	-0.378	(0)
FeH2PO4+2	1.558e-14	6.667e-15	-13.807	-14.176	-0.369	(0)
Fe (OH) 3	1.156e-14	1.156e-14	-13.937	-13.937	0.000	(0)
FeCl2+	1.250e-15	1.006e-15	-14.903	-14.997	-0.094	(0)
FeHSeO3+2	4.294e-17	1.227e-17	-16.367	-16.911	-0.544	(0)
FeCl3	1.113e-18	1.113e-18	-17.954	-17.954	0.000	(0)
Fe (OH) 4-	3.068e-19	2.482e-19	-18.513	-18.605	-0.092	(0)
Fe2 (OH) 2+4	6.591e-20	4.389e-22	-19.181	-21.358	-2.177	(0)
Fe3 (OH) 4+5	2.953e-27	1.173e-30	-26.530	-29.931	-3.401	(0)
FeNO3+2	0.000e+00	0.000e+00	-63.759	-64.303	-0.544	(0)
H (0)	1.164e-19					
H2	5.818e-20	5.915e-20	-19.235	-19.228	0.007	(0)
K	6.291e-03					
K+	6.020e-03	4.823e-03	-2.220	-2.317	-0.096	(0)
KSO4-	2.715e-04	2.196e-04	-3.566	-3.658	-0.092	(0)
KHPO4-	1.854e-10	1.500e-10	-9.732	-9.824	-0.092	(0)
KCrO4-	0.000e+00	0.000e+00	-43.667	-43.803	-0.136	(0)
Mg	3.635e-03					
Mg+2	2.461e-03	1.015e-03	-2.609	-2.994	-0.385	(0)
MgSO4	1.173e-03	1.173e-03	-2.931	-2.931	0.000	(0)
MgH2PO4+	3.599e-07	2.911e-07	-6.444	-6.536	-0.092	(0)
MgHPO4	2.678e-09	2.678e-09	-8.572	-8.572	0.000	(0)
MgOH+	3.488e-11	2.859e-11	-10.457	-10.544	-0.086	(0)
MgH2BO3+	2.559e-12	1.980e-12	-11.592	-11.703	-0.111	(0)
MgPO4-	1.003e-15	8.112e-16	-14.999	-15.091	-0.092	(0)
Mn (2)	9.539e-05					
Mn+2	7.219e-05	2.062e-05	-4.142	-4.686	-0.544	(0)
MnSO4	2.285e-05	2.285e-05	-4.641	-4.641	0.000	(0)
MnCl+	3.569e-07	2.872e-07	-6.447	-6.542	-0.094	(0)
MnCl2	4.488e-09	4.488e-09	-8.348	-8.348	0.000	(0)
MnCl3-	1.700e-11	1.367e-11	-10.770	-10.864	-0.094	(0)
MnOH+	4.948e-12	3.981e-12	-11.306	-11.400	-0.094	(0)
MnSe	3.144e-17	3.144e-17	-16.503	-16.503	0.000	(0)
MnSeO4	7.932e-27	7.932e-27	-26.101	-26.101	0.000	(0)

Mn (OH) 3-	5.717e-28	4.600e-28	-27.243	-27.337	-0.094	(0)
Mn (OH) 4-2	3.999e-37	1.676e-37	-36.398	-36.776	-0.378	(0)
MnNO3+	0.000e+00	0.000e+00	-56.548	-56.684	-0.136	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-108.478	-108.478	0.000	(0)
Mn (3)	3.223e-26					
Mn+3	3.223e-26	4.387e-27	-25.492	-26.358	-0.866	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-76.457	-76.834	-0.378	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-82.432	-82.540	-0.108	(0)
Mo	1.151e-06					
MoO4-2	4.714e-07	1.943e-07	-6.327	-6.712	-0.385	(0)
HMoO4-	4.107e-07	3.003e-07	-6.386	-6.522	-0.136	(0)
H2MoO4	2.690e-07	2.690e-07	-6.570	-6.570	0.000	(0)
AlMo6O21-3	3.639e-15	2.171e-16	-14.439	-15.663	-1.224	(0)
HMo7O24-5	1.001e-20	3.977e-24	-20.000	-23.400	-3.401	(0)
H2Mo7O24-4	3.158e-21	2.103e-23	-20.501	-22.677	-2.177	(0)
Mo7O24-6	1.548e-21	1.962e-26	-20.810	-25.707	-4.897	(0)
H3Mo7O24-3	5.612e-23	3.348e-24	-22.251	-23.475	-1.224	(0)
N (-3)	7.218e-04					
NH4+	6.757e-04	5.228e-04	-3.170	-3.282	-0.111	(0)
NH4SO4-	4.605e-05	3.705e-05	-4.337	-4.431	-0.094	(0)
CuNH3+2	2.979e-09	8.511e-10	-8.526	-9.070	-0.544	(0)
NH3	2.338e-09	2.338e-09	-8.631	-8.631	0.000	(0)
CaNH3+2	4.981e-11	1.423e-11	-10.303	-10.847	-0.544	(0)
NiNH3+2	2.238e-11	6.394e-12	-10.650	-11.194	-0.544	(0)
Co (NH3) +2	5.605e-12	1.601e-12	-11.251	-11.796	-0.544	(0)
BaNH3+2	8.904e-16	2.544e-16	-15.050	-15.595	-0.544	(0)
Ni (NH3) 2+2	1.471e-17	4.201e-18	-16.833	-17.377	-0.544	(0)
Co (NH3) 2+2	5.113e-19	1.461e-19	-18.291	-18.835	-0.544	(0)
Ca (NH3) 2+2	6.632e-20	1.894e-20	-19.178	-19.723	-0.544	(0)
Co (NH3) 3+2	2.153e-26	6.150e-27	-25.667	-26.211	-0.544	(0)
Co (NH3) 4+2	3.778e-34	1.079e-34	-33.423	-33.967	-0.544	(0)
Cr (NH3) 5OH+2	0.000e+00	0.000e+00	-40.611	-41.155	-0.544	(0)
Co (NH3) 5+2	0.000e+00	0.000e+00	-41.678	-42.223	-0.544	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-45.831	-47.056	-1.224	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-47.366	-47.910	-0.544	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-49.862	-50.406	-0.544	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-60.792	-60.928	-0.136	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-65.026	-65.570	-0.544	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-68.505	-69.050	-0.544	(0)
N (3)	8.441e-40					
NO2-	8.441e-40	6.589e-40	-39.074	-39.181	-0.108	(0)
CuNO2+	0.000e+00	0.000e+00	-41.845	-41.981	-0.136	(0)
CoNO2+	0.000e+00	0.000e+00	-43.791	-43.927	-0.136	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-80.152	-80.152	0.000	(0)
N (5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-52.103	-52.199	-0.096	(0)
CaNO3+	0.000e+00	0.000e+00	-54.018	-54.154	-0.136	(0)
CuNO3+	0.000e+00	0.000e+00	-56.370	-56.506	-0.136	(0)
MnNO3+	0.000e+00	0.000e+00	-56.548	-56.684	-0.136	(0)
NiNO3+	0.000e+00	0.000e+00	-57.311	-57.448	-0.136	(0)
ZnNO3+	0.000e+00	0.000e+00	-57.389	-57.525	-0.136	(0)
CoNO3+	0.000e+00	0.000e+00	-57.457	-57.593	-0.136	(0)
BaNO3+	0.000e+00	0.000e+00	-58.243	-58.379	-0.136	(0)
PbNO3+	0.000e+00	0.000e+00	-58.735	-58.871	-0.136	(0)
CdNO3+	0.000e+00	0.000e+00	-60.413	-60.549	-0.136	(0)
CrNO3+2	0.000e+00	0.000e+00	-62.020	-62.564	-0.544	(0)
FeNO3+2	0.000e+00	0.000e+00	-63.759	-64.303	-0.544	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-108.478	-108.478	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-109.483	-109.483	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-109.617	-109.617	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-110.438	-110.438	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-110.814	-110.814	0.000	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-113.111	-113.111	0.000	(0)
Na	1.498e-02					
Na+	1.447e-02	1.160e-02	-1.839	-1.936	-0.096	(0)
NaSO4-	5.058e-04	4.091e-04	-3.296	-3.388	-0.092	(0)

	NaHPO4-	6.904e-10	5.584e-10	-9.161	-9.253	-0.092	(0)
	NaH2BO3	1.131e-12	1.131e-12	-11.947	-11.947	0.000	(0)
	NaCrO4-	0.000e+00	0.000e+00	-43.159	-43.295	-0.136	(0)
Ni		8.382e-06					
	Ni+2	5.447e-06	2.245e-06	-5.264	-5.649	-0.385	(0)
	NiSO4	2.847e-06	2.847e-06	-5.546	-5.546	0.000	(0)
	NiCl+	8.574e-08	6.268e-08	-7.067	-7.203	-0.136	(0)
	Ni (SO4) 2-2	2.272e-09	6.490e-10	-8.644	-9.188	-0.544	(0)
	NiNH3+2	2.238e-11	6.394e-12	-10.650	-11.194	-0.544	(0)
	NiCl2	3.540e-12	3.540e-12	-11.451	-11.451	0.000	(0)
	NiOH+	3.055e-12	2.233e-12	-11.515	-11.651	-0.136	(0)
	Ni (OH) 2	2.859e-17	2.859e-17	-16.544	-16.544	0.000	(0)
	Ni (NH3) 2+2	1.471e-17	4.201e-18	-16.833	-17.377	-0.544	(0)
	Ni (OH) 3-	4.413e-24	3.226e-24	-23.355	-23.491	-0.136	(0)
	NiSeO4	1.501e-27	1.501e-27	-26.824	-26.824	0.000	(0)
	NiNO3+	0.000e+00	0.000e+00	-57.311	-57.448	-0.136	(0)
O (0)		0.000e+00					
	O2	0.000e+00	0.000e+00	-55.241	-55.234	0.007	(0)
P		9.400e-06					
	H2PO4-	8.064e-06	6.522e-06	-5.093	-5.186	-0.092	(0)
	CaH2PO4+	5.618e-07	4.544e-07	-6.250	-6.343	-0.092	(0)
	MgH2PO4+	3.599e-07	2.911e-07	-6.444	-6.536	-0.092	(0)
	FeH2PO4+	3.142e-07	2.541e-07	-6.503	-6.595	-0.092	(0)
	H3PO4	7.741e-08	7.741e-08	-7.111	-7.111	0.000	(0)
	HPO4-2	1.084e-08	4.544e-09	-7.965	-8.343	-0.378	(0)
	CaHPO4	6.463e-09	6.463e-09	-8.190	-8.190	0.000	(0)
	MgHPO4	2.678e-09	2.678e-09	-8.572	-8.572	0.000	(0)
	FeHPO4	1.436e-09	1.436e-09	-8.843	-8.843	0.000	(0)
	NaHPO4-	6.904e-10	5.584e-10	-9.161	-9.253	-0.092	(0)
	KHPO4-	1.854e-10	1.500e-10	-9.732	-9.824	-0.092	(0)
	CoHPO4	1.139e-11	1.139e-11	-10.944	-10.944	0.000	(0)
	CrH2PO4+2	7.383e-12	2.109e-12	-11.132	-11.676	-0.544	(0)
	FeHPO4+	3.147e-12	2.545e-12	-11.502	-11.594	-0.092	(0)
	CaPO4-	2.137e-13	1.729e-13	-12.670	-12.762	-0.092	(0)
	FeH2PO4+2	1.558e-14	6.667e-15	-13.807	-14.176	-0.369	(0)
	MgPO4-	1.003e-15	8.112e-16	-14.999	-15.091	-0.092	(0)
	PO4-3	1.424e-16	1.939e-17	-15.846	-16.712	-0.866	(0)
	CrO3HPO4-2	0.000e+00	0.000e+00	-43.693	-44.237	-0.544	(0)
	CrO3H2PO4-	0.000e+00	0.000e+00	-45.469	-45.605	-0.136	(0)
Pb		9.691e-08					
	PbSO4	4.727e-08	4.727e-08	-7.325	-7.325	0.000	(0)
	Pb+2	3.540e-08	1.459e-08	-7.451	-7.836	-0.385	(0)
	PbCl+	7.379e-09	5.395e-09	-8.132	-8.268	-0.136	(0)
	Pb (SO4) 2-2	6.595e-09	1.884e-09	-8.181	-8.725	-0.544	(0)
	PbCl2	2.606e-10	2.606e-10	-9.584	-9.584	0.000	(0)
	PbOH+	5.657e-12	4.136e-12	-11.247	-11.383	-0.136	(0)
	PbCl3-	1.659e-12	1.213e-12	-11.780	-11.916	-0.136	(0)
	PbCl4-2	1.993e-14	5.694e-15	-13.700	-14.245	-0.544	(0)
	Pb2OH+3	1.603e-17	9.564e-19	-16.795	-18.019	-1.224	(0)
	Pb (OH) 2	1.476e-17	1.476e-17	-16.831	-16.831	0.000	(0)
	Pb (OH) 3-	2.278e-24	1.666e-24	-23.642	-23.778	-0.136	(0)
	Pb (OH) 4-2	1.611e-31	4.603e-32	-30.793	-31.337	-0.544	(0)
	Pb3 (OH) 4+2	1.005e-31	2.870e-32	-30.998	-31.542	-0.544	(0)
	Pb4 (OH) 4+4	6.014e-34	4.005e-36	-33.221	-35.397	-2.177	(0)
	PbNO3+	0.000e+00	0.000e+00	-58.735	-58.871	-0.136	(0)
	Pb (NO3) 2	0.000e+00	0.000e+00	-110.814	-110.814	0.000	(0)
S (6)		2.322e-02					
	SO4-2	1.605e-02	6.614e-03	-1.795	-2.180	-0.385	(0)
	CaSO4	4.877e-03	4.877e-03	-2.312	-2.312	0.000	(0)
	MgSO4	1.173e-03	1.173e-03	-2.931	-2.931	0.000	(0)
	NaSO4-	5.058e-04	4.091e-04	-3.296	-3.388	-0.092	(0)
	KSO4-	2.715e-04	2.196e-04	-3.566	-3.658	-0.092	(0)
	FeSO4	1.352e-04	1.352e-04	-3.869	-3.869	0.000	(0)
	HSO4-	6.197e-05	4.952e-05	-4.208	-4.305	-0.097	(0)
	NH4SO4-	4.605e-05	3.705e-05	-4.337	-4.431	-0.094	(0)
	AlSO4+	4.325e-05	3.456e-05	-4.364	-4.461	-0.097	(0)
	MnSO4	2.285e-05	2.285e-05	-4.641	-4.641	0.000	(0)
	CuSO4	2.163e-05	2.163e-05	-4.665	-4.665	0.000	(0)

Al (SO4) 2-	3.425e-06	2.737e-06	-5.465	-5.563	-0.097	(0)
CoSO4	3.220e-06	3.220e-06	-5.492	-5.492	0.000	(0)
NiSO4	2.847e-06	2.847e-06	-5.546	-5.546	0.000	(0)
ZnSO4	2.521e-06	2.521e-06	-5.598	-5.598	0.000	(0)
Zn (SO4) 2-2	5.305e-07	1.515e-07	-6.275	-6.819	-0.544	(0)
BeSO4	5.495e-08	5.495e-08	-7.260	-7.260	0.000	(0)
PbSO4	4.727e-08	4.727e-08	-7.325	-7.325	0.000	(0)
CrSO4+	2.618e-08	1.914e-08	-7.582	-7.718	-0.136	(0)
Pb (SO4) 2-2	6.595e-09	1.884e-09	-8.181	-8.725	-0.544	(0)
Be (SO4) 2-2	3.956e-09	1.130e-09	-8.403	-8.947	-0.544	(0)
CrOHSO4	2.437e-09	2.437e-09	-8.613	-8.613	0.000	(0)
Ni (SO4) 2-2	2.272e-09	6.490e-10	-8.644	-9.188	-0.544	(0)
CdSO4	1.783e-09	1.783e-09	-8.749	-8.749	0.000	(0)
Cd (SO4) 2-2	5.911e-10	1.689e-10	-9.228	-9.772	-0.544	(0)
FeSO4+	4.732e-12	3.807e-12	-11.325	-11.419	-0.094	(0)
Fe (SO4) 2-	7.664e-13	5.603e-13	-12.116	-12.252	-0.136	(0)
Cr2 (OH) 2SO4+2	1.197e-15	3.419e-16	-14.922	-15.466	-0.544	(0)
Cr2 (OH) 2 (SO4) 2	1.343e-16	1.343e-16	-15.872	-15.872	0.000	(0)
CrO3SO4-2	0.000e+00	0.000e+00	-42.797	-43.341	-0.544	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-60.792	-60.928	-0.136	(0)
Se (-2)	6.740e-11					
HSe-	4.510e-11	3.297e-11	-10.346	-10.482	-0.136	(0)
H2Se	2.230e-11	2.230e-11	-10.652	-10.652	0.000	(0)
MnSe	3.144e-17	3.144e-17	-16.503	-16.503	0.000	(0)
Se-2	9.300e-22	2.657e-22	-21.032	-21.576	-0.544	(0)
Se (4)	1.271e-07					
HSeO3-	1.238e-07	9.049e-08	-6.907	-7.043	-0.136	(0)
H2SeO3	3.297e-09	3.297e-09	-8.482	-8.482	0.000	(0)
SeO3-2	1.367e-11	3.905e-12	-10.864	-11.408	-0.544	(0)
FeHSeO3+2	4.294e-17	1.227e-17	-16.367	-16.911	-0.544	(0)
Cd (SeO3) 2-2	5.753e-26	1.643e-26	-25.240	-25.784	-0.544	(0)
Se (6)	3.837e-24					
SeO4-2	3.818e-24	1.574e-24	-23.418	-23.803	-0.385	(0)
HSeO4-	8.207e-27	6.000e-27	-26.086	-26.222	-0.136	(0)
MnSeO4	7.932e-27	7.932e-27	-26.101	-26.101	0.000	(0)
CoSeO4	1.849e-27	1.849e-27	-26.733	-26.733	0.000	(0)
NiSeO4	1.501e-27	1.501e-27	-26.824	-26.824	0.000	(0)
ZnSeO4	4.430e-28	4.430e-28	-27.354	-27.354	0.000	(0)
CdSeO4	3.576e-31	3.576e-31	-30.447	-30.447	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-50.607	-51.151	-0.544	(0)
Zn	7.523e-06					
Zn+2	4.410e-06	1.818e-06	-5.356	-5.740	-0.385	(0)
ZnSO4	2.521e-06	2.521e-06	-5.598	-5.598	0.000	(0)
Zn (SO4) 2-2	5.305e-07	1.515e-07	-6.275	-6.819	-0.544	(0)
ZnCl+	6.136e-08	4.867e-08	-7.212	-7.313	-0.101	(0)
ZnCl2	6.866e-10	6.866e-10	-9.163	-9.163	0.000	(0)
ZnOH+	1.911e-11	1.397e-11	-10.719	-10.855	-0.136	(0)
ZnOHCl	7.463e-12	7.463e-12	-11.127	-11.127	0.000	(0)
ZnCl3-	7.451e-12	5.911e-12	-11.128	-11.228	-0.101	(0)
ZnCl4-2	7.493e-14	3.140e-14	-13.125	-13.503	-0.378	(0)
Zn (OH) 2	3.669e-16	3.669e-16	-15.435	-15.435	0.000	(0)
Zn (OH) 3-	2.838e-22	2.075e-22	-21.547	-21.683	-0.136	(0)
ZnSeO4	4.430e-28	4.430e-28	-27.354	-27.354	0.000	(0)
Zn (OH) 4-2	3.263e-30	9.322e-31	-29.486	-30.031	-0.544	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-50.607	-51.151	-0.544	(0)
ZnNO3+	0.000e+00	0.000e+00	-57.389	-57.525	-0.136	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-110.438	-110.438	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2-142.78	-136.51	6.27	(Co (NH3) 5Cl) (NO3) 2	
(Co (NH3) 5Cl) Cl2 -40.56	-36.02	4.54	(Co (NH3) 5Cl) Cl2	
(Co (NH3) 5OH2) Cl3 -47.83	-36.02	11.81	(Co (NH3) 5OH2) Cl3	
(Co (NH3) 6) (NO3) 3-203.91	-185.98	17.93	(Co (NH3) 6) (NO3) 3	
(Co (NH3) 6) Cl3 -55.38	-35.25	20.13	(Co (NH3) 6) Cl3	
(NH4) 2CrO4 -49.00	-48.62	0.38	(NH4) 2CrO4	

(NH4)2SeO4	-30.82	-30.37	0.45	(NH4)2SeO4
Al(OH)3(am)	-5.07	6.06	11.13	Al(OH)3
Al2(MoO4)3	-35.46	-32.31	3.15	Al2(MoO4)3
Al2O3	-8.30	12.12	20.43	Al2O3
Al4(OH)10SO4	-8.74	13.96	22.70	Al4(OH)10SO4
AlAsO4·2H2O	-9.51	-4.71	4.80	AlAsO4·2H2O
AlOHSO4	-0.99	-4.22	-3.23	AlOHSO4
Alunite	0.13	-0.64	-0.77	KAl3(SO4)2(OH)6
Anglesite	-2.19	-10.02	-7.83	PbSO4
Anhydrite	-0.31	-4.65	-4.34	CaSO4
Antlerite	-9.23	-0.44	8.79	Cu3(OH)4SO4
Arsenolite	-27.45	-30.39	-2.94	As4O6
As2O5	-28.32	-21.54	6.77	As2O5
Atacamite	-7.12	0.55	7.67	Cu2(OH)3Cl
Ba(OH)2·8H2O	-23.38	1.18	24.56	Ba(OH)2·8H2O
Ba3(AsO4)2	-9.06	-18.00	-8.94	Ba3(AsO4)2
BaCrO4	-39.21	-48.97	-9.77	BaCrO4
BaHPO4	-7.91	-27.68	-19.77	BaHPO4
BaMoO4	-6.64	-13.63	-6.99	BaMoO4
Barite	0.95	-9.10	-10.05	BaSO4
BaSeO3	-11.71	-9.91	1.79	BaSeO3
BaSeO4	-23.20	-30.72	-7.53	BaSeO4
Be(OH)2(alpha)	-5.98	0.92	6.89	Be(OH)2
Be(OH)2(am)	-6.28	0.92	7.19	Be(OH)2
Be(OH)2(beta)	-5.58	0.92	6.49	Be(OH)2
BeMoO4	-12.28	-13.90	-1.61	BeMoO4
BeSeO4·4H2O	-28.05	-30.99	-2.94	BeSeO4·4H2O
Bianchite	-6.16	-7.92	-1.76	ZnSO4·6H2O
Birnessite	-24.25	-6.16	18.09	MnO2
Bixbyite	-28.14	-28.42	-0.27	Mn2O3
Boehmite	-2.87	6.06	8.93	AlOOH
Brochantite	-12.99	2.84	15.83	Cu4(OH)6SO4
Brucite	-12.08	5.11	17.18	Mg(OH)2
Bunsenite	-10.29	2.45	12.74	NiO
Ca3(AsO4)2·4H2O	-26.96	-4.66	22.30	Ca3(AsO4)2·4H2O
Ca3(PO4)2(beta)	-11.76	-40.84	-29.08	Ca3(PO4)2
Ca4H(PO4)3·3H2O	-16.99	-64.07	-47.08	Ca4H(PO4)3·3H2O
CaCrO4	-42.34	-44.53	-2.19	CaCrO4
CaHPO4	-3.87	-23.23	-19.37	CaHPO4
CaHPO4·2H2O	-4.17	-23.23	-19.06	CaHPO4·2H2O
CaMoO4	-1.24	-9.18	-7.94	CaMoO4
CaSeO3·2H2O	-8.34	-5.47	2.87	CaSeO3·2H2O
CaSeO4·2H2O	-23.28	-26.28	-3.00	CaSeO4·2H2O
Cd(BO2)2	-20.70	-10.86	9.84	Cd(BO2)2
Cd(OH)2	-14.74	-0.81	13.93	Cd(OH)2
Cd(OH)2(am)	-14.80	-0.81	13.99	Cd(OH)2
Cd3(OH)2(SO4)2	-29.71	-23.00	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-35.28	-12.72	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-27.57	-60.17	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-41.94	-13.54	28.40	Cd4(OH)6SO4
CdCl2	-12.22	-12.83	-0.60	CdCl2
CdCl2·1H2O	-11.16	-12.83	-1.67	CdCl2·1H2O
CdCl2·2.5H2O	-10.89	-12.83	-1.93	CdCl2·2.5H2O
Cdmetal(alpha)	-30.65	-16.91	13.74	Cd
Cdmetal(gamma)	-30.76	-16.91	13.84	Cd
CdMoO4	-1.42	-15.62	-14.21	CdMoO4
CdOHCl	-10.45	-6.82	3.63	CdOHCl
CdSe	5.08	-15.35	-20.43	CdSe
CdSeO4·2H2O	-30.87	-32.72	-1.85	CdSeO4·2H2O
CdSO4	-11.08	-11.09	-0.02	CdSO4
CdSO4·1H2O	-9.46	-11.09	-1.63	CdSO4·1H2O
CdSO4·2.67H2O	-9.28	-11.09	-1.82	CdSO4·2.67H2O
Chalcanthite	-4.34	-7.00	-2.66	CuSO4·5H2O
Claudetite	-27.16	-30.39	-3.23	As4O6
Clausthalite	13.19	-14.27	-27.46	PbSe
Co(BO2)2	-34.61	-7.54	27.07	Co(BO2)2
Co(OH)2	-10.59	2.50	13.09	Co(OH)2
Co(OH)3	-19.81	-21.85	-2.03	Co(OH)3

Co3 (AsO4) 2	-27.06	-14.03	13.03	Co3 (AsO4) 2
Co3 (PO4) 2	-15.52	-50.21	-34.69	Co3 (PO4) 2
Co3O4	-31.01	-41.18	-10.17	Co3O4
CoCl2	-18.01	-9.51	8.51	CoCl2
CoCl2:6H2O	-12.02	-9.51	2.51	CoCl2:6H2O
CoFe2O4	3.43	0.37	-3.05	CoFe2O4
CoHPO4	-7.30	-26.36	-19.06	CoHPO4
CoMoO4	-4.61	-12.31	-7.69	CoMoO4
CoO	-11.40	2.51	13.90	CoO
CoSe	4.17	-12.03	-16.20	CoSe
CoSeO3	-9.91	-8.59	1.32	CoSeO3
CoSeO4:6H2O	-27.87	-29.40	-1.53	CoSeO4:6H2O
CoSO4	-10.81	-7.77	3.04	CoSO4
CoSO4:6H2O	-5.30	-7.78	-2.48	CoSO4:6H2O
Cotunnite	-6.89	-11.75	-4.86	PbCl2
Cr (OH) 2	-22.67	-11.74	10.93	Cr (OH) 2
Cr (OH) 3	-8.05	-6.62	1.42	Cr (OH) 3
Cr (OH) 3 (am)	-5.87	-6.62	-0.75	Cr (OH) 3
Cr2O3	-11.04	-13.24	-2.21	Cr2O3
CrCl2	-38.18	-23.75	14.42	CrCl2
CrCl3	-40.11	-24.64	15.48	CrCl3
Crmetal	-58.84	-27.84	31.00	Cr
CrO3	-46.96	-50.16	-3.19	CrO3
Cu (OH) 2	-5.56	3.28	8.84	Cu (OH) 2
Cu2 (OH) 3NO3	-59.16	-49.69	9.47	Cu2 (OH) 3NO3
Cu2Se (alpha)	27.71	-18.73	-46.44	Cu2Se
Cu2SO4	-12.59	-14.48	-1.89	Cu2SO4
Cu3 (AsO4) 2:2H2O	-17.80	-11.70	6.10	Cu3 (AsO4) 2:2H2O
Cu3 (PO4) 2	-11.03	-47.88	-36.85	Cu3 (PO4) 2
Cu3 (PO4) 2:3H2O	-12.76	-47.88	-35.12	Cu3 (PO4) 2:3H2O
Cu3Se2	34.52	-29.98	-64.51	Cu3Se2
CuCrO4	-41.44	-46.88	-5.44	CuCrO4
Cumetal	-1.18	-10.15	-8.97	Cu
CuMoO4	1.58	-11.53	-13.11	CuMoO4
CuOCuSO4	-14.43	-3.72	10.71	CuOCuSO4
Cupricferrite	-5.47	1.15	6.62	CuFe2O4
Cuprite	-3.17	-4.20	-1.04	Cu2O
Cuprousferrite	5.70	-3.17	-8.87	CuFeO2
CuSe	22.21	-11.25	-33.46	CuSe
CuSe2	24.10	-9.68	-33.79	CuSe2
CuSeO3:2H2O	-8.44	-7.81	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-26.19	-28.63	-2.44	CuSeO4:5H2O
CuSO4	-10.16	-7.00	3.16	CuSO4
Diaspore	-1.12	6.06	7.18	AlOOH
Epsomite	-3.02	-5.18	-2.16	MgSO4:7H2O
Fe (OH) 2	-9.52	4.04	13.56	Fe (OH) 2
Fe (OH) 2.7Cl.3	0.17	-2.87	-3.04	Fe (OH) 2.7Cl.3
Fe2 (OH) 4SeO3	-14.78	-13.23	1.55	Fe2 (OH) 4SeO3
Fe2 (SeO3) 3:2H2O	-14.79	-35.41	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-29.96	-32.97	-3.01	Fe2 (SO4) 3
Fe3 (OH) 8	-18.31	1.91	20.22	Fe3 (OH) 8
FeAsO4:2H2O	-12.24	-11.84	0.40	FeAsO4:2H2O
FeCr2O4	-16.82	-9.20	7.62	FeCr2O4
FeMoO4	-0.71	-10.77	-10.06	FeMoO4
Ferrihydrite	-4.48	-1.07	3.41	Fe (OH) 3
Ferroselite	9.82	-8.92	-18.74	FeSe2
FeSe	0.52	-10.49	-11.01	FeSe
Gibbsite	-2.52	6.06	8.58	Al (OH) 3
Goethite	-1.74	-1.07	0.67	FeOOH
Goslarite	-5.87	-7.92	-2.05	ZnSO4:7H2O
Gypsum	-0.04	-4.65	-4.61	CaSO4:2H2O
H-Jarosite	-12.35	-23.76	-11.41	(H3O) Fe3 (SO4) 2 (OH) 6
H2MoO4	-1.79	-14.81	-13.02	H2MoO4
H2Se (g)	-9.62	-14.53	-4.91	H2Se
Halite	-5.48	-3.89	1.59	NaCl
Hausmannite	-35.95	26.34	62.29	Mn3O4
Hematite	-1.10	-2.13	-1.03	Fe2O3
Hercynite	-7.67	16.17	23.83	FeAl2O4

Hinsdalite	-18.20	-20.70	-2.50	PbAl ₃ PO ₄ SO ₄ (OH) 6
Hydroxylapatite	-14.11	-58.44	-44.33	Ca ₅ (PO ₄) 3OH
Hydroxylpyromorphite	-22.48	-85.27	-62.79	Pb ₅ (PO ₄) 3OH
K-Alum	-7.51	-12.77	-5.26	KAl (SO ₄) 2:12H ₂ O
K-Jarosite	-7.62	-22.02	-14.41	KFe ₃ (SO ₄) 2 (OH) 6
K ₂ Cr ₂ O ₇	-79.36	-96.85	-17.48	K ₂ Cr ₂ O ₇
K ₂ CrO ₄	-46.12	-46.69	-0.57	K ₂ CrO ₄
K ₂ MoO ₄	-14.62	-11.34	3.27	K ₂ MoO ₄
K ₂ SeO ₄	-27.71	-28.44	-0.73	K ₂ SeO ₄
Langite	-15.14	2.84	17.98	Cu ₄ (OH) 6SO ₄ :H ₂ O
Larnakite	-9.38	-9.75	-0.37	PbO:PbSO ₄
Laurionite	-6.37	-5.74	0.62	PbOHCl
Lepidocrocite	-2.44	-1.07	1.37	FeOOH
Lime	-27.65	5.63	33.28	CaO
Litharge	-12.63	0.26	12.89	PbO
Maghemite	-8.52	-2.13	6.39	Fe ₂ O ₃
Magnesioferrite	-14.72	2.97	17.69	Fe ₂ MgO ₄
Magnetite	-2.11	1.91	4.03	Fe ₃ O ₄
Manganite	-13.88	11.46	25.34	MnOOH
Massicot	-12.83	0.26	13.09	PbO
Melanothallite	-15.18	-8.73	6.45	CuCl ₂
Melanterite	-3.97	-6.24	-2.27	FeSO ₄ :7H ₂ O
Mg (OH) 2 (active)	-13.69	5.11	18.79	Mg (OH) 2
Mg ₃ (PO ₄) 2	-19.13	-42.41	-23.28	Mg ₃ (PO ₄) 2
MgCr ₂ O ₄	-24.87	-8.14	16.74	MgCr ₂ O ₄
MgCrO ₄	-50.70	-45.05	5.65	MgCrO ₄
MgHPO ₄ :3H ₂ O	-5.58	-23.76	-18.18	MgHPO ₄ :3H ₂ O
MgMoO ₄	-7.86	-9.71	-1.85	MgMoO ₄
MgSeO ₃ :6H ₂ O	-9.03	-5.99	3.04	MgSeO ₃ :6H ₂ O
MgSeO ₄ :6H ₂ O	-25.60	-26.80	-1.20	MgSeO ₄ :6H ₂ O
Minium	-57.89	16.89	74.78	Pb ₃ O ₄
Mirabilite	-4.70	-6.06	-1.35	Na ₂ SO ₄ :10H ₂ O
Mn ₂ (SO ₄) 3	-54.03	-59.25	-5.22	Mn ₂ (SO ₄) 3
Mn ₃ (AsO ₄) 2:8H ₂ O	-23.81	-11.31	12.50	Mn ₃ (AsO ₄) 2:8H ₂ O
Mn ₃ (PO ₄) 2	-23.63	-47.48	-23.85	Mn ₃ (PO ₄) 2
MnCl ₂ :4H ₂ O	-11.35	-8.60	2.75	MnCl ₂ :4H ₂ O
MnHPO ₄	-0.05	-25.45	-25.40	MnHPO ₄
MnSe	-14.91	-11.12	3.79	MnSe
MnSeO ₃	-8.81	-7.68	1.13	MnSeO ₃
MnSeO ₃ :2H ₂ O	-8.64	-7.68	0.96	MnSeO ₃ :2H ₂ O
MnSeO ₄ :5H ₂ O	-26.44	-28.49	-2.05	MnSeO ₄ :5H ₂ O
MnSO ₄	-9.64	-6.87	2.78	MnSO ₄
Monteponite	-16.23	-0.81	15.41	CdO
MoO ₃	-6.81	-14.81	-8.00	MoO ₃
Morenosite	-5.65	-7.83	-2.18	NiSO ₄ :7H ₂ O
Na-Jarosite	-10.90	-21.64	-10.75	NaFe ₃ (SO ₄) 2 (OH) 6
Na ₂ Cr ₂ O ₇	-86.12	-96.08	-9.96	Na ₂ Cr ₂ O ₇
Na ₂ CrO ₄	-48.92	-45.93	2.99	Na ₂ CrO ₄
Na ₂ Mo ₂ O ₇	-8.63	-25.39	-16.76	Na ₂ Mo ₂ O ₇
Na ₂ MoO ₄	-12.10	-10.58	1.52	Na ₂ MoO ₄
Na ₂ MoO ₄ :2H ₂ O	-11.81	-10.58	1.22	Na ₂ MoO ₄ :2H ₂ O
Na ₂ SeO ₃ :5H ₂ O	-17.17	-6.87	10.30	Na ₂ SeO ₃ :5H ₂ O
Na ₂ SeO ₄	-28.95	-27.67	1.28	Na ₂ SeO ₄
Nantokite	-1.25	-8.11	-6.86	CuCl
Ni (OH) 2	-10.63	2.45	13.08	Ni (OH) 2
Ni ₃ (AsO ₄) 2:8H ₂ O	-29.89	-14.19	15.70	Ni ₃ (AsO ₄) 2:8H ₂ O
Ni ₃ (PO ₄) 2	-19.07	-50.37	-31.30	Ni ₃ (PO ₄) 2
Ni ₄ (OH) 6SO ₄	-32.48	-0.48	32.00	Ni ₄ (OH) 6SO ₄
NiMoO ₄	-1.21	-12.36	-11.15	NiMoO ₄
NiSe	5.62	-12.08	-17.70	NiSe
NiSeO ₃ :2H ₂ O	-11.55	-8.64	2.91	NiSeO ₃ :2H ₂ O
NiSeO ₄ :6H ₂ O	-27.93	-29.45	-1.52	NiSeO ₄ :6H ₂ O
Nsutite	-23.66	-6.16	17.50	MnO ₂
O ₂ (g)	-52.60	32.20	84.80	O ₂
Pb (BO ₂) 2	-16.35	-9.78	6.57	Pb (BO ₂) 2
Pb (OH) 2	-8.06	0.26	8.32	Pb (OH) 2
Pb ₂ (OH) 3Cl	-14.27	-5.48	8.79	Pb ₂ (OH) 3Cl
Pb ₂ O (OH) 2	-25.66	0.53	26.19	Pb ₂ O (OH) 2

Pb2O3	-44.41	16.63	61.04	Pb2O3
Pb3(AsO4)2	-26.55	-20.75	5.80	Pb3(AsO4)2
Pb3(PO4)2	-13.40	-56.93	-43.53	Pb3(PO4)2
Pb3O2SO4	-20.41	-9.49	10.92	Pb3O2SO4
Pb4(OH)6SO4	-30.33	-9.23	21.10	Pb4(OH)6SO4
Pb4O3SO4	-31.51	-9.22	22.28	Pb4O3SO4
PbCrO4	-37.16	-49.89	-12.73	PbCrO4
PbHPO4	-4.79	-28.60	-23.81	PbHPO4
Pbmetal	-20.08	-15.84	4.24	Pb
PbMoO4	1.23	-14.55	-15.78	PbMoO4
PbO:0.3H2O	-12.72	0.26	12.98	PbO:0.33H2O
PbSeO4	-24.75	-31.64	-6.88	PbSeO4
Periclase	-16.93	5.11	22.04	MgO
Plattnerite	-34.12	16.36	50.49	PbO2
Plumbgummite	-6.49	-39.28	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-17.56	5.63	23.19	Ca(OH)2
Pyrochroite	-12.07	3.41	15.48	Mn(OH)2
Pyrolusite	-22.68	19.51	42.19	MnO2
Pyromorphite	-6.84	-91.27	-84.43	Pb5(PO4)3Cl
Retgersite	-5.78	-7.83	-2.05	NiSO4:6H2O
Semetal(am)	8.71	1.57	-7.14	Se
Semetal(hex)	9.32	1.57	-7.76	Se
SeO2	-11.21	-11.09	0.12	SeO2
SeO3	-53.38	-31.90	21.48	SeO3
Spinel	-20.78	17.23	38.01	MgAl2O4
Strengite	-3.56	-29.93	-26.37	FePO4:2H2O
Tenorite	-4.56	3.28	7.84	CuO
Thenardite	-6.40	-6.05	0.35	Na2SO4
Tsumebite	-15.27	-25.06	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	-9.60	-45.60	-36.00	Fe3(PO4)2:8H2O
Zincite	-9.24	2.36	11.60	ZnO
Zincosite	-12.10	-7.92	4.18	ZnSO4
Zn(BO2)2	-15.98	-7.69	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-113.38	-110.14	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-9.84	2.36	12.20	Zn(OH)2
Zn(OH)2(am)	-10.36	2.36	12.71	Zn(OH)2
Zn(OH)2(beta)	-9.64	2.36	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-9.42	2.36	11.78	Zn(OH)2
Zn(OH)2(gamma)	-9.38	2.36	11.73	Zn(OH)2
Zn2(OH)2SO4	-13.06	-5.56	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-16.48	-1.29	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-28.12	-14.47	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-15.23	-50.65	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-33.17	-13.48	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-29.24	-0.84	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-38.72	-0.22	38.50	Zn5(OH)8Cl2
ZnCl2	-16.92	-9.65	7.27	ZnCl2
Znmetal	-39.99	-13.74	26.25	Zn
ZnMoO4	-2.36	-12.45	-10.09	ZnMoO4
ZnO(active)	-9.09	2.36	11.45	ZnO
ZnSe	2.30	-12.17	-14.48	ZnSe
ZnSeO4:6H2O	-28.03	-29.55	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.41	-7.92	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 1.

Mixture 1.

3.000e-02 Solution 1

1.000e-01 Solution 2
1.000e-01 Solution 3
7.700e-01 Solution 4

-----Solution composition-----

Elements	Molality	Moles
Al	4.673e-05	4.673e-05
As	2.504e-08	2.504e-08
B	8.429e-06	8.429e-06
Ba	2.687e-07	2.687e-07
Be	1.716e-07	1.716e-07
C	2.779e-04	2.779e-04
Ca	1.028e-02	1.028e-02
Cd	6.929e-09	6.929e-09
Cl	1.286e-02	1.286e-02
Co	1.071e-05	1.071e-05
Cr	6.658e-08	6.658e-08
Cu	7.622e-05	7.622e-05
Fe	3.990e-04	3.990e-04
Hg	6.994e-11	6.994e-11
K	4.966e-03	4.966e-03
Mg	3.211e-03	3.211e-03
Mn	8.034e-05	8.034e-05
Mo	8.961e-07	8.961e-07
N	7.520e-04	7.520e-04
Na	1.376e-02	1.376e-02
Ni	6.709e-06	6.709e-06
P	9.935e-06	9.935e-06
Pb	7.708e-08	7.708e-08
S	1.856e-02	1.856e-02
Se	1.121e-07	1.121e-07
Zn	5.932e-06	5.932e-06

-----Description of solution-----

pH	=	5.503	Charge balance
pe	=	4.031	Adjusted to redox equilibrium
Activity of water	=	0.999	
Ionic strength (mol/kgw)	=	6.122e-02	
Mass of water (kg)	=	1.000e+00	
Total alkalinity (eq/kg)	=	5.399e-05	
Total CO2 (mol/kg)	=	2.779e-04	
Temperature (°C)	=	20.03	
Electrical balance (eq)	=	-2.329e-03	
Percent error, $100 \cdot (\text{Cat} - \text{An}) / (\text{Cat} + \text{An})$	=	-3.01	
Iterations	=	13	
Total H	=	1.110173e+02	
Total O	=	5.558201e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	3.875e-06	3.143e-06	-5.412	-5.503	-0.091	0.00
OH-	2.735e-09	2.185e-09	-8.563	-8.660	-0.097	(0)
H2O	5.551e+01	9.990e-01	1.744	-0.000	0.000	18.05
Al	4.673e-05					
AlSO4+	2.991e-05	2.422e-05	-4.524	-4.616	-0.092	(0)
Al(OH)2+	6.595e-06	5.397e-06	-5.181	-5.268	-0.087	(0)
Al+3	4.375e-06	6.632e-07	-5.359	-6.178	-0.819	(0)
AlOH+2	3.413e-06	1.531e-06	-5.467	-5.815	-0.348	(0)
Al(SO4)2-	2.039e-06	1.651e-06	-5.691	-5.782	-0.092	(0)
Al(OH)3	3.447e-07	3.447e-07	-6.463	-6.463	0.000	(0)
Al(OH)4-	5.247e-08	4.249e-08	-7.280	-7.372	-0.092	(0)
AlMo6O21-3	2.356e-22	1.762e-23	-21.628	-22.754	-1.126	(0)

As (3)	1.443e-11					
H3AsO3	1.443e-11	1.443e-11	-10.841	-10.841	0.000	(0)
H2AsO3-	2.604e-15	1.952e-15	-14.584	-14.710	-0.125	(0)
H4AsO3+	2.996e-17	2.246e-17	-16.523	-16.649	-0.125	(0)
HAsO3-2	1.441e-21	4.551e-22	-20.841	-21.342	-0.501	(0)
AsO3-3	6.280e-29	4.695e-30	-28.202	-29.328	-1.126	(0)
As (5)	2.503e-08					
H2AsO4-	2.314e-08	1.735e-08	-7.636	-7.761	-0.125	(0)
HAsO4-2	1.878e-09	5.930e-10	-8.726	-9.227	-0.501	(0)
H3AsO4	8.899e-12	9.025e-12	-11.051	-11.045	0.006	(0)
AsO4-3	7.105e-15	5.312e-16	-14.148	-15.275	-1.126	(0)
B	8.429e-06					
H3BO3	8.426e-06	8.546e-06	-5.074	-5.068	0.006	(0)
H2BO3-	1.836e-09	1.445e-09	-8.736	-8.840	-0.104	(0)
CaH2BO3+	2.971e-10	2.338e-10	-9.527	-9.631	-0.104	(0)
MgH2BO3+	6.176e-11	4.861e-11	-10.209	-10.313	-0.104	(0)
NaH2BO3	2.710e-11	2.710e-11	-10.567	-10.567	0.000	(0)
H5 (BO3) 2-	1.378e-14	1.085e-14	-13.861	-13.965	-0.104	(0)
BaH2BO3+	6.415e-15	5.048e-15	-14.193	-14.297	-0.104	(0)
H8 (BO3) 3-	1.020e-17	8.030e-18	-16.991	-17.095	-0.104	(0)
Ba	2.687e-07					
Ba+2	2.687e-07	1.162e-07	-6.571	-6.935	-0.364	(0)
BaHCO3+	3.574e-11	2.944e-11	-10.447	-10.531	-0.084	(0)
BaNH3+2	2.353e-14	7.430e-15	-13.628	-14.129	-0.501	(0)
BaCO3	2.270e-14	2.270e-14	-13.644	-13.644	0.000	(0)
BaH2BO3+	6.415e-15	5.048e-15	-14.193	-14.297	-0.104	(0)
BaOH+	1.315e-15	1.071e-15	-14.881	-14.970	-0.089	(0)
BaNO3+	0.000e+00	0.000e+00	-43.450	-43.575	-0.125	(0)
Be	1.716e-07					
Be+2	8.552e-08	3.698e-08	-7.068	-7.432	-0.364	(0)
BeOH+	5.690e-08	4.712e-08	-7.245	-7.327	-0.082	(0)
BeSO4	2.676e-08	2.676e-08	-7.572	-7.572	0.000	(0)
Be (SO4) 2-2	1.499e-09	4.735e-10	-8.824	-9.325	-0.501	(0)
BeCl+	7.490e-10	6.102e-10	-9.126	-9.215	-0.089	(0)
Be (OH) 2	9.516e-11	9.516e-11	-10.022	-10.022	0.000	(0)
BeCO3	2.824e-11	2.824e-11	-10.549	-10.549	0.000	(0)
Be2OH+3	1.580e-12	2.892e-13	-11.801	-12.539	-0.738	(0)
Be3 (OH) 3+3	1.382e-14	2.529e-15	-13.859	-14.597	-0.738	(0)
Be (OH) 3-	9.240e-15	7.651e-15	-14.034	-14.116	-0.082	(0)
Be (OH) 4-2	3.287e-23	1.545e-23	-22.483	-22.811	-0.328	(0)
C (4)	2.779e-04					
H2CO3	2.369e-04	2.369e-04	-3.625	-3.625	0.000	(0)
HCO3-	3.847e-05	3.148e-05	-4.415	-4.502	-0.087	(0)
CaHCO3+	1.794e-06	1.477e-06	-5.746	-5.830	-0.084	(0)
MgHCO3+	3.780e-07	3.041e-07	-6.423	-6.517	-0.094	(0)
NaHCO3	2.106e-07	2.106e-07	-6.677	-6.677	0.000	(0)
FeHCO3+	3.862e-08	3.182e-08	-7.413	-7.497	-0.084	(0)
CuCO3	3.307e-08	3.307e-08	-7.481	-7.481	0.000	(0)
CuHCO3+	3.169e-08	2.375e-08	-7.499	-7.624	-0.125	(0)
MnHCO3+	1.457e-08	1.187e-08	-7.837	-7.926	-0.089	(0)
NiHCO3+	9.121e-09	6.838e-09	-8.040	-8.165	-0.125	(0)
CoHCO3+	7.351e-09	5.510e-09	-8.134	-8.259	-0.125	(0)
ZnHCO3+	1.908e-09	1.430e-09	-8.719	-8.845	-0.125	(0)
CaCO3	1.745e-09	1.745e-09	-8.758	-8.758	0.000	(0)
CO3-2	9.829e-10	4.250e-10	-9.007	-9.372	-0.364	(0)
PbHCO3+	3.673e-10	2.753e-10	-9.435	-9.560	-0.125	(0)
MgCO3	3.159e-10	3.159e-10	-9.500	-9.500	0.000	(0)
NaCO3-	1.203e-10	9.849e-11	-9.920	-10.007	-0.087	(0)
ZnCO3	3.882e-11	3.882e-11	-10.411	-10.411	0.000	(0)
BaHCO3+	3.574e-11	2.944e-11	-10.447	-10.531	-0.084	(0)
NiCO3	3.087e-11	3.087e-11	-10.510	-10.510	0.000	(0)
BeCO3	2.824e-11	2.824e-11	-10.549	-10.549	0.000	(0)
CoCO3	1.786e-11	1.786e-11	-10.748	-10.748	0.000	(0)
PbCO3	1.662e-11	1.662e-11	-10.779	-10.779	0.000	(0)
Cu (CO3) 2-2	1.198e-13	3.783e-14	-12.922	-13.422	-0.501	(0)
CdHCO3+	1.141e-13	8.555e-14	-12.943	-13.068	-0.125	(0)
BaCO3	2.270e-14	2.270e-14	-13.644	-13.644	0.000	(0)
CdCO3	1.278e-14	1.278e-14	-13.894	-13.894	0.000	(0)

	Pb (CO3) 2-2	6.450e-17	2.037e-17	-16.190	-16.691	-0.501	(0)
	Cd (CO3) 2-2	1.275e-20	4.025e-21	-19.895	-20.395	-0.501	(0)
	HgCO3	2.618e-22	2.618e-22	-21.582	-21.582	0.000	(0)
	HgHCO3+	2.044e-23	1.532e-23	-22.690	-22.815	-0.125	(0)
	Hg (CO3) 2-2	1.114e-27	3.519e-28	-26.953	-27.454	-0.501	(0)
Ca	1.028e-02						
	Ca+2	6.683e-03	2.890e-03	-2.175	-2.539	-0.364	(0)
	CaSO4	3.593e-03	3.593e-03	-2.445	-2.445	0.000	(0)
	CaHCO3+	1.794e-06	1.477e-06	-5.746	-5.830	-0.084	(0)
	CaH2PO4+	4.871e-07	3.987e-07	-6.312	-6.399	-0.087	(0)
	CaHPO4	1.608e-07	1.608e-07	-6.794	-6.794	0.000	(0)
	CaCO3	1.745e-09	1.745e-09	-8.758	-8.758	0.000	(0)
	CaNH3+2	1.168e-09	3.688e-10	-8.933	-9.433	-0.501	(0)
	CaH2BO3+	2.971e-10	2.338e-10	-9.527	-9.631	-0.104	(0)
	CaPO4-	1.492e-10	1.221e-10	-9.826	-9.913	-0.087	(0)
	CaOH+	1.445e-10	1.191e-10	-9.840	-9.924	-0.084	(0)
	Ca (NH3) 2+2	4.712e-17	1.488e-17	-16.327	-16.827	-0.501	(0)
	CaNO3+	5.287e-40	3.963e-40	-39.277	-39.402	-0.125	(0)
Cd	6.929e-09						
	Cd+2	3.050e-09	1.319e-09	-8.516	-8.880	-0.364	(0)
	CdCl+	1.734e-09	1.300e-09	-8.761	-8.886	-0.125	(0)
	CdSO4	1.660e-09	1.660e-09	-8.780	-8.780	0.000	(0)
	Cd (SO4) 2-2	4.287e-10	1.354e-10	-9.368	-9.868	-0.501	(0)
	CdCl2	5.553e-11	5.553e-11	-10.255	-10.255	0.000	(0)
	CdCl3-	4.629e-13	3.470e-13	-12.334	-12.460	-0.125	(0)
	CdOHCl	1.517e-13	1.517e-13	-12.819	-12.819	0.000	(0)
	CdHCO3+	1.141e-13	8.555e-14	-12.943	-13.068	-0.125	(0)
	CdOH+	3.075e-14	2.305e-14	-13.512	-13.637	-0.125	(0)
	CdCO3	1.278e-14	1.278e-14	-13.894	-13.894	0.000	(0)
	Cd (OH) 2	6.772e-19	6.772e-19	-18.169	-18.169	0.000	(0)
	Cd (CO3) 2-2	1.275e-20	4.025e-21	-19.895	-20.395	-0.501	(0)
	Cd2OH+3	2.167e-21	1.620e-22	-20.664	-21.790	-1.126	(0)
	Cd (SeO3) 2-2	3.874e-23	1.223e-23	-22.412	-22.912	-0.501	(0)
	Cd (OH) 3-	1.767e-25	1.324e-25	-24.753	-24.878	-0.125	(0)
	CdSeO4	9.499e-27	9.499e-27	-26.022	-26.022	0.000	(0)
	Cd (OH) 4-2	2.197e-34	6.939e-35	-33.658	-34.159	-0.501	(0)
	CdNO3+	0.000e+00	0.000e+00	-45.571	-45.696	-0.125	(0)
	CdHS+	0.000e+00	0.000e+00	-50.924	-51.050	-0.125	(0)
	Cd (NO3) 2	0.000e+00	0.000e+00	-83.438	-83.438	0.000	(0)
	Cd (HS) 2	0.000e+00	0.000e+00	-94.023	-94.023	0.000	(0)
	Cd (HS) 3-	0.000e+00	0.000e+00	-142.176	-142.301	-0.125	(0)
	Cd (HS) 4-2	0.000e+00	0.000e+00	-189.782	-190.283	-0.501	(0)
Cl	1.286e-02						
	Cl-	1.281e-02	1.039e-02	-1.892	-1.983	-0.091	(0)
	CuCl2-	2.053e-05	1.651e-05	-4.688	-4.782	-0.094	(0)
	CuCl	7.516e-06	7.516e-06	-5.124	-5.124	0.000	(0)
	MnCl+	3.117e-07	2.540e-07	-6.506	-6.595	-0.089	(0)
	CuCl+	2.556e-07	2.056e-07	-6.593	-6.687	-0.094	(0)
	CoCl+	1.176e-07	8.816e-08	-6.930	-7.055	-0.125	(0)
	CuCl3-2	8.169e-08	3.597e-08	-7.088	-7.444	-0.356	(0)
	NiCl+	6.810e-08	5.105e-08	-7.167	-7.292	-0.125	(0)
	ZnCl+	4.963e-08	3.993e-08	-7.304	-7.399	-0.094	(0)
	PbCl+	6.027e-09	4.518e-09	-8.220	-8.345	-0.125	(0)
	MnCl2	3.727e-09	3.727e-09	-8.429	-8.429	0.000	(0)
	CdCl+	1.734e-09	1.300e-09	-8.761	-8.886	-0.125	(0)
	BeCl+	7.490e-10	6.102e-10	-9.126	-9.215	-0.089	(0)
	CuCl2	5.795e-10	5.795e-10	-9.237	-9.237	0.000	(0)
	ZnCl2	5.297e-10	5.297e-10	-9.276	-9.276	0.000	(0)
	PbCl2	2.050e-10	2.050e-10	-9.688	-9.688	0.000	(0)
	ZnOHCl	1.736e-10	1.736e-10	-9.760	-9.760	0.000	(0)
	CdCl2	5.553e-11	5.553e-11	-10.255	-10.255	0.000	(0)
	MnCl3-	1.309e-11	1.067e-11	-10.883	-10.972	-0.089	(0)
	CrCl+2	9.992e-12	3.155e-12	-11.000	-11.501	-0.501	(0)
	ZnCl3-	5.324e-12	4.283e-12	-11.274	-11.368	-0.094	(0)
	NiCl2	2.708e-12	2.708e-12	-11.567	-11.567	0.000	(0)
	PbCl3-	1.195e-12	8.957e-13	-11.923	-12.048	-0.125	(0)
	CdCl3-	4.629e-13	3.470e-13	-12.334	-12.460	-0.125	(0)
	CdOHCl	1.517e-13	1.517e-13	-12.819	-12.819	0.000	(0)

CuCl3-	6.387e-14	5.138e-14	-13.195	-13.289	-0.094	(0)
ZnCl4-2	4.855e-14	2.138e-14	-13.314	-13.670	-0.356	(0)
FeCl+2	4.026e-14	1.773e-14	-13.395	-13.751	-0.356	(0)
PbCl4-2	1.251e-14	3.952e-15	-13.903	-14.403	-0.501	(0)
HgCl2	1.045e-14	1.045e-14	-13.981	-13.981	0.000	(0)
CrCl2+	2.672e-15	2.003e-15	-14.573	-14.698	-0.125	(0)
HgCl3-	1.465e-15	1.098e-15	-14.834	-14.959	-0.125	(0)
FeCl2+	1.182e-15	9.629e-16	-14.927	-15.016	-0.089	(0)
CrOHC12	9.820e-16	9.820e-16	-15.008	-15.008	0.000	(0)
HgCl4-2	1.506e-16	4.756e-17	-15.822	-16.323	-0.501	(0)
HgClOH	4.049e-17	4.049e-17	-16.393	-16.393	0.000	(0)
CuCl4-2	7.195e-18	3.168e-18	-17.143	-17.499	-0.356	(0)
FeCl3	1.001e-18	1.001e-18	-18.000	-18.000	0.000	(0)
HgCl+	2.186e-19	1.639e-19	-18.660	-18.786	-0.125	(0)
CoCl+2	6.382e-34	2.016e-34	-33.195	-33.696	-0.501	(0)
CrO3Cl-	2.349e-37	1.761e-37	-36.629	-36.754	-0.125	(0)
Cr (NH3) 6Cl+2	5.214e-40	1.647e-40	-39.283	-39.783	-0.501	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-42.502	-43.002	-0.501	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-56.185	-56.685	-0.501	(0)
Co (2)	1.071e-05					
Co+2	7.874e-06	2.487e-06	-5.104	-5.604	-0.501	(0)
CoSO4	2.709e-06	2.709e-06	-5.567	-5.567	0.000	(0)
CoCl+	1.176e-07	8.816e-08	-6.930	-7.055	-0.125	(0)
CoHCO3+	7.351e-09	5.510e-09	-8.134	-8.259	-0.125	(0)
CoHPO4	3.236e-10	3.236e-10	-9.490	-9.490	0.000	(0)
CoOH+	2.118e-10	1.588e-10	-9.674	-9.799	-0.125	(0)
Co (NH3) +2	1.497e-10	4.726e-11	-9.825	-10.325	-0.501	(0)
CoCO3	1.786e-11	1.786e-11	-10.748	-10.748	0.000	(0)
Co (OH) 2	4.038e-14	4.038e-14	-13.394	-13.394	0.000	(0)
Co (NH3) 2+2	4.149e-16	1.310e-16	-15.382	-15.883	-0.501	(0)
Co2OH+3	2.647e-16	1.979e-17	-15.577	-16.704	-1.126	(0)
Co (OH) 3-	3.440e-21	2.579e-21	-20.463	-20.589	-0.125	(0)
Co (NH3) 3+2	5.294e-22	1.672e-22	-21.276	-21.777	-0.501	(0)
CoOOH-	1.455e-22	1.091e-22	-21.837	-21.962	-0.125	(0)
CoSeO4	4.441e-23	4.441e-23	-22.353	-22.353	0.000	(0)
Co (NH3) 4+2	2.816e-28	8.895e-29	-27.550	-28.051	-0.501	(0)
Co4 (OH) 4+4	1.276e-29	1.269e-31	-28.894	-30.897	-2.002	(0)
Co (OH) 4-2	4.142e-30	1.308e-30	-29.383	-29.883	-0.501	(0)
CoNO2+	1.087e-32	8.149e-33	-31.964	-32.089	-0.125	(0)
Co (NH3) 5+2	4.738e-35	1.496e-35	-34.324	-34.825	-0.501	(0)
CoNO3+	0.000e+00	0.000e+00	-42.658	-42.783	-0.125	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-79.854	-79.854	0.000	(0)
Co (3)	5.479e-30					
CoOH+2	5.478e-30	1.730e-30	-29.261	-29.762	-0.501	(0)
Co+3	7.016e-34	1.064e-34	-33.154	-33.973	-0.819	(0)
CoCl+2	6.382e-34	2.016e-34	-33.195	-33.696	-0.501	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-42.502	-43.002	-0.501	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-51.955	-52.081	-0.125	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-56.185	-56.685	-0.501	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-58.186	-58.686	-0.501	(0)
Cr (2)	7.788e-21					
Cr+2	7.788e-21	2.459e-21	-20.109	-20.609	-0.501	(0)
Cr (3)	6.658e-08					
Cr (OH) +2	4.364e-08	1.378e-08	-7.360	-7.861	-0.501	(0)
CrOHSO4	1.094e-08	1.094e-08	-7.961	-7.961	0.000	(0)
Cr (OH) 2+	4.203e-09	3.151e-09	-8.376	-8.502	-0.125	(0)
CrSO4+	4.025e-09	3.017e-09	-8.395	-8.520	-0.125	(0)
Cr+3	3.749e-09	2.803e-10	-8.426	-9.552	-1.126	(0)
CrCl+2	9.992e-12	3.155e-12	-11.000	-11.501	-0.501	(0)
Cr (OH) 3	3.789e-12	3.789e-12	-11.421	-11.421	0.000	(0)
CrH2PO4+2	1.260e-12	3.978e-13	-11.900	-12.400	-0.501	(0)
Cr2 (OH) 2SO4+2	2.533e-14	7.999e-15	-13.596	-14.097	-0.501	(0)
Cr2 (OH) 2 (SO4) 2	2.707e-15	2.707e-15	-14.567	-14.567	0.000	(0)
CrCl2+	2.672e-15	2.003e-15	-14.573	-14.698	-0.125	(0)
CrOHC12	9.820e-16	9.820e-16	-15.008	-15.008	0.000	(0)
CrO2-	7.645e-16	5.731e-16	-15.117	-15.242	-0.125	(0)
Cr (OH) 4-	6.441e-16	4.828e-16	-15.191	-15.316	-0.125	(0)
Cr (NH3) 5OH+2	2.953e-33	9.326e-34	-32.530	-33.030	-0.501	(0)

Cr (NH3) 6+3	1.676e-38	1.253e-39	-37.776	-38.902	-1.126	(0)
Cr (NH3) 6Cl+2	5.214e-40	1.647e-40	-39.283	-39.783	-0.501	(0)
CrNO3+2	0.000e+00	0.000e+00	-47.981	-48.481	-0.501	(0)
Cr (6)	1.330e-30					
HCrO4-	1.127e-30	8.449e-31	-29.948	-30.073	-0.125	(0)
CrO4-2	1.948e-31	8.423e-32	-30.710	-31.075	-0.364	(0)
NaCrO4-	6.046e-33	4.532e-33	-32.219	-32.344	-0.125	(0)
KCrO4-	1.618e-33	1.213e-33	-32.791	-32.916	-0.125	(0)
CrO3HPO4-2	6.358e-35	2.008e-35	-34.197	-34.697	-0.501	(0)
CrO3SO4-2	1.481e-35	4.676e-36	-34.830	-35.330	-0.501	(0)
H2CrO4	1.671e-36	1.671e-36	-35.777	-35.777	0.000	(0)
CrO3Cl-	2.349e-37	1.761e-37	-36.629	-36.754	-0.125	(0)
CrO3H2PO4-	4.055e-38	3.040e-38	-37.392	-37.517	-0.125	(0)
Cr2O7-2	0.000e+00	0.000e+00	-58.049	-58.549	-0.501	(0)
Cu (1)	2.889e-05					
CuCl2-	2.053e-05	1.651e-05	-4.688	-4.782	-0.094	(0)
CuCl	7.516e-06	7.516e-06	-5.124	-5.124	0.000	(0)
Cu+	7.665e-07	5.746e-07	-6.116	-6.241	-0.125	(0)
CuCl3-2	8.169e-08	3.597e-08	-7.088	-7.444	-0.356	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-91.808	-92.201	-0.393	(0)
CuS4S5-3	0.000e+00	0.000e+00	-92.559	-92.931	-0.372	(0)
Cu (2)	4.733e-05					
Cu+2	3.056e-05	1.321e-05	-4.515	-4.879	-0.364	(0)
CuSO4	1.625e-05	1.625e-05	-4.789	-4.789	0.000	(0)
CuCl+	2.556e-07	2.056e-07	-6.593	-6.687	-0.094	(0)
CuOH+	1.301e-07	1.047e-07	-6.886	-6.980	-0.094	(0)
CuNH3+2	7.101e-08	2.242e-08	-7.149	-7.649	-0.501	(0)
CuCO3	3.307e-08	3.307e-08	-7.481	-7.481	0.000	(0)
CuHCO3+	3.169e-08	2.375e-08	-7.499	-7.624	-0.125	(0)
Cu2 (OH) 2+2	8.426e-10	2.661e-10	-9.074	-9.575	-0.501	(0)
CuCl2	5.795e-10	5.795e-10	-9.237	-9.237	0.000	(0)
Cu (OH) 2	8.542e-11	8.542e-11	-10.068	-10.068	0.000	(0)
Cu (CO3) 2-2	1.198e-13	3.783e-14	-12.922	-13.422	-0.501	(0)
CuCl3-	6.387e-14	5.138e-14	-13.195	-13.289	-0.094	(0)
Cu (OH) 3-	7.481e-16	5.608e-16	-15.126	-15.251	-0.125	(0)
CuCl4-2	7.195e-18	3.168e-18	-17.143	-17.499	-0.356	(0)
Cu (OH) 4-2	4.474e-23	1.413e-23	-22.349	-22.850	-0.501	(0)
CuNO2+	8.584e-31	6.435e-31	-30.066	-30.191	-0.125	(0)
CuNO3+	0.000e+00	0.000e+00	-41.621	-41.746	-0.125	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-56.514	-56.514	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-80.037	-80.037	0.000	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-129.388	-129.513	-0.125	(0)
Fe (2)	3.988e-04					
Fe+2	2.809e-04	8.871e-05	-3.551	-4.052	-0.501	(0)
FeSO4	1.175e-04	1.175e-04	-3.930	-3.930	0.000	(0)
FeH2PO4+	3.213e-07	2.630e-07	-6.493	-6.580	-0.087	(0)
FeHPO4	4.213e-08	4.213e-08	-7.375	-7.375	0.000	(0)
FeHCO3+	3.862e-08	3.182e-08	-7.413	-7.497	-0.084	(0)
FeOH+	9.474e-09	7.718e-09	-8.023	-8.112	-0.089	(0)
Fe (OH) 2	1.268e-14	1.268e-14	-13.897	-13.897	0.000	(0)
Fe (OH) 3-	1.504e-17	1.225e-17	-16.823	-16.912	-0.089	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-95.458	-95.458	0.000	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-143.473	-143.598	-0.125	(0)
Fe (3)	2.086e-07					
Fe (OH) 2+	2.079e-07	1.702e-07	-6.682	-6.769	-0.087	(0)
Fe (OH) 3	2.877e-10	2.877e-10	-9.541	-9.541	0.000	(0)
FeOH+2	2.331e-10	1.027e-10	-9.632	-9.989	-0.356	(0)
FeHPO4+	9.811e-11	8.030e-11	-10.008	-10.095	-0.087	(0)
FeSO4+	4.374e-12	3.563e-12	-11.359	-11.448	-0.089	(0)
Fe (SO4) 2-	6.024e-13	4.516e-13	-12.220	-12.345	-0.125	(0)
Fe+3	4.362e-13	6.612e-14	-12.360	-13.180	-0.819	(0)
Fe (OH) 4-	2.130e-13	1.743e-13	-12.672	-12.759	-0.087	(0)
FeCl+2	4.026e-14	1.773e-14	-13.395	-13.751	-0.356	(0)
FeH2PO4+2	1.655e-14	7.426e-15	-13.781	-14.129	-0.348	(0)
FeCl2+	1.182e-15	9.629e-16	-14.927	-15.016	-0.089	(0)
Fe2 (OH) 2+4	4.192e-17	4.170e-19	-16.378	-18.380	-2.002	(0)
FeHSeO3+2	3.905e-17	1.233e-17	-16.408	-16.909	-0.501	(0)
FeCl3	1.001e-18	1.001e-18	-18.000	-18.000	0.000	(0)

Fe3 (OH) 4+5	1.309e-21	9.736e-25	-20.883	-24.012	-3.129	(0)
FeNO3+2	0.000e+00	0.000e+00	-48.948	-49.449	-0.501	(0)
H (0)	1.256e-22					
H2	6.280e-23	6.369e-23	-22.202	-22.196	0.006	(0)
Hg (0)	6.993e-11					
Hg	6.993e-11	6.993e-11	-10.155	-10.155	0.000	(0)
Hg (1)	1.407e-25					
Hg2+2	7.035e-26	2.222e-26	-25.153	-25.653	-0.501	(0)
Hg (2)	1.211e-14					
HgCl2	1.045e-14	1.045e-14	-13.981	-13.981	0.000	(0)
HgCl3-	1.465e-15	1.098e-15	-14.834	-14.959	-0.125	(0)
HgCl4-2	1.506e-16	4.756e-17	-15.822	-16.323	-0.501	(0)
HgClOH	4.049e-17	4.049e-17	-16.393	-16.393	0.000	(0)
HgCl+	2.186e-19	1.639e-19	-18.660	-18.786	-0.125	(0)
Hg (NH3) 2+2	5.710e-20	1.803e-20	-19.243	-19.744	-0.501	(0)
Hg (OH) 2	3.281e-20	3.328e-20	-19.484	-19.478	0.006	(0)
HgCO3	2.618e-22	2.618e-22	-21.582	-21.582	0.000	(0)
HgNH3+2	1.042e-22	3.292e-23	-21.982	-22.483	-0.501	(0)
HgOH+	9.958e-23	7.465e-23	-22.002	-22.127	-0.125	(0)
HgHCO3+	2.044e-23	1.532e-23	-22.690	-22.815	-0.125	(0)
Hg+2	2.139e-24	6.754e-25	-23.670	-24.170	-0.501	(0)
HgSO4	7.679e-25	7.679e-25	-24.115	-24.115	0.000	(0)
Hg (NH3) 3+2	3.618e-26	1.143e-26	-25.441	-25.942	-0.501	(0)
Hg (CO3) 2-2	1.114e-27	3.519e-28	-26.953	-27.454	-0.501	(0)
Hg (OH) 3-	1.789e-29	1.341e-29	-28.747	-28.873	-0.125	(0)
Hg (NH3) 4+2	4.607e-32	1.455e-32	-31.337	-31.837	-0.501	(0)
HgNO3+	0.000e+00	0.000e+00	-61.975	-62.100	-0.125	(0)
Hg (HS) 2	0.000e+00	0.000e+00	-86.322	-86.322	0.000	(0)
HgHS2-	0.000e+00	0.000e+00	-87.088	-87.213	-0.125	(0)
HgS2-2	0.000e+00	0.000e+00	-89.918	-90.419	-0.501	(0)
Hg (NO3) 2	0.000e+00	0.000e+00	-99.860	-99.860	0.000	(0)
K	4.966e-03					
K+	4.780e-03	3.876e-03	-2.321	-2.412	-0.091	(0)
KSO4-	1.858e-04	1.520e-04	-3.731	-3.818	-0.087	(0)
KHPO4-	4.287e-09	3.508e-09	-8.368	-8.455	-0.087	(0)
KCrO4-	1.618e-33	1.213e-33	-32.791	-32.916	-0.125	(0)
Mg	3.211e-03					
Mg+2	2.244e-03	9.701e-04	-2.649	-3.013	-0.364	(0)
MgSO4	9.667e-04	9.667e-04	-3.015	-3.015	0.000	(0)
MgHCO3+	3.780e-07	3.041e-07	-6.423	-6.517	-0.094	(0)
MgH2PO4+	3.490e-07	2.856e-07	-6.457	-6.544	-0.087	(0)
MgHPO4	7.453e-08	7.453e-08	-7.128	-7.128	0.000	(0)
MgOH+	9.390e-10	7.775e-10	-9.027	-9.109	-0.082	(0)
MgCO3	3.159e-10	3.159e-10	-9.500	-9.500	0.000	(0)
MgH2BO3+	6.176e-11	4.861e-11	-10.209	-10.313	-0.104	(0)
MgPO4-	7.828e-13	6.407e-13	-12.106	-12.193	-0.087	(0)
Mn (2)	8.034e-05					
Mn+2	6.147e-05	1.941e-05	-4.211	-4.712	-0.501	(0)
MnSO4	1.853e-05	1.853e-05	-4.732	-4.732	0.000	(0)
MnCl+	3.117e-07	2.540e-07	-6.506	-6.595	-0.089	(0)
MnHCO3+	1.457e-08	1.187e-08	-7.837	-7.926	-0.089	(0)
MnCl2	3.727e-09	3.727e-09	-8.429	-8.429	0.000	(0)
MnOH+	1.308e-10	1.066e-10	-9.883	-9.972	-0.089	(0)
MnCl3-	1.309e-11	1.067e-11	-10.883	-10.972	-0.089	(0)
MnSeO4	1.837e-22	1.837e-22	-21.736	-21.736	0.000	(0)
Mn (OH) 3-	1.213e-23	9.884e-24	-22.916	-23.005	-0.089	(0)
MnSe	9.700e-25	9.700e-25	-24.013	-24.013	0.000	(0)
Mn (OH) 4-2	2.319e-31	1.021e-31	-30.635	-30.991	-0.356	(0)
MnNO3+	0.000e+00	0.000e+00	-41.766	-41.891	-0.125	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-78.865	-78.865	0.000	(0)
Mn (3)	2.941e-26					
Mn+3	2.941e-26	4.458e-27	-25.532	-26.351	-0.819	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-64.745	-65.101	-0.356	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-70.673	-70.773	-0.101	(0)
Mo	8.961e-07					
MoO4-2	8.681e-07	3.754e-07	-6.061	-6.426	-0.364	(0)

HMoO4-	2.731e-08	2.047e-08	-7.564	-7.689	-0.125	(0)
H2MoO4	6.454e-10	6.454e-10	-9.190	-9.190	0.000	(0)
AlMo6O21-3	2.356e-22	1.762e-23	-21.628	-22.754	-1.126	(0)
Mo7O24-6	1.491e-31	4.659e-36	-30.827	-35.332	-4.505	(0)
HMo7O24-5	4.480e-32	3.332e-35	-31.349	-34.477	-3.129	(0)
H2Mo7O24-4	6.245e-34	6.213e-36	-33.204	-35.207	-2.002	(0)
H3Mo7O24-3	4.664e-37	3.488e-38	-36.331	-37.457	-1.126	(0)
N (-3)	7.520e-04					
NH4+	7.099e-04	5.587e-04	-3.149	-3.253	-0.104	(0)
NH4SO4-	4.187e-05	3.411e-05	-4.378	-4.467	-0.089	(0)
NH3	7.103e-08	7.103e-08	-7.149	-7.149	0.000	(0)
CuNH3+2	7.101e-08	2.242e-08	-7.149	-7.649	-0.501	(0)
CaNH3+2	1.168e-09	3.688e-10	-8.933	-9.433	-0.501	(0)
NiNH3+2	5.306e-10	1.676e-10	-9.275	-9.776	-0.501	(0)
Co (NH3) +2	1.497e-10	4.726e-11	-9.825	-10.325	-0.501	(0)
BaNH3+2	2.353e-14	7.430e-15	-13.628	-14.129	-0.501	(0)
Ni (NH3) 2+2	1.055e-14	3.331e-15	-13.977	-14.477	-0.501	(0)
Co (NH3) 2+2	4.149e-16	1.310e-16	-15.382	-15.883	-0.501	(0)
Ca (NH3) 2+2	4.712e-17	1.488e-17	-16.327	-16.827	-0.501	(0)
Hg (NH3) 2+2	5.710e-20	1.803e-20	-19.243	-19.744	-0.501	(0)
Co (NH3) 3+2	5.294e-22	1.672e-22	-21.276	-21.777	-0.501	(0)
HgNH3+2	1.042e-22	3.292e-23	-21.982	-22.483	-0.501	(0)
Hg (NH3) 3+2	3.618e-26	1.143e-26	-25.441	-25.942	-0.501	(0)
Co (NH3) 4+2	2.816e-28	8.895e-29	-27.550	-28.051	-0.501	(0)
Hg (NH3) 4+2	4.607e-32	1.455e-32	-31.337	-31.837	-0.501	(0)
Cr (NH3) 5OH+2	2.953e-33	9.326e-34	-32.530	-33.030	-0.501	(0)
Co (NH3) 5+2	4.738e-35	1.496e-35	-34.324	-34.825	-0.501	(0)
Cr (NH3) 6+3	1.676e-38	1.253e-39	-37.776	-38.902	-1.126	(0)
Cr (NH3) 6Cl+2	5.214e-40	1.647e-40	-39.283	-39.783	-0.501	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-42.502	-43.002	-0.501	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-51.955	-52.081	-0.125	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-56.185	-56.685	-0.501	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-58.186	-58.686	-0.501	(0)
N (3)	5.873e-28					
NO2-	5.864e-28	4.651e-28	-27.232	-27.332	-0.101	(0)
CuNO2+	8.584e-31	6.435e-31	-30.066	-30.191	-0.125	(0)
CoNO2+	1.087e-32	8.149e-33	-31.964	-32.089	-0.125	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-56.514	-56.514	0.000	(0)
N (5)	5.207e-38					
NO3-	5.154e-38	4.180e-38	-37.288	-37.379	-0.091	(0)
CaNO3+	5.287e-40	3.963e-40	-39.277	-39.402	-0.125	(0)
CuNO3+	0.000e+00	0.000e+00	-41.621	-41.746	-0.125	(0)
MnNO3+	0.000e+00	0.000e+00	-41.766	-41.891	-0.125	(0)
NiNO3+	0.000e+00	0.000e+00	-42.564	-42.690	-0.125	(0)
ZnNO3+	0.000e+00	0.000e+00	-42.639	-42.765	-0.125	(0)
CoNO3+	0.000e+00	0.000e+00	-42.658	-42.783	-0.125	(0)
BaNO3+	0.000e+00	0.000e+00	-43.450	-43.575	-0.125	(0)
PbNO3+	0.000e+00	0.000e+00	-43.975	-44.101	-0.125	(0)
CdNO3+	0.000e+00	0.000e+00	-45.571	-45.696	-0.125	(0)
CrNO3+2	0.000e+00	0.000e+00	-47.981	-48.481	-0.501	(0)
FeNO3+2	0.000e+00	0.000e+00	-48.948	-49.449	-0.501	(0)
HgNO3+	0.000e+00	0.000e+00	-61.975	-62.100	-0.125	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-78.865	-78.865	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-79.854	-79.854	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-80.037	-80.037	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-80.857	-80.857	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-81.224	-81.224	0.000	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-83.438	-83.438	0.000	(0)
Hg (NO3) 2	0.000e+00	0.000e+00	-99.860	-99.860	0.000	(0)
Na	1.376e-02					
Na+	1.335e-02	1.083e-02	-1.874	-1.965	-0.091	(0)
NaSO4-	4.021e-04	3.291e-04	-3.396	-3.483	-0.087	(0)
NaHCO3	2.106e-07	2.106e-07	-6.677	-6.677	0.000	(0)
NaHPO4-	1.855e-08	1.518e-08	-7.732	-7.819	-0.087	(0)
NaCO3-	1.203e-10	9.849e-11	-9.920	-10.007	-0.087	(0)
NaH2BO3	2.710e-11	2.710e-11	-10.567	-10.567	0.000	(0)
NaCrO4-	6.046e-33	4.532e-33	-32.219	-32.344	-0.125	(0)
Ni	6.709e-06					

Ni+2	4.503e-06	1.947e-06	-5.347	-5.711	-0.364	(0)
NiSO4	2.127e-06	2.127e-06	-5.672	-5.672	0.000	(0)
NiCl+	6.810e-08	5.105e-08	-7.167	-7.292	-0.125	(0)
NiHCO3+	9.121e-09	6.838e-09	-8.040	-8.165	-0.125	(0)
Ni (SO4) 2-2	1.322e-09	4.176e-10	-8.879	-9.379	-0.501	(0)
NiNH3+2	5.306e-10	1.676e-10	-9.275	-9.776	-0.501	(0)
NiOH+	7.343e-11	5.505e-11	-10.134	-10.259	-0.125	(0)
NiCO3	3.087e-11	3.087e-11	-10.510	-10.510	0.000	(0)
NiCl2	2.708e-12	2.708e-12	-11.567	-11.567	0.000	(0)
Ni (OH) 2	1.995e-14	1.995e-14	-13.700	-13.700	0.000	(0)
Ni (NH3) 2+2	1.055e-14	3.331e-15	-13.977	-14.477	-0.501	(0)
Ni (OH) 3-	8.517e-20	6.385e-20	-19.070	-19.195	-0.125	(0)
NiSeO4	3.201e-23	3.201e-23	-22.495	-22.495	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-42.564	-42.690	-0.125	(0)
O (0)	0.000e+00					
O2	0.000e+00	0.000e+00	-49.296	-49.290	0.006	(0)
P	9.935e-06					
H2PO4-	8.174e-06	6.689e-06	-5.088	-5.175	-0.087	(0)
CaH2PO4+	4.871e-07	3.987e-07	-6.312	-6.399	-0.087	(0)
MgH2PO4+	3.490e-07	2.856e-07	-6.457	-6.544	-0.087	(0)
FeH2PO4+	3.213e-07	2.630e-07	-6.493	-6.580	-0.087	(0)
HPO4-2	3.002e-07	1.322e-07	-6.523	-6.879	-0.356	(0)
CaHPO4	1.608e-07	1.608e-07	-6.794	-6.794	0.000	(0)
MgHPO4	7.453e-08	7.453e-08	-7.128	-7.128	0.000	(0)
FeHPO4	4.213e-08	4.213e-08	-7.375	-7.375	0.000	(0)
NaHPO4-	1.855e-08	1.518e-08	-7.732	-7.819	-0.087	(0)
KHPO4-	4.287e-09	3.508e-09	-8.368	-8.455	-0.087	(0)
H3PO4	2.800e-09	2.800e-09	-8.553	-8.553	0.000	(0)
CoHPO4	3.236e-10	3.236e-10	-9.490	-9.490	0.000	(0)
CaPO4-	1.492e-10	1.221e-10	-9.826	-9.913	-0.087	(0)
FeHPO4+	9.811e-11	8.030e-11	-10.008	-10.095	-0.087	(0)
CrH2PO4+2	1.260e-12	3.978e-13	-11.900	-12.400	-0.501	(0)
MgPO4-	7.828e-13	6.407e-13	-12.106	-12.193	-0.087	(0)
PO4-3	1.056e-13	1.601e-14	-12.976	-13.796	-0.819	(0)
FeH2PO4+2	1.655e-14	7.426e-15	-13.781	-14.129	-0.348	(0)
CrO3HPO4-2	6.358e-35	2.008e-35	-34.197	-34.697	-0.501	(0)
CrO3H2PO4-	4.055e-38	3.040e-38	-37.392	-37.517	-0.125	(0)
Pb	7.708e-08					
PbSO4	3.630e-08	3.630e-08	-7.440	-7.440	0.000	(0)
Pb+2	3.008e-08	1.301e-08	-7.522	-7.886	-0.364	(0)
PbCl+	6.027e-09	4.518e-09	-8.220	-8.345	-0.125	(0)
Pb (SO4) 2-2	3.946e-09	1.246e-09	-8.404	-8.904	-0.501	(0)
PbHCO3+	3.673e-10	2.753e-10	-9.435	-9.560	-0.125	(0)
PbCl2	2.050e-10	2.050e-10	-9.688	-9.688	0.000	(0)
PbOH+	1.395e-10	1.046e-10	-9.855	-9.981	-0.125	(0)
PbCO3	1.662e-11	1.662e-11	-10.779	-10.779	0.000	(0)
PbCl3-	1.195e-12	8.957e-13	-11.923	-12.048	-0.125	(0)
PbCl4-2	1.251e-14	3.952e-15	-13.903	-14.403	-0.501	(0)
Pb (OH) 2	1.059e-14	1.059e-14	-13.975	-13.975	0.000	(0)
Pb2OH+3	2.884e-16	2.156e-17	-15.540	-16.666	-1.126	(0)
Pb (CO3) 2-2	6.450e-17	2.037e-17	-16.190	-16.691	-0.501	(0)
Pb (OH) 3-	4.520e-20	3.388e-20	-19.345	-19.470	-0.125	(0)
Pb (OH) 4-2	8.411e-26	2.656e-26	-25.075	-25.576	-0.501	(0)
Pb3 (OH) 4+2	4.188e-26	1.323e-26	-25.378	-25.879	-0.501	(0)
Pb4 (OH) 4+4	1.652e-28	1.644e-30	-27.782	-29.784	-2.002	(0)
PbNO3+	0.000e+00	0.000e+00	-43.975	-44.101	-0.125	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-81.224	-81.224	0.000	(0)
Pb (HS) 2	0.000e+00	0.000e+00	-92.971	-92.971	0.000	(0)
Pb (HS) 3-	0.000e+00	0.000e+00	-141.724	-141.849	-0.125	(0)
S (-2)	0.000e+00					
H2S	0.000e+00	0.000e+00	-48.595	-48.595	0.000	(0)
HS-	0.000e+00	0.000e+00	-50.053	-50.178	-0.125	(0)
CdHS+	0.000e+00	0.000e+00	-50.924	-51.050	-0.125	(0)
S5-2	0.000e+00	0.000e+00	-53.651	-54.152	-0.501	(0)
S6-2	0.000e+00	0.000e+00	-54.055	-54.556	-0.501	(0)
S4-2	0.000e+00	0.000e+00	-54.252	-54.753	-0.501	(0)
S3-2	0.000e+00	0.000e+00	-55.067	-55.567	-0.501	(0)
S2-2	0.000e+00	0.000e+00	-56.095	-56.596	-0.501	(0)

S-2	0.000e+00	0.000e+00	-61.766	-62.122	-0.356	(0)
Hg (HS) 2	0.000e+00	0.000e+00	-86.322	-86.322	0.000	(0)
HgHS2-	0.000e+00	0.000e+00	-87.088	-87.213	-0.125	(0)
HgS2-2	0.000e+00	0.000e+00	-89.918	-90.419	-0.501	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-91.808	-92.201	-0.393	(0)
CuS4S5-3	0.000e+00	0.000e+00	-92.559	-92.931	-0.372	(0)
Pb (HS) 2	0.000e+00	0.000e+00	-92.971	-92.971	0.000	(0)
Zn (HS) 2	0.000e+00	0.000e+00	-93.335	-93.335	0.000	(0)
ZnS (HS) -	0.000e+00	0.000e+00	-93.717	-93.842	-0.125	(0)
Cd (HS) 2	0.000e+00	0.000e+00	-94.023	-94.023	0.000	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-95.458	-95.458	0.000	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-129.388	-129.513	-0.125	(0)
Zn (HS) 3-	0.000e+00	0.000e+00	-140.107	-140.233	-0.125	(0)
Pb (HS) 3-	0.000e+00	0.000e+00	-141.724	-141.849	-0.125	(0)
Cd (HS) 3-	0.000e+00	0.000e+00	-142.176	-142.301	-0.125	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-143.473	-143.598	-0.125	(0)
ZnS (HS) 2-2	0.000e+00	0.000e+00	-144.209	-144.710	-0.501	(0)
Cd (HS) 4-2	0.000e+00	0.000e+00	-189.782	-190.283	-0.501	(0)
Zn (HS) 4-2	0.000e+00	0.000e+00	-191.370	-191.870	-0.501	(0)
S (6)	1.856e-02					
SO4-2	1.318e-02	5.698e-03	-1.880	-2.244	-0.364	(0)
CaSO4	3.593e-03	3.593e-03	-2.445	-2.445	0.000	(0)
MgSO4	9.667e-04	9.667e-04	-3.015	-3.015	0.000	(0)
NaSO4-	4.021e-04	3.291e-04	-3.396	-3.483	-0.087	(0)
KSO4-	1.858e-04	1.520e-04	-3.731	-3.818	-0.087	(0)
FeSO4	1.175e-04	1.175e-04	-3.930	-3.930	0.000	(0)
NH4SO4-	4.187e-05	3.411e-05	-4.378	-4.467	-0.089	(0)
AlSO4+	2.991e-05	2.422e-05	-4.524	-4.616	-0.092	(0)
MnSO4	1.853e-05	1.853e-05	-4.732	-4.732	0.000	(0)
CuSO4	1.625e-05	1.625e-05	-4.789	-4.789	0.000	(0)
CoSO4	2.709e-06	2.709e-06	-5.567	-5.567	0.000	(0)
NiSO4	2.127e-06	2.127e-06	-5.672	-5.672	0.000	(0)
Al (SO4) 2-	2.039e-06	1.651e-06	-5.691	-5.782	-0.092	(0)
ZnSO4	1.897e-06	1.897e-06	-5.722	-5.722	0.000	(0)
HSO4-	1.859e-06	1.505e-06	-5.731	-5.822	-0.092	(0)
Zn (SO4) 2-2	3.109e-07	9.819e-08	-6.507	-7.008	-0.501	(0)
PbSO4	3.630e-08	3.630e-08	-7.440	-7.440	0.000	(0)
BeSO4	2.676e-08	2.676e-08	-7.572	-7.572	0.000	(0)
CrOHSO4	1.094e-08	1.094e-08	-7.961	-7.961	0.000	(0)
CrSO4+	4.025e-09	3.017e-09	-8.395	-8.520	-0.125	(0)
Pb (SO4) 2-2	3.946e-09	1.246e-09	-8.404	-8.904	-0.501	(0)
CdSO4	1.660e-09	1.660e-09	-8.780	-8.780	0.000	(0)
Be (SO4) 2-2	1.499e-09	4.735e-10	-8.824	-9.325	-0.501	(0)
Ni (SO4) 2-2	1.322e-09	4.176e-10	-8.879	-9.379	-0.501	(0)
Cd (SO4) 2-2	4.287e-10	1.354e-10	-9.368	-9.868	-0.501	(0)
FeSO4+	4.374e-12	3.563e-12	-11.359	-11.448	-0.089	(0)
Fe (SO4) 2-	6.024e-13	4.516e-13	-12.220	-12.345	-0.125	(0)
Cr2 (OH) 2SO4+2	2.533e-14	7.999e-15	-13.596	-14.097	-0.501	(0)
Cr2 (OH) 2 (SO4) 2	2.707e-15	2.707e-15	-14.567	-14.567	0.000	(0)
HgSO4	7.679e-25	7.679e-25	-24.115	-24.115	0.000	(0)
CrO3SO4-2	1.481e-35	4.676e-36	-34.830	-35.330	-0.501	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-51.955	-52.081	-0.125	(0)
Se (-2)	5.174e-20					
HSe-	5.083e-20	3.810e-20	-19.294	-19.419	-0.125	(0)
H2Se	9.087e-22	9.087e-22	-21.042	-21.042	0.000	(0)
MnSe	9.700e-25	9.700e-25	-24.013	-24.013	0.000	(0)
Se-2	2.763e-29	8.725e-30	-28.559	-29.059	-0.501	(0)
Se (4)	1.121e-07					
HSeO3-	1.117e-07	8.375e-08	-6.952	-7.077	-0.125	(0)
SeO3-2	3.246e-10	1.025e-10	-9.489	-9.989	-0.501	(0)
H2SeO3	1.076e-10	1.076e-10	-9.968	-9.968	0.000	(0)
FeHSeO3+2	3.905e-17	1.233e-17	-16.408	-16.909	-0.501	(0)
Cd (SeO3) 2-2	3.874e-23	1.223e-23	-22.412	-22.912	-0.501	(0)
Se (6)	8.973e-20					
SeO4-2	8.946e-20	3.868e-20	-19.048	-19.413	-0.364	(0)
MnSeO4	1.837e-22	1.837e-22	-21.736	-21.736	0.000	(0)
CoSeO4	4.441e-23	4.441e-23	-22.353	-22.353	0.000	(0)
NiSeO4	3.201e-23	3.201e-23	-22.495	-22.495	0.000	(0)

ZnSeO4	9.510e-24	9.510e-24	-23.022	-23.022	0.000	(0)
HSeO4-	6.944e-24	5.206e-24	-23.158	-23.284	-0.125	(0)
CdSeO4	9.499e-27	9.499e-27	-26.022	-26.022	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-41.928	-42.428	-0.501	(0)
Zn	5.932e-06					
Zn+2	3.671e-06	1.587e-06	-5.435	-5.799	-0.364	(0)
ZnSO4	1.897e-06	1.897e-06	-5.722	-5.722	0.000	(0)
Zn (SO4) 2-2	3.109e-07	9.819e-08	-6.507	-7.008	-0.501	(0)
ZnCl+	4.963e-08	3.993e-08	-7.304	-7.399	-0.094	(0)
ZnHCO3+	1.908e-09	1.430e-09	-8.719	-8.845	-0.125	(0)
ZnCl2	5.297e-10	5.297e-10	-9.276	-9.276	0.000	(0)
ZnOH+	4.628e-10	3.469e-10	-9.335	-9.460	-0.125	(0)
ZnOHCl	1.736e-10	1.736e-10	-9.760	-9.760	0.000	(0)
ZnCO3	3.882e-11	3.882e-11	-10.411	-10.411	0.000	(0)
ZnCl3-	5.324e-12	4.283e-12	-11.274	-11.368	-0.094	(0)
Zn (OH) 2	2.578e-13	2.578e-13	-12.589	-12.589	0.000	(0)
ZnCl4-2	4.855e-14	2.138e-14	-13.314	-13.670	-0.356	(0)
Zn (OH) 3-	5.516e-18	4.135e-18	-17.258	-17.384	-0.125	(0)
ZnSeO4	9.510e-24	9.510e-24	-23.022	-23.022	0.000	(0)
Zn (OH) 4-2	1.669e-24	5.269e-25	-23.778	-24.278	-0.501	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-41.928	-42.428	-0.501	(0)
ZnNO3+	0.000e+00	0.000e+00	-42.639	-42.765	-0.125	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-80.857	-80.857	0.000	(0)
Zn (HS) 2	0.000e+00	0.000e+00	-93.335	-93.335	0.000	(0)
ZnS (HS) -	0.000e+00	0.000e+00	-93.717	-93.842	-0.125	(0)
Zn (HS) 3-	0.000e+00	0.000e+00	-140.107	-140.233	-0.125	(0)
ZnS (HS) 2-2	0.000e+00	0.000e+00	-144.209	-144.710	-0.501	(0)
Zn (HS) 4-2	0.000e+00	0.000e+00	-191.370	-191.870	-0.501	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K,	1 atm)
(Co (NH3) 5Cl) (NO3) 2-105.73	-99.46	6.27	(Co (NH3) 5Cl) (NO3) 2	
(Co (NH3) 5Cl) Cl2 -33.22	-28.67	4.54	(Co (NH3) 5Cl) Cl2	
(Co (NH3) 5OH2) Cl3 -40.48	-28.67	11.81	(Co (NH3) 5OH2) Cl3	
(Co (NH3) 6) (NO3) 3-150.54	-132.61	17.93	(Co (NH3) 6) (NO3) 3	
(Co (NH3) 6) Cl3 -46.55	-26.42	20.13	(Co (NH3) 6) Cl3	
(NH4) 2CrO4 -27.96	-37.58	0.38	(NH4) 2CrO4	
(NH4) 2SeO4 -26.37	-25.92	0.45	(NH4) 2SeO4	
Al (OH) 3 (am) -0.80	10.33	11.13	Al (OH) 3	
Al2 (MoO4) 3 -34.78	-31.63	3.14	Al2 (MoO4) 3	
Al2O3 0.24	20.66	20.42	Al2O3	
Al4 (OH) 10SO4 5.36	28.06	22.70	Al4 (OH) 10SO4	
AlAsO4:2H2O -5.52	-0.72	4.80	AlAsO4:2H2O	
AlOHSO4 0.31	-2.92	-3.23	AlOHSO4	
Alunite 8.35	7.58	-0.78	KAl3 (SO4) 2 (OH) 6	
Anglesite -2.30	-10.13	-7.83	PbSO4	
Anhydrite -0.44	-4.78	-4.34	CaSO4	
Anilite -22.84	-55.26	-32.42	Cu0.25Cu1.5S	
Antlerite -3.66	5.13	8.79	Cu3 (OH) 4SO4	
Aragonite -3.65	-11.91	-8.26	CaCO3	
Arsenolite -40.42	-43.36	-2.94	As4O6	
Artinite -14.35	-4.39	9.96	MgCO3:Mg (OH) 2:3H2O	
As2O5 -28.86	-22.09	6.77	As2O5	
Atacamite -2.90	4.77	7.67	Cu2 (OH) 3Cl	
Azurite -5.75	-22.38	-16.62	Cu3 (OH) 2 (CO3) 2	
Ba (OH) 2:8H2O -20.49	4.07	24.56	Ba (OH) 2:8H2O	
Ba3 (AsO4) 2 -0.93	-9.88	-8.94	Ba3 (AsO4) 2	
BaCrO4 -28.24	-38.01	-9.77	BaCrO4	
BaHPO4 -6.46	-26.23	-19.77	BaHPO4	
BaMoO4 -6.37	-13.36	-6.99	BaMoO4	
Barite 0.87	-9.18	-10.05	BaSO4	
BaS -67.79	-51.61	16.18	BaS	
BaSeO3 -10.30	-8.51	1.79	BaSeO3	
BaSeO4 -18.82	-26.35	-7.53	BaSeO4	
Be (OH) 2 (alpha) -3.32	3.57	6.89	Be (OH) 2	
Be (OH) 2 (am) -3.62	3.57	7.19	Be (OH) 2	

Be (OH) 2 (beta)	-2.92	3.57	6.49	Be (OH) 2
BeMoO4	-12.24	-13.86	-1.61	BeMoO4
BeS	-71.49	-52.11	19.38	BeS
BeSeO4:4H2O	-23.91	-26.85	-2.94	BeSeO4:4H2O
Bianchite	-6.28	-8.05	-1.76	ZnSO4:6H2O
Birnessite	-18.40	-0.31	18.09	MnO2
Bixbyite	-19.41	-19.69	-0.27	Mn2O3
BlaubleiI	-26.15	-50.31	-24.16	Cu0.9Cu0.2S
BlaubleiII	-25.32	-52.59	-27.28	Cu0.6Cu0.8S
Boehmite	1.40	10.33	8.93	AlOOH
Brochantite	-4.57	11.25	15.82	Cu4 (OH) 6SO4
Brucite	-9.19	7.99	17.18	Mg (OH) 2
Bunsenite	-7.45	5.29	12.74	NiO
Ca3 (AsO4) 2:4H2O	-18.99	3.31	22.30	Ca3 (AsO4) 2:4H2O
Ca3 (PO4) 2 (beta)	-6.13	-35.21	-29.08	Ca3 (PO4) 2
Ca4H (PO4) 3:3H2O	-9.97	-57.05	-47.08	Ca4H (PO4) 3:3H2O
CaCrO4	-31.43	-33.61	-2.19	CaCrO4
CaHPO4	-2.47	-21.84	-19.37	CaHPO4
CaHPO4:2H2O	-2.78	-21.84	-19.06	CaHPO4:2H2O
Calcite	-3.45	-11.91	-8.46	CaCO3
Calomel	-11.44	-29.62	-18.18	Hg2Cl2
CaMoO4	-1.02	-8.96	-7.94	CaMoO4
CaSeO3:2H2O	-6.99	-4.11	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-18.96	-21.95	-3.00	CaSeO4:2H2O
Cd (BO2) 2	-17.85	-8.01	9.84	Cd (BO2) 2
Cd (OH) 2	-11.80	2.12	13.93	Cd (OH) 2
Cd (OH) 2 (am)	-11.86	2.12	13.99	Cd (OH) 2
Cd3 (OH) 2 (SO4) 2	-26.83	-20.12	6.71	Cd3 (OH) 2 (SO4) 2
Cd3 (OH) 4SO4	-29.43	-6.87	22.56	Cd3 (OH) 4SO4
Cd3 (PO4) 2	-21.63	-54.23	-32.60	Cd3 (PO4) 2
Cd4 (OH) 6SO4	-33.15	-4.75	28.40	Cd4 (OH) 6SO4
CdCl2	-12.24	-12.85	-0.60	CdCl2
CdCl2:1H2O	-11.18	-12.85	-1.67	CdCl2:1H2O
CdCl2:2.5H2O	-10.91	-12.85	-1.93	CdCl2:2.5H2O
Cdmetal (alpha)	-30.68	-16.94	13.74	Cd
Cdmetal (gamma)	-30.79	-16.94	13.84	Cd
CdMoO4	-1.10	-15.31	-14.21	CdMoO4
CdOHCl	-8.99	-5.36	3.63	CdOHCl
CdSe	-2.37	-22.80	-20.43	CdSe
CdSeO4:2H2O	-26.44	-28.29	-1.85	CdSeO4:2H2O
CdSO4	-11.11	-11.12	-0.02	CdSO4
CdSO4:1H2O	-9.49	-11.12	-1.63	CdSO4:1H2O
CdSO4:2.67H2O	-9.31	-11.13	-1.82	CdSO4:2.67H2O
Cerussite	-4.05	-17.26	-13.20	PbCO3
CH4 (g)	-54.84	-96.65	-41.81	CH4
Chalcanthite	-4.47	-7.13	-2.66	CuSO4:5H2O
Chalcocite	-21.74	-57.16	-35.42	Cu2S
Chalcopyrite	-62.57	-98.28	-35.71	CuFeS2
Cinnabar	-28.71	-75.16	-46.45	HgS
Claudetite	-40.13	-43.36	-3.23	As4O6
Clausthalite	5.65	-21.80	-27.46	PbSe
Co (BO2) 2	-31.80	-4.73	27.07	Co (BO2) 2
Co (OH) 2	-7.69	5.40	13.09	Co (OH) 2
Co (OH) 3	-15.43	-17.47	-2.03	Co (OH) 3
CO2 (g)	-2.22	-20.38	-18.16	CO2
Co3 (AsO4) 2	-18.92	-5.89	13.03	Co3 (AsO4) 2
Co3 (PO4) 2	-9.72	-44.40	-34.69	Co3 (PO4) 2
Co3O4	-19.35	-29.53	-10.18	Co3O4
CoCl2	-18.08	-9.57	8.50	CoCl2
CoCl2:6H2O	-12.09	-9.57	2.51	CoCl2:6H2O
CoCO3	-5.03	-14.98	-9.94	CoCO3
CoFe2O4	15.11	12.06	-3.06	CoFe2O4
CoHPO4	-5.84	-24.90	-19.06	CoHPO4
CoMoO4	-4.34	-12.03	-7.69	CoMoO4
CoO	-8.50	5.40	13.90	CoO
CoS (alpha)	-42.84	-50.28	-7.44	CoS
CoS (beta)	-39.21	-50.28	-11.07	CoS
CoSe	-3.32	-19.52	-16.20	CoSe

CoSeO3	-8.50	-7.18	1.32	CoSeO3
CoSeO4:6H2O	-23.49	-25.02	-1.53	CoSeO4:6H2O
CoSO4	-10.89	-7.85	3.04	CoSO4
CoSO4:6H2O	-5.38	-7.85	-2.48	CoSO4:6H2O
Cotunnite	-6.99	-11.85	-4.86	PbCl2
Covellite	-26.97	-49.55	-22.59	CuS
Cr(OH)2	-20.53	-9.60	10.92	Cr(OH)2
Cr(OH)3	-4.42	-3.00	1.42	Cr(OH)3
Cr(OH)3(am)	-2.25	-3.00	-0.75	Cr(OH)3
Cr2O3	-3.79	-6.00	-2.21	Cr2O3
CrCl2	-39.00	-24.58	14.42	CrCl2
CrCl3	-40.93	-25.46	15.47	CrCl3
Crmetal	-59.67	-28.67	30.99	Cr
CrO3	-38.88	-42.08	-3.20	CrO3
Cu(OH)2	-2.72	6.13	8.84	Cu(OH)2
Cu2(OH)3NO3	-40.10	-30.63	9.47	Cu2(OH)3NO3
Cu2Se(alpha)	20.04	-26.40	-46.44	Cu2Se
Cu2SO4	-12.83	-14.73	-1.89	Cu2SO4
Cu3(AsO4)2:2H2O	-9.81	-3.71	6.10	Cu3(AsO4)2:2H2O
Cu3(PO4)2	-5.38	-42.23	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-7.11	-42.23	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	19.31	-45.19	-64.50	Cu3Se2
CuCO3	-2.75	-14.25	-11.50	CuCO3
CuCrO4	-30.51	-35.95	-5.44	CuCrO4
Cumetal	-1.30	-10.27	-8.97	Cu
CuMoO4	1.81	-11.30	-13.11	CuMoO4
CuOCuSO4	-11.71	-1.00	10.71	CuOCuSO4
Cupricferrite	6.17	12.78	6.61	CuFe2O4
Cuprite	-0.44	-1.48	-1.04	Cu2O
Cuprousferrite	11.46	2.59	-8.87	CuFeO2
CuSe	14.66	-18.80	-33.46	CuSe
CuSe2	9.13	-24.65	-33.78	CuSe2
CuSeO3:2H2O	-7.08	-6.45	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-21.85	-24.29	-2.44	CuSeO4:5H2O
CuSO4	-10.28	-7.12	3.16	CuSO4
Diaspore	3.15	10.33	7.18	AlOOH
Djurleite	-22.14	-56.65	-34.51	Cu0.066Cu1.868S
Dolomite(disordered)	-7.89	-24.30	-16.40	CaMg(CO3)2
Dolomite(ordered)	-7.32	-24.30	-16.97	CaMg(CO3)2
Epsomite	-3.10	-5.26	-2.16	MgSO4:7H2O
Fe(OH)2	-6.61	6.95	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	4.12	1.08	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-7.48	-5.92	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-10.46	-31.08	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-30.08	-33.09	-3.02	Fe2(SO4)3
Fe3(OH)8	-6.62	13.61	20.22	Fe3(OH)8
FeAsO4:2H2O	-8.12	-7.72	0.40	FeAsO4:2H2O
FeCr2O4	-6.66	0.96	7.62	FeCr2O4
FeMoO4	-0.42	-10.48	-10.06	FeMoO4
Ferrihydrite	-0.08	3.33	3.41	Fe(OH)3
Ferroselite	-5.09	-23.82	-18.74	FeSe2
FeS(ppt)	-45.81	-48.73	-2.92	FeS
FeSe	-6.96	-17.97	-11.01	FeSe
Galena	-38.35	-52.56	-14.21	PbS
Gibbsite	1.75	10.33	8.57	Al(OH)3
Goethite	2.66	3.33	0.67	FeOOH
Goslarite	-5.99	-8.05	-2.05	ZnSO4:7H2O
Greenockite	-39.03	-53.55	-14.52	CdS
Greigite	-164.08	-209.11	-45.03	Fe3S4
Gypsum	-0.17	-4.78	-4.61	CaSO4:2H2O
H-Jarosite	-5.10	-16.52	-11.41	(H3O)Fe3(SO4)2(OH)6
H2MoO4	-4.41	-17.43	-13.02	H2MoO4
H2S(g)	-47.67	-55.68	-8.01	H2S
H2Se(g)	-20.01	-24.92	-4.91	H2Se
Halite	-5.54	-3.95	1.59	NaCl
Hausmannite	-24.33	37.95	62.28	Mn3O4
Hematite	7.69	6.66	-1.03	Fe2O3
Hercynite	3.79	27.61	23.83	FeAl2O4

Hg (CH3) 2 (g)	-137.63	-212.77	-75.14	Hg (CH3) 2
Hg (g)	-8.92	-16.86	-7.94	Hg
Hg (OH) 2	-15.98	-19.48	-3.50	Hg (OH) 2
Hg2 (g)	-18.59	-33.72	-15.13	Hg2
Hg2 (OH) 2	-19.91	-14.65	5.26	Hg2 (OH) 2
Hg2CO3	-18.84	-35.02	-16.18	Hg2CO3
Hg2CrO4	-48.03	-56.73	-8.70	Hg2CrO4
Hg2HPO4	-20.18	-44.95	-24.77	Hg2HPO4
Hg2S	-58.44	-70.33	-11.88	Hg2S
Hg2SeO3	-22.57	-27.23	-4.66	Hg2SeO3
Hg2SO4	-21.75	-27.90	-6.15	Hg2SO4
Hg3O2CO3	-49.13	-78.81	-29.68	Hg3O2CO3
HgCl (g)	-34.79	-14.81	19.98	HgCl
HgCl2	-12.87	-34.45	-21.58	HgCl2
Hgmetal (l)	-3.16	-16.86	-13.70	Hg
HgSe	11.30	-44.40	-55.69	HgSe
HgSeO3	-19.63	-32.06	-12.43	HgSeO3
HgSO4	-23.26	-32.73	-9.46	HgSO4
Hinsdalite	-6.95	-9.45	-2.50	PbAl3PO4SO4 (OH) 6
Huntite	-19.42	-49.07	-29.65	CaMg3 (CO3) 4
Hydrocerussite	-12.63	-31.40	-18.77	Pb3 (OH) 2 (CO3) 2
Hydromagnesite	-33.43	-41.55	-8.12	Mg5 (CO3) 4 (OH) 2 : 4H2O
Hydroxylapatite	-4.25	-48.58	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-12.52	-75.31	-62.79	Pb5 (PO4) 3OH
K-Alum	-7.82	-13.08	-5.26	KAl (SO4) 2 : 12H2O
K-Jarosite	0.99	-13.43	-14.41	KFe3 (SO4) 2 (OH) 6
K2Cr2O7	-60.49	-77.98	-17.48	K2Cr2O7
K2CrO4	-35.33	-35.90	-0.57	K2CrO4
K2MoO4	-14.52	-11.25	3.27	K2MoO4
K2SeO4	-23.51	-24.24	-0.73	K2SeO4
Langite	-6.73	11.25	17.98	Cu4 (OH) 6SO4 : H2O
Larnakite	-6.64	-7.01	-0.37	PbO : PbSO4
Laurionite	-4.99	-4.37	0.62	PbOHCl
Lepidocrocite	1.96	3.33	1.37	FeOOH
Lime	-24.81	8.47	33.28	CaO
Litharge	-9.77	3.12	12.89	PbO
Mackinawite	-45.13	-48.73	-3.60	FeS
Maghemite	0.27	6.66	6.39	Fe2O3
Magnesioferrite	-3.04	14.65	17.69	Fe2MgO4
Magnesite	-4.87	-12.38	-7.52	MgCO3
Magnetite	9.59	13.61	4.02	Fe3O4
Malachite	-2.59	-8.13	-5.53	Cu2 (OH) 2CO3
Manganite	-9.51	15.83	25.34	MnOOH
Massicot	-9.97	3.12	13.09	PbO
Melanothallite	-15.29	-8.85	6.45	CuCl2
Melanterite	-4.03	-6.30	-2.27	FeSO4 : 7H2O
Metacinnabar	-29.31	-75.16	-45.85	HgS
Mg (OH) 2 (active)	-10.80	7.99	18.79	Mg (OH) 2
Mg3 (PO4) 2	-13.35	-36.63	-23.28	Mg3 (PO4) 2
MgCr2O4	-14.74	1.99	16.73	MgCr2O4
MgCrO4	-39.73	-34.09	5.64	MgCrO4
MgHPO4 : 3H2O	-4.14	-22.31	-18.18	MgHPO4 : 3H2O
MgMoO4	-7.59	-9.44	-1.85	MgMoO4
MgSeO3 : 6H2O	-7.63	-4.59	3.04	MgSeO3 : 6H2O
MgSeO4 : 6H2O	-21.23	-22.43	-1.20	MgSeO4 : 6H2O
Minium	-46.35	28.42	74.77	Pb3O4
Mirabilite	-4.83	-6.18	-1.35	Na2SO4 : 10H2O
Mn2 (SO4) 3	-54.21	-59.43	-5.23	Mn2 (SO4) 3
Mn3 (AsO4) 2 : 8H2O	-15.71	-3.21	12.50	Mn3 (AsO4) 2 : 8H2O
Mn3 (PO4) 2	-17.87	-41.73	-23.85	Mn3 (PO4) 2
MnCl2 : 4H2O	-11.43	-8.68	2.75	MnCl2 : 4H2O
MnHPO4	1.39	-24.01	-25.40	MnHPO4
MnS (grn)	-49.65	-49.39	0.27	MnS
MnS (pnk)	-52.73	-49.39	3.34	MnS
MnSe	-22.42	-18.63	3.79	MnSe
MnSeO3	-7.42	-6.29	1.13	MnSeO3
MnSeO3 : 2H2O	-7.24	-6.29	0.96	MnSeO3 : 2H2O
MnSeO4 : 5H2O	-22.08	-24.13	-2.05	MnSeO4 : 5H2O

MnSO4	-9.73	-6.96	2.78	MnSO4
Monteponite	-13.29	2.13	15.41	CdO
Montroydite	-15.95	-19.48	-3.52	HgO
MoO3	-9.43	-17.43	-8.00	MoO3
Morenosite	-5.78	-7.96	-2.18	NiSO4:7H2O
MoS2	-76.44	-147.86	-71.41	MoS2
Na-Jarosite	-2.23	-12.98	-10.75	NaFe3(SO4)2(OH)6
Na2Cr2O7	-67.12	-77.08	-9.96	Na2Cr2O7
Na2CrO4	-37.99	-35.01	2.99	Na2CrO4
Na2Mo2O7	-11.02	-27.79	-16.76	Na2Mo2O7
Na2MoO4	-11.88	-10.36	1.52	Na2MoO4
Na2MoO4:2H2O	-11.58	-10.36	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-15.81	-5.51	10.30	Na2SeO3:5H2O
Na2SeO4	-24.62	-23.34	1.28	Na2SeO4
Nantokite	-1.37	-8.22	-6.86	CuCl
Natron	-11.80	-13.31	-1.51	Na2CO3:10H2O
Nesquehonite	-7.79	-12.39	-4.60	MgCO3:3H2O
Ni(OH)2	-7.79	5.29	13.08	Ni(OH)2
Ni3(AsO4)2:8H2O	-21.91	-6.21	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-13.42	-44.72	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-24.07	7.93	32.00	Ni4(OH)6SO4
NiCO3	-8.34	-15.08	-6.75	NiCO3
NiMoO4	-0.99	-12.14	-11.15	NiMoO4
NiS(alpha)	-44.79	-50.39	-5.60	NiS
NiS(beta)	-39.29	-50.39	-11.10	NiS
NiS(gamma)	-37.59	-50.39	-12.80	NiS
NiSe	-1.93	-19.63	-17.70	NiSe
NiSeO3:2H2O	-10.19	-7.29	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-23.61	-25.13	-1.52	NiSeO4:6H2O
Nsutite	-17.81	-0.31	17.50	MnO2
O2(g)	-46.65	38.13	84.79	O2
Orpiment	-126.61	-188.72	-62.11	As2S3
Otavite	-6.25	-18.25	-12.00	CdCO3
Pb(BO2)2	-13.58	-7.02	6.57	Pb(BO2)2
Pb(OH)2	-5.21	3.12	8.32	Pb(OH)2
Pb10(OH)60(CO3)6	-82.31	-91.07	-8.76	Pb10(OH)60(CO3)6
Pb2(OH)3Cl	-10.04	-1.25	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-19.95	6.24	26.19	Pb2O(OH)2
Pb2O3	-35.73	25.31	61.04	Pb2O3
Pb2OCO3	-13.70	-14.14	-0.44	Pb2OCO3
Pb3(AsO4)2	-18.53	-12.73	5.80	Pb3(AsO4)2
Pb3(PO4)2	-7.72	-51.25	-43.53	Pb3(PO4)2
Pb3O2CO3	-22.37	-11.02	11.35	Pb3O2CO3
Pb3O2SO4	-14.81	-3.89	10.92	Pb3O2SO4
Pb4(OH)6SO4	-21.87	-0.77	21.10	Pb4(OH)6SO4
Pb4O3SO4	-23.06	-0.77	22.28	Pb4O3SO4
PbCrO4	-26.23	-38.96	-12.73	PbCrO4
PbHPO4	-3.38	-27.18	-23.81	PbHPO4
Pbmetal	-20.19	-15.95	4.24	Pb
PbMoO4	1.47	-14.31	-15.78	PbMoO4
PbO:0.3H2O	-9.86	3.12	12.98	PbO:0.33H2O
PbSeO4	-20.41	-27.30	-6.88	PbSeO4
Periclase	-14.04	7.99	22.03	MgO
Phosgenite	-9.30	-29.11	-19.81	PbCl2:PbCO3
Plattnerite	-28.29	22.19	50.48	PbO2
Plumbgummite	6.29	-26.50	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-14.72	8.47	23.19	Ca(OH)2
Pyrite	-66.68	-85.34	-18.66	FeS2
Pyrochroite	-9.19	6.29	15.48	Mn(OH)2
Pyrolusite	-16.83	25.36	42.19	MnO2
Pyromorphite	1.63	-82.80	-84.43	Pb5(PO4)3Cl
Realgar	-55.93	-76.05	-20.13	AsS
Retgersite	-5.90	-7.96	-2.05	NiSO4:6H2O
Rhodochrosite	-3.51	-14.08	-10.57	MnCO3
Semetal(am)	1.29	-5.85	-7.14	Se
Semetal(hex)	1.90	-5.85	-7.76	Se
SeO2	-12.70	-12.58	0.12	SeO2
SeO3	-51.90	-30.42	21.48	SeO3

Siderite	-3.23	-13.42	-10.19	FeCO3
Smithsonite	-5.22	-15.17	-9.95	ZnCO3
Sphalerite	-38.94	-50.47	-11.54	ZnS
Spinel	-9.35	28.65	38.00	MgAl2O4
Strengite	-0.60	-26.98	-26.37	FePO4:2H2O
Sulfur	-34.52	-36.61	-2.10	S
Tenorite	-1.71	6.13	7.84	CuO
Thenardite	-6.52	-6.18	0.35	Na2SO4
Thermonatrite	-13.97	-13.30	0.67	Na2CO3:H2O
Tsumebite	-8.15	-17.94	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	-3.75	-39.75	-36.00	Fe3(PO4)2:8H2O
Witherite	-7.72	-16.31	-8.58	BaCO3
Wurtzite	-41.46	-50.47	-9.01	ZnS
Zincite	-6.39	5.21	11.60	ZnO
Zincosite	-12.22	-8.04	4.17	ZnSO4
Zn(BO2)2	-13.22	-4.93	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-83.80	-80.56	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-6.99	5.21	12.20	Zn(OH)2
Zn(OH)2(am)	-7.51	5.21	12.71	Zn(OH)2
Zn(OH)2(beta)	-6.80	5.21	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-6.57	5.21	11.78	Zn(OH)2
Zn(OH)2(gamma)	-6.53	5.21	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.34	-2.84	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.27	2.92	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-20.12	-6.47	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-9.57	-44.99	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-30.56	-10.88	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-20.83	7.57	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-27.45	11.05	38.50	Zn5(OH)8Cl2
ZnCl2	-17.03	-9.77	7.27	ZnCl2
ZnCO3:1H2O	-4.91	-15.17	-10.26	ZnCO3:1H2O
Znmetal	-40.11	-13.86	26.24	Zn
ZnMoO4	-2.13	-12.22	-10.09	ZnMoO4
ZnO(active)	-6.25	5.21	11.45	ZnO
ZnS(am)	-41.38	-50.47	-9.10	ZnS
ZnSe	-5.24	-19.72	-14.48	ZnSe
ZnSeO4:6H2O	-23.69	-25.21	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.54	-8.04	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 4.

End of Run after 0.246 Seconds.

Input file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\PHREEQC\2 Mixing
 \Kanmantoo Scenario 2a mixing worst case.pqi
 Output file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\PHREEQC\2 Mixing
 \Kanmantoo Scenario 2a mixing worst case.pqi
 Database file: C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
 \minteq.v4.dat

 Reading data base.

SOLUTION_MASTER_SPECIES
 SOLUTION_SPECIES
 SOLUTION_SPECIES
 PHASES
 PHASES
 SURFACE_MASTER_SPECIES
 SURFACE_SPECIES
 END

 Reading input data for simulation 1.

DATABASE C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
 \minteq.v4.dat
 SELECTED_OUTPUT 1
 file Kanmantoo Scenario 2a mixing.sel
 totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg
 Na K Alkalinity Cl S(6) Hg
 SOLUTION_MASTER_SPECIES
 Co Co+3 -1.0 Co 58.9332
 Co(2) Co+2 0.0 Co
 Co(3) Co+3 -1.0 Co
 END

 End of simulation.

 Reading input data for simulation 2.

PHASES
 CoO
 CoO + 2H+ = Co+2 + H2O
 log_k 13.5864
 delta_h -106.295 kJ
 Co(OH)2
 Co(OH)2 + 2H+ = Co+2 + 2H2O
 log_k 13.094
 delta_h -0 kJ
 Co(OH)3
 Co(OH)3 + 3H+ = Co+3 + 3H2O
 log_k -2.309
 delta_h -92.43 kJ
 Co3O4
 Co3O4 + 8H+ = Co+2 + 2Co+3 + 4H2O
 log_k -10.4956
 delta_h -107.5 kJ
 CoFe2O4
 CoFe2O4 + 8H+ = Co+2 + 2Fe+3 + 4H2O
 log_k -3.5281
 delta_h -158.82 kJ
 CoCl2
 CoCl2 = Co+2 + 2Cl-
 log_k 8.2672
 delta_h -79.815 kJ
 CoCl2:6H2O

```

      CoCl2:6H2O = Co+2 + 2Cl- + 6H2O
      log_k 2.5365
      delta_h      8.0598      kJ
(Co(NH3)6)Cl3
      (Co(NH3)6)Cl3 + 6H+ = Co+3 + 6NH4+ + 3Cl-
      log_k 20.0317
      delta_h      -33.1      kJ
(Co(NH3)5OH2)Cl3
      (Co(NH3)5OH2)Cl3 + 5H+ = Co+3 + 5NH4+ + 3Cl- + H2O
      log_k 11.7351
      delta_h      -25.37      kJ
(Co(NH3)5Cl)Cl2
      (Co(NH3)5Cl)Cl2 + 5H+ = Co+3 + 5NH4+ + 3Cl-
      log_k 4.5102
      delta_h      -10.74      kJ
CoCO3
      CoCO3 = Co+2 + CO3-2
      log_k -9.98
      delta_h      -12.7612      kJ
CoSO4
      CoSO4 = Co+2 + SO4-2
      log_k 2.8024
      delta_h      -79.277      kJ
CoSO4:6H2O
      CoSO4:6H2O = Co+2 + SO4-2 + 6H2O
      log_k -2.4726
      delta_h      1.0801      kJ

```

END

End of simulation.

Reading input data for simulation 3.

SOLUTION 1 #Groundwater worst case maximum values

```

temp      21
pH        5.05
pe        1
redox     pe
units     mg/l
density   1
Al        5.21
Alkalinity 0
As        0
Ba        0
Be        0
B         0
Cd        0.04
Co        24.2
Cr        0
Cu        9.29
Fe        937
Pb        0.01
Mn        171
Mo        0
V         0
Zn        1.78
Se        0.08
Ni        5.57
N         60
P         23.6
Ca        590
Mg        1340
Na        5880
K         216
Cl        9420

```

S(6)	9110
Hg	0.0004
water	1 # kg
SOLUTION 2 #Mean River Murray water quality	
temp	20
pH	7.5
pe	4
redox	pe
units	mg/l
density	1
Al	1.48
Alkalinity	61
As	0.0013
Ba	0.0478
Be	0
B	0.05
Cd	0.0007
Co	0.0006
Cr	0.0021
Cu	0.006
Fe	1.37
Pb	0.0012
Mn	0.06
Mo	0.0003
Zn	0.0164
Se	0.0002
Ni	0.0028
N	1.05
P	0.11
Ca	13
Mg	9
Na	49
K	4
Cl	79
S(6)	17
Hg	0.00008
water	1 # kg
SOLUTION 3 #Mean Mt Barker water quality	
temp	20
pH	6.18
pe	4
redox	pe
units	mg/l
density	1
Al	0.04
Alkalinity	50
As	0.002
Ba	0.012
Be	0
B	0.088
Cd	0
Co	0.039
Cr	0.007
Cu	0.022
Fe	0.493
Pb	0.003
Mn	0.046
Mo	0.009
Zn	0.023
Se	0.002
Ni	0.011
N	24.3
P	0.52
Ca	32
Mg	17
Na	132
K	25
Cl	231

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S(6)      190
Hg         0
water     1 # kg
SOLUTION 4 #Mean RWD water quality
temp      20
pH         4.05
pe         4
redox      pe
units      mg/l
density    1
Al         1.42
Alkalinity 0
As         0.002
Ba         0.04
Be         0.002
B          0.1
Cd         0.0008
Co         0.72
Cr         0.0033
Cu         6.25
Fe         24.67
Pb         0.02
Mn         5.22
Mo         0.11
Zn         0.49
Se         0.01
Ni         0.49
N          10.07
P          0.29
Ca         522
Mg         88
Na         343
K          245
Cl         490
S(6)      2222
Hg         0
water     1 # kg
MIX 1
1         0.03
2         0.1
3         0.1
4         0.77

```

Beginning of initial solution calculations.

Initial solution 1.

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-----Solution composition-----

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Elements	Molality	Moles
Al	1.986e-04	1.986e-04
Ca	1.514e-02	1.514e-02
Cd	3.660e-07	3.660e-07
Cl	2.733e-01	2.733e-01
Co	4.224e-04	4.224e-04
Cu	1.504e-04	1.504e-04
Fe	1.726e-02	1.726e-02
Hg	2.051e-09	2.051e-09
K	5.682e-03	5.682e-03
Mg	5.671e-02	5.671e-02
Mn	3.202e-03	3.202e-03
N	4.406e-03	4.406e-03
Na	2.631e-01	2.631e-01
Ni	9.762e-05	9.762e-05
P	7.837e-04	7.837e-04
Pb	4.964e-08	4.964e-08

S (6)	9.754e-02	9.754e-02
Se	1.042e-06	1.042e-06
Zn	2.800e-05	2.800e-05

-----Description of solution-----

pH	=	5.050
pe	=	1.000
Activity of water	=	0.988
Ionic strength (mol/kgw)	=	4.862e-01
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	1.381e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	21.00
Electrical balance (eq)	=	-9.552e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.26
Iterations	=	14
Total H	=	1.110329e+02
Total O	=	5.590014e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.214e-05	8.913e-06	-4.916	-5.050	-0.134	0.00
OH-	1.292e-09	8.222e-10	-8.889	-9.085	-0.196	(0)
H2O	5.551e+01	9.883e-01	1.744	-0.005	0.000	18.05
Al	1.986e-04					
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
Al (SO4) 2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Al+3	1.839e-05	1.139e-06	-4.735	-5.943	-1.208	(0)
AlOH+2	4.197e-06	9.786e-07	-5.377	-6.009	-0.632	(0)
Al (OH) 2+	1.624e-06	1.128e-06	-5.790	-5.948	-0.158	(0)
Al (OH) 3	2.514e-08	2.514e-08	-7.600	-7.600	0.000	(0)
Al (OH) 4-	2.040e-09	1.366e-09	-8.690	-8.864	-0.174	(0)
Ca	1.514e-02					
Ca+2	8.161e-03	2.370e-03	-2.088	-2.625	-0.537	(0)
CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
CaOH+	5.236e-11	3.715e-11	-10.281	-10.430	-0.149	(0)
Ca (NH3) 2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
Cd	3.660e-07					
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
Cd (SO4) 2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
Cd+2	1.502e-08	4.363e-09	-7.823	-8.360	-0.537	(0)
CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
CdOHC1	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CdOH+	6.462e-14	2.865e-14	-13.190	-13.543	-0.353	(0)
Cd2OH+3	9.945e-19	6.582e-22	-18.002	-21.182	-3.179	(0)
Cd (OH) 2	2.726e-19	2.726e-19	-18.564	-18.564	0.000	(0)
Cd (OH) 3-	4.195e-26	1.860e-26	-25.377	-25.730	-0.353	(0)
Cd (OH) 4-2	8.799e-35	3.400e-36	-34.056	-35.469	-1.413	(0)
Cd (SeO3) 2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cl	2.733e-01					
Cl-	2.729e-01	2.003e-01	-0.564	-0.698	-0.134	(0)
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)

CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
ZnOHC1	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CdOHC1	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co (2)	4.224e-04					
Co+2	3.644e-04	1.408e-05	-3.438	-4.851	-1.413	(0)
CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
Co (NH3) +2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CoOH+	7.075e-10	3.137e-10	-9.150	-9.504	-0.353	(0)
Co2OH+3	3.344e-13	2.213e-16	-12.476	-15.655	-3.179	(0)
Co (NH3) 2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Co (OH) 2	2.782e-14	2.782e-14	-13.556	-13.556	0.000	(0)
Co (NH3) 3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Co (OH) 3-	1.398e-21	6.199e-22	-20.854	-21.208	-0.353	(0)
CoOOH-	8.505e-23	3.771e-23	-22.070	-22.424	-0.353	(0)
Co4 (OH) 4+4	8.668e-25	1.932e-30	-24.062	-29.714	-5.652	(0)
Co (NH3) 4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
Co (OH) 4-2	2.839e-30	1.097e-31	-29.547	-30.960	-1.413	(0)
Co (NH3) 5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Co (3)	8.287e-32					
CoOH+2	8.232e-32	3.180e-33	-31.085	-32.498	-1.413	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co+3	9.049e-36	5.605e-37	-35.043	-36.251	-1.208	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
Cu (1)	1.504e-04					
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)

Cu+	1.823e-08	8.082e-09	-7.739	-8.092	-0.353	(0)
Cu (2)	1.182e-09					
Cu+2	5.900e-10	1.714e-10	-9.229	-9.766	-0.537	(0)
CuSO4	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
CuOH+	7.604e-13	4.972e-13	-12.119	-12.303	-0.185	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
Cu (OH) 2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
Cu2 (OH) 2+2	1.564e-19	6.042e-21	-18.806	-20.219	-1.413	(0)
Cu (OH) 3-	6.965e-22	3.088e-22	-21.157	-21.510	-0.353	(0)
Cu (OH) 4-2	7.024e-29	2.714e-30	-28.153	-29.566	-1.413	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Fe (2)	1.726e-02					
Fe+2	1.529e-02	5.907e-04	-1.816	-3.229	-1.413	(0)
FeSO4	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
FeOH+	2.826e-08	1.934e-08	-7.549	-7.714	-0.165	(0)
Fe (OH) 2	1.209e-14	1.209e-14	-13.918	-13.918	0.000	(0)
Fe (OH) 3-	6.009e-18	4.111e-18	-17.221	-17.386	-0.165	(0)
Fe (3)	2.087e-10					
Fe (OH) 2+	1.957e-10	1.360e-10	-9.708	-9.867	-0.158	(0)
FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
FeOH+2	1.136e-12	2.489e-13	-11.945	-12.604	-0.659	(0)
Fe (OH) 3	9.228e-14	9.228e-14	-13.035	-13.035	0.000	(0)
FeSO4+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe (SO4) 2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Fe+3	7.010e-15	4.342e-16	-14.154	-15.362	-1.208	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
Fe (OH) 4-	2.440e-17	1.696e-17	-16.613	-16.771	-0.158	(0)
Fe2 (OH) 2+4	1.061e-18	2.365e-24	-17.974	-23.626	-5.652	(0)
Fe3 (OH) 4+5	3.023e-24	4.459e-33	-23.520	-32.351	-8.831	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
H (0)	1.047e-15					
H2	5.235e-16	5.855e-16	-15.281	-15.232	0.049	(0)
Hg (0)	2.051e-09					
Hg	2.051e-09	2.051e-09	-8.688	-8.688	0.000	(0)
Hg (1)	9.698e-28					
Hg2+2	4.849e-28	1.874e-29	-27.314	-28.727	-1.413	(0)
Hg (2)	4.726e-15					
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
Hg (NH3) 2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Hg (OH) 2	1.022e-25	1.143e-25	-24.991	-24.942	0.049	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
HgOH+	1.615e-27	7.162e-28	-26.792	-27.145	-0.353	(0)
Hg+2	4.674e-28	1.806e-29	-27.330	-28.743	-1.413	(0)
HgSO4	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Hg (NH3) 3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Hg (OH) 3-	3.623e-35	1.606e-35	-34.441	-34.794	-0.353	(0)
Hg (NH3) 4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Hg (NO3) 2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
K	5.682e-03					
K+	5.178e-03	3.801e-03	-2.286	-2.420	-0.134	(0)

KSO4-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
KHPO4-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
Mg	5.671e-02					
Mg+2	3.360e-02	9.758e-03	-1.474	-2.011	-0.537	(0)
MgSO4	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
MgHPO4	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
MgOH+	4.148e-09	2.990e-09	-8.382	-8.524	-0.142	(0)
MgPO4-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
Mn (2)	3.202e-03					
Mn+2	2.899e-03	1.120e-04	-2.538	-3.951	-1.413	(0)
MnSO4	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
MnOH+	3.381e-10	2.313e-10	-9.471	-9.636	-0.165	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Mn (OH) 3-	3.538e-24	2.421e-24	-23.451	-23.616	-0.165	(0)
Mn (OH) 4-2	3.983e-32	8.727e-33	-31.400	-32.059	-0.659	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Mn (3)	4.471e-28					
Mn+3	4.471e-28	2.769e-29	-27.350	-28.558	-1.208	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-79.028	-79.687	-0.659	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-88.115	-88.325	-0.210	(0)
N (-3)	4.406e-03					
NH4+	3.919e-03	2.335e-03	-2.407	-2.632	-0.225	(0)
NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
NH3	1.123e-07	1.123e-07	-6.950	-6.950	0.000	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
Co (NH3) +2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
Ni (NH3) 2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Co (NH3) 2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Ca (NH3) 2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
Co (NH3) 3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Hg (NH3) 2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Co (NH3) 4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
Hg (NH3) 3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Co (NH3) 5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
Hg (NH3) 4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
N (3)	0.000e+00					
NO2-	0.000e+00	0.000e+00	-47.968	-48.177	-0.210	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
N (5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-64.954	-65.088	-0.134	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)

	Co (NO3) 2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
	Zn (NO3) 2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)
	Pb (NO3) 2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
	Cd (NO3) 2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
	Cu (NO3) 2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
	Hg (NO3) 2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
Na		2.631e-01					
	Na+	2.447e-01	1.796e-01	-0.611	-0.746	-0.134	(0)
	NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
	NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
Ni		9.762e-05					
	Ni+2	4.671e-05	1.357e-05	-4.331	-4.867	-0.537	(0)
	NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
	NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
	Ni (SO4) 2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
	NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
	NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
	NiOH+	3.238e-10	1.435e-10	-9.490	-9.843	-0.353	(0)
	Ni (NH3) 2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
	Ni (OH) 2	1.692e-14	1.692e-14	-13.772	-13.772	0.000	(0)
	Ni (OH) 3-	4.261e-20	1.889e-20	-19.371	-19.724	-0.353	(0)
	NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
	NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
O (0)		0.000e+00					
	O2	0.000e+00	0.000e+00	-63.001	-62.952	0.049	(0)
P		7.837e-04					
	H2PO4-	4.270e-04	2.967e-04	-3.370	-3.528	-0.158	(0)
	MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
	FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
	CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
	MgHPO4	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
	HPO4-2	9.473e-06	2.076e-06	-5.024	-5.683	-0.659	(0)
	NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
	FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
	CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
	H3PO4	3.560e-07	3.560e-07	-6.449	-6.449	0.000	(0)
	KHPO4-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
	CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
	CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
	MgPO4-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
	FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
	PO4-3	1.460e-12	9.045e-14	-11.836	-13.044	-1.208	(0)
	FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Pb		4.964e-08					
	PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
	Pb (SO4) 2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
	PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
	PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
	Pb+2	3.636e-09	1.056e-09	-8.439	-8.976	-0.537	(0)
	PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
	PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
	PbOH+	6.682e-12	2.963e-12	-11.175	-11.528	-0.353	(0)
	Pb (OH) 2	1.046e-16	1.046e-16	-15.980	-15.980	0.000	(0)
	Pb2OH+3	7.494e-17	4.960e-20	-16.125	-19.305	-3.179	(0)
	Pb (OH) 3-	2.635e-22	1.168e-22	-21.579	-21.933	-0.353	(0)
	Pb (OH) 4-2	8.268e-28	3.195e-29	-27.083	-28.496	-1.413	(0)
	Pb3 (OH) 4+2	3.173e-30	1.226e-31	-29.499	-30.912	-1.413	(0)
	Pb4 (OH) 4+4	5.352e-31	1.193e-36	-30.271	-35.923	-5.652	(0)
	PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
	Pb (NO3) 2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
S (6)		9.754e-02					
	SO4-2	4.586e-02	1.332e-02	-1.339	-1.875	-0.537	(0)
	MgSO4	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
	NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
	CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
	FeSO4	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
	KSO4-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
	NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)

MnSO4	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
Al (SO4) 2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Zn (SO4) 2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
HSO4-	1.536e-05	1.028e-05	-4.814	-4.988	-0.174	(0)
ZnSO4	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
Ni (SO4) 2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
Cd (SO4) 2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
Pb (SO4) 2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
CuSO4	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
FeSO4+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe (SO4) 2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
HgSO4	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Se (-2)	1.042e-06					
HSe-	1.012e-06	4.485e-07	-5.995	-6.348	-0.353	(0)
H2Se	3.047e-08	3.047e-08	-7.516	-7.516	0.000	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Se-2	1.000e-15	3.865e-17	-15.000	-16.413	-1.413	(0)
Se (4)	2.708e-15					
HSeO3-	2.690e-15	1.193e-15	-14.570	-14.923	-0.353	(0)
SeO3-2	1.341e-17	5.183e-19	-16.872	-18.285	-1.413	(0)
H2SeO3	4.383e-18	4.383e-18	-17.358	-17.358	0.000	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
Cd (SeO3) 2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
Se (6)	9.467e-35					
SeO4-2	9.354e-35	2.717e-35	-34.029	-34.566	-0.537	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
HSeO4-	2.413e-38	1.070e-38	-37.617	-37.971	-0.353	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn	2.800e-05					
Zn (SO4) 2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
Zn+2	6.051e-06	1.758e-06	-5.218	-5.755	-0.537	(0)
ZnSO4	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
ZnOH+	3.259e-10	1.445e-10	-9.487	-9.840	-0.353	(0)
Zn (OH) 2	3.473e-14	3.473e-14	-13.459	-13.459	0.000	(0)
Zn (OH) 3-	4.384e-19	1.944e-19	-18.358	-18.711	-0.353	(0)
Zn (OH) 4-2	2.236e-25	8.641e-27	-24.650	-26.063	-1.413	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2	-161.31	-155.03	6.27	(Co (NH3) 5Cl) (NO3) 2
(Co (NH3) 5Cl) Cl2	-30.79	-26.25	4.54	(Co (NH3) 5Cl) Cl2
(Co (NH3) 5OH2) Cl3	-38.05	-26.26	11.80	(Co (NH3) 5OH2) Cl3
(Co (NH3) 6) (NO3) 3	-234.94	-217.01	17.93	(Co (NH3) 6) (NO3) 3
(Co (NH3) 6) Cl3	-43.95	-23.84	20.11	(Co (NH3) 6) Cl3
(NH4) 2SeO4	-40.28	-39.83	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	-1.87	9.19	11.06	Al (OH) 3
Al2O3	-1.87	18.40	20.27	Al2O3

Al4(OH)10SO4	2.10	24.80	22.70	Al4(OH)10SO4
AlOHSO4	0.46	-2.77	-3.23	AlOHSO4
Alunite	7.17	6.27	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.03	-10.85	-7.82	PbSO4
Anhydrite	-0.16	-4.50	-4.34	CaSO4
Antlerite	-19.78	-10.99	8.79	Cu3(OH)4SO4
Atacamite	-12.71	-5.10	7.61	Cu2(OH)3Cl
Bianchite	-5.90	-7.66	-1.76	ZnSO4·6H2O
Birnessite	-25.46	-7.37	18.09	MnO2
Bixbyite	-26.48	-26.83	-0.35	Mn2O3
Boehmite	0.34	9.20	8.86	AlOOH
Brochantite	-26.38	-10.67	15.71	Cu4(OH)6SO4
Brucite	-9.04	8.08	17.12	Mg(OH)2
Bunsenite	-7.46	5.23	12.68	NiO
Ca3(PO4)2(beta)	-4.91	-33.96	-29.05	Ca3(PO4)2
Ca4H(PO4)3·3H2O	-7.62	-54.70	-47.08	Ca4H(PO4)3·3H2O
CaHPO4	-1.37	-20.72	-19.35	CaHPO4
CaHPO4·2H2O	-1.68	-20.73	-19.05	CaHPO4·2H2O
Calomel	-11.99	-30.12	-18.13	Hg2Cl2
CaSeO3·2H2O	-15.37	-12.51	2.86	CaSeO3·2H2O
CaSeO4·2H2O	-34.20	-37.20	-3.00	CaSeO4·2H2O
Cd(OH)2	-12.14	1.73	13.87	Cd(OH)2
Cd(OH)2(am)	-12.21	1.73	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-25.45	-18.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-29.34	-6.78	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-18.57	-51.17	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-33.45	-5.05	28.40	Cd4(OH)6SO4
CdCl2	-9.14	-9.76	-0.61	CdCl2
CdCl2·1H2O	-8.09	-9.76	-1.68	CdCl2·1H2O
CdCl2·2.5H2O	-7.84	-9.77	-1.93	CdCl2·2.5H2O
Cdmetal(alpha)	-24.05	-10.36	13.69	Cd
Cdmetal(gamma)	-24.16	-10.36	13.80	Cd
CdOHCl	-7.62	-4.01	3.61	CdOHCl
CdSe	10.72	-9.66	-20.38	CdSe
CdSeO4·2H2O	-41.09	-42.94	-1.85	CdSeO4·2H2O
CdSO4	-10.19	-10.24	-0.05	CdSO4
CdSO4·1H2O	-8.59	-10.24	-1.65	CdSO4·1H2O
CdSO4·2.67H2O	-8.42	-10.25	-1.83	CdSO4·2.67H2O
Chalcantite	-9.01	-11.67	-2.65	CuSO4·5H2O
Clausthalite	17.11	-10.27	-27.39	PbSe
Co(OH)2	-7.86	5.24	13.09	Co(OH)2
Co(OH)3	-19.03	-21.12	-2.09	Co(OH)3
Co3(PO4)2	-5.95	-40.64	-34.69	Co3(PO4)2
Co3O4	-26.74	-36.97	-10.24	Co3O4
CoCl2	-14.71	-6.25	8.46	CoCl2
CoCl2·6H2O	-8.80	-6.28	2.52	CoCl2·6H2O
CoFe2O4	7.95	4.80	-3.15	CoFe2O4
CoHPO4	-3.88	-22.95	-19.06	CoHPO4
CoO	-8.60	5.24	13.84	CoO
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-16.04	-14.72	1.32	CoSeO3
CoSeO4·6H2O	-37.92	-39.45	-1.53	CoSeO4·6H2O
CoSO4	-9.72	-6.73	2.99	CoSO4
CoSO4·6H2O	-4.28	-6.76	-2.48	CoSO4·6H2O
Cotunnite	-5.53	-10.37	-4.84	PbCl2
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.91	-69.49	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.83	-17.48	-46.31	Cu2Se
Cu2SO4	-16.16	-18.06	-1.90	Cu2SO4
Cu3(PO4)2	-18.54	-55.39	-36.85	Cu3(PO4)2
Cu3(PO4)2·3H2O	-20.28	-55.40	-35.12	Cu3(PO4)2·3H2O
Cu3Se2	35.75	-28.55	-64.30	Cu3Se2
Cumetal	-0.17	-9.09	-8.93	Cu
CuOCuSO4	-21.94	-11.31	10.63	CuOCuSO4
Cupricferrite	-6.60	-0.11	6.49	CuFe2O4
Cuprite	-4.98	-6.09	-1.11	Cu2O
Cuprousferrite	5.61	-3.27	-8.88	CuFeO2
CuSe	22.32	-11.06	-33.39	CuSe

CuSe2	23.34	-10.36	-33.70	CuSe2
CuSeO3:2H2O	-20.25	-19.65	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-41.92	-44.36	-2.44	CuSeO4:5H2O
CuSO4	-14.76	-11.64	3.11	CuSO4
Diaspore	2.08	9.20	7.12	AlOOH
Epsomite	-1.77	-3.92	-2.15	MgSO4:7H2O
Fe(OH)2	-6.70	6.86	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.09	-1.95	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-21.97	-20.42	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-39.73	-60.36	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-33.19	-36.35	-3.16	Fe2(SO4)3
Fe3(OH)8	-13.82	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.59	-0.23	3.37	Fe(OH)3
Ferroselite	14.88	-3.83	-18.71	FeSe2
FeSe	6.48	-4.53	-11.00	FeSe
Gibbsite	0.67	9.19	8.52	Al(OH)3
Goethite	-0.86	-0.22	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4:7H2O
Gypsum	0.10	-4.51	-4.61	CaSO4:2H2O
H-Jarosite	-13.07	-24.62	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-6.47	-11.40	-4.92	H2Se
Halite	-3.04	-1.44	1.59	NaCl
Hausmannite	-31.51	30.53	62.03	Mn3O4
Hematite	0.67	-0.44	-1.11	Fe2O3
Hercynite	1.62	25.26	23.64	FeAl2O4
Hg(g)	-7.44	-15.36	-7.93	Hg
Hg(OH)2	-21.45	-24.94	-3.50	Hg(OH)2
Hg2(g)	-15.63	-30.73	-15.09	Hg2
Hg2(OH)2	-23.90	-18.64	5.26	Hg2(OH)2
Hg2HPO4	-22.05	-46.82	-24.77	Hg2HPO4
Hg2SeO3	-33.94	-38.60	-4.66	Hg2SeO3
Hg2SO4	-24.46	-30.60	-6.14	Hg2SO4
HgCl(g)	-34.94	-15.06	19.88	HgCl
HgCl2	-14.91	-36.43	-21.52	HgCl2
Hgmetal(l)	-1.71	-15.36	-13.65	Hg
HgSe	19.36	-36.33	-55.69	HgSe
HgSeO3	-32.48	-44.91	-12.43	HgSeO3
HgSO4	-27.45	-36.91	-9.45	HgSO4
Hinsdalite	-8.96	-11.46	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-2.88	-47.21	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-16.18	-78.97	-62.79	Pb5(PO4)3OH
K-Alum	-6.93	-12.18	-5.24	KAl(SO4)2:12H2O
K-Jarosite	-7.50	-21.99	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-38.68	-39.41	-0.73	K2SeO4
Langite	-28.56	-10.68	17.88	Cu4(OH)6SO4:H2O
Larnakite	-9.35	-9.73	-0.38	PbO:PbSO4
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.59	-0.22	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.73	1.12	12.85	PbO
Maghemite	-6.83	-0.44	6.39	Fe2O3
Magnesioferrite	-9.88	7.64	17.52	Fe2MgO4
Magnetite	2.53	6.43	3.90	Fe3O4
Manganite	-13.15	12.19	25.34	MnOOH
Massicot	-11.93	1.12	13.05	PbO
Melanothallite	-17.57	-11.16	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeSO4:7H2O
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(PO4)2	-8.84	-32.12	-23.28	Mg3(PO4)2
MgHPO4:3H2O	-1.94	-20.12	-18.18	MgHPO4:3H2O
MgSeO3:6H2O	-14.96	-11.91	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-35.41	-36.61	-1.20	MgSeO4:6H2O
Minium	-59.08	15.45	74.53	Pb3O4
Mirabilite	-2.11	-3.42	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-57.42	-62.74	-5.32	Mn2(SO4)3
Mn3(PO4)2	-14.09	-37.94	-23.85	Mn3(PO4)2
MnCl2:4H2O	-8.11	-5.37	2.74	MnCl2:4H2O
MnHPO4	3.36	-22.04	-25.40	MnHPO4

MnSe	-8.98	-5.25	3.73	MnSe
MnSeO3	-14.95	-13.82	1.13	MnSeO3
MnSeO3:2H2O	-14.80	-13.83	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-36.49	-38.54	-2.05	MnSeO4:5H2O
MnSO4	-8.56	-5.83	2.74	MnSO4
Monteponite	-13.62	1.73	15.35	CdO
Montroydite	-21.39	-24.94	-3.55	HgO
Morenosite	-4.60	-6.78	-2.17	NiSO4:7H2O
Na-Jarosite	-9.47	-20.31	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-21.69	-11.39	10.30	Na2SeO3:5H2O
Na2SeO4	-37.34	-36.06	1.28	Na2SeO4
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(PO4)2	-9.39	-40.69	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-23.08	8.92	32.00	Ni4(OH)6SO4
NiSe	11.53	-6.17	-17.70	NiSe
NiSeO3:2H2O	-17.64	-14.75	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-37.94	-39.46	-1.52	NiSeO4:6H2O
Nsutite	-24.87	-7.37	17.50	MnO2
O2(g)	-60.26	24.19	84.45	O2
Pb(OH)2	-7.18	1.11	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.31	-3.52	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-23.96	2.23	26.19	Pb2O(OH)2
Pb2O3	-46.71	14.33	61.04	Pb2O3
Pb3(PO4)2	-9.49	-53.02	-43.53	Pb3(PO4)2
Pb3O2SO4	-19.49	-8.61	10.87	Pb3O2SO4
Pb4(OH)6SO4	-28.61	-7.51	21.10	Pb4(OH)6SO4
Pb4O3SO4	-29.70	-7.50	22.20	Pb4O3SO4
PbHPO4	-3.26	-27.07	-23.81	PbHPO4
Pbmetal	-15.22	-10.98	4.24	Pb
PbO:0.3H2O	-11.86	1.12	12.98	PbO:0.33H2O
PbSeO4	-36.67	-43.54	-6.88	PbSeO4
Periclase	-13.86	8.08	21.94	MgO
Plattnerite	-37.09	13.21	50.31	PbO2
Plumbgummite	5.12	-27.67	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-15.65	7.46	23.11	Ca(OH)2
Pyrochroite	-9.29	6.14	15.43	Mn(OH)2
Pyrolusite	-23.79	18.24	42.03	MnO2
Pyromorphite	-0.28	-84.71	-84.43	Pb5(PO4)3Cl
Retgersite	-4.72	-6.77	-2.05	NiSO4:6H2O
Semetal(am)	7.84	0.70	-7.14	Se
Semetal(hex)	8.45	0.70	-7.75	Se
SeO2	-20.09	-19.97	0.12	SeO2
SeO3	-66.05	-44.66	21.39	SeO3
Spinel	-11.29	26.48	37.77	MgAl2O4
Strengite	-2.04	-28.42	-26.38	FePO4:2H2O
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.71	-3.37	0.34	Na2SO4
Tsumebite	-15.85	-25.64	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	0.19	-35.81	-36.00	Fe3(PO4)2:8H2O
Zincite	-7.21	4.34	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnSO4
Zn(NO3)2:6H2O	-139.22	-135.96	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-7.87	4.33	12.20	Zn(OH)2
Zn(OH)2(am)	-8.33	4.33	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.62	4.33	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.39	4.33	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.40	4.33	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.80	-3.30	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.26	2.93	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-7.95	-43.37	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-30.45	-10.92	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-23.03	5.37	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-28.31	10.19	38.50	Zn5(OH)8Cl2
ZnCl2	-14.37	-7.15	7.22	ZnCl2
Znmetal	-33.91	-7.76	26.15	Zn
ZnO(active)	-7.06	4.34	11.40	ZnO
ZnSe	7.41	-7.05	-14.46	ZnSe

ZnSeO4:6H2O	-38.83	-40.35	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.10	-7.64	-0.53	ZnSO4:1H2O

**For a gas, $SI = \log_{10}(\text{fugacity})$. Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Initial solution 2.

-----Solution composition-----

Elements	Molality	Moles
Al	5.487e-05	5.487e-05
Alkalinity	9.999e-04	9.999e-04
As	1.736e-08	1.736e-08
B	4.626e-06	4.626e-06
Ba	3.481e-07	3.481e-07
Ca	3.244e-04	3.244e-04
Cd	6.229e-09	6.229e-09
Cl	2.229e-03	2.229e-03
Co	1.018e-08	1.018e-08
Cr	4.040e-08	4.040e-08
Cu	9.444e-08	9.444e-08
Fe	2.454e-05	2.454e-05
Hg	3.989e-10	3.989e-10
K	1.023e-04	1.023e-04
Mg	3.704e-04	3.704e-04
Mn	1.092e-06	1.092e-06
Mo	3.128e-09	3.128e-09
N	7.498e-05	7.498e-05
Na	2.132e-03	2.132e-03
Ni	4.772e-08	4.772e-08
P	3.552e-06	3.552e-06
Pb	5.793e-09	5.793e-09
S (6)	1.770e-04	1.770e-04
Se	2.534e-09	2.534e-09
Zn	2.509e-07	2.509e-07

-----Description of solution-----

pH	=	7.500
pe	=	4.000
Activity of water	=	1.000
Ionic strength (mol/kgw)	=	4.384e-03
Mass of water (kg)	=	1.000e+00
Total carbon (mol/kg)	=	8.307e-04
Total CO2 (mol/kg)	=	8.307e-04
Temperature (°C)	=	20.00
Electrical balance (eq)	=	3.069e-04
Percent error, $100 * (\text{Cat} - \text{An}) / (\text{Cat} + \text{An})$	=	4.34
Iterations	=	11
Total H	=	1.110151e+02
Total O	=	5.551033e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
OH-	2.330e-07	2.169e-07	-6.633	-6.664	-0.031	(0)
H+	3.394e-08	3.162e-08	-7.469	-7.500	-0.031	0.00
H2O	5.551e+01	9.999e-01	1.744	-0.000	0.000	18.05
Al	5.487e-05					
Al (OH) 4-	5.036e-05	4.694e-05	-4.298	-4.328	-0.031	(0)
Al (OH) 3	3.857e-06	3.857e-06	-5.414	-5.414	0.000	(0)
Al (OH) 2+	6.505e-07	6.071e-07	-6.187	-6.217	-0.030	(0)
AlOH+2	2.277e-09	1.728e-09	-8.643	-8.763	-0.120	(0)
Al+3	1.426e-11	7.540e-12	-10.846	-11.123	-0.277	(0)

AlSO4+	6.366e-12	5.934e-12	-11.196	-11.227	-0.031	(0)
Al (SO4) 2-	9.367e-15	8.732e-15	-14.028	-14.059	-0.031	(0)
AlMo6O21-3	0.000e+00	0.000e+00	-52.596	-52.898	-0.301	(0)
As (3)	3.031e-18					
H3AsO3	2.988e-18	2.988e-18	-17.525	-17.525	0.000	(0)
H2AsO3-	4.335e-20	4.013e-20	-19.363	-19.397	-0.033	(0)
HAsO3-2	1.264e-24	9.286e-25	-23.898	-24.032	-0.134	(0)
H4AsO3+	5.056e-26	4.681e-26	-25.296	-25.330	-0.033	(0)
AsO3-3	1.904e-30	9.510e-31	-29.720	-30.022	-0.301	(0)
As (5)	1.736e-08					
HAsO4-2	1.407e-08	1.033e-08	-7.852	-7.986	-0.134	(0)
H2AsO4-	3.286e-09	3.043e-09	-8.483	-8.517	-0.033	(0)
AsO4-3	1.840e-12	9.193e-13	-11.735	-12.037	-0.301	(0)
H3AsO4	1.591e-14	1.592e-14	-13.798	-13.798	0.000	(0)
B	4.626e-06					
H3BO3	4.542e-06	4.547e-06	-5.343	-5.342	0.000	(0)
H2BO3-	8.215e-08	7.636e-08	-7.085	-7.117	-0.032	(0)
CaH2BO3+	1.090e-09	1.013e-09	-8.963	-8.994	-0.032	(0)
MgH2BO3+	7.768e-10	7.220e-10	-9.110	-9.141	-0.032	(0)
NaH2BO3	2.626e-10	2.626e-10	-9.581	-9.581	0.000	(0)
BaH2BO3+	6.446e-13	5.992e-13	-12.191	-12.222	-0.032	(0)
H5 (BO3) 2-	3.281e-13	3.050e-13	-12.484	-12.516	-0.032	(0)
H8 (BO3) 3-	1.291e-16	1.200e-16	-15.889	-15.921	-0.032	(0)
Ba	3.481e-07					
Ba+2	3.464e-07	2.610e-07	-6.460	-6.583	-0.123	(0)
BaHCO3+	1.611e-09	1.505e-09	-8.793	-8.822	-0.030	(0)
BaCO3	1.153e-10	1.153e-10	-9.938	-9.938	0.000	(0)
BaH2BO3+	6.446e-13	5.992e-13	-12.191	-12.222	-0.032	(0)
BaNH3+2	2.781e-13	2.043e-13	-12.556	-12.690	-0.134	(0)
BaOH+	2.559e-13	2.387e-13	-12.592	-12.622	-0.030	(0)
BaNO3+	4.082e-25	3.779e-25	-24.389	-24.423	-0.033	(0)
C (4)	8.307e-04					
HCO3-	7.685e-04	7.172e-04	-3.114	-3.144	-0.030	(0)
H2CO3	5.433e-05	5.433e-05	-4.265	-4.265	0.000	(0)
CaHCO3+	2.954e-06	2.759e-06	-5.530	-5.559	-0.030	(0)
MgHCO3+	2.090e-06	1.947e-06	-5.680	-5.711	-0.031	(0)
CO3-2	1.276e-06	9.617e-07	-5.894	-6.017	-0.123	(0)
NaHCO3	8.795e-07	8.795e-07	-6.056	-6.056	0.000	(0)
CaCO3	3.236e-07	3.236e-07	-6.490	-6.490	0.000	(0)
MgCO3	2.008e-07	2.008e-07	-6.697	-6.697	0.000	(0)
CuCO3	6.481e-08	6.481e-08	-7.188	-7.188	0.000	(0)
NaCO3-	4.379e-08	4.087e-08	-7.359	-7.389	-0.030	(0)
MnHCO3+	1.164e-08	1.086e-08	-7.934	-7.964	-0.030	(0)
ZnCO3	9.487e-09	9.487e-09	-8.023	-8.023	0.000	(0)
FeHCO3+	9.148e-09	8.545e-09	-8.039	-8.068	-0.030	(0)
ZnHCO3+	3.799e-09	3.517e-09	-8.420	-8.454	-0.033	(0)
PbCO3	2.909e-09	2.909e-09	-8.536	-8.536	0.000	(0)
NiHCO3+	2.779e-09	2.573e-09	-8.556	-8.590	-0.033	(0)
BaHCO3+	1.611e-09	1.505e-09	-8.793	-8.822	-0.030	(0)
NiCO3	1.154e-09	1.154e-09	-8.938	-8.938	0.000	(0)
PbHCO3+	5.238e-10	4.849e-10	-9.281	-9.314	-0.033	(0)
CuHCO3+	5.060e-10	4.684e-10	-9.296	-9.329	-0.033	(0)
CoHCO3+	3.770e-10	3.490e-10	-9.424	-9.457	-0.033	(0)
Cu (CO3) 2-2	2.284e-10	1.678e-10	-9.641	-9.775	-0.134	(0)
BaCO3	1.153e-10	1.153e-10	-9.938	-9.938	0.000	(0)
CoCO3	1.125e-10	1.125e-10	-9.949	-9.949	0.000	(0)
CdCO3	8.551e-11	8.551e-11	-10.068	-10.068	0.000	(0)
Pb (CO3) 2-2	1.098e-11	8.067e-12	-10.959	-11.093	-0.134	(0)
CdHCO3+	6.223e-12	5.761e-12	-11.206	-11.239	-0.033	(0)
Cd (CO3) 2-2	8.298e-14	6.096e-14	-13.081	-13.215	-0.134	(0)
HgCO3	2.918e-18	2.918e-18	-17.535	-17.535	0.000	(0)
Hg (CO3) 2-2	1.208e-20	8.873e-21	-19.918	-20.052	-0.134	(0)
HgHCO3+	1.856e-21	1.718e-21	-20.731	-20.765	-0.033	(0)
Ca	3.244e-04					
Ca+2	3.146e-04	2.370e-04	-3.502	-3.625	-0.123	(0)
CaSO4	6.357e-06	6.357e-06	-5.197	-5.197	0.000	(0)
CaHCO3+	2.954e-06	2.759e-06	-5.530	-5.559	-0.030	(0)
CaCO3	3.236e-07	3.236e-07	-6.490	-6.490	0.000	(0)

CaHPO4	1.634e-07	1.634e-07	-6.787	-6.787	0.000	(0)
CaPO4-	1.319e-08	1.231e-08	-7.880	-7.910	-0.030	(0)
CaH2PO4+	4.366e-09	4.075e-09	-8.360	-8.390	-0.030	(0)
CaH2BO3+	1.090e-09	1.013e-09	-8.963	-8.994	-0.032	(0)
CaOH+	1.037e-09	9.688e-10	-8.984	-9.014	-0.030	(0)
CaNH3+2	5.039e-10	3.702e-10	-9.298	-9.432	-0.134	(0)
Ca (NH3) 2+2	2.488e-16	1.828e-16	-15.604	-15.738	-0.134	(0)
CaNO3+	2.220e-22	2.055e-22	-21.654	-21.687	-0.033	(0)
Cd	6.229e-09					
Cd+2	5.178e-09	3.901e-09	-8.286	-8.409	-0.123	(0)
CdCl+	8.299e-10	7.683e-10	-9.081	-9.114	-0.033	(0)
CdSO4	1.059e-10	1.059e-10	-9.975	-9.975	0.000	(0)
CdCO3	8.551e-11	8.551e-11	-10.068	-10.068	0.000	(0)
CdOHC1	8.913e-12	8.913e-12	-11.050	-11.050	0.000	(0)
CdOH+	7.309e-12	6.767e-12	-11.136	-11.170	-0.033	(0)
CdCl2	6.560e-12	6.560e-12	-11.183	-11.183	0.000	(0)
CdHCO3+	6.223e-12	5.761e-12	-11.206	-11.239	-0.033	(0)
Cd (SO4) 2-2	2.538e-13	1.864e-13	-12.596	-12.730	-0.134	(0)
Cd (CO3) 2-2	8.298e-14	6.096e-14	-13.081	-13.215	-0.134	(0)
Cd (OH) 2	1.982e-14	1.982e-14	-13.703	-13.703	0.000	(0)
CdCl3-	8.847e-15	8.191e-15	-14.053	-14.087	-0.033	(0)
Cd (OH) 3-	4.164e-19	3.855e-19	-18.380	-18.414	-0.033	(0)
Cd2OH+3	2.817e-19	1.408e-19	-18.550	-18.852	-0.301	(0)
CdSeO4	5.758e-22	5.758e-22	-21.240	-21.240	0.000	(0)
Cd (SeO3) 2-2	2.869e-22	2.108e-22	-21.542	-21.676	-0.134	(0)
Cd (OH) 4-2	2.735e-26	2.009e-26	-25.563	-25.697	-0.134	(0)
CdNO3+	4.067e-27	3.766e-27	-26.391	-26.424	-0.033	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-45.365	-45.365	0.000	(0)
Cl	2.229e-03					
Cl-	2.229e-03	2.077e-03	-2.652	-2.683	-0.031	(0)
MnCl+	2.186e-09	2.040e-09	-8.660	-8.690	-0.030	(0)
CuCl	1.397e-09	1.397e-09	-8.855	-8.855	0.000	(0)
ZnCl+	9.250e-10	8.616e-10	-9.034	-9.065	-0.031	(0)
CdCl+	8.299e-10	7.683e-10	-9.081	-9.114	-0.033	(0)
CuCl2-	6.588e-10	6.136e-10	-9.181	-9.212	-0.031	(0)
ZnOHC1	3.727e-10	3.727e-10	-9.429	-9.429	0.000	(0)
NiCl+	1.821e-10	1.686e-10	-9.740	-9.773	-0.033	(0)
PbCl+	7.542e-11	6.982e-11	-10.123	-10.156	-0.033	(0)
CoCl+	5.294e-11	4.901e-11	-10.276	-10.310	-0.033	(0)
CuCl+	3.819e-11	3.558e-11	-10.418	-10.449	-0.031	(0)
CdOHC1	8.913e-12	8.913e-12	-11.050	-11.050	0.000	(0)
CdCl2	6.560e-12	6.560e-12	-11.183	-11.183	0.000	(0)
MnCl2	5.982e-12	5.982e-12	-11.223	-11.223	0.000	(0)
ZnCl2	2.282e-12	2.282e-12	-11.642	-11.642	0.000	(0)
PbCl2	6.331e-13	6.331e-13	-12.199	-12.199	0.000	(0)
CuCl3-2	3.528e-13	2.671e-13	-12.452	-12.573	-0.121	(0)
CuCl2	2.001e-14	2.001e-14	-13.699	-13.699	0.000	(0)
CdCl3-	8.847e-15	8.191e-15	-14.053	-14.087	-0.033	(0)
HgClOH	3.971e-15	3.971e-15	-14.401	-14.401	0.000	(0)
ZnCl3-	3.958e-15	3.686e-15	-14.403	-14.433	-0.031	(0)
MnCl3-	3.668e-15	3.421e-15	-14.436	-14.466	-0.030	(0)
HgCl2	2.065e-15	2.065e-15	-14.685	-14.685	0.000	(0)
NiCl2	1.787e-15	1.787e-15	-14.748	-14.748	0.000	(0)
CrCl+2	8.838e-16	6.492e-16	-15.054	-15.188	-0.134	(0)
PbCl3-	5.973e-16	5.530e-16	-15.224	-15.257	-0.033	(0)
FeCl+2	5.123e-17	3.879e-17	-16.290	-16.411	-0.121	(0)
HgCl3-	4.682e-17	4.335e-17	-16.330	-16.363	-0.033	(0)
ZnCl4-2	4.856e-18	3.677e-18	-17.314	-17.435	-0.121	(0)
CrOHC12	3.999e-18	3.999e-18	-17.398	-17.398	0.000	(0)
PbCl4-2	6.635e-19	4.874e-19	-18.178	-18.312	-0.134	(0)
HgCl4-2	5.108e-19	3.752e-19	-18.292	-18.426	-0.134	(0)
FeCl2+	4.518e-19	4.215e-19	-18.345	-18.375	-0.030	(0)
CuCl3-	3.804e-19	3.544e-19	-18.420	-18.451	-0.031	(0)
HgCl+	1.747e-19	1.617e-19	-18.758	-18.791	-0.033	(0)
CrCl2+	8.871e-20	8.213e-20	-19.052	-19.086	-0.033	(0)
FeCl3	8.752e-23	8.752e-23	-22.058	-22.058	0.000	(0)
CuCl4-2	5.775e-24	4.372e-24	-23.238	-23.359	-0.121	(0)
CrO3Cl-	3.021e-29	2.797e-29	-28.520	-28.553	-0.033	(0)

Cr (NH3) 6Cl+2	1.542e-37	1.133e-37	-36.812	-36.946	-0.134	(0)
CoCl+2	1.419e-37	1.042e-37	-36.848	-36.982	-0.134	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-40.718	-40.852	-0.134	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-53.313	-53.447	-0.134	(0)
Co (2)	1.018e-08					
Co+2	9.417e-09	6.917e-09	-8.026	-8.160	-0.134	(0)
CoHCO3+	3.770e-10	3.490e-10	-9.424	-9.457	-0.033	(0)
CoSO4	1.626e-10	1.626e-10	-9.789	-9.789	0.000	(0)
CoCO3	1.125e-10	1.125e-10	-9.949	-9.949	0.000	(0)
CoCl+	5.294e-11	4.901e-11	-10.276	-10.310	-0.033	(0)
CoOH+	4.747e-11	4.394e-11	-10.324	-10.357	-0.033	(0)
CoHPO4	1.115e-11	1.115e-11	-10.953	-10.953	0.000	(0)
Co (NH3) +2	2.196e-12	1.613e-12	-11.658	-11.792	-0.134	(0)
Co (OH) 2	1.111e-12	1.111e-12	-11.954	-11.954	0.000	(0)
Co (NH3) 2+2	7.431e-17	5.459e-17	-16.129	-16.263	-0.134	(0)
Co (OH) 3-	7.626e-18	7.060e-18	-17.118	-17.151	-0.033	(0)
CoOOH-	3.189e-19	2.952e-19	-18.496	-18.530	-0.033	(0)
Co2OH+3	3.049e-20	1.524e-20	-19.516	-19.817	-0.301	(0)
CoNO2+	1.822e-20	1.686e-20	-19.740	-19.773	-0.033	(0)
CoSeO4	2.530e-21	2.530e-21	-20.597	-20.597	0.000	(0)
Co (NH3) 3+2	1.160e-21	8.524e-22	-20.935	-21.069	-0.134	(0)
Co (OH) 4-2	4.850e-25	3.563e-25	-24.314	-24.448	-0.134	(0)
Co (NH3) 4+2	7.554e-27	5.549e-27	-26.122	-26.256	-0.134	(0)
CoNO3+	3.128e-27	2.896e-27	-26.505	-26.538	-0.033	(0)
Co (NH3) 5+2	1.555e-32	1.142e-32	-31.808	-31.942	-0.134	(0)
Co4 (OH) 4+4	2.555e-33	7.440e-34	-32.593	-33.128	-0.536	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-44.808	-44.808	0.000	(0)
Co (3)	6.065e-31					
CoOH+2	6.065e-31	4.456e-31	-30.217	-30.351	-0.134	(0)
Co+3	5.207e-37	2.754e-37	-36.283	-36.560	-0.277	(0)
CoCl+2	1.419e-37	1.042e-37	-36.848	-36.982	-0.134	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-40.718	-40.852	-0.134	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-49.776	-49.810	-0.033	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.616	-52.750	-0.134	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-53.313	-53.447	-0.134	(0)
Cr (2)	3.686e-24					
Cr+2	3.686e-24	2.708e-24	-23.433	-23.567	-0.134	(0)
Cr (3)	4.040e-08					
Cr (OH) 2+	3.452e-08	3.196e-08	-7.462	-7.495	-0.033	(0)
Cr (OH) 3	3.822e-09	3.822e-09	-8.418	-8.418	0.000	(0)
Cr (OH) +2	1.919e-09	1.410e-09	-8.717	-8.851	-0.134	(0)
CrO2-	6.201e-11	5.740e-11	-10.208	-10.241	-0.033	(0)
Cr (OH) 4-	5.233e-11	4.845e-11	-10.281	-10.315	-0.033	(0)
CrOHSO4	2.406e-11	2.406e-11	-10.619	-10.619	0.000	(0)
Cr+3	5.783e-13	2.889e-13	-12.238	-12.539	-0.301	(0)
CrSO4+	7.237e-14	6.700e-14	-13.140	-13.174	-0.033	(0)
CrCl+2	8.838e-16	6.492e-16	-15.054	-15.188	-0.134	(0)
CrH2PO4+2	6.914e-17	5.079e-17	-16.160	-16.294	-0.134	(0)
CrOHC12	3.999e-18	3.999e-18	-17.398	-17.398	0.000	(0)
Cr2 (OH) 2SO4+2	2.442e-18	1.794e-18	-17.612	-17.746	-0.134	(0)
CrCl2+	8.871e-20	8.213e-20	-19.052	-19.086	-0.033	(0)
Cr2 (OH) 2 (SO4) 2	1.310e-20	1.310e-20	-19.883	-19.883	0.000	(0)
Cr (NH3) 5OH+2	3.552e-29	2.609e-29	-28.450	-28.583	-0.134	(0)
CrNO3+2	2.920e-33	2.145e-33	-32.535	-32.669	-0.134	(0)
Cr (NH3) 6+3	8.634e-36	4.314e-36	-35.064	-35.365	-0.301	(0)
Cr (NH3) 6Cl+2	1.542e-37	1.133e-37	-36.812	-36.946	-0.134	(0)
Cr (6)	9.578e-19					
CrO4-2	8.783e-19	6.617e-19	-18.056	-18.179	-0.123	(0)
HCrO4-	7.214e-20	6.679e-20	-19.142	-19.175	-0.033	(0)
NaCrO4-	7.047e-21	6.524e-21	-20.152	-20.185	-0.033	(0)
KCrO4-	2.530e-22	2.342e-22	-21.597	-21.630	-0.033	(0)
CrO3HPO4-2	2.689e-25	1.976e-25	-24.570	-24.704	-0.134	(0)
H2CrO4	1.327e-27	1.327e-27	-26.877	-26.877	0.000	(0)
CrO3SO4-2	1.091e-28	8.018e-29	-27.962	-28.096	-0.134	(0)
CrO3Cl-	3.021e-29	2.797e-29	-28.520	-28.553	-0.033	(0)
CrO3H2PO4-	3.251e-30	3.009e-30	-29.488	-29.522	-0.033	(0)
Cr2O7-2	2.400e-37	1.763e-37	-36.620	-36.754	-0.134	(0)
Cu (1)	2.634e-09					

CuCl	1.397e-09	1.397e-09	-8.855	-8.855	0.000	(0)
CuCl2-	6.588e-10	6.136e-10	-9.181	-9.212	-0.031	(0)
Cu+	5.774e-10	5.346e-10	-9.239	-9.272	-0.033	(0)
CuCl3-2	3.528e-13	2.671e-13	-12.452	-12.573	-0.121	(0)
Cu (2)	9.181e-08					
CuCO3	6.481e-08	6.481e-08	-7.188	-7.188	0.000	(0)
Cu+2	1.519e-08	1.145e-08	-7.818	-7.941	-0.123	(0)
CuOH+	9.669e-09	9.007e-09	-8.015	-8.045	-0.031	(0)
Cu (OH) 2	7.320e-10	7.320e-10	-9.135	-9.135	0.000	(0)
CuHCO3+	5.060e-10	4.684e-10	-9.296	-9.329	-0.033	(0)
CuNH3+2	3.245e-10	2.384e-10	-9.489	-9.623	-0.134	(0)
CuSO4	3.036e-10	3.036e-10	-9.518	-9.518	0.000	(0)
Cu (CO3) 2-2	2.284e-10	1.678e-10	-9.641	-9.775	-0.134	(0)
CuCl+	3.819e-11	3.558e-11	-10.418	-10.449	-0.031	(0)
Cu2 (OH) 2+2	2.680e-12	1.969e-12	-11.572	-11.706	-0.134	(0)
Cu (OH) 3-	5.164e-13	4.781e-13	-12.287	-12.321	-0.033	(0)
CuCl2	2.001e-14	2.001e-14	-13.699	-13.699	0.000	(0)
Cu (OH) 4-2	1.631e-18	1.198e-18	-17.788	-17.922	-0.134	(0)
CuNO2+	4.478e-19	4.146e-19	-18.349	-18.382	-0.033	(0)
CuCl3-	3.804e-19	3.544e-19	-18.420	-18.451	-0.031	(0)
CuCl4-2	5.775e-24	4.372e-24	-23.238	-23.359	-0.121	(0)
CuNO3+	1.062e-26	9.835e-27	-25.974	-26.007	-0.033	(0)
Cu (NO2) 2	1.468e-30	1.468e-30	-29.833	-29.833	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-45.498	-45.498	0.000	(0)
Fe (2)	1.480e-06					
Fe+2	1.424e-06	1.046e-06	-5.846	-5.980	-0.134	(0)
FeSO4	2.988e-08	2.988e-08	-7.525	-7.525	0.000	(0)
FeOH+	9.684e-09	9.034e-09	-8.014	-8.044	-0.030	(0)
FeHCO3+	9.148e-09	8.545e-09	-8.039	-8.068	-0.030	(0)
FeHPO4	6.152e-09	6.152e-09	-8.211	-8.211	0.000	(0)
FeH2PO4+	4.140e-10	3.864e-10	-9.383	-9.413	-0.030	(0)
Fe (OH) 2	1.473e-12	1.473e-12	-11.832	-11.832	0.000	(0)
Fe (OH) 3-	1.517e-13	1.415e-13	-12.819	-12.849	-0.030	(0)
Fe (3)	2.306e-05					
Fe (OH) 2+	1.977e-05	1.845e-05	-4.704	-4.734	-0.030	(0)
Fe (OH) 3	3.089e-06	3.089e-06	-5.510	-5.510	0.000	(0)
Fe (OH) 4-	2.004e-07	1.870e-07	-6.698	-6.728	-0.030	(0)
FeOH+2	1.476e-10	1.117e-10	-9.831	-9.952	-0.121	(0)
FeHPO4+	1.169e-11	1.091e-11	-10.932	-10.962	-0.030	(0)
Fe+3	1.370e-15	7.246e-16	-14.863	-15.140	-0.277	(0)
FeSO4+	9.021e-16	8.414e-16	-15.045	-15.075	-0.030	(0)
FeCl+2	5.123e-17	3.879e-17	-16.290	-16.411	-0.121	(0)
FeH2PO4+2	1.336e-17	1.014e-17	-16.874	-16.994	-0.120	(0)
Fe (SO4) 2-	2.486e-18	2.301e-18	-17.605	-17.638	-0.033	(0)
Fe2 (OH) 2+4	1.697e-18	4.942e-19	-17.770	-18.306	-0.536	(0)
FeCl2+	4.518e-19	4.215e-19	-18.345	-18.375	-0.030	(0)
FeHSeO3+2	4.463e-21	3.279e-21	-20.350	-20.484	-0.134	(0)
Fe3 (OH) 4+5	8.596e-22	1.251e-22	-21.066	-21.903	-0.837	(0)
FeCl3	8.752e-23	8.752e-23	-22.058	-22.058	0.000	(0)
FeNO3+2	3.361e-33	2.469e-33	-32.474	-32.607	-0.134	(0)
H (0)	1.488e-26					
H2	7.440e-27	7.447e-27	-26.128	-26.128	0.000	(0)
Hg (0)	3.989e-10					
Hg	3.989e-10	3.989e-10	-9.399	-9.399	0.000	(0)
Hg (1)	1.698e-24					
Hg2+2	8.491e-25	6.238e-25	-24.071	-24.205	-0.134	(0)
Hg (2)	7.725e-15					
HgClOH	3.971e-15	3.971e-15	-14.401	-14.401	0.000	(0)
HgCl2	2.065e-15	2.065e-15	-14.685	-14.685	0.000	(0)
Hg (OH) 2	1.620e-15	1.622e-15	-14.791	-14.790	0.000	(0)
HgCl3-	4.682e-17	4.335e-17	-16.330	-16.363	-0.033	(0)
Hg (NH3) 2+2	1.829e-17	1.344e-17	-16.738	-16.872	-0.134	(0)
HgCO3	2.918e-18	2.918e-18	-17.535	-17.535	0.000	(0)
HgCl4-2	5.108e-19	3.752e-19	-18.292	-18.426	-0.134	(0)
HgCl+	1.747e-19	1.617e-19	-18.758	-18.791	-0.033	(0)
HgOH+	3.953e-20	3.660e-20	-19.403	-19.437	-0.033	(0)
Hg (CO3) 2-2	1.208e-20	8.873e-21	-19.918	-20.052	-0.134	(0)
HgNH3+2	2.701e-21	1.984e-21	-20.568	-20.702	-0.134	(0)

	HgHCO3+	1.856e-21	1.718e-21	-20.731	-20.765	-0.033	(0)
	Hg (NH3) 3+2	1.423e-22	1.045e-22	-21.847	-21.981	-0.134	(0)
	Hg (OH) 3-	7.020e-23	6.499e-23	-22.154	-22.187	-0.033	(0)
	Hg+2	4.536e-24	3.332e-24	-23.343	-23.477	-0.134	(0)
	HgSO4	8.159e-26	8.159e-26	-25.088	-25.088	0.000	(0)
	Hg (NH3) 4+2	2.222e-27	1.633e-27	-26.653	-26.787	-0.134	(0)
	HgNO3+	0.000e+00	0.000e+00	-42.573	-42.607	-0.033	(0)
	Hg (NO3) 2	0.000e+00	0.000e+00	-61.566	-61.566	0.000	(0)
K		1.023e-04					
	K+	1.022e-04	9.526e-05	-3.990	-4.021	-0.031	(0)
	KSO4-	8.635e-08	8.059e-08	-7.064	-7.094	-0.030	(0)
	KHPO4-	1.143e-09	1.067e-09	-8.942	-8.972	-0.030	(0)
	KCrO4-	2.530e-22	2.342e-22	-21.597	-21.630	-0.033	(0)
Mg		3.704e-04					
	Mg+2	3.619e-04	2.727e-04	-3.441	-3.564	-0.123	(0)
	MgSO4	5.861e-06	5.861e-06	-5.232	-5.232	0.000	(0)
	MgHCO3+	2.090e-06	1.947e-06	-5.680	-5.711	-0.031	(0)
	MgHPO4	2.594e-07	2.594e-07	-6.586	-6.586	0.000	(0)
	MgCO3	2.008e-07	2.008e-07	-6.697	-6.697	0.000	(0)
	MgOH+	2.319e-08	2.168e-08	-7.635	-7.664	-0.029	(0)
	MgH2PO4+	1.072e-08	1.000e-08	-7.970	-8.000	-0.030	(0)
	MgH2BO3+	7.768e-10	7.220e-10	-9.110	-9.141	-0.032	(0)
	MgPO4-	2.373e-10	2.214e-10	-9.625	-9.655	-0.030	(0)
Mn (2)		1.092e-06					
	Mn+2	1.062e-06	7.802e-07	-5.974	-6.108	-0.134	(0)
	MnSO4	1.606e-08	1.606e-08	-7.794	-7.794	0.000	(0)
	MnHCO3+	1.164e-08	1.086e-08	-7.934	-7.964	-0.030	(0)
	MnCl+	2.186e-09	2.040e-09	-8.660	-8.690	-0.030	(0)
	MnOH+	4.556e-10	4.250e-10	-9.341	-9.372	-0.030	(0)
	MnCl2	5.982e-12	5.982e-12	-11.223	-11.223	0.000	(0)
	MnCl3-	3.668e-15	3.421e-15	-14.436	-14.466	-0.030	(0)
	Mn (OH) 3-	4.191e-19	3.909e-19	-18.378	-18.408	-0.030	(0)
	MnSeO4	1.512e-19	1.512e-19	-18.821	-18.821	0.000	(0)
	Mn (OH) 4-2	5.307e-25	4.018e-25	-24.275	-24.396	-0.121	(0)
	MnNO3+	3.528e-25	3.267e-25	-24.452	-24.486	-0.033	(0)
	MnSe	1.498e-37	1.498e-37	-36.824	-36.824	0.000	(0)
	Mn (NO3) 2	0.000e+00	0.000e+00	-42.659	-42.659	0.000	(0)
Mn (3)		3.139e-28					
	Mn+3	3.139e-28	1.660e-28	-27.503	-27.780	-0.277	(0)
Mn (6)		0.000e+00					
	MnO4-2	0.000e+00	0.000e+00	-50.534	-50.655	-0.121	(0)
Mn (7)		0.000e+00					
	MnO4-	0.000e+00	0.000e+00	-56.329	-56.360	-0.031	(0)
Mo		3.128e-09					
	MoO4-2	3.126e-09	2.355e-09	-8.505	-8.628	-0.123	(0)
	HMoO4-	1.395e-12	1.292e-12	-11.855	-11.889	-0.033	(0)
	H2MoO4	4.105e-16	4.105e-16	-15.387	-15.387	0.000	(0)
	AlMo6O21-3	0.000e+00	0.000e+00	-52.596	-52.898	-0.301	(0)
	Mo7O24-6	0.000e+00	0.000e+00	-65.519	-66.724	-1.205	(0)
	HMo7O24-5	0.000e+00	0.000e+00	-67.030	-67.867	-0.837	(0)
	H2Mo7O24-4	0.000e+00	0.000e+00	-70.058	-70.594	-0.536	(0)
	H3Mo7O24-3	0.000e+00	0.000e+00	-74.541	-74.842	-0.301	(0)
N (-3)		7.498e-05					
	NH4+	7.402e-05	6.880e-05	-4.131	-4.162	-0.032	(0)
	NH3	8.673e-07	8.673e-07	-6.062	-6.062	0.000	(0)
	NH4SO4-	9.714e-08	9.062e-08	-7.013	-7.043	-0.030	(0)
	CaNH3+2	5.039e-10	3.702e-10	-9.298	-9.432	-0.134	(0)
	CuNH3+2	3.245e-10	2.384e-10	-9.489	-9.623	-0.134	(0)
	NiNH3+2	4.626e-11	3.398e-11	-10.335	-10.469	-0.134	(0)
	Co (NH3) +2	2.196e-12	1.613e-12	-11.658	-11.792	-0.134	(0)
	BaNH3+2	2.781e-13	2.043e-13	-12.556	-12.690	-0.134	(0)
	Ni (NH3) 2+2	1.127e-14	8.280e-15	-13.948	-14.082	-0.134	(0)
	Ca (NH3) 2+2	2.488e-16	1.828e-16	-15.604	-15.738	-0.134	(0)
	Co (NH3) 2+2	7.431e-17	5.459e-17	-16.129	-16.263	-0.134	(0)
	Hg (NH3) 2+2	1.829e-17	1.344e-17	-16.738	-16.872	-0.134	(0)
	HgNH3+2	2.701e-21	1.984e-21	-20.568	-20.702	-0.134	(0)
	Co (NH3) 3+2	1.160e-21	8.524e-22	-20.935	-21.069	-0.134	(0)
	Hg (NH3) 3+2	1.423e-22	1.045e-22	-21.847	-21.981	-0.134	(0)

Co (NH3) 4+2	7.554e-27	5.549e-27	-26.122	-26.256	-0.134	(0)
Hg (NH3) 4+2	2.222e-27	1.633e-27	-26.653	-26.787	-0.134	(0)
Cr (NH3) 5OH+2	3.552e-29	2.609e-29	-28.450	-28.583	-0.134	(0)
Co (NH3) 5+2	1.555e-32	1.142e-32	-31.808	-31.942	-0.134	(0)
Cr (NH3) 6+3	8.634e-36	4.314e-36	-35.064	-35.365	-0.301	(0)
Cr (NH3) 6Cl+2	1.542e-37	1.133e-37	-36.812	-36.946	-0.134	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-40.718	-40.852	-0.134	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-49.776	-49.810	-0.033	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.616	-52.750	-0.134	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-53.313	-53.447	-0.134	(0)
N (3)	3.719e-13					
NO2-	3.719e-13	3.460e-13	-12.430	-12.461	-0.031	(0)
CuNO2+	4.478e-19	4.146e-19	-18.349	-18.382	-0.033	(0)
CoNO2+	1.822e-20	1.686e-20	-19.740	-19.773	-0.033	(0)
Cu (NO2) 2	1.468e-30	1.468e-30	-29.833	-29.833	0.000	(0)
N (5)	2.838e-19					
NO3-	2.836e-19	2.642e-19	-18.547	-18.578	-0.031	(0)
CaNO3+	2.220e-22	2.055e-22	-21.654	-21.687	-0.033	(0)
BaNO3+	4.082e-25	3.779e-25	-24.389	-24.423	-0.033	(0)
MnNO3+	3.528e-25	3.267e-25	-24.452	-24.486	-0.033	(0)
ZnNO3+	1.268e-25	1.174e-25	-24.897	-24.930	-0.033	(0)
NiNO3+	2.306e-26	2.135e-26	-25.637	-25.671	-0.033	(0)
CuNO3+	1.062e-26	9.835e-27	-25.974	-26.007	-0.033	(0)
PbNO3+	4.189e-27	3.878e-27	-26.378	-26.411	-0.033	(0)
CdNO3+	4.067e-27	3.766e-27	-26.391	-26.424	-0.033	(0)
CoNO3+	3.128e-27	2.896e-27	-26.505	-26.538	-0.033	(0)
FeNO3+2	3.361e-33	2.469e-33	-32.474	-32.607	-0.134	(0)
CrNO3+2	2.920e-33	2.145e-33	-32.535	-32.669	-0.134	(0)
HgNO3+	0.000e+00	0.000e+00	-42.573	-42.607	-0.033	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-42.659	-42.659	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-44.222	-44.222	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-44.734	-44.734	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-44.808	-44.808	0.000	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-45.365	-45.365	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-45.498	-45.498	0.000	(0)
Hg (NO3) 2	0.000e+00	0.000e+00	-61.566	-61.566	0.000	(0)
Na	2.132e-03					
Na+	2.130e-03	1.984e-03	-2.672	-2.702	-0.031	(0)
NaSO4-	1.394e-06	1.301e-06	-5.856	-5.886	-0.030	(0)
NaHCO3	8.795e-07	8.795e-07	-6.056	-6.056	0.000	(0)
NaCO3-	4.379e-08	4.087e-08	-7.359	-7.389	-0.030	(0)
NaHPO4-	3.689e-08	3.443e-08	-7.433	-7.463	-0.030	(0)
NaH2BO3	2.626e-10	2.626e-10	-9.581	-9.581	0.000	(0)
NaCrO4-	7.047e-21	6.524e-21	-20.152	-20.185	-0.033	(0)
Ni	4.772e-08					
Ni+2	4.270e-08	3.217e-08	-7.370	-7.493	-0.123	(0)
NiHCO3+	2.779e-09	2.573e-09	-8.556	-8.590	-0.033	(0)
NiCO3	1.154e-09	1.154e-09	-8.938	-8.938	0.000	(0)
NiSO4	7.582e-10	7.582e-10	-9.120	-9.120	0.000	(0)
NiCl+	1.821e-10	1.686e-10	-9.740	-9.773	-0.033	(0)
NiOH+	9.752e-11	9.028e-11	-10.011	-10.044	-0.033	(0)
NiNH3+2	4.626e-11	3.398e-11	-10.335	-10.469	-0.134	(0)
Ni (OH) 2	3.261e-12	3.261e-12	-11.487	-11.487	0.000	(0)
Ni (NH3) 2+2	1.127e-14	8.280e-15	-13.948	-14.082	-0.134	(0)
Ni (SO4) 2-2	4.372e-15	3.212e-15	-14.359	-14.493	-0.134	(0)
NiCl2	1.787e-15	1.787e-15	-14.748	-14.748	0.000	(0)
Ni (OH) 3-	1.122e-15	1.038e-15	-14.950	-14.984	-0.033	(0)
NiSeO4	1.083e-20	1.083e-20	-19.965	-19.965	0.000	(0)
NiNO3+	2.306e-26	2.135e-26	-25.637	-25.671	-0.033	(0)
O (0)	0.000e+00					
O2	0.000e+00	0.000e+00	-41.434	-41.433	0.000	(0)
P	3.552e-06					
HPO4-2	2.163e-06	1.637e-06	-5.665	-5.786	-0.121	(0)
H2PO4-	8.935e-07	8.339e-07	-6.049	-6.079	-0.030	(0)
MgHPO4	2.594e-07	2.594e-07	-6.586	-6.586	0.000	(0)
CaHPO4	1.634e-07	1.634e-07	-6.787	-6.787	0.000	(0)
NaHPO4-	3.689e-08	3.443e-08	-7.433	-7.463	-0.030	(0)
CaPO4-	1.319e-08	1.231e-08	-7.880	-7.910	-0.030	(0)

MgH2PO4+	1.072e-08	1.000e-08	-7.970	-8.000	-0.030	(0)
FeHPO4	6.152e-09	6.152e-09	-8.211	-8.211	0.000	(0)
CaH2PO4+	4.366e-09	4.075e-09	-8.360	-8.390	-0.030	(0)
KHPO4-	1.143e-09	1.067e-09	-8.942	-8.972	-0.030	(0)
FeH2PO4+	4.140e-10	3.864e-10	-9.383	-9.413	-0.030	(0)
MgPO4-	2.373e-10	2.214e-10	-9.625	-9.655	-0.030	(0)
PO4-3	3.724e-11	1.969e-11	-10.429	-10.706	-0.277	(0)
FeHPO4+	1.169e-11	1.091e-11	-10.932	-10.962	-0.030	(0)
CoHPO4	1.115e-11	1.115e-11	-10.953	-10.953	0.000	(0)
H3PO4	3.512e-12	3.512e-12	-11.454	-11.454	0.000	(0)
CrH2PO4+2	6.914e-17	5.079e-17	-16.160	-16.294	-0.134	(0)
FeH2PO4+2	1.336e-17	1.014e-17	-16.874	-16.994	-0.120	(0)
CrO3HPO4-2	2.689e-25	1.976e-25	-24.570	-24.704	-0.134	(0)
CrO3H2PO4-	3.251e-30	3.009e-30	-29.488	-29.522	-0.033	(0)
Pb	5.793e-09					
PbCO3	2.909e-09	2.909e-09	-8.536	-8.536	0.000	(0)
Pb+2	1.335e-09	1.006e-09	-8.874	-8.997	-0.123	(0)
PbOH+	8.692e-10	8.047e-10	-9.061	-9.094	-0.033	(0)
PbHCO3+	5.238e-10	4.849e-10	-9.281	-9.314	-0.033	(0)
PbCl+	7.542e-11	6.982e-11	-10.123	-10.156	-0.033	(0)
PbSO4	6.058e-11	6.058e-11	-10.218	-10.218	0.000	(0)
Pb (CO3) 2-2	1.098e-11	8.067e-12	-10.959	-11.093	-0.134	(0)
Pb (OH) 2	8.102e-12	8.102e-12	-11.091	-11.091	0.000	(0)
PbCl2	6.331e-13	6.331e-13	-12.199	-12.199	0.000	(0)
Pb (SO4) 2-2	6.108e-14	4.487e-14	-13.214	-13.348	-0.134	(0)
Pb (OH) 3-	2.786e-15	2.579e-15	-14.555	-14.588	-0.033	(0)
PbCl3-	5.973e-16	5.530e-16	-15.224	-15.257	-0.033	(0)
Pb2OH+3	2.568e-17	1.283e-17	-16.590	-16.892	-0.301	(0)
PbCl4-2	6.635e-19	4.874e-19	-18.178	-18.312	-0.134	(0)
Pb (OH) 4-2	2.738e-19	2.011e-19	-18.563	-18.697	-0.134	(0)
Pb3 (OH) 4+2	8.117e-22	5.963e-22	-21.091	-21.225	-0.134	(0)
Pb4 (OH) 4+4	1.971e-26	5.739e-27	-25.705	-26.241	-0.536	(0)
PbNO3+	4.189e-27	3.878e-27	-26.378	-26.411	-0.033	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-44.734	-44.734	0.000	(0)
S (6)	1.770e-04					
SO4-2	1.632e-04	1.229e-04	-3.787	-3.910	-0.123	(0)
CaSO4	6.357e-06	6.357e-06	-5.197	-5.197	0.000	(0)
MgSO4	5.861e-06	5.861e-06	-5.232	-5.232	0.000	(0)
NaSO4-	1.394e-06	1.301e-06	-5.856	-5.886	-0.030	(0)
NH4SO4-	9.714e-08	9.062e-08	-7.013	-7.043	-0.030	(0)
KSO4-	8.635e-08	8.059e-08	-7.064	-7.094	-0.030	(0)
FeSO4	2.988e-08	2.988e-08	-7.525	-7.525	0.000	(0)
MnSO4	1.606e-08	1.606e-08	-7.794	-7.794	0.000	(0)
ZnSO4	4.418e-09	4.418e-09	-8.355	-8.355	0.000	(0)
NiSO4	7.582e-10	7.582e-10	-9.120	-9.120	0.000	(0)
HSO4-	3.503e-10	3.265e-10	-9.456	-9.486	-0.031	(0)
CuSO4	3.036e-10	3.036e-10	-9.518	-9.518	0.000	(0)
CoSO4	1.626e-10	1.626e-10	-9.789	-9.789	0.000	(0)
CdSO4	1.059e-10	1.059e-10	-9.975	-9.975	0.000	(0)
PbSO4	6.058e-11	6.058e-11	-10.218	-10.218	0.000	(0)
CrOHSO4	2.406e-11	2.406e-11	-10.619	-10.619	0.000	(0)
Zn (SO4) 2-2	6.720e-12	4.936e-12	-11.173	-11.307	-0.134	(0)
AlSO4+	6.366e-12	5.934e-12	-11.196	-11.227	-0.031	(0)
Cd (SO4) 2-2	2.538e-13	1.864e-13	-12.596	-12.730	-0.134	(0)
CrSO4+	7.237e-14	6.700e-14	-13.140	-13.174	-0.033	(0)
Pb (SO4) 2-2	6.108e-14	4.487e-14	-13.214	-13.348	-0.134	(0)
Al (SO4) 2-	9.367e-15	8.732e-15	-14.028	-14.059	-0.031	(0)
Ni (SO4) 2-2	4.372e-15	3.212e-15	-14.359	-14.493	-0.134	(0)
FeSO4+	9.021e-16	8.414e-16	-15.045	-15.075	-0.030	(0)
Fe (SO4) 2-	2.486e-18	2.301e-18	-17.605	-17.638	-0.033	(0)
Cr2 (OH) 2SO4+2	2.442e-18	1.794e-18	-17.612	-17.746	-0.134	(0)
Cr2 (OH) 2 (SO4) 2	1.310e-20	1.310e-20	-19.883	-19.883	0.000	(0)
HgSO4	8.159e-26	8.159e-26	-25.088	-25.088	0.000	(0)
CrO3SO4-2	1.091e-28	8.018e-29	-27.962	-28.096	-0.134	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-49.776	-49.810	-0.033	(0)
Se (-2)	1.592e-33					
HSe-	1.592e-33	1.474e-33	-32.798	-32.832	-0.033	(0)
H2Se	3.537e-37	3.537e-37	-36.451	-36.451	0.000	(0)

MnSe	1.498e-37	1.498e-37	-36.824	-36.824	0.000	(0)
Se-2	0.000e+00	0.000e+00	-40.341	-40.475	-0.134	(0)
Se (4)	2.534e-09					
HSeO3-	2.197e-09	2.034e-09	-8.658	-8.692	-0.033	(0)
SeO3-2	3.367e-10	2.473e-10	-9.473	-9.607	-0.134	(0)
H2SeO3	2.629e-14	2.629e-14	-13.580	-13.580	0.000	(0)
FeHSeO3+2	4.463e-21	3.279e-21	-20.350	-20.484	-0.134	(0)
Cd (SeO3) 2-2	2.869e-22	2.108e-22	-21.542	-21.676	-0.134	(0)
Se (6)	1.052e-15					
SeO4-2	1.052e-15	7.926e-16	-14.978	-15.101	-0.123	(0)
MnSeO4	1.512e-19	1.512e-19	-18.821	-18.821	0.000	(0)
ZnSeO4	2.105e-20	2.105e-20	-19.677	-19.677	0.000	(0)
NiSeO4	1.083e-20	1.083e-20	-19.965	-19.965	0.000	(0)
CoSeO4	2.530e-21	2.530e-21	-20.597	-20.597	0.000	(0)
HSeO4-	1.158e-21	1.072e-21	-20.936	-20.970	-0.033	(0)
CdSeO4	5.758e-22	5.758e-22	-21.240	-21.240	0.000	(0)
Zn (SeO4) 2-2	2.303e-35	1.691e-35	-34.638	-34.772	-0.134	(0)
Zn	2.509e-07					
Zn+2	2.276e-07	1.714e-07	-6.643	-6.766	-0.123	(0)
ZnCO3	9.487e-09	9.487e-09	-8.023	-8.023	0.000	(0)
ZnSO4	4.418e-09	4.418e-09	-8.355	-8.355	0.000	(0)
ZnOH+	4.016e-09	3.718e-09	-8.396	-8.430	-0.033	(0)
ZnHCO3+	3.799e-09	3.517e-09	-8.420	-8.454	-0.033	(0)
ZnCl+	9.250e-10	8.616e-10	-9.034	-9.065	-0.031	(0)
ZnOHCl	3.727e-10	3.727e-10	-9.429	-9.429	0.000	(0)
Zn (OH) 2	2.754e-10	2.754e-10	-9.560	-9.560	0.000	(0)
Zn (SO4) 2-2	6.720e-12	4.936e-12	-11.173	-11.307	-0.134	(0)
ZnCl2	2.282e-12	2.282e-12	-11.642	-11.642	0.000	(0)
Zn (OH) 3-	4.748e-13	4.395e-13	-12.324	-12.357	-0.033	(0)
ZnCl3-	3.958e-15	3.686e-15	-14.403	-14.433	-0.031	(0)
Zn (OH) 4-2	7.584e-18	5.571e-18	-17.120	-17.254	-0.134	(0)
ZnCl4-2	4.856e-18	3.677e-18	-17.314	-17.435	-0.121	(0)
ZnSeO4	2.105e-20	2.105e-20	-19.677	-19.677	0.000	(0)
ZnNO3+	1.268e-25	1.174e-25	-24.897	-24.930	-0.033	(0)
Zn (SeO4) 2-2	2.303e-35	1.691e-35	-34.638	-34.772	-0.134	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-44.222	-44.222	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2	-65.98	-59.71	6.27	(Co (NH3) 5Cl) (NO3) 2
(Co (NH3) 5Cl) Cl2	-32.46	-27.92	4.54	(Co (NH3) 5Cl) Cl2
(Co (NH3) 5OH2) Cl3	-39.73	-27.92	11.81	(Co (NH3) 5OH2) Cl3
(Co (NH3) 6) (NO3) 3	-90.20	-72.27	17.93	(Co (NH3) 6) (NO3) 3
(Co (NH3) 6) Cl3	-44.71	-24.58	20.13	(Co (NH3) 6) Cl3
(NH4) 2CrO4	-26.88	-26.50	0.38	(NH4) 2CrO4
(NH4) 2SeO4	-23.88	-23.43	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	0.25	11.38	11.13	Al (OH) 3
Al2 (MoO4) 3	-51.28	-48.13	3.15	Al2 (MoO4) 3
Al2O3	2.33	22.75	20.43	Al2O3
Al4 (OH) 10SO4	3.90	26.60	22.70	Al4 (OH) 10SO4
AlAsO4:2H2O	-7.22	-2.42	4.80	AlAsO4:2H2O
AlOHSO4	-4.30	-7.53	-3.23	AlOHSO4
Alunite	0.56	-0.21	-0.77	KAl3 (SO4) 2 (OH) 6
Anglesite	-5.08	-12.91	-7.83	PbSO4
Anhydrite	-3.20	-7.54	-4.34	CaSO4
Antlerite	-6.52	2.27	8.79	Cu3 (OH) 4SO4
Aragonite	-1.38	-9.64	-8.26	CaCO3
Arsenolite	-67.16	-70.10	-2.94	As4O6
Artinite	-8.11	1.85	9.96	MgCO3:Mg (OH) 2:3H2O
As2O5	-34.37	-27.60	6.77	As2O5
Atacamite	-3.74	3.93	7.67	Cu2 (OH) 3Cl
Azurite	-4.24	-20.86	-16.62	Cu3 (OH) 2 (CO3) 2
Ba (OH) 2:8H2O	-16.14	8.42	24.56	Ba (OH) 2:8H2O
Ba3 (AsO4) 2	6.60	-2.35	-8.94	Ba3 (AsO4) 2
BaCrO4	-14.99	-24.76	-9.77	BaCrO4
BaHPO4	-5.01	-24.79	-19.77	BaHPO4

BaMoO4	-8.22	-15.21	-6.99	BaMoO4
Barite	-0.44	-10.49	-10.05	BaSO4
BaSeO3	-9.57	-7.78	1.79	BaSeO3
BaSeO4	-14.16	-21.68	-7.53	BaSeO4
Bianchite	-8.91	-10.68	-1.76	ZnSO4:6H2O
Birnessite	-11.87	6.22	18.09	MnO2
Bixbyite	-10.29	-10.56	-0.27	Mn2O3
Boehmite	2.45	11.38	8.93	AlOOH
Brochantite	-6.50	9.32	15.83	Cu4(OH)6SO4
Brucite	-5.75	11.44	17.18	Mg(OH)2
Bunsenite	-5.24	7.51	12.74	NiO
Ca3(AsO4)2:4H2O	-15.77	6.53	22.30	Ca3(AsO4)2:4H2O
Ca3(PO4)2(beta)	-3.21	-32.29	-29.08	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-7.04	-54.12	-47.08	Ca4H(PO4)3:3H2O
CaCrO4	-19.62	-21.80	-2.19	CaCrO4
CaHPO4	-2.46	-21.83	-19.37	CaHPO4
CaHPO4:2H2O	-2.77	-21.83	-19.06	CaHPO4:2H2O
Calcite	-1.19	-9.64	-8.46	CaCO3
Calomel	-11.39	-29.57	-18.18	Hg2Cl2
CaMoO4	-4.31	-12.25	-7.94	CaMoO4
CaSeO3:2H2O	-7.69	-4.82	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-15.73	-18.73	-3.00	CaSeO4:2H2O
Cd(BO2)2	-13.93	-4.09	9.84	Cd(BO2)2
Cd(OH)2	-7.34	6.59	13.93	Cd(OH)2
Cd(OH)2(am)	-7.40	6.59	13.99	Cd(OH)2
Cd3(OH)2(SO4)2	-24.76	-18.05	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-21.70	0.86	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-14.04	-46.64	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-20.95	7.45	28.40	Cd4(OH)6SO4
CdCl2	-13.17	-13.77	-0.60	CdCl2
CdCl2:1H2O	-12.10	-13.77	-1.67	CdCl2:1H2O
CdCl2:2.5H2O	-11.84	-13.77	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-30.15	-16.41	13.74	Cd
Cdmetal(gamma)	-30.25	-16.41	13.84	Cd
CdMoO4	-2.83	-17.04	-14.21	CdMoO4
CdOHCl	-7.22	-3.59	3.63	CdOHCl
CdSe	-13.31	-33.74	-20.43	CdSe
CdSeO4:2H2O	-21.66	-23.51	-1.85	CdSeO4:2H2O
CdSO4	-12.30	-12.32	-0.02	CdSO4
CdSO4:1H2O	-10.69	-12.32	-1.63	CdSO4:1H2O
CdSO4:2.67H2O	-10.50	-12.32	-1.82	CdSO4:2.67H2O
Cerussite	-1.81	-15.01	-13.20	PbCO3
CH4(g)	-71.20	-113.02	-41.81	CH4
Chalcanthite	-9.19	-11.85	-2.66	CuSO4:5H2O
Claudetite	-66.87	-70.10	-3.23	As4O6
Clausthalite	-6.87	-34.33	-27.46	PbSe
Co(BO2)2	-30.91	-3.84	27.07	Co(BO2)2
Co(OH)2	-6.25	6.84	13.09	Co(OH)2
Co(OH)3	-12.03	-14.06	-2.03	Co(OH)3
CO2(g)	-2.86	-21.02	-18.16	CO2
Co3(AsO4)2	-20.11	-7.08	13.03	Co3(AsO4)2
Co3(PO4)2	-11.20	-45.89	-34.69	Co3(PO4)2
Co3O4	-11.11	-21.28	-10.17	Co3O4
CoCl2	-22.03	-13.53	8.51	CoCl2
CoCl2:6H2O	-16.04	-13.53	2.51	CoCl2:6H2O
CoCO3	-4.24	-14.18	-9.94	CoCO3
CoFe2O4	24.61	21.56	-3.05	CoFe2O4
CoHPO4	-7.31	-26.37	-19.06	CoHPO4
CoMoO4	-9.10	-16.79	-7.69	CoMoO4
CoO	-7.06	6.84	13.90	CoO
CoSe	-17.29	-33.49	-16.20	CoSe
CoSeO3	-10.67	-9.35	1.32	CoSeO3
CoSeO4:6H2O	-21.73	-23.26	-1.53	CoSeO4:6H2O
CoSO4	-15.11	-12.07	3.04	CoSO4
CoSO4:6H2O	-9.59	-12.07	-2.48	CoSO4:6H2O
Cotunnite	-9.50	-14.36	-4.86	PbCl2
Cr(OH)2	-19.49	-8.57	10.93	Cr(OH)2
Cr(OH)3	-1.42	0.00	1.42	Cr(OH)3

Cr (OH) 3 (am)	0.75	0.00	-0.75	Cr (OH) 3
Cr2O3	2.22	0.01	-2.21	Cr2O3
CrCl2	-43.36	-28.93	14.42	CrCl2
CrCl3	-46.02	-30.54	15.48	CrCl3
Crmetal	-62.56	-31.57	31.00	Cr
CrO3	-29.98	-33.18	-3.19	CrO3
Cu (OH) 2	-1.78	7.06	8.84	Cu (OH) 2
Cu2 (OH) 3NO3	-21.43	-11.96	9.47	Cu2 (OH) 3NO3
Cu2Se (alpha)	2.56	-43.88	-46.44	Cu2Se
Cu2SO4	-20.56	-22.45	-1.89	Cu2SO4
Cu3 (AsO4) 2:2H2O	-12.52	-6.42	6.10	Cu3 (AsO4) 2:2H2O
Cu3 (PO4) 2	-8.39	-45.24	-36.85	Cu3 (PO4) 2
Cu3 (PO4) 2:3H2O	-10.12	-45.24	-35.12	Cu3 (PO4) 2:3H2O
Cu3Se2	-12.64	-77.15	-64.51	Cu3Se2
CuCO3	-2.46	-13.96	-11.50	CuCO3
CuCrO4	-20.68	-26.12	-5.44	CuCrO4
Cumetal	-4.30	-13.27	-8.97	Cu
CuMoO4	-3.46	-16.57	-13.11	CuMoO4
CuOCuSO4	-15.51	-4.79	10.71	CuOCuSO4
Cupricferrite	15.16	21.78	6.62	CuFe2O4
Cuprite	-2.51	-3.54	-1.04	Cu2O
Cuprousferrite	14.46	5.59	-8.87	CuFeO2
CuSe	0.19	-33.27	-33.46	CuSe
CuSe2	-16.82	-50.60	-33.79	CuSe2
CuSeO3:2H2O	-9.75	-9.13	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-20.60	-23.04	-2.44	CuSeO4:5H2O
CuSO4	-15.01	-11.85	3.16	CuSO4
Diaspore	4.20	11.38	7.18	AlOOH
Dolomite (disordered)	-2.82	-19.22	-16.40	CaMg (CO3) 2
Dolomite (ordered)	-2.25	-19.22	-16.97	CaMg (CO3) 2
Epsomite	-5.31	-7.48	-2.16	MgSO4:7H2O
Fe (OH) 2	-4.54	9.02	13.56	Fe (OH) 2
Fe (OH) 2.7Cl.3	7.35	4.31	-3.04	Fe (OH) 2.7Cl.3
Fe2 (OH) 4SeO3	-3.03	-1.47	1.55	Fe2 (OH) 4SeO3
Fe2 (SeO3) 3:2H2O	-13.23	-33.86	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-39.00	-42.01	-3.01	Fe2 (SO4) 3
Fe3 (OH) 8	3.52	23.74	20.22	Fe3 (OH) 8
FeAsO4:2H2O	-6.84	-6.44	0.40	FeAsO4:2H2O
FeCr2O4	1.41	9.03	7.62	FeCr2O4
FeMoO4	-4.55	-14.61	-10.06	FeMoO4
Ferrihydrite	3.95	7.36	3.41	Fe (OH) 3
Ferroselite	-29.91	-48.64	-18.74	FeSe2
FeSe	-20.31	-31.31	-11.01	FeSe
Gibbsite	2.80	11.38	8.58	Al (OH) 3
Goethite	6.69	7.36	0.67	FeOOH
Goslarite	-8.62	-10.68	-2.05	ZnSO4:7H2O
Gypsum	-2.92	-7.54	-4.61	CaSO4:2H2O
H-Jarosite	-4.33	-15.74	-11.41	(H3O) Fe3 (SO4) 2 (OH) 6
H2MoO4	-10.61	-23.63	-13.02	H2MoO4
H2Se (g)	-35.42	-40.33	-4.91	H2Se
Halite	-6.98	-5.39	1.59	NaCl
Hausmannite	-12.61	49.68	62.29	Mn3O4
Hematite	15.75	14.72	-1.03	Fe2O3
Hercynite	7.94	31.77	23.83	FeAl2O4
Hg (CH3) 2 (g)	-165.68	-240.82	-75.15	Hg (CH3) 2
Hg (g)	-8.16	-16.10	-7.94	Hg
Hg (OH) 2	-11.29	-14.79	-3.50	Hg (OH) 2
Hg2 (g)	-17.08	-32.20	-15.13	Hg2
Hg2 (OH) 2	-14.47	-9.21	5.26	Hg2 (OH) 2
Hg2CO3	-14.04	-30.22	-16.18	Hg2CO3
Hg2CrO4	-33.68	-42.38	-8.70	Hg2CrO4
Hg2HPO4	-17.64	-42.41	-24.77	Hg2HPO4
Hg2SeO3	-20.74	-25.40	-4.66	Hg2SeO3
Hg2SO4	-21.97	-28.12	-6.15	Hg2SO4
Hg3O2CO3	-35.71	-65.39	-29.68	Hg3O2CO3
HgCl (g)	-34.77	-14.79	19.98	HgCl
HgCl2	-13.57	-35.16	-21.58	HgCl2
Hgmetal (l)	-2.40	-16.10	-13.70	Hg

HgSe	0.57	-55.12	-55.69	HgSe
HgSeO3	-18.55	-30.98	-12.43	HgSeO3
HgSO4	-24.24	-33.70	-9.46	HgSO4
Hinsdalite	-9.48	-11.98	-2.50	PbAl3PO4SO4 (OH) 6
Huntite	-8.74	-38.39	-29.65	CaMg3 (CO3) 4
Hydrocerussite	-5.26	-24.03	-18.77	Pb3 (OH) 2 (CO3) 2
Hydromagnesite	-18.78	-26.89	-8.11	Mg5 (CO3) 4 (OH) 2:4H2O
Hydroxylapatite	1.59	-42.74	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-6.81	-69.60	-62.79	Pb5 (PO4) 3OH
K-Alum	-17.70	-22.97	-5.26	KAl (SO4) 2:12H2O
K-Jarosite	2.15	-12.26	-14.41	KFe3 (SO4) 2 (OH) 6
K2Cr2O7	-41.92	-59.40	-17.48	K2Cr2O7
K2CrO4	-25.65	-26.22	-0.57	K2CrO4
K2MoO4	-19.94	-16.67	3.27	K2MoO4
K2SeO4	-22.41	-23.14	-0.73	K2SeO4
Langite	-8.66	9.32	17.98	Cu4 (OH) 6SO4:H2O
Larnakite	-6.54	-6.91	-0.37	PbO:PbSO4
Laurionite	-4.80	-4.18	0.62	PbOHCl
Lepidocrocite	5.99	7.36	1.37	FeOOH
Lime	-21.90	11.37	33.28	CaO
Litharge	-6.89	6.00	12.89	PbO
Maghemite	8.33	14.72	6.39	Fe2O3
Magnesioferrite	8.46	26.16	17.69	Fe2MgO4
Magnesite	-2.06	-9.58	-7.52	MgCO3
Magnetite	19.71	23.74	4.03	Fe3O4
Malachite	-1.37	-6.90	-5.53	Cu2 (OH) 2CO3
Manganite	-4.95	20.39	25.34	MnOOH
Massicot	-7.09	6.00	13.09	PbO
Melanothallite	-19.75	-13.31	6.45	CuCl2
Melanterite	-7.62	-9.89	-2.27	FeSO4:7H2O
Mg (OH) 2 (active)	-7.36	11.44	18.79	Mg (OH) 2
Mg3 (PO4) 2	-8.82	-32.10	-23.28	Mg3 (PO4) 2
MgCr2O4	-5.29	11.44	16.74	MgCr2O4
MgCrO4	-27.39	-21.74	5.65	MgCrO4
MgHPO4:3H2O	-3.60	-21.77	-18.18	MgHPO4:3H2O
MgMoO4	-10.34	-12.19	-1.85	MgMoO4
MgSeO3:6H2O	-7.80	-4.76	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-17.47	-18.67	-1.20	MgSeO4:6H2O
Minium	-33.77	41.01	74.78	Pb3O4
Mirabilite	-7.96	-9.32	-1.35	Na2SO4:10H2O
Mn2 (SO4) 3	-62.07	-67.29	-5.22	Mn2 (SO4) 3
Mn3 (AsO4) 2:8H2O	-13.42	-0.92	12.50	Mn3 (AsO4) 2:8H2O
Mn3 (PO4) 2	-15.88	-39.73	-23.85	Mn3 (PO4) 2
MnCl2:4H2O	-14.22	-11.47	2.75	MnCl2:4H2O
MnHPO4	1.09	-24.31	-25.40	MnHPO4
MnSe	-35.23	-31.44	3.79	MnSe
MnSeO3	-8.43	-7.30	1.13	MnSeO3
MnSeO3:2H2O	-8.26	-7.30	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-19.16	-21.21	-2.05	MnSeO4:5H2O
MnSO4	-12.80	-10.02	2.78	MnSO4
Monteponite	-8.82	6.59	15.41	CdO
Montroydite	-11.27	-14.79	-3.52	HgO
MoO3	-15.63	-23.63	-8.00	MoO3
Morenosite	-9.22	-11.40	-2.18	NiSO4:7H2O
Na-Jarosite	-0.20	-10.94	-10.75	NaFe3 (SO4) 2 (OH) 6
Na2Cr2O7	-46.80	-56.76	-9.96	Na2Cr2O7
Na2CrO4	-26.57	-23.58	2.99	Na2CrO4
Na2Mo2O7	-20.90	-37.66	-16.76	Na2Mo2O7
Na2MoO4	-15.55	-14.03	1.52	Na2MoO4
Na2MoO4:2H2O	-15.26	-14.03	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-16.90	-6.60	10.30	Na2SeO3:5H2O
Na2SeO4	-21.79	-20.51	1.28	Na2SeO4
Nantokite	-5.10	-11.95	-6.86	CuCl
Natron	-9.91	-11.42	-1.51	Na2CO3:10H2O
Nesquehonite	-4.98	-9.58	-4.60	MgCO3:3H2O
Ni (OH) 2	-5.57	7.51	13.08	Ni (OH) 2
Ni3 (AsO4) 2:8H2O	-20.77	-5.07	15.70	Ni3 (AsO4) 2:8H2O
Ni3 (PO4) 2	-12.59	-43.89	-31.30	Ni3 (PO4) 2

Ni4(OH)6SO4	-20.88	11.12	32.00	Ni4(OH)6SO4
NiCO3	-6.76	-13.51	-6.75	NiCO3
NiMoO4	-4.97	-16.12	-11.15	NiMoO4
NiSe	-15.12	-32.82	-17.70	NiSe
NiSeO3:2H2O	-11.59	-8.68	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-21.07	-22.59	-1.52	NiSeO4:6H2O
Nsutite	-11.28	6.22	17.50	MnO2
O2(g)	-38.80	46.00	84.80	O2
Otavite	-2.43	-14.43	-12.00	CdCO3
Pb(BO2)2	-11.25	-4.68	6.57	Pb(BO2)2
Pb(OH)2	-2.32	6.00	8.32	Pb(OH)2
Pb10(OH)60(CO3)6	-57.32	-66.08	-8.76	Pb10(OH)60(CO3)6
Pb2(OH)3Cl	-6.97	1.82	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-14.18	12.01	26.19	Pb2O(OH)2
Pb2O3	-26.03	35.01	61.04	Pb2O3
Pb2OCO3	-8.58	-9.01	-0.44	Pb2OCO3
Pb3(AsO4)2	-15.39	-9.59	5.80	Pb3(AsO4)2
Pb3(PO4)2	-4.87	-48.40	-43.53	Pb3(PO4)2
Pb3O2CO3	-14.36	-3.01	11.35	Pb3O2CO3
Pb3O2SO4	-11.83	-0.90	10.92	Pb3O2SO4
Pb4(OH)6SO4	-16.00	5.10	21.10	Pb4(OH)6SO4
Pb4O3SO4	-17.18	5.10	22.28	Pb4O3SO4
PbCrO4	-14.44	-27.18	-12.73	PbCrO4
PbHPO4	-3.40	-27.20	-23.81	PbHPO4
Pbmetal	-21.24	-17.00	4.24	Pb
PbMoO4	-1.84	-17.63	-15.78	PbMoO4
PbO:0.3H2O	-6.98	6.00	12.98	PbO:0.33H2O
PbSeO4	-17.21	-24.10	-6.88	PbSeO4
Periclase	-10.60	11.44	22.04	MgO
Phosgenite	-9.57	-29.38	-19.81	PbCl2:PbCO3
Plattnerite	-21.48	29.00	50.49	PbO2
Plumbgummite	6.51	-26.28	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-11.81	11.37	23.19	Ca(OH)2
Pyrochroite	-6.59	8.89	15.48	Mn(OH)2
Pyrolusite	-10.30	31.89	42.19	MnO2
Pyromorphite	4.64	-79.79	-84.43	Pb5(PO4)3Cl
Retgersite	-9.35	-11.40	-2.05	NiSO4:6H2O
Rhodochrosite	-1.55	-12.12	-10.57	MnCO3
Semetal(am)	-10.19	-17.33	-7.14	Se
Semetal(hex)	-9.58	-17.33	-7.76	Se
SeO2	-16.31	-16.19	0.12	SeO2
SeO3	-51.58	-30.10	21.48	SeO3
Siderite	-1.81	-12.00	-10.19	FeCO3
Smithsonite	-2.83	-12.78	-9.95	ZnCO3
Spinel	-3.82	34.19	38.01	MgAl2O4
Strengite	0.53	-25.85	-26.37	FePO4:2H2O
Tenorite	-0.78	7.06	7.84	CuO
Thenardite	-9.66	-9.32	0.35	Na2SO4
Thermonatrite	-12.09	-11.42	0.67	Na2CO3:H2O
Tsumebite	-4.35	-14.14	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	-3.35	-39.35	-36.00	Fe3(PO4)2:8H2O
Witherite	-4.02	-12.60	-8.58	BaCO3
Zincite	-3.37	8.23	11.60	ZnO
Zincosite	-14.85	-10.68	4.18	ZnSO4
Zn(BO2)2	-10.74	-2.45	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-47.16	-43.92	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-3.97	8.23	12.20	Zn(OH)2
Zn(OH)2(am)	-4.48	8.23	12.71	Zn(OH)2
Zn(OH)2(beta)	-3.77	8.23	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-3.54	8.23	11.78	Zn(OH)2
Zn(OH)2(gamma)	-3.50	8.23	11.73	Zn(OH)2
Zn2(OH)2SO4	-9.94	-2.44	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.91	6.29	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-16.54	-2.89	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-6.29	-41.71	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-32.80	-13.12	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-14.37	14.03	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.70	20.80	38.50	Zn5(OH)8Cl2

ZnCl2	-19.40	-12.13	7.27	ZnCl2
ZnCO3:1H2O	-2.52	-12.78	-10.26	ZnCO3:1H2O
Znmetal	-41.01	-14.77	26.25	Zn
ZnMoO4	-5.30	-15.39	-10.09	ZnMoO4
ZnO(active)	-3.22	8.23	11.45	ZnO
ZnSe	-17.62	-32.10	-14.48	ZnSe
ZnSeO4:6H2O	-20.35	-21.87	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-10.17	-10.68	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Initial solution 3.

-----Solution composition-----

Elements	Molality	Moles
Al	1.484e-06	1.484e-06
Alkalinity	8.200e-04	8.200e-04
As	2.671e-08	2.671e-08
B	8.146e-06	8.146e-06
Ba	8.744e-08	8.744e-08
Ca	7.990e-04	7.990e-04
Cl	6.520e-03	6.520e-03
Co	6.622e-07	6.622e-07
Cr	1.347e-07	1.347e-07
Cu	3.464e-07	3.464e-07
Fe	8.834e-06	8.834e-06
K	6.399e-04	6.399e-04
Mg	6.999e-04	6.999e-04
Mn	8.379e-07	8.379e-07
Mo	9.387e-08	9.387e-08
N	1.736e-03	1.736e-03
Na	5.746e-03	5.746e-03
Ni	1.876e-07	1.876e-07
P	1.680e-05	1.680e-05
Pb	1.449e-08	1.449e-08
S(6)	1.979e-03	1.979e-03
Se	2.535e-08	2.535e-08
Zn	3.520e-07	3.520e-07

-----Description of solution-----

pH	=	6.180
pe	=	4.000
Activity of water	=	1.000
Ionic strength (mol/kgw)	=	1.387e-02
Mass of water (kg)	=	1.000e+00
Total carbon (mol/kg)	=	1.948e-03
Total CO2 (mol/kg)	=	1.948e-03
Temperature (°C)	=	20.00
Electrical balance (eq)	=	-1.692e-04
Percent error, 100*(Cat- An)/(Cat+ An)	=	-0.78
Iterations	=	12
Total H	=	1.110238e+02
Total O	=	5.552069e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	7.433e-07	6.607e-07	-6.129	-6.180	-0.051	0.00
OH-	1.171e-08	1.038e-08	-7.931	-7.984	-0.052	(0)
H2O	5.551e+01	9.997e-01	1.744	-0.000	0.000	18.05
Al	1.484e-06					
Al(OH)2+	9.360e-07	8.356e-07	-6.029	-6.078	-0.049	(0)

Al (OH) 3	2.540e-07	2.540e-07	-6.595	-6.595	0.000	(0)
Al (OH) 4-	1.663e-07	1.479e-07	-6.779	-6.830	-0.051	(0)
AlOH+2	7.824e-08	4.969e-08	-7.107	-7.304	-0.197	(0)
AlSO4+	3.549e-08	3.158e-08	-7.450	-7.501	-0.051	(0)
Al+3	1.309e-08	4.532e-09	-7.883	-8.344	-0.461	(0)
Al (SO4) 2-	4.624e-10	4.114e-10	-9.335	-9.386	-0.051	(0)
AlMo6O21-3	4.906e-34	1.428e-34	-33.309	-33.845	-0.536	(0)
As (3)	1.676e-13					
H3AsO3	1.675e-13	1.675e-13	-12.776	-12.776	0.000	(0)
H2AsO3-	1.235e-16	1.077e-16	-15.908	-15.968	-0.060	(0)
H4AsO3+	6.290e-20	5.484e-20	-19.201	-19.261	-0.060	(0)
HAsO3-2	2.065e-22	1.193e-22	-21.685	-21.923	-0.238	(0)
AsO3-3	2.009e-29	5.847e-30	-28.697	-29.233	-0.536	(0)
As (5)	2.671e-08					
H2AsO4-	2.145e-08	1.870e-08	-7.669	-7.728	-0.060	(0)
HAsO4-2	5.262e-09	3.040e-09	-8.279	-8.517	-0.238	(0)
H3AsO4	2.038e-12	2.045e-12	-11.691	-11.689	0.001	(0)
AsO4-3	4.448e-14	1.294e-14	-13.352	-13.888	-0.536	(0)
B	8.146e-06					
H3BO3	8.139e-06	8.165e-06	-5.089	-5.088	0.001	(0)
H2BO3-	7.437e-09	6.563e-09	-8.129	-8.183	-0.054	(0)
CaH2BO3+	1.795e-10	1.584e-10	-9.746	-9.800	-0.054	(0)
MgH2BO3+	1.002e-10	8.839e-11	-9.999	-10.054	-0.054	(0)
NaH2BO3	5.773e-11	5.773e-11	-10.239	-10.239	0.000	(0)
H5 (BO3) 2-	5.334e-14	4.707e-14	-13.273	-13.327	-0.054	(0)
BaH2BO3+	1.215e-14	1.072e-14	-13.915	-13.970	-0.054	(0)
H8 (BO3) 3-	3.769e-17	3.326e-17	-16.424	-16.478	-0.054	(0)
Ba	8.744e-08					
Ba+2	8.709e-08	5.435e-08	-7.060	-7.265	-0.205	(0)
BaHCO3+	3.501e-10	3.132e-10	-9.456	-9.504	-0.048	(0)
BaCO3	1.148e-12	1.148e-12	-11.940	-11.940	0.000	(0)
BaNH3+2	7.754e-14	4.480e-14	-13.110	-13.349	-0.238	(0)
BaH2BO3+	1.215e-14	1.072e-14	-13.915	-13.970	-0.054	(0)
BaOH+	2.669e-15	2.379e-15	-14.574	-14.624	-0.050	(0)
BaNO3+	1.252e-37	1.092e-37	-36.902	-36.962	-0.060	(0)
C (4)	1.948e-03					
H2CO3	1.134e-03	1.134e-03	-2.945	-2.945	0.000	(0)
HCO3-	8.028e-04	7.166e-04	-3.095	-3.145	-0.049	(0)
CaHCO3+	5.603e-06	5.013e-06	-5.252	-5.300	-0.048	(0)
MgHCO3+	3.121e-06	2.771e-06	-5.506	-5.557	-0.052	(0)
NaHCO3	2.248e-06	2.248e-06	-5.648	-5.648	0.000	(0)
CO3-2	7.369e-08	4.599e-08	-7.133	-7.337	-0.205	(0)
FeHCO3+	3.932e-08	3.517e-08	-7.405	-7.454	-0.048	(0)
CuCO3	3.016e-08	3.016e-08	-7.521	-7.521	0.000	(0)
CaCO3	2.814e-08	2.814e-08	-7.551	-7.551	0.000	(0)
CoHCO3+	1.894e-08	1.651e-08	-7.723	-7.782	-0.060	(0)
MgCO3	1.368e-08	1.368e-08	-7.864	-7.864	0.000	(0)
NiHCO3+	8.938e-09	7.793e-09	-8.049	-8.108	-0.060	(0)
MnHCO3+	6.750e-09	6.017e-09	-8.171	-8.221	-0.050	(0)
NaCO3-	5.601e-09	5.000e-09	-8.252	-8.301	-0.049	(0)
CuHCO3+	5.224e-09	4.555e-09	-8.282	-8.342	-0.060	(0)
ZnHCO3+	4.406e-09	3.842e-09	-8.356	-8.415	-0.060	(0)
PbHCO3+	2.579e-09	2.249e-09	-8.589	-8.648	-0.060	(0)
PbCO3	6.455e-10	6.455e-10	-9.190	-9.190	0.000	(0)
ZnCO3	4.960e-10	4.960e-10	-9.304	-9.304	0.000	(0)
BaHCO3+	3.501e-10	3.132e-10	-9.456	-9.504	-0.048	(0)
CoCO3	2.546e-10	2.546e-10	-9.594	-9.594	0.000	(0)
NiCO3	1.673e-10	1.673e-10	-9.776	-9.776	0.000	(0)
Cu (CO3) 2-2	6.462e-12	3.734e-12	-11.190	-11.428	-0.238	(0)
BaCO3	1.148e-12	1.148e-12	-11.940	-11.940	0.000	(0)
Pb (CO3) 2-2	1.482e-13	8.562e-14	-12.829	-13.067	-0.238	(0)
Ca	7.990e-04					
Ca+2	6.907e-04	4.311e-04	-3.161	-3.365	-0.205	(0)
CaSO4	1.024e-04	1.024e-04	-3.990	-3.990	0.000	(0)
CaHCO3+	5.603e-06	5.013e-06	-5.252	-5.300	-0.048	(0)
CaHPO4	2.128e-07	2.128e-07	-6.672	-6.672	0.000	(0)
CaH2PO4+	1.242e-07	1.109e-07	-6.906	-6.955	-0.049	(0)
CaCO3	2.814e-08	2.814e-08	-7.551	-7.551	0.000	(0)

	CaNH3+2	1.227e-09	7.089e-10	-8.911	-9.149	-0.238	(0)
	CaPO4-	8.600e-10	7.677e-10	-9.066	-9.115	-0.049	(0)
	CaH2BO3+	1.795e-10	1.584e-10	-9.746	-9.800	-0.054	(0)
	CaOH+	9.423e-11	8.430e-11	-10.026	-10.074	-0.048	(0)
	Ca (NH3) 2+2	6.381e-16	3.686e-16	-15.195	-15.433	-0.238	(0)
	CaNO3+	5.947e-34	5.185e-34	-33.226	-33.285	-0.060	(0)
Cl	6.520e-03						
	Cl-	6.520e-03	5.795e-03	-2.186	-2.237	-0.051	(0)
	CuCl2-	5.238e-08	4.651e-08	-7.281	-7.332	-0.052	(0)
	CuCl	3.795e-08	3.795e-08	-7.421	-7.421	0.000	(0)
	CoCl+	7.428e-09	6.476e-09	-8.129	-8.189	-0.060	(0)
	MnCl+	3.540e-09	3.156e-09	-8.451	-8.501	-0.050	(0)
	ZnCl+	2.961e-09	2.629e-09	-8.529	-8.580	-0.052	(0)
	NiCl+	1.636e-09	1.426e-09	-8.786	-8.846	-0.060	(0)
	CuCl+	1.088e-09	9.662e-10	-8.963	-9.015	-0.052	(0)
	PbCl+	1.037e-09	9.043e-10	-8.984	-9.044	-0.060	(0)
	CuCl3-2	8.950e-11	5.651e-11	-10.048	-10.248	-0.200	(0)
	ZnOHC1	5.442e-11	5.442e-11	-10.264	-10.264	0.000	(0)
	MnCl2	2.583e-11	2.583e-11	-10.588	-10.588	0.000	(0)
	PbCl2	2.288e-11	2.288e-11	-10.640	-10.640	0.000	(0)
	ZnCl2	1.943e-11	1.943e-11	-10.712	-10.712	0.000	(0)
	CrCl+2	1.984e-12	1.146e-12	-11.703	-11.941	-0.238	(0)
	CuCl2	1.517e-12	1.517e-12	-11.819	-11.819	0.000	(0)
	ZnCl3-	9.866e-14	8.761e-14	-13.006	-13.057	-0.052	(0)
	PbCl3-	6.398e-14	5.578e-14	-13.194	-13.253	-0.060	(0)
	MnCl3-	4.626e-14	4.123e-14	-13.335	-13.385	-0.050	(0)
	NiCl2	4.219e-14	4.219e-14	-13.375	-13.375	0.000	(0)
	CrOHC12	9.427e-16	9.427e-16	-15.026	-15.026	0.000	(0)
	FeCl+2	7.064e-16	4.460e-16	-15.151	-15.351	-0.200	(0)
	CrCl2+	4.641e-16	4.046e-16	-15.333	-15.393	-0.060	(0)
	ZnCl4-2	3.862e-16	2.438e-16	-15.413	-15.613	-0.200	(0)
	PbCl4-2	2.375e-16	1.372e-16	-15.624	-15.863	-0.238	(0)
	CuCl3-	8.442e-17	7.496e-17	-16.074	-16.125	-0.052	(0)
	FeCl2+	1.517e-17	1.352e-17	-16.819	-16.869	-0.050	(0)
	FeCl3	7.837e-21	7.837e-21	-20.106	-20.106	0.000	(0)
	CuCl4-2	4.088e-21	2.581e-21	-20.388	-20.588	-0.200	(0)
	CrO3Cl-	6.803e-34	5.932e-34	-33.167	-33.227	-0.060	(0)
	Cr (NH3) 6Cl+2	4.721e-34	2.728e-34	-33.326	-33.564	-0.238	(0)
	CoCl+2	2.383e-35	1.377e-35	-34.623	-34.861	-0.238	(0)
	Co (NH3) 5Cl+2	4.164e-39	2.406e-39	-38.380	-38.619	-0.238	(0)
	Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-50.953	-51.191	-0.238	(0)
Co (2)	6.622e-07						
	Co+2	5.668e-07	3.275e-07	-6.247	-6.485	-0.238	(0)
	CoSO4	6.815e-08	6.815e-08	-7.167	-7.167	0.000	(0)
	CoHCO3+	1.894e-08	1.651e-08	-7.723	-7.782	-0.060	(0)
	CoCl+	7.428e-09	6.476e-09	-8.129	-8.189	-0.060	(0)
	CoHPO4	3.779e-10	3.779e-10	-9.423	-9.423	0.000	(0)
	CoCO3	2.546e-10	2.546e-10	-9.594	-9.594	0.000	(0)
	Co (NH3) +2	1.392e-10	8.044e-11	-9.856	-10.095	-0.238	(0)
	CoOH+	1.142e-10	9.955e-11	-9.942	-10.002	-0.060	(0)
	Co (OH) 2	1.205e-13	1.205e-13	-12.919	-12.919	0.000	(0)
	Co (NH3) 2+2	4.961e-15	2.866e-15	-14.304	-14.543	-0.238	(0)
	Co2OH+3	5.615e-18	1.634e-18	-17.251	-17.787	-0.536	(0)
	Co (NH3) 3+2	8.158e-20	4.713e-20	-19.088	-19.327	-0.238	(0)
	Co (OH) 3-	4.201e-20	3.662e-20	-19.377	-19.436	-0.060	(0)
	CoOOH-	1.757e-21	1.532e-21	-20.755	-20.815	-0.060	(0)
	CoSeO4	1.414e-22	1.414e-22	-21.850	-21.850	0.000	(0)
	Co (NH3) 4+2	5.592e-25	3.231e-25	-24.252	-24.491	-0.238	(0)
	CoNO2+	5.547e-28	4.836e-28	-27.256	-27.316	-0.060	(0)
	Co (OH) 4-2	1.531e-28	8.843e-29	-27.815	-28.053	-0.238	(0)
	Co (NH3) 5+2	1.212e-30	7.004e-31	-29.916	-30.155	-0.238	(0)
	Co4 (OH) 4+4	1.759e-31	1.960e-32	-30.755	-31.708	-0.953	(0)
	CoNO3+	2.182e-37	1.902e-37	-36.661	-36.721	-0.060	(0)
	Co (NO3) 2	0.000e+00	0.000e+00	-66.848	-66.848	0.000	(0)
Co (3)	1.747e-30						
	CoOH+2	1.747e-30	1.009e-30	-29.758	-29.996	-0.238	(0)
	Co+3	3.766e-35	1.304e-35	-34.424	-34.885	-0.461	(0)
	CoCl+2	2.383e-35	1.377e-35	-34.623	-34.861	-0.238	(0)

Co(NH3)5Cl+2	4.164e-39	2.406e-39	-38.380	-38.619	-0.238	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-46.993	-47.052	-0.060	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-50.953	-51.191	-0.238	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.021	-52.260	-0.238	(0)
Cr(2)	2.965e-21					
Cr+2	2.965e-21	1.713e-21	-20.528	-20.766	-0.238	(0)
Cr(3)	1.347e-07					
Cr(OH)+2	7.386e-08	4.267e-08	-7.132	-7.370	-0.238	(0)
Cr(OH)2+	5.309e-08	4.628e-08	-7.275	-7.335	-0.060	(0)
CrOHSO4	6.448e-09	6.448e-09	-8.191	-8.191	0.000	(0)
Cr+3	6.279e-10	1.827e-10	-9.202	-9.738	-0.536	(0)
CrSO4+	4.304e-10	3.752e-10	-9.366	-9.426	-0.060	(0)
Cr(OH)3	2.649e-10	2.649e-10	-9.577	-9.577	0.000	(0)
CrCl+2	1.984e-12	1.146e-12	-11.703	-11.941	-0.238	(0)
CrH2PO4+2	8.321e-13	4.807e-13	-12.080	-12.318	-0.238	(0)
CrO2-	2.185e-13	1.905e-13	-12.661	-12.720	-0.060	(0)
Cr(OH)4-	1.843e-13	1.607e-13	-12.735	-12.794	-0.060	(0)
Cr2(OH)2SO4+2	2.519e-14	1.455e-14	-13.599	-13.837	-0.238	(0)
CrOHC12	9.427e-16	9.427e-16	-15.026	-15.026	0.000	(0)
Cr2(OH)2(SO4)2	9.408e-16	9.408e-16	-15.027	-15.027	0.000	(0)
CrCl2+	4.641e-16	4.046e-16	-15.333	-15.393	-0.060	(0)
Cr(NH3)5OH+2	1.771e-27	1.023e-27	-26.752	-26.990	-0.238	(0)
Cr(NH3)6+3	1.279e-32	3.722e-33	-31.893	-32.429	-0.536	(0)
Cr(NH3)6Cl+2	4.721e-34	2.728e-34	-33.326	-33.564	-0.238	(0)
CrNO3+2	0.000e+00	0.000e+00	-41.487	-41.725	-0.238	(0)
Cr(6)	4.667e-26					
HCrO4-	2.786e-26	2.429e-26	-25.555	-25.615	-0.060	(0)
CrO4-2	1.845e-26	1.152e-26	-25.734	-25.939	-0.205	(0)
NaCrO4-	3.332e-28	2.905e-28	-27.477	-27.537	-0.060	(0)
KCrO4-	2.771e-29	2.416e-29	-28.557	-28.617	-0.060	(0)
CrO3HPO4-2	1.861e-30	1.075e-30	-29.730	-29.968	-0.238	(0)
H2CrO4	1.008e-32	1.008e-32	-31.996	-31.996	0.000	(0)
CrO3SO4-2	9.338e-33	5.395e-33	-32.030	-32.268	-0.238	(0)
CrO3Cl-	6.803e-34	5.932e-34	-33.167	-33.227	-0.060	(0)
CrO3H2PO4-	3.925e-34	3.422e-34	-33.406	-33.466	-0.060	(0)
Cr2O7-2	0.000e+00	0.000e+00	-49.394	-49.632	-0.238	(0)
Cu(1)	9.639e-08					
CuCl2-	5.238e-08	4.651e-08	-7.281	-7.332	-0.052	(0)
CuCl	3.795e-08	3.795e-08	-7.421	-7.421	0.000	(0)
Cu+	5.967e-09	5.202e-09	-8.224	-8.284	-0.060	(0)
CuCl3-2	8.950e-11	5.651e-11	-10.048	-10.248	-0.200	(0)
Cu(2)	2.501e-07					
Cu+2	1.785e-07	1.114e-07	-6.748	-6.953	-0.205	(0)
CuCO3	3.016e-08	3.016e-08	-7.521	-7.521	0.000	(0)
CuSO4	2.616e-08	2.616e-08	-7.582	-7.582	0.000	(0)
CuHCO3+	5.224e-09	4.555e-09	-8.282	-8.342	-0.060	(0)
CuOH+	4.723e-09	4.194e-09	-8.326	-8.377	-0.052	(0)
CuNH3+2	4.229e-09	2.443e-09	-8.374	-8.612	-0.238	(0)
CuCl+	1.088e-09	9.662e-10	-8.963	-9.015	-0.052	(0)
Cu(OH)2	1.631e-11	1.631e-11	-10.788	-10.788	0.000	(0)
Cu(CO3)2-2	6.462e-12	3.734e-12	-11.190	-11.428	-0.238	(0)
CuCl2	1.517e-12	1.517e-12	-11.819	-11.819	0.000	(0)
Cu2(OH)2+2	7.389e-13	4.269e-13	-12.131	-12.370	-0.238	(0)
Cu(OH)3-	5.847e-16	5.097e-16	-15.233	-15.293	-0.060	(0)
CuCl3-	8.442e-17	7.496e-17	-16.074	-16.125	-0.052	(0)
CuCl4-2	4.088e-21	2.581e-21	-20.388	-20.588	-0.200	(0)
Cu(OH)4-2	1.058e-22	6.112e-23	-21.976	-22.214	-0.238	(0)
CuNO2+	2.803e-27	2.444e-27	-26.552	-26.612	-0.060	(0)
CuNO3+	1.523e-37	1.328e-37	-36.817	-36.877	-0.060	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-47.281	-47.281	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-68.225	-68.225	0.000	(0)
Fe(2)	8.637e-06					
Fe+2	7.461e-06	4.311e-06	-5.127	-5.365	-0.238	(0)
FeSO4	1.090e-06	1.090e-06	-5.963	-5.963	0.000	(0)
FeHCO3+	3.932e-08	3.517e-08	-7.405	-7.454	-0.048	(0)
FeH2PO4+	2.668e-08	2.382e-08	-7.574	-7.623	-0.049	(0)
FeHPO4	1.815e-08	1.815e-08	-7.741	-7.741	0.000	(0)
FeOH+	1.998e-09	1.781e-09	-8.699	-8.749	-0.050	(0)

Fe (OH) 2	1.389e-14	1.389e-14	-13.857	-13.857	0.000	(0)
Fe (OH) 3-	7.166e-17	6.388e-17	-16.145	-16.195	-0.050	(0)
Fe (3)	1.964e-07					
Fe (OH) 2+	1.950e-07	1.740e-07	-6.710	-6.759	-0.049	(0)
Fe (OH) 3	1.394e-09	1.394e-09	-8.856	-8.856	0.000	(0)
FeHPO4+	3.605e-11	3.218e-11	-10.443	-10.492	-0.049	(0)
FeOH+2	3.488e-11	2.202e-11	-10.457	-10.657	-0.200	(0)
Fe (OH) 4-	4.526e-12	4.040e-12	-11.344	-11.394	-0.049	(0)
FeSO4+	3.443e-14	3.069e-14	-13.463	-13.513	-0.050	(0)
Fe+3	8.622e-15	2.985e-15	-14.064	-14.525	-0.461	(0)
FeH2PO4+2	9.841e-16	6.250e-16	-15.007	-15.204	-0.197	(0)
Fe (SO4) 2-	8.526e-16	7.433e-16	-15.069	-15.129	-0.060	(0)
FeCl+2	7.064e-16	4.460e-16	-15.151	-15.351	-0.200	(0)
FeCl2+	1.517e-17	1.352e-17	-16.819	-16.869	-0.050	(0)
FeHSeO3+2	2.518e-19	1.455e-19	-18.599	-18.837	-0.238	(0)
Fe2 (OH) 2+4	1.724e-19	1.921e-20	-18.763	-19.717	-0.953	(0)
FeCl3	7.837e-21	7.837e-21	-20.106	-20.106	0.000	(0)
Fe3 (OH) 4+5	1.414e-24	4.585e-26	-23.850	-25.339	-1.489	(0)
FeNO3+2	0.000e+00	0.000e+00	-43.612	-43.850	-0.238	(0)
H (0)	6.481e-24					
H2	3.240e-24	3.251e-24	-23.489	-23.488	0.001	(0)
K	6.399e-04					
K+	6.351e-04	5.645e-04	-3.197	-3.248	-0.051	(0)
KSO4-	4.737e-06	4.229e-06	-5.324	-5.374	-0.049	(0)
KHPO4-	5.074e-09	4.530e-09	-8.295	-8.344	-0.049	(0)
KCrO4-	2.771e-29	2.416e-29	-28.557	-28.617	-0.060	(0)
Mg	6.999e-04					
Mg+2	6.224e-04	3.884e-04	-3.206	-3.411	-0.205	(0)
MgSO4	7.392e-05	7.392e-05	-4.131	-4.131	0.000	(0)
MgHCO3+	3.121e-06	2.771e-06	-5.506	-5.557	-0.052	(0)
MgHPO4	2.647e-07	2.647e-07	-6.577	-6.577	0.000	(0)
MgH2PO4+	2.388e-07	2.132e-07	-6.622	-6.671	-0.049	(0)
MgCO3	1.368e-08	1.368e-08	-7.864	-7.864	0.000	(0)
MgOH+	1.649e-09	1.478e-09	-8.783	-8.830	-0.048	(0)
MgH2BO3+	1.002e-10	8.839e-11	-9.999	-10.054	-0.054	(0)
MgPO4-	1.211e-11	1.081e-11	-10.917	-10.966	-0.049	(0)
Mn (2)	8.379e-07					
Mn+2	7.487e-07	4.326e-07	-6.126	-6.364	-0.238	(0)
MnSO4	7.886e-08	7.886e-08	-7.103	-7.103	0.000	(0)
MnHCO3+	6.750e-09	6.017e-09	-8.171	-8.221	-0.050	(0)
MnCl+	3.540e-09	3.156e-09	-8.451	-8.501	-0.050	(0)
MnCl2	2.583e-11	2.583e-11	-10.588	-10.588	0.000	(0)
MnOH+	1.265e-11	1.128e-11	-10.898	-10.948	-0.050	(0)
MnCl3-	4.626e-14	4.123e-14	-13.335	-13.385	-0.050	(0)
MnSeO4	9.893e-23	9.893e-23	-22.005	-22.005	0.000	(0)
Mn (OH) 3-	2.664e-23	2.375e-23	-22.574	-22.624	-0.050	(0)
MnSe	3.564e-30	3.564e-30	-29.448	-29.448	0.000	(0)
Mn (OH) 4-2	1.850e-30	1.168e-30	-29.733	-29.933	-0.200	(0)
MnNO3+	2.882e-37	2.513e-37	-36.540	-36.600	-0.060	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-66.631	-66.631	0.000	(0)
Mn (3)	2.658e-28					
Mn+3	2.658e-28	9.203e-29	-27.575	-28.036	-0.461	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-61.272	-61.471	-0.200	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-67.123	-67.177	-0.053	(0)
Mo	9.387e-08					
MoO4-2	9.311e-08	5.811e-08	-7.031	-7.236	-0.205	(0)
HMoO4-	7.636e-10	6.657e-10	-9.117	-9.177	-0.060	(0)
H2MoO4	4.421e-12	4.421e-12	-11.354	-11.354	0.000	(0)
AlMo6O21-3	4.906e-34	1.428e-34	-33.309	-33.845	-0.536	(0)
Mo7O24-6	0.000e+00	0.000e+00	-44.274	-46.418	-2.144	(0)
HMo7O24-5	0.000e+00	0.000e+00	-44.752	-46.242	-1.489	(0)
H2Mo7O24-4	0.000e+00	0.000e+00	-46.695	-47.648	-0.953	(0)
H3Mo7O24-3	0.000e+00	0.000e+00	-50.040	-50.576	-0.536	(0)
N (-3)	1.736e-03					
NH4+	1.715e-03	1.514e-03	-2.766	-2.820	-0.054	(0)
NH4SO4-	1.980e-05	1.765e-05	-4.703	-4.753	-0.050	(0)

NH3	9.134e-07	9.134e-07	-6.039	-6.039	0.000	(0)
CuNH3+2	4.229e-09	2.443e-09	-8.374	-8.612	-0.238	(0)
CaNH3+2	1.227e-09	7.089e-10	-8.911	-9.149	-0.238	(0)
NiNH3+2	1.878e-10	1.085e-10	-9.726	-9.965	-0.238	(0)
Co (NH3) +2	1.392e-10	8.044e-11	-9.856	-10.095	-0.238	(0)
BaNH3+2	7.754e-14	4.480e-14	-13.110	-13.349	-0.238	(0)
Ni (NH3) 2+2	4.818e-14	2.784e-14	-13.317	-13.555	-0.238	(0)
Co (NH3) 2+2	4.961e-15	2.866e-15	-14.304	-14.543	-0.238	(0)
Ca (NH3) 2+2	6.381e-16	3.686e-16	-15.195	-15.433	-0.238	(0)
Co (NH3) 3+2	8.158e-20	4.713e-20	-19.088	-19.327	-0.238	(0)
Co (NH3) 4+2	5.592e-25	3.231e-25	-24.252	-24.491	-0.238	(0)
Cr (NH3) 5OH+2	1.771e-27	1.023e-27	-26.752	-26.990	-0.238	(0)
Co (NH3) 5+2	1.212e-30	7.004e-31	-29.916	-30.155	-0.238	(0)
Cr (NH3) 6+3	1.279e-32	3.722e-33	-31.893	-32.429	-0.536	(0)
Cr (NH3) 6Cl+2	4.721e-34	2.728e-34	-33.326	-33.564	-0.238	(0)
Co (NH3) 5Cl+2	4.164e-39	2.406e-39	-38.380	-38.619	-0.238	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-46.993	-47.052	-0.060	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-50.953	-51.191	-0.238	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.021	-52.260	-0.238	(0)
N (3)	2.370e-22					
NO2-	2.370e-22	2.096e-22	-21.625	-21.679	-0.053	(0)
CuNO2+	2.803e-27	2.444e-27	-26.552	-26.612	-0.060	(0)
CoNO2+	5.547e-28	4.836e-28	-27.256	-27.316	-0.060	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-47.281	-47.281	0.000	(0)
N (5)	4.129e-31					
NO3-	4.123e-31	3.665e-31	-30.385	-30.436	-0.051	(0)
CaNO3+	5.947e-34	5.185e-34	-33.226	-33.285	-0.060	(0)
MnNO3+	2.882e-37	2.513e-37	-36.540	-36.600	-0.060	(0)
CoNO3+	2.182e-37	1.902e-37	-36.661	-36.721	-0.060	(0)
ZnNO3+	2.043e-37	1.781e-37	-36.690	-36.749	-0.060	(0)
CuNO3+	1.523e-37	1.328e-37	-36.817	-36.877	-0.060	(0)
BaNO3+	1.252e-37	1.092e-37	-36.902	-36.962	-0.060	(0)
NiNO3+	1.030e-37	8.978e-38	-36.987	-37.047	-0.060	(0)
PbNO3+	2.864e-38	2.497e-38	-37.543	-37.603	-0.060	(0)
CrNO3+2	0.000e+00	0.000e+00	-41.487	-41.725	-0.238	(0)
FeNO3+2	0.000e+00	0.000e+00	-43.612	-43.850	-0.238	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-66.631	-66.631	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-66.848	-66.848	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-67.783	-67.783	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-67.899	-67.899	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-68.225	-68.225	0.000	(0)
Na	5.746e-03					
Na+	5.710e-03	5.076e-03	-2.243	-2.295	-0.051	(0)
NaSO4-	3.300e-05	2.946e-05	-4.481	-4.531	-0.049	(0)
NaHCO3	2.248e-06	2.248e-06	-5.648	-5.648	0.000	(0)
NaHPO4-	7.066e-08	6.308e-08	-7.151	-7.200	-0.049	(0)
NaCO3-	5.601e-09	5.000e-09	-8.252	-8.301	-0.049	(0)
NaH2BO3	5.773e-11	5.773e-11	-10.239	-10.239	0.000	(0)
NaCrO4-	3.332e-28	2.905e-28	-27.477	-27.537	-0.060	(0)
Ni	1.876e-07					
Ni+2	1.563e-07	9.752e-08	-6.806	-7.011	-0.205	(0)
NiSO4	2.035e-08	2.035e-08	-7.691	-7.691	0.000	(0)
NiHCO3+	8.938e-09	7.793e-09	-8.049	-8.108	-0.060	(0)
NiCl+	1.636e-09	1.426e-09	-8.786	-8.846	-0.060	(0)
NiNH3+2	1.878e-10	1.085e-10	-9.726	-9.965	-0.238	(0)
NiCO3	1.673e-10	1.673e-10	-9.776	-9.776	0.000	(0)
NiOH+	1.502e-11	1.310e-11	-10.823	-10.883	-0.060	(0)
Ni (SO4) 2-2	1.321e-12	7.633e-13	-11.879	-12.117	-0.238	(0)
Ni (NH3) 2+2	4.818e-14	2.784e-14	-13.317	-13.555	-0.238	(0)
NiCl2	4.219e-14	4.219e-14	-13.375	-13.375	0.000	(0)
Ni (OH) 2	2.264e-14	2.264e-14	-13.645	-13.645	0.000	(0)
Ni (OH) 3-	3.956e-19	3.449e-19	-18.403	-18.462	-0.060	(0)
NiSeO4	3.876e-23	3.876e-23	-22.412	-22.412	0.000	(0)
NiNO3+	1.030e-37	8.978e-38	-36.987	-37.047	-0.060	(0)
O (0)	0.000e+00					
O2	0.000e+00	0.000e+00	-46.715	-46.713	0.001	(0)
P	1.680e-05					
H2PO4-	1.398e-05	1.248e-05	-4.855	-4.904	-0.049	(0)

HPO4-2	1.858e-06	1.173e-06	-5.731	-5.931	-0.200	(0)
MgHPO4	2.647e-07	2.647e-07	-6.577	-6.577	0.000	(0)
MgH2PO4+	2.388e-07	2.132e-07	-6.622	-6.671	-0.049	(0)
CaHPO4	2.128e-07	2.128e-07	-6.672	-6.672	0.000	(0)
CaH2PO4+	1.242e-07	1.109e-07	-6.906	-6.955	-0.049	(0)
NaHPO4-	7.066e-08	6.308e-08	-7.151	-7.200	-0.049	(0)
FeH2PO4+	2.668e-08	2.382e-08	-7.574	-7.623	-0.049	(0)
FeHPO4	1.815e-08	1.815e-08	-7.741	-7.741	0.000	(0)
KHPO4-	5.074e-09	4.530e-09	-8.295	-8.344	-0.049	(0)
H3PO4	1.098e-09	1.098e-09	-8.959	-8.959	0.000	(0)
CaPO4-	8.600e-10	7.677e-10	-9.066	-9.115	-0.049	(0)
CoHPO4	3.779e-10	3.779e-10	-9.423	-9.423	0.000	(0)
FeHPO4+	3.605e-11	3.218e-11	-10.443	-10.492	-0.049	(0)
MgPO4-	1.211e-11	1.081e-11	-10.917	-10.966	-0.049	(0)
PO4-3	1.950e-12	6.752e-13	-11.710	-12.171	-0.461	(0)
CrH2PO4+2	8.321e-13	4.807e-13	-12.080	-12.318	-0.238	(0)
FeH2PO4+2	9.841e-16	6.250e-16	-15.007	-15.204	-0.197	(0)
CrO3HPO4-2	1.861e-30	1.075e-30	-29.730	-29.968	-0.238	(0)
CrO3H2PO4-	3.925e-34	3.422e-34	-33.406	-33.466	-0.060	(0)
Pb	1.449e-08					
Pb+2	7.481e-09	4.669e-09	-8.126	-8.331	-0.205	(0)
PbHCO3+	2.579e-09	2.249e-09	-8.589	-8.648	-0.060	(0)
PbSO4	2.489e-09	2.489e-09	-8.604	-8.604	0.000	(0)
PbCl+	1.037e-09	9.043e-10	-8.984	-9.044	-0.060	(0)
PbCO3	6.455e-10	6.455e-10	-9.190	-9.190	0.000	(0)
PbOH+	2.050e-10	1.787e-10	-9.688	-9.748	-0.060	(0)
Pb (SO4) 2-2	2.825e-11	1.632e-11	-10.549	-10.787	-0.238	(0)
PbCl2	2.288e-11	2.288e-11	-10.640	-10.640	0.000	(0)
Pb (CO3) 2-2	1.482e-13	8.562e-14	-12.829	-13.067	-0.238	(0)
Pb (OH) 2	8.609e-14	8.609e-14	-13.065	-13.065	0.000	(0)
PbCl3-	6.398e-14	5.578e-14	-13.194	-13.253	-0.060	(0)
PbCl4-2	2.375e-16	1.372e-16	-15.624	-15.863	-0.238	(0)
Pb2OH+3	4.544e-17	1.322e-17	-16.343	-16.879	-0.536	(0)
Pb (OH) 3-	1.504e-18	1.312e-18	-17.823	-17.882	-0.060	(0)
Pb (OH) 4-2	8.471e-24	4.894e-24	-23.072	-23.310	-0.238	(0)
Pb3 (OH) 4+2	5.409e-25	3.125e-25	-24.267	-24.505	-0.238	(0)
Pb4 (OH) 4+4	1.253e-28	1.396e-29	-27.902	-28.855	-0.953	(0)
PbNO3+	2.864e-38	2.497e-38	-37.543	-37.603	-0.060	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-67.783	-67.783	0.000	(0)
S (6)	1.979e-03					
SO4-2	1.744e-03	1.088e-03	-2.758	-2.963	-0.205	(0)
CaSO4	1.024e-04	1.024e-04	-3.990	-3.990	0.000	(0)
MgSO4	7.392e-05	7.392e-05	-4.131	-4.131	0.000	(0)
NaSO4-	3.300e-05	2.946e-05	-4.481	-4.531	-0.049	(0)
NH4SO4-	1.980e-05	1.765e-05	-4.703	-4.753	-0.050	(0)
KSO4-	4.737e-06	4.229e-06	-5.324	-5.374	-0.049	(0)
FeSO4	1.090e-06	1.090e-06	-5.963	-5.963	0.000	(0)
MnSO4	7.886e-08	7.886e-08	-7.103	-7.103	0.000	(0)
CoSO4	6.815e-08	6.815e-08	-7.167	-7.167	0.000	(0)
HSO4-	6.789e-08	6.040e-08	-7.168	-7.219	-0.051	(0)
ZnSO4	4.277e-08	4.277e-08	-7.369	-7.369	0.000	(0)
AlSO4+	3.549e-08	3.158e-08	-7.450	-7.501	-0.051	(0)
CuSO4	2.616e-08	2.616e-08	-7.582	-7.582	0.000	(0)
NiSO4	2.035e-08	2.035e-08	-7.691	-7.691	0.000	(0)
CrOHSO4	6.448e-09	6.448e-09	-8.191	-8.191	0.000	(0)
PbSO4	2.489e-09	2.489e-09	-8.604	-8.604	0.000	(0)
Zn (SO4) 2-2	7.323e-10	4.231e-10	-9.135	-9.374	-0.238	(0)
Al (SO4) 2-	4.624e-10	4.114e-10	-9.335	-9.386	-0.051	(0)
CrSO4+	4.304e-10	3.752e-10	-9.366	-9.426	-0.060	(0)
Pb (SO4) 2-2	2.825e-11	1.632e-11	-10.549	-10.787	-0.238	(0)
Ni (SO4) 2-2	1.321e-12	7.633e-13	-11.879	-12.117	-0.238	(0)
FeSO4+	3.443e-14	3.069e-14	-13.463	-13.513	-0.050	(0)
Cr2 (OH) 2SO4+2	2.519e-14	1.455e-14	-13.599	-13.837	-0.238	(0)
Cr2 (OH) 2 (SO4) 2	9.408e-16	9.408e-16	-15.027	-15.027	0.000	(0)
Fe (SO4) 2-	8.526e-16	7.433e-16	-15.069	-15.129	-0.060	(0)
CrO3SO4-2	9.338e-33	5.395e-33	-32.030	-32.268	-0.238	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-46.993	-47.052	-0.060	(0)
Se (-2)	1.522e-24					

HSe-	1.515e-24	1.321e-24	-23.820	-23.879	-0.060	(0)
H2Se	6.623e-27	6.623e-27	-26.179	-26.179	0.000	(0)
MnSe	3.564e-30	3.564e-30	-29.448	-29.448	0.000	(0)
Se-2	2.485e-33	1.436e-33	-32.605	-32.843	-0.238	(0)
Se (4)	2.535e-08					
HSeO3-	2.512e-08	2.190e-08	-7.600	-7.660	-0.060	(0)
SeO3-2	2.207e-10	1.275e-10	-9.656	-9.895	-0.238	(0)
H2SeO3	5.915e-12	5.915e-12	-11.228	-11.228	0.000	(0)
FeHSeO3+2	2.518e-19	1.455e-19	-18.599	-18.837	-0.238	(0)
Se (6)	1.500e-18					
SeO4-2	1.499e-18	9.357e-19	-17.824	-18.029	-0.205	(0)
CoSeO4	1.414e-22	1.414e-22	-21.850	-21.850	0.000	(0)
MnSeO4	9.893e-23	9.893e-23	-22.005	-22.005	0.000	(0)
NiSeO4	3.876e-23	3.876e-23	-22.412	-22.412	0.000	(0)
HSeO4-	3.034e-23	2.645e-23	-22.518	-22.578	-0.060	(0)
ZnSeO4	2.716e-23	2.716e-23	-22.566	-22.566	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-40.351	-40.589	-0.238	(0)
Zn	3.520e-07					
Zn+2	3.003e-07	1.874e-07	-6.522	-6.727	-0.205	(0)
ZnSO4	4.277e-08	4.277e-08	-7.369	-7.369	0.000	(0)
ZnHCO3+	4.406e-09	3.842e-09	-8.356	-8.415	-0.060	(0)
ZnCl+	2.961e-09	2.629e-09	-8.529	-8.580	-0.052	(0)
Zn (SO4) 2-2	7.323e-10	4.231e-10	-9.135	-9.374	-0.238	(0)
ZnCO3	4.960e-10	4.960e-10	-9.304	-9.304	0.000	(0)
ZnOH+	2.231e-10	1.945e-10	-9.651	-9.711	-0.060	(0)
ZnOHCl	5.442e-11	5.442e-11	-10.264	-10.264	0.000	(0)
ZnCl2	1.943e-11	1.943e-11	-10.712	-10.712	0.000	(0)
Zn (OH) 2	6.895e-13	6.895e-13	-12.161	-12.161	0.000	(0)
ZnCl3-	9.866e-14	8.761e-14	-13.006	-13.057	-0.052	(0)
ZnCl4-2	3.862e-16	2.438e-16	-15.413	-15.613	-0.200	(0)
Zn (OH) 3-	6.039e-17	5.265e-17	-16.219	-16.279	-0.060	(0)
Zn (OH) 4-2	5.527e-23	3.193e-23	-22.257	-22.496	-0.238	(0)
ZnSeO4	2.716e-23	2.716e-23	-22.566	-22.566	0.000	(0)
ZnNO3+	2.043e-37	1.781e-37	-36.690	-36.749	-0.060	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-40.351	-40.589	-0.238	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-67.899	-67.899	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2	-87.46	-81.19	6.27	(Co (NH3) 5Cl) (NO3) 2
(Co (NH3) 5Cl) Cl2	-29.34	-24.80	4.54	(Co (NH3) 5Cl) Cl2
(Co (NH3) 5OH2) Cl3	-36.61	-24.80	11.81	(Co (NH3) 5OH2) Cl3
(Co (NH3) 6) (NO3) 3	-123.96	-106.03	17.93	(Co (NH3) 6) (NO3) 3
(Co (NH3) 6) Cl3	-41.57	-21.44	20.13	(Co (NH3) 6) Cl3
(NH4) 2CrO4	-31.96	-31.58	0.38	(NH4) 2CrO4
(NH4) 2SeO4	-24.12	-23.67	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	-0.94	10.20	11.13	Al (OH) 3
Al2 (MoO4) 3	-41.54	-38.39	3.15	Al2 (MoO4) 3
Al2O3	-0.03	20.39	20.43	Al2O3
Al4 (OH) 10SO4	2.76	25.46	22.70	Al4 (OH) 10SO4
AlAsO4:2H2O	-6.29	-1.49	4.80	AlAsO4:2H2O
AlOHSO4	-1.90	-5.13	-3.23	AlOHSO4
Alunite	3.65	2.87	-0.77	KAl3 (SO4) 2 (OH) 6
Anglesite	-3.47	-11.29	-7.83	PbSO4
Anhydrite	-1.99	-6.33	-4.34	CaSO4
Antlerite	-7.89	0.90	8.79	Cu3 (OH) 4SO4
Aragonite	-2.44	-10.70	-8.26	CaCO3
Arsenolite	-48.16	-51.10	-2.94	As4O6
Artinite	-11.76	-1.80	9.96	MgCO3:Mg (OH) 2:3H2O
As2O5	-30.15	-23.38	6.77	As2O5
Atacamite	-5.27	2.40	7.67	Cu2 (OH) 3Cl
Azurite	-6.55	-23.17	-16.62	Cu3 (OH) 2 (CO3) 2
Ba (OH) 2:8H2O	-19.46	5.09	24.56	Ba (OH) 2:8H2O
Ba3 (AsO4) 2	0.85	-8.09	-8.94	Ba3 (AsO4) 2
BaCrO4	-23.43	-33.20	-9.77	BaCrO4
BaHPO4	-5.84	-25.62	-19.77	BaHPO4

BaMoO4	-7.51	-14.50	-6.99	BaMoO4
Barite	-0.18	-10.23	-10.05	BaSO4
BaSeO3	-10.54	-8.74	1.79	BaSeO3
BaSeO4	-17.77	-25.29	-7.53	BaSeO4
Bianchite	-7.93	-9.69	-1.76	ZnSO4:6H2O
Birnessite	-17.41	0.68	18.09	MnO2
Bixbyite	-18.72	-18.99	-0.27	Mn2O3
Boehmite	1.27	10.20	8.93	AlOOH
Brochantite	-9.53	6.30	15.83	Cu4(OH)6SO4
Brucite	-8.24	8.95	17.18	Mg(OH)2
Bunsenite	-7.40	5.35	12.74	NiO
Ca3(AsO4)2:4H2O	-18.70	3.60	22.30	Ca3(AsO4)2:4H2O
Ca3(PO4)2(beta)	-5.36	-34.44	-29.08	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-9.07	-56.15	-47.08	Ca4H(PO4)3:3H2O
CaCrO4	-27.12	-29.30	-2.19	CaCrO4
CaHPO4	-2.35	-21.72	-19.37	CaHPO4
CaHPO4:2H2O	-2.65	-21.72	-19.06	CaHPO4:2H2O
Calcite	-2.25	-10.70	-8.46	CaCO3
CaMoO4	-2.66	-10.60	-7.94	CaMoO4
CaSeO3:2H2O	-7.72	-4.85	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-18.40	-21.39	-3.00	CaSeO4:2H2O
Cerussite	-2.46	-15.67	-13.20	PbCO3
CH4(g)	-59.32	-101.14	-41.81	CH4
Chalcanthite	-7.26	-9.92	-2.66	CuSO4:5H2O
Claudetite	-47.87	-51.10	-3.23	As4O6
Clausthalite	1.43	-26.03	-27.46	PbSe
Co(BO2)2	-31.37	-4.30	27.07	Co(BO2)2
Co(OH)2	-7.22	5.87	13.09	Co(OH)2
Co(OH)3	-14.31	-16.35	-2.03	Co(OH)3
CO2(g)	-1.54	-19.70	-18.16	CO2
Co3(AsO4)2	-18.79	-5.75	13.03	Co3(AsO4)2
Co3(PO4)2	-9.11	-43.80	-34.69	Co3(PO4)2
Co3O4	-16.64	-26.82	-10.17	Co3O4
CoCl2	-19.46	-10.96	8.51	CoCl2
CoCl2:6H2O	-13.47	-10.96	2.51	CoCl2:6H2O
CoCO3	-3.88	-13.82	-9.94	CoCO3
CoFe2O4	16.96	13.90	-3.05	CoFe2O4
CoHPO4	-5.77	-24.84	-19.06	CoHPO4
CoMoO4	-6.03	-13.72	-7.69	CoMoO4
CoO	-8.03	5.88	13.90	CoO
CoSe	-7.98	-24.18	-16.20	CoSe
CoSeO3	-9.28	-7.96	1.32	CoSeO3
CoSeO4:6H2O	-22.98	-24.51	-1.53	CoSeO4:6H2O
CoSO4	-12.49	-9.45	3.04	CoSO4
CoSO4:6H2O	-6.97	-9.45	-2.48	CoSO4:6H2O
Cotunnite	-7.95	-12.80	-4.86	PbCl2
Cr(OH)2	-19.33	-8.41	10.93	Cr(OH)2
Cr(OH)3	-2.58	-1.15	1.42	Cr(OH)3
Cr(OH)3(am)	-0.40	-1.15	-0.75	Cr(OH)3
Cr2O3	-0.10	-2.31	-2.21	Cr2O3
CrCl2	-39.66	-25.24	14.42	CrCl2
CrCl3	-41.88	-26.41	15.48	CrCl3
Crmetal	-59.76	-28.77	31.00	Cr
CrO3	-35.10	-38.30	-3.19	CrO3
Cu(OH)2	-3.44	5.41	8.84	Cu(OH)2
Cu2(OH)3NO3	-35.27	-25.80	9.47	Cu2(OH)3NO3
Cu2Se(alpha)	12.17	-34.27	-46.44	Cu2Se
Cu2SO4	-17.64	-19.53	-1.89	Cu2SO4
Cu3(AsO4)2:2H2O	-13.26	-7.16	6.10	Cu3(AsO4)2:2H2O
Cu3(PO4)2	-8.35	-45.20	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-10.08	-45.20	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	5.59	-58.92	-64.51	Cu3Se2
CuCO3	-2.79	-14.29	-11.50	CuCO3
CuCrO4	-27.45	-32.89	-5.44	CuCrO4
Cumetal	-3.31	-12.28	-8.97	Cu
CuMoO4	-1.08	-14.19	-13.11	CuMoO4
CuOCuSO4	-15.22	-4.51	10.71	CuOCuSO4
Cupricferrite	6.82	13.44	6.62	CuFe2O4

Cuprite	-3.17	-4.21	-1.04	Cu ₂ O
Cuprousferrite	10.78	1.91	-8.87	CuFeO ₂
CuSe	8.81	-24.65	-33.46	CuSe
CuSe ₂	-0.57	-34.35	-33.79	CuSe ₂
CuSeO ₃ :2H ₂ O	-9.05	-8.43	0.62	CuSeO ₃ :2H ₂ O
CuSeO ₄ :5H ₂ O	-22.54	-24.98	-2.44	CuSeO ₄ :5H ₂ O
CuSO ₄	-13.07	-9.92	3.16	CuSO ₄
Diaspore	3.02	10.20	7.18	AlOOH
Dolomite (disordered)	-5.05	-21.45	-16.40	CaMg (CO ₃) ₂
Dolomite (ordered)	-4.48	-21.45	-16.97	CaMg (CO ₃) ₂
Epsomite	-4.21	-6.37	-2.16	MgSO ₄ :7H ₂ O
Fe (OH) ₂	-6.57	6.99	13.56	Fe (OH) ₂
Fe (OH) 2.7Cl _{1.3}	4.53	1.49	-3.04	Fe (OH) 2.7Cl _{1.3}
Fe ₂ (OH) 4SeO ₃	-7.36	-5.81	1.55	Fe ₂ (OH) 4SeO ₃
Fe ₂ (SeO ₃) 3:2H ₂ O	-12.86	-33.49	-20.63	Fe ₂ (SeO ₃) 3:2H ₂ O
Fe ₂ (SO ₄) ₃	-34.93	-37.94	-3.01	Fe ₂ (SO ₄) ₃
Fe ₃ (OH) ₈	-5.20	15.02	20.22	Fe ₃ (OH) ₈
FeAsO ₄ :2H ₂ O	-8.07	-7.67	0.40	FeAsO ₄ :2H ₂ O
FeCr ₂ O ₄	-2.93	4.69	7.62	FeCr ₂ O ₄
FeMoO ₄	-2.54	-12.60	-10.06	FeMoO ₄
Ferrihydrite	0.60	4.01	3.41	Fe (OH) ₃
Ferroselite	-14.03	-32.76	-18.74	FeSe ₂
FeSe	-12.06	-23.06	-11.01	FeSe
Gibbsite	1.62	10.20	8.58	Al (OH) ₃
Goethite	3.34	4.01	0.67	FeOOH
Goslarite	-7.64	-9.69	-2.05	ZnSO ₄ :7H ₂ O
Gypsum	-1.72	-6.33	-4.61	CaSO ₄ :2H ₂ O
H-Jarosite	-7.19	-18.60	-11.41	(H ₃ O) Fe ₃ (SO ₄) ₂ (OH) ₆
H ₂ MoO ₄	-6.57	-19.60	-13.02	H ₂ MoO ₄
H ₂ Se (g)	-25.14	-30.06	-4.91	H ₂ Se
Halite	-6.12	-4.53	1.59	NaCl
Hausmannite	-23.94	38.35	62.29	Mn ₃ O ₄
Hematite	9.06	8.03	-1.03	Fe ₂ O ₃
Hercynite	3.56	27.39	23.83	FeAl ₂ O ₄
Hinsdalite	-8.92	-11.42	-2.50	PbAl ₃ PO ₄ SO ₄ (OH) ₆
Huntite	-13.30	-42.95	-29.65	CaMg ₃ (CO ₃) ₄
Hydrocerussite	-8.54	-27.31	-18.77	Pb ₃ (OH) ₂ (CO ₃) ₂
Hydromagnesite	-25.93	-34.04	-8.11	Mg ₅ (CO ₃) ₄ (OH) ₂ :4H ₂ O
Hydroxylapatite	-2.83	-47.16	-44.33	Ca ₅ (PO ₄) ₃ OH
Hydroxylpyromorphite	-9.20	-71.99	-62.79	Pb ₅ (PO ₄) ₃ OH
K-Alum	-12.26	-17.52	-5.26	KAl (SO ₄) ₂ :12H ₂ O
K-Jarosite	-1.26	-15.67	-14.41	KFe ₃ (SO ₄) ₂ (OH) ₆
K ₂ Cr ₂ O ₇	-53.25	-70.73	-17.48	K ₂ Cr ₂ O ₇
K ₂ CrO ₄	-31.87	-32.44	-0.57	K ₂ CrO ₄
K ₂ MoO ₄	-17.00	-13.73	3.27	K ₂ MoO ₄
K ₂ SeO ₄	-23.80	-24.53	-0.73	K ₂ SeO ₄
Langite	-11.68	6.30	17.98	Cu ₄ (OH) ₆ SO ₄ :H ₂ O
Larnakite	-6.90	-7.26	-0.37	PbO:PbSO ₄
Laurionite	-5.01	-4.39	0.62	PbOHCl
Lepidocrocite	2.64	4.01	1.37	FeOOH
Lime	-24.28	8.99	33.28	CaO
Litharge	-8.86	4.03	12.89	PbO
Maghemite	1.64	8.03	6.39	Fe ₂ O ₃
Magnesioferrite	-0.71	16.98	17.69	Fe ₂ MgO ₄
Magnesite	-3.23	-10.75	-7.52	MgCO ₃
Magnetite	11.00	15.02	4.03	Fe ₃ O ₄
Malachite	-3.35	-8.88	-5.53	Cu ₂ (OH) ₂ CO ₃
Manganite	-9.16	16.18	25.34	MnOOH
Massicot	-9.06	4.03	13.09	PbO
Melanothallite	-17.87	-11.43	6.45	CuCl ₂
Melanterite	-6.06	-8.33	-2.27	FeSO ₄ :7H ₂ O
Mg (OH) ₂ (active)	-9.84	8.95	18.79	Mg (OH) ₂
Mg ₃ (PO ₄) ₂	-11.29	-34.57	-23.28	Mg ₃ (PO ₄) ₂
MgCr ₂ O ₄	-10.10	6.64	16.74	MgCr ₂ O ₄
MgCrO ₄	-35.00	-29.35	5.65	MgCrO ₄
MgHPO ₄ :3H ₂ O	-3.59	-21.76	-18.18	MgHPO ₄ :3H ₂ O
MgMoO ₄	-8.80	-10.65	-1.85	MgMoO ₄
MgSeO ₃ :6H ₂ O	-7.93	-4.89	3.04	MgSeO ₃ :6H ₂ O

MgSeO4:6H2O	-20.24	-21.44	-1.20	MgSeO4:6H2O
Minium	-42.34	32.45	74.78	Pb3O4
Mirabilite	-6.20	-7.55	-1.35	Na2SO4:10H2O
Mn2(SO4)3	-59.74	-64.96	-5.22	Mn2(SO4)3
Mn3(AsO4)2:8H2O	-17.89	-5.39	12.50	Mn3(AsO4)2:8H2O
Mn3(PO4)2	-19.58	-43.43	-23.85	Mn3(PO4)2
MnCl2:4H2O	-13.59	-10.84	2.75	MnCl2:4H2O
MnHPO4	0.69	-24.71	-25.40	MnHPO4
MnSe	-27.86	-24.06	3.79	MnSe
MnSeO3	-8.97	-7.84	1.13	MnSeO3
MnSeO3:2H2O	-8.80	-7.84	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-22.34	-24.39	-2.05	MnSeO4:5H2O
MnSO4	-12.10	-9.33	2.78	MnSO4
MoO3	-11.60	-19.60	-8.00	MoO3
Morenosite	-7.79	-9.98	-2.18	NiSO4:7H2O
Na-Jarosite	-3.97	-14.72	-10.75	NaFe3(SO4)2(OH)6
Na2Cr2O7	-58.86	-68.83	-9.96	Na2Cr2O7
Na2CrO4	-33.52	-30.53	2.99	Na2CrO4
Na2Mo2O7	-14.66	-31.42	-16.76	Na2Mo2O7
Na2MoO4	-13.34	-11.82	1.52	Na2MoO4
Na2MoO4:2H2O	-13.05	-11.83	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-16.37	-6.07	10.30	Na2SeO3:5H2O
Na2SeO4	-23.90	-22.62	1.28	Na2SeO4
Nantokite	-3.66	-10.52	-6.86	CuCl
Natron	-10.42	-11.93	-1.51	Na2CO3:10H2O
Nesquehonite	-6.15	-10.75	-4.60	MgCO3:3H2O
Ni(OH)2	-7.73	5.35	13.08	Ni(OH)2
Ni3(AsO4)2:8H2O	-23.03	-7.33	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-14.07	-45.37	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-25.93	6.07	32.00	Ni4(OH)6SO4
NiCO3	-7.60	-14.35	-6.75	NiCO3
NiMoO4	-3.10	-14.25	-11.15	NiMoO4
NiSe	-7.01	-24.71	-17.70	NiSe
NiSeO3:2H2O	-11.40	-8.49	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-23.52	-25.04	-1.52	NiSeO4:6H2O
Nsutite	-16.82	0.68	17.50	MnO2
O2(g)	-44.08	40.72	84.80	O2
Pb(BO2)2	-12.71	-6.15	6.57	Pb(BO2)2
Pb(OH)2	-4.30	4.03	8.32	Pb(OH)2
Pb10(OH)60(CO3)6	-69.13	-77.89	-8.76	Pb10(OH)60(CO3)6
Pb2(OH)3Cl	-9.15	-0.36	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-18.13	8.06	26.19	Pb2O(OH)2
Pb2O3	-32.62	28.42	61.04	Pb2O3
Pb2OCO3	-11.20	-11.64	-0.44	Pb2OCO3
Pb3(AsO4)2	-17.09	-11.29	5.80	Pb3(AsO4)2
Pb3(PO4)2	-5.80	-49.33	-43.53	Pb3(PO4)2
Pb3O2CO3	-18.96	-7.61	11.35	Pb3O2CO3
Pb3O2SO4	-14.16	-3.24	10.92	Pb3O2SO4
Pb4(OH)6SO4	-20.31	0.79	21.10	Pb4(OH)6SO4
Pb4O3SO4	-21.49	0.79	22.28	Pb4O3SO4
PbCrO4	-21.54	-34.27	-12.73	PbCrO4
PbHPO4	-2.88	-26.68	-23.81	PbHPO4
Pbmetal	-20.57	-16.33	4.24	Pb
PbMoO4	0.21	-15.57	-15.78	PbMoO4
PbO:0.3H2O	-8.95	4.03	12.98	PbO:0.33H2O
PbSeO4	-19.47	-26.36	-6.88	PbSeO4
Periclase	-13.09	8.95	22.04	MgO
Phosgenite	-8.66	-28.47	-19.81	PbCl2:PbCO3
Plattnerite	-26.10	24.39	50.49	PbO2
Plumbgummite	5.99	-26.80	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-14.19	8.99	23.19	Ca(OH)2
Pyrochroite	-9.49	6.00	15.48	Mn(OH)2
Pyrolusite	-15.84	26.36	42.19	MnO2
Pyromorphite	4.03	-80.40	-84.43	Pb5(PO4)3Cl
Retgersite	-7.92	-9.97	-2.05	NiSO4:6H2O
Rhodochrosite	-3.13	-13.70	-10.57	MnCO3
Semetal(am)	-2.56	-9.70	-7.14	Se
Semetal(hex)	-1.94	-9.70	-7.76	Se

SeO2	-13.96	-13.84	0.12	SeO2
SeO3	-51.87	-30.39	21.48	SeO3
Siderite	-2.51	-12.70	-10.19	FeCO3
Smithsonite	-4.11	-14.06	-9.95	ZnCO3
Spinel	-8.67	29.34	38.01	MgAl2O4
Strengite	-0.32	-26.70	-26.37	FePO4:2H2O
Tenorite	-2.43	5.41	7.84	CuO
Thenardite	-7.90	-7.55	0.35	Na2SO4
Thermonatrite	-12.59	-11.93	0.67	Na2CO3:H2O
Tsumebite	-7.46	-17.25	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	-4.44	-40.44	-36.00	Fe3(PO4)2:8H2O
Witherite	-6.02	-14.60	-8.58	BaCO3
Zincite	-5.97	5.63	11.60	ZnO
Zincosite	-13.87	-9.69	4.18	ZnSO4
Zn(BO2)2	-12.83	-4.54	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-70.84	-67.60	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-6.57	5.63	12.20	Zn(OH)2
Zn(OH)2(am)	-7.08	5.63	12.71	Zn(OH)2
Zn(OH)2(beta)	-6.37	5.63	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-6.15	5.63	11.78	Zn(OH)2
Zn(OH)2(gamma)	-6.10	5.63	11.73	Zn(OH)2
Zn2(OH)2SO4	-11.56	-4.06	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.34	2.85	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-20.13	-6.48	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-9.10	-44.52	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-33.43	-13.75	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-21.19	7.21	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-27.17	11.33	38.50	Zn5(OH)8Cl2
ZnCl2	-18.47	-11.20	7.27	ZnCl2
ZnCO3:1H2O	-3.80	-14.06	-10.26	ZnCO3:1H2O
Znmetal	-40.97	-14.73	26.25	Zn
ZnMoO4	-3.87	-13.96	-10.09	ZnMoO4
ZnO(active)	-5.82	5.63	11.45	ZnO
ZnSe	-9.95	-24.43	-14.48	ZnSe
ZnSeO4:6H2O	-23.24	-24.76	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-9.18	-9.69	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Initial solution 4.

-----Solution composition-----

Elements	Molality	Moles
Al	5.284e-05	5.284e-05
As	2.680e-08	2.680e-08
B	9.287e-06	9.287e-06
Ba	2.924e-07	2.924e-07
Be	2.228e-07	2.228e-07
Ca	1.308e-02	1.308e-02
Cd	7.145e-09	7.145e-09
Cl	1.388e-02	1.388e-02
Co	1.227e-05	1.227e-05
Cr	6.372e-08	6.372e-08
Cu	9.874e-05	9.874e-05
Fe	4.435e-04	4.435e-04
K	6.291e-03	6.291e-03
Mg	3.635e-03	3.635e-03
Mn	9.539e-05	9.539e-05
Mo	1.151e-06	1.151e-06
N	7.218e-04	7.218e-04
Na	1.498e-02	1.498e-02
Ni	8.382e-06	8.382e-06
P	9.400e-06	9.400e-06
Pb	9.691e-08	9.691e-08
S(6)	2.322e-02	2.322e-02

Se	1.271e-07	1.271e-07
Zn	7.523e-06	7.523e-06

-----Description of solution-----

pH	=	4.050
pe	=	4.000
Activity of water	=	0.999
Ionic strength (mol/kgw)	=	7.235e-02
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	-1.741e-04
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	20.00
Electrical balance (eq)	=	-3.291e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	-3.64
Iterations	=	12
Total H	=	1.110168e+02
Total O	=	5.559979e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.112e-04	8.913e-05	-3.954	-4.050	-0.096	0.00
OH-	9.765e-11	7.686e-11	-10.010	-10.114	-0.104	(0)
H2O	5.551e+01	9.988e-01	1.744	-0.001	0.000	18.05
Al	5.284e-05					
AlSO4+	4.325e-05	3.456e-05	-4.364	-4.461	-0.097	(0)
Al+3	5.995e-06	8.162e-07	-5.222	-6.088	-0.866	(0)
Al(SO4) 2-	3.425e-06	2.737e-06	-5.465	-5.563	-0.097	(0)
AlOH+2	1.549e-07	6.629e-08	-6.810	-7.179	-0.369	(0)
Al(OH) 2+	1.021e-08	8.256e-09	-7.991	-8.083	-0.092	(0)
Al(OH) 3	1.859e-11	1.859e-11	-10.731	-10.731	0.000	(0)
Al(OH) 4-	1.003e-13	8.018e-14	-12.999	-13.096	-0.097	(0)
AlMo6O21-3	3.639e-15	2.171e-16	-14.439	-15.663	-1.224	(0)
As (3)	2.521e-08					
H3AsO3	2.521e-08	2.521e-08	-7.598	-7.598	0.000	(0)
H4AsO3+	1.523e-12	1.113e-12	-11.817	-11.953	-0.136	(0)
H2AsO3-	1.643e-13	1.201e-13	-12.784	-12.920	-0.136	(0)
HAsO3-2	3.453e-21	9.864e-22	-20.462	-21.006	-0.544	(0)
AsO3-3	6.008e-30	3.584e-31	-29.221	-30.446	-1.224	(0)
As (5)	1.588e-09					
H2AsO4-	1.567e-09	1.145e-09	-8.805	-8.941	-0.136	(0)
H3AsO4	1.662e-11	1.690e-11	-10.779	-10.772	0.007	(0)
HAsO4-2	4.832e-12	1.380e-12	-11.316	-11.860	-0.544	(0)
AsO4-3	7.304e-19	4.357e-20	-18.136	-19.361	-1.224	(0)
B	9.287e-06					
H3BO3	9.287e-06	9.443e-06	-5.032	-5.025	0.007	(0)
H2BO3-	7.274e-11	5.627e-11	-10.138	-10.250	-0.111	(0)
CaH2BO3+	1.376e-11	1.065e-11	-10.861	-10.973	-0.111	(0)
MgH2BO3+	2.559e-12	1.980e-12	-11.592	-11.703	-0.111	(0)
NaH2BO3	1.131e-12	1.131e-12	-11.947	-11.947	0.000	(0)
H5(BO3) 2-	6.034e-16	4.668e-16	-15.219	-15.331	-0.111	(0)
BaH2BO3+	2.636e-16	2.039e-16	-15.579	-15.691	-0.111	(0)
H8(BO3) 3-	4.932e-19	3.815e-19	-18.307	-18.418	-0.111	(0)
Ba	2.924e-07					
Ba+2	2.924e-07	1.205e-07	-6.534	-6.919	-0.385	(0)
BaNH3+2	8.904e-16	2.544e-16	-15.050	-15.595	-0.544	(0)
BaH2BO3+	2.636e-16	2.039e-16	-15.579	-15.691	-0.111	(0)
BaOH+	4.857e-17	3.908e-17	-16.314	-16.408	-0.094	(0)
BaNO3+	0.000e+00	0.000e+00	-58.243	-58.379	-0.136	(0)
Be	2.228e-07					
Be+2	1.589e-07	6.549e-08	-6.799	-7.184	-0.385	(0)
BeSO4	5.495e-08	5.495e-08	-7.260	-7.260	0.000	(0)
Be(SO4) 2-2	3.956e-09	1.130e-09	-8.403	-8.947	-0.544	(0)
BeOH+	3.590e-09	2.942e-09	-8.445	-8.531	-0.086	(0)

	BeCl+	1.430e-09	1.151e-09	-8.845	-8.939	-0.094	(0)
	Be (OH) 2	2.095e-13	2.095e-13	-12.679	-12.679	0.000	(0)
	Be2OH+3	1.919e-13	3.197e-14	-12.717	-13.495	-0.778	(0)
	Be3 (OH) 3+3	3.696e-18	6.156e-19	-17.432	-18.211	-0.778	(0)
	Be (OH) 3-	7.246e-19	5.938e-19	-18.140	-18.226	-0.086	(0)
	Be (OH) 4-2	9.377e-29	4.228e-29	-28.028	-28.374	-0.346	(0)
Ca	1.308e-02						
	Ca+2	8.199e-03	3.380e-03	-2.086	-2.471	-0.385	(0)
	CaSO4	4.877e-03	4.877e-03	-2.312	-2.312	0.000	(0)
	CaH2PO4+	5.618e-07	4.544e-07	-6.250	-6.343	-0.092	(0)
	CaHPO4	6.463e-09	6.463e-09	-8.190	-8.190	0.000	(0)
	CaNH3+2	4.981e-11	1.423e-11	-10.303	-10.847	-0.544	(0)
	CaH2BO3+	1.376e-11	1.065e-11	-10.861	-10.973	-0.111	(0)
	CaOH+	6.009e-12	4.895e-12	-11.221	-11.310	-0.089	(0)
	CaPO4-	2.137e-13	1.729e-13	-12.670	-12.762	-0.092	(0)
	Ca (NH3) 2+2	6.632e-20	1.894e-20	-19.178	-19.723	-0.544	(0)
	CaNO3+	0.000e+00	0.000e+00	-54.018	-54.154	-0.136	(0)
Cd	7.145e-09						
	Cd+2	2.961e-09	1.221e-09	-8.529	-8.913	-0.385	(0)
	CdSO4	1.783e-09	1.783e-09	-8.749	-8.749	0.000	(0)
	CdCl+	1.752e-09	1.281e-09	-8.757	-8.893	-0.136	(0)
	Cd (SO4) 2-2	5.911e-10	1.689e-10	-9.228	-9.772	-0.544	(0)
	CdCl2	5.825e-11	5.825e-11	-10.235	-10.235	0.000	(0)
	CdCl3-	5.300e-13	3.875e-13	-12.276	-12.412	-0.136	(0)
	CdOHC1	5.266e-15	5.266e-15	-14.279	-14.279	0.000	(0)
	CdOH+	1.026e-15	7.503e-16	-14.989	-15.125	-0.136	(0)
	Cd (OH) 2	7.790e-22	7.790e-22	-21.108	-21.108	0.000	(0)
	Cd2OH+3	8.185e-23	4.883e-24	-22.087	-23.311	-1.224	(0)
	Cd (SeO3) 2-2	5.753e-26	1.643e-26	-25.240	-25.784	-0.544	(0)
	Cd (OH) 3-	7.346e-30	5.370e-30	-29.134	-29.270	-0.136	(0)
	CdSeO4	3.576e-31	3.576e-31	-30.447	-30.447	0.000	(0)
	Cd (OH) 4-2	3.472e-40	0.000e+00	-39.459	-40.004	-0.544	(0)
	CdNO3+	0.000e+00	0.000e+00	-60.413	-60.549	-0.136	(0)
	Cd (NO3) 2	0.000e+00	0.000e+00	-113.111	-113.111	0.000	(0)
Cl	1.388e-02						
	Cl-	1.381e-02	1.106e-02	-1.860	-1.956	-0.096	(0)
	CuCl2-	2.907e-05	2.306e-05	-4.537	-4.637	-0.101	(0)
	CuCl	9.858e-06	9.858e-06	-5.006	-5.006	0.000	(0)
	MnCl+	3.569e-07	2.872e-07	-6.447	-6.542	-0.094	(0)
	CuCl+	3.164e-07	2.510e-07	-6.500	-6.600	-0.101	(0)
	CoCl+	1.315e-07	9.612e-08	-6.881	-7.017	-0.136	(0)
	CuCl3-2	1.276e-07	5.349e-08	-6.894	-7.272	-0.378	(0)
	NiCl+	8.574e-08	6.268e-08	-7.067	-7.203	-0.136	(0)
	ZnCl+	6.136e-08	4.867e-08	-7.212	-7.313	-0.101	(0)
	PbCl+	7.379e-09	5.395e-09	-8.132	-8.268	-0.136	(0)
	MnCl2	4.488e-09	4.488e-09	-8.348	-8.348	0.000	(0)
	CdCl+	1.752e-09	1.281e-09	-8.757	-8.893	-0.136	(0)
	BeCl+	1.430e-09	1.151e-09	-8.845	-8.939	-0.094	(0)
	CuCl2	7.521e-10	7.521e-10	-9.124	-9.124	0.000	(0)
	ZnCl2	6.866e-10	6.866e-10	-9.163	-9.163	0.000	(0)
	PbCl2	2.606e-10	2.606e-10	-9.584	-9.584	0.000	(0)
	CrCl+2	6.429e-11	1.836e-11	-10.192	-10.736	-0.544	(0)
	CdCl2	5.825e-11	5.825e-11	-10.235	-10.235	0.000	(0)
	MnCl3-	1.700e-11	1.367e-11	-10.770	-10.864	-0.094	(0)
	ZnOHC1	7.463e-12	7.463e-12	-11.127	-11.127	0.000	(0)
	ZnCl3-	7.451e-12	5.911e-12	-11.128	-11.228	-0.101	(0)
	NiCl2	3.540e-12	3.540e-12	-11.451	-11.451	0.000	(0)
	PbCl3-	1.659e-12	1.213e-12	-11.780	-11.916	-0.136	(0)
	CdCl3-	5.300e-13	3.875e-13	-12.276	-12.412	-0.136	(0)
	CuCl3-	8.945e-14	7.096e-14	-13.048	-13.149	-0.101	(0)
	ZnCl4-2	7.493e-14	3.140e-14	-13.125	-13.503	-0.378	(0)
	FeCl+2	4.146e-14	1.738e-14	-13.382	-13.760	-0.378	(0)
	PbCl4-2	1.993e-14	5.694e-15	-13.700	-14.245	-0.544	(0)
	CrCl2+	1.693e-14	1.238e-14	-13.771	-13.907	-0.136	(0)
	CdOHC1	5.266e-15	5.266e-15	-14.279	-14.279	0.000	(0)
	FeCl2+	1.250e-15	1.006e-15	-14.903	-14.997	-0.094	(0)
	CrOHC12	2.136e-16	2.136e-16	-15.670	-15.670	0.000	(0)
	CuCl4-2	1.113e-17	4.664e-18	-16.954	-17.331	-0.378	(0)

FeCl3	1.113e-18	1.113e-18	-17.954	-17.954	0.000	(0)
CoCl+2	7.155e-34	2.044e-34	-33.145	-33.690	-0.544	(0)
CrO3Cl-	0.000e+00	0.000e+00	-44.667	-44.803	-0.136	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-47.366	-47.910	-0.544	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-49.862	-50.406	-0.544	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-65.026	-65.570	-0.544	(0)
Co (2)	1.227e-05					
Co+2	8.914e-06	2.546e-06	-5.050	-5.594	-0.544	(0)
CoSO4	3.220e-06	3.220e-06	-5.492	-5.492	0.000	(0)
CoCl+	1.315e-07	9.612e-08	-6.881	-7.017	-0.136	(0)
CoHPO4	1.139e-11	1.139e-11	-10.944	-10.944	0.000	(0)
CoOH+	7.843e-12	5.734e-12	-11.106	-11.242	-0.136	(0)
Co (NH3) +2	5.605e-12	1.601e-12	-11.251	-11.796	-0.544	(0)
Co (OH) 2	5.139e-17	5.139e-17	-16.289	-16.289	0.000	(0)
Co2OH+3	1.226e-17	7.317e-19	-16.911	-18.136	-1.224	(0)
Co (NH3) 2+2	5.113e-19	1.461e-19	-18.291	-18.835	-0.544	(0)
Co (OH) 3-	1.583e-25	1.157e-25	-24.801	-24.937	-0.136	(0)
Co (NH3) 3+2	2.153e-26	6.150e-27	-25.667	-26.211	-0.544	(0)
CoOOH-	6.625e-27	4.844e-27	-26.179	-26.315	-0.136	(0)
CoSeO4	1.849e-27	1.849e-27	-26.733	-26.733	0.000	(0)
Co (NH3) 4+2	3.778e-34	1.079e-34	-33.423	-33.967	-0.544	(0)
Co4 (OH) 4+4	3.238e-35	2.156e-37	-34.490	-36.666	-2.177	(0)
Co (OH) 4-2	7.245e-36	2.070e-36	-35.140	-35.684	-0.544	(0)
Co (NH3) 5+2	0.000e+00	0.000e+00	-41.678	-42.223	-0.544	(0)
CoNO2+	0.000e+00	0.000e+00	-43.791	-43.927	-0.136	(0)
CoNO3+	0.000e+00	0.000e+00	-57.457	-57.593	-0.136	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-109.483	-109.483	0.000	(0)
Co (3)	2.050e-31					
CoOH+2	2.035e-31	5.813e-32	-30.691	-31.236	-0.544	(0)
Co+3	7.446e-34	1.014e-34	-33.128	-33.994	-0.866	(0)
CoCl+2	7.155e-34	2.044e-34	-33.145	-33.690	-0.544	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-49.862	-50.406	-0.544	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-60.792	-60.928	-0.136	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-65.026	-65.570	-0.544	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-68.505	-69.050	-0.544	(0)
Cr (2)	5.033e-20					
Cr+2	5.033e-20	1.438e-20	-19.298	-19.842	-0.544	(0)
Cr (3)	6.372e-08					
CrSO4+	2.618e-08	1.914e-08	-7.582	-7.718	-0.136	(0)
Cr+3	2.571e-08	1.534e-09	-7.590	-8.814	-1.224	(0)
Cr (OH) +2	9.288e-09	2.653e-09	-8.032	-8.576	-0.544	(0)
CrOHSO4	2.437e-09	2.437e-09	-8.613	-8.613	0.000	(0)
CrCl+2	6.429e-11	1.836e-11	-10.192	-10.736	-0.544	(0)
Cr (OH) 2+	2.915e-11	2.131e-11	-10.535	-10.671	-0.136	(0)
CrH2PO4+2	7.383e-12	2.109e-12	-11.132	-11.676	-0.544	(0)
CrCl2+	1.693e-14	1.238e-14	-13.771	-13.907	-0.136	(0)
Cr2 (OH) 2SO4+2	1.197e-15	3.419e-16	-14.922	-15.466	-0.544	(0)
Cr (OH) 3	9.036e-16	9.036e-16	-15.044	-15.044	0.000	(0)
CrOHC12	2.136e-16	2.136e-16	-15.670	-15.670	0.000	(0)
Cr2 (OH) 2 (SO4) 2	1.343e-16	1.343e-16	-15.872	-15.872	0.000	(0)
CrO2-	6.593e-21	4.820e-21	-20.181	-20.317	-0.136	(0)
Cr (OH) 4-	5.552e-21	4.059e-21	-20.256	-20.392	-0.136	(0)
Cr (NH3) 5OH+2	0.000e+00	0.000e+00	-40.611	-41.155	-0.544	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-45.831	-47.056	-1.224	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-47.366	-47.910	-0.544	(0)
CrNO3+2	0.000e+00	0.000e+00	-62.020	-62.564	-0.544	(0)
Cr (6)	3.419e-40					
HCrO4-	3.419e-40	2.500e-40	-39.466	-39.602	-0.136	(0)
CrO4-2	0.000e+00	0.000e+00	-41.671	-42.056	-0.385	(0)
CrO3SO4-2	0.000e+00	0.000e+00	-42.797	-43.341	-0.544	(0)
NaCrO4-	0.000e+00	0.000e+00	-43.159	-43.295	-0.136	(0)
KCrO4-	0.000e+00	0.000e+00	-43.667	-43.803	-0.136	(0)
CrO3HPO4-2	0.000e+00	0.000e+00	-43.693	-44.237	-0.544	(0)
H2CrO4	0.000e+00	0.000e+00	-43.854	-43.854	0.000	(0)
CrO3Cl-	0.000e+00	0.000e+00	-44.667	-44.803	-0.136	(0)
CrO3H2PO4-	0.000e+00	0.000e+00	-45.469	-45.605	-0.136	(0)
Cr2O7-2	0.000e+00	0.000e+00	-77.063	-77.607	-0.544	(0)
Cu (1)	4.003e-05					

CuCl2-	2.907e-05	2.306e-05	-4.537	-4.637	-0.101	(0)
CuCl	9.858e-06	9.858e-06	-5.006	-5.006	0.000	(0)
Cu+	9.682e-07	7.078e-07	-6.014	-6.150	-0.136	(0)
CuCl3-2	1.276e-07	5.349e-08	-6.894	-7.272	-0.378	(0)
Cu (2)	5.872e-05					
Cu+2	3.676e-05	1.515e-05	-4.435	-4.819	-0.385	(0)
CuSO4	2.163e-05	2.163e-05	-4.665	-4.665	0.000	(0)
CuCl+	3.164e-07	2.510e-07	-6.500	-6.600	-0.101	(0)
CuOH+	5.328e-09	4.227e-09	-8.273	-8.374	-0.101	(0)
CuNH3+2	2.979e-09	8.511e-10	-8.526	-9.070	-0.544	(0)
CuCl2	7.521e-10	7.521e-10	-9.124	-9.124	0.000	(0)
Cu2 (OH) 2+2	1.518e-12	4.336e-13	-11.819	-12.363	-0.544	(0)
Cu (OH) 2	1.218e-13	1.218e-13	-12.914	-12.914	0.000	(0)
CuCl3-	8.945e-14	7.096e-14	-13.048	-13.149	-0.101	(0)
CuCl4-2	1.113e-17	4.664e-18	-16.954	-17.331	-0.378	(0)
Cu (OH) 3-	3.855e-20	2.818e-20	-19.414	-19.550	-0.136	(0)
Cu (OH) 4-2	8.762e-29	2.503e-29	-28.057	-28.602	-0.544	(0)
CuNO2+	0.000e+00	0.000e+00	-41.845	-41.981	-0.136	(0)
CuNO3+	0.000e+00	0.000e+00	-56.370	-56.506	-0.136	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-80.152	-80.152	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-109.617	-109.617	0.000	(0)
Fe (2)	4.435e-04					
Fe+2	3.080e-04	8.798e-05	-3.511	-4.056	-0.544	(0)
FeSO4	1.352e-04	1.352e-04	-3.869	-3.869	0.000	(0)
FeH2PO4+	3.142e-07	2.541e-07	-6.503	-6.595	-0.092	(0)
FeHPO4	1.436e-09	1.436e-09	-8.843	-8.843	0.000	(0)
FeOH+	3.346e-10	2.692e-10	-9.475	-9.570	-0.094	(0)
Fe (OH) 2	1.556e-17	1.556e-17	-16.808	-16.808	0.000	(0)
Fe (OH) 3-	6.584e-22	5.298e-22	-21.182	-21.276	-0.094	(0)
Fe (3)	2.581e-10					
Fe (OH) 2+	2.410e-10	1.949e-10	-9.618	-9.710	-0.092	(0)
FeOH+2	7.944e-12	3.329e-12	-11.100	-11.478	-0.378	(0)
FeSO4+	4.732e-12	3.807e-12	-11.325	-11.419	-0.094	(0)
FeHPO4+	3.147e-12	2.545e-12	-11.502	-11.594	-0.092	(0)
Fe (SO4) 2-	7.664e-13	5.603e-13	-12.116	-12.252	-0.136	(0)
Fe+3	4.475e-13	6.093e-14	-12.349	-13.215	-0.866	(0)
FeCl+2	4.146e-14	1.738e-14	-13.382	-13.760	-0.378	(0)
FeH2PO4+2	1.558e-14	6.667e-15	-13.807	-14.176	-0.369	(0)
Fe (OH) 3	1.156e-14	1.156e-14	-13.937	-13.937	0.000	(0)
FeCl2+	1.250e-15	1.006e-15	-14.903	-14.997	-0.094	(0)
FeHSeO3+2	4.294e-17	1.227e-17	-16.367	-16.911	-0.544	(0)
FeCl3	1.113e-18	1.113e-18	-17.954	-17.954	0.000	(0)
Fe (OH) 4-	3.068e-19	2.482e-19	-18.513	-18.605	-0.092	(0)
Fe2 (OH) 2+4	6.591e-20	4.389e-22	-19.181	-21.358	-2.177	(0)
Fe3 (OH) 4+5	2.953e-27	1.173e-30	-26.530	-29.931	-3.401	(0)
FeNO3+2	0.000e+00	0.000e+00	-63.759	-64.303	-0.544	(0)
H (0)	1.164e-19					
H2	5.818e-20	5.915e-20	-19.235	-19.228	0.007	(0)
K	6.291e-03					
K+	6.020e-03	4.823e-03	-2.220	-2.317	-0.096	(0)
KSO4-	2.715e-04	2.196e-04	-3.566	-3.658	-0.092	(0)
KHPO4-	1.854e-10	1.500e-10	-9.732	-9.824	-0.092	(0)
KCrO4-	0.000e+00	0.000e+00	-43.667	-43.803	-0.136	(0)
Mg	3.635e-03					
Mg+2	2.461e-03	1.015e-03	-2.609	-2.994	-0.385	(0)
MgSO4	1.173e-03	1.173e-03	-2.931	-2.931	0.000	(0)
MgH2PO4+	3.599e-07	2.911e-07	-6.444	-6.536	-0.092	(0)
MgHPO4	2.678e-09	2.678e-09	-8.572	-8.572	0.000	(0)
MgOH+	3.488e-11	2.859e-11	-10.457	-10.544	-0.086	(0)
MgH2BO3+	2.559e-12	1.980e-12	-11.592	-11.703	-0.111	(0)
MgPO4-	1.003e-15	8.112e-16	-14.999	-15.091	-0.092	(0)
Mn (2)	9.539e-05					
Mn+2	7.219e-05	2.062e-05	-4.142	-4.686	-0.544	(0)
MnSO4	2.285e-05	2.285e-05	-4.641	-4.641	0.000	(0)
MnCl+	3.569e-07	2.872e-07	-6.447	-6.542	-0.094	(0)
MnCl2	4.488e-09	4.488e-09	-8.348	-8.348	0.000	(0)
MnCl3-	1.700e-11	1.367e-11	-10.770	-10.864	-0.094	(0)
MnOH+	4.948e-12	3.981e-12	-11.306	-11.400	-0.094	(0)

MnSe	3.144e-17	3.144e-17	-16.503	-16.503	0.000	(0)
MnSeO4	7.932e-27	7.932e-27	-26.101	-26.101	0.000	(0)
Mn (OH) 3-	5.717e-28	4.600e-28	-27.243	-27.337	-0.094	(0)
Mn (OH) 4-2	3.999e-37	1.676e-37	-36.398	-36.776	-0.378	(0)
MnNO3+	0.000e+00	0.000e+00	-56.548	-56.684	-0.136	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-108.478	-108.478	0.000	(0)
Mn (3)	3.223e-26					
Mn+3	3.223e-26	4.387e-27	-25.492	-26.358	-0.866	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-76.457	-76.834	-0.378	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-82.432	-82.540	-0.108	(0)
Mo	1.151e-06					
MoO4-2	4.714e-07	1.943e-07	-6.327	-6.712	-0.385	(0)
HMoO4-	4.107e-07	3.003e-07	-6.386	-6.522	-0.136	(0)
H2MoO4	2.690e-07	2.690e-07	-6.570	-6.570	0.000	(0)
AlMo6O21-3	3.639e-15	2.171e-16	-14.439	-15.663	-1.224	(0)
HMo7O24-5	1.001e-20	3.977e-24	-20.000	-23.400	-3.401	(0)
H2Mo7O24-4	3.158e-21	2.103e-23	-20.501	-22.677	-2.177	(0)
Mo7O24-6	1.548e-21	1.962e-26	-20.810	-25.707	-4.897	(0)
H3Mo7O24-3	5.612e-23	3.348e-24	-22.251	-23.475	-1.224	(0)
N (-3)	7.218e-04					
NH4+	6.757e-04	5.228e-04	-3.170	-3.282	-0.111	(0)
NH4SO4-	4.605e-05	3.705e-05	-4.337	-4.431	-0.094	(0)
CuNH3+2	2.979e-09	8.511e-10	-8.526	-9.070	-0.544	(0)
NH3	2.338e-09	2.338e-09	-8.631	-8.631	0.000	(0)
CaNH3+2	4.981e-11	1.423e-11	-10.303	-10.847	-0.544	(0)
NiNH3+2	2.238e-11	6.394e-12	-10.650	-11.194	-0.544	(0)
Co (NH3) +2	5.605e-12	1.601e-12	-11.251	-11.796	-0.544	(0)
BaNH3+2	8.904e-16	2.544e-16	-15.050	-15.595	-0.544	(0)
Ni (NH3) 2+2	1.471e-17	4.201e-18	-16.833	-17.377	-0.544	(0)
Co (NH3) 2+2	5.113e-19	1.461e-19	-18.291	-18.835	-0.544	(0)
Ca (NH3) 2+2	6.632e-20	1.894e-20	-19.178	-19.723	-0.544	(0)
Co (NH3) 3+2	2.153e-26	6.150e-27	-25.667	-26.211	-0.544	(0)
Co (NH3) 4+2	3.778e-34	1.079e-34	-33.423	-33.967	-0.544	(0)
Cr (NH3) 5OH+2	0.000e+00	0.000e+00	-40.611	-41.155	-0.544	(0)
Co (NH3) 5+2	0.000e+00	0.000e+00	-41.678	-42.223	-0.544	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-45.831	-47.056	-1.224	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-47.366	-47.910	-0.544	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-49.862	-50.406	-0.544	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-60.792	-60.928	-0.136	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-65.026	-65.570	-0.544	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-68.505	-69.050	-0.544	(0)
N (3)	8.441e-40					
NO2-	8.441e-40	6.589e-40	-39.074	-39.181	-0.108	(0)
CuNO2+	0.000e+00	0.000e+00	-41.845	-41.981	-0.136	(0)
CoNO2+	0.000e+00	0.000e+00	-43.791	-43.927	-0.136	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-80.152	-80.152	0.000	(0)
N (5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-52.103	-52.199	-0.096	(0)
CaNO3+	0.000e+00	0.000e+00	-54.018	-54.154	-0.136	(0)
CuNO3+	0.000e+00	0.000e+00	-56.370	-56.506	-0.136	(0)
MnNO3+	0.000e+00	0.000e+00	-56.548	-56.684	-0.136	(0)
NiNO3+	0.000e+00	0.000e+00	-57.311	-57.448	-0.136	(0)
ZnNO3+	0.000e+00	0.000e+00	-57.389	-57.525	-0.136	(0)
CoNO3+	0.000e+00	0.000e+00	-57.457	-57.593	-0.136	(0)
BaNO3+	0.000e+00	0.000e+00	-58.243	-58.379	-0.136	(0)
PbNO3+	0.000e+00	0.000e+00	-58.735	-58.871	-0.136	(0)
CdNO3+	0.000e+00	0.000e+00	-60.413	-60.549	-0.136	(0)
CrNO3+2	0.000e+00	0.000e+00	-62.020	-62.564	-0.544	(0)
FeNO3+2	0.000e+00	0.000e+00	-63.759	-64.303	-0.544	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-108.478	-108.478	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-109.483	-109.483	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-109.617	-109.617	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-110.438	-110.438	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-110.814	-110.814	0.000	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-113.111	-113.111	0.000	(0)
Na	1.498e-02					

Na+	1.447e-02	1.160e-02	-1.839	-1.936	-0.096	(0)
NaSO4-	5.058e-04	4.091e-04	-3.296	-3.388	-0.092	(0)
NaHPO4-	6.904e-10	5.584e-10	-9.161	-9.253	-0.092	(0)
NaH2BO3	1.131e-12	1.131e-12	-11.947	-11.947	0.000	(0)
NaCrO4-	0.000e+00	0.000e+00	-43.159	-43.295	-0.136	(0)
Ni	8.382e-06					
Ni+2	5.447e-06	2.245e-06	-5.264	-5.649	-0.385	(0)
NiSO4	2.847e-06	2.847e-06	-5.546	-5.546	0.000	(0)
NiCl+	8.574e-08	6.268e-08	-7.067	-7.203	-0.136	(0)
Ni (SO4) 2-2	2.272e-09	6.490e-10	-8.644	-9.188	-0.544	(0)
NiNH3+2	2.238e-11	6.394e-12	-10.650	-11.194	-0.544	(0)
NiCl2	3.540e-12	3.540e-12	-11.451	-11.451	0.000	(0)
NiOH+	3.055e-12	2.233e-12	-11.515	-11.651	-0.136	(0)
Ni (OH) 2	2.859e-17	2.859e-17	-16.544	-16.544	0.000	(0)
Ni (NH3) 2+2	1.471e-17	4.201e-18	-16.833	-17.377	-0.544	(0)
Ni (OH) 3-	4.413e-24	3.226e-24	-23.355	-23.491	-0.136	(0)
NiSeO4	1.501e-27	1.501e-27	-26.824	-26.824	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-57.311	-57.448	-0.136	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.241	-55.234	0.007	(0)
P	9.400e-06					
H2PO4-	8.064e-06	6.522e-06	-5.093	-5.186	-0.092	(0)
CaH2PO4+	5.618e-07	4.544e-07	-6.250	-6.343	-0.092	(0)
MgH2PO4+	3.599e-07	2.911e-07	-6.444	-6.536	-0.092	(0)
FeH2PO4+	3.142e-07	2.541e-07	-6.503	-6.595	-0.092	(0)
H3PO4	7.741e-08	7.741e-08	-7.111	-7.111	0.000	(0)
HPO4-2	1.084e-08	4.544e-09	-7.965	-8.343	-0.378	(0)
CaHPO4	6.463e-09	6.463e-09	-8.190	-8.190	0.000	(0)
MgHPO4	2.678e-09	2.678e-09	-8.572	-8.572	0.000	(0)
FeHPO4	1.436e-09	1.436e-09	-8.843	-8.843	0.000	(0)
NaHPO4-	6.904e-10	5.584e-10	-9.161	-9.253	-0.092	(0)
KHPO4-	1.854e-10	1.500e-10	-9.732	-9.824	-0.092	(0)
CoHPO4	1.139e-11	1.139e-11	-10.944	-10.944	0.000	(0)
CrH2PO4+2	7.383e-12	2.109e-12	-11.132	-11.676	-0.544	(0)
FeHPO4+	3.147e-12	2.545e-12	-11.502	-11.594	-0.092	(0)
CaPO4-	2.137e-13	1.729e-13	-12.670	-12.762	-0.092	(0)
FeH2PO4+2	1.558e-14	6.667e-15	-13.807	-14.176	-0.369	(0)
MgPO4-	1.003e-15	8.112e-16	-14.999	-15.091	-0.092	(0)
PO4-3	1.424e-16	1.939e-17	-15.846	-16.712	-0.866	(0)
CrO3HPO4-2	0.000e+00	0.000e+00	-43.693	-44.237	-0.544	(0)
CrO3H2PO4-	0.000e+00	0.000e+00	-45.469	-45.605	-0.136	(0)
Pb	9.691e-08					
PbSO4	4.727e-08	4.727e-08	-7.325	-7.325	0.000	(0)
Pb+2	3.540e-08	1.459e-08	-7.451	-7.836	-0.385	(0)
PbCl+	7.379e-09	5.395e-09	-8.132	-8.268	-0.136	(0)
Pb (SO4) 2-2	6.595e-09	1.884e-09	-8.181	-8.725	-0.544	(0)
PbCl2	2.606e-10	2.606e-10	-9.584	-9.584	0.000	(0)
PbOH+	5.657e-12	4.136e-12	-11.247	-11.383	-0.136	(0)
PbCl3-	1.659e-12	1.213e-12	-11.780	-11.916	-0.136	(0)
PbCl4-2	1.993e-14	5.694e-15	-13.700	-14.245	-0.544	(0)
Pb2OH+3	1.603e-17	9.564e-19	-16.795	-18.019	-1.224	(0)
Pb (OH) 2	1.476e-17	1.476e-17	-16.831	-16.831	0.000	(0)
Pb (OH) 3-	2.278e-24	1.666e-24	-23.642	-23.778	-0.136	(0)
Pb (OH) 4-2	1.611e-31	4.603e-32	-30.793	-31.337	-0.544	(0)
Pb3 (OH) 4+2	1.005e-31	2.870e-32	-30.998	-31.542	-0.544	(0)
Pb4 (OH) 4+4	6.014e-34	4.005e-36	-33.221	-35.397	-2.177	(0)
PbNO3+	0.000e+00	0.000e+00	-58.735	-58.871	-0.136	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-110.814	-110.814	0.000	(0)
S(6)	2.322e-02					
SO4-2	1.605e-02	6.614e-03	-1.795	-2.180	-0.385	(0)
CaSO4	4.877e-03	4.877e-03	-2.312	-2.312	0.000	(0)
MgSO4	1.173e-03	1.173e-03	-2.931	-2.931	0.000	(0)
NaSO4-	5.058e-04	4.091e-04	-3.296	-3.388	-0.092	(0)
KSO4-	2.715e-04	2.196e-04	-3.566	-3.658	-0.092	(0)
FeSO4	1.352e-04	1.352e-04	-3.869	-3.869	0.000	(0)
HSO4-	6.197e-05	4.952e-05	-4.208	-4.305	-0.097	(0)
NH4SO4-	4.605e-05	3.705e-05	-4.337	-4.431	-0.094	(0)
AlSO4+	4.325e-05	3.456e-05	-4.364	-4.461	-0.097	(0)

MnSO4	2.285e-05	2.285e-05	-4.641	-4.641	0.000	(0)
CuSO4	2.163e-05	2.163e-05	-4.665	-4.665	0.000	(0)
Al (SO4) 2-	3.425e-06	2.737e-06	-5.465	-5.563	-0.097	(0)
CoSO4	3.220e-06	3.220e-06	-5.492	-5.492	0.000	(0)
NiSO4	2.847e-06	2.847e-06	-5.546	-5.546	0.000	(0)
ZnSO4	2.521e-06	2.521e-06	-5.598	-5.598	0.000	(0)
Zn (SO4) 2-2	5.305e-07	1.515e-07	-6.275	-6.819	-0.544	(0)
BeSO4	5.495e-08	5.495e-08	-7.260	-7.260	0.000	(0)
PbSO4	4.727e-08	4.727e-08	-7.325	-7.325	0.000	(0)
CrSO4+	2.618e-08	1.914e-08	-7.582	-7.718	-0.136	(0)
Pb (SO4) 2-2	6.595e-09	1.884e-09	-8.181	-8.725	-0.544	(0)
Be (SO4) 2-2	3.956e-09	1.130e-09	-8.403	-8.947	-0.544	(0)
CrOHSO4	2.437e-09	2.437e-09	-8.613	-8.613	0.000	(0)
Ni (SO4) 2-2	2.272e-09	6.490e-10	-8.644	-9.188	-0.544	(0)
CdSO4	1.783e-09	1.783e-09	-8.749	-8.749	0.000	(0)
Cd (SO4) 2-2	5.911e-10	1.689e-10	-9.228	-9.772	-0.544	(0)
FeSO4+	4.732e-12	3.807e-12	-11.325	-11.419	-0.094	(0)
Fe (SO4) 2-	7.664e-13	5.603e-13	-12.116	-12.252	-0.136	(0)
Cr2 (OH) 2SO4+2	1.197e-15	3.419e-16	-14.922	-15.466	-0.544	(0)
Cr2 (OH) 2 (SO4) 2	1.343e-16	1.343e-16	-15.872	-15.872	0.000	(0)
CrO3SO4-2	0.000e+00	0.000e+00	-42.797	-43.341	-0.544	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-60.792	-60.928	-0.136	(0)
Se (-2)	6.740e-11					
HSe-	4.510e-11	3.297e-11	-10.346	-10.482	-0.136	(0)
H2Se	2.230e-11	2.230e-11	-10.652	-10.652	0.000	(0)
MnSe	3.144e-17	3.144e-17	-16.503	-16.503	0.000	(0)
Se-2	9.300e-22	2.657e-22	-21.032	-21.576	-0.544	(0)
Se (4)	1.271e-07					
HSeO3-	1.238e-07	9.049e-08	-6.907	-7.043	-0.136	(0)
H2SeO3	3.297e-09	3.297e-09	-8.482	-8.482	0.000	(0)
SeO3-2	1.367e-11	3.905e-12	-10.864	-11.408	-0.544	(0)
FeHSeO3+2	4.294e-17	1.227e-17	-16.367	-16.911	-0.544	(0)
Cd (SeO3) 2-2	5.753e-26	1.643e-26	-25.240	-25.784	-0.544	(0)
Se (6)	3.837e-24					
SeO4-2	3.818e-24	1.574e-24	-23.418	-23.803	-0.385	(0)
HSeO4-	8.207e-27	6.000e-27	-26.086	-26.222	-0.136	(0)
MnSeO4	7.932e-27	7.932e-27	-26.101	-26.101	0.000	(0)
CoSeO4	1.849e-27	1.849e-27	-26.733	-26.733	0.000	(0)
NiSeO4	1.501e-27	1.501e-27	-26.824	-26.824	0.000	(0)
ZnSeO4	4.430e-28	4.430e-28	-27.354	-27.354	0.000	(0)
CdSeO4	3.576e-31	3.576e-31	-30.447	-30.447	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-50.607	-51.151	-0.544	(0)
Zn	7.523e-06					
Zn+2	4.410e-06	1.818e-06	-5.356	-5.740	-0.385	(0)
ZnSO4	2.521e-06	2.521e-06	-5.598	-5.598	0.000	(0)
Zn (SO4) 2-2	5.305e-07	1.515e-07	-6.275	-6.819	-0.544	(0)
ZnCl+	6.136e-08	4.867e-08	-7.212	-7.313	-0.101	(0)
ZnCl2	6.866e-10	6.866e-10	-9.163	-9.163	0.000	(0)
ZnOH+	1.911e-11	1.397e-11	-10.719	-10.855	-0.136	(0)
ZnOHC1	7.463e-12	7.463e-12	-11.127	-11.127	0.000	(0)
ZnCl3-	7.451e-12	5.911e-12	-11.128	-11.228	-0.101	(0)
ZnCl4-2	7.493e-14	3.140e-14	-13.125	-13.503	-0.378	(0)
Zn (OH) 2	3.669e-16	3.669e-16	-15.435	-15.435	0.000	(0)
Zn (OH) 3-	2.838e-22	2.075e-22	-21.547	-21.683	-0.136	(0)
ZnSeO4	4.430e-28	4.430e-28	-27.354	-27.354	0.000	(0)
Zn (OH) 4-2	3.263e-30	9.322e-31	-29.486	-30.031	-0.544	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-50.607	-51.151	-0.544	(0)
ZnNO3+	0.000e+00	0.000e+00	-57.389	-57.525	-0.136	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-110.438	-110.438	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2-142.78	-136.51	6.27	(Co (NH3) 5Cl) (NO3) 2	
(Co (NH3) 5Cl) Cl2 -40.56	-36.02	4.54	(Co (NH3) 5Cl) Cl2	
(Co (NH3) 5OH2) Cl3 -47.83	-36.02	11.81	(Co (NH3) 5OH2) Cl3	
(Co (NH3) 6) (NO3) 3-203.91	-185.98	17.93	(Co (NH3) 6) (NO3) 3	

(Co (NH3) 6) Cl3	-55.38	-35.25	20.13	(Co (NH3) 6) Cl3
(NH4) 2CrO4	-49.00	-48.62	0.38	(NH4) 2CrO4
(NH4) 2SeO4	-30.82	-30.37	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	-5.07	6.06	11.13	Al (OH) 3
Al2 (MoO4) 3	-35.46	-32.31	3.15	Al2 (MoO4) 3
Al2O3	-8.30	12.12	20.43	Al2O3
Al4 (OH) 10SO4	-8.74	13.96	22.70	Al4 (OH) 10SO4
AlAsO4:2H2O	-9.51	-4.71	4.80	AlAsO4:2H2O
AlOHSO4	-0.99	-4.22	-3.23	AlOHSO4
Alunite	0.13	-0.64	-0.77	KAl3 (SO4) 2 (OH) 6
Anglesite	-2.19	-10.02	-7.83	PbSO4
Anhydrite	-0.31	-4.65	-4.34	CaSO4
Antlerite	-9.23	-0.44	8.79	Cu3 (OH) 4SO4
Arsenolite	-27.45	-30.39	-2.94	As4O6
As2O5	-28.32	-21.54	6.77	As2O5
Atacamite	-7.12	0.55	7.67	Cu2 (OH) 3Cl
Ba (OH) 2:8H2O	-23.38	1.18	24.56	Ba (OH) 2:8H2O
Ba3 (AsO4) 2	-9.06	-18.00	-8.94	Ba3 (AsO4) 2
BaCrO4	-39.21	-48.97	-9.77	BaCrO4
BaHPO4	-7.91	-27.68	-19.77	BaHPO4
BaMoO4	-6.64	-13.63	-6.99	BaMoO4
Barite	0.95	-9.10	-10.05	BaSO4
BaSeO3	-11.71	-9.91	1.79	BaSeO3
BaSeO4	-23.20	-30.72	-7.53	BaSeO4
Be (OH) 2 (alpha)	-5.98	0.92	6.89	Be (OH) 2
Be (OH) 2 (am)	-6.28	0.92	7.19	Be (OH) 2
Be (OH) 2 (beta)	-5.58	0.92	6.49	Be (OH) 2
BeMoO4	-12.28	-13.90	-1.61	BeMoO4
BeSeO4:4H2O	-28.05	-30.99	-2.94	BeSeO4:4H2O
Bianchite	-6.16	-7.92	-1.76	ZnSO4:6H2O
Birnessite	-24.25	-6.16	18.09	MnO2
Bixbyite	-28.14	-28.42	-0.27	Mn2O3
Boehmite	-2.87	6.06	8.93	AlOOH
Brochantite	-12.99	2.84	15.83	Cu4 (OH) 6SO4
Brucite	-12.08	5.11	17.18	Mg (OH) 2
Bunsenite	-10.29	2.45	12.74	NiO
Ca3 (AsO4) 2:4H2O	-26.96	-4.66	22.30	Ca3 (AsO4) 2:4H2O
Ca3 (PO4) 2 (beta)	-11.76	-40.84	-29.08	Ca3 (PO4) 2
Ca4H (PO4) 3:3H2O	-16.99	-64.07	-47.08	Ca4H (PO4) 3:3H2O
CaCrO4	-42.34	-44.53	-2.19	CaCrO4
CaHPO4	-3.87	-23.23	-19.37	CaHPO4
CaHPO4:2H2O	-4.17	-23.23	-19.06	CaHPO4:2H2O
CaMoO4	-1.24	-9.18	-7.94	CaMoO4
CaSeO3:2H2O	-8.34	-5.47	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-23.28	-26.28	-3.00	CaSeO4:2H2O
Cd (BO2) 2	-20.70	-10.86	9.84	Cd (BO2) 2
Cd (OH) 2	-14.74	-0.81	13.93	Cd (OH) 2
Cd (OH) 2 (am)	-14.80	-0.81	13.99	Cd (OH) 2
Cd3 (OH) 2 (SO4) 2	-29.71	-23.00	6.71	Cd3 (OH) 2 (SO4) 2
Cd3 (OH) 4SO4	-35.28	-12.72	22.56	Cd3 (OH) 4SO4
Cd3 (PO4) 2	-27.57	-60.17	-32.60	Cd3 (PO4) 2
Cd4 (OH) 6SO4	-41.94	-13.54	28.40	Cd4 (OH) 6SO4
CdCl2	-12.22	-12.83	-0.60	CdCl2
CdCl2:1H2O	-11.16	-12.83	-1.67	CdCl2:1H2O
CdCl2:2.5H2O	-10.89	-12.83	-1.93	CdCl2:2.5H2O
Cdmetal (alpha)	-30.65	-16.91	13.74	Cd
Cdmetal (gamma)	-30.76	-16.91	13.84	Cd
CdMoO4	-1.42	-15.62	-14.21	CdMoO4
CdOHCl	-10.45	-6.82	3.63	CdOHCl
CdSe	5.08	-15.35	-20.43	CdSe
CdSeO4:2H2O	-30.87	-32.72	-1.85	CdSeO4:2H2O
CdSO4	-11.08	-11.09	-0.02	CdSO4
CdSO4:1H2O	-9.46	-11.09	-1.63	CdSO4:1H2O
CdSO4:2.67H2O	-9.28	-11.09	-1.82	CdSO4:2.67H2O
Chalcanthite	-4.34	-7.00	-2.66	CuSO4:5H2O
Claudetite	-27.16	-30.39	-3.23	As4O6
Clausthalite	13.19	-14.27	-27.46	PbSe
Co (BO2) 2	-34.61	-7.54	27.07	Co (BO2) 2

Co (OH) 2	-10.59	2.50	13.09	Co (OH) 2
Co (OH) 3	-19.81	-21.85	-2.03	Co (OH) 3
Co3 (AsO4) 2	-27.06	-14.03	13.03	Co3 (AsO4) 2
Co3 (PO4) 2	-15.52	-50.21	-34.69	Co3 (PO4) 2
Co3O4	-31.01	-41.18	-10.17	Co3O4
CoCl2	-18.01	-9.51	8.51	CoCl2
CoCl2:6H2O	-12.02	-9.51	2.51	CoCl2:6H2O
CoFe2O4	3.43	0.37	-3.05	CoFe2O4
CoHPO4	-7.30	-26.36	-19.06	CoHPO4
CoMoO4	-4.61	-12.31	-7.69	CoMoO4
CoO	-11.40	2.51	13.90	CoO
CoSe	4.17	-12.03	-16.20	CoSe
CoSeO3	-9.91	-8.59	1.32	CoSeO3
CoSeO4:6H2O	-27.87	-29.40	-1.53	CoSeO4:6H2O
CoSO4	-10.81	-7.77	3.04	CoSO4
CoSO4:6H2O	-5.30	-7.78	-2.48	CoSO4:6H2O
Cotunnite	-6.89	-11.75	-4.86	PbCl2
Cr (OH) 2	-22.67	-11.74	10.93	Cr (OH) 2
Cr (OH) 3	-8.05	-6.62	1.42	Cr (OH) 3
Cr (OH) 3 (am)	-5.87	-6.62	-0.75	Cr (OH) 3
Cr2O3	-11.04	-13.24	-2.21	Cr2O3
CrCl2	-38.18	-23.75	14.42	CrCl2
CrCl3	-40.11	-24.64	15.48	CrCl3
Crmetal	-58.84	-27.84	31.00	Cr
CrO3	-46.96	-50.16	-3.19	CrO3
Cu (OH) 2	-5.56	3.28	8.84	Cu (OH) 2
Cu2 (OH) 3NO3	-59.16	-49.69	9.47	Cu2 (OH) 3NO3
Cu2Se (alpha)	27.71	-18.73	-46.44	Cu2Se
Cu2SO4	-12.59	-14.48	-1.89	Cu2SO4
Cu3 (AsO4) 2:2H2O	-17.80	-11.70	6.10	Cu3 (AsO4) 2:2H2O
Cu3 (PO4) 2	-11.03	-47.88	-36.85	Cu3 (PO4) 2
Cu3 (PO4) 2:3H2O	-12.76	-47.88	-35.12	Cu3 (PO4) 2:3H2O
Cu3Se2	34.52	-29.98	-64.51	Cu3Se2
CuCrO4	-41.44	-46.88	-5.44	CuCrO4
Cumetal	-1.18	-10.15	-8.97	Cu
CuMoO4	1.58	-11.53	-13.11	CuMoO4
CuOCuSO4	-14.43	-3.72	10.71	CuOCuSO4
Cupricferrite	-5.47	1.15	6.62	CuFe2O4
Cuprite	-3.17	-4.20	-1.04	Cu2O
Cuprousferrite	5.70	-3.17	-8.87	CuFeO2
CuSe	22.21	-11.25	-33.46	CuSe
CuSe2	24.10	-9.68	-33.79	CuSe2
CuSeO3:2H2O	-8.44	-7.81	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-26.19	-28.63	-2.44	CuSeO4:5H2O
CuSO4	-10.16	-7.00	3.16	CuSO4
Diaspore	-1.12	6.06	7.18	AlOOH
Epsomite	-3.02	-5.18	-2.16	MgSO4:7H2O
Fe (OH) 2	-9.52	4.04	13.56	Fe (OH) 2
Fe (OH) 2.7Cl.3	0.17	-2.87	-3.04	Fe (OH) 2.7Cl.3
Fe2 (OH) 4SeO3	-14.78	-13.23	1.55	Fe2 (OH) 4SeO3
Fe2 (SeO3) 3:2H2O	-14.79	-35.41	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-29.96	-32.97	-3.01	Fe2 (SO4) 3
Fe3 (OH) 8	-18.31	1.91	20.22	Fe3 (OH) 8
FeAsO4:2H2O	-12.24	-11.84	0.40	FeAsO4:2H2O
FeCr2O4	-16.82	-9.20	7.62	FeCr2O4
FeMoO4	-0.71	-10.77	-10.06	FeMoO4
Ferrihydrite	-4.48	-1.07	3.41	Fe (OH) 3
Ferroselite	9.82	-8.92	-18.74	FeSe2
FeSe	0.52	-10.49	-11.01	FeSe
Gibbsite	-2.52	6.06	8.58	Al (OH) 3
Goethite	-1.74	-1.07	0.67	FeOOH
Goslarite	-5.87	-7.92	-2.05	ZnSO4:7H2O
Gypsum	-0.04	-4.65	-4.61	CaSO4:2H2O
H-Jarosite	-12.35	-23.76	-11.41	(H3O) Fe3 (SO4) 2 (OH) 6
H2MoO4	-1.79	-14.81	-13.02	H2MoO4
H2Se (g)	-9.62	-14.53	-4.91	H2Se
Halite	-5.48	-3.89	1.59	NaCl
Hausmannite	-35.95	26.34	62.29	Mn3O4

Hematite	-1.10	-2.13	-1.03	Fe2O3
Hercynite	-7.67	16.17	23.83	FeAl2O4
Hinsdalite	-18.20	-20.70	-2.50	PbAl3PO4SO4 (OH) 6
Hydroxylapatite	-14.11	-58.44	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-22.48	-85.27	-62.79	Pb5 (PO4) 3OH
K-Alum	-7.51	-12.77	-5.26	KAl (SO4) 2:12H2O
K-Jarosite	-7.62	-22.02	-14.41	KFe3 (SO4) 2 (OH) 6
K2Cr2O7	-79.36	-96.85	-17.48	K2Cr2O7
K2CrO4	-46.12	-46.69	-0.57	K2CrO4
K2MoO4	-14.62	-11.34	3.27	K2MoO4
K2SeO4	-27.71	-28.44	-0.73	K2SeO4
Langite	-15.14	2.84	17.98	Cu4 (OH) 6SO4:H2O
Larnakite	-9.38	-9.75	-0.37	PbO:PbSO4
Laurionite	-6.37	-5.74	0.62	PbOHCl
Lepidocrocite	-2.44	-1.07	1.37	FeOOH
Lime	-27.65	5.63	33.28	CaO
Litharge	-12.63	0.26	12.89	PbO
Maghemite	-8.52	-2.13	6.39	Fe2O3
Magnesioferrite	-14.72	2.97	17.69	Fe2MgO4
Magnetite	-2.11	1.91	4.03	Fe3O4
Manganite	-13.88	11.46	25.34	MnOOH
Massicot	-12.83	0.26	13.09	PbO
Melanothallite	-15.18	-8.73	6.45	CuCl2
Melanterite	-3.97	-6.24	-2.27	FeSO4:7H2O
Mg (OH) 2 (active)	-13.69	5.11	18.79	Mg (OH) 2
Mg3 (PO4) 2	-19.13	-42.41	-23.28	Mg3 (PO4) 2
MgCr2O4	-24.87	-8.14	16.74	MgCr2O4
MgCrO4	-50.70	-45.05	5.65	MgCrO4
MgHPO4:3H2O	-5.58	-23.76	-18.18	MgHPO4:3H2O
MgMoO4	-7.86	-9.71	-1.85	MgMoO4
MgSeO3:6H2O	-9.03	-5.99	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-25.60	-26.80	-1.20	MgSeO4:6H2O
Minium	-57.89	16.89	74.78	Pb3O4
Mirabilite	-4.70	-6.06	-1.35	Na2SO4:10H2O
Mn2 (SO4) 3	-54.03	-59.25	-5.22	Mn2 (SO4) 3
Mn3 (AsO4) 2:8H2O	-23.81	-11.31	12.50	Mn3 (AsO4) 2:8H2O
Mn3 (PO4) 2	-23.63	-47.48	-23.85	Mn3 (PO4) 2
MnCl2:4H2O	-11.35	-8.60	2.75	MnCl2:4H2O
MnHPO4	-0.05	-25.45	-25.40	MnHPO4
MnSe	-14.91	-11.12	3.79	MnSe
MnSeO3	-8.81	-7.68	1.13	MnSeO3
MnSeO3:2H2O	-8.64	-7.68	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-26.44	-28.49	-2.05	MnSeO4:5H2O
MnSO4	-9.64	-6.87	2.78	MnSO4
Monteponite	-16.23	-0.81	15.41	CdO
MoO3	-6.81	-14.81	-8.00	MoO3
Morenosite	-5.65	-7.83	-2.18	NiSO4:7H2O
Na-Jarosite	-10.90	-21.64	-10.75	NaFe3 (SO4) 2 (OH) 6
Na2Cr2O7	-86.12	-96.08	-9.96	Na2Cr2O7
Na2CrO4	-48.92	-45.93	2.99	Na2CrO4
Na2Mo2O7	-8.63	-25.39	-16.76	Na2Mo2O7
Na2MoO4	-12.10	-10.58	1.52	Na2MoO4
Na2MoO4:2H2O	-11.81	-10.58	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-17.17	-6.87	10.30	Na2SeO3:5H2O
Na2SeO4	-28.95	-27.67	1.28	Na2SeO4
Nantokite	-1.25	-8.11	-6.86	CuCl
Ni (OH) 2	-10.63	2.45	13.08	Ni (OH) 2
Ni3 (AsO4) 2:8H2O	-29.89	-14.19	15.70	Ni3 (AsO4) 2:8H2O
Ni3 (PO4) 2	-19.07	-50.37	-31.30	Ni3 (PO4) 2
Ni4 (OH) 6SO4	-32.48	-0.48	32.00	Ni4 (OH) 6SO4
NiMoO4	-1.21	-12.36	-11.15	NiMoO4
NiSe	5.62	-12.08	-17.70	NiSe
NiSeO3:2H2O	-11.55	-8.64	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-27.93	-29.45	-1.52	NiSeO4:6H2O
Nsutite	-23.66	-6.16	17.50	MnO2
O2 (g)	-52.60	32.20	84.80	O2
Pb (BO2) 2	-16.35	-9.78	6.57	Pb (BO2) 2
Pb (OH) 2	-8.06	0.26	8.32	Pb (OH) 2

Pb2 (OH) 3Cl	-14.27	-5.48	8.79	Pb2 (OH) 3Cl
Pb2O (OH) 2	-25.66	0.53	26.19	Pb2O (OH) 2
Pb2O3	-44.41	16.63	61.04	Pb2O3
Pb3 (AsO4) 2	-26.55	-20.75	5.80	Pb3 (AsO4) 2
Pb3 (PO4) 2	-13.40	-56.93	-43.53	Pb3 (PO4) 2
Pb3O2SO4	-20.41	-9.49	10.92	Pb3O2SO4
Pb4 (OH) 6SO4	-30.33	-9.23	21.10	Pb4 (OH) 6SO4
Pb4O3SO4	-31.51	-9.22	22.28	Pb4O3SO4
PbCrO4	-37.16	-49.89	-12.73	PbCrO4
PbHPO4	-4.79	-28.60	-23.81	PbHPO4
Pbmetal	-20.08	-15.84	4.24	Pb
PbMoO4	1.23	-14.55	-15.78	PbMoO4
PbO:0.33H2O	-12.72	0.26	12.98	PbO:0.33H2O
PbSeO4	-24.75	-31.64	-6.88	PbSeO4
Periclase	-16.93	5.11	22.04	MgO
Plattnerite	-34.12	16.36	50.49	PbO2
Plumbgummite	-6.49	-39.28	-32.79	PbAl3 (PO4) 2 (OH) 5:H2O
Portlandite	-17.56	5.63	23.19	Ca (OH) 2
Pyrochroite	-12.07	3.41	15.48	Mn (OH) 2
Pyrolusite	-22.68	19.51	42.19	MnO2
Pyromorphite	-6.84	-91.27	-84.43	Pb5 (PO4) 3Cl
Retgersite	-5.78	-7.83	-2.05	NiSO4:6H2O
Semetal (am)	8.71	1.57	-7.14	Se
Semetal (hex)	9.32	1.57	-7.76	Se
SeO2	-11.21	-11.09	0.12	SeO2
SeO3	-53.38	-31.90	21.48	SeO3
Spinel	-20.78	17.23	38.01	MgAl2O4
Strengite	-3.56	-29.93	-26.37	FePO4:2H2O
Tenorite	-4.56	3.28	7.84	CuO
Thenardite	-6.40	-6.05	0.35	Na2SO4
Tsumebite	-15.27	-25.06	-9.79	Pb2CuPO4 (OH) 3:3H2O
Vivianite	-9.60	-45.60	-36.00	Fe3 (PO4) 2:8H2O
Zincite	-9.24	2.36	11.60	ZnO
Zincosite	-12.10	-7.92	4.18	ZnSO4
Zn (BO2) 2	-15.98	-7.69	8.29	Zn (BO2) 2
Zn (NO3) 2:6H2O	-113.38	-110.14	3.24	Zn (NO3) 2:6H2O
Zn (OH) 2	-9.84	2.36	12.20	Zn (OH) 2
Zn (OH) 2 (am)	-10.36	2.36	12.71	Zn (OH) 2
Zn (OH) 2 (beta)	-9.64	2.36	12.00	Zn (OH) 2
Zn (OH) 2 (epsilon)	-9.42	2.36	11.78	Zn (OH) 2
Zn (OH) 2 (gamma)	-9.38	2.36	11.73	Zn (OH) 2
Zn2 (OH) 2SO4	-13.06	-5.56	7.50	Zn2 (OH) 2SO4
Zn2 (OH) 3Cl	-16.48	-1.29	15.19	Zn2 (OH) 3Cl
Zn3 (AsO4) 2:2.5H2O	-28.12	-14.47	13.65	Zn3 (AsO4) 2:2.5H2O
Zn3 (PO4) 2:4H2O	-15.23	-50.65	-35.42	Zn3 (PO4) 2:4H2O
Zn3O (SO4) 2	-33.17	-13.48	19.68	Zn3O (SO4) 2
Zn4 (OH) 6SO4	-29.24	-0.84	28.40	Zn4 (OH) 6SO4
Zn5 (OH) 8Cl2	-38.72	-0.22	38.50	Zn5 (OH) 8Cl2
ZnCl2	-16.92	-9.65	7.27	ZnCl2
Znmetal	-39.99	-13.74	26.25	Zn
ZnMoO4	-2.36	-12.45	-10.09	ZnMoO4
ZnO (active)	-9.09	2.36	11.45	ZnO
ZnSe	2.30	-12.17	-14.48	ZnSe
ZnSeO4:6H2O	-28.03	-29.55	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.41	-7.92	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 1.

Mixture 1.

3.000e-02 Solution 1
 1.000e-01 Solution 2
 1.000e-01 Solution 3
 7.700e-01 Solution 4

-----Solution composition-----

Elements	Molality	Moles
Al	5.228e-05	5.228e-05
As	2.504e-08	2.504e-08
B	8.429e-06	8.429e-06
Ba	2.687e-07	2.687e-07
Be	1.716e-07	1.716e-07
C	2.779e-04	2.779e-04
Ca	1.064e-02	1.064e-02
Cd	1.710e-08	1.710e-08
Cl	1.976e-02	1.976e-02
Co	2.218e-05	2.218e-05
Cr	6.658e-08	6.658e-08
Cu	8.059e-05	8.059e-05
Fe	8.626e-04	8.626e-04
Hg	1.014e-10	1.014e-10
K	5.089e-03	5.089e-03
Mg	4.607e-03	4.607e-03
Mn	1.697e-04	1.697e-04
Mo	8.961e-07	8.961e-07
N	8.691e-04	8.691e-04
Na	2.021e-02	2.021e-02
Ni	9.406e-06	9.406e-06
P	3.278e-05	3.278e-05
Pb	7.814e-08	7.814e-08
S	2.102e-02	2.102e-02
Se	1.320e-07	1.320e-07
Zn	6.693e-06	6.693e-06

-----Description of solution-----

pH	=	5.468	Charge balance
pe	=	4.253	Adjusted to redox equilibrium
Activity of water	=	0.999	
Ionic strength (mol/kgw)	=	7.434e-02	
Mass of water (kg)	=	1.000e+00	
Total alkalinity (eq/kg)	=	5.156e-05	
Total CO2 (mol/kg)	=	2.779e-04	
Temperature (°C)	=	20.03	
Electrical balance (eq)	=	-2.807e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-2.88	
Iterations	=	12	
Total H	=	1.110178e+02	
Total O	=	5.559195e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	4.261e-06	3.407e-06	-5.371	-5.468	-0.097	0.00
OH-	2.567e-09	2.015e-09	-8.591	-8.696	-0.105	(0)
H2O	5.551e+01	9.987e-01	1.744	-0.001	0.000	18.05
Al	5.228e-05					
AlSO4+	3.446e-05	2.747e-05	-4.463	-4.561	-0.098	(0)
Al (OH) 2+	6.110e-06	4.932e-06	-5.214	-5.307	-0.093	(0)
Al+3	5.329e-06	7.128e-07	-5.273	-6.147	-0.874	(0)
AlOH+2	3.574e-06	1.517e-06	-5.447	-5.819	-0.372	(0)
Al (SO4) 2-	2.478e-06	1.976e-06	-5.606	-5.704	-0.098	(0)
Al (OH) 3	2.905e-07	2.905e-07	-6.537	-6.537	0.000	(0)

Al (OH) 4-	4.140e-08	3.301e-08	-7.383	-7.481	-0.098	(0)
AlMo6O21-3	3.797e-22	2.180e-23	-21.421	-22.662	-1.241	(0)
As (3)	6.428e-12					
H3AsO3	6.427e-12	6.427e-12	-11.192	-11.192	0.000	(0)
H2AsO3-	1.102e-15	8.021e-16	-14.958	-15.096	-0.138	(0)
H4AsO3+	1.490e-17	1.085e-17	-16.827	-16.965	-0.138	(0)
HAsO3-2	6.144e-22	1.725e-22	-21.212	-21.763	-0.552	(0)
AsO3-3	2.860e-29	1.641e-30	-28.544	-29.785	-1.241	(0)
As (5)	2.504e-08					
H2AsO4-	2.314e-08	1.684e-08	-7.636	-7.774	-0.138	(0)
HAsO4-2	1.891e-09	5.310e-10	-8.723	-9.275	-0.552	(0)
H3AsO4	9.338e-12	9.499e-12	-11.030	-11.022	0.007	(0)
AsO4-3	7.645e-15	4.388e-16	-14.117	-15.358	-1.241	(0)
B	8.429e-06					
H3BO3	8.427e-06	8.572e-06	-5.074	-5.067	0.007	(0)
H2BO3-	1.733e-09	1.337e-09	-8.761	-8.874	-0.113	(0)
CaH2BO3+	2.746e-10	2.118e-10	-9.561	-9.674	-0.113	(0)
MgH2BO3+	7.913e-11	6.104e-11	-10.102	-10.214	-0.113	(0)
NaH2BO3	3.628e-11	3.628e-11	-10.440	-10.440	0.000	(0)
H5 (BO3) 2-	1.305e-14	1.007e-14	-13.884	-13.997	-0.113	(0)
BaH2BO3+	5.726e-15	4.417e-15	-14.242	-14.355	-0.113	(0)
H8 (BO3) 3-	9.689e-18	7.474e-18	-17.014	-17.126	-0.113	(0)
Ba	2.687e-07					
Ba+2	2.687e-07	1.099e-07	-6.571	-6.959	-0.388	(0)
BaHCO3+	3.186e-11	2.591e-11	-10.497	-10.587	-0.090	(0)
BaNH3+2	2.608e-14	7.324e-15	-13.584	-14.135	-0.552	(0)
BaCO3	1.843e-14	1.843e-14	-13.735	-13.735	0.000	(0)
BaH2BO3+	5.726e-15	4.417e-15	-14.242	-14.355	-0.113	(0)
BaOH+	1.163e-15	9.341e-16	-14.934	-15.030	-0.095	(0)
BaNO3+	0.000e+00	0.000e+00	-41.985	-42.123	-0.138	(0)
Be	1.716e-07					
Be+2	8.868e-08	3.627e-08	-7.052	-7.440	-0.388	(0)
BeOH+	5.210e-08	4.262e-08	-7.283	-7.370	-0.087	(0)
BeSO4	2.770e-08	2.770e-08	-7.558	-7.558	0.000	(0)
Be (SO4) 2-2	1.842e-09	5.173e-10	-8.735	-9.286	-0.552	(0)
BeCl+	1.130e-09	9.072e-10	-8.947	-9.042	-0.095	(0)
Be (OH) 2	7.936e-11	7.936e-11	-10.100	-10.100	0.000	(0)
BeCO3	2.378e-11	2.378e-11	-10.624	-10.624	0.000	(0)
Be2OH+3	1.564e-12	2.565e-13	-11.806	-12.591	-0.785	(0)
Be3 (OH) 3+3	1.141e-14	1.871e-15	-13.943	-14.728	-0.785	(0)
Be (OH) 3-	7.193e-15	5.884e-15	-14.143	-14.230	-0.087	(0)
Be (OH) 4-2	2.447e-23	1.096e-23	-22.611	-22.960	-0.349	(0)
C (4)	2.779e-04					
H2CO3	2.390e-04	2.390e-04	-3.622	-3.622	0.000	(0)
HCO3-	3.629e-05	2.929e-05	-4.440	-4.533	-0.093	(0)
CaHCO3+	1.655e-06	1.346e-06	-5.781	-5.871	-0.090	(0)
MgHCO3+	4.853e-07	3.841e-07	-6.314	-6.416	-0.102	(0)
NaHCO3	2.835e-07	2.835e-07	-6.547	-6.547	0.000	(0)
FeHCO3+	7.115e-08	5.786e-08	-7.148	-7.238	-0.090	(0)
CuHCO3+	2.833e-08	2.062e-08	-7.548	-7.686	-0.138	(0)
CuCO3	2.648e-08	2.648e-08	-7.577	-7.577	0.000	(0)
MnHCO3+	2.616e-08	2.100e-08	-7.582	-7.678	-0.095	(0)
CoHCO3+	1.312e-08	9.553e-09	-7.882	-8.020	-0.138	(0)
NiHCO3+	1.154e-08	8.403e-09	-7.938	-8.076	-0.138	(0)
ZnHCO3+	1.926e-09	1.402e-09	-8.715	-8.853	-0.138	(0)
CaCO3	1.466e-09	1.466e-09	-8.834	-8.834	0.000	(0)
CO3-2	8.920e-10	3.648e-10	-9.050	-9.438	-0.388	(0)
MgCO3	3.681e-10	3.681e-10	-9.434	-9.434	0.000	(0)
PbHCO3+	3.219e-10	2.343e-10	-9.492	-9.630	-0.138	(0)
NaCO3-	1.515e-10	1.223e-10	-9.820	-9.913	-0.093	(0)
ZnCO3	3.511e-11	3.511e-11	-10.455	-10.455	0.000	(0)
NiCO3	3.499e-11	3.499e-11	-10.456	-10.456	0.000	(0)
BaHCO3+	3.186e-11	2.591e-11	-10.497	-10.587	-0.090	(0)
CoCO3	2.857e-11	2.857e-11	-10.544	-10.544	0.000	(0)
BeCO3	2.378e-11	2.378e-11	-10.624	-10.624	0.000	(0)
PbCO3	1.304e-11	1.304e-11	-10.885	-10.885	0.000	(0)
CdHCO3+	2.240e-13	1.631e-13	-12.650	-12.788	-0.138	(0)
Cu (CO3) 2-2	9.259e-14	2.600e-14	-13.033	-13.585	-0.552	(0)

CdCO3	2.246e-14	2.246e-14	-13.649	-13.649	0.000	(0)
BaCO3	1.843e-14	1.843e-14	-13.735	-13.735	0.000	(0)
Pb (CO3) 2-2	4.887e-17	1.372e-17	-16.311	-16.863	-0.552	(0)
Cd (CO3) 2-2	2.163e-20	6.074e-21	-19.665	-20.217	-0.552	(0)
HgCO3	9.042e-22	9.042e-22	-21.044	-21.044	0.000	(0)
HgHCO3+	7.880e-23	5.736e-23	-22.103	-22.241	-0.138	(0)
Hg (CO3) 2-2	3.714e-27	1.043e-27	-26.430	-26.982	-0.552	(0)
Ca	1.064e-02					
Ca+2	6.919e-03	2.830e-03	-2.160	-2.548	-0.388	(0)
CaSO4	3.713e-03	3.713e-03	-2.430	-2.430	0.000	(0)
CaHCO3+	1.655e-06	1.346e-06	-5.781	-5.871	-0.090	(0)
CaH2PO4+	1.506e-06	1.216e-06	-5.822	-5.915	-0.093	(0)
CaHPO4	4.523e-07	4.523e-07	-6.345	-6.345	0.000	(0)
CaCO3	1.466e-09	1.466e-09	-8.834	-8.834	0.000	(0)
CaNH3+2	1.340e-09	3.763e-10	-8.873	-9.424	-0.552	(0)
CaPO4-	3.923e-10	3.167e-10	-9.406	-9.499	-0.093	(0)
CaH2BO3+	2.746e-10	2.118e-10	-9.561	-9.674	-0.113	(0)
CaOH+	1.322e-10	1.075e-10	-9.879	-9.969	-0.090	(0)
Ca (NH3) 2+2	5.635e-17	1.582e-17	-16.249	-16.801	-0.552	(0)
CaNO3+	1.596e-38	1.162e-38	-37.797	-37.935	-0.138	(0)
Cd	1.710e-08					
Cd+2	6.606e-09	2.702e-09	-8.180	-8.568	-0.388	(0)
CdCl+	5.545e-09	4.036e-09	-8.256	-8.394	-0.138	(0)
CdSO4	3.588e-09	3.588e-09	-8.445	-8.445	0.000	(0)
Cd (SO4) 2-2	1.100e-09	3.089e-10	-8.959	-9.510	-0.552	(0)
CdCl2	2.614e-10	2.614e-10	-9.583	-9.583	0.000	(0)
CdCl3-	3.402e-12	2.477e-12	-11.468	-11.606	-0.138	(0)
CdOHCl	4.344e-13	4.344e-13	-12.362	-12.362	0.000	(0)
CdHCO3+	2.240e-13	1.631e-13	-12.650	-12.788	-0.138	(0)
CdOH+	5.982e-14	4.354e-14	-13.223	-13.361	-0.138	(0)
CdCO3	2.246e-14	2.246e-14	-13.649	-13.649	0.000	(0)
Cd (OH) 2	1.180e-18	1.180e-18	-17.928	-17.928	0.000	(0)
Cd (CO3) 2-2	2.163e-20	6.074e-21	-19.665	-20.217	-0.552	(0)
Cd2OH+3	1.092e-20	6.270e-22	-19.962	-21.203	-1.241	(0)
Cd (SeO3) 2-2	9.911e-23	2.783e-23	-22.004	-22.555	-0.552	(0)
Cd (OH) 3-	2.922e-25	2.127e-25	-24.534	-24.672	-0.138	(0)
CdSeO4	4.845e-26	4.845e-26	-25.315	-25.315	0.000	(0)
Cd (OH) 4-2	3.660e-34	1.028e-34	-33.437	-33.988	-0.552	(0)
CdNO3+	0.000e+00	0.000e+00	-43.771	-43.909	-0.138	(0)
CdHS+	0.000e+00	0.000e+00	-52.035	-52.173	-0.138	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-80.173	-80.173	0.000	(0)
Cd (HS) 2	0.000e+00	0.000e+00	-96.582	-96.582	0.000	(0)
Cd (HS) 3-	0.000e+00	0.000e+00	-146.157	-146.294	-0.138	(0)
Cd (HS) 4-2	0.000e+00	0.000e+00	-195.160	-195.711	-0.552	(0)
Cl	1.976e-02					
Cl-	1.970e-02	1.575e-02	-1.706	-1.803	-0.097	(0)
CuCl2-	2.684e-05	2.124e-05	-4.571	-4.673	-0.102	(0)
CuCl	6.378e-06	6.378e-06	-5.195	-5.195	0.000	(0)
MnCl+	9.121e-07	7.323e-07	-6.040	-6.135	-0.095	(0)
CuCl+	3.674e-07	2.908e-07	-6.435	-6.536	-0.102	(0)
CoCl+	3.420e-07	2.490e-07	-6.466	-6.604	-0.138	(0)
CuCl3-2	1.688e-07	7.015e-08	-6.773	-7.154	-0.381	(0)
NiCl+	1.404e-07	1.022e-07	-6.853	-6.991	-0.138	(0)
ZnCl+	8.058e-08	6.377e-08	-7.094	-7.195	-0.102	(0)
MnCl2	1.629e-08	1.629e-08	-7.788	-7.788	0.000	(0)
PbCl+	8.605e-09	6.264e-09	-8.065	-8.203	-0.138	(0)
CdCl+	5.545e-09	4.036e-09	-8.256	-8.394	-0.138	(0)
ZnCl2	1.283e-09	1.283e-09	-8.892	-8.892	0.000	(0)
CuCl2	1.242e-09	1.242e-09	-8.906	-8.906	0.000	(0)
BeCl+	1.130e-09	9.072e-10	-8.947	-9.042	-0.095	(0)
PbCl2	4.309e-10	4.309e-10	-9.366	-9.366	0.000	(0)
CdCl2	2.614e-10	2.614e-10	-9.583	-9.583	0.000	(0)
ZnOHCl	2.557e-10	2.557e-10	-9.592	-9.592	0.000	(0)
MnCl3-	8.803e-11	7.068e-11	-10.055	-10.151	-0.095	(0)
ZnCl3-	1.986e-11	1.572e-11	-10.702	-10.804	-0.102	(0)
CrCl+2	1.647e-11	4.624e-12	-10.783	-11.335	-0.552	(0)
NiCl2	8.217e-12	8.217e-12	-11.085	-11.085	0.000	(0)
PbCl3-	3.920e-12	2.854e-12	-11.407	-11.545	-0.138	(0)

CdCl3-	3.402e-12	2.477e-12	-11.468	-11.606	-0.138	(0)
CdOHC1	4.344e-13	4.344e-13	-12.362	-12.362	0.000	(0)
ZnCl4-2	2.862e-13	1.190e-13	-12.543	-12.925	-0.381	(0)
CuCl3-	2.110e-13	1.670e-13	-12.676	-12.777	-0.102	(0)
FeCl+2	2.106e-13	8.753e-14	-12.677	-13.058	-0.381	(0)
HgCl2	9.667e-14	9.667e-14	-13.015	-13.015	0.000	(0)
PbCl4-2	6.797e-14	1.909e-14	-13.168	-13.719	-0.552	(0)
HgCl3-	2.115e-14	1.539e-14	-13.675	-13.813	-0.138	(0)
FeCl2+	8.976e-15	7.207e-15	-14.047	-14.142	-0.095	(0)
CrCl2+	6.112e-15	4.449e-15	-14.214	-14.352	-0.138	(0)
HgCl4-2	3.599e-15	1.010e-15	-14.444	-14.995	-0.552	(0)
CrOHC12	2.012e-15	2.012e-15	-14.696	-14.696	0.000	(0)
HgClOH	2.277e-16	2.277e-16	-15.643	-15.643	0.000	(0)
CuCl4-2	3.756e-17	1.561e-17	-16.425	-16.807	-0.381	(0)
FeCl3	1.135e-17	1.135e-17	-16.945	-16.945	0.000	(0)
HgCl+	1.373e-18	9.995e-19	-17.862	-18.000	-0.138	(0)
CoCl+2	3.379e-33	9.487e-34	-32.471	-33.023	-0.552	(0)
CrO3Cl-	1.010e-36	7.349e-37	-35.996	-36.134	-0.138	(0)
Cr(NH3) 6Cl+2	1.101e-39	3.090e-40	-38.958	-39.510	-0.552	(0)
Co(NH3) 5Cl+2	0.000e+00	0.000e+00	-41.688	-42.240	-0.552	(0)
Co(NH3) 6Cl+2	0.000e+00	0.000e+00	-55.353	-55.905	-0.552	(0)
Co (2)	2.218e-05					
Co+2	1.650e-05	4.633e-06	-4.783	-5.334	-0.552	(0)
CoSO4	5.327e-06	5.327e-06	-5.274	-5.274	0.000	(0)
CoCl+	3.420e-07	2.490e-07	-6.466	-6.604	-0.138	(0)
CoHCO3+	1.312e-08	9.553e-09	-7.882	-8.020	-0.138	(0)
CoHPO4	1.732e-09	1.732e-09	-8.762	-8.762	0.000	(0)
CoOH+	3.748e-10	2.728e-10	-9.426	-9.564	-0.138	(0)
Co(NH3) +2	3.268e-10	9.176e-11	-9.486	-10.037	-0.552	(0)
CoCO3	2.857e-11	2.857e-11	-10.544	-10.544	0.000	(0)
Co(OH) 2	6.396e-14	6.396e-14	-13.194	-13.194	0.000	(0)
Co2OH+3	1.104e-15	6.334e-17	-14.957	-16.198	-1.241	(0)
Co(NH3) 2+2	9.441e-16	2.651e-16	-15.025	-15.577	-0.552	(0)
Co(OH) 3-	5.174e-21	3.767e-21	-20.286	-20.424	-0.138	(0)
Co(NH3) 3+2	1.255e-21	3.525e-22	-20.901	-21.453	-0.552	(0)
CoOOH-	2.190e-22	1.594e-22	-21.660	-21.797	-0.138	(0)
CoSeO4	2.060e-22	2.060e-22	-21.686	-21.686	0.000	(0)
Co(NH3) 4+2	6.960e-28	1.954e-28	-27.157	-27.709	-0.552	(0)
Co4(OH) 4+4	1.778e-28	1.105e-30	-27.750	-29.957	-2.206	(0)
Co(OH) 4-2	6.275e-30	1.762e-30	-29.202	-29.754	-0.552	(0)
CoNO2+	2.644e-31	1.925e-31	-30.578	-30.716	-0.138	(0)
Co(NH3) 5+2	1.220e-34	3.426e-35	-33.914	-34.465	-0.552	(0)
CoNO3+	0.000e+00	0.000e+00	-40.899	-41.037	-0.138	(0)
Co(NO3) 2	0.000e+00	0.000e+00	-76.631	-76.631	0.000	(0)
Co (3)	1.765e-29					
CoOH+2	1.764e-29	4.953e-30	-28.754	-29.305	-0.552	(0)
CoCl+2	3.379e-33	9.487e-34	-32.471	-33.023	-0.552	(0)
Co+3	2.469e-33	3.302e-34	-32.607	-33.481	-0.874	(0)
Co(NH3) 5Cl+2	0.000e+00	0.000e+00	-41.688	-42.240	-0.552	(0)
Co(NH3) 6SO4+	0.000e+00	0.000e+00	-51.320	-51.458	-0.138	(0)
Co(NH3) 6Cl+2	0.000e+00	0.000e+00	-55.353	-55.905	-0.552	(0)
Co(NH3) 6OH+2	0.000e+00	0.000e+00	-57.571	-58.122	-0.552	(0)
Cr (2)	5.080e-21					
Cr+2	5.080e-21	1.427e-21	-20.294	-20.846	-0.552	(0)
Cr (3)	6.658e-08					
Cr(OH) +2	4.375e-08	1.229e-08	-7.359	-7.911	-0.552	(0)
CrOHSO4	1.029e-08	1.029e-08	-7.988	-7.988	0.000	(0)
Cr+3	4.721e-09	2.710e-10	-8.326	-9.567	-1.241	(0)
CrSO4+	4.228e-09	3.078e-09	-8.374	-8.512	-0.138	(0)
Cr(OH) 2+	3.558e-09	2.590e-09	-8.449	-8.587	-0.138	(0)
CrCl+2	1.647e-11	4.624e-12	-10.783	-11.335	-0.552	(0)
CrH2PO4+2	4.264e-12	1.197e-12	-11.370	-11.922	-0.552	(0)
Cr(OH) 3	2.872e-12	2.872e-12	-11.542	-11.542	0.000	(0)
Cr2(OH) 2SO4+2	2.389e-14	6.707e-15	-13.622	-14.173	-0.552	(0)
CrCl2+	6.112e-15	4.449e-15	-14.214	-14.352	-0.138	(0)
Cr2(OH) 2(SO4) 2	2.396e-15	2.396e-15	-14.621	-14.621	0.000	(0)
CrOHC12	2.012e-15	2.012e-15	-14.696	-14.696	0.000	(0)
CrO2-	5.506e-16	4.008e-16	-15.259	-15.397	-0.138	(0)

Cr (OH) 4-	4.635e-16	3.374e-16	-15.334	-15.472	-0.138	(0)
Cr (NH3) 5OH+2	3.638e-33	1.022e-33	-32.439	-32.991	-0.552	(0)
Cr (NH3) 6+3	2.703e-38	1.551e-39	-37.568	-38.809	-1.241	(0)
Cr (NH3) 6Cl+2	1.101e-39	3.090e-40	-38.958	-39.510	-0.552	(0)
CrNO3+2	0.000e+00	0.000e+00	-46.468	-47.020	-0.552	(0)
Cr (6)	3.455e-30					
HCrO4-	2.947e-30	2.145e-30	-29.531	-29.669	-0.138	(0)
CrO4-2	4.823e-31	1.972e-31	-30.317	-30.705	-0.388	(0)
NaCrO4-	2.109e-32	1.536e-32	-31.676	-31.814	-0.138	(0)
KCrO4-	3.935e-33	2.865e-33	-32.405	-32.543	-0.138	(0)
CrO3HPO4-2	5.654e-34	1.588e-34	-33.248	-33.799	-0.552	(0)
CrO3SO4-2	4.839e-35	1.359e-35	-34.315	-34.867	-0.552	(0)
H2CrO4	4.600e-36	4.600e-36	-35.337	-35.337	0.000	(0)
CrO3Cl-	1.010e-36	7.349e-37	-35.996	-36.134	-0.138	(0)
CrO3H2PO4-	3.580e-37	2.606e-37	-36.446	-36.584	-0.138	(0)
Cr2O7-2	0.000e+00	0.000e+00	-57.189	-57.740	-0.552	(0)
Cu (1)	3.383e-05					
CuCl2-	2.684e-05	2.124e-05	-4.571	-4.673	-0.102	(0)
CuCl	6.378e-06	6.378e-06	-5.195	-5.195	0.000	(0)
Cu+	4.419e-07	3.216e-07	-6.355	-6.493	-0.138	(0)
CuCl3-2	1.688e-07	7.015e-08	-6.773	-7.154	-0.381	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-94.987	-95.393	-0.406	(0)
CuS4S5-3	0.000e+00	0.000e+00	-95.739	-96.123	-0.384	(0)
Cu (2)	4.676e-05					
Cu+2	3.014e-05	1.233e-05	-4.521	-4.909	-0.388	(0)
CuSO4	1.600e-05	1.600e-05	-4.796	-4.796	0.000	(0)
CuCl+	3.674e-07	2.908e-07	-6.435	-6.536	-0.102	(0)
CuOH+	1.138e-07	9.007e-08	-6.944	-7.045	-0.102	(0)
CuNH3+2	7.764e-08	2.180e-08	-7.110	-7.662	-0.552	(0)
CuHCO3+	2.833e-08	2.062e-08	-7.548	-7.686	-0.138	(0)
CuCO3	2.648e-08	2.648e-08	-7.577	-7.577	0.000	(0)
CuCl2	1.242e-09	1.242e-09	-8.906	-8.906	0.000	(0)
Cu2 (OH) 2+2	7.013e-10	1.969e-10	-9.154	-9.706	-0.552	(0)
Cu (OH) 2	6.776e-11	6.776e-11	-10.169	-10.169	0.000	(0)
CuCl3-	2.110e-13	1.670e-13	-12.676	-12.777	-0.102	(0)
Cu (CO3) 2-2	9.259e-14	2.600e-14	-13.033	-13.585	-0.552	(0)
Cu (OH) 3-	5.635e-16	4.102e-16	-15.249	-15.387	-0.138	(0)
CuCl4-2	3.756e-17	1.561e-17	-16.425	-16.807	-0.381	(0)
Cu (OH) 4-2	3.394e-23	9.529e-24	-22.469	-23.021	-0.552	(0)
CuNO2+	1.045e-29	7.610e-30	-28.981	-29.119	-0.138	(0)
CuNO3+	0.000e+00	0.000e+00	-40.162	-40.299	-0.138	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-54.338	-54.338	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-77.114	-77.114	0.000	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-133.710	-133.848	-0.138	(0)
Fe (2)	8.620e-04					
Fe+2	6.174e-04	1.734e-04	-3.209	-3.761	-0.552	(0)
FeSO4	2.423e-04	2.423e-04	-3.616	-3.616	0.000	(0)
FeH2PO4+	1.982e-06	1.600e-06	-5.703	-5.796	-0.093	(0)
FeHPO4	2.365e-07	2.365e-07	-6.626	-6.626	0.000	(0)
FeHCO3+	7.115e-08	5.786e-08	-7.148	-7.238	-0.090	(0)
FeOH+	1.732e-08	1.391e-08	-7.761	-7.857	-0.095	(0)
Fe (OH) 2	2.108e-14	2.108e-14	-13.676	-13.676	0.000	(0)
Fe (OH) 3-	2.338e-17	1.878e-17	-16.631	-16.726	-0.095	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-98.036	-98.036	0.000	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-147.474	-147.612	-0.138	(0)
Fe (3)	5.862e-07					
Fe (OH) 2+	5.838e-07	4.712e-07	-6.234	-6.327	-0.093	(0)
FeHPO4+	9.305e-10	7.511e-10	-9.031	-9.124	-0.093	(0)
FeOH+2	7.419e-10	3.083e-10	-9.130	-9.511	-0.381	(0)
Fe (OH) 3	7.346e-10	7.346e-10	-9.134	-9.134	0.000	(0)
FeSO4+	1.525e-11	1.225e-11	-10.817	-10.912	-0.095	(0)
Fe (SO4) 2-	2.250e-12	1.638e-12	-11.648	-11.786	-0.138	(0)
Fe+3	1.610e-12	2.154e-13	-11.793	-12.667	-0.874	(0)
Fe (OH) 4-	5.086e-13	4.105e-13	-12.294	-12.387	-0.093	(0)
FeCl+2	2.106e-13	8.753e-14	-12.677	-13.058	-0.381	(0)
FeH2PO4+2	1.774e-13	7.532e-14	-12.751	-13.123	-0.372	(0)
FeCl2+	8.976e-15	7.207e-15	-14.047	-14.142	-0.095	(0)
Fe2 (OH) 2+4	6.050e-16	3.761e-18	-15.218	-17.425	-2.206	(0)

	FeHSeO3+2	1.634e-16	4.589e-17	-15.787	-16.338	-0.552	(0)
	FeCl3	1.135e-17	1.135e-17	-16.945	-16.945	0.000	(0)
	Fe3(OH) 4+5	6.816e-20	2.432e-23	-19.166	-22.614	-3.448	(0)
	FeNO3+2	0.000e+00	0.000e+00	-46.908	-47.459	-0.552	(0)
H (0)	5.299e-23						
	H2	2.649e-23	2.695e-23	-22.577	-22.569	0.007	(0)
Hg (0)	1.013e-10						
	Hg	1.013e-10	1.013e-10	-9.994	-9.994	0.000	(0)
Hg (1)	9.223e-25						
	Hg2+2	4.612e-25	1.295e-25	-24.336	-24.888	-0.552	(0)
Hg (2)	1.216e-13						
	HgCl2	9.667e-14	9.667e-14	-13.015	-13.015	0.000	(0)
	HgCl3-	2.115e-14	1.539e-14	-13.675	-13.813	-0.138	(0)
	HgCl4-2	3.599e-15	1.010e-15	-14.444	-14.995	-0.552	(0)
	HgClOH	2.277e-16	2.277e-16	-15.643	-15.643	0.000	(0)
	HgCl+	1.373e-18	9.995e-19	-17.862	-18.000	-0.138	(0)
	Hg(NH3) 2+2	2.806e-19	7.879e-20	-18.552	-19.104	-0.552	(0)
	Hg(OH) 2	1.119e-19	1.138e-19	-18.951	-18.944	0.007	(0)
	HgCO3	9.042e-22	9.042e-22	-21.044	-21.044	0.000	(0)
	HgNH3+2	4.916e-22	1.380e-22	-21.308	-21.860	-0.552	(0)
	HgOH+	3.805e-22	2.770e-22	-21.420	-21.558	-0.138	(0)
	HgHCO3+	7.880e-23	5.736e-23	-22.103	-22.241	-0.138	(0)
	Hg+2	9.678e-24	2.718e-24	-23.014	-23.566	-0.552	(0)
	HgSO4	3.261e-24	3.261e-24	-23.487	-23.487	0.000	(0)
	Hg(NH3) 3+2	1.853e-25	5.203e-26	-24.732	-25.284	-0.552	(0)
	Hg(CO3) 2-2	3.714e-27	1.043e-27	-26.430	-26.982	-0.552	(0)
	Hg(OH) 3-	5.811e-29	4.230e-29	-28.236	-28.374	-0.138	(0)
	Hg(NH3) 4+2	2.458e-31	6.903e-32	-30.609	-31.161	-0.552	(0)
	HgNO3+	0.000e+00	0.000e+00	-59.881	-60.019	-0.138	(0)
	Hg(HS) 2	0.000e+00	0.000e+00	-88.587	-88.587	0.000	(0)
	HgHS2-	0.000e+00	0.000e+00	-89.376	-89.514	-0.138	(0)
	HgS2-2	0.000e+00	0.000e+00	-92.202	-92.754	-0.552	(0)
	Hg(NO3) 2	0.000e+00	0.000e+00	-96.303	-96.303	0.000	(0)
K	5.089e-03						
	K+	4.888e-03	3.909e-03	-2.311	-2.408	-0.097	(0)
	KSO4-	2.005e-04	1.618e-04	-3.698	-3.791	-0.093	(0)
	KHPO4-	1.259e-08	1.016e-08	-7.900	-7.993	-0.093	(0)
	KCrO4-	3.935e-33	2.865e-33	-32.405	-32.543	-0.138	(0)
Mg	4.607e-03						
	Mg+2	3.220e-03	1.317e-03	-2.492	-2.880	-0.388	(0)
	MgSO4	1.385e-03	1.385e-03	-2.859	-2.859	0.000	(0)
	MgH2PO4+	1.496e-06	1.207e-06	-5.825	-5.918	-0.093	(0)
	MgHCO3+	4.853e-07	3.841e-07	-6.314	-6.416	-0.102	(0)
	MgHPO4	2.906e-07	2.906e-07	-6.537	-6.537	0.000	(0)
	MgOH+	1.190e-09	9.732e-10	-8.925	-9.012	-0.087	(0)
	MgCO3	3.681e-10	3.681e-10	-9.434	-9.434	0.000	(0)
	MgH2BO3+	7.913e-11	6.104e-11	-10.102	-10.214	-0.113	(0)
	MgPO4-	2.854e-12	2.304e-12	-11.544	-11.638	-0.093	(0)
Mn (2)	1.697e-04						
	Mn+2	1.315e-04	3.693e-05	-3.881	-4.433	-0.552	(0)
	MnSO4	3.721e-05	3.721e-05	-4.429	-4.429	0.000	(0)
	MnCl+	9.121e-07	7.323e-07	-6.040	-6.135	-0.095	(0)
	MnHCO3+	2.616e-08	2.100e-08	-7.582	-7.678	-0.095	(0)
	MnCl2	1.629e-08	1.629e-08	-7.788	-7.788	0.000	(0)
	MnOH+	2.328e-10	1.869e-10	-9.633	-9.728	-0.095	(0)
	MnCl3-	8.803e-11	7.068e-11	-10.055	-10.151	-0.095	(0)
	MnSeO4	8.698e-22	8.698e-22	-21.061	-21.061	0.000	(0)
	Mn(OH) 3-	1.836e-23	1.474e-23	-22.736	-22.831	-0.095	(0)
	MnSe	1.475e-25	1.475e-25	-24.831	-24.831	0.000	(0)
	Mn(OH) 4-2	3.380e-31	1.405e-31	-30.471	-30.852	-0.381	(0)
	MnNO3+	1.006e-40	0.000e+00	-39.997	-40.135	-0.138	(0)
	Mn(NO3) 2	0.000e+00	0.000e+00	-75.633	-75.633	0.000	(0)
Mn (3)	1.057e-25						
	Mn+3	1.057e-25	1.413e-26	-24.976	-25.850	-0.874	(0)
Mn (6)	0.000e+00						
	MnO4-2	0.000e+00	0.000e+00	-63.834	-64.216	-0.381	(0)
Mn (7)	0.000e+00						
	MnO4-	0.000e+00	0.000e+00	-69.557	-69.666	-0.109	(0)

Mo	8.961e-07					
MoO4-2	8.666e-07	3.544e-07	-6.062	-6.451	-0.388	(0)
HMoO4-	2.879e-08	2.095e-08	-7.541	-7.679	-0.138	(0)
H2MoO4	7.163e-10	7.163e-10	-9.145	-9.145	0.000	(0)
AlMo6O21-3	3.797e-22	2.180e-23	-21.421	-22.662	-1.241	(0)
Mo7O24-6	5.487e-31	5.954e-36	-30.261	-35.225	-4.965	(0)
HMo7O24-5	1.294e-31	4.617e-35	-30.888	-34.336	-3.448	(0)
H2Mo7O24-4	1.501e-33	9.333e-36	-32.824	-35.030	-2.206	(0)
H3Mo7O24-3	9.896e-37	5.680e-38	-36.005	-37.246	-1.241	(0)
N (-3)	8.691e-04					
NH4+	8.183e-04	6.312e-04	-3.087	-3.200	-0.113	(0)
NH4SO4-	5.065e-05	4.067e-05	-4.295	-4.391	-0.095	(0)
CuNH3+2	7.764e-08	2.180e-08	-7.110	-7.662	-0.552	(0)
NH3	7.402e-08	7.402e-08	-7.131	-7.131	0.000	(0)
CaNH3+2	1.340e-09	3.763e-10	-8.873	-9.424	-0.552	(0)
NiNH3+2	8.213e-10	2.306e-10	-9.086	-9.637	-0.552	(0)
Co (NH3) +2	3.268e-10	9.176e-11	-9.486	-10.037	-0.552	(0)
BaNH3+2	2.608e-14	7.324e-15	-13.584	-14.135	-0.552	(0)
Ni (NH3) 2+2	1.701e-14	4.776e-15	-13.769	-14.321	-0.552	(0)
Co (NH3) 2+2	9.441e-16	2.651e-16	-15.025	-15.577	-0.552	(0)
Ca (NH3) 2+2	5.635e-17	1.582e-17	-16.249	-16.801	-0.552	(0)
Hg (NH3) 2+2	2.806e-19	7.879e-20	-18.552	-19.104	-0.552	(0)
Co (NH3) 3+2	1.255e-21	3.525e-22	-20.901	-21.453	-0.552	(0)
HgNH3+2	4.916e-22	1.380e-22	-21.308	-21.860	-0.552	(0)
Hg (NH3) 3+2	1.853e-25	5.203e-26	-24.732	-25.284	-0.552	(0)
Co (NH3) 4+2	6.960e-28	1.954e-28	-27.157	-27.709	-0.552	(0)
Hg (NH3) 4+2	2.458e-31	6.903e-32	-30.609	-31.161	-0.552	(0)
Cr (NH3) 5OH+2	3.638e-33	1.022e-33	-32.439	-32.991	-0.552	(0)
Co (NH3) 5+2	1.220e-34	3.426e-35	-33.914	-34.465	-0.552	(0)
Cr (NH3) 6+3	2.703e-38	1.551e-39	-37.568	-38.809	-1.241	(0)
Cr (NH3) 6Cl+2	1.101e-39	3.090e-40	-38.958	-39.510	-0.552	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-41.688	-42.240	-0.552	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-51.320	-51.458	-0.138	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-55.353	-55.905	-0.552	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-57.571	-58.122	-0.552	(0)
N (3)	7.584e-27					
NO2-	7.573e-27	5.896e-27	-26.121	-26.229	-0.109	(0)
CuNO2+	1.045e-29	7.610e-30	-28.981	-29.119	-0.138	(0)
CoNO2+	2.644e-31	1.925e-31	-30.578	-30.716	-0.138	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-54.338	-54.338	0.000	(0)
N (5)	1.581e-36					
NO3-	1.565e-36	1.252e-36	-35.805	-35.903	-0.097	(0)
CaNO3+	1.596e-38	1.162e-38	-37.797	-37.935	-0.138	(0)
MnNO3+	1.006e-40	0.000e+00	-39.997	-40.135	-0.138	(0)
CuNO3+	0.000e+00	0.000e+00	-40.162	-40.299	-0.138	(0)
CoNO3+	0.000e+00	0.000e+00	-40.899	-41.037	-0.138	(0)
NiNO3+	0.000e+00	0.000e+00	-40.955	-41.092	-0.138	(0)
ZnNO3+	0.000e+00	0.000e+00	-41.128	-41.266	-0.138	(0)
BaNO3+	0.000e+00	0.000e+00	-41.985	-42.123	-0.138	(0)
PbNO3+	0.000e+00	0.000e+00	-42.525	-42.663	-0.138	(0)
CdNO3+	0.000e+00	0.000e+00	-43.771	-43.909	-0.138	(0)
CrNO3+2	0.000e+00	0.000e+00	-46.468	-47.020	-0.552	(0)
FeNO3+2	0.000e+00	0.000e+00	-46.908	-47.459	-0.552	(0)
HgNO3+	0.000e+00	0.000e+00	-59.881	-60.019	-0.138	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-75.633	-75.633	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-76.631	-76.631	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-77.114	-77.114	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-77.882	-77.882	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-78.310	-78.310	0.000	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-80.173	-80.173	0.000	(0)
Hg (NO3) 2	0.000e+00	0.000e+00	-96.303	-96.303	0.000	(0)
Na	2.021e-02					
Na+	1.959e-02	1.567e-02	-1.708	-1.805	-0.097	(0)
NaSO4-	6.225e-04	5.025e-04	-3.206	-3.299	-0.093	(0)
NaHCO3	2.835e-07	2.835e-07	-6.547	-6.547	0.000	(0)
NaHPO4-	7.813e-08	6.307e-08	-7.107	-7.200	-0.093	(0)
NaCO3-	1.515e-10	1.223e-10	-9.820	-9.913	-0.093	(0)
NaH2BO3	3.628e-11	3.628e-11	-10.440	-10.440	0.000	(0)

NaCrO4-	2.109e-32	1.536e-32	-31.676	-31.814	-0.138	(0)
Ni	9.406e-06					
Ni+2	6.287e-06	2.571e-06	-5.202	-5.590	-0.388	(0)
NiSO4	2.965e-06	2.965e-06	-5.528	-5.528	0.000	(0)
NiCl+	1.404e-07	1.022e-07	-6.853	-6.991	-0.138	(0)
NiHCO3+	1.154e-08	8.403e-09	-7.938	-8.076	-0.138	(0)
Ni (SO4) 2-2	2.187e-09	6.142e-10	-8.660	-9.212	-0.552	(0)
NiNH3+2	8.213e-10	2.306e-10	-9.086	-9.637	-0.552	(0)
NiOH+	9.208e-11	6.703e-11	-10.036	-10.174	-0.138	(0)
NiCO3	3.499e-11	3.499e-11	-10.456	-10.456	0.000	(0)
NiCl2	8.217e-12	8.217e-12	-11.085	-11.085	0.000	(0)
Ni (OH) 2	2.240e-14	2.240e-14	-13.650	-13.650	0.000	(0)
Ni (NH3) 2+2	1.701e-14	4.776e-15	-13.769	-14.321	-0.552	(0)
Ni (OH) 3-	9.081e-20	6.610e-20	-19.042	-19.180	-0.138	(0)
NiSeO4	1.052e-22	1.052e-22	-21.978	-21.978	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-40.955	-41.092	-0.138	(0)
O (0)	0.000e+00					
O2	0.000e+00	0.000e+00	-48.550	-48.543	0.007	(0)
P	3.278e-05					
H2PO4-	2.580e-05	2.083e-05	-4.588	-4.681	-0.093	(0)
FeH2PO4+	1.982e-06	1.600e-06	-5.703	-5.796	-0.093	(0)
CaH2PO4+	1.506e-06	1.216e-06	-5.822	-5.915	-0.093	(0)
MgH2PO4+	1.496e-06	1.207e-06	-5.825	-5.918	-0.093	(0)
HPO4-2	9.134e-07	3.796e-07	-6.039	-6.421	-0.381	(0)
CaHPO4	4.523e-07	4.523e-07	-6.345	-6.345	0.000	(0)
MgHPO4	2.906e-07	2.906e-07	-6.537	-6.537	0.000	(0)
FeHPO4	2.365e-07	2.365e-07	-6.626	-6.626	0.000	(0)
NaHPO4-	7.813e-08	6.307e-08	-7.107	-7.200	-0.093	(0)
KHPO4-	1.259e-08	1.016e-08	-7.900	-7.993	-0.093	(0)
H3PO4	9.454e-09	9.454e-09	-8.024	-8.024	0.000	(0)
CoHPO4	1.732e-09	1.732e-09	-8.762	-8.762	0.000	(0)
FeHPO4+	9.305e-10	7.511e-10	-9.031	-9.124	-0.093	(0)
CaPO4-	3.923e-10	3.167e-10	-9.406	-9.499	-0.093	(0)
CrH2PO4+2	4.264e-12	1.197e-12	-11.370	-11.922	-0.552	(0)
MgPO4-	2.854e-12	2.304e-12	-11.544	-11.638	-0.093	(0)
PO4-3	3.171e-13	4.241e-14	-12.499	-13.373	-0.874	(0)
FeH2PO4+2	1.774e-13	7.532e-14	-12.751	-13.123	-0.372	(0)
CrO3HPO4-2	5.654e-34	1.588e-34	-33.248	-33.799	-0.552	(0)
CrO3H2PO4-	3.580e-37	2.606e-37	-36.446	-36.584	-0.138	(0)
Pb	7.814e-08					
PbSO4	3.503e-08	3.503e-08	-7.456	-7.456	0.000	(0)
Pb+2	2.909e-08	1.190e-08	-7.536	-7.925	-0.388	(0)
PbCl+	8.605e-09	6.264e-09	-8.065	-8.203	-0.138	(0)
Pb (SO4) 2-2	4.520e-09	1.269e-09	-8.345	-8.896	-0.552	(0)
PbCl2	4.309e-10	4.309e-10	-9.366	-9.366	0.000	(0)
PbHCO3+	3.219e-10	2.343e-10	-9.492	-9.630	-0.138	(0)
PbOH+	1.212e-10	8.819e-11	-9.917	-10.055	-0.138	(0)
PbCO3	1.304e-11	1.304e-11	-10.885	-10.885	0.000	(0)
PbCl3-	3.920e-12	2.854e-12	-11.407	-11.545	-0.138	(0)
PbCl4-2	6.797e-14	1.909e-14	-13.168	-13.719	-0.552	(0)
Pb (OH) 2	8.231e-15	8.231e-15	-14.085	-14.085	0.000	(0)
Pb2OH+3	2.897e-16	1.663e-17	-15.538	-16.779	-1.241	(0)
Pb (CO3) 2-2	4.887e-17	1.372e-17	-16.311	-16.863	-0.552	(0)
Pb (OH) 3-	3.338e-20	2.430e-20	-19.477	-19.614	-0.138	(0)
Pb (OH) 4-2	6.254e-26	1.756e-26	-25.204	-25.755	-0.552	(0)
Pb3 (OH) 4+2	2.604e-26	7.313e-27	-25.584	-26.136	-0.552	(0)
Pb4 (OH) 4+4	1.337e-28	8.312e-31	-27.874	-30.080	-2.206	(0)
PbNO3+	0.000e+00	0.000e+00	-42.525	-42.663	-0.138	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-78.310	-78.310	0.000	(0)
Pb (HS) 2	0.000e+00	0.000e+00	-95.880	-95.880	0.000	(0)
Pb (HS) 3-	0.000e+00	0.000e+00	-146.055	-146.193	-0.138	(0)
S (-2)	0.000e+00					
H2S	0.000e+00	0.000e+00	-49.995	-49.995	0.000	(0)
HS-	0.000e+00	0.000e+00	-51.475	-51.613	-0.138	(0)
CdHS+	0.000e+00	0.000e+00	-52.035	-52.173	-0.138	(0)
S5-2	0.000e+00	0.000e+00	-55.070	-55.622	-0.552	(0)
S6-2	0.000e+00	0.000e+00	-55.474	-56.026	-0.552	(0)
S4-2	0.000e+00	0.000e+00	-55.671	-56.223	-0.552	(0)

S3-2	0.000e+00	0.000e+00	-56.485	-57.037	-0.552	(0)
S2-2	0.000e+00	0.000e+00	-57.514	-58.066	-0.552	(0)
S-2	0.000e+00	0.000e+00	-63.211	-63.592	-0.381	(0)
Hg (HS) 2	0.000e+00	0.000e+00	-88.587	-88.587	0.000	(0)
HgHS2-	0.000e+00	0.000e+00	-89.376	-89.514	-0.138	(0)
HgS2-2	0.000e+00	0.000e+00	-92.202	-92.754	-0.552	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-94.987	-95.393	-0.406	(0)
CuS4S5-3	0.000e+00	0.000e+00	-95.739	-96.123	-0.384	(0)
Pb (HS) 2	0.000e+00	0.000e+00	-95.880	-95.880	0.000	(0)
Zn (HS) 2	0.000e+00	0.000e+00	-96.182	-96.182	0.000	(0)
Cd (HS) 2	0.000e+00	0.000e+00	-96.582	-96.582	0.000	(0)
ZnS (HS) -	0.000e+00	0.000e+00	-96.587	-96.724	-0.138	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-98.036	-98.036	0.000	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-133.710	-133.848	-0.138	(0)
Zn (HS) 3-	0.000e+00	0.000e+00	-144.377	-144.515	-0.138	(0)
Pb (HS) 3-	0.000e+00	0.000e+00	-146.055	-146.193	-0.138	(0)
Cd (HS) 3-	0.000e+00	0.000e+00	-146.157	-146.294	-0.138	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-147.474	-147.612	-0.138	(0)
ZnS (HS) 2-2	0.000e+00	0.000e+00	-148.475	-149.027	-0.552	(0)
Cd (HS) 4-2	0.000e+00	0.000e+00	-195.160	-195.711	-0.552	(0)
Zn (HS) 4-2	0.000e+00	0.000e+00	-197.036	-197.587	-0.552	(0)
S (6)	2.102e-02					
SO4-2	1.470e-02	6.013e-03	-1.833	-2.221	-0.388	(0)
CaSO4	3.713e-03	3.713e-03	-2.430	-2.430	0.000	(0)
MgSO4	1.385e-03	1.385e-03	-2.859	-2.859	0.000	(0)
NaSO4-	6.225e-04	5.025e-04	-3.206	-3.299	-0.093	(0)
FeSO4	2.423e-04	2.423e-04	-3.616	-3.616	0.000	(0)
KSO4-	2.005e-04	1.618e-04	-3.698	-3.791	-0.093	(0)
NH4SO4-	5.065e-05	4.067e-05	-4.295	-4.391	-0.095	(0)
MnSO4	3.721e-05	3.721e-05	-4.429	-4.429	0.000	(0)
AlSO4+	3.446e-05	2.747e-05	-4.463	-4.561	-0.098	(0)
CuSO4	1.600e-05	1.600e-05	-4.796	-4.796	0.000	(0)
CoSO4	5.327e-06	5.327e-06	-5.274	-5.274	0.000	(0)
NiSO4	2.965e-06	2.965e-06	-5.528	-5.528	0.000	(0)
Al (SO4) 2-	2.478e-06	1.976e-06	-5.606	-5.704	-0.098	(0)
HSO4-	2.160e-06	1.722e-06	-5.666	-5.764	-0.098	(0)
ZnSO4	2.109e-06	2.109e-06	-5.676	-5.676	0.000	(0)
Zn (SO4) 2-2	4.103e-07	1.152e-07	-6.387	-6.938	-0.552	(0)
PbSO4	3.503e-08	3.503e-08	-7.456	-7.456	0.000	(0)
BeSO4	2.770e-08	2.770e-08	-7.558	-7.558	0.000	(0)
CrOHSO4	1.029e-08	1.029e-08	-7.988	-7.988	0.000	(0)
Pb (SO4) 2-2	4.520e-09	1.269e-09	-8.345	-8.896	-0.552	(0)
CrSO4+	4.228e-09	3.078e-09	-8.374	-8.512	-0.138	(0)
CdSO4	3.588e-09	3.588e-09	-8.445	-8.445	0.000	(0)
Ni (SO4) 2-2	2.187e-09	6.142e-10	-8.660	-9.212	-0.552	(0)
Be (SO4) 2-2	1.842e-09	5.173e-10	-8.735	-9.286	-0.552	(0)
Cd (SO4) 2-2	1.100e-09	3.089e-10	-8.959	-9.510	-0.552	(0)
FeSO4+	1.525e-11	1.225e-11	-10.817	-10.912	-0.095	(0)
Fe (SO4) 2-	2.250e-12	1.638e-12	-11.648	-11.786	-0.138	(0)
Cr2 (OH) 2SO4+2	2.389e-14	6.707e-15	-13.622	-14.173	-0.552	(0)
Cr2 (OH) 2 (SO4) 2	2.396e-15	2.396e-15	-14.621	-14.621	0.000	(0)
HgSO4	3.261e-24	3.261e-24	-23.487	-23.487	0.000	(0)
CrO3SO4-2	4.839e-35	1.359e-35	-34.315	-34.867	-0.552	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-51.320	-51.458	-0.138	(0)
Se (-2)	4.621e-21					
HSe-	4.536e-21	3.302e-21	-20.343	-20.481	-0.138	(0)
H2Se	8.538e-23	8.538e-23	-22.069	-22.069	0.000	(0)
MnSe	1.475e-25	1.475e-25	-24.831	-24.831	0.000	(0)
Se-2	2.484e-30	6.974e-31	-29.605	-30.157	-0.552	(0)
Se (4)	1.320e-07					
HSeO3-	1.314e-07	9.568e-08	-6.881	-7.019	-0.138	(0)
SeO3-2	3.847e-10	1.080e-10	-9.415	-9.966	-0.552	(0)
H2SeO3	1.333e-10	1.333e-10	-9.875	-9.875	0.000	(0)
FeHSeO3+2	1.634e-16	4.589e-17	-15.787	-16.338	-0.552	(0)
Cd (SeO3) 2-2	9.911e-23	2.783e-23	-22.004	-22.555	-0.552	(0)
Se (6)	2.367e-19					
SeO4-2	2.355e-19	9.630e-20	-18.628	-19.016	-0.388	(0)
MnSeO4	8.698e-22	8.698e-22	-21.061	-21.061	0.000	(0)

CoSeO4	2.060e-22	2.060e-22	-21.686	-21.686	0.000	(0)
NiSeO4	1.052e-22	1.052e-22	-21.978	-21.978	0.000	(0)
ZnSeO4	2.494e-23	2.494e-23	-22.603	-22.603	0.000	(0)
HSeO4-	1.930e-23	1.405e-23	-22.714	-22.852	-0.138	(0)
CdSeO4	4.845e-26	4.845e-26	-25.315	-25.315	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-41.062	-41.613	-0.552	(0)
Zn	6.693e-06					
Zn+2	4.090e-06	1.672e-06	-5.388	-5.777	-0.388	(0)
ZnSO4	2.109e-06	2.109e-06	-5.676	-5.676	0.000	(0)
Zn (SO4) 2-2	4.103e-07	1.152e-07	-6.387	-6.938	-0.552	(0)
ZnCl+	8.058e-08	6.377e-08	-7.094	-7.195	-0.102	(0)
ZnHCO3+	1.926e-09	1.402e-09	-8.715	-8.853	-0.138	(0)
ZnCl2	1.283e-09	1.283e-09	-8.892	-8.892	0.000	(0)
ZnOH+	4.630e-10	3.370e-10	-9.334	-9.472	-0.138	(0)
ZnOHCl	2.557e-10	2.557e-10	-9.592	-9.592	0.000	(0)
ZnCO3	3.511e-11	3.511e-11	-10.455	-10.455	0.000	(0)
ZnCl3-	1.986e-11	1.572e-11	-10.702	-10.804	-0.102	(0)
ZnCl4-2	2.862e-13	1.190e-13	-12.543	-12.925	-0.381	(0)
Zn (OH) 2	2.309e-13	2.309e-13	-12.637	-12.637	0.000	(0)
Zn (OH) 3-	4.692e-18	3.416e-18	-17.329	-17.467	-0.138	(0)
ZnSeO4	2.494e-23	2.494e-23	-22.603	-22.603	0.000	(0)
Zn (OH) 4-2	1.429e-24	4.014e-25	-23.845	-24.396	-0.552	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-41.062	-41.613	-0.552	(0)
ZnNO3+	0.000e+00	0.000e+00	-41.128	-41.266	-0.138	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-77.882	-77.882	0.000	(0)
Zn (HS) 2	0.000e+00	0.000e+00	-96.182	-96.182	0.000	(0)
ZnS (HS) -	0.000e+00	0.000e+00	-96.587	-96.724	-0.138	(0)
Zn (HS) 3-	0.000e+00	0.000e+00	-144.377	-144.515	-0.138	(0)
ZnS (HS) 2-2	0.000e+00	0.000e+00	-148.475	-149.027	-0.552	(0)
Zn (HS) 4-2	0.000e+00	0.000e+00	-197.036	-197.587	-0.552	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2-102.02	-95.75	6.27	(Co (NH3) 5Cl) (NO3) 2	
(Co (NH3) 5Cl) Cl2 -32.09	-27.55	4.54	(Co (NH3) 5Cl) Cl2	
(Co (NH3) 5OH2) Cl3 -39.36	-27.55	11.81	(Co (NH3) 5OH2) Cl3	
(Co (NH3) 6) (NO3) 3-145.51	-127.58	17.93	(Co (NH3) 6) (NO3) 3	
(Co (NH3) 6) Cl3 -45.41	-25.28	20.13	(Co (NH3) 6) Cl3	
(NH4) 2CrO4 -37.48	-37.10	0.38	(NH4) 2CrO4	
(NH4) 2SeO4 -25.87	-25.42	0.45	(NH4) 2SeO4	
Al (OH) 3 (am) -0.88	10.25	11.13	Al (OH) 3	
Al2 (MoO4) 3 -34.79	-31.65	3.14	Al2 (MoO4) 3	
Al2O3 0.09	20.51	20.42	Al2O3	
Al4 (OH) 10SO4 5.16	27.86	22.70	Al4 (OH) 10SO4	
AlAsO4:2H2O -5.57	-0.77	4.80	AlAsO4:2H2O	
AlOHSO4 0.33	-2.90	-3.23	AlOHSO4	
Alunite 8.29	7.51	-0.78	KAl3 (SO4) 2 (OH) 6	
Anglesite -2.32	-10.15	-7.83	PbSO4	
Anhydrite -0.43	-4.77	-4.34	CaSO4	
Anilite -24.69	-57.11	-32.42	Cu0.25Cu1.5S	
Antlerite -3.87	4.92	8.79	Cu3 (OH) 4SO4	
Aragonite -3.72	-11.99	-8.26	CaCO3	
Arsenolite -41.83	-44.76	-2.94	As4O6	
Artinite -14.22	-4.27	9.96	MgCO3:Mg (OH) 2:3H2O	
As2O5 -28.82	-22.04	6.77	As2O5	
Atacamite -2.89	4.78	7.67	Cu2 (OH) 3Cl	
Azurite -6.05	-22.67	-16.62	Cu3 (OH) 2 (CO3) 2	
Ba (OH) 2:8H2O -20.58	3.97	24.56	Ba (OH) 2:8H2O	
Ba3 (AsO4) 2 -1.17	-10.12	-8.94	Ba3 (AsO4) 2	
BaCrO4 -27.90	-37.66	-9.77	BaCrO4	
BaHPO4 -6.02	-25.80	-19.77	BaHPO4	
BaMoO4 -6.42	-13.41	-6.99	BaMoO4	
Barite 0.87	-9.18	-10.05	BaSO4	
BaS -69.28	-53.10	16.18	BaS	
BaSeO3 -10.31	-8.51	1.79	BaSeO3	
BaSeO4 -18.45	-25.98	-7.53	BaSeO4	

Be (OH) 2 (alpha)	-3.40	3.49	6.89	Be (OH) 2
Be (OH) 2 (am)	-3.70	3.49	7.19	Be (OH) 2
Be (OH) 2 (beta)	-3.00	3.49	6.49	Be (OH) 2
BeMoO4	-12.28	-13.89	-1.61	BeMoO4
BeS	-72.97	-53.59	19.38	BeS
BeSeO4:4H2O	-23.52	-26.46	-2.94	BeSeO4:4H2O
Bianchite	-6.24	-8.00	-1.76	ZnSO4:6H2O
Birnessite	-17.82	0.27	18.09	MnO2
Bixbyite	-18.62	-18.90	-0.27	Mn2O3
BlaubleiI	-27.70	-51.86	-24.16	Cu0.9Cu0.2S
BlaubleiII	-27.01	-54.28	-27.28	Cu0.6Cu0.8S
Boehmite	1.33	10.25	8.93	AlOOH
Brochantite	-4.88	10.94	15.82	Cu4 (OH) 6SO4
Brucite	-9.13	8.05	17.18	Mg (OH) 2
Bunsenite	-7.40	5.34	12.74	NiO
Ca3 (AsO4) 2:4H2O	-19.19	3.11	22.30	Ca3 (AsO4) 2:4H2O
Ca3 (PO4) 2 (beta)	-5.31	-34.39	-29.08	Ca3 (PO4) 2
Ca4H (PO4) 3:3H2O	-8.70	-55.78	-47.08	Ca4H (PO4) 3:3H2O
CaCrO4	-31.07	-33.25	-2.19	CaCrO4
CaHPO4	-2.02	-21.39	-19.37	CaHPO4
CaHPO4:2H2O	-2.33	-21.39	-19.06	CaHPO4:2H2O
Calcite	-3.53	-11.99	-8.46	CaCO3
Calomel	-10.31	-28.49	-18.18	Hg2Cl2
CaMoO4	-1.05	-9.00	-7.94	CaMoO4
CaSeO3:2H2O	-6.97	-4.10	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-18.57	-21.57	-3.00	CaSeO4:2H2O
Cd (BO2) 2	-17.61	-7.77	9.84	Cd (BO2) 2
Cd (OH) 2	-11.56	2.37	13.93	Cd (OH) 2
Cd (OH) 2 (am)	-11.62	2.37	13.99	Cd (OH) 2
Cd3 (OH) 2 (SO4) 2	-25.92	-19.21	6.71	Cd3 (OH) 2 (SO4) 2
Cd3 (OH) 4SO4	-28.62	-6.06	22.56	Cd3 (OH) 4SO4
Cd3 (PO4) 2	-19.85	-52.45	-32.60	Cd3 (PO4) 2
Cd4 (OH) 6SO4	-32.09	-3.69	28.40	Cd4 (OH) 6SO4
CdCl2	-11.57	-12.17	-0.60	CdCl2
CdCl2:1H2O	-10.50	-12.17	-1.67	CdCl2:1H2O
CdCl2:2.5H2O	-10.24	-12.18	-1.93	CdCl2:2.5H2O
Cdmetal (alpha)	-30.81	-17.07	13.74	Cd
Cdmetal (gamma)	-30.92	-17.07	13.84	Cd
CdMoO4	-0.81	-15.02	-14.21	CdMoO4
CdOHCl	-8.53	-4.90	3.63	CdOHCl
CdSe	-3.16	-23.58	-20.43	CdSe
CdSeO4:2H2O	-25.74	-27.59	-1.85	CdSeO4:2H2O
CdSO4	-10.77	-10.79	-0.02	CdSO4
CdSO4:1H2O	-9.16	-10.79	-1.63	CdSO4:1H2O
CdSO4:2.67H2O	-8.97	-10.79	-1.82	CdSO4:2.67H2O
Cerussite	-4.16	-17.36	-13.20	PbCO3
CH4 (g)	-56.33	-98.14	-41.81	CH4
Chalcanthite	-4.47	-7.13	-2.66	CuSO4:5H2O
Chalcocite	-23.71	-59.13	-35.42	Cu2S
Chalcopyrite	-65.25	-100.96	-35.71	CuFeS2
Cinnabar	-29.58	-76.02	-46.45	HgS
Claudetite	-41.53	-44.76	-3.23	As4O6
Clausthalite	4.52	-22.94	-27.46	PbSe
Co (BO2) 2	-31.60	-4.53	27.07	Co (BO2) 2
Co (OH) 2	-7.49	5.60	13.09	Co (OH) 2
Co (OH) 3	-15.05	-17.08	-2.03	Co (OH) 3
CO2 (g)	-2.21	-20.37	-18.16	CO2
Co3 (AsO4) 2	-18.28	-5.24	13.03	Co3 (AsO4) 2
Co3 (PO4) 2	-8.06	-42.75	-34.69	Co3 (PO4) 2
Co3O4	-18.38	-28.56	-10.18	Co3O4
CoCl2	-17.44	-8.94	8.50	CoCl2
CoCl2:6H2O	-11.46	-8.94	2.51	CoCl2:6H2O
CoCO3	-4.83	-14.77	-9.94	CoCO3
CoFe2O4	16.13	13.07	-3.06	CoFe2O4
CoHPO4	-5.11	-24.17	-19.06	CoHPO4
CoMoO4	-4.09	-11.78	-7.69	CoMoO4
CoO	-8.30	5.60	13.90	CoO
CoS (alpha)	-44.04	-51.48	-7.44	CoS

CoS (beta)	-40.41	-51.48	-11.07	CoS
CoSe	-4.15	-20.35	-16.20	CoSe
CoSeO3	-8.21	-6.89	1.32	CoSeO3
CoSeO4:6H2O	-22.82	-24.35	-1.53	CoSeO4:6H2O
CoSO4	-10.59	-7.56	3.04	CoSO4
CoSO4:6H2O	-5.08	-7.56	-2.48	CoSO4:6H2O
Cotunnite	-6.67	-11.53	-4.86	PbCl2
Covellite	-28.47	-51.05	-22.59	CuS
Cr (OH) 2	-20.84	-9.91	10.92	Cr (OH) 2
Cr (OH) 3	-4.54	-3.12	1.42	Cr (OH) 3
Cr (OH) 3 (am)	-2.37	-3.12	-0.75	Cr (OH) 3
Cr2O3	-4.03	-6.24	-2.21	Cr2O3
CrCl2	-38.87	-24.45	14.42	CrCl2
CrCl3	-40.40	-24.93	15.47	CrCl3
Crmetal	-60.35	-29.35	30.99	Cr
CrO3	-38.44	-41.64	-3.20	CrO3
Cu (OH) 2	-2.82	6.02	8.84	Cu (OH) 2
Cu2 (OH) 3NO3	-38.79	-29.32	9.47	Cu2 (OH) 3NO3
Cu2Se (alpha)	18.44	-28.00	-46.44	Cu2Se
Cu2SO4	-13.31	-15.21	-1.89	Cu2SO4
Cu3 (AsO4) 2:2H2O	-10.07	-3.97	6.10	Cu3 (AsO4) 2:2H2O
Cu3 (PO4) 2	-4.62	-41.47	-36.85	Cu3 (PO4) 2
Cu3 (PO4) 2:3H2O	-6.35	-41.47	-35.12	Cu3 (PO4) 2:3H2O
Cu3Se2	16.58	-47.92	-64.50	Cu3Se2
CuCO3	-2.85	-14.35	-11.50	CuCO3
CuCrO4	-30.17	-35.61	-5.44	CuCrO4
Cumetal	-1.78	-10.75	-8.97	Cu
CuMoO4	1.75	-11.36	-13.11	CuMoO4
CuOCuSO4	-11.82	-1.10	10.71	CuOCuSO4
Cupricferrite	6.88	13.50	6.61	CuFe2O4
Cuprite	-1.01	-2.05	-1.04	Cu2O
Cuprousferrite	11.58	2.71	-8.87	CuFeO2
CuSe	13.54	-19.92	-33.46	CuSe
CuSe2	7.35	-26.43	-33.78	CuSe2
CuSeO3:2H2O	-7.08	-6.46	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-21.49	-23.93	-2.44	CuSeO4:5H2O
CuSO4	-10.29	-7.13	3.16	CuSO4
Diaspore	3.08	10.25	7.18	AlOOH
Djurleite	-24.08	-58.60	-34.51	Cu0.066Cu1.868S
Dolomite (disordered)	-7.90	-24.30	-16.40	CaMg (CO3) 2
Dolomite (ordered)	-7.33	-24.30	-16.97	CaMg (CO3) 2
Epsomite	-2.94	-5.11	-2.16	MgSO4:7H2O
Fe (OH) 2	-6.39	7.17	13.56	Fe (OH) 2
Fe (OH) 2.7Cl1.3	4.59	1.55	-3.04	Fe (OH) 2.7Cl1.3
Fe2 (OH) 4SeO3	-6.57	-5.02	1.55	Fe2 (OH) 4SeO3
Fe2 (SeO3) 3:2H2O	-9.36	-29.99	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-28.98	-32.00	-3.02	Fe2 (SO4) 3
Fe3 (OH) 8	-5.58	14.64	20.22	Fe3 (OH) 8
FeAsO4:2H2O	-7.69	-7.29	0.40	FeAsO4:2H2O
FeCr2O4	-6.68	0.94	7.62	FeCr2O4
FeMoO4	-0.15	-10.21	-10.06	FeMoO4
Ferrihydrite	0.33	3.73	3.41	Fe (OH) 3
Ferroselite	-6.55	-25.28	-18.74	FeSe2
FeS (ppt)	-46.99	-49.91	-2.92	FeS
FeSe	-7.77	-18.77	-11.01	FeSe
Galena	-39.86	-54.07	-14.21	PbS
Gibbsite	1.68	10.25	8.57	Al (OH) 3
Goethite	3.06	3.73	0.67	FeOOH
Goslarite	-5.95	-8.00	-2.05	ZnSO4:7H2O
Greenockite	-40.19	-54.71	-14.52	CdS
Greigite	-168.64	-213.68	-45.03	Fe3S4
Gypsum	-0.16	-4.77	-4.61	CaSO4:2H2O
H-Jarosite	-3.69	-15.11	-11.41	(H3O) Fe3 (SO4) 2 (OH) 6
H2MoO4	-4.36	-17.39	-13.02	H2MoO4
H2S (g)	-49.07	-57.08	-8.01	H2S
H2Se (g)	-21.03	-25.95	-4.91	H2Se
Halite	-5.20	-3.61	1.59	NaCl
Hausmannite	-23.33	38.95	62.28	Mn3O4

Hematite	8.51	7.47	-1.03	Fe2O3
Hercynite	3.86	27.68	23.83	FeAl2O4
Hg (CH3) 2 (g)	-140.08	-215.22	-75.14	Hg (CH3) 2
Hg (g)	-8.76	-16.70	-7.94	Hg
Hg (OH) 2	-15.45	-18.94	-3.50	Hg (OH) 2
Hg2 (g)	-18.27	-33.39	-15.13	Hg2
Hg2 (OH) 2	-19.21	-13.95	5.26	Hg2 (OH) 2
Hg2CO3	-18.14	-34.33	-16.18	Hg2CO3
Hg2CrO4	-46.89	-55.59	-8.70	Hg2CrO4
Hg2HPO4	-18.95	-43.73	-24.77	Hg2HPO4
Hg2S	-59.15	-71.03	-11.88	Hg2S
Hg2SeO3	-21.78	-26.44	-4.66	Hg2SeO3
Hg2SO4	-20.96	-27.11	-6.15	Hg2SO4
Hg3O2CO3	-47.52	-77.20	-29.68	Hg3O2CO3
HgCl (g)	-34.22	-14.25	19.98	HgCl
HgCl2	-11.90	-33.48	-21.58	HgCl2
Hgmetal (l)	-3.00	-16.70	-13.70	Hg
HgSe	10.80	-44.89	-55.69	HgSe
HgSeO3	-19.00	-31.43	-12.43	HgSeO3
HgSO4	-22.64	-32.10	-9.46	HgSO4
Hinsdalite	-6.66	-9.16	-2.50	PbAl3PO4SO4 (OH) 6
Huntite	-19.29	-48.94	-29.65	CaMg3 (CO3) 4
Hydrocerussite	-12.95	-31.72	-18.77	Pb3 (OH) 2 (CO3) 2
Hydromagnesite	-33.11	-41.22	-8.12	Mg5 (CO3) 4 (OH) 2 : 4H2O
Hydroxylapatite	-3.06	-47.39	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-11.48	-74.27	-62.79	Pb5 (PO4) 3OH
K-Alum	-7.74	-13.00	-5.26	KAl (SO4) 2 : 12H2O
K-Jarosite	2.36	-12.05	-14.41	KFe3 (SO4) 2 (OH) 6
K2Cr2O7	-59.68	-77.16	-17.48	K2Cr2O7
K2CrO4	-34.95	-35.52	-0.57	K2CrO4
K2MoO4	-14.54	-11.27	3.27	K2MoO4
K2SeO4	-23.10	-23.83	-0.73	K2SeO4
Langite	-7.04	10.94	17.98	Cu4 (OH) 6SO4 : H2O
Larnakite	-6.77	-7.14	-0.37	PbO : PbSO4
Laurionite	-4.88	-4.26	0.62	PbOHCl
Lepidocrocite	2.36	3.73	1.37	FeOOH
Lime	-24.89	8.39	33.28	CaO
Litharge	-9.88	3.01	12.89	PbO
Mackinawite	-46.31	-49.91	-3.60	FeS
Maghemite	1.08	7.47	6.39	Fe2O3
Magnesioferrite	-2.16	15.52	17.69	Fe2MgO4
Magnesite	-4.80	-12.32	-7.52	MgCO3
Magnetite	10.62	14.64	4.02	Fe3O4
Malachite	-2.79	-8.32	-5.53	Cu2 (OH) 2CO3
Manganite	-9.12	16.22	25.34	MnOOH
Massicot	-10.08	3.01	13.09	PbO
Melanothallite	-14.96	-8.51	6.45	CuCl2
Melanterite	-3.72	-5.99	-2.27	FeSO4 : 7H2O
Metacinnabar	-30.18	-76.02	-45.85	HgS
Mg (OH) 2 (active)	-10.74	8.05	18.79	Mg (OH) 2
Mg3 (PO4) 2	-12.11	-35.39	-23.28	Mg3 (PO4) 2
MgCr2O4	-14.92	1.82	16.73	MgCr2O4
MgCrO4	-39.23	-33.59	5.64	MgCrO4
MgHPO4 : 3H2O	-3.55	-21.72	-18.18	MgHPO4 : 3H2O
MgMoO4	-7.48	-9.33	-1.85	MgMoO4
MgSeO3 : 6H2O	-7.48	-4.44	3.04	MgSeO3 : 6H2O
MgSeO4 : 6H2O	-20.70	-21.90	-1.20	MgSeO4 : 6H2O
Minium	-46.30	28.47	74.77	Pb3O4
Mirabilite	-4.49	-5.84	-1.35	Na2SO4 : 10H2O
Mn2 (SO4) 3	-53.14	-58.36	-5.23	Mn2 (SO4) 3
Mn3 (AsO4) 2 : 8H2O	-15.04	-2.54	12.50	Mn3 (AsO4) 2 : 8H2O
Mn3 (PO4) 2	-16.19	-40.04	-23.85	Mn3 (PO4) 2
MnCl2 : 4H2O	-10.79	-8.04	2.75	MnCl2 : 4H2O
MnHPO4	2.13	-23.27	-25.40	MnHPO4
MnS (grn)	-50.84	-50.58	0.27	MnS
MnS (pnk)	-53.92	-50.58	3.34	MnS
MnSe	-23.24	-19.45	3.79	MnSe
MnSeO3	-7.11	-5.98	1.13	MnSeO3

MnSeO3:2H2O	-6.94	-5.99	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-21.40	-23.45	-2.05	MnSeO4:5H2O
MnSO4	-9.43	-6.65	2.78	MnSO4
Monteponite	-13.04	2.37	15.41	CdO
Montroydite	-15.42	-18.94	-3.52	HgO
MoO3	-9.39	-17.39	-8.00	MoO3
Morenosite	-5.63	-7.81	-2.18	NiSO4:7H2O
MoS2	-79.57	-150.99	-71.41	MoS2
Na-Jarosite	-0.69	-11.45	-10.75	NaFe3(SO4)2(OH)6
Na2Cr2O7	-65.99	-75.95	-9.96	Na2Cr2O7
Na2CrO4	-37.30	-34.32	2.99	Na2CrO4
Na2Mo2O7	-10.68	-27.45	-16.76	Na2Mo2O7
Na2MoO4	-11.58	-10.06	1.52	Na2MoO4
Na2MoO4:2H2O	-11.29	-10.06	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-15.46	-5.16	10.30	Na2SeO3:5H2O
Na2SeO4	-23.91	-22.63	1.28	Na2SeO4
Nantokite	-1.44	-8.30	-6.86	CuCl
Natron	-11.55	-13.05	-1.51	Na2CO3:10H2O
Nesquehonite	-7.72	-12.32	-4.60	MgCO3:3H2O
Ni(OH)2	-7.73	5.34	13.08	Ni(OH)2
Ni3(AsO4)2:8H2O	-21.71	-6.01	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-12.21	-43.51	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-23.78	8.22	32.00	Ni4(OH)6SO4
NiCO3	-8.28	-15.03	-6.75	NiCO3
NiMoO4	-0.89	-12.04	-11.15	NiMoO4
NiS(alpha)	-46.13	-51.73	-5.60	NiS
NiS(beta)	-40.63	-51.73	-11.10	NiS
NiS(gamma)	-38.93	-51.73	-12.80	NiS
NiSe	-2.90	-20.60	-17.70	NiSe
NiSeO3:2H2O	-10.05	-7.14	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-23.09	-24.61	-1.52	NiSeO4:6H2O
Nsutite	-17.23	0.27	17.50	MnO2
O2(g)	-45.91	38.88	84.79	O2
Orpiment	-131.51	-193.62	-62.11	As2S3
Otavite	-6.01	-18.01	-12.00	CdCO3
Pb(BO2)2	-13.69	-7.12	6.57	Pb(BO2)2
Pb(OH)2	-5.31	3.01	8.32	Pb(OH)2
Pb10(OH)6O(CO3)6	-83.38	-92.14	-8.76	Pb10(OH)6O(CO3)6
Pb2(OH)3Cl	-10.04	-1.25	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-20.17	6.02	26.19	Pb2O(OH)2
Pb2O3	-35.58	25.46	61.04	Pb2O3
Pb2OCO3	-13.92	-14.35	-0.44	Pb2OCO3
Pb3(AsO4)2	-18.81	-13.01	5.80	Pb3(AsO4)2
Pb3(PO4)2	-6.99	-50.52	-43.53	Pb3(PO4)2
Pb3O2CO3	-22.69	-11.34	11.35	Pb3O2CO3
Pb3O2SO4	-15.05	-4.13	10.92	Pb3O2SO4
Pb4(OH)6SO4	-22.22	-1.12	21.10	Pb4(OH)6SO4
Pb4O3SO4	-23.40	-1.12	22.28	Pb4O3SO4
PbCrO4	-25.90	-38.63	-12.73	PbCrO4
PbHPO4	-2.96	-26.76	-23.81	PbHPO4
Pbmetal	-20.67	-16.43	4.24	Pb
PbMoO4	1.41	-14.38	-15.78	PbMoO4
PbO:0.3H2O	-9.97	3.01	12.98	PbO:0.33H2O
PbSeO4	-20.06	-26.94	-6.88	PbSeO4
Periclase	-13.98	8.05	22.03	MgO
Phosgenite	-9.08	-28.89	-19.81	PbCl2:PbCO3
Plattnerite	-28.03	22.45	50.48	PbO2
Plumbgummite	7.01	-25.78	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-14.80	8.39	23.19	Ca(OH)2
Pyrite	-68.89	-87.55	-18.66	FeS2
Pyrochroite	-8.98	6.50	15.48	Mn(OH)2
Pyrolusite	-16.25	25.94	42.19	MnO2
Pyromorphite	2.89	-81.54	-84.43	Pb5(PO4)3Cl
Realgar	-57.86	-77.99	-20.13	AsS
Retgersite	-5.76	-7.81	-2.05	NiSO4:6H2O
Rhodochrosite	-3.30	-13.87	-10.57	MnCO3
Semetal(am)	0.63	-6.51	-7.14	Se
Semetal(hex)	1.25	-6.51	-7.76	Se

SeO2	-12.61	-12.49	0.12	SeO2
SeO3	-51.43	-29.95	21.48	SeO3
Siderite	-3.01	-13.20	-10.19	FeCO3
Smithsonite	-5.26	-15.21	-9.95	ZnCO3
Sphalerite	-40.38	-51.92	-11.54	ZnS
Spinel	-9.44	28.56	38.00	MgAl2O4
Strengite	0.33	-26.04	-26.37	FePO4:2H2O
Sulfur	-35.54	-37.64	-2.10	S
Tenorite	-1.81	6.03	7.84	CuO
Thenardite	-6.18	-5.83	0.35	Na2SO4
Thermonatrite	-13.72	-13.05	0.67	Na2CO3:H2O
Tsumebite	-7.94	-17.73	-9.79	Pb2CuPO4 (OH) 3:3H2O
Vivianite	-2.03	-38.03	-36.00	Fe3 (PO4) 2:8H2O
Witherite	-7.82	-16.40	-8.58	BaCO3
Wurtzite	-42.91	-51.92	-9.01	ZnS
Zincite	-6.44	5.16	11.60	ZnO
Zincosite	-12.17	-8.00	4.17	ZnSO4
Zn (BO2) 2	-13.26	-4.97	8.29	Zn (BO2) 2
Zn (NO3) 2:6H2O	-80.83	-77.59	3.24	Zn (NO3) 2:6H2O
Zn (OH) 2	-7.04	5.16	12.20	Zn (OH) 2
Zn (OH) 2 (am)	-7.56	5.16	12.71	Zn (OH) 2
Zn (OH) 2 (beta)	-6.84	5.16	12.00	Zn (OH) 2
Zn (OH) 2 (epsilon)	-6.62	5.16	11.78	Zn (OH) 2
Zn (OH) 2 (gamma)	-6.58	5.16	11.73	Zn (OH) 2
Zn2 (OH) 2SO4	-10.34	-2.84	7.50	Zn2 (OH) 2SO4
Zn2 (OH) 3Cl	-12.15	3.05	15.19	Zn2 (OH) 3Cl
Zn3 (AsO4) 2:2.5H2O	-20.22	-6.57	13.65	Zn3 (AsO4) 2:2.5H2O
Zn3 (PO4) 2:4H2O	-8.66	-44.08	-35.42	Zn3 (PO4) 2:4H2O
Zn3O (SO4) 2	-30.52	-10.84	19.68	Zn3O (SO4) 2
Zn4 (OH) 6SO4	-20.93	7.47	28.40	Zn4 (OH) 6SO4
Zn5 (OH) 8Cl2	-27.25	11.25	38.50	Zn5 (OH) 8Cl2
ZnCl2	-16.65	-9.38	7.27	ZnCl2
ZnCO3:1H2O	-4.96	-15.22	-10.26	ZnCO3:1H2O
Znmetal	-40.53	-14.28	26.24	Zn
ZnMoO4	-2.13	-12.23	-10.09	ZnMoO4
ZnO (active)	-6.29	5.16	11.45	ZnO
ZnS (am)	-42.82	-51.92	-9.10	ZnS
ZnSe	-6.31	-20.79	-14.48	ZnSe
ZnSeO4:6H2O	-23.28	-24.80	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.49	-8.00	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 4.

End of Run after 0.25 Seconds.

Input file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\PHREEQC\2 Mixing
 \Kanmantoo Scenario 3 mixing.pqi
 Output file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\PHREEQC\2 Mixing
 \Kanmantoo Scenario 3 mixing.pqi
 Database file: C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
 \minteq.v4.dat

 Reading data base.

SOLUTION_MASTER_SPECIES
 SOLUTION_SPECIES
 SOLUTION_SPECIES
 PHASES
 PHASES
 SURFACE_MASTER_SPECIES
 SURFACE_SPECIES
 END

 Reading input data for simulation 1.

DATABASE C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
 \minteq.v4.dat
 SELECTED_OUTPUT 1
 file Kanmantoo Scenario 3 mixing.sel
 totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg
 Na K Alkalinity Cl S(6) Hg
 SOLUTION_MASTER_SPECIES
 Co Co+3 -1.0 Co 58.9332
 Co(2) Co+2 0.0 Co
 Co(3) Co+3 -1.0 Co
 END

 End of simulation.

 Reading input data for simulation 2.

PHASES
 CoO
 CoO + 2H+ = Co+2 + H2O
 log_k 13.5864
 delta_h -106.295 kJ
 Co(OH)2
 Co(OH)2 + 2H+ = Co+2 + 2H2O
 log_k 13.094
 delta_h -0 kJ
 Co(OH)3
 Co(OH)3 + 3H+ = Co+3 + 3H2O
 log_k -2.309
 delta_h -92.43 kJ
 Co3O4
 Co3O4 + 8H+ = Co+2 + 2Co+3 + 4H2O
 log_k -10.4956
 delta_h -107.5 kJ
 CoFe2O4
 CoFe2O4 + 8H+ = Co+2 + 2Fe+3 + 4H2O
 log_k -3.5281
 delta_h -158.82 kJ
 CoCl2
 CoCl2 = Co+2 + 2Cl-
 log_k 8.2672
 delta_h -79.815 kJ
 CoCl2:6H2O

```

      CoCl2:6H2O = Co+2 + 2Cl- + 6H2O
      log_k 2.5365
      delta_h      8.0598      kJ
(Co(NH3)6)Cl3
      (Co(NH3)6)Cl3 + 6H+ = Co+3 + 6NH4+ + 3Cl-
      log_k 20.0317
      delta_h      -33.1      kJ
(Co(NH3)5OH2)Cl3
      (Co(NH3)5OH2)Cl3 + 5H+ = Co+3 + 5NH4+ + 3Cl- + H2O
      log_k 11.7351
      delta_h      -25.37      kJ
(Co(NH3)5Cl)Cl2
      (Co(NH3)5Cl)Cl2 + 5H+ = Co+3 + 5NH4+ + 3Cl-
      log_k 4.5102
      delta_h      -10.74      kJ
CoCO3
      CoCO3 = Co+2 + CO3-2
      log_k -9.98
      delta_h      -12.7612      kJ
CoSO4
      CoSO4 = Co+2 + SO4-2
      log_k 2.8024
      delta_h      -79.277      kJ
CoSO4:6H2O
      CoSO4:6H2O = Co+2 + SO4-2 + 6H2O
      log_k -2.4726
      delta_h      1.0801      kJ

```

END

End of simulation.

Reading input data for simulation 3.

SOLUTION 1 # Mean Groundwater quality

```

temp      21
pH         6.79
pe         1
redox      pe
units      mg/l
density    1
Al         0.37
Alkalinity 0
As         0
Ba         0
Be         0
B          0
Cd         0.003
Co         2.34
Cr         0
Cu         0.31
Fe         100.34
Pb         0.003
Mn         12.2
Mo         0
V          0
Zn         0.17
Se         0.03
Ni         0.45
N          7
P          0.68
Ca         130
Mg         246
Na         1094
K          62
Cl         1533

```

S(6)	1485
Hg	0.0002
water	1 # kg
SOLUTION 2 #Mean River Murray water quality	
temp	20
pH	7.5
pe	4
redox	pe
units	mg/l
density	1
Al	1.48
Alkalinity	61
As	0.0013
Ba	0.0478
Be	0
B	0.05
Cd	0.0007
Co	0.0006
Cr	0.0021
Cu	0.006
Fe	1.37
Pb	0.0012
Mn	0.06
Mo	0.0003
Zn	0.0164
Se	0.0002
Ni	0.0028
N	1.05
P	0.11
Ca	13
Mg	9
Na	49
K	4
Cl	79
S(6)	17
Hg	0.00008
water	1 # kg
SOLUTION 3 #Mean Mt Barker water quality	
temp	20
pH	6.18
pe	4
redox	pe
units	mg/l
density	1
Al	0.04
Alkalinity	50
As	0.002
Ba	0.012
Be	0
B	0.088
Cd	0
Co	0.039
Cr	0.007
Cu	0.022
Fe	0.493
Pb	0.003
Mn	0.046
Mo	0.009
Zn	0.023
Se	0.002
Ni	0.011
N	24.3
P	0.52
Ca	32
Mg	17
Na	132
K	25
Cl	231

```

S(6)      190
Hg         0
water     1 # kg
SOLUTION 4 #Mean RWD water quality TREATED
temp      20
pH        4.75
pe         4
redox     pe
units     mg/l
density   1
Al        0.00008
Alkalinity 0
As        0.002
Ba        0.04
Be        0.002
B         0.1
Cd        0.0008
Co        0.72
Cr        0.0033
Cu        6.25
Fe        0.02
Pb        0.02
Mn        0.00001
Mo        0.11
Zn        0.49
Se        0.01
Ni        0.49
N         10.07
P         0.29
Ca        522
Mg        88
Na        343
K         245
Cl        490
S(6)     2222
Hg         0
water     1 # kg
MIX 1
1         0.03
2         0.1
3         0.1
4         0.77

```

Beginning of initial solution calculations.

Initial solution 1.

```

-----Solution composition-----

```

Elements	Molality	Moles
Al	1.378e-05	1.378e-05
Ca	3.259e-03	3.259e-03
Cd	2.681e-08	2.681e-08
Cl	4.344e-02	4.344e-02
Co	3.989e-05	3.989e-05
Cu	4.901e-06	4.901e-06
Fe	1.805e-03	1.805e-03
Hg	1.002e-09	1.002e-09
K	1.593e-03	1.593e-03
Mg	1.017e-02	1.017e-02
Mn	2.231e-04	2.231e-04
N	5.021e-04	5.021e-04
Na	4.781e-02	4.781e-02
Ni	7.703e-06	7.703e-06
P	2.206e-05	2.206e-05
Pb	1.455e-08	1.455e-08

S (6)	1.553e-02	1.553e-02
Se	3.817e-07	3.817e-07
Zn	2.612e-06	2.612e-06

-----Description of solution-----

pH	=	6.790
pe	=	1.000
Activity of water	=	0.998
Ionic strength (mol/kgw)	=	9.259e-02
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	6.274e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	21.00
Electrical balance (eq)	=	6.374e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	4.58
Iterations	=	13
Total H	=	1.110158e+02
Total O	=	5.556909e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.061e-07	1.622e-07	-6.686	-6.790	-0.104	0.00
OH-	5.935e-08	4.562e-08	-7.227	-7.341	-0.114	(0)
H2O	5.551e+01	9.980e-01	1.744	-0.001	0.000	18.05
Al	1.378e-05					
Al (OH) 4-	8.973e-06	7.024e-06	-5.047	-5.153	-0.106	(0)
Al (OH) 2+	2.373e-06	1.884e-06	-5.625	-5.725	-0.100	(0)
Al (OH) 3	2.329e-06	2.329e-06	-5.633	-5.633	0.000	(0)
AlOH+2	7.409e-08	2.945e-08	-7.130	-7.531	-0.401	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
Al+3	5.344e-09	6.178e-10	-8.272	-9.209	-0.937	(0)
Al (SO4) 2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ca	3.259e-03					
Ca+2	2.406e-03	9.221e-04	-2.619	-3.035	-0.416	(0)
CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CaOH+	1.001e-09	8.020e-10	-8.999	-9.096	-0.096	(0)
Ca (NH3) 2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
Cd	2.681e-08					
CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
Cd+2	7.874e-09	3.018e-09	-8.104	-8.520	-0.416	(0)
CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
Cd (SO4) 2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
CdOH+	1.568e-12	1.100e-12	-11.805	-11.959	-0.154	(0)
Cd (OH) 2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
Cd2OH+3	4.264e-19	1.748e-20	-18.370	-19.758	-1.387	(0)
Cd (SeO3) 2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Cd (OH) 3-	3.135e-21	2.198e-21	-20.504	-20.658	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Cd (OH) 4-2	9.222e-29	2.230e-29	-28.035	-28.652	-0.617	(0)
CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cl	4.344e-02					
Cl-	4.343e-02	3.417e-02	-1.362	-1.466	-0.104	(0)
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)

CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
ZnOHC1	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
CdOHC1	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co (NH3) 5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co (2)	3.989e-05					
Co+2	3.225e-05	7.797e-06	-4.491	-5.108	-0.617	(0)
CoSO4	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CoHPO4	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CoOH+	1.375e-08	9.639e-09	-7.862	-8.016	-0.154	(0)
Co (NH3) +2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
Co (OH) 2	4.744e-11	4.744e-11	-10.324	-10.324	0.000	(0)
Co (NH3) 2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Co2OH+3	9.190e-14	3.766e-15	-13.037	-14.424	-1.387	(0)
Co (OH) 3-	8.364e-17	5.865e-17	-16.078	-16.232	-0.154	(0)
CoOOH-	5.039e-18	3.533e-18	-17.298	-17.452	-0.154	(0)
Co (NH3) 3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Co4 (OH) 4+4	5.041e-22	1.722e-24	-21.297	-23.764	-2.466	(0)
Co (NH3) 4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
Co (OH) 4-2	2.382e-24	5.759e-25	-23.623	-24.240	-0.617	(0)
Co (NH3) 5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Co (3)	4.042e-31					
CoOH+2	4.042e-31	9.773e-32	-30.393	-31.010	-0.617	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co+3	2.685e-36	3.104e-37	-35.571	-36.508	-0.937	(0)
Co (NH3) 5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
Cu (1)	4.900e-06					
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)

Cu+	1.553e-08	1.089e-08	-7.809	-7.963	-0.154	(0)
Cu (2)	8.967e-10					
Cu+2	6.026e-10	2.310e-10	-9.220	-9.636	-0.416	(0)
CuSO4	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
CuOH+	4.792e-11	3.719e-11	-10.319	-10.430	-0.110	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
Cu (OH) 2	5.595e-13	5.595e-13	-12.252	-12.252	0.000	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
Cu2 (OH) 2+2	1.398e-16	3.379e-17	-15.855	-16.471	-0.617	(0)
Cu (OH) 3-	1.014e-16	7.111e-17	-15.994	-16.148	-0.154	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
Cu (OH) 4-2	1.434e-22	3.468e-23	-21.843	-22.460	-0.617	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Fe (2)	1.805e-03					
Fe+2	1.454e-03	3.515e-04	-2.837	-3.454	-0.617	(0)
FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
FeHPO4	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
FeOH+	8.090e-07	6.384e-07	-6.092	-6.195	-0.103	(0)
Fe (OH) 2	2.214e-11	2.214e-11	-10.655	-10.655	0.000	(0)
Fe (OH) 3-	5.296e-13	4.179e-13	-12.276	-12.379	-0.103	(0)
Fe (3)	3.233e-07					
Fe (OH) 2+	3.138e-07	2.491e-07	-6.503	-6.604	-0.100	(0)
Fe (OH) 3	9.382e-09	9.382e-09	-8.028	-8.028	0.000	(0)
Fe (OH) 4-	1.205e-10	9.565e-11	-9.919	-10.019	-0.100	(0)
FeOH+2	2.119e-11	8.217e-12	-10.674	-11.085	-0.411	(0)
FeHPO4+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeSO4+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe+3	2.235e-15	2.584e-16	-14.651	-15.588	-0.937	(0)
Fe (SO4) 2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
Fe2 (OH) 2+4	7.548e-19	2.579e-21	-18.122	-20.589	-2.466	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
Fe3 (OH) 4+5	6.361e-23	8.906e-27	-22.197	-26.050	-3.854	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
H (0)	3.796e-19					
H2	1.898e-19	1.939e-19	-18.722	-18.712	0.009	(0)
Hg (0)	1.002e-09					
Hg	1.002e-09	1.002e-09	-8.999	-8.999	0.000	(0)
Hg (1)	3.697e-29					
Hg2+2	1.848e-29	4.469e-30	-28.733	-29.350	-0.617	(0)
Hg (2)	2.362e-18					
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
Hg (OH) 2	1.682e-22	1.718e-22	-21.774	-21.765	0.009	(0)
Hg (NH3) 2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
HgOH+	2.768e-26	1.941e-26	-25.558	-25.712	-0.154	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg (NH3) 3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Hg+2	3.648e-29	8.820e-30	-28.438	-29.055	-0.617	(0)
HgSO4	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Hg (OH) 3-	1.911e-30	1.340e-30	-29.719	-29.873	-0.154	(0)
Hg (NH3) 4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Hg (NO3) 2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
K	1.593e-03					
K+	1.549e-03	1.219e-03	-2.810	-2.914	-0.104	(0)

KSO4-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
KHPO4-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
Mg	1.017e-02					
Mg+2	7.920e-03	3.036e-03	-2.101	-2.518	-0.416	(0)
MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
MgHPO4	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
MgOH+	6.402e-08	5.162e-08	-7.194	-7.287	-0.094	(0)
MgPO4-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
Mn (2)	2.231e-04					
Mn+2	1.882e-04	4.549e-05	-3.725	-4.342	-0.617	(0)
MnSO4	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
MnOH+	6.606e-09	5.213e-09	-8.180	-8.283	-0.103	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Mn (OH) 3-	2.129e-19	1.680e-19	-18.672	-18.775	-0.103	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
Mn (OH) 4-2	8.666e-26	3.361e-26	-25.062	-25.474	-0.411	(0)
MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Mn (3)	9.732e-29					
Mn+3	9.732e-29	1.125e-29	-28.012	-28.949	-0.937	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-65.730	-66.142	-0.411	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-74.661	-74.779	-0.119	(0)
N (-3)	5.021e-04					
NH4+	4.805e-04	3.617e-04	-3.318	-3.442	-0.123	(0)
NH4SO4-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
NH3	9.560e-07	9.560e-07	-6.020	-6.020	0.000	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
Co (NH3) +2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
Ni (NH3) 2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Co (NH3) 2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Ca (NH3) 2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
Co (NH3) 3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Hg (NH3) 2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
Co (NH3) 4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg (NH3) 3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Co (NH3) 5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
Hg (NH3) 4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
Co (NH3) 5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
N (3)	1.148e-35					
NO2-	1.148e-35	8.735e-36	-34.940	-35.059	-0.119	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
N (5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-48.382	-48.486	-0.104	(0)
CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)

Co (NO3) 2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Hg (NO3) 2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
Na	4.781e-02					
Na+	4.677e-02	3.680e-02	-1.330	-1.434	-0.104	(0)
NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
Ni	7.703e-06					
Ni+2	5.664e-06	2.171e-06	-5.247	-5.663	-0.416	(0)
NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
NiOH+	1.818e-09	1.275e-09	-8.741	-8.895	-0.154	(0)
Ni (SO4) 2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
Ni (OH) 2	8.335e-12	8.335e-12	-11.079	-11.079	0.000	(0)
Ni (NH3) 2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Ni (OH) 3-	7.365e-16	5.164e-16	-15.133	-15.287	-0.154	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
O (0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.993	-55.984	0.009	(0)
P	2.206e-05					
H2PO4-	6.634e-06	5.268e-06	-5.178	-5.278	-0.100	(0)
HPO4-2	5.222e-06	2.025e-06	-5.282	-5.694	-0.411	(0)
MgHPO4	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
FeHPO4	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
KHPO4-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
CoHPO4	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
MgPO4-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
H3PO4	1.150e-10	1.150e-10	-9.939	-9.939	0.000	(0)
PO4-3	4.196e-11	4.850e-12	-10.377	-11.314	-0.937	(0)
FeHPO4+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
Pb	1.455e-08					
Pb+2	5.480e-09	2.100e-09	-8.261	-8.678	-0.416	(0)
PbSO4	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
PbOH+	4.662e-10	3.269e-10	-9.331	-9.486	-0.154	(0)
Pb (SO4) 2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
Pb (OH) 2	6.405e-13	6.405e-13	-12.193	-12.193	0.000	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
Pb2OH+3	2.655e-16	1.088e-17	-15.576	-16.963	-1.387	(0)
Pb (OH) 3-	5.660e-17	3.969e-17	-16.247	-16.401	-0.154	(0)
Pb (OH) 4-2	2.491e-21	6.022e-22	-20.604	-21.220	-0.617	(0)
Pb3 (OH) 4+2	3.779e-23	9.137e-24	-22.423	-23.039	-0.617	(0)
Pb4 (OH) 4+4	5.175e-26	1.768e-28	-25.286	-27.753	-2.466	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
S (6)	1.553e-02					
SO4-2	1.094e-02	4.194e-03	-1.961	-2.377	-0.416	(0)
MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
KSO4-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
MnSO4	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)

NH4SO4-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
CoSO4	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
ZnSO4	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn (SO4) 2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
HSO4-	7.527e-08	5.892e-08	-7.123	-7.230	-0.106	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
PbSO4	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
Al (SO4) 2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ni (SO4) 2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
Cd (SO4) 2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
Pb (SO4) 2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
CuSO4	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
FeSO4+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe (SO4) 2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
HgSO4	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Se (-2)	4.685e-09					
HSe-	4.677e-09	3.279e-09	-8.330	-8.484	-0.154	(0)
H2Se	4.054e-12	4.054e-12	-11.392	-11.392	0.000	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Se-2	6.423e-17	1.553e-17	-16.192	-16.809	-0.617	(0)
Se (4)	3.770e-07					
HSeO3-	3.526e-07	2.472e-07	-6.453	-6.607	-0.154	(0)
SeO3-2	2.442e-08	5.904e-09	-7.612	-8.229	-0.617	(0)
H2SeO3	1.653e-11	1.653e-11	-10.782	-10.782	0.000	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
Cd (SeO3) 2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Se (6)	2.478e-21					
SeO4-2	2.463e-21	9.439e-22	-20.609	-21.025	-0.416	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
HSeO4-	9.645e-27	6.763e-27	-26.016	-26.170	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
Zn	2.612e-06					
Zn+2	1.813e-06	6.948e-07	-5.742	-6.158	-0.416	(0)
ZnSO4	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn (SO4) 2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
ZnOH+	4.520e-09	3.170e-09	-8.345	-8.499	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
Zn (OH) 2	4.227e-11	4.227e-11	-10.374	-10.374	0.000	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
Zn (OH) 3-	1.872e-14	1.313e-14	-13.728	-13.882	-0.154	(0)
Zn (OH) 4-2	1.339e-19	3.238e-20	-18.873	-19.490	-0.617	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2	-124.48	-118.20	6.27	(Co (NH3) 5Cl) (NO3) 2
(Co (NH3) 5Cl) Cl2	-28.70	-24.17	4.54	(Co (NH3) 5Cl) Cl2
(Co (NH3) 5OH2) Cl3	-35.96	-24.17	11.80	(Co (NH3) 5OH2) Cl3
(Co (NH3) 6) (NO3) 3	-179.81	-161.88	17.93	(Co (NH3) 6) (NO3) 3
(Co (NH3) 6) Cl3	-40.93	-20.82	20.11	(Co (NH3) 6) Cl3
(NH4) 2SeO4	-28.36	-27.91	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	0.09	11.16	11.06	Al (OH) 3
Al2O3	2.05	22.32	20.27	Al2O3

Al4(OH)10SO4	5.98	28.68	22.70	Al4(OH)10SO4
AlOHSO4	-1.57	-4.80	-3.23	AlOHSO4
Alunite	6.34	5.44	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.24	-11.06	-7.82	PbSO4
Anhydrite	-1.07	-5.41	-4.34	CaSO4
Antlerite	-12.92	-4.13	8.79	Cu3(OH)4SO4
Atacamite	-7.99	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.78	-8.54	-1.76	ZnSO4·6H2O
Birnessite	-18.88	-0.79	18.09	MnO2
Bixbyite	-16.81	-17.16	-0.35	Mn2O3
Boehmite	2.30	11.16	8.86	AlOOH
Brochantite	-15.89	-0.19	15.71	Cu4(OH)6SO4
Brucite	-6.06	11.06	17.12	Mg(OH)2
Bunsenite	-4.77	7.92	12.68	NiO
Ca3(PO4)2(beta)	-2.69	-31.73	-29.05	Ca3(PO4)2
Ca4H(PO4)3·3H2O	-5.80	-52.88	-47.08	Ca4H(PO4)3·3H2O
CaHPO4	-1.79	-21.14	-19.35	CaHPO4
CaHPO4·2H2O	-2.09	-21.14	-19.05	CaHPO4·2H2O
Calomel	-14.15	-32.28	-18.13	Hg2Cl2
CaSeO3·2H2O	-5.71	-2.85	2.86	CaSeO3·2H2O
CaSeO4·2H2O	-21.06	-24.06	-3.00	CaSeO4·2H2O
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-23.45	-16.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-23.34	-0.78	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-15.59	-48.19	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-24.12	4.28	28.40	Cd4(OH)6SO4
CdCl2	-10.84	-11.45	-0.61	CdCl2
CdCl2·1H2O	-9.78	-11.45	-1.68	CdCl2·1H2O
CdCl2·2.5H2O	-9.52	-11.46	-1.93	CdCl2·2.5H2O
Cdmetal(alpha)	-24.21	-10.52	13.69	Cd
Cdmetal(gamma)	-24.32	-10.52	13.80	Cd
CdOHCl	-6.81	-3.20	3.61	CdOHCl
CdSe	10.17	-10.21	-20.38	CdSe
CdSeO4·2H2O	-27.70	-29.55	-1.85	CdSeO4·2H2O
CdSO4	-10.85	-10.90	-0.05	CdSO4
CdSO4·1H2O	-9.25	-10.90	-1.65	CdSO4·1H2O
CdSO4·2.67H2O	-9.07	-10.90	-1.83	CdSO4·2.67H2O
Chalcantite	-9.36	-12.02	-2.65	CuSO4·5H2O
Clausthalite	17.01	-10.37	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.05	-16.14	-2.09	Co(OH)3
Co3(PO4)2	-3.27	-37.95	-34.69	Co3(PO4)2
Co3O4	-13.57	-23.81	-10.24	Co3O4
CoCl2	-16.50	-8.04	8.46	CoCl2
CoCl2·6H2O	-10.56	-8.05	2.52	CoCl2·6H2O
CoFe2O4	21.18	18.03	-3.15	CoFe2O4
CoHPO4	-4.15	-23.21	-19.06	CoHPO4
CoO	-5.37	8.47	13.84	CoO
CoSe	9.40	-6.80	-16.20	CoSe
CoSeO3	-6.24	-4.92	1.32	CoSeO3
CoSeO4·6H2O	-24.61	-26.14	-1.53	CoSeO4·6H2O
CoSO4	-10.48	-7.49	2.99	CoSO4
CoSO4·6H2O	-5.02	-7.49	-2.48	CoSO4·6H2O
Cotunnite	-6.77	-11.61	-4.84	PbCl2
Cu(OH)2	-4.87	3.94	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.82	-47.39	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.69	-17.62	-46.31	Cu2Se
Cu2SO4	-16.40	-18.30	-1.90	Cu2SO4
Cu3(PO4)2	-14.69	-51.54	-36.85	Cu3(PO4)2
Cu3(PO4)2·3H2O	-16.42	-51.54	-35.12	Cu3(PO4)2·3H2O
Cu3Se2	35.35	-28.95	-64.30	Cu3Se2
Cumetal	-0.04	-8.96	-8.93	Cu
CuOCuSO4	-18.70	-8.07	10.63	CuOCuSO4
Cupricferrite	7.02	13.50	6.49	CuFe2O4
Cuprite	-1.24	-2.35	-1.11	Cu2O
Cuprousferrite	12.49	3.61	-8.88	CuFeO2
CuSe	22.06	-11.33	-33.39	CuSe

CuSe2	22.68	-11.02	-33.70	CuSe2
CuSeO3:2H2O	-10.05	-9.46	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-28.23	-30.67	-2.44	CuSeO4:5H2O
CuSO4	-15.13	-12.01	3.11	CuSO4
Diaspore	4.04	11.16	7.12	AlOOH
Epsomite	-2.75	-4.90	-2.15	MgSO4:7H2O
Fe(OH)2	-3.44	10.12	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.34	2.30	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-5.39	-3.84	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-10.00	-30.63	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-35.15	-38.31	-3.16	Fe2(SO4)3
Fe3(OH)8	-0.54	19.68	20.22	Fe3(OH)8
Ferrihydrite	1.41	4.78	3.37	Fe(OH)3
Ferroselite	13.87	-4.84	-18.71	FeSe2
FeSe	5.86	-5.15	-11.00	FeSe
Gibbsite	2.64	11.16	8.52	Al(OH)3
Goethite	4.15	4.78	0.64	FeOOH
Goslarite	-6.50	-8.54	-2.05	ZnSO4:7H2O
Gypsum	-0.80	-5.41	-4.61	CaSO4:2H2O
H-Jarosite	-6.02	-17.57	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-10.35	-15.27	-4.92	H2Se
Halite	-4.49	-2.90	1.59	NaCl
Hausmannite	-18.74	43.29	62.03	Mn3O4
Hematite	10.67	9.56	-1.11	Fe2O3
Hercynite	8.80	32.44	23.64	FeAl2O4
Hg(g)	-7.75	-15.67	-7.93	Hg
Hg(OH)2	-18.27	-21.76	-3.50	Hg(OH)2
Hg2(g)	-16.26	-31.35	-15.09	Hg2
Hg2(OH)2	-21.03	-15.77	5.26	Hg2(OH)2
Hg2HPO4	-22.68	-47.45	-24.77	Hg2HPO4
Hg2SeO3	-24.51	-29.17	-4.66	Hg2SeO3
Hg2SO4	-25.58	-31.73	-6.14	Hg2SO4
HgCl(g)	-36.02	-16.14	19.88	HgCl
HgCl2	-16.76	-38.28	-21.52	HgCl2
Hgmetal(l)	-2.02	-15.67	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSeO3	-22.73	-35.16	-12.43	HgSeO3
HgSO4	-28.27	-37.72	-9.45	HgSO4
Hinsdalite	-6.76	-9.26	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	2.00	-42.33	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-7.75	-70.54	-62.79	Pb5(PO4)3OH
K-Alum	-11.65	-16.89	-5.24	KAl(SO4)2:12H2O
K-Jarosite	0.79	-13.70	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-26.12	-26.85	-0.73	K2SeO4
Langite	-18.07	-0.19	17.88	Cu4(OH)6SO4:H2O
Larnakite	-5.77	-6.15	-0.38	PbO:PbSO4
Laurionite	-3.98	-3.35	0.62	PbOHCl
Lepidocrocite	3.41	4.78	1.37	FeOOH
Lime	-22.62	10.54	33.16	CaO
Litharge	-7.95	4.90	12.85	PbO
Maghemite	3.18	9.56	6.39	Fe2O3
Magnesioferrite	3.10	20.62	17.52	Fe2MgO4
Magnetite	15.79	19.69	3.90	Fe3O4
Manganite	-8.31	17.03	25.34	MnOOH
Massicot	-8.15	4.90	13.05	PbO
Melanothallite	-18.98	-12.57	6.41	CuCl2
Melanterite	-3.58	-5.84	-2.26	FeSO4:7H2O
Mg(OH)2(active)	-7.73	11.06	18.79	Mg(OH)2
Mg3(PO4)2	-6.90	-30.18	-23.28	Mg3(PO4)2
MgHPO4:3H2O	-2.45	-20.62	-18.18	MgHPO4:3H2O
MgSeO3:6H2O	-5.38	-2.34	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-22.35	-23.55	-1.20	MgSeO4:6H2O
Minium	-44.24	30.28	74.53	Pb3O4
Mirabilite	-3.95	-5.25	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-59.71	-65.03	-5.32	Mn2(SO4)3
Mn3(PO4)2	-11.81	-35.65	-23.85	Mn3(PO4)2
MnCl2:4H2O	-10.02	-7.28	2.74	MnCl2:4H2O
MnHPO4	2.95	-22.45	-25.40	MnHPO4

MnSe	-9.77	-6.04	3.73	MnSe
MnSeO3	-5.29	-4.16	1.13	MnSeO3
MnSeO3:2H2O	-5.12	-4.16	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-23.32	-25.37	-2.05	MnSeO4:5H2O
MnSO4	-9.46	-6.72	2.74	MnSO4
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.22	-21.76	-3.55	HgO
Morenosite	-5.87	-8.05	-2.17	NiSO4:7H2O
Na-Jarosite	-1.38	-12.22	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-12.99	-2.69	10.30	Na2SeO3:5H2O
Na2SeO4	-25.17	-23.89	1.28	Na2SeO4
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.11	7.91	13.02	Ni(OH)2
Ni3(PO4)2	-8.32	-39.62	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-16.30	15.70	32.00	Ni4(OH)6SO4
NiSe	10.34	-7.36	-17.70	NiSe
NiSeO3:2H2O	-8.37	-5.48	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-25.17	-26.69	-1.52	NiSeO4:6H2O
Nsutite	-18.29	-0.79	17.50	MnO2
O2(g)	-53.29	31.16	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.25	1.55	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-16.39	9.80	26.19	Pb2O(OH)2
Pb2O3	-35.66	25.38	61.04	Pb2O3
Pb3(PO4)2	-5.13	-48.66	-43.53	Pb3(PO4)2
Pb3O2SO4	-12.13	-1.25	10.87	Pb3O2SO4
Pb4(OH)6SO4	-17.45	3.65	21.10	Pb4(OH)6SO4
Pb4O3SO4	-18.55	3.65	22.20	Pb4O3SO4
PbHPO4	-2.98	-26.78	-23.81	PbHPO4
Pbmetal	-14.92	-10.68	4.24	Pb
PbO:0.3H2O	-8.08	4.90	12.98	PbO:0.33H2O
PbSeO4	-22.83	-29.70	-6.88	PbSeO4
Periclase	-10.88	11.06	21.94	MgO
Plattnerite	-29.83	20.48	50.31	PbO2
Plumbgummite	7.80	-24.99	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-12.57	10.54	23.11	Ca(OH)2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-17.21	24.82	42.03	MnO2
Pyromorphite	5.63	-78.80	-84.43	Pb5(PO4)3Cl
Retgersite	-6.00	-8.05	-2.05	NiSO4:6H2O
Semetal(am)	7.44	0.31	-7.14	Se
Semetal(hex)	8.05	0.31	-7.75	Se
SeO2	-13.52	-13.40	0.12	SeO2
SeO3	-56.00	-34.60	21.39	SeO3
Spinel	-4.39	33.38	37.77	MgAl2O4
Strengite	-0.53	-26.90	-26.38	FePO4:2H2O
Tenorite	-3.86	3.94	7.80	CuO
Thenardite	-5.59	-5.25	0.34	Na2SO4
Tsumebite	-8.15	-17.94	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	3.00	-33.00	-36.00	Fe3(PO4)2:8H2O
Zincite	-4.13	7.42	11.55	ZnO
Zincosite	-12.66	-8.54	4.13	ZnSO4
Zn(NO3)2:6H2O	-106.39	-103.14	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.78	7.42	12.20	Zn(OH)2
Zn(OH)2(am)	-5.25	7.42	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.42	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.31	7.42	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.42	11.73	Zn(OH)2
Zn2(OH)2SO4	-8.62	-1.12	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.61	6.58	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-5.69	-41.11	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-29.18	-9.65	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-14.68	13.72	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.91	20.59	38.50	Zn5(OH)8Cl2
ZnCl2	-16.31	-9.09	7.22	ZnCl2
Znmetal	-34.31	-8.16	26.15	Zn
ZnO(active)	-3.98	7.42	11.40	ZnO
ZnSe	6.61	-7.85	-14.46	ZnSe

ZnSeO4:6H2O	-25.67	-27.19	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-8.00	-8.54	-0.53	ZnSO4:1H2O

**For a gas, $SI = \log_{10}(\text{fugacity})$. Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Initial solution 2.

-----Solution composition-----

Elements	Molality	Moles
Al	5.487e-05	5.487e-05
Alkalinity	9.999e-04	9.999e-04
As	1.736e-08	1.736e-08
B	4.626e-06	4.626e-06
Ba	3.481e-07	3.481e-07
Ca	3.244e-04	3.244e-04
Cd	6.229e-09	6.229e-09
Cl	2.229e-03	2.229e-03
Co	1.018e-08	1.018e-08
Cr	4.040e-08	4.040e-08
Cu	9.444e-08	9.444e-08
Fe	2.454e-05	2.454e-05
Hg	3.989e-10	3.989e-10
K	1.023e-04	1.023e-04
Mg	3.704e-04	3.704e-04
Mn	1.092e-06	1.092e-06
Mo	3.128e-09	3.128e-09
N	7.498e-05	7.498e-05
Na	2.132e-03	2.132e-03
Ni	4.772e-08	4.772e-08
P	3.552e-06	3.552e-06
Pb	5.793e-09	5.793e-09
S (6)	1.770e-04	1.770e-04
Se	2.534e-09	2.534e-09
Zn	2.509e-07	2.509e-07

-----Description of solution-----

pH	=	7.500
pe	=	4.000
Activity of water	=	1.000
Ionic strength (mol/kgw)	=	4.384e-03
Mass of water (kg)	=	1.000e+00
Total carbon (mol/kg)	=	8.307e-04
Total CO2 (mol/kg)	=	8.307e-04
Temperature (°C)	=	20.00
Electrical balance (eq)	=	3.069e-04
Percent error, $100 * (\text{Cat} - \text{An}) / (\text{Cat} + \text{An})$	=	4.34
Iterations	=	11
Total H	=	1.110151e+02
Total O	=	5.551033e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
OH-	2.330e-07	2.169e-07	-6.633	-6.664	-0.031	(0)
H+	3.394e-08	3.162e-08	-7.469	-7.500	-0.031	0.00
H2O	5.551e+01	9.999e-01	1.744	-0.000	0.000	18.05
Al	5.487e-05					
Al (OH) 4-	5.036e-05	4.694e-05	-4.298	-4.328	-0.031	(0)
Al (OH) 3	3.857e-06	3.857e-06	-5.414	-5.414	0.000	(0)
Al (OH) 2+	6.505e-07	6.071e-07	-6.187	-6.217	-0.030	(0)
AlOH+2	2.277e-09	1.728e-09	-8.643	-8.763	-0.120	(0)
Al+3	1.426e-11	7.540e-12	-10.846	-11.123	-0.277	(0)

AlSO4+	6.366e-12	5.934e-12	-11.196	-11.227	-0.031	(0)
Al (SO4) 2-	9.367e-15	8.732e-15	-14.028	-14.059	-0.031	(0)
AlMo6O21-3	0.000e+00	0.000e+00	-52.596	-52.898	-0.301	(0)
As (3)	3.031e-18					
H3AsO3	2.988e-18	2.988e-18	-17.525	-17.525	0.000	(0)
H2AsO3-	4.335e-20	4.013e-20	-19.363	-19.397	-0.033	(0)
HAsO3-2	1.264e-24	9.286e-25	-23.898	-24.032	-0.134	(0)
H4AsO3+	5.056e-26	4.681e-26	-25.296	-25.330	-0.033	(0)
AsO3-3	1.904e-30	9.510e-31	-29.720	-30.022	-0.301	(0)
As (5)	1.736e-08					
HAsO4-2	1.407e-08	1.033e-08	-7.852	-7.986	-0.134	(0)
H2AsO4-	3.286e-09	3.043e-09	-8.483	-8.517	-0.033	(0)
AsO4-3	1.840e-12	9.193e-13	-11.735	-12.037	-0.301	(0)
H3AsO4	1.591e-14	1.592e-14	-13.798	-13.798	0.000	(0)
B	4.626e-06					
H3BO3	4.542e-06	4.547e-06	-5.343	-5.342	0.000	(0)
H2BO3-	8.215e-08	7.636e-08	-7.085	-7.117	-0.032	(0)
CaH2BO3+	1.090e-09	1.013e-09	-8.963	-8.994	-0.032	(0)
MgH2BO3+	7.768e-10	7.220e-10	-9.110	-9.141	-0.032	(0)
NaH2BO3	2.626e-10	2.626e-10	-9.581	-9.581	0.000	(0)
BaH2BO3+	6.446e-13	5.992e-13	-12.191	-12.222	-0.032	(0)
H5 (BO3) 2-	3.281e-13	3.050e-13	-12.484	-12.516	-0.032	(0)
H8 (BO3) 3-	1.291e-16	1.200e-16	-15.889	-15.921	-0.032	(0)
Ba	3.481e-07					
Ba+2	3.464e-07	2.610e-07	-6.460	-6.583	-0.123	(0)
BaHCO3+	1.611e-09	1.505e-09	-8.793	-8.822	-0.030	(0)
BaCO3	1.153e-10	1.153e-10	-9.938	-9.938	0.000	(0)
BaH2BO3+	6.446e-13	5.992e-13	-12.191	-12.222	-0.032	(0)
BaNH3+2	2.781e-13	2.043e-13	-12.556	-12.690	-0.134	(0)
BaOH+	2.559e-13	2.387e-13	-12.592	-12.622	-0.030	(0)
BaNO3+	4.082e-25	3.779e-25	-24.389	-24.423	-0.033	(0)
C (4)	8.307e-04					
HCO3-	7.685e-04	7.172e-04	-3.114	-3.144	-0.030	(0)
H2CO3	5.433e-05	5.433e-05	-4.265	-4.265	0.000	(0)
CaHCO3+	2.954e-06	2.759e-06	-5.530	-5.559	-0.030	(0)
MgHCO3+	2.090e-06	1.947e-06	-5.680	-5.711	-0.031	(0)
CO3-2	1.276e-06	9.617e-07	-5.894	-6.017	-0.123	(0)
NaHCO3	8.795e-07	8.795e-07	-6.056	-6.056	0.000	(0)
CaCO3	3.236e-07	3.236e-07	-6.490	-6.490	0.000	(0)
MgCO3	2.008e-07	2.008e-07	-6.697	-6.697	0.000	(0)
CuCO3	6.481e-08	6.481e-08	-7.188	-7.188	0.000	(0)
NaCO3-	4.379e-08	4.087e-08	-7.359	-7.389	-0.030	(0)
MnHCO3+	1.164e-08	1.086e-08	-7.934	-7.964	-0.030	(0)
ZnCO3	9.487e-09	9.487e-09	-8.023	-8.023	0.000	(0)
FeHCO3+	9.148e-09	8.545e-09	-8.039	-8.068	-0.030	(0)
ZnHCO3+	3.799e-09	3.517e-09	-8.420	-8.454	-0.033	(0)
PbCO3	2.909e-09	2.909e-09	-8.536	-8.536	0.000	(0)
NiHCO3+	2.779e-09	2.573e-09	-8.556	-8.590	-0.033	(0)
BaHCO3+	1.611e-09	1.505e-09	-8.793	-8.822	-0.030	(0)
NiCO3	1.154e-09	1.154e-09	-8.938	-8.938	0.000	(0)
PbHCO3+	5.238e-10	4.849e-10	-9.281	-9.314	-0.033	(0)
CuHCO3+	5.060e-10	4.684e-10	-9.296	-9.329	-0.033	(0)
CoHCO3+	3.770e-10	3.490e-10	-9.424	-9.457	-0.033	(0)
Cu (CO3) 2-2	2.284e-10	1.678e-10	-9.641	-9.775	-0.134	(0)
BaCO3	1.153e-10	1.153e-10	-9.938	-9.938	0.000	(0)
CoCO3	1.125e-10	1.125e-10	-9.949	-9.949	0.000	(0)
CdCO3	8.551e-11	8.551e-11	-10.068	-10.068	0.000	(0)
Pb (CO3) 2-2	1.098e-11	8.067e-12	-10.959	-11.093	-0.134	(0)
CdHCO3+	6.223e-12	5.761e-12	-11.206	-11.239	-0.033	(0)
Cd (CO3) 2-2	8.298e-14	6.096e-14	-13.081	-13.215	-0.134	(0)
HgCO3	2.918e-18	2.918e-18	-17.535	-17.535	0.000	(0)
Hg (CO3) 2-2	1.208e-20	8.873e-21	-19.918	-20.052	-0.134	(0)
HgHCO3+	1.856e-21	1.718e-21	-20.731	-20.765	-0.033	(0)
Ca	3.244e-04					
Ca+2	3.146e-04	2.370e-04	-3.502	-3.625	-0.123	(0)
CaSO4	6.357e-06	6.357e-06	-5.197	-5.197	0.000	(0)
CaHCO3+	2.954e-06	2.759e-06	-5.530	-5.559	-0.030	(0)
CaCO3	3.236e-07	3.236e-07	-6.490	-6.490	0.000	(0)

CaHPO4	1.634e-07	1.634e-07	-6.787	-6.787	0.000	(0)
CaPO4-	1.319e-08	1.231e-08	-7.880	-7.910	-0.030	(0)
CaH2PO4+	4.366e-09	4.075e-09	-8.360	-8.390	-0.030	(0)
CaH2BO3+	1.090e-09	1.013e-09	-8.963	-8.994	-0.032	(0)
CaOH+	1.037e-09	9.688e-10	-8.984	-9.014	-0.030	(0)
CaNH3+2	5.039e-10	3.702e-10	-9.298	-9.432	-0.134	(0)
Ca (NH3) 2+2	2.488e-16	1.828e-16	-15.604	-15.738	-0.134	(0)
CaNO3+	2.220e-22	2.055e-22	-21.654	-21.687	-0.033	(0)
Cd	6.229e-09					
Cd+2	5.178e-09	3.901e-09	-8.286	-8.409	-0.123	(0)
CdCl+	8.299e-10	7.683e-10	-9.081	-9.114	-0.033	(0)
CdSO4	1.059e-10	1.059e-10	-9.975	-9.975	0.000	(0)
CdCO3	8.551e-11	8.551e-11	-10.068	-10.068	0.000	(0)
CdOHC1	8.913e-12	8.913e-12	-11.050	-11.050	0.000	(0)
CdOH+	7.309e-12	6.767e-12	-11.136	-11.170	-0.033	(0)
CdCl2	6.560e-12	6.560e-12	-11.183	-11.183	0.000	(0)
CdHCO3+	6.223e-12	5.761e-12	-11.206	-11.239	-0.033	(0)
Cd (SO4) 2-2	2.538e-13	1.864e-13	-12.596	-12.730	-0.134	(0)
Cd (CO3) 2-2	8.298e-14	6.096e-14	-13.081	-13.215	-0.134	(0)
Cd (OH) 2	1.982e-14	1.982e-14	-13.703	-13.703	0.000	(0)
CdCl3-	8.847e-15	8.191e-15	-14.053	-14.087	-0.033	(0)
Cd (OH) 3-	4.164e-19	3.855e-19	-18.380	-18.414	-0.033	(0)
Cd2OH+3	2.817e-19	1.408e-19	-18.550	-18.852	-0.301	(0)
CdSeO4	5.758e-22	5.758e-22	-21.240	-21.240	0.000	(0)
Cd (SeO3) 2-2	2.869e-22	2.108e-22	-21.542	-21.676	-0.134	(0)
Cd (OH) 4-2	2.735e-26	2.009e-26	-25.563	-25.697	-0.134	(0)
CdNO3+	4.067e-27	3.766e-27	-26.391	-26.424	-0.033	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-45.365	-45.365	0.000	(0)
Cl	2.229e-03					
Cl-	2.229e-03	2.077e-03	-2.652	-2.683	-0.031	(0)
MnCl+	2.186e-09	2.040e-09	-8.660	-8.690	-0.030	(0)
CuCl	1.397e-09	1.397e-09	-8.855	-8.855	0.000	(0)
ZnCl+	9.250e-10	8.616e-10	-9.034	-9.065	-0.031	(0)
CdCl+	8.299e-10	7.683e-10	-9.081	-9.114	-0.033	(0)
CuCl2-	6.588e-10	6.136e-10	-9.181	-9.212	-0.031	(0)
ZnOHC1	3.727e-10	3.727e-10	-9.429	-9.429	0.000	(0)
NiCl+	1.821e-10	1.686e-10	-9.740	-9.773	-0.033	(0)
PbCl+	7.542e-11	6.982e-11	-10.123	-10.156	-0.033	(0)
CoCl+	5.294e-11	4.901e-11	-10.276	-10.310	-0.033	(0)
CuCl+	3.819e-11	3.558e-11	-10.418	-10.449	-0.031	(0)
CdOHC1	8.913e-12	8.913e-12	-11.050	-11.050	0.000	(0)
CdCl2	6.560e-12	6.560e-12	-11.183	-11.183	0.000	(0)
MnCl2	5.982e-12	5.982e-12	-11.223	-11.223	0.000	(0)
ZnCl2	2.282e-12	2.282e-12	-11.642	-11.642	0.000	(0)
PbCl2	6.331e-13	6.331e-13	-12.199	-12.199	0.000	(0)
CuCl3-2	3.528e-13	2.671e-13	-12.452	-12.573	-0.121	(0)
CuCl2	2.001e-14	2.001e-14	-13.699	-13.699	0.000	(0)
CdCl3-	8.847e-15	8.191e-15	-14.053	-14.087	-0.033	(0)
HgClOH	3.971e-15	3.971e-15	-14.401	-14.401	0.000	(0)
ZnCl3-	3.958e-15	3.686e-15	-14.403	-14.433	-0.031	(0)
MnCl3-	3.668e-15	3.421e-15	-14.436	-14.466	-0.030	(0)
HgCl2	2.065e-15	2.065e-15	-14.685	-14.685	0.000	(0)
NiCl2	1.787e-15	1.787e-15	-14.748	-14.748	0.000	(0)
CrCl+2	8.838e-16	6.492e-16	-15.054	-15.188	-0.134	(0)
PbCl3-	5.973e-16	5.530e-16	-15.224	-15.257	-0.033	(0)
FeCl+2	5.123e-17	3.879e-17	-16.290	-16.411	-0.121	(0)
HgCl3-	4.682e-17	4.335e-17	-16.330	-16.363	-0.033	(0)
ZnCl4-2	4.856e-18	3.677e-18	-17.314	-17.435	-0.121	(0)
CrOHC12	3.999e-18	3.999e-18	-17.398	-17.398	0.000	(0)
PbCl4-2	6.635e-19	4.874e-19	-18.178	-18.312	-0.134	(0)
HgCl4-2	5.108e-19	3.752e-19	-18.292	-18.426	-0.134	(0)
FeCl2+	4.518e-19	4.215e-19	-18.345	-18.375	-0.030	(0)
CuCl3-	3.804e-19	3.544e-19	-18.420	-18.451	-0.031	(0)
HgCl+	1.747e-19	1.617e-19	-18.758	-18.791	-0.033	(0)
CrCl2+	8.871e-20	8.213e-20	-19.052	-19.086	-0.033	(0)
FeCl3	8.752e-23	8.752e-23	-22.058	-22.058	0.000	(0)
CuCl4-2	5.775e-24	4.372e-24	-23.238	-23.359	-0.121	(0)
CrO3Cl-	3.021e-29	2.797e-29	-28.520	-28.553	-0.033	(0)

Cr (NH3) 6Cl+2	1.542e-37	1.133e-37	-36.812	-36.946	-0.134	(0)
CoCl+2	1.419e-37	1.042e-37	-36.848	-36.982	-0.134	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-40.718	-40.852	-0.134	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-53.313	-53.447	-0.134	(0)
Co (2)	1.018e-08					
Co+2	9.417e-09	6.917e-09	-8.026	-8.160	-0.134	(0)
CoHCO3+	3.770e-10	3.490e-10	-9.424	-9.457	-0.033	(0)
CoSO4	1.626e-10	1.626e-10	-9.789	-9.789	0.000	(0)
CoCO3	1.125e-10	1.125e-10	-9.949	-9.949	0.000	(0)
CoCl+	5.294e-11	4.901e-11	-10.276	-10.310	-0.033	(0)
CoOH+	4.747e-11	4.394e-11	-10.324	-10.357	-0.033	(0)
CoHPO4	1.115e-11	1.115e-11	-10.953	-10.953	0.000	(0)
Co (NH3) +2	2.196e-12	1.613e-12	-11.658	-11.792	-0.134	(0)
Co (OH) 2	1.111e-12	1.111e-12	-11.954	-11.954	0.000	(0)
Co (NH3) 2+2	7.431e-17	5.459e-17	-16.129	-16.263	-0.134	(0)
Co (OH) 3-	7.626e-18	7.060e-18	-17.118	-17.151	-0.033	(0)
CoOOH-	3.189e-19	2.952e-19	-18.496	-18.530	-0.033	(0)
Co2OH+3	3.049e-20	1.524e-20	-19.516	-19.817	-0.301	(0)
CoNO2+	1.822e-20	1.686e-20	-19.740	-19.773	-0.033	(0)
CoSeO4	2.530e-21	2.530e-21	-20.597	-20.597	0.000	(0)
Co (NH3) 3+2	1.160e-21	8.524e-22	-20.935	-21.069	-0.134	(0)
Co (OH) 4-2	4.850e-25	3.563e-25	-24.314	-24.448	-0.134	(0)
Co (NH3) 4+2	7.554e-27	5.549e-27	-26.122	-26.256	-0.134	(0)
CoNO3+	3.128e-27	2.896e-27	-26.505	-26.538	-0.033	(0)
Co (NH3) 5+2	1.555e-32	1.142e-32	-31.808	-31.942	-0.134	(0)
Co4 (OH) 4+4	2.555e-33	7.440e-34	-32.593	-33.128	-0.536	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-44.808	-44.808	0.000	(0)
Co (3)	6.065e-31					
CoOH+2	6.065e-31	4.456e-31	-30.217	-30.351	-0.134	(0)
Co+3	5.207e-37	2.754e-37	-36.283	-36.560	-0.277	(0)
CoCl+2	1.419e-37	1.042e-37	-36.848	-36.982	-0.134	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-40.718	-40.852	-0.134	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-49.776	-49.810	-0.033	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.616	-52.750	-0.134	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-53.313	-53.447	-0.134	(0)
Cr (2)	3.686e-24					
Cr+2	3.686e-24	2.708e-24	-23.433	-23.567	-0.134	(0)
Cr (3)	4.040e-08					
Cr (OH) 2+	3.452e-08	3.196e-08	-7.462	-7.495	-0.033	(0)
Cr (OH) 3	3.822e-09	3.822e-09	-8.418	-8.418	0.000	(0)
Cr (OH) +2	1.919e-09	1.410e-09	-8.717	-8.851	-0.134	(0)
CrO2-	6.201e-11	5.740e-11	-10.208	-10.241	-0.033	(0)
Cr (OH) 4-	5.233e-11	4.845e-11	-10.281	-10.315	-0.033	(0)
CrOHSO4	2.406e-11	2.406e-11	-10.619	-10.619	0.000	(0)
Cr+3	5.783e-13	2.889e-13	-12.238	-12.539	-0.301	(0)
CrSO4+	7.237e-14	6.700e-14	-13.140	-13.174	-0.033	(0)
CrCl+2	8.838e-16	6.492e-16	-15.054	-15.188	-0.134	(0)
CrH2PO4+2	6.914e-17	5.079e-17	-16.160	-16.294	-0.134	(0)
CrOHC12	3.999e-18	3.999e-18	-17.398	-17.398	0.000	(0)
Cr2 (OH) 2SO4+2	2.442e-18	1.794e-18	-17.612	-17.746	-0.134	(0)
CrCl2+	8.871e-20	8.213e-20	-19.052	-19.086	-0.033	(0)
Cr2 (OH) 2 (SO4) 2	1.310e-20	1.310e-20	-19.883	-19.883	0.000	(0)
Cr (NH3) 5OH+2	3.552e-29	2.609e-29	-28.450	-28.583	-0.134	(0)
CrNO3+2	2.920e-33	2.145e-33	-32.535	-32.669	-0.134	(0)
Cr (NH3) 6+3	8.634e-36	4.314e-36	-35.064	-35.365	-0.301	(0)
Cr (NH3) 6Cl+2	1.542e-37	1.133e-37	-36.812	-36.946	-0.134	(0)
Cr (6)	9.578e-19					
CrO4-2	8.783e-19	6.617e-19	-18.056	-18.179	-0.123	(0)
HCrO4-	7.214e-20	6.679e-20	-19.142	-19.175	-0.033	(0)
NaCrO4-	7.047e-21	6.524e-21	-20.152	-20.185	-0.033	(0)
KCrO4-	2.530e-22	2.342e-22	-21.597	-21.630	-0.033	(0)
CrO3HPO4-2	2.689e-25	1.976e-25	-24.570	-24.704	-0.134	(0)
H2CrO4	1.327e-27	1.327e-27	-26.877	-26.877	0.000	(0)
CrO3SO4-2	1.091e-28	8.018e-29	-27.962	-28.096	-0.134	(0)
CrO3Cl-	3.021e-29	2.797e-29	-28.520	-28.553	-0.033	(0)
CrO3H2PO4-	3.251e-30	3.009e-30	-29.488	-29.522	-0.033	(0)
Cr2O7-2	2.400e-37	1.763e-37	-36.620	-36.754	-0.134	(0)
Cu (1)	2.634e-09					

CuCl	1.397e-09	1.397e-09	-8.855	-8.855	0.000	(0)
CuCl2-	6.588e-10	6.136e-10	-9.181	-9.212	-0.031	(0)
Cu+	5.774e-10	5.346e-10	-9.239	-9.272	-0.033	(0)
CuCl3-2	3.528e-13	2.671e-13	-12.452	-12.573	-0.121	(0)
Cu (2)	9.181e-08					
CuCO3	6.481e-08	6.481e-08	-7.188	-7.188	0.000	(0)
Cu+2	1.519e-08	1.145e-08	-7.818	-7.941	-0.123	(0)
CuOH+	9.669e-09	9.007e-09	-8.015	-8.045	-0.031	(0)
Cu (OH) 2	7.320e-10	7.320e-10	-9.135	-9.135	0.000	(0)
CuHCO3+	5.060e-10	4.684e-10	-9.296	-9.329	-0.033	(0)
CuNH3+2	3.245e-10	2.384e-10	-9.489	-9.623	-0.134	(0)
CuSO4	3.036e-10	3.036e-10	-9.518	-9.518	0.000	(0)
Cu (CO3) 2-2	2.284e-10	1.678e-10	-9.641	-9.775	-0.134	(0)
CuCl+	3.819e-11	3.558e-11	-10.418	-10.449	-0.031	(0)
Cu2 (OH) 2+2	2.680e-12	1.969e-12	-11.572	-11.706	-0.134	(0)
Cu (OH) 3-	5.164e-13	4.781e-13	-12.287	-12.321	-0.033	(0)
CuCl2	2.001e-14	2.001e-14	-13.699	-13.699	0.000	(0)
Cu (OH) 4-2	1.631e-18	1.198e-18	-17.788	-17.922	-0.134	(0)
CuNO2+	4.478e-19	4.146e-19	-18.349	-18.382	-0.033	(0)
CuCl3-	3.804e-19	3.544e-19	-18.420	-18.451	-0.031	(0)
CuCl4-2	5.775e-24	4.372e-24	-23.238	-23.359	-0.121	(0)
CuNO3+	1.062e-26	9.835e-27	-25.974	-26.007	-0.033	(0)
Cu (NO2) 2	1.468e-30	1.468e-30	-29.833	-29.833	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-45.498	-45.498	0.000	(0)
Fe (2)	1.480e-06					
Fe+2	1.424e-06	1.046e-06	-5.846	-5.980	-0.134	(0)
FeSO4	2.988e-08	2.988e-08	-7.525	-7.525	0.000	(0)
FeOH+	9.684e-09	9.034e-09	-8.014	-8.044	-0.030	(0)
FeHCO3+	9.148e-09	8.545e-09	-8.039	-8.068	-0.030	(0)
FeHPO4	6.152e-09	6.152e-09	-8.211	-8.211	0.000	(0)
FeH2PO4+	4.140e-10	3.864e-10	-9.383	-9.413	-0.030	(0)
Fe (OH) 2	1.473e-12	1.473e-12	-11.832	-11.832	0.000	(0)
Fe (OH) 3-	1.517e-13	1.415e-13	-12.819	-12.849	-0.030	(0)
Fe (3)	2.306e-05					
Fe (OH) 2+	1.977e-05	1.845e-05	-4.704	-4.734	-0.030	(0)
Fe (OH) 3	3.089e-06	3.089e-06	-5.510	-5.510	0.000	(0)
Fe (OH) 4-	2.004e-07	1.870e-07	-6.698	-6.728	-0.030	(0)
FeOH+2	1.476e-10	1.117e-10	-9.831	-9.952	-0.121	(0)
FeHPO4+	1.169e-11	1.091e-11	-10.932	-10.962	-0.030	(0)
Fe+3	1.370e-15	7.246e-16	-14.863	-15.140	-0.277	(0)
FeSO4+	9.021e-16	8.414e-16	-15.045	-15.075	-0.030	(0)
FeCl+2	5.123e-17	3.879e-17	-16.290	-16.411	-0.121	(0)
FeH2PO4+2	1.336e-17	1.014e-17	-16.874	-16.994	-0.120	(0)
Fe (SO4) 2-	2.486e-18	2.301e-18	-17.605	-17.638	-0.033	(0)
Fe2 (OH) 2+4	1.697e-18	4.942e-19	-17.770	-18.306	-0.536	(0)
FeCl2+	4.518e-19	4.215e-19	-18.345	-18.375	-0.030	(0)
FeHSeO3+2	4.463e-21	3.279e-21	-20.350	-20.484	-0.134	(0)
Fe3 (OH) 4+5	8.596e-22	1.251e-22	-21.066	-21.903	-0.837	(0)
FeCl3	8.752e-23	8.752e-23	-22.058	-22.058	0.000	(0)
FeNO3+2	3.361e-33	2.469e-33	-32.474	-32.607	-0.134	(0)
H (0)	1.488e-26					
H2	7.440e-27	7.447e-27	-26.128	-26.128	0.000	(0)
Hg (0)	3.989e-10					
Hg	3.989e-10	3.989e-10	-9.399	-9.399	0.000	(0)
Hg (1)	1.698e-24					
Hg2+2	8.491e-25	6.238e-25	-24.071	-24.205	-0.134	(0)
Hg (2)	7.725e-15					
HgClOH	3.971e-15	3.971e-15	-14.401	-14.401	0.000	(0)
HgCl2	2.065e-15	2.065e-15	-14.685	-14.685	0.000	(0)
Hg (OH) 2	1.620e-15	1.622e-15	-14.791	-14.790	0.000	(0)
HgCl3-	4.682e-17	4.335e-17	-16.330	-16.363	-0.033	(0)
Hg (NH3) 2+2	1.829e-17	1.344e-17	-16.738	-16.872	-0.134	(0)
HgCO3	2.918e-18	2.918e-18	-17.535	-17.535	0.000	(0)
HgCl4-2	5.108e-19	3.752e-19	-18.292	-18.426	-0.134	(0)
HgCl+	1.747e-19	1.617e-19	-18.758	-18.791	-0.033	(0)
HgOH+	3.953e-20	3.660e-20	-19.403	-19.437	-0.033	(0)
Hg (CO3) 2-2	1.208e-20	8.873e-21	-19.918	-20.052	-0.134	(0)
HgNH3+2	2.701e-21	1.984e-21	-20.568	-20.702	-0.134	(0)

	HgHCO3+	1.856e-21	1.718e-21	-20.731	-20.765	-0.033	(0)
	Hg (NH3) 3+2	1.423e-22	1.045e-22	-21.847	-21.981	-0.134	(0)
	Hg (OH) 3-	7.020e-23	6.499e-23	-22.154	-22.187	-0.033	(0)
	Hg+2	4.536e-24	3.332e-24	-23.343	-23.477	-0.134	(0)
	HgSO4	8.159e-26	8.159e-26	-25.088	-25.088	0.000	(0)
	Hg (NH3) 4+2	2.222e-27	1.633e-27	-26.653	-26.787	-0.134	(0)
	HgNO3+	0.000e+00	0.000e+00	-42.573	-42.607	-0.033	(0)
	Hg (NO3) 2	0.000e+00	0.000e+00	-61.566	-61.566	0.000	(0)
K		1.023e-04					
	K+	1.022e-04	9.526e-05	-3.990	-4.021	-0.031	(0)
	KSO4-	8.635e-08	8.059e-08	-7.064	-7.094	-0.030	(0)
	KHPO4-	1.143e-09	1.067e-09	-8.942	-8.972	-0.030	(0)
	KCrO4-	2.530e-22	2.342e-22	-21.597	-21.630	-0.033	(0)
Mg		3.704e-04					
	Mg+2	3.619e-04	2.727e-04	-3.441	-3.564	-0.123	(0)
	MgSO4	5.861e-06	5.861e-06	-5.232	-5.232	0.000	(0)
	MgHCO3+	2.090e-06	1.947e-06	-5.680	-5.711	-0.031	(0)
	MgHPO4	2.594e-07	2.594e-07	-6.586	-6.586	0.000	(0)
	MgCO3	2.008e-07	2.008e-07	-6.697	-6.697	0.000	(0)
	MgOH+	2.319e-08	2.168e-08	-7.635	-7.664	-0.029	(0)
	MgH2PO4+	1.072e-08	1.000e-08	-7.970	-8.000	-0.030	(0)
	MgH2BO3+	7.768e-10	7.220e-10	-9.110	-9.141	-0.032	(0)
	MgPO4-	2.373e-10	2.214e-10	-9.625	-9.655	-0.030	(0)
Mn (2)		1.092e-06					
	Mn+2	1.062e-06	7.802e-07	-5.974	-6.108	-0.134	(0)
	MnSO4	1.606e-08	1.606e-08	-7.794	-7.794	0.000	(0)
	MnHCO3+	1.164e-08	1.086e-08	-7.934	-7.964	-0.030	(0)
	MnCl+	2.186e-09	2.040e-09	-8.660	-8.690	-0.030	(0)
	MnOH+	4.556e-10	4.250e-10	-9.341	-9.372	-0.030	(0)
	MnCl2	5.982e-12	5.982e-12	-11.223	-11.223	0.000	(0)
	MnCl3-	3.668e-15	3.421e-15	-14.436	-14.466	-0.030	(0)
	Mn (OH) 3-	4.191e-19	3.909e-19	-18.378	-18.408	-0.030	(0)
	MnSeO4	1.512e-19	1.512e-19	-18.821	-18.821	0.000	(0)
	Mn (OH) 4-2	5.307e-25	4.018e-25	-24.275	-24.396	-0.121	(0)
	MnNO3+	3.528e-25	3.267e-25	-24.452	-24.486	-0.033	(0)
	MnSe	1.498e-37	1.498e-37	-36.824	-36.824	0.000	(0)
	Mn (NO3) 2	0.000e+00	0.000e+00	-42.659	-42.659	0.000	(0)
Mn (3)		3.139e-28					
	Mn+3	3.139e-28	1.660e-28	-27.503	-27.780	-0.277	(0)
Mn (6)		0.000e+00					
	MnO4-2	0.000e+00	0.000e+00	-50.534	-50.655	-0.121	(0)
Mn (7)		0.000e+00					
	MnO4-	0.000e+00	0.000e+00	-56.329	-56.360	-0.031	(0)
Mo		3.128e-09					
	MoO4-2	3.126e-09	2.355e-09	-8.505	-8.628	-0.123	(0)
	HMoO4-	1.395e-12	1.292e-12	-11.855	-11.889	-0.033	(0)
	H2MoO4	4.105e-16	4.105e-16	-15.387	-15.387	0.000	(0)
	AlMo6O21-3	0.000e+00	0.000e+00	-52.596	-52.898	-0.301	(0)
	Mo7O24-6	0.000e+00	0.000e+00	-65.519	-66.724	-1.205	(0)
	HMo7O24-5	0.000e+00	0.000e+00	-67.030	-67.867	-0.837	(0)
	H2Mo7O24-4	0.000e+00	0.000e+00	-70.058	-70.594	-0.536	(0)
	H3Mo7O24-3	0.000e+00	0.000e+00	-74.541	-74.842	-0.301	(0)
N (-3)		7.498e-05					
	NH4+	7.402e-05	6.880e-05	-4.131	-4.162	-0.032	(0)
	NH3	8.673e-07	8.673e-07	-6.062	-6.062	0.000	(0)
	NH4SO4-	9.714e-08	9.062e-08	-7.013	-7.043	-0.030	(0)
	CaNH3+2	5.039e-10	3.702e-10	-9.298	-9.432	-0.134	(0)
	CuNH3+2	3.245e-10	2.384e-10	-9.489	-9.623	-0.134	(0)
	NiNH3+2	4.626e-11	3.398e-11	-10.335	-10.469	-0.134	(0)
	Co (NH3) +2	2.196e-12	1.613e-12	-11.658	-11.792	-0.134	(0)
	BaNH3+2	2.781e-13	2.043e-13	-12.556	-12.690	-0.134	(0)
	Ni (NH3) 2+2	1.127e-14	8.280e-15	-13.948	-14.082	-0.134	(0)
	Ca (NH3) 2+2	2.488e-16	1.828e-16	-15.604	-15.738	-0.134	(0)
	Co (NH3) 2+2	7.431e-17	5.459e-17	-16.129	-16.263	-0.134	(0)
	Hg (NH3) 2+2	1.829e-17	1.344e-17	-16.738	-16.872	-0.134	(0)
	HgNH3+2	2.701e-21	1.984e-21	-20.568	-20.702	-0.134	(0)
	Co (NH3) 3+2	1.160e-21	8.524e-22	-20.935	-21.069	-0.134	(0)
	Hg (NH3) 3+2	1.423e-22	1.045e-22	-21.847	-21.981	-0.134	(0)

Co (NH3) 4+2	7.554e-27	5.549e-27	-26.122	-26.256	-0.134	(0)
Hg (NH3) 4+2	2.222e-27	1.633e-27	-26.653	-26.787	-0.134	(0)
Cr (NH3) 5OH+2	3.552e-29	2.609e-29	-28.450	-28.583	-0.134	(0)
Co (NH3) 5+2	1.555e-32	1.142e-32	-31.808	-31.942	-0.134	(0)
Cr (NH3) 6+3	8.634e-36	4.314e-36	-35.064	-35.365	-0.301	(0)
Cr (NH3) 6Cl+2	1.542e-37	1.133e-37	-36.812	-36.946	-0.134	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-40.718	-40.852	-0.134	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-49.776	-49.810	-0.033	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.616	-52.750	-0.134	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-53.313	-53.447	-0.134	(0)
N (3)	3.719e-13					
NO2-	3.719e-13	3.460e-13	-12.430	-12.461	-0.031	(0)
CuNO2+	4.478e-19	4.146e-19	-18.349	-18.382	-0.033	(0)
CoNO2+	1.822e-20	1.686e-20	-19.740	-19.773	-0.033	(0)
Cu (NO2) 2	1.468e-30	1.468e-30	-29.833	-29.833	0.000	(0)
N (5)	2.838e-19					
NO3-	2.836e-19	2.642e-19	-18.547	-18.578	-0.031	(0)
CaNO3+	2.220e-22	2.055e-22	-21.654	-21.687	-0.033	(0)
BaNO3+	4.082e-25	3.779e-25	-24.389	-24.423	-0.033	(0)
MnNO3+	3.528e-25	3.267e-25	-24.452	-24.486	-0.033	(0)
ZnNO3+	1.268e-25	1.174e-25	-24.897	-24.930	-0.033	(0)
NiNO3+	2.306e-26	2.135e-26	-25.637	-25.671	-0.033	(0)
CuNO3+	1.062e-26	9.835e-27	-25.974	-26.007	-0.033	(0)
PbNO3+	4.189e-27	3.878e-27	-26.378	-26.411	-0.033	(0)
CdNO3+	4.067e-27	3.766e-27	-26.391	-26.424	-0.033	(0)
CoNO3+	3.128e-27	2.896e-27	-26.505	-26.538	-0.033	(0)
FeNO3+2	3.361e-33	2.469e-33	-32.474	-32.607	-0.134	(0)
CrNO3+2	2.920e-33	2.145e-33	-32.535	-32.669	-0.134	(0)
HgNO3+	0.000e+00	0.000e+00	-42.573	-42.607	-0.033	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-42.659	-42.659	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-44.222	-44.222	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-44.734	-44.734	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-44.808	-44.808	0.000	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-45.365	-45.365	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-45.498	-45.498	0.000	(0)
Hg (NO3) 2	0.000e+00	0.000e+00	-61.566	-61.566	0.000	(0)
Na	2.132e-03					
Na+	2.130e-03	1.984e-03	-2.672	-2.702	-0.031	(0)
NaSO4-	1.394e-06	1.301e-06	-5.856	-5.886	-0.030	(0)
NaHCO3	8.795e-07	8.795e-07	-6.056	-6.056	0.000	(0)
NaCO3-	4.379e-08	4.087e-08	-7.359	-7.389	-0.030	(0)
NaHPO4-	3.689e-08	3.443e-08	-7.433	-7.463	-0.030	(0)
NaH2BO3	2.626e-10	2.626e-10	-9.581	-9.581	0.000	(0)
NaCrO4-	7.047e-21	6.524e-21	-20.152	-20.185	-0.033	(0)
Ni	4.772e-08					
Ni+2	4.270e-08	3.217e-08	-7.370	-7.493	-0.123	(0)
NiHCO3+	2.779e-09	2.573e-09	-8.556	-8.590	-0.033	(0)
NiCO3	1.154e-09	1.154e-09	-8.938	-8.938	0.000	(0)
NiSO4	7.582e-10	7.582e-10	-9.120	-9.120	0.000	(0)
NiCl+	1.821e-10	1.686e-10	-9.740	-9.773	-0.033	(0)
NiOH+	9.752e-11	9.028e-11	-10.011	-10.044	-0.033	(0)
NiNH3+2	4.626e-11	3.398e-11	-10.335	-10.469	-0.134	(0)
Ni (OH) 2	3.261e-12	3.261e-12	-11.487	-11.487	0.000	(0)
Ni (NH3) 2+2	1.127e-14	8.280e-15	-13.948	-14.082	-0.134	(0)
Ni (SO4) 2-2	4.372e-15	3.212e-15	-14.359	-14.493	-0.134	(0)
NiCl2	1.787e-15	1.787e-15	-14.748	-14.748	0.000	(0)
Ni (OH) 3-	1.122e-15	1.038e-15	-14.950	-14.984	-0.033	(0)
NiSeO4	1.083e-20	1.083e-20	-19.965	-19.965	0.000	(0)
NiNO3+	2.306e-26	2.135e-26	-25.637	-25.671	-0.033	(0)
O (0)	0.000e+00					
O2	0.000e+00	0.000e+00	-41.434	-41.433	0.000	(0)
P	3.552e-06					
HPO4-2	2.163e-06	1.637e-06	-5.665	-5.786	-0.121	(0)
H2PO4-	8.935e-07	8.339e-07	-6.049	-6.079	-0.030	(0)
MgHPO4	2.594e-07	2.594e-07	-6.586	-6.586	0.000	(0)
CaHPO4	1.634e-07	1.634e-07	-6.787	-6.787	0.000	(0)
NaHPO4-	3.689e-08	3.443e-08	-7.433	-7.463	-0.030	(0)
CaPO4-	1.319e-08	1.231e-08	-7.880	-7.910	-0.030	(0)

MgH2PO4+	1.072e-08	1.000e-08	-7.970	-8.000	-0.030	(0)
FeHPO4	6.152e-09	6.152e-09	-8.211	-8.211	0.000	(0)
CaH2PO4+	4.366e-09	4.075e-09	-8.360	-8.390	-0.030	(0)
KHPO4-	1.143e-09	1.067e-09	-8.942	-8.972	-0.030	(0)
FeH2PO4+	4.140e-10	3.864e-10	-9.383	-9.413	-0.030	(0)
MgPO4-	2.373e-10	2.214e-10	-9.625	-9.655	-0.030	(0)
PO4-3	3.724e-11	1.969e-11	-10.429	-10.706	-0.277	(0)
FeHPO4+	1.169e-11	1.091e-11	-10.932	-10.962	-0.030	(0)
CoHPO4	1.115e-11	1.115e-11	-10.953	-10.953	0.000	(0)
H3PO4	3.512e-12	3.512e-12	-11.454	-11.454	0.000	(0)
CrH2PO4+2	6.914e-17	5.079e-17	-16.160	-16.294	-0.134	(0)
FeH2PO4+2	1.336e-17	1.014e-17	-16.874	-16.994	-0.120	(0)
CrO3HPO4-2	2.689e-25	1.976e-25	-24.570	-24.704	-0.134	(0)
CrO3H2PO4-	3.251e-30	3.009e-30	-29.488	-29.522	-0.033	(0)
Pb	5.793e-09					
PbCO3	2.909e-09	2.909e-09	-8.536	-8.536	0.000	(0)
Pb+2	1.335e-09	1.006e-09	-8.874	-8.997	-0.123	(0)
PbOH+	8.692e-10	8.047e-10	-9.061	-9.094	-0.033	(0)
PbHCO3+	5.238e-10	4.849e-10	-9.281	-9.314	-0.033	(0)
PbCl+	7.542e-11	6.982e-11	-10.123	-10.156	-0.033	(0)
PbSO4	6.058e-11	6.058e-11	-10.218	-10.218	0.000	(0)
Pb (CO3) 2-2	1.098e-11	8.067e-12	-10.959	-11.093	-0.134	(0)
Pb (OH) 2	8.102e-12	8.102e-12	-11.091	-11.091	0.000	(0)
PbCl2	6.331e-13	6.331e-13	-12.199	-12.199	0.000	(0)
Pb (SO4) 2-2	6.108e-14	4.487e-14	-13.214	-13.348	-0.134	(0)
Pb (OH) 3-	2.786e-15	2.579e-15	-14.555	-14.588	-0.033	(0)
PbCl3-	5.973e-16	5.530e-16	-15.224	-15.257	-0.033	(0)
Pb2OH+3	2.568e-17	1.283e-17	-16.590	-16.892	-0.301	(0)
PbCl4-2	6.635e-19	4.874e-19	-18.178	-18.312	-0.134	(0)
Pb (OH) 4-2	2.738e-19	2.011e-19	-18.563	-18.697	-0.134	(0)
Pb3 (OH) 4+2	8.117e-22	5.963e-22	-21.091	-21.225	-0.134	(0)
Pb4 (OH) 4+4	1.971e-26	5.739e-27	-25.705	-26.241	-0.536	(0)
PbNO3+	4.189e-27	3.878e-27	-26.378	-26.411	-0.033	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-44.734	-44.734	0.000	(0)
S (6)	1.770e-04					
SO4-2	1.632e-04	1.229e-04	-3.787	-3.910	-0.123	(0)
CaSO4	6.357e-06	6.357e-06	-5.197	-5.197	0.000	(0)
MgSO4	5.861e-06	5.861e-06	-5.232	-5.232	0.000	(0)
NaSO4-	1.394e-06	1.301e-06	-5.856	-5.886	-0.030	(0)
NH4SO4-	9.714e-08	9.062e-08	-7.013	-7.043	-0.030	(0)
KSO4-	8.635e-08	8.059e-08	-7.064	-7.094	-0.030	(0)
FeSO4	2.988e-08	2.988e-08	-7.525	-7.525	0.000	(0)
MnSO4	1.606e-08	1.606e-08	-7.794	-7.794	0.000	(0)
ZnSO4	4.418e-09	4.418e-09	-8.355	-8.355	0.000	(0)
NiSO4	7.582e-10	7.582e-10	-9.120	-9.120	0.000	(0)
HSO4-	3.503e-10	3.265e-10	-9.456	-9.486	-0.031	(0)
CuSO4	3.036e-10	3.036e-10	-9.518	-9.518	0.000	(0)
CoSO4	1.626e-10	1.626e-10	-9.789	-9.789	0.000	(0)
CdSO4	1.059e-10	1.059e-10	-9.975	-9.975	0.000	(0)
PbSO4	6.058e-11	6.058e-11	-10.218	-10.218	0.000	(0)
CrOHSO4	2.406e-11	2.406e-11	-10.619	-10.619	0.000	(0)
Zn (SO4) 2-2	6.720e-12	4.936e-12	-11.173	-11.307	-0.134	(0)
AlSO4+	6.366e-12	5.934e-12	-11.196	-11.227	-0.031	(0)
Cd (SO4) 2-2	2.538e-13	1.864e-13	-12.596	-12.730	-0.134	(0)
CrSO4+	7.237e-14	6.700e-14	-13.140	-13.174	-0.033	(0)
Pb (SO4) 2-2	6.108e-14	4.487e-14	-13.214	-13.348	-0.134	(0)
Al (SO4) 2-	9.367e-15	8.732e-15	-14.028	-14.059	-0.031	(0)
Ni (SO4) 2-2	4.372e-15	3.212e-15	-14.359	-14.493	-0.134	(0)
FeSO4+	9.021e-16	8.414e-16	-15.045	-15.075	-0.030	(0)
Fe (SO4) 2-	2.486e-18	2.301e-18	-17.605	-17.638	-0.033	(0)
Cr2 (OH) 2SO4+2	2.442e-18	1.794e-18	-17.612	-17.746	-0.134	(0)
Cr2 (OH) 2 (SO4) 2	1.310e-20	1.310e-20	-19.883	-19.883	0.000	(0)
HgSO4	8.159e-26	8.159e-26	-25.088	-25.088	0.000	(0)
CrO3SO4-2	1.091e-28	8.018e-29	-27.962	-28.096	-0.134	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-49.776	-49.810	-0.033	(0)
Se (-2)	1.592e-33					
HSe-	1.592e-33	1.474e-33	-32.798	-32.832	-0.033	(0)
H2Se	3.537e-37	3.537e-37	-36.451	-36.451	0.000	(0)

MnSe	1.498e-37	1.498e-37	-36.824	-36.824	0.000	(0)
Se-2	0.000e+00	0.000e+00	-40.341	-40.475	-0.134	(0)
Se (4)	2.534e-09					
HSeO3-	2.197e-09	2.034e-09	-8.658	-8.692	-0.033	(0)
SeO3-2	3.367e-10	2.473e-10	-9.473	-9.607	-0.134	(0)
H2SeO3	2.629e-14	2.629e-14	-13.580	-13.580	0.000	(0)
FeHSeO3+2	4.463e-21	3.279e-21	-20.350	-20.484	-0.134	(0)
Cd (SeO3) 2-2	2.869e-22	2.108e-22	-21.542	-21.676	-0.134	(0)
Se (6)	1.052e-15					
SeO4-2	1.052e-15	7.926e-16	-14.978	-15.101	-0.123	(0)
MnSeO4	1.512e-19	1.512e-19	-18.821	-18.821	0.000	(0)
ZnSeO4	2.105e-20	2.105e-20	-19.677	-19.677	0.000	(0)
NiSeO4	1.083e-20	1.083e-20	-19.965	-19.965	0.000	(0)
CoSeO4	2.530e-21	2.530e-21	-20.597	-20.597	0.000	(0)
HSeO4-	1.158e-21	1.072e-21	-20.936	-20.970	-0.033	(0)
CdSeO4	5.758e-22	5.758e-22	-21.240	-21.240	0.000	(0)
Zn (SeO4) 2-2	2.303e-35	1.691e-35	-34.638	-34.772	-0.134	(0)
Zn	2.509e-07					
Zn+2	2.276e-07	1.714e-07	-6.643	-6.766	-0.123	(0)
ZnCO3	9.487e-09	9.487e-09	-8.023	-8.023	0.000	(0)
ZnSO4	4.418e-09	4.418e-09	-8.355	-8.355	0.000	(0)
ZnOH+	4.016e-09	3.718e-09	-8.396	-8.430	-0.033	(0)
ZnHCO3+	3.799e-09	3.517e-09	-8.420	-8.454	-0.033	(0)
ZnCl+	9.250e-10	8.616e-10	-9.034	-9.065	-0.031	(0)
ZnOHCl	3.727e-10	3.727e-10	-9.429	-9.429	0.000	(0)
Zn (OH) 2	2.754e-10	2.754e-10	-9.560	-9.560	0.000	(0)
Zn (SO4) 2-2	6.720e-12	4.936e-12	-11.173	-11.307	-0.134	(0)
ZnCl2	2.282e-12	2.282e-12	-11.642	-11.642	0.000	(0)
Zn (OH) 3-	4.748e-13	4.395e-13	-12.324	-12.357	-0.033	(0)
ZnCl3-	3.958e-15	3.686e-15	-14.403	-14.433	-0.031	(0)
Zn (OH) 4-2	7.584e-18	5.571e-18	-17.120	-17.254	-0.134	(0)
ZnCl4-2	4.856e-18	3.677e-18	-17.314	-17.435	-0.121	(0)
ZnSeO4	2.105e-20	2.105e-20	-19.677	-19.677	0.000	(0)
ZnNO3+	1.268e-25	1.174e-25	-24.897	-24.930	-0.033	(0)
Zn (SeO4) 2-2	2.303e-35	1.691e-35	-34.638	-34.772	-0.134	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-44.222	-44.222	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2	-65.98	-59.71	6.27	(Co (NH3) 5Cl) (NO3) 2
(Co (NH3) 5Cl) Cl2	-32.46	-27.92	4.54	(Co (NH3) 5Cl) Cl2
(Co (NH3) 5OH2) Cl3	-39.73	-27.92	11.81	(Co (NH3) 5OH2) Cl3
(Co (NH3) 6) (NO3) 3	-90.20	-72.27	17.93	(Co (NH3) 6) (NO3) 3
(Co (NH3) 6) Cl3	-44.71	-24.58	20.13	(Co (NH3) 6) Cl3
(NH4) 2CrO4	-26.88	-26.50	0.38	(NH4) 2CrO4
(NH4) 2SeO4	-23.88	-23.43	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	0.25	11.38	11.13	Al (OH) 3
Al2 (MoO4) 3	-51.28	-48.13	3.15	Al2 (MoO4) 3
Al2O3	2.33	22.75	20.43	Al2O3
Al4 (OH) 10SO4	3.90	26.60	22.70	Al4 (OH) 10SO4
AlAsO4:2H2O	-7.22	-2.42	4.80	AlAsO4:2H2O
AlOHSO4	-4.30	-7.53	-3.23	AlOHSO4
Alunite	0.56	-0.21	-0.77	KAl3 (SO4) 2 (OH) 6
Anglesite	-5.08	-12.91	-7.83	PbSO4
Anhydrite	-3.20	-7.54	-4.34	CaSO4
Antlerite	-6.52	2.27	8.79	Cu3 (OH) 4SO4
Aragonite	-1.38	-9.64	-8.26	CaCO3
Arsenolite	-67.16	-70.10	-2.94	As4O6
Artinite	-8.11	1.85	9.96	MgCO3:Mg (OH) 2:3H2O
As2O5	-34.37	-27.60	6.77	As2O5
Atacamite	-3.74	3.93	7.67	Cu2 (OH) 3Cl
Azurite	-4.24	-20.86	-16.62	Cu3 (OH) 2 (CO3) 2
Ba (OH) 2:8H2O	-16.14	8.42	24.56	Ba (OH) 2:8H2O
Ba3 (AsO4) 2	6.60	-2.35	-8.94	Ba3 (AsO4) 2
BaCrO4	-14.99	-24.76	-9.77	BaCrO4
BaHPO4	-5.01	-24.79	-19.77	BaHPO4

BaMoO4	-8.22	-15.21	-6.99	BaMoO4
Barite	-0.44	-10.49	-10.05	BaSO4
BaSeO3	-9.57	-7.78	1.79	BaSeO3
BaSeO4	-14.16	-21.68	-7.53	BaSeO4
Bianchite	-8.91	-10.68	-1.76	ZnSO4:6H2O
Birnessite	-11.87	6.22	18.09	MnO2
Bixbyite	-10.29	-10.56	-0.27	Mn2O3
Boehmite	2.45	11.38	8.93	AlOOH
Brochantite	-6.50	9.32	15.83	Cu4(OH)6SO4
Brucite	-5.75	11.44	17.18	Mg(OH)2
Bunsenite	-5.24	7.51	12.74	NiO
Ca3(AsO4)2:4H2O	-15.77	6.53	22.30	Ca3(AsO4)2:4H2O
Ca3(PO4)2(beta)	-3.21	-32.29	-29.08	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-7.04	-54.12	-47.08	Ca4H(PO4)3:3H2O
CaCrO4	-19.62	-21.80	-2.19	CaCrO4
CaHPO4	-2.46	-21.83	-19.37	CaHPO4
CaHPO4:2H2O	-2.77	-21.83	-19.06	CaHPO4:2H2O
Calcite	-1.19	-9.64	-8.46	CaCO3
Calomel	-11.39	-29.57	-18.18	Hg2Cl2
CaMoO4	-4.31	-12.25	-7.94	CaMoO4
CaSeO3:2H2O	-7.69	-4.82	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-15.73	-18.73	-3.00	CaSeO4:2H2O
Cd(BO2)2	-13.93	-4.09	9.84	Cd(BO2)2
Cd(OH)2	-7.34	6.59	13.93	Cd(OH)2
Cd(OH)2(am)	-7.40	6.59	13.99	Cd(OH)2
Cd3(OH)2(SO4)2	-24.76	-18.05	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-21.70	0.86	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-14.04	-46.64	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-20.95	7.45	28.40	Cd4(OH)6SO4
CdCl2	-13.17	-13.77	-0.60	CdCl2
CdCl2:1H2O	-12.10	-13.77	-1.67	CdCl2:1H2O
CdCl2:2.5H2O	-11.84	-13.77	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-30.15	-16.41	13.74	Cd
Cdmetal(gamma)	-30.25	-16.41	13.84	Cd
CdMoO4	-2.83	-17.04	-14.21	CdMoO4
CdOHCl	-7.22	-3.59	3.63	CdOHCl
CdSe	-13.31	-33.74	-20.43	CdSe
CdSeO4:2H2O	-21.66	-23.51	-1.85	CdSeO4:2H2O
CdSO4	-12.30	-12.32	-0.02	CdSO4
CdSO4:1H2O	-10.69	-12.32	-1.63	CdSO4:1H2O
CdSO4:2.67H2O	-10.50	-12.32	-1.82	CdSO4:2.67H2O
Cerussite	-1.81	-15.01	-13.20	PbCO3
CH4(g)	-71.20	-113.02	-41.81	CH4
Chalcanthite	-9.19	-11.85	-2.66	CuSO4:5H2O
Claudetite	-66.87	-70.10	-3.23	As4O6
Clausthalite	-6.87	-34.33	-27.46	PbSe
Co(BO2)2	-30.91	-3.84	27.07	Co(BO2)2
Co(OH)2	-6.25	6.84	13.09	Co(OH)2
Co(OH)3	-12.03	-14.06	-2.03	Co(OH)3
CO2(g)	-2.86	-21.02	-18.16	CO2
Co3(AsO4)2	-20.11	-7.08	13.03	Co3(AsO4)2
Co3(PO4)2	-11.20	-45.89	-34.69	Co3(PO4)2
Co3O4	-11.11	-21.28	-10.17	Co3O4
CoCl2	-22.03	-13.53	8.51	CoCl2
CoCl2:6H2O	-16.04	-13.53	2.51	CoCl2:6H2O
CoCO3	-4.24	-14.18	-9.94	CoCO3
CoFe2O4	24.61	21.56	-3.05	CoFe2O4
CoHPO4	-7.31	-26.37	-19.06	CoHPO4
CoMoO4	-9.10	-16.79	-7.69	CoMoO4
CoO	-7.06	6.84	13.90	CoO
CoSe	-17.29	-33.49	-16.20	CoSe
CoSeO3	-10.67	-9.35	1.32	CoSeO3
CoSeO4:6H2O	-21.73	-23.26	-1.53	CoSeO4:6H2O
CoSO4	-15.11	-12.07	3.04	CoSO4
CoSO4:6H2O	-9.59	-12.07	-2.48	CoSO4:6H2O
Cotunnite	-9.50	-14.36	-4.86	PbCl2
Cr(OH)2	-19.49	-8.57	10.93	Cr(OH)2
Cr(OH)3	-1.42	0.00	1.42	Cr(OH)3

Cr (OH) 3 (am)	0.75	0.00	-0.75	Cr (OH) 3
Cr2O3	2.22	0.01	-2.21	Cr2O3
CrCl2	-43.36	-28.93	14.42	CrCl2
CrCl3	-46.02	-30.54	15.48	CrCl3
Crmetal	-62.56	-31.57	31.00	Cr
CrO3	-29.98	-33.18	-3.19	CrO3
Cu (OH) 2	-1.78	7.06	8.84	Cu (OH) 2
Cu2 (OH) 3NO3	-21.43	-11.96	9.47	Cu2 (OH) 3NO3
Cu2Se (alpha)	2.56	-43.88	-46.44	Cu2Se
Cu2SO4	-20.56	-22.45	-1.89	Cu2SO4
Cu3 (AsO4) 2:2H2O	-12.52	-6.42	6.10	Cu3 (AsO4) 2:2H2O
Cu3 (PO4) 2	-8.39	-45.24	-36.85	Cu3 (PO4) 2
Cu3 (PO4) 2:3H2O	-10.12	-45.24	-35.12	Cu3 (PO4) 2:3H2O
Cu3Se2	-12.64	-77.15	-64.51	Cu3Se2
CuCO3	-2.46	-13.96	-11.50	CuCO3
CuCrO4	-20.68	-26.12	-5.44	CuCrO4
Cumetal	-4.30	-13.27	-8.97	Cu
CuMoO4	-3.46	-16.57	-13.11	CuMoO4
CuOCuSO4	-15.51	-4.79	10.71	CuOCuSO4
Cupricferrite	15.16	21.78	6.62	CuFe2O4
Cuprite	-2.51	-3.54	-1.04	Cu2O
Cuprousferrite	14.46	5.59	-8.87	CuFeO2
CuSe	0.19	-33.27	-33.46	CuSe
CuSe2	-16.82	-50.60	-33.79	CuSe2
CuSeO3:2H2O	-9.75	-9.13	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-20.60	-23.04	-2.44	CuSeO4:5H2O
CuSO4	-15.01	-11.85	3.16	CuSO4
Diaspore	4.20	11.38	7.18	AlOOH
Dolomite (disordered)	-2.82	-19.22	-16.40	CaMg (CO3) 2
Dolomite (ordered)	-2.25	-19.22	-16.97	CaMg (CO3) 2
Epsomite	-5.31	-7.48	-2.16	MgSO4:7H2O
Fe (OH) 2	-4.54	9.02	13.56	Fe (OH) 2
Fe (OH) 2.7Cl.3	7.35	4.31	-3.04	Fe (OH) 2.7Cl.3
Fe2 (OH) 4SeO3	-3.03	-1.47	1.55	Fe2 (OH) 4SeO3
Fe2 (SeO3) 3:2H2O	-13.23	-33.86	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-39.00	-42.01	-3.01	Fe2 (SO4) 3
Fe3 (OH) 8	3.52	23.74	20.22	Fe3 (OH) 8
FeAsO4:2H2O	-6.84	-6.44	0.40	FeAsO4:2H2O
FeCr2O4	1.41	9.03	7.62	FeCr2O4
FeMoO4	-4.55	-14.61	-10.06	FeMoO4
Ferrihydrite	3.95	7.36	3.41	Fe (OH) 3
Ferroselite	-29.91	-48.64	-18.74	FeSe2
FeSe	-20.31	-31.31	-11.01	FeSe
Gibbsite	2.80	11.38	8.58	Al (OH) 3
Goethite	6.69	7.36	0.67	FeOOH
Goslarite	-8.62	-10.68	-2.05	ZnSO4:7H2O
Gypsum	-2.92	-7.54	-4.61	CaSO4:2H2O
H-Jarosite	-4.33	-15.74	-11.41	(H3O) Fe3 (SO4) 2 (OH) 6
H2MoO4	-10.61	-23.63	-13.02	H2MoO4
H2Se (g)	-35.42	-40.33	-4.91	H2Se
Halite	-6.98	-5.39	1.59	NaCl
Hausmannite	-12.61	49.68	62.29	Mn3O4
Hematite	15.75	14.72	-1.03	Fe2O3
Hercynite	7.94	31.77	23.83	FeAl2O4
Hg (CH3) 2 (g)	-165.68	-240.82	-75.15	Hg (CH3) 2
Hg (g)	-8.16	-16.10	-7.94	Hg
Hg (OH) 2	-11.29	-14.79	-3.50	Hg (OH) 2
Hg2 (g)	-17.08	-32.20	-15.13	Hg2
Hg2 (OH) 2	-14.47	-9.21	5.26	Hg2 (OH) 2
Hg2CO3	-14.04	-30.22	-16.18	Hg2CO3
Hg2CrO4	-33.68	-42.38	-8.70	Hg2CrO4
Hg2HPO4	-17.64	-42.41	-24.77	Hg2HPO4
Hg2SeO3	-20.74	-25.40	-4.66	Hg2SeO3
Hg2SO4	-21.97	-28.12	-6.15	Hg2SO4
Hg3O2CO3	-35.71	-65.39	-29.68	Hg3O2CO3
HgCl (g)	-34.77	-14.79	19.98	HgCl
HgCl2	-13.57	-35.16	-21.58	HgCl2
Hgmetal (l)	-2.40	-16.10	-13.70	Hg

HgSe	0.57	-55.12	-55.69	HgSe
HgSeO3	-18.55	-30.98	-12.43	HgSeO3
HgSO4	-24.24	-33.70	-9.46	HgSO4
Hinsdalite	-9.48	-11.98	-2.50	PbAl3PO4SO4 (OH) 6
Huntite	-8.74	-38.39	-29.65	CaMg3 (CO3) 4
Hydrocerussite	-5.26	-24.03	-18.77	Pb3 (OH) 2 (CO3) 2
Hydromagnesite	-18.78	-26.89	-8.11	Mg5 (CO3) 4 (OH) 2:4H2O
Hydroxylapatite	1.59	-42.74	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-6.81	-69.60	-62.79	Pb5 (PO4) 3OH
K-Alum	-17.70	-22.97	-5.26	KAl (SO4) 2:12H2O
K-Jarosite	2.15	-12.26	-14.41	KFe3 (SO4) 2 (OH) 6
K2Cr2O7	-41.92	-59.40	-17.48	K2Cr2O7
K2CrO4	-25.65	-26.22	-0.57	K2CrO4
K2MoO4	-19.94	-16.67	3.27	K2MoO4
K2SeO4	-22.41	-23.14	-0.73	K2SeO4
Langite	-8.66	9.32	17.98	Cu4 (OH) 6SO4:H2O
Larnakite	-6.54	-6.91	-0.37	PbO:PbSO4
Laurionite	-4.80	-4.18	0.62	PbOHCl
Lepidocrocite	5.99	7.36	1.37	FeOOH
Lime	-21.90	11.37	33.28	CaO
Litharge	-6.89	6.00	12.89	PbO
Maghemite	8.33	14.72	6.39	Fe2O3
Magnesioferrite	8.46	26.16	17.69	Fe2MgO4
Magnesite	-2.06	-9.58	-7.52	MgCO3
Magnetite	19.71	23.74	4.03	Fe3O4
Malachite	-1.37	-6.90	-5.53	Cu2 (OH) 2CO3
Manganite	-4.95	20.39	25.34	MnOOH
Massicot	-7.09	6.00	13.09	PbO
Melanothallite	-19.75	-13.31	6.45	CuCl2
Melanterite	-7.62	-9.89	-2.27	FeSO4:7H2O
Mg (OH) 2 (active)	-7.36	11.44	18.79	Mg (OH) 2
Mg3 (PO4) 2	-8.82	-32.10	-23.28	Mg3 (PO4) 2
MgCr2O4	-5.29	11.44	16.74	MgCr2O4
MgCrO4	-27.39	-21.74	5.65	MgCrO4
MgHPO4:3H2O	-3.60	-21.77	-18.18	MgHPO4:3H2O
MgMoO4	-10.34	-12.19	-1.85	MgMoO4
MgSeO3:6H2O	-7.80	-4.76	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-17.47	-18.67	-1.20	MgSeO4:6H2O
Minium	-33.77	41.01	74.78	Pb3O4
Mirabilite	-7.96	-9.32	-1.35	Na2SO4:10H2O
Mn2 (SO4) 3	-62.07	-67.29	-5.22	Mn2 (SO4) 3
Mn3 (AsO4) 2:8H2O	-13.42	-0.92	12.50	Mn3 (AsO4) 2:8H2O
Mn3 (PO4) 2	-15.88	-39.73	-23.85	Mn3 (PO4) 2
MnCl2:4H2O	-14.22	-11.47	2.75	MnCl2:4H2O
MnHPO4	1.09	-24.31	-25.40	MnHPO4
MnSe	-35.23	-31.44	3.79	MnSe
MnSeO3	-8.43	-7.30	1.13	MnSeO3
MnSeO3:2H2O	-8.26	-7.30	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-19.16	-21.21	-2.05	MnSeO4:5H2O
MnSO4	-12.80	-10.02	2.78	MnSO4
Monteponite	-8.82	6.59	15.41	CdO
Montroydite	-11.27	-14.79	-3.52	HgO
MoO3	-15.63	-23.63	-8.00	MoO3
Morenosite	-9.22	-11.40	-2.18	NiSO4:7H2O
Na-Jarosite	-0.20	-10.94	-10.75	NaFe3 (SO4) 2 (OH) 6
Na2Cr2O7	-46.80	-56.76	-9.96	Na2Cr2O7
Na2CrO4	-26.57	-23.58	2.99	Na2CrO4
Na2Mo2O7	-20.90	-37.66	-16.76	Na2Mo2O7
Na2MoO4	-15.55	-14.03	1.52	Na2MoO4
Na2MoO4:2H2O	-15.26	-14.03	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-16.90	-6.60	10.30	Na2SeO3:5H2O
Na2SeO4	-21.79	-20.51	1.28	Na2SeO4
Nantokite	-5.10	-11.95	-6.86	CuCl
Natron	-9.91	-11.42	-1.51	Na2CO3:10H2O
Nesquehonite	-4.98	-9.58	-4.60	MgCO3:3H2O
Ni (OH) 2	-5.57	7.51	13.08	Ni (OH) 2
Ni3 (AsO4) 2:8H2O	-20.77	-5.07	15.70	Ni3 (AsO4) 2:8H2O
Ni3 (PO4) 2	-12.59	-43.89	-31.30	Ni3 (PO4) 2

Ni4(OH)6SO4	-20.88	11.12	32.00	Ni4(OH)6SO4
NiCO3	-6.76	-13.51	-6.75	NiCO3
NiMoO4	-4.97	-16.12	-11.15	NiMoO4
NiSe	-15.12	-32.82	-17.70	NiSe
NiSeO3:2H2O	-11.59	-8.68	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-21.07	-22.59	-1.52	NiSeO4:6H2O
Nsutite	-11.28	6.22	17.50	MnO2
O2(g)	-38.80	46.00	84.80	O2
Otavite	-2.43	-14.43	-12.00	CdCO3
Pb(BO2)2	-11.25	-4.68	6.57	Pb(BO2)2
Pb(OH)2	-2.32	6.00	8.32	Pb(OH)2
Pb10(OH)6O(CO3)6	-57.32	-66.08	-8.76	Pb10(OH)6O(CO3)6
Pb2(OH)3Cl	-6.97	1.82	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-14.18	12.01	26.19	Pb2O(OH)2
Pb2O3	-26.03	35.01	61.04	Pb2O3
Pb2OCO3	-8.58	-9.01	-0.44	Pb2OCO3
Pb3(AsO4)2	-15.39	-9.59	5.80	Pb3(AsO4)2
Pb3(PO4)2	-4.87	-48.40	-43.53	Pb3(PO4)2
Pb3O2CO3	-14.36	-3.01	11.35	Pb3O2CO3
Pb3O2SO4	-11.83	-0.90	10.92	Pb3O2SO4
Pb4(OH)6SO4	-16.00	5.10	21.10	Pb4(OH)6SO4
Pb4O3SO4	-17.18	5.10	22.28	Pb4O3SO4
PbCrO4	-14.44	-27.18	-12.73	PbCrO4
PbHPO4	-3.40	-27.20	-23.81	PbHPO4
Pbmetal	-21.24	-17.00	4.24	Pb
PbMoO4	-1.84	-17.63	-15.78	PbMoO4
PbO:0.3H2O	-6.98	6.00	12.98	PbO:0.33H2O
PbSeO4	-17.21	-24.10	-6.88	PbSeO4
Periclase	-10.60	11.44	22.04	MgO
Phosgenite	-9.57	-29.38	-19.81	PbCl2:PbCO3
Plattnerite	-21.48	29.00	50.49	PbO2
Plumbgummite	6.51	-26.28	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-11.81	11.37	23.19	Ca(OH)2
Pyrochroite	-6.59	8.89	15.48	Mn(OH)2
Pyrolusite	-10.30	31.89	42.19	MnO2
Pyromorphite	4.64	-79.79	-84.43	Pb5(PO4)3Cl
Retgersite	-9.35	-11.40	-2.05	NiSO4:6H2O
Rhodochrosite	-1.55	-12.12	-10.57	MnCO3
Semetal(am)	-10.19	-17.33	-7.14	Se
Semetal(hex)	-9.58	-17.33	-7.76	Se
SeO2	-16.31	-16.19	0.12	SeO2
SeO3	-51.58	-30.10	21.48	SeO3
Siderite	-1.81	-12.00	-10.19	FeCO3
Smithsonite	-2.83	-12.78	-9.95	ZnCO3
Spinel	-3.82	34.19	38.01	MgAl2O4
Strengite	0.53	-25.85	-26.37	FePO4:2H2O
Tenorite	-0.78	7.06	7.84	CuO
Thenardite	-9.66	-9.32	0.35	Na2SO4
Thermonatrite	-12.09	-11.42	0.67	Na2CO3:H2O
Tsumebite	-4.35	-14.14	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	-3.35	-39.35	-36.00	Fe3(PO4)2:8H2O
Witherite	-4.02	-12.60	-8.58	BaCO3
Zincite	-3.37	8.23	11.60	ZnO
Zincosite	-14.85	-10.68	4.18	ZnSO4
Zn(BO2)2	-10.74	-2.45	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-47.16	-43.92	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-3.97	8.23	12.20	Zn(OH)2
Zn(OH)2(am)	-4.48	8.23	12.71	Zn(OH)2
Zn(OH)2(beta)	-3.77	8.23	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-3.54	8.23	11.78	Zn(OH)2
Zn(OH)2(gamma)	-3.50	8.23	11.73	Zn(OH)2
Zn2(OH)2SO4	-9.94	-2.44	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.91	6.29	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-16.54	-2.89	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-6.29	-41.71	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-32.80	-13.12	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-14.37	14.03	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.70	20.80	38.50	Zn5(OH)8Cl2

ZnCl2	-19.40	-12.13	7.27	ZnCl2
ZnCO3:1H2O	-2.52	-12.78	-10.26	ZnCO3:1H2O
Znmetal	-41.01	-14.77	26.25	Zn
ZnMoO4	-5.30	-15.39	-10.09	ZnMoO4
ZnO(active)	-3.22	8.23	11.45	ZnO
ZnSe	-17.62	-32.10	-14.48	ZnSe
ZnSeO4:6H2O	-20.35	-21.87	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-10.17	-10.68	-0.51	ZnSO4:1H2O

**For a gas, $SI = \log_{10}(\text{fugacity})$. Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Initial solution 3.

-----Solution composition-----

Elements	Molality	Moles
Al	1.484e-06	1.484e-06
Alkalinity	8.200e-04	8.200e-04
As	2.671e-08	2.671e-08
B	8.146e-06	8.146e-06
Ba	8.744e-08	8.744e-08
Ca	7.990e-04	7.990e-04
Cl	6.520e-03	6.520e-03
Co	6.622e-07	6.622e-07
Cr	1.347e-07	1.347e-07
Cu	3.464e-07	3.464e-07
Fe	8.834e-06	8.834e-06
K	6.399e-04	6.399e-04
Mg	6.999e-04	6.999e-04
Mn	8.379e-07	8.379e-07
Mo	9.387e-08	9.387e-08
N	1.736e-03	1.736e-03
Na	5.746e-03	5.746e-03
Ni	1.876e-07	1.876e-07
P	1.680e-05	1.680e-05
Pb	1.449e-08	1.449e-08
S(6)	1.979e-03	1.979e-03
Se	2.535e-08	2.535e-08
Zn	3.520e-07	3.520e-07

-----Description of solution-----

pH	=	6.180
pe	=	4.000
Activity of water	=	1.000
Ionic strength (mol/kgw)	=	1.387e-02
Mass of water (kg)	=	1.000e+00
Total carbon (mol/kg)	=	1.948e-03
Total CO2 (mol/kg)	=	1.948e-03
Temperature (°C)	=	20.00
Electrical balance (eq)	=	-1.692e-04
Percent error, $100 * (\text{Cat} - \text{An}) / (\text{Cat} + \text{An})$	=	-0.78
Iterations	=	12
Total H	=	1.110238e+02
Total O	=	5.552069e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	7.433e-07	6.607e-07	-6.129	-6.180	-0.051	0.00
OH-	1.171e-08	1.038e-08	-7.931	-7.984	-0.052	(0)
H2O	5.551e+01	9.997e-01	1.744	-0.000	0.000	18.05
Al	1.484e-06					
Al(OH)2+	9.360e-07	8.356e-07	-6.029	-6.078	-0.049	(0)

Al (OH) 3	2.540e-07	2.540e-07	-6.595	-6.595	0.000	(0)
Al (OH) 4-	1.663e-07	1.479e-07	-6.779	-6.830	-0.051	(0)
AlOH+2	7.824e-08	4.969e-08	-7.107	-7.304	-0.197	(0)
AlSO4+	3.549e-08	3.158e-08	-7.450	-7.501	-0.051	(0)
Al+3	1.309e-08	4.532e-09	-7.883	-8.344	-0.461	(0)
Al (SO4) 2-	4.624e-10	4.114e-10	-9.335	-9.386	-0.051	(0)
AlMo6O21-3	4.906e-34	1.428e-34	-33.309	-33.845	-0.536	(0)
As (3)	1.676e-13					
H3AsO3	1.675e-13	1.675e-13	-12.776	-12.776	0.000	(0)
H2AsO3-	1.235e-16	1.077e-16	-15.908	-15.968	-0.060	(0)
H4AsO3+	6.290e-20	5.484e-20	-19.201	-19.261	-0.060	(0)
HAsO3-2	2.065e-22	1.193e-22	-21.685	-21.923	-0.238	(0)
AsO3-3	2.009e-29	5.847e-30	-28.697	-29.233	-0.536	(0)
As (5)	2.671e-08					
H2AsO4-	2.145e-08	1.870e-08	-7.669	-7.728	-0.060	(0)
HAsO4-2	5.262e-09	3.040e-09	-8.279	-8.517	-0.238	(0)
H3AsO4	2.038e-12	2.045e-12	-11.691	-11.689	0.001	(0)
AsO4-3	4.448e-14	1.294e-14	-13.352	-13.888	-0.536	(0)
B	8.146e-06					
H3BO3	8.139e-06	8.165e-06	-5.089	-5.088	0.001	(0)
H2BO3-	7.437e-09	6.563e-09	-8.129	-8.183	-0.054	(0)
CaH2BO3+	1.795e-10	1.584e-10	-9.746	-9.800	-0.054	(0)
MgH2BO3+	1.002e-10	8.839e-11	-9.999	-10.054	-0.054	(0)
NaH2BO3	5.773e-11	5.773e-11	-10.239	-10.239	0.000	(0)
H5 (BO3) 2-	5.334e-14	4.707e-14	-13.273	-13.327	-0.054	(0)
BaH2BO3+	1.215e-14	1.072e-14	-13.915	-13.970	-0.054	(0)
H8 (BO3) 3-	3.769e-17	3.326e-17	-16.424	-16.478	-0.054	(0)
Ba	8.744e-08					
Ba+2	8.709e-08	5.435e-08	-7.060	-7.265	-0.205	(0)
BaHCO3+	3.501e-10	3.132e-10	-9.456	-9.504	-0.048	(0)
BaCO3	1.148e-12	1.148e-12	-11.940	-11.940	0.000	(0)
BaNH3+2	7.754e-14	4.480e-14	-13.110	-13.349	-0.238	(0)
BaH2BO3+	1.215e-14	1.072e-14	-13.915	-13.970	-0.054	(0)
BaOH+	2.669e-15	2.379e-15	-14.574	-14.624	-0.050	(0)
BaNO3+	1.252e-37	1.092e-37	-36.902	-36.962	-0.060	(0)
C (4)	1.948e-03					
H2CO3	1.134e-03	1.134e-03	-2.945	-2.945	0.000	(0)
HCO3-	8.028e-04	7.166e-04	-3.095	-3.145	-0.049	(0)
CaHCO3+	5.603e-06	5.013e-06	-5.252	-5.300	-0.048	(0)
MgHCO3+	3.121e-06	2.771e-06	-5.506	-5.557	-0.052	(0)
NaHCO3	2.248e-06	2.248e-06	-5.648	-5.648	0.000	(0)
CO3-2	7.369e-08	4.599e-08	-7.133	-7.337	-0.205	(0)
FeHCO3+	3.932e-08	3.517e-08	-7.405	-7.454	-0.048	(0)
CuCO3	3.016e-08	3.016e-08	-7.521	-7.521	0.000	(0)
CaCO3	2.814e-08	2.814e-08	-7.551	-7.551	0.000	(0)
CoHCO3+	1.894e-08	1.651e-08	-7.723	-7.782	-0.060	(0)
MgCO3	1.368e-08	1.368e-08	-7.864	-7.864	0.000	(0)
NiHCO3+	8.938e-09	7.793e-09	-8.049	-8.108	-0.060	(0)
MnHCO3+	6.750e-09	6.017e-09	-8.171	-8.221	-0.050	(0)
NaCO3-	5.601e-09	5.000e-09	-8.252	-8.301	-0.049	(0)
CuHCO3+	5.224e-09	4.555e-09	-8.282	-8.342	-0.060	(0)
ZnHCO3+	4.406e-09	3.842e-09	-8.356	-8.415	-0.060	(0)
PbHCO3+	2.579e-09	2.249e-09	-8.589	-8.648	-0.060	(0)
PbCO3	6.455e-10	6.455e-10	-9.190	-9.190	0.000	(0)
ZnCO3	4.960e-10	4.960e-10	-9.304	-9.304	0.000	(0)
BaHCO3+	3.501e-10	3.132e-10	-9.456	-9.504	-0.048	(0)
CoCO3	2.546e-10	2.546e-10	-9.594	-9.594	0.000	(0)
NiCO3	1.673e-10	1.673e-10	-9.776	-9.776	0.000	(0)
Cu (CO3) 2-2	6.462e-12	3.734e-12	-11.190	-11.428	-0.238	(0)
BaCO3	1.148e-12	1.148e-12	-11.940	-11.940	0.000	(0)
Pb (CO3) 2-2	1.482e-13	8.562e-14	-12.829	-13.067	-0.238	(0)
Ca	7.990e-04					
Ca+2	6.907e-04	4.311e-04	-3.161	-3.365	-0.205	(0)
CaSO4	1.024e-04	1.024e-04	-3.990	-3.990	0.000	(0)
CaHCO3+	5.603e-06	5.013e-06	-5.252	-5.300	-0.048	(0)
CaHPO4	2.128e-07	2.128e-07	-6.672	-6.672	0.000	(0)
CaH2PO4+	1.242e-07	1.109e-07	-6.906	-6.955	-0.049	(0)
CaCO3	2.814e-08	2.814e-08	-7.551	-7.551	0.000	(0)

	CaNH3+2	1.227e-09	7.089e-10	-8.911	-9.149	-0.238	(0)
	CaPO4-	8.600e-10	7.677e-10	-9.066	-9.115	-0.049	(0)
	CaH2BO3+	1.795e-10	1.584e-10	-9.746	-9.800	-0.054	(0)
	CaOH+	9.423e-11	8.430e-11	-10.026	-10.074	-0.048	(0)
	Ca (NH3) 2+2	6.381e-16	3.686e-16	-15.195	-15.433	-0.238	(0)
	CaNO3+	5.947e-34	5.185e-34	-33.226	-33.285	-0.060	(0)
Cl	6.520e-03						
	Cl-	6.520e-03	5.795e-03	-2.186	-2.237	-0.051	(0)
	CuCl2-	5.238e-08	4.651e-08	-7.281	-7.332	-0.052	(0)
	CuCl	3.795e-08	3.795e-08	-7.421	-7.421	0.000	(0)
	CoCl+	7.428e-09	6.476e-09	-8.129	-8.189	-0.060	(0)
	MnCl+	3.540e-09	3.156e-09	-8.451	-8.501	-0.050	(0)
	ZnCl+	2.961e-09	2.629e-09	-8.529	-8.580	-0.052	(0)
	NiCl+	1.636e-09	1.426e-09	-8.786	-8.846	-0.060	(0)
	CuCl+	1.088e-09	9.662e-10	-8.963	-9.015	-0.052	(0)
	PbCl+	1.037e-09	9.043e-10	-8.984	-9.044	-0.060	(0)
	CuCl3-2	8.950e-11	5.651e-11	-10.048	-10.248	-0.200	(0)
	ZnOHC1	5.442e-11	5.442e-11	-10.264	-10.264	0.000	(0)
	MnCl2	2.583e-11	2.583e-11	-10.588	-10.588	0.000	(0)
	PbCl2	2.288e-11	2.288e-11	-10.640	-10.640	0.000	(0)
	ZnCl2	1.943e-11	1.943e-11	-10.712	-10.712	0.000	(0)
	CrCl+2	1.984e-12	1.146e-12	-11.703	-11.941	-0.238	(0)
	CuCl2	1.517e-12	1.517e-12	-11.819	-11.819	0.000	(0)
	ZnCl3-	9.866e-14	8.761e-14	-13.006	-13.057	-0.052	(0)
	PbCl3-	6.398e-14	5.578e-14	-13.194	-13.253	-0.060	(0)
	MnCl3-	4.626e-14	4.123e-14	-13.335	-13.385	-0.050	(0)
	NiCl2	4.219e-14	4.219e-14	-13.375	-13.375	0.000	(0)
	CrOHC12	9.427e-16	9.427e-16	-15.026	-15.026	0.000	(0)
	FeCl+2	7.064e-16	4.460e-16	-15.151	-15.351	-0.200	(0)
	CrCl2+	4.641e-16	4.046e-16	-15.333	-15.393	-0.060	(0)
	ZnCl4-2	3.862e-16	2.438e-16	-15.413	-15.613	-0.200	(0)
	PbCl4-2	2.375e-16	1.372e-16	-15.624	-15.863	-0.238	(0)
	CuCl3-	8.442e-17	7.496e-17	-16.074	-16.125	-0.052	(0)
	FeCl2+	1.517e-17	1.352e-17	-16.819	-16.869	-0.050	(0)
	FeCl3	7.837e-21	7.837e-21	-20.106	-20.106	0.000	(0)
	CuCl4-2	4.088e-21	2.581e-21	-20.388	-20.588	-0.200	(0)
	CrO3Cl-	6.803e-34	5.932e-34	-33.167	-33.227	-0.060	(0)
	Cr (NH3) 6Cl+2	4.721e-34	2.728e-34	-33.326	-33.564	-0.238	(0)
	CoCl+2	2.383e-35	1.377e-35	-34.623	-34.861	-0.238	(0)
	Co (NH3) 5Cl+2	4.164e-39	2.406e-39	-38.380	-38.619	-0.238	(0)
	Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-50.953	-51.191	-0.238	(0)
Co (2)	6.622e-07						
	Co+2	5.668e-07	3.275e-07	-6.247	-6.485	-0.238	(0)
	CoSO4	6.815e-08	6.815e-08	-7.167	-7.167	0.000	(0)
	CoHCO3+	1.894e-08	1.651e-08	-7.723	-7.782	-0.060	(0)
	CoCl+	7.428e-09	6.476e-09	-8.129	-8.189	-0.060	(0)
	CoHPO4	3.779e-10	3.779e-10	-9.423	-9.423	0.000	(0)
	CoCO3	2.546e-10	2.546e-10	-9.594	-9.594	0.000	(0)
	Co (NH3) +2	1.392e-10	8.044e-11	-9.856	-10.095	-0.238	(0)
	CoOH+	1.142e-10	9.955e-11	-9.942	-10.002	-0.060	(0)
	Co (OH) 2	1.205e-13	1.205e-13	-12.919	-12.919	0.000	(0)
	Co (NH3) 2+2	4.961e-15	2.866e-15	-14.304	-14.543	-0.238	(0)
	Co2OH+3	5.615e-18	1.634e-18	-17.251	-17.787	-0.536	(0)
	Co (NH3) 3+2	8.158e-20	4.713e-20	-19.088	-19.327	-0.238	(0)
	Co (OH) 3-	4.201e-20	3.662e-20	-19.377	-19.436	-0.060	(0)
	CoOOH-	1.757e-21	1.532e-21	-20.755	-20.815	-0.060	(0)
	CoSeO4	1.414e-22	1.414e-22	-21.850	-21.850	0.000	(0)
	Co (NH3) 4+2	5.592e-25	3.231e-25	-24.252	-24.491	-0.238	(0)
	CoNO2+	5.547e-28	4.836e-28	-27.256	-27.316	-0.060	(0)
	Co (OH) 4-2	1.531e-28	8.843e-29	-27.815	-28.053	-0.238	(0)
	Co (NH3) 5+2	1.212e-30	7.004e-31	-29.916	-30.155	-0.238	(0)
	Co4 (OH) 4+4	1.759e-31	1.960e-32	-30.755	-31.708	-0.953	(0)
	CoNO3+	2.182e-37	1.902e-37	-36.661	-36.721	-0.060	(0)
	Co (NO3) 2	0.000e+00	0.000e+00	-66.848	-66.848	0.000	(0)
Co (3)	1.747e-30						
	CoOH+2	1.747e-30	1.009e-30	-29.758	-29.996	-0.238	(0)
	Co+3	3.766e-35	1.304e-35	-34.424	-34.885	-0.461	(0)
	CoCl+2	2.383e-35	1.377e-35	-34.623	-34.861	-0.238	(0)

Co(NH3)5Cl+2	4.164e-39	2.406e-39	-38.380	-38.619	-0.238	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-46.993	-47.052	-0.060	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-50.953	-51.191	-0.238	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.021	-52.260	-0.238	(0)
Cr(2)	2.965e-21					
Cr+2	2.965e-21	1.713e-21	-20.528	-20.766	-0.238	(0)
Cr(3)	1.347e-07					
Cr(OH)+2	7.386e-08	4.267e-08	-7.132	-7.370	-0.238	(0)
Cr(OH)2+	5.309e-08	4.628e-08	-7.275	-7.335	-0.060	(0)
CrOHSO4	6.448e-09	6.448e-09	-8.191	-8.191	0.000	(0)
Cr+3	6.279e-10	1.827e-10	-9.202	-9.738	-0.536	(0)
CrSO4+	4.304e-10	3.752e-10	-9.366	-9.426	-0.060	(0)
Cr(OH)3	2.649e-10	2.649e-10	-9.577	-9.577	0.000	(0)
CrCl+2	1.984e-12	1.146e-12	-11.703	-11.941	-0.238	(0)
CrH2PO4+2	8.321e-13	4.807e-13	-12.080	-12.318	-0.238	(0)
CrO2-	2.185e-13	1.905e-13	-12.661	-12.720	-0.060	(0)
Cr(OH)4-	1.843e-13	1.607e-13	-12.735	-12.794	-0.060	(0)
Cr2(OH)2SO4+2	2.519e-14	1.455e-14	-13.599	-13.837	-0.238	(0)
CrOHC12	9.427e-16	9.427e-16	-15.026	-15.026	0.000	(0)
Cr2(OH)2(SO4)2	9.408e-16	9.408e-16	-15.027	-15.027	0.000	(0)
CrCl2+	4.641e-16	4.046e-16	-15.333	-15.393	-0.060	(0)
Cr(NH3)5OH+2	1.771e-27	1.023e-27	-26.752	-26.990	-0.238	(0)
Cr(NH3)6+3	1.279e-32	3.722e-33	-31.893	-32.429	-0.536	(0)
Cr(NH3)6Cl+2	4.721e-34	2.728e-34	-33.326	-33.564	-0.238	(0)
CrNO3+2	0.000e+00	0.000e+00	-41.487	-41.725	-0.238	(0)
Cr(6)	4.667e-26					
HCrO4-	2.786e-26	2.429e-26	-25.555	-25.615	-0.060	(0)
CrO4-2	1.845e-26	1.152e-26	-25.734	-25.939	-0.205	(0)
NaCrO4-	3.332e-28	2.905e-28	-27.477	-27.537	-0.060	(0)
KCrO4-	2.771e-29	2.416e-29	-28.557	-28.617	-0.060	(0)
CrO3HPO4-2	1.861e-30	1.075e-30	-29.730	-29.968	-0.238	(0)
H2CrO4	1.008e-32	1.008e-32	-31.996	-31.996	0.000	(0)
CrO3SO4-2	9.338e-33	5.395e-33	-32.030	-32.268	-0.238	(0)
CrO3Cl-	6.803e-34	5.932e-34	-33.167	-33.227	-0.060	(0)
CrO3H2PO4-	3.925e-34	3.422e-34	-33.406	-33.466	-0.060	(0)
Cr2O7-2	0.000e+00	0.000e+00	-49.394	-49.632	-0.238	(0)
Cu(1)	9.639e-08					
CuCl2-	5.238e-08	4.651e-08	-7.281	-7.332	-0.052	(0)
CuCl	3.795e-08	3.795e-08	-7.421	-7.421	0.000	(0)
Cu+	5.967e-09	5.202e-09	-8.224	-8.284	-0.060	(0)
CuCl3-2	8.950e-11	5.651e-11	-10.048	-10.248	-0.200	(0)
Cu(2)	2.501e-07					
Cu+2	1.785e-07	1.114e-07	-6.748	-6.953	-0.205	(0)
CuCO3	3.016e-08	3.016e-08	-7.521	-7.521	0.000	(0)
CuSO4	2.616e-08	2.616e-08	-7.582	-7.582	0.000	(0)
CuHCO3+	5.224e-09	4.555e-09	-8.282	-8.342	-0.060	(0)
CuOH+	4.723e-09	4.194e-09	-8.326	-8.377	-0.052	(0)
CuNH3+2	4.229e-09	2.443e-09	-8.374	-8.612	-0.238	(0)
CuCl+	1.088e-09	9.662e-10	-8.963	-9.015	-0.052	(0)
Cu(OH)2	1.631e-11	1.631e-11	-10.788	-10.788	0.000	(0)
Cu(CO3)2-2	6.462e-12	3.734e-12	-11.190	-11.428	-0.238	(0)
CuCl2	1.517e-12	1.517e-12	-11.819	-11.819	0.000	(0)
Cu2(OH)2+2	7.389e-13	4.269e-13	-12.131	-12.370	-0.238	(0)
Cu(OH)3-	5.847e-16	5.097e-16	-15.233	-15.293	-0.060	(0)
CuCl3-	8.442e-17	7.496e-17	-16.074	-16.125	-0.052	(0)
CuCl4-2	4.088e-21	2.581e-21	-20.388	-20.588	-0.200	(0)
Cu(OH)4-2	1.058e-22	6.112e-23	-21.976	-22.214	-0.238	(0)
CuNO2+	2.803e-27	2.444e-27	-26.552	-26.612	-0.060	(0)
CuNO3+	1.523e-37	1.328e-37	-36.817	-36.877	-0.060	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-47.281	-47.281	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-68.225	-68.225	0.000	(0)
Fe(2)	8.637e-06					
Fe+2	7.461e-06	4.311e-06	-5.127	-5.365	-0.238	(0)
FeSO4	1.090e-06	1.090e-06	-5.963	-5.963	0.000	(0)
FeHCO3+	3.932e-08	3.517e-08	-7.405	-7.454	-0.048	(0)
FeH2PO4+	2.668e-08	2.382e-08	-7.574	-7.623	-0.049	(0)
FeHPO4	1.815e-08	1.815e-08	-7.741	-7.741	0.000	(0)
FeOH+	1.998e-09	1.781e-09	-8.699	-8.749	-0.050	(0)

Fe (OH) 2	1.389e-14	1.389e-14	-13.857	-13.857	0.000	(0)
Fe (OH) 3-	7.166e-17	6.388e-17	-16.145	-16.195	-0.050	(0)
Fe (3)	1.964e-07					
Fe (OH) 2+	1.950e-07	1.740e-07	-6.710	-6.759	-0.049	(0)
Fe (OH) 3	1.394e-09	1.394e-09	-8.856	-8.856	0.000	(0)
FeHPO4+	3.605e-11	3.218e-11	-10.443	-10.492	-0.049	(0)
FeOH+2	3.488e-11	2.202e-11	-10.457	-10.657	-0.200	(0)
Fe (OH) 4-	4.526e-12	4.040e-12	-11.344	-11.394	-0.049	(0)
FeSO4+	3.443e-14	3.069e-14	-13.463	-13.513	-0.050	(0)
Fe+3	8.622e-15	2.985e-15	-14.064	-14.525	-0.461	(0)
FeH2PO4+2	9.841e-16	6.250e-16	-15.007	-15.204	-0.197	(0)
Fe (SO4) 2-	8.526e-16	7.433e-16	-15.069	-15.129	-0.060	(0)
FeCl+2	7.064e-16	4.460e-16	-15.151	-15.351	-0.200	(0)
FeCl2+	1.517e-17	1.352e-17	-16.819	-16.869	-0.050	(0)
FeHSeO3+2	2.518e-19	1.455e-19	-18.599	-18.837	-0.238	(0)
Fe2 (OH) 2+4	1.724e-19	1.921e-20	-18.763	-19.717	-0.953	(0)
FeCl3	7.837e-21	7.837e-21	-20.106	-20.106	0.000	(0)
Fe3 (OH) 4+5	1.414e-24	4.585e-26	-23.850	-25.339	-1.489	(0)
FeNO3+2	0.000e+00	0.000e+00	-43.612	-43.850	-0.238	(0)
H (0)	6.481e-24					
H2	3.240e-24	3.251e-24	-23.489	-23.488	0.001	(0)
K	6.399e-04					
K+	6.351e-04	5.645e-04	-3.197	-3.248	-0.051	(0)
KSO4-	4.737e-06	4.229e-06	-5.324	-5.374	-0.049	(0)
KHPO4-	5.074e-09	4.530e-09	-8.295	-8.344	-0.049	(0)
KCrO4-	2.771e-29	2.416e-29	-28.557	-28.617	-0.060	(0)
Mg	6.999e-04					
Mg+2	6.224e-04	3.884e-04	-3.206	-3.411	-0.205	(0)
MgSO4	7.392e-05	7.392e-05	-4.131	-4.131	0.000	(0)
MgHCO3+	3.121e-06	2.771e-06	-5.506	-5.557	-0.052	(0)
MgHPO4	2.647e-07	2.647e-07	-6.577	-6.577	0.000	(0)
MgH2PO4+	2.388e-07	2.132e-07	-6.622	-6.671	-0.049	(0)
MgCO3	1.368e-08	1.368e-08	-7.864	-7.864	0.000	(0)
MgOH+	1.649e-09	1.478e-09	-8.783	-8.830	-0.048	(0)
MgH2BO3+	1.002e-10	8.839e-11	-9.999	-10.054	-0.054	(0)
MgPO4-	1.211e-11	1.081e-11	-10.917	-10.966	-0.049	(0)
Mn (2)	8.379e-07					
Mn+2	7.487e-07	4.326e-07	-6.126	-6.364	-0.238	(0)
MnSO4	7.886e-08	7.886e-08	-7.103	-7.103	0.000	(0)
MnHCO3+	6.750e-09	6.017e-09	-8.171	-8.221	-0.050	(0)
MnCl+	3.540e-09	3.156e-09	-8.451	-8.501	-0.050	(0)
MnCl2	2.583e-11	2.583e-11	-10.588	-10.588	0.000	(0)
MnOH+	1.265e-11	1.128e-11	-10.898	-10.948	-0.050	(0)
MnCl3-	4.626e-14	4.123e-14	-13.335	-13.385	-0.050	(0)
MnSeO4	9.893e-23	9.893e-23	-22.005	-22.005	0.000	(0)
Mn (OH) 3-	2.664e-23	2.375e-23	-22.574	-22.624	-0.050	(0)
MnSe	3.564e-30	3.564e-30	-29.448	-29.448	0.000	(0)
Mn (OH) 4-2	1.850e-30	1.168e-30	-29.733	-29.933	-0.200	(0)
MnNO3+	2.882e-37	2.513e-37	-36.540	-36.600	-0.060	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-66.631	-66.631	0.000	(0)
Mn (3)	2.658e-28					
Mn+3	2.658e-28	9.203e-29	-27.575	-28.036	-0.461	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-61.272	-61.471	-0.200	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-67.123	-67.177	-0.053	(0)
Mo	9.387e-08					
MoO4-2	9.311e-08	5.811e-08	-7.031	-7.236	-0.205	(0)
HMoO4-	7.636e-10	6.657e-10	-9.117	-9.177	-0.060	(0)
H2MoO4	4.421e-12	4.421e-12	-11.354	-11.354	0.000	(0)
AlMo6O21-3	4.906e-34	1.428e-34	-33.309	-33.845	-0.536	(0)
Mo7O24-6	0.000e+00	0.000e+00	-44.274	-46.418	-2.144	(0)
HMo7O24-5	0.000e+00	0.000e+00	-44.752	-46.242	-1.489	(0)
H2Mo7O24-4	0.000e+00	0.000e+00	-46.695	-47.648	-0.953	(0)
H3Mo7O24-3	0.000e+00	0.000e+00	-50.040	-50.576	-0.536	(0)
N (-3)	1.736e-03					
NH4+	1.715e-03	1.514e-03	-2.766	-2.820	-0.054	(0)
NH4SO4-	1.980e-05	1.765e-05	-4.703	-4.753	-0.050	(0)

NH3	9.134e-07	9.134e-07	-6.039	-6.039	0.000	(0)
CuNH3+2	4.229e-09	2.443e-09	-8.374	-8.612	-0.238	(0)
CaNH3+2	1.227e-09	7.089e-10	-8.911	-9.149	-0.238	(0)
NiNH3+2	1.878e-10	1.085e-10	-9.726	-9.965	-0.238	(0)
Co (NH3) +2	1.392e-10	8.044e-11	-9.856	-10.095	-0.238	(0)
BaNH3+2	7.754e-14	4.480e-14	-13.110	-13.349	-0.238	(0)
Ni (NH3) 2+2	4.818e-14	2.784e-14	-13.317	-13.555	-0.238	(0)
Co (NH3) 2+2	4.961e-15	2.866e-15	-14.304	-14.543	-0.238	(0)
Ca (NH3) 2+2	6.381e-16	3.686e-16	-15.195	-15.433	-0.238	(0)
Co (NH3) 3+2	8.158e-20	4.713e-20	-19.088	-19.327	-0.238	(0)
Co (NH3) 4+2	5.592e-25	3.231e-25	-24.252	-24.491	-0.238	(0)
Cr (NH3) 5OH+2	1.771e-27	1.023e-27	-26.752	-26.990	-0.238	(0)
Co (NH3) 5+2	1.212e-30	7.004e-31	-29.916	-30.155	-0.238	(0)
Cr (NH3) 6+3	1.279e-32	3.722e-33	-31.893	-32.429	-0.536	(0)
Cr (NH3) 6Cl+2	4.721e-34	2.728e-34	-33.326	-33.564	-0.238	(0)
Co (NH3) 5Cl+2	4.164e-39	2.406e-39	-38.380	-38.619	-0.238	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-46.993	-47.052	-0.060	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-50.953	-51.191	-0.238	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.021	-52.260	-0.238	(0)
N (3)	2.370e-22					
NO2-	2.370e-22	2.096e-22	-21.625	-21.679	-0.053	(0)
CuNO2+	2.803e-27	2.444e-27	-26.552	-26.612	-0.060	(0)
CoNO2+	5.547e-28	4.836e-28	-27.256	-27.316	-0.060	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-47.281	-47.281	0.000	(0)
N (5)	4.129e-31					
NO3-	4.123e-31	3.665e-31	-30.385	-30.436	-0.051	(0)
CaNO3+	5.947e-34	5.185e-34	-33.226	-33.285	-0.060	(0)
MnNO3+	2.882e-37	2.513e-37	-36.540	-36.600	-0.060	(0)
CoNO3+	2.182e-37	1.902e-37	-36.661	-36.721	-0.060	(0)
ZnNO3+	2.043e-37	1.781e-37	-36.690	-36.749	-0.060	(0)
CuNO3+	1.523e-37	1.328e-37	-36.817	-36.877	-0.060	(0)
BaNO3+	1.252e-37	1.092e-37	-36.902	-36.962	-0.060	(0)
NiNO3+	1.030e-37	8.978e-38	-36.987	-37.047	-0.060	(0)
PbNO3+	2.864e-38	2.497e-38	-37.543	-37.603	-0.060	(0)
CrNO3+2	0.000e+00	0.000e+00	-41.487	-41.725	-0.238	(0)
FeNO3+2	0.000e+00	0.000e+00	-43.612	-43.850	-0.238	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-66.631	-66.631	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-66.848	-66.848	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-67.783	-67.783	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-67.899	-67.899	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-68.225	-68.225	0.000	(0)
Na	5.746e-03					
Na+	5.710e-03	5.076e-03	-2.243	-2.295	-0.051	(0)
NaSO4-	3.300e-05	2.946e-05	-4.481	-4.531	-0.049	(0)
NaHCO3	2.248e-06	2.248e-06	-5.648	-5.648	0.000	(0)
NaHPO4-	7.066e-08	6.308e-08	-7.151	-7.200	-0.049	(0)
NaCO3-	5.601e-09	5.000e-09	-8.252	-8.301	-0.049	(0)
NaH2BO3	5.773e-11	5.773e-11	-10.239	-10.239	0.000	(0)
NaCrO4-	3.332e-28	2.905e-28	-27.477	-27.537	-0.060	(0)
Ni	1.876e-07					
Ni+2	1.563e-07	9.752e-08	-6.806	-7.011	-0.205	(0)
NiSO4	2.035e-08	2.035e-08	-7.691	-7.691	0.000	(0)
NiHCO3+	8.938e-09	7.793e-09	-8.049	-8.108	-0.060	(0)
NiCl+	1.636e-09	1.426e-09	-8.786	-8.846	-0.060	(0)
NiNH3+2	1.878e-10	1.085e-10	-9.726	-9.965	-0.238	(0)
NiCO3	1.673e-10	1.673e-10	-9.776	-9.776	0.000	(0)
NiOH+	1.502e-11	1.310e-11	-10.823	-10.883	-0.060	(0)
Ni (SO4) 2-2	1.321e-12	7.633e-13	-11.879	-12.117	-0.238	(0)
Ni (NH3) 2+2	4.818e-14	2.784e-14	-13.317	-13.555	-0.238	(0)
NiCl2	4.219e-14	4.219e-14	-13.375	-13.375	0.000	(0)
Ni (OH) 2	2.264e-14	2.264e-14	-13.645	-13.645	0.000	(0)
Ni (OH) 3-	3.956e-19	3.449e-19	-18.403	-18.462	-0.060	(0)
NiSeO4	3.876e-23	3.876e-23	-22.412	-22.412	0.000	(0)
NiNO3+	1.030e-37	8.978e-38	-36.987	-37.047	-0.060	(0)
O (0)	0.000e+00					
O2	0.000e+00	0.000e+00	-46.715	-46.713	0.001	(0)
P	1.680e-05					
H2PO4-	1.398e-05	1.248e-05	-4.855	-4.904	-0.049	(0)

HPO4-2	1.858e-06	1.173e-06	-5.731	-5.931	-0.200	(0)
MgHPO4	2.647e-07	2.647e-07	-6.577	-6.577	0.000	(0)
MgH2PO4+	2.388e-07	2.132e-07	-6.622	-6.671	-0.049	(0)
CaHPO4	2.128e-07	2.128e-07	-6.672	-6.672	0.000	(0)
CaH2PO4+	1.242e-07	1.109e-07	-6.906	-6.955	-0.049	(0)
NaHPO4-	7.066e-08	6.308e-08	-7.151	-7.200	-0.049	(0)
FeH2PO4+	2.668e-08	2.382e-08	-7.574	-7.623	-0.049	(0)
FeHPO4	1.815e-08	1.815e-08	-7.741	-7.741	0.000	(0)
KHPO4-	5.074e-09	4.530e-09	-8.295	-8.344	-0.049	(0)
H3PO4	1.098e-09	1.098e-09	-8.959	-8.959	0.000	(0)
CaPO4-	8.600e-10	7.677e-10	-9.066	-9.115	-0.049	(0)
CoHPO4	3.779e-10	3.779e-10	-9.423	-9.423	0.000	(0)
FeHPO4+	3.605e-11	3.218e-11	-10.443	-10.492	-0.049	(0)
MgPO4-	1.211e-11	1.081e-11	-10.917	-10.966	-0.049	(0)
PO4-3	1.950e-12	6.752e-13	-11.710	-12.171	-0.461	(0)
CrH2PO4+2	8.321e-13	4.807e-13	-12.080	-12.318	-0.238	(0)
FeH2PO4+2	9.841e-16	6.250e-16	-15.007	-15.204	-0.197	(0)
CrO3HPO4-2	1.861e-30	1.075e-30	-29.730	-29.968	-0.238	(0)
CrO3H2PO4-	3.925e-34	3.422e-34	-33.406	-33.466	-0.060	(0)
Pb	1.449e-08					
Pb+2	7.481e-09	4.669e-09	-8.126	-8.331	-0.205	(0)
PbHCO3+	2.579e-09	2.249e-09	-8.589	-8.648	-0.060	(0)
PbSO4	2.489e-09	2.489e-09	-8.604	-8.604	0.000	(0)
PbCl+	1.037e-09	9.043e-10	-8.984	-9.044	-0.060	(0)
PbCO3	6.455e-10	6.455e-10	-9.190	-9.190	0.000	(0)
PbOH+	2.050e-10	1.787e-10	-9.688	-9.748	-0.060	(0)
Pb (SO4) 2-2	2.825e-11	1.632e-11	-10.549	-10.787	-0.238	(0)
PbCl2	2.288e-11	2.288e-11	-10.640	-10.640	0.000	(0)
Pb (CO3) 2-2	1.482e-13	8.562e-14	-12.829	-13.067	-0.238	(0)
Pb (OH) 2	8.609e-14	8.609e-14	-13.065	-13.065	0.000	(0)
PbCl3-	6.398e-14	5.578e-14	-13.194	-13.253	-0.060	(0)
PbCl4-2	2.375e-16	1.372e-16	-15.624	-15.863	-0.238	(0)
Pb2OH+3	4.544e-17	1.322e-17	-16.343	-16.879	-0.536	(0)
Pb (OH) 3-	1.504e-18	1.312e-18	-17.823	-17.882	-0.060	(0)
Pb (OH) 4-2	8.471e-24	4.894e-24	-23.072	-23.310	-0.238	(0)
Pb3 (OH) 4+2	5.409e-25	3.125e-25	-24.267	-24.505	-0.238	(0)
Pb4 (OH) 4+4	1.253e-28	1.396e-29	-27.902	-28.855	-0.953	(0)
PbNO3+	2.864e-38	2.497e-38	-37.543	-37.603	-0.060	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-67.783	-67.783	0.000	(0)
S (6)	1.979e-03					
SO4-2	1.744e-03	1.088e-03	-2.758	-2.963	-0.205	(0)
CaSO4	1.024e-04	1.024e-04	-3.990	-3.990	0.000	(0)
MgSO4	7.392e-05	7.392e-05	-4.131	-4.131	0.000	(0)
NaSO4-	3.300e-05	2.946e-05	-4.481	-4.531	-0.049	(0)
NH4SO4-	1.980e-05	1.765e-05	-4.703	-4.753	-0.050	(0)
KSO4-	4.737e-06	4.229e-06	-5.324	-5.374	-0.049	(0)
FeSO4	1.090e-06	1.090e-06	-5.963	-5.963	0.000	(0)
MnSO4	7.886e-08	7.886e-08	-7.103	-7.103	0.000	(0)
CoSO4	6.815e-08	6.815e-08	-7.167	-7.167	0.000	(0)
HSO4-	6.789e-08	6.040e-08	-7.168	-7.219	-0.051	(0)
ZnSO4	4.277e-08	4.277e-08	-7.369	-7.369	0.000	(0)
AlSO4+	3.549e-08	3.158e-08	-7.450	-7.501	-0.051	(0)
CuSO4	2.616e-08	2.616e-08	-7.582	-7.582	0.000	(0)
NiSO4	2.035e-08	2.035e-08	-7.691	-7.691	0.000	(0)
CrOHSO4	6.448e-09	6.448e-09	-8.191	-8.191	0.000	(0)
PbSO4	2.489e-09	2.489e-09	-8.604	-8.604	0.000	(0)
Zn (SO4) 2-2	7.323e-10	4.231e-10	-9.135	-9.374	-0.238	(0)
Al (SO4) 2-	4.624e-10	4.114e-10	-9.335	-9.386	-0.051	(0)
CrSO4+	4.304e-10	3.752e-10	-9.366	-9.426	-0.060	(0)
Pb (SO4) 2-2	2.825e-11	1.632e-11	-10.549	-10.787	-0.238	(0)
Ni (SO4) 2-2	1.321e-12	7.633e-13	-11.879	-12.117	-0.238	(0)
FeSO4+	3.443e-14	3.069e-14	-13.463	-13.513	-0.050	(0)
Cr2 (OH) 2SO4+2	2.519e-14	1.455e-14	-13.599	-13.837	-0.238	(0)
Cr2 (OH) 2 (SO4) 2	9.408e-16	9.408e-16	-15.027	-15.027	0.000	(0)
Fe (SO4) 2-	8.526e-16	7.433e-16	-15.069	-15.129	-0.060	(0)
CrO3SO4-2	9.338e-33	5.395e-33	-32.030	-32.268	-0.238	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-46.993	-47.052	-0.060	(0)
Se (-2)	1.522e-24					

HSe-	1.515e-24	1.321e-24	-23.820	-23.879	-0.060	(0)
H2Se	6.623e-27	6.623e-27	-26.179	-26.179	0.000	(0)
MnSe	3.564e-30	3.564e-30	-29.448	-29.448	0.000	(0)
Se-2	2.485e-33	1.436e-33	-32.605	-32.843	-0.238	(0)
Se (4)	2.535e-08					
HSeO3-	2.512e-08	2.190e-08	-7.600	-7.660	-0.060	(0)
SeO3-2	2.207e-10	1.275e-10	-9.656	-9.895	-0.238	(0)
H2SeO3	5.915e-12	5.915e-12	-11.228	-11.228	0.000	(0)
FeHSeO3+2	2.518e-19	1.455e-19	-18.599	-18.837	-0.238	(0)
Se (6)	1.500e-18					
SeO4-2	1.499e-18	9.357e-19	-17.824	-18.029	-0.205	(0)
CoSeO4	1.414e-22	1.414e-22	-21.850	-21.850	0.000	(0)
MnSeO4	9.893e-23	9.893e-23	-22.005	-22.005	0.000	(0)
NiSeO4	3.876e-23	3.876e-23	-22.412	-22.412	0.000	(0)
HSeO4-	3.034e-23	2.645e-23	-22.518	-22.578	-0.060	(0)
ZnSeO4	2.716e-23	2.716e-23	-22.566	-22.566	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-40.351	-40.589	-0.238	(0)
Zn	3.520e-07					
Zn+2	3.003e-07	1.874e-07	-6.522	-6.727	-0.205	(0)
ZnSO4	4.277e-08	4.277e-08	-7.369	-7.369	0.000	(0)
ZnHCO3+	4.406e-09	3.842e-09	-8.356	-8.415	-0.060	(0)
ZnCl+	2.961e-09	2.629e-09	-8.529	-8.580	-0.052	(0)
Zn (SO4) 2-2	7.323e-10	4.231e-10	-9.135	-9.374	-0.238	(0)
ZnCO3	4.960e-10	4.960e-10	-9.304	-9.304	0.000	(0)
ZnOH+	2.231e-10	1.945e-10	-9.651	-9.711	-0.060	(0)
ZnOHCl	5.442e-11	5.442e-11	-10.264	-10.264	0.000	(0)
ZnCl2	1.943e-11	1.943e-11	-10.712	-10.712	0.000	(0)
Zn (OH) 2	6.895e-13	6.895e-13	-12.161	-12.161	0.000	(0)
ZnCl3-	9.866e-14	8.761e-14	-13.006	-13.057	-0.052	(0)
ZnCl4-2	3.862e-16	2.438e-16	-15.413	-15.613	-0.200	(0)
Zn (OH) 3-	6.039e-17	5.265e-17	-16.219	-16.279	-0.060	(0)
Zn (OH) 4-2	5.527e-23	3.193e-23	-22.257	-22.496	-0.238	(0)
ZnSeO4	2.716e-23	2.716e-23	-22.566	-22.566	0.000	(0)
ZnNO3+	2.043e-37	1.781e-37	-36.690	-36.749	-0.060	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-40.351	-40.589	-0.238	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-67.899	-67.899	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2	-87.46	-81.19	6.27	(Co (NH3) 5Cl) (NO3) 2
(Co (NH3) 5Cl) Cl2	-29.34	-24.80	4.54	(Co (NH3) 5Cl) Cl2
(Co (NH3) 5OH2) Cl3	-36.61	-24.80	11.81	(Co (NH3) 5OH2) Cl3
(Co (NH3) 6) (NO3) 3	-123.96	-106.03	17.93	(Co (NH3) 6) (NO3) 3
(Co (NH3) 6) Cl3	-41.57	-21.44	20.13	(Co (NH3) 6) Cl3
(NH4) 2CrO4	-31.96	-31.58	0.38	(NH4) 2CrO4
(NH4) 2SeO4	-24.12	-23.67	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	-0.94	10.20	11.13	Al (OH) 3
Al2 (MoO4) 3	-41.54	-38.39	3.15	Al2 (MoO4) 3
Al2O3	-0.03	20.39	20.43	Al2O3
Al4 (OH) 10SO4	2.76	25.46	22.70	Al4 (OH) 10SO4
AlAsO4:2H2O	-6.29	-1.49	4.80	AlAsO4:2H2O
AlOHSO4	-1.90	-5.13	-3.23	AlOHSO4
Alunite	3.65	2.87	-0.77	KAl3 (SO4) 2 (OH) 6
Anglesite	-3.47	-11.29	-7.83	PbSO4
Anhydrite	-1.99	-6.33	-4.34	CaSO4
Antlerite	-7.89	0.90	8.79	Cu3 (OH) 4SO4
Aragonite	-2.44	-10.70	-8.26	CaCO3
Arsenolite	-48.16	-51.10	-2.94	As4O6
Artinite	-11.76	-1.80	9.96	MgCO3:Mg (OH) 2:3H2O
As2O5	-30.15	-23.38	6.77	As2O5
Atacamite	-5.27	2.40	7.67	Cu2 (OH) 3Cl
Azurite	-6.55	-23.17	-16.62	Cu3 (OH) 2 (CO3) 2
Ba (OH) 2:8H2O	-19.46	5.09	24.56	Ba (OH) 2:8H2O
Ba3 (AsO4) 2	0.85	-8.09	-8.94	Ba3 (AsO4) 2
BaCrO4	-23.43	-33.20	-9.77	BaCrO4
BaHPO4	-5.84	-25.62	-19.77	BaHPO4

BaMoO4	-7.51	-14.50	-6.99	BaMoO4
Barite	-0.18	-10.23	-10.05	BaSO4
BaSeO3	-10.54	-8.74	1.79	BaSeO3
BaSeO4	-17.77	-25.29	-7.53	BaSeO4
Bianchite	-7.93	-9.69	-1.76	ZnSO4:6H2O
Birnessite	-17.41	0.68	18.09	MnO2
Bixbyite	-18.72	-18.99	-0.27	Mn2O3
Boehmite	1.27	10.20	8.93	AlOOH
Brochantite	-9.53	6.30	15.83	Cu4(OH)6SO4
Brucite	-8.24	8.95	17.18	Mg(OH)2
Bunsenite	-7.40	5.35	12.74	NiO
Ca3(AsO4)2:4H2O	-18.70	3.60	22.30	Ca3(AsO4)2:4H2O
Ca3(PO4)2(beta)	-5.36	-34.44	-29.08	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-9.07	-56.15	-47.08	Ca4H(PO4)3:3H2O
CaCrO4	-27.12	-29.30	-2.19	CaCrO4
CaHPO4	-2.35	-21.72	-19.37	CaHPO4
CaHPO4:2H2O	-2.65	-21.72	-19.06	CaHPO4:2H2O
Calcite	-2.25	-10.70	-8.46	CaCO3
CaMoO4	-2.66	-10.60	-7.94	CaMoO4
CaSeO3:2H2O	-7.72	-4.85	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-18.40	-21.39	-3.00	CaSeO4:2H2O
Cerussite	-2.46	-15.67	-13.20	PbCO3
CH4(g)	-59.32	-101.14	-41.81	CH4
Chalcanthite	-7.26	-9.92	-2.66	CuSO4:5H2O
Claudetite	-47.87	-51.10	-3.23	As4O6
Clausthalite	1.43	-26.03	-27.46	PbSe
Co(BO2)2	-31.37	-4.30	27.07	Co(BO2)2
Co(OH)2	-7.22	5.87	13.09	Co(OH)2
Co(OH)3	-14.31	-16.35	-2.03	Co(OH)3
CO2(g)	-1.54	-19.70	-18.16	CO2
Co3(AsO4)2	-18.79	-5.75	13.03	Co3(AsO4)2
Co3(PO4)2	-9.11	-43.80	-34.69	Co3(PO4)2
Co3O4	-16.64	-26.82	-10.17	Co3O4
CoCl2	-19.46	-10.96	8.51	CoCl2
CoCl2:6H2O	-13.47	-10.96	2.51	CoCl2:6H2O
CoCO3	-3.88	-13.82	-9.94	CoCO3
CoFe2O4	16.96	13.90	-3.05	CoFe2O4
CoHPO4	-5.77	-24.84	-19.06	CoHPO4
CoMoO4	-6.03	-13.72	-7.69	CoMoO4
CoO	-8.03	5.88	13.90	CoO
CoSe	-7.98	-24.18	-16.20	CoSe
CoSeO3	-9.28	-7.96	1.32	CoSeO3
CoSeO4:6H2O	-22.98	-24.51	-1.53	CoSeO4:6H2O
CoSO4	-12.49	-9.45	3.04	CoSO4
CoSO4:6H2O	-6.97	-9.45	-2.48	CoSO4:6H2O
Cotunnite	-7.95	-12.80	-4.86	PbCl2
Cr(OH)2	-19.33	-8.41	10.93	Cr(OH)2
Cr(OH)3	-2.58	-1.15	1.42	Cr(OH)3
Cr(OH)3(am)	-0.40	-1.15	-0.75	Cr(OH)3
Cr2O3	-0.10	-2.31	-2.21	Cr2O3
CrCl2	-39.66	-25.24	14.42	CrCl2
CrCl3	-41.88	-26.41	15.48	CrCl3
Crmetal	-59.76	-28.77	31.00	Cr
CrO3	-35.10	-38.30	-3.19	CrO3
Cu(OH)2	-3.44	5.41	8.84	Cu(OH)2
Cu2(OH)3NO3	-35.27	-25.80	9.47	Cu2(OH)3NO3
Cu2Se(alpha)	12.17	-34.27	-46.44	Cu2Se
Cu2SO4	-17.64	-19.53	-1.89	Cu2SO4
Cu3(AsO4)2:2H2O	-13.26	-7.16	6.10	Cu3(AsO4)2:2H2O
Cu3(PO4)2	-8.35	-45.20	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-10.08	-45.20	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	5.59	-58.92	-64.51	Cu3Se2
CuCO3	-2.79	-14.29	-11.50	CuCO3
CuCrO4	-27.45	-32.89	-5.44	CuCrO4
Cumetal	-3.31	-12.28	-8.97	Cu
CuMoO4	-1.08	-14.19	-13.11	CuMoO4
CuOCuSO4	-15.22	-4.51	10.71	CuOCuSO4
Cupricferrite	6.82	13.44	6.62	CuFe2O4

Cuprite	-3.17	-4.21	-1.04	Cu ₂ O
Cuprousferrite	10.78	1.91	-8.87	CuFeO ₂
CuSe	8.81	-24.65	-33.46	CuSe
CuSe ₂	-0.57	-34.35	-33.79	CuSe ₂
CuSeO ₃ :2H ₂ O	-9.05	-8.43	0.62	CuSeO ₃ :2H ₂ O
CuSeO ₄ :5H ₂ O	-22.54	-24.98	-2.44	CuSeO ₄ :5H ₂ O
CuSO ₄	-13.07	-9.92	3.16	CuSO ₄
Diaspore	3.02	10.20	7.18	AlOOH
Dolomite (disordered)	-5.05	-21.45	-16.40	CaMg (CO ₃) ₂
Dolomite (ordered)	-4.48	-21.45	-16.97	CaMg (CO ₃) ₂
Epsomite	-4.21	-6.37	-2.16	MgSO ₄ :7H ₂ O
Fe (OH) ₂	-6.57	6.99	13.56	Fe (OH) ₂
Fe (OH) 2.7Cl _{1.3}	4.53	1.49	-3.04	Fe (OH) 2.7Cl _{1.3}
Fe ₂ (OH) 4SeO ₃	-7.36	-5.81	1.55	Fe ₂ (OH) 4SeO ₃
Fe ₂ (SeO ₃) 3:2H ₂ O	-12.86	-33.49	-20.63	Fe ₂ (SeO ₃) 3:2H ₂ O
Fe ₂ (SO ₄) ₃	-34.93	-37.94	-3.01	Fe ₂ (SO ₄) ₃
Fe ₃ (OH) ₈	-5.20	15.02	20.22	Fe ₃ (OH) ₈
FeAsO ₄ :2H ₂ O	-8.07	-7.67	0.40	FeAsO ₄ :2H ₂ O
FeCr ₂ O ₄	-2.93	4.69	7.62	FeCr ₂ O ₄
FeMoO ₄	-2.54	-12.60	-10.06	FeMoO ₄
Ferrihydrite	0.60	4.01	3.41	Fe (OH) ₃
Ferroselite	-14.03	-32.76	-18.74	FeSe ₂
FeSe	-12.06	-23.06	-11.01	FeSe
Gibbsite	1.62	10.20	8.58	Al (OH) ₃
Goethite	3.34	4.01	0.67	FeOOH
Goslarite	-7.64	-9.69	-2.05	ZnSO ₄ :7H ₂ O
Gypsum	-1.72	-6.33	-4.61	CaSO ₄ :2H ₂ O
H-Jarosite	-7.19	-18.60	-11.41	(H ₃ O) Fe ₃ (SO ₄) ₂ (OH) ₆
H ₂ MoO ₄	-6.57	-19.60	-13.02	H ₂ MoO ₄
H ₂ Se (g)	-25.14	-30.06	-4.91	H ₂ Se
Halite	-6.12	-4.53	1.59	NaCl
Hausmannite	-23.94	38.35	62.29	Mn ₃ O ₄
Hematite	9.06	8.03	-1.03	Fe ₂ O ₃
Hercynite	3.56	27.39	23.83	FeAl ₂ O ₄
Hinsdalite	-8.92	-11.42	-2.50	PbAl ₃ PO ₄ SO ₄ (OH) ₆
Huntite	-13.30	-42.95	-29.65	CaMg ₃ (CO ₃) ₄
Hydrocerussite	-8.54	-27.31	-18.77	Pb ₃ (OH) ₂ (CO ₃) ₂
Hydromagnesite	-25.93	-34.04	-8.11	Mg ₅ (CO ₃) ₄ (OH) ₂ :4H ₂ O
Hydroxylapatite	-2.83	-47.16	-44.33	Ca ₅ (PO ₄) ₃ OH
Hydroxylpyromorphite	-9.20	-71.99	-62.79	Pb ₅ (PO ₄) ₃ OH
K-Alum	-12.26	-17.52	-5.26	KAl (SO ₄) ₂ :12H ₂ O
K-Jarosite	-1.26	-15.67	-14.41	KFe ₃ (SO ₄) ₂ (OH) ₆
K ₂ Cr ₂ O ₇	-53.25	-70.73	-17.48	K ₂ Cr ₂ O ₇
K ₂ CrO ₄	-31.87	-32.44	-0.57	K ₂ CrO ₄
K ₂ MoO ₄	-17.00	-13.73	3.27	K ₂ MoO ₄
K ₂ SeO ₄	-23.80	-24.53	-0.73	K ₂ SeO ₄
Langite	-11.68	6.30	17.98	Cu ₄ (OH) ₆ SO ₄ :H ₂ O
Larnakite	-6.90	-7.26	-0.37	PbO:PbSO ₄
Laurionite	-5.01	-4.39	0.62	PbOHCl
Lepidocrocite	2.64	4.01	1.37	FeOOH
Lime	-24.28	8.99	33.28	CaO
Litharge	-8.86	4.03	12.89	PbO
Maghemite	1.64	8.03	6.39	Fe ₂ O ₃
Magnesioferrite	-0.71	16.98	17.69	Fe ₂ MgO ₄
Magnesite	-3.23	-10.75	-7.52	MgCO ₃
Magnetite	11.00	15.02	4.03	Fe ₃ O ₄
Malachite	-3.35	-8.88	-5.53	Cu ₂ (OH) ₂ CO ₃
Manganite	-9.16	16.18	25.34	MnOOH
Massicot	-9.06	4.03	13.09	PbO
Melanothallite	-17.87	-11.43	6.45	CuCl ₂
Melanterite	-6.06	-8.33	-2.27	FeSO ₄ :7H ₂ O
Mg (OH) ₂ (active)	-9.84	8.95	18.79	Mg (OH) ₂
Mg ₃ (PO ₄) ₂	-11.29	-34.57	-23.28	Mg ₃ (PO ₄) ₂
MgCr ₂ O ₄	-10.10	6.64	16.74	MgCr ₂ O ₄
MgCrO ₄	-35.00	-29.35	5.65	MgCrO ₄
MgHPO ₄ :3H ₂ O	-3.59	-21.76	-18.18	MgHPO ₄ :3H ₂ O
MgMoO ₄	-8.80	-10.65	-1.85	MgMoO ₄
MgSeO ₃ :6H ₂ O	-7.93	-4.89	3.04	MgSeO ₃ :6H ₂ O

MgSeO4:6H2O	-20.24	-21.44	-1.20	MgSeO4:6H2O
Minium	-42.34	32.45	74.78	Pb3O4
Mirabilite	-6.20	-7.55	-1.35	Na2SO4:10H2O
Mn2(SO4)3	-59.74	-64.96	-5.22	Mn2(SO4)3
Mn3(AsO4)2:8H2O	-17.89	-5.39	12.50	Mn3(AsO4)2:8H2O
Mn3(PO4)2	-19.58	-43.43	-23.85	Mn3(PO4)2
MnCl2:4H2O	-13.59	-10.84	2.75	MnCl2:4H2O
MnHPO4	0.69	-24.71	-25.40	MnHPO4
MnSe	-27.86	-24.06	3.79	MnSe
MnSeO3	-8.97	-7.84	1.13	MnSeO3
MnSeO3:2H2O	-8.80	-7.84	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-22.34	-24.39	-2.05	MnSeO4:5H2O
MnSO4	-12.10	-9.33	2.78	MnSO4
MoO3	-11.60	-19.60	-8.00	MoO3
Morenosite	-7.79	-9.98	-2.18	NiSO4:7H2O
Na-Jarosite	-3.97	-14.72	-10.75	NaFe3(SO4)2(OH)6
Na2Cr2O7	-58.86	-68.83	-9.96	Na2Cr2O7
Na2CrO4	-33.52	-30.53	2.99	Na2CrO4
Na2Mo2O7	-14.66	-31.42	-16.76	Na2Mo2O7
Na2MoO4	-13.34	-11.82	1.52	Na2MoO4
Na2MoO4:2H2O	-13.05	-11.83	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-16.37	-6.07	10.30	Na2SeO3:5H2O
Na2SeO4	-23.90	-22.62	1.28	Na2SeO4
Nantokite	-3.66	-10.52	-6.86	CuCl
Natron	-10.42	-11.93	-1.51	Na2CO3:10H2O
Nesquehonite	-6.15	-10.75	-4.60	MgCO3:3H2O
Ni(OH)2	-7.73	5.35	13.08	Ni(OH)2
Ni3(AsO4)2:8H2O	-23.03	-7.33	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-14.07	-45.37	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-25.93	6.07	32.00	Ni4(OH)6SO4
NiCO3	-7.60	-14.35	-6.75	NiCO3
NiMoO4	-3.10	-14.25	-11.15	NiMoO4
NiSe	-7.01	-24.71	-17.70	NiSe
NiSeO3:2H2O	-11.40	-8.49	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-23.52	-25.04	-1.52	NiSeO4:6H2O
Nsutite	-16.82	0.68	17.50	MnO2
O2(g)	-44.08	40.72	84.80	O2
Pb(BO2)2	-12.71	-6.15	6.57	Pb(BO2)2
Pb(OH)2	-4.30	4.03	8.32	Pb(OH)2
Pb10(OH)60(CO3)6	-69.13	-77.89	-8.76	Pb10(OH)60(CO3)6
Pb2(OH)3Cl	-9.15	-0.36	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-18.13	8.06	26.19	Pb2O(OH)2
Pb2O3	-32.62	28.42	61.04	Pb2O3
Pb2OCO3	-11.20	-11.64	-0.44	Pb2OCO3
Pb3(AsO4)2	-17.09	-11.29	5.80	Pb3(AsO4)2
Pb3(PO4)2	-5.80	-49.33	-43.53	Pb3(PO4)2
Pb3O2CO3	-18.96	-7.61	11.35	Pb3O2CO3
Pb3O2SO4	-14.16	-3.24	10.92	Pb3O2SO4
Pb4(OH)6SO4	-20.31	0.79	21.10	Pb4(OH)6SO4
Pb4O3SO4	-21.49	0.79	22.28	Pb4O3SO4
PbCrO4	-21.54	-34.27	-12.73	PbCrO4
PbHPO4	-2.88	-26.68	-23.81	PbHPO4
Pbmetal	-20.57	-16.33	4.24	Pb
PbMoO4	0.21	-15.57	-15.78	PbMoO4
PbO:0.3H2O	-8.95	4.03	12.98	PbO:0.33H2O
PbSeO4	-19.47	-26.36	-6.88	PbSeO4
Periclase	-13.09	8.95	22.04	MgO
Phosgenite	-8.66	-28.47	-19.81	PbCl2:PbCO3
Plattnerite	-26.10	24.39	50.49	PbO2
Plumbgummite	5.99	-26.80	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-14.19	8.99	23.19	Ca(OH)2
Pyrochroite	-9.49	6.00	15.48	Mn(OH)2
Pyrolusite	-15.84	26.36	42.19	MnO2
Pyromorphite	4.03	-80.40	-84.43	Pb5(PO4)3Cl
Retgersite	-7.92	-9.97	-2.05	NiSO4:6H2O
Rhodochrosite	-3.13	-13.70	-10.57	MnCO3
Semetal(am)	-2.56	-9.70	-7.14	Se
Semetal(hex)	-1.94	-9.70	-7.76	Se

SeO2	-13.96	-13.84	0.12	SeO2
SeO3	-51.87	-30.39	21.48	SeO3
Siderite	-2.51	-12.70	-10.19	FeCO3
Smithsonite	-4.11	-14.06	-9.95	ZnCO3
Spinel	-8.67	29.34	38.01	MgAl2O4
Strengite	-0.32	-26.70	-26.37	FePO4:2H2O
Tenorite	-2.43	5.41	7.84	CuO
Thenardite	-7.90	-7.55	0.35	Na2SO4
Thermonatrite	-12.59	-11.93	0.67	Na2CO3:H2O
Tsumebite	-7.46	-17.25	-9.79	Pb2CuPO4(OH) 3:3H2O
Vivianite	-4.44	-40.44	-36.00	Fe3(PO4) 2:8H2O
Witherite	-6.02	-14.60	-8.58	BaCO3
Zincite	-5.97	5.63	11.60	ZnO
Zincosite	-13.87	-9.69	4.18	ZnSO4
Zn(BO2) 2	-12.83	-4.54	8.29	Zn(BO2) 2
Zn(NO3) 2:6H2O	-70.84	-67.60	3.24	Zn(NO3) 2:6H2O
Zn(OH) 2	-6.57	5.63	12.20	Zn(OH) 2
Zn(OH) 2(am)	-7.08	5.63	12.71	Zn(OH) 2
Zn(OH) 2(beta)	-6.37	5.63	12.00	Zn(OH) 2
Zn(OH) 2(epsilon)	-6.15	5.63	11.78	Zn(OH) 2
Zn(OH) 2(gamma)	-6.10	5.63	11.73	Zn(OH) 2
Zn2(OH) 2SO4	-11.56	-4.06	7.50	Zn2(OH) 2SO4
Zn2(OH) 3Cl	-12.34	2.85	15.19	Zn2(OH) 3Cl
Zn3(AsO4) 2:2.5H2O	-20.13	-6.48	13.65	Zn3(AsO4) 2:2.5H2O
Zn3(PO4) 2:4H2O	-9.10	-44.52	-35.42	Zn3(PO4) 2:4H2O
Zn3O(SO4) 2	-33.43	-13.75	19.68	Zn3O(SO4) 2
Zn4(OH) 6SO4	-21.19	7.21	28.40	Zn4(OH) 6SO4
Zn5(OH) 8Cl2	-27.17	11.33	38.50	Zn5(OH) 8Cl2
ZnCl2	-18.47	-11.20	7.27	ZnCl2
ZnCO3:1H2O	-3.80	-14.06	-10.26	ZnCO3:1H2O
Znmetal	-40.97	-14.73	26.25	Zn
ZnMoO4	-3.87	-13.96	-10.09	ZnMoO4
ZnO(active)	-5.82	5.63	11.45	ZnO
ZnSe	-9.95	-24.43	-14.48	ZnSe
ZnSeO4:6H2O	-23.24	-24.76	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-9.18	-9.69	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Initial solution 4.

-----Solution composition-----

Elements	Molality	Moles
Al	2.977e-09	2.977e-09
As	2.680e-08	2.680e-08
B	9.287e-06	9.287e-06
Ba	2.924e-07	2.924e-07
Be	2.228e-07	2.228e-07
Ca	1.308e-02	1.308e-02
Cd	7.145e-09	7.145e-09
Cl	1.388e-02	1.388e-02
Co	1.227e-05	1.227e-05
Cr	6.372e-08	6.372e-08
Cu	9.874e-05	9.874e-05
Fe	3.595e-07	3.595e-07
K	6.291e-03	6.291e-03
Mg	3.635e-03	3.635e-03
Mn	1.827e-10	1.827e-10
Mo	1.151e-06	1.151e-06
N	7.218e-04	7.218e-04
Na	1.498e-02	1.498e-02
Ni	8.382e-06	8.382e-06
P	9.400e-06	9.400e-06
Pb	9.691e-08	9.691e-08
S(6)	2.322e-02	2.322e-02

Se	1.271e-07	1.271e-07
Zn	7.523e-06	7.523e-06

-----Description of solution-----

pH	=	4.750
pe	=	4.000
Activity of water	=	0.999
Ionic strength (mol/kgw)	=	7.170e-02
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	-3.485e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	20.00
Electrical balance (eq)	=	-4.666e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	-5.21
Iterations	=	10
Total H	=	1.110166e+02
Total O	=	5.559979e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.218e-05	1.778e-05	-4.654	-4.750	-0.096	0.00
OH-	4.890e-10	3.852e-10	-9.311	-9.414	-0.104	(0)
H2O	5.551e+01	9.988e-01	1.744	-0.001	0.000	18.05
Al	2.977e-09					
AlSO4+	2.401e-09	1.920e-09	-8.620	-8.717	-0.097	(0)
Al+3	3.265e-10	4.471e-11	-9.486	-10.350	-0.863	(0)
Al(SO4)2-	1.927e-10	1.541e-10	-9.715	-9.812	-0.097	(0)
AlOH+2	4.242e-11	1.820e-11	-10.372	-10.740	-0.368	(0)
Al(OH)2+	1.404e-11	1.136e-11	-10.853	-10.945	-0.092	(0)
Al(OH)3	1.282e-13	1.282e-13	-12.892	-12.892	0.000	(0)
Al(OH)4-	3.466e-15	2.772e-15	-14.460	-14.557	-0.097	(0)
AlMo6O21-3	9.100e-22	5.498e-23	-21.041	-22.260	-1.219	(0)
As(3)	2.994e-09					
H3AsO3	2.994e-09	2.994e-09	-8.524	-8.524	0.000	(0)
H2AsO3-	9.768e-14	7.151e-14	-13.010	-13.146	-0.135	(0)
H4AsO3+	3.604e-14	2.638e-14	-13.443	-13.579	-0.135	(0)
HAsO3-2	1.024e-20	2.943e-21	-19.990	-20.531	-0.542	(0)
AsO3-3	8.871e-29	5.360e-30	-28.052	-29.271	-1.219	(0)
As(5)	2.381e-08					
H2AsO4-	2.340e-08	1.713e-08	-7.631	-7.766	-0.135	(0)
HAsO4-2	3.601e-10	1.035e-10	-9.444	-9.985	-0.542	(0)
H3AsO4	4.958e-11	5.041e-11	-10.305	-10.298	0.007	(0)
AsO4-3	2.709e-16	1.637e-17	-15.567	-16.786	-1.219	(0)
B	9.287e-06					
H3BO3	9.287e-06	9.441e-06	-5.032	-5.025	0.007	(0)
H2BO3-	3.641e-10	2.820e-10	-9.439	-9.550	-0.111	(0)
CaH2BO3+	6.864e-11	5.315e-11	-10.163	-10.274	-0.111	(0)
MgH2BO3+	1.277e-11	9.891e-12	-10.894	-11.005	-0.111	(0)
NaH2BO3	5.668e-12	5.668e-12	-11.247	-11.247	0.000	(0)
H5(BO3)2-	3.020e-15	2.339e-15	-14.520	-14.631	-0.111	(0)
BaH2BO3+	1.323e-15	1.024e-15	-14.878	-14.990	-0.111	(0)
H8(BO3)3-	2.468e-18	1.911e-18	-17.608	-17.719	-0.111	(0)
Ba	2.924e-07					
Ba+2	2.924e-07	1.208e-07	-6.534	-6.918	-0.384	(0)
BaNH3+2	4.449e-15	1.278e-15	-14.352	-14.893	-0.542	(0)
BaH2BO3+	1.323e-15	1.024e-15	-14.878	-14.990	-0.111	(0)
BaOH+	2.439e-16	1.963e-16	-15.613	-15.707	-0.094	(0)
BaNO3+	0.000e+00	0.000e+00	-51.242	-51.378	-0.135	(0)
Be	2.228e-07					
Be+2	1.486e-07	6.139e-08	-6.828	-7.212	-0.384	(0)
BeSO4	5.224e-08	5.224e-08	-7.282	-7.282	0.000	(0)
BeOH+	1.686e-08	1.382e-08	-7.773	-7.859	-0.086	(0)
Be(SO4)2-2	3.792e-09	1.089e-09	-8.421	-8.963	-0.542	(0)

	BeCl+	1.341e-09	1.079e-09	-8.873	-8.967	-0.094	(0)
	Be (OH) 2	4.933e-12	4.933e-12	-11.307	-11.307	0.000	(0)
	Be2OH+3	8.412e-13	1.408e-13	-12.075	-12.851	-0.776	(0)
	Be3 (OH) 3+3	3.814e-16	6.386e-17	-15.419	-16.195	-0.776	(0)
	Be (OH) 3-	8.547e-17	7.008e-17	-16.068	-16.154	-0.086	(0)
	Be (OH) 4-2	5.534e-26	2.501e-26	-25.257	-25.602	-0.345	(0)
Ca	1.308e-02						
	Ca+2	8.148e-03	3.367e-03	-2.089	-2.473	-0.384	(0)
	CaSO4	4.927e-03	4.927e-03	-2.307	-2.307	0.000	(0)
	CaH2PO4+	5.780e-07	4.678e-07	-6.238	-6.330	-0.092	(0)
	CaHPO4	3.335e-08	3.335e-08	-7.477	-7.477	0.000	(0)
	CaNH3+2	2.473e-10	7.105e-11	-9.607	-10.148	-0.542	(0)
	CaH2BO3+	6.864e-11	5.315e-11	-10.163	-10.274	-0.111	(0)
	CaOH+	2.999e-11	2.445e-11	-10.523	-10.612	-0.089	(0)
	CaPO4-	5.524e-12	4.471e-12	-11.258	-11.350	-0.092	(0)
	Ca (NH3) 2+2	1.650e-18	4.741e-19	-17.782	-18.324	-0.542	(0)
	CaNO3+	0.000e+00	0.000e+00	-47.020	-47.155	-0.135	(0)
Cd	7.145e-09						
	Cd+2	2.941e-09	1.215e-09	-8.531	-8.915	-0.384	(0)
	CdSO4	1.800e-09	1.800e-09	-8.745	-8.745	0.000	(0)
	CdCl+	1.743e-09	1.276e-09	-8.759	-8.894	-0.135	(0)
	Cd (SO4) 2-2	6.018e-10	1.729e-10	-9.221	-9.762	-0.542	(0)
	CdCl2	5.809e-11	5.809e-11	-10.236	-10.236	0.000	(0)
	CdCl3-	5.281e-13	3.866e-13	-12.277	-12.413	-0.135	(0)
	CdOHC1	2.630e-14	2.630e-14	-13.580	-13.580	0.000	(0)
	CdOH+	5.116e-15	3.745e-15	-14.291	-14.427	-0.135	(0)
	Cd (OH) 2	1.949e-20	1.949e-20	-19.710	-19.710	0.000	(0)
	Cd2OH+3	4.018e-22	2.427e-23	-21.396	-22.615	-1.219	(0)
	Cd (SeO3) 2-2	1.497e-24	4.299e-25	-23.825	-24.367	-0.542	(0)
	Cd (OH) 3-	9.197e-28	6.733e-28	-27.036	-27.172	-0.135	(0)
	CdSeO4	4.585e-29	4.585e-29	-28.339	-28.339	0.000	(0)
	Cd (OH) 4-2	2.170e-37	6.233e-38	-36.664	-37.205	-0.542	(0)
	CdNO3+	0.000e+00	0.000e+00	-53.416	-53.551	-0.135	(0)
	Cd (NO3) 2	0.000e+00	0.000e+00	-99.113	-99.113	0.000	(0)
Cl	1.388e-02						
	Cl-	1.381e-02	1.107e-02	-1.860	-1.956	-0.096	(0)
	CuCl2-	2.901e-05	2.303e-05	-4.537	-4.638	-0.100	(0)
	CuCl	9.838e-06	9.838e-06	-5.007	-5.007	0.000	(0)
	CuCl+	3.155e-07	2.505e-07	-6.501	-6.601	-0.100	(0)
	CoCl+	1.314e-07	9.622e-08	-6.881	-7.017	-0.135	(0)
	CuCl3-2	1.272e-07	5.345e-08	-6.896	-7.272	-0.377	(0)
	NiCl+	8.541e-08	6.253e-08	-7.068	-7.204	-0.135	(0)
	ZnCl+	6.106e-08	4.847e-08	-7.214	-7.315	-0.100	(0)
	PbCl+	7.318e-09	5.357e-09	-8.136	-8.271	-0.135	(0)
	CdCl+	1.743e-09	1.276e-09	-8.759	-8.894	-0.135	(0)
	BeCl+	1.341e-09	1.079e-09	-8.873	-8.967	-0.094	(0)
	CuCl2	7.510e-10	7.510e-10	-9.124	-9.124	0.000	(0)
	ZnCl2	6.842e-10	6.842e-10	-9.165	-9.165	0.000	(0)
	PbCl2	2.590e-10	2.590e-10	-9.587	-9.587	0.000	(0)
	CdCl2	5.809e-11	5.809e-11	-10.236	-10.236	0.000	(0)
	ZnOHC1	3.725e-11	3.725e-11	-10.429	-10.429	0.000	(0)
	CrCl+2	3.660e-11	1.051e-11	-10.437	-10.978	-0.542	(0)
	ZnCl3-	7.424e-12	5.894e-12	-11.129	-11.230	-0.100	(0)
	NiCl2	3.533e-12	3.533e-12	-11.452	-11.452	0.000	(0)
	PbCl3-	1.647e-12	1.206e-12	-11.783	-11.919	-0.135	(0)
	MnCl+	6.844e-13	5.510e-13	-12.165	-12.259	-0.094	(0)
	CdCl3-	5.281e-13	3.866e-13	-12.277	-12.413	-0.135	(0)
	CuCl3-	8.931e-14	7.090e-14	-13.049	-13.149	-0.100	(0)
	ZnCl4-2	7.457e-14	3.134e-14	-13.127	-13.504	-0.377	(0)
	CdOHC1	2.630e-14	2.630e-14	-13.580	-13.580	0.000	(0)
	PbCl4-2	1.972e-14	5.666e-15	-13.705	-14.247	-0.542	(0)
	CrCl2+	9.684e-15	7.090e-15	-14.014	-14.149	-0.135	(0)
	MnCl2	8.616e-15	8.616e-15	-14.065	-14.065	0.000	(0)
	CrOHC12	6.133e-16	6.133e-16	-15.212	-15.212	0.000	(0)
	FeCl+2	3.353e-17	1.409e-17	-16.475	-16.851	-0.377	(0)
	MnCl3-	3.263e-17	2.627e-17	-16.486	-16.581	-0.094	(0)
	CuCl4-2	1.110e-17	4.663e-18	-16.955	-17.331	-0.377	(0)
	FeCl2+	1.014e-18	8.161e-19	-17.994	-18.088	-0.094	(0)

FeCl3	9.034e-22	9.034e-22	-21.044	-21.044	0.000	(0)
CoCl+2	7.123e-34	2.046e-34	-33.147	-33.689	-0.542	(0)
CrO3Cl-	0.000e+00	0.000e+00	-40.710	-40.845	-0.135	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-43.410	-43.952	-0.542	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-46.364	-46.905	-0.542	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-60.828	-61.370	-0.542	(0)
Co (2)	1.227e-05					
Co+2	8.867e-06	2.547e-06	-5.052	-5.594	-0.542	(0)
CoSO4	3.266e-06	3.266e-06	-5.486	-5.486	0.000	(0)
CoCl+	1.314e-07	9.622e-08	-6.881	-7.017	-0.135	(0)
CoHPO4	5.898e-11	5.898e-11	-10.229	-10.229	0.000	(0)
CoOH+	3.926e-11	2.875e-11	-10.406	-10.541	-0.135	(0)
Co (NH3) +2	2.795e-11	8.028e-12	-10.554	-11.095	-0.542	(0)
Co (OH) 2	1.291e-15	1.291e-15	-14.889	-14.889	0.000	(0)
Co2OH+3	6.075e-17	3.670e-18	-16.216	-17.435	-1.219	(0)
Co (NH3) 2+2	1.278e-17	3.670e-18	-16.894	-17.435	-0.542	(0)
Co (OH) 3-	1.991e-23	1.457e-23	-22.701	-22.836	-0.135	(0)
Co (NH3) 3+2	2.696e-24	7.744e-25	-23.569	-24.111	-0.542	(0)
CoOOH-	8.332e-25	6.100e-25	-24.079	-24.215	-0.135	(0)
CoSeO4	2.382e-25	2.382e-25	-24.623	-24.623	0.000	(0)
Co (NH3) 4+2	2.371e-31	6.812e-32	-30.625	-31.167	-0.542	(0)
Co4 (OH) 4+4	2.001e-32	1.362e-34	-31.699	-33.866	-2.167	(0)
Co (OH) 4-2	4.547e-33	1.306e-33	-32.342	-32.884	-0.542	(0)
Co (NH3) 5+2	6.596e-39	1.895e-39	-38.181	-38.722	-0.542	(0)
CoNO2+	6.432e-39	4.709e-39	-38.192	-38.327	-0.135	(0)
CoNO3+	0.000e+00	0.000e+00	-50.457	-50.593	-0.135	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-95.483	-95.483	0.000	(0)
Co (3)	1.016e-30					
CoOH+2	1.015e-30	2.915e-31	-29.994	-30.535	-0.542	(0)
Co+3	7.406e-34	1.014e-34	-33.130	-33.994	-0.863	(0)
CoCl+2	7.123e-34	2.046e-34	-33.147	-33.689	-0.542	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-46.364	-46.905	-0.542	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-56.587	-56.722	-0.135	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-60.828	-61.370	-0.542	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-63.608	-64.149	-0.542	(0)
Cr (2)	2.863e-20					
Cr+2	2.863e-20	8.225e-21	-19.543	-20.085	-0.542	(0)
Cr (3)	6.372e-08					
Cr (OH) +2	2.648e-08	7.608e-09	-7.577	-8.119	-0.542	(0)
CrSO4+	1.517e-08	1.110e-08	-7.819	-7.955	-0.135	(0)
Cr+3	1.453e-08	8.775e-10	-7.838	-9.057	-1.219	(0)
CrOHSO4	7.084e-09	7.084e-09	-8.150	-8.150	0.000	(0)
Cr (OH) 2+	4.184e-10	3.063e-10	-9.378	-9.514	-0.135	(0)
CrCl+2	3.660e-11	1.051e-11	-10.437	-10.978	-0.542	(0)
CrH2PO4+2	4.340e-12	1.247e-12	-11.363	-11.904	-0.542	(0)
Cr (OH) 3	6.508e-14	6.508e-14	-13.187	-13.187	0.000	(0)
Cr2 (OH) 2SO4+2	9.920e-15	2.850e-15	-14.003	-14.545	-0.542	(0)
CrCl2+	9.684e-15	7.090e-15	-14.014	-14.149	-0.135	(0)
Cr2 (OH) 2 (SO4) 2	1.135e-15	1.135e-15	-14.945	-14.945	0.000	(0)
CrOHC12	6.133e-16	6.133e-16	-15.212	-15.212	0.000	(0)
CrO2-	2.377e-18	1.740e-18	-17.624	-17.759	-0.135	(0)
Cr (OH) 4-	2.001e-18	1.465e-18	-17.699	-17.834	-0.135	(0)
Cr (NH3) 5OH+2	2.208e-37	6.342e-38	-36.656	-37.198	-0.542	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-41.879	-43.098	-1.219	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-43.410	-43.952	-0.542	(0)
CrNO3+2	0.000e+00	0.000e+00	-55.265	-55.807	-0.542	(0)
Cr (6)	1.602e-35					
HCrO4-	1.552e-35	1.136e-35	-34.809	-34.945	-0.135	(0)
CrO4-2	4.843e-37	2.002e-37	-36.315	-36.699	-0.384	(0)
NaCrO4-	1.576e-38	1.154e-38	-37.803	-37.938	-0.135	(0)
KCrO4-	4.899e-39	3.587e-39	-38.310	-38.445	-0.135	(0)
CrO3SO4-2	1.458e-39	4.189e-40	-38.836	-39.378	-0.542	(0)
CrO3HPO4-2	9.462e-40	2.718e-40	-39.024	-39.566	-0.542	(0)
H2CrO4	1.269e-40	1.269e-40	-39.896	-39.896	0.000	(0)
CrO3Cl-	0.000e+00	0.000e+00	-40.710	-40.845	-0.135	(0)
CrO3H2PO4-	0.000e+00	0.000e+00	-41.497	-41.633	-0.135	(0)
Cr2O7-2	0.000e+00	0.000e+00	-67.750	-68.292	-0.542	(0)
Cu (1)	3.994e-05					

CuCl2-	2.901e-05	2.303e-05	-4.537	-4.638	-0.100	(0)
CuCl	9.838e-06	9.838e-06	-5.007	-5.007	0.000	(0)
Cu+	9.642e-07	7.059e-07	-6.016	-6.151	-0.135	(0)
CuCl3-2	1.272e-07	5.345e-08	-6.896	-7.272	-0.377	(0)
Cu (2)	5.880e-05					
Cu+2	3.657e-05	1.511e-05	-4.437	-4.821	-0.384	(0)
CuSO4	2.187e-05	2.187e-05	-4.660	-4.660	0.000	(0)
CuCl+	3.155e-07	2.505e-07	-6.501	-6.601	-0.100	(0)
CuOH+	2.661e-08	2.113e-08	-7.575	-7.675	-0.100	(0)
CuNH3+2	1.481e-08	4.254e-09	-7.829	-8.371	-0.542	(0)
CuCl2	7.510e-10	7.510e-10	-9.124	-9.124	0.000	(0)
Cu2 (OH) 2+2	3.771e-11	1.083e-11	-10.423	-10.965	-0.542	(0)
Cu (OH) 2	3.050e-12	3.050e-12	-11.516	-11.516	0.000	(0)
CuCl3-	8.931e-14	7.090e-14	-13.049	-13.149	-0.100	(0)
CuCl4-2	1.110e-17	4.663e-18	-16.955	-17.331	-0.377	(0)
Cu (OH) 3-	4.834e-18	3.539e-18	-17.316	-17.451	-0.135	(0)
Cu (OH) 4-2	5.483e-26	1.575e-26	-25.261	-25.803	-0.542	(0)
CuNO2+	5.671e-37	4.151e-37	-36.246	-36.382	-0.135	(0)
CuNO3+	0.000e+00	0.000e+00	-49.372	-49.507	-0.135	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-68.953	-68.953	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-95.618	-95.618	0.000	(0)
Fe (2)	3.595e-07					
Fe+2	2.482e-07	7.129e-08	-6.605	-7.147	-0.542	(0)
FeSO4	1.111e-07	1.111e-07	-6.954	-6.954	0.000	(0)
FeH2PO4+	2.629e-10	2.127e-10	-9.580	-9.672	-0.092	(0)
FeHPO4	6.024e-12	6.024e-12	-11.220	-11.220	0.000	(0)
FeOH+	1.358e-12	1.093e-12	-11.867	-11.961	-0.094	(0)
Fe (OH) 2	3.167e-19	3.167e-19	-18.499	-18.499	0.000	(0)
Fe (OH) 3-	6.712e-23	5.404e-23	-22.173	-22.267	-0.094	(0)
Fe (3)	4.953e-12					
Fe (OH) 2+	4.901e-12	3.967e-12	-11.310	-11.402	-0.092	(0)
FeOH+2	3.218e-14	1.352e-14	-13.492	-13.869	-0.377	(0)
FeHPO4+	1.320e-14	1.068e-14	-13.880	-13.971	-0.092	(0)
FeSO4+	3.885e-15	3.128e-15	-14.411	-14.505	-0.094	(0)
Fe (OH) 3	1.180e-15	1.180e-15	-14.928	-14.928	0.000	(0)
Fe (SO4) 2-	6.376e-16	4.668e-16	-15.195	-15.331	-0.135	(0)
Fe+3	3.605e-16	4.937e-17	-15.443	-16.307	-0.863	(0)
FeCl+2	3.353e-17	1.409e-17	-16.475	-16.851	-0.377	(0)
FeH2PO4+2	1.301e-17	5.582e-18	-16.886	-17.253	-0.368	(0)
FeCl2+	1.014e-18	8.161e-19	-17.994	-18.088	-0.094	(0)
Fe (OH) 4-	1.568e-19	1.269e-19	-18.805	-18.897	-0.092	(0)
FeHSeO3+2	3.538e-20	1.016e-20	-19.451	-19.993	-0.542	(0)
FeCl3	9.034e-22	9.034e-22	-21.044	-21.044	0.000	(0)
Fe2 (OH) 2+4	1.063e-24	7.240e-27	-23.973	-26.140	-2.167	(0)
Fe3 (OH) 4+5	9.574e-34	3.939e-37	-33.019	-36.405	-3.386	(0)
FeNO3+2	0.000e+00	0.000e+00	-59.853	-60.395	-0.542	(0)
H (0)	4.633e-21					
H2	2.316e-21	2.355e-21	-20.635	-20.628	0.007	(0)
K	6.291e-03					
K+	6.016e-03	4.823e-03	-2.221	-2.317	-0.096	(0)
KSO4-	2.751e-04	2.226e-04	-3.560	-3.652	-0.092	(0)
KHPO4-	9.595e-10	7.766e-10	-9.018	-9.110	-0.092	(0)
KCrO4-	4.899e-39	3.587e-39	-38.310	-38.445	-0.135	(0)
Mg	3.635e-03					
Mg+2	2.448e-03	1.012e-03	-2.611	-2.995	-0.384	(0)
MgSO4	1.186e-03	1.186e-03	-2.926	-2.926	0.000	(0)
MgH2PO4+	3.706e-07	2.999e-07	-6.431	-6.523	-0.092	(0)
MgHPO4	1.383e-08	1.383e-08	-7.859	-7.859	0.000	(0)
MgOH+	1.742e-10	1.429e-10	-9.759	-9.845	-0.086	(0)
MgH2BO3+	1.277e-11	9.891e-12	-10.894	-11.005	-0.111	(0)
MgPO4-	2.594e-14	2.100e-14	-13.586	-13.678	-0.092	(0)
Mn (2)	1.827e-10					
Mn+2	1.376e-10	3.954e-11	-9.861	-10.403	-0.542	(0)
MnSO4	4.441e-11	4.441e-11	-10.352	-10.352	0.000	(0)
MnCl+	6.844e-13	5.510e-13	-12.165	-12.259	-0.094	(0)
MnCl2	8.616e-15	8.616e-15	-14.065	-14.065	0.000	(0)
MnOH+	4.752e-17	3.826e-17	-16.323	-16.417	-0.094	(0)
MnCl3-	3.263e-17	2.627e-17	-16.486	-16.581	-0.094	(0)

MnSe	1.949e-26	1.949e-26	-25.710	-25.710	0.000	(0)
MnSeO4	1.958e-30	1.958e-30	-29.708	-29.708	0.000	(0)
Mn (OH) 3-	1.379e-31	1.110e-31	-30.860	-30.955	-0.094	(0)
Mn (OH) 4-2	4.825e-40	2.028e-40	-39.317	-39.693	-0.377	(0)
MnNO3+	0.000e+00	0.000e+00	-55.266	-55.402	-0.135	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-100.196	-100.196	0.000	(0)
Mn (3)	6.143e-32					
Mn+3	6.143e-32	8.412e-33	-31.212	-32.075	-0.863	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-76.575	-76.952	-0.377	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-82.550	-82.657	-0.107	(0)
Mo	1.151e-06					
MoO4-2	9.618e-07	3.975e-07	-6.017	-6.401	-0.384	(0)
HMoO4-	1.674e-07	1.226e-07	-6.776	-6.912	-0.135	(0)
H2MoO4	2.191e-08	2.191e-08	-7.659	-7.659	0.000	(0)
AlMo6O21-3	9.100e-22	5.498e-23	-21.041	-22.260	-1.219	(0)
HMo7O24-5	7.260e-25	2.987e-28	-24.139	-27.525	-3.386	(0)
Mo7O24-6	5.543e-25	7.385e-30	-24.256	-29.132	-4.875	(0)
H2Mo7O24-4	4.628e-26	3.151e-28	-25.335	-27.502	-2.167	(0)
H3Mo7O24-3	1.657e-28	1.001e-29	-27.781	-29.000	-1.219	(0)
N (-3)	7.218e-04					
NH4+	6.751e-04	5.228e-04	-3.171	-3.282	-0.111	(0)
NH4SO4-	4.666e-05	3.757e-05	-4.331	-4.425	-0.094	(0)
CuNH3+2	1.481e-08	4.254e-09	-7.829	-8.371	-0.542	(0)
NH3	1.172e-08	1.172e-08	-7.931	-7.931	0.000	(0)
CaNH3+2	2.473e-10	7.105e-11	-9.607	-10.148	-0.542	(0)
NiNH3+2	1.112e-10	3.194e-11	-9.954	-10.496	-0.542	(0)
Co (NH3) +2	2.795e-11	8.028e-12	-10.554	-11.095	-0.542	(0)
BaNH3+2	4.449e-15	1.278e-15	-14.352	-14.893	-0.542	(0)
Ni (NH3) 2+2	3.662e-16	1.052e-16	-15.436	-15.978	-0.542	(0)
Co (NH3) 2+2	1.278e-17	3.670e-18	-16.894	-17.435	-0.542	(0)
Ca (NH3) 2+2	1.650e-18	4.741e-19	-17.782	-18.324	-0.542	(0)
Co (NH3) 3+2	2.696e-24	7.744e-25	-23.569	-24.111	-0.542	(0)
Co (NH3) 4+2	2.371e-31	6.812e-32	-30.625	-31.167	-0.542	(0)
Cr (NH3) 5OH+2	2.208e-37	6.342e-38	-36.656	-37.198	-0.542	(0)
Co (NH3) 5+2	6.596e-39	1.895e-39	-38.181	-38.722	-0.542	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-41.879	-43.098	-1.219	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-43.410	-43.952	-0.542	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-46.364	-46.905	-0.542	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-56.587	-56.722	-0.135	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-60.828	-61.370	-0.542	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-63.608	-64.149	-0.542	(0)
N (3)	3.363e-34					
NO2-	3.358e-34	2.623e-34	-33.474	-33.581	-0.107	(0)
CuNO2+	5.671e-37	4.151e-37	-36.246	-36.382	-0.135	(0)
CoNO2+	6.432e-39	4.709e-39	-38.192	-38.327	-0.135	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-68.953	-68.953	0.000	(0)
N (5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-45.103	-45.199	-0.096	(0)
CaNO3+	0.000e+00	0.000e+00	-47.020	-47.155	-0.135	(0)
CuNO3+	0.000e+00	0.000e+00	-49.372	-49.507	-0.135	(0)
NiNO3+	0.000e+00	0.000e+00	-50.313	-50.449	-0.135	(0)
ZnNO3+	0.000e+00	0.000e+00	-50.392	-50.528	-0.135	(0)
CoNO3+	0.000e+00	0.000e+00	-50.457	-50.593	-0.135	(0)
BaNO3+	0.000e+00	0.000e+00	-51.242	-51.378	-0.135	(0)
PbNO3+	0.000e+00	0.000e+00	-51.739	-51.874	-0.135	(0)
CdNO3+	0.000e+00	0.000e+00	-53.416	-53.551	-0.135	(0)
CrNO3+2	0.000e+00	0.000e+00	-55.265	-55.807	-0.542	(0)
MnNO3+	0.000e+00	0.000e+00	-55.266	-55.402	-0.135	(0)
FeNO3+2	0.000e+00	0.000e+00	-59.853	-60.395	-0.542	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-95.483	-95.483	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-95.618	-95.618	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-96.440	-96.440	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-96.817	-96.817	0.000	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-99.113	-99.113	0.000	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-100.196	-100.196	0.000	(0)
Na	1.498e-02					

Na+	1.447e-02	1.160e-02	-1.840	-1.936	-0.096	(0)
NaSO4-	5.126e-04	4.149e-04	-3.290	-3.382	-0.092	(0)
NaHPO4-	3.574e-09	2.892e-09	-8.447	-8.539	-0.092	(0)
NaH2BO3	5.668e-12	5.668e-12	-11.247	-11.247	0.000	(0)
NaCrO4-	1.576e-38	1.154e-38	-37.803	-37.938	-0.135	(0)
Ni	8.382e-06					
Ni+2	5.416e-06	2.238e-06	-5.266	-5.650	-0.384	(0)
NiSO4	2.878e-06	2.878e-06	-5.541	-5.541	0.000	(0)
NiCl+	8.541e-08	6.253e-08	-7.068	-7.204	-0.135	(0)
Ni (SO4) 2-2	2.315e-09	6.652e-10	-8.635	-9.177	-0.542	(0)
NiNH3+2	1.112e-10	3.194e-11	-9.954	-10.496	-0.542	(0)
NiOH+	1.524e-11	1.116e-11	-10.817	-10.952	-0.135	(0)
NiCl2	3.533e-12	3.533e-12	-11.452	-11.452	0.000	(0)
Ni (OH) 2	7.160e-16	7.160e-16	-15.145	-15.145	0.000	(0)
Ni (NH3) 2+2	3.662e-16	1.052e-16	-15.436	-15.978	-0.542	(0)
Ni (OH) 3-	5.531e-22	4.049e-22	-21.257	-21.393	-0.135	(0)
NiSeO4	1.926e-25	1.926e-25	-24.715	-24.715	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-50.313	-50.449	-0.135	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-52.441	-52.434	0.007	(0)
P	9.400e-06					
H2PO4-	8.327e-06	6.739e-06	-5.080	-5.171	-0.092	(0)
CaH2PO4+	5.780e-07	4.678e-07	-6.238	-6.330	-0.092	(0)
MgH2PO4+	3.706e-07	2.999e-07	-6.431	-6.523	-0.092	(0)
HPO4-2	5.600e-08	2.353e-08	-7.252	-7.628	-0.377	(0)
CaHPO4	3.335e-08	3.335e-08	-7.477	-7.477	0.000	(0)
H3PO4	1.596e-08	1.596e-08	-7.797	-7.797	0.000	(0)
MgHPO4	1.383e-08	1.383e-08	-7.859	-7.859	0.000	(0)
NaHPO4-	3.574e-09	2.892e-09	-8.447	-8.539	-0.092	(0)
KHPO4-	9.595e-10	7.766e-10	-9.018	-9.110	-0.092	(0)
FeH2PO4+	2.629e-10	2.127e-10	-9.580	-9.672	-0.092	(0)
CoHPO4	5.898e-11	5.898e-11	-10.229	-10.229	0.000	(0)
FeHPO4	6.024e-12	6.024e-12	-11.220	-11.220	0.000	(0)
CaPO4-	5.524e-12	4.471e-12	-11.258	-11.350	-0.092	(0)
CrH2PO4+2	4.340e-12	1.247e-12	-11.363	-11.904	-0.542	(0)
MgPO4-	2.594e-14	2.100e-14	-13.586	-13.678	-0.092	(0)
FeHPO4+	1.320e-14	1.068e-14	-13.880	-13.971	-0.092	(0)
PO4-3	3.676e-15	5.033e-16	-14.435	-15.298	-0.863	(0)
FeH2PO4+2	1.301e-17	5.582e-18	-16.886	-17.253	-0.368	(0)
CrO3HPO4-2	9.462e-40	2.718e-40	-39.024	-39.566	-0.542	(0)
CrO3H2PO4-	0.000e+00	0.000e+00	-41.497	-41.633	-0.135	(0)
Pb	9.691e-08					
PbSO4	4.757e-08	4.757e-08	-7.323	-7.323	0.000	(0)
Pb+2	3.504e-08	1.448e-08	-7.455	-7.839	-0.384	(0)
PbCl+	7.318e-09	5.357e-09	-8.136	-8.271	-0.135	(0)
Pb (SO4) 2-2	6.692e-09	1.922e-09	-8.174	-8.716	-0.542	(0)
PbCl2	2.590e-10	2.590e-10	-9.587	-9.587	0.000	(0)
PbOH+	2.810e-11	2.057e-11	-10.551	-10.687	-0.135	(0)
PbCl3-	1.647e-12	1.206e-12	-11.783	-11.919	-0.135	(0)
PbCl4-2	1.972e-14	5.666e-15	-13.705	-14.247	-0.542	(0)
Pb (OH) 2	3.679e-16	3.679e-16	-15.434	-15.434	0.000	(0)
Pb2OH+3	7.815e-17	4.722e-18	-16.107	-17.326	-1.219	(0)
Pb (OH) 3-	2.842e-22	2.081e-22	-21.546	-21.682	-0.135	(0)
Pb (OH) 4-2	1.003e-28	2.882e-29	-27.999	-28.540	-0.542	(0)
Pb3 (OH) 4+2	6.162e-29	1.770e-29	-28.210	-28.752	-0.542	(0)
Pb4 (OH) 4+4	3.600e-31	2.452e-33	-30.444	-32.611	-2.167	(0)
PbNO3+	0.000e+00	0.000e+00	-51.739	-51.874	-0.135	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-96.817	-96.817	0.000	(0)
S(6)	2.322e-02					
SO4-2	1.623e-02	6.707e-03	-1.790	-2.173	-0.384	(0)
CaSO4	4.927e-03	4.927e-03	-2.307	-2.307	0.000	(0)
MgSO4	1.186e-03	1.186e-03	-2.926	-2.926	0.000	(0)
NaSO4-	5.126e-04	4.149e-04	-3.290	-3.382	-0.092	(0)
KSO4-	2.751e-04	2.226e-04	-3.560	-3.652	-0.092	(0)
NH4SO4-	4.666e-05	3.757e-05	-4.331	-4.425	-0.094	(0)
CuSO4	2.187e-05	2.187e-05	-4.660	-4.660	0.000	(0)
HSO4-	1.253e-05	1.002e-05	-4.902	-4.999	-0.097	(0)
CoSO4	3.266e-06	3.266e-06	-5.486	-5.486	0.000	(0)

NiSO4	2.878e-06	2.878e-06	-5.541	-5.541	0.000	(0)
ZnSO4	2.544e-06	2.544e-06	-5.595	-5.595	0.000	(0)
Zn(SO4) 2-2	5.398e-07	1.551e-07	-6.268	-6.810	-0.542	(0)
FeSO4	1.111e-07	1.111e-07	-6.954	-6.954	0.000	(0)
BeSO4	5.224e-08	5.224e-08	-7.282	-7.282	0.000	(0)
PbSO4	4.757e-08	4.757e-08	-7.323	-7.323	0.000	(0)
CrSO4+	1.517e-08	1.110e-08	-7.819	-7.955	-0.135	(0)
CrOHSO4	7.084e-09	7.084e-09	-8.150	-8.150	0.000	(0)
Pb(SO4) 2-2	6.692e-09	1.922e-09	-8.174	-8.716	-0.542	(0)
Be(SO4) 2-2	3.792e-09	1.089e-09	-8.421	-8.963	-0.542	(0)
AlSO4+	2.401e-09	1.920e-09	-8.620	-8.717	-0.097	(0)
Ni(SO4) 2-2	2.315e-09	6.652e-10	-8.635	-9.177	-0.542	(0)
CdSO4	1.800e-09	1.800e-09	-8.745	-8.745	0.000	(0)
Cd(SO4) 2-2	6.018e-10	1.729e-10	-9.221	-9.762	-0.542	(0)
Al(SO4) 2-	1.927e-10	1.541e-10	-9.715	-9.812	-0.097	(0)
MnSO4	4.441e-11	4.441e-11	-10.352	-10.352	0.000	(0)
Cr2(OH) 2SO4+2	9.920e-15	2.850e-15	-14.003	-14.545	-0.542	(0)
FeSO4+	3.885e-15	3.128e-15	-14.411	-14.505	-0.094	(0)
Cr2(OH) 2(SO4) 2	1.135e-15	1.135e-15	-14.945	-14.945	0.000	(0)
Fe(SO4) 2-	6.376e-16	4.668e-16	-15.195	-15.331	-0.135	(0)
CrO3SO4-2	1.458e-39	4.189e-40	-38.836	-39.378	-0.542	(0)
Co(NH3) 6SO4+	0.000e+00	0.000e+00	-56.587	-56.722	-0.135	(0)
Se(-2)	3.193e-15					
HSe-	2.906e-15	2.127e-15	-14.537	-14.672	-0.135	(0)
H2Se	2.871e-16	2.871e-16	-15.542	-15.542	0.000	(0)
Se-2	2.991e-25	8.592e-26	-24.524	-25.066	-0.542	(0)
MnSe	1.949e-26	1.949e-26	-25.710	-25.710	0.000	(0)
Se(4)	1.271e-07					
HSeO3-	1.264e-07	9.254e-08	-6.898	-7.034	-0.135	(0)
H2SeO3	6.727e-10	6.727e-10	-9.172	-9.172	0.000	(0)
SeO3-2	6.967e-11	2.001e-11	-10.157	-10.699	-0.542	(0)
FeHSeO3+2	3.538e-20	1.016e-20	-19.451	-19.993	-0.542	(0)
Cd(SeO3) 2-2	1.497e-24	4.299e-25	-23.825	-24.367	-0.542	(0)
Se(6)	4.909e-22					
SeO4-2	4.902e-22	2.026e-22	-21.310	-21.693	-0.384	(0)
CoSeO4	2.382e-25	2.382e-25	-24.623	-24.623	0.000	(0)
HSeO4-	2.105e-25	1.541e-25	-24.677	-24.812	-0.135	(0)
NiSeO4	1.926e-25	1.926e-25	-24.715	-24.715	0.000	(0)
ZnSeO4	5.677e-26	5.677e-26	-25.246	-25.246	0.000	(0)
CdSeO4	4.585e-29	4.585e-29	-28.339	-28.339	0.000	(0)
MnSeO4	1.958e-30	1.958e-30	-29.708	-29.708	0.000	(0)
Zn(SeO4) 2-2	0.000e+00	0.000e+00	-46.392	-46.933	-0.542	(0)
Zn	7.523e-06					
Zn+2	4.378e-06	1.809e-06	-5.359	-5.743	-0.384	(0)
ZnSO4	2.544e-06	2.544e-06	-5.595	-5.595	0.000	(0)
Zn(SO4) 2-2	5.398e-07	1.551e-07	-6.268	-6.810	-0.542	(0)
ZnCl+	6.106e-08	4.847e-08	-7.214	-7.315	-0.100	(0)
ZnCl2	6.842e-10	6.842e-10	-9.165	-9.165	0.000	(0)
ZnOH+	9.520e-11	6.970e-11	-10.021	-10.157	-0.135	(0)
ZnOHC1	3.725e-11	3.725e-11	-10.429	-10.429	0.000	(0)
ZnCl3-	7.424e-12	5.894e-12	-11.129	-11.230	-0.100	(0)
ZnCl4-2	7.457e-14	3.134e-14	-13.127	-13.504	-0.377	(0)
Zn(OH) 2	9.172e-15	9.172e-15	-14.038	-14.038	0.000	(0)
Zn(OH) 3-	3.551e-20	2.600e-20	-19.450	-19.585	-0.135	(0)
ZnSeO4	5.677e-26	5.677e-26	-25.246	-25.246	0.000	(0)
Zn(OH) 4-2	2.038e-27	5.854e-28	-26.691	-27.233	-0.542	(0)
Zn(SeO4) 2-2	0.000e+00	0.000e+00	-46.392	-46.933	-0.542	(0)
ZnNO3+	0.000e+00	0.000e+00	-50.392	-50.528	-0.135	(0)
Zn(NO3) 2	0.000e+00	0.000e+00	-96.440	-96.440	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co(NH3) 5Cl) (NO3) 2	125.28	-119.01	6.27	(Co(NH3) 5Cl) (NO3) 2
(Co(NH3) 5Cl) Cl2	-37.06	-32.52	4.54	(Co(NH3) 5Cl) Cl2
(Co(NH3) 5OH2) Cl3	-44.33	-32.52	11.81	(Co(NH3) 5OH2) Cl3
(Co(NH3) 6) (NO3) 3	178.71	-160.78	17.93	(Co(NH3) 6) (NO3) 3

(Co (NH3) 6) Cl3	-51.18	-31.05	20.13	(Co (NH3) 6) Cl3
(NH4) 2CrO4	-43.64	-43.26	0.38	(NH4) 2CrO4
(NH4) 2SeO4	-28.71	-28.26	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	-7.23	3.90	11.13	Al (OH) 3
Al2 (MoO4) 3	-43.05	-39.90	3.15	Al2 (MoO4) 3
Al2O3	-12.63	7.80	20.43	Al2O3
Al4 (OH) 10SO4	-18.78	3.92	22.70	Al4 (OH) 10SO4
AlAsO4:2H2O	-11.20	-6.40	4.80	AlAsO4:2H2O
AlOHSO4	-4.54	-7.77	-3.23	AlOHSO4
Alunite	-8.44	-9.22	-0.77	KAl3 (SO4) 2 (OH) 6
Anglesite	-2.19	-10.01	-7.83	PbSO4
Anhydrite	-0.31	-4.65	-4.34	CaSO4
Antlerite	-6.43	2.36	8.79	Cu3 (OH) 4SO4
Arsenolite	-31.15	-34.09	-2.94	As4O6
As2O5	-27.37	-20.59	6.77	As2O5
Atacamite	-5.02	2.65	7.67	Cu2 (OH) 3Cl
Ba (OH) 2:8H2O	-21.98	2.58	24.56	Ba (OH) 2:8H2O
Ba3 (AsO4) 2	-3.91	-12.85	-8.94	Ba3 (AsO4) 2
BaCrO4	-33.85	-43.62	-9.77	BaCrO4
BaHPO4	-7.19	-26.97	-19.77	BaHPO4
BaMoO4	-6.33	-13.32	-6.99	BaMoO4
Barite	0.96	-9.09	-10.05	BaSO4
BaSeO3	-11.00	-9.20	1.79	BaSeO3
BaSeO4	-21.09	-28.61	-7.53	BaSeO4
Be (OH) 2 (alpha)	-4.61	2.29	6.89	Be (OH) 2
Be (OH) 2 (am)	-4.91	2.29	7.19	Be (OH) 2
Be (OH) 2 (beta)	-4.21	2.29	6.49	Be (OH) 2
BeMoO4	-12.00	-13.61	-1.61	BeMoO4
BeSeO4:4H2O	-25.97	-28.91	-2.94	BeSeO4:4H2O
Bianchite	-6.16	-7.92	-1.76	ZnSO4:6H2O
Birnessite	-27.17	-9.08	18.09	MnO2
Bixbyite	-35.38	-35.65	-0.27	Mn2O3
Boehmite	-5.03	3.90	8.93	AlOOH
Brochantite	-8.79	7.04	15.83	Cu4 (OH) 6SO4
Brucite	-10.68	6.50	17.18	Mg (OH) 2
Bunsenite	-8.90	3.85	12.74	NiO
Ca3 (AsO4) 2:4H2O	-21.82	0.48	22.30	Ca3 (AsO4) 2:4H2O
Ca3 (PO4) 2 (beta)	-8.93	-38.01	-29.08	Ca3 (PO4) 2
Ca4H (PO4) 3:3H2O	-13.46	-60.54	-47.08	Ca4H (PO4) 3:3H2O
CaCrO4	-36.99	-39.17	-2.19	CaCrO4
CaHPO4	-3.15	-22.52	-19.37	CaHPO4
CaHPO4:2H2O	-3.46	-22.52	-19.06	CaHPO4:2H2O
CaMoO4	-0.93	-8.87	-7.94	CaMoO4
CaSeO3:2H2O	-7.63	-4.76	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-21.17	-24.17	-3.00	CaSeO4:2H2O
Cd (BO2) 2	-19.30	-9.46	9.84	Cd (BO2) 2
Cd (OH) 2	-13.34	0.58	13.93	Cd (OH) 2
Cd (OH) 2 (am)	-13.41	0.58	13.99	Cd (OH) 2
Cd3 (OH) 2 (SO4) 2	-28.30	-21.59	6.71	Cd3 (OH) 2 (SO4) 2
Cd3 (OH) 4SO4	-32.48	-9.92	22.56	Cd3 (OH) 4SO4
Cd3 (PO4) 2	-24.74	-57.34	-32.60	Cd3 (PO4) 2
Cd4 (OH) 6SO4	-37.74	-9.34	28.40	Cd4 (OH) 6SO4
CdCl2	-12.22	-12.83	-0.60	CdCl2
CdCl2:1H2O	-11.16	-12.83	-1.67	CdCl2:1H2O
CdCl2:2.5H2O	-10.89	-12.83	-1.93	CdCl2:2.5H2O
Cdmetal (alpha)	-30.66	-16.92	13.74	Cd
Cdmetal (gamma)	-30.76	-16.92	13.84	Cd
CdMoO4	-1.11	-15.32	-14.21	CdMoO4
CdOHCl	-9.75	-6.12	3.63	CdOHCl
CdSe	1.59	-18.84	-20.43	CdSe
CdSeO4:2H2O	-28.76	-30.61	-1.85	CdSeO4:2H2O
CdSO4	-11.07	-11.09	-0.02	CdSO4
CdSO4:1H2O	-9.46	-11.09	-1.63	CdSO4:1H2O
CdSO4:2.67H2O	-9.27	-11.09	-1.82	CdSO4:2.67H2O
Chalcanthite	-4.34	-7.00	-2.66	CuSO4:5H2O
Claudetite	-30.86	-34.09	-3.23	As4O6
Clausthalite	9.70	-17.76	-27.46	PbSe
Co (BO2) 2	-33.21	-6.14	27.07	Co (BO2) 2

Co (OH) 2	-9.19	3.91	13.09	Co (OH) 2
Co (OH) 3	-17.71	-19.75	-2.03	Co (OH) 3
Co3 (AsO4) 2	-21.91	-8.88	13.03	Co3 (AsO4) 2
Co3 (PO4) 2	-12.69	-47.38	-34.69	Co3 (PO4) 2
Co3O4	-25.41	-35.58	-10.17	Co3O4
CoCl2	-18.01	-9.51	8.51	CoCl2
CoCl2:6H2O	-12.02	-9.51	2.51	CoCl2:6H2O
CoFe2O4	2.84	-0.21	-3.05	CoFe2O4
CoHPO4	-6.58	-25.64	-19.06	CoHPO4
CoMoO4	-4.30	-11.99	-7.69	CoMoO4
CoO	-10.00	3.91	13.90	CoO
CoSe	0.68	-15.52	-16.20	CoSe
CoSeO3	-9.20	-7.88	1.32	CoSeO3
CoSeO4:6H2O	-25.76	-27.29	-1.53	CoSeO4:6H2O
CoSO4	-10.81	-7.77	3.04	CoSO4
CoSO4:6H2O	-5.29	-7.77	-2.48	CoSO4:6H2O
Cotunnite	-6.89	-11.75	-4.86	PbCl2
Cr (OH) 2	-21.51	-10.59	10.93	Cr (OH) 2
Cr (OH) 3	-6.19	-4.76	1.42	Cr (OH) 3
Cr (OH) 3 (am)	-4.01	-4.76	-0.75	Cr (OH) 3
Cr2O3	-7.32	-9.53	-2.21	Cr2O3
CrCl2	-38.42	-24.00	14.42	CrCl2
CrCl3	-40.36	-24.88	15.48	CrCl3
Crmetal	-59.08	-28.08	31.00	Cr
CrO3	-43.00	-46.20	-3.19	CrO3
Cu (OH) 2	-4.16	4.68	8.84	Cu (OH) 2
Cu2 (OH) 3NO3	-50.06	-40.59	9.47	Cu2 (OH) 3NO3
Cu2Se (alpha)	24.22	-22.22	-46.44	Cu2Se
Cu2SO4	-12.58	-14.48	-1.89	Cu2SO4
Cu3 (AsO4) 2:2H2O	-12.66	-6.56	6.10	Cu3 (AsO4) 2:2H2O
Cu3 (PO4) 2	-8.21	-45.06	-36.85	Cu3 (PO4) 2
Cu3 (PO4) 2:3H2O	-9.94	-45.06	-35.12	Cu3 (PO4) 2:3H2O
Cu3Se2	27.54	-36.97	-64.51	Cu3Se2
CuCrO4	-36.08	-41.52	-5.44	CuCrO4
Cumetal	-1.18	-10.15	-8.97	Cu
CuMoO4	1.89	-11.22	-13.11	CuMoO4
CuOCuSO4	-13.03	-2.32	10.71	CuOCuSO4
Cupricferrite	-6.05	0.56	6.62	CuFe2O4
Cuprite	-1.77	-2.80	-1.04	Cu2O
Cuprousferrite	5.41	-3.46	-8.87	CuFeO2
CuSe	18.72	-14.74	-33.46	CuSe
CuSe2	17.12	-16.66	-33.79	CuSe2
CuSeO3:2H2O	-7.73	-7.11	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-24.08	-26.52	-2.44	CuSeO4:5H2O
CuSO4	-10.15	-6.99	3.16	CuSO4
Diaspore	-3.28	3.90	7.18	AlOOH
Epsomite	-3.01	-5.17	-2.16	MgSO4:7H2O
Fe (OH) 2	-11.21	2.35	13.56	Fe (OH) 2
Fe (OH) 2.7Cl.3	-1.03	-4.07	-3.04	Fe (OH) 2.7Cl.3
Fe2 (OH) 4SeO3	-17.45	-15.90	1.55	Fe2 (OH) 4SeO3
Fe2 (SeO3) 3:2H2O	-18.84	-39.47	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-36.12	-39.13	-3.01	Fe2 (SO4) 3
Fe3 (OH) 8	-21.99	-1.76	20.22	Fe3 (OH) 8
FeAsO4:2H2O	-12.76	-12.36	0.40	FeAsO4:2H2O
FeCr2O4	-14.79	-7.17	7.62	FeCr2O4
FeMoO4	-3.49	-13.55	-10.06	FeMoO4
Ferrihydrite	-5.47	-2.06	3.41	Fe (OH) 3
Ferroselite	-0.25	-18.99	-18.74	FeSe2
FeSe	-6.06	-17.07	-11.01	FeSe
Gibbsite	-4.68	3.90	8.58	Al (OH) 3
Goethite	-2.73	-2.06	0.67	FeOOH
Goslarite	-5.87	-7.92	-2.05	ZnSO4:7H2O
Gypsum	-0.03	-4.65	-4.61	CaSO4:2H2O
H-Jarosite	-18.11	-29.52	-11.41	(H3O) Fe3 (SO4) 2 (OH) 6
H2MoO4	-2.88	-15.90	-13.02	H2MoO4
H2Se (g)	-14.51	-19.42	-4.91	H2Se
Halite	-5.48	-3.89	1.59	NaCl
Hausmannite	-47.50	14.79	62.29	Mn3O4

Hematite	-3.08	-4.11	-1.03	Fe2O3
Hercynite	-13.68	10.15	23.83	FeAl2O4
Hinsdalite	-25.36	-27.86	-2.50	PbAl3PO4SO4 (OH) 6
Hydroxylapatite	-9.18	-53.51	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-17.55	-80.34	-62.79	Pb5 (PO4) 3OH
K-Alum	-11.76	-17.02	-5.26	KAl (SO4) 2:12H2O
K-Jarosite	-12.68	-27.09	-14.41	KFe3 (SO4) 2 (OH) 6
K2Cr2O7	-70.05	-87.53	-17.48	K2Cr2O7
K2CrO4	-40.76	-41.33	-0.57	K2CrO4
K2MoO4	-14.31	-11.03	3.27	K2MoO4
K2SeO4	-25.60	-26.33	-0.73	K2SeO4
Langite	-10.94	7.04	17.98	Cu4 (OH) 6SO4:H2O
Larnakite	-7.98	-8.35	-0.37	PbO:PbSO4
Laurionite	-5.67	-5.05	0.62	PbOHCl
Lepidocrocite	-3.43	-2.06	1.37	FeOOH
Lime	-26.25	7.03	33.28	CaO
Litharge	-11.23	1.66	12.89	PbO
Maghemite	-10.50	-4.11	6.39	Fe2O3
Magnesioferrite	-15.30	2.39	17.69	Fe2MgO4
Magnetite	-5.79	-1.76	4.03	Fe3O4
Manganite	-17.49	7.85	25.34	MnOOH
Massicot	-11.43	1.66	13.09	PbO
Melanothallite	-15.18	-8.73	6.45	CuCl2
Melanterite	-7.05	-9.32	-2.27	FeSO4:7H2O
Mg (OH) 2 (active)	-12.29	6.50	18.79	Mg (OH) 2
Mg3 (PO4) 2	-16.30	-39.58	-23.28	Mg3 (PO4) 2
MgCr2O4	-19.76	-3.02	16.74	MgCr2O4
MgCrO4	-45.34	-39.69	5.65	MgCrO4
MgHPO4:3H2O	-4.87	-23.04	-18.18	MgHPO4:3H2O
MgMoO4	-7.55	-9.40	-1.85	MgMoO4
MgSeO3:6H2O	-8.32	-5.28	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-23.49	-24.69	-1.20	MgSeO4:6H2O
Minium	-52.30	22.48	74.78	Pb3O4
Mirabilite	-4.70	-6.05	-1.35	Na2SO4:10H2O
Mn2 (SO4) 3	-65.45	-70.67	-5.22	Mn2 (SO4) 3
Mn3 (AsO4) 2:8H2O	-35.81	-23.31	12.50	Mn3 (AsO4) 2:8H2O
Mn3 (PO4) 2	-37.95	-61.81	-23.85	Mn3 (PO4) 2
MnCl2:4H2O	-17.06	-14.32	2.75	MnCl2:4H2O
MnHPO4	-5.05	-30.45	-25.40	MnHPO4
MnSe	-24.12	-20.33	3.79	MnSe
MnSeO3	-13.82	-12.69	1.13	MnSeO3
MnSeO3:2H2O	-13.64	-12.69	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-30.05	-32.10	-2.05	MnSeO4:5H2O
MnSO4	-15.35	-12.58	2.78	MnSO4
Monteponite	-14.83	0.58	15.41	CdO
MoO3	-7.90	-15.90	-8.00	MoO3
Morenosite	-5.65	-7.83	-2.18	NiSO4:7H2O
Na-Jarosite	-15.96	-26.71	-10.75	NaFe3 (SO4) 2 (OH) 6
Na2Cr2O7	-76.81	-86.77	-9.96	Na2Cr2O7
Na2CrO4	-43.56	-40.57	2.99	Na2CrO4
Na2Mo2O7	-9.41	-26.17	-16.76	Na2Mo2O7
Na2MoO4	-11.79	-10.27	1.52	Na2MoO4
Na2MoO4:2H2O	-11.50	-10.27	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-16.46	-6.16	10.30	Na2SeO3:5H2O
Na2SeO4	-26.84	-25.56	1.28	Na2SeO4
Nantokite	-1.25	-8.11	-6.86	CuCl
Ni (OH) 2	-9.23	3.85	13.08	Ni (OH) 2
Ni3 (AsO4) 2:8H2O	-24.75	-9.05	15.70	Ni3 (AsO4) 2:8H2O
Ni3 (PO4) 2	-16.25	-47.55	-31.30	Ni3 (PO4) 2
Ni4 (OH) 6SO4	-28.28	3.72	32.00	Ni4 (OH) 6SO4
NiMoO4	-0.90	-12.05	-11.15	NiMoO4
NiSe	2.13	-15.57	-17.70	NiSe
NiSeO3:2H2O	-10.84	-7.93	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-25.83	-27.35	-1.52	NiSeO4:6H2O
Nsutite	-26.58	-9.08	17.50	MnO2
O2 (g)	-49.80	35.00	84.80	O2
Pb (BO2) 2	-14.95	-8.39	6.57	Pb (BO2) 2
Pb (OH) 2	-6.67	1.66	8.32	Pb (OH) 2

Pb2 (OH) 3Cl	-12.18	-3.39	8.79	Pb2 (OH) 3Cl
Pb2O (OH) 2	-22.87	3.32	26.19	Pb2O (OH) 2
Pb2O3	-40.22	20.82	61.04	Pb2O3
Pb3 (AsO4) 2	-21.41	-15.61	5.80	Pb3 (AsO4) 2
Pb3 (PO4) 2	-10.58	-54.11	-43.53	Pb3 (PO4) 2
Pb3O2SO4	-17.61	-6.69	10.92	Pb3O2SO4
Pb4 (OH) 6SO4	-26.13	-5.03	21.10	Pb4 (OH) 6SO4
Pb4O3SO4	-27.32	-5.03	22.28	Pb4O3SO4
PbCrO4	-31.81	-44.54	-12.73	PbCrO4
PbHPO4	-4.08	-27.89	-23.81	PbHPO4
Pbmetal	-20.08	-15.84	4.24	Pb
PbMoO4	1.54	-14.24	-15.78	PbMoO4
PbO:0.33H2O	-11.32	1.66	12.98	PbO:0.33H2O
PbSeO4	-22.65	-29.53	-6.88	PbSeO4
Periclase	-15.53	6.50	22.04	MgO
Plattnerite	-31.33	19.16	50.49	PbO2
Plumbgummitite	-12.95	-45.74	-32.79	PbAl3 (PO4) 2 (OH) 5:H2O
Portlandite	-16.16	7.03	23.19	Ca (OH) 2
Pyrochroite	-16.39	-0.90	15.48	Mn (OH) 2
Pyrolusite	-25.60	16.60	42.19	MnO2
Pyromorphite	-2.62	-87.05	-84.43	Pb5 (PO4) 3Cl
Retgersite	-5.77	-7.83	-2.05	NiSO4:6H2O
Semetal (am)	5.22	-1.92	-7.14	Se
Semetal (hex)	5.83	-1.92	-7.76	Se
SeO2	-11.90	-11.78	0.12	SeO2
SeO3	-52.67	-31.19	21.48	SeO3
Spinel	-23.70	14.30	38.01	MgAl2O4
Strengite	-5.23	-31.61	-26.37	FePO4:2H2O
Tenorite	-3.16	4.68	7.84	CuO
Thenardite	-6.39	-6.04	0.35	Na2SO4
Tsumebite	-11.76	-21.55	-9.79	Pb2CuPO4 (OH) 3:3H2O
Vivianite	-16.04	-52.04	-36.00	Fe3 (PO4) 2:8H2O
Zincite	-7.84	3.76	11.60	ZnO
Zincosite	-12.09	-7.92	4.18	ZnSO4
Zn (BO2) 2	-14.58	-6.29	8.29	Zn (BO2) 2
Zn (NO3) 2:6H2O	-99.38	-96.14	3.24	Zn (NO3) 2:6H2O
Zn (OH) 2	-8.44	3.76	12.20	Zn (OH) 2
Zn (OH) 2 (am)	-8.96	3.76	12.71	Zn (OH) 2
Zn (OH) 2 (beta)	-8.25	3.76	12.00	Zn (OH) 2
Zn (OH) 2 (epsilon)	-8.02	3.76	11.78	Zn (OH) 2
Zn (OH) 2 (gamma)	-7.98	3.76	11.73	Zn (OH) 2
Zn2 (OH) 2SO4	-11.66	-4.16	7.50	Zn2 (OH) 2SO4
Zn2 (OH) 3Cl	-14.38	0.81	15.19	Zn2 (OH) 3Cl
Zn3 (AsO4) 2:2.5H2O	-22.97	-9.32	13.65	Zn3 (AsO4) 2:2.5H2O
Zn3 (PO4) 2:4H2O	-12.41	-47.83	-35.42	Zn3 (PO4) 2:4H2O
Zn3O (SO4) 2	-31.76	-12.08	19.68	Zn3O (SO4) 2
Zn4 (OH) 6SO4	-25.05	3.35	28.40	Zn4 (OH) 6SO4
Zn5 (OH) 8Cl2	-33.13	5.37	38.50	Zn5 (OH) 8Cl2
ZnCl2	-16.92	-9.65	7.27	ZnCl2
Znmetal	-39.99	-13.74	26.25	Zn
ZnMoO4	-2.05	-12.14	-10.09	ZnMoO4
ZnO (active)	-7.70	3.76	11.45	ZnO
ZnSe	-1.19	-15.66	-14.48	ZnSe
ZnSeO4:6H2O	-25.92	-27.44	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.41	-7.92	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 1.

Mixture 1.

3.000e-02 Solution 1
 1.000e-01 Solution 2
 1.000e-01 Solution 3
 7.700e-01 Solution 4

-----Solution composition-----

Elements	Molality	Moles
Al	6.051e-06	6.051e-06
As	2.504e-08	2.504e-08
B	8.428e-06	8.428e-06
Ba	2.687e-07	2.687e-07
Be	1.716e-07	1.716e-07
C	2.779e-04	2.779e-04
Ca	1.028e-02	1.028e-02
Cd	6.929e-09	6.929e-09
Cl	1.286e-02	1.286e-02
Co	1.071e-05	1.071e-05
Cr	6.657e-08	6.657e-08
Cu	7.622e-05	7.622e-05
Fe	5.777e-05	5.777e-05
Hg	6.994e-11	6.994e-11
K	4.966e-03	4.966e-03
Mg	3.211e-03	3.211e-03
Mn	6.887e-06	6.887e-06
Mo	8.960e-07	8.960e-07
N	7.519e-04	7.519e-04
Na	1.376e-02	1.376e-02
Ni	6.709e-06	6.709e-06
P	9.935e-06	9.935e-06
Pb	7.708e-08	7.708e-08
S	1.856e-02	1.856e-02
Se	1.121e-07	1.121e-07
Zn	5.931e-06	5.931e-06

-----Description of solution-----

pH	=	6.281	Charge balance
pe	=	3.998	Adjusted to redox equilibrium
Activity of water	=	0.999	
Ionic strength (mol/kgw)	=	6.076e-02	
Mass of water (kg)	=	1.000e+00	
Total alkalinity (eq/kg)	=	1.597e-04	
Total CO2 (mol/kg)	=	2.779e-04	
Temperature (°C)	=	20.03	
Electrical balance (eq)	=	-3.388e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-4.40	
Iterations	=	13	
Total H	=	1.110172e+02	
Total O	=	5.558201e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	6.452e-07	5.235e-07	-6.190	-6.281	-0.091	0.00
OH-	1.641e-08	1.312e-08	-7.785	-7.882	-0.097	(0)
H2O	5.551e+01	9.990e-01	1.744	-0.000	0.000	18.05
Al	6.051e-06					
Al (OH) 2+	3.287e-06	2.691e-06	-5.483	-5.570	-0.087	(0)
Al (OH) 3	1.032e-06	1.032e-06	-5.986	-5.986	0.000	(0)
Al (OH) 4-	9.423e-07	7.634e-07	-6.026	-6.117	-0.091	(0)
AlSO4+	4.180e-07	3.387e-07	-6.379	-6.470	-0.091	(0)
AlOH+2	2.828e-07	1.271e-07	-6.548	-6.896	-0.347	(0)
Al+3	6.024e-08	9.176e-09	-7.220	-8.037	-0.817	(0)

Al (SO4) 2-	2.879e-08	2.332e-08	-7.541	-7.632	-0.091	(0)
AlMo6O21-3	8.187e-29	6.180e-30	-28.087	-29.209	-1.122	(0)
As (3)	5.680e-14					
H3AsO3	5.674e-14	5.674e-14	-13.246	-13.246	0.000	(0)
H2AsO3-	6.141e-17	4.608e-17	-16.212	-16.336	-0.125	(0)
H4AsO3+	1.961e-20	1.472e-20	-19.708	-19.832	-0.125	(0)
HAsO3-2	2.034e-22	6.450e-23	-21.692	-22.190	-0.499	(0)
AsO3-3	5.291e-29	3.995e-30	-28.276	-29.399	-1.122	(0)
As (5)	2.504e-08					
H2AsO4-	1.686e-08	1.265e-08	-7.773	-7.898	-0.125	(0)
HAsO4-2	8.184e-09	2.596e-09	-8.087	-8.586	-0.499	(0)
H3AsO4	1.081e-12	1.096e-12	-11.966	-11.960	0.006	(0)
AsO4-3	1.849e-13	1.396e-14	-12.733	-13.855	-1.122	(0)
B	8.428e-06					
H3BO3	8.415e-06	8.534e-06	-5.075	-5.069	0.006	(0)
H2BO3-	1.100e-08	8.662e-09	-7.959	-8.062	-0.104	(0)
CaH2BO3+	1.775e-09	1.398e-09	-8.751	-8.855	-0.104	(0)
MgH2BO3+	3.692e-10	2.908e-10	-9.433	-9.536	-0.104	(0)
NaH2BO3	1.625e-10	1.625e-10	-9.789	-9.789	0.000	(0)
H5 (BO3) 2-	8.244e-14	6.492e-14	-13.084	-13.188	-0.104	(0)
BaH2BO3+	3.849e-14	3.031e-14	-13.415	-13.518	-0.104	(0)
H8 (BO3) 3-	6.094e-17	4.799e-17	-16.215	-16.319	-0.104	(0)
Ba	2.687e-07					
Ba+2	2.686e-07	1.164e-07	-6.571	-6.934	-0.363	(0)
BaHCO3+	1.234e-10	1.017e-10	-9.909	-9.992	-0.084	(0)
BaCO3	4.709e-13	4.709e-13	-12.327	-12.327	0.000	(0)
BaNH3+2	1.408e-13	4.465e-14	-12.851	-13.350	-0.499	(0)
BaH2BO3+	3.849e-14	3.031e-14	-13.415	-13.518	-0.104	(0)
BaOH+	7.902e-15	6.441e-15	-14.102	-14.191	-0.089	(0)
BaNO3+	1.163e-36	8.730e-37	-35.934	-36.059	-0.125	(0)
Be	1.716e-07					
BeOH+	1.273e-07	1.055e-07	-6.895	-6.977	-0.082	(0)
Be+2	3.182e-08	1.379e-08	-7.497	-7.861	-0.363	(0)
BeSO4	1.008e-08	1.008e-08	-7.996	-7.996	0.000	(0)
Be (OH) 2	1.279e-09	1.279e-09	-8.893	-8.893	0.000	(0)
Be (SO4) 2-2	5.684e-10	1.803e-10	-9.245	-9.744	-0.499	(0)
BeCl+	2.792e-10	2.276e-10	-9.554	-9.643	-0.089	(0)
BeCO3	2.181e-10	2.181e-10	-9.661	-9.661	0.000	(0)
Be2OH+3	1.313e-12	2.413e-13	-11.882	-12.617	-0.736	(0)
Be (OH) 3-	7.449e-13	6.171e-13	-12.128	-12.210	-0.082	(0)
Be3 (OH) 3+3	1.543e-13	2.836e-14	-12.812	-13.547	-0.736	(0)
Be (OH) 4-2	1.589e-20	7.482e-21	-19.799	-20.126	-0.327	(0)
C (4)	2.779e-04					
H2CO3	1.361e-04	1.361e-04	-3.866	-3.866	0.000	(0)
HCO3-	1.326e-04	1.086e-04	-3.877	-3.964	-0.087	(0)
CaHCO3+	6.167e-06	5.083e-06	-5.210	-5.294	-0.084	(0)
MgHCO3+	1.301e-06	1.047e-06	-5.886	-5.980	-0.094	(0)
NaHCO3	7.265e-07	7.265e-07	-6.139	-6.139	0.000	(0)
CuCO3	6.489e-07	6.489e-07	-6.188	-6.188	0.000	(0)
CuHCO3+	1.035e-07	7.764e-08	-6.985	-7.110	-0.125	(0)
CaCO3	3.603e-08	3.603e-08	-7.443	-7.443	0.000	(0)
NiHCO3+	3.125e-08	2.345e-08	-7.505	-7.630	-0.125	(0)
CoHCO3+	2.529e-08	1.898e-08	-7.597	-7.722	-0.125	(0)
CO3-2	2.031e-08	8.802e-09	-7.692	-8.055	-0.363	(0)
FeHCO3+	1.895e-08	1.562e-08	-7.722	-7.806	-0.084	(0)
ZnHCO3+	6.546e-09	4.912e-09	-8.184	-8.309	-0.125	(0)
MgCO3	6.529e-09	6.529e-09	-8.185	-8.185	0.000	(0)
MnHCO3+	4.307e-09	3.510e-09	-8.366	-8.455	-0.089	(0)
NaCO3-	2.491e-09	2.040e-09	-8.604	-8.690	-0.087	(0)
PbHCO3+	1.229e-09	9.223e-10	-8.910	-9.035	-0.125	(0)
ZnCO3	8.005e-10	8.005e-10	-9.097	-9.097	0.000	(0)
NiCO3	6.356e-10	6.356e-10	-9.197	-9.197	0.000	(0)
CoCO3	3.694e-10	3.694e-10	-9.432	-9.432	0.000	(0)
PbCO3	3.342e-10	3.342e-10	-9.476	-9.476	0.000	(0)
BeCO3	2.181e-10	2.181e-10	-9.661	-9.661	0.000	(0)
BaHCO3+	1.234e-10	1.017e-10	-9.909	-9.992	-0.084	(0)
Cu (CO3) 2-2	4.847e-11	1.537e-11	-10.315	-10.813	-0.499	(0)
BaCO3	4.709e-13	4.709e-13	-12.327	-12.327	0.000	(0)

	CdHCO3+	3.922e-13	2.943e-13	-12.406	-12.531	-0.125	(0)
	CdCO3	2.639e-13	2.639e-13	-12.579	-12.579	0.000	(0)
	Pb (CO3) 2-2	2.674e-14	8.483e-15	-13.573	-14.071	-0.499	(0)
	Cd (CO3) 2-2	5.429e-18	1.722e-18	-17.265	-17.764	-0.499	(0)
	HgCO3	4.647e-21	4.647e-21	-20.333	-20.333	0.000	(0)
	HgHCO3+	6.036e-23	4.530e-23	-22.219	-22.344	-0.125	(0)
	Hg (CO3) 2-2	4.078e-25	1.293e-25	-24.390	-24.888	-0.499	(0)
Ca	1.028e-02						
	Ca+2	6.650e-03	2.882e-03	-2.177	-2.540	-0.363	(0)
	CaSO4	3.621e-03	3.621e-03	-2.441	-2.441	0.000	(0)
	CaHCO3+	6.167e-06	5.083e-06	-5.210	-5.294	-0.084	(0)
	CaHPO4	7.691e-07	7.691e-07	-6.114	-6.114	0.000	(0)
	CaH2PO4+	3.878e-07	3.176e-07	-6.411	-6.498	-0.087	(0)
	CaCO3	3.603e-08	3.603e-08	-7.443	-7.443	0.000	(0)
	CaNH3+2	6.954e-09	2.206e-09	-8.158	-8.656	-0.499	(0)
	CaPO4-	4.280e-09	3.505e-09	-8.369	-8.455	-0.087	(0)
	CaH2BO3+	1.775e-09	1.398e-09	-8.751	-8.855	-0.104	(0)
	CaOH+	8.647e-10	7.127e-10	-9.063	-9.147	-0.084	(0)
	Ca (NH3) 2+2	1.683e-15	5.339e-16	-14.774	-15.273	-0.499	(0)
	CaNO3+	1.725e-32	1.295e-32	-31.763	-31.888	-0.125	(0)
Cd	6.929e-09						
	Cd+2	3.036e-09	1.315e-09	-8.518	-8.881	-0.363	(0)
	CdCl+	1.728e-09	1.297e-09	-8.762	-8.887	-0.125	(0)
	CdSO4	1.673e-09	1.673e-09	-8.777	-8.777	0.000	(0)
	Cd (SO4) 2-2	4.347e-10	1.379e-10	-9.362	-9.860	-0.499	(0)
	CdCl2	5.543e-11	5.543e-11	-10.256	-10.256	0.000	(0)
	CdOHC1	9.086e-13	9.086e-13	-12.042	-12.042	0.000	(0)
	CdCl3-	4.618e-13	3.466e-13	-12.336	-12.460	-0.125	(0)
	CdHCO3+	3.922e-13	2.943e-13	-12.406	-12.531	-0.125	(0)
	CdCO3	2.639e-13	2.639e-13	-12.579	-12.579	0.000	(0)
	CdOH+	1.839e-13	1.380e-13	-12.735	-12.860	-0.125	(0)
	Cd (OH) 2	2.434e-17	2.434e-17	-16.614	-16.614	0.000	(0)
	Cd (CO3) 2-2	5.429e-18	1.722e-18	-17.265	-17.764	-0.499	(0)
	Cd2OH+3	1.282e-20	9.675e-22	-19.892	-21.014	-1.122	(0)
	Cd (SeO3) 2-2	1.352e-21	4.288e-22	-20.869	-21.368	-0.499	(0)
	Cd (OH) 3-	3.807e-23	2.857e-23	-22.419	-22.544	-0.125	(0)
	CdSeO4	1.735e-24	1.735e-24	-23.761	-23.761	0.000	(0)
	Cd (OH) 4-2	2.833e-31	8.987e-32	-30.548	-31.046	-0.499	(0)
	CdNO3+	8.762e-39	6.575e-39	-38.057	-38.182	-0.125	(0)
	CdHS+	0.000e+00	0.000e+00	-57.659	-57.784	-0.125	(0)
	Cd (NO3) 2	0.000e+00	0.000e+00	-68.408	-68.408	0.000	(0)
	Cd (HS) 2	0.000e+00	0.000e+00	-107.490	-107.490	0.000	(0)
	Cd (HS) 3-	0.000e+00	0.000e+00	-162.376	-162.501	-0.125	(0)
	Cd (HS) 4-2	0.000e+00	0.000e+00	-216.717	-217.215	-0.499	(0)
Cl	1.286e-02						
	Cl-	1.281e-02	1.039e-02	-1.892	-1.983	-0.091	(0)
	CuCl2-	2.101e-05	1.691e-05	-4.678	-4.772	-0.094	(0)
	CuCl	7.695e-06	7.695e-06	-5.114	-5.114	0.000	(0)
	CuCl+	2.421e-07	1.949e-07	-6.616	-6.710	-0.094	(0)
	CoCl+	1.174e-07	8.807e-08	-6.931	-7.055	-0.125	(0)
	CuCl3-2	8.353e-08	3.687e-08	-7.078	-7.433	-0.355	(0)
	NiCl+	6.767e-08	5.078e-08	-7.170	-7.294	-0.125	(0)
	ZnCl+	4.941e-08	3.977e-08	-7.306	-7.400	-0.094	(0)
	MnCl+	2.673e-08	2.179e-08	-7.573	-7.662	-0.089	(0)
	PbCl+	5.848e-09	4.389e-09	-8.233	-8.358	-0.125	(0)
	CdCl+	1.728e-09	1.297e-09	-8.762	-8.887	-0.125	(0)
	ZnOHC1	1.038e-09	1.038e-09	-8.984	-8.984	0.000	(0)
	CuCl2	5.495e-10	5.495e-10	-9.260	-9.260	0.000	(0)
	ZnCl2	5.279e-10	5.279e-10	-9.277	-9.277	0.000	(0)
	MnCl2	3.199e-10	3.199e-10	-9.495	-9.495	0.000	(0)
	BeCl+	2.792e-10	2.276e-10	-9.554	-9.643	-0.089	(0)
	PbCl2	1.992e-10	1.992e-10	-9.701	-9.701	0.000	(0)
	CdCl2	5.543e-11	5.543e-11	-10.256	-10.256	0.000	(0)
	ZnCl3-	5.305e-12	4.270e-12	-11.275	-11.370	-0.094	(0)
	NiCl2	2.694e-12	2.694e-12	-11.570	-11.570	0.000	(0)
	CrCl+2	1.360e-12	4.314e-13	-11.866	-12.365	-0.499	(0)
	PbCl3-	1.160e-12	8.709e-13	-11.935	-12.060	-0.125	(0)
	MnCl3-	1.124e-12	9.158e-13	-11.949	-12.038	-0.089	(0)

CdOHC1	9.086e-13	9.086e-13	-12.042	-12.042	0.000	(0)
CdCl3-	4.618e-13	3.466e-13	-12.336	-12.460	-0.125	(0)
CuCl3-	6.056e-14	4.874e-14	-13.218	-13.312	-0.094	(0)
ZnCl4-2	4.831e-14	2.132e-14	-13.316	-13.671	-0.355	(0)
PbCl4-2	1.212e-14	3.844e-15	-13.917	-14.415	-0.499	(0)
HgCl2	8.968e-15	8.968e-15	-14.047	-14.047	0.000	(0)
FeCl+2	5.293e-15	2.336e-15	-14.276	-14.632	-0.355	(0)
HgCl3-	1.256e-15	9.425e-16	-14.901	-15.026	-0.125	(0)
CrOHC12	8.063e-16	8.063e-16	-15.093	-15.093	0.000	(0)
CrCl2+	3.650e-16	2.739e-16	-15.438	-15.562	-0.125	(0)
HgClOH	2.084e-16	2.084e-16	-15.681	-15.681	0.000	(0)
FeCl2+	1.557e-16	1.269e-16	-15.808	-15.896	-0.089	(0)
HgCl4-2	1.287e-16	4.083e-17	-15.890	-16.389	-0.499	(0)
CuCl4-2	6.814e-18	3.007e-18	-17.167	-17.522	-0.355	(0)
HgCl+	1.872e-19	1.405e-19	-18.728	-18.852	-0.125	(0)
FeCl3	1.320e-19	1.320e-19	-18.880	-18.880	0.000	(0)
CrO3Cl-	1.191e-33	8.939e-34	-32.924	-33.049	-0.125	(0)
CoCl+2	5.877e-34	1.864e-34	-33.231	-33.730	-0.499	(0)
Cr(NH3) 6Cl+2	3.306e-36	1.049e-36	-35.481	-35.979	-0.499	(0)
Co(NH3) 5Cl+2	2.252e-39	7.142e-40	-38.647	-39.146	-0.499	(0)
Co(NH3) 6Cl+2	0.000e+00	0.000e+00	-51.552	-52.051	-0.499	(0)
Co (2)	1.071e-05					
Co+2	7.828e-06	2.483e-06	-5.106	-5.605	-0.499	(0)
CoSO4	2.734e-06	2.734e-06	-5.563	-5.563	0.000	(0)
CoCl+	1.174e-07	8.807e-08	-6.931	-7.055	-0.125	(0)
CoHCO3+	2.529e-08	1.898e-08	-7.597	-7.722	-0.125	(0)
CoHPO4	1.549e-09	1.549e-09	-8.810	-8.810	0.000	(0)
CoOH+	1.268e-09	9.519e-10	-8.897	-9.021	-0.125	(0)
Co(NH3) +2	8.924e-10	2.831e-10	-9.049	-9.548	-0.499	(0)
CoCO3	3.694e-10	3.694e-10	-9.432	-9.432	0.000	(0)
Co(OH) 2	1.453e-12	1.453e-12	-11.838	-11.838	0.000	(0)
Co(NH3) 2+2	1.484e-14	4.707e-15	-13.829	-14.327	-0.499	(0)
Co2OH+3	1.569e-15	1.184e-16	-14.804	-15.926	-1.122	(0)
Co(OH) 3-	7.422e-19	5.570e-19	-18.129	-18.254	-0.125	(0)
Co(NH3) 3+2	1.136e-19	3.603e-20	-18.945	-19.443	-0.499	(0)
CoOOH-	3.140e-20	2.357e-20	-19.503	-19.628	-0.125	(0)
CoSeO4	8.119e-21	8.119e-21	-20.091	-20.091	0.000	(0)
Co(NH3) 4+2	3.625e-25	1.150e-25	-24.441	-24.939	-0.499	(0)
Co4(OH) 4+4	1.619e-26	1.638e-28	-25.791	-27.786	-1.995	(0)
CoNO2+	1.150e-26	8.632e-27	-25.939	-26.064	-0.125	(0)
Co(OH) 4-2	5.348e-27	1.696e-27	-26.272	-26.771	-0.499	(0)
Co(NH3) 5+2	3.657e-31	1.160e-31	-30.437	-30.936	-0.499	(0)
CoNO3+	7.180e-36	5.388e-36	-35.144	-35.269	-0.125	(0)
Co(NO3) 2	0.000e+00	0.000e+00	-64.824	-64.824	0.000	(0)
Co (3)	3.027e-29					
CoOH+2	3.027e-29	9.600e-30	-28.519	-29.018	-0.499	(0)
Co+3	6.454e-34	9.832e-35	-33.190	-34.007	-0.817	(0)
CoCl+2	5.877e-34	1.864e-34	-33.231	-33.730	-0.499	(0)
Co(NH3) 5Cl+2	2.252e-39	7.142e-40	-38.647	-39.146	-0.499	(0)
Co(NH3) 6SO4+	0.000e+00	0.000e+00	-47.317	-47.442	-0.125	(0)
Co(NH3) 6Cl+2	0.000e+00	0.000e+00	-51.552	-52.051	-0.499	(0)
Co(NH3) 6OH+2	0.000e+00	0.000e+00	-52.775	-53.274	-0.499	(0)
Cr (2)	1.145e-21					
Cr+2	1.145e-21	3.631e-22	-20.941	-21.440	-0.499	(0)
Cr (3)	6.657e-08					
Cr(OH) +2	3.565e-08	1.131e-08	-7.448	-7.947	-0.499	(0)
Cr(OH) 2+	2.068e-08	1.552e-08	-7.684	-7.809	-0.125	(0)
CrOHSO4	9.069e-09	9.069e-09	-8.042	-8.042	0.000	(0)
CrSO4+	5.552e-10	4.167e-10	-9.256	-9.380	-0.125	(0)
Cr+3	5.074e-10	3.831e-11	-9.295	-10.417	-1.122	(0)
Cr(OH) 3	1.120e-10	1.120e-10	-9.951	-9.951	0.000	(0)
CrCl+2	1.360e-12	4.314e-13	-11.866	-12.365	-0.499	(0)
CrH2PO4+2	1.369e-13	4.342e-14	-12.864	-13.362	-0.499	(0)
CrO2-	1.355e-13	1.017e-13	-12.868	-12.993	-0.125	(0)
Cr(OH) 4-	1.142e-13	8.569e-14	-12.942	-13.067	-0.125	(0)
Cr2(OH) 2SO4+2	1.715e-14	5.440e-15	-13.766	-14.264	-0.499	(0)
Cr2(OH) 2(SO4) 2	1.861e-15	1.861e-15	-14.730	-14.730	0.000	(0)
CrOHC12	8.063e-16	8.063e-16	-15.093	-15.093	0.000	(0)

CrCl2+	3.650e-16	2.739e-16	-15.438	-15.562	-0.125	(0)
Cr(NH3) 5OH+2	1.873e-29	5.940e-30	-28.727	-29.226	-0.499	(0)
Cr(NH3) 6+3	1.056e-34	7.976e-36	-33.976	-35.098	-1.122	(0)
Cr(NH3) 6Cl+2	3.306e-36	1.049e-36	-35.481	-35.979	-0.499	(0)
CrNO3+2	0.000e+00	0.000e+00	-41.331	-41.830	-0.499	(0)
Cr (6)	7.125e-26					
CrO4-2	3.555e-26	1.540e-26	-25.449	-25.812	-0.363	(0)
HCrO4-	3.430e-26	2.574e-26	-25.465	-25.589	-0.125	(0)
NaCrO4-	1.105e-27	8.290e-28	-26.957	-27.081	-0.125	(0)
KCrO4-	2.956e-28	2.219e-28	-27.529	-27.654	-0.125	(0)
CrO3HPO4-2	1.540e-30	4.886e-31	-29.812	-30.311	-0.499	(0)
CrO3SO4-2	7.560e-32	2.398e-32	-31.121	-31.620	-0.499	(0)
H2CrO4	8.480e-33	8.480e-33	-32.072	-32.072	0.000	(0)
CrO3Cl-	1.191e-33	8.939e-34	-32.924	-33.049	-0.125	(0)
CrO3H2PO4-	1.642e-34	1.232e-34	-33.785	-33.909	-0.125	(0)
Cr2O7-2	0.000e+00	0.000e+00	-49.083	-49.582	-0.499	(0)
Cu (1)	2.958e-05					
CuCl2-	2.101e-05	1.691e-05	-4.678	-4.772	-0.094	(0)
CuCl	7.695e-06	7.695e-06	-5.114	-5.114	0.000	(0)
Cu+	7.836e-07	5.881e-07	-6.106	-6.231	-0.125	(0)
CuCl3-2	8.353e-08	3.687e-08	-7.078	-7.433	-0.355	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-103.707	-104.100	-0.393	(0)
CuS4S5-3	0.000e+00	0.000e+00	-104.458	-104.830	-0.372	(0)
Cu (2)	4.665e-05					
Cu+2	2.889e-05	1.252e-05	-4.539	-4.902	-0.363	(0)
CuSO4	1.556e-05	1.556e-05	-4.808	-4.808	0.000	(0)
CuOH+	7.398e-07	5.955e-07	-6.131	-6.225	-0.094	(0)
CuCO3	6.489e-07	6.489e-07	-6.188	-6.188	0.000	(0)
CuNH3+2	4.018e-07	1.274e-07	-6.396	-6.895	-0.499	(0)
CuCl+	2.421e-07	1.949e-07	-6.616	-6.710	-0.094	(0)
CuHCO3+	1.035e-07	7.764e-08	-6.985	-7.110	-0.125	(0)
Cu2 (OH) 2+2	2.714e-08	8.608e-09	-7.566	-8.065	-0.499	(0)
Cu (OH) 2	2.917e-09	2.917e-09	-8.535	-8.535	0.000	(0)
CuCl2	5.495e-10	5.495e-10	-9.260	-9.260	0.000	(0)
Cu (CO3) 2-2	4.847e-11	1.537e-11	-10.315	-10.813	-0.499	(0)
Cu (OH) 3-	1.532e-13	1.150e-13	-12.815	-12.939	-0.125	(0)
CuCl3-	6.056e-14	4.874e-14	-13.218	-13.312	-0.094	(0)
CuCl4-2	6.814e-18	3.007e-18	-17.167	-17.522	-0.355	(0)
Cu (OH) 4-2	5.481e-20	1.738e-20	-19.261	-19.760	-0.499	(0)
CuNO2+	8.619e-25	6.468e-25	-24.065	-24.189	-0.125	(0)
CuNO3+	7.430e-35	5.576e-35	-34.129	-34.254	-0.125	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-44.486	-44.486	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-65.029	-65.029	0.000	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-149.611	-149.735	-0.125	(0)
Fe (2)	5.677e-05					
Fe+2	3.979e-05	1.262e-05	-4.400	-4.899	-0.499	(0)
FeSO4	1.689e-05	1.689e-05	-4.772	-4.772	0.000	(0)
FeH2PO4+	3.650e-08	2.989e-08	-7.438	-7.525	-0.087	(0)
FeHPO4	2.874e-08	2.874e-08	-7.541	-7.541	0.000	(0)
FeHCO3+	1.895e-08	1.562e-08	-7.722	-7.806	-0.084	(0)
FeOH+	8.087e-09	6.592e-09	-8.092	-8.181	-0.089	(0)
Fe (OH) 2	6.503e-14	6.503e-14	-13.187	-13.187	0.000	(0)
Fe (OH) 3-	4.628e-16	3.772e-16	-15.335	-15.423	-0.089	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-109.770	-109.770	0.000	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-164.519	-164.644	-0.125	(0)
Fe (3)	9.949e-07					
Fe (OH) 2+	9.864e-07	8.077e-07	-6.006	-6.093	-0.087	(0)
Fe (OH) 3	8.197e-09	8.197e-09	-8.086	-8.086	0.000	(0)
FeOH+2	1.839e-10	8.118e-11	-9.735	-10.091	-0.355	(0)
FeHPO4+	6.194e-11	5.071e-11	-10.208	-10.295	-0.087	(0)
Fe (OH) 4-	3.642e-11	2.982e-11	-10.439	-10.525	-0.087	(0)
FeSO4+	5.818e-13	4.742e-13	-12.235	-12.324	-0.089	(0)
Fe (SO4) 2-	8.093e-14	6.074e-14	-13.092	-13.217	-0.125	(0)
Fe+3	5.717e-14	8.709e-15	-13.243	-14.060	-0.817	(0)
FeCl+2	5.293e-15	2.336e-15	-14.276	-14.632	-0.355	(0)
FeH2PO4+2	1.738e-15	7.813e-16	-14.760	-15.107	-0.347	(0)
FeCl2+	1.557e-16	1.269e-16	-15.808	-15.896	-0.089	(0)
Fe2 (OH) 2+4	2.576e-17	2.607e-19	-16.589	-18.584	-1.995	(0)

	FeHSeO3+2	5.058e-18	1.604e-18	-17.296	-17.795	-0.499	(0)
	FeCl3	1.320e-19	1.320e-19	-18.880	-18.880	0.000	(0)
	Fe3(OH) 4+5	3.781e-21	2.889e-24	-20.422	-23.539	-3.117	(0)
	FeNO3+2	0.000e+00	0.000e+00	-42.315	-42.814	-0.499	(0)
H (0)	4.067e-24						
	H2	2.034e-24	2.062e-24	-23.692	-23.686	0.006	(0)
Hg (0)	6.993e-11						
	Hg	6.993e-11	6.993e-11	-10.155	-10.155	0.000	(0)
Hg (1)	1.201e-25						
	Hg2+2	6.003e-26	1.904e-26	-25.222	-25.720	-0.499	(0)
Hg (2)	1.056e-14						
	HgCl2	8.968e-15	8.968e-15	-14.047	-14.047	0.000	(0)
	HgCl3-	1.256e-15	9.425e-16	-14.901	-15.026	-0.125	(0)
	HgClOH	2.084e-16	2.084e-16	-15.681	-15.681	0.000	(0)
	HgCl4-2	1.287e-16	4.083e-17	-15.890	-16.389	-0.499	(0)
	Hg(NH3) 2+2	1.753e-18	5.561e-19	-17.756	-18.255	-0.499	(0)
	Hg(OH) 2	1.013e-18	1.028e-18	-17.994	-17.988	0.006	(0)
	HgCl+	1.872e-19	1.405e-19	-18.728	-18.852	-0.125	(0)
	HgCO3	4.647e-21	4.647e-21	-20.333	-20.333	0.000	(0)
	HgNH3+2	5.336e-22	1.692e-22	-21.273	-21.771	-0.499	(0)
	HgOH+	5.118e-22	3.841e-22	-21.291	-21.416	-0.125	(0)
	HgHCO3+	6.036e-23	4.530e-23	-22.219	-22.344	-0.125	(0)
	Hg(NH3) 3+2	6.664e-24	2.114e-24	-23.176	-23.675	-0.499	(0)
	Hg+2	1.825e-24	5.789e-25	-23.739	-24.237	-0.499	(0)
	HgSO4	6.651e-25	6.651e-25	-24.177	-24.177	0.000	(0)
	Hg(CO3) 2-2	4.078e-25	1.293e-25	-24.390	-24.888	-0.499	(0)
	Hg(OH) 3-	3.313e-27	2.486e-27	-26.480	-26.604	-0.125	(0)
	Hg(NH3) 4+2	5.089e-29	1.614e-29	-28.293	-28.792	-0.499	(0)
	HgNO3+	0.000e+00	0.000e+00	-54.527	-54.652	-0.125	(0)
	Hg(NO3) 2	0.000e+00	0.000e+00	-84.896	-84.896	0.000	(0)
	HgHS2-	0.000e+00	0.000e+00	-99.843	-99.967	-0.125	(0)
	Hg(HS) 2	0.000e+00	0.000e+00	-99.855	-99.855	0.000	(0)
	HgS2-2	0.000e+00	0.000e+00	-101.896	-102.394	-0.499	(0)
K	4.966e-03						
	K+	4.778e-03	3.877e-03	-2.321	-2.412	-0.091	(0)
	KSO4-	1.877e-04	1.537e-04	-3.727	-3.813	-0.087	(0)
	KHPO4-	2.055e-08	1.682e-08	-7.687	-7.774	-0.087	(0)
	KCrO4-	2.956e-28	2.219e-28	-27.529	-27.654	-0.125	(0)
Mg	3.211e-03						
	Mg+2	2.234e-03	9.681e-04	-2.651	-3.014	-0.363	(0)
	MgSO4	9.749e-04	9.749e-04	-3.011	-3.011	0.000	(0)
	MgHCO3+	1.301e-06	1.047e-06	-5.886	-5.980	-0.094	(0)
	MgHPO4	3.567e-07	3.567e-07	-6.448	-6.448	0.000	(0)
	MgH2PO4+	2.780e-07	2.277e-07	-6.556	-6.643	-0.087	(0)
	MgCO3	6.529e-09	6.529e-09	-8.185	-8.185	0.000	(0)
	MgOH+	5.622e-09	4.658e-09	-8.250	-8.332	-0.082	(0)
	MgH2BO3+	3.692e-10	2.908e-10	-9.433	-9.536	-0.104	(0)
	MgPO4-	2.248e-11	1.840e-11	-10.648	-10.735	-0.087	(0)
Mn (2)	6.887e-06						
	Mn+2	5.249e-06	1.665e-06	-5.280	-5.779	-0.499	(0)
	MnSO4	1.606e-06	1.606e-06	-5.794	-5.794	0.000	(0)
	MnCl+	2.673e-08	2.179e-08	-7.573	-7.662	-0.089	(0)
	MnHCO3+	4.307e-09	3.510e-09	-8.366	-8.455	-0.089	(0)
	MnCl2	3.199e-10	3.199e-10	-9.495	-9.495	0.000	(0)
	MnOH+	6.731e-11	5.486e-11	-10.172	-10.261	-0.089	(0)
	MnCl3-	1.124e-12	9.158e-13	-11.949	-12.038	-0.089	(0)
	MnSeO4	2.884e-21	2.884e-21	-20.540	-20.540	0.000	(0)
	Mn(OH) 3-	2.250e-22	1.834e-22	-21.648	-21.737	-0.089	(0)
	Mn(OH) 4-2	2.577e-29	1.137e-29	-28.589	-28.944	-0.355	(0)
	MnSe	1.674e-29	1.674e-29	-28.776	-28.776	0.000	(0)
	MnNO3+	4.815e-36	3.613e-36	-35.317	-35.442	-0.125	(0)
	Mn(NO3) 2	0.000e+00	0.000e+00	-64.901	-64.901	0.000	(0)
Mn (3)	2.323e-27						
	Mn+3	2.323e-27	3.539e-28	-26.634	-27.451	-0.817	(0)
Mn (6)	0.000e+00						
	MnO4-2	0.000e+00	0.000e+00	-59.720	-60.075	-0.355	(0)
Mn (7)	0.000e+00						
	MnO4-	0.000e+00	0.000e+00	-65.680	-65.780	-0.100	(0)

Mo	8.960e-07					
MoO4-2	8.913e-07	3.862e-07	-6.050	-6.413	-0.363	(0)
HMoO4-	4.676e-09	3.509e-09	-8.330	-8.455	-0.125	(0)
H2MoO4	1.843e-11	1.843e-11	-10.735	-10.735	0.000	(0)
AlMo6O21-3	8.187e-29	6.180e-30	-28.087	-29.209	-1.122	(0)
Mo7O24-6	1.039e-37	0.000e+00	-36.984	-41.472	-4.488	(0)
HMo7O24-5	5.260e-39	0.000e+00	-38.279	-41.396	-3.117	(0)
H2Mo7O24-4	0.000e+00	0.000e+00	-40.909	-42.904	-1.995	(0)
H3Mo7O24-3	0.000e+00	0.000e+00	-44.811	-45.933	-1.122	(0)
N (-3)	7.519e-04					
NH4+	7.088e-04	5.582e-04	-3.149	-3.253	-0.104	(0)
NH4SO4-	4.226e-05	3.444e-05	-4.374	-4.463	-0.089	(0)
NH3	4.261e-07	4.261e-07	-6.371	-6.371	0.000	(0)
CuNH3+2	4.018e-07	1.274e-07	-6.396	-6.895	-0.499	(0)
CaNH3+2	6.954e-09	2.206e-09	-8.158	-8.656	-0.499	(0)
NiNH3+2	3.151e-09	9.993e-10	-8.502	-9.000	-0.499	(0)
Co (NH3) +2	8.924e-10	2.831e-10	-9.049	-9.548	-0.499	(0)
Ni (NH3) 2+2	3.756e-13	1.191e-13	-12.425	-12.924	-0.499	(0)
BaNH3+2	1.408e-13	4.465e-14	-12.851	-13.350	-0.499	(0)
Co (NH3) 2+2	1.484e-14	4.707e-15	-13.829	-14.327	-0.499	(0)
Ca (NH3) 2+2	1.683e-15	5.339e-16	-14.774	-15.273	-0.499	(0)
Hg (NH3) 2+2	1.753e-18	5.561e-19	-17.756	-18.255	-0.499	(0)
Co (NH3) 3+2	1.136e-19	3.603e-20	-18.945	-19.443	-0.499	(0)
HgNH3+2	5.336e-22	1.692e-22	-21.273	-21.771	-0.499	(0)
Hg (NH3) 3+2	6.664e-24	2.114e-24	-23.176	-23.675	-0.499	(0)
Co (NH3) 4+2	3.625e-25	1.150e-25	-24.441	-24.939	-0.499	(0)
Hg (NH3) 4+2	5.089e-29	1.614e-29	-28.293	-28.792	-0.499	(0)
Cr (NH3) 5OH+2	1.873e-29	5.940e-30	-28.727	-29.226	-0.499	(0)
Co (NH3) 5+2	3.657e-31	1.160e-31	-30.437	-30.936	-0.499	(0)
Cr (NH3) 6+3	1.056e-34	7.976e-36	-33.976	-35.098	-1.122	(0)
Cr (NH3) 6Cl+2	3.306e-36	1.049e-36	-35.481	-35.979	-0.499	(0)
Co (NH3) 5Cl+2	2.252e-39	7.142e-40	-38.647	-39.146	-0.499	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-47.317	-47.442	-0.125	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-51.552	-52.051	-0.499	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.775	-53.274	-0.499	(0)
N (3)	6.225e-22					
NO2-	6.216e-22	4.934e-22	-21.206	-21.307	-0.100	(0)
CuNO2+	8.619e-25	6.468e-25	-24.065	-24.189	-0.125	(0)
CoNO2+	1.150e-26	8.632e-27	-25.939	-26.064	-0.125	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-44.486	-44.486	0.000	(0)
N (5)	1.705e-30					
NO3-	1.688e-30	1.369e-30	-29.773	-29.863	-0.091	(0)
CaNO3+	1.725e-32	1.295e-32	-31.763	-31.888	-0.125	(0)
CuNO3+	7.430e-35	5.576e-35	-34.129	-34.254	-0.125	(0)
NiNO3+	8.872e-36	6.658e-36	-35.052	-35.177	-0.125	(0)
ZnNO3+	7.475e-36	5.610e-36	-35.126	-35.251	-0.125	(0)
CoNO3+	7.180e-36	5.388e-36	-35.144	-35.269	-0.125	(0)
MnNO3+	4.815e-36	3.613e-36	-35.317	-35.442	-0.125	(0)
BaNO3+	1.163e-36	8.730e-37	-35.934	-36.059	-0.125	(0)
PbNO3+	3.362e-37	2.523e-37	-36.473	-36.598	-0.125	(0)
CdNO3+	8.762e-39	6.575e-39	-38.057	-38.182	-0.125	(0)
CrNO3+2	0.000e+00	0.000e+00	-41.331	-41.830	-0.499	(0)
FeNO3+2	0.000e+00	0.000e+00	-42.315	-42.814	-0.499	(0)
HgNO3+	0.000e+00	0.000e+00	-54.527	-54.652	-0.125	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-64.824	-64.824	0.000	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-64.901	-64.901	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-65.029	-65.029	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-65.828	-65.828	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-66.206	-66.206	0.000	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-68.408	-68.408	0.000	(0)
Hg (NO3) 2	0.000e+00	0.000e+00	-84.896	-84.896	0.000	(0)
Na	1.376e-02					
Na+	1.335e-02	1.083e-02	-1.875	-1.965	-0.091	(0)
NaSO4-	4.062e-04	3.326e-04	-3.391	-3.478	-0.087	(0)
NaHCO3	7.265e-07	7.265e-07	-6.139	-6.139	0.000	(0)
NaHPO4-	8.890e-08	7.279e-08	-7.051	-7.138	-0.087	(0)
NaCO3-	2.491e-09	2.040e-09	-8.604	-8.690	-0.087	(0)
NaH2BO3	1.625e-10	1.625e-10	-9.789	-9.789	0.000	(0)

NaCrO4-	1.105e-27	8.290e-28	-26.957	-27.081	-0.125	(0)
Ni	6.709e-06					
Ni+2	4.467e-06	1.936e-06	-5.350	-5.713	-0.363	(0)
NiSO4	2.137e-06	2.137e-06	-5.670	-5.670	0.000	(0)
NiCl+	6.767e-08	5.078e-08	-7.170	-7.294	-0.125	(0)
NiHCO3+	3.125e-08	2.345e-08	-7.505	-7.630	-0.125	(0)
NiNH3+2	3.151e-09	9.993e-10	-8.502	-9.000	-0.499	(0)
Ni (SO4) 2-2	1.337e-09	4.239e-10	-8.874	-9.373	-0.499	(0)
NiCO3	6.356e-10	6.356e-10	-9.197	-9.197	0.000	(0)
NiOH+	4.378e-10	3.285e-10	-9.359	-9.483	-0.125	(0)
NiCl2	2.694e-12	2.694e-12	-11.570	-11.570	0.000	(0)
Ni (OH) 2	7.147e-13	7.147e-13	-12.146	-12.146	0.000	(0)
Ni (NH3) 2+2	3.756e-13	1.191e-13	-12.425	-12.924	-0.499	(0)
Ni (OH) 3-	1.830e-17	1.373e-17	-16.738	-16.862	-0.125	(0)
NiSeO4	5.827e-21	5.827e-21	-20.235	-20.235	0.000	(0)
NiNO3+	8.872e-36	6.658e-36	-35.052	-35.177	-0.125	(0)
O (0)	0.000e+00					
O2	0.000e+00	0.000e+00	-46.316	-46.310	0.006	(0)
P	9.935e-06					
H2PO4-	6.526e-06	5.343e-06	-5.185	-5.272	-0.087	(0)
HPO4-2	1.436e-06	6.339e-07	-5.843	-6.198	-0.355	(0)
CaHPO4	7.691e-07	7.691e-07	-6.114	-6.114	0.000	(0)
CaH2PO4+	3.878e-07	3.176e-07	-6.411	-6.498	-0.087	(0)
MgHPO4	3.567e-07	3.567e-07	-6.448	-6.448	0.000	(0)
MgH2PO4+	2.780e-07	2.277e-07	-6.556	-6.643	-0.087	(0)
NaHPO4-	8.890e-08	7.279e-08	-7.051	-7.138	-0.087	(0)
FeH2PO4+	3.650e-08	2.989e-08	-7.438	-7.525	-0.087	(0)
FeHPO4	2.874e-08	2.874e-08	-7.541	-7.541	0.000	(0)
KHPO4-	2.055e-08	1.682e-08	-7.687	-7.774	-0.087	(0)
CaPO4-	4.280e-09	3.505e-09	-8.369	-8.455	-0.087	(0)
CoHPO4	1.549e-09	1.549e-09	-8.810	-8.810	0.000	(0)
H3PO4	3.726e-10	3.726e-10	-9.429	-9.429	0.000	(0)
FeHPO4+	6.194e-11	5.071e-11	-10.208	-10.295	-0.087	(0)
MgPO4-	2.248e-11	1.840e-11	-10.648	-10.735	-0.087	(0)
PO4-3	3.025e-12	4.608e-13	-11.519	-12.336	-0.817	(0)
CrH2PO4+2	1.369e-13	4.342e-14	-12.864	-13.362	-0.499	(0)
FeH2PO4+2	1.738e-15	7.813e-16	-14.760	-15.107	-0.347	(0)
CrO3HPO4-2	1.540e-30	4.886e-31	-29.812	-30.311	-0.499	(0)
CrO3H2PO4-	1.642e-34	1.232e-34	-33.785	-33.909	-0.125	(0)
Pb	7.708e-08					
PbSO4	3.562e-08	3.562e-08	-7.448	-7.448	0.000	(0)
Pb+2	2.915e-08	1.263e-08	-7.535	-7.899	-0.363	(0)
PbCl+	5.848e-09	4.389e-09	-8.233	-8.358	-0.125	(0)
Pb (SO4) 2-2	3.896e-09	1.236e-09	-8.409	-8.908	-0.499	(0)
PbHCO3+	1.229e-09	9.223e-10	-8.910	-9.035	-0.125	(0)
PbOH+	8.123e-10	6.096e-10	-9.090	-9.215	-0.125	(0)
PbCO3	3.342e-10	3.342e-10	-9.476	-9.476	0.000	(0)
PbCl2	1.992e-10	1.992e-10	-9.701	-9.701	0.000	(0)
PbCl3-	1.160e-12	8.709e-13	-11.935	-12.060	-0.125	(0)
Pb (OH) 2	3.704e-13	3.704e-13	-12.431	-12.431	0.000	(0)
Pb (CO3) 2-2	2.674e-14	8.483e-15	-13.573	-14.071	-0.499	(0)
PbCl4-2	1.212e-14	3.844e-15	-13.917	-14.415	-0.499	(0)
Pb2OH+3	1.616e-15	1.220e-16	-14.792	-15.914	-1.122	(0)
Pb (OH) 3-	9.484e-18	7.117e-18	-17.023	-17.148	-0.125	(0)
Pb (OH) 4-2	1.056e-22	3.349e-23	-21.976	-22.475	-0.499	(0)
Pb3 (OH) 4+2	4.957e-23	1.572e-23	-22.305	-22.804	-0.499	(0)
Pb4 (OH) 4+4	1.874e-25	1.897e-27	-24.727	-26.722	-1.995	(0)
PbNO3+	3.362e-37	2.523e-37	-36.473	-36.598	-0.125	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-66.206	-66.206	0.000	(0)
Pb (HS) 2	0.000e+00	0.000e+00	-106.450	-106.450	0.000	(0)
Pb (HS) 3-	0.000e+00	0.000e+00	-161.936	-162.060	-0.125	(0)
S (-2)	0.000e+00					
H2S	0.000e+00	0.000e+00	-56.106	-56.106	0.000	(0)
HS-	0.000e+00	0.000e+00	-56.786	-56.911	-0.125	(0)
CdHS+	0.000e+00	0.000e+00	-57.659	-57.784	-0.125	(0)
S5-2	0.000e+00	0.000e+00	-59.608	-60.106	-0.499	(0)
S6-2	0.000e+00	0.000e+00	-60.012	-60.511	-0.499	(0)
S4-2	0.000e+00	0.000e+00	-60.208	-60.707	-0.499	(0)

S3-2	0.000e+00	0.000e+00	-61.023	-61.522	-0.499	(0)
S2-2	0.000e+00	0.000e+00	-62.051	-62.550	-0.499	(0)
S-2	0.000e+00	0.000e+00	-67.721	-68.076	-0.355	(0)
HgHS2-	0.000e+00	0.000e+00	-99.843	-99.967	-0.125	(0)
Hg (HS) 2	0.000e+00	0.000e+00	-99.855	-99.855	0.000	(0)
HgS2-2	0.000e+00	0.000e+00	-101.896	-102.394	-0.499	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-103.707	-104.100	-0.393	(0)
CuS4S5-3	0.000e+00	0.000e+00	-104.458	-104.830	-0.372	(0)
ZnS (HS) -	0.000e+00	0.000e+00	-106.407	-106.531	-0.125	(0)
Pb (HS) 2	0.000e+00	0.000e+00	-106.450	-106.450	0.000	(0)
Zn (HS) 2	0.000e+00	0.000e+00	-106.802	-106.802	0.000	(0)
Cd (HS) 2	0.000e+00	0.000e+00	-107.490	-107.490	0.000	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-109.770	-109.770	0.000	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-149.611	-149.735	-0.125	(0)
Zn (HS) 3-	0.000e+00	0.000e+00	-160.308	-160.433	-0.125	(0)
Pb (HS) 3-	0.000e+00	0.000e+00	-161.936	-162.060	-0.125	(0)
Cd (HS) 3-	0.000e+00	0.000e+00	-162.376	-162.501	-0.125	(0)
ZnS (HS) 2-2	0.000e+00	0.000e+00	-163.633	-164.132	-0.499	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-164.519	-164.644	-0.125	(0)
Cd (HS) 4-2	0.000e+00	0.000e+00	-216.717	-217.215	-0.499	(0)
Zn (HS) 4-2	0.000e+00	0.000e+00	-218.305	-218.804	-0.499	(0)
S (6)	1.856e-02					
SO4-2	1.329e-02	5.758e-03	-1.877	-2.240	-0.363	(0)
CaSO4	3.621e-03	3.621e-03	-2.441	-2.441	0.000	(0)
MgSO4	9.749e-04	9.749e-04	-3.011	-3.011	0.000	(0)
NaSO4-	4.062e-04	3.326e-04	-3.391	-3.478	-0.087	(0)
KSO4-	1.877e-04	1.537e-04	-3.727	-3.813	-0.087	(0)
NH4SO4-	4.226e-05	3.444e-05	-4.374	-4.463	-0.089	(0)
FeSO4	1.689e-05	1.689e-05	-4.772	-4.772	0.000	(0)
CuSO4	1.556e-05	1.556e-05	-4.808	-4.808	0.000	(0)
CoSO4	2.734e-06	2.734e-06	-5.563	-5.563	0.000	(0)
NiSO4	2.137e-06	2.137e-06	-5.670	-5.670	0.000	(0)
ZnSO4	1.908e-06	1.908e-06	-5.719	-5.719	0.000	(0)
MnSO4	1.606e-06	1.606e-06	-5.794	-5.794	0.000	(0)
AlSO4+	4.180e-07	3.387e-07	-6.379	-6.470	-0.091	(0)
Zn (SO4) 2-2	3.148e-07	9.983e-08	-6.502	-7.001	-0.499	(0)
HSO4-	3.128e-07	2.534e-07	-6.505	-6.596	-0.091	(0)
PbSO4	3.562e-08	3.562e-08	-7.448	-7.448	0.000	(0)
Al (SO4) 2-	2.879e-08	2.332e-08	-7.541	-7.632	-0.091	(0)
BeSO4	1.008e-08	1.008e-08	-7.996	-7.996	0.000	(0)
CrOHSO4	9.069e-09	9.069e-09	-8.042	-8.042	0.000	(0)
Pb (SO4) 2-2	3.896e-09	1.236e-09	-8.409	-8.908	-0.499	(0)
CdSO4	1.673e-09	1.673e-09	-8.777	-8.777	0.000	(0)
Ni (SO4) 2-2	1.337e-09	4.239e-10	-8.874	-9.373	-0.499	(0)
Be (SO4) 2-2	5.684e-10	1.803e-10	-9.245	-9.744	-0.499	(0)
CrSO4+	5.552e-10	4.167e-10	-9.256	-9.380	-0.125	(0)
Cd (SO4) 2-2	4.347e-10	1.379e-10	-9.362	-9.860	-0.499	(0)
FeSO4+	5.818e-13	4.742e-13	-12.235	-12.324	-0.089	(0)
Fe (SO4) 2-	8.093e-14	6.074e-14	-13.092	-13.217	-0.125	(0)
Cr2 (OH) 2SO4+2	1.715e-14	5.440e-15	-13.766	-14.264	-0.499	(0)
Cr2 (OH) 2 (SO4) 2	1.861e-15	1.861e-15	-14.730	-14.730	0.000	(0)
HgSO4	6.651e-25	6.651e-25	-24.177	-24.177	0.000	(0)
CrO3SO4-2	7.560e-32	2.398e-32	-31.121	-31.620	-0.499	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-47.317	-47.442	-0.125	(0)
Se (-2)	1.707e-24					
HSe-	1.702e-24	1.277e-24	-23.769	-23.894	-0.125	(0)
H2Se	5.074e-27	5.074e-27	-26.295	-26.295	0.000	(0)
MnSe	1.674e-29	1.674e-29	-28.776	-28.776	0.000	(0)
Se-2	5.535e-33	1.756e-33	-32.257	-32.756	-0.499	(0)
Se (4)	1.121e-07					
HSeO3-	1.102e-07	8.271e-08	-6.958	-7.082	-0.125	(0)
SeO3-2	1.916e-09	6.077e-10	-8.718	-9.216	-0.499	(0)
H2SeO3	1.770e-11	1.770e-11	-10.752	-10.752	0.000	(0)
FeHSeO3+2	5.058e-18	1.604e-18	-17.296	-17.795	-0.499	(0)
Cd (SeO3) 2-2	1.352e-21	4.288e-22	-20.869	-21.368	-0.499	(0)
Se (6)	1.636e-17					
SeO4-2	1.635e-17	7.083e-18	-16.787	-17.150	-0.363	(0)
CoSeO4	8.119e-21	8.119e-21	-20.091	-20.091	0.000	(0)

NiSeO4	5.827e-21	5.827e-21	-20.235	-20.235	0.000	(0)
MnSeO4	2.884e-21	2.884e-21	-20.540	-20.540	0.000	(0)
ZnSeO4	1.734e-21	1.734e-21	-20.761	-20.761	0.000	(0)
HSeO4-	2.116e-22	1.588e-22	-21.675	-21.799	-0.125	(0)
CdSeO4	1.735e-24	1.735e-24	-23.761	-23.761	0.000	(0)
Zn (SeO4) 2-2	3.925e-38	1.245e-38	-37.406	-37.905	-0.499	(0)
Zn	5.931e-06					
Zn+2	3.647e-06	1.580e-06	-5.438	-5.801	-0.363	(0)
ZnSO4	1.908e-06	1.908e-06	-5.719	-5.719	0.000	(0)
Zn (SO4) 2-2	3.148e-07	9.983e-08	-6.502	-7.001	-0.499	(0)
ZnCl+	4.941e-08	3.977e-08	-7.306	-7.400	-0.094	(0)
ZnHCO3+	6.546e-09	4.912e-09	-8.184	-8.309	-0.125	(0)
ZnOH+	2.763e-09	2.073e-09	-8.559	-8.683	-0.125	(0)
ZnOHC1	1.038e-09	1.038e-09	-8.984	-8.984	0.000	(0)
ZnCO3	8.005e-10	8.005e-10	-9.097	-9.097	0.000	(0)
ZnCl2	5.279e-10	5.279e-10	-9.277	-9.277	0.000	(0)
Zn (OH) 2	9.248e-12	9.248e-12	-11.034	-11.034	0.000	(0)
ZnCl3-	5.305e-12	4.270e-12	-11.275	-11.370	-0.094	(0)
ZnCl4-2	4.831e-14	2.132e-14	-13.316	-13.671	-0.355	(0)
Zn (OH) 3-	1.187e-15	8.906e-16	-14.926	-15.050	-0.125	(0)
Zn (OH) 4-2	2.148e-21	6.813e-22	-20.668	-21.167	-0.499	(0)
ZnSeO4	1.734e-21	1.734e-21	-20.761	-20.761	0.000	(0)
ZnNO3+	7.475e-36	5.610e-36	-35.126	-35.251	-0.125	(0)
Zn (SeO4) 2-2	3.925e-38	1.245e-38	-37.406	-37.905	-0.499	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-65.828	-65.828	0.000	(0)
ZnS (HS) -	0.000e+00	0.000e+00	-106.407	-106.531	-0.125	(0)
Zn (HS) 2	0.000e+00	0.000e+00	-106.802	-106.802	0.000	(0)
Zn (HS) 3-	0.000e+00	0.000e+00	-160.308	-160.433	-0.125	(0)
ZnS (HS) 2-2	0.000e+00	0.000e+00	-163.633	-164.132	-0.499	(0)
Zn (HS) 4-2	0.000e+00	0.000e+00	-218.305	-218.804	-0.499	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2	-86.85	-80.58	6.27	(Co (NH3) 5Cl) (NO3) 2
(Co (NH3) 5Cl) Cl2	-29.36	-24.82	4.54	(Co (NH3) 5Cl) Cl2
(Co (NH3) 5OH2) Cl3	-36.63	-24.82	11.81	(Co (NH3) 5OH2) Cl3
(Co (NH3) 6) (NO3) 3	-123.36	-105.43	17.93	(Co (NH3) 6) (NO3) 3
(Co (NH3) 6) Cl3	-41.92	-21.79	20.13	(Co (NH3) 6) Cl3
(NH4) 2CrO4	-32.70	-32.32	0.38	(NH4) 2CrO4
(NH4) 2SeO4	-24.11	-23.66	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	-0.33	10.80	11.13	Al (OH) 3
Al2 (MoO4) 3	-38.46	-35.31	3.14	Al2 (MoO4) 3
Al2O3	1.19	21.61	20.42	Al2O3
Al4 (OH) 10SO4	5.72	28.42	22.70	Al4 (OH) 10SO4
AlAsO4:2H2O	-5.96	-1.16	4.80	AlAsO4:2H2O
AlOHSO4	-0.77	-4.00	-3.23	AlOHSO4
Alunite	7.46	6.68	-0.78	KAl3 (SO4) 2 (OH) 6
Anglesite	-2.31	-10.14	-7.83	PbSO4
Anhydrite	-0.44	-4.78	-4.34	CaSO4
Anilite	-28.78	-61.20	-32.42	Cu0.25Cu1.5S
Antlerite	-0.61	8.18	8.79	Cu3 (OH) 4SO4
Aragonite	-2.33	-10.60	-8.26	CaCO3
Arsenolite	-50.04	-52.98	-2.94	As4O6
Artinite	-11.48	-1.52	9.96	MgCO3:Mg (OH) 2:3H2O
As2O5	-30.69	-23.92	6.77	As2O5
Atacamite	-0.61	7.05	7.67	Cu2 (OH) 3Cl
Azurite	-1.63	-18.26	-16.62	Cu3 (OH) 2 (CO3) 2
Ba (OH) 2:8H2O	-18.93	5.62	24.56	Ba (OH) 2:8H2O
Ba3 (AsO4) 2	1.91	-7.04	-8.94	Ba3 (AsO4) 2
BaCrO4	-22.98	-32.75	-9.77	BaCrO4
BaHPO4	-5.78	-25.55	-19.77	BaHPO4
BaMoO4	-6.35	-13.35	-6.99	BaMoO4
Barite	0.87	-9.17	-10.05	BaSO4
BaS	-73.74	-57.56	16.18	BaS
BaSeO3	-9.53	-7.74	1.79	BaSeO3
BaSeO4	-16.56	-24.08	-7.53	BaSeO4

Be (OH) 2 (alpha)	-2.19	4.70	6.89	Be (OH) 2
Be (OH) 2 (am)	-2.49	4.70	7.19	Be (OH) 2
Be (OH) 2 (beta)	-1.79	4.70	6.49	Be (OH) 2
BeMoO4	-12.66	-14.27	-1.61	BeMoO4
BeS	-77.87	-58.49	19.38	BeS
BeSeO4:4H2O	-22.07	-25.01	-2.94	BeSeO4:4H2O
Bianchite	-6.28	-8.04	-1.76	ZnSO4:6H2O
Birnessite	-16.42	1.67	18.09	MnO2
Bixbyite	-16.94	-17.22	-0.27	Mn2O3
BlaubleiI	-32.13	-56.29	-24.16	Cu0.9Cu0.2S
BlaubleiII	-31.28	-58.56	-27.28	Cu0.6Cu0.8S
Boehmite	1.88	10.81	8.93	AlOOH
Brochantite	0.01	15.83	15.82	Cu4 (OH) 6SO4
Brucite	-7.64	9.55	17.18	Mg (OH) 2
Bunsenite	-5.89	6.85	12.74	NiO
Ca3 (AsO4) 2:4H2O	-16.16	6.14	22.30	Ca3 (AsO4) 2:4H2O
Ca3 (PO4) 2 (beta)	-3.21	-32.29	-29.08	Ca3 (PO4) 2
Ca4H (PO4) 3:3H2O	-6.37	-53.45	-47.08	Ca4H (PO4) 3:3H2O
CaCrO4	-26.17	-28.35	-2.19	CaCrO4
CaHPO4	-1.79	-21.16	-19.37	CaHPO4
CaHPO4:2H2O	-2.10	-21.16	-19.06	CaHPO4:2H2O
Calcite	-2.14	-10.60	-8.46	CaCO3
Calomel	-11.50	-29.69	-18.18	Hg2Cl2
CaMoO4	-1.01	-8.95	-7.94	CaMoO4
CaSeO3:2H2O	-6.21	-3.34	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-16.70	-19.69	-3.00	CaSeO4:2H2O
Cd (BO2) 2	-16.30	-6.46	9.84	Cd (BO2) 2
Cd (OH) 2	-10.24	3.68	13.93	Cd (OH) 2
Cd (OH) 2 (am)	-10.31	3.68	13.99	Cd (OH) 2
Cd3 (OH) 2 (SO4) 2	-25.27	-18.56	6.71	Cd3 (OH) 2 (SO4) 2
Cd3 (OH) 4SO4	-26.32	-3.76	22.56	Cd3 (OH) 4SO4
Cd3 (PO4) 2	-18.72	-51.32	-32.60	Cd3 (PO4) 2
Cd4 (OH) 6SO4	-28.48	-0.08	28.40	Cd4 (OH) 6SO4
CdCl2	-12.24	-12.85	-0.60	CdCl2
CdCl2:1H2O	-11.18	-12.85	-1.67	CdCl2:1H2O
CdCl2:2.5H2O	-10.91	-12.85	-1.93	CdCl2:2.5H2O
Cdmetal (alpha)	-30.61	-16.88	13.74	Cd
Cdmetal (gamma)	-30.72	-16.88	13.84	Cd
CdMoO4	-1.09	-15.29	-14.21	CdMoO4
CdOHCl	-8.21	-4.58	3.63	CdOHCl
CdSe	-6.07	-26.49	-20.43	CdSe
CdSeO4:2H2O	-24.18	-26.03	-1.85	CdSeO4:2H2O
CdSO4	-11.10	-11.12	-0.02	CdSO4
CdSO4:1H2O	-9.49	-11.12	-1.63	CdSO4:1H2O
CdSO4:2.67H2O	-9.30	-11.12	-1.82	CdSO4:2.67H2O
Cerussite	-2.75	-15.95	-13.20	PbCO3
CH4 (g)	-61.04	-102.85	-41.81	CH4
Chalcanthite	-4.49	-7.14	-2.66	CuSO4:5H2O
Chalcocite	-27.67	-63.09	-35.42	Cu2S
Chalcopyrite	-75.35	-111.06	-35.71	CuFeS2
Cinnabar	-34.73	-81.18	-46.45	HgS
Claudetite	-49.75	-52.98	-3.23	As4O6
Clausthalite	1.94	-25.51	-27.46	PbSe
Co (BO2) 2	-30.25	-3.18	27.07	Co (BO2) 2
Co (OH) 2	-6.14	6.96	13.09	Co (OH) 2
Co (OH) 3	-13.13	-15.17	-2.03	Co (OH) 3
CO2 (g)	-2.46	-20.62	-18.16	CO2
Co3 (AsO4) 2	-16.08	-3.05	13.03	Co3 (AsO4) 2
Co3 (PO4) 2	-6.80	-41.49	-34.69	Co3 (PO4) 2
Co3O4	-13.20	-23.37	-10.18	Co3O4
CoCl2	-18.08	-9.57	8.50	CoCl2
CoCl2:6H2O	-12.09	-9.57	2.51	CoCl2:6H2O
CoCO3	-3.72	-13.66	-9.94	CoCO3
CoFe2O4	19.58	16.52	-3.06	CoFe2O4
CoHPO4	-5.16	-24.22	-19.06	CoHPO4
CoMoO4	-4.33	-12.02	-7.69	CoMoO4
CoO	-6.95	6.96	13.90	CoO
CoS (alpha)	-48.79	-56.23	-7.44	CoS

CoS (beta)	-45.16	-56.23	-11.07	CoS
CoSe	-7.02	-23.22	-16.20	CoSe
CoSeO3	-7.73	-6.41	1.32	CoSeO3
CoSeO4:6H2O	-21.23	-22.76	-1.53	CoSeO4:6H2O
CoSO4	-10.88	-7.84	3.04	CoSO4
CoSO4:6H2O	-5.37	-7.85	-2.48	CoSO4:6H2O
Cotunnite	-7.01	-11.86	-4.86	PbCl2
Covellite	-32.94	-55.53	-22.59	CuS
Cr (OH) 2	-19.80	-8.88	10.92	Cr (OH) 2
Cr (OH) 3	-2.95	-1.53	1.42	Cr (OH) 3
Cr (OH) 3 (am)	-0.78	-1.53	-0.75	Cr (OH) 3
Cr2O3	-0.85	-3.06	-2.21	Cr2O3
CrCl2	-39.83	-25.41	14.42	CrCl2
CrCl3	-41.79	-26.32	15.47	CrCl3
Crmetal	-60.43	-29.44	30.99	Cr
CrO3	-35.18	-38.37	-3.20	CrO3
Cu (OH) 2	-1.18	7.66	8.84	Cu (OH) 2
Cu2 (OH) 3NO3	-30.29	-20.83	9.47	Cu2 (OH) 3NO3
Cu2Se (alpha)	16.36	-30.07	-46.44	Cu2Se
Cu2SO4	-12.81	-14.70	-1.89	Cu2SO4
Cu3 (AsO4) 2:2H2O	-7.04	-0.94	6.10	Cu3 (AsO4) 2:2H2O
Cu3 (PO4) 2	-2.53	-39.38	-36.85	Cu3 (PO4) 2
Cu3 (PO4) 2:3H2O	-4.26	-39.38	-35.12	Cu3 (PO4) 2:3H2O
Cu3Se2	11.91	-52.59	-64.50	Cu3Se2
CuCO3	-1.46	-12.96	-11.50	CuCO3
CuCrO4	-25.27	-30.71	-5.44	CuCrO4
Cumetal	-1.26	-10.23	-8.97	Cu
CuMoO4	1.80	-11.32	-13.11	CuMoO4
CuOCuSO4	-10.20	0.52	10.71	CuOCuSO4
Cupricferrite	10.61	17.22	6.61	CuFe2O4
Cuprite	1.14	0.10	-1.04	Cu2O
Cuprousferrite	13.70	4.83	-8.87	CuFeO2
CuSe	10.94	-22.52	-33.46	CuSe
CuSe2	1.65	-32.13	-33.78	CuSe2
CuSeO3:2H2O	-6.33	-5.70	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-19.61	-22.05	-2.44	CuSeO4:5H2O
CuSO4	-10.30	-7.14	3.16	CuSO4
Diaspore	3.63	10.81	7.18	AlOOH
Djurleite	-28.08	-62.59	-34.51	Cu0.066Cu1.868S
Dolomite (disordered)	-5.26	-21.67	-16.40	CaMg (CO3) 2
Dolomite (ordered)	-4.69	-21.67	-16.97	CaMg (CO3) 2
Epsomite	-3.10	-5.26	-2.16	MgSO4:7H2O
Fe (OH) 2	-5.90	7.66	13.56	Fe (OH) 2
Fe (OH) 2.7Cl1.3	5.34	2.30	-3.04	Fe (OH) 2.7Cl1.3
Fe2 (OH) 4SeO3	-5.35	-3.80	1.55	Fe2 (OH) 4SeO3
Fe2 (SeO3) 3:2H2O	-9.90	-30.53	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-31.82	-34.84	-3.02	Fe2 (SO4) 3
Fe3 (OH) 8	-3.00	17.23	20.22	Fe3 (OH) 8
FeAsO4:2H2O	-7.58	-7.18	0.40	FeAsO4:2H2O
FeCr2O4	-3.01	4.61	7.62	FeCr2O4
FeMoO4	-1.25	-11.31	-10.06	FeMoO4
Ferrihydrite	1.37	4.78	3.41	Fe (OH) 3
Ferroselite	-13.39	-32.13	-18.74	FeSe2
FeS (ppt)	-52.61	-55.53	-2.92	FeS
FeSe	-11.51	-22.51	-11.01	FeSe
Galena	-44.32	-58.53	-14.21	PbS
Gibbsite	2.23	10.80	8.57	Al (OH) 3
Goethite	4.11	4.78	0.67	FeOOH
Goslarite	-5.99	-8.04	-2.05	ZnSO4:7H2O
Greenockite	-44.99	-59.51	-14.52	CdS
Greigite	-190.50	-235.54	-45.03	Fe3S4
Gypsum	-0.17	-4.78	-4.61	CaSO4:2H2O
H-Jarosite	-3.84	-15.26	-11.41	(H3O) Fe3 (SO4) 2 (OH) 6
H2MoO4	-5.95	-18.98	-13.02	H2MoO4
H2S (g)	-55.18	-63.19	-8.01	H2S
H2Se (g)	-25.26	-30.17	-4.91	H2Se
Halite	-5.54	-3.95	1.59	NaCl
Hausmannite	-21.37	40.91	62.28	Mn3O4

Hematite	10.60	9.57	-1.03	Fe2O3
Hercynite	5.45	29.27	23.83	FeAl2O4
Hg (CH3) 2 (g)	-148.54	-223.68	-75.14	Hg (CH3) 2
Hg (g)	-8.92	-16.86	-7.94	Hg
Hg (OH) 2	-14.49	-17.99	-3.50	Hg (OH) 2
Hg2 (g)	-18.59	-33.72	-15.13	Hg2
Hg2 (OH) 2	-18.42	-13.16	5.26	Hg2 (OH) 2
Hg2CO3	-17.59	-33.78	-16.18	Hg2CO3
Hg2CrO4	-42.83	-51.53	-8.70	Hg2CrO4
Hg2HPO4	-19.56	-44.34	-24.77	Hg2HPO4
Hg2S	-64.47	-76.35	-11.88	Hg2S
Hg2SeO3	-21.86	-26.52	-4.66	Hg2SeO3
Hg2SO4	-21.81	-27.96	-6.15	Hg2SO4
Hg3O2CO3	-44.90	-74.58	-29.68	Hg3O2CO3
HgCl (g)	-34.82	-14.84	19.98	HgCl
HgCl2	-12.93	-34.52	-21.58	HgCl2
Hgmetal (l)	-3.16	-16.86	-13.70	Hg
HgSe	7.53	-48.16	-55.69	HgSe
HgSeO3	-18.92	-31.35	-12.43	HgSeO3
HgSO4	-23.33	-32.79	-9.46	HgSO4
Hinsdalite	-6.40	-8.90	-2.50	PbAl3PO4SO4 (OH) 6
Huntite	-14.16	-43.80	-29.65	CaMg3 (CO3) 4
Hydrocerussite	-8.47	-27.25	-18.77	Pb3 (OH) 2 (CO3) 2
Hydromagnesite	-26.62	-34.73	-8.12	Mg5 (CO3) 4 (OH) 2 : 4H2O
Hydroxylapatite	0.90	-43.43	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-7.43	-70.22	-62.79	Pb5 (PO4) 3OH
K-Alum	-9.67	-14.93	-5.26	KAl (SO4) 2 : 12H2O
K-Jarosite	3.02	-11.39	-14.41	KFe3 (SO4) 2 (OH) 6
K2Cr2O7	-51.53	-69.01	-17.48	K2Cr2O7
K2CrO4	-30.07	-30.64	-0.57	K2CrO4
K2MoO4	-14.51	-11.24	3.27	K2MoO4
K2SeO4	-21.24	-21.97	-0.73	K2SeO4
Langite	-2.15	15.83	17.98	Cu4 (OH) 6SO4 : H2O
Larnakite	-5.11	-5.48	-0.37	PbO : PbSO4
Laurionite	-4.22	-3.60	0.62	PbOHCl
Lepidocrocite	3.41	4.78	1.37	FeOOH
Lime	-23.25	10.02	33.28	CaO
Litharge	-8.23	4.66	12.89	PbO
Mackinawite	-51.93	-55.53	-3.60	FeS
Maghemite	3.18	9.57	6.39	Fe2O3
Magnesioferrite	1.42	19.11	17.69	Fe2MgO4
Magnesite	-3.55	-11.07	-7.52	MgCO3
Magnetite	13.21	17.23	4.02	Fe3O4
Malachite	0.23	-5.30	-5.53	Cu2 (OH) 2CO3
Manganite	-8.28	17.06	25.34	MnOOH
Massicot	-8.43	4.66	13.09	PbO
Melanothallite	-15.31	-8.87	6.45	CuCl2
Melanterite	-4.87	-7.14	-2.27	FeSO4 : 7H2O
Metacinnabar	-35.33	-81.18	-45.85	HgS
Mg (OH) 2 (active)	-9.25	9.55	18.79	Mg (OH) 2
Mg3 (PO4) 2	-10.44	-33.72	-23.28	Mg3 (PO4) 2
MgCr2O4	-10.24	6.49	16.73	MgCr2O4
MgCrO4	-34.47	-28.83	5.64	MgCrO4
MgHPO4 : 3H2O	-3.46	-21.63	-18.18	MgHPO4 : 3H2O
MgMoO4	-7.58	-9.43	-1.85	MgMoO4
MgSeO3 : 6H2O	-6.86	-3.82	3.04	MgSeO3 : 6H2O
MgSeO4 : 6H2O	-18.97	-20.17	-1.20	MgSeO4 : 6H2O
Minium	-40.23	34.55	74.77	Pb3O4
Mirabilite	-4.82	-6.17	-1.35	Na2SO4 : 10H2O
Mn2 (SO4) 3	-56.40	-61.62	-5.23	Mn2 (SO4) 3
Mn3 (AsO4) 2 : 8H2O	-16.07	-3.57	12.50	Mn3 (AsO4) 2 : 8H2O
Mn3 (PO4) 2	-18.16	-42.01	-23.85	Mn3 (PO4) 2
MnCl2 : 4H2O	-12.49	-9.75	2.75	MnCl2 : 4H2O
MnHPO4	1.00	-24.40	-25.40	MnHPO4
MnS (grn)	-56.67	-56.41	0.27	MnS
MnS (pnk)	-59.75	-56.41	3.34	MnS
MnSe	-27.18	-23.39	3.79	MnSe
MnSeO3	-7.71	-6.58	1.13	MnSeO3

MnSeO3:2H2O	-7.54	-6.58	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-20.88	-22.93	-2.05	MnSeO4:5H2O
MnSO4	-10.79	-8.02	2.78	MnSO4
Monteponite	-11.73	3.68	15.41	CdO
Montroydite	-14.46	-17.99	-3.52	HgO
MoO3	-10.97	-18.97	-8.00	MoO3
Morenosite	-5.77	-7.96	-2.18	NiSO4:7H2O
MoS2	-94.50	-165.91	-71.41	MoS2
Na-Jarosite	-0.19	-10.94	-10.75	NaFe3(SO4)2(OH)6
Na2Cr2O7	-58.16	-68.12	-9.96	Na2Cr2O7
Na2CrO4	-32.73	-29.74	2.99	Na2CrO4
Na2Mo2O7	-12.56	-29.32	-16.76	Na2Mo2O7
Na2MoO4	-11.86	-10.34	1.52	Na2MoO4
Na2MoO4:2H2O	-11.57	-10.34	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-15.03	-4.73	10.30	Na2SeO3:5H2O
Na2SeO4	-22.36	-21.08	1.28	Na2SeO4
Nantokite	-1.36	-8.21	-6.86	CuCl
Natron	-10.48	-11.99	-1.51	Na2CO3:10H2O
Nesquehonite	-6.47	-11.07	-4.60	MgCO3:3H2O
Ni(OH)2	-6.23	6.85	13.08	Ni(OH)2
Ni3(AsO4)2:8H2O	-19.08	-3.38	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-10.51	-41.81	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-19.41	12.59	32.00	Ni4(OH)6SO4
NiCO3	-7.02	-13.77	-6.75	NiCO3
NiMoO4	-0.98	-12.13	-11.15	NiMoO4
NiS(alpha)	-50.74	-56.34	-5.60	NiS
NiS(beta)	-45.24	-56.34	-11.10	NiS
NiS(gamma)	-43.54	-56.34	-12.80	NiS
NiSe	-5.63	-23.33	-17.70	NiSe
NiSeO3:2H2O	-9.42	-6.52	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-21.35	-22.87	-1.52	NiSeO4:6H2O
Nsutite	-15.83	1.67	17.50	MnO2
O2(g)	-43.67	41.11	84.79	O2
Orpiment	-153.96	-216.06	-62.11	As2S3
Otavite	-4.94	-16.94	-12.00	CdCO3
Pb(BO2)2	-12.04	-5.47	6.57	Pb(BO2)2
Pb(OH)2	-3.66	4.66	8.32	Pb(OH)2
Pb10(OH)6O(CO3)6	-68.31	-77.07	-8.76	Pb10(OH)6O(CO3)6
Pb2(OH)3Cl	-7.73	1.06	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-16.86	9.33	26.19	Pb2O(OH)2
Pb2O3	-31.16	29.88	61.04	Pb2O3
Pb2OCO3	-10.85	-11.29	-0.44	Pb2OCO3
Pb3(AsO4)2	-15.73	-9.93	5.80	Pb3(AsO4)2
Pb3(PO4)2	-4.84	-48.37	-43.53	Pb3(PO4)2
Pb3O2CO3	-17.98	-6.63	11.35	Pb3O2CO3
Pb3O2SO4	-11.73	-0.81	10.92	Pb3O2SO4
Pb4(OH)6SO4	-17.25	3.85	21.10	Pb4(OH)6SO4
Pb4O3SO4	-18.43	3.85	22.28	Pb4O3SO4
PbCrO4	-20.98	-33.71	-12.73	PbCrO4
PbHPO4	-2.71	-26.52	-23.81	PbHPO4
Pbmetal	-20.14	-15.89	4.24	Pb
PbMoO4	1.47	-14.31	-15.78	PbMoO4
PbO:0.3H2O	-8.32	4.66	12.98	PbO:0.33H2O
PbSeO4	-18.16	-25.05	-6.88	PbSeO4
Periclase	-12.49	9.55	22.03	MgO
Phosgenite	-8.01	-27.82	-19.81	PbCl2:PbCO3
Plattnerite	-25.26	25.22	50.48	PbO2
Plumbgummite	7.51	-25.28	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-13.17	10.02	23.19	Ca(OH)2
Pyrite	-79.51	-98.16	-18.66	FeS2
Pyrochroite	-8.70	6.78	15.48	Mn(OH)2
Pyrolusite	-14.85	27.34	42.19	MnO2
Pyromorphite	5.94	-78.49	-84.43	Pb5(PO4)3Cl
Realgar	-66.59	-86.72	-20.13	AsS
Retgersite	-5.90	-7.96	-2.05	NiSO4:6H2O
Rhodochrosite	-3.26	-13.83	-10.57	MnCO3
Semetal(am)	-2.48	-9.62	-7.14	Se
Semetal(hex)	-1.86	-9.62	-7.76	Se

SeO2	-13.48	-13.36	0.12	SeO2
SeO3	-51.19	-29.71	21.48	SeO3
Siderite	-2.76	-12.95	-10.19	FeCO3
Smithsonite	-3.90	-13.86	-9.95	ZnCO3
Sphalerite	-44.89	-56.43	-11.54	ZnS
Spinel	-6.84	31.16	38.00	MgAl2O4
Strengite	-0.03	-26.40	-26.37	FePO4:2H2O
Sulfur	-40.54	-42.63	-2.10	S
Tenorite	-0.18	7.66	7.84	CuO
Thenardite	-6.52	-6.17	0.35	Na2SO4
Thermonatrite	-12.65	-11.99	0.67	Na2CO3:H2O
Tsumebite	-4.41	-14.20	-9.79	Pb2CuPO4(OH) 3:3H2O
Vivianite	-3.37	-39.37	-36.00	Fe3(PO4)2:8H2O
Witherite	-6.41	-14.99	-8.58	BaCO3
Wurtzite	-47.42	-56.43	-9.01	ZnS
Zincite	-4.84	6.76	11.60	ZnO
Zincosite	-12.22	-8.04	4.17	ZnSO4
Zn(BO2)2	-11.67	-3.38	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-68.77	-65.53	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-5.44	6.76	12.20	Zn(OH)2
Zn(OH)2(am)	-5.95	6.76	12.71	Zn(OH)2
Zn(OH)2(beta)	-5.24	6.76	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-5.02	6.76	11.78	Zn(OH)2
Zn(OH)2(gamma)	-4.97	6.76	11.73	Zn(OH)2
Zn2(OH)2SO4	-8.78	-1.28	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-9.93	5.26	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-17.29	-3.64	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-6.66	-42.08	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-29.00	-9.32	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-16.16	12.24	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-21.23	17.27	38.50	Zn5(OH)8Cl2
ZnCl2	-17.03	-9.77	7.27	ZnCl2
ZnCO3:1H2O	-3.60	-13.86	-10.26	ZnCO3:1H2O
Znmetal	-40.04	-13.80	26.24	Zn
ZnMoO4	-2.12	-12.21	-10.09	ZnMoO4
ZnO(active)	-4.69	6.76	11.45	ZnO
ZnS(am)	-47.33	-56.43	-9.10	ZnS
ZnSe	-8.94	-23.41	-14.48	ZnSe
ZnSeO4:6H2O	-21.43	-22.95	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.53	-8.04	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 4.

End of Run after 0.514 Seconds.

Input file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\PHREEQC\2 Mixing
 \Kanmantoo Scenario 3a mixing worst case.pqi
 Output file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\PHREEQC\2 Mixing
 \Kanmantoo Scenario 3a mixing worst case.pqi
 Database file: C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
 \minteq.v4.dat

 Reading data base.

SOLUTION_MASTER_SPECIES
 SOLUTION_SPECIES
 SOLUTION_SPECIES
 PHASES
 PHASES
 SURFACE_MASTER_SPECIES
 SURFACE_SPECIES
 END

 Reading input data for simulation 1.

DATABASE C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
 \minteq.v4.dat
 SELECTED_OUTPUT 1
 file Kanmantoo Scenario 3a mixing.sel
 totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg
 Na K Alkalinity Cl S(6) Hg
 SOLUTION_MASTER_SPECIES
 Co Co+3 -1.0 Co 58.9332
 Co(2) Co+2 0.0 Co
 Co(3) Co+3 -1.0 Co
 END

 End of simulation.

 Reading input data for simulation 2.

PHASES
 CoO
 CoO + 2H+ = Co+2 + H2O
 log_k 13.5864
 delta_h -106.295 kJ
 Co(OH)2
 Co(OH)2 + 2H+ = Co+2 + 2H2O
 log_k 13.094
 delta_h -0 kJ
 Co(OH)3
 Co(OH)3 + 3H+ = Co+3 + 3H2O
 log_k -2.309
 delta_h -92.43 kJ
 Co3O4
 Co3O4 + 8H+ = Co+2 + 2Co+3 + 4H2O
 log_k -10.4956
 delta_h -107.5 kJ
 CoFe2O4
 CoFe2O4 + 8H+ = Co+2 + 2Fe+3 + 4H2O
 log_k -3.5281
 delta_h -158.82 kJ
 CoCl2
 CoCl2 = Co+2 + 2Cl-
 log_k 8.2672
 delta_h -79.815 kJ
 CoCl2:6H2O

```

      CoCl2:6H2O = Co+2 + 2Cl- + 6H2O
      log_k 2.5365
      delta_h      8.0598      kJ
(Co(NH3)6)Cl3
      (Co(NH3)6)Cl3 + 6H+ = Co+3 + 6NH4+ + 3Cl-
      log_k 20.0317
      delta_h      -33.1      kJ
(Co(NH3)5OH2)Cl3
      (Co(NH3)5OH2)Cl3 + 5H+ = Co+3 + 5NH4+ + 3Cl- + H2O
      log_k 11.7351
      delta_h      -25.37      kJ
(Co(NH3)5Cl)Cl2
      (Co(NH3)5Cl)Cl2 + 5H+ = Co+3 + 5NH4+ + 3Cl-
      log_k 4.5102
      delta_h      -10.74      kJ
CoCO3
      CoCO3 = Co+2 + CO3-2
      log_k -9.98
      delta_h      -12.7612      kJ
CoSO4
      CoSO4 = Co+2 + SO4-2
      log_k 2.8024
      delta_h      -79.277      kJ
CoSO4:6H2O
      CoSO4:6H2O = Co+2 + SO4-2 + 6H2O
      log_k -2.4726
      delta_h      1.0801      kJ

```

END

End of simulation.

Reading input data for simulation 3.

SOLUTION 1 #Groundwater worst case maximum values

```

temp      21
pH         5.05
pe         1
redox      pe
units      mg/l
density    1
Al         5.21
Alkalinity 0
As         0
Ba         0
Be         0
B          0
Cd         0.04
Co         24.2
Cr         0
Cu         9.29
Fe         937
Pb         0.01
Mn         171
Mo         0
V          0
Zn         1.78
Se         0.08
Ni         5.57
N          60
P          23.6
Ca         590
Mg         1340
Na         5880
K          216
Cl         9420

```

S(6)	9110
Hg	0.0004
water	1 # kg
SOLUTION 2 #Mean River Murray water quality	
temp	20
pH	7.5
pe	4
redox	pe
units	mg/l
density	1
Al	1.48
Alkalinity	61
As	0.0013
Ba	0.0478
Be	0
B	0.05
Cd	0.0007
Co	0.0006
Cr	0.0021
Cu	0.006
Fe	1.37
Pb	0.0012
Mn	0.06
Mo	0.0003
Zn	0.0164
Se	0.0002
Ni	0.0028
N	1.05
P	0.11
Ca	13
Mg	9
Na	49
K	4
Cl	79
S(6)	17
Hg	0.00008
water	1 # kg
SOLUTION 3 #Mean Mt Barker water quality	
temp	20
pH	6.18
pe	4
redox	pe
units	mg/l
density	1
Al	0.04
Alkalinity	50
As	0.002
Ba	0.012
Be	0
B	0.088
Cd	0
Co	0.039
Cr	0.007
Cu	0.022
Fe	0.493
Pb	0.003
Mn	0.046
Mo	0.009
Zn	0.023
Se	0.002
Ni	0.011
N	24.3
P	0.52
Ca	32
Mg	17
Na	132
K	25
Cl	231

```

S(6)      190
Hg         0
water     1 # kg
SOLUTION 4 #Mean RWD water quality TREATED
temp      20
pH        4.75
pe        4
redox     pe
units     mg/l
density   1
Al        0.00008
Alkalinity 0
As        0.002
Ba        0.04
Be        0.002
B         0.1
Cd        0.0008
Co        0.72
Cr        0.0033
Cu        6.25
Fe        0.02
Pb        0.02
Mn        0.00001
Mo        0.11
Zn        0.49
Se        0.01
Ni        0.49
N         10.07
P         0.29
Ca        522
Mg        88
Na        343
K         245
Cl        490
S(6)      2222
Hg         0
water     1 # kg
MIX 1
1         0.03
2         0.1
3         0.1
4         0.77

```

Beginning of initial solution calculations.

Initial solution 1.

-----Solution composition-----

Elements	Molality	Moles
Al	1.986e-04	1.986e-04
Ca	1.514e-02	1.514e-02
Cd	3.660e-07	3.660e-07
Cl	2.733e-01	2.733e-01
Co	4.224e-04	4.224e-04
Cu	1.504e-04	1.504e-04
Fe	1.726e-02	1.726e-02
Hg	2.051e-09	2.051e-09
K	5.682e-03	5.682e-03
Mg	5.671e-02	5.671e-02
Mn	3.202e-03	3.202e-03
N	4.406e-03	4.406e-03
Na	2.631e-01	2.631e-01
Ni	9.762e-05	9.762e-05
P	7.837e-04	7.837e-04
Pb	4.964e-08	4.964e-08

S (6)	9.754e-02	9.754e-02
Se	1.042e-06	1.042e-06
Zn	2.800e-05	2.800e-05

-----Description of solution-----

pH	=	5.050
pe	=	1.000
Activity of water	=	0.988
Ionic strength (mol/kgw)	=	4.862e-01
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	1.381e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	21.00
Electrical balance (eq)	=	-9.552e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.26
Iterations	=	14
Total H	=	1.110329e+02
Total O	=	5.590014e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.214e-05	8.913e-06	-4.916	-5.050	-0.134	0.00
OH-	1.292e-09	8.222e-10	-8.889	-9.085	-0.196	(0)
H2O	5.551e+01	9.883e-01	1.744	-0.005	0.000	18.05
Al	1.986e-04					
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
Al (SO4) 2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Al+3	1.839e-05	1.139e-06	-4.735	-5.943	-1.208	(0)
AlOH+2	4.197e-06	9.786e-07	-5.377	-6.009	-0.632	(0)
Al (OH) 2+	1.624e-06	1.128e-06	-5.790	-5.948	-0.158	(0)
Al (OH) 3	2.514e-08	2.514e-08	-7.600	-7.600	0.000	(0)
Al (OH) 4-	2.040e-09	1.366e-09	-8.690	-8.864	-0.174	(0)
Ca	1.514e-02					
Ca+2	8.161e-03	2.370e-03	-2.088	-2.625	-0.537	(0)
CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
CaOH+	5.236e-11	3.715e-11	-10.281	-10.430	-0.149	(0)
Ca (NH3) 2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
Cd	3.660e-07					
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
Cd (SO4) 2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
Cd+2	1.502e-08	4.363e-09	-7.823	-8.360	-0.537	(0)
CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
CdOHC1	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CdOH+	6.462e-14	2.865e-14	-13.190	-13.543	-0.353	(0)
Cd2OH+3	9.945e-19	6.582e-22	-18.002	-21.182	-3.179	(0)
Cd (OH) 2	2.726e-19	2.726e-19	-18.564	-18.564	0.000	(0)
Cd (OH) 3-	4.195e-26	1.860e-26	-25.377	-25.730	-0.353	(0)
Cd (OH) 4-2	8.799e-35	3.400e-36	-34.056	-35.469	-1.413	(0)
Cd (SeO3) 2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cl	2.733e-01					
Cl-	2.729e-01	2.003e-01	-0.564	-0.698	-0.134	(0)
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)

CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
ZnOHC1	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CdOHC1	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co (2)	4.224e-04					
Co+2	3.644e-04	1.408e-05	-3.438	-4.851	-1.413	(0)
CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
Co (NH3) +2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CoOH+	7.075e-10	3.137e-10	-9.150	-9.504	-0.353	(0)
Co2OH+3	3.344e-13	2.213e-16	-12.476	-15.655	-3.179	(0)
Co (NH3) 2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Co (OH) 2	2.782e-14	2.782e-14	-13.556	-13.556	0.000	(0)
Co (NH3) 3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Co (OH) 3-	1.398e-21	6.199e-22	-20.854	-21.208	-0.353	(0)
CoOOH-	8.505e-23	3.771e-23	-22.070	-22.424	-0.353	(0)
Co4 (OH) 4+4	8.668e-25	1.932e-30	-24.062	-29.714	-5.652	(0)
Co (NH3) 4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
Co (OH) 4-2	2.839e-30	1.097e-31	-29.547	-30.960	-1.413	(0)
Co (NH3) 5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Co (3)	8.287e-32					
CoOH+2	8.232e-32	3.180e-33	-31.085	-32.498	-1.413	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co+3	9.049e-36	5.605e-37	-35.043	-36.251	-1.208	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
Cu (1)	1.504e-04					
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)

Cu+	1.823e-08	8.082e-09	-7.739	-8.092	-0.353	(0)
Cu (2)	1.182e-09					
Cu+2	5.900e-10	1.714e-10	-9.229	-9.766	-0.537	(0)
CuSO4	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
CuOH+	7.604e-13	4.972e-13	-12.119	-12.303	-0.185	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
Cu (OH) 2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
Cu2 (OH) 2+2	1.564e-19	6.042e-21	-18.806	-20.219	-1.413	(0)
Cu (OH) 3-	6.965e-22	3.088e-22	-21.157	-21.510	-0.353	(0)
Cu (OH) 4-2	7.024e-29	2.714e-30	-28.153	-29.566	-1.413	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Fe (2)	1.726e-02					
Fe+2	1.529e-02	5.907e-04	-1.816	-3.229	-1.413	(0)
FeSO4	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
FeOH+	2.826e-08	1.934e-08	-7.549	-7.714	-0.165	(0)
Fe (OH) 2	1.209e-14	1.209e-14	-13.918	-13.918	0.000	(0)
Fe (OH) 3-	6.009e-18	4.111e-18	-17.221	-17.386	-0.165	(0)
Fe (3)	2.087e-10					
Fe (OH) 2+	1.957e-10	1.360e-10	-9.708	-9.867	-0.158	(0)
FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
FeOH+2	1.136e-12	2.489e-13	-11.945	-12.604	-0.659	(0)
Fe (OH) 3	9.228e-14	9.228e-14	-13.035	-13.035	0.000	(0)
FeSO4+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe (SO4) 2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Fe+3	7.010e-15	4.342e-16	-14.154	-15.362	-1.208	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
Fe (OH) 4-	2.440e-17	1.696e-17	-16.613	-16.771	-0.158	(0)
Fe2 (OH) 2+4	1.061e-18	2.365e-24	-17.974	-23.626	-5.652	(0)
Fe3 (OH) 4+5	3.023e-24	4.459e-33	-23.520	-32.351	-8.831	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
H (0)	1.047e-15					
H2	5.235e-16	5.855e-16	-15.281	-15.232	0.049	(0)
Hg (0)	2.051e-09					
Hg	2.051e-09	2.051e-09	-8.688	-8.688	0.000	(0)
Hg (1)	9.698e-28					
Hg2+2	4.849e-28	1.874e-29	-27.314	-28.727	-1.413	(0)
Hg (2)	4.726e-15					
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
Hg (NH3) 2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Hg (OH) 2	1.022e-25	1.143e-25	-24.991	-24.942	0.049	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
HgOH+	1.615e-27	7.162e-28	-26.792	-27.145	-0.353	(0)
Hg+2	4.674e-28	1.806e-29	-27.330	-28.743	-1.413	(0)
HgSO4	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Hg (NH3) 3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Hg (OH) 3-	3.623e-35	1.606e-35	-34.441	-34.794	-0.353	(0)
Hg (NH3) 4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Hg (NO3) 2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
K	5.682e-03					
K+	5.178e-03	3.801e-03	-2.286	-2.420	-0.134	(0)

KSO4-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
KHPO4-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
Mg	5.671e-02					
Mg+2	3.360e-02	9.758e-03	-1.474	-2.011	-0.537	(0)
MgSO4	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
MgHPO4	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
MgOH+	4.148e-09	2.990e-09	-8.382	-8.524	-0.142	(0)
MgPO4-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
Mn (2)	3.202e-03					
Mn+2	2.899e-03	1.120e-04	-2.538	-3.951	-1.413	(0)
MnSO4	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
MnOH+	3.381e-10	2.313e-10	-9.471	-9.636	-0.165	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Mn (OH) 3-	3.538e-24	2.421e-24	-23.451	-23.616	-0.165	(0)
Mn (OH) 4-2	3.983e-32	8.727e-33	-31.400	-32.059	-0.659	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Mn (3)	4.471e-28					
Mn+3	4.471e-28	2.769e-29	-27.350	-28.558	-1.208	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-79.028	-79.687	-0.659	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-88.115	-88.325	-0.210	(0)
N (-3)	4.406e-03					
NH4+	3.919e-03	2.335e-03	-2.407	-2.632	-0.225	(0)
NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
NH3	1.123e-07	1.123e-07	-6.950	-6.950	0.000	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
Co (NH3) +2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
Ni (NH3) 2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Co (NH3) 2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Ca (NH3) 2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
Co (NH3) 3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Hg (NH3) 2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Co (NH3) 4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
Hg (NH3) 3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Co (NH3) 5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
Hg (NH3) 4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
N (3)	0.000e+00					
NO2-	0.000e+00	0.000e+00	-47.968	-48.177	-0.210	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
N (5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-64.954	-65.088	-0.134	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)

	Co (NO3) 2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
	Zn (NO3) 2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)
	Pb (NO3) 2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
	Cd (NO3) 2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
	Cu (NO3) 2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
	Hg (NO3) 2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
Na		2.631e-01					
	Na+	2.447e-01	1.796e-01	-0.611	-0.746	-0.134	(0)
	NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
	NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
Ni		9.762e-05					
	Ni+2	4.671e-05	1.357e-05	-4.331	-4.867	-0.537	(0)
	NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
	NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
	Ni (SO4) 2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
	NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
	NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
	NiOH+	3.238e-10	1.435e-10	-9.490	-9.843	-0.353	(0)
	Ni (NH3) 2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
	Ni (OH) 2	1.692e-14	1.692e-14	-13.772	-13.772	0.000	(0)
	Ni (OH) 3-	4.261e-20	1.889e-20	-19.371	-19.724	-0.353	(0)
	NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
	NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
O (0)		0.000e+00					
	O2	0.000e+00	0.000e+00	-63.001	-62.952	0.049	(0)
P		7.837e-04					
	H2PO4-	4.270e-04	2.967e-04	-3.370	-3.528	-0.158	(0)
	MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
	FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
	CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
	MgHPO4	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
	HPO4-2	9.473e-06	2.076e-06	-5.024	-5.683	-0.659	(0)
	NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
	FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
	CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
	H3PO4	3.560e-07	3.560e-07	-6.449	-6.449	0.000	(0)
	KHPO4-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
	CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
	CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
	MgPO4-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
	FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
	PO4-3	1.460e-12	9.045e-14	-11.836	-13.044	-1.208	(0)
	FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Pb		4.964e-08					
	PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
	Pb (SO4) 2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
	PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
	PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
	Pb+2	3.636e-09	1.056e-09	-8.439	-8.976	-0.537	(0)
	PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
	PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
	PbOH+	6.682e-12	2.963e-12	-11.175	-11.528	-0.353	(0)
	Pb (OH) 2	1.046e-16	1.046e-16	-15.980	-15.980	0.000	(0)
	Pb2OH+3	7.494e-17	4.960e-20	-16.125	-19.305	-3.179	(0)
	Pb (OH) 3-	2.635e-22	1.168e-22	-21.579	-21.933	-0.353	(0)
	Pb (OH) 4-2	8.268e-28	3.195e-29	-27.083	-28.496	-1.413	(0)
	Pb3 (OH) 4+2	3.173e-30	1.226e-31	-29.499	-30.912	-1.413	(0)
	Pb4 (OH) 4+4	5.352e-31	1.193e-36	-30.271	-35.923	-5.652	(0)
	PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
	Pb (NO3) 2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
S (6)		9.754e-02					
	SO4-2	4.586e-02	1.332e-02	-1.339	-1.875	-0.537	(0)
	MgSO4	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
	NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
	CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
	FeSO4	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
	KSO4-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
	NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)

MnSO4	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
Al (SO4) 2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Zn (SO4) 2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
HSO4-	1.536e-05	1.028e-05	-4.814	-4.988	-0.174	(0)
ZnSO4	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
Ni (SO4) 2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
Cd (SO4) 2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
Pb (SO4) 2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
CuSO4	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
FeSO4+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe (SO4) 2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
HgSO4	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Se (-2)	1.042e-06					
HSe-	1.012e-06	4.485e-07	-5.995	-6.348	-0.353	(0)
H2Se	3.047e-08	3.047e-08	-7.516	-7.516	0.000	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Se-2	1.000e-15	3.865e-17	-15.000	-16.413	-1.413	(0)
Se (4)	2.708e-15					
HSeO3-	2.690e-15	1.193e-15	-14.570	-14.923	-0.353	(0)
SeO3-2	1.341e-17	5.183e-19	-16.872	-18.285	-1.413	(0)
H2SeO3	4.383e-18	4.383e-18	-17.358	-17.358	0.000	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
Cd (SeO3) 2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
Se (6)	9.467e-35					
SeO4-2	9.354e-35	2.717e-35	-34.029	-34.566	-0.537	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
HSeO4-	2.413e-38	1.070e-38	-37.617	-37.971	-0.353	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn	2.800e-05					
Zn (SO4) 2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
Zn+2	6.051e-06	1.758e-06	-5.218	-5.755	-0.537	(0)
ZnSO4	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
ZnOH+	3.259e-10	1.445e-10	-9.487	-9.840	-0.353	(0)
Zn (OH) 2	3.473e-14	3.473e-14	-13.459	-13.459	0.000	(0)
Zn (OH) 3-	4.384e-19	1.944e-19	-18.358	-18.711	-0.353	(0)
Zn (OH) 4-2	2.236e-25	8.641e-27	-24.650	-26.063	-1.413	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2	-161.31	-155.03	6.27	(Co (NH3) 5Cl) (NO3) 2
(Co (NH3) 5Cl) Cl2	-30.79	-26.25	4.54	(Co (NH3) 5Cl) Cl2
(Co (NH3) 5OH2) Cl3	-38.05	-26.26	11.80	(Co (NH3) 5OH2) Cl3
(Co (NH3) 6) (NO3) 3	-234.94	-217.01	17.93	(Co (NH3) 6) (NO3) 3
(Co (NH3) 6) Cl3	-43.95	-23.84	20.11	(Co (NH3) 6) Cl3
(NH4) 2SeO4	-40.28	-39.83	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	-1.87	9.19	11.06	Al (OH) 3
Al2O3	-1.87	18.40	20.27	Al2O3

Al4(OH)10SO4	2.10	24.80	22.70	Al4(OH)10SO4
AlOHSO4	0.46	-2.77	-3.23	AlOHSO4
Alunite	7.17	6.27	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.03	-10.85	-7.82	PbSO4
Anhydrite	-0.16	-4.50	-4.34	CaSO4
Antlerite	-19.78	-10.99	8.79	Cu3(OH)4SO4
Atacamite	-12.71	-5.10	7.61	Cu2(OH)3Cl
Bianchite	-5.90	-7.66	-1.76	ZnSO4·6H2O
Birnessite	-25.46	-7.37	18.09	MnO2
Bixbyite	-26.48	-26.83	-0.35	Mn2O3
Boehmite	0.34	9.20	8.86	AlOOH
Brochantite	-26.38	-10.67	15.71	Cu4(OH)6SO4
Brucite	-9.04	8.08	17.12	Mg(OH)2
Bunsenite	-7.46	5.23	12.68	NiO
Ca3(PO4)2(beta)	-4.91	-33.96	-29.05	Ca3(PO4)2
Ca4H(PO4)3·3H2O	-7.62	-54.70	-47.08	Ca4H(PO4)3·3H2O
CaHPO4	-1.37	-20.72	-19.35	CaHPO4
CaHPO4·2H2O	-1.68	-20.73	-19.05	CaHPO4·2H2O
Calomel	-11.99	-30.12	-18.13	Hg2Cl2
CaSeO3·2H2O	-15.37	-12.51	2.86	CaSeO3·2H2O
CaSeO4·2H2O	-34.20	-37.20	-3.00	CaSeO4·2H2O
Cd(OH)2	-12.14	1.73	13.87	Cd(OH)2
Cd(OH)2(am)	-12.21	1.73	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-25.45	-18.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-29.34	-6.78	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-18.57	-51.17	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-33.45	-5.05	28.40	Cd4(OH)6SO4
CdCl2	-9.14	-9.76	-0.61	CdCl2
CdCl2·1H2O	-8.09	-9.76	-1.68	CdCl2·1H2O
CdCl2·2.5H2O	-7.84	-9.77	-1.93	CdCl2·2.5H2O
Cdmetal(alpha)	-24.05	-10.36	13.69	Cd
Cdmetal(gamma)	-24.16	-10.36	13.80	Cd
CdOHCl	-7.62	-4.01	3.61	CdOHCl
CdSe	10.72	-9.66	-20.38	CdSe
CdSeO4·2H2O	-41.09	-42.94	-1.85	CdSeO4·2H2O
CdSO4	-10.19	-10.24	-0.05	CdSO4
CdSO4·1H2O	-8.59	-10.24	-1.65	CdSO4·1H2O
CdSO4·2.67H2O	-8.42	-10.25	-1.83	CdSO4·2.67H2O
Chalcantite	-9.01	-11.67	-2.65	CuSO4·5H2O
Clausthalite	17.11	-10.27	-27.39	PbSe
Co(OH)2	-7.86	5.24	13.09	Co(OH)2
Co(OH)3	-19.03	-21.12	-2.09	Co(OH)3
Co3(PO4)2	-5.95	-40.64	-34.69	Co3(PO4)2
Co3O4	-26.74	-36.97	-10.24	Co3O4
CoCl2	-14.71	-6.25	8.46	CoCl2
CoCl2·6H2O	-8.80	-6.28	2.52	CoCl2·6H2O
CoFe2O4	7.95	4.80	-3.15	CoFe2O4
CoHPO4	-3.88	-22.95	-19.06	CoHPO4
CoO	-8.60	5.24	13.84	CoO
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-16.04	-14.72	1.32	CoSeO3
CoSeO4·6H2O	-37.92	-39.45	-1.53	CoSeO4·6H2O
CoSO4	-9.72	-6.73	2.99	CoSO4
CoSO4·6H2O	-4.28	-6.76	-2.48	CoSO4·6H2O
Cotunnite	-5.53	-10.37	-4.84	PbCl2
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.91	-69.49	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.83	-17.48	-46.31	Cu2Se
Cu2SO4	-16.16	-18.06	-1.90	Cu2SO4
Cu3(PO4)2	-18.54	-55.39	-36.85	Cu3(PO4)2
Cu3(PO4)2·3H2O	-20.28	-55.40	-35.12	Cu3(PO4)2·3H2O
Cu3Se2	35.75	-28.55	-64.30	Cu3Se2
Cumetal	-0.17	-9.09	-8.93	Cu
CuOCuSO4	-21.94	-11.31	10.63	CuOCuSO4
Cupricferrite	-6.60	-0.11	6.49	CuFe2O4
Cuprite	-4.98	-6.09	-1.11	Cu2O
Cuprousferrite	5.61	-3.27	-8.88	CuFeO2
CuSe	22.32	-11.06	-33.39	CuSe

CuSe2	23.34	-10.36	-33.70	CuSe2
CuSeO3:2H2O	-20.25	-19.65	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-41.92	-44.36	-2.44	CuSeO4:5H2O
CuSO4	-14.76	-11.64	3.11	CuSO4
Diaspore	2.08	9.20	7.12	AlOOH
Epsomite	-1.77	-3.92	-2.15	MgSO4:7H2O
Fe(OH)2	-6.70	6.86	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.09	-1.95	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-21.97	-20.42	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-39.73	-60.36	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-33.19	-36.35	-3.16	Fe2(SO4)3
Fe3(OH)8	-13.82	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.59	-0.23	3.37	Fe(OH)3
Ferroselite	14.88	-3.83	-18.71	FeSe2
FeSe	6.48	-4.53	-11.00	FeSe
Gibbsite	0.67	9.19	8.52	Al(OH)3
Goethite	-0.86	-0.22	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4:7H2O
Gypsum	0.10	-4.51	-4.61	CaSO4:2H2O
H-Jarosite	-13.07	-24.62	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-6.47	-11.40	-4.92	H2Se
Halite	-3.04	-1.44	1.59	NaCl
Hausmannite	-31.51	30.53	62.03	Mn3O4
Hematite	0.67	-0.44	-1.11	Fe2O3
Hercynite	1.62	25.26	23.64	FeAl2O4
Hg(g)	-7.44	-15.36	-7.93	Hg
Hg(OH)2	-21.45	-24.94	-3.50	Hg(OH)2
Hg2(g)	-15.63	-30.73	-15.09	Hg2
Hg2(OH)2	-23.90	-18.64	5.26	Hg2(OH)2
Hg2HPO4	-22.05	-46.82	-24.77	Hg2HPO4
Hg2SeO3	-33.94	-38.60	-4.66	Hg2SeO3
Hg2SO4	-24.46	-30.60	-6.14	Hg2SO4
HgCl(g)	-34.94	-15.06	19.88	HgCl
HgCl2	-14.91	-36.43	-21.52	HgCl2
Hgmetal(l)	-1.71	-15.36	-13.65	Hg
HgSe	19.36	-36.33	-55.69	HgSe
HgSeO3	-32.48	-44.91	-12.43	HgSeO3
HgSO4	-27.45	-36.91	-9.45	HgSO4
Hinsdalite	-8.96	-11.46	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-2.88	-47.21	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-16.18	-78.97	-62.79	Pb5(PO4)3OH
K-Alum	-6.93	-12.18	-5.24	KAl(SO4)2:12H2O
K-Jarosite	-7.50	-21.99	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-38.68	-39.41	-0.73	K2SeO4
Langite	-28.56	-10.68	17.88	Cu4(OH)6SO4:H2O
Larnakite	-9.35	-9.73	-0.38	PbO:PbSO4
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.59	-0.22	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.73	1.12	12.85	PbO
Maghemite	-6.83	-0.44	6.39	Fe2O3
Magnesioferrite	-9.88	7.64	17.52	Fe2MgO4
Magnetite	2.53	6.43	3.90	Fe3O4
Manganite	-13.15	12.19	25.34	MnOOH
Massicot	-11.93	1.12	13.05	PbO
Melanothallite	-17.57	-11.16	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeSO4:7H2O
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(PO4)2	-8.84	-32.12	-23.28	Mg3(PO4)2
MgHPO4:3H2O	-1.94	-20.12	-18.18	MgHPO4:3H2O
MgSeO3:6H2O	-14.96	-11.91	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-35.41	-36.61	-1.20	MgSeO4:6H2O
Minium	-59.08	15.45	74.53	Pb3O4
Mirabilite	-2.11	-3.42	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-57.42	-62.74	-5.32	Mn2(SO4)3
Mn3(PO4)2	-14.09	-37.94	-23.85	Mn3(PO4)2
MnCl2:4H2O	-8.11	-5.37	2.74	MnCl2:4H2O
MnHPO4	3.36	-22.04	-25.40	MnHPO4

MnSe	-8.98	-5.25	3.73	MnSe
MnSeO3	-14.95	-13.82	1.13	MnSeO3
MnSeO3:2H2O	-14.80	-13.83	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-36.49	-38.54	-2.05	MnSeO4:5H2O
MnSO4	-8.56	-5.83	2.74	MnSO4
Monteponite	-13.62	1.73	15.35	CdO
Montroydite	-21.39	-24.94	-3.55	HgO
Morenosite	-4.60	-6.78	-2.17	NiSO4:7H2O
Na-Jarosite	-9.47	-20.31	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-21.69	-11.39	10.30	Na2SeO3:5H2O
Na2SeO4	-37.34	-36.06	1.28	Na2SeO4
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(PO4)2	-9.39	-40.69	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-23.08	8.92	32.00	Ni4(OH)6SO4
NiSe	11.53	-6.17	-17.70	NiSe
NiSeO3:2H2O	-17.64	-14.75	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-37.94	-39.46	-1.52	NiSeO4:6H2O
Nsutite	-24.87	-7.37	17.50	MnO2
O2(g)	-60.26	24.19	84.45	O2
Pb(OH)2	-7.18	1.11	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.31	-3.52	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-23.96	2.23	26.19	Pb2O(OH)2
Pb2O3	-46.71	14.33	61.04	Pb2O3
Pb3(PO4)2	-9.49	-53.02	-43.53	Pb3(PO4)2
Pb3O2SO4	-19.49	-8.61	10.87	Pb3O2SO4
Pb4(OH)6SO4	-28.61	-7.51	21.10	Pb4(OH)6SO4
Pb4O3SO4	-29.70	-7.50	22.20	Pb4O3SO4
PbHPO4	-3.26	-27.07	-23.81	PbHPO4
Pbmetal	-15.22	-10.98	4.24	Pb
PbO:0.3H2O	-11.86	1.12	12.98	PbO:0.33H2O
PbSeO4	-36.67	-43.54	-6.88	PbSeO4
Periclase	-13.86	8.08	21.94	MgO
Plattnerite	-37.09	13.21	50.31	PbO2
Plumbgummite	5.12	-27.67	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-15.65	7.46	23.11	Ca(OH)2
Pyrochroite	-9.29	6.14	15.43	Mn(OH)2
Pyrolusite	-23.79	18.24	42.03	MnO2
Pyromorphite	-0.28	-84.71	-84.43	Pb5(PO4)3Cl
Retgersite	-4.72	-6.77	-2.05	NiSO4:6H2O
Semetal(am)	7.84	0.70	-7.14	Se
Semetal(hex)	8.45	0.70	-7.75	Se
SeO2	-20.09	-19.97	0.12	SeO2
SeO3	-66.05	-44.66	21.39	SeO3
Spinel	-11.29	26.48	37.77	MgAl2O4
Strengite	-2.04	-28.42	-26.38	FePO4:2H2O
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.71	-3.37	0.34	Na2SO4
Tsumebite	-15.85	-25.64	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	0.19	-35.81	-36.00	Fe3(PO4)2:8H2O
Zincite	-7.21	4.34	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnSO4
Zn(NO3)2:6H2O	-139.22	-135.96	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-7.87	4.33	12.20	Zn(OH)2
Zn(OH)2(am)	-8.33	4.33	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.62	4.33	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.39	4.33	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.40	4.33	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.80	-3.30	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.26	2.93	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-7.95	-43.37	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-30.45	-10.92	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-23.03	5.37	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-28.31	10.19	38.50	Zn5(OH)8Cl2
ZnCl2	-14.37	-7.15	7.22	ZnCl2
Znmetal	-33.91	-7.76	26.15	Zn
ZnO(active)	-7.06	4.34	11.40	ZnO
ZnSe	7.41	-7.05	-14.46	ZnSe

ZnSeO4:6H2O	-38.83	-40.35	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.10	-7.64	-0.53	ZnSO4:1H2O

**For a gas, $SI = \log_{10}(\text{fugacity})$. Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Initial solution 2.

-----Solution composition-----

Elements	Molality	Moles
Al	5.487e-05	5.487e-05
Alkalinity	9.999e-04	9.999e-04
As	1.736e-08	1.736e-08
B	4.626e-06	4.626e-06
Ba	3.481e-07	3.481e-07
Ca	3.244e-04	3.244e-04
Cd	6.229e-09	6.229e-09
Cl	2.229e-03	2.229e-03
Co	1.018e-08	1.018e-08
Cr	4.040e-08	4.040e-08
Cu	9.444e-08	9.444e-08
Fe	2.454e-05	2.454e-05
Hg	3.989e-10	3.989e-10
K	1.023e-04	1.023e-04
Mg	3.704e-04	3.704e-04
Mn	1.092e-06	1.092e-06
Mo	3.128e-09	3.128e-09
N	7.498e-05	7.498e-05
Na	2.132e-03	2.132e-03
Ni	4.772e-08	4.772e-08
P	3.552e-06	3.552e-06
Pb	5.793e-09	5.793e-09
S (6)	1.770e-04	1.770e-04
Se	2.534e-09	2.534e-09
Zn	2.509e-07	2.509e-07

-----Description of solution-----

pH	=	7.500
pe	=	4.000
Activity of water	=	1.000
Ionic strength (mol/kgw)	=	4.384e-03
Mass of water (kg)	=	1.000e+00
Total carbon (mol/kg)	=	8.307e-04
Total CO2 (mol/kg)	=	8.307e-04
Temperature (°C)	=	20.00
Electrical balance (eq)	=	3.069e-04
Percent error, $100 * (\text{Cat} - \text{An}) / (\text{Cat} + \text{An})$	=	4.34
Iterations	=	11
Total H	=	1.110151e+02
Total O	=	5.551033e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
OH-	2.330e-07	2.169e-07	-6.633	-6.664	-0.031	(0)
H+	3.394e-08	3.162e-08	-7.469	-7.500	-0.031	0.00
H2O	5.551e+01	9.999e-01	1.744	-0.000	0.000	18.05
Al	5.487e-05					
Al (OH) 4-	5.036e-05	4.694e-05	-4.298	-4.328	-0.031	(0)
Al (OH) 3	3.857e-06	3.857e-06	-5.414	-5.414	0.000	(0)
Al (OH) 2+	6.505e-07	6.071e-07	-6.187	-6.217	-0.030	(0)
AlOH+2	2.277e-09	1.728e-09	-8.643	-8.763	-0.120	(0)
Al+3	1.426e-11	7.540e-12	-10.846	-11.123	-0.277	(0)

AlSO4+	6.366e-12	5.934e-12	-11.196	-11.227	-0.031	(0)
Al (SO4) 2-	9.367e-15	8.732e-15	-14.028	-14.059	-0.031	(0)
AlMo6O21-3	0.000e+00	0.000e+00	-52.596	-52.898	-0.301	(0)
As (3)	3.031e-18					
H3AsO3	2.988e-18	2.988e-18	-17.525	-17.525	0.000	(0)
H2AsO3-	4.335e-20	4.013e-20	-19.363	-19.397	-0.033	(0)
HAsO3-2	1.264e-24	9.286e-25	-23.898	-24.032	-0.134	(0)
H4AsO3+	5.056e-26	4.681e-26	-25.296	-25.330	-0.033	(0)
AsO3-3	1.904e-30	9.510e-31	-29.720	-30.022	-0.301	(0)
As (5)	1.736e-08					
HAsO4-2	1.407e-08	1.033e-08	-7.852	-7.986	-0.134	(0)
H2AsO4-	3.286e-09	3.043e-09	-8.483	-8.517	-0.033	(0)
AsO4-3	1.840e-12	9.193e-13	-11.735	-12.037	-0.301	(0)
H3AsO4	1.591e-14	1.592e-14	-13.798	-13.798	0.000	(0)
B	4.626e-06					
H3BO3	4.542e-06	4.547e-06	-5.343	-5.342	0.000	(0)
H2BO3-	8.215e-08	7.636e-08	-7.085	-7.117	-0.032	(0)
CaH2BO3+	1.090e-09	1.013e-09	-8.963	-8.994	-0.032	(0)
MgH2BO3+	7.768e-10	7.220e-10	-9.110	-9.141	-0.032	(0)
NaH2BO3	2.626e-10	2.626e-10	-9.581	-9.581	0.000	(0)
BaH2BO3+	6.446e-13	5.992e-13	-12.191	-12.222	-0.032	(0)
H5 (BO3) 2-	3.281e-13	3.050e-13	-12.484	-12.516	-0.032	(0)
H8 (BO3) 3-	1.291e-16	1.200e-16	-15.889	-15.921	-0.032	(0)
Ba	3.481e-07					
Ba+2	3.464e-07	2.610e-07	-6.460	-6.583	-0.123	(0)
BaHCO3+	1.611e-09	1.505e-09	-8.793	-8.822	-0.030	(0)
BaCO3	1.153e-10	1.153e-10	-9.938	-9.938	0.000	(0)
BaH2BO3+	6.446e-13	5.992e-13	-12.191	-12.222	-0.032	(0)
BaNH3+2	2.781e-13	2.043e-13	-12.556	-12.690	-0.134	(0)
BaOH+	2.559e-13	2.387e-13	-12.592	-12.622	-0.030	(0)
BaNO3+	4.082e-25	3.779e-25	-24.389	-24.423	-0.033	(0)
C (4)	8.307e-04					
HCO3-	7.685e-04	7.172e-04	-3.114	-3.144	-0.030	(0)
H2CO3	5.433e-05	5.433e-05	-4.265	-4.265	0.000	(0)
CaHCO3+	2.954e-06	2.759e-06	-5.530	-5.559	-0.030	(0)
MgHCO3+	2.090e-06	1.947e-06	-5.680	-5.711	-0.031	(0)
CO3-2	1.276e-06	9.617e-07	-5.894	-6.017	-0.123	(0)
NaHCO3	8.795e-07	8.795e-07	-6.056	-6.056	0.000	(0)
CaCO3	3.236e-07	3.236e-07	-6.490	-6.490	0.000	(0)
MgCO3	2.008e-07	2.008e-07	-6.697	-6.697	0.000	(0)
CuCO3	6.481e-08	6.481e-08	-7.188	-7.188	0.000	(0)
NaCO3-	4.379e-08	4.087e-08	-7.359	-7.389	-0.030	(0)
MnHCO3+	1.164e-08	1.086e-08	-7.934	-7.964	-0.030	(0)
ZnCO3	9.487e-09	9.487e-09	-8.023	-8.023	0.000	(0)
FeHCO3+	9.148e-09	8.545e-09	-8.039	-8.068	-0.030	(0)
ZnHCO3+	3.799e-09	3.517e-09	-8.420	-8.454	-0.033	(0)
PbCO3	2.909e-09	2.909e-09	-8.536	-8.536	0.000	(0)
NiHCO3+	2.779e-09	2.573e-09	-8.556	-8.590	-0.033	(0)
BaHCO3+	1.611e-09	1.505e-09	-8.793	-8.822	-0.030	(0)
NiCO3	1.154e-09	1.154e-09	-8.938	-8.938	0.000	(0)
PbHCO3+	5.238e-10	4.849e-10	-9.281	-9.314	-0.033	(0)
CuHCO3+	5.060e-10	4.684e-10	-9.296	-9.329	-0.033	(0)
CoHCO3+	3.770e-10	3.490e-10	-9.424	-9.457	-0.033	(0)
Cu (CO3) 2-2	2.284e-10	1.678e-10	-9.641	-9.775	-0.134	(0)
BaCO3	1.153e-10	1.153e-10	-9.938	-9.938	0.000	(0)
CoCO3	1.125e-10	1.125e-10	-9.949	-9.949	0.000	(0)
CdCO3	8.551e-11	8.551e-11	-10.068	-10.068	0.000	(0)
Pb (CO3) 2-2	1.098e-11	8.067e-12	-10.959	-11.093	-0.134	(0)
CdHCO3+	6.223e-12	5.761e-12	-11.206	-11.239	-0.033	(0)
Cd (CO3) 2-2	8.298e-14	6.096e-14	-13.081	-13.215	-0.134	(0)
HgCO3	2.918e-18	2.918e-18	-17.535	-17.535	0.000	(0)
Hg (CO3) 2-2	1.208e-20	8.873e-21	-19.918	-20.052	-0.134	(0)
HgHCO3+	1.856e-21	1.718e-21	-20.731	-20.765	-0.033	(0)
Ca	3.244e-04					
Ca+2	3.146e-04	2.370e-04	-3.502	-3.625	-0.123	(0)
CaSO4	6.357e-06	6.357e-06	-5.197	-5.197	0.000	(0)
CaHCO3+	2.954e-06	2.759e-06	-5.530	-5.559	-0.030	(0)
CaCO3	3.236e-07	3.236e-07	-6.490	-6.490	0.000	(0)

CaHPO4	1.634e-07	1.634e-07	-6.787	-6.787	0.000	(0)
CaPO4-	1.319e-08	1.231e-08	-7.880	-7.910	-0.030	(0)
CaH2PO4+	4.366e-09	4.075e-09	-8.360	-8.390	-0.030	(0)
CaH2BO3+	1.090e-09	1.013e-09	-8.963	-8.994	-0.032	(0)
CaOH+	1.037e-09	9.688e-10	-8.984	-9.014	-0.030	(0)
CaNH3+2	5.039e-10	3.702e-10	-9.298	-9.432	-0.134	(0)
Ca (NH3) 2+2	2.488e-16	1.828e-16	-15.604	-15.738	-0.134	(0)
CaNO3+	2.220e-22	2.055e-22	-21.654	-21.687	-0.033	(0)
Cd	6.229e-09					
Cd+2	5.178e-09	3.901e-09	-8.286	-8.409	-0.123	(0)
CdCl+	8.299e-10	7.683e-10	-9.081	-9.114	-0.033	(0)
CdSO4	1.059e-10	1.059e-10	-9.975	-9.975	0.000	(0)
CdCO3	8.551e-11	8.551e-11	-10.068	-10.068	0.000	(0)
CdOHC1	8.913e-12	8.913e-12	-11.050	-11.050	0.000	(0)
CdOH+	7.309e-12	6.767e-12	-11.136	-11.170	-0.033	(0)
CdCl2	6.560e-12	6.560e-12	-11.183	-11.183	0.000	(0)
CdHCO3+	6.223e-12	5.761e-12	-11.206	-11.239	-0.033	(0)
Cd (SO4) 2-2	2.538e-13	1.864e-13	-12.596	-12.730	-0.134	(0)
Cd (CO3) 2-2	8.298e-14	6.096e-14	-13.081	-13.215	-0.134	(0)
Cd (OH) 2	1.982e-14	1.982e-14	-13.703	-13.703	0.000	(0)
CdCl3-	8.847e-15	8.191e-15	-14.053	-14.087	-0.033	(0)
Cd (OH) 3-	4.164e-19	3.855e-19	-18.380	-18.414	-0.033	(0)
Cd2OH+3	2.817e-19	1.408e-19	-18.550	-18.852	-0.301	(0)
CdSeO4	5.758e-22	5.758e-22	-21.240	-21.240	0.000	(0)
Cd (SeO3) 2-2	2.869e-22	2.108e-22	-21.542	-21.676	-0.134	(0)
Cd (OH) 4-2	2.735e-26	2.009e-26	-25.563	-25.697	-0.134	(0)
CdNO3+	4.067e-27	3.766e-27	-26.391	-26.424	-0.033	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-45.365	-45.365	0.000	(0)
Cl	2.229e-03					
Cl-	2.229e-03	2.077e-03	-2.652	-2.683	-0.031	(0)
MnCl+	2.186e-09	2.040e-09	-8.660	-8.690	-0.030	(0)
CuCl	1.397e-09	1.397e-09	-8.855	-8.855	0.000	(0)
ZnCl+	9.250e-10	8.616e-10	-9.034	-9.065	-0.031	(0)
CdCl+	8.299e-10	7.683e-10	-9.081	-9.114	-0.033	(0)
CuCl2-	6.588e-10	6.136e-10	-9.181	-9.212	-0.031	(0)
ZnOHC1	3.727e-10	3.727e-10	-9.429	-9.429	0.000	(0)
NiCl+	1.821e-10	1.686e-10	-9.740	-9.773	-0.033	(0)
PbCl+	7.542e-11	6.982e-11	-10.123	-10.156	-0.033	(0)
CoCl+	5.294e-11	4.901e-11	-10.276	-10.310	-0.033	(0)
CuCl+	3.819e-11	3.558e-11	-10.418	-10.449	-0.031	(0)
CdOHC1	8.913e-12	8.913e-12	-11.050	-11.050	0.000	(0)
CdCl2	6.560e-12	6.560e-12	-11.183	-11.183	0.000	(0)
MnCl2	5.982e-12	5.982e-12	-11.223	-11.223	0.000	(0)
ZnCl2	2.282e-12	2.282e-12	-11.642	-11.642	0.000	(0)
PbCl2	6.331e-13	6.331e-13	-12.199	-12.199	0.000	(0)
CuCl3-2	3.528e-13	2.671e-13	-12.452	-12.573	-0.121	(0)
CuCl2	2.001e-14	2.001e-14	-13.699	-13.699	0.000	(0)
CdCl3-	8.847e-15	8.191e-15	-14.053	-14.087	-0.033	(0)
HgClOH	3.971e-15	3.971e-15	-14.401	-14.401	0.000	(0)
ZnCl3-	3.958e-15	3.686e-15	-14.403	-14.433	-0.031	(0)
MnCl3-	3.668e-15	3.421e-15	-14.436	-14.466	-0.030	(0)
HgCl2	2.065e-15	2.065e-15	-14.685	-14.685	0.000	(0)
NiCl2	1.787e-15	1.787e-15	-14.748	-14.748	0.000	(0)
CrCl+2	8.838e-16	6.492e-16	-15.054	-15.188	-0.134	(0)
PbCl3-	5.973e-16	5.530e-16	-15.224	-15.257	-0.033	(0)
FeCl+2	5.123e-17	3.879e-17	-16.290	-16.411	-0.121	(0)
HgCl3-	4.682e-17	4.335e-17	-16.330	-16.363	-0.033	(0)
ZnCl4-2	4.856e-18	3.677e-18	-17.314	-17.435	-0.121	(0)
CrOHC12	3.999e-18	3.999e-18	-17.398	-17.398	0.000	(0)
PbCl4-2	6.635e-19	4.874e-19	-18.178	-18.312	-0.134	(0)
HgCl4-2	5.108e-19	3.752e-19	-18.292	-18.426	-0.134	(0)
FeCl2+	4.518e-19	4.215e-19	-18.345	-18.375	-0.030	(0)
CuCl3-	3.804e-19	3.544e-19	-18.420	-18.451	-0.031	(0)
HgCl+	1.747e-19	1.617e-19	-18.758	-18.791	-0.033	(0)
CrCl2+	8.871e-20	8.213e-20	-19.052	-19.086	-0.033	(0)
FeCl3	8.752e-23	8.752e-23	-22.058	-22.058	0.000	(0)
CuCl4-2	5.775e-24	4.372e-24	-23.238	-23.359	-0.121	(0)
CrO3Cl-	3.021e-29	2.797e-29	-28.520	-28.553	-0.033	(0)

Cr (NH3) 6Cl+2	1.542e-37	1.133e-37	-36.812	-36.946	-0.134	(0)
CoCl+2	1.419e-37	1.042e-37	-36.848	-36.982	-0.134	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-40.718	-40.852	-0.134	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-53.313	-53.447	-0.134	(0)
Co (2)	1.018e-08					
Co+2	9.417e-09	6.917e-09	-8.026	-8.160	-0.134	(0)
CoHCO3+	3.770e-10	3.490e-10	-9.424	-9.457	-0.033	(0)
CoSO4	1.626e-10	1.626e-10	-9.789	-9.789	0.000	(0)
CoCO3	1.125e-10	1.125e-10	-9.949	-9.949	0.000	(0)
CoCl+	5.294e-11	4.901e-11	-10.276	-10.310	-0.033	(0)
CoOH+	4.747e-11	4.394e-11	-10.324	-10.357	-0.033	(0)
CoHPO4	1.115e-11	1.115e-11	-10.953	-10.953	0.000	(0)
Co (NH3) +2	2.196e-12	1.613e-12	-11.658	-11.792	-0.134	(0)
Co (OH) 2	1.111e-12	1.111e-12	-11.954	-11.954	0.000	(0)
Co (NH3) 2+2	7.431e-17	5.459e-17	-16.129	-16.263	-0.134	(0)
Co (OH) 3-	7.626e-18	7.060e-18	-17.118	-17.151	-0.033	(0)
CoOOH-	3.189e-19	2.952e-19	-18.496	-18.530	-0.033	(0)
Co2OH+3	3.049e-20	1.524e-20	-19.516	-19.817	-0.301	(0)
CoNO2+	1.822e-20	1.686e-20	-19.740	-19.773	-0.033	(0)
CoSeO4	2.530e-21	2.530e-21	-20.597	-20.597	0.000	(0)
Co (NH3) 3+2	1.160e-21	8.524e-22	-20.935	-21.069	-0.134	(0)
Co (OH) 4-2	4.850e-25	3.563e-25	-24.314	-24.448	-0.134	(0)
Co (NH3) 4+2	7.554e-27	5.549e-27	-26.122	-26.256	-0.134	(0)
CoNO3+	3.128e-27	2.896e-27	-26.505	-26.538	-0.033	(0)
Co (NH3) 5+2	1.555e-32	1.142e-32	-31.808	-31.942	-0.134	(0)
Co4 (OH) 4+4	2.555e-33	7.440e-34	-32.593	-33.128	-0.536	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-44.808	-44.808	0.000	(0)
Co (3)	6.065e-31					
CoOH+2	6.065e-31	4.456e-31	-30.217	-30.351	-0.134	(0)
Co+3	5.207e-37	2.754e-37	-36.283	-36.560	-0.277	(0)
CoCl+2	1.419e-37	1.042e-37	-36.848	-36.982	-0.134	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-40.718	-40.852	-0.134	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-49.776	-49.810	-0.033	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.616	-52.750	-0.134	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-53.313	-53.447	-0.134	(0)
Cr (2)	3.686e-24					
Cr+2	3.686e-24	2.708e-24	-23.433	-23.567	-0.134	(0)
Cr (3)	4.040e-08					
Cr (OH) 2+	3.452e-08	3.196e-08	-7.462	-7.495	-0.033	(0)
Cr (OH) 3	3.822e-09	3.822e-09	-8.418	-8.418	0.000	(0)
Cr (OH) +2	1.919e-09	1.410e-09	-8.717	-8.851	-0.134	(0)
CrO2-	6.201e-11	5.740e-11	-10.208	-10.241	-0.033	(0)
Cr (OH) 4-	5.233e-11	4.845e-11	-10.281	-10.315	-0.033	(0)
CrOHSO4	2.406e-11	2.406e-11	-10.619	-10.619	0.000	(0)
Cr+3	5.783e-13	2.889e-13	-12.238	-12.539	-0.301	(0)
CrSO4+	7.237e-14	6.700e-14	-13.140	-13.174	-0.033	(0)
CrCl+2	8.838e-16	6.492e-16	-15.054	-15.188	-0.134	(0)
CrH2PO4+2	6.914e-17	5.079e-17	-16.160	-16.294	-0.134	(0)
CrOHC12	3.999e-18	3.999e-18	-17.398	-17.398	0.000	(0)
Cr2 (OH) 2SO4+2	2.442e-18	1.794e-18	-17.612	-17.746	-0.134	(0)
CrCl2+	8.871e-20	8.213e-20	-19.052	-19.086	-0.033	(0)
Cr2 (OH) 2 (SO4) 2	1.310e-20	1.310e-20	-19.883	-19.883	0.000	(0)
Cr (NH3) 5OH+2	3.552e-29	2.609e-29	-28.450	-28.583	-0.134	(0)
CrNO3+2	2.920e-33	2.145e-33	-32.535	-32.669	-0.134	(0)
Cr (NH3) 6+3	8.634e-36	4.314e-36	-35.064	-35.365	-0.301	(0)
Cr (NH3) 6Cl+2	1.542e-37	1.133e-37	-36.812	-36.946	-0.134	(0)
Cr (6)	9.578e-19					
CrO4-2	8.783e-19	6.617e-19	-18.056	-18.179	-0.123	(0)
HCrO4-	7.214e-20	6.679e-20	-19.142	-19.175	-0.033	(0)
NaCrO4-	7.047e-21	6.524e-21	-20.152	-20.185	-0.033	(0)
KCrO4-	2.530e-22	2.342e-22	-21.597	-21.630	-0.033	(0)
CrO3HPO4-2	2.689e-25	1.976e-25	-24.570	-24.704	-0.134	(0)
H2CrO4	1.327e-27	1.327e-27	-26.877	-26.877	0.000	(0)
CrO3SO4-2	1.091e-28	8.018e-29	-27.962	-28.096	-0.134	(0)
CrO3Cl-	3.021e-29	2.797e-29	-28.520	-28.553	-0.033	(0)
CrO3H2PO4-	3.251e-30	3.009e-30	-29.488	-29.522	-0.033	(0)
Cr2O7-2	2.400e-37	1.763e-37	-36.620	-36.754	-0.134	(0)
Cu (1)	2.634e-09					

CuCl	1.397e-09	1.397e-09	-8.855	-8.855	0.000	(0)
CuCl2-	6.588e-10	6.136e-10	-9.181	-9.212	-0.031	(0)
Cu+	5.774e-10	5.346e-10	-9.239	-9.272	-0.033	(0)
CuCl3-2	3.528e-13	2.671e-13	-12.452	-12.573	-0.121	(0)
Cu (2)	9.181e-08					
CuCO3	6.481e-08	6.481e-08	-7.188	-7.188	0.000	(0)
Cu+2	1.519e-08	1.145e-08	-7.818	-7.941	-0.123	(0)
CuOH+	9.669e-09	9.007e-09	-8.015	-8.045	-0.031	(0)
Cu (OH) 2	7.320e-10	7.320e-10	-9.135	-9.135	0.000	(0)
CuHCO3+	5.060e-10	4.684e-10	-9.296	-9.329	-0.033	(0)
CuNH3+2	3.245e-10	2.384e-10	-9.489	-9.623	-0.134	(0)
CuSO4	3.036e-10	3.036e-10	-9.518	-9.518	0.000	(0)
Cu (CO3) 2-2	2.284e-10	1.678e-10	-9.641	-9.775	-0.134	(0)
CuCl+	3.819e-11	3.558e-11	-10.418	-10.449	-0.031	(0)
Cu2 (OH) 2+2	2.680e-12	1.969e-12	-11.572	-11.706	-0.134	(0)
Cu (OH) 3-	5.164e-13	4.781e-13	-12.287	-12.321	-0.033	(0)
CuCl2	2.001e-14	2.001e-14	-13.699	-13.699	0.000	(0)
Cu (OH) 4-2	1.631e-18	1.198e-18	-17.788	-17.922	-0.134	(0)
CuNO2+	4.478e-19	4.146e-19	-18.349	-18.382	-0.033	(0)
CuCl3-	3.804e-19	3.544e-19	-18.420	-18.451	-0.031	(0)
CuCl4-2	5.775e-24	4.372e-24	-23.238	-23.359	-0.121	(0)
CuNO3+	1.062e-26	9.835e-27	-25.974	-26.007	-0.033	(0)
Cu (NO2) 2	1.468e-30	1.468e-30	-29.833	-29.833	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-45.498	-45.498	0.000	(0)
Fe (2)	1.480e-06					
Fe+2	1.424e-06	1.046e-06	-5.846	-5.980	-0.134	(0)
FeSO4	2.988e-08	2.988e-08	-7.525	-7.525	0.000	(0)
FeOH+	9.684e-09	9.034e-09	-8.014	-8.044	-0.030	(0)
FeHCO3+	9.148e-09	8.545e-09	-8.039	-8.068	-0.030	(0)
FeHPO4	6.152e-09	6.152e-09	-8.211	-8.211	0.000	(0)
FeH2PO4+	4.140e-10	3.864e-10	-9.383	-9.413	-0.030	(0)
Fe (OH) 2	1.473e-12	1.473e-12	-11.832	-11.832	0.000	(0)
Fe (OH) 3-	1.517e-13	1.415e-13	-12.819	-12.849	-0.030	(0)
Fe (3)	2.306e-05					
Fe (OH) 2+	1.977e-05	1.845e-05	-4.704	-4.734	-0.030	(0)
Fe (OH) 3	3.089e-06	3.089e-06	-5.510	-5.510	0.000	(0)
Fe (OH) 4-	2.004e-07	1.870e-07	-6.698	-6.728	-0.030	(0)
FeOH+2	1.476e-10	1.117e-10	-9.831	-9.952	-0.121	(0)
FeHPO4+	1.169e-11	1.091e-11	-10.932	-10.962	-0.030	(0)
Fe+3	1.370e-15	7.246e-16	-14.863	-15.140	-0.277	(0)
FeSO4+	9.021e-16	8.414e-16	-15.045	-15.075	-0.030	(0)
FeCl+2	5.123e-17	3.879e-17	-16.290	-16.411	-0.121	(0)
FeH2PO4+2	1.336e-17	1.014e-17	-16.874	-16.994	-0.120	(0)
Fe (SO4) 2-	2.486e-18	2.301e-18	-17.605	-17.638	-0.033	(0)
Fe2 (OH) 2+4	1.697e-18	4.942e-19	-17.770	-18.306	-0.536	(0)
FeCl2+	4.518e-19	4.215e-19	-18.345	-18.375	-0.030	(0)
FeHSeO3+2	4.463e-21	3.279e-21	-20.350	-20.484	-0.134	(0)
Fe3 (OH) 4+5	8.596e-22	1.251e-22	-21.066	-21.903	-0.837	(0)
FeCl3	8.752e-23	8.752e-23	-22.058	-22.058	0.000	(0)
FeNO3+2	3.361e-33	2.469e-33	-32.474	-32.607	-0.134	(0)
H (0)	1.488e-26					
H2	7.440e-27	7.447e-27	-26.128	-26.128	0.000	(0)
Hg (0)	3.989e-10					
Hg	3.989e-10	3.989e-10	-9.399	-9.399	0.000	(0)
Hg (1)	1.698e-24					
Hg2+2	8.491e-25	6.238e-25	-24.071	-24.205	-0.134	(0)
Hg (2)	7.725e-15					
HgClOH	3.971e-15	3.971e-15	-14.401	-14.401	0.000	(0)
HgCl2	2.065e-15	2.065e-15	-14.685	-14.685	0.000	(0)
Hg (OH) 2	1.620e-15	1.622e-15	-14.791	-14.790	0.000	(0)
HgCl3-	4.682e-17	4.335e-17	-16.330	-16.363	-0.033	(0)
Hg (NH3) 2+2	1.829e-17	1.344e-17	-16.738	-16.872	-0.134	(0)
HgCO3	2.918e-18	2.918e-18	-17.535	-17.535	0.000	(0)
HgCl4-2	5.108e-19	3.752e-19	-18.292	-18.426	-0.134	(0)
HgCl+	1.747e-19	1.617e-19	-18.758	-18.791	-0.033	(0)
HgOH+	3.953e-20	3.660e-20	-19.403	-19.437	-0.033	(0)
Hg (CO3) 2-2	1.208e-20	8.873e-21	-19.918	-20.052	-0.134	(0)
HgNH3+2	2.701e-21	1.984e-21	-20.568	-20.702	-0.134	(0)

	HgHCO3+	1.856e-21	1.718e-21	-20.731	-20.765	-0.033	(0)
	Hg (NH3) 3+2	1.423e-22	1.045e-22	-21.847	-21.981	-0.134	(0)
	Hg (OH) 3-	7.020e-23	6.499e-23	-22.154	-22.187	-0.033	(0)
	Hg+2	4.536e-24	3.332e-24	-23.343	-23.477	-0.134	(0)
	HgSO4	8.159e-26	8.159e-26	-25.088	-25.088	0.000	(0)
	Hg (NH3) 4+2	2.222e-27	1.633e-27	-26.653	-26.787	-0.134	(0)
	HgNO3+	0.000e+00	0.000e+00	-42.573	-42.607	-0.033	(0)
	Hg (NO3) 2	0.000e+00	0.000e+00	-61.566	-61.566	0.000	(0)
K		1.023e-04					
	K+	1.022e-04	9.526e-05	-3.990	-4.021	-0.031	(0)
	KSO4-	8.635e-08	8.059e-08	-7.064	-7.094	-0.030	(0)
	KHPO4-	1.143e-09	1.067e-09	-8.942	-8.972	-0.030	(0)
	KCrO4-	2.530e-22	2.342e-22	-21.597	-21.630	-0.033	(0)
Mg		3.704e-04					
	Mg+2	3.619e-04	2.727e-04	-3.441	-3.564	-0.123	(0)
	MgSO4	5.861e-06	5.861e-06	-5.232	-5.232	0.000	(0)
	MgHCO3+	2.090e-06	1.947e-06	-5.680	-5.711	-0.031	(0)
	MgHPO4	2.594e-07	2.594e-07	-6.586	-6.586	0.000	(0)
	MgCO3	2.008e-07	2.008e-07	-6.697	-6.697	0.000	(0)
	MgOH+	2.319e-08	2.168e-08	-7.635	-7.664	-0.029	(0)
	MgH2PO4+	1.072e-08	1.000e-08	-7.970	-8.000	-0.030	(0)
	MgH2BO3+	7.768e-10	7.220e-10	-9.110	-9.141	-0.032	(0)
	MgPO4-	2.373e-10	2.214e-10	-9.625	-9.655	-0.030	(0)
Mn (2)		1.092e-06					
	Mn+2	1.062e-06	7.802e-07	-5.974	-6.108	-0.134	(0)
	MnSO4	1.606e-08	1.606e-08	-7.794	-7.794	0.000	(0)
	MnHCO3+	1.164e-08	1.086e-08	-7.934	-7.964	-0.030	(0)
	MnCl+	2.186e-09	2.040e-09	-8.660	-8.690	-0.030	(0)
	MnOH+	4.556e-10	4.250e-10	-9.341	-9.372	-0.030	(0)
	MnCl2	5.982e-12	5.982e-12	-11.223	-11.223	0.000	(0)
	MnCl3-	3.668e-15	3.421e-15	-14.436	-14.466	-0.030	(0)
	Mn (OH) 3-	4.191e-19	3.909e-19	-18.378	-18.408	-0.030	(0)
	MnSeO4	1.512e-19	1.512e-19	-18.821	-18.821	0.000	(0)
	Mn (OH) 4-2	5.307e-25	4.018e-25	-24.275	-24.396	-0.121	(0)
	MnNO3+	3.528e-25	3.267e-25	-24.452	-24.486	-0.033	(0)
	MnSe	1.498e-37	1.498e-37	-36.824	-36.824	0.000	(0)
	Mn (NO3) 2	0.000e+00	0.000e+00	-42.659	-42.659	0.000	(0)
Mn (3)		3.139e-28					
	Mn+3	3.139e-28	1.660e-28	-27.503	-27.780	-0.277	(0)
Mn (6)		0.000e+00					
	MnO4-2	0.000e+00	0.000e+00	-50.534	-50.655	-0.121	(0)
Mn (7)		0.000e+00					
	MnO4-	0.000e+00	0.000e+00	-56.329	-56.360	-0.031	(0)
Mo		3.128e-09					
	MoO4-2	3.126e-09	2.355e-09	-8.505	-8.628	-0.123	(0)
	HMoO4-	1.395e-12	1.292e-12	-11.855	-11.889	-0.033	(0)
	H2MoO4	4.105e-16	4.105e-16	-15.387	-15.387	0.000	(0)
	AlMo6O21-3	0.000e+00	0.000e+00	-52.596	-52.898	-0.301	(0)
	Mo7O24-6	0.000e+00	0.000e+00	-65.519	-66.724	-1.205	(0)
	HMo7O24-5	0.000e+00	0.000e+00	-67.030	-67.867	-0.837	(0)
	H2Mo7O24-4	0.000e+00	0.000e+00	-70.058	-70.594	-0.536	(0)
	H3Mo7O24-3	0.000e+00	0.000e+00	-74.541	-74.842	-0.301	(0)
N (-3)		7.498e-05					
	NH4+	7.402e-05	6.880e-05	-4.131	-4.162	-0.032	(0)
	NH3	8.673e-07	8.673e-07	-6.062	-6.062	0.000	(0)
	NH4SO4-	9.714e-08	9.062e-08	-7.013	-7.043	-0.030	(0)
	CaNH3+2	5.039e-10	3.702e-10	-9.298	-9.432	-0.134	(0)
	CuNH3+2	3.245e-10	2.384e-10	-9.489	-9.623	-0.134	(0)
	NiNH3+2	4.626e-11	3.398e-11	-10.335	-10.469	-0.134	(0)
	Co (NH3) +2	2.196e-12	1.613e-12	-11.658	-11.792	-0.134	(0)
	BaNH3+2	2.781e-13	2.043e-13	-12.556	-12.690	-0.134	(0)
	Ni (NH3) 2+2	1.127e-14	8.280e-15	-13.948	-14.082	-0.134	(0)
	Ca (NH3) 2+2	2.488e-16	1.828e-16	-15.604	-15.738	-0.134	(0)
	Co (NH3) 2+2	7.431e-17	5.459e-17	-16.129	-16.263	-0.134	(0)
	Hg (NH3) 2+2	1.829e-17	1.344e-17	-16.738	-16.872	-0.134	(0)
	HgNH3+2	2.701e-21	1.984e-21	-20.568	-20.702	-0.134	(0)
	Co (NH3) 3+2	1.160e-21	8.524e-22	-20.935	-21.069	-0.134	(0)
	Hg (NH3) 3+2	1.423e-22	1.045e-22	-21.847	-21.981	-0.134	(0)

Co (NH3) 4+2	7.554e-27	5.549e-27	-26.122	-26.256	-0.134	(0)
Hg (NH3) 4+2	2.222e-27	1.633e-27	-26.653	-26.787	-0.134	(0)
Cr (NH3) 5OH+2	3.552e-29	2.609e-29	-28.450	-28.583	-0.134	(0)
Co (NH3) 5+2	1.555e-32	1.142e-32	-31.808	-31.942	-0.134	(0)
Cr (NH3) 6+3	8.634e-36	4.314e-36	-35.064	-35.365	-0.301	(0)
Cr (NH3) 6Cl+2	1.542e-37	1.133e-37	-36.812	-36.946	-0.134	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-40.718	-40.852	-0.134	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-49.776	-49.810	-0.033	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.616	-52.750	-0.134	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-53.313	-53.447	-0.134	(0)
N (3)	3.719e-13					
NO2-	3.719e-13	3.460e-13	-12.430	-12.461	-0.031	(0)
CuNO2+	4.478e-19	4.146e-19	-18.349	-18.382	-0.033	(0)
CoNO2+	1.822e-20	1.686e-20	-19.740	-19.773	-0.033	(0)
Cu (NO2) 2	1.468e-30	1.468e-30	-29.833	-29.833	0.000	(0)
N (5)	2.838e-19					
NO3-	2.836e-19	2.642e-19	-18.547	-18.578	-0.031	(0)
CaNO3+	2.220e-22	2.055e-22	-21.654	-21.687	-0.033	(0)
BaNO3+	4.082e-25	3.779e-25	-24.389	-24.423	-0.033	(0)
MnNO3+	3.528e-25	3.267e-25	-24.452	-24.486	-0.033	(0)
ZnNO3+	1.268e-25	1.174e-25	-24.897	-24.930	-0.033	(0)
NiNO3+	2.306e-26	2.135e-26	-25.637	-25.671	-0.033	(0)
CuNO3+	1.062e-26	9.835e-27	-25.974	-26.007	-0.033	(0)
PbNO3+	4.189e-27	3.878e-27	-26.378	-26.411	-0.033	(0)
CdNO3+	4.067e-27	3.766e-27	-26.391	-26.424	-0.033	(0)
CoNO3+	3.128e-27	2.896e-27	-26.505	-26.538	-0.033	(0)
FeNO3+2	3.361e-33	2.469e-33	-32.474	-32.607	-0.134	(0)
CrNO3+2	2.920e-33	2.145e-33	-32.535	-32.669	-0.134	(0)
HgNO3+	0.000e+00	0.000e+00	-42.573	-42.607	-0.033	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-42.659	-42.659	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-44.222	-44.222	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-44.734	-44.734	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-44.808	-44.808	0.000	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-45.365	-45.365	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-45.498	-45.498	0.000	(0)
Hg (NO3) 2	0.000e+00	0.000e+00	-61.566	-61.566	0.000	(0)
Na	2.132e-03					
Na+	2.130e-03	1.984e-03	-2.672	-2.702	-0.031	(0)
NaSO4-	1.394e-06	1.301e-06	-5.856	-5.886	-0.030	(0)
NaHCO3	8.795e-07	8.795e-07	-6.056	-6.056	0.000	(0)
NaCO3-	4.379e-08	4.087e-08	-7.359	-7.389	-0.030	(0)
NaHPO4-	3.689e-08	3.443e-08	-7.433	-7.463	-0.030	(0)
NaH2BO3	2.626e-10	2.626e-10	-9.581	-9.581	0.000	(0)
NaCrO4-	7.047e-21	6.524e-21	-20.152	-20.185	-0.033	(0)
Ni	4.772e-08					
Ni+2	4.270e-08	3.217e-08	-7.370	-7.493	-0.123	(0)
NiHCO3+	2.779e-09	2.573e-09	-8.556	-8.590	-0.033	(0)
NiCO3	1.154e-09	1.154e-09	-8.938	-8.938	0.000	(0)
NiSO4	7.582e-10	7.582e-10	-9.120	-9.120	0.000	(0)
NiCl+	1.821e-10	1.686e-10	-9.740	-9.773	-0.033	(0)
NiOH+	9.752e-11	9.028e-11	-10.011	-10.044	-0.033	(0)
NiNH3+2	4.626e-11	3.398e-11	-10.335	-10.469	-0.134	(0)
Ni (OH) 2	3.261e-12	3.261e-12	-11.487	-11.487	0.000	(0)
Ni (NH3) 2+2	1.127e-14	8.280e-15	-13.948	-14.082	-0.134	(0)
Ni (SO4) 2-2	4.372e-15	3.212e-15	-14.359	-14.493	-0.134	(0)
NiCl2	1.787e-15	1.787e-15	-14.748	-14.748	0.000	(0)
Ni (OH) 3-	1.122e-15	1.038e-15	-14.950	-14.984	-0.033	(0)
NiSeO4	1.083e-20	1.083e-20	-19.965	-19.965	0.000	(0)
NiNO3+	2.306e-26	2.135e-26	-25.637	-25.671	-0.033	(0)
O (0)	0.000e+00					
O2	0.000e+00	0.000e+00	-41.434	-41.433	0.000	(0)
P	3.552e-06					
HPO4-2	2.163e-06	1.637e-06	-5.665	-5.786	-0.121	(0)
H2PO4-	8.935e-07	8.339e-07	-6.049	-6.079	-0.030	(0)
MgHPO4	2.594e-07	2.594e-07	-6.586	-6.586	0.000	(0)
CaHPO4	1.634e-07	1.634e-07	-6.787	-6.787	0.000	(0)
NaHPO4-	3.689e-08	3.443e-08	-7.433	-7.463	-0.030	(0)
CaPO4-	1.319e-08	1.231e-08	-7.880	-7.910	-0.030	(0)

MgH2PO4+	1.072e-08	1.000e-08	-7.970	-8.000	-0.030	(0)
FeHPO4	6.152e-09	6.152e-09	-8.211	-8.211	0.000	(0)
CaH2PO4+	4.366e-09	4.075e-09	-8.360	-8.390	-0.030	(0)
KHPO4-	1.143e-09	1.067e-09	-8.942	-8.972	-0.030	(0)
FeH2PO4+	4.140e-10	3.864e-10	-9.383	-9.413	-0.030	(0)
MgPO4-	2.373e-10	2.214e-10	-9.625	-9.655	-0.030	(0)
PO4-3	3.724e-11	1.969e-11	-10.429	-10.706	-0.277	(0)
FeHPO4+	1.169e-11	1.091e-11	-10.932	-10.962	-0.030	(0)
CoHPO4	1.115e-11	1.115e-11	-10.953	-10.953	0.000	(0)
H3PO4	3.512e-12	3.512e-12	-11.454	-11.454	0.000	(0)
CrH2PO4+2	6.914e-17	5.079e-17	-16.160	-16.294	-0.134	(0)
FeH2PO4+2	1.336e-17	1.014e-17	-16.874	-16.994	-0.120	(0)
CrO3HPO4-2	2.689e-25	1.976e-25	-24.570	-24.704	-0.134	(0)
CrO3H2PO4-	3.251e-30	3.009e-30	-29.488	-29.522	-0.033	(0)
Pb	5.793e-09					
PbCO3	2.909e-09	2.909e-09	-8.536	-8.536	0.000	(0)
Pb+2	1.335e-09	1.006e-09	-8.874	-8.997	-0.123	(0)
PbOH+	8.692e-10	8.047e-10	-9.061	-9.094	-0.033	(0)
PbHCO3+	5.238e-10	4.849e-10	-9.281	-9.314	-0.033	(0)
PbCl+	7.542e-11	6.982e-11	-10.123	-10.156	-0.033	(0)
PbSO4	6.058e-11	6.058e-11	-10.218	-10.218	0.000	(0)
Pb (CO3) 2-2	1.098e-11	8.067e-12	-10.959	-11.093	-0.134	(0)
Pb (OH) 2	8.102e-12	8.102e-12	-11.091	-11.091	0.000	(0)
PbCl2	6.331e-13	6.331e-13	-12.199	-12.199	0.000	(0)
Pb (SO4) 2-2	6.108e-14	4.487e-14	-13.214	-13.348	-0.134	(0)
Pb (OH) 3-	2.786e-15	2.579e-15	-14.555	-14.588	-0.033	(0)
PbCl3-	5.973e-16	5.530e-16	-15.224	-15.257	-0.033	(0)
Pb2OH+3	2.568e-17	1.283e-17	-16.590	-16.892	-0.301	(0)
PbCl4-2	6.635e-19	4.874e-19	-18.178	-18.312	-0.134	(0)
Pb (OH) 4-2	2.738e-19	2.011e-19	-18.563	-18.697	-0.134	(0)
Pb3 (OH) 4+2	8.117e-22	5.963e-22	-21.091	-21.225	-0.134	(0)
Pb4 (OH) 4+4	1.971e-26	5.739e-27	-25.705	-26.241	-0.536	(0)
PbNO3+	4.189e-27	3.878e-27	-26.378	-26.411	-0.033	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-44.734	-44.734	0.000	(0)
S (6)	1.770e-04					
SO4-2	1.632e-04	1.229e-04	-3.787	-3.910	-0.123	(0)
CaSO4	6.357e-06	6.357e-06	-5.197	-5.197	0.000	(0)
MgSO4	5.861e-06	5.861e-06	-5.232	-5.232	0.000	(0)
NaSO4-	1.394e-06	1.301e-06	-5.856	-5.886	-0.030	(0)
NH4SO4-	9.714e-08	9.062e-08	-7.013	-7.043	-0.030	(0)
KSO4-	8.635e-08	8.059e-08	-7.064	-7.094	-0.030	(0)
FeSO4	2.988e-08	2.988e-08	-7.525	-7.525	0.000	(0)
MnSO4	1.606e-08	1.606e-08	-7.794	-7.794	0.000	(0)
ZnSO4	4.418e-09	4.418e-09	-8.355	-8.355	0.000	(0)
NiSO4	7.582e-10	7.582e-10	-9.120	-9.120	0.000	(0)
HSO4-	3.503e-10	3.265e-10	-9.456	-9.486	-0.031	(0)
CuSO4	3.036e-10	3.036e-10	-9.518	-9.518	0.000	(0)
CoSO4	1.626e-10	1.626e-10	-9.789	-9.789	0.000	(0)
CdSO4	1.059e-10	1.059e-10	-9.975	-9.975	0.000	(0)
PbSO4	6.058e-11	6.058e-11	-10.218	-10.218	0.000	(0)
CrOHSO4	2.406e-11	2.406e-11	-10.619	-10.619	0.000	(0)
Zn (SO4) 2-2	6.720e-12	4.936e-12	-11.173	-11.307	-0.134	(0)
AlSO4+	6.366e-12	5.934e-12	-11.196	-11.227	-0.031	(0)
Cd (SO4) 2-2	2.538e-13	1.864e-13	-12.596	-12.730	-0.134	(0)
CrSO4+	7.237e-14	6.700e-14	-13.140	-13.174	-0.033	(0)
Pb (SO4) 2-2	6.108e-14	4.487e-14	-13.214	-13.348	-0.134	(0)
Al (SO4) 2-	9.367e-15	8.732e-15	-14.028	-14.059	-0.031	(0)
Ni (SO4) 2-2	4.372e-15	3.212e-15	-14.359	-14.493	-0.134	(0)
FeSO4+	9.021e-16	8.414e-16	-15.045	-15.075	-0.030	(0)
Fe (SO4) 2-	2.486e-18	2.301e-18	-17.605	-17.638	-0.033	(0)
Cr2 (OH) 2SO4+2	2.442e-18	1.794e-18	-17.612	-17.746	-0.134	(0)
Cr2 (OH) 2 (SO4) 2	1.310e-20	1.310e-20	-19.883	-19.883	0.000	(0)
HgSO4	8.159e-26	8.159e-26	-25.088	-25.088	0.000	(0)
CrO3SO4-2	1.091e-28	8.018e-29	-27.962	-28.096	-0.134	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-49.776	-49.810	-0.033	(0)
Se (-2)	1.592e-33					
HSe-	1.592e-33	1.474e-33	-32.798	-32.832	-0.033	(0)
H2Se	3.537e-37	3.537e-37	-36.451	-36.451	0.000	(0)

MnSe	1.498e-37	1.498e-37	-36.824	-36.824	0.000	(0)
Se-2	0.000e+00	0.000e+00	-40.341	-40.475	-0.134	(0)
Se (4)	2.534e-09					
HSeO3-	2.197e-09	2.034e-09	-8.658	-8.692	-0.033	(0)
SeO3-2	3.367e-10	2.473e-10	-9.473	-9.607	-0.134	(0)
H2SeO3	2.629e-14	2.629e-14	-13.580	-13.580	0.000	(0)
FeHSeO3+2	4.463e-21	3.279e-21	-20.350	-20.484	-0.134	(0)
Cd (SeO3) 2-2	2.869e-22	2.108e-22	-21.542	-21.676	-0.134	(0)
Se (6)	1.052e-15					
SeO4-2	1.052e-15	7.926e-16	-14.978	-15.101	-0.123	(0)
MnSeO4	1.512e-19	1.512e-19	-18.821	-18.821	0.000	(0)
ZnSeO4	2.105e-20	2.105e-20	-19.677	-19.677	0.000	(0)
NiSeO4	1.083e-20	1.083e-20	-19.965	-19.965	0.000	(0)
CoSeO4	2.530e-21	2.530e-21	-20.597	-20.597	0.000	(0)
HSeO4-	1.158e-21	1.072e-21	-20.936	-20.970	-0.033	(0)
CdSeO4	5.758e-22	5.758e-22	-21.240	-21.240	0.000	(0)
Zn (SeO4) 2-2	2.303e-35	1.691e-35	-34.638	-34.772	-0.134	(0)
Zn	2.509e-07					
Zn+2	2.276e-07	1.714e-07	-6.643	-6.766	-0.123	(0)
ZnCO3	9.487e-09	9.487e-09	-8.023	-8.023	0.000	(0)
ZnSO4	4.418e-09	4.418e-09	-8.355	-8.355	0.000	(0)
ZnOH+	4.016e-09	3.718e-09	-8.396	-8.430	-0.033	(0)
ZnHCO3+	3.799e-09	3.517e-09	-8.420	-8.454	-0.033	(0)
ZnCl+	9.250e-10	8.616e-10	-9.034	-9.065	-0.031	(0)
ZnOHCl	3.727e-10	3.727e-10	-9.429	-9.429	0.000	(0)
Zn (OH) 2	2.754e-10	2.754e-10	-9.560	-9.560	0.000	(0)
Zn (SO4) 2-2	6.720e-12	4.936e-12	-11.173	-11.307	-0.134	(0)
ZnCl2	2.282e-12	2.282e-12	-11.642	-11.642	0.000	(0)
Zn (OH) 3-	4.748e-13	4.395e-13	-12.324	-12.357	-0.033	(0)
ZnCl3-	3.958e-15	3.686e-15	-14.403	-14.433	-0.031	(0)
Zn (OH) 4-2	7.584e-18	5.571e-18	-17.120	-17.254	-0.134	(0)
ZnCl4-2	4.856e-18	3.677e-18	-17.314	-17.435	-0.121	(0)
ZnSeO4	2.105e-20	2.105e-20	-19.677	-19.677	0.000	(0)
ZnNO3+	1.268e-25	1.174e-25	-24.897	-24.930	-0.033	(0)
Zn (SeO4) 2-2	2.303e-35	1.691e-35	-34.638	-34.772	-0.134	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-44.222	-44.222	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2	-65.98	-59.71	6.27	(Co (NH3) 5Cl) (NO3) 2
(Co (NH3) 5Cl) Cl2	-32.46	-27.92	4.54	(Co (NH3) 5Cl) Cl2
(Co (NH3) 5OH2) Cl3	-39.73	-27.92	11.81	(Co (NH3) 5OH2) Cl3
(Co (NH3) 6) (NO3) 3	-90.20	-72.27	17.93	(Co (NH3) 6) (NO3) 3
(Co (NH3) 6) Cl3	-44.71	-24.58	20.13	(Co (NH3) 6) Cl3
(NH4) 2CrO4	-26.88	-26.50	0.38	(NH4) 2CrO4
(NH4) 2SeO4	-23.88	-23.43	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	0.25	11.38	11.13	Al (OH) 3
Al2 (MoO4) 3	-51.28	-48.13	3.15	Al2 (MoO4) 3
Al2O3	2.33	22.75	20.43	Al2O3
Al4 (OH) 10SO4	3.90	26.60	22.70	Al4 (OH) 10SO4
AlAsO4:2H2O	-7.22	-2.42	4.80	AlAsO4:2H2O
AlOHSO4	-4.30	-7.53	-3.23	AlOHSO4
Alunite	0.56	-0.21	-0.77	KAl3 (SO4) 2 (OH) 6
Anglesite	-5.08	-12.91	-7.83	PbSO4
Anhydrite	-3.20	-7.54	-4.34	CaSO4
Antlerite	-6.52	2.27	8.79	Cu3 (OH) 4SO4
Aragonite	-1.38	-9.64	-8.26	CaCO3
Arsenolite	-67.16	-70.10	-2.94	As4O6
Artinite	-8.11	1.85	9.96	MgCO3:Mg (OH) 2:3H2O
As2O5	-34.37	-27.60	6.77	As2O5
Atacamite	-3.74	3.93	7.67	Cu2 (OH) 3Cl
Azurite	-4.24	-20.86	-16.62	Cu3 (OH) 2 (CO3) 2
Ba (OH) 2:8H2O	-16.14	8.42	24.56	Ba (OH) 2:8H2O
Ba3 (AsO4) 2	6.60	-2.35	-8.94	Ba3 (AsO4) 2
BaCrO4	-14.99	-24.76	-9.77	BaCrO4
BaHPO4	-5.01	-24.79	-19.77	BaHPO4

BaMoO4	-8.22	-15.21	-6.99	BaMoO4
Barite	-0.44	-10.49	-10.05	BaSO4
BaSeO3	-9.57	-7.78	1.79	BaSeO3
BaSeO4	-14.16	-21.68	-7.53	BaSeO4
Bianchite	-8.91	-10.68	-1.76	ZnSO4:6H2O
Birnessite	-11.87	6.22	18.09	MnO2
Bixbyite	-10.29	-10.56	-0.27	Mn2O3
Boehmite	2.45	11.38	8.93	AlOOH
Brochantite	-6.50	9.32	15.83	Cu4(OH)6SO4
Brucite	-5.75	11.44	17.18	Mg(OH)2
Bunsenite	-5.24	7.51	12.74	NiO
Ca3(AsO4)2:4H2O	-15.77	6.53	22.30	Ca3(AsO4)2:4H2O
Ca3(PO4)2(beta)	-3.21	-32.29	-29.08	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-7.04	-54.12	-47.08	Ca4H(PO4)3:3H2O
CaCrO4	-19.62	-21.80	-2.19	CaCrO4
CaHPO4	-2.46	-21.83	-19.37	CaHPO4
CaHPO4:2H2O	-2.77	-21.83	-19.06	CaHPO4:2H2O
Calcite	-1.19	-9.64	-8.46	CaCO3
Calomel	-11.39	-29.57	-18.18	Hg2Cl2
CaMoO4	-4.31	-12.25	-7.94	CaMoO4
CaSeO3:2H2O	-7.69	-4.82	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-15.73	-18.73	-3.00	CaSeO4:2H2O
Cd(BO2)2	-13.93	-4.09	9.84	Cd(BO2)2
Cd(OH)2	-7.34	6.59	13.93	Cd(OH)2
Cd(OH)2(am)	-7.40	6.59	13.99	Cd(OH)2
Cd3(OH)2(SO4)2	-24.76	-18.05	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-21.70	0.86	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-14.04	-46.64	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-20.95	7.45	28.40	Cd4(OH)6SO4
CdCl2	-13.17	-13.77	-0.60	CdCl2
CdCl2:1H2O	-12.10	-13.77	-1.67	CdCl2:1H2O
CdCl2:2.5H2O	-11.84	-13.77	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-30.15	-16.41	13.74	Cd
Cdmetal(gamma)	-30.25	-16.41	13.84	Cd
CdMoO4	-2.83	-17.04	-14.21	CdMoO4
CdOHCl	-7.22	-3.59	3.63	CdOHCl
CdSe	-13.31	-33.74	-20.43	CdSe
CdSeO4:2H2O	-21.66	-23.51	-1.85	CdSeO4:2H2O
CdSO4	-12.30	-12.32	-0.02	CdSO4
CdSO4:1H2O	-10.69	-12.32	-1.63	CdSO4:1H2O
CdSO4:2.67H2O	-10.50	-12.32	-1.82	CdSO4:2.67H2O
Cerussite	-1.81	-15.01	-13.20	PbCO3
CH4(g)	-71.20	-113.02	-41.81	CH4
Chalcanthite	-9.19	-11.85	-2.66	CuSO4:5H2O
Claudetite	-66.87	-70.10	-3.23	As4O6
Clausthalite	-6.87	-34.33	-27.46	PbSe
Co(BO2)2	-30.91	-3.84	27.07	Co(BO2)2
Co(OH)2	-6.25	6.84	13.09	Co(OH)2
Co(OH)3	-12.03	-14.06	-2.03	Co(OH)3
CO2(g)	-2.86	-21.02	-18.16	CO2
Co3(AsO4)2	-20.11	-7.08	13.03	Co3(AsO4)2
Co3(PO4)2	-11.20	-45.89	-34.69	Co3(PO4)2
Co3O4	-11.11	-21.28	-10.17	Co3O4
CoCl2	-22.03	-13.53	8.51	CoCl2
CoCl2:6H2O	-16.04	-13.53	2.51	CoCl2:6H2O
CoCO3	-4.24	-14.18	-9.94	CoCO3
CoFe2O4	24.61	21.56	-3.05	CoFe2O4
CoHPO4	-7.31	-26.37	-19.06	CoHPO4
CoMoO4	-9.10	-16.79	-7.69	CoMoO4
CoO	-7.06	6.84	13.90	CoO
CoSe	-17.29	-33.49	-16.20	CoSe
CoSeO3	-10.67	-9.35	1.32	CoSeO3
CoSeO4:6H2O	-21.73	-23.26	-1.53	CoSeO4:6H2O
CoSO4	-15.11	-12.07	3.04	CoSO4
CoSO4:6H2O	-9.59	-12.07	-2.48	CoSO4:6H2O
Cotunnite	-9.50	-14.36	-4.86	PbCl2
Cr(OH)2	-19.49	-8.57	10.93	Cr(OH)2
Cr(OH)3	-1.42	0.00	1.42	Cr(OH)3

Cr (OH) 3 (am)	0.75	0.00	-0.75	Cr (OH) 3
Cr2O3	2.22	0.01	-2.21	Cr2O3
CrCl2	-43.36	-28.93	14.42	CrCl2
CrCl3	-46.02	-30.54	15.48	CrCl3
Crmetal	-62.56	-31.57	31.00	Cr
CrO3	-29.98	-33.18	-3.19	CrO3
Cu (OH) 2	-1.78	7.06	8.84	Cu (OH) 2
Cu2 (OH) 3NO3	-21.43	-11.96	9.47	Cu2 (OH) 3NO3
Cu2Se (alpha)	2.56	-43.88	-46.44	Cu2Se
Cu2SO4	-20.56	-22.45	-1.89	Cu2SO4
Cu3 (AsO4) 2:2H2O	-12.52	-6.42	6.10	Cu3 (AsO4) 2:2H2O
Cu3 (PO4) 2	-8.39	-45.24	-36.85	Cu3 (PO4) 2
Cu3 (PO4) 2:3H2O	-10.12	-45.24	-35.12	Cu3 (PO4) 2:3H2O
Cu3Se2	-12.64	-77.15	-64.51	Cu3Se2
CuCO3	-2.46	-13.96	-11.50	CuCO3
CuCrO4	-20.68	-26.12	-5.44	CuCrO4
Cumetal	-4.30	-13.27	-8.97	Cu
CuMoO4	-3.46	-16.57	-13.11	CuMoO4
CuOCuSO4	-15.51	-4.79	10.71	CuOCuSO4
Cupricferrite	15.16	21.78	6.62	CuFe2O4
Cuprite	-2.51	-3.54	-1.04	Cu2O
Cuprousferrite	14.46	5.59	-8.87	CuFeO2
CuSe	0.19	-33.27	-33.46	CuSe
CuSe2	-16.82	-50.60	-33.79	CuSe2
CuSeO3:2H2O	-9.75	-9.13	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-20.60	-23.04	-2.44	CuSeO4:5H2O
CuSO4	-15.01	-11.85	3.16	CuSO4
Diaspore	4.20	11.38	7.18	AlOOH
Dolomite (disordered)	-2.82	-19.22	-16.40	CaMg (CO3) 2
Dolomite (ordered)	-2.25	-19.22	-16.97	CaMg (CO3) 2
Epsomite	-5.31	-7.48	-2.16	MgSO4:7H2O
Fe (OH) 2	-4.54	9.02	13.56	Fe (OH) 2
Fe (OH) 2.7Cl.3	7.35	4.31	-3.04	Fe (OH) 2.7Cl.3
Fe2 (OH) 4SeO3	-3.03	-1.47	1.55	Fe2 (OH) 4SeO3
Fe2 (SeO3) 3:2H2O	-13.23	-33.86	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-39.00	-42.01	-3.01	Fe2 (SO4) 3
Fe3 (OH) 8	3.52	23.74	20.22	Fe3 (OH) 8
FeAsO4:2H2O	-6.84	-6.44	0.40	FeAsO4:2H2O
FeCr2O4	1.41	9.03	7.62	FeCr2O4
FeMoO4	-4.55	-14.61	-10.06	FeMoO4
Ferrihydrite	3.95	7.36	3.41	Fe (OH) 3
Ferroselite	-29.91	-48.64	-18.74	FeSe2
FeSe	-20.31	-31.31	-11.01	FeSe
Gibbsite	2.80	11.38	8.58	Al (OH) 3
Goethite	6.69	7.36	0.67	FeOOH
Goslarite	-8.62	-10.68	-2.05	ZnSO4:7H2O
Gypsum	-2.92	-7.54	-4.61	CaSO4:2H2O
H-Jarosite	-4.33	-15.74	-11.41	(H3O) Fe3 (SO4) 2 (OH) 6
H2MoO4	-10.61	-23.63	-13.02	H2MoO4
H2Se (g)	-35.42	-40.33	-4.91	H2Se
Halite	-6.98	-5.39	1.59	NaCl
Hausmannite	-12.61	49.68	62.29	Mn3O4
Hematite	15.75	14.72	-1.03	Fe2O3
Hercynite	7.94	31.77	23.83	FeAl2O4
Hg (CH3) 2 (g)	-165.68	-240.82	-75.15	Hg (CH3) 2
Hg (g)	-8.16	-16.10	-7.94	Hg
Hg (OH) 2	-11.29	-14.79	-3.50	Hg (OH) 2
Hg2 (g)	-17.08	-32.20	-15.13	Hg2
Hg2 (OH) 2	-14.47	-9.21	5.26	Hg2 (OH) 2
Hg2CO3	-14.04	-30.22	-16.18	Hg2CO3
Hg2CrO4	-33.68	-42.38	-8.70	Hg2CrO4
Hg2HPO4	-17.64	-42.41	-24.77	Hg2HPO4
Hg2SeO3	-20.74	-25.40	-4.66	Hg2SeO3
Hg2SO4	-21.97	-28.12	-6.15	Hg2SO4
Hg3O2CO3	-35.71	-65.39	-29.68	Hg3O2CO3
HgCl (g)	-34.77	-14.79	19.98	HgCl
HgCl2	-13.57	-35.16	-21.58	HgCl2
Hgmetal (l)	-2.40	-16.10	-13.70	Hg

HgSe	0.57	-55.12	-55.69	HgSe
HgSeO3	-18.55	-30.98	-12.43	HgSeO3
HgSO4	-24.24	-33.70	-9.46	HgSO4
Hinsdalite	-9.48	-11.98	-2.50	PbAl3PO4SO4 (OH) 6
Huntite	-8.74	-38.39	-29.65	CaMg3 (CO3) 4
Hydrocerussite	-5.26	-24.03	-18.77	Pb3 (OH) 2 (CO3) 2
Hydromagnesite	-18.78	-26.89	-8.11	Mg5 (CO3) 4 (OH) 2:4H2O
Hydroxylapatite	1.59	-42.74	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-6.81	-69.60	-62.79	Pb5 (PO4) 3OH
K-Alum	-17.70	-22.97	-5.26	KAl (SO4) 2:12H2O
K-Jarosite	2.15	-12.26	-14.41	KFe3 (SO4) 2 (OH) 6
K2Cr2O7	-41.92	-59.40	-17.48	K2Cr2O7
K2CrO4	-25.65	-26.22	-0.57	K2CrO4
K2MoO4	-19.94	-16.67	3.27	K2MoO4
K2SeO4	-22.41	-23.14	-0.73	K2SeO4
Langite	-8.66	9.32	17.98	Cu4 (OH) 6SO4:H2O
Larnakite	-6.54	-6.91	-0.37	PbO:PbSO4
Laurionite	-4.80	-4.18	0.62	PbOHCl
Lepidocrocite	5.99	7.36	1.37	FeOOH
Lime	-21.90	11.37	33.28	CaO
Litharge	-6.89	6.00	12.89	PbO
Maghemite	8.33	14.72	6.39	Fe2O3
Magnesioferrite	8.46	26.16	17.69	Fe2MgO4
Magnesite	-2.06	-9.58	-7.52	MgCO3
Magnetite	19.71	23.74	4.03	Fe3O4
Malachite	-1.37	-6.90	-5.53	Cu2 (OH) 2CO3
Manganite	-4.95	20.39	25.34	MnOOH
Massicot	-7.09	6.00	13.09	PbO
Melanothallite	-19.75	-13.31	6.45	CuCl2
Melanterite	-7.62	-9.89	-2.27	FeSO4:7H2O
Mg (OH) 2 (active)	-7.36	11.44	18.79	Mg (OH) 2
Mg3 (PO4) 2	-8.82	-32.10	-23.28	Mg3 (PO4) 2
MgCr2O4	-5.29	11.44	16.74	MgCr2O4
MgCrO4	-27.39	-21.74	5.65	MgCrO4
MgHPO4:3H2O	-3.60	-21.77	-18.18	MgHPO4:3H2O
MgMoO4	-10.34	-12.19	-1.85	MgMoO4
MgSeO3:6H2O	-7.80	-4.76	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-17.47	-18.67	-1.20	MgSeO4:6H2O
Minium	-33.77	41.01	74.78	Pb3O4
Mirabilite	-7.96	-9.32	-1.35	Na2SO4:10H2O
Mn2 (SO4) 3	-62.07	-67.29	-5.22	Mn2 (SO4) 3
Mn3 (AsO4) 2:8H2O	-13.42	-0.92	12.50	Mn3 (AsO4) 2:8H2O
Mn3 (PO4) 2	-15.88	-39.73	-23.85	Mn3 (PO4) 2
MnCl2:4H2O	-14.22	-11.47	2.75	MnCl2:4H2O
MnHPO4	1.09	-24.31	-25.40	MnHPO4
MnSe	-35.23	-31.44	3.79	MnSe
MnSeO3	-8.43	-7.30	1.13	MnSeO3
MnSeO3:2H2O	-8.26	-7.30	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-19.16	-21.21	-2.05	MnSeO4:5H2O
MnSO4	-12.80	-10.02	2.78	MnSO4
Monteponite	-8.82	6.59	15.41	CdO
Montroydite	-11.27	-14.79	-3.52	HgO
MoO3	-15.63	-23.63	-8.00	MoO3
Morenosite	-9.22	-11.40	-2.18	NiSO4:7H2O
Na-Jarosite	-0.20	-10.94	-10.75	NaFe3 (SO4) 2 (OH) 6
Na2Cr2O7	-46.80	-56.76	-9.96	Na2Cr2O7
Na2CrO4	-26.57	-23.58	2.99	Na2CrO4
Na2Mo2O7	-20.90	-37.66	-16.76	Na2Mo2O7
Na2MoO4	-15.55	-14.03	1.52	Na2MoO4
Na2MoO4:2H2O	-15.26	-14.03	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-16.90	-6.60	10.30	Na2SeO3:5H2O
Na2SeO4	-21.79	-20.51	1.28	Na2SeO4
Nantokite	-5.10	-11.95	-6.86	CuCl
Natron	-9.91	-11.42	-1.51	Na2CO3:10H2O
Nesquehonite	-4.98	-9.58	-4.60	MgCO3:3H2O
Ni (OH) 2	-5.57	7.51	13.08	Ni (OH) 2
Ni3 (AsO4) 2:8H2O	-20.77	-5.07	15.70	Ni3 (AsO4) 2:8H2O
Ni3 (PO4) 2	-12.59	-43.89	-31.30	Ni3 (PO4) 2

Ni4(OH)6SO4	-20.88	11.12	32.00	Ni4(OH)6SO4
NiCO3	-6.76	-13.51	-6.75	NiCO3
NiMoO4	-4.97	-16.12	-11.15	NiMoO4
NiSe	-15.12	-32.82	-17.70	NiSe
NiSeO3:2H2O	-11.59	-8.68	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-21.07	-22.59	-1.52	NiSeO4:6H2O
Nsutite	-11.28	6.22	17.50	MnO2
O2(g)	-38.80	46.00	84.80	O2
Otavite	-2.43	-14.43	-12.00	CdCO3
Pb(BO2)2	-11.25	-4.68	6.57	Pb(BO2)2
Pb(OH)2	-2.32	6.00	8.32	Pb(OH)2
Pb10(OH)6O(CO3)6	-57.32	-66.08	-8.76	Pb10(OH)6O(CO3)6
Pb2(OH)3Cl	-6.97	1.82	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-14.18	12.01	26.19	Pb2O(OH)2
Pb2O3	-26.03	35.01	61.04	Pb2O3
Pb2OCO3	-8.58	-9.01	-0.44	Pb2OCO3
Pb3(AsO4)2	-15.39	-9.59	5.80	Pb3(AsO4)2
Pb3(PO4)2	-4.87	-48.40	-43.53	Pb3(PO4)2
Pb3O2CO3	-14.36	-3.01	11.35	Pb3O2CO3
Pb3O2SO4	-11.83	-0.90	10.92	Pb3O2SO4
Pb4(OH)6SO4	-16.00	5.10	21.10	Pb4(OH)6SO4
Pb4O3SO4	-17.18	5.10	22.28	Pb4O3SO4
PbCrO4	-14.44	-27.18	-12.73	PbCrO4
PbHPO4	-3.40	-27.20	-23.81	PbHPO4
Pbmetal	-21.24	-17.00	4.24	Pb
PbMoO4	-1.84	-17.63	-15.78	PbMoO4
PbO:0.3H2O	-6.98	6.00	12.98	PbO:0.33H2O
PbSeO4	-17.21	-24.10	-6.88	PbSeO4
Periclase	-10.60	11.44	22.04	MgO
Phosgenite	-9.57	-29.38	-19.81	PbCl2:PbCO3
Plattnerite	-21.48	29.00	50.49	PbO2
Plumbgummite	6.51	-26.28	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-11.81	11.37	23.19	Ca(OH)2
Pyrochroite	-6.59	8.89	15.48	Mn(OH)2
Pyrolusite	-10.30	31.89	42.19	MnO2
Pyromorphite	4.64	-79.79	-84.43	Pb5(PO4)3Cl
Retgersite	-9.35	-11.40	-2.05	NiSO4:6H2O
Rhodochrosite	-1.55	-12.12	-10.57	MnCO3
Semetal(am)	-10.19	-17.33	-7.14	Se
Semetal(hex)	-9.58	-17.33	-7.76	Se
SeO2	-16.31	-16.19	0.12	SeO2
SeO3	-51.58	-30.10	21.48	SeO3
Siderite	-1.81	-12.00	-10.19	FeCO3
Smithsonite	-2.83	-12.78	-9.95	ZnCO3
Spinel	-3.82	34.19	38.01	MgAl2O4
Strengite	0.53	-25.85	-26.37	FePO4:2H2O
Tenorite	-0.78	7.06	7.84	CuO
Thenardite	-9.66	-9.32	0.35	Na2SO4
Thermonatrite	-12.09	-11.42	0.67	Na2CO3:H2O
Tsumebite	-4.35	-14.14	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	-3.35	-39.35	-36.00	Fe3(PO4)2:8H2O
Witherite	-4.02	-12.60	-8.58	BaCO3
Zincite	-3.37	8.23	11.60	ZnO
Zincosite	-14.85	-10.68	4.18	ZnSO4
Zn(BO2)2	-10.74	-2.45	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-47.16	-43.92	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-3.97	8.23	12.20	Zn(OH)2
Zn(OH)2(am)	-4.48	8.23	12.71	Zn(OH)2
Zn(OH)2(beta)	-3.77	8.23	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-3.54	8.23	11.78	Zn(OH)2
Zn(OH)2(gamma)	-3.50	8.23	11.73	Zn(OH)2
Zn2(OH)2SO4	-9.94	-2.44	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.91	6.29	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-16.54	-2.89	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-6.29	-41.71	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-32.80	-13.12	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-14.37	14.03	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.70	20.80	38.50	Zn5(OH)8Cl2

ZnCl2	-19.40	-12.13	7.27	ZnCl2
ZnCO3:1H2O	-2.52	-12.78	-10.26	ZnCO3:1H2O
Znmetal	-41.01	-14.77	26.25	Zn
ZnMoO4	-5.30	-15.39	-10.09	ZnMoO4
ZnO(active)	-3.22	8.23	11.45	ZnO
ZnSe	-17.62	-32.10	-14.48	ZnSe
ZnSeO4:6H2O	-20.35	-21.87	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-10.17	-10.68	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Initial solution 3.

-----Solution composition-----

Elements	Molality	Moles
Al	1.484e-06	1.484e-06
Alkalinity	8.200e-04	8.200e-04
As	2.671e-08	2.671e-08
B	8.146e-06	8.146e-06
Ba	8.744e-08	8.744e-08
Ca	7.990e-04	7.990e-04
Cl	6.520e-03	6.520e-03
Co	6.622e-07	6.622e-07
Cr	1.347e-07	1.347e-07
Cu	3.464e-07	3.464e-07
Fe	8.834e-06	8.834e-06
K	6.399e-04	6.399e-04
Mg	6.999e-04	6.999e-04
Mn	8.379e-07	8.379e-07
Mo	9.387e-08	9.387e-08
N	1.736e-03	1.736e-03
Na	5.746e-03	5.746e-03
Ni	1.876e-07	1.876e-07
P	1.680e-05	1.680e-05
Pb	1.449e-08	1.449e-08
S(6)	1.979e-03	1.979e-03
Se	2.535e-08	2.535e-08
Zn	3.520e-07	3.520e-07

-----Description of solution-----

pH	=	6.180
pe	=	4.000
Activity of water	=	1.000
Ionic strength (mol/kgw)	=	1.387e-02
Mass of water (kg)	=	1.000e+00
Total carbon (mol/kg)	=	1.948e-03
Total CO2 (mol/kg)	=	1.948e-03
Temperature (°C)	=	20.00
Electrical balance (eq)	=	-1.692e-04
Percent error, 100*(Cat- An)/(Cat+ An)	=	-0.78
Iterations	=	12
Total H	=	1.110238e+02
Total O	=	5.552069e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	7.433e-07	6.607e-07	-6.129	-6.180	-0.051	0.00
OH-	1.171e-08	1.038e-08	-7.931	-7.984	-0.052	(0)
H2O	5.551e+01	9.997e-01	1.744	-0.000	0.000	18.05
Al	1.484e-06					
Al(OH)2+	9.360e-07	8.356e-07	-6.029	-6.078	-0.049	(0)

Al (OH) 3	2.540e-07	2.540e-07	-6.595	-6.595	0.000	(0)
Al (OH) 4-	1.663e-07	1.479e-07	-6.779	-6.830	-0.051	(0)
AlOH+2	7.824e-08	4.969e-08	-7.107	-7.304	-0.197	(0)
AlSO4+	3.549e-08	3.158e-08	-7.450	-7.501	-0.051	(0)
Al+3	1.309e-08	4.532e-09	-7.883	-8.344	-0.461	(0)
Al (SO4) 2-	4.624e-10	4.114e-10	-9.335	-9.386	-0.051	(0)
AlMo6O21-3	4.906e-34	1.428e-34	-33.309	-33.845	-0.536	(0)
As (3)	1.676e-13					
H3AsO3	1.675e-13	1.675e-13	-12.776	-12.776	0.000	(0)
H2AsO3-	1.235e-16	1.077e-16	-15.908	-15.968	-0.060	(0)
H4AsO3+	6.290e-20	5.484e-20	-19.201	-19.261	-0.060	(0)
HAsO3-2	2.065e-22	1.193e-22	-21.685	-21.923	-0.238	(0)
AsO3-3	2.009e-29	5.847e-30	-28.697	-29.233	-0.536	(0)
As (5)	2.671e-08					
H2AsO4-	2.145e-08	1.870e-08	-7.669	-7.728	-0.060	(0)
HAsO4-2	5.262e-09	3.040e-09	-8.279	-8.517	-0.238	(0)
H3AsO4	2.038e-12	2.045e-12	-11.691	-11.689	0.001	(0)
AsO4-3	4.448e-14	1.294e-14	-13.352	-13.888	-0.536	(0)
B	8.146e-06					
H3BO3	8.139e-06	8.165e-06	-5.089	-5.088	0.001	(0)
H2BO3-	7.437e-09	6.563e-09	-8.129	-8.183	-0.054	(0)
CaH2BO3+	1.795e-10	1.584e-10	-9.746	-9.800	-0.054	(0)
MgH2BO3+	1.002e-10	8.839e-11	-9.999	-10.054	-0.054	(0)
NaH2BO3	5.773e-11	5.773e-11	-10.239	-10.239	0.000	(0)
H5 (BO3) 2-	5.334e-14	4.707e-14	-13.273	-13.327	-0.054	(0)
BaH2BO3+	1.215e-14	1.072e-14	-13.915	-13.970	-0.054	(0)
H8 (BO3) 3-	3.769e-17	3.326e-17	-16.424	-16.478	-0.054	(0)
Ba	8.744e-08					
Ba+2	8.709e-08	5.435e-08	-7.060	-7.265	-0.205	(0)
BaHCO3+	3.501e-10	3.132e-10	-9.456	-9.504	-0.048	(0)
BaCO3	1.148e-12	1.148e-12	-11.940	-11.940	0.000	(0)
BaNH3+2	7.754e-14	4.480e-14	-13.110	-13.349	-0.238	(0)
BaH2BO3+	1.215e-14	1.072e-14	-13.915	-13.970	-0.054	(0)
BaOH+	2.669e-15	2.379e-15	-14.574	-14.624	-0.050	(0)
BaNO3+	1.252e-37	1.092e-37	-36.902	-36.962	-0.060	(0)
C (4)	1.948e-03					
H2CO3	1.134e-03	1.134e-03	-2.945	-2.945	0.000	(0)
HCO3-	8.028e-04	7.166e-04	-3.095	-3.145	-0.049	(0)
CaHCO3+	5.603e-06	5.013e-06	-5.252	-5.300	-0.048	(0)
MgHCO3+	3.121e-06	2.771e-06	-5.506	-5.557	-0.052	(0)
NaHCO3	2.248e-06	2.248e-06	-5.648	-5.648	0.000	(0)
CO3-2	7.369e-08	4.599e-08	-7.133	-7.337	-0.205	(0)
FeHCO3+	3.932e-08	3.517e-08	-7.405	-7.454	-0.048	(0)
CuCO3	3.016e-08	3.016e-08	-7.521	-7.521	0.000	(0)
CaCO3	2.814e-08	2.814e-08	-7.551	-7.551	0.000	(0)
CoHCO3+	1.894e-08	1.651e-08	-7.723	-7.782	-0.060	(0)
MgCO3	1.368e-08	1.368e-08	-7.864	-7.864	0.000	(0)
NiHCO3+	8.938e-09	7.793e-09	-8.049	-8.108	-0.060	(0)
MnHCO3+	6.750e-09	6.017e-09	-8.171	-8.221	-0.050	(0)
NaCO3-	5.601e-09	5.000e-09	-8.252	-8.301	-0.049	(0)
CuHCO3+	5.224e-09	4.555e-09	-8.282	-8.342	-0.060	(0)
ZnHCO3+	4.406e-09	3.842e-09	-8.356	-8.415	-0.060	(0)
PbHCO3+	2.579e-09	2.249e-09	-8.589	-8.648	-0.060	(0)
PbCO3	6.455e-10	6.455e-10	-9.190	-9.190	0.000	(0)
ZnCO3	4.960e-10	4.960e-10	-9.304	-9.304	0.000	(0)
BaHCO3+	3.501e-10	3.132e-10	-9.456	-9.504	-0.048	(0)
CoCO3	2.546e-10	2.546e-10	-9.594	-9.594	0.000	(0)
NiCO3	1.673e-10	1.673e-10	-9.776	-9.776	0.000	(0)
Cu (CO3) 2-2	6.462e-12	3.734e-12	-11.190	-11.428	-0.238	(0)
BaCO3	1.148e-12	1.148e-12	-11.940	-11.940	0.000	(0)
Pb (CO3) 2-2	1.482e-13	8.562e-14	-12.829	-13.067	-0.238	(0)
Ca	7.990e-04					
Ca+2	6.907e-04	4.311e-04	-3.161	-3.365	-0.205	(0)
CaSO4	1.024e-04	1.024e-04	-3.990	-3.990	0.000	(0)
CaHCO3+	5.603e-06	5.013e-06	-5.252	-5.300	-0.048	(0)
CaHPO4	2.128e-07	2.128e-07	-6.672	-6.672	0.000	(0)
CaH2PO4+	1.242e-07	1.109e-07	-6.906	-6.955	-0.049	(0)
CaCO3	2.814e-08	2.814e-08	-7.551	-7.551	0.000	(0)

	CaNH3+2	1.227e-09	7.089e-10	-8.911	-9.149	-0.238	(0)
	CaPO4-	8.600e-10	7.677e-10	-9.066	-9.115	-0.049	(0)
	CaH2BO3+	1.795e-10	1.584e-10	-9.746	-9.800	-0.054	(0)
	CaOH+	9.423e-11	8.430e-11	-10.026	-10.074	-0.048	(0)
	Ca (NH3) 2+2	6.381e-16	3.686e-16	-15.195	-15.433	-0.238	(0)
	CaNO3+	5.947e-34	5.185e-34	-33.226	-33.285	-0.060	(0)
Cl	6.520e-03						
	Cl-	6.520e-03	5.795e-03	-2.186	-2.237	-0.051	(0)
	CuCl2-	5.238e-08	4.651e-08	-7.281	-7.332	-0.052	(0)
	CuCl	3.795e-08	3.795e-08	-7.421	-7.421	0.000	(0)
	CoCl+	7.428e-09	6.476e-09	-8.129	-8.189	-0.060	(0)
	MnCl+	3.540e-09	3.156e-09	-8.451	-8.501	-0.050	(0)
	ZnCl+	2.961e-09	2.629e-09	-8.529	-8.580	-0.052	(0)
	NiCl+	1.636e-09	1.426e-09	-8.786	-8.846	-0.060	(0)
	CuCl+	1.088e-09	9.662e-10	-8.963	-9.015	-0.052	(0)
	PbCl+	1.037e-09	9.043e-10	-8.984	-9.044	-0.060	(0)
	CuCl3-2	8.950e-11	5.651e-11	-10.048	-10.248	-0.200	(0)
	ZnOHC1	5.442e-11	5.442e-11	-10.264	-10.264	0.000	(0)
	MnCl2	2.583e-11	2.583e-11	-10.588	-10.588	0.000	(0)
	PbCl2	2.288e-11	2.288e-11	-10.640	-10.640	0.000	(0)
	ZnCl2	1.943e-11	1.943e-11	-10.712	-10.712	0.000	(0)
	CrCl+2	1.984e-12	1.146e-12	-11.703	-11.941	-0.238	(0)
	CuCl2	1.517e-12	1.517e-12	-11.819	-11.819	0.000	(0)
	ZnCl3-	9.866e-14	8.761e-14	-13.006	-13.057	-0.052	(0)
	PbCl3-	6.398e-14	5.578e-14	-13.194	-13.253	-0.060	(0)
	MnCl3-	4.626e-14	4.123e-14	-13.335	-13.385	-0.050	(0)
	NiCl2	4.219e-14	4.219e-14	-13.375	-13.375	0.000	(0)
	CrOHC12	9.427e-16	9.427e-16	-15.026	-15.026	0.000	(0)
	FeCl+2	7.064e-16	4.460e-16	-15.151	-15.351	-0.200	(0)
	CrCl2+	4.641e-16	4.046e-16	-15.333	-15.393	-0.060	(0)
	ZnCl4-2	3.862e-16	2.438e-16	-15.413	-15.613	-0.200	(0)
	PbCl4-2	2.375e-16	1.372e-16	-15.624	-15.863	-0.238	(0)
	CuCl3-	8.442e-17	7.496e-17	-16.074	-16.125	-0.052	(0)
	FeCl2+	1.517e-17	1.352e-17	-16.819	-16.869	-0.050	(0)
	FeCl3	7.837e-21	7.837e-21	-20.106	-20.106	0.000	(0)
	CuCl4-2	4.088e-21	2.581e-21	-20.388	-20.588	-0.200	(0)
	CrO3Cl-	6.803e-34	5.932e-34	-33.167	-33.227	-0.060	(0)
	Cr (NH3) 6Cl+2	4.721e-34	2.728e-34	-33.326	-33.564	-0.238	(0)
	CoCl+2	2.383e-35	1.377e-35	-34.623	-34.861	-0.238	(0)
	Co (NH3) 5Cl+2	4.164e-39	2.406e-39	-38.380	-38.619	-0.238	(0)
	Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-50.953	-51.191	-0.238	(0)
Co (2)	6.622e-07						
	Co+2	5.668e-07	3.275e-07	-6.247	-6.485	-0.238	(0)
	CoSO4	6.815e-08	6.815e-08	-7.167	-7.167	0.000	(0)
	CoHCO3+	1.894e-08	1.651e-08	-7.723	-7.782	-0.060	(0)
	CoCl+	7.428e-09	6.476e-09	-8.129	-8.189	-0.060	(0)
	CoHPO4	3.779e-10	3.779e-10	-9.423	-9.423	0.000	(0)
	CoCO3	2.546e-10	2.546e-10	-9.594	-9.594	0.000	(0)
	Co (NH3) +2	1.392e-10	8.044e-11	-9.856	-10.095	-0.238	(0)
	CoOH+	1.142e-10	9.955e-11	-9.942	-10.002	-0.060	(0)
	Co (OH) 2	1.205e-13	1.205e-13	-12.919	-12.919	0.000	(0)
	Co (NH3) 2+2	4.961e-15	2.866e-15	-14.304	-14.543	-0.238	(0)
	Co2OH+3	5.615e-18	1.634e-18	-17.251	-17.787	-0.536	(0)
	Co (NH3) 3+2	8.158e-20	4.713e-20	-19.088	-19.327	-0.238	(0)
	Co (OH) 3-	4.201e-20	3.662e-20	-19.377	-19.436	-0.060	(0)
	CoOOH-	1.757e-21	1.532e-21	-20.755	-20.815	-0.060	(0)
	CoSeO4	1.414e-22	1.414e-22	-21.850	-21.850	0.000	(0)
	Co (NH3) 4+2	5.592e-25	3.231e-25	-24.252	-24.491	-0.238	(0)
	CoNO2+	5.547e-28	4.836e-28	-27.256	-27.316	-0.060	(0)
	Co (OH) 4-2	1.531e-28	8.843e-29	-27.815	-28.053	-0.238	(0)
	Co (NH3) 5+2	1.212e-30	7.004e-31	-29.916	-30.155	-0.238	(0)
	Co4 (OH) 4+4	1.759e-31	1.960e-32	-30.755	-31.708	-0.953	(0)
	CoNO3+	2.182e-37	1.902e-37	-36.661	-36.721	-0.060	(0)
	Co (NO3) 2	0.000e+00	0.000e+00	-66.848	-66.848	0.000	(0)
Co (3)	1.747e-30						
	CoOH+2	1.747e-30	1.009e-30	-29.758	-29.996	-0.238	(0)
	Co+3	3.766e-35	1.304e-35	-34.424	-34.885	-0.461	(0)
	CoCl+2	2.383e-35	1.377e-35	-34.623	-34.861	-0.238	(0)

Co(NH3)5Cl+2	4.164e-39	2.406e-39	-38.380	-38.619	-0.238	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-46.993	-47.052	-0.060	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-50.953	-51.191	-0.238	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.021	-52.260	-0.238	(0)
Cr(2)	2.965e-21					
Cr+2	2.965e-21	1.713e-21	-20.528	-20.766	-0.238	(0)
Cr(3)	1.347e-07					
Cr(OH)+2	7.386e-08	4.267e-08	-7.132	-7.370	-0.238	(0)
Cr(OH)2+	5.309e-08	4.628e-08	-7.275	-7.335	-0.060	(0)
CrOHSO4	6.448e-09	6.448e-09	-8.191	-8.191	0.000	(0)
Cr+3	6.279e-10	1.827e-10	-9.202	-9.738	-0.536	(0)
CrSO4+	4.304e-10	3.752e-10	-9.366	-9.426	-0.060	(0)
Cr(OH)3	2.649e-10	2.649e-10	-9.577	-9.577	0.000	(0)
CrCl+2	1.984e-12	1.146e-12	-11.703	-11.941	-0.238	(0)
CrH2PO4+2	8.321e-13	4.807e-13	-12.080	-12.318	-0.238	(0)
CrO2-	2.185e-13	1.905e-13	-12.661	-12.720	-0.060	(0)
Cr(OH)4-	1.843e-13	1.607e-13	-12.735	-12.794	-0.060	(0)
Cr2(OH)2SO4+2	2.519e-14	1.455e-14	-13.599	-13.837	-0.238	(0)
CrOHC12	9.427e-16	9.427e-16	-15.026	-15.026	0.000	(0)
Cr2(OH)2(SO4)2	9.408e-16	9.408e-16	-15.027	-15.027	0.000	(0)
CrCl2+	4.641e-16	4.046e-16	-15.333	-15.393	-0.060	(0)
Cr(NH3)5OH+2	1.771e-27	1.023e-27	-26.752	-26.990	-0.238	(0)
Cr(NH3)6+3	1.279e-32	3.722e-33	-31.893	-32.429	-0.536	(0)
Cr(NH3)6Cl+2	4.721e-34	2.728e-34	-33.326	-33.564	-0.238	(0)
CrNO3+2	0.000e+00	0.000e+00	-41.487	-41.725	-0.238	(0)
Cr(6)	4.667e-26					
HCrO4-	2.786e-26	2.429e-26	-25.555	-25.615	-0.060	(0)
CrO4-2	1.845e-26	1.152e-26	-25.734	-25.939	-0.205	(0)
NaCrO4-	3.332e-28	2.905e-28	-27.477	-27.537	-0.060	(0)
KCrO4-	2.771e-29	2.416e-29	-28.557	-28.617	-0.060	(0)
CrO3HPO4-2	1.861e-30	1.075e-30	-29.730	-29.968	-0.238	(0)
H2CrO4	1.008e-32	1.008e-32	-31.996	-31.996	0.000	(0)
CrO3SO4-2	9.338e-33	5.395e-33	-32.030	-32.268	-0.238	(0)
CrO3Cl-	6.803e-34	5.932e-34	-33.167	-33.227	-0.060	(0)
CrO3H2PO4-	3.925e-34	3.422e-34	-33.406	-33.466	-0.060	(0)
Cr2O7-2	0.000e+00	0.000e+00	-49.394	-49.632	-0.238	(0)
Cu(1)	9.639e-08					
CuCl2-	5.238e-08	4.651e-08	-7.281	-7.332	-0.052	(0)
CuCl	3.795e-08	3.795e-08	-7.421	-7.421	0.000	(0)
Cu+	5.967e-09	5.202e-09	-8.224	-8.284	-0.060	(0)
CuCl3-2	8.950e-11	5.651e-11	-10.048	-10.248	-0.200	(0)
Cu(2)	2.501e-07					
Cu+2	1.785e-07	1.114e-07	-6.748	-6.953	-0.205	(0)
CuCO3	3.016e-08	3.016e-08	-7.521	-7.521	0.000	(0)
CuSO4	2.616e-08	2.616e-08	-7.582	-7.582	0.000	(0)
CuHCO3+	5.224e-09	4.555e-09	-8.282	-8.342	-0.060	(0)
CuOH+	4.723e-09	4.194e-09	-8.326	-8.377	-0.052	(0)
CuNH3+2	4.229e-09	2.443e-09	-8.374	-8.612	-0.238	(0)
CuCl+	1.088e-09	9.662e-10	-8.963	-9.015	-0.052	(0)
Cu(OH)2	1.631e-11	1.631e-11	-10.788	-10.788	0.000	(0)
Cu(CO3)2-2	6.462e-12	3.734e-12	-11.190	-11.428	-0.238	(0)
CuCl2	1.517e-12	1.517e-12	-11.819	-11.819	0.000	(0)
Cu2(OH)2+2	7.389e-13	4.269e-13	-12.131	-12.370	-0.238	(0)
Cu(OH)3-	5.847e-16	5.097e-16	-15.233	-15.293	-0.060	(0)
CuCl3-	8.442e-17	7.496e-17	-16.074	-16.125	-0.052	(0)
CuCl4-2	4.088e-21	2.581e-21	-20.388	-20.588	-0.200	(0)
Cu(OH)4-2	1.058e-22	6.112e-23	-21.976	-22.214	-0.238	(0)
CuNO2+	2.803e-27	2.444e-27	-26.552	-26.612	-0.060	(0)
CuNO3+	1.523e-37	1.328e-37	-36.817	-36.877	-0.060	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-47.281	-47.281	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-68.225	-68.225	0.000	(0)
Fe(2)	8.637e-06					
Fe+2	7.461e-06	4.311e-06	-5.127	-5.365	-0.238	(0)
FeSO4	1.090e-06	1.090e-06	-5.963	-5.963	0.000	(0)
FeHCO3+	3.932e-08	3.517e-08	-7.405	-7.454	-0.048	(0)
FeH2PO4+	2.668e-08	2.382e-08	-7.574	-7.623	-0.049	(0)
FeHPO4	1.815e-08	1.815e-08	-7.741	-7.741	0.000	(0)
FeOH+	1.998e-09	1.781e-09	-8.699	-8.749	-0.050	(0)

Fe (OH) 2	1.389e-14	1.389e-14	-13.857	-13.857	0.000	(0)
Fe (OH) 3-	7.166e-17	6.388e-17	-16.145	-16.195	-0.050	(0)
Fe (3)	1.964e-07					
Fe (OH) 2+	1.950e-07	1.740e-07	-6.710	-6.759	-0.049	(0)
Fe (OH) 3	1.394e-09	1.394e-09	-8.856	-8.856	0.000	(0)
FeHPO4+	3.605e-11	3.218e-11	-10.443	-10.492	-0.049	(0)
FeOH+2	3.488e-11	2.202e-11	-10.457	-10.657	-0.200	(0)
Fe (OH) 4-	4.526e-12	4.040e-12	-11.344	-11.394	-0.049	(0)
FeSO4+	3.443e-14	3.069e-14	-13.463	-13.513	-0.050	(0)
Fe+3	8.622e-15	2.985e-15	-14.064	-14.525	-0.461	(0)
FeH2PO4+2	9.841e-16	6.250e-16	-15.007	-15.204	-0.197	(0)
Fe (SO4) 2-	8.526e-16	7.433e-16	-15.069	-15.129	-0.060	(0)
FeCl+2	7.064e-16	4.460e-16	-15.151	-15.351	-0.200	(0)
FeCl2+	1.517e-17	1.352e-17	-16.819	-16.869	-0.050	(0)
FeHSeO3+2	2.518e-19	1.455e-19	-18.599	-18.837	-0.238	(0)
Fe2 (OH) 2+4	1.724e-19	1.921e-20	-18.763	-19.717	-0.953	(0)
FeCl3	7.837e-21	7.837e-21	-20.106	-20.106	0.000	(0)
Fe3 (OH) 4+5	1.414e-24	4.585e-26	-23.850	-25.339	-1.489	(0)
FeNO3+2	0.000e+00	0.000e+00	-43.612	-43.850	-0.238	(0)
H (0)	6.481e-24					
H2	3.240e-24	3.251e-24	-23.489	-23.488	0.001	(0)
K	6.399e-04					
K+	6.351e-04	5.645e-04	-3.197	-3.248	-0.051	(0)
KSO4-	4.737e-06	4.229e-06	-5.324	-5.374	-0.049	(0)
KHPO4-	5.074e-09	4.530e-09	-8.295	-8.344	-0.049	(0)
KCrO4-	2.771e-29	2.416e-29	-28.557	-28.617	-0.060	(0)
Mg	6.999e-04					
Mg+2	6.224e-04	3.884e-04	-3.206	-3.411	-0.205	(0)
MgSO4	7.392e-05	7.392e-05	-4.131	-4.131	0.000	(0)
MgHCO3+	3.121e-06	2.771e-06	-5.506	-5.557	-0.052	(0)
MgHPO4	2.647e-07	2.647e-07	-6.577	-6.577	0.000	(0)
MgH2PO4+	2.388e-07	2.132e-07	-6.622	-6.671	-0.049	(0)
MgCO3	1.368e-08	1.368e-08	-7.864	-7.864	0.000	(0)
MgOH+	1.649e-09	1.478e-09	-8.783	-8.830	-0.048	(0)
MgH2BO3+	1.002e-10	8.839e-11	-9.999	-10.054	-0.054	(0)
MgPO4-	1.211e-11	1.081e-11	-10.917	-10.966	-0.049	(0)
Mn (2)	8.379e-07					
Mn+2	7.487e-07	4.326e-07	-6.126	-6.364	-0.238	(0)
MnSO4	7.886e-08	7.886e-08	-7.103	-7.103	0.000	(0)
MnHCO3+	6.750e-09	6.017e-09	-8.171	-8.221	-0.050	(0)
MnCl+	3.540e-09	3.156e-09	-8.451	-8.501	-0.050	(0)
MnCl2	2.583e-11	2.583e-11	-10.588	-10.588	0.000	(0)
MnOH+	1.265e-11	1.128e-11	-10.898	-10.948	-0.050	(0)
MnCl3-	4.626e-14	4.123e-14	-13.335	-13.385	-0.050	(0)
MnSeO4	9.893e-23	9.893e-23	-22.005	-22.005	0.000	(0)
Mn (OH) 3-	2.664e-23	2.375e-23	-22.574	-22.624	-0.050	(0)
MnSe	3.564e-30	3.564e-30	-29.448	-29.448	0.000	(0)
Mn (OH) 4-2	1.850e-30	1.168e-30	-29.733	-29.933	-0.200	(0)
MnNO3+	2.882e-37	2.513e-37	-36.540	-36.600	-0.060	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-66.631	-66.631	0.000	(0)
Mn (3)	2.658e-28					
Mn+3	2.658e-28	9.203e-29	-27.575	-28.036	-0.461	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-61.272	-61.471	-0.200	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-67.123	-67.177	-0.053	(0)
Mo	9.387e-08					
MoO4-2	9.311e-08	5.811e-08	-7.031	-7.236	-0.205	(0)
HMoO4-	7.636e-10	6.657e-10	-9.117	-9.177	-0.060	(0)
H2MoO4	4.421e-12	4.421e-12	-11.354	-11.354	0.000	(0)
AlMo6O21-3	4.906e-34	1.428e-34	-33.309	-33.845	-0.536	(0)
Mo7O24-6	0.000e+00	0.000e+00	-44.274	-46.418	-2.144	(0)
HMo7O24-5	0.000e+00	0.000e+00	-44.752	-46.242	-1.489	(0)
H2Mo7O24-4	0.000e+00	0.000e+00	-46.695	-47.648	-0.953	(0)
H3Mo7O24-3	0.000e+00	0.000e+00	-50.040	-50.576	-0.536	(0)
N (-3)	1.736e-03					
NH4+	1.715e-03	1.514e-03	-2.766	-2.820	-0.054	(0)
NH4SO4-	1.980e-05	1.765e-05	-4.703	-4.753	-0.050	(0)

NH3	9.134e-07	9.134e-07	-6.039	-6.039	0.000	(0)
CuNH3+2	4.229e-09	2.443e-09	-8.374	-8.612	-0.238	(0)
CaNH3+2	1.227e-09	7.089e-10	-8.911	-9.149	-0.238	(0)
NiNH3+2	1.878e-10	1.085e-10	-9.726	-9.965	-0.238	(0)
Co (NH3) +2	1.392e-10	8.044e-11	-9.856	-10.095	-0.238	(0)
BaNH3+2	7.754e-14	4.480e-14	-13.110	-13.349	-0.238	(0)
Ni (NH3) 2+2	4.818e-14	2.784e-14	-13.317	-13.555	-0.238	(0)
Co (NH3) 2+2	4.961e-15	2.866e-15	-14.304	-14.543	-0.238	(0)
Ca (NH3) 2+2	6.381e-16	3.686e-16	-15.195	-15.433	-0.238	(0)
Co (NH3) 3+2	8.158e-20	4.713e-20	-19.088	-19.327	-0.238	(0)
Co (NH3) 4+2	5.592e-25	3.231e-25	-24.252	-24.491	-0.238	(0)
Cr (NH3) 5OH+2	1.771e-27	1.023e-27	-26.752	-26.990	-0.238	(0)
Co (NH3) 5+2	1.212e-30	7.004e-31	-29.916	-30.155	-0.238	(0)
Cr (NH3) 6+3	1.279e-32	3.722e-33	-31.893	-32.429	-0.536	(0)
Cr (NH3) 6Cl+2	4.721e-34	2.728e-34	-33.326	-33.564	-0.238	(0)
Co (NH3) 5Cl+2	4.164e-39	2.406e-39	-38.380	-38.619	-0.238	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-46.993	-47.052	-0.060	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-50.953	-51.191	-0.238	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-52.021	-52.260	-0.238	(0)
N (3)	2.370e-22					
NO2-	2.370e-22	2.096e-22	-21.625	-21.679	-0.053	(0)
CuNO2+	2.803e-27	2.444e-27	-26.552	-26.612	-0.060	(0)
CoNO2+	5.547e-28	4.836e-28	-27.256	-27.316	-0.060	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-47.281	-47.281	0.000	(0)
N (5)	4.129e-31					
NO3-	4.123e-31	3.665e-31	-30.385	-30.436	-0.051	(0)
CaNO3+	5.947e-34	5.185e-34	-33.226	-33.285	-0.060	(0)
MnNO3+	2.882e-37	2.513e-37	-36.540	-36.600	-0.060	(0)
CoNO3+	2.182e-37	1.902e-37	-36.661	-36.721	-0.060	(0)
ZnNO3+	2.043e-37	1.781e-37	-36.690	-36.749	-0.060	(0)
CuNO3+	1.523e-37	1.328e-37	-36.817	-36.877	-0.060	(0)
BaNO3+	1.252e-37	1.092e-37	-36.902	-36.962	-0.060	(0)
NiNO3+	1.030e-37	8.978e-38	-36.987	-37.047	-0.060	(0)
PbNO3+	2.864e-38	2.497e-38	-37.543	-37.603	-0.060	(0)
CrNO3+2	0.000e+00	0.000e+00	-41.487	-41.725	-0.238	(0)
FeNO3+2	0.000e+00	0.000e+00	-43.612	-43.850	-0.238	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-66.631	-66.631	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-66.848	-66.848	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-67.783	-67.783	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-67.899	-67.899	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-68.225	-68.225	0.000	(0)
Na	5.746e-03					
Na+	5.710e-03	5.076e-03	-2.243	-2.295	-0.051	(0)
NaSO4-	3.300e-05	2.946e-05	-4.481	-4.531	-0.049	(0)
NaHCO3	2.248e-06	2.248e-06	-5.648	-5.648	0.000	(0)
NaHPO4-	7.066e-08	6.308e-08	-7.151	-7.200	-0.049	(0)
NaCO3-	5.601e-09	5.000e-09	-8.252	-8.301	-0.049	(0)
NaH2BO3	5.773e-11	5.773e-11	-10.239	-10.239	0.000	(0)
NaCrO4-	3.332e-28	2.905e-28	-27.477	-27.537	-0.060	(0)
Ni	1.876e-07					
Ni+2	1.563e-07	9.752e-08	-6.806	-7.011	-0.205	(0)
NiSO4	2.035e-08	2.035e-08	-7.691	-7.691	0.000	(0)
NiHCO3+	8.938e-09	7.793e-09	-8.049	-8.108	-0.060	(0)
NiCl+	1.636e-09	1.426e-09	-8.786	-8.846	-0.060	(0)
NiNH3+2	1.878e-10	1.085e-10	-9.726	-9.965	-0.238	(0)
NiCO3	1.673e-10	1.673e-10	-9.776	-9.776	0.000	(0)
NiOH+	1.502e-11	1.310e-11	-10.823	-10.883	-0.060	(0)
Ni (SO4) 2-2	1.321e-12	7.633e-13	-11.879	-12.117	-0.238	(0)
Ni (NH3) 2+2	4.818e-14	2.784e-14	-13.317	-13.555	-0.238	(0)
NiCl2	4.219e-14	4.219e-14	-13.375	-13.375	0.000	(0)
Ni (OH) 2	2.264e-14	2.264e-14	-13.645	-13.645	0.000	(0)
Ni (OH) 3-	3.956e-19	3.449e-19	-18.403	-18.462	-0.060	(0)
NiSeO4	3.876e-23	3.876e-23	-22.412	-22.412	0.000	(0)
NiNO3+	1.030e-37	8.978e-38	-36.987	-37.047	-0.060	(0)
O (0)	0.000e+00					
O2	0.000e+00	0.000e+00	-46.715	-46.713	0.001	(0)
P	1.680e-05					
H2PO4-	1.398e-05	1.248e-05	-4.855	-4.904	-0.049	(0)

HPO4-2	1.858e-06	1.173e-06	-5.731	-5.931	-0.200	(0)
MgHPO4	2.647e-07	2.647e-07	-6.577	-6.577	0.000	(0)
MgH2PO4+	2.388e-07	2.132e-07	-6.622	-6.671	-0.049	(0)
CaHPO4	2.128e-07	2.128e-07	-6.672	-6.672	0.000	(0)
CaH2PO4+	1.242e-07	1.109e-07	-6.906	-6.955	-0.049	(0)
NaHPO4-	7.066e-08	6.308e-08	-7.151	-7.200	-0.049	(0)
FeH2PO4+	2.668e-08	2.382e-08	-7.574	-7.623	-0.049	(0)
FeHPO4	1.815e-08	1.815e-08	-7.741	-7.741	0.000	(0)
KHPO4-	5.074e-09	4.530e-09	-8.295	-8.344	-0.049	(0)
H3PO4	1.098e-09	1.098e-09	-8.959	-8.959	0.000	(0)
CaPO4-	8.600e-10	7.677e-10	-9.066	-9.115	-0.049	(0)
CoHPO4	3.779e-10	3.779e-10	-9.423	-9.423	0.000	(0)
FeHPO4+	3.605e-11	3.218e-11	-10.443	-10.492	-0.049	(0)
MgPO4-	1.211e-11	1.081e-11	-10.917	-10.966	-0.049	(0)
PO4-3	1.950e-12	6.752e-13	-11.710	-12.171	-0.461	(0)
CrH2PO4+2	8.321e-13	4.807e-13	-12.080	-12.318	-0.238	(0)
FeH2PO4+2	9.841e-16	6.250e-16	-15.007	-15.204	-0.197	(0)
CrO3HPO4-2	1.861e-30	1.075e-30	-29.730	-29.968	-0.238	(0)
CrO3H2PO4-	3.925e-34	3.422e-34	-33.406	-33.466	-0.060	(0)
Pb	1.449e-08					
Pb+2	7.481e-09	4.669e-09	-8.126	-8.331	-0.205	(0)
PbHCO3+	2.579e-09	2.249e-09	-8.589	-8.648	-0.060	(0)
PbSO4	2.489e-09	2.489e-09	-8.604	-8.604	0.000	(0)
PbCl+	1.037e-09	9.043e-10	-8.984	-9.044	-0.060	(0)
PbCO3	6.455e-10	6.455e-10	-9.190	-9.190	0.000	(0)
PbOH+	2.050e-10	1.787e-10	-9.688	-9.748	-0.060	(0)
Pb (SO4) 2-2	2.825e-11	1.632e-11	-10.549	-10.787	-0.238	(0)
PbCl2	2.288e-11	2.288e-11	-10.640	-10.640	0.000	(0)
Pb (CO3) 2-2	1.482e-13	8.562e-14	-12.829	-13.067	-0.238	(0)
Pb (OH) 2	8.609e-14	8.609e-14	-13.065	-13.065	0.000	(0)
PbCl3-	6.398e-14	5.578e-14	-13.194	-13.253	-0.060	(0)
PbCl4-2	2.375e-16	1.372e-16	-15.624	-15.863	-0.238	(0)
Pb2OH+3	4.544e-17	1.322e-17	-16.343	-16.879	-0.536	(0)
Pb (OH) 3-	1.504e-18	1.312e-18	-17.823	-17.882	-0.060	(0)
Pb (OH) 4-2	8.471e-24	4.894e-24	-23.072	-23.310	-0.238	(0)
Pb3 (OH) 4+2	5.409e-25	3.125e-25	-24.267	-24.505	-0.238	(0)
Pb4 (OH) 4+4	1.253e-28	1.396e-29	-27.902	-28.855	-0.953	(0)
PbNO3+	2.864e-38	2.497e-38	-37.543	-37.603	-0.060	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-67.783	-67.783	0.000	(0)
S (6)	1.979e-03					
SO4-2	1.744e-03	1.088e-03	-2.758	-2.963	-0.205	(0)
CaSO4	1.024e-04	1.024e-04	-3.990	-3.990	0.000	(0)
MgSO4	7.392e-05	7.392e-05	-4.131	-4.131	0.000	(0)
NaSO4-	3.300e-05	2.946e-05	-4.481	-4.531	-0.049	(0)
NH4SO4-	1.980e-05	1.765e-05	-4.703	-4.753	-0.050	(0)
KSO4-	4.737e-06	4.229e-06	-5.324	-5.374	-0.049	(0)
FeSO4	1.090e-06	1.090e-06	-5.963	-5.963	0.000	(0)
MnSO4	7.886e-08	7.886e-08	-7.103	-7.103	0.000	(0)
CoSO4	6.815e-08	6.815e-08	-7.167	-7.167	0.000	(0)
HSO4-	6.789e-08	6.040e-08	-7.168	-7.219	-0.051	(0)
ZnSO4	4.277e-08	4.277e-08	-7.369	-7.369	0.000	(0)
AlSO4+	3.549e-08	3.158e-08	-7.450	-7.501	-0.051	(0)
CuSO4	2.616e-08	2.616e-08	-7.582	-7.582	0.000	(0)
NiSO4	2.035e-08	2.035e-08	-7.691	-7.691	0.000	(0)
CrOHSO4	6.448e-09	6.448e-09	-8.191	-8.191	0.000	(0)
PbSO4	2.489e-09	2.489e-09	-8.604	-8.604	0.000	(0)
Zn (SO4) 2-2	7.323e-10	4.231e-10	-9.135	-9.374	-0.238	(0)
Al (SO4) 2-	4.624e-10	4.114e-10	-9.335	-9.386	-0.051	(0)
CrSO4+	4.304e-10	3.752e-10	-9.366	-9.426	-0.060	(0)
Pb (SO4) 2-2	2.825e-11	1.632e-11	-10.549	-10.787	-0.238	(0)
Ni (SO4) 2-2	1.321e-12	7.633e-13	-11.879	-12.117	-0.238	(0)
FeSO4+	3.443e-14	3.069e-14	-13.463	-13.513	-0.050	(0)
Cr2 (OH) 2SO4+2	2.519e-14	1.455e-14	-13.599	-13.837	-0.238	(0)
Cr2 (OH) 2 (SO4) 2	9.408e-16	9.408e-16	-15.027	-15.027	0.000	(0)
Fe (SO4) 2-	8.526e-16	7.433e-16	-15.069	-15.129	-0.060	(0)
CrO3SO4-2	9.338e-33	5.395e-33	-32.030	-32.268	-0.238	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-46.993	-47.052	-0.060	(0)
Se (-2)	1.522e-24					

HSe-	1.515e-24	1.321e-24	-23.820	-23.879	-0.060	(0)
H2Se	6.623e-27	6.623e-27	-26.179	-26.179	0.000	(0)
MnSe	3.564e-30	3.564e-30	-29.448	-29.448	0.000	(0)
Se-2	2.485e-33	1.436e-33	-32.605	-32.843	-0.238	(0)
Se (4)	2.535e-08					
HSeO3-	2.512e-08	2.190e-08	-7.600	-7.660	-0.060	(0)
SeO3-2	2.207e-10	1.275e-10	-9.656	-9.895	-0.238	(0)
H2SeO3	5.915e-12	5.915e-12	-11.228	-11.228	0.000	(0)
FeHSeO3+2	2.518e-19	1.455e-19	-18.599	-18.837	-0.238	(0)
Se (6)	1.500e-18					
SeO4-2	1.499e-18	9.357e-19	-17.824	-18.029	-0.205	(0)
CoSeO4	1.414e-22	1.414e-22	-21.850	-21.850	0.000	(0)
MnSeO4	9.893e-23	9.893e-23	-22.005	-22.005	0.000	(0)
NiSeO4	3.876e-23	3.876e-23	-22.412	-22.412	0.000	(0)
HSeO4-	3.034e-23	2.645e-23	-22.518	-22.578	-0.060	(0)
ZnSeO4	2.716e-23	2.716e-23	-22.566	-22.566	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-40.351	-40.589	-0.238	(0)
Zn	3.520e-07					
Zn+2	3.003e-07	1.874e-07	-6.522	-6.727	-0.205	(0)
ZnSO4	4.277e-08	4.277e-08	-7.369	-7.369	0.000	(0)
ZnHCO3+	4.406e-09	3.842e-09	-8.356	-8.415	-0.060	(0)
ZnCl+	2.961e-09	2.629e-09	-8.529	-8.580	-0.052	(0)
Zn (SO4) 2-2	7.323e-10	4.231e-10	-9.135	-9.374	-0.238	(0)
ZnCO3	4.960e-10	4.960e-10	-9.304	-9.304	0.000	(0)
ZnOH+	2.231e-10	1.945e-10	-9.651	-9.711	-0.060	(0)
ZnOHCl	5.442e-11	5.442e-11	-10.264	-10.264	0.000	(0)
ZnCl2	1.943e-11	1.943e-11	-10.712	-10.712	0.000	(0)
Zn (OH) 2	6.895e-13	6.895e-13	-12.161	-12.161	0.000	(0)
ZnCl3-	9.866e-14	8.761e-14	-13.006	-13.057	-0.052	(0)
ZnCl4-2	3.862e-16	2.438e-16	-15.413	-15.613	-0.200	(0)
Zn (OH) 3-	6.039e-17	5.265e-17	-16.219	-16.279	-0.060	(0)
Zn (OH) 4-2	5.527e-23	3.193e-23	-22.257	-22.496	-0.238	(0)
ZnSeO4	2.716e-23	2.716e-23	-22.566	-22.566	0.000	(0)
ZnNO3+	2.043e-37	1.781e-37	-36.690	-36.749	-0.060	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-40.351	-40.589	-0.238	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-67.899	-67.899	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2	-87.46	-81.19	6.27	(Co (NH3) 5Cl) (NO3) 2
(Co (NH3) 5Cl) Cl2	-29.34	-24.80	4.54	(Co (NH3) 5Cl) Cl2
(Co (NH3) 5OH2) Cl3	-36.61	-24.80	11.81	(Co (NH3) 5OH2) Cl3
(Co (NH3) 6) (NO3) 3	-123.96	-106.03	17.93	(Co (NH3) 6) (NO3) 3
(Co (NH3) 6) Cl3	-41.57	-21.44	20.13	(Co (NH3) 6) Cl3
(NH4) 2CrO4	-31.96	-31.58	0.38	(NH4) 2CrO4
(NH4) 2SeO4	-24.12	-23.67	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	-0.94	10.20	11.13	Al (OH) 3
Al2 (MoO4) 3	-41.54	-38.39	3.15	Al2 (MoO4) 3
Al2O3	-0.03	20.39	20.43	Al2O3
Al4 (OH) 10SO4	2.76	25.46	22.70	Al4 (OH) 10SO4
AlAsO4:2H2O	-6.29	-1.49	4.80	AlAsO4:2H2O
AlOHSO4	-1.90	-5.13	-3.23	AlOHSO4
Alunite	3.65	2.87	-0.77	KAl3 (SO4) 2 (OH) 6
Anglesite	-3.47	-11.29	-7.83	PbSO4
Anhydrite	-1.99	-6.33	-4.34	CaSO4
Antlerite	-7.89	0.90	8.79	Cu3 (OH) 4SO4
Aragonite	-2.44	-10.70	-8.26	CaCO3
Arsenolite	-48.16	-51.10	-2.94	As4O6
Artinite	-11.76	-1.80	9.96	MgCO3:Mg (OH) 2:3H2O
As2O5	-30.15	-23.38	6.77	As2O5
Atacamite	-5.27	2.40	7.67	Cu2 (OH) 3Cl
Azurite	-6.55	-23.17	-16.62	Cu3 (OH) 2 (CO3) 2
Ba (OH) 2:8H2O	-19.46	5.09	24.56	Ba (OH) 2:8H2O
Ba3 (AsO4) 2	0.85	-8.09	-8.94	Ba3 (AsO4) 2
BaCrO4	-23.43	-33.20	-9.77	BaCrO4
BaHPO4	-5.84	-25.62	-19.77	BaHPO4

BaMoO4	-7.51	-14.50	-6.99	BaMoO4
Barite	-0.18	-10.23	-10.05	BaSO4
BaSeO3	-10.54	-8.74	1.79	BaSeO3
BaSeO4	-17.77	-25.29	-7.53	BaSeO4
Bianchite	-7.93	-9.69	-1.76	ZnSO4:6H2O
Birnessite	-17.41	0.68	18.09	MnO2
Bixbyite	-18.72	-18.99	-0.27	Mn2O3
Boehmite	1.27	10.20	8.93	AlOOH
Brochantite	-9.53	6.30	15.83	Cu4(OH)6SO4
Brucite	-8.24	8.95	17.18	Mg(OH)2
Bunsenite	-7.40	5.35	12.74	NiO
Ca3(AsO4)2:4H2O	-18.70	3.60	22.30	Ca3(AsO4)2:4H2O
Ca3(PO4)2(beta)	-5.36	-34.44	-29.08	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-9.07	-56.15	-47.08	Ca4H(PO4)3:3H2O
CaCrO4	-27.12	-29.30	-2.19	CaCrO4
CaHPO4	-2.35	-21.72	-19.37	CaHPO4
CaHPO4:2H2O	-2.65	-21.72	-19.06	CaHPO4:2H2O
Calcite	-2.25	-10.70	-8.46	CaCO3
CaMoO4	-2.66	-10.60	-7.94	CaMoO4
CaSeO3:2H2O	-7.72	-4.85	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-18.40	-21.39	-3.00	CaSeO4:2H2O
Cerussite	-2.46	-15.67	-13.20	PbCO3
CH4(g)	-59.32	-101.14	-41.81	CH4
Chalcanthite	-7.26	-9.92	-2.66	CuSO4:5H2O
Claudetite	-47.87	-51.10	-3.23	As4O6
Clausthalite	1.43	-26.03	-27.46	PbSe
Co(BO2)2	-31.37	-4.30	27.07	Co(BO2)2
Co(OH)2	-7.22	5.87	13.09	Co(OH)2
Co(OH)3	-14.31	-16.35	-2.03	Co(OH)3
CO2(g)	-1.54	-19.70	-18.16	CO2
Co3(AsO4)2	-18.79	-5.75	13.03	Co3(AsO4)2
Co3(PO4)2	-9.11	-43.80	-34.69	Co3(PO4)2
Co3O4	-16.64	-26.82	-10.17	Co3O4
CoCl2	-19.46	-10.96	8.51	CoCl2
CoCl2:6H2O	-13.47	-10.96	2.51	CoCl2:6H2O
CoCO3	-3.88	-13.82	-9.94	CoCO3
CoFe2O4	16.96	13.90	-3.05	CoFe2O4
CoHPO4	-5.77	-24.84	-19.06	CoHPO4
CoMoO4	-6.03	-13.72	-7.69	CoMoO4
CoO	-8.03	5.88	13.90	CoO
CoSe	-7.98	-24.18	-16.20	CoSe
CoSeO3	-9.28	-7.96	1.32	CoSeO3
CoSeO4:6H2O	-22.98	-24.51	-1.53	CoSeO4:6H2O
CoSO4	-12.49	-9.45	3.04	CoSO4
CoSO4:6H2O	-6.97	-9.45	-2.48	CoSO4:6H2O
Cotunnite	-7.95	-12.80	-4.86	PbCl2
Cr(OH)2	-19.33	-8.41	10.93	Cr(OH)2
Cr(OH)3	-2.58	-1.15	1.42	Cr(OH)3
Cr(OH)3(am)	-0.40	-1.15	-0.75	Cr(OH)3
Cr2O3	-0.10	-2.31	-2.21	Cr2O3
CrCl2	-39.66	-25.24	14.42	CrCl2
CrCl3	-41.88	-26.41	15.48	CrCl3
Crmetal	-59.76	-28.77	31.00	Cr
CrO3	-35.10	-38.30	-3.19	CrO3
Cu(OH)2	-3.44	5.41	8.84	Cu(OH)2
Cu2(OH)3NO3	-35.27	-25.80	9.47	Cu2(OH)3NO3
Cu2Se(alpha)	12.17	-34.27	-46.44	Cu2Se
Cu2SO4	-17.64	-19.53	-1.89	Cu2SO4
Cu3(AsO4)2:2H2O	-13.26	-7.16	6.10	Cu3(AsO4)2:2H2O
Cu3(PO4)2	-8.35	-45.20	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-10.08	-45.20	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	5.59	-58.92	-64.51	Cu3Se2
CuCO3	-2.79	-14.29	-11.50	CuCO3
CuCrO4	-27.45	-32.89	-5.44	CuCrO4
Cumetal	-3.31	-12.28	-8.97	Cu
CuMoO4	-1.08	-14.19	-13.11	CuMoO4
CuOCuSO4	-15.22	-4.51	10.71	CuOCuSO4
Cupricferrite	6.82	13.44	6.62	CuFe2O4

Cuprite	-3.17	-4.21	-1.04	Cu ₂ O
Cuprousferrite	10.78	1.91	-8.87	CuFeO ₂
CuSe	8.81	-24.65	-33.46	CuSe
CuSe ₂	-0.57	-34.35	-33.79	CuSe ₂
CuSeO ₃ :2H ₂ O	-9.05	-8.43	0.62	CuSeO ₃ :2H ₂ O
CuSeO ₄ :5H ₂ O	-22.54	-24.98	-2.44	CuSeO ₄ :5H ₂ O
CuSO ₄	-13.07	-9.92	3.16	CuSO ₄
Diaspore	3.02	10.20	7.18	AlOOH
Dolomite (disordered)	-5.05	-21.45	-16.40	CaMg (CO ₃) ₂
Dolomite (ordered)	-4.48	-21.45	-16.97	CaMg (CO ₃) ₂
Epsomite	-4.21	-6.37	-2.16	MgSO ₄ :7H ₂ O
Fe (OH) ₂	-6.57	6.99	13.56	Fe (OH) ₂
Fe (OH) 2.7Cl _{1.3}	4.53	1.49	-3.04	Fe (OH) 2.7Cl _{1.3}
Fe ₂ (OH) 4SeO ₃	-7.36	-5.81	1.55	Fe ₂ (OH) 4SeO ₃
Fe ₂ (SeO ₃) 3:2H ₂ O	-12.86	-33.49	-20.63	Fe ₂ (SeO ₃) 3:2H ₂ O
Fe ₂ (SO ₄) ₃	-34.93	-37.94	-3.01	Fe ₂ (SO ₄) ₃
Fe ₃ (OH) ₈	-5.20	15.02	20.22	Fe ₃ (OH) ₈
FeAsO ₄ :2H ₂ O	-8.07	-7.67	0.40	FeAsO ₄ :2H ₂ O
FeCr ₂ O ₄	-2.93	4.69	7.62	FeCr ₂ O ₄
FeMoO ₄	-2.54	-12.60	-10.06	FeMoO ₄
Ferrihydrite	0.60	4.01	3.41	Fe (OH) ₃
Ferroselite	-14.03	-32.76	-18.74	FeSe ₂
FeSe	-12.06	-23.06	-11.01	FeSe
Gibbsite	1.62	10.20	8.58	Al (OH) ₃
Goethite	3.34	4.01	0.67	FeOOH
Goslarite	-7.64	-9.69	-2.05	ZnSO ₄ :7H ₂ O
Gypsum	-1.72	-6.33	-4.61	CaSO ₄ :2H ₂ O
H-Jarosite	-7.19	-18.60	-11.41	(H ₃ O) Fe ₃ (SO ₄) ₂ (OH) ₆
H ₂ MoO ₄	-6.57	-19.60	-13.02	H ₂ MoO ₄
H ₂ Se (g)	-25.14	-30.06	-4.91	H ₂ Se
Halite	-6.12	-4.53	1.59	NaCl
Hausmannite	-23.94	38.35	62.29	Mn ₃ O ₄
Hematite	9.06	8.03	-1.03	Fe ₂ O ₃
Hercynite	3.56	27.39	23.83	FeAl ₂ O ₄
Hinsdalite	-8.92	-11.42	-2.50	PbAl ₃ PO ₄ SO ₄ (OH) ₆
Huntite	-13.30	-42.95	-29.65	CaMg ₃ (CO ₃) ₄
Hydrocerussite	-8.54	-27.31	-18.77	Pb ₃ (OH) ₂ (CO ₃) ₂
Hydromagnesite	-25.93	-34.04	-8.11	Mg ₅ (CO ₃) ₄ (OH) ₂ :4H ₂ O
Hydroxylapatite	-2.83	-47.16	-44.33	Ca ₅ (PO ₄) ₃ OH
Hydroxylpyromorphite	-9.20	-71.99	-62.79	Pb ₅ (PO ₄) ₃ OH
K-Alum	-12.26	-17.52	-5.26	KAl (SO ₄) ₂ :12H ₂ O
K-Jarosite	-1.26	-15.67	-14.41	KFe ₃ (SO ₄) ₂ (OH) ₆
K ₂ Cr ₂ O ₇	-53.25	-70.73	-17.48	K ₂ Cr ₂ O ₇
K ₂ CrO ₄	-31.87	-32.44	-0.57	K ₂ CrO ₄
K ₂ MoO ₄	-17.00	-13.73	3.27	K ₂ MoO ₄
K ₂ SeO ₄	-23.80	-24.53	-0.73	K ₂ SeO ₄
Langite	-11.68	6.30	17.98	Cu ₄ (OH) ₆ SO ₄ :H ₂ O
Larnakite	-6.90	-7.26	-0.37	PbO:PbSO ₄
Laurionite	-5.01	-4.39	0.62	PbOHCl
Lepidocrocite	2.64	4.01	1.37	FeOOH
Lime	-24.28	8.99	33.28	CaO
Litharge	-8.86	4.03	12.89	PbO
Maghemite	1.64	8.03	6.39	Fe ₂ O ₃
Magnesioferrite	-0.71	16.98	17.69	Fe ₂ MgO ₄
Magnesite	-3.23	-10.75	-7.52	MgCO ₃
Magnetite	11.00	15.02	4.03	Fe ₃ O ₄
Malachite	-3.35	-8.88	-5.53	Cu ₂ (OH) ₂ CO ₃
Manganite	-9.16	16.18	25.34	MnOOH
Massicot	-9.06	4.03	13.09	PbO
Melanothallite	-17.87	-11.43	6.45	CuCl ₂
Melanterite	-6.06	-8.33	-2.27	FeSO ₄ :7H ₂ O
Mg (OH) ₂ (active)	-9.84	8.95	18.79	Mg (OH) ₂
Mg ₃ (PO ₄) ₂	-11.29	-34.57	-23.28	Mg ₃ (PO ₄) ₂
MgCr ₂ O ₄	-10.10	6.64	16.74	MgCr ₂ O ₄
MgCrO ₄	-35.00	-29.35	5.65	MgCrO ₄
MgHPO ₄ :3H ₂ O	-3.59	-21.76	-18.18	MgHPO ₄ :3H ₂ O
MgMoO ₄	-8.80	-10.65	-1.85	MgMoO ₄
MgSeO ₃ :6H ₂ O	-7.93	-4.89	3.04	MgSeO ₃ :6H ₂ O

MgSeO4:6H2O	-20.24	-21.44	-1.20	MgSeO4:6H2O
Minium	-42.34	32.45	74.78	Pb3O4
Mirabilite	-6.20	-7.55	-1.35	Na2SO4:10H2O
Mn2(SO4)3	-59.74	-64.96	-5.22	Mn2(SO4)3
Mn3(AsO4)2:8H2O	-17.89	-5.39	12.50	Mn3(AsO4)2:8H2O
Mn3(PO4)2	-19.58	-43.43	-23.85	Mn3(PO4)2
MnCl2:4H2O	-13.59	-10.84	2.75	MnCl2:4H2O
MnHPO4	0.69	-24.71	-25.40	MnHPO4
MnSe	-27.86	-24.06	3.79	MnSe
MnSeO3	-8.97	-7.84	1.13	MnSeO3
MnSeO3:2H2O	-8.80	-7.84	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-22.34	-24.39	-2.05	MnSeO4:5H2O
MnSO4	-12.10	-9.33	2.78	MnSO4
MoO3	-11.60	-19.60	-8.00	MoO3
Morenosite	-7.79	-9.98	-2.18	NiSO4:7H2O
Na-Jarosite	-3.97	-14.72	-10.75	NaFe3(SO4)2(OH)6
Na2Cr2O7	-58.86	-68.83	-9.96	Na2Cr2O7
Na2CrO4	-33.52	-30.53	2.99	Na2CrO4
Na2Mo2O7	-14.66	-31.42	-16.76	Na2Mo2O7
Na2MoO4	-13.34	-11.82	1.52	Na2MoO4
Na2MoO4:2H2O	-13.05	-11.83	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-16.37	-6.07	10.30	Na2SeO3:5H2O
Na2SeO4	-23.90	-22.62	1.28	Na2SeO4
Nantokite	-3.66	-10.52	-6.86	CuCl
Natron	-10.42	-11.93	-1.51	Na2CO3:10H2O
Nesquehonite	-6.15	-10.75	-4.60	MgCO3:3H2O
Ni(OH)2	-7.73	5.35	13.08	Ni(OH)2
Ni3(AsO4)2:8H2O	-23.03	-7.33	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-14.07	-45.37	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-25.93	6.07	32.00	Ni4(OH)6SO4
NiCO3	-7.60	-14.35	-6.75	NiCO3
NiMoO4	-3.10	-14.25	-11.15	NiMoO4
NiSe	-7.01	-24.71	-17.70	NiSe
NiSeO3:2H2O	-11.40	-8.49	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-23.52	-25.04	-1.52	NiSeO4:6H2O
Nsutite	-16.82	0.68	17.50	MnO2
O2(g)	-44.08	40.72	84.80	O2
Pb(BO2)2	-12.71	-6.15	6.57	Pb(BO2)2
Pb(OH)2	-4.30	4.03	8.32	Pb(OH)2
Pb10(OH)60(CO3)6	-69.13	-77.89	-8.76	Pb10(OH)60(CO3)6
Pb2(OH)3Cl	-9.15	-0.36	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-18.13	8.06	26.19	Pb2O(OH)2
Pb2O3	-32.62	28.42	61.04	Pb2O3
Pb2OCO3	-11.20	-11.64	-0.44	Pb2OCO3
Pb3(AsO4)2	-17.09	-11.29	5.80	Pb3(AsO4)2
Pb3(PO4)2	-5.80	-49.33	-43.53	Pb3(PO4)2
Pb3O2CO3	-18.96	-7.61	11.35	Pb3O2CO3
Pb3O2SO4	-14.16	-3.24	10.92	Pb3O2SO4
Pb4(OH)6SO4	-20.31	0.79	21.10	Pb4(OH)6SO4
Pb4O3SO4	-21.49	0.79	22.28	Pb4O3SO4
PbCrO4	-21.54	-34.27	-12.73	PbCrO4
PbHPO4	-2.88	-26.68	-23.81	PbHPO4
Pbmetal	-20.57	-16.33	4.24	Pb
PbMoO4	0.21	-15.57	-15.78	PbMoO4
PbO:0.3H2O	-8.95	4.03	12.98	PbO:0.33H2O
PbSeO4	-19.47	-26.36	-6.88	PbSeO4
Periclase	-13.09	8.95	22.04	MgO
Phosgenite	-8.66	-28.47	-19.81	PbCl2:PbCO3
Plattnerite	-26.10	24.39	50.49	PbO2
Plumbgummite	5.99	-26.80	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-14.19	8.99	23.19	Ca(OH)2
Pyrochroite	-9.49	6.00	15.48	Mn(OH)2
Pyrolusite	-15.84	26.36	42.19	MnO2
Pyromorphite	4.03	-80.40	-84.43	Pb5(PO4)3Cl
Retgersite	-7.92	-9.97	-2.05	NiSO4:6H2O
Rhodochrosite	-3.13	-13.70	-10.57	MnCO3
Semetal(am)	-2.56	-9.70	-7.14	Se
Semetal(hex)	-1.94	-9.70	-7.76	Se

SeO2	-13.96	-13.84	0.12	SeO2
SeO3	-51.87	-30.39	21.48	SeO3
Siderite	-2.51	-12.70	-10.19	FeCO3
Smithsonite	-4.11	-14.06	-9.95	ZnCO3
Spinel	-8.67	29.34	38.01	MgAl2O4
Strengite	-0.32	-26.70	-26.37	FePO4:2H2O
Tenorite	-2.43	5.41	7.84	CuO
Thenardite	-7.90	-7.55	0.35	Na2SO4
Thermonatrite	-12.59	-11.93	0.67	Na2CO3:H2O
Tsumebite	-7.46	-17.25	-9.79	Pb2CuPO4(OH) 3:3H2O
Vivianite	-4.44	-40.44	-36.00	Fe3(PO4) 2:8H2O
Witherite	-6.02	-14.60	-8.58	BaCO3
Zincite	-5.97	5.63	11.60	ZnO
Zincosite	-13.87	-9.69	4.18	ZnSO4
Zn(BO2) 2	-12.83	-4.54	8.29	Zn(BO2) 2
Zn(NO3) 2:6H2O	-70.84	-67.60	3.24	Zn(NO3) 2:6H2O
Zn(OH) 2	-6.57	5.63	12.20	Zn(OH) 2
Zn(OH) 2(am)	-7.08	5.63	12.71	Zn(OH) 2
Zn(OH) 2(beta)	-6.37	5.63	12.00	Zn(OH) 2
Zn(OH) 2(epsilon)	-6.15	5.63	11.78	Zn(OH) 2
Zn(OH) 2(gamma)	-6.10	5.63	11.73	Zn(OH) 2
Zn2(OH) 2SO4	-11.56	-4.06	7.50	Zn2(OH) 2SO4
Zn2(OH) 3Cl	-12.34	2.85	15.19	Zn2(OH) 3Cl
Zn3(AsO4) 2:2.5H2O	-20.13	-6.48	13.65	Zn3(AsO4) 2:2.5H2O
Zn3(PO4) 2:4H2O	-9.10	-44.52	-35.42	Zn3(PO4) 2:4H2O
Zn3O(SO4) 2	-33.43	-13.75	19.68	Zn3O(SO4) 2
Zn4(OH) 6SO4	-21.19	7.21	28.40	Zn4(OH) 6SO4
Zn5(OH) 8Cl2	-27.17	11.33	38.50	Zn5(OH) 8Cl2
ZnCl2	-18.47	-11.20	7.27	ZnCl2
ZnCO3:1H2O	-3.80	-14.06	-10.26	ZnCO3:1H2O
Znmetal	-40.97	-14.73	26.25	Zn
ZnMoO4	-3.87	-13.96	-10.09	ZnMoO4
ZnO(active)	-5.82	5.63	11.45	ZnO
ZnSe	-9.95	-24.43	-14.48	ZnSe
ZnSeO4:6H2O	-23.24	-24.76	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-9.18	-9.69	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Initial solution 4.

-----Solution composition-----

Elements	Molality	Moles
Al	2.977e-09	2.977e-09
As	2.680e-08	2.680e-08
B	9.287e-06	9.287e-06
Ba	2.924e-07	2.924e-07
Be	2.228e-07	2.228e-07
Ca	1.308e-02	1.308e-02
Cd	7.145e-09	7.145e-09
Cl	1.388e-02	1.388e-02
Co	1.227e-05	1.227e-05
Cr	6.372e-08	6.372e-08
Cu	9.874e-05	9.874e-05
Fe	3.595e-07	3.595e-07
K	6.291e-03	6.291e-03
Mg	3.635e-03	3.635e-03
Mn	1.827e-10	1.827e-10
Mo	1.151e-06	1.151e-06
N	7.218e-04	7.218e-04
Na	1.498e-02	1.498e-02
Ni	8.382e-06	8.382e-06
P	9.400e-06	9.400e-06
Pb	9.691e-08	9.691e-08
S(6)	2.322e-02	2.322e-02

Se	1.271e-07	1.271e-07
Zn	7.523e-06	7.523e-06

-----Description of solution-----

pH	=	4.750
pe	=	4.000
Activity of water	=	0.999
Ionic strength (mol/kgw)	=	7.170e-02
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	-3.485e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	20.00
Electrical balance (eq)	=	-4.666e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	-5.21
Iterations	=	10
Total H	=	1.110166e+02
Total O	=	5.559979e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.218e-05	1.778e-05	-4.654	-4.750	-0.096	0.00
OH-	4.890e-10	3.852e-10	-9.311	-9.414	-0.104	(0)
H2O	5.551e+01	9.988e-01	1.744	-0.001	0.000	18.05
Al	2.977e-09					
AlSO4+	2.401e-09	1.920e-09	-8.620	-8.717	-0.097	(0)
Al+3	3.265e-10	4.471e-11	-9.486	-10.350	-0.863	(0)
Al(SO4)2-	1.927e-10	1.541e-10	-9.715	-9.812	-0.097	(0)
AlOH+2	4.242e-11	1.820e-11	-10.372	-10.740	-0.368	(0)
Al(OH)2+	1.404e-11	1.136e-11	-10.853	-10.945	-0.092	(0)
Al(OH)3	1.282e-13	1.282e-13	-12.892	-12.892	0.000	(0)
Al(OH)4-	3.466e-15	2.772e-15	-14.460	-14.557	-0.097	(0)
AlMo6O21-3	9.100e-22	5.498e-23	-21.041	-22.260	-1.219	(0)
As(3)	2.994e-09					
H3AsO3	2.994e-09	2.994e-09	-8.524	-8.524	0.000	(0)
H2AsO3-	9.768e-14	7.151e-14	-13.010	-13.146	-0.135	(0)
H4AsO3+	3.604e-14	2.638e-14	-13.443	-13.579	-0.135	(0)
HAsO3-2	1.024e-20	2.943e-21	-19.990	-20.531	-0.542	(0)
AsO3-3	8.871e-29	5.360e-30	-28.052	-29.271	-1.219	(0)
As(5)	2.381e-08					
H2AsO4-	2.340e-08	1.713e-08	-7.631	-7.766	-0.135	(0)
HAsO4-2	3.601e-10	1.035e-10	-9.444	-9.985	-0.542	(0)
H3AsO4	4.958e-11	5.041e-11	-10.305	-10.298	0.007	(0)
AsO4-3	2.709e-16	1.637e-17	-15.567	-16.786	-1.219	(0)
B	9.287e-06					
H3BO3	9.287e-06	9.441e-06	-5.032	-5.025	0.007	(0)
H2BO3-	3.641e-10	2.820e-10	-9.439	-9.550	-0.111	(0)
CaH2BO3+	6.864e-11	5.315e-11	-10.163	-10.274	-0.111	(0)
MgH2BO3+	1.277e-11	9.891e-12	-10.894	-11.005	-0.111	(0)
NaH2BO3	5.668e-12	5.668e-12	-11.247	-11.247	0.000	(0)
H5(BO3)2-	3.020e-15	2.339e-15	-14.520	-14.631	-0.111	(0)
BaH2BO3+	1.323e-15	1.024e-15	-14.878	-14.990	-0.111	(0)
H8(BO3)3-	2.468e-18	1.911e-18	-17.608	-17.719	-0.111	(0)
Ba	2.924e-07					
Ba+2	2.924e-07	1.208e-07	-6.534	-6.918	-0.384	(0)
BaNH3+2	4.449e-15	1.278e-15	-14.352	-14.893	-0.542	(0)
BaH2BO3+	1.323e-15	1.024e-15	-14.878	-14.990	-0.111	(0)
BaOH+	2.439e-16	1.963e-16	-15.613	-15.707	-0.094	(0)
BaNO3+	0.000e+00	0.000e+00	-51.242	-51.378	-0.135	(0)
Be	2.228e-07					
Be+2	1.486e-07	6.139e-08	-6.828	-7.212	-0.384	(0)
BeSO4	5.224e-08	5.224e-08	-7.282	-7.282	0.000	(0)
BeOH+	1.686e-08	1.382e-08	-7.773	-7.859	-0.086	(0)
Be(SO4)2-2	3.792e-09	1.089e-09	-8.421	-8.963	-0.542	(0)

	BeCl+	1.341e-09	1.079e-09	-8.873	-8.967	-0.094	(0)
	Be (OH) 2	4.933e-12	4.933e-12	-11.307	-11.307	0.000	(0)
	Be2OH+3	8.412e-13	1.408e-13	-12.075	-12.851	-0.776	(0)
	Be3 (OH) 3+3	3.814e-16	6.386e-17	-15.419	-16.195	-0.776	(0)
	Be (OH) 3-	8.547e-17	7.008e-17	-16.068	-16.154	-0.086	(0)
	Be (OH) 4-2	5.534e-26	2.501e-26	-25.257	-25.602	-0.345	(0)
Ca	1.308e-02						
	Ca+2	8.148e-03	3.367e-03	-2.089	-2.473	-0.384	(0)
	CaSO4	4.927e-03	4.927e-03	-2.307	-2.307	0.000	(0)
	CaH2PO4+	5.780e-07	4.678e-07	-6.238	-6.330	-0.092	(0)
	CaHPO4	3.335e-08	3.335e-08	-7.477	-7.477	0.000	(0)
	CaNH3+2	2.473e-10	7.105e-11	-9.607	-10.148	-0.542	(0)
	CaH2BO3+	6.864e-11	5.315e-11	-10.163	-10.274	-0.111	(0)
	CaOH+	2.999e-11	2.445e-11	-10.523	-10.612	-0.089	(0)
	CaPO4-	5.524e-12	4.471e-12	-11.258	-11.350	-0.092	(0)
	Ca (NH3) 2+2	1.650e-18	4.741e-19	-17.782	-18.324	-0.542	(0)
	CaNO3+	0.000e+00	0.000e+00	-47.020	-47.155	-0.135	(0)
Cd	7.145e-09						
	Cd+2	2.941e-09	1.215e-09	-8.531	-8.915	-0.384	(0)
	CdSO4	1.800e-09	1.800e-09	-8.745	-8.745	0.000	(0)
	CdCl+	1.743e-09	1.276e-09	-8.759	-8.894	-0.135	(0)
	Cd (SO4) 2-2	6.018e-10	1.729e-10	-9.221	-9.762	-0.542	(0)
	CdCl2	5.809e-11	5.809e-11	-10.236	-10.236	0.000	(0)
	CdCl3-	5.281e-13	3.866e-13	-12.277	-12.413	-0.135	(0)
	CdOHC1	2.630e-14	2.630e-14	-13.580	-13.580	0.000	(0)
	CdOH+	5.116e-15	3.745e-15	-14.291	-14.427	-0.135	(0)
	Cd (OH) 2	1.949e-20	1.949e-20	-19.710	-19.710	0.000	(0)
	Cd2OH+3	4.018e-22	2.427e-23	-21.396	-22.615	-1.219	(0)
	Cd (SeO3) 2-2	1.497e-24	4.299e-25	-23.825	-24.367	-0.542	(0)
	Cd (OH) 3-	9.197e-28	6.733e-28	-27.036	-27.172	-0.135	(0)
	CdSeO4	4.585e-29	4.585e-29	-28.339	-28.339	0.000	(0)
	Cd (OH) 4-2	2.170e-37	6.233e-38	-36.664	-37.205	-0.542	(0)
	CdNO3+	0.000e+00	0.000e+00	-53.416	-53.551	-0.135	(0)
	Cd (NO3) 2	0.000e+00	0.000e+00	-99.113	-99.113	0.000	(0)
Cl	1.388e-02						
	Cl-	1.381e-02	1.107e-02	-1.860	-1.956	-0.096	(0)
	CuCl2-	2.901e-05	2.303e-05	-4.537	-4.638	-0.100	(0)
	CuCl	9.838e-06	9.838e-06	-5.007	-5.007	0.000	(0)
	CuCl+	3.155e-07	2.505e-07	-6.501	-6.601	-0.100	(0)
	CoCl+	1.314e-07	9.622e-08	-6.881	-7.017	-0.135	(0)
	CuCl3-2	1.272e-07	5.345e-08	-6.896	-7.272	-0.377	(0)
	NiCl+	8.541e-08	6.253e-08	-7.068	-7.204	-0.135	(0)
	ZnCl+	6.106e-08	4.847e-08	-7.214	-7.315	-0.100	(0)
	PbCl+	7.318e-09	5.357e-09	-8.136	-8.271	-0.135	(0)
	CdCl+	1.743e-09	1.276e-09	-8.759	-8.894	-0.135	(0)
	BeCl+	1.341e-09	1.079e-09	-8.873	-8.967	-0.094	(0)
	CuCl2	7.510e-10	7.510e-10	-9.124	-9.124	0.000	(0)
	ZnCl2	6.842e-10	6.842e-10	-9.165	-9.165	0.000	(0)
	PbCl2	2.590e-10	2.590e-10	-9.587	-9.587	0.000	(0)
	CdCl2	5.809e-11	5.809e-11	-10.236	-10.236	0.000	(0)
	ZnOHC1	3.725e-11	3.725e-11	-10.429	-10.429	0.000	(0)
	CrCl+2	3.660e-11	1.051e-11	-10.437	-10.978	-0.542	(0)
	ZnCl3-	7.424e-12	5.894e-12	-11.129	-11.230	-0.100	(0)
	NiCl2	3.533e-12	3.533e-12	-11.452	-11.452	0.000	(0)
	PbCl3-	1.647e-12	1.206e-12	-11.783	-11.919	-0.135	(0)
	MnCl+	6.844e-13	5.510e-13	-12.165	-12.259	-0.094	(0)
	CdCl3-	5.281e-13	3.866e-13	-12.277	-12.413	-0.135	(0)
	CuCl3-	8.931e-14	7.090e-14	-13.049	-13.149	-0.100	(0)
	ZnCl4-2	7.457e-14	3.134e-14	-13.127	-13.504	-0.377	(0)
	CdOHC1	2.630e-14	2.630e-14	-13.580	-13.580	0.000	(0)
	PbCl4-2	1.972e-14	5.666e-15	-13.705	-14.247	-0.542	(0)
	CrCl2+	9.684e-15	7.090e-15	-14.014	-14.149	-0.135	(0)
	MnCl2	8.616e-15	8.616e-15	-14.065	-14.065	0.000	(0)
	CrOHC12	6.133e-16	6.133e-16	-15.212	-15.212	0.000	(0)
	FeCl+2	3.353e-17	1.409e-17	-16.475	-16.851	-0.377	(0)
	MnCl3-	3.263e-17	2.627e-17	-16.486	-16.581	-0.094	(0)
	CuCl4-2	1.110e-17	4.663e-18	-16.955	-17.331	-0.377	(0)
	FeCl2+	1.014e-18	8.161e-19	-17.994	-18.088	-0.094	(0)

FeCl3	9.034e-22	9.034e-22	-21.044	-21.044	0.000	(0)
CoCl+2	7.123e-34	2.046e-34	-33.147	-33.689	-0.542	(0)
CrO3Cl-	0.000e+00	0.000e+00	-40.710	-40.845	-0.135	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-43.410	-43.952	-0.542	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-46.364	-46.905	-0.542	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-60.828	-61.370	-0.542	(0)
Co (2)	1.227e-05					
Co+2	8.867e-06	2.547e-06	-5.052	-5.594	-0.542	(0)
CoSO4	3.266e-06	3.266e-06	-5.486	-5.486	0.000	(0)
CoCl+	1.314e-07	9.622e-08	-6.881	-7.017	-0.135	(0)
CoHPO4	5.898e-11	5.898e-11	-10.229	-10.229	0.000	(0)
CoOH+	3.926e-11	2.875e-11	-10.406	-10.541	-0.135	(0)
Co (NH3) +2	2.795e-11	8.028e-12	-10.554	-11.095	-0.542	(0)
Co (OH) 2	1.291e-15	1.291e-15	-14.889	-14.889	0.000	(0)
Co2OH+3	6.075e-17	3.670e-18	-16.216	-17.435	-1.219	(0)
Co (NH3) 2+2	1.278e-17	3.670e-18	-16.894	-17.435	-0.542	(0)
Co (OH) 3-	1.991e-23	1.457e-23	-22.701	-22.836	-0.135	(0)
Co (NH3) 3+2	2.696e-24	7.744e-25	-23.569	-24.111	-0.542	(0)
CoOOH-	8.332e-25	6.100e-25	-24.079	-24.215	-0.135	(0)
CoSeO4	2.382e-25	2.382e-25	-24.623	-24.623	0.000	(0)
Co (NH3) 4+2	2.371e-31	6.812e-32	-30.625	-31.167	-0.542	(0)
Co4 (OH) 4+4	2.001e-32	1.362e-34	-31.699	-33.866	-2.167	(0)
Co (OH) 4-2	4.547e-33	1.306e-33	-32.342	-32.884	-0.542	(0)
Co (NH3) 5+2	6.596e-39	1.895e-39	-38.181	-38.722	-0.542	(0)
CoNO2+	6.432e-39	4.709e-39	-38.192	-38.327	-0.135	(0)
CoNO3+	0.000e+00	0.000e+00	-50.457	-50.593	-0.135	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-95.483	-95.483	0.000	(0)
Co (3)	1.016e-30					
CoOH+2	1.015e-30	2.915e-31	-29.994	-30.535	-0.542	(0)
Co+3	7.406e-34	1.014e-34	-33.130	-33.994	-0.863	(0)
CoCl+2	7.123e-34	2.046e-34	-33.147	-33.689	-0.542	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-46.364	-46.905	-0.542	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-56.587	-56.722	-0.135	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-60.828	-61.370	-0.542	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-63.608	-64.149	-0.542	(0)
Cr (2)	2.863e-20					
Cr+2	2.863e-20	8.225e-21	-19.543	-20.085	-0.542	(0)
Cr (3)	6.372e-08					
Cr (OH) +2	2.648e-08	7.608e-09	-7.577	-8.119	-0.542	(0)
CrSO4+	1.517e-08	1.110e-08	-7.819	-7.955	-0.135	(0)
Cr+3	1.453e-08	8.775e-10	-7.838	-9.057	-1.219	(0)
CrOHSO4	7.084e-09	7.084e-09	-8.150	-8.150	0.000	(0)
Cr (OH) 2+	4.184e-10	3.063e-10	-9.378	-9.514	-0.135	(0)
CrCl+2	3.660e-11	1.051e-11	-10.437	-10.978	-0.542	(0)
CrH2PO4+2	4.340e-12	1.247e-12	-11.363	-11.904	-0.542	(0)
Cr (OH) 3	6.508e-14	6.508e-14	-13.187	-13.187	0.000	(0)
Cr2 (OH) 2SO4+2	9.920e-15	2.850e-15	-14.003	-14.545	-0.542	(0)
CrCl2+	9.684e-15	7.090e-15	-14.014	-14.149	-0.135	(0)
Cr2 (OH) 2 (SO4) 2	1.135e-15	1.135e-15	-14.945	-14.945	0.000	(0)
CrOHC12	6.133e-16	6.133e-16	-15.212	-15.212	0.000	(0)
CrO2-	2.377e-18	1.740e-18	-17.624	-17.759	-0.135	(0)
Cr (OH) 4-	2.001e-18	1.465e-18	-17.699	-17.834	-0.135	(0)
Cr (NH3) 5OH+2	2.208e-37	6.342e-38	-36.656	-37.198	-0.542	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-41.879	-43.098	-1.219	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-43.410	-43.952	-0.542	(0)
CrNO3+2	0.000e+00	0.000e+00	-55.265	-55.807	-0.542	(0)
Cr (6)	1.602e-35					
HCrO4-	1.552e-35	1.136e-35	-34.809	-34.945	-0.135	(0)
CrO4-2	4.843e-37	2.002e-37	-36.315	-36.699	-0.384	(0)
NaCrO4-	1.576e-38	1.154e-38	-37.803	-37.938	-0.135	(0)
KCrO4-	4.899e-39	3.587e-39	-38.310	-38.445	-0.135	(0)
CrO3SO4-2	1.458e-39	4.189e-40	-38.836	-39.378	-0.542	(0)
CrO3HPO4-2	9.462e-40	2.718e-40	-39.024	-39.566	-0.542	(0)
H2CrO4	1.269e-40	1.269e-40	-39.896	-39.896	0.000	(0)
CrO3Cl-	0.000e+00	0.000e+00	-40.710	-40.845	-0.135	(0)
CrO3H2PO4-	0.000e+00	0.000e+00	-41.497	-41.633	-0.135	(0)
Cr2O7-2	0.000e+00	0.000e+00	-67.750	-68.292	-0.542	(0)
Cu (1)	3.994e-05					

CuCl2-	2.901e-05	2.303e-05	-4.537	-4.638	-0.100	(0)
CuCl	9.838e-06	9.838e-06	-5.007	-5.007	0.000	(0)
Cu+	9.642e-07	7.059e-07	-6.016	-6.151	-0.135	(0)
CuCl3-2	1.272e-07	5.345e-08	-6.896	-7.272	-0.377	(0)
Cu (2)	5.880e-05					
Cu+2	3.657e-05	1.511e-05	-4.437	-4.821	-0.384	(0)
CuSO4	2.187e-05	2.187e-05	-4.660	-4.660	0.000	(0)
CuCl+	3.155e-07	2.505e-07	-6.501	-6.601	-0.100	(0)
CuOH+	2.661e-08	2.113e-08	-7.575	-7.675	-0.100	(0)
CuNH3+2	1.481e-08	4.254e-09	-7.829	-8.371	-0.542	(0)
CuCl2	7.510e-10	7.510e-10	-9.124	-9.124	0.000	(0)
Cu2 (OH) 2+2	3.771e-11	1.083e-11	-10.423	-10.965	-0.542	(0)
Cu (OH) 2	3.050e-12	3.050e-12	-11.516	-11.516	0.000	(0)
CuCl3-	8.931e-14	7.090e-14	-13.049	-13.149	-0.100	(0)
CuCl4-2	1.110e-17	4.663e-18	-16.955	-17.331	-0.377	(0)
Cu (OH) 3-	4.834e-18	3.539e-18	-17.316	-17.451	-0.135	(0)
Cu (OH) 4-2	5.483e-26	1.575e-26	-25.261	-25.803	-0.542	(0)
CuNO2+	5.671e-37	4.151e-37	-36.246	-36.382	-0.135	(0)
CuNO3+	0.000e+00	0.000e+00	-49.372	-49.507	-0.135	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-68.953	-68.953	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-95.618	-95.618	0.000	(0)
Fe (2)	3.595e-07					
Fe+2	2.482e-07	7.129e-08	-6.605	-7.147	-0.542	(0)
FeSO4	1.111e-07	1.111e-07	-6.954	-6.954	0.000	(0)
FeH2PO4+	2.629e-10	2.127e-10	-9.580	-9.672	-0.092	(0)
FeHPO4	6.024e-12	6.024e-12	-11.220	-11.220	0.000	(0)
FeOH+	1.358e-12	1.093e-12	-11.867	-11.961	-0.094	(0)
Fe (OH) 2	3.167e-19	3.167e-19	-18.499	-18.499	0.000	(0)
Fe (OH) 3-	6.712e-23	5.404e-23	-22.173	-22.267	-0.094	(0)
Fe (3)	4.953e-12					
Fe (OH) 2+	4.901e-12	3.967e-12	-11.310	-11.402	-0.092	(0)
FeOH+2	3.218e-14	1.352e-14	-13.492	-13.869	-0.377	(0)
FeHPO4+	1.320e-14	1.068e-14	-13.880	-13.971	-0.092	(0)
FeSO4+	3.885e-15	3.128e-15	-14.411	-14.505	-0.094	(0)
Fe (OH) 3	1.180e-15	1.180e-15	-14.928	-14.928	0.000	(0)
Fe (SO4) 2-	6.376e-16	4.668e-16	-15.195	-15.331	-0.135	(0)
Fe+3	3.605e-16	4.937e-17	-15.443	-16.307	-0.863	(0)
FeCl+2	3.353e-17	1.409e-17	-16.475	-16.851	-0.377	(0)
FeH2PO4+2	1.301e-17	5.582e-18	-16.886	-17.253	-0.368	(0)
FeCl2+	1.014e-18	8.161e-19	-17.994	-18.088	-0.094	(0)
Fe (OH) 4-	1.568e-19	1.269e-19	-18.805	-18.897	-0.092	(0)
FeHSeO3+2	3.538e-20	1.016e-20	-19.451	-19.993	-0.542	(0)
FeCl3	9.034e-22	9.034e-22	-21.044	-21.044	0.000	(0)
Fe2 (OH) 2+4	1.063e-24	7.240e-27	-23.973	-26.140	-2.167	(0)
Fe3 (OH) 4+5	9.574e-34	3.939e-37	-33.019	-36.405	-3.386	(0)
FeNO3+2	0.000e+00	0.000e+00	-59.853	-60.395	-0.542	(0)
H (0)	4.633e-21					
H2	2.316e-21	2.355e-21	-20.635	-20.628	0.007	(0)
K	6.291e-03					
K+	6.016e-03	4.823e-03	-2.221	-2.317	-0.096	(0)
KSO4-	2.751e-04	2.226e-04	-3.560	-3.652	-0.092	(0)
KHPO4-	9.595e-10	7.766e-10	-9.018	-9.110	-0.092	(0)
KCrO4-	4.899e-39	3.587e-39	-38.310	-38.445	-0.135	(0)
Mg	3.635e-03					
Mg+2	2.448e-03	1.012e-03	-2.611	-2.995	-0.384	(0)
MgSO4	1.186e-03	1.186e-03	-2.926	-2.926	0.000	(0)
MgH2PO4+	3.706e-07	2.999e-07	-6.431	-6.523	-0.092	(0)
MgHPO4	1.383e-08	1.383e-08	-7.859	-7.859	0.000	(0)
MgOH+	1.742e-10	1.429e-10	-9.759	-9.845	-0.086	(0)
MgH2BO3+	1.277e-11	9.891e-12	-10.894	-11.005	-0.111	(0)
MgPO4-	2.594e-14	2.100e-14	-13.586	-13.678	-0.092	(0)
Mn (2)	1.827e-10					
Mn+2	1.376e-10	3.954e-11	-9.861	-10.403	-0.542	(0)
MnSO4	4.441e-11	4.441e-11	-10.352	-10.352	0.000	(0)
MnCl+	6.844e-13	5.510e-13	-12.165	-12.259	-0.094	(0)
MnCl2	8.616e-15	8.616e-15	-14.065	-14.065	0.000	(0)
MnOH+	4.752e-17	3.826e-17	-16.323	-16.417	-0.094	(0)
MnCl3-	3.263e-17	2.627e-17	-16.486	-16.581	-0.094	(0)

MnSe	1.949e-26	1.949e-26	-25.710	-25.710	0.000	(0)
MnSeO4	1.958e-30	1.958e-30	-29.708	-29.708	0.000	(0)
Mn (OH) 3-	1.379e-31	1.110e-31	-30.860	-30.955	-0.094	(0)
Mn (OH) 4-2	4.825e-40	2.028e-40	-39.317	-39.693	-0.377	(0)
MnNO3+	0.000e+00	0.000e+00	-55.266	-55.402	-0.135	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-100.196	-100.196	0.000	(0)
Mn (3)	6.143e-32					
Mn+3	6.143e-32	8.412e-33	-31.212	-32.075	-0.863	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-76.575	-76.952	-0.377	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-82.550	-82.657	-0.107	(0)
Mo	1.151e-06					
MoO4-2	9.618e-07	3.975e-07	-6.017	-6.401	-0.384	(0)
HMoO4-	1.674e-07	1.226e-07	-6.776	-6.912	-0.135	(0)
H2MoO4	2.191e-08	2.191e-08	-7.659	-7.659	0.000	(0)
AlMo6O21-3	9.100e-22	5.498e-23	-21.041	-22.260	-1.219	(0)
HMo7O24-5	7.260e-25	2.987e-28	-24.139	-27.525	-3.386	(0)
Mo7O24-6	5.543e-25	7.385e-30	-24.256	-29.132	-4.875	(0)
H2Mo7O24-4	4.628e-26	3.151e-28	-25.335	-27.502	-2.167	(0)
H3Mo7O24-3	1.657e-28	1.001e-29	-27.781	-29.000	-1.219	(0)
N (-3)	7.218e-04					
NH4+	6.751e-04	5.228e-04	-3.171	-3.282	-0.111	(0)
NH4SO4-	4.666e-05	3.757e-05	-4.331	-4.425	-0.094	(0)
CuNH3+2	1.481e-08	4.254e-09	-7.829	-8.371	-0.542	(0)
NH3	1.172e-08	1.172e-08	-7.931	-7.931	0.000	(0)
CaNH3+2	2.473e-10	7.105e-11	-9.607	-10.148	-0.542	(0)
NiNH3+2	1.112e-10	3.194e-11	-9.954	-10.496	-0.542	(0)
Co (NH3) +2	2.795e-11	8.028e-12	-10.554	-11.095	-0.542	(0)
BaNH3+2	4.449e-15	1.278e-15	-14.352	-14.893	-0.542	(0)
Ni (NH3) 2+2	3.662e-16	1.052e-16	-15.436	-15.978	-0.542	(0)
Co (NH3) 2+2	1.278e-17	3.670e-18	-16.894	-17.435	-0.542	(0)
Ca (NH3) 2+2	1.650e-18	4.741e-19	-17.782	-18.324	-0.542	(0)
Co (NH3) 3+2	2.696e-24	7.744e-25	-23.569	-24.111	-0.542	(0)
Co (NH3) 4+2	2.371e-31	6.812e-32	-30.625	-31.167	-0.542	(0)
Cr (NH3) 5OH+2	2.208e-37	6.342e-38	-36.656	-37.198	-0.542	(0)
Co (NH3) 5+2	6.596e-39	1.895e-39	-38.181	-38.722	-0.542	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-41.879	-43.098	-1.219	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-43.410	-43.952	-0.542	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-46.364	-46.905	-0.542	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-56.587	-56.722	-0.135	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-60.828	-61.370	-0.542	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-63.608	-64.149	-0.542	(0)
N (3)	3.363e-34					
NO2-	3.358e-34	2.623e-34	-33.474	-33.581	-0.107	(0)
CuNO2+	5.671e-37	4.151e-37	-36.246	-36.382	-0.135	(0)
CoNO2+	6.432e-39	4.709e-39	-38.192	-38.327	-0.135	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-68.953	-68.953	0.000	(0)
N (5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-45.103	-45.199	-0.096	(0)
CaNO3+	0.000e+00	0.000e+00	-47.020	-47.155	-0.135	(0)
CuNO3+	0.000e+00	0.000e+00	-49.372	-49.507	-0.135	(0)
NiNO3+	0.000e+00	0.000e+00	-50.313	-50.449	-0.135	(0)
ZnNO3+	0.000e+00	0.000e+00	-50.392	-50.528	-0.135	(0)
CoNO3+	0.000e+00	0.000e+00	-50.457	-50.593	-0.135	(0)
BaNO3+	0.000e+00	0.000e+00	-51.242	-51.378	-0.135	(0)
PbNO3+	0.000e+00	0.000e+00	-51.739	-51.874	-0.135	(0)
CdNO3+	0.000e+00	0.000e+00	-53.416	-53.551	-0.135	(0)
CrNO3+2	0.000e+00	0.000e+00	-55.265	-55.807	-0.542	(0)
MnNO3+	0.000e+00	0.000e+00	-55.266	-55.402	-0.135	(0)
FeNO3+2	0.000e+00	0.000e+00	-59.853	-60.395	-0.542	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-95.483	-95.483	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-95.618	-95.618	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-96.440	-96.440	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-96.817	-96.817	0.000	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-99.113	-99.113	0.000	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-100.196	-100.196	0.000	(0)
Na	1.498e-02					

Na+	1.447e-02	1.160e-02	-1.840	-1.936	-0.096	(0)
NaSO4-	5.126e-04	4.149e-04	-3.290	-3.382	-0.092	(0)
NaHPO4-	3.574e-09	2.892e-09	-8.447	-8.539	-0.092	(0)
NaH2BO3	5.668e-12	5.668e-12	-11.247	-11.247	0.000	(0)
NaCrO4-	1.576e-38	1.154e-38	-37.803	-37.938	-0.135	(0)
Ni	8.382e-06					
Ni+2	5.416e-06	2.238e-06	-5.266	-5.650	-0.384	(0)
NiSO4	2.878e-06	2.878e-06	-5.541	-5.541	0.000	(0)
NiCl+	8.541e-08	6.253e-08	-7.068	-7.204	-0.135	(0)
Ni (SO4) 2-2	2.315e-09	6.652e-10	-8.635	-9.177	-0.542	(0)
NiNH3+2	1.112e-10	3.194e-11	-9.954	-10.496	-0.542	(0)
NiOH+	1.524e-11	1.116e-11	-10.817	-10.952	-0.135	(0)
NiCl2	3.533e-12	3.533e-12	-11.452	-11.452	0.000	(0)
Ni (OH) 2	7.160e-16	7.160e-16	-15.145	-15.145	0.000	(0)
Ni (NH3) 2+2	3.662e-16	1.052e-16	-15.436	-15.978	-0.542	(0)
Ni (OH) 3-	5.531e-22	4.049e-22	-21.257	-21.393	-0.135	(0)
NiSeO4	1.926e-25	1.926e-25	-24.715	-24.715	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-50.313	-50.449	-0.135	(0)
O (0)	0.000e+00					
O2	0.000e+00	0.000e+00	-52.441	-52.434	0.007	(0)
P	9.400e-06					
H2PO4-	8.327e-06	6.739e-06	-5.080	-5.171	-0.092	(0)
CaH2PO4+	5.780e-07	4.678e-07	-6.238	-6.330	-0.092	(0)
MgH2PO4+	3.706e-07	2.999e-07	-6.431	-6.523	-0.092	(0)
HPO4-2	5.600e-08	2.353e-08	-7.252	-7.628	-0.377	(0)
CaHPO4	3.335e-08	3.335e-08	-7.477	-7.477	0.000	(0)
H3PO4	1.596e-08	1.596e-08	-7.797	-7.797	0.000	(0)
MgHPO4	1.383e-08	1.383e-08	-7.859	-7.859	0.000	(0)
NaHPO4-	3.574e-09	2.892e-09	-8.447	-8.539	-0.092	(0)
KHPO4-	9.595e-10	7.766e-10	-9.018	-9.110	-0.092	(0)
FeH2PO4+	2.629e-10	2.127e-10	-9.580	-9.672	-0.092	(0)
CoHPO4	5.898e-11	5.898e-11	-10.229	-10.229	0.000	(0)
FeHPO4	6.024e-12	6.024e-12	-11.220	-11.220	0.000	(0)
CaPO4-	5.524e-12	4.471e-12	-11.258	-11.350	-0.092	(0)
CrH2PO4+2	4.340e-12	1.247e-12	-11.363	-11.904	-0.542	(0)
MgPO4-	2.594e-14	2.100e-14	-13.586	-13.678	-0.092	(0)
FeHPO4+	1.320e-14	1.068e-14	-13.880	-13.971	-0.092	(0)
PO4-3	3.676e-15	5.033e-16	-14.435	-15.298	-0.863	(0)
FeH2PO4+2	1.301e-17	5.582e-18	-16.886	-17.253	-0.368	(0)
CrO3HPO4-2	9.462e-40	2.718e-40	-39.024	-39.566	-0.542	(0)
CrO3H2PO4-	0.000e+00	0.000e+00	-41.497	-41.633	-0.135	(0)
Pb	9.691e-08					
PbSO4	4.757e-08	4.757e-08	-7.323	-7.323	0.000	(0)
Pb+2	3.504e-08	1.448e-08	-7.455	-7.839	-0.384	(0)
PbCl+	7.318e-09	5.357e-09	-8.136	-8.271	-0.135	(0)
Pb (SO4) 2-2	6.692e-09	1.922e-09	-8.174	-8.716	-0.542	(0)
PbCl2	2.590e-10	2.590e-10	-9.587	-9.587	0.000	(0)
PbOH+	2.810e-11	2.057e-11	-10.551	-10.687	-0.135	(0)
PbCl3-	1.647e-12	1.206e-12	-11.783	-11.919	-0.135	(0)
PbCl4-2	1.972e-14	5.666e-15	-13.705	-14.247	-0.542	(0)
Pb (OH) 2	3.679e-16	3.679e-16	-15.434	-15.434	0.000	(0)
Pb2OH+3	7.815e-17	4.722e-18	-16.107	-17.326	-1.219	(0)
Pb (OH) 3-	2.842e-22	2.081e-22	-21.546	-21.682	-0.135	(0)
Pb (OH) 4-2	1.003e-28	2.882e-29	-27.999	-28.540	-0.542	(0)
Pb3 (OH) 4+2	6.162e-29	1.770e-29	-28.210	-28.752	-0.542	(0)
Pb4 (OH) 4+4	3.600e-31	2.452e-33	-30.444	-32.611	-2.167	(0)
PbNO3+	0.000e+00	0.000e+00	-51.739	-51.874	-0.135	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-96.817	-96.817	0.000	(0)
S (6)	2.322e-02					
SO4-2	1.623e-02	6.707e-03	-1.790	-2.173	-0.384	(0)
CaSO4	4.927e-03	4.927e-03	-2.307	-2.307	0.000	(0)
MgSO4	1.186e-03	1.186e-03	-2.926	-2.926	0.000	(0)
NaSO4-	5.126e-04	4.149e-04	-3.290	-3.382	-0.092	(0)
KSO4-	2.751e-04	2.226e-04	-3.560	-3.652	-0.092	(0)
NH4SO4-	4.666e-05	3.757e-05	-4.331	-4.425	-0.094	(0)
CuSO4	2.187e-05	2.187e-05	-4.660	-4.660	0.000	(0)
HSO4-	1.253e-05	1.002e-05	-4.902	-4.999	-0.097	(0)
CoSO4	3.266e-06	3.266e-06	-5.486	-5.486	0.000	(0)

NiSO4	2.878e-06	2.878e-06	-5.541	-5.541	0.000	(0)
ZnSO4	2.544e-06	2.544e-06	-5.595	-5.595	0.000	(0)
Zn (SO4) 2-2	5.398e-07	1.551e-07	-6.268	-6.810	-0.542	(0)
FeSO4	1.111e-07	1.111e-07	-6.954	-6.954	0.000	(0)
BeSO4	5.224e-08	5.224e-08	-7.282	-7.282	0.000	(0)
PbSO4	4.757e-08	4.757e-08	-7.323	-7.323	0.000	(0)
CrSO4+	1.517e-08	1.110e-08	-7.819	-7.955	-0.135	(0)
CrOHSO4	7.084e-09	7.084e-09	-8.150	-8.150	0.000	(0)
Pb (SO4) 2-2	6.692e-09	1.922e-09	-8.174	-8.716	-0.542	(0)
Be (SO4) 2-2	3.792e-09	1.089e-09	-8.421	-8.963	-0.542	(0)
AlSO4+	2.401e-09	1.920e-09	-8.620	-8.717	-0.097	(0)
Ni (SO4) 2-2	2.315e-09	6.652e-10	-8.635	-9.177	-0.542	(0)
CdSO4	1.800e-09	1.800e-09	-8.745	-8.745	0.000	(0)
Cd (SO4) 2-2	6.018e-10	1.729e-10	-9.221	-9.762	-0.542	(0)
Al (SO4) 2-	1.927e-10	1.541e-10	-9.715	-9.812	-0.097	(0)
MnSO4	4.441e-11	4.441e-11	-10.352	-10.352	0.000	(0)
Cr2 (OH) 2SO4+2	9.920e-15	2.850e-15	-14.003	-14.545	-0.542	(0)
FeSO4+	3.885e-15	3.128e-15	-14.411	-14.505	-0.094	(0)
Cr2 (OH) 2 (SO4) 2	1.135e-15	1.135e-15	-14.945	-14.945	0.000	(0)
Fe (SO4) 2-	6.376e-16	4.668e-16	-15.195	-15.331	-0.135	(0)
CrO3SO4-2	1.458e-39	4.189e-40	-38.836	-39.378	-0.542	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-56.587	-56.722	-0.135	(0)
Se (-2)	3.193e-15					
HSe-	2.906e-15	2.127e-15	-14.537	-14.672	-0.135	(0)
H2Se	2.871e-16	2.871e-16	-15.542	-15.542	0.000	(0)
Se-2	2.991e-25	8.592e-26	-24.524	-25.066	-0.542	(0)
MnSe	1.949e-26	1.949e-26	-25.710	-25.710	0.000	(0)
Se (4)	1.271e-07					
HSeO3-	1.264e-07	9.254e-08	-6.898	-7.034	-0.135	(0)
H2SeO3	6.727e-10	6.727e-10	-9.172	-9.172	0.000	(0)
SeO3-2	6.967e-11	2.001e-11	-10.157	-10.699	-0.542	(0)
FeHSeO3+2	3.538e-20	1.016e-20	-19.451	-19.993	-0.542	(0)
Cd (SeO3) 2-2	1.497e-24	4.299e-25	-23.825	-24.367	-0.542	(0)
Se (6)	4.909e-22					
SeO4-2	4.902e-22	2.026e-22	-21.310	-21.693	-0.384	(0)
CoSeO4	2.382e-25	2.382e-25	-24.623	-24.623	0.000	(0)
HSeO4-	2.105e-25	1.541e-25	-24.677	-24.812	-0.135	(0)
NiSeO4	1.926e-25	1.926e-25	-24.715	-24.715	0.000	(0)
ZnSeO4	5.677e-26	5.677e-26	-25.246	-25.246	0.000	(0)
CdSeO4	4.585e-29	4.585e-29	-28.339	-28.339	0.000	(0)
MnSeO4	1.958e-30	1.958e-30	-29.708	-29.708	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-46.392	-46.933	-0.542	(0)
Zn	7.523e-06					
Zn+2	4.378e-06	1.809e-06	-5.359	-5.743	-0.384	(0)
ZnSO4	2.544e-06	2.544e-06	-5.595	-5.595	0.000	(0)
Zn (SO4) 2-2	5.398e-07	1.551e-07	-6.268	-6.810	-0.542	(0)
ZnCl+	6.106e-08	4.847e-08	-7.214	-7.315	-0.100	(0)
ZnCl2	6.842e-10	6.842e-10	-9.165	-9.165	0.000	(0)
ZnOH+	9.520e-11	6.970e-11	-10.021	-10.157	-0.135	(0)
ZnOHC1	3.725e-11	3.725e-11	-10.429	-10.429	0.000	(0)
ZnCl3-	7.424e-12	5.894e-12	-11.129	-11.230	-0.100	(0)
ZnCl4-2	7.457e-14	3.134e-14	-13.127	-13.504	-0.377	(0)
Zn (OH) 2	9.172e-15	9.172e-15	-14.038	-14.038	0.000	(0)
Zn (OH) 3-	3.551e-20	2.600e-20	-19.450	-19.585	-0.135	(0)
ZnSeO4	5.677e-26	5.677e-26	-25.246	-25.246	0.000	(0)
Zn (OH) 4-2	2.038e-27	5.854e-28	-26.691	-27.233	-0.542	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-46.392	-46.933	-0.542	(0)
ZnNO3+	0.000e+00	0.000e+00	-50.392	-50.528	-0.135	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-96.440	-96.440	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2	-125.28	-119.01	6.27	(Co (NH3) 5Cl) (NO3) 2
(Co (NH3) 5Cl) Cl2	-37.06	-32.52	4.54	(Co (NH3) 5Cl) Cl2
(Co (NH3) 5OH2) Cl3	-44.33	-32.52	11.81	(Co (NH3) 5OH2) Cl3
(Co (NH3) 6) (NO3) 3	-178.71	-160.78	17.93	(Co (NH3) 6) (NO3) 3

(Co (NH3) 6) Cl3	-51.18	-31.05	20.13	(Co (NH3) 6) Cl3
(NH4) 2CrO4	-43.64	-43.26	0.38	(NH4) 2CrO4
(NH4) 2SeO4	-28.71	-28.26	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	-7.23	3.90	11.13	Al (OH) 3
Al2 (MoO4) 3	-43.05	-39.90	3.15	Al2 (MoO4) 3
Al2O3	-12.63	7.80	20.43	Al2O3
Al4 (OH) 10SO4	-18.78	3.92	22.70	Al4 (OH) 10SO4
AlAsO4:2H2O	-11.20	-6.40	4.80	AlAsO4:2H2O
AlOHSO4	-4.54	-7.77	-3.23	AlOHSO4
Alunite	-8.44	-9.22	-0.77	KAl3 (SO4) 2 (OH) 6
Anglesite	-2.19	-10.01	-7.83	PbSO4
Anhydrite	-0.31	-4.65	-4.34	CaSO4
Antlerite	-6.43	2.36	8.79	Cu3 (OH) 4SO4
Arsenolite	-31.15	-34.09	-2.94	As4O6
As2O5	-27.37	-20.59	6.77	As2O5
Atacamite	-5.02	2.65	7.67	Cu2 (OH) 3Cl
Ba (OH) 2:8H2O	-21.98	2.58	24.56	Ba (OH) 2:8H2O
Ba3 (AsO4) 2	-3.91	-12.85	-8.94	Ba3 (AsO4) 2
BaCrO4	-33.85	-43.62	-9.77	BaCrO4
BaHPO4	-7.19	-26.97	-19.77	BaHPO4
BaMoO4	-6.33	-13.32	-6.99	BaMoO4
Barite	0.96	-9.09	-10.05	BaSO4
BaSeO3	-11.00	-9.20	1.79	BaSeO3
BaSeO4	-21.09	-28.61	-7.53	BaSeO4
Be (OH) 2 (alpha)	-4.61	2.29	6.89	Be (OH) 2
Be (OH) 2 (am)	-4.91	2.29	7.19	Be (OH) 2
Be (OH) 2 (beta)	-4.21	2.29	6.49	Be (OH) 2
BeMoO4	-12.00	-13.61	-1.61	BeMoO4
BeSeO4:4H2O	-25.97	-28.91	-2.94	BeSeO4:4H2O
Bianchite	-6.16	-7.92	-1.76	ZnSO4:6H2O
Birnessite	-27.17	-9.08	18.09	MnO2
Bixbyite	-35.38	-35.65	-0.27	Mn2O3
Boehmite	-5.03	3.90	8.93	AlOOH
Brochantite	-8.79	7.04	15.83	Cu4 (OH) 6SO4
Brucite	-10.68	6.50	17.18	Mg (OH) 2
Bunsenite	-8.90	3.85	12.74	NiO
Ca3 (AsO4) 2:4H2O	-21.82	0.48	22.30	Ca3 (AsO4) 2:4H2O
Ca3 (PO4) 2 (beta)	-8.93	-38.01	-29.08	Ca3 (PO4) 2
Ca4H (PO4) 3:3H2O	-13.46	-60.54	-47.08	Ca4H (PO4) 3:3H2O
CaCrO4	-36.99	-39.17	-2.19	CaCrO4
CaHPO4	-3.15	-22.52	-19.37	CaHPO4
CaHPO4:2H2O	-3.46	-22.52	-19.06	CaHPO4:2H2O
CaMoO4	-0.93	-8.87	-7.94	CaMoO4
CaSeO3:2H2O	-7.63	-4.76	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-21.17	-24.17	-3.00	CaSeO4:2H2O
Cd (BO2) 2	-19.30	-9.46	9.84	Cd (BO2) 2
Cd (OH) 2	-13.34	0.58	13.93	Cd (OH) 2
Cd (OH) 2 (am)	-13.41	0.58	13.99	Cd (OH) 2
Cd3 (OH) 2 (SO4) 2	-28.30	-21.59	6.71	Cd3 (OH) 2 (SO4) 2
Cd3 (OH) 4SO4	-32.48	-9.92	22.56	Cd3 (OH) 4SO4
Cd3 (PO4) 2	-24.74	-57.34	-32.60	Cd3 (PO4) 2
Cd4 (OH) 6SO4	-37.74	-9.34	28.40	Cd4 (OH) 6SO4
CdCl2	-12.22	-12.83	-0.60	CdCl2
CdCl2:1H2O	-11.16	-12.83	-1.67	CdCl2:1H2O
CdCl2:2.5H2O	-10.89	-12.83	-1.93	CdCl2:2.5H2O
Cdmetal (alpha)	-30.66	-16.92	13.74	Cd
Cdmetal (gamma)	-30.76	-16.92	13.84	Cd
CdMoO4	-1.11	-15.32	-14.21	CdMoO4
CdOHCl	-9.75	-6.12	3.63	CdOHCl
CdSe	1.59	-18.84	-20.43	CdSe
CdSeO4:2H2O	-28.76	-30.61	-1.85	CdSeO4:2H2O
CdSO4	-11.07	-11.09	-0.02	CdSO4
CdSO4:1H2O	-9.46	-11.09	-1.63	CdSO4:1H2O
CdSO4:2.67H2O	-9.27	-11.09	-1.82	CdSO4:2.67H2O
Chalcanthite	-4.34	-7.00	-2.66	CuSO4:5H2O
Claudetite	-30.86	-34.09	-3.23	As4O6
Clausthalite	9.70	-17.76	-27.46	PbSe
Co (BO2) 2	-33.21	-6.14	27.07	Co (BO2) 2

Co (OH) 2	-9.19	3.91	13.09	Co (OH) 2
Co (OH) 3	-17.71	-19.75	-2.03	Co (OH) 3
Co3 (AsO4) 2	-21.91	-8.88	13.03	Co3 (AsO4) 2
Co3 (PO4) 2	-12.69	-47.38	-34.69	Co3 (PO4) 2
Co3O4	-25.41	-35.58	-10.17	Co3O4
CoCl2	-18.01	-9.51	8.51	CoCl2
CoCl2:6H2O	-12.02	-9.51	2.51	CoCl2:6H2O
CoFe2O4	2.84	-0.21	-3.05	CoFe2O4
CoHPO4	-6.58	-25.64	-19.06	CoHPO4
CoMoO4	-4.30	-11.99	-7.69	CoMoO4
CoO	-10.00	3.91	13.90	CoO
CoSe	0.68	-15.52	-16.20	CoSe
CoSeO3	-9.20	-7.88	1.32	CoSeO3
CoSeO4:6H2O	-25.76	-27.29	-1.53	CoSeO4:6H2O
CoSO4	-10.81	-7.77	3.04	CoSO4
CoSO4:6H2O	-5.29	-7.77	-2.48	CoSO4:6H2O
Cotunnite	-6.89	-11.75	-4.86	PbCl2
Cr (OH) 2	-21.51	-10.59	10.93	Cr (OH) 2
Cr (OH) 3	-6.19	-4.76	1.42	Cr (OH) 3
Cr (OH) 3 (am)	-4.01	-4.76	-0.75	Cr (OH) 3
Cr2O3	-7.32	-9.53	-2.21	Cr2O3
CrCl2	-38.42	-24.00	14.42	CrCl2
CrCl3	-40.36	-24.88	15.48	CrCl3
Crmetal	-59.08	-28.08	31.00	Cr
CrO3	-43.00	-46.20	-3.19	CrO3
Cu (OH) 2	-4.16	4.68	8.84	Cu (OH) 2
Cu2 (OH) 3NO3	-50.06	-40.59	9.47	Cu2 (OH) 3NO3
Cu2Se (alpha)	24.22	-22.22	-46.44	Cu2Se
Cu2SO4	-12.58	-14.48	-1.89	Cu2SO4
Cu3 (AsO4) 2:2H2O	-12.66	-6.56	6.10	Cu3 (AsO4) 2:2H2O
Cu3 (PO4) 2	-8.21	-45.06	-36.85	Cu3 (PO4) 2
Cu3 (PO4) 2:3H2O	-9.94	-45.06	-35.12	Cu3 (PO4) 2:3H2O
Cu3Se2	27.54	-36.97	-64.51	Cu3Se2
CuCrO4	-36.08	-41.52	-5.44	CuCrO4
Cumetal	-1.18	-10.15	-8.97	Cu
CuMoO4	1.89	-11.22	-13.11	CuMoO4
CuOCuSO4	-13.03	-2.32	10.71	CuOCuSO4
Cupricferrite	-6.05	0.56	6.62	CuFe2O4
Cuprite	-1.77	-2.80	-1.04	Cu2O
Cuprousferrite	5.41	-3.46	-8.87	CuFeO2
CuSe	18.72	-14.74	-33.46	CuSe
CuSe2	17.12	-16.66	-33.79	CuSe2
CuSeO3:2H2O	-7.73	-7.11	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-24.08	-26.52	-2.44	CuSeO4:5H2O
CuSO4	-10.15	-6.99	3.16	CuSO4
Diaspore	-3.28	3.90	7.18	AlOOH
Epsomite	-3.01	-5.17	-2.16	MgSO4:7H2O
Fe (OH) 2	-11.21	2.35	13.56	Fe (OH) 2
Fe (OH) 2.7Cl.3	-1.03	-4.07	-3.04	Fe (OH) 2.7Cl.3
Fe2 (OH) 4SeO3	-17.45	-15.90	1.55	Fe2 (OH) 4SeO3
Fe2 (SeO3) 3:2H2O	-18.84	-39.47	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-36.12	-39.13	-3.01	Fe2 (SO4) 3
Fe3 (OH) 8	-21.99	-1.76	20.22	Fe3 (OH) 8
FeAsO4:2H2O	-12.76	-12.36	0.40	FeAsO4:2H2O
FeCr2O4	-14.79	-7.17	7.62	FeCr2O4
FeMoO4	-3.49	-13.55	-10.06	FeMoO4
Ferrihydrite	-5.47	-2.06	3.41	Fe (OH) 3
Ferroselite	-0.25	-18.99	-18.74	FeSe2
FeSe	-6.06	-17.07	-11.01	FeSe
Gibbsite	-4.68	3.90	8.58	Al (OH) 3
Goethite	-2.73	-2.06	0.67	FeOOH
Goslarite	-5.87	-7.92	-2.05	ZnSO4:7H2O
Gypsum	-0.03	-4.65	-4.61	CaSO4:2H2O
H-Jarosite	-18.11	-29.52	-11.41	(H3O) Fe3 (SO4) 2 (OH) 6
H2MoO4	-2.88	-15.90	-13.02	H2MoO4
H2Se (g)	-14.51	-19.42	-4.91	H2Se
Halite	-5.48	-3.89	1.59	NaCl
Hausmannite	-47.50	14.79	62.29	Mn3O4

Hematite	-3.08	-4.11	-1.03	Fe2O3
Hercynite	-13.68	10.15	23.83	FeAl2O4
Hinsdalite	-25.36	-27.86	-2.50	PbAl3PO4SO4 (OH) 6
Hydroxylapatite	-9.18	-53.51	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-17.55	-80.34	-62.79	Pb5 (PO4) 3OH
K-Alum	-11.76	-17.02	-5.26	KAl (SO4) 2:12H2O
K-Jarosite	-12.68	-27.09	-14.41	KFe3 (SO4) 2 (OH) 6
K2Cr2O7	-70.05	-87.53	-17.48	K2Cr2O7
K2CrO4	-40.76	-41.33	-0.57	K2CrO4
K2MoO4	-14.31	-11.03	3.27	K2MoO4
K2SeO4	-25.60	-26.33	-0.73	K2SeO4
Langite	-10.94	7.04	17.98	Cu4 (OH) 6SO4:H2O
Larnakite	-7.98	-8.35	-0.37	PbO:PbSO4
Laurionite	-5.67	-5.05	0.62	PbOHCl
Lepidocrocite	-3.43	-2.06	1.37	FeOOH
Lime	-26.25	7.03	33.28	CaO
Litharge	-11.23	1.66	12.89	PbO
Maghemite	-10.50	-4.11	6.39	Fe2O3
Magnesioferrite	-15.30	2.39	17.69	Fe2MgO4
Magnetite	-5.79	-1.76	4.03	Fe3O4
Manganite	-17.49	7.85	25.34	MnOOH
Massicot	-11.43	1.66	13.09	PbO
Melanothallite	-15.18	-8.73	6.45	CuCl2
Melanterite	-7.05	-9.32	-2.27	FeSO4:7H2O
Mg (OH) 2 (active)	-12.29	6.50	18.79	Mg (OH) 2
Mg3 (PO4) 2	-16.30	-39.58	-23.28	Mg3 (PO4) 2
MgCr2O4	-19.76	-3.02	16.74	MgCr2O4
MgCrO4	-45.34	-39.69	5.65	MgCrO4
MgHPO4:3H2O	-4.87	-23.04	-18.18	MgHPO4:3H2O
MgMoO4	-7.55	-9.40	-1.85	MgMoO4
MgSeO3:6H2O	-8.32	-5.28	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-23.49	-24.69	-1.20	MgSeO4:6H2O
Minium	-52.30	22.48	74.78	Pb3O4
Mirabilite	-4.70	-6.05	-1.35	Na2SO4:10H2O
Mn2 (SO4) 3	-65.45	-70.67	-5.22	Mn2 (SO4) 3
Mn3 (AsO4) 2:8H2O	-35.81	-23.31	12.50	Mn3 (AsO4) 2:8H2O
Mn3 (PO4) 2	-37.95	-61.81	-23.85	Mn3 (PO4) 2
MnCl2:4H2O	-17.06	-14.32	2.75	MnCl2:4H2O
MnHPO4	-5.05	-30.45	-25.40	MnHPO4
MnSe	-24.12	-20.33	3.79	MnSe
MnSeO3	-13.82	-12.69	1.13	MnSeO3
MnSeO3:2H2O	-13.64	-12.69	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-30.05	-32.10	-2.05	MnSeO4:5H2O
MnSO4	-15.35	-12.58	2.78	MnSO4
Monteponite	-14.83	0.58	15.41	CdO
MoO3	-7.90	-15.90	-8.00	MoO3
Morenosite	-5.65	-7.83	-2.18	NiSO4:7H2O
Na-Jarosite	-15.96	-26.71	-10.75	NaFe3 (SO4) 2 (OH) 6
Na2Cr2O7	-76.81	-86.77	-9.96	Na2Cr2O7
Na2CrO4	-43.56	-40.57	2.99	Na2CrO4
Na2Mo2O7	-9.41	-26.17	-16.76	Na2Mo2O7
Na2MoO4	-11.79	-10.27	1.52	Na2MoO4
Na2MoO4:2H2O	-11.50	-10.27	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-16.46	-6.16	10.30	Na2SeO3:5H2O
Na2SeO4	-26.84	-25.56	1.28	Na2SeO4
Nantokite	-1.25	-8.11	-6.86	CuCl
Ni (OH) 2	-9.23	3.85	13.08	Ni (OH) 2
Ni3 (AsO4) 2:8H2O	-24.75	-9.05	15.70	Ni3 (AsO4) 2:8H2O
Ni3 (PO4) 2	-16.25	-47.55	-31.30	Ni3 (PO4) 2
Ni4 (OH) 6SO4	-28.28	3.72	32.00	Ni4 (OH) 6SO4
NiMoO4	-0.90	-12.05	-11.15	NiMoO4
NiSe	2.13	-15.57	-17.70	NiSe
NiSeO3:2H2O	-10.84	-7.93	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-25.83	-27.35	-1.52	NiSeO4:6H2O
Nsutite	-26.58	-9.08	17.50	MnO2
O2 (g)	-49.80	35.00	84.80	O2
Pb (BO2) 2	-14.95	-8.39	6.57	Pb (BO2) 2
Pb (OH) 2	-6.67	1.66	8.32	Pb (OH) 2

Pb2 (OH) 3Cl	-12.18	-3.39	8.79	Pb2 (OH) 3Cl
Pb2O (OH) 2	-22.87	3.32	26.19	Pb2O (OH) 2
Pb2O3	-40.22	20.82	61.04	Pb2O3
Pb3 (AsO4) 2	-21.41	-15.61	5.80	Pb3 (AsO4) 2
Pb3 (PO4) 2	-10.58	-54.11	-43.53	Pb3 (PO4) 2
Pb3O2SO4	-17.61	-6.69	10.92	Pb3O2SO4
Pb4 (OH) 6SO4	-26.13	-5.03	21.10	Pb4 (OH) 6SO4
Pb4O3SO4	-27.32	-5.03	22.28	Pb4O3SO4
PbCrO4	-31.81	-44.54	-12.73	PbCrO4
PbHPO4	-4.08	-27.89	-23.81	PbHPO4
Pbmetal	-20.08	-15.84	4.24	Pb
PbMoO4	1.54	-14.24	-15.78	PbMoO4
PbO:0.33H2O	-11.32	1.66	12.98	PbO:0.33H2O
PbSeO4	-22.65	-29.53	-6.88	PbSeO4
Periclase	-15.53	6.50	22.04	MgO
Plattnerite	-31.33	19.16	50.49	PbO2
Plumbgummite	-12.95	-45.74	-32.79	PbAl3 (PO4) 2 (OH) 5:H2O
Portlandite	-16.16	7.03	23.19	Ca (OH) 2
Pyrochroite	-16.39	-0.90	15.48	Mn (OH) 2
Pyrolusite	-25.60	16.60	42.19	MnO2
Pyromorphite	-2.62	-87.05	-84.43	Pb5 (PO4) 3Cl
Retgersite	-5.77	-7.83	-2.05	NiSO4:6H2O
Semetal (am)	5.22	-1.92	-7.14	Se
Semetal (hex)	5.83	-1.92	-7.76	Se
SeO2	-11.90	-11.78	0.12	SeO2
SeO3	-52.67	-31.19	21.48	SeO3
Spinel	-23.70	14.30	38.01	MgAl2O4
Strengite	-5.23	-31.61	-26.37	FePO4:2H2O
Tenorite	-3.16	4.68	7.84	CuO
Thenardite	-6.39	-6.04	0.35	Na2SO4
Tsumebite	-11.76	-21.55	-9.79	Pb2CuPO4 (OH) 3:3H2O
Vivianite	-16.04	-52.04	-36.00	Fe3 (PO4) 2:8H2O
Zincite	-7.84	3.76	11.60	ZnO
Zincosite	-12.09	-7.92	4.18	ZnSO4
Zn (BO2) 2	-14.58	-6.29	8.29	Zn (BO2) 2
Zn (NO3) 2:6H2O	-99.38	-96.14	3.24	Zn (NO3) 2:6H2O
Zn (OH) 2	-8.44	3.76	12.20	Zn (OH) 2
Zn (OH) 2 (am)	-8.96	3.76	12.71	Zn (OH) 2
Zn (OH) 2 (beta)	-8.25	3.76	12.00	Zn (OH) 2
Zn (OH) 2 (epsilon)	-8.02	3.76	11.78	Zn (OH) 2
Zn (OH) 2 (gamma)	-7.98	3.76	11.73	Zn (OH) 2
Zn2 (OH) 2SO4	-11.66	-4.16	7.50	Zn2 (OH) 2SO4
Zn2 (OH) 3Cl	-14.38	0.81	15.19	Zn2 (OH) 3Cl
Zn3 (AsO4) 2:2.5H2O	-22.97	-9.32	13.65	Zn3 (AsO4) 2:2.5H2O
Zn3 (PO4) 2:4H2O	-12.41	-47.83	-35.42	Zn3 (PO4) 2:4H2O
Zn3O (SO4) 2	-31.76	-12.08	19.68	Zn3O (SO4) 2
Zn4 (OH) 6SO4	-25.05	3.35	28.40	Zn4 (OH) 6SO4
Zn5 (OH) 8Cl2	-33.13	5.37	38.50	Zn5 (OH) 8Cl2
ZnCl2	-16.92	-9.65	7.27	ZnCl2
Znmetal	-39.99	-13.74	26.25	Zn
ZnMoO4	-2.05	-12.14	-10.09	ZnMoO4
ZnO (active)	-7.70	3.76	11.45	ZnO
ZnSe	-1.19	-15.66	-14.48	ZnSe
ZnSeO4:6H2O	-25.92	-27.44	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.41	-7.92	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 1.

Mixture 1.

3.000e-02 Solution 1
 1.000e-01 Solution 2
 1.000e-01 Solution 3
 7.700e-01 Solution 4

-----Solution composition-----

Elements	Molality	Moles
Al	1.160e-05	1.160e-05
As	2.504e-08	2.504e-08
B	8.428e-06	8.428e-06
Ba	2.687e-07	2.687e-07
Be	1.716e-07	1.716e-07
C	2.779e-04	2.779e-04
Ca	1.064e-02	1.064e-02
Cd	1.710e-08	1.710e-08
Cl	1.976e-02	1.976e-02
Co	2.218e-05	2.218e-05
Cr	6.657e-08	6.657e-08
Cu	8.059e-05	8.059e-05
Fe	5.213e-04	5.213e-04
Hg	1.014e-10	1.014e-10
K	5.089e-03	5.089e-03
Mg	4.607e-03	4.607e-03
Mn	9.624e-05	9.624e-05
Mo	8.960e-07	8.960e-07
N	8.691e-04	8.691e-04
Na	2.021e-02	2.021e-02
Ni	9.406e-06	9.406e-06
P	3.278e-05	3.278e-05
Pb	7.813e-08	7.813e-08
S	2.102e-02	2.102e-02
Se	1.320e-07	1.320e-07
Zn	6.693e-06	6.693e-06

-----Description of solution-----

pH	=	6.133	Charge balance
pe	=	4.132	Adjusted to redox equilibrium
Activity of water	=	0.999	
Ionic strength (mol/kgw)	=	7.385e-02	
Mass of water (kg)	=	1.000e+00	
Total alkalinity (eq/kg)	=	1.486e-04	
Total CO2 (mol/kg)	=	2.779e-04	
Temperature (°C)	=	20.03	
Electrical balance (eq)	=	-3.866e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-3.99	
Iterations	=	13	
Total H	=	1.110177e+02	
Total O	=	5.559194e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	9.201e-07	7.361e-07	-6.036	-6.133	-0.097	0.00
OH-	1.187e-08	9.327e-09	-7.925	-8.030	-0.105	(0)
H2O	5.551e+01	9.987e-01	1.744	-0.001	0.000	18.05
Al	1.160e-05					
Al (OH) 2+	6.382e-06	5.154e-06	-5.195	-5.288	-0.093	(0)
AlSO4+	1.695e-06	1.353e-06	-5.771	-5.869	-0.098	(0)
Al (OH) 3	1.405e-06	1.405e-06	-5.852	-5.852	0.000	(0)
Al (OH) 4-	9.262e-07	7.389e-07	-6.033	-6.131	-0.098	(0)
AlOH+2	8.053e-07	3.425e-07	-6.094	-6.465	-0.371	(0)
Al+3	2.588e-07	3.477e-08	-6.587	-7.459	-0.872	(0)

Al (SO4) 2-	1.231e-07	9.820e-08	-6.910	-7.008	-0.098	(0)
AlMo6O21-3	2.210e-27	1.281e-28	-26.656	-27.893	-1.237	(0)
As (3)	8.895e-14					
H3AsO3	8.888e-14	8.888e-14	-13.051	-13.051	0.000	(0)
H2AsO3-	7.045e-17	5.134e-17	-16.152	-16.290	-0.137	(0)
H4AsO3+	4.449e-20	3.242e-20	-19.352	-19.489	-0.137	(0)
HAsO3-2	1.812e-22	5.110e-23	-21.742	-22.292	-0.550	(0)
AsO3-3	3.884e-29	2.251e-30	-28.411	-29.648	-1.237	(0)
As (5)	2.504e-08					
H2AsO4-	1.818e-08	1.325e-08	-7.740	-7.878	-0.137	(0)
HAsO4-2	6.857e-09	1.934e-09	-8.164	-8.714	-0.550	(0)
H3AsO4	1.588e-12	1.615e-12	-11.799	-11.792	0.007	(0)
AsO4-3	1.276e-13	7.395e-15	-12.894	-14.131	-1.237	(0)
B	8.428e-06					
H3BO3	8.419e-06	8.563e-06	-5.075	-5.067	0.007	(0)
H2BO3-	8.007e-09	6.181e-09	-8.097	-8.209	-0.112	(0)
CaH2BO3+	1.265e-09	9.768e-10	-8.898	-9.010	-0.112	(0)
MgH2BO3+	3.649e-10	2.817e-10	-9.438	-9.550	-0.112	(0)
NaH2BO3	1.678e-10	1.678e-10	-9.775	-9.775	0.000	(0)
H5 (BO3) 2-	6.022e-14	4.649e-14	-13.220	-13.333	-0.112	(0)
BaH2BO3+	2.650e-14	2.046e-14	-13.577	-13.689	-0.112	(0)
H8 (BO3) 3-	4.467e-17	3.448e-17	-16.350	-16.462	-0.112	(0)
Ba	2.687e-07					
Ba+2	2.686e-07	1.101e-07	-6.571	-6.958	-0.387	(0)
BaHCO3+	9.788e-11	7.964e-11	-10.009	-10.099	-0.090	(0)
BaCO3	2.621e-13	2.621e-13	-12.581	-12.581	0.000	(0)
BaNH3+2	1.204e-13	3.394e-14	-12.920	-13.469	-0.550	(0)
BaH2BO3+	2.650e-14	2.046e-14	-13.577	-13.689	-0.112	(0)
BaOH+	5.391e-15	4.331e-15	-14.268	-14.363	-0.095	(0)
BaNO3+	5.062e-37	3.689e-37	-36.296	-36.433	-0.137	(0)
Be	1.716e-07					
BeOH+	1.141e-07	9.334e-08	-6.943	-7.030	-0.087	(0)
Be+2	4.188e-08	1.716e-08	-7.378	-7.765	-0.387	(0)
BeSO4	1.323e-08	1.323e-08	-7.878	-7.878	0.000	(0)
Be (SO4) 2-2	8.843e-10	2.494e-10	-9.053	-9.603	-0.550	(0)
Be (OH) 2	8.045e-10	8.045e-10	-9.094	-9.094	0.000	(0)
BeCl+	5.344e-10	4.293e-10	-9.272	-9.367	-0.095	(0)
BeCO3	1.598e-10	1.598e-10	-9.796	-9.796	0.000	(0)
Be2OH+3	1.615e-12	2.658e-13	-11.792	-12.575	-0.783	(0)
Be (OH) 3-	3.373e-13	2.760e-13	-12.472	-12.559	-0.087	(0)
Be3 (OH) 3+3	1.194e-13	1.966e-14	-12.923	-13.706	-0.783	(0)
Be (OH) 4-2	5.305e-21	2.379e-21	-20.275	-20.624	-0.348	(0)
C (4)	2.779e-04					
H2CO3	1.584e-04	1.584e-04	-3.800	-3.800	0.000	(0)
HCO3-	1.113e-04	8.989e-05	-3.953	-4.046	-0.093	(0)
CaHCO3+	5.065e-06	4.121e-06	-5.295	-5.385	-0.090	(0)
MgHCO3+	1.486e-06	1.177e-06	-5.828	-5.929	-0.101	(0)
NaHCO3	8.700e-07	8.700e-07	-6.060	-6.060	0.000	(0)
CuCO3	3.272e-07	3.272e-07	-6.485	-6.485	0.000	(0)
FeHCO3+	1.305e-07	1.062e-07	-6.884	-6.974	-0.090	(0)
CuHCO3+	7.555e-08	5.506e-08	-7.122	-7.259	-0.137	(0)
MnHCO3+	4.554e-08	3.659e-08	-7.342	-7.437	-0.095	(0)
CoHCO3+	4.020e-08	2.929e-08	-7.396	-7.533	-0.137	(0)
NiHCO3+	3.522e-08	2.567e-08	-7.453	-7.591	-0.137	(0)
CaCO3	2.077e-08	2.077e-08	-7.682	-7.682	0.000	(0)
CO3-2	1.264e-08	5.181e-09	-7.898	-8.286	-0.387	(0)
ZnHCO3+	5.882e-09	4.286e-09	-8.230	-8.368	-0.137	(0)
MgCO3	5.218e-09	5.218e-09	-8.282	-8.282	0.000	(0)
NaCO3-	2.151e-09	1.737e-09	-8.667	-8.760	-0.093	(0)
PbHCO3+	9.668e-10	7.045e-10	-9.015	-9.152	-0.137	(0)
ZnCO3	4.967e-10	4.967e-10	-9.304	-9.304	0.000	(0)
NiCO3	4.947e-10	4.947e-10	-9.306	-9.306	0.000	(0)
CoCO3	4.054e-10	4.054e-10	-9.392	-9.392	0.000	(0)
PbCO3	1.815e-10	1.815e-10	-9.741	-9.741	0.000	(0)
BeCO3	1.598e-10	1.598e-10	-9.796	-9.796	0.000	(0)
BaHCO3+	9.788e-11	7.964e-11	-10.009	-10.099	-0.090	(0)
Cu (CO3) 2-2	1.618e-11	4.563e-12	-10.791	-11.341	-0.550	(0)
CdHCO3+	6.853e-13	4.994e-13	-12.164	-12.302	-0.137	(0)

CdCO3	3.184e-13	3.184e-13	-12.497	-12.497	0.000	(0)
BaCO3	2.621e-13	2.621e-13	-12.581	-12.581	0.000	(0)
Pb (CO3) 2-2	9.619e-15	2.712e-15	-14.017	-14.567	-0.550	(0)
Cd (CO3) 2-2	4.337e-18	1.223e-18	-17.363	-17.913	-0.550	(0)
HgCO3	7.372e-21	7.372e-21	-20.132	-20.132	0.000	(0)
HgHCO3+	1.387e-22	1.011e-22	-21.858	-21.995	-0.137	(0)
Hg (CO3) 2-2	4.283e-25	1.208e-25	-24.368	-24.918	-0.550	(0)
Ca	1.064e-02					
Ca+2	6.889e-03	2.823e-03	-2.162	-2.549	-0.387	(0)
CaSO4	3.738e-03	3.738e-03	-2.427	-2.427	0.000	(0)
CaHCO3+	5.065e-06	4.121e-06	-5.295	-5.385	-0.090	(0)
CaHPO4	1.768e-06	1.768e-06	-5.752	-5.752	0.000	(0)
CaH2PO4+	1.271e-06	1.027e-06	-5.896	-5.989	-0.093	(0)
CaCO3	2.077e-08	2.077e-08	-7.682	-7.682	0.000	(0)
CaPO4-	7.096e-09	5.731e-09	-8.149	-8.242	-0.093	(0)
CaNH3+2	6.158e-09	1.736e-09	-8.211	-8.760	-0.550	(0)
CaH2BO3+	1.265e-09	9.768e-10	-8.898	-9.010	-0.112	(0)
CaOH+	6.100e-10	4.963e-10	-9.215	-9.304	-0.090	(0)
Ca (NH3) 2+2	1.198e-15	3.378e-16	-14.922	-15.471	-0.550	(0)
CaNO3+	7.776e-33	5.666e-33	-32.109	-32.247	-0.137	(0)
Cd	1.710e-08					
Cd+2	6.581e-09	2.696e-09	-8.182	-8.569	-0.387	(0)
CdCl+	5.528e-09	4.028e-09	-8.257	-8.395	-0.137	(0)
CdSO4	3.615e-09	3.615e-09	-8.442	-8.442	0.000	(0)
Cd (SO4) 2-2	1.114e-09	3.141e-10	-8.953	-9.503	-0.550	(0)
CdCl2	2.609e-10	2.609e-10	-9.583	-9.583	0.000	(0)
CdCl3-	3.392e-12	2.472e-12	-11.470	-11.607	-0.137	(0)
CdOHCl	2.007e-12	2.007e-12	-11.698	-11.698	0.000	(0)
CdHCO3+	6.853e-13	4.994e-13	-12.164	-12.302	-0.137	(0)
CdCO3	3.184e-13	3.184e-13	-12.497	-12.497	0.000	(0)
CdOH+	2.760e-13	2.011e-13	-12.559	-12.697	-0.137	(0)
Cd (OH) 2	2.522e-17	2.522e-17	-16.598	-16.598	0.000	(0)
Cd (CO3) 2-2	4.337e-18	1.223e-18	-17.363	-17.913	-0.550	(0)
Cd2OH+3	4.989e-20	2.891e-21	-19.302	-20.539	-1.237	(0)
Cd (SeO3) 2-2	2.074e-21	5.848e-22	-20.683	-21.233	-0.550	(0)
Cd (OH) 3-	2.888e-23	2.105e-23	-22.539	-22.677	-0.137	(0)
CdSeO4	2.727e-24	2.727e-24	-23.564	-23.564	0.000	(0)
Cd (OH) 4-2	1.669e-31	4.706e-32	-30.778	-31.327	-0.550	(0)
CdNO3+	8.264e-39	6.022e-39	-38.083	-38.220	-0.137	(0)
CdHS+	0.000e+00	0.000e+00	-57.056	-57.194	-0.137	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-68.796	-68.796	0.000	(0)
Cd (HS) 2	0.000e+00	0.000e+00	-106.622	-106.622	0.000	(0)
Cd (HS) 3-	0.000e+00	0.000e+00	-161.217	-161.355	-0.137	(0)
Cd (HS) 4-2	0.000e+00	0.000e+00	-215.242	-215.791	-0.550	(0)
Cl	1.976e-02					
Cl-	1.969e-02	1.575e-02	-1.706	-1.803	-0.097	(0)
CuCl2-	3.081e-05	2.440e-05	-4.511	-4.613	-0.101	(0)
CuCl	7.326e-06	7.326e-06	-5.135	-5.135	0.000	(0)
MnCl+	5.175e-07	4.157e-07	-6.286	-6.381	-0.095	(0)
CoCl+	3.415e-07	2.488e-07	-6.467	-6.604	-0.137	(0)
CuCl+	3.195e-07	2.530e-07	-6.496	-6.597	-0.101	(0)
CuCl3-2	1.935e-07	8.059e-08	-6.713	-7.094	-0.380	(0)
NiCl+	1.396e-07	1.017e-07	-6.855	-6.993	-0.137	(0)
ZnCl+	8.023e-08	6.354e-08	-7.096	-7.197	-0.101	(0)
MnCl2	9.250e-09	9.250e-09	-8.034	-8.034	0.000	(0)
PbCl+	8.423e-09	6.138e-09	-8.075	-8.212	-0.137	(0)
CdCl+	5.528e-09	4.028e-09	-8.257	-8.395	-0.137	(0)
ZnCl2	1.278e-09	1.278e-09	-8.894	-8.894	0.000	(0)
ZnOHCl	1.179e-09	1.179e-09	-8.928	-8.928	0.000	(0)
CuCl2	1.081e-09	1.081e-09	-8.966	-8.966	0.000	(0)
BeCl+	5.344e-10	4.293e-10	-9.272	-9.367	-0.095	(0)
PbCl2	4.222e-10	4.222e-10	-9.374	-9.374	0.000	(0)
CdCl2	2.609e-10	2.609e-10	-9.583	-9.583	0.000	(0)
MnCl3-	4.995e-11	4.013e-11	-10.301	-10.397	-0.095	(0)
ZnCl3-	1.978e-11	1.566e-11	-10.704	-10.805	-0.101	(0)
NiCl2	8.180e-12	8.180e-12	-11.087	-11.087	0.000	(0)
PbCl3-	3.838e-12	2.796e-12	-11.416	-11.553	-0.137	(0)
CdCl3-	3.392e-12	2.472e-12	-11.470	-11.607	-0.137	(0)

CrCl+2	3.258e-12	9.187e-13	-11.487	-12.037	-0.550	(0)
CdOHC1	2.007e-12	2.007e-12	-11.698	-11.698	0.000	(0)
ZnCl4-2	2.846e-13	1.185e-13	-12.546	-12.926	-0.380	(0)
CuCl3-	1.835e-13	1.453e-13	-12.736	-12.838	-0.101	(0)
FeCl+2	9.521e-14	3.965e-14	-13.021	-13.402	-0.380	(0)
PbCl4-2	6.633e-14	1.870e-14	-13.178	-13.728	-0.550	(0)
HgCl2	5.550e-14	5.550e-14	-13.256	-13.256	0.000	(0)
HgCl3-	1.213e-14	8.838e-15	-13.916	-14.054	-0.137	(0)
FeCl2+	4.064e-15	3.265e-15	-14.391	-14.486	-0.095	(0)
HgCl4-2	2.058e-15	5.802e-16	-14.687	-15.236	-0.550	(0)
CrOHC12	1.850e-15	1.850e-15	-14.733	-14.733	0.000	(0)
CrCl2+	1.213e-15	8.839e-16	-14.916	-15.054	-0.137	(0)
HgClOH	6.051e-16	6.051e-16	-15.218	-15.218	0.000	(0)
CuCl4-2	3.262e-17	1.358e-17	-16.487	-16.867	-0.380	(0)
FeCl3	5.143e-18	5.143e-18	-17.289	-17.289	0.000	(0)
HgCl+	7.875e-19	5.738e-19	-18.104	-18.241	-0.137	(0)
CoCl+2	2.547e-33	7.182e-34	-32.594	-33.144	-0.550	(0)
CrO3Cl-	8.561e-34	6.238e-34	-33.067	-33.205	-0.137	(0)
Cr(NH3) 6Cl+2	2.134e-36	6.019e-37	-35.671	-36.220	-0.550	(0)
Co(NH3) 5Cl+2	3.273e-39	9.230e-40	-38.485	-39.035	-0.550	(0)
Co(NH3) 6Cl+2	0.000e+00	0.000e+00	-51.485	-52.034	-0.550	(0)
Co (2)	2.218e-05					
Co+2	1.642e-05	4.629e-06	-4.785	-5.334	-0.550	(0)
CoSO4	5.373e-06	5.373e-06	-5.270	-5.270	0.000	(0)
CoCl+	3.415e-07	2.488e-07	-6.467	-6.604	-0.137	(0)
CoHCO3+	4.020e-08	2.929e-08	-7.396	-7.533	-0.137	(0)
CoHPO4	6.782e-09	6.782e-09	-8.169	-8.169	0.000	(0)
CoOH+	1.732e-09	1.262e-09	-8.762	-8.899	-0.137	(0)
Co(NH3) +2	1.504e-09	4.242e-10	-8.823	-9.372	-0.550	(0)
CoCO3	4.054e-10	4.054e-10	-9.392	-9.392	0.000	(0)
Co (OH) 2	1.369e-12	1.369e-12	-11.864	-11.864	0.000	(0)
Co(NH3) 2+2	2.011e-14	5.670e-15	-13.697	-14.246	-0.550	(0)
Co2OH+3	5.053e-15	2.928e-16	-14.296	-15.533	-1.237	(0)
Co (OH) 3-	5.121e-19	3.732e-19	-18.291	-18.428	-0.137	(0)
Co(NH3) 3+2	1.237e-19	3.488e-20	-18.908	-19.457	-0.550	(0)
CoOOH-	2.167e-20	1.579e-20	-19.664	-19.801	-0.137	(0)
CoSeO4	1.161e-20	1.161e-20	-19.935	-19.935	0.000	(0)
Co(NH3) 4+2	3.172e-25	8.945e-26	-24.499	-25.048	-0.550	(0)
Co4 (OH) 4+4	8.000e-26	5.058e-28	-25.097	-27.296	-2.199	(0)
CoNO2+	1.050e-26	7.648e-27	-25.979	-26.116	-0.137	(0)
Co (OH) 4-2	2.865e-27	8.080e-28	-26.543	-27.093	-0.550	(0)
Co(NH3) 5+2	2.573e-31	7.254e-32	-30.590	-31.139	-0.550	(0)
CoNO3+	6.160e-36	4.489e-36	-35.210	-35.348	-0.137	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-65.253	-65.253	0.000	(0)
Co (3)	6.155e-29					
CoOH+2	6.154e-29	1.735e-29	-28.211	-28.761	-0.550	(0)
CoCl+2	2.547e-33	7.182e-34	-32.594	-33.144	-0.550	(0)
Co+3	1.861e-33	2.500e-34	-32.730	-33.602	-0.872	(0)
Co(NH3) 5Cl+2	3.273e-39	9.230e-40	-38.485	-39.035	-0.550	(0)
Co(NH3) 6SO4+	0.000e+00	0.000e+00	-47.446	-47.583	-0.137	(0)
Co(NH3) 6Cl+2	0.000e+00	0.000e+00	-51.485	-52.034	-0.550	(0)
Co(NH3) 6OH+2	0.000e+00	0.000e+00	-53.037	-53.586	-0.550	(0)
Cr (2)	1.327e-21					
Cr+2	1.327e-21	3.741e-22	-20.877	-21.427	-0.550	(0)
Cr (3)	6.657e-08					
Cr (OH) +2	4.006e-08	1.130e-08	-7.397	-7.947	-0.550	(0)
Cr (OH) 2+	1.512e-08	1.102e-08	-7.820	-7.958	-0.137	(0)
CrOHSO4	9.550e-09	9.550e-09	-8.020	-8.020	0.000	(0)
Cr+3	9.291e-10	5.383e-11	-9.032	-10.269	-1.237	(0)
CrSO4+	8.470e-10	6.172e-10	-9.072	-9.210	-0.137	(0)
Cr (OH) 3	5.656e-11	5.656e-11	-10.247	-10.247	0.000	(0)
CrCl+2	3.258e-12	9.187e-13	-11.487	-12.037	-0.550	(0)
CrH2PO4+2	7.143e-13	2.014e-13	-12.146	-12.696	-0.550	(0)
CrO2-	5.014e-14	3.654e-14	-13.300	-13.437	-0.137	(0)
Cr (OH) 4-	4.221e-14	3.076e-14	-13.375	-13.512	-0.137	(0)
Cr2 (OH) 2SO4+2	2.030e-14	5.724e-15	-13.693	-14.242	-0.550	(0)
Cr2 (OH) 2 (SO4) 2	2.064e-15	2.064e-15	-14.685	-14.685	0.000	(0)
CrOHC12	1.850e-15	1.850e-15	-14.733	-14.733	0.000	(0)

CrCl2+	1.213e-15	8.839e-16	-14.916	-15.054	-0.137	(0)
Cr(NH3) 5OH+2	7.059e-30	1.990e-30	-29.151	-29.701	-0.550	(0)
Cr(NH3) 6+3	5.214e-35	3.021e-36	-34.283	-35.520	-1.237	(0)
Cr(NH3) 6Cl+2	2.134e-36	6.019e-37	-35.671	-36.220	-0.550	(0)
CrNO3+2	0.000e+00	0.000e+00	-41.483	-42.032	-0.550	(0)
Cr (6)	2.077e-26					
HCrO4-	1.156e-26	8.427e-27	-25.937	-26.074	-0.137	(0)
CrO4-2	8.753e-27	3.586e-27	-26.058	-26.445	-0.387	(0)
NaCrO4-	3.832e-28	2.793e-28	-27.417	-27.554	-0.137	(0)
KCrO4-	7.149e-29	5.209e-29	-28.146	-28.283	-0.137	(0)
CrO3HPO4-2	1.873e-30	5.282e-31	-29.727	-30.277	-0.550	(0)
CrO3SO4-2	4.128e-32	1.164e-32	-31.384	-31.934	-0.550	(0)
H2CrO4	3.904e-33	3.904e-33	-32.408	-32.408	0.000	(0)
CrO3Cl-	8.561e-34	6.238e-34	-33.067	-33.205	-0.137	(0)
CrO3H2PO4-	2.570e-34	1.873e-34	-33.590	-33.727	-0.137	(0)
Cr2O7-2	0.000e+00	0.000e+00	-50.002	-50.552	-0.550	(0)
Cu (1)	3.884e-05					
CuCl2-	3.081e-05	2.440e-05	-4.511	-4.613	-0.101	(0)
CuCl	7.326e-06	7.326e-06	-5.135	-5.135	0.000	(0)
Cu+	5.070e-07	3.695e-07	-6.295	-6.432	-0.137	(0)
CuCl3-2	1.935e-07	8.059e-08	-6.713	-7.094	-0.380	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-103.636	-104.041	-0.406	(0)
CuS4S5-3	0.000e+00	0.000e+00	-104.388	-104.771	-0.383	(0)
Cu (2)	4.175e-05					
Cu+2	2.618e-05	1.073e-05	-4.582	-4.970	-0.387	(0)
CuSO4	1.405e-05	1.405e-05	-4.852	-4.852	0.000	(0)
CuOH+	4.581e-07	3.627e-07	-6.339	-6.440	-0.101	(0)
CuCO3	3.272e-07	3.272e-07	-6.485	-6.485	0.000	(0)
CuCl+	3.195e-07	2.530e-07	-6.496	-6.597	-0.101	(0)
CuNH3+2	3.112e-07	8.776e-08	-6.507	-7.057	-0.550	(0)
CuHCO3+	7.555e-08	5.506e-08	-7.122	-7.259	-0.137	(0)
Cu2 (OH) 2+2	1.133e-08	3.194e-09	-7.946	-8.496	-0.550	(0)
Cu (OH) 2	1.263e-09	1.263e-09	-8.899	-8.899	0.000	(0)
CuCl2	1.081e-09	1.081e-09	-8.966	-8.966	0.000	(0)
Cu (CO3) 2-2	1.618e-11	4.563e-12	-10.791	-11.341	-0.550	(0)
CuCl3-	1.835e-13	1.453e-13	-12.736	-12.838	-0.101	(0)
Cu (OH) 3-	4.856e-14	3.539e-14	-13.314	-13.451	-0.137	(0)
CuCl4-2	3.262e-17	1.358e-17	-16.487	-16.867	-0.380	(0)
Cu (OH) 4-2	1.349e-20	3.805e-21	-19.870	-20.420	-0.550	(0)
CuNO2+	3.613e-25	2.633e-25	-24.442	-24.580	-0.137	(0)
CuNO3+	2.929e-35	2.134e-35	-34.533	-34.671	-0.137	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-45.199	-45.199	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-65.796	-65.796	0.000	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-148.831	-148.968	-0.137	(0)
Fe (2)	5.156e-04					
Fe+2	3.677e-04	1.037e-04	-3.435	-3.984	-0.550	(0)
FeSO4	1.462e-04	1.462e-04	-3.835	-3.835	0.000	(0)
FeH2PO4+	1.003e-06	8.104e-07	-5.998	-6.091	-0.093	(0)
FeHPO4	5.543e-07	5.543e-07	-6.256	-6.256	0.000	(0)
FeHCO3+	1.305e-07	1.062e-07	-6.884	-6.974	-0.090	(0)
FeOH+	4.792e-08	3.850e-08	-7.319	-7.415	-0.095	(0)
Fe (OH) 2	2.700e-13	2.700e-13	-12.569	-12.569	0.000	(0)
Fe (OH) 3-	1.386e-15	1.113e-15	-14.858	-14.953	-0.095	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-108.299	-108.299	0.000	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-162.758	-162.895	-0.137	(0)
Fe (3)	5.699e-06					
Fe (OH) 2+	5.663e-06	4.573e-06	-5.247	-5.340	-0.093	(0)
Fe (OH) 3	3.299e-08	3.299e-08	-7.482	-7.482	0.000	(0)
FeHPO4+	1.651e-09	1.334e-09	-8.782	-8.875	-0.093	(0)
FeOH+2	1.552e-09	6.465e-10	-8.809	-9.189	-0.380	(0)
Fe (OH) 4-	1.057e-10	8.534e-11	-9.976	-10.069	-0.093	(0)
FeSO4+	6.970e-12	5.600e-12	-11.157	-11.252	-0.095	(0)
Fe (SO4) 2-	1.037e-12	7.560e-13	-11.984	-12.121	-0.137	(0)
Fe+3	7.263e-13	9.756e-14	-12.139	-13.011	-0.872	(0)
FeCl+2	9.521e-14	3.965e-14	-13.021	-13.402	-0.380	(0)
FeH2PO4+2	6.793e-14	2.889e-14	-13.168	-13.539	-0.371	(0)
FeCl2+	4.064e-15	3.265e-15	-14.391	-14.486	-0.095	(0)
Fe2 (OH) 2+4	2.615e-15	1.653e-17	-14.583	-16.782	-2.199	(0)

	FeHSeO3+2	7.309e-17	2.061e-17	-16.136	-16.686	-0.550	(0)
	FeCl3	5.143e-18	5.143e-18	-17.289	-17.289	0.000	(0)
	Fe3(OH) 4+5	2.832e-18	1.037e-21	-17.548	-20.984	-3.436	(0)
	FeNO3+2	0.000e+00	0.000e+00	-41.564	-42.114	-0.550	(0)
H (0)	4.311e-24						
	H2	2.156e-24	2.193e-24	-23.666	-23.659	0.007	(0)
Hg (0)	1.014e-10						
	Hg	1.014e-10	1.014e-10	-9.994	-9.994	0.000	(0)
Hg (1)	5.275e-25						
	Hg2+2	2.638e-25	7.438e-26	-24.579	-25.129	-0.550	(0)
Hg (2)	7.030e-14						
	HgCl2	5.550e-14	5.550e-14	-13.256	-13.256	0.000	(0)
	HgCl3-	1.213e-14	8.838e-15	-13.916	-14.054	-0.137	(0)
	HgCl4-2	2.058e-15	5.802e-16	-14.687	-15.236	-0.550	(0)
	HgClOH	6.051e-16	6.051e-16	-15.218	-15.218	0.000	(0)
	Hg(NH3) 2+2	3.433e-18	9.681e-19	-17.464	-18.014	-0.550	(0)
	Hg(OH) 2	1.376e-18	1.400e-18	-17.861	-17.854	0.007	(0)
	HgCl+	7.875e-19	5.738e-19	-18.104	-18.241	-0.137	(0)
	HgCO3	7.372e-21	7.372e-21	-20.132	-20.132	0.000	(0)
	HgNH3+2	1.300e-21	3.666e-22	-20.886	-21.436	-0.550	(0)
	HgOH+	1.010e-21	7.359e-22	-20.996	-21.133	-0.137	(0)
	HgHCO3+	1.387e-22	1.011e-22	-21.858	-21.995	-0.137	(0)
	Hg(NH3) 3+2	1.049e-23	2.958e-24	-22.979	-23.529	-0.550	(0)
	Hg+2	5.533e-24	1.560e-24	-23.257	-23.807	-0.550	(0)
	HgSO4	1.889e-24	1.889e-24	-23.724	-23.724	0.000	(0)
	Hg(CO3) 2-2	4.283e-25	1.208e-25	-24.368	-24.918	-0.550	(0)
	Hg(OH) 3-	3.304e-27	2.408e-27	-26.481	-26.618	-0.137	(0)
	Hg(NH3) 4+2	6.438e-29	1.815e-29	-28.191	-28.741	-0.550	(0)
	HgNO3+	0.000e+00	0.000e+00	-54.433	-54.571	-0.137	(0)
	Hg(NO3) 2	0.000e+00	0.000e+00	-85.166	-85.166	0.000	(0)
	Hg(HS) 2	0.000e+00	0.000e+00	-98.868	-98.868	0.000	(0)
	HgHS2-	0.000e+00	0.000e+00	-98.991	-99.129	-0.137	(0)
	HgS2-2	0.000e+00	0.000e+00	-101.154	-101.704	-0.550	(0)
K	5.089e-03						
	K+	4.886e-03	3.910e-03	-2.311	-2.408	-0.097	(0)
	KSO4-	2.022e-04	1.633e-04	-3.694	-3.787	-0.093	(0)
	KHPO4-	4.931e-08	3.983e-08	-7.307	-7.400	-0.093	(0)
	KCrO4-	7.149e-29	5.209e-29	-28.146	-28.283	-0.137	(0)
Mg	4.607e-03						
	Mg+2	3.208e-03	1.314e-03	-2.494	-2.881	-0.387	(0)
	MgSO4	1.395e-03	1.395e-03	-2.855	-2.855	0.000	(0)
	MgHCO3+	1.486e-06	1.177e-06	-5.828	-5.929	-0.101	(0)
	MgH2PO4+	1.264e-06	1.020e-06	-5.898	-5.991	-0.093	(0)
	MgHPO4	1.137e-06	1.137e-06	-5.944	-5.944	0.000	(0)
	MgOH+	5.494e-09	4.496e-09	-8.260	-8.347	-0.087	(0)
	MgCO3	5.218e-09	5.218e-09	-8.282	-8.282	0.000	(0)
	MgH2BO3+	3.649e-10	2.817e-10	-9.438	-9.550	-0.112	(0)
	MgPO4-	5.166e-11	4.172e-11	-10.287	-10.380	-0.093	(0)
Mn (2)	9.624e-05						
	Mn+2	7.435e-05	2.096e-05	-4.129	-4.679	-0.550	(0)
	MnSO4	2.132e-05	2.132e-05	-4.671	-4.671	0.000	(0)
	MnCl+	5.175e-07	4.157e-07	-6.286	-6.381	-0.095	(0)
	MnHCO3+	4.554e-08	3.659e-08	-7.342	-7.437	-0.095	(0)
	MnCl2	9.250e-09	9.250e-09	-8.034	-8.034	0.000	(0)
	MnOH+	6.114e-10	4.912e-10	-9.214	-9.309	-0.095	(0)
	MnCl3-	4.995e-11	4.013e-11	-10.301	-10.397	-0.095	(0)
	MnSeO4	2.785e-20	2.785e-20	-19.555	-19.555	0.000	(0)
	Mn(OH) 3-	1.033e-21	8.297e-22	-20.986	-21.081	-0.095	(0)
	MnSe	2.069e-28	2.069e-28	-27.684	-27.684	0.000	(0)
	Mn(OH) 4-2	8.786e-29	3.659e-29	-28.056	-28.437	-0.380	(0)
	MnNO3+	2.790e-35	2.033e-35	-34.554	-34.692	-0.137	(0)
	Mn(NO3) 2	0.000e+00	0.000e+00	-64.500	-64.500	0.000	(0)
Mn (3)	4.525e-26						
	Mn+3	4.525e-26	6.078e-27	-25.344	-26.216	-0.872	(0)
Mn (6)	0.000e+00						
	MnO4-2	0.000e+00	0.000e+00	-59.240	-59.621	-0.380	(0)
Mn (7)	0.000e+00						
	MnO4-	0.000e+00	0.000e+00	-65.083	-65.192	-0.108	(0)

Mo	8.960e-07					
MoO4-2	8.896e-07	3.645e-07	-6.051	-6.438	-0.387	(0)
HMoO4-	6.390e-09	4.657e-09	-8.194	-8.332	-0.137	(0)
H2MoO4	3.439e-11	3.439e-11	-10.464	-10.464	0.000	(0)
AlMo6O21-3	2.210e-27	1.281e-28	-26.656	-27.893	-1.237	(0)
Mo7O24-6	3.055e-36	0.000e+00	-35.515	-40.463	-4.948	(0)
HMo7O24-5	1.575e-37	0.000e+00	-36.803	-40.239	-3.436	(0)
H2Mo7O24-4	3.986e-40	0.000e+00	-39.399	-41.599	-2.199	(0)
H3Mo7O24-3	0.000e+00	0.000e+00	-43.243	-44.480	-1.237	(0)
N (-3)	8.691e-04					
NH4+	8.173e-04	6.309e-04	-3.088	-3.200	-0.112	(0)
NH4SO4-	5.107e-05	4.103e-05	-4.292	-4.387	-0.095	(0)
NH3	3.424e-07	3.424e-07	-6.465	-6.465	0.000	(0)
CuNH3+2	3.112e-07	8.776e-08	-6.507	-7.057	-0.550	(0)
CaNH3+2	6.158e-09	1.736e-09	-8.211	-8.760	-0.550	(0)
NiNH3+2	3.766e-09	1.062e-09	-8.424	-8.974	-0.550	(0)
Co (NH3) +2	1.504e-09	4.242e-10	-8.823	-9.372	-0.550	(0)
Ni (NH3) 2+2	3.609e-13	1.018e-13	-12.443	-12.992	-0.550	(0)
BaNH3+2	1.204e-13	3.394e-14	-12.920	-13.469	-0.550	(0)
Co (NH3) 2+2	2.011e-14	5.670e-15	-13.697	-14.246	-0.550	(0)
Ca (NH3) 2+2	1.198e-15	3.378e-16	-14.922	-15.471	-0.550	(0)
Hg (NH3) 2+2	3.433e-18	9.681e-19	-17.464	-18.014	-0.550	(0)
Co (NH3) 3+2	1.237e-19	3.488e-20	-18.908	-19.457	-0.550	(0)
HgNH3+2	1.300e-21	3.666e-22	-20.886	-21.436	-0.550	(0)
Hg (NH3) 3+2	1.049e-23	2.958e-24	-22.979	-23.529	-0.550	(0)
Co (NH3) 4+2	3.172e-25	8.945e-26	-24.499	-25.048	-0.550	(0)
Hg (NH3) 4+2	6.438e-29	1.815e-29	-28.191	-28.741	-0.550	(0)
Cr (NH3) 5OH+2	7.059e-30	1.990e-30	-29.151	-29.701	-0.550	(0)
Co (NH3) 5+2	2.573e-31	7.254e-32	-30.590	-31.139	-0.550	(0)
Cr (NH3) 6+3	5.214e-35	3.021e-36	-34.283	-35.520	-1.237	(0)
Cr (NH3) 6Cl+2	2.134e-36	6.019e-37	-35.671	-36.220	-0.550	(0)
Co (NH3) 5Cl+2	3.273e-39	9.230e-40	-38.485	-39.035	-0.550	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-47.446	-47.583	-0.137	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-51.485	-52.034	-0.550	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-53.037	-53.586	-0.550	(0)
N (3)	3.013e-22					
NO2-	3.010e-22	2.344e-22	-21.522	-21.630	-0.108	(0)
CuNO2+	3.613e-25	2.633e-25	-24.442	-24.580	-0.137	(0)
CoNO2+	1.050e-26	7.648e-27	-25.979	-26.116	-0.137	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-45.199	-45.199	0.000	(0)
N (5)	7.725e-31					
NO3-	7.647e-31	6.118e-31	-30.117	-30.213	-0.097	(0)
CaNO3+	7.776e-33	5.666e-33	-32.109	-32.247	-0.137	(0)
CuNO3+	2.929e-35	2.134e-35	-34.533	-34.671	-0.137	(0)
MnNO3+	2.790e-35	2.033e-35	-34.554	-34.692	-0.137	(0)
CoNO3+	6.160e-36	4.489e-36	-35.210	-35.348	-0.137	(0)
NiNO3+	5.397e-36	3.933e-36	-35.268	-35.405	-0.137	(0)
ZnNO3+	3.626e-36	2.642e-36	-35.441	-35.578	-0.137	(0)
BaNO3+	5.062e-37	3.689e-37	-36.296	-36.433	-0.137	(0)
PbNO3+	1.428e-37	1.040e-37	-36.845	-36.983	-0.137	(0)
CdNO3+	8.264e-39	6.022e-39	-38.083	-38.220	-0.137	(0)
CrNO3+2	0.000e+00	0.000e+00	-41.483	-42.032	-0.550	(0)
FeNO3+2	0.000e+00	0.000e+00	-41.564	-42.114	-0.550	(0)
HgNO3+	0.000e+00	0.000e+00	-54.433	-54.571	-0.137	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-64.500	-64.500	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-65.253	-65.253	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-65.796	-65.796	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-66.505	-66.505	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-66.941	-66.941	0.000	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-68.796	-68.796	0.000	(0)
Hg (NO3) 2	0.000e+00	0.000e+00	-85.166	-85.166	0.000	(0)
Na	2.021e-02					
Na+	1.958e-02	1.567e-02	-1.708	-1.805	-0.097	(0)
NaSO4-	6.281e-04	5.072e-04	-3.202	-3.295	-0.093	(0)
NaHCO3	8.700e-07	8.700e-07	-6.060	-6.060	0.000	(0)
NaHPO4-	3.061e-07	2.472e-07	-6.514	-6.607	-0.093	(0)
NaCO3-	2.151e-09	1.737e-09	-8.667	-8.760	-0.093	(0)
NaH2BO3	1.678e-10	1.678e-10	-9.775	-9.775	0.000	(0)

NaCrO4-	3.832e-28	2.793e-28	-27.417	-27.554	-0.137	(0)
Ni	9.406e-06					
Ni+2	6.246e-06	2.559e-06	-5.204	-5.592	-0.387	(0)
NiSO4	2.979e-06	2.979e-06	-5.526	-5.526	0.000	(0)
NiCl+	1.396e-07	1.017e-07	-6.855	-6.993	-0.137	(0)
NiHCO3+	3.522e-08	2.567e-08	-7.453	-7.591	-0.137	(0)
NiNH3+2	3.766e-09	1.062e-09	-8.424	-8.974	-0.550	(0)
Ni (SO4) 2-2	2.209e-09	6.228e-10	-8.656	-9.206	-0.550	(0)
NiCO3	4.947e-10	4.947e-10	-9.306	-9.306	0.000	(0)
NiOH+	4.238e-10	3.088e-10	-9.373	-9.510	-0.137	(0)
NiCl2	8.180e-12	8.180e-12	-11.087	-11.087	0.000	(0)
Ni (OH) 2	4.776e-13	4.776e-13	-12.321	-12.321	0.000	(0)
Ni (NH3) 2+2	3.609e-13	1.018e-13	-12.443	-12.992	-0.550	(0)
Ni (OH) 3-	8.953e-18	6.524e-18	-17.048	-17.185	-0.137	(0)
NiSeO4	5.908e-21	5.908e-21	-20.229	-20.229	0.000	(0)
NiNO3+	5.397e-36	3.933e-36	-35.268	-35.405	-0.137	(0)
O (0)	0.000e+00					
O2	0.000e+00	0.000e+00	-46.371	-46.364	0.007	(0)
P	3.278e-05					
H2PO4-	2.184e-05	1.764e-05	-4.661	-4.754	-0.093	(0)
HPO4-2	3.573e-06	1.488e-06	-5.447	-5.827	-0.380	(0)
CaHPO4	1.768e-06	1.768e-06	-5.752	-5.752	0.000	(0)
CaH2PO4+	1.271e-06	1.027e-06	-5.896	-5.989	-0.093	(0)
MgH2PO4+	1.264e-06	1.020e-06	-5.898	-5.991	-0.093	(0)
MgHPO4	1.137e-06	1.137e-06	-5.944	-5.944	0.000	(0)
FeH2PO4+	1.003e-06	8.104e-07	-5.998	-6.091	-0.093	(0)
FeHPO4	5.543e-07	5.543e-07	-6.256	-6.256	0.000	(0)
NaHPO4-	3.061e-07	2.472e-07	-6.514	-6.607	-0.093	(0)
KHPO4-	4.931e-08	3.983e-08	-7.307	-7.400	-0.093	(0)
CaPO4-	7.096e-09	5.731e-09	-8.149	-8.242	-0.093	(0)
CoHPO4	6.782e-09	6.782e-09	-8.169	-8.169	0.000	(0)
H3PO4	1.730e-09	1.730e-09	-8.762	-8.762	0.000	(0)
FeHPO4+	1.651e-09	1.334e-09	-8.782	-8.875	-0.093	(0)
MgPO4-	5.166e-11	4.172e-11	-10.287	-10.380	-0.093	(0)
PO4-3	5.727e-12	7.693e-13	-11.242	-12.114	-0.872	(0)
CrH2PO4+2	7.143e-13	2.014e-13	-12.146	-12.696	-0.550	(0)
FeH2PO4+2	6.793e-14	2.889e-14	-13.168	-13.539	-0.371	(0)
CrO3HPO4-2	1.873e-30	5.282e-31	-29.727	-30.277	-0.550	(0)
CrO3H2PO4-	2.570e-34	1.873e-34	-33.590	-33.727	-0.137	(0)
Pb	7.813e-08					
PbSO4	3.465e-08	3.465e-08	-7.460	-7.460	0.000	(0)
Pb+2	2.845e-08	1.166e-08	-7.546	-7.933	-0.387	(0)
PbCl+	8.423e-09	6.138e-09	-8.075	-8.212	-0.137	(0)
Pb (SO4) 2-2	4.493e-09	1.267e-09	-8.347	-8.897	-0.550	(0)
PbHCO3+	9.668e-10	7.045e-10	-9.015	-9.152	-0.137	(0)
PbOH+	5.489e-10	4.000e-10	-9.261	-9.398	-0.137	(0)
PbCl2	4.222e-10	4.222e-10	-9.374	-9.374	0.000	(0)
PbCO3	1.815e-10	1.815e-10	-9.741	-9.741	0.000	(0)
PbCl3-	3.838e-12	2.796e-12	-11.416	-11.553	-0.137	(0)
Pb (OH) 2	1.728e-13	1.728e-13	-12.763	-12.763	0.000	(0)
PbCl4-2	6.633e-14	1.870e-14	-13.178	-13.728	-0.550	(0)
Pb (CO3) 2-2	9.619e-15	2.712e-15	-14.017	-14.567	-0.550	(0)
Pb2OH+3	1.275e-15	7.389e-17	-14.894	-16.131	-1.237	(0)
Pb (OH) 3-	3.239e-18	2.360e-18	-17.490	-17.627	-0.137	(0)
Pb (OH) 4-2	2.800e-23	7.896e-24	-22.553	-23.103	-0.550	(0)
Pb3 (OH) 4+2	1.120e-23	3.157e-24	-22.951	-23.501	-0.550	(0)
Pb4 (OH) 4+4	5.561e-26	3.516e-28	-25.255	-27.454	-2.199	(0)
PbNO3+	1.428e-37	1.040e-37	-36.845	-36.983	-0.137	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-66.941	-66.941	0.000	(0)
Pb (HS) 2	0.000e+00	0.000e+00	-105.929	-105.929	0.000	(0)
Pb (HS) 3-	0.000e+00	0.000e+00	-161.124	-161.261	-0.137	(0)
S (-2)	0.000e+00					
H2S	0.000e+00	0.000e+00	-55.680	-55.680	0.000	(0)
HS-	0.000e+00	0.000e+00	-56.495	-56.633	-0.137	(0)
CdHS+	0.000e+00	0.000e+00	-57.056	-57.194	-0.137	(0)
S5-2	0.000e+00	0.000e+00	-59.427	-59.976	-0.550	(0)
S6-2	0.000e+00	0.000e+00	-59.831	-60.381	-0.550	(0)
S4-2	0.000e+00	0.000e+00	-60.027	-60.577	-0.550	(0)

S3-2	0.000e+00	0.000e+00	-60.842	-61.392	-0.550	(0)
S2-2	0.000e+00	0.000e+00	-61.870	-62.420	-0.550	(0)
S-2	0.000e+00	0.000e+00	-67.566	-67.946	-0.380	(0)
Hg (HS) 2	0.000e+00	0.000e+00	-98.868	-98.868	0.000	(0)
HgHS2-	0.000e+00	0.000e+00	-98.991	-99.129	-0.137	(0)
HgS2-2	0.000e+00	0.000e+00	-101.154	-101.704	-0.550	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-103.636	-104.041	-0.406	(0)
CuS4S5-3	0.000e+00	0.000e+00	-104.388	-104.771	-0.383	(0)
Pb (HS) 2	0.000e+00	0.000e+00	-105.929	-105.929	0.000	(0)
ZnS (HS) -	0.000e+00	0.000e+00	-105.963	-106.100	-0.137	(0)
Zn (HS) 2	0.000e+00	0.000e+00	-106.223	-106.223	0.000	(0)
Cd (HS) 2	0.000e+00	0.000e+00	-106.622	-106.622	0.000	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-108.299	-108.299	0.000	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-148.831	-148.968	-0.137	(0)
Zn (HS) 3-	0.000e+00	0.000e+00	-159.438	-159.576	-0.137	(0)
Pb (HS) 3-	0.000e+00	0.000e+00	-161.124	-161.261	-0.137	(0)
Cd (HS) 3-	0.000e+00	0.000e+00	-161.217	-161.355	-0.137	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-162.758	-162.895	-0.137	(0)
ZnS (HS) 2-2	0.000e+00	0.000e+00	-162.873	-163.423	-0.550	(0)
Cd (HS) 4-2	0.000e+00	0.000e+00	-215.242	-215.791	-0.550	(0)
Zn (HS) 4-2	0.000e+00	0.000e+00	-217.119	-217.668	-0.550	(0)
S (6)	2.102e-02					
SO4-2	1.481e-02	6.069e-03	-1.829	-2.217	-0.387	(0)
CaSO4	3.738e-03	3.738e-03	-2.427	-2.427	0.000	(0)
MgSO4	1.395e-03	1.395e-03	-2.855	-2.855	0.000	(0)
NaSO4-	6.281e-04	5.072e-04	-3.202	-3.295	-0.093	(0)
KSO4-	2.022e-04	1.633e-04	-3.694	-3.787	-0.093	(0)
FeSO4	1.462e-04	1.462e-04	-3.835	-3.835	0.000	(0)
NH4SO4-	5.107e-05	4.103e-05	-4.292	-4.387	-0.095	(0)
MnSO4	2.132e-05	2.132e-05	-4.671	-4.671	0.000	(0)
CuSO4	1.405e-05	1.405e-05	-4.852	-4.852	0.000	(0)
CoSO4	5.373e-06	5.373e-06	-5.270	-5.270	0.000	(0)
NiSO4	2.979e-06	2.979e-06	-5.526	-5.526	0.000	(0)
ZnSO4	2.121e-06	2.121e-06	-5.674	-5.674	0.000	(0)
AlSO4+	1.695e-06	1.353e-06	-5.771	-5.869	-0.098	(0)
HSO4-	4.708e-07	3.756e-07	-6.327	-6.425	-0.098	(0)
Zn (SO4) 2-2	4.147e-07	1.169e-07	-6.382	-6.932	-0.550	(0)
Al (SO4) 2-	1.231e-07	9.820e-08	-6.910	-7.008	-0.098	(0)
PbSO4	3.465e-08	3.465e-08	-7.460	-7.460	0.000	(0)
BeSO4	1.323e-08	1.323e-08	-7.878	-7.878	0.000	(0)
CrOHSO4	9.550e-09	9.550e-09	-8.020	-8.020	0.000	(0)
Pb (SO4) 2-2	4.493e-09	1.267e-09	-8.347	-8.897	-0.550	(0)
CdSO4	3.615e-09	3.615e-09	-8.442	-8.442	0.000	(0)
Ni (SO4) 2-2	2.209e-09	6.228e-10	-8.656	-9.206	-0.550	(0)
Cd (SO4) 2-2	1.114e-09	3.141e-10	-8.953	-9.503	-0.550	(0)
Be (SO4) 2-2	8.843e-10	2.494e-10	-9.053	-9.603	-0.550	(0)
CrSO4+	8.470e-10	6.172e-10	-9.072	-9.210	-0.137	(0)
FeSO4+	6.970e-12	5.600e-12	-11.157	-11.252	-0.095	(0)
Fe (SO4) 2-	1.037e-12	7.560e-13	-11.984	-12.121	-0.137	(0)
Cr2 (OH) 2SO4+2	2.030e-14	5.724e-15	-13.693	-14.242	-0.550	(0)
Cr2 (OH) 2 (SO4) 2	2.064e-15	2.064e-15	-14.685	-14.685	0.000	(0)
HgSO4	1.889e-24	1.889e-24	-23.724	-23.724	0.000	(0)
CrO3SO4-2	4.128e-32	1.164e-32	-31.384	-31.934	-0.550	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-47.446	-47.583	-0.137	(0)
Se (-2)	2.429e-24					
HSe-	2.419e-24	1.762e-24	-23.616	-23.754	-0.137	(0)
H2Se	9.847e-27	9.847e-27	-26.007	-26.007	0.000	(0)
MnSe	2.069e-28	2.069e-28	-27.684	-27.684	0.000	(0)
Se-2	6.110e-33	1.723e-33	-32.214	-32.764	-0.550	(0)
Se (4)	1.320e-07					
HSeO3-	1.302e-07	9.486e-08	-6.885	-7.023	-0.137	(0)
SeO3-2	1.758e-09	4.957e-10	-8.755	-9.305	-0.550	(0)
H2SeO3	2.855e-11	2.855e-11	-10.544	-10.544	0.000	(0)
FeHSeO3+2	7.309e-17	2.061e-17	-16.136	-16.686	-0.550	(0)
Cd (SeO3) 2-2	2.074e-21	5.848e-22	-20.683	-21.233	-0.550	(0)
Se (6)	1.330e-17					
SeO4-2	1.325e-17	5.431e-18	-16.878	-17.265	-0.387	(0)
MnSeO4	2.785e-20	2.785e-20	-19.555	-19.555	0.000	(0)

CoSeO4	1.161e-20	1.161e-20	-19.935	-19.935	0.000	(0)
NiSeO4	5.908e-21	5.908e-21	-20.229	-20.229	0.000	(0)
ZnSeO4	1.402e-21	1.402e-21	-20.853	-20.853	0.000	(0)
HSeO4-	2.350e-22	1.712e-22	-21.629	-21.766	-0.137	(0)
CdSeO4	2.727e-24	2.727e-24	-23.564	-23.564	0.000	(0)
Zn (SeO4) 2-2	2.737e-38	7.718e-39	-37.563	-38.112	-0.550	(0)
Zn	6.693e-06					
Zn+2	4.066e-06	1.666e-06	-5.391	-5.778	-0.387	(0)
ZnSO4	2.121e-06	2.121e-06	-5.674	-5.674	0.000	(0)
Zn (SO4) 2-2	4.147e-07	1.169e-07	-6.382	-6.932	-0.550	(0)
ZnCl+	8.023e-08	6.354e-08	-7.096	-7.197	-0.101	(0)
ZnHCO3+	5.882e-09	4.286e-09	-8.230	-8.368	-0.137	(0)
ZnOH+	2.133e-09	1.554e-09	-8.671	-8.809	-0.137	(0)
ZnCl2	1.278e-09	1.278e-09	-8.894	-8.894	0.000	(0)
ZnOHCl	1.179e-09	1.179e-09	-8.928	-8.928	0.000	(0)
ZnCO3	4.967e-10	4.967e-10	-9.304	-9.304	0.000	(0)
ZnCl3-	1.978e-11	1.566e-11	-10.704	-10.805	-0.101	(0)
Zn (OH) 2	4.928e-12	4.928e-12	-11.307	-11.307	0.000	(0)
ZnCl4-2	2.846e-13	1.185e-13	-12.546	-12.926	-0.380	(0)
Zn (OH) 3-	4.630e-16	3.374e-16	-15.334	-15.472	-0.137	(0)
ZnSeO4	1.402e-21	1.402e-21	-20.853	-20.853	0.000	(0)
Zn (OH) 4-2	6.507e-22	1.835e-22	-21.187	-21.736	-0.550	(0)
ZnNO3+	3.626e-36	2.642e-36	-35.441	-35.578	-0.137	(0)
Zn (SeO4) 2-2	2.737e-38	7.718e-39	-37.563	-38.112	-0.550	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-66.505	-66.505	0.000	(0)
ZnS (HS) -	0.000e+00	0.000e+00	-105.963	-106.100	-0.137	(0)
Zn (HS) 2	0.000e+00	0.000e+00	-106.223	-106.223	0.000	(0)
Zn (HS) 3-	0.000e+00	0.000e+00	-159.438	-159.576	-0.137	(0)
ZnS (HS) 2-2	0.000e+00	0.000e+00	-162.873	-163.423	-0.550	(0)
Zn (HS) 4-2	0.000e+00	0.000e+00	-217.119	-217.668	-0.550	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2	-87.44	-81.17	6.27	(Co (NH3) 5Cl) (NO3) 2
(Co (NH3) 5Cl) Cl2	-28.89	-24.35	4.54	(Co (NH3) 5Cl) Cl2
(Co (NH3) 5OH2) Cl3	-36.16	-24.35	11.81	(Co (NH3) 5OH2) Cl3
(Co (NH3) 6) (NO3) 3	-124.57	-106.64	17.93	(Co (NH3) 6) (NO3) 3
(Co (NH3) 6) Cl3	-41.54	-21.41	20.13	(Co (NH3) 6) Cl3
(NH4) 2CrO4	-33.22	-32.85	0.38	(NH4) 2CrO4
(NH4) 2SeO4	-24.12	-23.67	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	-0.19	10.94	11.13	Al (OH) 3
Al2 (MoO4) 3	-37.37	-34.23	3.14	Al2 (MoO4) 3
Al2O3	1.46	21.88	20.42	Al2O3
Al4 (OH) 10SO4	6.57	29.27	22.70	Al4 (OH) 10SO4
AlAsO4:2H2O	-5.65	-0.85	4.80	AlAsO4:2H2O
AlOHSO4	-0.31	-3.54	-3.23	AlOHSO4
Alunite	8.35	7.58	-0.78	KAl3 (SO4) 2 (OH) 6
Anglesite	-2.32	-10.15	-7.83	PbSO4
Anhydrite	-0.43	-4.77	-4.34	CaSO4
Anilite	-28.97	-61.39	-32.42	Cu0.25Cu1.5S
Antlerite	-1.38	7.40	8.79	Cu3 (OH) 4SO4
Aragonite	-2.57	-10.83	-8.26	CaCO3
Arsenolite	-49.26	-52.20	-2.94	As4O6
Artinite	-11.74	-1.78	9.96	MgCO3:Mg (OH) 2:3H2O
As2O5	-30.36	-23.58	6.77	As2O5
Atacamite	-1.01	6.66	7.67	Cu2 (OH) 3Cl
Azurite	-2.59	-19.21	-16.62	Cu3 (OH) 2 (CO3) 2
Ba (OH) 2:8H2O	-19.25	5.30	24.56	Ba (OH) 2:8H2O
Ba3 (AsO4) 2	1.28	-7.66	-8.94	Ba3 (AsO4) 2
BaCrO4	-23.64	-33.40	-9.77	BaCrO4
BaHPO4	-5.43	-25.21	-19.77	BaHPO4
BaMoO4	-6.40	-13.40	-6.99	BaMoO4
Barite	0.87	-9.18	-10.05	BaSO4
BaS	-73.64	-57.46	16.18	BaS
BaSeO3	-9.64	-7.85	1.79	BaSeO3
BaSeO4	-16.70	-24.22	-7.53	BaSeO4

Be (OH) 2 (alpha)	-2.39	4.50	6.89	Be (OH) 2
Be (OH) 2 (am)	-2.69	4.50	7.19	Be (OH) 2
Be (OH) 2 (beta)	-1.99	4.50	6.49	Be (OH) 2
BeMoO4	-12.59	-14.20	-1.61	BeMoO4
BeS	-77.64	-58.26	19.38	BeS
BeSeO4:4H2O	-22.09	-25.03	-2.94	BeSeO4:4H2O
Bianchite	-6.24	-8.00	-1.76	ZnSO4:6H2O
Birnessite	-15.64	2.45	18.09	MnO2
Bixbyite	-15.36	-15.64	-0.27	Mn2O3
BlaubleiI	-32.10	-56.26	-24.16	Cu0.9Cu0.2S
BlaubleiII	-31.35	-58.63	-27.28	Cu0.6Cu0.8S
Boehmite	2.01	10.94	8.93	AlOOH
Brochantite	-1.12	14.70	15.82	Cu4 (OH) 6SO4
Brucite	-7.80	9.38	17.18	Mg (OH) 2
Bunsenite	-6.07	6.67	12.74	NiO
Ca3 (AsO4) 2:4H2O	-16.74	5.56	22.30	Ca3 (AsO4) 2:4H2O
Ca3 (PO4) 2 (beta)	-2.80	-31.88	-29.08	Ca3 (PO4) 2
Ca4H (PO4) 3:3H2O	-5.59	-52.67	-47.08	Ca4H (PO4) 3:3H2O
CaCrO4	-26.81	-28.99	-2.19	CaCrO4
CaHPO4	-1.43	-20.80	-19.37	CaHPO4
CaHPO4:2H2O	-1.73	-20.80	-19.06	CaHPO4:2H2O
Calcite	-2.38	-10.83	-8.46	CaCO3
Calomel	-10.55	-28.73	-18.18	Hg2Cl2
CaMoO4	-1.04	-8.99	-7.94	CaMoO4
CaSeO3:2H2O	-6.31	-3.44	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-16.82	-19.82	-3.00	CaSeO4:2H2O
Cd (BO2) 2	-16.28	-6.44	9.84	Cd (BO2) 2
Cd (OH) 2	-10.23	3.70	13.93	Cd (OH) 2
Cd (OH) 2 (am)	-10.29	3.70	13.99	Cd (OH) 2
Cd3 (OH) 2 (SO4) 2	-24.59	-17.88	6.71	Cd3 (OH) 2 (SO4) 2
Cd3 (OH) 4SO4	-25.95	-3.39	22.56	Cd3 (OH) 4SO4
Cd3 (PO4) 2	-17.34	-49.94	-32.60	Cd3 (PO4) 2
Cd4 (OH) 6SO4	-28.10	0.30	28.40	Cd4 (OH) 6SO4
CdCl2	-11.57	-12.17	-0.60	CdCl2
CdCl2:1H2O	-10.50	-12.18	-1.67	CdCl2:1H2O
CdCl2:2.5H2O	-10.24	-12.18	-1.93	CdCl2:2.5H2O
Cdmetal (alpha)	-30.57	-16.83	13.74	Cd
Cdmetal (gamma)	-30.68	-16.83	13.84	Cd
CdMoO4	-0.80	-15.01	-14.21	CdMoO4
CdOHCl	-7.87	-4.24	3.63	CdOHCl
CdSe	-5.76	-26.19	-20.43	CdSe
CdSeO4:2H2O	-23.99	-25.84	-1.85	CdSeO4:2H2O
CdSO4	-10.77	-10.79	-0.02	CdSO4
CdSO4:1H2O	-9.15	-10.79	-1.63	CdSO4:1H2O
CdSO4:2.67H2O	-8.97	-10.79	-1.82	CdSO4:2.67H2O
Cerussite	-3.02	-16.22	-13.20	PbCO3
CH4 (g)	-60.86	-102.67	-41.81	CH4
Chalcanthite	-4.53	-7.19	-2.66	CuSO4:5H2O
Chalcocite	-27.95	-63.36	-35.42	Cu2S
Chalcopyrite	-74.24	-109.95	-35.71	CuFeS2
Cinnabar	-34.17	-80.62	-46.45	HgS
Claudetite	-48.97	-52.20	-3.23	As4O6
Clausthalite	1.90	-25.55	-27.46	PbSe
Co (BO2) 2	-30.27	-3.20	27.07	Co (BO2) 2
Co (OH) 2	-6.16	6.93	13.09	Co (OH) 2
Co (OH) 3	-13.17	-15.20	-2.03	Co (OH) 3
CO2 (g)	-2.39	-20.55	-18.16	CO2
Co3 (AsO4) 2	-15.82	-2.79	13.03	Co3 (AsO4) 2
Co3 (PO4) 2	-5.54	-40.23	-34.69	Co3 (PO4) 2
Co3O4	-13.30	-23.48	-10.18	Co3O4
CoCl2	-17.44	-8.94	8.50	CoCl2
CoCl2:6H2O	-11.46	-8.94	2.51	CoCl2:6H2O
CoCO3	-3.68	-13.62	-9.94	CoCO3
CoFe2O4	20.76	17.71	-3.06	CoFe2O4
CoHPO4	-4.52	-23.58	-19.06	CoHPO4
CoMoO4	-4.08	-11.77	-7.69	CoMoO4
CoO	-6.97	6.93	13.90	CoO
CoS (alpha)	-48.39	-55.83	-7.44	CoS

CoS (beta)	-44.76	-55.83	-11.07	CoS
CoSe	-6.76	-22.96	-16.20	CoSe
CoSeO3	-7.54	-6.22	1.32	CoSeO3
CoSeO4:6H2O	-21.07	-22.60	-1.53	CoSeO4:6H2O
CoSO4	-10.59	-7.55	3.04	CoSO4
CoSO4:6H2O	-5.08	-7.55	-2.48	CoSO4:6H2O
Cotunnite	-6.68	-11.54	-4.86	PbCl2
Covellite	-32.88	-55.47	-22.59	CuS
Cr (OH) 2	-20.09	-9.16	10.92	Cr (OH) 2
Cr (OH) 3	-3.25	-1.83	1.42	Cr (OH) 3
Cr (OH) 3 (am)	-1.08	-1.83	-0.75	Cr (OH) 3
Cr2O3	-1.44	-3.65	-2.21	Cr2O3
CrCl2	-39.45	-25.03	14.42	CrCl2
CrCl3	-41.10	-25.63	15.47	CrCl3
Crmetal	-60.69	-29.69	30.99	Cr
CrO3	-35.52	-38.71	-3.20	CrO3
Cu (OH) 2	-1.55	7.30	8.84	Cu (OH) 2
Cu2 (OH) 3NO3	-31.22	-21.76	9.47	Cu2 (OH) 3NO3
Cu2Se (alpha)	15.95	-30.49	-46.44	Cu2Se
Cu2SO4	-13.19	-15.08	-1.89	Cu2SO4
Cu3 (AsO4) 2:2H2O	-7.80	-1.70	6.10	Cu3 (AsO4) 2:2H2O
Cu3 (PO4) 2	-2.29	-39.14	-36.85	Cu3 (PO4) 2
Cu3 (PO4) 2:3H2O	-4.02	-39.14	-35.12	Cu3 (PO4) 2:3H2O
Cu3Se2	11.43	-53.08	-64.50	Cu3Se2
CuCO3	-1.76	-13.26	-11.50	CuCO3
CuCrO4	-25.97	-31.41	-5.44	CuCrO4
Cumetal	-1.60	-10.56	-8.97	Cu
CuMoO4	1.70	-11.41	-13.11	CuMoO4
CuOCuSO4	-10.60	0.11	10.71	CuOCuSO4
Cupricferrite	11.46	18.07	6.61	CuFe2O4
Cuprite	0.44	-0.60	-1.04	Cu2O
Cuprousferrite	13.96	5.09	-8.87	CuFeO2
CuSe	10.87	-22.59	-33.46	CuSe
CuSe2	1.84	-31.95	-33.78	CuSe2
CuSeO3:2H2O	-6.48	-5.86	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-19.80	-22.24	-2.44	CuSeO4:5H2O
CuSO4	-10.34	-7.19	3.16	CuSO4
Diaspore	3.76	10.94	7.18	AlOOH
Djurleite	-28.33	-62.84	-34.51	Cu0.066Cu1.868S
Dolomite (disordered)	-5.60	-22.00	-16.40	CaMg (CO3) 2
Dolomite (ordered)	-5.03	-22.00	-16.97	CaMg (CO3) 2
Epsomite	-2.94	-5.10	-2.16	MgSO4:7H2O
Fe (OH) 2	-5.28	8.28	13.56	Fe (OH) 2
Fe (OH) 2.7Cl1.3	6.05	3.01	-3.04	Fe (OH) 2.7Cl1.3
Fe2 (OH) 4SeO3	-3.94	-2.38	1.55	Fe2 (OH) 4SeO3
Fe2 (SeO3) 3:2H2O	-8.07	-28.69	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-29.66	-32.67	-3.02	Fe2 (SO4) 3
Fe3 (OH) 8	-1.17	19.05	20.22	Fe3 (OH) 8
FeAsO4:2H2O	-6.80	-6.40	0.40	FeAsO4:2H2O
FeCr2O4	-2.98	4.63	7.62	FeCr2O4
FeMoO4	-0.36	-10.42	-10.06	FeMoO4
Ferrihydrite	1.98	5.39	3.41	Fe (OH) 3
Ferroselite	-12.22	-30.96	-18.74	FeSe2
FeS (ppt)	-51.57	-54.48	-2.92	FeS
FeSe	-10.60	-21.61	-11.01	FeSe
Galena	-44.23	-58.43	-14.21	PbS
Gibbsite	2.36	10.94	8.57	Al (OH) 3
Goethite	4.72	5.39	0.67	FeOOH
Goslarite	-5.95	-8.00	-2.05	ZnSO4:7H2O
Greenockite	-44.55	-59.07	-14.52	CdS
Greigite	-186.97	-232.00	-45.03	Fe3S4
Gypsum	-0.15	-4.77	-4.61	CaSO4:2H2O
H-Jarosite	-1.39	-12.80	-11.41	(H3O) Fe3 (SO4) 2 (OH) 6
H2MoO4	-5.68	-18.70	-13.02	H2MoO4
H2S (g)	-54.76	-62.77	-8.01	H2S
H2Se (g)	-24.97	-29.89	-4.91	H2Se
Halite	-5.20	-3.61	1.59	NaCl
Hausmannite	-18.99	43.29	62.28	Mn3O4

Hematite	11.81	10.78	-1.03	Fe2O3
Hercynite	6.33	30.16	23.83	FeAl2O4
Hg (CH3) 2 (g)	-148.06	-223.20	-75.14	Hg (CH3) 2
Hg (g)	-8.76	-16.70	-7.94	Hg
Hg (OH) 2	-14.36	-17.85	-3.50	Hg (OH) 2
Hg2 (g)	-18.27	-33.39	-15.13	Hg2
Hg2 (OH) 2	-18.12	-12.86	5.26	Hg2 (OH) 2
Hg2CO3	-17.23	-33.41	-16.18	Hg2CO3
Hg2CrO4	-42.87	-51.57	-8.70	Hg2CrO4
Hg2HPO4	-18.60	-43.38	-24.77	Hg2HPO4
Hg2S	-63.74	-75.63	-11.88	Hg2S
Hg2SeO3	-21.36	-26.02	-4.66	Hg2SeO3
Hg2SO4	-21.20	-27.35	-6.15	Hg2SO4
Hg3O2CO3	-44.43	-74.11	-29.68	Hg3O2CO3
HgCl (g)	-34.34	-14.37	19.98	HgCl
HgCl2	-12.14	-33.72	-21.58	HgCl2
Hgmetal (l)	-3.00	-16.70	-13.70	Hg
HgSe	7.95	-47.74	-55.69	HgSe
HgSeO3	-18.58	-31.01	-12.43	HgSeO3
HgSO4	-22.87	-32.34	-9.46	HgSO4
Hinsdalite	-5.35	-7.85	-2.50	PbAl3PO4SO4 (OH) 6
Huntite	-14.69	-44.34	-29.65	CaMg3 (CO3) 4
Hydrocerussite	-9.34	-28.11	-18.77	Pb3 (OH) 2 (CO3) 2
Hydromagnesite	-27.17	-35.29	-8.12	Mg5 (CO3) 4 (OH) 2 : 4H2O
Hydroxylapatite	1.38	-42.96	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-7.09	-69.88	-62.79	Pb5 (PO4) 3OH
K-Alum	-9.05	-14.31	-5.26	KAl (SO4) 2 : 12H2O
K-Jarosite	5.33	-9.08	-14.41	KFe3 (SO4) 2 (OH) 6
K2Cr2O7	-52.49	-69.97	-17.48	K2Cr2O7
K2CrO4	-30.69	-31.26	-0.57	K2CrO4
K2MoO4	-14.53	-11.25	3.27	K2MoO4
K2SeO4	-21.35	-22.08	-0.73	K2SeO4
Langite	-3.28	14.70	17.98	Cu4 (OH) 6SO4 : H2O
Larnakite	-5.45	-5.82	-0.37	PbO : PbSO4
Laurionite	-4.23	-3.60	0.62	PbOHCl
Lepidocrocite	4.02	5.39	1.37	FeOOH
Lime	-23.56	9.72	33.28	CaO
Litharge	-8.56	4.33	12.89	PbO
Mackinawite	-50.88	-54.48	-3.60	FeS
Maghemite	4.39	10.78	6.39	Fe2O3
Magnesioferrite	2.47	20.16	17.69	Fe2MgO4
Magnesite	-3.65	-11.17	-7.52	MgCO3
Magnetite	15.03	19.06	4.02	Fe3O4
Malachite	-0.43	-5.96	-5.53	Cu2 (OH) 2CO3
Manganite	-7.49	17.85	25.34	MnOOH
Massicot	-8.76	4.33	13.09	PbO
Melanothallite	-15.02	-8.57	6.45	CuCl2
Melanterite	-3.94	-6.21	-2.27	FeSO4 : 7H2O
Metacinnabar	-34.77	-80.62	-45.85	HgS
Mg (OH) 2 (active)	-9.41	9.38	18.79	Mg (OH) 2
Mg3 (PO4) 2	-9.59	-32.87	-23.28	Mg3 (PO4) 2
MgCr2O4	-11.00	5.74	16.73	MgCr2O4
MgCrO4	-34.97	-29.33	5.64	MgCrO4
MgHPO4 : 3H2O	-2.95	-21.13	-18.18	MgHPO4 : 3H2O
MgMoO4	-7.47	-9.32	-1.85	MgMoO4
MgSeO3 : 6H2O	-6.81	-3.77	3.04	MgSeO3 : 6H2O
MgSeO4 : 6H2O	-18.95	-20.15	-1.20	MgSeO4 : 6H2O
Minium	-41.25	33.53	74.77	Pb3O4
Mirabilite	-4.48	-5.83	-1.35	Na2SO4 : 10H2O
Mn2 (SO4) 3	-53.86	-59.08	-5.23	Mn2 (SO4) 3
Mn3 (AsO4) 2 : 8H2O	-13.33	-0.83	12.50	Mn3 (AsO4) 2 : 8H2O
Mn3 (PO4) 2	-14.41	-38.26	-23.85	Mn3 (PO4) 2
MnCl2 : 4H2O	-11.03	-8.29	2.75	MnCl2 : 4H2O
MnHPO4	2.47	-22.93	-25.40	MnHPO4
MnS (grn)	-55.44	-55.18	0.27	MnS
MnS (pnk)	-58.52	-55.18	3.34	MnS
MnSe	-26.09	-22.30	3.79	MnSe
MnSeO3	-6.70	-5.57	1.13	MnSeO3

MnSeO3:2H2O	-6.53	-5.57	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-19.90	-21.95	-2.05	MnSeO4:5H2O
MnSO4	-9.67	-6.90	2.78	MnSO4
Monteponite	-11.71	3.70	15.41	CdO
Montroydite	-14.33	-17.85	-3.52	HgO
MoO3	-10.70	-18.70	-8.00	MoO3
Morenosite	-5.63	-7.81	-2.18	NiSO4:7H2O
MoS2	-93.35	-164.76	-71.41	MoS2
Na-Jarosite	2.27	-8.48	-10.75	NaFe3(SO4)2(OH)6
Na2Cr2O7	-58.80	-68.77	-9.96	Na2Cr2O7
Na2CrO4	-33.04	-30.06	2.99	Na2CrO4
Na2Mo2O7	-11.99	-28.75	-16.76	Na2Mo2O7
Na2MoO4	-11.57	-10.05	1.52	Na2MoO4
Na2MoO4:2H2O	-11.27	-10.05	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-14.80	-4.50	10.30	Na2SeO3:5H2O
Na2SeO4	-22.16	-20.88	1.28	Na2SeO4
Nantokite	-1.38	-8.24	-6.86	CuCl
Natron	-10.39	-11.90	-1.51	Na2CO3:10H2O
Nesquehonite	-6.57	-11.17	-4.60	MgCO3:3H2O
Ni(OH)2	-6.41	6.67	13.08	Ni(OH)2
Ni3(AsO4)2:8H2O	-19.27	-3.57	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-9.70	-41.00	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-19.79	12.21	32.00	Ni4(OH)6SO4
NiCO3	-7.13	-13.88	-6.75	NiCO3
NiMoO4	-0.88	-12.03	-11.15	NiMoO4
NiS(alpha)	-50.49	-56.09	-5.60	NiS
NiS(beta)	-44.99	-56.09	-11.10	NiS
NiS(gamma)	-43.29	-56.09	-12.80	NiS
NiSe	-5.51	-23.21	-17.70	NiSe
NiSeO3:2H2O	-9.39	-6.48	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-21.34	-22.86	-1.52	NiSeO4:6H2O
Nsutite	-15.06	2.45	17.50	MnO2
O2(g)	-43.73	41.06	84.79	O2
Orpiment	-152.29	-214.40	-62.11	As2S3
Otavite	-4.86	-16.85	-12.00	CdCO3
Pb(BO2)2	-12.37	-5.80	6.57	Pb(BO2)2
Pb(OH)2	-3.99	4.33	8.32	Pb(OH)2
Pb10(OH)6O(CO3)6	-71.23	-79.99	-8.76	Pb10(OH)6O(CO3)6
Pb2(OH)3Cl	-8.07	0.73	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-17.52	8.66	26.19	Pb2O(OH)2
Pb2O3	-31.85	29.19	61.04	Pb2O3
Pb2OCO3	-11.45	-11.89	-0.44	Pb2OCO3
Pb3(AsO4)2	-16.39	-10.59	5.80	Pb3(AsO4)2
Pb3(PO4)2	-4.50	-48.03	-43.53	Pb3(PO4)2
Pb3O2CO3	-18.90	-7.55	11.35	Pb3O2CO3
Pb3O2SO4	-12.41	-1.49	10.92	Pb3O2SO4
Pb4(OH)6SO4	-18.26	2.84	21.10	Pb4(OH)6SO4
Pb4O3SO4	-19.44	2.85	22.28	Pb4O3SO4
PbCrO4	-21.65	-34.38	-12.73	PbCrO4
PbHPO4	-2.38	-26.18	-23.81	PbHPO4
Pbmetal	-20.44	-16.20	4.24	Pb
PbMoO4	1.41	-14.37	-15.78	PbMoO4
PbO:0.3H2O	-8.65	4.33	12.98	PbO:0.33H2O
PbSeO4	-18.31	-25.20	-6.88	PbSeO4
Periclase	-12.65	9.38	22.03	MgO
Phosgenite	-7.95	-27.76	-19.81	PbCl2:PbCO3
Plattnerite	-25.62	24.86	50.48	PbO2
Plumbgummite	8.91	-23.88	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-13.47	9.72	23.19	Ca(OH)2
Pyrite	-78.06	-96.72	-18.66	FeS2
Pyrochroite	-7.90	7.59	15.48	Mn(OH)2
Pyrolusite	-14.07	28.12	42.19	MnO2
Pyromorphite	6.62	-77.81	-84.43	Pb5(PO4)3Cl
Realgar	-65.95	-86.08	-20.13	AsS
Retgersite	-5.76	-7.81	-2.05	NiSO4:6H2O
Rhodochrosite	-2.39	-12.96	-10.57	MnCO3
Semetal(am)	-2.21	-9.36	-7.14	Se
Semetal(hex)	-1.60	-9.36	-7.76	Se

SeO2	-13.28	-13.16	0.12	SeO2
SeO3	-51.01	-29.53	21.48	SeO3
Siderite	-2.08	-12.27	-10.19	FeCO3
Smithsonite	-4.11	-14.06	-9.95	ZnCO3
Sphalerite	-44.74	-56.28	-11.54	ZnS
Spinel	-6.74	31.26	38.00	MgAl2O4
Strengite	1.25	-25.13	-26.37	FePO4:2H2O
Sulfur	-40.14	-42.23	-2.10	S
Tenorite	-0.54	7.30	7.84	CuO
Thenardite	-6.18	-5.83	0.35	Na2SO4
Thermonatrite	-12.56	-11.90	0.67	Na2CO3:H2O
Tsumebite	-4.76	-14.55	-9.79	Pb2CuPO4(OH) 3:3H2O
Vivianite	-0.19	-36.19	-36.00	Fe3(PO4)2:8H2O
Witherite	-6.66	-15.24	-8.58	BaCO3
Wurtzite	-47.26	-56.28	-9.01	ZnS
Zincite	-5.11	6.49	11.60	ZnO
Zincosite	-12.17	-8.00	4.17	ZnSO4
Zn(BO2)2	-11.94	-3.65	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-69.45	-66.21	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-5.71	6.49	12.20	Zn(OH)2
Zn(OH)2(am)	-6.23	6.49	12.71	Zn(OH)2
Zn(OH)2(beta)	-5.51	6.49	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-5.29	6.49	11.78	Zn(OH)2
Zn(OH)2(gamma)	-5.25	6.49	11.73	Zn(OH)2
Zn2(OH)2SO4	-9.01	-1.51	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-10.15	5.04	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-17.77	-4.12	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-6.14	-41.56	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-29.18	-9.50	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-16.94	11.46	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-21.94	16.56	38.50	Zn5(OH)8Cl2
ZnCl2	-16.65	-9.38	7.27	ZnCl2
ZnCO3:1H2O	-3.80	-14.06	-10.26	ZnCO3:1H2O
Znmetal	-40.29	-14.04	26.24	Zn
ZnMoO4	-2.12	-12.22	-10.09	ZnMoO4
ZnO(active)	-4.96	6.49	11.45	ZnO
ZnS(am)	-47.18	-56.28	-9.10	ZnS
ZnSe	-8.92	-23.40	-14.48	ZnSe
ZnSeO4:6H2O	-21.53	-23.05	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.49	-8.00	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 4.

End of Run after 0.262 Seconds.



Appendix E PHREEQC RWD Amendment Input

SELECTED_OUTPUT 1

```

-file          Kanmantoo Source 3 RWD TREATMENT.sel
-totals        Al  As  Be  Ba  B  Co  Cd
               Cr  Cu  Fe  Mn  Mo  Pb  Se
               Ni  Zn  N  P  Ca  Mg  Na
               K  Alkalinity Cl  S(6)
-molalities    H+  HCO3-  CO3-2
-equilibrium_phases  Diaspore Magnetite Portlandite
-saturation_indices  Portlandite Diaspore Magnetite

```

SOLUTION_MASTER_SPECIES

```

Co      Co+3      -1.0  Co      58.9332
Co(2)   Co+2      0.0  Co
Co(3)   Co+3     -1.0  Co
END

```

PHASES

```

CoO
  CoO + 2H+ = Co+2 + H2O
  log_k 13.5864
  delta_h -106.295 kJ
Co(OH)2
  Co(OH)2 + 2H+ = Co+2 + 2H2O
  log_k 13.094
  delta_h -0 kJ
Co(OH)3
  Co(OH)3 + 3H+ = Co+3 + 3H2O
  log_k -2.309
  delta_h -92.43 kJ
Co3O4
  Co3O4 + 8H+ = Co+2 + 2Co+3 + 4H2O
  log_k -10.4956
  delta_h -107.5 kJ
CoFe2O4
  CoFe2O4 + 8H+ = Co+2 + 2Fe+3 + 4H2O
  log_k -3.5281
  delta_h -158.82 kJ
CoCl2
  CoCl2 = Co+2 + 2Cl-
  log_k 8.2672
  delta_h -79.815 kJ
CoCl2:6H2O
  CoCl2:6H2O = Co+2 + 2Cl- + 6H2O
  log_k 2.5365
  delta_h 8.0598 kJ
(Co(NH3)6)Cl3
  (Co(NH3)6)Cl3 + 6H+ = Co+3 + 6NH4+ + 3Cl-
  log_k 20.0317
  delta_h -33.1 kJ
(Co(NH3)5OH2)Cl3
  (Co(NH3)5OH2)Cl3 + 5H+ = Co+3 + 5NH4+ + 3Cl- + H2O
  log_k 11.7351
  delta_h -25.37 kJ
(Co(NH3)5Cl)Cl2
  (Co(NH3)5Cl)Cl2 + 5H+ = Co+3 + 5NH4+ + 3Cl-
  log_k 4.5102
  delta_h -10.74 kJ
CoCO3
  CoCO3 = Co+2 + CO3-2
  log_k -9.98
  delta_h -12.7612 kJ
CoSO4
  CoSO4 = Co+2 + SO4-2
  log_k 2.8024
  delta_h -79.277 kJ
CoSO4:6H2O
  CoSO4:6H2O = Co+2 + SO4-2 + 6H2O
  log_k -2.4726

```

delta_h 1.0801 kJ
END

SOLUTION 1 #Mean RWD water quality

temp 20
pH 4.05
pe 4
redox pe
units mg/l
density 1
Al 1.42
Alkalinity 0
As 0.002
Ba 0.04
Be 0.002
B 0.1
Cd 0.0008
Co 0.72
Cr 0.0033
Cu 6.25
Fe 24.67
Pb 0.02
Mn 5.22
Mo 0.11
Zn 0.49
Se 0.01
Ni 0.49
N 10.07
P 0.29
Ca 522
Mg 88
Na 343
K 245
Cl 490
S(6) 2222
-water 1 # kg

USER_PRINT

-start

10 PRINT "Moles of Portlandite:",EQUI_DELTA("Fix_pH")
20 PRINT "Moles of Diaspore:", EQUI_DELTA("Fix_pH")
30 PRINT "Moles of Magnetite:", EQUI_DELTA("Fix_pH")
40 PRINT "Moles of Birnessite:", EQUI_DELTA("Fix_pH")
50 PRINT "mg of Portlandite:", EQUI_DELTA("Fix_pH")*74.092*1000
60 PRINT "mg of Diaspore:", EQUI_DELTA("Fix_pH")*59.99*1000
70 PRINT "mg of Magnetite:", EQUI_DELTA("Fix_pH")*231.53*1000
70 PRINT "mg of Birnessite:", EQUI_DELTA("Fix_pH")*86.936*1000
-end

PHASES

Fix_pH

H+ = H+
log_k 0

END

USE solution 1

EQUILIBRIUM_PHASES 1

CO2(g) -3.5 10
Diaspore 0 0
Fix_pH -4.5 Portlandite 10
Magnetite 0 0
O2(g) -0.68 10
Birnessite 0 0

END

USE solution 1

```

EQUILIBRIUM_PHASES 2
  CO2(g)      -3.5 10
  Diaspore    0 0
  Fix_pH      -4.75 Portlandite 10
  Magnetite   0 0
  O2(g)       -0.68 10
  Birnessite  0 0
END

USE solution 1
EQUILIBRIUM_PHASES 3
  CO2(g)      -3.5 10
  Diaspore    0 0
  Fix_pH      -5 Portlandite 10
  Magnetite   0 0
  O2(g)       -0.68 10
  Birnessite  0 0
END

USE solution 1
EQUILIBRIUM_PHASES 4
  Birnessite  0 0
  CO2(g)      -3.5 10
  Diaspore    0 0
  Fix_pH      -5.25 Portlandite 10
  Magnetite   0 0
  O2(g)       -0.68 10
END

USE solution 1
EQUILIBRIUM_PHASES 5
  Birnessite  0 0
  Diaspore    0 0
  Fix_pH      -5.5 Portlandite 10
  Magnetite   0 0
  O2(g)       -0.68 10
CO2(g)      -3.5 10
END

USE solution 1
EQUILIBRIUM_PHASES 6
  Birnessite  0 0
  Diaspore    0 0
  Fix_pH      -5.75 Portlandite 10
  Magnetite   0 0
  O2(g)       -0.68 10
CO2(g)      -3.5 10
END

USE solution 1
EQUILIBRIUM_PHASES 7
  Birnessite  0 0
  Diaspore    0 0
  Fix_pH      -6 Portlandite 10
  Magnetite   0 0
  O2(g)       -0.68 10
CO2(g)      -3.5 10
END

USE solution 1
EQUILIBRIUM_PHASES 8
  Birnessite  0 0
  Diaspore    0 0
  Fix_pH      -6.25 Portlandite 10
  Magnetite   0 0
  O2(g)       -0.68 10
CO2(g)      -3.5 10
END

```

```
USE solution 1
EQUILIBRIUM_PHASES 9
  Birnessite 0 0
  Diaspore 0 0
  Fix_pH -6.5 Portlandite 10
  Magnetite 0 0
  O2(g) -0.68 10
CO2(g) -3.5 10
END
```



Appendix F PHREEQC RWD Amendment Output

Input file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\PHREEQC\3 Treatment
\Kanmantoo RWD TREATMENT.pqi
Output file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\PHREEQC\3 Treatment
\Kanmantoo RWD TREATMENT.pqi
Database file: C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
\minteq.v4.dat

Reading data base.

SOLUTION_MASTER_SPECIES
SOLUTION_SPECIES
SOLUTION_SPECIES
PHASES
PHASES
SURFACE_MASTER_SPECIES
SURFACE_SPECIES
END

Reading input data for simulation 1.

DATABASE C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
\minteq.v4.dat

SELECTED_OUTPUT 1
file Kanmantoo Source 3 RWD TREATMENT.sel
totals Al As Be Ba B Co Cd
Cr Cu Fe Mn Mo Pb Se
Ni Zn N P Ca Mg Na
K Alkalinity Cl S(6)
molalities H+ HCO3- CO3-2
equilibrium_phases Diaspore Magnetite Portlandite
saturation_indices Portlandite Diaspore Magnetite
SOLUTION_MASTER_SPECIES
Co Co+3 -1.0 Co 58.9332
Co(2) Co+2 0.0 Co
Co(3) Co+3 -1.0 Co
END

End of simulation.

Reading input data for simulation 2.

PHASES
CoO
CoO + 2H+ = Co+2 + H2O
log_k 13.5864
delta_h -106.295 kJ
Co(OH)2
Co(OH)2 + 2H+ = Co+2 + 2H2O
log_k 13.094
delta_h -0 kJ
Co(OH)3
Co(OH)3 + 3H+ = Co+3 + 3H2O
log_k -2.309
delta_h -92.43 kJ
Co3O4
Co3O4 + 8H+ = Co+2 + 2Co+3 + 4H2O
log_k -10.4956
delta_h -107.5 kJ
CoFe2O4
CoFe2O4 + 8H+ = Co+2 + 2Fe+3 + 4H2O
log_k -3.5281
delta_h -158.82 kJ

```

CoCl2
  CoCl2 = Co+2 + 2Cl-
  log_k 8.2672
  delta_h -79.815 kJ
CoCl2:6H2O
  CoCl2:6H2O = Co+2 + 2Cl- + 6H2O
  log_k 2.5365
  delta_h 8.0598 kJ
(Co(NH3)6)Cl3
  (Co(NH3)6)Cl3 + 6H+ = Co+3 + 6NH4+ + 3Cl-
  log_k 20.0317
  delta_h -33.1 kJ
(Co(NH3)5OH2)Cl3
  (Co(NH3)5OH2)Cl3 + 5H+ = Co+3 + 5NH4+ + 3Cl- + H2O
  log_k 11.7351
  delta_h -25.37 kJ
(Co(NH3)5Cl)Cl2
  (Co(NH3)5Cl)Cl2 + 5H+ = Co+3 + 5NH4+ + 3Cl-
  log_k 4.5102
  delta_h -10.74 kJ
CoCO3
  CoCO3 = Co+2 + CO3-2
  log_k -9.98
  delta_h -12.7612 kJ
CoSO4
  CoSO4 = Co+2 + SO4-2
  log_k 2.8024
  delta_h -79.277 kJ
CoSO4:6H2O
  CoSO4:6H2O = Co+2 + SO4-2 + 6H2O
  log_k -2.4726
  delta_h 1.0801 kJ
END

```

End of simulation.

Reading input data for simulation 3.

```

SOLUTION 1 #Mean RWD water quality
temp      20
pH         4.05
pe         4
redox      pe
units      mg/l
density    1
Al         1.42
Alkalinity 0
As         0.002
Ba         0.04
Be         0.002
B          0.1
Cd         0.0008
Co         0.72
Cr         0.0033
Cu         6.25
Fe         24.67
Pb         0.02
Mn         5.22
Mo         0.11
Zn         0.49
Se         0.01
Ni         0.49
N          10.07
P          0.29
Ca         522

```



```

Mg      88
Na      343
K       245
Cl      490
S(6)    2222
water   1 # kg
USER_PRINT
start
10 PRINT "Moles of Portlandite:",EQUI_DELTA("Fix_pH")
20 PRINT "Moles of Diaspore:", EQUI_DELTA("Fix_pH")
30 PRINT "Moles of Magnetite:", EQUI_DELTA("Fix_pH")
40 PRINT "Moles of Birnessite:", EQUI_DELTA("Fix_pH")
50 PRINT "mg of Portlandite:", EQUI_DELTA("Fix_pH")*74.092*1000
60 PRINT "mg of Diaspore:", EQUI_DELTA("Fix_pH")*59.99*1000
70 PRINT "mg of Magnetite:", EQUI_DELTA("Fix_pH")*231.53*1000
70 PRINT "mg of Birnessite:", EQUI_DELTA("Fix_pH")*86.936*1000
end
PHASES
Fix_pH
H+ = H+
log_k    0
END

```

Beginning of initial solution calculations.

Initial solution 1.

-----User print-----

```

Moles of Portlandite:      0
Moles of Diaspore:        0
Moles of Magnetite:       0
Moles of Birnessite:      0
mg of Portlandite:        0
mg of Diaspore:          0
mg of Birnessite:        0

```

-----Solution composition-----

Elements	Molality	Moles
Al	5.284e-05	5.284e-05
As	2.680e-08	2.680e-08
B	9.287e-06	9.287e-06
Ba	2.924e-07	2.924e-07
Be	2.228e-07	2.228e-07
Ca	1.308e-02	1.308e-02
Cd	7.145e-09	7.145e-09
Cl	1.388e-02	1.388e-02
Co	1.227e-05	1.227e-05
Cr	6.372e-08	6.372e-08
Cu	9.874e-05	9.874e-05
Fe	4.435e-04	4.435e-04
K	6.291e-03	6.291e-03
Mg	3.635e-03	3.635e-03
Mn	9.539e-05	9.539e-05
Mo	1.151e-06	1.151e-06
N	7.218e-04	7.218e-04
Na	1.498e-02	1.498e-02
Ni	8.382e-06	8.382e-06
P	9.400e-06	9.400e-06
Pb	9.691e-08	9.691e-08
S(6)	2.322e-02	2.322e-02
Se	1.271e-07	1.271e-07
Zn	7.523e-06	7.523e-06

-----Description of solution-----

pH = 4.050
 pe = 4.000
 Activity of water = 0.999
 Ionic strength (mol/kgw) = 7.235e-02
 Mass of water (kg) = 1.000e+00
 Total alkalinity (eq/kg) = -1.741e-04
 Total carbon (mol/kg) = 0.000e+00
 Total CO2 (mol/kg) = 0.000e+00
 Temperature (°C) = 20.00
 Electrical balance (eq) = -3.291e-03
 Percent error, 100*(Cat-|An|)/(Cat+|An|) = -3.64
 Iterations = 12
 Total H = 1.110168e+02
 Total O = 5.559979e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.112e-04	8.913e-05	-3.954	-4.050	-0.096	0.00
OH-	9.765e-11	7.686e-11	-10.010	-10.114	-0.104	(0)
H2O	5.551e+01	9.988e-01	1.744	-0.001	0.000	18.05
Al	5.284e-05					
AlSO4+	4.325e-05	3.456e-05	-4.364	-4.461	-0.097	(0)
Al+3	5.995e-06	8.162e-07	-5.222	-6.088	-0.866	(0)
Al(SO4)2-	3.425e-06	2.737e-06	-5.465	-5.563	-0.097	(0)
AlOH+2	1.549e-07	6.629e-08	-6.810	-7.179	-0.369	(0)
Al(OH)2+	1.021e-08	8.256e-09	-7.991	-8.083	-0.092	(0)
Al(OH)3	1.859e-11	1.859e-11	-10.731	-10.731	0.000	(0)
Al(OH)4-	1.003e-13	8.018e-14	-12.999	-13.096	-0.097	(0)
AlMo6O21-3	3.639e-15	2.171e-16	-14.439	-15.663	-1.224	(0)
As (3)	2.521e-08					
H3AsO3	2.521e-08	2.521e-08	-7.598	-7.598	0.000	(0)
H4AsO3+	1.523e-12	1.113e-12	-11.817	-11.953	-0.136	(0)
H2AsO3-	1.643e-13	1.201e-13	-12.784	-12.920	-0.136	(0)
HAsO3-2	3.453e-21	9.864e-22	-20.462	-21.006	-0.544	(0)
AsO3-3	6.008e-30	3.584e-31	-29.221	-30.446	-1.224	(0)
As (5)	1.588e-09					
H2AsO4-	1.567e-09	1.145e-09	-8.805	-8.941	-0.136	(0)
H3AsO4	1.662e-11	1.690e-11	-10.779	-10.772	0.007	(0)
HAsO4-2	4.832e-12	1.380e-12	-11.316	-11.860	-0.544	(0)
AsO4-3	7.304e-19	4.357e-20	-18.136	-19.361	-1.224	(0)
B	9.287e-06					
H3BO3	9.287e-06	9.443e-06	-5.032	-5.025	0.007	(0)
H2BO3-	7.274e-11	5.627e-11	-10.138	-10.250	-0.111	(0)
CaH2BO3+	1.376e-11	1.065e-11	-10.861	-10.973	-0.111	(0)
MgH2BO3+	2.559e-12	1.980e-12	-11.592	-11.703	-0.111	(0)
NaH2BO3	1.131e-12	1.131e-12	-11.947	-11.947	0.000	(0)
H5(BO3)2-	6.034e-16	4.668e-16	-15.219	-15.331	-0.111	(0)
BaH2BO3+	2.636e-16	2.039e-16	-15.579	-15.691	-0.111	(0)
H8(BO3)3-	4.932e-19	3.815e-19	-18.307	-18.418	-0.111	(0)
Ba	2.924e-07					
Ba+2	2.924e-07	1.205e-07	-6.534	-6.919	-0.385	(0)
BaNH3+2	8.904e-16	2.544e-16	-15.050	-15.595	-0.544	(0)
BaH2BO3+	2.636e-16	2.039e-16	-15.579	-15.691	-0.111	(0)
BaOH+	4.857e-17	3.908e-17	-16.314	-16.408	-0.094	(0)
BaNO3+	0.000e+00	0.000e+00	-58.243	-58.379	-0.136	(0)
Be	2.228e-07					
Be+2	1.589e-07	6.549e-08	-6.799	-7.184	-0.385	(0)
BeSO4	5.495e-08	5.495e-08	-7.260	-7.260	0.000	(0)
Be(SO4)2-2	3.956e-09	1.130e-09	-8.403	-8.947	-0.544	(0)
BeOH+	3.590e-09	2.942e-09	-8.445	-8.531	-0.086	(0)
BeCl+	1.430e-09	1.151e-09	-8.845	-8.939	-0.094	(0)
Be(OH)2	2.095e-13	2.095e-13	-12.679	-12.679	0.000	(0)
Be2OH+3	1.919e-13	3.197e-14	-12.717	-13.495	-0.778	(0)
Be3(OH)3+3	3.696e-18	6.156e-19	-17.432	-18.211	-0.778	(0)

	Be (OH) 3-	7.246e-19	5.938e-19	-18.140	-18.226	-0.086	(0)
	Be (OH) 4-2	9.377e-29	4.228e-29	-28.028	-28.374	-0.346	(0)
Ca	1.308e-02						
	Ca+2	8.199e-03	3.380e-03	-2.086	-2.471	-0.385	(0)
	CaSO4	4.877e-03	4.877e-03	-2.312	-2.312	0.000	(0)
	CaH2PO4+	5.618e-07	4.544e-07	-6.250	-6.343	-0.092	(0)
	CaHPO4	6.463e-09	6.463e-09	-8.190	-8.190	0.000	(0)
	CaNH3+2	4.981e-11	1.423e-11	-10.303	-10.847	-0.544	(0)
	CaH2BO3+	1.376e-11	1.065e-11	-10.861	-10.973	-0.111	(0)
	CaOH+	6.009e-12	4.895e-12	-11.221	-11.310	-0.089	(0)
	CaPO4-	2.137e-13	1.729e-13	-12.670	-12.762	-0.092	(0)
	Ca (NH3) 2+2	6.632e-20	1.894e-20	-19.178	-19.723	-0.544	(0)
	CaNO3+	0.000e+00	0.000e+00	-54.018	-54.154	-0.136	(0)
Cd	7.145e-09						
	Cd+2	2.961e-09	1.221e-09	-8.529	-8.913	-0.385	(0)
	CdSO4	1.783e-09	1.783e-09	-8.749	-8.749	0.000	(0)
	CdCl+	1.752e-09	1.281e-09	-8.757	-8.893	-0.136	(0)
	Cd (SO4) 2-2	5.911e-10	1.689e-10	-9.228	-9.772	-0.544	(0)
	CdCl2	5.825e-11	5.825e-11	-10.235	-10.235	0.000	(0)
	CdCl3-	5.300e-13	3.875e-13	-12.276	-12.412	-0.136	(0)
	CdOHCl	5.266e-15	5.266e-15	-14.279	-14.279	0.000	(0)
	CdOH+	1.026e-15	7.503e-16	-14.989	-15.125	-0.136	(0)
	Cd (OH) 2	7.790e-22	7.790e-22	-21.108	-21.108	0.000	(0)
	Cd2OH+3	8.185e-23	4.883e-24	-22.087	-23.311	-1.224	(0)
	Cd (SeO3) 2-2	5.753e-26	1.643e-26	-25.240	-25.784	-0.544	(0)
	Cd (OH) 3-	7.346e-30	5.370e-30	-29.134	-29.270	-0.136	(0)
	CdSeO4	3.576e-31	3.576e-31	-30.447	-30.447	0.000	(0)
	Cd (OH) 4-2	3.472e-40	0.000e+00	-39.459	-40.004	-0.544	(0)
	CdNO3+	0.000e+00	0.000e+00	-60.413	-60.549	-0.136	(0)
	Cd (NO3) 2	0.000e+00	0.000e+00	-113.111	-113.111	0.000	(0)
Cl	1.388e-02						
	Cl-	1.381e-02	1.106e-02	-1.860	-1.956	-0.096	(0)
	CuCl2-	2.907e-05	2.306e-05	-4.537	-4.637	-0.101	(0)
	CuCl	9.858e-06	9.858e-06	-5.006	-5.006	0.000	(0)
	MnCl+	3.569e-07	2.872e-07	-6.447	-6.542	-0.094	(0)
	CuCl+	3.164e-07	2.510e-07	-6.500	-6.600	-0.101	(0)
	CoCl+	1.315e-07	9.612e-08	-6.881	-7.017	-0.136	(0)
	CuCl3-2	1.276e-07	5.349e-08	-6.894	-7.272	-0.378	(0)
	NiCl+	8.574e-08	6.268e-08	-7.067	-7.203	-0.136	(0)
	ZnCl+	6.136e-08	4.867e-08	-7.212	-7.313	-0.101	(0)
	PbCl+	7.379e-09	5.395e-09	-8.132	-8.268	-0.136	(0)
	MnCl2	4.488e-09	4.488e-09	-8.348	-8.348	0.000	(0)
	CdCl+	1.752e-09	1.281e-09	-8.757	-8.893	-0.136	(0)
	BeCl+	1.430e-09	1.151e-09	-8.845	-8.939	-0.094	(0)
	CuCl2	7.521e-10	7.521e-10	-9.124	-9.124	0.000	(0)
	ZnCl2	6.866e-10	6.866e-10	-9.163	-9.163	0.000	(0)
	PbCl2	2.606e-10	2.606e-10	-9.584	-9.584	0.000	(0)
	CrCl+2	6.429e-11	1.836e-11	-10.192	-10.736	-0.544	(0)
	CdCl2	5.825e-11	5.825e-11	-10.235	-10.235	0.000	(0)
	MnCl3-	1.700e-11	1.367e-11	-10.770	-10.864	-0.094	(0)
	ZnOHCl	7.463e-12	7.463e-12	-11.127	-11.127	0.000	(0)
	ZnCl3-	7.451e-12	5.911e-12	-11.128	-11.228	-0.101	(0)
	NiCl2	3.540e-12	3.540e-12	-11.451	-11.451	0.000	(0)
	PbCl3-	1.659e-12	1.213e-12	-11.780	-11.916	-0.136	(0)
	CdCl3-	5.300e-13	3.875e-13	-12.276	-12.412	-0.136	(0)
	CuCl3-	8.945e-14	7.096e-14	-13.048	-13.149	-0.101	(0)
	ZnCl4-2	7.493e-14	3.140e-14	-13.125	-13.503	-0.378	(0)
	FeCl+2	4.146e-14	1.738e-14	-13.382	-13.760	-0.378	(0)
	PbCl4-2	1.993e-14	5.694e-15	-13.700	-14.245	-0.544	(0)
	CrCl2+	1.693e-14	1.238e-14	-13.771	-13.907	-0.136	(0)
	CdOHCl	5.266e-15	5.266e-15	-14.279	-14.279	0.000	(0)
	FeCl2+	1.250e-15	1.006e-15	-14.903	-14.997	-0.094	(0)
	CrOHCl2	2.136e-16	2.136e-16	-15.670	-15.670	0.000	(0)
	CuCl4-2	1.113e-17	4.664e-18	-16.954	-17.331	-0.378	(0)
	FeCl3	1.113e-18	1.113e-18	-17.954	-17.954	0.000	(0)
	CoCl+2	7.155e-34	2.044e-34	-33.145	-33.690	-0.544	(0)
	CrO3Cl-	0.000e+00	0.000e+00	-44.667	-44.803	-0.136	(0)
	Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-47.366	-47.910	-0.544	(0)

Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-49.862	-50.406	-0.544	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-65.026	-65.570	-0.544	(0)
Co (2)	1.227e-05					
Co+2	8.914e-06	2.546e-06	-5.050	-5.594	-0.544	(0)
CoSO4	3.220e-06	3.220e-06	-5.492	-5.492	0.000	(0)
CoCl+	1.315e-07	9.612e-08	-6.881	-7.017	-0.136	(0)
CoHPO4	1.139e-11	1.139e-11	-10.944	-10.944	0.000	(0)
CoOH+	7.843e-12	5.734e-12	-11.106	-11.242	-0.136	(0)
Co (NH3) +2	5.605e-12	1.601e-12	-11.251	-11.796	-0.544	(0)
Co (OH) 2	5.139e-17	5.139e-17	-16.289	-16.289	0.000	(0)
Co2OH+3	1.226e-17	7.317e-19	-16.911	-18.136	-1.224	(0)
Co (NH3) 2+2	5.113e-19	1.461e-19	-18.291	-18.835	-0.544	(0)
Co (OH) 3-	1.583e-25	1.157e-25	-24.801	-24.937	-0.136	(0)
Co (NH3) 3+2	2.153e-26	6.150e-27	-25.667	-26.211	-0.544	(0)
CoOOH-	6.625e-27	4.844e-27	-26.179	-26.315	-0.136	(0)
CoSeO4	1.849e-27	1.849e-27	-26.733	-26.733	0.000	(0)
Co (NH3) 4+2	3.778e-34	1.079e-34	-33.423	-33.967	-0.544	(0)
Co4 (OH) 4+4	3.238e-35	2.156e-37	-34.490	-36.666	-2.177	(0)
Co (OH) 4-2	7.245e-36	2.070e-36	-35.140	-35.684	-0.544	(0)
Co (NH3) 5+2	0.000e+00	0.000e+00	-41.678	-42.223	-0.544	(0)
CoNO2+	0.000e+00	0.000e+00	-43.791	-43.927	-0.136	(0)
CoNO3+	0.000e+00	0.000e+00	-57.457	-57.593	-0.136	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-109.483	-109.483	0.000	(0)
Co (3)	2.050e-31					
CoOH+2	2.035e-31	5.813e-32	-30.691	-31.236	-0.544	(0)
Co+3	7.446e-34	1.014e-34	-33.128	-33.994	-0.866	(0)
CoCl+2	7.155e-34	2.044e-34	-33.145	-33.690	-0.544	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-49.862	-50.406	-0.544	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-60.792	-60.928	-0.136	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-65.026	-65.570	-0.544	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-68.505	-69.050	-0.544	(0)
Cr (2)	5.033e-20					
Cr+2	5.033e-20	1.438e-20	-19.298	-19.842	-0.544	(0)
Cr (3)	6.372e-08					
CrSO4+	2.618e-08	1.914e-08	-7.582	-7.718	-0.136	(0)
Cr+3	2.571e-08	1.534e-09	-7.590	-8.814	-1.224	(0)
Cr (OH) +2	9.288e-09	2.653e-09	-8.032	-8.576	-0.544	(0)
CrOHSO4	2.437e-09	2.437e-09	-8.613	-8.613	0.000	(0)
CrCl+2	6.429e-11	1.836e-11	-10.192	-10.736	-0.544	(0)
Cr (OH) 2+	2.915e-11	2.131e-11	-10.535	-10.671	-0.136	(0)
CrH2PO4+2	7.383e-12	2.109e-12	-11.132	-11.676	-0.544	(0)
CrCl2+	1.693e-14	1.238e-14	-13.771	-13.907	-0.136	(0)
Cr2 (OH) 2SO4+2	1.197e-15	3.419e-16	-14.922	-15.466	-0.544	(0)
Cr (OH) 3	9.036e-16	9.036e-16	-15.044	-15.044	0.000	(0)
CrOHC12	2.136e-16	2.136e-16	-15.670	-15.670	0.000	(0)
Cr2 (OH) 2 (SO4) 2	1.343e-16	1.343e-16	-15.872	-15.872	0.000	(0)
CrO2-	6.593e-21	4.820e-21	-20.181	-20.317	-0.136	(0)
Cr (OH) 4-	5.552e-21	4.059e-21	-20.256	-20.392	-0.136	(0)
Cr (NH3) 5OH+2	0.000e+00	0.000e+00	-40.611	-41.155	-0.544	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-45.831	-47.056	-1.224	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-47.366	-47.910	-0.544	(0)
CrNO3+2	0.000e+00	0.000e+00	-62.020	-62.564	-0.544	(0)
Cr (6)	3.419e-40					
HCrO4-	3.419e-40	2.500e-40	-39.466	-39.602	-0.136	(0)
CrO4-2	0.000e+00	0.000e+00	-41.671	-42.056	-0.385	(0)
CrO3SO4-2	0.000e+00	0.000e+00	-42.797	-43.341	-0.544	(0)
NaCrO4-	0.000e+00	0.000e+00	-43.159	-43.295	-0.136	(0)
KCrO4-	0.000e+00	0.000e+00	-43.667	-43.803	-0.136	(0)
CrO3HPO4-2	0.000e+00	0.000e+00	-43.693	-44.237	-0.544	(0)
H2CrO4	0.000e+00	0.000e+00	-43.854	-43.854	0.000	(0)
CrO3Cl-	0.000e+00	0.000e+00	-44.667	-44.803	-0.136	(0)
CrO3H2PO4-	0.000e+00	0.000e+00	-45.469	-45.605	-0.136	(0)
Cr2O7-2	0.000e+00	0.000e+00	-77.063	-77.607	-0.544	(0)
Cu (1)	4.003e-05					
CuCl2-	2.907e-05	2.306e-05	-4.537	-4.637	-0.101	(0)
CuCl	9.858e-06	9.858e-06	-5.006	-5.006	0.000	(0)
Cu+	9.682e-07	7.078e-07	-6.014	-6.150	-0.136	(0)
CuCl3-2	1.276e-07	5.349e-08	-6.894	-7.272	-0.378	(0)

Cu (2)	5.872e-05					
Cu+2	3.676e-05	1.515e-05	-4.435	-4.819	-0.385	(0)
CuSO4	2.163e-05	2.163e-05	-4.665	-4.665	0.000	(0)
CuCl+	3.164e-07	2.510e-07	-6.500	-6.600	-0.101	(0)
CuOH+	5.328e-09	4.227e-09	-8.273	-8.374	-0.101	(0)
CuNH3+2	2.979e-09	8.511e-10	-8.526	-9.070	-0.544	(0)
CuCl2	7.521e-10	7.521e-10	-9.124	-9.124	0.000	(0)
Cu2 (OH) 2+2	1.518e-12	4.336e-13	-11.819	-12.363	-0.544	(0)
Cu (OH) 2	1.218e-13	1.218e-13	-12.914	-12.914	0.000	(0)
CuCl3-	8.945e-14	7.096e-14	-13.048	-13.149	-0.101	(0)
CuCl4-2	1.113e-17	4.664e-18	-16.954	-17.331	-0.378	(0)
Cu (OH) 3-	3.855e-20	2.818e-20	-19.414	-19.550	-0.136	(0)
Cu (OH) 4-2	8.762e-29	2.503e-29	-28.057	-28.602	-0.544	(0)
CuNO2+	0.000e+00	0.000e+00	-41.845	-41.981	-0.136	(0)
CuNO3+	0.000e+00	0.000e+00	-56.370	-56.506	-0.136	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-80.152	-80.152	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-109.617	-109.617	0.000	(0)
Fe (2)	4.435e-04					
Fe+2	3.080e-04	8.798e-05	-3.511	-4.056	-0.544	(0)
FeSO4	1.352e-04	1.352e-04	-3.869	-3.869	0.000	(0)
FeH2PO4+	3.142e-07	2.541e-07	-6.503	-6.595	-0.092	(0)
FeHPO4	1.436e-09	1.436e-09	-8.843	-8.843	0.000	(0)
FeOH+	3.346e-10	2.692e-10	-9.475	-9.570	-0.094	(0)
Fe (OH) 2	1.556e-17	1.556e-17	-16.808	-16.808	0.000	(0)
Fe (OH) 3-	6.584e-22	5.298e-22	-21.182	-21.276	-0.094	(0)
Fe (3)	2.581e-10					
Fe (OH) 2+	2.410e-10	1.949e-10	-9.618	-9.710	-0.092	(0)
FeOH+2	7.944e-12	3.329e-12	-11.100	-11.478	-0.378	(0)
FeSO4+	4.732e-12	3.807e-12	-11.325	-11.419	-0.094	(0)
FeHPO4+	3.147e-12	2.545e-12	-11.502	-11.594	-0.092	(0)
Fe (SO4) 2-	7.664e-13	5.603e-13	-12.116	-12.252	-0.136	(0)
Fe+3	4.475e-13	6.093e-14	-12.349	-13.215	-0.866	(0)
FeCl+2	4.146e-14	1.738e-14	-13.382	-13.760	-0.378	(0)
FeH2PO4+2	1.558e-14	6.667e-15	-13.807	-14.176	-0.369	(0)
Fe (OH) 3	1.156e-14	1.156e-14	-13.937	-13.937	0.000	(0)
FeCl2+	1.250e-15	1.006e-15	-14.903	-14.997	-0.094	(0)
FeHSeO3+2	4.294e-17	1.227e-17	-16.367	-16.911	-0.544	(0)
FeCl3	1.113e-18	1.113e-18	-17.954	-17.954	0.000	(0)
Fe (OH) 4-	3.068e-19	2.482e-19	-18.513	-18.605	-0.092	(0)
Fe2 (OH) 2+4	6.591e-20	4.389e-22	-19.181	-21.358	-2.177	(0)
Fe3 (OH) 4+5	2.953e-27	1.173e-30	-26.530	-29.931	-3.401	(0)
FeNO3+2	0.000e+00	0.000e+00	-63.759	-64.303	-0.544	(0)
H (0)	1.164e-19					
H2	5.818e-20	5.915e-20	-19.235	-19.228	0.007	(0)
K	6.291e-03					
K+	6.020e-03	4.823e-03	-2.220	-2.317	-0.096	(0)
KSO4-	2.715e-04	2.196e-04	-3.566	-3.658	-0.092	(0)
KHPO4-	1.854e-10	1.500e-10	-9.732	-9.824	-0.092	(0)
KCrO4-	0.000e+00	0.000e+00	-43.667	-43.803	-0.136	(0)
Mg	3.635e-03					
Mg+2	2.461e-03	1.015e-03	-2.609	-2.994	-0.385	(0)
MgSO4	1.173e-03	1.173e-03	-2.931	-2.931	0.000	(0)
MgH2PO4+	3.599e-07	2.911e-07	-6.444	-6.536	-0.092	(0)
MgHPO4	2.678e-09	2.678e-09	-8.572	-8.572	0.000	(0)
MgOH+	3.488e-11	2.859e-11	-10.457	-10.544	-0.086	(0)
MgH2BO3+	2.559e-12	1.980e-12	-11.592	-11.703	-0.111	(0)
MgPO4-	1.003e-15	8.112e-16	-14.999	-15.091	-0.092	(0)
Mn (2)	9.539e-05					
Mn+2	7.219e-05	2.062e-05	-4.142	-4.686	-0.544	(0)
MnSO4	2.285e-05	2.285e-05	-4.641	-4.641	0.000	(0)
MnCl+	3.569e-07	2.872e-07	-6.447	-6.542	-0.094	(0)
MnCl2	4.488e-09	4.488e-09	-8.348	-8.348	0.000	(0)
MnCl3-	1.700e-11	1.367e-11	-10.770	-10.864	-0.094	(0)
MnOH+	4.948e-12	3.981e-12	-11.306	-11.400	-0.094	(0)
MnSe	3.144e-17	3.144e-17	-16.503	-16.503	0.000	(0)
MnSeO4	7.932e-27	7.932e-27	-26.101	-26.101	0.000	(0)
Mn (OH) 3-	5.717e-28	4.600e-28	-27.243	-27.337	-0.094	(0)
Mn (OH) 4-2	3.999e-37	1.676e-37	-36.398	-36.776	-0.378	(0)

MnNO3+	0.000e+00	0.000e+00	-56.548	-56.684	-0.136	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-108.478	-108.478	0.000	(0)
Mn (3)	3.223e-26					
Mn+3	3.223e-26	4.387e-27	-25.492	-26.358	-0.866	(0)
Mn (6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-76.457	-76.834	-0.378	(0)
Mn (7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-82.432	-82.540	-0.108	(0)
Mo	1.151e-06					
MoO4-2	4.714e-07	1.943e-07	-6.327	-6.712	-0.385	(0)
HMoO4-	4.107e-07	3.003e-07	-6.386	-6.522	-0.136	(0)
H2MoO4	2.690e-07	2.690e-07	-6.570	-6.570	0.000	(0)
AlMo6O21-3	3.639e-15	2.171e-16	-14.439	-15.663	-1.224	(0)
HMo7O24-5	1.001e-20	3.977e-24	-20.000	-23.400	-3.401	(0)
H2Mo7O24-4	3.158e-21	2.103e-23	-20.501	-22.677	-2.177	(0)
Mo7O24-6	1.548e-21	1.962e-26	-20.810	-25.707	-4.897	(0)
H3Mo7O24-3	5.612e-23	3.348e-24	-22.251	-23.475	-1.224	(0)
N (-3)	7.218e-04					
NH4+	6.757e-04	5.228e-04	-3.170	-3.282	-0.111	(0)
NH4SO4-	4.605e-05	3.705e-05	-4.337	-4.431	-0.094	(0)
CuNH3+2	2.979e-09	8.511e-10	-8.526	-9.070	-0.544	(0)
NH3	2.338e-09	2.338e-09	-8.631	-8.631	0.000	(0)
CaNH3+2	4.981e-11	1.423e-11	-10.303	-10.847	-0.544	(0)
NiNH3+2	2.238e-11	6.394e-12	-10.650	-11.194	-0.544	(0)
Co (NH3) +2	5.605e-12	1.601e-12	-11.251	-11.796	-0.544	(0)
BaNH3+2	8.904e-16	2.544e-16	-15.050	-15.595	-0.544	(0)
Ni (NH3) 2+2	1.471e-17	4.201e-18	-16.833	-17.377	-0.544	(0)
Co (NH3) 2+2	5.113e-19	1.461e-19	-18.291	-18.835	-0.544	(0)
Ca (NH3) 2+2	6.632e-20	1.894e-20	-19.178	-19.723	-0.544	(0)
Co (NH3) 3+2	2.153e-26	6.150e-27	-25.667	-26.211	-0.544	(0)
Co (NH3) 4+2	3.778e-34	1.079e-34	-33.423	-33.967	-0.544	(0)
Cr (NH3) 5OH+2	0.000e+00	0.000e+00	-40.611	-41.155	-0.544	(0)
Co (NH3) 5+2	0.000e+00	0.000e+00	-41.678	-42.223	-0.544	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-45.831	-47.056	-1.224	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-47.366	-47.910	-0.544	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-49.862	-50.406	-0.544	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-60.792	-60.928	-0.136	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-65.026	-65.570	-0.544	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-68.505	-69.050	-0.544	(0)
N (3)	8.441e-40					
NO2-	8.441e-40	6.589e-40	-39.074	-39.181	-0.108	(0)
CuNO2+	0.000e+00	0.000e+00	-41.845	-41.981	-0.136	(0)
CoNO2+	0.000e+00	0.000e+00	-43.791	-43.927	-0.136	(0)
Cu (NO2) 2	0.000e+00	0.000e+00	-80.152	-80.152	0.000	(0)
N (5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-52.103	-52.199	-0.096	(0)
CaNO3+	0.000e+00	0.000e+00	-54.018	-54.154	-0.136	(0)
CuNO3+	0.000e+00	0.000e+00	-56.370	-56.506	-0.136	(0)
MnNO3+	0.000e+00	0.000e+00	-56.548	-56.684	-0.136	(0)
NiNO3+	0.000e+00	0.000e+00	-57.311	-57.448	-0.136	(0)
ZnNO3+	0.000e+00	0.000e+00	-57.389	-57.525	-0.136	(0)
CoNO3+	0.000e+00	0.000e+00	-57.457	-57.593	-0.136	(0)
BaNO3+	0.000e+00	0.000e+00	-58.243	-58.379	-0.136	(0)
PbNO3+	0.000e+00	0.000e+00	-58.735	-58.871	-0.136	(0)
CdNO3+	0.000e+00	0.000e+00	-60.413	-60.549	-0.136	(0)
CrNO3+2	0.000e+00	0.000e+00	-62.020	-62.564	-0.544	(0)
FeNO3+2	0.000e+00	0.000e+00	-63.759	-64.303	-0.544	(0)
Mn (NO3) 2	0.000e+00	0.000e+00	-108.478	-108.478	0.000	(0)
Co (NO3) 2	0.000e+00	0.000e+00	-109.483	-109.483	0.000	(0)
Cu (NO3) 2	0.000e+00	0.000e+00	-109.617	-109.617	0.000	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-110.438	-110.438	0.000	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-110.814	-110.814	0.000	(0)
Cd (NO3) 2	0.000e+00	0.000e+00	-113.111	-113.111	0.000	(0)
Na	1.498e-02					
Na+	1.447e-02	1.160e-02	-1.839	-1.936	-0.096	(0)
NaSO4-	5.058e-04	4.091e-04	-3.296	-3.388	-0.092	(0)
NaHPO4-	6.904e-10	5.584e-10	-9.161	-9.253	-0.092	(0)
NaH2BO3	1.131e-12	1.131e-12	-11.947	-11.947	0.000	(0)

NaCrO4-	0.000e+00	0.000e+00	-43.159	-43.295	-0.136	(0)
Ni	8.382e-06					
Ni+2	5.447e-06	2.245e-06	-5.264	-5.649	-0.385	(0)
NiSO4	2.847e-06	2.847e-06	-5.546	-5.546	0.000	(0)
NiCl+	8.574e-08	6.268e-08	-7.067	-7.203	-0.136	(0)
Ni (SO4) 2-2	2.272e-09	6.490e-10	-8.644	-9.188	-0.544	(0)
NiNH3+2	2.238e-11	6.394e-12	-10.650	-11.194	-0.544	(0)
NiCl2	3.540e-12	3.540e-12	-11.451	-11.451	0.000	(0)
NiOH+	3.055e-12	2.233e-12	-11.515	-11.651	-0.136	(0)
Ni (OH) 2	2.859e-17	2.859e-17	-16.544	-16.544	0.000	(0)
Ni (NH3) 2+2	1.471e-17	4.201e-18	-16.833	-17.377	-0.544	(0)
Ni (OH) 3-	4.413e-24	3.226e-24	-23.355	-23.491	-0.136	(0)
NiSeO4	1.501e-27	1.501e-27	-26.824	-26.824	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-57.311	-57.448	-0.136	(0)
O (0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.241	-55.234	0.007	(0)
P	9.400e-06					
H2PO4-	8.064e-06	6.522e-06	-5.093	-5.186	-0.092	(0)
CaH2PO4+	5.618e-07	4.544e-07	-6.250	-6.343	-0.092	(0)
MgH2PO4+	3.599e-07	2.911e-07	-6.444	-6.536	-0.092	(0)
FeH2PO4+	3.142e-07	2.541e-07	-6.503	-6.595	-0.092	(0)
H3PO4	7.741e-08	7.741e-08	-7.111	-7.111	0.000	(0)
HPO4-2	1.084e-08	4.544e-09	-7.965	-8.343	-0.378	(0)
CaHPO4	6.463e-09	6.463e-09	-8.190	-8.190	0.000	(0)
MgHPO4	2.678e-09	2.678e-09	-8.572	-8.572	0.000	(0)
FeHPO4	1.436e-09	1.436e-09	-8.843	-8.843	0.000	(0)
NaHPO4-	6.904e-10	5.584e-10	-9.161	-9.253	-0.092	(0)
KHPO4-	1.854e-10	1.500e-10	-9.732	-9.824	-0.092	(0)
CoHPO4	1.139e-11	1.139e-11	-10.944	-10.944	0.000	(0)
CrH2PO4+2	7.383e-12	2.109e-12	-11.132	-11.676	-0.544	(0)
FeHPO4+	3.147e-12	2.545e-12	-11.502	-11.594	-0.092	(0)
CaPO4-	2.137e-13	1.729e-13	-12.670	-12.762	-0.092	(0)
FeH2PO4+2	1.558e-14	6.667e-15	-13.807	-14.176	-0.369	(0)
MgPO4-	1.003e-15	8.112e-16	-14.999	-15.091	-0.092	(0)
PO4-3	1.424e-16	1.939e-17	-15.846	-16.712	-0.866	(0)
CrO3HPO4-2	0.000e+00	0.000e+00	-43.693	-44.237	-0.544	(0)
CrO3H2PO4-	0.000e+00	0.000e+00	-45.469	-45.605	-0.136	(0)
Pb	9.691e-08					
PbSO4	4.727e-08	4.727e-08	-7.325	-7.325	0.000	(0)
Pb+2	3.540e-08	1.459e-08	-7.451	-7.836	-0.385	(0)
PbCl+	7.379e-09	5.395e-09	-8.132	-8.268	-0.136	(0)
Pb (SO4) 2-2	6.595e-09	1.884e-09	-8.181	-8.725	-0.544	(0)
PbCl2	2.606e-10	2.606e-10	-9.584	-9.584	0.000	(0)
PbOH+	5.657e-12	4.136e-12	-11.247	-11.383	-0.136	(0)
PbCl3-	1.659e-12	1.213e-12	-11.780	-11.916	-0.136	(0)
PbCl4-2	1.993e-14	5.694e-15	-13.700	-14.245	-0.544	(0)
Pb2OH+3	1.603e-17	9.564e-19	-16.795	-18.019	-1.224	(0)
Pb (OH) 2	1.476e-17	1.476e-17	-16.831	-16.831	0.000	(0)
Pb (OH) 3-	2.278e-24	1.666e-24	-23.642	-23.778	-0.136	(0)
Pb (OH) 4-2	1.611e-31	4.603e-32	-30.793	-31.337	-0.544	(0)
Pb3 (OH) 4+2	1.005e-31	2.870e-32	-30.998	-31.542	-0.544	(0)
Pb4 (OH) 4+4	6.014e-34	4.005e-36	-33.221	-35.397	-2.177	(0)
PbNO3+	0.000e+00	0.000e+00	-58.735	-58.871	-0.136	(0)
Pb (NO3) 2	0.000e+00	0.000e+00	-110.814	-110.814	0.000	(0)
S (6)	2.322e-02					
SO4-2	1.605e-02	6.614e-03	-1.795	-2.180	-0.385	(0)
CaSO4	4.877e-03	4.877e-03	-2.312	-2.312	0.000	(0)
MgSO4	1.173e-03	1.173e-03	-2.931	-2.931	0.000	(0)
NaSO4-	5.058e-04	4.091e-04	-3.296	-3.388	-0.092	(0)
KSO4-	2.715e-04	2.196e-04	-3.566	-3.658	-0.092	(0)
FeSO4	1.352e-04	1.352e-04	-3.869	-3.869	0.000	(0)
HSO4-	6.197e-05	4.952e-05	-4.208	-4.305	-0.097	(0)
NH4SO4-	4.605e-05	3.705e-05	-4.337	-4.431	-0.094	(0)
AlSO4+	4.325e-05	3.456e-05	-4.364	-4.461	-0.097	(0)
MnSO4	2.285e-05	2.285e-05	-4.641	-4.641	0.000	(0)
CuSO4	2.163e-05	2.163e-05	-4.665	-4.665	0.000	(0)
Al (SO4) 2-	3.425e-06	2.737e-06	-5.465	-5.563	-0.097	(0)
CoSO4	3.220e-06	3.220e-06	-5.492	-5.492	0.000	(0)

NiSO4	2.847e-06	2.847e-06	-5.546	-5.546	0.000	(0)
ZnSO4	2.521e-06	2.521e-06	-5.598	-5.598	0.000	(0)
Zn (SO4) 2-2	5.305e-07	1.515e-07	-6.275	-6.819	-0.544	(0)
BeSO4	5.495e-08	5.495e-08	-7.260	-7.260	0.000	(0)
PbSO4	4.727e-08	4.727e-08	-7.325	-7.325	0.000	(0)
CrSO4+	2.618e-08	1.914e-08	-7.582	-7.718	-0.136	(0)
Pb (SO4) 2-2	6.595e-09	1.884e-09	-8.181	-8.725	-0.544	(0)
Be (SO4) 2-2	3.956e-09	1.130e-09	-8.403	-8.947	-0.544	(0)
CrOHSO4	2.437e-09	2.437e-09	-8.613	-8.613	0.000	(0)
Ni (SO4) 2-2	2.272e-09	6.490e-10	-8.644	-9.188	-0.544	(0)
CdSO4	1.783e-09	1.783e-09	-8.749	-8.749	0.000	(0)
Cd (SO4) 2-2	5.911e-10	1.689e-10	-9.228	-9.772	-0.544	(0)
FeSO4+	4.732e-12	3.807e-12	-11.325	-11.419	-0.094	(0)
Fe (SO4) 2-	7.664e-13	5.603e-13	-12.116	-12.252	-0.136	(0)
Cr2 (OH) 2SO4+2	1.197e-15	3.419e-16	-14.922	-15.466	-0.544	(0)
Cr2 (OH) 2 (SO4) 2	1.343e-16	1.343e-16	-15.872	-15.872	0.000	(0)
CrO3SO4-2	0.000e+00	0.000e+00	-42.797	-43.341	-0.544	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-60.792	-60.928	-0.136	(0)
Se (-2)	6.740e-11					
HSe-	4.510e-11	3.297e-11	-10.346	-10.482	-0.136	(0)
H2Se	2.230e-11	2.230e-11	-10.652	-10.652	0.000	(0)
MnSe	3.144e-17	3.144e-17	-16.503	-16.503	0.000	(0)
Se-2	9.300e-22	2.657e-22	-21.032	-21.576	-0.544	(0)
Se (4)	1.271e-07					
HSeO3-	1.238e-07	9.049e-08	-6.907	-7.043	-0.136	(0)
H2SeO3	3.297e-09	3.297e-09	-8.482	-8.482	0.000	(0)
SeO3-2	1.367e-11	3.905e-12	-10.864	-11.408	-0.544	(0)
FeHSeO3+2	4.294e-17	1.227e-17	-16.367	-16.911	-0.544	(0)
Cd (SeO3) 2-2	5.753e-26	1.643e-26	-25.240	-25.784	-0.544	(0)
Se (6)	3.837e-24					
SeO4-2	3.818e-24	1.574e-24	-23.418	-23.803	-0.385	(0)
HSeO4-	8.207e-27	6.000e-27	-26.086	-26.222	-0.136	(0)
MnSeO4	7.932e-27	7.932e-27	-26.101	-26.101	0.000	(0)
CoSeO4	1.849e-27	1.849e-27	-26.733	-26.733	0.000	(0)
NiSeO4	1.501e-27	1.501e-27	-26.824	-26.824	0.000	(0)
ZnSeO4	4.430e-28	4.430e-28	-27.354	-27.354	0.000	(0)
CdSeO4	3.576e-31	3.576e-31	-30.447	-30.447	0.000	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-50.607	-51.151	-0.544	(0)
Zn	7.523e-06					
Zn+2	4.410e-06	1.818e-06	-5.356	-5.740	-0.385	(0)
ZnSO4	2.521e-06	2.521e-06	-5.598	-5.598	0.000	(0)
Zn (SO4) 2-2	5.305e-07	1.515e-07	-6.275	-6.819	-0.544	(0)
ZnCl+	6.136e-08	4.867e-08	-7.212	-7.313	-0.101	(0)
ZnCl2	6.866e-10	6.866e-10	-9.163	-9.163	0.000	(0)
ZnOH+	1.911e-11	1.397e-11	-10.719	-10.855	-0.136	(0)
ZnOHCl	7.463e-12	7.463e-12	-11.127	-11.127	0.000	(0)
ZnCl3-	7.451e-12	5.911e-12	-11.128	-11.228	-0.101	(0)
ZnCl4-2	7.493e-14	3.140e-14	-13.125	-13.503	-0.378	(0)
Zn (OH) 2	3.669e-16	3.669e-16	-15.435	-15.435	0.000	(0)
Zn (OH) 3-	2.838e-22	2.075e-22	-21.547	-21.683	-0.136	(0)
ZnSeO4	4.430e-28	4.430e-28	-27.354	-27.354	0.000	(0)
Zn (OH) 4-2	3.263e-30	9.322e-31	-29.486	-30.031	-0.544	(0)
Zn (SeO4) 2-2	0.000e+00	0.000e+00	-50.607	-51.151	-0.544	(0)
ZnNO3+	0.000e+00	0.000e+00	-57.389	-57.525	-0.136	(0)
Zn (NO3) 2	0.000e+00	0.000e+00	-110.438	-110.438	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2	-142.78	-136.51	6.27	(Co (NH3) 5Cl) (NO3) 2
(Co (NH3) 5Cl) Cl2	-40.56	-36.02	4.54	(Co (NH3) 5Cl) Cl2
(Co (NH3) 5OH2) Cl3	-47.83	-36.02	11.81	(Co (NH3) 5OH2) Cl3
(Co (NH3) 6) (NO3) 3	-203.91	-185.98	17.93	(Co (NH3) 6) (NO3) 3
(Co (NH3) 6) Cl3	-55.38	-35.25	20.13	(Co (NH3) 6) Cl3
(NH4) 2CrO4	-49.00	-48.62	0.38	(NH4) 2CrO4
(NH4) 2SeO4	-30.82	-30.37	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	-5.07	6.06	11.13	Al (OH) 3

Al2 (MoO4) 3	-35.46	-32.31	3.15	Al2 (MoO4) 3
Al2O3	-8.30	12.12	20.43	Al2O3
Al4 (OH) 10SO4	-8.74	13.96	22.70	Al4 (OH) 10SO4
AlAsO4:2H2O	-9.51	-4.71	4.80	AlAsO4:2H2O
AlOHSO4	-0.99	-4.22	-3.23	AlOHSO4
Alunite	0.13	-0.64	-0.77	KAl3 (SO4) 2 (OH) 6
Anglesite	-2.19	-10.02	-7.83	PbSO4
Anhydrite	-0.31	-4.65	-4.34	CaSO4
Antlerite	-9.23	-0.44	8.79	Cu3 (OH) 4SO4
Arsenolite	-27.45	-30.39	-2.94	As4O6
As2O5	-28.32	-21.54	6.77	As2O5
Atacamite	-7.12	0.55	7.67	Cu2 (OH) 3Cl
Ba (OH) 2:8H2O	-23.38	1.18	24.56	Ba (OH) 2:8H2O
Ba3 (AsO4) 2	-9.06	-18.00	-8.94	Ba3 (AsO4) 2
BaCrO4	-39.21	-48.97	-9.77	BaCrO4
BaHPO4	-7.91	-27.68	-19.77	BaHPO4
BaMoO4	-6.64	-13.63	-6.99	BaMoO4
Barite	0.95	-9.10	-10.05	BaSO4
BaSeO3	-11.71	-9.91	1.79	BaSeO3
BaSeO4	-23.20	-30.72	-7.53	BaSeO4
Be (OH) 2 (alpha)	-5.98	0.92	6.89	Be (OH) 2
Be (OH) 2 (am)	-6.28	0.92	7.19	Be (OH) 2
Be (OH) 2 (beta)	-5.58	0.92	6.49	Be (OH) 2
BeMoO4	-12.28	-13.90	-1.61	BeMoO4
BeSeO4:4H2O	-28.05	-30.99	-2.94	BeSeO4:4H2O
Bianchite	-6.16	-7.92	-1.76	ZnSO4:6H2O
Birnessite	-24.25	-6.16	18.09	MnO2
Bixbyite	-28.14	-28.42	-0.27	Mn2O3
Boehmite	-2.87	6.06	8.93	AlOOH
Brochantite	-12.99	2.84	15.83	Cu4 (OH) 6SO4
Brucite	-12.08	5.11	17.18	Mg (OH) 2
Bunsenite	-10.29	2.45	12.74	NiO
Ca3 (AsO4) 2:4H2O	-26.96	-4.66	22.30	Ca3 (AsO4) 2:4H2O
Ca3 (PO4) 2 (beta)	-11.76	-40.84	-29.08	Ca3 (PO4) 2
Ca4H (PO4) 3:3H2O	-16.99	-64.07	-47.08	Ca4H (PO4) 3:3H2O
CaCrO4	-42.34	-44.53	-2.19	CaCrO4
CaHPO4	-3.87	-23.23	-19.37	CaHPO4
CaHPO4:2H2O	-4.17	-23.23	-19.06	CaHPO4:2H2O
CaMoO4	-1.24	-9.18	-7.94	CaMoO4
CaSeO3:2H2O	-8.34	-5.47	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-23.28	-26.28	-3.00	CaSeO4:2H2O
Cd (BO2) 2	-20.70	-10.86	9.84	Cd (BO2) 2
Cd (OH) 2	-14.74	-0.81	13.93	Cd (OH) 2
Cd (OH) 2 (am)	-14.80	-0.81	13.99	Cd (OH) 2
Cd3 (OH) 2 (SO4) 2	-29.71	-23.00	6.71	Cd3 (OH) 2 (SO4) 2
Cd3 (OH) 4SO4	-35.28	-12.72	22.56	Cd3 (OH) 4SO4
Cd3 (PO4) 2	-27.57	-60.17	-32.60	Cd3 (PO4) 2
Cd4 (OH) 6SO4	-41.94	-13.54	28.40	Cd4 (OH) 6SO4
CdCl2	-12.22	-12.83	-0.60	CdCl2
CdCl2:1H2O	-11.16	-12.83	-1.67	CdCl2:1H2O
CdCl2:2.5H2O	-10.89	-12.83	-1.93	CdCl2:2.5H2O
Cdmetal (alpha)	-30.65	-16.91	13.74	Cd
Cdmetal (gamma)	-30.76	-16.91	13.84	Cd
CdMoO4	-1.42	-15.62	-14.21	CdMoO4
CdOHCl	-10.45	-6.82	3.63	CdOHCl
CdSe	5.08	-15.35	-20.43	CdSe
CdSeO4:2H2O	-30.87	-32.72	-1.85	CdSeO4:2H2O
CdSO4	-11.08	-11.09	-0.02	CdSO4
CdSO4:1H2O	-9.46	-11.09	-1.63	CdSO4:1H2O
CdSO4:2.67H2O	-9.28	-11.09	-1.82	CdSO4:2.67H2O
Chalcanthite	-4.34	-7.00	-2.66	CuSO4:5H2O
Claudetite	-27.16	-30.39	-3.23	As4O6
Clausthalite	13.19	-14.27	-27.46	PbSe
Co (BO2) 2	-34.61	-7.54	27.07	Co (BO2) 2
Co (OH) 2	-10.59	2.50	13.09	Co (OH) 2
Co (OH) 3	-19.81	-21.85	-2.03	Co (OH) 3
Co3 (AsO4) 2	-27.06	-14.03	13.03	Co3 (AsO4) 2
Co3 (PO4) 2	-15.52	-50.21	-34.69	Co3 (PO4) 2

Co3O4	-31.01	-41.18	-10.17	Co3O4
CoCl2	-18.01	-9.51	8.51	CoCl2
CoCl2:6H2O	-12.02	-9.51	2.51	CoCl2:6H2O
CoFe2O4	3.43	0.37	-3.05	CoFe2O4
CoHPO4	-7.30	-26.36	-19.06	CoHPO4
CoMoO4	-4.61	-12.31	-7.69	CoMoO4
CoO	-11.40	2.51	13.90	CoO
CoSe	4.17	-12.03	-16.20	CoSe
CoSeO3	-9.91	-8.59	1.32	CoSeO3
CoSeO4:6H2O	-27.87	-29.40	-1.53	CoSeO4:6H2O
CoSO4	-10.81	-7.77	3.04	CoSO4
CoSO4:6H2O	-5.30	-7.78	-2.48	CoSO4:6H2O
Cotunnite	-6.89	-11.75	-4.86	PbCl2
Cr (OH) 2	-22.67	-11.74	10.93	Cr (OH) 2
Cr (OH) 3	-8.05	-6.62	1.42	Cr (OH) 3
Cr (OH) 3 (am)	-5.87	-6.62	-0.75	Cr (OH) 3
Cr2O3	-11.04	-13.24	-2.21	Cr2O3
CrCl2	-38.18	-23.75	14.42	CrCl2
CrCl3	-40.11	-24.64	15.48	CrCl3
Crmetal	-58.84	-27.84	31.00	Cr
CrO3	-46.96	-50.16	-3.19	CrO3
Cu (OH) 2	-5.56	3.28	8.84	Cu (OH) 2
Cu2 (OH) 3NO3	-59.16	-49.69	9.47	Cu2 (OH) 3NO3
Cu2Se (alpha)	27.71	-18.73	-46.44	Cu2Se
Cu2SO4	-12.59	-14.48	-1.89	Cu2SO4
Cu3 (AsO4) 2:2H2O	-17.80	-11.70	6.10	Cu3 (AsO4) 2:2H2O
Cu3 (PO4) 2	-11.03	-47.88	-36.85	Cu3 (PO4) 2
Cu3 (PO4) 2:3H2O	-12.76	-47.88	-35.12	Cu3 (PO4) 2:3H2O
Cu3Se2	34.52	-29.98	-64.51	Cu3Se2
CuCrO4	-41.44	-46.88	-5.44	CuCrO4
Cumetal	-1.18	-10.15	-8.97	Cu
CuMoO4	1.58	-11.53	-13.11	CuMoO4
CuOCuSO4	-14.43	-3.72	10.71	CuOCuSO4
Cupricferrite	-5.47	1.15	6.62	CuFe2O4
Cuprite	-3.17	-4.20	-1.04	Cu2O
Cuprousferrite	5.70	-3.17	-8.87	CuFeO2
CuSe	22.21	-11.25	-33.46	CuSe
CuSe2	24.10	-9.68	-33.79	CuSe2
CuSeO3:2H2O	-8.44	-7.81	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-26.19	-28.63	-2.44	CuSeO4:5H2O
CuSO4	-10.16	-7.00	3.16	CuSO4
Diaspore	-1.12	6.06	7.18	AlOOH
Epsomite	-3.02	-5.18	-2.16	MgSO4:7H2O
Fe (OH) 2	-9.52	4.04	13.56	Fe (OH) 2
Fe (OH) 2.7Cl1.3	0.17	-2.87	-3.04	Fe (OH) 2.7Cl1.3
Fe2 (OH) 4SeO3	-14.78	-13.23	1.55	Fe2 (OH) 4SeO3
Fe2 (SeO3) 3:2H2O	-14.79	-35.41	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-29.96	-32.97	-3.01	Fe2 (SO4) 3
Fe3 (OH) 8	-18.31	1.91	20.22	Fe3 (OH) 8
FeAsO4:2H2O	-12.24	-11.84	0.40	FeAsO4:2H2O
FeCr2O4	-16.82	-9.20	7.62	FeCr2O4
FeMoO4	-0.71	-10.77	-10.06	FeMoO4
Ferrihydrite	-4.48	-1.07	3.41	Fe (OH) 3
Ferroselite	9.82	-8.92	-18.74	FeSe2
FeSe	0.52	-10.49	-11.01	FeSe
Fix_pH	-4.05	-4.05	0.00	H+
Gibbsite	-2.52	6.06	8.58	Al (OH) 3
Goethite	-1.74	-1.07	0.67	FeOOH
Goslarite	-5.87	-7.92	-2.05	ZnSO4:7H2O
Gypsum	-0.04	-4.65	-4.61	CaSO4:2H2O
H-Jarosite	-12.35	-23.76	-11.41	(H3O) Fe3 (SO4) 2 (OH) 6
H2MoO4	-1.79	-14.81	-13.02	H2MoO4
H2Se (g)	-9.62	-14.53	-4.91	H2Se
Halite	-5.48	-3.89	1.59	NaCl
Hausmannite	-35.95	26.34	62.29	Mn3O4
Hematite	-1.10	-2.13	-1.03	Fe2O3
Hercynite	-7.67	16.17	23.83	FeAl2O4
Hinsdalite	-18.20	-20.70	-2.50	PbAl3PO4SO4 (OH) 6

Hydroxylapatite	-14.11	-58.44	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-22.48	-85.27	-62.79	Pb5 (PO4) 3OH
K-Alum	-7.51	-12.77	-5.26	KAl (SO4) 2:12H2O
K-Jarosite	-7.62	-22.02	-14.41	KFe3 (SO4) 2 (OH) 6
K2Cr2O7	-79.36	-96.85	-17.48	K2Cr2O7
K2CrO4	-46.12	-46.69	-0.57	K2CrO4
K2MoO4	-14.62	-11.34	3.27	K2MoO4
K2SeO4	-27.71	-28.44	-0.73	K2SeO4
Langite	-15.14	2.84	17.98	Cu4 (OH) 6SO4:H2O
Larnakite	-9.38	-9.75	-0.37	PbO:PbSO4
Laurionite	-6.37	-5.74	0.62	PbOHCl
Lepidocrocite	-2.44	-1.07	1.37	FeOOH
Lime	-27.65	5.63	33.28	CaO
Litharge	-12.63	0.26	12.89	PbO
Maghemite	-8.52	-2.13	6.39	Fe2O3
Magnesioferrite	-14.72	2.97	17.69	Fe2MgO4
Magnetite	-2.11	1.91	4.03	Fe3O4
Manganite	-13.88	11.46	25.34	MnOOH
Massicot	-12.83	0.26	13.09	PbO
Melanothallite	-15.18	-8.73	6.45	CuCl2
Melanterite	-3.97	-6.24	-2.27	FeSO4:7H2O
Mg (OH) 2 (active)	-13.69	5.11	18.79	Mg (OH) 2
Mg3 (PO4) 2	-19.13	-42.41	-23.28	Mg3 (PO4) 2
MgCr2O4	-24.87	-8.14	16.74	MgCr2O4
MgCrO4	-50.70	-45.05	5.65	MgCrO4
MgHPO4:3H2O	-5.58	-23.76	-18.18	MgHPO4:3H2O
MgMoO4	-7.86	-9.71	-1.85	MgMoO4
MgSeO3:6H2O	-9.03	-5.99	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-25.60	-26.80	-1.20	MgSeO4:6H2O
Minium	-57.89	16.89	74.78	Pb3O4
Mirabilite	-4.70	-6.06	-1.35	Na2SO4:10H2O
Mn2 (SO4) 3	-54.03	-59.25	-5.22	Mn2 (SO4) 3
Mn3 (AsO4) 2:8H2O	-23.81	-11.31	12.50	Mn3 (AsO4) 2:8H2O
Mn3 (PO4) 2	-23.63	-47.48	-23.85	Mn3 (PO4) 2
MnCl2:4H2O	-11.35	-8.60	2.75	MnCl2:4H2O
MnHPO4	-0.05	-25.45	-25.40	MnHPO4
MnSe	-14.91	-11.12	3.79	MnSe
MnSeO3	-8.81	-7.68	1.13	MnSeO3
MnSeO3:2H2O	-8.64	-7.68	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-26.44	-28.49	-2.05	MnSeO4:5H2O
MnSO4	-9.64	-6.87	2.78	MnSO4
Monteponite	-16.23	-0.81	15.41	CdO
MoO3	-6.81	-14.81	-8.00	MoO3
Morenosite	-5.65	-7.83	-2.18	NiSO4:7H2O
Na-Jarosite	-10.90	-21.64	-10.75	NaFe3 (SO4) 2 (OH) 6
Na2Cr2O7	-86.12	-96.08	-9.96	Na2Cr2O7
Na2CrO4	-48.92	-45.93	2.99	Na2CrO4
Na2Mo2O7	-8.63	-25.39	-16.76	Na2Mo2O7
Na2MoO4	-12.10	-10.58	1.52	Na2MoO4
Na2MoO4:2H2O	-11.81	-10.58	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-17.17	-6.87	10.30	Na2SeO3:5H2O
Na2SeO4	-28.95	-27.67	1.28	Na2SeO4
Nantokite	-1.25	-8.11	-6.86	CuCl
Ni (OH) 2	-10.63	2.45	13.08	Ni (OH) 2
Ni3 (AsO4) 2:8H2O	-29.89	-14.19	15.70	Ni3 (AsO4) 2:8H2O
Ni3 (PO4) 2	-19.07	-50.37	-31.30	Ni3 (PO4) 2
Ni4 (OH) 6SO4	-32.48	-0.48	32.00	Ni4 (OH) 6SO4
NiMoO4	-1.21	-12.36	-11.15	NiMoO4
NiSe	5.62	-12.08	-17.70	NiSe
NiSeO3:2H2O	-11.55	-8.64	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-27.93	-29.45	-1.52	NiSeO4:6H2O
Nsutite	-23.66	-6.16	17.50	MnO2
O2 (g)	-52.60	32.20	84.80	O2
Pb (BO2) 2	-16.35	-9.78	6.57	Pb (BO2) 2
Pb (OH) 2	-8.06	0.26	8.32	Pb (OH) 2
Pb2 (OH) 3Cl	-14.27	-5.48	8.79	Pb2 (OH) 3Cl
Pb2O (OH) 2	-25.66	0.53	26.19	Pb2O (OH) 2
Pb2O3	-44.41	16.63	61.04	Pb2O3

Pb3(AsO4)2	-26.55	-20.75	5.80	Pb3(AsO4)2
Pb3(PO4)2	-13.40	-56.93	-43.53	Pb3(PO4)2
Pb3O2SO4	-20.41	-9.49	10.92	Pb3O2SO4
Pb4(OH)6SO4	-30.33	-9.23	21.10	Pb4(OH)6SO4
Pb4O3SO4	-31.51	-9.22	22.28	Pb4O3SO4
PbCrO4	-37.16	-49.89	-12.73	PbCrO4
PbHPO4	-4.79	-28.60	-23.81	PbHPO4
Pbmetal	-20.08	-15.84	4.24	Pb
PbMoO4	1.23	-14.55	-15.78	PbMoO4
PbO:0.3H2O	-12.72	0.26	12.98	PbO:0.33H2O
PbSeO4	-24.75	-31.64	-6.88	PbSeO4
Periclase	-16.93	5.11	22.04	MgO
Plattnerite	-34.12	16.36	50.49	PbO2
Plumbgummite	-6.49	-39.28	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-17.56	5.63	23.19	Ca(OH)2
Pyrochroite	-12.07	3.41	15.48	Mn(OH)2
Pyrolusite	-22.68	19.51	42.19	MnO2
Pyromorphite	-6.84	-91.27	-84.43	Pb5(PO4)3Cl
Retgersite	-5.78	-7.83	-2.05	NiSO4:6H2O
Semetal(am)	8.71	1.57	-7.14	Se
Semetal(hex)	9.32	1.57	-7.76	Se
SeO2	-11.21	-11.09	0.12	SeO2
SeO3	-53.38	-31.90	21.48	SeO3
Spinel	-20.78	17.23	38.01	MgAl2O4
Strengite	-3.56	-29.93	-26.37	FePO4:2H2O
Tenorite	-4.56	3.28	7.84	CuO
Thenardite	-6.40	-6.05	0.35	Na2SO4
Tsumebite	-15.27	-25.06	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	-9.60	-45.60	-36.00	Fe3(PO4)2:8H2O
Zincite	-9.24	2.36	11.60	ZnO
Zincosite	-12.10	-7.92	4.18	ZnSO4
Zn(BO2)2	-15.98	-7.69	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-113.38	-110.14	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-9.84	2.36	12.20	Zn(OH)2
Zn(OH)2(am)	-10.36	2.36	12.71	Zn(OH)2
Zn(OH)2(beta)	-9.64	2.36	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-9.42	2.36	11.78	Zn(OH)2
Zn(OH)2(gamma)	-9.38	2.36	11.73	Zn(OH)2
Zn2(OH)2SO4	-13.06	-5.56	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-16.48	-1.29	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-28.12	-14.47	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-15.23	-50.65	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-33.17	-13.48	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-29.24	-0.84	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-38.72	-0.22	38.50	Zn5(OH)8Cl2
ZnCl2	-16.92	-9.65	7.27	ZnCl2
Znmetal	-39.99	-13.74	26.25	Zn
ZnMoO4	-2.36	-12.45	-10.09	ZnMoO4
ZnO(active)	-9.09	2.36	11.45	ZnO
ZnSe	2.30	-12.17	-14.48	ZnSe
ZnSeO4:6H2O	-28.03	-29.55	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.41	-7.92	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 4.

```

USE solution 1
EQUILIBRIUM_PHASES 1
CO2(g)      -3.5 10
Diaspore    0 0

```

```

Fix_pH      -4.5 Portlandite   10
Magnetite   0 0
O2(g)       -0.68 10
Birnessite  0 0

```

END

Beginning of batch-reaction calculations.

Reaction step 1.

Using solution 1.

Using pure phase assemblage 1.

-----User print-----

```

Moles of Portlandite: -1.3251e-03
Moles of Diaspore:    -1.3251e-03
Moles of Magnetite:   -1.3251e-03
Moles of Birnessite:  -1.3251e-03
mg of Portlandite:    -9.8183e+01
mg of Diaspore:       -7.9496e+01
mg of Birnessite:     -1.1520e+02

```

-----Phase assemblage-----

Phase	SI	log IAP	log K(T, P)	Moles in assemblage		
				Initial	Final	Delta
Birnessite	-0.00	18.09	18.09	0.000e+00	9.516e-05	9.516e-05
CO2(g)	-3.50	-21.66	-18.16	1.000e+01	1.000e+01	-1.259e-05
Diaspore	-0.00	7.18	7.18	0.000e+00	2.184e-05	2.184e-05
Fix_pH	-4.50	-4.50	0.00			
Ca(OH)2		is reactant		1.000e+01	9.999e+00	-1.325e-03
Magnetite	-0.00	4.03	4.03	0.000e+00	1.447e-04	1.447e-04
O2(g)	-0.68	84.12	84.80	1.000e+01	9.998e+00	-2.051e-03

-----Solution composition-----

Elements	Molality	Moles
Al	3.099e-05	3.100e-05
As	2.680e-08	2.680e-08
B	9.287e-06	9.287e-06
Ba	2.924e-07	2.924e-07
Be	2.228e-07	2.228e-07
C	1.259e-05	1.259e-05
Ca	1.440e-02	1.440e-02
Cd	7.145e-09	7.145e-09
Cl	1.388e-02	1.388e-02
Co	1.227e-05	1.227e-05
Cr	6.372e-08	6.372e-08
Cu	9.874e-05	9.874e-05
Fe	9.373e-06	9.374e-06
K	6.291e-03	6.291e-03
Mg	3.635e-03	3.635e-03
Mn	2.349e-07	2.349e-07
Mo	1.151e-06	1.151e-06
N	7.218e-04	7.218e-04
Na	1.498e-02	1.498e-02
Ni	8.382e-06	8.382e-06
P	9.400e-06	9.400e-06
Pb	9.690e-08	9.691e-08
S	2.322e-02	2.322e-02
Se	1.271e-07	1.271e-07
Zn	7.523e-06	7.523e-06

-----Description of solution-----

pH = 4.500 Charge balance
 pe = 16.530 Adjusted to redox equilibrium
 Activity of water = 0.999
 Ionic strength (mol/kgw) = 7.303e-02
 Mass of water (kg) = 1.000e+00
 Total alkalinity (eq/kg) = -6.115e-05
 Total CO2 (mol/kg) = 1.259e-05
 Temperature (°C) = 20.00
 Electrical balance (eq) = -3.291e-03
 Percent error, 100*(Cat-|An|)/(Cat+|An|) = -3.62
 Iterations = 25
 Total H = 1.110194e+02
 Total O = 5.560576e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	3.949e-05	3.162e-05	-4.403	-4.500	-0.097	0.00
OH-	2.755e-10	2.166e-10	-9.560	-9.664	-0.104	(0)
H2O	5.551e+01	9.988e-01	1.744	-0.001	0.000	18.05
Al	3.099e-05					
AlSO4+	2.517e-05	2.010e-05	-4.599	-4.697	-0.098	(0)
Al+3	3.553e-06	4.808e-07	-5.449	-6.318	-0.869	(0)
Al(SO4) 2-	1.967e-06	1.571e-06	-5.706	-5.804	-0.098	(0)
AlOH+2	2.579e-07	1.100e-07	-6.589	-6.958	-0.370	(0)
Al(OH) 2+	4.780e-08	3.863e-08	-7.321	-7.413	-0.092	(0)
Al(OH) 3	2.451e-10	2.451e-10	-9.611	-9.611	0.000	(0)
Al(OH) 4-	3.732e-12	2.980e-12	-11.428	-11.526	-0.098	(0)
AlMo6O21-3	1.307e-16	7.692e-18	-15.884	-17.114	-1.230	(0)
As (3)	1.657e-33					
H3AsO3	1.657e-33	1.657e-33	-32.781	-32.781	0.000	(0)
H4AsO3+	3.557e-38	2.596e-38	-37.449	-37.586	-0.137	(0)
H2AsO3-	3.049e-38	2.226e-38	-37.516	-37.653	-0.137	(0)
HAsO3-2	0.000e+00	0.000e+00	-44.741	-45.288	-0.547	(0)
AsO3-3	0.000e+00	0.000e+00	-53.048	-54.278	-1.230	(0)
As (5)	2.680e-08					
H2AsO4-	2.647e-08	1.932e-08	-7.577	-7.714	-0.137	(0)
HAsO4-2	2.311e-10	6.563e-11	-9.636	-10.183	-0.547	(0)
H3AsO4	9.943e-11	1.011e-10	-10.002	-9.995	0.007	(0)
AsO4-3	9.918e-17	5.838e-18	-16.004	-17.234	-1.230	(0)
B	9.287e-06					
H3BO3	9.287e-06	9.444e-06	-5.032	-5.025	0.007	(0)
H2BO3-	2.052e-10	1.586e-10	-9.688	-9.800	-0.112	(0)
CaH2BO3+	4.287e-11	3.313e-11	-10.368	-10.480	-0.112	(0)
MgH2BO3+	7.236e-12	5.592e-12	-11.141	-11.252	-0.112	(0)
NaH2BO3	3.187e-12	3.187e-12	-11.497	-11.497	0.000	(0)
H5(BO3) 2-	1.703e-15	1.316e-15	-14.769	-14.881	-0.112	(0)
BaH2BO3+	7.403e-16	5.722e-16	-15.131	-15.242	-0.112	(0)
H8(BO3) 3-	1.392e-18	1.076e-18	-17.856	-17.968	-0.112	(0)
Ba	2.924e-07					
Ba+2	2.919e-07	1.200e-07	-6.535	-6.921	-0.386	(0)
BaNO3+	5.137e-10	3.750e-10	-9.289	-9.426	-0.137	(0)
BaHCO3+	1.935e-13	1.576e-13	-12.713	-12.803	-0.089	(0)
BaH2BO3+	7.403e-16	5.722e-16	-15.131	-15.242	-0.112	(0)
BaOH+	1.364e-16	1.096e-16	-15.865	-15.960	-0.095	(0)
BaCO3	1.207e-17	1.207e-17	-16.918	-16.918	0.000	(0)
BaNH3+2	0.000e+00	0.000e+00	-70.382	-70.929	-0.547	(0)
Be	2.228e-07					
Be+2	1.550e-07	6.372e-08	-6.810	-7.196	-0.386	(0)
BeSO4	5.277e-08	5.277e-08	-7.278	-7.278	0.000	(0)
BeOH+	9.851e-09	8.067e-09	-8.007	-8.093	-0.087	(0)
Be(SO4) 2-2	3.772e-09	1.071e-09	-8.423	-8.970	-0.547	(0)
BeCl+	1.398e-09	1.124e-09	-8.854	-8.949	-0.095	(0)
Be(OH) 2	1.619e-12	1.619e-12	-11.791	-11.791	0.000	(0)
Be2OH+3	5.148e-13	8.530e-14	-12.288	-13.069	-0.781	(0)

BeCO3	2.507e-14	2.507e-14	-13.601	-13.601	0.000	(0)
Be3 (OH) 3+3	7.661e-17	1.269e-17	-16.116	-16.896	-0.781	(0)
Be (OH) 3-	1.579e-17	1.293e-17	-16.802	-16.888	-0.087	(0)
Be (OH) 4-2	5.770e-27	2.595e-27	-26.239	-26.586	-0.347	(0)
C (4)	1.259e-05					
H2CO3	1.237e-05	1.237e-05	-4.908	-4.908	0.000	(0)
HCO3-	2.020e-07	1.633e-07	-6.695	-6.787	-0.092	(0)
CaHCO3+	1.214e-08	9.887e-09	-7.916	-8.005	-0.089	(0)
MgHCO3+	2.086e-09	1.653e-09	-8.681	-8.782	-0.101	(0)
NaHCO3	1.170e-09	1.170e-09	-8.932	-8.932	0.000	(0)
CuHCO3+	3.260e-10	2.380e-10	-9.487	-9.623	-0.137	(0)
NiHCO3+	5.611e-11	4.096e-11	-10.251	-10.388	-0.137	(0)
CoHCO3+	4.002e-11	2.922e-11	-10.398	-10.534	-0.137	(0)
CuCO3	3.293e-11	3.293e-11	-10.482	-10.482	0.000	(0)
ZnHCO3+	1.167e-11	8.520e-12	-10.933	-11.070	-0.137	(0)
PbHCO3+	2.203e-12	1.608e-12	-11.657	-11.794	-0.137	(0)
CaCO3	1.160e-12	1.160e-12	-11.936	-11.936	0.000	(0)
CO3-2	5.326e-13	2.190e-13	-12.274	-12.660	-0.386	(0)
MnHCO3+	1.998e-13	1.607e-13	-12.699	-12.794	-0.095	(0)
BaHCO3+	1.935e-13	1.576e-13	-12.713	-12.803	-0.089	(0)
MgCO3	1.705e-13	1.705e-13	-12.768	-12.768	0.000	(0)
NaCO3-	6.727e-14	5.437e-14	-13.172	-13.265	-0.092	(0)
BeCO3	2.507e-14	2.507e-14	-13.601	-13.601	0.000	(0)
ZnCO3	2.299e-14	2.299e-14	-13.639	-13.639	0.000	(0)
NiCO3	1.838e-14	1.838e-14	-13.736	-13.736	0.000	(0)
PbCO3	9.645e-15	9.645e-15	-14.016	-14.016	0.000	(0)
CoCO3	9.413e-15	9.413e-15	-14.026	-14.026	0.000	(0)
CdHCO3+	5.632e-16	4.111e-16	-15.249	-15.386	-0.137	(0)
BaCO3	1.207e-17	1.207e-17	-16.918	-16.918	0.000	(0)
CdCO3	6.102e-18	6.102e-18	-17.215	-17.215	0.000	(0)
FeHCO3+	2.848e-19	2.319e-19	-18.545	-18.635	-0.089	(0)
Cu (CO3) 2-2	6.834e-20	1.941e-20	-19.165	-19.712	-0.547	(0)
Pb (CO3) 2-2	2.145e-23	6.091e-24	-22.669	-23.215	-0.547	(0)
Cd (CO3) 2-2	3.487e-27	9.904e-28	-26.457	-27.004	-0.547	(0)
Ca	1.440e-02					
Ca+2	9.076e-03	3.731e-03	-2.042	-2.428	-0.386	(0)
CaSO4	5.314e-03	5.314e-03	-2.275	-2.275	0.000	(0)
CaNO3+	9.565e-06	6.982e-06	-5.019	-5.156	-0.137	(0)
CaH2PO4+	6.353e-07	5.135e-07	-6.197	-6.289	-0.092	(0)
CaHPO4	2.059e-08	2.059e-08	-7.686	-7.686	0.000	(0)
CaHCO3+	1.214e-08	9.887e-09	-7.916	-8.005	-0.089	(0)
CaH2BO3+	4.287e-11	3.313e-11	-10.368	-10.480	-0.112	(0)
CaOH+	1.871e-11	1.523e-11	-10.728	-10.817	-0.089	(0)
CaPO4-	1.920e-12	1.552e-12	-11.717	-11.809	-0.092	(0)
CaCO3	1.160e-12	1.160e-12	-11.936	-11.936	0.000	(0)
CaNH3+2	0.000e+00	0.000e+00	-65.589	-66.136	-0.547	(0)
Ca (NH3) 2+2	0.000e+00	0.000e+00	-129.797	-130.344	-0.547	(0)
Cd	7.145e-09					
Cd+2	2.974e-09	1.223e-09	-8.527	-8.913	-0.386	(0)
CdCl+	1.765e-09	1.288e-09	-8.753	-8.890	-0.137	(0)
CdSO4	1.762e-09	1.762e-09	-8.754	-8.754	0.000	(0)
Cd (SO4) 2-2	5.803e-10	1.648e-10	-9.236	-9.783	-0.547	(0)
CdCl2	5.885e-11	5.885e-11	-10.230	-10.230	0.000	(0)
CdNO3+	3.490e-12	2.547e-12	-11.457	-11.594	-0.137	(0)
CdCl3-	5.385e-13	3.931e-13	-12.269	-12.405	-0.137	(0)
CdOHC1	1.493e-14	1.493e-14	-13.826	-13.826	0.000	(0)
CdSeO4	1.188e-14	1.188e-14	-13.925	-13.925	0.000	(0)
CdOH+	2.902e-15	2.118e-15	-14.537	-14.674	-0.137	(0)
Cd (NO3) 2	6.300e-16	6.300e-16	-15.201	-15.201	0.000	(0)
CdHCO3+	5.632e-16	4.111e-16	-15.249	-15.386	-0.137	(0)
CdCO3	6.102e-18	6.102e-18	-17.215	-17.215	0.000	(0)
Cd (OH) 2	6.198e-21	6.198e-21	-20.208	-20.208	0.000	(0)
Cd2OH+3	2.346e-22	1.381e-23	-21.630	-22.860	-1.230	(0)
Cd (CO3) 2-2	3.487e-27	9.904e-28	-26.457	-27.004	-0.547	(0)
Cd (OH) 3-	1.650e-28	1.204e-28	-27.783	-27.919	-0.137	(0)
Cd (OH) 4-2	2.208e-38	6.269e-39	-37.656	-38.203	-0.547	(0)
Cd (SeO3) 2-2	0.000e+00	0.000e+00	-44.114	-44.661	-0.547	(0)
CdHS+	0.000e+00	0.000e+00	-141.849	-141.985	-0.137	(0)

Cd	(HS) 2	0.000e+00	0.000e+00	-275.862	-275.862	0.000	(0)
	(HS) 3-	0.000e+00	0.000e+00	-414.906	-415.042	-0.137	(0)
	(HS) 4-2	0.000e+00	0.000e+00	-553.380	-553.927	-0.547	(0)
Cl	1.388e-02						
Cl-	1.387e-02	1.111e-02	-1.858	-1.954	-0.097	(0)	
CuCl+	5.359e-07	4.248e-07	-6.271	-6.372	-0.101	(0)	
CoCl+	1.321e-07	9.640e-08	-6.879	-7.016	-0.137	(0)	
NiCl+	8.640e-08	6.307e-08	-7.063	-7.200	-0.137	(0)	
ZnCl+	6.189e-08	4.905e-08	-7.208	-7.309	-0.101	(0)	
PbCl+	7.453e-09	5.441e-09	-8.128	-8.264	-0.137	(0)	
CdCl+	1.765e-09	1.288e-09	-8.753	-8.890	-0.137	(0)	
BeCl+	1.398e-09	1.124e-09	-8.854	-8.949	-0.095	(0)	
CuCl2	1.278e-09	1.278e-09	-8.893	-8.893	0.000	(0)	
MnCl+	8.816e-10	7.089e-10	-9.055	-9.149	-0.095	(0)	
ZnCl2	6.949e-10	6.949e-10	-9.158	-9.158	0.000	(0)	
PbCl2	2.639e-10	2.639e-10	-9.578	-9.578	0.000	(0)	
FeCl+2	2.004e-10	8.375e-11	-9.698	-10.077	-0.379	(0)	
CdCl2	5.885e-11	5.885e-11	-10.230	-10.230	0.000	(0)	
ZnOHC1	2.120e-11	2.120e-11	-10.674	-10.674	0.000	(0)	
MnCl2	1.112e-11	1.112e-11	-10.954	-10.954	0.000	(0)	
ZnCl3-	7.579e-12	6.007e-12	-11.120	-11.221	-0.101	(0)	
FeCl2+	6.055e-12	4.869e-12	-11.218	-11.313	-0.095	(0)	
NiCl2	3.577e-12	3.577e-12	-11.446	-11.446	0.000	(0)	
PbCl3-	1.690e-12	1.233e-12	-11.772	-11.909	-0.137	(0)	
CdCl3-	5.385e-13	3.931e-13	-12.269	-12.405	-0.137	(0)	
CuCl3-	1.528e-13	1.211e-13	-12.816	-12.917	-0.101	(0)	
CrO3Cl-	1.403e-13	1.024e-13	-12.853	-12.990	-0.137	(0)	
ZnCl4-2	7.670e-14	3.205e-14	-13.115	-13.494	-0.379	(0)	
MnCl3-	4.233e-14	3.404e-14	-13.373	-13.468	-0.095	(0)	
PbCl4-2	2.048e-14	5.816e-15	-13.689	-14.235	-0.547	(0)	
CdOHC1	1.493e-14	1.493e-14	-13.826	-13.826	0.000	(0)	
FeCl3	5.409e-15	5.409e-15	-14.267	-14.267	0.000	(0)	
CuCl4-2	1.913e-17	7.994e-18	-16.718	-17.097	-0.379	(0)	
CuCl2-	1.461e-17	1.158e-17	-16.835	-16.936	-0.101	(0)	
CuCl	4.928e-18	4.928e-18	-17.307	-17.307	0.000	(0)	
CrCl+2	2.164e-19	6.146e-20	-18.665	-19.211	-0.547	(0)	
CuCl3-2	6.453e-20	2.697e-20	-19.190	-19.569	-0.379	(0)	
CoCl+2	2.444e-21	6.941e-22	-20.612	-21.159	-0.547	(0)	
CrCl2+	5.698e-23	4.160e-23	-22.244	-22.381	-0.137	(0)	
CrOHC12	2.023e-24	2.023e-24	-23.694	-23.694	0.000	(0)	
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-313.990	-314.537	-0.547	(0)	
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-384.486	-385.033	-0.547	(0)	
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-387.832	-388.379	-0.547	(0)	
Co (2)	1.227e-05						
Co+2	8.955e-06	2.543e-06	-5.048	-5.595	-0.547	(0)	
CoSO4	3.174e-06	3.174e-06	-5.498	-5.498	0.000	(0)	
CoCl+	1.321e-07	9.640e-08	-6.879	-7.016	-0.137	(0)	
CoNO3+	3.148e-09	2.298e-09	-8.502	-8.639	-0.137	(0)	
CoSeO4	6.123e-11	6.123e-11	-10.213	-10.213	0.000	(0)	
CoHCO3+	4.002e-11	2.922e-11	-10.398	-10.534	-0.137	(0)	
CoHPO4	3.280e-11	3.280e-11	-10.484	-10.484	0.000	(0)	
CoOH+	2.211e-11	1.614e-11	-10.655	-10.792	-0.137	(0)	
Co (NO3) 2	2.666e-12	2.666e-12	-11.574	-11.574	0.000	(0)	
CoCO3	9.413e-15	9.413e-15	-14.026	-14.026	0.000	(0)	
Co (OH) 2	4.077e-16	4.077e-16	-15.390	-15.390	0.000	(0)	
Co2OH+3	3.494e-17	2.057e-18	-16.457	-17.687	-1.230	(0)	
CoNO2+	1.601e-21	1.169e-21	-20.796	-20.932	-0.137	(0)	
Co (OH) 3-	3.544e-24	2.587e-24	-23.451	-23.587	-0.137	(0)	
CoOOH-	1.483e-25	1.083e-25	-24.829	-24.965	-0.137	(0)	
Co4 (OH) 4+4	2.081e-33	1.353e-35	-32.682	-34.869	-2.187	(0)	
Co (OH) 4-2	4.592e-34	1.304e-34	-33.338	-33.885	-0.547	(0)	
Co (NH3) +2	0.000e+00	0.000e+00	-66.582	-67.128	-0.547	(0)	
Co (NH3) 2+2	0.000e+00	0.000e+00	-128.954	-129.501	-0.547	(0)	
Co (NH3) 3+2	0.000e+00	0.000e+00	-191.662	-192.209	-0.547	(0)	
Co (NH3) 4+2	0.000e+00	0.000e+00	-254.750	-255.297	-0.547	(0)	
Co (NH3) 5+2	0.000e+00	0.000e+00	-318.338	-318.885	-0.547	(0)	
Co (3)	1.956e-18						
CoOH+2	1.951e-18	5.540e-19	-17.710	-18.257	-0.547	(0)	

Co+3	2.533e-21	3.428e-22	-20.596	-21.465	-0.869	(0)
CoCl+2	2.444e-21	6.941e-22	-20.612	-21.159	-0.547	(0)
Co(NH3) 5Cl+2	0.000e+00	0.000e+00	-313.990	-314.537	-0.547	(0)
Co(NH3) 6SO4+	0.000e+00	0.000e+00	-380.262	-380.399	-0.137	(0)
Co(NH3) 6Cl+2	0.000e+00	0.000e+00	-384.486	-385.033	-0.547	(0)
Co(NH3) 6OH+2	0.000e+00	0.000e+00	-387.518	-388.064	-0.547	(0)
Cr (2)	0.000e+00					
Cr+2	0.000e+00	0.000e+00	-40.302	-40.849	-0.547	(0)
Cr (3)	2.844e-16					
Cr (OH) +2	8.775e-17	2.492e-17	-16.057	-16.603	-0.547	(0)
Cr+3	8.683e-17	5.112e-18	-16.061	-17.291	-1.230	(0)
CrSO4+	8.625e-17	6.296e-17	-16.064	-16.201	-0.137	(0)
CrOHSO4	2.259e-17	2.259e-17	-16.646	-16.646	0.000	(0)
Cr (OH) 2+	7.729e-19	5.642e-19	-18.112	-18.249	-0.137	(0)
CrCl+2	2.164e-19	6.146e-20	-18.665	-19.211	-0.547	(0)
CrH2PO4+2	2.534e-20	7.195e-21	-19.596	-20.143	-0.547	(0)
CrNO3+2	2.885e-22	8.193e-23	-21.540	-22.087	-0.547	(0)
Cr (OH) 3	6.741e-23	6.741e-23	-22.171	-22.171	0.000	(0)
CrCl2+	5.698e-23	4.160e-23	-22.244	-22.381	-0.137	(0)
CrOHC12	2.023e-24	2.023e-24	-23.694	-23.694	0.000	(0)
CrO2-	1.388e-27	1.013e-27	-26.858	-26.994	-0.137	(0)
Cr (OH) 4-	1.169e-27	8.535e-28	-26.932	-27.069	-0.137	(0)
Cr2 (OH) 2SO4+2	1.048e-31	2.976e-32	-30.980	-31.526	-0.547	(0)
Cr2 (OH) 2 (SO4) 2	1.154e-32	1.154e-32	-31.938	-31.938	0.000	(0)
Cr (NH3) 5OH+2	0.000e+00	0.000e+00	-325.297	-325.844	-0.547	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-386.297	-387.527	-1.230	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-387.832	-388.379	-0.547	(0)
Cr (6)	6.372e-08					
HCrO4-	6.255e-08	4.566e-08	-7.204	-7.340	-0.137	(0)
CrO4-2	1.101e-09	4.524e-10	-8.958	-9.344	-0.386	(0)
NaCrO4-	3.571e-11	2.606e-11	-10.447	-10.584	-0.137	(0)
KCrO4-	1.110e-11	8.106e-12	-10.955	-11.091	-0.137	(0)
CrO3SO4-2	1.026e-11	2.915e-12	-10.989	-11.535	-0.547	(0)
CrO3HPO4-2	3.812e-12	1.083e-12	-11.419	-11.966	-0.547	(0)
H2CrO4	9.074e-13	9.074e-13	-12.042	-12.042	0.000	(0)
Cr2O7-2	2.905e-13	8.249e-14	-12.537	-13.084	-0.547	(0)
CrO3Cl-	1.403e-13	1.024e-13	-12.853	-12.990	-0.137	(0)
CrO3H2PO4-	2.259e-14	1.649e-14	-13.646	-13.783	-0.137	(0)
Cu (1)	2.008e-17					
CuCl2-	1.461e-17	1.158e-17	-16.835	-16.936	-0.101	(0)
CuCl	4.928e-18	4.928e-18	-17.307	-17.307	0.000	(0)
Cu+	4.827e-19	3.524e-19	-18.316	-18.453	-0.137	(0)
CuCl3-2	6.453e-20	2.697e-20	-19.190	-19.569	-0.379	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-287.819	-288.224	-0.405	(0)
CuS4S5-3	0.000e+00	0.000e+00	-288.571	-288.954	-0.383	(0)
Cu (2)	9.874e-05					
Cu+2	6.213e-05	2.554e-05	-4.207	-4.593	-0.386	(0)
CuSO4	3.598e-05	3.598e-05	-4.444	-4.444	0.000	(0)
CuCl+	5.359e-07	4.248e-07	-6.271	-6.372	-0.101	(0)
CuNO3+	6.489e-08	4.737e-08	-7.188	-7.324	-0.137	(0)
CuOH+	2.533e-08	2.008e-08	-7.596	-7.697	-0.101	(0)
CuCl2	1.278e-09	1.278e-09	-8.893	-8.893	0.000	(0)
CuHCO3+	3.260e-10	2.380e-10	-9.487	-9.623	-0.137	(0)
Cu2 (OH) 2+2	3.445e-11	9.784e-12	-10.463	-11.010	-0.547	(0)
CuCO3	3.293e-11	3.293e-11	-10.482	-10.482	0.000	(0)
Cu (NO3) 2	3.306e-12	3.306e-12	-11.481	-11.481	0.000	(0)
Cu (OH) 2	1.630e-12	1.630e-12	-11.788	-11.788	0.000	(0)
CuCl3-	1.528e-13	1.211e-13	-12.816	-12.917	-0.101	(0)
CuCl4-2	1.913e-17	7.994e-18	-16.718	-17.097	-0.379	(0)
Cu (OH) 3-	1.457e-18	1.063e-18	-17.837	-17.973	-0.137	(0)
CuNO2+	2.389e-19	1.744e-19	-18.622	-18.758	-0.137	(0)
Cu (CO3) 2-2	6.834e-20	1.941e-20	-19.165	-19.712	-0.547	(0)
Cu (OH) 4-2	9.373e-27	2.662e-27	-26.028	-26.575	-0.547	(0)
Cu (NO2) 2	1.164e-34	1.164e-34	-33.934	-33.934	0.000	(0)
CuNH3+2	0.000e+00	0.000e+00	-63.629	-64.176	-0.547	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-401.799	-401.935	-0.137	(0)
Fe (2)	6.288e-13					
Fe+2	4.392e-13	1.247e-13	-12.357	-12.904	-0.547	(0)

FeSO4	1.892e-13	1.892e-13	-12.723	-12.723	0.000	(0)
FeH2PO4+	4.562e-16	3.687e-16	-15.341	-15.433	-0.092	(0)
FeHPO4	5.871e-18	5.871e-18	-17.231	-17.231	0.000	(0)
FeOH+	1.338e-18	1.076e-18	-17.874	-17.968	-0.095	(0)
FeHCO3+	2.848e-19	2.319e-19	-18.545	-18.635	-0.089	(0)
Fe (OH) 2	1.752e-25	1.752e-25	-24.757	-24.757	0.000	(0)
Fe (OH) 3-	2.091e-29	1.681e-29	-28.680	-28.774	-0.095	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-286.115	-286.115	0.000	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-425.022	-425.159	-0.137	(0)
Fe (3)	9.373e-06					
Fe (OH) 2+	9.192e-06	7.430e-06	-5.037	-5.129	-0.092	(0)
FeOH+2	1.078e-07	4.504e-08	-6.968	-7.346	-0.379	(0)
FeHPO4+	4.360e-08	3.524e-08	-7.361	-7.453	-0.092	(0)
FeSO4+	2.243e-08	1.804e-08	-7.649	-7.744	-0.095	(0)
Fe (SO4) 2-	3.589e-09	2.620e-09	-8.445	-8.582	-0.137	(0)
Fe+3	2.161e-09	2.924e-10	-8.665	-9.534	-0.869	(0)
Fe (OH) 3	1.242e-09	1.242e-09	-8.906	-8.906	0.000	(0)
FeCl+2	2.004e-10	8.375e-11	-9.698	-10.077	-0.379	(0)
FeH2PO4+2	7.676e-11	3.275e-11	-10.115	-10.485	-0.370	(0)
Fe2 (OH) 2+4	1.235e-11	8.032e-14	-10.908	-13.095	-2.187	(0)
FeNO3+2	7.574e-12	2.151e-12	-11.121	-11.667	-0.547	(0)
FeCl2+	6.055e-12	4.869e-12	-11.218	-11.313	-0.095	(0)
Fe (OH) 4-	9.298e-14	7.515e-14	-13.032	-13.124	-0.092	(0)
Fe3 (OH) 4+5	2.138e-14	8.185e-18	-13.670	-17.087	-3.417	(0)
FeCl3	5.409e-15	5.409e-15	-14.267	-14.267	0.000	(0)
FeHSeO3+2	2.679e-23	7.606e-24	-22.572	-23.119	-0.547	(0)
H (0)	0.000e+00					
H2	0.000e+00	0.000e+00	-45.195	-45.187	0.007	(0)
K	6.291e-03					
K+	6.023e-03	4.823e-03	-2.220	-2.317	-0.097	(0)
KSO4-	2.681e-04	2.167e-04	-3.572	-3.664	-0.092	(0)
KHPO4-	5.352e-10	4.326e-10	-9.271	-9.364	-0.092	(0)
KCrO4-	1.110e-11	8.106e-12	-10.955	-11.091	-0.137	(0)
Mg	3.635e-03					
Mg+2	2.474e-03	1.017e-03	-2.607	-2.993	-0.386	(0)
MgSO4	1.161e-03	1.161e-03	-2.935	-2.935	0.000	(0)
MgH2PO4+	3.695e-07	2.986e-07	-6.432	-6.525	-0.092	(0)
MgHPO4	7.745e-09	7.745e-09	-8.111	-8.111	0.000	(0)
MgHCO3+	2.086e-09	1.653e-09	-8.681	-8.782	-0.101	(0)
MgOH+	9.860e-11	8.075e-11	-10.006	-10.093	-0.087	(0)
MgH2BO3+	7.236e-12	5.592e-12	-11.141	-11.252	-0.112	(0)
MgCO3	1.705e-13	1.705e-13	-12.768	-12.768	0.000	(0)
MgPO4-	8.180e-15	6.611e-15	-14.087	-14.180	-0.092	(0)
Mn (2)	2.349e-07					
Mn+2	1.785e-07	5.068e-08	-6.748	-7.295	-0.547	(0)
MnSO4	5.542e-08	5.542e-08	-7.256	-7.256	0.000	(0)
MnCl+	8.816e-10	7.089e-10	-9.055	-9.149	-0.095	(0)
MnNO3+	6.274e-11	4.580e-11	-10.202	-10.339	-0.137	(0)
MnCl2	1.112e-11	1.112e-11	-10.954	-10.954	0.000	(0)
MnSeO4	6.464e-13	6.464e-13	-12.190	-12.190	0.000	(0)
MnHCO3+	1.998e-13	1.607e-13	-12.699	-12.794	-0.095	(0)
Mn (NO3) 2	6.636e-14	6.636e-14	-13.178	-13.178	0.000	(0)
MnCl3-	4.233e-14	3.404e-14	-13.373	-13.468	-0.095	(0)
MnOH+	3.430e-14	2.758e-14	-13.465	-13.559	-0.095	(0)
Mn (OH) 3-	3.148e-29	2.531e-29	-28.502	-28.597	-0.095	(0)
Mn (OH) 4-2	6.219e-38	2.599e-38	-37.206	-37.585	-0.379	(0)
MnSe	0.000e+00	0.000e+00	-106.429	-106.429	0.000	(0)
Mn (3)	2.698e-16					
Mn+3	2.698e-16	3.651e-17	-15.569	-16.438	-0.869	(0)
Mn (6)	4.504e-26					
MnO4-2	4.504e-26	1.882e-26	-25.346	-25.725	-0.379	(0)
Mn (7)	1.610e-19					
MnO4-	1.610e-19	1.256e-19	-18.793	-18.901	-0.108	(0)
Mo	1.151e-06					
MoO4-2	8.338e-07	3.428e-07	-6.079	-6.465	-0.386	(0)
HMoO4-	2.575e-07	1.880e-07	-6.589	-6.726	-0.137	(0)
H2MoO4	5.974e-08	5.974e-08	-7.224	-7.224	0.000	(0)
AlMo6O21-3	1.307e-16	7.692e-18	-15.884	-17.114	-1.230	(0)

HM07024-5	4.924e-23	1.885e-26	-22.308	-25.725	-3.417	(0)
Mo7024-6	2.182e-23	2.621e-28	-22.661	-27.582	-4.920	(0)
H2Mo7024-4	5.438e-24	3.536e-26	-23.265	-25.451	-2.187	(0)
H3Mo7024-3	3.393e-26	1.998e-27	-25.469	-26.699	-1.230	(0)
N(-3)	0.000e+00					
NH4+	0.000e+00	0.000e+00	-58.952	-59.064	-0.112	(0)
NH4SO4-	0.000e+00	0.000e+00	-60.124	-60.219	-0.095	(0)
CuNH3+2	0.000e+00	0.000e+00	-63.629	-64.176	-0.547	(0)
NH3	0.000e+00	0.000e+00	-63.963	-63.963	0.000	(0)
CaNH3+2	0.000e+00	0.000e+00	-65.589	-66.136	-0.547	(0)
NiNH3+2	0.000e+00	0.000e+00	-65.979	-66.526	-0.547	(0)
Co(NH3)+2	0.000e+00	0.000e+00	-66.582	-67.128	-0.547	(0)
BaNH3+2	0.000e+00	0.000e+00	-70.382	-70.929	-0.547	(0)
Ni(NH3)2+2	0.000e+00	0.000e+00	-127.494	-128.040	-0.547	(0)
Co(NH3)2+2	0.000e+00	0.000e+00	-128.954	-129.501	-0.547	(0)
Ca(NH3)2+2	0.000e+00	0.000e+00	-129.797	-130.344	-0.547	(0)
Co(NH3)3+2	0.000e+00	0.000e+00	-191.662	-192.209	-0.547	(0)
Co(NH3)4+2	0.000e+00	0.000e+00	-254.750	-255.297	-0.547	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-313.990	-314.537	-0.547	(0)
Co(NH3)5+2	0.000e+00	0.000e+00	-318.338	-318.885	-0.547	(0)
Cr(NH3)5OH+2	0.000e+00	0.000e+00	-325.297	-325.844	-0.547	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-380.262	-380.399	-0.137	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-384.486	-385.033	-0.547	(0)
Cr(NH3)6+3	0.000e+00	0.000e+00	-386.297	-387.527	-1.230	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-387.518	-388.064	-0.547	(0)
Cr(NH3)6Cl+2	0.000e+00	0.000e+00	-387.832	-388.379	-0.547	(0)
N(3)	8.387e-17					
NO2-	8.363e-17	6.522e-17	-16.078	-16.186	-0.108	(0)
CuNO2+	2.389e-19	1.744e-19	-18.622	-18.758	-0.137	(0)
CoNO2+	1.601e-21	1.169e-21	-20.796	-20.932	-0.137	(0)
Cu(NO2)2	1.164e-34	1.164e-34	-33.934	-33.934	0.000	(0)
N(5)	7.218e-04					
NO3-	7.121e-04	5.702e-04	-3.147	-3.244	-0.097	(0)
CaNO3+	9.565e-06	6.982e-06	-5.019	-5.156	-0.137	(0)
CuNO3+	6.489e-08	4.737e-08	-7.188	-7.324	-0.137	(0)
NiNO3+	4.414e-09	3.222e-09	-8.355	-8.492	-0.137	(0)
ZnNO3+	3.695e-09	2.697e-09	-8.432	-8.569	-0.137	(0)
CoNO3+	3.148e-09	2.298e-09	-8.502	-8.639	-0.137	(0)
BaNO3+	5.137e-10	3.750e-10	-9.289	-9.426	-0.137	(0)
PbNO3+	1.670e-10	1.219e-10	-9.777	-9.914	-0.137	(0)
MnNO3+	6.274e-11	4.580e-11	-10.202	-10.339	-0.137	(0)
FeNO3+2	7.574e-12	2.151e-12	-11.121	-11.667	-0.547	(0)
CdNO3+	3.490e-12	2.547e-12	-11.457	-11.594	-0.137	(0)
Cu(NO3)2	3.306e-12	3.306e-12	-11.481	-11.481	0.000	(0)
Co(NO3)2	2.666e-12	2.666e-12	-11.574	-11.574	0.000	(0)
Zn(NO3)2	2.973e-13	2.973e-13	-12.527	-12.527	0.000	(0)
Pb(NO3)2	1.252e-13	1.252e-13	-12.902	-12.902	0.000	(0)
Mn(NO3)2	6.636e-14	6.636e-14	-13.178	-13.178	0.000	(0)
Cd(NO3)2	6.300e-16	6.300e-16	-15.201	-15.201	0.000	(0)
CrNO3+2	2.885e-22	8.193e-23	-21.540	-22.087	-0.547	(0)
Na	1.498e-02					
Na+	1.448e-02	1.159e-02	-1.839	-1.936	-0.097	(0)
NaSO4-	4.995e-04	4.037e-04	-3.301	-3.394	-0.092	(0)
NaHPO4-	1.993e-09	1.611e-09	-8.701	-8.793	-0.092	(0)
NaHCO3	1.170e-09	1.170e-09	-8.932	-8.932	0.000	(0)
NaCrO4-	3.571e-11	2.606e-11	-10.447	-10.584	-0.137	(0)
NaH2BO3	3.187e-12	3.187e-12	-11.497	-11.497	0.000	(0)
NaCO3-	6.727e-14	5.437e-14	-13.172	-13.265	-0.092	(0)
Ni	8.382e-06					
Ni+2	5.473e-06	2.250e-06	-5.262	-5.648	-0.386	(0)
NiSO4	2.816e-06	2.816e-06	-5.550	-5.550	0.000	(0)
NiCl+	8.640e-08	6.307e-08	-7.063	-7.200	-0.137	(0)
NiNO3+	4.414e-09	3.222e-09	-8.355	-8.492	-0.137	(0)
Ni(SO4)2-2	2.231e-09	6.335e-10	-8.652	-9.198	-0.547	(0)
NiHCO3+	5.611e-11	4.096e-11	-10.251	-10.388	-0.137	(0)
NiSeO4	4.986e-11	4.986e-11	-10.302	-10.302	0.000	(0)
NiOH+	8.639e-12	6.307e-12	-11.064	-11.200	-0.137	(0)
NiCl2	3.577e-12	3.577e-12	-11.446	-11.446	0.000	(0)

NiCO3	1.838e-14	1.838e-14	-13.736	-13.736	0.000	(0)
Ni(OH)2	2.276e-16	2.276e-16	-15.643	-15.643	0.000	(0)
Ni(OH)3-	9.914e-23	7.237e-23	-22.004	-22.140	-0.137	(0)
NiNH3+2	0.000e+00	0.000e+00	-65.979	-66.526	-0.547	(0)
Ni(NH3)2+2	0.000e+00	0.000e+00	-127.494	-128.040	-0.547	(0)
O(0)	9.507e-04					
O2	4.754e-04	4.834e-04	-3.323	-3.316	0.007	(0)
P	9.400e-06					
H2PO4-	8.261e-06	6.677e-06	-5.083	-5.175	-0.092	(0)
CaH2PO4+	6.353e-07	5.135e-07	-6.197	-6.289	-0.092	(0)
MgH2PO4+	3.695e-07	2.986e-07	-6.432	-6.525	-0.092	(0)
FeHPO4+	4.360e-08	3.524e-08	-7.361	-7.453	-0.092	(0)
HPO4-2	3.137e-08	1.311e-08	-7.503	-7.882	-0.379	(0)
H3PO4	2.812e-08	2.812e-08	-7.551	-7.551	0.000	(0)
CaHPO4	2.059e-08	2.059e-08	-7.686	-7.686	0.000	(0)
MgHPO4	7.745e-09	7.745e-09	-8.111	-8.111	0.000	(0)
NaHPO4-	1.993e-09	1.611e-09	-8.701	-8.793	-0.092	(0)
KHPO4-	5.352e-10	4.326e-10	-9.271	-9.364	-0.092	(0)
FeH2PO4+2	7.676e-11	3.275e-11	-10.115	-10.485	-0.370	(0)
CoHPO4	3.280e-11	3.280e-11	-10.484	-10.484	0.000	(0)
CrO3HPO4-2	3.812e-12	1.083e-12	-11.419	-11.966	-0.547	(0)
CaPO4-	1.920e-12	1.552e-12	-11.717	-11.809	-0.092	(0)
CrO3H2PO4-	2.259e-14	1.649e-14	-13.646	-13.783	-0.137	(0)
MgPO4-	8.180e-15	6.611e-15	-14.087	-14.180	-0.092	(0)
PO4-3	1.165e-15	1.577e-16	-14.934	-15.802	-0.869	(0)
FeH2PO4+	4.562e-16	3.687e-16	-15.341	-15.433	-0.092	(0)
FeHPO4	5.871e-18	5.871e-18	-17.231	-17.231	0.000	(0)
CrH2PO4+2	2.534e-20	7.195e-21	-19.596	-20.143	-0.547	(0)
Pb	9.690e-08					
PbSO4	4.686e-08	4.686e-08	-7.329	-7.329	0.000	(0)
Pb+2	3.565e-08	1.465e-08	-7.448	-7.834	-0.386	(0)
PbCl+	7.453e-09	5.441e-09	-8.128	-8.264	-0.137	(0)
Pb(SO4)2-2	6.491e-09	1.843e-09	-8.188	-8.734	-0.547	(0)
PbCl2	2.639e-10	2.639e-10	-9.578	-9.578	0.000	(0)
PbNO3+	1.670e-10	1.219e-10	-9.777	-9.914	-0.137	(0)
PbOH+	1.604e-11	1.171e-11	-10.795	-10.932	-0.137	(0)
PbHCO3+	2.203e-12	1.608e-12	-11.657	-11.794	-0.137	(0)
PbCl3-	1.690e-12	1.233e-12	-11.772	-11.909	-0.137	(0)
Pb(NO3)2	1.252e-13	1.252e-13	-12.902	-12.902	0.000	(0)
PbCl4-2	2.048e-14	5.816e-15	-13.689	-14.235	-0.547	(0)
PbCO3	9.645e-15	9.645e-15	-14.016	-14.016	0.000	(0)
Pb(OH)2	1.177e-16	1.177e-16	-15.929	-15.929	0.000	(0)
Pb2OH+3	4.619e-17	2.719e-18	-16.335	-17.566	-1.230	(0)
Pb(OH)3-	5.130e-23	3.745e-23	-22.290	-22.427	-0.137	(0)
Pb(CO3)2-2	2.145e-23	6.091e-24	-22.669	-23.215	-0.547	(0)
Pb(OH)4-2	1.027e-29	2.917e-30	-28.988	-29.535	-0.547	(0)
Pb3(OH)4+2	6.460e-30	1.834e-30	-29.190	-29.736	-0.547	(0)
Pb4(OH)4+4	3.954e-32	2.571e-34	-31.403	-33.590	-2.187	(0)
Pb(HS)2	0.000e+00	0.000e+00	-274.725	-274.725	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-414.369	-414.506	-0.137	(0)
S(-2)	0.000e+00					
H2S	0.000e+00	0.000e+00	-138.495	-138.495	0.000	(0)
HS-	0.000e+00	0.000e+00	-140.944	-141.081	-0.137	(0)
CdHS+	0.000e+00	0.000e+00	-141.849	-141.985	-0.137	(0)
S5-2	0.000e+00	0.000e+00	-145.511	-146.058	-0.547	(0)
S6-2	0.000e+00	0.000e+00	-145.915	-146.462	-0.547	(0)
S4-2	0.000e+00	0.000e+00	-146.112	-146.659	-0.547	(0)
S3-2	0.000e+00	0.000e+00	-146.927	-147.473	-0.547	(0)
S2-2	0.000e+00	0.000e+00	-147.955	-148.502	-0.547	(0)
S-2	0.000e+00	0.000e+00	-153.649	-154.028	-0.379	(0)
Pb(HS)2	0.000e+00	0.000e+00	-274.725	-274.725	0.000	(0)
Zn(HS)2	0.000e+00	0.000e+00	-275.080	-275.080	0.000	(0)
Cd(HS)2	0.000e+00	0.000e+00	-275.862	-275.862	0.000	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-276.453	-276.590	-0.137	(0)
Fe(HS)2	0.000e+00	0.000e+00	-286.115	-286.115	0.000	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-287.819	-288.224	-0.405	(0)
CuS4S5-3	0.000e+00	0.000e+00	-288.571	-288.954	-0.383	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-401.799	-401.935	-0.137	(0)

Zn (HS) 3-	0.000e+00	0.000e+00	-412.744	-412.881	-0.137	(0)
Pb (HS) 3-	0.000e+00	0.000e+00	-414.369	-414.506	-0.137	(0)
Cd (HS) 3-	0.000e+00	0.000e+00	-414.906	-415.042	-0.137	(0)
ZnS (HS) 2-2	0.000e+00	0.000e+00	-417.814	-418.361	-0.547	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-425.022	-425.159	-0.137	(0)
Cd (HS) 4-2	0.000e+00	0.000e+00	-553.380	-553.927	-0.547	(0)
Zn (HS) 4-2	0.000e+00	0.000e+00	-554.874	-555.421	-0.547	(0)
S (6)	2.322e-02					
SO4-2	1.588e-02	6.529e-03	-1.799	-2.185	-0.386	(0)
CaSO4	5.314e-03	5.314e-03	-2.275	-2.275	0.000	(0)
MgSO4	1.161e-03	1.161e-03	-2.935	-2.935	0.000	(0)
NaSO4-	4.995e-04	4.037e-04	-3.301	-3.394	-0.092	(0)
KSO4-	2.681e-04	2.167e-04	-3.572	-3.664	-0.092	(0)
CuSO4	3.598e-05	3.598e-05	-4.444	-4.444	0.000	(0)
AlSO4+	2.517e-05	2.010e-05	-4.599	-4.697	-0.098	(0)
HSO4-	2.172e-05	1.734e-05	-4.663	-4.761	-0.098	(0)
CoSO4	3.174e-06	3.174e-06	-5.498	-5.498	0.000	(0)
NiSO4	2.816e-06	2.816e-06	-5.550	-5.550	0.000	(0)
ZnSO4	2.497e-06	2.497e-06	-5.603	-5.603	0.000	(0)
Al (SO4) 2-	1.967e-06	1.571e-06	-5.706	-5.804	-0.098	(0)
Zn (SO4) 2-2	5.217e-07	1.482e-07	-6.283	-6.829	-0.547	(0)
MnSO4	5.542e-08	5.542e-08	-7.256	-7.256	0.000	(0)
BeSO4	5.277e-08	5.277e-08	-7.278	-7.278	0.000	(0)
PbSO4	4.686e-08	4.686e-08	-7.329	-7.329	0.000	(0)
FeSO4+	2.243e-08	1.804e-08	-7.649	-7.744	-0.095	(0)
Pb (SO4) 2-2	6.491e-09	1.843e-09	-8.188	-8.734	-0.547	(0)
Be (SO4) 2-2	3.772e-09	1.071e-09	-8.423	-8.970	-0.547	(0)
Fe (SO4) 2-	3.589e-09	2.620e-09	-8.445	-8.582	-0.137	(0)
Ni (SO4) 2-2	2.231e-09	6.335e-10	-8.652	-9.198	-0.547	(0)
CdSO4	1.762e-09	1.762e-09	-8.754	-8.754	0.000	(0)
Cd (SO4) 2-2	5.803e-10	1.648e-10	-9.236	-9.783	-0.547	(0)
CrO3SO4-2	1.026e-11	2.915e-12	-10.989	-11.535	-0.547	(0)
FeSO4	1.892e-13	1.892e-13	-12.723	-12.723	0.000	(0)
CrSO4+	8.625e-17	6.296e-17	-16.064	-16.201	-0.137	(0)
CrOHSO4	2.259e-17	2.259e-17	-16.646	-16.646	0.000	(0)
Cr2 (OH) 2SO4+2	1.048e-31	2.976e-32	-30.980	-31.526	-0.547	(0)
Cr2 (OH) 2 (SO4) 2	1.154e-32	1.154e-32	-31.938	-31.938	0.000	(0)
NH4SO4-	0.000e+00	0.000e+00	-60.124	-60.219	-0.095	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-380.262	-380.399	-0.137	(0)
Se (-2)	0.000e+00					
HSe-	0.000e+00	0.000e+00	-98.112	-98.248	-0.137	(0)
H2Se	0.000e+00	0.000e+00	-98.868	-98.868	0.000	(0)
MnSe	0.000e+00	0.000e+00	-106.429	-106.429	0.000	(0)
Se-2	0.000e+00	0.000e+00	-108.345	-108.892	-0.547	(0)
Se (4)	1.617e-17					
HSeO3-	1.602e-17	1.169e-17	-16.795	-16.932	-0.137	(0)
H2SeO3	1.511e-19	1.511e-19	-18.821	-18.821	0.000	(0)
SeO3-2	5.007e-21	1.422e-21	-20.300	-20.847	-0.547	(0)
FeHSeO3+2	2.679e-23	7.606e-24	-22.572	-23.119	-0.547	(0)
Cd (SeO3) 2-2	0.000e+00	0.000e+00	-44.114	-44.661	-0.547	(0)
Se (6)	1.271e-07					
SeO4-2	1.269e-07	5.217e-08	-6.896	-7.283	-0.386	(0)
HSeO4-	9.670e-11	7.059e-11	-10.015	-10.151	-0.137	(0)
CoSeO4	6.123e-11	6.123e-11	-10.213	-10.213	0.000	(0)
NiSeO4	4.986e-11	4.986e-11	-10.302	-10.302	0.000	(0)
ZnSeO4	1.474e-11	1.474e-11	-10.831	-10.831	0.000	(0)
MnSeO4	6.464e-13	6.464e-13	-12.190	-12.190	0.000	(0)
CdSeO4	1.188e-14	1.188e-14	-13.925	-13.925	0.000	(0)
Zn (SeO4) 2-2	2.746e-18	7.799e-19	-17.561	-18.108	-0.547	(0)
Zn	7.523e-06					
Zn+2	4.438e-06	1.824e-06	-5.353	-5.739	-0.386	(0)
ZnSO4	2.497e-06	2.497e-06	-5.603	-5.603	0.000	(0)
Zn (SO4) 2-2	5.217e-07	1.482e-07	-6.283	-6.829	-0.547	(0)
ZnCl+	6.189e-08	4.905e-08	-7.208	-7.309	-0.101	(0)
ZnNO3+	3.695e-09	2.697e-09	-8.432	-8.569	-0.137	(0)
ZnCl2	6.949e-10	6.949e-10	-9.158	-9.158	0.000	(0)
ZnOH+	5.414e-11	3.952e-11	-10.267	-10.403	-0.137	(0)
ZnOHC1	2.120e-11	2.120e-11	-10.674	-10.674	0.000	(0)

ZnSeO4	1.474e-11	1.474e-11	-10.831	-10.831	0.000	(0)
ZnHCO3+	1.167e-11	8.520e-12	-10.933	-11.070	-0.137	(0)
ZnCl3-	7.579e-12	6.007e-12	-11.120	-11.221	-0.101	(0)
Zn(NO3)2	2.973e-13	2.973e-13	-12.527	-12.527	0.000	(0)
ZnCl4-2	7.670e-14	3.205e-14	-13.115	-13.494	-0.379	(0)
ZnCO3	2.299e-14	2.299e-14	-13.639	-13.639	0.000	(0)
Zn(OH)2	2.925e-15	2.925e-15	-14.534	-14.534	0.000	(0)
Zn(SeO4)2-2	2.746e-18	7.799e-19	-17.561	-18.108	-0.547	(0)
Zn(OH)3-	6.386e-21	4.662e-21	-20.195	-20.331	-0.137	(0)
Zn(OH)4-2	2.078e-28	5.902e-29	-27.682	-28.229	-0.547	(0)
Zn(HS)2	0.000e+00	0.000e+00	-275.080	-275.080	0.000	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-276.453	-276.590	-0.137	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-412.744	-412.881	-0.137	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-417.814	-418.361	-0.547	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-554.874	-555.421	-0.547	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2-309.00	-302.73	6.27	(Co(NH3)5Cl)(NO3)2	
(Co(NH3)5Cl)Cl2-304.69	-300.15	4.54	(Co(NH3)5Cl)Cl2	
(Co(NH3)5OH2)Cl3-311.96	-300.15	11.81	(Co(NH3)5OH2)Cl3	
(Co(NH3)6)(NO3)3-376.51	-358.58	17.93	(Co(NH3)6)(NO3)3	
(Co(NH3)6)Cl3-374.84	-354.71	20.13	(Co(NH3)6)Cl3	
(NH4)2CrO4-127.85	-127.47	0.38	(NH4)2CrO4	
(NH4)2SeO4-125.86	-125.41	0.45	(NH4)2SeO4	
Al(OH)3(am)-3.95	7.18	11.13	Al(OH)3	
Al2(MoO4)3-35.18	-32.03	3.15	Al2(MoO4)3	
Al2O3-6.06	14.36	20.43	Al2O3	
Al4(OH)10SO4-5.16	17.54	22.70	Al4(OH)10SO4	
AlAsO4:2H2O-7.61	-2.81	4.80	AlAsO4:2H2O	
AlOHSO4-0.77	-4.00	-3.23	AlOHSO4	
Alunite2.13	1.36	-0.77	KAl3(SO4)2(OH)6	
Anglesite-2.19	-10.02	-7.83	PbSO4	
Anhydrite-0.27	-4.61	-4.34	CaSO4	
Anilite-132.99	-165.41	-32.42	Cu0.25Cu1.5S	
Antlerite-6.75	2.03	8.79	Cu3(OH)4SO4	
Aragonite-6.82	-15.09	-8.26	CaCO3	
Arsenolite-128.18	-131.12	-2.94	As4O6	
Artinite-19.61	-9.65	9.96	MgCO3:Mg(OH)2:3H2O	
As2O5-26.76	-19.99	6.77	As2O5	
Atacamite-5.31	2.36	7.67	Cu2(OH)3Cl	
Azurite-13.48	-30.10	-16.62	Cu3(OH)2(CO3)2	
Ba(OH)2:8H2O-22.48	2.07	24.56	Ba(OH)2:8H2O	
Ba3(AsO4)2-4.81	-13.75	-8.94	Ba3(AsO4)2	
BaCrO4-6.50	-16.27	-9.77	BaCrO4	
BaHPO4-7.45	-27.22	-19.77	BaHPO4	
BaMoO4-6.39	-13.39	-6.99	BaMoO4	
Barite0.94	-9.11	-10.05	BaSO4	
BaS-159.68	-143.50	16.18	BaS	
BaSeO3-21.15	-19.35	1.79	BaSeO3	
BaSeO4-6.68	-14.20	-7.53	BaSeO4	
Be(OH)2(alpha)-5.09	1.80	6.89	Be(OH)2	
Be(OH)2(am)-5.39	1.80	7.19	Be(OH)2	
Be(OH)2(beta)-4.69	1.80	6.49	Be(OH)2	
BeMoO4-12.05	-13.66	-1.61	BeMoO4	
BeS-163.16	-143.78	19.38	BeS	
BeSeO4:4H2O-11.54	-14.48	-2.94	BeSeO4:4H2O	
Bianchite-6.16	-7.93	-1.76	ZnSO4:6H2O	
Birnessite-0.00	18.09	18.09	MnO2	
Bixbyite-5.60	-5.88	-0.27	Mn2O3	
BlaubleiI-120.24	-144.40	-24.16	Cu0.9Cu0.2S	
BlaubleiII-126.82	-154.10	-27.28	Cu0.6Cu0.8S	
Boehmite-1.75	7.18	8.93	AlOOH	
Brochantite-9.39	6.44	15.83	Cu4(OH)6SO4	
Brucite-11.18	6.01	17.18	Mg(OH)2	
Bunsenite-9.39	3.35	12.74	NiO	

Ca3 (AsO4) 2:4H2O	-22.58	-0.28	22.30	Ca3 (AsO4) 2:4H2O
Ca3 (PO4) 2 (beta)	-9.81	-38.89	-29.08	Ca3 (PO4) 2
Ca4H (PO4) 3:3H2O	-14.54	-61.62	-47.08	Ca4H (PO4) 3:3H2O
CaCrO4	-9.59	-11.77	-2.19	CaCrO4
CaHPO4	-3.36	-22.73	-19.37	CaHPO4
CaHPO4:2H2O	-3.67	-22.73	-19.06	CaHPO4:2H2O
Calcite	-6.63	-15.09	-8.46	CaCO3
CaMoO4	-0.95	-8.89	-7.94	CaMoO4
CaSeO3:2H2O	-17.73	-14.86	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-6.72	-9.71	-3.00	CaSeO4:2H2O
Cd (BO2) 2	-19.80	-9.96	9.84	Cd (BO2) 2
Cd (OH) 2	-13.84	0.09	13.93	Cd (OH) 2
Cd (OH) 2 (am)	-13.90	0.09	13.99	Cd (OH) 2
Cd3 (OH) 2 (SO4) 2	-28.82	-22.11	6.71	Cd3 (OH) 2 (SO4) 2
Cd3 (OH) 4SO4	-33.49	-10.93	22.56	Cd3 (OH) 4SO4
Cd3 (PO4) 2	-25.74	-58.34	-32.60	Cd3 (PO4) 2
Cd4 (OH) 6SO4	-39.24	-10.84	28.40	Cd4 (OH) 6SO4
CdCl2	-12.22	-12.82	-0.60	CdCl2
CdCl2:1H2O	-11.15	-12.82	-1.67	CdCl2:1H2O
CdCl2:2.5H2O	-10.89	-12.82	-1.93	CdCl2:2.5H2O
Cdmetal (alpha)	-55.71	-41.97	13.74	Cd
Cdmetal (gamma)	-55.82	-41.97	13.84	Cd
CdMoO4	-1.17	-15.38	-14.21	CdMoO4
CdOHCl	-10.00	-6.37	3.63	CdOHCl
CdSe	-82.23	-102.66	-20.43	CdSe
CdSeO4:2H2O	-14.35	-16.20	-1.85	CdSeO4:2H2O
CdSO4	-11.08	-11.10	-0.02	CdSO4
CdSO4:1H2O	-9.47	-11.10	-1.63	CdSO4:1H2O
CdSO4:2.67H2O	-9.28	-11.10	-1.82	CdSO4:2.67H2O
Cerussite	-7.29	-20.49	-13.20	PbCO3
CH4 (g)	-148.08	-189.90	-41.81	CH4
Chalcanthite	-4.12	-6.78	-2.66	CuSO4:5H2O
Chalcocite	-138.06	-173.49	-35.42	Cu2S
Chalcopyrite	-254.94	-290.66	-35.71	CuFeS2
Claudetite	-127.89	-131.12	-3.23	As4O6
Clausthalite	-74.12	-101.58	-27.46	PbSe
Co (BO2) 2	-33.71	-6.64	27.07	Co (BO2) 2
Co (OH) 2	-9.69	3.40	13.09	Co (OH) 2
Co (OH) 3	-5.93	-7.97	-2.03	Co (OH) 3
CO2 (g)	-3.50	-21.66	-18.16	CO2
Co3 (AsO4) 2	-22.81	-9.77	13.03	Co3 (AsO4) 2
Co3 (PO4) 2	-13.70	-48.39	-34.69	Co3 (PO4) 2
Co3O4	-2.35	-12.53	-10.17	Co3O4
CoCl2	-18.01	-9.50	8.51	CoCl2
CoCl2:6H2O	-12.02	-9.51	2.51	CoCl2:6H2O
CoCO3	-8.31	-18.25	-9.94	CoCO3
CoFe2O4	14.39	11.34	-3.05	CoFe2O4
CoHPO4	-6.84	-25.90	-19.06	CoHPO4
CoMoO4	-4.37	-12.06	-7.69	CoMoO4
CoO	-10.50	3.40	13.90	CoO
CoS (alpha)	-134.74	-142.18	-7.44	CoS
CoS (beta)	-131.11	-142.18	-11.07	CoS
CoSe	-83.14	-99.34	-16.20	CoSe
CoSeO3	-19.35	-18.03	1.32	CoSeO3
CoSeO4:6H2O	-11.35	-12.88	-1.53	CoSeO4:6H2O
CoSO4	-10.82	-7.78	3.04	CoSO4
CoSO4:6H2O	-5.31	-7.78	-2.48	CoSO4:6H2O
Cotunnite	-6.88	-11.74	-4.86	PbCl2
Covellite	-118.58	-141.17	-22.59	CuS
Cr (OH) 2	-42.78	-31.85	10.93	Cr (OH) 2
Cr (OH) 3	-15.17	-13.75	1.42	Cr (OH) 3
Cr (OH) 3 (am)	-13.00	-13.75	-0.75	Cr (OH) 3
Cr2O3	-25.29	-27.50	-2.21	Cr2O3
CrCl2	-59.18	-44.76	14.42	CrCl2
CrCl3	-48.59	-33.11	15.48	CrCl3
Crmetal	-104.91	-73.91	31.00	Cr
CrO3	-15.15	-18.34	-3.19	CrO3
Cu (OH) 2	-4.44	4.41	8.84	Cu (OH) 2

Cu2 (OH) 3NO3	-8.40	1.07	9.47	Cu2 (OH) 3NO3
Cu2Se (alpha)	-84.21	-130.65	-46.44	Cu2Se
Cu2SO4	-37.20	-39.09	-1.89	Cu2SO4
Cu3 (AsO4) 2:2H2O	-12.87	-6.77	6.10	Cu3 (AsO4) 2:2H2O
Cu3 (PO4) 2	-8.53	-45.38	-36.85	Cu3 (PO4) 2
Cu3 (PO4) 2:3H2O	-10.26	-45.38	-35.12	Cu3 (PO4) 2:3H2O
Cu3Se2	-164.49	-229.00	-64.51	Cu3Se2
CuCO3	-5.75	-17.25	-11.50	CuCO3
CuCrO4	-8.50	-13.94	-5.44	CuCrO4
Cumetal	-26.01	-34.98	-8.97	Cu
CuMoO4	2.05	-11.06	-13.11	CuMoO4
CuOCuSO4	-13.09	-2.37	10.71	CuOCuSO4
Cupricferrite	5.72	12.34	6.62	CuFe2O4
Cuprite	-26.87	-27.91	-1.04	Cu2O
Cuprousferrite	-1.12	-9.99	-8.87	CuFeO2
CuSe	-64.88	-98.34	-33.46	CuSe
CuSe2	-125.24	-159.03	-33.79	CuSe2
CuSeO3:2H2O	-17.65	-17.03	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-9.44	-11.88	-2.44	CuSeO4:5H2O
CuSO4	-9.94	-6.78	3.16	CuSO4
Diaspore	-0.00	7.18	7.18	AlOOH
Djurleite	-136.84	-171.35	-34.52	Cu0.066Cu1.868S
Dolomite(disordered)	-14.34	-30.74	-16.40	CaMg (CO3) 2
Dolomite(ordered)	-13.77	-30.74	-16.97	CaMg (CO3) 2
Epsomite	-3.02	-5.18	-2.16	MgSO4:7H2O
Fe (OH) 2	-17.47	-3.91	13.56	Fe (OH) 2
Fe (OH) 2.7Cl.3	5.07	2.03	-3.04	Fe (OH) 2.7Cl.3
Fe2 (OH) 4SeO3	-15.06	-13.50	1.55	Fe2 (OH) 4SeO3
Fe2 (SeO3) 3:2H2O	-35.74	-56.37	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-22.61	-25.62	-3.01	Fe2 (SO4) 3
Fe3 (OH) 8	-16.20	4.02	20.22	Fe3 (OH) 8
FeAsO4:2H2O	-6.43	-6.03	0.40	FeAsO4:2H2O
FeCr2O4	-39.02	-31.40	7.62	FeCr2O4
FeMoO4	-9.31	-19.37	-10.06	FeMoO4
Ferrihydrite	0.55	3.96	3.41	Fe (OH) 3
Ferroselite	-148.60	-167.34	-18.74	FeSe2
FeS (ppt)	-146.57	-149.48	-2.92	FeS
FeSe	-95.65	-106.65	-11.01	FeSe
Fix_pH	-4.50	-4.50	0.00	H+
Galena	-130.21	-144.41	-14.21	PbS
Gibbsite	-1.40	7.18	8.58	Al (OH) 3
Goethite	3.29	3.96	0.67	FeOOH
Goslarite	-5.87	-7.93	-2.05	ZnSO4:7H2O
Greenockite	-130.97	-145.49	-14.52	CdS
Greigite	-533.26	-578.29	-45.03	Fe3S4
Gypsum	-0.00	-4.61	-4.61	CaSO4:2H2O
H-Jarosite	0.93	-10.48	-11.41	(H3O) Fe3 (SO4) 2 (OH) 6
H2MoO4	-2.44	-15.46	-13.02	H2MoO4
H2S (g)	-137.57	-145.58	-8.01	H2S
H2Se (g)	-97.83	-102.75	-4.91	H2Se
Halite	-5.48	-3.89	1.59	NaCl
Hausmannite	-15.12	47.17	62.29	Mn3O4
Hematite	8.96	7.93	-1.03	Fe2O3
Hercynite	-13.37	10.46	23.83	FeAl2O4
Hinsdalite	-15.28	-17.78	-2.50	PbAl3PO4SO4 (OH) 6
Huntite	-32.40	-62.04	-29.65	CaMg3 (CO3) 4
Hydrocerussite	-21.05	-39.82	-18.77	Pb3 (OH) 2 (CO3) 2
Hydromagnesite	-48.49	-56.61	-8.11	Mg5 (CO3) 4 (OH) 2:4H2O
Hydroxylapatite	-10.72	-55.05	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-19.29	-82.08	-62.79	Pb5 (PO4) 3OH
K-Alum	-7.75	-13.01	-5.26	KAl (SO4) 2:12H2O
K-Jarosite	6.12	-8.29	-14.41	KFe3 (SO4) 2 (OH) 6
K2Cr2O7	-14.84	-32.32	-17.48	K2Cr2O7
K2CrO4	-13.41	-13.98	-0.57	K2CrO4
K2MoO4	-14.37	-11.10	3.27	K2MoO4
K2SeO4	-11.19	-11.92	-0.73	K2SeO4
Langite	-11.54	6.44	17.98	Cu4 (OH) 6SO4:H2O
Larnakite	-8.48	-8.85	-0.37	PbO:PbSO4

Laurionite	-5.91	-5.29	0.62	PbOHCl
Lepidocrocite	2.59	3.96	1.37	FeOOH
Lime	-26.71	6.57	33.28	CaO
Litharge	-11.72	1.17	12.89	PbO
Mackinawite	-145.88	-149.48	-3.60	FeS
Maghemite	1.54	7.93	6.39	Fe2O3
Magnesioferrite	-3.76	13.94	17.69	Fe2MgO4
Magnesite	-8.13	-15.65	-7.52	MgCO3
Magnetite	-0.00	4.03	4.03	Fe3O4
Malachite	-7.31	-12.85	-5.53	Cu2 (OH) 2CO3
Manganite	-2.61	22.73	25.34	MnOOH
Massicot	-11.93	1.17	13.09	PbO
Melanothallite	-14.95	-8.50	6.45	CuCl2
Melanterite	-12.82	-15.09	-2.27	FeSO4:7H2O
Mg (OH) 2 (active)	-12.79	6.01	18.79	Mg (OH) 2
Mg3 (PO4) 2	-17.30	-40.58	-23.28	Mg3 (PO4) 2
MgCr2O4	-38.23	-21.49	16.74	MgCr2O4
MgCrO4	-17.98	-12.34	5.65	MgCrO4
MgHPO4:3H2O	-5.12	-23.30	-18.18	MgHPO4:3H2O
MgMoO4	-7.61	-9.46	-1.85	MgMoO4
MgSeO3:6H2O	-18.47	-15.43	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-9.08	-10.28	-1.20	MgSeO4:6H2O
Minium	-29.23	45.56	74.78	Pb3O4
Mirabilite	-4.71	-6.06	-1.35	Na2SO4:10H2O
Mn2 (SO4) 3	-34.21	-39.43	-5.22	Mn2 (SO4) 3
Mn3 (AsO4) 2:8H2O	-27.38	-14.88	12.50	Mn3 (AsO4) 2:8H2O
Mn3 (PO4) 2	-29.64	-53.49	-23.85	Mn3 (PO4) 2
MnCl2:4H2O	-13.95	-11.21	2.75	MnCl2:4H2O
MnHPO4	-2.20	-27.60	-25.40	MnHPO4
MnS (grn)	-144.14	-143.88	0.27	MnS
MnS (pnk)	-147.22	-143.88	3.34	MnS
MnSe	-104.84	-101.04	3.79	MnSe
MnSeO3	-20.86	-19.73	1.13	MnSeO3
MnSeO3:2H2O	-20.69	-19.73	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-12.53	-14.58	-2.05	MnSeO4:5H2O
MnSO4	-12.26	-9.48	2.78	MnSO4
Monteponite	-15.33	0.09	15.41	CdO
MoO3	-7.46	-15.46	-8.00	MoO3
Morenosite	-5.66	-7.84	-2.18	NiSO4:7H2O
MoS2	-277.26	-348.68	-71.42	MoS2
Na-Jarosite	2.84	-7.91	-10.75	NaFe3 (SO4) 2 (OH) 6
Na2Cr2O7	-21.60	-31.56	-9.96	Na2Cr2O7
Na2CrO4	-16.20	-13.22	2.99	Na2CrO4
Na2Mo2O7	-9.04	-25.80	-16.76	Na2Mo2O7
Na2MoO4	-11.86	-10.34	1.52	Na2MoO4
Na2MoO4:2H2O	-11.56	-10.34	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-26.61	-16.31	10.30	Na2SeO3:5H2O
Na2SeO4	-12.43	-11.15	1.28	Na2SeO4
Nantokite	-13.55	-20.41	-6.86	CuCl
Natron	-15.03	-16.54	-1.51	Na2CO3:10H2O
Nesquehonite	-11.06	-15.65	-4.60	MgCO3:3H2O
Ni (OH) 2	-9.73	3.35	13.08	Ni (OH) 2
Ni3 (AsO4) 2:8H2O	-25.64	-9.94	15.70	Ni3 (AsO4) 2:8H2O
Ni3 (PO4) 2	-17.25	-48.55	-31.30	Ni3 (PO4) 2
Ni4 (OH) 6SO4	-29.78	2.22	32.00	Ni4 (OH) 6SO4
NiCO3	-11.56	-18.31	-6.75	NiCO3
NiMoO4	-0.97	-12.11	-11.15	NiMoO4
NiS (alpha)	-136.63	-142.23	-5.60	NiS
NiS (beta)	-131.13	-142.23	-11.10	NiS
NiS (gamma)	-129.43	-142.23	-12.80	NiS
NiSe	-81.70	-99.40	-17.70	NiSe
NiSeO3:2H2O	-20.99	-18.08	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-11.41	-12.93	-1.52	NiSeO4:6H2O
Nsutite	0.59	18.09	17.50	MnO2
O2 (g)	-0.68	84.12	84.80	O2
Orpiment	-440.19	-502.30	-62.11	As2S3
Otavite	-9.57	-21.57	-12.00	CdCO3
Pb (BO2) 2	-15.45	-8.88	6.57	Pb (BO2) 2

Pb (OH) 2	-7.16	1.16	8.32	Pb (OH) 2
Pb10 (OH) 60 (CO3) 6	-109.54	-118.30	-8.76	Pb10 (OH) 60 (CO3) 6
Pb2 (OH) 3Cl	-12.92	-4.12	8.79	Pb2 (OH) 3Cl
Pb2O (OH) 2	-23.86	2.33	26.19	Pb2O (OH) 2
Pb2O3	-16.65	44.39	61.04	Pb2O3
Pb2OCO3	-18.89	-19.33	-0.44	Pb2OCO3
Pb3 (AsO4) 2	-22.29	-16.49	5.80	Pb3 (AsO4) 2
Pb3 (PO4) 2	-11.58	-55.11	-43.53	Pb3 (PO4) 2
Pb3O2CO3	-29.51	-18.16	11.35	Pb3O2CO3
Pb3O2SO4	-18.61	-7.69	10.92	Pb3O2SO4
Pb4 (OH) 6SO4	-27.62	-6.52	21.10	Pb4 (OH) 6SO4
Pb4O3SO4	-28.81	-6.52	22.28	Pb4O3SO4
PbCrO4	-4.45	-17.18	-12.73	PbCrO4
PbHPO4	-4.33	-28.14	-23.81	PbHPO4
Pbmetal	-45.14	-40.89	4.24	Pb
PbMoO4	1.48	-14.30	-15.78	PbMoO4
PbO:0.3H2O	-11.81	1.17	12.98	PbO:0.33H2O
PbSeO4	-8.23	-15.12	-6.88	PbSeO4
Periclase	-16.03	6.01	22.04	MgO
Phosgenite	-12.43	-32.24	-19.81	PbCl2:PbCO3
Plattnerite	-7.26	43.22	50.49	PbO2
Plumbgummite	-3.11	-35.90	-32.79	PbAl3 (PO4) 2 (OH) 5:H2O
Portlandite	-16.62	6.57	23.19	Ca (OH) 2
Pyrite	-234.35	-253.01	-18.66	FeS2
Pyrochroite	-13.78	1.70	15.48	Mn (OH) 2
Pyrolusite	1.57	43.76	42.19	MnO2
Pyromorphite	-4.10	-88.53	-84.43	Pb5 (PO4) 3Cl
Realgar	-179.26	-199.39	-20.13	AsS
Retgersite	-5.78	-7.84	-2.05	NiSO4:6H2O
Rhodochrosite	-9.38	-19.95	-10.57	MnCO3
Semetal (am)	-53.55	-60.69	-7.14	Se
Semetal (hex)	-52.93	-60.69	-7.76	Se
SeO2	-21.55	-21.43	0.12	SeO2
SeO3	-37.76	-16.28	21.48	SeO3
Siderite	-15.37	-25.56	-10.19	FeCO3
Smithsonite	-8.45	-18.40	-9.95	ZnCO3
Sphalerite	-130.78	-142.32	-11.54	ZnS
Spinel	-17.64	20.37	38.01	MgAl2O4
Strengite	1.03	-25.34	-26.37	FePO4:2H2O
Sulfur	-101.43	-103.52	-2.10	S
Tenorite	-3.43	4.41	7.84	CuO
Thenardite	-6.41	-6.06	0.35	Na2SO4
Thermonatrite	-17.20	-16.53	0.67	Na2CO3:H2O
Tsumebite	-12.78	-22.57	-9.79	Pb2CuPO4 (OH) 3:3H2O
Vivianite	-34.32	-70.32	-36.00	Fe3 (PO4) 2:8H2O
Witherite	-11.00	-19.58	-8.58	BaCO3
Wurtzite	-133.31	-142.32	-9.01	ZnS
Zincite	-8.34	3.26	11.60	ZnO
Zincosite	-12.10	-7.92	4.18	ZnSO4
Zn (BO2) 2	-15.08	-6.79	8.29	Zn (BO2) 2
Zn (NO3) 2:6H2O	-15.47	-12.23	3.24	Zn (NO3) 2:6H2O
Zn (OH) 2	-8.94	3.26	12.20	Zn (OH) 2
Zn (OH) 2 (am)	-9.45	3.26	12.71	Zn (OH) 2
Zn (OH) 2 (beta)	-8.74	3.26	12.00	Zn (OH) 2
Zn (OH) 2 (epsilon)	-8.52	3.26	11.78	Zn (OH) 2
Zn (OH) 2 (gamma)	-8.47	3.26	11.73	Zn (OH) 2
Zn2 (OH) 2SO4	-12.16	-4.66	7.50	Zn2 (OH) 2SO4
Zn2 (OH) 3Cl	-15.12	0.07	15.19	Zn2 (OH) 3Cl
Zn3 (AsO4) 2:2.5H2O	-23.86	-10.21	13.65	Zn3 (AsO4) 2:2.5H2O
Zn3 (PO4) 2:4H2O	-13.40	-48.82	-35.42	Zn3 (PO4) 2:4H2O
Zn3O (SO4) 2	-32.27	-12.59	19.68	Zn3O (SO4) 2
Zn4 (OH) 6SO4	-26.54	1.86	28.40	Zn4 (OH) 6SO4
Zn5 (OH) 8Cl2	-35.11	3.39	38.50	Zn5 (OH) 8Cl2
ZnCl2	-16.91	-9.65	7.27	ZnCl2
ZnCO3:1H2O	-8.14	-18.40	-10.26	ZnCO3:1H2O
Znmetal	-65.05	-38.80	26.25	Zn
ZnMoO4	-2.11	-12.20	-10.09	ZnMoO4
ZnO (active)	-8.19	3.26	11.45	ZnO

ZnS(am)	-133.22	-142.32	-9.10	ZnS
ZnSe	-85.01	-99.49	-14.48	ZnSe
ZnSeO4:6H2O	-11.50	-13.02	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.42	-7.92	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 5.

```

USE solution 1
EQUILIBRIUM_PHASES 2
  CO2(g)      -3.5 10
  Diaspore    0 0
  Fix_pH      -4.75 Portlandite 10
  Magnetite   0 0
  O2(g)       -0.68 10
  Birnessite  0 0
END

```

Beginning of batch-reaction calculations.

Reaction step 1.

Using solution 1.
Using pure phase assemblage 2.

-----User print-----

```

Moles of Portlandite: -1.3791e-03
Moles of Diaspore: -1.3791e-03
Moles of Magnetite: -1.3791e-03
Moles of Birnessite: -1.3791e-03
mg of Portlandite: -1.0218e+02
mg of Diaspore: -8.2732e+01
mg of Birnessite: -1.1989e+02

```

-----Phase assemblage-----

Phase	SI	log IAP	log K(T, P)	Moles in assemblage		
				Initial	Final	Delta
Birnessite	-0.00	18.09	18.09	0.000e+00	9.532e-05	9.532e-05
CO2(g)	-3.50	-21.66	-18.16	1.000e+01	1.000e+01	-1.276e-05
Diaspore	-0.00	7.18	7.18	0.000e+00	4.727e-05	4.727e-05
Fix_pH	-4.75	-4.75	0.00			
Ca(OH)2		is reactant		1.000e+01	9.999e+00	-1.379e-03
Magnetite	0.00	4.03	4.03	0.000e+00	1.461e-04	1.461e-04
O2(g)	-0.68	84.12	84.80	1.000e+01	9.998e+00	-2.051e-03

-----Solution composition-----

Elements	Molality	Moles
Al	5.569e-06	5.570e-06
As	2.680e-08	2.680e-08
B	9.287e-06	9.287e-06
Ba	2.924e-07	2.924e-07
Be	2.228e-07	2.228e-07
C	1.276e-05	1.276e-05
Ca	1.445e-02	1.446e-02

Cd	7.145e-09	7.145e-09
Cl	1.388e-02	1.388e-02
Co	1.227e-05	1.227e-05
Cr	6.372e-08	6.372e-08
Cu	9.874e-05	9.874e-05
Fe	5.224e-06	5.224e-06
K	6.291e-03	6.291e-03
Mg	3.635e-03	3.635e-03
Mn	7.430e-08	7.430e-08
Mo	1.151e-06	1.151e-06
N	7.218e-04	7.218e-04
Na	1.498e-02	1.498e-02
Ni	8.382e-06	8.382e-06
P	9.399e-06	9.400e-06
Pb	9.690e-08	9.691e-08
S	2.322e-02	2.322e-02
Se	1.271e-07	1.271e-07
Zn	7.523e-06	7.523e-06

-----Description of solution-----

pH	=	4.750	Charge balance
pe	=	16.280	Adjusted to redox equilibrium
Activity of water	=	0.999	
Ionic strength (mol/kgw)	=	7.308e-02	
Mass of water (kg)	=	1.000e+00	
Total alkalinity (eq/kg)	=	-3.401e-05	
Total CO2 (mol/kg)	=	1.276e-05	
Temperature (°C)	=	20.00	
Electrical balance (eq)	=	-3.291e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-3.62	
Iterations	=	31	
Total H	=	1.110195e+02	
Total O	=	5.560581e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.221e-05	1.778e-05	-4.653	-4.750	-0.097	0.00
OH-	4.899e-10	3.852e-10	-9.310	-9.414	-0.104	(0)
H2O	5.551e+01	9.988e-01	1.744	-0.001	0.000	18.05
Al	5.569e-06					
AlSO4+	4.478e-06	3.576e-06	-5.349	-5.447	-0.098	(0)
Al+3	6.322e-07	8.550e-08	-6.199	-7.068	-0.869	(0)
Al (SO4) 2-	3.502e-07	2.796e-07	-6.456	-6.553	-0.098	(0)
AlOH+2	8.157e-08	3.480e-08	-7.088	-7.458	-0.370	(0)
Al (OH) 2+	2.688e-08	2.172e-08	-7.571	-7.663	-0.092	(0)
Al (OH) 3	2.451e-10	2.451e-10	-9.611	-9.611	0.000	(0)
Al (OH) 4-	6.637e-12	5.300e-12	-11.178	-11.276	-0.098	(0)
AlMo6O21-3	1.734e-18	1.020e-19	-17.761	-18.991	-1.231	(0)
As (3)	9.271e-34					
H3AsO3	9.271e-34	9.271e-34	-33.033	-33.033	0.000	(0)
H2AsO3-	3.033e-38	2.214e-38	-37.518	-37.655	-0.137	(0)
H4AsO3+	1.119e-38	8.168e-39	-37.951	-38.088	-0.137	(0)
HAsO3-2	0.000e+00	0.000e+00	-44.493	-45.040	-0.547	(0)
AsO3-3	0.000e+00	0.000e+00	-52.550	-53.780	-1.231	(0)
As (5)	2.680e-08					
H2AsO4-	2.633e-08	1.922e-08	-7.579	-7.716	-0.137	(0)
HAsO4-2	4.090e-10	1.161e-10	-9.388	-9.935	-0.547	(0)
H3AsO4	5.563e-11	5.657e-11	-10.255	-10.247	0.007	(0)
AsO4-3	3.123e-16	1.837e-17	-15.505	-16.736	-1.231	(0)
B	9.287e-06					
H3BO3	9.287e-06	9.444e-06	-5.032	-5.025	0.007	(0)
H2BO3-	3.650e-10	2.820e-10	-9.438	-9.550	-0.112	(0)
CaH2BO3+	7.649e-11	5.911e-11	-10.116	-10.228	-0.112	(0)
MgH2BO3+	1.286e-11	9.942e-12	-10.891	-11.003	-0.112	(0)

NaH2BO3	5.667e-12	5.667e-12	-11.247	-11.247	0.000	(0)
H5 (BO3) 2-	3.028e-15	2.340e-15	-14.519	-14.631	-0.112	(0)
BaH2BO3+	1.316e-15	1.017e-15	-14.881	-14.993	-0.112	(0)
H8 (BO3) 3-	2.475e-18	1.913e-18	-17.606	-17.718	-0.112	(0)
Ba	2.924e-07					
Ba+2	2.919e-07	1.200e-07	-6.535	-6.921	-0.386	(0)
BaNO3+	5.136e-10	3.749e-10	-9.289	-9.426	-0.137	(0)
BaHCO3+	3.440e-13	2.801e-13	-12.463	-12.553	-0.089	(0)
BaH2BO3+	1.316e-15	1.017e-15	-14.881	-14.993	-0.112	(0)
BaOH+	2.424e-16	1.949e-16	-15.615	-15.710	-0.095	(0)
BaCO3	3.816e-17	3.816e-17	-16.418	-16.418	0.000	(0)
BaNH3+2	0.000e+00	0.000e+00	-70.632	-71.179	-0.547	(0)
Be	2.228e-07					
Be+2	1.498e-07	6.158e-08	-6.824	-7.211	-0.386	(0)
BeSO4	5.103e-08	5.103e-08	-7.292	-7.292	0.000	(0)
BeOH+	1.693e-08	1.386e-08	-7.771	-7.858	-0.087	(0)
Be (SO4) 2-2	3.651e-09	1.036e-09	-8.438	-8.984	-0.547	(0)
BeCl+	1.351e-09	1.086e-09	-8.869	-8.964	-0.095	(0)
Be (OH) 2	4.947e-12	4.947e-12	-11.306	-11.306	0.000	(0)
Be2OH+3	8.554e-13	1.417e-13	-12.068	-12.849	-0.781	(0)
BeCO3	7.662e-14	7.662e-14	-13.116	-13.116	0.000	(0)
Be3 (OH) 3+3	3.890e-16	6.443e-17	-15.410	-16.191	-0.781	(0)
Be (OH) 3-	8.583e-17	7.028e-17	-16.066	-16.153	-0.087	(0)
Be (OH) 4-2	5.577e-26	2.508e-26	-25.254	-25.601	-0.347	(0)
C (4)	1.276e-05					
H2CO3	1.237e-05	1.237e-05	-4.908	-4.908	0.000	(0)
HCO3-	3.593e-07	2.904e-07	-6.445	-6.537	-0.092	(0)
CaHCO3+	2.167e-08	1.764e-08	-7.664	-7.753	-0.089	(0)
MgHCO3+	3.708e-09	2.939e-09	-8.431	-8.532	-0.101	(0)
NaHCO3	2.081e-09	2.081e-09	-8.682	-8.682	0.000	(0)
CuHCO3+	5.795e-10	4.230e-10	-9.237	-9.374	-0.137	(0)
CuCO3	1.041e-10	1.041e-10	-9.983	-9.983	0.000	(0)
NiHCO3+	9.976e-11	7.282e-11	-10.001	-10.138	-0.137	(0)
CoHCO3+	7.115e-11	5.193e-11	-10.148	-10.285	-0.137	(0)
ZnHCO3+	2.075e-11	1.515e-11	-10.683	-10.820	-0.137	(0)
PbHCO3+	3.916e-12	2.858e-12	-11.407	-11.544	-0.137	(0)
CaCO3	3.680e-12	3.680e-12	-11.434	-11.434	0.000	(0)
CO3-2	1.685e-12	6.924e-13	-11.773	-12.160	-0.386	(0)
MgCO3	5.390e-13	5.390e-13	-12.268	-12.268	0.000	(0)
BaHCO3+	3.440e-13	2.801e-13	-12.463	-12.553	-0.089	(0)
NaCO3-	2.127e-13	1.719e-13	-12.672	-12.765	-0.092	(0)
MnHCO3+	1.124e-13	9.034e-14	-12.949	-13.044	-0.095	(0)
BeCO3	7.662e-14	7.662e-14	-13.116	-13.116	0.000	(0)
ZnCO3	7.266e-14	7.266e-14	-13.139	-13.139	0.000	(0)
NiCO3	5.809e-14	5.809e-14	-13.236	-13.236	0.000	(0)
PbCO3	3.048e-14	3.048e-14	-13.516	-13.516	0.000	(0)
CoCO3	2.975e-14	2.975e-14	-13.526	-13.526	0.000	(0)
CdHCO3+	1.001e-15	7.308e-16	-14.999	-15.136	-0.137	(0)
BaCO3	3.816e-17	3.816e-17	-16.418	-16.418	0.000	(0)
CdCO3	1.929e-17	1.929e-17	-16.715	-16.715	0.000	(0)
Cu (CO3) 2-2	6.833e-19	1.940e-19	-18.165	-18.712	-0.547	(0)
FeHCO3+	1.602e-19	1.304e-19	-18.795	-18.885	-0.089	(0)
Pb (CO3) 2-2	2.144e-22	6.087e-23	-21.669	-22.216	-0.547	(0)
Cd (CO3) 2-2	3.488e-26	9.900e-27	-25.457	-26.004	-0.547	(0)
Ca	1.445e-02					
Ca+2	9.109e-03	3.744e-03	-2.041	-2.427	-0.386	(0)
CaSO4	5.335e-03	5.335e-03	-2.273	-2.273	0.000	(0)
CaNO3+	9.598e-06	7.006e-06	-5.018	-5.155	-0.137	(0)
CaH2PO4+	6.369e-07	5.148e-07	-6.196	-6.288	-0.092	(0)
CaHPO4	3.670e-08	3.670e-08	-7.435	-7.435	0.000	(0)
CaHCO3+	2.167e-08	1.764e-08	-7.664	-7.753	-0.089	(0)
CaH2BO3+	7.649e-11	5.911e-11	-10.116	-10.228	-0.112	(0)
CaOH+	3.338e-11	2.718e-11	-10.476	-10.566	-0.089	(0)
CaPO4-	6.087e-12	4.919e-12	-11.216	-11.308	-0.092	(0)
CaCO3	3.680e-12	3.680e-12	-11.434	-11.434	0.000	(0)
CaNH3+2	0.000e+00	0.000e+00	-65.838	-66.385	-0.547	(0)
Ca (NH3) 2+2	0.000e+00	0.000e+00	-130.296	-130.843	-0.547	(0)
Cd	7.145e-09					

Cd+2	2.974e-09	1.222e-09	-8.527	-8.913	-0.386	(0)
CdCl+	1.764e-09	1.288e-09	-8.753	-8.890	-0.137	(0)
CdSO4	1.763e-09	1.763e-09	-8.754	-8.754	0.000	(0)
Cd(SO4) 2-2	5.810e-10	1.649e-10	-9.236	-9.783	-0.547	(0)
CdCl2	5.882e-11	5.882e-11	-10.230	-10.230	0.000	(0)
CdNO3+	3.488e-12	2.546e-12	-11.457	-11.594	-0.137	(0)
CdCl3-	5.383e-13	3.929e-13	-12.269	-12.406	-0.137	(0)
CdOHC1	2.654e-14	2.654e-14	-13.576	-13.576	0.000	(0)
CdSeO4	1.188e-14	1.188e-14	-13.925	-13.925	0.000	(0)
CdOH+	5.159e-15	3.766e-15	-14.287	-14.424	-0.137	(0)
CdHCO3+	1.001e-15	7.308e-16	-14.999	-15.136	-0.137	(0)
Cd(NO3) 2	6.297e-16	6.297e-16	-15.201	-15.201	0.000	(0)
CdCO3	1.929e-17	1.929e-17	-16.715	-16.715	0.000	(0)
Cd(OH) 2	1.959e-20	1.959e-20	-19.708	-19.708	0.000	(0)
Cd2OH+3	4.173e-22	2.454e-23	-21.380	-22.610	-1.231	(0)
Cd(CO3) 2-2	3.488e-26	9.900e-27	-25.457	-26.004	-0.547	(0)
Cd(OH) 3-	9.275e-28	6.770e-28	-27.033	-27.169	-0.137	(0)
Cd(OH) 4-2	2.208e-37	6.267e-38	-36.656	-37.203	-0.547	(0)
Cd(SeO3) 2-2	0.000e+00	0.000e+00	-44.114	-44.661	-0.547	(0)
CdHS+	0.000e+00	0.000e+00	-142.098	-142.235	-0.137	(0)
Cd(HS) 2	0.000e+00	0.000e+00	-276.361	-276.361	0.000	(0)
Cd(HS) 3-	0.000e+00	0.000e+00	-415.655	-415.792	-0.137	(0)
Cd(HS) 4-2	0.000e+00	0.000e+00	-554.379	-554.926	-0.547	(0)
C1	1.388e-02					
Cl-	1.387e-02	1.111e-02	-1.858	-1.954	-0.097	(0)
CuCl+	5.356e-07	4.245e-07	-6.271	-6.372	-0.101	(0)
CoCl+	1.320e-07	9.636e-08	-6.879	-7.016	-0.137	(0)
NiCl+	8.638e-08	6.305e-08	-7.064	-7.200	-0.137	(0)
ZnCl+	6.186e-08	4.903e-08	-7.209	-7.310	-0.101	(0)
PbCl+	7.449e-09	5.438e-09	-8.128	-8.265	-0.137	(0)
CdCl+	1.764e-09	1.288e-09	-8.753	-8.890	-0.137	(0)
BeCl+	1.351e-09	1.086e-09	-8.869	-8.964	-0.095	(0)
CuCl2	1.277e-09	1.277e-09	-8.894	-8.894	0.000	(0)
ZnCl2	6.946e-10	6.946e-10	-9.158	-9.158	0.000	(0)
MnCl+	2.788e-10	2.242e-10	-9.555	-9.649	-0.095	(0)
PbCl2	2.638e-10	2.638e-10	-9.579	-9.579	0.000	(0)
CdCl2	5.882e-11	5.882e-11	-10.230	-10.230	0.000	(0)
ZnOHC1	3.768e-11	3.768e-11	-10.424	-10.424	0.000	(0)
FeCl+2	3.564e-11	1.489e-11	-10.448	-10.827	-0.379	(0)
ZnCl3-	7.575e-12	6.004e-12	-11.121	-11.222	-0.101	(0)
NiCl2	3.576e-12	3.576e-12	-11.447	-11.447	0.000	(0)
MnCl2	3.517e-12	3.517e-12	-11.454	-11.454	0.000	(0)
PbCl3-	1.689e-12	1.233e-12	-11.772	-11.909	-0.137	(0)
FeCl2+	1.077e-12	8.657e-13	-11.968	-12.063	-0.095	(0)
CdCl3-	5.383e-13	3.929e-13	-12.269	-12.406	-0.137	(0)
CuCl3-	1.527e-13	1.210e-13	-12.816	-12.917	-0.101	(0)
CrO3Cl-	7.780e-14	5.679e-14	-13.109	-13.246	-0.137	(0)
ZnCl4-2	7.667e-14	3.203e-14	-13.115	-13.494	-0.379	(0)
CdOHC1	2.654e-14	2.654e-14	-13.576	-13.576	0.000	(0)
PbCl4-2	2.047e-14	5.812e-15	-13.689	-14.236	-0.547	(0)
MnCl3-	1.339e-14	1.076e-14	-13.873	-13.968	-0.095	(0)
FeCl3	9.617e-16	9.617e-16	-15.017	-15.017	0.000	(0)
CuCl2-	2.596e-17	2.058e-17	-16.586	-16.687	-0.101	(0)
CuCl4-2	1.912e-17	7.988e-18	-16.719	-17.098	-0.379	(0)
CuCl	8.759e-18	8.759e-18	-17.058	-17.058	0.000	(0)
CuCl3-2	1.147e-19	4.792e-20	-18.940	-19.319	-0.379	(0)
CrCl+2	2.135e-20	6.060e-21	-19.671	-20.217	-0.547	(0)
CoCl+2	1.374e-21	3.901e-22	-20.862	-21.409	-0.547	(0)
CrCl2+	5.619e-24	4.102e-24	-23.250	-23.387	-0.137	(0)
CrOHC12	3.548e-25	3.548e-25	-24.450	-24.450	0.000	(0)
Co(NH3) 5Cl+2	0.000e+00	0.000e+00	-315.490	-316.037	-0.547	(0)
Co(NH3) 6Cl+2	0.000e+00	0.000e+00	-386.237	-386.783	-0.547	(0)
Cr(NH3) 6Cl+2	0.000e+00	0.000e+00	-390.339	-390.885	-0.547	(0)
Co(2)	1.227e-05					
Co+2	8.955e-06	2.542e-06	-5.048	-5.595	-0.547	(0)
CoSO4	3.175e-06	3.175e-06	-5.498	-5.498	0.000	(0)
CoCl+	1.320e-07	9.636e-08	-6.879	-7.016	-0.137	(0)
CoNO3+	3.147e-09	2.297e-09	-8.502	-8.639	-0.137	(0)

CoHCO3+	7.115e-11	5.193e-11	-10.148	-10.285	-0.137	(0)
CoSeO4	6.121e-11	6.121e-11	-10.213	-10.213	0.000	(0)
CoHPO4	5.825e-11	5.825e-11	-10.235	-10.235	0.000	(0)
CoOH+	3.930e-11	2.868e-11	-10.406	-10.542	-0.137	(0)
Co (NO3) 2	2.665e-12	2.665e-12	-11.574	-11.574	0.000	(0)
CoCO3	2.975e-14	2.975e-14	-13.526	-13.526	0.000	(0)
Co (OH) 2	1.289e-15	1.289e-15	-14.890	-14.890	0.000	(0)
Co2OH+3	6.214e-17	3.654e-18	-16.207	-17.437	-1.231	(0)
CoNO2+	1.600e-21	1.168e-21	-20.796	-20.933	-0.137	(0)
Co (OH) 3-	1.992e-23	1.454e-23	-22.701	-22.837	-0.137	(0)
CoOOH-	8.339e-25	6.087e-25	-24.079	-24.216	-0.137	(0)
Co4 (OH) 4+4	2.081e-32	1.351e-34	-31.682	-33.869	-2.188	(0)
Co (OH) 4-2	4.592e-33	1.303e-33	-32.338	-32.885	-0.547	(0)
Co (NH3) +2	0.000e+00	0.000e+00	-66.832	-67.379	-0.547	(0)
Co (NH3) 2+2	0.000e+00	0.000e+00	-129.454	-130.001	-0.547	(0)
Co (NH3) 3+2	0.000e+00	0.000e+00	-192.412	-192.959	-0.547	(0)
Co (NH3) 4+2	0.000e+00	0.000e+00	-255.750	-256.297	-0.547	(0)
Co (NH3) 5+2	0.000e+00	0.000e+00	-319.588	-320.135	-0.547	(0)
Co (3)	1.954e-18					
CoOH+2	1.951e-18	5.537e-19	-17.710	-18.257	-0.547	(0)
Co+3	1.425e-21	1.927e-22	-20.846	-21.715	-0.869	(0)
CoCl+2	1.374e-21	3.901e-22	-20.862	-21.409	-0.547	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-315.490	-316.037	-0.547	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-382.012	-382.149	-0.137	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-386.237	-386.783	-0.547	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-389.018	-389.565	-0.547	(0)
Cr (2)	0.000e+00					
Cr+2	0.000e+00	0.000e+00	-41.058	-41.605	-0.547	(0)
Cr (3)	3.670e-17					
Cr (OH) +2	1.539e-17	4.370e-18	-16.813	-17.360	-0.547	(0)
Cr+3	8.571e-18	5.041e-19	-17.067	-18.297	-1.231	(0)
CrSO4+	8.511e-18	6.212e-18	-17.070	-17.207	-0.137	(0)
CrOHSO4	3.963e-18	3.963e-18	-17.402	-17.402	0.000	(0)
Cr (OH) 2+	2.410e-19	1.759e-19	-18.618	-18.755	-0.137	(0)
CrCl+2	2.135e-20	6.060e-21	-19.671	-20.217	-0.547	(0)
CrH2PO4+2	2.497e-21	7.089e-22	-20.603	-21.149	-0.547	(0)
Cr (OH) 3	3.738e-23	3.738e-23	-22.427	-22.427	0.000	(0)
CrNO3+2	2.846e-23	8.078e-24	-22.546	-23.093	-0.547	(0)
CrCl2+	5.619e-24	4.102e-24	-23.250	-23.387	-0.137	(0)
CrOHCl2	3.548e-25	3.548e-25	-24.450	-24.450	0.000	(0)
CrO2-	1.369e-27	9.995e-28	-26.864	-27.000	-0.137	(0)
Cr (OH) 4-	1.153e-27	8.416e-28	-26.938	-27.075	-0.137	(0)
Cr2 (OH) 2SO4+2	3.226e-33	9.158e-34	-32.491	-33.038	-0.547	(0)
Cr2 (OH) 2 (SO4) 2	3.554e-34	3.554e-34	-33.449	-33.449	0.000	(0)
Cr (NH3) 5OH+2	0.000e+00	0.000e+00	-327.303	-327.850	-0.547	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-388.803	-390.033	-1.231	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-390.339	-390.885	-0.547	(0)
Cr (6)	6.372e-08					
HCrO4-	6.169e-08	4.503e-08	-7.210	-7.346	-0.137	(0)
CrO4-2	1.930e-09	7.934e-10	-8.714	-9.101	-0.386	(0)
NaCrO4-	6.262e-11	4.571e-11	-10.203	-10.340	-0.137	(0)
KCrO4-	1.947e-11	1.421e-11	-10.711	-10.847	-0.137	(0)
CrO3SO4-2	5.697e-12	1.617e-12	-11.244	-11.791	-0.547	(0)
CrO3HPO4-2	3.757e-12	1.066e-12	-11.425	-11.972	-0.547	(0)
H2CrO4	5.032e-13	5.032e-13	-12.298	-12.298	0.000	(0)
Cr2O7-2	2.826e-13	8.022e-14	-12.549	-13.096	-0.547	(0)
CrO3Cl-	7.780e-14	5.679e-14	-13.109	-13.246	-0.137	(0)
CrO3H2PO4-	1.252e-14	9.136e-15	-13.903	-14.039	-0.137	(0)
Cu (1)	3.569e-17					
CuCl2-	2.596e-17	2.058e-17	-16.586	-16.687	-0.101	(0)
CuCl	8.759e-18	8.759e-18	-17.058	-17.058	0.000	(0)
Cu+	8.580e-19	6.263e-19	-18.067	-18.203	-0.137	(0)
CuCl3-2	1.147e-19	4.792e-20	-18.940	-19.319	-0.379	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-287.569	-287.974	-0.405	(0)
CuS4S5-3	0.000e+00	0.000e+00	-288.321	-288.704	-0.383	(0)
Cu (2)	9.874e-05					
Cu+2	6.211e-05	2.553e-05	-4.207	-4.593	-0.386	(0)
CuSO4	3.598e-05	3.598e-05	-4.444	-4.444	0.000	(0)

CuCl+	5.356e-07	4.245e-07	-6.271	-6.372	-0.101	(0)
CuNO3+	6.486e-08	4.734e-08	-7.188	-7.325	-0.137	(0)
CuOH+	4.502e-08	3.569e-08	-7.347	-7.448	-0.101	(0)
CuCl2	1.277e-09	1.277e-09	-8.894	-8.894	0.000	(0)
CuHCO3+	5.795e-10	4.230e-10	-9.237	-9.374	-0.137	(0)
Cu2 (OH) 2+2	1.089e-10	3.091e-11	-9.963	-10.510	-0.547	(0)
CuCO3	1.041e-10	1.041e-10	-9.983	-9.983	0.000	(0)
Cu (OH) 2	5.152e-12	5.152e-12	-11.288	-11.288	0.000	(0)
Cu (NO3) 2	3.304e-12	3.304e-12	-11.481	-11.481	0.000	(0)
CuCl3-	1.527e-13	1.210e-13	-12.816	-12.917	-0.101	(0)
CuCl4-2	1.912e-17	7.988e-18	-16.719	-17.098	-0.379	(0)
Cu (OH) 3-	8.188e-18	5.977e-18	-17.087	-17.224	-0.137	(0)
Cu (CO3) 2-2	6.833e-19	1.940e-19	-18.165	-18.712	-0.547	(0)
CuNO2+	2.388e-19	1.743e-19	-18.622	-18.759	-0.137	(0)
Cu (OH) 4-2	9.372e-26	2.660e-26	-25.028	-25.575	-0.547	(0)
Cu (NO2) 2	1.163e-34	1.163e-34	-33.934	-33.934	0.000	(0)
CuNH3+2	0.000e+00	0.000e+00	-63.879	-64.426	-0.547	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-402.548	-402.685	-0.137	(0)
Fe (2)	1.989e-13					
Fe+2	1.389e-13	3.944e-14	-12.857	-13.404	-0.547	(0)
FeSO4	5.986e-14	5.986e-14	-13.223	-13.223	0.000	(0)
FeH2PO4+	1.441e-16	1.165e-16	-15.841	-15.934	-0.092	(0)
FeHPO4	3.298e-18	3.298e-18	-17.482	-17.482	0.000	(0)
FeOH+	7.524e-19	6.049e-19	-18.124	-18.218	-0.095	(0)
FeHCO3+	1.602e-19	1.304e-19	-18.795	-18.885	-0.089	(0)
Fe (OH) 2	1.752e-25	1.752e-25	-24.757	-24.757	0.000	(0)
Fe (OH) 3-	3.718e-29	2.990e-29	-28.430	-28.524	-0.095	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-287.115	-287.115	0.000	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-426.271	-426.408	-0.137	(0)
Fe (3)	5.224e-06					
Fe (OH) 2+	5.169e-06	4.178e-06	-5.287	-5.379	-0.092	(0)
FeOH+2	3.409e-08	1.424e-08	-7.467	-7.846	-0.379	(0)
FeHPO4+	1.378e-08	1.113e-08	-7.861	-7.953	-0.092	(0)
FeSO4+	3.991e-09	3.209e-09	-8.399	-8.494	-0.095	(0)
Fe (OH) 3	1.242e-09	1.242e-09	-8.906	-8.906	0.000	(0)
Fe (SO4) 2-	6.390e-10	4.664e-10	-9.195	-9.331	-0.137	(0)
Fe+3	3.845e-10	5.200e-11	-9.415	-10.284	-0.869	(0)
FeCl+2	3.564e-11	1.489e-11	-10.448	-10.827	-0.379	(0)
FeH2PO4+2	1.364e-11	5.819e-12	-10.865	-11.235	-0.370	(0)
FeNO3+2	1.347e-12	3.824e-13	-11.871	-12.417	-0.547	(0)
Fe2 (OH) 2+4	1.237e-12	8.032e-15	-11.908	-14.095	-2.188	(0)
FeCl2+	1.077e-12	8.657e-13	-11.968	-12.063	-0.095	(0)
Fe (OH) 4-	1.654e-13	1.336e-13	-12.782	-12.874	-0.092	(0)
Fe3 (OH) 4+5	1.205e-15	4.603e-19	-14.919	-18.337	-3.418	(0)
FeCl3	9.617e-16	9.617e-16	-15.017	-15.017	0.000	(0)
FeHSeO3+2	2.680e-24	7.608e-25	-23.572	-24.119	-0.547	(0)
H (0)	0.000e+00					
H2	0.000e+00	0.000e+00	-45.195	-45.187	0.007	(0)
K	6.291e-03					
K+	6.023e-03	4.822e-03	-2.220	-2.317	-0.097	(0)
KSO4-	2.682e-04	2.168e-04	-3.571	-3.664	-0.092	(0)
KHPO4-	9.508e-10	7.684e-10	-9.022	-9.114	-0.092	(0)
KCrO4-	1.947e-11	1.421e-11	-10.711	-10.847	-0.137	(0)
Mg	3.635e-03					
Mg+2	2.473e-03	1.017e-03	-2.607	-2.993	-0.386	(0)
MgSO4	1.161e-03	1.161e-03	-2.935	-2.935	0.000	(0)
MgH2PO4+	3.690e-07	2.983e-07	-6.433	-6.525	-0.092	(0)
MgHPO4	1.375e-08	1.375e-08	-7.862	-7.862	0.000	(0)
MgHCO3+	3.708e-09	2.939e-09	-8.431	-8.532	-0.101	(0)
MgOH+	1.753e-10	1.435e-10	-9.756	-9.843	-0.087	(0)
MgH2BO3+	1.286e-11	9.942e-12	-10.891	-11.003	-0.112	(0)
MgCO3	5.390e-13	5.390e-13	-12.268	-12.268	0.000	(0)
MgPO4-	2.584e-14	2.088e-14	-13.588	-13.680	-0.092	(0)
Mn (2)	7.430e-08					
Mn+2	5.646e-08	1.603e-08	-7.248	-7.795	-0.547	(0)
MnSO4	1.754e-08	1.754e-08	-7.756	-7.756	0.000	(0)
MnCl+	2.788e-10	2.242e-10	-9.555	-9.649	-0.095	(0)
MnNO3+	1.984e-11	1.448e-11	-10.702	-10.839	-0.137	(0)

MnCl2	3.517e-12	3.517e-12	-11.454	-11.454	0.000	(0)
MnSeO4	2.044e-13	2.044e-13	-12.689	-12.689	0.000	(0)
MnHCO3+	1.124e-13	9.034e-14	-12.949	-13.044	-0.095	(0)
Mn(NO3) 2	2.098e-14	2.098e-14	-13.678	-13.678	0.000	(0)
MnOH+	1.929e-14	1.551e-14	-13.715	-13.809	-0.095	(0)
MnCl3-	1.339e-14	1.076e-14	-13.873	-13.968	-0.095	(0)
Mn(OH) 3-	5.598e-29	4.501e-29	-28.252	-28.347	-0.095	(0)
Mn(OH) 4-2	1.967e-37	8.218e-38	-36.706	-37.085	-0.379	(0)
MnSe	0.000e+00	0.000e+00	-106.928	-106.928	0.000	(0)
Mn (3)	4.800e-17					
Mn+3	4.800e-17	6.492e-18	-16.319	-17.188	-0.869	(0)
Mn (6)	1.425e-25					
MnO4-2	1.425e-25	5.952e-26	-24.846	-25.225	-0.379	(0)
Mn (7)	2.863e-19					
MnO4-	2.863e-19	2.233e-19	-18.543	-18.651	-0.108	(0)
Mo	1.151e-06					
MoO4-2	9.622e-07	3.955e-07	-6.017	-6.403	-0.386	(0)
HMoO4-	1.671e-07	1.219e-07	-6.777	-6.914	-0.137	(0)
H2MoO4	2.180e-08	2.180e-08	-7.662	-7.662	0.000	(0)
AlMo6O21-3	1.734e-18	1.020e-19	-17.761	-18.991	-1.231	(0)
HMo7O24-5	7.553e-25	2.884e-28	-24.122	-27.540	-3.418	(0)
Mo7O24-6	5.959e-25	7.130e-30	-24.225	-29.147	-4.922	(0)
H2Mo7O24-4	4.686e-26	3.043e-28	-25.329	-27.517	-2.188	(0)
H3Mo7O24-3	1.643e-28	9.665e-30	-27.784	-29.015	-1.231	(0)
N (-3)	0.000e+00					
NH4+	0.000e+00	0.000e+00	-59.452	-59.564	-0.112	(0)
NH4SO4-	0.000e+00	0.000e+00	-60.624	-60.719	-0.095	(0)
CuNH3+2	0.000e+00	0.000e+00	-63.879	-64.426	-0.547	(0)
NH3	0.000e+00	0.000e+00	-64.213	-64.213	0.000	(0)
CaNH3+2	0.000e+00	0.000e+00	-65.838	-66.385	-0.547	(0)
NiNH3+2	0.000e+00	0.000e+00	-66.229	-66.776	-0.547	(0)
Co(NH3) +2	0.000e+00	0.000e+00	-66.832	-67.379	-0.547	(0)
BaNH3+2	0.000e+00	0.000e+00	-70.632	-71.179	-0.547	(0)
Ni(NH3) 2+2	0.000e+00	0.000e+00	-127.994	-128.541	-0.547	(0)
Co(NH3) 2+2	0.000e+00	0.000e+00	-129.454	-130.001	-0.547	(0)
Ca(NH3) 2+2	0.000e+00	0.000e+00	-130.296	-130.843	-0.547	(0)
Co(NH3) 3+2	0.000e+00	0.000e+00	-192.412	-192.959	-0.547	(0)
Co(NH3) 4+2	0.000e+00	0.000e+00	-255.750	-256.297	-0.547	(0)
Co(NH3) 5Cl+2	0.000e+00	0.000e+00	-315.490	-316.037	-0.547	(0)
Co(NH3) 5+2	0.000e+00	0.000e+00	-319.588	-320.135	-0.547	(0)
Cr(NH3) 5OH+2	0.000e+00	0.000e+00	-327.303	-327.850	-0.547	(0)
Co(NH3) 6SO4+	0.000e+00	0.000e+00	-382.012	-382.149	-0.137	(0)
Co(NH3) 6Cl+2	0.000e+00	0.000e+00	-386.237	-386.783	-0.547	(0)
Cr(NH3) 6+3	0.000e+00	0.000e+00	-388.803	-390.033	-1.231	(0)
Co(NH3) 6OH+2	0.000e+00	0.000e+00	-389.018	-389.565	-0.547	(0)
Cr(NH3) 6Cl+2	0.000e+00	0.000e+00	-390.339	-390.885	-0.547	(0)
N (3)	8.386e-17					
NO2-	8.362e-17	6.521e-17	-16.078	-16.186	-0.108	(0)
CuNO2+	2.388e-19	1.743e-19	-18.622	-18.759	-0.137	(0)
CoNO2+	1.600e-21	1.168e-21	-20.796	-20.933	-0.137	(0)
Cu(NO2) 2	1.163e-34	1.163e-34	-33.934	-33.934	0.000	(0)
N (5)	7.218e-04					
NO3-	7.121e-04	5.702e-04	-3.147	-3.244	-0.097	(0)
CaNO3+	9.598e-06	7.006e-06	-5.018	-5.155	-0.137	(0)
CuNO3+	6.486e-08	4.734e-08	-7.188	-7.325	-0.137	(0)
NiNO3+	4.413e-09	3.221e-09	-8.355	-8.492	-0.137	(0)
ZnNO3+	3.693e-09	2.696e-09	-8.433	-8.569	-0.137	(0)
CoNO3+	3.147e-09	2.297e-09	-8.502	-8.639	-0.137	(0)
BaNO3+	5.136e-10	3.749e-10	-9.289	-9.426	-0.137	(0)
PbNO3+	1.669e-10	1.218e-10	-9.778	-9.914	-0.137	(0)
MnNO3+	1.984e-11	1.448e-11	-10.702	-10.839	-0.137	(0)
CdNO3+	3.488e-12	2.546e-12	-11.457	-11.594	-0.137	(0)
Cu(NO3) 2	3.304e-12	3.304e-12	-11.481	-11.481	0.000	(0)
Co(NO3) 2	2.665e-12	2.665e-12	-11.574	-11.574	0.000	(0)
FeNO3+2	1.347e-12	3.824e-13	-11.871	-12.417	-0.547	(0)
Zn(NO3) 2	2.971e-13	2.971e-13	-12.527	-12.527	0.000	(0)
Pb(NO3) 2	1.251e-13	1.251e-13	-12.903	-12.903	0.000	(0)
Mn(NO3) 2	2.098e-14	2.098e-14	-13.678	-13.678	0.000	(0)

	Cd(NO3) 2	6.297e-16	6.297e-16	-15.201	-15.201	0.000	(0)
	CrNO3+2	2.846e-23	8.078e-24	-22.546	-23.093	-0.547	(0)
Na		1.498e-02					
	Na+	1.448e-02	1.159e-02	-1.839	-1.936	-0.097	(0)
	NaSO4-	4.997e-04	4.039e-04	-3.301	-3.394	-0.092	(0)
	NaHPO4-	3.540e-09	2.861e-09	-8.451	-8.543	-0.092	(0)
	NaHCO3	2.081e-09	2.081e-09	-8.682	-8.682	0.000	(0)
	NaCrO4-	6.262e-11	4.571e-11	-10.203	-10.340	-0.137	(0)
	NaH2BO3	5.667e-12	5.667e-12	-11.247	-11.247	0.000	(0)
	NaCO3-	2.127e-13	1.719e-13	-12.672	-12.765	-0.092	(0)
Ni		8.382e-06					
	Ni+2	5.472e-06	2.249e-06	-5.262	-5.648	-0.386	(0)
	NiSO4	2.817e-06	2.817e-06	-5.550	-5.550	0.000	(0)
	NiCl+	8.638e-08	6.305e-08	-7.064	-7.200	-0.137	(0)
	NiNO3+	4.413e-09	3.221e-09	-8.355	-8.492	-0.137	(0)
	Ni(SO4) 2-2	2.234e-09	6.340e-10	-8.651	-9.198	-0.547	(0)
	NiHCO3+	9.976e-11	7.282e-11	-10.001	-10.138	-0.137	(0)
	NiSeO4	4.985e-11	4.985e-11	-10.302	-10.302	0.000	(0)
	NiOH+	1.536e-11	1.121e-11	-10.814	-10.950	-0.137	(0)
	NiCl2	3.576e-12	3.576e-12	-11.447	-11.447	0.000	(0)
	NiCO3	5.809e-14	5.809e-14	-13.236	-13.236	0.000	(0)
	Ni(OH) 2	7.194e-16	7.194e-16	-15.143	-15.143	0.000	(0)
	Ni(OH) 3-	5.574e-22	4.068e-22	-21.254	-21.391	-0.137	(0)
	NiNH3+2	0.000e+00	0.000e+00	-66.229	-66.776	-0.547	(0)
	Ni(NH3) 2+2	0.000e+00	0.000e+00	-127.994	-128.541	-0.547	(0)
O(0)		9.507e-04					
	O2	4.754e-04	4.834e-04	-3.323	-3.316	0.007	(0)
P		9.399e-06					
	H2PO4-	8.253e-06	6.670e-06	-5.083	-5.176	-0.092	(0)
	CaH2PO4+	6.369e-07	5.148e-07	-6.196	-6.288	-0.092	(0)
	MgH2PO4+	3.690e-07	2.983e-07	-6.433	-6.525	-0.092	(0)
	HPO4-2	5.574e-08	2.329e-08	-7.254	-7.633	-0.379	(0)
	CaHPO4	3.670e-08	3.670e-08	-7.435	-7.435	0.000	(0)
	H3PO4	1.580e-08	1.580e-08	-7.801	-7.801	0.000	(0)
	FeHPO4+	1.378e-08	1.113e-08	-7.861	-7.953	-0.092	(0)
	MgHPO4	1.375e-08	1.375e-08	-7.862	-7.862	0.000	(0)
	NaHPO4-	3.540e-09	2.861e-09	-8.451	-8.543	-0.092	(0)
	KHPO4-	9.508e-10	7.684e-10	-9.022	-9.114	-0.092	(0)
	CoHPO4	5.825e-11	5.825e-11	-10.235	-10.235	0.000	(0)
	FeH2PO4+2	1.364e-11	5.819e-12	-10.865	-11.235	-0.370	(0)
	CaPO4-	6.087e-12	4.919e-12	-11.216	-11.308	-0.092	(0)
	CrO3HPO4-2	3.757e-12	1.066e-12	-11.425	-11.972	-0.547	(0)
	MgPO4-	2.584e-14	2.088e-14	-13.588	-13.680	-0.092	(0)
	CrO3H2PO4-	1.252e-14	9.136e-15	-13.903	-14.039	-0.137	(0)
	PO4-3	3.683e-15	4.981e-16	-14.434	-15.303	-0.869	(0)
	FeH2PO4+	1.441e-16	1.165e-16	-15.841	-15.934	-0.092	(0)
	FeHPO4	3.298e-18	3.298e-18	-17.482	-17.482	0.000	(0)
	CrH2PO4+2	2.497e-21	7.089e-22	-20.603	-21.149	-0.547	(0)
Pb		9.690e-08					
	PbSO4	4.686e-08	4.686e-08	-7.329	-7.329	0.000	(0)
	Pb+2	3.564e-08	1.465e-08	-7.448	-7.834	-0.386	(0)
	PbCl+	7.449e-09	5.438e-09	-8.128	-8.265	-0.137	(0)
	Pb(SO4) 2-2	6.497e-09	1.844e-09	-8.187	-8.734	-0.547	(0)
	PbCl2	2.638e-10	2.638e-10	-9.579	-9.579	0.000	(0)
	PbNO3+	1.669e-10	1.218e-10	-9.778	-9.914	-0.137	(0)
	PbOH+	2.851e-11	2.081e-11	-10.545	-10.682	-0.137	(0)
	PbHCO3+	3.916e-12	2.858e-12	-11.407	-11.544	-0.137	(0)
	PbCl3-	1.689e-12	1.233e-12	-11.772	-11.909	-0.137	(0)
	Pb(NO3) 2	1.251e-13	1.251e-13	-12.903	-12.903	0.000	(0)
	PbCO3	3.048e-14	3.048e-14	-13.516	-13.516	0.000	(0)
	PbCl4-2	2.047e-14	5.812e-15	-13.689	-14.236	-0.547	(0)
	Pb(OH) 2	3.721e-16	3.721e-16	-15.429	-15.429	0.000	(0)
	Pb2OH+3	8.212e-17	4.830e-18	-16.086	-17.316	-1.231	(0)
	Pb(OH) 3-	2.883e-22	2.105e-22	-21.540	-21.677	-0.137	(0)
	Pb(CO3) 2-2	2.144e-22	6.087e-23	-21.669	-22.216	-0.547	(0)
	Pb(OH) 4-2	1.027e-28	2.915e-29	-27.988	-28.535	-0.547	(0)
	Pb3(OH) 4+2	6.451e-29	1.831e-29	-28.190	-28.737	-0.547	(0)
	Pb4(OH) 4+4	3.951e-31	2.565e-33	-30.403	-32.591	-2.188	(0)

Pb (HS) 2	0.000e+00	0.000e+00	-275.225	-275.225	0.000	(0)
Pb (HS) 3-	0.000e+00	0.000e+00	-415.118	-415.255	-0.137	(0)
S (-2)	0.000e+00					
H2S	0.000e+00	0.000e+00	-138.995	-138.995	0.000	(0)
HS-	0.000e+00	0.000e+00	-141.194	-141.330	-0.137	(0)
CdHS+	0.000e+00	0.000e+00	-142.098	-142.235	-0.137	(0)
S5-2	0.000e+00	0.000e+00	-145.511	-146.058	-0.547	(0)
S6-2	0.000e+00	0.000e+00	-145.914	-146.461	-0.547	(0)
S4-2	0.000e+00	0.000e+00	-146.112	-146.659	-0.547	(0)
S3-2	0.000e+00	0.000e+00	-146.926	-147.473	-0.547	(0)
S2-2	0.000e+00	0.000e+00	-147.955	-148.502	-0.547	(0)
S-2	0.000e+00	0.000e+00	-153.649	-154.028	-0.379	(0)
Pb (HS) 2	0.000e+00	0.000e+00	-275.225	-275.225	0.000	(0)
Zn (HS) 2	0.000e+00	0.000e+00	-275.580	-275.580	0.000	(0)
Cd (HS) 2	0.000e+00	0.000e+00	-276.361	-276.361	0.000	(0)
ZnS (HS) -	0.000e+00	0.000e+00	-276.703	-276.840	-0.137	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-287.115	-287.115	0.000	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-287.569	-287.974	-0.405	(0)
CuS4S5-3	0.000e+00	0.000e+00	-288.321	-288.704	-0.383	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-402.548	-402.685	-0.137	(0)
Zn (HS) 3-	0.000e+00	0.000e+00	-413.493	-413.630	-0.137	(0)
Pb (HS) 3-	0.000e+00	0.000e+00	-415.118	-415.255	-0.137	(0)
Cd (HS) 3-	0.000e+00	0.000e+00	-415.655	-415.792	-0.137	(0)
ZnS (HS) 2-2	0.000e+00	0.000e+00	-418.313	-418.860	-0.547	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-426.271	-426.408	-0.137	(0)
Cd (HS) 4-2	0.000e+00	0.000e+00	-554.379	-554.926	-0.547	(0)
Zn (HS) 4-2	0.000e+00	0.000e+00	-555.873	-556.420	-0.547	(0)
S (6)	2.322e-02					
SO4-2	1.589e-02	6.532e-03	-1.799	-2.185	-0.386	(0)
CaSO4	5.335e-03	5.335e-03	-2.273	-2.273	0.000	(0)
MgSO4	1.161e-03	1.161e-03	-2.935	-2.935	0.000	(0)
NaSO4-	4.997e-04	4.039e-04	-3.301	-3.394	-0.092	(0)
KSO4-	2.682e-04	2.168e-04	-3.571	-3.664	-0.092	(0)
CuSO4	3.598e-05	3.598e-05	-4.444	-4.444	0.000	(0)
HSO4-	1.222e-05	9.757e-06	-4.913	-5.011	-0.098	(0)
AlSO4+	4.478e-06	3.576e-06	-5.349	-5.447	-0.098	(0)
CoSO4	3.175e-06	3.175e-06	-5.498	-5.498	0.000	(0)
NiSO4	2.817e-06	2.817e-06	-5.550	-5.550	0.000	(0)
ZnSO4	2.497e-06	2.497e-06	-5.603	-5.603	0.000	(0)
Zn (SO4) 2-2	5.223e-07	1.483e-07	-6.282	-6.829	-0.547	(0)
Al (SO4) 2-	3.502e-07	2.796e-07	-6.456	-6.553	-0.098	(0)
BeSO4	5.103e-08	5.103e-08	-7.292	-7.292	0.000	(0)
PbSO4	4.686e-08	4.686e-08	-7.329	-7.329	0.000	(0)
MnSO4	1.754e-08	1.754e-08	-7.756	-7.756	0.000	(0)
Pb (SO4) 2-2	6.497e-09	1.844e-09	-8.187	-8.734	-0.547	(0)
FeSO4+	3.991e-09	3.209e-09	-8.399	-8.494	-0.095	(0)
Be (SO4) 2-2	3.651e-09	1.036e-09	-8.438	-8.984	-0.547	(0)
Ni (SO4) 2-2	2.234e-09	6.340e-10	-8.651	-9.198	-0.547	(0)
CdSO4	1.763e-09	1.763e-09	-8.754	-8.754	0.000	(0)
Fe (SO4) 2-	6.390e-10	4.664e-10	-9.195	-9.331	-0.137	(0)
Cd (SO4) 2-2	5.810e-10	1.649e-10	-9.236	-9.783	-0.547	(0)
CrO3SO4-2	5.697e-12	1.617e-12	-11.244	-11.791	-0.547	(0)
FeSO4	5.986e-14	5.986e-14	-13.223	-13.223	0.000	(0)
CrSO4+	8.511e-18	6.212e-18	-17.070	-17.207	-0.137	(0)
CrOHSO4	3.963e-18	3.963e-18	-17.402	-17.402	0.000	(0)
Cr2 (OH) 2SO4+2	3.226e-33	9.158e-34	-32.491	-33.038	-0.547	(0)
Cr2 (OH) 2 (SO4) 2	3.554e-34	3.554e-34	-33.449	-33.449	0.000	(0)
NH4SO4-	0.000e+00	0.000e+00	-60.624	-60.719	-0.095	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-382.012	-382.149	-0.137	(0)
Se (-2)	0.000e+00					
HSe-	0.000e+00	0.000e+00	-98.362	-98.498	-0.137	(0)
H2Se	0.000e+00	0.000e+00	-99.368	-99.368	0.000	(0)
MnSe	0.000e+00	0.000e+00	-106.928	-106.928	0.000	(0)
Se-2	0.000e+00	0.000e+00	-108.345	-108.892	-0.547	(0)
Se (4)	9.062e-18					
HSeO3-	9.009e-18	6.576e-18	-17.045	-17.182	-0.137	(0)
H2SeO3	4.780e-20	4.780e-20	-19.321	-19.321	0.000	(0)
SeO3-2	5.010e-21	1.422e-21	-20.300	-20.847	-0.547	(0)

FeHSeO3+2	2.680e-24	7.608e-25	-23.572	-24.119	-0.547	(0)
Cd (SeO3) 2-2	0.000e+00	0.000e+00	-44.114	-44.661	-0.547	(0)
Se (6)	1.271e-07					
SeO4-2	1.270e-07	5.218e-08	-6.896	-7.282	-0.386	(0)
CoSeO4	6.121e-11	6.121e-11	-10.213	-10.213	0.000	(0)
HSeO4-	5.439e-11	3.970e-11	-10.264	-10.401	-0.137	(0)
NiSeO4	4.985e-11	4.985e-11	-10.302	-10.302	0.000	(0)
ZnSeO4	1.474e-11	1.474e-11	-10.832	-10.832	0.000	(0)
MnSeO4	2.044e-13	2.044e-13	-12.689	-12.689	0.000	(0)
CdSeO4	1.188e-14	1.188e-14	-13.925	-13.925	0.000	(0)
Zn (SeO4) 2-2	2.747e-18	7.798e-19	-17.561	-18.108	-0.547	(0)
Zn	7.523e-06					
Zn+2	4.437e-06	1.824e-06	-5.353	-5.739	-0.386	(0)
ZnSO4	2.497e-06	2.497e-06	-5.603	-5.603	0.000	(0)
Zn (SO4) 2-2	5.223e-07	1.483e-07	-6.282	-6.829	-0.547	(0)
ZnCl+	6.186e-08	4.903e-08	-7.209	-7.310	-0.101	(0)
ZnNO3+	3.693e-09	2.696e-09	-8.433	-8.569	-0.137	(0)
ZnCl2	6.946e-10	6.946e-10	-9.158	-9.158	0.000	(0)
ZnOH+	9.624e-11	7.025e-11	-10.017	-10.153	-0.137	(0)
ZnOHCl	3.768e-11	3.768e-11	-10.424	-10.424	0.000	(0)
ZnHCO3+	2.075e-11	1.515e-11	-10.683	-10.820	-0.137	(0)
ZnSeO4	1.474e-11	1.474e-11	-10.832	-10.832	0.000	(0)
ZnCl3-	7.575e-12	6.004e-12	-11.121	-11.222	-0.101	(0)
Zn (NO3) 2	2.971e-13	2.971e-13	-12.527	-12.527	0.000	(0)
ZnCl4-2	7.667e-14	3.203e-14	-13.115	-13.494	-0.379	(0)
ZnCO3	7.266e-14	7.266e-14	-13.139	-13.139	0.000	(0)
Zn (OH) 2	9.245e-15	9.245e-15	-14.034	-14.034	0.000	(0)
Zn (SeO4) 2-2	2.747e-18	7.798e-19	-17.561	-18.108	-0.547	(0)
Zn (OH) 3-	3.590e-20	2.620e-20	-19.445	-19.582	-0.137	(0)
Zn (OH) 4-2	2.078e-27	5.900e-28	-26.682	-27.229	-0.547	(0)
Zn (HS) 2	0.000e+00	0.000e+00	-275.580	-275.580	0.000	(0)
ZnS (HS) -	0.000e+00	0.000e+00	-276.703	-276.840	-0.137	(0)
Zn (HS) 3-	0.000e+00	0.000e+00	-413.493	-413.630	-0.137	(0)
ZnS (HS) 2-2	0.000e+00	0.000e+00	-418.313	-418.860	-0.547	(0)
Zn (HS) 4-2	0.000e+00	0.000e+00	-555.873	-556.420	-0.547	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2-310.50	-304.23	6.27	(Co (NH3) 5Cl) (NO3) 2	
(Co (NH3) 5Cl) Cl2-306.19	-301.65	4.54	(Co (NH3) 5Cl) Cl2	
(Co (NH3) 5OH2) Cl3-313.46	-301.65	11.81	(Co (NH3) 5OH2) Cl3	
(Co (NH3) 6) (NO3) 3-378.26	-360.33	17.93	(Co (NH3) 6) (NO3) 3	
(Co (NH3) 6) Cl3 -376.59	-356.46	20.13	(Co (NH3) 6) Cl3	
(NH4) 2CrO4 -128.61	-128.23	0.38	(NH4) 2CrO4	
(NH4) 2SeO4 -126.86	-126.41	0.45	(NH4) 2SeO4	
Al (OH) 3 (am) -3.95	7.18	11.13	Al (OH) 3	
Al2 (MoO4) 3 -36.49	-33.34	3.15	Al2 (MoO4) 3	
Al2O3 -6.06	14.36	20.43	Al2O3	
Al4 (OH) 10SO4 -5.66	17.04	22.70	Al4 (OH) 10SO4	
AlAsO4:2H2O -7.87	-3.07	4.80	AlAsO4:2H2O	
AlOHSO4 -1.27	-4.50	-3.23	AlOHSO4	
Alunite 1.38	0.61	-0.77	KAl3 (SO4) 2 (OH) 6	
Anglesite -2.19	-10.02	-7.83	PbSO4	
Anhydrite -0.27	-4.61	-4.34	CaSO4	
Anilite -132.61	-165.03	-32.42	Cu0.25Cu1.5S	
Antlerite -5.75	3.03	8.79	Cu3 (OH) 4SO4	
Aragonite -6.32	-14.59	-8.26	CaCO3	
Arsenolite -129.19	-132.13	-2.94	As4O6	
Artinite -18.61	-8.65	9.96	MgCO3:Mg (OH) 2:3H2O	
As2O5 -27.27	-20.49	6.77	As2O5	
Atacamite -4.56	3.11	7.67	Cu2 (OH) 3Cl	
Azurite -11.98	-28.60	-16.62	Cu3 (OH) 2 (CO3) 2	
Ba (OH) 2:8H2O -21.98	2.57	24.56	Ba (OH) 2:8H2O	
Ba3 (AsO4) 2 -3.81	-12.76	-8.94	Ba3 (AsO4) 2	
BaCrO4 -6.25	-16.02	-9.77	BaCrO4	
BaHPO4 -7.20	-26.97	-19.77	BaHPO4	

BaMoO4	-6.33	-13.32	-6.99	BaMoO4
Barite	0.94	-9.11	-10.05	BaSO4
BaS	-159.68	-143.50	16.18	BaS
BaSeO3	-21.15	-19.35	1.79	BaSeO3
BaSeO4	-6.68	-14.20	-7.53	BaSeO4
Be (OH) 2 (alpha)	-4.61	2.29	6.89	Be (OH) 2
Be (OH) 2 (am)	-4.91	2.29	7.19	Be (OH) 2
Be (OH) 2 (beta)	-4.21	2.29	6.49	Be (OH) 2
BeMoO4	-12.00	-13.61	-1.61	BeMoO4
BeS	-163.17	-143.79	19.38	BeS
BeSeO4:4H2O	-11.56	-14.50	-2.94	BeSeO4:4H2O
Bianchite	-6.16	-7.93	-1.76	ZnSO4:6H2O
Birnessite	-0.00	18.09	18.09	MnO2
Bixbyite	-5.60	-5.88	-0.27	Mn2O3
BlaubleiI	-120.19	-144.35	-24.16	Cu0.9Cu0.2S
BlaubleiII	-126.62	-153.90	-27.28	Cu0.6Cu0.8S
Boehmite	-1.75	7.18	8.93	AlOOH
Brochantite	-7.89	7.94	15.83	Cu4 (OH) 6SO4
Brucite	-10.68	6.51	17.18	Mg (OH) 2
Bunsenite	-8.89	3.85	12.74	NiO
Ca3 (AsO4) 2:4H2O	-21.58	0.72	22.30	Ca3 (AsO4) 2:4H2O
Ca3 (PO4) 2 (beta)	-8.80	-37.89	-29.08	Ca3 (PO4) 2
Ca4H (PO4) 3:3H2O	-13.29	-60.37	-47.08	Ca4H (PO4) 3:3H2O
CaCrO4	-9.34	-11.53	-2.19	CaCrO4
CaHPO4	-3.11	-22.48	-19.37	CaHPO4
CaHPO4:2H2O	-3.42	-22.48	-19.06	CaHPO4:2H2O
Calcite	-6.13	-14.59	-8.46	CaCO3
CaMoO4	-0.89	-8.83	-7.94	CaMoO4
CaSeO3:2H2O	-17.73	-14.86	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-6.72	-9.71	-3.00	CaSeO4:2H2O
Cd (BO2) 2	-19.30	-9.46	9.84	Cd (BO2) 2
Cd (OH) 2	-13.34	0.59	13.93	Cd (OH) 2
Cd (OH) 2 (am)	-13.40	0.59	13.99	Cd (OH) 2
Cd3 (OH) 2 (SO4) 2	-28.32	-21.61	6.71	Cd3 (OH) 2 (SO4) 2
Cd3 (OH) 4SO4	-32.49	-9.93	22.56	Cd3 (OH) 4SO4
Cd3 (PO4) 2	-24.74	-57.34	-32.60	Cd3 (PO4) 2
Cd4 (OH) 6SO4	-37.74	-9.34	28.40	Cd4 (OH) 6SO4
CdCl2	-12.22	-12.82	-0.60	CdCl2
CdCl2:1H2O	-11.15	-12.82	-1.67	CdCl2:1H2O
CdCl2:2.5H2O	-10.89	-12.82	-1.93	CdCl2:2.5H2O
Cdmetal (alpha)	-55.21	-41.47	13.74	Cd
Cdmetal (gamma)	-55.32	-41.47	13.84	Cd
CdMoO4	-1.11	-15.32	-14.21	CdMoO4
CdOHCl	-9.75	-6.12	3.63	CdOHCl
CdSe	-82.23	-102.66	-20.43	CdSe
CdSeO4:2H2O	-14.35	-16.20	-1.85	CdSeO4:2H2O
CdSO4	-11.08	-11.10	-0.02	CdSO4
CdSO4:1H2O	-9.47	-11.10	-1.63	CdSO4:1H2O
CdSO4:2.67H2O	-9.28	-11.10	-1.82	CdSO4:2.67H2O
Cerussite	-6.79	-19.99	-13.20	PbCO3
CH4 (g)	-148.08	-189.90	-41.81	CH4
Chalcanthite	-4.12	-6.78	-2.66	CuSO4:5H2O
Chalcocite	-137.56	-172.99	-35.42	Cu2S
Chalcopyrite	-255.44	-291.16	-35.71	CuFeS2
Claudetite	-128.90	-132.13	-3.23	As4O6
Clausthalite	-74.12	-101.58	-27.46	PbSe
Co (BO2) 2	-33.21	-6.14	27.07	Co (BO2) 2
Co (OH) 2	-9.19	3.90	13.09	Co (OH) 2
Co (OH) 3	-5.43	-7.47	-2.03	Co (OH) 3
CO2 (g)	-3.50	-21.66	-18.16	CO2
Co3 (AsO4) 2	-21.81	-8.78	13.03	Co3 (AsO4) 2
Co3 (PO4) 2	-12.70	-47.39	-34.69	Co3 (PO4) 2
Co3O4	-0.85	-11.03	-10.17	Co3O4
CoCl2	-18.01	-9.50	8.51	CoCl2
CoCl2:6H2O	-12.02	-9.51	2.51	CoCl2:6H2O
CoCO3	-7.81	-17.75	-9.94	CoCO3
CoFe2O4	14.89	11.84	-3.05	CoFe2O4
CoHPO4	-6.59	-25.65	-19.06	CoHPO4

CoMoO4	-4.31	-12.00	-7.69	CoMoO4
CoO	-10.00	3.90	13.90	CoO
CoS (alpha)	-134.74	-142.18	-7.44	CoS
CoS (beta)	-131.11	-142.18	-11.07	CoS
CoSe	-83.14	-99.34	-16.20	CoSe
CoSeO3	-19.35	-18.03	1.32	CoSeO3
CoSeO4:6H2O	-11.35	-12.88	-1.53	CoSeO4:6H2O
CoSO4	-10.82	-7.78	3.04	CoSO4
CoSO4:6H2O	-5.31	-7.78	-2.48	CoSO4:6H2O
Cotunnite	-6.88	-11.74	-4.86	PbCl2
Covellite	-118.58	-141.17	-22.59	CuS
Cr (OH) 2	-43.03	-32.11	10.93	Cr (OH) 2
Cr (OH) 3	-15.43	-14.01	1.42	Cr (OH) 3
Cr (OH) 3 (am)	-13.26	-14.01	-0.75	Cr (OH) 3
Cr2O3	-25.80	-28.01	-2.21	Cr2O3
CrCl2	-59.94	-45.51	14.42	CrCl2
CrCl3	-49.59	-34.12	15.48	CrCl3
Crmetal	-105.16	-74.16	31.00	Cr
CrO3	-15.41	-18.60	-3.19	CrO3
Cu (OH) 2	-3.94	4.91	8.84	Cu (OH) 2
Cu2 (OH) 3NO3	-7.65	1.82	9.47	Cu2 (OH) 3NO3
Cu2Se (alpha)	-83.71	-130.15	-46.44	Cu2Se
Cu2SO4	-36.70	-38.59	-1.89	Cu2SO4
Cu3 (AsO4) 2:2H2O	-11.87	-5.77	6.10	Cu3 (AsO4) 2:2H2O
Cu3 (PO4) 2	-7.53	-44.38	-36.85	Cu3 (PO4) 2
Cu3 (PO4) 2:3H2O	-9.27	-44.39	-35.12	Cu3 (PO4) 2:3H2O
Cu3Se2	-163.99	-228.50	-64.51	Cu3Se2
CuCO3	-5.25	-16.75	-11.50	CuCO3
CuCrO4	-8.25	-13.69	-5.44	CuCrO4
Cumetal	-25.51	-34.48	-8.97	Cu
CuMoO4	2.12	-11.00	-13.11	CuMoO4
CuOCuSO4	-12.59	-1.87	10.71	CuOCuSO4
Cupricferrite	6.22	12.84	6.62	CuFe2O4
Cuprite	-25.87	-26.91	-1.04	Cu2O
Cuprousferrite	-0.62	-9.49	-8.87	CuFeO2
CuSe	-64.88	-98.34	-33.46	CuSe
CuSe2	-125.74	-159.53	-33.79	CuSe2
CuSeO3:2H2O	-17.65	-17.03	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-9.44	-11.88	-2.44	CuSeO4:5H2O
CuSO4	-9.94	-6.78	3.16	CuSO4
Diaspore	-0.00	7.18	7.18	AlOOH
Djurleite	-136.37	-170.89	-34.52	Cu0.066Cu1.868S
Dolomite (disordered)	-13.34	-29.74	-16.40	CaMg (CO3) 2
Dolomite (ordered)	-12.77	-29.74	-16.97	CaMg (CO3) 2
Epsomite	-3.02	-5.18	-2.16	MgSO4:7H2O
Fe (OH) 2	-17.47	-3.91	13.56	Fe (OH) 2
Fe (OH) 2.7Cl.3	4.99	1.95	-3.04	Fe (OH) 2.7Cl.3
Fe2 (OH) 4SeO3	-15.56	-14.00	1.55	Fe2 (OH) 4SeO3
Fe2 (SeO3) 3:2H2O	-37.24	-57.87	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-24.11	-27.12	-3.01	Fe2 (SO4) 3
Fe3 (OH) 8	-16.20	4.02	20.22	Fe3 (OH) 8
FeAsO4:2H2O	-6.68	-6.28	0.40	FeAsO4:2H2O
FeCr2O4	-39.53	-31.91	7.62	FeCr2O4
FeMoO4	-9.75	-19.81	-10.06	FeMoO4
Ferrihydrite	0.55	3.96	3.41	Fe (OH) 3
Ferroselite	-149.60	-168.34	-18.74	FeSe2
FeS (ppt)	-147.07	-149.98	-2.92	FeS
FeSe	-96.15	-107.15	-11.01	FeSe
Fix_pH	-4.75	-4.75	0.00	H+
Galena	-130.21	-144.41	-14.21	PbS
Gibbsite	-1.40	7.18	8.58	Al (OH) 3
Goethite	3.29	3.96	0.67	FeOOH
Goslarite	-5.87	-7.93	-2.05	ZnSO4:7H2O
Greenockite	-130.97	-145.49	-14.52	CdS
Greigite	-535.26	-580.29	-45.03	Fe3S4
Gypsum	0.00	-4.61	-4.61	CaSO4:2H2O
H-Jarosite	-0.06	-11.48	-11.41	(H3O) Fe3 (SO4) 2 (OH) 6
H2MoO4	-2.88	-15.90	-13.02	H2MoO4

H2S (g)	-138.07	-146.08	-8.01	H2S
H2Se (g)	-98.33	-103.25	-4.91	H2Se
Halite	-5.48	-3.89	1.59	NaCl
Hausmannite	-15.12	47.17	62.29	Mn3O4
Hematite	8.96	7.93	-1.03	Fe2O3
Hercynite	-13.37	10.46	23.83	FeAl2O4
Hinsdalite	-15.53	-18.03	-2.50	PbAl3PO4SO4 (OH) 6
Huntite	-30.40	-60.04	-29.65	CaMg3 (CO3) 4
Hydrocerussite	-19.55	-38.32	-18.77	Pb3 (OH) 2 (CO3) 2
Hydromagnesite	-45.99	-54.11	-8.11	Mg5 (CO3) 4 (OH) 2 : 4H2O
Hydroxylapatite	-8.96	-53.29	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-17.54	-80.33	-62.79	Pb5 (PO4) 3OH
K-Alum	-8.50	-13.76	-5.26	KAl (SO4) 2 : 12H2O
K-Jarosite	5.37	-9.04	-14.41	KFe3 (SO4) 2 (OH) 6
K2Cr2O7	-14.85	-32.33	-17.48	K2Cr2O7
K2CrO4	-13.17	-13.73	-0.57	K2CrO4
K2MoO4	-14.31	-11.04	3.27	K2MoO4
K2SeO4	-11.19	-11.92	-0.73	K2SeO4
Langite	-10.04	7.94	17.98	Cu4 (OH) 6SO4 : H2O
Larnakite	-7.98	-8.35	-0.37	PbO : PbSO4
Laurionite	-5.66	-5.04	0.62	PbOHCl
Lepidocrocite	2.59	3.96	1.37	FeOOH
Lime	-26.21	7.07	33.28	CaO
Litharge	-11.22	1.67	12.89	PbO
Mackinawite	-146.38	-149.98	-3.60	FeS
Maghemite	1.54	7.93	6.39	Fe2O3
Magnesioferrite	-3.26	14.44	17.69	Fe2MgO4
Magnesite	-7.63	-15.15	-7.52	MgCO3
Magnetite	0.00	4.03	4.03	Fe3O4
Malachite	-6.31	-11.85	-5.53	Cu2 (OH) 2CO3
Manganite	-2.61	22.73	25.34	MnOOH
Massicot	-11.43	1.67	13.09	PbO
Melanothallite	-14.95	-8.50	6.45	CuCl2
Melanterite	-13.32	-15.59	-2.27	FeSO4 : 7H2O
Mg (OH) 2 (active)	-12.29	6.51	18.79	Mg (OH) 2
Mg3 (PO4) 2	-16.30	-39.58	-23.28	Mg3 (PO4) 2
MgCr2O4	-38.24	-21.50	16.74	MgCr2O4
MgCrO4	-17.74	-12.09	5.65	MgCrO4
MgHPO4 : 3H2O	-4.87	-23.05	-18.18	MgHPO4 : 3H2O
MgMoO4	-7.55	-9.40	-1.85	MgMoO4
MgSeO3 : 6H2O	-18.47	-15.43	3.04	MgSeO3 : 6H2O
MgSeO4 : 6H2O	-9.08	-10.28	-1.20	MgSeO4 : 6H2O
Minium	-27.73	47.05	74.78	Pb3O4
Mirabilite	-4.71	-6.06	-1.35	Na2SO4 : 10H2O
Mn2 (SO4) 3	-35.71	-40.93	-5.22	Mn2 (SO4) 3
Mn3 (AsO4) 2 : 8H2O	-27.88	-15.38	12.50	Mn3 (AsO4) 2 : 8H2O
Mn3 (PO4) 2	-30.14	-53.99	-23.85	Mn3 (PO4) 2
MnCl2 : 4H2O	-14.45	-11.71	2.75	MnCl2 : 4H2O
MnHPO4	-2.45	-27.85	-25.40	MnHPO4
MnS (grn)	-144.64	-144.38	0.27	MnS
MnS (pnk)	-147.72	-144.38	3.34	MnS
MnSe	-105.34	-101.54	3.79	MnSe
MnSeO3	-21.36	-20.23	1.13	MnSeO3
MnSeO3 : 2H2O	-21.19	-20.23	0.96	MnSeO3 : 2H2O
MnSeO4 : 5H2O	-13.03	-15.08	-2.05	MnSeO4 : 5H2O
MnSO4	-12.76	-9.98	2.78	MnSO4
Monteponite	-14.83	0.59	15.41	CdO
MoO3	-7.90	-15.90	-8.00	MoO3
Morenosite	-5.66	-7.84	-2.18	NiSO4 : 7H2O
MoS2	-278.70	-350.12	-71.42	MoS2
Na-Jarosite	2.09	-8.66	-10.75	NaFe3 (SO4) 2 (OH) 6
Na2Cr2O7	-21.61	-31.57	-9.96	Na2Cr2O7
Na2CrO4	-15.96	-12.97	2.99	Na2CrO4
Na2Mo2O7	-9.41	-26.18	-16.76	Na2Mo2O7
Na2MoO4	-11.79	-10.27	1.52	Na2MoO4
Na2MoO4 : 2H2O	-11.50	-10.28	1.22	Na2MoO4 : 2H2O
Na2SeO3 : 5H2O	-26.61	-16.31	10.30	Na2SeO3 : 5H2O
Na2SeO4	-12.43	-11.15	1.28	Na2SeO4

Nantokite	-13.30	-20.16	-6.86	CuCl
Natron	-14.53	-16.04	-1.51	Na2CO3:10H2O
Nesquehonite	-10.56	-15.15	-4.60	MgCO3:3H2O
Ni (OH) 2	-9.23	3.85	13.08	Ni (OH) 2
Ni3 (AsO4) 2:8H2O	-24.64	-8.94	15.70	Ni3 (AsO4) 2:8H2O
Ni3 (PO4) 2	-16.25	-47.55	-31.30	Ni3 (PO4) 2
Ni4 (OH) 6SO4	-28.28	3.72	32.00	Ni4 (OH) 6SO4
NiCO3	-11.06	-17.81	-6.75	NiCO3
NiMoO4	-0.90	-12.05	-11.15	NiMoO4
NiS (alpha)	-136.63	-142.23	-5.60	NiS
NiS (beta)	-131.13	-142.23	-11.10	NiS
NiS (gamma)	-129.43	-142.23	-12.80	NiS
NiSe	-81.70	-99.40	-17.70	NiSe
NiSeO3:2H2O	-20.99	-18.08	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-11.41	-12.93	-1.52	NiSeO4:6H2O
Nsutite	0.59	18.09	17.50	MnO2
O2 (g)	-0.68	84.12	84.80	O2
Orpiment	-442.19	-504.30	-62.11	As2S3
Otavite	-9.07	-21.07	-12.00	CdCO3
Pb (BO2) 2	-14.95	-8.38	6.57	Pb (BO2) 2
Pb (OH) 2	-6.66	1.66	8.32	Pb (OH) 2
Pb10 (OH) 60 (CO3) 6	-104.54	-113.30	-8.76	Pb10 (OH) 60 (CO3) 6
Pb2 (OH) 3Cl	-12.17	-3.37	8.79	Pb2 (OH) 3Cl
Pb2O (OH) 2	-22.86	3.33	26.19	Pb2O (OH) 2
Pb2O3	-15.65	45.39	61.04	Pb2O3
Pb2OCO3	-17.89	-18.33	-0.44	Pb2OCO3
Pb3 (AsO4) 2	-21.30	-15.50	5.80	Pb3 (AsO4) 2
Pb3 (PO4) 2	-10.58	-54.11	-43.53	Pb3 (PO4) 2
Pb3O2CO3	-28.01	-16.66	11.35	Pb3O2CO3
Pb3O2SO4	-17.61	-6.69	10.92	Pb3O2SO4
Pb4 (OH) 6SO4	-26.13	-5.03	21.10	Pb4 (OH) 6SO4
Pb4O3SO4	-27.31	-5.02	22.28	Pb4O3SO4
PbCrO4	-4.20	-16.93	-12.73	PbCrO4
PbHPO4	-4.08	-27.89	-23.81	PbHPO4
Pbmetal	-44.64	-40.39	4.24	Pb
PbMoO4	1.54	-14.24	-15.78	PbMoO4
PbO:0.3H2O	-11.31	1.67	12.98	PbO:0.33H2O
PbSeO4	-8.23	-15.12	-6.88	PbSeO4
Periclase	-15.53	6.51	22.04	MgO
Phosgenite	-11.93	-31.74	-19.81	PbCl2:PbCO3
Plattnerite	-6.76	43.72	50.49	PbO2
Plumbgummite	-3.11	-35.90	-32.79	PbAl3 (PO4) 2 (OH) 5:H2O
Portlandite	-16.12	7.07	23.19	Ca (OH) 2
Pyrite	-235.35	-254.01	-18.66	FeS2
Pyrochroite	-13.78	1.70	15.48	Mn (OH) 2
Pyrolusite	1.57	43.76	42.19	MnO2
Pyromorphite	-2.60	-87.03	-84.43	Pb5 (PO4) 3Cl
Realgar	-180.01	-200.14	-20.13	AsS
Retgersite	-5.78	-7.84	-2.05	NiSO4:6H2O
Rhodochrosite	-9.38	-19.95	-10.57	MnCO3
Semetal (am)	-54.05	-61.19	-7.14	Se
Semetal (hex)	-53.43	-61.19	-7.76	Se
SeO2	-22.05	-21.93	0.12	SeO2
SeO3	-38.26	-16.78	21.48	SeO3
Siderite	-15.37	-25.56	-10.19	FeCO3
Smithsonite	-7.95	-17.90	-9.95	ZnCO3
Sphalerite	-130.78	-142.32	-11.54	ZnS
Spinel	-17.14	20.87	38.01	MgAl2O4
Strengite	0.78	-25.59	-26.37	FePO4:2H2O
Sulfur	-101.92	-104.02	-2.10	S
Tenorite	-2.93	4.91	7.84	CuO
Thenardite	-6.41	-6.06	0.35	Na2SO4
Thermonatrite	-16.70	-16.03	0.67	Na2CO3:H2O
Tsumebite	-11.53	-21.32	-9.79	Pb2CuPO4 (OH) 3:3H2O
Vivianite	-34.82	-70.82	-36.00	Fe3 (PO4) 2:8H2O
Witherite	-10.50	-19.08	-8.58	BaCO3
Wurtzite	-133.31	-142.32	-9.01	ZnS
Zincite	-7.84	3.76	11.60	ZnO

Zincosite	-12.10	-7.92	4.18	ZnSO4
Zn(BO2)2	-14.58	-6.29	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-15.47	-12.23	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-8.44	3.76	12.20	Zn(OH)2
Zn(OH)2(am)	-8.96	3.76	12.71	Zn(OH)2
Zn(OH)2(beta)	-8.24	3.76	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-8.02	3.76	11.78	Zn(OH)2
Zn(OH)2(gamma)	-7.97	3.76	11.73	Zn(OH)2
Zn2(OH)2SO4	-11.66	-4.16	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-14.38	0.82	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-22.86	-9.21	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-12.40	-47.82	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-31.77	-12.09	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-25.04	3.36	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-33.11	5.39	38.50	Zn5(OH)8Cl2
ZnCl2	-16.91	-9.65	7.27	ZnCl2
ZnCO3:1H2O	-7.64	-17.90	-10.26	ZnCO3:1H2O
Znmetal	-64.55	-38.30	26.25	Zn
ZnMoO4	-2.05	-12.14	-10.09	ZnMoO4
ZnO(active)	-7.69	3.76	11.45	ZnO
ZnS(am)	-133.22	-142.32	-9.10	ZnS
ZnSe	-85.01	-99.49	-14.48	ZnSe
ZnSeO4:6H2O	-11.50	-13.02	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.42	-7.92	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 6.

```

USE solution 1
EQUILIBRIUM_PHASES 3
  CO2(g)      -3.5 10
  Diaspore    0 0
  Fix_pH      -5 Portlandite 10
  Magnetite   0 0
  O2(g)       -0.68 10
  Birnessite  0 0
END

```

Beginning of batch-reaction calculations.

Reaction step 1.

Using solution 1.
Using pure phase assemblage 3.

-----User print-----

Moles of Portlandite: -1.3949e-03
Moles of Diaspore: -1.3949e-03
Moles of Magnetite: -1.3949e-03
Moles of Birnessite: -1.3949e-03
mg of Portlandite: -1.0335e+02
mg of Diaspore: -8.3681e+01
mg of Birnessite: -1.2127e+02

-----Phase assemblage-----

Phase	SI	log IAP	log K(T, P)	Initial	Moles in assemblage Final	Delta

Birnessite	0.00	18.09	18.09	0.000e+00	9.537e-05	9.537e-05
CO2(g)	-3.50	-21.66	-18.16	1.000e+01	1.000e+01	-1.306e-05
Diaspore	0.00	7.18	7.18	0.000e+00	5.183e-05	5.183e-05
Fix_pH	-5.00	-5.00	0.00			
Ca(OH)2		is reactant		1.000e+01	9.999e+00	-1.395e-03
Magnetite	0.00	4.03	4.03	0.000e+00	1.469e-04	1.469e-04
O2(g)	-0.68	84.12	84.80	1.000e+01	9.998e+00	-2.051e-03

-----Solution composition-----

Elements	Molality	Moles
Al	1.012e-06	1.012e-06
As	2.680e-08	2.680e-08
B	9.287e-06	9.287e-06
Ba	2.924e-07	2.924e-07
Be	2.228e-07	2.228e-07
C	1.306e-05	1.306e-05
Ca	1.447e-02	1.447e-02
Cd	7.145e-09	7.145e-09
Cl	1.388e-02	1.388e-02
Co	1.227e-05	1.227e-05
Cr	6.372e-08	6.372e-08
Cu	9.874e-05	9.874e-05
Fe	2.924e-06	2.924e-06
K	6.291e-03	6.291e-03
Mg	3.635e-03	3.635e-03
Mn	2.350e-08	2.350e-08
Mo	1.151e-06	1.151e-06
N	7.218e-04	7.218e-04
Na	1.498e-02	1.498e-02
Ni	8.382e-06	8.382e-06
P	9.399e-06	9.400e-06
Pb	9.690e-08	9.691e-08
S	2.322e-02	2.322e-02
Se	1.271e-07	1.271e-07
Zn	7.523e-06	7.523e-06

-----Description of solution-----

pH	=	5.000	Charge balance
pe	=	16.030	Adjusted to redox equilibrium
Activity of water	=	0.999	
Ionic strength (mol/kgw)	=	7.309e-02	
Mass of water (kg)	=	1.000e+00	
Total alkalinity (eq/kg)	=	-1.845e-05	
Total CO2 (mol/kg)	=	1.306e-05	
Temperature (°C)	=	20.00	
Electrical balance (eq)	=	-3.291e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-3.61	
Iterations	=	50	
Total H	=	1.110195e+02	
Total O	=	5.560583e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.249e-05	1.000e-05	-4.903	-5.000	-0.097	0.00
OH-	8.711e-10	6.850e-10	-9.060	-9.164	-0.104	(0)
H2O	5.551e+01	9.988e-01	1.744	-0.001	0.000	18.05
Al	1.012e-06					
AlSO4+	7.965e-07	6.359e-07	-6.099	-6.197	-0.098	(0)
Al+3	1.124e-07	1.520e-08	-6.949	-7.818	-0.869	(0)
Al(SO4)2-	6.229e-08	4.973e-08	-7.206	-7.303	-0.098	(0)
AlOH+2	2.580e-08	1.100e-08	-7.588	-7.958	-0.370	(0)

Al (OH) 2+	1.512e-08	1.222e-08	-7.821	-7.913	-0.092	(0)
Al (OH) 3	2.451e-10	2.451e-10	-9.611	-9.611	0.000	(0)
Al (OH) 4-	1.180e-11	9.424e-12	-10.928	-11.026	-0.098	(0)
AlMo6O21-3	1.572e-20	9.243e-22	-19.804	-21.034	-1.231	(0)
As (3)	5.157e-34					
H3AsO3	5.157e-34	5.157e-34	-33.288	-33.288	0.000	(0)
H2AsO3-	3.001e-38	2.190e-38	-37.523	-37.660	-0.137	(0)
H4AsO3+	3.500e-39	2.555e-39	-38.456	-38.593	-0.137	(0)
HAsO3-2	0.000e+00	0.000e+00	-44.248	-44.795	-0.547	(0)
AsO3-3	0.000e+00	0.000e+00	-52.054	-53.285	-1.231	(0)
As (5)	2.680e-08					
H2AsO4-	2.605e-08	1.901e-08	-7.584	-7.721	-0.137	(0)
HAsO4-2	7.195e-10	2.042e-10	-9.143	-9.690	-0.547	(0)
H3AsO4	3.094e-11	3.147e-11	-10.509	-10.502	0.007	(0)
AsO4-3	9.770e-16	5.745e-17	-15.010	-16.241	-1.231	(0)
B	9.287e-06					
H3BO3	9.286e-06	9.444e-06	-5.032	-5.025	0.007	(0)
H2BO3-	6.490e-10	5.015e-10	-9.188	-9.300	-0.112	(0)
CaH2BO3+	1.362e-10	1.052e-10	-9.866	-9.978	-0.112	(0)
MgH2BO3+	2.287e-11	1.768e-11	-10.641	-10.753	-0.112	(0)
NaH2BO3	1.008e-11	1.008e-11	-10.997	-10.997	0.000	(0)
H5 (BO3) 2-	5.384e-15	4.161e-15	-14.269	-14.381	-0.112	(0)
BaH2BO3+	2.341e-15	1.809e-15	-14.631	-14.743	-0.112	(0)
H8 (BO3) 3-	4.401e-18	3.401e-18	-17.356	-17.468	-0.112	(0)
Ba	2.924e-07					
Ba+2	2.919e-07	1.200e-07	-6.535	-6.921	-0.386	(0)
BaNO3+	5.136e-10	3.749e-10	-9.289	-9.426	-0.137	(0)
BaHCO3+	6.118e-13	4.981e-13	-12.213	-12.303	-0.089	(0)
BaH2BO3+	2.341e-15	1.809e-15	-14.631	-14.743	-0.112	(0)
BaOH+	4.311e-16	3.466e-16	-15.365	-15.460	-0.095	(0)
BaCO3	1.207e-16	1.207e-16	-15.918	-15.918	0.000	(0)
BaNH3+2	0.000e+00	0.000e+00	-70.882	-71.429	-0.547	(0)
Be	2.228e-07					
Be+2	1.414e-07	5.813e-08	-6.849	-7.236	-0.386	(0)
BeSO4	4.818e-08	4.818e-08	-7.317	-7.317	0.000	(0)
BeOH+	2.842e-08	2.328e-08	-7.546	-7.633	-0.087	(0)
Be (SO4) 2-2	3.448e-09	9.787e-10	-8.462	-9.009	-0.547	(0)
BeCl+	1.276e-09	1.026e-09	-8.894	-8.989	-0.095	(0)
Be (OH) 2	1.477e-11	1.477e-11	-10.831	-10.831	0.000	(0)
Be2OH+3	1.356e-12	2.245e-13	-11.868	-12.649	-0.781	(0)
BeCO3	2.287e-13	2.287e-13	-12.641	-12.641	0.000	(0)
Be3 (OH) 3+3	1.841e-15	3.048e-16	-14.735	-15.516	-0.781	(0)
Be (OH) 3-	4.556e-16	3.731e-16	-15.341	-15.428	-0.087	(0)
Be (OH) 4-2	5.265e-25	2.368e-25	-24.279	-24.626	-0.347	(0)
C (4)	1.306e-05					
H2CO3	1.237e-05	1.237e-05	-4.908	-4.908	0.000	(0)
HCO3-	6.389e-07	5.164e-07	-6.195	-6.287	-0.092	(0)
CaHCO3+	3.857e-08	3.140e-08	-7.414	-7.503	-0.089	(0)
MgHCO3+	6.593e-09	5.225e-09	-8.181	-8.282	-0.101	(0)
NaHCO3	3.700e-09	3.700e-09	-8.432	-8.432	0.000	(0)
CuHCO3+	1.030e-09	7.519e-10	-8.987	-9.124	-0.137	(0)
CuCO3	3.290e-10	3.290e-10	-9.483	-9.483	0.000	(0)
NiHCO3+	1.774e-10	1.295e-10	-9.751	-9.888	-0.137	(0)
CoHCO3+	1.265e-10	9.233e-11	-9.898	-10.035	-0.137	(0)
ZnHCO3+	3.689e-11	2.693e-11	-10.433	-10.570	-0.137	(0)
CaCO3	1.165e-11	1.165e-11	-10.934	-10.934	0.000	(0)
PbHCO3+	6.960e-12	5.080e-12	-11.157	-11.294	-0.137	(0)
CO3-2	5.328e-12	2.190e-12	-11.273	-11.660	-0.386	(0)
MgCO3	1.704e-12	1.704e-12	-11.768	-11.768	0.000	(0)
NaCO3-	6.727e-13	5.437e-13	-12.172	-12.265	-0.092	(0)
BaHCO3+	6.118e-13	4.981e-13	-12.213	-12.303	-0.089	(0)
ZnCO3	2.297e-13	2.297e-13	-12.639	-12.639	0.000	(0)
BeCO3	2.287e-13	2.287e-13	-12.641	-12.641	0.000	(0)
NiCO3	1.837e-13	1.837e-13	-12.736	-12.736	0.000	(0)
PbCO3	9.636e-14	9.636e-14	-13.016	-13.016	0.000	(0)
CoCO3	9.407e-14	9.407e-14	-13.027	-13.027	0.000	(0)
MnHCO3+	6.319e-14	5.080e-14	-13.199	-13.294	-0.095	(0)
CdHCO3+	1.780e-15	1.299e-15	-14.750	-14.886	-0.137	(0)

BaCO3	1.207e-16	1.207e-16	-15.918	-15.918	0.000	(0)
CdCO3	6.099e-17	6.099e-17	-16.215	-16.215	0.000	(0)
Cu (CO3) 2-2	6.831e-18	1.939e-18	-17.166	-17.712	-0.547	(0)
FeHCO3+	9.007e-20	7.333e-20	-19.045	-19.135	-0.089	(0)
Pb (CO3) 2-2	2.144e-21	6.085e-22	-20.669	-21.216	-0.547	(0)
Cd (CO3) 2-2	3.488e-25	9.899e-26	-24.457	-25.004	-0.547	(0)
Ca	1.447e-02					
Ca+2	9.119e-03	3.748e-03	-2.040	-2.426	-0.386	(0)
CaSO4	5.341e-03	5.341e-03	-2.272	-2.272	0.000	(0)
CaNO3+	9.607e-06	7.012e-06	-5.017	-5.154	-0.137	(0)
CaH2PO4+	6.328e-07	5.114e-07	-6.199	-6.291	-0.092	(0)
CaHPO4	6.484e-08	6.484e-08	-7.188	-7.188	0.000	(0)
CaHCO3+	3.857e-08	3.140e-08	-7.414	-7.503	-0.089	(0)
CaH2BO3+	1.362e-10	1.052e-10	-9.866	-9.978	-0.112	(0)
CaOH+	5.942e-11	4.838e-11	-10.226	-10.315	-0.089	(0)
CaPO4-	1.912e-11	1.546e-11	-10.718	-10.811	-0.092	(0)
CaCO3	1.165e-11	1.165e-11	-10.934	-10.934	0.000	(0)
CaNH3+2	0.000e+00	0.000e+00	-66.087	-66.634	-0.547	(0)
Ca (NH3) 2+2	0.000e+00	0.000e+00	-130.795	-131.342	-0.547	(0)
Cd	7.145e-09					
Cd+2	2.974e-09	1.222e-09	-8.527	-8.913	-0.386	(0)
CdCl+	1.764e-09	1.288e-09	-8.753	-8.890	-0.137	(0)
CdSO4	1.763e-09	1.763e-09	-8.754	-8.754	0.000	(0)
Cd (SO4) 2-2	5.812e-10	1.649e-10	-9.236	-9.783	-0.547	(0)
CdCl2	5.881e-11	5.881e-11	-10.231	-10.231	0.000	(0)
CdNO3+	3.488e-12	2.546e-12	-11.457	-11.594	-0.137	(0)
CdCl3-	5.382e-13	3.929e-13	-12.269	-12.406	-0.137	(0)
CdOHC1	4.719e-14	4.719e-14	-13.326	-13.326	0.000	(0)
CdSeO4	1.188e-14	1.188e-14	-13.925	-13.925	0.000	(0)
CdOH+	9.174e-15	6.696e-15	-14.037	-14.174	-0.137	(0)
CdHCO3+	1.780e-15	1.299e-15	-14.750	-14.886	-0.137	(0)
Cd (NO3) 2	6.296e-16	6.296e-16	-15.201	-15.201	0.000	(0)
CdCO3	6.099e-17	6.099e-17	-16.215	-16.215	0.000	(0)
Cd (OH) 2	6.195e-20	6.195e-20	-19.208	-19.208	0.000	(0)
Cd2OH+3	7.420e-22	4.363e-23	-21.130	-22.360	-1.231	(0)
Cd (CO3) 2-2	3.488e-25	9.899e-26	-24.457	-25.004	-0.547	(0)
Cd (OH) 3-	5.215e-27	3.807e-27	-26.283	-26.419	-0.137	(0)
Cd (OH) 4-2	2.208e-36	6.266e-37	-35.656	-36.203	-0.547	(0)
Cd (SeO3) 2-2	0.000e+00	0.000e+00	-44.114	-44.661	-0.547	(0)
CdHS+	0.000e+00	0.000e+00	-142.348	-142.485	-0.137	(0)
Cd (HS) 2	0.000e+00	0.000e+00	-276.861	-276.861	0.000	(0)
Cd (HS) 3-	0.000e+00	0.000e+00	-416.405	-416.542	-0.137	(0)
Cd (HS) 4-2	0.000e+00	0.000e+00	-555.379	-555.926	-0.547	(0)
Cl	1.388e-02					
Cl-	1.387e-02	1.111e-02	-1.858	-1.954	-0.097	(0)
CuCl+	5.354e-07	4.243e-07	-6.271	-6.372	-0.101	(0)
CoCl+	1.320e-07	9.634e-08	-6.879	-7.016	-0.137	(0)
NiCl+	8.637e-08	6.304e-08	-7.064	-7.200	-0.137	(0)
ZnCl+	6.185e-08	4.902e-08	-7.209	-7.310	-0.101	(0)
PbCl+	7.447e-09	5.435e-09	-8.128	-8.265	-0.137	(0)
CdCl+	1.764e-09	1.288e-09	-8.753	-8.890	-0.137	(0)
CuCl2	1.277e-09	1.277e-09	-8.894	-8.894	0.000	(0)
BeCl+	1.276e-09	1.026e-09	-8.894	-8.989	-0.095	(0)
ZnCl2	6.945e-10	6.945e-10	-9.158	-9.158	0.000	(0)
PbCl2	2.637e-10	2.637e-10	-9.579	-9.579	0.000	(0)
MnCl+	8.816e-11	7.088e-11	-10.055	-10.149	-0.095	(0)
ZnOHC1	6.699e-11	6.699e-11	-10.174	-10.174	0.000	(0)
CdCl2	5.881e-11	5.881e-11	-10.231	-10.231	0.000	(0)
ZnCl3-	7.574e-12	6.003e-12	-11.121	-11.222	-0.101	(0)
FeCl+2	6.339e-12	2.648e-12	-11.198	-11.577	-0.379	(0)
NiCl2	3.575e-12	3.575e-12	-11.447	-11.447	0.000	(0)
PbCl3-	1.688e-12	1.232e-12	-11.773	-11.909	-0.137	(0)
MnCl2	1.112e-12	1.112e-12	-11.954	-11.954	0.000	(0)
CdCl3-	5.382e-13	3.929e-13	-12.269	-12.406	-0.137	(0)
FeCl2+	1.915e-13	1.539e-13	-12.718	-12.813	-0.095	(0)
CuCl3-	1.526e-13	1.210e-13	-12.816	-12.917	-0.101	(0)
ZnCl4-2	7.666e-14	3.203e-14	-13.115	-13.494	-0.379	(0)
CdOHC1	4.719e-14	4.719e-14	-13.326	-13.326	0.000	(0)

CrO3Cl-	4.270e-14	3.117e-14	-13.370	-13.506	-0.137	(0)
PbCl4-2	2.047e-14	5.809e-15	-13.689	-14.236	-0.547	(0)
MnCl3-	4.233e-15	3.403e-15	-14.373	-14.468	-0.095	(0)
FeCl3	1.710e-16	1.710e-16	-15.767	-15.767	0.000	(0)
CuCl2-	4.614e-17	3.657e-17	-16.336	-16.437	-0.101	(0)
CuCl4-2	1.911e-17	7.984e-18	-16.719	-17.098	-0.379	(0)
CuCl	1.557e-17	1.557e-17	-16.808	-16.808	0.000	(0)
CuCl3-2	2.039e-19	8.518e-20	-18.691	-19.070	-0.379	(0)
CrCl+2	2.084e-21	5.915e-22	-20.681	-21.228	-0.547	(0)
CoCl+2	7.728e-22	2.193e-22	-21.112	-21.659	-0.547	(0)
CrCl2+	5.485e-25	4.003e-25	-24.261	-24.398	-0.137	(0)
CrOHC12	6.157e-26	6.157e-26	-25.211	-25.211	0.000	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-316.990	-317.537	-0.547	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-387.987	-388.534	-0.547	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-392.849	-393.396	-0.547	(0)
Co (2)	1.227e-05					
Co+2	8.955e-06	2.542e-06	-5.048	-5.595	-0.547	(0)
CoSO4	3.175e-06	3.175e-06	-5.498	-5.498	0.000	(0)
CoCl+	1.320e-07	9.634e-08	-6.879	-7.016	-0.137	(0)
CoNO3+	3.147e-09	2.297e-09	-8.502	-8.639	-0.137	(0)
CoHCO3+	1.265e-10	9.233e-11	-9.898	-10.035	-0.137	(0)
CoHPO4	1.028e-10	1.028e-10	-9.988	-9.988	0.000	(0)
CoOH+	6.988e-11	5.100e-11	-10.156	-10.292	-0.137	(0)
CoSeO4	6.121e-11	6.121e-11	-10.213	-10.213	0.000	(0)
Co (NO3) 2	2.664e-12	2.664e-12	-11.574	-11.574	0.000	(0)
CoCO3	9.407e-14	9.407e-14	-13.027	-13.027	0.000	(0)
Co (OH) 2	4.075e-15	4.075e-15	-14.390	-14.390	0.000	(0)
Co2OH+3	1.105e-16	6.497e-18	-15.957	-17.187	-1.231	(0)
CoNO2+	1.600e-21	1.168e-21	-20.796	-20.933	-0.137	(0)
Co (OH) 3-	1.120e-22	8.176e-23	-21.951	-22.087	-0.137	(0)
CoOOH-	4.689e-24	3.422e-24	-23.329	-23.466	-0.137	(0)
Co4 (OH) 4+4	2.080e-31	1.350e-33	-30.682	-32.870	-2.188	(0)
Co (OH) 4-2	4.592e-32	1.303e-32	-31.338	-31.885	-0.547	(0)
Co (NH3) +2	0.000e+00	0.000e+00	-67.082	-67.629	-0.547	(0)
Co (NH3) 2+2	0.000e+00	0.000e+00	-129.954	-130.501	-0.547	(0)
Co (NH3) 3+2	0.000e+00	0.000e+00	-193.162	-193.709	-0.547	(0)
Co (NH3) 4+2	0.000e+00	0.000e+00	-256.750	-257.297	-0.547	(0)
Co (NH3) 5+2	0.000e+00	0.000e+00	-320.838	-321.385	-0.547	(0)
Co (3)	1.952e-18					
CoOH+2	1.951e-18	5.537e-19	-17.710	-18.257	-0.547	(0)
Co+3	8.011e-22	1.083e-22	-21.096	-21.965	-0.869	(0)
CoCl+2	7.728e-22	2.193e-22	-21.112	-21.659	-0.547	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-316.990	-317.537	-0.547	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-383.762	-383.899	-0.137	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-387.987	-388.534	-0.547	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-390.518	-391.065	-0.547	(0)
Cr (2)	0.000e+00					
Cr+2	0.000e+00	0.000e+00	-41.819	-42.366	-0.547	(0)
Cr (3)	5.105e-18					
Cr (OH) +2	2.672e-18	7.585e-19	-17.573	-18.120	-0.547	(0)
Cr+3	8.367e-19	4.920e-20	-18.077	-19.308	-1.231	(0)
CrSO4+	8.308e-19	6.064e-19	-18.081	-18.217	-0.137	(0)
CrOHSO4	6.880e-19	6.880e-19	-18.162	-18.162	0.000	(0)
Cr (OH) 2+	7.440e-20	5.430e-20	-19.128	-19.265	-0.137	(0)
CrCl+2	2.084e-21	5.915e-22	-20.681	-21.228	-0.547	(0)
CrH2PO4+2	2.419e-22	6.867e-23	-21.616	-22.163	-0.547	(0)
Cr (OH) 3	2.052e-23	2.052e-23	-22.688	-22.688	0.000	(0)
CrNO3+2	2.778e-24	7.885e-25	-23.556	-24.103	-0.547	(0)
CrCl2+	5.485e-25	4.003e-25	-24.261	-24.398	-0.137	(0)
CrOHC12	6.157e-26	6.157e-26	-25.211	-25.211	0.000	(0)
CrO2-	1.336e-27	9.755e-28	-26.874	-27.011	-0.137	(0)
Cr (OH) 4-	1.125e-27	8.214e-28	-26.949	-27.085	-0.137	(0)
Cr2 (OH) 2SO4+2	9.722e-35	2.759e-35	-34.012	-34.559	-0.547	(0)
Cr2 (OH) 2 (SO4) 2	1.071e-35	1.071e-35	-34.970	-34.970	0.000	(0)
Cr (NH3) 5OH+2	0.000e+00	0.000e+00	-329.314	-329.861	-0.547	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-391.313	-392.544	-1.231	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-392.849	-393.396	-0.547	(0)
Cr (6)	6.372e-08					

HCrO4-	6.021e-08	4.395e-08	-7.220	-7.357	-0.137	(0)
CrO4-2	3.351e-09	1.377e-09	-8.475	-8.861	-0.386	(0)
NaCrO4-	1.087e-10	7.933e-11	-9.964	-10.101	-0.137	(0)
KCrO4-	3.380e-11	2.467e-11	-10.471	-10.608	-0.137	(0)
CrO3HPO4-2	3.640e-12	1.033e-12	-11.439	-11.986	-0.547	(0)
CrO3SO4-2	3.128e-12	8.877e-13	-11.505	-12.052	-0.547	(0)
H2CrO4	2.762e-13	2.762e-13	-12.559	-12.559	0.000	(0)
Cr2O7-2	2.693e-13	7.642e-14	-12.570	-13.117	-0.547	(0)
CrO3Cl-	4.270e-14	3.117e-14	-13.370	-13.506	-0.137	(0)
CrO3H2PO4-	6.819e-15	4.977e-15	-14.166	-14.303	-0.137	(0)
Cu (1)	6.344e-17					
CuCl2-	4.614e-17	3.657e-17	-16.336	-16.437	-0.101	(0)
CuCl	1.557e-17	1.557e-17	-16.808	-16.808	0.000	(0)
Cu+	1.525e-18	1.113e-18	-17.817	-17.953	-0.137	(0)
CuCl3-2	2.039e-19	8.518e-20	-18.691	-19.070	-0.379	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-287.319	-287.724	-0.405	(0)
CuS4S5-3	0.000e+00	0.000e+00	-288.071	-288.454	-0.383	(0)
Cu (2)	9.874e-05					
Cu+2	6.209e-05	2.552e-05	-4.207	-4.593	-0.386	(0)
CuSO4	3.597e-05	3.597e-05	-4.444	-4.444	0.000	(0)
CuCl+	5.354e-07	4.243e-07	-6.271	-6.372	-0.101	(0)
CuOH+	8.003e-08	6.343e-08	-7.097	-7.198	-0.101	(0)
CuNO3+	6.483e-08	4.732e-08	-7.188	-7.325	-0.137	(0)
CuCl2	1.277e-09	1.277e-09	-8.894	-8.894	0.000	(0)
CuHCO3+	1.030e-09	7.519e-10	-8.987	-9.124	-0.137	(0)
Cu2 (OH) 2+2	3.440e-10	9.764e-11	-9.463	-10.010	-0.547	(0)
CuCO3	3.290e-10	3.290e-10	-9.483	-9.483	0.000	(0)
Cu (OH) 2	1.628e-11	1.628e-11	-10.788	-10.788	0.000	(0)
Cu (NO3) 2	3.302e-12	3.302e-12	-11.481	-11.481	0.000	(0)
CuCl3-	1.526e-13	1.210e-13	-12.816	-12.917	-0.101	(0)
Cu (OH) 3-	4.602e-17	3.359e-17	-16.337	-16.474	-0.137	(0)
CuCl4-2	1.911e-17	7.984e-18	-16.719	-17.098	-0.379	(0)
Cu (CO3) 2-2	6.831e-18	1.939e-18	-17.166	-17.712	-0.547	(0)
CuNO2+	2.387e-19	1.742e-19	-18.622	-18.759	-0.137	(0)
Cu (OH) 4-2	9.369e-25	2.659e-25	-24.028	-24.575	-0.547	(0)
Cu (NO2) 2	1.163e-34	1.163e-34	-33.935	-33.935	0.000	(0)
CuNH3+2	0.000e+00	0.000e+00	-64.129	-64.676	-0.547	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-403.298	-403.435	-0.137	(0)
Fe (2)	6.292e-14					
Fe+2	4.394e-14	1.247e-14	-13.357	-13.904	-0.547	(0)
FeSO4	1.893e-14	1.893e-14	-13.723	-13.723	0.000	(0)
FeH2PO4+	4.524e-17	3.656e-17	-16.344	-16.437	-0.092	(0)
FeHPO4	1.841e-18	1.841e-18	-17.735	-17.735	0.000	(0)
FeOH+	4.231e-19	3.401e-19	-18.374	-18.468	-0.095	(0)
FeHCO3+	9.007e-20	7.333e-20	-19.045	-19.135	-0.089	(0)
Fe (OH) 2	1.752e-25	1.752e-25	-24.757	-24.757	0.000	(0)
Fe (OH) 3-	6.613e-29	5.316e-29	-28.180	-28.274	-0.095	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-288.115	-288.115	0.000	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-427.521	-427.658	-0.137	(0)
Fe (3)	2.924e-06					
Fe (OH) 2+	2.907e-06	2.349e-06	-5.537	-5.629	-0.092	(0)
FeOH+2	1.078e-08	4.504e-09	-7.967	-8.346	-0.379	(0)
FeHPO4+	4.324e-09	3.494e-09	-8.364	-8.457	-0.092	(0)
Fe (OH) 3	1.242e-09	1.242e-09	-8.906	-8.906	0.000	(0)
FeSO4+	7.099e-10	5.707e-10	-9.149	-9.244	-0.095	(0)
Fe (SO4) 2-	1.137e-10	8.296e-11	-9.944	-10.081	-0.137	(0)
Fe+3	6.838e-11	9.247e-12	-10.165	-11.034	-0.869	(0)
FeCl+2	6.339e-12	2.648e-12	-11.198	-11.577	-0.379	(0)
FeH2PO4+2	2.407e-12	1.027e-12	-11.618	-11.988	-0.370	(0)
Fe (OH) 4-	2.940e-13	2.376e-13	-12.532	-12.624	-0.092	(0)
FeNO3+2	2.396e-13	6.801e-14	-12.621	-13.167	-0.547	(0)
FeCl2+	1.915e-13	1.539e-13	-12.718	-12.813	-0.095	(0)
Fe2 (OH) 2+4	1.238e-13	8.032e-16	-12.907	-15.095	-2.188	(0)
FeCl3	1.710e-16	1.710e-16	-15.767	-15.767	0.000	(0)
Fe3 (OH) 4+5	6.782e-17	2.588e-20	-16.169	-19.587	-3.418	(0)
FeHSeO3+2	2.681e-25	7.609e-26	-24.572	-25.119	-0.547	(0)
H (0)	0.000e+00					
H2	0.000e+00	0.000e+00	-45.195	-45.187	0.007	(0)

K	6.291e-03					
K+	6.023e-03	4.822e-03	-2.220	-2.317	-0.097	(0)
KSO4-	2.683e-04	2.168e-04	-3.571	-3.664	-0.092	(0)
KHPO4-	1.678e-09	1.356e-09	-8.775	-8.868	-0.092	(0)
KCrO4-	3.380e-11	2.467e-11	-10.471	-10.608	-0.137	(0)
Mg	3.635e-03					
Mg+2	2.473e-03	1.016e-03	-2.607	-2.993	-0.386	(0)
MgSO4	1.161e-03	1.161e-03	-2.935	-2.935	0.000	(0)
MgH2PO4+	3.663e-07	2.960e-07	-6.436	-6.529	-0.092	(0)
MgHPO4	2.428e-08	2.428e-08	-7.615	-7.615	0.000	(0)
MgHCO3+	6.593e-09	5.225e-09	-8.181	-8.282	-0.101	(0)
MgOH+	3.117e-10	2.552e-10	-9.506	-9.593	-0.087	(0)
MgH2BO3+	2.287e-11	1.768e-11	-10.641	-10.753	-0.112	(0)
MgCO3	1.704e-12	1.704e-12	-11.768	-11.768	0.000	(0)
MgPO4-	8.108e-14	6.553e-14	-13.091	-13.184	-0.092	(0)
Mn (2)	2.350e-08					
Mn+2	1.786e-08	5.068e-09	-7.748	-8.295	-0.547	(0)
MnSO4	5.546e-09	5.546e-09	-8.256	-8.256	0.000	(0)
MnCl+	8.816e-11	7.088e-11	-10.055	-10.149	-0.095	(0)
MnNO3+	6.275e-12	4.580e-12	-11.202	-11.339	-0.137	(0)
MnCl2	1.112e-12	1.112e-12	-11.954	-11.954	0.000	(0)
MnSeO4	6.466e-14	6.466e-14	-13.189	-13.189	0.000	(0)
MnHCO3+	6.319e-14	5.080e-14	-13.199	-13.294	-0.095	(0)
MnOH+	1.085e-14	8.721e-15	-13.965	-14.059	-0.095	(0)
Mn (NO3) 2	6.634e-15	6.634e-15	-14.178	-14.178	0.000	(0)
MnCl3-	4.233e-15	3.403e-15	-14.373	-14.468	-0.095	(0)
Mn (OH) 3-	9.955e-29	8.004e-29	-28.002	-28.097	-0.095	(0)
Mn (OH) 4-2	6.220e-37	2.599e-37	-36.206	-36.585	-0.379	(0)
MnSe	0.000e+00	0.000e+00	-107.428	-107.428	0.000	(0)
Mn (3)	8.537e-18					
Mn+3	8.537e-18	1.155e-18	-17.069	-17.938	-0.869	(0)
Mn (6)	4.505e-25					
MnO4-2	4.505e-25	1.882e-25	-24.346	-24.725	-0.379	(0)
Mn (7)	5.092e-19					
MnO4-	5.092e-19	3.970e-19	-18.293	-18.401	-0.108	(0)
Mo	1.151e-06					
MoO4-2	1.042e-06	4.282e-07	-5.982	-6.368	-0.386	(0)
HMoO4-	1.017e-07	7.425e-08	-6.993	-7.129	-0.137	(0)
H2MoO4	7.463e-09	7.463e-09	-8.127	-8.127	0.000	(0)
AlMo6O21-3	1.572e-20	9.243e-22	-19.804	-21.034	-1.231	(0)
Mo7O24-6	1.041e-26	1.244e-31	-25.983	-30.905	-4.922	(0)
HMo7O24-5	7.414e-27	2.829e-30	-26.130	-29.548	-3.418	(0)
H2Mo7O24-4	2.586e-28	1.679e-30	-27.587	-29.775	-2.188	(0)
H3Mo7O24-3	5.099e-31	2.998e-32	-30.292	-31.523	-1.231	(0)
N (-3)	0.000e+00					
NH4+	0.000e+00	0.000e+00	-59.952	-60.064	-0.112	(0)
NH4SO4-	0.000e+00	0.000e+00	-61.124	-61.219	-0.095	(0)
CuNH3+2	0.000e+00	0.000e+00	-64.129	-64.676	-0.547	(0)
NH3	0.000e+00	0.000e+00	-64.463	-64.463	0.000	(0)
CaNH3+2	0.000e+00	0.000e+00	-66.087	-66.634	-0.547	(0)
NiNH3+2	0.000e+00	0.000e+00	-66.479	-67.026	-0.547	(0)
Co (NH3) +2	0.000e+00	0.000e+00	-67.082	-67.629	-0.547	(0)
BaNH3+2	0.000e+00	0.000e+00	-70.882	-71.429	-0.547	(0)
Ni (NH3) 2+2	0.000e+00	0.000e+00	-128.494	-129.041	-0.547	(0)
Co (NH3) 2+2	0.000e+00	0.000e+00	-129.954	-130.501	-0.547	(0)
Ca (NH3) 2+2	0.000e+00	0.000e+00	-130.795	-131.342	-0.547	(0)
Co (NH3) 3+2	0.000e+00	0.000e+00	-193.162	-193.709	-0.547	(0)
Co (NH3) 4+2	0.000e+00	0.000e+00	-256.750	-257.297	-0.547	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-316.990	-317.537	-0.547	(0)
Co (NH3) 5+2	0.000e+00	0.000e+00	-320.838	-321.385	-0.547	(0)
Cr (NH3) 5OH+2	0.000e+00	0.000e+00	-329.314	-329.861	-0.547	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-383.762	-383.899	-0.137	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-387.987	-388.534	-0.547	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-390.518	-391.065	-0.547	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-391.313	-392.544	-1.231	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-392.849	-393.396	-0.547	(0)
N (3)	8.386e-17					
NO2-	8.362e-17	6.521e-17	-16.078	-16.186	-0.108	(0)

CuNO ₂ +	2.387e-19	1.742e-19	-18.622	-18.759	-0.137	(0)
CoNO ₂ +	1.600e-21	1.168e-21	-20.796	-20.933	-0.137	(0)
Cu (NO ₂) ₂	1.163e-34	1.163e-34	-33.935	-33.935	0.000	(0)
N (5)	7.218e-04					
NO ₃ -	7.121e-04	5.701e-04	-3.147	-3.244	-0.097	(0)
CaNO ₃ +	9.607e-06	7.012e-06	-5.017	-5.154	-0.137	(0)
CuNO ₃ +	6.483e-08	4.732e-08	-7.188	-7.325	-0.137	(0)
NiNO ₃ +	4.412e-09	3.221e-09	-8.355	-8.492	-0.137	(0)
ZnNO ₃ +	3.693e-09	2.695e-09	-8.433	-8.569	-0.137	(0)
CoNO ₃ +	3.147e-09	2.297e-09	-8.502	-8.639	-0.137	(0)
BaNO ₃ +	5.136e-10	3.749e-10	-9.289	-9.426	-0.137	(0)
PbNO ₃ +	1.668e-10	1.218e-10	-9.778	-9.914	-0.137	(0)
MnNO ₃ +	6.275e-12	4.580e-12	-11.202	-11.339	-0.137	(0)
CdNO ₃ +	3.488e-12	2.546e-12	-11.457	-11.594	-0.137	(0)
Cu (NO ₃) ₂	3.302e-12	3.302e-12	-11.481	-11.481	0.000	(0)
Co (NO ₃) ₂	2.664e-12	2.664e-12	-11.574	-11.574	0.000	(0)
Zn (NO ₃) ₂	2.971e-13	2.971e-13	-12.527	-12.527	0.000	(0)
FeNO ₃ +2	2.396e-13	6.801e-14	-12.621	-13.167	-0.547	(0)
Pb (NO ₃) ₂	1.251e-13	1.251e-13	-12.903	-12.903	0.000	(0)
Mn (NO ₃) ₂	6.634e-15	6.634e-15	-14.178	-14.178	0.000	(0)
Cd (NO ₃) ₂	6.296e-16	6.296e-16	-15.201	-15.201	0.000	(0)
CrNO ₃ +2	2.778e-24	7.885e-25	-23.556	-24.103	-0.547	(0)
Na	1.498e-02					
Na+	1.448e-02	1.159e-02	-1.839	-1.936	-0.097	(0)
NaSO ₄ -	4.998e-04	4.039e-04	-3.301	-3.394	-0.092	(0)
NaHPO ₄ -	6.248e-09	5.050e-09	-8.204	-8.297	-0.092	(0)
NaHCO ₃	3.700e-09	3.700e-09	-8.432	-8.432	0.000	(0)
NaCrO ₄ -	1.087e-10	7.933e-11	-9.964	-10.101	-0.137	(0)
NaH ₂ BO ₃	1.008e-11	1.008e-11	-10.997	-10.997	0.000	(0)
NaCO ₃ -	6.727e-13	5.437e-13	-12.172	-12.265	-0.092	(0)
Ni	8.382e-06					
Ni+2	5.472e-06	2.249e-06	-5.262	-5.648	-0.386	(0)
NiSO ₄	2.817e-06	2.817e-06	-5.550	-5.550	0.000	(0)
NiCl+	8.637e-08	6.304e-08	-7.064	-7.200	-0.137	(0)
NiNO ₃ +	4.412e-09	3.221e-09	-8.355	-8.492	-0.137	(0)
Ni (SO ₄) ₂ -2	2.234e-09	6.341e-10	-8.651	-9.198	-0.547	(0)
NiHCO ₃ +	1.774e-10	1.295e-10	-9.751	-9.888	-0.137	(0)
NiSeO ₄	4.985e-11	4.985e-11	-10.302	-10.302	0.000	(0)
NiOH+	2.731e-11	1.993e-11	-10.564	-10.700	-0.137	(0)
NiCl ₂	3.575e-12	3.575e-12	-11.447	-11.447	0.000	(0)
NiCO ₃	1.837e-13	1.837e-13	-12.736	-12.736	0.000	(0)
Ni (OH) ₂	2.275e-15	2.275e-15	-14.643	-14.643	0.000	(0)
Ni (OH) ₃ -	3.134e-21	2.288e-21	-20.504	-20.641	-0.137	(0)
NiNH ₃ +2	0.000e+00	0.000e+00	-66.479	-67.026	-0.547	(0)
Ni (NH ₃) ₂ +2	0.000e+00	0.000e+00	-128.494	-129.041	-0.547	(0)
O (0)	9.507e-04					
O ₂	4.754e-04	4.834e-04	-3.323	-3.316	0.007	(0)
P	9.399e-06					
H ₂ PO ₄ -	8.192e-06	6.620e-06	-5.087	-5.179	-0.092	(0)
CaH ₂ PO ₄ +	6.328e-07	5.114e-07	-6.199	-6.291	-0.092	(0)
MgH ₂ PO ₄ +	3.663e-07	2.960e-07	-6.436	-6.529	-0.092	(0)
HPO ₄ -2	9.839e-08	4.111e-08	-7.007	-7.386	-0.379	(0)
CaHPO ₄	6.484e-08	6.484e-08	-7.188	-7.188	0.000	(0)
MgHPO ₄	2.428e-08	2.428e-08	-7.615	-7.615	0.000	(0)
H ₃ PO ₄	8.816e-09	8.816e-09	-8.055	-8.055	0.000	(0)
NaHPO ₄ -	6.248e-09	5.050e-09	-8.204	-8.297	-0.092	(0)
FeHPO ₄ +	4.324e-09	3.494e-09	-8.364	-8.457	-0.092	(0)
KHPO ₄ -	1.678e-09	1.356e-09	-8.775	-8.868	-0.092	(0)
CoHPO ₄	1.028e-10	1.028e-10	-9.988	-9.988	0.000	(0)
CaPO ₄ -	1.912e-11	1.546e-11	-10.718	-10.811	-0.092	(0)
CrO ₃ HPO ₄ -2	3.640e-12	1.033e-12	-11.439	-11.986	-0.547	(0)
FeH ₂ PO ₄ +2	2.407e-12	1.027e-12	-11.618	-11.988	-0.370	(0)
MgPO ₄ -	8.108e-14	6.553e-14	-13.091	-13.184	-0.092	(0)
PO ₄ -3	1.156e-14	1.564e-15	-13.937	-14.806	-0.869	(0)
CrO ₃ H ₂ PO ₄ -	6.819e-15	4.977e-15	-14.166	-14.303	-0.137	(0)
FeH ₂ PO ₄ +	4.524e-17	3.656e-17	-16.344	-16.437	-0.092	(0)
FeHPO ₄	1.841e-18	1.841e-18	-17.735	-17.735	0.000	(0)
CrH ₂ PO ₄ +2	2.419e-22	6.867e-23	-21.616	-22.163	-0.547	(0)

Pb	9.690e-08					
PbSO4	4.685e-08	4.685e-08	-7.329	-7.329	0.000	(0)
Pb+2	3.562e-08	1.464e-08	-7.448	-7.834	-0.386	(0)
PbCl+	7.447e-09	5.435e-09	-8.128	-8.265	-0.137	(0)
Pb (SO4) 2-2	6.497e-09	1.844e-09	-8.187	-8.734	-0.547	(0)
PbCl2	2.637e-10	2.637e-10	-9.579	-9.579	0.000	(0)
PbNO3+	1.668e-10	1.218e-10	-9.778	-9.914	-0.137	(0)
PbOH+	5.067e-11	3.699e-11	-10.295	-10.432	-0.137	(0)
PbHCO3+	6.960e-12	5.080e-12	-11.157	-11.294	-0.137	(0)
PbCl3-	1.688e-12	1.232e-12	-11.773	-11.909	-0.137	(0)
Pb (NO3) 2	1.251e-13	1.251e-13	-12.903	-12.903	0.000	(0)
PbCO3	9.636e-14	9.636e-14	-13.016	-13.016	0.000	(0)
PbCl4-2	2.047e-14	5.809e-15	-13.689	-14.236	-0.547	(0)
Pb (OH) 2	1.176e-15	1.176e-15	-14.929	-14.929	0.000	(0)
Pb2OH+3	1.460e-16	8.582e-18	-15.836	-17.066	-1.231	(0)
Pb (CO3) 2-2	2.144e-21	6.085e-22	-20.669	-21.216	-0.547	(0)
Pb (OH) 3-	1.621e-21	1.183e-21	-20.790	-20.927	-0.137	(0)
Pb (OH) 4-2	1.027e-27	2.914e-28	-26.989	-27.536	-0.547	(0)
Pb3 (OH) 4+2	6.444e-28	1.829e-28	-27.191	-27.738	-0.547	(0)
Pb4 (OH) 4+4	3.947e-30	2.561e-32	-29.404	-31.592	-2.188	(0)
Pb (HS) 2	0.000e+00	0.000e+00	-275.725	-275.725	0.000	(0)
Pb (HS) 3-	0.000e+00	0.000e+00	-415.868	-416.005	-0.137	(0)
S (-2)	0.000e+00					
H2S	0.000e+00	0.000e+00	-139.495	-139.495	0.000	(0)
HS-	0.000e+00	0.000e+00	-141.444	-141.580	-0.137	(0)
CdHS+	0.000e+00	0.000e+00	-142.348	-142.485	-0.137	(0)
S5-2	0.000e+00	0.000e+00	-145.511	-146.058	-0.547	(0)
S6-2	0.000e+00	0.000e+00	-145.914	-146.461	-0.547	(0)
S4-2	0.000e+00	0.000e+00	-146.112	-146.658	-0.547	(0)
S3-2	0.000e+00	0.000e+00	-146.926	-147.473	-0.547	(0)
S2-2	0.000e+00	0.000e+00	-147.955	-148.502	-0.547	(0)
S-2	0.000e+00	0.000e+00	-153.649	-154.028	-0.379	(0)
Pb (HS) 2	0.000e+00	0.000e+00	-275.725	-275.725	0.000	(0)
Zn (HS) 2	0.000e+00	0.000e+00	-276.080	-276.080	0.000	(0)
Cd (HS) 2	0.000e+00	0.000e+00	-276.861	-276.861	0.000	(0)
ZnS (HS) -	0.000e+00	0.000e+00	-276.953	-277.090	-0.137	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-287.319	-287.724	-0.405	(0)
CuS4S5-3	0.000e+00	0.000e+00	-288.071	-288.454	-0.383	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-288.115	-288.115	0.000	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-403.298	-403.435	-0.137	(0)
Zn (HS) 3-	0.000e+00	0.000e+00	-414.243	-414.380	-0.137	(0)
Pb (HS) 3-	0.000e+00	0.000e+00	-415.868	-416.005	-0.137	(0)
Cd (HS) 3-	0.000e+00	0.000e+00	-416.405	-416.542	-0.137	(0)
ZnS (HS) 2-2	0.000e+00	0.000e+00	-418.813	-419.360	-0.547	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-427.521	-427.658	-0.137	(0)
Cd (HS) 4-2	0.000e+00	0.000e+00	-555.379	-555.926	-0.547	(0)
Zn (HS) 4-2	0.000e+00	0.000e+00	-556.873	-557.420	-0.547	(0)
S (6)	2.322e-02					
SO4-2	1.590e-02	6.533e-03	-1.799	-2.185	-0.386	(0)
CaSO4	5.341e-03	5.341e-03	-2.272	-2.272	0.000	(0)
MgSO4	1.161e-03	1.161e-03	-2.935	-2.935	0.000	(0)
NaSO4-	4.998e-04	4.039e-04	-3.301	-3.394	-0.092	(0)
KSO4-	2.683e-04	2.168e-04	-3.571	-3.664	-0.092	(0)
CuSO4	3.597e-05	3.597e-05	-4.444	-4.444	0.000	(0)
HSO4-	6.873e-06	5.488e-06	-5.163	-5.261	-0.098	(0)
CoSO4	3.175e-06	3.175e-06	-5.498	-5.498	0.000	(0)
NiSO4	2.817e-06	2.817e-06	-5.550	-5.550	0.000	(0)
ZnSO4	2.497e-06	2.497e-06	-5.603	-5.603	0.000	(0)
AlSO4+	7.965e-07	6.359e-07	-6.099	-6.197	-0.098	(0)
Zn (SO4) 2-2	5.225e-07	1.483e-07	-6.282	-6.829	-0.547	(0)
Al (SO4) 2-	6.229e-08	4.973e-08	-7.206	-7.303	-0.098	(0)
BeSO4	4.818e-08	4.818e-08	-7.317	-7.317	0.000	(0)
PbSO4	4.685e-08	4.685e-08	-7.329	-7.329	0.000	(0)
Pb (SO4) 2-2	6.497e-09	1.844e-09	-8.187	-8.734	-0.547	(0)
MnSO4	5.546e-09	5.546e-09	-8.256	-8.256	0.000	(0)
Be (SO4) 2-2	3.448e-09	9.787e-10	-8.462	-9.009	-0.547	(0)
Ni (SO4) 2-2	2.234e-09	6.341e-10	-8.651	-9.198	-0.547	(0)
CdSO4	1.763e-09	1.763e-09	-8.754	-8.754	0.000	(0)

FeSO4+	7.099e-10	5.707e-10	-9.149	-9.244	-0.095	(0)
Cd(SO4) 2-2	5.812e-10	1.649e-10	-9.236	-9.783	-0.547	(0)
Fe(SO4) 2-	1.137e-10	8.296e-11	-9.944	-10.081	-0.137	(0)
CrO3SO4-2	3.128e-12	8.877e-13	-11.505	-12.052	-0.547	(0)
FeSO4	1.893e-14	1.893e-14	-13.723	-13.723	0.000	(0)
CrSO4+	8.308e-19	6.064e-19	-18.081	-18.217	-0.137	(0)
CrOHSO4	6.880e-19	6.880e-19	-18.162	-18.162	0.000	(0)
Cr2(OH) 2SO4+2	9.722e-35	2.759e-35	-34.012	-34.559	-0.547	(0)
Cr2(OH) 2(SO4) 2	1.071e-35	1.071e-35	-34.970	-34.970	0.000	(0)
NH4SO4-	0.000e+00	0.000e+00	-61.124	-61.219	-0.095	(0)
Co(NH3) 6SO4+	0.000e+00	0.000e+00	-383.762	-383.899	-0.137	(0)
Se(-2)	0.000e+00					
HSe-	0.000e+00	0.000e+00	-98.612	-98.748	-0.137	(0)
H2Se	0.000e+00	0.000e+00	-99.868	-99.868	0.000	(0)
MnSe	0.000e+00	0.000e+00	-107.428	-107.428	0.000	(0)
Se-2	0.000e+00	0.000e+00	-108.345	-108.892	-0.547	(0)
Se(4)	5.087e-18					
HSeO3-	5.067e-18	3.698e-18	-17.295	-17.432	-0.137	(0)
H2SeO3	1.512e-20	1.512e-20	-19.821	-19.821	0.000	(0)
SeO3-2	5.011e-21	1.422e-21	-20.300	-20.847	-0.547	(0)
FeHSeO3+2	2.681e-25	7.609e-26	-24.572	-25.119	-0.547	(0)
Cd(SeO3) 2-2	0.000e+00	0.000e+00	-44.114	-44.661	-0.547	(0)
Se(6)	1.271e-07					
SeO4-2	1.270e-07	5.219e-08	-6.896	-7.282	-0.386	(0)
CoSeO4	6.121e-11	6.121e-11	-10.213	-10.213	0.000	(0)
NiSeO4	4.985e-11	4.985e-11	-10.302	-10.302	0.000	(0)
HSeO4-	3.059e-11	2.233e-11	-10.514	-10.651	-0.137	(0)
ZnSeO4	1.474e-11	1.474e-11	-10.832	-10.832	0.000	(0)
MnSeO4	6.466e-14	6.466e-14	-13.189	-13.189	0.000	(0)
CdSeO4	1.188e-14	1.188e-14	-13.925	-13.925	0.000	(0)
Zn(SeO4) 2-2	2.748e-18	7.799e-19	-17.561	-18.108	-0.547	(0)
Zn	7.523e-06					
Zn+2	4.437e-06	1.823e-06	-5.353	-5.739	-0.386	(0)
ZnSO4	2.497e-06	2.497e-06	-5.603	-5.603	0.000	(0)
Zn(SO4) 2-2	5.225e-07	1.483e-07	-6.282	-6.829	-0.547	(0)
ZnCl+	6.185e-08	4.902e-08	-7.209	-7.310	-0.101	(0)
ZnNO3+	3.693e-09	2.695e-09	-8.433	-8.569	-0.137	(0)
ZnCl2	6.945e-10	6.945e-10	-9.158	-9.158	0.000	(0)
ZnOH+	1.711e-10	1.249e-10	-9.767	-9.903	-0.137	(0)
ZnOHCl	6.699e-11	6.699e-11	-10.174	-10.174	0.000	(0)
ZnHCO3+	3.689e-11	2.693e-11	-10.433	-10.570	-0.137	(0)
ZnSeO4	1.474e-11	1.474e-11	-10.832	-10.832	0.000	(0)
ZnCl3-	7.574e-12	6.003e-12	-11.121	-11.222	-0.101	(0)
Zn(NO3) 2	2.971e-13	2.971e-13	-12.527	-12.527	0.000	(0)
ZnCO3	2.297e-13	2.297e-13	-12.639	-12.639	0.000	(0)
ZnCl4-2	7.666e-14	3.203e-14	-13.115	-13.494	-0.379	(0)
Zn(OH) 2	2.923e-14	2.923e-14	-13.534	-13.534	0.000	(0)
Zn(SeO4) 2-2	2.748e-18	7.799e-19	-17.561	-18.108	-0.547	(0)
Zn(OH) 3-	2.019e-19	1.473e-19	-18.695	-18.832	-0.137	(0)
Zn(OH) 4-2	2.078e-26	5.899e-27	-25.682	-26.229	-0.547	(0)
Zn(HS) 2	0.000e+00	0.000e+00	-276.080	-276.080	0.000	(0)
ZnS(HS) -	0.000e+00	0.000e+00	-276.953	-277.090	-0.137	(0)
Zn(HS) 3-	0.000e+00	0.000e+00	-414.243	-414.380	-0.137	(0)
ZnS(HS) 2-2	0.000e+00	0.000e+00	-418.813	-419.360	-0.547	(0)
Zn(HS) 4-2	0.000e+00	0.000e+00	-556.873	-557.420	-0.547	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co(NH3) 5Cl) (NO3) 2	-312.00	-305.73	6.27	(Co(NH3) 5Cl) (NO3) 2
(Co(NH3) 5Cl) Cl2	-307.69	-303.15	4.54	(Co(NH3) 5Cl) Cl2
(Co(NH3) 5OH2) Cl3	-314.96	-303.15	11.81	(Co(NH3) 5OH2) Cl3
(Co(NH3) 6) (NO3) 3	-380.01	-362.08	17.93	(Co(NH3) 6) (NO3) 3
(Co(NH3) 6) Cl3	-378.34	-358.21	20.13	(Co(NH3) 6) Cl3
(NH4) 2CrO4	-129.37	-128.99	0.38	(NH4) 2CrO4
(NH4) 2SeO4	-127.86	-127.41	0.45	(NH4) 2SeO4
Al(OH) 3(am)	-3.95	7.18	11.13	Al(OH) 3

Al2 (MoO4) 3	-37.89	-34.74	3.15	Al2 (MoO4) 3
Al2O3	-6.06	14.36	20.43	Al2O3
Al4 (OH) 10SO4	-6.16	16.54	22.70	Al4 (OH) 10SO4
AlAsO4:2H2O	-8.12	-3.32	4.80	AlAsO4:2H2O
AlOHSO4	-1.77	-5.00	-3.23	AlOHSO4
Alunite	0.63	-0.14	-0.77	KAl3 (SO4) 2 (OH) 6
Anglesite	-2.19	-10.02	-7.83	PbSO4
Anhydrite	-0.27	-4.61	-4.34	CaSO4
Anilite	-132.24	-164.66	-32.42	Cu0.25Cu1.5S
Antlerite	-4.75	4.03	8.79	Cu3 (OH) 4SO4
Aragonite	-5.82	-14.09	-8.26	CaCO3
Arsenolite	-130.21	-133.15	-2.94	As4O6
Artinite	-17.61	-7.65	9.96	MgCO3:Mg (OH) 2:3H2O
As2O5	-27.78	-21.00	6.77	As2O5
Atacamite	-3.81	3.86	7.67	Cu2 (OH) 3Cl
Azurite	-10.48	-27.10	-16.62	Cu3 (OH) 2 (CO3) 2
Ba (OH) 2:8H2O	-21.48	3.07	24.56	Ba (OH) 2:8H2O
Ba3 (AsO4) 2	-2.82	-11.77	-8.94	Ba3 (AsO4) 2
BaCrO4	-6.01	-15.78	-9.77	BaCrO4
BaHPO4	-6.95	-26.73	-19.77	BaHPO4
BaMoO4	-6.30	-13.29	-6.99	BaMoO4
Barite	0.94	-9.11	-10.05	BaSO4
BaS	-159.68	-143.50	16.18	BaS
BaSeO3	-21.15	-19.35	1.79	BaSeO3
BaSeO4	-6.68	-14.20	-7.53	BaSeO4
Be (OH) 2 (alpha)	-4.13	2.76	6.89	Be (OH) 2
Be (OH) 2 (am)	-4.43	2.76	7.19	Be (OH) 2
Be (OH) 2 (beta)	-3.73	2.76	6.49	Be (OH) 2
BeMoO4	-11.99	-13.60	-1.61	BeMoO4
BeS	-163.20	-143.82	19.38	BeS
BeSeO4:4H2O	-11.58	-14.52	-2.94	BeSeO4:4H2O
Bianchite	-6.16	-7.93	-1.76	ZnSO4:6H2O
Birnessite	0.00	18.09	18.09	MnO2
Bixbyite	-5.60	-5.88	-0.27	Mn2O3
BlaubleiI	-120.14	-144.30	-24.16	Cu0.9Cu0.2S
BlaubleiII	-126.42	-153.70	-27.28	Cu0.6Cu0.8S
Boehmite	-1.75	7.18	8.93	AlOOH
Brochantite	-6.39	9.44	15.83	Cu4 (OH) 6SO4
Brucite	-10.18	7.01	17.18	Mg (OH) 2
Bunsenite	-8.39	4.35	12.74	NiO
Ca3 (AsO4) 2:4H2O	-20.59	1.71	22.30	Ca3 (AsO4) 2:4H2O
Ca3 (PO4) 2 (beta)	-7.81	-36.89	-29.08	Ca3 (PO4) 2
Ca4H (PO4) 3:3H2O	-12.04	-59.12	-47.08	Ca4H (PO4) 3:3H2O
CaCrO4	-9.10	-11.29	-2.19	CaCrO4
CaHPO4	-2.86	-22.23	-19.37	CaHPO4
CaHPO4:2H2O	-3.17	-22.23	-19.06	CaHPO4:2H2O
Calcite	-5.63	-14.09	-8.46	CaCO3
CaMoO4	-0.85	-8.79	-7.94	CaMoO4
CaSeO3:2H2O	-17.73	-14.86	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-6.71	-9.71	-3.00	CaSeO4:2H2O
Cd (BO2) 2	-18.80	-8.96	9.84	Cd (BO2) 2
Cd (OH) 2	-12.84	1.09	13.93	Cd (OH) 2
Cd (OH) 2 (am)	-12.90	1.09	13.99	Cd (OH) 2
Cd3 (OH) 2 (SO4) 2	-27.82	-21.11	6.71	Cd3 (OH) 2 (SO4) 2
Cd3 (OH) 4SO4	-31.49	-8.93	22.56	Cd3 (OH) 4SO4
Cd3 (PO4) 2	-23.75	-56.35	-32.60	Cd3 (PO4) 2
Cd4 (OH) 6SO4	-36.24	-7.84	28.40	Cd4 (OH) 6SO4
CdCl2	-12.22	-12.82	-0.60	CdCl2
CdCl2:1H2O	-11.15	-12.82	-1.67	CdCl2:1H2O
CdCl2:2.5H2O	-10.89	-12.82	-1.93	CdCl2:2.5H2O
Cdmetal (alpha)	-54.71	-40.97	13.74	Cd
Cdmetal (gamma)	-54.82	-40.97	13.84	Cd
CdMoO4	-1.07	-15.28	-14.21	CdMoO4
CdOHCl	-9.50	-5.87	3.63	CdOHCl
CdSe	-82.23	-102.66	-20.43	CdSe
CdSeO4:2H2O	-14.35	-16.20	-1.85	CdSeO4:2H2O
CdSO4	-11.08	-11.10	-0.02	CdSO4
CdSO4:1H2O	-9.47	-11.10	-1.63	CdSO4:1H2O

CdSO4:2.67H2O	-9.28	-11.10	-1.82	CdSO4:2.67H2O
Cerussite	-6.29	-19.49	-13.20	PbCO3
CH4(g)	-148.08	-189.90	-41.81	CH4
Chalcanthite	-4.12	-6.78	-2.66	CuSO4:5H2O
Chalcocite	-137.07	-172.49	-35.42	Cu2S
Chalcopyrite	-255.94	-291.66	-35.71	CuFeS2
Claudetite	-129.92	-133.15	-3.23	As4O6
Clausthalite	-74.13	-101.58	-27.46	PbSe
Co(BO2)2	-32.71	-5.64	27.07	Co(BO2)2
Co(OH)2	-8.69	4.40	13.09	Co(OH)2
Co(OH)3	-4.93	-6.97	-2.03	Co(OH)3
CO2(g)	-3.50	-21.66	-18.16	CO2
Co3(AsO4)2	-20.82	-7.79	13.03	Co3(AsO4)2
Co3(PO4)2	-11.71	-46.40	-34.69	Co3(PO4)2
Co3O4	0.65	-9.53	-10.17	Co3O4
CoCl2	-18.01	-9.50	8.51	CoCl2
CoCl2:6H2O	-12.02	-9.51	2.51	CoCl2:6H2O
CoCO3	-7.31	-17.25	-9.94	CoCO3
CoFe2O4	15.39	12.34	-3.05	CoFe2O4
CoHPO4	-6.34	-25.40	-19.06	CoHPO4
CoMoO4	-4.27	-11.96	-7.69	CoMoO4
CoO	-9.50	4.40	13.90	CoO
CoS(alpha)	-134.74	-142.18	-7.44	CoS
CoS(beta)	-131.11	-142.18	-11.07	CoS
CoSe	-83.14	-99.34	-16.20	CoSe
CoSeO3	-19.35	-18.03	1.32	CoSeO3
CoSeO4:6H2O	-11.35	-12.88	-1.53	CoSeO4:6H2O
CoSO4	-10.82	-7.78	3.04	CoSO4
CoSO4:6H2O	-5.31	-7.78	-2.48	CoSO4:6H2O
Cotunnite	-6.88	-11.74	-4.86	PbCl2
Covellite	-118.58	-141.17	-22.59	CuS
Cr(OH)2	-43.29	-32.37	10.93	Cr(OH)2
Cr(OH)3	-15.69	-14.27	1.42	Cr(OH)3
Cr(OH)3(am)	-13.52	-14.27	-0.75	Cr(OH)3
Cr2O3	-26.32	-28.53	-2.21	Cr2O3
CrCl2	-60.70	-46.27	14.42	CrCl2
CrCl3	-50.60	-35.13	15.48	CrCl3
Crmetal	-105.42	-74.43	31.00	Cr
CrO3	-15.67	-18.86	-3.19	CrO3
Cu(OH)2	-3.44	5.41	8.84	Cu(OH)2
Cu2(OH)3NO3	-6.90	2.57	9.47	Cu2(OH)3NO3
Cu2Se(alpha)	-83.21	-129.66	-46.44	Cu2Se
Cu2SO4	-36.20	-38.09	-1.89	Cu2SO4
Cu3(AsO4)2:2H2O	-10.88	-4.78	6.10	Cu3(AsO4)2:2H2O
Cu3(PO4)2	-6.54	-43.39	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-8.27	-43.39	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	-163.49	-228.00	-64.51	Cu3Se2
CuCO3	-4.75	-16.25	-11.50	CuCO3
CuCrO4	-8.01	-13.45	-5.44	CuCrO4
Cumetal	-25.01	-33.98	-8.97	Cu
CuMoO4	2.15	-10.96	-13.11	CuMoO4
CuOCuSO4	-12.09	-1.37	10.71	CuOCuSO4
Cupricferrite	6.72	13.34	6.62	CuFe2O4
Cuprite	-24.87	-25.91	-1.04	Cu2O
Cuprousferrite	-0.12	-8.99	-8.87	CuFeO2
CuSe	-64.88	-98.34	-33.46	CuSe
CuSe2	-126.24	-160.03	-33.79	CuSe2
CuSeO3:2H2O	-17.65	-17.03	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-9.44	-11.88	-2.44	CuSeO4:5H2O
CuSO4	-9.94	-6.78	3.16	CuSO4
Diaspore	0.00	7.18	7.18	AlOOH
Djurleite	-135.90	-170.42	-34.52	Cu0.066Cu1.868S
Dolomite(disordered)	-12.34	-28.74	-16.40	CaMg(CO3)2
Dolomite(ordered)	-11.77	-28.74	-16.97	CaMg(CO3)2
Epsomite	-3.02	-5.18	-2.16	MgSO4:7H2O
Fe(OH)2	-17.47	-3.91	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	4.92	1.88	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-16.06	-14.50	1.55	Fe2(OH)4SeO3

Fe2 (SeO3) 3:2H2O	-38.74	-59.37	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-25.61	-28.62	-3.01	Fe2 (SO4) 3
Fe3 (OH) 8	-16.20	4.02	20.22	Fe3 (OH) 8
FeAsO4:2H2O	-6.94	-6.54	0.40	FeAsO4:2H2O
FeCr2O4	-40.05	-32.43	7.62	FeCr2O4
FeMoO4	-10.21	-20.27	-10.06	FeMoO4
Ferrihydrite	0.55	3.96	3.41	Fe (OH) 3
Ferroselite	-150.60	-169.34	-18.74	FeSe2
FeS (ppt)	-147.57	-150.48	-2.92	FeS
FeSe	-96.65	-107.65	-11.01	FeSe
Fix_pH	-5.00	-5.00	0.00	H+
Galena	-130.21	-144.41	-14.21	PbS
Gibbsite	-1.40	7.18	8.58	Al (OH) 3
Goethite	3.29	3.96	0.67	FeOOH
Goslarite	-5.87	-7.93	-2.05	ZnSO4:7H2O
Greenockite	-130.97	-145.49	-14.52	CdS
Greigite	-537.26	-582.29	-45.03	Fe3S4
Gypsum	0.00	-4.61	-4.61	CaSO4:2H2O
H-Jarosite	-1.06	-12.48	-11.41	(H3O) Fe3 (SO4) 2 (OH) 6
H2MoO4	-3.35	-16.37	-13.02	H2MoO4
H2S (g)	-138.57	-146.58	-8.01	H2S
H2Se (g)	-98.83	-103.75	-4.91	H2Se
Halite	-5.48	-3.89	1.59	NaCl
Hausmannite	-15.12	47.17	62.29	Mn3O4
Hematite	8.96	7.93	-1.03	Fe2O3
Hercynite	-13.37	10.46	23.83	FeAl2O4
Hinsdalite	-15.78	-18.28	-2.50	PbAl3PO4SO4 (OH) 6
Huntite	-28.40	-58.04	-29.65	CaMg3 (CO3) 4
Hydrocerussite	-18.05	-36.82	-18.77	Pb3 (OH) 2 (CO3) 2
Hydromagnesite	-43.49	-51.61	-8.11	Mg5 (CO3) 4 (OH) 2:4H2O
Hydroxylapatite	-7.22	-51.55	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-15.80	-78.59	-62.79	Pb5 (PO4) 3OH
K-Alum	-9.25	-14.51	-5.26	KAl (SO4) 2:12H2O
K-Jarosite	4.62	-9.79	-14.41	KFe3 (SO4) 2 (OH) 6
K2Cr2O7	-14.87	-32.36	-17.48	K2Cr2O7
K2CrO4	-12.93	-13.49	-0.57	K2CrO4
K2MoO4	-14.27	-11.00	3.27	K2MoO4
K2SeO4	-11.19	-11.92	-0.73	K2SeO4
Langite	-8.54	9.44	17.98	Cu4 (OH) 6SO4:H2O
Larnakite	-7.49	-7.85	-0.37	PbO:PbSO4
Laurionite	-5.41	-4.79	0.62	PbOHCl
Lepidocrocite	2.59	3.96	1.37	FeOOH
Lime	-25.71	7.57	33.28	CaO
Litharge	-10.72	2.17	12.89	PbO
Mackinawite	-146.88	-150.48	-3.60	FeS
Maghemite	1.54	7.93	6.39	Fe2O3
Magnesioferrite	-2.76	14.94	17.69	Fe2MgO4
Magnesite	-7.13	-14.65	-7.52	MgCO3
Magnetite	0.00	4.03	4.03	Fe3O4
Malachite	-5.31	-10.85	-5.53	Cu2 (OH) 2CO3
Manganite	-2.61	22.73	25.34	MnOOH
Massicot	-10.93	2.17	13.09	PbO
Melanothallite	-14.95	-8.50	6.45	CuCl2
Melanterite	-13.82	-16.09	-2.27	FeSO4:7H2O
Mg (OH) 2 (active)	-11.79	7.01	18.79	Mg (OH) 2
Mg3 (PO4) 2	-15.31	-38.59	-23.28	Mg3 (PO4) 2
MgCr2O4	-38.26	-21.52	16.74	MgCr2O4
MgCrO4	-17.50	-11.85	5.65	MgCrO4
MgHPO4:3H2O	-4.63	-22.80	-18.18	MgHPO4:3H2O
MgMoO4	-7.51	-9.36	-1.85	MgMoO4
MgSeO3:6H2O	-18.47	-15.43	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-9.08	-10.28	-1.20	MgSeO4:6H2O
Minium	-26.23	48.55	74.78	Pb3O4
Mirabilite	-4.71	-6.06	-1.35	Na2SO4:10H2O
Mn2 (SO4) 3	-37.21	-42.43	-5.22	Mn2 (SO4) 3
Mn3 (AsO4) 2:8H2O	-28.39	-15.89	12.50	Mn3 (AsO4) 2:8H2O
Mn3 (PO4) 2	-30.64	-54.50	-23.85	Mn3 (PO4) 2
MnCl2:4H2O	-14.95	-12.21	2.75	MnCl2:4H2O

MnHPO4	-2.70	-28.10	-25.40	MnHPO4
MnS (grn)	-145.14	-144.88	0.27	MnS
MnS (pnk)	-148.22	-144.88	3.34	MnS
MnSe	-105.84	-102.04	3.79	MnSe
MnSeO3	-21.86	-20.73	1.13	MnSeO3
MnSeO3:2H2O	-21.68	-20.73	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-13.53	-15.58	-2.05	MnSeO4:5H2O
MnSO4	-13.26	-10.48	2.78	MnSO4
Monteponite	-14.33	1.09	15.41	CdO
MoO3	-8.37	-16.37	-8.00	MoO3
Morenosite	-5.66	-7.84	-2.18	NiSO4:7H2O
MoS2	-280.16	-351.59	-71.42	MoS2
Na-Jarosite	1.34	-9.41	-10.75	NaFe3(SO4)2(OH)6
Na2Cr2O7	-21.63	-31.59	-9.96	Na2Cr2O7
Na2CrO4	-15.72	-12.73	2.99	Na2CrO4
Na2Mo2O7	-9.84	-26.61	-16.76	Na2Mo2O7
Na2MoO4	-11.76	-10.24	1.52	Na2MoO4
Na2MoO4:2H2O	-11.47	-10.24	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-26.61	-16.31	10.30	Na2SeO3:5H2O
Na2SeO4	-12.43	-11.15	1.28	Na2SeO4
Nantokite	-13.05	-19.91	-6.86	CuCl
Natron	-14.03	-15.54	-1.51	Na2CO3:10H2O
Nesquehonite	-10.06	-14.65	-4.60	MgCO3:3H2O
Ni(OH)2	-8.73	4.35	13.08	Ni(OH)2
Ni3(AsO4)2:8H2O	-23.65	-7.95	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-15.26	-46.56	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-26.78	5.22	32.00	Ni4(OH)6SO4
NiCO3	-10.56	-17.31	-6.75	NiCO3
NiMoO4	-0.87	-12.02	-11.15	NiMoO4
NiS (alpha)	-136.63	-142.23	-5.60	NiS
NiS (beta)	-131.13	-142.23	-11.10	NiS
NiS (gamma)	-129.43	-142.23	-12.80	NiS
NiSe	-81.70	-99.40	-17.70	NiSe
NiSeO3:2H2O	-20.99	-18.08	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-11.41	-12.93	-1.52	NiSeO4:6H2O
Nsutite	0.59	18.09	17.50	MnO2
O2(g)	-0.68	84.12	84.80	O2
Orpiment	-444.20	-506.31	-62.11	As2S3
Otavite	-8.57	-20.57	-12.00	CdCO3
Pb(BO2)2	-14.45	-7.88	6.57	Pb(BO2)2
Pb(OH)2	-6.16	2.16	8.32	Pb(OH)2
Pb10(OH)6O(CO3)6	-99.55	-108.31	-8.76	Pb10(OH)6O(CO3)6
Pb2(OH)3Cl	-11.42	-2.62	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-21.86	4.33	26.19	Pb2O(OH)2
Pb2O3	-14.65	46.39	61.04	Pb2O3
Pb2OCO3	-16.89	-17.33	-0.44	Pb2OCO3
Pb3(AsO4)2	-20.31	-14.51	5.80	Pb3(AsO4)2
Pb3(PO4)2	-9.59	-53.12	-43.53	Pb3(PO4)2
Pb3O2CO3	-26.51	-15.16	11.35	Pb3O2CO3
Pb3O2SO4	-16.61	-5.69	10.92	Pb3O2SO4
Pb4(OH)6SO4	-24.63	-3.53	21.10	Pb4(OH)6SO4
Pb4O3SO4	-25.81	-3.52	22.28	Pb4O3SO4
PbCrO4	-3.96	-16.70	-12.73	PbCrO4
PbHPO4	-3.84	-27.64	-23.81	PbHPO4
Pbmetal	-44.14	-39.89	4.24	Pb
PbMoO4	1.58	-14.20	-15.78	PbMoO4
PbO:0.3H2O	-10.82	2.16	12.98	PbO:0.33H2O
PbSeO4	-8.23	-15.12	-6.88	PbSeO4
Periclase	-15.03	7.01	22.04	MgO
Phosgenite	-11.43	-31.24	-19.81	PbCl2:PbCO3
Plattnerite	-6.26	44.22	50.49	PbO2
Plumbgummitite	-3.11	-35.90	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-15.62	7.57	23.19	Ca(OH)2
Pyrite	-236.35	-255.01	-18.66	FeS2
Pyrochroite	-13.78	1.70	15.48	Mn(OH)2
Pyrolusite	1.57	43.76	42.19	MnO2
Pyromorphite	-1.11	-85.54	-84.43	Pb5(PO4)3Cl
Realgar	-180.77	-200.90	-20.13	AsS

Retgersite	-5.78	-7.84	-2.05	NiSO4:6H2O
Rhodochrosite	-9.38	-19.95	-10.57	MnCO3
Semetal(am)	-54.55	-61.69	-7.14	Se
Semetal(hex)	-53.93	-61.69	-7.76	Se
SeO2	-22.55	-22.43	0.12	SeO2
SeO3	-38.76	-17.28	21.48	SeO3
Siderite	-15.37	-25.56	-10.19	FeCO3
Smithsonite	-7.45	-17.40	-9.95	ZnCO3
Sphalerite	-130.78	-142.32	-11.54	ZnS
Spinel	-16.64	21.37	38.01	MgAl2O4
Strengite	0.53	-25.84	-26.37	FePO4:2H2O
Sulfur	-102.42	-104.52	-2.10	S
Tenorite	-2.43	5.41	7.84	CuO
Thenardite	-6.41	-6.06	0.35	Na2SO4
Thermonatrite	-16.20	-15.53	0.67	Na2CO3:H2O
Tsumebite	-10.28	-20.07	-9.79	Pb2CuPO4(OH) 3:3H2O
Vivianite	-35.33	-71.33	-36.00	Fe3(PO4)2:8H2O
Witherite	-10.00	-18.58	-8.58	BaCO3
Wurtzite	-133.31	-142.32	-9.01	ZnS
Zincite	-7.34	4.26	11.60	ZnO
Zincosite	-12.10	-7.92	4.18	ZnSO4
Zn(BO2)2	-14.08	-5.79	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-15.47	-12.23	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-7.94	4.26	12.20	Zn(OH)2
Zn(OH)2(am)	-8.46	4.26	12.71	Zn(OH)2
Zn(OH)2(beta)	-7.74	4.26	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-7.52	4.26	11.78	Zn(OH)2
Zn(OH)2(gamma)	-7.47	4.26	11.73	Zn(OH)2
Zn2(OH)2SO4	-11.16	-3.66	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-13.63	1.57	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-21.87	-8.22	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-11.41	-46.83	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-31.27	-11.59	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-23.54	4.86	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-31.11	7.39	38.50	Zn5(OH)8Cl2
ZnCl2	-16.91	-9.65	7.27	ZnCl2
ZnCO3:1H2O	-7.14	-17.40	-10.26	ZnCO3:1H2O
Znmetal	-64.05	-37.80	26.25	Zn
ZnMoO4	-2.01	-12.11	-10.09	ZnMoO4
ZnO(active)	-7.19	4.26	11.45	ZnO
ZnS(am)	-133.22	-142.32	-9.10	ZnS
ZnSe	-85.01	-99.49	-14.48	ZnSe
ZnSeO4:6H2O	-11.50	-13.02	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.42	-7.92	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 7.

```

USE solution 1
EQUILIBRIUM PHASES 4
  Birnessite 0 0
  CO2(g)      -3.5 10
  Diaspore    0 0
  Fix_pH      -5.25 Portlandite 10
  Magnetite   0 0
  O2(g)       -0.68 10
END

```

Beginning of batch-reaction calculations.

Reaction step 1.

Using solution 1.

Using pure phase assemblage 4.

-----User print-----

Moles of Portlandite: -1.4014e-03
Moles of Diaspore: -1.4014e-03
Moles of Magnetite: -1.4014e-03
Moles of Birnessite: -1.4014e-03
mg of Portlandite: -1.0384e+02
mg of Diaspore: -8.4073e+01
mg of Birnessite: -1.2184e+02

-----Phase assemblage-----

Phase	SI	log IAP	log K(T, P)	Moles in assemblage		
				Initial	Final	Delta
Birnessite	0.00	18.09	18.09	0.000e+00	9.539e-05	9.539e-05
CO2(g)	-3.50	-21.66	-18.16	1.000e+01	1.000e+01	-1.360e-05
Diaspore	0.00	7.18	7.18	0.000e+00	5.265e-05	5.265e-05
Fix_pH	-5.25	-5.25	0.00			
Ca(OH)2		is reactant		1.000e+01	9.999e+00	-1.401e-03
Magnetite	0.00	4.03	4.03	0.000e+00	1.473e-04	1.473e-04
O2(g)	-0.68	84.12	84.80	1.000e+01	9.998e+00	-2.051e-03

-----Solution composition-----

Elements	Molality	Moles
Al	1.896e-07	1.897e-07
As	2.680e-08	2.680e-08
B	9.287e-06	9.287e-06
Ba	2.924e-07	2.924e-07
Be	2.228e-07	2.228e-07
C	1.360e-05	1.360e-05
Ca	1.448e-02	1.448e-02
Cd	7.145e-09	7.145e-09
Cl	1.388e-02	1.388e-02
Co	1.227e-05	1.227e-05
Cr	6.372e-08	6.372e-08
Cu	9.874e-05	9.874e-05
Fe	1.641e-06	1.641e-06
K	6.291e-03	6.291e-03
Mg	3.635e-03	3.635e-03
Mn	7.431e-09	7.432e-09
Mo	1.151e-06	1.151e-06
N	7.218e-04	7.218e-04
Na	1.498e-02	1.498e-02
Ni	8.382e-06	8.382e-06
P	9.399e-06	9.400e-06
Pb	9.690e-08	9.691e-08
S	2.322e-02	2.322e-02
Se	1.271e-07	1.271e-07
Zn	7.523e-06	7.523e-06

-----Description of solution-----

pH	=	5.250	Charge balance
pe	=	15.780	Adjusted to redox equilibrium
Activity of water	=	0.999	
Ionic strength (mol/kgw)	=	7.310e-02	
Mass of water (kg)	=	1.000e+00	
Total alkalinity (eq/kg)	=	-9.164e-06	
Total CO2 (mol/kg)	=	1.360e-05	

Temperature (°C) = 20.00
 Electrical balance (eq) = -3.291e-03
 Percent error, 100*(Cat-|An|)/(Cat+|An|) = -3.61
 Iterations = 23
 Total H = 1.110195e+02
 Total O = 5.560584e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	7.023e-06	5.623e-06	-5.153	-5.250	-0.097	0.00
OH-	1.549e-09	1.218e-09	-8.810	-8.914	-0.104	(0)
H2O	5.551e+01	9.988e-01	1.744	-0.001	0.000	18.05
Al	1.896e-07					
AlSO4+	1.416e-07	1.131e-07	-6.849	-6.947	-0.098	(0)
Al+3	1.999e-08	2.704e-09	-7.699	-8.568	-0.869	(0)
Al (SO4) 2-	1.108e-08	8.845e-09	-7.956	-8.053	-0.098	(0)
Al (OH) 2+	8.500e-09	6.869e-09	-8.071	-8.163	-0.092	(0)
AlOH+2	8.157e-09	3.480e-09	-8.088	-8.458	-0.370	(0)
Al (OH) 3	2.451e-10	2.451e-10	-9.611	-9.611	0.000	(0)
Al (OH) 4-	2.099e-11	1.676e-11	-10.678	-10.776	-0.098	(0)
AlMo6O21-3	1.151e-22	6.770e-24	-21.939	-23.169	-1.231	(0)
As (3)	2.842e-34					
H3AsO3	2.842e-34	2.842e-34	-33.546	-33.546	0.000	(0)
H2AsO3-	2.941e-38	2.146e-38	-37.532	-37.668	-0.137	(0)
H4AsO3+	1.085e-39	7.918e-40	-38.965	-39.101	-0.137	(0)
HAsO3-2	0.000e+00	0.000e+00	-44.007	-44.554	-0.547	(0)
AsO3-3	0.000e+00	0.000e+00	-51.563	-52.794	-1.231	(0)
As (5)	2.680e-08					
H2AsO4-	2.553e-08	1.863e-08	-7.593	-7.730	-0.137	(0)
HAsO4-2	1.254e-09	3.559e-10	-8.902	-9.449	-0.547	(0)
H3AsO4	1.705e-11	1.734e-11	-10.768	-10.761	0.007	(0)
AsO4-3	3.028e-15	1.780e-16	-14.519	-15.749	-1.231	(0)
B	9.287e-06					
H3BO3	9.286e-06	9.443e-06	-5.032	-5.025	0.007	(0)
H2BO3-	1.154e-09	8.918e-10	-8.938	-9.050	-0.112	(0)
CaH2BO3+	2.422e-10	1.872e-10	-9.616	-9.728	-0.112	(0)
MgH2BO3+	4.067e-11	3.143e-11	-10.391	-10.503	-0.112	(0)
NaH2BO3	1.792e-11	1.792e-11	-10.747	-10.747	0.000	(0)
H5 (BO3) 2-	9.574e-15	7.398e-15	-14.019	-14.131	-0.112	(0)
BaH2BO3+	4.162e-15	3.216e-15	-14.381	-14.493	-0.112	(0)
H8 (BO3) 3-	7.824e-18	6.046e-18	-17.107	-17.218	-0.112	(0)
Ba	2.924e-07					
Ba+2	2.919e-07	1.200e-07	-6.535	-6.921	-0.386	(0)
BaNO3+	5.136e-10	3.749e-10	-9.289	-9.426	-0.137	(0)
BaHCO3+	1.088e-12	8.858e-13	-11.963	-12.053	-0.089	(0)
BaH2BO3+	4.162e-15	3.216e-15	-14.381	-14.493	-0.112	(0)
BaOH+	7.666e-16	6.163e-16	-15.115	-15.210	-0.095	(0)
BaCO3	3.816e-16	3.816e-16	-15.418	-15.418	0.000	(0)
BaNH3+2	0.000e+00	0.000e+00	-71.132	-71.679	-0.547	(0)
Be	2.228e-07					
Be+2	1.287e-07	5.287e-08	-6.891	-7.277	-0.386	(0)
BeOH+	4.597e-08	3.765e-08	-7.338	-7.424	-0.087	(0)
BeSO4	4.383e-08	4.383e-08	-7.358	-7.358	0.000	(0)
Be (SO4) 2-2	3.137e-09	8.903e-10	-8.504	-9.050	-0.547	(0)
BeCl+	1.160e-09	9.328e-10	-8.935	-9.030	-0.095	(0)
Be (OH) 2	4.248e-11	4.248e-11	-10.372	-10.372	0.000	(0)
Be2OH+3	1.995e-12	3.303e-13	-11.700	-12.481	-0.781	(0)
BeCO3	6.579e-13	6.579e-13	-12.182	-12.182	0.000	(0)
Be3 (OH) 3+3	7.788e-15	1.290e-15	-14.109	-14.889	-0.781	(0)
Be (OH) 3-	2.330e-15	1.908e-15	-14.633	-14.719	-0.087	(0)
Be (OH) 4-2	4.789e-24	2.154e-24	-23.320	-23.667	-0.347	(0)
C (4)	1.360e-05					
H2CO3	1.237e-05	1.237e-05	-4.908	-4.908	0.000	(0)
HCO3-	1.136e-06	9.183e-07	-5.945	-6.037	-0.092	(0)
CaHCO3+	6.862e-08	5.587e-08	-7.164	-7.253	-0.089	(0)

MgHCO3+	1.172e-08	9.292e-09	-7.931	-8.032	-0.101	(0)
NaHCO3	6.579e-09	6.579e-09	-8.182	-8.182	0.000	(0)
CuHCO3+	1.831e-09	1.336e-09	-8.737	-8.874	-0.137	(0)
CuCO3	1.040e-09	1.040e-09	-8.983	-8.983	0.000	(0)
NiHCO3+	3.154e-10	2.302e-10	-9.501	-9.638	-0.137	(0)
CoHCO3+	2.249e-10	1.642e-10	-9.648	-9.785	-0.137	(0)
ZnHCO3+	6.560e-11	4.788e-11	-10.183	-10.320	-0.137	(0)
CaCO3	3.685e-11	3.685e-11	-10.434	-10.434	0.000	(0)
CO3-2	1.685e-11	6.924e-12	-10.773	-11.160	-0.386	(0)
PbHCO3+	1.237e-11	9.030e-12	-10.908	-11.044	-0.137	(0)
MgCO3	5.390e-12	5.390e-12	-11.268	-11.268	0.000	(0)
NaCO3-	2.127e-12	1.719e-12	-11.672	-11.765	-0.092	(0)
BaHCO3+	1.088e-12	8.858e-13	-11.963	-12.053	-0.089	(0)
ZnCO3	7.264e-13	7.264e-13	-12.139	-12.139	0.000	(0)
BeCO3	6.579e-13	6.579e-13	-12.182	-12.182	0.000	(0)
NiCO3	5.809e-13	5.809e-13	-12.236	-12.236	0.000	(0)
PbCO3	3.046e-13	3.046e-13	-12.516	-12.516	0.000	(0)
CoCO3	2.975e-13	2.975e-13	-12.527	-12.527	0.000	(0)
MnHCO3+	3.553e-14	2.857e-14	-13.449	-13.544	-0.095	(0)
CdHCO3+	3.166e-15	2.311e-15	-14.500	-14.636	-0.137	(0)
BaCO3	3.816e-16	3.816e-16	-15.418	-15.418	0.000	(0)
CdCO3	1.929e-16	1.929e-16	-15.715	-15.715	0.000	(0)
Cu (CO3) 2-2	6.826e-17	1.937e-17	-16.166	-16.713	-0.547	(0)
FeHCO3+	5.065e-20	4.124e-20	-19.295	-19.385	-0.089	(0)
Pb (CO3) 2-2	2.143e-20	6.082e-21	-19.669	-20.216	-0.547	(0)
Cd (CO3) 2-2	3.488e-24	9.899e-25	-23.457	-24.004	-0.547	(0)
Ca	1.448e-02					
Ca+2	9.123e-03	3.749e-03	-2.040	-2.426	-0.386	(0)
CaSO4	5.344e-03	5.344e-03	-2.272	-2.272	0.000	(0)
CaNO3+	9.611e-06	7.015e-06	-5.017	-5.154	-0.137	(0)
CaH2PO4+	6.234e-07	5.038e-07	-6.205	-6.298	-0.092	(0)
CaHPO4	1.136e-07	1.136e-07	-6.945	-6.945	0.000	(0)
CaHCO3+	6.862e-08	5.587e-08	-7.164	-7.253	-0.089	(0)
CaH2BO3+	2.422e-10	1.872e-10	-9.616	-9.728	-0.112	(0)
CaOH+	1.057e-10	8.607e-11	-9.976	-10.065	-0.089	(0)
CaPO4-	5.958e-11	4.815e-11	-10.225	-10.317	-0.092	(0)
CaCO3	3.685e-11	3.685e-11	-10.434	-10.434	0.000	(0)
CaNH3+2	0.000e+00	0.000e+00	-66.337	-66.884	-0.547	(0)
Ca (NH3) 2+2	0.000e+00	0.000e+00	-131.295	-131.842	-0.547	(0)
Cd	7.145e-09					
Cd+2	2.974e-09	1.222e-09	-8.527	-8.913	-0.386	(0)
CdCl+	1.764e-09	1.288e-09	-8.753	-8.890	-0.137	(0)
CdSO4	1.763e-09	1.763e-09	-8.754	-8.754	0.000	(0)
Cd (SO4) 2-2	5.812e-10	1.650e-10	-9.236	-9.783	-0.547	(0)
CdCl2	5.881e-11	5.881e-11	-10.231	-10.231	0.000	(0)
CdNO3+	3.488e-12	2.546e-12	-11.457	-11.594	-0.137	(0)
CdCl3-	5.382e-13	3.928e-13	-12.269	-12.406	-0.137	(0)
CdOHC1	8.391e-14	8.391e-14	-13.076	-13.076	0.000	(0)
CdOH+	1.631e-14	1.191e-14	-13.787	-13.924	-0.137	(0)
CdSeO4	1.188e-14	1.188e-14	-13.925	-13.925	0.000	(0)
CdHCO3+	3.166e-15	2.311e-15	-14.500	-14.636	-0.137	(0)
Cd (NO3) 2	6.296e-16	6.296e-16	-15.201	-15.201	0.000	(0)
CdCO3	1.929e-16	1.929e-16	-15.715	-15.715	0.000	(0)
Cd (OH) 2	1.959e-19	1.959e-19	-18.708	-18.708	0.000	(0)
Cd2OH+3	1.320e-21	7.758e-23	-20.880	-22.110	-1.231	(0)
Cd (CO3) 2-2	3.488e-24	9.899e-25	-23.457	-24.004	-0.547	(0)
Cd (OH) 3-	2.933e-26	2.141e-26	-25.533	-25.669	-0.137	(0)
Cd (OH) 4-2	2.208e-35	6.266e-36	-34.656	-35.203	-0.547	(0)
Cd (SeO3) 2-2	0.000e+00	0.000e+00	-44.114	-44.661	-0.547	(0)
CdHS+	0.000e+00	0.000e+00	-142.598	-142.735	-0.137	(0)
Cd (HS) 2	0.000e+00	0.000e+00	-277.361	-277.361	0.000	(0)
Cd (HS) 3-	0.000e+00	0.000e+00	-417.155	-417.292	-0.137	(0)
Cd (HS) 4-2	0.000e+00	0.000e+00	-556.379	-556.926	-0.547	(0)
Cl	1.388e-02					
Cl-	1.387e-02	1.111e-02	-1.858	-1.954	-0.097	(0)
CuCl+	5.350e-07	4.240e-07	-6.272	-6.373	-0.101	(0)
CoCl+	1.320e-07	9.633e-08	-6.879	-7.016	-0.137	(0)
NiCl+	8.637e-08	6.304e-08	-7.064	-7.200	-0.137	(0)

ZnCl+	6.185e-08	4.902e-08	-7.209	-7.310	-0.101	(0)
PbCl+	7.443e-09	5.433e-09	-8.128	-8.265	-0.137	(0)
CdCl+	1.764e-09	1.288e-09	-8.753	-8.890	-0.137	(0)
CuCl2	1.276e-09	1.276e-09	-8.894	-8.894	0.000	(0)
BeCl+	1.160e-09	9.328e-10	-8.935	-9.030	-0.095	(0)
ZnCl2	6.944e-10	6.944e-10	-9.158	-9.158	0.000	(0)
PbCl2	2.635e-10	2.635e-10	-9.579	-9.579	0.000	(0)
ZnOHC1	1.191e-10	1.191e-10	-9.924	-9.924	0.000	(0)
CdCl2	5.881e-11	5.881e-11	-10.231	-10.231	0.000	(0)
MnCl+	2.788e-11	2.241e-11	-10.555	-10.649	-0.095	(0)
ZnCl3-	7.573e-12	6.003e-12	-11.121	-11.222	-0.101	(0)
NiCl2	3.575e-12	3.575e-12	-11.447	-11.447	0.000	(0)
PbCl3-	1.687e-12	1.231e-12	-11.773	-11.910	-0.137	(0)
FeCl+2	1.127e-12	4.709e-13	-11.948	-12.327	-0.379	(0)
CdCl3-	5.382e-13	3.928e-13	-12.269	-12.406	-0.137	(0)
MnCl2	3.517e-13	3.517e-13	-12.454	-12.454	0.000	(0)
CuCl3-	1.525e-13	1.209e-13	-12.817	-12.918	-0.101	(0)
CdOHC1	8.391e-14	8.391e-14	-13.076	-13.076	0.000	(0)
ZnCl4-2	7.666e-14	3.203e-14	-13.115	-13.494	-0.379	(0)
FeCl2+	3.405e-14	2.737e-14	-13.468	-13.563	-0.095	(0)
CrO3Cl-	2.303e-14	1.681e-14	-13.638	-13.774	-0.137	(0)
PbCl4-2	2.046e-14	5.806e-15	-13.689	-14.236	-0.547	(0)
MnCl3-	1.339e-15	1.076e-15	-14.873	-14.968	-0.095	(0)
CuCl2-	8.200e-17	6.499e-17	-16.086	-16.187	-0.101	(0)
FeCl3	3.041e-17	3.041e-17	-16.517	-16.517	0.000	(0)
CuCl	2.766e-17	2.766e-17	-16.558	-16.558	0.000	(0)
CuCl4-2	1.910e-17	7.979e-18	-16.719	-17.098	-0.379	(0)
CuCl3-2	3.623e-19	1.514e-19	-18.441	-18.820	-0.379	(0)
CoCl+2	4.346e-22	1.233e-22	-21.362	-21.909	-0.547	(0)
CrCl+2	1.999e-22	5.673e-23	-21.699	-22.246	-0.547	(0)
CrCl2+	5.260e-26	3.839e-26	-25.279	-25.416	-0.137	(0)
CrOHC12	1.050e-26	1.050e-26	-25.979	-25.979	0.000	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-318.490	-319.037	-0.547	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-389.737	-390.284	-0.547	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-395.367	-395.914	-0.547	(0)
Co (2)	1.227e-05					
Co+2	8.955e-06	2.541e-06	-5.048	-5.595	-0.547	(0)
CoSO4	3.175e-06	3.175e-06	-5.498	-5.498	0.000	(0)
CoCl+	1.320e-07	9.633e-08	-6.879	-7.016	-0.137	(0)
CoNO3+	3.146e-09	2.297e-09	-8.502	-8.639	-0.137	(0)
CoHCO3+	2.249e-10	1.642e-10	-9.648	-9.785	-0.137	(0)
CoHPO4	1.800e-10	1.800e-10	-9.745	-9.745	0.000	(0)
CoOH+	1.243e-10	9.069e-11	-9.906	-10.042	-0.137	(0)
CoSeO4	6.121e-11	6.121e-11	-10.213	-10.213	0.000	(0)
Co (NO3) 2	2.664e-12	2.664e-12	-11.574	-11.574	0.000	(0)
CoCO3	2.975e-13	2.975e-13	-12.527	-12.527	0.000	(0)
Co (OH) 2	1.288e-14	1.288e-14	-13.890	-13.890	0.000	(0)
Co2OH+3	1.965e-16	1.155e-17	-15.707	-16.937	-1.231	(0)
CoNO2+	1.600e-21	1.168e-21	-20.796	-20.933	-0.137	(0)
Co (OH) 3-	6.299e-22	4.598e-22	-21.201	-21.337	-0.137	(0)
CoOOH-	2.637e-23	1.924e-23	-22.579	-22.716	-0.137	(0)
Co4 (OH) 4+4	2.080e-30	1.350e-32	-29.682	-31.870	-2.188	(0)
Co (OH) 4-2	4.592e-31	1.303e-31	-30.338	-30.885	-0.547	(0)
Co (NH3) +2	0.000e+00	0.000e+00	-67.332	-67.879	-0.547	(0)
Co (NH3) 2+2	0.000e+00	0.000e+00	-130.454	-131.001	-0.547	(0)
Co (NH3) 3+2	0.000e+00	0.000e+00	-193.912	-194.459	-0.547	(0)
Co (NH3) 4+2	0.000e+00	0.000e+00	-257.750	-258.297	-0.547	(0)
Co (NH3) 5+2	0.000e+00	0.000e+00	-322.088	-322.635	-0.547	(0)
Co (3)	1.952e-18					
CoOH+2	1.951e-18	5.536e-19	-17.710	-18.257	-0.547	(0)
Co+3	4.505e-22	6.092e-23	-21.346	-22.215	-0.869	(0)
CoCl+2	4.346e-22	1.233e-22	-21.362	-21.909	-0.547	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-318.490	-319.037	-0.547	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-385.512	-385.649	-0.137	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-389.737	-390.284	-0.547	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-392.018	-392.565	-0.547	(0)
Cr (2)	0.000e+00					
Cr+2	0.000e+00	0.000e+00	-42.587	-43.134	-0.547	(0)

Cr (3)	7.559e-19					
Cr (OH) +2	4.558e-19	1.294e-19	-18.341	-18.888	-0.547	(0)
CrOHSO4	1.173e-19	1.173e-19	-18.931	-18.931	0.000	(0)
Cr+3	8.026e-20	4.719e-21	-19.096	-20.326	-1.231	(0)
CrSO4+	7.969e-20	5.816e-20	-19.099	-19.235	-0.137	(0)
Cr (OH) 2+	2.256e-20	1.647e-20	-19.647	-19.783	-0.137	(0)
CrCl+2	1.999e-22	5.673e-23	-21.699	-22.246	-0.547	(0)
CrH2PO4+2	2.285e-23	6.486e-24	-22.641	-23.188	-0.547	(0)
Cr (OH) 3	1.107e-23	1.107e-23	-22.956	-22.956	0.000	(0)
CrNO3+2	2.664e-25	7.562e-26	-24.574	-25.121	-0.547	(0)
CrCl2+	5.260e-26	3.839e-26	-25.279	-25.416	-0.137	(0)
CrOHC12	1.050e-26	1.050e-26	-25.979	-25.979	0.000	(0)
CrO2-	1.282e-27	9.356e-28	-26.892	-27.029	-0.137	(0)
Cr (OH) 4-	1.079e-27	7.878e-28	-26.967	-27.104	-0.137	(0)
Cr2 (OH) 2SO4+2	2.828e-36	8.027e-37	-35.548	-36.095	-0.547	(0)
Cr2 (OH) 2 (SO4) 2	3.115e-37	3.115e-37	-36.507	-36.507	0.000	(0)
Cr (NH3) 5OH+2	0.000e+00	0.000e+00	-331.332	-331.879	-0.547	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-393.831	-395.062	-1.231	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-395.367	-395.914	-0.547	(0)
Cr (6)	6.372e-08					
HCrO4-	5.775e-08	4.215e-08	-7.238	-7.375	-0.137	(0)
CrO4-2	5.715e-09	2.349e-09	-8.243	-8.629	-0.386	(0)
NaCrO4-	1.854e-10	1.353e-10	-9.732	-9.869	-0.137	(0)
KCrO4-	5.765e-11	4.208e-11	-10.239	-10.376	-0.137	(0)
CrO3HPO4-2	3.438e-12	9.758e-13	-11.464	-12.011	-0.547	(0)
CrO3SO4-2	1.687e-12	4.788e-13	-11.773	-12.320	-0.547	(0)
Cr2O7-2	2.477e-13	7.030e-14	-12.606	-13.153	-0.547	(0)
H2CrO4	1.490e-13	1.490e-13	-12.827	-12.827	0.000	(0)
CrO3Cl-	2.303e-14	1.681e-14	-13.638	-13.774	-0.137	(0)
CrO3H2PO4-	3.621e-15	2.643e-15	-14.441	-14.578	-0.137	(0)
Cu (1)	1.127e-16					
CuCl2-	8.200e-17	6.499e-17	-16.086	-16.187	-0.101	(0)
CuCl	2.766e-17	2.766e-17	-16.558	-16.558	0.000	(0)
Cu+	2.710e-18	1.978e-18	-17.567	-17.704	-0.137	(0)
CuCl3-2	3.623e-19	1.514e-19	-18.441	-18.820	-0.379	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-287.069	-287.474	-0.405	(0)
CuS4S5-3	0.000e+00	0.000e+00	-287.821	-288.204	-0.383	(0)
Cu (2)	9.874e-05					
Cu+2	6.204e-05	2.550e-05	-4.207	-4.593	-0.386	(0)
CuSO4	3.595e-05	3.595e-05	-4.444	-4.444	0.000	(0)
CuCl+	5.350e-07	4.240e-07	-6.272	-6.373	-0.101	(0)
CuOH+	1.422e-07	1.127e-07	-6.847	-6.948	-0.101	(0)
CuNO3+	6.479e-08	4.729e-08	-7.189	-7.325	-0.137	(0)
CuHCO3+	1.831e-09	1.336e-09	-8.737	-8.874	-0.137	(0)
CuCl2	1.276e-09	1.276e-09	-8.894	-8.894	0.000	(0)
Cu2 (OH) 2+2	1.086e-09	3.083e-10	-8.964	-9.511	-0.547	(0)
CuCO3	1.040e-09	1.040e-09	-8.983	-8.983	0.000	(0)
Cu (OH) 2	5.146e-11	5.146e-11	-10.289	-10.289	0.000	(0)
Cu (NO3) 2	3.300e-12	3.300e-12	-11.482	-11.482	0.000	(0)
CuCl3-	1.525e-13	1.209e-13	-12.817	-12.918	-0.101	(0)
Cu (OH) 3-	2.586e-16	1.888e-16	-15.587	-15.724	-0.137	(0)
Cu (CO3) 2-2	6.826e-17	1.937e-17	-16.166	-16.713	-0.547	(0)
CuCl4-2	1.910e-17	7.979e-18	-16.719	-17.098	-0.379	(0)
CuNO2+	2.385e-19	1.741e-19	-18.622	-18.759	-0.137	(0)
Cu (OH) 4-2	9.362e-24	2.657e-24	-23.029	-23.576	-0.547	(0)
Cu (NO2) 2	1.162e-34	1.162e-34	-33.935	-33.935	0.000	(0)
CuNH3+2	0.000e+00	0.000e+00	-64.379	-64.926	-0.547	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-404.048	-404.185	-0.137	(0)
Fe (2)	1.990e-14					
Fe+2	1.390e-14	3.944e-15	-13.857	-14.404	-0.547	(0)
FeSO4	5.987e-15	5.987e-15	-14.223	-14.223	0.000	(0)
FeH2PO4+	1.409e-17	1.139e-17	-16.851	-16.944	-0.092	(0)
FeHPO4	1.019e-18	1.019e-18	-17.992	-17.992	0.000	(0)
FeOH+	2.379e-19	1.913e-19	-18.624	-18.718	-0.095	(0)
FeHCO3+	5.065e-20	4.124e-20	-19.295	-19.385	-0.089	(0)
Fe (OH) 2	1.752e-25	1.752e-25	-24.757	-24.757	0.000	(0)
Fe (OH) 3-	1.176e-28	9.454e-29	-27.930	-28.024	-0.095	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-289.114	-289.114	0.000	(0)

Fe (HS) 3-	0.000e+00	0.000e+00	-428.771	-428.908	-0.137	(0)
Fe (3)	1.641e-06					
Fe (OH) 2+	1.635e-06	1.321e-06	-5.787	-5.879	-0.092	(0)
FeOH+2	3.409e-09	1.424e-09	-8.467	-8.846	-0.379	(0)
FeHPO4+	1.346e-09	1.088e-09	-8.871	-8.963	-0.092	(0)
Fe (OH) 3	1.242e-09	1.242e-09	-8.906	-8.906	0.000	(0)
FeSO4+	1.262e-10	1.015e-10	-9.899	-9.994	-0.095	(0)
Fe (SO4) 2-	2.021e-11	1.475e-11	-10.694	-10.831	-0.137	(0)
Fe+3	1.216e-11	1.644e-12	-10.915	-11.784	-0.869	(0)
FeCl+2	1.127e-12	4.709e-13	-11.948	-12.327	-0.379	(0)
Fe (OH) 4-	5.229e-13	4.226e-13	-12.282	-12.374	-0.092	(0)
FeH2PO4+2	4.216e-13	1.799e-13	-12.375	-12.745	-0.370	(0)
FeNO3+2	4.261e-14	1.209e-14	-13.370	-13.917	-0.547	(0)
FeCl2+	3.405e-14	2.737e-14	-13.468	-13.563	-0.095	(0)
Fe2 (OH) 2+4	1.238e-14	8.032e-17	-13.907	-16.095	-2.188	(0)
FeCl3	3.041e-17	3.041e-17	-16.517	-16.517	0.000	(0)
Fe3 (OH) 4+5	3.815e-18	1.455e-21	-17.418	-20.837	-3.419	(0)
FeHSeO3+2	2.681e-26	7.609e-27	-25.572	-26.119	-0.547	(0)
H (0)	0.000e+00					
H2	0.000e+00	0.000e+00	-45.195	-45.187	0.007	(0)
K	6.291e-03					
K+	6.023e-03	4.822e-03	-2.220	-2.317	-0.097	(0)
KSO4-	2.683e-04	2.168e-04	-3.571	-3.664	-0.092	(0)
KHPO4-	2.939e-09	2.375e-09	-8.532	-8.624	-0.092	(0)
KCrO4-	5.765e-11	4.208e-11	-10.239	-10.376	-0.137	(0)
Mg	3.635e-03					
Mg+2	2.473e-03	1.016e-03	-2.607	-2.993	-0.386	(0)
MgSO4	1.161e-03	1.161e-03	-2.935	-2.935	0.000	(0)
MgH2PO4+	3.607e-07	2.915e-07	-6.443	-6.535	-0.092	(0)
MgHPO4	4.251e-08	4.251e-08	-7.372	-7.372	0.000	(0)
MgHCO3+	1.172e-08	9.292e-09	-7.931	-8.032	-0.101	(0)
MgOH+	5.543e-10	4.539e-10	-9.256	-9.343	-0.087	(0)
MgH2BO3+	4.067e-11	3.143e-11	-10.391	-10.503	-0.112	(0)
MgCO3	5.390e-12	5.390e-12	-11.268	-11.268	0.000	(0)
MgPO4-	2.525e-13	2.041e-13	-12.598	-12.690	-0.092	(0)
Mn (2)	7.431e-09					
Mn+2	5.647e-09	1.603e-09	-8.248	-8.795	-0.547	(0)
MnSO4	1.754e-09	1.754e-09	-8.756	-8.756	0.000	(0)
MnCl+	2.788e-11	2.241e-11	-10.555	-10.649	-0.095	(0)
MnNO3+	1.984e-12	1.448e-12	-11.702	-11.839	-0.137	(0)
MnCl2	3.517e-13	3.517e-13	-12.454	-12.454	0.000	(0)
MnHCO3+	3.553e-14	2.857e-14	-13.449	-13.544	-0.095	(0)
MnSeO4	2.045e-14	2.045e-14	-13.689	-13.689	0.000	(0)
MnOH+	6.100e-15	4.904e-15	-14.215	-14.309	-0.095	(0)
Mn (NO3) 2	2.098e-15	2.098e-15	-14.678	-14.678	0.000	(0)
MnCl3-	1.339e-15	1.076e-15	-14.873	-14.968	-0.095	(0)
Mn (OH) 3-	1.770e-28	1.423e-28	-27.752	-27.847	-0.095	(0)
Mn (OH) 4-2	1.967e-36	8.218e-37	-35.706	-36.085	-0.379	(0)
MnSe	0.000e+00	0.000e+00	-107.928	-107.928	0.000	(0)
Mn (3)	1.518e-18					
Mn+3	1.518e-18	2.053e-19	-17.819	-18.688	-0.869	(0)
Mn (6)	1.425e-24					
MnO4-2	1.425e-24	5.952e-25	-23.846	-24.225	-0.379	(0)
Mn (7)	9.055e-19					
MnO4-	9.055e-19	7.061e-19	-18.043	-18.151	-0.108	(0)
Mo	1.151e-06					
MoO4-2	1.089e-06	4.475e-07	-5.963	-6.349	-0.386	(0)
HMoO4-	5.978e-08	4.363e-08	-7.223	-7.360	-0.137	(0)
H2MoO4	2.466e-09	2.466e-09	-8.608	-8.608	0.000	(0)
AlMo6O21-3	1.151e-22	6.770e-24	-21.939	-23.169	-1.231	(0)
Mo7O24-6	1.417e-28	1.693e-33	-27.849	-32.771	-4.923	(0)
HMo7O24-5	5.677e-29	2.166e-32	-28.246	-31.664	-3.419	(0)
H2Mo7O24-4	1.113e-30	7.225e-33	-29.953	-32.141	-2.188	(0)
H3Mo7O24-3	1.234e-33	7.258e-35	-32.909	-34.139	-1.231	(0)
N (-3)	0.000e+00					
NH4+	0.000e+00	0.000e+00	-60.452	-60.564	-0.112	(0)
NH4SO4-	0.000e+00	0.000e+00	-61.624	-61.719	-0.095	(0)
CuNH3+2	0.000e+00	0.000e+00	-64.379	-64.926	-0.547	(0)

NH3	0.000e+00	0.000e+00	-64.713	-64.713	0.000	(0)
CaNH3+2	0.000e+00	0.000e+00	-66.337	-66.884	-0.547	(0)
NiNH3+2	0.000e+00	0.000e+00	-66.729	-67.276	-0.547	(0)
Co (NH3) +2	0.000e+00	0.000e+00	-67.332	-67.879	-0.547	(0)
BaNH3+2	0.000e+00	0.000e+00	-71.132	-71.679	-0.547	(0)
Ni (NH3) 2+2	0.000e+00	0.000e+00	-128.994	-129.541	-0.547	(0)
Co (NH3) 2+2	0.000e+00	0.000e+00	-130.454	-131.001	-0.547	(0)
Ca (NH3) 2+2	0.000e+00	0.000e+00	-131.295	-131.842	-0.547	(0)
Co (NH3) 3+2	0.000e+00	0.000e+00	-193.912	-194.459	-0.547	(0)
Co (NH3) 4+2	0.000e+00	0.000e+00	-257.750	-258.297	-0.547	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-318.490	-319.037	-0.547	(0)
Co (NH3) 5+2	0.000e+00	0.000e+00	-322.088	-322.635	-0.547	(0)
Cr (NH3) 5OH+2	0.000e+00	0.000e+00	-331.332	-331.879	-0.547	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-385.512	-385.649	-0.137	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-389.737	-390.284	-0.547	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-392.018	-392.565	-0.547	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-393.831	-395.062	-1.231	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-395.367	-395.914	-0.547	(0)
N (3)	8.386e-17					
NO2-	8.362e-17	6.521e-17	-16.078	-16.186	-0.108	(0)
CuNO2+	2.385e-19	1.741e-19	-18.622	-18.759	-0.137	(0)
CoNO2+	1.600e-21	1.168e-21	-20.796	-20.933	-0.137	(0)
Cu (NO2) 2	1.162e-34	1.162e-34	-33.935	-33.935	0.000	(0)
N (5)	7.218e-04					
NO3-	7.121e-04	5.701e-04	-3.147	-3.244	-0.097	(0)
CaNO3+	9.611e-06	7.015e-06	-5.017	-5.154	-0.137	(0)
CuNO3+	6.479e-08	4.729e-08	-7.189	-7.325	-0.137	(0)
NiNO3+	4.412e-09	3.220e-09	-8.355	-8.492	-0.137	(0)
ZnNO3+	3.692e-09	2.695e-09	-8.433	-8.569	-0.137	(0)
CoNO3+	3.146e-09	2.297e-09	-8.502	-8.639	-0.137	(0)
BaNO3+	5.136e-10	3.749e-10	-9.289	-9.426	-0.137	(0)
PbNO3+	1.668e-10	1.217e-10	-9.778	-9.915	-0.137	(0)
CdNO3+	3.488e-12	2.546e-12	-11.457	-11.594	-0.137	(0)
Cu (NO3) 2	3.300e-12	3.300e-12	-11.482	-11.482	0.000	(0)
Co (NO3) 2	2.664e-12	2.664e-12	-11.574	-11.574	0.000	(0)
MnNO3+	1.984e-12	1.448e-12	-11.702	-11.839	-0.137	(0)
Zn (NO3) 2	2.970e-13	2.970e-13	-12.527	-12.527	0.000	(0)
Pb (NO3) 2	1.250e-13	1.250e-13	-12.903	-12.903	0.000	(0)
FeNO3+2	4.261e-14	1.209e-14	-13.370	-13.917	-0.547	(0)
Mn (NO3) 2	2.098e-15	2.098e-15	-14.678	-14.678	0.000	(0)
Cd (NO3) 2	6.296e-16	6.296e-16	-15.201	-15.201	0.000	(0)
CrNO3+2	2.664e-25	7.562e-26	-24.574	-25.121	-0.547	(0)
Na	1.498e-02					
Na+	1.448e-02	1.159e-02	-1.839	-1.936	-0.097	(0)
NaSO4-	4.998e-04	4.040e-04	-3.301	-3.394	-0.092	(0)
NaHPO4-	1.094e-08	8.843e-09	-7.961	-8.053	-0.092	(0)
NaHCO3	6.579e-09	6.579e-09	-8.182	-8.182	0.000	(0)
NaCrO4-	1.854e-10	1.353e-10	-9.732	-9.869	-0.137	(0)
NaH2BO3	1.792e-11	1.792e-11	-10.747	-10.747	0.000	(0)
NaCO3-	2.127e-12	1.719e-12	-11.672	-11.765	-0.092	(0)
Ni	8.382e-06					
Ni+2	5.472e-06	2.249e-06	-5.262	-5.648	-0.386	(0)
NiSO4	2.817e-06	2.817e-06	-5.550	-5.550	0.000	(0)
NiCl+	8.637e-08	6.304e-08	-7.064	-7.200	-0.137	(0)
NiNO3+	4.412e-09	3.220e-09	-8.355	-8.492	-0.137	(0)
Ni (SO4) 2-2	2.234e-09	6.342e-10	-8.651	-9.198	-0.547	(0)
NiHCO3+	3.154e-10	2.302e-10	-9.501	-9.638	-0.137	(0)
NiSeO4	4.985e-11	4.985e-11	-10.302	-10.302	0.000	(0)
NiOH+	4.857e-11	3.545e-11	-10.314	-10.450	-0.137	(0)
NiCl2	3.575e-12	3.575e-12	-11.447	-11.447	0.000	(0)
NiCO3	5.809e-13	5.809e-13	-12.236	-12.236	0.000	(0)
Ni (OH) 2	7.193e-15	7.193e-15	-14.143	-14.143	0.000	(0)
Ni (OH) 3-	1.762e-20	1.286e-20	-19.754	-19.891	-0.137	(0)
NiNH3+2	0.000e+00	0.000e+00	-66.729	-67.276	-0.547	(0)
Ni (NH3) 2+2	0.000e+00	0.000e+00	-128.994	-129.541	-0.547	(0)
O (0)	9.507e-04					
O2	4.754e-04	4.834e-04	-3.323	-3.316	0.007	(0)
P	9.399e-06					

H2PO4-	8.067e-06	6.519e-06	-5.093	-5.186	-0.092	(0)
CaH2PO4+	6.234e-07	5.038e-07	-6.205	-6.298	-0.092	(0)
MgH2PO4+	3.607e-07	2.915e-07	-6.443	-6.535	-0.092	(0)
HPO4-2	1.723e-07	7.198e-08	-6.764	-7.143	-0.379	(0)
CaHPO4	1.136e-07	1.136e-07	-6.945	-6.945	0.000	(0)
MgHPO4	4.251e-08	4.251e-08	-7.372	-7.372	0.000	(0)
NaHPO4-	1.094e-08	8.843e-09	-7.961	-8.053	-0.092	(0)
H3PO4	4.882e-09	4.882e-09	-8.311	-8.311	0.000	(0)
KHPO4-	2.939e-09	2.375e-09	-8.532	-8.624	-0.092	(0)
FeHPO4+	1.346e-09	1.088e-09	-8.871	-8.963	-0.092	(0)
CoHPO4	1.800e-10	1.800e-10	-9.745	-9.745	0.000	(0)
CaPO4-	5.958e-11	4.815e-11	-10.225	-10.317	-0.092	(0)
CrO3HPO4-2	3.438e-12	9.758e-13	-11.464	-12.011	-0.547	(0)
FeH2PO4+2	4.216e-13	1.799e-13	-12.375	-12.745	-0.370	(0)
MgPO4-	2.525e-13	2.041e-13	-12.598	-12.690	-0.092	(0)
PO4-3	3.600e-14	4.869e-15	-13.444	-14.313	-0.869	(0)
CrO3H2PO4-	3.621e-15	2.643e-15	-14.441	-14.578	-0.137	(0)
FeH2PO4+	1.409e-17	1.139e-17	-16.851	-16.944	-0.092	(0)
FeHPO4	1.019e-18	1.019e-18	-17.992	-17.992	0.000	(0)
CrH2PO4+2	2.285e-23	6.486e-24	-22.641	-23.188	-0.547	(0)
Pb	9.690e-08					
PbSO4	4.683e-08	4.683e-08	-7.330	-7.330	0.000	(0)
Pb+2	3.561e-08	1.463e-08	-7.448	-7.835	-0.386	(0)
PbCl+	7.443e-09	5.433e-09	-8.128	-8.265	-0.137	(0)
Pb(SO4) 2-2	6.495e-09	1.843e-09	-8.187	-8.734	-0.547	(0)
PbCl2	2.635e-10	2.635e-10	-9.579	-9.579	0.000	(0)
PbNO3+	1.668e-10	1.217e-10	-9.778	-9.915	-0.137	(0)
PbOH+	9.006e-11	6.574e-11	-10.045	-10.182	-0.137	(0)
PbHCO3+	1.237e-11	9.030e-12	-10.908	-11.044	-0.137	(0)
PbCl3-	1.687e-12	1.231e-12	-11.773	-11.910	-0.137	(0)
PbCO3	3.046e-13	3.046e-13	-12.516	-12.516	0.000	(0)
Pb(NO3) 2	1.250e-13	1.250e-13	-12.903	-12.903	0.000	(0)
PbCl4-2	2.046e-14	5.806e-15	-13.689	-14.236	-0.547	(0)
Pb(OH) 2	3.718e-15	3.718e-15	-14.430	-14.430	0.000	(0)
Pb2OH+3	2.593e-16	1.525e-17	-15.586	-16.817	-1.231	(0)
Pb(CO3) 2-2	2.143e-20	6.082e-21	-19.669	-20.216	-0.547	(0)
Pb(OH) 3-	9.110e-21	6.649e-21	-20.040	-20.177	-0.137	(0)
Pb(OH) 4-2	1.026e-26	2.912e-27	-25.989	-26.536	-0.547	(0)
Pb3(OH) 4+2	6.435e-27	1.826e-27	-26.191	-26.738	-0.547	(0)
Pb4(OH) 4+4	3.939e-29	2.556e-31	-28.405	-30.592	-2.188	(0)
Pb(HS) 2	0.000e+00	0.000e+00	-276.225	-276.225	0.000	(0)
Pb(HS) 3-	0.000e+00	0.000e+00	-416.619	-416.755	-0.137	(0)
S(-2)	0.000e+00					
H2S	0.000e+00	0.000e+00	-139.994	-139.994	0.000	(0)
HS-	0.000e+00	0.000e+00	-141.693	-141.830	-0.137	(0)
CdHS+	0.000e+00	0.000e+00	-142.598	-142.735	-0.137	(0)
S5-2	0.000e+00	0.000e+00	-145.511	-146.058	-0.547	(0)
S6-2	0.000e+00	0.000e+00	-145.914	-146.461	-0.547	(0)
S4-2	0.000e+00	0.000e+00	-146.111	-146.658	-0.547	(0)
S3-2	0.000e+00	0.000e+00	-146.926	-147.473	-0.547	(0)
S2-2	0.000e+00	0.000e+00	-147.955	-148.502	-0.547	(0)
S-2	0.000e+00	0.000e+00	-153.649	-154.028	-0.379	(0)
Pb(HS) 2	0.000e+00	0.000e+00	-276.225	-276.225	0.000	(0)
Zn(HS) 2	0.000e+00	0.000e+00	-276.580	-276.580	0.000	(0)
ZnS(HS) -	0.000e+00	0.000e+00	-277.203	-277.340	-0.137	(0)
Cd(HS) 2	0.000e+00	0.000e+00	-277.361	-277.361	0.000	(0)
Cu(S4) 2-3	0.000e+00	0.000e+00	-287.069	-287.474	-0.405	(0)
CuS4S5-3	0.000e+00	0.000e+00	-287.821	-288.204	-0.383	(0)
Fe(HS) 2	0.000e+00	0.000e+00	-289.114	-289.114	0.000	(0)
Cu(HS) 3-	0.000e+00	0.000e+00	-404.048	-404.185	-0.137	(0)
Zn(HS) 3-	0.000e+00	0.000e+00	-414.993	-415.130	-0.137	(0)
Pb(HS) 3-	0.000e+00	0.000e+00	-416.619	-416.755	-0.137	(0)
Cd(HS) 3-	0.000e+00	0.000e+00	-417.155	-417.292	-0.137	(0)
ZnS(HS) 2-2	0.000e+00	0.000e+00	-419.313	-419.860	-0.547	(0)
Fe(HS) 3-	0.000e+00	0.000e+00	-428.771	-428.908	-0.137	(0)
Cd(HS) 4-2	0.000e+00	0.000e+00	-556.379	-556.926	-0.547	(0)
Zn(HS) 4-2	0.000e+00	0.000e+00	-557.873	-558.420	-0.547	(0)
S(6)	2.322e-02					

SO4-2	1.590e-02	6.534e-03	-1.799	-2.185	-0.386	(0)
CaSO4	5.344e-03	5.344e-03	-2.272	-2.272	0.000	(0)
MgSO4	1.161e-03	1.161e-03	-2.935	-2.935	0.000	(0)
NaSO4-	4.998e-04	4.040e-04	-3.301	-3.394	-0.092	(0)
KSO4-	2.683e-04	2.168e-04	-3.571	-3.664	-0.092	(0)
CuSO4	3.595e-05	3.595e-05	-4.444	-4.444	0.000	(0)
HSO4-	3.865e-06	3.086e-06	-5.413	-5.511	-0.098	(0)
CoSO4	3.175e-06	3.175e-06	-5.498	-5.498	0.000	(0)
NiSO4	2.817e-06	2.817e-06	-5.550	-5.550	0.000	(0)
ZnSO4	2.497e-06	2.497e-06	-5.603	-5.603	0.000	(0)
Zn (SO4) 2-2	5.225e-07	1.483e-07	-6.282	-6.829	-0.547	(0)
AlSO4+	1.416e-07	1.131e-07	-6.849	-6.947	-0.098	(0)
PbSO4	4.683e-08	4.683e-08	-7.330	-7.330	0.000	(0)
BeSO4	4.383e-08	4.383e-08	-7.358	-7.358	0.000	(0)
Al (SO4) 2-	1.108e-08	8.845e-09	-7.956	-8.053	-0.098	(0)
Pb (SO4) 2-2	6.495e-09	1.843e-09	-8.187	-8.734	-0.547	(0)
Be (SO4) 2-2	3.137e-09	8.903e-10	-8.504	-9.050	-0.547	(0)
Ni (SO4) 2-2	2.234e-09	6.342e-10	-8.651	-9.198	-0.547	(0)
CdSO4	1.763e-09	1.763e-09	-8.754	-8.754	0.000	(0)
MnSO4	1.754e-09	1.754e-09	-8.756	-8.756	0.000	(0)
Cd (SO4) 2-2	5.812e-10	1.650e-10	-9.236	-9.783	-0.547	(0)
FeSO4+	1.262e-10	1.015e-10	-9.899	-9.994	-0.095	(0)
Fe (SO4) 2-	2.021e-11	1.475e-11	-10.694	-10.831	-0.137	(0)
CrO3SO4-2	1.687e-12	4.788e-13	-11.773	-12.320	-0.547	(0)
FeSO4	5.987e-15	5.987e-15	-14.223	-14.223	0.000	(0)
CrOHSO4	1.173e-19	1.173e-19	-18.931	-18.931	0.000	(0)
CrSO4+	7.969e-20	5.816e-20	-19.099	-19.235	-0.137	(0)
Cr2 (OH) 2SO4+2	2.828e-36	8.027e-37	-35.548	-36.095	-0.547	(0)
Cr2 (OH) 2 (SO4) 2	3.115e-37	3.115e-37	-36.507	-36.507	0.000	(0)
NH4SO4-	0.000e+00	0.000e+00	-61.624	-61.719	-0.095	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-385.512	-385.649	-0.137	(0)
Se (-2)	0.000e+00					
HSe-	0.000e+00	0.000e+00	-98.862	-98.998	-0.137	(0)
H2Se	0.000e+00	0.000e+00	-100.368	-100.368	0.000	(0)
MnSe	0.000e+00	0.000e+00	-107.928	-107.928	0.000	(0)
Se-2	0.000e+00	0.000e+00	-108.345	-108.892	-0.547	(0)
Se (4)	2.859e-18					
HSeO3-	2.850e-18	2.080e-18	-17.545	-17.682	-0.137	(0)
SeO3-2	5.012e-21	1.422e-21	-20.300	-20.847	-0.547	(0)
H2SeO3	4.781e-21	4.781e-21	-20.320	-20.320	0.000	(0)
FeHSeO3+2	2.681e-26	7.609e-27	-25.572	-26.119	-0.547	(0)
Cd (SeO3) 2-2	0.000e+00	0.000e+00	-44.114	-44.661	-0.547	(0)
Se (6)	1.271e-07					
SeO4-2	1.270e-07	5.219e-08	-6.896	-7.282	-0.386	(0)
CoSeO4	6.121e-11	6.121e-11	-10.213	-10.213	0.000	(0)
NiSeO4	4.985e-11	4.985e-11	-10.302	-10.302	0.000	(0)
HSeO4-	1.720e-11	1.256e-11	-10.764	-10.901	-0.137	(0)
ZnSeO4	1.474e-11	1.474e-11	-10.832	-10.832	0.000	(0)
MnSeO4	2.045e-14	2.045e-14	-13.689	-13.689	0.000	(0)
CdSeO4	1.188e-14	1.188e-14	-13.925	-13.925	0.000	(0)
Zn (SeO4) 2-2	2.748e-18	7.800e-19	-17.561	-18.108	-0.547	(0)
Zn	7.523e-06					
Zn+2	4.436e-06	1.823e-06	-5.353	-5.739	-0.386	(0)
ZnSO4	2.497e-06	2.497e-06	-5.603	-5.603	0.000	(0)
Zn (SO4) 2-2	5.225e-07	1.483e-07	-6.282	-6.829	-0.547	(0)
ZnCl+	6.185e-08	4.902e-08	-7.209	-7.310	-0.101	(0)
ZnNO3+	3.692e-09	2.695e-09	-8.433	-8.569	-0.137	(0)
ZnCl2	6.944e-10	6.944e-10	-9.158	-9.158	0.000	(0)
ZnOH+	3.043e-10	2.221e-10	-9.517	-9.653	-0.137	(0)
ZnOHCl	1.191e-10	1.191e-10	-9.924	-9.924	0.000	(0)
ZnHCO3+	6.560e-11	4.788e-11	-10.183	-10.320	-0.137	(0)
ZnSeO4	1.474e-11	1.474e-11	-10.832	-10.832	0.000	(0)
ZnCl3-	7.573e-12	6.003e-12	-11.121	-11.222	-0.101	(0)
ZnCO3	7.264e-13	7.264e-13	-12.139	-12.139	0.000	(0)
Zn (NO3) 2	2.970e-13	2.970e-13	-12.527	-12.527	0.000	(0)
Zn (OH) 2	9.243e-14	9.243e-14	-13.034	-13.034	0.000	(0)
ZnCl4-2	7.666e-14	3.203e-14	-13.115	-13.494	-0.379	(0)
Zn (SeO4) 2-2	2.748e-18	7.800e-19	-17.561	-18.108	-0.547	(0)

Zn(OH) 3-	1.135e-18	8.285e-19	-17.945	-18.082	-0.137	(0)
Zn(OH) 4-2	2.078e-25	5.899e-26	-24.682	-25.229	-0.547	(0)
Zn(HS) 2	0.000e+00	0.000e+00	-276.580	-276.580	0.000	(0)
ZnS(HS) -	0.000e+00	0.000e+00	-277.203	-277.340	-0.137	(0)
Zn(HS) 3-	0.000e+00	0.000e+00	-414.993	-415.130	-0.137	(0)
ZnS(HS) 2-2	0.000e+00	0.000e+00	-419.313	-419.860	-0.547	(0)
Zn(HS) 4-2	0.000e+00	0.000e+00	-557.873	-558.420	-0.547	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-313.50	-307.23	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-309.19	-304.65	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-316.46	-304.65	11.81	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-381.76	-363.83	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-380.09	-359.96	20.13	(Co(NH3)6)Cl3
(NH4)2CrO4	-130.13	-129.76	0.38	(NH4)2CrO4
(NH4)2SeO4	-128.86	-128.41	0.45	(NH4)2SeO4
Al(OH)3(am)	-3.95	7.18	11.13	Al(OH)3
Al2(MoO4)3	-39.33	-36.18	3.15	Al2(MoO4)3
Al2O3	-6.06	14.36	20.43	Al2O3
Al4(OH)10SO4	-6.66	16.04	22.70	Al4(OH)10SO4
AlAsO4:2H2O	-8.38	-3.58	4.80	AlAsO4:2H2O
AlOHSO4	-2.27	-5.50	-3.23	AlOHSO4
Alunite	-0.12	-0.89	-0.77	KAl3(SO4)2(OH)6
Anglesite	-2.19	-10.02	-7.83	PbSO4
Anhydrite	-0.27	-4.61	-4.34	CaSO4
Anilite	-131.86	-164.28	-32.42	Cu0.25Cu1.5S
Antlerite	-3.76	5.03	8.79	Cu3(OH)4SO4
Aragonite	-5.32	-13.59	-8.26	CaCO3
Arsenolite	-131.24	-134.18	-2.94	As4O6
Artinite	-16.61	-6.65	9.96	MgCO3:Mg(OH)2:3H2O
As2O5	-28.29	-21.52	6.77	As2O5
Atacamite	-3.06	4.61	7.67	Cu2(OH)3Cl
Azurite	-8.98	-25.60	-16.62	Cu3(OH)2(CO3)2
Ba(OH)2:8H2O	-20.98	3.57	24.56	Ba(OH)2:8H2O
Ba3(AsO4)2	-1.84	-10.78	-8.94	Ba3(AsO4)2
BaCrO4	-5.78	-15.55	-9.77	BaCrO4
BaHPO4	-6.71	-26.48	-19.77	BaHPO4
BaMoO4	-6.28	-13.27	-6.99	BaMoO4
Barite	0.94	-9.11	-10.05	BaSO4
BaS	-159.68	-143.50	16.18	BaS
BaSeO3	-21.15	-19.35	1.79	BaSeO3
BaSeO4	-6.68	-14.20	-7.53	BaSeO4
Be(OH)2(alpha)	-3.67	3.22	6.89	Be(OH)2
Be(OH)2(am)	-3.97	3.22	7.19	Be(OH)2
Be(OH)2(beta)	-3.27	3.22	6.49	Be(OH)2
BeMoO4	-12.01	-13.63	-1.61	BeMoO4
BeS	-163.24	-143.86	19.38	BeS
BeSeO4:4H2O	-11.62	-14.56	-2.94	BeSeO4:4H2O
Bianchite	-6.16	-7.93	-1.76	ZnSO4:6H2O
Birnessite	0.00	18.09	18.09	MnO2
Bixbyite	-5.60	-5.88	-0.27	Mn2O3
BlaubleiI	-120.09	-144.26	-24.16	Cu0.9Cu0.2S
BlaubleiII	-126.22	-153.50	-27.28	Cu0.6Cu0.8S
Boehmite	-1.75	7.18	8.93	AlOOH
Brochantite	-4.89	10.94	15.83	Cu4(OH)6SO4
Brucite	-9.68	7.51	17.18	Mg(OH)2
Bunsenite	-7.89	4.85	12.74	NiO
Ca3(AsO4)2:4H2O	-19.60	2.70	22.30	Ca3(AsO4)2:4H2O
Ca3(PO4)2(beta)	-6.82	-35.90	-29.08	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-10.81	-57.89	-47.08	Ca4H(PO4)3:3H2O
CaCrO4	-8.87	-11.06	-2.19	CaCrO4
CaHPO4	-2.62	-21.99	-19.37	CaHPO4
CaHPO4:2H2O	-2.93	-21.99	-19.06	CaHPO4:2H2O
Calcite	-5.13	-13.59	-8.46	CaCO3
CaMoO4	-0.83	-8.78	-7.94	CaMoO4

CaSeO3:2H2O	-17.73	-14.86	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-6.71	-9.71	-3.00	CaSeO4:2H2O
Cd(BO2)2	-18.30	-8.46	9.84	Cd(BO2)2
Cd(OH)2	-12.34	1.59	13.93	Cd(OH)2
Cd(OH)2(am)	-12.40	1.59	13.99	Cd(OH)2
Cd3(OH)2(SO4)2	-27.32	-20.61	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-30.49	-7.93	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-22.76	-55.36	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-34.74	-6.34	28.40	Cd4(OH)6SO4
CdCl2	-12.22	-12.82	-0.60	CdCl2
CdCl2:1H2O	-11.15	-12.82	-1.67	CdCl2:1H2O
CdCl2:2.5H2O	-10.89	-12.82	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-54.21	-40.47	13.74	Cd
Cdmetal(gamma)	-54.32	-40.47	13.84	Cd
CdMoO4	-1.05	-15.26	-14.21	CdMoO4
CdOHCl	-9.25	-5.62	3.63	CdOHCl
CdSe	-82.23	-102.66	-20.43	CdSe
CdSeO4:2H2O	-14.35	-16.20	-1.85	CdSeO4:2H2O
CdSO4	-11.08	-11.10	-0.02	CdSO4
CdSO4:1H2O	-9.47	-11.10	-1.63	CdSO4:1H2O
CdSO4:2.67H2O	-9.28	-11.10	-1.82	CdSO4:2.67H2O
Cerussite	-5.79	-18.99	-13.20	PbCO3
CH4(g)	-148.08	-189.90	-41.81	CH4
Chalcanthite	-4.12	-6.78	-2.66	CuSO4:5H2O
Chalcocite	-136.57	-171.99	-35.42	Cu2S
Chalcopyrite	-256.44	-292.16	-35.71	CuFeS2
Claudetite	-130.95	-134.18	-3.23	As4O6
Clausthalite	-74.13	-101.58	-27.46	PbSe
Co(BO2)2	-32.21	-5.14	27.07	Co(BO2)2
Co(OH)2	-8.19	4.90	13.09	Co(OH)2
Co(OH)3	-4.43	-6.47	-2.03	Co(OH)3
CO2(g)	-3.50	-21.66	-18.16	CO2
Co3(AsO4)2	-19.84	-6.81	13.03	Co3(AsO4)2
Co3(PO4)2	-10.72	-45.41	-34.69	Co3(PO4)2
Co3O4	2.15	-8.03	-10.17	Co3O4
CoCl2	-18.01	-9.50	8.51	CoCl2
CoCl2:6H2O	-12.02	-9.51	2.51	CoCl2:6H2O
CoCO3	-6.81	-16.75	-9.94	CoCO3
CoFe2O4	15.89	12.84	-3.05	CoFe2O4
CoHPO4	-6.10	-25.16	-19.06	CoHPO4
CoMoO4	-4.25	-11.94	-7.69	CoMoO4
CoO	-9.00	4.90	13.90	CoO
CoS(alpha)	-134.74	-142.18	-7.44	CoS
CoS(beta)	-131.11	-142.18	-11.07	CoS
CoSe	-83.14	-99.34	-16.20	CoSe
CoSeO3	-19.35	-18.03	1.32	CoSeO3
CoSeO4:6H2O	-11.35	-12.88	-1.53	CoSeO4:6H2O
CoSO4	-10.82	-7.78	3.04	CoSO4
CoSO4:6H2O	-5.31	-7.78	-2.48	CoSO4:6H2O
Cotunnite	-6.89	-11.74	-4.86	PbCl2
Covellite	-118.58	-141.17	-22.59	CuS
Cr(OH)2	-43.56	-32.63	10.93	Cr(OH)2
Cr(OH)3	-15.96	-14.53	1.42	Cr(OH)3
Cr(OH)3(am)	-13.78	-14.53	-0.75	Cr(OH)3
Cr2O3	-26.86	-29.07	-2.21	Cr2O3
CrCl2	-61.47	-47.04	14.42	CrCl2
CrCl3	-51.62	-36.15	15.48	CrCl3
Crmetal	-105.69	-74.69	31.00	Cr
CrO3	-15.93	-19.13	-3.19	CrO3
Cu(OH)2	-2.94	5.91	8.84	Cu(OH)2
Cu2(OH)3NO3	-6.15	3.32	9.47	Cu2(OH)3NO3
Cu2Se(alpha)	-82.72	-129.16	-46.44	Cu2Se
Cu2SO4	-35.70	-37.59	-1.89	Cu2SO4
Cu3(AsO4)2:2H2O	-9.90	-3.80	6.10	Cu3(AsO4)2:2H2O
Cu3(PO4)2	-5.56	-42.41	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-7.29	-42.41	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	-162.99	-227.50	-64.51	Cu3Se2
CuCO3	-4.25	-15.75	-11.50	CuCO3

CuCrO4	-7.78	-13.22	-5.44	CuCrO4
Cumetal	-24.51	-33.48	-8.97	Cu
CuMoO4	2.17	-10.94	-13.11	CuMoO4
CuOCuSO4	-11.59	-0.87	10.71	CuOCuSO4
Cupricferrite	7.22	13.84	6.62	CuFe2O4
Cuprite	-23.87	-24.91	-1.04	Cu2O
Cuprousferrite	0.38	-8.49	-8.87	CuFeO2
CuSe	-64.88	-98.34	-33.46	CuSe
CuSe2	-126.75	-160.53	-33.79	CuSe2
CuSeO3:2H2O	-17.65	-17.03	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-9.44	-11.88	-2.44	CuSeO4:5H2O
CuSO4	-9.94	-6.78	3.16	CuSO4
Diaspore	0.00	7.18	7.18	AlOOH
Djurleite	-135.44	-169.95	-34.52	Cu0.066Cu1.868S
Dolomite(disordered)	-11.34	-27.74	-16.40	CaMg(CO3)2
Dolomite(ordered)	-10.77	-27.74	-16.97	CaMg(CO3)2
Epsomite	-3.02	-5.18	-2.16	MgSO4:7H2O
Fe(OH)2	-17.47	-3.91	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	4.84	1.80	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-16.56	-15.00	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-40.24	-60.86	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-27.11	-30.12	-3.01	Fe2(SO4)3
Fe3(OH)8	-16.20	4.02	20.22	Fe3(OH)8
FeAsO4:2H2O	-7.20	-6.80	0.40	FeAsO4:2H2O
FeCr2O4	-40.59	-32.97	7.62	FeCr2O4
FeMoO4	-10.70	-20.75	-10.06	FeMoO4
Ferrihydrite	0.55	3.96	3.41	Fe(OH)3
Ferroselite	-151.60	-170.34	-18.74	FeSe2
FeS(ppt)	-148.07	-150.98	-2.92	FeS
FeSe	-97.15	-108.15	-11.01	FeSe
Fix_pH	-5.25	-5.25	0.00	H+
Galena	-130.21	-144.41	-14.21	PbS
Gibbsite	-1.40	7.18	8.58	Al(OH)3
Goethite	3.29	3.96	0.67	FeOOH
Goslarite	-5.87	-7.93	-2.05	ZnSO4:7H2O
Greenockite	-130.97	-145.49	-14.52	CdS
Greigite	-539.26	-584.29	-45.03	Fe3S4
Gypsum	0.00	-4.61	-4.61	CaSO4:2H2O
H-Jarosite	-2.06	-13.48	-11.41	(H3O)Fe3(SO4)2(OH)6
H2MoO4	-3.83	-16.85	-13.02	H2MoO4
H2S(g)	-139.07	-147.08	-8.01	H2S
H2Se(g)	-99.33	-104.25	-4.91	H2Se
Halite	-5.48	-3.89	1.59	NaCl
Hausmannite	-15.12	47.17	62.29	Mn3O4
Hematite	8.96	7.93	-1.03	Fe2O3
Hercynite	-13.37	10.46	23.83	FeAl2O4
Hinsdalite	-16.04	-18.54	-2.50	PbAl3PO4SO4(OH)6
Huntite	-26.40	-56.04	-29.65	CaMg3(CO3)4
Hydrocerussite	-16.55	-35.32	-18.77	Pb3(OH)2(CO3)2
Hydromagnesite	-40.99	-49.11	-8.11	Mg5(CO3)4(OH)2:4H2O
Hydroxylapatite	-5.49	-49.82	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-14.07	-76.86	-62.79	Pb5(PO4)3OH
K-Alum	-10.00	-15.26	-5.26	KAl(SO4)2:12H2O
K-Jarosite	3.87	-10.54	-14.41	KFe3(SO4)2(OH)6
K2Cr2O7	-14.91	-32.39	-17.48	K2Cr2O7
K2CrO4	-12.69	-13.26	-0.57	K2CrO4
K2MoO4	-14.25	-10.98	3.27	K2MoO4
K2SeO4	-11.19	-11.92	-0.73	K2SeO4
Langite	-7.05	10.94	17.98	Cu4(OH)6SO4:H2O
Larnakite	-6.99	-7.35	-0.37	PbO:PbSO4
Laurionite	-5.16	-4.54	0.62	PbOHCl
Lepidocrocite	2.59	3.96	1.37	FeOOH
Lime	-25.21	8.07	33.28	CaO
Litharge	-10.22	2.66	12.89	PbO
Mackinawite	-147.38	-150.98	-3.60	FeS
Maghemite	1.54	7.93	6.39	Fe2O3
Magnesioferrite	-2.26	15.44	17.69	Fe2MgO4
Magnesite	-6.63	-14.15	-7.52	MgCO3

Magnetite	0.00	4.03	4.03	Fe3O4
Malachite	-4.31	-9.85	-5.53	Cu2 (OH) 2CO3
Manganite	-2.61	22.73	25.34	MnOOH
Massicot	-10.43	2.66	13.09	PbO
Melanothallite	-14.95	-8.50	6.45	CuCl2
Melanterite	-14.32	-16.59	-2.27	FeSO4:7H2O
Mg (OH) 2 (active)	-11.29	7.51	18.79	Mg (OH) 2
Mg3 (PO4) 2	-14.32	-37.60	-23.28	Mg3 (PO4) 2
MgCr2O4	-38.30	-21.56	16.74	MgCr2O4
MgCrO4	-17.27	-11.62	5.65	MgCrO4
MgHPO4:3H2O	-4.38	-22.56	-18.18	MgHPO4:3H2O
MgMoO4	-7.49	-9.34	-1.85	MgMoO4
MgSeO3:6H2O	-18.47	-15.43	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-9.08	-10.28	-1.20	MgSeO4:6H2O
Minium	-24.73	50.05	74.78	Pb3O4
Mirabilite	-4.71	-6.06	-1.35	Na2SO4:10H2O
Mn2 (SO4) 3	-38.71	-43.93	-5.22	Mn2 (SO4) 3
Mn3 (AsO4) 2:8H2O	-28.91	-16.41	12.50	Mn3 (AsO4) 2:8H2O
Mn3 (PO4) 2	-31.16	-55.01	-23.85	Mn3 (PO4) 2
MnCl2:4H2O	-15.45	-12.71	2.75	MnCl2:4H2O
MnHPO4	-2.96	-28.36	-25.40	MnHPO4
MnS (grn)	-145.64	-145.38	0.27	MnS
MnS (pnk)	-148.72	-145.38	3.34	MnS
MnSe	-106.34	-102.54	3.79	MnSe
MnSeO3	-22.36	-21.23	1.13	MnSeO3
MnSeO3:2H2O	-22.18	-21.23	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-14.03	-16.08	-2.05	MnSeO4:5H2O
MnSO4	-13.76	-10.98	2.78	MnSO4
Monteponite	-13.83	1.59	15.41	CdO
MoO3	-8.85	-16.85	-8.00	MoO3
Morenosite	-5.66	-7.84	-2.18	NiSO4:7H2O
MoS2	-281.64	-353.07	-71.42	MoS2
Na-Jarosite	0.59	-10.16	-10.75	NaFe3 (SO4) 2 (OH) 6
Na2Cr2O7	-21.67	-31.63	-9.96	Na2Cr2O7
Na2CrO4	-15.49	-12.50	2.99	Na2CrO4
Na2Mo2O7	-10.30	-27.07	-16.76	Na2Mo2O7
Na2MoO4	-11.74	-10.22	1.52	Na2MoO4
Na2MoO4:2H2O	-11.45	-10.22	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-26.61	-16.31	10.30	Na2SeO3:5H2O
Na2SeO4	-12.43	-11.15	1.28	Na2SeO4
Nantokite	-12.80	-19.66	-6.86	CuCl
Natron	-13.53	-15.04	-1.51	Na2CO3:10H2O
Nesquehonite	-9.56	-14.15	-4.60	MgCO3:3H2O
Ni (OH) 2	-8.23	4.85	13.08	Ni (OH) 2
Ni3 (AsO4) 2:8H2O	-22.67	-6.97	15.70	Ni3 (AsO4) 2:8H2O
Ni3 (PO4) 2	-14.27	-45.57	-31.30	Ni3 (PO4) 2
Ni4 (OH) 6SO4	-25.28	6.72	32.00	Ni4 (OH) 6SO4
NiCO3	-10.06	-16.81	-6.75	NiCO3
NiMoO4	-0.85	-12.00	-11.15	NiMoO4
NiS (alpha)	-136.63	-142.23	-5.60	NiS
NiS (beta)	-131.13	-142.23	-11.10	NiS
NiS (gamma)	-129.43	-142.23	-12.80	NiS
NiSe	-81.70	-99.40	-17.70	NiSe
NiSeO3:2H2O	-20.99	-18.08	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-11.41	-12.93	-1.52	NiSeO4:6H2O
Nsutite	0.59	18.09	17.50	MnO2
O2 (g)	-0.68	84.12	84.80	O2
Orpiment	-446.22	-508.33	-62.11	As2S3
Otavite	-8.07	-20.07	-12.00	CdCO3
Pb (BO2) 2	-13.95	-7.38	6.57	Pb (BO2) 2
Pb (OH) 2	-5.66	2.66	8.32	Pb (OH) 2
Pb10 (OH) 60 (CO3) 6	-94.55	-103.31	-8.76	Pb10 (OH) 60 (CO3) 6
Pb2 (OH) 3Cl	-10.67	-1.88	8.79	Pb2 (OH) 3Cl
Pb2O (OH) 2	-20.86	5.33	26.19	Pb2O (OH) 2
Pb2O3	-13.65	47.39	61.04	Pb2O3
Pb2OCO3	-15.89	-16.33	-0.44	Pb2OCO3
Pb3 (AsO4) 2	-19.33	-13.53	5.80	Pb3 (AsO4) 2
Pb3 (PO4) 2	-8.60	-52.13	-43.53	Pb3 (PO4) 2

Pb3O2CO3	-25.02	-13.66	11.35	Pb3O2CO3
Pb3O2SO4	-15.61	-4.69	10.92	Pb3O2SO4
Pb4(OH)6SO4	-23.13	-2.03	21.10	Pb4(OH)6SO4
Pb4O3SO4	-24.31	-2.03	22.28	Pb4O3SO4
PbCrO4	-3.73	-16.46	-12.73	PbCrO4
PbHPO4	-3.59	-27.40	-23.81	PbHPO4
Pbmetal	-43.64	-39.39	4.24	Pb
PbMoO4	1.60	-14.18	-15.78	PbMoO4
PbO:0.3H2O	-10.32	2.66	12.98	PbO:0.33H2O
PbSeO4	-8.23	-15.12	-6.88	PbSeO4
Periclase	-14.53	7.51	22.04	MgO
Phosgenite	-10.93	-30.74	-19.81	PbCl2:PbCO3
Plattnerite	-5.76	44.72	50.49	PbO2
Plumbgummite	-3.13	-35.92	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-15.12	8.07	23.19	Ca(OH)2
Pyrite	-237.35	-256.01	-18.66	FeS2
Pyrochroite	-13.78	1.70	15.48	Mn(OH)2
Pyrolusite	1.57	43.76	42.19	MnO2
Pyromorphite	0.36	-84.07	-84.43	Pb5(PO4)3Cl
Realgar	-181.53	-201.65	-20.13	AsS
Retgersite	-5.78	-7.84	-2.05	NiSO4:6H2O
Rhodochrosite	-9.38	-19.95	-10.57	MnCO3
Semetal(am)	-55.05	-62.19	-7.14	Se
Semetal(hex)	-54.43	-62.19	-7.76	Se
SeO2	-23.05	-22.93	0.12	SeO2
SeO3	-39.26	-17.78	21.48	SeO3
Siderite	-15.37	-25.56	-10.19	FeCO3
Smithsonite	-6.95	-16.90	-9.95	ZnCO3
Sphalerite	-130.78	-142.32	-11.54	ZnS
Spinel	-16.14	21.87	38.01	MgAl2O4
Strengite	0.27	-26.10	-26.37	FePO4:2H2O
Sulfur	-102.92	-105.02	-2.10	S
Tenorite	-1.93	5.91	7.84	CuO
Thenardite	-6.41	-6.06	0.35	Na2SO4
Thermonatrite	-15.70	-15.03	0.67	Na2CO3:H2O
Tsumebite	-9.04	-18.83	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	-35.84	-71.84	-36.00	Fe3(PO4)2:8H2O
Witherite	-9.50	-18.08	-8.58	BaCO3
Wurtzite	-133.31	-142.32	-9.01	ZnS
Zincite	-6.84	4.76	11.60	ZnO
Zincosite	-12.10	-7.92	4.18	ZnSO4
Zn(BO2)2	-13.58	-5.29	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-15.47	-12.23	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-7.44	4.76	12.20	Zn(OH)2
Zn(OH)2(am)	-7.96	4.76	12.71	Zn(OH)2
Zn(OH)2(beta)	-7.24	4.76	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-7.02	4.76	11.78	Zn(OH)2
Zn(OH)2(gamma)	-6.97	4.76	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.66	-3.16	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.88	2.32	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-20.89	-7.24	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-10.42	-45.84	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-30.77	-11.09	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-22.04	6.36	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-29.11	9.39	38.50	Zn5(OH)8Cl2
ZnCl2	-16.91	-9.65	7.27	ZnCl2
ZnCO3:1H2O	-6.64	-16.90	-10.26	ZnCO3:1H2O
Znmetal	-63.55	-37.30	26.25	Zn
ZnMoO4	-1.99	-12.09	-10.09	ZnMoO4
ZnO(active)	-6.69	4.76	11.45	ZnO
ZnS(am)	-133.22	-142.32	-9.10	ZnS
ZnSe	-85.01	-99.49	-14.48	ZnSe
ZnSeO4:6H2O	-11.50	-13.02	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.42	-7.92	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 8.

```
USE solution 1
EQUILIBRIUM_PHASES 5
  Birnessite 0 0
  Diaspore 0 0
  Fix_pH -5.5 Portlandite 10
  Magnetite 0 0
  O2(g) -0.68 10
  CO2(g) -3.5 10
END
```

Beginning of batch-reaction calculations.

Reaction step 1.

Using solution 1.

Using pure phase assemblage 5.

-----User print-----

```
Moles of Portlandite: -1.4051e-03
Moles of Diaspore: -1.4051e-03
Moles of Magnetite: -1.4051e-03
Moles of Birnessite: -1.4051e-03
mg of Portlandite: -1.0411e+02
mg of Diaspore: -8.4293e+01
mg of Birnessite: -1.2215e+02
```

-----Phase assemblage-----

Phase	SI	log IAP	log K(T, P)	Moles in assemblage		
				Initial	Final	Delta
Birnessite	0.00	18.09	18.09	0.000e+00	9.539e-05	9.539e-05
CO2(g)	-3.50	-21.66	-18.16	1.000e+01	1.000e+01	-1.455e-05
Diaspore	-0.00	7.18	7.18	0.000e+00	5.280e-05	5.280e-05
Fix_pH	-5.50	-5.50	0.00			
Ca(OH)2		is reactant		1.000e+01	9.999e+00	-1.405e-03
Magnetite	0.00	4.03	4.03	0.000e+00	1.475e-04	1.475e-04
O2(g)	-0.68	84.12	84.80	1.000e+01	9.998e+00	-2.051e-03

-----Solution composition-----

Elements	Molality	Moles
Al	3.836e-08	3.836e-08
As	2.680e-08	2.680e-08
B	9.287e-06	9.287e-06
Ba	2.924e-07	2.924e-07
Be	2.228e-07	2.228e-07
C	1.455e-05	1.455e-05
Ca	1.448e-02	1.448e-02
Cd	7.145e-09	7.145e-09
Cl	1.388e-02	1.388e-02
Co	1.227e-05	1.227e-05
Cr	6.372e-08	6.372e-08
Cu	9.874e-05	9.874e-05
Fe	9.221e-07	9.221e-07
K	6.291e-03	6.291e-03
Mg	3.635e-03	3.635e-03

Mn	2.350e-09	2.350e-09
Mo	1.151e-06	1.151e-06
N	7.218e-04	7.218e-04
Na	1.498e-02	1.498e-02
Ni	8.382e-06	8.382e-06
P	9.399e-06	9.400e-06
Pb	9.690e-08	9.691e-08
S	2.322e-02	2.322e-02
Se	1.271e-07	1.271e-07
Zn	7.523e-06	7.523e-06

-----Description of solution-----

pH	=	5.500	Charge balance
pe	=	15.530	Adjusted to redox equilibrium
Activity of water	=	0.999	
Ionic strength (mol/kgw)	=	7.310e-02	
Mass of water (kg)	=	1.000e+00	
Total alkalinity (eq/kg)	=	-3.020e-06	
Total CO2 (mol/kg)	=	1.455e-05	
Temperature (°C)	=	20.00	
Electrical balance (eq)	=	-3.291e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-3.61	
Iterations	=	23	
Total H	=	1.110195e+02	
Total O	=	5.560585e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	3.950e-06	3.162e-06	-5.403	-5.500	-0.097	0.00
OH-	2.755e-09	2.166e-09	-8.560	-8.664	-0.104	(0)
H2O	5.551e+01	9.988e-01	1.744	-0.001	0.000	18.05
Al	3.836e-08					
AlSO4+	2.519e-08	2.011e-08	-7.599	-7.697	-0.098	(0)
Al(OH) 2+	4.780e-09	3.863e-09	-8.321	-8.413	-0.092	(0)
Al+3	3.555e-09	4.808e-10	-8.449	-9.318	-0.869	(0)
AlOH+2	2.580e-09	1.100e-09	-8.588	-8.958	-0.370	(0)
Al(SO4) 2-	1.970e-09	1.573e-09	-8.706	-8.803	-0.098	(0)
Al(OH) 3	2.451e-10	2.451e-10	-9.611	-9.611	0.000	(0)
Al(OH) 4-	3.732e-11	2.980e-11	-10.428	-10.526	-0.098	(0)
AlMo6O21-3	7.500e-25	4.409e-26	-24.125	-25.356	-1.231	(0)
As (3)	1.543e-34					
H3AsO3	1.542e-34	1.542e-34	-33.812	-33.812	0.000	(0)
H2AsO3-	2.838e-38	2.071e-38	-37.547	-37.684	-0.137	(0)
H4AsO3+	3.311e-40	2.416e-40	-39.480	-39.617	-0.137	(0)
HAsO3-2	0.000e+00	0.000e+00	-43.772	-44.319	-0.547	(0)
AsO3-3	0.000e+00	0.000e+00	-51.078	-52.309	-1.231	(0)
As (5)	2.680e-08					
H2AsO4-	2.464e-08	1.798e-08	-7.608	-7.745	-0.137	(0)
HAsO4-2	2.152e-09	6.108e-10	-8.667	-9.214	-0.547	(0)
H3AsO4	9.254e-12	9.411e-12	-11.034	-11.026	0.007	(0)
AsO4-3	9.242e-15	5.434e-16	-14.034	-15.265	-1.231	(0)
B	9.287e-06					
H3BO3	9.284e-06	9.442e-06	-5.032	-5.025	0.007	(0)
H2BO3-	2.052e-09	1.586e-09	-8.688	-8.800	-0.112	(0)
CaH2BO3+	4.308e-10	3.329e-10	-9.366	-9.478	-0.112	(0)
MgH2BO3+	7.232e-11	5.588e-11	-10.141	-10.253	-0.112	(0)
NaH2BO3	3.186e-11	3.186e-11	-10.497	-10.497	0.000	(0)
H5(BO3) 2-	1.702e-14	1.315e-14	-13.769	-13.881	-0.112	(0)
BaH2BO3+	7.400e-15	5.719e-15	-14.131	-14.243	-0.112	(0)
H8(BO3) 3-	1.391e-17	1.075e-17	-16.857	-16.969	-0.112	(0)
Ba	2.924e-07					
Ba+2	2.919e-07	1.200e-07	-6.535	-6.921	-0.386	(0)
BaNO3+	5.136e-10	3.748e-10	-9.289	-9.426	-0.137	(0)
BaHCO3+	1.935e-12	1.575e-12	-11.713	-11.803	-0.089	(0)

		BaH2BO3+	7.400e-15	5.719e-15	-14.131	-14.243	-0.112	(0)
		BaOH+	1.363e-15	1.096e-15	-14.865	-14.960	-0.095	(0)
		BaCO3	1.207e-15	1.207e-15	-14.918	-14.918	0.000	(0)
		BaNH3+2	0.000e+00	0.000e+00	-71.382	-71.929	-0.547	(0)
Be	2.228e-07							
		Be+2	1.108e-07	4.554e-08	-6.955	-7.342	-0.386	(0)
		BeOH+	7.041e-08	5.766e-08	-7.152	-7.239	-0.087	(0)
		BeSO4	3.775e-08	3.775e-08	-7.423	-7.423	0.000	(0)
		Be (SO4) 2-2	2.702e-09	7.668e-10	-8.568	-9.115	-0.547	(0)
		BeCl+	9.993e-10	8.034e-10	-9.000	-9.095	-0.095	(0)
		Be (OH) 2	1.157e-10	1.157e-10	-9.937	-9.937	0.000	(0)
		Be2OH+3	2.631e-12	4.358e-13	-11.580	-12.361	-0.781	(0)
		BeCO3	1.792e-12	1.792e-12	-11.747	-11.747	0.000	(0)
		Be3 (OH) 3+3	2.799e-14	4.634e-15	-13.553	-14.334	-0.781	(0)
		Be (OH) 3-	1.129e-14	9.243e-15	-13.947	-14.034	-0.087	(0)
		Be (OH) 4-2	4.125e-23	1.855e-23	-22.385	-22.732	-0.347	(0)
C (4)	1.455e-05							
		H2CO3	1.237e-05	1.237e-05	-4.908	-4.908	0.000	(0)
		HCO3-	2.021e-06	1.633e-06	-5.695	-5.787	-0.092	(0)
		CaHCO3+	1.220e-07	9.937e-08	-6.913	-7.003	-0.089	(0)
		MgHCO3+	2.085e-08	1.652e-08	-7.681	-7.782	-0.101	(0)
		NaHCO3	1.170e-08	1.170e-08	-7.932	-7.932	0.000	(0)
		CuCO3	3.283e-09	3.283e-09	-8.484	-8.484	0.000	(0)
		CuHCO3+	3.251e-09	2.373e-09	-8.488	-8.625	-0.137	(0)
		NiHCO3+	5.609e-10	4.094e-10	-9.251	-9.388	-0.137	(0)
		CoHCO3+	4.000e-10	2.920e-10	-9.398	-9.535	-0.137	(0)
		ZnHCO3+	1.167e-10	8.514e-11	-9.933	-10.070	-0.137	(0)
		CaCO3	1.166e-10	1.166e-10	-9.933	-9.933	0.000	(0)
		CO3-2	5.328e-11	2.190e-11	-10.273	-10.660	-0.386	(0)
		PbHCO3+	2.198e-11	1.604e-11	-10.658	-10.795	-0.137	(0)
		MgCO3	1.704e-11	1.704e-11	-10.768	-10.768	0.000	(0)
		NaCO3-	6.727e-12	5.437e-12	-11.172	-11.265	-0.092	(0)
		ZnCO3	2.297e-12	2.297e-12	-11.639	-11.639	0.000	(0)
		BaHCO3+	1.935e-12	1.575e-12	-11.713	-11.803	-0.089	(0)
		NiCO3	1.837e-12	1.837e-12	-11.736	-11.736	0.000	(0)
		BeCO3	1.792e-12	1.792e-12	-11.747	-11.747	0.000	(0)
		PbCO3	9.623e-13	9.623e-13	-12.017	-12.017	0.000	(0)
		CoCO3	9.406e-13	9.406e-13	-12.027	-12.027	0.000	(0)
		MnHCO3+	1.998e-14	1.607e-14	-13.699	-13.794	-0.095	(0)
		CdHCO3+	5.629e-15	4.109e-15	-14.250	-14.386	-0.137	(0)
		BaCO3	1.207e-15	1.207e-15	-14.918	-14.918	0.000	(0)
		Cu (CO3) 2-2	6.818e-16	1.935e-16	-15.166	-15.713	-0.547	(0)
		CdCO3	6.099e-16	6.099e-16	-15.215	-15.215	0.000	(0)
		Pb (CO3) 2-2	2.141e-19	6.077e-20	-18.669	-19.216	-0.547	(0)
		FeHCO3+	2.848e-20	2.319e-20	-19.545	-19.635	-0.089	(0)
		Cd (CO3) 2-2	3.488e-23	9.899e-24	-22.457	-23.004	-0.547	(0)
Ca	1.448e-02							
		Ca+2	9.125e-03	3.750e-03	-2.040	-2.426	-0.386	(0)
		CaSO4	5.345e-03	5.345e-03	-2.272	-2.272	0.000	(0)
		CaNO3+	9.614e-06	7.017e-06	-5.017	-5.154	-0.137	(0)
		CaH2PO4+	6.065e-07	4.902e-07	-6.217	-6.310	-0.092	(0)
		CaHPO4	1.965e-07	1.965e-07	-6.707	-6.707	0.000	(0)
		CaHCO3+	1.220e-07	9.937e-08	-6.913	-7.003	-0.089	(0)
		CaH2BO3+	4.308e-10	3.329e-10	-9.366	-9.478	-0.112	(0)
		CaOH+	1.880e-10	1.531e-10	-9.726	-9.815	-0.089	(0)
		CaPO4-	1.833e-10	1.481e-10	-9.737	-9.829	-0.092	(0)
		CaCO3	1.166e-10	1.166e-10	-9.933	-9.933	0.000	(0)
		CaNH3+2	0.000e+00	0.000e+00	-66.587	-67.134	-0.547	(0)
		Ca (NH3) 2+2	0.000e+00	0.000e+00	-131.795	-132.342	-0.547	(0)
Cd	7.145e-09							
		Cd+2	2.974e-09	1.222e-09	-8.527	-8.913	-0.386	(0)
		CdCl+	1.764e-09	1.288e-09	-8.754	-8.890	-0.137	(0)
		CdSO4	1.763e-09	1.763e-09	-8.754	-8.754	0.000	(0)
		Cd (SO4) 2-2	5.812e-10	1.650e-10	-9.236	-9.783	-0.547	(0)
		CdCl2	5.881e-11	5.881e-11	-10.231	-10.231	0.000	(0)
		CdNO3+	3.488e-12	2.546e-12	-11.457	-11.594	-0.137	(0)
		CdCl3-	5.382e-13	3.928e-13	-12.269	-12.406	-0.137	(0)
		CdOHC1	1.492e-13	1.492e-13	-12.826	-12.826	0.000	(0)

CdOH+	2.901e-14	2.117e-14	-13.537	-13.674	-0.137	(0)
CdSeO4	1.188e-14	1.188e-14	-13.925	-13.925	0.000	(0)
CdHCO3+	5.629e-15	4.109e-15	-14.250	-14.386	-0.137	(0)
Cd(NO3) 2	6.295e-16	6.295e-16	-15.201	-15.201	0.000	(0)
CdCO3	6.099e-16	6.099e-16	-15.215	-15.215	0.000	(0)
Cd(OH) 2	6.195e-19	6.195e-19	-18.208	-18.208	0.000	(0)
Cd2OH+3	2.347e-21	1.380e-22	-20.630	-21.860	-1.231	(0)
Cd(CO3) 2-2	3.488e-23	9.899e-24	-22.457	-23.004	-0.547	(0)
Cd(OH) 3-	1.649e-25	1.204e-25	-24.783	-24.919	-0.137	(0)
Cd(OH) 4-2	2.208e-34	6.266e-35	-33.656	-34.203	-0.547	(0)
Cd(SeO3) 2-2	0.000e+00	0.000e+00	-44.114	-44.661	-0.547	(0)
CdHS+	0.000e+00	0.000e+00	-142.848	-142.985	-0.137	(0)
Cd(HS) 2	0.000e+00	0.000e+00	-277.861	-277.861	0.000	(0)
Cd(HS) 3-	0.000e+00	0.000e+00	-417.905	-418.042	-0.137	(0)
Cd(HS) 4-2	0.000e+00	0.000e+00	-557.379	-557.926	-0.547	(0)
Cl	1.388e-02					
Cl-	1.387e-02	1.111e-02	-1.858	-1.954	-0.097	(0)
CuCl+	5.343e-07	4.235e-07	-6.272	-6.373	-0.101	(0)
CoCl+	1.320e-07	9.633e-08	-6.879	-7.016	-0.137	(0)
NiCl+	8.637e-08	6.304e-08	-7.064	-7.200	-0.137	(0)
ZnCl+	6.185e-08	4.902e-08	-7.209	-7.310	-0.101	(0)
PbCl+	7.437e-09	5.428e-09	-8.129	-8.265	-0.137	(0)
CdCl+	1.764e-09	1.288e-09	-8.754	-8.890	-0.137	(0)
CuCl2	1.274e-09	1.274e-09	-8.895	-8.895	0.000	(0)
BeCl+	9.993e-10	8.034e-10	-9.000	-9.095	-0.095	(0)
ZnCl2	6.944e-10	6.944e-10	-9.158	-9.158	0.000	(0)
PbCl2	2.633e-10	2.633e-10	-9.580	-9.580	0.000	(0)
ZnOHC1	2.118e-10	2.118e-10	-9.674	-9.674	0.000	(0)
CdCl2	5.881e-11	5.881e-11	-10.231	-10.231	0.000	(0)
MnCl+	8.816e-12	7.088e-12	-11.055	-11.149	-0.095	(0)
ZnCl3-	7.573e-12	6.002e-12	-11.121	-11.222	-0.101	(0)
NiCl2	3.575e-12	3.575e-12	-11.447	-11.447	0.000	(0)
PbCl3-	1.686e-12	1.230e-12	-11.773	-11.910	-0.137	(0)
CdCl3-	5.382e-13	3.928e-13	-12.269	-12.406	-0.137	(0)
FeCl+2	2.004e-13	8.374e-14	-12.698	-13.077	-0.379	(0)
CuCl3-	1.523e-13	1.207e-13	-12.817	-12.918	-0.101	(0)
CdOHC1	1.492e-13	1.492e-13	-12.826	-12.826	0.000	(0)
MnCl2	1.112e-13	1.112e-13	-12.954	-12.954	0.000	(0)
ZnCl4-2	7.665e-14	3.202e-14	-13.115	-13.495	-0.379	(0)
PbCl4-2	2.044e-14	5.801e-15	-13.690	-14.236	-0.547	(0)
CrO3Cl-	1.207e-14	8.812e-15	-13.918	-14.055	-0.137	(0)
FeCl2+	6.055e-15	4.868e-15	-14.218	-14.313	-0.095	(0)
MnCl3-	4.233e-16	3.403e-16	-15.373	-15.468	-0.095	(0)
CuCl2-	1.456e-16	1.154e-16	-15.837	-15.938	-0.101	(0)
CuCl	4.914e-17	4.914e-17	-16.309	-16.309	0.000	(0)
CuCl4-2	1.907e-17	7.969e-18	-16.720	-17.099	-0.379	(0)
FeCl3	5.408e-18	5.408e-18	-17.267	-17.267	0.000	(0)
CuCl3-2	6.435e-19	2.688e-19	-18.191	-18.571	-0.379	(0)
CoCl+2	2.444e-22	6.935e-23	-21.612	-22.159	-0.547	(0)
CrCl+2	1.863e-23	5.288e-24	-22.730	-23.277	-0.547	(0)
CrCl2+	4.903e-27	3.579e-27	-26.310	-26.446	-0.137	(0)
CrOHC12	1.741e-27	1.741e-27	-26.759	-26.759	0.000	(0)
Co(NH3) 5Cl+2	0.000e+00	0.000e+00	-319.990	-320.537	-0.547	(0)
Co(NH3) 6Cl+2	0.000e+00	0.000e+00	-391.487	-392.034	-0.547	(0)
Cr(NH3) 6Cl+2	0.000e+00	0.000e+00	-397.898	-398.445	-0.547	(0)
Co (2)	1.227e-05					
Co+2	8.954e-06	2.541e-06	-5.048	-5.595	-0.547	(0)
CoSO4	3.175e-06	3.175e-06	-5.498	-5.498	0.000	(0)
CoCl+	1.320e-07	9.633e-08	-6.879	-7.016	-0.137	(0)
CoNO3+	3.146e-09	2.296e-09	-8.502	-8.639	-0.137	(0)
CoHCO3+	4.000e-10	2.920e-10	-9.398	-9.535	-0.137	(0)
CoHPO4	3.114e-10	3.114e-10	-9.507	-9.507	0.000	(0)
CoOH+	2.209e-10	1.613e-10	-9.656	-9.792	-0.137	(0)
CoSeO4	6.121e-11	6.121e-11	-10.213	-10.213	0.000	(0)
Co(NO3) 2	2.664e-12	2.664e-12	-11.574	-11.574	0.000	(0)
CoCO3	9.406e-13	9.406e-13	-12.027	-12.027	0.000	(0)
Co(OH) 2	4.074e-14	4.074e-14	-13.390	-13.390	0.000	(0)
Co2OH+3	3.494e-16	2.054e-17	-15.457	-16.687	-1.231	(0)

Co (OH) 3-	3.542e-21	2.585e-21	-20.451	-20.587	-0.137	(0)
CoNO2+	1.600e-21	1.168e-21	-20.796	-20.933	-0.137	(0)
CoOOH-	1.483e-22	1.082e-22	-21.829	-21.966	-0.137	(0)
Co4 (OH) 4+4	2.080e-29	1.349e-31	-28.682	-30.870	-2.188	(0)
Co (OH) 4-2	4.591e-30	1.303e-30	-29.338	-29.885	-0.547	(0)
Co (NH3) +2	0.000e+00	0.000e+00	-67.582	-68.129	-0.547	(0)
Co (NH3) 2+2	0.000e+00	0.000e+00	-130.954	-131.501	-0.547	(0)
Co (NH3) 3+2	0.000e+00	0.000e+00	-194.662	-195.209	-0.547	(0)
Co (NH3) 4+2	0.000e+00	0.000e+00	-258.750	-259.297	-0.547	(0)
Co (NH3) 5+2	0.000e+00	0.000e+00	-323.338	-323.885	-0.547	(0)
Co (3)	1.951e-18					
CoOH+2	1.951e-18	5.536e-19	-17.710	-18.257	-0.547	(0)
Co+3	2.533e-22	3.425e-23	-21.596	-22.465	-0.869	(0)
CoCl+2	2.444e-22	6.935e-23	-21.612	-22.159	-0.547	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-319.990	-320.537	-0.547	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-387.262	-387.399	-0.137	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-391.487	-392.034	-0.547	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-393.518	-394.065	-0.547	(0)
Cr (2)	0.000e+00					
Cr+2	0.000e+00	0.000e+00	-43.367	-43.914	-0.547	(0)
Cr (3)	1.166e-19					
Cr (OH) +2	7.556e-20	2.144e-20	-19.122	-19.669	-0.547	(0)
CrOHSO4	1.945e-20	1.945e-20	-19.711	-19.711	0.000	(0)
Cr+3	7.482e-21	4.399e-22	-20.126	-21.357	-1.231	(0)
CrSO4+	7.428e-21	5.422e-21	-20.129	-20.266	-0.137	(0)
Cr (OH) 2+	6.652e-21	4.855e-21	-20.177	-20.314	-0.137	(0)
CrCl+2	1.863e-23	5.288e-24	-22.730	-23.277	-0.547	(0)
Cr (OH) 3	5.800e-24	5.800e-24	-23.237	-23.237	0.000	(0)
CrH2PO4+2	2.072e-24	5.881e-25	-23.684	-24.231	-0.547	(0)
CrNO3+2	2.484e-26	7.049e-27	-25.605	-26.152	-0.547	(0)
CrCl2+	4.903e-27	3.579e-27	-26.310	-26.446	-0.137	(0)
CrOHCl2	1.741e-27	1.741e-27	-26.759	-26.759	0.000	(0)
CrO2-	1.195e-27	8.721e-28	-26.923	-27.059	-0.137	(0)
Cr (OH) 4-	1.006e-27	7.344e-28	-26.997	-27.134	-0.137	(0)
Cr2 (OH) 2SO4+2	7.772e-38	2.206e-38	-37.109	-37.656	-0.547	(0)
Cr2 (OH) 2 (SO4) 2	8.561e-39	8.561e-39	-38.067	-38.067	0.000	(0)
Cr (NH3) 5OH+2	0.000e+00	0.000e+00	-333.363	-333.910	-0.547	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-396.362	-397.592	-1.231	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-397.898	-398.445	-0.547	(0)
Cr (6)	6.372e-08					
HCrO4-	5.383e-08	3.929e-08	-7.269	-7.406	-0.137	(0)
CrO4-2	9.473e-09	3.893e-09	-8.024	-8.410	-0.386	(0)
NaCrO4-	3.073e-10	2.243e-10	-9.512	-9.649	-0.137	(0)
KCrO4-	9.556e-11	6.975e-11	-10.020	-10.156	-0.137	(0)
CrO3HPO4-2	3.117e-12	8.847e-13	-11.506	-12.053	-0.547	(0)
CrO3SO4-2	8.844e-13	2.510e-13	-12.053	-12.600	-0.547	(0)
Cr2O7-2	2.152e-13	6.109e-14	-12.667	-13.214	-0.547	(0)
H2CrO4	7.808e-14	7.808e-14	-13.107	-13.107	0.000	(0)
CrO3Cl-	1.207e-14	8.812e-15	-13.918	-14.055	-0.137	(0)
CrO3H2PO4-	1.847e-15	1.348e-15	-14.734	-14.870	-0.137	(0)
Cu (1)	2.002e-16					
CuCl2-	1.456e-16	1.154e-16	-15.837	-15.938	-0.101	(0)
CuCl	4.914e-17	4.914e-17	-16.309	-16.309	0.000	(0)
Cu+	4.814e-18	3.513e-18	-17.318	-17.454	-0.137	(0)
CuCl3-2	6.435e-19	2.688e-19	-18.191	-18.571	-0.379	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-286.820	-287.225	-0.405	(0)
CuS4S5-3	0.000e+00	0.000e+00	-287.572	-287.955	-0.383	(0)
Cu (2)	9.874e-05					
Cu+2	6.197e-05	2.547e-05	-4.208	-4.594	-0.386	(0)
CuSO4	3.590e-05	3.590e-05	-4.445	-4.445	0.000	(0)
CuCl+	5.343e-07	4.235e-07	-6.272	-6.373	-0.101	(0)
CuOH+	2.526e-07	2.002e-07	-6.598	-6.699	-0.101	(0)
CuNO3+	6.471e-08	4.723e-08	-7.189	-7.326	-0.137	(0)
Cu2 (OH) 2+2	3.427e-09	9.727e-10	-8.465	-9.012	-0.547	(0)
CuCO3	3.283e-09	3.283e-09	-8.484	-8.484	0.000	(0)
CuHCO3+	3.251e-09	2.373e-09	-8.488	-8.625	-0.137	(0)
CuCl2	1.274e-09	1.274e-09	-8.895	-8.895	0.000	(0)
Cu (OH) 2	1.625e-10	1.625e-10	-9.789	-9.789	0.000	(0)

Cu (NO3) 2	3.296e-12	3.296e-12	-11.482	-11.482	0.000	(0)
CuCl3-	1.523e-13	1.207e-13	-12.817	-12.918	-0.101	(0)
Cu (OH) 3-	1.453e-15	1.060e-15	-14.838	-14.975	-0.137	(0)
Cu (CO3) 2-2	6.818e-16	1.935e-16	-15.166	-15.713	-0.547	(0)
CuCl4-2	1.907e-17	7.969e-18	-16.720	-17.099	-0.379	(0)
CuNO2+	2.382e-19	1.739e-19	-18.623	-18.760	-0.137	(0)
Cu (OH) 4-2	9.351e-23	2.654e-23	-22.029	-22.576	-0.547	(0)
Cu (NO2) 2	1.160e-34	1.160e-34	-33.935	-33.935	0.000	(0)
CuNH3+2	0.000e+00	0.000e+00	-64.630	-65.177	-0.547	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-404.799	-404.936	-0.137	(0)
Fe (2)	6.293e-15					
Fe+2	4.395e-15	1.247e-15	-14.357	-14.904	-0.547	(0)
FeSO4	1.893e-15	1.893e-15	-14.723	-14.723	0.000	(0)
FeH2PO4+	4.334e-18	3.502e-18	-17.363	-17.456	-0.092	(0)
FeHPO4	5.576e-19	5.576e-19	-18.254	-18.254	0.000	(0)
FeOH+	1.338e-19	1.076e-19	-18.874	-18.968	-0.095	(0)
FeHCO3+	2.848e-20	2.319e-20	-19.545	-19.635	-0.089	(0)
Fe (OH) 2	1.752e-25	1.752e-25	-24.757	-24.757	0.000	(0)
Fe (OH) 3-	2.091e-28	1.681e-28	-27.680	-27.774	-0.095	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-290.114	-290.114	0.000	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-430.021	-430.158	-0.137	(0)
Fe (3)	9.221e-07					
Fe (OH) 2+	9.193e-07	7.430e-07	-6.037	-6.129	-0.092	(0)
Fe (OH) 3	1.242e-09	1.242e-09	-8.906	-8.906	0.000	(0)
FeOH+2	1.078e-09	4.504e-10	-8.967	-9.346	-0.379	(0)
FeHPO4+	4.142e-10	3.347e-10	-9.383	-9.475	-0.092	(0)
FeSO4+	2.245e-11	1.805e-11	-10.649	-10.744	-0.095	(0)
Fe (SO4) 2-	3.595e-12	2.624e-12	-11.444	-11.581	-0.137	(0)
Fe+3	2.162e-12	2.924e-13	-11.665	-12.534	-0.869	(0)
Fe (OH) 4-	9.299e-13	7.515e-13	-12.032	-12.124	-0.092	(0)
FeCl+2	2.004e-13	8.374e-14	-12.698	-13.077	-0.379	(0)
FeH2PO4+2	7.292e-14	3.111e-14	-13.137	-13.507	-0.370	(0)
FeNO3+2	7.577e-15	2.150e-15	-14.120	-14.667	-0.547	(0)
FeCl2+	6.055e-15	4.868e-15	-14.218	-14.313	-0.095	(0)
Fe2 (OH) 2+4	1.238e-15	8.032e-18	-14.907	-17.095	-2.188	(0)
FeCl3	5.408e-18	5.408e-18	-17.267	-17.267	0.000	(0)
Fe3 (OH) 4+5	2.146e-19	8.185e-23	-18.668	-22.087	-3.419	(0)
FeHSeO3+2	2.681e-27	7.610e-28	-26.572	-27.119	-0.547	(0)
H (0)	0.000e+00					
H2	0.000e+00	0.000e+00	-45.195	-45.187	0.007	(0)
K	6.291e-03					
K+	6.023e-03	4.822e-03	-2.220	-2.317	-0.097	(0)
KSO4-	2.683e-04	2.168e-04	-3.571	-3.664	-0.092	(0)
KHPO4-	5.083e-09	4.108e-09	-8.294	-8.386	-0.092	(0)
KCrO4-	9.556e-11	6.975e-11	-10.020	-10.156	-0.137	(0)
Mg	3.635e-03					
Mg+2	2.473e-03	1.016e-03	-2.607	-2.993	-0.386	(0)
MgSO4	1.161e-03	1.161e-03	-2.935	-2.935	0.000	(0)
MgH2PO4+	3.508e-07	2.835e-07	-6.455	-6.547	-0.092	(0)
MgHPO4	7.353e-08	7.353e-08	-7.134	-7.134	0.000	(0)
MgHCO3+	2.085e-08	1.652e-08	-7.681	-7.782	-0.101	(0)
MgOH+	9.856e-10	8.071e-10	-9.006	-9.093	-0.087	(0)
MgH2BO3+	7.232e-11	5.588e-11	-10.141	-10.253	-0.112	(0)
MgCO3	1.704e-11	1.704e-11	-10.768	-10.768	0.000	(0)
MgPO4-	7.766e-13	6.276e-13	-12.110	-12.202	-0.092	(0)
Mn (2)	2.350e-09					
Mn+2	1.786e-09	5.068e-10	-8.748	-9.295	-0.547	(0)
MnSO4	5.547e-10	5.547e-10	-9.256	-9.256	0.000	(0)
MnCl+	8.816e-12	7.088e-12	-11.055	-11.149	-0.095	(0)
MnNO3+	6.275e-13	4.580e-13	-12.202	-12.339	-0.137	(0)
MnCl2	1.112e-13	1.112e-13	-12.954	-12.954	0.000	(0)
MnHCO3+	1.998e-14	1.607e-14	-13.699	-13.794	-0.095	(0)
MnSeO4	6.466e-15	6.466e-15	-14.189	-14.189	0.000	(0)
MnOH+	3.430e-15	2.758e-15	-14.465	-14.559	-0.095	(0)
Mn (NO3) 2	6.634e-16	6.634e-16	-15.178	-15.178	0.000	(0)
MnCl3-	4.233e-16	3.403e-16	-15.373	-15.468	-0.095	(0)
Mn (OH) 3-	3.148e-28	2.531e-28	-27.502	-27.597	-0.095	(0)
Mn (OH) 4-2	6.221e-36	2.599e-36	-35.206	-35.585	-0.379	(0)

MnSe	0.000e+00	0.000e+00	-108.428	-108.428	0.000	(0)
Mn (3)	2.700e-19					
Mn+3	2.700e-19	3.651e-20	-18.569	-19.438	-0.869	(0)
Mn (6)	4.505e-24					
MnO4-2	4.505e-24	1.882e-24	-23.346	-23.725	-0.379	(0)
Mn (7)	1.610e-18					
MnO4-	1.610e-18	1.256e-18	-17.793	-17.901	-0.108	(0)
Mo	1.151e-06					
MoO4-2	1.116e-06	4.586e-07	-5.952	-6.339	-0.386	(0)
HMoO4-	3.445e-08	2.514e-08	-7.463	-7.600	-0.137	(0)
H2MoO4	7.992e-10	7.992e-10	-9.097	-9.097	0.000	(0)
AlMo6O21-3	7.500e-25	4.409e-26	-24.125	-25.356	-1.231	(0)
Mo7O24-6	1.682e-30	2.010e-35	-29.774	-34.697	-4.923	(0)
HMo7O24-5	3.790e-31	1.445e-34	-30.421	-33.840	-3.419	(0)
H2Mo7O24-4	4.180e-33	2.712e-35	-32.379	-34.567	-2.188	(0)
H3Mo7O24-3	2.606e-36	1.532e-37	-35.584	-36.815	-1.231	(0)
N (-3)	0.000e+00					
NH4+	0.000e+00	0.000e+00	-60.952	-61.064	-0.112	(0)
NH4SO4-	0.000e+00	0.000e+00	-62.124	-62.219	-0.095	(0)
CuNH3+2	0.000e+00	0.000e+00	-64.630	-65.177	-0.547	(0)
NH3	0.000e+00	0.000e+00	-64.963	-64.963	0.000	(0)
CaNH3+2	0.000e+00	0.000e+00	-66.587	-67.134	-0.547	(0)
NiNH3+2	0.000e+00	0.000e+00	-66.979	-67.526	-0.547	(0)
Co (NH3) +2	0.000e+00	0.000e+00	-67.582	-68.129	-0.547	(0)
BaNH3+2	0.000e+00	0.000e+00	-71.382	-71.929	-0.547	(0)
Ni (NH3) 2+2	0.000e+00	0.000e+00	-129.494	-130.041	-0.547	(0)
Co (NH3) 2+2	0.000e+00	0.000e+00	-130.954	-131.501	-0.547	(0)
Ca (NH3) 2+2	0.000e+00	0.000e+00	-131.795	-132.342	-0.547	(0)
Co (NH3) 3+2	0.000e+00	0.000e+00	-194.662	-195.209	-0.547	(0)
Co (NH3) 4+2	0.000e+00	0.000e+00	-258.750	-259.297	-0.547	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-319.990	-320.537	-0.547	(0)
Co (NH3) 5+2	0.000e+00	0.000e+00	-323.338	-323.885	-0.547	(0)
Cr (NH3) 5OH+2	0.000e+00	0.000e+00	-333.363	-333.910	-0.547	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-387.262	-387.399	-0.137	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-391.487	-392.034	-0.547	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-393.518	-394.065	-0.547	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-396.362	-397.592	-1.231	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-397.898	-398.445	-0.547	(0)
N (3)	8.386e-17					
NO2-	8.362e-17	6.521e-17	-16.078	-16.186	-0.108	(0)
CuNO2+	2.382e-19	1.739e-19	-18.623	-18.760	-0.137	(0)
CoNO2+	1.600e-21	1.168e-21	-20.796	-20.933	-0.137	(0)
Cu (NO2) 2	1.160e-34	1.160e-34	-33.935	-33.935	0.000	(0)
N (5)	7.218e-04					
NO3-	7.121e-04	5.701e-04	-3.147	-3.244	-0.097	(0)
CaNO3+	9.614e-06	7.017e-06	-5.017	-5.154	-0.137	(0)
CuNO3+	6.471e-08	4.723e-08	-7.189	-7.326	-0.137	(0)
NiNO3+	4.412e-09	3.220e-09	-8.355	-8.492	-0.137	(0)
ZnNO3+	3.692e-09	2.695e-09	-8.433	-8.569	-0.137	(0)
CoNO3+	3.146e-09	2.296e-09	-8.502	-8.639	-0.137	(0)
BaNO3+	5.136e-10	3.748e-10	-9.289	-9.426	-0.137	(0)
PbNO3+	1.666e-10	1.216e-10	-9.778	-9.915	-0.137	(0)
CdNO3+	3.488e-12	2.546e-12	-11.457	-11.594	-0.137	(0)
Cu (NO3) 2	3.296e-12	3.296e-12	-11.482	-11.482	0.000	(0)
Co (NO3) 2	2.664e-12	2.664e-12	-11.574	-11.574	0.000	(0)
MnNO3+	6.275e-13	4.580e-13	-12.202	-12.339	-0.137	(0)
Zn (NO3) 2	2.970e-13	2.970e-13	-12.527	-12.527	0.000	(0)
Pb (NO3) 2	1.249e-13	1.249e-13	-12.903	-12.903	0.000	(0)
FeNO3+2	7.577e-15	2.150e-15	-14.120	-14.667	-0.547	(0)
Mn (NO3) 2	6.634e-16	6.634e-16	-15.178	-15.178	0.000	(0)
Cd (NO3) 2	6.295e-16	6.295e-16	-15.201	-15.201	0.000	(0)
CrNO3+2	2.484e-26	7.049e-27	-25.605	-26.152	-0.547	(0)
Na	1.498e-02					
Na+	1.448e-02	1.159e-02	-1.839	-1.936	-0.097	(0)
NaSO4-	4.998e-04	4.040e-04	-3.301	-3.394	-0.092	(0)
NaHPO4-	1.893e-08	1.530e-08	-7.723	-7.815	-0.092	(0)
NaHCO3	1.170e-08	1.170e-08	-7.932	-7.932	0.000	(0)
NaCrO4-	3.073e-10	2.243e-10	-9.512	-9.649	-0.137	(0)

	NaH2BO3	3.186e-11	3.186e-11	-10.497	-10.497	0.000	(0)
	NaCO3-	6.727e-12	5.437e-12	-11.172	-11.265	-0.092	(0)
Ni		8.382e-06					
	Ni+2	5.471e-06	2.249e-06	-5.262	-5.648	-0.386	(0)
	NiSO4	2.817e-06	2.817e-06	-5.550	-5.550	0.000	(0)
	NiCl+	8.637e-08	6.304e-08	-7.064	-7.200	-0.137	(0)
	NiNO3+	4.412e-09	3.220e-09	-8.355	-8.492	-0.137	(0)
	Ni (SO4) 2-2	2.235e-09	6.342e-10	-8.651	-9.198	-0.547	(0)
	NiHCO3+	5.609e-10	4.094e-10	-9.251	-9.388	-0.137	(0)
	NiOH+	8.636e-11	6.303e-11	-10.064	-10.200	-0.137	(0)
	NiSeO4	4.985e-11	4.985e-11	-10.302	-10.302	0.000	(0)
	NiCl2	3.575e-12	3.575e-12	-11.447	-11.447	0.000	(0)
	NiCO3	1.837e-12	1.837e-12	-11.736	-11.736	0.000	(0)
	Ni (OH) 2	2.274e-14	2.274e-14	-13.643	-13.643	0.000	(0)
	Ni (OH) 3-	9.910e-20	7.233e-20	-19.004	-19.141	-0.137	(0)
	NiNH3+2	0.000e+00	0.000e+00	-66.979	-67.526	-0.547	(0)
	Ni (NH3) 2+2	0.000e+00	0.000e+00	-129.494	-130.041	-0.547	(0)
O (0)		9.507e-04					
	O2	4.754e-04	4.834e-04	-3.323	-3.316	0.007	(0)
P		9.399e-06					
	H2PO4-	7.846e-06	6.341e-06	-5.105	-5.198	-0.092	(0)
	CaH2PO4+	6.065e-07	4.902e-07	-6.217	-6.310	-0.092	(0)
	MgH2PO4+	3.508e-07	2.835e-07	-6.455	-6.547	-0.092	(0)
	HPO4-2	2.980e-07	1.245e-07	-6.526	-6.905	-0.379	(0)
	CaHPO4	1.965e-07	1.965e-07	-6.707	-6.707	0.000	(0)
	MgHPO4	7.353e-08	7.353e-08	-7.134	-7.134	0.000	(0)
	NaHPO4-	1.893e-08	1.530e-08	-7.723	-7.815	-0.092	(0)
	KHPO4-	5.083e-09	4.108e-09	-8.294	-8.386	-0.092	(0)
	H3PO4	2.670e-09	2.670e-09	-8.573	-8.573	0.000	(0)
	FeHPO4+	4.142e-10	3.347e-10	-9.383	-9.475	-0.092	(0)
	CoHPO4	3.114e-10	3.114e-10	-9.507	-9.507	0.000	(0)
	CaPO4-	1.833e-10	1.481e-10	-9.737	-9.829	-0.092	(0)
	CrO3HPO4-2	3.117e-12	8.847e-13	-11.506	-12.053	-0.547	(0)
	MgPO4-	7.766e-13	6.276e-13	-12.110	-12.202	-0.092	(0)
	PO4-3	1.107e-13	1.498e-14	-12.956	-13.825	-0.869	(0)
	FeH2PO4+2	7.292e-14	3.111e-14	-13.137	-13.507	-0.370	(0)
	CrO3H2PO4-	1.847e-15	1.348e-15	-14.734	-14.870	-0.137	(0)
	FeH2PO4+	4.334e-18	3.502e-18	-17.363	-17.456	-0.092	(0)
	FeHPO4	5.576e-19	5.576e-19	-18.254	-18.254	0.000	(0)
	CrH2PO4+2	2.072e-24	5.881e-25	-23.684	-24.231	-0.547	(0)
Pb		9.690e-08					
	PbSO4	4.679e-08	4.679e-08	-7.330	-7.330	0.000	(0)
	Pb+2	3.558e-08	1.462e-08	-7.449	-7.835	-0.386	(0)
	PbCl+	7.437e-09	5.428e-09	-8.129	-8.265	-0.137	(0)
	Pb (SO4) 2-2	6.490e-09	1.842e-09	-8.188	-8.735	-0.547	(0)
	PbCl2	2.633e-10	2.633e-10	-9.580	-9.580	0.000	(0)
	PbNO3+	1.666e-10	1.216e-10	-9.778	-9.915	-0.137	(0)
	PbOH+	1.600e-10	1.168e-10	-9.796	-9.933	-0.137	(0)
	PbHCO3+	2.198e-11	1.604e-11	-10.658	-10.795	-0.137	(0)
	PbCl3-	1.686e-12	1.230e-12	-11.773	-11.910	-0.137	(0)
	PbCO3	9.623e-13	9.623e-13	-12.017	-12.017	0.000	(0)
	Pb (NO3) 2	1.249e-13	1.249e-13	-12.903	-12.903	0.000	(0)
	PbCl4-2	2.044e-14	5.801e-15	-13.690	-14.236	-0.547	(0)
	Pb (OH) 2	1.175e-14	1.175e-14	-13.930	-13.930	0.000	(0)
	Pb2OH+3	4.604e-16	2.706e-17	-15.337	-16.568	-1.231	(0)
	Pb (CO3) 2-2	2.141e-19	6.077e-20	-18.669	-19.216	-0.547	(0)
	Pb (OH) 3-	5.119e-20	3.736e-20	-19.291	-19.428	-0.137	(0)
	Pb (OH) 4-2	1.025e-25	2.910e-26	-24.989	-25.536	-0.547	(0)
	Pb3 (OH) 4+2	6.419e-26	1.822e-26	-25.193	-25.740	-0.547	(0)
	Pb4 (OH) 4+4	3.926e-28	2.547e-30	-27.406	-29.594	-2.188	(0)
	Pb (HS) 2	0.000e+00	0.000e+00	-276.725	-276.725	0.000	(0)
	Pb (HS) 3-	0.000e+00	0.000e+00	-417.369	-417.506	-0.137	(0)
S (-2)		0.000e+00					
	H2S	0.000e+00	0.000e+00	-140.494	-140.494	0.000	(0)
	HS-	0.000e+00	0.000e+00	-141.943	-142.080	-0.137	(0)
	CdHS+	0.000e+00	0.000e+00	-142.848	-142.985	-0.137	(0)
	S5-2	0.000e+00	0.000e+00	-145.511	-146.058	-0.547	(0)
	S6-2	0.000e+00	0.000e+00	-145.914	-146.461	-0.547	(0)

S4-2	0.000e+00	0.000e+00	-146.111	-146.658	-0.547	(0)
S3-2	0.000e+00	0.000e+00	-146.926	-147.473	-0.547	(0)
S2-2	0.000e+00	0.000e+00	-147.955	-148.502	-0.547	(0)
S-2	0.000e+00	0.000e+00	-153.649	-154.028	-0.379	(0)
Pb (HS) 2	0.000e+00	0.000e+00	-276.725	-276.725	0.000	(0)
Zn (HS) 2	0.000e+00	0.000e+00	-277.080	-277.080	0.000	(0)
ZnS (HS) -	0.000e+00	0.000e+00	-277.453	-277.590	-0.137	(0)
Cd (HS) 2	0.000e+00	0.000e+00	-277.861	-277.861	0.000	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-286.820	-287.225	-0.405	(0)
CuS4S5-3	0.000e+00	0.000e+00	-287.572	-287.955	-0.383	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-290.114	-290.114	0.000	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-404.799	-404.936	-0.137	(0)
Zn (HS) 3-	0.000e+00	0.000e+00	-415.743	-415.880	-0.137	(0)
Pb (HS) 3-	0.000e+00	0.000e+00	-417.369	-417.506	-0.137	(0)
Cd (HS) 3-	0.000e+00	0.000e+00	-417.905	-418.042	-0.137	(0)
ZnS (HS) 2-2	0.000e+00	0.000e+00	-419.813	-420.360	-0.547	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-430.021	-430.158	-0.137	(0)
Cd (HS) 4-2	0.000e+00	0.000e+00	-557.379	-557.926	-0.547	(0)
Zn (HS) 4-2	0.000e+00	0.000e+00	-558.873	-559.420	-0.547	(0)
S (6)	2.322e-02					
SO4-2	1.590e-02	6.534e-03	-1.799	-2.185	-0.386	(0)
CaSO4	5.345e-03	5.345e-03	-2.272	-2.272	0.000	(0)
MgSO4	1.161e-03	1.161e-03	-2.935	-2.935	0.000	(0)
NaSO4-	4.998e-04	4.040e-04	-3.301	-3.394	-0.092	(0)
KSO4-	2.683e-04	2.168e-04	-3.571	-3.664	-0.092	(0)
CuSO4	3.590e-05	3.590e-05	-4.445	-4.445	0.000	(0)
CoSO4	3.175e-06	3.175e-06	-5.498	-5.498	0.000	(0)
NiSO4	2.817e-06	2.817e-06	-5.550	-5.550	0.000	(0)
ZnSO4	2.497e-06	2.497e-06	-5.603	-5.603	0.000	(0)
HSO4-	2.174e-06	1.735e-06	-5.663	-5.761	-0.098	(0)
Zn (SO4) 2-2	5.225e-07	1.483e-07	-6.282	-6.829	-0.547	(0)
PbSO4	4.679e-08	4.679e-08	-7.330	-7.330	0.000	(0)
BeSO4	3.775e-08	3.775e-08	-7.423	-7.423	0.000	(0)
AlSO4+	2.519e-08	2.011e-08	-7.599	-7.697	-0.098	(0)
Pb (SO4) 2-2	6.490e-09	1.842e-09	-8.188	-8.735	-0.547	(0)
Be (SO4) 2-2	2.702e-09	7.668e-10	-8.568	-9.115	-0.547	(0)
Ni (SO4) 2-2	2.235e-09	6.342e-10	-8.651	-9.198	-0.547	(0)
Al (SO4) 2-	1.970e-09	1.573e-09	-8.706	-8.803	-0.098	(0)
CdSO4	1.763e-09	1.763e-09	-8.754	-8.754	0.000	(0)
Cd (SO4) 2-2	5.812e-10	1.650e-10	-9.236	-9.783	-0.547	(0)
MnSO4	5.547e-10	5.547e-10	-9.256	-9.256	0.000	(0)
FeSO4+	2.245e-11	1.805e-11	-10.649	-10.744	-0.095	(0)
Fe (SO4) 2-	3.595e-12	2.624e-12	-11.444	-11.581	-0.137	(0)
CrO3SO4-2	8.844e-13	2.510e-13	-12.053	-12.600	-0.547	(0)
FeSO4	1.893e-15	1.893e-15	-14.723	-14.723	0.000	(0)
CrOHSO4	1.945e-20	1.945e-20	-19.711	-19.711	0.000	(0)
CrSO4+	7.428e-21	5.422e-21	-20.129	-20.266	-0.137	(0)
Cr2 (OH) 2SO4+2	7.772e-38	2.206e-38	-37.109	-37.656	-0.547	(0)
Cr2 (OH) 2 (SO4) 2	8.561e-39	8.561e-39	-38.067	-38.067	0.000	(0)
NH4SO4-	0.000e+00	0.000e+00	-62.124	-62.219	-0.095	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-387.262	-387.399	-0.137	(0)
Se (-2)	0.000e+00					
HSe-	0.000e+00	0.000e+00	-99.111	-99.248	-0.137	(0)
H2Se	0.000e+00	0.000e+00	-100.868	-100.868	0.000	(0)
Se-2	0.000e+00	0.000e+00	-108.345	-108.892	-0.547	(0)
MnSe	0.000e+00	0.000e+00	-108.428	-108.428	0.000	(0)
Se (4)	1.609e-18					
HSeO3-	1.603e-18	1.170e-18	-17.795	-17.932	-0.137	(0)
SeO3-2	5.012e-21	1.423e-21	-20.300	-20.847	-0.547	(0)
H2SeO3	1.512e-21	1.512e-21	-20.820	-20.820	0.000	(0)
FeHSeO3+2	2.681e-27	7.610e-28	-26.572	-27.119	-0.547	(0)
Cd (SeO3) 2-2	0.000e+00	0.000e+00	-44.114	-44.661	-0.547	(0)
Se (6)	1.271e-07					
SeO4-2	1.270e-07	5.220e-08	-6.896	-7.282	-0.386	(0)
CoSeO4	6.121e-11	6.121e-11	-10.213	-10.213	0.000	(0)
NiSeO4	4.985e-11	4.985e-11	-10.302	-10.302	0.000	(0)
ZnSeO4	1.474e-11	1.474e-11	-10.832	-10.832	0.000	(0)
HSeO4-	9.675e-12	7.062e-12	-11.014	-11.151	-0.137	(0)

	CdSeO4	1.188e-14	1.188e-14	-13.925	-13.925	0.000	(0)
	MnSeO4	6.466e-15	6.466e-15	-14.189	-14.189	0.000	(0)
	Zn (SeO4) 2-2	2.748e-18	7.800e-19	-17.561	-18.108	-0.547	(0)
Zn	7.523e-06						
	Zn+2	4.436e-06	1.823e-06	-5.353	-5.739	-0.386	(0)
	ZnSO4	2.497e-06	2.497e-06	-5.603	-5.603	0.000	(0)
	Zn (SO4) 2-2	5.225e-07	1.483e-07	-6.282	-6.829	-0.547	(0)
	ZnCl+	6.185e-08	4.902e-08	-7.209	-7.310	-0.101	(0)
	ZnNO3+	3.692e-09	2.695e-09	-8.433	-8.569	-0.137	(0)
	ZnCl2	6.944e-10	6.944e-10	-9.158	-9.158	0.000	(0)
	ZnOH+	5.411e-10	3.949e-10	-9.267	-9.403	-0.137	(0)
	ZnOHCl	2.118e-10	2.118e-10	-9.674	-9.674	0.000	(0)
	ZnHCO3+	1.167e-10	8.514e-11	-9.933	-10.070	-0.137	(0)
	ZnSeO4	1.474e-11	1.474e-11	-10.832	-10.832	0.000	(0)
	ZnCl3-	7.573e-12	6.002e-12	-11.121	-11.222	-0.101	(0)
	ZnCO3	2.297e-12	2.297e-12	-11.639	-11.639	0.000	(0)
	Zn (NO3) 2	2.970e-13	2.970e-13	-12.527	-12.527	0.000	(0)
	Zn (OH) 2	2.923e-13	2.923e-13	-12.534	-12.534	0.000	(0)
	ZnCl4-2	7.665e-14	3.202e-14	-13.115	-13.495	-0.379	(0)
	Zn (OH) 3-	6.383e-18	4.659e-18	-17.195	-17.332	-0.137	(0)
	Zn (SeO4) 2-2	2.748e-18	7.800e-19	-17.561	-18.108	-0.547	(0)
	Zn (OH) 4-2	2.078e-24	5.898e-25	-23.682	-24.229	-0.547	(0)
	Zn (HS) 2	0.000e+00	0.000e+00	-277.080	-277.080	0.000	(0)
	ZnS (HS) -	0.000e+00	0.000e+00	-277.453	-277.590	-0.137	(0)
	Zn (HS) 3-	0.000e+00	0.000e+00	-415.743	-415.880	-0.137	(0)
	ZnS (HS) 2-2	0.000e+00	0.000e+00	-419.813	-420.360	-0.547	(0)
	Zn (HS) 4-2	0.000e+00	0.000e+00	-558.873	-559.420	-0.547	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2-315.00	-308.73	6.27	(Co (NH3) 5Cl) (NO3) 2	
(Co (NH3) 5Cl) Cl2-310.69	-306.15	4.54	(Co (NH3) 5Cl) Cl2	
(Co (NH3) 5OH2) Cl3-317.96	-306.15	11.81	(Co (NH3) 5OH2) Cl3	
(Co (NH3) 6) (NO3) 3-383.51	-365.58	17.93	(Co (NH3) 6) (NO3) 3	
(Co (NH3) 6) Cl3 -381.84	-361.71	20.13	(Co (NH3) 6) Cl3	
(NH4) 2CrO4 -130.92	-130.54	0.38	(NH4) 2CrO4	
(NH4) 2SeO4 -129.86	-129.41	0.45	(NH4) 2SeO4	
Al (OH) 3 (am) -3.95	7.18	11.13	Al (OH) 3	
Al2 (MoO4) 3 -40.80	-37.65	3.15	Al2 (MoO4) 3	
Al2O3 -6.06	14.36	20.43	Al2O3	
Al4 (OH) 10SO4 -7.16	15.54	22.70	Al4 (OH) 10SO4	
AlAsO4:2H2O -8.65	-3.85	4.80	AlAsO4:2H2O	
AlOHSO4 -2.77	-6.00	-3.23	AlOHSO4	
Alunite -0.87	-1.64	-0.77	KAl3 (SO4) 2 (OH) 6	
Anglesite -2.19	-10.02	-7.83	PbSO4	
Anhydrite -0.27	-4.61	-4.34	CaSO4	
Anilite -131.49	-163.91	-32.42	Cu0.25Cu1.5S	
Antlerite -2.76	6.03	8.79	Cu3 (OH) 4SO4	
Aragonite -4.82	-13.09	-8.26	CaCO3	
Arsenolite -132.31	-135.24	-2.94	As4O6	
Artinite -15.61	-5.65	9.96	MgCO3:Mg (OH) 2:3H2O	
As2O5 -28.82	-22.05	6.77	As2O5	
Atacamite -2.31	5.36	7.67	Cu2 (OH) 3Cl	
Azurite -7.48	-24.10	-16.62	Cu3 (OH) 2 (CO3) 2	
Ba (OH) 2:8H2O -20.48	4.07	24.56	Ba (OH) 2:8H2O	
Ba3 (AsO4) 2 -0.87	-9.82	-8.94	Ba3 (AsO4) 2	
BaCrO4 -5.56	-15.33	-9.77	BaCrO4	
BaHPO4 -6.47	-26.25	-19.77	BaHPO4	
BaMoO4 -6.27	-13.26	-6.99	BaMoO4	
Barite 0.94	-9.11	-10.05	BaSO4	
BaS -159.68	-143.50	16.18	BaS	
BaSeO3 -21.15	-19.35	1.79	BaSeO3	
BaSeO4 -6.68	-14.20	-7.53	BaSeO4	
Be (OH) 2 (alpha) -3.24	3.66	6.89	Be (OH) 2	
Be (OH) 2 (am) -3.54	3.66	7.19	Be (OH) 2	
Be (OH) 2 (beta) -2.84	3.66	6.49	Be (OH) 2	

BeMoO4	-12.07	-13.68	-1.61	BeMoO4
BeS	-163.30	-143.92	19.38	BeS
BeSeO4:4H2O	-11.69	-14.63	-2.94	BeSeO4:4H2O
Bianchite	-6.16	-7.93	-1.76	ZnSO4:6H2O
Birnessite	0.00	18.09	18.09	MnO2
Bixbyite	-5.60	-5.88	-0.27	Mn2O3
BlaubleiI	-120.04	-144.21	-24.16	Cu0.9Cu0.2S
BlaubleiII	-126.02	-153.30	-27.28	Cu0.6Cu0.8S
Boehmite	-1.75	7.18	8.93	AlOOH
Brochantite	-3.39	12.44	15.83	Cu4(OH)6SO4
Brucite	-9.18	8.01	17.18	Mg(OH)2
Bunsenite	-7.39	5.35	12.74	NiO
Ca3(AsO4)2:4H2O	-18.63	3.67	22.30	Ca3(AsO4)2:4H2O
Ca3(PO4)2(beta)	-5.85	-34.93	-29.08	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-9.60	-56.68	-47.08	Ca4H(PO4)3:3H2O
CaCrO4	-8.65	-10.84	-2.19	CaCrO4
CaHPO4	-2.38	-21.75	-19.37	CaHPO4
CaHPO4:2H2O	-2.69	-21.75	-19.06	CaHPO4:2H2O
Calcite	-4.63	-13.09	-8.46	CaCO3
CaMoO4	-0.82	-8.76	-7.94	CaMoO4
CaSeO3:2H2O	-17.73	-14.86	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-6.71	-9.71	-3.00	CaSeO4:2H2O
Cd(BO2)2	-17.80	-7.96	9.84	Cd(BO2)2
Cd(OH)2	-11.84	2.09	13.93	Cd(OH)2
Cd(OH)2(am)	-11.90	2.09	13.99	Cd(OH)2
Cd3(OH)2(SO4)2	-26.82	-20.11	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-29.49	-6.93	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-21.79	-54.39	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-33.24	-4.84	28.40	Cd4(OH)6SO4
CdCl2	-12.22	-12.82	-0.60	CdCl2
CdCl2:1H2O	-11.15	-12.82	-1.67	CdCl2:1H2O
CdCl2:2.5H2O	-10.89	-12.82	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-53.71	-39.97	13.74	Cd
Cdmetal(gamma)	-53.82	-39.97	13.84	Cd
CdMoO4	-1.04	-15.25	-14.21	CdMoO4
CdOHCl	-9.00	-5.37	3.63	CdOHCl
CdSe	-82.23	-102.66	-20.43	CdSe
CdSeO4:2H2O	-14.35	-16.20	-1.85	CdSeO4:2H2O
CdSO4	-11.08	-11.10	-0.02	CdSO4
CdSO4:1H2O	-9.47	-11.10	-1.63	CdSO4:1H2O
CdSO4:2.67H2O	-9.28	-11.10	-1.82	CdSO4:2.67H2O
Cerussite	-5.29	-18.49	-13.20	PbCO3
CH4(g)	-148.08	-189.90	-41.81	CH4
Chalcanthite	-4.12	-6.78	-2.66	CuSO4:5H2O
Chalcocite	-136.07	-171.49	-35.42	Cu2S
Chalcopyrite	-256.94	-292.66	-35.71	CuFeS2
Claudetite	-132.01	-135.24	-3.23	As4O6
Clausthalite	-74.13	-101.58	-27.46	PbSe
Co(BO2)2	-31.71	-4.64	27.07	Co(BO2)2
Co(OH)2	-7.69	5.40	13.09	Co(OH)2
Co(OH)3	-3.93	-5.97	-2.03	Co(OH)3
CO2(g)	-3.50	-21.66	-18.16	CO2
Co3(AsO4)2	-18.87	-5.84	13.03	Co3(AsO4)2
Co3(PO4)2	-9.75	-44.43	-34.69	Co3(PO4)2
Co3O4	3.65	-6.53	-10.17	Co3O4
CoCl2	-18.01	-9.50	8.51	CoCl2
CoCl2:6H2O	-12.02	-9.51	2.51	CoCl2:6H2O
CoCO3	-6.31	-16.25	-9.94	CoCO3
CoFe2O4	16.39	13.33	-3.05	CoFe2O4
CoHPO4	-5.86	-24.92	-19.06	CoHPO4
CoMoO4	-4.24	-11.93	-7.69	CoMoO4
CoO	-8.50	5.40	13.90	CoO
CoS(alpha)	-134.74	-142.18	-7.44	CoS
CoS(beta)	-131.11	-142.18	-11.07	CoS
CoSe	-83.14	-99.34	-16.20	CoSe
CoSeO3	-19.35	-18.03	1.32	CoSeO3
CoSeO4:6H2O	-11.35	-12.88	-1.53	CoSeO4:6H2O
CoSO4	-10.82	-7.78	3.04	CoSO4

CoSO4:6H2O	-5.31	-7.78	-2.48	CoSO4:6H2O
Cotunnite	-6.89	-11.74	-4.86	PbCl2
Covellite	-118.58	-141.17	-22.59	CuS
Cr(OH)2	-43.84	-32.92	10.93	Cr(OH)2
Cr(OH)3	-16.24	-14.81	1.42	Cr(OH)3
Cr(OH)3(am)	-14.06	-14.81	-0.75	Cr(OH)3
Cr2O3	-27.42	-29.63	-2.21	Cr2O3
CrCl2	-62.25	-47.82	14.42	CrCl2
CrCl3	-52.65	-37.18	15.48	CrCl3
Crmetal	-105.97	-74.97	31.00	Cr
CrO3	-16.21	-19.41	-3.19	CrO3
Cu(OH)2	-2.44	6.40	8.84	Cu(OH)2
Cu2(OH)3NO3	-5.40	4.07	9.47	Cu2(OH)3NO3
Cu2Se(alpha)	-82.22	-128.66	-46.44	Cu2Se
Cu2SO4	-35.20	-37.09	-1.89	Cu2SO4
Cu3(AsO4)2:2H2O	-8.94	-2.84	6.10	Cu3(AsO4)2:2H2O
Cu3(PO4)2	-4.58	-41.43	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-6.31	-41.43	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	-162.49	-227.00	-64.51	Cu3Se2
CuCO3	-3.75	-15.25	-11.50	CuCO3
CuCrO4	-7.56	-13.00	-5.44	CuCrO4
Cumetal	-24.01	-32.98	-8.97	Cu
CuMoO4	2.18	-10.93	-13.11	CuMoO4
CuOCuSO4	-11.09	-0.37	10.71	CuOCuSO4
Cupricferrite	7.72	14.34	6.62	CuFe2O4
Cuprite	-22.87	-23.91	-1.04	Cu2O
Cuprousferrite	0.88	-7.99	-8.87	CuFeO2
CuSe	-64.88	-98.34	-33.46	CuSe
CuSe2	-127.25	-161.03	-33.79	CuSe2
CuSeO3:2H2O	-17.65	-17.03	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-9.44	-11.88	-2.44	CuSeO4:5H2O
CuSO4	-9.94	-6.78	3.16	CuSO4
Diaspore	-0.00	7.18	7.18	AlOOH
Djurleite	-134.97	-169.49	-34.52	Cu0.066Cu1.868S
Dolomite(disordered)	-10.34	-26.74	-16.40	CaMg(CO3)2
Dolomite(ordered)	-9.77	-26.74	-16.97	CaMg(CO3)2
Epsomite	-3.02	-5.18	-2.16	MgSO4:7H2O
Fe(OH)2	-17.47	-3.91	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	4.77	1.73	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-17.06	-15.50	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-41.74	-62.36	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-28.61	-31.62	-3.01	Fe2(SO4)3
Fe3(OH)8	-16.20	4.02	20.22	Fe3(OH)8
FeAsO4:2H2O	-7.46	-7.06	0.40	FeAsO4:2H2O
FeCr2O4	-41.15	-33.53	7.62	FeCr2O4
FeMoO4	-11.18	-21.24	-10.06	FeMoO4
Ferrihydrite	0.55	3.96	3.41	Fe(OH)3
Ferroselite	-152.60	-171.34	-18.74	FeSe2
FeS(ppt)	-148.57	-151.48	-2.92	FeS
FeSe	-97.65	-108.65	-11.01	FeSe
Fix_pH	-5.50	-5.50	0.00	H+
Galena	-130.21	-144.42	-14.21	PbS
Gibbsite	-1.40	7.18	8.58	Al(OH)3
Goethite	3.29	3.96	0.67	FeOOH
Goslarite	-5.87	-7.93	-2.05	ZnSO4:7H2O
Greenockite	-130.97	-145.49	-14.52	CdS
Greigite	-541.26	-586.29	-45.03	Fe3S4
Gypsum	0.00	-4.61	-4.61	CaSO4:2H2O
H-Jarosite	-3.06	-14.48	-11.41	(H3O)Fe3(SO4)2(OH)6
H2MoO4	-4.32	-17.34	-13.02	H2MoO4
H2S(g)	-139.57	-147.58	-8.01	H2S
H2Se(g)	-99.83	-104.75	-4.91	H2Se
Halite	-5.48	-3.89	1.59	NaCl
Hausmannite	-15.12	47.17	62.29	Mn3O4
Hematite	8.96	7.93	-1.03	Fe2O3
Hercynite	-13.37	10.46	23.83	FeAl2O4
Hinsdalite	-16.30	-18.80	-2.50	PbAl3PO4SO4(OH)6
Huntite	-24.40	-54.04	-29.65	CaMg3(CO3)4

Hydrocerussite	-15.05	-33.83	-18.77	Pb3 (OH) 2 (CO3) 2
Hydromagnesite	-38.49	-46.61	-8.11	Mg5 (CO3) 4 (OH) 2 : 4H2O
Hydroxylapatite	-3.77	-48.10	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-12.36	-75.15	-62.79	Pb5 (PO4) 3OH
K-Alum	-10.75	-16.01	-5.26	KAl (SO4) 2 : 12H2O
K-Jarosite	3.12	-11.29	-14.41	KFe3 (SO4) 2 (OH) 6
K2Cr2O7	-14.97	-32.45	-17.48	K2Cr2O7
K2CrO4	-12.48	-13.04	-0.57	K2CrO4
K2MoO4	-14.24	-10.97	3.27	K2MoO4
K2SeO4	-11.19	-11.92	-0.73	K2SeO4
Langite	-5.55	12.44	17.98	Cu4 (OH) 6SO4 : H2O
Larnakite	-6.49	-6.86	-0.37	PbO : PbSO4
Laurionite	-4.91	-4.29	0.62	PbOHCl
Lepidocrocite	2.59	3.96	1.37	FeOOH
Lime	-24.71	8.57	33.28	CaO
Litharge	-9.73	3.16	12.89	PbO
Mackinawite	-147.88	-151.48	-3.60	FeS
Maghemite	1.54	7.93	6.39	Fe2O3
Magnesioferrite	-1.76	15.94	17.69	Fe2MgO4
Magnesite	-6.13	-13.65	-7.52	MgCO3
Magnetite	0.00	4.03	4.03	Fe3O4
Malachite	-3.31	-8.85	-5.53	Cu2 (OH) 2CO3
Manganite	-2.61	22.73	25.34	MnOOH
Massicot	-9.93	3.16	13.09	PbO
Melanothallite	-14.95	-8.50	6.45	CuCl2
Melanterite	-14.82	-17.09	-2.27	FeSO4 : 7H2O
Mg (OH) 2 (active)	-10.79	8.01	18.79	Mg (OH) 2
Mg3 (PO4) 2	-13.35	-36.63	-23.28	Mg3 (PO4) 2
MgCr2O4	-38.36	-21.62	16.74	MgCr2O4
MgCrO4	-17.05	-11.40	5.65	MgCrO4
MgHPO4 : 3H2O	-4.14	-22.32	-18.18	MgHPO4 : 3H2O
MgMoO4	-7.48	-9.33	-1.85	MgMoO4
MgSeO3 : 6H2O	-18.47	-15.43	3.04	MgSeO3 : 6H2O
MgSeO4 : 6H2O	-9.08	-10.28	-1.20	MgSeO4 : 6H2O
Minium	-23.23	51.55	74.78	Pb3O4
Mirabilite	-4.71	-6.06	-1.35	Na2SO4 : 10H2O
Mn2 (SO4) 3	-40.21	-45.43	-5.22	Mn2 (SO4) 3
Mn3 (AsO4) 2 : 8H2O	-29.44	-16.94	12.50	Mn3 (AsO4) 2 : 8H2O
Mn3 (PO4) 2	-31.68	-55.53	-23.85	Mn3 (PO4) 2
MnCl2 : 4H2O	-15.95	-13.21	2.75	MnCl2 : 4H2O
MnHPO4	-3.22	-28.62	-25.40	MnHPO4
MnS (grn)	-146.14	-145.88	0.27	MnS
MnS (pnk)	-149.22	-145.88	3.34	MnS
MnSe	-106.84	-103.04	3.79	MnSe
MnSeO3	-22.86	-21.73	1.13	MnSeO3
MnSeO3 : 2H2O	-22.68	-21.73	0.96	MnSeO3 : 2H2O
MnSeO4 : 5H2O	-14.53	-16.58	-2.05	MnSeO4 : 5H2O
MnSO4	-14.26	-11.48	2.78	MnSO4
Monteponite	-13.33	2.09	15.41	CdO
MoO3	-9.34	-17.34	-8.00	MoO3
Morenosite	-5.66	-7.84	-2.18	NiSO4 : 7H2O
MoS2	-283.13	-354.56	-71.42	MoS2
Na-Jarosite	-0.16	-10.91	-10.75	NaFe3 (SO4) 2 (OH) 6
Na2Cr2O7	-21.73	-31.69	-9.96	Na2Cr2O7
Na2CrO4	-15.27	-12.28	2.99	Na2CrO4
Na2Mo2O7	-10.78	-27.55	-16.76	Na2Mo2O7
Na2MoO4	-11.73	-10.21	1.52	Na2MoO4
Na2MoO4 : 2H2O	-11.44	-10.21	1.22	Na2MoO4 : 2H2O
Na2SeO3 : 5H2O	-26.61	-16.31	10.30	Na2SeO3 : 5H2O
Na2SeO4	-12.43	-11.15	1.28	Na2SeO4
Nantokite	-12.55	-19.41	-6.86	CuCl
Natron	-13.03	-14.54	-1.51	Na2CO3 : 10H2O
Nesquehonite	-9.06	-13.65	-4.60	MgCO3 : 3H2O
Ni (OH) 2	-7.73	5.35	13.08	Ni (OH) 2
Ni3 (AsO4) 2 : 8H2O	-21.70	-6.00	15.70	Ni3 (AsO4) 2 : 8H2O
Ni3 (PO4) 2	-13.29	-44.59	-31.30	Ni3 (PO4) 2
Ni4 (OH) 6SO4	-23.78	8.22	32.00	Ni4 (OH) 6SO4
NiCO3	-9.56	-16.31	-6.75	NiCO3

NiMoO4	-0.84	-11.99	-11.15	NiMoO4
NiS (alpha)	-136.63	-142.23	-5.60	NiS
NiS (beta)	-131.13	-142.23	-11.10	NiS
NiS (gamma)	-129.43	-142.23	-12.80	NiS
NiSe	-81.70	-99.40	-17.70	NiSe
NiSeO3:2H2O	-20.99	-18.08	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-11.41	-12.93	-1.52	NiSeO4:6H2O
Nsutite	0.59	18.09	17.50	MnO2
O2 (g)	-0.68	84.12	84.80	O2
Orpiment	-448.25	-510.36	-62.11	As2S3
Otavite	-7.57	-19.57	-12.00	CdCO3
Pb (BO2) 2	-13.45	-6.88	6.57	Pb (BO2) 2
Pb (OH) 2	-5.16	3.16	8.32	Pb (OH) 2
Pb10 (OH) 6O (CO3) 6	-89.55	-98.31	-8.76	Pb10 (OH) 6O (CO3) 6
Pb2 (OH) 3Cl	-9.92	-1.13	8.79	Pb2 (OH) 3Cl
Pb2O (OH) 2	-19.86	6.33	26.19	Pb2O (OH) 2
Pb2O3	-12.65	48.39	61.04	Pb2O3
Pb2OCO3	-14.89	-15.33	-0.44	Pb2OCO3
Pb3 (AsO4) 2	-18.36	-12.56	5.80	Pb3 (AsO4) 2
Pb3 (PO4) 2	-7.62	-51.15	-43.53	Pb3 (PO4) 2
Pb3O2CO3	-23.52	-12.17	11.35	Pb3O2CO3
Pb3O2SO4	-14.61	-3.69	10.92	Pb3O2SO4
Pb4 (OH) 6SO4	-21.63	-0.53	21.10	Pb4 (OH) 6SO4
Pb4O3SO4	-22.81	-0.53	22.28	Pb4O3SO4
PbCrO4	-3.51	-16.24	-12.73	PbCrO4
PbHPO4	-3.35	-27.16	-23.81	PbHPO4
Pbmetal	-43.14	-38.89	4.24	Pb
PbMoO4	1.61	-14.17	-15.78	PbMoO4
PbO:0.3H2O	-9.82	3.16	12.98	PbO:0.33H2O
PbSeO4	-8.23	-15.12	-6.88	PbSeO4
Periclase	-14.03	8.01	22.04	MgO
Phosgenite	-10.43	-30.24	-19.81	PbCl2:PbCO3
Plattnerite	-5.26	45.22	50.49	PbO2
Plumbgummite	-3.15	-35.94	-32.79	PbAl3 (PO4) 2 (OH) 5:H2O
Portlandite	-14.62	8.57	23.19	Ca (OH) 2
Pyrite	-238.35	-257.01	-18.66	FeS2
Pyrochroite	-13.78	1.70	15.48	Mn (OH) 2
Pyrolusite	1.57	43.76	42.19	MnO2
Pyromorphite	1.83	-82.60	-84.43	Pb5 (PO4) 3Cl
Realgar	-182.29	-202.42	-20.13	AsS
Retgersite	-5.78	-7.84	-2.05	NiSO4:6H2O
Rhodochrosite	-9.38	-19.95	-10.57	MnCO3
Semetal (am)	-55.55	-62.69	-7.14	Se
Semetal (hex)	-54.93	-62.69	-7.76	Se
SeO2	-23.55	-23.43	0.12	SeO2
SeO3	-39.76	-18.28	21.48	SeO3
Siderite	-15.37	-25.56	-10.19	FeCO3
Smithsonite	-6.45	-16.40	-9.95	ZnCO3
Sphalerite	-130.78	-142.32	-11.54	ZnS
Spinel	-15.64	22.37	38.01	MgAl2O4
Strengite	0.01	-26.36	-26.37	FePO4:2H2O
Sulfur	-103.42	-105.52	-2.10	S
Tenorite	-1.43	6.41	7.84	CuO
Thenardite	-6.41	-6.06	0.35	Na2SO4
Thermonatrite	-15.20	-14.53	0.67	Na2CO3:H2O
Tsumebite	-7.80	-17.59	-9.79	Pb2CuPO4 (OH) 3:3H2O
Vivianite	-36.37	-72.37	-36.00	Fe3 (PO4) 2:8H2O
Witherite	-9.00	-17.58	-8.58	BaCO3
Wurtzite	-133.31	-142.32	-9.01	ZnS
Zincite	-6.34	5.26	11.60	ZnO
Zincosite	-12.10	-7.92	4.18	ZnSO4
Zn (BO2) 2	-13.08	-4.79	8.29	Zn (BO2) 2
Zn (NO3) 2:6H2O	-15.47	-12.23	3.24	Zn (NO3) 2:6H2O
Zn (OH) 2	-6.94	5.26	12.20	Zn (OH) 2
Zn (OH) 2 (am)	-7.46	5.26	12.71	Zn (OH) 2
Zn (OH) 2 (beta)	-6.74	5.26	12.00	Zn (OH) 2
Zn (OH) 2 (epsilon)	-6.52	5.26	11.78	Zn (OH) 2
Zn (OH) 2 (gamma)	-6.47	5.26	11.73	Zn (OH) 2

Zn2(OH)2SO4	-10.16	-2.66	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.13	3.07	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-19.92	-6.27	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-9.45	-44.87	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-30.27	-10.59	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-20.54	7.86	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-27.11	11.39	38.50	Zn5(OH)8Cl2
ZnCl2	-16.91	-9.65	7.27	ZnCl2
ZnCO3:1H2O	-6.14	-16.40	-10.26	ZnCO3:1H2O
Znmetal	-63.05	-36.80	26.25	Zn
ZnMoO4	-1.98	-12.08	-10.09	ZnMoO4
ZnO(active)	-6.19	5.26	11.45	ZnO
ZnS(am)	-133.22	-142.32	-9.10	ZnS
ZnSe	-85.01	-99.49	-14.48	ZnSe
ZnSeO4:6H2O	-11.50	-13.02	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.42	-7.92	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 9.

```

USE solution 1
EQUILIBRIUM_PHASES 6
  Birnessite 0 0
  Diaspore 0 0
  Fix_pH -5.75 Portlandite 10
  Magnetite 0 0
  O2(g) -0.68 10
  CO2(g) -3.5 10
END

```

Beginning of batch-reaction calculations.

Reaction step 1.

Using solution 1.
Using pure phase assemblage 6.

-----User print-----

Moles of Portlandite: -1.4079e-03
Moles of Diaspore: -1.4079e-03
Moles of Magnetite: -1.4079e-03
Moles of Birnessite: -1.4079e-03
mg of Portlandite: -1.0431e+02
mg of Diaspore: -8.4459e+01
mg of Birnessite: -1.2240e+02

-----Phase assemblage-----

Phase	SI	log IAP	log K(T, P)	Moles in assemblage		
				Initial	Final	Delta
Birnessite	0.00	18.09	18.09	0.000e+00	9.539e-05	9.539e-05
CO2(g)	-3.50	-21.66	-18.16	1.000e+01	1.000e+01	-1.626e-05
Diaspore	-0.00	7.18	7.18	0.000e+00	5.283e-05	5.283e-05
Fix_pH	-5.75	-5.75	0.00			
Ca(OH)2		is reactant		1.000e+01	9.999e+00	-1.408e-03
Magnetite	0.00	4.03	4.03	0.000e+00	1.477e-04	1.477e-04
O2(g)	-0.68	84.12	84.80	1.000e+01	9.998e+00	-2.051e-03

-----Solution composition-----

Elements	Molality	Moles
Al	9.277e-09	9.278e-09
As	2.680e-08	2.680e-08
B	9.287e-06	9.287e-06
Ba	2.924e-07	2.924e-07
Be	2.228e-07	2.228e-07
C	1.626e-05	1.626e-05
Ca	1.448e-02	1.448e-02
Cd	7.145e-09	7.145e-09
Cl	1.388e-02	1.388e-02
Co	1.227e-05	1.227e-05
Cr	6.372e-08	6.372e-08
Cu	9.874e-05	9.874e-05
Fe	5.187e-07	5.187e-07
K	6.291e-03	6.291e-03
Mg	3.635e-03	3.635e-03
Mn	7.432e-10	7.432e-10
Mo	1.151e-06	1.151e-06
N	7.218e-04	7.218e-04
Na	1.498e-02	1.498e-02
Ni	8.382e-06	8.382e-06
P	9.399e-06	9.400e-06
Pb	9.690e-08	9.691e-08
S	2.322e-02	2.322e-02
Se	1.271e-07	1.271e-07
Zn	7.523e-06	7.523e-06

-----Description of solution-----

pH	=	5.750	Charge balance
pe	=	15.280	Adjusted to redox equilibrium
Activity of water	=	0.999	
Ionic strength (mol/kgw)	=	7.310e-02	
Mass of water (kg)	=	1.000e+00	
Total alkalinity (eq/kg)	=	2.051e-06	
Total CO2 (mol/kg)	=	1.626e-05	
Temperature (°C)	=	20.00	
Electrical balance (eq)	=	-3.291e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-3.61	
Iterations	=	31	
Total H	=	1.110195e+02	
Total O	=	5.560585e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.221e-06	1.778e-06	-5.653	-5.750	-0.097	0.00
OH-	4.899e-09	3.852e-09	-8.310	-8.414	-0.104	(0)
H2O	5.551e+01	9.988e-01	1.744	-0.001	0.000	18.05
Al	9.277e-09					
AlSO4+	4.479e-09	3.576e-09	-8.349	-8.447	-0.098	(0)
Al(OH)2+	2.688e-09	2.172e-09	-8.571	-8.663	-0.092	(0)
AlOH+2	8.157e-10	3.480e-10	-9.088	-9.458	-0.370	(0)
Al+3	6.323e-10	8.550e-11	-9.199	-10.068	-0.869	(0)
Al(SO4)2-	3.503e-10	2.797e-10	-9.456	-9.553	-0.098	(0)
Al(OH)3	2.451e-10	2.451e-10	-9.611	-9.611	0.000	(0)
Al(OH)4-	6.637e-11	5.300e-11	-10.178	-10.276	-0.098	(0)
AlMo6O21-3	4.578e-27	2.691e-28	-26.339	-27.570	-1.231	(0)
As(3)	8.167e-35					
H3AsO3	8.164e-35	8.164e-35	-34.088	-34.088	0.000	(0)
H2AsO3-	2.671e-38	1.950e-38	-37.573	-37.710	-0.137	(0)
H4AsO3+	0.000e+00	0.000e+00	-40.006	-40.143	-0.137	(0)

		HAsO3-2	0.000e+00	0.000e+00	-43.549	-44.096	-0.547	(0)
		AsO3-3	0.000e+00	0.000e+00	-50.605	-51.835	-1.231	(0)
As (5)	2.680e-08							
		H2AsO4-	2.319e-08	1.693e-08	-7.635	-7.771	-0.137	(0)
		HAsO4-2	3.603e-09	1.022e-09	-8.443	-8.990	-0.547	(0)
		H3AsO4	4.899e-12	4.982e-12	-11.310	-11.303	0.007	(0)
		AsO4-3	2.751e-14	1.617e-15	-13.560	-14.791	-1.231	(0)
B	9.287e-06							
		H3BO3	9.282e-06	9.440e-06	-5.032	-5.025	0.007	(0)
		H2BO3-	3.648e-09	2.819e-09	-8.438	-8.550	-0.112	(0)
		CaH2BO3+	7.660e-10	5.919e-10	-9.116	-9.228	-0.112	(0)
		MgH2BO3+	1.286e-10	9.935e-11	-9.891	-10.003	-0.112	(0)
		NaH2BO3	5.664e-11	5.664e-11	-10.247	-10.247	0.000	(0)
		H5 (BO3) 2-	3.025e-14	2.338e-14	-13.519	-13.631	-0.112	(0)
		BaH2BO3+	1.316e-14	1.017e-14	-13.881	-13.993	-0.112	(0)
		H8 (BO3) 3-	2.472e-17	1.910e-17	-16.607	-16.719	-0.112	(0)
Ba	2.924e-07							
		Ba+2	2.919e-07	1.200e-07	-6.535	-6.921	-0.386	(0)
		BaN03+	5.136e-10	3.748e-10	-9.289	-9.426	-0.137	(0)
		BaHCO3+	3.440e-12	2.801e-12	-11.463	-11.553	-0.089	(0)
		BaH2BO3+	1.316e-14	1.017e-14	-13.881	-13.993	-0.112	(0)
		BaCO3	3.816e-15	3.816e-15	-14.418	-14.418	0.000	(0)
		BaOH+	2.424e-15	1.949e-15	-14.615	-14.710	-0.095	(0)
		BaNH3+2	0.000e+00	0.000e+00	-71.632	-72.179	-0.547	(0)
Be	2.228e-07							
		BeOH+	1.004e-07	8.222e-08	-6.998	-7.085	-0.087	(0)
		Be+2	8.885e-08	3.652e-08	-7.051	-7.438	-0.386	(0)
		BeSO4	3.027e-08	3.027e-08	-7.519	-7.519	0.000	(0)
		Be (SO4) 2-2	2.167e-09	6.149e-10	-8.664	-9.211	-0.547	(0)
		BeCl+	8.013e-10	6.442e-10	-9.096	-9.191	-0.095	(0)
		Be (OH) 2	2.934e-10	2.934e-10	-9.533	-9.533	0.000	(0)
		BeCO3	4.544e-12	4.544e-12	-11.343	-11.343	0.000	(0)
		Be2OH+3	3.009e-12	4.982e-13	-11.522	-12.303	-0.781	(0)
		Be3 (OH) 3+3	8.114e-14	1.344e-14	-13.091	-13.872	-0.781	(0)
		Be (OH) 3-	5.090e-14	4.168e-14	-13.293	-13.380	-0.087	(0)
		Be (OH) 4-2	3.307e-22	1.487e-22	-21.481	-21.828	-0.347	(0)
C (4)	1.626e-05							
		H2CO3	1.237e-05	1.237e-05	-4.908	-4.908	0.000	(0)
		HCO3-	3.593e-06	2.904e-06	-5.445	-5.537	-0.092	(0)
		CaHCO3+	2.171e-07	1.767e-07	-6.663	-6.753	-0.089	(0)
		MgHCO3+	3.707e-08	2.938e-08	-7.431	-7.532	-0.101	(0)
		NaHCO3	2.080e-08	2.080e-08	-7.682	-7.682	0.000	(0)
		CuCO3	1.036e-08	1.036e-08	-7.985	-7.985	0.000	(0)
		CuHCO3+	5.769e-09	4.211e-09	-8.239	-8.376	-0.137	(0)
		NiHCO3+	9.974e-10	7.280e-10	-9.001	-9.138	-0.137	(0)
		CoHCO3+	7.113e-10	5.191e-10	-9.148	-9.285	-0.137	(0)
		CaCO3	3.687e-10	3.687e-10	-9.433	-9.433	0.000	(0)
		ZnHCO3+	2.074e-10	1.514e-10	-9.683	-9.820	-0.137	(0)
		CO3-2	1.685e-10	6.924e-11	-9.773	-10.160	-0.386	(0)
		MgCO3	5.390e-11	5.390e-11	-10.268	-10.268	0.000	(0)
		PbHCO3+	3.903e-11	2.849e-11	-10.409	-10.545	-0.137	(0)
		NaCO3-	2.127e-11	1.719e-11	-10.672	-10.765	-0.092	(0)
		ZnCO3	7.263e-12	7.263e-12	-11.139	-11.139	0.000	(0)
		NiCO3	5.808e-12	5.808e-12	-11.236	-11.236	0.000	(0)
		BeCO3	4.544e-12	4.544e-12	-11.343	-11.343	0.000	(0)
		BaHCO3+	3.440e-12	2.801e-12	-11.463	-11.553	-0.089	(0)
		PbCO3	3.039e-12	3.039e-12	-11.517	-11.517	0.000	(0)
		CoCO3	2.974e-12	2.974e-12	-11.527	-11.527	0.000	(0)
		MnHCO3+	1.124e-14	9.034e-15	-13.949	-14.044	-0.095	(0)
		CdHCO3+	1.001e-14	7.307e-15	-14.000	-14.136	-0.137	(0)
		Cu (CO3) 2-2	6.803e-15	1.931e-15	-14.167	-14.714	-0.547	(0)
		BaCO3	3.816e-15	3.816e-15	-14.418	-14.418	0.000	(0)
		CdCO3	1.928e-15	1.928e-15	-14.715	-14.715	0.000	(0)
		Pb (CO3) 2-2	2.138e-18	6.068e-19	-17.670	-18.217	-0.547	(0)
		FeHCO3+	1.602e-20	1.304e-20	-19.795	-19.885	-0.089	(0)
		Cd (CO3) 2-2	3.488e-22	9.898e-23	-21.457	-22.004	-0.547	(0)
Ca	1.448e-02							
		Ca+2	9.127e-03	3.751e-03	-2.040	-2.426	-0.386	(0)

CaSO4	5.346e-03	5.346e-03	-2.272	-2.272	0.000	(0)
CaNO3+	9.615e-06	7.018e-06	-5.017	-5.154	-0.137	(0)
CaH2PO4+	5.783e-07	4.674e-07	-6.238	-6.330	-0.092	(0)
CaHPO4	3.332e-07	3.332e-07	-6.477	-6.477	0.000	(0)
CaHCO3+	2.171e-07	1.767e-07	-6.663	-6.753	-0.089	(0)
CaH2BO3+	7.660e-10	5.919e-10	-9.116	-9.228	-0.112	(0)
CaPO4-	5.527e-10	4.467e-10	-9.258	-9.350	-0.092	(0)
CaCO3	3.687e-10	3.687e-10	-9.433	-9.433	0.000	(0)
CaOH+	3.344e-10	2.723e-10	-9.476	-9.565	-0.089	(0)
CaNH3+2	0.000e+00	0.000e+00	-66.837	-67.384	-0.547	(0)
Ca (NH3) 2+2	0.000e+00	0.000e+00	-132.295	-132.842	-0.547	(0)
Cd	7.145e-09					
Cd+2	2.973e-09	1.222e-09	-8.527	-8.913	-0.386	(0)
CdCl+	1.764e-09	1.287e-09	-8.754	-8.890	-0.137	(0)
CdSO4	1.763e-09	1.763e-09	-8.754	-8.754	0.000	(0)
Cd (SO4) 2-2	5.812e-10	1.650e-10	-9.236	-9.783	-0.547	(0)
CdCl2	5.881e-11	5.881e-11	-10.231	-10.231	0.000	(0)
CdNO3+	3.488e-12	2.546e-12	-11.457	-11.594	-0.137	(0)
CdCl3-	5.382e-13	3.928e-13	-12.269	-12.406	-0.137	(0)
CdOHC1	2.653e-13	2.653e-13	-12.576	-12.576	0.000	(0)
CdOH+	5.158e-14	3.765e-14	-13.287	-13.424	-0.137	(0)
CdSeO4	1.188e-14	1.188e-14	-13.925	-13.925	0.000	(0)
CdHCO3+	1.001e-14	7.307e-15	-14.000	-14.136	-0.137	(0)
CdCO3	1.928e-15	1.928e-15	-14.715	-14.715	0.000	(0)
Cd (NO3) 2	6.295e-16	6.295e-16	-15.201	-15.201	0.000	(0)
Cd (OH) 2	1.959e-18	1.959e-18	-17.708	-17.708	0.000	(0)
Cd2OH+3	4.173e-21	2.453e-22	-20.380	-21.610	-1.231	(0)
Cd (CO3) 2-2	3.488e-22	9.898e-23	-21.457	-22.004	-0.547	(0)
Cd (OH) 3-	9.274e-25	6.769e-25	-24.033	-24.169	-0.137	(0)
Cd (OH) 4-2	2.208e-33	6.266e-34	-32.656	-33.203	-0.547	(0)
Cd (SeO3) 2-2	0.000e+00	0.000e+00	-44.114	-44.661	-0.547	(0)
CdHS+	0.000e+00	0.000e+00	-143.098	-143.235	-0.137	(0)
Cd (HS) 2	0.000e+00	0.000e+00	-278.361	-278.361	0.000	(0)
Cd (HS) 3-	0.000e+00	0.000e+00	-418.655	-418.792	-0.137	(0)
Cd (HS) 4-2	0.000e+00	0.000e+00	-558.379	-558.926	-0.547	(0)
Cl	1.388e-02					
Cl-	1.387e-02	1.111e-02	-1.858	-1.954	-0.097	(0)
CuCl+	5.331e-07	4.225e-07	-6.273	-6.374	-0.101	(0)
CoCl+	1.320e-07	9.632e-08	-6.880	-7.016	-0.137	(0)
NiCl+	8.636e-08	6.303e-08	-7.064	-7.200	-0.137	(0)
ZnCl+	6.184e-08	4.901e-08	-7.209	-7.310	-0.101	(0)
PbCl+	7.426e-09	5.420e-09	-8.129	-8.266	-0.137	(0)
CdCl+	1.764e-09	1.287e-09	-8.754	-8.890	-0.137	(0)
CuCl2	1.272e-09	1.272e-09	-8.896	-8.896	0.000	(0)
BeCl+	8.013e-10	6.442e-10	-9.096	-9.191	-0.095	(0)
ZnCl2	6.943e-10	6.943e-10	-9.158	-9.158	0.000	(0)
ZnOHC1	3.766e-10	3.766e-10	-9.424	-9.424	0.000	(0)
PbCl2	2.629e-10	2.629e-10	-9.580	-9.580	0.000	(0)
CdCl2	5.881e-11	5.881e-11	-10.231	-10.231	0.000	(0)
ZnCl3-	7.572e-12	6.001e-12	-11.121	-11.222	-0.101	(0)
NiCl2	3.574e-12	3.574e-12	-11.447	-11.447	0.000	(0)
MnCl+	2.788e-12	2.241e-12	-11.555	-11.649	-0.095	(0)
PbCl3-	1.683e-12	1.228e-12	-11.774	-11.911	-0.137	(0)
CdCl3-	5.382e-13	3.928e-13	-12.269	-12.406	-0.137	(0)
CdOHC1	2.653e-13	2.653e-13	-12.576	-12.576	0.000	(0)
CuCl3-	1.520e-13	1.205e-13	-12.818	-12.919	-0.101	(0)
ZnCl4-2	7.664e-14	3.202e-14	-13.116	-13.495	-0.379	(0)
FeCl+2	3.565e-14	1.489e-14	-13.448	-13.827	-0.379	(0)
MnCl2	3.517e-14	3.517e-14	-13.454	-13.454	0.000	(0)
PbCl4-2	2.041e-14	5.792e-15	-13.690	-14.237	-0.547	(0)
CrO3Cl-	6.059e-15	4.422e-15	-14.218	-14.354	-0.137	(0)
FeCl2+	1.077e-15	8.656e-16	-14.968	-15.063	-0.095	(0)
CuCl2-	2.584e-16	2.048e-16	-15.588	-15.689	-0.101	(0)
MnCl3-	1.339e-16	1.076e-16	-15.873	-15.968	-0.095	(0)
CuCl	8.718e-17	8.718e-17	-16.060	-16.060	0.000	(0)
CuCl4-2	1.903e-17	7.951e-18	-16.721	-17.100	-0.379	(0)
CuCl3-2	1.142e-18	4.770e-19	-17.942	-18.321	-0.379	(0)
FeCl3	9.616e-19	9.616e-19	-18.017	-18.017	0.000	(0)

CoCl+2	1.374e-22	3.900e-23	-21.862	-22.409	-0.547	(0)
CrCl+2	1.663e-24	4.719e-25	-23.779	-24.326	-0.547	(0)
CrCl2+	4.376e-28	3.194e-28	-27.359	-27.496	-0.137	(0)
CrOHC12	2.762e-28	2.762e-28	-27.559	-27.559	0.000	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-321.490	-322.037	-0.547	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-393.237	-393.784	-0.547	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-400.447	-400.994	-0.547	(0)
Co (2)	1.227e-05					
Co+2	8.954e-06	2.541e-06	-5.048	-5.595	-0.547	(0)
CoSO4	3.174e-06	3.174e-06	-5.498	-5.498	0.000	(0)
CoCl+	1.320e-07	9.632e-08	-6.880	-7.016	-0.137	(0)
CoNO3+	3.146e-09	2.296e-09	-8.502	-8.639	-0.137	(0)
CoHCO3+	7.113e-10	5.191e-10	-9.148	-9.285	-0.137	(0)
CoHPO4	5.278e-10	5.278e-10	-9.278	-9.278	0.000	(0)
CoOH+	3.929e-10	2.868e-10	-9.406	-9.542	-0.137	(0)
CoSeO4	6.121e-11	6.121e-11	-10.213	-10.213	0.000	(0)
CoCO3	2.974e-12	2.974e-12	-11.527	-11.527	0.000	(0)
Co (NO3) 2	2.664e-12	2.664e-12	-11.575	-11.575	0.000	(0)
Co (OH) 2	1.288e-13	1.288e-13	-12.890	-12.890	0.000	(0)
Co2OH+3	6.212e-16	3.652e-17	-15.207	-16.437	-1.231	(0)
Co (OH) 3-	1.992e-20	1.454e-20	-19.701	-19.838	-0.137	(0)
CoNO2+	1.600e-21	1.168e-21	-20.796	-20.933	-0.137	(0)
CoOOH-	8.337e-22	6.085e-22	-21.079	-21.216	-0.137	(0)
Co4 (OH) 4+4	2.080e-28	1.349e-30	-27.682	-29.870	-2.188	(0)
Co (OH) 4-2	4.591e-29	1.303e-29	-28.338	-28.885	-0.547	(0)
Co (NH3) +2	0.000e+00	0.000e+00	-67.832	-68.379	-0.547	(0)
Co (NH3) 2+2	0.000e+00	0.000e+00	-131.454	-132.001	-0.547	(0)
Co (NH3) 3+2	0.000e+00	0.000e+00	-195.412	-195.959	-0.547	(0)
Co (NH3) 4+2	0.000e+00	0.000e+00	-259.750	-260.297	-0.547	(0)
Co (NH3) 5+2	0.000e+00	0.000e+00	-324.588	-325.135	-0.547	(0)
Co (3)	1.951e-18					
CoOH+2	1.950e-18	5.535e-19	-17.710	-18.257	-0.547	(0)
Co+3	1.424e-22	1.926e-23	-21.846	-22.715	-0.869	(0)
CoCl+2	1.374e-22	3.900e-23	-21.862	-22.409	-0.547	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-321.490	-322.037	-0.547	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-389.012	-389.149	-0.137	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-393.237	-393.784	-0.547	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-395.018	-395.565	-0.547	(0)
Cr (2)	0.000e+00					
Cr+2	0.000e+00	0.000e+00	-44.167	-44.714	-0.547	(0)
Cr (3)	1.829e-20					
Cr (OH) +2	1.199e-20	3.403e-21	-19.921	-20.468	-0.547	(0)
CrOHSO4	3.087e-21	3.087e-21	-20.511	-20.511	0.000	(0)
Cr (OH) 2+	1.877e-21	1.370e-21	-20.727	-20.863	-0.137	(0)
Cr+3	6.677e-22	3.925e-23	-21.175	-22.406	-1.231	(0)
CrSO4+	6.629e-22	4.838e-22	-21.179	-21.315	-0.137	(0)
Cr (OH) 3	2.911e-24	2.911e-24	-23.536	-23.536	0.000	(0)
CrCl+2	1.663e-24	4.719e-25	-23.779	-24.326	-0.547	(0)
CrH2PO4+2	1.763e-25	5.003e-26	-24.754	-25.301	-0.547	(0)
CrNO3+2	2.216e-27	6.290e-28	-26.654	-27.201	-0.547	(0)
CrO2-	1.066e-27	7.782e-28	-26.972	-27.109	-0.137	(0)
Cr (OH) 4-	8.979e-28	6.553e-28	-27.047	-27.184	-0.137	(0)
CrCl2+	4.376e-28	3.194e-28	-27.359	-27.496	-0.137	(0)
CrOHC12	2.762e-28	2.762e-28	-27.559	-27.559	0.000	(0)
Cr2 (OH) 2SO4+2	1.957e-39	5.554e-40	-38.708	-39.255	-0.547	(0)
Cr2 (OH) 2 (SO4) 2	2.156e-40	2.156e-40	-39.666	-39.666	0.000	(0)
Cr (NH3) 5OH+2	0.000e+00	0.000e+00	-335.412	-335.959	-0.547	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-398.911	-400.142	-1.231	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-400.447	-400.994	-0.547	(0)
Cr (6)	6.372e-08					
HCrO4-	4.804e-08	3.506e-08	-7.318	-7.455	-0.137	(0)
CrO4-2	1.503e-08	6.178e-09	-7.823	-8.209	-0.386	(0)
NaCrO4-	4.876e-10	3.559e-10	-9.312	-9.449	-0.137	(0)
KCrO4-	1.516e-10	1.107e-10	-9.819	-9.956	-0.137	(0)
CrO3HPO4-2	2.652e-12	7.527e-13	-11.576	-12.123	-0.547	(0)
CrO3SO4-2	4.438e-13	1.260e-13	-12.353	-12.900	-0.547	(0)
Cr2O7-2	1.714e-13	4.864e-14	-12.766	-13.313	-0.547	(0)
H2CrO4	3.918e-14	3.918e-14	-13.407	-13.407	0.000	(0)

	CrO3Cl-	6.059e-15	4.422e-15	-14.218	-14.354	-0.137	(0)
	CrO3H2PO4-	8.834e-16	6.448e-16	-15.054	-15.191	-0.137	(0)
Cu (1)	3.553e-16						
	CuCl2-	2.584e-16	2.048e-16	-15.588	-15.689	-0.101	(0)
	CuCl	8.718e-17	8.718e-17	-16.060	-16.060	0.000	(0)
	Cu+	8.541e-18	6.234e-18	-17.069	-17.205	-0.137	(0)
	CuCl3-2	1.142e-18	4.770e-19	-17.942	-18.321	-0.379	(0)
	Cu (S4) 2-3	0.000e+00	0.000e+00	-286.571	-286.976	-0.405	(0)
	CuS4S5-3	0.000e+00	0.000e+00	-287.323	-287.706	-0.383	(0)
Cu (2)	9.874e-05						
	Cu+2	6.183e-05	2.541e-05	-4.209	-4.595	-0.386	(0)
	CuSO4	3.582e-05	3.582e-05	-4.446	-4.446	0.000	(0)
	CuCl+	5.331e-07	4.225e-07	-6.273	-6.374	-0.101	(0)
	CuOH+	4.482e-07	3.552e-07	-6.349	-6.450	-0.101	(0)
	CuNO3+	6.456e-08	4.712e-08	-7.190	-7.327	-0.137	(0)
	Cu2 (OH) 2+2	1.079e-08	3.062e-09	-7.967	-8.514	-0.547	(0)
	CuCO3	1.036e-08	1.036e-08	-7.985	-7.985	0.000	(0)
	CuHCO3+	5.769e-09	4.211e-09	-8.239	-8.376	-0.137	(0)
	CuCl2	1.272e-09	1.272e-09	-8.896	-8.896	0.000	(0)
	Cu (OH) 2	5.128e-10	5.128e-10	-9.290	-9.290	0.000	(0)
	Cu (NO3) 2	3.288e-12	3.288e-12	-11.483	-11.483	0.000	(0)
	CuCl3-	1.520e-13	1.205e-13	-12.818	-12.919	-0.101	(0)
	Cu (OH) 3-	8.151e-15	5.949e-15	-14.089	-14.226	-0.137	(0)
	Cu (CO3) 2-2	6.803e-15	1.931e-15	-14.167	-14.714	-0.547	(0)
	CuCl4-2	1.903e-17	7.951e-18	-16.721	-17.100	-0.379	(0)
	CuNO2+	2.377e-19	1.735e-19	-18.624	-18.761	-0.137	(0)
	Cu (OH) 4-2	9.331e-22	2.648e-22	-21.030	-21.577	-0.547	(0)
	Cu (NO2) 2	1.158e-34	1.158e-34	-33.936	-33.936	0.000	(0)
	CuNH3+2	0.000e+00	0.000e+00	-64.881	-65.428	-0.547	(0)
	Cu (HS) 3-	0.000e+00	0.000e+00	-405.550	-405.687	-0.137	(0)
Fe (2)	1.990e-15						
	Fe+2	1.390e-15	3.944e-16	-14.857	-15.404	-0.547	(0)
	FeSO4	5.987e-16	5.987e-16	-15.223	-15.223	0.000	(0)
	FeH2PO4+	1.306e-18	1.056e-18	-17.884	-17.976	-0.092	(0)
	FeHPO4	2.989e-19	2.989e-19	-18.524	-18.524	0.000	(0)
	FeOH+	7.524e-20	6.049e-20	-19.124	-19.218	-0.095	(0)
	FeHCO3+	1.602e-20	1.304e-20	-19.795	-19.885	-0.089	(0)
	Fe (OH) 2	1.752e-25	1.752e-25	-24.757	-24.757	0.000	(0)
	Fe (OH) 3-	3.719e-28	2.990e-28	-27.430	-27.524	-0.095	(0)
	Fe (HS) 2	0.000e+00	0.000e+00	-291.114	-291.114	0.000	(0)
	Fe (HS) 3-	0.000e+00	0.000e+00	-431.271	-431.408	-0.137	(0)
Fe (3)	5.187e-07						
	Fe (OH) 2+	5.170e-07	4.178e-07	-6.287	-6.379	-0.092	(0)
	Fe (OH) 3	1.242e-09	1.242e-09	-8.906	-8.906	0.000	(0)
	FeOH+2	3.409e-10	1.424e-10	-9.467	-9.846	-0.379	(0)
	FeHPO4+	1.249e-10	1.009e-10	-9.904	-9.996	-0.092	(0)
	FeSO4+	3.992e-12	3.210e-12	-11.399	-11.494	-0.095	(0)
	Fe (OH) 4-	1.654e-12	1.336e-12	-11.782	-11.874	-0.092	(0)
	Fe (SO4) 2-	6.393e-13	4.666e-13	-12.194	-12.331	-0.137	(0)
	Fe+3	3.846e-13	5.200e-14	-12.415	-13.284	-0.869	(0)
	FeCl+2	3.565e-14	1.489e-14	-13.448	-13.827	-0.379	(0)
	FeH2PO4+2	1.236e-14	5.274e-15	-13.908	-14.278	-0.370	(0)
	FeNO3+2	1.347e-15	3.824e-16	-14.870	-15.417	-0.547	(0)
	FeCl2+	1.077e-15	8.656e-16	-14.968	-15.063	-0.095	(0)
	Fe2 (OH) 2+4	1.238e-16	8.032e-19	-15.907	-18.095	-2.188	(0)
	FeCl3	9.616e-19	9.616e-19	-18.017	-18.017	0.000	(0)
	Fe3 (OH) 4+5	1.207e-20	4.603e-24	-19.918	-23.337	-3.419	(0)
	FeHSeO3+2	2.681e-28	7.610e-29	-27.572	-28.119	-0.547	(0)
H (0)	0.000e+00						
	H2	0.000e+00	0.000e+00	-45.195	-45.187	0.007	(0)
K	6.291e-03						
	K+	6.023e-03	4.822e-03	-2.220	-2.317	-0.097	(0)
	KSO4-	2.683e-04	2.168e-04	-3.571	-3.664	-0.092	(0)
	KHPO4-	8.617e-09	6.964e-09	-8.065	-8.157	-0.092	(0)
	KCrO4-	1.516e-10	1.107e-10	-9.819	-9.956	-0.137	(0)
Mg	3.635e-03						
	Mg+2	2.473e-03	1.016e-03	-2.607	-2.993	-0.386	(0)
	MgSO4	1.161e-03	1.161e-03	-2.935	-2.935	0.000	(0)

MgH ₂ PO ₄ ⁺	3.344e-07	2.703e-07	-6.476	-6.568	-0.092	(0)
MgHPO ₄	1.246e-07	1.246e-07	-6.904	-6.904	0.000	(0)
MgHCO ₃ ⁺	3.707e-08	2.938e-08	-7.431	-7.532	-0.101	(0)
MgOH ⁺	1.753e-09	1.435e-09	-8.756	-8.843	-0.087	(0)
MgH ₂ BO ₃ ⁺	1.286e-10	9.935e-11	-9.891	-10.003	-0.112	(0)
MgCO ₃	5.390e-11	5.390e-11	-10.268	-10.268	0.000	(0)
MgPO ₄ ⁻	2.341e-12	1.892e-12	-11.631	-11.723	-0.092	(0)
Mn (2)	7.432e-10					
Mn ²⁺	5.647e-10	1.603e-10	-9.248	-9.795	-0.547	(0)
MnSO ₄	1.754e-10	1.754e-10	-9.756	-9.756	0.000	(0)
MnCl ⁺	2.788e-12	2.241e-12	-11.555	-11.649	-0.095	(0)
MnNO ₃ ⁺	1.984e-13	1.448e-13	-12.702	-12.839	-0.137	(0)
MnCl ₂	3.517e-14	3.517e-14	-13.454	-13.454	0.000	(0)
MnHCO ₃ ⁺	1.124e-14	9.034e-15	-13.949	-14.044	-0.095	(0)
MnSeO ₄	2.045e-15	2.045e-15	-14.689	-14.689	0.000	(0)
MnOH ⁺	1.929e-15	1.551e-15	-14.715	-14.809	-0.095	(0)
Mn (NO ₃) ₂	2.098e-16	2.098e-16	-15.678	-15.678	0.000	(0)
MnCl ₃ ⁻	1.339e-16	1.076e-16	-15.873	-15.968	-0.095	(0)
Mn (OH) ₃ ⁻	5.598e-28	4.501e-28	-27.252	-27.347	-0.095	(0)
Mn (OH) ₄ ⁻²	1.967e-35	8.218e-36	-34.706	-35.085	-0.379	(0)
MnSe	0.000e+00	0.000e+00	-108.928	-108.928	0.000	(0)
Mn (3)	4.801e-20					
Mn ³⁺	4.801e-20	6.492e-21	-19.319	-20.188	-0.869	(0)
Mn (6)	1.425e-23					
MnO ₄ ⁻²	1.425e-23	5.952e-24	-22.846	-23.225	-0.379	(0)
Mn (7)	2.863e-18					
MnO ₄ ⁻	2.863e-18	2.233e-18	-17.543	-17.651	-0.108	(0)
Mo	1.151e-06					
MoO ₄ ⁻²	1.131e-06	4.649e-07	-5.946	-6.333	-0.386	(0)
HMoO ₄ ⁻	1.964e-08	1.433e-08	-7.707	-7.844	-0.137	(0)
H ₂ MoO ₄	2.562e-10	2.562e-10	-9.591	-9.591	0.000	(0)
AlMo ₆ O ₂₁ ⁻³	4.578e-27	2.691e-28	-26.339	-27.570	-1.231	(0)
Mo ₇ O ₂₄ ⁻⁶	1.851e-32	2.211e-37	-31.733	-36.655	-4.923	(0)
HMo ₇ O ₂₄ ⁻⁵	2.345e-33	8.944e-37	-32.630	-36.048	-3.419	(0)
H ₂ Mo ₇ O ₂₄ ⁻⁴	1.454e-35	9.435e-38	-34.837	-37.025	-2.188	(0)
H ₃ Mo ₇ O ₂₄ ⁻³	5.099e-39	2.997e-40	-38.293	-39.523	-1.231	(0)
N (-3)	0.000e+00					
NH ₄ ⁺	0.000e+00	0.000e+00	-61.452	-61.564	-0.112	(0)
NH ₄ SO ₄ ⁻	0.000e+00	0.000e+00	-62.624	-62.719	-0.095	(0)
CuNH ₃ ²⁺	0.000e+00	0.000e+00	-64.881	-65.428	-0.547	(0)
NH ₃	0.000e+00	0.000e+00	-65.213	-65.213	0.000	(0)
CaNH ₃ ²⁺	0.000e+00	0.000e+00	-66.837	-67.384	-0.547	(0)
NiNH ₃ ²⁺	0.000e+00	0.000e+00	-67.229	-67.776	-0.547	(0)
Co (NH ₃) ₂ ⁺	0.000e+00	0.000e+00	-67.832	-68.379	-0.547	(0)
BaNH ₃ ²⁺	0.000e+00	0.000e+00	-71.632	-72.179	-0.547	(0)
Ni (NH ₃) ₂ ²⁺	0.000e+00	0.000e+00	-129.994	-130.541	-0.547	(0)
Co (NH ₃) ₂ ²⁺	0.000e+00	0.000e+00	-131.454	-132.001	-0.547	(0)
Ca (NH ₃) ₂ ²⁺	0.000e+00	0.000e+00	-132.295	-132.842	-0.547	(0)
Co (NH ₃) ₃ ²⁺	0.000e+00	0.000e+00	-195.412	-195.959	-0.547	(0)
Co (NH ₃) ₄ ²⁺	0.000e+00	0.000e+00	-259.750	-260.297	-0.547	(0)
Co (NH ₃) ₅ Cl ²⁺	0.000e+00	0.000e+00	-321.490	-322.037	-0.547	(0)
Co (NH ₃) ₅ ²⁺	0.000e+00	0.000e+00	-324.588	-325.135	-0.547	(0)
Cr (NH ₃) ₅ OH ²⁺	0.000e+00	0.000e+00	-335.412	-335.959	-0.547	(0)
Co (NH ₃) ₆ SO ₄ ⁺	0.000e+00	0.000e+00	-389.012	-389.149	-0.137	(0)
Co (NH ₃) ₆ Cl ²⁺	0.000e+00	0.000e+00	-393.237	-393.784	-0.547	(0)
Co (NH ₃) ₆ OH ²⁺	0.000e+00	0.000e+00	-395.018	-395.565	-0.547	(0)
Cr (NH ₃) ₆ ³⁺	0.000e+00	0.000e+00	-398.911	-400.142	-1.231	(0)
Cr (NH ₃) ₆ Cl ²⁺	0.000e+00	0.000e+00	-400.447	-400.994	-0.547	(0)
N (3)	8.386e-17					
NO ₂ ⁻	8.362e-17	6.521e-17	-16.078	-16.186	-0.108	(0)
CuNO ₂ ⁺	2.377e-19	1.735e-19	-18.624	-18.761	-0.137	(0)
CoNO ₂ ⁺	1.600e-21	1.168e-21	-20.796	-20.933	-0.137	(0)
Cu (NO ₂) ₂	1.158e-34	1.158e-34	-33.936	-33.936	0.000	(0)
N (5)	7.218e-04					
NO ₃ ⁻	7.121e-04	5.701e-04	-3.147	-3.244	-0.097	(0)
CaNO ₃ ⁺	9.615e-06	7.018e-06	-5.017	-5.154	-0.137	(0)
CuNO ₃ ⁺	6.456e-08	4.712e-08	-7.190	-7.327	-0.137	(0)
NiNO ₃ ⁺	4.412e-09	3.220e-09	-8.355	-8.492	-0.137	(0)

	ZnNO3+	3.692e-09	2.695e-09	-8.433	-8.570	-0.137	(0)
	CoNO3+	3.146e-09	2.296e-09	-8.502	-8.639	-0.137	(0)
	BaNO3+	5.136e-10	3.748e-10	-9.289	-9.426	-0.137	(0)
	PbNO3+	1.664e-10	1.214e-10	-9.779	-9.916	-0.137	(0)
	CdNO3+	3.488e-12	2.546e-12	-11.457	-11.594	-0.137	(0)
	Cu (NO3) 2	3.288e-12	3.288e-12	-11.483	-11.483	0.000	(0)
	Co (NO3) 2	2.664e-12	2.664e-12	-11.575	-11.575	0.000	(0)
	Zn (NO3) 2	2.970e-13	2.970e-13	-12.527	-12.527	0.000	(0)
	MnNO3+	1.984e-13	1.448e-13	-12.702	-12.839	-0.137	(0)
	Pb (NO3) 2	1.247e-13	1.247e-13	-12.904	-12.904	0.000	(0)
	FeNO3+2	1.347e-15	3.824e-16	-14.870	-15.417	-0.547	(0)
	Cd (NO3) 2	6.295e-16	6.295e-16	-15.201	-15.201	0.000	(0)
	Mn (NO3) 2	2.098e-16	2.098e-16	-15.678	-15.678	0.000	(0)
	CrNO3+2	2.216e-27	6.290e-28	-26.654	-27.201	-0.547	(0)
Na		1.498e-02					
	Na+	1.448e-02	1.159e-02	-1.839	-1.936	-0.097	(0)
	NaSO4-	4.998e-04	4.040e-04	-3.301	-3.394	-0.092	(0)
	NaHPO4-	3.208e-08	2.593e-08	-7.494	-7.586	-0.092	(0)
	NaHCO3	2.080e-08	2.080e-08	-7.682	-7.682	0.000	(0)
	NaCrO4-	4.876e-10	3.559e-10	-9.312	-9.449	-0.137	(0)
	NaH2BO3	5.664e-11	5.664e-11	-10.247	-10.247	0.000	(0)
	NaCO3-	2.127e-11	1.719e-11	-10.672	-10.765	-0.092	(0)
Ni		8.382e-06					
	Ni+2	5.471e-06	2.248e-06	-5.262	-5.648	-0.386	(0)
	NiSO4	2.816e-06	2.816e-06	-5.550	-5.550	0.000	(0)
	NiCl+	8.636e-08	6.303e-08	-7.064	-7.200	-0.137	(0)
	NiNO3+	4.412e-09	3.220e-09	-8.355	-8.492	-0.137	(0)
	Ni (SO4) 2-2	2.234e-09	6.341e-10	-8.651	-9.198	-0.547	(0)
	NiHCO3+	9.974e-10	7.280e-10	-9.001	-9.138	-0.137	(0)
	NiOH+	1.536e-10	1.121e-10	-9.814	-9.950	-0.137	(0)
	NiSeO4	4.985e-11	4.985e-11	-10.302	-10.302	0.000	(0)
	NiCO3	5.808e-12	5.808e-12	-11.236	-11.236	0.000	(0)
	NiCl2	3.574e-12	3.574e-12	-11.447	-11.447	0.000	(0)
	Ni (OH) 2	7.192e-14	7.192e-14	-13.143	-13.143	0.000	(0)
	Ni (OH) 3-	5.573e-19	4.067e-19	-18.254	-18.391	-0.137	(0)
	NiNH3+2	0.000e+00	0.000e+00	-67.229	-67.776	-0.547	(0)
	Ni (NH3) 2+2	0.000e+00	0.000e+00	-129.994	-130.541	-0.547	(0)
O (0)		9.507e-04					
	O2	4.753e-04	4.834e-04	-3.323	-3.316	0.007	(0)
P		9.399e-06					
	H2PO4-	7.480e-06	6.045e-06	-5.126	-5.219	-0.092	(0)
	CaH2PO4+	5.783e-07	4.674e-07	-6.238	-6.330	-0.092	(0)
	HPO4-2	5.053e-07	2.111e-07	-6.296	-6.676	-0.379	(0)
	MgH2PO4+	3.344e-07	2.703e-07	-6.476	-6.568	-0.092	(0)
	CaHPO4	3.332e-07	3.332e-07	-6.477	-6.477	0.000	(0)
	MgHPO4	1.246e-07	1.246e-07	-6.904	-6.904	0.000	(0)
	NaHPO4-	3.208e-08	2.593e-08	-7.494	-7.586	-0.092	(0)
	KHPO4-	8.617e-09	6.964e-09	-8.065	-8.157	-0.092	(0)
	H3PO4	1.432e-09	1.432e-09	-8.844	-8.844	0.000	(0)
	CaPO4-	5.527e-10	4.467e-10	-9.258	-9.350	-0.092	(0)
	CoHPO4	5.278e-10	5.278e-10	-9.278	-9.278	0.000	(0)
	FeHPO4+	1.249e-10	1.009e-10	-9.904	-9.996	-0.092	(0)
	CrO3HPO4-2	2.652e-12	7.527e-13	-11.576	-12.123	-0.547	(0)
	MgPO4-	2.341e-12	1.892e-12	-11.631	-11.723	-0.092	(0)
	PO4-3	3.339e-13	4.515e-14	-12.476	-13.345	-0.869	(0)
	FeH2PO4+2	1.236e-14	5.274e-15	-13.908	-14.278	-0.370	(0)
	CrO3H2PO4-	8.834e-16	6.448e-16	-15.054	-15.191	-0.137	(0)
	FeH2PO4+	1.306e-18	1.056e-18	-17.884	-17.976	-0.092	(0)
	FeHPO4	2.989e-19	2.989e-19	-18.524	-18.524	0.000	(0)
	CrH2PO4+2	1.763e-25	5.003e-26	-24.754	-25.301	-0.547	(0)
Pb		9.690e-08					
	PbSO4	4.672e-08	4.672e-08	-7.331	-7.331	0.000	(0)
	Pb+2	3.552e-08	1.460e-08	-7.449	-7.836	-0.386	(0)
	PbCl+	7.426e-09	5.420e-09	-8.129	-8.266	-0.137	(0)
	Pb (SO4) 2-2	6.481e-09	1.839e-09	-8.188	-8.735	-0.547	(0)
	PbOH+	2.841e-10	2.074e-10	-9.546	-9.683	-0.137	(0)
	PbCl2	2.629e-10	2.629e-10	-9.580	-9.580	0.000	(0)
	PbNO3+	1.664e-10	1.214e-10	-9.779	-9.916	-0.137	(0)

PbHCO3+	3.903e-11	2.849e-11	-10.409	-10.545	-0.137	(0)
PbCO3	3.039e-12	3.039e-12	-11.517	-11.517	0.000	(0)
PbCl3-	1.683e-12	1.228e-12	-11.774	-11.911	-0.137	(0)
Pb(NO3)2	1.247e-13	1.247e-13	-12.904	-12.904	0.000	(0)
Pb(OH)2	3.709e-14	3.709e-14	-13.431	-13.431	0.000	(0)
PbCl4-2	2.041e-14	5.792e-15	-13.690	-14.237	-0.547	(0)
Pb2OH+3	8.163e-16	4.799e-17	-15.088	-16.319	-1.231	(0)
Pb(CO3)2-2	2.138e-18	6.068e-19	-17.670	-18.217	-0.547	(0)
Pb(OH)3-	2.874e-19	2.098e-19	-18.542	-18.678	-0.137	(0)
Pb(OH)4-2	1.024e-24	2.906e-25	-23.990	-24.537	-0.547	(0)
Pb3(OH)4+2	6.390e-25	1.814e-25	-24.194	-24.741	-0.547	(0)
Pb4(OH)4+4	3.903e-27	2.532e-29	-26.409	-28.596	-2.188	(0)
Pb(HS)2	0.000e+00	0.000e+00	-277.226	-277.226	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-418.120	-418.256	-0.137	(0)
S(-2)	0.000e+00					
H2S	0.000e+00	0.000e+00	-140.994	-140.994	0.000	(0)
HS-	0.000e+00	0.000e+00	-142.193	-142.330	-0.137	(0)
CdHS+	0.000e+00	0.000e+00	-143.098	-143.235	-0.137	(0)
S5-2	0.000e+00	0.000e+00	-145.511	-146.058	-0.547	(0)
S6-2	0.000e+00	0.000e+00	-145.914	-146.461	-0.547	(0)
S4-2	0.000e+00	0.000e+00	-146.111	-146.658	-0.547	(0)
S3-2	0.000e+00	0.000e+00	-146.926	-147.473	-0.547	(0)
S2-2	0.000e+00	0.000e+00	-147.955	-148.502	-0.547	(0)
S-2	0.000e+00	0.000e+00	-153.649	-154.028	-0.379	(0)
Pb(HS)2	0.000e+00	0.000e+00	-277.226	-277.226	0.000	(0)
Zn(HS)2	0.000e+00	0.000e+00	-277.580	-277.580	0.000	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-277.703	-277.840	-0.137	(0)
Cd(HS)2	0.000e+00	0.000e+00	-278.361	-278.361	0.000	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-286.571	-286.976	-0.405	(0)
CuS4S5-3	0.000e+00	0.000e+00	-287.323	-287.706	-0.383	(0)
Fe(HS)2	0.000e+00	0.000e+00	-291.114	-291.114	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-405.550	-405.687	-0.137	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-416.493	-416.630	-0.137	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-418.120	-418.256	-0.137	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-418.655	-418.792	-0.137	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-420.313	-420.860	-0.547	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-431.271	-431.408	-0.137	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-558.379	-558.926	-0.547	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-559.873	-560.420	-0.547	(0)
S(6)	2.322e-02					
SO4-2	1.590e-02	6.534e-03	-1.799	-2.185	-0.386	(0)
CaSO4	5.346e-03	5.346e-03	-2.272	-2.272	0.000	(0)
MgSO4	1.161e-03	1.161e-03	-2.935	-2.935	0.000	(0)
NaSO4-	4.998e-04	4.040e-04	-3.301	-3.394	-0.092	(0)
KSO4-	2.683e-04	2.168e-04	-3.571	-3.664	-0.092	(0)
CuSO4	3.582e-05	3.582e-05	-4.446	-4.446	0.000	(0)
CoSO4	3.174e-06	3.174e-06	-5.498	-5.498	0.000	(0)
NiSO4	2.816e-06	2.816e-06	-5.550	-5.550	0.000	(0)
ZnSO4	2.497e-06	2.497e-06	-5.603	-5.603	0.000	(0)
HSO4-	1.222e-06	9.759e-07	-5.913	-6.011	-0.098	(0)
Zn(SO4)2-2	5.225e-07	1.483e-07	-6.282	-6.829	-0.547	(0)
PbSO4	4.672e-08	4.672e-08	-7.331	-7.331	0.000	(0)
BeSO4	3.027e-08	3.027e-08	-7.519	-7.519	0.000	(0)
Pb(SO4)2-2	6.481e-09	1.839e-09	-8.188	-8.735	-0.547	(0)
AlSO4+	4.479e-09	3.576e-09	-8.349	-8.447	-0.098	(0)
Ni(SO4)2-2	2.234e-09	6.341e-10	-8.651	-9.198	-0.547	(0)
Be(SO4)2-2	2.167e-09	6.149e-10	-8.664	-9.211	-0.547	(0)
CdSO4	1.763e-09	1.763e-09	-8.754	-8.754	0.000	(0)
Cd(SO4)2-2	5.812e-10	1.650e-10	-9.236	-9.783	-0.547	(0)
Al(SO4)2-	3.503e-10	2.797e-10	-9.456	-9.553	-0.098	(0)
MnSO4	1.754e-10	1.754e-10	-9.756	-9.756	0.000	(0)
FeSO4+	3.992e-12	3.210e-12	-11.399	-11.494	-0.095	(0)
Fe(SO4)2-	6.393e-13	4.666e-13	-12.194	-12.331	-0.137	(0)
CrO3SO4-2	4.438e-13	1.260e-13	-12.353	-12.900	-0.547	(0)
FeSO4	5.987e-16	5.987e-16	-15.223	-15.223	0.000	(0)
CrOHSO4	3.087e-21	3.087e-21	-20.511	-20.511	0.000	(0)
CrSO4+	6.629e-22	4.838e-22	-21.179	-21.315	-0.137	(0)
Cr2(OH)2SO4+2	1.957e-39	5.554e-40	-38.708	-39.255	-0.547	(0)

Cr2 (OH) 2 (SO4) 2	2.156e-40	2.156e-40	-39.666	-39.666	0.000	(0)
NH4SO4-	0.000e+00	0.000e+00	-62.624	-62.719	-0.095	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-389.012	-389.149	-0.137	(0)
Se (-2)	0.000e+00					
HSe-	0.000e+00	0.000e+00	-99.361	-99.498	-0.137	(0)
H2Se	0.000e+00	0.000e+00	-101.368	-101.368	0.000	(0)
Se-2	0.000e+00	0.000e+00	-108.345	-108.892	-0.547	(0)
MnSe	0.000e+00	0.000e+00	-108.928	-108.928	0.000	(0)
Se (4)	9.067e-19					
HSeO3-	9.012e-19	6.578e-19	-18.045	-18.182	-0.137	(0)
SeO3-2	5.012e-21	1.423e-21	-20.300	-20.847	-0.547	(0)
H2SeO3	4.781e-22	4.781e-22	-21.320	-21.320	0.000	(0)
FeHSeO3+2	2.681e-28	7.610e-29	-27.572	-28.119	-0.547	(0)
Cd (SeO3) 2-2	0.000e+00	0.000e+00	-44.114	-44.661	-0.547	(0)
Se (6)	1.271e-07					
SeO4-2	1.270e-07	5.220e-08	-6.896	-7.282	-0.386	(0)
CoSeO4	6.121e-11	6.121e-11	-10.213	-10.213	0.000	(0)
NiSeO4	4.985e-11	4.985e-11	-10.302	-10.302	0.000	(0)
ZnSeO4	1.474e-11	1.474e-11	-10.832	-10.832	0.000	(0)
HSeO4-	5.441e-12	3.971e-12	-11.264	-11.401	-0.137	(0)
CdSeO4	1.188e-14	1.188e-14	-13.925	-13.925	0.000	(0)
MnSeO4	2.045e-15	2.045e-15	-14.689	-14.689	0.000	(0)
Zn (SeO4) 2-2	2.748e-18	7.799e-19	-17.561	-18.108	-0.547	(0)
Zn	7.523e-06					
Zn+2	4.436e-06	1.823e-06	-5.353	-5.739	-0.386	(0)
ZnSO4	2.497e-06	2.497e-06	-5.603	-5.603	0.000	(0)
Zn (SO4) 2-2	5.225e-07	1.483e-07	-6.282	-6.829	-0.547	(0)
ZnCl+	6.184e-08	4.901e-08	-7.209	-7.310	-0.101	(0)
ZnNO3+	3.692e-09	2.695e-09	-8.433	-8.570	-0.137	(0)
ZnOH+	9.621e-10	7.022e-10	-9.017	-9.154	-0.137	(0)
ZnCl2	6.943e-10	6.943e-10	-9.158	-9.158	0.000	(0)
ZnOHCl	3.766e-10	3.766e-10	-9.424	-9.424	0.000	(0)
ZnHCO3+	2.074e-10	1.514e-10	-9.683	-9.820	-0.137	(0)
ZnSeO4	1.474e-11	1.474e-11	-10.832	-10.832	0.000	(0)
ZnCl3-	7.572e-12	6.001e-12	-11.121	-11.222	-0.101	(0)
ZnCO3	7.263e-12	7.263e-12	-11.139	-11.139	0.000	(0)
Zn (OH) 2	9.241e-13	9.241e-13	-12.034	-12.034	0.000	(0)
Zn (NO3) 2	2.970e-13	2.970e-13	-12.527	-12.527	0.000	(0)
ZnCl4-2	7.664e-14	3.202e-14	-13.116	-13.495	-0.379	(0)
Zn (OH) 3-	3.589e-17	2.619e-17	-16.445	-16.582	-0.137	(0)
Zn (SeO4) 2-2	2.748e-18	7.799e-19	-17.561	-18.108	-0.547	(0)
Zn (OH) 4-2	2.078e-23	5.898e-24	-22.682	-23.229	-0.547	(0)
Zn (HS) 2	0.000e+00	0.000e+00	-277.580	-277.580	0.000	(0)
ZnS (HS) -	0.000e+00	0.000e+00	-277.703	-277.840	-0.137	(0)
Zn (HS) 3-	0.000e+00	0.000e+00	-416.493	-416.630	-0.137	(0)
ZnS (HS) 2-2	0.000e+00	0.000e+00	-420.313	-420.860	-0.547	(0)
Zn (HS) 4-2	0.000e+00	0.000e+00	-559.873	-560.420	-0.547	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2	-316.50	-310.23	6.27	(Co (NH3) 5Cl) (NO3) 2
(Co (NH3) 5Cl) Cl2	-312.19	-307.65	4.54	(Co (NH3) 5Cl) Cl2
(Co (NH3) 5OH2) Cl3	-319.46	-307.65	11.81	(Co (NH3) 5OH2) Cl3
(Co (NH3) 6) (NO3) 3	-385.26	-367.33	17.93	(Co (NH3) 6) (NO3) 3
(Co (NH3) 6) Cl3	-383.59	-363.46	20.13	(Co (NH3) 6) Cl3
(NH4) 2CrO4	-131.71	-131.34	0.38	(NH4) 2CrO4
(NH4) 2SeO4	-130.86	-130.41	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	-3.95	7.18	11.13	Al (OH) 3
Al2 (MoO4) 3	-42.28	-39.13	3.15	Al2 (MoO4) 3
Al2O3	-6.06	14.36	20.43	Al2O3
Al4 (OH) 10SO4	-7.66	15.04	22.70	Al4 (OH) 10SO4
AlAsO4:2H2O	-8.92	-4.12	4.80	AlAsO4:2H2O
AlOHSO4	-3.27	-6.50	-3.23	AlOHSO4
Alunite	-1.62	-2.39	-0.77	KAl3 (SO4) 2 (OH) 6
Anglesite	-2.19	-10.02	-7.83	PbSO4
Anhydrite	-0.27	-4.61	-4.34	CaSO4

Anilite	-131.11	-163.54	-32.42	Cu _{0.25} Cu _{1.5} S
Antlerite	-1.76	7.03	8.79	Cu ₃ (OH) 4SO ₄
Aragonite	-4.32	-12.59	-8.26	CaCO ₃
Arsenolite	-133.41	-136.35	-2.94	As ₄ O ₆
Artinite	-14.61	-4.65	9.96	MgCO ₃ :Mg(OH) 2:3H ₂ O
As ₂ O ₅	-29.38	-22.60	6.77	As ₂ O ₅
Atacamite	-1.57	6.10	7.67	Cu ₂ (OH) 3Cl
Azurite	-5.98	-22.61	-16.62	Cu ₃ (OH) 2 (CO ₃) 2
Ba(OH) 2:8H ₂ O	-19.98	4.57	24.56	Ba(OH) 2:8H ₂ O
Ba ₃ (AsO ₄) 2	0.07	-8.87	-8.94	Ba ₃ (AsO ₄) 2
BaCrO ₄	-5.36	-15.13	-9.77	BaCrO ₄
BaHPO ₄	-6.24	-26.02	-19.77	BaHPO ₄
BaMoO ₄	-6.26	-13.25	-6.99	BaMoO ₄
Barite	0.94	-9.11	-10.05	BaSO ₄
BaS	-159.68	-143.50	16.18	BaS
BaSeO ₃	-21.15	-19.35	1.79	BaSeO ₃
BaSeO ₄	-6.68	-14.20	-7.53	BaSeO ₄
Be(OH) 2 (alpha)	-2.83	4.06	6.89	Be(OH) 2
Be(OH) 2 (am)	-3.13	4.06	7.19	Be(OH) 2
Be(OH) 2 (beta)	-2.43	4.06	6.49	Be(OH) 2
BeMoO ₄	-12.16	-13.77	-1.61	BeMoO ₄
BeS	-163.40	-144.02	19.38	BeS
BeSeO ₄ :4H ₂ O	-11.78	-14.72	-2.94	BeSeO ₄ :4H ₂ O
Bianchite	-6.16	-7.93	-1.76	ZnSO ₄ :6H ₂ O
Birnessite	0.00	18.09	18.09	MnO ₂
Bixbyite	-5.60	-5.88	-0.27	Mn ₂ O ₃
BlaubleiI	-119.99	-144.16	-24.16	Cu _{0.9} Cu _{0.2} S
BlaubleiII	-125.82	-153.10	-27.28	Cu _{0.6} Cu _{0.8} S
Boehmite	-1.75	7.18	8.93	AlOOH
Brochantite	-1.90	13.93	15.83	Cu ₄ (OH) 6SO ₄
Brucite	-8.68	8.51	17.18	Mg(OH) 2
Bunsenite	-6.89	5.85	12.74	NiO
Ca ₃ (AsO ₄) 2:4H ₂ O	-17.69	4.61	22.30	Ca ₃ (AsO ₄) 2:4H ₂ O
Ca ₃ (PO ₄) 2 (beta)	-4.89	-33.97	-29.08	Ca ₃ (PO ₄) 2
Ca ₄ H(PO ₄) 3:3H ₂ O	-8.41	-55.49	-47.08	Ca ₄ H(PO ₄) 3:3H ₂ O
CaCrO ₄	-8.45	-10.64	-2.19	CaCrO ₄
CaHPO ₄	-2.15	-21.52	-19.37	CaHPO ₄
CaHPO ₄ :2H ₂ O	-2.46	-21.52	-19.06	CaHPO ₄ :2H ₂ O
Calcite	-4.13	-12.59	-8.46	CaCO ₃
CaMoO ₄	-0.81	-8.76	-7.94	CaMoO ₄
CaSeO ₃ :2H ₂ O	-17.73	-14.86	2.87	CaSeO ₃ :2H ₂ O
CaSeO ₄ :2H ₂ O	-6.71	-9.71	-3.00	CaSeO ₄ :2H ₂ O
Cd(BO ₂) 2	-17.30	-7.46	9.84	Cd(BO ₂) 2
Cd(OH) 2	-11.34	2.59	13.93	Cd(OH) 2
Cd(OH) 2 (am)	-11.40	2.59	13.99	Cd(OH) 2
Cd ₃ (OH) 2 (SO ₄) 2	-26.32	-19.61	6.71	Cd ₃ (OH) 2 (SO ₄) 2
Cd ₃ (OH) 4SO ₄	-28.49	-5.93	22.56	Cd ₃ (OH) 4SO ₄
Cd ₃ (PO ₄) 2	-20.83	-53.43	-32.60	Cd ₃ (PO ₄) 2
Cd ₄ (OH) 6SO ₄	-31.74	-3.34	28.40	Cd ₄ (OH) 6SO ₄
CdCl ₂	-12.22	-12.82	-0.60	CdCl ₂
CdCl ₂ :1H ₂ O	-11.15	-12.82	-1.67	CdCl ₂ :1H ₂ O
CdCl ₂ :2.5H ₂ O	-10.89	-12.82	-1.93	CdCl ₂ :2.5H ₂ O
Cdmetal (alpha)	-53.21	-39.47	13.74	Cd
Cdmetal (gamma)	-53.32	-39.47	13.84	Cd
CdMoO ₄	-1.04	-15.25	-14.21	CdMoO ₄
CdOHCl	-8.75	-5.12	3.63	CdOHCl
CdSe	-82.23	-102.66	-20.43	CdSe
CdSeO ₄ :2H ₂ O	-14.35	-16.20	-1.85	CdSeO ₄ :2H ₂ O
CdSO ₄	-11.08	-11.10	-0.02	CdSO ₄
CdSO ₄ :1H ₂ O	-9.47	-11.10	-1.63	CdSO ₄ :1H ₂ O
CdSO ₄ :2.67H ₂ O	-9.28	-11.10	-1.82	CdSO ₄ :2.67H ₂ O
Cerussite	-4.79	-18.00	-13.20	PbCO ₃
CH ₄ (g)	-148.08	-189.90	-41.81	CH ₄
Chalcanthite	-4.12	-6.78	-2.66	CuSO ₄ :5H ₂ O
Chalcocite	-135.57	-170.99	-35.42	Cu ₂ S
Chalcopyrite	-257.45	-293.16	-35.71	CuFeS ₂
Claudetite	-133.12	-136.35	-3.23	As ₄ O ₆
Clausthalite	-74.13	-101.58	-27.46	PbSe

Co (BO2) 2	-31.21	-4.14	27.07	Co (BO2) 2
Co (OH) 2	-7.19	5.90	13.09	Co (OH) 2
Co (OH) 3	-3.43	-5.47	-2.03	Co (OH) 3
CO2 (g)	-3.50	-21.66	-18.16	CO2
Co3 (AsO4) 2	-17.92	-4.89	13.03	Co3 (AsO4) 2
Co3 (PO4) 2	-8.79	-43.48	-34.69	Co3 (PO4) 2
Co3O4	5.15	-5.03	-10.17	Co3O4
CoCl2	-18.01	-9.50	8.51	CoCl2
CoCl2:6H2O	-12.02	-9.51	2.51	CoCl2:6H2O
CoCO3	-5.81	-15.75	-9.94	CoCO3
CoFe2O4	16.89	13.83	-3.05	CoFe2O4
CoHPO4	-5.63	-24.69	-19.06	CoHPO4
CoMoO4	-4.24	-11.93	-7.69	CoMoO4
CoO	-8.00	5.90	13.90	CoO
CoS (alpha)	-134.74	-142.18	-7.44	CoS
CoS (beta)	-131.11	-142.18	-11.07	CoS
CoSe	-83.14	-99.34	-16.20	CoSe
CoSeO3	-19.35	-18.03	1.32	CoSeO3
CoSeO4:6H2O	-11.35	-12.88	-1.53	CoSeO4:6H2O
CoSO4	-10.82	-7.78	3.04	CoSO4
CoSO4:6H2O	-5.31	-7.78	-2.48	CoSO4:6H2O
Cotunnite	-6.89	-11.74	-4.86	PbCl2
Covellite	-118.59	-141.18	-22.59	CuS
Cr (OH) 2	-44.14	-33.21	10.93	Cr (OH) 2
Cr (OH) 3	-16.54	-15.11	1.42	Cr (OH) 3
Cr (OH) 3 (am)	-14.36	-15.11	-0.75	Cr (OH) 3
Cr2O3	-28.02	-30.23	-2.21	Cr2O3
CrCl2	-63.05	-48.62	14.42	CrCl2
CrCl3	-53.70	-38.23	15.48	CrCl3
Crmetal	-106.27	-75.27	31.00	Cr
CrO3	-16.51	-19.71	-3.19	CrO3
Cu (OH) 2	-1.94	6.90	8.84	Cu (OH) 2
Cu2 (OH) 3NO3	-4.65	4.81	9.47	Cu2 (OH) 3NO3
Cu2Se (alpha)	-81.72	-128.16	-46.44	Cu2Se
Cu2SO4	-34.70	-36.60	-1.89	Cu2SO4
Cu3 (AsO4) 2:2H2O	-7.99	-1.89	6.10	Cu3 (AsO4) 2:2H2O
Cu3 (PO4) 2	-3.63	-40.48	-36.85	Cu3 (PO4) 2
Cu3 (PO4) 2:3H2O	-5.36	-40.48	-35.12	Cu3 (PO4) 2:3H2O
Cu3Se2	-161.99	-226.50	-64.51	Cu3Se2
CuCO3	-3.25	-14.75	-11.50	CuCO3
CuCrO4	-7.36	-12.80	-5.44	CuCrO4
Cumetal	-23.51	-32.48	-8.97	Cu
CuMoO4	2.18	-10.93	-13.11	CuMoO4
CuOCuSO4	-10.59	0.12	10.71	CuOCuSO4
Cupricferrite	8.22	14.83	6.62	CuFe2O4
Cuprite	-21.88	-22.91	-1.04	Cu2O
Cuprousferrite	1.38	-7.49	-8.87	CuFeO2
CuSe	-64.88	-98.34	-33.46	CuSe
CuSe2	-127.75	-161.53	-33.79	CuSe2
CuSeO3:2H2O	-17.65	-17.03	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-9.44	-11.88	-2.44	CuSeO4:5H2O
CuSO4	-9.94	-6.78	3.16	CuSO4
Diaspore	-0.00	7.18	7.18	AlOOH
Djurleite	-134.50	-169.02	-34.52	Cu0.066Cu1.868S
Dolomite (disordered)	-9.34	-25.74	-16.40	CaMg (CO3) 2
Dolomite (ordered)	-8.77	-25.74	-16.97	CaMg (CO3) 2
Epsomite	-3.02	-5.18	-2.16	MgSO4:7H2O
Fe (OH) 2	-17.47	-3.91	13.56	Fe (OH) 2
Fe (OH) 2.7Cl.3	4.69	1.65	-3.04	Fe (OH) 2.7Cl.3
Fe2 (OH) 4SeO3	-17.56	-16.00	1.55	Fe2 (OH) 4SeO3
Fe2 (SeO3) 3:2H2O	-43.24	-63.86	-20.63	Fe2 (SeO3) 3:2H2O
Fe2 (SO4) 3	-30.11	-33.12	-3.01	Fe2 (SO4) 3
Fe3 (OH) 8	-16.20	4.02	20.22	Fe3 (OH) 8
FeAsO4:2H2O	-7.74	-7.34	0.40	FeAsO4:2H2O
FeCr2O4	-41.75	-34.13	7.62	FeCr2O4
FeMoO4	-11.68	-21.74	-10.06	FeMoO4
Ferrihydrite	0.55	3.96	3.41	Fe (OH) 3
Ferroselite	-153.60	-172.34	-18.74	FeSe2

FeS (ppt)	-149.07	-151.98	-2.92	FeS
FeSe	-98.15	-109.15	-11.01	FeSe
Fix_pH	-5.75	-5.75	0.00	H+
Galena	-130.21	-144.42	-14.21	PbS
Gibbsite	-1.40	7.18	8.58	Al (OH) 3
Goethite	3.29	3.96	0.67	FeOOH
Goslarite	-5.87	-7.93	-2.05	ZnSO4:7H2O
Greenockite	-130.97	-145.49	-14.52	CdS
Greigite	-543.26	-588.29	-45.03	Fe3S4
Gypsum	0.00	-4.61	-4.61	CaSO4:2H2O
H-Jarosite	-4.06	-15.48	-11.41	(H3O) Fe3 (SO4) 2 (OH) 6
H2MoO4	-4.81	-17.83	-13.02	H2MoO4
H2S (g)	-140.07	-148.08	-8.01	H2S
H2Se (g)	-100.33	-105.25	-4.91	H2Se
Halite	-5.48	-3.89	1.59	NaCl
Hausmannite	-15.12	47.17	62.29	Mn3O4
Hematite	8.96	7.93	-1.03	Fe2O3
Hercynite	-13.37	10.46	23.83	FeAl2O4
Hinsdalite	-16.57	-19.07	-2.50	PbAl3PO4SO4 (OH) 6
Huntite	-22.40	-52.04	-29.65	CaMg3 (CO3) 4
Hydrocerussite	-13.56	-32.33	-18.77	Pb3 (OH) 2 (CO3) 2
Hydromagnesite	-35.99	-44.11	-8.11	Mg5 (CO3) 4 (OH) 2:4H2O
Hydroxylapatite	-2.08	-46.42	-44.33	Ca5 (PO4) 3OH
Hydroxylpyromorphite	-10.68	-73.47	-62.79	Pb5 (PO4) 3OH
K-Alum	-11.50	-16.76	-5.26	KAl (SO4) 2:12H2O
K-Jarosite	2.37	-12.04	-14.41	KFe3 (SO4) 2 (OH) 6
K2Cr2O7	-15.07	-32.55	-17.48	K2Cr2O7
K2CrO4	-12.27	-12.84	-0.57	K2CrO4
K2MoO4	-14.24	-10.97	3.27	K2MoO4
K2SeO4	-11.19	-11.92	-0.73	K2SeO4
Langite	-4.05	13.93	17.98	Cu4 (OH) 6SO4:H2O
Larnakite	-5.99	-6.36	-0.37	PbO:PbSO4
Laurionite	-4.66	-4.04	0.62	PbOHCl
Lepidocrocite	2.59	3.96	1.37	FeOOH
Lime	-24.21	9.07	33.28	CaO
Litharge	-9.23	3.66	12.89	PbO
Mackinawite	-148.38	-151.98	-3.60	FeS
Maghemite	1.54	7.93	6.39	Fe2O3
Magnesioferrite	-1.26	16.44	17.69	Fe2MgO4
Magnesite	-5.63	-13.15	-7.52	MgCO3
Magnetite	0.00	4.03	4.03	Fe3O4
Malachite	-2.32	-7.85	-5.53	Cu2 (OH) 2CO3
Manganite	-2.61	22.73	25.34	MnOOH
Massicot	-9.43	3.66	13.09	PbO
Melanothallite	-14.95	-8.50	6.45	CuCl2
Melanterite	-15.32	-17.59	-2.27	FeSO4:7H2O
Mg (OH) 2 (active)	-10.29	8.51	18.79	Mg (OH) 2
Mg3 (PO4) 2	-12.39	-35.67	-23.28	Mg3 (PO4) 2
MgCr2O4	-38.46	-21.72	16.74	MgCr2O4
MgCrO4	-16.85	-11.20	5.65	MgCrO4
MgHPO4:3H2O	-3.91	-22.09	-18.18	MgHPO4:3H2O
MgMoO4	-7.48	-9.33	-1.85	MgMoO4
MgSeO3:6H2O	-18.47	-15.43	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-9.08	-10.28	-1.20	MgSeO4:6H2O
Minium	-21.73	53.05	74.78	Pb3O4
Mirabilite	-4.71	-6.06	-1.35	Na2SO4:10H2O
Mn2 (SO4) 3	-41.71	-46.93	-5.22	Mn2 (SO4) 3
Mn3 (AsO4) 2:8H2O	-29.99	-17.49	12.50	Mn3 (AsO4) 2:8H2O
Mn3 (PO4) 2	-32.22	-56.08	-23.85	Mn3 (PO4) 2
MnCl2:4H2O	-16.45	-13.71	2.75	MnCl2:4H2O
MnHPO4	-3.49	-28.89	-25.40	MnHPO4
MnS (grn)	-146.64	-146.38	0.27	MnS
MnS (pnk)	-149.72	-146.38	3.34	MnS
MnSe	-107.34	-103.54	3.79	MnSe
MnSeO3	-23.36	-22.23	1.13	MnSeO3
MnSeO3:2H2O	-23.18	-22.23	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-15.03	-17.08	-2.05	MnSeO4:5H2O
MnSO4	-14.76	-11.98	2.78	MnSO4

Monteponite	-12.83	2.59	15.41	CdO
MoO3	-9.83	-17.83	-8.00	MoO3
Morenosite	-5.66	-7.84	-2.18	NiSO4:7H2O
MoS2	-284.63	-356.05	-71.42	MoS2
Na-Jarosite	-0.91	-11.66	-10.75	NaFe3(SO4)2(OH)6
Na2Cr2O7	-21.83	-31.79	-9.96	Na2Cr2O7
Na2CrO4	-15.07	-12.08	2.99	Na2CrO4
Na2Mo2O7	-11.27	-28.04	-16.76	Na2Mo2O7
Na2MoO4	-11.72	-10.20	1.52	Na2MoO4
Na2MoO4:2H2O	-11.43	-10.21	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-26.61	-16.31	10.30	Na2SeO3:5H2O
Na2SeO4	-12.43	-11.15	1.28	Na2SeO4
Nantokite	-12.30	-19.16	-6.86	CuCl
Natron	-12.53	-14.04	-1.51	Na2CO3:10H2O
Nesquehonite	-8.56	-13.15	-4.60	MgCO3:3H2O
Ni(OH)2	-7.23	5.85	13.08	Ni(OH)2
Ni3(AsO4)2:8H2O	-20.75	-5.05	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-12.34	-43.64	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-22.28	9.72	32.00	Ni4(OH)6SO4
NiCO3	-9.06	-15.81	-6.75	NiCO3
NiMoO4	-0.83	-11.98	-11.15	NiMoO4
NiS(alpha)	-136.63	-142.23	-5.60	NiS
NiS(beta)	-131.13	-142.23	-11.10	NiS
NiS(gamma)	-129.43	-142.23	-12.80	NiS
NiSe	-81.70	-99.40	-17.70	NiSe
NiSeO3:2H2O	-20.99	-18.08	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-11.41	-12.93	-1.52	NiSeO4:6H2O
Nsutite	0.59	18.09	17.50	MnO2
O2(g)	-0.68	84.12	84.80	O2
Orpiment	-450.30	-512.41	-62.11	As2S3
Otavite	-7.07	-19.07	-12.00	CdCO3
Pb(BO2)2	-12.95	-6.38	6.57	Pb(BO2)2
Pb(OH)2	-4.66	3.66	8.32	Pb(OH)2
Pb10(OH)6O(CO3)6	-84.56	-93.32	-8.76	Pb10(OH)6O(CO3)6
Pb2(OH)3Cl	-9.17	-0.38	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-18.86	7.33	26.19	Pb2O(OH)2
Pb2O3	-11.65	49.39	61.04	Pb2O3
Pb2OCO3	-13.90	-14.33	-0.44	Pb2OCO3
Pb3(AsO4)2	-17.41	-11.61	5.80	Pb3(AsO4)2
Pb3(PO4)2	-6.67	-50.20	-43.53	Pb3(PO4)2
Pb3O2CO3	-22.02	-10.67	11.35	Pb3O2CO3
Pb3O2SO4	-13.62	-2.69	10.92	Pb3O2SO4
Pb4(OH)6SO4	-20.13	0.97	21.10	Pb4(OH)6SO4
Pb4O3SO4	-21.31	0.97	22.28	Pb4O3SO4
PbCrO4	-3.31	-16.04	-12.73	PbCrO4
PbHPO4	-3.13	-26.93	-23.81	PbHPO4
Pbmetal	-42.64	-38.39	4.24	Pb
PbMoO4	1.61	-14.17	-15.78	PbMoO4
PbO:0.3H2O	-9.32	3.66	12.98	PbO:0.33H2O
PbSeO4	-8.23	-15.12	-6.88	PbSeO4
Periclase	-13.53	8.51	22.04	MgO
Phosgenite	-9.93	-29.74	-19.81	PbCl2:PbCO3
Plattnerite	-4.76	45.72	50.49	PbO2
Plumbgummite	-3.19	-35.98	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-14.12	9.07	23.19	Ca(OH)2
Pyrite	-239.35	-258.01	-18.66	FeS2
Pyrochroite	-13.78	1.70	15.48	Mn(OH)2
Pyrolusite	1.57	43.76	42.19	MnO2
Pyromorphite	3.26	-81.17	-84.43	Pb5(PO4)3Cl
Realgar	-183.07	-203.20	-20.13	AsS
Retgersite	-5.78	-7.84	-2.05	NiSO4:6H2O
Rhodochrosite	-9.38	-19.95	-10.57	MnCO3
Semetal(am)	-56.05	-63.19	-7.14	Se
Semetal(hex)	-55.43	-63.19	-7.76	Se
SeO2	-24.05	-23.93	0.12	SeO2
SeO3	-40.26	-18.78	21.48	SeO3
Siderite	-15.37	-25.56	-10.19	FeCO3
Smithsonite	-5.95	-15.90	-9.95	ZnCO3

Sphalerite	-130.78	-142.32	-11.54	ZnS
Spinel	-15.14	22.87	38.01	MgAl2O4
Strengite	-0.26	-26.63	-26.37	FePO4:2H2O
Sulfur	-103.92	-106.02	-2.10	S
Tenorite	-0.93	6.90	7.84	CuO
Thenardite	-6.41	-6.06	0.35	Na2SO4
Thermonatrite	-14.70	-14.03	0.67	Na2CO3:H2O
Tsumebite	-6.57	-16.36	-9.79	Pb2CuPO4 (OH) 3:3H2O
Vivianite	-36.91	-72.91	-36.00	Fe3 (PO4) 2:8H2O
Witherite	-8.50	-17.08	-8.58	BaCO3
Wurtzite	-133.31	-142.32	-9.01	ZnS
Zincite	-5.84	5.76	11.60	ZnO
Zincosite	-12.10	-7.92	4.18	ZnSO4
Zn(BO2)2	-12.58	-4.29	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-15.47	-12.23	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-6.44	5.76	12.20	Zn(OH)2
Zn(OH)2(am)	-6.96	5.76	12.71	Zn(OH)2
Zn(OH)2(beta)	-6.24	5.76	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-6.02	5.76	11.78	Zn(OH)2
Zn(OH)2(gamma)	-5.97	5.76	11.73	Zn(OH)2
Zn2(OH)2SO4	-9.66	-2.16	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-11.38	3.82	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-18.97	-5.32	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-8.49	-43.91	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-29.77	-10.09	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-19.04	9.36	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-25.11	13.39	38.50	Zn5(OH)8Cl2
ZnCl2	-16.91	-9.65	7.27	ZnCl2
ZnCO3:1H2O	-5.64	-15.90	-10.26	ZnCO3:1H2O
Znmetal	-62.55	-36.30	26.25	Zn
ZnMoO4	-1.98	-12.07	-10.09	ZnMoO4
ZnO(active)	-5.69	5.76	11.45	ZnO
ZnS(am)	-133.22	-142.32	-9.10	ZnS
ZnSe	-85.01	-99.49	-14.48	ZnSe
ZnSeO4:6H2O	-11.50	-13.02	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.42	-7.92	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 10.

```

USE solution 1
EQUILIBRIUM PHASES 7
  Birnessite 0 0
  Diaspore 0 0
  Fix_pH -6 Portlandite 10
  Magnetite 0 0
  O2(g) -0.68 10
  CO2(g) -3.5 10
END

```

Beginning of batch-reaction calculations.

Reaction step 1.

Using solution 1.

Using pure phase assemblage 7.

-----User print-----

Moles of Portlandite: -1.4109e-03
Moles of Diaspore: -1.4109e-03
Moles of Magnetite: -1.4109e-03
Moles of Birnessite: -1.4109e-03
mg of Portlandite: -1.0453e+02
mg of Diaspore: -8.4637e+01
mg of Birnessite: -1.2265e+02

-----Phase assemblage-----

Phase	SI	log IAP	log K(T, P)	Moles in assemblage		
				Initial	Final	Delta
Birnessite	0.00	18.09	18.09	0.000e+00	9.539e-05	9.539e-05
CO2(g)	-3.50	-21.66	-18.16	1.000e+01	1.000e+01	-1.930e-05
Diaspore	0.00	7.18	7.18	0.000e+00	5.283e-05	5.283e-05
Fix_pH	-6.00	-6.00	0.00			
Ca(OH)2		is reactant		1.000e+01	9.999e+00	-1.411e-03
Magnetite	0.00	4.03	4.03	0.000e+00	1.477e-04	1.477e-04
O2(g)	-0.68	84.12	84.80	1.000e+01	9.998e+00	-2.051e-03

-----Solution composition-----

Elements	Molality	Moles
Al	3.104e-09	3.104e-09
As	2.680e-08	2.680e-08
B	9.287e-06	9.287e-06
Ba	2.924e-07	2.924e-07
Be	2.228e-07	2.228e-07
C	1.930e-05	1.930e-05
Ca	1.449e-02	1.449e-02
Cd	7.145e-09	7.145e-09
Cl	1.388e-02	1.388e-02
Co	1.227e-05	1.227e-05
Cr	6.372e-08	6.372e-08
Cu	9.874e-05	9.874e-05
Fe	2.921e-07	2.921e-07
K	6.291e-03	6.291e-03
Mg	3.635e-03	3.635e-03
Mn	2.350e-10	2.350e-10
Mo	1.151e-06	1.151e-06
N	7.218e-04	7.218e-04
Na	1.498e-02	1.498e-02
Ni	8.382e-06	8.382e-06
P	9.399e-06	9.400e-06
Pb	9.690e-08	9.691e-08
S	2.322e-02	2.322e-02
Se	1.271e-07	1.271e-07
Zn	7.523e-06	7.523e-06

-----Description of solution-----

pH = 6.000 Charge balance
pe = 15.030 Adjusted to redox equilibrium
Activity of water = 0.999
Ionic strength (mol/kgw) = 7.311e-02
Mass of water (kg) = 1.000e+00
Total alkalinity (eq/kg) = 7.722e-06
Total CO2 (mol/kg) = 1.930e-05
Temperature (°C) = 20.00
Electrical balance (eq) = -3.291e-03
Percent error, 100*(Cat-|An|)/(Cat+|An|) = -3.61
Iterations = 23
Total H = 1.110195e+02
Total O = 5.560587e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.249e-06	1.000e-06	-5.903	-6.000	-0.097	0.00
OH-	8.712e-09	6.850e-09	-8.060	-8.164	-0.104	(0)
H2O	5.551e+01	9.988e-01	1.744	-0.001	0.000	18.05
Al	3.104e-09					
Al (OH) 2+	1.512e-09	1.222e-09	-8.821	-8.913	-0.092	(0)
AlSO4+	7.966e-10	6.360e-10	-9.099	-9.197	-0.098	(0)
AlOH+2	2.580e-10	1.100e-10	-9.588	-9.958	-0.370	(0)
Al (OH) 3	2.451e-10	2.451e-10	-9.611	-9.611	0.000	(0)
Al (OH) 4-	1.180e-10	9.424e-11	-9.928	-10.026	-0.098	(0)
Al+3	1.124e-10	1.520e-11	-9.949	-10.818	-0.869	(0)
Al (SO4) 2-	6.230e-11	4.974e-11	-10.206	-10.303	-0.098	(0)
AlMo6O21-3	2.695e-29	1.584e-30	-28.569	-29.800	-1.231	(0)
As (3)	4.159e-35					
H3AsO3	4.156e-35	4.156e-35	-34.381	-34.381	0.000	(0)
H2AsO3-	2.419e-38	1.765e-38	-37.616	-37.753	-0.137	(0)
H4AsO3+	0.000e+00	0.000e+00	-40.550	-40.686	-0.137	(0)
HAsO3-2	0.000e+00	0.000e+00	-43.342	-43.889	-0.547	(0)
AsO3-3	0.000e+00	0.000e+00	-50.148	-51.378	-1.231	(0)
As (5)	2.680e-08					
H2AsO4-	2.100e-08	1.532e-08	-7.678	-7.815	-0.137	(0)
HAsO4-2	5.800e-09	1.646e-09	-8.237	-8.784	-0.547	(0)
H3AsO4	2.494e-12	2.536e-12	-11.603	-11.596	0.007	(0)
AsO4-3	7.877e-14	4.631e-15	-13.104	-14.334	-1.231	(0)
B	9.287e-06					
H3BO3	9.279e-06	9.436e-06	-5.033	-5.025	0.007	(0)
H2BO3-	6.485e-09	5.011e-09	-8.188	-8.300	-0.112	(0)
CaH2BO3+	1.362e-09	1.052e-09	-8.866	-8.978	-0.112	(0)
MgH2BO3+	2.285e-10	1.766e-10	-9.641	-9.753	-0.112	(0)
NaH2BO3	1.007e-10	1.007e-10	-9.997	-9.997	0.000	(0)
H5 (BO3) 2-	5.376e-14	4.154e-14	-13.270	-13.381	-0.112	(0)
BaH2BO3+	2.339e-14	1.807e-14	-13.631	-13.743	-0.112	(0)
H8 (BO3) 3-	4.390e-17	3.393e-17	-16.357	-16.469	-0.112	(0)
Ba	2.924e-07					
Ba+2	2.919e-07	1.200e-07	-6.535	-6.921	-0.386	(0)
BaNO3+	5.135e-10	3.748e-10	-9.289	-9.426	-0.137	(0)
BaHCO3+	6.117e-12	4.981e-12	-11.213	-11.303	-0.089	(0)
BaH2BO3+	2.339e-14	1.807e-14	-13.631	-13.743	-0.112	(0)
BaCO3	1.207e-14	1.207e-14	-13.918	-13.918	0.000	(0)
BaOH+	4.311e-15	3.466e-15	-14.365	-14.460	-0.095	(0)
BaNH3+2	0.000e+00	0.000e+00	-71.882	-72.429	-0.547	(0)
Be	2.228e-07					
BeOH+	1.319e-07	1.080e-07	-6.880	-6.967	-0.087	(0)
Be+2	6.564e-08	2.698e-08	-7.183	-7.569	-0.386	(0)
BeSO4	2.236e-08	2.236e-08	-7.651	-7.651	0.000	(0)
Be (SO4) 2-2	1.601e-09	4.542e-10	-8.796	-9.343	-0.547	(0)
Be (OH) 2	6.854e-10	6.854e-10	-9.164	-9.164	0.000	(0)
BeCl+	5.920e-10	4.759e-10	-9.228	-9.322	-0.095	(0)
BeCO3	1.062e-11	1.062e-11	-10.974	-10.974	0.000	(0)
Be2OH+3	2.920e-12	4.835e-13	-11.535	-12.316	-0.781	(0)
Be (OH) 3-	2.114e-13	1.731e-13	-12.675	-12.762	-0.087	(0)
Be3 (OH) 3+3	1.840e-13	3.046e-14	-12.735	-13.516	-0.781	(0)
Be (OH) 4-2	2.443e-21	1.099e-21	-20.612	-20.959	-0.347	(0)
C (4)	1.930e-05					
H2CO3	1.237e-05	1.237e-05	-4.908	-4.908	0.000	(0)
HCO3-	6.389e-06	5.164e-06	-5.195	-5.287	-0.092	(0)
CaHCO3+	3.861e-07	3.143e-07	-6.413	-6.503	-0.089	(0)
MgHCO3+	6.592e-08	5.225e-08	-7.181	-7.282	-0.101	(0)
NaHCO3	3.700e-08	3.700e-08	-7.432	-7.432	0.000	(0)
CuCO3	3.262e-08	3.262e-08	-7.487	-7.487	0.000	(0)
CuHCO3+	1.022e-08	7.456e-09	-7.991	-8.128	-0.137	(0)
NiHCO3+	1.773e-09	1.294e-09	-8.751	-8.888	-0.137	(0)
CoHCO3+	1.265e-09	9.231e-10	-8.898	-9.035	-0.137	(0)
CaCO3	1.166e-09	1.166e-09	-8.933	-8.933	0.000	(0)
CO3-2	5.328e-10	2.190e-10	-9.273	-9.660	-0.386	(0)

	ZnHCO3+	3.688e-10	2.692e-10	-9.433	-9.570	-0.137	(0)
	MgCO3	1.704e-10	1.704e-10	-9.768	-9.768	0.000	(0)
	PbHCO3+	6.922e-11	5.053e-11	-10.160	-10.296	-0.137	(0)
	NaCO3-	6.727e-11	5.436e-11	-10.172	-10.265	-0.092	(0)
	ZnCO3	2.296e-11	2.296e-11	-10.639	-10.639	0.000	(0)
	NiCO3	1.836e-11	1.836e-11	-10.736	-10.736	0.000	(0)
	BeCO3	1.062e-11	1.062e-11	-10.974	-10.974	0.000	(0)
	PbCO3	9.583e-12	9.583e-12	-11.018	-11.018	0.000	(0)
	CoCO3	9.404e-12	9.404e-12	-11.027	-11.027	0.000	(0)
	BaHCO3+	6.117e-12	4.981e-12	-11.213	-11.303	-0.089	(0)
	Cu (CO3) 2-2	6.774e-14	1.922e-14	-13.169	-13.716	-0.547	(0)
	CdHCO3+	1.780e-14	1.299e-14	-13.750	-13.886	-0.137	(0)
	BaCO3	1.207e-14	1.207e-14	-13.918	-13.918	0.000	(0)
	MnHCO3+	6.319e-15	5.080e-15	-14.199	-14.294	-0.095	(0)
	CdCO3	6.098e-15	6.098e-15	-14.215	-14.215	0.000	(0)
	Pb (CO3) 2-2	2.132e-17	6.051e-18	-16.671	-17.218	-0.547	(0)
	FeHCO3+	9.007e-21	7.333e-21	-20.045	-20.135	-0.089	(0)
	Cd (CO3) 2-2	3.488e-21	9.898e-22	-20.457	-21.004	-0.547	(0)
Ca		1.449e-02					
	Ca+2	9.128e-03	3.751e-03	-2.040	-2.426	-0.386	(0)
	CaSO4	5.347e-03	5.347e-03	-2.272	-2.272	0.000	(0)
	CaNO3+	9.617e-06	7.019e-06	-5.017	-5.154	-0.137	(0)
	CaHPO4	5.471e-07	5.471e-07	-6.262	-6.262	0.000	(0)
	CaH2PO4+	5.340e-07	4.315e-07	-6.272	-6.365	-0.092	(0)
	CaHCO3+	3.861e-07	3.143e-07	-6.413	-6.503	-0.089	(0)
	CaPO4-	1.614e-09	1.304e-09	-8.792	-8.885	-0.092	(0)
	CaH2BO3+	1.362e-09	1.052e-09	-8.866	-8.978	-0.112	(0)
	CaCO3	1.166e-09	1.166e-09	-8.933	-8.933	0.000	(0)
	CaOH+	5.948e-10	4.843e-10	-9.226	-9.315	-0.089	(0)
	CaNH3+2	0.000e+00	0.000e+00	-67.087	-67.634	-0.547	(0)
	Ca (NH3) 2+2	0.000e+00	0.000e+00	-132.795	-133.342	-0.547	(0)
Cd		7.145e-09					
	Cd+2	2.973e-09	1.222e-09	-8.527	-8.913	-0.386	(0)
	CdCl+	1.764e-09	1.287e-09	-8.754	-8.890	-0.137	(0)
	CdSO4	1.763e-09	1.763e-09	-8.754	-8.754	0.000	(0)
	Cd (SO4) 2-2	5.812e-10	1.649e-10	-9.236	-9.783	-0.547	(0)
	CdCl2	5.881e-11	5.881e-11	-10.231	-10.231	0.000	(0)
	CdNO3+	3.488e-12	2.545e-12	-11.457	-11.594	-0.137	(0)
	CdCl3-	5.382e-13	3.928e-13	-12.269	-12.406	-0.137	(0)
	CdOHCl	4.718e-13	4.718e-13	-12.326	-12.326	0.000	(0)
	CdOH+	9.173e-14	6.695e-14	-13.037	-13.174	-0.137	(0)
	CdHCO3+	1.780e-14	1.299e-14	-13.750	-13.886	-0.137	(0)
	CdSeO4	1.188e-14	1.188e-14	-13.925	-13.925	0.000	(0)
	CdCO3	6.098e-15	6.098e-15	-14.215	-14.215	0.000	(0)
	Cd (NO3) 2	6.295e-16	6.295e-16	-15.201	-15.201	0.000	(0)
	Cd (OH) 2	6.194e-18	6.194e-18	-17.208	-17.208	0.000	(0)
	Cd2OH+3	7.421e-21	4.362e-22	-20.130	-21.360	-1.231	(0)
	Cd (CO3) 2-2	3.488e-21	9.898e-22	-20.457	-21.004	-0.547	(0)
	Cd (OH) 3-	5.215e-24	3.806e-24	-23.283	-23.420	-0.137	(0)
	Cd (OH) 4-2	2.208e-32	6.266e-33	-31.656	-32.203	-0.547	(0)
	Cd (SeO3) 2-2	0.000e+00	0.000e+00	-44.114	-44.661	-0.547	(0)
	CdHS+	0.000e+00	0.000e+00	-143.348	-143.485	-0.137	(0)
	Cd (HS) 2	0.000e+00	0.000e+00	-278.861	-278.861	0.000	(0)
	Cd (HS) 3-	0.000e+00	0.000e+00	-419.405	-419.542	-0.137	(0)
	Cd (HS) 4-2	0.000e+00	0.000e+00	-559.379	-559.926	-0.547	(0)
Cl		1.388e-02					
	Cl-	1.387e-02	1.111e-02	-1.858	-1.954	-0.097	(0)
	CuCl+	5.309e-07	4.207e-07	-6.275	-6.376	-0.101	(0)
	CoCl+	1.320e-07	9.631e-08	-6.880	-7.016	-0.137	(0)
	NiCl+	8.635e-08	6.303e-08	-7.064	-7.200	-0.137	(0)
	ZnCl+	6.183e-08	4.900e-08	-7.209	-7.310	-0.101	(0)
	PbCl+	7.406e-09	5.405e-09	-8.130	-8.267	-0.137	(0)
	CdCl+	1.764e-09	1.287e-09	-8.754	-8.890	-0.137	(0)
	CuCl2	1.266e-09	1.266e-09	-8.898	-8.898	0.000	(0)
	ZnCl2	6.942e-10	6.942e-10	-9.159	-9.159	0.000	(0)
	ZnOHCl	6.696e-10	6.696e-10	-9.174	-9.174	0.000	(0)
	BeCl+	5.920e-10	4.759e-10	-9.228	-9.322	-0.095	(0)
	PbCl2	2.622e-10	2.622e-10	-9.581	-9.581	0.000	(0)

CdCl ₂	5.881e-11	5.881e-11	-10.231	-10.231	0.000	(0)
ZnCl ₃ -	7.571e-12	6.000e-12	-11.121	-11.222	-0.101	(0)
NiCl ₂	3.574e-12	3.574e-12	-11.447	-11.447	0.000	(0)
PbCl ₃ -	1.679e-12	1.225e-12	-11.775	-11.912	-0.137	(0)
MnCl ⁺	8.817e-13	7.088e-13	-12.055	-12.149	-0.095	(0)
CdCl ₃ -	5.382e-13	3.928e-13	-12.269	-12.406	-0.137	(0)
CdOHCl	4.718e-13	4.718e-13	-12.326	-12.326	0.000	(0)
CuCl ₃ -	1.513e-13	1.199e-13	-12.820	-12.921	-0.101	(0)
ZnCl ₄ -2	7.663e-14	3.201e-14	-13.116	-13.495	-0.379	(0)
PbCl ₄ -2	2.036e-14	5.777e-15	-13.691	-14.238	-0.547	(0)
MnCl ₂	1.112e-14	1.112e-14	-13.954	-13.954	0.000	(0)
FeCl ⁺ +2	6.339e-15	2.648e-15	-14.198	-14.577	-0.379	(0)
CrO ₃ Cl-	2.860e-15	2.087e-15	-14.544	-14.680	-0.137	(0)
CuCl ₂ -	4.575e-16	3.626e-16	-15.340	-15.441	-0.101	(0)
FeCl ₂ +	1.915e-16	1.539e-16	-15.718	-15.813	-0.095	(0)
CuCl	1.544e-16	1.544e-16	-15.811	-15.811	0.000	(0)
MnCl ₃ -	4.233e-17	3.403e-17	-16.373	-16.468	-0.095	(0)
CuCl ₄ -2	1.895e-17	7.917e-18	-16.722	-17.101	-0.379	(0)
CuCl ₃ -2	2.022e-18	8.446e-19	-17.694	-18.073	-0.379	(0)
FeCl ₃	1.710e-19	1.710e-19	-18.767	-18.767	0.000	(0)
CoCl ⁺ +2	7.726e-23	2.193e-23	-22.112	-22.659	-0.547	(0)
CrCl ⁺ +2	1.396e-25	3.961e-26	-24.855	-25.402	-0.547	(0)
CrOHCl ₂	4.123e-29	4.123e-29	-28.385	-28.385	0.000	(0)
CrCl ₂ +	3.672e-29	2.680e-29	-28.435	-28.572	-0.137	(0)
Co(NH ₃) ₅ Cl ⁺ +2	0.000e+00	0.000e+00	-322.990	-323.537	-0.547	(0)
Co(NH ₃) ₆ Cl ⁺ +2	0.000e+00	0.000e+00	-394.987	-395.534	-0.547	(0)
Cr(NH ₃) ₆ Cl ⁺ +2	0.000e+00	0.000e+00	-403.023	-403.570	-0.547	(0)
Co(2)	1.227e-05					
Co+2	8.953e-06	2.541e-06	-5.048	-5.595	-0.547	(0)
CoSO ₄	3.174e-06	3.174e-06	-5.498	-5.498	0.000	(0)
CoCl ⁺	1.320e-07	9.631e-08	-6.880	-7.016	-0.137	(0)
CoNO ₃ +	3.146e-09	2.296e-09	-8.502	-8.639	-0.137	(0)
CoHCO ₃ +	1.265e-09	9.231e-10	-8.898	-9.035	-0.137	(0)
CoHPO ₄	8.664e-10	8.664e-10	-9.062	-9.062	0.000	(0)
CoOH ⁺	6.986e-10	5.099e-10	-9.156	-9.293	-0.137	(0)
CoSeO ₄	6.120e-11	6.120e-11	-10.213	-10.213	0.000	(0)
CoCO ₃	9.404e-12	9.404e-12	-11.027	-11.027	0.000	(0)
Co(NO ₃) ₂	2.663e-12	2.663e-12	-11.575	-11.575	0.000	(0)
Co(OH) ₂	4.073e-13	4.073e-13	-12.390	-12.390	0.000	(0)
Co ₂ OH ⁺ +3	1.105e-15	6.493e-17	-14.957	-16.188	-1.231	(0)
Co(OH) ₃ -	1.120e-19	8.174e-20	-18.951	-19.088	-0.137	(0)
CoOOH-	4.688e-21	3.421e-21	-20.329	-20.466	-0.137	(0)
CoNO ₂ +	1.600e-21	1.168e-21	-20.796	-20.933	-0.137	(0)
Co ₄ (OH) ₄ +4	2.079e-27	1.348e-29	-26.682	-28.870	-2.188	(0)
Co(OH) ₄ -2	4.591e-28	1.303e-28	-27.338	-27.885	-0.547	(0)
Co(NH ₃) ₂	0.000e+00	0.000e+00	-68.082	-68.629	-0.547	(0)
Co(NH ₃) ₂ +2	0.000e+00	0.000e+00	-131.954	-132.501	-0.547	(0)
Co(NH ₃) ₃ +2	0.000e+00	0.000e+00	-196.162	-196.709	-0.547	(0)
Co(NH ₃) ₄ +2	0.000e+00	0.000e+00	-260.750	-261.297	-0.547	(0)
Co(NH ₃) ₅ +2	0.000e+00	0.000e+00	-325.838	-326.385	-0.547	(0)
Co(3)	1.950e-18					
CoOH ⁺ +2	1.950e-18	5.535e-19	-17.710	-18.257	-0.547	(0)
Co+3	8.009e-23	1.083e-23	-22.096	-22.965	-0.869	(0)
CoCl ⁺ +2	7.726e-23	2.193e-23	-22.112	-22.659	-0.547	(0)
Co(NH ₃) ₅ Cl ⁺ +2	0.000e+00	0.000e+00	-322.990	-323.537	-0.547	(0)
Co(NH ₃) ₆ SO ₄ +	0.000e+00	0.000e+00	-390.763	-390.899	-0.137	(0)
Co(NH ₃) ₆ Cl ⁺ +2	0.000e+00	0.000e+00	-394.987	-395.534	-0.547	(0)
Co(NH ₃) ₆ OH ⁺ +2	0.000e+00	0.000e+00	-396.518	-397.065	-0.547	(0)
Cr(2)	0.000e+00					
Cr+2	0.000e+00	0.000e+00	-44.993	-45.540	-0.547	(0)
Cr(3)	2.862e-21					
Cr(OH) ₂	1.790e-21	5.079e-22	-20.747	-21.294	-0.547	(0)
Cr(OH) ₂ +	4.982e-22	3.636e-22	-21.303	-21.439	-0.137	(0)
CrOHSO ₄	4.607e-22	4.607e-22	-21.337	-21.337	0.000	(0)
Cr+3	5.605e-23	3.295e-24	-22.251	-23.482	-1.231	(0)
CrSO ₄ +	5.564e-23	4.061e-23	-22.255	-22.391	-0.137	(0)
Cr(OH) ₃	1.374e-24	1.374e-24	-23.862	-23.862	0.000	(0)
CrCl ⁺ +2	1.396e-25	3.961e-26	-24.855	-25.402	-0.547	(0)

CrH2PO4+2	1.366e-26	3.876e-27	-25.865	-26.412	-0.547	(0)
CrO2-	8.949e-28	6.532e-28	-27.048	-27.185	-0.137	(0)
Cr(OH) 4-	7.536e-28	5.500e-28	-27.123	-27.260	-0.137	(0)
CrNO3+2	1.860e-28	5.279e-29	-27.730	-28.277	-0.547	(0)
CrOHC12	4.123e-29	4.123e-29	-28.385	-28.385	0.000	(0)
CrCl2+	3.672e-29	2.680e-29	-28.435	-28.572	-0.137	(0)
Cr2(OH) 2SO4+2	0.000e+00	0.000e+00	-40.361	-40.908	-0.547	(0)
Cr2(OH) 2(SO4) 2	0.000e+00	0.000e+00	-41.319	-41.319	0.000	(0)
Cr(NH3) 5OH+2	0.000e+00	0.000e+00	-337.488	-338.035	-0.547	(0)
Cr(NH3) 6+3	0.000e+00	0.000e+00	-401.487	-402.718	-1.231	(0)
Cr(NH3) 6Cl+2	0.000e+00	0.000e+00	-403.023	-403.570	-0.547	(0)
Cr(6)	6.372e-08					
HCrO4-	4.032e-08	2.943e-08	-7.394	-7.531	-0.137	(0)
CrO4-2	2.244e-08	9.221e-09	-7.649	-8.035	-0.386	(0)
NaCrO4-	7.277e-10	5.312e-10	-9.138	-9.275	-0.137	(0)
KCrO4-	2.263e-10	1.652e-10	-9.645	-9.782	-0.137	(0)
CrO3HPO4-2	2.055e-12	5.832e-13	-11.687	-12.234	-0.547	(0)
CrO3SO4-2	2.095e-13	5.945e-14	-12.679	-13.226	-0.547	(0)
Cr2O7-2	1.207e-13	3.427e-14	-12.918	-13.465	-0.547	(0)
H2CrO4	1.849e-14	1.849e-14	-13.733	-13.733	0.000	(0)
CrO3Cl-	2.860e-15	2.087e-15	-14.544	-14.680	-0.137	(0)
CrO3H2PO4-	3.849e-16	2.809e-16	-15.415	-15.551	-0.137	(0)
Cu(1)	6.291e-16					
CuCl2-	4.575e-16	3.626e-16	-15.340	-15.441	-0.101	(0)
CuCl	1.544e-16	1.544e-16	-15.811	-15.811	0.000	(0)
Cu+	1.512e-17	1.104e-17	-16.820	-16.957	-0.137	(0)
CuCl3-2	2.022e-18	8.446e-19	-17.694	-18.073	-0.379	(0)
Cu(S4) 2-3	0.000e+00	0.000e+00	-286.322	-286.728	-0.405	(0)
CuS4S5-3	0.000e+00	0.000e+00	-287.075	-287.458	-0.383	(0)
Cu(2)	9.874e-05					
Cu+2	6.157e-05	2.530e-05	-4.211	-4.597	-0.386	(0)
CuSO4	3.567e-05	3.567e-05	-4.448	-4.448	0.000	(0)
CuOH+	7.936e-07	6.290e-07	-6.100	-6.201	-0.101	(0)
CuCl+	5.309e-07	4.207e-07	-6.275	-6.376	-0.101	(0)
CuNO3+	6.429e-08	4.692e-08	-7.192	-7.329	-0.137	(0)
Cu2(OH) 2+2	3.383e-08	9.601e-09	-7.471	-8.018	-0.547	(0)
CuCO3	3.262e-08	3.262e-08	-7.487	-7.487	0.000	(0)
CuHCO3+	1.022e-08	7.456e-09	-7.991	-8.128	-0.137	(0)
Cu(OH) 2	1.615e-09	1.615e-09	-8.792	-8.792	0.000	(0)
CuCl2	1.266e-09	1.266e-09	-8.898	-8.898	0.000	(0)
Cu(NO3) 2	3.274e-12	3.274e-12	-11.485	-11.485	0.000	(0)
CuCl3-	1.513e-13	1.199e-13	-12.820	-12.921	-0.101	(0)
Cu(CO3) 2-2	6.774e-14	1.922e-14	-13.169	-13.716	-0.547	(0)
Cu(OH) 3-	4.564e-14	3.331e-14	-13.341	-13.477	-0.137	(0)
CuCl4-2	1.895e-17	7.917e-18	-16.722	-17.101	-0.379	(0)
CuNO2+	2.367e-19	1.728e-19	-18.626	-18.763	-0.137	(0)
Cu(OH) 4-2	9.291e-21	2.637e-21	-20.032	-20.579	-0.547	(0)
Cu(NO2) 2	1.153e-34	1.153e-34	-33.938	-33.938	0.000	(0)
CuNH3+2	0.000e+00	0.000e+00	-65.133	-65.680	-0.547	(0)
Cu(HS) 3-	0.000e+00	0.000e+00	-406.302	-406.438	-0.137	(0)
Fe(2)	6.294e-16					
Fe+2	4.395e-16	1.247e-16	-15.357	-15.904	-0.547	(0)
FeSO4	1.893e-16	1.893e-16	-15.723	-15.723	0.000	(0)
FeH2PO4+	3.814e-19	3.082e-19	-18.419	-18.511	-0.092	(0)
FeHPO4	1.552e-19	1.552e-19	-18.809	-18.809	0.000	(0)
FeOH+	4.231e-20	3.401e-20	-19.374	-19.468	-0.095	(0)
FeHCO3+	9.007e-21	7.333e-21	-20.045	-20.135	-0.089	(0)
Fe(OH) 2	1.752e-25	1.752e-25	-24.757	-24.757	0.000	(0)
Fe(OH) 3-	6.613e-28	5.316e-28	-27.180	-27.274	-0.095	(0)
Fe(HS) 2	0.000e+00	0.000e+00	-292.114	-292.114	0.000	(0)
Fe(HS) 3-	0.000e+00	0.000e+00	-432.521	-432.658	-0.137	(0)
Fe(3)	2.921e-07					
Fe(OH) 2+	2.907e-07	2.349e-07	-6.537	-6.629	-0.092	(0)
Fe(OH) 3	1.242e-09	1.242e-09	-8.906	-8.906	0.000	(0)
FeOH+2	1.078e-10	4.504e-11	-9.967	-10.346	-0.379	(0)
FeHPO4+	3.645e-11	2.946e-11	-10.438	-10.531	-0.092	(0)
Fe(OH) 4-	2.940e-12	2.376e-12	-11.532	-11.624	-0.092	(0)
FeSO4+	7.099e-13	5.708e-13	-12.149	-12.244	-0.095	(0)

Fe (SO4) 2-	1.137e-13	8.297e-14	-12.944	-13.081	-0.137	(0)
Fe+3	6.839e-14	9.247e-15	-13.165	-14.034	-0.869	(0)
FeCl+2	6.339e-15	2.648e-15	-14.198	-14.577	-0.379	(0)
FeH2PO4+2	2.030e-15	8.658e-16	-14.693	-15.063	-0.370	(0)
FeNO3+2	2.396e-16	6.800e-17	-15.620	-16.167	-0.547	(0)
FeCl2+	1.915e-16	1.539e-16	-15.718	-15.813	-0.095	(0)
Fe2 (OH) 2+4	1.238e-17	8.032e-20	-16.907	-19.095	-2.188	(0)
FeCl3	1.710e-19	1.710e-19	-18.767	-18.767	0.000	(0)
Fe3 (OH) 4+5	6.788e-22	2.588e-25	-21.168	-24.587	-3.419	(0)
FeHSeO3+2	2.681e-29	7.610e-30	-28.572	-29.119	-0.547	(0)
H (0)	0.000e+00					
H2	0.000e+00	0.000e+00	-45.195	-45.187	0.007	(0)
K	6.291e-03					
K+	6.023e-03	4.822e-03	-2.220	-2.317	-0.097	(0)
KSO4-	2.683e-04	2.168e-04	-3.571	-3.664	-0.092	(0)
KHPO4-	1.415e-08	1.143e-08	-7.849	-7.942	-0.092	(0)
KCrO4-	2.263e-10	1.652e-10	-9.645	-9.782	-0.137	(0)
Mg	3.635e-03					
Mg+2	2.473e-03	1.016e-03	-2.607	-2.993	-0.386	(0)
MgSO4	1.161e-03	1.161e-03	-2.935	-2.935	0.000	(0)
MgH2PO4+	3.087e-07	2.495e-07	-6.510	-6.603	-0.092	(0)
MgHPO4	2.046e-07	2.046e-07	-6.689	-6.689	0.000	(0)
MgHCO3+	6.592e-08	5.225e-08	-7.181	-7.282	-0.101	(0)
MgOH+	3.117e-09	2.552e-09	-8.506	-8.593	-0.087	(0)
MgH2BO3+	2.285e-10	1.766e-10	-9.641	-9.753	-0.112	(0)
MgCO3	1.704e-10	1.704e-10	-9.768	-9.768	0.000	(0)
MgPO4-	6.834e-12	5.523e-12	-11.165	-11.258	-0.092	(0)
Mn (2)	2.350e-10					
Mn+2	1.786e-10	5.068e-11	-9.748	-10.295	-0.547	(0)
MnSO4	5.546e-11	5.546e-11	-10.256	-10.256	0.000	(0)
MnCl+	8.817e-13	7.088e-13	-12.055	-12.149	-0.095	(0)
MnNO3+	6.275e-14	4.580e-14	-13.202	-13.339	-0.137	(0)
MnCl2	1.112e-14	1.112e-14	-13.954	-13.954	0.000	(0)
MnHCO3+	6.319e-15	5.080e-15	-14.199	-14.294	-0.095	(0)
MnOH+	1.085e-15	8.721e-16	-14.965	-15.059	-0.095	(0)
MnSeO4	6.467e-16	6.467e-16	-15.189	-15.189	0.000	(0)
Mn (NO3) 2	6.634e-17	6.634e-17	-16.178	-16.178	0.000	(0)
MnCl3-	4.233e-17	3.403e-17	-16.373	-16.468	-0.095	(0)
Mn (OH) 3-	9.956e-28	8.004e-28	-27.002	-27.097	-0.095	(0)
Mn (OH) 4-2	6.221e-35	2.599e-35	-34.206	-34.585	-0.379	(0)
MnSe	0.000e+00	0.000e+00	-109.428	-109.428	0.000	(0)
Mn (3)	8.538e-21					
Mn+3	8.538e-21	1.155e-21	-20.069	-20.938	-0.869	(0)
Mn (6)	4.505e-23					
MnO4-2	4.505e-23	1.882e-23	-22.346	-22.725	-0.379	(0)
Mn (7)	5.092e-18					
MnO4-	5.092e-18	3.970e-18	-17.293	-17.401	-0.108	(0)
Mo	1.151e-06					
MoO4-2	1.140e-06	4.684e-07	-5.943	-6.329	-0.386	(0)
HMoO4-	1.113e-08	8.122e-09	-7.954	-8.090	-0.137	(0)
H2MoO4	8.164e-11	8.164e-11	-10.088	-10.088	0.000	(0)
AlMo6O21-3	2.695e-29	1.584e-30	-28.569	-29.800	-1.231	(0)
Mo7O24-6	1.953e-34	2.332e-39	-33.709	-38.632	-4.923	(0)
HMo7O24-5	1.391e-35	5.306e-39	-34.857	-38.275	-3.419	(0)
H2Mo7O24-4	4.852e-38	3.148e-40	-37.314	-39.502	-2.188	(0)
H3Mo7O24-3	0.000e+00	0.000e+00	-41.019	-42.250	-1.231	(0)
N (-3)	0.000e+00					
NH4+	0.000e+00	0.000e+00	-61.952	-62.064	-0.112	(0)
NH4SO4-	0.000e+00	0.000e+00	-63.124	-63.219	-0.095	(0)
CuNH3+2	0.000e+00	0.000e+00	-65.133	-65.680	-0.547	(0)
NH3	0.000e+00	0.000e+00	-65.463	-65.463	0.000	(0)
CaNH3+2	0.000e+00	0.000e+00	-67.087	-67.634	-0.547	(0)
NiNH3+2	0.000e+00	0.000e+00	-67.479	-68.026	-0.547	(0)
Co (NH3) +2	0.000e+00	0.000e+00	-68.082	-68.629	-0.547	(0)
BaNH3+2	0.000e+00	0.000e+00	-71.882	-72.429	-0.547	(0)
Ni (NH3) 2+2	0.000e+00	0.000e+00	-130.494	-131.041	-0.547	(0)
Co (NH3) 2+2	0.000e+00	0.000e+00	-131.954	-132.501	-0.547	(0)
Ca (NH3) 2+2	0.000e+00	0.000e+00	-132.795	-133.342	-0.547	(0)

Co (NH3) 3+2	0.000e+00	0.000e+00	-196.162	-196.709	-0.547	(0)
Co (NH3) 4+2	0.000e+00	0.000e+00	-260.750	-261.297	-0.547	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-322.990	-323.537	-0.547	(0)
Co (NH3) 5+2	0.000e+00	0.000e+00	-325.838	-326.385	-0.547	(0)
Cr (NH3) 5OH+2	0.000e+00	0.000e+00	-337.488	-338.035	-0.547	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-390.763	-390.899	-0.137	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-394.987	-395.534	-0.547	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-396.518	-397.065	-0.547	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-401.487	-402.718	-1.231	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-403.023	-403.570	-0.547	(0)
N (3)	8.386e-17					
NO2-	8.362e-17	6.521e-17	-16.078	-16.186	-0.108	(0)
CuNO2+	2.367e-19	1.728e-19	-18.626	-18.763	-0.137	(0)
CoNO2+	1.600e-21	1.168e-21	-20.796	-20.933	-0.137	(0)
Cu (NO2) 2	1.153e-34	1.153e-34	-33.938	-33.938	0.000	(0)
N (5)	7.218e-04					
NO3-	7.121e-04	5.701e-04	-3.147	-3.244	-0.097	(0)
CaNO3+	9.617e-06	7.019e-06	-5.017	-5.154	-0.137	(0)
CuNO3+	6.429e-08	4.692e-08	-7.192	-7.329	-0.137	(0)
NiNO3+	4.411e-09	3.220e-09	-8.355	-8.492	-0.137	(0)
ZnNO3+	3.691e-09	2.694e-09	-8.433	-8.570	-0.137	(0)
CoNO3+	3.146e-09	2.296e-09	-8.502	-8.639	-0.137	(0)
BaNO3+	5.135e-10	3.748e-10	-9.289	-9.426	-0.137	(0)
PbNO3+	1.659e-10	1.211e-10	-9.780	-9.917	-0.137	(0)
CdNO3+	3.488e-12	2.545e-12	-11.457	-11.594	-0.137	(0)
Cu (NO3) 2	3.274e-12	3.274e-12	-11.485	-11.485	0.000	(0)
Co (NO3) 2	2.663e-12	2.663e-12	-11.575	-11.575	0.000	(0)
Zn (NO3) 2	2.969e-13	2.969e-13	-12.527	-12.527	0.000	(0)
Pb (NO3) 2	1.244e-13	1.244e-13	-12.905	-12.905	0.000	(0)
MnNO3+	6.275e-14	4.580e-14	-13.202	-13.339	-0.137	(0)
Cd (NO3) 2	6.295e-16	6.295e-16	-15.201	-15.201	0.000	(0)
FeNO3+2	2.396e-16	6.800e-17	-15.620	-16.167	-0.547	(0)
Mn (NO3) 2	6.634e-17	6.634e-17	-16.178	-16.178	0.000	(0)
CrNO3+2	1.860e-28	5.279e-29	-27.730	-28.277	-0.547	(0)
Na	1.498e-02					
Na+	1.448e-02	1.159e-02	-1.839	-1.936	-0.097	(0)
NaSO4-	4.998e-04	4.039e-04	-3.301	-3.394	-0.092	(0)
NaHPO4-	5.267e-08	4.257e-08	-7.278	-7.371	-0.092	(0)
NaHCO3	3.700e-08	3.700e-08	-7.432	-7.432	0.000	(0)
NaCrO4-	7.277e-10	5.312e-10	-9.138	-9.275	-0.137	(0)
NaH2BO3	1.007e-10	1.007e-10	-9.997	-9.997	0.000	(0)
NaCO3-	6.727e-11	5.436e-11	-10.172	-10.265	-0.092	(0)
Ni	8.382e-06					
Ni+2	5.471e-06	2.248e-06	-5.262	-5.648	-0.386	(0)
NiSO4	2.816e-06	2.816e-06	-5.550	-5.550	0.000	(0)
NiCl+	8.635e-08	6.303e-08	-7.064	-7.200	-0.137	(0)
NiNO3+	4.411e-09	3.220e-09	-8.355	-8.492	-0.137	(0)
Ni (SO4) 2-2	2.234e-09	6.340e-10	-8.651	-9.198	-0.547	(0)
NiHCO3+	1.773e-09	1.294e-09	-8.751	-8.888	-0.137	(0)
NiOH+	2.731e-10	1.993e-10	-9.564	-9.701	-0.137	(0)
NiSeO4	4.985e-11	4.985e-11	-10.302	-10.302	0.000	(0)
NiCO3	1.836e-11	1.836e-11	-10.736	-10.736	0.000	(0)
NiCl2	3.574e-12	3.574e-12	-11.447	-11.447	0.000	(0)
Ni (OH) 2	2.274e-13	2.274e-13	-12.643	-12.643	0.000	(0)
Ni (OH) 3-	3.133e-18	2.287e-18	-17.504	-17.641	-0.137	(0)
NiNH3+2	0.000e+00	0.000e+00	-67.479	-68.026	-0.547	(0)
Ni (NH3) 2+2	0.000e+00	0.000e+00	-130.494	-131.041	-0.547	(0)
O (0)	9.507e-04					
O2	4.753e-04	4.834e-04	-3.323	-3.316	0.007	(0)
P	9.399e-06					
H2PO4-	6.906e-06	5.581e-06	-5.161	-5.253	-0.092	(0)
HPO4-2	8.295e-07	3.465e-07	-6.081	-6.460	-0.379	(0)
CaHPO4	5.471e-07	5.471e-07	-6.262	-6.262	0.000	(0)
CaH2PO4+	5.340e-07	4.315e-07	-6.272	-6.365	-0.092	(0)
MgH2PO4+	3.087e-07	2.495e-07	-6.510	-6.603	-0.092	(0)
MgHPO4	2.046e-07	2.046e-07	-6.689	-6.689	0.000	(0)
NaHPO4-	5.267e-08	4.257e-08	-7.278	-7.371	-0.092	(0)
KHPO4-	1.415e-08	1.143e-08	-7.849	-7.942	-0.092	(0)

CaPO4-	1.614e-09	1.304e-09	-8.792	-8.885	-0.092	(0)
CoHPO4	8.664e-10	8.664e-10	-9.062	-9.062	0.000	(0)
H3PO4	7.432e-10	7.432e-10	-9.129	-9.129	0.000	(0)
FeHPO4+	3.645e-11	2.946e-11	-10.438	-10.531	-0.092	(0)
MgPO4-	6.834e-12	5.523e-12	-11.165	-11.258	-0.092	(0)
CrO3HPO4-2	2.055e-12	5.832e-13	-11.687	-12.234	-0.547	(0)
PO4-3	9.747e-13	1.318e-13	-12.011	-12.880	-0.869	(0)
FeH2PO4+2	2.030e-15	8.658e-16	-14.693	-15.063	-0.370	(0)
CrO3H2PO4-	3.849e-16	2.809e-16	-15.415	-15.551	-0.137	(0)
FeH2PO4+	3.814e-19	3.082e-19	-18.419	-18.511	-0.092	(0)
FeHPO4	1.552e-19	1.552e-19	-18.809	-18.809	0.000	(0)
CrH2PO4+2	1.366e-26	3.876e-27	-25.865	-26.412	-0.547	(0)
Pb	9.690e-08					
PbSO4	4.659e-08	4.659e-08	-7.332	-7.332	0.000	(0)
Pb+2	3.543e-08	1.456e-08	-7.451	-7.837	-0.386	(0)
PbCl+	7.406e-09	5.405e-09	-8.130	-8.267	-0.137	(0)
Pb(SO4) 2-2	6.463e-09	1.834e-09	-8.190	-8.737	-0.547	(0)
PbOH+	5.040e-10	3.678e-10	-9.298	-9.434	-0.137	(0)
PbCl2	2.622e-10	2.622e-10	-9.581	-9.581	0.000	(0)
PbNO3+	1.659e-10	1.211e-10	-9.780	-9.917	-0.137	(0)
PbHCO3+	6.922e-11	5.053e-11	-10.160	-10.296	-0.137	(0)
PbCO3	9.583e-12	9.583e-12	-11.018	-11.018	0.000	(0)
PbCl3-	1.679e-12	1.225e-12	-11.775	-11.912	-0.137	(0)
Pb(NO3) 2	1.244e-13	1.244e-13	-12.905	-12.905	0.000	(0)
Pb(OH) 2	1.170e-13	1.170e-13	-12.932	-12.932	0.000	(0)
PbCl4-2	2.036e-14	5.777e-15	-13.691	-14.238	-0.547	(0)
Pb2OH+3	1.444e-15	8.488e-17	-14.840	-16.071	-1.231	(0)
Pb(CO3) 2-2	2.132e-17	6.051e-18	-16.671	-17.218	-0.547	(0)
Pb(OH) 3-	1.612e-18	1.177e-18	-17.793	-17.929	-0.137	(0)
Pb(OH) 4-2	1.021e-23	2.898e-24	-22.991	-23.538	-0.547	(0)
Pb3(OH) 4+2	6.340e-24	1.799e-24	-23.198	-23.745	-0.547	(0)
Pb4(OH) 4+4	3.863e-26	2.506e-28	-25.413	-27.601	-2.188	(0)
Pb(HS) 2	0.000e+00	0.000e+00	-277.727	-277.727	0.000	(0)
Pb(HS) 3-	0.000e+00	0.000e+00	-418.871	-419.007	-0.137	(0)
S(-2)	0.000e+00					
H2S	0.000e+00	0.000e+00	-141.494	-141.494	0.000	(0)
HS-	0.000e+00	0.000e+00	-142.443	-142.580	-0.137	(0)
CdHS+	0.000e+00	0.000e+00	-143.348	-143.485	-0.137	(0)
S5-2	0.000e+00	0.000e+00	-145.511	-146.058	-0.547	(0)
S6-2	0.000e+00	0.000e+00	-145.914	-146.461	-0.547	(0)
S4-2	0.000e+00	0.000e+00	-146.111	-146.658	-0.547	(0)
S3-2	0.000e+00	0.000e+00	-146.926	-147.473	-0.547	(0)
S2-2	0.000e+00	0.000e+00	-147.955	-148.502	-0.547	(0)
S-2	0.000e+00	0.000e+00	-153.649	-154.028	-0.379	(0)
Pb(HS) 2	0.000e+00	0.000e+00	-277.727	-277.727	0.000	(0)
ZnS(HS) -	0.000e+00	0.000e+00	-277.953	-278.090	-0.137	(0)
Zn(HS) 2	0.000e+00	0.000e+00	-278.080	-278.080	0.000	(0)
Cd(HS) 2	0.000e+00	0.000e+00	-278.861	-278.861	0.000	(0)
Cu(S4) 2-3	0.000e+00	0.000e+00	-286.322	-286.728	-0.405	(0)
CuS4S5-3	0.000e+00	0.000e+00	-287.075	-287.458	-0.383	(0)
Fe(HS) 2	0.000e+00	0.000e+00	-292.114	-292.114	0.000	(0)
Cu(HS) 3-	0.000e+00	0.000e+00	-406.302	-406.438	-0.137	(0)
Zn(HS) 3-	0.000e+00	0.000e+00	-417.243	-417.380	-0.137	(0)
Pb(HS) 3-	0.000e+00	0.000e+00	-418.871	-419.007	-0.137	(0)
Cd(HS) 3-	0.000e+00	0.000e+00	-419.405	-419.542	-0.137	(0)
ZnS(HS) 2-2	0.000e+00	0.000e+00	-420.813	-421.360	-0.547	(0)
Fe(HS) 3-	0.000e+00	0.000e+00	-432.521	-432.658	-0.137	(0)
Cd(HS) 4-2	0.000e+00	0.000e+00	-559.379	-559.926	-0.547	(0)
Zn(HS) 4-2	0.000e+00	0.000e+00	-560.873	-561.420	-0.547	(0)
S(6)	2.322e-02					
SO4-2	1.590e-02	6.534e-03	-1.799	-2.185	-0.386	(0)
CaSO4	5.347e-03	5.347e-03	-2.272	-2.272	0.000	(0)
MgSO4	1.161e-03	1.161e-03	-2.935	-2.935	0.000	(0)
NaSO4-	4.998e-04	4.039e-04	-3.301	-3.394	-0.092	(0)
KSO4-	2.683e-04	2.168e-04	-3.571	-3.664	-0.092	(0)
CuSO4	3.567e-05	3.567e-05	-4.448	-4.448	0.000	(0)
CoSO4	3.174e-06	3.174e-06	-5.498	-5.498	0.000	(0)
NiSO4	2.816e-06	2.816e-06	-5.550	-5.550	0.000	(0)

ZnSO4	2.496e-06	2.496e-06	-5.603	-5.603	0.000	(0)
HSO4-	6.874e-07	5.488e-07	-6.163	-6.261	-0.098	(0)
Zn (SO4) 2-2	5.224e-07	1.482e-07	-6.282	-6.829	-0.547	(0)
PbSO4	4.659e-08	4.659e-08	-7.332	-7.332	0.000	(0)
BeSO4	2.236e-08	2.236e-08	-7.651	-7.651	0.000	(0)
Pb (SO4) 2-2	6.463e-09	1.834e-09	-8.190	-8.737	-0.547	(0)
Ni (SO4) 2-2	2.234e-09	6.340e-10	-8.651	-9.198	-0.547	(0)
CdSO4	1.763e-09	1.763e-09	-8.754	-8.754	0.000	(0)
Be (SO4) 2-2	1.601e-09	4.542e-10	-8.796	-9.343	-0.547	(0)
AlSO4+	7.966e-10	6.360e-10	-9.099	-9.197	-0.098	(0)
Cd (SO4) 2-2	5.812e-10	1.649e-10	-9.236	-9.783	-0.547	(0)
Al (SO4) 2-	6.230e-11	4.974e-11	-10.206	-10.303	-0.098	(0)
MnSO4	5.546e-11	5.546e-11	-10.256	-10.256	0.000	(0)
FeSO4+	7.099e-13	5.708e-13	-12.149	-12.244	-0.095	(0)
CrO3SO4-2	2.095e-13	5.945e-14	-12.679	-13.226	-0.547	(0)
Fe (SO4) 2-	1.137e-13	8.297e-14	-12.944	-13.081	-0.137	(0)
FeSO4	1.893e-16	1.893e-16	-15.723	-15.723	0.000	(0)
CrOHSO4	4.607e-22	4.607e-22	-21.337	-21.337	0.000	(0)
CrSO4+	5.564e-23	4.061e-23	-22.255	-22.391	-0.137	(0)
Cr2 (OH) 2SO4+2	0.000e+00	0.000e+00	-40.361	-40.908	-0.547	(0)
Cr2 (OH) 2 (SO4) 2	0.000e+00	0.000e+00	-41.319	-41.319	0.000	(0)
NH4SO4-	0.000e+00	0.000e+00	-63.124	-63.219	-0.095	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-390.763	-390.899	-0.137	(0)
Se (-2)	0.000e+00					
HSe-	0.000e+00	0.000e+00	-99.611	-99.748	-0.137	(0)
H2Se	0.000e+00	0.000e+00	-101.868	-101.868	0.000	(0)
Se-2	0.000e+00	0.000e+00	-108.345	-108.892	-0.547	(0)
MnSe	0.000e+00	0.000e+00	-109.428	-109.428	0.000	(0)
Se (4)	5.119e-19					
HSeO3-	5.068e-19	3.699e-19	-18.295	-18.432	-0.137	(0)
SeO3-2	5.013e-21	1.423e-21	-20.300	-20.847	-0.547	(0)
H2SeO3	1.512e-22	1.512e-22	-21.820	-21.820	0.000	(0)
FeHSeO3+2	2.681e-29	7.610e-30	-28.572	-29.119	-0.547	(0)
Cd (SeO3) 2-2	0.000e+00	0.000e+00	-44.114	-44.661	-0.547	(0)
Se (6)	1.271e-07					
SeO4-2	1.270e-07	5.220e-08	-6.896	-7.282	-0.386	(0)
CoSeO4	6.120e-11	6.120e-11	-10.213	-10.213	0.000	(0)
NiSeO4	4.985e-11	4.985e-11	-10.302	-10.302	0.000	(0)
ZnSeO4	1.473e-11	1.473e-11	-10.832	-10.832	0.000	(0)
HSeO4-	3.060e-12	2.233e-12	-11.514	-11.651	-0.137	(0)
CdSeO4	1.188e-14	1.188e-14	-13.925	-13.925	0.000	(0)
MnSeO4	6.467e-16	6.467e-16	-15.189	-15.189	0.000	(0)
Zn (SeO4) 2-2	2.748e-18	7.798e-19	-17.561	-18.108	-0.547	(0)
Zn	7.523e-06					
Zn+2	4.435e-06	1.823e-06	-5.353	-5.739	-0.386	(0)
ZnSO4	2.496e-06	2.496e-06	-5.603	-5.603	0.000	(0)
Zn (SO4) 2-2	5.224e-07	1.482e-07	-6.282	-6.829	-0.547	(0)
ZnCl+	6.183e-08	4.900e-08	-7.209	-7.310	-0.101	(0)
ZnNO3+	3.691e-09	2.694e-09	-8.433	-8.570	-0.137	(0)
ZnOH+	1.711e-09	1.249e-09	-8.767	-8.904	-0.137	(0)
ZnCl2	6.942e-10	6.942e-10	-9.159	-9.159	0.000	(0)
ZnOHCl	6.696e-10	6.696e-10	-9.174	-9.174	0.000	(0)
ZnHCO3+	3.688e-10	2.692e-10	-9.433	-9.570	-0.137	(0)
ZnCO3	2.296e-11	2.296e-11	-10.639	-10.639	0.000	(0)
ZnSeO4	1.473e-11	1.473e-11	-10.832	-10.832	0.000	(0)
ZnCl3-	7.571e-12	6.000e-12	-11.121	-11.222	-0.101	(0)
Zn (OH) 2	2.922e-12	2.922e-12	-11.534	-11.534	0.000	(0)
Zn (NO3) 2	2.969e-13	2.969e-13	-12.527	-12.527	0.000	(0)
ZnCl4-2	7.663e-14	3.201e-14	-13.116	-13.495	-0.379	(0)
Zn (OH) 3-	2.018e-16	1.473e-16	-15.695	-15.832	-0.137	(0)
Zn (SeO4) 2-2	2.748e-18	7.798e-19	-17.561	-18.108	-0.547	(0)
Zn (OH) 4-2	2.078e-22	5.897e-23	-21.682	-22.229	-0.547	(0)
ZnS (HS) -	0.000e+00	0.000e+00	-277.953	-278.090	-0.137	(0)
Zn (HS) 2	0.000e+00	0.000e+00	-278.080	-278.080	0.000	(0)
Zn (HS) 3-	0.000e+00	0.000e+00	-417.243	-417.380	-0.137	(0)
ZnS (HS) 2-2	0.000e+00	0.000e+00	-420.813	-421.360	-0.547	(0)
Zn (HS) 4-2	0.000e+00	0.000e+00	-560.873	-561.420	-0.547	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2	-318.00	-311.73	6.27	(Co (NH3) 5Cl) (NO3) 2
(Co (NH3) 5Cl) Cl2	-313.69	-309.15	4.54	(Co (NH3) 5Cl) Cl2
(Co (NH3) 5OH2) Cl3	-320.96	-309.15	11.81	(Co (NH3) 5OH2) Cl3
(Co (NH3) 6) (NO3) 3	-387.01	-369.08	17.93	(Co (NH3) 6) (NO3) 3
(Co (NH3) 6) Cl3	-385.34	-365.21	20.13	(Co (NH3) 6) Cl3
(NH4) 2CrO4	-132.54	-132.16	0.38	(NH4) 2CrO4
(NH4) 2SeO4	-131.86	-131.41	0.45	(NH4) 2SeO4
Al (OH) 3 (am)	-3.95	7.18	11.13	Al (OH) 3
Al2 (MoO4) 3	-43.77	-40.62	3.15	Al2 (MoO4) 3
Al2O3	-6.06	14.36	20.43	Al2O3
Al4 (OH) 10SO4	-8.16	14.54	22.70	Al4 (OH) 10SO4
AlAsO4:2H2O	-9.21	-4.41	4.80	AlAsO4:2H2O
AlOHSO4	-3.77	-7.00	-3.23	AlOHSO4
Alunite	-2.37	-3.14	-0.77	KAl3 (SO4) 2 (OH) 6
Anglesite	-2.20	-10.02	-7.83	PbSO4
Anhydrite	-0.27	-4.61	-4.34	CaSO4
Anilite	-130.74	-163.17	-32.42	Cu0.25Cu1.5S
Antlerite	-0.77	8.02	8.79	Cu3 (OH) 4SO4
Aragonite	-3.82	-12.09	-8.26	CaCO3
Arsenolite	-134.58	-137.52	-2.94	As4O6
Artinite	-13.61	-3.65	9.96	MgCO3:Mg (OH) 2:3H2O
As2O5	-29.96	-23.19	6.77	As2O5
Atacamite	-0.82	6.85	7.67	Cu2 (OH) 3Cl
Azurite	-4.49	-21.11	-16.62	Cu3 (OH) 2 (CO3) 2
Ba (OH) 2:8H2O	-19.48	5.07	24.56	Ba (OH) 2:8H2O
Ba3 (AsO4) 2	0.99	-7.95	-8.94	Ba3 (AsO4) 2
BaCrO4	-5.19	-14.96	-9.77	BaCrO4
BaHPO4	-6.03	-25.80	-19.77	BaHPO4
BaMoO4	-6.26	-13.25	-6.99	BaMoO4
Barite	0.94	-9.11	-10.05	BaSO4
BaS	-159.68	-143.50	16.18	BaS
BaSeO3	-21.15	-19.35	1.79	BaSeO3
BaSeO4	-6.68	-14.20	-7.53	BaSeO4
Be (OH) 2 (alpha)	-2.46	4.43	6.89	Be (OH) 2
Be (OH) 2 (am)	-2.76	4.43	7.19	Be (OH) 2
Be (OH) 2 (beta)	-2.06	4.43	6.49	Be (OH) 2
BeMoO4	-12.29	-13.90	-1.61	BeMoO4
BeS	-163.53	-144.15	19.38	BeS
BeSeO4:4H2O	-11.91	-14.85	-2.94	BeSeO4:4H2O
Bianchite	-6.16	-7.93	-1.76	ZnSO4:6H2O
Birnessite	0.00	18.09	18.09	MnO2
Bixbyite	-5.60	-5.88	-0.27	Mn2O3
BlaubleiI	-119.95	-144.11	-24.16	Cu0.9Cu0.2S
BlaubleiII	-125.63	-152.90	-27.28	Cu0.6Cu0.8S
Boehmite	-1.75	7.18	8.93	AlOOH
Brochantite	-0.40	15.42	15.83	Cu4 (OH) 6SO4
Brucite	-8.18	9.01	17.18	Mg (OH) 2
Bunsenite	-6.39	6.35	12.74	NiO
Ca3 (AsO4) 2:4H2O	-16.77	5.53	22.30	Ca3 (AsO4) 2:4H2O
Ca3 (PO4) 2 (beta)	-3.96	-33.04	-29.08	Ca3 (PO4) 2
Ca4H (PO4) 3:3H2O	-7.27	-54.35	-47.08	Ca4H (PO4) 3:3H2O
CaCrO4	-8.28	-10.46	-2.19	CaCrO4
CaHPO4	-1.94	-21.31	-19.37	CaHPO4
CaHPO4:2H2O	-2.24	-21.31	-19.06	CaHPO4:2H2O
Calcite	-3.63	-12.09	-8.46	CaCO3
CaMoO4	-0.81	-8.76	-7.94	CaMoO4
CaSeO3:2H2O	-17.73	-14.86	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-6.71	-9.71	-3.00	CaSeO4:2H2O
Cd (BO2) 2	-16.80	-6.96	9.84	Cd (BO2) 2
Cd (OH) 2	-10.84	3.09	13.93	Cd (OH) 2
Cd (OH) 2 (am)	-10.90	3.09	13.99	Cd (OH) 2
Cd3 (OH) 2 (SO4) 2	-25.82	-19.11	6.71	Cd3 (OH) 2 (SO4) 2
Cd3 (OH) 4SO4	-27.49	-4.93	22.56	Cd3 (OH) 4SO4
Cd3 (PO4) 2	-19.90	-52.50	-32.60	Cd3 (PO4) 2

Cd4 (OH) 6SO4	-30.24	-1.84	28.40	Cd4 (OH) 6SO4
CdCl2	-12.22	-12.82	-0.60	CdCl2
CdCl2:1H2O	-11.15	-12.82	-1.67	CdCl2:1H2O
CdCl2:2.5H2O	-10.89	-12.82	-1.93	CdCl2:2.5H2O
Cdmetal (alpha)	-52.71	-38.97	13.74	Cd
Cdmetal (gamma)	-52.82	-38.97	13.84	Cd
CdMoO4	-1.03	-15.24	-14.21	CdMoO4
CdOHCl	-8.50	-4.87	3.63	CdOHCl
CdSe	-82.23	-102.66	-20.43	CdSe
CdSeO4:2H2O	-14.35	-16.20	-1.85	CdSeO4:2H2O
CdSO4	-11.08	-11.10	-0.02	CdSO4
CdSO4:1H2O	-9.47	-11.10	-1.63	CdSO4:1H2O
CdSO4:2.67H2O	-9.28	-11.10	-1.82	CdSO4:2.67H2O
Cerussite	-4.29	-17.50	-13.20	PbCO3
CH4 (g)	-148.08	-189.90	-41.81	CH4
Chalcanthite	-4.13	-6.78	-2.66	CuSO4:5H2O
Chalcocite	-135.07	-170.49	-35.42	Cu2S
Chalcopyrite	-257.95	-293.66	-35.71	CuFeS2
Claudetite	-134.29	-137.52	-3.23	As4O6
Clausthalite	-74.13	-101.59	-27.46	PbSe
Co (BO2) 2	-30.71	-3.64	27.07	Co (BO2) 2
Co (OH) 2	-6.69	6.40	13.09	Co (OH) 2
Co (OH) 3	-2.93	-4.97	-2.03	Co (OH) 3
CO2 (g)	-3.50	-21.66	-18.16	CO2
Co3 (AsO4) 2	-17.01	-3.98	13.03	Co3 (AsO4) 2
Co3 (PO4) 2	-7.86	-42.55	-34.69	Co3 (PO4) 2
Co3O4	6.65	-3.53	-10.17	Co3O4
CoCl2	-18.01	-9.50	8.51	CoCl2
CoCl2:6H2O	-12.02	-9.51	2.51	CoCl2:6H2O
CoCO3	-5.31	-15.25	-9.94	CoCO3
CoFe2O4	17.39	14.33	-3.05	CoFe2O4
CoHPO4	-5.41	-24.48	-19.06	CoHPO4
CoMoO4	-4.23	-11.92	-7.69	CoMoO4
CoO	-7.50	6.40	13.90	CoO
CoS (alpha)	-134.74	-142.18	-7.44	CoS
CoS (beta)	-131.11	-142.18	-11.07	CoS
CoSe	-83.14	-99.34	-16.20	CoSe
CoSeO3	-19.35	-18.03	1.32	CoSeO3
CoSeO4:6H2O	-11.35	-12.88	-1.53	CoSeO4:6H2O
CoSO4	-10.82	-7.78	3.04	CoSO4
CoSO4:6H2O	-5.31	-7.78	-2.48	CoSO4:6H2O
Cotunnite	-6.89	-11.75	-4.86	PbCl2
Covellite	-118.59	-141.18	-22.59	CuS
Cr (OH) 2	-44.47	-33.54	10.93	Cr (OH) 2
Cr (OH) 3	-16.86	-15.44	1.42	Cr (OH) 3
Cr (OH) 3 (am)	-14.69	-15.44	-0.75	Cr (OH) 3
Cr2O3	-28.67	-30.88	-2.21	Cr2O3
CrCl2	-63.87	-49.45	14.42	CrCl2
CrCl3	-54.78	-39.30	15.48	CrCl3
Crmetal	-106.60	-75.60	31.00	Cr
CrO3	-16.84	-20.03	-3.19	CrO3
Cu (OH) 2	-1.44	7.40	8.84	Cu (OH) 2
Cu2 (OH) 3NO3	-3.91	5.56	9.47	Cu2 (OH) 3NO3
Cu2Se (alpha)	-81.22	-127.66	-46.44	Cu2Se
Cu2SO4	-34.21	-36.10	-1.89	Cu2SO4
Cu3 (AsO4) 2:2H2O	-7.08	-0.98	6.10	Cu3 (AsO4) 2:2H2O
Cu3 (PO4) 2	-2.70	-39.55	-36.85	Cu3 (PO4) 2
Cu3 (PO4) 2:3H2O	-4.43	-39.55	-35.12	Cu3 (PO4) 2:3H2O
Cu3Se2	-161.50	-226.01	-64.51	Cu3Se2
CuCO3	-2.76	-14.26	-11.50	CuCO3
CuCrO4	-7.19	-12.63	-5.44	CuCrO4
Cumetal	-23.02	-31.99	-8.97	Cu
CuMoO4	2.19	-10.93	-13.11	CuMoO4
CuOCuSO4	-10.09	0.62	10.71	CuOCuSO4
Cupricferrite	8.72	15.33	6.62	CuFe2O4
Cuprite	-20.88	-21.91	-1.04	Cu2O
Cuprousferrite	1.88	-6.99	-8.87	CuFeO2
CuSe	-64.88	-98.35	-33.46	CuSe

CuSe2	-128.25	-162.03	-33.79	CuSe2
CuSeO3:2H2O	-17.65	-17.03	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-9.44	-11.88	-2.44	CuSeO4:5H2O
CuSO4	-9.94	-6.78	3.16	CuSO4
Diaspore	0.00	7.18	7.18	AlOOH
Djurleite	-134.04	-168.56	-34.52	Cu0.066Cu1.868S
Dolomite(disordered)	-8.34	-24.74	-16.40	CaMg(CO3)2
Dolomite(ordered)	-7.77	-24.74	-16.97	CaMg(CO3)2
Epsomite	-3.02	-5.18	-2.16	MgSO4:7H2O
Fe(OH)2	-17.47	-3.91	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	4.62	1.58	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-18.06	-16.50	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-44.74	-65.36	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-31.61	-34.62	-3.01	Fe2(SO4)3
Fe3(OH)8	-16.20	4.02	20.22	Fe3(OH)8
FeAsO4:2H2O	-8.03	-7.63	0.40	FeAsO4:2H2O
FeCr2O4	-42.40	-34.78	7.62	FeCr2O4
FeMoO4	-12.18	-22.23	-10.06	FeMoO4
Ferrihydrite	0.55	3.96	3.41	Fe(OH)3
Ferroselite	-154.60	-173.34	-18.74	FeSe2
FeS(ppt)	-149.57	-152.48	-2.92	FeS
FeSe	-98.65	-109.65	-11.01	FeSe
Fix_pH	-6.00	-6.00	0.00	H+
Galena	-130.21	-144.42	-14.21	PbS
Gibbsite	-1.40	7.18	8.58	Al(OH)3
Goethite	3.29	3.96	0.67	FeOOH
Goslarite	-5.87	-7.93	-2.05	ZnSO4:7H2O
Greenockite	-130.97	-145.49	-14.52	CdS
Greigite	-545.26	-590.29	-45.03	Fe3S4
Gypsum	0.00	-4.61	-4.61	CaSO4:2H2O
H-Jarosite	-5.06	-16.48	-11.41	(H3O)Fe3(SO4)2(OH)6
H2MoO4	-5.31	-18.33	-13.02	H2MoO4
H2S(g)	-140.57	-148.58	-8.01	H2S
H2Se(g)	-100.83	-105.75	-4.91	H2Se
Halite	-5.48	-3.89	1.59	NaCl
Hausmannite	-15.12	47.17	62.29	Mn3O4
Hematite	8.96	7.93	-1.03	Fe2O3
Hercynite	-13.37	10.46	23.83	FeAl2O4
Hinsdalite	-16.86	-19.36	-2.50	PbAl3PO4SO4(OH)6
Huntite	-20.40	-50.04	-29.65	CaMg3(CO3)4
Hydrocerussite	-12.06	-30.83	-18.77	Pb3(OH)2(CO3)2
Hydromagnesite	-33.49	-41.61	-8.11	Mg5(CO3)4(OH)2:4H2O
Hydroxylapatite	-0.44	-44.77	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-9.03	-71.82	-62.79	Pb5(PO4)3OH
K-Alum	-12.25	-17.51	-5.26	KAl(SO4)2:12H2O
K-Jarosite	1.62	-12.79	-14.41	KFe3(SO4)2(OH)6
K2Cr2O7	-15.22	-32.70	-17.48	K2Cr2O7
K2CrO4	-12.10	-12.67	-0.57	K2CrO4
K2MoO4	-14.23	-10.96	3.27	K2MoO4
K2SeO4	-11.19	-11.92	-0.73	K2SeO4
Langite	-2.56	15.42	17.98	Cu4(OH)6SO4:H2O
Larnakite	-5.49	-5.86	-0.37	PbO:PbSO4
Laurionite	-4.41	-3.79	0.62	PbOHCl
Lepidocrocite	2.59	3.96	1.37	FeOOH
Lime	-23.71	9.57	33.28	CaO
Litharge	-8.73	4.16	12.89	PbO
Mackinawite	-148.88	-152.48	-3.60	FeS
Maghemite	1.54	7.93	6.39	Fe2O3
Magnesioferrite	-0.76	16.94	17.69	Fe2MgO4
Magnesite	-5.13	-12.65	-7.52	MgCO3
Magnetite	0.00	4.03	4.03	Fe3O4
Malachite	-1.32	-6.85	-5.53	Cu2(OH)2CO3
Manganite	-2.61	22.73	25.34	MnOOH
Massicot	-8.93	4.16	13.09	PbO
Melanothallite	-14.95	-8.51	6.45	CuCl2
Melanterite	-15.82	-18.09	-2.27	FeSO4:7H2O
Mg(OH)2(active)	-9.79	9.01	18.79	Mg(OH)2
Mg3(PO4)2	-11.46	-34.74	-23.28	Mg3(PO4)2

MgCr2O4	-38.61	-21.87	16.74	MgCr2O4
MgCrO4	-16.67	-11.03	5.65	MgCrO4
MgHPO4:3H2O	-3.70	-21.87	-18.18	MgHPO4:3H2O
MgMoO4	-7.47	-9.32	-1.85	MgMoO4
MgSeO3:6H2O	-18.47	-15.43	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-9.08	-10.28	-1.20	MgSeO4:6H2O
Minium	-20.24	54.55	74.78	Pb3O4
Mirabilite	-4.71	-6.06	-1.35	Na2SO4:10H2O
Mn2(SO4)3	-43.21	-48.43	-5.22	Mn2(SO4)3
Mn3(AsO4)2:8H2O	-30.58	-18.08	12.50	Mn3(AsO4)2:8H2O
Mn3(PO4)2	-32.79	-56.65	-23.85	Mn3(PO4)2
MnCl2:4H2O	-16.95	-14.21	2.75	MnCl2:4H2O
MnHPO4	-3.78	-29.18	-25.40	MnHPO4
MnS(grn)	-147.14	-146.88	0.27	MnS
MnS(pnk)	-150.22	-146.88	3.34	MnS
MnSe	-107.84	-104.04	3.79	MnSe
MnSeO3	-23.86	-22.73	1.13	MnSeO3
MnSeO3:2H2O	-23.68	-22.73	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-15.53	-17.58	-2.05	MnSeO4:5H2O
MnSO4	-15.26	-12.48	2.78	MnSO4
Monteponite	-12.33	3.09	15.41	CdO
MoO3	-10.33	-18.33	-8.00	MoO3
Morenosite	-5.66	-7.84	-2.18	NiSO4:7H2O
MoS2	-286.12	-357.55	-71.42	MoS2
Na-Jarosite	-1.66	-12.41	-10.75	NaFe3(SO4)2(OH)6
Na2Cr2O7	-21.98	-31.94	-9.96	Na2Cr2O7
Na2CrO4	-14.90	-11.91	2.99	Na2CrO4
Na2Mo2O7	-11.77	-28.53	-16.76	Na2Mo2O7
Na2MoO4	-11.72	-10.20	1.52	Na2MoO4
Na2MoO4:2H2O	-11.43	-10.20	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-26.61	-16.31	10.30	Na2SeO3:5H2O
Na2SeO4	-12.43	-11.15	1.28	Na2SeO4
Nantokite	-12.05	-18.91	-6.86	CuCl
Natron	-12.03	-13.54	-1.51	Na2CO3:10H2O
Nesquehonite	-8.06	-12.65	-4.60	MgCO3:3H2O
Ni(OH)2	-6.73	6.35	13.08	Ni(OH)2
Ni3(AsO4)2:8H2O	-19.84	-4.14	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-11.40	-42.70	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-20.78	11.22	32.00	Ni4(OH)6SO4
NiCO3	-8.56	-15.31	-6.75	NiCO3
NiMoO4	-0.83	-11.98	-11.15	NiMoO4
NiS(alpha)	-136.63	-142.23	-5.60	NiS
NiS(beta)	-131.13	-142.23	-11.10	NiS
NiS(gamma)	-129.43	-142.23	-12.80	NiS
NiSe	-81.70	-99.40	-17.70	NiSe
NiSeO3:2H2O	-20.99	-18.08	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-11.41	-12.93	-1.52	NiSeO4:6H2O
Nsutite	0.59	18.09	17.50	MnO2
O2(g)	-0.68	84.12	84.80	O2
Orpiment	-452.39	-514.50	-62.11	As2S3
Otavite	-6.57	-18.57	-12.00	CdCO3
Pb(BO2)2	-12.45	-5.89	6.57	Pb(BO2)2
Pb(OH)2	-4.16	4.16	8.32	Pb(OH)2
Pb10(OH)6O(CO3)6	-79.57	-88.33	-8.76	Pb10(OH)6O(CO3)6
Pb2(OH)3Cl	-8.42	0.37	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-17.86	8.32	26.19	Pb2O(OH)2
Pb2O3	-10.66	50.38	61.04	Pb2O3
Pb2OCO3	-12.90	-13.33	-0.44	Pb2OCO3
Pb3(AsO4)2	-16.50	-10.70	5.80	Pb3(AsO4)2
Pb3(PO4)2	-5.74	-49.27	-43.53	Pb3(PO4)2
Pb3O2CO3	-20.52	-9.17	11.35	Pb3O2CO3
Pb3O2SO4	-12.62	-1.70	10.92	Pb3O2SO4
Pb4(OH)6SO4	-18.64	2.46	21.10	Pb4(OH)6SO4
Pb4O3SO4	-19.82	2.47	22.28	Pb4O3SO4
PbCrO4	-3.14	-15.87	-12.73	PbCrO4
PbHPO4	-2.91	-26.72	-23.81	PbHPO4
Pbmetal	-42.14	-37.90	4.24	Pb
PbMoO4	1.61	-14.17	-15.78	PbMoO4

PbO:0.3H2O	-8.82	4.16	12.98	PbO:0.33H2O
PbSeO4	-8.23	-15.12	-6.88	PbSeO4
Periclase	-13.03	9.01	22.04	MgO
Phosgenite	-9.43	-29.24	-19.81	PbCl2:PbCO3
Plattnerite	-4.26	46.22	50.49	PbO2
Plumbgummite	-3.26	-36.05	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-13.62	9.57	23.19	Ca(OH)2
Pyrite	-240.35	-259.01	-18.66	FeS2
Pyrochroite	-13.78	1.70	15.48	Mn(OH)2
Pyrolusite	1.57	43.76	42.19	MnO2
Pyromorphite	4.65	-79.78	-84.43	Pb5(PO4)3Cl
Realgar	-183.86	-203.99	-20.13	AsS
Retgersite	-5.78	-7.84	-2.05	NiSO4:6H2O
Rhodochrosite	-9.38	-19.95	-10.57	MnCO3
Semetal(am)	-56.55	-63.69	-7.14	Se
Semetal(hex)	-55.93	-63.69	-7.76	Se
SeO2	-24.55	-24.43	0.12	SeO2
SeO3	-40.76	-19.28	21.48	SeO3
Siderite	-15.37	-25.56	-10.19	FeCO3
Smithsonite	-5.45	-15.40	-9.95	ZnCO3
Sphalerite	-130.78	-142.32	-11.54	ZnS
Spinel	-14.64	23.37	38.01	MgAl2O4
Strengite	-0.54	-26.92	-26.37	FePO4:2H2O
Sulfur	-104.42	-106.52	-2.10	S
Tenorite	-0.44	7.40	7.84	CuO
Thenardite	-6.41	-6.06	0.35	Na2SO4
Thermonatrite	-14.20	-13.53	0.67	Na2CO3:H2O
Tsumebite	-5.36	-15.15	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	-37.48	-73.48	-36.00	Fe3(PO4)2:8H2O
Witherite	-8.00	-16.58	-8.58	BaCO3
Wurtzite	-133.31	-142.32	-9.01	ZnS
Zincite	-5.34	6.26	11.60	ZnO
Zincosite	-12.10	-7.92	4.18	ZnSO4
Zn(BO2)2	-12.08	-3.79	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-15.47	-12.23	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-5.94	6.26	12.20	Zn(OH)2
Zn(OH)2(am)	-6.46	6.26	12.71	Zn(OH)2
Zn(OH)2(beta)	-5.74	6.26	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-5.52	6.26	11.78	Zn(OH)2
Zn(OH)2(gamma)	-5.47	6.26	11.73	Zn(OH)2
Zn2(OH)2SO4	-9.16	-1.66	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-10.63	4.57	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-18.06	-4.41	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-7.56	-42.98	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-29.27	-9.59	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-17.55	10.85	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-23.11	15.39	38.50	Zn5(OH)8Cl2
ZnCl2	-16.91	-9.65	7.27	ZnCl2
ZnCO3:1H2O	-5.14	-15.40	-10.26	ZnCO3:1H2O
Znmetal	-62.05	-35.80	26.25	Zn
ZnMoO4	-1.98	-12.07	-10.09	ZnMoO4
ZnO(active)	-5.19	6.26	11.45	ZnO
ZnS(am)	-133.22	-142.32	-9.10	ZnS
ZnSe	-85.01	-99.49	-14.48	ZnSe
ZnSeO4:6H2O	-11.50	-13.02	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.42	-7.92	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 11.

```

USE solution 1
EQUILIBRIUM_PHASES 8
  Birnessite 0 0
  Diaspore 0 0
  Fix_pH -6.25 Portlandite 10
  Magnetite 0 0
  O2(g) -0.68 10
  CO2(g) -3.5 10
END

```

Beginning of batch-reaction calculations.

Reaction step 1.

Using solution 1.
Using pure phase assemblage 8.

-----User print-----

```

Moles of Portlandite: -1.4150e-03
Moles of Diaspore: -1.4150e-03
Moles of Magnetite: -1.4150e-03
Moles of Birnessite: -1.4150e-03
mg of Portlandite: -1.0484e+02
mg of Diaspore: -8.4884e+01
mg of Birnessite: -1.2301e+02

```

-----Phase assemblage-----

Phase	SI	log IAP	log K(T, P)	Moles in assemblage		
				Initial	Final	Delta
Birnessite	0.00	18.09	18.09	0.000e+00	9.539e-05	9.539e-05
CO2(g)	-3.50	-21.66	-18.16	1.000e+01	1.000e+01	-2.474e-05
Diaspore	0.00	7.18	7.18	0.000e+00	5.284e-05	5.284e-05
Fix_pH	-6.25	-6.25	0.00			
Ca(OH)2		is reactant		1.000e+01	9.999e+00	-1.415e-03
Magnetite	-0.00	4.03	4.03	0.000e+00	1.478e-04	1.478e-04
O2(g)	-0.68	84.12	84.80	1.000e+01	9.998e+00	-2.051e-03

-----Solution composition-----

Elements	Molality	Moles
Al	1.559e-09	1.559e-09
As	2.680e-08	2.680e-08
B	9.287e-06	9.287e-06
Ba	2.924e-07	2.924e-07
Be	2.228e-07	2.228e-07
C	2.473e-05	2.474e-05
Ca	1.449e-02	1.449e-02
Cd	7.145e-09	7.145e-09
Cl	1.388e-02	1.388e-02
Co	1.227e-05	1.227e-05
Cr	6.372e-08	6.372e-08
Cu	9.874e-05	9.874e-05
Fe	1.648e-07	1.648e-07
K	6.291e-03	6.291e-03
Mg	3.635e-03	3.635e-03
Mn	7.432e-11	7.433e-11
Mo	1.151e-06	1.151e-06
N	7.218e-04	7.218e-04
Na	1.498e-02	1.498e-02
Ni	8.382e-06	8.382e-06
P	9.399e-06	9.400e-06
Pb	9.690e-08	9.691e-08
S	2.322e-02	2.322e-02

Se	1.271e-07	1.271e-07
Zn	7.523e-06	7.523e-06

-----Description of solution-----

pH	=	6.250	Charge balance
pe	=	14.780	Adjusted to redox equilibrium
Activity of water	=	0.999	
Ionic strength (mol/kgw)	=	7.312e-02	
Mass of water (kg)	=	1.000e+00	
Total alkalinity (eq/kg)	=	1.584e-05	
Total CO2 (mol/kg)	=	2.473e-05	
Temperature (°C)	=	20.00	
Electrical balance (eq)	=	-3.291e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-3.61	
Iterations	=	27	
Total H	=	1.110196e+02	
Total O	=	5.560588e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	7.024e-07	5.623e-07	-6.153	-6.250	-0.097	0.00
OH-	1.549e-08	1.218e-08	-7.810	-7.914	-0.104	(0)
H2O	5.551e+01	9.988e-01	1.744	-0.001	0.000	18.05
Al	1.559e-09					
Al (OH) 2+	8.500e-10	6.869e-10	-9.071	-9.163	-0.092	(0)
Al (OH) 3	2.451e-10	2.451e-10	-9.611	-9.611	0.000	(0)
Al (OH) 4-	2.099e-10	1.676e-10	-9.678	-9.776	-0.098	(0)
AlSO4+	1.416e-10	1.131e-10	-9.849	-9.947	-0.098	(0)
AlOH+2	8.158e-11	3.480e-11	-10.088	-10.458	-0.370	(0)
Al+3	2.000e-11	2.704e-12	-10.699	-11.568	-0.869	(0)
Al (SO4) 2-	1.108e-11	8.844e-12	-10.956	-11.053	-0.098	(0)
AlMo6O21-3	1.555e-31	9.140e-33	-30.808	-32.039	-1.231	(0)
As (3)	2.002e-35					
H3AsO3	2.000e-35	2.000e-35	-34.699	-34.699	0.000	(0)
H2AsO3-	2.070e-38	1.511e-38	-37.684	-37.821	-0.137	(0)
H4AsO3+	0.000e+00	0.000e+00	-41.117	-41.254	-0.137	(0)
HAsO3-2	0.000e+00	0.000e+00	-43.159	-43.706	-0.547	(0)
AsO3-3	0.000e+00	0.000e+00	-49.715	-50.946	-1.231	(0)
As (5)	2.680e-08					
H2AsO4-	1.797e-08	1.312e-08	-7.745	-7.882	-0.137	(0)
HAsO4-2	8.828e-09	2.505e-09	-8.054	-8.601	-0.547	(0)
H3AsO4	1.200e-12	1.221e-12	-11.921	-11.913	0.007	(0)
AsO4-3	2.132e-13	1.253e-14	-12.671	-13.902	-1.231	(0)
B	9.287e-06					
H3BO3	9.272e-06	9.430e-06	-5.033	-5.025	0.007	(0)
H2BO3-	1.152e-08	8.906e-09	-7.938	-8.050	-0.112	(0)
CaH2BO3+	2.421e-09	1.871e-09	-8.616	-8.728	-0.112	(0)
MgH2BO3+	4.061e-10	3.138e-10	-9.391	-9.503	-0.112	(0)
NaH2BO3	1.789e-10	1.789e-10	-9.747	-9.747	0.000	(0)
H5 (BO3) 2-	9.547e-14	7.378e-14	-13.020	-13.132	-0.112	(0)
BaH2BO3+	4.156e-14	3.212e-14	-13.381	-13.493	-0.112	(0)
H8 (BO3) 3-	7.792e-17	6.021e-17	-16.108	-16.220	-0.112	(0)
Ba	2.924e-07					
Ba+2	2.919e-07	1.199e-07	-6.535	-6.921	-0.386	(0)
BaNO3+	5.135e-10	3.748e-10	-9.289	-9.426	-0.137	(0)
BaHCO3+	1.088e-11	8.857e-12	-10.963	-11.053	-0.089	(0)
BaH2BO3+	4.156e-14	3.212e-14	-13.381	-13.493	-0.112	(0)
BaCO3	3.815e-14	3.815e-14	-13.418	-13.418	0.000	(0)
BaOH+	7.666e-15	6.163e-15	-14.115	-14.210	-0.095	(0)
BaNH3+2	0.000e+00	0.000e+00	-72.132	-72.679	-0.547	(0)
Be	2.228e-07					
BeOH+	1.598e-07	1.309e-07	-6.796	-6.883	-0.087	(0)
Be+2	4.473e-08	1.838e-08	-7.349	-7.736	-0.386	(0)
BeSO4	1.524e-08	1.524e-08	-7.817	-7.817	0.000	(0)

Be (OH) 2	1.477e-09	1.477e-09	-8.831	-8.831	0.000	(0)
Be (SO4) 2-2	1.091e-09	3.095e-10	-8.962	-9.509	-0.547	(0)
BeCl+	4.034e-10	3.243e-10	-9.394	-9.489	-0.095	(0)
BeCO3	2.287e-11	2.287e-11	-10.641	-10.641	0.000	(0)
Be2OH+3	2.411e-12	3.993e-13	-11.618	-12.399	-0.781	(0)
Be (OH) 3-	8.102e-13	6.635e-13	-12.091	-12.178	-0.087	(0)
Be3 (OH) 3+3	3.273e-13	5.420e-14	-12.485	-13.266	-0.781	(0)
Be (OH) 4-2	1.665e-20	7.487e-21	-19.779	-20.126	-0.347	(0)
C (4)	2.473e-05					
H2CO3	1.237e-05	1.237e-05	-4.908	-4.908	0.000	(0)
HCO3-	1.136e-05	9.183e-06	-4.945	-5.037	-0.092	(0)
CaHCO3+	6.867e-07	5.591e-07	-6.163	-6.252	-0.089	(0)
MgHCO3+	1.172e-07	9.291e-08	-6.931	-7.032	-0.101	(0)
CuCO3	1.023e-07	1.023e-07	-6.990	-6.990	0.000	(0)
NaHCO3	6.579e-08	6.579e-08	-7.182	-7.182	0.000	(0)
CuHCO3+	1.801e-08	1.315e-08	-7.744	-7.881	-0.137	(0)
CaCO3	3.688e-09	3.688e-09	-8.433	-8.433	0.000	(0)
NiHCO3+	3.153e-09	2.301e-09	-8.501	-8.638	-0.137	(0)
CoHCO3+	2.249e-09	1.641e-09	-8.648	-8.785	-0.137	(0)
CO3-2	1.685e-09	6.924e-10	-8.773	-9.160	-0.386	(0)
ZnHCO3+	6.557e-10	4.785e-10	-9.183	-9.320	-0.137	(0)
MgCO3	5.389e-10	5.389e-10	-9.268	-9.268	0.000	(0)
NaCO3-	2.127e-10	1.719e-10	-9.672	-9.765	-0.092	(0)
PbHCO3+	1.225e-10	8.942e-11	-9.912	-10.049	-0.137	(0)
ZnCO3	7.260e-11	7.260e-11	-10.139	-10.139	0.000	(0)
NiCO3	5.806e-11	5.806e-11	-10.236	-10.236	0.000	(0)
PbCO3	3.016e-11	3.016e-11	-10.521	-10.521	0.000	(0)
CoCO3	2.973e-11	2.973e-11	-10.527	-10.527	0.000	(0)
BeCO3	2.287e-11	2.287e-11	-10.641	-10.641	0.000	(0)
BaHCO3+	1.088e-11	8.857e-12	-10.963	-11.053	-0.089	(0)
Cu (CO3) 2-2	6.717e-13	1.906e-13	-12.173	-12.720	-0.547	(0)
BaCO3	3.815e-14	3.815e-14	-13.418	-13.418	0.000	(0)
CdHCO3+	3.165e-14	2.310e-14	-13.500	-13.636	-0.137	(0)
CdCO3	1.928e-14	1.928e-14	-13.715	-13.715	0.000	(0)
MnHCO3+	3.553e-15	2.857e-15	-14.449	-14.544	-0.095	(0)
Pb (CO3) 2-2	2.122e-16	6.022e-17	-15.673	-16.220	-0.547	(0)
Cd (CO3) 2-2	3.488e-20	9.897e-21	-19.457	-20.004	-0.547	(0)
FeHCO3+	5.065e-21	4.124e-21	-20.295	-20.385	-0.089	(0)
Ca	1.449e-02					
Ca+2	9.131e-03	3.752e-03	-2.039	-2.426	-0.386	(0)
CaSO4	5.348e-03	5.348e-03	-2.272	-2.272	0.000	(0)
CaNO3+	9.619e-06	7.021e-06	-5.017	-5.154	-0.137	(0)
CaHPO4	8.559e-07	8.559e-07	-6.068	-6.068	0.000	(0)
CaHCO3+	6.867e-07	5.591e-07	-6.163	-6.252	-0.089	(0)
CaH2PO4+	4.698e-07	3.797e-07	-6.328	-6.421	-0.092	(0)
CaPO4-	4.490e-09	3.629e-09	-8.348	-8.440	-0.092	(0)
CaCO3	3.688e-09	3.688e-09	-8.433	-8.433	0.000	(0)
CaH2BO3+	2.421e-09	1.871e-09	-8.616	-8.728	-0.112	(0)
CaOH+	1.058e-09	8.614e-10	-8.976	-9.065	-0.089	(0)
CaNH3+2	0.000e+00	0.000e+00	-67.337	-67.884	-0.547	(0)
Ca (NH3) 2+2	0.000e+00	0.000e+00	-133.295	-133.842	-0.547	(0)
Cd	7.145e-09					
Cd+2	2.973e-09	1.222e-09	-8.527	-8.913	-0.386	(0)
CdCl+	1.764e-09	1.287e-09	-8.754	-8.890	-0.137	(0)
CdSO4	1.763e-09	1.763e-09	-8.754	-8.754	0.000	(0)
Cd (SO4) 2-2	5.812e-10	1.649e-10	-9.236	-9.783	-0.547	(0)
CdCl2	5.880e-11	5.880e-11	-10.231	-10.231	0.000	(0)
CdNO3+	3.487e-12	2.545e-12	-11.458	-11.594	-0.137	(0)
CdOHCl	8.389e-13	8.389e-13	-12.076	-12.076	0.000	(0)
CdCl3-	5.381e-13	3.928e-13	-12.269	-12.406	-0.137	(0)
CdOH+	1.631e-13	1.190e-13	-12.788	-12.924	-0.137	(0)
CdHCO3+	3.165e-14	2.310e-14	-13.500	-13.636	-0.137	(0)
CdCO3	1.928e-14	1.928e-14	-13.715	-13.715	0.000	(0)
CdSeO4	1.188e-14	1.188e-14	-13.925	-13.925	0.000	(0)
Cd (NO3) 2	6.294e-16	6.294e-16	-15.201	-15.201	0.000	(0)
Cd (OH) 2	1.959e-17	1.959e-17	-16.708	-16.708	0.000	(0)
Cd (CO3) 2-2	3.488e-20	9.897e-21	-19.457	-20.004	-0.547	(0)
Cd2OH+3	1.320e-20	7.756e-22	-19.880	-21.110	-1.231	(0)

	Cd(OH) 3-	2.932e-23	2.140e-23	-22.533	-22.670	-0.137	(0)
	Cd(OH) 4-2	2.208e-31	6.265e-32	-30.656	-31.203	-0.547	(0)
	Cd(SeO3) 2-2	0.000e+00	0.000e+00	-44.114	-44.661	-0.547	(0)
	CdHS+	0.000e+00	0.000e+00	-143.598	-143.735	-0.137	(0)
	Cd(HS) 2	0.000e+00	0.000e+00	-279.361	-279.361	0.000	(0)
	Cd(HS) 3-	0.000e+00	0.000e+00	-420.155	-420.292	-0.137	(0)
	Cd(HS) 4-2	0.000e+00	0.000e+00	-560.379	-560.926	-0.547	(0)
Cl	1.388e-02						
	Cl-	1.387e-02	1.111e-02	-1.858	-1.954	-0.097	(0)
	CuCl+	5.264e-07	4.172e-07	-6.279	-6.380	-0.101	(0)
	CoCl+	1.319e-07	9.629e-08	-6.880	-7.016	-0.137	(0)
	NiCl+	8.633e-08	6.301e-08	-7.064	-7.201	-0.137	(0)
	ZnCl+	6.181e-08	4.899e-08	-7.209	-7.310	-0.101	(0)
	PbCl+	7.371e-09	5.380e-09	-8.132	-8.269	-0.137	(0)
	CdCl+	1.764e-09	1.287e-09	-8.754	-8.890	-0.137	(0)
	CuCl2	1.255e-09	1.255e-09	-8.901	-8.901	0.000	(0)
	ZnOHC1	1.190e-09	1.190e-09	-8.924	-8.924	0.000	(0)
	ZnCl2	6.940e-10	6.940e-10	-9.159	-9.159	0.000	(0)
	BeCl+	4.034e-10	3.243e-10	-9.394	-9.489	-0.095	(0)
	PbCl2	2.609e-10	2.609e-10	-9.583	-9.583	0.000	(0)
	CdCl2	5.880e-11	5.880e-11	-10.231	-10.231	0.000	(0)
	ZnCl3-	7.569e-12	5.999e-12	-11.121	-11.222	-0.101	(0)
	NiCl2	3.573e-12	3.573e-12	-11.447	-11.447	0.000	(0)
	PbCl3-	1.671e-12	1.219e-12	-11.777	-11.914	-0.137	(0)
	CdOHC1	8.389e-13	8.389e-13	-12.076	-12.076	0.000	(0)
	CdCl3-	5.381e-13	3.928e-13	-12.269	-12.406	-0.137	(0)
	MnCl+	2.788e-13	2.241e-13	-12.555	-12.649	-0.095	(0)
	CuCl3-	1.501e-13	1.189e-13	-12.824	-12.925	-0.101	(0)
	ZnCl4-2	7.661e-14	3.200e-14	-13.116	-13.495	-0.379	(0)
	PbCl4-2	2.026e-14	5.749e-15	-13.693	-14.240	-0.547	(0)
	MnCl2	3.517e-15	3.517e-15	-14.454	-14.454	0.000	(0)
	CrO3Cl-	1.251e-15	9.128e-16	-14.903	-15.040	-0.137	(0)
	FeCl+2	1.127e-15	4.709e-16	-14.948	-15.327	-0.379	(0)
	CuCl2-	8.067e-16	6.394e-16	-15.093	-15.194	-0.101	(0)
	CuCl	2.722e-16	2.722e-16	-15.565	-15.565	0.000	(0)
	FeCl2+	3.405e-17	2.737e-17	-16.468	-16.563	-0.095	(0)
	CuCl4-2	1.879e-17	7.850e-18	-16.726	-17.105	-0.379	(0)
	MnCl3-	1.339e-17	1.076e-17	-16.873	-16.968	-0.095	(0)
	CuCl3-2	3.565e-18	1.489e-18	-17.448	-17.827	-0.379	(0)
	FeCl3	3.041e-20	3.041e-20	-19.517	-19.517	0.000	(0)
	CoCl+2	4.344e-23	1.233e-23	-22.362	-22.909	-0.547	(0)
	CrCl+2	1.086e-26	3.080e-27	-25.964	-26.511	-0.547	(0)
	CrOHC12	5.702e-30	5.702e-30	-29.244	-29.244	0.000	(0)
	CrCl2+	2.856e-30	2.085e-30	-29.544	-29.681	-0.137	(0)
	Co(NH3) 5Cl+2	0.000e+00	0.000e+00	-324.490	-325.037	-0.547	(0)
	Co(NH3) 6Cl+2	0.000e+00	0.000e+00	-396.737	-397.284	-0.547	(0)
	Cr(NH3) 6Cl+2	0.000e+00	0.000e+00	-405.632	-406.179	-0.547	(0)
Co(2)	1.227e-05						
	Co+2	8.952e-06	2.540e-06	-5.048	-5.595	-0.547	(0)
	CoSO4	3.173e-06	3.173e-06	-5.499	-5.499	0.000	(0)
	CoCl+	1.319e-07	9.629e-08	-6.880	-7.016	-0.137	(0)
	CoNO3+	3.145e-09	2.295e-09	-8.502	-8.639	-0.137	(0)
	CoHCO3+	2.249e-09	1.641e-09	-8.648	-8.785	-0.137	(0)
	CoHPO4	1.355e-09	1.355e-09	-8.868	-8.868	0.000	(0)
	CoOH+	1.242e-09	9.065e-10	-8.906	-9.043	-0.137	(0)
	CoSeO4	6.119e-11	6.119e-11	-10.213	-10.213	0.000	(0)
	CoCO3	2.973e-11	2.973e-11	-10.527	-10.527	0.000	(0)
	Co(NO3) 2	2.663e-12	2.663e-12	-11.575	-11.575	0.000	(0)
	Co(OH) 2	1.288e-12	1.288e-12	-11.890	-11.890	0.000	(0)
	Co2OH+3	1.964e-15	1.154e-16	-14.707	-15.938	-1.231	(0)
	Co(OH) 3-	6.296e-19	4.595e-19	-18.201	-18.338	-0.137	(0)
	CoOOH-	2.636e-20	1.924e-20	-19.579	-19.716	-0.137	(0)
	CoNO2+	1.599e-21	1.167e-21	-20.796	-20.933	-0.137	(0)
	Co4(OH) 4+4	2.078e-26	1.347e-28	-25.682	-27.871	-2.188	(0)
	Co(OH) 4-2	4.590e-27	1.303e-27	-26.338	-26.885	-0.547	(0)
	Co(NH3) +2	0.000e+00	0.000e+00	-68.332	-68.879	-0.547	(0)
	Co(NH3) 2+2	0.000e+00	0.000e+00	-132.454	-133.001	-0.547	(0)
	Co(NH3) 3+2	0.000e+00	0.000e+00	-196.912	-197.459	-0.547	(0)

Co (NH3) 4+2	0.000e+00	0.000e+00	-261.750	-262.297	-0.547	(0)
Co (NH3) 5+2	0.000e+00	0.000e+00	-327.088	-327.635	-0.547	(0)
Co (3)	1.950e-18					
CoOH+2	1.950e-18	5.534e-19	-17.710	-18.257	-0.547	(0)
Co+3	4.503e-23	6.089e-24	-22.346	-23.215	-0.869	(0)
CoCl+2	4.344e-23	1.233e-23	-22.362	-22.909	-0.547	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-324.490	-325.037	-0.547	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-392.513	-392.649	-0.137	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-396.737	-397.284	-0.547	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-398.018	-398.565	-0.547	(0)
Cr (2)	0.000e+00					
Cr+2	0.000e+00	0.000e+00	-45.852	-46.399	-0.547	(0)
Cr (3)	4.431e-22					
Cr (OH) +2	2.475e-22	7.024e-23	-21.606	-22.153	-0.547	(0)
Cr (OH) 2+	1.225e-22	8.943e-23	-21.912	-22.049	-0.137	(0)
CrOHSO4	6.371e-23	6.371e-23	-22.196	-22.196	0.000	(0)
Cr+3	4.359e-24	2.562e-25	-23.361	-24.591	-1.231	(0)
CrSO4+	4.327e-24	3.158e-24	-23.364	-23.501	-0.137	(0)
Cr (OH) 3	6.009e-25	6.009e-25	-24.221	-24.221	0.000	(0)
CrCl+2	1.086e-26	3.080e-27	-25.964	-26.511	-0.547	(0)
CrH2PO4+2	9.344e-28	2.652e-28	-27.029	-27.576	-0.547	(0)
CrO2-	6.961e-28	5.080e-28	-27.157	-27.294	-0.137	(0)
Cr (OH) 4-	5.861e-28	4.278e-28	-27.232	-27.369	-0.137	(0)
CrNO3+2	1.447e-29	4.106e-30	-28.840	-29.387	-0.547	(0)
CrOHC12	5.702e-30	5.702e-30	-29.244	-29.244	0.000	(0)
CrCl2+	2.856e-30	2.085e-30	-29.544	-29.681	-0.137	(0)
Cr2 (OH) 2SO4+2	0.000e+00	0.000e+00	-42.079	-42.626	-0.547	(0)
Cr2 (OH) 2 (SO4) 2	0.000e+00	0.000e+00	-43.037	-43.037	0.000	(0)
Cr (NH3) 5OH+2	0.000e+00	0.000e+00	-339.597	-340.144	-0.547	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-404.096	-405.327	-1.231	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-405.632	-406.179	-0.547	(0)
Cr (6)	6.372e-08					
HCrO4-	3.136e-08	2.289e-08	-7.504	-7.640	-0.137	(0)
CrO4-2	3.103e-08	1.275e-08	-7.508	-7.894	-0.386	(0)
NaCrO4-	1.007e-09	7.346e-10	-8.997	-9.134	-0.137	(0)
KCrO4-	3.130e-10	2.285e-10	-9.504	-9.641	-0.137	(0)
CrO3HPO4-2	1.406e-12	3.990e-13	-11.852	-12.399	-0.547	(0)
CrO3SO4-2	9.162e-14	2.600e-14	-13.038	-13.585	-0.547	(0)
Cr2O7-2	7.304e-14	2.073e-14	-13.136	-13.683	-0.547	(0)
H2CrO4	8.089e-15	8.089e-15	-14.092	-14.092	0.000	(0)
CrO3Cl-	1.251e-15	9.128e-16	-14.903	-15.040	-0.137	(0)
CrO3H2PO4-	1.481e-16	1.081e-16	-15.830	-15.966	-0.137	(0)
Cu (1)	1.109e-15					
CuCl2-	8.067e-16	6.394e-16	-15.093	-15.194	-0.101	(0)
CuCl	2.722e-16	2.722e-16	-15.565	-15.565	0.000	(0)
Cu+	2.667e-17	1.946e-17	-16.574	-16.711	-0.137	(0)
CuCl3-2	3.565e-18	1.489e-18	-17.448	-17.827	-0.379	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-286.076	-286.481	-0.405	(0)
CuS4S5-3	0.000e+00	0.000e+00	-286.828	-287.211	-0.383	(0)
Cu (2)	9.874e-05					
Cu+2	6.105e-05	2.509e-05	-4.214	-4.601	-0.386	(0)
CuSO4	3.537e-05	3.537e-05	-4.451	-4.451	0.000	(0)
CuOH+	1.399e-06	1.109e-06	-5.854	-5.955	-0.101	(0)
CuCl+	5.264e-07	4.172e-07	-6.279	-6.380	-0.101	(0)
Cu2 (OH) 2+2	1.052e-07	2.985e-08	-6.978	-7.525	-0.547	(0)
CuCO3	1.023e-07	1.023e-07	-6.990	-6.990	0.000	(0)
CuNO3+	6.374e-08	4.652e-08	-7.196	-7.332	-0.137	(0)
CuHCO3+	1.801e-08	1.315e-08	-7.744	-7.881	-0.137	(0)
Cu (OH) 2	5.063e-09	5.063e-09	-8.296	-8.296	0.000	(0)
CuCl2	1.255e-09	1.255e-09	-8.901	-8.901	0.000	(0)
Cu (NO3) 2	3.246e-12	3.246e-12	-11.489	-11.489	0.000	(0)
Cu (CO3) 2-2	6.717e-13	1.906e-13	-12.173	-12.720	-0.547	(0)
Cu (OH) 3-	2.545e-13	1.857e-13	-12.594	-12.731	-0.137	(0)
CuCl3-	1.501e-13	1.189e-13	-12.824	-12.925	-0.101	(0)
CuCl4-2	1.879e-17	7.850e-18	-16.726	-17.105	-0.379	(0)
CuNO2+	2.347e-19	1.713e-19	-18.630	-18.766	-0.137	(0)
Cu (OH) 4-2	9.213e-20	2.614e-20	-19.036	-19.583	-0.547	(0)
Cu (NO2) 2	1.143e-34	1.143e-34	-33.942	-33.942	0.000	(0)

CuNH3+2	0.000e+00	0.000e+00	-65.386	-65.933	-0.547	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-407.055	-407.192	-0.137	(0)
Fe (2)	1.991e-16					
Fe+2	1.390e-16	3.944e-17	-15.857	-16.404	-0.547	(0)
FeSO4	5.987e-17	5.987e-17	-16.223	-16.223	0.000	(0)
FeH2PO4+	1.061e-19	8.573e-20	-18.974	-19.067	-0.092	(0)
FeHPO4	7.676e-20	7.676e-20	-19.115	-19.115	0.000	(0)
FeOH+	2.379e-20	1.913e-20	-19.624	-19.718	-0.095	(0)
FeHCO3+	5.065e-21	4.124e-21	-20.295	-20.385	-0.089	(0)
Fe (OH) 2	1.752e-25	1.752e-25	-24.757	-24.757	0.000	(0)
Fe (OH) 3-	1.176e-27	9.454e-28	-26.930	-27.024	-0.095	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-293.115	-293.115	0.000	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-433.771	-433.908	-0.137	(0)
Fe (3)	1.648e-07					
Fe (OH) 2+	1.635e-07	1.321e-07	-6.787	-6.879	-0.092	(0)
Fe (OH) 3	1.242e-09	1.242e-09	-8.906	-8.906	0.000	(0)
FeOH+2	3.409e-11	1.424e-11	-10.467	-10.846	-0.379	(0)
FeHPO4+	1.014e-11	8.193e-12	-10.994	-11.087	-0.092	(0)
Fe (OH) 4-	5.229e-12	4.226e-12	-11.282	-11.374	-0.092	(0)
FeSO4+	1.262e-13	1.015e-13	-12.899	-12.994	-0.095	(0)
Fe (SO4) 2-	2.021e-14	1.475e-14	-13.694	-13.831	-0.137	(0)
Fe+3	1.216e-14	1.644e-15	-13.915	-14.784	-0.869	(0)
FeCl+2	1.127e-15	4.709e-16	-14.948	-15.327	-0.379	(0)
FeH2PO4+2	3.175e-16	1.354e-16	-15.498	-15.868	-0.370	(0)
FeNO3+2	4.261e-17	1.209e-17	-16.370	-16.917	-0.547	(0)
FeCl2+	3.405e-17	2.737e-17	-16.468	-16.563	-0.095	(0)
Fe2 (OH) 2+4	1.238e-18	8.032e-21	-17.907	-20.095	-2.188	(0)
FeCl3	3.041e-20	3.041e-20	-19.517	-19.517	0.000	(0)
Fe3 (OH) 4+5	3.818e-23	1.455e-26	-22.418	-25.837	-3.419	(0)
FeHSeO3+2	2.682e-30	7.610e-31	-29.572	-30.119	-0.547	(0)
H (0)	0.000e+00					
H2	0.000e+00	0.000e+00	-45.195	-45.187	0.007	(0)
K	6.291e-03					
K+	6.023e-03	4.822e-03	-2.220	-2.317	-0.097	(0)
KSO4-	2.683e-04	2.168e-04	-3.571	-3.664	-0.092	(0)
KHPO4-	2.213e-08	1.788e-08	-7.655	-7.748	-0.092	(0)
KCrO4-	3.130e-10	2.285e-10	-9.504	-9.641	-0.137	(0)
Mg	3.635e-03					
Mg+2	2.473e-03	1.016e-03	-2.607	-2.993	-0.386	(0)
MgSO4	1.161e-03	1.161e-03	-2.935	-2.935	0.000	(0)
MgHPO4	3.200e-07	3.200e-07	-6.495	-6.495	0.000	(0)
MgH2PO4+	2.715e-07	2.194e-07	-6.566	-6.659	-0.092	(0)
MgHCO3+	1.172e-07	9.291e-08	-6.931	-7.032	-0.101	(0)
MgOH+	5.542e-09	4.538e-09	-8.256	-8.343	-0.087	(0)
MgCO3	5.389e-10	5.389e-10	-9.268	-9.268	0.000	(0)
MgH2BO3+	4.061e-10	3.138e-10	-9.391	-9.503	-0.112	(0)
MgPO4-	1.901e-11	1.536e-11	-10.721	-10.814	-0.092	(0)
Mn (2)	7.432e-11					
Mn+2	5.648e-11	1.603e-11	-10.248	-10.795	-0.547	(0)
MnSO4	1.754e-11	1.754e-11	-10.756	-10.756	0.000	(0)
MnCl+	2.788e-13	2.241e-13	-12.555	-12.649	-0.095	(0)
MnNO3+	1.984e-14	1.448e-14	-13.702	-13.839	-0.137	(0)
MnHCO3+	3.553e-15	2.857e-15	-14.449	-14.544	-0.095	(0)
MnCl2	3.517e-15	3.517e-15	-14.454	-14.454	0.000	(0)
MnOH+	6.100e-16	4.904e-16	-15.215	-15.309	-0.095	(0)
MnSeO4	2.045e-16	2.045e-16	-15.689	-15.689	0.000	(0)
Mn (NO3) 2	2.098e-17	2.098e-17	-16.678	-16.678	0.000	(0)
MnCl3-	1.339e-17	1.076e-17	-16.873	-16.968	-0.095	(0)
Mn (OH) 3-	1.770e-27	1.423e-27	-26.752	-26.847	-0.095	(0)
Mn (OH) 4-2	1.967e-34	8.218e-35	-33.706	-34.085	-0.379	(0)
MnSe	0.000e+00	0.000e+00	-109.928	-109.928	0.000	(0)
Mn (3)	1.518e-21					
Mn+3	1.518e-21	2.053e-22	-20.819	-21.688	-0.869	(0)
Mn (6)	1.425e-22					
MnO4-2	1.425e-22	5.952e-23	-21.846	-22.225	-0.379	(0)
Mn (7)	9.055e-18					
MnO4-	9.055e-18	7.061e-18	-17.043	-17.151	-0.108	(0)
Mo	1.151e-06					

MoO4-2	1.145e-06	4.704e-07	-5.941	-6.328	-0.386	(0)
HMoO4-	6.285e-09	4.587e-09	-8.202	-8.338	-0.137	(0)
H2MoO4	2.593e-11	2.593e-11	-10.586	-10.586	0.000	(0)
AlMo6O21-3	1.555e-31	9.140e-33	-30.808	-32.039	-1.231	(0)
Mo7O24-6	2.014e-36	0.000e+00	-35.696	-40.619	-4.923	(0)
HMo7O24-5	8.065e-38	0.000e+00	-37.093	-40.512	-3.419	(0)
H2Mo7O24-4	1.581e-40	0.000e+00	-39.801	-41.989	-2.188	(0)
H3Mo7O24-3	0.000e+00	0.000e+00	-43.756	-44.987	-1.231	(0)
N (-3)	0.000e+00					
NH4+	0.000e+00	0.000e+00	-62.452	-62.564	-0.112	(0)
NH4SO4-	0.000e+00	0.000e+00	-63.624	-63.719	-0.095	(0)
CuNH3+2	0.000e+00	0.000e+00	-65.386	-65.933	-0.547	(0)
NH3	0.000e+00	0.000e+00	-65.713	-65.713	0.000	(0)
CaNH3+2	0.000e+00	0.000e+00	-67.337	-67.884	-0.547	(0)
NiNH3+2	0.000e+00	0.000e+00	-67.729	-68.276	-0.547	(0)
Co (NH3) +2	0.000e+00	0.000e+00	-68.332	-68.879	-0.547	(0)
BaNH3+2	0.000e+00	0.000e+00	-72.132	-72.679	-0.547	(0)
Ni (NH3) 2+2	0.000e+00	0.000e+00	-130.994	-131.541	-0.547	(0)
Co (NH3) 2+2	0.000e+00	0.000e+00	-132.454	-133.001	-0.547	(0)
Ca (NH3) 2+2	0.000e+00	0.000e+00	-133.295	-133.842	-0.547	(0)
Co (NH3) 3+2	0.000e+00	0.000e+00	-196.912	-197.459	-0.547	(0)
Co (NH3) 4+2	0.000e+00	0.000e+00	-261.750	-262.297	-0.547	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-324.490	-325.037	-0.547	(0)
Co (NH3) 5+2	0.000e+00	0.000e+00	-327.088	-327.635	-0.547	(0)
Cr (NH3) 5OH+2	0.000e+00	0.000e+00	-339.597	-340.144	-0.547	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-392.513	-392.649	-0.137	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-396.737	-397.284	-0.547	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-398.018	-398.565	-0.547	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-404.096	-405.327	-1.231	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-405.632	-406.179	-0.547	(0)
N (3)	8.386e-17					
NO2-	8.362e-17	6.521e-17	-16.078	-16.186	-0.108	(0)
CuNO2+	2.347e-19	1.713e-19	-18.630	-18.766	-0.137	(0)
CoNO2+	1.599e-21	1.167e-21	-20.796	-20.933	-0.137	(0)
Cu (NO2) 2	1.143e-34	1.143e-34	-33.942	-33.942	0.000	(0)
N (5)	7.218e-04					
NO3-	7.121e-04	5.701e-04	-3.147	-3.244	-0.097	(0)
CaNO3+	9.619e-06	7.021e-06	-5.017	-5.154	-0.137	(0)
CuNO3+	6.374e-08	4.652e-08	-7.196	-7.332	-0.137	(0)
NiNO3+	4.410e-09	3.219e-09	-8.356	-8.492	-0.137	(0)
ZnNO3+	3.690e-09	2.693e-09	-8.433	-8.570	-0.137	(0)
CoNO3+	3.145e-09	2.295e-09	-8.502	-8.639	-0.137	(0)
BaNO3+	5.135e-10	3.748e-10	-9.289	-9.426	-0.137	(0)
PbNO3+	1.651e-10	1.205e-10	-9.782	-9.919	-0.137	(0)
CdNO3+	3.487e-12	2.545e-12	-11.458	-11.594	-0.137	(0)
Cu (NO3) 2	3.246e-12	3.246e-12	-11.489	-11.489	0.000	(0)
Co (NO3) 2	2.663e-12	2.663e-12	-11.575	-11.575	0.000	(0)
Zn (NO3) 2	2.968e-13	2.968e-13	-12.527	-12.527	0.000	(0)
Pb (NO3) 2	1.238e-13	1.238e-13	-12.907	-12.907	0.000	(0)
MnNO3+	1.984e-14	1.448e-14	-13.702	-13.839	-0.137	(0)
Cd (NO3) 2	6.294e-16	6.294e-16	-15.201	-15.201	0.000	(0)
FeNO3+2	4.261e-17	1.209e-17	-16.370	-16.917	-0.547	(0)
Mn (NO3) 2	2.098e-17	2.098e-17	-16.678	-16.678	0.000	(0)
CrNO3+2	1.447e-29	4.106e-30	-28.840	-29.387	-0.547	(0)
Na	1.498e-02					
Na+	1.448e-02	1.159e-02	-1.839	-1.936	-0.097	(0)
NaSO4-	4.998e-04	4.039e-04	-3.301	-3.394	-0.092	(0)
NaHPO4-	8.239e-08	6.658e-08	-7.084	-7.177	-0.092	(0)
NaHCO3	6.579e-08	6.579e-08	-7.182	-7.182	0.000	(0)
NaCrO4-	1.007e-09	7.346e-10	-8.997	-9.134	-0.137	(0)
NaCO3-	2.127e-10	1.719e-10	-9.672	-9.765	-0.092	(0)
NaH2BO3	1.789e-10	1.789e-10	-9.747	-9.747	0.000	(0)
Ni	8.382e-06					
Ni+2	5.470e-06	2.248e-06	-5.262	-5.648	-0.386	(0)
NiSO4	2.815e-06	2.815e-06	-5.550	-5.550	0.000	(0)
NiCl+	8.633e-08	6.301e-08	-7.064	-7.201	-0.137	(0)
NiNO3+	4.410e-09	3.219e-09	-8.356	-8.492	-0.137	(0)
NiHCO3+	3.153e-09	2.301e-09	-8.501	-8.638	-0.137	(0)

Ni (SO4) 2-2	2.234e-09	6.339e-10	-8.651	-9.198	-0.547	(0)
NiOH+	4.855e-10	3.543e-10	-9.314	-9.451	-0.137	(0)
NiCO3	5.806e-11	5.806e-11	-10.236	-10.236	0.000	(0)
NiSeO4	4.984e-11	4.984e-11	-10.302	-10.302	0.000	(0)
NiCl2	3.573e-12	3.573e-12	-11.447	-11.447	0.000	(0)
Ni (OH) 2	7.189e-13	7.189e-13	-12.143	-12.143	0.000	(0)
Ni (OH) 3-	1.762e-17	1.286e-17	-16.754	-16.891	-0.137	(0)
NiNH3+2	0.000e+00	0.000e+00	-67.729	-68.276	-0.547	(0)
Ni (NH3) 2+2	0.000e+00	0.000e+00	-130.994	-131.541	-0.547	(0)
O (0)	9.507e-04					
O2	4.753e-04	4.834e-04	-3.323	-3.316	0.007	(0)
P	9.399e-06					
H2PO4-	6.074e-06	4.909e-06	-5.217	-5.309	-0.092	(0)
HPO4-2	1.297e-06	5.420e-07	-5.887	-6.266	-0.379	(0)
CaHPO4	8.559e-07	8.559e-07	-6.068	-6.068	0.000	(0)
CaH2PO4+	4.698e-07	3.797e-07	-6.328	-6.421	-0.092	(0)
MgHPO4	3.200e-07	3.200e-07	-6.495	-6.495	0.000	(0)
MgH2PO4+	2.715e-07	2.194e-07	-6.566	-6.659	-0.092	(0)
NaHPO4-	8.239e-08	6.658e-08	-7.084	-7.177	-0.092	(0)
KHPO4-	2.213e-08	1.788e-08	-7.655	-7.748	-0.092	(0)
CaPO4-	4.490e-09	3.629e-09	-8.348	-8.440	-0.092	(0)
CoHPO4	1.355e-09	1.355e-09	-8.868	-8.868	0.000	(0)
H3PO4	3.676e-10	3.676e-10	-9.435	-9.435	0.000	(0)
MgPO4-	1.901e-11	1.536e-11	-10.721	-10.814	-0.092	(0)
FeHPO4+	1.014e-11	8.193e-12	-10.994	-11.087	-0.092	(0)
PO4-3	2.711e-12	3.666e-13	-11.567	-12.436	-0.869	(0)
CrO3HPO4-2	1.406e-12	3.990e-13	-11.852	-12.399	-0.547	(0)
FeH2PO4+2	3.175e-16	1.354e-16	-15.498	-15.868	-0.370	(0)
CrO3H2PO4-	1.481e-16	1.081e-16	-15.830	-15.966	-0.137	(0)
FeH2PO4+	1.061e-19	8.573e-20	-18.974	-19.067	-0.092	(0)
FeHPO4	7.676e-20	7.676e-20	-19.115	-19.115	0.000	(0)
CrH2PO4+2	9.344e-28	2.652e-28	-27.029	-27.576	-0.547	(0)
Pb	9.690e-08					
PbSO4	4.637e-08	4.637e-08	-7.334	-7.334	0.000	(0)
Pb+2	3.526e-08	1.449e-08	-7.453	-7.839	-0.386	(0)
PbCl+	7.371e-09	5.380e-09	-8.132	-8.269	-0.137	(0)
Pb (SO4) 2-2	6.432e-09	1.825e-09	-8.192	-8.739	-0.547	(0)
PbOH+	8.919e-10	6.510e-10	-9.050	-9.186	-0.137	(0)
PbCl2	2.609e-10	2.609e-10	-9.583	-9.583	0.000	(0)
PbNO3+	1.651e-10	1.205e-10	-9.782	-9.919	-0.137	(0)
PbHCO3+	1.225e-10	8.942e-11	-9.912	-10.049	-0.137	(0)
PbCO3	3.016e-11	3.016e-11	-10.521	-10.521	0.000	(0)
PbCl3-	1.671e-12	1.219e-12	-11.777	-11.914	-0.137	(0)
Pb (OH) 2	3.682e-13	3.682e-13	-12.434	-12.434	0.000	(0)
Pb (NO3) 2	1.238e-13	1.238e-13	-12.907	-12.907	0.000	(0)
PbCl4-2	2.026e-14	5.749e-15	-13.693	-14.240	-0.547	(0)
Pb2OH+3	2.544e-15	1.495e-16	-14.595	-15.825	-1.231	(0)
Pb (CO3) 2-2	2.122e-16	6.022e-17	-15.673	-16.220	-0.547	(0)
Pb (OH) 3-	9.021e-18	6.584e-18	-17.045	-17.181	-0.137	(0)
Pb (OH) 4-2	1.016e-22	2.884e-23	-21.993	-22.540	-0.547	(0)
Pb3 (OH) 4+2	6.249e-23	1.773e-23	-22.204	-22.751	-0.547	(0)
Pb4 (OH) 4+4	3.790e-25	2.458e-27	-24.421	-26.609	-2.188	(0)
Pb (HS) 2	0.000e+00	0.000e+00	-278.229	-278.229	0.000	(0)
Pb (HS) 3-	0.000e+00	0.000e+00	-419.623	-419.760	-0.137	(0)
S (-2)	0.000e+00					
H2S	0.000e+00	0.000e+00	-141.994	-141.994	0.000	(0)
HS-	0.000e+00	0.000e+00	-142.693	-142.830	-0.137	(0)
CdHS+	0.000e+00	0.000e+00	-143.598	-143.735	-0.137	(0)
S5-2	0.000e+00	0.000e+00	-145.511	-146.058	-0.547	(0)
S6-2	0.000e+00	0.000e+00	-145.914	-146.461	-0.547	(0)
S4-2	0.000e+00	0.000e+00	-146.111	-146.658	-0.547	(0)
S3-2	0.000e+00	0.000e+00	-146.926	-147.473	-0.547	(0)
S2-2	0.000e+00	0.000e+00	-147.955	-148.502	-0.547	(0)
S-2	0.000e+00	0.000e+00	-153.649	-154.028	-0.379	(0)
ZnS (HS) -	0.000e+00	0.000e+00	-278.203	-278.340	-0.137	(0)
Pb (HS) 2	0.000e+00	0.000e+00	-278.229	-278.229	0.000	(0)
Zn (HS) 2	0.000e+00	0.000e+00	-278.580	-278.580	0.000	(0)
Cd (HS) 2	0.000e+00	0.000e+00	-279.361	-279.361	0.000	(0)

Cu (S4) 2-3	0.000e+00	0.000e+00	-286.076	-286.481	-0.405	(0)
CuS4S5-3	0.000e+00	0.000e+00	-286.828	-287.211	-0.383	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-293.115	-293.115	0.000	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-407.055	-407.192	-0.137	(0)
Zn (HS) 3-	0.000e+00	0.000e+00	-417.993	-418.130	-0.137	(0)
Pb (HS) 3-	0.000e+00	0.000e+00	-419.623	-419.760	-0.137	(0)
Cd (HS) 3-	0.000e+00	0.000e+00	-420.155	-420.292	-0.137	(0)
ZnS (HS) 2-2	0.000e+00	0.000e+00	-421.313	-421.860	-0.547	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-433.771	-433.908	-0.137	(0)
Cd (HS) 4-2	0.000e+00	0.000e+00	-560.379	-560.926	-0.547	(0)
Zn (HS) 4-2	0.000e+00	0.000e+00	-561.873	-562.420	-0.547	(0)
S (6)	2.322e-02					
SO4-2	1.590e-02	6.533e-03	-1.799	-2.185	-0.386	(0)
CaSO4	5.348e-03	5.348e-03	-2.272	-2.272	0.000	(0)
MgSO4	1.161e-03	1.161e-03	-2.935	-2.935	0.000	(0)
NaSO4-	4.998e-04	4.039e-04	-3.301	-3.394	-0.092	(0)
KSO4-	2.683e-04	2.168e-04	-3.571	-3.664	-0.092	(0)
CuSO4	3.537e-05	3.537e-05	-4.451	-4.451	0.000	(0)
CoSO4	3.173e-06	3.173e-06	-5.499	-5.499	0.000	(0)
NiSO4	2.815e-06	2.815e-06	-5.550	-5.550	0.000	(0)
ZnSO4	2.496e-06	2.496e-06	-5.603	-5.603	0.000	(0)
Zn (SO4) 2-2	5.222e-07	1.482e-07	-6.282	-6.829	-0.547	(0)
HSO4-	3.865e-07	3.086e-07	-6.413	-6.511	-0.098	(0)
PbSO4	4.637e-08	4.637e-08	-7.334	-7.334	0.000	(0)
BeSO4	1.524e-08	1.524e-08	-7.817	-7.817	0.000	(0)
Pb (SO4) 2-2	6.432e-09	1.825e-09	-8.192	-8.739	-0.547	(0)
Ni (SO4) 2-2	2.234e-09	6.339e-10	-8.651	-9.198	-0.547	(0)
CdSO4	1.763e-09	1.763e-09	-8.754	-8.754	0.000	(0)
Be (SO4) 2-2	1.091e-09	3.095e-10	-8.962	-9.509	-0.547	(0)
Cd (SO4) 2-2	5.812e-10	1.649e-10	-9.236	-9.783	-0.547	(0)
AlSO4+	1.416e-10	1.131e-10	-9.849	-9.947	-0.098	(0)
MnSO4	1.754e-11	1.754e-11	-10.756	-10.756	0.000	(0)
Al (SO4) 2-	1.108e-11	8.844e-12	-10.956	-11.053	-0.098	(0)
FeSO4+	1.262e-13	1.015e-13	-12.899	-12.994	-0.095	(0)
CrO3SO4-2	9.162e-14	2.600e-14	-13.038	-13.585	-0.547	(0)
Fe (SO4) 2-	2.021e-14	1.475e-14	-13.694	-13.831	-0.137	(0)
FeSO4	5.987e-17	5.987e-17	-16.223	-16.223	0.000	(0)
CrOHSO4	6.371e-23	6.371e-23	-22.196	-22.196	0.000	(0)
CrSO4+	4.327e-24	3.158e-24	-23.364	-23.501	-0.137	(0)
Cr2 (OH) 2SO4+2	0.000e+00	0.000e+00	-42.079	-42.626	-0.547	(0)
Cr2 (OH) 2 (SO4) 2	0.000e+00	0.000e+00	-43.037	-43.037	0.000	(0)
NH4SO4-	0.000e+00	0.000e+00	-63.624	-63.719	-0.095	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-392.513	-392.649	-0.137	(0)
Se (-2)	0.000e+00					
HSe-	0.000e+00	0.000e+00	-99.861	-99.998	-0.137	(0)
H2Se	0.000e+00	0.000e+00	-102.368	-102.368	0.000	(0)
Se-2	0.000e+00	0.000e+00	-108.345	-108.892	-0.547	(0)
MnSe	0.000e+00	0.000e+00	-109.928	-109.928	0.000	(0)
Se (4)	2.900e-19					
HSeO3-	2.850e-19	2.080e-19	-18.545	-18.682	-0.137	(0)
SeO3-2	5.013e-21	1.423e-21	-20.300	-20.847	-0.547	(0)
H2SeO3	4.781e-23	4.781e-23	-22.320	-22.320	0.000	(0)
FeHSeO3+2	2.682e-30	7.610e-31	-29.572	-30.119	-0.547	(0)
Cd (SeO3) 2-2	0.000e+00	0.000e+00	-44.114	-44.661	-0.547	(0)
Se (6)	1.271e-07					
SeO4-2	1.270e-07	5.220e-08	-6.896	-7.282	-0.386	(0)
CoSeO4	6.119e-11	6.119e-11	-10.213	-10.213	0.000	(0)
NiSeO4	4.984e-11	4.984e-11	-10.302	-10.302	0.000	(0)
ZnSeO4	1.473e-11	1.473e-11	-10.832	-10.832	0.000	(0)
HSeO4-	1.721e-12	1.256e-12	-11.764	-11.901	-0.137	(0)
CdSeO4	1.188e-14	1.188e-14	-13.925	-13.925	0.000	(0)
MnSeO4	2.045e-16	2.045e-16	-15.689	-15.689	0.000	(0)
Zn (SeO4) 2-2	2.747e-18	7.796e-19	-17.561	-18.108	-0.547	(0)
Zn	7.523e-06					
Zn+2	4.434e-06	1.822e-06	-5.353	-5.739	-0.386	(0)
ZnSO4	2.496e-06	2.496e-06	-5.603	-5.603	0.000	(0)
Zn (SO4) 2-2	5.222e-07	1.482e-07	-6.282	-6.829	-0.547	(0)
ZnCl+	6.181e-08	4.899e-08	-7.209	-7.310	-0.101	(0)

ZnNO3+	3.690e-09	2.693e-09	-8.433	-8.570	-0.137	(0)
ZnOH+	3.041e-09	2.220e-09	-8.517	-8.654	-0.137	(0)
ZnOHCl	1.190e-09	1.190e-09	-8.924	-8.924	0.000	(0)
ZnCl2	6.940e-10	6.940e-10	-9.159	-9.159	0.000	(0)
ZnHCO3+	6.557e-10	4.785e-10	-9.183	-9.320	-0.137	(0)
ZnCO3	7.260e-11	7.260e-11	-10.139	-10.139	0.000	(0)
ZnSeO4	1.473e-11	1.473e-11	-10.832	-10.832	0.000	(0)
Zn(OH)2	9.237e-12	9.237e-12	-11.034	-11.034	0.000	(0)
ZnCl3-	7.569e-12	5.999e-12	-11.121	-11.222	-0.101	(0)
Zn(NO3)2	2.968e-13	2.968e-13	-12.527	-12.527	0.000	(0)
ZnCl4-2	7.661e-14	3.200e-14	-13.116	-13.495	-0.379	(0)
Zn(OH)3-	1.134e-15	8.280e-16	-14.945	-15.082	-0.137	(0)
Zn(SeO4)2-2	2.747e-18	7.796e-19	-17.561	-18.108	-0.547	(0)
Zn(OH)4-2	2.077e-21	5.895e-22	-20.682	-21.230	-0.547	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-278.203	-278.340	-0.137	(0)
Zn(HS)2	0.000e+00	0.000e+00	-278.580	-278.580	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-417.993	-418.130	-0.137	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-421.313	-421.860	-0.547	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-561.873	-562.420	-0.547	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	319.50	-313.23	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	315.19	-310.65	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	322.46	-310.65	11.81	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	388.76	-370.83	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	387.09	-366.96	20.13	(Co(NH3)6)Cl3
(NH4)2CrO4	133.40	-133.02	0.38	(NH4)2CrO4
(NH4)2SeO4	132.86	-132.41	0.45	(NH4)2SeO4
Al(OH)3(am)	3.95	7.18	11.13	Al(OH)3
Al2(MoO4)3	45.27	-42.12	3.15	Al2(MoO4)3
Al2O3	6.06	14.36	20.43	Al2O3
Al4(OH)10SO4	8.66	14.04	22.70	Al4(OH)10SO4
AlAsO4:2H2O	9.53	-4.73	4.80	AlAsO4:2H2O
AlOHSO4	4.27	-7.50	-3.23	AlOHSO4
Alunite	3.12	-3.89	-0.77	KAl3(SO4)2(OH)6
Anglesite	2.20	-10.02	-7.83	PbSO4
Anhydrite	0.27	-4.61	-4.34	CaSO4
Anilite	130.37	-162.80	-32.42	Cu0.25Cu1.5S
Antlerite	0.22	9.01	8.79	Cu3(OH)4SO4
Aragonite	3.32	-11.59	-8.26	CaCO3
Arsenolite	135.85	-138.79	-2.94	As4O6
Artinite	12.61	-2.65	9.96	MgCO3:Mg(OH)2:3H2O
As2O5	30.60	-23.83	6.77	As2O5
Atacamite	0.08	7.59	7.67	Cu2(OH)3Cl
Azurite	3.00	-19.62	-16.62	Cu3(OH)2(CO3)2
Ba(OH)2:8H2O	18.98	5.57	24.56	Ba(OH)2:8H2O
Ba3(AsO4)2	1.85	-7.09	-8.94	Ba3(AsO4)2
BaCrO4	5.05	-14.82	-9.77	BaCrO4
BaHPO4	5.83	-25.61	-19.77	BaHPO4
BaMoO4	6.26	-13.25	-6.99	BaMoO4
Barite	0.94	-9.11	-10.05	BaSO4
BaS	159.68	-143.50	16.18	BaS
BaSeO3	21.15	-19.35	1.79	BaSeO3
BaSeO4	6.68	-14.20	-7.53	BaSeO4
Be(OH)2(alpha)	2.13	4.76	6.89	Be(OH)2
Be(OH)2(am)	2.43	4.76	7.19	Be(OH)2
Be(OH)2(beta)	1.73	4.76	6.49	Be(OH)2
BeMoO4	12.45	-14.06	-1.61	BeMoO4
BeS	163.70	-144.32	19.38	BeS
BeSeO4:4H2O	12.08	-15.02	-2.94	BeSeO4:4H2O
Bianchite	6.16	-7.93	-1.76	ZnSO4:6H2O
Birnessite	0.00	18.09	18.09	MnO2
Bixbyite	5.60	-5.88	-0.27	Mn2O3
BlaubleiI	119.90	-144.06	-24.16	Cu0.9Cu0.2S
BlaubleiII	125.43	-152.71	-27.28	Cu0.6Cu0.8S

Boehmite	-1.75	7.18	8.93	AlOOH
Brochantite	1.08	16.91	15.83	Cu ₄ (OH) ₆ SO ₄
Brucite	-7.68	9.51	17.18	Mg(OH) ₂
Bunsenite	-5.89	6.85	12.74	NiO
Ca ₃ (AsO ₄) ₂ ·4H ₂ O	-15.91	6.39	22.30	Ca ₃ (AsO ₄) ₂ ·4H ₂ O
Ca ₃ (PO ₄) ₂ (beta)	-3.07	-32.15	-29.08	Ca ₃ (PO ₄) ₂
Ca ₄ H(PO ₄) ₃ ·3H ₂ O	-6.18	-53.26	-47.08	Ca ₄ H(PO ₄) ₃ ·3H ₂ O
CaCrO ₄	-8.13	-10.32	-2.19	CaCrO ₄
CaHPO ₄	-1.74	-21.11	-19.37	CaHPO ₄
CaHPO ₄ ·2H ₂ O	-2.05	-21.11	-19.06	CaHPO ₄ ·2H ₂ O
Calcite	-3.13	-11.59	-8.46	CaCO ₃
CaMoO ₄	-0.81	-8.75	-7.94	CaMoO ₄
CaSeO ₃ ·2H ₂ O	-17.73	-14.86	2.87	CaSeO ₃ ·2H ₂ O
CaSeO ₄ ·2H ₂ O	-6.71	-9.71	-3.00	CaSeO ₄ ·2H ₂ O
Cd(BO ₂) ₂	-16.30	-6.46	9.84	Cd(BO ₂) ₂
Cd(OH) ₂	-10.34	3.59	13.93	Cd(OH) ₂
Cd(OH) ₂ (am)	-10.40	3.59	13.99	Cd(OH) ₂
Cd ₃ (OH) ₂ (SO ₄) ₂	-25.32	-18.61	6.71	Cd ₃ (OH) ₂ (SO ₄) ₂
Cd ₃ (OH) ₄ SO ₄	-26.49	-3.93	22.56	Cd ₃ (OH) ₄ SO ₄
Cd ₃ (PO ₄) ₂	-19.01	-51.61	-32.60	Cd ₃ (PO ₄) ₂
Cd ₄ (OH) ₆ SO ₄	-28.74	-0.34	28.40	Cd ₄ (OH) ₆ SO ₄
CdCl ₂	-12.22	-12.82	-0.60	CdCl ₂
CdCl ₂ ·1H ₂ O	-11.15	-12.82	-1.67	CdCl ₂ ·1H ₂ O
CdCl ₂ ·2.5H ₂ O	-10.89	-12.82	-1.93	CdCl ₂ ·2.5H ₂ O
Cdmetal(alpha)	-52.21	-38.47	13.74	Cd
Cdmetal(gamma)	-52.32	-38.47	13.84	Cd
CdMoO ₄	-1.03	-15.24	-14.21	CdMoO ₄
CdOHCl	-8.25	-4.62	3.63	CdOHCl
CdSe	-82.23	-102.66	-20.43	CdSe
CdSeO ₄ ·2H ₂ O	-14.35	-16.20	-1.85	CdSeO ₄ ·2H ₂ O
CdSO ₄	-11.08	-11.10	-0.02	CdSO ₄
CdSO ₄ ·1H ₂ O	-9.47	-11.10	-1.63	CdSO ₄ ·1H ₂ O
CdSO ₄ ·2.67H ₂ O	-9.28	-11.10	-1.82	CdSO ₄ ·2.67H ₂ O
Cerussite	-3.79	-17.00	-13.20	PbCO ₃
CH ₄ (g)	-148.08	-189.90	-41.81	CH ₄
Chalcanthite	-4.13	-6.79	-2.66	CuSO ₄ ·5H ₂ O
Chalcocite	-134.58	-170.00	-35.42	Cu ₂ S
Chalcopyrite	-258.45	-294.17	-35.71	CuFeS ₂
Claudetite	-135.56	-138.79	-3.23	As ₄ O ₆
Clausthalite	-74.13	-101.59	-27.46	PbSe
Co(BO ₂) ₂	-30.22	-3.15	27.07	Co(BO ₂) ₂
Co(OH) ₂	-6.19	6.90	13.09	Co(OH) ₂
Co(OH) ₃	-2.43	-4.47	-2.03	Co(OH) ₃
CO ₂ (g)	-3.50	-21.66	-18.16	CO ₂
Co ₃ (AsO ₄) ₂	-16.15	-3.11	13.03	Co ₃ (AsO ₄) ₂
Co ₃ (PO ₄) ₂	-6.97	-41.66	-34.69	Co ₃ (PO ₄) ₂
Co ₃ O ₄	8.15	-2.03	-10.17	Co ₃ O ₄
CoCl ₂	-18.01	-9.50	8.51	CoCl ₂
CoCl ₂ ·6H ₂ O	-12.02	-9.51	2.51	CoCl ₂ ·6H ₂ O
CoCO ₃	-4.81	-14.75	-9.94	CoCO ₃
CoFe ₂ O ₄	17.89	14.83	-3.05	CoFe ₂ O ₄
CoHPO ₄	-5.22	-24.28	-19.06	CoHPO ₄
CoMoO ₄	-4.23	-11.92	-7.69	CoMoO ₄
CoO	-7.00	6.90	13.90	CoO
CoS(alpha)	-134.74	-142.18	-7.44	CoS
CoS(beta)	-131.11	-142.18	-11.07	CoS
CoSe	-83.14	-99.34	-16.20	CoSe
CoSeO ₃	-19.35	-18.03	1.32	CoSeO ₃
CoSeO ₄ ·6H ₂ O	-11.35	-12.88	-1.53	CoSeO ₄ ·6H ₂ O
CoSO ₄	-10.82	-7.78	3.04	CoSO ₄
CoSO ₄ ·6H ₂ O	-5.31	-7.78	-2.48	CoSO ₄ ·6H ₂ O
Cotunnite	-6.89	-11.75	-4.86	PbCl ₂
Covellite	-118.59	-141.18	-22.59	CuS
Cr(OH) ₂	-44.83	-33.90	10.93	Cr(OH) ₂
Cr(OH) ₃	-17.22	-15.80	1.42	Cr(OH) ₃
Cr(OH) ₃ (am)	-15.05	-15.80	-0.75	Cr(OH) ₃
Cr ₂ O ₃	-29.39	-31.60	-2.21	Cr ₂ O ₃
CrCl ₂	-64.73	-50.31	14.42	CrCl ₂

CrCl3	-55.89	-40.41	15.48	CrCl3
Crmetal	-106.96	-75.96	31.00	Cr
CrO3	-17.20	-20.39	-3.19	CrO3
Cu(OH)2	-0.94	7.90	8.84	Cu(OH)2
Cu2(OH)3NO3	-3.16	6.30	9.47	Cu2(OH)3NO3
Cu2Se(alpha)	-80.73	-127.17	-46.44	Cu2Se
Cu2SO4	-33.71	-35.61	-1.89	Cu2SO4
Cu3(AsO4)2:2H2O	-6.23	-0.13	6.10	Cu3(AsO4)2:2H2O
Cu3(PO4)2	-1.82	-38.67	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-3.55	-38.67	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	-161.01	-225.52	-64.51	Cu3Se2
CuCO3	-2.26	-13.76	-11.50	CuCO3
CuCrO4	-7.05	-12.49	-5.44	CuCrO4
Cumetal	-22.52	-31.49	-8.97	Cu
CuMoO4	2.18	-10.93	-13.11	CuMoO4
CuOCuSO4	-9.60	1.11	10.71	CuOCuSO4
Cupricferrite	9.21	15.83	6.62	CuFe2O4
Cuprite	-19.89	-20.92	-1.04	Cu2O
Cuprousferrite	2.37	-6.50	-8.87	CuFeO2
CuSe	-64.89	-98.35	-33.46	CuSe
CuSe2	-128.75	-162.54	-33.79	CuSe2
CuSeO3:2H2O	-17.66	-17.03	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-9.45	-11.89	-2.44	CuSeO4:5H2O
CuSO4	-9.94	-6.79	3.16	CuSO4
Diaspore	0.00	7.18	7.18	AlOOH
Djurleite	-133.58	-168.10	-34.52	Cu0.066Cu1.868S
Dolomite(disordered)	-7.34	-23.74	-16.40	CaMg(CO3)2
Dolomite(ordered)	-6.77	-23.74	-16.97	CaMg(CO3)2
Epsomite	-3.02	-5.18	-2.16	MgSO4:7H2O
Fe(OH)2	-17.47	-3.91	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	4.54	1.50	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-18.56	-17.00	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-46.24	-66.86	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-33.11	-36.12	-3.01	Fe2(SO4)3
Fe3(OH)8	-16.20	4.02	20.22	Fe3(OH)8
FeAsO4:2H2O	-8.35	-7.95	0.40	FeAsO4:2H2O
FeCr2O4	-43.12	-35.50	7.62	FeCr2O4
FeMoO4	-12.67	-22.73	-10.06	FeMoO4
Ferrihydrite	0.55	3.96	3.41	Fe(OH)3
Ferroselite	-155.60	-174.34	-18.74	FeSe2
FeS(ppt)	-150.07	-152.98	-2.92	FeS
FeSe	-99.15	-110.15	-11.01	FeSe
Fix_pH	-6.25	-6.25	0.00	H+
Galena	-130.21	-144.42	-14.21	PbS
Gibbsite	-1.40	7.18	8.58	Al(OH)3
Goethite	3.29	3.96	0.67	FeOOH
Goslarite	-5.87	-7.93	-2.05	ZnSO4:7H2O
Greenockite	-130.97	-145.49	-14.52	CdS
Greigite	-547.26	-592.29	-45.03	Fe3S4
Gypsum	0.00	-4.61	-4.61	CaSO4:2H2O
H-Jarosite	-6.06	-17.48	-11.41	(H3O)Fe3(SO4)2(OH)6
H2MoO4	-5.80	-18.83	-13.02	H2MoO4
H2S(g)	-141.07	-149.08	-8.01	H2S
H2Se(g)	-101.33	-106.25	-4.91	H2Se
Halite	-5.48	-3.89	1.59	NaCl
Hausmannite	-15.12	47.17	62.29	Mn3O4
Hematite	8.96	7.93	-1.03	Fe2O3
Hercynite	-13.37	10.46	23.83	FeAl2O4
Hinsdalite	-17.17	-19.67	-2.50	PbAl3PO4SO4(OH)6
Huntite	-18.40	-48.04	-29.65	CaMg3(CO3)4
Hydrocerussite	-10.57	-29.34	-18.77	Pb3(OH)2(CO3)2
Hydromagnesite	-30.99	-39.11	-8.11	Mg5(CO3)4(OH)2:4H2O
Hydroxylapatite	1.15	-43.19	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-7.46	-70.25	-62.79	Pb5(PO4)3OH
K-Alum	-13.00	-18.26	-5.26	KAl(SO4)2:12H2O
K-Jarosite	0.87	-13.54	-14.41	KFe3(SO4)2(OH)6
K2Cr2O7	-15.44	-32.92	-17.48	K2Cr2O7
K2CrO4	-11.96	-12.53	-0.57	K2CrO4

K2MoO4	-14.23	-10.96	3.27	K2MoO4
K2SeO4	-11.19	-11.92	-0.73	K2SeO4
Langite	-1.07	16.91	17.98	Cu4 (OH) 6SO4:H2O
Larnakite	-4.99	-5.36	-0.37	PbO:PbSO4
Laurionite	-4.17	-3.54	0.62	PbOHCl
Lepidocrocite	2.59	3.96	1.37	FeOOH
Lime	-23.20	10.07	33.28	CaO
Litharge	-8.23	4.66	12.89	PbO
Mackinawite	-149.38	-152.98	-3.60	FeS
Maghemite	1.54	7.93	6.39	Fe2O3
Magnesioferrite	-0.26	17.44	17.69	Fe2MgO4
Magnesite	-4.63	-12.15	-7.52	MgCO3
Magnetite	-0.00	4.03	4.03	Fe3O4
Malachite	-0.33	-5.86	-5.53	Cu2 (OH) 2CO3
Manganite	-2.61	22.73	25.34	MnOOH
Massicot	-8.43	4.66	13.09	PbO
Melanothallite	-14.96	-8.51	6.45	CuCl2
Melanterite	-16.32	-18.59	-2.27	FeSO4:7H2O
Mg (OH) 2 (active)	-9.29	9.51	18.79	Mg (OH) 2
Mg3 (PO4) 2	-10.57	-33.85	-23.28	Mg3 (PO4) 2
MgCr2O4	-38.83	-22.09	16.74	MgCr2O4
MgCrO4	-16.53	-10.89	5.65	MgCrO4
MgHPO4:3H2O	-3.51	-21.68	-18.18	MgHPO4:3H2O
MgMoO4	-7.47	-9.32	-1.85	MgMoO4
MgSeO3:6H2O	-18.47	-15.43	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-9.08	-10.28	-1.20	MgSeO4:6H2O
Minium	-18.74	56.04	74.78	Pb3O4
Mirabilite	-4.71	-6.06	-1.35	Na2SO4:10H2O
Mn2 (SO4) 3	-44.71	-49.93	-5.22	Mn2 (SO4) 3
Mn3 (AsO4) 2:8H2O	-31.22	-18.72	12.50	Mn3 (AsO4) 2:8H2O
Mn3 (PO4) 2	-33.40	-57.26	-23.85	Mn3 (PO4) 2
MnCl2:4H2O	-17.45	-14.71	2.75	MnCl2:4H2O
MnHPO4	-4.08	-29.48	-25.40	MnHPO4
MnS (grn)	-147.64	-147.38	0.27	MnS
MnS (pnk)	-150.72	-147.38	3.34	MnS
MnSe	-108.34	-104.54	3.79	MnSe
MnSeO3	-24.36	-23.23	1.13	MnSeO3
MnSeO3:2H2O	-24.18	-23.23	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-16.03	-18.08	-2.05	MnSeO4:5H2O
MnSO4	-15.76	-12.98	2.78	MnSO4
Monteponite	-11.83	3.59	15.41	CdO
MoO3	-10.83	-18.83	-8.00	MoO3
Morenosite	-5.66	-7.84	-2.18	NiSO4:7H2O
MoS2	-287.62	-359.05	-71.42	MoS2
Na-Jarosite	-2.41	-13.16	-10.75	NaFe3 (SO4) 2 (OH) 6
Na2Cr2O7	-22.20	-32.16	-9.96	Na2Cr2O7
Na2CrO4	-14.75	-11.77	2.99	Na2CrO4
Na2Mo2O7	-12.26	-29.03	-16.76	Na2Mo2O7
Na2MoO4	-11.72	-10.20	1.52	Na2MoO4
Na2MoO4:2H2O	-11.42	-10.20	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-26.61	-16.31	10.30	Na2SeO3:5H2O
Na2SeO4	-12.43	-11.15	1.28	Na2SeO4
Nantokite	-11.81	-18.67	-6.86	CuCl
Natron	-11.53	-13.04	-1.51	Na2CO3:10H2O
Nesquehonite	-7.56	-12.15	-4.60	MgCO3:3H2O
Ni (OH) 2	-6.23	6.85	13.08	Ni (OH) 2
Ni3 (AsO4) 2:8H2O	-18.98	-3.28	15.70	Ni3 (AsO4) 2:8H2O
Ni3 (PO4) 2	-10.52	-41.82	-31.30	Ni3 (PO4) 2
Ni4 (OH) 6SO4	-19.28	12.72	32.00	Ni4 (OH) 6SO4
NiCO3	-8.06	-14.81	-6.75	NiCO3
NiMoO4	-0.83	-11.98	-11.15	NiMoO4
NiS (alpha)	-136.63	-142.23	-5.60	NiS
NiS (beta)	-131.13	-142.23	-11.10	NiS
NiS (gamma)	-129.43	-142.23	-12.80	NiS
NiSe	-81.70	-99.40	-17.70	NiSe
NiSeO3:2H2O	-20.99	-18.08	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-11.41	-12.93	-1.52	NiSeO4:6H2O
Nsutite	0.59	18.09	17.50	MnO2

O2 (g)	-0.68	84.12	84.80	O2
Orpiment	-454.52	-516.64	-62.11	As2S3
Otavite	-6.07	-18.07	-12.00	CdCO3
Pb(BO2) 2	-11.95	-5.39	6.57	Pb(BO2) 2
Pb(OH) 2	-3.66	4.66	8.32	Pb(OH) 2
Pb10(OH) 6O(CO3) 6	-74.59	-83.35	-8.76	Pb10(OH) 6O(CO3) 6
Pb2(OH) 3Cl	-7.68	1.12	8.79	Pb2(OH) 3Cl
Pb2O(OH) 2	-16.87	9.32	26.19	Pb2O(OH) 2
Pb2O3	-9.66	51.38	61.04	Pb2O3
Pb2OCO3	-11.90	-12.34	-0.44	Pb2OCO3
Pb3(AsO4) 2	-15.64	-9.84	5.80	Pb3(AsO4) 2
Pb3(PO4) 2	-4.86	-48.39	-43.53	Pb3(PO4) 2
Pb3O2CO3	-19.03	-7.68	11.35	Pb3O2CO3
Pb3O2SO4	-11.63	-0.70	10.92	Pb3O2SO4
Pb4(OH) 6SO4	-17.14	3.96	21.10	Pb4(OH) 6SO4
Pb4O3SO4	-18.33	3.96	22.28	Pb4O3SO4
PbCrO4	-3.00	-15.73	-12.73	PbCrO4
PbHPO4	-2.72	-26.52	-23.81	PbHPO4
Pbmetal	-41.64	-37.40	4.24	Pb
PbMoO4	1.61	-14.17	-15.78	PbMoO4
PbO:0.33H2O	-8.32	4.66	12.98	PbO:0.33H2O
PbSeO4	-8.24	-15.12	-6.88	PbSeO4
Periclase	-12.53	9.51	22.04	MgO
Phosgenite	-8.94	-28.75	-19.81	PbCl2:PbCO3
Plattnerite	-3.77	46.72	50.49	PbO2
Plumbgummite	-3.38	-36.17	-32.79	PbAl3(PO4) 2(OH) 5:H2O
Portlandite	-13.12	10.07	23.19	Ca(OH) 2
Pyrite	-241.35	-260.01	-18.66	FeS2
Pyrochroite	-13.78	1.70	15.48	Mn(OH) 2
Pyrolusite	1.57	43.76	42.19	MnO2
Pyromorphite	5.97	-78.46	-84.43	Pb5(PO4) 3Cl
Realgar	-184.68	-204.81	-20.13	AsS
Retgersite	-5.78	-7.84	-2.05	NiSO4:6H2O
Rhodochrosite	-9.38	-19.95	-10.57	MnCO3
Semetal(am)	-57.05	-64.19	-7.14	Se
Semetal(hex)	-56.43	-64.19	-7.76	Se
SeO2	-25.05	-24.93	0.12	SeO2
SeO3	-41.26	-19.78	21.48	SeO3
Siderite	-15.37	-25.56	-10.19	FeCO3
Smithsonite	-4.95	-14.90	-9.95	ZnCO3
Sphalerite	-130.78	-142.32	-11.54	ZnS
Spinel	-14.14	23.87	38.01	MgAl2O4
Strengite	-0.85	-27.22	-26.37	FePO4:2H2O
Sulfur	-104.92	-107.02	-2.10	S
Tenorite	0.06	7.90	7.84	CuO
Thenardite	-6.41	-6.06	0.35	Na2SO4
Thermonatrite	-13.70	-13.03	0.67	Na2CO3:H2O
Tsumebite	-4.18	-13.97	-9.79	Pb2CuPO4(OH) 3:3H2O
Vivianite	-38.09	-74.09	-36.00	Fe3(PO4) 2:8H2O
Witherite	-7.50	-16.08	-8.58	BaCO3
Wurtzite	-133.31	-142.32	-9.01	ZnS
Zincite	-4.84	6.76	11.60	ZnO
Zincosite	-12.10	-7.92	4.18	ZnSO4
Zn(BO2) 2	-11.58	-3.29	8.29	Zn(BO2) 2
Zn(NO3) 2:6H2O	-15.47	-12.23	3.24	Zn(NO3) 2:6H2O
Zn(OH) 2	-5.44	6.76	12.20	Zn(OH) 2
Zn(OH) 2(am)	-5.96	6.76	12.71	Zn(OH) 2
Zn(OH) 2(beta)	-5.24	6.76	12.00	Zn(OH) 2
Zn(OH) 2(epsilon)	-5.02	6.76	11.78	Zn(OH) 2
Zn(OH) 2(gamma)	-4.97	6.76	11.73	Zn(OH) 2
Zn2(OH) 2SO4	-8.66	-1.16	7.50	Zn2(OH) 2SO4
Zn2(OH) 3Cl	-9.88	5.32	15.19	Zn2(OH) 3Cl
Zn3(AsO4) 2:2.5H2O	-17.20	-3.55	13.65	Zn3(AsO4) 2:2.5H2O
Zn3(PO4) 2:4H2O	-6.67	-42.09	-35.42	Zn3(PO4) 2:4H2O
Zn3O(SO4) 2	-28.77	-9.09	19.68	Zn3O(SO4) 2
Zn4(OH) 6SO4	-16.05	12.35	28.40	Zn4(OH) 6SO4
Zn5(OH) 8Cl2	-21.11	17.39	38.50	Zn5(OH) 8Cl2
ZnCl2	-16.91	-9.65	7.27	ZnCl2

ZnCO3:1H2O	-4.64	-14.90	-10.26	ZnCO3:1H2O
Znmetal	-61.55	-35.30	26.25	Zn
ZnMoO4	-1.97	-12.07	-10.09	ZnMoO4
ZnO(active)	-4.69	6.76	11.45	ZnO
ZnS(am)	-133.22	-142.32	-9.10	ZnS
ZnSe	-85.01	-99.49	-14.48	ZnSe
ZnSeO4:6H2O	-11.50	-13.02	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.42	-7.92	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 12.

```

USE solution 1
EQUILIBRIUM_PHASES 9
  Birnessite 0 0
  Diaspore 0 0
  Fix_pH -6.5 Portlandite 10
  Magnetite 0 0
  O2(g) -0.68 10
  CO2(g) -3.5 10
END

```

Beginning of batch-reaction calculations.

Reaction step 1.

Using solution 1.
Using pure phase assemblage 9.

-----User print-----

```

Moles of Portlandite: -1.4216e-03
Moles of Diaspore: -1.4216e-03
Moles of Magnetite: -1.4216e-03
Moles of Birnessite: -1.4216e-03
mg of Portlandite: -1.0533e+02
mg of Diaspore: -8.5284e+01
mg of Birnessite: -1.2359e+02

```

-----Phase assemblage-----

Phase	SI	log IAP	log K(T, P)	Moles in assemblage		
				Initial	Final	Delta
Birnessite	-0.00	18.09	18.09	0.000e+00	9.539e-05	9.539e-05
CO2(g)	-3.50	-21.66	-18.16	1.000e+01	1.000e+01	-3.450e-05
Diaspore	-0.00	7.18	7.18	0.000e+00	5.284e-05	5.284e-05
Fix_pH	-6.50	-6.50	0.00			
Ca(OH)2		is reactant		1.000e+01	9.999e+00	-1.422e-03
Magnetite	0.00	4.03	4.03	0.000e+00	1.478e-04	1.478e-04
O2(g)	-0.68	84.12	84.80	1.000e+01	9.998e+00	-2.051e-03

-----Solution composition-----

Elements	Molality	Moles
Al	1.153e-09	1.153e-09
As	2.680e-08	2.680e-08
B	9.287e-06	9.287e-06

Ba	2.924e-07	2.924e-07
Be	2.228e-07	2.228e-07
C	3.450e-05	3.450e-05
Ca	1.450e-02	1.450e-02
Cd	7.145e-09	7.145e-09
Cl	1.388e-02	1.388e-02
Co	1.227e-05	1.227e-05
Cr	6.372e-08	6.372e-08
Cu	9.874e-05	9.874e-05
Fe	9.320e-08	9.320e-08
K	6.291e-03	6.291e-03
Mg	3.635e-03	3.635e-03
Mn	2.351e-11	2.351e-11
Mo	1.151e-06	1.151e-06
N	7.218e-04	7.218e-04
Na	1.498e-02	1.498e-02
Ni	8.382e-06	8.382e-06
P	9.399e-06	9.400e-06
Pb	9.690e-08	9.691e-08
S	2.322e-02	2.322e-02
Se	1.271e-07	1.271e-07
Zn	7.523e-06	7.523e-06

-----Description of solution-----

pH	=	6.500	Charge balance
pe	=	14.530	Adjusted to redox equilibrium
Activity of water	=	0.999	
Ionic strength (mol/kgw)	=	7.313e-02	
Mass of water (kg)	=	1.000e+00	
Total alkalinity (eq/kg)	=	2.909e-05	
Total CO2 (mol/kg)	=	3.450e-05	
Temperature (°C)	=	20.00	
Electrical balance (eq)	=	-3.291e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-3.61	
Iterations	=	20	
Total H	=	1.110196e+02	
Total O	=	5.560592e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	3.950e-07	3.162e-07	-6.403	-6.500	-0.097	0.00
OH-	2.755e-08	2.166e-08	-7.560	-7.664	-0.104	(0)
H2O	5.551e+01	9.988e-01	1.744	-0.001	0.000	18.05
Al	1.153e-09					
Al (OH) 2+	4.780e-10	3.863e-10	-9.321	-9.413	-0.093	(0)
Al (OH) 4-	3.733e-10	2.980e-10	-9.428	-9.526	-0.098	(0)
Al (OH) 3	2.451e-10	2.451e-10	-9.611	-9.611	0.000	(0)
AlOH+2	2.580e-11	1.100e-11	-10.588	-10.958	-0.370	(0)
AlSO4+	2.519e-11	2.011e-11	-10.599	-10.697	-0.098	(0)
Al+3	3.556e-12	4.808e-13	-11.449	-12.318	-0.869	(0)
Al (SO4) 2-	1.970e-12	1.572e-12	-11.706	-11.803	-0.098	(0)
AlMo6O21-3	8.872e-34	5.213e-35	-33.052	-34.283	-1.231	(0)
As (3)	8.970e-36					
H3AsO3	8.953e-36	8.953e-36	-35.048	-35.048	0.000	(0)
H2AsO3-	1.648e-38	1.202e-38	-37.783	-37.920	-0.137	(0)
H4AsO3+	0.000e+00	0.000e+00	-41.716	-41.853	-0.137	(0)
HAsO3-2	0.000e+00	0.000e+00	-43.008	-43.556	-0.547	(0)
AsO3-3	0.000e+00	0.000e+00	-49.314	-50.545	-1.231	(0)
As (5)	2.680e-08					
H2AsO4-	1.430e-08	1.044e-08	-7.845	-7.981	-0.137	(0)
HAsO4-2	1.250e-08	3.546e-09	-7.903	-8.450	-0.547	(0)
H3AsO4	5.372e-13	5.463e-13	-12.270	-12.263	0.007	(0)
AsO4-3	5.368e-13	3.154e-14	-12.270	-13.501	-1.231	(0)
B	9.287e-06					

H3BO3	9.261e-06	9.418e-06	-5.033	-5.026	0.007	(0)
H2BO3-	2.047e-08	1.582e-08	-7.689	-7.801	-0.112	(0)
CaH2BO3+	4.301e-09	3.324e-09	-8.366	-8.478	-0.112	(0)
MgH2BO3+	7.213e-10	5.574e-10	-9.142	-9.254	-0.112	(0)
NaH2BO3	3.178e-10	3.178e-10	-9.498	-9.498	0.000	(0)
H5 (BO3) 2-	1.694e-13	1.309e-13	-12.771	-12.883	-0.112	(0)
BaH2BO3+	7.381e-14	5.704e-14	-13.132	-13.244	-0.112	(0)
H8 (BO3) 3-	1.381e-16	1.067e-16	-15.860	-15.972	-0.112	(0)
Ba	2.924e-07					
Ba+2	2.919e-07	1.199e-07	-6.535	-6.921	-0.386	(0)
BaNO3+	5.135e-10	3.748e-10	-9.289	-9.426	-0.137	(0)
BaHCO3+	1.934e-11	1.575e-11	-10.713	-10.803	-0.089	(0)
BaCO3	1.206e-13	1.206e-13	-12.918	-12.918	0.000	(0)
BaH2BO3+	7.381e-14	5.704e-14	-13.132	-13.244	-0.112	(0)
BaOH+	1.363e-14	1.096e-14	-13.865	-13.960	-0.095	(0)
BaNH3+2	0.000e+00	0.000e+00	-72.382	-72.929	-0.547	(0)
Be	2.228e-07					
BeOH+	1.807e-07	1.480e-07	-6.743	-6.830	-0.087	(0)
Be+2	2.844e-08	1.169e-08	-7.546	-7.932	-0.386	(0)
BeSO4	9.686e-09	9.686e-09	-8.014	-8.014	0.000	(0)
Be (OH) 2	2.969e-09	2.969e-09	-8.527	-8.527	0.000	(0)
Be (SO4) 2-2	6.933e-10	1.967e-10	-9.159	-9.706	-0.547	(0)
BeCl+	2.565e-10	2.062e-10	-9.591	-9.686	-0.095	(0)
BeCO3	4.599e-11	4.599e-11	-10.337	-10.337	0.000	(0)
Be (OH) 3-	2.897e-12	2.372e-12	-11.538	-11.625	-0.087	(0)
Be2OH+3	1.733e-12	2.870e-13	-11.761	-12.542	-0.781	(0)
Be3 (OH) 3+3	4.731e-13	7.832e-14	-12.325	-13.106	-0.781	(0)
Be (OH) 4-2	1.059e-19	4.760e-20	-18.975	-19.322	-0.347	(0)
C (4)	3.450e-05					
HCO3-	2.021e-05	1.633e-05	-4.695	-4.787	-0.093	(0)
H2CO3	1.237e-05	1.237e-05	-4.908	-4.908	0.000	(0)
CaHCO3+	1.222e-06	9.947e-07	-5.913	-6.002	-0.089	(0)
CuCO3	3.177e-07	3.177e-07	-6.498	-6.498	0.000	(0)
MgHCO3+	2.085e-07	1.652e-07	-6.681	-6.782	-0.101	(0)
NaHCO3	1.170e-07	1.170e-07	-6.932	-6.932	0.000	(0)
CuHCO3+	3.146e-08	2.296e-08	-7.502	-7.639	-0.137	(0)
CaCO3	1.167e-08	1.167e-08	-7.933	-7.933	0.000	(0)
NiHCO3+	5.605e-09	4.091e-09	-8.251	-8.388	-0.137	(0)
CO3-2	5.328e-09	2.190e-09	-8.273	-8.660	-0.386	(0)
CoHCO3+	3.997e-09	2.917e-09	-8.398	-8.535	-0.137	(0)
MgCO3	1.704e-09	1.704e-09	-8.768	-8.768	0.000	(0)
ZnHCO3+	1.165e-09	8.505e-10	-8.934	-9.070	-0.137	(0)
NaCO3-	6.727e-10	5.436e-10	-9.172	-9.265	-0.093	(0)
ZnCO3	2.295e-10	2.295e-10	-9.639	-9.639	0.000	(0)
PbHCO3+	2.160e-10	1.576e-10	-9.666	-9.802	-0.137	(0)
NiCO3	1.835e-10	1.835e-10	-9.736	-9.736	0.000	(0)
PbCO3	9.454e-11	9.454e-11	-10.024	-10.024	0.000	(0)
CoCO3	9.399e-11	9.399e-11	-10.027	-10.027	0.000	(0)
BeCO3	4.599e-11	4.599e-11	-10.337	-10.337	0.000	(0)
BaHCO3+	1.934e-11	1.575e-11	-10.713	-10.803	-0.089	(0)
Cu (CO3) 2-2	6.599e-12	1.872e-12	-11.181	-11.728	-0.547	(0)
BaCO3	1.206e-13	1.206e-13	-12.918	-12.918	0.000	(0)
CdCO3	6.097e-14	6.097e-14	-13.215	-13.215	0.000	(0)
CdHCO3+	5.628e-14	4.108e-14	-13.250	-13.386	-0.137	(0)
Pb (CO3) 2-2	2.104e-15	5.970e-16	-14.677	-15.224	-0.547	(0)
MnHCO3+	1.998e-15	1.607e-15	-14.699	-14.794	-0.095	(0)
Cd (CO3) 2-2	3.488e-19	9.896e-20	-18.457	-19.005	-0.547	(0)
FeHCO3+	2.848e-21	2.319e-21	-20.545	-20.635	-0.089	(0)
Ca	1.450e-02					
Ca+2	9.135e-03	3.754e-03	-2.039	-2.426	-0.386	(0)
CaSO4	5.350e-03	5.350e-03	-2.272	-2.272	0.000	(0)
CaNO3+	9.623e-06	7.024e-06	-5.017	-5.153	-0.137	(0)
CaHPO4	1.254e-06	1.254e-06	-5.902	-5.902	0.000	(0)
CaHCO3+	1.222e-06	9.947e-07	-5.913	-6.002	-0.089	(0)
CaH2PO4+	3.869e-07	3.127e-07	-6.412	-6.505	-0.093	(0)
CaPO4-	1.169e-08	9.450e-09	-7.932	-8.025	-0.093	(0)
CaCO3	1.167e-08	1.167e-08	-7.933	-7.933	0.000	(0)
CaH2BO3+	4.301e-09	3.324e-09	-8.366	-8.478	-0.112	(0)

		CaOH+	1.882e-09	1.532e-09	-8.725	-8.815	-0.089	(0)
		CaNH3+2	0.000e+00	0.000e+00	-67.587	-68.134	-0.547	(0)
		Ca (NH3) 2+2	0.000e+00	0.000e+00	-133.795	-134.342	-0.547	(0)
Cd	7.145e-09							
		Cd+2	2.973e-09	1.222e-09	-8.527	-8.913	-0.386	(0)
		CdCl+	1.764e-09	1.287e-09	-8.754	-8.890	-0.137	(0)
		CdSO4	1.762e-09	1.762e-09	-8.754	-8.754	0.000	(0)
		Cd (SO4) 2-2	5.811e-10	1.649e-10	-9.236	-9.783	-0.547	(0)
		CdCl2	5.879e-11	5.879e-11	-10.231	-10.231	0.000	(0)
		CdNO3+	3.487e-12	2.545e-12	-11.458	-11.594	-0.137	(0)
		CdOHCl	1.492e-12	1.492e-12	-11.826	-11.826	0.000	(0)
		CdCl3-	5.381e-13	3.927e-13	-12.269	-12.406	-0.137	(0)
		CdOH+	2.900e-13	2.117e-13	-12.538	-12.674	-0.137	(0)
		CdCO3	6.097e-14	6.097e-14	-13.215	-13.215	0.000	(0)
		CdHCO3+	5.628e-14	4.108e-14	-13.250	-13.386	-0.137	(0)
		CdSeO4	1.187e-14	1.187e-14	-13.925	-13.925	0.000	(0)
		Cd (NO3) 2	6.293e-16	6.293e-16	-15.201	-15.201	0.000	(0)
		Cd (OH) 2	6.193e-17	6.193e-17	-16.208	-16.208	0.000	(0)
		Cd (CO3) 2-2	3.488e-19	9.896e-20	-18.457	-19.005	-0.547	(0)
		Cd2OH+3	2.347e-20	1.379e-21	-19.630	-20.860	-1.231	(0)
		Cd (OH) 3-	1.649e-22	1.203e-22	-21.783	-21.920	-0.137	(0)
		Cd (OH) 4-2	2.208e-30	6.264e-31	-29.656	-30.203	-0.547	(0)
		Cd (SeO3) 2-2	0.000e+00	0.000e+00	-44.114	-44.661	-0.547	(0)
		CdHS+	0.000e+00	0.000e+00	-143.849	-143.985	-0.137	(0)
		Cd (HS) 2	0.000e+00	0.000e+00	-279.862	-279.862	0.000	(0)
		Cd (HS) 3-	0.000e+00	0.000e+00	-420.905	-421.042	-0.137	(0)
		Cd (HS) 4-2	0.000e+00	0.000e+00	-561.379	-561.926	-0.547	(0)
Cl	1.388e-02							
		Cl-	1.387e-02	1.111e-02	-1.858	-1.954	-0.097	(0)
		CuCl+	5.171e-07	4.098e-07	-6.286	-6.387	-0.101	(0)
		CoCl+	1.319e-07	9.626e-08	-6.880	-7.017	-0.137	(0)
		NiCl+	8.630e-08	6.299e-08	-7.064	-7.201	-0.137	(0)
		ZnCl+	6.178e-08	4.896e-08	-7.209	-7.310	-0.101	(0)
		PbCl+	7.306e-09	5.333e-09	-8.136	-8.273	-0.137	(0)
		ZnOHCl	2.116e-09	2.116e-09	-8.675	-8.675	0.000	(0)
		CdCl+	1.764e-09	1.287e-09	-8.754	-8.890	-0.137	(0)
		CuCl2	1.233e-09	1.233e-09	-8.909	-8.909	0.000	(0)
		ZnCl2	6.936e-10	6.936e-10	-9.159	-9.159	0.000	(0)
		PbCl2	2.587e-10	2.587e-10	-9.587	-9.587	0.000	(0)
		BeCl+	2.565e-10	2.062e-10	-9.591	-9.686	-0.095	(0)
		CdCl2	5.879e-11	5.879e-11	-10.231	-10.231	0.000	(0)
		ZnCl3-	7.564e-12	5.995e-12	-11.121	-11.222	-0.101	(0)
		NiCl2	3.572e-12	3.572e-12	-11.447	-11.447	0.000	(0)
		PbCl3-	1.656e-12	1.209e-12	-11.781	-11.918	-0.137	(0)
		CdOHCl	1.492e-12	1.492e-12	-11.826	-11.826	0.000	(0)
		CdCl3-	5.381e-13	3.927e-13	-12.269	-12.406	-0.137	(0)
		CuCl3-	1.474e-13	1.168e-13	-12.831	-12.932	-0.101	(0)
		MnCl+	8.817e-14	7.088e-14	-13.055	-13.149	-0.095	(0)
		ZnCl4-2	7.657e-14	3.199e-14	-13.116	-13.495	-0.379	(0)
		PbCl4-2	2.008e-14	5.699e-15	-13.697	-14.244	-0.547	(0)
		CuCl2-	1.409e-15	1.117e-15	-14.851	-14.952	-0.101	(0)
		MnCl2	1.112e-15	1.112e-15	-14.954	-14.954	0.000	(0)
		CrO3Cl-	5.041e-16	3.679e-16	-15.297	-15.434	-0.137	(0)
		CuCl	4.754e-16	4.754e-16	-15.323	-15.323	0.000	(0)
		FeCl+2	2.005e-16	8.374e-17	-15.698	-16.077	-0.379	(0)
		CuCl4-2	1.846e-17	7.710e-18	-16.734	-17.113	-0.379	(0)
		CuCl3-2	6.227e-18	2.601e-18	-17.206	-17.585	-0.379	(0)
		FeCl2+	6.055e-18	4.868e-18	-17.218	-17.313	-0.095	(0)
		MnCl3-	4.233e-18	3.403e-18	-17.373	-17.468	-0.095	(0)
		FeCl3	5.407e-21	5.407e-21	-20.267	-20.267	0.000	(0)
		CoCl+2	2.442e-23	6.930e-24	-22.612	-23.159	-0.547	(0)
		CrCl+2	7.781e-28	2.208e-28	-27.109	-27.656	-0.547	(0)
		CrOHCl2	7.267e-31	7.267e-31	-30.139	-30.139	0.000	(0)
		CrCl2+	2.047e-31	1.494e-31	-30.689	-30.826	-0.137	(0)
		Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-325.990	-326.538	-0.547	(0)
		Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-398.487	-399.034	-0.547	(0)
		Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-408.277	-408.824	-0.547	(0)
Co (2)	1.227e-05							

Co+2	8.950e-06	2.540e-06	-5.048	-5.595	-0.547	(0)
CoSO4	3.172e-06	3.172e-06	-5.499	-5.499	0.000	(0)
CoCl+	1.319e-07	9.626e-08	-6.880	-7.017	-0.137	(0)
CoHCO3+	3.997e-09	2.917e-09	-8.398	-8.535	-0.137	(0)
CoNO3+	3.144e-09	2.295e-09	-8.503	-8.639	-0.137	(0)
CoOH+	2.208e-09	1.612e-09	-8.656	-8.793	-0.137	(0)
CoHPO4	1.983e-09	1.983e-09	-8.703	-8.703	0.000	(0)
CoCO3	9.399e-11	9.399e-11	-10.027	-10.027	0.000	(0)
CoSeO4	6.117e-11	6.117e-11	-10.213	-10.213	0.000	(0)
Co (OH) 2	4.071e-12	4.071e-12	-11.390	-11.390	0.000	(0)
Co (NO3) 2	2.662e-12	2.662e-12	-11.575	-11.575	0.000	(0)
Co2OH+3	3.490e-15	2.051e-16	-14.457	-15.688	-1.231	(0)
Co (OH) 3-	3.540e-18	2.583e-18	-17.451	-17.588	-0.137	(0)
CoOOH-	1.482e-19	1.081e-19	-18.829	-18.966	-0.137	(0)
CoNO2+	1.599e-21	1.167e-21	-20.796	-20.933	-0.137	(0)
Co4 (OH) 4+4	2.076e-25	1.346e-27	-24.683	-26.871	-2.188	(0)
Co (OH) 4-2	4.589e-26	1.302e-26	-25.338	-25.885	-0.547	(0)
Co (NH3) +2	0.000e+00	0.000e+00	-68.582	-69.129	-0.547	(0)
Co (NH3) 2+2	0.000e+00	0.000e+00	-132.954	-133.501	-0.547	(0)
Co (NH3) 3+2	0.000e+00	0.000e+00	-197.662	-198.209	-0.547	(0)
Co (NH3) 4+2	0.000e+00	0.000e+00	-262.751	-263.298	-0.547	(0)
Co (NH3) 5+2	0.000e+00	0.000e+00	-328.339	-328.886	-0.547	(0)
Co (3)	1.950e-18					
CoOH+2	1.950e-18	5.532e-19	-17.710	-18.257	-0.547	(0)
Co+3	2.532e-23	3.423e-24	-22.597	-23.466	-0.869	(0)
CoCl+2	2.442e-23	6.930e-24	-22.612	-23.159	-0.547	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-325.990	-326.538	-0.547	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-394.263	-394.400	-0.137	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-398.487	-399.034	-0.547	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-399.518	-400.065	-0.547	(0)
Cr (2)	0.000e+00					
Cr+2	0.000e+00	0.000e+00	-46.747	-47.294	-0.547	(0)
Cr (3)	6.831e-23					
Cr (OH) +2	3.155e-23	8.953e-24	-22.501	-23.048	-0.547	(0)
Cr (OH) 2+	2.777e-23	2.027e-23	-22.556	-22.693	-0.137	(0)
CrOHSO4	8.120e-24	8.120e-24	-23.090	-23.090	0.000	(0)
Cr+3	3.125e-25	1.837e-26	-24.505	-25.736	-1.231	(0)
CrSO4+	3.101e-25	2.263e-25	-24.508	-24.645	-0.137	(0)
Cr (OH) 3	2.422e-25	2.422e-25	-24.616	-24.616	0.000	(0)
CrCl+2	7.781e-28	2.208e-28	-27.109	-27.656	-0.547	(0)
CrO2-	4.989e-28	3.641e-28	-27.302	-27.439	-0.137	(0)
Cr (OH) 4-	4.201e-28	3.066e-28	-27.377	-27.513	-0.137	(0)
CrH2PO4+2	5.514e-29	1.565e-29	-28.259	-28.806	-0.547	(0)
CrNO3+2	1.037e-30	2.943e-31	-29.984	-30.531	-0.547	(0)
CrOHC12	7.267e-31	7.267e-31	-30.139	-30.139	0.000	(0)
CrCl2+	2.047e-31	1.494e-31	-30.689	-30.826	-0.137	(0)
Cr2 (OH) 2SO4+2	0.000e+00	0.000e+00	-43.868	-44.415	-0.547	(0)
Cr2 (OH) 2 (SO4) 2	0.000e+00	0.000e+00	-44.826	-44.826	0.000	(0)
Cr (NH3) 5OH+2	0.000e+00	0.000e+00	-341.742	-342.289	-0.547	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-406.741	-407.972	-1.231	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-408.277	-408.824	-0.547	(0)
Cr (6)	6.372e-08					
CrO4-2	3.955e-08	1.625e-08	-7.403	-7.789	-0.386	(0)
HCrO4-	2.248e-08	1.641e-08	-7.648	-7.785	-0.137	(0)
NaCrO4-	1.283e-09	9.363e-10	-8.892	-9.029	-0.137	(0)
KCrO4-	3.990e-10	2.912e-10	-9.399	-9.536	-0.137	(0)
CrO3HPO4-2	8.296e-13	2.354e-13	-12.081	-12.628	-0.547	(0)
Cr2O7-2	3.753e-14	1.065e-14	-13.426	-13.973	-0.547	(0)
CrO3SO4-2	3.693e-14	1.048e-14	-13.433	-13.980	-0.547	(0)
H2CrO4	3.260e-15	3.260e-15	-14.487	-14.487	0.000	(0)
CrO3Cl-	5.041e-16	3.679e-16	-15.297	-15.434	-0.137	(0)
CrO3H2PO4-	4.913e-17	3.586e-17	-16.309	-16.445	-0.137	(0)
Cu (1)	1.937e-15					
CuCl2-	1.409e-15	1.117e-15	-14.851	-14.952	-0.101	(0)
CuCl	4.754e-16	4.754e-16	-15.323	-15.323	0.000	(0)
Cu+	4.658e-17	3.400e-17	-16.332	-16.469	-0.137	(0)
CuCl3-2	6.227e-18	2.601e-18	-17.206	-17.585	-0.379	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-285.834	-286.239	-0.405	(0)

CuS4S5-3	0.000e+00	0.000e+00	-286.586	-286.969	-0.383	(0)
Cu (2)	9.874e-05					
Cu+2	5.997e-05	2.464e-05	-4.222	-4.608	-0.386	(0)
CuSO4	3.474e-05	3.474e-05	-4.459	-4.459	0.000	(0)
CuOH+	2.444e-06	1.937e-06	-5.612	-5.713	-0.101	(0)
CuCl+	5.171e-07	4.098e-07	-6.286	-6.387	-0.101	(0)
Cu2 (OH) 2+2	3.210e-07	9.108e-08	-6.494	-7.041	-0.547	(0)
CuCO3	3.177e-07	3.177e-07	-6.498	-6.498	0.000	(0)
CuNO3+	6.262e-08	4.570e-08	-7.203	-7.340	-0.137	(0)
CuHCO3+	3.146e-08	2.296e-08	-7.502	-7.639	-0.137	(0)
Cu (OH) 2	1.573e-08	1.573e-08	-7.803	-7.803	0.000	(0)
CuCl2	1.233e-09	1.233e-09	-8.909	-8.909	0.000	(0)
Cu (CO3) 2-2	6.599e-12	1.872e-12	-11.181	-11.728	-0.547	(0)
Cu (NO3) 2	3.189e-12	3.189e-12	-11.496	-11.496	0.000	(0)
Cu (OH) 3-	1.406e-12	1.026e-12	-11.852	-11.989	-0.137	(0)
CuCl3-	1.474e-13	1.168e-13	-12.831	-12.932	-0.101	(0)
CuCl4-2	1.846e-17	7.710e-18	-16.734	-17.113	-0.379	(0)
Cu (OH) 4-2	9.051e-19	2.568e-19	-18.043	-18.590	-0.547	(0)
CuNO2+	2.305e-19	1.683e-19	-18.637	-18.774	-0.137	(0)
Cu (NO2) 2	1.123e-34	1.123e-34	-33.950	-33.950	0.000	(0)
CuNH3+2	0.000e+00	0.000e+00	-65.644	-66.191	-0.547	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-407.813	-407.950	-0.137	(0)
Fe (2)	6.296e-17					
Fe+2	4.396e-17	1.247e-17	-16.357	-16.904	-0.547	(0)
FeSO4	1.893e-17	1.893e-17	-16.723	-16.723	0.000	(0)
FeHPO4	3.554e-20	3.554e-20	-19.449	-19.449	0.000	(0)
FeH2PO4+	2.762e-20	2.232e-20	-19.559	-19.651	-0.093	(0)
FeOH+	1.338e-20	1.076e-20	-19.874	-19.968	-0.095	(0)
FeHCO3+	2.848e-21	2.319e-21	-20.545	-20.635	-0.089	(0)
Fe (OH) 2	1.752e-25	1.752e-25	-24.757	-24.757	0.000	(0)
Fe (OH) 3-	2.091e-27	1.681e-27	-26.680	-26.774	-0.095	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-294.115	-294.115	0.000	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-435.021	-435.158	-0.137	(0)
Fe (3)	9.320e-08					
Fe (OH) 2+	9.193e-08	7.430e-08	-7.037	-7.129	-0.093	(0)
Fe (OH) 3	1.242e-09	1.242e-09	-8.906	-8.906	0.000	(0)
FeOH+2	1.078e-11	4.504e-12	-10.967	-11.346	-0.379	(0)
Fe (OH) 4-	9.299e-12	7.515e-12	-11.032	-11.124	-0.093	(0)
FeHPO4+	2.639e-12	2.133e-12	-11.579	-11.671	-0.093	(0)
FeSO4+	2.245e-14	1.805e-14	-13.649	-13.744	-0.095	(0)
Fe (SO4) 2-	3.594e-15	2.623e-15	-14.444	-14.581	-0.137	(0)
Fe+3	2.163e-15	2.924e-16	-14.665	-15.534	-0.869	(0)
FeCl+2	2.005e-16	8.374e-17	-15.698	-16.077	-0.379	(0)
FeH2PO4+2	4.648e-17	1.983e-17	-16.333	-16.703	-0.370	(0)
FeNO3+2	7.579e-18	2.150e-18	-17.120	-17.667	-0.547	(0)
FeCl2+	6.055e-18	4.868e-18	-17.218	-17.313	-0.095	(0)
Fe2 (OH) 2+4	1.239e-19	8.032e-22	-18.907	-21.095	-2.188	(0)
FeCl3	5.407e-21	5.407e-21	-20.267	-20.267	0.000	(0)
Fe3 (OH) 4+5	2.148e-24	8.185e-28	-23.668	-27.087	-3.419	(0)
FeHSeO3+2	2.682e-31	7.609e-32	-30.572	-31.119	-0.547	(0)
H (0)	0.000e+00					
H2	0.000e+00	0.000e+00	-45.195	-45.187	0.007	(0)
K	6.291e-03					
K+	6.023e-03	4.822e-03	-2.220	-2.317	-0.097	(0)
KSO4-	2.683e-04	2.168e-04	-3.571	-3.664	-0.093	(0)
KHPO4-	3.239e-08	2.618e-08	-7.490	-7.582	-0.093	(0)
KCrO4-	3.990e-10	2.912e-10	-9.399	-9.536	-0.137	(0)
Mg	3.635e-03					
Mg+2	2.473e-03	1.016e-03	-2.607	-2.993	-0.386	(0)
MgSO4	1.161e-03	1.161e-03	-2.935	-2.935	0.000	(0)
MgHPO4	4.685e-07	4.685e-07	-6.329	-6.329	0.000	(0)
MgH2PO4+	2.235e-07	1.807e-07	-6.651	-6.743	-0.093	(0)
MgHCO3+	2.085e-07	1.652e-07	-6.681	-6.782	-0.101	(0)
MgOH+	9.855e-09	8.070e-09	-8.006	-8.093	-0.087	(0)
MgCO3	1.704e-09	1.704e-09	-8.768	-8.768	0.000	(0)
MgH2BO3+	7.213e-10	5.574e-10	-9.142	-9.254	-0.112	(0)
MgPO4-	4.949e-11	3.999e-11	-10.306	-10.398	-0.093	(0)
Mn (2)	2.351e-11					

Mn+2	1.786e-11	5.068e-12	-10.748	-11.295	-0.547	(0)
MnSO4	5.546e-12	5.546e-12	-11.256	-11.256	0.000	(0)
MnCl+	8.817e-14	7.088e-14	-13.055	-13.149	-0.095	(0)
MnNO3+	6.275e-15	4.580e-15	-14.202	-14.339	-0.137	(0)
MnHCO3+	1.998e-15	1.607e-15	-14.699	-14.794	-0.095	(0)
MnCl2	1.112e-15	1.112e-15	-14.954	-14.954	0.000	(0)
MnOH+	3.430e-16	2.758e-16	-15.465	-15.559	-0.095	(0)
MnSeO4	6.466e-17	6.466e-17	-16.189	-16.189	0.000	(0)
Mn (NO3) 2	6.633e-18	6.633e-18	-17.178	-17.178	0.000	(0)
MnCl3-	4.233e-18	3.403e-18	-17.373	-17.468	-0.095	(0)
Mn (OH) 3-	3.148e-27	2.531e-27	-26.502	-26.597	-0.095	(0)
Mn (OH) 4-2	6.221e-34	2.599e-34	-33.206	-33.585	-0.379	(0)
MnSe	0.000e+00	0.000e+00	-110.428	-110.428	0.000	(0)
Mn (3)	2.700e-22					
Mn+3	2.700e-22	3.651e-23	-21.569	-22.438	-0.869	(0)
Mn (6)	4.506e-22					
MnO4-2	4.506e-22	1.882e-22	-21.346	-21.725	-0.379	(0)
Mn (7)	1.610e-17					
MnO4-	1.610e-17	1.256e-17	-16.793	-16.901	-0.108	(0)
Mo	1.151e-06					
MoO4-2	1.147e-06	4.715e-07	-5.940	-6.326	-0.386	(0)
HMoO4-	3.543e-09	2.586e-09	-8.451	-8.587	-0.137	(0)
H2MoO4	8.219e-12	8.219e-12	-11.085	-11.085	0.000	(0)
AlMo6O21-3	8.872e-34	5.213e-35	-33.052	-34.283	-1.231	(0)
Mo7O24-6	2.049e-38	0.000e+00	-37.688	-42.612	-4.924	(0)
HMo7O24-5	4.613e-40	0.000e+00	-39.336	-42.755	-3.419	(0)
H2Mo7O24-4	0.000e+00	0.000e+00	-42.294	-44.482	-2.188	(0)
H3Mo7O24-3	0.000e+00	0.000e+00	-46.499	-47.730	-1.231	(0)
N (-3)	0.000e+00					
NH4+	0.000e+00	0.000e+00	-62.952	-63.064	-0.112	(0)
NH4SO4-	0.000e+00	0.000e+00	-64.124	-64.219	-0.095	(0)
CuNH3+2	0.000e+00	0.000e+00	-65.644	-66.191	-0.547	(0)
NH3	0.000e+00	0.000e+00	-65.963	-65.963	0.000	(0)
CaNH3+2	0.000e+00	0.000e+00	-67.587	-68.134	-0.547	(0)
NiNH3+2	0.000e+00	0.000e+00	-67.979	-68.526	-0.547	(0)
Co (NH3) +2	0.000e+00	0.000e+00	-68.582	-69.129	-0.547	(0)
BaNH3+2	0.000e+00	0.000e+00	-72.382	-72.929	-0.547	(0)
Ni (NH3) 2+2	0.000e+00	0.000e+00	-131.494	-132.041	-0.547	(0)
Co (NH3) 2+2	0.000e+00	0.000e+00	-132.954	-133.501	-0.547	(0)
Ca (NH3) 2+2	0.000e+00	0.000e+00	-133.795	-134.342	-0.547	(0)
Co (NH3) 3+2	0.000e+00	0.000e+00	-197.662	-198.209	-0.547	(0)
Co (NH3) 4+2	0.000e+00	0.000e+00	-262.751	-263.298	-0.547	(0)
Co (NH3) 5Cl+2	0.000e+00	0.000e+00	-325.990	-326.538	-0.547	(0)
Co (NH3) 5+2	0.000e+00	0.000e+00	-328.339	-328.886	-0.547	(0)
Cr (NH3) 5OH+2	0.000e+00	0.000e+00	-341.742	-342.289	-0.547	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-394.263	-394.400	-0.137	(0)
Co (NH3) 6Cl+2	0.000e+00	0.000e+00	-398.487	-399.034	-0.547	(0)
Co (NH3) 6OH+2	0.000e+00	0.000e+00	-399.518	-400.065	-0.547	(0)
Cr (NH3) 6+3	0.000e+00	0.000e+00	-406.741	-407.972	-1.231	(0)
Cr (NH3) 6Cl+2	0.000e+00	0.000e+00	-408.277	-408.824	-0.547	(0)
N (3)	8.385e-17					
NO2-	8.362e-17	6.520e-17	-16.078	-16.186	-0.108	(0)
CuNO2+	2.305e-19	1.683e-19	-18.637	-18.774	-0.137	(0)
CoNO2+	1.599e-21	1.167e-21	-20.796	-20.933	-0.137	(0)
Cu (NO2) 2	1.123e-34	1.123e-34	-33.950	-33.950	0.000	(0)
N (5)	7.218e-04					
NO3-	7.121e-04	5.701e-04	-3.147	-3.244	-0.097	(0)
CaNO3+	9.623e-06	7.024e-06	-5.017	-5.153	-0.137	(0)
CuNO3+	6.262e-08	4.570e-08	-7.203	-7.340	-0.137	(0)
NiNO3+	4.409e-09	3.218e-09	-8.356	-8.492	-0.137	(0)
ZnNO3+	3.688e-09	2.692e-09	-8.433	-8.570	-0.137	(0)
CoNO3+	3.144e-09	2.295e-09	-8.503	-8.639	-0.137	(0)
BaNO3+	5.135e-10	3.748e-10	-9.289	-9.426	-0.137	(0)
PbNO3+	1.637e-10	1.195e-10	-9.786	-9.923	-0.137	(0)
CdNO3+	3.487e-12	2.545e-12	-11.458	-11.594	-0.137	(0)
Cu (NO3) 2	3.189e-12	3.189e-12	-11.496	-11.496	0.000	(0)
Co (NO3) 2	2.662e-12	2.662e-12	-11.575	-11.575	0.000	(0)
Zn (NO3) 2	2.967e-13	2.967e-13	-12.528	-12.528	0.000	(0)

	Pb(NO3) 2	1.227e-13	1.227e-13	-12.911	-12.911	0.000	(0)
	MnNO3+	6.275e-15	4.580e-15	-14.202	-14.339	-0.137	(0)
	Cd(NO3) 2	6.293e-16	6.293e-16	-15.201	-15.201	0.000	(0)
	FeNO3+2	7.579e-18	2.150e-18	-17.120	-17.667	-0.547	(0)
	Mn(NO3) 2	6.633e-18	6.633e-18	-17.178	-17.178	0.000	(0)
	CrNO3+2	1.037e-30	2.943e-31	-29.984	-30.531	-0.547	(0)
Na	1.498e-02						
	Na+	1.448e-02	1.159e-02	-1.839	-1.936	-0.097	(0)
	NaSO4-	4.998e-04	4.039e-04	-3.301	-3.394	-0.093	(0)
	NaHPO4-	1.206e-07	9.747e-08	-6.919	-7.011	-0.093	(0)
	NaHCO3	1.170e-07	1.170e-07	-6.932	-6.932	0.000	(0)
	NaCrO4-	1.283e-09	9.363e-10	-8.892	-9.029	-0.137	(0)
	NaCO3-	6.727e-10	5.436e-10	-9.172	-9.265	-0.093	(0)
	NaH2BO3	3.178e-10	3.178e-10	-9.498	-9.498	0.000	(0)
Ni	8.382e-06						
	Ni+2	5.468e-06	2.247e-06	-5.262	-5.648	-0.386	(0)
	NiSO4	2.814e-06	2.814e-06	-5.551	-5.551	0.000	(0)
	NiCl+	8.630e-08	6.299e-08	-7.064	-7.201	-0.137	(0)
	NiHCO3+	5.605e-09	4.091e-09	-8.251	-8.388	-0.137	(0)
	NiNO3+	4.409e-09	3.218e-09	-8.356	-8.492	-0.137	(0)
	Ni(SO4) 2-2	2.233e-09	6.335e-10	-8.651	-9.198	-0.547	(0)
	NiOH+	8.630e-10	6.299e-10	-9.064	-9.201	-0.137	(0)
	NiCO3	1.835e-10	1.835e-10	-9.736	-9.736	0.000	(0)
	NiSeO4	4.982e-11	4.982e-11	-10.303	-10.303	0.000	(0)
	NiCl2	3.572e-12	3.572e-12	-11.447	-11.447	0.000	(0)
	Ni(OH) 2	2.273e-12	2.273e-12	-11.643	-11.643	0.000	(0)
	Ni(OH) 3-	9.903e-17	7.228e-17	-16.004	-16.141	-0.137	(0)
	NiNH3+2	0.000e+00	0.000e+00	-67.979	-68.526	-0.547	(0)
	Ni(NH3) 2+2	0.000e+00	0.000e+00	-131.494	-132.041	-0.547	(0)
O(0)	9.507e-04						
	O2	4.753e-04	4.834e-04	-3.323	-3.316	0.007	(0)
P	9.399e-06						
	H2PO4-	5.001e-06	4.041e-06	-5.301	-5.393	-0.093	(0)
	HPO4-2	1.900e-06	7.935e-07	-5.721	-6.100	-0.379	(0)
	CaHPO4	1.254e-06	1.254e-06	-5.902	-5.902	0.000	(0)
	MgHPO4	4.685e-07	4.685e-07	-6.329	-6.329	0.000	(0)
	CaH2PO4+	3.869e-07	3.127e-07	-6.412	-6.505	-0.093	(0)
	MgH2PO4+	2.235e-07	1.807e-07	-6.651	-6.743	-0.093	(0)
	NaHPO4-	1.206e-07	9.747e-08	-6.919	-7.011	-0.093	(0)
	KHPO4-	3.239e-08	2.618e-08	-7.490	-7.582	-0.093	(0)
	CaPO4-	1.169e-08	9.450e-09	-7.932	-8.025	-0.093	(0)
	CoHPO4	1.983e-09	1.983e-09	-8.703	-8.703	0.000	(0)
	H3PO4	1.702e-10	1.702e-10	-9.769	-9.769	0.000	(0)
	MgPO4-	4.949e-11	3.999e-11	-10.306	-10.398	-0.093	(0)
	PO4-3	7.059e-12	9.544e-13	-11.151	-12.020	-0.869	(0)
	FeHPO4+	2.639e-12	2.133e-12	-11.579	-11.671	-0.093	(0)
	CrO3HPO4-2	8.296e-13	2.354e-13	-12.081	-12.628	-0.547	(0)
	CrO3H2PO4-	4.913e-17	3.586e-17	-16.309	-16.445	-0.137	(0)
	FeH2PO4+2	4.648e-17	1.983e-17	-16.333	-16.703	-0.370	(0)
	FeHPO4	3.554e-20	3.554e-20	-19.449	-19.449	0.000	(0)
	FeH2PO4+	2.762e-20	2.232e-20	-19.559	-19.651	-0.093	(0)
	CrH2PO4+2	5.514e-29	1.565e-29	-28.259	-28.806	-0.547	(0)
Pb	9.690e-08						
	PbSO4	4.596e-08	4.596e-08	-7.338	-7.338	0.000	(0)
	Pb+2	3.496e-08	1.436e-08	-7.456	-7.843	-0.386	(0)
	PbCl+	7.306e-09	5.333e-09	-8.136	-8.273	-0.137	(0)
	Pb(SO4) 2-2	6.376e-09	1.809e-09	-8.195	-8.743	-0.547	(0)
	PbOH+	1.572e-09	1.148e-09	-8.803	-8.940	-0.137	(0)
	PbCl2	2.587e-10	2.587e-10	-9.587	-9.587	0.000	(0)
	PbHCO3+	2.160e-10	1.576e-10	-9.666	-9.802	-0.137	(0)
	PbNO3+	1.637e-10	1.195e-10	-9.786	-9.923	-0.137	(0)
	PbCO3	9.454e-11	9.454e-11	-10.024	-10.024	0.000	(0)
	PbCl3-	1.656e-12	1.209e-12	-11.781	-11.918	-0.137	(0)
	Pb(OH) 2	1.154e-12	1.154e-12	-11.938	-11.938	0.000	(0)
	Pb(NO3) 2	1.227e-13	1.227e-13	-12.911	-12.911	0.000	(0)
	PbCl4-2	2.008e-14	5.699e-15	-13.697	-14.244	-0.547	(0)
	Pb2OH+3	4.445e-15	2.612e-16	-14.352	-15.583	-1.231	(0)
	Pb(CO3) 2-2	2.104e-15	5.970e-16	-14.677	-15.224	-0.547	(0)

Pb (OH) 3-	5.029e-17	3.670e-17	-16.299	-16.435	-0.137	(0)
Pb (OH) 4-2	1.008e-21	2.859e-22	-20.997	-21.544	-0.547	(0)
Pb3 (OH) 4+2	6.088e-22	1.727e-22	-21.216	-21.763	-0.547	(0)
Pb4 (OH) 4+4	3.661e-24	2.373e-26	-23.436	-25.625	-2.188	(0)
Pb (HS) 2	0.000e+00	0.000e+00	-278.733	-278.733	0.000	(0)
Pb (HS) 3-	0.000e+00	0.000e+00	-420.377	-420.514	-0.137	(0)
S (-2)	0.000e+00					
H2S	0.000e+00	0.000e+00	-142.495	-142.495	0.000	(0)
HS-	0.000e+00	0.000e+00	-142.944	-143.080	-0.137	(0)
CdHS+	0.000e+00	0.000e+00	-143.849	-143.985	-0.137	(0)
S5-2	0.000e+00	0.000e+00	-145.511	-146.058	-0.547	(0)
S6-2	0.000e+00	0.000e+00	-145.914	-146.461	-0.547	(0)
S4-2	0.000e+00	0.000e+00	-146.111	-146.658	-0.547	(0)
S3-2	0.000e+00	0.000e+00	-146.926	-147.473	-0.547	(0)
S2-2	0.000e+00	0.000e+00	-147.955	-148.502	-0.547	(0)
S-2	0.000e+00	0.000e+00	-153.649	-154.028	-0.379	(0)
ZnS (HS) -	0.000e+00	0.000e+00	-278.453	-278.590	-0.137	(0)
Pb (HS) 2	0.000e+00	0.000e+00	-278.733	-278.733	0.000	(0)
Zn (HS) 2	0.000e+00	0.000e+00	-279.080	-279.080	0.000	(0)
Cd (HS) 2	0.000e+00	0.000e+00	-279.862	-279.862	0.000	(0)
Cu (S4) 2-3	0.000e+00	0.000e+00	-285.834	-286.239	-0.405	(0)
CuS4S5-3	0.000e+00	0.000e+00	-286.586	-286.969	-0.383	(0)
Fe (HS) 2	0.000e+00	0.000e+00	-294.115	-294.115	0.000	(0)
Cu (HS) 3-	0.000e+00	0.000e+00	-407.813	-407.950	-0.137	(0)
Zn (HS) 3-	0.000e+00	0.000e+00	-418.744	-418.880	-0.137	(0)
Pb (HS) 3-	0.000e+00	0.000e+00	-420.377	-420.514	-0.137	(0)
Cd (HS) 3-	0.000e+00	0.000e+00	-420.905	-421.042	-0.137	(0)
ZnS (HS) 2-2	0.000e+00	0.000e+00	-421.813	-422.360	-0.547	(0)
Fe (HS) 3-	0.000e+00	0.000e+00	-435.021	-435.158	-0.137	(0)
Cd (HS) 4-2	0.000e+00	0.000e+00	-561.379	-561.926	-0.547	(0)
Zn (HS) 4-2	0.000e+00	0.000e+00	-562.874	-563.421	-0.547	(0)
S (6)	2.322e-02					
SO4-2	1.590e-02	6.533e-03	-1.799	-2.185	-0.386	(0)
CaSO4	5.350e-03	5.350e-03	-2.272	-2.272	0.000	(0)
MgSO4	1.161e-03	1.161e-03	-2.935	-2.935	0.000	(0)
NaSO4-	4.998e-04	4.039e-04	-3.301	-3.394	-0.093	(0)
KSO4-	2.683e-04	2.168e-04	-3.571	-3.664	-0.093	(0)
CuSO4	3.474e-05	3.474e-05	-4.459	-4.459	0.000	(0)
CoSO4	3.172e-06	3.172e-06	-5.499	-5.499	0.000	(0)
NiSO4	2.814e-06	2.814e-06	-5.551	-5.551	0.000	(0)
ZnSO4	2.494e-06	2.494e-06	-5.603	-5.603	0.000	(0)
Zn (SO4) 2-2	5.219e-07	1.481e-07	-6.282	-6.829	-0.547	(0)
HSO4-	2.173e-07	1.735e-07	-6.663	-6.761	-0.098	(0)
PbSO4	4.596e-08	4.596e-08	-7.338	-7.338	0.000	(0)
BeSO4	9.686e-09	9.686e-09	-8.014	-8.014	0.000	(0)
Pb (SO4) 2-2	6.376e-09	1.809e-09	-8.195	-8.743	-0.547	(0)
Ni (SO4) 2-2	2.233e-09	6.335e-10	-8.651	-9.198	-0.547	(0)
CdSO4	1.762e-09	1.762e-09	-8.754	-8.754	0.000	(0)
Be (SO4) 2-2	6.933e-10	1.967e-10	-9.159	-9.706	-0.547	(0)
Cd (SO4) 2-2	5.811e-10	1.649e-10	-9.236	-9.783	-0.547	(0)
AlSO4+	2.519e-11	2.011e-11	-10.599	-10.697	-0.098	(0)
MnSO4	5.546e-12	5.546e-12	-11.256	-11.256	0.000	(0)
Al (SO4) 2-	1.970e-12	1.572e-12	-11.706	-11.803	-0.098	(0)
CrO3SO4-2	3.693e-14	1.048e-14	-13.433	-13.980	-0.547	(0)
FeSO4+	2.245e-14	1.805e-14	-13.649	-13.744	-0.095	(0)
Fe (SO4) 2-	3.594e-15	2.623e-15	-14.444	-14.581	-0.137	(0)
FeSO4	1.893e-17	1.893e-17	-16.723	-16.723	0.000	(0)
CrOHSO4	8.120e-24	8.120e-24	-23.090	-23.090	0.000	(0)
CrSO4+	3.101e-25	2.263e-25	-24.508	-24.645	-0.137	(0)
Cr2 (OH) 2SO4+2	0.000e+00	0.000e+00	-43.868	-44.415	-0.547	(0)
Cr2 (OH) 2 (SO4) 2	0.000e+00	0.000e+00	-44.826	-44.826	0.000	(0)
NH4SO4-	0.000e+00	0.000e+00	-64.124	-64.219	-0.095	(0)
Co (NH3) 6SO4+	0.000e+00	0.000e+00	-394.263	-394.400	-0.137	(0)
Se (-2)	0.000e+00					
HSe-	0.000e+00	0.000e+00	-100.111	-100.248	-0.137	(0)
H2Se	0.000e+00	0.000e+00	-102.868	-102.868	0.000	(0)
Se-2	0.000e+00	0.000e+00	-108.345	-108.892	-0.547	(0)
MnSe	0.000e+00	0.000e+00	-110.428	-110.428	0.000	(0)

Se (4)	1.653e-19					
HSeO3-	1.603e-19	1.170e-19	-18.795	-18.932	-0.137	(0)
SeO3-2	5.013e-21	1.422e-21	-20.300	-20.847	-0.547	(0)
H2SeO3	1.512e-23	1.512e-23	-22.820	-22.820	0.000	(0)
FeHSeO3+2	2.682e-31	7.609e-32	-30.572	-31.119	-0.547	(0)
Cd (SeO3) 2-2	0.000e+00	0.000e+00	-44.114	-44.661	-0.547	(0)
Se (6)	1.271e-07					
SeO4-2	1.270e-07	5.219e-08	-6.896	-7.282	-0.386	(0)
CoSeO4	6.117e-11	6.117e-11	-10.213	-10.213	0.000	(0)
NiSeO4	4.982e-11	4.982e-11	-10.303	-10.303	0.000	(0)
ZnSeO4	1.472e-11	1.472e-11	-10.832	-10.832	0.000	(0)
HSeO4-	9.675e-13	7.062e-13	-12.014	-12.151	-0.137	(0)
CdSeO4	1.187e-14	1.187e-14	-13.925	-13.925	0.000	(0)
MnSeO4	6.466e-17	6.466e-17	-16.189	-16.189	0.000	(0)
Zn (SeO4) 2-2	2.746e-18	7.791e-19	-17.561	-18.108	-0.547	(0)
Zn	7.523e-06					
Zn+2	4.432e-06	1.821e-06	-5.353	-5.740	-0.386	(0)
ZnSO4	2.494e-06	2.494e-06	-5.603	-5.603	0.000	(0)
Zn (SO4) 2-2	5.219e-07	1.481e-07	-6.282	-6.829	-0.547	(0)
ZnCl+	6.178e-08	4.896e-08	-7.209	-7.310	-0.101	(0)
ZnOH+	5.405e-09	3.945e-09	-8.267	-8.404	-0.137	(0)
ZnNO3+	3.688e-09	2.692e-09	-8.433	-8.570	-0.137	(0)
ZnOHCl	2.116e-09	2.116e-09	-8.675	-8.675	0.000	(0)
ZnHCO3+	1.165e-09	8.505e-10	-8.934	-9.070	-0.137	(0)
ZnCl2	6.936e-10	6.936e-10	-9.159	-9.159	0.000	(0)
ZnCO3	2.295e-10	2.295e-10	-9.639	-9.639	0.000	(0)
Zn (OH) 2	2.919e-11	2.919e-11	-10.535	-10.535	0.000	(0)
ZnSeO4	1.472e-11	1.472e-11	-10.832	-10.832	0.000	(0)
ZnCl3-	7.564e-12	5.995e-12	-11.121	-11.222	-0.101	(0)
Zn (NO3) 2	2.967e-13	2.967e-13	-12.528	-12.528	0.000	(0)
ZnCl4-2	7.657e-14	3.199e-14	-13.116	-13.495	-0.379	(0)
Zn (OH) 3-	6.376e-15	4.654e-15	-14.195	-14.332	-0.137	(0)
Zn (SeO4) 2-2	2.746e-18	7.791e-19	-17.561	-18.108	-0.547	(0)
Zn (OH) 4-2	2.076e-20	5.892e-21	-19.683	-20.230	-0.547	(0)
ZnS (HS) -	0.000e+00	0.000e+00	-278.453	-278.590	-0.137	(0)
Zn (HS) 2	0.000e+00	0.000e+00	-279.080	-279.080	0.000	(0)
Zn (HS) 3-	0.000e+00	0.000e+00	-418.744	-418.880	-0.137	(0)
ZnS (HS) 2-2	0.000e+00	0.000e+00	-421.813	-422.360	-0.547	(0)
Zn (HS) 4-2	0.000e+00	0.000e+00	-562.874	-563.421	-0.547	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co (NH3) 5Cl) (NO3) 2-321.00	-314.73	6.27	(Co (NH3) 5Cl) (NO3) 2	
(Co (NH3) 5Cl) Cl2-316.69	-312.15	4.54	(Co (NH3) 5Cl) Cl2	
(Co (NH3) 5OH2) Cl3-323.96	-312.15	11.81	(Co (NH3) 5OH2) Cl3	
(Co (NH3) 6) (NO3) 3-390.51	-372.58	17.93	(Co (NH3) 6) (NO3) 3	
(Co (NH3) 6) Cl3 -388.84	-368.71	20.13	(Co (NH3) 6) Cl3	
(NH4) 2CrO4 -134.29	-133.92	0.38	(NH4) 2CrO4	
(NH4) 2SeO4 -133.86	-133.41	0.45	(NH4) 2SeO4	
Al (OH) 3 (am) -3.95	7.18	11.13	Al (OH) 3	
Al2 (MoO4) 3 -46.76	-43.62	3.15	Al2 (MoO4) 3	
Al2O3 -6.06	14.36	20.43	Al2O3	
Al4 (OH) 10SO4 -9.16	13.54	22.70	Al4 (OH) 10SO4	
AlAsO4:2H2O -9.88	-5.08	4.80	AlAsO4:2H2O	
AlOHSO4 -4.77	-8.00	-3.23	AlOHSO4	
Alunite -3.87	-4.64	-0.77	KAl3 (SO4) 2 (OH) 6	
Anglesite -2.20	-10.03	-7.83	PbSO4	
Anhydrite -0.27	-4.61	-4.34	CaSO4	
Anilite -130.01	-162.44	-32.42	Cu0.25Cu1.5S	
Antlerite 1.20	9.99	8.79	Cu3 (OH) 4SO4	
Aragonite -2.82	-11.09	-8.26	CaCO3	
Arsenolite -137.25	-140.19	-2.94	As4O6	
Artinite -11.61	-1.65	9.96	MgCO3:Mg (OH) 2:3H2O	
As2O5 -31.30	-24.52	6.77	As2O5	
Atacamite 0.66	8.33	7.67	Cu2 (OH) 3Cl	
Azurite -1.52	-18.15	-16.62	Cu3 (OH) 2 (CO3) 2	

Ba (OH) 2:8H2O	-18.48	6.07	24.56	Ba (OH) 2:8H2O
Ba3 (AsO4) 2	2.65	-6.29	-8.94	Ba3 (AsO4) 2
BaCrO4	-4.94	-14.71	-9.77	BaCrO4
BaHPO4	-5.67	-25.44	-19.77	BaHPO4
BaMoO4	-6.25	-13.25	-6.99	BaMoO4
Barite	0.94	-9.11	-10.05	BaSO4
BaS	-159.68	-143.50	16.18	BaS
BaSeO3	-21.15	-19.35	1.79	BaSeO3
BaSeO4	-6.68	-14.20	-7.53	BaSeO4
Be (OH) 2 (alpha)	-1.83	5.07	6.89	Be (OH) 2
Be (OH) 2 (am)	-2.13	5.07	7.19	Be (OH) 2
Be (OH) 2 (beta)	-1.43	5.07	6.49	Be (OH) 2
BeMoO4	-12.65	-14.26	-1.61	BeMoO4
BeS	-163.89	-144.51	19.38	BeS
BeSeO4:4H2O	-12.28	-15.22	-2.94	BeSeO4:4H2O
Bianchite	-6.16	-7.93	-1.76	ZnSO4:6H2O
Birnessite	-0.00	18.09	18.09	MnO2
Bixbyite	-5.60	-5.88	-0.27	Mn2O3
BlaubleiI	-119.86	-144.02	-24.16	Cu0.9Cu0.2S
BlaubleiIII	-125.24	-152.52	-27.28	Cu0.6Cu0.8S
Boehmite	-1.75	7.18	8.93	AlOOH
Brochantite	2.55	18.38	15.83	Cu4 (OH) 6SO4
Brucite	-7.18	10.01	17.18	Mg (OH) 2
Bunsenite	-5.39	7.35	12.74	NiO
Ca3 (AsO4) 2:4H2O	-15.10	7.20	22.30	Ca3 (AsO4) 2:4H2O
Ca3 (PO4) 2 (beta)	-2.24	-31.32	-29.08	Ca3 (PO4) 2
Ca4H (PO4) 3:3H2O	-5.18	-52.26	-47.08	Ca4H (PO4) 3:3H2O
CaCrO4	-8.03	-10.21	-2.19	CaCrO4
CaHPO4	-1.58	-20.95	-19.37	CaHPO4
CaHPO4:2H2O	-1.88	-20.95	-19.06	CaHPO4:2H2O
Calcite	-2.63	-11.09	-8.46	CaCO3
CaMoO4	-0.81	-8.75	-7.94	CaMoO4
CaSeO3:2H2O	-17.73	-14.86	2.87	CaSeO3:2H2O
CaSeO4:2H2O	-6.71	-9.71	-3.00	CaSeO4:2H2O
Cd (BO2) 2	-15.80	-5.96	9.84	Cd (BO2) 2
Cd (OH) 2	-9.84	4.09	13.93	Cd (OH) 2
Cd (OH) 2 (am)	-9.90	4.09	13.99	Cd (OH) 2
Cd3 (OH) 2 (SO4) 2	-24.82	-18.11	6.71	Cd3 (OH) 2 (SO4) 2
Cd3 (OH) 4SO4	-25.49	-2.93	22.56	Cd3 (OH) 4SO4
Cd3 (PO4) 2	-18.18	-50.78	-32.60	Cd3 (PO4) 2
Cd4 (OH) 6SO4	-27.24	1.16	28.40	Cd4 (OH) 6SO4
CdCl2	-12.22	-12.82	-0.60	CdCl2
CdCl2:1H2O	-11.15	-12.82	-1.67	CdCl2:1H2O
CdCl2:2.5H2O	-10.89	-12.82	-1.93	CdCl2:2.5H2O
Cdmetal (alpha)	-51.71	-37.97	13.74	Cd
Cdmetal (gamma)	-51.82	-37.97	13.84	Cd
CdMoO4	-1.03	-15.24	-14.21	CdMoO4
CdOHCl	-8.00	-4.37	3.63	CdOHCl
CdSe	-82.23	-102.66	-20.43	CdSe
CdSeO4:2H2O	-14.35	-16.20	-1.85	CdSeO4:2H2O
CdSO4	-11.08	-11.10	-0.02	CdSO4
CdSO4:1H2O	-9.47	-11.10	-1.63	CdSO4:1H2O
CdSO4:2.67H2O	-9.28	-11.10	-1.82	CdSO4:2.67H2O
Cerussite	-3.30	-16.50	-13.20	PbCO3
CH4 (g)	-148.08	-189.90	-41.81	CH4
Chalcanthite	-4.14	-6.80	-2.66	CuSO4:5H2O
Chalcocite	-134.10	-169.52	-35.42	Cu2S
Chalcopyrite	-258.96	-294.67	-35.71	CuFeS2
Claudetite	-136.96	-140.19	-3.23	As4O6
Clausthalite	-74.13	-101.59	-27.46	PbSe
Co (BO2) 2	-29.72	-2.65	27.07	Co (BO2) 2
Co (OH) 2	-5.69	7.40	13.09	Co (OH) 2
Co (OH) 3	-1.93	-3.97	-2.03	Co (OH) 3
CO2 (g)	-3.50	-21.66	-18.16	CO2
Co3 (AsO4) 2	-15.34	-2.31	13.03	Co3 (AsO4) 2
Co3 (PO4) 2	-6.14	-40.83	-34.69	Co3 (PO4) 2
Co3O4	9.65	-0.53	-10.17	Co3O4
CoCl2	-18.01	-9.50	8.51	CoCl2

CoCl2:6H2O	-12.02	-9.51	2.51	CoCl2:6H2O
CoCO3	-4.31	-14.25	-9.94	CoCO3
CoFe2O4	18.39	15.33	-3.05	CoFe2O4
CoHPO4	-5.05	-24.12	-19.06	CoHPO4
CoMoO4	-4.23	-11.92	-7.69	CoMoO4
CoO	-6.50	7.40	13.90	CoO
CoS(alpha)	-134.74	-142.18	-7.44	CoS
CoS(beta)	-131.11	-142.18	-11.07	CoS
CoSe	-83.14	-99.34	-16.20	CoSe
CoSeO3	-19.35	-18.03	1.32	CoSeO3
CoSeO4:6H2O	-11.35	-12.88	-1.53	CoSeO4:6H2O
CoSO4	-10.82	-7.78	3.04	CoSO4
CoSO4:6H2O	-5.31	-7.78	-2.48	CoSO4:6H2O
Cotunnite	-6.89	-11.75	-4.86	PbCl2
Covellite	-118.60	-141.19	-22.59	CuS
Cr(OH)2	-45.22	-34.29	10.93	Cr(OH)2
Cr(OH)3	-17.62	-16.19	1.42	Cr(OH)3
Cr(OH)3(am)	-15.44	-16.19	-0.75	Cr(OH)3
Cr2O3	-30.18	-32.39	-2.21	Cr2O3
CrCl2	-65.63	-51.20	14.42	CrCl2
CrCl3	-57.03	-41.56	15.48	CrCl3
Crmetal	-107.35	-76.35	31.00	Cr
CrO3	-17.59	-20.79	-3.19	CrO3
Cu(OH)2	-0.45	8.39	8.84	Cu(OH)2
Cu2(OH)3NO3	-2.43	7.04	9.47	Cu2(OH)3NO3
Cu2Se(alpha)	-80.25	-126.69	-46.44	Cu2Se
Cu2SO4	-33.23	-35.12	-1.89	Cu2SO4
Cu3(AsO4)2:2H2O	-5.45	0.65	6.10	Cu3(AsO4)2:2H2O
Cu3(PO4)2	-1.02	-37.87	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-2.75	-37.87	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	-160.53	-225.04	-64.51	Cu3Se2
CuCO3	-1.77	-13.27	-11.50	CuCO3
CuCrO4	-6.96	-12.40	-5.44	CuCrO4
Cumetal	-22.03	-31.00	-8.97	Cu
CuMoO4	2.18	-10.93	-13.11	CuMoO4
CuOCuSO4	-9.12	1.60	10.71	CuOCuSO4
Cupricferrite	9.71	16.32	6.62	CuFe2O4
Cuprite	-18.90	-19.94	-1.04	Cu2O
Cuprousferrite	2.87	-6.00	-8.87	CuFeO2
CuSe	-64.89	-98.36	-33.46	CuSe
CuSe2	-129.26	-163.05	-33.79	CuSe2
CuSeO3:2H2O	-17.66	-17.04	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-9.45	-11.89	-2.44	CuSeO4:5H2O
CuSO4	-9.95	-6.79	3.16	CuSO4
Diaspore	-0.00	7.18	7.18	AlOOH
Djurleite	-133.13	-167.65	-34.52	Cu0.066Cu1.868S
Dolomite(disordered)	-6.34	-22.74	-16.40	CaMg(CO3)2
Dolomite(ordered)	-5.77	-22.74	-16.97	CaMg(CO3)2
Epsomite	-3.02	-5.18	-2.16	MgSO4:7H2O
Fe(OH)2	-17.47	-3.91	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	4.47	1.43	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-19.06	-17.50	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-47.74	-68.36	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-34.61	-37.62	-3.01	Fe2(SO4)3
Fe3(OH)8	-16.20	4.02	20.22	Fe3(OH)8
FeAsO4:2H2O	-8.70	-8.30	0.40	FeAsO4:2H2O
FeCr2O4	-43.91	-36.29	7.62	FeCr2O4
FeMoO4	-13.17	-23.23	-10.06	FeMoO4
Ferrihydrite	0.55	3.96	3.41	Fe(OH)3
Ferroselite	-156.60	-175.34	-18.74	FeSe2
FeS(ppt)	-150.57	-153.48	-2.92	FeS
FeSe	-99.65	-110.65	-11.01	FeSe
Fix_pH	-6.50	-6.50	0.00	H+
Galena	-130.21	-144.42	-14.21	PbS
Gibbsite	-1.40	7.18	8.58	Al(OH)3
Goethite	3.29	3.96	0.67	FeOOH
Goslarite	-5.87	-7.93	-2.05	ZnSO4:7H2O
Greenockite	-130.97	-145.49	-14.52	CdS

Greigite	-549.26	-594.29	-45.03	Fe ₃ S ₄
Gypsum	0.00	-4.61	-4.61	CaSO ₄ :2H ₂ O
H-Jarosite	-7.06	-18.48	-11.41	(H ₃ O)Fe ₃ (SO ₄) ₂ (OH) ₆
H ₂ MoO ₄	-6.30	-19.33	-13.02	H ₂ MoO ₄
H ₂ S(g)	-141.57	-149.58	-8.01	H ₂ S
H ₂ Se(g)	-101.83	-106.75	-4.91	H ₂ Se
Halite	-5.48	-3.89	1.59	NaCl
Hausmannite	-15.12	47.17	62.29	Mn ₃ O ₄
Hematite	8.96	7.93	-1.03	Fe ₂ O ₃
Hercynite	-13.37	10.46	23.83	FeAl ₂ O ₄
Hinsdalite	-17.51	-20.01	-2.50	PbAl ₃ PO ₄ SO ₄ (OH) ₆
Huntite	-16.40	-46.04	-29.65	CaMg ₃ (CO ₃) ₄
Hydrocerussite	-9.08	-27.85	-18.77	Pb ₃ (OH) ₂ (CO ₃) ₂
Hydromagnesite	-28.49	-36.61	-8.11	Mg ₅ (CO ₃) ₄ (OH) ₂ :4H ₂ O
Hydroxylapatite	2.64	-41.69	-44.33	Ca ₅ (PO ₄) ₃ OH
Hydroxylpyromorphite	-5.98	-68.77	-62.79	Pb ₅ (PO ₄) ₃ OH
K-Alum	-13.75	-19.01	-5.26	KAl(SO ₄) ₂ :12H ₂ O
K-Jarosite	0.12	-14.29	-14.41	KFe ₃ (SO ₄) ₂ (OH) ₆
K ₂ Cr ₂ O ₇	-15.73	-33.21	-17.48	K ₂ Cr ₂ O ₇
K ₂ CrO ₄	-11.85	-12.42	-0.57	K ₂ CrO ₄
K ₂ MoO ₄	-14.23	-10.96	3.27	K ₂ MoO ₄
K ₂ SeO ₄	-11.19	-11.92	-0.73	K ₂ SeO ₄
Langite	0.39	18.38	17.98	Cu ₄ (OH) ₆ SO ₄ :H ₂ O
Larnakite	-4.50	-4.87	-0.37	PbO:PbSO ₄
Laurionite	-3.92	-3.30	0.62	PbOHCl
Lepidocrocite	2.59	3.96	1.37	FeOOH
Lime	-22.70	10.57	33.28	CaO
Litharge	-7.73	5.16	12.89	PbO
Mackinawite	-149.88	-153.48	-3.60	FeS
Maghemite	1.54	7.93	6.39	Fe ₂ O ₃
Magnesioferrite	0.24	17.94	17.69	Fe ₂ MgO ₄
Magnesite	-4.13	-11.65	-7.52	MgCO ₃
Magnetite	0.00	4.03	4.03	Fe ₃ O ₄
Malachite	0.66	-4.88	-5.53	Cu ₂ (OH) ₂ CO ₃
Manganite	-2.61	22.73	25.34	MnOOH
Massicot	-7.94	5.16	13.09	PbO
Melanothallite	-14.96	-8.52	6.45	CuCl ₂
Melanterite	-16.82	-19.09	-2.27	FeSO ₄ :7H ₂ O
Mg(OH) ₂ (active)	-8.79	10.01	18.79	Mg(OH) ₂
Mg ₃ (PO ₄) ₂	-9.74	-33.02	-23.28	Mg ₃ (PO ₄) ₂
MgCr ₂ O ₄	-39.12	-22.38	16.74	MgCr ₂ O ₄
MgCrO ₄	-16.43	-10.78	5.65	MgCrO ₄
MgHPO ₄ :3H ₂ O	-3.34	-21.51	-18.18	MgHPO ₄ :3H ₂ O
MgMoO ₄	-7.47	-9.32	-1.85	MgMoO ₄
MgSeO ₃ :6H ₂ O	-18.47	-15.43	3.04	MgSeO ₃ :6H ₂ O
MgSeO ₄ :6H ₂ O	-9.08	-10.28	-1.20	MgSeO ₄ :6H ₂ O
Minium	-17.25	57.53	74.78	Pb ₃ O ₄
Mirabilite	-4.71	-6.06	-1.35	Na ₂ SO ₄ :10H ₂ O
Mn ₂ (SO ₄) ₃	-46.21	-51.43	-5.22	Mn ₂ (SO ₄) ₃
Mn ₃ (AsO ₄) ₂ :8H ₂ O	-31.91	-19.41	12.50	Mn ₃ (AsO ₄) ₂ :8H ₂ O
Mn ₃ (PO ₄) ₂	-34.07	-57.93	-23.85	Mn ₃ (PO ₄) ₂
MnCl ₂ :4H ₂ O	-17.95	-15.21	2.75	MnCl ₂ :4H ₂ O
MnHPO ₄	-4.42	-29.82	-25.40	MnHPO ₄
MnS(grn)	-148.14	-147.88	0.27	MnS
MnS(pnk)	-151.22	-147.88	3.34	MnS
MnSe	-108.84	-105.04	3.79	MnSe
MnSeO ₃	-24.86	-23.73	1.13	MnSeO ₃
MnSeO ₃ :2H ₂ O	-24.68	-23.73	0.96	MnSeO ₃ :2H ₂ O
MnSeO ₄ :5H ₂ O	-16.53	-18.58	-2.05	MnSeO ₄ :5H ₂ O
MnSO ₄	-16.26	-13.48	2.78	MnSO ₄
Monteponite	-11.33	4.09	15.41	CdO
MoO ₃	-11.33	-19.33	-8.00	MoO ₃
Morenosite	-5.66	-7.84	-2.18	NiSO ₄ :7H ₂ O
MoS ₂	-289.12	-360.54	-71.42	MoS ₂
Na-Jarosite	-3.16	-13.91	-10.75	NaFe ₃ (SO ₄) ₂ (OH) ₆
Na ₂ Cr ₂ O ₇	-22.49	-32.45	-9.96	Na ₂ Cr ₂ O ₇
Na ₂ CrO ₄	-14.65	-11.66	2.99	Na ₂ CrO ₄
Na ₂ Mo ₂ O ₇	-12.76	-29.52	-16.76	Na ₂ Mo ₂ O ₇

Na2MoO4	-11.72	-10.20	1.52	Na2MoO4
Na2MoO4:2H2O	-11.42	-10.20	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-26.61	-16.31	10.30	Na2SeO3:5H2O
Na2SeO4	-12.43	-11.15	1.28	Na2SeO4
Nantokite	-11.57	-18.42	-6.86	CuCl
Natron	-11.03	-12.54	-1.51	Na2CO3:10H2O
Nesquehonite	-7.06	-11.65	-4.60	MgCO3:3H2O
Ni(OH)2	-5.73	7.35	13.08	Ni(OH)2
Ni3(AsO4)2:8H2O	-18.17	-2.47	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-9.69	-40.99	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-17.78	14.22	32.00	Ni4(OH)6SO4
NiCO3	-7.56	-14.31	-6.75	NiCO3
NiMoO4	-0.83	-11.97	-11.15	NiMoO4
NiS(alpha)	-136.63	-142.23	-5.60	NiS
NiS(beta)	-131.13	-142.23	-11.10	NiS
NiS(gamma)	-129.43	-142.23	-12.80	NiS
NiSe	-81.70	-99.40	-17.70	NiSe
NiSeO3:2H2O	-20.99	-18.08	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-11.41	-12.93	-1.52	NiSeO4:6H2O
Nsutite	0.59	18.09	17.50	MnO2
O2(g)	-0.68	84.12	84.80	O2
Orpiment	-456.72	-518.83	-62.11	As2S3
Otavite	-5.57	-17.57	-12.00	CdCO3
Pb(BO2)2	-11.46	-4.89	6.57	Pb(BO2)2
Pb(OH)2	-3.17	5.16	8.32	Pb(OH)2
Pb10(OH)6O(CO3)6	-69.63	-78.39	-8.76	Pb10(OH)6O(CO3)6
Pb2(OH)3Cl	-6.93	1.86	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-15.88	10.31	26.19	Pb2O(OH)2
Pb2O3	-8.67	52.37	61.04	Pb2O3
Pb2OCO3	-10.91	-11.35	-0.44	Pb2OCO3
Pb3(AsO4)2	-14.85	-9.05	5.80	Pb3(AsO4)2
Pb3(PO4)2	-4.04	-47.57	-43.53	Pb3(PO4)2
Pb3O2CO3	-17.54	-6.19	11.35	Pb3O2CO3
Pb3O2SO4	-10.64	0.29	10.92	Pb3O2SO4
Pb4(OH)6SO4	-15.66	5.44	21.10	Pb4(OH)6SO4
Pb4O3SO4	-16.84	5.44	22.28	Pb4O3SO4
PbCrO4	-2.90	-15.63	-12.73	PbCrO4
PbHPO4	-2.56	-26.36	-23.81	PbHPO4
Pbmetal	-41.15	-36.90	4.24	Pb
PbMoO4	1.61	-14.17	-15.78	PbMoO4
PbO:0.3H2O	-7.82	5.16	12.98	PbO:0.33H2O
PbSeO4	-8.24	-15.13	-6.88	PbSeO4
Periclase	-12.03	10.01	22.04	MgO
Phosgenite	-8.44	-28.25	-19.81	PbCl2:PbCO3
Plattnerite	-3.27	47.22	50.49	PbO2
Plumbgummitite	-3.55	-36.34	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-12.61	10.57	23.19	Ca(OH)2
Pyrite	-242.35	-261.01	-18.66	FeS2
Pyrochroite	-13.78	1.70	15.48	Mn(OH)2
Pyrolusite	1.57	43.76	42.19	MnO2
Pyromorphite	7.20	-77.23	-84.43	Pb5(PO4)3Cl
Realgar	-185.53	-205.66	-20.13	AsS
Retgersite	-5.78	-7.84	-2.05	NiSO4:6H2O
Rhodochrosite	-9.38	-19.95	-10.57	MnCO3
Semetal(am)	-57.55	-64.69	-7.14	Se
Semetal(hex)	-56.93	-64.69	-7.76	Se
SeO2	-25.55	-25.43	0.12	SeO2
SeO3	-41.76	-20.28	21.48	SeO3
Siderite	-15.37	-25.56	-10.19	FeCO3
Smithsonite	-4.45	-14.40	-9.95	ZnCO3
Sphalerite	-130.78	-142.32	-11.54	ZnS
Spinel	-13.64	24.37	38.01	MgAl2O4
Strengite	-1.18	-27.56	-26.37	FePO4:2H2O
Sulfur	-105.42	-107.52	-2.10	S
Tenorite	0.55	8.39	7.84	CuO
Thenardite	-6.41	-6.06	0.35	Na2SO4
Thermonatrite	-13.20	-12.53	0.67	Na2CO3:H2O
Tsumebite	-3.03	-12.82	-9.79	Pb2CuPO4(OH)3:3H2O

Vivianite	-38.76	-74.76	-36.00	Fe3(PO4)2:8H2O
Witherite	-7.00	-15.58	-8.58	BaCO3
Wurtzite	-133.31	-142.32	-9.01	ZnS
Zincite	-4.34	7.26	11.60	ZnO
Zincosite	-12.10	-7.92	4.18	ZnSO4
Zn(BO2)2	-11.08	-2.79	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-15.47	-12.23	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-4.94	7.26	12.20	Zn(OH)2
Zn(OH)2(am)	-5.46	7.26	12.71	Zn(OH)2
Zn(OH)2(beta)	-4.74	7.26	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-4.52	7.26	11.78	Zn(OH)2
Zn(OH)2(gamma)	-4.47	7.26	11.73	Zn(OH)2
Zn2(OH)2SO4	-8.17	-0.67	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-9.13	6.06	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-16.40	-2.75	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-5.84	-41.26	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-28.27	-8.59	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-14.55	13.85	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-19.11	19.39	38.50	Zn5(OH)8Cl2
ZnCl2	-16.91	-9.65	7.27	ZnCl2
ZnCO3:1H2O	-4.14	-14.40	-10.26	ZnCO3:1H2O
Znmetal	-61.05	-34.80	26.25	Zn
ZnMoO4	-1.97	-12.07	-10.09	ZnMoO4
ZnO(active)	-4.19	7.26	11.45	ZnO
ZnS(am)	-133.22	-142.32	-9.10	ZnS
ZnSe	-85.01	-99.49	-14.48	ZnSe
ZnSeO4:6H2O	-11.51	-13.03	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.42	-7.93	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 13.

End of Run after 0.64 Seconds.



Appendix G PHREEQC Outputs Excel Workbook



Appendix H Source Water Quality Excel Workbook

Kanmantoo
Geochemical
Modelling Addendum
Report
Kanmantoo Copper
Mine

Prepared for:
Mining One PTY Ltd

Prepared by:

EHS  **Support**[™]

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Acronyms

GL	gigalitres
GMO	Groundwater Management Objective
GP	Giant Pit
ha	Hectare
OTD	Old Tailings Dam
m	metres
mV	millivolts
mg/L	milligrammes per litre
PHES	pumped hydro energy storage
RL	Relative Level
RWD	Return Water Dam
TSF	Tailings Storage Facility



1 Introduction

Kanmantoo Copper Mine is located approximately 40 km south-east of Adelaide, South Australia. The site consists of the Giant Pit (GP) which is almost 400 m in depth, the Tailings Storage Facility (TSF) a 40 hectare (ha) pond to the north-west of the MP (MP) and an Old Tailings Dam (OTD) directly to the north of the MP. Two minor pits, Emily Star and Nugent Pits, lie to the south-west and south-east of the MP.

Hydrogeological modelling by Mining One has demonstrated that groundwater recovery within the MP is extremely slow and the inward gradient is maintained over the modelling period. The opportunity to drain the existing TSF, the Return Water Dam (RWD), water have been investigated as potential scenarios for the recovery of water within the GP.



2 Objective and Scope

Mining One engaged the services of EHS Support to provide geochemical experience in the assessment of water quality changes when one or more sources of water contribute to the recovery of water within the MP.

In January 2019, EHS Support completed a review of source water quality and a combination of geochemical simulations to support a proposed pumped hydro energy storage (PHES). This addendum is to supplement the previous study with additional scenarios that simulate natural groundwater recovery and possible addition of RWD water.

Mining One provided EHS Support with two scenarios that could occur during the natural recovery of the MP over a 250- year period. The sequence of events proposed for the scheme are provided in **Table 2-1** and the Scenarios are presented in **Table 2-2**.

Table 2-1 Sequence of Events for the Natural Recovery of the MP

Sequence	Description
1	The pit was mined until mid-2019, to a final level of RL 836 m
2	Scenario 1 - Pit naturally recovers to a depth of 59.59 m by 2272
3	Scenario 2 – Mid-2022 to mid-2027 – 4 GL of RWD water added and pit naturally recovers to a depth of 91.37 m by 2272

Table 2-2 Scenarios of Source Water Recovery and Mixing

Scenario	Source Water	Description
1	GW	Average groundwater quality
1a	GW	Worst case groundwater quality – lowest pH and highest concentrations
2	GW and RWD	Average groundwater quality + 4 GL RWD water between years 1 to 5
2a	GW and RWD	Worst case groundwater quality – lowest pH and highest concentrations

The objective of this report is to use volumes of groundwater recharge and injected RWD water (Scenario 2 only) to explore the changes in water quality, as the groundwater recovery occurs between 2022 and 2272. The volumes of water have been provided from hydrogeological modelling conducted by Mining One.

A geochemical modelling program, PHREEQC, has been used to calculate the sequential effects of groundwater recharge, RWD water and evaporation over varying time-steps. PHREEQC is an analytical code developed by the United States Geological Survey. The program uses peer-reviewed thermodynamic constants to calculate changes in soluble speciation, mineral phase saturation and physicochemical properties of water samples. It should be noted that the RWD water, has elevated metals (aluminium, cobalt, copper, iron, manganese and nickel and low pH) with respect to the Groundwater Management Objective (GMO) values provided in **Table 3-3**.

Two scenarios were developed to simulate the sequence of events as groundwater recovers within the GP. The two scenarios focus on the timeframe 2022 through 2272:

1. Scenario 1 – groundwater recovery using average groundwater concentrations;
2. Scenario 1a – groundwater recovery using maximum groundwater concentrations;



3. Scenario 2 - groundwater recovery using average groundwater concentrations and 4 GL untreated RWD water (between Year 0 and 5); and
4. Scenario 2a - groundwater recovery using maximum groundwater concentrations and 4 GL untreated RWD water (between Year 0 and 5).

The following geochemical interactions are simulated within the mixed waters using PHREEQC:

1. Mixing of specified ratios of source waters; and
2. Evaporation of mixed source waters.

By using the following datasets:

1. Kanmantoo Copper Mine groundwater network (21 monitoring locations) April 2007 to September 2018; and
2. RWD water quality March 2012 to September 2018.

Water quality derived from the Scenario outputs is compared against the Groundwater Management Objectives for the site.

Redox potential has not been simulated as part of the model inputs as this parameter has not been reported for the RWD water. However, redox potential is an input parameter required for the geochemical modelling. A default redox potential of 237 millivolts (mV) from PHREEQC was used. This value was selected to represent a water in contact with atmospheric oxygen which would induce moderately oxidising conditions.



3 Model Inputs

Mining One provided EHS Support with two scenarios that could occur during the natural recovery of the MP over a 250 year period as provided in **Table 2-2**.

Groundwater quality data from the Kanmantoo Copper Mine (April 2007 to September 2018) was used to develop an average and worst-case water quality. RWD water quality (March 2012 to September 2018) was used to develop the mean RWD water quality.

Evaporation deficits and groundwater recharge volumes were provided by Mining One. An injection volume of 4 GL RWD water is simulated in the hydrogeological modelling, however, a proportion of this volume is lost as seepage into the surrounding unsaturated media. The remaining calculated volume is used in the geochemical modelling as the added RWD water.

The model input files were developed in a sequential layout. Each time-step defined in the geochemical model aligns with a time period from the hydrogeological modelling. This has been summarised in **Table 3-1** below.

Table 3-1 Model Time-Steps and Processes

Hydrogeological Model Period (Years)	Geochemical Model Time-Step	Geochemical Model Process
0	1	Speciation of Groundwater In-flow Evaporation
0-10	2	Speciation of Groundwater In-flow Mix with existing pit water from previous time-step Evaporation
10-20	3	Speciation of Groundwater In-flow Mix with existing pit water from previous time-step Evaporation
20-50	4	Speciation of Groundwater In-flow Mix with existing pit water from previous time-step Evaporation
50-100	5	Speciation of Groundwater In-flow Mix with existing pit water from previous time-step Evaporation
100-150	6	Speciation of Groundwater In-flow Mix with existing pit water from previous time-step Evaporation
150-200	7	Speciation of Groundwater In-flow Mix with existing pit water from previous time-step Evaporation
200-250	8	Speciation of Groundwater In-flow Mix with existing pit water from previous time-step Evaporation



3.1 Scenario 1 & 1a

Scenario 1 and 1a use the average and highest concentrations of water quality respectively from the fifteen groundwater monitoring well locations within the capture zone of the MP (JBS&G, 2017). The minimum pH value (pH 5.05) was used for the maximum groundwater quality as it is below the GMO. The groundwater composition is representative of anticipated groundwater quality at mid-2021 (**Table 3-2**).

Table 3-2 Average Groundwater Concentrations, 2014 to 2018¹

Parameters	Unit	Groundwater Management Objective (GMMP, 2014)	Average Groundwater Quality	Maximum Groundwater Quality
pH Value	pH Unit	Between 6.0-8.5	6.79	<u>5.05</u>
Electrical Conductivity @ 25°C	µS/cm		7,148	45,000
Total Dissolved Solids	mg/L		4,647	29,250
Redox	mV		58	291
Temperature	°C		21	32
Calcium	mg/L		130	590
Magnesium	mg/L		246	1,340
Sodium	mg/L		1,094	5,880
Potassium	mg/L		62	216
Total Alkalinity as CaCO ₃	mg/L		398	872
Sulfate as SO ₄ -	mg/L		1,485	9,110
Chloride	mg/L		1,533	9,420
Aluminium	mg/L	0.13	<u>0.37</u>	<u>5.21</u>
Arsenic	mg/L		not measured	not measured
Barium	mg/L		not measured	not measured
Beryllium	mg/L		not measured	not measured
Boron	mg/L		not measured	not measured
Cadmium	mg/L	0.009	0.003	<u>0.04</u>
Chromium	mg/L		not measured	not measured
Cobalt	mg/L	0.14	<u>2.34</u>	<u>24.20</u>
Copper	mg/L	0.031	<u>0.31</u>	<u>9.29</u>
Iron	mg/L	11	<u>100</u>	<u>937</u>
Lead	mg/L	0.03	0.003	0.01
Manganese	mg/L	3.7	<u>12.20</u>	<u>171</u>
Mercury	mg/L	0.0003	0.0002	<u>0.0004</u>
Molybdenum	mg/L		not measured	not measured
Nickel	mg/L	0.1	<u>0.45</u>	<u>5.57</u>
Selenium	mg/L	0.1	0.03	0.08
Vanadium	mg/L		not measured	not measured
Zinc	mg/L	0.94	0.17	<u>1.78</u>
Total Nitrogen as N	mg/L	21.8	7.35	<u>60</u>

¹ Exceedances of GMO values are in **bold** and underlined.



Parameters	Unit	Groundwater Management Objective (GMMP, 2014)	Average Groundwater Quality	Maximum Groundwater Quality
Total Phosphorus as P	mg/L	3.82	0.68	<u>23.60</u>

3.2 Scenario 2

Scenario 2 and 2a use the average and highest groundwater concentrations respectively, and an additional source of water from the RWD. A volume of 4 GL of RWD water is injected between Year 0 and 5 in addition to the groundwater recharge contribution (**Table 3-3**).

Table 3-3 Mean RWD Water Concentrations²

Parameters	Unit	Groundwater Management Objective (GMMP, 2014)	Average Groundwater Quality	Maximum Groundwater Quality	RWD
pH Value	pH Unit	Between 6.0-8.5	6.79	<u>5.05</u>	<u>4.05</u>
Electrical Conductivity @ 25°C	µS/cm		7,148	45,000	6,573
Total Dissolved Solids (Calc.)	mg/L		4,647	29,250	4,283
Redox	mV		58	291	not measured
Temperature	°C		21	32	not measured
Calcium	mg/L		130	590	522
Magnesium	mg/L		246	1,340	88
Sodium	mg/L		1,094	5,880	343
Potassium	mg/L		62	216	245
Total Alkalinity as CaCO ₃	mg/L		398	872	23
Sulfate as SO ₄ - Turbidimetric	mg/L		1,485	9,110	2,222
Chloride	mg/L		1,533	9,420	490
Aluminium	mg/L	0.13	<u>0.37</u>	<u>5.21</u>	<u>1.42</u>
Arsenic	mg/L		not measured	not measured	0.002
Barium	mg/L		not measured	not measured	0.04
Beryllium	mg/L		not measured	not measured	0.002
Boron	mg/L		not measured	not measured	0.10
Cadmium	mg/L	0.009	0.003	<u>0.04</u>	0.0008
Chromium	mg/L		not measured	not measured	0.0033
Cobalt	mg/L	0.14	<u>2.34</u>	<u>24.20</u>	<u>0.72</u>
Copper	mg/L	0.031	<u>0.31</u>	<u>9.29</u>	<u>6.25</u>

² Exceedances of GMO values are in **bold** and underlined.



Parameters	Unit	Groundwater Management Objective (GMMP, 2014)	Average Groundwater Quality	Maximum Groundwater Quality	RWD
Iron	mg/L	11	<u>100</u>	<u>937</u>	<u>24.67</u>
Lead	mg/L	0.03	0.003	0.01	0.02
Manganese	mg/L	3.7	<u>12.20</u>	<u>171</u>	<u>5.22</u>
Mercury	mg/L	0.0003	0.0002	<u>0.0004</u>	<0.0001
Molybdenum	mg/L		not measured	not measured	0.11
Nickel	mg/L	0.1	<u>0.45</u>	<u>5.57</u>	<u>0.49</u>
Selenium	mg/L	0.1	0.03	0.08	0.01
Vanadium	mg/L		not measured	not measured	<0.01
Zinc	mg/L	0.94	0.17	<u>1.78</u>	0.49
Total Nitrogen as N	mg/L	21.8	7.35	<u>60</u>	10.07
Total Phosphorus as P	mg/L	3.82	0.68	<u>23.60</u>	0.29

3.3 Summary

In summary, **Table 3-4** provides the volumes (m³) of water discharged into the pit and lost by evaporation for each time-step between 2022 and 2272.



Table 3-4 Summary of Scenarios (volumes m³)

Period (Years)	Time-Step	Scenario						
		1 & 1a			2 & 2a			
		Groundwater Inflow ³	Evaporation	Total volume	Groundwater Inflow ⁴	RWD	Evaporation	Total volume
0	1	50	-36	14	39	-	-39	14
10	2	522	-56	466	51,180	1,339,928	-51,180	1,339,928
20	3	111,820	-13,799	98,020	51,180	-	-51,180	1,339,935
50	4	669,894	-30,778	639,116	50,825	-	-50,825	1,328,406
100	5	684,295	-31,154	653,141	50,779	-	-50,779	1,326,904
150	6	684,513	-31,160	653,353	50,157	-	-50,157	1,306,710
200	7	684,839	-31,168	653,670	50,153	-	-50,153	1,306,565
250	8	685,344	-31,182	654,163	50,150	-	-50,150	1,306,468

³ Includes pit volume from previous time-step

⁴ Includes pit volume from previous time-step



Exceedances of GMO values for each source water are provided in **Table 3-5** below. Most sources report exceedances which include aluminium, cobalt, copper, iron, manganese and nickel.

Table 3-5 Summary of Source Water Quality Exceedances of GMO

Source Water	Description	Analytes Exceeding GMO Values	Concentration (mg/L)	GMO Values (mg/L)
1, 2	Groundwater mean quality	Aluminium	0.37	0.13
		Cobalt	2.34	0.14
		Copper	0.31	0.031
		Iron	100	11
		Manganese	12.20	3.7
		Nickel	0.45	0.1
1a, 2a	Groundwater maximum quality	Aluminium	5.21	0.13
		Cadmium	0.04	0.009
		Cobalt	24.20	0.14
		Copper	9.29	0.031
		Iron	937	11
		Manganese	171	3.7
		Mercury	0.0004	0.0003
		Nickel	5.57	0.1
		Zinc	1.78	0.94
		Total nitrogen	60	21.8
		Total phosphorus	23.60	3.82
		pH	5.05	between 6 and 8.5
2, 2a	RWD untreated	Aluminium	1.42	0.13
		Cobalt	0.72	0.14
		Copper	6.25	0.031
		Iron	24.67	11
		Manganese	5.22	3.7
		Nickel	0.49	0.1
		pH	4.05	between 6 and 8.5



4 Model Outputs

Two scenarios were provided to EHS Support from Mining One which describe the natural recharge of the GP between 2022 and 2272 (**Table 2-1** and **Table 2-2**).

The model outputs are discussed below as Scenarios 1 and 2 using mean groundwater quality and Scenarios 1a and 2a using worst-case or maximum groundwater quality. Scenarios 2 and 2a are also supplemented with water from the RWD between Years 0 and 5.



4.1 Scenario 1

Scenario 1 simulates the natural recharge of the MP between 2022 and 2272 over eight time steps using an average groundwater quality. The water quality for Scenario 1 at Year 2272 is provided in **Table 4-1**. Aluminium, cobalt, copper, iron, manganese and nickel exceed the GMO values.

Table 4-1 Scenario 1 Water Quality⁵

Parameters	Unit	Groundwater Management Objective (GMMP, 2014)	Scenario 1 Year 2272
pH Value	pH Unit	Between 6.0-8.5	6.79
Electrical Conductivity @ 25°C	µS/cm		not calculated
Total Dissolved Solids	mg/L		not calculated
Redox	mV		not calculated
Temperature	°C		not calculated
Calcium	mg/L		138
Magnesium	mg/L		261
Sodium	mg/L		1,212
Potassium	mg/L		66
Total Alkalinity as CaCO ₃	mg/L		4.05
Sulfate as SO ₄ -	mg/L		526
Chloride	mg/L		1,628
Aluminium	mg/L	0.13	<u>0.39</u>
Arsenic	mg/L		- ⁶
Barium	mg/L		-
Beryllium	mg/L		-
Boron	mg/L		-
Cadmium	mg/L	0.009	0.003
Chromium	mg/L		-
Cobalt	mg/L	0.14	<u>2.49</u>
Copper	mg/L	0.031	<u>0.33</u>
Iron	mg/L	11	<u>107</u>
Lead	mg/L	0.03	0.003
Manganese	mg/L	3.7	<u>13</u>
Mercury	mg/L	0.0003	0.0002
Molybdenum	mg/L		-
Nickel	mg/L	0.1	<u>0.48</u>
Selenium	mg/L	0.1	0.03
Zinc	mg/L	0.94	0.18
Total Nitrogen as N	mg/L	21.8	7.43
Total Phosphorus as P	mg/L	3.82	0.72

⁵ Exceedances of GMO values are in **bold** and underlined.

⁶ - Analyte not reported



4.2 Scenario 1a

Scenario 1a is representative of the anticipated water quality at 2272 after eight time-steps using the worst case groundwater quality. The water quality for Scenario 1a is provided in **Table 4-2**. Aluminium, cadmium, cobalt, copper, iron, manganese, mercury, nickel, zinc, pH, total nitrogen and total phosphorus exceed the GMO values.

Table 4-2 Scenario 1a Water Quality⁷

Parameters	Unit	Groundwater Management Objective (GMMP, 2014)	Scenario 1a Year 2272
pH Value	pH Unit	Between 6.0-8.5	<u>5.04</u>
Electrical Conductivity @ 25°C	µS/cm		not calculated
Total Dissolved Solids	mg/L		not calculated
Redox	mV		not calculated
Temperature	°C		not calculated
Calcium	mg/L		642
Magnesium	mg/L		1,457
Sodium	mg/L		6,672
Potassium	mg/L		234
Total Alkalinity as CaCO ₃	mg/L		0.89
Sulfate as SO ₄ -	mg/L		3,306
Chloride	mg/L		10,243
Aluminium	mg/L	0.13	<u>5.67</u>
Arsenic	mg/L		⁸
Barium	mg/L		-
Beryllium	mg/L		-
Boron	mg/L		-
Cadmium	mg/L	0.009	<u>0.04</u>
Chromium	mg/L		-
Cobalt	mg/L	0.14	<u>26.31</u>
Copper	mg/L	0.031	<u>10.09</u>
Iron	mg/L	11	<u>1,019</u>
Lead	mg/L	0.03	0.01
Manganese	mg/L	3.7	<u>186</u>
Mercury	mg/L	0.0003	<u>0.0004</u>
Molybdenum	mg/L		-
Nickel	mg/L	0.1	<u>6.06</u>
Selenium	mg/L	0.1	0.09
Zinc	mg/L	0.94	<u>1.94</u>
Total Nitrogen as N	mg/L	21.8	<u>65.24</u>
Total Phosphorus as P	mg/L	3.82	<u>25.66</u>

⁷ Exceedances of GMO values are in **bold** and underlined.

⁸ - Analyte not reported



4.3 Scenario 2

Scenario 2 uses an additional source of water from the RWD to supplement the natural recharge of an average groundwater quality into the pit. The water quality for Scenario 2 is provided in **Table 4-3**. Aluminium, cobalt, copper, iron, manganese, nickel, zinc, total phosphorus and pH exceed the GMO values.

Table 4-3 Scenario 2 Water Quality⁹

Parameters	Unit	Groundwater Management Objective (GMMP, 2014)	Scenario 2
pH Value	pH Unit	Between 6.0-8.5	6.79
Electrical Conductivity @ 25°C	µS/cm		not calculated
Total Dissolved Solids	mg/L		not calculated
Redox	mV		not calculated
Temperature	°C		not calculated
Calcium	mg/L		135
Magnesium	mg/L		256
Sodium	mg/L		1,190
Potassium	mg/L		65
Total Alkalinity as CaCO ₃	mg/L		3.97
Sulfate as SO ₄ -	mg/L		517
Chloride	mg/L		1,598
Aluminium	mg/L	0.13	<u>0.39</u>
Arsenic	mg/L		¹⁰
Barium	mg/L		-
Beryllium	mg/L		-
Boron	mg/L		-
Cadmium	mg/L	0.009	0.003
Chromium	mg/L		-
Cobalt	mg/L	0.14	<u>2.44</u>
Copper	mg/L	0.031	<u>0.32</u>
Iron	mg/L	11	<u>105</u>
Lead	mg/L	0.03	0.003
Manganese	mg/L	3.7	<u>12.72</u>
Mercury	mg/L	0.0003	0.0002
Molybdenum	mg/L		-
Nickel	mg/L	0.1	<u>0.47</u>
Selenium	mg/L	0.1	0.03
Zinc	mg/L	0.94	0.18
Total Nitrogen as N	mg/L	21.8	7.3
Total Phosphorus as P	mg/L	3.82	0.71

⁹ Exceedances of GMO values are in **bold** and underlined.

¹⁰ - Analyte not reported



4.4 Scenario 2a

Scenario 2a uses an additional source of water from the RWD to supplement the natural recharge of a worst case groundwater quality into the pit. The water quality for Scenario 2a is provided in **Table 4-4**. Aluminium, cobalt, copper, iron, manganese, nickel, zinc, total phosphorus and pH exceed the GMO values.

Table 4-4 Scenario 2a Water Quality¹¹

Parameters	Unit	Groundwater Management Objective (GMMP, 2014)	Scenario 2a
pH Value	pH Unit	Between 6.0-8.5	<u>5.04</u>
Electrical Conductivity @ 25°C	µS/cm		not calculated
Total Dissolved Solids	mg/L		not calculated
Redox	mV		not calculated
Temperature	°C		not calculated
Calcium	mg/L		630
Magnesium	mg/L		1,430
Sodium	mg/L		6,547
Potassium	mg/L		230
Total Alkalinity as CaCO ₃	mg/L		0.87
Sulfate as SO ₄ -	mg/L		3,245
Chloride	mg/L		10,052
Aluminium	mg/L	0.13	<u>5.56</u>
Arsenic	mg/L		- ¹²
Barium	mg/L		-
Beryllium	mg/L		-
Boron	mg/L		-
Cadmium	mg/L	0.009	<u>0.04</u>
Chromium	mg/L		-
Cobalt	mg/L	0.14	<u>25.82</u>
Copper	mg/L	0.031	<u>9.9</u>
Iron	mg/L	11	<u>1,000</u>
Lead	mg/L	0.03	0.01
Manganese	mg/L	3.7	<u>182</u>
Mercury	mg/L	0.0003	<u>0.0004</u>
Molybdenum	mg/L		-
Nickel	mg/L	0.1	<u>5.94</u>
Selenium	mg/L	0.1	0.09
Zinc	mg/L	0.94	<u>1.9</u>
Total Nitrogen as N	mg/L	21.8	<u>64</u>
Total Phosphorus as P	mg/L	3.82	<u>25</u>

¹¹ Exceedances of GMO values are in **bold** and underlined.

¹² - Analyte not reported



4.5 Summary

The mixing of source waters has been qualitatively simulated to produce a water body in the Kanmantoo MP. The source waters include groundwater, evaporated pit water and untreated RWD water.

Table 4-5 Summary of Scenario Outputs for Year 2272

Parameters	Unit	Groundwater Management Objective (GMMP, 2014)	Scenario 1	Scenario 1a	Scenario 2	Scenario 2a
pH Value	pH Unit	Between 6.0-8.5	6.79	<u>5.04</u>	6.79	<u>5.04</u>
Electrical Conductivity @ 25°C	µS/cm		not calculated	not calculated	not calculated	not calculated
Total Dissolved Solids	mg/L		not calculated	not calculated	not calculated	not calculated
Redox	mV		not calculated	not calculated	not calculated	not calculated
Temperature	°C		not calculated	not calculated	not calculated	not calculated
Calcium	mg/L		138	642	135	630
Magnesium	mg/L		261	1,457	256	1,430
Sodium	mg/L		1,212	6,672	1,190	6,547
Potassium	mg/L		66	234	65	230
Total Alkalinity as CaCO ₃	mg/L		4.05	0.89	3.97	0.87
Sulfate as SO ₄ -	mg/L		526	3,306	517	3,245
Chloride	mg/L		1,628	10,243	1,598	10,052
Aluminium	mg/L	0.13	<u>0.39</u>	<u>5.67</u>	<u>0.39</u>	<u>5.56</u>
Arsenic	mg/L		₁₃	₁₄	₁₅	₁₆
Barium	mg/L		-	-	-	-
Beryllium	mg/L		-	-	-	-
Boron	mg/L		-	-	-	-
Cadmium	mg/L	0.009	0.003	<u>0.04</u>	0.003	<u>0.04</u>
Chromium	mg/L		-	-	-	-
Cobalt	mg/L	0.14	<u>2.49</u>	<u>26.31</u>	<u>2.44</u>	<u>25.82</u>
Copper	mg/L	0.031	<u>0.33</u>	<u>10.09</u>	<u>0.32</u>	<u>9.9</u>
Iron	mg/L	11	<u>107</u>	<u>1,019</u>	<u>105</u>	<u>1,000</u>
Lead	mg/L	0.03	0.003	0.01	0.003	0.01
Manganese	mg/L	3.7	<u>13</u>	<u>186</u>	<u>12.72</u>	<u>182</u>
Mercury	mg/L	0.0003	0.0002	<u>0.0004</u>	0.0002	<u>0.0004</u>
Molybdenum	mg/L		-	-	-	-

¹³ - Analyte not reported

¹⁴ - Analyte not reported

¹⁵ - Analyte not reported

¹⁶ - Analyte not reported



Parameters	Unit	Groundwater Management Objective (GMMP, 2014)	Scenario 1	Scenario 1a	Scenario 2	Scenario 2a
Nickel	mg/L	0.1	<u>0.48</u>	<u>6.06</u>	<u>0.47</u>	<u>5.94</u>
Selenium	mg/L	0.1	0.03	0.09	0.03	0.09
Zinc	mg/L	0.94	0.18	<u>1.94</u>	0.18	<u>1.9</u>
Total Nitrogen as N	mg/L	21.8	7.43	<u>65.24</u>	7.3	<u>64</u>
Total Phosphorus as P	mg/L	3.82	0.72	<u>25.66</u>	0.71	<u>25</u>

For the initial Scenarios 1 and 1a, recovering groundwater and evaporated pit water contribute to exceedances of GMO values. In Scenarios 2 and 2a, RWD water becomes the dominant component and is responsible for the exceedances of GMO values.

The Scenario source waters and analytes exceeding the GMO values are summarised in **Table 4-6** below.

Table 4-6 Summary of Scenarios and Water Quality

Scenario	Source Water	Volume Year 2272 (m³)	Analytes Exceeding GMO Values	Concentration (mg/L)	GMO Values (mg/L)
1	Groundwater mean quality Evaporated pit water	654,163	Aluminium	0.39	0.13
			Cobalt	2.49	0.14
			Copper	0.33	0.031
			Iron	107	11
			Manganese	13	3.7
			Nickel	0.48	0.1
1a	Groundwater maximum quality Evaporated pit water		Aluminium	5.67	0.13
			Cadmium	0.04	0.009
			Cobalt	26.31	0.14
			Copper	10.09	0.031
			Iron	1,019	11
			Manganese	186	3.7
			Mercury	0.0004	0.0003
			Nickel	6.06	0.1
			Zinc	1.94	0.94
			pH	5.04	between 6 and 8.5
			Total nitrogen	65.24	21.8
			Total phosphorus	25.66	3.82
2	Groundwater mean quality Evaporated pit water RWD untreated	1,306,468	Aluminium	0.39	0.13
			Cobalt	2.44	0.14
			Copper	0.32	0.031
			Iron	105	11
			Manganese	12.72	3.7
			Nickel	0.47	0.1



Scenario	Source Water	Volume Year 2272 (m ³)	Analytes Exceeding GMO Values	Concentration (mg/L)	GMO Values (mg/L)
2a	Groundwater maximum quality Evaporated pit water RWD untreated		Aluminium	5.56	0.13
			Cobalt	25.82	0.14
			Copper	9.9	0.031
			Iron	1,000	11
			Manganese	182	3.7
			Nickel	5.94	0.1
			Zinc	1.9	0.94
			Total phosphorus	25	3.82
			pH	5.04	between 6 and 8.5



5 Conclusions and Recommendations

Geochemical modelling has been used to explore the changes in water quality when different sources of water are mixed in varying volumes.

The outcome of the geochemical modelling illustrates the influence the source waters have on the resulting mixed water chemistry. As summarised in **Table 3-5**, groundwater and RWD water report exceedances of metals in comparison to the GMO values. The worst-case scenario using maximum values of groundwater are unlikely to be realised as these concentrations are reported from groundwater monitoring wells KMB010, KMB011 and KMB013, which are assumed to be outside the catchment zone and separated from the remaining wells by a groundwater divide. The water quality signatures from these areas will be diluted by groundwater from other areas within the catchment zone which discharges to the GP. The water quality of each Scenario has been summarised in **Table 4-6** which details the source waters and the analytes which exceed the GMO within each Scenario.

Future management recommendations include:

1. groundwater monitoring well locations, KMB028 and KMB031, are redeveloped to address the elevated pH reported from these two wells. If bentonite grout is responsible for the elevated pH, redevelopment will potentially address the residual grout affecting the pH.
2. Additional monitoring is suggested to further develop the conceptual model. This includes the collection of field parameters and total acidity measurements. The pit lake water should also be sampled and analysed (at varying depths), to provide information on the magnitude of acidity production as groundwater is oxidised.

It should be noted that the long-term water quality of the water body within the GP, will be mainly controlled by the quality of the source waters used to make up the water body volume. However, this report does not account for changes in water quality that can occur from side wall runoff and further evaporation of the water body. Oxidation of the groundwater inflow will release acidity, as hydrolysed minerals dissociate. Acid rock drainage will continue to occur from the side walls into the water body and evaporation has the potential to increase the salinity of the water. Hydrogeological modelling by Mining One has demonstrated that the GP will act as a groundwater sink for the foreseeable future and presents a low risk to surrounding groundwater quality. However, the quality of the GP water body should be considered for future health and ecological risk assessments, if the water is used for alternative uses in the future.

5.1 Assumptions and Limitations

Assumptions and potential limitations include:

- Groundwater intersected by the monitoring well screens is assumed to be from the same groundwater body and is within the same catchment zone that discharges to the MP (except KMB021, KMB024, KMB025 and KMB029 which are assumed to be outside the catchment zone and separated from the remaining wells by a groundwater divide).
- The mixing of two or more water chemistries will result in kinetically determined reactions. It is not intended that the geochemical simulations will have the site derived (or measured) kinetic rates to undertake a kinetic assessment. The geochemical simulations will be conducted assuming geochemical equilibrium will be achieved instantaneously between the waters that will be mixed together.
- The geochemical modelling has used average (or maximum concentrations) source water qualities and simulated steady-state equilibrium conditions after mixing.



- It is assumed that there is no interaction between the waters and the walls of the MP which could modify the resident water chemistry.
- Oxidation of groundwater and subsequent deprotonation of hydrolysed metal species, has not been modelled
- The analytical suite for groundwater is not as extensive in groundwater as it is for the RWD waters.
- Sorption and co-precipitation which results in the removal of cobalt, copper, nickel and zinc have not been modelled as input parameters to control these reactions have not been measured. However, the sorption and co-precipitation (onto aluminium, iron and manganese oxyhydroxides) potential of these metals is high. As demonstrated by the physical studies discussed within Earth Systems (2012).



6 References

Earth Systems (2012) Chemical Assessment of Pit Water Treatment and Preliminary Treatment and Strategy. Hillgrove Resources Ltd.

EHS Support (2019) Kanmantoo Geochemical Modelling Report

JBS&G (2017) 2016 to 2017 Groundwater Compliance Summary Report, Kanmantoo Copper Project. Hillgrove Resources Ltd.



Attachment 1 PHREEQC Input Files

SELECTED_OUTPUT 1

-file Kanmantoo Scenario 1 mixing OCT19.sel
 -totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg Na K
 Alkalinity Cl S(6) Hg

SOLUTION_MASTER_SPECIES

Co Co+3 -1.0 Co 58.9332
 Co(2) Co+2 0.0 Co
 Co(3) Co+3 -1.0 Co
 END

PHASES

CoO
 $\text{CoO} + 2\text{H}^+ = \text{Co}^{+2} + \text{H}_2\text{O}$
 log_k 13.5864
 delta_h -106.295 kJ
 Co(OH)2
 $\text{Co(OH)}_2 + 2\text{H}^+ = \text{Co}^{+2} + 2\text{H}_2\text{O}$
 log_k 13.094
 delta_h -0 kJ
 Co(OH)3
 $\text{Co(OH)}_3 + 3\text{H}^+ = \text{Co}^{+3} + 3\text{H}_2\text{O}$
 log_k -2.309
 delta_h -92.43 kJ
 Co3O4
 $\text{Co}_3\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Co}^{+3} + 4\text{H}_2\text{O}$
 log_k -10.4956
 delta_h -107.5 kJ
 CoFe2O4
 $\text{CoFe}_2\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Fe}^{+3} + 4\text{H}_2\text{O}$
 log_k -3.5281
 delta_h -158.82 kJ
 CoCl2
 $\text{CoCl}_2 = \text{Co}^{+2} + 2\text{Cl}^-$
 log_k 8.2672
 delta_h -79.815 kJ
 CoCl2:6H2O
 $\text{CoCl}_2 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + 2\text{Cl}^- + 6\text{H}_2\text{O}$
 log_k 2.5365
 delta_h 8.0598 kJ
 (Co(NH3)6)Cl3
 $(\text{Co(NH}_3)_6)\text{Cl}_3 + 6\text{H}^+ = \text{Co}^{+3} + 6\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 20.0317
 delta_h -33.1 kJ
 (Co(NH3)5OH2)Cl3
 $(\text{Co(NH}_3)_5\text{OH}_2)\text{Cl}_3 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^- + \text{H}_2\text{O}$
 log_k 11.7351
 delta_h -25.37 kJ
 (Co(NH3)5Cl)Cl2
 $(\text{Co(NH}_3)_5\text{Cl})\text{Cl}_2 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 4.5102
 delta_h -10.74 kJ
 CoCO3
 $\text{CoCO}_3 = \text{Co}^{+2} + \text{CO}_3^{2-}$
 log_k -9.98
 delta_h -12.7612 kJ
 CoS04
 $\text{CoS}_04 = \text{Co}^{+2} + \text{S}_04^{2-}$
 log_k 2.8024
 delta_h -79.277 kJ
 CoS04:6H2O
 $\text{CoS}_04 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + \text{S}_04^{2-} + 6\text{H}_2\text{O}$
 log_k -2.4726
 delta_h 1.0801 kJ
 END

SOLUTION 1 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

REACTION 1
H2O -1; 39

END # Time-step 1

SOLUTION 2 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7

P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

MIX 1
1 0.03
2 0.97

REACTION 2
H2O -1; 6

END #Time-step 2

SOLUTION 3 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

MIX 2
1 0.004
3 0.996

REACTION 3
H2O -1; 7

END #Time-step 3

SOLUTION 4 # Mean Groundwater quality

temp	21
pH	6.79
pe	1

redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

MIX 3

1	0.146
4	0.854

REACTION 4
H2O -1; 3

END #Time-step 4

SOLUTION 5 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68

Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

MIX 4

1	0.934
5	0.066

REACTION 5
H2O -1; 3

END #Time-step 5

SOLUTION 6 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

MIX 5

1	0.954
6	0.046

REACTION 6
H2O -1; 3

END #Time-step 6

SOLUTION 7 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe

units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

MIX 6

1	0.954
7	0.046

REACTION 7
H2O -1; 3

END #Time-step 7

SOLUTION 8 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130

Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

MIX 7

1	0.954
8	0.046

REACTION 8
H2O -1; 3

END #Time-step 8

SELECTED_OUTPUT 1

-file Kanmantoo Scenario 1a mixing worst case OCT19.sel
 -totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg Na K
 Alkalinity Cl S(6) Hg

SOLUTION_MASTER_SPECIES

Co Co+3 -1.0 Co 58.9332
 Co(2) Co+2 0.0 Co
 Co(3) Co+3 -1.0 Co
 END

PHASES

CoO
 $\text{CoO} + 2\text{H}^+ = \text{Co}^{+2} + \text{H}_2\text{O}$
 log_k 13.5864
 delta_h -106.295 kJ
 Co(OH)2
 $\text{Co(OH)}_2 + 2\text{H}^+ = \text{Co}^{+2} + 2\text{H}_2\text{O}$
 log_k 13.094
 delta_h -0 kJ
 Co(OH)3
 $\text{Co(OH)}_3 + 3\text{H}^+ = \text{Co}^{+3} + 3\text{H}_2\text{O}$
 log_k -2.309
 delta_h -92.43 kJ
 Co3O4
 $\text{Co}_3\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Co}^{+3} + 4\text{H}_2\text{O}$
 log_k -10.4956
 delta_h -107.5 kJ
 CoFe2O4
 $\text{CoFe}_2\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Fe}^{+3} + 4\text{H}_2\text{O}$
 log_k -3.5281
 delta_h -158.82 kJ
 CoCl2
 $\text{CoCl}_2 = \text{Co}^{+2} + 2\text{Cl}^-$
 log_k 8.2672
 delta_h -79.815 kJ
 CoCl2:6H2O
 $\text{CoCl}_2 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + 2\text{Cl}^- + 6\text{H}_2\text{O}$
 log_k 2.5365
 delta_h 8.0598 kJ
 (Co(NH3)6)Cl3
 $(\text{Co(NH}_3)_6)\text{Cl}_3 + 6\text{H}^+ = \text{Co}^{+3} + 6\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 20.0317
 delta_h -33.1 kJ
 (Co(NH3)5OH2)Cl3
 $(\text{Co(NH}_3)_5\text{OH}_2)\text{Cl}_3 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^- + \text{H}_2\text{O}$
 log_k 11.7351
 delta_h -25.37 kJ
 (Co(NH3)5Cl)Cl2
 $(\text{Co(NH}_3)_5\text{Cl})\text{Cl}_2 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 4.5102
 delta_h -10.74 kJ
 CoCO3
 $\text{CoCO}_3 = \text{Co}^{+2} + \text{CO}_3^{2-}$
 log_k -9.98
 delta_h -12.7612 kJ
 CoS04
 $\text{CoS}_04 = \text{Co}^{+2} + \text{S}_04^{2-}$
 log_k 2.8024
 delta_h -79.277 kJ
 CoS04:6H2O
 $\text{CoS}_04 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + \text{S}_04^{2-} + 6\text{H}_2\text{O}$
 log_k -2.4726
 delta_h 1.0801 kJ
 END

SOLUTION 1 #Groundwater worst case maximum values

temp	21
pH	5.05
pe	1
redox	pe
units	mg/l
density	1
Al	5.21
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.04
Co	24.2
Cr	0
Cu	9.29
Fe	937
Pb	0.01
Mn	171
Mo	0
V	0
Zn	1.78
Se	0.08
Ni	5.57
N	60
P	23.6
Ca	590
Mg	1340
Na	5880
K	216
Cl	9420
S(6)	9110
Hg	0.0004
-water	1 # kg

REACTION 1

H2O -1; 39

END # Time-step 1

SOLUTION 2 #Groundwater worst case maximum values

temp	21
pH	5.05
pe	1
redox	pe
units	mg/l
density	1
Al	5.21
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.04
Co	24.2
Cr	0
Cu	9.29
Fe	937
Pb	0.01
Mn	171
Mo	0
V	0
Zn	1.78
Se	0.08
Ni	5.57
N	60
P	23.6

Ca	590
Mg	1340
Na	5880
K	216
Cl	9420
S(6)	9110
Hg	0.0004
-water	1 # kg

MIX 1
1 0.03
2 0.97

REACTION 2
H2O -1; 6

END #Time-step 2

SOLUTION 3 #Groundwater worst case maximum values

temp	21
pH	5.05
pe	1
redox	pe
units	mg/l
density	1
Al	5.21
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.04
Co	24.2
Cr	0
Cu	9.29
Fe	937
Pb	0.01
Mn	171
Mo	0
V	0
Zn	1.78
Se	0.08
Ni	5.57
N	60
P	23.6
Ca	590
Mg	1340
Na	5880
K	216
Cl	9420
S(6)	9110
Hg	0.0004
-water	1 # kg

MIX 2
1 0.004
3 0.996

REACTION 3
H2O -1; 7

END #Time-step 3

SOLUTION 4 #Groundwater worst case maximum values

temp	21
pH	5.05
pe	1
redox	pe

units	mg/l
density	1
Al	5.21
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.04
Co	24.2
Cr	0
Cu	9.29
Fe	937
Pb	0.01
Mn	171
Mo	0
V	0
Zn	1.78
Se	0.08
Ni	5.57
N	60
P	23.6
Ca	590
Mg	1340
Na	5880
K	216
Cl	9420
S(6)	9110
Hg	0.0004
-water	1 # kg

MIX 3

1	0.146
4	0.854

REACTION 4
H2O -1; 3

END #Time-step 4

SOLUTION 5 #Groundwater worst case maximum values

temp	21
pH	5.05
pe	1
redox	pe
units	mg/l
density	1
Al	5.21
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.04
Co	24.2
Cr	0
Cu	9.29
Fe	937
Pb	0.01
Mn	171
Mo	0
V	0
Zn	1.78
Se	0.08
Ni	5.57
N	60
P	23.6
Ca	590

Mg	1340
Na	5880
K	216
Cl	9420
S(6)	9110
Hg	0.0004
-water	1 # kg

MIX 4
1 0.934
5 0.066

REACTION 5
H2O -1; 3

END #Time-step 5

SOLUTION 6 #Groundwater worst case maximum values

temp	21
pH	5.05
pe	1
redox	pe
units	mg/l
density	1
Al	5.21
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.04
Co	24.2
Cr	0
Cu	9.29
Fe	937
Pb	0.01
Mn	171
Mo	0
V	0
Zn	1.78
Se	0.08
Ni	5.57
N	60
P	23.6
Ca	590
Mg	1340
Na	5880
K	216
Cl	9420
S(6)	9110
Hg	0.0004
-water	1 # kg

MIX 5
1 0.954
6 0.046

REACTION 6
H2O -1; 3

END #Time-step 6

SOLUTION 7 #Groundwater worst case maximum values

temp	21
pH	5.05
pe	1
redox	pe
units	mg/l

density	1
Al	5.21
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.04
Co	24.2
Cr	0
Cu	9.29
Fe	937
Pb	0.01
Mn	171
Mo	0
V	0
Zn	1.78
Se	0.08
Ni	5.57
N	60
P	23.6
Ca	590
Mg	1340
Na	5880
K	216
Cl	9420
S(6)	9110
Hg	0.0004
-water	1 # kg

MIX 6

1	0.954
7	0.046

REACTION 7
H2O -1; 3

END #Time-step 7

SOLUTION 8 #Groundwater worst case maximum values

temp	21
pH	5.05
pe	1
redox	pe
units	mg/l
density	1
Al	5.21
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.04
Co	24.2
Cr	0
Cu	9.29
Fe	937
Pb	0.01
Mn	171
Mo	0
V	0
Zn	1.78
Se	0.08
Ni	5.57
N	60
P	23.6
Ca	590
Mg	1340

Na	5880
K	216
Cl	9420
S(6)	9110
Hg	0.0004
-water	1 # kg

MIX 7

1	0.954
8	0.046

REACTION 8
H2O -1; 3

END #Time-step 8

SELECTED_OUTPUT 1

-file Kanmantoo Scenario 2 mixing OCT19.sel
 -totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg Na K
 Alkalinity Cl S(6) Hg

SOLUTION_MASTER_SPECIES

Co Co+3 -1.0 Co 58.9332
 Co(2) Co+2 0.0 Co
 Co(3) Co+3 -1.0 Co
 END

PHASES

CoO
 $\text{CoO} + 2\text{H}^+ = \text{Co}^{+2} + \text{H}_2\text{O}$
 log_k 13.5864
 delta_h -106.295 kJ
 Co(OH)2
 $\text{Co(OH)}_2 + 2\text{H}^+ = \text{Co}^{+2} + 2\text{H}_2\text{O}$
 log_k 13.094
 delta_h -0 kJ
 Co(OH)3
 $\text{Co(OH)}_3 + 3\text{H}^+ = \text{Co}^{+3} + 3\text{H}_2\text{O}$
 log_k -2.309
 delta_h -92.43 kJ
 Co3O4
 $\text{Co}_3\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Co}^{+3} + 4\text{H}_2\text{O}$
 log_k -10.4956
 delta_h -107.5 kJ
 CoFe2O4
 $\text{CoFe}_2\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Fe}^{+3} + 4\text{H}_2\text{O}$
 log_k -3.5281
 delta_h -158.82 kJ
 CoCl2
 $\text{CoCl}_2 = \text{Co}^{+2} + 2\text{Cl}^-$
 log_k 8.2672
 delta_h -79.815 kJ
 CoCl2:6H2O
 $\text{CoCl}_2 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + 2\text{Cl}^- + 6\text{H}_2\text{O}$
 log_k 2.5365
 delta_h 8.0598 kJ
 (Co(NH3)6)Cl3
 $(\text{Co(NH}_3)_6)\text{Cl}_3 + 6\text{H}^+ = \text{Co}^{+3} + 6\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 20.0317
 delta_h -33.1 kJ
 (Co(NH3)5OH2)Cl3
 $(\text{Co(NH}_3)_5\text{OH}_2)\text{Cl}_3 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^- + \text{H}_2\text{O}$
 log_k 11.7351
 delta_h -25.37 kJ
 (Co(NH3)5Cl)Cl2
 $(\text{Co(NH}_3)_5\text{Cl})\text{Cl}_2 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 4.5102
 delta_h -10.74 kJ
 CoCO3
 $\text{CoCO}_3 = \text{Co}^{+2} + \text{CO}_3^{2-}$
 log_k -9.98
 delta_h -12.7612 kJ
 CoS04
 $\text{CoS}_04 = \text{Co}^{+2} + \text{S}_04^{2-}$
 log_k 2.8024
 delta_h -79.277 kJ
 CoS04:6H2O
 $\text{CoS}_04 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + \text{S}_04^{2-} + 6\text{H}_2\text{O}$
 log_k -2.4726
 delta_h 1.0801 kJ
 END

SOLUTION 1 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

REACTION 1
H2O -1; 40

END # Time-step 1

SOLUTION 2 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7

P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

SOLUTION 3 #Mean RWD untreated water quality

temp	20
pH	4.05
pe	4
redox	pe
units	mg/l
density	1
Al	1.42
Alkalinity	0
As	0.002
Ba	0.04
Be	0.002
B	0.1
Cd	0.0008
Co	0.72
Cr	0.0033
Cu	6.25
Fe	24.67
Pb	0.02
Mn	5.22
Mo	0.11
Zn	0.49
Se	0.01
Ni	0.49
N	10.07
P	0.29
Ca	522
Mg	88
Na	343
K	245
Cl	490
S(6)	2222
Hg	0
-water	1 # kg

MIX 1

1	0.03679
2	0.9632
3	1e-005

REACTION 2

H2O -1; 2

END #Time-step 2

SOLUTION 4 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0

Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

MIX 2

1	0.963
4	0.037

REACTION 3
H2O -1; 2

END #Time-step 3

SOLUTION 5 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

MIX 3
1 0.972
5 0.028

REACTION 4
H2O -1; 2

END #Time-step 4

SOLUTION 6 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

MIX 4
1 0.973
6 0.027

REACTION 5
H2O -1; 2

END #Time-step 5

SOLUTION 7 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003

Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

MIX 5

1	0.988
7	0.012

REACTION 6
H2O -1; 2

END #Time-step 6

SOLUTION 8 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

MIX 6

1 0.988
8 0.012

REACTION 7
H2O -1; 2

END #Time-step 7

SOLUTION 9 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

MIX 7
1 0.988
9 0.012

REACTION 8
H2O -1; 2

END #Time-step 8

SELECTED_OUTPUT 1

-file Kanmantoo Scenario 2 mixing worst case OCT19.sel
 -totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg Na K
 Alkalinity Cl S(6) Hg

SOLUTION_MASTER_SPECIES

Co Co+3 -1.0 Co 58.9332
 Co(2) Co+2 0.0 Co
 Co(3) Co+3 -1.0 Co
 END

PHASES

CoO
 $\text{CoO} + 2\text{H}^+ = \text{Co}^{+2} + \text{H}_2\text{O}$
 log_k 13.5864
 delta_h -106.295 kJ
 Co(OH)2
 $\text{Co(OH)}_2 + 2\text{H}^+ = \text{Co}^{+2} + 2\text{H}_2\text{O}$
 log_k 13.094
 delta_h -0 kJ
 Co(OH)3
 $\text{Co(OH)}_3 + 3\text{H}^+ = \text{Co}^{+3} + 3\text{H}_2\text{O}$
 log_k -2.309
 delta_h -92.43 kJ
 Co3O4
 $\text{Co}_3\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Co}^{+3} + 4\text{H}_2\text{O}$
 log_k -10.4956
 delta_h -107.5 kJ
 CoFe2O4
 $\text{CoFe}_2\text{O}_4 + 8\text{H}^+ = \text{Co}^{+2} + 2\text{Fe}^{+3} + 4\text{H}_2\text{O}$
 log_k -3.5281
 delta_h -158.82 kJ
 CoCl2
 $\text{CoCl}_2 = \text{Co}^{+2} + 2\text{Cl}^-$
 log_k 8.2672
 delta_h -79.815 kJ
 CoCl2:6H2O
 $\text{CoCl}_2 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + 2\text{Cl}^- + 6\text{H}_2\text{O}$
 log_k 2.5365
 delta_h 8.0598 kJ
 (Co(NH3)6)Cl3
 $(\text{Co(NH}_3)_6)\text{Cl}_3 + 6\text{H}^+ = \text{Co}^{+3} + 6\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 20.0317
 delta_h -33.1 kJ
 (Co(NH3)5OH2)Cl3
 $(\text{Co(NH}_3)_5\text{OH}_2)\text{Cl}_3 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^- + \text{H}_2\text{O}$
 log_k 11.7351
 delta_h -25.37 kJ
 (Co(NH3)5Cl)Cl2
 $(\text{Co(NH}_3)_5\text{Cl})\text{Cl}_2 + 5\text{H}^+ = \text{Co}^{+3} + 5\text{NH}_4^+ + 3\text{Cl}^-$
 log_k 4.5102
 delta_h -10.74 kJ
 CoCO3
 $\text{CoCO}_3 = \text{Co}^{+2} + \text{CO}_3^{2-}$
 log_k -9.98
 delta_h -12.7612 kJ
 CoS04
 $\text{CoS}_04 = \text{Co}^{+2} + \text{S}_04^{2-}$
 log_k 2.8024
 delta_h -79.277 kJ
 CoS04:6H2O
 $\text{CoS}_04 \cdot 6\text{H}_2\text{O} = \text{Co}^{+2} + \text{S}_04^{2-} + 6\text{H}_2\text{O}$
 log_k -2.4726
 delta_h 1.0801 kJ
 END

SOLUTION 1 #Groundwater worst case maximum values

temp	21
pH	5.05
pe	1
redox	pe
units	mg/l
density	1
Al	5.21
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.04
Co	24.2
Cr	0
Cu	9.29
Fe	937
Pb	0.01
Mn	171
Mo	0
V	0
Zn	1.78
Se	0.08
Ni	5.57
N	60
P	23.6
Ca	590
Mg	1340
Na	5880
K	216
Cl	9420
S(6)	9110
Hg	0.0004
-water	1 # kg

REACTION 1
H2O -1; 40

END # Time-step 1

SOLUTION 2 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7

P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

SOLUTION 3 #Mean RWD untreated water quality

temp	20
pH	4.05
pe	4
redox	pe
units	mg/l
density	1
Al	1.42
Alkalinity	0
As	0.002
Ba	0.04
Be	0.002
B	0.1
Cd	0.0008
Co	0.72
Cr	0.0033
Cu	6.25
Fe	24.67
Pb	0.02
Mn	5.22
Mo	0.11
Zn	0.49
Se	0.01
Ni	0.49
N	10.07
P	0.29
Ca	522
Mg	88
Na	343
K	245
Cl	490
S(6)	2222
Hg	0
-water	1 # kg

MIX 1

1	0.03679
2	0.9632
3	1e-005

REACTION 2
H2O -1; 2

END #Time-step 2

SOLUTION 4 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0

Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

MIX 2

1	0.963
4	0.037

REACTION 3
H2O -1; 2

END #Time-step 3

SOLUTION 5 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

MIX 3
1 0.972
5 0.028

REACTION 4
H2O -1; 2

END #Time-step 4

SOLUTION 6 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

MIX 4
1 0.973
6 0.027

REACTION 5
H2O -1; 2

END #Time-step 5

SOLUTION 7 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003

Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

MIX 5

1	0.988
7	0.012

REACTION 6
H2O -1; 2

END #Time-step 6

SOLUTION 8 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

MIX 6

1 0.988
8 0.012

REACTION 7
H2O -1; 2

END #Time-step 7

SOLUTION 9 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
-water	1 # kg

MIX 7
1 0.988
9 0.012

REACTION 8
H2O -1; 2

END #Time-step 8



Attachment 2 PHREEQC Output Files

Input file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\Phase II\PHREEQC\2
Mixing\Kanmantoo Scenario 1 mixing OCT19.pqi
Output file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\Phase II\PHREEQC\2
Mixing\Kanmantoo Scenario 1 mixing OCT19.pqi
Database file: C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
\minteq.v4.dat

Reading data base.

SOLUTION_MASTER_SPECIES
SOLUTION_SPECIES
SOLUTION_SPECIES
PHASES
PHASES
SURFACE_MASTER_SPECIES
SURFACE_SPECIES
END

Reading input data for simulation 1.

DATABASE C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
\minteq.v4.dat
SELECTED_OUTPUT 1
file Kanmantoo Scenario 1 mixing OCT19.sel
totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg
Na K Alkalinity Cl S(6) Hg
SOLUTION_MASTER_SPECIES
Co Co+3 -1.0 Co 58.9332
Co(2) Co+2 0.0 Co
Co(3) Co+3 -1.0 Co
END

End of simulation.

Reading input data for simulation 2.

PHASES
CoO
CoO + 2H+ = Co+2 + H2O
log_k 13.5864
delta_h -106.295 kJ
Co(OH)2
Co(OH)2 + 2H+ = Co+2 + 2H2O
log_k 13.094
delta_h -0 kJ
Co(OH)3
Co(OH)3 + 3H+ = Co+3 + 3H2O
log_k -2.309
delta_h -92.43 kJ
Co3O4
Co3O4 + 8H+ = Co+2 + 2Co+3 + 4H2O
log_k -10.4956
delta_h -107.5 kJ
CoFe2O4
CoFe2O4 + 8H+ = Co+2 + 2Fe+3 + 4H2O
log_k -3.5281
delta_h -158.82 kJ
CoCl2
CoCl2 = Co+2 + 2Cl-
log_k 8.2672
delta_h -79.815 kJ
CoCl2:6H2O

```

      CoCl2:6H2O = Co+2 + 2Cl- + 6H2O
      log_k 2.5365
      delta_h      8.0598      kJ
(Co(NH3)6)Cl3
      (Co(NH3)6)Cl3 + 6H+ = Co+3 + 6NH4+ + 3Cl-
      log_k 20.0317
      delta_h      -33.1 kJ
(Co(NH3)5OH2)Cl3
      (Co(NH3)5OH2)Cl3 + 5H+ = Co+3 + 5NH4+ + 3Cl- + H2O
      log_k 11.7351
      delta_h      -25.37      kJ
(Co(NH3)5Cl)Cl2
      (Co(NH3)5Cl)Cl2 + 5H+ = Co+3 + 5NH4+ + 3Cl-
      log_k 4.5102
      delta_h      -10.74      kJ
CoCO3
      CoCO3 = Co+2 + CO3-2
      log_k -9.98
      delta_h      -12.7612    kJ
CoSO4
      CoSO4 = Co+2 + SO4-2
      log_k 2.8024
      delta_h      -79.277     kJ
CoSO4:6H2O
      CoSO4:6H2O = Co+2 + SO4-2 + 6H2O
      log_k -2.4726
      delta_h      1.0801      kJ
END

```

End of simulation.

Reading input data for simulation 3.

SOLUTION 1 # Mean Groundwater quality

```

temp      21
pH         6.79
pe         1
redox      pe
units      mg/l
density    1
Al         0.37
Alkalinity 0
As         0
Ba         0
Be         0
B          0
Cd         0.003
Co         2.34
Cr         0
Cu         0.31
Fe         100.34
Pb         0.003
Mn         12.2
Mo         0
V          0
Zn         0.17
Se         0.03
Ni         0.45
N          7
P          0.68
Ca         130
Mg         246
Na         1094
K          62
Cl         1533

```

S(6) 1485
 Hg 0.0002
 water 1 # kg
 REACTION 1
 H2O -1
 39
 END # Time-step 1

 Beginning of initial solution calculations.

Initial solution 1.

-----Solution composition-----

Elements	Molality	Moles
Al	1.378e-05	1.378e-05
Ca	3.259e-03	3.259e-03
Cd	2.681e-08	2.681e-08
Cl	4.344e-02	4.344e-02
Co	3.989e-05	3.989e-05
Cu	4.901e-06	4.901e-06
Fe	1.805e-03	1.805e-03
Hg	1.002e-09	1.002e-09
K	1.593e-03	1.593e-03
Mg	1.017e-02	1.017e-02
Mn	2.231e-04	2.231e-04
N	5.021e-04	5.021e-04
Na	4.781e-02	4.781e-02
Ni	7.703e-06	7.703e-06
P	2.206e-05	2.206e-05
Pb	1.455e-08	1.455e-08
S(6)	1.553e-02	1.553e-02
Se	3.817e-07	3.817e-07
Zn	2.612e-06	2.612e-06

-----Description of solution-----

pH	=	6.790
pe	=	1.000
Activity of water	=	0.998
Ionic strength (mol/kgw)	=	9.259e-02
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	6.274e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	21.00
Electrical balance (eq)	=	6.374e-03
Percent error, $100 \cdot (\text{Cat} - \text{An}) / (\text{Cat} + \text{An})$	=	4.58
Iterations	=	13
Total H	=	1.110158e+02
Total O	=	5.556909e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.061e-07	1.622e-07	-6.686	-6.790	-0.104	0.00
OH-	5.935e-08	4.562e-08	-7.227	-7.341	-0.114	(0)
H2O	5.551e+01	9.980e-01	1.744	-0.001	0.000	18.05
Al	1.378e-05					
Al(OH)4-	8.973e-06	7.024e-06	-5.047	-5.153	-0.106	(0)
Al(OH)2+	2.373e-06	1.884e-06	-5.625	-5.725	-0.100	(0)
Al(OH)3	2.329e-06	2.329e-06	-5.633	-5.633	0.000	(0)
AlOH+2	7.409e-08	2.945e-08	-7.130	-7.531	-0.401	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)

	Al+3	5.344e-09	6.178e-10	-8.272	-9.209	-0.937	(0)
	Al(SO4)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ca		3.259e-03					
	Ca+2	2.406e-03	9.221e-04	-2.619	-3.035	-0.416	(0)
	CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
	CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
	CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
	CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
	CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
	CaOH+	1.001e-09	8.020e-10	-8.999	-9.096	-0.096	(0)
	Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
	CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
Cd		2.681e-08					
	CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
	Cd+2	7.874e-09	3.018e-09	-8.104	-8.520	-0.416	(0)
	CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
	CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
	Cd(SO4)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
	CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
	CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
	CdOH+	1.568e-12	1.100e-12	-11.805	-11.959	-0.154	(0)
	Cd(OH)2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
	Cd2OH+3	4.264e-19	1.748e-20	-18.370	-19.758	-1.387	(0)
	Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
	Cd(OH)3-	3.135e-21	2.198e-21	-20.504	-20.658	-0.154	(0)
	CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
	Cd(OH)4-2	9.222e-29	2.230e-29	-28.035	-28.652	-0.617	(0)
	CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cl		4.344e-02					
	Cl-	4.343e-02	3.417e-02	-1.362	-1.466	-0.104	(0)
	CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
	MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
	CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
	CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
	NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
	MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
	ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
	CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
	CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
	ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
	PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
	ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
	CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
	MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
	PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
	ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
	CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
	NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
	CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
	CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
	PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
	ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
	PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
	CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
	FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
	FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
	CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
	HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
	HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
	HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
	FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
	HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
	CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
	HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
	CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
	Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)

Co(2)	3.989e-05						
Co+2	3.225e-05	7.797e-06	-4.491	-5.108	-0.617	(0)	
CoSO4	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)	
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)	
CoHP04	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)	
CoOH+	1.375e-08	9.639e-09	-7.862	-8.016	-0.154	(0)	
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)	
Co(OH)2	4.744e-11	4.744e-11	-10.324	-10.324	0.000	(0)	
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)	
Co2OH+3	9.190e-14	3.766e-15	-13.037	-14.424	-1.387	(0)	
Co(OH)3-	8.364e-17	5.865e-17	-16.078	-16.232	-0.154	(0)	
CoOOH-	5.039e-18	3.533e-18	-17.298	-17.452	-0.154	(0)	
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)	
Co4(OH)4+4	5.041e-22	1.722e-24	-21.297	-23.764	-2.466	(0)	
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)	
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)	
Co(OH)4-2	2.382e-24	5.759e-25	-23.623	-24.240	-0.617	(0)	
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)	
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)	
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)	
Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)	
Co(3)	4.042e-31						
CoOH+2	4.042e-31	9.773e-32	-30.393	-31.010	-0.617	(0)	
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)	
Co+3	2.685e-36	3.104e-37	-35.571	-36.508	-0.937	(0)	
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)	
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)	
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)	
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)	
Cu(1)	4.900e-06						
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)	
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)	
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)	
Cu+	1.553e-08	1.089e-08	-7.809	-7.963	-0.154	(0)	
Cu(2)	8.967e-10						
Cu+2	6.026e-10	2.310e-10	-9.220	-9.636	-0.416	(0)	
CuSO4	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)	
CuOH+	4.792e-11	3.719e-11	-10.319	-10.430	-0.110	(0)	
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)	
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)	
Cu(OH)2	5.595e-13	5.595e-13	-12.252	-12.252	0.000	(0)	
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)	
Cu2(OH)2+2	1.398e-16	3.379e-17	-15.855	-16.471	-0.617	(0)	
Cu(OH)3-	1.014e-16	7.111e-17	-15.994	-16.148	-0.154	(0)	
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)	
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)	
Cu(OH)4-2	1.434e-22	3.468e-23	-21.843	-22.460	-0.617	(0)	
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)	
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)	
Cu(NO2)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)	
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)	
Fe(2)	1.805e-03						
Fe+2	1.454e-03	3.515e-04	-2.837	-3.454	-0.617	(0)	
FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)	
FeHP04	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)	
FeH2P04+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)	
FeOH+	8.090e-07	6.384e-07	-6.092	-6.195	-0.103	(0)	
Fe(OH)2	2.214e-11	2.214e-11	-10.655	-10.655	0.000	(0)	
Fe(OH)3-	5.296e-13	4.179e-13	-12.276	-12.379	-0.103	(0)	
Fe(3)	3.233e-07						
Fe(OH)2+	3.138e-07	2.491e-07	-6.503	-6.604	-0.100	(0)	
Fe(OH)3	9.382e-09	9.382e-09	-8.028	-8.028	0.000	(0)	
Fe(OH)4-	1.205e-10	9.565e-11	-9.919	-10.019	-0.100	(0)	
FeOH+2	2.119e-11	8.217e-12	-10.674	-11.085	-0.411	(0)	
FeHP04+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)	
FeSO4+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)	
Fe+3	2.235e-15	2.584e-16	-14.651	-15.588	-0.937	(0)	
Fe(SO4)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)	

FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
Fe2(OH)2+4	7.548e-19	2.579e-21	-18.122	-20.589	-2.466	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
Fe3(OH)4+5	6.361e-23	8.906e-27	-22.197	-26.050	-3.854	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
H(0)	3.796e-19					
H2	1.898e-19	1.939e-19	-18.722	-18.712	0.009	(0)
Hg(0)	1.002e-09					
Hg	1.002e-09	1.002e-09	-8.999	-8.999	0.000	(0)
Hg(1)	3.697e-29					
Hg2+2	1.848e-29	4.469e-30	-28.733	-29.350	-0.617	(0)
Hg(2)	2.362e-18					
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
Hg(OH)2	1.682e-22	1.718e-22	-21.774	-21.765	0.009	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
HgOH+	2.768e-26	1.941e-26	-25.558	-25.712	-0.154	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Hg+2	3.648e-29	8.820e-30	-28.438	-29.055	-0.617	(0)
HgSO4	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Hg(OH)3-	1.911e-30	1.340e-30	-29.719	-29.873	-0.154	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
K	1.593e-03					
K+	1.549e-03	1.219e-03	-2.810	-2.914	-0.104	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
Mg	1.017e-02					
Mg+2	7.920e-03	3.036e-03	-2.101	-2.518	-0.416	(0)
MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
MgOH+	6.402e-08	5.162e-08	-7.194	-7.287	-0.094	(0)
MgPO4-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
Mn(2)	2.231e-04					
Mn+2	1.882e-04	4.549e-05	-3.725	-4.342	-0.617	(0)
MnSO4	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
MnOH+	6.606e-09	5.213e-09	-8.180	-8.283	-0.103	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Mn(OH)3-	2.129e-19	1.680e-19	-18.672	-18.775	-0.103	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
Mn(OH)4-2	8.666e-26	3.361e-26	-25.062	-25.474	-0.411	(0)
MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Mn(3)	9.732e-29					
Mn+3	9.732e-29	1.125e-29	-28.012	-28.949	-0.937	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-65.730	-66.142	-0.411	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-74.661	-74.779	-0.119	(0)
N(-3)	5.021e-04					
NH4+	4.805e-04	3.617e-04	-3.318	-3.442	-0.123	(0)
NH4SO4-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
NH3	9.560e-07	9.560e-07	-6.020	-6.020	0.000	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)

CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
N(3)	1.148e-35					
N02-	1.148e-35	8.735e-36	-34.940	-35.059	-0.119	(0)
CoN02+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CuN02+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
Cu(N02)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-48.382	-48.486	-0.104	(0)
CaN03+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
MnN03+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
CoN03+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
NiN03+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
ZnN03+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
PbN03+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
CdN03+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
CuN03+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
FeN03+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
HgN03+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Mn(N03)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
Na	4.781e-02					
Na+	4.677e-02	3.680e-02	-1.330	-1.434	-0.104	(0)
NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
NaHP04-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
Ni	7.703e-06					
Ni+2	5.664e-06	2.171e-06	-5.247	-5.663	-0.416	(0)
NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
NiOH+	1.818e-09	1.275e-09	-8.741	-8.895	-0.154	(0)
Ni(SO4)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
Ni(OH)2	8.335e-12	8.335e-12	-11.079	-11.079	0.000	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Ni(OH)3-	7.365e-16	5.164e-16	-15.133	-15.287	-0.154	(0)
NiSe04	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.993	-55.984	0.009	(0)
P	2.206e-05					
H2P04-	6.634e-06	5.268e-06	-5.178	-5.278	-0.100	(0)
HP04-2	5.222e-06	2.025e-06	-5.282	-5.694	-0.411	(0)
MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
FeHP04	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2P04+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
NaHP04-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
MgH2P04+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
CaHP04	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2P04+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)

KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
CoHP04	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CaP04-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
MgP04-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
H3P04	1.150e-10	1.150e-10	-9.939	-9.939	0.000	(0)
P04-3	4.196e-11	4.850e-12	-10.377	-11.314	-0.937	(0)
FeHP04+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeH2P04+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
Pb	1.455e-08					
Pb+2	5.480e-09	2.100e-09	-8.261	-8.678	-0.416	(0)
PbS04	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
PbOH+	4.662e-10	3.269e-10	-9.331	-9.486	-0.154	(0)
Pb(S04)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
Pb(OH)2	6.405e-13	6.405e-13	-12.193	-12.193	0.000	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
Pb2OH+3	2.655e-16	1.088e-17	-15.576	-16.963	-1.387	(0)
Pb(OH)3-	5.660e-17	3.969e-17	-16.247	-16.401	-0.154	(0)
Pb(OH)4-2	2.491e-21	6.022e-22	-20.604	-21.220	-0.617	(0)
Pb3(OH)4+2	3.779e-23	9.137e-24	-22.423	-23.039	-0.617	(0)
Pb4(OH)4+4	5.175e-26	1.768e-28	-25.286	-27.753	-2.466	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
S(6)	1.553e-02					
S04-2	1.094e-02	4.194e-03	-1.961	-2.377	-0.416	(0)
MgS04	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
NaS04-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
CaS04	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
FeS04	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
MnS04	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
NH4S04-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
CoS04	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
NiS04	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
ZnS04	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(S04)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
HS04-	7.527e-08	5.892e-08	-7.123	-7.230	-0.106	(0)
AlS04+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
PbS04	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
CdS04	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
Al(S04)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ni(S04)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
Cd(S04)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
Pb(S04)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
CuS04	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
FeS04+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe(S04)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
HgS04	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Se(-2)	4.685e-09					
HSe-	4.677e-09	3.279e-09	-8.330	-8.484	-0.154	(0)
H2Se	4.054e-12	4.054e-12	-11.392	-11.392	0.000	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Se-2	6.423e-17	1.553e-17	-16.192	-16.809	-0.617	(0)
Se(4)	3.770e-07					
HSeO3-	3.526e-07	2.472e-07	-6.453	-6.607	-0.154	(0)
SeO3-2	2.442e-08	5.904e-09	-7.612	-8.229	-0.617	(0)
H2SeO3	1.653e-11	1.653e-11	-10.782	-10.782	0.000	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Se(6)	2.478e-21					
SeO4-2	2.463e-21	9.439e-22	-20.609	-21.025	-0.416	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)

	HSeO4-	9.645e-27	6.763e-27	-26.016	-26.170	-0.154	(0)
	CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
	Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
Zn	2.612e-06						
	Zn+2	1.813e-06	6.948e-07	-5.742	-6.158	-0.416	(0)
	ZnSO4	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
	Zn(SO4)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
	ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
	ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
	ZnOH+	4.520e-09	3.170e-09	-8.345	-8.499	-0.154	(0)
	ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
	ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
	Zn(OH)2	4.227e-11	4.227e-11	-10.374	-10.374	0.000	(0)
	ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
	Zn(OH)3-	1.872e-14	1.313e-14	-13.728	-13.882	-0.154	(0)
	Zn(OH)4-2	1.339e-19	3.238e-20	-18.873	-19.490	-0.617	(0)
	ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
	Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
	ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
	Zn(NO3)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-124.48	-118.20	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-28.70	-24.17	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.96	-24.17	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-179.81	-161.88	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.93	-20.82	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-28.36	-27.91	0.45	(NH4)2SeO4
Al(OH)3(am)	0.09	11.16	11.06	Al(OH)3
Al2O3	2.05	22.32	20.27	Al2O3
Al4(OH)10SO4	5.98	28.68	22.70	Al4(OH)10SO4
AlOHSO4	-1.57	-4.80	-3.23	AlOHSO4
Alunite	6.34	5.44	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.24	-11.06	-7.82	PbSO4
Anhydrite	-1.07	-5.41	-4.34	CaSO4
Antlerite	-12.92	-4.13	8.79	Cu3(OH)4SO4
Atacamite	-7.99	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.78	-8.54	-1.76	ZnSO4:6H2O
Birnessite	-18.88	-0.79	18.09	MnO2
Bixbyite	-16.81	-17.16	-0.35	Mn2O3
Boehmite	2.30	11.16	8.86	AlOOH
Brochantite	-15.89	-0.19	15.71	Cu4(OH)6SO4
Brucite	-6.06	11.06	17.12	Mg(OH)2
Bunsenite	-4.77	7.92	12.68	NiO
Ca3(PO4)2(beta)	-2.69	-31.73	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-5.80	-52.88	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.79	-21.14	-19.35	CaHP04
CaHP04:2H2O	-2.09	-21.14	-19.05	CaHP04:2H2O
Calomel	-14.15	-32.28	-18.13	Hg2Cl2
CaSeO3:2H2O	-5.71	-2.85	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-21.06	-24.06	-3.00	CaSeO4:2H2O
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-23.45	-16.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-23.34	-0.78	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-15.59	-48.19	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-24.12	4.28	28.40	Cd4(OH)6SO4
CdCl2	-10.84	-11.45	-0.61	CdCl2
CdCl2:1H2O	-9.78	-11.45	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-9.52	-11.46	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.21	-10.52	13.69	Cd
Cdmetal(gamma)	-24.32	-10.52	13.80	Cd
CdOHCl	-6.81	-3.20	3.61	CdOHCl
CdSe	10.17	-10.21	-20.38	CdSe
CdSeO4:2H2O	-27.70	-29.55	-1.85	CdSeO4:2H2O

CdS04	-10.85	-10.90	-0.05	CdS04
CdS04:1H2O	-9.25	-10.90	-1.65	CdS04:1H2O
CdS04:2.67H2O	-9.07	-10.90	-1.83	CdS04:2.67H2O
Chalcanthite	-9.36	-12.02	-2.65	CuS04:5H2O
Clausthalite	17.01	-10.37	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.05	-16.14	-2.09	Co(OH)3
Co3(P04)2	-3.27	-37.95	-34.69	Co3(P04)2
Co304	-13.57	-23.81	-10.24	Co304
CoCl2	-16.50	-8.04	8.46	CoCl2
CoCl2:6H2O	-10.56	-8.05	2.52	CoCl2:6H2O
CoFe204	21.18	18.03	-3.15	CoFe204
CoHP04	-4.15	-23.21	-19.06	CoHP04
CoO	-5.37	8.47	13.84	CoO
CoSe	9.40	-6.80	-16.20	CoSe
CoSe03	-6.24	-4.92	1.32	CoSe03
CoSe04:6H2O	-24.61	-26.14	-1.53	CoSe04:6H2O
CoS04	-10.48	-7.49	2.99	CoS04
CoS04:6H2O	-5.02	-7.49	-2.48	CoS04:6H2O
Cotunnite	-6.77	-11.61	-4.84	PbCl2
Cu(OH)2	-4.87	3.94	8.81	Cu(OH)2
Cu2(OH)3N03	-56.82	-47.39	9.42	Cu2(OH)3N03
Cu2Se(alpha)	28.69	-17.62	-46.31	Cu2Se
Cu2S04	-16.40	-18.30	-1.90	Cu2S04
Cu3(P04)2	-14.69	-51.54	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-16.42	-51.54	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.35	-28.95	-64.30	Cu3Se2
Cumetal	-0.04	-8.96	-8.93	Cu
Cu0CuS04	-18.70	-8.07	10.63	Cu0CuS04
Cupricferrite	7.02	13.50	6.49	CuFe204
Cuprite	-1.24	-2.35	-1.11	Cu2O
Cuprousferrite	12.49	3.61	-8.88	CuFe02
CuSe	22.06	-11.33	-33.39	CuSe
CuSe2	22.68	-11.02	-33.70	CuSe2
CuSe03:2H2O	-10.05	-9.46	0.60	CuSe03:2H2O
CuSe04:5H2O	-28.23	-30.67	-2.44	CuSe04:5H2O
CuS04	-15.13	-12.01	3.11	CuS04
Diaspore	4.04	11.16	7.12	Al00H
Epsomite	-2.75	-4.90	-2.15	MgS04:7H2O
Fe(OH)2	-3.44	10.12	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.34	2.30	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-5.39	-3.84	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H2O	-10.00	-30.63	-20.63	Fe2(Se03)3:2H2O
Fe2(S04)3	-35.15	-38.31	-3.16	Fe2(S04)3
Fe3(OH)8	-0.54	19.68	20.22	Fe3(OH)8
Ferrihydrite	1.41	4.78	3.37	Fe(OH)3
Ferroselite	13.87	-4.84	-18.71	FeSe2
FeSe	5.86	-5.15	-11.00	FeSe
Gibbsite	2.64	11.16	8.52	Al(OH)3
Goethite	4.15	4.78	0.64	Fe00H
Goslarite	-6.50	-8.54	-2.05	ZnS04:7H2O
Gypsum	-0.80	-5.41	-4.61	CaS04:2H2O
H-Jarosite	-6.02	-17.57	-11.55	(H30)Fe3(S04)2(OH)6
H2Se(g)	-10.35	-15.27	-4.92	H2Se
Halite	-4.49	-2.90	1.59	NaCl
Hausmannite	-18.74	43.29	62.03	Mn304
Hematite	10.67	9.56	-1.11	Fe203
Hercynite	8.80	32.44	23.64	FeAl204
Hg(g)	-7.75	-15.67	-7.93	Hg
Hg(OH)2	-18.27	-21.76	-3.50	Hg(OH)2
Hg2(g)	-16.26	-31.35	-15.09	Hg2
Hg2(OH)2	-21.03	-15.77	5.26	Hg2(OH)2
Hg2HP04	-22.68	-47.45	-24.77	Hg2HP04
Hg2Se03	-24.51	-29.17	-4.66	Hg2Se03
Hg2S04	-25.58	-31.73	-6.14	Hg2S04
HgCl(g)	-36.02	-16.14	19.88	HgCl
HgCl2	-16.76	-38.28	-21.52	HgCl2
Hgmetal(l)	-2.02	-15.67	-13.65	Hg

HgSe	18.66	-37.04	-55.69	HgSe
HgSeO3	-22.73	-35.16	-12.43	HgSeO3
HgSO4	-28.27	-37.72	-9.45	HgSO4
Hinsdalite	-6.76	-9.26	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	2.00	-42.33	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-7.75	-70.54	-62.79	Pb5(P04)3OH
K-Alum	-11.65	-16.89	-5.24	KAl(S04)2:12H2O
K-Jarosite	0.79	-13.70	-14.49	KFe3(S04)2(OH)6
K2SeO4	-26.12	-26.85	-0.73	K2SeO4
Langite	-18.07	-0.19	17.88	Cu4(OH)6S04:H2O
Larnakite	-5.77	-6.15	-0.38	Pb0:PbS04
Laurionite	-3.98	-3.35	0.62	PbOHCl
Lepidocrocite	3.41	4.78	1.37	FeOOH
Lime	-22.62	10.54	33.16	CaO
Litharge	-7.95	4.90	12.85	PbO
Maghemite	3.18	9.56	6.39	Fe2O3
Magnesioferrite	3.10	20.62	17.52	Fe2MgO4
Magnetite	15.79	19.69	3.90	Fe3O4
Manganite	-8.31	17.03	25.34	MnOOH
Massicot	-8.15	4.90	13.05	PbO
Melanothallite	-18.98	-12.57	6.41	CuCl2
Melanterite	-3.58	-5.84	-2.26	FeS04:7H2O
Mg(OH)2(active)	-7.73	11.06	18.79	Mg(OH)2
Mg3(P04)2	-6.90	-30.18	-23.28	Mg3(P04)2
MgHP04:3H2O	-2.45	-20.62	-18.18	MgHP04:3H2O
MgSeO3:6H2O	-5.38	-2.34	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-22.35	-23.55	-1.20	MgSeO4:6H2O
Minium	-44.24	30.28	74.53	Pb3O4
Mirabilite	-3.95	-5.25	-1.30	Na2S04:10H2O
Mn2(S04)3	-59.71	-65.03	-5.32	Mn2(S04)3
Mn3(P04)2	-11.81	-35.65	-23.85	Mn3(P04)2
MnCl2:4H2O	-10.02	-7.28	2.74	MnCl2:4H2O
MnHP04	2.95	-22.45	-25.40	MnHP04
MnSe	-9.77	-6.04	3.73	MnSe
MnSeO3	-5.29	-4.16	1.13	MnSeO3
MnSeO3:2H2O	-5.12	-4.16	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-23.32	-25.37	-2.05	MnSeO4:5H2O
MnSO4	-9.46	-6.72	2.74	MnSO4
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.22	-21.76	-3.55	HgO
Morenosite	-5.87	-8.05	-2.17	NiS04:7H2O
Na-Jarosite	-1.38	-12.22	-10.84	NaFe3(S04)2(OH)6
Na2SeO3:5H2O	-12.99	-2.69	10.30	Na2SeO3:5H2O
Na2SeO4	-25.17	-23.89	1.28	Na2SeO4
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.11	7.91	13.02	Ni(OH)2
Ni3(P04)2	-8.32	-39.62	-31.30	Ni3(P04)2
Ni4(OH)6S04	-16.30	15.70	32.00	Ni4(OH)6S04
NiSe	10.34	-7.36	-17.70	NiSe
NiSeO3:2H2O	-8.37	-5.48	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-25.17	-26.69	-1.52	NiSeO4:6H2O
Nsutite	-18.29	-0.79	17.50	MnO2
O2(g)	-53.29	31.16	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.25	1.55	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-16.39	9.80	26.19	Pb2O(OH)2
Pb2O3	-35.66	25.38	61.04	Pb2O3
Pb3(P04)2	-5.13	-48.66	-43.53	Pb3(P04)2
Pb3O2S04	-12.13	-1.25	10.87	Pb3O2S04
Pb4(OH)6S04	-17.45	3.65	21.10	Pb4(OH)6S04
Pb4O3S04	-18.55	3.65	22.20	Pb4O3S04
PbHP04	-2.98	-26.78	-23.81	PbHP04
Pbmetal	-14.92	-10.68	4.24	Pb
PbO:0.3H2O	-8.08	4.90	12.98	PbO:0.33H2O
PbSeO4	-22.83	-29.70	-6.88	PbSeO4
Periclase	-10.88	11.06	21.94	MgO
Plattnerite	-29.83	20.48	50.31	PbO2
Plumbgummite	7.80	-24.99	-32.79	PbAl3(P04)2(OH)5:H2O

Portlandite	-12.57	10.54	23.11	Ca(OH)2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-17.21	24.82	42.03	MnO2
Pyromorphite	5.63	-78.80	-84.43	Pb5(P04)3Cl
Retgersite	-6.00	-8.05	-2.05	NiSO4:6H2O
Semetal(am)	7.44	0.31	-7.14	Se
Semetal(hex	8.05	0.31	-7.75	Se
SeO2	-13.52	-13.40	0.12	SeO2
SeO3	-56.00	-34.60	21.39	SeO3
Spinel	-4.39	33.38	37.77	MgAl2O4
Strengite	-0.53	-26.90	-26.38	FePO4:2H2O
Tenorite	-3.86	3.94	7.80	CuO
Thenardite	-5.59	-5.25	0.34	Na2SO4
Tsumebite	-8.15	-17.94	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	3.00	-33.00	-36.00	Fe3(P04)2:8H2O
Zincite	-4.13	7.42	11.55	ZnO
Zincosite	-12.66	-8.54	4.13	ZnSO4
Zn(NO3)2:6H2O	-106.39	-103.14	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.78	7.42	12.20	Zn(OH)2
Zn(OH)2(am)	-5.25	7.42	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.42	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.31	7.42	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.42	11.73	Zn(OH)2
Zn2(OH)2SO4	-8.62	-1.12	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.61	6.58	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-5.69	-41.11	-35.42	Zn3(P04)2:4H2O
Zn3O(SO4)2	-29.18	-9.65	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-14.68	13.72	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.91	20.59	38.50	Zn5(OH)8Cl2
ZnCl2	-16.31	-9.09	7.22	ZnCl2
Znmetal	-34.31	-8.16	26.15	Zn
ZnO(active)	-3.98	7.42	11.40	ZnO
ZnSe	6.61	-7.85	-14.46	ZnSe
ZnSeO4:6H2O	-25.67	-27.19	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-8.00	-8.54	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using solution 1.
Using reaction 1.

Reaction 1.

3.900e+01 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000
Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	4.633e-05	1.378e-05
Ca	1.096e-02	3.259e-03

Cd	9.016e-08	2.681e-08
Cl	1.461e-01	4.344e-02
Co	1.341e-04	3.989e-05
Cu	1.648e-05	4.901e-06
Fe	6.070e-03	1.805e-03
Hg	3.369e-09	1.002e-09
K	5.357e-03	1.593e-03
Mg	3.419e-02	1.017e-02
Mn	7.502e-04	2.231e-04
N	1.688e-03	5.021e-04
Na	1.608e-01	4.781e-02
Ni	2.590e-05	7.703e-06
P	7.417e-05	2.206e-05
Pb	4.892e-08	1.455e-08
S	5.222e-02	1.553e-02
Se	1.284e-06	3.817e-07
Zn	8.783e-06	2.612e-06

-----Description of solution-----

pH	=	6.756	Charge balance
pe	=	1.442	Adjusted to redox equilibrium
Activity of water	=	0.993	
Ionic strength (mol/kgw)	=	2.890e-01	
Mass of water (kg)	=	2.974e-01	
Total alkalinity (eq/kg)	=	2.111e-04	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	6.374e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	4.81	
Iterations	=	10	
Total H	=	3.301575e+01	
Total O	=	1.656909e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.383e-07	1.753e-07	-6.623	-6.756	-0.133	0.00
OH-	6.190e-08	4.200e-08	-7.208	-7.377	-0.168	(0)
H2O	5.551e+01	9.933e-01	1.744	-0.003	0.000	18.05
Al	4.633e-05					
Al(OH)4-	2.924e-05	2.061e-05	-4.534	-4.686	-0.152	(0)
Al(OH)2+	8.995e-06	6.524e-06	-5.046	-5.186	-0.140	(0)
Al(OH)3	7.425e-06	7.425e-06	-5.129	-5.129	0.000	(0)
AlOH+2	4.004e-07	1.108e-07	-6.397	-6.956	-0.558	(0)
AlSO4+	2.046e-07	1.442e-07	-6.689	-6.841	-0.152	(0)
Al+3	3.989e-08	2.524e-09	-7.399	-8.598	-1.199	(0)
Al(SO4)2-	2.056e-08	1.449e-08	-7.687	-7.839	-0.152	(0)
Ca	1.096e-02					
Ca+2	7.046e-03	2.066e-03	-2.152	-2.685	-0.533	(0)
CaSO4	3.908e-03	3.908e-03	-2.408	-2.408	0.000	(0)
CaHP04	3.628e-06	3.628e-06	-5.440	-5.440	0.000	(0)
CaH2PO4+	6.890e-07	4.997e-07	-6.162	-6.301	-0.140	(0)
CaNH3+2	1.046e-07	8.519e-09	-6.980	-8.070	-1.089	(0)
CaPO4-	6.954e-08	5.043e-08	-7.158	-7.297	-0.140	(0)
CaOH+	2.244e-09	1.654e-09	-8.649	-8.781	-0.132	(0)
Ca(NH3)2+2	1.364e-13	1.111e-14	-12.865	-13.954	-1.089	(0)
CaNO3+	0.000e+00	0.000e+00	-46.754	-47.026	-0.272	(0)
Cd	9.016e-08					
CdCl+	5.318e-08	2.841e-08	-7.274	-7.547	-0.272	(0)
CdCl2	1.259e-08	1.259e-08	-7.900	-7.900	0.000	(0)
Cd+2	9.492e-09	2.783e-09	-8.023	-8.555	-0.533	(0)
Cd(SO4)2-2	7.966e-09	6.485e-10	-8.099	-9.188	-1.089	(0)
CdSO4	5.340e-09	5.340e-09	-8.272	-8.272	0.000	(0)
CdCl3-	1.537e-09	8.212e-10	-8.813	-9.086	-0.272	(0)

CdOHC1	6.048e-11	6.048e-11	-10.218	-10.218	0.000	(0)
CdOH+	1.748e-12	9.336e-13	-11.757	-12.030	-0.272	(0)
Cd(OH)2	4.539e-16	4.539e-16	-15.343	-15.343	0.000	(0)
Cd(SeO3)2-2	5.208e-18	4.240e-19	-17.283	-18.373	-1.089	(0)
Cd2OH+3	3.865e-18	1.368e-20	-17.413	-19.864	-2.451	(0)
Cd(OH)3-	2.961e-21	1.582e-21	-20.529	-20.801	-0.272	(0)
CdSeO4	7.128e-27	7.128e-27	-26.147	-26.147	0.000	(0)
Cd(OH)4-2	1.814e-28	1.477e-29	-27.741	-28.831	-1.089	(0)
CdHS+	0.000e+00	0.000e+00	-40.864	-41.136	-0.272	(0)
CdNO3+	0.000e+00	0.000e+00	-52.587	-52.859	-0.272	(0)
Cd(HS)2	0.000e+00	0.000e+00	-74.520	-74.520	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-98.063	-98.063	0.000	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-112.936	-113.209	-0.272	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-150.512	-151.601	-1.089	(0)
Cl	1.461e-01					
Cl-	1.460e-01	1.075e-01	-0.836	-0.969	-0.133	(0)
CuCl2-	1.511e-05	1.046e-05	-4.821	-4.980	-0.160	(0)
MnCl+	1.015e-05	7.276e-06	-4.993	-5.138	-0.145	(0)
CoCl+	6.307e-06	3.369e-06	-5.200	-5.472	-0.272	(0)
NiCl+	2.348e-06	1.254e-06	-5.629	-5.902	-0.272	(0)
MnCl2	1.104e-06	1.104e-06	-5.957	-5.957	0.000	(0)
CuCl3-2	8.978e-07	2.367e-07	-6.047	-6.626	-0.579	(0)
CuCl	4.616e-07	4.616e-07	-6.336	-6.336	0.000	(0)
ZnCl+	4.493e-07	3.111e-07	-6.347	-6.507	-0.160	(0)
CdCl+	5.318e-08	2.841e-08	-7.274	-7.547	-0.272	(0)
MnCl3-	4.562e-08	3.269e-08	-7.341	-7.486	-0.145	(0)
ZnCl2	4.455e-08	4.455e-08	-7.351	-7.351	0.000	(0)
ZnOHC1	2.393e-08	2.393e-08	-7.621	-7.621	0.000	(0)
PbCl+	1.728e-08	9.232e-09	-7.762	-8.035	-0.272	(0)
CdCl2	1.259e-08	1.259e-08	-7.900	-7.900	0.000	(0)
ZnCl3-	5.403e-09	3.740e-09	-8.267	-8.427	-0.160	(0)
PbCl2	4.352e-09	4.352e-09	-8.361	-8.361	0.000	(0)
CdCl3-	1.537e-09	8.212e-10	-8.813	-9.086	-0.272	(0)
ZnCl4-2	7.383e-10	1.946e-10	-9.132	-9.711	-0.579	(0)
NiCl2	6.861e-10	6.861e-10	-9.164	-9.164	0.000	(0)
PbCl3-	3.642e-10	1.945e-10	-9.439	-9.711	-0.272	(0)
PbCl4-2	1.106e-10	9.007e-12	-9.956	-11.045	-1.089	(0)
CdOHC1	6.048e-11	6.048e-11	-10.218	-10.218	0.000	(0)
CuCl+	4.700e-11	3.254e-11	-10.328	-10.488	-0.160	(0)
CuCl2	9.958e-13	9.958e-13	-12.002	-12.002	0.000	(0)
FeCl+2	9.339e-15	2.462e-15	-14.030	-14.609	-0.579	(0)
HgCl4-2	2.064e-15	1.681e-16	-14.685	-15.775	-1.089	(0)
FeCl2+	1.871e-15	1.341e-15	-14.728	-14.873	-0.145	(0)
CuCl3-	1.343e-15	9.294e-16	-14.872	-15.032	-0.160	(0)
HgCl3-	7.089e-16	3.787e-16	-15.149	-15.422	-0.272	(0)
HgCl2	3.493e-16	3.493e-16	-15.457	-15.457	0.000	(0)
FeCl3	1.441e-17	1.441e-17	-16.841	-16.841	0.000	(0)
HgClOH	2.493e-18	2.493e-18	-17.603	-17.603	0.000	(0)
CuCl4-2	2.175e-18	5.733e-19	-17.663	-18.242	-0.579	(0)
HgCl+	1.032e-21	5.511e-22	-20.986	-21.259	-0.272	(0)
CoCl+2	2.480e-34	2.019e-35	-33.606	-34.695	-1.089	(0)
Co(NH3)5Cl+2	4.915e-36	4.002e-37	-35.308	-36.398	-1.089	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-47.487	-48.577	-1.089	(0)
Co(2)	1.341e-04					
Co+2	1.125e-04	9.163e-06	-3.949	-5.038	-1.089	(0)
CoSO4	1.517e-05	1.517e-05	-4.819	-4.819	0.000	(0)
CoCl+	6.307e-06	3.369e-06	-5.200	-5.472	-0.272	(0)
Co(NH3)+2	6.330e-08	5.153e-09	-7.199	-8.288	-1.089	(0)
CoHPO4	3.777e-08	3.777e-08	-7.423	-7.423	0.000	(0)
CoOH+	1.952e-08	1.043e-08	-7.709	-7.982	-0.272	(0)
Co(OH)2	4.725e-11	4.725e-11	-10.326	-10.326	0.000	(0)
Co(NH3)2+2	6.191e-12	5.040e-13	-11.208	-12.298	-1.089	(0)
Co2OH+3	1.353e-12	4.789e-15	-11.869	-14.320	-2.451	(0)
Co(NH3)3+2	2.552e-16	2.078e-17	-15.593	-16.682	-1.089	(0)
Co(OH)3-	1.007e-16	5.378e-17	-15.997	-16.269	-0.272	(0)
CoOOH-	6.094e-18	3.255e-18	-17.215	-17.487	-0.272	(0)
Co4(OH)4+4	5.372e-20	2.360e-24	-19.270	-23.627	-4.357	(0)
Co(NH3)4+2	4.386e-21	3.571e-22	-20.358	-21.447	-1.089	(0)

CoSeO4	5.913e-23	5.913e-23	-22.228	-22.228	0.000	(0)
Co(OH)4-2	5.972e-24	4.862e-25	-23.224	-24.313	-1.089	(0)
Co(NH3)5+2	2.384e-26	1.941e-27	-25.623	-26.712	-1.089	(0)
CoNO2+	6.954e-37	3.715e-37	-36.158	-36.430	-0.272	(0)
CoNO3+	0.000e+00	0.000e+00	-49.420	-49.692	-0.272	(0)
Co(NO3)2	0.000e+00	0.000e+00	-94.237	-94.237	0.000	(0)
Co(3)	3.590e-30					
CoOH+2	3.589e-30	2.922e-31	-29.445	-30.534	-1.089	(0)
CoCl+2	2.480e-34	2.019e-35	-33.606	-34.695	-1.089	(0)
Co+3	1.593e-35	1.008e-36	-34.798	-35.996	-1.199	(0)
Co(NH3)5Cl+2	4.915e-36	4.002e-37	-35.308	-36.398	-1.089	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-44.525	-44.797	-0.272	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-47.487	-48.577	-1.089	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-49.314	-50.403	-1.089	(0)
Cu(1)	1.648e-05					
CuCl2-	1.511e-05	1.046e-05	-4.821	-4.980	-0.160	(0)
CuCl3-2	8.978e-07	2.367e-07	-6.047	-6.626	-0.579	(0)
CuCl	4.616e-07	4.616e-07	-6.336	-6.336	0.000	(0)
Cu+	6.387e-09	3.412e-09	-8.195	-8.467	-0.272	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-72.257	-72.742	-0.485	(0)
CuS4S5-3	0.000e+00	0.000e+00	-73.018	-73.472	-0.453	(0)
Cu(2)	1.270e-09					
Cu+2	6.819e-10	2.000e-10	-9.166	-9.699	-0.533	(0)
CuSO4	3.749e-10	3.749e-10	-9.426	-9.426	0.000	(0)
CuNH3+2	1.222e-10	9.946e-12	-9.913	-11.002	-1.089	(0)
CuCl+	4.700e-11	3.254e-11	-10.328	-10.488	-0.160	(0)
CuOH+	4.281e-11	2.964e-11	-10.368	-10.528	-0.160	(0)
CuCl2	9.958e-13	9.958e-13	-12.002	-12.002	0.000	(0)
Cu(OH)2	4.105e-13	4.105e-13	-12.387	-12.387	0.000	(0)
CuCl3-	1.343e-15	9.294e-16	-14.872	-15.032	-0.160	(0)
Cu2(OH)2+2	2.636e-16	2.146e-17	-15.579	-16.668	-1.089	(0)
Cu(OH)3-	8.991e-17	4.803e-17	-16.046	-16.319	-0.272	(0)
CuCl4-2	2.175e-18	5.733e-19	-17.663	-18.242	-0.579	(0)
Cu(OH)4-2	2.649e-22	2.156e-23	-21.577	-22.666	-1.089	(0)
CuNO2+	2.255e-40	1.205e-40	-39.647	-39.919	-0.272	(0)
CuNO3+	0.000e+00	0.000e+00	-53.771	-54.043	-0.272	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-71.149	-71.149	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-99.807	-99.807	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-105.293	-105.565	-0.272	(0)
Fe(2)	6.069e-03					
Fe+2	5.204e-03	4.237e-04	-2.284	-3.373	-1.089	(0)
FeSO4	8.544e-04	8.544e-04	-3.068	-3.068	0.000	(0)
FeHP04	6.373e-06	6.373e-06	-5.196	-5.196	0.000	(0)
FeH2P04+	3.060e-06	2.219e-06	-5.514	-5.654	-0.140	(0)
FeOH+	9.886e-07	7.084e-07	-6.005	-6.150	-0.145	(0)
Fe(OH)2	2.262e-11	2.262e-11	-10.646	-10.646	0.000	(0)
Fe(OH)3-	5.485e-13	3.930e-13	-12.261	-12.406	-0.145	(0)
Fe(HS)2	0.000e+00	0.000e+00	-75.600	-75.600	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-113.879	-114.151	-0.272	(0)
Fe(3)	9.947e-07					
Fe(OH)2+	9.699e-07	7.034e-07	-6.013	-6.153	-0.140	(0)
Fe(OH)3	2.438e-08	2.438e-08	-7.613	-7.613	0.000	(0)
Fe(OH)4-	3.156e-10	2.289e-10	-9.501	-9.640	-0.140	(0)
FeOH+2	9.560e-11	2.520e-11	-10.020	-10.599	-0.579	(0)
FeHP04+	4.380e-11	3.176e-11	-10.359	-10.498	-0.140	(0)
FeSO4+	1.009e-13	7.227e-14	-12.996	-13.141	-0.145	(0)
Fe(SO4)2-	2.563e-14	1.369e-14	-13.591	-13.864	-0.272	(0)
Fe+3	1.360e-14	8.606e-16	-13.866	-15.065	-1.199	(0)
FeCl+2	9.339e-15	2.462e-15	-14.030	-14.609	-0.579	(0)
FeCl2+	1.871e-15	1.341e-15	-14.728	-14.873	-0.145	(0)
FeH2P04+2	6.175e-16	1.708e-16	-15.209	-15.767	-0.558	(0)
Fe2(OH)2+4	5.521e-16	2.425e-20	-15.258	-19.615	-4.357	(0)
FeHSeO3+2	1.458e-17	1.187e-18	-16.836	-17.925	-1.089	(0)
FeCl3	1.441e-17	1.441e-17	-16.841	-16.841	0.000	(0)
Fe3(OH)4+5	1.521e-18	2.365e-25	-17.818	-24.626	-6.808	(0)
FeNO3+2	0.000e+00	0.000e+00	-57.742	-58.831	-1.089	(0)
H(0)	5.552e-20					
H2	2.776e-20	2.967e-20	-19.557	-19.528	0.029	(0)

Hg(0)	3.369e-09					
Hg	3.369e-09	3.369e-09	-8.473	-8.473	0.000	(0)
Hg(1)	9.483e-27					
Hg2+2	4.741e-27	3.860e-28	-26.324	-27.413	-1.089	(0)
Hg(2)	3.125e-15					
HgCl4-2	2.064e-15	1.681e-16	-14.685	-15.775	-1.089	(0)
HgCl3-	7.089e-16	3.787e-16	-15.149	-15.422	-0.272	(0)
HgCl2	3.493e-16	3.493e-16	-15.457	-15.457	0.000	(0)
HgClOH	2.493e-18	2.493e-18	-17.603	-17.603	0.000	(0)
Hg(NH3)2+2	5.861e-20	4.772e-21	-19.232	-20.321	-1.089	(0)
Hg(OH)2	3.500e-21	3.740e-21	-20.456	-20.427	0.029	(0)
HgCl+	1.032e-21	5.511e-22	-20.986	-21.259	-0.272	(0)
HgNH3+2	4.624e-24	3.765e-25	-23.335	-24.424	-1.089	(0)
Hg(NH3)3+2	1.098e-24	8.935e-26	-23.960	-25.049	-1.089	(0)
HgOH+	8.592e-25	4.590e-25	-24.066	-24.338	-0.272	(0)
Hg+2	2.783e-27	2.266e-28	-26.556	-27.645	-1.089	(0)
HgSO4	4.095e-28	4.095e-28	-27.388	-27.388	0.000	(0)
Hg(OH)3-	5.029e-29	2.686e-29	-28.299	-28.571	-0.272	(0)
Hg(NH3)4+2	4.123e-29	3.357e-30	-28.385	-29.474	-1.089	(0)
HgHS2-	0.000e+00	0.000e+00	-69.960	-70.232	-0.272	(0)
Hg(HS)2	0.000e+00	0.000e+00	-70.594	-70.594	0.000	(0)
HgS2-2	0.000e+00	0.000e+00	-71.095	-72.184	-1.089	(0)
HgNO3+	0.000e+00	0.000e+00	-72.754	-73.026	-0.272	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-118.261	-118.261	0.000	(0)
K	5.357e-03					
K+	5.053e-03	3.718e-03	-2.296	-2.430	-0.133	(0)
KS04-	3.046e-04	2.209e-04	-3.516	-3.656	-0.140	(0)
KHP04-	1.470e-07	1.066e-07	-6.833	-6.972	-0.140	(0)
Mg	3.419e-02					
Mg+2	2.367e-02	6.941e-03	-1.626	-2.159	-0.533	(0)
MgSO4	1.050e-02	1.050e-02	-1.979	-1.979	0.000	(0)
MgHP04	1.682e-05	1.682e-05	-4.774	-4.774	0.000	(0)
MgH2P04+	4.948e-06	3.588e-06	-5.306	-5.445	-0.140	(0)
MgOH+	1.455e-07	1.087e-07	-6.837	-6.964	-0.127	(0)
MgP04-	3.652e-09	2.648e-09	-8.438	-8.577	-0.140	(0)
Mn(2)	7.502e-04					
Mn+2	6.607e-04	5.378e-05	-3.180	-4.269	-1.089	(0)
MnSO4	7.827e-05	7.827e-05	-4.106	-4.106	0.000	(0)
MnCl+	1.015e-05	7.276e-06	-4.993	-5.138	-0.145	(0)
MnCl2	1.104e-06	1.104e-06	-5.957	-5.957	0.000	(0)
MnCl3-	4.562e-08	3.269e-08	-7.341	-7.486	-0.145	(0)
MnOH+	7.919e-09	5.674e-09	-8.101	-8.246	-0.145	(0)
MnSe	3.649e-14	3.649e-14	-13.438	-13.438	0.000	(0)
Mn(OH)3-	2.163e-19	1.550e-19	-18.665	-18.810	-0.145	(0)
MnSeO4	1.844e-22	1.844e-22	-21.734	-21.734	0.000	(0)
Mn(OH)4-2	1.083e-25	2.854e-26	-24.966	-25.545	-0.579	(0)
MnNO3+	0.000e+00	0.000e+00	-48.651	-48.923	-0.272	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-93.373	-93.373	0.000	(0)
Mn(3)	5.809e-28					
Mn+3	5.809e-28	3.676e-29	-27.236	-28.435	-1.199	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-64.003	-64.582	-0.579	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-72.600	-72.778	-0.178	(0)
N(-3)	1.688e-03					
NH4+	1.556e-03	1.007e-03	-2.808	-2.997	-0.189	(0)
NH4SO4-	1.293e-04	9.263e-05	-3.888	-4.033	-0.145	(0)
NH3	2.462e-06	2.462e-06	-5.609	-5.609	0.000	(0)
NiNH3+2	1.439e-07	1.171e-08	-6.842	-7.931	-1.089	(0)
CaNH3+2	1.046e-07	8.519e-09	-6.980	-8.070	-1.089	(0)
Co(NH3)+2	6.330e-08	5.153e-09	-7.199	-8.288	-1.089	(0)
CuNH3+2	1.222e-10	9.946e-12	-9.913	-11.002	-1.089	(0)
Ni(NH3)2+2	8.699e-11	7.082e-12	-10.061	-11.150	-1.089	(0)
Co(NH3)2+2	6.191e-12	5.040e-13	-11.208	-12.298	-1.089	(0)
Ca(NH3)2+2	1.364e-13	1.111e-14	-12.865	-13.954	-1.089	(0)
Co(NH3)3+2	2.552e-16	2.078e-17	-15.593	-16.682	-1.089	(0)
Hg(NH3)2+2	5.861e-20	4.772e-21	-19.232	-20.321	-1.089	(0)
Co(NH3)4+2	4.386e-21	3.571e-22	-20.358	-21.447	-1.089	(0)

HgNH3+2	4.624e-24	3.765e-25	-23.335	-24.424	-1.089	(0)
Hg(NH3)3+2	1.098e-24	8.935e-26	-23.960	-25.049	-1.089	(0)
Co(NH3)5+2	2.384e-26	1.941e-27	-25.623	-26.712	-1.089	(0)
Hg(NH3)4+2	4.123e-29	3.357e-30	-28.385	-29.474	-1.089	(0)
Co(NH3)5Cl+2	4.915e-36	4.002e-37	-35.308	-36.398	-1.089	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-44.525	-44.797	-0.272	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-47.487	-48.577	-1.089	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-49.314	-50.403	-1.089	(0)
N(3)	8.671e-33					
N02-	8.670e-33	5.753e-33	-32.062	-32.240	-0.178	(0)
CoN02+	6.954e-37	3.715e-37	-36.158	-36.430	-0.272	(0)
CuN02+	2.255e-40	1.205e-40	-39.647	-39.919	-0.272	(0)
Cu(N02)2	0.000e+00	0.000e+00	-71.149	-71.149	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-44.721	-44.854	-0.133	(0)
CaN03+	0.000e+00	0.000e+00	-46.754	-47.026	-0.272	(0)
MnN03+	0.000e+00	0.000e+00	-48.651	-48.923	-0.272	(0)
CoN03+	0.000e+00	0.000e+00	-49.420	-49.692	-0.272	(0)
NiN03+	0.000e+00	0.000e+00	-49.518	-49.790	-0.272	(0)
ZnN03+	0.000e+00	0.000e+00	-50.096	-50.369	-0.272	(0)
PbN03+	0.000e+00	0.000e+00	-52.012	-52.284	-0.272	(0)
CdN03+	0.000e+00	0.000e+00	-52.587	-52.859	-0.272	(0)
CuN03+	0.000e+00	0.000e+00	-53.771	-54.043	-0.272	(0)
FeN03+2	0.000e+00	0.000e+00	-57.742	-58.831	-1.089	(0)
HgN03+	0.000e+00	0.000e+00	-72.754	-73.026	-0.272	(0)
Mn(N03)2	0.000e+00	0.000e+00	-93.373	-93.373	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-94.237	-94.237	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-95.933	-95.933	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-96.887	-96.887	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-98.063	-98.063	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-99.807	-99.807	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-118.261	-118.261	0.000	(0)
Na	1.608e-01					
Na+	1.536e-01	1.130e-01	-0.814	-0.947	-0.133	(0)
NaS04-	7.146e-03	5.182e-03	-2.146	-2.285	-0.140	(0)
NaHP04-	6.920e-06	5.018e-06	-5.160	-5.299	-0.140	(0)
Ni	2.590e-05					
Ni+2	1.573e-05	4.612e-06	-4.803	-5.336	-0.533	(0)
NiS04	7.651e-06	7.651e-06	-5.116	-5.116	0.000	(0)
NiCl+	2.348e-06	1.254e-06	-5.629	-5.902	-0.272	(0)
NiNH3+2	1.439e-07	1.171e-08	-6.842	-7.931	-1.089	(0)
Ni(S04)2-2	2.758e-08	2.245e-09	-7.559	-8.649	-1.089	(0)
NiOH+	4.666e-09	2.493e-09	-8.331	-8.603	-0.272	(0)
NiCl2	6.861e-10	6.861e-10	-9.164	-9.164	0.000	(0)
Ni(NH3)2+2	8.699e-11	7.082e-12	-10.061	-11.150	-1.089	(0)
Ni(OH)2	1.501e-11	1.501e-11	-10.824	-10.824	0.000	(0)
Ni(OH)3-	1.602e-15	8.559e-16	-14.795	-15.068	-0.272	(0)
NiSe04	2.747e-23	2.747e-23	-22.561	-22.561	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-49.518	-49.790	-0.272	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-54.386	-54.357	0.029	(0)
P	7.417e-05					
MgHP04	1.682e-05	1.682e-05	-4.774	-4.774	0.000	(0)
H2P04-	1.591e-05	1.154e-05	-4.798	-4.938	-0.140	(0)
HP04-2	1.556e-05	4.103e-06	-4.808	-5.387	-0.579	(0)
NaHP04-	6.920e-06	5.018e-06	-5.160	-5.299	-0.140	(0)
FeHP04	6.373e-06	6.373e-06	-5.196	-5.196	0.000	(0)
MgH2P04+	4.948e-06	3.588e-06	-5.306	-5.445	-0.140	(0)
CaHP04	3.628e-06	3.628e-06	-5.440	-5.440	0.000	(0)
FeH2P04+	3.060e-06	2.219e-06	-5.514	-5.654	-0.140	(0)
CaH2P04+	6.890e-07	4.997e-07	-6.162	-6.301	-0.140	(0)
KHP04-	1.470e-07	1.066e-07	-6.833	-6.972	-0.140	(0)
CaP04-	6.954e-08	5.043e-08	-7.158	-7.297	-0.140	(0)
CoHP04	3.777e-08	3.777e-08	-7.423	-7.423	0.000	(0)
MgP04-	3.652e-09	2.648e-09	-8.438	-8.577	-0.140	(0)
H3P04	2.724e-10	2.724e-10	-9.565	-9.565	0.000	(0)
P04-3	1.436e-10	9.087e-12	-9.843	-11.042	-1.199	(0)
FeHP04+	4.380e-11	3.176e-11	-10.359	-10.498	-0.140	(0)

FeH2PO4+2	6.175e-16	1.708e-16	-15.209	-15.767	-0.558	(0)
Pb	4.892e-08					
PbCl+	1.728e-08	9.232e-09	-7.762	-8.035	-0.272	(0)
PbSO4	1.068e-08	1.068e-08	-7.972	-7.972	0.000	(0)
Pb+2	8.661e-09	2.540e-09	-8.062	-8.595	-0.533	(0)
Pb(SO4)2-2	6.784e-09	5.523e-10	-8.169	-9.258	-1.089	(0)
PbCl2	4.352e-09	4.352e-09	-8.361	-8.361	0.000	(0)
PbOH+	6.813e-10	3.639e-10	-9.167	-9.439	-0.272	(0)
PbCl3-	3.642e-10	1.945e-10	-9.439	-9.711	-0.272	(0)
PbCl4-2	1.106e-10	9.007e-12	-9.956	-11.045	-1.089	(0)
Pb(OH)2	6.564e-13	6.564e-13	-12.183	-12.183	0.000	(0)
Pb2OH+3	4.138e-15	1.465e-17	-14.383	-16.834	-2.451	(0)
Pb(OH)3-	7.010e-17	3.744e-17	-16.154	-16.427	-0.272	(0)
Pb(OH)4-2	6.425e-21	5.231e-22	-20.192	-21.281	-1.089	(0)
Pb3(OH)4+2	1.425e-22	1.160e-23	-21.846	-22.935	-1.089	(0)
Pb4(OH)4+4	6.181e-24	2.715e-28	-23.209	-27.566	-4.357	(0)
PbNO3+	0.000e+00	0.000e+00	-52.012	-52.284	-0.272	(0)
Pb(HS)2	0.000e+00	0.000e+00	-74.502	-74.502	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-96.887	-96.887	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-113.518	-113.790	-0.272	(0)
S(-2)	0.000e+00					
H2S	0.000e+00	0.000e+00	-40.272	-40.272	0.000	(0)
HS-	0.000e+00	0.000e+00	-40.316	-40.588	-0.272	(0)
CdHS+	0.000e+00	0.000e+00	-40.864	-41.136	-0.272	(0)
S5-2	0.000e+00	0.000e+00	-42.198	-43.287	-1.089	(0)
S6-2	0.000e+00	0.000e+00	-42.624	-43.713	-1.089	(0)
S4-2	0.000e+00	0.000e+00	-42.797	-43.887	-1.089	(0)
S3-2	0.000e+00	0.000e+00	-43.610	-44.700	-1.089	(0)
S2-2	0.000e+00	0.000e+00	-44.636	-45.726	-1.089	(0)
S-2	0.000e+00	0.000e+00	-50.671	-51.250	-0.579	(0)
HgHS2-	0.000e+00	0.000e+00	-69.960	-70.232	-0.272	(0)
Hg(HS)2	0.000e+00	0.000e+00	-70.594	-70.594	0.000	(0)
HgS2-2	0.000e+00	0.000e+00	-71.095	-72.184	-1.089	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-72.257	-72.742	-0.485	(0)
CuS4S5-3	0.000e+00	0.000e+00	-73.018	-73.472	-0.453	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-73.264	-73.536	-0.272	(0)
Zn(HS)2	0.000e+00	0.000e+00	-74.282	-74.282	0.000	(0)
Pb(HS)2	0.000e+00	0.000e+00	-74.502	-74.502	0.000	(0)
Cd(HS)2	0.000e+00	0.000e+00	-74.520	-74.520	0.000	(0)
Fe(HS)2	0.000e+00	0.000e+00	-75.600	-75.600	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-105.293	-105.565	-0.272	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-111.318	-111.591	-0.272	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-112.936	-113.209	-0.272	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-113.518	-113.790	-0.272	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-113.725	-114.815	-1.089	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-113.879	-114.151	-0.272	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-150.512	-151.601	-1.089	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-152.550	-153.639	-1.089	(0)
S(6)	5.222e-02					
SO4-2	2.927e-02	8.584e-03	-1.534	-2.066	-0.533	(0)
MgSO4	1.050e-02	1.050e-02	-1.979	-1.979	0.000	(0)
NaSO4-	7.146e-03	5.182e-03	-2.146	-2.285	-0.140	(0)
CaSO4	3.908e-03	3.908e-03	-2.408	-2.408	0.000	(0)
FeSO4	8.544e-04	8.544e-04	-3.068	-3.068	0.000	(0)
KS04-	3.046e-04	2.209e-04	-3.516	-3.656	-0.140	(0)
NH4SO4-	1.293e-04	9.263e-05	-3.888	-4.033	-0.145	(0)
MnSO4	7.827e-05	7.827e-05	-4.106	-4.106	0.000	(0)
CoSO4	1.517e-05	1.517e-05	-4.819	-4.819	0.000	(0)
NiSO4	7.651e-06	7.651e-06	-5.116	-5.116	0.000	(0)
ZnSO4	2.155e-06	2.155e-06	-5.667	-5.667	0.000	(0)
Zn(SO4)2-2	2.047e-06	1.667e-07	-5.689	-6.778	-1.089	(0)
AlSO4+	2.046e-07	1.442e-07	-6.689	-6.841	-0.152	(0)
HS04-	1.849e-07	1.304e-07	-6.733	-6.885	-0.152	(0)
Ni(SO4)2-2	2.758e-08	2.245e-09	-7.559	-8.649	-1.089	(0)
Al(SO4)2-	2.056e-08	1.449e-08	-7.687	-7.839	-0.152	(0)
PbSO4	1.068e-08	1.068e-08	-7.972	-7.972	0.000	(0)
Cd(SO4)2-2	7.966e-09	6.485e-10	-8.099	-9.188	-1.089	(0)
Pb(SO4)2-2	6.784e-09	5.523e-10	-8.169	-9.258	-1.089	(0)

CdSO4	5.340e-09	5.340e-09	-8.272	-8.272	0.000	(0)
CuSO4	3.749e-10	3.749e-10	-9.426	-9.426	0.000	(0)
FeSO4+	1.009e-13	7.227e-14	-12.996	-13.141	-0.145	(0)
Fe(SO4)2-	2.563e-14	1.369e-14	-13.591	-13.864	-0.272	(0)
HgSO4	4.095e-28	4.095e-28	-27.388	-27.388	0.000	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-44.525	-44.797	-0.272	(0)
Se(-2)	5.411e-11					
HSe-	5.404e-11	2.886e-11	-10.267	-10.540	-0.272	(0)
H2Se	3.858e-14	3.858e-14	-13.414	-13.414	0.000	(0)
MnSe	3.649e-14	3.649e-14	-13.438	-13.438	0.000	(0)
Se-2	1.553e-18	1.264e-19	-17.809	-18.898	-1.089	(0)
Se(4)	1.284e-06					
HSeO3-	1.121e-06	5.988e-07	-5.950	-6.223	-0.272	(0)
SeO3-2	1.625e-07	1.323e-08	-6.789	-7.879	-1.089	(0)
H2SeO3	4.329e-11	4.329e-11	-10.364	-10.364	0.000	(0)
FeHSeO3+2	1.458e-17	1.187e-18	-16.836	-17.925	-1.089	(0)
Cd(SeO3)2-2	5.208e-18	4.240e-19	-17.283	-18.373	-1.089	(0)
Se(6)	4.718e-20					
SeO4-2	4.690e-20	1.375e-20	-19.329	-19.862	-0.533	(0)
MnSeO4	1.844e-22	1.844e-22	-21.734	-21.734	0.000	(0)
CoSeO4	5.913e-23	5.913e-23	-22.228	-22.228	0.000	(0)
NiSeO4	2.747e-23	2.747e-23	-22.561	-22.561	0.000	(0)
ZnSeO4	2.529e-24	2.529e-24	-23.597	-23.597	0.000	(0)
HSeO4-	1.994e-25	1.065e-25	-24.700	-24.973	-0.272	(0)
CdSeO4	7.128e-27	7.128e-27	-26.147	-26.147	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-42.363	-43.453	-1.089	(0)
Zn	8.783e-06					
Zn+2	4.048e-06	1.187e-06	-5.393	-5.926	-0.533	(0)
ZnSO4	2.155e-06	2.155e-06	-5.667	-5.667	0.000	(0)
Zn(SO4)2-2	2.047e-06	1.667e-07	-5.689	-6.778	-1.089	(0)
ZnCl+	4.493e-07	3.111e-07	-6.347	-6.507	-0.160	(0)
ZnCl2	4.455e-08	4.455e-08	-7.351	-7.351	0.000	(0)
ZnOHCl	2.393e-08	2.393e-08	-7.621	-7.621	0.000	(0)
ZnOH+	9.333e-09	4.985e-09	-8.030	-8.302	-0.272	(0)
ZnCl3-	5.403e-09	3.740e-09	-8.267	-8.427	-0.160	(0)
ZnCl4-2	7.383e-10	1.946e-10	-9.132	-9.711	-0.579	(0)
Zn(OH)2	6.121e-11	6.121e-11	-10.213	-10.213	0.000	(0)
Zn(OH)3-	3.276e-14	1.750e-14	-13.485	-13.757	-0.272	(0)
Zn(OH)4-2	4.881e-19	3.974e-20	-18.311	-19.401	-1.089	(0)
ZnSeO4	2.529e-24	2.529e-24	-23.597	-23.597	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-42.363	-43.453	-1.089	(0)
ZnNO3+	0.000e+00	0.000e+00	-50.096	-50.369	-0.272	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-73.264	-73.536	-0.272	(0)
Zn(HS)2	0.000e+00	0.000e+00	-74.282	-74.282	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-95.933	-95.933	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-111.318	-111.591	-0.272	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-113.725	-114.815	-1.089	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-152.550	-153.639	-1.089	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-114.15	-107.88	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-24.64	-20.11	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-31.91	-20.11	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-165.93	-148.00	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-36.46	-16.35	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-26.31	-25.86	0.45	(NH4)2SeO4
Al(OH)3(am)	0.60	11.66	11.06	Al(OH)3
Al2O3	3.06	23.33	20.27	Al2O3
Al4(OH)10SO4	8.37	31.07	22.70	Al4(OH)10SO4
AlOHSO4	-0.68	-3.91	-3.23	AlOHSO4
Alunite	9.06	8.16	-0.90	KAl3(SO4)2(OH)6
Anglesite	-2.84	-10.66	-7.82	PbSO4
Anhydrite	-0.41	-4.75	-4.34	CaSO4
Anilite	-16.65	-48.96	-32.31	Cu0.25Cu1.5S
Antlerite	-12.94	-4.15	8.79	Cu3(OH)4SO4

Atacamite	-7.72	-0.11	7.61	Cu ₂ (OH) ₃ Cl
Bianchite	-6.25	-8.01	-1.76	ZnSO ₄ ·6H ₂ O
Birnessite	-18.07	0.03	18.09	MnO ₂
Bixbyite	-15.99	-16.34	-0.35	Mn ₂ O ₃
BlaubleiI	-20.09	-44.25	-24.16	Cu _{0.9} Cu _{0.2} S
BlaubleiII	-19.15	-46.43	-27.28	Cu _{0.6} Cu _{0.8} S
Boehmite	2.81	11.66	8.86	Al ₂ O ₃
Brochantite	-16.05	-0.34	15.71	Cu ₄ (OH) ₆ SO ₄
Brucite	-5.77	11.35	17.12	Mg(OH) ₂
Bunsenite	-4.51	8.17	12.68	NiO
Ca ₃ (PO ₄) ₂ (beta)	-1.09	-30.14	-29.05	Ca ₃ (PO ₄) ₂
Ca ₄ H(PO ₄) ₃ ·3H ₂ O	-3.55	-50.63	-47.08	Ca ₄ H(PO ₄) ₃ ·3H ₂ O
CaHPO ₄	-1.13	-20.48	-19.35	CaHPO ₄
CaHPO ₄ ·2H ₂ O	-1.44	-20.49	-19.05	CaHPO ₄ ·2H ₂ O
Calomel	-11.22	-29.35	-18.13	Hg ₂ Cl ₂
CaSeO ₃ ·2H ₂ O	-5.02	-2.16	2.86	CaSeO ₃ ·2H ₂ O
CaSeO ₄ ·2H ₂ O	-19.55	-22.55	-3.00	CaSeO ₄ ·2H ₂ O
Cd(OH) ₂	-8.92	4.95	13.87	Cd(OH) ₂
Cd(OH) ₂ (am)	-8.99	4.95	13.94	Cd(OH) ₂
Cd ₃ (OH) ₂ (SO ₄) ₂	-23.00	-16.29	6.71	Cd ₃ (OH) ₂ (SO ₄) ₂
Cd ₃ (OH) ₄ SO ₄	-23.28	-0.72	22.56	Cd ₃ (OH) ₄ SO ₄
Cd ₃ (PO ₄) ₂	-15.15	-47.75	-32.60	Cd ₃ (PO ₄) ₂
Cd ₄ (OH) ₆ SO ₄	-24.17	4.23	28.40	Cd ₄ (OH) ₆ SO ₄
CdCl ₂	-9.88	-10.49	-0.61	CdCl ₂
CdCl ₂ ·1H ₂ O	-8.82	-10.50	-1.68	CdCl ₂ ·1H ₂ O
CdCl ₂ ·2.5H ₂ O	-8.57	-10.50	-1.93	CdCl ₂ ·2.5H ₂ O
Cdmetal(alpha)	-25.13	-11.44	13.69	Cd
Cdmetal(gamma)	-25.24	-11.44	13.80	Cd
CdOHCl	-6.38	-2.77	3.61	CdOHCl
CdSe	8.04	-12.34	-20.38	CdSe
CdSeO ₄ ·2H ₂ O	-26.57	-28.42	-1.85	CdSeO ₄ ·2H ₂ O
CdSO ₄	-10.57	-10.62	-0.05	CdSO ₄
CdSO ₄ ·1H ₂ O	-8.97	-10.62	-1.65	CdSO ₄ ·1H ₂ O
CdSO ₄ ·2.67H ₂ O	-8.80	-10.63	-1.83	CdSO ₄ ·2.67H ₂ O
Chalcanthite	-9.13	-11.78	-2.65	CuSO ₄ ·5H ₂ O
Chalcocite	-15.45	-50.77	-35.32	Cu ₂ S
Chalcopyrite	-45.11	-80.74	-35.62	CuFeS ₂
Cinnabar	-21.47	-67.77	-46.30	HgS
Clausthalite	15.01	-12.38	-27.39	PbSe
Co(OH) ₂	-4.63	8.47	13.09	Co(OH) ₂
Co(OH) ₃	-13.65	-15.74	-2.09	Co(OH) ₃
Co ₃ (PO ₄) ₂	-2.51	-37.20	-34.69	Co ₃ (PO ₄) ₂
Co ₃ O ₄	-12.75	-22.99	-10.24	Co ₃ O ₄
CoCl ₂	-15.43	-6.98	8.46	CoCl ₂
CoCl ₂ ·6H ₂ O	-9.51	-6.99	2.52	CoCl ₂ ·6H ₂ O
CoFe ₂ O ₄	22.02	18.87	-3.15	CoFe ₂ O ₄
CoHPO ₄	-3.77	-22.84	-19.06	CoHPO ₄
CoO	-5.37	8.47	13.84	CoO
CoS(alpha)	-31.43	-38.87	-7.44	CoS
CoS(beta)	-27.80	-38.87	-11.07	CoS
CoSe	7.38	-8.82	-16.20	CoSe
CoSeO ₃	-5.82	-4.50	1.32	CoSeO ₃
CoSeO ₄ ·6H ₂ O	-23.39	-24.92	-1.53	CoSeO ₄ ·6H ₂ O
CoSO ₄	-10.10	-7.10	2.99	CoSO ₄
CoSO ₄ ·6H ₂ O	-4.65	-7.12	-2.48	CoSO ₄ ·6H ₂ O
Cotunnite	-5.69	-10.53	-4.84	PbCl ₂
Covellite	-21.00	-43.53	-22.53	CuS
Cu(OH) ₂	-5.00	3.81	8.81	Cu(OH) ₂
Cu ₂ (OH) ₃ NO ₃	-53.42	-43.99	9.42	Cu ₂ (OH) ₃ NO ₃
Cu ₂ Se(alpha)	25.59	-20.72	-46.31	Cu ₂ Se
Cu ₂ SO ₄	-17.10	-19.00	-1.90	Cu ₂ SO ₄
Cu ₃ (PO ₄) ₂	-14.33	-51.18	-36.85	Cu ₃ (PO ₄) ₂
Cu ₃ (PO ₄) ₂ ·3H ₂ O	-16.07	-51.19	-35.12	Cu ₃ (PO ₄) ₂ ·3H ₂ O
Cu ₃ Se ₂	30.10	-34.20	-64.30	Cu ₃ Se ₂
Cumetal	-0.98	-9.91	-8.93	Cu
CuOCuSO ₄	-18.59	-7.96	10.63	CuOCuSO ₄
Cupricferrite	7.72	14.21	6.49	CuFe ₂ O ₄
Cuprite	-2.31	-3.42	-1.11	Cu ₂ O

Cuprousferrite	12.37	3.49	-8.88	CuFeO2
CuSe	19.91	-13.48	-33.39	CuSe
CuSe2	19.32	-14.38	-33.70	CuSe2
CuSeO3:2H2O	-9.77	-9.17	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-27.14	-29.58	-2.44	CuSeO4:5H2O
CuSO4	-14.88	-11.77	3.11	CuSO4
Diaspore	4.55	11.66	7.12	AlOOH
Djurleite	-15.89	-50.29	-34.40	Cu0.066Cu1.868S
Epsomite	-2.09	-4.25	-2.15	MgSO4:7H2O
Fe(OH)2	-3.43	10.13	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.92	2.88	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-4.14	-2.58	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-7.91	-28.54	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-33.17	-36.33	-3.16	Fe2(SO4)3
Fe3(OH)8	0.30	20.52	20.22	Fe3(OH)8
Ferrihydrite	1.83	5.19	3.37	Fe(OH)3
Ferroselite	10.65	-8.06	-18.71	FeSe2
FeS(ppt)	-34.28	-37.21	-2.92	FeS
FeSe	3.85	-7.16	-11.00	FeSe
Galena	-28.27	-42.43	-14.16	PbS
Gibbsite	3.14	11.66	8.52	Al(OH)3
Goethite	4.56	5.20	0.64	FeOOH
Goslarite	-5.97	-8.01	-2.05	ZnSO4:7H2O
Greenockite	-27.90	-42.39	-14.49	CdS
Greigite	-123.80	-168.83	-45.03	Fe3S4
Gypsum	-0.14	-4.76	-4.61	CaSO4:2H2O
H-Jarosite	-4.02	-15.57	-11.55	(H3O)Fe3(SO4)2(OH)6
H2S(g)	-39.33	-47.34	-8.01	H2S
H2Se(g)	-12.37	-17.30	-4.92	H2Se
Halite	-3.51	-1.92	1.59	NaCl
Hausmannite	-17.92	44.11	62.03	Mn3O4
Hematite	11.51	10.40	-1.11	Fe2O3
Hercynite	9.83	33.47	23.64	FeAl2O4
Hg(g)	-7.22	-15.15	-7.93	Hg
Hg(OH)2	-16.93	-20.43	-3.50	Hg(OH)2
Hg2(g)	-15.20	-30.30	-15.09	Hg2
Hg2(OH)2	-19.17	-13.91	5.26	Hg2(OH)2
Hg2HPO4	-20.44	-45.21	-24.77	Hg2HPO4
Hg2S	-49.40	-61.25	-11.84	Hg2S
Hg2SeO3	-22.22	-26.88	-4.66	Hg2SeO3
Hg2SO4	-23.34	-29.48	-6.14	Hg2SO4
HgCl(g)	-34.56	-14.68	19.88	HgCl
HgCl2	-14.35	-35.87	-21.52	HgCl2
Hgmetal(l)	-1.50	-15.15	-13.65	Hg
HgSe	17.98	-37.72	-55.69	HgSe
HgSeO3	-20.97	-33.40	-12.43	HgSeO3
HgSO4	-26.55	-36.00	-9.45	HgSO4
Hinsdalite	-4.48	-6.98	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	4.54	-39.80	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-6.56	-69.35	-62.79	Pb5(PO4)3OH
K-Alum	-9.95	-15.20	-5.24	KAl(SO4)2:12H2O
K-Jarosite	3.25	-11.24	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-23.99	-24.72	-0.73	K2SeO4
Langite	-18.23	-0.35	17.88	Cu4(OH)6SO4:H2O
Larnakite	-5.37	-5.75	-0.38	PbO:PbSO4
Laurionite	-3.43	-2.81	0.62	PbOHCl
Lepidocrocite	3.83	5.20	1.37	FeOOH
Lime	-22.34	10.82	33.16	CaO
Litharge	-7.94	4.91	12.85	PbO
Mackinawite	-33.61	-37.21	-3.60	FeS
Maghemite	4.01	10.40	6.39	Fe2O3
Magnesioferrite	4.22	21.75	17.52	Fe2MgO4
Magnetite	16.63	20.53	3.90	Fe3O4
Manganite	-7.91	17.43	25.34	MnOOH
Massicot	-8.14	4.91	13.05	PbO
Melanothallite	-18.04	-11.64	6.41	CuCl2
Melanterite	-3.20	-5.46	-2.26	FeSO4:7H2O
Metacinnabar	-22.07	-67.77	-45.70	HgS

Mg(OH)2(active)	-7.45	11.35	18.79	Mg(OH)2
Mg3(P04)2	-5.28	-28.56	-23.28	Mg3(P04)2
MgHP04:3H2O	-1.79	-19.97	-18.18	MgHP04:3H2O
MgSe03:6H2O	-4.69	-1.64	3.04	MgSe03:6H2O
MgSe04:6H2O	-20.84	-22.04	-1.20	MgSe04:6H2O
Minium	-43.39	31.13	74.53	Pb304
Mirabilite	-2.69	-3.99	-1.30	Na2S04:10H2O
Mn2(S04)3	-57.75	-63.07	-5.32	Mn2(S04)3
Mn3(P04)2	-11.04	-34.89	-23.85	Mn3(P04)2
MnCl2:4H2O	-8.96	-6.22	2.74	MnCl2:4H2O
MnHP04	3.33	-22.07	-25.40	MnHP04
MnS(grn)	-38.35	-38.10	0.25	MnS
MnS(pnk)	-41.44	-38.10	3.34	MnS
MnSe	-11.79	-8.05	3.73	MnSe
MnSe03	-4.87	-3.74	1.13	MnSe03
MnSe03:2H2O	-4.70	-3.74	0.96	MnSe03:2H2O
MnSe04:5H2O	-22.10	-24.15	-2.05	MnSe04:5H2O
MnS04	-9.07	-6.34	2.74	MnS04
Monteponite	-10.40	4.95	15.35	Cd0
Montroydite	-16.88	-20.42	-3.55	Hg0
Morenosite	-5.25	-7.42	-2.17	NiS04:7H2O
Na-Jarosite	1.08	-9.76	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-11.67	-1.37	10.30	Na2Se03:5H2O
Na2Se04	-23.04	-21.76	1.28	Na2Se04
Nantokite	-2.60	-9.44	-6.83	CuCl
Ni(OH)2	-4.85	8.17	13.02	Ni(OH)2
Ni3(P04)2	-6.79	-38.09	-31.30	Ni3(P04)2
Ni4(OH)6S04	-14.89	17.11	32.00	Ni4(OH)6S04
NiS(alpha)	-33.57	-39.17	-5.60	NiS
NiS(beta)	-28.07	-39.17	-11.10	NiS
NiS(gamma)	-26.37	-39.17	-12.80	NiS
NiSe	8.58	-9.12	-17.70	NiSe
NiSe03:2H2O	-7.70	-4.81	2.89	NiSe03:2H2O
NiSe04:6H2O	-23.70	-25.22	-1.52	NiSe04:6H2O
Nsutite	-17.48	0.03	17.50	Mn02
O2(g)	-51.67	32.78	84.45	O2
Pb(OH)2	-3.38	4.91	8.29	Pb(OH)2
Pb2(OH)3Cl	-6.69	2.10	8.79	Pb2(OH)3Cl
Pb20(OH)2	-16.36	9.83	26.19	Pb20(OH)2
Pb203	-34.82	26.22	61.04	Pb203
Pb3(P04)2	-4.34	-47.87	-43.53	Pb3(P04)2
Pb302S04	-11.71	-0.83	10.87	Pb302S04
Pb4(OH)6S04	-17.03	4.07	21.10	Pb4(OH)6S04
Pb403S04	-18.12	4.08	22.20	Pb403S04
PbHP04	-2.59	-26.39	-23.81	PbHP04
Pbmetal	-15.72	-11.48	4.24	Pb
Pb0:0.3H2O	-8.07	4.91	12.98	Pb0:0.33H2O
PbSe04	-21.58	-28.46	-6.88	PbSe04
Periclase	-10.59	11.35	21.94	Mg0
Plattnerite	-29.00	21.31	50.31	Pb02
Plumbgummite	10.08	-22.71	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-12.29	10.82	23.11	Ca(OH)2
Pyrite	-49.53	-68.15	-18.63	FeS2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-16.40	25.63	42.03	Mn02
Pyromorphite	7.36	-77.07	-84.43	Pb5(P04)3Cl
Retgersite	-5.37	-7.42	-2.05	NiS04:6H2O
Semetal(am)	6.24	-0.90	-7.14	Se
Semetal(hex	6.85	-0.90	-7.75	Se
Se02	-13.10	-12.98	0.12	Se02
Se03	-54.76	-33.37	21.39	Se03
Sphalerite	-28.24	-39.76	-11.52	ZnS
Spinel	-3.09	34.68	37.77	MgAl204
Strengite	0.27	-26.11	-26.38	FeP04:2H2O
Sulfur	-28.84	-30.95	-2.11	S
Tenorite	-3.99	3.81	7.80	Cu0
Thenardite	-4.30	-3.96	0.34	Na2S04
Tsumebite	-7.89	-17.68	-9.79	Pb2CuP04(OH)3:3H2O

Vivianite	3.77	-32.23	-36.00	Fe3(P04)2:8H20
Wurtzite	-30.76	-39.76	-9.00	ZnS
Zincite	-3.96	7.58	11.55	ZnO
Zincosite	-12.12	-7.99	4.13	ZnS04
Zn(N03)2:6H20	-98.91	-95.65	3.26	Zn(N03)2:6H20
Zn(OH)2	-4.62	7.58	12.20	Zn(OH)2
Zn(OH)2(am)	-5.09	7.58	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.37	7.58	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.15	7.58	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.15	7.58	11.73	Zn(OH)2
Zn2(OH)2S04	-7.91	-0.41	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-7.75	7.44	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H20	-4.45	-39.87	-35.42	Zn3(P04)2:4H20
Zn30(S04)2	-27.93	-8.40	19.53	Zn30(S04)2
Zn4(OH)6S04	-13.65	14.75	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-16.04	22.46	38.50	Zn5(OH)8Cl2
ZnCl2	-15.09	-7.86	7.22	ZnCl2
Znmetal	-34.96	-8.81	26.15	Zn
Zn0(active)	-3.82	7.58	11.40	Zn0
ZnS(am)	-30.67	-39.76	-9.09	ZnS
ZnSe	4.75	-9.71	-14.46	ZnSe
ZnSe04:6H20	-24.28	-25.80	-1.52	ZnSe04:6H20
ZnS04:1H20	-7.46	-7.99	-0.53	ZnS04:1H20

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 4.

SOLUTION 2 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485

```

      Hg      0.0002
      water  1 # kg
MIX 1
      1      0.03
      2      0.97
REACTION 2
H2O -1
      6
END #Time-step 2

```

Beginning of initial solution calculations.

Initial solution 2.

-----Solution composition-----

Elements	Molality	Moles
Al	1.378e-05	1.378e-05
Ca	3.259e-03	3.259e-03
Cd	2.681e-08	2.681e-08
Cl	4.344e-02	4.344e-02
Co	3.989e-05	3.989e-05
Cu	4.901e-06	4.901e-06
Fe	1.805e-03	1.805e-03
Hg	1.002e-09	1.002e-09
K	1.593e-03	1.593e-03
Mg	1.017e-02	1.017e-02
Mn	2.231e-04	2.231e-04
N	5.021e-04	5.021e-04
Na	4.781e-02	4.781e-02
Ni	7.703e-06	7.703e-06
P	2.206e-05	2.206e-05
Pb	1.455e-08	1.455e-08
S(6)	1.553e-02	1.553e-02
Se	3.817e-07	3.817e-07
Zn	2.612e-06	2.612e-06

-----Description of solution-----

```

                                pH = 6.790
                                pe = 1.000
                        Activity of water = 0.998
      Ionic strength (mol/kgw) = 9.259e-02
      Mass of water (kg) = 1.000e+00
      Total alkalinity (eq/kg) = 6.274e-05
      Total carbon (mol/kg) = 0.000e+00
      Total CO2 (mol/kg) = 0.000e+00
      Temperature (°C) = 21.00
      Electrical balance (eq) = 6.374e-03
Percent error, 100*(Cat-|An|)/(Cat+|An|) = 4.58
      Iterations = 13
      Total H = 1.110158e+02
      Total O = 5.556909e+01

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-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm³/mol
H+	2.061e-07	1.622e-07	-6.686	-6.790	-0.104	0.00
OH-	5.935e-08	4.562e-08	-7.227	-7.341	-0.114	(0)
H2O	5.551e+01	9.980e-01	1.744	-0.001	0.000	18.05
Al	1.378e-05					
Al(OH)4-	8.973e-06	7.024e-06	-5.047	-5.153	-0.106	(0)
Al(OH)2+	2.373e-06	1.884e-06	-5.625	-5.725	-0.100	(0)
Al(OH)3	2.329e-06	2.329e-06	-5.633	-5.633	0.000	(0)

		AlOH+2	7.409e-08	2.945e-08	-7.130	-7.531	-0.401	(0)
		AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
		Al+3	5.344e-09	6.178e-10	-8.272	-9.209	-0.937	(0)
		Al(SO4)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ca	3.259e-03							
		Ca+2	2.406e-03	9.221e-04	-2.619	-3.035	-0.416	(0)
		CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
		CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
		CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
		CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
		CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
		CaOH+	1.001e-09	8.020e-10	-8.999	-9.096	-0.096	(0)
		Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
		CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
Cd	2.681e-08							
		CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
		Cd+2	7.874e-09	3.018e-09	-8.104	-8.520	-0.416	(0)
		CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
		CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
		Cd(SO4)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
		CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
		CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
		CdOH+	1.568e-12	1.100e-12	-11.805	-11.959	-0.154	(0)
		Cd(OH)2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
		Cd2OH+3	4.264e-19	1.748e-20	-18.370	-19.758	-1.387	(0)
		Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
		Cd(OH)3-	3.135e-21	2.198e-21	-20.504	-20.658	-0.154	(0)
		CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
		Cd(OH)4-2	9.222e-29	2.230e-29	-28.035	-28.652	-0.617	(0)
		CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
		Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cl	4.344e-02							
		Cl-	4.343e-02	3.417e-02	-1.362	-1.466	-0.104	(0)
		CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
		MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
		CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
		CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
		NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
		MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
		ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
		CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
		CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
		ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
		PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
		ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
		CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
		MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
		PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
		ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
		CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
		NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
		CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
		CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
		PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
		ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
		PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
		CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
		FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
		FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
		CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
		HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
		HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
		HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
		FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
		HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
		CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
		HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
		CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)

Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(2)	3.989e-05					
Co+2	3.225e-05	7.797e-06	-4.491	-5.108	-0.617	(0)
CoS04	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CoHP04	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CoOH+	1.375e-08	9.639e-09	-7.862	-8.016	-0.154	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
Co(OH)2	4.744e-11	4.744e-11	-10.324	-10.324	0.000	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Co2OH+3	9.190e-14	3.766e-15	-13.037	-14.424	-1.387	(0)
Co(OH)3-	8.364e-17	5.865e-17	-16.078	-16.232	-0.154	(0)
Co0OH-	5.039e-18	3.533e-18	-17.298	-17.452	-0.154	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Co4(OH)4+4	5.041e-22	1.722e-24	-21.297	-23.764	-2.466	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
CoSe04	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
Co(OH)4-2	2.382e-24	5.759e-25	-23.623	-24.240	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Co(3)	4.042e-31					
CoOH+2	4.042e-31	9.773e-32	-30.393	-31.010	-0.617	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co+3	2.685e-36	3.104e-37	-35.571	-36.508	-0.937	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
Cu(1)	4.900e-06					
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
Cu+	1.553e-08	1.089e-08	-7.809	-7.963	-0.154	(0)
Cu(2)	8.967e-10					
Cu+2	6.026e-10	2.310e-10	-9.220	-9.636	-0.416	(0)
CuS04	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
CuOH+	4.792e-11	3.719e-11	-10.319	-10.430	-0.110	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
Cu(OH)2	5.595e-13	5.595e-13	-12.252	-12.252	0.000	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
Cu2(OH)2+2	1.398e-16	3.379e-17	-15.855	-16.471	-0.617	(0)
Cu(OH)3-	1.014e-16	7.111e-17	-15.994	-16.148	-0.154	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
Cu(OH)4-2	1.434e-22	3.468e-23	-21.843	-22.460	-0.617	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Fe(2)	1.805e-03					
Fe+2	1.454e-03	3.515e-04	-2.837	-3.454	-0.617	(0)
FeS04	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
FeHP04	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2P04+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
FeOH+	8.090e-07	6.384e-07	-6.092	-6.195	-0.103	(0)
Fe(OH)2	2.214e-11	2.214e-11	-10.655	-10.655	0.000	(0)
Fe(OH)3-	5.296e-13	4.179e-13	-12.276	-12.379	-0.103	(0)
Fe(3)	3.233e-07					
Fe(OH)2+	3.138e-07	2.491e-07	-6.503	-6.604	-0.100	(0)
Fe(OH)3	9.382e-09	9.382e-09	-8.028	-8.028	0.000	(0)
Fe(OH)4-	1.205e-10	9.565e-11	-9.919	-10.019	-0.100	(0)
FeOH+2	2.119e-11	8.217e-12	-10.674	-11.085	-0.411	(0)
FeHP04+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeS04+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)

Fe+3	2.235e-15	2.584e-16	-14.651	-15.588	-0.937	(0)
Fe(SO4)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
Fe2(OH)2+4	7.548e-19	2.579e-21	-18.122	-20.589	-2.466	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
Fe3(OH)4+5	6.361e-23	8.906e-27	-22.197	-26.050	-3.854	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
H(0)	3.796e-19					
H2	1.898e-19	1.939e-19	-18.722	-18.712	0.009	(0)
Hg(0)	1.002e-09					
Hg	1.002e-09	1.002e-09	-8.999	-8.999	0.000	(0)
Hg(1)	3.697e-29					
Hg2+2	1.848e-29	4.469e-30	-28.733	-29.350	-0.617	(0)
Hg(2)	2.362e-18					
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
Hg(OH)2	1.682e-22	1.718e-22	-21.774	-21.765	0.009	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
HgOH+	2.768e-26	1.941e-26	-25.558	-25.712	-0.154	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Hg+2	3.648e-29	8.820e-30	-28.438	-29.055	-0.617	(0)
HgSO4	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Hg(OH)3-	1.911e-30	1.340e-30	-29.719	-29.873	-0.154	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
K	1.593e-03					
K+	1.549e-03	1.219e-03	-2.810	-2.914	-0.104	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
Mg	1.017e-02					
Mg+2	7.920e-03	3.036e-03	-2.101	-2.518	-0.416	(0)
MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
MgOH+	6.402e-08	5.162e-08	-7.194	-7.287	-0.094	(0)
MgPO4-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
Mn(2)	2.231e-04					
Mn+2	1.882e-04	4.549e-05	-3.725	-4.342	-0.617	(0)
MnSO4	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
MnOH+	6.606e-09	5.213e-09	-8.180	-8.283	-0.103	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Mn(OH)3-	2.129e-19	1.680e-19	-18.672	-18.775	-0.103	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
Mn(OH)4-2	8.666e-26	3.361e-26	-25.062	-25.474	-0.411	(0)
MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Mn(3)	9.732e-29					
Mn+3	9.732e-29	1.125e-29	-28.012	-28.949	-0.937	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-65.730	-66.142	-0.411	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-74.661	-74.779	-0.119	(0)
N(-3)	5.021e-04					
NH4+	4.805e-04	3.617e-04	-3.318	-3.442	-0.123	(0)
NH4SO4-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
NH3	9.560e-07	9.560e-07	-6.020	-6.020	0.000	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)

Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
N(3)	1.148e-35					
N02-	1.148e-35	8.735e-36	-34.940	-35.059	-0.119	(0)
CoN02+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CuN02+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
Cu(N02)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-48.382	-48.486	-0.104	(0)
CaN03+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
MnN03+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
CoN03+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
NiN03+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
ZnN03+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
PbN03+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
CdN03+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
CuN03+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
FeN03+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
HgN03+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Mn(N03)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
Na	4.781e-02					
Na+	4.677e-02	3.680e-02	-1.330	-1.434	-0.104	(0)
NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
Ni	7.703e-06					
Ni+2	5.664e-06	2.171e-06	-5.247	-5.663	-0.416	(0)
NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
NiOH+	1.818e-09	1.275e-09	-8.741	-8.895	-0.154	(0)
Ni(SO4)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
Ni(OH)2	8.335e-12	8.335e-12	-11.079	-11.079	0.000	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Ni(OH)3-	7.365e-16	5.164e-16	-15.133	-15.287	-0.154	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.993	-55.984	0.009	(0)
P	2.206e-05					
H2PO4-	6.634e-06	5.268e-06	-5.178	-5.278	-0.100	(0)
HP04-2	5.222e-06	2.025e-06	-5.282	-5.694	-0.411	(0)
MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
FeHP04	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
NaHP04-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)

CaHP04	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2P04+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
CoHP04	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CaP04-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
MgP04-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
H3P04	1.150e-10	1.150e-10	-9.939	-9.939	0.000	(0)
P04-3	4.196e-11	4.850e-12	-10.377	-11.314	-0.937	(0)
FeHP04+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeH2P04+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
Pb	1.455e-08					
Pb+2	5.480e-09	2.100e-09	-8.261	-8.678	-0.416	(0)
PbS04	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
PbOH+	4.662e-10	3.269e-10	-9.331	-9.486	-0.154	(0)
Pb(S04)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
Pb(OH)2	6.405e-13	6.405e-13	-12.193	-12.193	0.000	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
Pb2OH+3	2.655e-16	1.088e-17	-15.576	-16.963	-1.387	(0)
Pb(OH)3-	5.660e-17	3.969e-17	-16.247	-16.401	-0.154	(0)
Pb(OH)4-2	2.491e-21	6.022e-22	-20.604	-21.220	-0.617	(0)
Pb3(OH)4+2	3.779e-23	9.137e-24	-22.423	-23.039	-0.617	(0)
Pb4(OH)4+4	5.175e-26	1.768e-28	-25.286	-27.753	-2.466	(0)
PbN03+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
Pb(N03)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
S(6)	1.553e-02					
S04-2	1.094e-02	4.194e-03	-1.961	-2.377	-0.416	(0)
MgS04	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
NaS04-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
CaS04	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
FeS04	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
MnS04	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
NH4S04-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
CoS04	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
NiS04	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
ZnS04	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(S04)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
HS04-	7.527e-08	5.892e-08	-7.123	-7.230	-0.106	(0)
AlS04+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
PbS04	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
CdS04	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
Al(S04)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ni(S04)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
Cd(S04)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
Pb(S04)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
CuS04	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
FeS04+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe(S04)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
HgS04	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Se(-2)	4.685e-09					
HSe-	4.677e-09	3.279e-09	-8.330	-8.484	-0.154	(0)
H2Se	4.054e-12	4.054e-12	-11.392	-11.392	0.000	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Se-2	6.423e-17	1.553e-17	-16.192	-16.809	-0.617	(0)
Se(4)	3.770e-07					
HSe03-	3.526e-07	2.472e-07	-6.453	-6.607	-0.154	(0)
Se03-2	2.442e-08	5.904e-09	-7.612	-8.229	-0.617	(0)
H2Se03	1.653e-11	1.653e-11	-10.782	-10.782	0.000	(0)
FeHSe03+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
Cd(Se03)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Se(6)	2.478e-21					
Se04-2	2.463e-21	9.439e-22	-20.609	-21.025	-0.416	(0)
MnSe04	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
CoSe04	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)

	NiSe04	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
	ZnSe04	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
	HSe04-	9.645e-27	6.763e-27	-26.016	-26.170	-0.154	(0)
	CdSe04	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
	Zn(Se04)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
Zn	2.612e-06						
	Zn+2	1.813e-06	6.948e-07	-5.742	-6.158	-0.416	(0)
	ZnS04	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
	Zn(S04)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
	ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
	ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
	ZnOH+	4.520e-09	3.170e-09	-8.345	-8.499	-0.154	(0)
	ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
	ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
	Zn(OH)2	4.227e-11	4.227e-11	-10.374	-10.374	0.000	(0)
	ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
	Zn(OH)3-	1.872e-14	1.313e-14	-13.728	-13.882	-0.154	(0)
	Zn(OH)4-2	1.339e-19	3.238e-20	-18.873	-19.490	-0.617	(0)
	ZnSe04	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
	Zn(Se04)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
	ZnN03+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
	Zn(N03)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(N03)2	-124.48	-118.20	6.27	(Co(NH3)5Cl)(N03)2
(Co(NH3)5Cl)Cl2	-28.70	-24.17	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.96	-24.17	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(N03)3	-179.81	-161.88	17.93	(Co(NH3)6)(N03)3
(Co(NH3)6)Cl3	-40.93	-20.82	20.11	(Co(NH3)6)Cl3
(NH4)2Se04	-28.36	-27.91	0.45	(NH4)2Se04
Al(OH)3(am)	0.09	11.16	11.06	Al(OH)3
Al2O3	2.05	22.32	20.27	Al2O3
Al4(OH)10S04	5.98	28.68	22.70	Al4(OH)10S04
AlOHS04	-1.57	-4.80	-3.23	AlOHS04
Alunite	6.34	5.44	-0.90	KAl3(S04)2(OH)6
Anglesite	-3.24	-11.06	-7.82	PbS04
Anhydrite	-1.07	-5.41	-4.34	CaS04
Antlerite	-12.92	-4.13	8.79	Cu3(OH)4S04
Atacamite	-7.99	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.78	-8.54	-1.76	ZnS04:6H2O
Birnessite	-18.88	-0.79	18.09	MnO2
Bixbyite	-16.81	-17.16	-0.35	Mn2O3
Boehmite	2.30	11.16	8.86	AlOOH
Brochantite	-15.89	-0.19	15.71	Cu4(OH)6S04
Brucite	-6.06	11.06	17.12	Mg(OH)2
Bunsenite	-4.77	7.92	12.68	NiO
Ca3(P04)2(beta)	-2.69	-31.73	-29.05	Ca3(P04)2
Ca4H(P04)3:3H2O	-5.80	-52.88	-47.08	Ca4H(P04)3:3H2O
CaHP04	-1.79	-21.14	-19.35	CaHP04
CaHP04:2H2O	-2.09	-21.14	-19.05	CaHP04:2H2O
Calomel	-14.15	-32.28	-18.13	Hg2Cl2
CaSe03:2H2O	-5.71	-2.85	2.86	CaSe03:2H2O
CaSe04:2H2O	-21.06	-24.06	-3.00	CaSe04:2H2O
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2
Cd3(OH)2(S04)2	-23.45	-16.74	6.71	Cd3(OH)2(S04)2
Cd3(OH)4S04	-23.34	-0.78	22.56	Cd3(OH)4S04
Cd3(P04)2	-15.59	-48.19	-32.60	Cd3(P04)2
Cd4(OH)6S04	-24.12	4.28	28.40	Cd4(OH)6S04
CdCl2	-10.84	-11.45	-0.61	CdCl2
CdCl2:1H2O	-9.78	-11.45	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-9.52	-11.46	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.21	-10.52	13.69	Cd
Cdmetal(gamma)	-24.32	-10.52	13.80	Cd
CdOHCl	-6.81	-3.20	3.61	CdOHCl

CdSe	10.17	-10.21	-20.38	CdSe
CdSeO4:2H2O	-27.70	-29.55	-1.85	CdSeO4:2H2O
CdSO4	-10.85	-10.90	-0.05	CdSO4
CdSO4:1H2O	-9.25	-10.90	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-9.07	-10.90	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.36	-12.02	-2.65	CuSO4:5H2O
Clausthalite	17.01	-10.37	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.05	-16.14	-2.09	Co(OH)3
Co3(P04)2	-3.27	-37.95	-34.69	Co3(P04)2
Co3O4	-13.57	-23.81	-10.24	Co3O4
CoCl2	-16.50	-8.04	8.46	CoCl2
CoCl2:6H2O	-10.56	-8.05	2.52	CoCl2:6H2O
CoFe2O4	21.18	18.03	-3.15	CoFe2O4
CoHP04	-4.15	-23.21	-19.06	CoHP04
CoO	-5.37	8.47	13.84	CoO
CoSe	9.40	-6.80	-16.20	CoSe
CoSeO3	-6.24	-4.92	1.32	CoSeO3
CoSeO4:6H2O	-24.61	-26.14	-1.53	CoSeO4:6H2O
CoSO4	-10.48	-7.49	2.99	CoSO4
CoSO4:6H2O	-5.02	-7.49	-2.48	CoSO4:6H2O
Cotunnite	-6.77	-11.61	-4.84	PbCl2
Cu(OH)2	-4.87	3.94	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.82	-47.39	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.69	-17.62	-46.31	Cu2Se
Cu2SO4	-16.40	-18.30	-1.90	Cu2SO4
Cu3(P04)2	-14.69	-51.54	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-16.42	-51.54	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.35	-28.95	-64.30	Cu3Se2
Cumetal	-0.04	-8.96	-8.93	Cu
Cu0CuSO4	-18.70	-8.07	10.63	Cu0CuSO4
Cupricferrite	7.02	13.50	6.49	CuFe2O4
Cuprite	-1.24	-2.35	-1.11	Cu2O
Cuprousferrite	12.49	3.61	-8.88	CuFeO2
CuSe	22.06	-11.33	-33.39	CuSe
CuSe2	22.68	-11.02	-33.70	CuSe2
CuSeO3:2H2O	-10.05	-9.46	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-28.23	-30.67	-2.44	CuSeO4:5H2O
CuSO4	-15.13	-12.01	3.11	CuSO4
Diaspore	4.04	11.16	7.12	AlOOH
Epsomite	-2.75	-4.90	-2.15	MgSO4:7H2O
Fe(OH)2	-3.44	10.12	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.34	2.30	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-5.39	-3.84	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-10.00	-30.63	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-35.15	-38.31	-3.16	Fe2(SO4)3
Fe3(OH)8	-0.54	19.68	20.22	Fe3(OH)8
Ferrihydrite	1.41	4.78	3.37	Fe(OH)3
Ferroselite	13.87	-4.84	-18.71	FeSe2
FeSe	5.86	-5.15	-11.00	FeSe
Gibbsite	2.64	11.16	8.52	Al(OH)3
Goethite	4.15	4.78	0.64	FeOOH
Goslarite	-6.50	-8.54	-2.05	ZnSO4:7H2O
Gypsum	-0.80	-5.41	-4.61	CaSO4:2H2O
H-Jarosite	-6.02	-17.57	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-10.35	-15.27	-4.92	H2Se
Halite	-4.49	-2.90	1.59	NaCl
Hausmannite	-18.74	43.29	62.03	Mn3O4
Hematite	10.67	9.56	-1.11	Fe2O3
Hercynite	8.80	32.44	23.64	FeAl2O4
Hg(g)	-7.75	-15.67	-7.93	Hg
Hg(OH)2	-18.27	-21.76	-3.50	Hg(OH)2
Hg2(g)	-16.26	-31.35	-15.09	Hg2
Hg2(OH)2	-21.03	-15.77	5.26	Hg2(OH)2
Hg2HP04	-22.68	-47.45	-24.77	Hg2HP04
Hg2SeO3	-24.51	-29.17	-4.66	Hg2SeO3
Hg2SO4	-25.58	-31.73	-6.14	Hg2SO4
HgCl(g)	-36.02	-16.14	19.88	HgCl

HgCl2	-16.76	-38.28	-21.52	HgCl2
Hgmetal(l)	-2.02	-15.67	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSeO3	-22.73	-35.16	-12.43	HgSeO3
HgSO4	-28.27	-37.72	-9.45	HgSO4
Hinsdalite	-6.76	-9.26	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	2.00	-42.33	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-7.75	-70.54	-62.79	Pb5(PO4)3OH
K-Alum	-11.65	-16.89	-5.24	KAl(SO4)2·12H2O
K-Jarosite	0.79	-13.70	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-26.12	-26.85	-0.73	K2SeO4
Langite	-18.07	-0.19	17.88	Cu4(OH)6SO4·H2O
Larnakite	-5.77	-6.15	-0.38	PbO:PbSO4
Laurionite	-3.98	-3.35	0.62	PbOHCl
Lepidocrocite	3.41	4.78	1.37	FeOOH
Lime	-22.62	10.54	33.16	CaO
Litharge	-7.95	4.90	12.85	PbO
Maghemite	3.18	9.56	6.39	Fe2O3
Magnesioferrite	3.10	20.62	17.52	Fe2MgO4
Magnetite	15.79	19.69	3.90	Fe3O4
Manganite	-8.31	17.03	25.34	MnOOH
Massicot	-8.15	4.90	13.05	PbO
Melanothallite	-18.98	-12.57	6.41	CuCl2
Melanterite	-3.58	-5.84	-2.26	FeSO4·7H2O
Mg(OH)2(active)	-7.73	11.06	18.79	Mg(OH)2
Mg3(PO4)2	-6.90	-30.18	-23.28	Mg3(PO4)2
MgHP04:3H2O	-2.45	-20.62	-18.18	MgHP04:3H2O
MgSeO3:6H2O	-5.38	-2.34	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-22.35	-23.55	-1.20	MgSeO4:6H2O
Minium	-44.24	30.28	74.53	Pb3O4
Mirabilite	-3.95	-5.25	-1.30	Na2SO4·10H2O
Mn2(SO4)3	-59.71	-65.03	-5.32	Mn2(SO4)3
Mn3(PO4)2	-11.81	-35.65	-23.85	Mn3(PO4)2
MnCl2:4H2O	-10.02	-7.28	2.74	MnCl2:4H2O
MnHP04	2.95	-22.45	-25.40	MnHP04
MnSe	-9.77	-6.04	3.73	MnSe
MnSeO3	-5.29	-4.16	1.13	MnSeO3
MnSeO3:2H2O	-5.12	-4.16	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-23.32	-25.37	-2.05	MnSeO4:5H2O
MnSO4	-9.46	-6.72	2.74	MnSO4
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.22	-21.76	-3.55	HgO
Morenosite	-5.87	-8.05	-2.17	NiSO4·7H2O
Na-Jarosite	-1.38	-12.22	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-12.99	-2.69	10.30	Na2SeO3:5H2O
Na2SeO4	-25.17	-23.89	1.28	Na2SeO4
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.11	7.91	13.02	Ni(OH)2
Ni3(PO4)2	-8.32	-39.62	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-16.30	15.70	32.00	Ni4(OH)6SO4
NiSe	10.34	-7.36	-17.70	NiSe
NiSeO3:2H2O	-8.37	-5.48	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-25.17	-26.69	-1.52	NiSeO4:6H2O
Nsutite	-18.29	-0.79	17.50	MnO2
O2(g)	-53.29	31.16	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.25	1.55	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-16.39	9.80	26.19	Pb2O(OH)2
Pb2O3	-35.66	25.38	61.04	Pb2O3
Pb3(PO4)2	-5.13	-48.66	-43.53	Pb3(PO4)2
Pb3O2SO4	-12.13	-1.25	10.87	Pb3O2SO4
Pb4(OH)6SO4	-17.45	3.65	21.10	Pb4(OH)6SO4
Pb4O3SO4	-18.55	3.65	22.20	Pb4O3SO4
PbHP04	-2.98	-26.78	-23.81	PbHP04
Pbmetal	-14.92	-10.68	4.24	Pb
PbO:0.3H2O	-8.08	4.90	12.98	PbO:0.33H2O
PbSeO4	-22.83	-29.70	-6.88	PbSeO4
Periclase	-10.88	11.06	21.94	MgO

Plattnerite	-29.83	20.48	50.31	PbO2
Plumbgummite	7.80	-24.99	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-12.57	10.54	23.11	Ca(OH)2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-17.21	24.82	42.03	MnO2
Pyromorphite	5.63	-78.80	-84.43	Pb5(P04)3Cl
Retgersite	-6.00	-8.05	-2.05	NiS04:6H2O
Semetal(am)	7.44	0.31	-7.14	Se
Semetal(hex)	8.05	0.31	-7.75	Se
SeO2	-13.52	-13.40	0.12	SeO2
SeO3	-56.00	-34.60	21.39	SeO3
Spinel	-4.39	33.38	37.77	MgAl2O4
Strengite	-0.53	-26.90	-26.38	FeP04:2H2O
Tenorite	-3.86	3.94	7.80	CuO
Thenardite	-5.59	-5.25	0.34	Na2S04
Tsumebite	-8.15	-17.94	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	3.00	-33.00	-36.00	Fe3(P04)2:8H2O
Zincite	-4.13	7.42	11.55	ZnO
Zincosite	-12.66	-8.54	4.13	ZnS04
Zn(NO3)2:6H2O	-106.39	-103.14	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.78	7.42	12.20	Zn(OH)2
Zn(OH)2(am)	-5.25	7.42	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.42	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.31	7.42	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.42	11.73	Zn(OH)2
Zn2(OH)2S04	-8.62	-1.12	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-8.61	6.58	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-5.69	-41.11	-35.42	Zn3(P04)2:4H2O
Zn3O(S04)2	-29.18	-9.65	19.53	Zn3O(S04)2
Zn4(OH)6S04	-14.68	13.72	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-17.91	20.59	38.50	Zn5(OH)8Cl2
ZnCl2	-16.31	-9.09	7.22	ZnCl2
Znmetal	-34.31	-8.16	26.15	Zn
ZnO(active)	-3.98	7.42	11.40	ZnO
ZnSe	6.61	-7.85	-14.46	ZnSe
ZnSeO4:6H2O	-25.67	-27.19	-1.52	ZnSeO4:6H2O
ZnS04:1H2O	-8.00	-8.54	-0.53	ZnS04:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 1.
Using reaction 2.

Mixture 1.

3.000e-02 Solution 1
9.700e-01 Solution 2

Reaction 2.

6.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000
Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	1.545e-05	1.378e-05
Ca	3.654e-03	3.259e-03
Cd	3.006e-08	2.681e-08
Cl	4.871e-02	4.344e-02
Co	4.473e-05	3.989e-05
Cu	5.495e-06	4.901e-06
Fe	2.024e-03	1.805e-03
Hg	1.123e-09	1.002e-09
K	1.786e-03	1.593e-03
Mg	1.140e-02	1.017e-02
Mn	2.502e-04	2.231e-04
N	5.630e-04	5.021e-04
Na	5.360e-02	4.781e-02
Ni	8.637e-06	7.703e-06
P	2.473e-05	2.206e-05
Pb	1.631e-08	1.455e-08
S	1.741e-02	1.553e-02
Se	4.280e-07	3.817e-07
Zn	2.929e-06	2.612e-06

-----Description of solution-----

pH	=	6.787	Charge balance
pe	=	1.026	Adjusted to redox equilibrium
Activity of water	=	0.998	
Ionic strength (mol/kgw)	=	1.033e-01	
Mass of water (kg)	=	8.919e-01	
Total alkalinity (eq/kg)	=	7.036e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	6.374e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	4.59	
Iterations	=	4	
Total H	=	9.901575e+01	
Total O	=	4.956909e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.092e-07	1.633e-07	-6.679	-6.787	-0.108	0.00
OH-	5.955e-08	4.529e-08	-7.225	-7.344	-0.119	(0)
H2O	5.551e+01	9.977e-01	1.744	-0.001	0.000	18.05
Al	1.545e-05					
Al(OH)4-	1.004e-05	7.783e-06	-4.998	-5.109	-0.110	(0)
Al(OH)2+	2.690e-06	2.118e-06	-5.570	-5.674	-0.104	(0)
Al(OH)3	2.600e-06	2.600e-06	-5.585	-5.585	0.000	(0)
AlOH+2	8.674e-08	3.336e-08	-7.062	-7.477	-0.415	(0)
AlSO4+	2.718e-08	2.107e-08	-7.566	-7.676	-0.110	(0)
Al+3	6.542e-09	7.049e-10	-8.184	-9.152	-0.968	(0)
Al(SO4)2-	1.428e-09	1.108e-09	-8.845	-8.956	-0.110	(0)
Ca	3.654e-03					
Ca+2	2.671e-03	9.923e-04	-2.573	-3.003	-0.430	(0)
CaSO4	9.818e-04	9.818e-04	-3.008	-3.008	0.000	(0)
CaHP04	9.221e-07	9.221e-07	-6.035	-6.035	0.000	(0)
CaH2P04+	1.502e-07	1.183e-07	-6.823	-6.927	-0.104	(0)
CaP04-	1.747e-08	1.376e-08	-7.758	-7.861	-0.104	(0)
CaNH3+2	7.800e-09	1.742e-09	-8.108	-8.759	-0.651	(0)
CaOH+	1.078e-09	8.567e-10	-8.967	-9.067	-0.100	(0)
Ca(NH3)2+2	4.329e-15	9.666e-16	-14.364	-15.015	-0.651	(0)
CaNO3+	0.000e+00	0.000e+00	-50.591	-50.754	-0.163	(0)

Cd	3.006e-08					
CdCl+	1.607e-08	1.105e-08	-7.794	-7.957	-0.163	(0)
Cd+2	8.234e-09	3.059e-09	-8.084	-8.514	-0.430	(0)
CdSO4	3.070e-09	3.070e-09	-8.513	-8.513	0.000	(0)
CdCl2	1.731e-09	1.731e-09	-8.762	-8.762	0.000	(0)
Cd(SO4)2-2	8.737e-10	1.951e-10	-9.059	-9.710	-0.651	(0)
CdCl3-	5.814e-11	3.996e-11	-10.236	-10.398	-0.163	(0)
CdOHCl	2.536e-11	2.536e-11	-10.596	-10.596	0.000	(0)
CdOH+	1.610e-12	1.106e-12	-11.793	-11.956	-0.163	(0)
Cd(OH)2	5.800e-16	5.800e-16	-15.237	-15.237	0.000	(0)
Cd2OH+3	5.201e-19	1.782e-20	-18.284	-19.749	-1.465	(0)
Cd(SeO3)2-2	4.953e-19	1.106e-19	-18.305	-18.956	-0.651	(0)
Cd(OH)3-	3.171e-21	2.180e-21	-20.499	-20.662	-0.163	(0)
CdSeO4	6.527e-28	6.527e-28	-27.185	-27.185	0.000	(0)
Cd(OH)4-2	9.827e-29	2.194e-29	-28.008	-28.659	-0.651	(0)
CdHS+	6.662e-39	4.579e-39	-38.176	-38.339	-0.163	(0)
CdNO3+	0.000e+00	0.000e+00	-56.065	-56.228	-0.163	(0)
Cd(HS)2	0.000e+00	0.000e+00	-68.968	-68.968	0.000	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-104.738	-104.901	-0.163	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-104.842	-104.842	0.000	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.886	-140.538	-0.651	(0)
Cl	4.871e-02					
Cl-	4.869e-02	3.802e-02	-1.313	-1.420	-0.108	(0)
CuCl2-	4.927e-06	3.785e-06	-5.307	-5.422	-0.115	(0)
MnCl+	2.885e-06	2.257e-06	-5.540	-5.646	-0.107	(0)
CoCl+	1.528e-06	1.050e-06	-5.816	-5.979	-0.163	(0)
CuCl	4.720e-07	4.720e-07	-6.326	-6.326	0.000	(0)
NiCl+	3.262e-07	2.242e-07	-6.487	-6.649	-0.163	(0)
MnCl2	1.212e-07	1.212e-07	-6.916	-6.916	0.000	(0)
ZnCl+	8.940e-08	6.867e-08	-7.049	-7.163	-0.115	(0)
CuCl3-2	8.086e-08	3.029e-08	-7.092	-7.519	-0.426	(0)
CdCl+	1.607e-08	1.105e-08	-7.794	-7.957	-0.163	(0)
ZnOHCl	5.696e-09	5.696e-09	-8.244	-8.244	0.000	(0)
PbCl+	4.083e-09	2.807e-09	-8.389	-8.552	-0.163	(0)
ZnCl2	3.479e-09	3.479e-09	-8.459	-8.459	0.000	(0)
CdCl2	1.731e-09	1.731e-09	-8.762	-8.762	0.000	(0)
MnCl3-	1.622e-09	1.269e-09	-8.790	-8.897	-0.107	(0)
PbCl2	4.680e-10	4.680e-10	-9.330	-9.330	0.000	(0)
ZnCl3-	1.345e-10	1.033e-10	-9.871	-9.986	-0.115	(0)
CdCl3-	5.814e-11	3.996e-11	-10.236	-10.398	-0.163	(0)
NiCl2	4.339e-11	4.339e-11	-10.363	-10.363	0.000	(0)
CdOHCl	2.536e-11	2.536e-11	-10.596	-10.596	0.000	(0)
CuCl+	1.665e-11	1.279e-11	-10.779	-10.893	-0.115	(0)
PbCl3-	1.077e-11	7.401e-12	-10.968	-11.131	-0.163	(0)
ZnCl4-2	5.079e-12	1.902e-12	-11.294	-11.721	-0.426	(0)
PbCl4-2	5.429e-13	1.212e-13	-12.265	-12.916	-0.651	(0)
CuCl2	1.385e-13	1.385e-13	-12.859	-12.859	0.000	(0)
FeCl+2	7.695e-16	2.882e-16	-15.114	-15.540	-0.426	(0)
FeCl2+	7.098e-17	5.553e-17	-16.149	-16.256	-0.107	(0)
CuCl3-	5.951e-17	4.572e-17	-16.225	-16.340	-0.115	(0)
HgCl2	2.154e-18	2.154e-18	-17.667	-17.667	0.000	(0)
HgCl3-	1.201e-18	8.259e-19	-17.920	-18.083	-0.163	(0)
HgCl4-2	5.808e-19	1.297e-19	-18.236	-18.887	-0.651	(0)
FeCl3	2.111e-19	2.111e-19	-18.676	-18.676	0.000	(0)
HgClOH	4.685e-20	4.685e-20	-19.329	-19.329	0.000	(0)
CuCl4-2	2.664e-20	9.976e-21	-19.575	-20.001	-0.426	(0)
HgCl+	1.397e-23	9.604e-24	-22.855	-23.018	-0.163	(0)
CoCl+2	1.084e-35	2.420e-36	-34.965	-35.616	-0.651	(0)
Co(NH3)5Cl+2	3.003e-39	6.704e-40	-38.523	-39.174	-0.651	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.072	-51.723	-0.651	(0)
Co(2)	4.473e-05					
Co+2	3.617e-05	8.075e-06	-4.442	-5.093	-0.651	(0)
CoSO4	6.993e-06	6.993e-06	-5.155	-5.155	0.000	(0)
CoCl+	1.528e-06	1.050e-06	-5.816	-5.979	-0.163	(0)
CoHPO4	1.762e-08	1.762e-08	-7.754	-7.754	0.000	(0)
CoOH+	1.442e-08	9.910e-09	-7.841	-8.004	-0.163	(0)
Co(NH3)+2	8.658e-09	1.933e-09	-8.063	-8.714	-0.651	(0)
Co(OH)2	4.841e-11	4.841e-11	-10.315	-10.315	0.000	(0)

Co(NH3)2+2	3.605e-13	8.049e-14	-12.443	-13.094	-0.651	(0)
Co2OH+3	1.170e-13	4.010e-15	-12.932	-14.397	-1.465	(0)
Co(OH)3-	8.643e-17	5.942e-17	-16.063	-16.226	-0.163	(0)
Co(NH3)3+2	6.327e-18	1.413e-18	-17.199	-17.850	-0.651	(0)
CoOOH-	5.208e-18	3.580e-18	-17.283	-17.446	-0.163	(0)
Co4(OH)4+4	7.742e-22	1.924e-24	-21.111	-23.716	-2.605	(0)
Co(NH3)4+2	4.629e-23	1.033e-23	-22.335	-22.986	-0.651	(0)
CoSeO4	4.342e-24	4.342e-24	-23.362	-23.362	0.000	(0)
Co(OH)4-2	2.594e-24	5.792e-25	-23.586	-24.237	-0.651	(0)
Co(NH3)5+2	1.071e-28	2.391e-29	-27.970	-28.621	-0.651	(0)
CoNO2+	1.084e-39	7.450e-40	-38.965	-39.128	-0.163	(0)
CoNO3+	0.000e+00	0.000e+00	-52.994	-53.157	-0.163	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.112	-101.112	0.000	(0)
Co(3)	4.781e-31					
CoOH+2	4.781e-31	1.067e-31	-30.321	-30.972	-0.651	(0)
CoCl+2	1.084e-35	2.420e-36	-34.965	-35.616	-0.651	(0)
Co+3	3.169e-36	3.415e-37	-35.499	-36.467	-0.968	(0)
Co(NH3)5Cl+2	3.003e-39	6.704e-40	-38.523	-39.174	-0.651	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.611	-47.774	-0.163	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.072	-51.723	-0.651	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.415	-53.066	-0.651	(0)
Cu(1)	5.494e-06					
CuCl2-	4.927e-06	3.785e-06	-5.307	-5.422	-0.115	(0)
CuCl	4.720e-07	4.720e-07	-6.326	-6.326	0.000	(0)
CuCl3-2	8.086e-08	3.029e-08	-7.092	-7.519	-0.426	(0)
Cu+	1.435e-08	9.862e-09	-7.843	-8.006	-0.163	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.280	-66.708	-0.428	(0)
CuS4S5-3	0.000e+00	0.000e+00	-67.035	-67.438	-0.403	(0)
Cu(2)	9.005e-10					
Cu+2	5.980e-10	2.222e-10	-9.223	-9.653	-0.430	(0)
CuSO4	2.179e-10	2.179e-10	-9.662	-9.662	0.000	(0)
CuOH+	4.622e-11	3.550e-11	-10.335	-10.450	-0.115	(0)
CuNH3+2	2.107e-11	4.704e-12	-10.676	-11.328	-0.651	(0)
CuCl+	1.665e-11	1.279e-11	-10.779	-10.893	-0.115	(0)
Cu(OH)2	5.303e-13	5.303e-13	-12.275	-12.275	0.000	(0)
CuCl2	1.385e-13	1.385e-13	-12.859	-12.859	0.000	(0)
Cu2(OH)2+2	1.380e-16	3.081e-17	-15.860	-16.511	-0.651	(0)
Cu(OH)3-	9.733e-17	6.690e-17	-16.012	-16.175	-0.163	(0)
CuCl3-	5.951e-17	4.572e-17	-16.225	-16.340	-0.115	(0)
CuCl4-2	2.664e-20	9.976e-21	-19.575	-20.001	-0.426	(0)
Cu(OH)4-2	1.450e-22	3.239e-23	-21.838	-22.490	-0.651	(0)
CuNO2+	0.000e+00	0.000e+00	-42.354	-42.516	-0.163	(0)
CuNO3+	0.000e+00	0.000e+00	-57.245	-57.407	-0.163	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.389	-76.389	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-97.090	-97.253	-0.163	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-106.581	-106.581	0.000	(0)
Fe(2)	2.024e-03					
Fe+2	1.634e-03	3.648e-04	-2.787	-3.438	-0.651	(0)
FeSO4	3.848e-04	3.848e-04	-3.415	-3.415	0.000	(0)
FeHPO4	2.904e-06	2.904e-06	-5.537	-5.537	0.000	(0)
FeH2PO4+	1.196e-06	9.421e-07	-5.922	-6.026	-0.104	(0)
FeOH+	8.407e-07	6.577e-07	-6.075	-6.182	-0.107	(0)
Fe(OH)2	2.264e-11	2.264e-11	-10.645	-10.645	0.000	(0)
Fe(OH)3-	5.423e-13	4.242e-13	-12.266	-12.372	-0.107	(0)
Fe(HS)2	0.000e+00	0.000e+00	-70.154	-70.154	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.787	-105.949	-0.163	(0)
Fe(3)	3.540e-07					
Fe(OH)2+	3.437e-07	2.707e-07	-6.464	-6.568	-0.104	(0)
Fe(OH)3	1.012e-08	1.012e-08	-7.995	-7.995	0.000	(0)
Fe(OH)4-	1.300e-10	1.024e-10	-9.886	-9.990	-0.104	(0)
FeOH+2	2.401e-11	8.993e-12	-10.620	-11.046	-0.426	(0)
FeHPO4+	7.065e-12	5.563e-12	-11.151	-11.255	-0.104	(0)
FeSO4+	1.599e-14	1.251e-14	-13.796	-13.903	-0.107	(0)
Fe+3	2.643e-15	2.848e-16	-14.578	-15.545	-0.968	(0)
Fe(SO4)2-	1.804e-15	1.240e-15	-14.744	-14.907	-0.163	(0)
FeCl+2	7.695e-16	2.882e-16	-15.114	-15.540	-0.426	(0)
FeH2PO4+2	7.248e-17	2.787e-17	-16.140	-16.555	-0.415	(0)
FeCl2+	7.098e-17	5.553e-17	-16.149	-16.256	-0.107	(0)

Fe2(OH)2+4	1.243e-18	3.088e-21	-17.906	-20.510	-2.605	(0)
FeHSeO3+2	7.986e-19	1.783e-19	-18.098	-18.749	-0.651	(0)
FeCl3	2.111e-19	2.111e-19	-18.676	-18.676	0.000	(0)
Fe3(OH)4+5	1.361e-22	1.159e-26	-21.866	-25.936	-4.070	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.070	-62.721	-0.651	(0)
H(0)	3.403e-19					
H2	1.702e-19	1.742e-19	-18.769	-18.759	0.010	(0)
Hg(0)	1.123e-09					
Hg	1.123e-09	1.123e-09	-8.950	-8.950	0.000	(0)
Hg(1)	5.679e-29					
Hg2+2	2.840e-29	6.340e-30	-28.547	-29.198	-0.651	(0)
Hg(2)	3.983e-18					
HgCl2	2.154e-18	2.154e-18	-17.667	-17.667	0.000	(0)
HgCl3-	1.201e-18	8.259e-19	-17.920	-18.083	-0.163	(0)
HgCl4-2	5.808e-19	1.297e-19	-18.236	-18.887	-0.651	(0)
HgClOH	4.685e-20	4.685e-20	-19.329	-19.329	0.000	(0)
Hg(OH)2	2.092e-22	2.142e-22	-21.679	-21.669	0.010	(0)
Hg(NH3)2+2	1.908e-22	4.260e-23	-21.719	-22.371	-0.651	(0)
HgCl+	1.397e-23	9.604e-24	-22.855	-23.018	-0.163	(0)
HgOH+	3.547e-26	2.438e-26	-25.450	-25.613	-0.163	(0)
HgNH3+2	3.536e-26	7.895e-27	-25.451	-26.103	-0.651	(0)
Hg(NH3)3+2	1.521e-27	3.396e-28	-26.818	-27.469	-0.651	(0)
Hg+2	4.999e-29	1.116e-29	-28.301	-28.952	-0.651	(0)
HgSO4	1.055e-29	1.055e-29	-28.977	-28.977	0.000	(0)
Hg(OH)3-	2.413e-30	1.659e-30	-29.617	-29.780	-0.163	(0)
Hg(NH3)4+2	2.432e-32	5.431e-33	-31.614	-32.265	-0.651	(0)
HgHS2-	0.000e+00	0.000e+00	-65.835	-65.998	-0.163	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.391	-66.391	0.000	(0)
HgS2-2	0.000e+00	0.000e+00	-67.268	-67.919	-0.651	(0)
HgNO3+	0.000e+00	0.000e+00	-77.581	-77.743	-0.163	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.388	-126.388	0.000	(0)
K	1.786e-03					
K+	1.733e-03	1.353e-03	-2.761	-2.869	-0.108	(0)
KS04-	5.340e-05	4.205e-05	-4.272	-4.376	-0.104	(0)
KHP04-	2.606e-08	2.052e-08	-7.584	-7.688	-0.104	(0)
Mg	1.140e-02					
Mg+2	8.806e-03	3.272e-03	-2.055	-2.485	-0.430	(0)
MgSO4	2.590e-03	2.590e-03	-2.587	-2.587	0.000	(0)
MgHP04	4.197e-06	4.197e-06	-5.377	-5.377	0.000	(0)
MgH2PO4+	1.059e-06	8.339e-07	-5.975	-6.079	-0.104	(0)
MgOH+	6.899e-08	5.523e-08	-7.161	-7.258	-0.097	(0)
MgPO4-	9.006e-10	7.092e-10	-9.045	-9.149	-0.104	(0)
Mn(2)	2.502e-04					
Mn+2	2.112e-04	4.716e-05	-3.675	-4.326	-0.651	(0)
MnSO4	3.591e-05	3.591e-05	-4.445	-4.445	0.000	(0)
MnCl+	2.885e-06	2.257e-06	-5.540	-5.646	-0.107	(0)
MnCl2	1.212e-07	1.212e-07	-6.916	-6.916	0.000	(0)
MnOH+	6.858e-09	5.365e-09	-8.164	-8.270	-0.107	(0)
MnCl3-	1.622e-09	1.269e-09	-8.790	-8.897	-0.107	(0)
MnSe	3.116e-12	3.116e-12	-11.506	-11.506	0.000	(0)
Mn(OH)3-	2.178e-19	1.704e-19	-18.662	-18.769	-0.107	(0)
MnSeO4	1.347e-23	1.347e-23	-22.871	-22.871	0.000	(0)
Mn(OH)4-2	9.032e-26	3.383e-26	-25.044	-25.471	-0.426	(0)
MnNO3+	0.000e+00	0.000e+00	-52.227	-52.390	-0.163	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.250	-100.250	0.000	(0)
Mn(3)	1.150e-28					
Mn+3	1.150e-28	1.239e-29	-27.939	-28.907	-0.968	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-65.619	-66.046	-0.426	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-74.534	-74.658	-0.124	(0)
N(-3)	5.630e-04					
NH4+	5.373e-04	3.994e-04	-3.270	-3.399	-0.129	(0)
NH4SO4-	2.456e-05	1.922e-05	-4.610	-4.716	-0.107	(0)
NH3	1.048e-06	1.048e-06	-5.980	-5.980	0.000	(0)
NiNH3+2	1.129e-08	2.520e-09	-7.947	-8.599	-0.651	(0)
Co(NH3)+2	8.658e-09	1.933e-09	-8.063	-8.714	-0.651	(0)
CaNH3+2	7.800e-09	1.742e-09	-8.108	-8.759	-0.651	(0)

CuNH3+2	2.107e-11	4.704e-12	-10.676	-11.328	-0.651	(0)
Ni(NH3)2+2	2.905e-12	6.485e-13	-11.537	-12.188	-0.651	(0)
Co(NH3)2+2	3.605e-13	8.049e-14	-12.443	-13.094	-0.651	(0)
Ca(NH3)2+2	4.329e-15	9.666e-16	-14.364	-15.015	-0.651	(0)
Co(NH3)3+2	6.327e-18	1.413e-18	-17.199	-17.850	-0.651	(0)
Hg(NH3)2+2	1.908e-22	4.260e-23	-21.719	-22.371	-0.651	(0)
Co(NH3)4+2	4.629e-23	1.033e-23	-22.335	-22.986	-0.651	(0)
HgNH3+2	3.536e-26	7.895e-27	-25.451	-26.103	-0.651	(0)
Hg(NH3)3+2	1.521e-27	3.396e-28	-26.818	-27.469	-0.651	(0)
Co(NH3)5+2	1.071e-28	2.391e-29	-27.970	-28.621	-0.651	(0)
Hg(NH3)4+2	2.432e-32	5.431e-33	-31.614	-32.265	-0.651	(0)
Co(NH3)5Cl+2	3.003e-39	6.704e-40	-38.523	-39.174	-0.651	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.611	-47.774	-0.163	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.072	-51.723	-0.651	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.415	-53.066	-0.651	(0)
N(3)	1.741e-35					
N02-	1.741e-35	1.309e-35	-34.759	-34.883	-0.124	(0)
CoN02+	1.084e-39	7.450e-40	-38.965	-39.128	-0.163	(0)
CuN02+	0.000e+00	0.000e+00	-42.354	-42.516	-0.163	(0)
Cu(N02)2	0.000e+00	0.000e+00	-76.389	-76.389	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-48.156	-48.264	-0.108	(0)
CaN03+	0.000e+00	0.000e+00	-50.591	-50.754	-0.163	(0)
MnN03+	0.000e+00	0.000e+00	-52.227	-52.390	-0.163	(0)
CoN03+	0.000e+00	0.000e+00	-52.994	-53.157	-0.163	(0)
NiN03+	0.000e+00	0.000e+00	-53.334	-53.496	-0.163	(0)
ZnN03+	0.000e+00	0.000e+00	-53.820	-53.983	-0.163	(0)
PbN03+	0.000e+00	0.000e+00	-55.597	-55.760	-0.163	(0)
CdN03+	0.000e+00	0.000e+00	-56.065	-56.228	-0.163	(0)
CuN03+	0.000e+00	0.000e+00	-57.245	-57.407	-0.163	(0)
FeN03+2	0.000e+00	0.000e+00	-62.070	-62.721	-0.651	(0)
HgN03+	0.000e+00	0.000e+00	-77.581	-77.743	-0.163	(0)
Mn(N03)2	0.000e+00	0.000e+00	-100.250	-100.250	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-101.112	-101.112	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-102.958	-102.958	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-103.773	-103.773	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-104.842	-104.842	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-106.581	-106.581	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-126.388	-126.388	0.000	(0)
Na	5.360e-02					
Na+	5.236e-02	4.088e-02	-1.281	-1.389	-0.108	(0)
NaSO4-	1.245e-03	9.804e-04	-2.905	-3.009	-0.104	(0)
NaHP04-	1.220e-06	9.604e-07	-5.914	-6.018	-0.104	(0)
Ni	8.637e-06					
Ni+2	6.273e-06	2.331e-06	-5.203	-5.633	-0.430	(0)
NiSO4	2.023e-06	2.023e-06	-5.694	-5.694	0.000	(0)
NiCl+	3.262e-07	2.242e-07	-6.487	-6.649	-0.163	(0)
NiNH3+2	1.129e-08	2.520e-09	-7.947	-8.599	-0.651	(0)
NiOH+	1.976e-09	1.358e-09	-8.704	-8.867	-0.163	(0)
Ni(SO4)2-2	1.391e-09	3.105e-10	-8.857	-9.508	-0.651	(0)
NiCl2	4.339e-11	4.339e-11	-10.363	-10.363	0.000	(0)
Ni(OH)2	8.817e-12	8.817e-12	-11.055	-11.055	0.000	(0)
Ni(NH3)2+2	2.905e-12	6.485e-13	-11.537	-12.188	-0.651	(0)
Ni(OH)3-	7.889e-16	5.423e-16	-15.103	-15.266	-0.163	(0)
NiSe04	1.157e-24	1.157e-24	-23.937	-23.937	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-53.334	-53.496	-0.163	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.901	-55.891	0.010	(0)
P	2.473e-05					
H2P04-	7.223e-06	5.688e-06	-5.141	-5.245	-0.104	(0)
HP04-2	5.797e-06	2.171e-06	-5.237	-5.663	-0.426	(0)
MgHP04	4.197e-06	4.197e-06	-5.377	-5.377	0.000	(0)
FeHP04	2.904e-06	2.904e-06	-5.537	-5.537	0.000	(0)
NaHP04-	1.220e-06	9.604e-07	-5.914	-6.018	-0.104	(0)
FeH2P04+	1.196e-06	9.421e-07	-5.922	-6.026	-0.104	(0)
MgH2P04+	1.059e-06	8.339e-07	-5.975	-6.079	-0.104	(0)
CaHP04	9.221e-07	9.221e-07	-6.035	-6.035	0.000	(0)
CaH2P04+	1.502e-07	1.183e-07	-6.823	-6.927	-0.104	(0)

KHP04-	2.606e-08	2.052e-08	-7.584	-7.688	-0.104	(0)
CoHP04	1.762e-08	1.762e-08	-7.754	-7.754	0.000	(0)
CaP04-	1.747e-08	1.376e-08	-7.758	-7.861	-0.104	(0)
MgP04-	9.006e-10	7.092e-10	-9.045	-9.149	-0.104	(0)
H3P04	1.251e-10	1.251e-10	-9.903	-9.903	0.000	(0)
P04-3	4.791e-11	5.163e-12	-10.320	-11.287	-0.968	(0)
FeHP04+	7.065e-12	5.563e-12	-11.151	-11.255	-0.104	(0)
FeH2P04+2	7.248e-17	2.787e-17	-16.140	-16.555	-0.415	(0)
Pb	1.631e-08					
Pb+2	5.874e-09	2.182e-09	-8.231	-8.661	-0.430	(0)
PbS04	4.800e-09	4.800e-09	-8.319	-8.319	0.000	(0)
PbCl+	4.083e-09	2.807e-09	-8.389	-8.552	-0.163	(0)
Pb(S04)2-2	5.817e-10	1.299e-10	-9.235	-9.886	-0.651	(0)
PbOH+	4.905e-10	3.372e-10	-9.309	-9.472	-0.163	(0)
PbCl2	4.680e-10	4.680e-10	-9.330	-9.330	0.000	(0)
PbCl3-	1.077e-11	7.401e-12	-10.968	-11.131	-0.163	(0)
Pb(OH)2	6.558e-13	6.558e-13	-12.183	-12.183	0.000	(0)
PbCl4-2	5.429e-13	1.212e-13	-12.265	-12.916	-0.651	(0)
Pb2OH+3	3.403e-16	1.166e-17	-15.468	-16.933	-1.465	(0)
Pb(OH)3-	5.868e-17	4.034e-17	-16.232	-16.394	-0.163	(0)
Pb(OH)4-2	2.721e-21	6.076e-22	-20.565	-21.216	-0.651	(0)
Pb3(OH)4+2	4.458e-23	9.954e-24	-22.351	-23.002	-0.651	(0)
Pb4(OH)4+4	8.051e-26	2.001e-28	-25.094	-27.699	-2.605	(0)
PbNO3+	0.000e+00	0.000e+00	-55.597	-55.760	-0.163	(0)
Pb(HS)2	0.000e+00	0.000e+00	-69.057	-69.057	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-103.773	-103.773	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.427	-105.589	-0.163	(0)
S(-2)	5.654e-38					
H2S	2.836e-38	2.836e-38	-37.547	-37.547	0.000	(0)
HS-	2.138e-38	1.470e-38	-37.670	-37.833	-0.163	(0)
CdHS+	6.662e-39	4.579e-39	-38.176	-38.339	-0.163	(0)
S5-2	1.414e-40	0.000e+00	-39.849	-40.501	-0.651	(0)
S6-2	0.000e+00	0.000e+00	-40.276	-40.927	-0.651	(0)
S4-2	0.000e+00	0.000e+00	-40.449	-41.100	-0.651	(0)
S3-2	0.000e+00	0.000e+00	-41.262	-41.913	-0.651	(0)
S2-2	0.000e+00	0.000e+00	-42.288	-42.939	-0.651	(0)
S-2	0.000e+00	0.000e+00	-48.037	-48.464	-0.426	(0)
HgHS2-	0.000e+00	0.000e+00	-65.835	-65.998	-0.163	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.280	-66.708	-0.428	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.391	-66.391	0.000	(0)
CuS4S5-3	0.000e+00	0.000e+00	-67.035	-67.438	-0.403	(0)
HgS2-2	0.000e+00	0.000e+00	-67.268	-67.919	-0.651	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-68.036	-68.199	-0.163	(0)
Cd(HS)2	0.000e+00	0.000e+00	-68.968	-68.968	0.000	(0)
Zn(HS)2	0.000e+00	0.000e+00	-68.976	-68.976	0.000	(0)
Pb(HS)2	0.000e+00	0.000e+00	-69.057	-69.057	0.000	(0)
Fe(HS)2	0.000e+00	0.000e+00	-70.154	-70.154	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-97.090	-97.253	-0.163	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.366	-103.529	-0.163	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-104.738	-104.901	-0.163	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.427	-105.589	-0.163	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.787	-105.949	-0.163	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-106.071	-106.722	-0.651	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.886	-140.538	-0.651	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-142.170	-142.822	-0.651	(0)
S(6)	1.741e-02					
S04-2	1.209e-02	4.491e-03	-1.918	-2.348	-0.430	(0)
MgS04	2.590e-03	2.590e-03	-2.587	-2.587	0.000	(0)
NaS04-	1.245e-03	9.804e-04	-2.905	-3.009	-0.104	(0)
CaS04	9.818e-04	9.818e-04	-3.008	-3.008	0.000	(0)
FeS04	3.848e-04	3.848e-04	-3.415	-3.415	0.000	(0)
KS04-	5.340e-05	4.205e-05	-4.272	-4.376	-0.104	(0)
MnS04	3.591e-05	3.591e-05	-4.445	-4.445	0.000	(0)
NH4S04-	2.456e-05	1.922e-05	-4.610	-4.716	-0.107	(0)
CoS04	6.993e-06	6.993e-06	-5.155	-5.155	0.000	(0)
NiS04	2.023e-06	2.023e-06	-5.694	-5.694	0.000	(0)
ZnS04	7.035e-07	7.035e-07	-6.153	-6.153	0.000	(0)
Zn(S04)2-2	1.275e-07	2.847e-08	-6.895	-7.546	-0.651	(0)

HSO4-	8.193e-08	6.353e-08	-7.087	-7.197	-0.110	(0)
AlSO4+	2.718e-08	2.107e-08	-7.566	-7.676	-0.110	(0)
PbSO4	4.800e-09	4.800e-09	-8.319	-8.319	0.000	(0)
CdSO4	3.070e-09	3.070e-09	-8.513	-8.513	0.000	(0)
Al(SO4)2-	1.428e-09	1.108e-09	-8.845	-8.956	-0.110	(0)
Ni(SO4)2-2	1.391e-09	3.105e-10	-8.857	-9.508	-0.651	(0)
Cd(SO4)2-2	8.737e-10	1.951e-10	-9.059	-9.710	-0.651	(0)
Pb(SO4)2-2	5.817e-10	1.299e-10	-9.235	-9.886	-0.651	(0)
CuSO4	2.179e-10	2.179e-10	-9.662	-9.662	0.000	(0)
FeSO4+	1.599e-14	1.251e-14	-13.796	-13.903	-0.107	(0)
Fe(SO4)2-	1.804e-15	1.240e-15	-14.744	-14.907	-0.163	(0)
HgSO4	1.055e-29	1.055e-29	-28.977	-28.977	0.000	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.611	-47.774	-0.163	(0)
Se(-2)	3.815e-09					
HSe-	3.809e-09	2.618e-09	-8.419	-8.582	-0.163	(0)
H2Se	3.260e-12	3.260e-12	-11.487	-11.487	0.000	(0)
MnSe	3.116e-12	3.116e-12	-11.506	-11.506	0.000	(0)
Se-2	5.514e-17	1.231e-17	-16.259	-16.910	-0.651	(0)
Se(4)	4.242e-07					
HSeO3-	3.953e-07	2.717e-07	-6.403	-6.566	-0.163	(0)
SeO3-2	2.886e-08	6.443e-09	-7.540	-8.191	-0.651	(0)
H2SeO3	1.830e-11	1.830e-11	-10.738	-10.738	0.000	(0)
FeHSeO3+2	7.986e-19	1.783e-19	-18.098	-18.749	-0.651	(0)
Cd(SeO3)2-2	4.953e-19	1.106e-19	-18.305	-18.956	-0.651	(0)
Se(6)	3.103e-21					
SeO4-2	3.084e-21	1.146e-21	-20.511	-20.941	-0.430	(0)
MnSeO4	1.347e-23	1.347e-23	-22.871	-22.871	0.000	(0)
CoSeO4	4.342e-24	4.342e-24	-23.362	-23.362	0.000	(0)
NiSeO4	1.157e-24	1.157e-24	-23.937	-23.937	0.000	(0)
ZnSeO4	1.315e-25	1.315e-25	-24.881	-24.881	0.000	(0)
HSeO4-	1.203e-26	8.268e-27	-25.920	-26.083	-0.163	(0)
CdSeO4	6.527e-28	6.527e-28	-27.185	-27.185	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.165	-45.816	-0.651	(0)
Zn	2.929e-06					
Zn+2	1.994e-06	7.408e-07	-5.700	-6.130	-0.430	(0)
ZnSO4	7.035e-07	7.035e-07	-6.153	-6.153	0.000	(0)
Zn(SO4)2-2	1.275e-07	2.847e-08	-6.895	-7.546	-0.651	(0)
ZnCl+	8.940e-08	6.867e-08	-7.049	-7.163	-0.115	(0)
ZnOHCl	5.696e-09	5.696e-09	-8.244	-8.244	0.000	(0)
ZnOH+	4.880e-09	3.355e-09	-8.312	-8.474	-0.163	(0)
ZnCl2	3.479e-09	3.479e-09	-8.459	-8.459	0.000	(0)
ZnCl3-	1.345e-10	1.033e-10	-9.871	-9.986	-0.115	(0)
Zn(OH)2	4.442e-11	4.442e-11	-10.352	-10.352	0.000	(0)
ZnCl4-2	5.079e-12	1.902e-12	-11.294	-11.721	-0.426	(0)
Zn(OH)3-	1.992e-14	1.369e-14	-13.701	-13.864	-0.163	(0)
Zn(OH)4-2	1.502e-19	3.353e-20	-18.823	-19.475	-0.651	(0)
ZnSeO4	1.315e-25	1.315e-25	-24.881	-24.881	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.165	-45.816	-0.651	(0)
ZnNO3+	0.000e+00	0.000e+00	-53.820	-53.983	-0.163	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-68.036	-68.199	-0.163	(0)
Zn(HS)2	0.000e+00	0.000e+00	-68.976	-68.976	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-102.958	-102.958	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.366	-103.529	-0.163	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-106.071	-106.722	-0.651	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-142.170	-142.822	-0.651	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-123.75	-117.47	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-28.32	-23.79	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.58	-23.79	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-178.86	-160.93	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.51	-20.40	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-28.19	-27.74	0.45	(NH4)2SeO4
Al(OH)3(am)	0.14	11.21	11.06	Al(OH)3
Al2O3	2.15	22.41	20.27	Al2O3

Al ₄ (OH) ₁₀ SO ₄	6.20	28.90	22.70	Al ₄ (OH) ₁₀ SO ₄
AlOHSO ₄	-1.48	-4.71	-3.23	AlOHSO ₄
Alunite	6.60	5.70	-0.90	KAl ₃ (SO ₄) ₂ (OH) ₆
Anglesite	-3.19	-11.01	-7.82	PbSO ₄
Anhydrite	-1.01	-5.35	-4.34	CaSO ₄
Anilite	-13.16	-45.47	-32.31	Cu _{0.25} Cu _{1.5} S
Antlerite	-12.95	-4.16	8.79	Cu ₃ (OH) ₄ SO ₄
Atacamite	-7.98	-0.37	7.61	Cu ₂ (OH) ₃ Cl
Bianchite	-6.72	-8.48	-1.76	ZnSO ₄ ·6H ₂ O
Birnessite	-18.83	-0.74	18.09	MnO ₂
Bixbyite	-16.75	-17.10	-0.35	Mn ₂ O ₃
BlaubleiI	-17.17	-41.34	-24.16	Cu _{0.9} Cu _{0.2} S
BlaubleiIII	-15.96	-43.24	-27.28	Cu _{0.6} Cu _{0.8} S
Boehmite	2.35	11.21	8.86	AlOOH
Brochantite	-15.95	-0.25	15.71	Cu ₄ (OH) ₆ SO ₄
Brucite	-6.03	11.09	17.12	Mg(OH) ₂
Bunsenite	-4.74	7.94	12.68	NiO
Ca ₃ (PO ₄) ₂ (beta)	-2.54	-31.58	-29.05	Ca ₃ (PO ₄) ₂
Ca ₄ H(PO ₄) ₃ ·3H ₂ O	-5.58	-52.66	-47.08	Ca ₄ H(PO ₄) ₃ ·3H ₂ O
CaHPO ₄	-1.73	-21.08	-19.35	CaHPO ₄
CaHPO ₄ ·2H ₂ O	-2.03	-21.08	-19.05	CaHPO ₄ ·2H ₂ O
Calomel	-13.91	-32.04	-18.13	Hg ₂ Cl ₂
CaSeO ₃ ·2H ₂ O	-5.64	-2.78	2.86	CaSeO ₃ ·2H ₂ O
CaSeO ₄ ·2H ₂ O	-20.95	-23.95	-3.00	CaSeO ₄ ·2H ₂ O
Cd(OH) ₂	-8.81	5.06	13.87	Cd(OH) ₂
Cd(OH) ₂ (am)	-8.88	5.06	13.94	Cd(OH) ₂
Cd ₃ (OH) ₂ (SO ₄) ₂	-23.38	-16.67	6.71	Cd ₃ (OH) ₂ (SO ₄) ₂
Cd ₃ (OH) ₄ SO ₄	-23.31	-0.75	22.56	Cd ₃ (OH) ₄ SO ₄
Cd ₃ (PO ₄) ₂	-15.52	-48.12	-32.60	Cd ₃ (PO ₄) ₂
Cd ₄ (OH) ₆ SO ₄	-24.09	4.31	28.40	Cd ₄ (OH) ₆ SO ₄
CdCl ₂	-10.74	-11.35	-0.61	CdCl ₂
CdCl ₂ ·1H ₂ O	-9.68	-11.36	-1.68	CdCl ₂ ·1H ₂ O
CdCl ₂ ·2.5H ₂ O	-9.43	-11.36	-1.93	CdCl ₂ ·2.5H ₂ O
Cdmetal(alpha)	-24.26	-10.57	13.69	Cd
Cdmetal(gamma)	-24.37	-10.57	13.80	Cd
CdOHCl	-6.76	-3.15	3.61	CdOHCl
CdSe	10.07	-10.31	-20.38	CdSe
CdSeO ₄ ·2H ₂ O	-27.61	-29.46	-1.85	CdSeO ₄ ·2H ₂ O
CdSO ₄	-10.81	-10.86	-0.05	CdSO ₄
CdSO ₄ ·1H ₂ O	-9.21	-10.86	-1.65	CdSO ₄ ·1H ₂ O
CdSO ₄ ·2.67H ₂ O	-9.03	-10.86	-1.83	CdSO ₄ ·2.67H ₂ O
Chalcanthite	-9.35	-12.01	-2.65	CuSO ₄ ·5H ₂ O
Chalcocite	-11.74	-47.06	-35.32	Cu ₂ S
Chalcopyrite	-39.56	-75.18	-35.62	CuFeS ₂
Cinnabar	-19.99	-66.29	-46.30	HgS
Clausthalite	16.93	-10.46	-27.39	PbSe
Co(OH) ₂	-4.62	8.48	13.09	Co(OH) ₂
Co(OH) ₃	-14.02	-16.11	-2.09	Co(OH) ₃
Co ₃ (PO ₄) ₂	-3.17	-37.85	-34.69	Co ₃ (PO ₄) ₂
Co ₃ O ₄	-13.50	-23.73	-10.24	Co ₃ O ₄
CoCl ₂	-16.39	-7.93	8.46	CoCl ₂
CoCl ₂ ·6H ₂ O	-10.46	-7.94	2.52	CoCl ₂ ·6H ₂ O
CoFe ₂ O ₄	21.26	18.11	-3.15	CoFe ₂ O ₄
CoHPO ₄	-4.11	-23.17	-19.06	CoHPO ₄
CoO	-5.36	8.48	13.84	CoO
CoS(alpha)	-28.70	-36.14	-7.44	CoS
CoS(beta)	-25.07	-36.14	-11.07	CoS
CoSe	9.31	-6.89	-16.20	CoSe
CoSeO ₃	-6.19	-4.87	1.32	CoSeO ₃
CoSeO ₄ ·6H ₂ O	-24.51	-26.04	-1.53	CoSeO ₄ ·6H ₂ O
CoSO ₄	-10.43	-7.44	2.99	CoSO ₄
CoSO ₄ ·6H ₂ O	-4.97	-7.45	-2.48	CoSO ₄ ·6H ₂ O
Cotunnite	-6.66	-11.50	-4.84	PbCl ₂
Covellite	-18.17	-40.70	-22.53	CuS
Cu(OH) ₂	-4.89	3.92	8.81	Cu(OH) ₂
Cu ₂ (OH) ₃ NO ₃	-56.64	-47.21	9.42	Cu ₂ (OH) ₃ NO ₃
Cu ₂ Se(alpha)	28.50	-17.81	-46.31	Cu ₂ Se
Cu ₂ SO ₄	-16.46	-18.36	-1.90	Cu ₂ SO ₄

Cu3(P04)2	-14.68	-51.53	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-16.42	-51.54	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.05	-29.26	-64.30	Cu3Se2
Cumetal	-0.11	-9.03	-8.93	Cu
Cu0CuS04	-18.71	-8.08	10.63	Cu0CuS04
Cupricferrite	7.06	13.55	6.49	CuFe204
Cuprite	-1.33	-2.44	-1.11	Cu2O
Cuprousferrite	12.47	3.59	-8.88	CuFe02
CuSe	21.94	-11.45	-33.39	CuSe
CuSe2	22.51	-11.19	-33.70	CuSe2
CuSe03:2H2O	-10.03	-9.43	0.60	CuSe03:2H2O
CuSe04:5H2O	-28.16	-30.60	-2.44	CuSe04:5H2O
CuS04	-15.11	-12.00	3.11	CuS04
Diaspore	4.09	11.21	7.12	Al00H
Djurleite	-12.24	-46.64	-34.40	Cu0.066Cu1.868S
Epsomite	-2.69	-4.84	-2.15	MgS04:7H2O
Fe(OH)2	-3.43	10.13	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.39	2.35	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-5.28	-3.73	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H2O	-9.80	-30.43	-20.63	Fe2(Se03)3:2H2O
Fe2(S04)3	-34.98	-38.13	-3.16	Fe2(S04)3
Fe3(OH)8	-0.46	19.76	20.22	Fe3(OH)8
Ferrihydrite	1.45	4.81	3.37	Fe(OH)3
Ferroselite	13.73	-4.98	-18.71	FeSe2
FeS(ppt)	-31.56	-34.48	-2.92	FeS
FeSe	5.77	-5.23	-11.00	FeSe
Galena	-25.55	-39.71	-14.16	PbS
Gibbsite	2.69	11.21	8.52	Al(OH)3
Goethite	4.18	4.81	0.64	Fe00H
Goslarite	-6.44	-8.48	-2.05	ZnS04:7H2O
Greenockite	-25.07	-39.56	-14.49	CdS
Greigite	-113.68	-158.71	-45.03	Fe3S4
Gypsum	-0.74	-5.35	-4.61	CaS04:2H2O
H-Jarosite	-5.85	-17.40	-11.55	(H3O)Fe3(S04)2(OH)6
H2S(g)	-36.61	-44.62	-8.01	H2S
H2Se(g)	-10.45	-15.37	-4.92	H2Se
Halite	-4.40	-2.81	1.59	NaCl
Hausmannite	-18.67	43.36	62.03	Mn304
Hematite	10.74	9.63	-1.11	Fe203
Hercynite	8.91	32.55	23.64	FeAl204
Hg(g)	-7.70	-15.63	-7.93	Hg
Hg(OH)2	-18.17	-21.67	-3.50	Hg(OH)2
Hg2(g)	-16.16	-31.25	-15.09	Hg2
Hg2(OH)2	-20.89	-15.63	5.26	Hg2(OH)2
Hg2HP04	-22.50	-47.27	-24.77	Hg2HP04
Hg2S	-48.40	-60.24	-11.84	Hg2S
Hg2Se03	-24.32	-28.98	-4.66	Hg2Se03
Hg2S04	-25.40	-31.55	-6.14	Hg2S04
HgCl(g)	-35.90	-16.02	19.88	HgCl
HgCl2	-16.56	-38.08	-21.52	HgCl2
Hgmetal(l)	-1.97	-15.63	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSe03	-22.59	-35.02	-12.43	HgSe03
HgS04	-28.13	-37.59	-9.45	HgS04
Hinsdalite	-6.54	-9.04	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	2.24	-42.09	-44.33	Ca5(P04)30H
Hydroxylpyromorphite	-7.59	-70.38	-62.79	Pb5(P04)30H
K-Alum	-11.49	-16.73	-5.24	KAl(S04)2:12H2O
K-Jarosite	1.00	-13.48	-14.49	KFe3(S04)2(OH)6
K2Se04	-25.95	-26.68	-0.73	K2Se04
Langite	-18.13	-0.25	17.88	Cu4(OH)6S04:H2O
Larnakite	-5.71	-6.10	-0.38	Pb0:PbS04
Laurionite	-3.92	-3.30	0.62	PbOHCl
Lepidocrocite	3.44	4.81	1.37	Fe00H
Lime	-22.59	10.57	33.16	Ca0
Litharge	-7.94	4.91	12.85	Pb0
Mackinawite	-30.88	-34.48	-3.60	FeS
Maghemite	3.24	9.63	6.39	Fe203

Magnesioferrite	3.19	20.72	17.52	Fe2MgO4
Magnetite	15.86	19.76	3.90	Fe3O4
Manganite	-8.28	17.06	25.34	MnOOH
Massicot	-8.14	4.91	13.05	PbO
Melanothallite	-18.90	-12.49	6.41	CuCl2
Melanterite	-3.53	-5.79	-2.26	FeSO4:7H2O
Metacinnabar	-20.59	-66.29	-45.70	HgS
Mg(OH)2(active)	-7.71	11.09	18.79	Mg(OH)2
Mg3(P04)2	-6.75	-30.03	-23.28	Mg3(P04)2
MgHP04:3H2O	-2.39	-20.56	-18.18	MgHP04:3H2O
MgSe03:6H2O	-5.31	-2.27	3.04	MgSe03:6H2O
MgSe04:6H2O	-22.23	-23.43	-1.20	MgSe04:6H2O
Minium	-44.17	30.36	74.53	Pb3O4
Mirabilite	-3.83	-5.13	-1.30	Na2SO4:10H2O
Mn2(S04)3	-59.54	-64.86	-5.32	Mn2(S04)3
Mn3(P04)2	-11.71	-35.55	-23.85	Mn3(P04)2
MnCl2:4H2O	-9.91	-7.17	2.74	MnCl2:4H2O
MnHP04	3.00	-22.40	-25.40	MnHP04
MnS(grn)	-35.62	-35.37	0.25	MnS
MnS(pnk)	-38.71	-35.37	3.34	MnS
MnSe	-9.86	-6.12	3.73	MnSe
MnSe03	-5.24	-4.11	1.13	MnSe03
MnSe03:2H2O	-5.07	-4.11	0.96	MnSe03:2H2O
MnSe04:5H2O	-23.22	-25.27	-2.05	MnSe04:5H2O
MnSO4	-9.41	-6.67	2.74	MnSO4
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.12	-21.67	-3.55	HgO
Morenosite	-5.81	-7.99	-2.17	NiSO4:7H2O
Na-Jarosite	-1.17	-12.00	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-12.86	-2.56	10.30	Na2Se03:5H2O
Na2Se04	-25.00	-23.72	1.28	Na2Se04
Nantokite	-2.59	-9.43	-6.83	CuCl
Ni(OH)2	-5.08	7.94	13.02	Ni(OH)2
Ni3(P04)2	-8.17	-39.47	-31.30	Ni3(P04)2
Ni4(OH)6S04	-16.16	15.84	32.00	Ni4(OH)6S04
NiS(alpha)	-31.08	-36.68	-5.60	NiS
NiS(beta)	-25.58	-36.68	-11.10	NiS
NiS(gamma)	-23.88	-36.68	-12.80	NiS
NiSe	10.27	-7.43	-17.70	NiSe
NiSe03:2H2O	-8.30	-5.41	2.89	NiSe03:2H2O
NiSe04:6H2O	-25.06	-26.58	-1.52	NiSe04:6H2O
Nsutite	-18.24	-0.74	17.50	MnO2
O2(g)	-53.20	31.25	84.45	O2
Pb(OH)2	-3.38	4.91	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.18	1.62	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-16.37	9.82	26.19	Pb2O(OH)2
Pb2O3	-35.59	25.45	61.04	Pb2O3
Pb3(P04)2	-5.03	-48.56	-43.53	Pb3(P04)2
Pb3O2S04	-12.06	-1.19	10.87	Pb3O2S04
Pb4(OH)6S04	-17.38	3.72	21.10	Pb4(OH)6S04
Pb4O3S04	-18.48	3.73	22.20	Pb4O3S04
PbHP04	-2.93	-26.74	-23.81	PbHP04
Pbmetal	-14.96	-10.71	4.24	Pb
PbO:0.3H2O	-8.07	4.91	12.98	PbO:0.33H2O
PbSe04	-22.73	-29.60	-6.88	PbSe04
Periclase	-10.86	11.09	21.94	MgO
Plattnerite	-29.77	20.54	50.31	PbO2
Plumbgummite	8.03	-24.76	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-12.54	10.57	23.11	Ca(OH)2
Pyrite	-44.85	-63.48	-18.63	FeS2
Pyrochroite	-6.18	9.25	15.43	Mn(OH)2
Pyrolusite	-17.16	24.87	42.03	MnO2
Pyromorphite	5.84	-78.59	-84.43	Pb5(P04)3Cl
Retgersite	-5.94	-7.99	-2.05	NiSO4:6H2O
Semetal(am)	7.39	0.26	-7.14	Se
Semetal(hex)	8.00	0.26	-7.75	Se
SeO2	-13.47	-13.35	0.12	SeO2
SeO3	-55.91	-34.51	21.39	SeO3

Sphalerite	-25.65	-37.18	-11.52	ZnS
Spinel	-4.27	33.50	37.77	MgAl2O4
Strengite	-0.46	-26.83	-26.38	FePO4:2H2O
Sulfur	-26.89	-28.99	-2.11	S
Tenorite	-3.88	3.92	7.80	CuO
Thenardite	-5.47	-5.12	0.34	Na2SO4
Tsumebite	-8.12	-17.91	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	3.10	-32.90	-36.00	Fe3(PO4)2:8H2O
Wurtzite	-28.18	-37.18	-9.00	ZnS
Zincite	-4.10	7.44	11.55	ZnO
Zincosite	-12.60	-8.48	4.13	ZnSO4
Zn(NO3)2:6H2O	-105.92	-102.66	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.76	7.44	12.20	Zn(OH)2
Zn(OH)2(am)	-5.22	7.44	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.51	7.44	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.29	7.44	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.29	7.44	11.73	Zn(OH)2
Zn2(OH)2SO4	-8.54	-1.04	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.51	6.68	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-5.55	-40.97	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-29.04	-9.51	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-14.55	13.85	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.70	20.80	38.50	Zn5(OH)8Cl2
ZnCl2	-16.19	-8.97	7.22	ZnCl2
Znmetal	-34.34	-8.18	26.15	Zn
ZnO(active)	-3.96	7.44	11.40	ZnO
ZnS(am)	-28.09	-37.18	-9.09	ZnS
ZnSe	6.54	-7.93	-14.46	ZnSe
ZnSeO4:6H2O	-25.56	-27.08	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.95	-8.48	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 5.

SOLUTION 3 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7

```

P      0.68
Ca     130
Mg     246
Na     1094
K       62
Cl     1533
S(6)   1485
Hg     0.0002
water  1 # kg
MIX 2
  1    0.004
  3    0.996
REACTION 3
H2O -1
7
END #Time-step 3

```

Beginning of initial solution calculations.

Initial solution 3.

-----Solution composition-----

Elements	Molality	Moles
Al	1.378e-05	1.378e-05
Ca	3.259e-03	3.259e-03
Cd	2.681e-08	2.681e-08
Cl	4.344e-02	4.344e-02
Co	3.989e-05	3.989e-05
Cu	4.901e-06	4.901e-06
Fe	1.805e-03	1.805e-03
Hg	1.002e-09	1.002e-09
K	1.593e-03	1.593e-03
Mg	1.017e-02	1.017e-02
Mn	2.231e-04	2.231e-04
N	5.021e-04	5.021e-04
Na	4.781e-02	4.781e-02
Ni	7.703e-06	7.703e-06
P	2.206e-05	2.206e-05
Pb	1.455e-08	1.455e-08
S(6)	1.553e-02	1.553e-02
Se	3.817e-07	3.817e-07
Zn	2.612e-06	2.612e-06

-----Description of solution-----

```

pH = 6.790
pe = 1.000
Activity of water = 0.998
Ionic strength (mol/kgw) = 9.259e-02
Mass of water (kg) = 1.000e+00
Total alkalinity (eq/kg) = 6.274e-05
Total carbon (mol/kg) = 0.000e+00
Total CO2 (mol/kg) = 0.000e+00
Temperature (°C) = 21.00
Electrical balance (eq) = 6.374e-03
Percent error, 100*(Cat-|An|)/(Cat+|An|) = 4.58
Iterations = 13
Total H = 1.110158e+02
Total O = 5.556909e+01

```

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol

	H+	2.061e-07	1.622e-07	-6.686	-6.790	-0.104	0.00
	OH-	5.935e-08	4.562e-08	-7.227	-7.341	-0.114	(0)
	H2O	5.551e+01	9.980e-01	1.744	-0.001	0.000	18.05
Al		1.378e-05					
	Al(OH)4-	8.973e-06	7.024e-06	-5.047	-5.153	-0.106	(0)
	Al(OH)2+	2.373e-06	1.884e-06	-5.625	-5.725	-0.100	(0)
	Al(OH)3	2.329e-06	2.329e-06	-5.633	-5.633	0.000	(0)
	AlOH+2	7.409e-08	2.945e-08	-7.130	-7.531	-0.401	(0)
	AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
	Al+3	5.344e-09	6.178e-10	-8.272	-9.209	-0.937	(0)
	Al(SO4)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ca		3.259e-03					
	Ca+2	2.406e-03	9.221e-04	-2.619	-3.035	-0.416	(0)
	CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
	CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
	CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
	CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
	CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
	CaOH+	1.001e-09	8.020e-10	-8.999	-9.096	-0.096	(0)
	Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
	CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
Cd		2.681e-08					
	CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
	Cd+2	7.874e-09	3.018e-09	-8.104	-8.520	-0.416	(0)
	CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
	CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
	Cd(SO4)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
	CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
	CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
	CdOH+	1.568e-12	1.100e-12	-11.805	-11.959	-0.154	(0)
	Cd(OH)2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
	Cd2OH+3	4.264e-19	1.748e-20	-18.370	-19.758	-1.387	(0)
	Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
	Cd(OH)3-	3.135e-21	2.198e-21	-20.504	-20.658	-0.154	(0)
	CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
	Cd(OH)4-2	9.222e-29	2.230e-29	-28.035	-28.652	-0.617	(0)
	CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cl		4.344e-02					
	Cl-	4.343e-02	3.417e-02	-1.362	-1.466	-0.104	(0)
	CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
	MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
	CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
	CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
	NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
	MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
	ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
	CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
	CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
	ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
	PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
	ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
	CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
	MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
	PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
	ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
	CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
	NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
	CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
	CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
	PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
	ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
	PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
	CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
	FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
	FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
	CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
	HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)

HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(2)	3.989e-05					
Co+2	3.225e-05	7.797e-06	-4.491	-5.108	-0.617	(0)
CoSO4	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CoHPO4	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CoOH+	1.375e-08	9.639e-09	-7.862	-8.016	-0.154	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
Co(OH)2	4.744e-11	4.744e-11	-10.324	-10.324	0.000	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Co2OH+3	9.190e-14	3.766e-15	-13.037	-14.424	-1.387	(0)
Co(OH)3-	8.364e-17	5.865e-17	-16.078	-16.232	-0.154	(0)
CoOOH-	5.039e-18	3.533e-18	-17.298	-17.452	-0.154	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Co4(OH)4+4	5.041e-22	1.722e-24	-21.297	-23.764	-2.466	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
Co(OH)4-2	2.382e-24	5.759e-25	-23.623	-24.240	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Co(3)	4.042e-31					
CoOH+2	4.042e-31	9.773e-32	-30.393	-31.010	-0.617	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co+3	2.685e-36	3.104e-37	-35.571	-36.508	-0.937	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
Cu(1)	4.900e-06					
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
Cu+	1.553e-08	1.089e-08	-7.809	-7.963	-0.154	(0)
Cu(2)	8.967e-10					
Cu+2	6.026e-10	2.310e-10	-9.220	-9.636	-0.416	(0)
CuSO4	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
CuOH+	4.792e-11	3.719e-11	-10.319	-10.430	-0.110	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
Cu(OH)2	5.595e-13	5.595e-13	-12.252	-12.252	0.000	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
Cu2(OH)2+2	1.398e-16	3.379e-17	-15.855	-16.471	-0.617	(0)
Cu(OH)3-	1.014e-16	7.111e-17	-15.994	-16.148	-0.154	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
Cu(OH)4-2	1.434e-22	3.468e-23	-21.843	-22.460	-0.617	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Fe(2)	1.805e-03					
Fe+2	1.454e-03	3.515e-04	-2.837	-3.454	-0.617	(0)
FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
FeHPO4	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
FeOH+	8.090e-07	6.384e-07	-6.092	-6.195	-0.103	(0)
Fe(OH)2	2.214e-11	2.214e-11	-10.655	-10.655	0.000	(0)
Fe(OH)3-	5.296e-13	4.179e-13	-12.276	-12.379	-0.103	(0)

Fe(3)	3.233e-07					
Fe(OH)2+	3.138e-07	2.491e-07	-6.503	-6.604	-0.100	(0)
Fe(OH)3	9.382e-09	9.382e-09	-8.028	-8.028	0.000	(0)
Fe(OH)4-	1.205e-10	9.565e-11	-9.919	-10.019	-0.100	(0)
FeOH+2	2.119e-11	8.217e-12	-10.674	-11.085	-0.411	(0)
FeHP04+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeS04+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe+3	2.235e-15	2.584e-16	-14.651	-15.588	-0.937	(0)
Fe(S04)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeH2P04+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
Fe2(OH)2+4	7.548e-19	2.579e-21	-18.122	-20.589	-2.466	(0)
FeHSe03+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
Fe3(OH)4+5	6.361e-23	8.906e-27	-22.197	-26.050	-3.854	(0)
FeN03+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
H(0)	3.796e-19					
H2	1.898e-19	1.939e-19	-18.722	-18.712	0.009	(0)
Hg(0)	1.002e-09					
Hg	1.002e-09	1.002e-09	-8.999	-8.999	0.000	(0)
Hg(1)	3.697e-29					
Hg2+2	1.848e-29	4.469e-30	-28.733	-29.350	-0.617	(0)
Hg(2)	2.362e-18					
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
Hg(OH)2	1.682e-22	1.718e-22	-21.774	-21.765	0.009	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
HgOH+	2.768e-26	1.941e-26	-25.558	-25.712	-0.154	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Hg+2	3.648e-29	8.820e-30	-28.438	-29.055	-0.617	(0)
HgS04	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Hg(OH)3-	1.911e-30	1.340e-30	-29.719	-29.873	-0.154	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
HgN03+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Hg(N03)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
K	1.593e-03					
K+	1.549e-03	1.219e-03	-2.810	-2.914	-0.104	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
Mg	1.017e-02					
Mg+2	7.920e-03	3.036e-03	-2.101	-2.518	-0.416	(0)
MgS04	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
MgH2P04+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
MgOH+	6.402e-08	5.162e-08	-7.194	-7.287	-0.094	(0)
MgP04-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
Mn(2)	2.231e-04					
Mn+2	1.882e-04	4.549e-05	-3.725	-4.342	-0.617	(0)
MnS04	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
MnOH+	6.606e-09	5.213e-09	-8.180	-8.283	-0.103	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Mn(OH)3-	2.129e-19	1.680e-19	-18.672	-18.775	-0.103	(0)
MnSe04	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
Mn(OH)4-2	8.666e-26	3.361e-26	-25.062	-25.474	-0.411	(0)
MnN03+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
Mn(N03)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Mn(3)	9.732e-29					
Mn+3	9.732e-29	1.125e-29	-28.012	-28.949	-0.937	(0)
Mn(6)	0.000e+00					
Mn04-2	0.000e+00	0.000e+00	-65.730	-66.142	-0.411	(0)

Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-74.661	-74.779	-0.119	(0)
N(-3)	5.021e-04					
NH4+	4.805e-04	3.617e-04	-3.318	-3.442	-0.123	(0)
NH4S04-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
NH3	9.560e-07	9.560e-07	-6.020	-6.020	0.000	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
N(3)	1.148e-35					
N02-	1.148e-35	8.735e-36	-34.940	-35.059	-0.119	(0)
CoN02+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CuN02+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
Cu(N02)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-48.382	-48.486	-0.104	(0)
CaN03+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
MnN03+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
CoN03+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
NiN03+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
ZnN03+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
PbN03+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
CdN03+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
CuN03+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
FeN03+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
HgN03+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Mn(N03)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
Na	4.781e-02					
Na+	4.677e-02	3.680e-02	-1.330	-1.434	-0.104	(0)
NaS04-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
NaHP04-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
Ni	7.703e-06					
Ni+2	5.664e-06	2.171e-06	-5.247	-5.663	-0.416	(0)
NiS04	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
NiOH+	1.818e-09	1.275e-09	-8.741	-8.895	-0.154	(0)
Ni(S04)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
Ni(OH)2	8.335e-12	8.335e-12	-11.079	-11.079	0.000	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Ni(OH)3-	7.365e-16	5.164e-16	-15.133	-15.287	-0.154	(0)
NiSe04	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.993	-55.984	0.009	(0)
P	2.206e-05					

H2PO4-	6.634e-06	5.268e-06	-5.178	-5.278	-0.100	(0)
HP04-2	5.222e-06	2.025e-06	-5.282	-5.694	-0.411	(0)
MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
FeHP04	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
NaHP04-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
CaHP04	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
CoHP04	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CaP04-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
MgP04-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
H3P04	1.150e-10	1.150e-10	-9.939	-9.939	0.000	(0)
P04-3	4.196e-11	4.850e-12	-10.377	-11.314	-0.937	(0)
FeHP04+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
Pb	1.455e-08					
Pb+2	5.480e-09	2.100e-09	-8.261	-8.678	-0.416	(0)
PbS04	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
PbOH+	4.662e-10	3.269e-10	-9.331	-9.486	-0.154	(0)
Pb(S04)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
Pb(OH)2	6.405e-13	6.405e-13	-12.193	-12.193	0.000	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
Pb2OH+3	2.655e-16	1.088e-17	-15.576	-16.963	-1.387	(0)
Pb(OH)3-	5.660e-17	3.969e-17	-16.247	-16.401	-0.154	(0)
Pb(OH)4-2	2.491e-21	6.022e-22	-20.604	-21.220	-0.617	(0)
Pb3(OH)4+2	3.779e-23	9.137e-24	-22.423	-23.039	-0.617	(0)
Pb4(OH)4+4	5.175e-26	1.768e-28	-25.286	-27.753	-2.466	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
S(6)	1.553e-02					
S04-2	1.094e-02	4.194e-03	-1.961	-2.377	-0.416	(0)
MgS04	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
NaS04-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
CaS04	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
FeS04	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
MnS04	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
NH4S04-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
CoS04	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
NiS04	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
ZnS04	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(S04)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
HS04-	7.527e-08	5.892e-08	-7.123	-7.230	-0.106	(0)
AlS04+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
PbS04	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
CdS04	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
Al(S04)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ni(S04)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
Cd(S04)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
Pb(S04)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
CuS04	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
FeS04+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe(S04)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
HgS04	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Se(-2)	4.685e-09					
HSe-	4.677e-09	3.279e-09	-8.330	-8.484	-0.154	(0)
H2Se	4.054e-12	4.054e-12	-11.392	-11.392	0.000	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Se-2	6.423e-17	1.553e-17	-16.192	-16.809	-0.617	(0)
Se(4)	3.770e-07					
HSeO3-	3.526e-07	2.472e-07	-6.453	-6.607	-0.154	(0)
SeO3-2	2.442e-08	5.904e-09	-7.612	-8.229	-0.617	(0)

H2SeO3	1.653e-11	1.653e-11	-10.782	-10.782	0.000	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Se(6)	2.478e-21					
SeO4-2	2.463e-21	9.439e-22	-20.609	-21.025	-0.416	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
HSeO4-	9.645e-27	6.763e-27	-26.016	-26.170	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
Zn	2.612e-06					
Zn+2	1.813e-06	6.948e-07	-5.742	-6.158	-0.416	(0)
ZnSO4	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(SO4)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
ZnOH+	4.520e-09	3.170e-09	-8.345	-8.499	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
Zn(OH)2	4.227e-11	4.227e-11	-10.374	-10.374	0.000	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
Zn(OH)3-	1.872e-14	1.313e-14	-13.728	-13.882	-0.154	(0)
Zn(OH)4-2	1.339e-19	3.238e-20	-18.873	-19.490	-0.617	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-124.48	-118.20	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-28.70	-24.17	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.96	-24.17	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-179.81	-161.88	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.93	-20.82	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-28.36	-27.91	0.45	(NH4)2SeO4
Al(OH)3(am)	0.09	11.16	11.06	Al(OH)3
Al2O3	2.05	22.32	20.27	Al2O3
Al4(OH)10SO4	5.98	28.68	22.70	Al4(OH)10SO4
AlOHSO4	-1.57	-4.80	-3.23	AlOHSO4
Alunite	6.34	5.44	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.24	-11.06	-7.82	PbSO4
Anhydrite	-1.07	-5.41	-4.34	CaSO4
Antlerite	-12.92	-4.13	8.79	Cu3(OH)4SO4
Atacamite	-7.99	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.78	-8.54	-1.76	ZnSO4·6H2O
Birnessite	-18.88	-0.79	18.09	MnO2
Bixbyite	-16.81	-17.16	-0.35	Mn2O3
Boehmite	2.30	11.16	8.86	AlOOH
Brochantite	-15.89	-0.19	15.71	Cu4(OH)6SO4
Brucite	-6.06	11.06	17.12	Mg(OH)2
Bunsenite	-4.77	7.92	12.68	NiO
Ca3(PO4)2(beta)	-2.69	-31.73	-29.05	Ca3(PO4)2
Ca4H(PO4)3·3H2O	-5.80	-52.88	-47.08	Ca4H(PO4)3·3H2O
CaHP04	-1.79	-21.14	-19.35	CaHP04
CaHP04·2H2O	-2.09	-21.14	-19.05	CaHP04·2H2O
Calomel	-14.15	-32.28	-18.13	Hg2Cl2
CaSeO3·2H2O	-5.71	-2.85	2.86	CaSeO3·2H2O
CaSeO4·2H2O	-21.06	-24.06	-3.00	CaSeO4·2H2O
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-23.45	-16.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-23.34	-0.78	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-15.59	-48.19	-32.60	Cd3(PO4)2

Cd4(OH)6SO4	-24.12	4.28	28.40	Cd4(OH)6SO4
CdCl2	-10.84	-11.45	-0.61	CdCl2
CdCl2:1H2O	-9.78	-11.45	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-9.52	-11.46	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.21	-10.52	13.69	Cd
Cdmetal(gamma)	-24.32	-10.52	13.80	Cd
CdOHCl	-6.81	-3.20	3.61	CdOHCl
CdSe	10.17	-10.21	-20.38	CdSe
CdSeO4:2H2O	-27.70	-29.55	-1.85	CdSeO4:2H2O
CdSO4	-10.85	-10.90	-0.05	CdSO4
CdSO4:1H2O	-9.25	-10.90	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-9.07	-10.90	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.36	-12.02	-2.65	CuSO4:5H2O
Clausthalite	17.01	-10.37	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.05	-16.14	-2.09	Co(OH)3
Co3(P04)2	-3.27	-37.95	-34.69	Co3(P04)2
Co3O4	-13.57	-23.81	-10.24	Co3O4
CoCl2	-16.50	-8.04	8.46	CoCl2
CoCl2:6H2O	-10.56	-8.05	2.52	CoCl2:6H2O
CoFe2O4	21.18	18.03	-3.15	CoFe2O4
CoHP04	-4.15	-23.21	-19.06	CoHP04
CoO	-5.37	8.47	13.84	CoO
CoSe	9.40	-6.80	-16.20	CoSe
CoSeO3	-6.24	-4.92	1.32	CoSeO3
CoSeO4:6H2O	-24.61	-26.14	-1.53	CoSeO4:6H2O
CoSO4	-10.48	-7.49	2.99	CoSO4
CoSO4:6H2O	-5.02	-7.49	-2.48	CoSO4:6H2O
Cotunnite	-6.77	-11.61	-4.84	PbCl2
Cu(OH)2	-4.87	3.94	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.82	-47.39	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.69	-17.62	-46.31	Cu2Se
Cu2SO4	-16.40	-18.30	-1.90	Cu2SO4
Cu3(P04)2	-14.69	-51.54	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-16.42	-51.54	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.35	-28.95	-64.30	Cu3Se2
Cumetal	-0.04	-8.96	-8.93	Cu
CuOCuSO4	-18.70	-8.07	10.63	CuOCuSO4
Cupricferrite	7.02	13.50	6.49	CuFe2O4
Cuprite	-1.24	-2.35	-1.11	Cu2O
Cuprousferrite	12.49	3.61	-8.88	CuFeO2
CuSe	22.06	-11.33	-33.39	CuSe
CuSe2	22.68	-11.02	-33.70	CuSe2
CuSeO3:2H2O	-10.05	-9.46	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-28.23	-30.67	-2.44	CuSeO4:5H2O
CuSO4	-15.13	-12.01	3.11	CuSO4
Diaspore	4.04	11.16	7.12	AlOOH
Epsomite	-2.75	-4.90	-2.15	MgSO4:7H2O
Fe(OH)2	-3.44	10.12	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.34	2.30	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-5.39	-3.84	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-10.00	-30.63	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-35.15	-38.31	-3.16	Fe2(SO4)3
Fe3(OH)8	-0.54	19.68	20.22	Fe3(OH)8
Ferrihydrite	1.41	4.78	3.37	Fe(OH)3
Ferroselite	13.87	-4.84	-18.71	FeSe2
FeSe	5.86	-5.15	-11.00	FeSe
Gibbsite	2.64	11.16	8.52	Al(OH)3
Goethite	4.15	4.78	0.64	FeOOH
Goslarite	-6.50	-8.54	-2.05	ZnSO4:7H2O
Gypsum	-0.80	-5.41	-4.61	CaSO4:2H2O
H-Jarosite	-6.02	-17.57	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-10.35	-15.27	-4.92	H2Se
Halite	-4.49	-2.90	1.59	NaCl
Hausmannite	-18.74	43.29	62.03	Mn3O4
Hematite	10.67	9.56	-1.11	Fe2O3
Hercynite	8.80	32.44	23.64	FeAl2O4
Hg(g)	-7.75	-15.67	-7.93	Hg

Hg(OH)2	-18.27	-21.76	-3.50	Hg(OH)2
Hg2(g)	-16.26	-31.35	-15.09	Hg2
Hg2(OH)2	-21.03	-15.77	5.26	Hg2(OH)2
Hg2HP04	-22.68	-47.45	-24.77	Hg2HP04
Hg2Se03	-24.51	-29.17	-4.66	Hg2Se03
Hg2S04	-25.58	-31.73	-6.14	Hg2S04
HgCl(g)	-36.02	-16.14	19.88	HgCl
HgCl2	-16.76	-38.28	-21.52	HgCl2
Hgmetal(l)	-2.02	-15.67	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSe03	-22.73	-35.16	-12.43	HgSe03
HgS04	-28.27	-37.72	-9.45	HgS04
Hinsdalite	-6.76	-9.26	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	2.00	-42.33	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-7.75	-70.54	-62.79	Pb5(P04)3OH
K-Alum	-11.65	-16.89	-5.24	KAl(S04)2:12H2O
K-Jarosite	0.79	-13.70	-14.49	KFe3(S04)2(OH)6
K2Se04	-26.12	-26.85	-0.73	K2Se04
Langite	-18.07	-0.19	17.88	Cu4(OH)6S04:H2O
Larnakite	-5.77	-6.15	-0.38	Pb0:PbS04
Laurionite	-3.98	-3.35	0.62	PbOHCl
Lepidocrocite	3.41	4.78	1.37	Fe00H
Lime	-22.62	10.54	33.16	Ca0
Litharge	-7.95	4.90	12.85	Pb0
Maghemite	3.18	9.56	6.39	Fe203
Magnesioferrite	3.10	20.62	17.52	Fe2Mg04
Magnetite	15.79	19.69	3.90	Fe304
Manganite	-8.31	17.03	25.34	Mn00H
Massicot	-8.15	4.90	13.05	Pb0
Melanothallite	-18.98	-12.57	6.41	CuCl2
Melanterite	-3.58	-5.84	-2.26	FeS04:7H2O
Mg(OH)2(active)	-7.73	11.06	18.79	Mg(OH)2
Mg3(P04)2	-6.90	-30.18	-23.28	Mg3(P04)2
MgHP04:3H2O	-2.45	-20.62	-18.18	MgHP04:3H2O
MgSe03:6H2O	-5.38	-2.34	3.04	MgSe03:6H2O
MgSe04:6H2O	-22.35	-23.55	-1.20	MgSe04:6H2O
Minium	-44.24	30.28	74.53	Pb304
Mirabilite	-3.95	-5.25	-1.30	Na2S04:10H2O
Mn2(S04)3	-59.71	-65.03	-5.32	Mn2(S04)3
Mn3(P04)2	-11.81	-35.65	-23.85	Mn3(P04)2
MnCl2:4H2O	-10.02	-7.28	2.74	MnCl2:4H2O
MnHP04	2.95	-22.45	-25.40	MnHP04
MnSe	-9.77	-6.04	3.73	MnSe
MnSe03	-5.29	-4.16	1.13	MnSe03
MnSe03:2H2O	-5.12	-4.16	0.96	MnSe03:2H2O
MnSe04:5H2O	-23.32	-25.37	-2.05	MnSe04:5H2O
MnS04	-9.46	-6.72	2.74	MnS04
Monteponite	-10.29	5.06	15.35	Cd0
Montroydite	-18.22	-21.76	-3.55	Hg0
Morenosite	-5.87	-8.05	-2.17	NiS04:7H2O
Na-Jarosite	-1.38	-12.22	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-12.99	-2.69	10.30	Na2Se03:5H2O
Na2Se04	-25.17	-23.89	1.28	Na2Se04
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.11	7.91	13.02	Ni(OH)2
Ni3(P04)2	-8.32	-39.62	-31.30	Ni3(P04)2
Ni4(OH)6S04	-16.30	15.70	32.00	Ni4(OH)6S04
NiSe	10.34	-7.36	-17.70	NiSe
NiSe03:2H2O	-8.37	-5.48	2.89	NiSe03:2H2O
NiSe04:6H2O	-25.17	-26.69	-1.52	NiSe04:6H2O
Nsutite	-18.29	-0.79	17.50	Mn02
O2(g)	-53.29	31.16	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.25	1.55	8.79	Pb2(OH)3Cl
Pb20(OH)2	-16.39	9.80	26.19	Pb20(OH)2
Pb203	-35.66	25.38	61.04	Pb203
Pb3(P04)2	-5.13	-48.66	-43.53	Pb3(P04)2
Pb302S04	-12.13	-1.25	10.87	Pb302S04

Pb4(OH)6SO4	-17.45	3.65	21.10	Pb4(OH)6SO4
Pb4O3SO4	-18.55	3.65	22.20	Pb4O3SO4
PbHPO4	-2.98	-26.78	-23.81	PbHPO4
Pbmetal	-14.92	-10.68	4.24	Pb
PbO:0.3H2O	-8.08	4.90	12.98	PbO:0.33H2O
PbSeO4	-22.83	-29.70	-6.88	PbSeO4
Periclase	-10.88	11.06	21.94	MgO
Plattnerite	-29.83	20.48	50.31	PbO2
Plumbgummite	7.80	-24.99	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-12.57	10.54	23.11	Ca(OH)2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-17.21	24.82	42.03	MnO2
Pyromorphite	5.63	-78.80	-84.43	Pb5(PO4)3Cl
Retgersite	-6.00	-8.05	-2.05	NiSO4:6H2O
Semetal(am)	7.44	0.31	-7.14	Se
Semetal(hex)	8.05	0.31	-7.75	Se
SeO2	-13.52	-13.40	0.12	SeO2
SeO3	-56.00	-34.60	21.39	SeO3
Spinel	-4.39	33.38	37.77	MgAl2O4
Strengite	-0.53	-26.90	-26.38	FePO4:2H2O
Tenorite	-3.86	3.94	7.80	CuO
Thenardite	-5.59	-5.25	0.34	Na2SO4
Tsumebite	-8.15	-17.94	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	3.00	-33.00	-36.00	Fe3(PO4)2:8H2O
Zincite	-4.13	7.42	11.55	ZnO
Zincosite	-12.66	-8.54	4.13	ZnSO4
Zn(NO3)2:6H2O	-106.39	-103.14	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.78	7.42	12.20	Zn(OH)2
Zn(OH)2(am)	-5.25	7.42	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.42	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.31	7.42	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.42	11.73	Zn(OH)2
Zn2(OH)2SO4	-8.62	-1.12	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.61	6.58	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-5.69	-41.11	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-29.18	-9.65	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-14.68	13.72	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.91	20.59	38.50	Zn5(OH)8Cl2
ZnCl2	-16.31	-9.09	7.22	ZnCl2
Znmetal	-34.31	-8.16	26.15	Zn
ZnO(active)	-3.98	7.42	11.40	ZnO
ZnSe	6.61	-7.85	-14.46	ZnSe
ZnSeO4:6H2O	-25.67	-27.19	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-8.00	-8.54	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 2.
Using reaction 3.

Mixture 2.

4.000e-03 Solution 1
9.960e-01 Solution 3

Reaction 3.

7.000e+00 moles of the following reaction have been added:

	Relative
Reactant	moles

H2O -1.00000

Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	1.577e-05	1.378e-05
Ca	3.729e-03	3.259e-03
Cd	3.068e-08	2.681e-08
Cl	4.971e-02	4.344e-02
Co	4.565e-05	3.989e-05
Cu	5.609e-06	4.901e-06
Fe	2.066e-03	1.805e-03
Hg	1.146e-09	1.002e-09
K	1.823e-03	1.593e-03
Mg	1.164e-02	1.017e-02
Mn	2.553e-04	2.231e-04
N	5.746e-04	5.021e-04
Na	5.471e-02	4.781e-02
Ni	8.815e-06	7.703e-06
P	2.524e-05	2.206e-05
Pb	1.665e-08	1.455e-08
S	1.777e-02	1.553e-02
Se	4.368e-07	3.817e-07
Zn	2.989e-06	2.612e-06

-----Description of solution-----

pH	=	6.786	Charge balance
pe	=	1.031	Adjusted to redox equilibrium
Activity of water	=	0.998	
Ionic strength (mol/kgw)	=	1.053e-01	
Mass of water (kg)	=	8.739e-01	
Total alkalinity (eq/kg)	=	7.181e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	6.374e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	4.60	
Iterations	=	4	
Total H	=	9.701575e+01	
Total O	=	4.856909e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.098e-07	1.635e-07	-6.678	-6.786	-0.108	0.00
OH-	5.959e-08	4.523e-08	-7.225	-7.345	-0.120	(0)
H2O	5.551e+01	9.977e-01	1.744	-0.001	0.000	18.05
Al	1.577e-05					
Al(OH)4-	1.024e-05	7.926e-06	-4.990	-5.101	-0.111	(0)
Al(OH)2+	2.751e-06	2.163e-06	-5.561	-5.665	-0.104	(0)
Al(OH)3	2.651e-06	2.651e-06	-5.577	-5.577	0.000	(0)
AlOH+2	8.921e-08	3.410e-08	-7.050	-7.467	-0.418	(0)
AlSO4+	2.821e-08	2.184e-08	-7.550	-7.661	-0.111	(0)
Al+3	6.781e-09	7.217e-10	-8.169	-9.142	-0.973	(0)
Al(SO4)2-	1.501e-09	1.162e-09	-8.824	-8.935	-0.111	(0)
Ca	3.729e-03					
Ca+2	2.721e-03	1.005e-03	-2.565	-2.998	-0.432	(0)
CaSO4	1.007e-03	1.007e-03	-2.997	-2.997	0.000	(0)

	CaHPO4	9.459e-07	9.459e-07	-6.024	-6.024	0.000	(0)	
	CaH2PO4+	1.545e-07	1.215e-07	-6.811	-6.915	-0.104	(0)	
	CaPO4-	1.793e-08	1.410e-08	-7.746	-7.851	-0.104	(0)	
	CaNH3+2	8.151e-09	1.794e-09	-8.089	-8.746	-0.658	(0)	
	CaOH+	1.092e-09	8.669e-10	-8.962	-9.062	-0.100	(0)	
	Ca(NH3)2+2	4.599e-15	1.012e-15	-14.337	-14.995	-0.658	(0)	
	CaNO3+	0.000e+00	0.000e+00	-50.542	-50.706	-0.164	(0)	
		3.068e-08						
	CdCl+	1.647e-08	1.128e-08	-7.783	-7.948	-0.164	(0)	
	Cd+2	8.297e-09	3.065e-09	-8.081	-8.514	-0.432	(0)	
	CdSO4	3.114e-09	3.114e-09	-8.507	-8.507	0.000	(0)	
	CdCl2	1.802e-09	1.802e-09	-8.744	-8.744	0.000	(0)	
	Cd(SO4)2-2	9.103e-10	2.003e-10	-9.041	-9.698	-0.658	(0)	
	CdCl3-	6.190e-11	4.240e-11	-10.208	-10.373	-0.164	(0)	
	CdOHCd	2.586e-11	2.586e-11	-10.587	-10.587	0.000	(0)	
	CdOH+	1.617e-12	1.107e-12	-11.791	-11.956	-0.164	(0)	
	Cd(OH)2	5.797e-16	5.797e-16	-15.237	-15.237	0.000	(0)	
	Cd2OH+3	5.390e-19	1.787e-20	-18.268	-19.748	-1.479	(0)	
	Cd(SeO3)2-2	5.193e-19	1.143e-19	-18.285	-18.942	-0.658	(0)	
	Cd(OH)3-	3.176e-21	2.175e-21	-20.498	-20.662	-0.164	(0)	
	CdSeO4	6.779e-28	6.779e-28	-27.169	-27.169	0.000	(0)	
	Cd(OH)4-2	9.940e-29	2.187e-29	-28.003	-28.660	-0.658	(0)	
	CdHS+	6.255e-39	4.284e-39	-38.204	-38.368	-0.164	(0)	
	CdNO3+	0.000e+00	0.000e+00	-56.021	-56.185	-0.164	(0)	
	Cd(HS)2	0.000e+00	0.000e+00	-69.027	-69.027	0.000	(0)	
	Cd(NO3)2	0.000e+00	0.000e+00	-104.757	-104.757	0.000	(0)	
	Cd(HS)3-	0.000e+00	0.000e+00	-104.825	-104.989	-0.164	(0)	
	Cd(HS)4-2	0.000e+00	0.000e+00	-139.999	-140.656	-0.658	(0)	
			4.971e-02					
		Cl-	4.970e-02	3.875e-02	-1.304	-1.412	-0.108	(0)
CuCl2-		5.036e-06	3.862e-06	-5.298	-5.413	-0.115	(0)	
MnCl+		2.963e-06	2.314e-06	-5.528	-5.636	-0.107	(0)	
CoCl+		1.572e-06	1.077e-06	-5.803	-5.968	-0.164	(0)	
CuCl		4.725e-07	4.725e-07	-6.326	-6.326	0.000	(0)	
NiCl+		3.379e-07	2.314e-07	-6.471	-6.636	-0.164	(0)	
MnCl2		1.267e-07	1.267e-07	-6.897	-6.897	0.000	(0)	
ZnCl+		9.231e-08	7.079e-08	-7.035	-7.150	-0.115	(0)	
CuCl3-2		8.462e-08	3.150e-08	-7.073	-7.502	-0.429	(0)	
CdCl+		1.647e-08	1.128e-08	-7.783	-7.948	-0.164	(0)	
ZnOHCd		5.864e-09	5.864e-09	-8.232	-8.232	0.000	(0)	
PbCl+		4.204e-09	2.879e-09	-8.376	-8.541	-0.164	(0)	
ZnCl2		3.655e-09	3.655e-09	-8.437	-8.437	0.000	(0)	
CdCl2		1.802e-09	1.802e-09	-8.744	-8.744	0.000	(0)	
MnCl3-		1.731e-09	1.352e-09	-8.762	-8.869	-0.107	(0)	
PbCl2		4.894e-10	4.894e-10	-9.310	-9.310	0.000	(0)	
ZnCl3-		1.443e-10	1.107e-10	-9.841	-9.956	-0.115	(0)	
CdCl3-		6.190e-11	4.240e-11	-10.208	-10.373	-0.164	(0)	
NiCl2		4.565e-11	4.565e-11	-10.341	-10.341	0.000	(0)	
CdOHCd		2.586e-11	2.586e-11	-10.587	-10.587	0.000	(0)	
CuCl+		1.689e-11	1.295e-11	-10.772	-10.888	-0.115	(0)	
PbCl3-		1.152e-11	7.887e-12	-10.939	-11.103	-0.164	(0)	
ZnCl4-2		5.578e-12	2.076e-12	-11.254	-11.683	-0.429	(0)	
PbCl4-2		5.984e-13	1.317e-13	-12.223	-12.881	-0.658	(0)	
CuCl2		1.429e-13	1.429e-13	-12.845	-12.845	0.000	(0)	
FeCl+2		8.034e-16	2.990e-16	-15.095	-15.524	-0.429	(0)	
FeCl2+		7.517e-17	5.871e-17	-16.124	-16.231	-0.107	(0)	
CuCl3-		6.272e-17	4.810e-17	-16.203	-16.318	-0.115	(0)	
HgCl2		2.337e-18	2.337e-18	-17.631	-17.631	0.000	(0)	
HgCl3-		1.333e-18	9.133e-19	-17.875	-18.039	-0.164	(0)	
HgCl4-2		6.642e-19	1.461e-19	-18.178	-18.835	-0.658	(0)	
FeCl3	2.275e-19	2.275e-19	-18.643	-18.643	0.000	(0)		
HgClOH	4.981e-20	4.981e-20	-19.303	-19.303	0.000	(0)		
CuCl4-2	2.874e-20	1.070e-20	-19.542	-19.971	-0.429	(0)		
HgCl+	1.493e-23	1.022e-23	-22.826	-22.990	-0.164	(0)		
CoCl+2	1.140e-35	2.509e-36	-34.943	-35.600	-0.658	(0)		
Co(NH3)5Cl+2	3.429e-39	7.545e-40	-38.465	-39.122	-0.658	(0)		
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.007	-51.665	-0.658	(0)		
Co(2)	4.565e-05							

Co+2	3.692e-05	8.122e-06	-4.433	-5.090	-0.658	(0)
CoS04	7.120e-06	7.120e-06	-5.147	-5.147	0.000	(0)
CoCl+	1.572e-06	1.077e-06	-5.803	-5.968	-0.164	(0)
CoHP04	1.794e-08	1.794e-08	-7.746	-7.746	0.000	(0)
CoOH+	1.454e-08	9.955e-09	-7.838	-8.002	-0.164	(0)
Co(NH3)+2	8.984e-09	1.977e-09	-8.047	-8.704	-0.658	(0)
Co(OH)2	4.857e-11	4.857e-11	-10.314	-10.314	0.000	(0)
Co(NH3)2+2	3.802e-13	8.365e-14	-12.420	-13.078	-0.658	(0)
Co2OH+3	1.222e-13	4.053e-15	-12.913	-14.392	-1.479	(0)
Co(OH)3-	8.692e-17	5.953e-17	-16.061	-16.225	-0.164	(0)
Co(NH3)3+2	6.783e-18	1.492e-18	-17.169	-17.826	-0.658	(0)
Co0OH-	5.238e-18	3.587e-18	-17.281	-17.445	-0.164	(0)
Co4(OH)4+4	8.360e-22	1.960e-24	-21.078	-23.708	-2.630	(0)
Co(NH3)4+2	5.044e-23	1.110e-23	-22.297	-22.955	-0.658	(0)
CoSe04	4.527e-24	4.527e-24	-23.344	-23.344	0.000	(0)
Co(OH)4-2	2.634e-24	5.796e-25	-23.579	-24.237	-0.658	(0)
Co(NH3)5+2	1.186e-28	2.610e-29	-27.926	-28.583	-0.658	(0)
CoNO2+	1.181e-39	8.091e-40	-38.928	-39.092	-0.164	(0)
CoNO3+	0.000e+00	0.000e+00	-52.947	-53.112	-0.164	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.025	-101.025	0.000	(0)
Co(3)	4.930e-31					
CoOH+2	4.930e-31	1.085e-31	-30.307	-30.965	-0.658	(0)
CoCl+2	1.140e-35	2.509e-36	-34.943	-35.600	-0.658	(0)
Co+3	3.265e-36	3.475e-37	-35.486	-36.459	-0.973	(0)
Co(NH3)5Cl+2	3.429e-39	7.545e-40	-38.465	-39.122	-0.658	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.554	-47.718	-0.164	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.007	-51.665	-0.658	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.359	-53.016	-0.658	(0)
Cu(1)	5.608e-06					
CuCl2-	5.036e-06	3.862e-06	-5.298	-5.413	-0.115	(0)
CuCl	4.725e-07	4.725e-07	-6.326	-6.326	0.000	(0)
CuCl3-2	8.462e-08	3.150e-08	-7.073	-7.502	-0.429	(0)
Cu+	1.414e-08	9.687e-09	-7.849	-8.014	-0.164	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.347	-66.776	-0.429	(0)
CuS4S5-3	0.000e+00	0.000e+00	-67.102	-67.506	-0.404	(0)
Cu(2)	9.018e-10					
Cu+2	5.975e-10	2.208e-10	-9.224	-9.656	-0.432	(0)
CuS04	2.192e-10	2.192e-10	-9.659	-9.659	0.000	(0)
CuOH+	4.595e-11	3.523e-11	-10.338	-10.453	-0.115	(0)
CuNH3+2	2.159e-11	4.751e-12	-10.666	-11.323	-0.658	(0)
CuCl+	1.689e-11	1.295e-11	-10.772	-10.888	-0.115	(0)
Cu(OH)2	5.255e-13	5.255e-13	-12.279	-12.279	0.000	(0)
CuCl2	1.429e-13	1.429e-13	-12.845	-12.845	0.000	(0)
Cu2(OH)2+2	1.379e-16	3.034e-17	-15.861	-16.518	-0.658	(0)
Cu(OH)3-	9.668e-17	6.622e-17	-16.015	-16.179	-0.164	(0)
CuCl3-	6.272e-17	4.810e-17	-16.203	-16.318	-0.115	(0)
CuCl4-2	2.874e-20	1.070e-20	-19.542	-19.971	-0.429	(0)
Cu(OH)4-2	1.455e-22	3.201e-23	-21.837	-22.495	-0.658	(0)
CuNO2+	0.000e+00	0.000e+00	-42.321	-42.486	-0.164	(0)
CuNO3+	0.000e+00	0.000e+00	-57.204	-57.368	-0.164	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.325	-76.325	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-97.181	-97.345	-0.164	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-106.499	-106.499	0.000	(0)
Fe(2)	2.065e-03					
Fe+2	1.668e-03	3.671e-04	-2.778	-3.435	-0.658	(0)
FeS04	3.920e-04	3.920e-04	-3.407	-3.407	0.000	(0)
FeHP04	2.959e-06	2.959e-06	-5.529	-5.529	0.000	(0)
FeH2P04+	1.222e-06	9.611e-07	-5.913	-6.017	-0.104	(0)
FeOH+	8.461e-07	6.609e-07	-6.073	-6.180	-0.107	(0)
Fe(OH)2	2.272e-11	2.272e-11	-10.644	-10.644	0.000	(0)
Fe(OH)3-	5.444e-13	4.252e-13	-12.264	-12.371	-0.107	(0)
Fe(HS)2	0.000e+00	0.000e+00	-70.211	-70.211	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.872	-106.036	-0.164	(0)
Fe(3)	3.599e-07					
Fe(OH)2+	3.495e-07	2.748e-07	-6.457	-6.561	-0.104	(0)
Fe(OH)3	1.026e-08	1.026e-08	-7.989	-7.989	0.000	(0)
Fe(OH)4-	1.319e-10	1.037e-10	-9.880	-9.984	-0.104	(0)
FeOH+2	2.456e-11	9.142e-12	-10.610	-11.039	-0.429	(0)

FeHP04+	7.292e-12	5.734e-12	-11.137	-11.242	-0.104	(0)
FeS04+	1.651e-14	1.289e-14	-13.782	-13.890	-0.107	(0)
Fe+3	2.724e-15	2.899e-16	-14.565	-15.538	-0.973	(0)
Fe(S04)2-	1.889e-15	1.293e-15	-14.724	-14.888	-0.164	(0)
FeCl+2	8.034e-16	2.990e-16	-15.095	-15.524	-0.429	(0)
FeH2P04+2	7.524e-17	2.876e-17	-16.124	-16.541	-0.418	(0)
FeCl2+	7.517e-17	5.871e-17	-16.124	-16.231	-0.107	(0)
Fe2(OH)2+4	1.362e-18	3.192e-21	-17.866	-20.496	-2.630	(0)
FeHSe03+2	8.387e-19	1.845e-19	-18.076	-18.734	-0.658	(0)
FeCl3	2.275e-19	2.275e-19	-18.643	-18.643	0.000	(0)
Fe3(OH)4+5	1.564e-22	1.216e-26	-21.806	-25.915	-4.109	(0)
FeN03+2	0.000e+00	0.000e+00	-62.014	-62.671	-0.658	(0)
H(0)	3.332e-19					
H2	1.666e-19	1.707e-19	-18.778	-18.768	0.011	(0)
Hg(0)	1.146e-09					
Hg	1.146e-09	1.146e-09	-8.941	-8.941	0.000	(0)
Hg(1)	6.143e-29					
Hg2+2	3.072e-29	6.759e-30	-28.513	-29.170	-0.658	(0)
Hg(2)	4.385e-18					
HgCl2	2.337e-18	2.337e-18	-17.631	-17.631	0.000	(0)
HgCl3-	1.333e-18	9.133e-19	-17.875	-18.039	-0.164	(0)
HgCl4-2	6.642e-19	1.461e-19	-18.178	-18.835	-0.658	(0)
HgCl0H	4.981e-20	4.981e-20	-19.303	-19.303	0.000	(0)
Hg(OH)2	2.178e-22	2.232e-22	-21.662	-21.651	0.011	(0)
Hg(NH3)2+2	2.089e-22	4.598e-23	-21.680	-22.337	-0.658	(0)
HgCl+	1.493e-23	1.022e-23	-22.826	-22.990	-0.164	(0)
HgNH3+2	3.810e-26	8.382e-27	-25.419	-26.077	-0.658	(0)
HgOH+	3.713e-26	2.543e-26	-25.430	-25.595	-0.164	(0)
Hg(NH3)3+2	1.693e-27	3.725e-28	-26.771	-27.429	-0.658	(0)
Hg+2	5.298e-29	1.166e-29	-28.276	-28.933	-0.658	(0)
HgS04	1.116e-29	1.116e-29	-28.952	-28.952	0.000	(0)
Hg(OH)3-	2.520e-30	1.726e-30	-29.599	-29.763	-0.164	(0)
Hg(NH3)4+2	2.752e-32	6.056e-33	-31.560	-32.218	-0.658	(0)
HgHS2-	0.000e+00	0.000e+00	-65.875	-66.039	-0.164	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.431	-66.431	0.000	(0)
HgS2-2	0.000e+00	0.000e+00	-67.303	-67.961	-0.658	(0)
HgN03+	0.000e+00	0.000e+00	-77.518	-77.682	-0.164	(0)
Hg(N03)2	0.000e+00	0.000e+00	-126.285	-126.285	0.000	(0)
K	1.823e-03					
K+	1.768e-03	1.378e-03	-2.753	-2.861	-0.108	(0)
KS04-	5.515e-05	4.337e-05	-4.258	-4.363	-0.104	(0)
KHP04-	2.692e-08	2.117e-08	-7.570	-7.674	-0.104	(0)
Mg	1.164e-02					
Mg+2	8.974e-03	3.316e-03	-2.047	-2.479	-0.432	(0)
MgS04	2.657e-03	2.657e-03	-2.576	-2.576	0.000	(0)
MgHP04	4.306e-06	4.306e-06	-5.366	-5.366	0.000	(0)
MgH2P04+	1.090e-06	8.567e-07	-5.963	-6.067	-0.104	(0)
MgOH+	6.991e-08	5.590e-08	-7.155	-7.253	-0.097	(0)
MgP04-	9.243e-10	7.268e-10	-9.034	-9.139	-0.104	(0)
Mn(2)	2.553e-04					
Mn+2	2.156e-04	4.745e-05	-3.666	-4.324	-0.658	(0)
MnS04	3.657e-05	3.657e-05	-4.437	-4.437	0.000	(0)
MnCl+	2.963e-06	2.314e-06	-5.528	-5.636	-0.107	(0)
MnCl2	1.267e-07	1.267e-07	-6.897	-6.897	0.000	(0)
MnOH+	6.901e-09	5.390e-09	-8.161	-8.268	-0.107	(0)
MnCl3-	1.731e-09	1.352e-09	-8.762	-8.869	-0.107	(0)
MnSe	2.993e-12	2.993e-12	-11.524	-11.524	0.000	(0)
Mn(OH)3-	2.186e-19	1.707e-19	-18.660	-18.768	-0.107	(0)
MnSe04	1.405e-23	1.405e-23	-22.852	-22.852	0.000	(0)
Mn(OH)4-2	9.096e-26	3.386e-26	-25.041	-25.470	-0.429	(0)
MnN03+	0.000e+00	0.000e+00	-52.181	-52.345	-0.164	(0)
Mn(N03)2	0.000e+00	0.000e+00	-100.163	-100.163	0.000	(0)
Mn(3)	1.185e-28					
Mn+3	1.185e-28	1.261e-29	-27.926	-28.899	-0.973	(0)
Mn(6)	0.000e+00					
Mn04-2	0.000e+00	0.000e+00	-65.599	-66.028	-0.429	(0)
Mn(7)	0.000e+00					
Mn04-	0.000e+00	0.000e+00	-74.510	-74.634	-0.125	(0)

N(-3)	5.746e-04					
NH4+	5.481e-04	4.065e-04	-3.261	-3.391	-0.130	(0)
NH4SO4-	2.535e-05	1.980e-05	-4.596	-4.703	-0.107	(0)
NH3	1.065e-06	1.065e-06	-5.972	-5.972	0.000	(0)
NiNH3+2	1.179e-08	2.594e-09	-7.929	-8.586	-0.658	(0)
Co(NH3)+2	8.984e-09	1.977e-09	-8.047	-8.704	-0.658	(0)
CaNH3+2	8.151e-09	1.794e-09	-8.089	-8.746	-0.658	(0)
CuNH3+2	2.159e-11	4.751e-12	-10.666	-11.323	-0.658	(0)
Ni(NH3)2+2	3.084e-12	6.786e-13	-11.511	-12.168	-0.658	(0)
Co(NH3)2+2	3.802e-13	8.365e-14	-12.420	-13.078	-0.658	(0)
Ca(NH3)2+2	4.599e-15	1.012e-15	-14.337	-14.995	-0.658	(0)
Co(NH3)3+2	6.783e-18	1.492e-18	-17.169	-17.826	-0.658	(0)
Hg(NH3)2+2	2.089e-22	4.598e-23	-21.680	-22.337	-0.658	(0)
Co(NH3)4+2	5.044e-23	1.110e-23	-22.297	-22.955	-0.658	(0)
HgNH3+2	3.810e-26	8.382e-27	-25.419	-26.077	-0.658	(0)
Hg(NH3)3+2	1.693e-27	3.725e-28	-26.771	-27.429	-0.658	(0)
Co(NH3)5+2	1.186e-28	2.610e-29	-27.926	-28.583	-0.658	(0)
Hg(NH3)4+2	2.752e-32	6.056e-33	-31.560	-32.218	-0.658	(0)
Co(NH3)5Cl+2	3.429e-39	7.545e-40	-38.465	-39.122	-0.658	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.554	-47.718	-0.164	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.007	-51.665	-0.658	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.359	-53.016	-0.658	(0)
N(3)	1.884e-35					
NO2-	1.883e-35	1.414e-35	-34.725	-34.850	-0.125	(0)
CoNO2+	1.181e-39	8.091e-40	-38.928	-39.092	-0.164	(0)
CuNO2+	0.000e+00	0.000e+00	-42.321	-42.486	-0.164	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.325	-76.325	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-48.113	-48.222	-0.108	(0)
CaNO3+	0.000e+00	0.000e+00	-50.542	-50.706	-0.164	(0)
MnNO3+	0.000e+00	0.000e+00	-52.181	-52.345	-0.164	(0)
CoNO3+	0.000e+00	0.000e+00	-52.947	-53.112	-0.164	(0)
NiNO3+	0.000e+00	0.000e+00	-53.284	-53.449	-0.164	(0)
ZnNO3+	0.000e+00	0.000e+00	-53.772	-53.936	-0.164	(0)
PbNO3+	0.000e+00	0.000e+00	-55.550	-55.715	-0.164	(0)
CdNO3+	0.000e+00	0.000e+00	-56.021	-56.185	-0.164	(0)
CuNO3+	0.000e+00	0.000e+00	-57.204	-57.368	-0.164	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.014	-62.671	-0.658	(0)
HgNO3+	0.000e+00	0.000e+00	-77.518	-77.682	-0.164	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.163	-100.163	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.025	-101.025	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-102.869	-102.869	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-103.686	-103.686	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-104.757	-104.757	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-106.499	-106.499	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.285	-126.285	0.000	(0)
Na	5.471e-02					
Na+	5.342e-02	4.165e-02	-1.272	-1.380	-0.108	(0)
NaSO4-	1.286e-03	1.011e-03	-2.891	-2.995	-0.104	(0)
NaHPO4-	1.260e-06	9.908e-07	-5.900	-6.004	-0.104	(0)
Ni	8.815e-06					
Ni+2	6.388e-06	2.360e-06	-5.195	-5.627	-0.432	(0)
NiSO4	2.074e-06	2.074e-06	-5.683	-5.683	0.000	(0)
NiCl+	3.379e-07	2.314e-07	-6.471	-6.636	-0.164	(0)
NiNH3+2	1.179e-08	2.594e-09	-7.929	-8.586	-0.658	(0)
NiOH+	2.006e-09	1.374e-09	-8.698	-8.862	-0.164	(0)
Ni(SO4)2-2	1.464e-09	3.222e-10	-8.834	-9.492	-0.658	(0)
NiCl2	4.565e-11	4.565e-11	-10.341	-10.341	0.000	(0)
Ni(OH)2	8.905e-12	8.905e-12	-11.050	-11.050	0.000	(0)
Ni(NH3)2+2	3.084e-12	6.786e-13	-11.511	-12.168	-0.658	(0)
Ni(OH)3-	7.987e-16	5.470e-16	-15.098	-15.262	-0.164	(0)
NiSeO4	1.214e-24	1.214e-24	-23.916	-23.916	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-53.284	-53.449	-0.164	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.884	-55.873	0.011	(0)
P	2.524e-05					
H2PO4-	7.333e-06	5.766e-06	-5.135	-5.239	-0.104	(0)
HPO4-2	5.906e-06	2.198e-06	-5.229	-5.658	-0.429	(0)

MgHP04	4.306e-06	4.306e-06	-5.366	-5.366	0.000	(0)
FeHP04	2.959e-06	2.959e-06	-5.529	-5.529	0.000	(0)
NaHP04-	1.260e-06	9.908e-07	-5.900	-6.004	-0.104	(0)
FeH2P04+	1.222e-06	9.611e-07	-5.913	-6.017	-0.104	(0)
MgH2P04+	1.090e-06	8.567e-07	-5.963	-6.067	-0.104	(0)
CaHP04	9.459e-07	9.459e-07	-6.024	-6.024	0.000	(0)
CaH2P04+	1.545e-07	1.215e-07	-6.811	-6.915	-0.104	(0)
KHP04-	2.692e-08	2.117e-08	-7.570	-7.674	-0.104	(0)
CoHP04	1.794e-08	1.794e-08	-7.746	-7.746	0.000	(0)
CaP04-	1.793e-08	1.410e-08	-7.746	-7.851	-0.104	(0)
MgP04-	9.243e-10	7.268e-10	-9.034	-9.139	-0.104	(0)
H3P04	1.270e-10	1.270e-10	-9.896	-9.896	0.000	(0)
P04-3	4.906e-11	5.221e-12	-10.309	-11.282	-0.973	(0)
FeHP04+	7.292e-12	5.734e-12	-11.137	-11.242	-0.104	(0)
FeH2P04+2	7.524e-17	2.876e-17	-16.124	-16.541	-0.418	(0)
Pb	1.665e-08					
Pb+2	5.946e-09	2.197e-09	-8.226	-8.658	-0.432	(0)
PbS04	4.891e-09	4.891e-09	-8.311	-8.311	0.000	(0)
PbCl+	4.204e-09	2.879e-09	-8.376	-8.541	-0.164	(0)
Pb(S04)2-2	6.088e-10	1.340e-10	-9.216	-9.873	-0.658	(0)
PbOH+	4.949e-10	3.389e-10	-9.305	-9.470	-0.164	(0)
PbCl2	4.894e-10	4.894e-10	-9.310	-9.310	0.000	(0)
PbCl3-	1.152e-11	7.887e-12	-10.939	-11.103	-0.164	(0)
Pb(OH)2	6.584e-13	6.584e-13	-12.182	-12.182	0.000	(0)
PbCl4-2	5.984e-13	1.317e-13	-12.223	-12.881	-0.658	(0)
Pb2OH+3	3.559e-16	1.180e-17	-15.449	-16.928	-1.479	(0)
Pb(OH)3-	5.905e-17	4.044e-17	-16.229	-16.393	-0.164	(0)
Pb(OH)4-2	2.765e-21	6.084e-22	-20.558	-21.216	-0.658	(0)
Pb3(OH)4+2	4.589e-23	1.010e-23	-22.338	-22.996	-0.658	(0)
Pb4(OH)4+4	8.717e-26	2.043e-28	-25.060	-27.690	-2.630	(0)
PbN03+	0.000e+00	0.000e+00	-55.550	-55.715	-0.164	(0)
Pb(HS)2	0.000e+00	0.000e+00	-69.114	-69.114	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-103.686	-103.686	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.512	-105.676	-0.164	(0)
S(-2)	5.293e-38					
H2S	2.651e-38	2.651e-38	-37.577	-37.577	0.000	(0)
HS-	2.003e-38	1.372e-38	-37.698	-37.863	-0.164	(0)
CdHS+	6.255e-39	4.284e-39	-38.204	-38.368	-0.164	(0)
S5-2	1.338e-40	0.000e+00	-39.873	-40.531	-0.658	(0)
S6-2	0.000e+00	0.000e+00	-40.300	-40.957	-0.658	(0)
S4-2	0.000e+00	0.000e+00	-40.473	-41.131	-0.658	(0)
S3-2	0.000e+00	0.000e+00	-41.286	-41.944	-0.658	(0)
S2-2	0.000e+00	0.000e+00	-42.312	-42.970	-0.658	(0)
S-2	0.000e+00	0.000e+00	-48.065	-48.494	-0.429	(0)
HgHS2-	0.000e+00	0.000e+00	-65.875	-66.039	-0.164	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.347	-66.776	-0.429	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.431	-66.431	0.000	(0)
CuS4S5-3	0.000e+00	0.000e+00	-67.102	-67.506	-0.404	(0)
HgS2-2	0.000e+00	0.000e+00	-67.303	-67.961	-0.658	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-68.090	-68.254	-0.164	(0)
Cd(HS)2	0.000e+00	0.000e+00	-69.027	-69.027	0.000	(0)
Zn(HS)2	0.000e+00	0.000e+00	-69.031	-69.031	0.000	(0)
Pb(HS)2	0.000e+00	0.000e+00	-69.114	-69.114	0.000	(0)
Fe(HS)2	0.000e+00	0.000e+00	-70.211	-70.211	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-97.181	-97.345	-0.164	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.449	-103.613	-0.164	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-104.825	-104.989	-0.164	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.512	-105.676	-0.164	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.872	-106.036	-0.164	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-106.149	-106.807	-0.658	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.999	-140.656	-0.658	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-142.278	-142.936	-0.658	(0)
S(6)	1.777e-02					
S04-2	1.230e-02	4.546e-03	-1.910	-2.342	-0.432	(0)
MgS04	2.657e-03	2.657e-03	-2.576	-2.576	0.000	(0)
NaS04-	1.286e-03	1.011e-03	-2.891	-2.995	-0.104	(0)
CaS04	1.007e-03	1.007e-03	-2.997	-2.997	0.000	(0)
FeS04	3.920e-04	3.920e-04	-3.407	-3.407	0.000	(0)

KS04-	5.515e-05	4.337e-05	-4.258	-4.363	-0.104	(0)
MnS04	3.657e-05	3.657e-05	-4.437	-4.437	0.000	(0)
NH4S04-	2.535e-05	1.980e-05	-4.596	-4.703	-0.107	(0)
CoS04	7.120e-06	7.120e-06	-5.147	-5.147	0.000	(0)
NiS04	2.074e-06	2.074e-06	-5.683	-5.683	0.000	(0)
ZnS04	7.201e-07	7.201e-07	-6.143	-6.143	0.000	(0)
Zn(S04)2-2	1.341e-07	2.950e-08	-6.873	-7.530	-0.658	(0)
HS04-	8.317e-08	6.439e-08	-7.080	-7.191	-0.111	(0)
AlS04+	2.821e-08	2.184e-08	-7.550	-7.661	-0.111	(0)
PbS04	4.891e-09	4.891e-09	-8.311	-8.311	0.000	(0)
CdS04	3.114e-09	3.114e-09	-8.507	-8.507	0.000	(0)
Al(S04)2-	1.501e-09	1.162e-09	-8.824	-8.935	-0.111	(0)
Ni(S04)2-2	1.464e-09	3.222e-10	-8.834	-9.492	-0.658	(0)
Cd(S04)2-2	9.103e-10	2.003e-10	-9.041	-9.698	-0.658	(0)
Pb(S04)2-2	6.088e-10	1.340e-10	-9.216	-9.873	-0.658	(0)
CuS04	2.192e-10	2.192e-10	-9.659	-9.659	0.000	(0)
FeS04+	1.651e-14	1.289e-14	-13.782	-13.890	-0.107	(0)
Fe(S04)2-	1.889e-15	1.293e-15	-14.724	-14.888	-0.164	(0)
HgS04	1.116e-29	1.116e-29	-28.952	-28.952	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.554	-47.718	-0.164	(0)
Se(-2)	3.661e-09					
HSe-	3.655e-09	2.503e-09	-8.437	-8.601	-0.164	(0)
H2Se	3.121e-12	3.121e-12	-11.506	-11.506	0.000	(0)
MnSe	2.993e-12	2.993e-12	-11.524	-11.524	0.000	(0)
Se-2	5.343e-17	1.176e-17	-16.272	-16.930	-0.658	(0)
Se(4)	4.331e-07					
HSeO3-	4.034e-07	2.763e-07	-6.394	-6.559	-0.164	(0)
SeO3-2	2.974e-08	6.543e-09	-7.527	-8.184	-0.658	(0)
H2SeO3	1.863e-11	1.863e-11	-10.730	-10.730	0.000	(0)
FeHSeO3+2	8.387e-19	1.845e-19	-18.076	-18.734	-0.658	(0)
Cd(SeO3)2-2	5.193e-19	1.143e-19	-18.285	-18.942	-0.658	(0)
Se(6)	3.234e-21					
SeO4-2	3.214e-21	1.188e-21	-20.493	-20.925	-0.432	(0)
MnSeO4	1.405e-23	1.405e-23	-22.852	-22.852	0.000	(0)
CoSeO4	4.527e-24	4.527e-24	-23.344	-23.344	0.000	(0)
NiSeO4	1.214e-24	1.214e-24	-23.916	-23.916	0.000	(0)
ZnSeO4	1.378e-25	1.378e-25	-24.861	-24.861	0.000	(0)
HSeO4-	1.253e-26	8.581e-27	-25.902	-26.066	-0.164	(0)
CdSeO4	6.779e-28	6.779e-28	-27.169	-27.169	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.123	-45.780	-0.658	(0)
Zn	2.989e-06					
Zn+2	2.028e-06	7.492e-07	-5.693	-6.125	-0.432	(0)
ZnS04	7.201e-07	7.201e-07	-6.143	-6.143	0.000	(0)
Zn(S04)2-2	1.341e-07	2.950e-08	-6.873	-7.530	-0.658	(0)
ZnCl+	9.231e-08	7.079e-08	-7.035	-7.150	-0.115	(0)
ZnOHCl	5.864e-09	5.864e-09	-8.232	-8.232	0.000	(0)
ZnOH+	4.947e-09	3.388e-09	-8.306	-8.470	-0.164	(0)
ZnCl2	3.655e-09	3.655e-09	-8.437	-8.437	0.000	(0)
ZnCl3-	1.443e-10	1.107e-10	-9.841	-9.956	-0.115	(0)
Zn(OH)2	4.480e-11	4.480e-11	-10.349	-10.349	0.000	(0)
ZnCl4-2	5.578e-12	2.076e-12	-11.254	-11.683	-0.429	(0)
Zn(OH)3-	2.014e-14	1.379e-14	-13.696	-13.860	-0.164	(0)
Zn(OH)4-2	1.533e-19	3.373e-20	-18.814	-19.472	-0.658	(0)
ZnSeO4	1.378e-25	1.378e-25	-24.861	-24.861	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.123	-45.780	-0.658	(0)
ZnNO3+	0.000e+00	0.000e+00	-53.772	-53.936	-0.164	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-68.090	-68.254	-0.164	(0)
Zn(HS)2	0.000e+00	0.000e+00	-69.031	-69.031	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-102.869	-102.869	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.449	-103.613	-0.164	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-106.149	-106.807	-0.658	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-142.278	-142.936	-0.658	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)
(Co(NH3)5Cl)(NO3)2	-123.61	-117.34	6.27

(Co(NH3)5Cl)Cl2	-28.25	-23.72	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.51	-23.72	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-178.68	-160.75	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.43	-20.32	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-28.16	-27.71	0.45	(NH4)2SeO4
Al(OH)3(am)	0.15	11.21	11.06	Al(OH)3
Al2O3	2.16	22.43	20.27	Al2O3
Al4(OH)10SO4	6.24	28.94	22.70	Al4(OH)10SO4
AlOHSO4	-1.47	-4.70	-3.23	AlOHSO4
Alunite	6.64	5.74	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.18	-11.00	-7.82	PbSO4
Anhydrite	-1.00	-5.34	-4.34	CaSO4
Anilite	-13.20	-45.51	-32.31	Cu0.25Cu1.5S
Antlerite	-12.96	-4.17	8.79	Cu3(OH)4SO4
Atacamite	-7.98	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.71	-8.47	-1.76	ZnSO4:6H2O
Birnessite	-18.82	-0.72	18.09	MnO2
Bixbyite	-16.74	-17.08	-0.35	Mn2O3
BlaubleiI	-17.21	-41.37	-24.16	Cu0.9Cu0.2S
BlaubleiII	-16.00	-43.28	-27.28	Cu0.6Cu0.8S
Boehmite	2.36	11.22	8.86	AlOOH
Brochantite	-15.96	-0.25	15.71	Cu4(OH)6SO4
Brucite	-6.02	11.09	17.12	Mg(OH)2
Bunsenite	-4.74	7.94	12.68	NiO
Ca3(PO4)2(beta)	-2.51	-31.56	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-5.55	-52.63	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.72	-21.07	-19.35	CaHP04
CaHP04:2H2O	-2.02	-21.07	-19.05	CaHP04:2H2O
Calomel	-13.86	-31.99	-18.13	Hg2Cl2
CaSeO3:2H2O	-5.63	-2.77	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-20.92	-23.93	-3.00	CaSeO4:2H2O
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-23.36	-16.65	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-23.30	-0.74	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-15.51	-48.11	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-24.08	4.32	28.40	Cd4(OH)6SO4
CdCl2	-10.72	-11.34	-0.61	CdCl2
CdCl2:1H2O	-9.66	-11.34	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-9.41	-11.34	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.27	-10.58	13.69	Cd
Cdmetal(gamma)	-24.37	-10.58	13.80	Cd
CdOHCl	-6.75	-3.14	3.61	CdOHCl
CdSe	10.05	-10.33	-20.38	CdSe
CdSeO4:2H2O	-27.59	-29.44	-1.85	CdSeO4:2H2O
CdSO4	-10.81	-10.86	-0.05	CdSO4
CdSO4:1H2O	-9.21	-10.86	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-9.03	-10.86	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.35	-12.00	-2.65	CuSO4:5H2O
Chalcocite	-11.78	-47.10	-35.32	Cu2S
Chalcopyrite	-39.62	-75.24	-35.62	CuFeS2
Cinnabar	-20.00	-66.30	-46.30	HgS
Clausthalite	16.91	-10.47	-27.39	PbSe
Co(OH)2	-4.61	8.48	13.09	Co(OH)2
Co(OH)3	-14.01	-16.10	-2.09	Co(OH)3
Co3(PO4)2	-3.15	-37.84	-34.69	Co3(PO4)2
Co3O4	-13.48	-23.72	-10.24	Co3O4
CoCl2	-16.37	-7.91	8.46	CoCl2
CoCl2:6H2O	-10.44	-7.92	2.52	CoCl2:6H2O
CoFe2O4	21.27	18.12	-3.15	CoFe2O4
CoHP04	-4.10	-23.16	-19.06	CoHP04
CoO	-5.36	8.48	13.84	CoO
CoS(alpha)	-28.73	-36.17	-7.44	CoS
CoS(beta)	-25.10	-36.17	-11.07	CoS
CoSe	9.29	-6.91	-16.20	CoSe
CoSeO3	-6.18	-4.86	1.32	CoSeO3
CoSeO4:6H2O	-24.49	-26.02	-1.53	CoSeO4:6H2O
CoSO4	-10.42	-7.43	2.99	CoSO4

CoS04:6H2O	-4.96	-7.44	-2.48	CoS04:6H2O
Cotunnite	-6.64	-11.48	-4.84	PbCl2
Covellite	-18.20	-40.73	-22.53	CuS
Cu(OH)2	-4.89	3.91	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.60	-47.18	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.47	-17.84	-46.31	Cu2Se
Cu2S04	-16.47	-18.37	-1.90	Cu2S04
Cu3(P04)2	-14.68	-51.53	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-16.42	-51.54	-35.12	Cu3(P04)2:3H2O
Cu3Se2	34.99	-29.31	-64.30	Cu3Se2
Cumetal	-0.12	-9.05	-8.93	Cu
Cu0CuS04	-18.71	-8.08	10.63	Cu0CuS04
Cupricferrite	7.07	13.56	6.49	CuFe204
Cuprite	-1.35	-2.46	-1.11	Cu2O
Cuprousferrite	12.47	3.59	-8.88	CuFe02
CuSe	21.92	-11.47	-33.39	CuSe
CuSe2	22.48	-11.22	-33.70	CuSe2
CuSe03:2H2O	-10.03	-9.43	0.60	CuSe03:2H2O
CuSe04:5H2O	-28.15	-30.59	-2.44	CuSe04:5H2O
CuS04	-15.11	-12.00	3.11	CuS04
Diaspore	4.10	11.22	7.12	Al00H
Djurleite	-12.29	-46.68	-34.40	Cu0.066Cu1.868S
Epsomite	-2.67	-4.83	-2.15	MgS04:7H2O
Fe(OH)2	-3.43	10.14	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.40	2.36	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-5.26	-3.71	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H2O	-9.77	-30.39	-20.63	Fe2(Se03)3:2H2O
Fe2(S04)3	-34.94	-38.10	-3.16	Fe2(S04)3
Fe3(OH)8	-0.45	19.77	20.22	Fe3(OH)8
Ferrihydrite	1.45	4.82	3.37	Fe(OH)3
Ferroselite	13.71	-5.00	-18.71	FeSe2
FeS(ppt)	-31.59	-34.51	-2.92	FeS
FeSe	5.75	-5.25	-11.00	FeSe
Galena	-25.57	-39.73	-14.16	PbS
Gibbsite	2.70	11.21	8.52	Al(OH)3
Goethite	4.18	4.82	0.64	Fe00H
Goslarite	-6.43	-8.47	-2.05	ZnS04:7H2O
Greenockite	-25.10	-39.59	-14.49	CdS
Greigite	-113.78	-158.82	-45.03	Fe3S4
Gypsum	-0.73	-5.34	-4.61	CaS04:2H2O
H-Jarosite	-5.82	-17.37	-11.55	(H30)Fe3(S04)2(OH)6
H2S(g)	-36.64	-44.65	-8.01	H2S
H2Se(g)	-10.46	-15.39	-4.92	H2Se
Halite	-4.39	-2.79	1.59	NaCl
Hausmannite	-18.65	43.38	62.03	Mn304
Hematite	10.75	9.64	-1.11	Fe203
Hercynite	8.93	32.57	23.64	FeAl204
Hg(g)	-7.69	-15.62	-7.93	Hg
Hg(OH)2	-18.16	-21.65	-3.50	Hg(OH)2
Hg2(g)	-16.14	-31.23	-15.09	Hg2
Hg2(OH)2	-20.86	-15.60	5.26	Hg2(OH)2
Hg2HP04	-22.46	-47.24	-24.77	Hg2HP04
Hg2S	-48.40	-60.25	-11.84	Hg2S
Hg2Se03	-24.29	-28.94	-4.66	Hg2Se03
Hg2S04	-25.37	-31.51	-6.14	Hg2S04
HgCl(g)	-35.88	-16.00	19.88	HgCl
HgCl2	-16.53	-38.05	-21.52	HgCl2
Hgmetal(l)	-1.97	-15.62	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSe03	-22.56	-34.99	-12.43	HgSe03
HgS04	-28.11	-37.56	-9.45	HgS04
Hinsdalite	-6.50	-9.00	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	2.28	-42.05	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-7.56	-70.35	-62.79	Pb5(P04)3OH
K-Alum	-11.46	-16.70	-5.24	KAl(S04)2:12H2O
K-Jarosite	1.04	-13.45	-14.49	KFe3(S04)2(OH)6
K2Se04	-25.92	-26.65	-0.73	K2Se04
Langite	-18.14	-0.26	17.88	Cu4(OH)6S04:H2O

Larnakite	-5.70	-6.09	-0.38	PbO:PbSO4
Laurionite	-3.91	-3.28	0.62	PbOHCl
Lepidocrocite	3.45	4.82	1.37	FeOOH
Lime	-22.59	10.57	33.16	CaO
Litharge	-7.94	4.91	12.85	PbO
Mackinawite	-30.91	-34.51	-3.60	FeS
Maghemite	3.25	9.64	6.39	Fe2O3
Magnesioferrite	3.21	20.73	17.52	Fe2MgO4
Magnetite	15.88	19.78	3.90	Fe3O4
Manganite	-8.28	17.06	25.34	MnOOH
Massicot	-8.14	4.91	13.05	PbO
Melanothallite	-18.89	-12.48	6.41	CuCl2
Melanterite	-3.53	-5.78	-2.26	FeSO4:7H2O
Metacinnabar	-20.60	-66.30	-45.70	HgS
Mg(OH)2(active)	-7.70	11.09	18.79	Mg(OH)2
Mg3(P04)2	-6.72	-30.00	-23.28	Mg3(P04)2
MgHP04:3H2O	-2.38	-20.55	-18.18	MgHP04:3H2O
MgSe03:6H2O	-5.30	-2.26	3.04	MgSe03:6H2O
MgSe04:6H2O	-22.21	-23.41	-1.20	MgSe04:6H2O
Minium	-44.15	30.37	74.53	Pb3O4
Mirabilite	-3.81	-5.11	-1.30	Na2SO4:10H2O
Mn2(S04)3	-59.50	-64.83	-5.32	Mn2(S04)3
Mn3(P04)2	-11.69	-35.54	-23.85	Mn3(P04)2
MnCl2:4H2O	-9.89	-7.15	2.74	MnCl2:4H2O
MnHP04	3.01	-22.39	-25.40	MnHP04
MnS(grn)	-35.65	-35.40	0.25	MnS
MnS(pnk)	-38.74	-35.40	3.34	MnS
MnSe	-9.87	-6.14	3.73	MnSe
MnSe03	-5.23	-4.10	1.13	MnSe03
MnSe03:2H2O	-5.06	-4.10	0.96	MnSe03:2H2O
MnSe04:5H2O	-23.20	-25.25	-2.05	MnSe04:5H2O
MnSO4	-9.40	-6.67	2.74	MnSO4
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.10	-21.65	-3.55	HgO
Morenosite	-5.80	-7.98	-2.17	NiSO4:7H2O
Na-Jarosite	-1.13	-11.97	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-12.84	-2.54	10.30	Na2Se03:5H2O
Na2Se04	-24.97	-23.69	1.28	Na2Se04
Nantokite	-2.59	-9.43	-6.83	CuCl
Ni(OH)2	-5.08	7.94	13.02	Ni(OH)2
Ni3(P04)2	-8.15	-39.45	-31.30	Ni3(P04)2
Ni4(OH)6S04	-16.14	15.86	32.00	Ni4(OH)6S04
NiS(alpha)	-31.10	-36.70	-5.60	NiS
NiS(beta)	-25.60	-36.70	-11.10	NiS
NiS(gamma)	-23.90	-36.70	-12.80	NiS
NiSe	10.26	-7.44	-17.70	NiSe
NiSe03:2H2O	-8.29	-5.40	2.89	NiSe03:2H2O
NiSe04:6H2O	-25.04	-26.56	-1.52	NiSe04:6H2O
Nsutite	-18.23	-0.72	17.50	MnO2
O2(g)	-53.18	31.27	84.45	O2
Pb(OH)2	-3.38	4.91	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.17	1.63	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-16.36	9.83	26.19	Pb2O(OH)2
Pb2O3	-35.58	25.46	61.04	Pb2O3
Pb3(P04)2	-5.01	-48.54	-43.53	Pb3(P04)2
Pb3O2S04	-12.05	-1.17	10.87	Pb3O2S04
Pb4(OH)6S04	-17.36	3.74	21.10	Pb4(OH)6S04
Pb4O3S04	-18.46	3.74	22.20	Pb4O3S04
PbHP04	-2.92	-26.73	-23.81	PbHP04
Pbmetal	-14.96	-10.72	4.24	Pb
PbO:0.3H2O	-8.07	4.91	12.98	PbO:0.33H2O
PbSe04	-22.71	-29.58	-6.88	PbSe04
Periclase	-10.85	11.09	21.94	MgO
Plattnerite	-29.76	20.55	50.31	PbO2
Plumbgummite	8.07	-24.72	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-12.54	10.57	23.11	Ca(OH)2
Pyrite	-44.90	-63.53	-18.63	FeS2
Pyrochroite	-6.18	9.25	15.43	Mn(OH)2

Pyrolusite	-17.15	24.88	42.03	MnO2
Pyromorphite	5.88	-78.55	-84.43	Pb5(P04)3Cl
Retgersite	-5.92	-7.98	-2.05	NiS04:6H2O
Semetal(am)	7.38	0.25	-7.14	Se
Semetal(hex)	7.99	0.25	-7.75	Se
SeO2	-13.47	-13.34	0.12	SeO2
SeO3	-55.89	-34.50	21.39	SeO3
Sphalerite	-25.68	-37.20	-11.52	ZnS
Spinel	-4.25	33.52	37.77	MgAl2O4
Strengite	-0.44	-26.82	-26.38	FeP04:2H2O
Sulfur	-26.91	-29.01	-2.11	S
Tenorite	-3.88	3.92	7.80	CuO
Thenardite	-5.45	-5.10	0.34	Na2S04
Tsumebite	-8.11	-17.90	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	3.12	-32.88	-36.00	Fe3(P04)2:8H2O
Wurtzite	-28.20	-37.20	-9.00	ZnS
Zincite	-4.10	7.45	11.55	ZnO
Zincosite	-12.59	-8.47	4.13	ZnS04
Zn(N03)2:6H2O	-105.83	-102.57	3.26	Zn(N03)2:6H2O
Zn(OH)2	-4.75	7.45	12.20	Zn(OH)2
Zn(OH)2(am)	-5.22	7.45	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.51	7.45	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.28	7.45	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.29	7.45	11.73	Zn(OH)2
Zn2(OH)2S04	-8.52	-1.02	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-8.50	6.69	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-5.52	-40.94	-35.42	Zn3(P04)2:4H2O
Zn3O(S04)2	-29.02	-9.49	19.53	Zn3O(S04)2
Zn4(OH)6S04	-14.53	13.87	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-17.67	20.83	38.50	Zn5(OH)8Cl2
ZnCl2	-16.17	-8.95	7.22	ZnCl2
Znmetal	-34.34	-8.19	26.15	Zn
ZnO(active)	-3.95	7.45	11.40	ZnO
ZnS(am)	-28.11	-37.20	-9.09	ZnS
ZnSe	6.52	-7.94	-14.46	ZnSe
ZnSeO4:6H2O	-25.54	-27.06	-1.52	ZnSeO4:6H2O
ZnS04:1H2O	-7.94	-8.47	-0.53	ZnS04:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 6.

SOLUTION 4 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003

```

Mn      12.2
Mo      0
V       0
Zn      0.17
Se      0.03
Ni      0.45
N       7
P       0.68
Ca      130
Mg      246
Na      1094
K       62
Cl      1533
S(6)    1485
Hg      0.0002
water   1 # kg
MIX 3
  1     0.146
  4     0.854
REACTION 4
H2O -1
3
END #Time-step 4

```

Beginning of initial solution calculations.

Initial solution 4.

-----Solution composition-----

Elements	Molality	Moles
Al	1.378e-05	1.378e-05
Ca	3.259e-03	3.259e-03
Cd	2.681e-08	2.681e-08
Cl	4.344e-02	4.344e-02
Co	3.989e-05	3.989e-05
Cu	4.901e-06	4.901e-06
Fe	1.805e-03	1.805e-03
Hg	1.002e-09	1.002e-09
K	1.593e-03	1.593e-03
Mg	1.017e-02	1.017e-02
Mn	2.231e-04	2.231e-04
N	5.021e-04	5.021e-04
Na	4.781e-02	4.781e-02
Ni	7.703e-06	7.703e-06
P	2.206e-05	2.206e-05
Pb	1.455e-08	1.455e-08
S(6)	1.553e-02	1.553e-02
Se	3.817e-07	3.817e-07
Zn	2.612e-06	2.612e-06

-----Description of solution-----

```

pH = 6.790
pe = 1.000
Activity of water = 0.998
Ionic strength (mol/kgw) = 9.259e-02
Mass of water (kg) = 1.000e+00
Total alkalinity (eq/kg) = 6.274e-05
Total carbon (mol/kg) = 0.000e+00
Total CO2 (mol/kg) = 0.000e+00
Temperature (°C) = 21.00
Electrical balance (eq) = 6.374e-03
Percent error, 100*(Cat-|An|)/(Cat+|An|) = 4.58
Iterations = 13
Total H = 1.110158e+02

```

Total O = 5.556909e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.061e-07	1.622e-07	-6.686	-6.790	-0.104	0.00
OH-	5.935e-08	4.562e-08	-7.227	-7.341	-0.114	(0)
H2O	5.551e+01	9.980e-01	1.744	-0.001	0.000	18.05
Al	1.378e-05					
Al(OH)4-	8.973e-06	7.024e-06	-5.047	-5.153	-0.106	(0)
Al(OH)2+	2.373e-06	1.884e-06	-5.625	-5.725	-0.100	(0)
Al(OH)3	2.329e-06	2.329e-06	-5.633	-5.633	0.000	(0)
AlOH+2	7.409e-08	2.945e-08	-7.130	-7.531	-0.401	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
Al+3	5.344e-09	6.178e-10	-8.272	-9.209	-0.937	(0)
Al(SO4)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ca	3.259e-03					
Ca+2	2.406e-03	9.221e-04	-2.619	-3.035	-0.416	(0)
CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
CaHP04	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2P04+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
CaP04-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CaOH+	1.001e-09	8.020e-10	-8.999	-9.096	-0.096	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
Cd	2.681e-08					
CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
Cd+2	7.874e-09	3.018e-09	-8.104	-8.520	-0.416	(0)
CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
Cd(SO4)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
CdOH+	1.568e-12	1.100e-12	-11.805	-11.959	-0.154	(0)
Cd(OH)2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
Cd2OH+3	4.264e-19	1.748e-20	-18.370	-19.758	-1.387	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Cd(OH)3-	3.135e-21	2.198e-21	-20.504	-20.658	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Cd(OH)4-2	9.222e-29	2.230e-29	-28.035	-28.652	-0.617	(0)
CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cl	4.344e-02					
Cl-	4.343e-02	3.417e-02	-1.362	-1.466	-0.104	(0)
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)

ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(2)	3.989e-05					
Co+2	3.225e-05	7.797e-06	-4.491	-5.108	-0.617	(0)
CoSO4	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CoHP04	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CoOH+	1.375e-08	9.639e-09	-7.862	-8.016	-0.154	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
Co(OH)2	4.744e-11	4.744e-11	-10.324	-10.324	0.000	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Co2OH+3	9.190e-14	3.766e-15	-13.037	-14.424	-1.387	(0)
Co(OH)3-	8.364e-17	5.865e-17	-16.078	-16.232	-0.154	(0)
CoOOH-	5.039e-18	3.533e-18	-17.298	-17.452	-0.154	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Co4(OH)4+4	5.041e-22	1.722e-24	-21.297	-23.764	-2.466	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
Co(OH)4-2	2.382e-24	5.759e-25	-23.623	-24.240	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Co(3)	4.042e-31					
CoOH+2	4.042e-31	9.773e-32	-30.393	-31.010	-0.617	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co+3	2.685e-36	3.104e-37	-35.571	-36.508	-0.937	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
Cu(1)	4.900e-06					
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
Cu+	1.553e-08	1.089e-08	-7.809	-7.963	-0.154	(0)
Cu(2)	8.967e-10					
Cu+2	6.026e-10	2.310e-10	-9.220	-9.636	-0.416	(0)
CuSO4	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
CuOH+	4.792e-11	3.719e-11	-10.319	-10.430	-0.110	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
Cu(OH)2	5.595e-13	5.595e-13	-12.252	-12.252	0.000	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
Cu2(OH)2+2	1.398e-16	3.379e-17	-15.855	-16.471	-0.617	(0)
Cu(OH)3-	1.014e-16	7.111e-17	-15.994	-16.148	-0.154	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
Cu(OH)4-2	1.434e-22	3.468e-23	-21.843	-22.460	-0.617	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Fe(2)	1.805e-03					

Fe+2	1.454e-03	3.515e-04	-2.837	-3.454	-0.617	(0)
FeS04	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
FeHP04	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2P04+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
FeOH+	8.090e-07	6.384e-07	-6.092	-6.195	-0.103	(0)
Fe(OH)2	2.214e-11	2.214e-11	-10.655	-10.655	0.000	(0)
Fe(OH)3-	5.296e-13	4.179e-13	-12.276	-12.379	-0.103	(0)
Fe(3)	3.233e-07					
Fe(OH)2+	3.138e-07	2.491e-07	-6.503	-6.604	-0.100	(0)
Fe(OH)3	9.382e-09	9.382e-09	-8.028	-8.028	0.000	(0)
Fe(OH)4-	1.205e-10	9.565e-11	-9.919	-10.019	-0.100	(0)
FeOH+2	2.119e-11	8.217e-12	-10.674	-11.085	-0.411	(0)
FeHP04+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeS04+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe+3	2.235e-15	2.584e-16	-14.651	-15.588	-0.937	(0)
Fe(S04)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeH2P04+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
Fe2(OH)2+4	7.548e-19	2.579e-21	-18.122	-20.589	-2.466	(0)
FeHSe03+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
Fe3(OH)4+5	6.361e-23	8.906e-27	-22.197	-26.050	-3.854	(0)
FeN03+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
H(0)	3.796e-19					
H2	1.898e-19	1.939e-19	-18.722	-18.712	0.009	(0)
Hg(0)	1.002e-09					
Hg	1.002e-09	1.002e-09	-8.999	-8.999	0.000	(0)
Hg(1)	3.697e-29					
Hg2+2	1.848e-29	4.469e-30	-28.733	-29.350	-0.617	(0)
Hg(2)	2.362e-18					
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
Hg(OH)2	1.682e-22	1.718e-22	-21.774	-21.765	0.009	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
HgOH+	2.768e-26	1.941e-26	-25.558	-25.712	-0.154	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Hg+2	3.648e-29	8.820e-30	-28.438	-29.055	-0.617	(0)
HgS04	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Hg(OH)3-	1.911e-30	1.340e-30	-29.719	-29.873	-0.154	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
HgN03+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Hg(N03)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
K	1.593e-03					
K+	1.549e-03	1.219e-03	-2.810	-2.914	-0.104	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
Mg	1.017e-02					
Mg+2	7.920e-03	3.036e-03	-2.101	-2.518	-0.416	(0)
MgS04	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
MgH2P04+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
MgOH+	6.402e-08	5.162e-08	-7.194	-7.287	-0.094	(0)
MgP04-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
Mn(2)	2.231e-04					
Mn+2	1.882e-04	4.549e-05	-3.725	-4.342	-0.617	(0)
MnS04	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
MnOH+	6.606e-09	5.213e-09	-8.180	-8.283	-0.103	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Mn(OH)3-	2.129e-19	1.680e-19	-18.672	-18.775	-0.103	(0)
MnSe04	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)

Mn(OH)4-2	8.666e-26	3.361e-26	-25.062	-25.474	-0.411	(0)
MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Mn(3)	9.732e-29					
Mn+3	9.732e-29	1.125e-29	-28.012	-28.949	-0.937	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-65.730	-66.142	-0.411	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-74.661	-74.779	-0.119	(0)
N(-3)	5.021e-04					
NH4+	4.805e-04	3.617e-04	-3.318	-3.442	-0.123	(0)
NH4SO4-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
NH3	9.560e-07	9.560e-07	-6.020	-6.020	0.000	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
N(3)	1.148e-35					
NO2-	1.148e-35	8.735e-36	-34.940	-35.059	-0.119	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-48.382	-48.486	-0.104	(0)
CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
Na	4.781e-02					
Na+	4.677e-02	3.680e-02	-1.330	-1.434	-0.104	(0)
NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
Ni	7.703e-06					
Ni+2	5.664e-06	2.171e-06	-5.247	-5.663	-0.416	(0)
NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
NiOH+	1.818e-09	1.275e-09	-8.741	-8.895	-0.154	(0)
Ni(SO4)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
Ni(OH)2	8.335e-12	8.335e-12	-11.079	-11.079	0.000	(0)

Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Ni(OH)3-	7.365e-16	5.164e-16	-15.133	-15.287	-0.154	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.993	-55.984	0.009	(0)
P	2.206e-05					
H2PO4-	6.634e-06	5.268e-06	-5.178	-5.278	-0.100	(0)
HPO4-2	5.222e-06	2.025e-06	-5.282	-5.694	-0.411	(0)
MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
FeHP04	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2P04+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
NaHP04-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
MgH2P04+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
CaHP04	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2P04+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
CoHP04	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CaP04-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
MgP04-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
H3P04	1.150e-10	1.150e-10	-9.939	-9.939	0.000	(0)
P04-3	4.196e-11	4.850e-12	-10.377	-11.314	-0.937	(0)
FeHP04+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeH2P04+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
Pb	1.455e-08					
Pb+2	5.480e-09	2.100e-09	-8.261	-8.678	-0.416	(0)
PbS04	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
PbOH+	4.662e-10	3.269e-10	-9.331	-9.486	-0.154	(0)
Pb(S04)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
Pb(OH)2	6.405e-13	6.405e-13	-12.193	-12.193	0.000	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
Pb2OH+3	2.655e-16	1.088e-17	-15.576	-16.963	-1.387	(0)
Pb(OH)3-	5.660e-17	3.969e-17	-16.247	-16.401	-0.154	(0)
Pb(OH)4-2	2.491e-21	6.022e-22	-20.604	-21.220	-0.617	(0)
Pb3(OH)4+2	3.779e-23	9.137e-24	-22.423	-23.039	-0.617	(0)
Pb4(OH)4+4	5.175e-26	1.768e-28	-25.286	-27.753	-2.466	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
S(6)	1.553e-02					
S04-2	1.094e-02	4.194e-03	-1.961	-2.377	-0.416	(0)
MgS04	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
NaS04-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
CaS04	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
FeS04	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
MnS04	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
NH4S04-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
CoS04	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
NiS04	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
ZnS04	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(S04)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
HS04-	7.527e-08	5.892e-08	-7.123	-7.230	-0.106	(0)
AlS04+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
PbS04	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
CdS04	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
Al(S04)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ni(S04)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
Cd(S04)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
Pb(S04)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
CuS04	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
FeS04+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe(S04)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
HgS04	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Se(-2)	4.685e-09					

HSe-	4.677e-09	3.279e-09	-8.330	-8.484	-0.154	(0)
H2Se	4.054e-12	4.054e-12	-11.392	-11.392	0.000	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Se-2	6.423e-17	1.553e-17	-16.192	-16.809	-0.617	(0)
Se(4)	3.770e-07					
HSeO3-	3.526e-07	2.472e-07	-6.453	-6.607	-0.154	(0)
SeO3-2	2.442e-08	5.904e-09	-7.612	-8.229	-0.617	(0)
H2SeO3	1.653e-11	1.653e-11	-10.782	-10.782	0.000	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Se(6)	2.478e-21					
SeO4-2	2.463e-21	9.439e-22	-20.609	-21.025	-0.416	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
HSeO4-	9.645e-27	6.763e-27	-26.016	-26.170	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
Zn	2.612e-06					
Zn+2	1.813e-06	6.948e-07	-5.742	-6.158	-0.416	(0)
ZnSO4	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(SO4)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
ZnOH+	4.520e-09	3.170e-09	-8.345	-8.499	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
Zn(OH)2	4.227e-11	4.227e-11	-10.374	-10.374	0.000	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
Zn(OH)3-	1.872e-14	1.313e-14	-13.728	-13.882	-0.154	(0)
Zn(OH)4-2	1.339e-19	3.238e-20	-18.873	-19.490	-0.617	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-124.48	-118.20	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-28.70	-24.17	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.96	-24.17	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-179.81	-161.88	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.93	-20.82	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-28.36	-27.91	0.45	(NH4)2SeO4
Al(OH)3(am)	0.09	11.16	11.06	Al(OH)3
Al2O3	2.05	22.32	20.27	Al2O3
Al4(OH)10SO4	5.98	28.68	22.70	Al4(OH)10SO4
AlOHSO4	-1.57	-4.80	-3.23	AlOHSO4
Alunite	6.34	5.44	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.24	-11.06	-7.82	PbSO4
Anhydrite	-1.07	-5.41	-4.34	CaSO4
Antlerite	-12.92	-4.13	8.79	Cu3(OH)4SO4
Atacamite	-7.99	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.78	-8.54	-1.76	ZnSO4:6H2O
Birnessite	-18.88	-0.79	18.09	MnO2
Bixbyite	-16.81	-17.16	-0.35	Mn2O3
Boehmite	2.30	11.16	8.86	AlOOH
Brochantite	-15.89	-0.19	15.71	Cu4(OH)6SO4
Brucite	-6.06	11.06	17.12	Mg(OH)2
Bunsenite	-4.77	7.92	12.68	NiO
Ca3(PO4)2(beta)	-2.69	-31.73	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-5.80	-52.88	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.79	-21.14	-19.35	CaHP04
CaHP04:2H2O	-2.09	-21.14	-19.05	CaHP04:2H2O
Calomel	-14.15	-32.28	-18.13	Hg2Cl2

CaSeO3:2H2O	-5.71	-2.85	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-21.06	-24.06	-3.00	CaSeO4:2H2O
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-23.45	-16.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-23.34	-0.78	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-15.59	-48.19	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-24.12	4.28	28.40	Cd4(OH)6SO4
CdCl2	-10.84	-11.45	-0.61	CdCl2
CdCl2:1H2O	-9.78	-11.45	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-9.52	-11.46	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.21	-10.52	13.69	Cd
Cdmetal(gamma)	-24.32	-10.52	13.80	Cd
CdOHCl	-6.81	-3.20	3.61	CdOHCl
CdSe	10.17	-10.21	-20.38	CdSe
CdSeO4:2H2O	-27.70	-29.55	-1.85	CdSeO4:2H2O
CdSO4	-10.85	-10.90	-0.05	CdSO4
CdSO4:1H2O	-9.25	-10.90	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-9.07	-10.90	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.36	-12.02	-2.65	CuSO4:5H2O
Clausthalite	17.01	-10.37	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.05	-16.14	-2.09	Co(OH)3
Co3(PO4)2	-3.27	-37.95	-34.69	Co3(PO4)2
Co3O4	-13.57	-23.81	-10.24	Co3O4
CoCl2	-16.50	-8.04	8.46	CoCl2
CoCl2:6H2O	-10.56	-8.05	2.52	CoCl2:6H2O
CoFe2O4	21.18	18.03	-3.15	CoFe2O4
CoHP04	-4.15	-23.21	-19.06	CoHP04
CoO	-5.37	8.47	13.84	CoO
CoSe	9.40	-6.80	-16.20	CoSe
CoSeO3	-6.24	-4.92	1.32	CoSeO3
CoSeO4:6H2O	-24.61	-26.14	-1.53	CoSeO4:6H2O
CoSO4	-10.48	-7.49	2.99	CoSO4
CoSO4:6H2O	-5.02	-7.49	-2.48	CoSO4:6H2O
Cotunnite	-6.77	-11.61	-4.84	PbCl2
Cu(OH)2	-4.87	3.94	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.82	-47.39	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.69	-17.62	-46.31	Cu2Se
Cu2SO4	-16.40	-18.30	-1.90	Cu2SO4
Cu3(PO4)2	-14.69	-51.54	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-16.42	-51.54	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	35.35	-28.95	-64.30	Cu3Se2
Cumetal	-0.04	-8.96	-8.93	Cu
CuOCuSO4	-18.70	-8.07	10.63	CuOCuSO4
Cupricferrite	7.02	13.50	6.49	CuFe2O4
Cuprite	-1.24	-2.35	-1.11	Cu2O
Cuprousferrite	12.49	3.61	-8.88	CuFeO2
CuSe	22.06	-11.33	-33.39	CuSe
CuSe2	22.68	-11.02	-33.70	CuSe2
CuSeO3:2H2O	-10.05	-9.46	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-28.23	-30.67	-2.44	CuSeO4:5H2O
CuSO4	-15.13	-12.01	3.11	CuSO4
Diaspore	4.04	11.16	7.12	AlOOH
Epsomite	-2.75	-4.90	-2.15	MgSO4:7H2O
Fe(OH)2	-3.44	10.12	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.34	2.30	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-5.39	-3.84	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-10.00	-30.63	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-35.15	-38.31	-3.16	Fe2(SO4)3
Fe3(OH)8	-0.54	19.68	20.22	Fe3(OH)8
Ferrihydrite	1.41	4.78	3.37	Fe(OH)3
Ferroselite	13.87	-4.84	-18.71	FeSe2
FeSe	5.86	-5.15	-11.00	FeSe
Gibbsite	2.64	11.16	8.52	Al(OH)3
Goethite	4.15	4.78	0.64	FeOOH
Goslarite	-6.50	-8.54	-2.05	ZnSO4:7H2O
Gypsum	-0.80	-5.41	-4.61	CaSO4:2H2O

H-Jarosite	-6.02	-17.57	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-10.35	-15.27	-4.92	H2Se
Halite	-4.49	-2.90	1.59	NaCl
Hausmannite	-18.74	43.29	62.03	Mn3O4
Hematite	10.67	9.56	-1.11	Fe2O3
Hercynite	8.80	32.44	23.64	FeAl2O4
Hg(g)	-7.75	-15.67	-7.93	Hg
Hg(OH)2	-18.27	-21.76	-3.50	Hg(OH)2
Hg2(g)	-16.26	-31.35	-15.09	Hg2
Hg2(OH)2	-21.03	-15.77	5.26	Hg2(OH)2
Hg2HPO4	-22.68	-47.45	-24.77	Hg2HPO4
Hg2SeO3	-24.51	-29.17	-4.66	Hg2SeO3
Hg2SO4	-25.58	-31.73	-6.14	Hg2SO4
HgCl(g)	-36.02	-16.14	19.88	HgCl
HgCl2	-16.76	-38.28	-21.52	HgCl2
Hgmetal(l)	-2.02	-15.67	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSeO3	-22.73	-35.16	-12.43	HgSeO3
HgSO4	-28.27	-37.72	-9.45	HgSO4
Hinsdalite	-6.76	-9.26	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	2.00	-42.33	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-7.75	-70.54	-62.79	Pb5(PO4)3OH
K-Alum	-11.65	-16.89	-5.24	KAl(SO4)2·12H2O
K-Jarosite	0.79	-13.70	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-26.12	-26.85	-0.73	K2SeO4
Langite	-18.07	-0.19	17.88	Cu4(OH)6SO4·H2O
Larnakite	-5.77	-6.15	-0.38	PbO·PbSO4
Laurionite	-3.98	-3.35	0.62	PbOHCl
Lepidocrocite	3.41	4.78	1.37	FeOOH
Lime	-22.62	10.54	33.16	CaO
Litharge	-7.95	4.90	12.85	PbO
Maghemite	3.18	9.56	6.39	Fe2O3
Magnesioferrite	3.10	20.62	17.52	Fe2MgO4
Magnetite	15.79	19.69	3.90	Fe3O4
Manganite	-8.31	17.03	25.34	MnOOH
Massicot	-8.15	4.90	13.05	PbO
Melanothallite	-18.98	-12.57	6.41	CuCl2
Melanterite	-3.58	-5.84	-2.26	FeSO4·7H2O
Mg(OH)2(active)	-7.73	11.06	18.79	Mg(OH)2
Mg3(PO4)2	-6.90	-30.18	-23.28	Mg3(PO4)2
MgHPO4·3H2O	-2.45	-20.62	-18.18	MgHPO4·3H2O
MgSeO3·6H2O	-5.38	-2.34	3.04	MgSeO3·6H2O
MgSeO4·6H2O	-22.35	-23.55	-1.20	MgSeO4·6H2O
Minium	-44.24	30.28	74.53	Pb3O4
Mirabilite	-3.95	-5.25	-1.30	Na2SO4·10H2O
Mn2(SO4)3	-59.71	-65.03	-5.32	Mn2(SO4)3
Mn3(PO4)2	-11.81	-35.65	-23.85	Mn3(PO4)2
MnCl2·4H2O	-10.02	-7.28	2.74	MnCl2·4H2O
MnHPO4	2.95	-22.45	-25.40	MnHPO4
MnSe	-9.77	-6.04	3.73	MnSe
MnSeO3	-5.29	-4.16	1.13	MnSeO3
MnSeO3·2H2O	-5.12	-4.16	0.96	MnSeO3·2H2O
MnSeO4·5H2O	-23.32	-25.37	-2.05	MnSeO4·5H2O
MnSO4	-9.46	-6.72	2.74	MnSO4
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.22	-21.76	-3.55	HgO
Morenosite	-5.87	-8.05	-2.17	NiSO4·7H2O
Na-Jarosite	-1.38	-12.22	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3·5H2O	-12.99	-2.69	10.30	Na2SeO3·5H2O
Na2SeO4	-25.17	-23.89	1.28	Na2SeO4
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.11	7.91	13.02	Ni(OH)2
Ni3(PO4)2	-8.32	-39.62	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-16.30	15.70	32.00	Ni4(OH)6SO4
NiSe	10.34	-7.36	-17.70	NiSe
NiSeO3·2H2O	-8.37	-5.48	2.89	NiSeO3·2H2O
NiSeO4·6H2O	-25.17	-26.69	-1.52	NiSeO4·6H2O
Nsutite	-18.29	-0.79	17.50	MnO2

O2(g)	-53.29	31.16	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.25	1.55	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-16.39	9.80	26.19	Pb2O(OH)2
Pb2O3	-35.66	25.38	61.04	Pb2O3
Pb3(P04)2	-5.13	-48.66	-43.53	Pb3(P04)2
Pb3O2S04	-12.13	-1.25	10.87	Pb3O2S04
Pb4(OH)6S04	-17.45	3.65	21.10	Pb4(OH)6S04
Pb4O3S04	-18.55	3.65	22.20	Pb4O3S04
PbHP04	-2.98	-26.78	-23.81	PbHP04
Pbmetal	-14.92	-10.68	4.24	Pb
PbO:0.3H2O	-8.08	4.90	12.98	PbO:0.33H2O
PbSe04	-22.83	-29.70	-6.88	PbSe04
Periclase	-10.88	11.06	21.94	MgO
Plattnerite	-29.83	20.48	50.31	PbO2
Plumbgummite	7.80	-24.99	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-12.57	10.54	23.11	Ca(OH)2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-17.21	24.82	42.03	MnO2
Pyromorphite	5.63	-78.80	-84.43	Pb5(P04)3Cl
Retgersite	-6.00	-8.05	-2.05	NiS04:6H2O
Semetal(am)	7.44	0.31	-7.14	Se
Semetal(hex	8.05	0.31	-7.75	Se
SeO2	-13.52	-13.40	0.12	SeO2
SeO3	-56.00	-34.60	21.39	SeO3
Spinel	-4.39	33.38	37.77	MgAl2O4
Strengite	-0.53	-26.90	-26.38	FeP04:2H2O
Tenorite	-3.86	3.94	7.80	CuO
Thenardite	-5.59	-5.25	0.34	Na2S04
Tsumebite	-8.15	-17.94	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	3.00	-33.00	-36.00	Fe3(P04)2:8H2O
Zincite	-4.13	7.42	11.55	ZnO
Zincosite	-12.66	-8.54	4.13	ZnS04
Zn(NO3)2:6H2O	-106.39	-103.14	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.78	7.42	12.20	Zn(OH)2
Zn(OH)2(am)	-5.25	7.42	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.42	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.31	7.42	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.42	11.73	Zn(OH)2
Zn2(OH)2S04	-8.62	-1.12	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-8.61	6.58	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-5.69	-41.11	-35.42	Zn3(P04)2:4H2O
Zn3O(S04)2	-29.18	-9.65	19.53	Zn3O(S04)2
Zn4(OH)6S04	-14.68	13.72	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-17.91	20.59	38.50	Zn5(OH)8Cl2
ZnCl2	-16.31	-9.09	7.22	ZnCl2
Znmetal	-34.31	-8.16	26.15	Zn
ZnO(active)	-3.98	7.42	11.40	ZnO
ZnSe	6.61	-7.85	-14.46	ZnSe
ZnSeO4:6H2O	-25.67	-27.19	-1.52	ZnSeO4:6H2O
ZnS04:1H2O	-8.00	-8.54	-0.53	ZnS04:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 3.
Using reaction 4.

Mixture 3.

1.460e-01 Solution 1
8.540e-01 Solution 4

Reaction 4.

3.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000

Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	1.456e-05	1.378e-05
Ca	3.445e-03	3.259e-03
Cd	2.835e-08	2.681e-08
Cl	4.593e-02	4.344e-02
Co	4.217e-05	3.989e-05
Cu	5.181e-06	4.901e-06
Fe	1.908e-03	1.805e-03
Hg	1.059e-09	1.002e-09
K	1.684e-03	1.593e-03
Mg	1.075e-02	1.017e-02
Mn	2.359e-04	2.231e-04
N	5.308e-04	5.021e-04
Na	5.054e-02	4.781e-02
Ni	8.144e-06	7.703e-06
P	2.332e-05	2.206e-05
Pb	1.538e-08	1.455e-08
S	1.642e-02	1.553e-02
Se	4.035e-07	3.817e-07
Zn	2.761e-06	2.612e-06

-----Description of solution-----

pH	=	6.788	Charge balance
pe	=	1.012	Adjusted to redox equilibrium
Activity of water	=	0.998	
Ionic strength (mol/kgw)	=	9.763e-02	
Mass of water (kg)	=	9.460e-01	
Total alkalinity (eq/kg)	=	6.633e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	6.374e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	4.58	
Iterations	=	4	
Total H	=	1.050158e+02	
Total O	=	5.256909e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.076e-07	1.627e-07	-6.683	-6.788	-0.106	0.00
OH-	5.945e-08	4.546e-08	-7.226	-7.342	-0.117	(0)
H2O	5.551e+01	9.978e-01	1.744	-0.001	0.000	18.05
Al	1.456e-05					
Al(OH)4-	9.475e-06	7.383e-06	-5.023	-5.132	-0.108	(0)
Al(OH)2+	2.522e-06	1.994e-06	-5.598	-5.700	-0.102	(0)
Al(OH)3	2.457e-06	2.457e-06	-5.610	-5.610	0.000	(0)

	AlOH+2	7.998e-08	3.129e-08	-7.097	-7.505	-0.408	(0)
	AlS04+	2.440e-08	1.901e-08	-7.613	-7.721	-0.108	(0)
	Al+3	5.896e-09	6.587e-10	-8.229	-9.181	-0.952	(0)
	Al(S04)2-	1.238e-09	9.649e-10	-8.907	-9.016	-0.108	(0)
Ca		3.445e-03					
	Ca+2	2.531e-03	9.555e-04	-2.597	-3.020	-0.423	(0)
	CaS04	9.129e-04	9.129e-04	-3.040	-3.040	0.000	(0)
	CaHP04	8.567e-07	8.567e-07	-6.067	-6.067	0.000	(0)
	CaH2P04+	1.385e-07	1.095e-07	-6.859	-6.960	-0.102	(0)
	CaP04-	1.623e-08	1.283e-08	-7.790	-7.892	-0.102	(0)
	CaNH3+2	6.874e-09	1.600e-09	-8.163	-8.796	-0.633	(0)
	CaOH+	1.038e-09	8.281e-10	-8.984	-9.082	-0.098	(0)
	Ca(NH3)2+2	3.639e-15	8.468e-16	-14.439	-15.072	-0.633	(0)
	CaNO3+	0.000e+00	0.000e+00	-50.730	-50.888	-0.158	(0)
Cd		2.835e-08					
	CdCl+	1.496e-08	1.039e-08	-7.825	-7.983	-0.158	(0)
	Cd+2	8.051e-09	3.039e-09	-8.094	-8.517	-0.423	(0)
	CdS04	2.945e-09	2.945e-09	-8.531	-8.531	0.000	(0)
	CdCl2	1.541e-09	1.541e-09	-8.812	-8.812	0.000	(0)
	Cd(S04)2-2	7.765e-10	1.807e-10	-9.110	-9.743	-0.633	(0)
	CdCl3-	4.849e-11	3.368e-11	-10.314	-10.473	-0.158	(0)
	CdOHCl	2.394e-11	2.394e-11	-10.621	-10.621	0.000	(0)
	CdOH+	1.589e-12	1.104e-12	-11.799	-11.957	-0.158	(0)
	Cd(OH)2	5.806e-16	5.806e-16	-15.236	-15.236	0.000	(0)
	Cd2OH+3	4.695e-19	1.766e-20	-18.328	-19.753	-1.425	(0)
	Cd(Se03)2-2	4.318e-19	1.005e-19	-18.365	-18.998	-0.633	(0)
	Cd(OH)3-	3.153e-21	2.190e-21	-20.501	-20.660	-0.158	(0)
	CdSe04	5.861e-28	5.861e-28	-27.232	-27.232	0.000	(0)
	Cd(OH)4-2	9.510e-29	2.213e-29	-28.022	-28.655	-0.633	(0)
	CdHS+	7.901e-39	5.488e-39	-38.102	-38.261	-0.158	(0)
	CdNO3+	0.000e+00	0.000e+00	-56.190	-56.348	-0.158	(0)
	Cd(HS)2	0.000e+00	0.000e+00	-68.808	-68.808	0.000	(0)
	Cd(HS)3-	0.000e+00	0.000e+00	-104.501	-104.659	-0.158	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-105.079	-105.079	0.000	(0)
	Cd(HS)4-2	0.000e+00	0.000e+00	-139.582	-140.215	-0.633	(0)
Cl		4.593e-02					
	Cl-	4.591e-02	3.599e-02	-1.338	-1.444	-0.106	(0)
	CuCl2-	4.624e-06	3.571e-06	-5.335	-5.447	-0.112	(0)
	MnCl+	2.670e-06	2.098e-06	-5.573	-5.678	-0.105	(0)
	CoCl+	1.407e-06	9.770e-07	-5.852	-6.010	-0.158	(0)
	CuCl	4.703e-07	4.703e-07	-6.328	-6.328	0.000	(0)
	NiCl+	2.947e-07	2.047e-07	-6.531	-6.689	-0.158	(0)
	MnCl2	1.067e-07	1.067e-07	-6.972	-6.972	0.000	(0)
	ZnCl+	8.147e-08	6.291e-08	-7.089	-7.201	-0.112	(0)
	CuCl3-2	7.093e-08	2.705e-08	-7.149	-7.568	-0.419	(0)
	CdCl+	1.496e-08	1.039e-08	-7.825	-7.983	-0.158	(0)
	ZnOHCl	5.238e-09	5.238e-09	-8.281	-8.281	0.000	(0)
	PbCl+	3.752e-09	2.606e-09	-8.426	-8.584	-0.158	(0)
	ZnCl2	3.017e-09	3.017e-09	-8.520	-8.520	0.000	(0)
	CdCl2	1.541e-09	1.541e-09	-8.812	-8.812	0.000	(0)
	MnCl3-	1.345e-09	1.057e-09	-8.871	-8.976	-0.105	(0)
	PbCl2	4.114e-10	4.114e-10	-9.386	-9.386	0.000	(0)
	ZnCl3-	1.099e-10	8.484e-11	-9.959	-10.071	-0.112	(0)
	CdCl3-	4.849e-11	3.368e-11	-10.314	-10.473	-0.158	(0)
	NiCl2	3.749e-11	3.749e-11	-10.426	-10.426	0.000	(0)
	CdOHCl	2.394e-11	2.394e-11	-10.621	-10.621	0.000	(0)
	CuCl+	1.599e-11	1.234e-11	-10.796	-10.909	-0.112	(0)
	PbCl3-	8.866e-12	6.158e-12	-11.052	-11.211	-0.158	(0)
	ZnCl4-2	3.877e-12	1.478e-12	-11.411	-11.830	-0.419	(0)
	PbCl4-2	4.103e-13	9.549e-14	-12.387	-13.020	-0.633	(0)
	CuCl2	1.265e-13	1.265e-13	-12.898	-12.898	0.000	(0)
	FeCl+2	6.802e-16	2.594e-16	-15.167	-15.586	-0.419	(0)
	FeCl2+	6.020e-17	4.730e-17	-16.220	-16.325	-0.105	(0)
	CuCl3-	5.121e-17	3.954e-17	-16.291	-16.403	-0.112	(0)
	HgCl2	1.707e-18	1.707e-18	-17.768	-17.768	0.000	(0)
	HgCl3-	8.922e-19	6.197e-19	-18.050	-18.208	-0.158	(0)
	HgCl4-2	3.958e-19	9.210e-20	-18.403	-19.036	-0.633	(0)
	FeCl3	1.702e-19	1.702e-19	-18.769	-18.769	0.000	(0)

HgClOH	3.938e-20	3.938e-20	-19.405	-19.405	0.000	(0)
CuCl4-2	2.142e-20	8.168e-21	-19.669	-20.088	-0.419	(0)
HgCl+	1.158e-23	8.041e-24	-22.936	-23.095	-0.158	(0)
CoCl+2	9.366e-36	2.180e-36	-35.028	-35.662	-0.633	(0)
Co(NH3)5Cl+2	2.049e-39	4.769e-40	-38.688	-39.322	-0.633	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.259	-51.892	-0.633	(0)
Co(2)	4.217e-05					
Co+2	3.409e-05	7.934e-06	-4.467	-5.101	-0.633	(0)
CoS04	6.634e-06	6.634e-06	-5.178	-5.178	0.000	(0)
CoCl+	1.407e-06	9.770e-07	-5.852	-6.010	-0.158	(0)
CoHPO4	1.670e-08	1.670e-08	-7.777	-7.777	0.000	(0)
CoOH+	1.407e-08	9.774e-09	-7.852	-8.010	-0.158	(0)
Co(NH3)+2	7.785e-09	1.812e-09	-8.109	-8.742	-0.633	(0)
Co(OH)2	4.793e-11	4.793e-11	-10.319	-10.319	0.000	(0)
Co(NH3)2+2	3.092e-13	7.195e-14	-12.510	-13.143	-0.633	(0)
Co2OH+3	1.033e-13	3.886e-15	-12.986	-14.410	-1.425	(0)
Co(OH)3-	8.501e-17	5.905e-17	-16.071	-16.229	-0.158	(0)
Co(NH3)3+2	5.176e-18	1.205e-18	-17.286	-17.919	-0.633	(0)
Co0OH-	5.122e-18	3.557e-18	-17.291	-17.449	-0.158	(0)
Co4(OH)4+4	6.207e-22	1.821e-24	-21.207	-23.740	-2.533	(0)
Co(NH3)4+2	3.612e-23	8.406e-24	-22.442	-23.075	-0.633	(0)
CoSe04	3.855e-24	3.855e-24	-23.414	-23.414	0.000	(0)
Co(OH)4-2	2.483e-24	5.778e-25	-23.605	-24.238	-0.633	(0)
Co(NH3)5+2	7.971e-29	1.855e-29	-28.098	-28.732	-0.633	(0)
CoNO2+	8.514e-40	5.914e-40	-39.070	-39.228	-0.158	(0)
CoNO3+	0.000e+00	0.000e+00	-53.123	-53.282	-0.158	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.354	-101.354	0.000	(0)
Co(3)	4.381e-31					
CoOH+2	4.381e-31	1.020e-31	-30.358	-30.992	-0.633	(0)
CoCl+2	9.366e-36	2.180e-36	-35.028	-35.662	-0.633	(0)
Co+3	2.909e-36	3.250e-37	-35.536	-36.488	-0.952	(0)
Co(NH3)5Cl+2	2.049e-39	4.769e-40	-38.688	-39.322	-0.633	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.775	-47.934	-0.158	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.259	-51.892	-0.633	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.576	-53.209	-0.633	(0)
Cu(1)	5.180e-06					
CuCl2-	4.624e-06	3.571e-06	-5.335	-5.447	-0.112	(0)
CuCl	4.703e-07	4.703e-07	-6.328	-6.328	0.000	(0)
CuCl3-2	7.093e-08	2.705e-08	-7.149	-7.568	-0.419	(0)
Cu+	1.495e-08	1.038e-08	-7.825	-7.984	-0.158	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.095	-66.520	-0.424	(0)
CuS4S5-3	0.000e+00	0.000e+00	-66.849	-67.250	-0.400	(0)
Cu(2)	8.979e-10					
Cu+2	6.000e-10	2.265e-10	-9.222	-9.645	-0.423	(0)
CuS04	2.145e-10	2.145e-10	-9.669	-9.669	0.000	(0)
CuOH+	4.706e-11	3.634e-11	-10.327	-10.440	-0.112	(0)
CuNH3+2	1.966e-11	4.575e-12	-10.706	-11.340	-0.633	(0)
CuCl+	1.599e-11	1.234e-11	-10.796	-10.909	-0.112	(0)
Cu(OH)2	5.448e-13	5.448e-13	-12.264	-12.264	0.000	(0)
CuCl2	1.265e-13	1.265e-13	-12.898	-12.898	0.000	(0)
Cu2(OH)2+2	1.387e-16	3.227e-17	-15.858	-16.491	-0.633	(0)
Cu(OH)3-	9.933e-17	6.899e-17	-16.003	-16.161	-0.158	(0)
CuCl3-	5.121e-17	3.954e-17	-16.291	-16.403	-0.112	(0)
CuCl4-2	2.142e-20	8.168e-21	-19.669	-20.088	-0.419	(0)
Cu(OH)4-2	1.440e-22	3.352e-23	-21.841	-22.475	-0.633	(0)
CuNO2+	0.000e+00	0.000e+00	-42.442	-42.601	-0.158	(0)
CuNO3+	0.000e+00	0.000e+00	-57.358	-57.516	-0.158	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.566	-76.566	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.842	-97.000	-0.158	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-106.807	-106.807	0.000	(0)
Fe(2)	1.908e-03					
Fe+2	1.539e-03	3.580e-04	-2.813	-3.446	-0.633	(0)
FeS04	3.647e-04	3.647e-04	-3.438	-3.438	0.000	(0)
FeHPO4	2.750e-06	2.750e-06	-5.561	-5.561	0.000	(0)
FeH2PO4+	1.124e-06	8.890e-07	-5.949	-6.051	-0.102	(0)
FeOH+	8.246e-07	6.480e-07	-6.084	-6.188	-0.105	(0)
Fe(OH)2	2.239e-11	2.239e-11	-10.650	-10.650	0.000	(0)
Fe(OH)3-	5.359e-13	4.212e-13	-12.271	-12.376	-0.105	(0)

Fe(HS)2	0.000e+00	0.000e+00	-69.999	-69.999	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.555	-105.713	-0.158	(0)
Fe(3)	3.377e-07					
Fe(OH)2+	3.278e-07	2.593e-07	-6.484	-6.586	-0.102	(0)
Fe(OH)3	9.728e-09	9.728e-09	-8.012	-8.012	0.000	(0)
Fe(OH)4-	1.250e-10	9.882e-11	-9.903	-10.005	-0.102	(0)
FeOH+2	2.250e-11	8.581e-12	-10.648	-11.066	-0.419	(0)
FeHP04+	6.452e-12	5.103e-12	-11.190	-11.292	-0.102	(0)
FeS04+	1.461e-14	1.148e-14	-13.835	-13.940	-0.105	(0)
Fe+3	2.424e-15	2.708e-16	-14.615	-15.567	-0.952	(0)
Fe(S04)2-	1.582e-15	1.099e-15	-14.801	-14.959	-0.158	(0)
FeCl+2	6.802e-16	2.594e-16	-15.167	-15.586	-0.419	(0)
FeH2P04+2	6.512e-17	2.547e-17	-16.186	-16.594	-0.408	(0)
FeCl2+	6.020e-17	4.730e-17	-16.220	-16.325	-0.105	(0)
Fe2(OH)2+4	9.587e-19	2.812e-21	-18.018	-20.551	-2.533	(0)
FeHSe03+2	6.940e-19	1.615e-19	-18.159	-18.792	-0.633	(0)
FeCl3	1.702e-19	1.702e-19	-18.769	-18.769	0.000	(0)
Fe3(OH)4+5	9.159e-23	1.011e-26	-22.038	-25.995	-3.957	(0)
FeN03+2	0.000e+00	0.000e+00	-62.227	-62.860	-0.633	(0)
H(0)	3.606e-19					
H2	1.803e-19	1.844e-19	-18.744	-18.734	0.010	(0)
Hg(0)	1.059e-09					
Hg	1.059e-09	1.059e-09	-8.975	-8.975	0.000	(0)
Hg(1)	4.544e-29					
Hg2+2	2.272e-29	5.287e-30	-28.644	-29.277	-0.633	(0)
Hg(2)	3.035e-18					
HgCl2	1.707e-18	1.707e-18	-17.768	-17.768	0.000	(0)
HgCl3-	8.922e-19	6.197e-19	-18.050	-18.208	-0.158	(0)
HgCl4-2	3.958e-19	9.210e-20	-18.403	-19.036	-0.633	(0)
HgCl0H	3.938e-20	3.938e-20	-19.405	-19.405	0.000	(0)
Hg(OH)2	1.867e-22	1.909e-22	-21.729	-21.719	0.010	(0)
Hg(NH3)2+2	1.473e-22	3.428e-23	-21.832	-22.465	-0.633	(0)
HgCl+	1.158e-23	8.041e-24	-22.936	-23.095	-0.158	(0)
HgOH+	3.116e-26	2.164e-26	-25.506	-25.665	-0.158	(0)
HgNH3+2	2.862e-26	6.661e-27	-25.543	-26.176	-0.633	(0)
Hg(NH3)3+2	1.120e-27	2.606e-28	-26.951	-27.584	-0.633	(0)
Hg+2	4.242e-29	9.871e-30	-28.372	-29.006	-0.633	(0)
HgS04	9.012e-30	9.012e-30	-29.045	-29.045	0.000	(0)
Hg(OH)3-	2.137e-30	1.484e-30	-29.670	-29.829	-0.158	(0)
Hg(NH3)4+2	1.708e-32	3.976e-33	-31.767	-32.401	-0.633	(0)
HgHS2-	0.000e+00	0.000e+00	-65.728	-65.887	-0.158	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.281	-66.281	0.000	(0)
HgS2-2	0.000e+00	0.000e+00	-67.173	-67.806	-0.633	(0)
HgN03+	0.000e+00	0.000e+00	-77.756	-77.914	-0.158	(0)
Hg(N03)2	0.000e+00	0.000e+00	-126.676	-126.676	0.000	(0)
K	1.684e-03					
K+	1.636e-03	1.282e-03	-2.786	-2.892	-0.106	(0)
KS04-	4.865e-05	3.848e-05	-4.313	-4.415	-0.102	(0)
KHP04-	2.373e-08	1.876e-08	-7.625	-7.727	-0.102	(0)
Mg	1.075e-02					
Mg+2	8.339e-03	3.148e-03	-2.079	-2.502	-0.423	(0)
MgS04	2.406e-03	2.406e-03	-2.619	-2.619	0.000	(0)
MgHP04	3.896e-06	3.896e-06	-5.409	-5.409	0.000	(0)
MgH2P04+	9.754e-07	7.714e-07	-6.011	-6.113	-0.102	(0)
MgOH+	6.639e-08	5.334e-08	-7.178	-7.273	-0.095	(0)
MgP04-	8.356e-10	6.608e-10	-9.078	-9.180	-0.102	(0)
Mn(2)	2.359e-04					
Mn+2	1.990e-04	4.632e-05	-3.701	-4.334	-0.633	(0)
MnS04	3.405e-05	3.405e-05	-4.468	-4.468	0.000	(0)
MnCl+	2.670e-06	2.098e-06	-5.573	-5.678	-0.105	(0)
MnCl2	1.067e-07	1.067e-07	-6.972	-6.972	0.000	(0)
MnOH+	6.730e-09	5.289e-09	-8.172	-8.277	-0.105	(0)
MnCl3-	1.345e-09	1.057e-09	-8.871	-8.976	-0.105	(0)
MnSe	3.467e-12	3.467e-12	-11.460	-11.460	0.000	(0)
Mn(OH)3-	2.153e-19	1.692e-19	-18.667	-18.772	-0.105	(0)
MnSe04	1.196e-23	1.196e-23	-22.922	-22.922	0.000	(0)
Mn(OH)4-2	8.845e-26	3.373e-26	-25.053	-25.472	-0.419	(0)
MnN03+	0.000e+00	0.000e+00	-52.357	-52.515	-0.158	(0)

Mn(NO3)2	0.000e+00	0.000e+00	-100.492	-100.492	0.000	(0)
Mn(3)	1.055e-28					
Mn+3	1.055e-28	1.178e-29	-27.977	-28.929	-0.952	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-65.678	-66.096	-0.419	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-74.601	-74.722	-0.121	(0)
N(-3)	5.308e-04					
NH4+	5.073e-04	3.796e-04	-3.295	-3.421	-0.126	(0)
NH4SO4-	2.244e-05	1.763e-05	-4.649	-4.754	-0.105	(0)
NH3	9.998e-07	9.998e-07	-6.000	-6.000	0.000	(0)
NiNH3+2	9.958e-09	2.318e-09	-8.002	-8.635	-0.633	(0)
Co(NH3)+2	7.785e-09	1.812e-09	-8.109	-8.742	-0.633	(0)
CaNH3+2	6.874e-09	1.600e-09	-8.163	-8.796	-0.633	(0)
CuNH3+2	1.966e-11	4.575e-12	-10.706	-11.340	-0.633	(0)
Ni(NH3)2+2	2.445e-12	5.689e-13	-11.612	-12.245	-0.633	(0)
Co(NH3)2+2	3.092e-13	7.195e-14	-12.510	-13.143	-0.633	(0)
Ca(NH3)2+2	3.639e-15	8.468e-16	-14.439	-15.072	-0.633	(0)
Co(NH3)3+2	5.176e-18	1.205e-18	-17.286	-17.919	-0.633	(0)
Hg(NH3)2+2	1.473e-22	3.428e-23	-21.832	-22.465	-0.633	(0)
Co(NH3)4+2	3.612e-23	8.406e-24	-22.442	-23.075	-0.633	(0)
HgNH3+2	2.862e-26	6.661e-27	-25.543	-26.176	-0.633	(0)
Hg(NH3)3+2	1.120e-27	2.606e-28	-26.951	-27.584	-0.633	(0)
Co(NH3)5+2	7.971e-29	1.855e-29	-28.098	-28.732	-0.633	(0)
Hg(NH3)4+2	1.708e-32	3.976e-33	-31.767	-32.401	-0.633	(0)
Co(NH3)5Cl+2	2.049e-39	4.769e-40	-38.688	-39.322	-0.633	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.775	-47.934	-0.158	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.259	-51.892	-0.633	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.576	-53.209	-0.633	(0)
N(3)	1.398e-35					
NO2-	1.398e-35	1.058e-35	-34.855	-34.976	-0.121	(0)
CoNO2+	8.514e-40	5.914e-40	-39.070	-39.228	-0.158	(0)
CuNO2+	0.000e+00	0.000e+00	-42.442	-42.601	-0.158	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.566	-76.566	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-48.275	-48.381	-0.106	(0)
CaNO3+	0.000e+00	0.000e+00	-50.730	-50.888	-0.158	(0)
MnNO3+	0.000e+00	0.000e+00	-52.357	-52.515	-0.158	(0)
CoNO3+	0.000e+00	0.000e+00	-53.123	-53.282	-0.158	(0)
NiNO3+	0.000e+00	0.000e+00	-53.471	-53.629	-0.158	(0)
ZnNO3+	0.000e+00	0.000e+00	-53.956	-54.115	-0.158	(0)
PbNO3+	0.000e+00	0.000e+00	-55.727	-55.885	-0.158	(0)
CdNO3+	0.000e+00	0.000e+00	-56.190	-56.348	-0.158	(0)
CuNO3+	0.000e+00	0.000e+00	-57.358	-57.516	-0.158	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.227	-62.860	-0.633	(0)
HgNO3+	0.000e+00	0.000e+00	-77.756	-77.914	-0.158	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.492	-100.492	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.354	-101.354	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.207	-103.207	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.016	-104.016	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.079	-105.079	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-106.807	-106.807	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.676	-126.676	0.000	(0)
Na	5.054e-02					
Na+	4.941e-02	3.873e-02	-1.306	-1.412	-0.106	(0)
NaSO4-	1.134e-03	8.968e-04	-2.945	-3.047	-0.102	(0)
NaHPO4-	1.110e-06	8.779e-07	-5.955	-6.057	-0.102	(0)
Ni	8.144e-06					
Ni+2	5.953e-06	2.247e-06	-5.225	-5.648	-0.423	(0)
NiSO4	1.883e-06	1.883e-06	-5.725	-5.725	0.000	(0)
NiCl+	2.947e-07	2.047e-07	-6.531	-6.689	-0.158	(0)
NiNH3+2	9.958e-09	2.318e-09	-8.002	-8.635	-0.633	(0)
NiOH+	1.893e-09	1.315e-09	-8.723	-8.881	-0.158	(0)
Ni(SO4)2-2	1.199e-09	2.791e-10	-8.921	-9.554	-0.633	(0)
NiCl2	3.749e-11	3.749e-11	-10.426	-10.426	0.000	(0)
Ni(OH)2	8.566e-12	8.566e-12	-11.067	-11.067	0.000	(0)
Ni(NH3)2+2	2.445e-12	5.689e-13	-11.612	-12.245	-0.633	(0)
Ni(OH)3-	7.614e-16	5.288e-16	-15.118	-15.277	-0.158	(0)

NiSeO4	1.008e-24	1.008e-24	-23.997	-23.997	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-53.471	-53.629	-0.158	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.950	-55.940	0.010	(0)
P	2.332e-05					
H2PO4-	6.914e-06	5.468e-06	-5.160	-5.262	-0.102	(0)
HP04-2	5.494e-06	2.095e-06	-5.260	-5.679	-0.419	(0)
MgHP04	3.896e-06	3.896e-06	-5.409	-5.409	0.000	(0)
FeHP04	2.750e-06	2.750e-06	-5.561	-5.561	0.000	(0)
FeH2PO4+	1.124e-06	8.890e-07	-5.949	-6.051	-0.102	(0)
NaHP04-	1.110e-06	8.779e-07	-5.955	-6.057	-0.102	(0)
MgH2PO4+	9.754e-07	7.714e-07	-6.011	-6.113	-0.102	(0)
CaHP04	8.567e-07	8.567e-07	-6.067	-6.067	0.000	(0)
CaH2PO4+	1.385e-07	1.095e-07	-6.859	-6.960	-0.102	(0)
KHP04-	2.373e-08	1.876e-08	-7.625	-7.727	-0.102	(0)
CoHP04	1.670e-08	1.670e-08	-7.777	-7.777	0.000	(0)
CaP04-	1.623e-08	1.283e-08	-7.790	-7.892	-0.102	(0)
MgP04-	8.356e-10	6.608e-10	-9.078	-9.180	-0.102	(0)
H3P04	1.198e-10	1.198e-10	-9.921	-9.921	0.000	(0)
P04-3	4.476e-11	5.000e-12	-10.349	-11.301	-0.952	(0)
FeHP04+	6.452e-12	5.103e-12	-11.190	-11.292	-0.102	(0)
FeH2PO4+2	6.512e-17	2.547e-17	-16.186	-16.594	-0.408	(0)
Pb	1.538e-08					
Pb+2	5.670e-09	2.141e-09	-8.246	-8.669	-0.423	(0)
PbS04	4.546e-09	4.546e-09	-8.342	-8.342	0.000	(0)
PbCl+	3.752e-09	2.606e-09	-8.426	-8.584	-0.158	(0)
Pb(S04)2-2	5.104e-10	1.188e-10	-9.292	-9.925	-0.633	(0)
PbOH+	4.780e-10	3.320e-10	-9.321	-9.479	-0.158	(0)
PbCl2	4.114e-10	4.114e-10	-9.386	-9.386	0.000	(0)
PbCl3-	8.866e-12	6.158e-12	-11.052	-11.211	-0.158	(0)
Pb(OH)2	6.481e-13	6.481e-13	-12.188	-12.188	0.000	(0)
PbCl4-2	4.103e-13	9.549e-14	-12.387	-13.020	-0.633	(0)
Pb2OH+3	2.994e-16	1.126e-17	-15.524	-16.948	-1.425	(0)
Pb(OH)3-	5.761e-17	4.002e-17	-16.239	-16.398	-0.158	(0)
Pb(OH)4-2	2.600e-21	6.051e-22	-20.585	-21.218	-0.633	(0)
Pb3(OH)4+2	4.097e-23	9.535e-24	-22.387	-23.021	-0.633	(0)
Pb4(OH)4+4	6.410e-26	1.880e-28	-25.193	-27.726	-2.533	(0)
PbNO3+	0.000e+00	0.000e+00	-55.727	-55.885	-0.158	(0)
Pb(HS)2	0.000e+00	0.000e+00	-68.902	-68.902	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.016	-104.016	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.195	-105.354	-0.158	(0)
S(-2)	6.767e-38					
H2S	3.408e-38	3.408e-38	-37.467	-37.467	0.000	(0)
HS-	2.552e-38	1.773e-38	-37.593	-37.751	-0.158	(0)
CdHS+	7.901e-39	5.488e-39	-38.102	-38.261	-0.158	(0)
S5-2	1.643e-40	0.000e+00	-39.784	-40.418	-0.633	(0)
S6-2	0.000e+00	0.000e+00	-40.211	-40.844	-0.633	(0)
S4-2	0.000e+00	0.000e+00	-40.384	-41.017	-0.633	(0)
S3-2	0.000e+00	0.000e+00	-41.197	-41.830	-0.633	(0)
S2-2	0.000e+00	0.000e+00	-42.223	-42.856	-0.633	(0)
S-2	0.000e+00	0.000e+00	-47.962	-48.381	-0.419	(0)
HgHS2-	0.000e+00	0.000e+00	-65.728	-65.887	-0.158	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.095	-66.520	-0.424	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.281	-66.281	0.000	(0)
CuS4S5-3	0.000e+00	0.000e+00	-66.849	-67.250	-0.400	(0)
HgS2-2	0.000e+00	0.000e+00	-67.173	-67.806	-0.633	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-67.891	-68.049	-0.158	(0)
Cd(HS)2	0.000e+00	0.000e+00	-68.808	-68.808	0.000	(0)
Zn(HS)2	0.000e+00	0.000e+00	-68.827	-68.827	0.000	(0)
Pb(HS)2	0.000e+00	0.000e+00	-68.902	-68.902	0.000	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.999	-69.999	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.842	-97.000	-0.158	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.140	-103.299	-0.158	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-104.501	-104.659	-0.158	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.195	-105.354	-0.158	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.555	-105.713	-0.158	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-105.857	-106.490	-0.633	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.582	-140.215	-0.633	(0)

Zn(HS)4-2	0.000e+00	0.000e+00	-141.877	-142.510	-0.633	(0)
S(6)	1.642e-02					
S04-2	1.149e-02	4.336e-03	-1.940	-2.363	-0.423	(0)
MgS04	2.406e-03	2.406e-03	-2.619	-2.619	0.000	(0)
NaS04-	1.134e-03	8.968e-04	-2.945	-3.047	-0.102	(0)
CaS04	9.129e-04	9.129e-04	-3.040	-3.040	0.000	(0)
FeS04	3.647e-04	3.647e-04	-3.438	-3.438	0.000	(0)
KS04-	4.865e-05	3.848e-05	-4.313	-4.415	-0.102	(0)
MnS04	3.405e-05	3.405e-05	-4.468	-4.468	0.000	(0)
NH4S04-	2.244e-05	1.763e-05	-4.649	-4.754	-0.105	(0)
CoS04	6.634e-06	6.634e-06	-5.178	-5.178	0.000	(0)
NiS04	1.883e-06	1.883e-06	-5.725	-5.725	0.000	(0)
ZnS04	6.573e-07	6.573e-07	-6.182	-6.182	0.000	(0)
Zn(S04)2-2	1.104e-07	2.568e-08	-6.957	-7.590	-0.633	(0)
HS04-	7.844e-08	6.112e-08	-7.105	-7.214	-0.108	(0)
AlS04+	2.440e-08	1.901e-08	-7.613	-7.721	-0.108	(0)
PbS04	4.546e-09	4.546e-09	-8.342	-8.342	0.000	(0)
CdS04	2.945e-09	2.945e-09	-8.531	-8.531	0.000	(0)
Al(S04)2-	1.238e-09	9.649e-10	-8.907	-9.016	-0.108	(0)
Ni(S04)2-2	1.199e-09	2.791e-10	-8.921	-9.554	-0.633	(0)
Cd(S04)2-2	7.765e-10	1.807e-10	-9.110	-9.743	-0.633	(0)
Pb(S04)2-2	5.104e-10	1.188e-10	-9.292	-9.925	-0.633	(0)
CuS04	2.145e-10	2.145e-10	-9.669	-9.669	0.000	(0)
FeS04+	1.461e-14	1.148e-14	-13.835	-13.940	-0.105	(0)
Fe(S04)2-	1.582e-15	1.099e-15	-14.801	-14.959	-0.158	(0)
HgS04	9.012e-30	9.012e-30	-29.045	-29.045	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.775	-47.934	-0.158	(0)
Se(-2)	4.263e-09					
HSe-	4.256e-09	2.956e-09	-8.371	-8.529	-0.158	(0)
H2Se	3.667e-12	3.667e-12	-11.436	-11.436	0.000	(0)
MnSe	3.467e-12	3.467e-12	-11.460	-11.460	0.000	(0)
Se-2	5.994e-17	1.395e-17	-16.222	-16.855	-0.633	(0)
Se(4)	3.993e-07					
HSeO3-	3.728e-07	2.589e-07	-6.429	-6.587	-0.158	(0)
SeO3-2	2.648e-08	6.162e-09	-7.577	-8.210	-0.633	(0)
H2SeO3	1.737e-11	1.737e-11	-10.760	-10.760	0.000	(0)
FeHSeO3+2	6.940e-19	1.615e-19	-18.159	-18.792	-0.633	(0)
Cd(SeO3)2-2	4.318e-19	1.005e-19	-18.365	-18.998	-0.633	(0)
Se(6)	2.760e-21					
SeO4-2	2.743e-21	1.036e-21	-20.562	-20.985	-0.423	(0)
MnSeO4	1.196e-23	1.196e-23	-22.922	-22.922	0.000	(0)
CoSeO4	3.855e-24	3.855e-24	-23.414	-23.414	0.000	(0)
NiSeO4	1.008e-24	1.008e-24	-23.997	-23.997	0.000	(0)
ZnSeO4	1.150e-25	1.150e-25	-24.939	-24.939	0.000	(0)
HSeO4-	1.072e-26	7.445e-27	-25.970	-26.128	-0.158	(0)
CdSeO4	5.861e-28	5.861e-28	-27.232	-27.232	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.285	-45.918	-0.633	(0)
Zn	2.761e-06					
Zn+2	1.899e-06	7.169e-07	-5.721	-6.145	-0.423	(0)
ZnS04	6.573e-07	6.573e-07	-6.182	-6.182	0.000	(0)
Zn(S04)2-2	1.104e-07	2.568e-08	-6.957	-7.590	-0.633	(0)
ZnCl+	8.147e-08	6.291e-08	-7.089	-7.201	-0.112	(0)
ZnOHCl	5.238e-09	5.238e-09	-8.281	-8.281	0.000	(0)
ZnOH+	4.692e-09	3.259e-09	-8.329	-8.487	-0.158	(0)
ZnCl2	3.017e-09	3.017e-09	-8.520	-8.520	0.000	(0)
ZnCl3-	1.099e-10	8.484e-11	-9.959	-10.071	-0.112	(0)
Zn(OH)2	4.331e-11	4.331e-11	-10.363	-10.363	0.000	(0)
ZnCl4-2	3.877e-12	1.478e-12	-11.411	-11.830	-0.419	(0)
Zn(OH)3-	1.929e-14	1.340e-14	-13.715	-13.873	-0.158	(0)
Zn(OH)4-2	1.415e-19	3.294e-20	-18.849	-19.482	-0.633	(0)
ZnSeO4	1.150e-25	1.150e-25	-24.939	-24.939	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.285	-45.918	-0.633	(0)
ZnNO3+	0.000e+00	0.000e+00	-53.956	-54.115	-0.158	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-67.891	-68.049	-0.158	(0)
Zn(HS)2	0.000e+00	0.000e+00	-68.827	-68.827	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.140	-103.299	-0.158	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.207	-103.207	0.000	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-105.857	-106.490	-0.633	(0)

Zn(HS)4-2 0.000e+00 0.000e+00 -141.877 -142.510 -0.633 (0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-124.13	-117.86	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-28.52	-23.98	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.78	-23.98	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-179.35	-161.42	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.72	-20.61	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-28.28	-27.83	0.45	(NH4)2SeO4
Al(OH)3(am)	0.12	11.18	11.06	Al(OH)3
Al2O3	2.10	22.37	20.27	Al2O3
Al4(OH)10SO4	6.09	28.79	22.70	Al4(OH)10SO4
AlOHSO4	-1.53	-4.76	-3.23	AlOHSO4
Alunite	6.46	5.56	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.21	-11.03	-7.82	PbSO4
Anhydrite	-1.04	-5.38	-4.34	CaSO4
Anilite	-13.04	-45.35	-32.31	Cu0.25Cu1.5S
Antlerite	-12.94	-4.15	8.79	Cu3(OH)4SO4
Atacamite	-7.98	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.75	-8.51	-1.76	ZnSO4:6H2O
Birnessite	-18.86	-0.76	18.09	MnO2
Bixbyite	-16.78	-17.13	-0.35	Mn2O3
BlaubleiI	-17.08	-41.24	-24.16	Cu0.9Cu0.2S
BlaubleiII	-15.86	-43.14	-27.28	Cu0.6Cu0.8S
Boehmite	2.32	11.18	8.86	AlOOH
Brochantite	-15.92	-0.22	15.71	Cu4(OH)6SO4
Brucite	-6.04	11.07	17.12	Mg(OH)2
Bunsenite	-4.76	7.93	12.68	NiO
Ca3(PO4)2(beta)	-2.61	-31.66	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-5.69	-52.77	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.76	-21.11	-19.35	CaHP04
CaHP04:2H2O	-2.06	-21.11	-19.05	CaHP04:2H2O
Calomel	-14.04	-32.16	-18.13	Hg2Cl2
CaSeO3:2H2O	-5.68	-2.82	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-21.01	-24.01	-3.00	CaSeO4:2H2O
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-23.41	-16.70	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-23.32	-0.76	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-15.55	-48.15	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-24.11	4.29	28.40	Cd4(OH)6SO4
CdCl2	-10.79	-11.40	-0.61	CdCl2
CdCl2:1H2O	-9.73	-11.41	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-9.48	-11.41	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.24	-10.54	13.69	Cd
Cdmetal(gamma)	-24.34	-10.54	13.80	Cd
CdOHCl	-6.78	-3.17	3.61	CdOHCl
CdSe	10.12	-10.26	-20.38	CdSe
CdSeO4:2H2O	-27.65	-29.50	-1.85	CdSeO4:2H2O
CdSO4	-10.83	-10.88	-0.05	CdSO4
CdSO4:1H2O	-9.23	-10.88	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-9.05	-10.88	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.36	-12.01	-2.65	CuSO4:5H2O
Chalcocite	-11.61	-46.93	-35.32	Cu2S
Chalcopyrite	-39.39	-75.02	-35.62	CuFeS2
Cinnabar	-19.96	-66.26	-46.30	HgS
Clausthalite	16.97	-10.41	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.04	-16.13	-2.09	Co(OH)3
Co3(PO4)2	-3.22	-37.90	-34.69	Co3(PO4)2
Co3O4	-13.53	-23.77	-10.24	Co3O4
CoCl2	-16.45	-7.99	8.46	CoCl2
CoCl2:6H2O	-10.51	-7.99	2.52	CoCl2:6H2O
CoFe2O4	21.22	18.07	-3.15	CoFe2O4
CoHP04	-4.13	-23.19	-19.06	CoHP04

CoO	-5.36	8.48	13.84	CoO
CoS(alpha)	-28.62	-36.06	-7.44	CoS
CoS(beta)	-24.99	-36.06	-11.07	CoS
CoSe	9.36	-6.84	-16.20	CoSe
CoSeO3	-6.22	-4.90	1.32	CoSeO3
CoSeO4:6H2O	-24.56	-26.09	-1.53	CoSeO4:6H2O
CoSO4	-10.45	-7.46	2.99	CoSO4
CoSO4:6H2O	-4.99	-7.47	-2.48	CoSO4:6H2O
Cotunnite	-6.71	-11.56	-4.84	PbCl2
Covellite	-18.08	-40.61	-22.53	CuS
Cu(OH)2	-4.88	3.93	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.73	-47.31	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.60	-17.71	-46.31	Cu2Se
Cu2SO4	-16.43	-18.33	-1.90	Cu2SO4
Cu3(PO4)2	-14.69	-51.54	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-16.42	-51.54	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	35.21	-29.09	-64.30	Cu3Se2
Cumetal	-0.07	-9.00	-8.93	Cu
CuOCuSO4	-18.71	-8.08	10.63	CuOCuSO4
Cupricferrite	7.04	13.52	6.49	CuFe2O4
Cuprite	-1.28	-2.39	-1.11	Cu2O
Cuprousferrite	12.48	3.60	-8.88	CuFeO2
CuSe	22.00	-11.39	-33.39	CuSe
CuSe2	22.60	-11.10	-33.70	CuSe2
CuSeO3:2H2O	-10.04	-9.45	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-28.19	-30.63	-2.44	CuSeO4:5H2O
CuSO4	-15.12	-12.01	3.11	CuSO4
Diaspore	4.06	11.18	7.12	AlOOH
Djurleite	-12.12	-46.51	-34.40	Cu0.066Cu1.868S
Epsomite	-2.72	-4.87	-2.15	MgSO4:7H2O
Fe(OH)2	-3.43	10.13	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.37	2.33	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-5.34	-3.78	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-9.91	-30.53	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-35.07	-38.22	-3.16	Fe2(SO4)3
Fe3(OH)8	-0.50	19.72	20.22	Fe3(OH)8
Ferrihydrite	1.43	4.80	3.37	Fe(OH)3
Ferroselite	13.81	-4.90	-18.71	FeSe2
FeS(ppt)	-31.49	-34.41	-2.92	FeS
FeSe	5.82	-5.19	-11.00	FeSe
Galena	-25.47	-39.63	-14.16	PbS
Gibbsite	2.66	11.18	8.52	Al(OH)3
Goethite	4.16	4.80	0.64	FeOOH
Goslarite	-6.47	-8.51	-2.05	ZnSO4:7H2O
Greenockite	-24.99	-39.48	-14.49	CdS
Greigite	-113.40	-158.43	-45.03	Fe3S4
Gypsum	-0.77	-5.38	-4.61	CaSO4:2H2O
H-Jarosite	-5.94	-17.49	-11.55	(H3O)Fe3(SO4)2(OH)6
H2S(g)	-36.53	-44.54	-8.01	H2S
H2Se(g)	-10.39	-15.32	-4.92	H2Se
Halite	-4.45	-2.86	1.59	NaCl
Hausmannite	-18.71	43.33	62.03	Mn3O4
Hematite	10.70	9.59	-1.11	Fe2O3
Hercynite	8.85	32.50	23.64	FeAl2O4
Hg(g)	-7.72	-15.65	-7.93	Hg
Hg(OH)2	-18.22	-21.72	-3.50	Hg(OH)2
Hg2(g)	-16.21	-31.30	-15.09	Hg2
Hg2(OH)2	-20.96	-15.70	5.26	Hg2(OH)2
Hg2HP04	-22.59	-47.37	-24.77	Hg2HP04
Hg2S	-48.40	-60.24	-11.84	Hg2S
Hg2SeO3	-24.42	-29.08	-4.66	Hg2SeO3
Hg2SO4	-25.50	-31.64	-6.14	Hg2SO4
HgCl(g)	-35.97	-16.08	19.88	HgCl
HgCl2	-16.66	-38.18	-21.52	HgCl2
Hgmetal(l)	-2.00	-15.65	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSeO3	-22.66	-35.09	-12.43	HgSeO3
HgSO4	-28.20	-37.66	-9.45	HgSO4

Hinsdalite	-6.65	-9.15	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	2.12	-42.21	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-7.67	-70.46	-62.79	Pb5(P04)3OH
K-Alum	-11.57	-16.81	-5.24	KAl(S04)2:12H2O
K-Jarosite	0.89	-13.59	-14.49	KFe3(S04)2(OH)6
K2Se04	-26.04	-26.77	-0.73	K2Se04
Langite	-18.10	-0.22	17.88	Cu4(OH)6S04:H2O
Larnakite	-5.74	-6.13	-0.38	PbO:PbS04
Laurionite	-3.95	-3.33	0.62	PbOHCl
Lepidocrocite	3.43	4.80	1.37	Fe00H
Lime	-22.60	10.56	33.16	CaO
Litharge	-7.94	4.91	12.85	PbO
Mackinawite	-30.81	-34.41	-3.60	FeS
Maghemite	3.21	9.59	6.39	Fe2O3
Magnesioferrite	3.14	20.67	17.52	Fe2Mg04
Magnetite	15.82	19.72	3.90	Fe3O4
Manganite	-8.30	17.04	25.34	Mn00H
Massicot	-8.15	4.91	13.05	PbO
Melanothallite	-18.94	-12.53	6.41	CuCl2
Melanterite	-3.56	-5.82	-2.26	FeS04:7H2O
Metacinnabar	-20.56	-66.26	-45.70	HgS
Mg(OH)2(active)	-7.72	11.07	18.79	Mg(OH)2
Mg3(P04)2	-6.83	-30.11	-23.28	Mg3(P04)2
MgHP04:3H2O	-2.42	-20.59	-18.18	MgHP04:3H2O
MgSe03:6H2O	-5.35	-2.31	3.04	MgSe03:6H2O
MgSe04:6H2O	-22.29	-23.49	-1.20	MgSe04:6H2O
Minium	-44.21	30.32	74.53	Pb3O4
Mirabilite	-3.89	-5.20	-1.30	Na2S04:10H2O
Mn2(S04)3	-59.62	-64.95	-5.32	Mn2(S04)3
Mn3(P04)2	-11.76	-35.60	-23.85	Mn3(P04)2
MnCl2:4H2O	-9.97	-7.23	2.74	MnCl2:4H2O
MnHP04	2.98	-22.42	-25.40	MnHP04
MnS(grn)	-35.54	-35.30	0.25	MnS
MnS(pnk)	-38.64	-35.30	3.34	MnS
MnSe	-9.81	-6.08	3.73	MnSe
MnSe03	-5.26	-4.13	1.13	MnSe03
MnSe03:2H2O	-5.10	-4.13	0.96	MnSe03:2H2O
MnSe04:5H2O	-23.27	-25.32	-2.05	MnSe04:5H2O
MnS04	-9.43	-6.70	2.74	MnS04
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.17	-21.72	-3.55	HgO
Morenosite	-5.84	-8.02	-2.17	NiS04:7H2O
Na-Jarosite	-1.28	-12.11	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-12.93	-2.63	10.30	Na2Se03:5H2O
Na2Se04	-25.09	-23.81	1.28	Na2Se04
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.10	7.93	13.02	Ni(OH)2
Ni3(P04)2	-8.25	-39.55	-31.30	Ni3(P04)2
Ni4(OH)6S04	-16.23	15.77	32.00	Ni4(OH)6S04
NiS(alpha)	-31.01	-36.61	-5.60	NiS
NiS(beta)	-25.51	-36.61	-11.10	NiS
NiS(gamma)	-23.81	-36.61	-12.80	NiS
NiSe	10.31	-7.39	-17.70	NiSe
NiSe03:2H2O	-8.34	-5.45	2.89	NiSe03:2H2O
NiSe04:6H2O	-25.12	-26.64	-1.52	NiSe04:6H2O
Nsutite	-18.27	-0.76	17.50	MnO2
O2(g)	-53.25	31.20	84.45	O2
Pb(OH)2	-3.38	4.91	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.21	1.58	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-16.38	9.81	26.19	Pb2O(OH)2
Pb2O3	-35.63	25.41	61.04	Pb2O3
Pb3(P04)2	-5.08	-48.61	-43.53	Pb3(P04)2
Pb3O2S04	-12.09	-1.22	10.87	Pb3O2S04
Pb4(OH)6S04	-17.42	3.68	21.10	Pb4(OH)6S04
Pb4O3S04	-18.51	3.69	22.20	Pb4O3S04
PbHP04	-2.95	-26.76	-23.81	PbHP04
Pbmetal	-14.94	-10.69	4.24	Pb
PbO:0.3H2O	-8.07	4.91	12.98	PbO:0.33H2O

PbSeO4	-22.78	-29.65	-6.88	PbSeO4
Periclase	-10.87	11.07	21.94	MgO
Plattnerite	-29.80	20.51	50.31	PbO2
Plumbgummite	7.91	-24.88	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-12.56	10.56	23.11	Ca(OH)2
Pyrite	-44.72	-63.35	-18.63	FeS2
Pyrochroite	-6.18	9.24	15.43	Mn(OH)2
Pyrolusite	-17.19	24.84	42.03	MnO2
Pyromorphite	5.74	-78.69	-84.43	Pb5(PO4)3Cl
Retgersite	-5.97	-8.02	-2.05	NiSO4:6H2O
Semetal(am)	7.42	0.28	-7.14	Se
Semetal(hex)	8.03	0.28	-7.75	Se
SeO2	-13.50	-13.37	0.12	SeO2
SeO3	-55.95	-34.56	21.39	SeO3
Sphalerite	-25.59	-37.11	-11.52	ZnS
Spinel	-4.33	33.44	37.77	MgAl2O4
Strengite	-0.49	-26.87	-26.38	FePO4:2H2O
Sulfur	-26.83	-28.94	-2.11	S
Tenorite	-3.87	3.93	7.80	CuO
Thenardite	-5.53	-5.19	0.34	Na2SO4
Tsumebite	-8.13	-17.92	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	3.05	-32.95	-36.00	Fe3(PO4)2:8H2O
Wurtzite	-28.11	-37.11	-9.00	ZnS
Zincite	-4.12	7.43	11.55	ZnO
Zincosite	-12.63	-8.51	4.13	ZnSO4
Zn(NO3)2:6H2O	-106.17	-102.91	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.77	7.43	12.20	Zn(OH)2
Zn(OH)2(am)	-5.24	7.43	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.52	7.43	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.30	7.43	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.30	7.43	11.73	Zn(OH)2
Zn2(OH)2SO4	-8.58	-1.08	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.56	6.63	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-5.62	-41.04	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-29.11	-9.58	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-14.62	13.78	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.81	20.69	38.50	Zn5(OH)8Cl2
ZnCl2	-16.25	-9.03	7.22	ZnCl2
Znmetal	-34.32	-8.17	26.15	Zn
ZnO(active)	-3.97	7.43	11.40	ZnO
ZnS(am)	-28.02	-37.11	-9.09	ZnS
ZnSe	6.58	-7.89	-14.46	ZnSe
ZnSeO4:6H2O	-25.62	-27.14	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.98	-8.51	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 7.

SOLUTION 5 # Mean Groundwater quality

temp 21
pH 6.79
pe 1
redox pe
units mg/l
density 1
Al 0.37
Alkalinity 0
As 0
Ba 0
Be 0

```

B      0
Cd     0.003
Co     2.34
Cr     0
Cu     0.31
Fe     100.34
Pb     0.003
Mn     12.2
Mo     0
V      0
Zn     0.17
Se     0.03
Ni     0.45
N      7
P      0.68
Ca     130
Mg     246
Na     1094
K      62
Cl     1533
S(6)   1485
Hg     0.0002
water  1 # kg
MIX 4
  1    0.934
  5    0.066
REACTION 5
H2O -1
  3
END #Time-step 5

```

Beginning of initial solution calculations.

Initial solution 5.

-----Solution composition-----

Elements	Molality	Moles
Al	1.378e-05	1.378e-05
Ca	3.259e-03	3.259e-03
Cd	2.681e-08	2.681e-08
Cl	4.344e-02	4.344e-02
Co	3.989e-05	3.989e-05
Cu	4.901e-06	4.901e-06
Fe	1.805e-03	1.805e-03
Hg	1.002e-09	1.002e-09
K	1.593e-03	1.593e-03
Mg	1.017e-02	1.017e-02
Mn	2.231e-04	2.231e-04
N	5.021e-04	5.021e-04
Na	4.781e-02	4.781e-02
Ni	7.703e-06	7.703e-06
P	2.206e-05	2.206e-05
Pb	1.455e-08	1.455e-08
S(6)	1.553e-02	1.553e-02
Se	3.817e-07	3.817e-07
Zn	2.612e-06	2.612e-06

-----Description of solution-----

```

pH = 6.790
pe = 1.000
Activity of water = 0.998
Ionic strength (mol/kgw) = 9.259e-02
Mass of water (kg) = 1.000e+00
Total alkalinity (eq/kg) = 6.274e-05

```

Total carbon (mol/kg) = 0.000e+00
 Total CO2 (mol/kg) = 0.000e+00
 Temperature (°C) = 21.00
 Electrical balance (eq) = 6.374e-03
 Percent error, $100 \cdot (\text{Cat} - |\text{An}|) / (\text{Cat} + |\text{An}|)$ = 4.58
 Iterations = 13
 Total H = 1.110158e+02
 Total O = 5.556909e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.061e-07	1.622e-07	-6.686	-6.790	-0.104	0.00
OH-	5.935e-08	4.562e-08	-7.227	-7.341	-0.114	(0)
H2O	5.551e+01	9.980e-01	1.744	-0.001	0.000	18.05
Al	1.378e-05					
Al(OH)4-	8.973e-06	7.024e-06	-5.047	-5.153	-0.106	(0)
Al(OH)2+	2.373e-06	1.884e-06	-5.625	-5.725	-0.100	(0)
Al(OH)3	2.329e-06	2.329e-06	-5.633	-5.633	0.000	(0)
AlOH2+	7.409e-08	2.945e-08	-7.130	-7.531	-0.401	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
Al+3	5.344e-09	6.178e-10	-8.272	-9.209	-0.937	(0)
Al(SO4)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ca	3.259e-03					
Ca+2	2.406e-03	9.221e-04	-2.619	-3.035	-0.416	(0)
CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CaOH+	1.001e-09	8.020e-10	-8.999	-9.096	-0.096	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
Cd	2.681e-08					
CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
Cd+2	7.874e-09	3.018e-09	-8.104	-8.520	-0.416	(0)
CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
Cd(SO4)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
CdOH+	1.568e-12	1.100e-12	-11.805	-11.959	-0.154	(0)
Cd(OH)2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
Cd2OH+3	4.264e-19	1.748e-20	-18.370	-19.758	-1.387	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Cd(OH)3-	3.135e-21	2.198e-21	-20.504	-20.658	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Cd(OH)4-2	9.222e-29	2.230e-29	-28.035	-28.652	-0.617	(0)
CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cl	4.344e-02					
Cl-	4.343e-02	3.417e-02	-1.362	-1.466	-0.104	(0)
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)

PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(2)	3.989e-05					
Co+2	3.225e-05	7.797e-06	-4.491	-5.108	-0.617	(0)
CoS04	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CoHP04	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CoOH+	1.375e-08	9.639e-09	-7.862	-8.016	-0.154	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
Co(OH)2	4.744e-11	4.744e-11	-10.324	-10.324	0.000	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Co2OH+3	9.190e-14	3.766e-15	-13.037	-14.424	-1.387	(0)
Co(OH)3-	8.364e-17	5.865e-17	-16.078	-16.232	-0.154	(0)
Co0OH-	5.039e-18	3.533e-18	-17.298	-17.452	-0.154	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Co4(OH)4+4	5.041e-22	1.722e-24	-21.297	-23.764	-2.466	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
CoSe04	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
Co(OH)4-2	2.382e-24	5.759e-25	-23.623	-24.240	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Co(3)	4.042e-31					
CoOH+2	4.042e-31	9.773e-32	-30.393	-31.010	-0.617	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co+3	2.685e-36	3.104e-37	-35.571	-36.508	-0.937	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
Cu(1)	4.900e-06					
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
Cu+	1.553e-08	1.089e-08	-7.809	-7.963	-0.154	(0)
Cu(2)	8.967e-10					
Cu+2	6.026e-10	2.310e-10	-9.220	-9.636	-0.416	(0)
CuS04	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
CuOH+	4.792e-11	3.719e-11	-10.319	-10.430	-0.110	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
Cu(OH)2	5.595e-13	5.595e-13	-12.252	-12.252	0.000	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
Cu2(OH)2+2	1.398e-16	3.379e-17	-15.855	-16.471	-0.617	(0)
Cu(OH)3-	1.014e-16	7.111e-17	-15.994	-16.148	-0.154	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)

CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
Cu(OH)4-2	1.434e-22	3.468e-23	-21.843	-22.460	-0.617	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Fe(2)	1.805e-03					
Fe+2	1.454e-03	3.515e-04	-2.837	-3.454	-0.617	(0)
FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
FeHP04	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
FeOH+	8.090e-07	6.384e-07	-6.092	-6.195	-0.103	(0)
Fe(OH)2	2.214e-11	2.214e-11	-10.655	-10.655	0.000	(0)
Fe(OH)3-	5.296e-13	4.179e-13	-12.276	-12.379	-0.103	(0)
Fe(3)	3.233e-07					
Fe(OH)2+	3.138e-07	2.491e-07	-6.503	-6.604	-0.100	(0)
Fe(OH)3	9.382e-09	9.382e-09	-8.028	-8.028	0.000	(0)
Fe(OH)4-	1.205e-10	9.565e-11	-9.919	-10.019	-0.100	(0)
FeOH+2	2.119e-11	8.217e-12	-10.674	-11.085	-0.411	(0)
FeHP04+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeSO4+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe+3	2.235e-15	2.584e-16	-14.651	-15.588	-0.937	(0)
Fe(SO4)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
Fe2(OH)2+4	7.548e-19	2.579e-21	-18.122	-20.589	-2.466	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
Fe3(OH)4+5	6.361e-23	8.906e-27	-22.197	-26.050	-3.854	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
H(0)	3.796e-19					
H2	1.898e-19	1.939e-19	-18.722	-18.712	0.009	(0)
Hg(0)	1.002e-09					
Hg	1.002e-09	1.002e-09	-8.999	-8.999	0.000	(0)
Hg(1)	3.697e-29					
Hg2+2	1.848e-29	4.469e-30	-28.733	-29.350	-0.617	(0)
Hg(2)	2.362e-18					
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
Hg(OH)2	1.682e-22	1.718e-22	-21.774	-21.765	0.009	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
HgOH+	2.768e-26	1.941e-26	-25.558	-25.712	-0.154	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Hg+2	3.648e-29	8.820e-30	-28.438	-29.055	-0.617	(0)
HgSO4	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Hg(OH)3-	1.911e-30	1.340e-30	-29.719	-29.873	-0.154	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
K	1.593e-03					
K+	1.549e-03	1.219e-03	-2.810	-2.914	-0.104	(0)
KSO4-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
Mg	1.017e-02					
Mg+2	7.920e-03	3.036e-03	-2.101	-2.518	-0.416	(0)
MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
MgOH+	6.402e-08	5.162e-08	-7.194	-7.287	-0.094	(0)
MgPO4-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
Mn(2)	2.231e-04					
Mn+2	1.882e-04	4.549e-05	-3.725	-4.342	-0.617	(0)
MnSO4	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)

MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
MnOH+	6.606e-09	5.213e-09	-8.180	-8.283	-0.103	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Mn(OH)3-	2.129e-19	1.680e-19	-18.672	-18.775	-0.103	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
Mn(OH)4-2	8.666e-26	3.361e-26	-25.062	-25.474	-0.411	(0)
MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Mn(3)	9.732e-29					
Mn+3	9.732e-29	1.125e-29	-28.012	-28.949	-0.937	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-65.730	-66.142	-0.411	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-74.661	-74.779	-0.119	(0)
N(-3)	5.021e-04					
NH4+	4.805e-04	3.617e-04	-3.318	-3.442	-0.123	(0)
NH4SO4-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
NH3	9.560e-07	9.560e-07	-6.020	-6.020	0.000	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
N(3)	1.148e-35					
NO2-	1.148e-35	8.735e-36	-34.940	-35.059	-0.119	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-48.382	-48.486	-0.104	(0)
CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
Na	4.781e-02					
Na+	4.677e-02	3.680e-02	-1.330	-1.434	-0.104	(0)
NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
Ni	7.703e-06					
Ni+2	5.664e-06	2.171e-06	-5.247	-5.663	-0.416	(0)

NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
NiOH+	1.818e-09	1.275e-09	-8.741	-8.895	-0.154	(0)
Ni(SO4)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
Ni(OH)2	8.335e-12	8.335e-12	-11.079	-11.079	0.000	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Ni(OH)3-	7.365e-16	5.164e-16	-15.133	-15.287	-0.154	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.993	-55.984	0.009	(0)
P	2.206e-05					
H2PO4-	6.634e-06	5.268e-06	-5.178	-5.278	-0.100	(0)
HPO4-2	5.222e-06	2.025e-06	-5.282	-5.694	-0.411	(0)
MgHPO4	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
FeHPO4	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
KHPO4-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
CoHPO4	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
MgPO4-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
H3PO4	1.150e-10	1.150e-10	-9.939	-9.939	0.000	(0)
PO4-3	4.196e-11	4.850e-12	-10.377	-11.314	-0.937	(0)
FeHPO4+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
Pb	1.455e-08					
Pb+2	5.480e-09	2.100e-09	-8.261	-8.678	-0.416	(0)
PbSO4	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
PbOH+	4.662e-10	3.269e-10	-9.331	-9.486	-0.154	(0)
Pb(SO4)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
Pb(OH)2	6.405e-13	6.405e-13	-12.193	-12.193	0.000	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
Pb2OH+3	2.655e-16	1.088e-17	-15.576	-16.963	-1.387	(0)
Pb(OH)3-	5.660e-17	3.969e-17	-16.247	-16.401	-0.154	(0)
Pb(OH)4-2	2.491e-21	6.022e-22	-20.604	-21.220	-0.617	(0)
Pb3(OH)4+2	3.779e-23	9.137e-24	-22.423	-23.039	-0.617	(0)
Pb4(OH)4+4	5.175e-26	1.768e-28	-25.286	-27.753	-2.466	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
S(6)	1.553e-02					
SO4-2	1.094e-02	4.194e-03	-1.961	-2.377	-0.416	(0)
MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
MnSO4	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
NH4SO4-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
CoSO4	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
ZnSO4	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(SO4)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
HSO4-	7.527e-08	5.892e-08	-7.123	-7.230	-0.106	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
PbSO4	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
Al(SO4)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ni(SO4)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
Cd(SO4)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)

Pb(SO4)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
CuSO4	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
FeSO4+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe(SO4)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
HgSO4	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Se(-2)	4.685e-09					
HSe-	4.677e-09	3.279e-09	-8.330	-8.484	-0.154	(0)
H2Se	4.054e-12	4.054e-12	-11.392	-11.392	0.000	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Se-2	6.423e-17	1.553e-17	-16.192	-16.809	-0.617	(0)
Se(4)	3.770e-07					
HSeO3-	3.526e-07	2.472e-07	-6.453	-6.607	-0.154	(0)
SeO3-2	2.442e-08	5.904e-09	-7.612	-8.229	-0.617	(0)
H2SeO3	1.653e-11	1.653e-11	-10.782	-10.782	0.000	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Se(6)	2.478e-21					
SeO4-2	2.463e-21	9.439e-22	-20.609	-21.025	-0.416	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
HSeO4-	9.645e-27	6.763e-27	-26.016	-26.170	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
Zn	2.612e-06					
Zn+2	1.813e-06	6.948e-07	-5.742	-6.158	-0.416	(0)
ZnSO4	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(SO4)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
ZnOH+	4.520e-09	3.170e-09	-8.345	-8.499	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
Zn(OH)2	4.227e-11	4.227e-11	-10.374	-10.374	0.000	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
Zn(OH)3-	1.872e-14	1.131e-14	-13.728	-13.882	-0.154	(0)
Zn(OH)4-2	1.339e-19	3.238e-20	-18.873	-19.490	-0.617	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	124.48	-118.20	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-28.70	-24.17	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.96	-24.17	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-179.81	-161.88	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.93	-20.82	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-28.36	-27.91	0.45	(NH4)2SeO4
Al(OH)3(am)	0.09	11.16	11.06	Al(OH)3
Al2O3	2.05	22.32	20.27	Al2O3
Al4(OH)10SO4	5.98	28.68	22.70	Al4(OH)10SO4
AlOHSO4	-1.57	-4.80	-3.23	AlOHSO4
Alunite	6.34	5.44	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.24	-11.06	-7.82	PbSO4
Anhydrite	-1.07	-5.41	-4.34	CaSO4
Antlerite	-12.92	-4.13	8.79	Cu3(OH)4SO4
Atacamite	-7.99	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.78	-8.54	-1.76	ZnSO4·6H2O
Birnessite	-18.88	-0.79	18.09	MnO2
Bixbyite	-16.81	-17.16	-0.35	Mn2O3
Boehmite	2.30	11.16	8.86	AlOOH
Brochantite	-15.89	-0.19	15.71	Cu4(OH)6SO4

Brucite	-6.06	11.06	17.12	Mg(OH)2
Bunsenite	-4.77	7.92	12.68	NiO
Ca3(P04)2(beta)	-2.69	-31.73	-29.05	Ca3(P04)2
Ca4H(P04)3:3H2O	-5.80	-52.88	-47.08	Ca4H(P04)3:3H2O
CaHP04	-1.79	-21.14	-19.35	CaHP04
CaHP04:2H2O	-2.09	-21.14	-19.05	CaHP04:2H2O
Calomel	-14.15	-32.28	-18.13	Hg2Cl2
CaSe03:2H2O	-5.71	-2.85	2.86	CaSe03:2H2O
CaSe04:2H2O	-21.06	-24.06	-3.00	CaSe04:2H2O
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2
Cd3(OH)2(S04)2	-23.45	-16.74	6.71	Cd3(OH)2(S04)2
Cd3(OH)4S04	-23.34	-0.78	22.56	Cd3(OH)4S04
Cd3(P04)2	-15.59	-48.19	-32.60	Cd3(P04)2
Cd4(OH)6S04	-24.12	4.28	28.40	Cd4(OH)6S04
CdCl2	-10.84	-11.45	-0.61	CdCl2
CdCl2:1H2O	-9.78	-11.45	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-9.52	-11.46	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.21	-10.52	13.69	Cd
Cdmetal(gamma)	-24.32	-10.52	13.80	Cd
CdOHCl	-6.81	-3.20	3.61	CdOHCl
CdSe	10.17	-10.21	-20.38	CdSe
CdSe04:2H2O	-27.70	-29.55	-1.85	CdSe04:2H2O
CdS04	-10.85	-10.90	-0.05	CdS04
CdS04:1H2O	-9.25	-10.90	-1.65	CdS04:1H2O
CdS04:2.67H2O	-9.07	-10.90	-1.83	CdS04:2.67H2O
Chalcanthite	-9.36	-12.02	-2.65	CuS04:5H2O
Clausthalite	17.01	-10.37	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.05	-16.14	-2.09	Co(OH)3
Co3(P04)2	-3.27	-37.95	-34.69	Co3(P04)2
Co304	-13.57	-23.81	-10.24	Co304
CoCl2	-16.50	-8.04	8.46	CoCl2
CoCl2:6H2O	-10.56	-8.05	2.52	CoCl2:6H2O
CoFe204	21.18	18.03	-3.15	CoFe204
CoHP04	-4.15	-23.21	-19.06	CoHP04
CoO	-5.37	8.47	13.84	CoO
CoSe	9.40	-6.80	-16.20	CoSe
CoSe03	-6.24	-4.92	1.32	CoSe03
CoSe04:6H2O	-24.61	-26.14	-1.53	CoSe04:6H2O
CoS04	-10.48	-7.49	2.99	CoS04
CoS04:6H2O	-5.02	-7.49	-2.48	CoS04:6H2O
Cotunnite	-6.77	-11.61	-4.84	PbCl2
Cu(OH)2	-4.87	3.94	8.81	Cu(OH)2
Cu2(OH)3N03	-56.82	-47.39	9.42	Cu2(OH)3N03
Cu2Se(alpha)	28.69	-17.62	-46.31	Cu2Se
Cu2S04	-16.40	-18.30	-1.90	Cu2S04
Cu3(P04)2	-14.69	-51.54	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-16.42	-51.54	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.35	-28.95	-64.30	Cu3Se2
Cumetal	-0.04	-8.96	-8.93	Cu
Cu0CuS04	-18.70	-8.07	10.63	Cu0CuS04
Cupricferrite	7.02	13.50	6.49	CuFe204
Cuprite	-1.24	-2.35	-1.11	CuFe20
Cuprousferrite	12.49	3.61	-8.88	CuFe02
CuSe	22.06	-11.33	-33.39	CuSe
CuSe2	22.68	-11.02	-33.70	CuSe2
CuSe03:2H2O	-10.05	-9.46	0.60	CuSe03:2H2O
CuSe04:5H2O	-28.23	-30.67	-2.44	CuSe04:5H2O
CuS04	-15.13	-12.01	3.11	CuS04
Diaspore	4.04	11.16	7.12	Al00H
Epsomite	-2.75	-4.90	-2.15	MgS04:7H2O
Fe(OH)2	-3.44	10.12	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.34	2.30	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-5.39	-3.84	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H2O	-10.00	-30.63	-20.63	Fe2(Se03)3:2H2O
Fe2(S04)3	-35.15	-38.31	-3.16	Fe2(S04)3
Fe3(OH)8	-0.54	19.68	20.22	Fe3(OH)8

Ferrihydrite	1.41	4.78	3.37	Fe(OH)3
Ferroselite	13.87	-4.84	-18.71	FeSe2
FeSe	5.86	-5.15	-11.00	FeSe
Gibbsite	2.64	11.16	8.52	Al(OH)3
Goethite	4.15	4.78	0.64	FeOOH
Goslarite	-6.50	-8.54	-2.05	ZnSO4:7H2O
Gypsum	-0.80	-5.41	-4.61	CaSO4:2H2O
H-Jarosite	-6.02	-17.57	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-10.35	-15.27	-4.92	H2Se
Halite	-4.49	-2.90	1.59	NaCl
Hausmannite	-18.74	43.29	62.03	Mn3O4
Hematite	10.67	9.56	-1.11	Fe2O3
Hercynite	8.80	32.44	23.64	FeAl2O4
Hg(g)	-7.75	-15.67	-7.93	Hg
Hg(OH)2	-18.27	-21.76	-3.50	Hg(OH)2
Hg2(g)	-16.26	-31.35	-15.09	Hg2
Hg2(OH)2	-21.03	-15.77	5.26	Hg2(OH)2
Hg2HPO4	-22.68	-47.45	-24.77	Hg2HPO4
Hg2SeO3	-24.51	-29.17	-4.66	Hg2SeO3
Hg2SO4	-25.58	-31.73	-6.14	Hg2SO4
HgCl(g)	-36.02	-16.14	19.88	HgCl
HgCl2	-16.76	-38.28	-21.52	HgCl2
Hgmetal(l)	-2.02	-15.67	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSeO3	-22.73	-35.16	-12.43	HgSeO3
HgSO4	-28.27	-37.72	-9.45	HgSO4
Hinsdalite	-6.76	-9.26	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	2.00	-42.33	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-7.75	-70.54	-62.79	Pb5(PO4)3OH
K-Alum	-11.65	-16.89	-5.24	KAl(SO4)2:12H2O
K-Jarosite	0.79	-13.70	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-26.12	-26.85	-0.73	K2SeO4
Langite	-18.07	-0.19	17.88	Cu4(OH)6SO4:H2O
Larnakite	-5.77	-6.15	-0.38	PbO:PbSO4
Laurionite	-3.98	-3.35	0.62	PbOHCl
Lepidocrocite	3.41	4.78	1.37	FeOOH
Lime	-22.62	10.54	33.16	CaO
Litharge	-7.95	4.90	12.85	PbO
Maghemite	3.18	9.56	6.39	Fe2O3
Magnesioferrite	3.10	20.62	17.52	Fe2MgO4
Magnetite	15.79	19.69	3.90	Fe3O4
Manganite	-8.31	17.03	25.34	MnOOH
Massicot	-8.15	4.90	13.05	PbO
Melanothallite	-18.98	-12.57	6.41	CuCl2
Melanterite	-3.58	-5.84	-2.26	FeSO4:7H2O
Mg(OH)2(active)	-7.73	11.06	18.79	Mg(OH)2
Mg3(PO4)2	-6.90	-30.18	-23.28	Mg3(PO4)2
MgHP04:3H2O	-2.45	-20.62	-18.18	MgHP04:3H2O
MgSeO3:6H2O	-5.38	-2.34	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-22.35	-23.55	-1.20	MgSeO4:6H2O
Minium	-44.24	30.28	74.53	Pb3O4
Mirabilite	-3.95	-5.25	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-59.71	-65.03	-5.32	Mn2(SO4)3
Mn3(PO4)2	-11.81	-35.65	-23.85	Mn3(PO4)2
MnCl2:4H2O	-10.02	-7.28	2.74	MnCl2:4H2O
MnHP04	2.95	-22.45	-25.40	MnHP04
MnSe	-9.77	-6.04	3.73	MnSe
MnSeO3	-5.29	-4.16	1.13	MnSeO3
MnSeO3:2H2O	-5.12	-4.16	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-23.32	-25.37	-2.05	MnSeO4:5H2O
MnSO4	-9.46	-6.72	2.74	MnSO4
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.22	-21.76	-3.55	HgO
Morenosite	-5.87	-8.05	-2.17	NiSO4:7H2O
Na-Jarosite	-1.38	-12.22	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-12.99	-2.69	10.30	Na2SeO3:5H2O
Na2SeO4	-25.17	-23.89	1.28	Na2SeO4
Nantokite	-2.60	-9.43	-6.83	CuCl

Ni(OH)2	-5.11	7.91	13.02	Ni(OH)2
Ni3(P04)2	-8.32	-39.62	-31.30	Ni3(P04)2
Ni4(OH)6S04	-16.30	15.70	32.00	Ni4(OH)6S04
NiSe	10.34	-7.36	-17.70	NiSe
NiSe03:2H2O	-8.37	-5.48	2.89	NiSe03:2H2O
NiSe04:6H2O	-25.17	-26.69	-1.52	NiSe04:6H2O
Nsutite	-18.29	-0.79	17.50	Mn02
O2(g)	-53.29	31.16	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.25	1.55	8.79	Pb2(OH)3Cl
Pb20(OH)2	-16.39	9.80	26.19	Pb20(OH)2
Pb203	-35.66	25.38	61.04	Pb203
Pb3(P04)2	-5.13	-48.66	-43.53	Pb3(P04)2
Pb302S04	-12.13	-1.25	10.87	Pb302S04
Pb4(OH)6S04	-17.45	3.65	21.10	Pb4(OH)6S04
Pb403S04	-18.55	3.65	22.20	Pb403S04
PbHP04	-2.98	-26.78	-23.81	PbHP04
Pbmetal	-14.92	-10.68	4.24	Pb
Pb0:0.3H2O	-8.08	4.90	12.98	Pb0:0.33H2O
PbSe04	-22.83	-29.70	-6.88	PbSe04
Periclase	-10.88	11.06	21.94	Mg0
Plattnerite	-29.83	20.48	50.31	Pb02
Plumbgummite	7.80	-24.99	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-12.57	10.54	23.11	Ca(OH)2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-17.21	24.82	42.03	Mn02
Pyromorphite	5.63	-78.80	-84.43	Pb5(P04)3Cl
Retgersite	-6.00	-8.05	-2.05	NiS04:6H2O
Semetal(am)	7.44	0.31	-7.14	Se
Semetal(hex)	8.05	0.31	-7.75	Se
Se02	-13.52	-13.40	0.12	Se02
Se03	-56.00	-34.60	21.39	Se03
Spinel	-4.39	33.38	37.77	MgAl204
Strengite	-0.53	-26.90	-26.38	FeP04:2H2O
Tenorite	-3.86	3.94	7.80	Cu0
Thenardite	-5.59	-5.25	0.34	Na2S04
Tsumebite	-8.15	-17.94	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	3.00	-33.00	-36.00	Fe3(P04)2:8H2O
Zincite	-4.13	7.42	11.55	Zn0
Zincosite	-12.66	-8.54	4.13	ZnS04
Zn(N03)2:6H2O	-106.39	-103.14	3.26	Zn(N03)2:6H2O
Zn(OH)2	-4.78	7.42	12.20	Zn(OH)2
Zn(OH)2(am)	-5.25	7.42	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.42	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.31	7.42	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.42	11.73	Zn(OH)2
Zn2(OH)2S04	-8.62	-1.12	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-8.61	6.58	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-5.69	-41.11	-35.42	Zn3(P04)2:4H2O
Zn30(S04)2	-29.18	-9.65	19.53	Zn30(S04)2
Zn4(OH)6S04	-14.68	13.72	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-17.91	20.59	38.50	Zn5(OH)8Cl2
ZnCl2	-16.31	-9.09	7.22	ZnCl2
Znmetal	-34.31	-8.16	26.15	Zn
Zn0(active)	-3.98	7.42	11.40	Zn0
ZnSe	6.61	-7.85	-14.46	ZnSe
ZnSe04:6H2O	-25.67	-27.19	-1.52	ZnSe04:6H2O
ZnS04:1H2O	-8.00	-8.54	-0.53	ZnS04:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 4.
Using reaction 5.

Mixture 4.

9.340e-01 Solution 1
6.600e-02 Solution 5

Reaction 5.

3.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000

Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	1.456e-05	1.378e-05
Ca	3.445e-03	3.259e-03
Cd	2.835e-08	2.681e-08
Cl	4.593e-02	4.344e-02
Co	4.217e-05	3.989e-05
Cu	5.181e-06	4.901e-06
Fe	1.908e-03	1.805e-03
Hg	1.059e-09	1.002e-09
K	1.684e-03	1.593e-03
Mg	1.075e-02	1.017e-02
Mn	2.359e-04	2.231e-04
N	5.308e-04	5.021e-04
Na	5.054e-02	4.781e-02
Ni	8.144e-06	7.703e-06
P	2.332e-05	2.206e-05
Pb	1.538e-08	1.455e-08
S	1.642e-02	1.553e-02
Se	4.035e-07	3.817e-07
Zn	2.761e-06	2.612e-06

-----Description of solution-----

pH	=	6.788	Charge balance
pe	=	1.012	Adjusted to redox equilibrium
Activity of water	=	0.998	
Ionic strength (mol/kgw)	=	9.763e-02	
Mass of water (kg)	=	9.460e-01	
Total alkalinity (eq/kg)	=	6.633e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	6.374e-03	
Percent error, $100 \cdot (\text{Cat} - \text{An}) / (\text{Cat} + \text{An})$	=	4.58	
Iterations	=	4	
Total H	=	1.050158e+02	
Total O	=	5.256909e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol

	H+	2.076e-07	1.627e-07	-6.683	-6.788	-0.106	0.00
	OH-	5.945e-08	4.546e-08	-7.226	-7.342	-0.117	(0)
	H2O	5.551e+01	9.978e-01	1.744	-0.001	0.000	18.05
Al		1.456e-05					
	Al(OH)4-	9.475e-06	7.383e-06	-5.023	-5.132	-0.108	(0)
	Al(OH)2+	2.522e-06	1.994e-06	-5.598	-5.700	-0.102	(0)
	Al(OH)3	2.457e-06	2.457e-06	-5.610	-5.610	0.000	(0)
	AlOH+2	7.998e-08	3.129e-08	-7.097	-7.505	-0.408	(0)
	AlSO4+	2.440e-08	1.901e-08	-7.613	-7.721	-0.108	(0)
	Al+3	5.896e-09	6.587e-10	-8.229	-9.181	-0.952	(0)
	Al(SO4)2-	1.238e-09	9.649e-10	-8.907	-9.016	-0.108	(0)
Ca		3.445e-03					
	Ca+2	2.531e-03	9.555e-04	-2.597	-3.020	-0.423	(0)
	CaSO4	9.129e-04	9.129e-04	-3.040	-3.040	0.000	(0)
	CaHPO4	8.567e-07	8.567e-07	-6.067	-6.067	0.000	(0)
	CaH2PO4+	1.385e-07	1.095e-07	-6.859	-6.960	-0.102	(0)
	CaPO4-	1.623e-08	1.283e-08	-7.790	-7.892	-0.102	(0)
	CaNH3+2	6.874e-09	1.600e-09	-8.163	-8.796	-0.633	(0)
	CaOH+	1.038e-09	8.281e-10	-8.984	-9.082	-0.098	(0)
	Ca(NH3)2+2	3.639e-15	8.468e-16	-14.439	-15.072	-0.633	(0)
	CaNO3+	0.000e+00	0.000e+00	-50.730	-50.888	-0.158	(0)
Cd		2.835e-08					
	CdCl+	1.496e-08	1.039e-08	-7.825	-7.983	-0.158	(0)
	Cd+2	8.051e-09	3.039e-09	-8.094	-8.517	-0.423	(0)
	CdSO4	2.945e-09	2.945e-09	-8.531	-8.531	0.000	(0)
	CdCl2	1.541e-09	1.541e-09	-8.812	-8.812	0.000	(0)
	Cd(SO4)2-2	7.765e-10	1.807e-10	-9.110	-9.743	-0.633	(0)
	CdCl3-	4.849e-11	3.368e-11	-10.314	-10.473	-0.158	(0)
	CdOHCl	2.394e-11	2.394e-11	-10.621	-10.621	0.000	(0)
	CdOH+	1.589e-12	1.104e-12	-11.799	-11.957	-0.158	(0)
	Cd(OH)2	5.806e-16	5.806e-16	-15.236	-15.236	0.000	(0)
	Cd2OH+3	4.695e-19	1.766e-20	-18.328	-19.753	-1.425	(0)
	Cd(SeO3)2-2	4.318e-19	1.005e-19	-18.365	-18.998	-0.633	(0)
	Cd(OH)3-	3.153e-21	2.190e-21	-20.501	-20.660	-0.158	(0)
	CdSeO4	5.861e-28	5.861e-28	-27.232	-27.232	0.000	(0)
	Cd(OH)4-2	9.510e-29	2.213e-29	-28.022	-28.655	-0.633	(0)
	CdHS+	7.901e-39	5.488e-39	-38.102	-38.261	-0.158	(0)
	CdNO3+	0.000e+00	0.000e+00	-56.190	-56.348	-0.158	(0)
	Cd(HS)2	0.000e+00	0.000e+00	-68.808	-68.808	0.000	(0)
	Cd(HS)3-	0.000e+00	0.000e+00	-104.501	-104.659	-0.158	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-105.079	-105.079	0.000	(0)
	Cd(HS)4-2	0.000e+00	0.000e+00	-139.582	-140.215	-0.633	(0)
Cl		4.593e-02					
	Cl-	4.591e-02	3.599e-02	-1.338	-1.444	-0.106	(0)
	CuCl2-	4.624e-06	3.571e-06	-5.335	-5.447	-0.112	(0)
	MnCl+	2.670e-06	2.098e-06	-5.573	-5.678	-0.105	(0)
	CoCl+	1.407e-06	9.770e-07	-5.852	-6.010	-0.158	(0)
	CuCl	4.703e-07	4.703e-07	-6.328	-6.328	0.000	(0)
	NiCl+	2.947e-07	2.047e-07	-6.531	-6.689	-0.158	(0)
	MnCl2	1.067e-07	1.067e-07	-6.972	-6.972	0.000	(0)
	ZnCl+	8.147e-08	6.291e-08	-7.089	-7.201	-0.112	(0)
	CuCl3-2	7.093e-08	2.705e-08	-7.149	-7.568	-0.419	(0)
	CdCl+	1.496e-08	1.039e-08	-7.825	-7.983	-0.158	(0)
	ZnOHCl	5.238e-09	5.238e-09	-8.281	-8.281	0.000	(0)
	PbCl+	3.752e-09	2.606e-09	-8.426	-8.584	-0.158	(0)
	ZnCl2	3.017e-09	3.017e-09	-8.520	-8.520	0.000	(0)
	CdCl2	1.541e-09	1.541e-09	-8.812	-8.812	0.000	(0)
	MnCl3-	1.345e-09	1.057e-09	-8.871	-8.976	-0.105	(0)
	PbCl2	4.114e-10	4.114e-10	-9.386	-9.386	0.000	(0)
	ZnCl3-	1.099e-10	8.484e-11	-9.959	-10.071	-0.112	(0)
	CdCl3-	4.849e-11	3.368e-11	-10.314	-10.473	-0.158	(0)
	NiCl2	3.749e-11	3.749e-11	-10.426	-10.426	0.000	(0)
	CdOHCl	2.394e-11	2.394e-11	-10.621	-10.621	0.000	(0)
	CuCl+	1.599e-11	1.234e-11	-10.796	-10.909	-0.112	(0)
	PbCl3-	8.866e-12	6.158e-12	-11.052	-11.211	-0.158	(0)
	ZnCl4-2	3.877e-12	1.478e-12	-11.411	-11.830	-0.419	(0)
	PbCl4-2	4.103e-13	9.549e-14	-12.387	-13.020	-0.633	(0)
	CuCl2	1.265e-13	1.265e-13	-12.898	-12.898	0.000	(0)

FeCl+2	6.802e-16	2.594e-16	-15.167	-15.586	-0.419	(0)
FeCl2+	6.020e-17	4.730e-17	-16.220	-16.325	-0.105	(0)
CuCl3-	5.121e-17	3.954e-17	-16.291	-16.403	-0.112	(0)
HgCl2	1.707e-18	1.707e-18	-17.768	-17.768	0.000	(0)
HgCl3-	8.922e-19	6.197e-19	-18.050	-18.208	-0.158	(0)
HgCl4-2	3.958e-19	9.210e-20	-18.403	-19.036	-0.633	(0)
FeCl3	1.702e-19	1.702e-19	-18.769	-18.769	0.000	(0)
HgClOH	3.938e-20	3.938e-20	-19.405	-19.405	0.000	(0)
CuCl4-2	2.142e-20	8.168e-21	-19.669	-20.088	-0.419	(0)
HgCl+	1.158e-23	8.041e-24	-22.936	-23.095	-0.158	(0)
CoCl+2	9.366e-36	2.180e-36	-35.028	-35.662	-0.633	(0)
Co(NH3)5Cl+2	2.049e-39	4.769e-40	-38.688	-39.322	-0.633	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.259	-51.892	-0.633	(0)
Co(2)	4.217e-05					
Co+2	3.409e-05	7.934e-06	-4.467	-5.101	-0.633	(0)
CoS04	6.634e-06	6.634e-06	-5.178	-5.178	0.000	(0)
CoCl+	1.407e-06	9.770e-07	-5.852	-6.010	-0.158	(0)
CoHP04	1.670e-08	1.670e-08	-7.777	-7.777	0.000	(0)
CoOH+	1.407e-08	9.774e-09	-7.852	-8.010	-0.158	(0)
Co(NH3)+2	7.785e-09	1.812e-09	-8.109	-8.742	-0.633	(0)
Co(OH)2	4.793e-11	4.793e-11	-10.319	-10.319	0.000	(0)
Co(NH3)2+2	3.092e-13	7.195e-14	-12.510	-13.143	-0.633	(0)
Co2OH+3	1.033e-13	3.886e-15	-12.986	-14.410	-1.425	(0)
Co(OH)3-	8.501e-17	5.905e-17	-16.071	-16.229	-0.158	(0)
Co(NH3)3+2	5.176e-18	1.205e-18	-17.286	-17.919	-0.633	(0)
Co0OH-	5.122e-18	3.557e-18	-17.291	-17.449	-0.158	(0)
Co4(OH)4+4	6.207e-22	1.821e-24	-21.207	-23.740	-2.533	(0)
Co(NH3)4+2	3.612e-23	8.406e-24	-22.442	-23.075	-0.633	(0)
CoSe04	3.855e-24	3.855e-24	-23.414	-23.414	0.000	(0)
Co(OH)4-2	2.483e-24	5.778e-25	-23.605	-24.238	-0.633	(0)
Co(NH3)5+2	7.971e-29	1.855e-29	-28.098	-28.732	-0.633	(0)
CoNO2+	8.514e-40	5.914e-40	-39.070	-39.228	-0.158	(0)
CoNO3+	0.000e+00	0.000e+00	-53.123	-53.282	-0.158	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.354	-101.354	0.000	(0)
Co(3)	4.381e-31					
CoOH+2	4.381e-31	1.020e-31	-30.358	-30.992	-0.633	(0)
CoCl+2	9.366e-36	2.180e-36	-35.028	-35.662	-0.633	(0)
Co+3	2.909e-36	3.250e-37	-35.536	-36.488	-0.952	(0)
Co(NH3)5Cl+2	2.049e-39	4.769e-40	-38.688	-39.322	-0.633	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.775	-47.934	-0.158	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.259	-51.892	-0.633	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.576	-53.209	-0.633	(0)
Cu(1)	5.180e-06					
CuCl2-	4.624e-06	3.571e-06	-5.335	-5.447	-0.112	(0)
CuCl	4.703e-07	4.703e-07	-6.328	-6.328	0.000	(0)
CuCl3-2	7.093e-08	2.705e-08	-7.149	-7.568	-0.419	(0)
Cu+	1.495e-08	1.038e-08	-7.825	-7.984	-0.158	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.095	-66.520	-0.424	(0)
CuS4S5-3	0.000e+00	0.000e+00	-66.849	-67.250	-0.400	(0)
Cu(2)	8.979e-10					
Cu+2	6.000e-10	2.265e-10	-9.222	-9.645	-0.423	(0)
CuS04	2.145e-10	2.145e-10	-9.669	-9.669	0.000	(0)
CuOH+	4.706e-11	3.634e-11	-10.327	-10.440	-0.112	(0)
CuNH3+2	1.966e-11	4.575e-12	-10.706	-11.340	-0.633	(0)
CuCl+	1.599e-11	1.234e-11	-10.796	-10.909	-0.112	(0)
Cu(OH)2	5.448e-13	5.448e-13	-12.264	-12.264	0.000	(0)
CuCl2	1.265e-13	1.265e-13	-12.898	-12.898	0.000	(0)
Cu2(OH)2+2	1.387e-16	3.227e-17	-15.858	-16.491	-0.633	(0)
Cu(OH)3-	9.933e-17	6.899e-17	-16.003	-16.161	-0.158	(0)
CuCl3-	5.121e-17	3.954e-17	-16.291	-16.403	-0.112	(0)
CuCl4-2	2.142e-20	8.168e-21	-19.669	-20.088	-0.419	(0)
Cu(OH)4-2	1.440e-22	3.352e-23	-21.841	-22.475	-0.633	(0)
CuNO2+	0.000e+00	0.000e+00	-42.442	-42.601	-0.158	(0)
CuNO3+	0.000e+00	0.000e+00	-57.358	-57.516	-0.158	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.566	-76.566	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.842	-97.000	-0.158	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-106.807	-106.807	0.000	(0)
Fe(2)	1.908e-03					

Fe+2	1.539e-03	3.580e-04	-2.813	-3.446	-0.633	(0)
FeS04	3.647e-04	3.647e-04	-3.438	-3.438	0.000	(0)
FeHPO4	2.750e-06	2.750e-06	-5.561	-5.561	0.000	(0)
FeH2PO4+	1.124e-06	8.890e-07	-5.949	-6.051	-0.102	(0)
FeOH+	8.246e-07	6.480e-07	-6.084	-6.188	-0.105	(0)
Fe(OH)2	2.239e-11	2.239e-11	-10.650	-10.650	0.000	(0)
Fe(OH)3-	5.359e-13	4.212e-13	-12.271	-12.376	-0.105	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.999	-69.999	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.555	-105.713	-0.158	(0)
Fe(3)	3.377e-07					
Fe(OH)2+	3.278e-07	2.593e-07	-6.484	-6.586	-0.102	(0)
Fe(OH)3	9.728e-09	9.728e-09	-8.012	-8.012	0.000	(0)
Fe(OH)4-	1.250e-10	9.882e-11	-9.903	-10.005	-0.102	(0)
FeOH+2	2.250e-11	8.581e-12	-10.648	-11.066	-0.419	(0)
FeHPO4+	6.452e-12	5.103e-12	-11.190	-11.292	-0.102	(0)
FeS04+	1.461e-14	1.148e-14	-13.835	-13.940	-0.105	(0)
Fe+3	2.424e-15	2.708e-16	-14.615	-15.567	-0.952	(0)
Fe(S04)2-	1.582e-15	1.099e-15	-14.801	-14.959	-0.158	(0)
FeCl+2	6.802e-16	2.594e-16	-15.167	-15.586	-0.419	(0)
FeH2PO4+2	6.512e-17	2.547e-17	-16.186	-16.594	-0.408	(0)
FeCl2+	6.020e-17	4.730e-17	-16.220	-16.325	-0.105	(0)
Fe2(OH)2+4	9.587e-19	2.812e-21	-18.018	-20.551	-2.533	(0)
FeHSe03+2	6.940e-19	1.615e-19	-18.159	-18.792	-0.633	(0)
FeCl3	1.702e-19	1.702e-19	-18.769	-18.769	0.000	(0)
Fe3(OH)4+5	9.159e-23	1.011e-26	-22.038	-25.995	-3.957	(0)
FeN03+2	0.000e+00	0.000e+00	-62.227	-62.860	-0.633	(0)
H(0)	3.606e-19					
H2	1.803e-19	1.844e-19	-18.744	-18.734	0.010	(0)
Hg(0)	1.059e-09					
Hg	1.059e-09	1.059e-09	-8.975	-8.975	0.000	(0)
Hg(1)	4.544e-29					
Hg2+2	2.272e-29	5.287e-30	-28.644	-29.277	-0.633	(0)
Hg(2)	3.035e-18					
HgCl2	1.707e-18	1.707e-18	-17.768	-17.768	0.000	(0)
HgCl3-	8.922e-19	6.197e-19	-18.050	-18.208	-0.158	(0)
HgCl4-2	3.958e-19	9.210e-20	-18.403	-19.036	-0.633	(0)
HgClOH	3.938e-20	3.938e-20	-19.405	-19.405	0.000	(0)
Hg(OH)2	1.867e-22	1.909e-22	-21.729	-21.719	0.010	(0)
Hg(NH3)2+2	1.473e-22	3.428e-23	-21.832	-22.465	-0.633	(0)
HgCl+	1.158e-23	8.041e-24	-22.936	-23.095	-0.158	(0)
HgOH+	3.116e-26	2.164e-26	-25.506	-25.665	-0.158	(0)
HgNH3+2	2.862e-26	6.661e-27	-25.543	-26.176	-0.633	(0)
Hg(NH3)3+2	1.120e-27	2.606e-28	-26.951	-27.584	-0.633	(0)
Hg+2	4.242e-29	9.871e-30	-28.372	-29.006	-0.633	(0)
HgS04	9.012e-30	9.012e-30	-29.045	-29.045	0.000	(0)
Hg(OH)3-	2.137e-30	1.484e-30	-29.670	-29.829	-0.158	(0)
Hg(NH3)4+2	1.708e-32	3.976e-33	-31.767	-32.401	-0.633	(0)
HgHS2-	0.000e+00	0.000e+00	-65.728	-65.887	-0.158	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.281	-66.281	0.000	(0)
HgS2-2	0.000e+00	0.000e+00	-67.173	-67.806	-0.633	(0)
HgN03+	0.000e+00	0.000e+00	-77.756	-77.914	-0.158	(0)
Hg(N03)2	0.000e+00	0.000e+00	-126.676	-126.676	0.000	(0)
K	1.684e-03					
K+	1.636e-03	1.282e-03	-2.786	-2.892	-0.106	(0)
KS04-	4.865e-05	3.848e-05	-4.313	-4.415	-0.102	(0)
KHP04-	2.373e-08	1.876e-08	-7.625	-7.727	-0.102	(0)
Mg	1.075e-02					
Mg+2	8.339e-03	3.148e-03	-2.079	-2.502	-0.423	(0)
MgS04	2.406e-03	2.406e-03	-2.619	-2.619	0.000	(0)
MgHPO4	3.896e-06	3.896e-06	-5.409	-5.409	0.000	(0)
MgH2PO4+	9.754e-07	7.714e-07	-6.011	-6.113	-0.102	(0)
MgOH+	6.639e-08	5.334e-08	-7.178	-7.273	-0.095	(0)
MgP04-	8.356e-10	6.608e-10	-9.078	-9.180	-0.102	(0)
Mn(2)	2.359e-04					
Mn+2	1.990e-04	4.632e-05	-3.701	-4.334	-0.633	(0)
MnS04	3.405e-05	3.405e-05	-4.468	-4.468	0.000	(0)
MnCl+	2.670e-06	2.098e-06	-5.573	-5.678	-0.105	(0)
MnCl2	1.067e-07	1.067e-07	-6.972	-6.972	0.000	(0)

MnOH+	6.730e-09	5.289e-09	-8.172	-8.277	-0.105	(0)
MnCl3-	1.345e-09	1.057e-09	-8.871	-8.976	-0.105	(0)
MnSe	3.467e-12	3.467e-12	-11.460	-11.460	0.000	(0)
Mn(OH)3-	2.153e-19	1.692e-19	-18.667	-18.772	-0.105	(0)
MnSeO4	1.196e-23	1.196e-23	-22.922	-22.922	0.000	(0)
Mn(OH)4-2	8.845e-26	3.373e-26	-25.053	-25.472	-0.419	(0)
MnNO3+	0.000e+00	0.000e+00	-52.357	-52.515	-0.158	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.492	-100.492	0.000	(0)
Mn(3)	1.055e-28					
Mn+3	1.055e-28	1.178e-29	-27.977	-28.929	-0.952	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-65.678	-66.096	-0.419	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-74.601	-74.722	-0.121	(0)
N(-3)	5.308e-04					
NH4+	5.073e-04	3.796e-04	-3.295	-3.421	-0.126	(0)
NH4SO4-	2.244e-05	1.763e-05	-4.649	-4.754	-0.105	(0)
NH3	9.998e-07	9.998e-07	-6.000	-6.000	0.000	(0)
NiNH3+2	9.958e-09	2.318e-09	-8.002	-8.635	-0.633	(0)
Co(NH3)+2	7.785e-09	1.812e-09	-8.109	-8.742	-0.633	(0)
CaNH3+2	6.874e-09	1.600e-09	-8.163	-8.796	-0.633	(0)
CuNH3+2	1.966e-11	4.575e-12	-10.706	-11.340	-0.633	(0)
Ni(NH3)2+2	2.445e-12	5.689e-13	-11.612	-12.245	-0.633	(0)
Co(NH3)2+2	3.092e-13	7.195e-14	-12.510	-13.143	-0.633	(0)
Ca(NH3)2+2	3.639e-15	8.468e-16	-14.439	-15.072	-0.633	(0)
Co(NH3)3+2	5.176e-18	1.205e-18	-17.286	-17.919	-0.633	(0)
Hg(NH3)2+2	1.473e-22	3.428e-23	-21.832	-22.465	-0.633	(0)
Co(NH3)4+2	3.612e-23	8.406e-24	-22.442	-23.075	-0.633	(0)
HgNH3+2	2.862e-26	6.661e-27	-25.543	-26.176	-0.633	(0)
Hg(NH3)3+2	1.120e-27	2.606e-28	-26.951	-27.584	-0.633	(0)
Co(NH3)5+2	7.971e-29	1.855e-29	-28.098	-28.732	-0.633	(0)
Hg(NH3)4+2	1.708e-32	3.976e-33	-31.767	-32.401	-0.633	(0)
Co(NH3)5Cl+2	2.049e-39	4.769e-40	-38.688	-39.322	-0.633	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.775	-47.934	-0.158	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.259	-51.892	-0.633	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.576	-53.209	-0.633	(0)
N(3)	1.398e-35					
NO2-	1.398e-35	1.058e-35	-34.855	-34.976	-0.121	(0)
CoNO2+	8.514e-40	5.914e-40	-39.070	-39.228	-0.158	(0)
CuNO2+	0.000e+00	0.000e+00	-42.442	-42.601	-0.158	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.566	-76.566	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-48.275	-48.381	-0.106	(0)
CaNO3+	0.000e+00	0.000e+00	-50.730	-50.888	-0.158	(0)
MnNO3+	0.000e+00	0.000e+00	-52.357	-52.515	-0.158	(0)
CoNO3+	0.000e+00	0.000e+00	-53.123	-53.282	-0.158	(0)
NiNO3+	0.000e+00	0.000e+00	-53.471	-53.629	-0.158	(0)
ZnNO3+	0.000e+00	0.000e+00	-53.956	-54.115	-0.158	(0)
PbNO3+	0.000e+00	0.000e+00	-55.727	-55.885	-0.158	(0)
CdNO3+	0.000e+00	0.000e+00	-56.190	-56.348	-0.158	(0)
CuNO3+	0.000e+00	0.000e+00	-57.358	-57.516	-0.158	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.227	-62.860	-0.633	(0)
HgNO3+	0.000e+00	0.000e+00	-77.756	-77.914	-0.158	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.492	-100.492	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.354	-101.354	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.207	-103.207	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.016	-104.016	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.079	-105.079	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-106.807	-106.807	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.676	-126.676	0.000	(0)
Na	5.054e-02					
Na+	4.941e-02	3.873e-02	-1.306	-1.412	-0.106	(0)
NaSO4-	1.134e-03	8.968e-04	-2.945	-3.047	-0.102	(0)
NaHPO4-	1.110e-06	8.779e-07	-5.955	-6.057	-0.102	(0)
Ni	8.144e-06					
Ni+2	5.953e-06	2.247e-06	-5.225	-5.648	-0.423	(0)
NiSO4	1.883e-06	1.883e-06	-5.725	-5.725	0.000	(0)
NiCl+	2.947e-07	2.047e-07	-6.531	-6.689	-0.158	(0)

NiNH3+2	9.958e-09	2.318e-09	-8.002	-8.635	-0.633	(0)
NiOH+	1.893e-09	1.315e-09	-8.723	-8.881	-0.158	(0)
Ni(SO4)2-2	1.199e-09	2.791e-10	-8.921	-9.554	-0.633	(0)
NiCl2	3.749e-11	3.749e-11	-10.426	-10.426	0.000	(0)
Ni(OH)2	8.566e-12	8.566e-12	-11.067	-11.067	0.000	(0)
Ni(NH3)2+2	2.445e-12	5.689e-13	-11.612	-12.245	-0.633	(0)
Ni(OH)3-	7.614e-16	5.288e-16	-15.118	-15.277	-0.158	(0)
NiSeO4	1.008e-24	1.008e-24	-23.997	-23.997	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-53.471	-53.629	-0.158	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.950	-55.940	0.010	(0)
P	2.332e-05					
H2PO4-	6.914e-06	5.468e-06	-5.160	-5.262	-0.102	(0)
HP04-2	5.494e-06	2.095e-06	-5.260	-5.679	-0.419	(0)
MgHP04	3.896e-06	3.896e-06	-5.409	-5.409	0.000	(0)
FeHP04	2.750e-06	2.750e-06	-5.561	-5.561	0.000	(0)
FeH2PO4+	1.124e-06	8.890e-07	-5.949	-6.051	-0.102	(0)
NaHP04-	1.110e-06	8.779e-07	-5.955	-6.057	-0.102	(0)
MgH2PO4+	9.754e-07	7.714e-07	-6.011	-6.113	-0.102	(0)
CaHP04	8.567e-07	8.567e-07	-6.067	-6.067	0.000	(0)
CaH2PO4+	1.385e-07	1.095e-07	-6.859	-6.960	-0.102	(0)
KHP04-	2.373e-08	1.876e-08	-7.625	-7.727	-0.102	(0)
CoHP04	1.670e-08	1.670e-08	-7.777	-7.777	0.000	(0)
CaP04-	1.623e-08	1.283e-08	-7.790	-7.892	-0.102	(0)
MgP04-	8.356e-10	6.608e-10	-9.078	-9.180	-0.102	(0)
H3P04	1.198e-10	1.198e-10	-9.921	-9.921	0.000	(0)
P04-3	4.476e-11	5.000e-12	-10.349	-11.301	-0.952	(0)
FeHP04+	6.452e-12	5.103e-12	-11.190	-11.292	-0.102	(0)
FeH2PO4+2	6.512e-17	2.547e-17	-16.186	-16.594	-0.408	(0)
Pb	1.538e-08					
Pb+2	5.670e-09	2.141e-09	-8.246	-8.669	-0.423	(0)
PbSO4	4.546e-09	4.546e-09	-8.342	-8.342	0.000	(0)
PbCl+	3.752e-09	2.606e-09	-8.426	-8.584	-0.158	(0)
Pb(SO4)2-2	5.104e-10	1.188e-10	-9.292	-9.925	-0.633	(0)
PbOH+	4.780e-10	3.320e-10	-9.321	-9.479	-0.158	(0)
PbCl2	4.114e-10	4.114e-10	-9.386	-9.386	0.000	(0)
PbCl3-	8.866e-12	6.158e-12	-11.052	-11.211	-0.158	(0)
Pb(OH)2	6.481e-13	6.481e-13	-12.188	-12.188	0.000	(0)
PbCl4-2	4.103e-13	9.549e-14	-12.387	-13.020	-0.633	(0)
Pb2OH+3	2.994e-16	1.126e-17	-15.524	-16.948	-1.425	(0)
Pb(OH)3-	5.761e-17	4.002e-17	-16.239	-16.398	-0.158	(0)
Pb(OH)4-2	2.600e-21	6.051e-22	-20.585	-21.218	-0.633	(0)
Pb3(OH)4+2	4.097e-23	9.535e-24	-22.387	-23.021	-0.633	(0)
Pb4(OH)4+4	6.410e-26	1.880e-28	-25.193	-27.726	-2.533	(0)
PbNO3+	0.000e+00	0.000e+00	-55.727	-55.885	-0.158	(0)
Pb(HS)2	0.000e+00	0.000e+00	-68.902	-68.902	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.016	-104.016	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.195	-105.354	-0.158	(0)
S(-2)	6.767e-38					
H2S	3.408e-38	3.408e-38	-37.467	-37.467	0.000	(0)
HS-	2.552e-38	1.773e-38	-37.593	-37.751	-0.158	(0)
CdHS+	7.901e-39	5.488e-39	-38.102	-38.261	-0.158	(0)
S5-2	1.643e-40	0.000e+00	-39.784	-40.418	-0.633	(0)
S6-2	0.000e+00	0.000e+00	-40.211	-40.844	-0.633	(0)
S4-2	0.000e+00	0.000e+00	-40.384	-41.017	-0.633	(0)
S3-2	0.000e+00	0.000e+00	-41.197	-41.830	-0.633	(0)
S2-2	0.000e+00	0.000e+00	-42.223	-42.856	-0.633	(0)
S-2	0.000e+00	0.000e+00	-47.962	-48.381	-0.419	(0)
HgHS2-	0.000e+00	0.000e+00	-65.728	-65.887	-0.158	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.095	-66.520	-0.424	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.281	-66.281	0.000	(0)
CuS4S5-3	0.000e+00	0.000e+00	-66.849	-67.250	-0.400	(0)
HgS2-2	0.000e+00	0.000e+00	-67.173	-67.806	-0.633	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-67.891	-68.049	-0.158	(0)
Cd(HS)2	0.000e+00	0.000e+00	-68.808	-68.808	0.000	(0)
Zn(HS)2	0.000e+00	0.000e+00	-68.827	-68.827	0.000	(0)
Pb(HS)2	0.000e+00	0.000e+00	-68.902	-68.902	0.000	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.999	-69.999	0.000	(0)

Cu(HS)3-	0.000e+00	0.000e+00	-96.842	-97.000	-0.158	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.140	-103.299	-0.158	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-104.501	-104.659	-0.158	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.195	-105.354	-0.158	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.555	-105.713	-0.158	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-105.857	-106.490	-0.633	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.582	-140.215	-0.633	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-141.877	-142.510	-0.633	(0)
S(6)	1.642e-02					
S04-2	1.149e-02	4.336e-03	-1.940	-2.363	-0.423	(0)
MgS04	2.406e-03	2.406e-03	-2.619	-2.619	0.000	(0)
NaS04-	1.134e-03	8.968e-04	-2.945	-3.047	-0.102	(0)
CaS04	9.129e-04	9.129e-04	-3.040	-3.040	0.000	(0)
FeS04	3.647e-04	3.647e-04	-3.438	-3.438	0.000	(0)
KS04-	4.865e-05	3.848e-05	-4.313	-4.415	-0.102	(0)
MnS04	3.405e-05	3.405e-05	-4.468	-4.468	0.000	(0)
NH4S04-	2.244e-05	1.763e-05	-4.649	-4.754	-0.105	(0)
CoS04	6.634e-06	6.634e-06	-5.178	-5.178	0.000	(0)
NiS04	1.883e-06	1.883e-06	-5.725	-5.725	0.000	(0)
ZnS04	6.573e-07	6.573e-07	-6.182	-6.182	0.000	(0)
Zn(S04)2-2	1.104e-07	2.568e-08	-6.957	-7.590	-0.633	(0)
HS04-	7.844e-08	6.112e-08	-7.105	-7.214	-0.108	(0)
AlS04+	2.440e-08	1.901e-08	-7.613	-7.721	-0.108	(0)
PbS04	4.546e-09	4.546e-09	-8.342	-8.342	0.000	(0)
CdS04	2.945e-09	2.945e-09	-8.531	-8.531	0.000	(0)
Al(S04)2-	1.238e-09	9.649e-10	-8.907	-9.016	-0.108	(0)
Ni(S04)2-2	1.199e-09	2.791e-10	-8.921	-9.554	-0.633	(0)
Cd(S04)2-2	7.765e-10	1.807e-10	-9.110	-9.743	-0.633	(0)
Pb(S04)2-2	5.104e-10	1.188e-10	-9.292	-9.925	-0.633	(0)
CuS04	2.145e-10	2.145e-10	-9.669	-9.669	0.000	(0)
FeS04+	1.461e-14	1.148e-14	-13.835	-13.940	-0.105	(0)
Fe(S04)2-	1.582e-15	1.099e-15	-14.801	-14.959	-0.158	(0)
HgS04	9.012e-30	9.012e-30	-29.045	-29.045	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.775	-47.934	-0.158	(0)
Se(-2)	4.263e-09					
HSe-	4.256e-09	2.956e-09	-8.371	-8.529	-0.158	(0)
H2Se	3.667e-12	3.667e-12	-11.436	-11.436	0.000	(0)
MnSe	3.467e-12	3.467e-12	-11.460	-11.460	0.000	(0)
Se-2	5.994e-17	1.395e-17	-16.222	-16.855	-0.633	(0)
Se(4)	3.993e-07					
HSe03-	3.728e-07	2.589e-07	-6.429	-6.587	-0.158	(0)
Se03-2	2.648e-08	6.162e-09	-7.577	-8.210	-0.633	(0)
H2Se03	1.737e-11	1.737e-11	-10.760	-10.760	0.000	(0)
FeHSe03+2	6.940e-19	1.615e-19	-18.159	-18.792	-0.633	(0)
Cd(Se03)2-2	4.318e-19	1.005e-19	-18.365	-18.998	-0.633	(0)
Se(6)	2.760e-21					
Se04-2	2.743e-21	1.036e-21	-20.562	-20.985	-0.423	(0)
MnSe04	1.196e-23	1.196e-23	-22.922	-22.922	0.000	(0)
CoSe04	3.855e-24	3.855e-24	-23.414	-23.414	0.000	(0)
NiSe04	1.008e-24	1.008e-24	-23.997	-23.997	0.000	(0)
ZnSe04	1.150e-25	1.150e-25	-24.939	-24.939	0.000	(0)
HSe04-	1.072e-26	7.445e-27	-25.970	-26.128	-0.158	(0)
CdSe04	5.861e-28	5.861e-28	-27.232	-27.232	0.000	(0)
Zn(Se04)2-2	0.000e+00	0.000e+00	-45.285	-45.918	-0.633	(0)
Zn	2.761e-06					
Zn+2	1.899e-06	7.169e-07	-5.721	-6.145	-0.423	(0)
ZnS04	6.573e-07	6.573e-07	-6.182	-6.182	0.000	(0)
Zn(S04)2-2	1.104e-07	2.568e-08	-6.957	-7.590	-0.633	(0)
ZnCl+	8.147e-08	6.291e-08	-7.089	-7.201	-0.112	(0)
ZnOHCl	5.238e-09	5.238e-09	-8.281	-8.281	0.000	(0)
ZnOH+	4.692e-09	3.259e-09	-8.329	-8.487	-0.158	(0)
ZnCl2	3.017e-09	3.017e-09	-8.520	-8.520	0.000	(0)
ZnCl3-	1.099e-10	8.484e-11	-9.959	-10.071	-0.112	(0)
Zn(OH)2	4.331e-11	4.331e-11	-10.363	-10.363	0.000	(0)
ZnCl4-2	3.877e-12	1.478e-12	-11.411	-11.830	-0.419	(0)
Zn(OH)3-	1.929e-14	1.340e-14	-13.715	-13.873	-0.158	(0)
Zn(OH)4-2	1.415e-19	3.294e-20	-18.849	-19.482	-0.633	(0)
ZnSe04	1.150e-25	1.150e-25	-24.939	-24.939	0.000	(0)

Zn(SeO ₄) ₂ -2	0.000e+00	0.000e+00	-45.285	-45.918	-0.633	(0)
ZnNO ₃ +	0.000e+00	0.000e+00	-53.956	-54.115	-0.158	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-67.891	-68.049	-0.158	(0)
Zn(HS) ₂	0.000e+00	0.000e+00	-68.827	-68.827	0.000	(0)
Zn(HS) ₃ -	0.000e+00	0.000e+00	-103.140	-103.299	-0.158	(0)
Zn(NO ₃) ₂	0.000e+00	0.000e+00	-103.207	-103.207	0.000	(0)
ZnS(HS) ₂ -2	0.000e+00	0.000e+00	-105.857	-106.490	-0.633	(0)
Zn(HS) ₄ -2	0.000e+00	0.000e+00	-141.877	-142.510	-0.633	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH ₃) ₅ Cl)(NO ₃) ₂ -124.13	-117.86	6.27	(Co(NH ₃) ₅ Cl)(NO ₃) ₂	
(Co(NH ₃) ₅ Cl)Cl ₂ -28.52	-23.98	4.54	(Co(NH ₃) ₅ Cl)Cl ₂	
(Co(NH ₃) ₅ OH ₂)Cl ₃ -35.78	-23.98	11.80	(Co(NH ₃) ₅ OH ₂)Cl ₃	
(Co(NH ₃) ₆)(NO ₃) ₃ -179.35	-161.42	17.93	(Co(NH ₃) ₆)(NO ₃) ₃	
(Co(NH ₃) ₆)Cl ₃ -40.72	-20.61	20.11	(Co(NH ₃) ₆)Cl ₃	
(NH ₄) ₂ SeO ₄ -28.28	-27.83	0.45	(NH ₄) ₂ SeO ₄	
Al(OH) ₃ (am) 0.12	11.18	11.06	Al(OH) ₃	
Al ₂ O ₃ 2.10	22.37	20.27	Al ₂ O ₃	
Al ₄ (OH) ₁₀ SO ₄ 6.09	28.79	22.70	Al ₄ (OH) ₁₀ SO ₄	
AlOHSO ₄ -1.53	-4.76	-3.23	AlOHSO ₄	
Alunite 6.46	5.56	-0.90	KAl ₃ (SO ₄) ₂ (OH) ₆	
Anglesite -3.21	-11.03	-7.82	PbSO ₄	
Anhydrite -1.04	-5.38	-4.34	CaSO ₄	
Anilite -13.04	-45.35	-32.31	Cu _{0.25} Cu _{1.5} S	
Antlerite -12.94	-4.15	8.79	Cu ₃ (OH) ₄ SO ₄	
Atacamite -7.98	-0.37	7.61	Cu ₂ (OH) ₃ Cl	
Bianchite -6.75	-8.51	-1.76	ZnSO ₄ :6H ₂ O	
Birnessite -18.86	-0.76	18.09	MnO ₂	
Bixbyite -16.78	-17.13	-0.35	Mn ₂ O ₃	
BlaubleiI -17.08	-41.24	-24.16	Cu _{0.9} Cu _{0.2} S	
BlaubleiII -15.86	-43.14	-27.28	Cu _{0.6} Cu _{0.8} S	
Boehmite 2.32	11.18	8.86	AlOOH	
Brochantite -15.92	-0.22	15.71	Cu ₄ (OH) ₆ SO ₄	
Brucite -6.04	11.07	17.12	Mg(OH) ₂	
Bunsenite -4.76	7.93	12.68	NiO	
Ca ₃ (PO ₄) ₂ (beta) -2.61	-31.66	-29.05	Ca ₃ (PO ₄) ₂	
Ca ₄ H(PO ₄) ₃ :3H ₂ O -5.69	-52.77	-47.08	Ca ₄ H(PO ₄) ₃ :3H ₂ O	
CaHPO ₄ -1.76	-21.11	-19.35	CaHPO ₄	
CaHPO ₄ :2H ₂ O -2.06	-21.11	-19.05	CaHPO ₄ :2H ₂ O	
Calomel -14.04	-32.16	-18.13	Hg ₂ Cl ₂	
CaSeO ₃ :2H ₂ O -5.68	-2.82	2.86	CaSeO ₃ :2H ₂ O	
CaSeO ₄ :2H ₂ O -21.01	-24.01	-3.00	CaSeO ₄ :2H ₂ O	
Cd(OH) ₂ -8.81	5.06	13.87	Cd(OH) ₂	
Cd(OH) ₂ (am) -8.88	5.06	13.94	Cd(OH) ₂	
Cd ₃ (OH) ₂ (SO ₄) ₂ -23.41	-16.70	6.71	Cd ₃ (OH) ₂ (SO ₄) ₂	
Cd ₃ (OH) ₄ SO ₄ -23.32	-0.76	22.56	Cd ₃ (OH) ₄ SO ₄	
Cd ₃ (PO ₄) ₂ -15.55	-48.15	-32.60	Cd ₃ (PO ₄) ₂	
Cd ₄ (OH) ₆ SO ₄ -24.11	4.29	28.40	Cd ₄ (OH) ₆ SO ₄	
CdCl ₂ -10.79	-11.40	-0.61	CdCl ₂	
CdCl ₂ :1H ₂ O -9.73	-11.41	-1.68	CdCl ₂ :1H ₂ O	
CdCl ₂ :2.5H ₂ O -9.48	-11.41	-1.93	CdCl ₂ :2.5H ₂ O	
Cdmetal(alpha) -24.24	-10.54	13.69	Cd	
Cdmetal(gamma) -24.34	-10.54	13.80	Cd	
CdOHCl -6.78	-3.17	3.61	CdOHCl	
CdSe 10.12	-10.26	-20.38	CdSe	
CdSeO ₄ :2H ₂ O -27.65	-29.50	-1.85	CdSeO ₄ :2H ₂ O	
CdSO ₄ -10.83	-10.88	-0.05	CdSO ₄	
CdSO ₄ :1H ₂ O -9.23	-10.88	-1.65	CdSO ₄ :1H ₂ O	
CdSO ₄ :2.67H ₂ O -9.05	-10.88	-1.83	CdSO ₄ :2.67H ₂ O	
Chalcanthite -9.36	-12.01	-2.65	CuSO ₄ :5H ₂ O	
Chalcocite -11.61	-46.93	-35.32	Cu ₂ S	
Chalcopyrite -39.39	-75.02	-35.62	CuFeS ₂	
Cinnabar -19.96	-66.26	-46.30	HgS	
Clausthalite 16.97	-10.41	-27.39	PbSe	
Co(OH) ₂ -4.62	8.47	13.09	Co(OH) ₂	

Co(OH)3	-14.04	-16.13	-2.09	Co(OH)3
Co3(P04)2	-3.22	-37.90	-34.69	Co3(P04)2
Co3O4	-13.53	-23.77	-10.24	Co3O4
CoCl2	-16.45	-7.99	8.46	CoCl2
CoCl2:6H2O	-10.51	-7.99	2.52	CoCl2:6H2O
CoFe2O4	21.22	18.07	-3.15	CoFe2O4
CoHP04	-4.13	-23.19	-19.06	CoHP04
CoO	-5.36	8.48	13.84	CoO
CoS(alpha)	-28.62	-36.06	-7.44	CoS
CoS(beta)	-24.99	-36.06	-11.07	CoS
CoSe	9.36	-6.84	-16.20	CoSe
CoSeO3	-6.22	-4.90	1.32	CoSeO3
CoSeO4:6H2O	-24.56	-26.09	-1.53	CoSeO4:6H2O
CoSO4	-10.45	-7.46	2.99	CoSO4
CoSO4:6H2O	-4.99	-7.47	-2.48	CoSO4:6H2O
Cotunnite	-6.71	-11.56	-4.84	PbCl2
Covellite	-18.08	-40.61	-22.53	CuS
Cu(OH)2	-4.88	3.93	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.73	-47.31	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.60	-17.71	-46.31	Cu2Se
Cu2SO4	-16.43	-18.33	-1.90	Cu2SO4
Cu3(P04)2	-14.69	-51.54	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-16.42	-51.54	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.21	-29.09	-64.30	Cu3Se2
Cumetal	-0.07	-9.00	-8.93	Cu
CuOCuSO4	-18.71	-8.08	10.63	CuOCuSO4
Cupricferrite	7.04	13.52	6.49	CuFe2O4
Cuprite	-1.28	-2.39	-1.11	Cu2O
Cuprousferrite	12.48	3.60	-8.88	CuFeO2
CuSe	22.00	-11.39	-33.39	CuSe
CuSe2	22.60	-11.10	-33.70	CuSe2
CuSeO3:2H2O	-10.04	-9.45	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-28.19	-30.63	-2.44	CuSeO4:5H2O
CuSO4	-15.12	-12.01	3.11	CuSO4
Diaspore	4.06	11.18	7.12	AlOOH
Djurleite	-12.12	-46.51	-34.40	Cu0.066Cu1.868S
Epsomite	-2.72	-4.87	-2.15	MgSO4:7H2O
Fe(OH)2	-3.43	10.13	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.37	2.33	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-5.34	-3.78	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-9.91	-30.53	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-35.07	-38.22	-3.16	Fe2(SO4)3
Fe3(OH)8	-0.50	19.72	20.22	Fe3(OH)8
Ferrihydrite	1.43	4.80	3.37	Fe(OH)3
Ferroselite	13.81	-4.90	-18.71	FeSe2
FeS(ppt)	-31.49	-34.41	-2.92	FeS
FeSe	5.82	-5.19	-11.00	FeSe
Galena	-25.47	-39.63	-14.16	PbS
Gibbsite	2.66	11.18	8.52	Al(OH)3
Goethite	4.16	4.80	0.64	FeOOH
Goslarite	-6.47	-8.51	-2.05	ZnSO4:7H2O
Greenockite	-24.99	-39.48	-14.49	CdS
Greigite	-113.40	-158.43	-45.03	Fe3S4
Gypsum	-0.77	-5.38	-4.61	CaSO4:2H2O
H-Jarosite	-5.94	-17.49	-11.55	(H3O)Fe3(SO4)2(OH)6
H2S(g)	-36.53	-44.54	-8.01	H2S
H2Se(g)	-10.39	-15.32	-4.92	H2Se
Halite	-4.45	-2.86	1.59	NaCl
Hausmannite	-18.71	43.33	62.03	Mn3O4
Hematite	10.70	9.59	-1.11	Fe2O3
Hercynite	8.85	32.50	23.64	FeAl2O4
Hg(g)	-7.72	-15.65	-7.93	Hg
Hg(OH)2	-18.22	-21.72	-3.50	Hg(OH)2
Hg2(g)	-16.21	-31.30	-15.09	Hg2
Hg2(OH)2	-20.96	-15.70	5.26	Hg2(OH)2
Hg2HP04	-22.59	-47.37	-24.77	Hg2HP04
Hg2S	-48.40	-60.24	-11.84	Hg2S
Hg2SeO3	-24.42	-29.08	-4.66	Hg2SeO3

Hg2SO4	-25.50	-31.64	-6.14	Hg2SO4
HgCl(g)	-35.97	-16.08	19.88	HgCl
HgCl2	-16.66	-38.18	-21.52	HgCl2
Hgmetal(l)	-2.00	-15.65	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSeO3	-22.66	-35.09	-12.43	HgSeO3
HgSO4	-28.20	-37.66	-9.45	HgSO4
Hinsdalite	-6.65	-9.15	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	2.12	-42.21	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-7.67	-70.46	-62.79	Pb5(PO4)3OH
K-Alum	-11.57	-16.81	-5.24	KAl(SO4)2·12H2O
K-Jarosite	0.89	-13.59	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-26.04	-26.77	-0.73	K2SeO4
Langite	-18.10	-0.22	17.88	Cu4(OH)6SO4·H2O
Larnakite	-5.74	-6.13	-0.38	PbO:PbSO4
Laurionite	-3.95	-3.33	0.62	PbOHCl
Lepidocrocite	3.43	4.80	1.37	FeOOH
Lime	-22.60	10.56	33.16	CaO
Litharge	-7.94	4.91	12.85	PbO
Mackinawite	-30.81	-34.41	-3.60	FeS
Maghemite	3.21	9.59	6.39	Fe2O3
Magnesioferrite	3.14	20.67	17.52	Fe2MgO4
Magnetite	15.82	19.72	3.90	Fe3O4
Manganite	-8.30	17.04	25.34	MnOOH
Massicot	-8.15	4.91	13.05	PbO
Melanothallite	-18.94	-12.53	6.41	CuCl2
Melanterite	-3.56	-5.82	-2.26	FeSO4·7H2O
Metacinnabar	-20.56	-66.26	-45.70	HgS
Mg(OH)2(active)	-7.72	11.07	18.79	Mg(OH)2
Mg3(PO4)2	-6.83	-30.11	-23.28	Mg3(PO4)2
MgHP04:3H2O	-2.42	-20.59	-18.18	MgHP04:3H2O
MgSeO3:6H2O	-5.35	-2.31	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-22.29	-23.49	-1.20	MgSeO4:6H2O
Minium	-44.21	30.32	74.53	Pb3O4
Mirabilite	-3.89	-5.20	-1.30	Na2SO4·10H2O
Mn2(SO4)3	-59.62	-64.95	-5.32	Mn2(SO4)3
Mn3(PO4)2	-11.76	-35.60	-23.85	Mn3(PO4)2
MnCl2:4H2O	-9.97	-7.23	2.74	MnCl2·4H2O
MnHP04	2.98	-22.42	-25.40	MnHP04
MnS(grn)	-35.54	-35.30	0.25	MnS
MnS(pnk)	-38.64	-35.30	3.34	MnS
MnSe	-9.81	-6.08	3.73	MnSe
MnSeO3	-5.26	-4.13	1.13	MnSeO3
MnSeO3:2H2O	-5.10	-4.13	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-23.27	-25.32	-2.05	MnSeO4:5H2O
MnSO4	-9.43	-6.70	2.74	MnSO4
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.17	-21.72	-3.55	HgO
Morenosite	-5.84	-8.02	-2.17	NiSO4·7H2O
Na-Jarosite	-1.28	-12.11	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-12.93	-2.63	10.30	Na2SeO3:5H2O
Na2SeO4	-25.09	-23.81	1.28	Na2SeO4
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.10	7.93	13.02	Ni(OH)2
Ni3(PO4)2	-8.25	-39.55	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-16.23	15.77	32.00	Ni4(OH)6SO4
NiS(alpha)	-31.01	-36.61	-5.60	NiS
NiS(beta)	-25.51	-36.61	-11.10	NiS
NiS(gamma)	-23.81	-36.61	-12.80	NiS
NiSe	10.31	-7.39	-17.70	NiSe
NiSeO3:2H2O	-8.34	-5.45	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-25.12	-26.64	-1.52	NiSeO4:6H2O
Nsutite	-18.27	-0.76	17.50	MnO2
O2(g)	-53.25	31.20	84.45	O2
Pb(OH)2	-3.38	4.91	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.21	1.58	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-16.38	9.81	26.19	Pb2O(OH)2
Pb2O3	-35.63	25.41	61.04	Pb2O3

Pb3(P04)2	-5.08	-48.61	-43.53	Pb3(P04)2
Pb302S04	-12.09	-1.22	10.87	Pb302S04
Pb4(OH)6S04	-17.42	3.68	21.10	Pb4(OH)6S04
Pb403S04	-18.51	3.69	22.20	Pb403S04
PbHP04	-2.95	-26.76	-23.81	PbHP04
Pbmetal	-14.94	-10.69	4.24	Pb
Pb0:0.3H2O	-8.07	4.91	12.98	Pb0:0.33H2O
PbSe04	-22.78	-29.65	-6.88	PbSe04
Periclase	-10.87	11.07	21.94	Mg0
Plattnerite	-29.80	20.51	50.31	Pb02
Plumbgummite	7.91	-24.88	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-12.56	10.56	23.11	Ca(OH)2
Pyrite	-44.72	-63.35	-18.63	FeS2
Pyrochroite	-6.18	9.24	15.43	Mn(OH)2
Pyrolusite	-17.19	24.84	42.03	Mn02
Pyromorphite	5.74	-78.69	-84.43	Pb5(P04)3Cl
Retgersite	-5.97	-8.02	-2.05	NiS04:6H2O
Semetal(am)	7.42	0.28	-7.14	Se
Semetal(hex	8.03	0.28	-7.75	Se
Se02	-13.50	-13.37	0.12	Se02
Se03	-55.95	-34.56	21.39	Se03
Sphalerite	-25.59	-37.11	-11.52	ZnS
Spinel	-4.33	33.44	37.77	MgAl204
Strengite	-0.49	-26.87	-26.38	FeP04:2H2O
Sulfur	-26.83	-28.94	-2.11	S
Tenorite	-3.87	3.93	7.80	Cu0
Thenardite	-5.53	-5.19	0.34	Na2S04
Tsumebite	-8.13	-17.92	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	3.05	-32.95	-36.00	Fe3(P04)2:8H2O
Wurtzite	-28.11	-37.11	-9.00	ZnS
Zincite	-4.12	7.43	11.55	Zn0
Zincosite	-12.63	-8.51	4.13	ZnS04
Zn(NO3)2:6H2O	-106.17	-102.91	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.77	7.43	12.20	Zn(OH)2
Zn(OH)2(am)	-5.24	7.43	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.52	7.43	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.30	7.43	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.30	7.43	11.73	Zn(OH)2
Zn2(OH)2S04	-8.58	-1.08	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-8.56	6.63	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-5.62	-41.04	-35.42	Zn3(P04)2:4H2O
Zn30(S04)2	-29.11	-9.58	19.53	Zn30(S04)2
Zn4(OH)6S04	-14.62	13.78	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-17.81	20.69	38.50	Zn5(OH)8Cl2
ZnCl2	-16.25	-9.03	7.22	ZnCl2
Znmetal	-34.32	-8.17	26.15	Zn
Zn0(active)	-3.97	7.43	11.40	Zn0
ZnS(am)	-28.02	-37.11	-9.09	ZnS
ZnSe	6.58	-7.89	-14.46	ZnSe
ZnSe04:6H2O	-25.62	-27.14	-1.52	ZnSe04:6H2O
ZnS04:1H2O	-7.98	-8.51	-0.53	ZnS04:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 8.

SOLUTION 6 # Mean Groundwater quality
temp 21
pH 6.79
pe 1
redox pe


```

units      mg/l
density    1
Al         0.37
Alkalinity 0
As         0
Ba         0
Be         0
B          0
Cd         0.003
Co         2.34
Cr         0
Cu         0.31
Fe         100.34
Pb         0.003
Mn         12.2
Mo         0
V          0
Zn         0.17
Se         0.03
Ni         0.45
N          7
P          0.68
Ca         130
Mg         246
Na         1094
K          62
Cl         1533
S(6)       1485
Hg         0.0002
water      1 # kg
MIX 5
  1      0.954
  6      0.046
REACTION 6
H2O -1
3
END #Time-step 6

```

Beginning of initial solution calculations.

Initial solution 6.

-----Solution composition-----

Elements	Molality	Moles
Al	1.378e-05	1.378e-05
Ca	3.259e-03	3.259e-03
Cd	2.681e-08	2.681e-08
Cl	4.344e-02	4.344e-02
Co	3.989e-05	3.989e-05
Cu	4.901e-06	4.901e-06
Fe	1.805e-03	1.805e-03
Hg	1.002e-09	1.002e-09
K	1.593e-03	1.593e-03
Mg	1.017e-02	1.017e-02
Mn	2.231e-04	2.231e-04
N	5.021e-04	5.021e-04
Na	4.781e-02	4.781e-02
Ni	7.703e-06	7.703e-06
P	2.206e-05	2.206e-05
Pb	1.455e-08	1.455e-08
S(6)	1.553e-02	1.553e-02
Se	3.817e-07	3.817e-07
Zn	2.612e-06	2.612e-06

-----Description of solution-----

pH = 6.790
 pe = 1.000
 Activity of water = 0.998
 Ionic strength (mol/kgw) = 9.259e-02
 Mass of water (kg) = 1.000e+00
 Total alkalinity (eq/kg) = 6.274e-05
 Total carbon (mol/kg) = 0.000e+00
 Total CO2 (mol/kg) = 0.000e+00
 Temperature (°C) = 21.00
 Electrical balance (eq) = 6.374e-03
 Percent error, 100*(Cat-|An|)/(Cat+|An|) = 4.58
 Iterations = 13
 Total H = 1.110158e+02
 Total O = 5.556909e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.061e-07	1.622e-07	-6.686	-6.790	-0.104	0.00
OH-	5.935e-08	4.562e-08	-7.227	-7.341	-0.114	(0)
H2O	5.551e+01	9.980e-01	1.744	-0.001	0.000	18.05
Al	1.378e-05					
Al(OH)4-	8.973e-06	7.024e-06	-5.047	-5.153	-0.106	(0)
Al(OH)2+	2.373e-06	1.884e-06	-5.625	-5.725	-0.100	(0)
Al(OH)3	2.329e-06	2.329e-06	-5.633	-5.633	0.000	(0)
AlOH+2	7.409e-08	2.945e-08	-7.130	-7.531	-0.401	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
Al+3	5.344e-09	6.178e-10	-8.272	-9.209	-0.937	(0)
Al(SO4)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ca	3.259e-03					
Ca+2	2.406e-03	9.221e-04	-2.619	-3.035	-0.416	(0)
CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CaOH+	1.001e-09	8.020e-10	-8.999	-9.096	-0.096	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
Cd	2.681e-08					
CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
Cd+2	7.874e-09	3.018e-09	-8.104	-8.520	-0.416	(0)
CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
Cd(SO4)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
CdOH+	1.568e-12	1.100e-12	-11.805	-11.959	-0.154	(0)
Cd(OH)2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
Cd2OH+3	4.264e-19	1.748e-20	-18.370	-19.758	-1.387	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Cd(OH)3-	3.135e-21	2.198e-21	-20.504	-20.658	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Cd(OH)4-2	9.222e-29	2.230e-29	-28.035	-28.652	-0.617	(0)
CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cl	4.344e-02					
Cl-	4.343e-02	3.417e-02	-1.362	-1.466	-0.104	(0)
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)

CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(2)	3.989e-05					
Co+2	3.225e-05	7.797e-06	-4.491	-5.108	-0.617	(0)
CoS04	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CoHP04	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CoOH+	1.375e-08	9.639e-09	-7.862	-8.016	-0.154	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
Co(OH)2	4.744e-11	4.744e-11	-10.324	-10.324	0.000	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Co2OH+3	9.190e-14	3.766e-15	-13.037	-14.424	-1.387	(0)
Co(OH)3-	8.364e-17	5.865e-17	-16.078	-16.232	-0.154	(0)
CoOOH-	5.039e-18	3.533e-18	-17.298	-17.452	-0.154	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Co4(OH)4+4	5.041e-22	1.722e-24	-21.297	-23.764	-2.466	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
CoSe04	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
Co(OH)4-2	2.382e-24	5.759e-25	-23.623	-24.240	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Co(3)	4.042e-31					
CoOH+2	4.042e-31	9.773e-32	-30.393	-31.010	-0.617	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co+3	2.685e-36	3.104e-37	-35.571	-36.508	-0.937	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
Cu(1)	4.900e-06					
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
Cu+	1.553e-08	1.089e-08	-7.809	-7.963	-0.154	(0)
Cu(2)	8.967e-10					
Cu+2	6.026e-10	2.310e-10	-9.220	-9.636	-0.416	(0)
CuS04	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
CuOH+	4.792e-11	3.719e-11	-10.319	-10.430	-0.110	(0)

CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
Cu(OH)2	5.595e-13	5.595e-13	-12.252	-12.252	0.000	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
Cu2(OH)2+2	1.398e-16	3.379e-17	-15.855	-16.471	-0.617	(0)
Cu(OH)3-	1.014e-16	7.111e-17	-15.994	-16.148	-0.154	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
Cu(OH)4-2	1.434e-22	3.468e-23	-21.843	-22.460	-0.617	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Fe(2)	1.805e-03					
Fe+2	1.454e-03	3.515e-04	-2.837	-3.454	-0.617	(0)
FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
FeHPO4	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
FeOH+	8.090e-07	6.384e-07	-6.092	-6.195	-0.103	(0)
Fe(OH)2	2.214e-11	2.214e-11	-10.655	-10.655	0.000	(0)
Fe(OH)3-	5.296e-13	4.179e-13	-12.276	-12.379	-0.103	(0)
Fe(3)	3.233e-07					
Fe(OH)2+	3.138e-07	2.491e-07	-6.503	-6.604	-0.100	(0)
Fe(OH)3	9.382e-09	9.382e-09	-8.028	-8.028	0.000	(0)
Fe(OH)4-	1.205e-10	9.565e-11	-9.919	-10.019	-0.100	(0)
FeOH+2	2.119e-11	8.217e-12	-10.674	-11.085	-0.411	(0)
FeHPO4+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeSO4+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe+3	2.235e-15	2.584e-16	-14.651	-15.588	-0.937	(0)
Fe(SO4)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
Fe2(OH)2+4	7.548e-19	2.579e-21	-18.122	-20.589	-2.466	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
Fe3(OH)4+5	6.361e-23	8.906e-27	-22.197	-26.050	-3.854	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
H(0)	3.796e-19					
H2	1.898e-19	1.939e-19	-18.722	-18.712	0.009	(0)
Hg(0)	1.002e-09					
Hg	1.002e-09	1.002e-09	-8.999	-8.999	0.000	(0)
Hg(1)	3.697e-29					
Hg2+2	1.848e-29	4.469e-30	-28.733	-29.350	-0.617	(0)
Hg(2)	2.362e-18					
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
Hg(OH)2	1.682e-22	1.718e-22	-21.774	-21.765	0.009	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
HgOH+	2.768e-26	1.941e-26	-25.558	-25.712	-0.154	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Hg+2	3.648e-29	8.820e-30	-28.438	-29.055	-0.617	(0)
HgSO4	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Hg(OH)3-	1.911e-30	1.340e-30	-29.719	-29.873	-0.154	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
K	1.593e-03					
K+	1.549e-03	1.219e-03	-2.810	-2.914	-0.104	(0)
KSO4-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
Mg	1.017e-02					
Mg+2	7.920e-03	3.036e-03	-2.101	-2.518	-0.416	(0)
MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)

MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
MgH2P04+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
MgOH+	6.402e-08	5.162e-08	-7.194	-7.287	-0.094	(0)
MgP04-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
Mn(2)	2.231e-04					
Mn+2	1.882e-04	4.549e-05	-3.725	-4.342	-0.617	(0)
MnS04	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
MnOH+	6.606e-09	5.213e-09	-8.180	-8.283	-0.103	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Mn(OH)3-	2.129e-19	1.680e-19	-18.672	-18.775	-0.103	(0)
MnSe04	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
Mn(OH)4-2	8.666e-26	3.361e-26	-25.062	-25.474	-0.411	(0)
MnN03+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
Mn(N03)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Mn(3)	9.732e-29					
Mn+3	9.732e-29	1.125e-29	-28.012	-28.949	-0.937	(0)
Mn(6)	0.000e+00					
Mn04-2	0.000e+00	0.000e+00	-65.730	-66.142	-0.411	(0)
Mn(7)	0.000e+00					
Mn04-	0.000e+00	0.000e+00	-74.661	-74.779	-0.119	(0)
N(-3)	5.021e-04					
NH4+	4.805e-04	3.617e-04	-3.318	-3.442	-0.123	(0)
NH4S04-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
NH3	9.560e-07	9.560e-07	-6.020	-6.020	0.000	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
N(3)	1.148e-35					
N02-	1.148e-35	8.735e-36	-34.940	-35.059	-0.119	(0)
CoN02+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CuN02+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
Cu(N02)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-48.382	-48.486	-0.104	(0)
CaN03+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
MnN03+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
CoN03+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
NiN03+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
ZnN03+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
PbN03+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
CdN03+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
CuN03+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
FeN03+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
HgN03+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Mn(N03)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)

Na	Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
	4.781e-02						
	Na+	4.677e-02	3.680e-02	-1.330	-1.434	-0.104	(0)
	NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
Ni	NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
	7.703e-06						
	Ni+2	5.664e-06	2.171e-06	-5.247	-5.663	-0.416	(0)
	NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
	NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
	NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
	NiOH+	1.818e-09	1.275e-09	-8.741	-8.895	-0.154	(0)
	Ni(SO4)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
	NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
	Ni(OH)2	8.335e-12	8.335e-12	-11.079	-11.079	0.000	(0)
	Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
	Ni(OH)3-	7.365e-16	5.164e-16	-15.133	-15.287	-0.154	(0)
	NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
	NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
O(0)	0.000e+00						
P	O2	0.000e+00	0.000e+00	-55.993	-55.984	0.009	(0)
	2.206e-05						
	H2PO4-	6.634e-06	5.268e-06	-5.178	-5.278	-0.100	(0)
	HPO4-2	5.222e-06	2.025e-06	-5.282	-5.694	-0.411	(0)
	MgHPO4	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
	FeHPO4	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
	FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
	NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
	MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
	CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
	CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
	KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
	CoHPO4	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
	CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
	MgPO4-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
	H3PO4	1.150e-10	1.150e-10	-9.939	-9.939	0.000	(0)
	PO4-3	4.196e-11	4.850e-12	-10.377	-11.314	-0.937	(0)
	FeHPO4+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
	FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
Pb	1.455e-08						
	Pb+2	5.480e-09	2.100e-09	-8.261	-8.678	-0.416	(0)
	PbSO4	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
	PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
	PbOH+	4.662e-10	3.269e-10	-9.331	-9.486	-0.154	(0)
	Pb(SO4)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
	PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
	PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
	Pb(OH)2	6.405e-13	6.405e-13	-12.193	-12.193	0.000	(0)
	PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
	Pb2OH+3	2.655e-16	1.088e-17	-15.576	-16.963	-1.387	(0)
	Pb(OH)3-	5.660e-17	3.969e-17	-16.247	-16.401	-0.154	(0)
	Pb(OH)4-2	2.491e-21	6.022e-22	-20.604	-21.220	-0.617	(0)
	Pb3(OH)4+2	3.779e-23	9.137e-24	-22.423	-23.039	-0.617	(0)
	Pb4(OH)4+4	5.175e-26	1.768e-28	-25.286	-27.753	-2.466	(0)
	PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
	Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
S(6)	1.553e-02						
	SO4-2	1.094e-02	4.194e-03	-1.961	-2.377	-0.416	(0)
	MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
	NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
	CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
	FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
	KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
	MnSO4	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
	NH4SO4-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
	CoSO4	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
	NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
	ZnSO4	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
	Zn(SO4)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)

HSO4-	7.527e-08	5.892e-08	-7.123	-7.230	-0.106	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
PbSO4	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
Al(SO4)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ni(SO4)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
Cd(SO4)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
Pb(SO4)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
CuSO4	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
FeSO4+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe(SO4)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
HgSO4	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Se(-2)	4.685e-09					
HSe-	4.677e-09	3.279e-09	-8.330	-8.484	-0.154	(0)
H2Se	4.054e-12	4.054e-12	-11.392	-11.392	0.000	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Se-2	6.423e-17	1.553e-17	-16.192	-16.809	-0.617	(0)
Se(4)	3.770e-07					
HSeO3-	3.526e-07	2.472e-07	-6.453	-6.607	-0.154	(0)
SeO3-2	2.442e-08	5.904e-09	-7.612	-8.229	-0.617	(0)
H2SeO3	1.653e-11	1.653e-11	-10.782	-10.782	0.000	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Se(6)	2.478e-21					
SeO4-2	2.463e-21	9.439e-22	-20.609	-21.025	-0.416	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
HSeO4-	9.645e-27	6.763e-27	-26.016	-26.170	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
Zn	2.612e-06					
Zn+2	1.813e-06	6.948e-07	-5.742	-6.158	-0.416	(0)
ZnSO4	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(SO4)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
ZnOH+	4.520e-09	3.170e-09	-8.345	-8.499	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
Zn(OH)2	4.227e-11	4.227e-11	-10.374	-10.374	0.000	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
Zn(OH)3-	1.872e-14	1.313e-14	-13.728	-13.882	-0.154	(0)
Zn(OH)4-2	1.339e-19	3.238e-20	-18.873	-19.490	-0.617	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-124.48	-118.20	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-28.70	-24.17	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.96	-24.17	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-179.81	-161.88	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.93	-20.82	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-28.36	-27.91	0.45	(NH4)2SeO4
Al(OH)3(am)	0.09	11.16	11.06	Al(OH)3
Al2O3	2.05	22.32	20.27	Al2O3
Al4(OH)10SO4	5.98	28.68	22.70	Al4(OH)10SO4
AlOHSO4	-1.57	-4.80	-3.23	AlOHSO4
Alunite	6.34	5.44	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.24	-11.06	-7.82	PbSO4
Anhydrite	-1.07	-5.41	-4.34	CaSO4

Antlerite	-12.92	-4.13	8.79	Cu3(OH)4SO4
Atacamite	-7.99	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.78	-8.54	-1.76	ZnSO4:6H2O
Birnessite	-18.88	-0.79	18.09	MnO2
Bixbyite	-16.81	-17.16	-0.35	Mn2O3
Boehmite	2.30	11.16	8.86	AlOOH
Brochantite	-15.89	-0.19	15.71	Cu4(OH)6SO4
Brucite	-6.06	11.06	17.12	Mg(OH)2
Bunsenite	-4.77	7.92	12.68	NiO
Ca3(P04)2(beta)	-2.69	-31.73	-29.05	Ca3(P04)2
Ca4H(P04)3:3H2O	-5.80	-52.88	-47.08	Ca4H(P04)3:3H2O
CaHP04	-1.79	-21.14	-19.35	CaHP04
CaHP04:2H2O	-2.09	-21.14	-19.05	CaHP04:2H2O
Calomel	-14.15	-32.28	-18.13	Hg2Cl2
CaSeO3:2H2O	-5.71	-2.85	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-21.06	-24.06	-3.00	CaSeO4:2H2O
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-23.45	-16.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-23.34	-0.78	22.56	Cd3(OH)4SO4
Cd3(P04)2	-15.59	-48.19	-32.60	Cd3(P04)2
Cd4(OH)6SO4	-24.12	4.28	28.40	Cd4(OH)6SO4
CdCl2	-10.84	-11.45	-0.61	CdCl2
CdCl2:1H2O	-9.78	-11.45	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-9.52	-11.46	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.21	-10.52	13.69	Cd
Cdmetal(gamma)	-24.32	-10.52	13.80	Cd
CdOHCl	-6.81	-3.20	3.61	CdOHCl
CdSe	10.17	-10.21	-20.38	CdSe
CdSeO4:2H2O	-27.70	-29.55	-1.85	CdSeO4:2H2O
CdSO4	-10.85	-10.90	-0.05	CdSO4
CdSO4:1H2O	-9.25	-10.90	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-9.07	-10.90	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.36	-12.02	-2.65	CuSO4:5H2O
Clausthalite	17.01	-10.37	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.05	-16.14	-2.09	Co(OH)3
Co3(P04)2	-3.27	-37.95	-34.69	Co3(P04)2
Co3O4	-13.57	-23.81	-10.24	Co3O4
CoCl2	-16.50	-8.04	8.46	CoCl2
CoCl2:6H2O	-10.56	-8.05	2.52	CoCl2:6H2O
CoFe2O4	21.18	18.03	-3.15	CoFe2O4
CoHP04	-4.15	-23.21	-19.06	CoHP04
CoO	-5.37	8.47	13.84	CoO
CoSe	9.40	-6.80	-16.20	CoSe
CoSeO3	-6.24	-4.92	1.32	CoSeO3
CoSeO4:6H2O	-24.61	-26.14	-1.53	CoSeO4:6H2O
CoSO4	-10.48	-7.49	2.99	CoSO4
CoSO4:6H2O	-5.02	-7.49	-2.48	CoSO4:6H2O
Cotunnite	-6.77	-11.61	-4.84	PbCl2
Cu(OH)2	-4.87	3.94	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.82	-47.39	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.69	-17.62	-46.31	Cu2Se
Cu2SO4	-16.40	-18.30	-1.90	Cu2SO4
Cu3(P04)2	-14.69	-51.54	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-16.42	-51.54	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.35	-28.95	-64.30	Cu3Se2
Cumetal	-0.04	-8.96	-8.93	Cu
CuOCuSO4	-18.70	-8.07	10.63	CuOCuSO4
Cupricferrite	7.02	13.50	6.49	CuFe2O4
Cuprite	-1.24	-2.35	-1.11	Cu2O
Cuprousferrite	12.49	3.61	-8.88	CuFeO2
CuSe	22.06	-11.33	-33.39	CuSe
CuSe2	22.68	-11.02	-33.70	CuSe2
CuSeO3:2H2O	-10.05	-9.46	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-28.23	-30.67	-2.44	CuSeO4:5H2O
CuSO4	-15.13	-12.01	3.11	CuSO4
Diaspore	4.04	11.16	7.12	AlOOH

Epsomite	-2.75	-4.90	-2.15	MgSO4:7H2O
Fe(OH)2	-3.44	10.12	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.34	2.30	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-5.39	-3.84	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-10.00	-30.63	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-35.15	-38.31	-3.16	Fe2(SO4)3
Fe3(OH)8	-0.54	19.68	20.22	Fe3(OH)8
Ferrihydrite	1.41	4.78	3.37	Fe(OH)3
Ferroselite	13.87	-4.84	-18.71	FeSe2
FeSe	5.86	-5.15	-11.00	FeSe
Gibbsite	2.64	11.16	8.52	Al(OH)3
Goethite	4.15	4.78	0.64	FeOOH
Goslarite	-6.50	-8.54	-2.05	ZnSO4:7H2O
Gypsum	-0.80	-5.41	-4.61	CaSO4:2H2O
H-Jarosite	-6.02	-17.57	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-10.35	-15.27	-4.92	H2Se
Halite	-4.49	-2.90	1.59	NaCl
Hausmannite	-18.74	43.29	62.03	Mn3O4
Hematite	10.67	9.56	-1.11	Fe2O3
Hercynite	8.80	32.44	23.64	FeAl2O4
Hg(g)	-7.75	-15.67	-7.93	Hg
Hg(OH)2	-18.27	-21.76	-3.50	Hg(OH)2
Hg2(g)	-16.26	-31.35	-15.09	Hg2
Hg2(OH)2	-21.03	-15.77	5.26	Hg2(OH)2
Hg2HPO4	-22.68	-47.45	-24.77	Hg2HPO4
Hg2SeO3	-24.51	-29.17	-4.66	Hg2SeO3
Hg2SO4	-25.58	-31.73	-6.14	Hg2SO4
HgCl(g)	-36.02	-16.14	19.88	HgCl
HgCl2	-16.76	-38.28	-21.52	HgCl2
Hgmetal(l)	-2.02	-15.67	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSeO3	-22.73	-35.16	-12.43	HgSeO3
HgSO4	-28.27	-37.72	-9.45	HgSO4
Hinsdalite	-6.76	-9.26	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	2.00	-42.33	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-7.75	-70.54	-62.79	Pb5(PO4)3OH
K-Alum	-11.65	-16.89	-5.24	KAl(SO4)2:12H2O
K-Jarosite	0.79	-13.70	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-26.12	-26.85	-0.73	K2SeO4
Langite	-18.07	-0.19	17.88	Cu4(OH)6SO4:H2O
Larnakite	-5.77	-6.15	-0.38	PbO:PbSO4
Laurionite	-3.98	-3.35	0.62	PbOHCl
Lepidocrocite	3.41	4.78	1.37	FeOOH
Lime	-22.62	10.54	33.16	CaO
Litharge	-7.95	4.90	12.85	PbO
Maghemite	3.18	9.56	6.39	Fe2O3
Magnesioferrite	3.10	20.62	17.52	Fe2MgO4
Magnetite	15.79	19.69	3.90	Fe3O4
Manganite	-8.31	17.03	25.34	MnOOH
Massicot	-8.15	4.90	13.05	PbO
Melanothallite	-18.98	-12.57	6.41	CuCl2
Melanterite	-3.58	-5.84	-2.26	FeSO4:7H2O
Mg(OH)2(active)	-7.73	11.06	18.79	Mg(OH)2
Mg3(PO4)2	-6.90	-30.18	-23.28	Mg3(PO4)2
MgHP04:3H2O	-2.45	-20.62	-18.18	MgHP04:3H2O
MgSeO3:6H2O	-5.38	-2.34	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-22.35	-23.55	-1.20	MgSeO4:6H2O
Minium	-44.24	30.28	74.53	Pb3O4
Mirabilite	-3.95	-5.25	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-59.71	-65.03	-5.32	Mn2(SO4)3
Mn3(PO4)2	-11.81	-35.65	-23.85	Mn3(PO4)2
MnCl2:4H2O	-10.02	-7.28	2.74	MnCl2:4H2O
MnHP04	2.95	-22.45	-25.40	MnHP04
MnSe	-9.77	-6.04	3.73	MnSe
MnSeO3	-5.29	-4.16	1.13	MnSeO3
MnSeO3:2H2O	-5.12	-4.16	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-23.32	-25.37	-2.05	MnSeO4:5H2O
MnSO4	-9.46	-6.72	2.74	MnSO4

Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.22	-21.76	-3.55	HgO
Morenosite	-5.87	-8.05	-2.17	NiSO4:7H2O
Na-Jarosite	-1.38	-12.22	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-12.99	-2.69	10.30	Na2SeO3:5H2O
Na2SeO4	-25.17	-23.89	1.28	Na2SeO4
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.11	7.91	13.02	Ni(OH)2
Ni3(PO4)2	-8.32	-39.62	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-16.30	15.70	32.00	Ni4(OH)6SO4
NiSe	10.34	-7.36	-17.70	NiSe
NiSeO3:2H2O	-8.37	-5.48	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-25.17	-26.69	-1.52	NiSeO4:6H2O
Nsutite	-18.29	-0.79	17.50	MnO2
O2(g)	-53.29	31.16	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.25	1.55	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-16.39	9.80	26.19	Pb2O(OH)2
Pb2O3	-35.66	25.38	61.04	Pb2O3
Pb3(PO4)2	-5.13	-48.66	-43.53	Pb3(PO4)2
Pb3O2SO4	-12.13	-1.25	10.87	Pb3O2SO4
Pb4(OH)6SO4	-17.45	3.65	21.10	Pb4(OH)6SO4
Pb4O3SO4	-18.55	3.65	22.20	Pb4O3SO4
PbHP04	-2.98	-26.78	-23.81	PbHP04
Pbmetal	-14.92	-10.68	4.24	Pb
PbO:0.3H2O	-8.08	4.90	12.98	PbO:0.33H2O
PbSeO4	-22.83	-29.70	-6.88	PbSeO4
Periclase	-10.88	11.06	21.94	MgO
Plattnerite	-29.83	20.48	50.31	PbO2
Plumbgummite	7.80	-24.99	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-12.57	10.54	23.11	Ca(OH)2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-17.21	24.82	42.03	MnO2
Pyromorphite	5.63	-78.80	-84.43	Pb5(PO4)3Cl
Retgersite	-6.00	-8.05	-2.05	NiSO4:6H2O
Semetal(am)	7.44	0.31	-7.14	Se
Semetal(hex)	8.05	0.31	-7.75	Se
SeO2	-13.52	-13.40	0.12	SeO2
SeO3	-56.00	-34.60	21.39	SeO3
Spinel	-4.39	33.38	37.77	MgAl2O4
Strengite	-0.53	-26.90	-26.38	FePO4:2H2O
Tenorite	-3.86	3.94	7.80	CuO
Thenardite	-5.59	-5.25	0.34	Na2SO4
Tsumebite	-8.15	-17.94	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	3.00	-33.00	-36.00	Fe3(PO4)2:8H2O
Zincite	-4.13	7.42	11.55	ZnO
Zincosite	-12.66	-8.54	4.13	ZnSO4
Zn(NO3)2:6H2O	-106.39	-103.14	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.78	7.42	12.20	Zn(OH)2
Zn(OH)2(am)	-5.25	7.42	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.42	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.31	7.42	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.42	11.73	Zn(OH)2
Zn2(OH)2SO4	-8.62	-1.12	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.61	6.58	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-5.69	-41.11	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-29.18	-9.65	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-14.68	13.72	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.91	20.59	38.50	Zn5(OH)8Cl2
ZnCl2	-16.31	-9.09	7.22	ZnCl2
Znmetal	-34.31	-8.16	26.15	Zn
ZnO(active)	-3.98	7.42	11.40	ZnO
ZnSe	6.61	-7.85	-14.46	ZnSe
ZnSeO4:6H2O	-25.67	-27.19	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-8.00	-8.54	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 5.
Using reaction 6.

Mixture 5.

9.540e-01 Solution 1
4.600e-02 Solution 6

Reaction 6.

3.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000

Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	1.456e-05	1.378e-05
Ca	3.445e-03	3.259e-03
Cd	2.835e-08	2.681e-08
Cl	4.593e-02	4.344e-02
Co	4.217e-05	3.989e-05
Cu	5.181e-06	4.901e-06
Fe	1.908e-03	1.805e-03
Hg	1.059e-09	1.002e-09
K	1.684e-03	1.593e-03
Mg	1.075e-02	1.017e-02
Mn	2.359e-04	2.231e-04
N	5.308e-04	5.021e-04
Na	5.054e-02	4.781e-02
Ni	8.144e-06	7.703e-06
P	2.332e-05	2.206e-05
Pb	1.538e-08	1.455e-08
S	1.642e-02	1.553e-02
Se	4.035e-07	3.817e-07
Zn	2.761e-06	2.612e-06

-----Description of solution-----

pH	=	6.788	Charge balance
pe	=	1.012	Adjusted to redox equilibrium
Activity of water	=	0.998	
Ionic strength (mol/kgw)	=	9.763e-02	
Mass of water (kg)	=	9.460e-01	
Total alkalinity (eq/kg)	=	6.633e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	6.374e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	4.58	
Iterations	=	4	
Total H	=	1.050158e+02	

Total O = 5.256909e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.076e-07	1.627e-07	-6.683	-6.788	-0.106	0.00
OH-	5.945e-08	4.546e-08	-7.226	-7.342	-0.117	(0)
H2O	5.551e+01	9.978e-01	1.744	-0.001	0.000	18.05
Al	1.456e-05					
Al(OH)4-	9.475e-06	7.383e-06	-5.023	-5.132	-0.108	(0)
Al(OH)2+	2.522e-06	1.994e-06	-5.598	-5.700	-0.102	(0)
Al(OH)3	2.457e-06	2.457e-06	-5.610	-5.610	0.000	(0)
AlOH+2	7.998e-08	3.129e-08	-7.097	-7.505	-0.408	(0)
AlSO4+	2.440e-08	1.901e-08	-7.613	-7.721	-0.108	(0)
Al+3	5.896e-09	6.587e-10	-8.229	-9.181	-0.952	(0)
Al(SO4)2-	1.238e-09	9.649e-10	-8.907	-9.016	-0.108	(0)
Ca	3.445e-03					
Ca+2	2.531e-03	9.555e-04	-2.597	-3.020	-0.423	(0)
CaSO4	9.129e-04	9.129e-04	-3.040	-3.040	0.000	(0)
CaHP04	8.567e-07	8.567e-07	-6.067	-6.067	0.000	(0)
CaH2PO4+	1.385e-07	1.095e-07	-6.859	-6.960	-0.102	(0)
CaPO4-	1.623e-08	1.283e-08	-7.790	-7.892	-0.102	(0)
CaNH3+2	6.874e-09	1.600e-09	-8.163	-8.796	-0.633	(0)
CaOH+	1.038e-09	8.281e-10	-8.984	-9.082	-0.098	(0)
Ca(NH3)2+2	3.639e-15	8.468e-16	-14.439	-15.072	-0.633	(0)
CaNO3+	0.000e+00	0.000e+00	-50.730	-50.888	-0.158	(0)
Cd	2.835e-08					
CdCl+	1.496e-08	1.039e-08	-7.825	-7.983	-0.158	(0)
Cd+2	8.051e-09	3.039e-09	-8.094	-8.517	-0.423	(0)
CdSO4	2.945e-09	2.945e-09	-8.531	-8.531	0.000	(0)
CdCl2	1.541e-09	1.541e-09	-8.812	-8.812	0.000	(0)
Cd(SO4)2-2	7.765e-10	1.807e-10	-9.110	-9.743	-0.633	(0)
CdCl3-	4.849e-11	3.368e-11	-10.314	-10.473	-0.158	(0)
CdOHCl	2.394e-11	2.394e-11	-10.621	-10.621	0.000	(0)
CdOH+	1.589e-12	1.104e-12	-11.799	-11.957	-0.158	(0)
Cd(OH)2	5.806e-16	5.806e-16	-15.236	-15.236	0.000	(0)
Cd2OH+3	4.695e-19	1.766e-20	-18.328	-19.753	-1.425	(0)
Cd(SeO3)2-2	4.318e-19	1.005e-19	-18.365	-18.998	-0.633	(0)
Cd(OH)3-	3.153e-21	2.190e-21	-20.501	-20.660	-0.158	(0)
CdSeO4	5.861e-28	5.861e-28	-27.232	-27.232	0.000	(0)
Cd(OH)4-2	9.510e-29	2.213e-29	-28.022	-28.655	-0.633	(0)
CdHS+	7.901e-39	5.488e-39	-38.102	-38.261	-0.158	(0)
CdNO3+	0.000e+00	0.000e+00	-56.190	-56.348	-0.158	(0)
Cd(HS)2	0.000e+00	0.000e+00	-68.808	-68.808	0.000	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-104.501	-104.659	-0.158	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.079	-105.079	0.000	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.582	-140.215	-0.633	(0)
Cl	4.593e-02					
Cl-	4.591e-02	3.599e-02	-1.338	-1.444	-0.106	(0)
CuCl2-	4.624e-06	3.571e-06	-5.335	-5.447	-0.112	(0)
MnCl+	2.670e-06	2.098e-06	-5.573	-5.678	-0.105	(0)
CoCl+	1.407e-06	9.770e-07	-5.852	-6.010	-0.158	(0)
CuCl	4.703e-07	4.703e-07	-6.328	-6.328	0.000	(0)
NiCl+	2.947e-07	2.047e-07	-6.531	-6.689	-0.158	(0)
MnCl2	1.067e-07	1.067e-07	-6.972	-6.972	0.000	(0)
ZnCl+	8.147e-08	6.291e-08	-7.089	-7.201	-0.112	(0)
CuCl3-2	7.093e-08	2.705e-08	-7.149	-7.568	-0.419	(0)
CdCl+	1.496e-08	1.039e-08	-7.825	-7.983	-0.158	(0)
ZnOHCl	5.238e-09	5.238e-09	-8.281	-8.281	0.000	(0)
PbCl+	3.752e-09	2.606e-09	-8.426	-8.584	-0.158	(0)
ZnCl2	3.017e-09	3.017e-09	-8.520	-8.520	0.000	(0)
CdCl2	1.541e-09	1.541e-09	-8.812	-8.812	0.000	(0)
MnCl3-	1.345e-09	1.057e-09	-8.871	-8.976	-0.105	(0)
PbCl2	4.114e-10	4.114e-10	-9.386	-9.386	0.000	(0)
ZnCl3-	1.099e-10	8.484e-11	-9.959	-10.071	-0.112	(0)
CdCl3-	4.849e-11	3.368e-11	-10.314	-10.473	-0.158	(0)

NiCl ₂	3.749e-11	3.749e-11	-10.426	-10.426	0.000	(0)
CdOHCl	2.394e-11	2.394e-11	-10.621	-10.621	0.000	(0)
CuCl+	1.599e-11	1.234e-11	-10.796	-10.909	-0.112	(0)
PbCl ₃ -	8.866e-12	6.158e-12	-11.052	-11.211	-0.158	(0)
ZnCl ₄ -2	3.877e-12	1.478e-12	-11.411	-11.830	-0.419	(0)
PbCl ₄ -2	4.103e-13	9.549e-14	-12.387	-13.020	-0.633	(0)
CuCl ₂	1.265e-13	1.265e-13	-12.898	-12.898	0.000	(0)
FeCl+2	6.802e-16	2.594e-16	-15.167	-15.586	-0.419	(0)
FeCl ₂ +	6.020e-17	4.730e-17	-16.220	-16.325	-0.105	(0)
CuCl ₃ -	5.121e-17	3.954e-17	-16.291	-16.403	-0.112	(0)
HgCl ₂	1.707e-18	1.707e-18	-17.768	-17.768	0.000	(0)
HgCl ₃ -	8.922e-19	6.197e-19	-18.050	-18.208	-0.158	(0)
HgCl ₄ -2	3.958e-19	9.210e-20	-18.403	-19.036	-0.633	(0)
FeCl ₃	1.702e-19	1.702e-19	-18.769	-18.769	0.000	(0)
HgClOH	3.938e-20	3.938e-20	-19.405	-19.405	0.000	(0)
CuCl ₄ -2	2.142e-20	8.168e-21	-19.669	-20.088	-0.419	(0)
HgCl+	1.158e-23	8.041e-24	-22.936	-23.095	-0.158	(0)
CoCl+2	9.366e-36	2.180e-36	-35.028	-35.662	-0.633	(0)
Co(NH ₃) ₅ Cl+2	2.049e-39	4.769e-40	-38.688	-39.322	-0.633	(0)
Co(NH ₃) ₆ Cl+2	0.000e+00	0.000e+00	-51.259	-51.892	-0.633	(0)
Co(2)	4.217e-05					
Co+2	3.409e-05	7.934e-06	-4.467	-5.101	-0.633	(0)
CoSO ₄	6.634e-06	6.634e-06	-5.178	-5.178	0.000	(0)
CoCl+	1.407e-06	9.770e-07	-5.852	-6.010	-0.158	(0)
CoHPO ₄	1.670e-08	1.670e-08	-7.777	-7.777	0.000	(0)
CoOH+	1.407e-08	9.774e-09	-7.852	-8.010	-0.158	(0)
Co(NH ₃) ₂	7.785e-09	1.812e-09	-8.109	-8.742	-0.633	(0)
Co(OH) ₂	4.793e-11	4.793e-11	-10.319	-10.319	0.000	(0)
Co(NH ₃) ₂ +2	3.092e-13	7.195e-14	-12.510	-13.143	-0.633	(0)
Co ₂ OH+3	1.033e-13	3.886e-15	-12.986	-14.410	-1.425	(0)
Co(OH) ₃ -	8.501e-17	5.905e-17	-16.071	-16.229	-0.158	(0)
Co(NH ₃) ₃ +2	5.176e-18	1.205e-18	-17.286	-17.919	-0.633	(0)
CoOOH-	5.122e-18	3.557e-18	-17.291	-17.449	-0.158	(0)
Co ₄ (OH) ₄ +4	6.207e-22	1.821e-24	-21.207	-23.740	-2.533	(0)
Co(NH ₃) ₄ +2	3.612e-23	8.406e-24	-22.442	-23.075	-0.633	(0)
CoSeO ₄	3.855e-24	3.855e-24	-23.414	-23.414	0.000	(0)
Co(OH) ₄ -2	2.483e-24	5.778e-25	-23.605	-24.238	-0.633	(0)
Co(NH ₃) ₅ +2	7.971e-29	1.855e-29	-28.098	-28.732	-0.633	(0)
CoNO ₂ +	8.514e-40	5.914e-40	-39.070	-39.228	-0.158	(0)
CoNO ₃ +	0.000e+00	0.000e+00	-53.123	-53.282	-0.158	(0)
Co(NO ₃) ₂	0.000e+00	0.000e+00	-101.354	-101.354	0.000	(0)
Co(3)	4.381e-31					
CoOH+2	4.381e-31	1.020e-31	-30.358	-30.992	-0.633	(0)
CoCl+2	9.366e-36	2.180e-36	-35.028	-35.662	-0.633	(0)
Co+3	2.909e-36	3.250e-37	-35.536	-36.488	-0.952	(0)
Co(NH ₃) ₅ Cl+2	2.049e-39	4.769e-40	-38.688	-39.322	-0.633	(0)
Co(NH ₃) ₆ SO ₄ +	0.000e+00	0.000e+00	-47.775	-47.934	-0.158	(0)
Co(NH ₃) ₆ Cl+2	0.000e+00	0.000e+00	-51.259	-51.892	-0.633	(0)
Co(NH ₃) ₆ OH+2	0.000e+00	0.000e+00	-52.576	-53.209	-0.633	(0)
Cu(1)	5.180e-06					
CuCl ₂ -	4.624e-06	3.571e-06	-5.335	-5.447	-0.112	(0)
CuCl	4.703e-07	4.703e-07	-6.328	-6.328	0.000	(0)
CuCl ₃ -2	7.093e-08	2.705e-08	-7.149	-7.568	-0.419	(0)
Cu+	1.495e-08	1.038e-08	-7.825	-7.984	-0.158	(0)
Cu(S ₄) ₂ -3	0.000e+00	0.000e+00	-66.095	-66.520	-0.424	(0)
CuS ₄ S ₅ -3	0.000e+00	0.000e+00	-66.849	-67.250	-0.400	(0)
Cu(2)	8.979e-10					
Cu+2	6.000e-10	2.265e-10	-9.222	-9.645	-0.423	(0)
CuSO ₄	2.145e-10	2.145e-10	-9.669	-9.669	0.000	(0)
CuOH+	4.706e-11	3.634e-11	-10.327	-10.440	-0.112	(0)
CuNH ₃ +2	1.966e-11	4.575e-12	-10.706	-11.340	-0.633	(0)
CuCl+	1.599e-11	1.234e-11	-10.796	-10.909	-0.112	(0)
Cu(OH) ₂	5.448e-13	5.448e-13	-12.264	-12.264	0.000	(0)
CuCl ₂	1.265e-13	1.265e-13	-12.898	-12.898	0.000	(0)
Cu ₂ (OH) ₂ +2	1.387e-16	3.227e-17	-15.858	-16.491	-0.633	(0)
Cu(OH) ₃ -	9.933e-17	6.899e-17	-16.003	-16.161	-0.158	(0)
CuCl ₃ -	5.121e-17	3.954e-17	-16.291	-16.403	-0.112	(0)
CuCl ₄ -2	2.142e-20	8.168e-21	-19.669	-20.088	-0.419	(0)

Cu(OH)4-2	1.440e-22	3.352e-23	-21.841	-22.475	-0.633	(0)
CuNO2+	0.000e+00	0.000e+00	-42.442	-42.601	-0.158	(0)
CuNO3+	0.000e+00	0.000e+00	-57.358	-57.516	-0.158	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.566	-76.566	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.842	-97.000	-0.158	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-106.807	-106.807	0.000	(0)
Fe(2)	1.908e-03					
Fe+2	1.539e-03	3.580e-04	-2.813	-3.446	-0.633	(0)
FeSO4	3.647e-04	3.647e-04	-3.438	-3.438	0.000	(0)
FeHP04	2.750e-06	2.750e-06	-5.561	-5.561	0.000	(0)
FeH2PO4+	1.124e-06	8.890e-07	-5.949	-6.051	-0.102	(0)
FeOH+	8.246e-07	6.480e-07	-6.084	-6.188	-0.105	(0)
Fe(OH)2	2.239e-11	2.239e-11	-10.650	-10.650	0.000	(0)
Fe(OH)3-	5.359e-13	4.212e-13	-12.271	-12.376	-0.105	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.999	-69.999	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.555	-105.713	-0.158	(0)
Fe(3)	3.377e-07					
Fe(OH)2+	3.278e-07	2.593e-07	-6.484	-6.586	-0.102	(0)
Fe(OH)3	9.728e-09	9.728e-09	-8.012	-8.012	0.000	(0)
Fe(OH)4-	1.250e-10	9.882e-11	-9.903	-10.005	-0.102	(0)
FeOH+2	2.250e-11	8.581e-12	-10.648	-11.066	-0.419	(0)
FeHP04+	6.452e-12	5.103e-12	-11.190	-11.292	-0.102	(0)
FeSO4+	1.461e-14	1.148e-14	-13.835	-13.940	-0.105	(0)
Fe+3	2.424e-15	2.708e-16	-14.615	-15.567	-0.952	(0)
Fe(SO4)2-	1.582e-15	1.099e-15	-14.801	-14.959	-0.158	(0)
FeCl+2	6.802e-16	2.594e-16	-15.167	-15.586	-0.419	(0)
FeH2PO4+2	6.512e-17	2.547e-17	-16.186	-16.594	-0.408	(0)
FeCl2+	6.020e-17	4.730e-17	-16.220	-16.325	-0.105	(0)
Fe2(OH)2+4	9.587e-19	2.812e-21	-18.018	-20.551	-2.533	(0)
FeHSeO3+2	6.940e-19	1.615e-19	-18.159	-18.792	-0.633	(0)
FeCl3	1.702e-19	1.702e-19	-18.769	-18.769	0.000	(0)
Fe3(OH)4+5	9.159e-23	1.011e-26	-22.038	-25.995	-3.957	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.227	-62.860	-0.633	(0)
H(0)	3.606e-19					
H2	1.803e-19	1.844e-19	-18.744	-18.734	0.010	(0)
Hg(0)	1.059e-09					
Hg	1.059e-09	1.059e-09	-8.975	-8.975	0.000	(0)
Hg(1)	4.544e-29					
Hg2+2	2.272e-29	5.287e-30	-28.644	-29.277	-0.633	(0)
Hg(2)	3.035e-18					
HgCl2	1.707e-18	1.707e-18	-17.768	-17.768	0.000	(0)
HgCl3-	8.922e-19	6.197e-19	-18.050	-18.208	-0.158	(0)
HgCl4-2	3.958e-19	9.210e-20	-18.403	-19.036	-0.633	(0)
HgClOH	3.938e-20	3.938e-20	-19.405	-19.405	0.000	(0)
Hg(OH)2	1.867e-22	1.909e-22	-21.729	-21.719	0.010	(0)
Hg(NH3)2+2	1.473e-22	3.428e-23	-21.832	-22.465	-0.633	(0)
HgCl+	1.158e-23	8.041e-24	-22.936	-23.095	-0.158	(0)
HgOH+	3.116e-26	2.164e-26	-25.506	-25.665	-0.158	(0)
HgNH3+2	2.862e-26	6.661e-27	-25.543	-26.176	-0.633	(0)
Hg(NH3)3+2	1.120e-27	2.606e-28	-26.951	-27.584	-0.633	(0)
Hg+2	4.242e-29	9.871e-30	-28.372	-29.006	-0.633	(0)
HgSO4	9.012e-30	9.012e-30	-29.045	-29.045	0.000	(0)
Hg(OH)3-	2.137e-30	1.484e-30	-29.670	-29.829	-0.158	(0)
Hg(NH3)4+2	1.708e-32	3.976e-33	-31.767	-32.401	-0.633	(0)
HgHS2-	0.000e+00	0.000e+00	-65.728	-65.887	-0.158	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.281	-66.281	0.000	(0)
HgS2-2	0.000e+00	0.000e+00	-67.173	-67.806	-0.633	(0)
HgNO3+	0.000e+00	0.000e+00	-77.756	-77.914	-0.158	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.676	-126.676	0.000	(0)
K	1.684e-03					
K+	1.636e-03	1.282e-03	-2.786	-2.892	-0.106	(0)
KSO4-	4.865e-05	3.848e-05	-4.313	-4.415	-0.102	(0)
KHP04-	2.373e-08	1.876e-08	-7.625	-7.727	-0.102	(0)
Mg	1.075e-02					
Mg+2	8.339e-03	3.148e-03	-2.079	-2.502	-0.423	(0)
MgSO4	2.406e-03	2.406e-03	-2.619	-2.619	0.000	(0)
MgHP04	3.896e-06	3.896e-06	-5.409	-5.409	0.000	(0)
MgH2PO4+	9.754e-07	7.714e-07	-6.011	-6.113	-0.102	(0)

MgOH+	6.639e-08	5.334e-08	-7.178	-7.273	-0.095	(0)
MgP04-	8.356e-10	6.608e-10	-9.078	-9.180	-0.102	(0)
Mn(2)	2.359e-04					
Mn+2	1.990e-04	4.632e-05	-3.701	-4.334	-0.633	(0)
MnSO4	3.405e-05	3.405e-05	-4.468	-4.468	0.000	(0)
MnCl+	2.670e-06	2.098e-06	-5.573	-5.678	-0.105	(0)
MnCl2	1.067e-07	1.067e-07	-6.972	-6.972	0.000	(0)
MnOH+	6.730e-09	5.289e-09	-8.172	-8.277	-0.105	(0)
MnCl3-	1.345e-09	1.057e-09	-8.871	-8.976	-0.105	(0)
MnSe	3.467e-12	3.467e-12	-11.460	-11.460	0.000	(0)
Mn(OH)3-	2.153e-19	1.692e-19	-18.667	-18.772	-0.105	(0)
MnSeO4	1.196e-23	1.196e-23	-22.922	-22.922	0.000	(0)
Mn(OH)4-2	8.845e-26	3.373e-26	-25.053	-25.472	-0.419	(0)
MnNO3+	0.000e+00	0.000e+00	-52.357	-52.515	-0.158	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.492	-100.492	0.000	(0)
Mn(3)	1.055e-28					
Mn+3	1.055e-28	1.178e-29	-27.977	-28.929	-0.952	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-65.678	-66.096	-0.419	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-74.601	-74.722	-0.121	(0)
N(-3)	5.308e-04					
NH4+	5.073e-04	3.796e-04	-3.295	-3.421	-0.126	(0)
NH4SO4-	2.244e-05	1.763e-05	-4.649	-4.754	-0.105	(0)
NH3	9.998e-07	9.998e-07	-6.000	-6.000	0.000	(0)
NiNH3+2	9.958e-09	2.318e-09	-8.002	-8.635	-0.633	(0)
Co(NH3)+2	7.785e-09	1.812e-09	-8.109	-8.742	-0.633	(0)
CaNH3+2	6.874e-09	1.600e-09	-8.163	-8.796	-0.633	(0)
CuNH3+2	1.966e-11	4.675e-12	-10.706	-11.340	-0.633	(0)
Ni(NH3)2+2	2.445e-12	5.689e-13	-11.612	-12.245	-0.633	(0)
Co(NH3)2+2	3.092e-13	7.195e-14	-12.510	-13.143	-0.633	(0)
Ca(NH3)2+2	3.639e-15	8.468e-16	-14.439	-15.072	-0.633	(0)
Co(NH3)3+2	5.176e-18	1.205e-18	-17.286	-17.919	-0.633	(0)
Hg(NH3)2+2	1.473e-22	3.428e-23	-21.832	-22.465	-0.633	(0)
Co(NH3)4+2	3.612e-23	8.406e-24	-22.442	-23.075	-0.633	(0)
HgNH3+2	2.862e-26	6.661e-27	-25.543	-26.176	-0.633	(0)
Hg(NH3)3+2	1.120e-27	2.606e-28	-26.951	-27.584	-0.633	(0)
Co(NH3)5+2	7.971e-29	1.855e-29	-28.098	-28.732	-0.633	(0)
Hg(NH3)4+2	1.708e-32	3.976e-33	-31.767	-32.401	-0.633	(0)
Co(NH3)5Cl+2	2.049e-39	4.769e-40	-38.688	-39.322	-0.633	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.775	-47.934	-0.158	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.259	-51.892	-0.633	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.576	-53.209	-0.633	(0)
N(3)	1.398e-35					
NO2-	1.398e-35	1.058e-35	-34.855	-34.976	-0.121	(0)
CoNO2+	8.514e-40	5.914e-40	-39.070	-39.228	-0.158	(0)
CuNO2+	0.000e+00	0.000e+00	-42.442	-42.601	-0.158	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.566	-76.566	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-48.275	-48.381	-0.106	(0)
CaNO3+	0.000e+00	0.000e+00	-50.730	-50.888	-0.158	(0)
MnNO3+	0.000e+00	0.000e+00	-52.357	-52.515	-0.158	(0)
CoNO3+	0.000e+00	0.000e+00	-53.123	-53.282	-0.158	(0)
NiNO3+	0.000e+00	0.000e+00	-53.471	-53.629	-0.158	(0)
ZnNO3+	0.000e+00	0.000e+00	-53.956	-54.115	-0.158	(0)
PbNO3+	0.000e+00	0.000e+00	-55.727	-55.885	-0.158	(0)
CdNO3+	0.000e+00	0.000e+00	-56.190	-56.348	-0.158	(0)
CuNO3+	0.000e+00	0.000e+00	-57.358	-57.516	-0.158	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.227	-62.860	-0.633	(0)
HgNO3+	0.000e+00	0.000e+00	-77.756	-77.914	-0.158	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.492	-100.492	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.354	-101.354	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.207	-103.207	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.016	-104.016	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.079	-105.079	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-106.807	-106.807	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.676	-126.676	0.000	(0)
Na	5.054e-02					

Na+	4.941e-02	3.873e-02	-1.306	-1.412	-0.106	(0)
NaSO4-	1.134e-03	8.968e-04	-2.945	-3.047	-0.102	(0)
NaHPO4-	1.110e-06	8.779e-07	-5.955	-6.057	-0.102	(0)
Ni	8.144e-06					
Ni+2	5.953e-06	2.247e-06	-5.225	-5.648	-0.423	(0)
NiSO4	1.883e-06	1.883e-06	-5.725	-5.725	0.000	(0)
NiCl+	2.947e-07	2.047e-07	-6.531	-6.689	-0.158	(0)
NiNH3+2	9.958e-09	2.318e-09	-8.002	-8.635	-0.633	(0)
NiOH+	1.893e-09	1.315e-09	-8.723	-8.881	-0.158	(0)
Ni(SO4)2-2	1.199e-09	2.791e-10	-8.921	-9.554	-0.633	(0)
NiCl2	3.749e-11	3.749e-11	-10.426	-10.426	0.000	(0)
Ni(OH)2	8.566e-12	8.566e-12	-11.067	-11.067	0.000	(0)
Ni(NH3)2+2	2.445e-12	5.689e-13	-11.612	-12.245	-0.633	(0)
Ni(OH)3-	7.614e-16	5.288e-16	-15.118	-15.277	-0.158	(0)
NiSeO4	1.008e-24	1.008e-24	-23.997	-23.997	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-53.471	-53.629	-0.158	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.950	-55.940	0.010	(0)
P	2.332e-05					
H2PO4-	6.914e-06	5.468e-06	-5.160	-5.262	-0.102	(0)
HP04-2	5.494e-06	2.095e-06	-5.260	-5.679	-0.419	(0)
MgHP04	3.896e-06	3.896e-06	-5.409	-5.409	0.000	(0)
FeHP04	2.750e-06	2.750e-06	-5.561	-5.561	0.000	(0)
FeH2PO4+	1.124e-06	8.890e-07	-5.949	-6.051	-0.102	(0)
NaHPO4-	1.110e-06	8.779e-07	-5.955	-6.057	-0.102	(0)
MgH2PO4+	9.754e-07	7.714e-07	-6.011	-6.113	-0.102	(0)
CaHP04	8.567e-07	8.567e-07	-6.067	-6.067	0.000	(0)
CaH2PO4+	1.385e-07	1.095e-07	-6.859	-6.960	-0.102	(0)
KHP04-	2.373e-08	1.876e-08	-7.625	-7.727	-0.102	(0)
CoHP04	1.670e-08	1.670e-08	-7.777	-7.777	0.000	(0)
CaP04-	1.623e-08	1.283e-08	-7.790	-7.892	-0.102	(0)
MgP04-	8.356e-10	6.608e-10	-9.078	-9.180	-0.102	(0)
H3P04	1.198e-10	1.198e-10	-9.921	-9.921	0.000	(0)
P04-3	4.476e-11	5.000e-12	-10.349	-11.301	-0.952	(0)
FeHP04+	6.452e-12	5.103e-12	-11.190	-11.292	-0.102	(0)
FeH2PO4+2	6.512e-17	2.547e-17	-16.186	-16.594	-0.408	(0)
Pb	1.538e-08					
Pb+2	5.670e-09	2.141e-09	-8.246	-8.669	-0.423	(0)
PbSO4	4.546e-09	4.546e-09	-8.342	-8.342	0.000	(0)
PbCl+	3.752e-09	2.606e-09	-8.426	-8.584	-0.158	(0)
Pb(SO4)2-2	5.104e-10	1.188e-10	-9.292	-9.925	-0.633	(0)
PbOH+	4.780e-10	3.320e-10	-9.321	-9.479	-0.158	(0)
PbCl2	4.114e-10	4.114e-10	-9.386	-9.386	0.000	(0)
PbCl3-	8.866e-12	6.158e-12	-11.052	-11.211	-0.158	(0)
Pb(OH)2	6.481e-13	6.481e-13	-12.188	-12.188	0.000	(0)
PbCl4-2	4.103e-13	9.549e-14	-12.387	-13.020	-0.633	(0)
Pb2OH+3	2.994e-16	1.126e-17	-15.524	-16.948	-1.425	(0)
Pb(OH)3-	5.761e-17	4.002e-17	-16.239	-16.398	-0.158	(0)
Pb(OH)4-2	2.600e-21	6.051e-22	-20.585	-21.218	-0.633	(0)
Pb3(OH)4+2	4.097e-23	9.535e-24	-22.387	-23.021	-0.633	(0)
Pb4(OH)4+4	6.410e-26	1.880e-28	-25.193	-27.726	-2.533	(0)
PbNO3+	0.000e+00	0.000e+00	-55.727	-55.885	-0.158	(0)
Pb(HS)2	0.000e+00	0.000e+00	-68.902	-68.902	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.016	-104.016	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.195	-105.354	-0.158	(0)
S(-2)	6.767e-38					
H2S	3.408e-38	3.408e-38	-37.467	-37.467	0.000	(0)
HS-	2.552e-38	1.773e-38	-37.593	-37.751	-0.158	(0)
CdHS+	7.901e-39	5.488e-39	-38.102	-38.261	-0.158	(0)
S5-2	1.643e-40	0.000e+00	-39.784	-40.418	-0.633	(0)
S6-2	0.000e+00	0.000e+00	-40.211	-40.844	-0.633	(0)
S4-2	0.000e+00	0.000e+00	-40.384	-41.017	-0.633	(0)
S3-2	0.000e+00	0.000e+00	-41.197	-41.830	-0.633	(0)
S2-2	0.000e+00	0.000e+00	-42.223	-42.856	-0.633	(0)
S-2	0.000e+00	0.000e+00	-47.962	-48.381	-0.419	(0)
HgHS2-	0.000e+00	0.000e+00	-65.728	-65.887	-0.158	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.095	-66.520	-0.424	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.281	-66.281	0.000	(0)

CuS4S5-3	0.000e+00	0.000e+00	-66.849	-67.250	-0.400	(0)
HgS2-2	0.000e+00	0.000e+00	-67.173	-67.806	-0.633	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-67.891	-68.049	-0.158	(0)
Cd(HS)2	0.000e+00	0.000e+00	-68.808	-68.808	0.000	(0)
Zn(HS)2	0.000e+00	0.000e+00	-68.827	-68.827	0.000	(0)
Pb(HS)2	0.000e+00	0.000e+00	-68.902	-68.902	0.000	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.999	-69.999	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.842	-97.000	-0.158	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.140	-103.299	-0.158	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-104.501	-104.659	-0.158	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.195	-105.354	-0.158	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.555	-105.713	-0.158	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-105.857	-106.490	-0.633	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.582	-140.215	-0.633	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-141.877	-142.510	-0.633	(0)
S(6)	1.642e-02					
S04-2	1.149e-02	4.336e-03	-1.940	-2.363	-0.423	(0)
MgS04	2.406e-03	2.406e-03	-2.619	-2.619	0.000	(0)
NaS04-	1.134e-03	8.968e-04	-2.945	-3.047	-0.102	(0)
CaS04	9.129e-04	9.129e-04	-3.040	-3.040	0.000	(0)
FeS04	3.647e-04	3.647e-04	-3.438	-3.438	0.000	(0)
KS04-	4.865e-05	3.848e-05	-4.313	-4.415	-0.102	(0)
MnS04	3.405e-05	3.405e-05	-4.468	-4.468	0.000	(0)
NH4S04-	2.244e-05	1.763e-05	-4.649	-4.754	-0.105	(0)
CoS04	6.634e-06	6.634e-06	-5.178	-5.178	0.000	(0)
NiS04	1.883e-06	1.883e-06	-5.725	-5.725	0.000	(0)
ZnS04	6.573e-07	6.573e-07	-6.182	-6.182	0.000	(0)
Zn(S04)2-2	1.104e-07	2.568e-08	-6.957	-7.590	-0.633	(0)
HS04-	7.844e-08	6.112e-08	-7.105	-7.214	-0.108	(0)
AlS04+	2.440e-08	1.901e-08	-7.613	-7.721	-0.108	(0)
PbS04	4.546e-09	4.546e-09	-8.342	-8.342	0.000	(0)
CdS04	2.945e-09	2.945e-09	-8.531	-8.531	0.000	(0)
Al(S04)2-	1.238e-09	9.649e-10	-8.907	-9.016	-0.108	(0)
Ni(S04)2-2	1.199e-09	2.791e-10	-8.921	-9.554	-0.633	(0)
Cd(S04)2-2	7.765e-10	1.807e-10	-9.110	-9.743	-0.633	(0)
Pb(S04)2-2	5.104e-10	1.188e-10	-9.292	-9.925	-0.633	(0)
CuS04	2.145e-10	2.145e-10	-9.669	-9.669	0.000	(0)
FeS04+	1.461e-14	1.148e-14	-13.835	-13.940	-0.105	(0)
Fe(S04)2-	1.582e-15	1.099e-15	-14.801	-14.959	-0.158	(0)
HgS04	9.012e-30	9.012e-30	-29.045	-29.045	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.775	-47.934	-0.158	(0)
Se(-2)	4.263e-09					
HSe-	4.256e-09	2.956e-09	-8.371	-8.529	-0.158	(0)
H2Se	3.667e-12	3.667e-12	-11.436	-11.436	0.000	(0)
MnSe	3.467e-12	3.467e-12	-11.460	-11.460	0.000	(0)
Se-2	5.994e-17	1.395e-17	-16.222	-16.855	-0.633	(0)
Se(4)	3.993e-07					
HSe03-	3.728e-07	2.589e-07	-6.429	-6.587	-0.158	(0)
Se03-2	2.648e-08	6.162e-09	-7.577	-8.210	-0.633	(0)
H2Se03	1.737e-11	1.737e-11	-10.760	-10.760	0.000	(0)
FeHSe03+2	6.940e-19	1.615e-19	-18.159	-18.792	-0.633	(0)
Cd(Se03)2-2	4.318e-19	1.005e-19	-18.365	-18.998	-0.633	(0)
Se(6)	2.760e-21					
Se04-2	2.743e-21	1.036e-21	-20.562	-20.985	-0.423	(0)
MnSe04	1.196e-23	1.196e-23	-22.922	-22.922	0.000	(0)
CoSe04	3.855e-24	3.855e-24	-23.414	-23.414	0.000	(0)
NiSe04	1.008e-24	1.008e-24	-23.997	-23.997	0.000	(0)
ZnSe04	1.150e-25	1.150e-25	-24.939	-24.939	0.000	(0)
HSe04-	1.072e-26	7.445e-27	-25.970	-26.128	-0.158	(0)
CdSe04	5.861e-28	5.861e-28	-27.232	-27.232	0.000	(0)
Zn(Se04)2-2	0.000e+00	0.000e+00	-45.285	-45.918	-0.633	(0)
Zn	2.761e-06					
Zn+2	1.899e-06	7.169e-07	-5.721	-6.145	-0.423	(0)
ZnS04	6.573e-07	6.573e-07	-6.182	-6.182	0.000	(0)
Zn(S04)2-2	1.104e-07	2.568e-08	-6.957	-7.590	-0.633	(0)
ZnCl+	8.147e-08	6.291e-08	-7.089	-7.201	-0.112	(0)
ZnOHCl	5.238e-09	5.238e-09	-8.281	-8.281	0.000	(0)
ZnOH+	4.692e-09	3.259e-09	-8.329	-8.487	-0.158	(0)

ZnCl2	3.017e-09	3.017e-09	-8.520	-8.520	0.000	(0)
ZnCl3-	1.099e-10	8.484e-11	-9.959	-10.071	-0.112	(0)
Zn(OH)2	4.331e-11	4.331e-11	-10.363	-10.363	0.000	(0)
ZnCl4-2	3.877e-12	1.478e-12	-11.411	-11.830	-0.419	(0)
Zn(OH)3-	1.929e-14	1.340e-14	-13.715	-13.873	-0.158	(0)
Zn(OH)4-2	1.415e-19	3.294e-20	-18.849	-19.482	-0.633	(0)
ZnSeO4	1.150e-25	1.150e-25	-24.939	-24.939	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.285	-45.918	-0.633	(0)
ZnNO3+	0.000e+00	0.000e+00	-53.956	-54.115	-0.158	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-67.891	-68.049	-0.158	(0)
Zn(HS)2	0.000e+00	0.000e+00	-68.827	-68.827	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.140	-103.299	-0.158	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.207	-103.207	0.000	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-105.857	-106.490	-0.633	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-141.877	-142.510	-0.633	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2-124.13	-117.86	6.27	(Co(NH3)5Cl)(NO3)2	
(Co(NH3)5Cl)Cl2 -28.52	-23.98	4.54	(Co(NH3)5Cl)Cl2	
(Co(NH3)5OH2)Cl3 -35.78	-23.98	11.80	(Co(NH3)5OH2)Cl3	
(Co(NH3)6)(NO3)3-179.35	-161.42	17.93	(Co(NH3)6)(NO3)3	
(Co(NH3)6)Cl3 -40.72	-20.61	20.11	(Co(NH3)6)Cl3	
(NH4)2SeO4 -28.28	-27.83	0.45	(NH4)2SeO4	
Al(OH)3(am) 0.12	11.18	11.06	Al(OH)3	
Al2O3 2.10	22.37	20.27	Al2O3	
Al4(OH)10SO4 6.09	28.79	22.70	Al4(OH)10SO4	
AlOHSO4 -1.53	-4.76	-3.23	AlOHSO4	
Alunite 6.46	5.56	-0.90	KAl3(SO4)2(OH)6	
Anglesite -3.21	-11.03	-7.82	PbSO4	
Anhydrite -1.04	-5.38	-4.34	CaSO4	
Anilite -13.04	-45.35	-32.31	Cu0.25Cu1.5S	
Antlerite -12.94	-4.15	8.79	Cu3(OH)4SO4	
Atacamite -7.98	-0.37	7.61	Cu2(OH)3Cl	
Bianchite -6.75	-8.51	-1.76	ZnSO4:6H2O	
Birnessite -18.86	-0.76	18.09	MnO2	
Bixbyite -16.78	-17.13	-0.35	Mn2O3	
BlaubleiI -17.08	-41.24	-24.16	Cu0.9Cu0.2S	
BlaubleiII -15.86	-43.14	-27.28	Cu0.6Cu0.8S	
Boehmite 2.32	11.18	8.86	AlOOH	
Brochantite -15.92	-0.22	15.71	Cu4(OH)6SO4	
Brucite -6.04	11.07	17.12	Mg(OH)2	
Bunsenite -4.76	7.93	12.68	NiO	
Ca3(PO4)2(beta) -2.61	-31.66	-29.05	Ca3(PO4)2	
Ca4H(PO4)3:3H2O -5.69	-52.77	-47.08	Ca4H(PO4)3:3H2O	
CaHP04 -1.76	-21.11	-19.35	CaHP04	
CaHP04:2H2O -2.06	-21.11	-19.05	CaHP04:2H2O	
Calomel -14.04	-32.16	-18.13	Hg2Cl2	
CaSeO3:2H2O -5.68	-2.82	2.86	CaSeO3:2H2O	
CaSeO4:2H2O -21.01	-24.01	-3.00	CaSeO4:2H2O	
Cd(OH)2 -8.81	5.06	13.87	Cd(OH)2	
Cd(OH)2(am) -8.88	5.06	13.94	Cd(OH)2	
Cd3(OH)2(SO4)2 -23.41	-16.70	6.71	Cd3(OH)2(SO4)2	
Cd3(OH)4SO4 -23.32	-0.76	22.56	Cd3(OH)4SO4	
Cd3(PO4)2 -15.55	-48.15	-32.60	Cd3(PO4)2	
Cd4(OH)6SO4 -24.11	4.29	28.40	Cd4(OH)6SO4	
CdCl2 -10.79	-11.40	-0.61	CdCl2	
CdCl2:1H2O -9.73	-11.41	-1.68	CdCl2:1H2O	
CdCl2:2.5H2O -9.48	-11.41	-1.93	CdCl2:2.5H2O	
Cdmetal(alpha) -24.24	-10.54	13.69	Cd	
Cdmetal(gamma) -24.34	-10.54	13.80	Cd	
CdOHCl -6.78	-3.17	3.61	CdOHCl	
CdSe 10.12	-10.26	-20.38	CdSe	
CdSeO4:2H2O -27.65	-29.50	-1.85	CdSeO4:2H2O	
CdSO4 -10.83	-10.88	-0.05	CdSO4	
CdSO4:1H2O -9.23	-10.88	-1.65	CdSO4:1H2O	

CdSO4:2.67H2O	-9.05	-10.88	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.36	-12.01	-2.65	CuSO4:5H2O
Chalcocite	-11.61	-46.93	-35.32	Cu2S
Chalcopyrite	-39.39	-75.02	-35.62	CuFeS2
Cinnabar	-19.96	-66.26	-46.30	HgS
Clausthalite	16.97	-10.41	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.04	-16.13	-2.09	Co(OH)3
Co3(P04)2	-3.22	-37.90	-34.69	Co3(P04)2
Co3O4	-13.53	-23.77	-10.24	Co3O4
CoCl2	-16.45	-7.99	8.46	CoCl2
CoCl2:6H2O	-10.51	-7.99	2.52	CoCl2:6H2O
CoFe2O4	21.22	18.07	-3.15	CoFe2O4
CoHP04	-4.13	-23.19	-19.06	CoHP04
CoO	-5.36	8.48	13.84	CoO
CoS(alpha)	-28.62	-36.06	-7.44	CoS
CoS(beta)	-24.99	-36.06	-11.07	CoS
CoSe	9.36	-6.84	-16.20	CoSe
CoSeO3	-6.22	-4.90	1.32	CoSeO3
CoSeO4:6H2O	-24.56	-26.09	-1.53	CoSeO4:6H2O
CoS04	-10.45	-7.46	2.99	CoS04
CoS04:6H2O	-4.99	-7.47	-2.48	CoS04:6H2O
Cotunnite	-6.71	-11.56	-4.84	PbCl2
Covellite	-18.08	-40.61	-22.53	CuS
Cu(OH)2	-4.88	3.93	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.73	-47.31	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.60	-17.71	-46.31	Cu2Se
Cu2S04	-16.43	-18.33	-1.90	Cu2S04
Cu3(P04)2	-14.69	-51.54	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-16.42	-51.54	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.21	-29.09	-64.30	Cu3Se2
Cumetal	-0.07	-9.00	-8.93	Cu
CuOCuS04	-18.71	-8.08	10.63	CuOCuS04
Cupricferrite	7.04	13.52	6.49	CuFe2O4
Cuprite	-1.28	-2.39	-1.11	Cu2O
Cuprousferrite	12.48	3.60	-8.88	CuFeO2
CuSe	22.00	-11.39	-33.39	CuSe
CuSe2	22.60	-11.10	-33.70	CuSe2
CuSeO3:2H2O	-10.04	-9.45	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-28.19	-30.63	-2.44	CuSeO4:5H2O
CuS04	-15.12	-12.01	3.11	CuS04
Diaspore	4.06	11.18	7.12	AlOOH
Djurleite	-12.12	-46.51	-34.40	Cu0.066Cu1.868S
Epsomite	-2.72	-4.87	-2.15	MgSO4:7H2O
Fe(OH)2	-3.43	10.13	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.37	2.33	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-5.34	-3.78	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-9.91	-30.53	-20.63	Fe2(SeO3)3:2H2O
Fe2(S04)3	-35.07	-38.22	-3.16	Fe2(S04)3
Fe3(OH)8	-0.50	19.72	20.22	Fe3(OH)8
Ferrihydrite	1.43	4.80	3.37	Fe(OH)3
Ferroselite	13.81	-4.90	-18.71	FeSe2
FeS(ppt)	-31.49	-34.41	-2.92	FeS
FeSe	5.82	-5.19	-11.00	FeSe
Galena	-25.47	-39.63	-14.16	PbS
Gibbsite	2.66	11.18	8.52	Al(OH)3
Goethite	4.16	4.80	0.64	FeOOH
Goslarite	-6.47	-8.51	-2.05	ZnSO4:7H2O
Greenockite	-24.99	-39.48	-14.49	CdS
Greigite	-113.40	-158.43	-45.03	Fe3S4
Gypsum	-0.77	-5.38	-4.61	CaSO4:2H2O
H-Jarosite	-5.94	-17.49	-11.55	(H3O)Fe3(S04)2(OH)6
H2S(g)	-36.53	-44.54	-8.01	H2S
H2Se(g)	-10.39	-15.32	-4.92	H2Se
Halite	-4.45	-2.86	1.59	NaCl
Hausmannite	-18.71	43.33	62.03	Mn3O4
Hematite	10.70	9.59	-1.11	Fe2O3
Hercynite	8.85	32.50	23.64	FeAl2O4

Hg(g)	-7.72	-15.65	-7.93	Hg
Hg(OH)2	-18.22	-21.72	-3.50	Hg(OH)2
Hg2(g)	-16.21	-31.30	-15.09	Hg2
Hg2(OH)2	-20.96	-15.70	5.26	Hg2(OH)2
Hg2HP04	-22.59	-47.37	-24.77	Hg2HP04
Hg2S	-48.40	-60.24	-11.84	Hg2S
Hg2Se03	-24.42	-29.08	-4.66	Hg2Se03
Hg2S04	-25.50	-31.64	-6.14	Hg2S04
HgCl(g)	-35.97	-16.08	19.88	HgCl
HgCl2	-16.66	-38.18	-21.52	HgCl2
Hgmetal(l)	-2.00	-15.65	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSe03	-22.66	-35.09	-12.43	HgSe03
HgS04	-28.20	-37.66	-9.45	HgS04
Hinsdalite	-6.65	-9.15	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	2.12	-42.21	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-7.67	-70.46	-62.79	Pb5(P04)3OH
K-Alum	-11.57	-16.81	-5.24	KAl(S04)2·12H2O
K-Jarosite	0.89	-13.59	-14.49	KFe3(S04)2(OH)6
K2Se04	-26.04	-26.77	-0.73	K2Se04
Langite	-18.10	-0.22	17.88	Cu4(OH)6S04·H2O
Larnakite	-5.74	-6.13	-0.38	PbO·PbS04
Laurionite	-3.95	-3.33	0.62	PbOHCl
Lepidocrocite	3.43	4.80	1.37	Fe00H
Lime	-22.60	10.56	33.16	CaO
Litharge	-7.94	4.91	12.85	PbO
Mackinawite	-30.81	-34.41	-3.60	FeS
Maghemite	3.21	9.59	6.39	Fe203
Magnesioferrite	3.14	20.67	17.52	Fe2Mg04
Magnetite	15.82	19.72	3.90	Fe304
Manganite	-8.30	17.04	25.34	Mn00H
Massicot	-8.15	4.91	13.05	PbO
Melanothallite	-18.94	-12.53	6.41	CuCl2
Melanterite	-3.56	-5.82	-2.26	FeS04·7H2O
Metacinnabar	-20.56	-66.26	-45.70	HgS
Mg(OH)2(active)	-7.72	11.07	18.79	Mg(OH)2
Mg3(P04)2	-6.83	-30.11	-23.28	Mg3(P04)2
MgHP04·3H2O	-2.42	-20.59	-18.18	MgHP04·3H2O
MgSe03·6H2O	-5.35	-2.31	3.04	MgSe03·6H2O
MgSe04·6H2O	-22.29	-23.49	-1.20	MgSe04·6H2O
Minium	-44.21	30.32	74.53	Pb304
Mirabilite	-3.89	-5.20	-1.30	Na2S04·10H2O
Mn2(S04)3	-59.62	-64.95	-5.32	Mn2(S04)3
Mn3(P04)2	-11.76	-35.60	-23.85	Mn3(P04)2
MnCl2·4H2O	-9.97	-7.23	2.74	MnCl2·4H2O
MnHP04	2.98	-22.42	-25.40	MnHP04
MnS(grn)	-35.54	-35.30	0.25	MnS
MnS(pnk)	-38.64	-35.30	3.34	MnS
MnSe	-9.81	-6.08	3.73	MnSe
MnSe03	-5.26	-4.13	1.13	MnSe03
MnSe03·2H2O	-5.10	-4.13	0.96	MnSe03·2H2O
MnSe04·5H2O	-23.27	-25.32	-2.05	MnSe04·5H2O
MnS04	-9.43	-6.70	2.74	MnS04
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.17	-21.72	-3.55	HgO
Morenosite	-5.84	-8.02	-2.17	NiS04·7H2O
Na-Jarosite	-1.28	-12.11	-10.84	NaFe3(S04)2(OH)6
Na2Se03·5H2O	-12.93	-2.63	10.30	Na2Se03·5H2O
Na2Se04	-25.09	-23.81	1.28	Na2Se04
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.10	7.93	13.02	Ni(OH)2
Ni3(P04)2	-8.25	-39.55	-31.30	Ni3(P04)2
Ni4(OH)6S04	-16.23	15.77	32.00	Ni4(OH)6S04
NiS(alpha)	-31.01	-36.61	-5.60	NiS
NiS(beta)	-25.51	-36.61	-11.10	NiS
NiS(gamma)	-23.81	-36.61	-12.80	NiS
NiSe	10.31	-7.39	-17.70	NiSe
NiSe03·2H2O	-8.34	-5.45	2.89	NiSe03·2H2O

NiSeO4:6H2O	-25.12	-26.64	-1.52	NiSeO4:6H2O
Nsutite	-18.27	-0.76	17.50	MnO2
O2(g)	-53.25	31.20	84.45	O2
Pb(OH)2	-3.38	4.91	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.21	1.58	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-16.38	9.81	26.19	Pb2O(OH)2
Pb2O3	-35.63	25.41	61.04	Pb2O3
Pb3(PO4)2	-5.08	-48.61	-43.53	Pb3(PO4)2
Pb3O2SO4	-12.09	-1.22	10.87	Pb3O2SO4
Pb4(OH)6SO4	-17.42	3.68	21.10	Pb4(OH)6SO4
Pb4O3SO4	-18.51	3.69	22.20	Pb4O3SO4
PbHP04	-2.95	-26.76	-23.81	PbHP04
Pbmetal	-14.94	-10.69	4.24	Pb
PbO:0.3H2O	-8.07	4.91	12.98	PbO:0.33H2O
PbSeO4	-22.78	-29.65	-6.88	PbSeO4
Periclase	-10.87	11.07	21.94	MgO
Plattnerite	-29.80	20.51	50.31	PbO2
Plumbgummite	7.91	-24.88	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-12.56	10.56	23.11	Ca(OH)2
Pyrite	-44.72	-63.35	-18.63	FeS2
Pyrochroite	-6.18	9.24	15.43	Mn(OH)2
Pyrolusite	-17.19	24.84	42.03	MnO2
Pyromorphite	5.74	-78.69	-84.43	Pb5(PO4)3Cl
Retgersite	-5.97	-8.02	-2.05	NiSO4:6H2O
Semetal(am)	7.42	0.28	-7.14	Se
Semetal(hex)	8.03	0.28	-7.75	Se
SeO2	-13.50	-13.37	0.12	SeO2
SeO3	-55.95	-34.56	21.39	SeO3
Sphalerite	-25.59	-37.11	-11.52	ZnS
Spinel	-4.33	33.44	37.77	MgAl2O4
Strengite	-0.49	-26.87	-26.38	FePO4:2H2O
Sulfur	-26.83	-28.94	-2.11	S
Tenorite	-3.87	3.93	7.80	CuO
Thenardite	-5.53	-5.19	0.34	Na2SO4
Tsumebite	-8.13	-17.92	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	3.05	-32.95	-36.00	Fe3(PO4)2:8H2O
Wurtzite	-28.11	-37.11	-9.00	ZnS
Zincite	-4.12	7.43	11.55	ZnO
Zincosite	-12.63	-8.51	4.13	ZnSO4
Zn(NO3)2:6H2O	-106.17	-102.91	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.77	7.43	12.20	Zn(OH)2
Zn(OH)2(am)	-5.24	7.43	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.52	7.43	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.30	7.43	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.30	7.43	11.73	Zn(OH)2
Zn2(OH)2SO4	-8.58	-1.08	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.56	6.63	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-5.62	-41.04	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-29.11	-9.58	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-14.62	13.78	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.81	20.69	38.50	Zn5(OH)8Cl2
ZnCl2	-16.25	-9.03	7.22	ZnCl2
Znmetal	-34.32	-8.17	26.15	Zn
ZnO(active)	-3.97	7.43	11.40	ZnO
ZnS(am)	-28.02	-37.11	-9.09	ZnS
ZnSe	6.58	-7.89	-14.46	ZnSe
ZnSeO4:6H2O	-25.62	-27.14	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.98	-8.51	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 9.

SOLUTION 7 # Mean Groundwater quality

temp 21
 pH 6.79
 pe 1
 redox pe
 units mg/l
 density 1
 Al 0.37
 Alkalinity 0
 As 0
 Ba 0
 Be 0
 B 0
 Cd 0.003
 Co 2.34
 Cr 0
 Cu 0.31
 Fe 100.34
 Pb 0.003
 Mn 12.2
 Mo 0
 V 0
 Zn 0.17
 Se 0.03
 Ni 0.45
 N 7
 P 0.68
 Ca 130
 Mg 246
 Na 1094
 K 62
 Cl 1533
 S(6) 1485
 Hg 0.0002
 water 1 # kg

MIX 6
 1 0.954
 7 0.046

REACTION 7

H2O -1

3

END #Time-step 7

Beginning of initial solution calculations.

Initial solution 7.

-----Solution composition-----

Elements	Molality	Moles
Al	1.378e-05	1.378e-05
Ca	3.259e-03	3.259e-03
Cd	2.681e-08	2.681e-08
Cl	4.344e-02	4.344e-02
Co	3.989e-05	3.989e-05
Cu	4.901e-06	4.901e-06
Fe	1.805e-03	1.805e-03
Hg	1.002e-09	1.002e-09
K	1.593e-03	1.593e-03
Mg	1.017e-02	1.017e-02
Mn	2.231e-04	2.231e-04
N	5.021e-04	5.021e-04
Na	4.781e-02	4.781e-02
Ni	7.703e-06	7.703e-06

P	2.206e-05	2.206e-05
Pb	1.455e-08	1.455e-08
S(6)	1.553e-02	1.553e-02
Se	3.817e-07	3.817e-07
Zn	2.612e-06	2.612e-06

-----Description of solution-----

pH	=	6.790
pe	=	1.000
Activity of water	=	0.998
Ionic strength (mol/kgw)	=	9.259e-02
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	6.274e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	21.00
Electrical balance (eq)	=	6.374e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	4.58
Iterations	=	13
Total H	=	1.110158e+02
Total O	=	5.556909e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.061e-07	1.622e-07	-6.686	-6.790	-0.104	0.00
OH-	5.935e-08	4.562e-08	-7.227	-7.341	-0.114	(0)
H2O	5.551e+01	9.980e-01	1.744	-0.001	0.000	18.05
Al	1.378e-05					
Al(OH)4-	8.973e-06	7.024e-06	-5.047	-5.153	-0.106	(0)
Al(OH)2+	2.373e-06	1.884e-06	-5.625	-5.725	-0.100	(0)
Al(OH)3	2.329e-06	2.329e-06	-5.633	-5.633	0.000	(0)
AlOH+2	7.409e-08	2.945e-08	-7.130	-7.531	-0.401	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
Al+3	5.344e-09	6.178e-10	-8.272	-9.209	-0.937	(0)
Al(SO4)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ca	3.259e-03					
Ca+2	2.406e-03	9.221e-04	-2.619	-3.035	-0.416	(0)
CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CaOH+	1.001e-09	8.020e-10	-8.999	-9.096	-0.096	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
Cd	2.681e-08					
CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
Cd+2	7.874e-09	3.018e-09	-8.104	-8.520	-0.416	(0)
CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
Cd(SO4)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
CdOH+	1.568e-12	1.100e-12	-11.805	-11.959	-0.154	(0)
Cd(OH)2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
Cd2OH+3	4.264e-19	1.748e-20	-18.370	-19.758	-1.387	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Cd(OH)3-	3.135e-21	2.198e-21	-20.504	-20.658	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Cd(OH)4-2	9.222e-29	2.230e-29	-28.035	-28.652	-0.617	(0)
CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cl	4.344e-02					
Cl-	4.343e-02	3.417e-02	-1.362	-1.466	-0.104	(0)

CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(2)	3.989e-05					
Co+2	3.225e-05	7.797e-06	-4.491	-5.108	-0.617	(0)
CoSO4	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CoHPO4	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CoOH+	1.375e-08	9.639e-09	-7.862	-8.016	-0.154	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
Co(OH)2	4.744e-11	4.744e-11	-10.324	-10.324	0.000	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Co2OH+3	9.190e-14	3.766e-15	-13.037	-14.424	-1.387	(0)
Co(OH)3-	8.364e-17	5.865e-17	-16.078	-16.232	-0.154	(0)
CoOOH-	5.039e-18	3.533e-18	-17.298	-17.452	-0.154	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Co4(OH)4+4	5.041e-22	1.722e-24	-21.297	-23.764	-2.466	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
Co(OH)4-2	2.382e-24	5.759e-25	-23.623	-24.240	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Co(3)	4.042e-31					
CoOH+2	4.042e-31	9.773e-32	-30.393	-31.010	-0.617	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co+3	2.685e-36	3.104e-37	-35.571	-36.508	-0.937	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
Cu(1)	4.900e-06					
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)

CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
Cu+	1.553e-08	1.089e-08	-7.809	-7.963	-0.154	(0)
Cu(2)	8.967e-10					
Cu+2	6.026e-10	2.310e-10	-9.220	-9.636	-0.416	(0)
CuS04	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
CuOH+	4.792e-11	3.719e-11	-10.319	-10.430	-0.110	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
Cu(OH)2	5.595e-13	5.595e-13	-12.252	-12.252	0.000	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
Cu2(OH)2+2	1.398e-16	3.379e-17	-15.855	-16.471	-0.617	(0)
Cu(OH)3-	1.014e-16	7.111e-17	-15.994	-16.148	-0.154	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
Cu(OH)4-2	1.434e-22	3.468e-23	-21.843	-22.460	-0.617	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Fe(2)	1.805e-03					
Fe+2	1.454e-03	3.515e-04	-2.837	-3.454	-0.617	(0)
FeS04	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
FeHP04	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2P04+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
FeOH+	8.090e-07	6.384e-07	-6.092	-6.195	-0.103	(0)
Fe(OH)2	2.214e-11	2.214e-11	-10.655	-10.655	0.000	(0)
Fe(OH)3-	5.296e-13	4.179e-13	-12.276	-12.379	-0.103	(0)
Fe(3)	3.233e-07					
Fe(OH)2+	3.138e-07	2.491e-07	-6.503	-6.604	-0.100	(0)
Fe(OH)3	9.382e-09	9.382e-09	-8.028	-8.028	0.000	(0)
Fe(OH)4-	1.205e-10	9.565e-11	-9.919	-10.019	-0.100	(0)
FeOH+2	2.119e-11	8.217e-12	-10.674	-11.085	-0.411	(0)
FeHP04+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeS04+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe+3	2.235e-15	2.584e-16	-14.651	-15.588	-0.937	(0)
Fe(S04)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeH2P04+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
Fe2(OH)2+4	7.548e-19	2.579e-21	-18.122	-20.589	-2.466	(0)
FeHSe03+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
Fe3(OH)4+5	6.361e-23	8.906e-27	-22.197	-26.050	-3.854	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
H(0)	3.796e-19					
H2	1.898e-19	1.939e-19	-18.722	-18.712	0.009	(0)
Hg(0)	1.002e-09					
Hg	1.002e-09	1.002e-09	-8.999	-8.999	0.000	(0)
Hg(1)	3.697e-29					
Hg2+2	1.848e-29	4.469e-30	-28.733	-29.350	-0.617	(0)
Hg(2)	2.362e-18					
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
Hg(OH)2	1.682e-22	1.718e-22	-21.774	-21.765	0.009	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
HgOH+	2.768e-26	1.941e-26	-25.558	-25.712	-0.154	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Hg+2	3.648e-29	8.820e-30	-28.438	-29.055	-0.617	(0)
HgS04	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Hg(OH)3-	1.911e-30	1.340e-30	-29.719	-29.873	-0.154	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)

K	1.593e-03					
K+	1.549e-03	1.219e-03	-2.810	-2.914	-0.104	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
Mg	1.017e-02					
Mg+2	7.920e-03	3.036e-03	-2.101	-2.518	-0.416	(0)
MgS04	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
MgH2P04+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
MgOH+	6.402e-08	5.162e-08	-7.194	-7.287	-0.094	(0)
MgP04-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
Mn(2)	2.231e-04					
Mn+2	1.882e-04	4.549e-05	-3.725	-4.342	-0.617	(0)
MnS04	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
MnOH+	6.606e-09	5.213e-09	-8.180	-8.283	-0.103	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Mn(OH)3-	2.129e-19	1.680e-19	-18.672	-18.775	-0.103	(0)
MnSe04	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
Mn(OH)4-2	8.666e-26	3.361e-26	-25.062	-25.474	-0.411	(0)
MnN03+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
Mn(N03)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Mn(3)	9.732e-29					
Mn+3	9.732e-29	1.125e-29	-28.012	-28.949	-0.937	(0)
Mn(6)	0.000e+00					
Mn04-2	0.000e+00	0.000e+00	-65.730	-66.142	-0.411	(0)
Mn(7)	0.000e+00					
Mn04-	0.000e+00	0.000e+00	-74.661	-74.779	-0.119	(0)
N(-3)	5.021e-04					
NH4+	4.805e-04	3.617e-04	-3.318	-3.442	-0.123	(0)
NH4S04-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
NH3	9.560e-07	9.560e-07	-6.020	-6.020	0.000	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
N(3)	1.148e-35					
N02-	1.148e-35	8.735e-36	-34.940	-35.059	-0.119	(0)
CoN02+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CuN02+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
Cu(N02)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-48.382	-48.486	-0.104	(0)
CaN03+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
MnN03+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
CoN03+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
NiN03+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
ZnN03+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
PbN03+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
CdN03+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
CuN03+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
FeN03+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)

HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
Na	4.781e-02					
Na+	4.677e-02	3.680e-02	-1.330	-1.434	-0.104	(0)
NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
Ni	7.703e-06					
Ni+2	5.664e-06	2.171e-06	-5.247	-5.663	-0.416	(0)
NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
NiOH+	1.818e-09	1.275e-09	-8.741	-8.895	-0.154	(0)
Ni(SO4)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
Ni(OH)2	8.335e-12	8.335e-12	-11.079	-11.079	0.000	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Ni(OH)3-	7.365e-16	5.164e-16	-15.133	-15.287	-0.154	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.993	-55.984	0.009	(0)
P	2.206e-05					
H2PO4-	6.634e-06	5.268e-06	-5.178	-5.278	-0.100	(0)
HPO4-2	5.222e-06	2.025e-06	-5.282	-5.694	-0.411	(0)
MgHPO4	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
FeHPO4	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
CoHP04	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
MgPO4-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
H3PO4	1.150e-10	1.150e-10	-9.939	-9.939	0.000	(0)
PO4-3	4.196e-11	4.850e-12	-10.377	-11.314	-0.937	(0)
FeHPO4+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
Pb	1.455e-08					
Pb+2	5.480e-09	2.100e-09	-8.261	-8.678	-0.416	(0)
PbSO4	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
PbOH+	4.662e-10	3.269e-10	-9.331	-9.486	-0.154	(0)
Pb(SO4)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
Pb(OH)2	6.405e-13	6.405e-13	-12.193	-12.193	0.000	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
Pb2OH+3	2.655e-16	1.088e-17	-15.576	-16.963	-1.387	(0)
Pb(OH)3-	5.660e-17	3.969e-17	-16.247	-16.401	-0.154	(0)
Pb(OH)4-2	2.491e-21	6.022e-22	-20.604	-21.220	-0.617	(0)
Pb3(OH)4+2	3.779e-23	9.137e-24	-22.423	-23.039	-0.617	(0)
Pb4(OH)4+4	5.175e-26	1.768e-28	-25.286	-27.753	-2.466	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
S(6)	1.553e-02					
SO4-2	1.094e-02	4.194e-03	-1.961	-2.377	-0.416	(0)
MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)

KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
MnS04	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
NH4S04-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
CoS04	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
NiS04	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
ZnS04	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(S04)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
HS04-	7.527e-08	5.892e-08	-7.123	-7.230	-0.106	(0)
AlS04+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
PbS04	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
CdS04	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
Al(S04)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ni(S04)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
Cd(S04)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
Pb(S04)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
CuS04	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
FeS04+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe(S04)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
HgS04	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Se(-2)	4.685e-09					
HSe-	4.677e-09	3.279e-09	-8.330	-8.484	-0.154	(0)
H2Se	4.054e-12	4.054e-12	-11.392	-11.392	0.000	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Se-2	6.423e-17	1.553e-17	-16.192	-16.809	-0.617	(0)
Se(4)	3.770e-07					
HSeO3-	3.526e-07	2.472e-07	-6.453	-6.607	-0.154	(0)
SeO3-2	2.442e-08	5.904e-09	-7.612	-8.229	-0.617	(0)
H2SeO3	1.653e-11	1.653e-11	-10.782	-10.782	0.000	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Se(6)	2.478e-21					
SeO4-2	2.463e-21	9.439e-22	-20.609	-21.025	-0.416	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
HSeO4-	9.645e-27	6.763e-27	-26.016	-26.170	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
Zn	2.612e-06					
Zn+2	1.813e-06	6.948e-07	-5.742	-6.158	-0.416	(0)
ZnS04	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(S04)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
ZnOH+	4.520e-09	3.170e-09	-8.345	-8.499	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
Zn(OH)2	4.227e-11	4.227e-11	-10.374	-10.374	0.000	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
Zn(OH)3-	1.872e-14	1.313e-14	-13.728	-13.882	-0.154	(0)
Zn(OH)4-2	1.339e-19	3.238e-20	-18.873	-19.490	-0.617	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
ZnN03+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
Zn(N03)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(N03)2	124.48	-118.20	6.27	(Co(NH3)5Cl)(N03)2
(Co(NH3)5Cl)Cl2	-28.70	-24.17	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.96	-24.17	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(N03)3	-179.81	-161.88	17.93	(Co(NH3)6)(N03)3
(Co(NH3)6)Cl3	-40.93	-20.82	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-28.36	-27.91	0.45	(NH4)2SeO4

Al(OH)3(am)	0.09	11.16	11.06	Al(OH)3
Al2O3	2.05	22.32	20.27	Al2O3
Al4(OH)10SO4	5.98	28.68	22.70	Al4(OH)10SO4
AlOHSO4	-1.57	-4.80	-3.23	AlOHSO4
Alunite	6.34	5.44	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.24	-11.06	-7.82	PbSO4
Anhydrite	-1.07	-5.41	-4.34	CaSO4
Antlerite	-12.92	-4.13	8.79	Cu3(OH)4SO4
Atacamite	-7.99	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.78	-8.54	-1.76	ZnSO4:6H2O
Birnessite	-18.88	-0.79	18.09	MnO2
Bixbyite	-16.81	-17.16	-0.35	Mn2O3
Boehmite	2.30	11.16	8.86	AlOOH
Brochantite	-15.89	-0.19	15.71	Cu4(OH)6SO4
Brucite	-6.06	11.06	17.12	Mg(OH)2
Bunsenite	-4.77	7.92	12.68	NiO
Ca3(PO4)2(beta)	-2.69	-31.73	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-5.80	-52.88	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.79	-21.14	-19.35	CaHP04
CaHP04:2H2O	-2.09	-21.14	-19.05	CaHP04:2H2O
Calomel	-14.15	-32.28	-18.13	Hg2Cl2
CaSeO3:2H2O	-5.71	-2.85	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-21.06	-24.06	-3.00	CaSeO4:2H2O
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-23.45	-16.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-23.34	-0.78	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-15.59	-48.19	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-24.12	4.28	28.40	Cd4(OH)6SO4
CdCl2	-10.84	-11.45	-0.61	CdCl2
CdCl2:1H2O	-9.78	-11.45	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-9.52	-11.46	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.21	-10.52	13.69	Cd
Cdmetal(gamma)	-24.32	-10.52	13.80	Cd
CdOHCl	-6.81	-3.20	3.61	CdOHCl
CdSe	10.17	-10.21	-20.38	CdSe
CdSeO4:2H2O	-27.70	-29.55	-1.85	CdSeO4:2H2O
CdSO4	-10.85	-10.90	-0.05	CdSO4
CdSO4:1H2O	-9.25	-10.90	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-9.07	-10.90	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.36	-12.02	-2.65	CuSO4:5H2O
Clausthalite	17.01	-10.37	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.05	-16.14	-2.09	Co(OH)3
Co3(PO4)2	-3.27	-37.95	-34.69	Co3(PO4)2
Co3O4	-13.57	-23.81	-10.24	Co3O4
CoCl2	-16.50	-8.04	8.46	CoCl2
CoCl2:6H2O	-10.56	-8.05	2.52	CoCl2:6H2O
CoFe2O4	21.18	18.03	-3.15	CoFe2O4
CoHP04	-4.15	-23.21	-19.06	CoHP04
CoO	-5.37	8.47	13.84	CoO
CoSe	9.40	-6.80	-16.20	CoSe
CoSeO3	-6.24	-4.92	1.32	CoSeO3
CoSeO4:6H2O	-24.61	-26.14	-1.53	CoSeO4:6H2O
CoSO4	-10.48	-7.49	2.99	CoSO4
CoSO4:6H2O	-5.02	-7.49	-2.48	CoSO4:6H2O
Cotunnite	-6.77	-11.61	-4.84	PbCl2
Cu(OH)2	-4.87	3.94	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.82	-47.39	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.69	-17.62	-46.31	Cu2Se
Cu2SO4	-16.40	-18.30	-1.90	Cu2SO4
Cu3(PO4)2	-14.69	-51.54	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-16.42	-51.54	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	35.35	-28.95	-64.30	Cu3Se2
Cumetal	-0.04	-8.96	-8.93	Cu
CuOCuSO4	-18.70	-8.07	10.63	CuOCuSO4
Cupricferrite	7.02	13.50	6.49	CuFe2O4
Cuprite	-1.24	-2.35	-1.11	Cu2O

Cuprousferrite	12.49	3.61	-8.88	CuFeO2
CuSe	22.06	-11.33	-33.39	CuSe
CuSe2	22.68	-11.02	-33.70	CuSe2
CuSeO3:2H2O	-10.05	-9.46	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-28.23	-30.67	-2.44	CuSeO4:5H2O
CuSO4	-15.13	-12.01	3.11	CuSO4
Diaspore	4.04	11.16	7.12	AlOOH
Epsomite	-2.75	-4.90	-2.15	MgSO4:7H2O
Fe(OH)2	-3.44	10.12	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.34	2.30	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-5.39	-3.84	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-10.00	-30.63	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-35.15	-38.31	-3.16	Fe2(SO4)3
Fe3(OH)8	-0.54	19.68	20.22	Fe3(OH)8
Ferrihydrite	1.41	4.78	3.37	Fe(OH)3
Ferroselite	13.87	-4.84	-18.71	FeSe2
FeSe	5.86	-5.15	-11.00	FeSe
Gibbsite	2.64	11.16	8.52	Al(OH)3
Goethite	4.15	4.78	0.64	FeOOH
Goslarite	-6.50	-8.54	-2.05	ZnSO4:7H2O
Gypsum	-0.80	-5.41	-4.61	CaSO4:2H2O
H-Jarosite	-6.02	-17.57	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-10.35	-15.27	-4.92	H2Se
Halite	-4.49	-2.90	1.59	NaCl
Hausmannite	-18.74	43.29	62.03	Mn3O4
Hematite	10.67	9.56	-1.11	Fe2O3
Hercynite	8.80	32.44	23.64	FeAl2O4
Hg(g)	-7.75	-15.67	-7.93	Hg
Hg(OH)2	-18.27	-21.76	-3.50	Hg(OH)2
Hg2(g)	-16.26	-31.35	-15.09	Hg2
Hg2(OH)2	-21.03	-15.77	5.26	Hg2(OH)2
Hg2HPO4	-22.68	-47.45	-24.77	Hg2HPO4
Hg2SeO3	-24.51	-29.17	-4.66	Hg2SeO3
Hg2SO4	-25.58	-31.73	-6.14	Hg2SO4
HgCl(g)	-36.02	-16.14	19.88	HgCl
HgCl2	-16.76	-38.28	-21.52	HgCl2
Hgmetal(l)	-2.02	-15.67	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSeO3	-22.73	-35.16	-12.43	HgSeO3
HgSO4	-28.27	-37.72	-9.45	HgSO4
Hinsdalite	-6.76	-9.26	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	2.00	-42.33	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-7.75	-70.54	-62.79	Pb5(PO4)3OH
K-Alum	-11.65	-16.89	-5.24	KAl(SO4)2:12H2O
K-Jarosite	0.79	-13.70	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-26.12	-26.85	-0.73	K2SeO4
Langite	-18.07	-0.19	17.88	Cu4(OH)6SO4:H2O
Larnakite	-5.77	-6.15	-0.38	PbO:PbSO4
Laurionite	-3.98	-3.35	0.62	PbOHCl
Lepidocrocite	3.41	4.78	1.37	FeOOH
Lime	-22.62	10.54	33.16	CaO
Litharge	-7.95	4.90	12.85	PbO
Maghemite	3.18	9.56	6.39	Fe2O3
Magnesioferrite	3.10	20.62	17.52	Fe2MgO4
Magnetite	15.79	19.69	3.90	Fe3O4
Manganite	-8.31	17.03	25.34	MnOOH
Massicot	-8.15	4.90	13.05	PbO
Melanothallite	-18.98	-12.57	6.41	CuCl2
Melanterite	-3.58	-5.84	-2.26	FeSO4:7H2O
Mg(OH)2(active)	-7.73	11.06	18.79	Mg(OH)2
Mg3(PO4)2	-6.90	-30.18	-23.28	Mg3(PO4)2
MgHPO4:3H2O	-2.45	-20.62	-18.18	MgHPO4:3H2O
MgSeO3:6H2O	-5.38	-2.34	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-22.35	-23.55	-1.20	MgSeO4:6H2O
Minium	-44.24	30.28	74.53	Pb3O4
Mirabilite	-3.95	-5.25	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-59.71	-65.03	-5.32	Mn2(SO4)3
Mn3(PO4)2	-11.81	-35.65	-23.85	Mn3(PO4)2

MnCl2:4H2O	-10.02	-7.28	2.74	MnCl2:4H2O
MnHP04	2.95	-22.45	-25.40	MnHP04
MnSe	-9.77	-6.04	3.73	MnSe
MnSe03	-5.29	-4.16	1.13	MnSe03
MnSe03:2H2O	-5.12	-4.16	0.96	MnSe03:2H2O
MnSe04:5H2O	-23.32	-25.37	-2.05	MnSe04:5H2O
MnS04	-9.46	-6.72	2.74	MnS04
Monteponite	-10.29	5.06	15.35	Cd0
Montroydite	-18.22	-21.76	-3.55	Hg0
Morenosite	-5.87	-8.05	-2.17	NiS04:7H2O
Na-Jarosite	-1.38	-12.22	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-12.99	-2.69	10.30	Na2Se03:5H2O
Na2Se04	-25.17	-23.89	1.28	Na2Se04
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.11	7.91	13.02	Ni(OH)2
Ni3(P04)2	-8.32	-39.62	-31.30	Ni3(P04)2
Ni4(OH)6S04	-16.30	15.70	32.00	Ni4(OH)6S04
NiSe	10.34	-7.36	-17.70	NiSe
NiSe03:2H2O	-8.37	-5.48	2.89	NiSe03:2H2O
NiSe04:6H2O	-25.17	-26.69	-1.52	NiSe04:6H2O
Nsutite	-18.29	-0.79	17.50	Mn02
O2(g)	-53.29	31.16	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.25	1.55	8.79	Pb2(OH)3Cl
Pb20(OH)2	-16.39	9.80	26.19	Pb20(OH)2
Pb203	-35.66	25.38	61.04	Pb203
Pb3(P04)2	-5.13	-48.66	-43.53	Pb3(P04)2
Pb302S04	-12.13	-1.25	10.87	Pb302S04
Pb4(OH)6S04	-17.45	3.65	21.10	Pb4(OH)6S04
Pb403S04	-18.55	3.65	22.20	Pb403S04
PbHP04	-2.98	-26.78	-23.81	PbHP04
Pbmetal	-14.92	-10.68	4.24	Pb
Pb0:0.3H2O	-8.08	4.90	12.98	Pb0:0.33H2O
PbSe04	-22.83	-29.70	-6.88	PbSe04
Periclase	-10.88	11.06	21.94	Mg0
Plattnerite	-29.83	20.48	50.31	Pb02
Plumbgummite	7.80	-24.99	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-12.57	10.54	23.11	Ca(OH)2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-17.21	24.82	42.03	Mn02
Pyromorphite	5.63	-78.80	-84.43	Pb5(P04)3Cl
Retgersite	-6.00	-8.05	-2.05	NiS04:6H2O
Semetal(am)	7.44	0.31	-7.14	Se
Semetal(hex)	8.05	0.31	-7.75	Se
Se02	-13.52	-13.40	0.12	Se02
Se03	-56.00	-34.60	21.39	Se03
Spinel	-4.39	33.38	37.77	MgAl204
Strengite	-0.53	-26.90	-26.38	FeP04:2H2O
Tenorite	-3.86	3.94	7.80	Cu0
Thenardite	-5.59	-5.25	0.34	Na2S04
Tsumebite	-8.15	-17.94	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	3.00	-33.00	-36.00	Fe3(P04)2:8H2O
Zincite	-4.13	7.42	11.55	Zn0
Zincosite	-12.66	-8.54	4.13	ZnS04
Zn(NO3)2:6H2O	-106.39	-103.14	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.78	7.42	12.20	Zn(OH)2
Zn(OH)2(am)	-5.25	7.42	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.42	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.31	7.42	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.42	11.73	Zn(OH)2
Zn2(OH)2S04	-8.62	-1.12	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-8.61	6.58	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-5.69	-41.11	-35.42	Zn3(P04)2:4H2O
Zn30(S04)2	-29.18	-9.65	19.53	Zn30(S04)2
Zn4(OH)6S04	-14.68	13.72	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-17.91	20.59	38.50	Zn5(OH)8Cl2
ZnCl2	-16.31	-9.09	7.22	ZnCl2
Znmetal	-34.31	-8.16	26.15	Zn

Zn0(active)	-3.98	7.42	11.40	Zn0
ZnSe	6.61	-7.85	-14.46	ZnSe
ZnSe04:6H2O	-25.67	-27.19	-1.52	ZnSe04:6H2O
ZnS04:1H2O	-8.00	-8.54	-0.53	ZnS04:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 6.
Using reaction 7.

Mixture 6.

9.540e-01 Solution 1
4.600e-02 Solution 7

Reaction 7.

3.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000

Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	1.456e-05	1.378e-05
Ca	3.445e-03	3.259e-03
Cd	2.835e-08	2.681e-08
Cl	4.593e-02	4.344e-02
Co	4.217e-05	3.989e-05
Cu	5.181e-06	4.901e-06
Fe	1.908e-03	1.805e-03
Hg	1.059e-09	1.002e-09
K	1.684e-03	1.593e-03
Mg	1.075e-02	1.017e-02
Mn	2.359e-04	2.231e-04
N	5.308e-04	5.021e-04
Na	5.054e-02	4.781e-02
Ni	8.144e-06	7.703e-06
P	2.332e-05	2.206e-05
Pb	1.538e-08	1.455e-08
S	1.642e-02	1.553e-02
Se	4.035e-07	3.817e-07
Zn	2.761e-06	2.612e-06

-----Description of solution-----

	pH	=	6.788	Charge balance
	pe	=	1.012	Adjusted to redox equilibrium
	Activity of water	=	0.998	
	Ionic strength (mol/kgw)	=	9.763e-02	
	Mass of water (kg)	=	9.460e-01	
	Total alkalinity (eq/kg)	=	6.633e-05	

Total carbon (mol/kg) = 0.000e+00
 Total CO2 (mol/kg) = 0.000e+00
 Temperature (°C) = 21.00
 Electrical balance (eq) = 6.374e-03
 Percent error, 100*(Cat-|An|)/(Cat+|An|) = 4.58
 Iterations = 4
 Total H = 1.050158e+02
 Total O = 5.256909e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.076e-07	1.627e-07	-6.683	-6.788	-0.106	0.00
OH-	5.945e-08	4.546e-08	-7.226	-7.342	-0.117	(0)
H2O	5.551e+01	9.978e-01	1.744	-0.001	0.000	18.05
Al	1.456e-05					
Al(OH)4-	9.475e-06	7.383e-06	-5.023	-5.132	-0.108	(0)
Al(OH)2+	2.522e-06	1.994e-06	-5.598	-5.700	-0.102	(0)
Al(OH)3	2.457e-06	2.457e-06	-5.610	-5.610	0.000	(0)
AlOH+2	7.998e-08	3.129e-08	-7.097	-7.505	-0.408	(0)
AlSO4+	2.440e-08	1.901e-08	-7.613	-7.721	-0.108	(0)
Al+3	5.896e-09	6.587e-10	-8.229	-9.181	-0.952	(0)
Al(SO4)2-	1.238e-09	9.649e-10	-8.907	-9.016	-0.108	(0)
Ca	3.445e-03					
Ca+2	2.531e-03	9.555e-04	-2.597	-3.020	-0.423	(0)
CaSO4	9.129e-04	9.129e-04	-3.040	-3.040	0.000	(0)
CaHPO4	8.567e-07	8.567e-07	-6.067	-6.067	0.000	(0)
CaH2PO4+	1.385e-07	1.095e-07	-6.859	-6.960	-0.102	(0)
CaPO4-	1.623e-08	1.283e-08	-7.790	-7.892	-0.102	(0)
CaNH3+2	6.874e-09	1.600e-09	-8.163	-8.796	-0.633	(0)
CaOH+	1.038e-09	8.281e-10	-8.984	-9.082	-0.098	(0)
Ca(NH3)2+2	3.639e-15	8.468e-16	-14.439	-15.072	-0.633	(0)
CaNO3+	0.000e+00	0.000e+00	-50.730	-50.888	-0.158	(0)
Cd	2.835e-08					
CdCl+	1.496e-08	1.039e-08	-7.825	-7.983	-0.158	(0)
Cd+2	8.051e-09	3.039e-09	-8.094	-8.517	-0.423	(0)
CdSO4	2.945e-09	2.945e-09	-8.531	-8.531	0.000	(0)
CdCl2	1.541e-09	1.541e-09	-8.812	-8.812	0.000	(0)
Cd(SO4)2-2	7.765e-10	1.807e-10	-9.110	-9.743	-0.633	(0)
CdCl3-	4.849e-11	3.368e-11	-10.314	-10.473	-0.158	(0)
CdOHCl	2.394e-11	2.394e-11	-10.621	-10.621	0.000	(0)
CdOH+	1.589e-12	1.104e-12	-11.799	-11.957	-0.158	(0)
Cd(OH)2	5.806e-16	5.806e-16	-15.236	-15.236	0.000	(0)
Cd2OH+3	4.695e-19	1.766e-20	-18.328	-19.753	-1.425	(0)
Cd(SeO3)2-2	4.318e-19	1.005e-19	-18.365	-18.998	-0.633	(0)
Cd(OH)3-	3.153e-21	2.190e-21	-20.501	-20.660	-0.158	(0)
CdSeO4	5.861e-28	5.861e-28	-27.232	-27.232	0.000	(0)
Cd(OH)4-2	9.510e-29	2.213e-29	-28.022	-28.655	-0.633	(0)
CdHS+	7.901e-39	5.488e-39	-38.102	-38.261	-0.158	(0)
CdNO3+	0.000e+00	0.000e+00	-56.190	-56.348	-0.158	(0)
Cd(HS)2	0.000e+00	0.000e+00	-68.808	-68.808	0.000	(0)
Cd(OH)3-	0.000e+00	0.000e+00	-104.501	-104.659	-0.158	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.079	-105.079	0.000	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.582	-140.215	-0.633	(0)
Cl	4.593e-02					
Cl-	4.591e-02	3.599e-02	-1.338	-1.444	-0.106	(0)
CuCl2-	4.624e-06	3.571e-06	-5.335	-5.447	-0.112	(0)
MnCl+	2.670e-06	2.098e-06	-5.573	-5.678	-0.105	(0)
CoCl+	1.407e-06	9.770e-07	-5.852	-6.010	-0.158	(0)
CuCl	4.703e-07	4.703e-07	-6.328	-6.328	0.000	(0)
NiCl+	2.947e-07	2.047e-07	-6.531	-6.689	-0.158	(0)
MnCl2	1.067e-07	1.067e-07	-6.972	-6.972	0.000	(0)
ZnCl+	8.147e-08	6.291e-08	-7.089	-7.201	-0.112	(0)
CuCl3-2	7.093e-08	2.705e-08	-7.149	-7.568	-0.419	(0)
CdCl+	1.496e-08	1.039e-08	-7.825	-7.983	-0.158	(0)
ZnOHCl	5.238e-09	5.238e-09	-8.281	-8.281	0.000	(0)

PbCl+	3.752e-09	2.606e-09	-8.426	-8.584	-0.158	(0)
ZnCl2	3.017e-09	3.017e-09	-8.520	-8.520	0.000	(0)
CdCl2	1.541e-09	1.541e-09	-8.812	-8.812	0.000	(0)
MnCl3-	1.345e-09	1.057e-09	-8.871	-8.976	-0.105	(0)
PbCl2	4.114e-10	4.114e-10	-9.386	-9.386	0.000	(0)
ZnCl3-	1.099e-10	8.484e-11	-9.959	-10.071	-0.112	(0)
CdCl3-	4.849e-11	3.368e-11	-10.314	-10.473	-0.158	(0)
NiCl2	3.749e-11	3.749e-11	-10.426	-10.426	0.000	(0)
CdOHCl	2.394e-11	2.394e-11	-10.621	-10.621	0.000	(0)
CuCl+	1.599e-11	1.234e-11	-10.796	-10.909	-0.112	(0)
PbCl3-	8.866e-12	6.158e-12	-11.052	-11.211	-0.158	(0)
ZnCl4-2	3.877e-12	1.478e-12	-11.411	-11.830	-0.419	(0)
PbCl4-2	4.103e-13	9.549e-14	-12.387	-13.020	-0.633	(0)
CuCl2	1.265e-13	1.265e-13	-12.898	-12.898	0.000	(0)
FeCl+2	6.802e-16	2.594e-16	-15.167	-15.586	-0.419	(0)
FeCl2+	6.020e-17	4.730e-17	-16.220	-16.325	-0.105	(0)
CuCl3-	5.121e-17	3.954e-17	-16.291	-16.403	-0.112	(0)
HgCl2	1.707e-18	1.707e-18	-17.768	-17.768	0.000	(0)
HgCl3-	8.922e-19	6.197e-19	-18.050	-18.208	-0.158	(0)
HgCl4-2	3.958e-19	9.210e-20	-18.403	-19.036	-0.633	(0)
FeCl3	1.702e-19	1.702e-19	-18.769	-18.769	0.000	(0)
HgClOH	3.938e-20	3.938e-20	-19.405	-19.405	0.000	(0)
CuCl4-2	2.142e-20	8.168e-21	-19.669	-20.088	-0.419	(0)
HgCl+	1.158e-23	8.041e-24	-22.936	-23.095	-0.158	(0)
CoCl+2	9.366e-36	2.180e-36	-35.028	-35.662	-0.633	(0)
Co(NH3)5Cl+2	2.049e-39	4.769e-40	-38.688	-39.322	-0.633	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.259	-51.892	-0.633	(0)
Co(2)	4.217e-05					
Co+2	3.409e-05	7.934e-06	-4.467	-5.101	-0.633	(0)
CoSO4	6.634e-06	6.634e-06	-5.178	-5.178	0.000	(0)
CoCl+	1.407e-06	9.770e-07	-5.852	-6.010	-0.158	(0)
CoHPO4	1.670e-08	1.670e-08	-7.777	-7.777	0.000	(0)
CoOH+	1.407e-08	9.774e-09	-7.852	-8.010	-0.158	(0)
Co(NH3)+2	7.785e-09	1.812e-09	-8.109	-8.742	-0.633	(0)
Co(OH)2	4.793e-11	4.793e-11	-10.319	-10.319	0.000	(0)
Co(NH3)2+2	3.092e-13	7.195e-14	-12.510	-13.143	-0.633	(0)
Co2OH+3	1.033e-13	3.886e-15	-12.986	-14.410	-1.425	(0)
Co(OH)3-	8.501e-17	5.905e-17	-16.071	-16.229	-0.158	(0)
Co(NH3)3+2	5.176e-18	1.205e-18	-17.286	-17.919	-0.633	(0)
CoOOH-	5.122e-18	3.557e-18	-17.291	-17.449	-0.158	(0)
Co4(OH)4+4	6.207e-22	1.821e-24	-21.207	-23.740	-2.533	(0)
Co(NH3)4+2	3.612e-23	8.406e-24	-22.442	-23.075	-0.633	(0)
CoSeO4	3.855e-24	3.855e-24	-23.414	-23.414	0.000	(0)
Co(OH)4-2	2.483e-24	5.778e-25	-23.605	-24.238	-0.633	(0)
Co(NH3)5+2	7.971e-29	1.855e-29	-28.098	-28.732	-0.633	(0)
CoNO2+	8.514e-40	5.914e-40	-39.070	-39.228	-0.158	(0)
CoNO3+	0.000e+00	0.000e+00	-53.123	-53.282	-0.158	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.354	-101.354	0.000	(0)
Co(3)	4.381e-31					
CoOH+2	4.381e-31	1.020e-31	-30.358	-30.992	-0.633	(0)
CoCl+2	9.366e-36	2.180e-36	-35.028	-35.662	-0.633	(0)
Co+3	2.909e-36	3.250e-37	-35.536	-36.488	-0.952	(0)
Co(NH3)5Cl+2	2.049e-39	4.769e-40	-38.688	-39.322	-0.633	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.775	-47.934	-0.158	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.259	-51.892	-0.633	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.576	-53.209	-0.633	(0)
Cu(1)	5.180e-06					
CuCl2-	4.624e-06	3.571e-06	-5.335	-5.447	-0.112	(0)
CuCl	4.703e-07	4.703e-07	-6.328	-6.328	0.000	(0)
CuCl3-2	7.093e-08	2.705e-08	-7.149	-7.568	-0.419	(0)
Cu+	1.495e-08	1.038e-08	-7.825	-7.984	-0.158	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.095	-66.520	-0.424	(0)
CuS4S5-3	0.000e+00	0.000e+00	-66.849	-67.250	-0.400	(0)
Cu(2)	8.979e-10					
Cu+2	6.000e-10	2.265e-10	-9.222	-9.645	-0.423	(0)
CuSO4	2.145e-10	2.145e-10	-9.669	-9.669	0.000	(0)
CuOH+	4.706e-11	3.634e-11	-10.327	-10.440	-0.112	(0)
CuNH3+2	1.966e-11	4.575e-12	-10.706	-11.340	-0.633	(0)

CuCl+	1.599e-11	1.234e-11	-10.796	-10.909	-0.112	(0)
Cu(OH)2	5.448e-13	5.448e-13	-12.264	-12.264	0.000	(0)
CuCl2	1.265e-13	1.265e-13	-12.898	-12.898	0.000	(0)
Cu2(OH)2+2	1.387e-16	3.227e-17	-15.858	-16.491	-0.633	(0)
Cu(OH)3-	9.933e-17	6.899e-17	-16.003	-16.161	-0.158	(0)
CuCl3-	5.121e-17	3.954e-17	-16.291	-16.403	-0.112	(0)
CuCl4-2	2.142e-20	8.168e-21	-19.669	-20.088	-0.419	(0)
Cu(OH)4-2	1.440e-22	3.352e-23	-21.841	-22.475	-0.633	(0)
CuNO2+	0.000e+00	0.000e+00	-42.442	-42.601	-0.158	(0)
CuNO3+	0.000e+00	0.000e+00	-57.358	-57.516	-0.158	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.566	-76.566	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.842	-97.000	-0.158	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-106.807	-106.807	0.000	(0)
Fe(2)	1.908e-03					
Fe+2	1.539e-03	3.580e-04	-2.813	-3.446	-0.633	(0)
FeSO4	3.647e-04	3.647e-04	-3.438	-3.438	0.000	(0)
FeHPO4	2.750e-06	2.750e-06	-5.561	-5.561	0.000	(0)
FeH2PO4+	1.124e-06	8.890e-07	-5.949	-6.051	-0.102	(0)
FeOH+	8.246e-07	6.480e-07	-6.084	-6.188	-0.105	(0)
Fe(OH)2	2.239e-11	2.239e-11	-10.650	-10.650	0.000	(0)
Fe(OH)3-	5.359e-13	4.212e-13	-12.271	-12.376	-0.105	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.999	-69.999	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.555	-105.713	-0.158	(0)
Fe(3)	3.377e-07					
Fe(OH)2+	3.278e-07	2.593e-07	-6.484	-6.586	-0.102	(0)
Fe(OH)3	9.728e-09	9.728e-09	-8.012	-8.012	0.000	(0)
Fe(OH)4-	1.250e-10	9.882e-11	-9.903	-10.005	-0.102	(0)
FeOH+2	2.250e-11	8.581e-12	-10.648	-11.066	-0.419	(0)
FeHPO4+	6.452e-12	5.103e-12	-11.190	-11.292	-0.102	(0)
FeSO4+	1.461e-14	1.148e-14	-13.835	-13.940	-0.105	(0)
Fe+3	2.424e-15	2.708e-16	-14.615	-15.567	-0.952	(0)
Fe(SO4)2-	1.582e-15	1.099e-15	-14.801	-14.959	-0.158	(0)
FeCl+2	6.802e-16	2.594e-16	-15.167	-15.586	-0.419	(0)
FeH2PO4+2	6.512e-17	2.547e-17	-16.186	-16.594	-0.408	(0)
FeCl2+	6.020e-17	4.730e-17	-16.220	-16.325	-0.105	(0)
Fe2(OH)2+4	9.587e-19	2.812e-21	-18.018	-20.551	-2.533	(0)
FeHSeO3+2	6.940e-19	1.615e-19	-18.159	-18.792	-0.633	(0)
FeCl3	1.702e-19	1.702e-19	-18.769	-18.769	0.000	(0)
Fe3(OH)4+5	9.159e-23	1.011e-26	-22.038	-25.995	-3.957	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.227	-62.860	-0.633	(0)
H(0)	3.606e-19					
H2	1.803e-19	1.844e-19	-18.744	-18.734	0.010	(0)
Hg(0)	1.059e-09					
Hg	1.059e-09	1.059e-09	-8.975	-8.975	0.000	(0)
Hg(1)	4.544e-29					
Hg2+2	2.272e-29	5.287e-30	-28.644	-29.277	-0.633	(0)
Hg(2)	3.035e-18					
HgCl2	1.707e-18	1.707e-18	-17.768	-17.768	0.000	(0)
HgCl3-	8.922e-19	6.197e-19	-18.050	-18.208	-0.158	(0)
HgCl4-2	3.958e-19	9.210e-20	-18.403	-19.036	-0.633	(0)
HgClOH	3.938e-20	3.938e-20	-19.405	-19.405	0.000	(0)
Hg(OH)2	1.867e-22	1.909e-22	-21.729	-21.719	0.010	(0)
Hg(NH3)2+2	1.473e-22	3.428e-23	-21.832	-22.465	-0.633	(0)
HgCl+	1.158e-23	8.041e-24	-22.936	-23.095	-0.158	(0)
HgOH+	3.116e-26	2.164e-26	-25.506	-25.665	-0.158	(0)
HgNH3+2	2.862e-26	6.661e-27	-25.543	-26.176	-0.633	(0)
Hg(NH3)3+2	1.120e-27	2.606e-28	-26.951	-27.584	-0.633	(0)
Hg+2	4.242e-29	9.871e-30	-28.372	-29.006	-0.633	(0)
HgSO4	9.012e-30	9.012e-30	-29.045	-29.045	0.000	(0)
Hg(OH)3-	2.137e-30	1.484e-30	-29.670	-29.829	-0.158	(0)
Hg(NH3)4+2	1.708e-32	3.976e-33	-31.767	-32.401	-0.633	(0)
HgHS2-	0.000e+00	0.000e+00	-65.728	-65.887	-0.158	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.281	-66.281	0.000	(0)
HgS2-2	0.000e+00	0.000e+00	-67.173	-67.806	-0.633	(0)
HgNO3+	0.000e+00	0.000e+00	-77.756	-77.914	-0.158	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.676	-126.676	0.000	(0)
K	1.684e-03					
K+	1.636e-03	1.282e-03	-2.786	-2.892	-0.106	(0)

KS04-	4.865e-05	3.848e-05	-4.313	-4.415	-0.102	(0)
KHP04-	2.373e-08	1.876e-08	-7.625	-7.727	-0.102	(0)
Mg	1.075e-02					
Mg+2	8.339e-03	3.148e-03	-2.079	-2.502	-0.423	(0)
MgS04	2.406e-03	2.406e-03	-2.619	-2.619	0.000	(0)
MgHP04	3.896e-06	3.896e-06	-5.409	-5.409	0.000	(0)
MgH2P04+	9.754e-07	7.714e-07	-6.011	-6.113	-0.102	(0)
MgOH+	6.639e-08	5.334e-08	-7.178	-7.273	-0.095	(0)
MgP04-	8.356e-10	6.608e-10	-9.078	-9.180	-0.102	(0)
Mn(2)	2.359e-04					
Mn+2	1.990e-04	4.632e-05	-3.701	-4.334	-0.633	(0)
MnS04	3.405e-05	3.405e-05	-4.468	-4.468	0.000	(0)
MnCl+	2.670e-06	2.098e-06	-5.573	-5.678	-0.105	(0)
MnCl2	1.067e-07	1.067e-07	-6.972	-6.972	0.000	(0)
MnOH+	6.730e-09	5.289e-09	-8.172	-8.277	-0.105	(0)
MnCl3-	1.345e-09	1.057e-09	-8.871	-8.976	-0.105	(0)
MnSe	3.467e-12	3.467e-12	-11.460	-11.460	0.000	(0)
Mn(OH)3-	2.153e-19	1.692e-19	-18.667	-18.772	-0.105	(0)
MnSe04	1.196e-23	1.196e-23	-22.922	-22.922	0.000	(0)
Mn(OH)4-2	8.845e-26	3.373e-26	-25.053	-25.472	-0.419	(0)
MnNO3+	0.000e+00	0.000e+00	-52.357	-52.515	-0.158	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.492	-100.492	0.000	(0)
Mn(3)	1.055e-28					
Mn+3	1.055e-28	1.178e-29	-27.977	-28.929	-0.952	(0)
Mn(6)	0.000e+00					
Mn04-2	0.000e+00	0.000e+00	-65.678	-66.096	-0.419	(0)
Mn(7)	0.000e+00					
Mn04-	0.000e+00	0.000e+00	-74.601	-74.722	-0.121	(0)
N(-3)	5.308e-04					
NH4+	5.073e-04	3.796e-04	-3.295	-3.421	-0.126	(0)
NH4S04-	2.244e-05	1.763e-05	-4.649	-4.754	-0.105	(0)
NH3	9.998e-07	9.998e-07	-6.000	-6.000	0.000	(0)
NiNH3+2	9.958e-09	2.318e-09	-8.002	-8.635	-0.633	(0)
Co(NH3)+2	7.785e-09	1.812e-09	-8.109	-8.742	-0.633	(0)
CaNH3+2	6.874e-09	1.600e-09	-8.163	-8.796	-0.633	(0)
CuNH3+2	1.966e-11	4.575e-12	-10.706	-11.340	-0.633	(0)
Ni(NH3)2+2	2.445e-12	5.689e-13	-11.612	-12.245	-0.633	(0)
Co(NH3)2+2	3.092e-13	7.195e-14	-12.510	-13.143	-0.633	(0)
Ca(NH3)2+2	3.639e-15	8.468e-16	-14.439	-15.072	-0.633	(0)
Co(NH3)3+2	5.176e-18	1.205e-18	-17.286	-17.919	-0.633	(0)
Hg(NH3)2+2	1.473e-22	3.428e-23	-21.832	-22.465	-0.633	(0)
Co(NH3)4+2	3.612e-23	8.406e-24	-22.442	-23.075	-0.633	(0)
HgNH3+2	2.862e-26	6.661e-27	-25.543	-26.176	-0.633	(0)
Hg(NH3)3+2	1.120e-27	2.606e-28	-26.951	-27.584	-0.633	(0)
Co(NH3)5+2	7.971e-29	1.855e-29	-28.098	-28.732	-0.633	(0)
Hg(NH3)4+2	1.708e-32	3.976e-33	-31.767	-32.401	-0.633	(0)
Co(NH3)5Cl+2	2.049e-39	4.769e-40	-38.688	-39.322	-0.633	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.775	-47.934	-0.158	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.259	-51.892	-0.633	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.576	-53.209	-0.633	(0)
N(3)	1.398e-35					
N02-	1.398e-35	1.058e-35	-34.855	-34.976	-0.121	(0)
CoN02+	8.514e-40	5.914e-40	-39.070	-39.228	-0.158	(0)
CuN02+	0.000e+00	0.000e+00	-42.442	-42.601	-0.158	(0)
Cu(N02)2	0.000e+00	0.000e+00	-76.566	-76.566	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-48.275	-48.381	-0.106	(0)
CaN03+	0.000e+00	0.000e+00	-50.730	-50.888	-0.158	(0)
MnN03+	0.000e+00	0.000e+00	-52.357	-52.515	-0.158	(0)
CoN03+	0.000e+00	0.000e+00	-53.123	-53.282	-0.158	(0)
NiN03+	0.000e+00	0.000e+00	-53.471	-53.629	-0.158	(0)
ZnN03+	0.000e+00	0.000e+00	-53.956	-54.115	-0.158	(0)
PbN03+	0.000e+00	0.000e+00	-55.727	-55.885	-0.158	(0)
CdN03+	0.000e+00	0.000e+00	-56.190	-56.348	-0.158	(0)
CuN03+	0.000e+00	0.000e+00	-57.358	-57.516	-0.158	(0)
FeN03+2	0.000e+00	0.000e+00	-62.227	-62.860	-0.633	(0)
HgN03+	0.000e+00	0.000e+00	-77.756	-77.914	-0.158	(0)
Mn(N03)2	0.000e+00	0.000e+00	-100.492	-100.492	0.000	(0)

Co(NO3)2	0.000e+00	0.000e+00	-101.354	-101.354	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.207	-103.207	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.016	-104.016	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.079	-105.079	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-106.807	-106.807	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.676	-126.676	0.000	(0)
Na	5.054e-02					
Na+	4.941e-02	3.873e-02	-1.306	-1.412	-0.106	(0)
NaSO4-	1.134e-03	8.968e-04	-2.945	-3.047	-0.102	(0)
NaHPO4-	1.110e-06	8.779e-07	-5.955	-6.057	-0.102	(0)
Ni	8.144e-06					
Ni+2	5.953e-06	2.247e-06	-5.225	-5.648	-0.423	(0)
NiSO4	1.883e-06	1.883e-06	-5.725	-5.725	0.000	(0)
NiCl+	2.947e-07	2.047e-07	-6.531	-6.689	-0.158	(0)
NiNH3+2	9.958e-09	2.318e-09	-8.002	-8.635	-0.633	(0)
NiOH+	1.893e-09	1.315e-09	-8.723	-8.881	-0.158	(0)
Ni(SO4)2-2	1.199e-09	2.791e-10	-8.921	-9.554	-0.633	(0)
NiCl2	3.749e-11	3.749e-11	-10.426	-10.426	0.000	(0)
Ni(OH)2	8.566e-12	8.566e-12	-11.067	-11.067	0.000	(0)
Ni(NH3)2+2	2.445e-12	5.689e-13	-11.612	-12.245	-0.633	(0)
Ni(OH)3-	7.614e-16	5.288e-16	-15.118	-15.277	-0.158	(0)
NiSeO4	1.008e-24	1.008e-24	-23.997	-23.997	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-53.471	-53.629	-0.158	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.950	-55.940	0.010	(0)
P	2.332e-05					
H2PO4-	6.914e-06	5.468e-06	-5.160	-5.262	-0.102	(0)
HPO4-2	5.494e-06	2.095e-06	-5.260	-5.679	-0.419	(0)
MgHPO4	3.896e-06	3.896e-06	-5.409	-5.409	0.000	(0)
FeHPO4	2.750e-06	2.750e-06	-5.561	-5.561	0.000	(0)
FeH2PO4+	1.124e-06	8.890e-07	-5.949	-6.051	-0.102	(0)
NaHPO4-	1.110e-06	8.779e-07	-5.955	-6.057	-0.102	(0)
MgH2PO4+	9.754e-07	7.714e-07	-6.011	-6.113	-0.102	(0)
CaHPO4	8.567e-07	8.567e-07	-6.067	-6.067	0.000	(0)
CaH2PO4+	1.385e-07	1.095e-07	-6.859	-6.960	-0.102	(0)
KHPO4-	2.373e-08	1.876e-08	-7.625	-7.727	-0.102	(0)
CoHPO4	1.670e-08	1.670e-08	-7.777	-7.777	0.000	(0)
CaPO4-	1.623e-08	1.283e-08	-7.790	-7.892	-0.102	(0)
MgPO4-	8.356e-10	6.608e-10	-9.078	-9.180	-0.102	(0)
H3PO4	1.198e-10	1.198e-10	-9.921	-9.921	0.000	(0)
PO4-3	4.476e-11	5.000e-12	-10.349	-11.301	-0.952	(0)
FeHPO4+	6.452e-12	5.103e-12	-11.190	-11.292	-0.102	(0)
FeH2PO4+2	6.512e-17	2.547e-17	-16.186	-16.594	-0.408	(0)
Pb	1.538e-08					
Pb+2	5.670e-09	2.141e-09	-8.246	-8.669	-0.423	(0)
PbSO4	4.546e-09	4.546e-09	-8.342	-8.342	0.000	(0)
PbCl+	3.752e-09	2.606e-09	-8.426	-8.584	-0.158	(0)
Pb(SO4)2-2	5.104e-10	1.188e-10	-9.292	-9.925	-0.633	(0)
PbOH+	4.780e-10	3.320e-10	-9.321	-9.479	-0.158	(0)
PbCl2	4.114e-10	4.114e-10	-9.386	-9.386	0.000	(0)
PbCl3-	8.866e-12	6.158e-12	-11.052	-11.211	-0.158	(0)
Pb(OH)2	6.481e-13	6.481e-13	-12.188	-12.188	0.000	(0)
PbCl4-2	4.103e-13	9.549e-14	-12.387	-13.020	-0.633	(0)
Pb2OH+3	2.994e-16	1.126e-17	-15.524	-16.948	-1.425	(0)
Pb(OH)3-	5.761e-17	4.002e-17	-16.239	-16.398	-0.158	(0)
Pb(OH)4-2	2.600e-21	6.051e-22	-20.585	-21.218	-0.633	(0)
Pb3(OH)4+2	4.097e-23	9.535e-24	-22.387	-23.021	-0.633	(0)
Pb4(OH)4+4	6.410e-26	1.880e-28	-25.193	-27.726	-2.533	(0)
PbNO3+	0.000e+00	0.000e+00	-55.727	-55.885	-0.158	(0)
Pb(HS)2	0.000e+00	0.000e+00	-68.902	-68.902	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.016	-104.016	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.195	-105.354	-0.158	(0)
S(-2)	6.767e-38					
H2S	3.408e-38	3.408e-38	-37.467	-37.467	0.000	(0)
HS-	2.552e-38	1.773e-38	-37.593	-37.751	-0.158	(0)
CdHS+	7.901e-39	5.488e-39	-38.102	-38.261	-0.158	(0)
S5-2	1.643e-40	0.000e+00	-39.784	-40.418	-0.633	(0)
S6-2	0.000e+00	0.000e+00	-40.211	-40.844	-0.633	(0)

S4-2	0.000e+00	0.000e+00	-40.384	-41.017	-0.633	(0)
S3-2	0.000e+00	0.000e+00	-41.197	-41.830	-0.633	(0)
S2-2	0.000e+00	0.000e+00	-42.223	-42.856	-0.633	(0)
S-2	0.000e+00	0.000e+00	-47.962	-48.381	-0.419	(0)
HgHS2-	0.000e+00	0.000e+00	-65.728	-65.887	-0.158	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.095	-66.520	-0.424	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.281	-66.281	0.000	(0)
CuS4S5-3	0.000e+00	0.000e+00	-66.849	-67.250	-0.400	(0)
HgS2-2	0.000e+00	0.000e+00	-67.173	-67.806	-0.633	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-67.891	-68.049	-0.158	(0)
Cd(HS)2	0.000e+00	0.000e+00	-68.808	-68.808	0.000	(0)
Zn(HS)2	0.000e+00	0.000e+00	-68.827	-68.827	0.000	(0)
Pb(HS)2	0.000e+00	0.000e+00	-68.902	-68.902	0.000	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.999	-69.999	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.842	-97.000	-0.158	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.140	-103.299	-0.158	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-104.501	-104.659	-0.158	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.195	-105.354	-0.158	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.555	-105.713	-0.158	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-105.857	-106.490	-0.633	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.582	-140.215	-0.633	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-141.877	-142.510	-0.633	(0)
S(6)	1.642e-02					
S04-2	1.149e-02	4.336e-03	-1.940	-2.363	-0.423	(0)
MgS04	2.406e-03	2.406e-03	-2.619	-2.619	0.000	(0)
NaS04-	1.134e-03	8.968e-04	-2.945	-3.047	-0.102	(0)
CaS04	9.129e-04	9.129e-04	-3.040	-3.040	0.000	(0)
FeS04	3.647e-04	3.647e-04	-3.438	-3.438	0.000	(0)
KS04-	4.865e-05	3.848e-05	-4.313	-4.415	-0.102	(0)
MnS04	3.405e-05	3.405e-05	-4.468	-4.468	0.000	(0)
NH4S04-	2.244e-05	1.763e-05	-4.649	-4.754	-0.105	(0)
CoS04	6.634e-06	6.634e-06	-5.178	-5.178	0.000	(0)
NiS04	1.883e-06	1.883e-06	-5.725	-5.725	0.000	(0)
ZnS04	6.573e-07	6.573e-07	-6.182	-6.182	0.000	(0)
Zn(S04)2-2	1.104e-07	2.568e-08	-6.957	-7.590	-0.633	(0)
HS04-	7.844e-08	6.112e-08	-7.105	-7.214	-0.108	(0)
AlS04+	2.440e-08	1.901e-08	-7.613	-7.721	-0.108	(0)
PbS04	4.546e-09	4.546e-09	-8.342	-8.342	0.000	(0)
CdS04	2.945e-09	2.945e-09	-8.531	-8.531	0.000	(0)
Al(S04)2-	1.238e-09	9.649e-10	-8.907	-9.016	-0.108	(0)
Ni(S04)2-2	1.199e-09	2.791e-10	-8.921	-9.554	-0.633	(0)
Cd(S04)2-2	7.765e-10	1.807e-10	-9.110	-9.743	-0.633	(0)
Pb(S04)2-2	5.104e-10	1.188e-10	-9.292	-9.925	-0.633	(0)
CuS04	2.145e-10	2.145e-10	-9.669	-9.669	0.000	(0)
FeS04+	1.461e-14	1.148e-14	-13.835	-13.940	-0.105	(0)
Fe(S04)2-	1.582e-15	1.099e-15	-14.801	-14.959	-0.158	(0)
HgS04	9.012e-30	9.012e-30	-29.045	-29.045	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.775	-47.934	-0.158	(0)
Se(-2)	4.263e-09					
HSe-	4.256e-09	2.956e-09	-8.371	-8.529	-0.158	(0)
H2Se	3.667e-12	3.667e-12	-11.436	-11.436	0.000	(0)
MnSe	3.467e-12	3.467e-12	-11.460	-11.460	0.000	(0)
Se-2	5.994e-17	1.395e-17	-16.222	-16.855	-0.633	(0)
Se(4)	3.993e-07					
HSeO3-	3.728e-07	2.589e-07	-6.429	-6.587	-0.158	(0)
SeO3-2	2.648e-08	6.162e-09	-7.577	-8.210	-0.633	(0)
H2SeO3	1.737e-11	1.737e-11	-10.760	-10.760	0.000	(0)
FeHSeO3+2	6.940e-19	1.615e-19	-18.159	-18.792	-0.633	(0)
Cd(SeO3)2-2	4.318e-19	1.005e-19	-18.365	-18.998	-0.633	(0)
Se(6)	2.760e-21					
SeO4-2	2.743e-21	1.036e-21	-20.562	-20.985	-0.423	(0)
MnSeO4	1.196e-23	1.196e-23	-22.922	-22.922	0.000	(0)
CoSeO4	3.855e-24	3.855e-24	-23.414	-23.414	0.000	(0)
NiSeO4	1.008e-24	1.008e-24	-23.997	-23.997	0.000	(0)
ZnSeO4	1.150e-25	1.150e-25	-24.939	-24.939	0.000	(0)
HSeO4-	1.072e-26	7.445e-27	-25.970	-26.128	-0.158	(0)
CdSeO4	5.861e-28	5.861e-28	-27.232	-27.232	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.285	-45.918	-0.633	(0)

Zn	2.761e-06						
Zn+2	1.899e-06	7.169e-07	-5.721	-6.145	-0.423	(0)	
ZnSO4	6.573e-07	6.573e-07	-6.182	-6.182	0.000	(0)	
Zn(SO4)2-2	1.104e-07	2.568e-08	-6.957	-7.590	-0.633	(0)	
ZnCl+	8.147e-08	6.291e-08	-7.089	-7.201	-0.112	(0)	
ZnOHCl	5.238e-09	5.238e-09	-8.281	-8.281	0.000	(0)	
ZnOH+	4.692e-09	3.259e-09	-8.329	-8.487	-0.158	(0)	
ZnCl2	3.017e-09	3.017e-09	-8.520	-8.520	0.000	(0)	
ZnCl3-	1.099e-10	8.484e-11	-9.959	-10.071	-0.112	(0)	
Zn(OH)2	4.331e-11	4.331e-11	-10.363	-10.363	0.000	(0)	
ZnCl4-2	3.877e-12	1.478e-12	-11.411	-11.830	-0.419	(0)	
Zn(OH)3-	1.929e-14	1.340e-14	-13.715	-13.873	-0.158	(0)	
Zn(OH)4-2	1.415e-19	3.294e-20	-18.849	-19.482	-0.633	(0)	
ZnSeO4	1.150e-25	1.150e-25	-24.939	-24.939	0.000	(0)	
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.285	-45.918	-0.633	(0)	
ZnNO3+	0.000e+00	0.000e+00	-53.956	-54.115	-0.158	(0)	
ZnS(HS)-	0.000e+00	0.000e+00	-67.891	-68.049	-0.158	(0)	
Zn(HS)2	0.000e+00	0.000e+00	-68.827	-68.827	0.000	(0)	
Zn(HS)3-	0.000e+00	0.000e+00	-103.140	-103.299	-0.158	(0)	
Zn(NO3)2	0.000e+00	0.000e+00	-103.207	-103.207	0.000	(0)	
ZnS(HS)2-2	0.000e+00	0.000e+00	-105.857	-106.490	-0.633	(0)	
Zn(HS)4-2	0.000e+00	0.000e+00	-141.877	-142.510	-0.633	(0)	

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2-124.13	-117.86	6.27	(Co(NH3)5Cl)(NO3)2	
(Co(NH3)5Cl)Cl2 -28.52	-23.98	4.54	(Co(NH3)5Cl)Cl2	
(Co(NH3)5OH2)Cl3 -35.78	-23.98	11.80	(Co(NH3)5OH2)Cl3	
(Co(NH3)6)(NO3)3-179.35	-161.42	17.93	(Co(NH3)6)(NO3)3	
(Co(NH3)6)Cl3 -40.72	-20.61	20.11	(Co(NH3)6)Cl3	
(NH4)2SeO4 -28.28	-27.83	0.45	(NH4)2SeO4	
Al(OH)3(am) 0.12	11.18	11.06	Al(OH)3	
Al2O3 2.10	22.37	20.27	Al2O3	
Al4(OH)10SO4 6.09	28.79	22.70	Al4(OH)10SO4	
AlOHSO4 -1.53	-4.76	-3.23	AlOHSO4	
Alunite 6.46	5.56	-0.90	KAl3(SO4)2(OH)6	
Anglesite -3.21	-11.03	-7.82	PbSO4	
Anhydrite -1.04	-5.38	-4.34	CaSO4	
Anilite -13.04	-45.35	-32.31	Cu0.25Cu1.5S	
Antlerite -12.94	-4.15	8.79	Cu3(OH)4SO4	
Atacamite -7.98	-0.37	7.61	Cu2(OH)3Cl	
Bianchite -6.75	-8.51	-1.76	ZnSO4:6H2O	
Birnessite -18.86	-0.76	18.09	MnO2	
Bixbyite -16.78	-17.13	-0.35	Mn2O3	
BlaubleiI -17.08	-41.24	-24.16	Cu0.9Cu0.2S	
BlaubleiII -15.86	-43.14	-27.28	Cu0.6Cu0.8S	
Boehmite 2.32	11.18	8.86	AlOOH	
Brochantite -15.92	-0.22	15.71	Cu4(OH)6SO4	
Brucite -6.04	11.07	17.12	Mg(OH)2	
Bunsenite -4.76	7.93	12.68	NiO	
Ca3(PO4)2(beta) -2.61	-31.66	-29.05	Ca3(PO4)2	
Ca4H(PO4)3:3H2O -5.69	-52.77	-47.08	Ca4H(PO4)3:3H2O	
CaHP04 -1.76	-21.11	-19.35	CaHP04	
CaHP04:2H2O -2.06	-21.11	-19.05	CaHP04:2H2O	
Calomel -14.04	-32.16	-18.13	Hg2Cl2	
CaSeO3:2H2O -5.68	-2.82	2.86	CaSeO3:2H2O	
CaSeO4:2H2O -21.01	-24.01	-3.00	CaSeO4:2H2O	
Cd(OH)2 -8.81	5.06	13.87	Cd(OH)2	
Cd(OH)2(am) -8.88	5.06	13.94	Cd(OH)2	
Cd3(OH)2(SO4)2 -23.41	-16.70	6.71	Cd3(OH)2(SO4)2	
Cd3(OH)4SO4 -23.32	-0.76	22.56	Cd3(OH)4SO4	
Cd3(PO4)2 -15.55	-48.15	-32.60	Cd3(PO4)2	
Cd4(OH)6SO4 -24.11	4.29	28.40	Cd4(OH)6SO4	
CdCl2 -10.79	-11.40	-0.61	CdCl2	
CdCl2:1H2O -9.73	-11.41	-1.68	CdCl2:1H2O	
CdCl2:2.5H2O -9.48	-11.41	-1.93	CdCl2:2.5H2O	

Cdmetal(alpha)	-24.24	-10.54	13.69	Cd
Cdmetal(gamma)	-24.34	-10.54	13.80	Cd
CdOHCl	-6.78	-3.17	3.61	CdOHCl
CdSe	10.12	-10.26	-20.38	CdSe
CdSe04:2H2O	-27.65	-29.50	-1.85	CdSe04:2H2O
CdS04	-10.83	-10.88	-0.05	CdS04
CdS04:1H2O	-9.23	-10.88	-1.65	CdS04:1H2O
CdS04:2.67H2O	-9.05	-10.88	-1.83	CdS04:2.67H2O
Chalcanthite	-9.36	-12.01	-2.65	CuS04:5H2O
Chalcocite	-11.61	-46.93	-35.32	Cu2S
Chalcopyrite	-39.39	-75.02	-35.62	CuFeS2
Cinnabar	-19.96	-66.26	-46.30	HgS
Clausthalite	16.97	-10.41	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.04	-16.13	-2.09	Co(OH)3
Co3(P04)2	-3.22	-37.90	-34.69	Co3(P04)2
Co304	-13.53	-23.77	-10.24	Co304
CoCl2	-16.45	-7.99	8.46	CoCl2
CoCl2:6H2O	-10.51	-7.99	2.52	CoCl2:6H2O
CoFe204	21.22	18.07	-3.15	CoFe204
CoHP04	-4.13	-23.19	-19.06	CoHP04
CoO	-5.36	8.48	13.84	CoO
CoS(alpha)	-28.62	-36.06	-7.44	CoS
CoS(beta)	-24.99	-36.06	-11.07	CoS
CoSe	9.36	-6.84	-16.20	CoSe
CoSe03	-6.22	-4.90	1.32	CoSe03
CoSe04:6H2O	-24.56	-26.09	-1.53	CoSe04:6H2O
CoS04	-10.45	-7.46	2.99	CoS04
CoS04:6H2O	-4.99	-7.47	-2.48	CoS04:6H2O
Cotunnite	-6.71	-11.56	-4.84	PbCl2
Covellite	-18.08	-40.61	-22.53	CuS
Cu(OH)2	-4.88	3.93	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.73	-47.31	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.60	-17.71	-46.31	Cu2Se
Cu2S04	-16.43	-18.33	-1.90	Cu2S04
Cu3(P04)2	-14.69	-51.54	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-16.42	-51.54	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.21	-29.09	-64.30	Cu3Se2
Cumetal	-0.07	-9.00	-8.93	Cu
Cu0CuS04	-18.71	-8.08	10.63	Cu0CuS04
Cupricferrite	7.04	13.52	6.49	CuFe204
Cuprite	-1.28	-2.39	-1.11	Cu2O
Cuprousferrite	12.48	3.60	-8.88	CuFe02
CuSe	22.00	-11.39	-33.39	CuSe
CuSe2	22.60	-11.10	-33.70	CuSe2
CuSe03:2H2O	-10.04	-9.45	0.60	CuSe03:2H2O
CuSe04:5H2O	-28.19	-30.63	-2.44	CuSe04:5H2O
CuS04	-15.12	-12.01	3.11	CuS04
Diaspore	4.06	11.18	7.12	Al00H
Djurleite	-12.12	-46.51	-34.40	Cu0.066Cu1.868S
Epsomite	-2.72	-4.87	-2.15	MgS04:7H2O
Fe(OH)2	-3.43	10.13	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.37	2.33	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-5.34	-3.78	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H2O	-9.91	-30.53	-20.63	Fe2(Se03)3:2H2O
Fe2(S04)3	-35.07	-38.22	-3.16	Fe2(S04)3
Fe3(OH)8	-0.50	19.72	20.22	Fe3(OH)8
Ferrihydrite	1.43	4.80	3.37	Fe(OH)3
Ferroselite	13.81	-4.90	-18.71	FeSe2
FeS(ppt)	-31.49	-34.41	-2.92	FeS
FeSe	5.82	-5.19	-11.00	FeSe
Galena	-25.47	-39.63	-14.16	PbS
Gibbsite	2.66	11.18	8.52	Al(OH)3
Goethite	4.16	4.80	0.64	Fe00H
Goslarite	-6.47	-8.51	-2.05	ZnS04:7H2O
Greenockite	-24.99	-39.48	-14.49	CdS
Greigite	-113.40	-158.43	-45.03	Fe3S4
Gypsum	-0.77	-5.38	-4.61	CaS04:2H2O

H-Jarosite	-5.94	-17.49	-11.55	(H3O)Fe3(SO4)2(OH)6
H2S(g)	-36.53	-44.54	-8.01	H2S
H2Se(g)	-10.39	-15.32	-4.92	H2Se
Halite	-4.45	-2.86	1.59	NaCl
Hausmannite	-18.71	43.33	62.03	Mn3O4
Hematite	10.70	9.59	-1.11	Fe2O3
Hercynite	8.85	32.50	23.64	FeAl2O4
Hg(g)	-7.72	-15.65	-7.93	Hg
Hg(OH)2	-18.22	-21.72	-3.50	Hg(OH)2
Hg2(g)	-16.21	-31.30	-15.09	Hg2
Hg2(OH)2	-20.96	-15.70	5.26	Hg2(OH)2
Hg2HPO4	-22.59	-47.37	-24.77	Hg2HPO4
Hg2S	-48.40	-60.24	-11.84	Hg2S
Hg2SeO3	-24.42	-29.08	-4.66	Hg2SeO3
Hg2SO4	-25.50	-31.64	-6.14	Hg2SO4
HgCl(g)	-35.97	-16.08	19.88	HgCl
HgCl2	-16.66	-38.18	-21.52	HgCl2
Hgmetal(l)	-2.00	-15.65	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSeO3	-22.66	-35.09	-12.43	HgSeO3
HgSO4	-28.20	-37.66	-9.45	HgSO4
Hinsdalite	-6.65	-9.15	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	2.12	-42.21	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-7.67	-70.46	-62.79	Pb5(PO4)3OH
K-Alum	-11.57	-16.81	-5.24	KAl(SO4)2·12H2O
K-Jarosite	0.89	-13.59	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-26.04	-26.77	-0.73	K2SeO4
Langite	-18.10	-0.22	17.88	Cu4(OH)6SO4·H2O
Larnakite	-5.74	-6.13	-0.38	PbO·PbSO4
Laurionite	-3.95	-3.33	0.62	PbOHCl
Lepidocrocite	3.43	4.80	1.37	FeOOH
Lime	-22.60	10.56	33.16	CaO
Litharge	-7.94	4.91	12.85	PbO
Mackinawite	-30.81	-34.41	-3.60	FeS
Maghemite	3.21	9.59	6.39	Fe2O3
Magnesioferrite	3.14	20.67	17.52	Fe2MgO4
Magnetite	15.82	19.72	3.90	Fe3O4
Manganite	-8.30	17.04	25.34	MnOOH
Massicot	-8.15	4.91	13.05	PbO
Melanothallite	-18.94	-12.53	6.41	CuCl2
Melanterite	-3.56	-5.82	-2.26	FeSO4·7H2O
Metacinnabar	-20.56	-66.26	-45.70	HgS
Mg(OH)2(active)	-7.72	11.07	18.79	Mg(OH)2
Mg3(PO4)2	-6.83	-30.11	-23.28	Mg3(PO4)2
MgHPO4·3H2O	-2.42	-20.59	-18.18	MgHPO4·3H2O
MgSeO3·6H2O	-5.35	-2.31	3.04	MgSeO3·6H2O
MgSeO4·6H2O	-22.29	-23.49	-1.20	MgSeO4·6H2O
Minium	-44.21	30.32	74.53	Pb3O4
Mirabilite	-3.89	-5.20	-1.30	Na2SO4·10H2O
Mn2(SO4)3	-59.62	-64.95	-5.32	Mn2(SO4)3
Mn3(PO4)2	-11.76	-35.60	-23.85	Mn3(PO4)2
MnCl2·4H2O	-9.97	-7.23	2.74	MnCl2·4H2O
MnHPO4	2.98	-22.42	-25.40	MnHPO4
MnS(grn)	-35.54	-35.30	0.25	MnS
MnS(pnk)	-38.64	-35.30	3.34	MnS
MnSe	-9.81	-6.08	3.73	MnSe
MnSeO3	-5.26	-4.13	1.13	MnSeO3
MnSeO3·2H2O	-5.10	-4.13	0.96	MnSeO3·2H2O
MnSeO4·5H2O	-23.27	-25.32	-2.05	MnSeO4·5H2O
MnSO4	-9.43	-6.70	2.74	MnSO4
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.17	-21.72	-3.55	HgO
Morenosite	-5.84	-8.02	-2.17	NiSO4·7H2O
Na-Jarosite	-1.28	-12.11	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3·5H2O	-12.93	-2.63	10.30	Na2SeO3·5H2O
Na2SeO4	-25.09	-23.81	1.28	Na2SeO4
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.10	7.93	13.02	Ni(OH)2

Ni3(P04)2	-8.25	-39.55	-31.30	Ni3(P04)2
Ni4(OH)6S04	-16.23	15.77	32.00	Ni4(OH)6S04
NiS(alpha)	-31.01	-36.61	-5.60	NiS
NiS(beta)	-25.51	-36.61	-11.10	NiS
NiS(gamma)	-23.81	-36.61	-12.80	NiS
NiSe	10.31	-7.39	-17.70	NiSe
NiSe03:2H2O	-8.34	-5.45	2.89	NiSe03:2H2O
NiSe04:6H2O	-25.12	-26.64	-1.52	NiSe04:6H2O
Nsutite	-18.27	-0.76	17.50	Mn02
O2(g)	-53.25	31.20	84.45	O2
Pb(OH)2	-3.38	4.91	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.21	1.58	8.79	Pb2(OH)3Cl
Pb20(OH)2	-16.38	9.81	26.19	Pb20(OH)2
Pb203	-35.63	25.41	61.04	Pb203
Pb3(P04)2	-5.08	-48.61	-43.53	Pb3(P04)2
Pb302S04	-12.09	-1.22	10.87	Pb302S04
Pb4(OH)6S04	-17.42	3.68	21.10	Pb4(OH)6S04
Pb403S04	-18.51	3.69	22.20	Pb403S04
PbHP04	-2.95	-26.76	-23.81	PbHP04
Pbmetal	-14.94	-10.69	4.24	Pb
Pb0:0.3H2O	-8.07	4.91	12.98	Pb0:0.33H2O
PbSe04	-22.78	-29.65	-6.88	PbSe04
Periclase	-10.87	11.07	21.94	MgO
Plattnerite	-29.80	20.51	50.31	Pb02
Plumbgummite	7.91	-24.88	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-12.56	10.56	23.11	Ca(OH)2
Pyrite	-44.72	-63.35	-18.63	FeS2
Pyrochroite	-6.18	9.24	15.43	Mn(OH)2
Pyrolusite	-17.19	24.84	42.03	Mn02
Pyromorphite	5.74	-78.69	-84.43	Pb5(P04)3Cl
Retgersite	-5.97	-8.02	-2.05	NiS04:6H2O
Semetal(am)	7.42	0.28	-7.14	Se
Semetal(hex	8.03	0.28	-7.75	Se
Se02	-13.50	-13.37	0.12	Se02
Se03	-55.95	-34.56	21.39	Se03
Sphalerite	-25.59	-37.11	-11.52	ZnS
Spinel	-4.33	33.44	37.77	MgAl204
Strengite	-0.49	-26.87	-26.38	FeP04:2H2O
Sulfur	-26.83	-28.94	-2.11	S
Tenorite	-3.87	3.93	7.80	Cu0
Thenardite	-5.53	-5.19	0.34	Na2S04
Tsumebite	-8.13	-17.92	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	3.05	-32.95	-36.00	Fe3(P04)2:8H2O
Wurtzite	-28.11	-37.11	-9.00	ZnS
Zincite	-4.12	7.43	11.55	Zn0
Zincosite	-12.63	-8.51	4.13	ZnS04
Zn(NO3)2:6H2O	-106.17	-102.91	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.77	7.43	12.20	Zn(OH)2
Zn(OH)2(am)	-5.24	7.43	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.52	7.43	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.30	7.43	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.30	7.43	11.73	Zn(OH)2
Zn2(OH)2S04	-8.58	-1.08	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-8.56	6.63	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-5.62	-41.04	-35.42	Zn3(P04)2:4H2O
Zn30(S04)2	-29.11	-9.58	19.53	Zn30(S04)2
Zn4(OH)6S04	-14.62	13.78	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-17.81	20.69	38.50	Zn5(OH)8Cl2
ZnCl2	-16.25	-9.03	7.22	ZnCl2
Znmetal	-34.32	-8.17	26.15	Zn
Zn0(active)	-3.97	7.43	11.40	Zn0
ZnS(am)	-28.02	-37.11	-9.09	ZnS
ZnSe	6.58	-7.89	-14.46	ZnSe
ZnSe04:6H2O	-25.62	-27.14	-1.52	ZnSe04:6H2O
ZnS04:1H2O	-7.98	-8.51	-0.53	ZnS04:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 10.

SOLUTION 8 # Mean Groundwater quality

temp 21
pH 6.79
pe 1
redox pe
units mg/l
density 1
Al 0.37
Alkalinity 0
As 0
Ba 0
Be 0
B 0
Cd 0.003
Co 2.34
Cr 0
Cu 0.31
Fe 100.34
Pb 0.003
Mn 12.2
Mo 0
V 0
Zn 0.17
Se 0.03
Ni 0.45
N 7
P 0.68
Ca 130
Mg 246
Na 1094
K 62
Cl 1533
S(6) 1485
Hg 0.0002
water 1 # kg

MIX 7
1 0.954
8 0.046

REACTION 8

H2O -1

3

END #Time-step 8

Beginning of initial solution calculations.

Initial solution 8.

-----Solution composition-----

Elements	Molality	Moles
Al	1.378e-05	1.378e-05
Ca	3.259e-03	3.259e-03
Cd	2.681e-08	2.681e-08
Cl	4.344e-02	4.344e-02
Co	3.989e-05	3.989e-05
Cu	4.901e-06	4.901e-06
Fe	1.805e-03	1.805e-03

Hg	1.002e-09	1.002e-09
K	1.593e-03	1.593e-03
Mg	1.017e-02	1.017e-02
Mn	2.231e-04	2.231e-04
N	5.021e-04	5.021e-04
Na	4.781e-02	4.781e-02
Ni	7.703e-06	7.703e-06
P	2.206e-05	2.206e-05
Pb	1.455e-08	1.455e-08
S(6)	1.553e-02	1.553e-02
Se	3.817e-07	3.817e-07
Zn	2.612e-06	2.612e-06

-----Description of solution-----

pH = 6.790
 pe = 1.000
 Activity of water = 0.998
 Ionic strength (mol/kgw) = 9.259e-02
 Mass of water (kg) = 1.000e+00
 Total alkalinity (eq/kg) = 6.274e-05
 Total carbon (mol/kg) = 0.000e+00
 Total CO2 (mol/kg) = 0.000e+00
 Temperature (°C) = 21.00
 Electrical balance (eq) = 6.374e-03
 Percent error, $100 \cdot (\text{Cat} - |\text{An}|) / (\text{Cat} + |\text{An}|)$ = 4.58
 Iterations = 13
 Total H = 1.110158e+02
 Total O = 5.556909e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.061e-07	1.622e-07	-6.686	-6.790	-0.104	0.00
OH-	5.935e-08	4.562e-08	-7.227	-7.341	-0.114	(0)
H2O	5.551e+01	9.980e-01	1.744	-0.001	0.000	18.05
Al	1.378e-05					
Al(OH)4-	8.973e-06	7.024e-06	-5.047	-5.153	-0.106	(0)
Al(OH)2+	2.373e-06	1.884e-06	-5.625	-5.725	-0.100	(0)
Al(OH)3	2.329e-06	2.329e-06	-5.633	-5.633	0.000	(0)
AlOH+2	7.409e-08	2.945e-08	-7.130	-7.531	-0.401	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
Al+3	5.344e-09	6.178e-10	-8.272	-9.209	-0.937	(0)
Al(SO4)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ca	3.259e-03					
Ca+2	2.406e-03	9.221e-04	-2.619	-3.035	-0.416	(0)
CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CaOH+	1.001e-09	8.020e-10	-8.999	-9.096	-0.096	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
Cd	2.681e-08					
CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
Cd+2	7.874e-09	3.018e-09	-8.104	-8.520	-0.416	(0)
CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
Cd(SO4)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
CdOH+	1.568e-12	1.100e-12	-11.805	-11.959	-0.154	(0)
Cd(OH)2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
Cd2OH+3	4.264e-19	1.748e-20	-18.370	-19.758	-1.387	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)

		Cd(OH)3-	3.135e-21	2.198e-21	-20.504	-20.658	-0.154	(0)
		CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
		Cd(OH)4-2	9.222e-29	2.230e-29	-28.035	-28.652	-0.617	(0)
		CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
		Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cl	4.344e-02	Cl-	4.343e-02	3.417e-02	-1.362	-1.466	-0.104	(0)
		CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
		MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
		CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
		CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
		NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
		MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
		ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
		CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
		CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
		ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
		PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
		ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
		CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
		MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
		PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
		ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
		CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
		NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
		CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
		CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
		PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
		ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
		PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
		CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
		FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
		FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
		CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
		HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
		HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
		HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
		FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
		HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
		CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
		HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
		CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
		Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
		Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(2)	3.989e-05	Co+2	3.225e-05	7.797e-06	-4.491	-5.108	-0.617	(0)
		CoSO4	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
		CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
		CoHPO4	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
		CoOH+	1.375e-08	9.639e-09	-7.862	-8.016	-0.154	(0)
		Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
		Co(OH)2	4.744e-11	4.744e-11	-10.324	-10.324	0.000	(0)
		Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
		Co2OH+3	9.190e-14	3.766e-15	-13.037	-14.424	-1.387	(0)
		Co(OH)3-	8.364e-17	5.865e-17	-16.078	-16.232	-0.154	(0)
		CoOOH-	5.039e-18	3.533e-18	-17.298	-17.452	-0.154	(0)
		Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
		Co4(OH)4+4	5.041e-22	1.722e-24	-21.297	-23.764	-2.466	(0)
		Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
		CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
		Co(OH)4-2	2.382e-24	5.759e-25	-23.623	-24.240	-0.617	(0)
		Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
		CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
		CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
		Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Co(3)	4.042e-31	CoOH+2	4.042e-31	9.773e-32	-30.393	-31.010	-0.617	(0)
		CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)

Co+3	2.685e-36	3.104e-37	-35.571	-36.508	-0.937	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
Cu(1)	4.900e-06					
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
Cu+	1.553e-08	1.089e-08	-7.809	-7.963	-0.154	(0)
Cu(2)	8.967e-10					
Cu+2	6.026e-10	2.310e-10	-9.220	-9.636	-0.416	(0)
CuSO4	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
CuOH+	4.792e-11	3.719e-11	-10.319	-10.430	-0.110	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
Cu(OH)2	5.595e-13	5.595e-13	-12.252	-12.252	0.000	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
Cu2(OH)2+2	1.398e-16	3.379e-17	-15.855	-16.471	-0.617	(0)
Cu(OH)3-	1.014e-16	7.111e-17	-15.994	-16.148	-0.154	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
Cu(OH)4-2	1.434e-22	3.468e-23	-21.843	-22.460	-0.617	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Fe(2)	1.805e-03					
Fe+2	1.454e-03	3.515e-04	-2.837	-3.454	-0.617	(0)
FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
FeHPO4	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
FeOH+	8.090e-07	6.384e-07	-6.092	-6.195	-0.103	(0)
Fe(OH)2	2.214e-11	2.214e-11	-10.655	-10.655	0.000	(0)
Fe(OH)3-	5.296e-13	4.179e-13	-12.276	-12.379	-0.103	(0)
Fe(3)	3.233e-07					
Fe(OH)2+	3.138e-07	2.491e-07	-6.503	-6.604	-0.100	(0)
Fe(OH)3	9.382e-09	9.382e-09	-8.028	-8.028	0.000	(0)
Fe(OH)4-	1.205e-10	9.565e-11	-9.919	-10.019	-0.100	(0)
FeOH+2	2.119e-11	8.217e-12	-10.674	-11.085	-0.411	(0)
FeHPO4+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeSO4+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe+3	2.235e-15	2.584e-16	-14.651	-15.588	-0.937	(0)
Fe(SO4)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
Fe2(OH)2+4	7.548e-19	2.579e-21	-18.122	-20.589	-2.466	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
Fe3(OH)4+5	6.361e-23	8.906e-27	-22.197	-26.050	-3.854	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
H(0)	3.796e-19					
H2	1.898e-19	1.939e-19	-18.722	-18.712	0.009	(0)
Hg(0)	1.002e-09					
Hg	1.002e-09	1.002e-09	-8.999	-8.999	0.000	(0)
Hg(1)	3.697e-29					
Hg2+2	1.848e-29	4.469e-30	-28.733	-29.350	-0.617	(0)
Hg(2)	2.362e-18					
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
Hg(OH)2	1.682e-22	1.718e-22	-21.774	-21.765	0.009	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
HgOH+	2.768e-26	1.941e-26	-25.558	-25.712	-0.154	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)

	Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
	Hg+2	3.648e-29	8.820e-30	-28.438	-29.055	-0.617	(0)
	HgSO4	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
	Hg(OH)3-	1.911e-30	1.340e-30	-29.719	-29.873	-0.154	(0)
	Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
	HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
	Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
K	1.593e-03						
	K+	1.549e-03	1.219e-03	-2.810	-2.914	-0.104	(0)
	KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
	KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
Mg	1.017e-02						
	Mg+2	7.920e-03	3.036e-03	-2.101	-2.518	-0.416	(0)
	MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
	MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
	MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
	MgOH+	6.402e-08	5.162e-08	-7.194	-7.287	-0.094	(0)
	MgP04-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
Mn(2)	2.231e-04						
	Mn+2	1.882e-04	4.549e-05	-3.725	-4.342	-0.617	(0)
	MnSO4	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
	MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
	MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
	MnOH+	6.606e-09	5.213e-09	-8.180	-8.283	-0.103	(0)
	MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
	MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
	Mn(OH)3-	2.129e-19	1.680e-19	-18.672	-18.775	-0.103	(0)
	MnSe04	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
	Mn(OH)4-2	8.666e-26	3.361e-26	-25.062	-25.474	-0.411	(0)
	MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
	Mn(NO3)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Mn(3)	9.732e-29						
	Mn+3	9.732e-29	1.125e-29	-28.012	-28.949	-0.937	(0)
Mn(6)	0.000e+00						
	MnO4-2	0.000e+00	0.000e+00	-65.730	-66.142	-0.411	(0)
Mn(7)	0.000e+00						
	MnO4-	0.000e+00	0.000e+00	-74.661	-74.779	-0.119	(0)
N(-3)	5.021e-04						
	NH4+	4.805e-04	3.617e-04	-3.318	-3.442	-0.123	(0)
	NH4SO4-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
	NH3	9.560e-07	9.560e-07	-6.020	-6.020	0.000	(0)
	NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
	Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
	CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
	CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
	Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
	Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
	Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
	Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
	Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
	Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
	HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
	Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
	Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
	Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
	Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
	Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
	Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
N(3)	1.148e-35						
	N02-	1.148e-35	8.735e-36	-34.940	-35.059	-0.119	(0)
	CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
	CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
	Cu(NO2)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
N(5)	0.000e+00						
	N03-	0.000e+00	0.000e+00	-48.382	-48.486	-0.104	(0)
	CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
	MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)

CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
Na	4.781e-02					
Na+	4.677e-02	3.680e-02	-1.330	-1.434	-0.104	(0)
NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
Ni	7.703e-06					
Ni+2	5.664e-06	2.171e-06	-5.247	-5.663	-0.416	(0)
NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
NiOH+	1.818e-09	1.275e-09	-8.741	-8.895	-0.154	(0)
Ni(SO4)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
Ni(OH)2	8.335e-12	8.335e-12	-11.079	-11.079	0.000	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Ni(OH)3-	7.365e-16	5.164e-16	-15.133	-15.287	-0.154	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.993	-55.984	0.009	(0)
P	2.206e-05					
H2PO4-	6.634e-06	5.268e-06	-5.178	-5.278	-0.100	(0)
HP04-2	5.222e-06	2.025e-06	-5.282	-5.694	-0.411	(0)
MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
FeHP04	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
NaHP04-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
CaHP04	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
CoHP04	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CaP04-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
MgP04-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
H3P04	1.150e-10	1.150e-10	-9.939	-9.939	0.000	(0)
P04-3	4.196e-11	4.850e-12	-10.377	-11.314	-0.937	(0)
FeHP04+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
Pb	1.455e-08					
Pb+2	5.480e-09	2.100e-09	-8.261	-8.678	-0.416	(0)
PbSO4	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
PbOH+	4.662e-10	3.269e-10	-9.331	-9.486	-0.154	(0)
Pb(SO4)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
Pb(OH)2	6.405e-13	6.405e-13	-12.193	-12.193	0.000	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
Pb2OH+3	2.655e-16	1.088e-17	-15.576	-16.963	-1.387	(0)
Pb(OH)3-	5.660e-17	3.969e-17	-16.247	-16.401	-0.154	(0)
Pb(OH)4-2	2.491e-21	6.022e-22	-20.604	-21.220	-0.617	(0)
Pb3(OH)4+2	3.779e-23	9.137e-24	-22.423	-23.039	-0.617	(0)
Pb4(OH)4+4	5.175e-26	1.768e-28	-25.286	-27.753	-2.466	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)

Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
S(6)	1.553e-02					
S04-2	1.094e-02	4.194e-03	-1.961	-2.377	-0.416	(0)
MgS04	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
NaS04-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
CaS04	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
FeS04	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
MnS04	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
NH4S04-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
CoS04	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
NiS04	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
ZnS04	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(S04)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
HS04-	7.527e-08	5.892e-08	-7.123	-7.230	-0.106	(0)
AlS04+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
PbS04	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
CdS04	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
Al(S04)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ni(S04)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
Cd(S04)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
Pb(S04)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
CuS04	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
FeS04+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe(S04)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
HgS04	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Se(-2)	4.685e-09					
HSe-	4.677e-09	3.279e-09	-8.330	-8.484	-0.154	(0)
H2Se	4.054e-12	4.054e-12	-11.392	-11.392	0.000	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Se-2	6.423e-17	1.553e-17	-16.192	-16.809	-0.617	(0)
Se(4)	3.770e-07					
HSeO3-	3.526e-07	2.472e-07	-6.453	-6.607	-0.154	(0)
SeO3-2	2.442e-08	5.904e-09	-7.612	-8.229	-0.617	(0)
H2SeO3	1.653e-11	1.653e-11	-10.782	-10.782	0.000	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Se(6)	2.478e-21					
SeO4-2	2.463e-21	9.439e-22	-20.609	-21.025	-0.416	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
HSeO4-	9.645e-27	6.763e-27	-26.016	-26.170	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
Zn	2.612e-06					
Zn+2	1.813e-06	6.948e-07	-5.742	-6.158	-0.416	(0)
ZnS04	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(S04)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
ZnOH+	4.520e-09	3.170e-09	-8.345	-8.499	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
Zn(OH)2	4.227e-11	4.227e-11	-10.374	-10.374	0.000	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
Zn(OH)3-	1.872e-14	1.313e-14	-13.728	-13.882	-0.154	(0)
Zn(OH)4-2	1.339e-19	3.238e-20	-18.873	-19.490	-0.617	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)

-----Saturation indices-----

Phase SI** log IAP log K(294 K, 1 atm)

(Co(NH3)5Cl)(NO3)2	-124.48	-118.20	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-28.70	-24.17	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.96	-24.17	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-179.81	-161.88	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.93	-20.82	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-28.36	-27.91	0.45	(NH4)2SeO4
Al(OH)3(am)	0.09	11.16	11.06	Al(OH)3
Al2O3	2.05	22.32	20.27	Al2O3
Al4(OH)10SO4	5.98	28.68	22.70	Al4(OH)10SO4
AlOHSO4	-1.57	-4.80	-3.23	AlOHSO4
Alunite	6.34	5.44	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.24	-11.06	-7.82	PbSO4
Anhydrite	-1.07	-5.41	-4.34	CaSO4
Antlerite	-12.92	-4.13	8.79	Cu3(OH)4SO4
Atacamite	-7.99	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.78	-8.54	-1.76	ZnSO4:6H2O
Birnessite	-18.88	-0.79	18.09	MnO2
Bixbyite	-16.81	-17.16	-0.35	Mn2O3
Boehmite	2.30	11.16	8.86	AlOOH
Brochantite	-15.89	-0.19	15.71	Cu4(OH)6SO4
Brucite	-6.06	11.06	17.12	Mg(OH)2
Bunsenite	-4.77	7.92	12.68	NiO
Ca3(PO4)2(beta)	-2.69	-31.73	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-5.80	-52.88	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.79	-21.14	-19.35	CaHP04
CaHP04:2H2O	-2.09	-21.14	-19.05	CaHP04:2H2O
Calomel	-14.15	-32.28	-18.13	Hg2Cl2
CaSeO3:2H2O	-5.71	-2.85	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-21.06	-24.06	-3.00	CaSeO4:2H2O
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-23.45	-16.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-23.34	-0.78	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-15.59	-48.19	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-24.12	4.28	28.40	Cd4(OH)6SO4
CdCl2	-10.84	-11.45	-0.61	CdCl2
CdCl2:1H2O	-9.78	-11.45	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-9.52	-11.46	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.21	-10.52	13.69	Cd
Cdmetal(gamma)	-24.32	-10.52	13.80	Cd
CdOHCl	-6.81	-3.20	3.61	CdOHCl
CdSe	10.17	-10.21	-20.38	CdSe
CdSeO4:2H2O	-27.70	-29.55	-1.85	CdSeO4:2H2O
CdSO4	-10.85	-10.90	-0.05	CdSO4
CdSO4:1H2O	-9.25	-10.90	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-9.07	-10.90	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.36	-12.02	-2.65	CuSO4:5H2O
Clausthalite	17.01	-10.37	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.05	-16.14	-2.09	Co(OH)3
Co3(PO4)2	-3.27	-37.95	-34.69	Co3(PO4)2
Co3O4	-13.57	-23.81	-10.24	Co3O4
CoCl2	-16.50	-8.04	8.46	CoCl2
CoCl2:6H2O	-10.56	-8.05	2.52	CoCl2:6H2O
CoFe2O4	21.18	18.03	-3.15	CoFe2O4
CoHP04	-4.15	-23.21	-19.06	CoHP04
CoO	-5.37	8.47	13.84	CoO
CoSe	9.40	-6.80	-16.20	CoSe
CoSeO3	-6.24	-4.92	1.32	CoSeO3
CoSeO4:6H2O	-24.61	-26.14	-1.53	CoSeO4:6H2O
CoSO4	-10.48	-7.49	2.99	CoSO4
CoSO4:6H2O	-5.02	-7.49	-2.48	CoSO4:6H2O
Cotunnite	-6.77	-11.61	-4.84	PbCl2
Cu(OH)2	-4.87	3.94	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.82	-47.39	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.69	-17.62	-46.31	Cu2Se
Cu2SO4	-16.40	-18.30	-1.90	Cu2SO4

Cu3(P04)2	-14.69	-51.54	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-16.42	-51.54	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.35	-28.95	-64.30	Cu3Se2
Cumetal	-0.04	-8.96	-8.93	Cu
Cu0CuS04	-18.70	-8.07	10.63	Cu0CuS04
Cupricferrite	7.02	13.50	6.49	CuFe204
Cuprite	-1.24	-2.35	-1.11	Cu2O
Cuprousferrite	12.49	3.61	-8.88	CuFe02
CuSe	22.06	-11.33	-33.39	CuSe
CuSe2	22.68	-11.02	-33.70	CuSe2
CuSe03:2H2O	-10.05	-9.46	0.60	CuSe03:2H2O
CuSe04:5H2O	-28.23	-30.67	-2.44	CuSe04:5H2O
CuS04	-15.13	-12.01	3.11	CuS04
Diaspore	4.04	11.16	7.12	Al00H
Epsomite	-2.75	-4.90	-2.15	MgS04:7H2O
Fe(OH)2	-3.44	10.12	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.34	2.30	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-5.39	-3.84	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H2O	-10.00	-30.63	-20.63	Fe2(Se03)3:2H2O
Fe2(S04)3	-35.15	-38.31	-3.16	Fe2(S04)3
Fe3(OH)8	-0.54	19.68	20.22	Fe3(OH)8
Ferrihydrite	1.41	4.78	3.37	Fe(OH)3
Ferroselite	13.87	-4.84	-18.71	FeSe2
FeSe	5.86	-5.15	-11.00	FeSe
Gibbsite	2.64	11.16	8.52	Al(OH)3
Goethite	4.15	4.78	0.64	Fe00H
Goslarite	-6.50	-8.54	-2.05	ZnS04:7H2O
Gypsum	-0.80	-5.41	-4.61	CaS04:2H2O
H-Jarosite	-6.02	-17.57	-11.55	(H3O)Fe3(S04)2(OH)6
H2Se(g)	-10.35	-15.27	-4.92	H2Se
Halite	-4.49	-2.90	1.59	NaCl
Hausmannite	-18.74	43.29	62.03	Mn304
Hematite	10.67	9.56	-1.11	Fe203
Hercynite	8.80	32.44	23.64	FeAl204
Hg(g)	-7.75	-15.67	-7.93	Hg
Hg(OH)2	-18.27	-21.76	-3.50	Hg(OH)2
Hg2(g)	-16.26	-31.35	-15.09	Hg2
Hg2(OH)2	-21.03	-15.77	5.26	Hg2(OH)2
Hg2HP04	-22.68	-47.45	-24.77	Hg2HP04
Hg2Se03	-24.51	-29.17	-4.66	Hg2Se03
Hg2S04	-25.58	-31.73	-6.14	Hg2S04
HgCl(g)	-36.02	-16.14	19.88	HgCl
HgCl2	-16.76	-38.28	-21.52	HgCl2
Hgmetal(l)	-2.02	-15.67	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSe03	-22.73	-35.16	-12.43	HgSe03
HgS04	-28.27	-37.72	-9.45	HgS04
Hinsdalite	-6.76	-9.26	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	2.00	-42.33	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-7.75	-70.54	-62.79	Pb5(P04)3OH
K-Alum	-11.65	-16.89	-5.24	KAl(S04)2:12H2O
K-Jarosite	0.79	-13.70	-14.49	KFe3(S04)2(OH)6
K2Se04	-26.12	-26.85	-0.73	K2Se04
Langite	-18.07	-0.19	17.88	Cu4(OH)6S04:H2O
Larnakite	-5.77	-6.15	-0.38	Pb0:PbS04
Laurionite	-3.98	-3.35	0.62	Pb0HCl
Lepidocrocite	3.41	4.78	1.37	Fe00H
Lime	-22.62	10.54	33.16	Ca0
Litharge	-7.95	4.90	12.85	Pb0
Maghemite	3.18	9.56	6.39	Fe203
Magnesioferrite	3.10	20.62	17.52	Fe2Mg04
Magnetite	15.79	19.69	3.90	Fe304
Manganite	-8.31	17.03	25.34	Mn00H
Massicot	-8.15	4.90	13.05	Pb0
Melanothallite	-18.98	-12.57	6.41	CuCl2
Melanterite	-3.58	-5.84	-2.26	FeS04:7H2O
Mg(OH)2(active)	-7.73	11.06	18.79	Mg(OH)2
Mg3(P04)2	-6.90	-30.18	-23.28	Mg3(P04)2

MgHP04:3H2O	-2.45	-20.62	-18.18	MgHP04:3H2O
MgSe03:6H2O	-5.38	-2.34	3.04	MgSe03:6H2O
MgSe04:6H2O	-22.35	-23.55	-1.20	MgSe04:6H2O
Minium	-44.24	30.28	74.53	Pb304
Mirabilite	-3.95	-5.25	-1.30	Na2S04:10H2O
Mn2(S04)3	-59.71	-65.03	-5.32	Mn2(S04)3
Mn3(P04)2	-11.81	-35.65	-23.85	Mn3(P04)2
MnCl2:4H2O	-10.02	-7.28	2.74	MnCl2:4H2O
MnHP04	2.95	-22.45	-25.40	MnHP04
MnSe	-9.77	-6.04	3.73	MnSe
MnSe03	-5.29	-4.16	1.13	MnSe03
MnSe03:2H2O	-5.12	-4.16	0.96	MnSe03:2H2O
MnSe04:5H2O	-23.32	-25.37	-2.05	MnSe04:5H2O
MnS04	-9.46	-6.72	2.74	MnS04
Monteponite	-10.29	5.06	15.35	Cd0
Montroydite	-18.22	-21.76	-3.55	Hg0
Morenosite	-5.87	-8.05	-2.17	NiS04:7H2O
Na-Jarosite	-1.38	-12.22	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-12.99	-2.69	10.30	Na2Se03:5H2O
Na2Se04	-25.17	-23.89	1.28	Na2Se04
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.11	7.91	13.02	Ni(OH)2
Ni3(P04)2	-8.32	-39.62	-31.30	Ni3(P04)2
Ni4(OH)6S04	-16.30	15.70	32.00	Ni4(OH)6S04
NiSe	10.34	-7.36	-17.70	NiSe
NiSe03:2H2O	-8.37	-5.48	2.89	NiSe03:2H2O
NiSe04:6H2O	-25.17	-26.69	-1.52	NiSe04:6H2O
Nsutite	-18.29	-0.79	17.50	Mn02
O2(g)	-53.29	31.16	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.25	1.55	8.79	Pb2(OH)3Cl
Pb20(OH)2	-16.39	9.80	26.19	Pb20(OH)2
Pb203	-35.66	25.38	61.04	Pb203
Pb3(P04)2	-5.13	-48.66	-43.53	Pb3(P04)2
Pb302S04	-12.13	-1.25	10.87	Pb302S04
Pb4(OH)6S04	-17.45	3.65	21.10	Pb4(OH)6S04
Pb403S04	-18.55	3.65	22.20	Pb403S04
PbHP04	-2.98	-26.78	-23.81	PbHP04
Pbmetal	-14.92	-10.68	4.24	Pb
Pb0:0.3H2O	-8.08	4.90	12.98	Pb0:0.33H2O
PbSe04	-22.83	-29.70	-6.88	PbSe04
Periclase	-10.88	11.06	21.94	Mg0
Plattnerite	-29.83	20.48	50.31	Pb02
Plumbgummite	7.80	-24.99	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-12.57	10.54	23.11	Ca(OH)2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-17.21	24.82	42.03	Mn02
Pyromorphite	5.63	-78.80	-84.43	Pb5(P04)3Cl
Retgersite	-6.00	-8.05	-2.05	NiS04:6H2O
Semetal(am)	7.44	0.31	-7.14	Se
Semetal(hex	8.05	0.31	-7.75	Se
Se02	-13.52	-13.40	0.12	Se02
Se03	-56.00	-34.60	21.39	Se03
Spinel	-4.39	33.38	37.77	MgAl204
Strengite	-0.53	-26.90	-26.38	FeP04:2H2O
Tenorite	-3.86	3.94	7.80	Cu0
Thenardite	-5.59	-5.25	0.34	Na2S04
Tsumebite	-8.15	-17.94	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	3.00	-33.00	-36.00	Fe3(P04)2:8H2O
Zincite	-4.13	7.42	11.55	Zn0
Zincosite	-12.66	-8.54	4.13	ZnS04
Zn(N03)2:6H2O	-106.39	-103.14	3.26	Zn(N03)2:6H2O
Zn(OH)2	-4.78	7.42	12.20	Zn(OH)2
Zn(OH)2(am)	-5.25	7.42	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.42	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.31	7.42	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.42	11.73	Zn(OH)2
Zn2(OH)2S04	-8.62	-1.12	7.50	Zn2(OH)2S04

Zn2(OH)3Cl	-8.61	6.58	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-5.69	-41.11	-35.42	Zn3(P04)2:4H2O
Zn30(S04)2	-29.18	-9.65	19.53	Zn30(S04)2
Zn4(OH)6S04	-14.68	13.72	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-17.91	20.59	38.50	Zn5(OH)8Cl2
ZnCl2	-16.31	-9.09	7.22	ZnCl2
Znmetal	-34.31	-8.16	26.15	Zn
Zn0(active)	-3.98	7.42	11.40	Zn0
ZnSe	6.61	-7.85	-14.46	ZnSe
ZnSe04:6H2O	-25.67	-27.19	-1.52	ZnSe04:6H2O
ZnS04:1H2O	-8.00	-8.54	-0.53	ZnS04:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 7.
Using reaction 8.

Mixture 7.

9.540e-01 Solution 1
4.600e-02 Solution 8

Reaction 8.

3.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000
Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	1.456e-05	1.378e-05
Ca	3.445e-03	3.259e-03
Cd	2.835e-08	2.681e-08
Cl	4.593e-02	4.344e-02
Co	4.217e-05	3.989e-05
Cu	5.181e-06	4.901e-06
Fe	1.908e-03	1.805e-03
Hg	1.059e-09	1.002e-09
K	1.684e-03	1.593e-03
Mg	1.075e-02	1.017e-02
Mn	2.359e-04	2.231e-04
N	5.308e-04	5.021e-04
Na	5.054e-02	4.781e-02
Ni	8.144e-06	7.703e-06
P	2.332e-05	2.206e-05
Pb	1.538e-08	1.455e-08
S	1.642e-02	1.553e-02
Se	4.035e-07	3.817e-07
Zn	2.761e-06	2.612e-06

-----Description of solution-----

pH = 6.788 Charge balance
 pe = 1.012 Adjusted to redox equilibrium
 Activity of water = 0.998
 Ionic strength (mol/kgw) = 9.763e-02
 Mass of water (kg) = 9.460e-01
 Total alkalinity (eq/kg) = 6.633e-05
 Total carbon (mol/kg) = 0.000e+00
 Total CO2 (mol/kg) = 0.000e+00
 Temperature (°C) = 21.00
 Electrical balance (eq) = 6.374e-03
 Percent error, 100*(Cat-|An|)/(Cat+|An|) = 4.58
 Iterations = 4
 Total H = 1.050158e+02
 Total O = 5.256909e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.076e-07	1.627e-07	-6.683	-6.788	-0.106	0.00
OH-	5.945e-08	4.546e-08	-7.226	-7.342	-0.117	(0)
H2O	5.551e+01	9.978e-01	1.744	-0.001	0.000	18.05
Al	1.456e-05					
Al(OH)4-	9.475e-06	7.383e-06	-5.023	-5.132	-0.108	(0)
Al(OH)2+	2.522e-06	1.994e-06	-5.598	-5.700	-0.102	(0)
Al(OH)3	2.457e-06	2.457e-06	-5.610	-5.610	0.000	(0)
AlOH+2	7.998e-08	3.129e-08	-7.097	-7.505	-0.408	(0)
AlSO4+	2.440e-08	1.901e-08	-7.613	-7.721	-0.108	(0)
Al+3	5.896e-09	6.587e-10	-8.229	-9.181	-0.952	(0)
Al(SO4)2-	1.238e-09	9.649e-10	-8.907	-9.016	-0.108	(0)
Ca	3.445e-03					
Ca+2	2.531e-03	9.555e-04	-2.597	-3.020	-0.423	(0)
CaSO4	9.129e-04	9.129e-04	-3.040	-3.040	0.000	(0)
CaHPO4	8.567e-07	8.567e-07	-6.067	-6.067	0.000	(0)
CaH2PO4+	1.385e-07	1.095e-07	-6.859	-6.960	-0.102	(0)
CaPO4-	1.623e-08	1.283e-08	-7.790	-7.892	-0.102	(0)
CaNH3+2	6.874e-09	1.600e-09	-8.163	-8.796	-0.633	(0)
CaOH+	1.038e-09	8.281e-10	-8.984	-9.082	-0.098	(0)
Ca(NH3)2+2	3.639e-15	8.468e-16	-14.439	-15.072	-0.633	(0)
CaNO3+	0.000e+00	0.000e+00	-50.730	-50.888	-0.158	(0)
Cd	2.835e-08					
CdCl+	1.496e-08	1.039e-08	-7.825	-7.983	-0.158	(0)
Cd+2	8.051e-09	3.039e-09	-8.094	-8.517	-0.423	(0)
CdSO4	2.945e-09	2.945e-09	-8.531	-8.531	0.000	(0)
CdCl2	1.541e-09	1.541e-09	-8.812	-8.812	0.000	(0)
Cd(SO4)2-2	7.765e-10	1.807e-10	-9.110	-9.743	-0.633	(0)
CdCl3-	4.849e-11	3.368e-11	-10.314	-10.473	-0.158	(0)
CdOHCl	2.394e-11	2.394e-11	-10.621	-10.621	0.000	(0)
CdOH+	1.589e-12	1.104e-12	-11.799	-11.957	-0.158	(0)
Cd(OH)2	5.806e-16	5.806e-16	-15.236	-15.236	0.000	(0)
Cd2OH+3	4.695e-19	1.766e-20	-18.328	-19.753	-1.425	(0)
Cd(SeO3)2-2	4.318e-19	1.005e-19	-18.365	-18.998	-0.633	(0)
Cd(OH)3-	3.153e-21	2.190e-21	-20.501	-20.660	-0.158	(0)
CdSeO4	5.861e-28	5.861e-28	-27.232	-27.232	0.000	(0)
Cd(OH)4-2	9.510e-29	2.213e-29	-28.022	-28.655	-0.633	(0)
CdHS+	7.901e-39	5.488e-39	-38.102	-38.261	-0.158	(0)
CdNO3+	0.000e+00	0.000e+00	-56.190	-56.348	-0.158	(0)
Cd(HS)2	0.000e+00	0.000e+00	-68.808	-68.808	0.000	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-104.501	-104.659	-0.158	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.079	-105.079	0.000	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.582	-140.215	-0.633	(0)
Cl	4.593e-02					
Cl-	4.591e-02	3.599e-02	-1.338	-1.444	-0.106	(0)
CuCl2-	4.624e-06	3.571e-06	-5.335	-5.447	-0.112	(0)
MnCl+	2.670e-06	2.098e-06	-5.573	-5.678	-0.105	(0)
CoCl+	1.407e-06	9.770e-07	-5.852	-6.010	-0.158	(0)

CuCl	4.703e-07	4.703e-07	-6.328	-6.328	0.000	(0)
NiCl+	2.947e-07	2.047e-07	-6.531	-6.689	-0.158	(0)
MnCl2	1.067e-07	1.067e-07	-6.972	-6.972	0.000	(0)
ZnCl+	8.147e-08	6.291e-08	-7.089	-7.201	-0.112	(0)
CuCl3-2	7.093e-08	2.705e-08	-7.149	-7.568	-0.419	(0)
CdCl+	1.496e-08	1.039e-08	-7.825	-7.983	-0.158	(0)
ZnOHC1	5.238e-09	5.238e-09	-8.281	-8.281	0.000	(0)
PbCl+	3.752e-09	2.606e-09	-8.426	-8.584	-0.158	(0)
ZnCl2	3.017e-09	3.017e-09	-8.520	-8.520	0.000	(0)
CdCl2	1.541e-09	1.541e-09	-8.812	-8.812	0.000	(0)
MnCl3-	1.345e-09	1.057e-09	-8.871	-8.976	-0.105	(0)
PbCl2	4.114e-10	4.114e-10	-9.386	-9.386	0.000	(0)
ZnCl3-	1.099e-10	8.484e-11	-9.959	-10.071	-0.112	(0)
CdCl3-	4.849e-11	3.368e-11	-10.314	-10.473	-0.158	(0)
NiCl2	3.749e-11	3.749e-11	-10.426	-10.426	0.000	(0)
CdOHC1	2.394e-11	2.394e-11	-10.621	-10.621	0.000	(0)
CuCl+	1.599e-11	1.234e-11	-10.796	-10.909	-0.112	(0)
PbCl3-	8.866e-12	6.158e-12	-11.052	-11.211	-0.158	(0)
ZnCl4-2	3.877e-12	1.478e-12	-11.411	-11.830	-0.419	(0)
PbCl4-2	4.103e-13	9.549e-14	-12.387	-13.020	-0.633	(0)
CuCl2	1.265e-13	1.265e-13	-12.898	-12.898	0.000	(0)
FeCl+2	6.802e-16	2.594e-16	-15.167	-15.586	-0.419	(0)
FeCl2+	6.020e-17	4.730e-17	-16.220	-16.325	-0.105	(0)
CuCl3-	5.121e-17	3.954e-17	-16.291	-16.403	-0.112	(0)
HgCl2	1.707e-18	1.707e-18	-17.768	-17.768	0.000	(0)
HgCl3-	8.922e-19	6.197e-19	-18.050	-18.208	-0.158	(0)
HgCl4-2	3.958e-19	9.210e-20	-18.403	-19.036	-0.633	(0)
FeCl3	1.702e-19	1.702e-19	-18.769	-18.769	0.000	(0)
HgClOH	3.938e-20	3.938e-20	-19.405	-19.405	0.000	(0)
CuCl4-2	2.142e-20	8.168e-21	-19.669	-20.088	-0.419	(0)
HgCl+	1.158e-23	8.041e-24	-22.936	-23.095	-0.158	(0)
CoCl+2	9.366e-36	2.180e-36	-35.028	-35.662	-0.633	(0)
Co(NH3)5Cl+2	2.049e-39	4.769e-40	-38.688	-39.322	-0.633	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.259	-51.892	-0.633	(0)
Co(2)	4.217e-05					
Co+2	3.409e-05	7.934e-06	-4.467	-5.101	-0.633	(0)
CoS04	6.634e-06	6.634e-06	-5.178	-5.178	0.000	(0)
CoCl+	1.407e-06	9.770e-07	-5.852	-6.010	-0.158	(0)
CoHP04	1.670e-08	1.670e-08	-7.777	-7.777	0.000	(0)
CoOH+	1.407e-08	9.774e-09	-7.852	-8.010	-0.158	(0)
Co(NH3)+2	7.785e-09	1.812e-09	-8.109	-8.742	-0.633	(0)
Co(OH)2	4.793e-11	4.793e-11	-10.319	-10.319	0.000	(0)
Co(NH3)2+2	3.092e-13	7.195e-14	-12.510	-13.143	-0.633	(0)
Co2OH+3	1.033e-13	3.886e-15	-12.986	-14.410	-1.425	(0)
Co(OH)3-	8.501e-17	5.905e-17	-16.071	-16.229	-0.158	(0)
Co(NH3)3+2	5.176e-18	1.205e-18	-17.286	-17.919	-0.633	(0)
Co0OH-	5.122e-18	3.557e-18	-17.291	-17.449	-0.158	(0)
Co4(OH)4+4	6.207e-22	1.821e-24	-21.207	-23.740	-2.533	(0)
Co(NH3)4+2	3.612e-23	8.406e-24	-22.442	-23.075	-0.633	(0)
CoSe04	3.855e-24	3.855e-24	-23.414	-23.414	0.000	(0)
Co(OH)4-2	2.483e-24	5.778e-25	-23.605	-24.238	-0.633	(0)
Co(NH3)5+2	7.971e-29	1.855e-29	-28.098	-28.732	-0.633	(0)
CoNO2+	8.514e-40	5.914e-40	-39.070	-39.228	-0.158	(0)
CoNO3+	0.000e+00	0.000e+00	-53.123	-53.282	-0.158	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.354	-101.354	0.000	(0)
Co(3)	4.381e-31					
CoOH+2	4.381e-31	1.020e-31	-30.358	-30.992	-0.633	(0)
CoCl+2	9.366e-36	2.180e-36	-35.028	-35.662	-0.633	(0)
Co+3	2.909e-36	3.250e-37	-35.536	-36.488	-0.952	(0)
Co(NH3)5Cl+2	2.049e-39	4.769e-40	-38.688	-39.322	-0.633	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.775	-47.934	-0.158	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.259	-51.892	-0.633	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.576	-53.209	-0.633	(0)
Cu(1)	5.180e-06					
CuCl2-	4.624e-06	3.571e-06	-5.335	-5.447	-0.112	(0)
CuCl	4.703e-07	4.703e-07	-6.328	-6.328	0.000	(0)
CuCl3-2	7.093e-08	2.705e-08	-7.149	-7.568	-0.419	(0)
Cu+	1.495e-08	1.038e-08	-7.825	-7.984	-0.158	(0)

Cu(S4)2-3	0.000e+00	0.000e+00	-66.095	-66.520	-0.424	(0)
CuS4S5-3	0.000e+00	0.000e+00	-66.849	-67.250	-0.400	(0)
Cu(2)	8.979e-10					
Cu+2	6.000e-10	2.265e-10	-9.222	-9.645	-0.423	(0)
CuS04	2.145e-10	2.145e-10	-9.669	-9.669	0.000	(0)
CuOH+	4.706e-11	3.634e-11	-10.327	-10.440	-0.112	(0)
CuNH3+2	1.966e-11	4.575e-12	-10.706	-11.340	-0.633	(0)
CuCl+	1.599e-11	1.234e-11	-10.796	-10.909	-0.112	(0)
Cu(OH)2	5.448e-13	5.448e-13	-12.264	-12.264	0.000	(0)
CuCl2	1.265e-13	1.265e-13	-12.898	-12.898	0.000	(0)
Cu2(OH)2+2	1.387e-16	3.227e-17	-15.858	-16.491	-0.633	(0)
Cu(OH)3-	9.933e-17	6.899e-17	-16.003	-16.161	-0.158	(0)
CuCl3-	5.121e-17	3.954e-17	-16.291	-16.403	-0.112	(0)
CuCl4-2	2.142e-20	8.168e-21	-19.669	-20.088	-0.419	(0)
Cu(OH)4-2	1.440e-22	3.352e-23	-21.841	-22.475	-0.633	(0)
CuNO2+	0.000e+00	0.000e+00	-42.442	-42.601	-0.158	(0)
CuNO3+	0.000e+00	0.000e+00	-57.358	-57.516	-0.158	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.566	-76.566	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.842	-97.000	-0.158	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-106.807	-106.807	0.000	(0)
Fe(2)	1.908e-03					
Fe+2	1.539e-03	3.580e-04	-2.813	-3.446	-0.633	(0)
FeS04	3.647e-04	3.647e-04	-3.438	-3.438	0.000	(0)
FeHP04	2.750e-06	2.750e-06	-5.561	-5.561	0.000	(0)
FeH2P04+	1.124e-06	8.890e-07	-5.949	-6.051	-0.102	(0)
FeOH+	8.246e-07	6.480e-07	-6.084	-6.188	-0.105	(0)
Fe(OH)2	2.239e-11	2.239e-11	-10.650	-10.650	0.000	(0)
Fe(OH)3-	5.359e-13	4.212e-13	-12.271	-12.376	-0.105	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.999	-69.999	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.555	-105.713	-0.158	(0)
Fe(3)	3.377e-07					
Fe(OH)2+	3.278e-07	2.593e-07	-6.484	-6.586	-0.102	(0)
Fe(OH)3	9.728e-09	9.728e-09	-8.012	-8.012	0.000	(0)
Fe(OH)4-	1.250e-10	9.882e-11	-9.903	-10.005	-0.102	(0)
FeOH+2	2.250e-11	8.581e-12	-10.648	-11.066	-0.419	(0)
FeHP04+	6.452e-12	5.103e-12	-11.190	-11.292	-0.102	(0)
FeS04+	1.461e-14	1.148e-14	-13.835	-13.940	-0.105	(0)
Fe+3	2.424e-15	2.708e-16	-14.615	-15.567	-0.952	(0)
Fe(S04)2-	1.582e-15	1.099e-15	-14.801	-14.959	-0.158	(0)
FeCl+2	6.802e-16	2.594e-16	-15.167	-15.586	-0.419	(0)
FeH2P04+2	6.512e-17	2.547e-17	-16.186	-16.594	-0.408	(0)
FeCl2+	6.020e-17	4.730e-17	-16.220	-16.325	-0.105	(0)
Fe2(OH)2+4	9.587e-19	2.812e-21	-18.018	-20.551	-2.533	(0)
FeHSe03+2	6.940e-19	1.615e-19	-18.159	-18.792	-0.633	(0)
FeCl3	1.702e-19	1.702e-19	-18.769	-18.769	0.000	(0)
Fe3(OH)4+5	9.159e-23	1.011e-26	-22.038	-25.995	-3.957	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.227	-62.860	-0.633	(0)
H(0)	3.606e-19					
H2	1.803e-19	1.844e-19	-18.744	-18.734	0.010	(0)
Hg(0)	1.059e-09					
Hg	1.059e-09	1.059e-09	-8.975	-8.975	0.000	(0)
Hg(1)	4.544e-29					
Hg2+2	2.272e-29	5.287e-30	-28.644	-29.277	-0.633	(0)
Hg(2)	3.035e-18					
HgCl2	1.707e-18	1.707e-18	-17.768	-17.768	0.000	(0)
HgCl3-	8.922e-19	6.197e-19	-18.050	-18.208	-0.158	(0)
HgCl4-2	3.958e-19	9.210e-20	-18.403	-19.036	-0.633	(0)
HgClOH	3.938e-20	3.938e-20	-19.405	-19.405	0.000	(0)
Hg(OH)2	1.867e-22	1.909e-22	-21.729	-21.719	0.010	(0)
Hg(NH3)2+2	1.473e-22	3.428e-23	-21.832	-22.465	-0.633	(0)
HgCl+	1.158e-23	8.041e-24	-22.936	-23.095	-0.158	(0)
HgOH+	3.116e-26	2.164e-26	-25.506	-25.665	-0.158	(0)
HgNH3+2	2.862e-26	6.661e-27	-25.543	-26.176	-0.633	(0)
Hg(NH3)3+2	1.120e-27	2.606e-28	-26.951	-27.584	-0.633	(0)
Hg+2	4.242e-29	9.871e-30	-28.372	-29.006	-0.633	(0)
HgS04	9.012e-30	9.012e-30	-29.045	-29.045	0.000	(0)
Hg(OH)3-	2.137e-30	1.484e-30	-29.670	-29.829	-0.158	(0)
Hg(NH3)4+2	1.708e-32	3.976e-33	-31.767	-32.401	-0.633	(0)

	HgHS2-	0.000e+00	0.000e+00	-65.728	-65.887	-0.158	(0)
	Hg(HS)2	0.000e+00	0.000e+00	-66.281	-66.281	0.000	(0)
	HgS2-2	0.000e+00	0.000e+00	-67.173	-67.806	-0.633	(0)
	HgNO3+	0.000e+00	0.000e+00	-77.756	-77.914	-0.158	(0)
	Hg(NO3)2	0.000e+00	0.000e+00	-126.676	-126.676	0.000	(0)
K		1.684e-03					
	K+	1.636e-03	1.282e-03	-2.786	-2.892	-0.106	(0)
	KS04-	4.865e-05	3.848e-05	-4.313	-4.415	-0.102	(0)
	KHP04-	2.373e-08	1.876e-08	-7.625	-7.727	-0.102	(0)
Mg		1.075e-02					
	Mg+2	8.339e-03	3.148e-03	-2.079	-2.502	-0.423	(0)
	MgS04	2.406e-03	2.406e-03	-2.619	-2.619	0.000	(0)
	MgHP04	3.896e-06	3.896e-06	-5.409	-5.409	0.000	(0)
	MgH2P04+	9.754e-07	7.714e-07	-6.011	-6.113	-0.102	(0)
	MgOH+	6.639e-08	5.334e-08	-7.178	-7.273	-0.095	(0)
	MgP04-	8.356e-10	6.608e-10	-9.078	-9.180	-0.102	(0)
Mn(2)		2.359e-04					
	Mn+2	1.990e-04	4.632e-05	-3.701	-4.334	-0.633	(0)
	MnS04	3.405e-05	3.405e-05	-4.468	-4.468	0.000	(0)
	MnCl+	2.670e-06	2.098e-06	-5.573	-5.678	-0.105	(0)
	MnCl2	1.067e-07	1.067e-07	-6.972	-6.972	0.000	(0)
	MnOH+	6.730e-09	5.289e-09	-8.172	-8.277	-0.105	(0)
	MnCl3-	1.345e-09	1.057e-09	-8.871	-8.976	-0.105	(0)
	MnSe	3.467e-12	3.467e-12	-11.460	-11.460	0.000	(0)
	Mn(OH)3-	2.153e-19	1.692e-19	-18.667	-18.772	-0.105	(0)
	MnSe04	1.196e-23	1.196e-23	-22.922	-22.922	0.000	(0)
	Mn(OH)4-2	8.845e-26	3.373e-26	-25.053	-25.472	-0.419	(0)
	MnNO3+	0.000e+00	0.000e+00	-52.357	-52.515	-0.158	(0)
	Mn(NO3)2	0.000e+00	0.000e+00	-100.492	-100.492	0.000	(0)
Mn(3)		1.055e-28					
	Mn+3	1.055e-28	1.178e-29	-27.977	-28.929	-0.952	(0)
Mn(6)		0.000e+00					
	Mn04-2	0.000e+00	0.000e+00	-65.678	-66.096	-0.419	(0)
Mn(7)		0.000e+00					
	Mn04-	0.000e+00	0.000e+00	-74.601	-74.722	-0.121	(0)
N(-3)		5.308e-04					
	NH4+	5.073e-04	3.796e-04	-3.295	-3.421	-0.126	(0)
	NH4S04-	2.244e-05	1.763e-05	-4.649	-4.754	-0.105	(0)
	NH3	9.998e-07	9.998e-07	-6.000	-6.000	0.000	(0)
	NiNH3+2	9.958e-09	2.318e-09	-8.002	-8.635	-0.633	(0)
	Co(NH3)+2	7.785e-09	1.812e-09	-8.109	-8.742	-0.633	(0)
	CaNH3+2	6.874e-09	1.600e-09	-8.163	-8.796	-0.633	(0)
	CuNH3+2	1.966e-11	4.575e-12	-10.706	-11.340	-0.633	(0)
	Ni(NH3)2+2	2.445e-12	5.689e-13	-11.612	-12.245	-0.633	(0)
	Co(NH3)2+2	3.092e-13	7.195e-14	-12.510	-13.143	-0.633	(0)
	Ca(NH3)2+2	3.639e-15	8.468e-16	-14.439	-15.072	-0.633	(0)
	Co(NH3)3+2	5.176e-18	1.205e-18	-17.286	-17.919	-0.633	(0)
	Hg(NH3)2+2	1.473e-22	3.428e-23	-21.832	-22.465	-0.633	(0)
	Co(NH3)4+2	3.612e-23	8.406e-24	-22.442	-23.075	-0.633	(0)
	HgNH3+2	2.862e-26	6.661e-27	-25.543	-26.176	-0.633	(0)
	Hg(NH3)3+2	1.120e-27	2.606e-28	-26.951	-27.584	-0.633	(0)
	Co(NH3)5+2	7.971e-29	1.855e-29	-28.098	-28.732	-0.633	(0)
	Hg(NH3)4+2	1.708e-32	3.976e-33	-31.767	-32.401	-0.633	(0)
	Co(NH3)5Cl+2	2.049e-39	4.769e-40	-38.688	-39.322	-0.633	(0)
	Co(NH3)6S04+	0.000e+00	0.000e+00	-47.775	-47.934	-0.158	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.259	-51.892	-0.633	(0)
	Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.576	-53.209	-0.633	(0)
N(3)		1.398e-35					
	N02-	1.398e-35	1.058e-35	-34.855	-34.976	-0.121	(0)
	CoN02+	8.514e-40	5.914e-40	-39.070	-39.228	-0.158	(0)
	CuN02+	0.000e+00	0.000e+00	-42.442	-42.601	-0.158	(0)
	Cu(N02)2	0.000e+00	0.000e+00	-76.566	-76.566	0.000	(0)
N(5)		0.000e+00					
	N03-	0.000e+00	0.000e+00	-48.275	-48.381	-0.106	(0)
	CaN03+	0.000e+00	0.000e+00	-50.730	-50.888	-0.158	(0)
	MnN03+	0.000e+00	0.000e+00	-52.357	-52.515	-0.158	(0)
	CoN03+	0.000e+00	0.000e+00	-53.123	-53.282	-0.158	(0)
	NiN03+	0.000e+00	0.000e+00	-53.471	-53.629	-0.158	(0)

	ZnNO3+	0.000e+00	0.000e+00	-53.956	-54.115	-0.158	(0)
	PbNO3+	0.000e+00	0.000e+00	-55.727	-55.885	-0.158	(0)
	CdNO3+	0.000e+00	0.000e+00	-56.190	-56.348	-0.158	(0)
	CuNO3+	0.000e+00	0.000e+00	-57.358	-57.516	-0.158	(0)
	FeNO3+2	0.000e+00	0.000e+00	-62.227	-62.860	-0.633	(0)
	HgNO3+	0.000e+00	0.000e+00	-77.756	-77.914	-0.158	(0)
	Mn(NO3)2	0.000e+00	0.000e+00	-100.492	-100.492	0.000	(0)
	Co(NO3)2	0.000e+00	0.000e+00	-101.354	-101.354	0.000	(0)
	Zn(NO3)2	0.000e+00	0.000e+00	-103.207	-103.207	0.000	(0)
	Pb(NO3)2	0.000e+00	0.000e+00	-104.016	-104.016	0.000	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-105.079	-105.079	0.000	(0)
	Cu(NO3)2	0.000e+00	0.000e+00	-106.807	-106.807	0.000	(0)
	Hg(NO3)2	0.000e+00	0.000e+00	-126.676	-126.676	0.000	(0)
Na		5.054e-02					
	Na+	4.941e-02	3.873e-02	-1.306	-1.412	-0.106	(0)
	NaSO4-	1.134e-03	8.968e-04	-2.945	-3.047	-0.102	(0)
	NaHPO4-	1.110e-06	8.779e-07	-5.955	-6.057	-0.102	(0)
Ni		8.144e-06					
	Ni+2	5.953e-06	2.247e-06	-5.225	-5.648	-0.423	(0)
	NiSO4	1.883e-06	1.883e-06	-5.725	-5.725	0.000	(0)
	NiCl+	2.947e-07	2.047e-07	-6.531	-6.689	-0.158	(0)
	NiNH3+2	9.958e-09	2.318e-09	-8.002	-8.635	-0.633	(0)
	NiOH+	1.893e-09	1.315e-09	-8.723	-8.881	-0.158	(0)
	Ni(SO4)2-2	1.199e-09	2.791e-10	-8.921	-9.554	-0.633	(0)
	NiCl2	3.749e-11	3.749e-11	-10.426	-10.426	0.000	(0)
	Ni(OH)2	8.566e-12	8.566e-12	-11.067	-11.067	0.000	(0)
	Ni(NH3)2+2	2.445e-12	5.689e-13	-11.612	-12.245	-0.633	(0)
	Ni(OH)3-	7.614e-16	5.288e-16	-15.118	-15.277	-0.158	(0)
	NiSeO4	1.008e-24	1.008e-24	-23.997	-23.997	0.000	(0)
	NiNO3+	0.000e+00	0.000e+00	-53.471	-53.629	-0.158	(0)
O(0)		0.000e+00					
	O2	0.000e+00	0.000e+00	-55.950	-55.940	0.010	(0)
P		2.332e-05					
	H2PO4-	6.914e-06	5.468e-06	-5.160	-5.262	-0.102	(0)
	HP04-2	5.494e-06	2.095e-06	-5.260	-5.679	-0.419	(0)
	MgHPO4	3.896e-06	3.896e-06	-5.409	-5.409	0.000	(0)
	FeHPO4	2.750e-06	2.750e-06	-5.561	-5.561	0.000	(0)
	FeH2PO4+	1.124e-06	8.890e-07	-5.949	-6.051	-0.102	(0)
	NaHPO4-	1.110e-06	8.779e-07	-5.955	-6.057	-0.102	(0)
	MgH2PO4+	9.754e-07	7.714e-07	-6.011	-6.113	-0.102	(0)
	CaHPO4	8.567e-07	8.567e-07	-6.067	-6.067	0.000	(0)
	CaH2PO4+	1.385e-07	1.095e-07	-6.859	-6.960	-0.102	(0)
	KHP04-	2.373e-08	1.876e-08	-7.625	-7.727	-0.102	(0)
	CoHPO4	1.670e-08	1.670e-08	-7.777	-7.777	0.000	(0)
	CaPO4-	1.623e-08	1.283e-08	-7.790	-7.892	-0.102	(0)
	MgPO4-	8.356e-10	6.608e-10	-9.078	-9.180	-0.102	(0)
	H3PO4	1.198e-10	1.198e-10	-9.921	-9.921	0.000	(0)
	PO4-3	4.476e-11	5.000e-12	-10.349	-11.301	-0.952	(0)
	FeHPO4+	6.452e-12	5.103e-12	-11.190	-11.292	-0.102	(0)
	FeH2PO4+2	6.512e-17	2.547e-17	-16.186	-16.594	-0.408	(0)
Pb		1.538e-08					
	Pb+2	5.670e-09	2.141e-09	-8.246	-8.669	-0.423	(0)
	PbSO4	4.546e-09	4.546e-09	-8.342	-8.342	0.000	(0)
	PbCl+	3.752e-09	2.606e-09	-8.426	-8.584	-0.158	(0)
	Pb(SO4)2-2	5.104e-10	1.188e-10	-9.292	-9.925	-0.633	(0)
	PbOH+	4.780e-10	3.320e-10	-9.321	-9.479	-0.158	(0)
	PbCl2	4.114e-10	4.114e-10	-9.386	-9.386	0.000	(0)
	PbCl3-	8.866e-12	6.158e-12	-11.052	-11.211	-0.158	(0)
	Pb(OH)2	6.481e-13	6.481e-13	-12.188	-12.188	0.000	(0)
	PbCl4-2	4.103e-13	9.549e-14	-12.387	-13.020	-0.633	(0)
	Pb2OH+3	2.994e-16	1.126e-17	-15.524	-16.948	-1.425	(0)
	Pb(OH)3-	5.761e-17	4.002e-17	-16.239	-16.398	-0.158	(0)
	Pb(OH)4-2	2.600e-21	6.051e-22	-20.585	-21.218	-0.633	(0)
	Pb3(OH)4+2	4.097e-23	9.535e-24	-22.387	-23.021	-0.633	(0)
	Pb4(OH)4+4	6.410e-26	1.880e-28	-25.193	-27.726	-2.533	(0)
	PbNO3+	0.000e+00	0.000e+00	-55.727	-55.885	-0.158	(0)
	Pb(HS)2	0.000e+00	0.000e+00	-68.902	-68.902	0.000	(0)
	Pb(NO3)2	0.000e+00	0.000e+00	-104.016	-104.016	0.000	(0)

Pb(HS)3-	0.000e+00	0.000e+00	-105.195	-105.354	-0.158	(0)
S(-2)	6.767e-38					
H2S	3.408e-38	3.408e-38	-37.467	-37.467	0.000	(0)
HS-	2.552e-38	1.773e-38	-37.593	-37.751	-0.158	(0)
CdHS+	7.901e-39	5.488e-39	-38.102	-38.261	-0.158	(0)
S5-2	1.643e-40	0.000e+00	-39.784	-40.418	-0.633	(0)
S6-2	0.000e+00	0.000e+00	-40.211	-40.844	-0.633	(0)
S4-2	0.000e+00	0.000e+00	-40.384	-41.017	-0.633	(0)
S3-2	0.000e+00	0.000e+00	-41.197	-41.830	-0.633	(0)
S2-2	0.000e+00	0.000e+00	-42.223	-42.856	-0.633	(0)
S-2	0.000e+00	0.000e+00	-47.962	-48.381	-0.419	(0)
HgHS2-	0.000e+00	0.000e+00	-65.728	-65.887	-0.158	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.095	-66.520	-0.424	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.281	-66.281	0.000	(0)
CuS4S5-3	0.000e+00	0.000e+00	-66.849	-67.250	-0.400	(0)
HgS2-2	0.000e+00	0.000e+00	-67.173	-67.806	-0.633	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-67.891	-68.049	-0.158	(0)
Cd(HS)2	0.000e+00	0.000e+00	-68.808	-68.808	0.000	(0)
Zn(HS)2	0.000e+00	0.000e+00	-68.827	-68.827	0.000	(0)
Pb(HS)2	0.000e+00	0.000e+00	-68.902	-68.902	0.000	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.999	-69.999	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.842	-97.000	-0.158	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.140	-103.299	-0.158	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-104.501	-104.659	-0.158	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.195	-105.354	-0.158	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.555	-105.713	-0.158	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-105.857	-106.490	-0.633	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.582	-140.215	-0.633	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-141.877	-142.510	-0.633	(0)
S(6)	1.642e-02					
S04-2	1.149e-02	4.336e-03	-1.940	-2.363	-0.423	(0)
MgS04	2.406e-03	2.406e-03	-2.619	-2.619	0.000	(0)
NaS04-	1.134e-03	8.968e-04	-2.945	-3.047	-0.102	(0)
CaS04	9.129e-04	9.129e-04	-3.040	-3.040	0.000	(0)
FeS04	3.647e-04	3.647e-04	-3.438	-3.438	0.000	(0)
KS04-	4.865e-05	3.848e-05	-4.313	-4.415	-0.102	(0)
MnS04	3.405e-05	3.405e-05	-4.468	-4.468	0.000	(0)
NH4S04-	2.244e-05	1.763e-05	-4.649	-4.754	-0.105	(0)
CoS04	6.634e-06	6.634e-06	-5.178	-5.178	0.000	(0)
NiS04	1.883e-06	1.883e-06	-5.725	-5.725	0.000	(0)
ZnS04	6.573e-07	6.573e-07	-6.182	-6.182	0.000	(0)
Zn(S04)2-2	1.104e-07	2.568e-08	-6.957	-7.590	-0.633	(0)
HS04-	7.844e-08	6.112e-08	-7.105	-7.214	-0.108	(0)
AlS04+	2.440e-08	1.901e-08	-7.613	-7.721	-0.108	(0)
PbS04	4.546e-09	4.546e-09	-8.342	-8.342	0.000	(0)
CdS04	2.945e-09	2.945e-09	-8.531	-8.531	0.000	(0)
Al(S04)2-	1.238e-09	9.649e-10	-8.907	-9.016	-0.108	(0)
Ni(S04)2-2	1.199e-09	2.791e-10	-8.921	-9.554	-0.633	(0)
Cd(S04)2-2	7.765e-10	1.807e-10	-9.110	-9.743	-0.633	(0)
Pb(S04)2-2	5.104e-10	1.188e-10	-9.292	-9.925	-0.633	(0)
CuS04	2.145e-10	2.145e-10	-9.669	-9.669	0.000	(0)
FeS04+	1.461e-14	1.148e-14	-13.835	-13.940	-0.105	(0)
Fe(S04)2-	1.582e-15	1.099e-15	-14.801	-14.959	-0.158	(0)
HgS04	9.012e-30	9.012e-30	-29.045	-29.045	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.775	-47.934	-0.158	(0)
Se(-2)	4.263e-09					
HSe-	4.256e-09	2.956e-09	-8.371	-8.529	-0.158	(0)
H2Se	3.667e-12	3.667e-12	-11.436	-11.436	0.000	(0)
MnSe	3.467e-12	3.467e-12	-11.460	-11.460	0.000	(0)
Se-2	5.994e-17	1.395e-17	-16.222	-16.855	-0.633	(0)
Se(4)	3.993e-07					
HSeO3-	3.728e-07	2.589e-07	-6.429	-6.587	-0.158	(0)
SeO3-2	2.648e-08	6.162e-09	-7.577	-8.210	-0.633	(0)
H2SeO3	1.737e-11	1.737e-11	-10.760	-10.760	0.000	(0)
FeHSeO3+2	6.940e-19	1.615e-19	-18.159	-18.792	-0.633	(0)
Cd(SeO3)2-2	4.318e-19	1.005e-19	-18.365	-18.998	-0.633	(0)
Se(6)	2.760e-21					
SeO4-2	2.743e-21	1.036e-21	-20.562	-20.985	-0.423	(0)

MnSeO4	1.196e-23	1.196e-23	-22.922	-22.922	0.000	(0)
CoSeO4	3.855e-24	3.855e-24	-23.414	-23.414	0.000	(0)
NiSeO4	1.008e-24	1.008e-24	-23.997	-23.997	0.000	(0)
ZnSeO4	1.150e-25	1.150e-25	-24.939	-24.939	0.000	(0)
HSeO4-	1.072e-26	7.445e-27	-25.970	-26.128	-0.158	(0)
CdSeO4	5.861e-28	5.861e-28	-27.232	-27.232	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.285	-45.918	-0.633	(0)
Zn	2.761e-06					
Zn+2	1.899e-06	7.169e-07	-5.721	-6.145	-0.423	(0)
ZnSO4	6.573e-07	6.573e-07	-6.182	-6.182	0.000	(0)
Zn(SO4)2-2	1.104e-07	2.568e-08	-6.957	-7.590	-0.633	(0)
ZnCl+	8.147e-08	6.291e-08	-7.089	-7.201	-0.112	(0)
ZnOHCl	5.238e-09	5.238e-09	-8.281	-8.281	0.000	(0)
ZnOH+	4.692e-09	3.259e-09	-8.329	-8.487	-0.158	(0)
ZnCl2	3.017e-09	3.017e-09	-8.520	-8.520	0.000	(0)
ZnCl3-	1.099e-10	8.484e-11	-9.959	-10.071	-0.112	(0)
Zn(OH)2	4.331e-11	4.331e-11	-10.363	-10.363	0.000	(0)
ZnCl4-2	3.877e-12	1.478e-12	-11.411	-11.830	-0.419	(0)
Zn(OH)3-	1.929e-14	1.340e-14	-13.715	-13.873	-0.158	(0)
Zn(OH)4-2	1.415e-19	3.294e-20	-18.849	-19.482	-0.633	(0)
ZnSeO4	1.150e-25	1.150e-25	-24.939	-24.939	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.285	-45.918	-0.633	(0)
ZnNO3+	0.000e+00	0.000e+00	-53.956	-54.115	-0.158	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-67.891	-68.049	-0.158	(0)
Zn(HS)2	0.000e+00	0.000e+00	-68.827	-68.827	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.140	-103.299	-0.158	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.207	-103.207	0.000	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-105.857	-106.490	-0.633	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-141.877	-142.510	-0.633	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-124.13	-117.86	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-28.52	-23.98	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.78	-23.98	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-179.35	-161.42	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.72	-20.61	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-28.28	-27.83	0.45	(NH4)2SeO4
Al(OH)3(am)	0.12	11.18	11.06	Al(OH)3
Al2O3	2.10	22.37	20.27	Al2O3
Al4(OH)10SO4	6.09	28.79	22.70	Al4(OH)10SO4
AlOHSO4	-1.53	-4.76	-3.23	AlOHSO4
Alunite	6.46	5.56	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.21	-11.03	-7.82	PbSO4
Anhydrite	-1.04	-5.38	-4.34	CaSO4
Anilite	-13.04	-45.35	-32.31	Cu0.25Cu1.5S
Antlerite	-12.94	-4.15	8.79	Cu3(OH)4SO4
Atacamite	-7.98	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.75	-8.51	-1.76	ZnSO4·6H2O
Birnessite	-18.86	-0.76	18.09	MnO2
Bixbyite	-16.78	-17.13	-0.35	Mn2O3
BlaubleiI	-17.08	-41.24	-24.16	Cu0.9Cu0.2S
BlaubleiII	-15.86	-43.14	-27.28	Cu0.6Cu0.8S
Boehmite	2.32	11.18	8.86	AlOOH
Brochantite	-15.92	-0.22	15.71	Cu4(OH)6SO4
Brucite	-6.04	11.07	17.12	Mg(OH)2
Bunsenite	-4.76	7.93	12.68	NiO
Ca3(PO4)2(beta)	-2.61	-31.66	-29.05	Ca3(PO4)2
Ca4H(PO4)3·3H2O	-5.69	-52.77	-47.08	Ca4H(PO4)3·3H2O
CaHP04	-1.76	-21.11	-19.35	CaHP04
CaHP04·2H2O	-2.06	-21.11	-19.05	CaHP04·2H2O
Calomel	-14.04	-32.16	-18.13	Hg2Cl2
CaSeO3·2H2O	-5.68	-2.82	2.86	CaSeO3·2H2O
CaSeO4·2H2O	-21.01	-24.01	-3.00	CaSeO4·2H2O
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2

Cd3(OH)2(SO4)2	-23.41	-16.70	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-23.32	-0.76	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-15.55	-48.15	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-24.11	4.29	28.40	Cd4(OH)6SO4
CdCl2	-10.79	-11.40	-0.61	CdCl2
CdCl2:1H2O	-9.73	-11.41	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-9.48	-11.41	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.24	-10.54	13.69	Cd
Cdmetal(gamma)	-24.34	-10.54	13.80	Cd
CdOHCl	-6.78	-3.17	3.61	CdOHCl
CdSe	10.12	-10.26	-20.38	CdSe
CdSeO4:2H2O	-27.65	-29.50	-1.85	CdSeO4:2H2O
CdSO4	-10.83	-10.88	-0.05	CdSO4
CdSO4:1H2O	-9.23	-10.88	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-9.05	-10.88	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.36	-12.01	-2.65	CuSO4:5H2O
Chalcocite	-11.61	-46.93	-35.32	Cu2S
Chalcopyrite	-39.39	-75.02	-35.62	CuFeS2
Cinnabar	-19.96	-66.26	-46.30	HgS
Clausthalite	16.97	-10.41	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.04	-16.13	-2.09	Co(OH)3
Co3(PO4)2	-3.22	-37.90	-34.69	Co3(PO4)2
Co3O4	-13.53	-23.77	-10.24	Co3O4
CoCl2	-16.45	-7.99	8.46	CoCl2
CoCl2:6H2O	-10.51	-7.99	2.52	CoCl2:6H2O
CoFe2O4	21.22	18.07	-3.15	CoFe2O4
CoHP04	-4.13	-23.19	-19.06	CoHP04
CoO	-5.36	8.48	13.84	CoO
CoS(alpha)	-28.62	-36.06	-7.44	CoS
CoS(beta)	-24.99	-36.06	-11.07	CoS
CoSe	9.36	-6.84	-16.20	CoSe
CoSeO3	-6.22	-4.90	1.32	CoSeO3
CoSeO4:6H2O	-24.56	-26.09	-1.53	CoSeO4:6H2O
CoSO4	-10.45	-7.46	2.99	CoSO4
CoSO4:6H2O	-4.99	-7.47	-2.48	CoSO4:6H2O
Cotunnite	-6.71	-11.56	-4.84	PbCl2
Covellite	-18.08	-40.61	-22.53	CuS
Cu(OH)2	-4.88	3.93	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.73	-47.31	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.60	-17.71	-46.31	Cu2Se
Cu2SO4	-16.43	-18.33	-1.90	Cu2SO4
Cu3(PO4)2	-14.69	-51.54	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-16.42	-51.54	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	35.21	-29.09	-64.30	Cu3Se2
Cumetal	-0.07	-9.00	-8.93	Cu
CuOCuSO4	-18.71	-8.08	10.63	CuOCuSO4
Cupricferrite	7.04	13.52	6.49	CuFe2O4
Cuprite	-1.28	-2.39	-1.11	Cu2O
Cuprousferrite	12.48	3.60	-8.88	CuFeO2
CuSe	22.00	-11.39	-33.39	CuSe
CuSe2	22.60	-11.10	-33.70	CuSe2
CuSeO3:2H2O	-10.04	-9.45	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-28.19	-30.63	-2.44	CuSeO4:5H2O
CuSO4	-15.12	-12.01	3.11	CuSO4
Diaspore	4.06	11.18	7.12	AlOOH
Djurleite	-12.12	-46.51	-34.40	Cu0.066Cu1.868S
Epsomite	-2.72	-4.87	-2.15	MgSO4:7H2O
Fe(OH)2	-3.43	10.13	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.37	2.33	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-5.34	-3.78	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-9.91	-30.53	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-35.07	-38.22	-3.16	Fe2(SO4)3
Fe3(OH)8	-0.50	19.72	20.22	Fe3(OH)8
Ferrihydrite	1.43	4.80	3.37	Fe(OH)3
Ferroselite	13.81	-4.90	-18.71	FeSe2
FeS(ppt)	-31.49	-34.41	-2.92	FeS
FeSe	5.82	-5.19	-11.00	FeSe

Galena	-25.47	-39.63	-14.16	PbS
Gibbsite	2.66	11.18	8.52	Al(OH)3
Goethite	4.16	4.80	0.64	FeOOH
Goslarite	-6.47	-8.51	-2.05	ZnSO4:7H2O
Greenockite	-24.99	-39.48	-14.49	CdS
Greigite	-113.40	-158.43	-45.03	Fe3S4
Gypsum	-0.77	-5.38	-4.61	CaSO4:2H2O
H-Jarosite	-5.94	-17.49	-11.55	(H3O)Fe3(SO4)2(OH)6
H2S(g)	-36.53	-44.54	-8.01	H2S
H2Se(g)	-10.39	-15.32	-4.92	H2Se
Halite	-4.45	-2.86	1.59	NaCl
Hausmannite	-18.71	43.33	62.03	Mn3O4
Hematite	10.70	9.59	-1.11	Fe2O3
Hercynite	8.85	32.50	23.64	FeAl2O4
Hg(g)	-7.72	-15.65	-7.93	Hg
Hg(OH)2	-18.22	-21.72	-3.50	Hg(OH)2
Hg2(g)	-16.21	-31.30	-15.09	Hg2
Hg2(OH)2	-20.96	-15.70	5.26	Hg2(OH)2
Hg2HP04	-22.59	-47.37	-24.77	Hg2HP04
Hg2S	-48.40	-60.24	-11.84	Hg2S
Hg2SeO3	-24.42	-29.08	-4.66	Hg2SeO3
Hg2SO4	-25.50	-31.64	-6.14	Hg2SO4
HgCl(g)	-35.97	-16.08	19.88	HgCl
HgCl2	-16.66	-38.18	-21.52	HgCl2
Hgmetal(l)	-2.00	-15.65	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSeO3	-22.66	-35.09	-12.43	HgSeO3
HgSO4	-28.20	-37.66	-9.45	HgSO4
Hinsdalite	-6.65	-9.15	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	2.12	-42.21	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-7.67	-70.46	-62.79	Pb5(P04)3OH
K-Alum	-11.57	-16.81	-5.24	KAl(SO4)2:12H2O
K-Jarosite	0.89	-13.59	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-26.04	-26.77	-0.73	K2SeO4
Langite	-18.10	-0.22	17.88	Cu4(OH)6SO4:H2O
Larnakite	-5.74	-6.13	-0.38	PbO:PbSO4
Laurionite	-3.95	-3.33	0.62	PbOHCl
Lepidocrocite	3.43	4.80	1.37	FeOOH
Lime	-22.60	10.56	33.16	CaO
Litharge	-7.94	4.91	12.85	PbO
Mackinawite	-30.81	-34.41	-3.60	FeS
Maghemite	3.21	9.59	6.39	Fe2O3
Magnesioferrite	3.14	20.67	17.52	Fe2MgO4
Magnetite	15.82	19.72	3.90	Fe3O4
Manganite	-8.30	17.04	25.34	MnOOH
Massicot	-8.15	4.91	13.05	PbO
Melanothallite	-18.94	-12.53	6.41	CuCl2
Melanterite	-3.56	-5.82	-2.26	FeSO4:7H2O
Metacinnabar	-20.56	-66.26	-45.70	HgS
Mg(OH)2(active)	-7.72	11.07	18.79	Mg(OH)2
Mg3(P04)2	-6.83	-30.11	-23.28	Mg3(P04)2
MgHP04:3H2O	-2.42	-20.59	-18.18	MgHP04:3H2O
MgSeO3:6H2O	-5.35	-2.31	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-22.29	-23.49	-1.20	MgSeO4:6H2O
Minium	-44.21	30.32	74.53	Pb3O4
Mirabilite	-3.89	-5.20	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-59.62	-64.95	-5.32	Mn2(SO4)3
Mn3(P04)2	-11.76	-35.60	-23.85	Mn3(P04)2
MnCl2:4H2O	-9.97	-7.23	2.74	MnCl2:4H2O
MnHP04	2.98	-22.42	-25.40	MnHP04
MnS(grn)	-35.54	-35.30	0.25	MnS
MnS(pnk)	-38.64	-35.30	3.34	MnS
MnSe	-9.81	-6.08	3.73	MnSe
MnSeO3	-5.26	-4.13	1.13	MnSeO3
MnSeO3:2H2O	-5.10	-4.13	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-23.27	-25.32	-2.05	MnSeO4:5H2O
MnSO4	-9.43	-6.70	2.74	MnSO4
Monteponite	-10.29	5.06	15.35	CdO

Montroydite	-18.17	-21.72	-3.55	HgO
Morenosite	-5.84	-8.02	-2.17	NiSO4:7H2O
Na-Jarosite	-1.28	-12.11	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-12.93	-2.63	10.30	Na2SeO3:5H2O
Na2SeO4	-25.09	-23.81	1.28	Na2SeO4
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.10	7.93	13.02	Ni(OH)2
Ni3(PO4)2	-8.25	-39.55	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-16.23	15.77	32.00	Ni4(OH)6SO4
NiS(alpha)	-31.01	-36.61	-5.60	NiS
NiS(beta)	-25.51	-36.61	-11.10	NiS
NiS(gamma)	-23.81	-36.61	-12.80	NiS
NiSe	10.31	-7.39	-17.70	NiSe
NiSeO3:2H2O	-8.34	-5.45	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-25.12	-26.64	-1.52	NiSeO4:6H2O
Nsutite	-18.27	-0.76	17.50	MnO2
O2(g)	-53.25	31.20	84.45	O2
Pb(OH)2	-3.38	4.91	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.21	1.58	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-16.38	9.81	26.19	Pb2O(OH)2
Pb2O3	-35.63	25.41	61.04	Pb2O3
Pb3(PO4)2	-5.08	-48.61	-43.53	Pb3(PO4)2
Pb3O2SO4	-12.09	-1.22	10.87	Pb3O2SO4
Pb4(OH)6SO4	-17.42	3.68	21.10	Pb4(OH)6SO4
Pb4O3SO4	-18.51	3.69	22.20	Pb4O3SO4
PbHP04	-2.95	-26.76	-23.81	PbHP04
Pbmetal	-14.94	-10.69	4.24	Pb
PbO:0.3H2O	-8.07	4.91	12.98	PbO:0.33H2O
PbSeO4	-22.78	-29.65	-6.88	PbSeO4
Periclase	-10.87	11.07	21.94	MgO
Plattnerite	-29.80	20.51	50.31	PbO2
Plumbgummite	7.91	-24.88	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-12.56	10.56	23.11	Ca(OH)2
Pyrite	-44.72	-63.35	-18.63	FeS2
Pyrochroite	-6.18	9.24	15.43	Mn(OH)2
Pyrolusite	-17.19	24.84	42.03	MnO2
Pyromorphite	5.74	-78.69	-84.43	Pb5(PO4)3Cl
Retgersite	-5.97	-8.02	-2.05	NiSO4:6H2O
Semetal(am)	7.42	0.28	-7.14	Se
Semetal(hex)	8.03	0.28	-7.75	Se
SeO2	-13.50	-13.37	0.12	SeO2
SeO3	-55.95	-34.56	21.39	SeO3
Sphalerite	-25.59	-37.11	-11.52	ZnS
Spinel	-4.33	33.44	37.77	MgAl2O4
Strengite	-0.49	-26.87	-26.38	FePO4:2H2O
Sulfur	-26.83	-28.94	-2.11	S
Tenorite	-3.87	3.93	7.80	CuO
Thenardite	-5.53	-5.19	0.34	Na2SO4
Tsumebite	-8.13	-17.92	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	3.05	-32.95	-36.00	Fe3(PO4)2:8H2O
Wurtzite	-28.11	-37.11	-9.00	ZnS
Zincite	-4.12	7.43	11.55	ZnO
Zincosite	-12.63	-8.51	4.13	ZnSO4
Zn(NO3)2:6H2O	-106.17	-102.91	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.77	7.43	12.20	Zn(OH)2
Zn(OH)2(am)	-5.24	7.43	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.52	7.43	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.30	7.43	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.30	7.43	11.73	Zn(OH)2
Zn2(OH)2SO4	-8.58	-1.08	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.56	6.63	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-5.62	-41.04	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-29.11	-9.58	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-14.62	13.78	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.81	20.69	38.50	Zn5(OH)8Cl2
ZnCl2	-16.25	-9.03	7.22	ZnCl2
Znmetal	-34.32	-8.17	26.15	Zn
ZnO(active)	-3.97	7.43	11.40	ZnO

ZnS(am)	-28.02	-37.11	-9.09	ZnS
ZnSe	6.58	-7.89	-14.46	ZnSe
ZnSe04:6H2O	-25.62	-27.14	-1.52	ZnSe04:6H2O
ZnS04:1H2O	-7.98	-8.51	-0.53	ZnS04:1H2O

**For a gas, $SI = \log_{10}(\text{fugacity})$. Fugacity = pressure * phi / 1 atm.
 For ideal gases, phi = 1.

 End of simulation.

 Reading input data for simulation 11.

 End of Run after 0.341 Seconds.

Input file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\Phase II\PHREEQC\2
Mixing\Kanmantoo Scenario 1a mixing worst case OCT19.pqi
Output file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\Phase II\PHREEQC\2
Mixing\Kanmantoo Scenario 1a mixing worst case OCT19.pqi
Database file: C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
\minteq.v4.dat

Reading data base.

SOLUTION_MASTER_SPECIES
SOLUTION_SPECIES
SOLUTION_SPECIES
PHASES
PHASES
SURFACE_MASTER_SPECIES
SURFACE_SPECIES
END

Reading input data for simulation 1.

DATABASE C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
\minteq.v4.dat
SELECTED_OUTPUT 1
file Kanmantoo Scenario 1a mixing worst case OCT19.sel
totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg
Na K Alkalinity Cl S(6) Hg
SOLUTION_MASTER_SPECIES
Co Co+3 -1.0 Co 58.9332
Co(2) Co+2 0.0 Co
Co(3) Co+3 -1.0 Co
END

End of simulation.

Reading input data for simulation 2.

PHASES
CoO
CoO + 2H+ = Co+2 + H2O
log_k 13.5864
delta_h -106.295 kJ
Co(OH)2
Co(OH)2 + 2H+ = Co+2 + 2H2O
log_k 13.094
delta_h -0 kJ
Co(OH)3
Co(OH)3 + 3H+ = Co+3 + 3H2O
log_k -2.309
delta_h -92.43 kJ
Co3O4
Co3O4 + 8H+ = Co+2 + 2Co+3 + 4H2O
log_k -10.4956
delta_h -107.5 kJ
CoFe2O4
CoFe2O4 + 8H+ = Co+2 + 2Fe+3 + 4H2O
log_k -3.5281
delta_h -158.82 kJ
CoCl2
CoCl2 = Co+2 + 2Cl-
log_k 8.2672
delta_h -79.815 kJ
CoCl2:6H2O

```

      CoCl2:6H2O = Co+2 + 2Cl- + 6H2O
      log_k 2.5365
      delta_h      8.0598      kJ
(Co(NH3)6)Cl3
      (Co(NH3)6)Cl3 + 6H+ = Co+3 + 6NH4+ + 3Cl-
      log_k 20.0317
      delta_h      -33.1 kJ
(Co(NH3)5OH2)Cl3
      (Co(NH3)5OH2)Cl3 + 5H+ = Co+3 + 5NH4+ + 3Cl- + H2O
      log_k 11.7351
      delta_h      -25.37      kJ
(Co(NH3)5Cl)Cl2
      (Co(NH3)5Cl)Cl2 + 5H+ = Co+3 + 5NH4+ + 3Cl-
      log_k 4.5102
      delta_h      -10.74      kJ
CoCO3
      CoCO3 = Co+2 + CO3-2
      log_k -9.98
      delta_h      -12.7612    kJ
CoSO4
      CoSO4 = Co+2 + SO4-2
      log_k 2.8024
      delta_h      -79.277     kJ
CoSO4:6H2O
      CoSO4:6H2O = Co+2 + SO4-2 + 6H2O
      log_k -2.4726
      delta_h      1.0801      kJ
END

```

End of simulation.

Reading input data for simulation 3.

SOLUTION 1 #Groundwater worst case maximum values

```

temp      21
pH        5.05
pe        1
redox     pe
units     mg/l
density   1
Al        5.21
Alkalinity 0
As        0
Ba        0
Be        0
B         0
Cd        0.04
Co        24.2
Cr        0
Cu        9.29
Fe        937
Pb        0.01
Mn        171
Mo        0
V         0
Zn        1.78
Se        0.08
Ni        5.57
N         60
P         23.6
Ca        590
Mg        1340
Na        5880
K         216
Cl        9420

```

S(6) 9110
 Hg 0.0004
 water 1 # kg
 REACTION 1
 H2O -1
 39
 END # Time-step 1

 Beginning of initial solution calculations.

Initial solution 1.

-----Solution composition-----

Elements	Molality	Moles
Al	1.986e-04	1.986e-04
Ca	1.514e-02	1.514e-02
Cd	3.660e-07	3.660e-07
Cl	2.733e-01	2.733e-01
Co	4.224e-04	4.224e-04
Cu	1.504e-04	1.504e-04
Fe	1.726e-02	1.726e-02
Hg	2.051e-09	2.051e-09
K	5.682e-03	5.682e-03
Mg	5.671e-02	5.671e-02
Mn	3.202e-03	3.202e-03
N	4.406e-03	4.406e-03
Na	2.631e-01	2.631e-01
Ni	9.762e-05	9.762e-05
P	7.837e-04	7.837e-04
Pb	4.964e-08	4.964e-08
S(6)	9.754e-02	9.754e-02
Se	1.042e-06	1.042e-06
Zn	2.800e-05	2.800e-05

-----Description of solution-----

pH	=	5.050
pe	=	1.000
Activity of water	=	0.988
Ionic strength (mol/kgw)	=	4.862e-01
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	1.381e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	21.00
Electrical balance (eq)	=	-9.552e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.26
Iterations	=	14
Total H	=	1.110329e+02
Total O	=	5.590014e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.214e-05	8.913e-06	-4.916	-5.050	-0.134	0.00
OH-	1.292e-09	8.222e-10	-8.889	-9.085	-0.196	(0)
H2O	5.551e+01	9.883e-01	1.744	-0.005	0.000	18.05
Al	1.986e-04					
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Al+3	1.839e-05	1.139e-06	-4.735	-5.943	-1.208	(0)
AlOH+2	4.197e-06	9.786e-07	-5.377	-6.009	-0.632	(0)
Al(OH)2+	1.624e-06	1.128e-06	-5.790	-5.948	-0.158	(0)

	Al(OH)3	2.514e-08	2.514e-08	-7.600	-7.600	0.000	(0)
	Al(OH)4-	2.040e-09	1.366e-09	-8.690	-8.864	-0.174	(0)
Ca		1.514e-02					
	Ca+2	8.161e-03	2.370e-03	-2.088	-2.625	-0.537	(0)
	CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
	CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
	CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
	CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
	CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
	CaOH+	5.236e-11	3.715e-11	-10.281	-10.430	-0.149	(0)
	Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
	CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
Cd		3.660e-07					
	CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
	CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
	Cd(SO4)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
	CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
	Cd+2	1.502e-08	4.363e-09	-7.823	-8.360	-0.537	(0)
	CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
	CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
	CdOH+	6.462e-14	2.865e-14	-13.190	-13.543	-0.353	(0)
	Cd2OH+3	9.945e-19	6.582e-22	-18.002	-21.182	-3.179	(0)
	Cd(OH)2	2.726e-19	2.726e-19	-18.564	-18.564	0.000	(0)
	Cd(OH)3-	4.195e-26	1.860e-26	-25.377	-25.730	-0.353	(0)
	Cd(OH)4-2	8.799e-35	3.400e-36	-34.056	-35.469	-1.413	(0)
	Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
	CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
	CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cl		2.733e-01					
	Cl-	2.729e-01	2.003e-01	-0.564	-0.698	-0.134	(0)
	CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
	MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
	CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
	CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
	NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
	MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
	CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
	ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
	MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
	ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
	CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
	CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
	ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
	CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
	PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
	ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
	NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
	PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
	ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
	PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
	PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
	CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
	CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
	CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
	FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
	CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
	HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
	FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
	HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
	HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
	FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
	CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
	HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
	HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
	CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
	Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)

Co(2)	4.224e-04					
Co+2	3.644e-04	1.408e-05	-3.438	-4.851	-1.413	(0)
CoS04	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CoHP04	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CoOH+	7.075e-10	3.137e-10	-9.150	-9.504	-0.353	(0)
Co2OH+3	3.344e-13	2.213e-16	-12.476	-15.655	-3.179	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Co(OH)2	2.782e-14	2.782e-14	-13.556	-13.556	0.000	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Co(OH)3-	1.398e-21	6.199e-22	-20.854	-21.208	-0.353	(0)
Co0OH-	8.505e-23	3.771e-23	-22.070	-22.424	-0.353	(0)
Co4(OH)4+4	8.668e-25	1.932e-30	-24.062	-29.714	-5.652	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
Co(OH)4-2	2.839e-30	1.097e-31	-29.547	-30.960	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
CoSe04	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Co(3)	8.287e-32					
CoOH+2	8.232e-32	3.180e-33	-31.085	-32.498	-1.413	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co+3	9.049e-36	5.605e-37	-35.043	-36.251	-1.208	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
Cu(1)	1.504e-04					
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
Cu+	1.823e-08	8.082e-09	-7.739	-8.092	-0.353	(0)
Cu(2)	1.182e-09					
Cu+2	5.900e-10	1.714e-10	-9.229	-9.766	-0.537	(0)
CuS04	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
CuOH+	7.604e-13	4.972e-13	-12.119	-12.303	-0.185	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
Cu(OH)2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
Cu2(OH)2+2	1.564e-19	6.042e-21	-18.806	-20.219	-1.413	(0)
Cu(OH)3-	6.965e-22	3.088e-22	-21.157	-21.510	-0.353	(0)
Cu(OH)4-2	7.024e-29	2.714e-30	-28.153	-29.566	-1.413	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Fe(2)	1.726e-02					
Fe+2	1.529e-02	5.907e-04	-1.816	-3.229	-1.413	(0)
FeS04	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
FeH2P04+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
FeHP04	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
FeOH+	2.826e-08	1.934e-08	-7.549	-7.714	-0.165	(0)
Fe(OH)2	1.209e-14	1.209e-14	-13.918	-13.918	0.000	(0)
Fe(OH)3-	6.009e-18	4.111e-18	-17.221	-17.386	-0.165	(0)
Fe(3)	2.087e-10					
Fe(OH)2+	1.957e-10	1.360e-10	-9.708	-9.867	-0.158	(0)
FeHP04+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
FeOH+2	1.136e-12	2.489e-13	-11.945	-12.604	-0.659	(0)
Fe(OH)3	9.228e-14	9.228e-14	-13.035	-13.035	0.000	(0)
FeS04+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(S04)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
FeH2P04+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)

Fe+3	7.010e-15	4.342e-16	-14.154	-15.362	-1.208	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
Fe(OH)4-	2.440e-17	1.696e-17	-16.613	-16.771	-0.158	(0)
Fe2(OH)2+4	1.061e-18	2.365e-24	-17.974	-23.626	-5.652	(0)
Fe3(OH)4+5	3.023e-24	4.459e-33	-23.520	-32.351	-8.831	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
H(0)	1.047e-15					
H2	5.235e-16	5.855e-16	-15.281	-15.232	0.049	(0)
Hg(0)	2.051e-09					
Hg	2.051e-09	2.051e-09	-8.688	-8.688	0.000	(0)
Hg(1)	9.698e-28					
Hg2+2	4.849e-28	1.874e-29	-27.314	-28.727	-1.413	(0)
Hg(2)	4.726e-15					
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Hg(OH)2	1.022e-25	1.143e-25	-24.991	-24.942	0.049	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
HgOH+	1.615e-27	7.162e-28	-26.792	-27.145	-0.353	(0)
Hg+2	4.674e-28	1.806e-29	-27.330	-28.743	-1.413	(0)
HgSO4	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Hg(OH)3-	3.623e-35	1.606e-35	-34.441	-34.794	-0.353	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
K	5.682e-03					
K+	5.178e-03	3.801e-03	-2.286	-2.420	-0.134	(0)
KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
Mg	5.671e-02					
Mg+2	3.360e-02	9.758e-03	-1.474	-2.011	-0.537	(0)
MgSO4	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
MgHPO4	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
MgOH+	4.148e-09	2.990e-09	-8.382	-8.524	-0.142	(0)
MgPO4-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
Mn(2)	3.202e-03					
Mn+2	2.899e-03	1.120e-04	-2.538	-3.951	-1.413	(0)
MnSO4	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
MnOH+	3.381e-10	2.313e-10	-9.471	-9.636	-0.165	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Mn(OH)3-	3.538e-24	2.421e-24	-23.451	-23.616	-0.165	(0)
Mn(OH)4-2	3.983e-32	8.727e-33	-31.400	-32.059	-0.659	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Mn(3)	4.471e-28					
Mn+3	4.471e-28	2.769e-29	-27.350	-28.558	-1.208	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-79.028	-79.687	-0.659	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-88.115	-88.325	-0.210	(0)
N(-3)	4.406e-03					
NH4+	3.919e-03	2.335e-03	-2.407	-2.632	-0.225	(0)
NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
NH3	1.123e-07	1.123e-07	-6.950	-6.950	0.000	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)

CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
N(3)	0.000e+00					
N02-	0.000e+00	0.000e+00	-47.968	-48.177	-0.210	(0)
CoN02+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CuN02+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
Cu(N02)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-64.954	-65.088	-0.134	(0)
CaN03+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
MnN03+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
NiN03+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
CoN03+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
ZnN03+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
CdN03+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
PbN03+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
CuN03+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
FeN03+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
HgN03+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Mn(N03)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
Na	2.631e-01					
Na+	2.447e-01	1.796e-01	-0.611	-0.746	-0.134	(0)
NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
NaHP04-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
Ni	9.762e-05					
Ni+2	4.671e-05	1.357e-05	-4.331	-4.867	-0.537	(0)
NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
Ni(SO4)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
NiOH+	3.238e-10	1.435e-10	-9.490	-9.843	-0.353	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Ni(OH)2	1.692e-14	1.692e-14	-13.772	-13.772	0.000	(0)
Ni(OH)3-	4.261e-20	1.889e-20	-19.371	-19.724	-0.353	(0)
NiSe04	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-63.001	-62.952	0.049	(0)
P	7.837e-04					
H2P04-	4.270e-04	2.967e-04	-3.370	-3.528	-0.158	(0)
MgH2P04+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
FeH2P04+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
CaH2P04+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
MgHP04	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
HP04-2	9.473e-06	2.076e-06	-5.024	-5.683	-0.659	(0)
NaHP04-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
FeHP04	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
CaHP04	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)

H3P04	3.560e-07	3.560e-07	-6.449	-6.449	0.000	(0)
KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
CoHP04	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
CaP04-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
MgP04-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
FeHP04+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
P04-3	1.460e-12	9.045e-14	-11.836	-13.044	-1.208	(0)
FeH2P04+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Pb	4.964e-08					
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
Pb(S04)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
PbS04	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
Pb+2	3.636e-09	1.056e-09	-8.439	-8.976	-0.537	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
PbOH+	6.682e-12	2.963e-12	-11.175	-11.528	-0.353	(0)
Pb(OH)2	1.046e-16	1.046e-16	-15.980	-15.980	0.000	(0)
Pb2OH+3	7.494e-17	4.960e-20	-16.125	-19.305	-3.179	(0)
Pb(OH)3-	2.635e-22	1.168e-22	-21.579	-21.933	-0.353	(0)
Pb(OH)4-2	8.268e-28	3.195e-29	-27.083	-28.496	-1.413	(0)
Pb3(OH)4+2	3.173e-30	1.226e-31	-29.499	-30.912	-1.413	(0)
Pb4(OH)4+4	5.352e-31	1.193e-36	-30.271	-35.923	-5.652	(0)
PbN03+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
Pb(N03)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
S(6)	9.754e-02					
S04-2	4.586e-02	1.332e-02	-1.339	-1.875	-0.537	(0)
MgS04	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
NaS04-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
CaS04	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
FeS04	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
NH4S04-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
MnS04	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
AlS04+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
CoS04	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
NiS04	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
Al(S04)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Zn(S04)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
HS04-	1.536e-05	1.028e-05	-4.814	-4.988	-0.174	(0)
ZnS04	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
Ni(S04)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
Cd(S04)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
Pb(S04)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
CdS04	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
PbS04	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
CuS04	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
FeS04+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(S04)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
HgS04	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Se(-2)	1.042e-06					
HSe-	1.012e-06	4.485e-07	-5.995	-6.348	-0.353	(0)
H2Se	3.047e-08	3.047e-08	-7.516	-7.516	0.000	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Se-2	1.000e-15	3.865e-17	-15.000	-16.413	-1.413	(0)
Se(4)	2.708e-15					
HSe03-	2.690e-15	1.193e-15	-14.570	-14.923	-0.353	(0)
Se03-2	1.341e-17	5.183e-19	-16.872	-18.285	-1.413	(0)
H2Se03	4.383e-18	4.383e-18	-17.358	-17.358	0.000	(0)
FeHSe03+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
Cd(Se03)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
Se(6)	9.467e-35					
Se04-2	9.354e-35	2.717e-35	-34.029	-34.566	-0.537	(0)
MnSe04	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
CoSe04	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
NiSe04	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
HSe04-	2.413e-38	1.070e-38	-37.617	-37.971	-0.353	(0)

	ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
	CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
	Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn		2.800e-05					
	Zn(SO4)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
	Zn+2	6.051e-06	1.758e-06	-5.218	-5.755	-0.537	(0)
	ZnSO4	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
	ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
	ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
	ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
	ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
	ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
	ZnOH+	3.259e-10	1.445e-10	-9.487	-9.840	-0.353	(0)
	Zn(OH)2	3.473e-14	3.473e-14	-13.459	-13.459	0.000	(0)
	Zn(OH)3-	4.384e-19	1.944e-19	-18.358	-18.711	-0.353	(0)
	Zn(OH)4-2	2.236e-25	8.641e-27	-24.650	-26.063	-1.413	(0)
	ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
	ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
	Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
	Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-161.31	-155.03	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-30.79	-26.25	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-38.05	-26.26	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-234.94	-217.01	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-43.95	-23.84	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-40.28	-39.83	0.45	(NH4)2SeO4
Al(OH)3(am)	-1.87	9.19	11.06	Al(OH)3
Al2O3	-1.87	18.40	20.27	Al2O3
Al4(OH)10SO4	2.10	24.80	22.70	Al4(OH)10SO4
AlOHSO4	0.46	-2.77	-3.23	AlOHSO4
Alunite	7.17	6.27	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.03	-10.85	-7.82	PbSO4
Anhydrite	-0.16	-4.50	-4.34	CaSO4
Antlerite	-19.78	-10.99	8.79	Cu3(OH)4SO4
Atacamite	-12.71	-5.10	7.61	Cu2(OH)3Cl
Bianchite	-5.90	-7.66	-1.76	ZnSO4:6H2O
Birnessite	-25.46	-7.37	18.09	MnO2
Bixbyite	-26.48	-26.83	-0.35	Mn2O3
Boehmite	0.34	9.20	8.86	AlOOH
Brochantite	-26.38	-10.67	15.71	Cu4(OH)6SO4
Brucite	-9.04	8.08	17.12	Mg(OH)2
Bunsenite	-7.46	5.23	12.68	NiO
Ca3(PO4)2(beta)	-4.91	-33.96	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-7.62	-54.70	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.37	-20.72	-19.35	CaHP04
CaHP04:2H2O	-1.68	-20.73	-19.05	CaHP04:2H2O
Calomel	-11.99	-30.12	-18.13	Hg2Cl2
CaSeO3:2H2O	-15.37	-12.51	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-34.20	-37.20	-3.00	CaSeO4:2H2O
Cd(OH)2	-12.14	1.73	13.87	Cd(OH)2
Cd(OH)2(am)	-12.21	1.73	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-25.45	-18.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-29.34	-6.78	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-18.57	-51.17	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-33.45	-5.05	28.40	Cd4(OH)6SO4
CdCl2	-9.14	-9.76	-0.61	CdCl2
CdCl2:1H2O	-8.09	-9.76	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-7.84	-9.77	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.05	-10.36	13.69	Cd
Cdmetal(gamma)	-24.16	-10.36	13.80	Cd
CdOHCl	-7.62	-4.01	3.61	CdOHCl
CdSe	10.72	-9.66	-20.38	CdSe
CdSeO4:2H2O	-41.09	-42.94	-1.85	CdSeO4:2H2O

CdSO4	-10.19	-10.24	-0.05	CdSO4
CdSO4:1H2O	-8.59	-10.24	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-8.42	-10.25	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.01	-11.67	-2.65	CuSO4:5H2O
Clausthalite	17.11	-10.27	-27.39	PbSe
Co(OH)2	-7.86	5.24	13.09	Co(OH)2
Co(OH)3	-19.03	-21.12	-2.09	Co(OH)3
Co3(P04)2	-5.95	-40.64	-34.69	Co3(P04)2
Co3O4	-26.74	-36.97	-10.24	Co3O4
CoCl2	-14.71	-6.25	8.46	CoCl2
CoCl2:6H2O	-8.80	-6.28	2.52	CoCl2:6H2O
CoFe2O4	7.95	4.80	-3.15	CoFe2O4
CoHP04	-3.88	-22.95	-19.06	CoHP04
CoO	-8.60	5.24	13.84	CoO
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-16.04	-14.72	1.32	CoSeO3
CoSeO4:6H2O	-37.92	-39.45	-1.53	CoSeO4:6H2O
CoSO4	-9.72	-6.73	2.99	CoSO4
CoSO4:6H2O	-4.28	-6.76	-2.48	CoSO4:6H2O
Cotunnite	-5.53	-10.37	-4.84	PbCl2
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.91	-69.49	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.83	-17.48	-46.31	Cu2Se
Cu2SO4	-16.16	-18.06	-1.90	Cu2SO4
Cu3(P04)2	-18.54	-55.39	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-20.28	-55.40	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.75	-28.55	-64.30	Cu3Se2
Cumetal	-0.17	-9.09	-8.93	Cu
CuOCuSO4	-21.94	-11.31	10.63	CuOCuSO4
Cupricferrite	-6.60	-0.11	6.49	CuFe2O4
Cuprite	-4.98	-6.09	-1.11	Cu2O
Cuprousferrite	5.61	-3.27	-8.88	CuFeO2
CuSe	22.32	-11.06	-33.39	CuSe
CuSe2	23.34	-10.36	-33.70	CuSe2
CuSeO3:2H2O	-20.25	-19.65	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-41.92	-44.36	-2.44	CuSeO4:5H2O
CuSO4	-14.76	-11.64	3.11	CuSO4
Diaspore	2.08	9.20	7.12	AlOOH
Epsomite	-1.77	-3.92	-2.15	MgSO4:7H2O
Fe(OH)2	-6.70	6.86	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.09	-1.95	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-21.97	-20.42	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-39.73	-60.36	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-33.19	-36.35	-3.16	Fe2(SO4)3
Fe3(OH)8	-13.82	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.59	-0.23	3.37	Fe(OH)3
Ferroselite	14.88	-3.83	-18.71	FeSe2
FeSe	6.48	-4.53	-11.00	FeSe
Gibbsite	0.67	9.19	8.52	Al(OH)3
Goethite	-0.86	-0.22	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4:7H2O
Gypsum	0.10	-4.51	-4.61	CaSO4:2H2O
H-Jarosite	-13.07	-24.62	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-6.47	-11.40	-4.92	H2Se
Halite	-3.04	-1.44	1.59	NaCl
Hausmannite	-31.51	30.53	62.03	Mn3O4
Hematite	0.67	-0.44	-1.11	Fe2O3
Hercynite	1.62	25.26	23.64	FeAl2O4
Hg(g)	-7.44	-15.36	-7.93	Hg
Hg(OH)2	-21.45	-24.94	-3.50	Hg(OH)2
Hg2(g)	-15.63	-30.73	-15.09	Hg2
Hg2(OH)2	-23.90	-18.64	5.26	Hg2(OH)2
Hg2HP04	-22.05	-46.82	-24.77	Hg2HP04
Hg2SeO3	-33.94	-38.60	-4.66	Hg2SeO3
Hg2SO4	-24.46	-30.60	-6.14	Hg2SO4
HgCl(g)	-34.94	-15.06	19.88	HgCl
HgCl2	-14.91	-36.43	-21.52	HgCl2
Hgmetal(l)	-1.71	-15.36	-13.65	Hg

HgSe	19.36	-36.33	-55.69	HgSe
HgSeO3	-32.48	-44.91	-12.43	HgSeO3
HgSO4	-27.45	-36.91	-9.45	HgSO4
Hinsdalite	-8.96	-11.46	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	-2.88	-47.21	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-16.18	-78.97	-62.79	Pb5(P04)3OH
K-Alum	-6.93	-12.18	-5.24	KAl(S04)2:12H2O
K-Jarosite	-7.50	-21.99	-14.49	KFe3(S04)2(OH)6
K2SeO4	-38.68	-39.41	-0.73	K2SeO4
Langite	-28.56	-10.68	17.88	Cu4(OH)6S04:H2O
Larnakite	-9.35	-9.73	-0.38	Pb0:PbS04
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.59	-0.22	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.73	1.12	12.85	PbO
Maghemite	-6.83	-0.44	6.39	Fe2O3
Magnesioferrite	-9.88	7.64	17.52	Fe2MgO4
Magnetite	2.53	6.43	3.90	Fe3O4
Manganite	-13.15	12.19	25.34	MnOOH
Massicot	-11.93	1.12	13.05	PbO
Melanothallite	-17.57	-11.16	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeS04:7H2O
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(P04)2	-8.84	-32.12	-23.28	Mg3(P04)2
MgHP04:3H2O	-1.94	-20.12	-18.18	MgHP04:3H2O
MgSeO3:6H2O	-14.96	-11.91	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-35.41	-36.61	-1.20	MgSeO4:6H2O
Minium	-59.08	15.45	74.53	Pb3O4
Mirabilite	-2.11	-3.42	-1.30	Na2S04:10H2O
Mn2(S04)3	-57.42	-62.74	-5.32	Mn2(S04)3
Mn3(P04)2	-14.09	-37.94	-23.85	Mn3(P04)2
MnCl2:4H2O	-8.11	-5.37	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnSe	-8.98	-5.25	3.73	MnSe
MnSeO3	-14.95	-13.82	1.13	MnSeO3
MnSeO3:2H2O	-14.80	-13.83	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-36.49	-38.54	-2.05	MnSeO4:5H2O
MnSO4	-8.56	-5.83	2.74	MnSO4
Monteponite	-13.62	1.73	15.35	CdO
Montroydite	-21.39	-24.94	-3.55	HgO
Morenosite	-4.60	-6.78	-2.17	NiS04:7H2O
Na-Jarosite	-9.47	-20.31	-10.84	NaFe3(S04)2(OH)6
Na2SeO3:5H2O	-21.69	-11.39	10.30	Na2SeO3:5H2O
Na2SeO4	-37.34	-36.06	1.28	Na2SeO4
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(P04)2	-9.39	-40.69	-31.30	Ni3(P04)2
Ni4(OH)6S04	-23.08	8.92	32.00	Ni4(OH)6S04
NiSe	11.53	-6.17	-17.70	NiSe
NiSeO3:2H2O	-17.64	-14.75	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-37.94	-39.46	-1.52	NiSeO4:6H2O
Nsutite	-24.87	-7.37	17.50	MnO2
O2(g)	-60.26	24.19	84.45	O2
Pb(OH)2	-7.18	1.11	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.31	-3.52	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-23.96	2.23	26.19	Pb2O(OH)2
Pb2O3	-46.71	14.33	61.04	Pb2O3
Pb3(P04)2	-9.49	-53.02	-43.53	Pb3(P04)2
Pb3O2S04	-19.49	-8.61	10.87	Pb3O2S04
Pb4(OH)6S04	-28.61	-7.51	21.10	Pb4(OH)6S04
Pb4O3S04	-29.70	-7.50	22.20	Pb4O3S04
PbHP04	-3.26	-27.07	-23.81	PbHP04
Pbmetal	-15.22	-10.98	4.24	Pb
PbO:0.3H2O	-11.86	1.12	12.98	PbO:0.33H2O
PbSeO4	-36.67	-43.54	-6.88	PbSeO4
Periclase	-13.86	8.08	21.94	MgO
Plattnerite	-37.09	13.21	50.31	PbO2
Plumbgummite	5.12	-27.67	-32.79	PbAl3(P04)2(OH)5:H2O

Portlandite	-15.65	7.46	23.11	Ca(OH)2
Pyrochroite	-9.29	6.14	15.43	Mn(OH)2
Pyrolusite	-23.79	18.24	42.03	MnO2
Pyromorphite	-0.28	-84.71	-84.43	Pb5(P04)3Cl
Retgersite	-4.72	-6.77	-2.05	NiSO4:6H2O
Semetal(am)	7.84	0.70	-7.14	Se
Semetal(hex	8.45	0.70	-7.75	Se
SeO2	-20.09	-19.97	0.12	SeO2
SeO3	-66.05	-44.66	21.39	SeO3
Spinel	-11.29	26.48	37.77	MgAl2O4
Strengite	-2.04	-28.42	-26.38	FePO4:2H2O
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.71	-3.37	0.34	Na2SO4
Tsumebite	-15.85	-25.64	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	0.19	-35.81	-36.00	Fe3(P04)2:8H2O
Zincite	-7.21	4.34	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnSO4
Zn(NO3)2:6H2O	-139.22	-135.96	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-7.87	4.33	12.20	Zn(OH)2
Zn(OH)2(am)	-8.33	4.33	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.62	4.33	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.39	4.33	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.40	4.33	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.80	-3.30	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.26	2.93	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-7.95	-43.37	-35.42	Zn3(P04)2:4H2O
Zn3O(SO4)2	-30.45	-10.92	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-23.03	5.37	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-28.31	10.19	38.50	Zn5(OH)8Cl2
ZnCl2	-14.37	-7.15	7.22	ZnCl2
Znmetal	-33.91	-7.76	26.15	Zn
ZnO(active)	-7.06	4.34	11.40	ZnO
ZnSe	7.41	-7.05	-14.46	ZnSe
ZnSeO4:6H2O	-38.83	-40.35	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.10	-7.64	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using solution 1.

Using reaction 1.

Reaction 1.

3.900e+01 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000
Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	6.679e-04	1.986e-04
Ca	5.092e-02	1.514e-02

Cd	1.231e-06	3.660e-07
Cl	9.190e-01	2.733e-01
Co	1.420e-03	4.224e-04
Cu	5.057e-04	1.504e-04
Fe	5.803e-02	1.726e-02
Hg	6.897e-09	2.051e-09
K	1.911e-02	5.682e-03
Mg	1.907e-01	5.671e-02
Mn	1.077e-02	3.202e-03
N	1.482e-02	4.406e-03
Na	8.846e-01	2.631e-01
Ni	3.283e-04	9.762e-05
P	2.635e-03	7.837e-04
Pb	1.669e-07	4.964e-08
S	3.280e-01	9.754e-02
Se	3.504e-06	1.042e-06
Zn	9.415e-05	2.800e-05

-----Description of solution-----

pH	=	4.824	Charge balance
pe	=	1.867	Adjusted to redox equilibrium
Activity of water	=	0.963	
Ionic strength (mol/kgw)	=	1.299e+00	
Mass of water (kg)	=	2.974e-01	
Total alkalinity (eq/kg)	=	4.645e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	-9.552e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.45	
Iterations	=	11	
Total H	=	3.303286e+01	
Total O	=	1.690014e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.771e-05	1.499e-05	-4.752	-4.824	-0.072	0.00
OH-	8.472e-10	4.762e-10	-9.072	-9.322	-0.250	(0)
H2O	5.551e+01	9.627e-01	1.744	-0.016	0.000	18.05
Al	6.679e-04					
AlSO4+	5.192e-04	3.163e-04	-3.285	-3.500	-0.215	(0)
Al(SO4)2-	1.312e-04	7.994e-05	-3.882	-4.097	-0.215	(0)
Al+3	9.866e-06	2.200e-06	-5.006	-5.658	-0.652	(0)
AlOH+2	6.376e-06	1.095e-06	-5.195	-5.961	-0.765	(0)
Al(OH)2+	1.136e-06	7.310e-07	-5.945	-6.136	-0.191	(0)
Al(OH)3	9.435e-09	9.435e-09	-8.025	-8.025	0.000	(0)
Al(OH)4-	4.877e-10	2.970e-10	-9.312	-9.527	-0.215	(0)
Ca	5.092e-02					
CaSO4	3.602e-02	3.602e-02	-1.444	-1.444	0.000	(0)
Ca+2	1.475e-02	7.569e-03	-1.831	-2.121	-0.290	(0)
CaH2PO4+	1.457e-04	9.378e-05	-3.837	-4.028	-0.191	(0)
CaHPO4	7.966e-06	7.966e-06	-5.099	-5.099	0.000	(0)
CaNH3+2	4.648e-07	2.279e-09	-6.333	-8.642	-2.310	(0)
CaPO4-	2.013e-09	1.296e-09	-8.696	-8.888	-0.191	(0)
CaOH+	1.036e-10	6.872e-11	-9.985	-10.163	-0.178	(0)
Ca(NH3)2+2	4.426e-14	2.170e-16	-13.354	-15.663	-2.310	(0)
CaNO3+	0.000e+00	0.000e+00	-61.042	-61.620	-0.577	(0)
Cd	1.231e-06					
CdCl3-	4.165e-07	1.102e-07	-6.380	-6.958	-0.577	(0)
Cd(SO4)2-2	2.979e-07	1.460e-09	-6.526	-8.836	-2.310	(0)
CdCl+	2.760e-07	7.302e-08	-6.559	-7.137	-0.577	(0)
CdCl2	2.338e-07	2.338e-07	-6.631	-6.631	0.000	(0)
CdSO4	4.779e-09	4.779e-09	-8.321	-8.321	0.000	(0)
Cd+2	1.929e-09	9.902e-10	-8.715	-9.004	-0.290	(0)

CdOHC1	1.763e-12	1.763e-12	-11.754	-11.754	0.000	(0)
CdOH+	1.423e-14	3.767e-15	-13.847	-14.424	-0.577	(0)
Cd2OH+3	3.087e-18	1.964e-23	-17.510	-22.707	-5.196	(0)
Cd(OH)2	2.076e-20	2.076e-20	-19.683	-19.683	0.000	(0)
Cd(OH)3-	3.101e-27	8.205e-28	-26.509	-27.086	-0.577	(0)
CdHS+	2.680e-27	7.092e-28	-26.572	-27.149	-0.577	(0)
Cd(SeO3)2-2	2.870e-30	1.407e-32	-29.542	-31.852	-2.310	(0)
Cd(OH)4-2	1.772e-35	8.687e-38	-34.752	-37.061	-2.310	(0)
CdSeO4	7.300e-37	7.300e-37	-36.137	-36.137	0.000	(0)
Cd(HS)2	0.000e+00	0.000e+00	-46.098	-46.098	0.000	(0)
CdNO3+	0.000e+00	0.000e+00	-67.888	-68.466	-0.577	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-69.774	-70.351	-0.577	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-91.999	-94.308	-2.310	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-128.827	-128.827	0.000	(0)
Cl	9.190e-01					
Cl-	9.173e-01	7.764e-01	-0.037	-0.110	-0.072	(0)
CuCl2-	3.129e-04	1.836e-04	-3.505	-3.736	-0.231	(0)
CuCl3-2	1.916e-04	3.001e-05	-3.718	-4.523	-0.805	(0)
NiCl+	1.714e-04	4.535e-05	-3.766	-4.343	-0.577	(0)
MnCl+	7.943e-05	4.997e-05	-4.100	-4.301	-0.201	(0)
CoCl+	6.536e-05	1.730e-05	-4.185	-4.762	-0.577	(0)
MnCl2	5.480e-05	5.480e-05	-4.261	-4.261	0.000	(0)
MnCl3-	1.863e-05	1.172e-05	-4.730	-4.931	-0.201	(0)
ZnCl+	1.535e-06	9.011e-07	-5.814	-6.045	-0.231	(0)
ZnCl4-2	1.358e-06	2.127e-07	-5.867	-6.672	-0.805	(0)
CuCl	1.121e-06	1.121e-06	-5.950	-5.950	0.000	(0)
ZnCl3-	9.638e-07	5.657e-07	-6.016	-6.247	-0.231	(0)
ZnCl2	9.324e-07	9.324e-07	-6.030	-6.030	0.000	(0)
CdCl3-	4.165e-07	1.102e-07	-6.380	-6.958	-0.577	(0)
CdCl+	2.760e-07	7.302e-08	-6.559	-7.137	-0.577	(0)
CdCl2	2.338e-07	2.338e-07	-6.631	-6.631	0.000	(0)
NiCl2	1.793e-07	1.793e-07	-6.747	-6.747	0.000	(0)
PbCl4-2	1.284e-07	6.297e-10	-6.891	-9.201	-2.310	(0)
PbCl3-	7.113e-09	1.882e-09	-8.148	-8.725	-0.577	(0)
PbCl+	6.466e-09	1.711e-09	-8.189	-8.767	-0.577	(0)
PbCl2	5.828e-09	5.828e-09	-8.235	-8.235	0.000	(0)
HgCl4-2	1.134e-09	5.561e-12	-8.945	-11.255	-2.310	(0)
ZnOHC1	7.860e-10	7.860e-10	-9.105	-9.105	0.000	(0)
CuCl+	3.590e-10	2.107e-10	-9.445	-9.676	-0.231	(0)
CuCl2	4.658e-11	4.658e-11	-10.332	-10.332	0.000	(0)
HgCl3-	6.553e-12	1.734e-12	-11.184	-11.761	-0.577	(0)
CdOHC1	1.763e-12	1.763e-12	-11.754	-11.754	0.000	(0)
CuCl3-	5.353e-13	3.141e-13	-12.271	-12.503	-0.231	(0)
HgCl2	2.214e-13	2.214e-13	-12.655	-12.655	0.000	(0)
FeCl+2	1.980e-13	3.100e-14	-12.703	-13.509	-0.805	(0)
FeCl2+	1.939e-13	1.220e-13	-12.712	-12.914	-0.201	(0)
FeCl3	9.472e-15	9.472e-15	-14.024	-14.024	0.000	(0)
CuCl4-2	8.939e-15	1.400e-15	-14.049	-14.854	-0.805	(0)
HgClOH	2.480e-18	2.480e-18	-17.606	-17.606	0.000	(0)
HgCl+	1.827e-19	4.834e-20	-18.738	-19.316	-0.577	(0)
CoCl+2	5.635e-32	2.763e-34	-31.249	-33.559	-2.310	(0)
Co(NH3)5Cl+2	2.321e-39	0.000e+00	-38.634	-40.944	-2.310	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.950	-54.259	-2.310	(0)
Co(2)	1.420e-03					
Co+2	1.328e-03	6.510e-06	-2.877	-5.186	-2.310	(0)
CoCl+	6.536e-05	1.730e-05	-4.185	-4.762	-0.577	(0)
CoSO4	2.711e-05	2.711e-05	-4.567	-4.567	0.000	(0)
Co(NH3)+2	5.454e-08	2.674e-10	-7.263	-9.573	-2.310	(0)
CoHPO4	1.609e-08	1.609e-08	-7.794	-7.794	0.000	(0)
CoOH+	3.175e-10	8.402e-11	-9.498	-10.076	-0.577	(0)
Co2OH+3	4.309e-12	2.741e-17	-11.366	-16.562	-5.196	(0)
Co(NH3)2+2	3.896e-13	1.910e-15	-12.409	-14.719	-2.310	(0)
Co(OH)2	4.317e-15	4.317e-15	-14.365	-14.365	0.000	(0)
Co(NH3)3+2	1.173e-18	5.752e-21	-17.931	-20.240	-2.310	(0)
Co(OH)3-	2.105e-22	5.571e-23	-21.677	-22.254	-0.577	(0)
Co4(OH)4+4	1.720e-23	9.942e-33	-22.764	-32.003	-9.238	(0)
CoOOH-	1.315e-23	3.479e-24	-22.881	-23.459	-0.577	(0)
Co(NH3)4+2	1.473e-24	7.220e-27	-23.832	-26.141	-2.310	(0)

Co(OH)4-2	1.165e-30	5.711e-33	-29.934	-32.243	-2.310	(0)
Co(NH3)5+2	5.845e-31	2.866e-33	-30.233	-32.543	-2.310	(0)
CoSeO4	1.209e-32	1.209e-32	-31.917	-31.917	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-48.133	-48.710	-0.577	(0)
CoNO3+	0.000e+00	0.000e+00	-64.421	-64.998	-0.577	(0)
Co(NO3)2	0.000e+00	0.000e+00	-124.701	-124.701	0.000	(0)
Co(3)	1.336e-30					
CoOH+2	1.280e-30	6.275e-33	-29.893	-32.202	-2.310	(0)
CoCl+2	5.635e-32	2.763e-34	-31.249	-33.559	-2.310	(0)
Co+3	8.563e-36	1.909e-36	-35.067	-35.719	-0.652	(0)
Co(NH3)5Cl+2	2.321e-39	0.000e+00	-38.634	-40.944	-2.310	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-50.360	-50.938	-0.577	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.950	-54.259	-2.310	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-56.580	-58.890	-2.310	(0)
Cu(1)	5.057e-04					
CuCl2-	3.129e-04	1.836e-04	-3.505	-3.736	-0.231	(0)
CuCl3-2	1.916e-04	3.001e-05	-3.718	-4.523	-0.805	(0)
CuCl	1.121e-06	1.121e-06	-5.950	-5.950	0.000	(0)
Cu+	4.335e-09	1.147e-09	-8.363	-8.940	-0.577	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-47.666	-48.208	-0.542	(0)
CuS4S5-3	0.000e+00	0.000e+00	-48.435	-48.938	-0.502	(0)
Cu(2)	1.734e-09					
CuSO4	8.451e-10	8.451e-10	-9.073	-9.073	0.000	(0)
CuCl+	3.590e-10	2.107e-10	-9.445	-9.676	-0.231	(0)
Cu+2	3.491e-10	1.792e-10	-9.457	-9.747	-0.290	(0)
CuNH3+2	1.328e-10	6.509e-13	-9.877	-12.186	-2.310	(0)
CuCl2	4.658e-11	4.658e-11	-10.332	-10.332	0.000	(0)
CuCl3-	5.353e-13	3.141e-13	-12.271	-12.503	-0.231	(0)
CuOH+	5.131e-13	3.011e-13	-12.290	-12.521	-0.231	(0)
CuCl4-2	8.939e-15	1.400e-15	-14.049	-14.854	-0.805	(0)
Cu(OH)2	4.730e-17	4.730e-17	-16.325	-16.325	0.000	(0)
Cu2(OH)2+2	4.520e-19	2.216e-21	-18.345	-20.654	-2.310	(0)
Cu(OH)3-	2.371e-22	6.275e-23	-21.625	-22.202	-0.577	(0)
Cu(OH)4-2	6.515e-29	3.194e-31	-28.186	-30.496	-2.310	(0)
CuNO2+	0.000e+00	0.000e+00	-51.521	-52.099	-0.577	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-61.729	-62.307	-0.577	(0)
CuNO3+	0.000e+00	0.000e+00	-68.671	-69.249	-0.577	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-95.461	-95.461	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-130.170	-130.170	0.000	(0)
Fe(2)	5.803e-02					
Fe+2	5.651e-02	2.771e-04	-1.248	-3.557	-2.310	(0)
FeSO4	1.406e-03	1.406e-03	-2.852	-2.852	0.000	(0)
FeH2PO4+	1.155e-04	7.436e-05	-3.937	-4.129	-0.191	(0)
FeHPO4	2.498e-06	2.498e-06	-5.602	-5.602	0.000	(0)
FeOH+	8.350e-09	5.253e-09	-8.078	-8.280	-0.201	(0)
Fe(OH)2	1.902e-15	1.902e-15	-14.721	-14.721	0.000	(0)
Fe(OH)3-	5.957e-19	3.747e-19	-18.225	-18.426	-0.201	(0)
Fe(HS)2	0.000e+00	0.000e+00	-46.913	-46.913	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-70.452	-71.029	-0.577	(0)
Fe(3)	3.013e-10					
Fe(OH)2+	2.449e-10	1.576e-10	-9.611	-9.802	-0.191	(0)
FeHPO4+	5.155e-11	3.318e-11	-10.288	-10.479	-0.191	(0)
FeOH+2	3.180e-12	4.981e-13	-11.498	-12.303	-0.805	(0)
Fe(SO4)2-	5.708e-13	1.511e-13	-12.243	-12.821	-0.577	(0)
FeSO4+	5.038e-13	3.169e-13	-12.298	-12.499	-0.201	(0)
FeCl+2	1.980e-13	3.100e-14	-12.703	-13.509	-0.805	(0)
FeCl2+	1.939e-13	1.220e-13	-12.712	-12.914	-0.201	(0)
FeH2PO4+2	8.886e-14	1.525e-14	-13.051	-13.817	-0.765	(0)
Fe(OH)3	6.197e-14	6.197e-14	-13.208	-13.208	0.000	(0)
Fe2(OH)2+4	1.639e-14	9.474e-24	-13.785	-23.023	-9.238	(0)
FeCl3	9.472e-15	9.472e-15	-14.024	-14.024	0.000	(0)
Fe+3	6.728e-15	1.500e-15	-14.172	-14.824	-0.652	(0)
Fe(OH)4-	1.025e-17	6.595e-18	-16.989	-17.181	-0.191	(0)
Fe3(OH)4+5	5.631e-18	2.070e-32	-17.249	-31.684	-14.435	(0)
FeHSeO3+2	1.102e-20	5.403e-23	-19.958	-22.267	-2.310	(0)
FeNO3+2	0.000e+00	0.000e+00	-71.438	-73.747	-2.310	(0)
H(0)	4.525e-17					
H2	2.262e-17	3.051e-17	-16.645	-16.516	0.130	(0)

Hg(0)	5.756e-09					
Hg	5.756e-09	5.756e-09	-8.240	-8.240	0.000	(0)
Hg(1)	3.266e-24					
Hg2+2	1.633e-24	8.008e-27	-23.787	-26.096	-2.310	(0)
Hg(2)	1.141e-09					
HgCl4-2	1.134e-09	5.561e-12	-8.945	-11.255	-2.310	(0)
HgCl3-	6.553e-12	1.734e-12	-11.184	-11.761	-0.577	(0)
HgCl2	2.214e-13	2.214e-13	-12.655	-12.655	0.000	(0)
HgClOH	2.480e-18	2.480e-18	-17.606	-17.606	0.000	(0)
HgCl+	1.827e-19	4.834e-20	-18.738	-19.316	-0.577	(0)
Hg(NH3)2+2	6.303e-20	3.090e-22	-19.200	-21.510	-2.310	(0)
HgNH3+2	6.808e-23	3.338e-25	-22.167	-24.476	-2.310	(0)
Hg(OH)2	4.330e-24	5.839e-24	-23.364	-23.234	0.130	(0)
Hg+2	5.610e-25	2.750e-27	-24.251	-26.561	-2.310	(0)
HgOH+	2.388e-25	6.318e-26	-24.622	-25.199	-0.577	(0)
Hg(NH3)3+2	8.620e-26	4.227e-28	-25.064	-27.374	-2.310	(0)
HgSO4	1.251e-26	1.251e-26	-25.903	-25.903	0.000	(0)
Hg(NH3)4+2	2.365e-31	1.160e-33	-30.626	-32.936	-2.310	(0)
Hg(OH)3-	1.797e-33	4.755e-34	-32.745	-33.323	-0.577	(0)
Hg(HS)2	0.000e+00	0.000e+00	-40.639	-40.639	0.000	(0)
HgHS2-	0.000e+00	0.000e+00	-41.632	-42.209	-0.577	(0)
HgS2-2	0.000e+00	0.000e+00	-43.783	-46.093	-2.310	(0)
HgNO3+	0.000e+00	0.000e+00	-86.522	-87.100	-0.577	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-147.492	-147.492	0.000	(0)
K	1.911e-02					
K+	1.597e-02	1.352e-02	-1.797	-1.869	-0.072	(0)
KS04-	3.139e-03	2.021e-03	-2.503	-2.695	-0.191	(0)
KHP04-	3.608e-07	2.322e-07	-6.443	-6.634	-0.191	(0)
Mg	1.907e-01					
MgSO4	1.252e-01	1.252e-01	-0.902	-0.902	0.000	(0)
Mg+2	6.408e-02	3.289e-02	-1.193	-1.483	-0.290	(0)
MgH2PO4+	1.353e-03	8.712e-04	-2.869	-3.060	-0.191	(0)
MgHP04	4.778e-05	4.778e-05	-4.321	-4.321	0.000	(0)
MgOH+	8.604e-09	5.839e-09	-8.065	-8.234	-0.168	(0)
MgP04-	1.367e-10	8.800e-11	-9.864	-10.055	-0.191	(0)
Mn(2)	1.077e-02					
Mn+2	1.043e-02	5.112e-05	-1.982	-4.291	-2.310	(0)
MnSO4	1.872e-04	1.872e-04	-3.728	-3.728	0.000	(0)
MnCl+	7.943e-05	4.997e-05	-4.100	-4.301	-0.201	(0)
MnCl2	5.480e-05	5.480e-05	-4.261	-4.261	0.000	(0)
MnCl3-	1.863e-05	1.172e-05	-4.730	-4.931	-0.201	(0)
MnOH+	9.721e-11	6.115e-11	-10.012	-10.214	-0.201	(0)
MnSe	1.265e-11	1.265e-11	-10.898	-10.898	0.000	(0)
Mn(OH)3-	3.414e-25	2.147e-25	-24.467	-24.668	-0.201	(0)
MnSeO4	5.044e-32	5.044e-32	-31.297	-31.297	0.000	(0)
Mn(OH)4-2	2.863e-33	4.484e-34	-32.543	-33.348	-0.805	(0)
MnNO3+	0.000e+00	0.000e+00	-63.526	-64.103	-0.577	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-123.711	-123.711	0.000	(0)
Mn(3)	4.176e-28					
Mn+3	4.176e-28	9.312e-29	-27.379	-28.031	-0.652	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-77.605	-78.410	-0.805	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-85.908	-86.181	-0.272	(0)
N(-3)	1.482e-02					
NH4+	1.250e-02	6.287e-03	-1.903	-2.202	-0.299	(0)
NH4SO4-	2.313e-03	1.455e-03	-2.636	-2.837	-0.201	(0)
NiNH3+2	8.733e-07	4.282e-09	-6.059	-8.368	-2.310	(0)
CaNH3+2	4.648e-07	2.279e-09	-6.333	-8.642	-2.310	(0)
NH3	1.798e-07	1.798e-07	-6.745	-6.745	0.000	(0)
Co(NH3)+2	5.454e-08	2.674e-10	-7.263	-9.573	-2.310	(0)
CuNH3+2	1.328e-10	6.509e-13	-9.877	-12.186	-2.310	(0)
Ni(NH3)2+2	3.856e-11	1.891e-13	-10.414	-12.723	-2.310	(0)
Co(NH3)2+2	3.896e-13	1.910e-15	-12.409	-14.719	-2.310	(0)
Ca(NH3)2+2	4.426e-14	2.170e-16	-13.354	-15.663	-2.310	(0)
Co(NH3)3+2	1.173e-18	5.752e-21	-17.931	-20.240	-2.310	(0)
Hg(NH3)2+2	6.303e-20	3.090e-22	-19.200	-21.510	-2.310	(0)
HgNH3+2	6.808e-23	3.338e-25	-22.167	-24.476	-2.310	(0)

Co(NH3)4+2	1.473e-24	7.220e-27	-23.832	-26.141	-2.310	(0)
Hg(NH3)3+2	8.620e-26	4.227e-28	-25.064	-27.374	-2.310	(0)
Co(NH3)5+2	5.845e-31	2.866e-33	-30.233	-32.543	-2.310	(0)
Hg(NH3)4+2	2.365e-31	1.160e-33	-30.626	-32.936	-2.310	(0)
Co(NH3)5Cl+2	2.321e-39	0.000e+00	-38.634	-40.944	-2.310	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-50.360	-50.938	-0.577	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.950	-54.259	-2.310	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-56.580	-58.890	-2.310	(0)
N(3)	0.000e+00					
N02-	0.000e+00	0.000e+00	-44.100	-44.372	-0.272	(0)
CoN02+	0.000e+00	0.000e+00	-48.133	-48.710	-0.577	(0)
CuN02+	0.000e+00	0.000e+00	-51.521	-52.099	-0.577	(0)
Cu(N02)2	0.000e+00	0.000e+00	-95.461	-95.461	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-59.939	-60.012	-0.072	(0)
CaN03+	0.000e+00	0.000e+00	-61.042	-61.620	-0.577	(0)
MnN03+	0.000e+00	0.000e+00	-63.526	-64.103	-0.577	(0)
NiN03+	0.000e+00	0.000e+00	-63.671	-64.248	-0.577	(0)
CoN03+	0.000e+00	0.000e+00	-64.421	-64.998	-0.577	(0)
ZnN03+	0.000e+00	0.000e+00	-65.346	-65.923	-0.577	(0)
CdN03+	0.000e+00	0.000e+00	-67.888	-68.466	-0.577	(0)
PbN03+	0.000e+00	0.000e+00	-68.455	-69.032	-0.577	(0)
CuN03+	0.000e+00	0.000e+00	-68.671	-69.249	-0.577	(0)
FeN03+2	0.000e+00	0.000e+00	-71.438	-73.747	-2.310	(0)
HgN03+	0.000e+00	0.000e+00	-86.522	-87.100	-0.577	(0)
Mn(N03)2	0.000e+00	0.000e+00	-123.711	-123.711	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-124.701	-124.701	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-126.646	-126.646	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-128.794	-128.794	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-128.827	-128.827	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-130.170	-130.170	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-147.492	-147.492	0.000	(0)
Na	8.846e-01					
Na+	7.681e-01	6.501e-01	-0.115	-0.187	-0.072	(0)
NaS04-	1.165e-01	7.499e-02	-0.934	-1.125	-0.191	(0)
NaHP04-	2.688e-05	1.730e-05	-4.571	-4.762	-0.191	(0)
Ni	3.283e-04					
NiCl+	1.714e-04	4.535e-05	-3.766	-4.343	-0.577	(0)
NiS04	9.634e-05	9.634e-05	-4.016	-4.016	0.000	(0)
Ni+2	4.497e-05	2.308e-05	-4.347	-4.637	-0.290	(0)
Ni(S04)2-2	1.451e-05	7.112e-08	-4.838	-7.148	-2.310	(0)
NiNH3+2	8.733e-07	4.282e-09	-6.059	-8.368	-2.310	(0)
NiCl2	1.793e-07	1.793e-07	-6.747	-6.747	0.000	(0)
NiOH+	5.346e-10	1.415e-10	-9.272	-9.849	-0.577	(0)
Ni(NH3)2+2	3.856e-11	1.891e-13	-10.414	-12.723	-2.310	(0)
Ni(OH)2	9.656e-15	9.656e-15	-14.015	-14.015	0.000	(0)
Ni(OH)3-	2.360e-20	6.246e-21	-19.627	-20.204	-0.577	(0)
NiSe04	3.958e-32	3.958e-32	-31.403	-31.403	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-63.671	-64.248	-0.577	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-60.538	-60.409	0.130	(0)
P	2.635e-03					
MgH2P04+	1.353e-03	8.712e-04	-2.869	-3.060	-0.191	(0)
H2P04-	9.183e-04	5.911e-04	-3.037	-3.228	-0.191	(0)
CaH2P04+	1.457e-04	9.378e-05	-3.837	-4.028	-0.191	(0)
FeH2P04+	1.155e-04	7.436e-05	-3.937	-4.129	-0.191	(0)
MgHP04	4.778e-05	4.778e-05	-4.321	-4.321	0.000	(0)
NaHP04-	2.688e-05	1.730e-05	-4.571	-4.762	-0.191	(0)
HP04-2	1.570e-05	2.459e-06	-4.804	-5.609	-0.805	(0)
CaHP04	7.966e-06	7.966e-06	-5.099	-5.099	0.000	(0)
FeHP04	2.498e-06	2.498e-06	-5.602	-5.602	0.000	(0)
H3P04	1.193e-06	1.193e-06	-5.923	-5.923	0.000	(0)
KHP04-	3.608e-07	2.322e-07	-6.443	-6.634	-0.191	(0)
CoHP04	1.609e-08	1.609e-08	-7.794	-7.794	0.000	(0)
CaP04-	2.013e-09	1.296e-09	-8.696	-8.888	-0.191	(0)
MgP04-	1.367e-10	8.800e-11	-9.864	-10.055	-0.191	(0)
FeHP04+	5.155e-11	3.318e-11	-10.288	-10.479	-0.191	(0)
P04-3	2.858e-13	6.373e-14	-12.544	-13.196	-0.652	(0)

FeH2PO4+2	8.886e-14	1.525e-14	-13.051	-13.817	-0.765	(0)
Pb	1.669e-07					
PbCl4-2	1.284e-07	6.297e-10	-6.891	-9.201	-2.310	(0)
Pb(SO4)2-2	1.829e-08	8.967e-11	-7.738	-10.047	-2.310	(0)
PbCl3-	7.113e-09	1.882e-09	-8.148	-8.725	-0.577	(0)
PbCl+	6.466e-09	1.711e-09	-8.189	-8.767	-0.577	(0)
PbCl2	5.828e-09	5.828e-09	-8.235	-8.235	0.000	(0)
PbSO4	6.891e-10	6.891e-10	-9.162	-9.162	0.000	(0)
Pb+2	1.269e-10	6.515e-11	-9.896	-10.186	-0.290	(0)
PbOH+	4.000e-13	1.058e-13	-12.398	-12.975	-0.577	(0)
Pb2OH+3	1.718e-17	1.093e-22	-16.765	-21.961	-5.196	(0)
Pb(OH)2	2.165e-18	2.165e-18	-17.665	-17.665	0.000	(0)
Pb(OH)3-	5.292e-24	1.400e-24	-23.276	-23.854	-0.577	(0)
Pb(OH)4-2	4.524e-29	2.218e-31	-28.344	-30.654	-2.310	(0)
Pb4(OH)4+4	3.362e-33	0.000e+00	-32.473	-41.712	-9.238	(0)
Pb3(OH)4+2	6.603e-34	3.238e-36	-33.180	-35.490	-2.310	(0)
Pb(HS)2	0.000e+00	0.000e+00	-47.222	-47.222	0.000	(0)
PbNO3+	0.000e+00	0.000e+00	-68.455	-69.032	-0.577	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-71.498	-72.075	-0.577	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-128.794	-128.794	0.000	(0)
S(-2)	1.274e-24					
H2S	1.245e-24	1.245e-24	-23.905	-23.905	0.000	(0)
HS-	2.657e-26	7.031e-27	-25.576	-26.153	-0.577	(0)
CdHS+	2.680e-27	7.092e-28	-26.572	-27.149	-0.577	(0)
S5-2	3.359e-29	1.647e-31	-28.474	-30.783	-2.310	(0)
S6-2	1.258e-29	6.170e-32	-28.900	-31.210	-2.310	(0)
S4-2	8.441e-30	4.139e-32	-29.074	-31.383	-2.310	(0)
S3-2	1.299e-30	6.369e-33	-29.886	-32.196	-2.310	(0)
S2-2	1.223e-31	5.997e-34	-30.913	-33.222	-2.310	(0)
S-2	1.145e-38	1.793e-39	-37.941	-38.746	-0.805	(0)
Hg(HS)2	0.000e+00	0.000e+00	-40.639	-40.639	0.000	(0)
HgHS2-	0.000e+00	0.000e+00	-41.632	-42.209	-0.577	(0)
HgS2-2	0.000e+00	0.000e+00	-43.783	-46.093	-2.310	(0)
Zn(HS)2	0.000e+00	0.000e+00	-45.808	-45.808	0.000	(0)
Cd(HS)2	0.000e+00	0.000e+00	-46.098	-46.098	0.000	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-46.417	-46.994	-0.577	(0)
Fe(HS)2	0.000e+00	0.000e+00	-46.913	-46.913	0.000	(0)
Pb(HS)2	0.000e+00	0.000e+00	-47.222	-47.222	0.000	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-47.666	-48.208	-0.542	(0)
CuS4S5-3	0.000e+00	0.000e+00	-48.435	-48.938	-0.502	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-61.729	-62.307	-0.577	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-68.104	-68.681	-0.577	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-69.774	-70.351	-0.577	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-70.452	-71.029	-0.577	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-71.498	-72.075	-0.577	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-71.528	-73.837	-2.310	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-91.999	-94.308	-2.310	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-93.985	-96.294	-2.310	(0)
S(6)	3.280e-01					
MgSO4	1.252e-01	1.252e-01	-0.902	-0.902	0.000	(0)
NaSO4-	1.165e-01	7.499e-02	-0.934	-1.125	-0.191	(0)
SO4-2	4.208e-02	2.160e-02	-1.376	-1.666	-0.290	(0)
CaSO4	3.602e-02	3.602e-02	-1.444	-1.444	0.000	(0)
KS04-	3.139e-03	2.021e-03	-2.503	-2.695	-0.191	(0)
NH4SO4-	2.313e-03	1.455e-03	-2.636	-2.837	-0.201	(0)
FeSO4	1.406e-03	1.406e-03	-2.852	-2.852	0.000	(0)
AlSO4+	5.192e-04	3.163e-04	-3.285	-3.500	-0.215	(0)
MnSO4	1.872e-04	1.872e-04	-3.728	-3.728	0.000	(0)
Al(SO4)2-	1.312e-04	7.994e-05	-3.882	-4.097	-0.215	(0)
NiSO4	9.634e-05	9.634e-05	-4.016	-4.016	0.000	(0)
Zn(SO4)2-2	8.626e-05	4.229e-07	-4.064	-6.374	-2.310	(0)
HSO4-	4.603e-05	2.803e-05	-4.337	-4.552	-0.215	(0)
CoSO4	2.711e-05	2.711e-05	-4.567	-4.567	0.000	(0)
Ni(SO4)2-2	1.451e-05	7.112e-08	-4.838	-7.148	-2.310	(0)
ZnSO4	2.173e-06	2.173e-06	-5.663	-5.663	0.000	(0)
Cd(SO4)2-2	2.979e-07	1.460e-09	-6.526	-8.836	-2.310	(0)
Pb(SO4)2-2	1.829e-08	8.967e-11	-7.738	-10.047	-2.310	(0)
CdSO4	4.779e-09	4.779e-09	-8.321	-8.321	0.000	(0)

CuSO4	8.451e-10	8.451e-10	-9.073	-9.073	0.000	(0)
PbSO4	6.891e-10	6.891e-10	-9.162	-9.162	0.000	(0)
Fe(SO4)2-	5.708e-13	1.511e-13	-12.243	-12.821	-0.577	(0)
FeSO4+	5.038e-13	3.169e-13	-12.298	-12.499	-0.201	(0)
HgSO4	1.251e-26	1.251e-26	-25.903	-25.903	0.000	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-50.360	-50.938	-0.577	(0)
Se(-2)	3.504e-06					
HSe-	3.401e-06	9.001e-07	-5.468	-6.046	-0.577	(0)
H2Se	1.028e-07	1.028e-07	-6.988	-6.988	0.000	(0)
MnSe	1.265e-11	1.265e-11	-10.898	-10.898	0.000	(0)
Se-2	9.407e-15	4.612e-17	-14.027	-16.336	-2.310	(0)
Se(4)	6.000e-11					
HSeO3-	5.908e-11	1.563e-11	-10.229	-10.806	-0.577	(0)
SeO3-2	8.239e-13	4.040e-15	-12.084	-14.394	-2.310	(0)
H2SeO3	9.660e-14	9.660e-14	-13.015	-13.015	0.000	(0)
FeHSeO3+2	1.102e-20	5.403e-23	-19.958	-22.267	-2.310	(0)
Cd(SeO3)2-2	2.870e-30	1.407e-32	-29.542	-31.852	-2.310	(0)
Se(6)	7.826e-30					
SeO4-2	7.714e-30	3.959e-30	-29.113	-29.402	-0.290	(0)
MnSeO4	5.044e-32	5.044e-32	-31.297	-31.297	0.000	(0)
NiSeO4	3.958e-32	3.958e-32	-31.403	-31.403	0.000	(0)
CoSeO4	1.209e-32	1.209e-32	-31.917	-31.917	0.000	(0)
HSeO4-	9.906e-33	2.621e-33	-32.004	-32.581	-0.577	(0)
ZnSeO4	2.918e-34	2.918e-34	-33.535	-33.535	0.000	(0)
CdSeO4	7.300e-37	7.300e-37	-36.137	-36.137	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-60.622	-62.931	-2.310	(0)
Zn	9.415e-05					
Zn(SO4)2-2	8.626e-05	4.229e-07	-4.064	-6.374	-2.310	(0)
ZnSO4	2.173e-06	2.173e-06	-5.663	-5.663	0.000	(0)
ZnCl+	1.535e-06	9.011e-07	-5.814	-6.045	-0.231	(0)
ZnCl4-2	1.358e-06	2.127e-07	-5.867	-6.672	-0.805	(0)
ZnCl3-	9.638e-07	5.657e-07	-6.016	-6.247	-0.231	(0)
ZnCl2	9.324e-07	9.324e-07	-6.030	-6.030	0.000	(0)
Zn+2	9.273e-07	4.759e-07	-6.033	-6.322	-0.290	(0)
ZnOHCl	7.860e-10	7.860e-10	-9.105	-9.105	0.000	(0)
ZnOH+	8.565e-11	2.267e-11	-10.067	-10.645	-0.577	(0)
Zn(OH)2	3.156e-15	3.156e-15	-14.501	-14.501	0.000	(0)
Zn(OH)3-	3.866e-20	1.023e-20	-19.413	-19.990	-0.577	(0)
Zn(OH)4-2	5.373e-26	2.634e-28	-25.270	-27.579	-2.310	(0)
ZnSeO4	2.918e-34	2.918e-34	-33.535	-33.535	0.000	(0)
Zn(HS)2	0.000e+00	0.000e+00	-45.808	-45.808	0.000	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-46.417	-46.994	-0.577	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-60.622	-62.931	-2.310	(0)
ZnNO3+	0.000e+00	0.000e+00	-65.346	-65.923	-0.577	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-68.104	-68.681	-0.577	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-71.528	-73.837	-2.310	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-93.985	-96.294	-2.310	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-126.646	-126.646	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-149.01	-142.74	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-27.47	-22.94	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-34.75	-22.95	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-217.95	-200.02	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.42	-20.31	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-34.26	-33.81	0.45	(NH4)2SeO4
Al(OH)3(am)	-2.30	8.77	11.06	Al(OH)3
Al2O3	-2.69	17.58	20.27	Al2O3
Al4(OH)10SO4	1.08	23.78	22.70	Al4(OH)10SO4
AlOHSO4	0.71	-2.52	-3.23	AlOHSO4
Alunite	7.57	6.67	-0.90	KAl3(SO4)2(OH)6
Anglesite	-4.03	-11.85	-7.82	PbSO4
Anhydrite	0.56	-3.79	-4.34	CaSO4
Anilite	-4.86	-37.18	-32.31	Cu0.25Cu1.5S
Antlerite	-20.46	-11.67	8.79	Cu3(OH)4SO4

Atacamite	-12.79	-5.18	7.61	Cu ₂ (OH) ₃ Cl
Bianchite	-6.32	-8.09	-1.76	ZnSO ₄ ·6H ₂ O
Birnessite	-24.99	-6.90	18.09	MnO ₂
Bixbyite	-26.82	-27.17	-0.35	Mn ₂ O ₃
BlaubleiI	-7.73	-31.89	-24.16	Cu _{0.9} Cu _{0.2} S
BlaubleiII	-7.05	-34.33	-27.28	Cu _{0.6} Cu _{0.8} S
Boehmite	-0.08	8.78	8.86	Al ₂ O ₃
Brochantite	-27.51	-11.81	15.71	Cu ₄ (OH) ₆ SO ₄
Brucite	-8.98	8.13	17.12	Mg(OH) ₂
Bunsenite	-7.69	5.00	12.68	NiO
Ca ₃ (PO ₄) ₂ (beta)	-3.71	-32.75	-29.05	Ca ₃ (PO ₄) ₂
Ca ₄ H(PO ₄) ₃ ·3H ₂ O	-5.86	-52.94	-47.08	Ca ₄ H(PO ₄) ₃ ·3H ₂ O
CaHP04	-0.79	-20.14	-19.35	CaHP04
CaHP04:2H2O	-1.12	-20.17	-19.05	CaHP04:2H2O
Calomel	-8.19	-26.32	-18.13	Hg ₂ Cl ₂
CaSeO ₃ ·2H ₂ O	-11.00	-8.14	2.86	CaSeO ₃ ·2H ₂ O
CaSeO ₄ ·2H ₂ O	-28.56	-31.56	-3.00	CaSeO ₄ ·2H ₂ O
Cd(OH) ₂	-13.26	0.61	13.87	Cd(OH) ₂
Cd(OH) ₂ (am)	-13.33	0.61	13.94	Cd(OH) ₂
Cd ₃ (OH) ₂ (SO ₄) ₂	-27.44	-20.73	6.71	Cd ₃ (OH) ₂ (SO ₄) ₂
Cd ₃ (OH) ₄ SO ₄	-32.01	-9.45	22.56	Cd ₃ (OH) ₄ SO ₄
Cd ₃ (PO ₄) ₂	-20.80	-53.40	-32.60	Cd ₃ (PO ₄) ₂
Cd ₄ (OH) ₆ SO ₄	-37.24	-8.84	28.40	Cd ₄ (OH) ₆ SO ₄
CdCl ₂	-8.61	-9.22	-0.61	CdCl ₂
CdCl ₂ ·1H ₂ O	-7.57	-9.24	-1.68	CdCl ₂ ·1H ₂ O
CdCl ₂ ·2.5H ₂ O	-7.33	-9.27	-1.93	CdCl ₂ ·2.5H ₂ O
Cdmetal(alpha)	-26.43	-12.74	13.69	Cd
Cdmetal(gamma)	-26.54	-12.74	13.80	Cd
CdOHCl	-7.92	-4.31	3.61	CdOHCl
CdSe	10.16	-10.23	-20.38	CdSe
CdSeO ₄ ·2H ₂ O	-36.59	-38.44	-1.85	CdSeO ₄ ·2H ₂ O
CdSO ₄	-10.62	-10.67	-0.05	CdSO ₄
CdSO ₄ ·1H ₂ O	-9.04	-10.69	-1.65	CdSO ₄ ·1H ₂ O
CdSO ₄ ·2.67H ₂ O	-8.88	-10.71	-1.83	CdSO ₄ ·2.67H ₂ O
Chalcanthite	-8.84	-11.49	-2.65	CuSO ₄ ·5H ₂ O
Chalcocite	-3.89	-39.21	-35.32	Cu ₂ S
Chalcopyrite	-20.34	-55.96	-35.62	CuFeS ₂
Cinnabar	-7.88	-54.18	-46.30	HgS
Clausthalite	15.98	-11.41	-27.39	PbSe
Co(OH) ₂	-8.66	4.43	13.09	Co(OH) ₂
Co(OH) ₃	-19.21	-21.30	-2.09	Co(OH) ₃
Co ₃ (PO ₄) ₂	-7.26	-41.95	-34.69	Co ₃ (PO ₄) ₂
Co ₃ O ₄	-27.86	-38.10	-10.24	Co ₃ O ₄
CoCl ₂	-13.86	-5.41	8.46	CoCl ₂
CoCl ₂ ·6H ₂ O	-8.02	-5.51	2.52	CoCl ₂ ·6H ₂ O
CoFe ₂ O ₄	6.84	3.69	-3.15	CoFe ₂ O ₄
CoHP04	-4.15	-23.21	-19.06	CoHP04
CoO	-9.39	4.45	13.84	CoO
CoS(alpha)	-19.08	-26.52	-7.44	CoS
CoS(beta)	-15.45	-26.52	-11.07	CoS
CoSe	9.79	-6.41	-16.20	CoSe
CoSeO ₃	-12.49	-11.17	1.32	CoSeO ₃
CoSeO ₄ ·6H ₂ O	-33.16	-34.69	-1.53	CoSeO ₄ ·6H ₂ O
CoSO ₄	-9.84	-6.85	2.99	CoSO ₄
CoSO ₄ ·6H ₂ O	-4.48	-6.95	-2.48	CoSO ₄ ·6H ₂ O
Cotunnite	-5.56	-10.41	-4.84	PbCl ₂
Covellite	-8.54	-31.08	-22.53	CuS
Cu(OH) ₂	-8.94	-0.13	8.81	Cu(OH) ₂
Cu ₂ (OH) ₃ NO ₃	-74.51	-65.08	9.42	Cu ₂ (OH) ₃ NO ₃
Cu ₂ Se(alpha)	27.21	-19.10	-46.31	Cu ₂ Se
Cu ₂ SO ₄	-17.64	-19.55	-1.90	Cu ₂ SO ₄
Cu ₃ (PO ₄) ₂	-18.78	-55.63	-36.85	Cu ₃ (PO ₄) ₂
Cu ₃ (PO ₄) ₂ ·3H ₂ O	-20.56	-55.68	-35.12	Cu ₃ (PO ₄) ₂ ·3H ₂ O
Cu ₃ Se ₂	34.23	-30.07	-64.30	Cu ₃ Se ₂
Cumetal	-1.88	-10.81	-8.93	Cu
CuOCuSO ₄	-22.16	-11.53	10.63	CuOCuSO ₄
Cupricferrite	-7.36	-0.87	6.49	CuFe ₂ O ₄
Cuprite	-7.14	-8.25	-1.11	Cu ₂ O

Cuprousferrite	4.38	-4.50	-8.88	CuFeO2
CuSe	22.42	-10.97	-33.39	CuSe
CuSe2	25.25	-8.46	-33.70	CuSe2
CuSeO3:2H2O	-16.36	-15.76	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-36.79	-39.23	-2.44	CuSeO4:5H2O
CuSO4	-14.53	-11.41	3.11	CuSO4
Diaspore	1.66	8.78	7.12	AlOOH
Djurleite	-4.28	-38.67	-34.40	Cu0.066Cu1.868S
Epsomite	-1.11	-3.26	-2.15	MgSO4:7H2O
Fe(OH)2	-7.51	6.06	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.16	-1.88	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-17.95	-16.40	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-27.00	-47.63	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-31.49	-34.64	-3.16	Fe2(SO4)3
Fe3(OH)8	-14.96	5.26	20.22	Fe3(OH)8
Ferrihydrite	-3.77	-0.40	3.37	Fe(OH)3
Ferroselite	16.44	-2.27	-18.71	FeSe2
FeS(ppt)	-21.96	-24.89	-2.92	FeS
FeSe	6.23	-4.78	-11.00	FeSe
Galena	-17.35	-31.51	-14.16	PbS
Gibbsite	0.25	8.77	8.52	Al(OH)3
Goethite	-1.02	-0.38	0.64	FeOOH
Goslarite	-6.06	-8.10	-2.05	ZnSO4:7H2O
Greenockite	-15.84	-30.33	-14.49	CdS
Greigite	-73.48	-118.52	-45.03	Fe3S4
Gypsum	0.79	-3.82	-4.61	CaSO4:2H2O
H-Jarosite	-12.25	-23.80	-11.55	(H3O)Fe3(SO4)2(OH)6
H2S(g)	-22.97	-30.98	-8.01	H2S
H2Se(g)	-5.95	-10.87	-4.92	H2Se
Halite	-1.89	-0.30	1.59	NaCl
Hausmannite	-32.64	29.39	62.03	Mn3O4
Hematite	0.36	-0.75	-1.11	Fe2O3
Hercynite	0.01	23.66	23.64	FeAl2O4
Hg(g)	-6.99	-14.92	-7.93	Hg
Hg(OH)2	-19.74	-23.23	-3.50	Hg(OH)2
Hg2(g)	-14.74	-29.83	-15.09	Hg2
Hg2(OH)2	-21.74	-16.48	5.26	Hg2(OH)2
Hg2HPO4	-19.34	-44.12	-24.77	Hg2HPO4
Hg2S	-35.58	-47.43	-11.84	Hg2S
Hg2SeO3	-27.42	-32.08	-4.66	Hg2SeO3
Hg2SO4	-21.62	-27.76	-6.14	Hg2SO4
HgCl(g)	-33.04	-13.16	19.88	HgCl
HgCl2	-11.55	-33.07	-21.52	HgCl2
Hgmetal(l)	-1.27	-14.92	-13.65	Hg
HgSe	21.62	-34.07	-55.69	HgSe
HgSeO3	-26.40	-38.83	-12.43	HgSeO3
HgSO4	-25.06	-34.51	-9.45	HgSO4
Hinsdalite	-10.67	-13.17	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-1.05	-45.38	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-22.92	-85.71	-62.79	Pb5(PO4)3OH
K-Alum	-5.81	-11.06	-5.24	KAl(SO4)2:12H2O
K-Jarosite	-6.34	-20.83	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-32.41	-33.14	-0.73	K2SeO4
Langite	-29.71	-11.82	17.88	Cu4(OH)6SO4:H2O
Larnakite	-12.02	-12.41	-0.38	PbO:PbSO4
Laurionite	-6.11	-5.49	0.62	PbOHCl
Lepidocrocite	-1.76	-0.38	1.37	FeOOH
Lime	-25.65	7.51	33.16	CaO
Litharge	-13.40	-0.55	12.85	PbO
Mackinawite	-21.29	-24.89	-3.60	FeS
Maghemite	-7.14	-0.75	6.39	Fe2O3
Magnesioferrite	-10.13	7.40	17.52	Fe2MgO4
Magnetite	1.42	5.32	3.90	Fe3O4
Manganite	-13.32	12.02	25.34	MnOOH
Massicot	-13.61	-0.55	13.05	PbO
Melanothallite	-16.37	-9.97	6.41	CuCl2
Melanterite	-3.08	-5.34	-2.26	FeSO4:7H2O
Metacinnabar	-8.48	-54.18	-45.70	HgS

Mg(OH)2(active)	-10.66	8.13	18.79	Mg(OH)2
Mg3(P04)2	-7.56	-30.84	-23.28	Mg3(P04)2
MgHP04:3H2O	-1.38	-19.55	-18.18	MgHP04:3H2O
MgSe03:6H2O	-10.61	-7.56	3.04	MgSe03:6H2O
MgSe04:6H2O	-29.78	-30.98	-1.20	MgSe04:6H2O
Minium	-62.82	11.70	74.53	Pb304
Mirabilite	-0.90	-2.20	-1.30	Na2S04:10H2O
Mn2(S04)3	-55.74	-61.06	-5.32	Mn2(S04)3
Mn3(P04)2	-15.42	-39.27	-23.85	Mn3(P04)2
MnCl2:4H2O	-7.32	-4.58	2.74	MnCl2:4H2O
MnHP04	3.09	-22.31	-25.40	MnHP04
MnS(grn)	-25.87	-25.62	0.25	MnS
MnS(pnk)	-28.96	-25.62	3.34	MnS
MnSe	-9.25	-5.51	3.73	MnSe
MnSe03	-11.40	-10.27	1.13	MnSe03
MnSe03:2H2O	-11.27	-10.31	0.96	MnSe03:2H2O
MnSe04:5H2O	-31.73	-33.78	-2.05	MnSe04:5H2O
MnS04	-8.69	-5.96	2.74	MnS04
Monteponite	-14.72	0.63	15.35	Cd0
Montroydite	-19.67	-23.22	-3.55	Hg0
Morenosite	-4.24	-6.42	-2.17	NiS04:7H2O
Na-Jarosite	-8.30	-19.14	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-16.74	-6.44	10.30	Na2Se03:5H2O
Na2Se04	-31.06	-29.78	1.28	Na2Se04
Nantokite	-2.22	-9.05	-6.83	CuCl
Ni(OH)2	-8.04	4.98	13.02	Ni(OH)2
Ni3(P04)2	-9.00	-40.30	-31.30	Ni3(P04)2
Ni4(OH)6S04	-23.37	8.63	32.00	Ni4(OH)6S04
NiS(alpha)	-20.37	-25.97	-5.60	NiS
NiS(beta)	-14.87	-25.97	-11.10	NiS
NiS(gamma)	-13.17	-25.97	-12.80	NiS
NiSe	11.84	-5.86	-17.70	NiSe
NiSe03:2H2O	-13.54	-10.65	2.89	NiSe03:2H2O
NiSe04:6H2O	-32.62	-34.14	-1.52	NiSe04:6H2O
Nsutite	-24.40	-6.90	17.50	Mn02
O2(g)	-57.72	26.73	84.45	O2
Pb(OH)2	-8.86	-0.57	8.29	Pb(OH)2
Pb2(OH)3Cl	-14.85	-6.06	8.79	Pb2(OH)3Cl
Pb20(OH)2	-27.31	-1.12	26.19	Pb20(OH)2
Pb203	-48.78	12.26	61.04	Pb203
Pb3(P04)2	-13.42	-56.95	-43.53	Pb3(P04)2
Pb302S04	-23.83	-12.96	10.87	Pb302S04
Pb4(OH)6S04	-34.66	-13.56	21.10	Pb4(OH)6S04
Pb403S04	-35.72	-13.51	22.20	Pb403S04
PbHP04	-4.40	-28.21	-23.81	PbHP04
Pbmetal	-18.16	-13.92	4.24	Pb
Pb0:0.3H2O	-13.54	-0.56	12.98	Pb0:0.33H2O
PbSe04	-32.71	-39.59	-6.88	PbSe04
Periclase	-13.80	8.15	21.94	Mg0
Plattnerite	-37.49	12.81	50.31	Pb02
Plumbgummite	3.26	-29.53	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-15.62	7.49	23.11	Ca(OH)2
Pyrite	-23.85	-42.48	-18.63	FeS2
Pyrochroite	-10.10	5.32	15.43	Mn(OH)2
Pyrolusite	-23.32	18.71	42.03	Mn02
Pyromorphite	-6.20	-90.63	-84.43	Pb5(P04)3Cl
Retgersite	-4.35	-6.40	-2.05	NiS04:6H2O
Semetal(am)	9.65	2.51	-7.14	Se
Semetal(hex	10.26	2.51	-7.75	Se
Se02	-15.74	-15.61	0.12	Se02
Se03	-60.43	-39.03	21.39	Se03
Sphalerite	-16.13	-27.65	-11.52	ZnS
Spinel	-12.04	25.73	37.77	MgAl204
Strengite	-1.67	-28.05	-26.38	FeP04:2H2O
Sulfur	-15.49	-17.59	-2.11	S
Tenorite	-7.91	-0.11	7.80	Cu0
Thenardite	-2.38	-2.04	0.34	Na2S04
Tsumebite	-19.15	-28.94	-9.79	Pb2CuP04(OH)3:3H2O

Vivianite	-1.20	-37.20	-36.00	Fe3(P04)2:8H20
Wurtzite	-18.65	-27.65	-9.00	ZnS
Zincite	-8.24	3.31	11.55	Zn0
Zincosite	-12.11	-7.99	4.13	ZnS04
Zn(N03)2:6H20	-129.70	-126.44	3.26	Zn(N03)2:6H20
Zn(OH)2	-8.91	3.29	12.20	Zn(OH)2
Zn(OH)2(am)	-9.37	3.29	12.67	Zn(OH)2
Zn(OH)2(beta)	-8.66	3.29	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-8.44	3.29	11.73	Zn(OH)2
Zn(OH)2(gamma)	-8.44	3.29	11.73	Zn(OH)2
Zn2(OH)2S04	-12.19	-4.69	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-13.52	1.67	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H20	-10.00	-45.42	-35.42	Zn3(P04)2:4H20
Zn30(S04)2	-32.19	-12.67	19.53	Zn30(S04)2
Zn4(OH)6S04	-26.51	1.89	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-31.87	6.63	38.50	Zn5(OH)8Cl2
ZnCl2	-13.76	-6.54	7.22	ZnCl2
Znmetal	-36.21	-10.06	26.15	Zn
Zn0(active)	-8.09	3.31	11.40	Zn0
ZnS(am)	-18.56	-27.65	-9.09	ZnS
ZnSe	6.92	-7.54	-14.46	ZnSe
ZnSe04:6H20	-34.30	-35.82	-1.52	ZnSe04:6H20
ZnS04:1H20	-7.47	-8.00	-0.53	ZnS04:1H20

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 4.

SOLUTION 2 #Groundwater worst case maximum values

temp 21
pH 5.05
pe 1
redox pe
units mg/l
density 1
Al 5.21
Alkalinity 0
As 0
Ba 0
Be 0
B 0
Cd 0.04
Co 24.2
Cr 0
Cu 9.29
Fe 937
Pb 0.01
Mn 171
Mo 0
V 0
Zn 1.78
Se 0.08
Ni 5.57
N 60
P 23.6
Ca 590
Mg 1340
Na 5880
K 216
Cl 9420
S(6) 9110

```

Hg      0.0004
water  1 # kg
MIX 1
  1    0.03
  2    0.97
REACTION 2
H2O -1
6
END #Time-step 2

```

Beginning of initial solution calculations.

Initial solution 2.

-----Solution composition-----

Elements	Molality	Moles
Al	1.986e-04	1.986e-04
Ca	1.514e-02	1.514e-02
Cd	3.660e-07	3.660e-07
Cl	2.733e-01	2.733e-01
Co	4.224e-04	4.224e-04
Cu	1.504e-04	1.504e-04
Fe	1.726e-02	1.726e-02
Hg	2.051e-09	2.051e-09
K	5.682e-03	5.682e-03
Mg	5.671e-02	5.671e-02
Mn	3.202e-03	3.202e-03
N	4.406e-03	4.406e-03
Na	2.631e-01	2.631e-01
Ni	9.762e-05	9.762e-05
P	7.837e-04	7.837e-04
Pb	4.964e-08	4.964e-08
S(6)	9.754e-02	9.754e-02
Se	1.042e-06	1.042e-06
Zn	2.800e-05	2.800e-05

-----Description of solution-----

```

pH = 5.050
pe = 1.000
Activity of water = 0.988
Ionic strength (mol/kgw) = 4.862e-01
Mass of water (kg) = 1.000e+00
Total alkalinity (eq/kg) = 1.381e-05
Total carbon (mol/kg) = 0.000e+00
Total CO2 (mol/kg) = 0.000e+00
Temperature (°C) = 21.00
Electrical balance (eq) = -9.552e-03
Percent error, 100*(Cat-|An|)/(Cat+|An|) = -1.26
Iterations = 14
Total H = 1.110329e+02
Total O = 5.590014e+01

```

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.214e-05	8.913e-06	-4.916	-5.050	-0.134	0.00
OH-	1.292e-09	8.222e-10	-8.889	-9.085	-0.196	(0)
H2O	5.551e+01	9.883e-01	1.744	-0.005	0.000	18.05
Al	1.986e-04					
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Al+3	1.839e-05	1.139e-06	-4.735	-5.943	-1.208	(0)

	AlOH+2	4.197e-06	9.786e-07	-5.377	-6.009	-0.632	(0)
	Al(OH)2+	1.624e-06	1.128e-06	-5.790	-5.948	-0.158	(0)
	Al(OH)3	2.514e-08	2.514e-08	-7.600	-7.600	0.000	(0)
	Al(OH)4-	2.040e-09	1.366e-09	-8.690	-8.864	-0.174	(0)
Ca	1.514e-02						
	Ca+2	8.161e-03	2.370e-03	-2.088	-2.625	-0.537	(0)
	CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
	CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
	CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
	CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
	CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
	CaOH+	5.236e-11	3.715e-11	-10.281	-10.430	-0.149	(0)
	Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
	CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
Cd	3.660e-07						
	CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
	CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
	Cd(SO4)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
	CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
	Cd+2	1.502e-08	4.363e-09	-7.823	-8.360	-0.537	(0)
	CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
	CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
	CdOH+	6.462e-14	2.865e-14	-13.190	-13.543	-0.353	(0)
	Cd2OH+3	9.945e-19	6.582e-22	-18.002	-21.182	-3.179	(0)
	Cd(OH)2	2.726e-19	2.726e-19	-18.564	-18.564	0.000	(0)
	Cd(OH)3-	4.195e-26	1.860e-26	-25.377	-25.730	-0.353	(0)
	Cd(OH)4-2	8.799e-35	3.400e-36	-34.056	-35.469	-1.413	(0)
	Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
	CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
	CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cl	2.733e-01						
	Cl-	2.729e-01	2.003e-01	-0.564	-0.698	-0.134	(0)
	CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
	MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
	CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
	CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
	NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
	MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
	CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
	ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
	MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
	ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
	CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
	CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
	ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
	CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
	PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
	ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
	NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
	PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
	ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
	PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
	PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
	CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
	CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
	CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
	FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
	CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
	HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
	FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
	HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
	HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
	FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
	CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
	HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
	HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
	CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)

Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(2)	4.224e-04					
Co+2	3.644e-04	1.408e-05	-3.438	-4.851	-1.413	(0)
CoS04	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CoOH+	7.075e-10	3.137e-10	-9.150	-9.504	-0.353	(0)
Co2OH+3	3.344e-13	2.213e-16	-12.476	-15.655	-3.179	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Co(OH)2	2.782e-14	2.782e-14	-13.556	-13.556	0.000	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Co(OH)3-	1.398e-21	6.199e-22	-20.854	-21.208	-0.353	(0)
CoOOH-	8.505e-23	3.771e-23	-22.070	-22.424	-0.353	(0)
Co4(OH)4+4	8.668e-25	1.932e-30	-24.062	-29.714	-5.652	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
Co(OH)4-2	2.839e-30	1.097e-31	-29.547	-30.960	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Co(3)	8.287e-32					
CoOH+2	8.232e-32	3.180e-33	-31.085	-32.498	-1.413	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co+3	9.049e-36	5.605e-37	-35.043	-36.251	-1.208	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
Cu(1)	1.504e-04					
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
Cu+	1.823e-08	8.082e-09	-7.739	-8.092	-0.353	(0)
Cu(2)	1.182e-09					
Cu+2	5.900e-10	1.714e-10	-9.229	-9.766	-0.537	(0)
CuS04	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
CuOH+	7.604e-13	4.972e-13	-12.119	-12.303	-0.185	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
Cu(OH)2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
Cu2(OH)2+2	1.564e-19	6.042e-21	-18.806	-20.219	-1.413	(0)
Cu(OH)3-	6.965e-22	3.088e-22	-21.157	-21.510	-0.353	(0)
Cu(OH)4-2	7.024e-29	2.714e-30	-28.153	-29.566	-1.413	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Fe(2)	1.726e-02					
Fe+2	1.529e-02	5.907e-04	-1.816	-3.229	-1.413	(0)
FeS04	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
FeH2P04+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
FeOH+	2.826e-08	1.934e-08	-7.549	-7.714	-0.165	(0)
Fe(OH)2	1.209e-14	1.209e-14	-13.918	-13.918	0.000	(0)
Fe(OH)3-	6.009e-18	4.111e-18	-17.221	-17.386	-0.165	(0)
Fe(3)	2.087e-10					
Fe(OH)2+	1.957e-10	1.360e-10	-9.708	-9.867	-0.158	(0)
FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
FeOH+2	1.136e-12	2.489e-13	-11.945	-12.604	-0.659	(0)
Fe(OH)3	9.228e-14	9.228e-14	-13.035	-13.035	0.000	(0)
FeS04+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(S04)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)

FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
FeH2P04+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Fe+3	7.010e-15	4.342e-16	-14.154	-15.362	-1.208	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
Fe(OH)4-	2.440e-17	1.696e-17	-16.613	-16.771	-0.158	(0)
Fe2(OH)2+4	1.061e-18	2.365e-24	-17.974	-23.626	-5.652	(0)
Fe3(OH)4+5	3.023e-24	4.459e-33	-23.520	-32.351	-8.831	(0)
FeHSe03+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
FeN03+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
H(0)	1.047e-15					
H2	5.235e-16	5.855e-16	-15.281	-15.232	0.049	(0)
Hg(0)	2.051e-09					
Hg	2.051e-09	2.051e-09	-8.688	-8.688	0.000	(0)
Hg(1)	9.698e-28					
Hg2+2	4.849e-28	1.874e-29	-27.314	-28.727	-1.413	(0)
Hg(2)	4.726e-15					
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Hg(OH)2	1.022e-25	1.143e-25	-24.991	-24.942	0.049	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
HgOH+	1.615e-27	7.162e-28	-26.792	-27.145	-0.353	(0)
Hg+2	4.674e-28	1.806e-29	-27.330	-28.743	-1.413	(0)
HgS04	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Hg(OH)3-	3.623e-35	1.606e-35	-34.441	-34.794	-0.353	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
HgN03+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Hg(N03)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
K	5.682e-03					
K+	5.178e-03	3.801e-03	-2.286	-2.420	-0.134	(0)
KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
Mg	5.671e-02					
Mg+2	3.360e-02	9.758e-03	-1.474	-2.011	-0.537	(0)
MgS04	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
MgH2P04+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
MgHP04	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
MgOH+	4.148e-09	2.990e-09	-8.382	-8.524	-0.142	(0)
MgP04-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
Mn(2)	3.202e-03					
Mn+2	2.899e-03	1.120e-04	-2.538	-3.951	-1.413	(0)
MnS04	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
MnOH+	3.381e-10	2.313e-10	-9.471	-9.636	-0.165	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Mn(OH)3-	3.538e-24	2.421e-24	-23.451	-23.616	-0.165	(0)
Mn(OH)4-2	3.983e-32	8.727e-33	-31.400	-32.059	-0.659	(0)
MnSe04	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
MnN03+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
Mn(N03)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Mn(3)	4.471e-28					
Mn+3	4.471e-28	2.769e-29	-27.350	-28.558	-1.208	(0)
Mn(6)	0.000e+00					
Mn04-2	0.000e+00	0.000e+00	-79.028	-79.687	-0.659	(0)
Mn(7)	0.000e+00					
Mn04-	0.000e+00	0.000e+00	-88.115	-88.325	-0.210	(0)
N(-3)	4.406e-03					
NH4+	3.919e-03	2.335e-03	-2.407	-2.632	-0.225	(0)
NH4S04-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
NH3	1.123e-07	1.123e-07	-6.950	-6.950	0.000	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)

CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
N(3)	0.000e+00					
N02-	0.000e+00	0.000e+00	-47.968	-48.177	-0.210	(0)
CoN02+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CuN02+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
Cu(N02)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-64.954	-65.088	-0.134	(0)
CaN03+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
MnN03+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
NiN03+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
CoN03+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
ZnN03+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
CdN03+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
PbN03+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
CuN03+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
FeN03+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
HgN03+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Mn(N03)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
Na	2.631e-01					
Na+	2.447e-01	1.796e-01	-0.611	-0.746	-0.134	(0)
NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
Ni	9.762e-05					
Ni+2	4.671e-05	1.357e-05	-4.331	-4.867	-0.537	(0)
NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
Ni(SO4)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
NiOH+	3.238e-10	1.435e-10	-9.490	-9.843	-0.353	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Ni(OH)2	1.692e-14	1.692e-14	-13.772	-13.772	0.000	(0)
Ni(OH)3-	4.261e-20	1.889e-20	-19.371	-19.724	-0.353	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-63.001	-62.952	0.049	(0)
P	7.837e-04					
H2PO4-	4.270e-04	2.967e-04	-3.370	-3.528	-0.158	(0)
MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
MgHPO4	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
HPO4-2	9.473e-06	2.076e-06	-5.024	-5.683	-0.659	(0)
NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)

FeHP04	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
CaHP04	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
H3P04	3.560e-07	3.560e-07	-6.449	-6.449	0.000	(0)
KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
CoHP04	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
CaP04-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
MgP04-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
FeHP04+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
P04-3	1.460e-12	9.045e-14	-11.836	-13.044	-1.208	(0)
FeH2P04+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Pb	4.964e-08					
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
Pb(S04)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
PbS04	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
Pb+2	3.636e-09	1.056e-09	-8.439	-8.976	-0.537	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
PbOH+	6.682e-12	2.963e-12	-11.175	-11.528	-0.353	(0)
Pb(OH)2	1.046e-16	1.046e-16	-15.980	-15.980	0.000	(0)
Pb2OH+3	7.494e-17	4.960e-20	-16.125	-19.305	-3.179	(0)
Pb(OH)3-	2.635e-22	1.168e-22	-21.579	-21.933	-0.353	(0)
Pb(OH)4-2	8.268e-28	3.195e-29	-27.083	-28.496	-1.413	(0)
Pb3(OH)4+2	3.173e-30	1.226e-31	-29.499	-30.912	-1.413	(0)
Pb4(OH)4+4	5.352e-31	1.193e-36	-30.271	-35.923	-5.652	(0)
PbN03+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
Pb(N03)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
S(6)	9.754e-02					
S04-2	4.586e-02	1.332e-02	-1.339	-1.875	-0.537	(0)
MgS04	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
NaS04-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
CaS04	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
FeS04	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
NH4S04-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
MnS04	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
AlS04+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
CoS04	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
NiS04	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
Al(S04)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Zn(S04)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
HS04-	1.536e-05	1.028e-05	-4.814	-4.988	-0.174	(0)
ZnS04	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
Ni(S04)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
Cd(S04)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
Pb(S04)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
CdS04	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
PbS04	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
CuS04	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
FeS04+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(S04)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
HgS04	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Se(-2)	1.042e-06					
HSe-	1.012e-06	4.485e-07	-5.995	-6.348	-0.353	(0)
H2Se	3.047e-08	3.047e-08	-7.516	-7.516	0.000	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Se-2	1.000e-15	3.865e-17	-15.000	-16.413	-1.413	(0)
Se(4)	2.708e-15					
HSe03-	2.690e-15	1.193e-15	-14.570	-14.923	-0.353	(0)
Se03-2	1.341e-17	5.183e-19	-16.872	-18.285	-1.413	(0)
H2Se03	4.383e-18	4.383e-18	-17.358	-17.358	0.000	(0)
FeHSe03+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
Cd(Se03)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
Se(6)	9.467e-35					
Se04-2	9.354e-35	2.717e-35	-34.029	-34.566	-0.537	(0)
MnSe04	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
CoSe04	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)

NiSe04	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
HSe04-	2.413e-38	1.070e-38	-37.617	-37.971	-0.353	(0)
ZnSe04	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
CdSe04	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
Zn(Se04)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn	2.800e-05					
Zn(S04)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
Zn+2	6.051e-06	1.758e-06	-5.218	-5.755	-0.537	(0)
ZnS04	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
ZnOH+	3.259e-10	1.445e-10	-9.487	-9.840	-0.353	(0)
Zn(OH)2	3.473e-14	3.473e-14	-13.459	-13.459	0.000	(0)
Zn(OH)3-	4.384e-19	1.944e-19	-18.358	-18.711	-0.353	(0)
Zn(OH)4-2	2.236e-25	8.641e-27	-24.650	-26.063	-1.413	(0)
ZnSe04	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
ZnN03+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
Zn(Se04)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn(N03)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(N03)2	-161.31	-155.03	6.27	(Co(NH3)5Cl)(N03)2
(Co(NH3)5Cl)Cl2	-30.79	-26.25	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-38.05	-26.26	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(N03)3	-234.94	-217.01	17.93	(Co(NH3)6)(N03)3
(Co(NH3)6)Cl3	-43.95	-23.84	20.11	(Co(NH3)6)Cl3
(NH4)2Se04	-40.28	-39.83	0.45	(NH4)2Se04
Al(OH)3(am)	-1.87	9.19	11.06	Al(OH)3
Al2O3	-1.87	18.40	20.27	Al2O3
Al4(OH)10S04	2.10	24.80	22.70	Al4(OH)10S04
AlOHS04	0.46	-2.77	-3.23	AlOHS04
Alunite	7.17	6.27	-0.90	KAl3(S04)2(OH)6
Anglesite	-3.03	-10.85	-7.82	PbS04
Anhydrite	-0.16	-4.50	-4.34	CaS04
Antlerite	-19.78	-10.99	8.79	Cu3(OH)4S04
Atacamite	-12.71	-5.10	7.61	Cu2(OH)3Cl
Bianchite	-5.90	-7.66	-1.76	ZnS04:6H2O
Birnessite	-25.46	-7.37	18.09	MnO2
Bixbyite	-26.48	-26.83	-0.35	Mn2O3
Boehmite	0.34	9.20	8.86	AlOOH
Brochantite	-26.38	-10.67	15.71	Cu4(OH)6S04
Brucite	-9.04	8.08	17.12	Mg(OH)2
Bunsenite	-7.46	5.23	12.68	NiO
Ca3(P04)2(beta)	-4.91	-33.96	-29.05	Ca3(P04)2
Ca4H(P04)3:3H2O	-7.62	-54.70	-47.08	Ca4H(P04)3:3H2O
CaHP04	-1.37	-20.72	-19.35	CaHP04
CaHP04:2H2O	-1.68	-20.73	-19.05	CaHP04:2H2O
Calomel	-11.99	-30.12	-18.13	Hg2Cl2
CaSe03:2H2O	-15.37	-12.51	2.86	CaSe03:2H2O
CaSe04:2H2O	-34.20	-37.20	-3.00	CaSe04:2H2O
Cd(OH)2	-12.14	1.73	13.87	Cd(OH)2
Cd(OH)2(am)	-12.21	1.73	13.94	Cd(OH)2
Cd3(OH)2(S04)2	-25.45	-18.74	6.71	Cd3(OH)2(S04)2
Cd3(OH)4S04	-29.34	-6.78	22.56	Cd3(OH)4S04
Cd3(P04)2	-18.57	-51.17	-32.60	Cd3(P04)2
Cd4(OH)6S04	-33.45	-5.05	28.40	Cd4(OH)6S04
CdCl2	-9.14	-9.76	-0.61	CdCl2
CdCl2:1H2O	-8.09	-9.76	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-7.84	-9.77	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.05	-10.36	13.69	Cd
Cdmetal(gamma)	-24.16	-10.36	13.80	Cd
CdOHCl	-7.62	-4.01	3.61	CdOHCl

CdSe	10.72	-9.66	-20.38	CdSe
CdSeO4:2H2O	-41.09	-42.94	-1.85	CdSeO4:2H2O
CdSO4	-10.19	-10.24	-0.05	CdSO4
CdSO4:1H2O	-8.59	-10.24	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-8.42	-10.25	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.01	-11.67	-2.65	CuSO4:5H2O
Clausthalite	17.11	-10.27	-27.39	PbSe
Co(OH)2	-7.86	5.24	13.09	Co(OH)2
Co(OH)3	-19.03	-21.12	-2.09	Co(OH)3
Co3(P04)2	-5.95	-40.64	-34.69	Co3(P04)2
Co3O4	-26.74	-36.97	-10.24	Co3O4
CoCl2	-14.71	-6.25	8.46	CoCl2
CoCl2:6H2O	-8.80	-6.28	2.52	CoCl2:6H2O
CoFe2O4	7.95	4.80	-3.15	CoFe2O4
CoHP04	-3.88	-22.95	-19.06	CoHP04
CoO	-8.60	5.24	13.84	CoO
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-16.04	-14.72	1.32	CoSeO3
CoSeO4:6H2O	-37.92	-39.45	-1.53	CoSeO4:6H2O
CoSO4	-9.72	-6.73	2.99	CoSO4
CoSO4:6H2O	-4.28	-6.76	-2.48	CoSO4:6H2O
Cotunnite	-5.53	-10.37	-4.84	PbCl2
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.91	-69.49	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.83	-17.48	-46.31	Cu2Se
Cu2SO4	-16.16	-18.06	-1.90	Cu2SO4
Cu3(P04)2	-18.54	-55.39	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-20.28	-55.40	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.75	-28.55	-64.30	Cu3Se2
Cumetal	-0.17	-9.09	-8.93	Cu
Cu0CuSO4	-21.94	-11.31	10.63	Cu0CuSO4
Cupricferrite	-6.60	-0.11	6.49	CuFe2O4
Cuprite	-4.98	-6.09	-1.11	Cu2O
Cuprousferrite	5.61	-3.27	-8.88	CuFeO2
CuSe	22.32	-11.06	-33.39	CuSe
CuSe2	23.34	-10.36	-33.70	CuSe2
CuSeO3:2H2O	-20.25	-19.65	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-41.92	-44.36	-2.44	CuSeO4:5H2O
CuSO4	-14.76	-11.64	3.11	CuSO4
Diaspore	2.08	9.20	7.12	AlOOH
Epsomite	-1.77	-3.92	-2.15	MgSO4:7H2O
Fe(OH)2	-6.70	6.86	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.09	-1.95	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-21.97	-20.42	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-39.73	-60.36	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-33.19	-36.35	-3.16	Fe2(SO4)3
Fe3(OH)8	-13.82	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.59	-0.23	3.37	Fe(OH)3
Ferroselite	14.88	-3.83	-18.71	FeSe2
FeSe	6.48	-4.53	-11.00	FeSe
Gibbsite	0.67	9.19	8.52	Al(OH)3
Goethite	-0.86	-0.22	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4:7H2O
Gypsum	0.10	-4.51	-4.61	CaSO4:2H2O
H-Jarosite	-13.07	-24.62	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-6.47	-11.40	-4.92	H2Se
Halite	-3.04	-1.44	1.59	NaCl
Hausmannite	-31.51	30.53	62.03	Mn3O4
Hematite	0.67	-0.44	-1.11	Fe2O3
Hercynite	1.62	25.26	23.64	FeAl2O4
Hg(g)	-7.44	-15.36	-7.93	Hg
Hg(OH)2	-21.45	-24.94	-3.50	Hg(OH)2
Hg2(g)	-15.63	-30.73	-15.09	Hg2
Hg2(OH)2	-23.90	-18.64	5.26	Hg2(OH)2
Hg2HP04	-22.05	-46.82	-24.77	Hg2HP04
Hg2SeO3	-33.94	-38.60	-4.66	Hg2SeO3
Hg2SO4	-24.46	-30.60	-6.14	Hg2SO4
HgCl(g)	-34.94	-15.06	19.88	HgCl

HgCl2	-14.91	-36.43	-21.52	HgCl2
Hgmetal(l)	-1.71	-15.36	-13.65	Hg
HgSe	19.36	-36.33	-55.69	HgSe
HgSeO3	-32.48	-44.91	-12.43	HgSeO3
HgSO4	-27.45	-36.91	-9.45	HgSO4
Hinsdalite	-8.96	-11.46	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-2.88	-47.21	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-16.18	-78.97	-62.79	Pb5(PO4)3OH
K-Alum	-6.93	-12.18	-5.24	KAl(SO4)2·12H2O
K-Jarosite	-7.50	-21.99	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-38.68	-39.41	-0.73	K2SeO4
Langite	-28.56	-10.68	17.88	Cu4(OH)6SO4·H2O
Larnakite	-9.35	-9.73	-0.38	PbO:PbSO4
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.59	-0.22	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.73	1.12	12.85	PbO
Maghemite	-6.83	-0.44	6.39	Fe2O3
Magnesioferrite	-9.88	7.64	17.52	Fe2MgO4
Magnetite	2.53	6.43	3.90	Fe3O4
Manganite	-13.15	12.19	25.34	MnOOH
Massicot	-11.93	1.12	13.05	PbO
Melanothallite	-17.57	-11.16	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeSO4·7H2O
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(PO4)2	-8.84	-32.12	-23.28	Mg3(PO4)2
MgHP04:3H2O	-1.94	-20.12	-18.18	MgHP04:3H2O
MgSeO3:6H2O	-14.96	-11.91	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-35.41	-36.61	-1.20	MgSeO4:6H2O
Minium	-59.08	15.45	74.53	Pb3O4
Mirabilite	-2.11	-3.42	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-57.42	-62.74	-5.32	Mn2(SO4)3
Mn3(PO4)2	-14.09	-37.94	-23.85	Mn3(PO4)2
MnCl2:4H2O	-8.11	-5.37	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnSe	-8.98	-5.25	3.73	MnSe
MnSeO3	-14.95	-13.82	1.13	MnSeO3
MnSeO3:2H2O	-14.80	-13.83	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-36.49	-38.54	-2.05	MnSeO4:5H2O
MnSO4	-8.56	-5.83	2.74	MnSO4
Monteponite	-13.62	1.73	15.35	CdO
Montroydite	-21.39	-24.94	-3.55	HgO
Morenosite	-4.60	-6.78	-2.17	NiSO4:7H2O
Na-Jarosite	-9.47	-20.31	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-21.69	-11.39	10.30	Na2SeO3:5H2O
Na2SeO4	-37.34	-36.06	1.28	Na2SeO4
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(PO4)2	-9.39	-40.69	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-23.08	8.92	32.00	Ni4(OH)6SO4
NiSe	11.53	-6.17	-17.70	NiSe
NiSeO3:2H2O	-17.64	-14.75	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-37.94	-39.46	-1.52	NiSeO4:6H2O
Nsutite	-24.87	-7.37	17.50	MnO2
O2(g)	-60.26	24.19	84.45	O2
Pb(OH)2	-7.18	1.11	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.31	-3.52	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-23.96	2.23	26.19	Pb2O(OH)2
Pb2O3	-46.71	14.33	61.04	Pb2O3
Pb3(P04)2	-9.49	-53.02	-43.53	Pb3(P04)2
Pb3O2SO4	-19.49	-8.61	10.87	Pb3O2SO4
Pb4(OH)6SO4	-28.61	-7.51	21.10	Pb4(OH)6SO4
Pb4O3SO4	-29.70	-7.50	22.20	Pb4O3SO4
PbHP04	-3.26	-27.07	-23.81	PbHP04
Pbmetal	-15.22	-10.98	4.24	Pb
PbO:0.3H2O	-11.86	1.12	12.98	PbO:0.33H2O
PbSeO4	-36.67	-43.54	-6.88	PbSeO4
Periclase	-13.86	8.08	21.94	MgO

Plattnerite	-37.09	13.21	50.31	PbO2
Plumbgummite	5.12	-27.67	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-15.65	7.46	23.11	Ca(OH)2
Pyrochroite	-9.29	6.14	15.43	Mn(OH)2
Pyrolusite	-23.79	18.24	42.03	MnO2
Pyromorphite	-0.28	-84.71	-84.43	Pb5(P04)3Cl
Retgersite	-4.72	-6.77	-2.05	NiS04:6H2O
Semetal(am)	7.84	0.70	-7.14	Se
Semetal(hex)	8.45	0.70	-7.75	Se
SeO2	-20.09	-19.97	0.12	SeO2
SeO3	-66.05	-44.66	21.39	SeO3
Spinel	-11.29	26.48	37.77	MgAl2O4
Strengite	-2.04	-28.42	-26.38	FeP04:2H2O
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.71	-3.37	0.34	Na2S04
Tsumebite	-15.85	-25.64	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	0.19	-35.81	-36.00	Fe3(P04)2:8H2O
Zincite	-7.21	4.34	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnS04
Zn(N03)2:6H2O	-139.22	-135.96	3.26	Zn(N03)2:6H2O
Zn(OH)2	-7.87	4.33	12.20	Zn(OH)2
Zn(OH)2(am)	-8.33	4.33	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.62	4.33	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.39	4.33	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.40	4.33	11.73	Zn(OH)2
Zn2(OH)2S04	-10.80	-3.30	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-12.26	2.93	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-7.95	-43.37	-35.42	Zn3(P04)2:4H2O
Zn30(S04)2	-30.45	-10.92	19.53	Zn30(S04)2
Zn4(OH)6S04	-23.03	5.37	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-28.31	10.19	38.50	Zn5(OH)8Cl2
ZnCl2	-14.37	-7.15	7.22	ZnCl2
Znmetal	-33.91	-7.76	26.15	Zn
ZnO(active)	-7.06	4.34	11.40	ZnO
ZnSe	7.41	-7.05	-14.46	ZnSe
ZnSe04:6H2O	-38.83	-40.35	-1.52	ZnSe04:6H2O
ZnS04:1H2O	-7.10	-7.64	-0.53	ZnS04:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 1.
Using reaction 2.

Mixture 1.

3.000e-02 Solution 1
9.700e-01 Solution 2

Reaction 2.

6.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000
Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	2.227e-04	1.986e-04
Ca	1.698e-02	1.514e-02
Cd	4.104e-07	3.660e-07
Cl	3.064e-01	2.733e-01
Co	4.736e-04	4.224e-04
Cu	1.686e-04	1.504e-04
Fe	1.935e-02	1.726e-02
Hg	2.300e-09	2.051e-09
K	6.371e-03	5.682e-03
Mg	6.358e-02	5.671e-02
Mn	3.590e-03	3.202e-03
N	4.940e-03	4.406e-03
Na	2.950e-01	2.631e-01
Ni	1.094e-04	9.762e-05
P	8.787e-04	7.837e-04
Pb	5.566e-08	4.964e-08
S	1.094e-01	9.754e-02
Se	1.168e-06	1.042e-06
Zn	3.139e-05	2.800e-05

-----Description of solution-----

pH	=	5.033	Charge balance
pe	=	1.098	Adjusted to redox equilibrium
Activity of water	=	0.987	
Ionic strength (mol/kgw)	=	5.362e-01	
Mass of water (kg)	=	8.919e-01	
Total alkalinity (eq/kg)	=	1.549e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	-9.552e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.27	
Iterations	=	4	
Total H	=	9.903286e+01	
Total O	=	4.990014e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.258e-05	9.269e-06	-4.900	-5.033	-0.133	0.00
OH-	1.256e-09	7.895e-10	-8.901	-9.103	-0.202	(0)
H2O	5.551e+01	9.870e-01	1.744	-0.006	0.000	18.05
Al	2.227e-04					
AlSO4+	1.699e-04	1.127e-04	-3.770	-3.948	-0.178	(0)
Al(SO4)2-	2.834e-05	1.879e-05	-4.548	-4.726	-0.178	(0)
Al+3	1.856e-05	1.187e-06	-4.732	-5.925	-1.194	(0)
AlOH+2	4.336e-06	9.794e-07	-5.363	-6.009	-0.646	(0)
Al(OH)2+	1.573e-06	1.084e-06	-5.803	-5.965	-0.162	(0)
Al(OH)3	2.320e-08	2.320e-08	-7.635	-7.635	0.000	(0)
Al(OH)4-	1.825e-09	1.211e-09	-8.739	-8.917	-0.178	(0)
Ca	1.698e-02					
Ca+2	8.803e-03	2.594e-03	-2.055	-2.586	-0.531	(0)
CaSO4	8.147e-03	8.147e-03	-2.089	-2.089	0.000	(0)
CaH2PO4+	2.548e-05	1.757e-05	-4.594	-4.755	-0.162	(0)
CaHP04	2.413e-06	2.413e-06	-5.617	-5.617	0.000	(0)
CaNH3+2	1.566e-08	5.141e-10	-7.805	-9.289	-1.484	(0)
CaPO4-	9.205e-10	6.346e-10	-9.036	-9.198	-0.162	(0)
CaOH+	5.541e-11	3.904e-11	-10.256	-10.408	-0.152	(0)
Ca(NH3)2+2	9.815e-16	3.221e-17	-15.008	-16.492	-1.484	(0)
CaNO3+	0.000e+00	0.000e+00	-66.135	-66.506	-0.371	(0)

Cd	4.104e-07					
CdCl+	2.009e-07	8.551e-08	-6.697	-7.068	-0.371	(0)
CdCl2	7.948e-08	7.948e-08	-7.100	-7.100	0.000	(0)
Cd(SO4)2-2	7.817e-08	2.566e-09	-7.107	-8.591	-1.484	(0)
CdCl3-	2.556e-08	1.088e-08	-7.592	-7.963	-0.371	(0)
Cd+2	1.355e-08	3.994e-09	-7.868	-8.399	-0.531	(0)
CdSO4	1.272e-08	1.272e-08	-7.895	-7.895	0.000	(0)
CdOHCl	3.422e-12	3.422e-12	-11.466	-11.466	0.000	(0)
CdOH+	5.916e-14	2.518e-14	-13.228	-13.599	-0.371	(0)
Cd2OH+3	1.155e-18	5.296e-22	-17.937	-21.276	-3.339	(0)
Cd(OH)2	2.301e-19	2.301e-19	-18.638	-18.638	0.000	(0)
CdHS+	7.516e-23	3.199e-23	-22.124	-22.495	-0.371	(0)
Cd(OH)3-	3.542e-26	1.507e-26	-25.451	-25.822	-0.371	(0)
Cd(OH)4-2	8.061e-35	2.646e-36	-34.094	-35.577	-1.484	(0)
Cd(SeO3)2-2	2.868e-37	9.412e-39	-36.542	-38.026	-1.484	(0)
Cd(HS)2	4.025e-38	4.025e-38	-37.395	-37.395	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.031	-40.031	0.000	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-57.229	-57.600	-0.371	(0)
CdNO3+	0.000e+00	0.000e+00	-71.911	-72.282	-0.371	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-76.024	-77.508	-1.484	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-137.065	-137.065	0.000	(0)
Cl	3.064e-01					
Cl-	3.060e-01	2.254e-01	-0.514	-0.647	-0.133	(0)
CuCl2-	1.455e-04	9.411e-05	-3.837	-4.026	-0.189	(0)
MnCl+	4.496e-05	3.050e-05	-4.347	-4.516	-0.169	(0)
CoCl+	2.450e-05	1.043e-05	-4.611	-4.982	-0.371	(0)
CuCl3-2	2.110e-05	4.465e-06	-4.676	-5.350	-0.674	(0)
NiCl+	1.947e-05	8.288e-06	-4.711	-5.082	-0.371	(0)
MnCl2	9.711e-06	9.711e-06	-5.013	-5.013	0.000	(0)
CuCl	1.979e-06	1.979e-06	-5.704	-5.704	0.000	(0)
ZnCl+	1.384e-06	8.952e-07	-5.859	-6.048	-0.189	(0)
MnCl3-	8.889e-07	6.030e-07	-6.051	-6.220	-0.169	(0)
ZnCl2	2.689e-07	2.689e-07	-6.570	-6.570	0.000	(0)
CdCl+	2.009e-07	8.551e-08	-6.697	-7.068	-0.371	(0)
CdCl2	7.948e-08	7.948e-08	-7.100	-7.100	0.000	(0)
ZnCl3-	7.324e-08	4.737e-08	-7.135	-7.324	-0.189	(0)
CdCl3-	2.556e-08	1.088e-08	-7.592	-7.963	-0.371	(0)
ZnCl4-2	2.443e-08	5.171e-09	-7.612	-8.286	-0.674	(0)
PbCl+	1.724e-08	7.336e-09	-7.764	-8.135	-0.371	(0)
NiCl2	9.511e-09	9.511e-09	-8.022	-8.022	0.000	(0)
PbCl2	7.254e-09	7.254e-09	-8.139	-8.139	0.000	(0)
PbCl4-2	2.013e-09	6.607e-11	-8.696	-10.180	-1.484	(0)
PbCl3-	1.598e-09	6.802e-10	-8.796	-9.167	-0.371	(0)
ZnOHCl	1.294e-09	1.294e-09	-8.888	-8.888	0.000	(0)
CuCl+	9.790e-11	6.332e-11	-10.009	-10.198	-0.189	(0)
CuCl2	4.065e-12	4.065e-12	-11.391	-11.391	0.000	(0)
CdOHCl	3.422e-12	3.422e-12	-11.466	-11.466	0.000	(0)
FeCl+2	1.486e-14	3.145e-15	-13.828	-14.502	-0.674	(0)
HgCl4-2	1.394e-14	4.577e-16	-13.856	-15.339	-1.484	(0)
CuCl3-	1.231e-14	7.959e-15	-13.910	-14.099	-0.189	(0)
FeCl2+	5.297e-15	3.593e-15	-14.276	-14.445	-0.169	(0)
HgCl3-	1.155e-15	4.916e-16	-14.937	-15.308	-0.371	(0)
FeCl2	2.162e-16	2.162e-16	-15.665	-15.665	0.000	(0)
HgCl3	8.099e-17	8.099e-17	-16.092	-16.092	0.000	(0)
CuCl4-2	4.865e-17	1.030e-17	-16.313	-16.987	-0.674	(0)
HgClOH	1.383e-20	1.383e-20	-19.859	-19.859	0.000	(0)
HgCl+	3.820e-22	1.626e-22	-21.418	-21.789	-0.371	(0)
CoCl+2	8.641e-34	2.836e-35	-33.063	-34.547	-1.484	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.357	-42.841	-1.484	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-54.854	-56.338	-1.484	(0)
Co(2)	4.736e-04					
Co+2	4.119e-04	1.352e-05	-3.385	-4.869	-1.484	(0)
CoSO4	3.716e-05	3.716e-05	-4.430	-4.430	0.000	(0)
CoCl+	2.450e-05	1.043e-05	-4.611	-4.982	-0.371	(0)
CoHPO4	2.952e-08	2.952e-08	-7.530	-7.530	0.000	(0)
Co(NH3)+2	1.113e-08	3.654e-10	-7.953	-9.437	-1.484	(0)
CoOH+	6.795e-10	2.892e-10	-9.168	-9.539	-0.371	(0)
Co2OH+3	4.273e-13	1.959e-16	-12.369	-15.708	-3.339	(0)

Co(NH3)2+2	5.234e-14	1.718e-15	-13.281	-14.765	-1.484	(0)
Co(OH)2	2.463e-14	2.463e-14	-13.608	-13.608	0.000	(0)
Co(NH3)3+2	1.037e-19	3.404e-21	-18.984	-20.468	-1.484	(0)
Co(OH)3-	1.238e-21	5.270e-22	-20.907	-21.278	-0.371	(0)
CoOOH-	7.542e-23	3.210e-23	-22.123	-22.493	-0.371	(0)
Co4(OH)4+4	1.203e-24	1.396e-30	-23.920	-29.855	-5.935	(0)
Co(NH3)4+2	8.567e-26	2.812e-27	-25.067	-26.551	-1.484	(0)
Co(OH)4-2	2.728e-30	8.955e-32	-29.564	-31.048	-1.484	(0)
Co(NH3)5+2	2.238e-32	7.346e-34	-31.650	-33.134	-1.484	(0)
CoSeO4	7.949e-37	7.949e-37	-36.100	-36.100	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.334	-51.705	-0.371	(0)
CoNO3+	0.000e+00	0.000e+00	-68.731	-69.102	-0.371	(0)
Co(NO3)2	0.000e+00	0.000e+00	-133.227	-133.227	0.000	(0)
Co(3)	1.129e-31					
CoOH+2	1.121e-31	3.678e-33	-30.951	-32.434	-1.484	(0)
CoCl+2	8.641e-34	2.836e-35	-33.063	-34.547	-1.484	(0)
Co+3	1.055e-35	6.751e-37	-34.977	-36.171	-1.194	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.357	-42.841	-1.484	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.289	-52.660	-0.371	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-54.854	-56.338	-1.484	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.728	-60.212	-1.484	(0)
Cu(1)	1.686e-04					
CuCl2-	1.455e-04	9.411e-05	-3.837	-4.026	-0.189	(0)
CuCl3-2	2.110e-05	4.465e-06	-4.676	-5.350	-0.674	(0)
CuCl	1.979e-06	1.979e-06	-5.704	-5.704	0.000	(0)
Cu+	1.638e-08	6.974e-09	-7.786	-8.157	-0.371	(0)
Cu(S4)2-3	4.006e-39	1.232e-39	-38.397	-38.909	-0.512	(0)
CuS4S5-3	6.880e-40	2.295e-40	-39.162	-39.639	-0.477	(0)
Cu(2)	1.323e-09					
Cu+2	6.294e-10	1.855e-10	-9.201	-9.732	-0.531	(0)
CuSO4	5.774e-10	5.774e-10	-9.238	-9.238	0.000	(0)
CuCl+	9.790e-11	6.332e-11	-10.009	-10.198	-0.189	(0)
CuNH3+2	1.351e-11	4.435e-13	-10.869	-12.353	-1.484	(0)
CuCl2	4.065e-12	4.065e-12	-11.391	-11.391	0.000	(0)
CuOH+	7.990e-13	5.168e-13	-12.097	-12.287	-0.189	(0)
CuCl3-	1.231e-14	7.959e-15	-13.910	-14.099	-0.189	(0)
Cu(OH)2	1.346e-16	1.346e-16	-15.871	-15.871	0.000	(0)
CuCl4-2	4.865e-17	1.030e-17	-16.313	-16.987	-0.674	(0)
Cu2(OH)2+2	1.989e-19	6.527e-21	-18.701	-20.185	-1.484	(0)
Cu(OH)3-	6.953e-22	2.959e-22	-21.158	-21.529	-0.371	(0)
Cu(OH)4-2	7.609e-29	2.497e-30	-28.119	-29.603	-1.484	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-49.775	-50.146	-0.371	(0)
CuNO2+	0.000e+00	0.000e+00	-55.025	-55.396	-0.371	(0)
CuNO3+	0.000e+00	0.000e+00	-73.284	-73.655	-0.371	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-102.070	-102.070	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-138.998	-138.998	0.000	(0)
Fe(2)	1.935e-02					
Fe+2	1.732e-02	5.685e-04	-1.761	-3.245	-1.484	(0)
FeSO4	1.904e-03	1.904e-03	-2.720	-2.720	0.000	(0)
FeH2PO4+	1.210e-04	8.339e-05	-3.917	-4.079	-0.162	(0)
FeHPO4	4.530e-06	4.530e-06	-5.344	-5.344	0.000	(0)
FeOH+	2.634e-08	1.787e-08	-7.579	-7.748	-0.169	(0)
Fe(OH)2	1.072e-14	1.072e-14	-13.970	-13.970	0.000	(0)
Fe(OH)3-	5.164e-18	3.503e-18	-17.287	-17.456	-0.169	(0)
Fe(HS)2	3.134e-39	3.134e-39	-38.504	-38.504	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-58.200	-58.571	-0.371	(0)
Fe(3)	2.361e-10					
Fe(OH)2+	2.196e-10	1.514e-10	-9.658	-9.820	-0.162	(0)
FeHPO4+	1.486e-11	1.025e-11	-10.828	-10.989	-0.162	(0)
FeOH+2	1.363e-12	2.885e-13	-11.866	-12.540	-0.674	(0)
FeSO4+	1.077e-13	7.308e-14	-12.968	-13.136	-0.169	(0)
Fe(OH)3	9.863e-14	9.863e-14	-13.006	-13.006	0.000	(0)
Fe(SO4)2-	5.401e-14	2.299e-14	-13.268	-13.639	-0.371	(0)
FeCl+2	1.486e-14	3.145e-15	-13.828	-14.502	-0.674	(0)
FeH2PO4+2	1.290e-14	2.913e-15	-13.890	-14.536	-0.646	(0)
Fe+3	8.191e-15	5.241e-16	-14.087	-15.281	-1.194	(0)
FeCl2+	5.297e-15	3.593e-15	-14.276	-14.445	-0.169	(0)
FeCl3	8.099e-17	8.099e-17	-16.092	-16.092	0.000	(0)

Fe(OH)4-	2.524e-17	1.740e-17	-16.598	-16.759	-0.162	(0)
Fe2(OH)2+4	2.738e-18	3.178e-24	-17.562	-23.498	-5.935	(0)
Fe3(OH)4+5	1.253e-23	6.668e-33	-22.902	-32.176	-9.274	(0)
FeHSeO3+2	1.448e-25	4.754e-27	-24.839	-26.323	-1.484	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.142	-78.626	-1.484	(0)
H(0)	7.114e-16					
H2	3.557e-16	4.024e-16	-15.449	-15.395	0.054	(0)
Hg(0)	2.300e-09					
Hg	2.300e-09	2.300e-09	-8.638	-8.638	0.000	(0)
Hg(1)	2.258e-27					
Hg2+2	1.129e-27	3.706e-29	-26.947	-28.431	-1.484	(0)
Hg(2)	1.532e-14					
HgCl4-2	1.394e-14	4.577e-16	-13.856	-15.339	-1.484	(0)
HgCl3-	1.155e-15	4.916e-16	-14.937	-15.308	-0.371	(0)
HgCl2	2.162e-16	2.162e-16	-15.665	-15.665	0.000	(0)
HgClOH	1.383e-20	1.383e-20	-19.859	-19.859	0.000	(0)
HgCl+	3.820e-22	1.626e-22	-21.418	-21.789	-0.371	(0)
Hg(NH3)2+2	4.724e-23	1.550e-24	-22.326	-23.810	-1.484	(0)
Hg(OH)2	1.643e-25	1.859e-25	-24.784	-24.731	0.054	(0)
HgNH3+2	7.753e-26	2.545e-27	-25.111	-26.594	-1.484	(0)
HgOH+	2.851e-27	1.213e-27	-26.545	-26.916	-0.371	(0)
Hg+2	9.707e-28	3.186e-29	-27.013	-28.497	-1.484	(0)
HgSO4	9.562e-29	9.562e-29	-28.019	-28.019	0.000	(0)
Hg(NH3)3+2	4.251e-29	1.395e-30	-28.371	-29.855	-1.484	(0)
Hg(NH3)4+2	7.676e-35	2.520e-36	-34.115	-35.599	-1.484	(0)
Hg(OH)3-	5.895e-35	2.509e-35	-34.230	-34.600	-0.371	(0)
Hg(HS)2	3.326e-35	3.326e-35	-34.478	-34.478	0.000	(0)
HgHS2-	3.403e-36	1.449e-36	-35.468	-35.839	-0.371	(0)
HgS2-2	9.327e-39	3.061e-40	-38.030	-39.514	-1.484	(0)
HgNO3+	0.000e+00	0.000e+00	-93.086	-93.457	-0.371	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-158.272	-158.272	0.000	(0)
K	6.371e-03					
K+	5.763e-03	4.246e-03	-2.239	-2.372	-0.133	(0)
KS04-	6.077e-04	4.189e-04	-3.216	-3.378	-0.162	(0)
KHP04-	9.353e-08	6.448e-08	-7.029	-7.191	-0.162	(0)
Mg	6.358e-02					
Mg+2	3.640e-02	1.073e-02	-1.439	-1.970	-0.531	(0)
MgSO4	2.695e-02	2.695e-02	-1.569	-1.569	0.000	(0)
MgH2PO4+	2.252e-04	1.553e-04	-3.647	-3.809	-0.162	(0)
MgHPO4	1.377e-05	1.377e-05	-4.861	-4.861	0.000	(0)
MgOH+	4.406e-09	3.156e-09	-8.356	-8.501	-0.145	(0)
MgPO4-	5.949e-11	4.101e-11	-10.226	-10.387	-0.162	(0)
Mn(2)	3.590e-03					
Mn+2	3.274e-03	1.075e-04	-2.485	-3.969	-1.484	(0)
MnSO4	2.597e-04	2.597e-04	-3.586	-3.586	0.000	(0)
MnCl+	4.496e-05	3.050e-05	-4.347	-4.516	-0.169	(0)
MnCl2	9.711e-06	9.711e-06	-5.013	-5.013	0.000	(0)
MnCl3-	8.889e-07	6.030e-07	-6.051	-6.220	-0.169	(0)
MnOH+	3.142e-10	2.131e-10	-9.503	-9.671	-0.169	(0)
MnSe	2.307e-11	2.307e-11	-10.637	-10.637	0.000	(0)
Mn(OH)3-	3.032e-24	2.057e-24	-23.518	-23.687	-0.169	(0)
Mn(OH)4-2	3.364e-32	7.119e-33	-31.473	-32.148	-0.674	(0)
MnSeO4	3.357e-36	3.357e-36	-35.474	-35.474	0.000	(0)
MnNO3+	0.000e+00	0.000e+00	-67.831	-68.202	-0.371	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-132.231	-132.231	0.000	(0)
Mn(3)	5.210e-28					
Mn+3	5.210e-28	3.334e-29	-27.283	-28.477	-1.194	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-78.776	-79.450	-0.674	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-87.774	-87.989	-0.216	(0)
N(-3)	4.940e-03					
NH4+	4.364e-03	2.559e-03	-2.360	-2.592	-0.232	(0)
NH4SO4-	5.762e-04	3.908e-04	-3.239	-3.408	-0.169	(0)
NH3	1.183e-07	1.183e-07	-6.927	-6.927	0.000	(0)
NiNH3+2	5.404e-08	1.774e-09	-7.267	-8.751	-1.484	(0)
CaNH3+2	1.566e-08	5.141e-10	-7.805	-9.289	-1.484	(0)
Co(NH3)+2	1.113e-08	3.654e-10	-7.953	-9.437	-1.484	(0)

CuNH3+2	1.351e-11	4.435e-13	-10.869	-12.353	-1.484	(0)
Ni(NH3)2+2	1.570e-12	5.154e-14	-11.804	-13.288	-1.484	(0)
Co(NH3)2+2	5.234e-14	1.718e-15	-13.281	-14.765	-1.484	(0)
Ca(NH3)2+2	9.815e-16	3.221e-17	-15.008	-16.492	-1.484	(0)
Co(NH3)3+2	1.037e-19	3.404e-21	-18.984	-20.468	-1.484	(0)
Hg(NH3)2+2	4.724e-23	1.550e-24	-22.326	-23.810	-1.484	(0)
Co(NH3)4+2	8.567e-26	2.812e-27	-25.067	-26.551	-1.484	(0)
HgNH3+2	7.753e-26	2.545e-27	-25.111	-26.594	-1.484	(0)
Hg(NH3)3+2	4.251e-29	1.395e-30	-28.371	-29.855	-1.484	(0)
Co(NH3)5+2	2.238e-32	7.346e-34	-31.650	-33.134	-1.484	(0)
Hg(NH3)4+2	7.676e-35	2.520e-36	-34.115	-35.599	-1.484	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.357	-42.841	-1.484	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.289	-52.660	-0.371	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-54.854	-56.338	-1.484	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.728	-60.212	-1.484	(0)
N(3)	0.000e+00					
N02-	0.000e+00	0.000e+00	-47.469	-47.684	-0.216	(0)
CoN02+	0.000e+00	0.000e+00	-51.334	-51.705	-0.371	(0)
CuN02+	0.000e+00	0.000e+00	-55.025	-55.396	-0.371	(0)
Cu(N02)2	0.000e+00	0.000e+00	-102.070	-102.070	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-64.301	-64.433	-0.133	(0)
CaN03+	0.000e+00	0.000e+00	-66.135	-66.506	-0.371	(0)
MnN03+	0.000e+00	0.000e+00	-67.831	-68.202	-0.371	(0)
NiN03+	0.000e+00	0.000e+00	-68.500	-68.871	-0.371	(0)
CoN03+	0.000e+00	0.000e+00	-68.731	-69.102	-0.371	(0)
ZnN03+	0.000e+00	0.000e+00	-69.440	-69.810	-0.371	(0)
CdN03+	0.000e+00	0.000e+00	-71.911	-72.282	-0.371	(0)
PbN03+	0.000e+00	0.000e+00	-71.914	-72.285	-0.371	(0)
CuN03+	0.000e+00	0.000e+00	-73.284	-73.655	-0.371	(0)
FeN03+2	0.000e+00	0.000e+00	-77.142	-78.626	-1.484	(0)
HgN03+	0.000e+00	0.000e+00	-93.086	-93.457	-0.371	(0)
Mn(N03)2	0.000e+00	0.000e+00	-132.231	-132.231	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-133.227	-133.227	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-134.955	-134.955	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-136.468	-136.468	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-137.065	-137.065	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-138.998	-138.998	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-158.272	-158.272	0.000	(0)
Na	2.950e-01					
Na+	2.728e-01	2.010e-01	-0.564	-0.697	-0.133	(0)
NaSO4-	2.219e-02	1.530e-02	-1.654	-1.815	-0.162	(0)
NaHP04-	6.856e-06	4.726e-06	-5.164	-5.325	-0.162	(0)
Ni	1.094e-04					
Ni+2	4.930e-05	1.453e-05	-4.307	-4.838	-0.531	(0)
NiSO4	4.002e-05	4.002e-05	-4.398	-4.398	0.000	(0)
NiCl+	1.947e-05	8.288e-06	-4.711	-5.082	-0.371	(0)
Ni(SO4)2-2	5.941e-07	1.950e-08	-6.226	-7.710	-1.484	(0)
NiNH3+2	5.404e-08	1.774e-09	-7.267	-8.751	-1.484	(0)
NiCl2	9.511e-09	9.511e-09	-8.022	-8.022	0.000	(0)
NiOH+	3.468e-10	1.476e-10	-9.460	-9.831	-0.371	(0)
Ni(NH3)2+2	1.570e-12	5.154e-14	-11.804	-13.288	-1.484	(0)
Ni(OH)2	1.670e-14	1.670e-14	-13.777	-13.777	0.000	(0)
Ni(OH)3-	4.208e-20	1.791e-20	-19.376	-19.747	-0.371	(0)
NiSe04	7.885e-37	7.885e-37	-36.103	-36.103	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-68.500	-68.871	-0.371	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-62.681	-62.627	0.054	(0)
P	8.787e-04					
H2P04-	4.686e-04	3.231e-04	-3.329	-3.491	-0.162	(0)
MgH2P04+	2.252e-04	1.553e-04	-3.647	-3.809	-0.162	(0)
FeH2P04+	1.210e-04	8.339e-05	-3.917	-4.079	-0.162	(0)
CaH2P04+	2.548e-05	1.757e-05	-4.594	-4.755	-0.162	(0)
MgHP04	1.377e-05	1.377e-05	-4.861	-4.861	0.000	(0)
HP04-2	1.027e-05	2.173e-06	-4.989	-5.663	-0.674	(0)
NaHP04-	6.856e-06	4.726e-06	-5.164	-5.325	-0.162	(0)
FeHP04	4.530e-06	4.530e-06	-5.344	-5.344	0.000	(0)
CaHP04	2.413e-06	2.413e-06	-5.617	-5.617	0.000	(0)

H3P04	4.032e-07	4.032e-07	-6.394	-6.394	0.000	(0)
KHP04-	9.353e-08	6.448e-08	-7.029	-7.191	-0.162	(0)
CoHP04	2.952e-08	2.952e-08	-7.530	-7.530	0.000	(0)
CaP04-	9.205e-10	6.346e-10	-9.036	-9.198	-0.162	(0)
MgP04-	5.949e-11	4.101e-11	-10.226	-10.387	-0.162	(0)
FeHP04+	1.486e-11	1.025e-11	-10.828	-10.989	-0.162	(0)
P04-3	1.423e-12	9.107e-14	-11.847	-13.041	-1.194	(0)
FeH2P04+2	1.290e-14	2.913e-15	-13.890	-14.536	-0.646	(0)
Pb	5.566e-08					
Pb(S04)2-2	1.757e-08	5.768e-10	-7.755	-9.239	-1.484	(0)
PbCl+	1.724e-08	7.336e-09	-7.764	-8.135	-0.371	(0)
PbCl2	7.254e-09	7.254e-09	-8.139	-8.139	0.000	(0)
PbS04	6.716e-09	6.716e-09	-8.173	-8.173	0.000	(0)
Pb+2	3.264e-09	9.620e-10	-8.486	-9.017	-0.531	(0)
PbCl4-2	2.013e-09	6.607e-11	-8.696	-10.180	-1.484	(0)
PbCl3-	1.598e-09	6.802e-10	-8.796	-9.167	-0.371	(0)
PbOH+	6.087e-12	2.591e-12	-11.216	-11.587	-0.371	(0)
Pb(OH)2	8.785e-17	8.785e-17	-16.056	-16.056	0.000	(0)
Pb2OH+3	8.616e-17	3.950e-20	-16.065	-19.403	-3.339	(0)
Pb(OH)3-	2.213e-22	9.420e-23	-21.655	-22.026	-0.371	(0)
Pb(OH)4-2	7.537e-28	2.474e-29	-27.123	-28.607	-1.484	(0)
Pb3(OH)4+2	2.399e-30	7.873e-32	-29.620	-31.104	-1.484	(0)
Pb4(OH)4+4	6.012e-31	6.977e-37	-30.221	-36.156	-5.935	(0)
Pb(HS)2	1.108e-38	1.108e-38	-37.955	-37.955	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-58.389	-58.760	-0.371	(0)
PbN03+	0.000e+00	0.000e+00	-71.914	-72.285	-0.371	(0)
Pb(N03)2	0.000e+00	0.000e+00	-136.468	-136.468	0.000	(0)
S(-2)	8.872e-21					
H2S	8.612e-21	8.612e-21	-20.065	-20.065	0.000	(0)
HS-	1.848e-22	7.864e-23	-21.733	-22.104	-0.371	(0)
CdHS+	7.516e-23	3.199e-23	-22.124	-22.495	-0.371	(0)
S5-2	9.074e-26	2.978e-27	-25.042	-26.526	-1.484	(0)
S6-2	3.400e-26	1.116e-27	-25.469	-26.952	-1.484	(0)
S4-2	2.281e-26	7.485e-28	-25.642	-27.126	-1.484	(0)
S3-2	3.510e-27	1.152e-28	-26.455	-27.939	-1.484	(0)
S2-2	3.305e-28	1.085e-29	-27.481	-28.965	-1.484	(0)
S-2	1.532e-34	3.243e-35	-33.815	-34.489	-0.674	(0)
Hg(HS)2	3.326e-35	3.326e-35	-34.478	-34.478	0.000	(0)
HgHS2-	3.403e-36	1.449e-36	-35.468	-35.839	-0.371	(0)
Zn(HS)2	6.655e-38	6.655e-38	-37.177	-37.177	0.000	(0)
Cd(HS)2	4.025e-38	4.025e-38	-37.395	-37.395	0.000	(0)
ZnS(HS)-	1.648e-38	7.016e-39	-37.783	-38.154	-0.371	(0)
Pb(HS)2	1.108e-38	1.108e-38	-37.955	-37.955	0.000	(0)
HgS2-2	9.327e-39	3.061e-40	-38.030	-39.514	-1.484	(0)
Cu(S4)2-3	4.006e-39	1.232e-39	-38.397	-38.909	-0.512	(0)
Fe(HS)2	3.134e-39	3.134e-39	-38.504	-38.504	0.000	(0)
CuS4S5-3	6.880e-40	2.295e-40	-39.162	-39.639	-0.477	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-49.775	-50.146	-0.371	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-55.630	-56.001	-0.371	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-57.229	-57.600	-0.371	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-58.200	-58.571	-0.371	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-58.389	-58.760	-0.371	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-59.464	-60.948	-1.484	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-76.024	-77.508	-1.484	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-78.082	-79.566	-1.484	(0)
S(6)	1.094e-01					
S04-2	4.836e-02	1.425e-02	-1.315	-1.846	-0.531	(0)
MgS04	2.695e-02	2.695e-02	-1.569	-1.569	0.000	(0)
NaS04-	2.219e-02	1.530e-02	-1.654	-1.815	-0.162	(0)
CaS04	8.147e-03	8.147e-03	-2.089	-2.089	0.000	(0)
FeS04	1.904e-03	1.904e-03	-2.720	-2.720	0.000	(0)
KS04-	6.077e-04	4.189e-04	-3.216	-3.378	-0.162	(0)
NH4S04-	5.762e-04	3.908e-04	-3.239	-3.408	-0.169	(0)
MnS04	2.597e-04	2.597e-04	-3.586	-3.586	0.000	(0)
AlS04+	1.699e-04	1.127e-04	-3.770	-3.948	-0.178	(0)
NiS04	4.002e-05	4.002e-05	-4.398	-4.398	0.000	(0)
CoS04	3.716e-05	3.716e-05	-4.430	-4.430	0.000	(0)
Al(S04)2-	2.834e-05	1.879e-05	-4.548	-4.726	-0.178	(0)

Zn(SO4)2-2	1.921e-05	6.304e-07	-4.717	-6.200	-1.484	(0)
HSO4-	1.725e-05	1.144e-05	-4.763	-4.941	-0.178	(0)
ZnSO4	4.908e-06	4.908e-06	-5.309	-5.309	0.000	(0)
Ni(SO4)2-2	5.941e-07	1.950e-08	-6.226	-7.710	-1.484	(0)
Cd(SO4)2-2	7.817e-08	2.566e-09	-7.107	-8.591	-1.484	(0)
Pb(SO4)2-2	1.757e-08	5.768e-10	-7.755	-9.239	-1.484	(0)
CdSO4	1.272e-08	1.272e-08	-7.895	-7.895	0.000	(0)
PbSO4	6.716e-09	6.716e-09	-8.173	-8.173	0.000	(0)
CuSO4	5.774e-10	5.774e-10	-9.238	-9.238	0.000	(0)
FeSO4+	1.077e-13	7.308e-14	-12.968	-13.136	-0.169	(0)
Fe(SO4)2-	5.401e-14	2.299e-14	-13.268	-13.639	-0.371	(0)
HgSO4	9.562e-29	9.562e-29	-28.019	-28.019	0.000	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.289	-52.660	-0.371	(0)
Se(-2)	1.168e-06					
HSe-	1.134e-06	4.828e-07	-5.945	-6.316	-0.371	(0)
H2Se	3.411e-08	3.411e-08	-7.467	-7.467	0.000	(0)
MnSe	2.307e-11	2.307e-11	-10.637	-10.637	0.000	(0)
Se-2	1.219e-15	4.001e-17	-14.914	-16.398	-1.484	(0)
Se(4)	9.315e-15					
HSeO3-	9.250e-15	3.937e-15	-14.034	-14.405	-0.371	(0)
SeO3-2	5.012e-17	1.645e-18	-16.300	-17.784	-1.484	(0)
H2SeO3	1.505e-17	1.505e-17	-16.823	-16.823	0.000	(0)
FeHSeO3+2	1.448e-25	4.754e-27	-24.839	-26.323	-1.484	(0)
Cd(SeO3)2-2	2.868e-37	9.412e-39	-36.542	-38.026	-1.484	(0)
Se(6)	4.303e-34					
SeO4-2	4.252e-34	1.253e-34	-33.371	-33.902	-0.531	(0)
MnSeO4	3.357e-36	3.357e-36	-35.474	-35.474	0.000	(0)
CoSeO4	7.949e-37	7.949e-37	-36.100	-36.100	0.000	(0)
NiSeO4	7.885e-37	7.885e-37	-36.103	-36.103	0.000	(0)
HSeO4-	1.205e-37	5.131e-38	-36.919	-37.290	-0.371	(0)
ZnSeO4	3.161e-38	3.161e-38	-37.500	-37.500	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.031	-40.031	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-69.912	-71.396	-1.484	(0)
Zn	3.139e-05					
Zn(SO4)2-2	1.921e-05	6.304e-07	-4.717	-6.200	-1.484	(0)
Zn+2	5.526e-06	1.629e-06	-5.258	-5.788	-0.531	(0)
ZnSO4	4.908e-06	4.908e-06	-5.309	-5.309	0.000	(0)
ZnCl+	1.384e-06	8.952e-07	-5.859	-6.048	-0.189	(0)
ZnCl2	2.689e-07	2.689e-07	-6.570	-6.570	0.000	(0)
ZnCl3-	7.324e-08	4.737e-08	-7.135	-7.324	-0.189	(0)
ZnCl4-2	2.443e-08	5.171e-09	-7.612	-8.286	-0.674	(0)
ZnOHCl	1.294e-09	1.294e-09	-8.888	-8.888	0.000	(0)
ZnOH+	3.021e-10	1.286e-10	-9.520	-9.891	-0.371	(0)
Zn(OH)2	2.967e-14	2.967e-14	-13.528	-13.528	0.000	(0)
Zn(OH)3-	3.746e-19	1.595e-19	-18.426	-18.797	-0.371	(0)
Zn(OH)4-2	2.074e-25	6.807e-27	-24.683	-26.167	-1.484	(0)
Zn(HS)2	6.655e-38	6.655e-38	-37.177	-37.177	0.000	(0)
ZnSeO4	3.161e-38	3.161e-38	-37.500	-37.500	0.000	(0)
ZnS(HS)-	1.648e-38	7.016e-39	-37.783	-38.154	-0.371	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-55.630	-56.001	-0.371	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-59.464	-60.948	-1.484	(0)
ZnNO3+	0.000e+00	0.000e+00	-69.440	-69.810	-0.371	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-69.912	-71.396	-1.484	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-78.082	-79.566	-1.484	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-134.955	-134.955	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-159.75	-153.48	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-30.44	-25.91	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-37.71	-25.91	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-232.75	-214.82	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-43.58	-23.47	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-39.54	-39.09	0.45	(NH4)2SeO4
Al(OH)3(am)	-1.91	9.16	11.06	Al(OH)3
Al2O3	-1.94	18.33	20.27	Al2O3

Al4(OH)10SO4	2.03	24.73	22.70	Al4(OH)10SO4
AlOHSO4	0.49	-2.74	-3.23	AlOHSO4
Alunite	7.22	6.32	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.04	-10.86	-7.82	PbSO4
Anhydrite	-0.09	-4.43	-4.34	CaSO4
Anilite	0.57	-31.74	-32.31	Cu0.25Cu1.5S
Antlerite	-19.72	-10.93	8.79	Cu3(OH)4SO4
Atacamite	-12.64	-5.03	7.61	Cu2(OH)3Cl
Bianchite	-5.91	-7.67	-1.76	ZnSO4:6H2O
Birnessite	-25.35	-7.26	18.09	MnO2
Bixbyite	-26.43	-26.77	-0.35	Mn2O3
BlaubleiI	-3.30	-27.46	-24.16	Cu0.9Cu0.2S
BlaubleiII	-2.16	-29.44	-27.28	Cu0.6Cu0.8S
Boehmite	0.30	9.16	8.86	AlOOH
Brochantite	-26.31	-10.61	15.71	Cu4(OH)6SO4
Brucite	-9.03	8.09	17.12	Mg(OH)2
Bunsenite	-7.46	5.22	12.68	NiO
Ca3(PO4)2(beta)	-4.79	-33.84	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-7.44	-54.52	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.31	-20.66	-19.35	CaHP04
CaHP04:2H2O	-1.62	-20.67	-19.05	CaHP04:2H2O
Calomel	-11.60	-29.73	-18.13	Hg2Cl2
CaSeO3:2H2O	-14.83	-11.97	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-33.50	-36.50	-3.00	CaSeO4:2H2O
Cd(OH)2	-12.21	1.66	13.87	Cd(OH)2
Cd(OH)2(am)	-12.28	1.66	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-25.54	-18.83	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-29.49	-6.93	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-18.68	-51.28	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-33.68	-5.28	28.40	Cd4(OH)6SO4
CdCl2	-9.08	-9.69	-0.61	CdCl2
CdCl2:1H2O	-8.02	-9.70	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-7.78	-9.71	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.29	-10.60	13.69	Cd
Cdmetal(gamma)	-24.39	-10.60	13.80	Cd
CdOHCl	-7.63	-4.02	3.61	CdOHCl
CdSe	10.70	-9.68	-20.38	CdSe
CdSeO4:2H2O	-40.46	-42.31	-1.85	CdSeO4:2H2O
CdSO4	-10.20	-10.24	-0.05	CdSO4
CdSO4:1H2O	-8.60	-10.25	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-8.43	-10.26	-1.83	CdSO4:2.67H2O
Chalcanthite	-8.95	-11.61	-2.65	CuSO4:5H2O
Chalcocite	1.94	-33.38	-35.32	Cu2S
Chalcopyrite	-11.50	-47.12	-35.62	CuFeS2
Cinnabar	-5.56	-51.86	-46.30	HgS
Clausthalite	17.09	-10.30	-27.39	PbSe
Co(OH)2	-7.91	5.19	13.09	Co(OH)2
Co(OH)3	-19.00	-21.09	-2.09	Co(OH)3
Co3(PO4)2	-6.00	-40.69	-34.69	Co3(PO4)2
Co3O4	-26.73	-36.97	-10.24	Co3O4
CoCl2	-14.62	-6.16	8.46	CoCl2
CoCl2:6H2O	-8.71	-6.20	2.52	CoCl2:6H2O
CoFe2O4	7.96	4.81	-3.15	CoFe2O4
CoHP04	-3.88	-22.94	-19.06	CoHP04
CoO	-8.65	5.19	13.84	CoO
CoS(alpha)	-14.50	-21.94	-7.44	CoS
CoS(beta)	-10.87	-21.94	-11.07	CoS
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-15.56	-14.24	1.32	CoSeO3
CoSeO4:6H2O	-37.28	-38.81	-1.53	CoSeO4:6H2O
CoSO4	-9.71	-6.72	2.99	CoSO4
CoSO4:6H2O	-4.27	-6.75	-2.48	CoSO4:6H2O
Cotunnite	-5.47	-10.31	-4.84	PbCl2
Covellite	-4.27	-26.80	-22.53	CuS
Cu(OH)2	-8.49	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.24	-68.81	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.71	-17.60	-46.31	Cu2Se
Cu2SO4	-16.25	-18.16	-1.90	Cu2SO4

Cu3(P04)2	-18.43	-55.28	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-20.17	-55.29	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.69	-28.61	-64.30	Cu3Se2
Cumetal	-0.33	-9.25	-8.93	Cu
Cu0CuS04	-21.88	-11.25	10.63	Cu0CuS04
Cupricferrite	-6.54	-0.05	6.49	CuFe204
Cuprite	-5.14	-6.25	-1.11	Cu2O
Cuprousferrite	5.56	-3.32	-8.88	CuFe02
CuSe	22.37	-11.01	-33.39	CuSe
CuSe2	23.60	-10.10	-33.70	CuSe2
CuSe03:2H2O	-19.71	-19.11	0.60	CuSe03:2H2O
CuSe04:5H2O	-41.22	-43.66	-2.44	CuSe04:5H2O
CuS04	-14.69	-11.58	3.11	CuS04
Diaspore	2.04	9.16	7.12	Al00H
Djurleite	1.45	-32.95	-34.40	Cu0.066Cu1.868S
Epsomite	-1.70	-3.86	-2.15	MgS04:7H2O
Fe(OH)2	-6.75	6.81	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.14	-1.90	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-21.38	-19.82	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H2O	-38.06	-58.69	-20.63	Fe2(Se03)3:2H2O
Fe2(S04)3	-32.94	-36.10	-3.16	Fe2(S04)3
Fe3(OH)8	-13.81	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.56	-0.20	3.37	Fe(OH)3
Ferroselite	15.09	-3.61	-18.71	FeSe2
FeS(ppt)	-17.39	-20.32	-2.92	FeS
FeSe	6.48	-4.53	-11.00	FeSe
Galena	-11.93	-26.09	-14.16	PbS
Gibbsite	0.64	9.16	8.52	Al(OH)3
Goethite	-0.83	-0.19	0.64	Fe00H
Goslarite	-5.63	-7.67	-2.05	ZnS04:7H2O
Greenockite	-10.98	-25.47	-14.49	CdS
Greigite	-57.06	-102.09	-45.03	Fe3S4
Gypsum	0.17	-4.44	-4.61	CaS04:2H2O
H-Jarosite	-12.86	-24.41	-11.55	(H3O)Fe3(S04)2(OH)6
H2S(g)	-19.13	-27.14	-8.01	H2S
H2Se(g)	-6.43	-11.35	-4.92	H2Se
Halite	-2.94	-1.34	1.59	NaCl
Hausmannite	-31.50	30.53	62.03	Mn304
Hematite	0.73	-0.38	-1.11	Fe203
Hercynite	1.50	25.14	23.64	FeAl204
Hg(g)	-7.39	-15.31	-7.93	Hg
Hg(OH)2	-21.23	-24.73	-3.50	Hg(OH)2
Hg2(g)	-15.53	-30.63	-15.09	Hg2
Hg2(OH)2	-23.64	-18.38	5.26	Hg2(OH)2
Hg2HP04	-21.73	-46.50	-24.77	Hg2HP04
Hg2S	-33.66	-45.50	-11.84	Hg2S
Hg2Se03	-33.15	-37.80	-4.66	Hg2Se03
Hg2S04	-24.13	-30.28	-6.14	Hg2S04
HgCl(g)	-34.75	-14.86	19.88	HgCl
HgCl2	-14.56	-36.08	-21.52	HgCl2
Hgmetal(l)	-1.66	-15.31	-13.65	Hg
HgSe	19.63	-36.07	-55.69	HgSe
HgSe03	-31.73	-44.16	-12.43	HgSe03
HgS04	-27.18	-36.63	-9.45	HgS04
Hinsdalite	-9.02	-11.52	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	-2.69	-47.02	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-16.39	-79.18	-62.79	Pb5(P04)3OH
K-Alum	-6.82	-12.06	-5.24	KAl(S04)2:12H2O
K-Jarosite	-7.25	-21.74	-14.49	KFe3(S04)2(OH)6
K2Se04	-37.92	-38.65	-0.73	K2Se04
Langite	-28.50	-10.61	17.88	Cu4(OH)6S04:H2O
Larnakite	-9.44	-9.82	-0.38	Pb0:PbS04
Laurionite	-5.26	-4.64	0.62	PbOHCl
Lepidocrocite	-1.56	-0.19	1.37	Fe00H
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.81	1.04	12.85	PbO
Mackinawite	-16.72	-20.32	-3.60	FeS
Maghemite	-6.77	-0.38	6.39	Fe203

Magnesioferrite	-9.81	7.71	17.52	Fe2MgO4
Magnetite	2.54	6.43	3.90	Fe3O4
Manganite	-13.12	12.22	25.34	MnOOH
Massicot	-12.01	1.04	13.05	PbO
Melanothallite	-17.43	-11.03	6.41	CuCl2
Melanterite	-2.87	-5.13	-2.26	FeSO4·7H2O
Metacinnabar	-6.16	-51.86	-45.70	HgS
Mg(OH)2(active)	-10.71	8.09	18.79	Mg(OH)2
Mg3(PO4)2	-8.71	-31.99	-23.28	Mg3(PO4)2
MgHP04:3H2O	-1.89	-20.06	-18.18	MgHP04:3H2O
MgSeO3:6H2O	-14.42	-11.38	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-34.71	-35.91	-1.20	MgSeO4:6H2O
Minium	-59.14	15.39	74.53	Pb3O4
Mirabilite	-1.99	-3.30	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-57.17	-62.49	-5.32	Mn2(SO4)3
Mn3(P04)2	-14.14	-37.99	-23.85	Mn3(P04)2
MnCl2:4H2O	-8.03	-5.29	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnS(grn)	-21.29	-21.04	0.25	MnS
MnS(pnk)	-24.38	-21.04	3.34	MnS
MnSe	-8.99	-5.25	3.73	MnSe
MnSeO3	-14.47	-13.34	1.13	MnSeO3
MnSeO3:2H2O	-14.31	-13.35	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-35.85	-37.90	-2.05	MnSeO4:5H2O
MnSO4	-8.55	-5.81	2.74	MnSO4
Monteponite	-13.69	1.66	15.35	CdO
Montroydite	-21.18	-24.73	-3.55	HgO
Morenosite	-4.55	-6.72	-2.17	NiSO4:7H2O
Na-Jarosite	-9.23	-20.07	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-21.09	-10.79	10.30	Na2SeO3:5H2O
Na2SeO4	-36.58	-35.30	1.28	Na2SeO4
Nantokite	-1.97	-8.80	-6.83	CuCl
Ni(OH)2	-7.81	5.22	13.02	Ni(OH)2
Ni3(P04)2	-9.29	-40.59	-31.30	Ni3(P04)2
Ni4(OH)6SO4	-23.03	8.97	32.00	Ni4(OH)6SO4
NiS(alpha)	-16.31	-21.91	-5.60	NiS
NiS(beta)	-10.81	-21.91	-11.10	NiS
NiS(gamma)	-9.11	-21.91	-12.80	NiS
NiSe	11.58	-6.12	-17.70	NiSe
NiSeO3:2H2O	-17.11	-14.22	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-37.25	-38.77	-1.52	NiSeO4:6H2O
Nsutite	-24.76	-7.26	17.50	MnO2
O2(g)	-59.94	24.51	84.45	O2
Pb(OH)2	-7.25	1.04	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.39	-3.60	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-24.11	2.08	26.19	Pb2O(OH)2
Pb2O3	-46.70	14.34	61.04	Pb2O3
Pb3(P04)2	-9.60	-53.13	-43.53	Pb3(P04)2
Pb3O2SO4	-19.65	-8.78	10.87	Pb3O2SO4
Pb4(OH)6SO4	-28.85	-7.75	21.10	Pb4(OH)6SO4
Pb4O3SO4	-29.93	-7.73	22.20	Pb4O3SO4
PbHP04	-3.29	-27.09	-23.81	PbHP04
Pbmetal	-15.46	-11.21	4.24	Pb
PbO:0.3H2O	-11.94	1.04	12.98	PbO:0.33H2O
PbSeO4	-36.04	-42.92	-6.88	PbSeO4
Periclase	-13.85	8.09	21.94	MgO
Plattnerite	-37.01	13.30	50.31	PbO2
Plumbgummite	5.05	-27.74	-32.79	PbAl3(P04)2(OH)5·H2O
Portlandite	-15.64	7.47	23.11	Ca(OH)2
Pyrite	-16.56	-35.19	-18.63	FeS2
Pyrochroite	-9.34	6.09	15.43	Mn(OH)2
Pyrolusite	-23.68	18.35	42.03	MnO2
Pyromorphite	-0.42	-84.85	-84.43	Pb5(P04)3Cl
Retgersite	-4.67	-6.72	-2.05	NiSO4:6H2O
Semetal(am)	8.05	0.91	-7.14	Se
Semetal(hex)	8.66	0.91	-7.75	Se
SeO2	-19.55	-19.43	0.12	SeO2
SeO3	-65.36	-43.96	21.39	SeO3

Sphalerite	-11.34	-22.86	-11.52	ZnS
Spinel	-11.35	26.42	37.77	MgAl2O4
Strengite	-1.95	-28.33	-26.38	FePO4:2H2O
Sulfur	-12.77	-14.87	-2.11	S
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.58	-3.24	0.34	Na2SO4
Tsumebite	-15.95	-25.74	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	0.14	-35.86	-36.00	Fe3(PO4)2:8H2O
Wurtzite	-13.86	-22.86	-9.00	ZnS
Zincite	-7.28	4.27	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnSO4
Zn(NO3)2:6H2O	-137.95	-134.69	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-7.93	4.27	12.20	Zn(OH)2
Zn(OH)2(am)	-8.40	4.27	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.69	4.27	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.46	4.27	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.47	4.27	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.87	-3.37	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.33	2.86	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-8.05	-43.47	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-30.52	-11.00	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-23.24	5.16	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-28.52	9.98	38.50	Zn5(OH)8Cl2
ZnCl2	-14.30	-7.08	7.22	ZnCl2
Znmetal	-34.14	-7.99	26.15	Zn
ZnO(active)	-7.13	4.27	11.40	ZnO
ZnS(am)	-13.77	-22.86	-9.09	ZnS
ZnSe	7.39	-7.07	-14.46	ZnSe
ZnSeO4:6H2O	-38.20	-39.72	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.11	-7.64	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 5.

SOLUTION 3 #Groundwater worst case maximum values

temp 21
pH 5.05
pe 1
redox pe
units mg/l
density 1
Al 5.21
Alkalinity 0
As 0
Ba 0
Be 0
B 0
Cd 0.04
Co 24.2
Cr 0
Cu 9.29
Fe 937
Pb 0.01
Mn 171
Mo 0
V 0
Zn 1.78
Se 0.08
Ni 5.57
N 60

```

P      23.6
Ca     590
Mg    1340
Na    5880
K      216
Cl    9420
S(6)   9110
Hg     0.0004
water  1 # kg
MIX 2
  1    0.004
  3    0.996
REACTION 3
H2O -1
7
END #Time-step 3

```

Beginning of initial solution calculations.

Initial solution 3.

-----Solution composition-----

Elements	Molality	Moles
Al	1.986e-04	1.986e-04
Ca	1.514e-02	1.514e-02
Cd	3.660e-07	3.660e-07
Cl	2.733e-01	2.733e-01
Co	4.224e-04	4.224e-04
Cu	1.504e-04	1.504e-04
Fe	1.726e-02	1.726e-02
Hg	2.051e-09	2.051e-09
K	5.682e-03	5.682e-03
Mg	5.671e-02	5.671e-02
Mn	3.202e-03	3.202e-03
N	4.406e-03	4.406e-03
Na	2.631e-01	2.631e-01
Ni	9.762e-05	9.762e-05
P	7.837e-04	7.837e-04
Pb	4.964e-08	4.964e-08
S(6)	9.754e-02	9.754e-02
Se	1.042e-06	1.042e-06
Zn	2.800e-05	2.800e-05

-----Description of solution-----

```

pH = 5.050
pe = 1.000
Activity of water = 0.988
Ionic strength (mol/kgw) = 4.862e-01
Mass of water (kg) = 1.000e+00
Total alkalinity (eq/kg) = 1.381e-05
Total carbon (mol/kg) = 0.000e+00
Total CO2 (mol/kg) = 0.000e+00
Temperature (°C) = 21.00
Electrical balance (eq) = -9.552e-03
Percent error, 100*(Cat-|An|)/(Cat+|An|) = -1.26
Iterations = 14
Total H = 1.110329e+02
Total O = 5.590014e+01

```

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol

H+	1.214e-05	8.913e-06	-4.916	-5.050	-0.134	0.00
OH-	1.292e-09	8.222e-10	-8.889	-9.085	-0.196	(0)
H2O	5.551e+01	9.883e-01	1.744	-0.005	0.000	18.05
Al	1.986e-04					
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Al+3	1.839e-05	1.139e-06	-4.735	-5.943	-1.208	(0)
AlOH+2	4.197e-06	9.786e-07	-5.377	-6.009	-0.632	(0)
Al(OH)2+	1.624e-06	1.128e-06	-5.790	-5.948	-0.158	(0)
Al(OH)3	2.514e-08	2.514e-08	-7.600	-7.600	0.000	(0)
Al(OH)4-	2.040e-09	1.366e-09	-8.690	-8.864	-0.174	(0)
Ca	1.514e-02					
Ca+2	8.161e-03	2.370e-03	-2.088	-2.625	-0.537	(0)
CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
CaOH+	5.236e-11	3.715e-11	-10.281	-10.430	-0.149	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
Cd	3.660e-07					
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
Cd(SO4)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
Cd+2	1.502e-08	4.363e-09	-7.823	-8.360	-0.537	(0)
CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CdOH+	6.462e-14	2.865e-14	-13.190	-13.543	-0.353	(0)
Cd2OH+3	9.945e-19	6.582e-22	-18.002	-21.182	-3.179	(0)
Cd(OH)2	2.726e-19	2.726e-19	-18.564	-18.564	0.000	(0)
Cd(OH)3-	4.195e-26	1.860e-26	-25.377	-25.730	-0.353	(0)
Cd(OH)4-2	8.799e-35	3.400e-36	-34.056	-35.469	-1.413	(0)
Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cl	2.733e-01					
Cl-	2.729e-01	2.003e-01	-0.564	-0.698	-0.134	(0)
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)

HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(2)	4.224e-04					
Co+2	3.644e-04	1.408e-05	-3.438	-4.851	-1.413	(0)
CoS04	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CoHP04	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CoOH+	7.075e-10	3.137e-10	-9.150	-9.504	-0.353	(0)
Co2OH+3	3.344e-13	2.213e-16	-12.476	-15.655	-3.179	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Co(OH)2	2.782e-14	2.782e-14	-13.556	-13.556	0.000	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Co(OH)3-	1.398e-21	6.199e-22	-20.854	-21.208	-0.353	(0)
Co0OH-	8.505e-23	3.771e-23	-22.070	-22.424	-0.353	(0)
Co4(OH)4+4	8.668e-25	1.932e-30	-24.062	-29.714	-5.652	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
Co(OH)4-2	2.839e-30	1.097e-31	-29.547	-30.960	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
CoSe04	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Co(3)	8.287e-32					
CoOH+2	8.232e-32	3.180e-33	-31.085	-32.498	-1.413	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co+3	9.049e-36	5.605e-37	-35.043	-36.251	-1.208	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
Cu(1)	1.504e-04					
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
Cu+	1.823e-08	8.082e-09	-7.739	-8.092	-0.353	(0)
Cu(2)	1.182e-09					
Cu+2	5.900e-10	1.714e-10	-9.229	-9.766	-0.537	(0)
CuS04	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
CuOH+	7.604e-13	4.972e-13	-12.119	-12.303	-0.185	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
Cu(OH)2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
Cu2(OH)2+2	1.564e-19	6.042e-21	-18.806	-20.219	-1.413	(0)
Cu(OH)3-	6.965e-22	3.088e-22	-21.157	-21.510	-0.353	(0)
Cu(OH)4-2	7.024e-29	2.714e-30	-28.153	-29.566	-1.413	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Fe(2)	1.726e-02					
Fe+2	1.529e-02	5.907e-04	-1.816	-3.229	-1.413	(0)
FeS04	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
FeH2P04+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
FeHP04	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
FeOH+	2.826e-08	1.934e-08	-7.549	-7.714	-0.165	(0)
Fe(OH)2	1.209e-14	1.209e-14	-13.918	-13.918	0.000	(0)
Fe(OH)3-	6.009e-18	4.111e-18	-17.221	-17.386	-0.165	(0)

Fe(3)	2.087e-10					
Fe(OH)2+	1.957e-10	1.360e-10	-9.708	-9.867	-0.158	(0)
FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
FeOH+2	1.136e-12	2.489e-13	-11.945	-12.604	-0.659	(0)
Fe(OH)3	9.228e-14	9.228e-14	-13.035	-13.035	0.000	(0)
FeS04+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(S04)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
FeH2P04+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Fe+3	7.010e-15	4.342e-16	-14.154	-15.362	-1.208	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
Fe(OH)4-	2.440e-17	1.696e-17	-16.613	-16.771	-0.158	(0)
Fe2(OH)2+4	1.061e-18	2.365e-24	-17.974	-23.626	-5.652	(0)
Fe3(OH)4+5	3.023e-24	4.459e-33	-23.520	-32.351	-8.831	(0)
FeHSe03+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
FeN03+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
H(0)	1.047e-15					
H2	5.235e-16	5.855e-16	-15.281	-15.232	0.049	(0)
Hg(0)	2.051e-09					
Hg	2.051e-09	2.051e-09	-8.688	-8.688	0.000	(0)
Hg(1)	9.698e-28					
Hg2+2	4.849e-28	1.874e-29	-27.314	-28.727	-1.413	(0)
Hg(2)	4.726e-15					
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Hg(OH)2	1.022e-25	1.143e-25	-24.991	-24.942	0.049	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
HgOH+	1.615e-27	7.162e-28	-26.792	-27.145	-0.353	(0)
Hg+2	4.674e-28	1.806e-29	-27.330	-28.743	-1.413	(0)
HgS04	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Hg(OH)3-	3.623e-35	1.606e-35	-34.441	-34.794	-0.353	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
HgN03+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Hg(N03)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
K	5.682e-03					
K+	5.178e-03	3.801e-03	-2.286	-2.420	-0.134	(0)
KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
Mg	5.671e-02					
Mg+2	3.360e-02	9.758e-03	-1.474	-2.011	-0.537	(0)
MgS04	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
MgH2P04+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
MgHP04	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
MgOH+	4.148e-09	2.990e-09	-8.382	-8.524	-0.142	(0)
MgP04-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
Mn(2)	3.202e-03					
Mn+2	2.899e-03	1.120e-04	-2.538	-3.951	-1.413	(0)
MnS04	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
MnOH+	3.381e-10	2.313e-10	-9.471	-9.636	-0.165	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Mn(OH)3-	3.538e-24	2.421e-24	-23.451	-23.616	-0.165	(0)
Mn(OH)4-2	3.983e-32	8.727e-33	-31.400	-32.059	-0.659	(0)
MnSe04	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
MnN03+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
Mn(N03)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Mn(3)	4.471e-28					
Mn+3	4.471e-28	2.769e-29	-27.350	-28.558	-1.208	(0)
Mn(6)	0.000e+00					
Mn04-2	0.000e+00	0.000e+00	-79.028	-79.687	-0.659	(0)

Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-88.115	-88.325	-0.210	(0)
N(-3)	4.406e-03					
NH4+	3.919e-03	2.335e-03	-2.407	-2.632	-0.225	(0)
NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
NH3	1.123e-07	1.123e-07	-6.950	-6.950	0.000	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
N(3)	0.000e+00					
NO2-	0.000e+00	0.000e+00	-47.968	-48.177	-0.210	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-64.954	-65.088	-0.134	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
Na	2.631e-01					
Na+	2.447e-01	1.796e-01	-0.611	-0.746	-0.134	(0)
NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
Ni	9.762e-05					
Ni+2	4.671e-05	1.357e-05	-4.331	-4.867	-0.537	(0)
NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
Ni(SO4)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
NiOH+	3.238e-10	1.435e-10	-9.490	-9.843	-0.353	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Ni(OH)2	1.692e-14	1.692e-14	-13.772	-13.772	0.000	(0)
Ni(OH)3-	4.261e-20	1.889e-20	-19.371	-19.724	-0.353	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-63.001	-62.952	0.049	(0)
P	7.837e-04					

H2PO4-	4.270e-04	2.967e-04	-3.370	-3.528	-0.158	(0)
MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
MgHPO4	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
HP04-2	9.473e-06	2.076e-06	-5.024	-5.683	-0.659	(0)
NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
H3PO4	3.560e-07	3.560e-07	-6.449	-6.449	0.000	(0)
KHPO4-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
MgPO4-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
PO4-3	1.460e-12	9.045e-14	-11.836	-13.044	-1.208	(0)
FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Pb	4.964e-08					
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
Pb(SO4)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
Pb+2	3.636e-09	1.056e-09	-8.439	-8.976	-0.537	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
PbOH+	6.682e-12	2.963e-12	-11.175	-11.528	-0.353	(0)
Pb(OH)2	1.046e-16	1.046e-16	-15.980	-15.980	0.000	(0)
Pb2OH+3	7.494e-17	4.960e-20	-16.125	-19.305	-3.179	(0)
Pb(OH)3-	2.635e-22	1.168e-22	-21.579	-21.933	-0.353	(0)
Pb(OH)4-2	8.268e-28	3.195e-29	-27.083	-28.496	-1.413	(0)
Pb3(OH)4+2	3.173e-30	1.226e-31	-29.499	-30.912	-1.413	(0)
Pb4(OH)4+4	5.352e-31	1.193e-36	-30.271	-35.923	-5.652	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
S(6)	9.754e-02					
SO4-2	4.586e-02	1.332e-02	-1.339	-1.875	-0.537	(0)
MgSO4	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
NaSO4-	1.839e-02	2.278e-02	-1.735	-1.893	-0.158	(0)
CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
FeSO4	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
KSO4-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
MnSO4	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Zn(SO4)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
HSO4-	1.536e-05	1.028e-05	-4.814	-4.988	-0.174	(0)
ZnSO4	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
Ni(SO4)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
Cd(SO4)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
Pb(SO4)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
CuSO4	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
FeSO4+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(SO4)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
HgSO4	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Se(-2)	1.042e-06					
HSe-	1.012e-06	4.485e-07	-5.995	-6.348	-0.353	(0)
H2Se	3.047e-08	3.047e-08	-7.516	-7.516	0.000	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Se-2	1.000e-15	3.865e-17	-15.000	-16.413	-1.413	(0)
Se(4)	2.708e-15					
HSeO3-	2.690e-15	1.193e-15	-14.570	-14.923	-0.353	(0)
SeO3-2	1.341e-17	5.183e-19	-16.872	-18.285	-1.413	(0)

H2SeO3	4.383e-18	4.383e-18	-17.358	-17.358	0.000	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
Se(6)	9.467e-35					
SeO4-2	9.354e-35	2.717e-35	-34.029	-34.566	-0.537	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
HSeO4-	2.413e-38	1.070e-38	-37.617	-37.971	-0.353	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn	2.800e-05					
Zn(SO4)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
Zn+2	6.051e-06	1.758e-06	-5.218	-5.755	-0.537	(0)
ZnSO4	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
ZnOH+	3.259e-10	1.445e-10	-9.487	-9.840	-0.353	(0)
Zn(OH)2	3.473e-14	3.473e-14	-13.459	-13.459	0.000	(0)
Zn(OH)3-	4.384e-19	1.944e-19	-18.358	-18.711	-0.353	(0)
Zn(OH)4-2	2.236e-25	8.641e-27	-24.650	-26.063	-1.413	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-161.31	-155.03	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-30.79	-26.25	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-38.05	-26.26	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-234.94	-217.01	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-43.95	-23.84	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-40.28	-39.83	0.45	(NH4)2SeO4
Al(OH)3(am)	-1.87	9.19	11.06	Al(OH)3
Al2O3	-1.87	18.40	20.27	Al2O3
Al4(OH)10SO4	2.10	24.80	22.70	Al4(OH)10SO4
AlOHSO4	0.46	-2.77	-3.23	AlOHSO4
Alunite	7.17	6.27	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.03	-10.85	-7.82	PbSO4
Anhydrite	-0.16	-4.50	-4.34	CaSO4
Antlerite	-19.78	-10.99	8.79	Cu3(OH)4SO4
Atacamite	-12.71	-5.10	7.61	Cu2(OH)3Cl
Bianchite	-5.90	-7.66	-1.76	ZnSO4:6H2O
Birnessite	-25.46	-7.37	18.09	MnO2
Bixbyite	-26.48	-26.83	-0.35	Mn2O3
Boehmite	0.34	9.20	8.86	AlOOH
Brochantite	-26.38	-10.67	15.71	Cu4(OH)6SO4
Brucite	-9.04	8.08	17.12	Mg(OH)2
Bunsenite	-7.46	5.23	12.68	NiO
Ca3(PO4)2(beta)	-4.91	-33.96	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-7.62	-54.70	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.37	-20.72	-19.35	CaHP04
CaHP04:2H2O	-1.68	-20.73	-19.05	CaHP04:2H2O
Calomel	-11.99	-30.12	-18.13	Hg2Cl2
CaSeO3:2H2O	-15.37	-12.51	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-34.20	-37.20	-3.00	CaSeO4:2H2O
Cd(OH)2	-12.14	1.73	13.87	Cd(OH)2
Cd(OH)2(am)	-12.21	1.73	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-25.45	-18.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-29.34	-6.78	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-18.57	-51.17	-32.60	Cd3(PO4)2

Cd4(OH)6SO4	-33.45	-5.05	28.40	Cd4(OH)6SO4
CdCl2	-9.14	-9.76	-0.61	CdCl2
CdCl2:1H2O	-8.09	-9.76	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-7.84	-9.77	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.05	-10.36	13.69	Cd
Cdmetal(gamma)	-24.16	-10.36	13.80	Cd
CdOHCl	-7.62	-4.01	3.61	CdOHCl
CdSe	10.72	-9.66	-20.38	CdSe
CdSeO4:2H2O	-41.09	-42.94	-1.85	CdSeO4:2H2O
CdSO4	-10.19	-10.24	-0.05	CdSO4
CdSO4:1H2O	-8.59	-10.24	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-8.42	-10.25	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.01	-11.67	-2.65	CuSO4:5H2O
Clausthalite	17.11	-10.27	-27.39	PbSe
Co(OH)2	-7.86	5.24	13.09	Co(OH)2
Co(OH)3	-19.03	-21.12	-2.09	Co(OH)3
Co3(P04)2	-5.95	-40.64	-34.69	Co3(P04)2
Co3O4	-26.74	-36.97	-10.24	Co3O4
CoCl2	-14.71	-6.25	8.46	CoCl2
CoCl2:6H2O	-8.80	-6.28	2.52	CoCl2:6H2O
CoFe2O4	7.95	4.80	-3.15	CoFe2O4
CoHP04	-3.88	-22.95	-19.06	CoHP04
CoO	-8.60	5.24	13.84	CoO
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-16.04	-14.72	1.32	CoSeO3
CoSeO4:6H2O	-37.92	-39.45	-1.53	CoSeO4:6H2O
CoSO4	-9.72	-6.73	2.99	CoSO4
CoSO4:6H2O	-4.28	-6.76	-2.48	CoSO4:6H2O
Cotunnite	-5.53	-10.37	-4.84	PbCl2
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.91	-69.49	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.83	-17.48	-46.31	Cu2Se
Cu2SO4	-16.16	-18.06	-1.90	Cu2SO4
Cu3(P04)2	-18.54	-55.39	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-20.28	-55.40	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.75	-28.55	-64.30	Cu3Se2
Cumetal	-0.17	-9.09	-8.93	Cu
CuOCuSO4	-21.94	-11.31	10.63	CuOCuSO4
Cupricferrite	-6.60	-0.11	6.49	CuFe2O4
Cuprite	-4.98	-6.09	-1.11	Cu2O
Cuprousferrite	5.61	-3.27	-8.88	CuFeO2
CuSe	22.32	-11.06	-33.39	CuSe
CuSe2	23.34	-10.36	-33.70	CuSe2
CuSeO3:2H2O	-20.25	-19.65	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-41.92	-44.36	-2.44	CuSeO4:5H2O
CuSO4	-14.76	-11.64	3.11	CuSO4
Diaspore	2.08	9.20	7.12	AlOOH
Epsomite	-1.77	-3.92	-2.15	MgSO4:7H2O
Fe(OH)2	-6.70	6.86	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.09	-1.95	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-21.97	-20.42	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-39.73	-60.36	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-33.19	-36.35	-3.16	Fe2(SO4)3
Fe3(OH)8	-13.82	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.59	-0.23	3.37	Fe(OH)3
Ferroselite	14.88	-3.83	-18.71	FeSe2
FeSe	6.48	-4.53	-11.00	FeSe
Gibbsite	0.67	9.19	8.52	Al(OH)3
Goethite	-0.86	-0.22	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4:7H2O
Gypsum	0.10	-4.51	-4.61	CaSO4:2H2O
H-Jarosite	-13.07	-24.62	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-6.47	-11.40	-4.92	H2Se
Halite	-3.04	-1.44	1.59	NaCl
Hausmannite	-31.51	30.53	62.03	Mn3O4
Hematite	0.67	-0.44	-1.11	Fe2O3
Hercynite	1.62	25.26	23.64	FeAl2O4
Hg(g)	-7.44	-15.36	-7.93	Hg

Hg(OH)2	-21.45	-24.94	-3.50	Hg(OH)2
Hg2(g)	-15.63	-30.73	-15.09	Hg2
Hg2(OH)2	-23.90	-18.64	5.26	Hg2(OH)2
Hg2HP04	-22.05	-46.82	-24.77	Hg2HP04
Hg2Se03	-33.94	-38.60	-4.66	Hg2Se03
Hg2S04	-24.46	-30.60	-6.14	Hg2S04
HgCl(g)	-34.94	-15.06	19.88	HgCl
HgCl2	-14.91	-36.43	-21.52	HgCl2
Hgmetal(l)	-1.71	-15.36	-13.65	Hg
HgSe	19.36	-36.33	-55.69	HgSe
HgSe03	-32.48	-44.91	-12.43	HgSe03
HgS04	-27.45	-36.91	-9.45	HgS04
Hinsdalite	-8.96	-11.46	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	-2.88	-47.21	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-16.18	-78.97	-62.79	Pb5(P04)3OH
K-Alum	-6.93	-12.18	-5.24	KAl(S04)2:12H2O
K-Jarosite	-7.50	-21.99	-14.49	KFe3(S04)2(OH)6
K2Se04	-38.68	-39.41	-0.73	K2Se04
Langite	-28.56	-10.68	17.88	Cu4(OH)6S04:H2O
Larnakite	-9.35	-9.73	-0.38	Pb0:PbS04
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.59	-0.22	1.37	Fe00H
Lime	-25.69	7.47	33.16	Ca0
Litharge	-11.73	1.12	12.85	Pb0
Maghemite	-6.83	-0.44	6.39	Fe203
Magnesioferrite	-9.88	7.64	17.52	Fe2Mg04
Magnetite	2.53	6.43	3.90	Fe304
Manganite	-13.15	12.19	25.34	Mn00H
Massicot	-11.93	1.12	13.05	Pb0
Melanothallite	-17.57	-11.16	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeS04:7H2O
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(P04)2	-8.84	-32.12	-23.28	Mg3(P04)2
MgHP04:3H2O	-1.94	-20.12	-18.18	MgHP04:3H2O
MgSe03:6H2O	-14.96	-11.91	3.04	MgSe03:6H2O
MgSe04:6H2O	-35.41	-36.61	-1.20	MgSe04:6H2O
Minium	-59.08	15.45	74.53	Pb304
Mirabilite	-2.11	-3.42	-1.30	Na2S04:10H2O
Mn2(S04)3	-57.42	-62.74	-5.32	Mn2(S04)3
Mn3(P04)2	-14.09	-37.94	-23.85	Mn3(P04)2
MnCl2:4H2O	-8.11	-5.37	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnSe	-8.98	-5.25	3.73	MnSe
MnSe03	-14.95	-13.82	1.13	MnSe03
MnSe03:2H2O	-14.80	-13.83	0.96	MnSe03:2H2O
MnSe04:5H2O	-36.49	-38.54	-2.05	MnSe04:5H2O
MnS04	-8.56	-5.83	2.74	MnS04
Monteponite	-13.62	1.73	15.35	Cd0
Montroydite	-21.39	-24.94	-3.55	Hg0
Morenosite	-4.60	-6.78	-2.17	NiS04:7H2O
Na-Jarosite	-9.47	-20.31	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-21.69	-11.39	10.30	Na2Se03:5H2O
Na2Se04	-37.34	-36.06	1.28	Na2Se04
Nantokite	-19.96	-8.79	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(P04)2	-9.39	-40.69	-31.30	Ni3(P04)2
Ni4(OH)6S04	-23.08	8.92	32.00	Ni4(OH)6S04
NiSe	11.53	-6.17	-17.70	NiSe
NiSe03:2H2O	-17.64	-14.75	2.89	NiSe03:2H2O
NiSe04:6H2O	-37.94	-39.46	-1.52	NiSe04:6H2O
Nsutite	-24.87	-7.37	17.50	Mn02
O2(g)	-60.26	24.19	84.45	O2
Pb(OH)2	-7.18	1.11	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.31	-3.52	8.79	Pb2(OH)3Cl
Pb20(OH)2	-23.96	2.23	26.19	Pb20(OH)2
Pb203	-46.71	14.33	61.04	Pb203
Pb3(P04)2	-9.49	-53.02	-43.53	Pb3(P04)2
Pb302S04	-19.49	-8.61	10.87	Pb302S04

Pb4(OH)6SO4	-28.61	-7.51	21.10	Pb4(OH)6SO4
Pb4O3SO4	-29.70	-7.50	22.20	Pb4O3SO4
PbHP04	-3.26	-27.07	-23.81	PbHP04
Pbmetal	-15.22	-10.98	4.24	Pb
PbO:0.3H2O	-11.86	1.12	12.98	PbO:0.33H2O
PbSe04	-36.67	-43.54	-6.88	PbSe04
Periclase	-13.86	8.08	21.94	MgO
Plattnerite	-37.09	13.21	50.31	PbO2
Plumbgummite	5.12	-27.67	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-15.65	7.46	23.11	Ca(OH)2
Pyrochroite	-9.29	6.14	15.43	Mn(OH)2
Pyrolusite	-23.79	18.24	42.03	MnO2
Pyromorphite	-0.28	-84.71	-84.43	Pb5(P04)3Cl
Retgersite	-4.72	-6.77	-2.05	NiSO4:6H2O
Semetal(am)	7.84	0.70	-7.14	Se
Semetal(hex	8.45	0.70	-7.75	Se
SeO2	-20.09	-19.97	0.12	SeO2
SeO3	-66.05	-44.66	21.39	SeO3
Spinel	-11.29	26.48	37.77	MgAl2O4
Strengite	-2.04	-28.42	-26.38	FeP04:2H2O
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.71	-3.37	0.34	Na2SO4
Tsumebite	-15.85	-25.64	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	0.19	-35.81	-36.00	Fe3(P04)2:8H2O
Zincite	-7.21	4.34	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnSO4
Zn(N03)2:6H2O	-139.22	-135.96	3.26	Zn(N03)2:6H2O
Zn(OH)2	-7.87	4.33	12.20	Zn(OH)2
Zn(OH)2(am)	-8.33	4.33	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.62	4.33	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.39	4.33	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.40	4.33	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.80	-3.30	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.26	2.93	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-7.95	-43.37	-35.42	Zn3(P04)2:4H2O
Zn3O(S04)2	-30.45	-10.92	19.53	Zn3O(S04)2
Zn4(OH)6SO4	-23.03	5.37	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-28.31	10.19	38.50	Zn5(OH)8Cl2
ZnCl2	-14.37	-7.15	7.22	ZnCl2
Znmetal	-33.91	-7.76	26.15	Zn
ZnO(active)	-7.06	4.34	11.40	ZnO
ZnSe	7.41	-7.05	-14.46	ZnSe
ZnSe04:6H2O	-38.83	-40.35	-1.52	ZnSe04:6H2O
ZnSO4:1H2O	-7.10	-7.64	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 2.
Using reaction 3.

Mixture 2.

4.000e-03 Solution 1
9.960e-01 Solution 3

Reaction 3.

7.000e+00 moles of the following reaction have been added:

	Relative
Reactant	moles

H2O -1.00000

Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	2.273e-04	1.986e-04
Ca	1.733e-02	1.514e-02
Cd	4.188e-07	3.660e-07
Cl	3.127e-01	2.733e-01
Co	4.833e-04	4.224e-04
Cu	1.721e-04	1.504e-04
Fe	1.975e-02	1.726e-02
Hg	2.347e-09	2.051e-09
K	6.503e-03	5.682e-03
Mg	6.489e-02	5.671e-02
Mn	3.664e-03	3.202e-03
N	5.042e-03	4.406e-03
Na	3.010e-01	2.631e-01
Ni	1.117e-04	9.762e-05
P	8.968e-04	7.837e-04
Pb	5.681e-08	4.964e-08
S	1.116e-01	9.754e-02
Se	1.193e-06	1.042e-06
Zn	3.204e-05	2.800e-05

-----Description of solution-----

pH	=	5.030	Charge balance
pe	=	1.116	Adjusted to redox equilibrium
Activity of water	=	0.987	
Ionic strength (mol/kgw)	=	5.456e-01	
Mass of water (kg)	=	8.739e-01	
Total alkalinity (eq/kg)	=	1.581e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	-9.552e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.27	
Iterations	=	4	
Total H	=	9.703286e+01	
Total O	=	4.890014e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.266e-05	9.335e-06	-4.898	-5.030	-0.132	0.00
OH-	1.249e-09	7.836e-10	-8.903	-9.106	-0.203	(0)
H2O	5.551e+01	9.867e-01	1.744	-0.006	0.000	18.05
Al	2.273e-04					
AlSO4+	1.735e-04	1.149e-04	-3.761	-3.940	-0.179	(0)
Al(SO4)2-	2.929e-05	1.939e-05	-4.533	-4.712	-0.179	(0)
Al+3	1.856e-05	1.196e-06	-4.731	-5.922	-1.191	(0)
AlOH+2	4.361e-06	9.795e-07	-5.360	-6.009	-0.649	(0)
Al(OH)2+	1.564e-06	1.076e-06	-5.806	-5.968	-0.162	(0)
Al(OH)3	2.286e-08	2.286e-08	-7.641	-7.641	0.000	(0)
Al(OH)4-	1.788e-09	1.184e-09	-8.748	-8.927	-0.179	(0)
Ca	1.733e-02					
Ca+2	8.919e-03	2.637e-03	-2.050	-2.579	-0.529	(0)
CaSO4	8.380e-03	8.380e-03	-2.077	-2.077	0.000	(0)

Cd	CaH2PO4+	2.633e-05	1.813e-05	-4.580	-4.742	-0.162	(0)	
	CaHPO4	2.472e-06	2.472e-06	-5.607	-5.607	0.000	(0)	
	CaNH3+2	1.655e-08	5.273e-10	-7.781	-9.278	-1.497	(0)	
	CaPO4-	9.376e-10	6.454e-10	-9.028	-9.190	-0.162	(0)	
	CaOH+	5.597e-11	3.939e-11	-10.252	-10.405	-0.153	(0)	
	Ca(NH3)2+2	1.047e-15	3.335e-17	-14.980	-16.477	-1.497	(0)	
	CaNO3+	0.000e+00	0.000e+00	-66.007	-66.381	-0.374	(0)	
		4.188e-07						
	CdCl+	2.033e-07	8.588e-08	-6.692	-7.066	-0.374	(0)	
	CdCl2	8.154e-08	8.154e-08	-7.089	-7.089	0.000	(0)	
Cd	Cd(SO4)2-2	8.108e-08	2.583e-09	-7.091	-8.588	-1.497	(0)	
	CdCl3-	2.698e-08	1.140e-08	-7.569	-7.943	-0.374	(0)	
	Cd+2	1.328e-08	3.927e-09	-7.877	-8.406	-0.529	(0)	
	CdSO4	1.266e-08	1.266e-08	-7.898	-7.898	0.000	(0)	
	CdOHC1	3.412e-12	3.412e-12	-11.467	-11.467	0.000	(0)	
	CdOH+	5.818e-14	2.458e-14	-13.235	-13.609	-0.374	(0)	
	Cd2OH+3	1.185e-18	5.083e-22	-17.926	-21.294	-3.368	(0)	
	Cd(OH)2	2.230e-19	2.230e-19	-18.652	-18.652	0.000	(0)	
	CdHS+	5.790e-23	2.446e-23	-22.237	-22.612	-0.374	(0)	
	Cd(OH)3-	3.431e-26	1.450e-26	-25.465	-25.839	-0.374	(0)	
	Cd(OH)4-2	7.927e-35	2.526e-36	-34.101	-35.598	-1.497	(0)	
	Cd(SeO3)2-2	4.410e-37	1.405e-38	-36.356	-37.852	-1.497	(0)	
	Cd(HS)2	2.393e-38	2.393e-38	-37.621	-37.621	0.000	(0)	
	CdSeO4	1.208e-40	1.208e-40	-39.918	-39.918	0.000	(0)	
	Cd(HS)3-	0.000e+00	0.000e+00	-57.561	-57.935	-0.374	(0)	
	CdNO3+	0.000e+00	0.000e+00	-71.796	-72.171	-0.374	(0)	
	Cd(HS)4-2	0.000e+00	0.000e+00	-76.456	-77.952	-1.497	(0)	
	Cd(NO3)2	0.000e+00	0.000e+00	-136.835	-136.835	0.000	(0)	
	Cl		3.127e-01					
		Cl-	3.123e-01	2.303e-01	-0.505	-0.638	-0.132	(0)
CuCl2-		1.481e-04	9.558e-05	-3.830	-4.020	-0.190	(0)	
MnCl+		4.563e-05	3.091e-05	-4.341	-4.510	-0.169	(0)	
CoCl+		2.501e-05	1.057e-05	-4.602	-4.976	-0.374	(0)	
CuCl3-2		2.202e-05	4.633e-06	-4.657	-5.334	-0.677	(0)	
NiCl+		2.028e-05	8.568e-06	-4.693	-5.067	-0.374	(0)	
MnCl2		1.005e-05	1.005e-05	-4.998	-4.998	0.000	(0)	
CuCl		1.968e-06	1.968e-06	-5.706	-5.706	0.000	(0)	
ZnCl+		1.395e-06	9.004e-07	-5.855	-6.046	-0.190	(0)	
MnCl3-		9.413e-07	6.375e-07	-6.026	-6.196	-0.169	(0)	
ZnCl2		2.763e-07	2.763e-07	-6.559	-6.559	0.000	(0)	
CdCl+		2.033e-07	8.588e-08	-6.692	-7.066	-0.374	(0)	
CdCl2		8.154e-08	8.154e-08	-7.089	-7.089	0.000	(0)	
ZnCl3-		7.700e-08	4.971e-08	-7.113	-7.304	-0.190	(0)	
CdCl3-		2.698e-08	1.140e-08	-7.569	-7.943	-0.374	(0)	
ZnCl4-2		2.634e-08	5.542e-09	-7.579	-8.256	-0.677	(0)	
PbCl+		1.741e-08	7.356e-09	-7.759	-8.133	-0.374	(0)	
NiCl2		1.004e-08	1.004e-08	-7.998	-7.998	0.000	(0)	
PbCl2		7.430e-09	7.430e-09	-8.129	-8.129	0.000	(0)	
PbCl4-2		2.216e-09	7.060e-11	-8.654	-10.151	-1.497	(0)	
PbCl3-		1.684e-09	7.116e-10	-8.774	-9.148	-0.374	(0)	
ZnOHC1		1.292e-09	1.292e-09	-8.889	-8.889	0.000	(0)	
CuCl+		1.016e-10	6.561e-11	-9.993	-10.183	-0.190	(0)	
CuCl2		4.302e-12	4.302e-12	-11.366	-11.366	0.000	(0)	
CdOHC1		3.412e-12	3.412e-12	-11.467	-11.467	0.000	(0)	
HgCl4-2		1.733e-14	5.521e-16	-13.761	-15.258	-1.497	(0)	
FeCl+2		1.579e-14	3.322e-15	-13.802	-14.479	-0.677	(0)	
CuCl3-		1.333e-14	8.604e-15	-13.875	-14.065	-0.190	(0)	
FeCl2+		5.724e-15	3.877e-15	-14.242	-14.412	-0.169	(0)	
HgCl3-		1.374e-15	5.805e-16	-14.862	-15.236	-0.374	(0)	
HgCl2		2.499e-16	2.499e-16	-15.602	-15.602	0.000	(0)	
FeCl3		8.926e-17	8.926e-17	-16.049	-16.049	0.000	(0)	
CuCl4-2		5.405e-17	1.137e-17	-16.267	-16.944	-0.677	(0)	
HgClOH	1.553e-20	1.553e-20	-19.809	-19.809	0.000	(0)		
HgCl+	4.355e-22	1.840e-22	-21.361	-21.735	-0.374	(0)		
CoCl+2	9.400e-34	2.995e-35	-33.027	-34.524	-1.497	(0)		
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.301	-42.798	-1.497	(0)		
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-54.794	-56.291	-1.497	(0)		
Co(2)	4.833e-04							

Co+2	4.210e-04	1.341e-05	-3.376	-4.872	-1.497	(0)
CoS04	3.731e-05	3.731e-05	-4.428	-4.428	0.000	(0)
CoCl+	2.501e-05	1.057e-05	-4.602	-4.976	-0.374	(0)
CoHP04	2.952e-08	2.952e-08	-7.530	-7.530	0.000	(0)
Co(NH3)+2	1.148e-08	3.659e-10	-7.940	-9.437	-1.497	(0)
CoOH+	6.742e-10	2.848e-10	-9.171	-9.545	-0.374	(0)
Co2OH+3	4.464e-13	1.915e-16	-12.350	-15.718	-3.368	(0)
Co(NH3)2+2	5.448e-14	1.736e-15	-13.264	-14.761	-1.497	(0)
Co(OH)2	2.408e-14	2.408e-14	-13.618	-13.618	0.000	(0)
Co(NH3)3+2	1.089e-19	3.471e-21	-18.963	-20.460	-1.497	(0)
Co(OH)3-	1.210e-21	5.114e-22	-20.917	-21.291	-0.374	(0)
Co0OH-	7.375e-23	3.116e-23	-22.132	-22.506	-0.374	(0)
Co4(OH)4+4	1.274e-24	1.313e-30	-23.895	-29.882	-5.987	(0)
Co(NH3)4+2	9.082e-26	2.894e-27	-25.042	-26.539	-1.497	(0)
Co(OH)4-2	2.707e-30	8.626e-32	-29.567	-31.064	-1.497	(0)
Co(NH3)5+2	2.394e-32	7.629e-34	-31.621	-33.118	-1.497	(0)
CoSe04	1.040e-36	1.040e-36	-35.983	-35.983	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.245	-51.620	-0.374	(0)
CoNO3+	0.000e+00	0.000e+00	-68.613	-68.987	-0.374	(0)
Co(NO3)2	0.000e+00	0.000e+00	-132.993	-132.993	0.000	(0)
Co(3)	1.194e-31					
CoOH+2	1.185e-31	3.775e-33	-30.926	-32.423	-1.497	(0)
CoCl+2	9.400e-34	2.995e-35	-33.027	-34.524	-1.497	(0)
Co+3	1.083e-35	6.979e-37	-34.965	-36.156	-1.191	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.301	-42.798	-1.497	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.242	-52.616	-0.374	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-54.794	-56.291	-1.497	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.680	-60.177	-1.497	(0)
Cu(1)	1.721e-04					
CuCl2-	1.481e-04	9.558e-05	-3.830	-4.020	-0.190	(0)
CuCl3-2	2.202e-05	4.633e-06	-4.657	-5.334	-0.677	(0)
CuCl	1.968e-06	1.968e-06	-5.706	-5.706	0.000	(0)
Cu+	1.607e-08	6.789e-09	-7.794	-8.168	-0.374	(0)
Cu(S4)2-3	2.328e-39	7.150e-40	-38.633	-39.146	-0.513	(0)
CuS4S5-3	3.997e-40	1.331e-40	-39.398	-39.876	-0.477	(0)
Cu(2)	1.350e-09					
Cu+2	6.364e-10	1.881e-10	-9.196	-9.725	-0.529	(0)
CuS04	5.927e-10	5.927e-10	-9.227	-9.227	0.000	(0)
CuCl+	1.016e-10	6.561e-11	-9.993	-10.183	-0.190	(0)
CuNH3+2	1.425e-11	4.540e-13	-10.846	-12.343	-1.497	(0)
CuCl2	4.302e-12	4.302e-12	-11.366	-11.366	0.000	(0)
CuOH+	8.060e-13	5.203e-13	-12.094	-12.284	-0.190	(0)
CuCl3-	1.333e-14	8.604e-15	-13.875	-14.065	-0.190	(0)
Cu(OH)2	1.345e-16	1.345e-16	-15.871	-15.871	0.000	(0)
CuCl4-2	5.405e-17	1.137e-17	-16.267	-16.944	-0.677	(0)
Cu2(OH)2+2	2.077e-19	6.616e-21	-18.683	-20.179	-1.497	(0)
Cu(OH)3-	6.949e-22	2.936e-22	-21.158	-21.532	-0.374	(0)
Cu(OH)4-2	7.718e-29	2.459e-30	-28.112	-29.609	-1.497	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-50.093	-50.467	-0.374	(0)
CuNO2+	0.000e+00	0.000e+00	-54.926	-55.301	-0.374	(0)
CuNO3+	0.000e+00	0.000e+00	-73.156	-73.530	-0.374	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-101.886	-101.886	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-138.755	-138.755	0.000	(0)
Fe(2)	1.975e-02					
Fe+2	1.771e-02	5.643e-04	-1.752	-3.249	-1.497	(0)
FeS04	1.912e-03	1.912e-03	-2.719	-2.719	0.000	(0)
FeH2P04+	1.221e-04	8.402e-05	-3.913	-4.076	-0.162	(0)
FeHP04	4.532e-06	4.532e-06	-5.344	-5.344	0.000	(0)
FeOH+	2.599e-08	1.760e-08	-7.585	-7.754	-0.169	(0)
Fe(OH)2	1.049e-14	1.049e-14	-13.979	-13.979	0.000	(0)
Fe(OH)3-	5.021e-18	3.400e-18	-17.299	-17.468	-0.169	(0)
Fe(HS)2	1.881e-39	1.881e-39	-38.726	-38.726	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-58.528	-58.902	-0.374	(0)
Fe(3)	2.413e-10					
Fe(OH)2+	2.240e-10	1.542e-10	-9.650	-9.812	-0.162	(0)
FeHP04+	1.551e-11	1.068e-11	-10.809	-10.971	-0.162	(0)
FeOH+2	1.408e-12	2.961e-13	-11.851	-12.528	-0.677	(0)
FeS04+	1.129e-13	7.648e-14	-12.947	-13.116	-0.169	(0)

Fe(OH)3	9.976e-14	9.976e-14	-13.001	-13.001	0.000	(0)
Fe(SO4)2-	5.762e-14	2.435e-14	-13.239	-13.614	-0.374	(0)
FeCl+2	1.579e-14	3.322e-15	-13.802	-14.479	-0.677	(0)
FeH2PO4+2	1.362e-14	3.058e-15	-13.866	-14.515	-0.649	(0)
Fe+3	8.409e-15	5.420e-16	-14.075	-15.266	-1.191	(0)
FeCl2+	5.724e-15	3.877e-15	-14.242	-14.412	-0.169	(0)
FeCl3	8.926e-17	8.926e-17	-16.049	-16.049	0.000	(0)
Fe(OH)4-	2.538e-17	1.747e-17	-16.596	-16.758	-0.162	(0)
Fe2(OH)2+4	3.250e-18	3.349e-24	-17.488	-23.475	-5.987	(0)
Fe3(OH)4+5	1.620e-23	7.161e-33	-22.790	-32.145	-9.355	(0)
FeHSeO3+2	1.915e-25	6.101e-27	-24.718	-26.215	-1.497	(0)
FeNO3+2	0.000e+00	0.000e+00	-76.996	-78.493	-1.497	(0)
H(0)	6.633e-16					
H2	3.316e-16	3.760e-16	-15.479	-15.425	0.055	(0)
Hg(0)	2.347e-09					
Hg	2.347e-09	2.347e-09	-8.629	-8.629	0.000	(0)
Hg(1)	2.631e-27					
Hg2+2	1.315e-27	4.191e-29	-26.881	-28.378	-1.497	(0)
Hg(2)	1.895e-14					
HgCl4-2	1.733e-14	5.521e-16	-13.761	-15.258	-1.497	(0)
HgCl3-	1.374e-15	5.805e-16	-14.862	-15.236	-0.374	(0)
HgCl2	2.499e-16	2.499e-16	-15.602	-15.602	0.000	(0)
HgClOH	1.553e-20	1.553e-20	-19.809	-19.809	0.000	(0)
HgCl+	4.355e-22	1.840e-22	-21.361	-21.735	-0.374	(0)
Hg(NH3)2+2	5.491e-23	1.750e-24	-22.260	-23.757	-1.497	(0)
Hg(OH)2	1.790e-25	2.029e-25	-24.747	-24.693	0.055	(0)
HgNH3+2	8.931e-26	2.846e-27	-25.049	-26.546	-1.497	(0)
HgOH+	3.159e-27	1.335e-27	-26.500	-26.875	-0.374	(0)
Hg+2	1.108e-27	3.530e-29	-26.955	-28.452	-1.497	(0)
HgSO4	1.072e-28	1.072e-28	-27.970	-27.970	0.000	(0)
Hg(NH3)3+2	4.988e-29	1.589e-30	-28.302	-29.799	-1.497	(0)
Hg(NH3)4+2	9.088e-35	2.896e-36	-34.042	-35.538	-1.497	(0)
Hg(OH)3-	6.436e-35	2.719e-35	-34.191	-34.566	-0.374	(0)
Hg(HS)2	2.228e-35	2.228e-35	-34.652	-34.652	0.000	(0)
HgHS2-	2.281e-36	9.636e-37	-35.642	-36.016	-0.374	(0)
HgS2-2	6.346e-39	2.022e-40	-38.198	-39.694	-1.497	(0)
HgNO3+	0.000e+00	0.000e+00	-92.920	-93.294	-0.374	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-157.990	-157.990	0.000	(0)
K	6.503e-03					
K+	5.874e-03	4.332e-03	-2.231	-2.363	-0.132	(0)
KS04-	6.282e-04	4.325e-04	-3.202	-3.364	-0.162	(0)
KHP04-	9.629e-08	6.629e-08	-7.016	-7.179	-0.162	(0)
Mg	6.489e-02					
Mg+2	3.690e-02	1.091e-02	-1.433	-1.962	-0.529	(0)
MgSO4	2.774e-02	2.774e-02	-1.557	-1.557	0.000	(0)
MgH2PO4+	2.329e-04	1.603e-04	-3.633	-3.795	-0.162	(0)
MgHP04	1.412e-05	1.412e-05	-4.850	-4.850	0.000	(0)
MgOH+	4.454e-09	3.187e-09	-8.351	-8.497	-0.145	(0)
MgP04-	6.064e-11	4.175e-11	-10.217	-10.379	-0.162	(0)
Mn(2)	3.664e-03					
Mn+2	3.346e-03	1.066e-04	-2.475	-3.972	-1.497	(0)
MnSO4	2.607e-04	2.607e-04	-3.584	-3.584	0.000	(0)
MnCl+	4.563e-05	3.091e-05	-4.341	-4.510	-0.169	(0)
MnCl2	1.005e-05	1.005e-05	-4.998	-4.998	0.000	(0)
MnCl3-	9.413e-07	6.375e-07	-6.026	-6.196	-0.169	(0)
MnOH+	3.099e-10	2.099e-10	-9.509	-9.678	-0.169	(0)
MnSe	2.302e-11	2.302e-11	-10.638	-10.638	0.000	(0)
Mn(OH)3-	2.946e-24	1.995e-24	-23.531	-23.700	-0.169	(0)
Mn(OH)4-2	3.259e-32	6.857e-33	-31.487	-32.164	-0.677	(0)
MnSeO4	4.390e-36	4.390e-36	-35.357	-35.357	0.000	(0)
MnNO3+	0.000e+00	0.000e+00	-67.713	-68.087	-0.374	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-131.998	-131.998	0.000	(0)
Mn(3)	5.346e-28					
Mn+3	5.346e-28	3.446e-29	-27.272	-28.463	-1.191	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-78.730	-79.407	-0.677	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-87.712	-87.929	-0.217	(0)

N(-3)	5.042e-03					
NH4+	4.448e-03	2.601e-03	-2.352	-2.585	-0.233	(0)
NH4SO4-	5.935e-04	4.020e-04	-3.227	-3.396	-0.169	(0)
NH3	1.194e-07	1.194e-07	-6.923	-6.923	0.000	(0)
NiNH3+2	5.686e-08	1.812e-09	-7.245	-8.742	-1.497	(0)
CaNH3+2	1.655e-08	5.273e-10	-7.781	-9.278	-1.497	(0)
Co(NH3)+2	1.148e-08	3.659e-10	-7.940	-9.437	-1.497	(0)
CuNH3+2	1.425e-11	4.540e-13	-10.846	-12.343	-1.497	(0)
Ni(NH3)2+2	1.667e-12	5.312e-14	-11.778	-13.275	-1.497	(0)
Co(NH3)2+2	5.448e-14	1.736e-15	-13.264	-14.761	-1.497	(0)
Ca(NH3)2+2	1.047e-15	3.335e-17	-14.980	-16.477	-1.497	(0)
Co(NH3)3+2	1.089e-19	3.471e-21	-18.963	-20.460	-1.497	(0)
Hg(NH3)2+2	5.491e-23	1.750e-24	-22.260	-23.757	-1.497	(0)
Co(NH3)4+2	9.082e-26	2.894e-27	-25.042	-26.539	-1.497	(0)
HgNH3+2	8.931e-26	2.846e-27	-25.049	-26.546	-1.497	(0)
Hg(NH3)3+2	4.988e-29	1.589e-30	-28.302	-29.799	-1.497	(0)
Co(NH3)5+2	2.394e-32	7.629e-34	-31.621	-33.118	-1.497	(0)
Hg(NH3)4+2	9.088e-35	2.896e-36	-34.042	-35.538	-1.497	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.301	-42.798	-1.497	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.242	-52.616	-0.374	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-54.794	-56.291	-1.497	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.680	-60.177	-1.497	(0)
N(3)	0.000e+00					
N02-	0.000e+00	0.000e+00	-47.378	-47.595	-0.217	(0)
CoN02+	0.000e+00	0.000e+00	-51.245	-51.620	-0.374	(0)
CuN02+	0.000e+00	0.000e+00	-54.926	-55.301	-0.374	(0)
Cu(N02)2	0.000e+00	0.000e+00	-101.886	-101.886	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-64.182	-64.315	-0.132	(0)
CaN03+	0.000e+00	0.000e+00	-66.007	-66.381	-0.374	(0)
MnN03+	0.000e+00	0.000e+00	-67.713	-68.087	-0.374	(0)
NiN03+	0.000e+00	0.000e+00	-68.373	-68.747	-0.374	(0)
CoN03+	0.000e+00	0.000e+00	-68.613	-68.987	-0.374	(0)
ZnN03+	0.000e+00	0.000e+00	-69.325	-69.699	-0.374	(0)
CdN03+	0.000e+00	0.000e+00	-71.796	-72.171	-0.374	(0)
PbN03+	0.000e+00	0.000e+00	-71.800	-72.174	-0.374	(0)
CuN03+	0.000e+00	0.000e+00	-73.156	-73.530	-0.374	(0)
FeN03+2	0.000e+00	0.000e+00	-76.996	-78.493	-1.497	(0)
HgN03+	0.000e+00	0.000e+00	-92.920	-93.294	-0.374	(0)
Mn(N03)2	0.000e+00	0.000e+00	-131.998	-131.998	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-132.993	-132.993	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-134.724	-134.724	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-136.239	-136.239	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-136.835	-136.835	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-138.755	-138.755	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-157.990	-157.990	0.000	(0)
Na	3.010e-01					
Na+	2.781e-01	2.051e-01	-0.556	-0.688	-0.132	(0)
NaSO4-	2.295e-02	1.580e-02	-1.639	-1.801	-0.162	(0)
NaHPO4-	7.060e-06	4.860e-06	-5.151	-5.313	-0.162	(0)
Ni	1.117e-04					
Ni+2	4.973e-05	1.470e-05	-4.303	-4.833	-0.529	(0)
NiSO4	4.099e-05	4.099e-05	-4.387	-4.387	0.000	(0)
NiCl+	2.028e-05	8.568e-06	-4.693	-5.067	-0.374	(0)
Ni(SO4)2-2	6.343e-07	2.021e-08	-6.198	-7.694	-1.497	(0)
NiNH3+2	5.686e-08	1.812e-09	-7.245	-8.742	-1.497	(0)
NiCl2	1.004e-08	1.004e-08	-7.998	-7.998	0.000	(0)
NiOH+	3.510e-10	1.483e-10	-9.455	-9.829	-0.374	(0)
Ni(NH3)2+2	1.667e-12	5.312e-14	-11.778	-13.275	-1.497	(0)
Ni(OH)2	1.666e-14	1.666e-14	-13.778	-13.778	0.000	(0)
Ni(OH)3-	4.196e-20	1.773e-20	-19.377	-19.751	-0.374	(0)
NiSeO4	1.052e-36	1.052e-36	-35.978	-35.978	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-68.373	-68.747	-0.374	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-62.623	-62.569	0.055	(0)
P	8.968e-04					
H2PO4-	4.764e-04	3.279e-04	-3.322	-3.484	-0.162	(0)
MgH2PO4+	2.329e-04	1.603e-04	-3.633	-3.795	-0.162	(0)

FeH2PO4+	1.221e-04	8.402e-05	-3.913	-4.076	-0.162	(0)
CaH2PO4+	2.633e-05	1.813e-05	-4.580	-4.742	-0.162	(0)
MgHPO4	1.412e-05	1.412e-05	-4.850	-4.850	0.000	(0)
HP04-2	1.041e-05	2.190e-06	-4.982	-5.659	-0.677	(0)
NaHP04-	7.060e-06	4.860e-06	-5.151	-5.313	-0.162	(0)
FeHP04	4.532e-06	4.532e-06	-5.344	-5.344	0.000	(0)
CaHP04	2.472e-06	2.472e-06	-5.607	-5.607	0.000	(0)
H3P04	4.122e-07	4.122e-07	-6.385	-6.385	0.000	(0)
KHP04-	9.629e-08	6.629e-08	-7.016	-7.179	-0.162	(0)
CoHP04	2.952e-08	2.952e-08	-7.530	-7.530	0.000	(0)
CaP04-	9.376e-10	6.454e-10	-9.028	-9.190	-0.162	(0)
MgP04-	6.064e-11	4.175e-11	-10.217	-10.379	-0.162	(0)
FeHP04+	1.551e-11	1.068e-11	-10.809	-10.971	-0.162	(0)
P04-3	1.414e-12	9.113e-14	-11.850	-13.040	-1.191	(0)
FeH2PO4+2	1.362e-14	3.058e-15	-13.866	-14.515	-0.649	(0)
Pb	5.681e-08					
Pb(S04)2-2	1.820e-08	5.798e-10	-7.740	-9.237	-1.497	(0)
PbCl+	1.741e-08	7.356e-09	-7.759	-8.133	-0.374	(0)
PbCl2	7.430e-09	7.430e-09	-8.129	-8.129	0.000	(0)
PbS04	6.671e-09	6.671e-09	-8.176	-8.176	0.000	(0)
Pb+2	3.194e-09	9.443e-10	-8.496	-9.025	-0.529	(0)
PbCl4-2	2.216e-09	7.060e-11	-8.654	-10.151	-1.497	(0)
PbCl3-	1.684e-09	7.116e-10	-8.774	-9.148	-0.374	(0)
PbOH+	5.976e-12	2.525e-12	-11.224	-11.598	-0.374	(0)
Pb2OH+3	8.810e-17	3.779e-20	-16.055	-19.423	-3.368	(0)
Pb(OH)2	8.497e-17	8.497e-17	-16.071	-16.071	0.000	(0)
Pb(OH)3-	2.141e-22	9.044e-23	-21.669	-22.044	-0.374	(0)
Pb(OH)4-2	7.398e-28	2.357e-29	-27.131	-28.628	-1.497	(0)
Pb3(OH)4+2	2.269e-30	7.230e-32	-29.644	-31.141	-1.497	(0)
Pb4(OH)4+4	6.102e-31	6.289e-37	-30.215	-36.201	-5.987	(0)
Pb(HS)2	6.575e-39	6.575e-39	-38.182	-38.182	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-58.721	-59.096	-0.374	(0)
PbNO3+	0.000e+00	0.000e+00	-71.800	-72.174	-0.374	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-136.239	-136.239	0.000	(0)
S(-2)	6.947e-21					
H2S	6.744e-21	6.744e-21	-20.171	-20.171	0.000	(0)
HS-	1.447e-22	6.115e-23	-21.839	-22.214	-0.374	(0)
CdHS+	5.790e-23	2.446e-23	-22.237	-22.612	-0.374	(0)
S5-2	7.217e-26	2.299e-27	-25.142	-26.638	-1.497	(0)
S6-2	2.704e-26	8.615e-28	-25.568	-27.065	-1.497	(0)
S4-2	1.814e-26	5.779e-28	-25.741	-27.238	-1.497	(0)
S3-2	2.791e-27	8.893e-29	-26.554	-28.051	-1.497	(0)
S2-2	2.628e-28	8.374e-30	-27.580	-29.077	-1.497	(0)
S-2	1.190e-34	2.504e-35	-33.924	-34.601	-0.677	(0)
Hg(HS)2	2.228e-35	2.228e-35	-34.652	-34.652	0.000	(0)
HgHS2-	2.281e-36	9.636e-37	-35.642	-36.016	-0.374	(0)
Zn(HS)2	3.962e-38	3.962e-38	-37.402	-37.402	0.000	(0)
Cd(HS)2	2.393e-38	2.393e-38	-37.621	-37.621	0.000	(0)
ZnS(HS)-	9.816e-39	4.147e-39	-38.008	-38.382	-0.374	(0)
Pb(HS)2	6.575e-39	6.575e-39	-38.182	-38.182	0.000	(0)
HgS2-2	6.346e-39	2.022e-40	-38.198	-39.694	-1.497	(0)
Cu(S4)2-3	2.328e-39	7.150e-40	-38.633	-39.146	-0.513	(0)
Fe(HS)2	1.881e-39	1.881e-39	-38.726	-38.726	0.000	(0)
CuS4S5-3	3.997e-40	1.331e-40	-39.398	-39.876	-0.477	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-50.093	-50.467	-0.374	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-55.962	-56.336	-0.374	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-57.561	-57.935	-0.374	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-58.528	-58.902	-0.374	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-58.721	-59.096	-0.374	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-59.789	-61.286	-1.497	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-76.456	-77.952	-1.497	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-78.513	-80.009	-1.497	(0)
S(6)	1.116e-01					
S04-2	4.878e-02	1.442e-02	-1.312	-1.841	-0.529	(0)
MgS04	2.774e-02	2.774e-02	-1.557	-1.557	0.000	(0)
NaS04-	2.295e-02	1.580e-02	-1.639	-1.801	-0.162	(0)
CaS04	8.380e-03	8.380e-03	-2.077	-2.077	0.000	(0)
FeS04	1.912e-03	1.912e-03	-2.719	-2.719	0.000	(0)

KS04-	6.282e-04	4.325e-04	-3.202	-3.364	-0.162	(0)
NH4S04-	5.935e-04	4.020e-04	-3.227	-3.396	-0.169	(0)
MnS04	2.607e-04	2.607e-04	-3.584	-3.584	0.000	(0)
AlS04+	1.735e-04	1.149e-04	-3.761	-3.940	-0.179	(0)
NiS04	4.099e-05	4.099e-05	-4.387	-4.387	0.000	(0)
CoS04	3.731e-05	3.731e-05	-4.428	-4.428	0.000	(0)
Al(S04)2-	2.929e-05	1.939e-05	-4.533	-4.712	-0.179	(0)
Zn(S04)2-2	1.995e-05	6.356e-07	-4.700	-6.197	-1.497	(0)
HS04-	1.761e-05	1.166e-05	-4.754	-4.933	-0.179	(0)
ZnS04	4.891e-06	4.891e-06	-5.311	-5.311	0.000	(0)
Ni(S04)2-2	6.343e-07	2.021e-08	-6.198	-7.694	-1.497	(0)
Cd(S04)2-2	8.108e-08	2.583e-09	-7.091	-8.588	-1.497	(0)
Pb(S04)2-2	1.820e-08	5.798e-10	-7.740	-9.237	-1.497	(0)
CdS04	1.266e-08	1.266e-08	-7.898	-7.898	0.000	(0)
PbS04	6.671e-09	6.671e-09	-8.176	-8.176	0.000	(0)
CuS04	5.927e-10	5.927e-10	-9.227	-9.227	0.000	(0)
FeS04+	1.129e-13	7.648e-14	-12.947	-13.116	-0.169	(0)
Fe(S04)2-	5.762e-14	2.435e-14	-13.239	-13.614	-0.374	(0)
HgS04	1.072e-28	1.072e-28	-27.970	-27.970	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.242	-52.616	-0.374	(0)
Se(-2)	1.193e-06					
HSe-	1.158e-06	4.891e-07	-5.936	-6.311	-0.374	(0)
H2Se	3.481e-08	3.481e-08	-7.458	-7.458	0.000	(0)
MnSe	2.302e-11	2.302e-11	-10.638	-10.638	0.000	(0)
Se-2	1.263e-15	4.024e-17	-14.899	-16.395	-1.497	(0)
Se(4)	1.165e-14					
HSeO3-	1.156e-14	4.886e-15	-13.937	-14.311	-0.374	(0)
SeO3-2	6.362e-17	2.027e-18	-16.196	-17.693	-1.497	(0)
H2SeO3	1.881e-17	1.881e-17	-16.726	-16.726	0.000	(0)
FeHSeO3+2	1.915e-25	6.101e-27	-24.718	-26.215	-1.497	(0)
Cd(SeO3)2-2	4.410e-37	1.405e-38	-36.356	-37.852	-1.497	(0)
Se(6)	5.655e-34					
SeO4-2	5.588e-34	1.652e-34	-33.253	-33.782	-0.529	(0)
MnSeO4	4.390e-36	4.390e-36	-35.357	-35.357	0.000	(0)
NiSeO4	1.052e-36	1.052e-36	-35.978	-35.978	0.000	(0)
CoSeO4	1.040e-36	1.040e-36	-35.983	-35.983	0.000	(0)
HSeO4-	1.613e-37	6.813e-38	-36.792	-37.167	-0.374	(0)
ZnSeO4	4.103e-38	4.103e-38	-37.387	-37.387	0.000	(0)
CdSeO4	1.208e-40	1.208e-40	-39.918	-39.918	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-69.666	-71.163	-1.497	(0)
Zn	3.204e-05					
Zn(S04)2-2	1.995e-05	6.356e-07	-4.700	-6.197	-1.497	(0)
Zn+2	5.424e-06	1.604e-06	-5.266	-5.795	-0.529	(0)
ZnS04	4.891e-06	4.891e-06	-5.311	-5.311	0.000	(0)
ZnCl+	1.395e-06	9.004e-07	-5.855	-6.046	-0.190	(0)
ZnCl2	2.763e-07	2.763e-07	-6.559	-6.559	0.000	(0)
ZnCl3-	7.700e-08	4.971e-08	-7.113	-7.304	-0.190	(0)
ZnCl4-2	2.634e-08	5.542e-09	-7.579	-8.256	-0.677	(0)
ZnOHCl	1.292e-09	1.292e-09	-8.889	-8.889	0.000	(0)
ZnOH+	2.974e-10	1.257e-10	-9.527	-9.901	-0.374	(0)
Zn(OH)2	2.879e-14	2.879e-14	-13.541	-13.541	0.000	(0)
Zn(OH)3-	3.635e-19	1.536e-19	-18.440	-18.814	-0.374	(0)
Zn(OH)4-2	2.042e-25	6.507e-27	-24.690	-26.187	-1.497	(0)
ZnSeO4	4.103e-38	4.103e-38	-37.387	-37.387	0.000	(0)
Zn(HS)2	3.962e-38	3.962e-38	-37.402	-37.402	0.000	(0)
ZnS(HS)-	9.816e-39	4.147e-39	-38.008	-38.382	-0.374	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-55.962	-56.336	-0.374	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-59.789	-61.286	-1.497	(0)
ZnNO3+	0.000e+00	0.000e+00	-69.325	-69.699	-0.374	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-69.666	-71.163	-1.497	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-78.513	-80.009	-1.497	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-134.724	-134.724	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)
(Co(NH3)5Cl)(NO3)2	-159.47	-153.20	6.27

(Co(NH3)5Cl)Cl2	-30.38	-25.84	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-37.65	-25.85	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-232.36	-214.43	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-43.51	-23.40	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-39.40	-38.95	0.45	(NH4)2SeO4
Al(OH)3(am)	-1.91	9.15	11.06	Al(OH)3
Al2O3	-1.95	18.32	20.27	Al2O3
Al4(OH)10SO4	2.01	24.71	22.70	Al4(OH)10SO4
AlOHSO4	0.49	-2.74	-3.23	AlOHSO4
Alunite	7.23	6.33	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.05	-10.87	-7.82	PbSO4
Anhydrite	-0.08	-4.42	-4.34	CaSO4
Anilite	0.44	-31.87	-32.31	Cu0.25Cu1.5S
Antlerite	-19.71	-10.92	8.79	Cu3(OH)4SO4
Atacamite	-12.63	-5.02	7.61	Cu2(OH)3Cl
Bianchite	-5.91	-7.67	-1.76	ZnSO4:6H2O
Birnessite	-25.33	-7.24	18.09	MnO2
Bixbyite	-26.42	-26.76	-0.35	Mn2O3
BlaubleiI	-3.41	-27.57	-24.16	Cu0.9Cu0.2S
BlaubleiII	-2.27	-29.55	-27.28	Cu0.6Cu0.8S
Boehmite	0.30	9.16	8.86	AlOOH
Brochantite	-26.30	-10.60	15.71	Cu4(OH)6SO4
Brucite	-9.03	8.09	17.12	Mg(OH)2
Bunsenite	-7.46	5.22	12.68	NiO
Ca3(PO4)2(beta)	-4.77	-33.82	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-7.40	-54.48	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.30	-20.65	-19.35	CaHP04
CaHP04:2H2O	-1.61	-20.66	-19.05	CaHP04:2H2O
Calomel	-11.52	-29.65	-18.13	Hg2Cl2
CaSeO3:2H2O	-14.73	-11.87	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-33.37	-36.37	-3.00	CaSeO4:2H2O
Cd(OH)2	-12.23	1.64	13.87	Cd(OH)2
Cd(OH)2(am)	-12.29	1.64	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-25.56	-18.85	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-29.52	-6.96	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-18.70	-51.30	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-33.72	-5.32	28.40	Cd4(OH)6SO4
CdCl2	-9.07	-9.68	-0.61	CdCl2
CdCl2:1H2O	-8.01	-9.69	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-7.77	-9.70	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.33	-10.64	13.69	Cd
Cdmetal(gamma)	-24.44	-10.64	13.80	Cd
CdOHCl	-7.63	-4.02	3.61	CdOHCl
CdSe	10.69	-9.69	-20.38	CdSe
CdSeO4:2H2O	-40.35	-42.20	-1.85	CdSeO4:2H2O
CdSO4	-10.20	-10.25	-0.05	CdSO4
CdSO4:1H2O	-8.60	-10.25	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-8.43	-10.26	-1.83	CdSO4:2.67H2O
Chalcanthite	-8.94	-11.60	-2.65	CuSO4:5H2O
Chalcocite	1.80	-33.52	-35.32	Cu2S
Chalcopyrite	-11.72	-47.34	-35.62	CuFeS2
Cinnabar	-5.63	-51.92	-46.30	HgS
Clausthalite	17.08	-10.31	-27.39	PbSe
Co(OH)2	-7.92	5.18	13.09	Co(OH)2
Co(OH)3	-19.00	-21.08	-2.09	Co(OH)3
Co3(PO4)2	-6.01	-40.70	-34.69	Co3(PO4)2
Co3O4	-26.73	-36.97	-10.24	Co3O4
CoCl2	-14.61	-6.15	8.46	CoCl2
CoCl2:6H2O	-8.70	-6.18	2.52	CoCl2:6H2O
CoFe2O4	7.96	4.81	-3.15	CoFe2O4
CoHP04	-3.88	-22.94	-19.06	CoHP04
CoO	-8.66	5.18	13.84	CoO
CoS(alpha)	-14.62	-22.06	-7.44	CoS
CoS(beta)	-10.99	-22.06	-11.07	CoS
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-15.47	-14.15	1.32	CoSeO3
CoSeO4:6H2O	-37.16	-38.69	-1.53	CoSeO4:6H2O
CoSO4	-9.70	-6.71	2.99	CoSO4

CoS04:6H2O	-4.27	-6.75	-2.48	CoS04:6H2O
Cotunnite	-5.46	-10.30	-4.84	PbCl2
Covellite	-4.38	-26.91	-22.53	CuS
Cu(OH)2	-8.49	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.12	-68.69	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.69	-17.62	-46.31	Cu2Se
Cu2S04	-16.27	-18.18	-1.90	Cu2S04
Cu3(P04)2	-18.41	-55.26	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-20.15	-55.27	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.68	-28.62	-64.30	Cu3Se2
Cumetal	-0.36	-9.28	-8.93	Cu
Cu0CuS04	-21.87	-11.24	10.63	Cu0CuS04
Cupricferrite	-6.53	-0.04	6.49	CuFe204
Cuprite	-5.17	-6.28	-1.11	Cu2O
Cuprousferrite	5.55	-3.33	-8.88	CuFe02
CuSe	22.38	-11.01	-33.39	CuSe
CuSe2	23.65	-10.05	-33.70	CuSe2
CuSe03:2H2O	-19.62	-19.02	0.60	CuSe03:2H2O
CuSe04:5H2O	-41.10	-43.54	-2.44	CuSe04:5H2O
CuS04	-14.68	-11.57	3.11	CuS04
Diaspore	2.04	9.16	7.12	Al00H
Djurleite	1.31	-33.08	-34.40	Cu0.066Cu1.868S
Epsomite	-1.69	-3.84	-2.15	MgS04:7H2O
Fe(OH)2	-6.76	6.80	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.15	-1.89	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-21.27	-19.72	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H2O	-37.76	-58.39	-20.63	Fe2(Se03)3:2H2O
Fe2(S04)3	-32.90	-36.05	-3.16	Fe2(S04)3
Fe3(OH)8	-13.81	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.56	-0.19	3.37	Fe(OH)3
Ferroselite	15.13	-3.58	-18.71	FeSe2
FeS(ppt)	-17.51	-20.43	-2.92	FeS
FeSe	6.48	-4.53	-11.00	FeSe
Galena	-12.05	-26.21	-14.16	PbS
Gibbsite	0.63	9.15	8.52	Al(OH)3
Goethite	-0.82	-0.19	0.64	Fe00H
Goslarite	-5.63	-7.68	-2.05	ZnS04:7H2O
Greenockite	-11.10	-25.59	-14.49	CdS
Greigite	-57.48	-102.52	-45.03	Fe3S4
Gypsum	0.18	-4.43	-4.61	CaS04:2H2O
H-Jarosite	-12.82	-24.37	-11.55	(H30)Fe3(S04)2(OH)6
H2S(g)	-19.23	-27.24	-8.01	H2S
H2Se(g)	-6.42	-11.34	-4.92	H2Se
Halite	-2.92	-1.33	1.59	NaCl
Hausmannite	-31.50	30.53	62.03	Mn304
Hematite	0.74	-0.37	-1.11	Fe203
Hercynite	1.48	25.12	23.64	FeAl204
Hg(g)	-7.38	-15.31	-7.93	Hg
Hg(OH)2	-21.20	-24.69	-3.50	Hg(OH)2
Hg2(g)	-15.52	-30.61	-15.09	Hg2
Hg2(OH)2	-23.59	-18.33	5.26	Hg2(OH)2
Hg2HP04	-21.67	-46.45	-24.77	Hg2HP04
Hg2S	-33.72	-45.56	-11.84	Hg2S
Hg2Se03	-33.00	-37.66	-4.66	Hg2Se03
Hg2S04	-24.08	-30.22	-6.14	Hg2S04
HgCl(g)	-34.71	-14.83	19.88	HgCl
HgCl2	-14.50	-36.02	-21.52	HgCl2
Hgmetal(l)	-1.65	-15.31	-13.65	Hg
HgSe	19.67	-36.02	-55.69	HgSe
HgSe03	-31.59	-44.02	-12.43	HgSe03
HgS04	-27.13	-36.58	-9.45	HgS04
Hinsdalite	-9.03	-11.53	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	-2.66	-46.99	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-16.43	-79.22	-62.79	Pb5(P04)3OH
K-Alum	-6.80	-12.04	-5.24	KAl(S04)2:12H2O
K-Jarosite	-7.21	-21.70	-14.49	KFe3(S04)2(OH)6
K2Se04	-37.78	-38.51	-0.73	K2Se04
Langite	-28.49	-10.60	17.88	Cu4(OH)6S04:H2O

Larnakite	-9.45	-9.84	-0.38	PbO:PbSO4
Laurionite	-5.26	-4.64	0.62	PbOHCl
Lepidocrocite	-1.56	-0.19	1.37	FeOOH
Lime	-25.69	7.48	33.16	CaO
Litharge	-11.82	1.03	12.85	PbO
Mackinawite	-16.83	-20.43	-3.60	FeS
Maghemite	-6.76	-0.37	6.39	Fe2O3
Magnesioferrite	-9.80	7.72	17.52	Fe2MgO4
Magnetite	2.54	6.44	3.90	Fe3O4
Manganite	-13.12	12.22	25.34	MnOOH
Massicot	-12.02	1.03	13.05	PbO
Melanothallite	-17.41	-11.00	6.41	CuCl2
Melanterite	-2.87	-5.13	-2.26	FeSO4:7H2O
Metacinnabar	-6.23	-51.92	-45.70	HgS
Mg(OH)2(active)	-10.71	8.09	18.79	Mg(OH)2
Mg3(P04)2	-8.69	-31.97	-23.28	Mg3(P04)2
MgHP04:3H2O	-1.87	-20.05	-18.18	MgHP04:3H2O
MgSe03:6H2O	-14.32	-11.28	3.04	MgSe03:6H2O
MgSe04:6H2O	-34.58	-35.78	-1.20	MgSe04:6H2O
Minium	-59.15	15.37	74.53	Pb3O4
Mirabilite	-1.97	-3.28	-1.30	Na2SO4:10H2O
Mn2(S04)3	-57.13	-62.45	-5.32	Mn2(S04)3
Mn3(P04)2	-14.15	-38.00	-23.85	Mn3(P04)2
MnCl2:4H2O	-8.01	-5.27	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnS(grn)	-21.40	-21.16	0.25	MnS
MnS(pnk)	-24.50	-21.16	3.34	MnS
MnSe	-8.99	-5.25	3.73	MnSe
MnSe03	-14.38	-13.25	1.13	MnSe03
MnSe03:2H2O	-14.23	-13.26	0.96	MnSe03:2H2O
MnSe04:5H2O	-35.73	-37.78	-2.05	MnSe04:5H2O
MnSO4	-8.55	-5.81	2.74	MnSO4
Monteponite	-13.70	1.65	15.35	CdO
Montroydite	-21.14	-24.69	-3.55	HgO
Morenosite	-4.54	-6.71	-2.17	NiSO4:7H2O
Na-Jarosite	-9.18	-20.02	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-20.99	-10.69	10.30	Na2Se03:5H2O
Na2Se04	-36.44	-35.16	1.28	Na2Se04
Nantokite	-1.97	-8.81	-6.83	CuCl
Ni(OH)2	-7.81	5.22	13.02	Ni(OH)2
Ni3(P04)2	-9.28	-40.58	-31.30	Ni3(P04)2
Ni4(OH)6SO4	-23.03	8.97	32.00	Ni4(OH)6SO4
NiS(alpha)	-16.42	-22.02	-5.60	NiS
NiS(beta)	-10.92	-22.02	-11.10	NiS
NiS(gamma)	-9.22	-22.02	-12.80	NiS
NiSe	11.59	-6.11	-17.70	NiSe
NiSe03:2H2O	-17.01	-14.13	2.89	NiSe03:2H2O
NiSe04:6H2O	-37.13	-38.65	-1.52	NiSe04:6H2O
Nsutite	-24.74	-7.24	17.50	MnO2
O2(g)	-59.88	24.57	84.45	O2
Pb(OH)2	-7.27	1.02	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.41	-3.62	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-24.14	2.05	26.19	Pb2O(OH)2
Pb2O3	-46.70	14.34	61.04	Pb2O3
Pb3(P04)2	-9.63	-53.16	-43.53	Pb3(P04)2
Pb3O2SO4	-19.68	-8.81	10.87	Pb3O2SO4
Pb4(OH)6SO4	-28.90	-7.80	21.10	Pb4(OH)6SO4
Pb4O3SO4	-29.98	-7.78	22.20	Pb4O3SO4
PbHP04	-3.29	-27.10	-23.81	PbHP04
Pbmetal	-15.50	-11.26	4.24	Pb
PbO:0.3H2O	-11.95	1.03	12.98	PbO:0.33H2O
PbSe04	-35.93	-42.81	-6.88	PbSe04
Periclase	-13.85	8.09	21.94	MgO
Plattnerite	-36.99	13.32	50.31	PbO2
Plumbgummite	5.03	-27.76	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-15.64	7.47	23.11	Ca(OH)2
Pyrite	-16.76	-35.38	-18.63	FeS2
Pyrochroite	-9.35	6.08	15.43	Mn(OH)2

Pyrolusite	-23.66	18.37	42.03	MnO2
Pyromorphite	-0.45	-84.88	-84.43	Pb5(P04)3Cl
Retgersite	-4.66	-6.71	-2.05	NiS04:6H2O
Semetal(am)	8.09	0.95	-7.14	Se
Semetal(hex)	8.70	0.95	-7.75	Se
SeO2	-19.46	-19.34	0.12	SeO2
SeO3	-65.23	-43.84	21.39	SeO3
Sphalerite	-11.46	-22.98	-11.52	ZnS
Spinel	-11.36	26.41	37.77	MgAl2O4
Strengite	-1.94	-28.32	-26.38	FeP04:2H2O
Sulfur	-12.85	-14.95	-2.11	S
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.56	-3.22	0.34	Na2S04
Tsumebite	-15.97	-25.76	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	0.13	-35.87	-36.00	Fe3(P04)2:8H2O
Wurtzite	-13.98	-22.98	-9.00	ZnS
Zincite	-7.29	4.26	11.55	ZnO
Zincosite	-11.76	-7.64	4.13	ZnS04
Zn(N03)2:6H2O	-137.72	-134.46	3.26	Zn(N03)2:6H2O
Zn(OH)2	-7.95	4.25	12.20	Zn(OH)2
Zn(OH)2(am)	-8.41	4.25	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.70	4.25	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.48	4.25	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.48	4.25	11.73	Zn(OH)2
Zn2(OH)2S04	-10.88	-3.38	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-12.35	2.84	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-8.07	-43.49	-35.42	Zn3(P04)2:4H2O
Zn3O(S04)2	-30.54	-11.01	19.53	Zn3O(S04)2
Zn4(OH)6S04	-23.28	5.12	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-28.56	9.94	38.50	Zn5(OH)8Cl2
ZnCl2	-14.29	-7.07	7.22	ZnCl2
Znmetal	-34.18	-8.03	26.15	Zn
ZnO(active)	-7.14	4.26	11.40	ZnO
ZnS(am)	-13.89	-22.98	-9.09	ZnS
ZnSe	7.39	-7.08	-14.46	ZnSe
ZnSeO4:6H2O	-38.09	-39.61	-1.52	ZnSeO4:6H2O
ZnS04:1H2O	-7.11	-7.64	-0.53	ZnS04:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 6.

SOLUTION 4 #Groundwater worst case maximum values

temp 21
pH 5.05
pe 1
redox pe
units mg/l
density 1
Al 5.21
Alkalinity 0
As 0
Ba 0
Be 0
B 0
Cd 0.04
Co 24.2
Cr 0
Cu 9.29
Fe 937
Pb 0.01

```

Mn      171
Mo      0
V       0
Zn      1.78
Se      0.08
Ni      5.57
N       60
P       23.6
Ca      590
Mg     1340
Na     5880
K       216
Cl     9420
S(6)   9110
Hg     0.0004
water   1 # kg
MIX 3
  1     0.146
  4     0.854
REACTION 4
H2O -1
  3
END #Time-step 4

```

Beginning of initial solution calculations.

Initial solution 4.

-----Solution composition-----

Elements	Molality	Moles
Al	1.986e-04	1.986e-04
Ca	1.514e-02	1.514e-02
Cd	3.660e-07	3.660e-07
Cl	2.733e-01	2.733e-01
Co	4.224e-04	4.224e-04
Cu	1.504e-04	1.504e-04
Fe	1.726e-02	1.726e-02
Hg	2.051e-09	2.051e-09
K	5.682e-03	5.682e-03
Mg	5.671e-02	5.671e-02
Mn	3.202e-03	3.202e-03
N	4.406e-03	4.406e-03
Na	2.631e-01	2.631e-01
Ni	9.762e-05	9.762e-05
P	7.837e-04	7.837e-04
Pb	4.964e-08	4.964e-08
S(6)	9.754e-02	9.754e-02
Se	1.042e-06	1.042e-06
Zn	2.800e-05	2.800e-05

-----Description of solution-----

```

pH = 5.050
pe = 1.000
Activity of water = 0.988
Ionic strength (mol/kgw) = 4.862e-01
Mass of water (kg) = 1.000e+00
Total alkalinity (eq/kg) = 1.381e-05
Total carbon (mol/kg) = 0.000e+00
Total CO2 (mol/kg) = 0.000e+00
Temperature (°C) = 21.00
Electrical balance (eq) = -9.552e-03
Percent error, 100*(Cat-|An|)/(Cat+|An|) = -1.26
Iterations = 14
Total H = 1.110329e+02

```

Total O = 5.590014e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.214e-05	8.913e-06	-4.916	-5.050	-0.134	0.00
OH-	1.292e-09	8.222e-10	-8.889	-9.085	-0.196	(0)
H2O	5.551e+01	9.883e-01	1.744	-0.005	0.000	18.05
Al	1.986e-04					
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Al+3	1.839e-05	1.139e-06	-4.735	-5.943	-1.208	(0)
AlOH+2	4.197e-06	9.786e-07	-5.377	-6.009	-0.632	(0)
Al(OH)2+	1.624e-06	1.128e-06	-5.790	-5.948	-0.158	(0)
Al(OH)3	2.514e-08	2.514e-08	-7.600	-7.600	0.000	(0)
Al(OH)4-	2.040e-09	1.366e-09	-8.690	-8.864	-0.174	(0)
Ca	1.514e-02					
Ca+2	8.161e-03	2.370e-03	-2.088	-2.625	-0.537	(0)
CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
CaOH+	5.236e-11	3.715e-11	-10.281	-10.430	-0.149	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
Cd	3.660e-07					
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
Cd(SO4)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
Cd+2	1.502e-08	4.363e-09	-7.823	-8.360	-0.537	(0)
CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CdOH+	6.462e-14	2.865e-14	-13.190	-13.543	-0.353	(0)
Cd2OH+3	9.945e-19	6.582e-22	-18.002	-21.182	-3.179	(0)
Cd(OH)2	2.726e-19	2.726e-19	-18.564	-18.564	0.000	(0)
Cd(OH)3-	4.195e-26	1.860e-26	-25.377	-25.730	-0.353	(0)
Cd(OH)4-2	8.799e-35	3.400e-36	-34.056	-35.469	-1.413	(0)
Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cl	2.733e-01					
Cl-	2.729e-01	2.003e-01	-0.564	-0.698	-0.134	(0)
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)

CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(2)	4.224e-04					
Co+2	3.644e-04	1.408e-05	-3.438	-4.851	-1.413	(0)
CoS04	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CoHP04	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CoOH+	7.075e-10	3.137e-10	-9.150	-9.504	-0.353	(0)
Co2OH+3	3.344e-13	2.213e-16	-12.476	-15.655	-3.179	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Co(OH)2	2.782e-14	2.782e-14	-13.556	-13.556	0.000	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Co(OH)3-	1.398e-21	6.199e-22	-20.854	-21.208	-0.353	(0)
Co0OH-	8.505e-23	3.771e-23	-22.070	-22.424	-0.353	(0)
Co4(OH)4+4	8.668e-25	1.932e-30	-24.062	-29.714	-5.652	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
Co(OH)4-2	2.839e-30	1.097e-31	-29.547	-30.960	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
CoSe04	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Co(3)	8.287e-32					
CoOH+2	8.232e-32	3.180e-33	-31.085	-32.498	-1.413	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co+3	9.049e-36	5.605e-37	-35.043	-36.251	-1.208	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
Cu(1)	1.504e-04					
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
Cu+	1.823e-08	8.082e-09	-7.739	-8.092	-0.353	(0)
Cu(2)	1.182e-09					
Cu+2	5.900e-10	1.714e-10	-9.229	-9.766	-0.537	(0)
CuS04	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
CuOH+	7.604e-13	4.972e-13	-12.119	-12.303	-0.185	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
Cu(OH)2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
Cu2(OH)2+2	1.564e-19	6.042e-21	-18.806	-20.219	-1.413	(0)
Cu(OH)3-	6.965e-22	3.088e-22	-21.157	-21.510	-0.353	(0)
Cu(OH)4-2	7.024e-29	2.714e-30	-28.153	-29.566	-1.413	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Fe(2)	1.726e-02					

Fe+2	1.529e-02	5.907e-04	-1.816	-3.229	-1.413	(0)
FeS04	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
FeH2P04+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
FeHP04	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
FeOH+	2.826e-08	1.934e-08	-7.549	-7.714	-0.165	(0)
Fe(OH)2	1.209e-14	1.209e-14	-13.918	-13.918	0.000	(0)
Fe(OH)3-	6.009e-18	4.111e-18	-17.221	-17.386	-0.165	(0)
Fe(3)	2.087e-10					
Fe(OH)2+	1.957e-10	1.360e-10	-9.708	-9.867	-0.158	(0)
FeHP04+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
FeOH+2	1.136e-12	2.489e-13	-11.945	-12.604	-0.659	(0)
Fe(OH)3	9.228e-14	9.228e-14	-13.035	-13.035	0.000	(0)
FeS04+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(S04)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
FeH2P04+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Fe+3	7.010e-15	4.342e-16	-14.154	-15.362	-1.208	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
Fe(OH)4-	2.440e-17	1.696e-17	-16.613	-16.771	-0.158	(0)
Fe2(OH)2+4	1.061e-18	2.365e-24	-17.974	-23.626	-5.652	(0)
Fe3(OH)4+5	3.023e-24	4.459e-33	-23.520	-32.351	-8.831	(0)
FeHSe03+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
FeN03+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
H(0)	1.047e-15					
H2	5.235e-16	5.855e-16	-15.281	-15.232	0.049	(0)
Hg(0)	2.051e-09					
Hg	2.051e-09	2.051e-09	-8.688	-8.688	0.000	(0)
Hg(1)	9.698e-28					
Hg2+2	4.849e-28	1.874e-29	-27.314	-28.727	-1.413	(0)
Hg(2)	4.726e-15					
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
HgCl0H	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Hg(OH)2	1.022e-25	1.143e-25	-24.991	-24.942	0.049	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
HgOH+	1.615e-27	7.162e-28	-26.792	-27.145	-0.353	(0)
Hg+2	4.674e-28	1.806e-29	-27.330	-28.743	-1.413	(0)
HgS04	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Hg(OH)3-	3.623e-35	1.606e-35	-34.441	-34.794	-0.353	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
HgN03+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Hg(N03)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
K	5.682e-03					
K+	5.178e-03	3.801e-03	-2.286	-2.420	-0.134	(0)
KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
Mg	5.671e-02					
Mg+2	3.360e-02	9.758e-03	-1.474	-2.011	-0.537	(0)
MgS04	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
MgH2P04+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
MgHP04	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
MgOH+	4.148e-09	2.990e-09	-8.382	-8.524	-0.142	(0)
MgP04-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
Mn(2)	3.202e-03					
Mn+2	2.899e-03	1.120e-04	-2.538	-3.951	-1.413	(0)
MnS04	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
MnOH+	3.381e-10	2.313e-10	-9.471	-9.636	-0.165	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Mn(OH)3-	3.538e-24	2.421e-24	-23.451	-23.616	-0.165	(0)
Mn(OH)4-2	3.983e-32	8.727e-33	-31.400	-32.059	-0.659	(0)

MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Mn(3)	4.471e-28					
Mn+3	4.471e-28	2.769e-29	-27.350	-28.558	-1.208	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-79.028	-79.687	-0.659	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-88.115	-88.325	-0.210	(0)
N(-3)	4.406e-03					
NH4+	3.919e-03	2.335e-03	-2.407	-2.632	-0.225	(0)
NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
NH3	1.123e-07	1.123e-07	-6.950	-6.950	0.000	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
N(3)	0.000e+00					
NO2-	0.000e+00	0.000e+00	-47.968	-48.177	-0.210	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-64.954	-65.088	-0.134	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
Na	2.631e-01					
Na+	2.447e-01	1.796e-01	-0.611	-0.746	-0.134	(0)
NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
Ni	9.762e-05					
Ni+2	4.671e-05	1.357e-05	-4.331	-4.867	-0.537	(0)
NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
Ni(SO4)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
NiOH+	3.238e-10	1.435e-10	-9.490	-9.843	-0.353	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)

Ni(OH)2	1.692e-14	1.692e-14	-13.772	-13.772	0.000	(0)
Ni(OH)3-	4.261e-20	1.889e-20	-19.371	-19.724	-0.353	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-63.001	-62.952	0.049	(0)
P	7.837e-04					
H2PO4-	4.270e-04	2.967e-04	-3.370	-3.528	-0.158	(0)
MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
MgHPO4	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
HP04-2	9.473e-06	2.076e-06	-5.024	-5.683	-0.659	(0)
NaHP04-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
FeHP04	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
CaHP04	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
H3PO4	3.560e-07	3.560e-07	-6.449	-6.449	0.000	(0)
KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
CoHP04	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
CaP04-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
MgP04-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
FeHP04+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
P04-3	1.460e-12	9.045e-14	-11.836	-13.044	-1.208	(0)
FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Pb	4.964e-08					
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
Pb(SO4)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
Pb+2	3.636e-09	1.056e-09	-8.439	-8.976	-0.537	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
PbOH+	6.682e-12	2.963e-12	-11.175	-11.528	-0.353	(0)
Pb(OH)2	1.046e-16	1.046e-16	-15.980	-15.980	0.000	(0)
Pb2OH+3	7.494e-17	4.960e-20	-16.125	-19.305	-3.179	(0)
Pb(OH)3-	2.635e-22	1.168e-22	-21.579	-21.933	-0.353	(0)
Pb(OH)4-2	8.268e-28	3.195e-29	-27.083	-28.496	-1.413	(0)
Pb3(OH)4+2	3.173e-30	1.226e-31	-29.499	-30.912	-1.413	(0)
Pb4(OH)4+4	5.352e-31	1.193e-36	-30.271	-35.923	-5.652	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
S(6)	9.754e-02					
S04-2	4.586e-02	1.332e-02	-1.339	-1.875	-0.537	(0)
MgSO4	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
FeSO4	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
MnSO4	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Zn(SO4)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
HS04-	1.536e-05	1.028e-05	-4.814	-4.988	-0.174	(0)
ZnSO4	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
Ni(SO4)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
Cd(SO4)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
Pb(SO4)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
CuSO4	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
FeSO4+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(SO4)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
HgSO4	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Se(-2)	1.042e-06					

HSe-	1.012e-06	4.485e-07	-5.995	-6.348	-0.353	(0)
H2Se	3.047e-08	3.047e-08	-7.516	-7.516	0.000	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Se-2	1.000e-15	3.865e-17	-15.000	-16.413	-1.413	(0)
Se(4)	2.708e-15					
HSeO3-	2.690e-15	1.193e-15	-14.570	-14.923	-0.353	(0)
SeO3-2	1.341e-17	5.183e-19	-16.872	-18.285	-1.413	(0)
H2SeO3	4.383e-18	4.383e-18	-17.358	-17.358	0.000	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
Se(6)	9.467e-35					
SeO4-2	9.354e-35	2.717e-35	-34.029	-34.566	-0.537	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
HSeO4-	2.413e-38	1.070e-38	-37.617	-37.971	-0.353	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn	2.800e-05					
Zn(SO4)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
Zn+2	6.051e-06	1.758e-06	-5.218	-5.755	-0.537	(0)
ZnSO4	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
ZnOH+	3.259e-10	1.445e-10	-9.487	-9.840	-0.353	(0)
Zn(OH)2	3.473e-14	3.473e-14	-13.459	-13.459	0.000	(0)
Zn(OH)3-	4.384e-19	1.944e-19	-18.358	-18.711	-0.353	(0)
Zn(OH)4-2	2.236e-25	8.641e-27	-24.650	-26.063	-1.413	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-161.31	-155.03	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-30.79	-26.25	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-38.05	-26.26	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-234.94	-217.01	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-43.95	-23.84	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-40.28	-39.83	0.45	(NH4)2SeO4
Al(OH)3(am)	-1.87	9.19	11.06	Al(OH)3
Al2O3	-1.87	18.40	20.27	Al2O3
Al4(OH)10SO4	2.10	24.80	22.70	Al4(OH)10SO4
AlOHSO4	0.46	-2.77	-3.23	AlOHSO4
Alunite	7.17	6.27	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.03	-10.85	-7.82	PbSO4
Anhydrite	-0.16	-4.50	-4.34	CaSO4
Antlerite	-19.78	-10.99	8.79	Cu3(OH)4SO4
Atacamite	-12.71	-5.10	7.61	Cu2(OH)3Cl
Bianchite	-5.90	-7.66	-1.76	ZnSO4:6H2O
Birnessite	-25.46	-7.37	18.09	MnO2
Bixbyite	-26.48	-26.83	-0.35	Mn2O3
Boehmite	0.34	9.20	8.86	AlOOH
Brochantite	-26.38	-10.67	15.71	Cu4(OH)6SO4
Brucite	-9.04	8.08	17.12	Mg(OH)2
Bunsenite	-7.46	5.23	12.68	NiO
Ca3(PO4)2(beta)	-4.91	-33.96	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-7.62	-54.70	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.37	-20.72	-19.35	CaHP04
CaHP04:2H2O	-1.68	-20.73	-19.05	CaHP04:2H2O
Calomel	-11.99	-30.12	-18.13	Hg2Cl2

CaSeO3:2H2O	-15.37	-12.51	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-34.20	-37.20	-3.00	CaSeO4:2H2O
Cd(OH)2	-12.14	1.73	13.87	Cd(OH)2
Cd(OH)2(am)	-12.21	1.73	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-25.45	-18.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-29.34	-6.78	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-18.57	-51.17	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-33.45	-5.05	28.40	Cd4(OH)6SO4
CdCl2	-9.14	-9.76	-0.61	CdCl2
CdCl2:1H2O	-8.09	-9.76	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-7.84	-9.77	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.05	-10.36	13.69	Cd
Cdmetal(gamma)	-24.16	-10.36	13.80	Cd
CdOHCl	-7.62	-4.01	3.61	CdOHCl
CdSe	10.72	-9.66	-20.38	CdSe
CdSeO4:2H2O	-41.09	-42.94	-1.85	CdSeO4:2H2O
CdSO4	-10.19	-10.24	-0.05	CdSO4
CdSO4:1H2O	-8.59	-10.24	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-8.42	-10.25	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.01	-11.67	-2.65	CuSO4:5H2O
Clausthalite	17.11	-10.27	-27.39	PbSe
Co(OH)2	-7.86	5.24	13.09	Co(OH)2
Co(OH)3	-19.03	-21.12	-2.09	Co(OH)3
Co3(PO4)2	-5.95	-40.64	-34.69	Co3(PO4)2
Co3O4	-26.74	-36.97	-10.24	Co3O4
CoCl2	-14.71	-6.25	8.46	CoCl2
CoCl2:6H2O	-8.80	-6.28	2.52	CoCl2:6H2O
CoFe2O4	7.95	4.80	-3.15	CoFe2O4
CoHP04	-3.88	-22.95	-19.06	CoHP04
CoO	-8.60	5.24	13.84	CoO
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-16.04	-14.72	1.32	CoSeO3
CoSeO4:6H2O	-37.92	-39.45	-1.53	CoSeO4:6H2O
CoSO4	-9.72	-6.73	2.99	CoSO4
CoSO4:6H2O	-4.28	-6.76	-2.48	CoSO4:6H2O
Cotunnite	-5.53	-10.37	-4.84	PbCl2
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.91	-69.49	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.83	-17.48	-46.31	Cu2Se
Cu2SO4	-16.16	-18.06	-1.90	Cu2SO4
Cu3(PO4)2	-18.54	-55.39	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-20.28	-55.40	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	35.75	-28.55	-64.30	Cu3Se2
Cumetal	-0.17	-9.09	-8.93	Cu
CuOCuSO4	-21.94	-11.31	10.63	CuOCuSO4
Cupricferrite	-6.60	-0.11	6.49	CuFe2O4
Cuprite	-4.98	-6.09	-1.11	Cu2O
Cuprousferrite	5.61	-3.27	-8.88	CuFeO2
CuSe	22.32	-11.06	-33.39	CuSe
CuSe2	23.34	-10.36	-33.70	CuSe2
CuSeO3:2H2O	-20.25	-19.65	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-41.92	-44.36	-2.44	CuSeO4:5H2O
CuSO4	-14.76	-11.64	3.11	CuSO4
Diaspore	2.08	9.20	7.12	AlOOH
Epsomite	-1.77	-3.92	-2.15	MgSO4:7H2O
Fe(OH)2	-6.70	6.86	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.09	-1.95	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-21.97	-20.42	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-39.73	-60.36	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-33.19	-36.35	-3.16	Fe2(SO4)3
Fe3(OH)8	-13.82	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.59	-0.23	3.37	Fe(OH)3
Ferroselite	14.88	-3.83	-18.71	FeSe2
FeSe	6.48	-4.53	-11.00	FeSe
Gibbsite	0.67	9.19	8.52	Al(OH)3
Goethite	-0.86	-0.22	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4:7H2O
Gypsum	0.10	-4.51	-4.61	CaSO4:2H2O

H-Jarosite	-13.07	-24.62	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-6.47	-11.40	-4.92	H2Se
Halite	-3.04	-1.44	1.59	NaCl
Hausmannite	-31.51	30.53	62.03	Mn3O4
Hematite	0.67	-0.44	-1.11	Fe2O3
Hercynite	1.62	25.26	23.64	FeAl2O4
Hg(g)	-7.44	-15.36	-7.93	Hg
Hg(OH)2	-21.45	-24.94	-3.50	Hg(OH)2
Hg2(g)	-15.63	-30.73	-15.09	Hg2
Hg2(OH)2	-23.90	-18.64	5.26	Hg2(OH)2
Hg2HPO4	-22.05	-46.82	-24.77	Hg2HPO4
Hg2SeO3	-33.94	-38.60	-4.66	Hg2SeO3
Hg2SO4	-24.46	-30.60	-6.14	Hg2SO4
HgCl(g)	-34.94	-15.06	19.88	HgCl
HgCl2	-14.91	-36.43	-21.52	HgCl2
Hgmetal(l)	-1.71	-15.36	-13.65	Hg
HgSe	19.36	-36.33	-55.69	HgSe
HgSeO3	-32.48	-44.91	-12.43	HgSeO3
HgSO4	-27.45	-36.91	-9.45	HgSO4
Hinsdalite	-8.96	-11.46	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-2.88	-47.21	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-16.18	-78.97	-62.79	Pb5(PO4)3OH
K-Alum	-6.93	-12.18	-5.24	KAl(SO4)2:12H2O
K-Jarosite	-7.50	-21.99	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-38.68	-39.41	-0.73	K2SeO4
Langite	-28.56	-10.68	17.88	Cu4(OH)6SO4:H2O
Larnakite	-9.35	-9.73	-0.38	PbO:PbSO4
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.59	-0.22	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.73	1.12	12.85	PbO
Maghemite	-6.83	-0.44	6.39	Fe2O3
Magnesioferrite	-9.88	7.64	17.52	Fe2MgO4
Magnetite	2.53	6.43	3.90	Fe3O4
Manganite	-13.15	12.19	25.34	MnOOH
Massicot	-11.93	1.12	13.05	PbO
Melanothallite	-17.57	-11.16	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeSO4:7H2O
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(PO4)2	-8.84	-32.12	-23.28	Mg3(PO4)2
MgHPO4:3H2O	-1.94	-20.12	-18.18	MgHPO4:3H2O
MgSeO3:6H2O	-14.96	-11.91	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-35.41	-36.61	-1.20	MgSeO4:6H2O
Minium	-59.08	15.45	74.53	Pb3O4
Mirabilite	-2.11	-3.42	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-57.42	-62.74	-5.32	Mn2(SO4)3
Mn3(PO4)2	-14.09	-37.94	-23.85	Mn3(PO4)2
MnCl2:4H2O	-8.11	-5.37	2.74	MnCl2:4H2O
MnHPO4	3.36	-22.04	-25.40	MnHPO4
MnSe	-8.98	-5.25	3.73	MnSe
MnSeO3	-14.95	-13.82	1.13	MnSeO3
MnSeO3:2H2O	-14.80	-13.83	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-36.49	-38.54	-2.05	MnSeO4:5H2O
MnSO4	-8.56	-5.83	2.74	MnSO4
Monteponite	-13.62	1.73	15.35	CdO
Montroydite	-21.39	-24.94	-3.55	HgO
Morenosite	-4.60	-6.78	-2.17	NiSO4:7H2O
Na-Jarosite	-9.47	-20.31	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-21.69	-11.39	10.30	Na2SeO3:5H2O
Na2SeO4	-37.34	-36.06	1.28	Na2SeO4
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(PO4)2	-9.39	-40.69	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-23.08	8.92	32.00	Ni4(OH)6SO4
NiSe	11.53	-6.17	-17.70	NiSe
NiSeO3:2H2O	-17.64	-14.75	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-37.94	-39.46	-1.52	NiSeO4:6H2O
Nsutite	-24.87	-7.37	17.50	MnO2

O2(g)	-60.26	24.19	84.45	O2
Pb(OH)2	-7.18	1.11	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.31	-3.52	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-23.96	2.23	26.19	Pb2O(OH)2
Pb2O3	-46.71	14.33	61.04	Pb2O3
Pb3(P04)2	-9.49	-53.02	-43.53	Pb3(P04)2
Pb3O2S04	-19.49	-8.61	10.87	Pb3O2S04
Pb4(OH)6S04	-28.61	-7.51	21.10	Pb4(OH)6S04
Pb4O3S04	-29.70	-7.50	22.20	Pb4O3S04
PbHP04	-3.26	-27.07	-23.81	PbHP04
Pbmetal	-15.22	-10.98	4.24	Pb
PbO:0.3H2O	-11.86	1.12	12.98	PbO:0.33H2O
PbSe04	-36.67	-43.54	-6.88	PbSe04
Periclase	-13.86	8.08	21.94	MgO
Plattnerite	-37.09	13.21	50.31	PbO2
Plumbgummite	5.12	-27.67	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-15.65	7.46	23.11	Ca(OH)2
Pyrochroite	-9.29	6.14	15.43	Mn(OH)2
Pyrolusite	-23.79	18.24	42.03	MnO2
Pyromorphite	-0.28	-84.71	-84.43	Pb5(P04)3Cl
Retgersite	-4.72	-6.77	-2.05	NiS04:6H2O
Semetal(am)	7.84	0.70	-7.14	Se
Semetal(hex	8.45	0.70	-7.75	Se
SeO2	-20.09	-19.97	0.12	SeO2
SeO3	-66.05	-44.66	21.39	SeO3
Spinel	-11.29	26.48	37.77	MgAl2O4
Strengite	-2.04	-28.42	-26.38	FeP04:2H2O
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.71	-3.37	0.34	Na2S04
Tsumebite	-15.85	-25.64	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	0.19	-35.81	-36.00	Fe3(P04)2:8H2O
Zincite	-7.21	4.34	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnS04
Zn(NO3)2:6H2O	-139.22	-135.96	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-7.87	4.33	12.20	Zn(OH)2
Zn(OH)2(am)	-8.33	4.33	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.62	4.33	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.39	4.33	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.40	4.33	11.73	Zn(OH)2
Zn2(OH)2S04	-10.80	-3.30	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-12.26	2.93	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-7.95	-43.37	-35.42	Zn3(P04)2:4H2O
Zn3O(S04)2	-30.45	-10.92	19.53	Zn3O(S04)2
Zn4(OH)6S04	-23.03	5.37	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-28.31	10.19	38.50	Zn5(OH)8Cl2
ZnCl2	-14.37	-7.15	7.22	ZnCl2
Znmetal	-33.91	-7.76	26.15	Zn
ZnO(active)	-7.06	4.34	11.40	ZnO
ZnSe	7.41	-7.05	-14.46	ZnSe
ZnSeO4:6H2O	-38.83	-40.35	-1.52	ZnSeO4:6H2O
ZnS04:1H2O	-7.10	-7.64	-0.53	ZnS04:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 3.

Using reaction 4.

Mixture 3.

1.460e-01 Solution 1
8.540e-01 Solution 4

Reaction 4.

3.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000

Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	2.100e-04	1.986e-04
Ca	1.601e-02	1.514e-02
Cd	3.869e-07	3.660e-07
Cl	2.889e-01	2.733e-01
Co	4.465e-04	4.224e-04
Cu	1.590e-04	1.504e-04
Fe	1.824e-02	1.726e-02
Hg	2.168e-09	2.051e-09
K	6.007e-03	5.682e-03
Mg	5.995e-02	5.671e-02
Mn	3.385e-03	3.202e-03
N	4.658e-03	4.406e-03
Na	2.781e-01	2.631e-01
Ni	1.032e-04	9.762e-05
P	8.285e-04	7.837e-04
Pb	5.248e-08	4.964e-08
S	1.031e-01	9.754e-02
Se	1.102e-06	1.042e-06
Zn	2.960e-05	2.800e-05

-----Description of solution-----

pH	=	5.042	Charge balance
pe	=	1.047	Adjusted to redox equilibrium
Activity of water	=	0.988	
Ionic strength (mol/kgw)	=	5.100e-01	
Mass of water (kg)	=	9.460e-01	
Total alkalinity (eq/kg)	=	1.460e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	-9.552e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.26	
Iterations	=	4	
Total H	=	1.050329e+02	
Total O	=	5.290014e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.235e-05	9.082e-06	-4.908	-5.042	-0.134	0.00
OH-	1.274e-09	8.063e-10	-8.895	-9.094	-0.199	(0)
H2O	5.551e+01	9.877e-01	1.744	-0.005	0.000	18.05
Al	2.100e-04					
AlSO4+	1.598e-04	1.065e-04	-3.796	-3.973	-0.176	(0)
Al(SO4)2-	2.576e-05	1.717e-05	-4.589	-4.765	-0.176	(0)
Al+3	1.850e-05	1.162e-06	-4.733	-5.935	-1.202	(0)

	AlOH+2	4.265e-06	9.790e-07	-5.370	-6.009	-0.639	(0)
	Al(OH)2+	1.599e-06	1.107e-06	-5.796	-5.956	-0.160	(0)
	Al(OH)3	2.419e-08	2.419e-08	-7.616	-7.616	0.000	(0)
	Al(OH)4-	1.934e-09	1.289e-09	-8.714	-8.890	-0.176	(0)
Ca	1.601e-02						
	Ca+2	8.471e-03	2.476e-03	-2.072	-2.606	-0.534	(0)
	CaSO4	7.511e-03	7.511e-03	-2.124	-2.124	0.000	(0)
	CaH2PO4+	2.319e-05	1.605e-05	-4.635	-4.794	-0.160	(0)
	CaHPO4	2.250e-06	2.250e-06	-5.648	-5.648	0.000	(0)
	CaNH3+2	1.337e-08	4.777e-10	-7.874	-9.321	-1.447	(0)
	CaPO4-	8.724e-10	6.039e-10	-9.059	-9.219	-0.160	(0)
	CaOH+	5.381e-11	3.806e-11	-10.269	-10.420	-0.150	(0)
	Ca(NH3)2+2	8.161e-16	2.915e-17	-15.088	-16.535	-1.447	(0)
	CaNO3+	0.000e+00	0.000e+00	-66.504	-66.866	-0.362	(0)
Cd	3.869e-07						
	CdCl+	1.939e-07	8.430e-08	-6.712	-7.074	-0.362	(0)
	CdCl2	7.373e-08	7.373e-08	-7.132	-7.132	0.000	(0)
	Cd(SO4)2-2	7.024e-08	2.509e-09	-7.153	-8.601	-1.447	(0)
	CdCl3-	2.184e-08	9.496e-09	-7.661	-8.022	-0.362	(0)
	Cd+2	1.432e-08	4.185e-09	-7.844	-8.378	-0.534	(0)
	CdSO4	1.288e-08	1.288e-08	-7.890	-7.890	0.000	(0)
	CdOHCl	3.446e-12	3.446e-12	-11.463	-11.463	0.000	(0)
	CdOH+	6.199e-14	2.695e-14	-13.208	-13.569	-0.362	(0)
	Cd2OH+3	1.071e-18	5.938e-22	-17.970	-21.226	-3.256	(0)
	Cd(OH)2	2.515e-19	2.515e-19	-18.599	-18.599	0.000	(0)
	CdHS+	1.582e-22	6.876e-23	-21.801	-22.163	-0.362	(0)
	Cd(OH)3-	3.870e-26	1.683e-26	-25.412	-25.774	-0.362	(0)
	Cd(OH)4-2	8.444e-35	3.016e-36	-34.073	-35.521	-1.447	(0)
	Cd(HS)2	1.774e-37	2.774e-37	-36.751	-36.751	0.000	(0)
	Cd(SeO3)2-2	8.361e-38	2.986e-39	-37.078	-38.525	-1.447	(0)
	CdSeO4	0.000e+00	0.000e+00	-40.354	-40.354	0.000	(0)
	Cd(HS)3-	0.000e+00	0.000e+00	-56.282	-56.643	-0.362	(0)
	CdNO3+	0.000e+00	0.000e+00	-72.239	-72.600	-0.362	(0)
	Cd(HS)4-2	0.000e+00	0.000e+00	-74.793	-76.240	-1.447	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-137.723	-137.723	0.000	(0)
Cl	2.889e-01						
	Cl-	2.885e-01	2.121e-01	-0.540	-0.673	-0.134	(0)
	CuCl2-	1.383e-04	8.995e-05	-3.859	-4.046	-0.187	(0)
	MnCl+	4.306e-05	2.933e-05	-4.366	-4.533	-0.167	(0)
	CoCl+	2.306e-05	1.003e-05	-4.637	-4.999	-0.362	(0)
	CuCl3-2	1.864e-05	4.016e-06	-4.730	-5.396	-0.667	(0)
	NiCl+	1.732e-05	7.530e-06	-4.761	-5.123	-0.362	(0)
	MnCl2	8.789e-06	8.789e-06	-5.056	-5.056	0.000	(0)
	CuCl	2.010e-06	2.010e-06	-5.697	-5.697	0.000	(0)
	ZnCl+	1.350e-06	8.780e-07	-5.870	-6.057	-0.187	(0)
	MnCl3-	7.536e-07	5.134e-07	-6.123	-6.290	-0.167	(0)
	ZnCl2	2.482e-07	2.482e-07	-6.605	-6.605	0.000	(0)
	CdCl+	1.939e-07	8.430e-08	-6.712	-7.074	-0.362	(0)
	CdCl2	7.373e-08	7.373e-08	-7.132	-7.132	0.000	(0)
	ZnCl3-	6.324e-08	4.113e-08	-7.199	-7.386	-0.187	(0)
	CdCl3-	2.184e-08	9.496e-09	-7.661	-8.022	-0.362	(0)
	ZnCl4-2	1.961e-08	4.225e-09	-7.708	-8.374	-0.667	(0)
	PbCl+	1.670e-08	7.258e-09	-7.777	-8.139	-0.362	(0)
	NiCl2	8.131e-09	8.131e-09	-8.090	-8.090	0.000	(0)
	PbCl2	6.753e-09	6.753e-09	-8.170	-8.170	0.000	(0)
	PbCl4-2	1.525e-09	5.446e-11	-8.817	-10.264	-1.447	(0)
	PbCl3-	1.371e-09	5.959e-10	-8.863	-9.225	-0.362	(0)
	ZnOHCl	1.297e-09	1.297e-09	-8.887	-8.887	0.000	(0)
	CuCl+	8.794e-11	5.720e-11	-10.056	-10.243	-0.187	(0)
	CuCl2	3.455e-12	3.455e-12	-11.462	-11.462	0.000	(0)
	CdOHCl	3.446e-12	3.446e-12	-11.463	-11.463	0.000	(0)
	FeCl+2	1.247e-14	2.686e-15	-13.904	-14.571	-0.667	(0)
	CuCl3-	9.787e-15	6.365e-15	-14.009	-14.196	-0.187	(0)
	HgCl4-2	7.489e-15	2.675e-16	-14.126	-15.573	-1.447	(0)
	FeCl2+	4.238e-15	2.887e-15	-14.373	-14.540	-0.167	(0)
	HgCl3-	7.024e-16	3.054e-16	-15.153	-15.515	-0.362	(0)
	HgCl2	1.427e-16	1.427e-16	-15.846	-15.846	0.000	(0)
	FeCl3	6.124e-17	6.124e-17	-16.213	-16.213	0.000	(0)

CuCl4-2	3.597e-17	7.750e-18	-16.444	-17.111	-0.667	(0)
HgClOH	9.906e-21	9.906e-21	-20.004	-20.004	0.000	(0)
HgCl+	2.624e-22	1.141e-22	-21.581	-21.943	-0.362	(0)
CoCl+2	6.789e-34	2.425e-35	-33.168	-34.615	-1.447	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.520	-42.967	-1.447	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.028	-56.475	-1.447	(0)
Co(2)	4.465e-04					
Co+2	3.867e-04	1.381e-05	-3.413	-4.860	-1.447	(0)
CoS04	3.668e-05	3.668e-05	-4.436	-4.436	0.000	(0)
CoCl+	2.306e-05	1.003e-05	-4.637	-4.999	-0.362	(0)
CoHPO4	2.947e-08	2.947e-08	-7.531	-7.531	0.000	(0)
Co(NH3)+2	1.018e-08	3.636e-10	-7.992	-9.439	-1.447	(0)
CoOH+	6.942e-10	3.018e-10	-9.158	-9.520	-0.362	(0)
Co2OH+3	3.767e-13	2.089e-16	-12.424	-15.680	-3.256	(0)
Co(NH3)2+2	4.659e-14	1.664e-15	-13.332	-14.779	-1.447	(0)
Co(OH)2	2.625e-14	2.625e-14	-13.581	-13.581	0.000	(0)
Co(NH3)3+2	8.990e-20	3.211e-21	-19.046	-20.493	-1.447	(0)
Co(OH)3-	1.319e-21	5.736e-22	-20.880	-21.241	-0.362	(0)
CoOOH-	8.031e-23	3.492e-23	-22.095	-22.457	-0.362	(0)
Co4(OH)4+4	1.017e-24	1.656e-30	-23.993	-29.781	-5.788	(0)
Co(NH3)4+2	7.231e-26	2.583e-27	-25.141	-26.588	-1.447	(0)
Co(OH)4-2	2.787e-30	9.955e-32	-29.555	-31.002	-1.447	(0)
Co(NH3)5+2	1.839e-32	6.570e-34	-31.735	-33.182	-1.447	(0)
CoSeO4	3.684e-37	3.684e-37	-36.434	-36.434	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.589	-51.951	-0.362	(0)
CoNO3+	0.000e+00	0.000e+00	-69.070	-69.432	-0.362	(0)
Co(NO3)2	0.000e+00	0.000e+00	-133.895	-133.895	0.000	(0)
Co(3)	9.625e-32					
CoOH+2	9.557e-32	3.414e-33	-31.020	-32.467	-1.447	(0)
CoCl+2	6.789e-34	2.425e-35	-33.168	-34.615	-1.447	(0)
Co+3	9.765e-36	6.134e-37	-35.010	-36.212	-1.202	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.520	-42.967	-1.447	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.424	-52.786	-0.362	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.028	-56.475	-1.447	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.867	-60.314	-1.447	(0)
Cu(1)	1.590e-04					
CuCl2-	1.383e-04	8.995e-05	-3.859	-4.046	-0.187	(0)
CuCl3-2	1.864e-05	4.016e-06	-4.730	-5.396	-0.667	(0)
CuCl	2.010e-06	2.010e-06	-5.697	-5.697	0.000	(0)
Cu+	1.732e-08	7.528e-09	-7.762	-8.123	-0.362	(0)
Cu(S4)2-3	1.886e-38	5.829e-39	-37.724	-38.234	-0.510	(0)
CuS4S5-3	3.241e-39	1.085e-39	-38.489	-38.964	-0.475	(0)
Cu(2)	1.249e-09					
Cu+2	6.092e-10	1.781e-10	-9.215	-9.749	-0.534	(0)
CuS04	5.355e-10	5.355e-10	-9.271	-9.271	0.000	(0)
CuCl+	8.794e-11	5.720e-11	-10.056	-10.243	-0.187	(0)
CuNH3+2	1.161e-11	4.145e-13	-10.935	-12.382	-1.447	(0)
CuCl2	3.455e-12	3.455e-12	-11.462	-11.462	0.000	(0)
CuOH+	7.790e-13	5.067e-13	-12.108	-12.295	-0.187	(0)
CuCl3-	9.787e-15	6.365e-15	-14.009	-14.196	-0.187	(0)
Cu(OH)2	1.347e-16	1.347e-16	-15.871	-15.871	0.000	(0)
CuCl4-2	3.597e-17	7.750e-18	-16.444	-17.111	-0.667	(0)
Cu2(OH)2+2	1.756e-19	6.274e-21	-18.755	-20.202	-1.447	(0)
Cu(OH)3-	6.961e-22	3.026e-22	-21.157	-21.519	-0.362	(0)
Cu(OH)4-2	7.302e-29	2.608e-30	-28.137	-29.584	-1.447	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-48.866	-49.227	-0.362	(0)
CuNO2+	0.000e+00	0.000e+00	-55.307	-55.669	-0.362	(0)
CuNO3+	0.000e+00	0.000e+00	-73.650	-74.012	-0.362	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-102.598	-102.598	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-139.694	-139.694	0.000	(0)
Fe(2)	1.824e-02					
Fe+2	1.624e-02	5.802e-04	-1.789	-3.236	-1.447	(0)
FeS04	1.877e-03	1.877e-03	-2.727	-2.727	0.000	(0)
FeH2PO4+	1.177e-04	8.149e-05	-3.929	-4.089	-0.160	(0)
FeHPO4	4.518e-06	4.518e-06	-5.345	-5.345	0.000	(0)
FeOH+	2.734e-08	1.862e-08	-7.563	-7.730	-0.167	(0)
Fe(OH)2	1.142e-14	1.142e-14	-13.942	-13.942	0.000	(0)
Fe(OH)3-	5.590e-18	3.808e-18	-17.253	-17.419	-0.167	(0)

Fe(HS)2	1.346e-38	1.346e-38	-37.871	-37.871	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-57.265	-57.626	-0.362	(0)
Fe(3)	2.216e-10					
Fe(OH)2+	2.070e-10	1.433e-10	-9.684	-9.844	-0.160	(0)
FeHP04+	1.313e-11	9.087e-12	-10.882	-11.042	-0.160	(0)
FeOH+2	1.241e-12	2.674e-13	-11.906	-12.573	-0.667	(0)
Fe(OH)3	9.536e-14	9.536e-14	-13.021	-13.021	0.000	(0)
FeS04+	9.405e-14	6.408e-14	-13.027	-13.193	-0.167	(0)
Fe(S04)2-	4.479e-14	1.947e-14	-13.349	-13.711	-0.362	(0)
FeCl+2	1.247e-14	2.686e-15	-13.904	-14.571	-0.667	(0)
FeH2P04+2	1.103e-14	2.531e-15	-13.958	-14.597	-0.639	(0)
Fe+3	7.573e-15	4.757e-16	-14.121	-15.323	-1.202	(0)
FeCl2+	4.238e-15	2.887e-15	-14.373	-14.540	-0.167	(0)
FeCl3	6.124e-17	6.124e-17	-16.213	-16.213	0.000	(0)
Fe(OH)4-	2.482e-17	1.718e-17	-16.605	-16.765	-0.160	(0)
Fe2(OH)2+4	1.678e-18	2.731e-24	-17.775	-23.564	-5.788	(0)
Fe3(OH)4+5	6.008e-24	5.425e-33	-23.221	-32.266	-9.044	(0)
FeHSe03+2	6.514e-26	2.327e-27	-25.186	-26.633	-1.447	(0)
FeN03+2	0.000e+00	0.000e+00	-77.560	-79.007	-1.447	(0)
H(0)	8.690e-16					
H2	4.345e-16	4.886e-16	-15.362	-15.311	0.051	(0)
Hg(0)	2.168e-09					
Hg	2.168e-09	2.168e-09	-8.664	-8.664	0.000	(0)
Hg(1)	1.459e-27					
Hg2+2	7.294e-28	2.605e-29	-27.137	-28.584	-1.447	(0)
Hg(2)	8.334e-15					
HgCl4-2	7.489e-15	2.675e-16	-14.126	-15.573	-1.447	(0)
HgCl3-	7.024e-16	3.054e-16	-15.153	-15.515	-0.362	(0)
HgCl2	1.427e-16	1.427e-16	-15.846	-15.846	0.000	(0)
HgClOH	9.906e-21	9.906e-21	-20.004	-20.004	0.000	(0)
HgCl+	2.624e-22	1.141e-22	-21.581	-21.943	-0.362	(0)
Hg(NH3)2+2	3.068e-23	1.096e-24	-22.513	-23.960	-1.447	(0)
Hg(OH)2	1.285e-25	1.446e-25	-24.891	-24.840	0.051	(0)
HgNH3+2	5.173e-26	1.848e-27	-25.286	-26.733	-1.447	(0)
HgOH+	2.125e-27	9.239e-28	-26.673	-27.034	-0.362	(0)
Hg+2	6.651e-28	2.376e-29	-27.177	-28.624	-1.447	(0)
HgS04	6.887e-29	6.887e-29	-28.162	-28.162	0.000	(0)
Hg(NH3)3+2	2.689e-29	9.605e-31	-28.570	-30.017	-1.447	(0)
Hg(HS)2	1.043e-34	1.043e-34	-33.982	-33.982	0.000	(0)
Hg(NH3)4+2	4.728e-35	1.689e-36	-34.325	-35.772	-1.447	(0)
Hg(OH)3-	4.584e-35	1.993e-35	-34.339	-34.701	-0.362	(0)
HgHS2-	1.067e-35	4.637e-36	-34.972	-35.334	-0.362	(0)
HgS2-2	2.800e-38	1.000e-39	-37.553	-39.000	-1.447	(0)
HgN03+	0.000e+00	0.000e+00	-93.562	-93.924	-0.362	(0)
Hg(N03)2	0.000e+00	0.000e+00	-159.077	-159.077	0.000	(0)
K	6.007e-03					
K+	5.455e-03	4.011e-03	-2.263	-2.397	-0.134	(0)
KS04-	5.523e-04	3.823e-04	-3.258	-3.418	-0.160	(0)
KHP04-	8.596e-08	5.950e-08	-7.066	-7.225	-0.160	(0)
Mg	5.995e-02					
Mg+2	3.494e-02	1.021e-02	-1.457	-1.991	-0.534	(0)
MgS04	2.479e-02	2.479e-02	-1.606	-1.606	0.000	(0)
MgH2P04+	2.045e-04	1.416e-04	-3.689	-3.849	-0.160	(0)
MgHP04	1.281e-05	1.281e-05	-4.892	-4.892	0.000	(0)
MgOH+	4.271e-09	3.069e-09	-8.369	-8.513	-0.143	(0)
MgP04-	5.626e-11	3.894e-11	-10.250	-10.410	-0.160	(0)
Mn(2)	3.385e-03					
Mn+2	3.075e-03	1.099e-04	-2.512	-3.959	-1.447	(0)
MnS04	2.564e-04	2.564e-04	-3.591	-3.591	0.000	(0)
MnCl+	4.306e-05	2.933e-05	-4.366	-4.533	-0.167	(0)
MnCl2	8.789e-06	8.789e-06	-5.056	-5.056	0.000	(0)
MnCl3-	7.536e-07	5.134e-07	-6.123	-6.290	-0.167	(0)
MnOH+	3.266e-10	2.225e-10	-9.486	-9.653	-0.167	(0)
MnSe	2.317e-11	2.317e-11	-10.635	-10.635	0.000	(0)
Mn(OH)3-	3.287e-24	2.239e-24	-23.483	-23.650	-0.167	(0)
Mn(OH)4-2	3.675e-32	7.917e-33	-31.435	-32.101	-0.667	(0)
MnSe04	1.556e-36	1.556e-36	-35.808	-35.808	0.000	(0)
MnN03+	0.000e+00	0.000e+00	-68.170	-68.531	-0.362	(0)

Mn(NO3)2	0.000e+00	0.000e+00	-132.899	-132.899	0.000	(0)
Mn(3)	4.824e-28					
Mn+3	4.824e-28	3.030e-29	-27.317	-28.519	-1.202	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-78.906	-79.572	-0.667	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-87.950	-88.163	-0.213	(0)
N(-3)	4.658e-03					
NH4+	4.129e-03	2.441e-03	-2.384	-2.612	-0.228	(0)
NH4SO4-	5.287e-04	3.602e-04	-3.277	-3.443	-0.167	(0)
NH3	1.152e-07	1.152e-07	-6.938	-6.938	0.000	(0)
NiNH3+2	4.668e-08	1.668e-09	-7.331	-8.778	-1.447	(0)
CaNH3+2	1.337e-08	4.777e-10	-7.874	-9.321	-1.447	(0)
Co(NH3)+2	1.018e-08	3.636e-10	-7.992	-9.439	-1.447	(0)
CuNH3+2	1.161e-11	4.145e-13	-10.935	-12.382	-1.447	(0)
Ni(NH3)2+2	1.321e-12	4.718e-14	-11.879	-13.326	-1.447	(0)
Co(NH3)2+2	4.659e-14	1.664e-15	-13.332	-14.779	-1.447	(0)
Ca(NH3)2+2	8.161e-16	2.915e-17	-15.088	-16.535	-1.447	(0)
Co(NH3)3+2	8.990e-20	3.211e-21	-19.046	-20.493	-1.447	(0)
Hg(NH3)2+2	3.068e-23	1.096e-24	-22.513	-23.960	-1.447	(0)
Co(NH3)4+2	7.231e-26	2.583e-27	-25.141	-26.588	-1.447	(0)
HgNH3+2	5.173e-26	1.848e-27	-25.286	-26.733	-1.447	(0)
Hg(NH3)3+2	2.689e-29	9.605e-31	-28.570	-30.017	-1.447	(0)
Co(NH3)5+2	1.839e-32	6.570e-34	-31.735	-33.182	-1.447	(0)
Hg(NH3)4+2	4.728e-35	1.689e-36	-34.325	-35.772	-1.447	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.520	-42.967	-1.447	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.424	-52.786	-0.362	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.028	-56.475	-1.447	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.867	-60.314	-1.447	(0)
N(3)	0.000e+00					
NO2-	0.000e+00	0.000e+00	-47.727	-47.939	-0.213	(0)
CoNO2+	0.000e+00	0.000e+00	-51.589	-51.951	-0.362	(0)
CuNO2+	0.000e+00	0.000e+00	-55.307	-55.669	-0.362	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-102.598	-102.598	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-64.639	-64.772	-0.134	(0)
CaNO3+	0.000e+00	0.000e+00	-66.504	-66.866	-0.362	(0)
MnNO3+	0.000e+00	0.000e+00	-68.170	-68.531	-0.362	(0)
NiNO3+	0.000e+00	0.000e+00	-68.863	-69.225	-0.362	(0)
CoNO3+	0.000e+00	0.000e+00	-69.070	-69.432	-0.362	(0)
ZnNO3+	0.000e+00	0.000e+00	-69.770	-70.131	-0.362	(0)
CdNO3+	0.000e+00	0.000e+00	-72.239	-72.600	-0.362	(0)
PbNO3+	0.000e+00	0.000e+00	-72.240	-72.602	-0.362	(0)
CuNO3+	0.000e+00	0.000e+00	-73.650	-74.012	-0.362	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.560	-79.007	-1.447	(0)
HgNO3+	0.000e+00	0.000e+00	-93.562	-93.924	-0.362	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-132.899	-132.899	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-133.895	-133.895	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-135.614	-135.614	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.124	-137.124	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-137.723	-137.723	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-139.694	-139.694	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.077	-159.077	0.000	(0)
Na	2.781e-01					
Na+	2.580e-01	1.897e-01	-0.588	-0.722	-0.134	(0)
NaSO4-	2.015e-02	1.395e-02	-1.696	-1.855	-0.160	(0)
NaHPO4-	6.296e-06	4.358e-06	-5.201	-5.361	-0.160	(0)
Ni	1.032e-04					
Ni+2	4.799e-05	1.403e-05	-4.319	-4.853	-0.534	(0)
NiSO4	3.733e-05	3.733e-05	-4.428	-4.428	0.000	(0)
NiCl+	1.732e-05	7.530e-06	-4.761	-5.123	-0.362	(0)
Ni(SO4)2-2	4.919e-07	1.757e-08	-6.308	-7.755	-1.447	(0)
NiNH3+2	4.668e-08	1.668e-09	-7.331	-8.778	-1.447	(0)
NiCl2	8.131e-09	8.131e-09	-8.090	-8.090	0.000	(0)
NiOH+	3.348e-10	1.456e-10	-9.475	-9.837	-0.362	(0)
Ni(NH3)2+2	1.321e-12	4.718e-14	-11.879	-13.326	-1.447	(0)
Ni(OH)2	1.682e-14	1.682e-14	-13.774	-13.774	0.000	(0)
Ni(OH)3-	4.237e-20	1.842e-20	-19.373	-19.735	-0.362	(0)

NiSeO4	3.453e-37	3.453e-37	-36.462	-36.462	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-68.863	-69.225	-0.362	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-62.846	-62.795	0.051	(0)
P	8.285e-04					
H2PO4-	4.468e-04	3.093e-04	-3.350	-3.510	-0.160	(0)
MgH2PO4+	2.045e-04	1.416e-04	-3.689	-3.849	-0.160	(0)
FeH2PO4+	1.177e-04	8.149e-05	-3.929	-4.089	-0.160	(0)
CaH2PO4+	2.319e-05	1.605e-05	-4.635	-4.794	-0.160	(0)
MgHP04	1.281e-05	1.281e-05	-4.892	-4.892	0.000	(0)
HP04-2	9.856e-06	2.123e-06	-5.006	-5.673	-0.667	(0)
NaHP04-	6.296e-06	4.358e-06	-5.201	-5.361	-0.160	(0)
FeHP04	4.518e-06	4.518e-06	-5.345	-5.345	0.000	(0)
CaHP04	2.250e-06	2.250e-06	-5.648	-5.648	0.000	(0)
H3PO4	3.782e-07	3.782e-07	-6.422	-6.422	0.000	(0)
KHP04-	8.596e-08	5.950e-08	-7.066	-7.225	-0.160	(0)
CoHP04	2.947e-08	2.947e-08	-7.531	-7.531	0.000	(0)
CaP04-	8.724e-10	6.039e-10	-9.059	-9.219	-0.160	(0)
MgP04-	5.626e-11	3.894e-11	-10.250	-10.410	-0.160	(0)
FeHP04+	1.313e-11	9.087e-12	-10.882	-11.042	-0.160	(0)
P04-3	1.446e-12	9.081e-14	-11.840	-13.042	-1.202	(0)
FeH2P04+2	1.103e-14	2.531e-15	-13.958	-14.597	-0.639	(0)
Pb	5.248e-08					
PbCl+	1.670e-08	7.258e-09	-7.777	-8.139	-0.362	(0)
Pb(SO4)2-2	1.585e-08	5.660e-10	-7.800	-9.247	-1.447	(0)
PbSO4	6.822e-09	6.822e-09	-8.166	-8.166	0.000	(0)
PbCl2	6.753e-09	6.753e-09	-8.170	-8.170	0.000	(0)
Pb+2	3.461e-09	1.012e-09	-8.461	-8.995	-0.534	(0)
PbCl4-2	1.525e-09	5.446e-11	-8.817	-10.264	-1.447	(0)
PbCl3-	1.371e-09	5.959e-10	-8.863	-9.225	-0.362	(0)
PbOH+	6.400e-12	2.782e-12	-11.194	-11.556	-0.362	(0)
Pb(OH)2	9.635e-17	9.635e-17	-16.016	-16.016	0.000	(0)
Pb2OH+3	8.043e-17	4.461e-20	-16.095	-19.351	-3.256	(0)
Pb(OH)3-	2.427e-22	1.055e-22	-21.615	-21.977	-0.362	(0)
Pb(OH)4-2	7.922e-28	2.830e-29	-27.101	-28.548	-1.447	(0)
Pb3(OH)4+2	2.788e-30	9.959e-32	-29.555	-31.002	-1.447	(0)
Pb4(OH)4+4	5.701e-31	9.279e-37	-30.244	-36.032	-5.788	(0)
Pb(HS)2	4.901e-38	4.901e-38	-37.310	-37.310	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-57.440	-57.802	-0.362	(0)
PbNO3+	0.000e+00	0.000e+00	-72.240	-72.602	-0.362	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.124	-137.124	0.000	(0)
S(-2)	1.784e-20					
H2S	1.731e-20	1.731e-20	-19.762	-19.762	0.000	(0)
HS-	3.710e-22	1.613e-22	-21.431	-21.792	-0.362	(0)
CdHS+	1.582e-22	6.876e-23	-21.801	-22.163	-0.362	(0)
S5-2	1.745e-25	6.234e-27	-24.758	-26.205	-1.447	(0)
S6-2	6.540e-26	2.336e-27	-25.184	-26.632	-1.447	(0)
S4-2	4.387e-26	1.567e-27	-25.358	-26.805	-1.447	(0)
S3-2	6.750e-27	2.411e-28	-26.171	-27.618	-1.447	(0)
S2-2	6.357e-28	2.270e-29	-27.197	-28.644	-1.447	(0)
S-2	3.151e-34	6.789e-35	-33.502	-34.168	-0.667	(0)
Hg(HS)2	1.043e-34	1.043e-34	-33.982	-33.982	0.000	(0)
HgHS2-	1.067e-35	4.637e-36	-34.972	-35.334	-0.362	(0)
Zn(HS)2	2.918e-37	2.918e-37	-36.535	-36.535	0.000	(0)
Cd(HS)2	1.774e-37	1.774e-37	-36.751	-36.751	0.000	(0)
ZnS(HS)-	7.222e-38	3.140e-38	-37.141	-37.503	-0.362	(0)
Pb(HS)2	4.901e-38	4.901e-38	-37.310	-37.310	0.000	(0)
HgS2-2	2.800e-38	1.000e-39	-37.553	-39.000	-1.447	(0)
Cu(S4)2-3	1.886e-38	5.829e-39	-37.724	-38.234	-0.510	(0)
Fe(HS)2	1.346e-38	1.346e-38	-37.871	-37.871	0.000	(0)
CuS4S5-3	3.241e-39	1.085e-39	-38.489	-38.964	-0.475	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-48.866	-49.227	-0.362	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-54.685	-55.047	-0.362	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-56.282	-56.643	-0.362	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-57.265	-57.626	-0.362	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-57.440	-57.802	-0.362	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-58.538	-59.985	-1.447	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-74.793	-76.240	-1.447	(0)

Zn(HS)4-2	0.000e+00	0.000e+00	-76.853	-78.300	-1.447	(0)
S(6)	1.031e-01					
S04-2	4.711e-02	1.377e-02	-1.327	-1.861	-0.534	(0)
MgS04	2.479e-02	2.479e-02	-1.606	-1.606	0.000	(0)
NaS04-	2.015e-02	1.395e-02	-1.696	-1.855	-0.160	(0)
CaS04	7.511e-03	7.511e-03	-2.124	-2.124	0.000	(0)
FeS04	1.877e-03	1.877e-03	-2.727	-2.727	0.000	(0)
KS04-	5.523e-04	3.823e-04	-3.258	-3.418	-0.160	(0)
NH4S04-	5.287e-04	3.602e-04	-3.277	-3.443	-0.167	(0)
MnS04	2.564e-04	2.564e-04	-3.591	-3.591	0.000	(0)
AlS04+	1.598e-04	1.065e-04	-3.796	-3.973	-0.176	(0)
NiS04	3.733e-05	3.733e-05	-4.428	-4.428	0.000	(0)
CoS04	3.668e-05	3.668e-05	-4.436	-4.436	0.000	(0)
Al(S04)2-	2.576e-05	1.717e-05	-4.589	-4.765	-0.176	(0)
Zn(S04)2-2	1.717e-05	6.132e-07	-4.765	-6.212	-1.447	(0)
HS04-	1.625e-05	1.083e-05	-4.789	-4.965	-0.176	(0)
ZnS04	4.942e-06	4.942e-06	-5.306	-5.306	0.000	(0)
Ni(S04)2-2	4.919e-07	1.757e-08	-6.308	-7.755	-1.447	(0)
Cd(S04)2-2	7.024e-08	2.509e-09	-7.153	-8.601	-1.447	(0)
Pb(S04)2-2	1.585e-08	5.660e-10	-7.800	-9.247	-1.447	(0)
CdS04	1.288e-08	1.288e-08	-7.890	-7.890	0.000	(0)
PbS04	6.822e-09	6.822e-09	-8.166	-8.166	0.000	(0)
CuS04	5.355e-10	5.355e-10	-9.271	-9.271	0.000	(0)
FeS04+	9.405e-14	6.408e-14	-13.027	-13.193	-0.167	(0)
Fe(S04)2-	4.479e-14	1.947e-14	-13.349	-13.711	-0.362	(0)
HgS04	6.887e-29	6.887e-29	-28.162	-28.162	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.424	-52.786	-0.362	(0)
Se(-2)	1.102e-06					
HSe-	1.069e-06	4.649e-07	-5.971	-6.333	-0.362	(0)
H2Se	3.219e-08	3.219e-08	-7.492	-7.492	0.000	(0)
MnSe	2.317e-11	2.317e-11	-10.635	-10.635	0.000	(0)
Se-2	1.101e-15	3.932e-17	-14.958	-16.405	-1.447	(0)
Se(4)	4.916e-15					
HSeO3-	4.883e-15	2.123e-15	-14.311	-14.673	-0.362	(0)
SeO3-2	2.534e-17	9.053e-19	-16.596	-18.043	-1.447	(0)
H2SeO3	7.950e-18	7.950e-18	-17.100	-17.100	0.000	(0)
FeHSeO3+2	6.514e-26	2.327e-27	-25.186	-26.633	-1.447	(0)
Cd(SeO3)2-2	8.361e-38	2.986e-39	-37.078	-38.525	-1.447	(0)
Se(6)	1.968e-34					
SeO4-2	1.944e-34	5.683e-35	-33.711	-34.245	-0.534	(0)
MnSeO4	1.556e-36	1.556e-36	-35.808	-35.808	0.000	(0)
CoSeO4	3.684e-37	3.684e-37	-36.434	-36.434	0.000	(0)
NiSeO4	3.453e-37	3.453e-37	-36.462	-36.462	0.000	(0)
HSeO4-	5.245e-38	2.280e-38	-37.280	-37.642	-0.362	(0)
ZnSeO4	1.494e-38	1.494e-38	-37.826	-37.826	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.354	-40.354	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-70.618	-72.065	-1.447	(0)
Zn	2.960e-05					
Zn(S04)2-2	1.717e-05	6.132e-07	-4.765	-6.212	-1.447	(0)
Zn+2	5.807e-06	1.697e-06	-5.236	-5.770	-0.534	(0)
ZnS04	4.942e-06	4.942e-06	-5.306	-5.306	0.000	(0)
ZnCl+	1.350e-06	8.780e-07	-5.870	-6.057	-0.187	(0)
ZnCl2	2.482e-07	2.482e-07	-6.605	-6.605	0.000	(0)
ZnCl3-	6.324e-08	4.113e-08	-7.199	-7.386	-0.187	(0)
ZnCl4-2	1.961e-08	4.225e-09	-7.708	-8.374	-0.667	(0)
ZnOHCl	1.297e-09	1.297e-09	-8.887	-8.887	0.000	(0)
ZnOH+	3.148e-10	1.369e-10	-9.502	-9.864	-0.362	(0)
Zn(OH)2	3.226e-14	3.226e-14	-13.491	-13.491	0.000	(0)
Zn(OH)3-	4.073e-19	1.771e-19	-18.390	-18.752	-0.362	(0)
Zn(OH)4-2	2.161e-25	7.719e-27	-24.665	-26.112	-1.447	(0)
Zn(HS)2	2.918e-37	2.918e-37	-36.535	-36.535	0.000	(0)
ZnS(HS)-	7.222e-38	3.140e-38	-37.141	-37.503	-0.362	(0)
ZnSeO4	1.494e-38	1.494e-38	-37.826	-37.826	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-54.685	-55.047	-0.362	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-58.538	-59.985	-1.447	(0)
ZnNO3+	0.000e+00	0.000e+00	-69.770	-70.131	-0.362	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-70.618	-72.065	-1.447	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-76.853	-78.300	-1.447	(0)

Zn(NO3)2 0.000e+00 0.000e+00 -135.614 -135.614 0.000 (0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-160.56	-154.28	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-30.62	-26.09	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-37.89	-26.09	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-233.88	-215.95	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-43.77	-23.66	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-39.92	-39.47	0.45	(NH4)2SeO4
Al(OH)3(am)	-1.89	9.17	11.06	Al(OH)3
Al2O3	-1.90	18.37	20.27	Al2O3
Al4(OH)10SO4	2.06	24.76	22.70	Al4(OH)10SO4
AlOHSO4	0.47	-2.76	-3.23	AlOHSO4
Alunite	7.20	6.30	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.04	-10.86	-7.82	PbSO4
Anhydrite	-0.12	-4.47	-4.34	CaSO4
Anilite	0.94	-31.37	-32.31	Cu0.25Cu1.5S
Antlerite	-19.75	-10.96	8.79	Cu3(OH)4SO4
Atacamite	-12.68	-5.06	7.61	Cu2(OH)3Cl
Bianchite	-5.90	-7.66	-1.76	ZnSO4:6H2O
Birnessite	-25.41	-7.31	18.09	MnO2
Bixbyite	-26.45	-26.80	-0.35	Mn2O3
BlaubleiI	-2.99	-27.15	-24.16	Cu0.9Cu0.2S
BlaubleiII	-1.82	-29.10	-27.28	Cu0.6Cu0.8S
Boehmite	0.32	9.18	8.86	AlOOH
Brochantite	-26.35	-10.64	15.71	Cu4(OH)6SO4
Brucite	-9.03	8.08	17.12	Mg(OH)2
Bunsenite	-7.46	5.23	12.68	NiO
Ca3(PO4)2(beta)	-4.85	-33.90	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-7.53	-54.61	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.34	-20.69	-19.35	CaHP04
CaHP04:2H2O	-1.65	-20.70	-19.05	CaHP04:2H2O
Calomel	-11.80	-29.93	-18.13	Hg2Cl2
CaSeO3:2H2O	-15.11	-12.25	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-33.86	-36.86	-3.00	CaSeO4:2H2O
Cd(OH)2	-12.17	1.69	13.87	Cd(OH)2
Cd(OH)2(am)	-12.24	1.69	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-25.49	-18.78	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-29.41	-6.85	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-18.62	-51.22	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-33.56	-5.16	28.40	Cd4(OH)6SO4
CdCl2	-9.11	-9.73	-0.61	CdCl2
CdCl2:1H2O	-8.06	-9.73	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-7.81	-9.74	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.17	-10.47	13.69	Cd
Cdmetal(gamma)	-24.27	-10.47	13.80	Cd
CdOHCl	-7.63	-4.02	3.61	CdOHCl
CdSe	10.71	-9.67	-20.38	CdSe
CdSeO4:2H2O	-40.78	-42.63	-1.85	CdSeO4:2H2O
CdSO4	-10.19	-10.24	-0.05	CdSO4
CdSO4:1H2O	-8.59	-10.24	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-8.42	-10.25	-1.83	CdSO4:2.67H2O
Chalcanthite	-8.98	-11.64	-2.65	CuSO4:5H2O
Chalcocite	2.32	-33.00	-35.32	Cu2S
Chalcopyrite	-10.86	-46.49	-35.62	CuFeS2
Cinnabar	-5.36	-51.66	-46.30	HgS
Clausthalite	17.10	-10.29	-27.39	PbSe
Co(OH)2	-7.88	5.21	13.09	Co(OH)2
Co(OH)3	-19.01	-21.10	-2.09	Co(OH)3
Co3(PO4)2	-5.98	-40.66	-34.69	Co3(PO4)2
Co3O4	-26.73	-36.97	-10.24	Co3O4
CoCl2	-14.66	-6.21	8.46	CoCl2
CoCl2:6H2O	-8.76	-6.24	2.52	CoCl2:6H2O
CoFe2O4	7.96	4.81	-3.15	CoFe2O4
CoHP04	-3.88	-22.94	-19.06	CoHP04

CoO	-8.62	5.22	13.84	CoO
CoS(alpha)	-14.17	-21.61	-7.44	CoS
CoS(beta)	-10.54	-21.61	-11.07	CoS
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-15.81	-14.49	1.32	CoSeO3
CoSeO4:6H2O	-37.61	-39.14	-1.53	CoSeO4:6H2O
CoSO4	-9.71	-6.72	2.99	CoSO4
CoSO4:6H2O	-4.28	-6.75	-2.48	CoSO4:6H2O
Cotunnite	-5.50	-10.34	-4.84	PbCl2
Covellite	-3.97	-26.50	-22.53	CuS
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.59	-69.16	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.77	-17.54	-46.31	Cu2Se
Cu2SO4	-16.20	-18.11	-1.90	Cu2SO4
Cu3(PO4)2	-18.48	-55.33	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-20.23	-55.35	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	35.72	-28.58	-64.30	Cu3Se2
Cumetal	-0.24	-9.17	-8.93	Cu
CuOCuSO4	-21.91	-11.28	10.63	CuOCuSO4
Cupricferrite	-6.57	-0.08	6.49	CuFe2O4
Cuprite	-5.06	-6.17	-1.11	Cu2O
Cuprousferrite	5.59	-3.29	-8.88	CuFeO2
CuSe	22.35	-11.04	-33.39	CuSe
CuSe2	23.46	-10.24	-33.70	CuSe2
CuSeO3:2H2O	-19.99	-19.39	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-41.58	-44.02	-2.44	CuSeO4:5H2O
CuSO4	-14.72	-11.61	3.11	CuSO4
Diaspore	2.06	9.18	7.12	AlOOH
Djurleite	1.83	-32.57	-34.40	Cu0.066Cu1.868S
Epsomite	-1.74	-3.89	-2.15	MgSO4:7H2O
Fe(OH)2	-6.73	6.84	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.11	-1.93	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-21.68	-20.13	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-38.92	-59.55	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-33.07	-36.23	-3.16	Fe2(SO4)3
Fe3(OH)8	-13.81	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.58	-0.21	3.37	Fe(OH)3
Ferroselite	14.99	-3.72	-18.71	FeSe2
FeS(ppt)	-17.06	-19.99	-2.92	FeS
FeSe	6.48	-4.53	-11.00	FeSe
Galena	-11.58	-25.75	-14.16	PbS
Gibbsite	0.66	9.17	8.52	Al(OH)3
Goethite	-0.84	-0.21	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4:7H2O
Greenockite	-10.64	-25.13	-14.49	CdS
Greigite	-55.85	-100.88	-45.03	Fe3S4
Gypsum	0.13	-4.48	-4.61	CaSO4:2H2O
H-Jarosite	-12.97	-24.52	-11.55	(H3O)Fe3(SO4)2(OH)6
H2S(g)	-18.82	-26.83	-8.01	H2S
H2Se(g)	-6.45	-11.37	-4.92	H2Se
Halite	-2.99	-1.40	1.59	NaCl
Hausmannite	-31.50	30.53	62.03	Mn3O4
Hematite	0.70	-0.41	-1.11	Fe2O3
Hercynite	1.57	25.21	23.64	FeAl2O4
Hg(g)	-7.41	-15.34	-7.93	Hg
Hg(OH)2	-21.34	-24.84	-3.50	Hg(OH)2
Hg2(g)	-15.59	-30.68	-15.09	Hg2
Hg2(OH)2	-23.77	-18.51	5.26	Hg2(OH)2
Hg2HP04	-21.89	-46.67	-24.77	Hg2HP04
Hg2S	-33.49	-45.33	-11.84	Hg2S
Hg2SeO3	-33.56	-38.22	-4.66	Hg2SeO3
Hg2SO4	-24.30	-30.45	-6.14	Hg2SO4
HgCl(g)	-34.85	-14.97	19.88	HgCl
HgCl2	-14.74	-36.26	-21.52	HgCl2
Hgmetal(l)	-1.69	-15.34	-13.65	Hg
HgSe	19.49	-36.20	-55.69	HgSe
HgSeO3	-32.11	-44.54	-12.43	HgSeO3
HgSO4	-27.32	-36.77	-9.45	HgSO4

Hinsdalite	-8.98	-11.48	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-2.79	-47.12	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-16.27	-79.06	-62.79	Pb5(P04)3OH
K-Alum	-6.88	-12.12	-5.24	KAl(S04)2:12H2O
K-Jarosite	-7.38	-21.87	-14.49	KFe3(S04)2(OH)6
K2Se04	-38.31	-39.04	-0.73	K2Se04
Langite	-28.53	-10.65	17.88	Cu4(OH)6S04:H2O
Larnakite	-9.39	-9.77	-0.38	PbO:PbS04
Laurionite	-5.26	-4.63	0.62	PbOHCl
Lepidocrocite	-1.58	-0.21	1.37	Fe00H
Lime	-25.69	7.47	33.16	Ca0
Litharge	-11.77	1.08	12.85	Pb0
Mackinawite	-16.39	-19.99	-3.60	FeS
Maghemite	-6.80	-0.41	6.39	Fe203
Magnesioferrite	-9.85	7.68	17.52	Fe2Mg04
Magnetite	2.53	6.43	3.90	Fe304
Manganite	-13.14	12.20	25.34	Mn00H
Massicot	-11.97	1.08	13.05	Pb0
Melanothallite	-17.50	-11.10	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeS04:7H2O
Metacinnabar	-5.96	-51.66	-45.70	HgS
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(P04)2	-8.78	-32.06	-23.28	Mg3(P04)2
MgHP04:3H2O	-1.92	-20.09	-18.18	MgHP04:3H2O
MgSe03:6H2O	-14.70	-11.65	3.04	MgSe03:6H2O
MgSe04:6H2O	-35.07	-36.27	-1.20	MgSe04:6H2O
Minium	-59.10	15.42	74.53	Pb304
Mirabilite	-2.06	-3.36	-1.30	Na2S04:10H2O
Mn2(S04)3	-57.30	-62.62	-5.32	Mn2(S04)3
Mn3(P04)2	-14.11	-37.96	-23.85	Mn3(P04)2
MnCl2:4H2O	-8.07	-5.33	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnS(grn)	-20.96	-20.71	0.25	MnS
MnS(pnk)	-24.05	-20.71	3.34	MnS
MnSe	-8.98	-5.25	3.73	MnSe
MnSe03	-14.72	-13.59	1.13	MnSe03
MnSe03:2H2O	-14.56	-13.60	0.96	MnSe03:2H2O
MnSe04:5H2O	-36.18	-38.23	-2.05	MnSe04:5H2O
MnS04	-8.56	-5.82	2.74	MnS04
Monteponite	-13.65	1.70	15.35	Cd0
Montroydite	-21.29	-24.83	-3.55	Hg0
Morenosite	-4.58	-6.75	-2.17	NiS04:7H2O
Na-Jarosite	-9.35	-20.19	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-21.40	-11.10	10.30	Na2Se03:5H2O
Na2Se04	-36.97	-35.69	1.28	Na2Se04
Nantokite	-1.97	-8.80	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(P04)2	-9.34	-40.64	-31.30	Ni3(P04)2
Ni4(OH)6S04	-23.05	8.95	32.00	Ni4(OH)6S04
NiS(alpha)	-16.00	-21.60	-5.60	NiS
NiS(beta)	-10.50	-21.60	-11.10	NiS
NiS(gamma)	-8.80	-21.60	-12.80	NiS
NiSe	11.56	-6.14	-17.70	NiSe
NiSe03:2H2O	-17.38	-14.50	2.89	NiSe03:2H2O
NiSe04:6H2O	-37.61	-39.13	-1.52	NiSe04:6H2O
Nsutite	-24.82	-7.31	17.50	Mn02
O2(g)	-60.10	24.35	84.45	O2
Pb(OH)2	-7.21	1.08	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.35	-3.55	8.79	Pb2(OH)3Cl
Pb20(OH)2	-24.03	2.16	26.19	Pb20(OH)2
Pb203	-46.70	14.34	61.04	Pb203
Pb3(P04)2	-9.54	-53.07	-43.53	Pb3(P04)2
Pb302S04	-19.56	-8.69	10.87	Pb302S04
Pb4(OH)6S04	-28.72	-7.62	21.10	Pb4(OH)6S04
Pb403S04	-29.81	-7.61	22.20	Pb403S04
PbHP04	-3.27	-27.08	-23.81	PbHP04
Pbmetal	-15.33	-11.09	4.24	Pb
Pb0:0.3H2O	-11.90	1.08	12.98	Pb0:0.33H2O

PbSeO4	-36.36	-43.24	-6.88	PbSeO4
Periclase	-13.86	8.09	21.94	MgO
Plattnerite	-37.05	13.26	50.31	PbO2
Plumbgummite	5.08	-27.71	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-15.64	7.47	23.11	Ca(OH)2
Pyrite	-16.02	-34.64	-18.63	FeS2
Pyrochroite	-9.31	6.11	15.43	Mn(OH)2
Pyrolusite	-23.74	18.29	42.03	MnO2
Pyromorphite	-0.34	-84.77	-84.43	Pb5(PO4)3Cl
Retgersite	-4.70	-6.75	-2.05	NiSO4:6H2O
Semetal(am)	7.94	0.80	-7.14	Se
Semetal(hex)	8.55	0.80	-7.75	Se
SeO2	-19.83	-19.71	0.12	SeO2
SeO3	-65.72	-44.32	21.39	SeO3
Sphalerite	-11.00	-22.52	-11.52	ZnS
Spinel	-11.32	26.45	37.77	MgAl2O4
Strengite	-2.00	-28.38	-26.38	FePO4:2H2O
Sulfur	-12.55	-14.66	-2.11	S
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.65	-3.31	0.34	Na2SO4
Tsumebite	-15.90	-25.69	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	0.16	-35.84	-36.00	Fe3(PO4)2:8H2O
Wurtzite	-13.52	-22.52	-9.00	ZnS
Zincite	-7.24	4.31	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnSO4
Zn(NO3)2:6H2O	-138.60	-135.35	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-7.90	4.30	12.20	Zn(OH)2
Zn(OH)2(am)	-8.36	4.30	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.65	4.30	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.43	4.30	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.43	4.30	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.83	-3.33	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.30	2.90	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-8.00	-43.42	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-30.48	-10.95	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-23.12	5.28	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-28.41	10.09	38.50	Zn5(OH)8Cl2
ZnCl2	-14.34	-7.12	7.22	ZnCl2
Znmetal	-34.02	-7.87	26.15	Zn
ZnO(active)	-7.09	4.31	11.40	ZnO
ZnS(am)	-13.43	-22.52	-9.09	ZnS
ZnSe	7.40	-7.06	-14.46	ZnSe
ZnSeO4:6H2O	-38.53	-40.05	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.10	-7.64	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 7.

SOLUTION 5 #Groundwater worst case maximum values

temp 21
pH 5.05
pe 1
redox pe
units mg/l
density 1
Al 5.21
Alkalinity 0
As 0
Ba 0
Be 0

```

B      0
Cd     0.04
Co     24.2
Cr     0
Cu     9.29
Fe     937
Pb     0.01
Mn     171
Mo     0
V      0
Zn     1.78
Se     0.08
Ni     5.57
N      60
P      23.6
Ca     590
Mg     1340
Na     5880
K      216
Cl     9420
S(6)   9110
Hg     0.0004
water  1 # kg
MIX 4
  1    0.934
  5    0.066
REACTION 5
H2O -1
  3
END #Time-step 5

```

Beginning of initial solution calculations.

Initial solution 5.

-----Solution composition-----

Elements	Molality	Moles
Al	1.986e-04	1.986e-04
Ca	1.514e-02	1.514e-02
Cd	3.660e-07	3.660e-07
Cl	2.733e-01	2.733e-01
Co	4.224e-04	4.224e-04
Cu	1.504e-04	1.504e-04
Fe	1.726e-02	1.726e-02
Hg	2.051e-09	2.051e-09
K	5.682e-03	5.682e-03
Mg	5.671e-02	5.671e-02
Mn	3.202e-03	3.202e-03
N	4.406e-03	4.406e-03
Na	2.631e-01	2.631e-01
Ni	9.762e-05	9.762e-05
P	7.837e-04	7.837e-04
Pb	4.964e-08	4.964e-08
S(6)	9.754e-02	9.754e-02
Se	1.042e-06	1.042e-06
Zn	2.800e-05	2.800e-05

-----Description of solution-----

```

pH = 5.050
pe = 1.000
Activity of water = 0.988
Ionic strength (mol/kgw) = 4.862e-01
Mass of water (kg) = 1.000e+00
Total alkalinity (eq/kg) = 1.381e-05

```

Total carbon (mol/kg) = 0.000e+00
 Total CO2 (mol/kg) = 0.000e+00
 Temperature (°C) = 21.00
 Electrical balance (eq) = -9.552e-03
 Percent error, 100*(Cat-|An|)/(Cat+|An|) = -1.26
 Iterations = 14
 Total H = 1.110329e+02
 Total O = 5.590014e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.214e-05	8.913e-06	-4.916	-5.050	-0.134	0.00
OH-	1.292e-09	8.222e-10	-8.889	-9.085	-0.196	(0)
H2O	5.551e+01	9.883e-01	1.744	-0.005	0.000	18.05
Al	1.986e-04					
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Al+3	1.839e-05	1.139e-06	-4.735	-5.943	-1.208	(0)
AlOH+2	4.197e-06	9.786e-07	-5.377	-6.009	-0.632	(0)
Al(OH)2+	1.624e-06	1.128e-06	-5.790	-5.948	-0.158	(0)
Al(OH)3	2.514e-08	2.514e-08	-7.600	-7.600	0.000	(0)
Al(OH)4-	2.040e-09	1.366e-09	-8.690	-8.864	-0.174	(0)
Ca	1.514e-02					
Ca+2	8.161e-03	2.370e-03	-2.088	-2.625	-0.537	(0)
CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
CaOH+	5.236e-11	3.715e-11	-10.281	-10.430	-0.149	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
Cd	3.660e-07					
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
Cd(SO4)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
Cd+2	1.502e-08	4.363e-09	-7.823	-8.360	-0.537	(0)
CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CdOH+	6.462e-14	2.865e-14	-13.190	-13.543	-0.353	(0)
Cd2OH+3	9.945e-19	6.582e-22	-18.002	-21.182	-3.179	(0)
Cd(OH)2	2.726e-19	2.726e-19	-18.564	-18.564	0.000	(0)
Cd(OH)3-	4.195e-26	1.860e-26	-25.377	-25.730	-0.353	(0)
Cd(OH)4-2	8.799e-35	3.400e-36	-34.056	-35.469	-1.413	(0)
Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cl	2.733e-01					
Cl-	2.729e-01	2.003e-01	-0.564	-0.698	-0.134	(0)
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)

PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(2)	4.224e-04					
Co+2	3.644e-04	1.408e-05	-3.438	-4.851	-1.413	(0)
CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CoOH+	7.075e-10	3.137e-10	-9.150	-9.504	-0.353	(0)
Co2OH+3	3.344e-13	2.213e-16	-12.476	-15.655	-3.179	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Co(OH)2	2.782e-14	2.782e-14	-13.556	-13.556	0.000	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Co(OH)3-	1.398e-21	6.199e-22	-20.854	-21.208	-0.353	(0)
CoOOH-	8.505e-23	3.771e-23	-22.070	-22.424	-0.353	(0)
Co4(OH)4+4	8.668e-25	1.932e-30	-24.062	-29.714	-5.652	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
Co(OH)4-2	2.839e-30	1.097e-31	-29.547	-30.960	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Co(3)	8.287e-32					
CoOH+2	8.232e-32	3.180e-33	-31.085	-32.498	-1.413	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co+3	9.049e-36	5.605e-37	-35.043	-36.251	-1.208	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
Cu(1)	1.504e-04					
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
Cu+	1.823e-08	8.082e-09	-7.739	-8.092	-0.353	(0)
Cu(2)	1.182e-09					
Cu+2	5.900e-10	1.714e-10	-9.229	-9.766	-0.537	(0)
CuSO4	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
CuOH+	7.604e-13	4.972e-13	-12.119	-12.303	-0.185	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
Cu(OH)2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
Cu2(OH)2+2	1.564e-19	6.042e-21	-18.806	-20.219	-1.413	(0)

Cu(OH)3-	6.965e-22	3.088e-22	-21.157	-21.510	-0.353	(0)
Cu(OH)4-2	7.024e-29	2.714e-30	-28.153	-29.566	-1.413	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Fe(2)	1.726e-02					
Fe+2	1.529e-02	5.907e-04	-1.816	-3.229	-1.413	(0)
FeSO4	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
FeOH+	2.826e-08	1.934e-08	-7.549	-7.714	-0.165	(0)
Fe(OH)2	1.209e-14	1.209e-14	-13.918	-13.918	0.000	(0)
Fe(OH)3-	6.009e-18	4.111e-18	-17.221	-17.386	-0.165	(0)
Fe(3)	2.087e-10					
Fe(OH)2+	1.957e-10	1.360e-10	-9.708	-9.867	-0.158	(0)
FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
FeOH+2	1.136e-12	2.489e-13	-11.945	-12.604	-0.659	(0)
Fe(OH)3	9.228e-14	9.228e-14	-13.035	-13.035	0.000	(0)
FeSO4+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(SO4)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Fe+3	7.010e-15	4.342e-16	-14.154	-15.362	-1.208	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
Fe(OH)4-	2.440e-17	1.696e-17	-16.613	-16.771	-0.158	(0)
Fe2(OH)2+4	1.061e-18	2.365e-24	-17.974	-23.626	-5.652	(0)
Fe3(OH)4+5	3.023e-24	4.459e-33	-23.520	-32.351	-8.831	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
H(0)	1.047e-15					
H2	5.235e-16	5.855e-16	-15.281	-15.232	0.049	(0)
Hg(0)	2.051e-09					
Hg	2.051e-09	2.051e-09	-8.688	-8.688	0.000	(0)
Hg(1)	9.698e-28					
Hg2+2	4.849e-28	1.874e-29	-27.314	-28.727	-1.413	(0)
Hg(2)	4.726e-15					
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Hg(OH)2	1.022e-25	1.143e-25	-24.991	-24.942	0.049	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
HgOH+	1.615e-27	7.162e-28	-26.792	-27.145	-0.353	(0)
Hg+2	4.674e-28	1.806e-29	-27.330	-28.743	-1.413	(0)
HgSO4	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Hg(OH)3-	3.623e-35	1.606e-35	-34.441	-34.794	-0.353	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
K	5.682e-03					
K+	5.178e-03	3.801e-03	-2.286	-2.420	-0.134	(0)
KSO4-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
Mg	5.671e-02					
Mg+2	3.360e-02	9.758e-03	-1.474	-2.011	-0.537	(0)
MgSO4	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
MgHP04	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
MgOH+	4.148e-09	2.990e-09	-8.382	-8.524	-0.142	(0)
MgP04-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
Mn(2)	3.202e-03					
Mn+2	2.899e-03	1.120e-04	-2.538	-3.951	-1.413	(0)
MnSO4	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)

MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
MnOH+	3.381e-10	2.313e-10	-9.471	-9.636	-0.165	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Mn(OH)3-	3.538e-24	2.421e-24	-23.451	-23.616	-0.165	(0)
Mn(OH)4-2	3.983e-32	8.727e-33	-31.400	-32.059	-0.659	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Mn(3)	4.471e-28					
Mn+3	4.471e-28	2.769e-29	-27.350	-28.558	-1.208	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-79.028	-79.687	-0.659	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-88.115	-88.325	-0.210	(0)
N(-3)	4.406e-03					
NH4+	3.919e-03	2.335e-03	-2.407	-2.632	-0.225	(0)
NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
NH3	1.123e-07	1.123e-07	-6.950	-6.950	0.000	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
N(3)	0.000e+00					
NO2-	0.000e+00	0.000e+00	-47.968	-48.177	-0.210	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-64.954	-65.088	-0.134	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
Na	2.631e-01					
Na+	2.447e-01	1.796e-01	-0.611	-0.746	-0.134	(0)
NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
Ni	9.762e-05					
Ni+2	4.671e-05	1.357e-05	-4.331	-4.867	-0.537	(0)

NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
Ni(SO4)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
NiOH+	3.238e-10	1.435e-10	-9.490	-9.843	-0.353	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Ni(OH)2	1.692e-14	1.692e-14	-13.772	-13.772	0.000	(0)
Ni(OH)3-	4.261e-20	1.889e-20	-19.371	-19.724	-0.353	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-63.001	-62.952	0.049	(0)
P	7.837e-04					
H2PO4-	4.270e-04	2.967e-04	-3.370	-3.528	-0.158	(0)
MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
MgHPO4	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
HPO4-2	9.473e-06	2.076e-06	-5.024	-5.683	-0.659	(0)
NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
H3PO4	3.560e-07	3.560e-07	-6.449	-6.449	0.000	(0)
KHPO4-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
MgPO4-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
PO4-3	1.460e-12	9.045e-14	-11.836	-13.044	-1.208	(0)
FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Pb	4.964e-08					
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
Pb(SO4)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
Pb+2	3.636e-09	1.056e-09	-8.439	-8.976	-0.537	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
PbOH+	6.682e-12	2.963e-12	-11.175	-11.528	-0.353	(0)
Pb(OH)2	1.046e-16	1.046e-16	-15.980	-15.980	0.000	(0)
Pb2OH+3	7.494e-17	4.960e-20	-16.125	-19.305	-3.179	(0)
Pb(OH)3-	2.635e-22	1.168e-22	-21.579	-21.933	-0.353	(0)
Pb(OH)4-2	8.268e-28	3.195e-29	-27.083	-28.496	-1.413	(0)
Pb3(OH)4+2	3.173e-30	1.226e-31	-29.499	-30.912	-1.413	(0)
Pb4(OH)4+4	5.352e-31	1.193e-36	-30.271	-35.923	-5.652	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
S(6)	9.754e-02					
SO4-2	4.586e-02	1.332e-02	-1.339	-1.875	-0.537	(0)
MgSO4	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
FeSO4	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
MnSO4	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Zn(SO4)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
HSO4-	1.536e-05	1.028e-05	-4.814	-4.988	-0.174	(0)
ZnSO4	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
Ni(SO4)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
Cd(SO4)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
Pb(SO4)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)

PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
CuSO4	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
FeSO4+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(SO4)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
HgSO4	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Se(-2)	1.042e-06					
HSe-	1.012e-06	4.485e-07	-5.995	-6.348	-0.353	(0)
H2Se	3.047e-08	3.047e-08	-7.516	-7.516	0.000	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Se-2	1.000e-15	3.865e-17	-15.000	-16.413	-1.413	(0)
Se(4)	2.708e-15					
HSeO3-	2.690e-15	1.193e-15	-14.570	-14.923	-0.353	(0)
SeO3-2	1.341e-17	5.183e-19	-16.872	-18.285	-1.413	(0)
H2SeO3	4.383e-18	4.383e-18	-17.358	-17.358	0.000	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
Se(6)	9.467e-35					
SeO4-2	9.354e-35	2.717e-35	-34.029	-34.566	-0.537	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
HSeO4-	2.413e-38	1.070e-38	-37.617	-37.971	-0.353	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn	2.800e-05					
Zn(SO4)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
Zn+2	6.051e-06	1.758e-06	-5.218	-5.755	-0.537	(0)
ZnSO4	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
ZnOH+	3.259e-10	1.445e-10	-9.487	-9.840	-0.353	(0)
Zn(OH)2	3.473e-14	3.473e-14	-13.459	-13.459	0.000	(0)
Zn(OH)3-	4.384e-19	1.944e-19	-18.358	-18.711	-0.353	(0)
Zn(OH)4-2	2.236e-25	8.641e-27	-24.650	-26.063	-1.413	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	161.31	-155.03	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-30.79	-26.25	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-38.05	-26.26	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-234.94	-217.01	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-43.95	-23.84	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-40.28	-39.83	0.45	(NH4)2SeO4
Al(OH)3(am)	-1.87	9.19	11.06	Al(OH)3
Al2O3	-1.87	18.40	20.27	Al2O3
Al4(OH)10SO4	2.10	24.80	22.70	Al4(OH)10SO4
AlOHSO4	0.46	-2.77	-3.23	AlOHSO4
Alunite	7.17	6.27	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.03	-10.85	-7.82	PbSO4
Anhydrite	-0.16	-4.50	-4.34	CaSO4
Antlerite	-19.78	-10.99	8.79	Cu3(OH)4SO4
Atacamite	-12.71	-5.10	7.61	Cu2(OH)3Cl
Bianchite	-5.90	-7.66	-1.76	ZnSO4·6H2O
Birnessite	-25.46	-7.37	18.09	MnO2
Bixbyite	-26.48	-26.83	-0.35	Mn2O3
Boehmite	0.34	9.20	8.86	AlOOH
Brochantite	-26.38	-10.67	15.71	Cu4(OH)6SO4

Brucite	-9.04	8.08	17.12	Mg(OH)2
Bunsenite	-7.46	5.23	12.68	NiO
Ca3(P04)2(beta)	-4.91	-33.96	-29.05	Ca3(P04)2
Ca4H(P04)3:3H2O	-7.62	-54.70	-47.08	Ca4H(P04)3:3H2O
CaHP04	-1.37	-20.72	-19.35	CaHP04
CaHP04:2H2O	-1.68	-20.73	-19.05	CaHP04:2H2O
Calomel	-11.99	-30.12	-18.13	Hg2Cl2
CaSe03:2H2O	-15.37	-12.51	2.86	CaSe03:2H2O
CaSe04:2H2O	-34.20	-37.20	-3.00	CaSe04:2H2O
Cd(OH)2	-12.14	1.73	13.87	Cd(OH)2
Cd(OH)2(am)	-12.21	1.73	13.94	Cd(OH)2
Cd3(OH)2(S04)2	-25.45	-18.74	6.71	Cd3(OH)2(S04)2
Cd3(OH)4S04	-29.34	-6.78	22.56	Cd3(OH)4S04
Cd3(P04)2	-18.57	-51.17	-32.60	Cd3(P04)2
Cd4(OH)6S04	-33.45	-5.05	28.40	Cd4(OH)6S04
CdCl2	-9.14	-9.76	-0.61	CdCl2
CdCl2:1H2O	-8.09	-9.76	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-7.84	-9.77	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.05	-10.36	13.69	Cd
Cdmetal(gamma)	-24.16	-10.36	13.80	Cd
CdOHCl	-7.62	-4.01	3.61	CdOHCl
CdSe	10.72	-9.66	-20.38	CdSe
CdSe04:2H2O	-41.09	-42.94	-1.85	CdSe04:2H2O
CdS04	-10.19	-10.24	-0.05	CdS04
CdS04:1H2O	-8.59	-10.24	-1.65	CdS04:1H2O
CdS04:2.67H2O	-8.42	-10.25	-1.83	CdS04:2.67H2O
Chalcanthite	-9.01	-11.67	-2.65	CuS04:5H2O
Clausthalite	17.11	-10.27	-27.39	PbSe
Co(OH)2	-7.86	5.24	13.09	Co(OH)2
Co(OH)3	-19.03	-21.12	-2.09	Co(OH)3
Co3(P04)2	-5.95	-40.64	-34.69	Co3(P04)2
Co304	-26.74	-36.97	-10.24	Co304
CoCl2	-14.71	-6.25	8.46	CoCl2
CoCl2:6H2O	-8.80	-6.28	2.52	CoCl2:6H2O
CoFe204	7.95	4.80	-3.15	CoFe204
CoHP04	-3.88	-22.95	-19.06	CoHP04
CoO	-8.60	5.24	13.84	CoO
CoSe	10.05	-6.15	-16.20	CoSe
CoSe03	-16.04	-14.72	1.32	CoSe03
CoSe04:6H2O	-37.92	-39.45	-1.53	CoSe04:6H2O
CoS04	-9.72	-6.73	2.99	CoS04
CoS04:6H2O	-4.28	-6.76	-2.48	CoS04:6H2O
Cotunnite	-5.53	-10.37	-4.84	PbCl2
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3N03	-78.91	-69.49	9.42	Cu2(OH)3N03
Cu2Se(alpha)	28.83	-17.48	-46.31	Cu2Se
Cu2S04	-16.16	-18.06	-1.90	Cu2S04
Cu3(P04)2	-18.54	-55.39	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-20.28	-55.40	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.75	-28.55	-64.30	Cu3Se2
Cumetal	-0.17	-9.09	-8.93	Cu
Cu0CuS04	-21.94	-11.31	10.63	Cu0CuS04
Cupricferrite	-6.60	-0.11	6.49	CuFe204
Cuprite	-4.98	-6.09	-1.11	CuFe204
Cuprousferrite	5.61	-3.27	-8.88	CuFe02
CuSe	22.32	-11.06	-33.39	CuSe
CuSe2	23.34	-10.36	-33.70	CuSe2
CuSe03:2H2O	-20.25	-19.65	0.60	CuSe03:2H2O
CuSe04:5H2O	-41.92	-44.36	-2.44	CuSe04:5H2O
CuS04	-14.76	-11.64	3.11	CuS04
Diaspore	2.08	9.20	7.12	Al00H
Epsomite	-1.77	-3.92	-2.15	MgS04:7H2O
Fe(OH)2	-6.70	6.86	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.09	-1.95	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-21.97	-20.42	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H2O	-39.73	-60.36	-20.63	Fe2(Se03)3:2H2O
Fe2(S04)3	-33.19	-36.35	-3.16	Fe2(S04)3
Fe3(OH)8	-13.82	6.41	20.22	Fe3(OH)8

Ferrihydrite	-3.59	-0.23	3.37	Fe(OH)3
Ferroselite	14.88	-3.83	-18.71	FeSe2
FeSe	6.48	-4.53	-11.00	FeSe
Gibbsite	0.67	9.19	8.52	Al(OH)3
Goethite	-0.86	-0.22	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4:7H2O
Gypsum	0.10	-4.51	-4.61	CaSO4:2H2O
H-Jarosite	-13.07	-24.62	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-6.47	-11.40	-4.92	H2Se
Halite	-3.04	-1.44	1.59	NaCl
Hausmannite	-31.51	30.53	62.03	Mn3O4
Hematite	0.67	-0.44	-1.11	Fe2O3
Hercynite	1.62	25.26	23.64	FeAl2O4
Hg(g)	-7.44	-15.36	-7.93	Hg
Hg(OH)2	-21.45	-24.94	-3.50	Hg(OH)2
Hg2(g)	-15.63	-30.73	-15.09	Hg2
Hg2(OH)2	-23.90	-18.64	5.26	Hg2(OH)2
Hg2HPO4	-22.05	-46.82	-24.77	Hg2HPO4
Hg2SeO3	-33.94	-38.60	-4.66	Hg2SeO3
Hg2SO4	-24.46	-30.60	-6.14	Hg2SO4
HgCl(g)	-34.94	-15.06	19.88	HgCl
HgCl2	-14.91	-36.43	-21.52	HgCl2
Hgmetal(l)	-1.71	-15.36	-13.65	Hg
HgSe	19.36	-36.33	-55.69	HgSe
HgSeO3	-32.48	-44.91	-12.43	HgSeO3
HgSO4	-27.45	-36.91	-9.45	HgSO4
Hinsdalite	-8.96	-11.46	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-2.88	-47.21	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-16.18	-78.97	-62.79	Pb5(PO4)3OH
K-Alum	-6.93	-12.18	-5.24	KAl(SO4)2:12H2O
K-Jarosite	-7.50	-21.99	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-38.68	-39.41	-0.73	K2SeO4
Langite	-28.56	-10.68	17.88	Cu4(OH)6SO4:H2O
Larnakite	-9.35	-9.73	-0.38	PbO:PbSO4
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.59	-0.22	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.73	1.12	12.85	PbO
Maghemite	-6.83	-0.44	6.39	Fe2O3
Magnesioferrite	-9.88	7.64	17.52	Fe2MgO4
Magnetite	2.53	6.43	3.90	Fe3O4
Manganite	-13.15	12.19	25.34	MnOOH
Massicot	-11.93	1.12	13.05	PbO
Melanothallite	-17.57	-11.16	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeSO4:7H2O
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(PO4)2	-8.84	-32.12	-23.28	Mg3(PO4)2
MgHP04:3H2O	-1.94	-20.12	-18.18	MgHP04:3H2O
MgSeO3:6H2O	-14.96	-11.91	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-35.41	-36.61	-1.20	MgSeO4:6H2O
Minium	-59.08	15.45	74.53	Pb3O4
Mirabilite	-2.11	-3.42	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-57.42	-62.74	-5.32	Mn2(SO4)3
Mn3(P04)2	-14.09	-37.94	-23.85	Mn3(P04)2
MnCl2:4H2O	-8.11	-5.37	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnSe	-8.98	-5.25	3.73	MnSe
MnSeO3	-14.95	-13.82	1.13	MnSeO3
MnSeO3:2H2O	-14.80	-13.83	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-36.49	-38.54	-2.05	MnSeO4:5H2O
MnSO4	-8.56	-5.83	2.74	MnSO4
Monteponite	-13.62	1.73	15.35	CdO
Montroydite	-21.39	-24.94	-3.55	HgO
Morenosite	-4.60	-6.78	-2.17	NiSO4:7H2O
Na-Jarosite	-9.47	-20.31	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-21.69	-11.39	10.30	Na2SeO3:5H2O
Na2SeO4	-37.34	-36.06	1.28	Na2SeO4
Nantokite	-1.96	-8.79	-6.83	CuCl

Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(P04)2	-9.39	-40.69	-31.30	Ni3(P04)2
Ni4(OH)6S04	-23.08	8.92	32.00	Ni4(OH)6S04
NiSe	11.53	-6.17	-17.70	NiSe
NiSe03:2H2O	-17.64	-14.75	2.89	NiSe03:2H2O
NiSe04:6H2O	-37.94	-39.46	-1.52	NiSe04:6H2O
Nsutite	-24.87	-7.37	17.50	Mn02
O2(g)	-60.26	24.19	84.45	O2
Pb(OH)2	-7.18	1.11	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.31	-3.52	8.79	Pb2(OH)3Cl
Pb20(OH)2	-23.96	2.23	26.19	Pb20(OH)2
Pb203	-46.71	14.33	61.04	Pb203
Pb3(P04)2	-9.49	-53.02	-43.53	Pb3(P04)2
Pb302S04	-19.49	-8.61	10.87	Pb302S04
Pb4(OH)6S04	-28.61	-7.51	21.10	Pb4(OH)6S04
Pb403S04	-29.70	-7.50	22.20	Pb403S04
PbHP04	-3.26	-27.07	-23.81	PbHP04
Pbmetal	-15.22	-10.98	4.24	Pb
Pb0:0.3H2O	-11.86	1.12	12.98	Pb0:0.33H2O
PbSe04	-36.67	-43.54	-6.88	PbSe04
Periclase	-13.86	8.08	21.94	Mg0
Plattnerite	-37.09	13.21	50.31	Pb02
Plumbgummite	5.12	-27.67	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-15.65	7.46	23.11	Ca(OH)2
Pyrochroite	-9.29	6.14	15.43	Mn(OH)2
Pyrolusite	-23.79	18.24	42.03	Mn02
Pyromorphite	-0.28	-84.71	-84.43	Pb5(P04)3Cl
Retgersite	-4.72	-6.77	-2.05	NiS04:6H2O
Semetal(am)	7.84	0.70	-7.14	Se
Semetal(hex)	8.45	0.70	-7.75	Se
Se02	-20.09	-19.97	0.12	Se02
Se03	-66.05	-44.66	21.39	Se03
Spinel	-11.29	26.48	37.77	MgAl204
Strengite	-2.04	-28.42	-26.38	FeP04:2H2O
Tenorite	-7.47	0.33	7.80	Cu0
Thenardite	-3.71	-3.37	0.34	Na2S04
Tsumebite	-15.85	-25.64	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	0.19	-35.81	-36.00	Fe3(P04)2:8H2O
Zincite	-7.21	4.34	11.55	Zn0
Zincosite	-11.76	-7.63	4.13	ZnS04
Zn(N03)2:6H2O	-139.22	-135.96	3.26	Zn(N03)2:6H2O
Zn(OH)2	-7.87	4.33	12.20	Zn(OH)2
Zn(OH)2(am)	-8.33	4.33	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.62	4.33	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.39	4.33	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.40	4.33	11.73	Zn(OH)2
Zn2(OH)2S04	-10.80	-3.30	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-12.26	2.93	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-7.95	-43.37	-35.42	Zn3(P04)2:4H2O
Zn30(S04)2	-30.45	-10.92	19.53	Zn30(S04)2
Zn4(OH)6S04	-23.03	5.37	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-28.31	10.19	38.50	Zn5(OH)8Cl2
ZnCl2	-14.37	-7.15	7.22	ZnCl2
Znmetal	-33.91	-7.76	26.15	Zn
Zn0(active)	-7.06	4.34	11.40	Zn0
ZnSe	7.41	-7.05	-14.46	ZnSe
ZnSe04:6H2O	-38.83	-40.35	-1.52	ZnSe04:6H2O
ZnS04:1H2O	-7.10	-7.64	-0.53	ZnS04:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 4.
Using reaction 5.

Mixture 4.

9.340e-01 Solution 1
6.600e-02 Solution 5

Reaction 5.

3.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000

Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	2.100e-04	1.986e-04
Ca	1.601e-02	1.514e-02
Cd	3.869e-07	3.660e-07
Cl	2.889e-01	2.733e-01
Co	4.465e-04	4.224e-04
Cu	1.590e-04	1.504e-04
Fe	1.824e-02	1.726e-02
Hg	2.168e-09	2.051e-09
K	6.007e-03	5.682e-03
Mg	5.995e-02	5.671e-02
Mn	3.385e-03	3.202e-03
N	4.658e-03	4.406e-03
Na	2.781e-01	2.631e-01
Ni	1.032e-04	9.762e-05
P	8.285e-04	7.837e-04
Pb	5.248e-08	4.964e-08
S	1.031e-01	9.754e-02
Se	1.102e-06	1.042e-06
Zn	2.960e-05	2.800e-05

-----Description of solution-----

pH	=	5.042	Charge balance
pe	=	1.047	Adjusted to redox equilibrium
Activity of water	=	0.988	
Ionic strength (mol/kgw)	=	5.100e-01	
Mass of water (kg)	=	9.460e-01	
Total alkalinity (eq/kg)	=	1.460e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	-9.552e-03	
Percent error, $100 \cdot (\text{Cat} - \text{An}) / (\text{Cat} + \text{An})$	=	-1.26	
Iterations	=	4	
Total H	=	1.050329e+02	
Total O	=	5.290014e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol

	H+	1.235e-05	9.082e-06	-4.908	-5.042	-0.134	0.00
	OH-	1.274e-09	8.063e-10	-8.895	-9.094	-0.199	(0)
	H2O	5.551e+01	9.877e-01	1.744	-0.005	0.000	18.05
Al		2.100e-04					
	AlSO4+	1.598e-04	1.065e-04	-3.796	-3.973	-0.176	(0)
	Al(SO4)2-	2.576e-05	1.717e-05	-4.589	-4.765	-0.176	(0)
	Al+3	1.850e-05	1.162e-06	-4.733	-5.935	-1.202	(0)
	AlOH+2	4.265e-06	9.790e-07	-5.370	-6.009	-0.639	(0)
	Al(OH)2+	1.599e-06	1.107e-06	-5.796	-5.956	-0.160	(0)
	Al(OH)3	2.419e-08	2.419e-08	-7.616	-7.616	0.000	(0)
	Al(OH)4-	1.934e-09	1.289e-09	-8.714	-8.890	-0.176	(0)
Ca		1.601e-02					
	Ca+2	8.471e-03	2.476e-03	-2.072	-2.606	-0.534	(0)
	CaSO4	7.511e-03	7.511e-03	-2.124	-2.124	0.000	(0)
	CaH2PO4+	2.319e-05	1.605e-05	-4.635	-4.794	-0.160	(0)
	CaHPO4	2.250e-06	2.250e-06	-5.648	-5.648	0.000	(0)
	CaNH3+2	1.337e-08	4.777e-10	-7.874	-9.321	-1.447	(0)
	CaPO4-	8.724e-10	6.039e-10	-9.059	-9.219	-0.160	(0)
	CaOH+	5.381e-11	3.806e-11	-10.269	-10.420	-0.150	(0)
	Ca(NH3)2+2	8.161e-16	2.915e-17	-15.088	-16.535	-1.447	(0)
	CaNO3+	0.000e+00	0.000e+00	-66.504	-66.866	-0.362	(0)
Cd		3.869e-07					
	CdCl+	1.939e-07	8.430e-08	-6.712	-7.074	-0.362	(0)
	CdCl2	7.373e-08	7.373e-08	-7.132	-7.132	0.000	(0)
	Cd(SO4)2-2	7.024e-08	2.509e-09	-7.153	-8.601	-1.447	(0)
	CdCl3-	2.184e-08	9.496e-09	-7.661	-8.022	-0.362	(0)
	Cd+2	1.432e-08	4.185e-09	-7.844	-8.378	-0.534	(0)
	CdSO4	1.288e-08	1.288e-08	-7.890	-7.890	0.000	(0)
	CdOHCl	3.446e-12	3.446e-12	-11.463	-11.463	0.000	(0)
	CdOH+	6.199e-14	2.695e-14	-13.208	-13.569	-0.362	(0)
	Cd2OH+3	1.071e-18	5.938e-22	-17.970	-21.226	-3.256	(0)
	Cd(OH)2	2.515e-19	2.515e-19	-18.599	-18.599	0.000	(0)
	CdHS+	1.582e-22	6.876e-23	-21.801	-22.163	-0.362	(0)
	Cd(OH)3-	3.870e-26	1.683e-26	-25.412	-25.774	-0.362	(0)
	Cd(OH)4-2	8.444e-35	3.016e-36	-34.073	-35.521	-1.447	(0)
	Cd(HS)2	1.774e-37	1.774e-37	-36.751	-36.751	0.000	(0)
	Cd(SeO3)2-2	8.360e-38	2.986e-39	-37.078	-38.525	-1.447	(0)
	CdSeO4	0.000e+00	0.000e+00	-40.354	-40.354	0.000	(0)
	Cd(HS)3-	0.000e+00	0.000e+00	-56.282	-56.643	-0.362	(0)
	CdNO3+	0.000e+00	0.000e+00	-72.239	-72.600	-0.362	(0)
	Cd(HS)4-2	0.000e+00	0.000e+00	-74.793	-76.240	-1.447	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-137.723	-137.723	0.000	(0)
Cl		2.889e-01					
	Cl-	2.885e-01	2.121e-01	-0.540	-0.673	-0.134	(0)
	CuCl2-	1.383e-04	8.995e-05	-3.859	-4.046	-0.187	(0)
	MnCl+	4.306e-05	2.933e-05	-4.366	-4.533	-0.167	(0)
	CoCl+	2.306e-05	1.003e-05	-4.637	-4.999	-0.362	(0)
	CuCl3-2	1.864e-05	4.016e-06	-4.730	-5.396	-0.667	(0)
	NiCl+	1.732e-05	7.530e-06	-4.761	-5.123	-0.362	(0)
	MnCl2	8.789e-06	8.789e-06	-5.056	-5.056	0.000	(0)
	CuCl	2.010e-06	2.010e-06	-5.697	-5.697	0.000	(0)
	ZnCl+	1.350e-06	8.780e-07	-5.870	-6.057	-0.187	(0)
	MnCl3-	7.536e-07	5.134e-07	-6.123	-6.290	-0.167	(0)
	ZnCl2	2.482e-07	2.482e-07	-6.605	-6.605	0.000	(0)
	CdCl+	1.939e-07	8.430e-08	-6.712	-7.074	-0.362	(0)
	CdCl2	7.373e-08	7.373e-08	-7.132	-7.132	0.000	(0)
	ZnCl3-	6.324e-08	4.113e-08	-7.199	-7.386	-0.187	(0)
	CdCl3-	2.184e-08	9.496e-09	-7.661	-8.022	-0.362	(0)
	ZnCl4-2	1.961e-08	4.225e-09	-7.708	-8.374	-0.667	(0)
	PbCl+	1.670e-08	7.258e-09	-7.777	-8.139	-0.362	(0)
	NiCl2	8.131e-09	8.131e-09	-8.090	-8.090	0.000	(0)
	PbCl2	6.753e-09	6.753e-09	-8.170	-8.170	0.000	(0)
	PbCl4-2	1.525e-09	5.446e-11	-8.817	-10.264	-1.447	(0)
	PbCl3-	1.371e-09	5.959e-10	-8.863	-9.225	-0.362	(0)
	ZnOHCl	1.297e-09	1.297e-09	-8.887	-8.887	0.000	(0)
	CuCl+	8.794e-11	5.720e-11	-10.056	-10.243	-0.187	(0)
	CuCl2	3.455e-12	3.455e-12	-11.462	-11.462	0.000	(0)
	CdOHCl	3.446e-12	3.446e-12	-11.463	-11.463	0.000	(0)

FeCl+2	1.247e-14	2.686e-15	-13.904	-14.571	-0.667	(0)
CuCl3-	9.786e-15	6.365e-15	-14.009	-14.196	-0.187	(0)
HgCl4-2	7.489e-15	2.675e-16	-14.126	-15.573	-1.447	(0)
FeCl2+	4.238e-15	2.887e-15	-14.373	-14.540	-0.167	(0)
HgCl3-	7.024e-16	3.054e-16	-15.153	-15.515	-0.362	(0)
HgCl2	1.427e-16	1.427e-16	-15.846	-15.846	0.000	(0)
FeCl3	6.124e-17	6.124e-17	-16.213	-16.213	0.000	(0)
CuCl4-2	3.597e-17	7.750e-18	-16.444	-17.111	-0.667	(0)
HgClOH	9.906e-21	9.906e-21	-20.004	-20.004	0.000	(0)
HgCl+	2.624e-22	1.141e-22	-21.581	-21.943	-0.362	(0)
CoCl+2	6.789e-34	2.425e-35	-33.168	-34.615	-1.447	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.520	-42.967	-1.447	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.028	-56.475	-1.447	(0)
Co(2)	4.465e-04					
Co+2	3.867e-04	1.381e-05	-3.413	-4.860	-1.447	(0)
CoS04	3.668e-05	3.668e-05	-4.436	-4.436	0.000	(0)
CoCl+	2.306e-05	1.003e-05	-4.637	-4.999	-0.362	(0)
CoHP04	2.947e-08	2.947e-08	-7.531	-7.531	0.000	(0)
Co(NH3)+2	1.018e-08	3.636e-10	-7.992	-9.439	-1.447	(0)
CoOH+	6.942e-10	3.018e-10	-9.158	-9.520	-0.362	(0)
Co2OH+3	3.767e-13	2.089e-16	-12.424	-15.680	-3.256	(0)
Co(NH3)2+2	4.659e-14	1.664e-15	-13.332	-14.779	-1.447	(0)
Co(OH)2	2.625e-14	2.625e-14	-13.581	-13.581	0.000	(0)
Co(NH3)3+2	8.990e-20	3.211e-21	-19.046	-20.493	-1.447	(0)
Co(OH)3-	1.319e-21	5.736e-22	-20.880	-21.241	-0.362	(0)
Co0OH-	8.031e-23	3.492e-23	-22.095	-22.457	-0.362	(0)
Co4(OH)4+4	1.017e-24	1.656e-30	-23.993	-29.781	-5.788	(0)
Co(NH3)4+2	7.231e-26	2.583e-27	-25.141	-26.588	-1.447	(0)
Co(OH)4-2	2.787e-30	9.955e-32	-29.555	-31.002	-1.447	(0)
Co(NH3)5+2	1.839e-32	6.570e-34	-31.735	-33.182	-1.447	(0)
CoSe04	3.684e-37	3.684e-37	-36.434	-36.434	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.589	-51.951	-0.362	(0)
CoNO3+	0.000e+00	0.000e+00	-69.070	-69.432	-0.362	(0)
Co(NO3)2	0.000e+00	0.000e+00	-133.895	-133.895	0.000	(0)
Co(3)	9.625e-32					
CoOH+2	9.557e-32	3.413e-33	-31.020	-32.467	-1.447	(0)
CoCl+2	6.789e-34	2.425e-35	-33.168	-34.615	-1.447	(0)
Co+3	9.765e-36	6.134e-37	-35.010	-36.212	-1.202	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.520	-42.967	-1.447	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.424	-52.786	-0.362	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.028	-56.475	-1.447	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.867	-60.314	-1.447	(0)
Cu(1)	1.590e-04					
CuCl2-	1.383e-04	8.995e-05	-3.859	-4.046	-0.187	(0)
CuCl3-2	1.864e-05	4.016e-06	-4.730	-5.396	-0.667	(0)
CuCl	2.010e-06	2.010e-06	-5.697	-5.697	0.000	(0)
Cu+	1.732e-08	7.528e-09	-7.762	-8.123	-0.362	(0)
Cu(S4)2-3	1.886e-38	5.830e-39	-37.724	-38.234	-0.510	(0)
CuS4S5-3	3.242e-39	1.086e-39	-38.489	-38.964	-0.475	(0)
Cu(2)	1.249e-09					
Cu+2	6.092e-10	1.781e-10	-9.215	-9.749	-0.534	(0)
CuS04	5.355e-10	5.355e-10	-9.271	-9.271	0.000	(0)
CuCl+	8.794e-11	5.720e-11	-10.056	-10.243	-0.187	(0)
CuNH3+2	1.161e-11	4.145e-13	-10.935	-12.382	-1.447	(0)
CuCl2	3.455e-12	3.455e-12	-11.462	-11.462	0.000	(0)
CuOH+	7.790e-13	5.067e-13	-12.108	-12.295	-0.187	(0)
CuCl3-	9.786e-15	6.365e-15	-14.009	-14.196	-0.187	(0)
Cu(OH)2	1.347e-16	1.347e-16	-15.871	-15.871	0.000	(0)
CuCl4-2	3.597e-17	7.750e-18	-16.444	-17.111	-0.667	(0)
Cu2(OH)2+2	1.756e-19	6.274e-21	-18.755	-20.202	-1.447	(0)
Cu(OH)3-	6.961e-22	3.026e-22	-21.157	-21.519	-0.362	(0)
Cu(OH)4-2	7.302e-29	2.608e-30	-28.137	-29.584	-1.447	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-48.866	-49.227	-0.362	(0)
CuNO2+	0.000e+00	0.000e+00	-55.307	-55.669	-0.362	(0)
CuNO3+	0.000e+00	0.000e+00	-73.650	-74.012	-0.362	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-102.598	-102.598	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-139.694	-139.694	0.000	(0)
Fe(2)	1.824e-02					

Fe+2	1.624e-02	5.802e-04	-1.789	-3.236	-1.447	(0)
FeS04	1.877e-03	1.877e-03	-2.727	-2.727	0.000	(0)
FeH2P04+	1.177e-04	8.149e-05	-3.929	-4.089	-0.160	(0)
FeHP04	4.518e-06	4.518e-06	-5.345	-5.345	0.000	(0)
FeOH+	2.734e-08	1.862e-08	-7.563	-7.730	-0.167	(0)
Fe(OH)2	1.142e-14	1.142e-14	-13.942	-13.942	0.000	(0)
Fe(OH)3-	5.590e-18	3.808e-18	-17.253	-17.419	-0.167	(0)
Fe(HS)2	1.346e-38	1.346e-38	-37.871	-37.871	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-57.265	-57.626	-0.362	(0)
Fe(3)	2.216e-10					
Fe(OH)2+	2.070e-10	1.433e-10	-9.684	-9.844	-0.160	(0)
FeHP04+	1.313e-11	9.087e-12	-10.882	-11.042	-0.160	(0)
FeOH+2	1.241e-12	2.674e-13	-11.906	-12.573	-0.667	(0)
Fe(OH)3	9.536e-14	9.536e-14	-13.021	-13.021	0.000	(0)
FeS04+	9.405e-14	6.407e-14	-13.027	-13.193	-0.167	(0)
Fe(S04)2-	4.479e-14	1.947e-14	-13.349	-13.711	-0.362	(0)
FeCl+2	1.247e-14	2.686e-15	-13.904	-14.571	-0.667	(0)
FeH2P04+2	1.103e-14	2.531e-15	-13.958	-14.597	-0.639	(0)
Fe+3	7.573e-15	4.757e-16	-14.121	-15.323	-1.202	(0)
FeCl2+	4.238e-15	2.887e-15	-14.373	-14.540	-0.167	(0)
FeCl3	6.124e-17	6.124e-17	-16.213	-16.213	0.000	(0)
Fe(OH)4-	2.482e-17	1.718e-17	-16.605	-16.765	-0.160	(0)
Fe2(OH)2+4	1.678e-18	2.731e-24	-17.775	-23.564	-5.788	(0)
Fe3(OH)4+5	6.008e-24	5.424e-33	-23.221	-32.266	-9.044	(0)
FeHSe03+2	6.513e-26	2.326e-27	-25.186	-26.633	-1.447	(0)
FeN03+2	0.000e+00	0.000e+00	-77.560	-79.007	-1.447	(0)
H(0)	8.690e-16					
H2	4.345e-16	4.886e-16	-15.362	-15.311	0.051	(0)
Hg(0)	2.168e-09					
Hg	2.168e-09	2.168e-09	-8.664	-8.664	0.000	(0)
Hg(1)	1.459e-27					
Hg2+2	7.294e-28	2.605e-29	-27.137	-28.584	-1.447	(0)
Hg(2)	8.334e-15					
HgCl4-2	7.489e-15	2.675e-16	-14.126	-15.573	-1.447	(0)
HgCl3-	7.024e-16	3.054e-16	-15.153	-15.515	-0.362	(0)
HgCl2	1.427e-16	1.427e-16	-15.846	-15.846	0.000	(0)
HgCl0H	9.906e-21	9.906e-21	-20.004	-20.004	0.000	(0)
HgCl+	2.624e-22	1.141e-22	-21.581	-21.943	-0.362	(0)
Hg(NH3)2+2	3.068e-23	1.096e-24	-22.513	-23.960	-1.447	(0)
Hg(OH)2	1.285e-25	1.446e-25	-24.891	-24.840	0.051	(0)
HgNH3+2	5.172e-26	1.848e-27	-25.286	-26.733	-1.447	(0)
HgOH+	2.125e-27	9.239e-28	-26.673	-27.034	-0.362	(0)
Hg+2	6.651e-28	2.376e-29	-27.177	-28.624	-1.447	(0)
HgS04	6.887e-29	6.887e-29	-28.162	-28.162	0.000	(0)
Hg(NH3)3+2	2.689e-29	9.605e-31	-28.570	-30.018	-1.447	(0)
Hg(HS)2	1.044e-34	1.044e-34	-33.981	-33.981	0.000	(0)
Hg(NH3)4+2	4.728e-35	1.689e-36	-34.325	-35.772	-1.447	(0)
Hg(OH)3-	4.584e-35	1.993e-35	-34.339	-34.701	-0.362	(0)
HgHS2-	1.067e-35	4.638e-36	-34.972	-35.334	-0.362	(0)
HgS2-2	2.800e-38	1.000e-39	-37.553	-39.000	-1.447	(0)
HgN03+	0.000e+00	0.000e+00	-93.562	-93.924	-0.362	(0)
Hg(N03)2	0.000e+00	0.000e+00	-159.077	-159.077	0.000	(0)
K	6.007e-03					
K+	5.455e-03	4.011e-03	-2.263	-2.397	-0.134	(0)
KS04-	5.523e-04	3.823e-04	-3.258	-3.418	-0.160	(0)
KHP04-	8.596e-08	5.950e-08	-7.066	-7.225	-0.160	(0)
Mg	5.995e-02					
Mg+2	3.494e-02	1.021e-02	-1.457	-1.991	-0.534	(0)
MgS04	2.479e-02	2.479e-02	-1.606	-1.606	0.000	(0)
MgH2P04+	2.045e-04	1.416e-04	-3.689	-3.849	-0.160	(0)
MgHP04	1.281e-05	1.281e-05	-4.892	-4.892	0.000	(0)
MgOH+	4.271e-09	3.069e-09	-8.369	-8.513	-0.143	(0)
MgP04-	5.626e-11	3.894e-11	-10.250	-10.410	-0.160	(0)
Mn(2)	3.385e-03					
Mn+2	3.075e-03	1.099e-04	-2.512	-3.959	-1.447	(0)
MnS04	2.564e-04	2.564e-04	-3.591	-3.591	0.000	(0)
MnCl+	4.306e-05	2.933e-05	-4.366	-4.533	-0.167	(0)
MnCl2	8.789e-06	8.789e-06	-5.056	-5.056	0.000	(0)

MnCl3-	7.536e-07	5.134e-07	-6.123	-6.290	-0.167	(0)
MnOH+	3.266e-10	2.225e-10	-9.486	-9.653	-0.167	(0)
MnSe	2.317e-11	2.317e-11	-10.635	-10.635	0.000	(0)
Mn(OH)3-	3.287e-24	2.239e-24	-23.483	-23.650	-0.167	(0)
Mn(OH)4-2	3.675e-32	7.917e-33	-31.435	-32.101	-0.667	(0)
MnSeO4	1.556e-36	1.556e-36	-35.808	-35.808	0.000	(0)
MnNO3+	0.000e+00	0.000e+00	-68.170	-68.531	-0.362	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-132.900	-132.900	0.000	(0)
Mn(3)	4.824e-28					
Mn+3	4.824e-28	3.030e-29	-27.317	-28.519	-1.202	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-78.906	-79.572	-0.667	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-87.950	-88.163	-0.213	(0)
N(-3)	4.658e-03					
NH4+	4.129e-03	2.441e-03	-2.384	-2.612	-0.228	(0)
NH4SO4-	5.287e-04	3.602e-04	-3.277	-3.443	-0.167	(0)
NH3	1.152e-07	1.152e-07	-6.938	-6.938	0.000	(0)
NiNH3+2	4.668e-08	1.668e-09	-7.331	-8.778	-1.447	(0)
CaNH3+2	1.337e-08	4.777e-10	-7.874	-9.321	-1.447	(0)
Co(NH3)+2	1.018e-08	3.636e-10	-7.992	-9.439	-1.447	(0)
CuNH3+2	1.161e-11	4.145e-13	-10.935	-12.382	-1.447	(0)
Ni(NH3)2+2	1.321e-12	4.718e-14	-11.879	-13.326	-1.447	(0)
Co(NH3)2+2	4.659e-14	1.664e-15	-13.332	-14.779	-1.447	(0)
Ca(NH3)2+2	8.161e-16	2.915e-17	-15.088	-16.535	-1.447	(0)
Co(NH3)3+2	8.990e-20	3.211e-21	-19.046	-20.493	-1.447	(0)
Hg(NH3)2+2	3.068e-23	1.096e-24	-22.513	-23.960	-1.447	(0)
Co(NH3)4+2	7.231e-26	2.583e-27	-25.141	-26.588	-1.447	(0)
HgNH3+2	5.172e-26	1.848e-27	-25.286	-26.733	-1.447	(0)
Hg(NH3)3+2	2.689e-29	9.605e-31	-28.570	-30.018	-1.447	(0)
Co(NH3)5+2	1.839e-32	6.570e-34	-31.735	-33.182	-1.447	(0)
Hg(NH3)4+2	4.728e-35	1.689e-36	-34.325	-35.772	-1.447	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.520	-42.967	-1.447	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.424	-52.786	-0.362	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.028	-56.475	-1.447	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.867	-60.314	-1.447	(0)
N(3)	0.000e+00					
NO2-	0.000e+00	0.000e+00	-47.727	-47.939	-0.213	(0)
CoNO2+	0.000e+00	0.000e+00	-51.589	-51.951	-0.362	(0)
CuNO2+	0.000e+00	0.000e+00	-55.307	-55.669	-0.362	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-102.598	-102.598	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-64.639	-64.772	-0.134	(0)
CaNO3+	0.000e+00	0.000e+00	-66.504	-66.866	-0.362	(0)
MnNO3+	0.000e+00	0.000e+00	-68.170	-68.531	-0.362	(0)
NiNO3+	0.000e+00	0.000e+00	-68.863	-69.225	-0.362	(0)
CoNO3+	0.000e+00	0.000e+00	-69.070	-69.432	-0.362	(0)
ZnNO3+	0.000e+00	0.000e+00	-69.770	-70.131	-0.362	(0)
CdNO3+	0.000e+00	0.000e+00	-72.239	-72.600	-0.362	(0)
PbNO3+	0.000e+00	0.000e+00	-72.240	-72.602	-0.362	(0)
CuNO3+	0.000e+00	0.000e+00	-73.650	-74.012	-0.362	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.560	-79.007	-1.447	(0)
HgNO3+	0.000e+00	0.000e+00	-93.562	-93.924	-0.362	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-132.900	-132.900	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-133.895	-133.895	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-135.615	-135.615	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.124	-137.124	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-137.723	-137.723	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-139.694	-139.694	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.077	-159.077	0.000	(0)
Na	2.781e-01					
Na+	2.580e-01	1.897e-01	-0.588	-0.722	-0.134	(0)
NaSO4-	2.015e-02	1.395e-02	-1.696	-1.855	-0.160	(0)
NaHPO4-	6.296e-06	4.358e-06	-5.201	-5.361	-0.160	(0)
Ni	1.032e-04					
Ni+2	4.799e-05	1.403e-05	-4.319	-4.853	-0.534	(0)
NiSO4	3.733e-05	3.733e-05	-4.428	-4.428	0.000	(0)
NiCl+	1.732e-05	7.530e-06	-4.761	-5.123	-0.362	(0)

Ni(SO4)2-2	4.919e-07	1.757e-08	-6.308	-7.755	-1.447	(0)
NiNH3+2	4.668e-08	1.668e-09	-7.331	-8.778	-1.447	(0)
NiCl2	8.131e-09	8.131e-09	-8.090	-8.090	0.000	(0)
NiOH+	3.348e-10	1.456e-10	-9.475	-9.837	-0.362	(0)
Ni(NH3)2+2	1.321e-12	4.718e-14	-11.879	-13.326	-1.447	(0)
Ni(OH)2	1.682e-14	1.682e-14	-13.774	-13.774	0.000	(0)
Ni(OH)3-	4.237e-20	1.842e-20	-19.373	-19.735	-0.362	(0)
NiSeO4	3.453e-37	3.453e-37	-36.462	-36.462	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-68.863	-69.225	-0.362	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-62.846	-62.795	0.051	(0)
P	8.285e-04					
H2PO4-	4.468e-04	3.093e-04	-3.350	-3.510	-0.160	(0)
MgH2PO4+	2.045e-04	1.416e-04	-3.689	-3.849	-0.160	(0)
FeH2PO4+	1.177e-04	8.149e-05	-3.929	-4.089	-0.160	(0)
CaH2PO4+	2.319e-05	1.605e-05	-4.635	-4.794	-0.160	(0)
MgHPO4	1.281e-05	1.281e-05	-4.892	-4.892	0.000	(0)
HPO4-2	9.856e-06	2.123e-06	-5.006	-5.673	-0.667	(0)
NaHPO4-	6.296e-06	4.358e-06	-5.201	-5.361	-0.160	(0)
FeHPO4	4.518e-06	4.518e-06	-5.345	-5.345	0.000	(0)
CaHPO4	2.250e-06	2.250e-06	-5.648	-5.648	0.000	(0)
H3PO4	3.782e-07	3.782e-07	-6.422	-6.422	0.000	(0)
KHP04-	8.596e-08	5.950e-08	-7.066	-7.225	-0.160	(0)
CoHPO4	2.947e-08	2.947e-08	-7.531	-7.531	0.000	(0)
CaP04-	8.724e-10	6.039e-10	-9.059	-9.219	-0.160	(0)
MgP04-	5.626e-11	3.894e-11	-10.250	-10.410	-0.160	(0)
FeHP04+	1.313e-11	9.087e-12	-10.882	-11.042	-0.160	(0)
P04-3	1.446e-12	9.081e-14	-11.840	-13.042	-1.202	(0)
FeH2P04+2	1.103e-14	2.531e-15	-13.958	-14.597	-0.639	(0)
Pb	5.248e-08					
PbCl+	1.670e-08	7.258e-09	-7.777	-8.139	-0.362	(0)
Pb(SO4)2-2	1.585e-08	5.660e-10	-7.800	-9.247	-1.447	(0)
PbSO4	6.822e-09	6.822e-09	-8.166	-8.166	0.000	(0)
PbCl2	6.753e-09	6.753e-09	-8.170	-8.170	0.000	(0)
Pb+2	3.461e-09	1.012e-09	-8.461	-8.995	-0.534	(0)
PbCl4-2	1.525e-09	5.446e-11	-8.817	-10.264	-1.447	(0)
PbCl3-	1.371e-09	5.959e-10	-8.863	-9.225	-0.362	(0)
PbOH+	6.400e-12	2.782e-12	-11.194	-11.556	-0.362	(0)
Pb(OH)2	9.635e-17	9.635e-17	-16.016	-16.016	0.000	(0)
Pb2OH+3	8.043e-17	4.461e-20	-16.095	-19.351	-3.256	(0)
Pb(OH)3-	2.427e-22	1.055e-22	-21.615	-21.977	-0.362	(0)
Pb(OH)4-2	7.922e-28	2.830e-29	-27.101	-28.548	-1.447	(0)
Pb3(OH)4+2	2.788e-30	9.959e-32	-29.555	-31.002	-1.447	(0)
Pb4(OH)4+4	5.701e-31	9.279e-37	-30.244	-36.032	-5.788	(0)
Pb(HS)2	4.902e-38	4.902e-38	-37.310	-37.310	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-57.440	-57.802	-0.362	(0)
PbNO3+	0.000e+00	0.000e+00	-72.240	-72.602	-0.362	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.124	-137.124	0.000	(0)
S(-2)	1.784e-20					
H2S	1.731e-20	1.731e-20	-19.762	-19.762	0.000	(0)
HS-	3.711e-22	1.613e-22	-21.431	-21.792	-0.362	(0)
CdHS+	1.582e-22	6.876e-23	-21.801	-22.163	-0.362	(0)
S5-2	1.746e-25	6.235e-27	-24.758	-26.205	-1.447	(0)
S6-2	6.540e-26	2.336e-27	-25.184	-26.632	-1.447	(0)
S4-2	4.387e-26	1.567e-27	-25.358	-26.805	-1.447	(0)
S3-2	6.751e-27	2.411e-28	-26.171	-27.618	-1.447	(0)
S2-2	6.357e-28	2.271e-29	-27.197	-28.644	-1.447	(0)
S-2	3.151e-34	6.789e-35	-33.502	-34.168	-0.667	(0)
Hg(HS)2	1.044e-34	1.044e-34	-33.981	-33.981	0.000	(0)
HgHS2-	1.067e-35	4.638e-36	-34.972	-35.334	-0.362	(0)
Zn(HS)2	2.918e-37	2.918e-37	-36.535	-36.535	0.000	(0)
Cd(HS)2	1.774e-37	1.774e-37	-36.751	-36.751	0.000	(0)
ZnS(HS)-	7.223e-38	3.140e-38	-37.141	-37.503	-0.362	(0)
Pb(HS)2	4.902e-38	4.902e-38	-37.310	-37.310	0.000	(0)
HgS2-2	2.800e-38	1.000e-39	-37.553	-39.000	-1.447	(0)
Cu(S4)2-3	1.886e-38	5.830e-39	-37.724	-38.234	-0.510	(0)
Fe(HS)2	1.346e-38	1.346e-38	-37.871	-37.871	0.000	(0)
CuS4S5-3	3.242e-39	1.086e-39	-38.489	-38.964	-0.475	(0)

Cu(HS)3-	0.000e+00	0.000e+00	-48.866	-49.227	-0.362	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-54.685	-55.047	-0.362	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-56.282	-56.643	-0.362	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-57.265	-57.626	-0.362	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-57.440	-57.802	-0.362	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-58.538	-59.985	-1.447	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-74.793	-76.240	-1.447	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-76.852	-78.299	-1.447	(0)
S(6)	1.031e-01					
S04-2	4.711e-02	1.377e-02	-1.327	-1.861	-0.534	(0)
MgS04	2.479e-02	2.479e-02	-1.606	-1.606	0.000	(0)
NaS04-	2.015e-02	1.395e-02	-1.696	-1.855	-0.160	(0)
CaS04	7.511e-03	7.511e-03	-2.124	-2.124	0.000	(0)
FeS04	1.877e-03	1.877e-03	-2.727	-2.727	0.000	(0)
KS04-	5.523e-04	3.823e-04	-3.258	-3.418	-0.160	(0)
NH4S04-	5.287e-04	3.602e-04	-3.277	-3.443	-0.167	(0)
MnS04	2.564e-04	2.564e-04	-3.591	-3.591	0.000	(0)
AlS04+	1.598e-04	1.065e-04	-3.796	-3.973	-0.176	(0)
NiS04	3.733e-05	3.733e-05	-4.428	-4.428	0.000	(0)
CoS04	3.668e-05	3.668e-05	-4.436	-4.436	0.000	(0)
Al(S04)2-	2.576e-05	1.717e-05	-4.589	-4.765	-0.176	(0)
Zn(S04)2-2	1.717e-05	6.132e-07	-4.765	-6.212	-1.447	(0)
HS04-	1.625e-05	1.083e-05	-4.789	-4.965	-0.176	(0)
ZnS04	4.942e-06	4.942e-06	-5.306	-5.306	0.000	(0)
Ni(S04)2-2	4.919e-07	1.757e-08	-6.308	-7.755	-1.447	(0)
Cd(S04)2-2	7.024e-08	2.509e-09	-7.153	-8.601	-1.447	(0)
Pb(S04)2-2	1.585e-08	5.660e-10	-7.800	-9.247	-1.447	(0)
CdS04	1.288e-08	1.288e-08	-7.890	-7.890	0.000	(0)
PbS04	6.822e-09	6.822e-09	-8.166	-8.166	0.000	(0)
CuS04	5.355e-10	5.355e-10	-9.271	-9.271	0.000	(0)
FeS04+	9.405e-14	6.407e-14	-13.027	-13.193	-0.167	(0)
Fe(S04)2-	4.479e-14	1.947e-14	-13.349	-13.711	-0.362	(0)
HgS04	6.887e-29	6.887e-29	-28.162	-28.162	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.424	-52.786	-0.362	(0)
Se(-2)	1.102e-06					
HSe-	1.069e-06	4.649e-07	-5.971	-6.333	-0.362	(0)
H2Se	3.219e-08	3.219e-08	-7.492	-7.492	0.000	(0)
MnSe	2.317e-11	2.317e-11	-10.635	-10.635	0.000	(0)
Se-2	1.101e-15	3.932e-17	-14.958	-16.405	-1.447	(0)
Se(4)	4.916e-15					
HSe03-	4.883e-15	2.123e-15	-14.311	-14.673	-0.362	(0)
Se03-2	2.534e-17	9.052e-19	-16.596	-18.043	-1.447	(0)
H2Se03	7.949e-18	7.949e-18	-17.100	-17.100	0.000	(0)
FeHSe03+2	6.513e-26	2.326e-27	-25.186	-26.633	-1.447	(0)
Cd(Se03)2-2	8.360e-38	2.986e-39	-37.078	-38.525	-1.447	(0)
Se(6)	1.968e-34					
Se04-2	1.944e-34	5.683e-35	-33.711	-34.245	-0.534	(0)
MnSe04	1.556e-36	1.556e-36	-35.808	-35.808	0.000	(0)
CoSe04	3.684e-37	3.684e-37	-36.434	-36.434	0.000	(0)
NiSe04	3.453e-37	3.453e-37	-36.462	-36.462	0.000	(0)
HSe04-	5.245e-38	2.280e-38	-37.280	-37.642	-0.362	(0)
ZnSe04	1.494e-38	1.494e-38	-37.826	-37.826	0.000	(0)
CdSe04	0.000e+00	0.000e+00	-40.354	-40.354	0.000	(0)
Zn(Se04)2-2	0.000e+00	0.000e+00	-70.618	-72.065	-1.447	(0)
Zn	2.960e-05					
Zn(S04)2-2	1.717e-05	6.132e-07	-4.765	-6.212	-1.447	(0)
Zn+2	5.807e-06	1.697e-06	-5.236	-5.770	-0.534	(0)
ZnS04	4.942e-06	4.942e-06	-5.306	-5.306	0.000	(0)
ZnCl+	1.350e-06	8.780e-07	-5.870	-6.057	-0.187	(0)
ZnCl2	2.482e-07	2.482e-07	-6.605	-6.605	0.000	(0)
ZnCl3-	6.324e-08	4.113e-08	-7.199	-7.386	-0.187	(0)
ZnCl4-2	1.961e-08	4.225e-09	-7.708	-8.374	-0.667	(0)
ZnOHCl	1.297e-09	1.297e-09	-8.887	-8.887	0.000	(0)
ZnOH+	3.148e-10	1.369e-10	-9.502	-9.864	-0.362	(0)
Zn(OH)2	3.226e-14	3.226e-14	-13.491	-13.491	0.000	(0)
Zn(OH)3-	4.073e-19	1.771e-19	-18.390	-18.752	-0.362	(0)
Zn(OH)4-2	2.161e-25	7.719e-27	-24.665	-26.112	-1.447	(0)
Zn(HS)2	2.918e-37	2.918e-37	-36.535	-36.535	0.000	(0)

ZnS(HS)-	7.223e-38	3.140e-38	-37.141	-37.503	-0.362	(0)
ZnSeO4	1.494e-38	1.494e-38	-37.826	-37.826	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-54.685	-55.047	-0.362	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-58.538	-59.985	-1.447	(0)
ZnNO3+	0.000e+00	0.000e+00	-69.770	-70.131	-0.362	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-70.618	-72.065	-1.447	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-76.852	-78.299	-1.447	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-135.615	-135.615	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2-160.56	-154.28	6.27	(Co(NH3)5Cl)(NO3)2	
(Co(NH3)5Cl)Cl2 -30.62	-26.09	4.54	(Co(NH3)5Cl)Cl2	
(Co(NH3)5OH2)Cl3 -37.89	-26.09	11.80	(Co(NH3)5OH2)Cl3	
(Co(NH3)6)(NO3)3-233.88	-215.95	17.93	(Co(NH3)6)(NO3)3	
(Co(NH3)6)Cl3 -43.77	-23.66	20.11	(Co(NH3)6)Cl3	
(NH4)2SeO4 -39.92	-39.47	0.45	(NH4)2SeO4	
Al(OH)3(am) -1.89	9.17	11.06	Al(OH)3	
Al2O3 -1.90	18.37	20.27	Al2O3	
Al4(OH)10SO4 2.06	24.76	22.70	Al4(OH)10SO4	
AlOHSO4 0.47	-2.76	-3.23	AlOHSO4	
Alunite 7.20	6.30	-0.90	KAl3(SO4)2(OH)6	
Anglesite -3.04	-10.86	-7.82	PbSO4	
Anhydrite -0.12	-4.47	-4.34	CaSO4	
Anilite 0.94	-31.37	-32.31	Cu0.25Cu1.5S	
Antlerite -19.75	-10.96	8.79	Cu3(OH)4SO4	
Atacamite -12.68	-5.06	7.61	Cu2(OH)3Cl	
Bianchite -5.90	-7.66	-1.76	ZnSO4:6H2O	
Birnessite -25.41	-7.31	18.09	MnO2	
Bixbyite -26.45	-26.80	-0.35	Mn2O3	
BlaubleiI -2.99	-27.15	-24.16	Cu0.9Cu0.2S	
BlaubleiII -1.82	-29.10	-27.28	Cu0.6Cu0.8S	
Boehmite 0.32	9.18	8.86	AlOOH	
Brochantite -26.35	-10.64	15.71	Cu4(OH)6SO4	
Brucite -9.03	8.08	17.12	Mg(OH)2	
Bunsenite -7.46	5.23	12.68	NiO	
Ca3(PO4)2(beta) -4.85	-33.90	-29.05	Ca3(PO4)2	
Ca4H(PO4)3:3H2O -7.53	-54.61	-47.08	Ca4H(PO4)3:3H2O	
CaHP04 -1.34	-20.69	-19.35	CaHP04	
CaHP04:2H2O -1.65	-20.70	-19.05	CaHP04:2H2O	
Calomel -11.80	-29.93	-18.13	Hg2Cl2	
CaSeO3:2H2O -15.11	-12.25	2.86	CaSeO3:2H2O	
CaSeO4:2H2O -33.86	-36.86	-3.00	CaSeO4:2H2O	
Cd(OH)2 -12.17	1.69	13.87	Cd(OH)2	
Cd(OH)2(am) -12.24	1.69	13.94	Cd(OH)2	
Cd3(OH)2(SO4)2 -25.49	-18.78	6.71	Cd3(OH)2(SO4)2	
Cd3(OH)4SO4 -29.41	-6.85	22.56	Cd3(OH)4SO4	
Cd3(PO4)2 -18.62	-51.22	-32.60	Cd3(PO4)2	
Cd4(OH)6SO4 -33.56	-5.16	28.40	Cd4(OH)6SO4	
CdCl2 -9.11	-9.73	-0.61	CdCl2	
CdCl2:1H2O -8.06	-9.73	-1.68	CdCl2:1H2O	
CdCl2:2.5H2O -7.81	-9.74	-1.93	CdCl2:2.5H2O	
Cdmetal(alpha) -24.17	-10.47	13.69	Cd	
Cdmetal(gamma) -24.27	-10.47	13.80	Cd	
CdOHCl -7.63	-4.02	3.61	CdOHCl	
CdSe 10.71	-9.67	-20.38	CdSe	
CdSeO4:2H2O -40.78	-42.63	-1.85	CdSeO4:2H2O	
CdSO4 -10.19	-10.24	-0.05	CdSO4	
CdSO4:1H2O -8.59	-10.24	-1.65	CdSO4:1H2O	
CdSO4:2.67H2O -8.42	-10.25	-1.83	CdSO4:2.67H2O	
Chalcantite -8.98	-11.64	-2.65	CuSO4:5H2O	
Chalcocite 2.32	-33.00	-35.32	Cu2S	
Chalcopyrite -10.86	-46.49	-35.62	CuFeS2	
Cinnabar -5.36	-51.66	-46.30	HgS	
Clausthalite 17.10	-10.29	-27.39	PbSe	
Co(OH)2 -7.88	5.21	13.09	Co(OH)2	

Co(OH)3	-19.01	-21.10	-2.09	Co(OH)3
Co3(P04)2	-5.98	-40.66	-34.69	Co3(P04)2
Co3O4	-26.73	-36.97	-10.24	Co3O4
CoCl2	-14.66	-6.21	8.46	CoCl2
CoCl2:6H2O	-8.76	-6.24	2.52	CoCl2:6H2O
CoFe2O4	7.96	4.81	-3.15	CoFe2O4
CoHP04	-3.88	-22.94	-19.06	CoHP04
CoO	-8.62	5.22	13.84	CoO
CoS(alpha)	-14.17	-21.61	-7.44	CoS
CoS(beta)	-10.54	-21.61	-11.07	CoS
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-15.81	-14.49	1.32	CoSeO3
CoSeO4:6H2O	-37.61	-39.14	-1.53	CoSeO4:6H2O
CoS04	-9.71	-6.72	2.99	CoS04
CoS04:6H2O	-4.28	-6.75	-2.48	CoS04:6H2O
Cotunnite	-5.50	-10.34	-4.84	PbCl2
Covellite	-3.97	-26.50	-22.53	CuS
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.59	-69.16	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.77	-17.54	-46.31	Cu2Se
Cu2S04	-16.20	-18.11	-1.90	Cu2S04
Cu3(P04)2	-18.48	-55.33	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-20.23	-55.35	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.72	-28.58	-64.30	Cu3Se2
Cumetal	-0.24	-9.17	-8.93	Cu
Cu0CuS04	-21.91	-11.28	10.63	Cu0CuS04
Cupricferrite	-6.57	-0.08	6.49	CuFe204
Cuprite	-5.06	-6.17	-1.11	Cu2O
Cuprousferrite	5.59	-3.29	-8.88	CuFeO2
CuSe	22.35	-11.04	-33.39	CuSe
CuSe2	23.46	-10.24	-33.70	CuSe2
CuSeO3:2H2O	-19.99	-19.39	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-41.58	-44.02	-2.44	CuSeO4:5H2O
CuS04	-14.72	-11.61	3.11	CuS04
Diaspore	2.06	9.18	7.12	AlOOH
Djurleite	1.83	-32.57	-34.40	Cu0.066Cu1.868S
Epsomite	-1.74	-3.89	-2.15	MgS04:7H2O
Fe(OH)2	-6.73	6.84	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.11	-1.93	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-21.68	-20.13	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-38.92	-59.55	-20.63	Fe2(SeO3)3:2H2O
Fe2(S04)3	-33.07	-36.23	-3.16	Fe2(S04)3
Fe3(OH)8	-13.81	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.58	-0.21	3.37	Fe(OH)3
Ferroselite	14.99	-3.72	-18.71	FeSe2
FeS(ppt)	-17.06	-19.99	-2.92	FeS
FeSe	6.48	-4.53	-11.00	FeSe
Galena	-11.58	-25.75	-14.16	PbS
Gibbsite	0.66	9.17	8.52	Al(OH)3
Goethite	-0.84	-0.21	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnS04:7H2O
Greenockite	-10.64	-25.13	-14.49	CdS
Greigite	-55.85	-100.88	-45.03	Fe3S4
Gypsum	0.13	-4.48	-4.61	CaS04:2H2O
H-Jarosite	-12.97	-24.52	-11.55	(H3O)Fe3(S04)2(OH)6
H2S(g)	-18.82	-26.83	-8.01	H2S
H2Se(g)	-6.45	-11.37	-4.92	H2Se
Halite	-2.99	-1.40	1.59	NaCl
Hausmannite	-31.50	30.53	62.03	Mn3O4
Hematite	0.70	-0.41	-1.11	Fe2O3
Hercynite	1.57	25.21	23.64	FeAl2O4
Hg(g)	-7.41	-15.34	-7.93	Hg
Hg(OH)2	-21.34	-24.84	-3.50	Hg(OH)2
Hg2(g)	-15.59	-30.68	-15.09	Hg2
Hg2(OH)2	-23.77	-18.51	5.26	Hg2(OH)2
Hg2HP04	-21.89	-46.67	-24.77	Hg2HP04
Hg2S	-33.49	-45.33	-11.84	Hg2S
Hg2SeO3	-33.56	-38.22	-4.66	Hg2SeO3

Hg2SO4	-24.30	-30.45	-6.14	Hg2SO4
HgCl(g)	-34.85	-14.97	19.88	HgCl
HgCl2	-14.74	-36.26	-21.52	HgCl2
Hgmetal(l)	-1.69	-15.34	-13.65	Hg
HgSe	19.49	-36.20	-55.69	HgSe
HgSeO3	-32.11	-44.54	-12.43	HgSeO3
HgSO4	-27.32	-36.77	-9.45	HgSO4
Hinsdalite	-8.98	-11.48	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-2.79	-47.12	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-16.27	-79.06	-62.79	Pb5(P04)3OH
K-Alum	-6.88	-12.12	-5.24	KAl(S04)2:12H2O
K-Jarosite	-7.38	-21.87	-14.49	KFe3(S04)2(OH)6
K2SeO4	-38.31	-39.04	-0.73	K2SeO4
Langite	-28.53	-10.65	17.88	Cu4(OH)6SO4:H2O
Larnakite	-9.39	-9.77	-0.38	PbO:PbSO4
Laurionite	-5.26	-4.63	0.62	PbOHCl
Lepidocrocite	-1.58	-0.21	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.77	1.08	12.85	PbO
Mackinawite	-16.39	-19.99	-3.60	FeS
Maghemite	-6.80	-0.41	6.39	Fe2O3
Magnesioferrite	-9.85	7.68	17.52	Fe2MgO4
Magnetite	2.53	6.43	3.90	Fe3O4
Manganite	-13.14	12.20	25.34	MnOOH
Massicot	-11.97	1.08	13.05	PbO
Melanothallite	-17.50	-11.10	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeSO4:7H2O
Metacinnabar	-5.96	-51.66	-45.70	HgS
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(P04)2	-8.78	-32.06	-23.28	Mg3(P04)2
MgHP04:3H2O	-1.92	-20.09	-18.18	MgHP04:3H2O
MgSeO3:6H2O	-14.70	-11.65	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-35.07	-36.27	-1.20	MgSeO4:6H2O
Minium	-59.10	15.42	74.53	Pb3O4
Mirabilite	-2.06	-3.36	-1.30	Na2SO4:10H2O
Mn2(S04)3	-57.30	-62.62	-5.32	Mn2(S04)3
Mn3(P04)2	-14.11	-37.96	-23.85	Mn3(P04)2
MnCl2:4H2O	-8.07	-5.33	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnS(grn)	-20.96	-20.71	0.25	MnS
MnS(pnk)	-24.05	-20.71	3.34	MnS
MnSe	-8.98	-5.25	3.73	MnSe
MnSeO3	-14.72	-13.59	1.13	MnSeO3
MnSeO3:2H2O	-14.56	-13.60	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-36.18	-38.23	-2.05	MnSeO4:5H2O
MnSO4	-8.56	-5.82	2.74	MnSO4
Monteponite	-13.65	1.70	15.35	CdO
Montroydite	-21.29	-24.83	-3.55	HgO
Morenosite	-4.58	-6.75	-2.17	NiSO4:7H2O
Na-Jarosite	-9.35	-20.19	-10.84	NaFe3(S04)2(OH)6
Na2SeO3:5H2O	-21.40	-11.10	10.30	Na2SeO3:5H2O
Na2SeO4	-36.97	-35.69	1.28	Na2SeO4
Nantokite	-1.97	-8.80	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(P04)2	-9.34	-40.64	-31.30	Ni3(P04)2
Ni4(OH)6SO4	-23.05	8.95	32.00	Ni4(OH)6SO4
NiS(alpha)	-16.00	-21.60	-5.60	NiS
NiS(beta)	-10.50	-21.60	-11.10	NiS
NiS(gamma)	-8.80	-21.60	-12.80	NiS
NiSe	11.56	-6.14	-17.70	NiSe
NiSeO3:2H2O	-17.38	-14.50	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-37.61	-39.13	-1.52	NiSeO4:6H2O
Nsutite	-24.82	-7.31	17.50	MnO2
O2(g)	-60.10	24.35	84.45	O2
Pb(OH)2	-7.21	1.08	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.35	-3.55	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-24.03	2.16	26.19	Pb2O(OH)2
Pb2O3	-46.70	14.34	61.04	Pb2O3

Pb3(P04)2	-9.54	-53.07	-43.53	Pb3(P04)2
Pb302S04	-19.56	-8.69	10.87	Pb302S04
Pb4(OH)6S04	-28.72	-7.62	21.10	Pb4(OH)6S04
Pb403S04	-29.81	-7.61	22.20	Pb403S04
PbHP04	-3.27	-27.08	-23.81	PbHP04
Pbmetal	-15.33	-11.09	4.24	Pb
Pb0:0.3H2O	-11.90	1.08	12.98	Pb0:0.33H2O
PbSe04	-36.36	-43.24	-6.88	PbSe04
Periclase	-13.86	8.09	21.94	Mg0
Plattnerite	-37.05	13.26	50.31	Pb02
Plumbgummite	5.08	-27.71	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-15.64	7.47	23.11	Ca(OH)2
Pyrite	-16.02	-34.64	-18.63	FeS2
Pyrochroite	-9.31	6.11	15.43	Mn(OH)2
Pyrolusite	-23.74	18.29	42.03	Mn02
Pyromorphite	-0.34	-84.77	-84.43	Pb5(P04)3Cl
Retgersite	-4.70	-6.75	-2.05	NiS04:6H2O
Semetal(am)	7.94	0.80	-7.14	Se
Semetal(hex	8.55	0.80	-7.75	Se
Se02	-19.83	-19.71	0.12	Se02
Se03	-65.72	-44.32	21.39	Se03
Sphalerite	-11.00	-22.52	-11.52	ZnS
Spinel	-11.32	26.45	37.77	MgAl204
Strengite	-2.00	-28.38	-26.38	FeP04:2H2O
Sulfur	-12.55	-14.66	-2.11	S
Tenorite	-7.47	0.33	7.80	Cu0
Thenardite	-3.65	-3.31	0.34	Na2S04
Tsumebite	-15.90	-25.69	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	0.16	-35.84	-36.00	Fe3(P04)2:8H2O
Wurtzite	-13.52	-22.52	-9.00	ZnS
Zincite	-7.24	4.31	11.55	Zn0
Zincosite	-11.76	-7.63	4.13	ZnS04
Zn(NO3)2:6H2O	-138.60	-135.35	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-7.90	4.30	12.20	Zn(OH)2
Zn(OH)2(am)	-8.36	4.30	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.65	4.30	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.43	4.30	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.43	4.30	11.73	Zn(OH)2
Zn2(OH)2S04	-10.83	-3.33	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-12.30	2.90	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-8.00	-43.42	-35.42	Zn3(P04)2:4H2O
Zn30(S04)2	-30.48	-10.95	19.53	Zn30(S04)2
Zn4(OH)6S04	-23.12	5.28	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-28.41	10.09	38.50	Zn5(OH)8Cl2
ZnCl2	-14.34	-7.12	7.22	ZnCl2
Znmetal	-34.02	-7.87	26.15	Zn
Zn0(active)	-7.09	4.31	11.40	Zn0
ZnS(am)	-13.43	-22.52	-9.09	ZnS
ZnSe	7.40	-7.06	-14.46	ZnSe
ZnSe04:6H2O	-38.53	-40.05	-1.52	ZnSe04:6H2O
ZnS04:1H2O	-7.10	-7.64	-0.53	ZnS04:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 8.

SOLUTION 6 #Groundwater worst case maximum values
temp 21
pH 5.05
pe 1
redox pe

```

units      mg/l
density    1
Al         5.21
Alkalinity 0
As         0
Ba         0
Be         0
B          0
Cd         0.04
Co         24.2
Cr         0
Cu         9.29
Fe         937
Pb         0.01
Mn         171
Mo         0
V          0
Zn         1.78
Se         0.08
Ni         5.57
N          60
P          23.6
Ca         590
Mg         1340
Na         5880
K          216
Cl         9420
S(6)       9110
Hg         0.0004
water      1 # kg
MIX 5
  1      0.954
  6      0.046
REACTION 6
H2O -1
  3
END #Time-step 6

```

Beginning of initial solution calculations.

Initial solution 6.

-----Solution composition-----

Elements	Molality	Moles
Al	1.986e-04	1.986e-04
Ca	1.514e-02	1.514e-02
Cd	3.660e-07	3.660e-07
Cl	2.733e-01	2.733e-01
Co	4.224e-04	4.224e-04
Cu	1.504e-04	1.504e-04
Fe	1.726e-02	1.726e-02
Hg	2.051e-09	2.051e-09
K	5.682e-03	5.682e-03
Mg	5.671e-02	5.671e-02
Mn	3.202e-03	3.202e-03
N	4.406e-03	4.406e-03
Na	2.631e-01	2.631e-01
Ni	9.762e-05	9.762e-05
P	7.837e-04	7.837e-04
Pb	4.964e-08	4.964e-08
S(6)	9.754e-02	9.754e-02
Se	1.042e-06	1.042e-06
Zn	2.800e-05	2.800e-05

-----Description of solution-----

pH = 5.050
 pe = 1.000
 Activity of water = 0.988
 Ionic strength (mol/kgw) = 4.862e-01
 Mass of water (kg) = 1.000e+00
 Total alkalinity (eq/kg) = 1.381e-05
 Total carbon (mol/kg) = 0.000e+00
 Total CO2 (mol/kg) = 0.000e+00
 Temperature (°C) = 21.00
 Electrical balance (eq) = -9.552e-03
 Percent error, 100*(Cat-|An|)/(Cat+|An|) = -1.26
 Iterations = 14
 Total H = 1.110329e+02
 Total O = 5.590014e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.214e-05	8.913e-06	-4.916	-5.050	-0.134	0.00
OH-	1.292e-09	8.222e-10	-8.889	-9.085	-0.196	(0)
H2O	5.551e+01	9.883e-01	1.744	-0.005	0.000	18.05
Al	1.986e-04					
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Al+3	1.839e-05	1.139e-06	-4.735	-5.943	-1.208	(0)
AlOH+2	4.197e-06	9.786e-07	-5.377	-6.009	-0.632	(0)
Al(OH)2+	1.624e-06	1.128e-06	-5.790	-5.948	-0.158	(0)
Al(OH)3	2.514e-08	2.514e-08	-7.600	-7.600	0.000	(0)
Al(OH)4-	2.040e-09	1.366e-09	-8.690	-8.864	-0.174	(0)
Ca	1.514e-02					
Ca+2	8.161e-03	2.370e-03	-2.088	-2.625	-0.537	(0)
CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
CaOH+	5.236e-11	3.715e-11	-10.281	-10.430	-0.149	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
Cd	3.660e-07					
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
Cd(SO4)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
Cd+2	1.502e-08	4.363e-09	-7.823	-8.360	-0.537	(0)
CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CdOH+	6.462e-14	2.865e-14	-13.190	-13.543	-0.353	(0)
Cd2OH+3	9.945e-19	6.582e-22	-18.002	-21.182	-3.179	(0)
Cd(OH)2	2.726e-19	2.726e-19	-18.564	-18.564	0.000	(0)
Cd(OH)3-	4.195e-26	1.860e-26	-25.377	-25.730	-0.353	(0)
Cd(OH)4-2	8.799e-35	3.400e-36	-34.056	-35.469	-1.413	(0)
Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cl	2.733e-01					
Cl-	2.729e-01	2.003e-01	-0.564	-0.698	-0.134	(0)
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)

ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(2)	4.224e-04					
Co+2	3.644e-04	1.408e-05	-3.438	-4.851	-1.413	(0)
CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CoOH+	7.075e-10	3.137e-10	-9.150	-9.504	-0.353	(0)
Co2OH+3	3.344e-13	2.213e-16	-12.476	-15.655	-3.179	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Co(OH)2	2.782e-14	2.782e-14	-13.556	-13.556	0.000	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Co(OH)3-	1.398e-21	6.199e-22	-20.854	-21.208	-0.353	(0)
CoOOH-	8.505e-23	3.771e-23	-22.070	-22.424	-0.353	(0)
Co4(OH)4+4	8.668e-25	1.932e-30	-24.062	-29.714	-5.652	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
Co(OH)4-2	2.839e-30	1.097e-31	-29.547	-30.960	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Co(3)	8.287e-32					
CoOH+2	8.232e-32	3.180e-33	-31.085	-32.498	-1.413	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co+3	9.049e-36	5.605e-37	-35.043	-36.251	-1.208	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
Cu(1)	1.504e-04					
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
Cu+	1.823e-08	8.082e-09	-7.739	-8.092	-0.353	(0)
Cu(2)	1.182e-09					
Cu+2	5.900e-10	1.714e-10	-9.229	-9.766	-0.537	(0)
CuSO4	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)

CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
CuOH+	7.604e-13	4.972e-13	-12.119	-12.303	-0.185	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
Cu(OH)2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
Cu2(OH)2+2	1.564e-19	6.042e-21	-18.806	-20.219	-1.413	(0)
Cu(OH)3-	6.965e-22	3.088e-22	-21.157	-21.510	-0.353	(0)
Cu(OH)4-2	7.024e-29	2.714e-30	-28.153	-29.566	-1.413	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Fe(2)	1.726e-02					
Fe+2	1.529e-02	5.907e-04	-1.816	-3.229	-1.413	(0)
FeS04	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
FeOH+	2.826e-08	1.934e-08	-7.549	-7.714	-0.165	(0)
Fe(OH)2	1.209e-14	1.209e-14	-13.918	-13.918	0.000	(0)
Fe(OH)3-	6.009e-18	4.111e-18	-17.221	-17.386	-0.165	(0)
Fe(3)	2.087e-10					
Fe(OH)2+	1.957e-10	1.360e-10	-9.708	-9.867	-0.158	(0)
FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
FeOH+2	1.136e-12	2.489e-13	-11.945	-12.604	-0.659	(0)
Fe(OH)3	9.228e-14	9.228e-14	-13.035	-13.035	0.000	(0)
FeS04+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(S04)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Fe+3	7.010e-15	4.342e-16	-14.154	-15.362	-1.208	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
Fe(OH)4-	2.440e-17	1.696e-17	-16.613	-16.771	-0.158	(0)
Fe2(OH)2+4	1.061e-18	2.365e-24	-17.974	-23.626	-5.652	(0)
Fe3(OH)4+5	3.023e-24	4.459e-33	-23.520	-32.351	-8.831	(0)
FeHSe03+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
H(0)	1.047e-15					
H2	5.235e-16	5.855e-16	-15.281	-15.232	0.049	(0)
Hg(0)	2.051e-09					
Hg	2.051e-09	2.051e-09	-8.688	-8.688	0.000	(0)
Hg(1)	9.698e-28					
Hg2+2	4.849e-28	1.874e-29	-27.314	-28.727	-1.413	(0)
Hg(2)	4.726e-15					
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Hg(OH)2	1.022e-25	1.143e-25	-24.991	-24.942	0.049	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
HgOH+	1.615e-27	7.162e-28	-26.792	-27.145	-0.353	(0)
Hg+2	4.674e-28	1.806e-29	-27.330	-28.743	-1.413	(0)
HgS04	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Hg(OH)3-	3.623e-35	1.606e-35	-34.441	-34.794	-0.353	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
K	5.682e-03					
K+	5.178e-03	3.801e-03	-2.286	-2.420	-0.134	(0)
KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
Mg	5.671e-02					
Mg+2	3.360e-02	9.758e-03	-1.474	-2.011	-0.537	(0)
MgS04	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)

MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
MgHP04	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
MgOH+	4.148e-09	2.990e-09	-8.382	-8.524	-0.142	(0)
MgP04-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
Mn(2)	3.202e-03					
Mn+2	2.899e-03	1.120e-04	-2.538	-3.951	-1.413	(0)
MnSO4	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
MnOH+	3.381e-10	2.313e-10	-9.471	-9.636	-0.165	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Mn(OH)3-	3.538e-24	2.421e-24	-23.451	-23.616	-0.165	(0)
Mn(OH)4-2	3.983e-32	8.727e-33	-31.400	-32.059	-0.659	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Mn(3)	4.471e-28					
Mn+3	4.471e-28	2.769e-29	-27.350	-28.558	-1.208	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-79.028	-79.687	-0.659	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-88.115	-88.325	-0.210	(0)
N(-3)	4.406e-03					
NH4+	3.919e-03	2.335e-03	-2.407	-2.632	-0.225	(0)
NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
NH3	1.123e-07	1.123e-07	-6.950	-6.950	0.000	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
N(3)	0.000e+00					
NO2-	0.000e+00	0.000e+00	-47.968	-48.177	-0.210	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-64.954	-65.088	-0.134	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)

Na	Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
	2.631e-01						
	Na+	2.447e-01	1.796e-01	-0.611	-0.746	-0.134	(0)
	NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
Ni	NaHP04-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
	9.762e-05						
	Ni+2	4.671e-05	1.357e-05	-4.331	-4.867	-0.537	(0)
	NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
	NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
	Ni(SO4)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
	NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
	NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
	NiOH+	3.238e-10	1.435e-10	-9.490	-9.843	-0.353	(0)
	Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
	Ni(OH)2	1.692e-14	1.692e-14	-13.772	-13.772	0.000	(0)
	Ni(OH)3-	4.261e-20	1.889e-20	-19.371	-19.724	-0.353	(0)
	NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
	NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
O(0)	0.000e+00						
P	O2	0.000e+00	0.000e+00	-63.001	-62.952	0.049	(0)
	7.837e-04						
	H2PO4-	4.270e-04	2.967e-04	-3.370	-3.528	-0.158	(0)
	MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
	FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
	CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
	MgHP04	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
	HP04-2	9.473e-06	2.076e-06	-5.024	-5.683	-0.659	(0)
	NaHP04-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
	FeHP04	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
	CaHP04	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
	H3PO4	3.560e-07	3.560e-07	-6.449	-6.449	0.000	(0)
	KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
	CoHP04	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
	CaP04-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
	MgP04-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
	FeHP04+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
	P04-3	1.460e-12	9.045e-14	-11.836	-13.044	-1.208	(0)
	FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Pb	4.964e-08						
	PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
	Pb(SO4)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
	PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
	PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
	Pb+2	3.636e-09	1.056e-09	-8.439	-8.976	-0.537	(0)
	PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
	PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
	PbOH+	6.682e-12	2.963e-12	-11.175	-11.528	-0.353	(0)
	Pb(OH)2	1.046e-16	1.046e-16	-15.980	-15.980	0.000	(0)
	Pb2OH+3	7.494e-17	4.960e-20	-16.125	-19.305	-3.179	(0)
	Pb(OH)3-	2.635e-22	1.168e-22	-21.579	-21.933	-0.353	(0)
	Pb(OH)4-2	8.268e-28	3.195e-29	-27.083	-28.496	-1.413	(0)
	Pb3(OH)4+2	3.173e-30	1.226e-31	-29.499	-30.912	-1.413	(0)
	Pb4(OH)4+4	5.352e-31	1.193e-36	-30.271	-35.923	-5.652	(0)
	PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
	Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
S(6)	9.754e-02						
	SO4-2	4.586e-02	1.332e-02	-1.339	-1.875	-0.537	(0)
	MgSO4	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
	NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
	CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
	FeSO4	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
	KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
	NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
	MnSO4	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
	AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
	CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
	NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
	Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)

Zn(SO4)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
HSO4-	1.536e-05	1.028e-05	-4.814	-4.988	-0.174	(0)
ZnSO4	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
Ni(SO4)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
Cd(SO4)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
Pb(SO4)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
CuSO4	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
FeSO4+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(SO4)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
HgSO4	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Se(-2)	1.042e-06					
HSe-	1.012e-06	4.485e-07	-5.995	-6.348	-0.353	(0)
H2Se	3.047e-08	3.047e-08	-7.516	-7.516	0.000	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Se-2	1.000e-15	3.865e-17	-15.000	-16.413	-1.413	(0)
Se(4)	2.708e-15					
HSeO3-	2.690e-15	1.193e-15	-14.570	-14.923	-0.353	(0)
SeO3-2	1.341e-17	5.183e-19	-16.872	-18.285	-1.413	(0)
H2SeO3	4.383e-18	4.383e-18	-17.358	-17.358	0.000	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
Se(6)	9.467e-35					
SeO4-2	9.354e-35	2.717e-35	-34.029	-34.566	-0.537	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
HSeO4-	2.413e-38	1.070e-38	-37.617	-37.971	-0.353	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn	2.800e-05					
Zn(SO4)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
Zn+2	6.051e-06	1.758e-06	-5.218	-5.755	-0.537	(0)
ZnSO4	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
ZnOH+	3.259e-10	1.445e-10	-9.487	-9.840	-0.353	(0)
Zn(OH)2	3.473e-14	3.473e-14	-13.459	-13.459	0.000	(0)
Zn(OH)3-	4.384e-19	1.944e-19	-18.358	-18.711	-0.353	(0)
Zn(OH)4-2	2.236e-25	8.641e-27	-24.650	-26.063	-1.413	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-161.31	-155.03	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-30.79	-26.25	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-38.05	-26.26	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-234.94	-217.01	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-43.95	-23.84	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-40.28	-39.83	0.45	(NH4)2SeO4
Al(OH)3(am)	-1.87	9.19	11.06	Al(OH)3
Al2O3	-1.87	18.40	20.27	Al2O3
Al4(OH)10SO4	2.10	24.80	22.70	Al4(OH)10SO4
AlOHSO4	0.46	-2.77	-3.23	AlOHSO4
Alunite	7.17	6.27	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.03	-10.85	-7.82	PbSO4
Anhydrite	-0.16	-4.50	-4.34	CaSO4

Antlerite	-19.78	-10.99	8.79	Cu ₃ (OH) ₄ SO ₄
Atacamite	-12.71	-5.10	7.61	Cu ₂ (OH) ₃ Cl
Bianchite	-5.90	-7.66	-1.76	ZnSO ₄ :6H ₂ O
Birnessite	-25.46	-7.37	18.09	MnO ₂
Bixbyite	-26.48	-26.83	-0.35	Mn ₂ O ₃
Boehmite	0.34	9.20	8.86	AlOOH
Brochantite	-26.38	-10.67	15.71	Cu ₄ (OH) ₆ SO ₄
Brucite	-9.04	8.08	17.12	Mg(OH) ₂
Bunsenite	-7.46	5.23	12.68	NiO
Ca ₃ (PO ₄) ₂ (beta)	-4.91	-33.96	-29.05	Ca ₃ (PO ₄) ₂
Ca ₄ H(PO ₄) ₃ :3H ₂ O	-7.62	-54.70	-47.08	Ca ₄ H(PO ₄) ₃ :3H ₂ O
CaHPO ₄	-1.37	-20.72	-19.35	CaHPO ₄
CaHPO ₄ :2H ₂ O	-1.68	-20.73	-19.05	CaHPO ₄ :2H ₂ O
Calomel	-11.99	-30.12	-18.13	Hg ₂ Cl ₂
CaSeO ₃ :2H ₂ O	-15.37	-12.51	2.86	CaSeO ₃ :2H ₂ O
CaSeO ₄ :2H ₂ O	-34.20	-37.20	-3.00	CaSeO ₄ :2H ₂ O
Cd(OH) ₂	-12.14	1.73	13.87	Cd(OH) ₂
Cd(OH) ₂ (am)	-12.21	1.73	13.94	Cd(OH) ₂
Cd ₃ (OH) ₂ (SO ₄) ₂	-25.45	-18.74	6.71	Cd ₃ (OH) ₂ (SO ₄) ₂
Cd ₃ (OH) ₄ SO ₄	-29.34	-6.78	22.56	Cd ₃ (OH) ₄ SO ₄
Cd ₃ (PO ₄) ₂	-18.57	-51.17	-32.60	Cd ₃ (PO ₄) ₂
Cd ₄ (OH) ₆ SO ₄	-33.45	-5.05	28.40	Cd ₄ (OH) ₆ SO ₄
CdCl ₂	-9.14	-9.76	-0.61	CdCl ₂
CdCl ₂ :1H ₂ O	-8.09	-9.76	-1.68	CdCl ₂ :1H ₂ O
CdCl ₂ :2.5H ₂ O	-7.84	-9.77	-1.93	CdCl ₂ :2.5H ₂ O
Cdmetal(alpha)	-24.05	-10.36	13.69	Cd
Cdmetal(gamma)	-24.16	-10.36	13.80	Cd
CdOHCl	-7.62	-4.01	3.61	CdOHCl
CdSe	10.72	-9.66	-20.38	CdSe
CdSeO ₄ :2H ₂ O	-41.09	-42.94	-1.85	CdSeO ₄ :2H ₂ O
CdSO ₄	-10.19	-10.24	-0.05	CdSO ₄
CdSO ₄ :1H ₂ O	-8.59	-10.24	-1.65	CdSO ₄ :1H ₂ O
CdSO ₄ :2.67H ₂ O	-8.42	-10.25	-1.83	CdSO ₄ :2.67H ₂ O
Chalcanthite	-9.01	-11.67	-2.65	CuSO ₄ :5H ₂ O
Clausthalite	17.11	-10.27	-27.39	PbSe
Co(OH) ₂	-7.86	5.24	13.09	Co(OH) ₂
Co(OH) ₃	-19.03	-21.12	-2.09	Co(OH) ₃
Co ₃ (PO ₄) ₂	-5.95	-40.64	-34.69	Co ₃ (PO ₄) ₂
Co ₃ O ₄	-26.74	-36.97	-10.24	Co ₃ O ₄
CoCl ₂	-14.71	-6.25	8.46	CoCl ₂
CoCl ₂ :6H ₂ O	-8.80	-6.28	2.52	CoCl ₂ :6H ₂ O
CoFe ₂ O ₄	7.95	4.80	-3.15	CoFe ₂ O ₄
CoHPO ₄	-3.88	-22.95	-19.06	CoHPO ₄
CoO	-8.60	5.24	13.84	CoO
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO ₃	-16.04	-14.72	1.32	CoSeO ₃
CoSeO ₄ :6H ₂ O	-37.92	-39.45	-1.53	CoSeO ₄ :6H ₂ O
CoSO ₄	-9.72	-6.73	2.99	CoSO ₄
CoSO ₄ :6H ₂ O	-4.28	-6.76	-2.48	CoSO ₄ :6H ₂ O
Cotunnite	-5.53	-10.37	-4.84	PbCl ₂
Cu(OH) ₂	-8.48	0.32	8.81	Cu(OH) ₂
Cu ₂ (OH) ₃ NO ₃	-78.91	-69.49	9.42	Cu ₂ (OH) ₃ NO ₃
Cu ₂ Se(alpha)	28.83	-17.48	-46.31	Cu ₂ Se
Cu ₂ SO ₄	-16.16	-18.06	-1.90	Cu ₂ SO ₄
Cu ₃ (PO ₄) ₂	-18.54	-55.39	-36.85	Cu ₃ (PO ₄) ₂
Cu ₃ (PO ₄) ₂ :3H ₂ O	-20.28	-55.40	-35.12	Cu ₃ (PO ₄) ₂ :3H ₂ O
Cu ₃ Se ₂	35.75	-28.55	-64.30	Cu ₃ Se ₂
Cumetal	-0.17	-9.09	-8.93	Cu
CuOCuSO ₄	-21.94	-11.31	10.63	CuOCuSO ₄
Cupricferrite	-6.60	-0.11	6.49	CuFe ₂ O ₄
Cuprite	-4.98	-6.09	-1.11	Cu ₂ O
Cuprousferrite	5.61	-3.27	-8.88	CuFeO ₂
CuSe	22.32	-11.06	-33.39	CuSe
CuSe ₂	23.34	-10.36	-33.70	CuSe ₂
CuSeO ₃ :2H ₂ O	-20.25	-19.65	0.60	CuSeO ₃ :2H ₂ O
CuSeO ₄ :5H ₂ O	-41.92	-44.36	-2.44	CuSeO ₄ :5H ₂ O
CuSO ₄	-14.76	-11.64	3.11	CuSO ₄
Diaspore	2.08	9.20	7.12	AlOOH

Epsomite	-1.77	-3.92	-2.15	MgSO4:7H2O
Fe(OH)2	-6.70	6.86	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.09	-1.95	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-21.97	-20.42	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-39.73	-60.36	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-33.19	-36.35	-3.16	Fe2(SO4)3
Fe3(OH)8	-13.82	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.59	-0.23	3.37	Fe(OH)3
Ferroselite	14.88	-3.83	-18.71	FeSe2
FeSe	6.48	-4.53	-11.00	FeSe
Gibbsite	0.67	9.19	8.52	Al(OH)3
Goethite	-0.86	-0.22	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4:7H2O
Gypsum	0.10	-4.51	-4.61	CaSO4:2H2O
H-Jarosite	-13.07	-24.62	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-6.47	-11.40	-4.92	H2Se
Halite	-3.04	-1.44	1.59	NaCl
Hausmannite	-31.51	30.53	62.03	Mn3O4
Hematite	0.67	-0.44	-1.11	Fe2O3
Hercynite	1.62	25.26	23.64	FeAl2O4
Hg(g)	-7.44	-15.36	-7.93	Hg
Hg(OH)2	-21.45	-24.94	-3.50	Hg(OH)2
Hg2(g)	-15.63	-30.73	-15.09	Hg2
Hg2(OH)2	-23.90	-18.64	5.26	Hg2(OH)2
Hg2HPO4	-22.05	-46.82	-24.77	Hg2HPO4
Hg2SeO3	-33.94	-38.60	-4.66	Hg2SeO3
Hg2SO4	-24.46	-30.60	-6.14	Hg2SO4
HgCl(g)	-34.94	-15.06	19.88	HgCl
HgCl2	-14.91	-36.43	-21.52	HgCl2
Hgmetal(l)	-1.71	-15.36	-13.65	Hg
HgSe	19.36	-36.33	-55.69	HgSe
HgSeO3	-32.48	-44.91	-12.43	HgSeO3
HgSO4	-27.45	-36.91	-9.45	HgSO4
Hinsdalite	-8.96	-11.46	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-2.88	-47.21	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-16.18	-78.97	-62.79	Pb5(PO4)3OH
K-Alum	-6.93	-12.18	-5.24	KAl(SO4)2:12H2O
K-Jarosite	-7.50	-21.99	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-38.68	-39.41	-0.73	K2SeO4
Langite	-28.56	-10.68	17.88	Cu4(OH)6SO4:H2O
Larnakite	-9.35	-9.73	-0.38	PbO:PbSO4
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.59	-0.22	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.73	1.12	12.85	PbO
Maghemite	-6.83	-0.44	6.39	Fe2O3
Magnesioferrite	-9.88	7.64	17.52	Fe2MgO4
Magnetite	2.53	6.43	3.90	Fe3O4
Manganite	-13.15	12.19	25.34	MnOOH
Massicot	-11.93	1.12	13.05	PbO
Melanothallite	-17.57	-11.16	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeSO4:7H2O
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(PO4)2	-8.84	-32.12	-23.28	Mg3(PO4)2
MgHP04:3H2O	-1.94	-20.12	-18.18	MgHP04:3H2O
MgSeO3:6H2O	-14.96	-11.91	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-35.41	-36.61	-1.20	MgSeO4:6H2O
Minium	-59.08	15.45	74.53	Pb3O4
Mirabilite	-2.11	-3.42	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-57.42	-62.74	-5.32	Mn2(SO4)3
Mn3(PO4)2	-14.09	-37.94	-23.85	Mn3(PO4)2
MnCl2:4H2O	-8.11	-5.37	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnSe	-8.98	-5.25	3.73	MnSe
MnSeO3	-14.95	-13.82	1.13	MnSeO3
MnSeO3:2H2O	-14.80	-13.83	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-36.49	-38.54	-2.05	MnSeO4:5H2O
MnSO4	-8.56	-5.83	2.74	MnSO4

Monteponite	-13.62	1.73	15.35	CdO
Montroydite	-21.39	-24.94	-3.55	HgO
Morenosite	-4.60	-6.78	-2.17	NiSO4:7H2O
Na-Jarosite	-9.47	-20.31	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-21.69	-11.39	10.30	Na2SeO3:5H2O
Na2SeO4	-37.34	-36.06	1.28	Na2SeO4
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(PO4)2	-9.39	-40.69	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-23.08	8.92	32.00	Ni4(OH)6SO4
NiSe	11.53	-6.17	-17.70	NiSe
NiSeO3:2H2O	-17.64	-14.75	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-37.94	-39.46	-1.52	NiSeO4:6H2O
Nsutite	-24.87	-7.37	17.50	MnO2
O2(g)	-60.26	24.19	84.45	O2
Pb(OH)2	-7.18	1.11	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.31	-3.52	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-23.96	2.23	26.19	Pb2O(OH)2
Pb2O3	-46.71	14.33	61.04	Pb2O3
Pb3(PO4)2	-9.49	-53.02	-43.53	Pb3(PO4)2
Pb3O2SO4	-19.49	-8.61	10.87	Pb3O2SO4
Pb4(OH)6SO4	-28.61	-7.51	21.10	Pb4(OH)6SO4
Pb4O3SO4	-29.70	-7.50	22.20	Pb4O3SO4
PbHP04	-3.26	-27.07	-23.81	PbHP04
Pbmetal	-15.22	-10.98	4.24	Pb
PbO:0.3H2O	-11.86	1.12	12.98	PbO:0.33H2O
PbSeO4	-36.67	-43.54	-6.88	PbSeO4
Periclase	-13.86	8.08	21.94	MgO
Plattnerite	-37.09	13.21	50.31	PbO2
Plumbgummite	5.12	-27.67	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-15.65	7.46	23.11	Ca(OH)2
Pyrochroite	-9.29	6.14	15.43	Mn(OH)2
Pyrolusite	-23.79	18.24	42.03	MnO2
Pyromorphite	-0.28	-84.71	-84.43	Pb5(PO4)3Cl
Retgersite	-4.72	-6.77	-2.05	NiSO4:6H2O
Semetal(am)	7.84	0.70	-7.14	Se
Semetal(hex)	8.45	0.70	-7.75	Se
SeO2	-20.09	-19.97	0.12	SeO2
SeO3	-66.05	-44.66	21.39	SeO3
Spinel	-11.29	26.48	37.77	MgAl2O4
Strengite	-2.04	-28.42	-26.38	FePO4:2H2O
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.71	-3.37	0.34	Na2SO4
Tsumebite	-15.85	-25.64	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	0.19	-35.81	-36.00	Fe3(PO4)2:8H2O
Zincite	-7.21	4.34	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnSO4
Zn(NO3)2:6H2O	-139.22	-135.96	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-7.87	4.33	12.20	Zn(OH)2
Zn(OH)2(am)	-8.33	4.33	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.62	4.33	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.39	4.33	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.40	4.33	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.80	-3.30	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.26	2.93	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-7.95	-43.37	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-30.45	-10.92	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-23.03	5.37	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-28.31	10.19	38.50	Zn5(OH)8Cl2
ZnCl2	-14.37	-7.15	7.22	ZnCl2
Znmetal	-33.91	-7.76	26.15	Zn
ZnO(active)	-7.06	4.34	11.40	ZnO
ZnSe	7.41	-7.05	-14.46	ZnSe
ZnSeO4:6H2O	-38.83	-40.35	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.10	-7.64	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 5.

Using reaction 6.

Mixture 5.

9.540e-01 Solution 1
4.600e-02 Solution 6

Reaction 6.

3.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000

Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	2.100e-04	1.986e-04
Ca	1.601e-02	1.514e-02
Cd	3.869e-07	3.660e-07
Cl	2.889e-01	2.733e-01
Co	4.465e-04	4.224e-04
Cu	1.590e-04	1.504e-04
Fe	1.824e-02	1.726e-02
Hg	2.168e-09	2.051e-09
K	6.007e-03	5.682e-03
Mg	5.995e-02	5.671e-02
Mn	3.385e-03	3.202e-03
N	4.658e-03	4.406e-03
Na	2.781e-01	2.631e-01
Ni	1.032e-04	9.762e-05
P	8.285e-04	7.837e-04
Pb	5.248e-08	4.964e-08
S	1.031e-01	9.754e-02
Se	1.102e-06	1.042e-06
Zn	2.960e-05	2.800e-05

-----Description of solution-----

pH	=	5.042	Charge balance
pe	=	1.047	Adjusted to redox equilibrium
Activity of water	=	0.988	
Ionic strength (mol/kgw)	=	5.100e-01	
Mass of water (kg)	=	9.460e-01	
Total alkalinity (eq/kg)	=	1.460e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	-9.552e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.26	
Iterations	=	4	
Total H	=	1.050329e+02	

Total O = 5.290014e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.235e-05	9.082e-06	-4.908	-5.042	-0.134	0.00
OH-	1.274e-09	8.063e-10	-8.895	-9.094	-0.199	(0)
H2O	5.551e+01	9.877e-01	1.744	-0.005	0.000	18.05
Al	2.100e-04					
AlSO4+	1.598e-04	1.065e-04	-3.796	-3.973	-0.176	(0)
Al(SO4)2-	2.576e-05	1.717e-05	-4.589	-4.765	-0.176	(0)
Al+3	1.850e-05	1.162e-06	-4.733	-5.935	-1.202	(0)
AlOH+2	4.265e-06	9.790e-07	-5.370	-6.009	-0.639	(0)
Al(OH)2+	1.599e-06	1.107e-06	-5.796	-5.956	-0.160	(0)
Al(OH)3	2.419e-08	2.419e-08	-7.616	-7.616	0.000	(0)
Al(OH)4-	1.934e-09	1.289e-09	-8.714	-8.890	-0.176	(0)
Ca	1.601e-02					
Ca+2	8.471e-03	2.476e-03	-2.072	-2.606	-0.534	(0)
CaSO4	7.511e-03	7.511e-03	-2.124	-2.124	0.000	(0)
CaH2PO4+	2.319e-05	1.605e-05	-4.635	-4.794	-0.160	(0)
CaHPO4	2.250e-06	2.250e-06	-5.648	-5.648	0.000	(0)
CaNH3+2	1.337e-08	4.777e-10	-7.874	-9.321	-1.447	(0)
CaPO4-	8.724e-10	6.039e-10	-9.059	-9.219	-0.160	(0)
CaOH+	5.381e-11	3.806e-11	-10.269	-10.420	-0.150	(0)
Ca(NH3)2+2	8.161e-16	2.915e-17	-15.088	-16.535	-1.447	(0)
CaNO3+	0.000e+00	0.000e+00	-66.504	-66.866	-0.362	(0)
Cd	3.869e-07					
CdCl+	1.939e-07	8.430e-08	-6.712	-7.074	-0.362	(0)
CdCl2	7.373e-08	7.373e-08	-7.132	-7.132	0.000	(0)
Cd(SO4)2-2	7.024e-08	2.509e-09	-7.153	-8.601	-1.447	(0)
CdCl3-	2.184e-08	9.496e-09	-7.661	-8.022	-0.362	(0)
Cd+2	1.432e-08	4.185e-09	-7.844	-8.378	-0.534	(0)
CdSO4	1.288e-08	1.288e-08	-7.890	-7.890	0.000	(0)
CdOHCl	3.446e-12	3.446e-12	-11.463	-11.463	0.000	(0)
CdOH+	6.199e-14	2.695e-14	-13.208	-13.569	-0.362	(0)
Cd2OH+3	1.071e-18	5.938e-22	-17.970	-21.226	-3.256	(0)
Cd(OH)2	2.515e-19	2.515e-19	-18.599	-18.599	0.000	(0)
CdHS+	1.582e-22	6.876e-23	-21.801	-22.163	-0.362	(0)
Cd(OH)3-	3.870e-26	1.683e-26	-25.412	-25.774	-0.362	(0)
Cd(OH)4-2	8.444e-35	3.016e-36	-34.073	-35.521	-1.447	(0)
Cd(HS)2	1.774e-37	1.774e-37	-36.751	-36.751	0.000	(0)
Cd(SeO3)2-2	8.361e-38	2.986e-39	-37.078	-38.525	-1.447	(0)
CdSeO4	0.000e+00	0.000e+00	-40.354	-40.354	0.000	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-56.282	-56.643	-0.362	(0)
CdNO3+	0.000e+00	0.000e+00	-72.239	-72.600	-0.362	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-74.793	-76.240	-1.447	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-137.723	-137.723	0.000	(0)
Cl	2.889e-01					
Cl-	2.885e-01	2.121e-01	-0.540	-0.673	-0.134	(0)
CuCl2-	1.383e-04	8.995e-05	-3.859	-4.046	-0.187	(0)
MnCl+	4.306e-05	2.933e-05	-4.366	-4.533	-0.167	(0)
CoCl+	2.306e-05	1.003e-05	-4.637	-4.999	-0.362	(0)
CuCl3-2	1.864e-05	4.016e-06	-4.730	-5.396	-0.667	(0)
NiCl+	1.732e-05	7.530e-06	-4.761	-5.123	-0.362	(0)
MnCl2	8.789e-06	8.789e-06	-5.056	-5.056	0.000	(0)
CuCl	2.010e-06	2.010e-06	-5.697	-5.697	0.000	(0)
ZnCl+	1.350e-06	8.780e-07	-5.870	-6.057	-0.187	(0)
MnCl3-	7.536e-07	5.134e-07	-6.123	-6.290	-0.167	(0)
ZnCl2	2.482e-07	2.482e-07	-6.605	-6.605	0.000	(0)
CdCl+	1.939e-07	8.430e-08	-6.712	-7.074	-0.362	(0)
CdCl2	7.373e-08	7.373e-08	-7.132	-7.132	0.000	(0)
ZnCl3-	6.324e-08	4.113e-08	-7.199	-7.386	-0.187	(0)
CdCl3-	2.184e-08	9.496e-09	-7.661	-8.022	-0.362	(0)
ZnCl4-2	1.961e-08	4.225e-09	-7.708	-8.374	-0.667	(0)
PbCl+	1.670e-08	7.258e-09	-7.777	-8.139	-0.362	(0)
NiCl2	8.131e-09	8.131e-09	-8.090	-8.090	0.000	(0)

PbCl2	6.753e-09	6.753e-09	-8.170	-8.170	0.000	(0)
PbCl4-2	1.525e-09	5.446e-11	-8.817	-10.264	-1.447	(0)
PbCl3-	1.371e-09	5.959e-10	-8.863	-9.225	-0.362	(0)
ZnOHCl	1.297e-09	1.297e-09	-8.887	-8.887	0.000	(0)
CuCl+	8.794e-11	5.720e-11	-10.056	-10.243	-0.187	(0)
CuCl2	3.455e-12	3.455e-12	-11.462	-11.462	0.000	(0)
CdOHCl	3.446e-12	3.446e-12	-11.463	-11.463	0.000	(0)
FeCl+2	1.247e-14	2.686e-15	-13.904	-14.571	-0.667	(0)
CuCl3-	9.787e-15	6.365e-15	-14.009	-14.196	-0.187	(0)
HgCl4-2	7.489e-15	2.675e-16	-14.126	-15.573	-1.447	(0)
FeCl2+	4.238e-15	2.887e-15	-14.373	-14.540	-0.167	(0)
HgCl3-	7.024e-16	3.054e-16	-15.153	-15.515	-0.362	(0)
HgCl2	1.427e-16	1.427e-16	-15.846	-15.846	0.000	(0)
FeCl3	6.124e-17	6.124e-17	-16.213	-16.213	0.000	(0)
CuCl4-2	3.597e-17	7.750e-18	-16.444	-17.111	-0.667	(0)
HgClOH	9.906e-21	9.906e-21	-20.004	-20.004	0.000	(0)
HgCl+	2.624e-22	1.141e-22	-21.581	-21.943	-0.362	(0)
CoCl+2	6.789e-34	2.425e-35	-33.168	-34.615	-1.447	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.520	-42.967	-1.447	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.028	-56.475	-1.447	(0)
Co(2)	4.465e-04					
Co+2	3.867e-04	1.381e-05	-3.413	-4.860	-1.447	(0)
CoS04	3.668e-05	3.668e-05	-4.436	-4.436	0.000	(0)
CoCl+	2.306e-05	1.003e-05	-4.637	-4.999	-0.362	(0)
CoHP04	2.947e-08	2.947e-08	-7.531	-7.531	0.000	(0)
Co(NH3)+2	1.018e-08	3.636e-10	-7.992	-9.439	-1.447	(0)
CoOH+	6.942e-10	3.018e-10	-9.158	-9.520	-0.362	(0)
Co2OH+3	3.767e-13	2.089e-16	-12.424	-15.680	-3.256	(0)
Co(NH3)2+2	4.659e-14	1.664e-15	-13.332	-14.779	-1.447	(0)
Co(OH)2	2.625e-14	2.625e-14	-13.581	-13.581	0.000	(0)
Co(NH3)3+2	8.990e-20	3.211e-21	-19.046	-20.493	-1.447	(0)
Co(OH)3-	1.319e-21	5.736e-22	-20.880	-21.241	-0.362	(0)
Co0OH-	8.031e-23	3.492e-23	-22.095	-22.457	-0.362	(0)
Co4(OH)4+4	1.017e-24	1.656e-30	-23.993	-29.781	-5.788	(0)
Co(NH3)4+2	7.231e-26	2.583e-27	-25.141	-26.588	-1.447	(0)
Co(OH)4-2	2.787e-30	9.955e-32	-29.555	-31.002	-1.447	(0)
Co(NH3)5+2	1.839e-32	6.570e-34	-31.735	-33.182	-1.447	(0)
CoSe04	3.684e-37	3.684e-37	-36.434	-36.434	0.000	(0)
CoN02+	0.000e+00	0.000e+00	-51.589	-51.951	-0.362	(0)
CoN03+	0.000e+00	0.000e+00	-69.070	-69.432	-0.362	(0)
Co(N03)2	0.000e+00	0.000e+00	-133.895	-133.895	0.000	(0)
Co(3)	9.625e-32					
CoOH+2	9.557e-32	3.414e-33	-31.020	-32.467	-1.447	(0)
CoCl+2	6.789e-34	2.425e-35	-33.168	-34.615	-1.447	(0)
Co+3	9.765e-36	6.134e-37	-35.010	-36.212	-1.202	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.520	-42.967	-1.447	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.424	-52.786	-0.362	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.028	-56.475	-1.447	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.867	-60.314	-1.447	(0)
Cu(1)	1.590e-04					
CuCl2-	1.383e-04	8.995e-05	-3.859	-4.046	-0.187	(0)
CuCl3-2	1.864e-05	4.016e-06	-4.730	-5.396	-0.667	(0)
CuCl	2.010e-06	2.010e-06	-5.697	-5.697	0.000	(0)
Cu+	1.732e-08	7.528e-09	-7.762	-8.123	-0.362	(0)
Cu(S4)2-3	1.886e-38	5.829e-39	-37.724	-38.234	-0.510	(0)
CuS4S5-3	3.241e-39	1.085e-39	-38.489	-38.964	-0.475	(0)
Cu(2)	1.249e-09					
Cu+2	6.092e-10	1.781e-10	-9.215	-9.749	-0.534	(0)
CuS04	5.355e-10	5.355e-10	-9.271	-9.271	0.000	(0)
CuCl+	8.794e-11	5.720e-11	-10.056	-10.243	-0.187	(0)
CuNH3+2	1.161e-11	4.145e-13	-10.935	-12.382	-1.447	(0)
CuCl2	3.455e-12	3.455e-12	-11.462	-11.462	0.000	(0)
CuOH+	7.790e-13	5.067e-13	-12.108	-12.295	-0.187	(0)
CuCl3-	9.787e-15	6.365e-15	-14.009	-14.196	-0.187	(0)
Cu(OH)2	1.347e-16	1.347e-16	-15.871	-15.871	0.000	(0)
CuCl4-2	3.597e-17	7.750e-18	-16.444	-17.111	-0.667	(0)
Cu2(OH)2+2	1.756e-19	6.274e-21	-18.755	-20.202	-1.447	(0)
Cu(OH)3-	6.961e-22	3.026e-22	-21.157	-21.519	-0.362	(0)

Cu(OH)4-2	7.302e-29	2.608e-30	-28.137	-29.584	-1.447	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-48.866	-49.227	-0.362	(0)
CuNO2+	0.000e+00	0.000e+00	-55.307	-55.669	-0.362	(0)
CuNO3+	0.000e+00	0.000e+00	-73.650	-74.012	-0.362	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-102.598	-102.598	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-139.694	-139.694	0.000	(0)
Fe(2)	1.824e-02					
Fe+2	1.624e-02	5.802e-04	-1.789	-3.236	-1.447	(0)
FeSO4	1.877e-03	1.877e-03	-2.727	-2.727	0.000	(0)
FeH2PO4+	1.177e-04	8.149e-05	-3.929	-4.089	-0.160	(0)
FeHPO4	4.518e-06	4.518e-06	-5.345	-5.345	0.000	(0)
FeOH+	2.734e-08	1.862e-08	-7.563	-7.730	-0.167	(0)
Fe(OH)2	1.142e-14	1.142e-14	-13.942	-13.942	0.000	(0)
Fe(OH)3-	5.590e-18	3.808e-18	-17.253	-17.419	-0.167	(0)
Fe(HS)2	1.346e-38	1.346e-38	-37.871	-37.871	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-57.265	-57.626	-0.362	(0)
Fe(3)	2.216e-10					
Fe(OH)2+	2.070e-10	1.433e-10	-9.684	-9.844	-0.160	(0)
FeHPO4+	1.313e-11	9.087e-12	-10.882	-11.042	-0.160	(0)
FeOH+2	1.241e-12	2.674e-13	-11.906	-12.573	-0.667	(0)
Fe(OH)3	9.536e-14	9.536e-14	-13.021	-13.021	0.000	(0)
FeSO4+	9.405e-14	6.408e-14	-13.027	-13.193	-0.167	(0)
Fe(SO4)2-	4.479e-14	1.947e-14	-13.349	-13.711	-0.362	(0)
FeCl+2	1.247e-14	2.686e-15	-13.904	-14.571	-0.667	(0)
FeH2PO4+2	1.103e-14	2.531e-15	-13.958	-14.597	-0.639	(0)
Fe+3	7.573e-15	4.757e-16	-14.121	-15.323	-1.202	(0)
FeCl2+	4.238e-15	2.887e-15	-14.373	-14.540	-0.167	(0)
FeCl3	6.124e-17	6.124e-17	-16.213	-16.213	0.000	(0)
Fe(OH)4-	2.482e-17	1.718e-17	-16.605	-16.765	-0.160	(0)
Fe2(OH)2+4	1.678e-18	2.731e-24	-17.775	-23.564	-5.788	(0)
Fe3(OH)4+5	6.008e-24	5.425e-33	-23.221	-32.266	-9.044	(0)
FeHSeO3+2	6.514e-26	2.327e-27	-25.186	-26.633	-1.447	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.560	-79.007	-1.447	(0)
H(0)	8.690e-16					
H2	4.345e-16	4.886e-16	-15.362	-15.311	0.051	(0)
Hg(0)	2.168e-09					
Hg	2.168e-09	2.168e-09	-8.664	-8.664	0.000	(0)
Hg(1)	1.459e-27					
Hg2+2	7.294e-28	2.605e-29	-27.137	-28.584	-1.447	(0)
Hg(2)	8.334e-15					
HgCl4-2	7.489e-15	2.675e-16	-14.126	-15.573	-1.447	(0)
HgCl3-	7.024e-16	3.054e-16	-15.153	-15.515	-0.362	(0)
HgCl2	1.427e-16	1.427e-16	-15.846	-15.846	0.000	(0)
HgClOH	9.906e-21	9.906e-21	-20.004	-20.004	0.000	(0)
HgCl+	2.624e-22	1.141e-22	-21.581	-21.943	-0.362	(0)
Hg(NH3)2+2	3.068e-23	1.096e-24	-22.513	-23.960	-1.447	(0)
Hg(OH)2	1.285e-25	1.446e-25	-24.891	-24.840	0.051	(0)
HgNH3+2	5.173e-26	1.848e-27	-25.286	-26.733	-1.447	(0)
HgOH+	2.125e-27	9.239e-28	-26.673	-27.034	-0.362	(0)
Hg+2	6.651e-28	2.376e-29	-27.177	-28.624	-1.447	(0)
HgSO4	6.887e-29	6.887e-29	-28.162	-28.162	0.000	(0)
Hg(NH3)3+2	2.689e-29	9.605e-31	-28.570	-30.017	-1.447	(0)
Hg(HS)2	1.043e-34	1.043e-34	-33.982	-33.982	0.000	(0)
Hg(NH3)4+2	4.728e-35	1.689e-36	-34.325	-35.772	-1.447	(0)
Hg(OH)3-	4.584e-35	1.993e-35	-34.339	-34.701	-0.362	(0)
HgHS2-	1.067e-35	4.637e-36	-34.972	-35.334	-0.362	(0)
HgS2-2	2.800e-38	1.000e-39	-37.553	-39.000	-1.447	(0)
HgNO3+	0.000e+00	0.000e+00	-93.562	-93.924	-0.362	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.077	-159.077	0.000	(0)
K	6.007e-03					
K+	5.455e-03	4.011e-03	-2.263	-2.397	-0.134	(0)
KS04-	5.523e-04	3.823e-04	-3.258	-3.418	-0.160	(0)
KHP04-	8.596e-08	5.950e-08	-7.066	-7.225	-0.160	(0)
Mg	5.995e-02					
Mg+2	3.494e-02	1.021e-02	-1.457	-1.991	-0.534	(0)
MgSO4	2.479e-02	2.479e-02	-1.606	-1.606	0.000	(0)
MgH2PO4+	2.045e-04	1.416e-04	-3.689	-3.849	-0.160	(0)
MgHPO4	1.281e-05	1.281e-05	-4.892	-4.892	0.000	(0)

MgOH+	4.271e-09	3.069e-09	-8.369	-8.513	-0.143	(0)
MgP04-	5.626e-11	3.894e-11	-10.250	-10.410	-0.160	(0)
Mn(2)	3.385e-03					
Mn+2	3.075e-03	1.099e-04	-2.512	-3.959	-1.447	(0)
MnSO4	2.564e-04	2.564e-04	-3.591	-3.591	0.000	(0)
MnCl+	4.306e-05	2.933e-05	-4.366	-4.533	-0.167	(0)
MnCl2	8.789e-06	8.789e-06	-5.056	-5.056	0.000	(0)
MnCl3-	7.536e-07	5.134e-07	-6.123	-6.290	-0.167	(0)
MnOH+	3.266e-10	2.225e-10	-9.486	-9.653	-0.167	(0)
MnSe	2.317e-11	2.317e-11	-10.635	-10.635	0.000	(0)
Mn(OH)3-	3.287e-24	2.239e-24	-23.483	-23.650	-0.167	(0)
Mn(OH)4-2	3.675e-32	7.917e-33	-31.435	-32.101	-0.667	(0)
MnSeO4	1.556e-36	1.556e-36	-35.808	-35.808	0.000	(0)
MnNO3+	0.000e+00	0.000e+00	-68.170	-68.531	-0.362	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-132.899	-132.899	0.000	(0)
Mn(3)	4.824e-28					
Mn+3	4.824e-28	3.030e-29	-27.317	-28.519	-1.202	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-78.906	-79.572	-0.667	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-87.950	-88.163	-0.213	(0)
N(-3)	4.658e-03					
NH4+	4.129e-03	2.441e-03	-2.384	-2.612	-0.228	(0)
NH4SO4-	5.287e-04	3.602e-04	-3.277	-3.443	-0.167	(0)
NH3	1.152e-07	1.152e-07	-6.938	-6.938	0.000	(0)
NiNH3+2	4.668e-08	1.668e-09	-7.331	-8.778	-1.447	(0)
CaNH3+2	1.337e-08	4.777e-10	-7.874	-9.321	-1.447	(0)
Co(NH3)+2	1.018e-08	3.636e-10	-7.992	-9.439	-1.447	(0)
CuNH3+2	1.161e-11	4.145e-13	-10.935	-12.382	-1.447	(0)
Ni(NH3)2+2	1.321e-12	4.718e-14	-11.879	-13.326	-1.447	(0)
Co(NH3)2+2	4.659e-14	1.664e-15	-13.332	-14.779	-1.447	(0)
Ca(NH3)2+2	8.161e-16	2.915e-17	-15.088	-16.535	-1.447	(0)
Co(NH3)3+2	8.990e-20	3.211e-21	-19.046	-20.493	-1.447	(0)
Hg(NH3)2+2	3.068e-23	1.096e-24	-22.513	-23.960	-1.447	(0)
Co(NH3)4+2	7.231e-26	2.583e-27	-25.141	-26.588	-1.447	(0)
HgNH3+2	5.173e-26	1.848e-27	-25.286	-26.733	-1.447	(0)
Hg(NH3)3+2	2.689e-29	9.605e-31	-28.570	-30.017	-1.447	(0)
Co(NH3)5+2	1.839e-32	6.570e-34	-31.735	-33.182	-1.447	(0)
Hg(NH3)4+2	4.728e-35	1.689e-36	-34.325	-35.772	-1.447	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.520	-42.967	-1.447	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.424	-52.786	-0.362	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.028	-56.475	-1.447	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.867	-60.314	-1.447	(0)
N(3)	0.000e+00					
NO2-	0.000e+00	0.000e+00	-47.727	-47.939	-0.213	(0)
CoNO2+	0.000e+00	0.000e+00	-51.589	-51.951	-0.362	(0)
CuNO2+	0.000e+00	0.000e+00	-55.307	-55.669	-0.362	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-102.598	-102.598	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-64.639	-64.772	-0.134	(0)
CaNO3+	0.000e+00	0.000e+00	-66.504	-66.866	-0.362	(0)
MnNO3+	0.000e+00	0.000e+00	-68.170	-68.531	-0.362	(0)
NiNO3+	0.000e+00	0.000e+00	-68.863	-69.225	-0.362	(0)
CoNO3+	0.000e+00	0.000e+00	-69.070	-69.432	-0.362	(0)
ZnNO3+	0.000e+00	0.000e+00	-69.770	-70.131	-0.362	(0)
CdNO3+	0.000e+00	0.000e+00	-72.239	-72.600	-0.362	(0)
PbNO3+	0.000e+00	0.000e+00	-72.240	-72.602	-0.362	(0)
CuNO3+	0.000e+00	0.000e+00	-73.650	-74.012	-0.362	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.560	-79.007	-1.447	(0)
HgNO3+	0.000e+00	0.000e+00	-93.562	-93.924	-0.362	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-132.899	-132.899	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-133.895	-133.895	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-135.614	-135.614	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.124	-137.124	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-137.723	-137.723	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-139.694	-139.694	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.077	-159.077	0.000	(0)
Na	2.781e-01					

Na+	2.580e-01	1.897e-01	-0.588	-0.722	-0.134	(0)
NaSO4-	2.015e-02	1.395e-02	-1.696	-1.855	-0.160	(0)
NaHPO4-	6.296e-06	4.358e-06	-5.201	-5.361	-0.160	(0)
Ni	1.032e-04					
Ni+2	4.799e-05	1.403e-05	-4.319	-4.853	-0.534	(0)
NiSO4	3.733e-05	3.733e-05	-4.428	-4.428	0.000	(0)
NiCl+	1.732e-05	7.530e-06	-4.761	-5.123	-0.362	(0)
Ni(SO4)2-2	4.919e-07	1.757e-08	-6.308	-7.755	-1.447	(0)
NiNH3+2	4.668e-08	1.668e-09	-7.331	-8.778	-1.447	(0)
NiCl2	8.131e-09	8.131e-09	-8.090	-8.090	0.000	(0)
NiOH+	3.348e-10	1.456e-10	-9.475	-9.837	-0.362	(0)
Ni(NH3)2+2	1.321e-12	4.718e-14	-11.879	-13.326	-1.447	(0)
Ni(OH)2	1.682e-14	1.682e-14	-13.774	-13.774	0.000	(0)
Ni(OH)3-	4.237e-20	1.842e-20	-19.373	-19.735	-0.362	(0)
NiSeO4	3.453e-37	3.453e-37	-36.462	-36.462	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-68.863	-69.225	-0.362	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-62.846	-62.795	0.051	(0)
P	8.285e-04					
H2PO4-	4.468e-04	3.093e-04	-3.350	-3.510	-0.160	(0)
MgH2PO4+	2.045e-04	1.416e-04	-3.689	-3.849	-0.160	(0)
FeH2PO4+	1.177e-04	8.149e-05	-3.929	-4.089	-0.160	(0)
CaH2PO4+	2.319e-05	1.605e-05	-4.635	-4.794	-0.160	(0)
MgHPO4	1.281e-05	1.281e-05	-4.892	-4.892	0.000	(0)
HPO4-2	9.856e-06	2.123e-06	-5.006	-5.673	-0.667	(0)
NaHPO4-	6.296e-06	4.358e-06	-5.201	-5.361	-0.160	(0)
FeHPO4	4.518e-06	4.518e-06	-5.345	-5.345	0.000	(0)
CaHPO4	2.250e-06	2.250e-06	-5.648	-5.648	0.000	(0)
H3PO4	3.782e-07	3.782e-07	-6.422	-6.422	0.000	(0)
KHPO4-	8.596e-08	5.950e-08	-7.066	-7.225	-0.160	(0)
CoHPO4	2.947e-08	2.947e-08	-7.531	-7.531	0.000	(0)
CaPO4-	8.724e-10	6.039e-10	-9.059	-9.219	-0.160	(0)
MgPO4-	5.626e-11	3.894e-11	-10.250	-10.410	-0.160	(0)
FeHPO4+	1.313e-11	9.087e-12	-10.882	-11.042	-0.160	(0)
PO4-3	1.446e-12	9.081e-14	-11.840	-13.042	-1.202	(0)
FeH2PO4+2	1.103e-14	2.531e-15	-13.958	-14.597	-0.639	(0)
Pb	5.248e-08					
PbCl+	1.670e-08	7.258e-09	-7.777	-8.139	-0.362	(0)
Pb(SO4)2-2	1.585e-08	5.660e-10	-7.800	-9.247	-1.447	(0)
PbSO4	6.822e-09	6.822e-09	-8.166	-8.166	0.000	(0)
PbCl2	6.753e-09	6.753e-09	-8.170	-8.170	0.000	(0)
Pb+2	3.461e-09	1.012e-09	-8.461	-8.995	-0.534	(0)
PbCl4-2	1.525e-09	5.446e-11	-8.817	-10.264	-1.447	(0)
PbCl3-	1.371e-09	5.959e-10	-8.863	-9.225	-0.362	(0)
PbOH+	6.400e-12	2.782e-12	-11.194	-11.556	-0.362	(0)
Pb(OH)2	9.635e-17	9.635e-17	-16.016	-16.016	0.000	(0)
Pb2OH+3	8.043e-17	4.461e-20	-16.095	-19.351	-3.256	(0)
Pb(OH)3-	2.427e-22	1.055e-22	-21.615	-21.977	-0.362	(0)
Pb(OH)4-2	7.922e-28	2.830e-29	-27.101	-28.548	-1.447	(0)
Pb3(OH)4+2	2.788e-30	9.959e-32	-29.555	-31.002	-1.447	(0)
Pb4(OH)4+4	5.701e-31	9.279e-37	-30.244	-36.032	-5.788	(0)
Pb(HS)2	4.901e-38	4.901e-38	-37.310	-37.310	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-57.440	-57.802	-0.362	(0)
PbNO3+	0.000e+00	0.000e+00	-72.240	-72.602	-0.362	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.124	-137.124	0.000	(0)
S(-2)	1.784e-20					
H2S	1.731e-20	1.731e-20	-19.762	-19.762	0.000	(0)
HS-	3.710e-22	1.613e-22	-21.431	-21.792	-0.362	(0)
CdHS+	1.582e-22	6.876e-23	-21.801	-22.163	-0.362	(0)
S5-2	1.745e-25	6.234e-27	-24.758	-26.205	-1.447	(0)
S6-2	6.540e-26	2.336e-27	-25.184	-26.632	-1.447	(0)
S4-2	4.387e-26	1.567e-27	-25.358	-26.805	-1.447	(0)
S3-2	6.750e-27	2.411e-28	-26.171	-27.618	-1.447	(0)
S2-2	6.357e-28	2.270e-29	-27.197	-28.644	-1.447	(0)
S-2	3.151e-34	6.789e-35	-33.502	-34.168	-0.667	(0)
Hg(HS)2	1.043e-34	1.043e-34	-33.982	-33.982	0.000	(0)
HgHS2-	1.067e-35	4.637e-36	-34.972	-35.334	-0.362	(0)
Zn(HS)2	2.918e-37	2.918e-37	-36.535	-36.535	0.000	(0)

Cd(HS)2	1.774e-37	1.774e-37	-36.751	-36.751	0.000	(0)
ZnS(HS)-	7.222e-38	3.140e-38	-37.141	-37.503	-0.362	(0)
Pb(HS)2	4.901e-38	4.901e-38	-37.310	-37.310	0.000	(0)
HgS2-2	2.800e-38	1.000e-39	-37.553	-39.000	-1.447	(0)
Cu(S4)2-3	1.886e-38	5.829e-39	-37.724	-38.234	-0.510	(0)
Fe(HS)2	1.346e-38	1.346e-38	-37.871	-37.871	0.000	(0)
CuS4S5-3	3.241e-39	1.085e-39	-38.489	-38.964	-0.475	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-48.866	-49.227	-0.362	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-54.685	-55.047	-0.362	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-56.282	-56.643	-0.362	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-57.265	-57.626	-0.362	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-57.440	-57.802	-0.362	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-58.538	-59.985	-1.447	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-74.793	-76.240	-1.447	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-76.853	-78.300	-1.447	(0)
S(6)	1.031e-01					
S04-2	4.711e-02	1.377e-02	-1.327	-1.861	-0.534	(0)
MgS04	2.479e-02	2.479e-02	-1.606	-1.606	0.000	(0)
NaS04-	2.015e-02	1.395e-02	-1.696	-1.855	-0.160	(0)
CaS04	7.511e-03	7.511e-03	-2.124	-2.124	0.000	(0)
FeS04	1.877e-03	1.877e-03	-2.727	-2.727	0.000	(0)
KS04-	5.523e-04	3.823e-04	-3.258	-3.418	-0.160	(0)
NH4S04-	5.287e-04	3.602e-04	-3.277	-3.443	-0.167	(0)
MnS04	2.564e-04	2.564e-04	-3.591	-3.591	0.000	(0)
AlS04+	1.598e-04	1.065e-04	-3.796	-3.973	-0.176	(0)
NiS04	3.733e-05	3.733e-05	-4.428	-4.428	0.000	(0)
CoS04	3.668e-05	3.668e-05	-4.436	-4.436	0.000	(0)
Al(S04)2-	2.576e-05	1.717e-05	-4.589	-4.765	-0.176	(0)
Zn(S04)2-2	1.717e-05	6.132e-07	-4.765	-6.212	-1.447	(0)
HS04-	1.625e-05	1.083e-05	-4.789	-4.965	-0.176	(0)
ZnS04	4.942e-06	4.942e-06	-5.306	-5.306	0.000	(0)
Ni(S04)2-2	4.919e-07	1.757e-08	-6.308	-7.755	-1.447	(0)
Cd(S04)2-2	7.024e-08	2.509e-09	-7.153	-8.601	-1.447	(0)
Pb(S04)2-2	1.585e-08	5.660e-10	-7.800	-9.247	-1.447	(0)
CdS04	1.288e-08	1.288e-08	-7.890	-7.890	0.000	(0)
PbS04	6.822e-09	6.822e-09	-8.166	-8.166	0.000	(0)
CuS04	5.355e-10	5.355e-10	-9.271	-9.271	0.000	(0)
FeS04+	9.405e-14	6.408e-14	-13.027	-13.193	-0.167	(0)
Fe(S04)2-	4.479e-14	1.947e-14	-13.349	-13.711	-0.362	(0)
HgS04	6.887e-29	6.887e-29	-28.162	-28.162	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.424	-52.786	-0.362	(0)
Se(-2)	1.102e-06					
HSe-	1.069e-06	4.649e-07	-5.971	-6.333	-0.362	(0)
H2Se	3.219e-08	3.219e-08	-7.492	-7.492	0.000	(0)
MnSe	2.317e-11	2.317e-11	-10.635	-10.635	0.000	(0)
Se-2	1.101e-15	3.932e-17	-14.958	-16.405	-1.447	(0)
Se(4)	4.916e-15					
HSe03-	4.883e-15	2.123e-15	-14.311	-14.673	-0.362	(0)
Se03-2	2.534e-17	9.053e-19	-16.596	-18.043	-1.447	(0)
H2Se03	7.950e-18	7.950e-18	-17.100	-17.100	0.000	(0)
FeHSe03+2	6.514e-26	2.327e-27	-25.186	-26.633	-1.447	(0)
Cd(Se03)2-2	8.361e-38	2.986e-39	-37.078	-38.525	-1.447	(0)
Se(6)	1.968e-34					
Se04-2	1.944e-34	5.683e-35	-33.711	-34.245	-0.534	(0)
MnSe04	1.556e-36	1.556e-36	-35.808	-35.808	0.000	(0)
CoSe04	3.684e-37	3.684e-37	-36.434	-36.434	0.000	(0)
NiSe04	3.453e-37	3.453e-37	-36.462	-36.462	0.000	(0)
HSe04-	5.245e-38	2.280e-38	-37.280	-37.642	-0.362	(0)
ZnSe04	1.494e-38	1.494e-38	-37.826	-37.826	0.000	(0)
CdSe04	0.000e+00	0.000e+00	-40.354	-40.354	0.000	(0)
Zn(Se04)2-2	0.000e+00	0.000e+00	-70.618	-72.065	-1.447	(0)
Zn	2.960e-05					
Zn(S04)2-2	1.717e-05	6.132e-07	-4.765	-6.212	-1.447	(0)
Zn+2	5.807e-06	1.697e-06	-5.236	-5.770	-0.534	(0)
ZnS04	4.942e-06	4.942e-06	-5.306	-5.306	0.000	(0)
ZnCl+	1.350e-06	8.780e-07	-5.870	-6.057	-0.187	(0)
ZnCl2	2.482e-07	2.482e-07	-6.605	-6.605	0.000	(0)
ZnCl3-	6.324e-08	4.113e-08	-7.199	-7.386	-0.187	(0)

ZnCl4-2	1.961e-08	4.225e-09	-7.708	-8.374	-0.667	(0)
ZnOHCl	1.297e-09	1.297e-09	-8.887	-8.887	0.000	(0)
ZnOH+	3.148e-10	1.369e-10	-9.502	-9.864	-0.362	(0)
Zn(OH)2	3.226e-14	3.226e-14	-13.491	-13.491	0.000	(0)
Zn(OH)3-	4.073e-19	1.771e-19	-18.390	-18.752	-0.362	(0)
Zn(OH)4-2	2.161e-25	7.719e-27	-24.665	-26.112	-1.447	(0)
Zn(HS)2	2.918e-37	2.918e-37	-36.535	-36.535	0.000	(0)
ZnS(HS)-	7.222e-38	3.140e-38	-37.141	-37.503	-0.362	(0)
ZnSeO4	1.494e-38	1.494e-38	-37.826	-37.826	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-54.685	-55.047	-0.362	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-58.538	-59.985	-1.447	(0)
ZnNO3+	0.000e+00	0.000e+00	-69.770	-70.131	-0.362	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-70.618	-72.065	-1.447	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-76.853	-78.300	-1.447	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-135.614	-135.614	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2-160.56	-154.28	6.27	(Co(NH3)5Cl)(NO3)2	
(Co(NH3)5Cl)Cl2 -30.62	-26.09	4.54	(Co(NH3)5Cl)Cl2	
(Co(NH3)5OH2)Cl3 -37.89	-26.09	11.80	(Co(NH3)5OH2)Cl3	
(Co(NH3)6)(NO3)3-233.88	-215.95	17.93	(Co(NH3)6)(NO3)3	
(Co(NH3)6)Cl3 -43.77	-23.66	20.11	(Co(NH3)6)Cl3	
(NH4)2SeO4 -39.92	-39.47	0.45	(NH4)2SeO4	
Al(OH)3(am) -1.89	9.17	11.06	Al(OH)3	
Al2O3 -1.90	18.37	20.27	Al2O3	
Al4(OH)10SO4 2.06	24.76	22.70	Al4(OH)10SO4	
AlOHSO4 0.47	-2.76	-3.23	AlOHSO4	
Alunite 7.20	6.30	-0.90	KAl3(SO4)2(OH)6	
Anglesite -3.04	-10.86	-7.82	PbSO4	
Anhydrite -0.12	-4.47	-4.34	CaSO4	
Anilite 0.94	-31.37	-32.31	Cu0.25Cu1.5S	
Antlerite -19.75	-10.96	8.79	Cu3(OH)4SO4	
Atacamite -12.68	-5.06	7.61	Cu2(OH)3Cl	
Bianchite -5.90	-7.66	-1.76	ZnSO4:6H2O	
Birnessite -25.41	-7.31	18.09	MnO2	
Bixbyite -26.45	-26.80	-0.35	Mn2O3	
BlaubleiI -2.99	-27.15	-24.16	Cu0.9Cu0.2S	
BlaubleiII -1.82	-29.10	-27.28	Cu0.6Cu0.8S	
Boehmite 0.32	9.18	8.86	AlOOH	
Brochantite -26.35	-10.64	15.71	Cu4(OH)6SO4	
Brucite -9.03	8.08	17.12	Mg(OH)2	
Bunsenite -7.46	5.23	12.68	NiO	
Ca3(PO4)2(beta) -4.85	-33.90	-29.05	Ca3(PO4)2	
Ca4H(PO4)3:3H2O -7.53	-54.61	-47.08	Ca4H(PO4)3:3H2O	
CaHP04 -1.34	-20.69	-19.35	CaHP04	
CaHP04:2H2O -1.65	-20.70	-19.05	CaHP04:2H2O	
Calomel -11.80	-29.93	-18.13	Hg2Cl2	
CaSeO3:2H2O -15.11	-12.25	2.86	CaSeO3:2H2O	
CaSeO4:2H2O -33.86	-36.86	-3.00	CaSeO4:2H2O	
Cd(OH)2 -12.17	1.69	13.87	Cd(OH)2	
Cd(OH)2(am) -12.24	1.69	13.94	Cd(OH)2	
Cd3(OH)2(SO4)2 -25.49	-18.78	6.71	Cd3(OH)2(SO4)2	
Cd3(OH)4SO4 -29.41	-6.85	22.56	Cd3(OH)4SO4	
Cd3(PO4)2 -18.62	-51.22	-32.60	Cd3(PO4)2	
Cd4(OH)6SO4 -33.56	-5.16	28.40	Cd4(OH)6SO4	
CdCl2 -9.11	-9.73	-0.61	CdCl2	
CdCl2:1H2O -8.06	-9.73	-1.68	CdCl2:1H2O	
CdCl2:2.5H2O -7.81	-9.74	-1.93	CdCl2:2.5H2O	
Cdmetal(alpha) -24.17	-10.47	13.69	Cd	
Cdmetal(gamma) -24.27	-10.47	13.80	Cd	
CdOHCl -7.63	-4.02	3.61	CdOHCl	
CdSe 10.71	-9.67	-20.38	CdSe	
CdSeO4:2H2O -40.78	-42.63	-1.85	CdSeO4:2H2O	
CdSO4 -10.19	-10.24	-0.05	CdSO4	
CdSO4:1H2O -8.59	-10.24	-1.65	CdSO4:1H2O	

CdSO4:2.67H2O	-8.42	-10.25	-1.83	CdSO4:2.67H2O
Chalcanthite	-8.98	-11.64	-2.65	CuSO4:5H2O
Chalcocite	2.32	-33.00	-35.32	Cu2S
Chalcopyrite	-10.86	-46.49	-35.62	CuFeS2
Cinnabar	-5.36	-51.66	-46.30	HgS
Clausthalite	17.10	-10.29	-27.39	PbSe
Co(OH)2	-7.88	5.21	13.09	Co(OH)2
Co(OH)3	-19.01	-21.10	-2.09	Co(OH)3
Co3(P04)2	-5.98	-40.66	-34.69	Co3(P04)2
Co3O4	-26.73	-36.97	-10.24	Co3O4
CoCl2	-14.66	-6.21	8.46	CoCl2
CoCl2:6H2O	-8.76	-6.24	2.52	CoCl2:6H2O
CoFe2O4	7.96	4.81	-3.15	CoFe2O4
CoHP04	-3.88	-22.94	-19.06	CoHP04
CoO	-8.62	5.22	13.84	CoO
CoS(alpha)	-14.17	-21.61	-7.44	CoS
CoS(beta)	-10.54	-21.61	-11.07	CoS
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-15.81	-14.49	1.32	CoSeO3
CoSeO4:6H2O	-37.61	-39.14	-1.53	CoSeO4:6H2O
CoSO4	-9.71	-6.72	2.99	CoSO4
CoSO4:6H2O	-4.28	-6.75	-2.48	CoSO4:6H2O
Cotunnite	-5.50	-10.34	-4.84	PbCl2
Covellite	-3.97	-26.50	-22.53	CuS
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.59	-69.16	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.77	-17.54	-46.31	Cu2Se
Cu2SO4	-16.20	-18.11	-1.90	Cu2SO4
Cu3(P04)2	-18.48	-55.33	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-20.23	-55.35	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.72	-28.58	-64.30	Cu3Se2
Cumetal	-0.24	-9.17	-8.93	Cu
CuOCuSO4	-21.91	-11.28	10.63	CuOCuSO4
Cupricferrite	-6.57	-0.08	6.49	CuFe2O4
Cuprite	-5.06	-6.17	-1.11	Cu2O
Cuprousferrite	5.59	-3.29	-8.88	CuFeO2
CuSe	22.35	-11.04	-33.39	CuSe
CuSe2	23.46	-10.24	-33.70	CuSe2
CuSeO3:2H2O	-19.99	-19.39	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-41.58	-44.02	-2.44	CuSeO4:5H2O
CuSO4	-14.72	-11.61	3.11	CuSO4
Diaspore	2.06	9.18	7.12	AlOOH
Djurleite	1.83	-32.57	-34.40	Cu0.066Cu1.868S
Epsomite	-1.74	-3.89	-2.15	MgSO4:7H2O
Fe(OH)2	-6.73	6.84	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.11	-1.93	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-21.68	-20.13	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-38.92	-59.55	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-33.07	-36.23	-3.16	Fe2(SO4)3
Fe3(OH)8	-13.81	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.58	-0.21	3.37	Fe(OH)3
Ferroselite	14.99	-3.72	-18.71	FeSe2
FeS(ppt)	-17.06	-19.99	-2.92	FeS
FeSe	6.48	-4.53	-11.00	FeSe
Galena	-11.58	-25.75	-14.16	PbS
Gibbsite	0.66	9.17	8.52	Al(OH)3
Goethite	-0.84	-0.21	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4:7H2O
Greenockite	-10.64	-25.13	-14.49	CdS
Greigite	-55.85	-100.88	-45.03	Fe3S4
Gypsum	0.13	-4.48	-4.61	CaSO4:2H2O
H-Jarosite	-12.97	-24.52	-11.55	(H3O)Fe3(SO4)2(OH)6
H2S(g)	-18.82	-26.83	-8.01	H2S
H2Se(g)	-6.45	-11.37	-4.92	H2Se
Halite	-2.99	-1.40	1.59	NaCl
Hausmannite	-31.50	30.53	62.03	Mn3O4
Hematite	0.70	-0.41	-1.11	Fe2O3
Hercynite	1.57	25.21	23.64	FeAl2O4

Hg(g)	-7.41	-15.34	-7.93	Hg
Hg(OH)2	-21.34	-24.84	-3.50	Hg(OH)2
Hg2(g)	-15.59	-30.68	-15.09	Hg2
Hg2(OH)2	-23.77	-18.51	5.26	Hg2(OH)2
Hg2HP04	-21.89	-46.67	-24.77	Hg2HP04
Hg2S	-33.49	-45.33	-11.84	Hg2S
Hg2Se03	-33.56	-38.22	-4.66	Hg2Se03
Hg2S04	-24.30	-30.45	-6.14	Hg2S04
HgCl(g)	-34.85	-14.97	19.88	HgCl
HgCl2	-14.74	-36.26	-21.52	HgCl2
Hgmetal(l)	-1.69	-15.34	-13.65	Hg
HgSe	19.49	-36.20	-55.69	HgSe
HgSe03	-32.11	-44.54	-12.43	HgSe03
HgS04	-27.32	-36.77	-9.45	HgS04
Hinsdalite	-8.98	-11.48	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	-2.79	-47.12	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-16.27	-79.06	-62.79	Pb5(P04)3OH
K-Alum	-6.88	-12.12	-5.24	KAl(S04)2·12H2O
K-Jarosite	-7.38	-21.87	-14.49	KFe3(S04)2(OH)6
K2Se04	-38.31	-39.04	-0.73	K2Se04
Langite	-28.53	-10.65	17.88	Cu4(OH)6S04·H2O
Larnakite	-9.39	-9.77	-0.38	PbO:PbS04
Laurionite	-5.26	-4.63	0.62	PbOHCl
Lepidocrocite	-1.58	-0.21	1.37	Fe00H
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.77	1.08	12.85	PbO
Mackinawite	-16.39	-19.99	-3.60	FeS
Maghemite	-6.80	-0.41	6.39	Fe203
Magnesioferrite	-9.85	7.68	17.52	Fe2Mg04
Magnetite	2.53	6.43	3.90	Fe304
Manganite	-13.14	12.20	25.34	Mn00H
Massicot	-11.97	1.08	13.05	PbO
Melanothallite	-17.50	-11.10	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeS04·7H2O
Metacinnabar	-5.96	-51.66	-45.70	HgS
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(P04)2	-8.78	-32.06	-23.28	Mg3(P04)2
MgHP04:3H2O	-1.92	-20.09	-18.18	MgHP04:3H2O
MgSe03:6H2O	-14.70	-11.65	3.04	MgSe03:6H2O
MgSe04:6H2O	-35.07	-36.27	-1.20	MgSe04:6H2O
Minium	-59.10	15.42	74.53	Pb304
Mirabilite	-2.06	-3.36	-1.30	Na2S04:10H2O
Mn2(S04)3	-57.30	-62.62	-5.32	Mn2(S04)3
Mn3(P04)2	-14.11	-37.96	-23.85	Mn3(P04)2
MnCl2:4H2O	-8.07	-5.33	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnS(grn)	-20.96	-20.71	0.25	MnS
MnS(pnk)	-24.05	-20.71	3.34	MnS
MnSe	-8.98	-5.25	3.73	MnSe
MnSe03	-14.72	-13.59	1.13	MnSe03
MnSe03:2H2O	-14.56	-13.60	0.96	MnSe03:2H2O
MnSe04:5H2O	-36.18	-38.23	-2.05	MnSe04:5H2O
MnS04	-8.56	-5.82	2.74	MnS04
Monteponite	-13.65	1.70	15.35	CdO
Montroydite	-21.29	-24.83	-3.55	HgO
Morenosite	-4.58	-6.75	-2.17	NiS04:7H2O
Na-Jarosite	-9.35	-20.19	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-21.40	-11.10	10.30	Na2Se03:5H2O
Na2Se04	-36.97	-35.69	1.28	Na2Se04
Nantokite	-1.97	-8.80	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(P04)2	-9.34	-40.64	-31.30	Ni3(P04)2
Ni4(OH)6S04	-23.05	8.95	32.00	Ni4(OH)6S04
NiS(alpha)	-16.00	-21.60	-5.60	NiS
NiS(beta)	-10.50	-21.60	-11.10	NiS
NiS(gamma)	-8.80	-21.60	-12.80	NiS
NiSe	11.56	-6.14	-17.70	NiSe
NiSe03:2H2O	-17.38	-14.50	2.89	NiSe03:2H2O

NiSeO4:6H2O	-37.61	-39.13	-1.52	NiSeO4:6H2O
Nsutite	-24.82	-7.31	17.50	MnO2
O2(g)	-60.10	24.35	84.45	O2
Pb(OH)2	-7.21	1.08	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.35	-3.55	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-24.03	2.16	26.19	Pb2O(OH)2
Pb2O3	-46.70	14.34	61.04	Pb2O3
Pb3(PO4)2	-9.54	-53.07	-43.53	Pb3(PO4)2
Pb3O2SO4	-19.56	-8.69	10.87	Pb3O2SO4
Pb4(OH)6SO4	-28.72	-7.62	21.10	Pb4(OH)6SO4
Pb4O3SO4	-29.81	-7.61	22.20	Pb4O3SO4
PbHP04	-3.27	-27.08	-23.81	PbHP04
Pbmetal	-15.33	-11.09	4.24	Pb
PbO:0.3H2O	-11.90	1.08	12.98	PbO:0.33H2O
PbSeO4	-36.36	-43.24	-6.88	PbSeO4
Periclase	-13.86	8.09	21.94	MgO
Plattnerite	-37.05	13.26	50.31	PbO2
Plumbgummite	5.08	-27.71	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-15.64	7.47	23.11	Ca(OH)2
Pyrite	-16.02	-34.64	-18.63	FeS2
Pyrochroite	-9.31	6.11	15.43	Mn(OH)2
Pyrolusite	-23.74	18.29	42.03	MnO2
Pyromorphite	-0.34	-84.77	-84.43	Pb5(PO4)3Cl
Retgersite	-4.70	-6.75	-2.05	NiSO4:6H2O
Semetal(am)	7.94	0.80	-7.14	Se
Semetal(hex)	8.55	0.80	-7.75	Se
SeO2	-19.83	-19.71	0.12	SeO2
SeO3	-65.72	-44.32	21.39	SeO3
Sphalerite	-11.00	-22.52	-11.52	ZnS
Spinel	-11.32	26.45	37.77	MgAl2O4
Strengite	-2.00	-28.38	-26.38	FePO4:2H2O
Sulfur	-12.55	-14.66	-2.11	S
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.65	-3.31	0.34	Na2SO4
Tsumebite	-15.90	-25.69	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	0.16	-35.84	-36.00	Fe3(PO4)2:8H2O
Wurtzite	-13.52	-22.52	-9.00	ZnS
Zincite	-7.24	4.31	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnSO4
Zn(NO3)2:6H2O	-138.60	-135.35	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-7.90	4.30	12.20	Zn(OH)2
Zn(OH)2(am)	-8.36	4.30	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.65	4.30	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.43	4.30	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.43	4.30	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.83	-3.33	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.30	2.90	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-8.00	-43.42	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-30.48	-10.95	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-23.12	5.28	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-28.41	10.09	38.50	Zn5(OH)8Cl2
ZnCl2	-14.34	-7.12	7.22	ZnCl2
Znmetal	-34.02	-7.87	26.15	Zn
ZnO(active)	-7.09	4.31	11.40	ZnO
ZnS(am)	-13.43	-22.52	-9.09	ZnS
ZnSe	7.40	-7.06	-14.46	ZnSe
ZnSeO4:6H2O	-38.53	-40.05	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.10	-7.64	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 9.

SOLUTION 7 #Groundwater worst case maximum values

```

temp      21
pH        5.05
pe        1
redox     pe
units     mg/l
density   1
Al        5.21
Alkalinity 0
As        0
Ba        0
Be        0
B         0
Cd        0.04
Co        24.2
Cr        0
Cu        9.29
Fe        937
Pb        0.01
Mn        171
Mo        0
V         0
Zn        1.78
Se        0.08
Ni        5.57
N         60
P         23.6
Ca        590
Mg        1340
Na        5880
K         216
Cl        9420
S(6)     9110
Hg        0.0004
water     1 # kg
MIX 6
  1      0.954
  7      0.046
REACTION 7
H2O -1
3
END #Time-step 7

```

Beginning of initial solution calculations.

Initial solution 7.

-----Solution composition-----

Elements	Molality	Moles
Al	1.986e-04	1.986e-04
Ca	1.514e-02	1.514e-02
Cd	3.660e-07	3.660e-07
Cl	2.733e-01	2.733e-01
Co	4.224e-04	4.224e-04
Cu	1.504e-04	1.504e-04
Fe	1.726e-02	1.726e-02
Hg	2.051e-09	2.051e-09
K	5.682e-03	5.682e-03
Mg	5.671e-02	5.671e-02
Mn	3.202e-03	3.202e-03
N	4.406e-03	4.406e-03
Na	2.631e-01	2.631e-01
Ni	9.762e-05	9.762e-05

P	7.837e-04	7.837e-04
Pb	4.964e-08	4.964e-08
S(6)	9.754e-02	9.754e-02
Se	1.042e-06	1.042e-06
Zn	2.800e-05	2.800e-05

-----Description of solution-----

pH	=	5.050
pe	=	1.000
Activity of water	=	0.988
Ionic strength (mol/kgw)	=	4.862e-01
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	1.381e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	21.00
Electrical balance (eq)	=	-9.552e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.26
Iterations	=	14
Total H	=	1.110329e+02
Total O	=	5.590014e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.214e-05	8.913e-06	-4.916	-5.050	-0.134	0.00
OH-	1.292e-09	8.222e-10	-8.889	-9.085	-0.196	(0)
H2O	5.551e+01	9.883e-01	1.744	-0.005	0.000	18.05
Al	1.986e-04					
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Al+3	1.839e-05	1.139e-06	-4.735	-5.943	-1.208	(0)
AlOH+2	4.197e-06	9.786e-07	-5.377	-6.009	-0.632	(0)
Al(OH)2+	1.624e-06	1.128e-06	-5.790	-5.948	-0.158	(0)
Al(OH)3	2.514e-08	2.514e-08	-7.600	-7.600	0.000	(0)
Al(OH)4-	2.040e-09	1.366e-09	-8.690	-8.864	-0.174	(0)
Ca	1.514e-02					
Ca+2	8.161e-03	2.370e-03	-2.088	-2.625	-0.537	(0)
CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
CaOH+	5.236e-11	3.715e-11	-10.281	-10.430	-0.149	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
Cd	3.660e-07					
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
Cd(SO4)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
Cd+2	1.502e-08	4.363e-09	-7.823	-8.360	-0.537	(0)
CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CdOH+	6.462e-14	2.865e-14	-13.190	-13.543	-0.353	(0)
Cd2OH+3	9.945e-19	6.582e-22	-18.002	-21.182	-3.179	(0)
Cd(OH)2	2.726e-19	2.726e-19	-18.564	-18.564	0.000	(0)
Cd(OH)3-	4.195e-26	1.860e-26	-25.377	-25.730	-0.353	(0)
Cd(OH)4-2	8.799e-35	3.400e-36	-34.056	-35.469	-1.413	(0)
Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cl	2.733e-01					
Cl-	2.729e-01	2.003e-01	-0.564	-0.698	-0.134	(0)

CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(2)	4.224e-04					
Co+2	3.644e-04	1.408e-05	-3.438	-4.851	-1.413	(0)
CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CoOH+	7.075e-10	3.137e-10	-9.150	-9.504	-0.353	(0)
Co2OH+3	3.344e-13	2.213e-16	-12.476	-15.655	-3.179	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Co(OH)2	2.782e-14	2.782e-14	-13.556	-13.556	0.000	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Co(OH)3-	1.398e-21	6.199e-22	-20.854	-21.208	-0.353	(0)
CoOOH-	8.505e-23	3.771e-23	-22.070	-22.424	-0.353	(0)
Co4(OH)4+4	8.668e-25	1.932e-30	-24.062	-29.714	-5.652	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
Co(OH)4-2	2.839e-30	1.097e-31	-29.547	-30.960	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Co(3)	8.287e-32					
CoOH+2	8.232e-32	3.180e-33	-31.085	-32.498	-1.413	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co+3	9.049e-36	5.605e-37	-35.043	-36.251	-1.208	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
Cu(1)	1.504e-04					
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)

CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
Cu+	1.823e-08	8.082e-09	-7.739	-8.092	-0.353	(0)
Cu(2)	1.182e-09					
Cu+2	5.900e-10	1.714e-10	-9.229	-9.766	-0.537	(0)
CuS04	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
CuOH+	7.604e-13	4.972e-13	-12.119	-12.303	-0.185	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
Cu(OH)2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
Cu2(OH)2+2	1.564e-19	6.042e-21	-18.806	-20.219	-1.413	(0)
Cu(OH)3-	6.965e-22	3.088e-22	-21.157	-21.510	-0.353	(0)
Cu(OH)4-2	7.024e-29	2.714e-30	-28.153	-29.566	-1.413	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Fe(2)	1.726e-02					
Fe+2	1.529e-02	5.907e-04	-1.816	-3.229	-1.413	(0)
FeS04	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
FeH2P04+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
FeHP04	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
FeOH+	2.826e-08	1.934e-08	-7.549	-7.714	-0.165	(0)
Fe(OH)2	1.209e-14	1.209e-14	-13.918	-13.918	0.000	(0)
Fe(OH)3-	6.009e-18	4.111e-18	-17.221	-17.386	-0.165	(0)
Fe(3)	2.087e-10					
Fe(OH)2+	1.957e-10	1.360e-10	-9.708	-9.867	-0.158	(0)
FeHP04+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
FeOH+2	1.136e-12	2.489e-13	-11.945	-12.604	-0.659	(0)
Fe(OH)3	9.228e-14	9.228e-14	-13.035	-13.035	0.000	(0)
FeS04+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(S04)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
FeH2P04+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Fe+3	7.010e-15	4.342e-16	-14.154	-15.362	-1.208	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
Fe(OH)4-	2.440e-17	1.696e-17	-16.613	-16.771	-0.158	(0)
Fe2(OH)2+4	1.061e-18	2.365e-24	-17.974	-23.626	-5.652	(0)
Fe3(OH)4+5	3.023e-24	4.459e-33	-23.520	-32.351	-8.831	(0)
FeHSe03+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
H(0)	1.047e-15					
H2	5.235e-16	5.855e-16	-15.281	-15.232	0.049	(0)
Hg(0)	2.051e-09					
Hg	2.051e-09	2.051e-09	-8.688	-8.688	0.000	(0)
Hg(1)	9.698e-28					
Hg2+2	4.849e-28	1.874e-29	-27.314	-28.727	-1.413	(0)
Hg(2)	4.726e-15					
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Hg(OH)2	1.022e-25	1.143e-25	-24.991	-24.942	0.049	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
HgOH+	1.615e-27	7.162e-28	-26.792	-27.145	-0.353	(0)
Hg+2	4.674e-28	1.806e-29	-27.330	-28.743	-1.413	(0)
HgS04	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Hg(OH)3-	3.623e-35	1.606e-35	-34.441	-34.794	-0.353	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)

K	5.682e-03					
K+	5.178e-03	3.801e-03	-2.286	-2.420	-0.134	(0)
KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
Mg	5.671e-02					
Mg+2	3.360e-02	9.758e-03	-1.474	-2.011	-0.537	(0)
MgS04	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
MgH2P04+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
MgHP04	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
MgOH+	4.148e-09	2.990e-09	-8.382	-8.524	-0.142	(0)
MgP04-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
Mn(2)	3.202e-03					
Mn+2	2.899e-03	1.120e-04	-2.538	-3.951	-1.413	(0)
MnS04	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
MnOH+	3.381e-10	2.313e-10	-9.471	-9.636	-0.165	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Mn(OH)3-	3.538e-24	2.421e-24	-23.451	-23.616	-0.165	(0)
Mn(OH)4-2	3.983e-32	8.727e-33	-31.400	-32.059	-0.659	(0)
MnSe04	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
MnN03+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
Mn(N03)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Mn(3)	4.471e-28					
Mn+3	4.471e-28	2.769e-29	-27.350	-28.558	-1.208	(0)
Mn(6)	0.000e+00					
Mn04-2	0.000e+00	0.000e+00	-79.028	-79.687	-0.659	(0)
Mn(7)	0.000e+00					
Mn04-	0.000e+00	0.000e+00	-88.115	-88.325	-0.210	(0)
N(-3)	4.406e-03					
NH4+	3.919e-03	2.335e-03	-2.407	-2.632	-0.225	(0)
NH4S04-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
NH3	1.123e-07	1.123e-07	-6.950	-6.950	0.000	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
N(3)	0.000e+00					
N02-	0.000e+00	0.000e+00	-47.968	-48.177	-0.210	(0)
CoN02+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CuN02+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
Cu(N02)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-64.954	-65.088	-0.134	(0)
CaN03+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
MnN03+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
NiN03+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
CoN03+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
ZnN03+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
CdN03+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
PbN03+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
CuN03+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
FeN03+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)

HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
Na	2.631e-01					
Na+	2.447e-01	1.796e-01	-0.611	-0.746	-0.134	(0)
NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
Ni	9.762e-05					
Ni+2	4.671e-05	1.357e-05	-4.331	-4.867	-0.537	(0)
NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
Ni(SO4)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
NiOH+	3.238e-10	1.435e-10	-9.490	-9.843	-0.353	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Ni(OH)2	1.692e-14	1.692e-14	-13.772	-13.772	0.000	(0)
Ni(OH)3-	4.261e-20	1.889e-20	-19.371	-19.724	-0.353	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-63.001	-62.952	0.049	(0)
P	7.837e-04					
H2PO4-	4.270e-04	2.967e-04	-3.370	-3.528	-0.158	(0)
MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
MgHPO4	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
HPO4-2	9.473e-06	2.076e-06	-5.024	-5.683	-0.659	(0)
NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
H3PO4	3.560e-07	3.560e-07	-6.449	-6.449	0.000	(0)
KHPO4-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
MgPO4-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
PO4-3	1.460e-12	9.045e-14	-11.836	-13.044	-1.208	(0)
FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Pb	4.964e-08					
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
Pb(SO4)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
Pb+2	3.636e-09	1.056e-09	-8.439	-8.976	-0.537	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
PbOH+	6.682e-12	2.963e-12	-11.175	-11.528	-0.353	(0)
Pb(OH)2	1.046e-16	1.046e-16	-15.980	-15.980	0.000	(0)
Pb2OH+3	7.494e-17	4.960e-20	-16.125	-19.305	-3.179	(0)
Pb(OH)3-	2.635e-22	1.168e-22	-21.579	-21.933	-0.353	(0)
Pb(OH)4-2	8.268e-28	3.195e-29	-27.083	-28.496	-1.413	(0)
Pb3(OH)4+2	3.173e-30	1.226e-31	-29.499	-30.912	-1.413	(0)
Pb4(OH)4+4	5.352e-31	1.193e-36	-30.271	-35.923	-5.652	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
S(6)	9.754e-02					
SO4-2	4.586e-02	1.332e-02	-1.339	-1.875	-0.537	(0)
MgSO4	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
FeSO4	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)

KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
NH4S04-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
MnS04	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
AlS04+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
CoS04	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
NiS04	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
Al(S04)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Zn(S04)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
HS04-	1.536e-05	1.028e-05	-4.814	-4.988	-0.174	(0)
ZnS04	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
Ni(S04)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
Cd(S04)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
Pb(S04)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
CdS04	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
PbS04	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
CuS04	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
FeS04+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(S04)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
HgS04	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Se(-2)	1.042e-06					
HSe-	1.012e-06	4.485e-07	-5.995	-6.348	-0.353	(0)
H2Se	3.047e-08	3.047e-08	-7.516	-7.516	0.000	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Se-2	1.000e-15	3.865e-17	-15.000	-16.413	-1.413	(0)
Se(4)	2.708e-15					
HSeO3-	2.690e-15	1.193e-15	-14.570	-14.923	-0.353	(0)
SeO3-2	1.341e-17	5.183e-19	-16.872	-18.285	-1.413	(0)
H2SeO3	4.383e-18	4.383e-18	-17.358	-17.358	0.000	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
Se(6)	9.467e-35					
SeO4-2	9.354e-35	2.717e-35	-34.029	-34.566	-0.537	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
HSeO4-	2.413e-38	1.070e-38	-37.617	-37.971	-0.353	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn	2.800e-05					
Zn(S04)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
Zn+2	6.051e-06	1.758e-06	-5.218	-5.755	-0.537	(0)
ZnS04	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
ZnOH+	3.259e-10	1.445e-10	-9.487	-9.840	-0.353	(0)
Zn(OH)2	3.473e-14	3.473e-14	-13.459	-13.459	0.000	(0)
Zn(OH)3-	4.384e-19	1.944e-19	-18.358	-18.711	-0.353	(0)
Zn(OH)4-2	2.236e-25	8.641e-27	-24.650	-26.063	-1.413	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	161.31	-155.03	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-30.79	-26.25	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-38.05	-26.26	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-234.94	-217.01	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-43.95	-23.84	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-40.28	-39.83	0.45	(NH4)2SeO4

Al(OH)3(am)	-1.87	9.19	11.06	Al(OH)3
Al2O3	-1.87	18.40	20.27	Al2O3
Al4(OH)10SO4	2.10	24.80	22.70	Al4(OH)10SO4
AlOHSO4	0.46	-2.77	-3.23	AlOHSO4
Alunite	7.17	6.27	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.03	-10.85	-7.82	PbSO4
Anhydrite	-0.16	-4.50	-4.34	CaSO4
Antlerite	-19.78	-10.99	8.79	Cu3(OH)4SO4
Atacamite	-12.71	-5.10	7.61	Cu2(OH)3Cl
Bianchite	-5.90	-7.66	-1.76	ZnSO4:6H2O
Birnessite	-25.46	-7.37	18.09	MnO2
Bixbyite	-26.48	-26.83	-0.35	Mn2O3
Boehmite	0.34	9.20	8.86	AlOOH
Brochantite	-26.38	-10.67	15.71	Cu4(OH)6SO4
Brucite	-9.04	8.08	17.12	Mg(OH)2
Bunsenite	-7.46	5.23	12.68	NiO
Ca3(PO4)2(beta)	-4.91	-33.96	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-7.62	-54.70	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.37	-20.72	-19.35	CaHP04
CaHP04:2H2O	-1.68	-20.73	-19.05	CaHP04:2H2O
Calomel	-11.99	-30.12	-18.13	Hg2Cl2
CaSeO3:2H2O	-15.37	-12.51	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-34.20	-37.20	-3.00	CaSeO4:2H2O
Cd(OH)2	-12.14	1.73	13.87	Cd(OH)2
Cd(OH)2(am)	-12.21	1.73	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-25.45	-18.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-29.34	-6.78	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-18.57	-51.17	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-33.45	-5.05	28.40	Cd4(OH)6SO4
CdCl2	-9.14	-9.76	-0.61	CdCl2
CdCl2:1H2O	-8.09	-9.76	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-7.84	-9.77	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.05	-10.36	13.69	Cd
Cdmetal(gamma)	-24.16	-10.36	13.80	Cd
CdOHCl	-7.62	-4.01	3.61	CdOHCl
CdSe	10.72	-9.66	-20.38	CdSe
CdSeO4:2H2O	-41.09	-42.94	-1.85	CdSeO4:2H2O
CdSO4	-10.19	-10.24	-0.05	CdSO4
CdSO4:1H2O	-8.59	-10.24	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-8.42	-10.25	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.01	-11.67	-2.65	CuSO4:5H2O
Clausthalite	17.11	-10.27	-27.39	PbSe
Co(OH)2	-7.86	5.24	13.09	Co(OH)2
Co(OH)3	-19.03	-21.12	-2.09	Co(OH)3
Co3(PO4)2	-5.95	-40.64	-34.69	Co3(PO4)2
Co3O4	-26.74	-36.97	-10.24	Co3O4
CoCl2	-14.71	-6.25	8.46	CoCl2
CoCl2:6H2O	-8.80	-6.28	2.52	CoCl2:6H2O
CoFe2O4	7.95	4.80	-3.15	CoFe2O4
CoHP04	-3.88	-22.95	-19.06	CoHP04
CoO	-8.60	5.24	13.84	CoO
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-16.04	-14.72	1.32	CoSeO3
CoSeO4:6H2O	-37.92	-39.45	-1.53	CoSeO4:6H2O
CoSO4	-9.72	-6.73	2.99	CoSO4
CoSO4:6H2O	-4.28	-6.76	-2.48	CoSO4:6H2O
Cotunnite	-5.53	-10.37	-4.84	PbCl2
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.91	-69.49	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.83	-17.48	-46.31	Cu2Se
Cu2SO4	-16.16	-18.06	-1.90	Cu2SO4
Cu3(PO4)2	-18.54	-55.39	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-20.28	-55.40	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	35.75	-28.55	-64.30	Cu3Se2
Cumetal	-0.17	-9.09	-8.93	Cu
CuOCuSO4	-21.94	-11.31	10.63	CuOCuSO4
Cupricferrite	-6.60	-0.11	6.49	CuFe2O4
Cuprite	-4.98	-6.09	-1.11	Cu2O

Cuprousferrite	5.61	-3.27	-8.88	CuFeO2
CuSe	22.32	-11.06	-33.39	CuSe
CuSe2	23.34	-10.36	-33.70	CuSe2
CuSeO3:2H2O	-20.25	-19.65	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-41.92	-44.36	-2.44	CuSeO4:5H2O
CuSO4	-14.76	-11.64	3.11	CuSO4
Diaspore	2.08	9.20	7.12	AlOOH
Epsomite	-1.77	-3.92	-2.15	MgSO4:7H2O
Fe(OH)2	-6.70	6.86	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.09	-1.95	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-21.97	-20.42	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-39.73	-60.36	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-33.19	-36.35	-3.16	Fe2(SO4)3
Fe3(OH)8	-13.82	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.59	-0.23	3.37	Fe(OH)3
Ferroselite	14.88	-3.83	-18.71	FeSe2
FeSe	6.48	-4.53	-11.00	FeSe
Gibbsite	0.67	9.19	8.52	Al(OH)3
Goethite	-0.86	-0.22	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4:7H2O
Gypsum	0.10	-4.51	-4.61	CaSO4:2H2O
H-Jarosite	-13.07	-24.62	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-6.47	-11.40	-4.92	H2Se
Halite	-3.04	-1.44	1.59	NaCl
Hausmannite	-31.51	30.53	62.03	Mn3O4
Hematite	0.67	-0.44	-1.11	Fe2O3
Hercynite	1.62	25.26	23.64	FeAl2O4
Hg(g)	-7.44	-15.36	-7.93	Hg
Hg(OH)2	-21.45	-24.94	-3.50	Hg(OH)2
Hg2(g)	-15.63	-30.73	-15.09	Hg2
Hg2(OH)2	-23.90	-18.64	5.26	Hg2(OH)2
Hg2HPO4	-22.05	-46.82	-24.77	Hg2HPO4
Hg2SeO3	-33.94	-38.60	-4.66	Hg2SeO3
Hg2SO4	-24.46	-30.60	-6.14	Hg2SO4
HgCl(g)	-34.94	-15.06	19.88	HgCl
HgCl2	-14.91	-36.43	-21.52	HgCl2
Hgmetal(l)	-1.71	-15.36	-13.65	Hg
HgSe	19.36	-36.33	-55.69	HgSe
HgSeO3	-32.48	-44.91	-12.43	HgSeO3
HgSO4	-27.45	-36.91	-9.45	HgSO4
Hinsdalite	-8.96	-11.46	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-2.88	-47.21	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-16.18	-78.97	-62.79	Pb5(PO4)3OH
K-Alum	-6.93	-12.18	-5.24	KAl(SO4)2:12H2O
K-Jarosite	-7.50	-21.99	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-38.68	-39.41	-0.73	K2SeO4
Langite	-28.56	-10.68	17.88	Cu4(OH)6SO4:H2O
Larnakite	-9.35	-9.73	-0.38	PbO:PbSO4
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.59	-0.22	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.73	1.12	12.85	PbO
Maghemite	-6.83	-0.44	6.39	Fe2O3
Magnesioferrite	-9.88	7.64	17.52	Fe2MgO4
Magnetite	2.53	6.43	3.90	Fe3O4
Manganite	-13.15	12.19	25.34	MnOOH
Massicot	-11.93	1.12	13.05	PbO
Melanothallite	-17.57	-11.16	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeSO4:7H2O
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(PO4)2	-8.84	-32.12	-23.28	Mg3(PO4)2
MgHPO4:3H2O	-1.94	-20.12	-18.18	MgHPO4:3H2O
MgSeO3:6H2O	-14.96	-11.91	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-35.41	-36.61	-1.20	MgSeO4:6H2O
Minium	-59.08	15.45	74.53	Pb3O4
Mirabilite	-2.11	-3.42	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-57.42	-62.74	-5.32	Mn2(SO4)3
Mn3(PO4)2	-14.09	-37.94	-23.85	Mn3(PO4)2

MnCl2:4H2O	-8.11	-5.37	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnSe	-8.98	-5.25	3.73	MnSe
MnSe03	-14.95	-13.82	1.13	MnSe03
MnSe03:2H2O	-14.80	-13.83	0.96	MnSe03:2H2O
MnSe04:5H2O	-36.49	-38.54	-2.05	MnSe04:5H2O
MnS04	-8.56	-5.83	2.74	MnS04
Monteponite	-13.62	1.73	15.35	Cd0
Montroydite	-21.39	-24.94	-3.55	Hg0
Morenosite	-4.60	-6.78	-2.17	NiS04:7H2O
Na-Jarosite	-9.47	-20.31	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-21.69	-11.39	10.30	Na2Se03:5H2O
Na2Se04	-37.34	-36.06	1.28	Na2Se04
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(P04)2	-9.39	-40.69	-31.30	Ni3(P04)2
Ni4(OH)6S04	-23.08	8.92	32.00	Ni4(OH)6S04
NiSe	11.53	-6.17	-17.70	NiSe
NiSe03:2H2O	-17.64	-14.75	2.89	NiSe03:2H2O
NiSe04:6H2O	-37.94	-39.46	-1.52	NiSe04:6H2O
Nsutite	-24.87	-7.37	17.50	Mn02
O2(g)	-60.26	24.19	84.45	O2
Pb(OH)2	-7.18	1.11	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.31	-3.52	8.79	Pb2(OH)3Cl
Pb20(OH)2	-23.96	2.23	26.19	Pb20(OH)2
Pb203	-46.71	14.33	61.04	Pb203
Pb3(P04)2	-9.49	-53.02	-43.53	Pb3(P04)2
Pb302S04	-19.49	-8.61	10.87	Pb302S04
Pb4(OH)6S04	-28.61	-7.51	21.10	Pb4(OH)6S04
Pb403S04	-29.70	-7.50	22.20	Pb403S04
PbHP04	-3.26	-27.07	-23.81	PbHP04
Pbmetal	-15.22	-10.98	4.24	Pb
Pb0:0.3H2O	-11.86	1.12	12.98	Pb0:0.33H2O
PbSe04	-36.67	-43.54	-6.88	PbSe04
Periclase	-13.86	8.08	21.94	Mg0
Plattnerite	-37.09	13.21	50.31	Pb02
Plumbgummite	5.12	-27.67	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-15.65	7.46	23.11	Ca(OH)2
Pyrochroite	-9.29	6.14	15.43	Mn(OH)2
Pyrolusite	-23.79	18.24	42.03	Mn02
Pyromorphite	-0.28	-84.71	-84.43	Pb5(P04)3Cl
Retgersite	-4.72	-6.77	-2.05	NiS04:6H2O
Semetal(am)	7.84	0.70	-7.14	Se
Semetal(hex)	8.45	0.70	-7.75	Se
Se02	-20.09	-19.97	0.12	Se02
Se03	-66.05	-44.66	21.39	Se03
Spinel	-11.29	26.48	37.77	MgAl204
Strengite	-2.04	-28.42	-26.38	FeP04:2H2O
Tenorite	-7.47	0.33	7.80	Cu0
Thenardite	-3.71	-3.37	0.34	Na2S04
Tsumebite	-15.85	-25.64	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	0.19	-35.81	-36.00	Fe3(P04)2:8H2O
Zincite	-7.21	4.34	11.55	Zn0
Zincosite	-11.76	-7.63	4.13	ZnS04
Zn(N03)2:6H2O	-139.22	-135.96	3.26	Zn(N03)2:6H2O
Zn(OH)2	-7.87	4.33	12.20	Zn(OH)2
Zn(OH)2(am)	-8.33	4.33	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.62	4.33	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.39	4.33	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.40	4.33	11.73	Zn(OH)2
Zn2(OH)2S04	-10.80	-3.30	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-12.26	2.93	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-7.95	-43.37	-35.42	Zn3(P04)2:4H2O
Zn30(S04)2	-30.45	-10.92	19.53	Zn30(S04)2
Zn4(OH)6S04	-23.03	5.37	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-28.31	10.19	38.50	Zn5(OH)8Cl2
ZnCl2	-14.37	-7.15	7.22	ZnCl2
Znmetal	-33.91	-7.76	26.15	Zn

ZnO(active)	-7.06	4.34	11.40	ZnO
ZnSe	7.41	-7.05	-14.46	ZnSe
ZnSeO4:6H2O	-38.83	-40.35	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.10	-7.64	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 6.
Using reaction 7.

Mixture 6.

9.540e-01 Solution 1
4.600e-02 Solution 7

Reaction 7.

3.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000

Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	2.100e-04	1.986e-04
Ca	1.601e-02	1.514e-02
Cd	3.869e-07	3.660e-07
Cl	2.889e-01	2.733e-01
Co	4.465e-04	4.224e-04
Cu	1.590e-04	1.504e-04
Fe	1.824e-02	1.726e-02
Hg	2.168e-09	2.051e-09
K	6.007e-03	5.682e-03
Mg	5.995e-02	5.671e-02
Mn	3.385e-03	3.202e-03
N	4.658e-03	4.406e-03
Na	2.781e-01	2.631e-01
Ni	1.032e-04	9.762e-05
P	8.285e-04	7.837e-04
Pb	5.248e-08	4.964e-08
S	1.031e-01	9.754e-02
Se	1.102e-06	1.042e-06
Zn	2.960e-05	2.800e-05

-----Description of solution-----

	pH	=	5.042	Charge balance
	pe	=	1.047	Adjusted to redox equilibrium
	Activity of water	=	0.988	
	Ionic strength (mol/kgw)	=	5.100e-01	
	Mass of water (kg)	=	9.460e-01	
	Total alkalinity (eq/kg)	=	1.460e-05	

Total carbon (mol/kg) = 0.000e+00
 Total CO2 (mol/kg) = 0.000e+00
 Temperature (°C) = 21.00
 Electrical balance (eq) = -9.552e-03
 Percent error, 100*(Cat-|An|)/(Cat+|An|) = -1.26
 Iterations = 4
 Total H = 1.050329e+02
 Total O = 5.290014e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.235e-05	9.082e-06	-4.908	-5.042	-0.134	0.00
OH-	1.274e-09	8.063e-10	-8.895	-9.094	-0.199	(0)
H2O	5.551e+01	9.877e-01	1.744	-0.005	0.000	18.05
Al	2.100e-04					
AlSO4+	1.598e-04	1.065e-04	-3.796	-3.973	-0.176	(0)
Al(SO4)2-	2.576e-05	1.717e-05	-4.589	-4.765	-0.176	(0)
Al+3	1.850e-05	1.162e-06	-4.733	-5.935	-1.202	(0)
AlOH+2	4.265e-06	9.790e-07	-5.370	-6.009	-0.639	(0)
Al(OH)2+	1.599e-06	1.107e-06	-5.796	-5.956	-0.160	(0)
Al(OH)3	2.419e-08	2.419e-08	-7.616	-7.616	0.000	(0)
Al(OH)4-	1.934e-09	1.289e-09	-8.714	-8.890	-0.176	(0)
Ca	1.601e-02					
Ca+2	8.471e-03	2.476e-03	-2.072	-2.606	-0.534	(0)
CaSO4	7.511e-03	7.511e-03	-2.124	-2.124	0.000	(0)
CaH2PO4+	2.319e-05	1.605e-05	-4.635	-4.794	-0.160	(0)
CaHPO4	2.250e-06	2.250e-06	-5.648	-5.648	0.000	(0)
CaNH3+2	1.337e-08	4.777e-10	-7.874	-9.321	-1.447	(0)
CaPO4-	8.724e-10	6.039e-10	-9.059	-9.219	-0.160	(0)
CaOH+	5.381e-11	3.806e-11	-10.269	-10.420	-0.150	(0)
Ca(NH3)2+2	8.161e-16	2.915e-17	-15.088	-16.535	-1.447	(0)
CaNO3+	0.000e+00	0.000e+00	-66.504	-66.866	-0.362	(0)
Cd	3.869e-07					
CdCl+	1.939e-07	8.430e-08	-6.712	-7.074	-0.362	(0)
CdCl2	7.373e-08	7.373e-08	-7.132	-7.132	0.000	(0)
Cd(SO4)2-2	7.024e-08	2.509e-09	-7.153	-8.601	-1.447	(0)
CdCl3-	2.184e-08	9.496e-09	-7.661	-8.022	-0.362	(0)
Cd+2	1.432e-08	4.185e-09	-7.844	-8.378	-0.534	(0)
CdSO4	1.288e-08	1.288e-08	-7.890	-7.890	0.000	(0)
CdOHCl	3.446e-12	3.446e-12	-11.463	-11.463	0.000	(0)
CdOH+	6.199e-14	2.695e-14	-13.208	-13.569	-0.362	(0)
Cd2OH+3	1.071e-18	5.938e-22	-17.970	-21.226	-3.256	(0)
Cd(OH)2	2.515e-19	2.515e-19	-18.599	-18.599	0.000	(0)
CdHS+	1.582e-22	6.876e-23	-21.801	-22.163	-0.362	(0)
Cd(OH)3-	3.870e-26	1.683e-26	-25.412	-25.774	-0.362	(0)
Cd(OH)4-2	8.444e-35	3.016e-36	-34.073	-35.521	-1.447	(0)
Cd(HS)2	1.774e-37	1.774e-37	-36.751	-36.751	0.000	(0)
Cd(SeO3)2-2	8.361e-38	2.986e-39	-37.078	-38.525	-1.447	(0)
CdSeO4	0.000e+00	0.000e+00	-40.354	-40.354	0.000	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-56.282	-56.643	-0.362	(0)
CdNO3+	0.000e+00	0.000e+00	-72.239	-72.600	-0.362	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-74.793	-76.240	-1.447	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-137.723	-137.723	0.000	(0)
Cl	2.889e-01					
Cl-	2.885e-01	2.121e-01	-0.540	-0.673	-0.134	(0)
CuCl2-	1.383e-04	8.995e-05	-3.859	-4.046	-0.187	(0)
MnCl+	4.306e-05	2.933e-05	-4.366	-4.533	-0.167	(0)
CoCl+	2.306e-05	1.003e-05	-4.637	-4.999	-0.362	(0)
CuCl3-2	1.864e-05	4.016e-06	-4.730	-5.396	-0.667	(0)
NiCl+	1.732e-05	7.530e-06	-4.761	-5.123	-0.362	(0)
MnCl2	8.789e-06	8.789e-06	-5.056	-5.056	0.000	(0)
CuCl	2.010e-06	2.010e-06	-5.697	-5.697	0.000	(0)
ZnCl+	1.350e-06	8.780e-07	-5.870	-6.057	-0.187	(0)
MnCl3-	7.536e-07	5.134e-07	-6.123	-6.290	-0.167	(0)
ZnCl2	2.482e-07	2.482e-07	-6.605	-6.605	0.000	(0)

CdCl+	1.939e-07	8.430e-08	-6.712	-7.074	-0.362	(0)
CdCl2	7.373e-08	7.373e-08	-7.132	-7.132	0.000	(0)
ZnCl3-	6.324e-08	4.113e-08	-7.199	-7.386	-0.187	(0)
CdCl3-	2.184e-08	9.496e-09	-7.661	-8.022	-0.362	(0)
ZnCl4-2	1.961e-08	4.225e-09	-7.708	-8.374	-0.667	(0)
PbCl+	1.670e-08	7.258e-09	-7.777	-8.139	-0.362	(0)
NiCl2	8.131e-09	8.131e-09	-8.090	-8.090	0.000	(0)
PbCl2	6.753e-09	6.753e-09	-8.170	-8.170	0.000	(0)
PbCl4-2	1.525e-09	5.446e-11	-8.817	-10.264	-1.447	(0)
PbCl3-	1.371e-09	5.959e-10	-8.863	-9.225	-0.362	(0)
ZnOHCl	1.297e-09	1.297e-09	-8.887	-8.887	0.000	(0)
CuCl+	8.794e-11	5.720e-11	-10.056	-10.243	-0.187	(0)
CuCl2	3.455e-12	3.455e-12	-11.462	-11.462	0.000	(0)
CdOHCl	3.446e-12	3.446e-12	-11.463	-11.463	0.000	(0)
FeCl+2	1.247e-14	2.686e-15	-13.904	-14.571	-0.667	(0)
CuCl3-	9.787e-15	6.365e-15	-14.009	-14.196	-0.187	(0)
HgCl4-2	7.489e-15	2.675e-16	-14.126	-15.573	-1.447	(0)
FeCl2+	4.238e-15	2.887e-15	-14.373	-14.540	-0.167	(0)
HgCl3-	7.024e-16	3.054e-16	-15.153	-15.515	-0.362	(0)
HgCl2	1.427e-16	1.427e-16	-15.846	-15.846	0.000	(0)
FeCl3	6.124e-17	6.124e-17	-16.213	-16.213	0.000	(0)
CuCl4-2	3.597e-17	7.750e-18	-16.444	-17.111	-0.667	(0)
HgClOH	9.906e-21	9.906e-21	-20.004	-20.004	0.000	(0)
HgCl+	2.624e-22	1.141e-22	-21.581	-21.943	-0.362	(0)
CoCl+2	6.789e-34	2.425e-35	-33.168	-34.615	-1.447	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.520	-42.967	-1.447	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.028	-56.475	-1.447	(0)
Co(2)	4.465e-04					
Co+2	3.867e-04	1.381e-05	-3.413	-4.860	-1.447	(0)
CoS04	3.668e-05	3.668e-05	-4.436	-4.436	0.000	(0)
CoCl+	2.306e-05	1.003e-05	-4.637	-4.999	-0.362	(0)
CoHPO4	2.947e-08	2.947e-08	-7.531	-7.531	0.000	(0)
Co(NH3)+2	1.018e-08	3.636e-10	-7.992	-9.439	-1.447	(0)
CoOH+	6.942e-10	3.018e-10	-9.158	-9.520	-0.362	(0)
Co2OH+3	3.767e-13	2.089e-16	-12.424	-15.680	-3.256	(0)
Co(NH3)2+2	4.659e-14	1.664e-15	-13.332	-14.779	-1.447	(0)
Co(OH)2	2.625e-14	2.625e-14	-13.581	-13.581	0.000	(0)
Co(NH3)3+2	8.990e-20	3.211e-21	-19.046	-20.493	-1.447	(0)
Co(OH)3-	1.319e-21	5.736e-22	-20.880	-21.241	-0.362	(0)
CoOOH-	8.031e-23	3.492e-23	-22.095	-22.457	-0.362	(0)
Co4(OH)4+4	1.017e-24	1.656e-30	-23.993	-29.781	-5.788	(0)
Co(NH3)4+2	7.231e-26	2.583e-27	-25.141	-26.588	-1.447	(0)
Co(OH)4-2	2.787e-30	9.955e-32	-29.555	-31.002	-1.447	(0)
Co(NH3)5+2	1.839e-32	6.570e-34	-31.735	-33.182	-1.447	(0)
CoSe04	3.684e-37	3.684e-37	-36.434	-36.434	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.589	-51.951	-0.362	(0)
CoNO3+	0.000e+00	0.000e+00	-69.070	-69.432	-0.362	(0)
Co(NO3)2	0.000e+00	0.000e+00	-133.895	-133.895	0.000	(0)
Co(3)	9.625e-32					
CoOH+2	9.557e-32	3.414e-33	-31.020	-32.467	-1.447	(0)
CoCl+2	6.789e-34	2.425e-35	-33.168	-34.615	-1.447	(0)
Co+3	9.765e-36	6.134e-37	-35.010	-36.212	-1.202	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.520	-42.967	-1.447	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.424	-52.786	-0.362	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.028	-56.475	-1.447	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.867	-60.314	-1.447	(0)
Cu(1)	1.590e-04					
CuCl2-	1.383e-04	8.995e-05	-3.859	-4.046	-0.187	(0)
CuCl3-2	1.864e-05	4.016e-06	-4.730	-5.396	-0.667	(0)
CuCl	2.010e-06	2.010e-06	-5.697	-5.697	0.000	(0)
Cu+	1.732e-08	7.528e-09	-7.762	-8.123	-0.362	(0)
Cu(S4)2-3	1.886e-38	5.829e-39	-37.724	-38.234	-0.510	(0)
CuS4S5-3	3.241e-39	1.085e-39	-38.489	-38.964	-0.475	(0)
Cu(2)	1.249e-09					
Cu+2	6.092e-10	1.781e-10	-9.215	-9.749	-0.534	(0)
CuS04	5.355e-10	5.355e-10	-9.271	-9.271	0.000	(0)
CuCl+	8.794e-11	5.720e-11	-10.056	-10.243	-0.187	(0)
CuNH3+2	1.161e-11	4.145e-13	-10.935	-12.382	-1.447	(0)

CuCl2	3.455e-12	3.455e-12	-11.462	-11.462	0.000	(0)
CuOH+	7.790e-13	5.067e-13	-12.108	-12.295	-0.187	(0)
CuCl3-	9.787e-15	6.365e-15	-14.009	-14.196	-0.187	(0)
Cu(OH)2	1.347e-16	1.347e-16	-15.871	-15.871	0.000	(0)
CuCl4-2	3.597e-17	7.750e-18	-16.444	-17.111	-0.667	(0)
Cu2(OH)2+2	1.756e-19	6.274e-21	-18.755	-20.202	-1.447	(0)
Cu(OH)3-	6.961e-22	3.026e-22	-21.157	-21.519	-0.362	(0)
Cu(OH)4-2	7.302e-29	2.608e-30	-28.137	-29.584	-1.447	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-48.866	-49.227	-0.362	(0)
CuNO2+	0.000e+00	0.000e+00	-55.307	-55.669	-0.362	(0)
CuNO3+	0.000e+00	0.000e+00	-73.650	-74.012	-0.362	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-102.598	-102.598	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-139.694	-139.694	0.000	(0)
Fe(2)	1.824e-02					
Fe+2	1.624e-02	5.802e-04	-1.789	-3.236	-1.447	(0)
FeS04	1.877e-03	1.877e-03	-2.727	-2.727	0.000	(0)
FeH2P04+	1.177e-04	8.149e-05	-3.929	-4.089	-0.160	(0)
FeHP04	4.518e-06	4.518e-06	-5.345	-5.345	0.000	(0)
FeOH+	2.734e-08	1.862e-08	-7.563	-7.730	-0.167	(0)
Fe(OH)2	1.142e-14	1.142e-14	-13.942	-13.942	0.000	(0)
Fe(OH)3-	5.590e-18	3.808e-18	-17.253	-17.419	-0.167	(0)
Fe(HS)2	1.346e-38	1.346e-38	-37.871	-37.871	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-57.265	-57.626	-0.362	(0)
Fe(3)	2.216e-10					
Fe(OH)2+	2.070e-10	1.433e-10	-9.684	-9.844	-0.160	(0)
FeHP04+	1.313e-11	9.087e-12	-10.882	-11.042	-0.160	(0)
FeOH+2	1.241e-12	2.674e-13	-11.906	-12.573	-0.667	(0)
Fe(OH)3	9.536e-14	9.536e-14	-13.021	-13.021	0.000	(0)
FeS04+	9.405e-14	6.408e-14	-13.027	-13.193	-0.167	(0)
Fe(S04)2-	4.479e-14	1.947e-14	-13.349	-13.711	-0.362	(0)
FeCl+2	1.247e-14	2.686e-15	-13.904	-14.571	-0.667	(0)
FeH2P04+2	1.103e-14	2.531e-15	-13.958	-14.597	-0.639	(0)
Fe+3	7.573e-15	4.757e-16	-14.121	-15.323	-1.202	(0)
FeCl2+	4.238e-15	2.887e-15	-14.373	-14.540	-0.167	(0)
FeCl3	6.124e-17	6.124e-17	-16.213	-16.213	0.000	(0)
Fe(OH)4-	2.482e-17	1.718e-17	-16.605	-16.765	-0.160	(0)
Fe2(OH)2+4	1.678e-18	2.731e-24	-17.775	-23.564	-5.788	(0)
Fe3(OH)4+5	6.008e-24	5.425e-33	-23.221	-32.266	-9.044	(0)
FeHSe03+2	6.514e-26	2.327e-27	-25.186	-26.633	-1.447	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.560	-79.007	-1.447	(0)
H(0)	8.690e-16					
H2	4.345e-16	4.886e-16	-15.362	-15.311	0.051	(0)
Hg(0)	2.168e-09					
Hg	2.168e-09	2.168e-09	-8.664	-8.664	0.000	(0)
Hg(1)	1.459e-27					
Hg2+2	7.294e-28	2.605e-29	-27.137	-28.584	-1.447	(0)
Hg(2)	8.334e-15					
HgCl4-2	7.489e-15	2.675e-16	-14.126	-15.573	-1.447	(0)
HgCl3-	7.024e-16	3.054e-16	-15.153	-15.515	-0.362	(0)
HgCl2	1.427e-16	1.427e-16	-15.846	-15.846	0.000	(0)
HgCl0H	9.906e-21	9.906e-21	-20.004	-20.004	0.000	(0)
HgCl+	2.624e-22	1.141e-22	-21.581	-21.943	-0.362	(0)
Hg(NH3)2+2	3.068e-23	1.096e-24	-22.513	-23.960	-1.447	(0)
Hg(OH)2	1.285e-25	1.446e-25	-24.891	-24.840	0.051	(0)
HgNH3+2	5.173e-26	1.848e-27	-25.286	-26.733	-1.447	(0)
HgOH+	2.125e-27	9.239e-28	-26.673	-27.034	-0.362	(0)
Hg+2	6.651e-28	2.376e-29	-27.177	-28.624	-1.447	(0)
HgS04	6.887e-29	6.887e-29	-28.162	-28.162	0.000	(0)
Hg(NH3)3+2	2.689e-29	9.605e-31	-28.570	-30.017	-1.447	(0)
Hg(HS)2	1.043e-34	1.043e-34	-33.982	-33.982	0.000	(0)
Hg(NH3)4+2	4.728e-35	1.689e-36	-34.325	-35.772	-1.447	(0)
Hg(OH)3-	4.584e-35	1.993e-35	-34.339	-34.701	-0.362	(0)
HgHS2-	1.067e-35	4.637e-36	-34.972	-35.334	-0.362	(0)
HgS2-2	2.800e-38	1.000e-39	-37.553	-39.000	-1.447	(0)
HgNO3+	0.000e+00	0.000e+00	-93.562	-93.924	-0.362	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.077	-159.077	0.000	(0)
K	6.007e-03					
K+	5.455e-03	4.011e-03	-2.263	-2.397	-0.134	(0)

KS04-	5.523e-04	3.823e-04	-3.258	-3.418	-0.160	(0)
KHP04-	8.596e-08	5.950e-08	-7.066	-7.225	-0.160	(0)
Mg	5.995e-02					
Mg+2	3.494e-02	1.021e-02	-1.457	-1.991	-0.534	(0)
MgS04	2.479e-02	2.479e-02	-1.606	-1.606	0.000	(0)
MgH2P04+	2.045e-04	1.416e-04	-3.689	-3.849	-0.160	(0)
MgHP04	1.281e-05	1.281e-05	-4.892	-4.892	0.000	(0)
MgOH+	4.271e-09	3.069e-09	-8.369	-8.513	-0.143	(0)
MgP04-	5.626e-11	3.894e-11	-10.250	-10.410	-0.160	(0)
Mn(2)	3.385e-03					
Mn+2	3.075e-03	1.099e-04	-2.512	-3.959	-1.447	(0)
MnS04	2.564e-04	2.564e-04	-3.591	-3.591	0.000	(0)
MnCl+	4.306e-05	2.933e-05	-4.366	-4.533	-0.167	(0)
MnCl2	8.789e-06	8.789e-06	-5.056	-5.056	0.000	(0)
MnCl3-	7.536e-07	5.134e-07	-6.123	-6.290	-0.167	(0)
MnOH+	3.266e-10	2.225e-10	-9.486	-9.653	-0.167	(0)
MnSe	2.317e-11	2.317e-11	-10.635	-10.635	0.000	(0)
Mn(OH)3-	3.287e-24	2.239e-24	-23.483	-23.650	-0.167	(0)
Mn(OH)4-2	3.675e-32	7.917e-33	-31.435	-32.101	-0.667	(0)
MnSe04	1.556e-36	1.556e-36	-35.808	-35.808	0.000	(0)
MnNO3+	0.000e+00	0.000e+00	-68.170	-68.531	-0.362	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-132.899	-132.899	0.000	(0)
Mn(3)	4.824e-28					
Mn+3	4.824e-28	3.030e-29	-27.317	-28.519	-1.202	(0)
Mn(6)	0.000e+00					
Mn04-2	0.000e+00	0.000e+00	-78.906	-79.572	-0.667	(0)
Mn(7)	0.000e+00					
Mn04-	0.000e+00	0.000e+00	-87.950	-88.163	-0.213	(0)
N(-3)	4.658e-03					
NH4+	4.129e-03	2.441e-03	-2.384	-2.612	-0.228	(0)
NH4S04-	5.287e-04	3.602e-04	-3.277	-3.443	-0.167	(0)
NH3	1.152e-07	1.152e-07	-6.938	-6.938	0.000	(0)
NiNH3+2	4.668e-08	1.668e-09	-7.331	-8.778	-1.447	(0)
CaNH3+2	1.337e-08	4.777e-10	-7.874	-9.321	-1.447	(0)
Co(NH3)+2	1.018e-08	3.636e-10	-7.992	-9.439	-1.447	(0)
CuNH3+2	1.161e-11	4.145e-13	-10.935	-12.382	-1.447	(0)
Ni(NH3)2+2	1.321e-12	4.718e-14	-11.879	-13.326	-1.447	(0)
Co(NH3)2+2	4.659e-14	1.664e-15	-13.332	-14.779	-1.447	(0)
Ca(NH3)2+2	8.161e-16	2.915e-17	-15.088	-16.535	-1.447	(0)
Co(NH3)3+2	8.990e-20	3.211e-21	-19.046	-20.493	-1.447	(0)
Hg(NH3)2+2	3.068e-23	1.096e-24	-22.513	-23.960	-1.447	(0)
Co(NH3)4+2	7.231e-26	2.583e-27	-25.141	-26.588	-1.447	(0)
HgNH3+2	5.173e-26	1.848e-27	-25.286	-26.733	-1.447	(0)
Hg(NH3)3+2	2.689e-29	9.605e-31	-28.570	-30.017	-1.447	(0)
Co(NH3)5+2	1.839e-32	6.570e-34	-31.735	-33.182	-1.447	(0)
Hg(NH3)4+2	4.728e-35	1.689e-36	-34.325	-35.772	-1.447	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.520	-42.967	-1.447	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.424	-52.786	-0.362	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.028	-56.475	-1.447	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.867	-60.314	-1.447	(0)
N(3)	0.000e+00					
NO2-	0.000e+00	0.000e+00	-47.727	-47.939	-0.213	(0)
CoNO2+	0.000e+00	0.000e+00	-51.589	-51.951	-0.362	(0)
CuNO2+	0.000e+00	0.000e+00	-55.307	-55.669	-0.362	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-102.598	-102.598	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-64.639	-64.772	-0.134	(0)
CaNO3+	0.000e+00	0.000e+00	-66.504	-66.866	-0.362	(0)
MnNO3+	0.000e+00	0.000e+00	-68.170	-68.531	-0.362	(0)
NiNO3+	0.000e+00	0.000e+00	-68.863	-69.225	-0.362	(0)
CoNO3+	0.000e+00	0.000e+00	-69.070	-69.432	-0.362	(0)
ZnNO3+	0.000e+00	0.000e+00	-69.770	-70.131	-0.362	(0)
CdNO3+	0.000e+00	0.000e+00	-72.239	-72.600	-0.362	(0)
PbNO3+	0.000e+00	0.000e+00	-72.240	-72.602	-0.362	(0)
CuNO3+	0.000e+00	0.000e+00	-73.650	-74.012	-0.362	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.560	-79.007	-1.447	(0)
HgNO3+	0.000e+00	0.000e+00	-93.562	-93.924	-0.362	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-132.899	-132.899	0.000	(0)

Co(NO3)2	0.000e+00	0.000e+00	-133.895	-133.895	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-135.614	-135.614	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.124	-137.124	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-137.723	-137.723	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-139.694	-139.694	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.077	-159.077	0.000	(0)
Na	2.781e-01					
Na+	2.580e-01	1.897e-01	-0.588	-0.722	-0.134	(0)
NaSO4-	2.015e-02	1.395e-02	-1.696	-1.855	-0.160	(0)
NaHP04-	6.296e-06	4.358e-06	-5.201	-5.361	-0.160	(0)
Ni	1.032e-04					
Ni+2	4.799e-05	1.403e-05	-4.319	-4.853	-0.534	(0)
NiSO4	3.733e-05	3.733e-05	-4.428	-4.428	0.000	(0)
NiCl+	1.732e-05	7.530e-06	-4.761	-5.123	-0.362	(0)
Ni(SO4)2-2	4.919e-07	1.757e-08	-6.308	-7.755	-1.447	(0)
NiNH3+2	4.668e-08	1.668e-09	-7.331	-8.778	-1.447	(0)
NiCl2	8.131e-09	8.131e-09	-8.090	-8.090	0.000	(0)
NiOH+	3.348e-10	1.456e-10	-9.475	-9.837	-0.362	(0)
Ni(NH3)2+2	1.321e-12	4.718e-14	-11.879	-13.326	-1.447	(0)
Ni(OH)2	1.682e-14	1.682e-14	-13.774	-13.774	0.000	(0)
Ni(OH)3-	4.237e-20	1.842e-20	-19.373	-19.735	-0.362	(0)
NiSeO4	3.453e-37	3.453e-37	-36.462	-36.462	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-68.863	-69.225	-0.362	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-62.846	-62.795	0.051	(0)
P	8.285e-04					
H2PO4-	4.468e-04	3.093e-04	-3.350	-3.510	-0.160	(0)
MgH2PO4+	2.045e-04	1.416e-04	-3.689	-3.849	-0.160	(0)
FeH2PO4+	1.177e-04	8.149e-05	-3.929	-4.089	-0.160	(0)
CaH2PO4+	2.319e-05	1.605e-05	-4.635	-4.794	-0.160	(0)
MgHP04	1.281e-05	1.281e-05	-4.892	-4.892	0.000	(0)
HPO4-2	9.856e-06	2.123e-06	-5.006	-5.673	-0.667	(0)
NaHP04-	6.296e-06	4.358e-06	-5.201	-5.361	-0.160	(0)
FeHP04	4.518e-06	4.518e-06	-5.345	-5.345	0.000	(0)
CaHP04	2.250e-06	2.250e-06	-5.648	-5.648	0.000	(0)
H3PO4	3.782e-07	3.782e-07	-6.422	-6.422	0.000	(0)
KHP04-	8.596e-08	5.950e-08	-7.066	-7.225	-0.160	(0)
CoHP04	2.947e-08	2.947e-08	-7.531	-7.531	0.000	(0)
CaP04-	8.724e-10	6.039e-10	-9.059	-9.219	-0.160	(0)
MgP04-	5.626e-11	3.894e-11	-10.250	-10.410	-0.160	(0)
FeHP04+	1.313e-11	9.087e-12	-10.882	-11.042	-0.160	(0)
P04-3	1.446e-12	9.081e-14	-11.840	-13.042	-1.202	(0)
FeH2PO4+2	1.103e-14	2.531e-15	-13.958	-14.597	-0.639	(0)
Pb	5.248e-08					
PbCl+	1.670e-08	7.258e-09	-7.777	-8.139	-0.362	(0)
Pb(SO4)2-2	1.585e-08	5.660e-10	-7.800	-9.247	-1.447	(0)
PbSO4	6.822e-09	6.822e-09	-8.166	-8.166	0.000	(0)
PbCl2	6.753e-09	6.753e-09	-8.170	-8.170	0.000	(0)
Pb+2	3.461e-09	1.012e-09	-8.461	-8.995	-0.534	(0)
PbCl4-2	1.525e-09	5.446e-11	-8.817	-10.264	-1.447	(0)
PbCl3-	1.371e-09	5.959e-10	-8.863	-9.225	-0.362	(0)
PbOH+	6.400e-12	2.782e-12	-11.194	-11.556	-0.362	(0)
Pb(OH)2	9.635e-17	9.635e-17	-16.016	-16.016	0.000	(0)
Pb2OH+3	8.043e-17	4.461e-20	-16.095	-19.351	-3.256	(0)
Pb(OH)3-	2.427e-22	1.055e-22	-21.615	-21.977	-0.362	(0)
Pb(OH)4-2	7.922e-28	2.830e-29	-27.101	-28.548	-1.447	(0)
Pb3(OH)4+2	2.788e-30	9.959e-32	-29.555	-31.002	-1.447	(0)
Pb4(OH)4+4	5.701e-31	9.279e-37	-30.244	-36.032	-5.788	(0)
Pb(HS)2	4.901e-38	4.901e-38	-37.310	-37.310	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-57.440	-57.802	-0.362	(0)
PbNO3+	0.000e+00	0.000e+00	-72.240	-72.602	-0.362	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.124	-137.124	0.000	(0)
S(-2)	1.784e-20					
H2S	1.731e-20	1.731e-20	-19.762	-19.762	0.000	(0)
HS-	3.710e-22	1.613e-22	-21.431	-21.792	-0.362	(0)
CdHS+	1.582e-22	6.876e-23	-21.801	-22.163	-0.362	(0)
S5-2	1.745e-25	6.234e-27	-24.758	-26.205	-1.447	(0)
S6-2	6.540e-26	2.336e-27	-25.184	-26.632	-1.447	(0)

S4-2	4.387e-26	1.567e-27	-25.358	-26.805	-1.447	(0)
S3-2	6.750e-27	2.411e-28	-26.171	-27.618	-1.447	(0)
S2-2	6.357e-28	2.270e-29	-27.197	-28.644	-1.447	(0)
S-2	3.151e-34	6.789e-35	-33.502	-34.168	-0.667	(0)
Hg(HS)2	1.043e-34	1.043e-34	-33.982	-33.982	0.000	(0)
HgHS2-	1.067e-35	4.637e-36	-34.972	-35.334	-0.362	(0)
Zn(HS)2	2.918e-37	2.918e-37	-36.535	-36.535	0.000	(0)
Cd(HS)2	1.774e-37	1.774e-37	-36.751	-36.751	0.000	(0)
ZnS(HS)-	7.222e-38	3.140e-38	-37.141	-37.503	-0.362	(0)
Pb(HS)2	4.901e-38	4.901e-38	-37.310	-37.310	0.000	(0)
HgS2-2	2.800e-38	1.000e-39	-37.553	-39.000	-1.447	(0)
Cu(S4)2-3	1.886e-38	5.829e-39	-37.724	-38.234	-0.510	(0)
Fe(HS)2	1.346e-38	1.346e-38	-37.871	-37.871	0.000	(0)
CuS4S5-3	3.241e-39	1.085e-39	-38.489	-38.964	-0.475	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-48.866	-49.227	-0.362	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-54.685	-55.047	-0.362	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-56.282	-56.643	-0.362	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-57.265	-57.626	-0.362	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-57.440	-57.802	-0.362	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-58.538	-59.985	-1.447	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-74.793	-76.240	-1.447	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-76.853	-78.300	-1.447	(0)
S(6)	1.031e-01					
S04-2	4.711e-02	1.377e-02	-1.327	-1.861	-0.534	(0)
MgS04	2.479e-02	2.479e-02	-1.606	-1.606	0.000	(0)
NaS04-	2.015e-02	1.395e-02	-1.696	-1.855	-0.160	(0)
CaS04	7.511e-03	7.511e-03	-2.124	-2.124	0.000	(0)
FeS04	1.877e-03	1.877e-03	-2.727	-2.727	0.000	(0)
KS04-	5.523e-04	3.823e-04	-3.258	-3.418	-0.160	(0)
NH4S04-	5.287e-04	3.602e-04	-3.277	-3.443	-0.167	(0)
MnS04	2.564e-04	2.564e-04	-3.591	-3.591	0.000	(0)
AlS04+	1.598e-04	1.065e-04	-3.796	-3.973	-0.176	(0)
NiS04	3.733e-05	3.733e-05	-4.428	-4.428	0.000	(0)
CoS04	3.668e-05	3.668e-05	-4.436	-4.436	0.000	(0)
Al(S04)2-	2.576e-05	1.717e-05	-4.589	-4.765	-0.176	(0)
Zn(S04)2-2	1.717e-05	6.132e-07	-4.765	-6.212	-1.447	(0)
HS04-	1.625e-05	1.083e-05	-4.789	-4.965	-0.176	(0)
ZnS04	4.942e-06	4.942e-06	-5.306	-5.306	0.000	(0)
Ni(S04)2-2	4.919e-07	1.757e-08	-6.308	-7.755	-1.447	(0)
Cd(S04)2-2	7.024e-08	2.509e-09	-7.153	-8.601	-1.447	(0)
Pb(S04)2-2	1.585e-08	5.660e-10	-7.800	-9.247	-1.447	(0)
CdS04	1.288e-08	1.288e-08	-7.890	-7.890	0.000	(0)
PbS04	6.822e-09	6.822e-09	-8.166	-8.166	0.000	(0)
CuS04	5.355e-10	5.355e-10	-9.271	-9.271	0.000	(0)
FeS04+	9.405e-14	6.408e-14	-13.027	-13.193	-0.167	(0)
Fe(S04)2-	4.479e-14	1.947e-14	-13.349	-13.711	-0.362	(0)
HgS04	6.887e-29	6.887e-29	-28.162	-28.162	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.424	-52.786	-0.362	(0)
Se(-2)	1.102e-06					
HSe-	1.069e-06	4.649e-07	-5.971	-6.333	-0.362	(0)
H2Se	3.219e-08	3.219e-08	-7.492	-7.492	0.000	(0)
MnSe	2.317e-11	2.317e-11	-10.635	-10.635	0.000	(0)
Se-2	1.101e-15	3.932e-17	-14.958	-16.405	-1.447	(0)
Se(4)	4.916e-15					
HSeO3-	4.883e-15	2.123e-15	-14.311	-14.673	-0.362	(0)
SeO3-2	2.534e-17	9.053e-19	-16.596	-18.043	-1.447	(0)
H2SeO3	7.950e-18	7.950e-18	-17.100	-17.100	0.000	(0)
FeHSeO3+2	6.514e-26	2.327e-27	-25.186	-26.633	-1.447	(0)
Cd(SeO3)2-2	8.361e-38	2.986e-39	-37.078	-38.525	-1.447	(0)
Se(6)	1.968e-34					
SeO4-2	1.944e-34	5.683e-35	-33.711	-34.245	-0.534	(0)
MnSeO4	1.556e-36	1.556e-36	-35.808	-35.808	0.000	(0)
CoSeO4	3.684e-37	3.684e-37	-36.434	-36.434	0.000	(0)
NiSeO4	3.453e-37	3.453e-37	-36.462	-36.462	0.000	(0)
HSeO4-	5.245e-38	2.280e-38	-37.280	-37.642	-0.362	(0)
ZnSeO4	1.494e-38	1.494e-38	-37.826	-37.826	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.354	-40.354	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-70.618	-72.065	-1.447	(0)

Zn	2.960e-05						
Zn(SO4)2-2	1.717e-05	6.132e-07	-4.765	-6.212	-1.447	(0)	
Zn+2	5.807e-06	1.697e-06	-5.236	-5.770	-0.534	(0)	
ZnSO4	4.942e-06	4.942e-06	-5.306	-5.306	0.000	(0)	
ZnCl+	1.350e-06	8.780e-07	-5.870	-6.057	-0.187	(0)	
ZnCl2	2.482e-07	2.482e-07	-6.605	-6.605	0.000	(0)	
ZnCl3-	6.324e-08	4.113e-08	-7.199	-7.386	-0.187	(0)	
ZnCl4-2	1.961e-08	4.225e-09	-7.708	-8.374	-0.667	(0)	
ZnOHCl	1.297e-09	1.297e-09	-8.887	-8.887	0.000	(0)	
ZnOH+	3.148e-10	1.369e-10	-9.502	-9.864	-0.362	(0)	
Zn(OH)2	3.226e-14	3.226e-14	-13.491	-13.491	0.000	(0)	
Zn(OH)3-	4.073e-19	1.771e-19	-18.390	-18.752	-0.362	(0)	
Zn(OH)4-2	2.161e-25	7.719e-27	-24.665	-26.112	-1.447	(0)	
Zn(HS)2	2.918e-37	2.918e-37	-36.535	-36.535	0.000	(0)	
ZnS(HS)-	7.222e-38	3.140e-38	-37.141	-37.503	-0.362	(0)	
ZnSeO4	1.494e-38	1.494e-38	-37.826	-37.826	0.000	(0)	
Zn(HS)3-	0.000e+00	0.000e+00	-54.685	-55.047	-0.362	(0)	
ZnS(HS)2-2	0.000e+00	0.000e+00	-58.538	-59.985	-1.447	(0)	
ZnNO3+	0.000e+00	0.000e+00	-69.770	-70.131	-0.362	(0)	
Zn(SeO4)2-2	0.000e+00	0.000e+00	-70.618	-72.065	-1.447	(0)	
Zn(HS)4-2	0.000e+00	0.000e+00	-76.853	-78.300	-1.447	(0)	
Zn(NO3)2	0.000e+00	0.000e+00	-135.614	-135.614	0.000	(0)	

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2-160.56	-154.28	6.27	(Co(NH3)5Cl)(NO3)2	
(Co(NH3)5Cl)Cl2 -30.62	-26.09	4.54	(Co(NH3)5Cl)Cl2	
(Co(NH3)5OH2)Cl3 -37.89	-26.09	11.80	(Co(NH3)5OH2)Cl3	
(Co(NH3)6)(NO3)3-233.88	-215.95	17.93	(Co(NH3)6)(NO3)3	
(Co(NH3)6)Cl3 -43.77	-23.66	20.11	(Co(NH3)6)Cl3	
(NH4)2SeO4 -39.92	-39.47	0.45	(NH4)2SeO4	
Al(OH)3(am) -1.89	9.17	11.06	Al(OH)3	
Al2O3 -1.90	18.37	20.27	Al2O3	
Al4(OH)10SO4 2.06	24.76	22.70	Al4(OH)10SO4	
AlOHSO4 0.47	-2.76	-3.23	AlOHSO4	
Alunite 7.20	6.30	-0.90	KAl3(SO4)2(OH)6	
Anglesite -3.04	-10.86	-7.82	PbSO4	
Anhydrite -0.12	-4.47	-4.34	CaSO4	
Anilite 0.94	-31.37	-32.31	Cu0.25Cu1.5S	
Antlerite -19.75	-10.96	8.79	Cu3(OH)4SO4	
Atacamite -12.68	-5.06	7.61	Cu2(OH)3Cl	
Bianchite -5.90	-7.66	-1.76	ZnSO4:6H2O	
Birnessite -25.41	-7.31	18.09	MnO2	
Bixbyite -26.45	-26.80	-0.35	Mn2O3	
BlaubleiI -2.99	-27.15	-24.16	Cu0.9Cu0.2S	
BlaubleiII -1.82	-29.10	-27.28	Cu0.6Cu0.8S	
Boehmite 0.32	9.18	8.86	AlOOH	
Brochantite -26.35	-10.64	15.71	Cu4(OH)6SO4	
Brucite -9.03	8.08	17.12	Mg(OH)2	
Bunsenite -7.46	5.23	12.68	NiO	
Ca3(PO4)2(beta) -4.85	-33.90	-29.05	Ca3(PO4)2	
Ca4H(PO4)3:3H2O -7.53	-54.61	-47.08	Ca4H(PO4)3:3H2O	
CaHP04 -1.34	-20.69	-19.35	CaHP04	
CaHP04:2H2O -1.65	-20.70	-19.05	CaHP04:2H2O	
Calomel -11.80	-29.93	-18.13	Hg2Cl2	
CaSeO3:2H2O -15.11	-12.25	2.86	CaSeO3:2H2O	
CaSeO4:2H2O -33.86	-36.86	-3.00	CaSeO4:2H2O	
Cd(OH)2 -12.17	1.69	13.87	Cd(OH)2	
Cd(OH)2(am) -12.24	1.69	13.94	Cd(OH)2	
Cd3(OH)2(SO4)2 -25.49	-18.78	6.71	Cd3(OH)2(SO4)2	
Cd3(OH)4SO4 -29.41	-6.85	22.56	Cd3(OH)4SO4	
Cd3(PO4)2 -18.62	-51.22	-32.60	Cd3(PO4)2	
Cd4(OH)6SO4 -33.56	-5.16	28.40	Cd4(OH)6SO4	
CdCl2 -9.11	-9.73	-0.61	CdCl2	
CdCl2:1H2O -8.06	-9.73	-1.68	CdCl2:1H2O	
CdCl2:2.5H2O -7.81	-9.74	-1.93	CdCl2:2.5H2O	

Cdmetal(alpha)	-24.17	-10.47	13.69	Cd
Cdmetal(gamma)	-24.27	-10.47	13.80	Cd
CdOHCl	-7.63	-4.02	3.61	CdOHCl
CdSe	10.71	-9.67	-20.38	CdSe
CdSe04:2H2O	-40.78	-42.63	-1.85	CdSe04:2H2O
CdS04	-10.19	-10.24	-0.05	CdS04
CdS04:1H2O	-8.59	-10.24	-1.65	CdS04:1H2O
CdS04:2.67H2O	-8.42	-10.25	-1.83	CdS04:2.67H2O
Chalcanthite	-8.98	-11.64	-2.65	CuS04:5H2O
Chalcocite	2.32	-33.00	-35.32	Cu2S
Chalcopyrite	-10.86	-46.49	-35.62	CuFeS2
Cinnabar	-5.36	-51.66	-46.30	HgS
Clausthalite	17.10	-10.29	-27.39	PbSe
Co(OH)2	-7.88	5.21	13.09	Co(OH)2
Co(OH)3	-19.01	-21.10	-2.09	Co(OH)3
Co3(P04)2	-5.98	-40.66	-34.69	Co3(P04)2
Co304	-26.73	-36.97	-10.24	Co304
CoCl2	-14.66	-6.21	8.46	CoCl2
CoCl2:6H2O	-8.76	-6.24	2.52	CoCl2:6H2O
CoFe204	7.96	4.81	-3.15	CoFe204
CoHP04	-3.88	-22.94	-19.06	CoHP04
CoO	-8.62	5.22	13.84	CoO
CoS(alpha)	-14.17	-21.61	-7.44	CoS
CoS(beta)	-10.54	-21.61	-11.07	CoS
CoSe	10.05	-6.15	-16.20	CoSe
CoSe03	-15.81	-14.49	1.32	CoSe03
CoSe04:6H2O	-37.61	-39.14	-1.53	CoSe04:6H2O
CoS04	-9.71	-6.72	2.99	CoS04
CoS04:6H2O	-4.28	-6.75	-2.48	CoS04:6H2O
Cotunnite	-5.50	-10.34	-4.84	PbCl2
Covellite	-3.97	-26.50	-22.53	CuS
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.59	-69.16	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.77	-17.54	-46.31	Cu2Se
Cu2S04	-16.20	-18.11	-1.90	Cu2S04
Cu3(P04)2	-18.48	-55.33	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-20.23	-55.35	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.72	-28.58	-64.30	Cu3Se2
Cumetal	-0.24	-9.17	-8.93	Cu
Cu0CuS04	-21.91	-11.28	10.63	Cu0CuS04
Cupricferrite	-6.57	-0.08	6.49	CuFe204
Cuprite	-5.06	-6.17	-1.11	Cu2O
Cuprousferrite	5.59	-3.29	-8.88	CuFe02
CuSe	22.35	-11.04	-33.39	CuSe
CuSe2	23.46	-10.24	-33.70	CuSe2
CuSe03:2H2O	-19.99	-19.39	0.60	CuSe03:2H2O
CuSe04:5H2O	-41.58	-44.02	-2.44	CuSe04:5H2O
CuS04	-14.72	-11.61	3.11	CuS04
Diaspore	2.06	9.18	7.12	Al00H
Djurleite	1.83	-32.57	-34.40	Cu0.066Cu1.868S
Epsomite	-1.74	-3.89	-2.15	MgS04:7H2O
Fe(OH)2	-6.73	6.84	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.11	-1.93	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-21.68	-20.13	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H2O	-38.92	-59.55	-20.63	Fe2(Se03)3:2H2O
Fe2(S04)3	-33.07	-36.23	-3.16	Fe2(S04)3
Fe3(OH)8	-13.81	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.58	-0.21	3.37	Fe(OH)3
Ferroselite	14.99	-3.72	-18.71	FeSe2
FeS(ppt)	-17.06	-19.99	-2.92	FeS
FeSe	6.48	-4.53	-11.00	FeSe
Galena	-11.58	-25.75	-14.16	PbS
Gibbsite	0.66	9.17	8.52	Al(OH)3
Goethite	-0.84	-0.21	0.64	Fe00H
Goslarite	-5.62	-7.67	-2.05	ZnS04:7H2O
Greenockite	-10.64	-25.13	-14.49	CdS
Greigite	-55.85	-100.88	-45.03	Fe3S4
Gypsum	0.13	-4.48	-4.61	CaS04:2H2O

H-Jarosite	-12.97	-24.52	-11.55	(H3O)Fe3(SO4)2(OH)6
H2S(g)	-18.82	-26.83	-8.01	H2S
H2Se(g)	-6.45	-11.37	-4.92	H2Se
Halite	-2.99	-1.40	1.59	NaCl
Hausmannite	-31.50	30.53	62.03	Mn3O4
Hematite	0.70	-0.41	-1.11	Fe2O3
Hercynite	1.57	25.21	23.64	FeAl2O4
Hg(g)	-7.41	-15.34	-7.93	Hg
Hg(OH)2	-21.34	-24.84	-3.50	Hg(OH)2
Hg2(g)	-15.59	-30.68	-15.09	Hg2
Hg2(OH)2	-23.77	-18.51	5.26	Hg2(OH)2
Hg2HPO4	-21.89	-46.67	-24.77	Hg2HPO4
Hg2S	-33.49	-45.33	-11.84	Hg2S
Hg2SeO3	-33.56	-38.22	-4.66	Hg2SeO3
Hg2SO4	-24.30	-30.45	-6.14	Hg2SO4
HgCl(g)	-34.85	-14.97	19.88	HgCl
HgCl2	-14.74	-36.26	-21.52	HgCl2
Hgmetal(l)	-1.69	-15.34	-13.65	Hg
HgSe	19.49	-36.20	-55.69	HgSe
HgSeO3	-32.11	-44.54	-12.43	HgSeO3
HgSO4	-27.32	-36.77	-9.45	HgSO4
Hinsdalite	-8.98	-11.48	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-2.79	-47.12	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-16.27	-79.06	-62.79	Pb5(PO4)3OH
K-Alum	-6.88	-12.12	-5.24	KAl(SO4)2·12H2O
K-Jarosite	-7.38	-21.87	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-38.31	-39.04	-0.73	K2SeO4
Langite	-28.53	-10.65	17.88	Cu4(OH)6SO4·H2O
Larnakite	-9.39	-9.77	-0.38	PbO·PbSO4
Laurionite	-5.26	-4.63	0.62	PbOHCl
Lepidocrocite	-1.58	-0.21	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.77	1.08	12.85	PbO
Mackinawite	-16.39	-19.99	-3.60	FeS
Maghemite	-6.80	-0.41	6.39	Fe2O3
Magnesioferrite	-9.85	7.68	17.52	Fe2MgO4
Magnetite	2.53	6.43	3.90	Fe3O4
Manganite	-13.14	12.20	25.34	MnOOH
Massicot	-11.97	1.08	13.05	PbO
Melanothallite	-17.50	-11.10	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeSO4·7H2O
Metacinnabar	-5.96	-51.66	-45.70	HgS
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(PO4)2	-8.78	-32.06	-23.28	Mg3(PO4)2
MgHPO4·3H2O	-1.92	-20.09	-18.18	MgHPO4·3H2O
MgSeO3·6H2O	-14.70	-11.65	3.04	MgSeO3·6H2O
MgSeO4·6H2O	-35.07	-36.27	-1.20	MgSeO4·6H2O
Minium	-59.10	15.42	74.53	Pb3O4
Mirabilite	-2.06	-3.36	-1.30	Na2SO4·10H2O
Mn2(SO4)3	-57.30	-62.62	-5.32	Mn2(SO4)3
Mn3(PO4)2	-14.11	-37.96	-23.85	Mn3(PO4)2
MnCl2·4H2O	-8.07	-5.33	2.74	MnCl2·4H2O
MnHPO4	3.36	-22.04	-25.40	MnHPO4
MnS(grn)	-20.96	-20.71	0.25	MnS
MnS(pnk)	-24.05	-20.71	3.34	MnS
MnSe	-8.98	-5.25	3.73	MnSe
MnSeO3	-14.72	-13.59	1.13	MnSeO3
MnSeO3·2H2O	-14.56	-13.60	0.96	MnSeO3·2H2O
MnSeO4·5H2O	-36.18	-38.23	-2.05	MnSeO4·5H2O
MnSO4	-8.56	-5.82	2.74	MnSO4
Monteponite	-13.65	1.70	15.35	CdO
Montroydite	-21.29	-24.83	-3.55	HgO
Morenosite	-4.58	-6.75	-2.17	NiSO4·7H2O
Na-Jarosite	-9.35	-20.19	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3·5H2O	-21.40	-11.10	10.30	Na2SeO3·5H2O
Na2SeO4	-36.97	-35.69	1.28	Na2SeO4
Nantokite	-1.97	-8.80	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2

Ni3(P04)2	-9.34	-40.64	-31.30	Ni3(P04)2
Ni4(OH)6S04	-23.05	8.95	32.00	Ni4(OH)6S04
NiS(alpha)	-16.00	-21.60	-5.60	NiS
NiS(beta)	-10.50	-21.60	-11.10	NiS
NiS(gamma)	-8.80	-21.60	-12.80	NiS
NiSe	11.56	-6.14	-17.70	NiSe
NiSe03:2H2O	-17.38	-14.50	2.89	NiSe03:2H2O
NiSe04:6H2O	-37.61	-39.13	-1.52	NiSe04:6H2O
Nsutite	-24.82	-7.31	17.50	Mn02
O2(g)	-60.10	24.35	84.45	O2
Pb(OH)2	-7.21	1.08	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.35	-3.55	8.79	Pb2(OH)3Cl
Pb20(OH)2	-24.03	2.16	26.19	Pb20(OH)2
Pb203	-46.70	14.34	61.04	Pb203
Pb3(P04)2	-9.54	-53.07	-43.53	Pb3(P04)2
Pb302S04	-19.56	-8.69	10.87	Pb302S04
Pb4(OH)6S04	-28.72	-7.62	21.10	Pb4(OH)6S04
Pb403S04	-29.81	-7.61	22.20	Pb403S04
PbHP04	-3.27	-27.08	-23.81	PbHP04
Pbmetal	-15.33	-11.09	4.24	Pb
Pb0:0.3H2O	-11.90	1.08	12.98	Pb0:0.33H2O
PbSe04	-36.36	-43.24	-6.88	PbSe04
Periclase	-13.86	8.09	21.94	MgO
Plattnerite	-37.05	13.26	50.31	Pb02
Plumbgummite	5.08	-27.71	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-15.64	7.47	23.11	Ca(OH)2
Pyrite	-16.02	-34.64	-18.63	FeS2
Pyrochroite	-9.31	6.11	15.43	Mn(OH)2
Pyrolusite	-23.74	18.29	42.03	Mn02
Pyromorphite	-0.34	-84.77	-84.43	Pb5(P04)3Cl
Retgersite	-4.70	-6.75	-2.05	NiS04:6H2O
Semetal(am)	7.94	0.80	-7.14	Se
Semetal(hex	8.55	0.80	-7.75	Se
Se02	-19.83	-19.71	0.12	Se02
Se03	-65.72	-44.32	21.39	Se03
Sphalerite	-11.00	-22.52	-11.52	ZnS
Spinel	-11.32	26.45	37.77	MgAl204
Strengite	-2.00	-28.38	-26.38	FeP04:2H2O
Sulfur	-12.55	-14.66	-2.11	S
Tenorite	-7.47	0.33	7.80	Cu0
Thenardite	-3.65	-3.31	0.34	Na2S04
Tsumebite	-15.90	-25.69	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	0.16	-35.84	-36.00	Fe3(P04)2:8H2O
Wurtzite	-13.52	-22.52	-9.00	ZnS
Zincite	-7.24	4.31	11.55	Zn0
Zincosite	-11.76	-7.63	4.13	ZnS04
Zn(NO3)2:6H2O	-138.60	-135.35	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-7.90	4.30	12.20	Zn(OH)2
Zn(OH)2(am)	-8.36	4.30	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.65	4.30	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.43	4.30	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.43	4.30	11.73	Zn(OH)2
Zn2(OH)2S04	-10.83	-3.33	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-12.30	2.90	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-8.00	-43.42	-35.42	Zn3(P04)2:4H2O
Zn30(S04)2	-30.48	-10.95	19.53	Zn30(S04)2
Zn4(OH)6S04	-23.12	5.28	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-28.41	10.09	38.50	Zn5(OH)8Cl2
ZnCl2	-14.34	-7.12	7.22	ZnCl2
Znmetal	-34.02	-7.87	26.15	Zn
Zn0(active)	-7.09	4.31	11.40	Zn0
ZnS(am)	-13.43	-22.52	-9.09	ZnS
ZnSe	7.40	-7.06	-14.46	ZnSe
ZnSe04:6H2O	-38.53	-40.05	-1.52	ZnSe04:6H2O
ZnS04:1H2O	-7.10	-7.64	-0.53	ZnS04:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 10.

SOLUTION 8 #Groundwater worst case maximum values

temp 21
pH 5.05
pe 1
redox pe
units mg/l
density 1
Al 5.21
Alkalinity 0
As 0
Ba 0
Be 0
B 0
Cd 0.04
Co 24.2
Cr 0
Cu 9.29
Fe 937
Pb 0.01
Mn 171
Mo 0
V 0
Zn 1.78
Se 0.08
Ni 5.57
N 60
P 23.6
Ca 590
Mg 1340
Na 5880
K 216
Cl 9420
S(6) 9110
Hg 0.0004
water 1 # kg

MIX 7
1 0.954
8 0.046

REACTION 8

H2O -1

3

END #Time-step 8

Beginning of initial solution calculations.

Initial solution 8.

-----Solution composition-----

Elements	Molality	Moles
Al	1.986e-04	1.986e-04
Ca	1.514e-02	1.514e-02
Cd	3.660e-07	3.660e-07
Cl	2.733e-01	2.733e-01
Co	4.224e-04	4.224e-04
Cu	1.504e-04	1.504e-04
Fe	1.726e-02	1.726e-02

Hg	2.051e-09	2.051e-09
K	5.682e-03	5.682e-03
Mg	5.671e-02	5.671e-02
Mn	3.202e-03	3.202e-03
N	4.406e-03	4.406e-03
Na	2.631e-01	2.631e-01
Ni	9.762e-05	9.762e-05
P	7.837e-04	7.837e-04
Pb	4.964e-08	4.964e-08
S(6)	9.754e-02	9.754e-02
Se	1.042e-06	1.042e-06
Zn	2.800e-05	2.800e-05

-----Description of solution-----

pH	=	5.050
pe	=	1.000
Activity of water	=	0.988
Ionic strength (mol/kgw)	=	4.862e-01
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	1.381e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	21.00
Electrical balance (eq)	=	-9.552e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.26
Iterations	=	14
Total H	=	1.110329e+02
Total O	=	5.590014e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.214e-05	8.913e-06	-4.916	-5.050	-0.134	0.00
OH-	1.292e-09	8.222e-10	-8.889	-9.085	-0.196	(0)
H2O	5.551e+01	9.883e-01	1.744	-0.005	0.000	18.05
Al	1.986e-04					
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Al+3	1.839e-05	1.139e-06	-4.735	-5.943	-1.208	(0)
AlOH+2	4.197e-06	9.786e-07	-5.377	-6.009	-0.632	(0)
Al(OH)2+	1.624e-06	1.128e-06	-5.790	-5.948	-0.158	(0)
Al(OH)3	2.514e-08	2.514e-08	-7.600	-7.600	0.000	(0)
Al(OH)4-	2.040e-09	1.366e-09	-8.690	-8.864	-0.174	(0)
Ca	1.514e-02					
Ca+2	8.161e-03	2.370e-03	-2.088	-2.625	-0.537	(0)
CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
CaOH+	5.236e-11	3.715e-11	-10.281	-10.430	-0.149	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
Cd	3.660e-07					
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
Cd(SO4)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
Cd+2	1.502e-08	4.363e-09	-7.823	-8.360	-0.537	(0)
CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CdOH+	6.462e-14	2.865e-14	-13.190	-13.543	-0.353	(0)
Cd2OH+3	9.945e-19	6.582e-22	-18.002	-21.182	-3.179	(0)
Cd(OH)2	2.726e-19	2.726e-19	-18.564	-18.564	0.000	(0)
Cd(OH)3-	4.195e-26	1.860e-26	-25.377	-25.730	-0.353	(0)

		Cd(OH)4-2	8.799e-35	3.400e-36	-34.056	-35.469	-1.413	(0)
		Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
		CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
		CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
		Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cl	2.733e-01							
		Cl-	2.729e-01	2.003e-01	-0.564	-0.698	-0.134	(0)
		CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
		MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
		CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
		CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
		NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
		MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
		CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
		ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
		MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
		ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
		CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
		CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
		ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
		CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
		PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
		ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
		NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
		PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
		ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
		PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
		PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
		CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
		CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
		CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
		FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
		CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
		HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
		FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
		HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
		HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
		FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
		CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
		HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
		HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
		CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
		Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
		Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(2)	4.224e-04							
		Co+2	3.644e-04	1.408e-05	-3.438	-4.851	-1.413	(0)
		CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
		CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
		CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
		Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
		CoOH+	7.075e-10	3.137e-10	-9.150	-9.504	-0.353	(0)
		Co2OH+3	3.344e-13	2.213e-16	-12.476	-15.655	-3.179	(0)
		Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
		Co(OH)2	2.782e-14	2.782e-14	-13.556	-13.556	0.000	(0)
		Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
		Co(OH)3-	1.398e-21	6.199e-22	-20.854	-21.208	-0.353	(0)
		CoOOH-	8.505e-23	3.771e-23	-22.070	-22.424	-0.353	(0)
		Co4(OH)4+4	8.668e-25	1.932e-30	-24.062	-29.714	-5.652	(0)
		Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
		Co(OH)4-2	2.839e-30	1.097e-31	-29.547	-30.960	-1.413	(0)
		Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
		CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
		CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
		CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
		Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Co(3)	8.287e-32							
		CoOH+2	8.232e-32	3.180e-33	-31.085	-32.498	-1.413	(0)
		CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)

Co+3	9.049e-36	5.605e-37	-35.043	-36.251	-1.208	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
Cu(1)	1.504e-04					
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
Cu+	1.823e-08	8.082e-09	-7.739	-8.092	-0.353	(0)
Cu(2)	1.182e-09					
Cu+2	5.900e-10	1.714e-10	-9.229	-9.766	-0.537	(0)
CuSO4	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
CuOH+	7.604e-13	4.972e-13	-12.119	-12.303	-0.185	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
Cu(OH)2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
Cu2(OH)2+2	1.564e-19	6.042e-21	-18.806	-20.219	-1.413	(0)
Cu(OH)3-	6.965e-22	3.088e-22	-21.157	-21.510	-0.353	(0)
Cu(OH)4-2	7.024e-29	2.714e-30	-28.153	-29.566	-1.413	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Fe(2)	1.726e-02					
Fe+2	1.529e-02	5.907e-04	-1.816	-3.229	-1.413	(0)
FeSO4	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
FeOH+	2.826e-08	1.934e-08	-7.549	-7.714	-0.165	(0)
Fe(OH)2	1.209e-14	1.209e-14	-13.918	-13.918	0.000	(0)
Fe(OH)3-	6.009e-18	4.111e-18	-17.221	-17.386	-0.165	(0)
Fe(3)	2.087e-10					
Fe(OH)2+	1.957e-10	1.360e-10	-9.708	-9.867	-0.158	(0)
FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
FeOH+2	1.136e-12	2.489e-13	-11.945	-12.604	-0.659	(0)
Fe(OH)3	9.228e-14	9.228e-14	-13.035	-13.035	0.000	(0)
FeSO4+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(SO4)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Fe+3	7.010e-15	4.342e-16	-14.154	-15.362	-1.208	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
Fe(OH)4-	2.440e-17	1.696e-17	-16.613	-16.771	-0.158	(0)
Fe2(OH)2+4	1.061e-18	2.365e-24	-17.974	-23.626	-5.652	(0)
Fe3(OH)4+5	3.023e-24	4.459e-33	-23.520	-32.351	-8.831	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
H(0)	1.047e-15					
H2	5.235e-16	5.855e-16	-15.281	-15.232	0.049	(0)
Hg(0)	2.051e-09					
Hg	2.051e-09	2.051e-09	-8.688	-8.688	0.000	(0)
Hg(1)	9.698e-28					
Hg2+2	4.849e-28	1.874e-29	-27.314	-28.727	-1.413	(0)
Hg(2)	4.726e-15					
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Hg(OH)2	1.022e-25	1.143e-25	-24.991	-24.942	0.049	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
HgOH+	1.615e-27	7.162e-28	-26.792	-27.145	-0.353	(0)

	Hg+2	4.674e-28	1.806e-29	-27.330	-28.743	-1.413	(0)
	HgS04	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
	Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
	Hg(OH)3-	3.623e-35	1.606e-35	-34.441	-34.794	-0.353	(0)
	Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
	HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
	Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
K	5.682e-03						
	K+	5.178e-03	3.801e-03	-2.286	-2.420	-0.134	(0)
	KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
	KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
Mg	5.671e-02						
	Mg+2	3.360e-02	9.758e-03	-1.474	-2.011	-0.537	(0)
	MgS04	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
	MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
	MgHP04	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
	MgOH+	4.148e-09	2.990e-09	-8.382	-8.524	-0.142	(0)
	MgP04-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
Mn(2)	3.202e-03						
	Mn+2	2.899e-03	1.120e-04	-2.538	-3.951	-1.413	(0)
	MnS04	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
	MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
	MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
	MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
	MnOH+	3.381e-10	2.313e-10	-9.471	-9.636	-0.165	(0)
	MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
	Mn(OH)3-	3.538e-24	2.421e-24	-23.451	-23.616	-0.165	(0)
	Mn(OH)4-2	3.983e-32	8.727e-33	-31.400	-32.059	-0.659	(0)
	MnSe04	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
	MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
	Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Mn(3)	4.471e-28						
	Mn+3	4.471e-28	2.769e-29	-27.350	-28.558	-1.208	(0)
Mn(6)	0.000e+00						
	MnO4-2	0.000e+00	0.000e+00	-79.028	-79.687	-0.659	(0)
Mn(7)	0.000e+00						
	MnO4-	0.000e+00	0.000e+00	-88.115	-88.325	-0.210	(0)
N(-3)	4.406e-03						
	NH4+	3.919e-03	2.335e-03	-2.407	-2.632	-0.225	(0)
	NH4S04-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
	NH3	1.123e-07	1.123e-07	-6.950	-6.950	0.000	(0)
	NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
	CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
	Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
	CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
	Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
	Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
	Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
	Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
	Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
	Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
	HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
	Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
	Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
	Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
	Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
	Co(NH3)6S04+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
	Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
N(3)	0.000e+00						
	NO2-	0.000e+00	0.000e+00	-47.968	-48.177	-0.210	(0)
	CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
	CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
	Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
N(5)	0.000e+00						
	NO3-	0.000e+00	0.000e+00	-64.954	-65.088	-0.134	(0)
	CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
	MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)

NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
Na	2.631e-01					
Na+	2.447e-01	1.796e-01	-0.611	-0.746	-0.134	(0)
NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
Ni	9.762e-05					
Ni+2	4.671e-05	1.357e-05	-4.331	-4.867	-0.537	(0)
NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
Ni(SO4)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
NiOH+	3.238e-10	1.435e-10	-9.490	-9.843	-0.353	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Ni(OH)2	1.692e-14	1.692e-14	-13.772	-13.772	0.000	(0)
Ni(OH)3-	4.261e-20	1.889e-20	-19.371	-19.724	-0.353	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-63.001	-62.952	0.049	(0)
P	7.837e-04					
H2PO4-	4.270e-04	2.967e-04	-3.370	-3.528	-0.158	(0)
MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
MgHPO4	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
HPO4-2	9.473e-06	2.076e-06	-5.024	-5.683	-0.659	(0)
NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
H3PO4	3.560e-07	3.560e-07	-6.449	-6.449	0.000	(0)
KHPO4-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
MgPO4-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
PO4-3	1.460e-12	9.045e-14	-11.836	-13.044	-1.208	(0)
FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Pb	4.964e-08					
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
Pb(SO4)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
Pb+2	3.636e-09	1.056e-09	-8.439	-8.976	-0.537	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
PbOH+	6.682e-12	2.963e-12	-11.175	-11.528	-0.353	(0)
Pb(OH)2	1.046e-16	1.046e-16	-15.980	-15.980	0.000	(0)
Pb2OH+3	7.494e-17	4.960e-20	-16.125	-19.305	-3.179	(0)
Pb(OH)3-	2.635e-22	1.168e-22	-21.579	-21.933	-0.353	(0)
Pb(OH)4-2	8.268e-28	3.195e-29	-27.083	-28.496	-1.413	(0)
Pb3(OH)4+2	3.173e-30	1.226e-31	-29.499	-30.912	-1.413	(0)
Pb4(OH)4+4	5.352e-31	1.193e-36	-30.271	-35.923	-5.652	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)

Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
S(6)	9.754e-02					
S04-2	4.586e-02	1.332e-02	-1.339	-1.875	-0.537	(0)
MgS04	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
NaS04-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
CaS04	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
FeS04	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
NH4S04-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
MnS04	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
AlS04+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
CoS04	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
NiS04	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
Al(S04)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Zn(S04)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
HS04-	1.536e-05	1.028e-05	-4.814	-4.988	-0.174	(0)
ZnS04	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
Ni(S04)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
Cd(S04)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
Pb(S04)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
CdS04	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
PbS04	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
CuS04	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
FeS04+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(S04)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
HgS04	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Se(-2)	1.042e-06					
HSe-	1.012e-06	4.485e-07	-5.995	-6.348	-0.353	(0)
H2Se	3.047e-08	3.047e-08	-7.516	-7.516	0.000	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Se-2	1.000e-15	3.865e-17	-15.000	-16.413	-1.413	(0)
Se(4)	2.708e-15					
HSeO3-	2.690e-15	1.193e-15	-14.570	-14.923	-0.353	(0)
SeO3-2	1.341e-17	5.183e-19	-16.872	-18.285	-1.413	(0)
H2SeO3	4.383e-18	4.383e-18	-17.358	-17.358	0.000	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
Se(6)	9.467e-35					
SeO4-2	9.354e-35	2.717e-35	-34.029	-34.566	-0.537	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
HSeO4-	2.413e-38	1.070e-38	-37.617	-37.971	-0.353	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn	2.800e-05					
Zn(S04)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
Zn+2	6.051e-06	1.758e-06	-5.218	-5.755	-0.537	(0)
ZnS04	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
ZnOH+	3.259e-10	1.445e-10	-9.487	-9.840	-0.353	(0)
Zn(OH)2	3.473e-14	3.473e-14	-13.459	-13.459	0.000	(0)
Zn(OH)3-	4.384e-19	1.944e-19	-18.358	-18.711	-0.353	(0)
Zn(OH)4-2	2.236e-25	8.641e-27	-24.650	-26.063	-1.413	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)

-----Saturation indices-----

Phase SI** log IAP log K(294 K, 1 atm)

(Co(NH3)5Cl)(NO3)2-161.31	-155.03	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2 -30.79	-26.25	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3 -38.05	-26.26	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3-234.94	-217.01	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3 -43.95	-23.84	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4 -40.28	-39.83	0.45	(NH4)2SeO4
Al(OH)3(am) -1.87	9.19	11.06	Al(OH)3
Al2O3 -1.87	18.40	20.27	Al2O3
Al4(OH)10SO4 2.10	24.80	22.70	Al4(OH)10SO4
AlOHSO4 0.46	-2.77	-3.23	AlOHSO4
Alunite 7.17	6.27	-0.90	KAl3(SO4)2(OH)6
Anglesite -3.03	-10.85	-7.82	PbSO4
Anhydrite -0.16	-4.50	-4.34	CaSO4
Antlerite -19.78	-10.99	8.79	Cu3(OH)4SO4
Atacamite -12.71	-5.10	7.61	Cu2(OH)3Cl
Bianchite -5.90	-7.66	-1.76	ZnSO4:6H2O
Birnessite -25.46	-7.37	18.09	MnO2
Bixbyite -26.48	-26.83	-0.35	Mn2O3
Boehmite 0.34	9.20	8.86	AlOOH
Brochantite -26.38	-10.67	15.71	Cu4(OH)6SO4
Brucite -9.04	8.08	17.12	Mg(OH)2
Bunsenite -7.46	5.23	12.68	NiO
Ca3(PO4)2(beta) -4.91	-33.96	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O -7.62	-54.70	-47.08	Ca4H(PO4)3:3H2O
CaHP04 -1.37	-20.72	-19.35	CaHP04
CaHP04:2H2O -1.68	-20.73	-19.05	CaHP04:2H2O
Calomel -11.99	-30.12	-18.13	Hg2Cl2
CaSeO3:2H2O -15.37	-12.51	2.86	CaSeO3:2H2O
CaSeO4:2H2O -34.20	-37.20	-3.00	CaSeO4:2H2O
Cd(OH)2 -12.14	1.73	13.87	Cd(OH)2
Cd(OH)2(am) -12.21	1.73	13.94	Cd(OH)2
Cd3(OH)2(SO4)2 -25.45	-18.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4 -29.34	-6.78	22.56	Cd3(OH)4SO4
Cd3(PO4)2 -18.57	-51.17	-32.60	Cd3(PO4)2
Cd4(OH)6SO4 -33.45	-5.05	28.40	Cd4(OH)6SO4
CdCl2 -9.14	-9.76	-0.61	CdCl2
CdCl2:1H2O -8.09	-9.76	-1.68	CdCl2:1H2O
CdCl2:2.5H2O -7.84	-9.77	-1.93	CdCl2:2.5H2O
Cdmetal(alpha) -24.05	-10.36	13.69	Cd
Cdmetal(gamma) -24.16	-10.36	13.80	Cd
CdOHCl -7.62	-4.01	3.61	CdOHCl
CdSe 10.72	-9.66	-20.38	CdSe
CdSeO4:2H2O -41.09	-42.94	-1.85	CdSeO4:2H2O
CdSO4 -10.19	-10.24	-0.05	CdSO4
CdSO4:1H2O -8.59	-10.24	-1.65	CdSO4:1H2O
CdSO4:2.67H2O -8.42	-10.25	-1.83	CdSO4:2.67H2O
Chalcanthite -9.01	-11.67	-2.65	CuSO4:5H2O
Clausthalite 17.11	-10.27	-27.39	PbSe
Co(OH)2 -7.86	5.24	13.09	Co(OH)2
Co(OH)3 -19.03	-21.12	-2.09	Co(OH)3
Co3(PO4)2 -5.95	-40.64	-34.69	Co3(PO4)2
Co3O4 -26.74	-36.97	-10.24	Co3O4
CoCl2 -14.71	-6.25	8.46	CoCl2
CoCl2:6H2O -8.80	-6.28	2.52	CoCl2:6H2O
CoFe2O4 7.95	4.80	-3.15	CoFe2O4
CoHP04 -3.88	-22.95	-19.06	CoHP04
CoO -8.60	5.24	13.84	CoO
CoSe 10.05	-6.15	-16.20	CoSe
CoSeO3 -16.04	-14.72	1.32	CoSeO3
CoSeO4:6H2O -37.92	-39.45	-1.53	CoSeO4:6H2O
CoSO4 -9.72	-6.73	2.99	CoSO4
CoSO4:6H2O -4.28	-6.76	-2.48	CoSO4:6H2O
Cotunnite -5.53	-10.37	-4.84	PbCl2
Cu(OH)2 -8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3 -78.91	-69.49	9.42	Cu2(OH)3NO3
Cu2Se(alpha) 28.83	-17.48	-46.31	Cu2Se
Cu2SO4 -16.16	-18.06	-1.90	Cu2SO4

Cu3(P04)2	-18.54	-55.39	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-20.28	-55.40	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.75	-28.55	-64.30	Cu3Se2
Cumetal	-0.17	-9.09	-8.93	Cu
Cu0CuS04	-21.94	-11.31	10.63	Cu0CuS04
Cupricferrite	-6.60	-0.11	6.49	CuFe204
Cuprite	-4.98	-6.09	-1.11	Cu2O
Cuprousferrite	5.61	-3.27	-8.88	CuFe02
CuSe	22.32	-11.06	-33.39	CuSe
CuSe2	23.34	-10.36	-33.70	CuSe2
CuSe03:2H2O	-20.25	-19.65	0.60	CuSe03:2H2O
CuSe04:5H2O	-41.92	-44.36	-2.44	CuSe04:5H2O
CuS04	-14.76	-11.64	3.11	CuS04
Diaspore	2.08	9.20	7.12	Al00H
Epsomite	-1.77	-3.92	-2.15	MgS04:7H2O
Fe(OH)2	-6.70	6.86	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.09	-1.95	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-21.97	-20.42	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H2O	-39.73	-60.36	-20.63	Fe2(Se03)3:2H2O
Fe2(S04)3	-33.19	-36.35	-3.16	Fe2(S04)3
Fe3(OH)8	-13.82	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.59	-0.23	3.37	Fe(OH)3
Ferroselite	14.88	-3.83	-18.71	FeSe2
FeSe	6.48	-4.53	-11.00	FeSe
Gibbsite	0.67	9.19	8.52	Al(OH)3
Goethite	-0.86	-0.22	0.64	Fe00H
Goslarite	-5.62	-7.67	-2.05	ZnS04:7H2O
Gypsum	0.10	-4.51	-4.61	CaS04:2H2O
H-Jarosite	-13.07	-24.62	-11.55	(H3O)Fe3(S04)2(OH)6
H2Se(g)	-6.47	-11.40	-4.92	H2Se
Halite	-3.04	-1.44	1.59	NaCl
Hausmannite	-31.51	30.53	62.03	Mn304
Hematite	0.67	-0.44	-1.11	Fe203
Hercynite	1.62	25.26	23.64	FeAl204
Hg(g)	-7.44	-15.36	-7.93	Hg
Hg(OH)2	-21.45	-24.94	-3.50	Hg(OH)2
Hg2(g)	-15.63	-30.73	-15.09	Hg2
Hg2(OH)2	-23.90	-18.64	5.26	Hg2(OH)2
Hg2HP04	-22.05	-46.82	-24.77	Hg2HP04
Hg2Se03	-33.94	-38.60	-4.66	Hg2Se03
Hg2S04	-24.46	-30.60	-6.14	Hg2S04
HgCl(g)	-34.94	-15.06	19.88	HgCl
HgCl2	-14.91	-36.43	-21.52	HgCl2
Hgmetal(l)	-1.71	-15.36	-13.65	Hg
HgSe	19.36	-36.33	-55.69	HgSe
HgSe03	-32.48	-44.91	-12.43	HgSe03
HgS04	-27.45	-36.91	-9.45	HgS04
Hinsdalite	-8.96	-11.46	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	-2.88	-47.21	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-16.18	-78.97	-62.79	Pb5(P04)3OH
K-Alum	-6.93	-12.18	-5.24	KAl(S04)2:12H2O
K-Jarosite	-7.50	-21.99	-14.49	KFe3(S04)2(OH)6
K2Se04	-38.68	-39.41	-0.73	K2Se04
Langite	-28.56	-10.68	17.88	Cu4(OH)6S04:H2O
Larnakite	-9.35	-9.73	-0.38	Pb0:PbS04
Laurionite	-5.25	-4.63	0.62	Pb0HCl
Lepidocrocite	-1.59	-0.22	1.37	Fe00H
Lime	-25.69	7.47	33.16	Ca0
Litharge	-11.73	1.12	12.85	Pb0
Maghemite	-6.83	-0.44	6.39	Fe203
Magnesioferrite	-9.88	7.64	17.52	Fe2Mg04
Magnetite	2.53	6.43	3.90	Fe304
Manganite	-13.15	12.19	25.34	Mn00H
Massicot	-11.93	1.12	13.05	Pb0
Melanothallite	-17.57	-11.16	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeS04:7H2O
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(P04)2	-8.84	-32.12	-23.28	Mg3(P04)2

MgHP04:3H2O	-1.94	-20.12	-18.18	MgHP04:3H2O
MgSe03:6H2O	-14.96	-11.91	3.04	MgSe03:6H2O
MgSe04:6H2O	-35.41	-36.61	-1.20	MgSe04:6H2O
Minium	-59.08	15.45	74.53	Pb304
Mirabilite	-2.11	-3.42	-1.30	Na2S04:10H2O
Mn2(S04)3	-57.42	-62.74	-5.32	Mn2(S04)3
Mn3(P04)2	-14.09	-37.94	-23.85	Mn3(P04)2
MnCl2:4H2O	-8.11	-5.37	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnSe	-8.98	-5.25	3.73	MnSe
MnSe03	-14.95	-13.82	1.13	MnSe03
MnSe03:2H2O	-14.80	-13.83	0.96	MnSe03:2H2O
MnSe04:5H2O	-36.49	-38.54	-2.05	MnSe04:5H2O
MnS04	-8.56	-5.83	2.74	MnS04
Monteponite	-13.62	1.73	15.35	Cd0
Montroydite	-21.39	-24.94	-3.55	Hg0
Morenosite	-4.60	-6.78	-2.17	NiS04:7H2O
Na-Jarosite	-9.47	-20.31	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-21.69	-11.39	10.30	Na2Se03:5H2O
Na2Se04	-37.34	-36.06	1.28	Na2Se04
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(P04)2	-9.39	-40.69	-31.30	Ni3(P04)2
Ni4(OH)6S04	-23.08	8.92	32.00	Ni4(OH)6S04
NiSe	11.53	-6.17	-17.70	NiSe
NiSe03:2H2O	-17.64	-14.75	2.89	NiSe03:2H2O
NiSe04:6H2O	-37.94	-39.46	-1.52	NiSe04:6H2O
Nsutite	-24.87	-7.37	17.50	Mn02
O2(g)	-60.26	24.19	84.45	O2
Pb(OH)2	-7.18	1.11	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.31	-3.52	8.79	Pb2(OH)3Cl
Pb20(OH)2	-23.96	2.23	26.19	Pb20(OH)2
Pb203	-46.71	14.33	61.04	Pb203
Pb3(P04)2	-9.49	-53.02	-43.53	Pb3(P04)2
Pb302S04	-19.49	-8.61	10.87	Pb302S04
Pb4(OH)6S04	-28.61	-7.51	21.10	Pb4(OH)6S04
Pb403S04	-29.70	-7.50	22.20	Pb403S04
PbHP04	-3.26	-27.07	-23.81	PbHP04
Pbmetal	-15.22	-10.98	4.24	Pb
Pb0:0.3H2O	-11.86	1.12	12.98	Pb0:0.33H2O
PbSe04	-36.67	-43.54	-6.88	PbSe04
Periclase	-13.86	8.08	21.94	Mg0
Plattnerite	-37.09	13.21	50.31	Pb02
Plumbgummite	5.12	-27.67	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-15.65	7.46	23.11	Ca(OH)2
Pyrochroite	-9.29	6.14	15.43	Mn(OH)2
Pyrolusite	-23.79	18.24	42.03	Mn02
Pyromorphite	-0.28	-84.71	-84.43	Pb5(P04)3Cl
Retgersite	-4.72	-6.77	-2.05	NiS04:6H2O
Semetal(am)	7.84	0.70	-7.14	Se
Semetal(hex)	8.45	0.70	-7.75	Se
Se02	-20.09	-19.97	0.12	Se02
Se03	-66.05	-44.66	21.39	Se03
Spinel	-11.29	26.48	37.77	MgAl204
Strengite	-2.04	-28.42	-26.38	FeP04:2H2O
Tenorite	-7.47	0.33	7.80	Cu0
Thenardite	-3.71	-3.37	0.34	Na2S04
Tsumebite	-15.85	-25.64	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	0.19	-35.81	-36.00	Fe3(P04)2:8H2O
Zincite	-7.21	4.34	11.55	Zn0
Zincosite	-11.76	-7.63	4.13	ZnS04
Zn(N03)2:6H2O	-139.22	-135.96	3.26	Zn(N03)2:6H2O
Zn(OH)2	-7.87	4.33	12.20	Zn(OH)2
Zn(OH)2(am)	-8.33	4.33	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.62	4.33	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.39	4.33	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.40	4.33	11.73	Zn(OH)2
Zn2(OH)2S04	-10.80	-3.30	7.50	Zn2(OH)2S04

Zn2(OH)3Cl	-12.26	2.93	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-7.95	-43.37	-35.42	Zn3(P04)2:4H2O
Zn30(S04)2	-30.45	-10.92	19.53	Zn30(S04)2
Zn4(OH)6S04	-23.03	5.37	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-28.31	10.19	38.50	Zn5(OH)8Cl2
ZnCl2	-14.37	-7.15	7.22	ZnCl2
Znmetal	-33.91	-7.76	26.15	Zn
Zn0(active)	-7.06	4.34	11.40	Zn0
ZnSe	7.41	-7.05	-14.46	ZnSe
ZnSe04:6H2O	-38.83	-40.35	-1.52	ZnSe04:6H2O
ZnS04:1H2O	-7.10	-7.64	-0.53	ZnS04:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 7.

Using reaction 8.

Mixture 7.

9.540e-01 Solution 1
4.600e-02 Solution 8

Reaction 8.

3.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000
Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	2.100e-04	1.986e-04
Ca	1.601e-02	1.514e-02
Cd	3.869e-07	3.660e-07
Cl	2.889e-01	2.733e-01
Co	4.465e-04	4.224e-04
Cu	1.590e-04	1.504e-04
Fe	1.824e-02	1.726e-02
Hg	2.168e-09	2.051e-09
K	6.007e-03	5.682e-03
Mg	5.995e-02	5.671e-02
Mn	3.385e-03	3.202e-03
N	4.658e-03	4.406e-03
Na	2.781e-01	2.631e-01
Ni	1.032e-04	9.762e-05
P	8.285e-04	7.837e-04
Pb	5.248e-08	4.964e-08
S	1.031e-01	9.754e-02
Se	1.102e-06	1.042e-06
Zn	2.960e-05	2.800e-05

-----Description of solution-----

pH = 5.042 Charge balance
 pe = 1.047 Adjusted to redox equilibrium
 Activity of water = 0.988
 Ionic strength (mol/kgw) = 5.100e-01
 Mass of water (kg) = 9.460e-01
 Total alkalinity (eq/kg) = 1.460e-05
 Total carbon (mol/kg) = 0.000e+00
 Total CO2 (mol/kg) = 0.000e+00
 Temperature (°C) = 21.00
 Electrical balance (eq) = -9.552e-03
 Percent error, 100*(Cat-|An|)/(Cat+|An|) = -1.26
 Iterations = 4
 Total H = 1.050329e+02
 Total O = 5.290014e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.235e-05	9.082e-06	-4.908	-5.042	-0.134	0.00
OH-	1.274e-09	8.063e-10	-8.895	-9.094	-0.199	(0)
H2O	5.551e+01	9.877e-01	1.744	-0.005	0.000	18.05
Al	2.100e-04					
AlSO4+	1.598e-04	1.065e-04	-3.796	-3.973	-0.176	(0)
Al(SO4)2-	2.576e-05	1.717e-05	-4.589	-4.765	-0.176	(0)
Al+3	1.850e-05	1.162e-06	-4.733	-5.935	-1.202	(0)
AlOH+2	4.265e-06	9.790e-07	-5.370	-6.009	-0.639	(0)
Al(OH)2+	1.599e-06	1.107e-06	-5.796	-5.956	-0.160	(0)
Al(OH)3	2.419e-08	2.419e-08	-7.616	-7.616	0.000	(0)
Al(OH)4-	1.934e-09	1.289e-09	-8.714	-8.890	-0.176	(0)
Ca	1.601e-02					
Ca+2	8.471e-03	2.476e-03	-2.072	-2.606	-0.534	(0)
CaSO4	7.511e-03	7.511e-03	-2.124	-2.124	0.000	(0)
CaH2PO4+	2.319e-05	1.605e-05	-4.635	-4.794	-0.160	(0)
CaHPO4	2.250e-06	2.250e-06	-5.648	-5.648	0.000	(0)
CaNH3+2	1.337e-08	4.777e-10	-7.874	-9.321	-1.447	(0)
CaPO4-	8.724e-10	6.039e-10	-9.059	-9.219	-0.160	(0)
CaOH+	5.381e-11	3.806e-11	-10.269	-10.420	-0.150	(0)
Ca(NH3)2+2	8.161e-16	2.915e-17	-15.088	-16.535	-1.447	(0)
CaNO3+	0.000e+00	0.000e+00	-66.504	-66.866	-0.362	(0)
Cd	3.869e-07					
CdCl+	1.939e-07	8.430e-08	-6.712	-7.074	-0.362	(0)
CdCl2	7.373e-08	7.373e-08	-7.132	-7.132	0.000	(0)
Cd(SO4)2-2	7.024e-08	2.509e-09	-7.153	-8.601	-1.447	(0)
CdCl3-	2.184e-08	9.496e-09	-7.661	-8.022	-0.362	(0)
Cd+2	1.432e-08	4.185e-09	-7.844	-8.378	-0.534	(0)
CdSO4	1.288e-08	1.288e-08	-7.890	-7.890	0.000	(0)
CdOHCl	3.446e-12	3.446e-12	-11.463	-11.463	0.000	(0)
CdOH+	6.199e-14	2.695e-14	-13.208	-13.569	-0.362	(0)
Cd2OH+3	1.071e-18	5.938e-22	-17.970	-21.226	-3.256	(0)
Cd(OH)2	2.515e-19	2.515e-19	-18.599	-18.599	0.000	(0)
CdHS+	1.582e-22	6.876e-23	-21.801	-22.163	-0.362	(0)
Cd(OH)3-	3.870e-26	1.683e-26	-25.412	-25.774	-0.362	(0)
Cd(OH)4-2	8.444e-35	3.016e-36	-34.073	-35.521	-1.447	(0)
Cd(HS)2	1.774e-37	1.774e-37	-36.751	-36.751	0.000	(0)
Cd(SeO3)2-2	8.361e-38	2.986e-39	-37.078	-38.525	-1.447	(0)
CdSeO4	0.000e+00	0.000e+00	-40.354	-40.354	0.000	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-56.282	-56.643	-0.362	(0)
CdNO3+	0.000e+00	0.000e+00	-72.239	-72.600	-0.362	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-74.793	-76.240	-1.447	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-137.723	-137.723	0.000	(0)
Cl	2.889e-01					
Cl-	2.885e-01	2.121e-01	-0.540	-0.673	-0.134	(0)
CuCl2-	1.383e-04	8.995e-05	-3.859	-4.046	-0.187	(0)
MnCl+	4.306e-05	2.933e-05	-4.366	-4.533	-0.167	(0)
CoCl+	2.306e-05	1.003e-05	-4.637	-4.999	-0.362	(0)

CuCl3-2	1.864e-05	4.016e-06	-4.730	-5.396	-0.667	(0)
NiCl+	1.732e-05	7.530e-06	-4.761	-5.123	-0.362	(0)
MnCl2	8.789e-06	8.789e-06	-5.056	-5.056	0.000	(0)
CuCl	2.010e-06	2.010e-06	-5.697	-5.697	0.000	(0)
ZnCl+	1.350e-06	8.780e-07	-5.870	-6.057	-0.187	(0)
MnCl3-	7.536e-07	5.134e-07	-6.123	-6.290	-0.167	(0)
ZnCl2	2.482e-07	2.482e-07	-6.605	-6.605	0.000	(0)
CdCl+	1.939e-07	8.430e-08	-6.712	-7.074	-0.362	(0)
CdCl2	7.373e-08	7.373e-08	-7.132	-7.132	0.000	(0)
ZnCl3-	6.324e-08	4.113e-08	-7.199	-7.386	-0.187	(0)
CdCl3-	2.184e-08	9.496e-09	-7.661	-8.022	-0.362	(0)
ZnCl4-2	1.961e-08	4.225e-09	-7.708	-8.374	-0.667	(0)
PbCl+	1.670e-08	7.258e-09	-7.777	-8.139	-0.362	(0)
NiCl2	8.131e-09	8.131e-09	-8.090	-8.090	0.000	(0)
PbCl2	6.753e-09	6.753e-09	-8.170	-8.170	0.000	(0)
PbCl4-2	1.525e-09	5.446e-11	-8.817	-10.264	-1.447	(0)
PbCl3-	1.371e-09	5.959e-10	-8.863	-9.225	-0.362	(0)
ZnOHCl	1.297e-09	1.297e-09	-8.887	-8.887	0.000	(0)
CuCl+	8.794e-11	5.720e-11	-10.056	-10.243	-0.187	(0)
CuCl2	3.455e-12	3.455e-12	-11.462	-11.462	0.000	(0)
CdOHCl	3.446e-12	3.446e-12	-11.463	-11.463	0.000	(0)
FeCl+2	1.247e-14	2.686e-15	-13.904	-14.571	-0.667	(0)
CuCl3-	9.787e-15	6.365e-15	-14.009	-14.196	-0.187	(0)
HgCl4-2	7.489e-15	2.675e-16	-14.126	-15.573	-1.447	(0)
FeCl2+	4.238e-15	2.887e-15	-14.373	-14.540	-0.167	(0)
HgCl3-	7.024e-16	3.054e-16	-15.153	-15.515	-0.362	(0)
HgCl2	1.427e-16	1.427e-16	-15.846	-15.846	0.000	(0)
FeCl3	6.124e-17	6.124e-17	-16.213	-16.213	0.000	(0)
CuCl4-2	3.597e-17	7.750e-18	-16.444	-17.111	-0.667	(0)
HgClOH	9.906e-21	9.906e-21	-20.004	-20.004	0.000	(0)
HgCl+	2.624e-22	1.141e-22	-21.581	-21.943	-0.362	(0)
CoCl+2	6.789e-34	2.425e-35	-33.168	-34.615	-1.447	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.520	-42.967	-1.447	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.028	-56.475	-1.447	(0)
Co(2)	4.465e-04					
Co+2	3.867e-04	1.381e-05	-3.413	-4.860	-1.447	(0)
CoS04	3.668e-05	3.668e-05	-4.436	-4.436	0.000	(0)
CoCl+	2.306e-05	1.003e-05	-4.637	-4.999	-0.362	(0)
CoHP04	2.947e-08	2.947e-08	-7.531	-7.531	0.000	(0)
Co(NH3)+2	1.018e-08	3.636e-10	-7.992	-9.439	-1.447	(0)
CoOH+	6.942e-10	3.018e-10	-9.158	-9.520	-0.362	(0)
Co2OH+3	3.767e-13	2.089e-16	-12.424	-15.680	-3.256	(0)
Co(NH3)2+2	4.659e-14	1.664e-15	-13.332	-14.779	-1.447	(0)
Co(OH)2	2.625e-14	2.625e-14	-13.581	-13.581	0.000	(0)
Co(NH3)3+2	8.990e-20	3.211e-21	-19.046	-20.493	-1.447	(0)
Co(OH)3-	1.319e-21	5.736e-22	-20.880	-21.241	-0.362	(0)
Co00H-	8.031e-23	3.492e-23	-22.095	-22.457	-0.362	(0)
Co4(OH)4+4	1.017e-24	1.656e-30	-23.993	-29.781	-5.788	(0)
Co(NH3)4+2	7.231e-26	2.583e-27	-25.141	-26.588	-1.447	(0)
Co(OH)4-2	2.787e-30	9.955e-32	-29.555	-31.002	-1.447	(0)
Co(NH3)5+2	1.839e-32	6.570e-34	-31.735	-33.182	-1.447	(0)
CoSe04	3.684e-37	3.684e-37	-36.434	-36.434	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.589	-51.951	-0.362	(0)
CoNO3+	0.000e+00	0.000e+00	-69.070	-69.432	-0.362	(0)
Co(NO3)2	0.000e+00	0.000e+00	-133.895	-133.895	0.000	(0)
Co(3)	9.625e-32					
CoOH+2	9.557e-32	3.414e-33	-31.020	-32.467	-1.447	(0)
CoCl+2	6.789e-34	2.425e-35	-33.168	-34.615	-1.447	(0)
Co+3	9.765e-36	6.134e-37	-35.010	-36.212	-1.202	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.520	-42.967	-1.447	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.424	-52.786	-0.362	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.028	-56.475	-1.447	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.867	-60.314	-1.447	(0)
Cu(1)	1.590e-04					
CuCl2-	1.383e-04	8.995e-05	-3.859	-4.046	-0.187	(0)
CuCl3-2	1.864e-05	4.016e-06	-4.730	-5.396	-0.667	(0)
CuCl	2.010e-06	2.010e-06	-5.697	-5.697	0.000	(0)
Cu+	1.732e-08	7.528e-09	-7.762	-8.123	-0.362	(0)

Cu(S4)2-3	1.886e-38	5.829e-39	-37.724	-38.234	-0.510	(0)
CuS4S5-3	3.241e-39	1.085e-39	-38.489	-38.964	-0.475	(0)
Cu(2)	1.249e-09					
Cu+2	6.092e-10	1.781e-10	-9.215	-9.749	-0.534	(0)
CuS04	5.355e-10	5.355e-10	-9.271	-9.271	0.000	(0)
CuCl+	8.794e-11	5.720e-11	-10.056	-10.243	-0.187	(0)
CuNH3+2	1.161e-11	4.145e-13	-10.935	-12.382	-1.447	(0)
CuCl2	3.455e-12	3.455e-12	-11.462	-11.462	0.000	(0)
CuOH+	7.790e-13	5.067e-13	-12.108	-12.295	-0.187	(0)
CuCl3-	9.787e-15	6.365e-15	-14.009	-14.196	-0.187	(0)
Cu(OH)2	1.347e-16	1.347e-16	-15.871	-15.871	0.000	(0)
CuCl4-2	3.597e-17	7.750e-18	-16.444	-17.111	-0.667	(0)
Cu2(OH)2+2	1.756e-19	6.274e-21	-18.755	-20.202	-1.447	(0)
Cu(OH)3-	6.961e-22	3.026e-22	-21.157	-21.519	-0.362	(0)
Cu(OH)4-2	7.302e-29	2.608e-30	-28.137	-29.584	-1.447	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-48.866	-49.227	-0.362	(0)
CuNO2+	0.000e+00	0.000e+00	-55.307	-55.669	-0.362	(0)
CuNO3+	0.000e+00	0.000e+00	-73.650	-74.012	-0.362	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-102.598	-102.598	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-139.694	-139.694	0.000	(0)
Fe(2)	1.824e-02					
Fe+2	1.624e-02	5.802e-04	-1.789	-3.236	-1.447	(0)
FeS04	1.877e-03	1.877e-03	-2.727	-2.727	0.000	(0)
FeH2P04+	1.177e-04	8.149e-05	-3.929	-4.089	-0.160	(0)
FeHP04	4.518e-06	4.518e-06	-5.345	-5.345	0.000	(0)
FeOH+	2.734e-08	1.862e-08	-7.563	-7.730	-0.167	(0)
Fe(OH)2	1.142e-14	1.142e-14	-13.942	-13.942	0.000	(0)
Fe(OH)3-	5.590e-18	3.808e-18	-17.253	-17.419	-0.167	(0)
Fe(HS)2	1.346e-38	1.346e-38	-37.871	-37.871	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-57.265	-57.626	-0.362	(0)
Fe(3)	2.216e-10					
Fe(OH)2+	2.070e-10	1.433e-10	-9.684	-9.844	-0.160	(0)
FeHP04+	1.313e-11	9.087e-12	-10.882	-11.042	-0.160	(0)
FeOH+2	1.241e-12	2.674e-13	-11.906	-12.573	-0.667	(0)
Fe(OH)3	9.536e-14	9.536e-14	-13.021	-13.021	0.000	(0)
FeS04+	9.405e-14	6.408e-14	-13.027	-13.193	-0.167	(0)
Fe(S04)2-	4.479e-14	1.947e-14	-13.349	-13.711	-0.362	(0)
FeCl+2	1.247e-14	2.686e-15	-13.904	-14.571	-0.667	(0)
FeH2P04+2	1.103e-14	2.531e-15	-13.958	-14.597	-0.639	(0)
Fe+3	7.573e-15	4.757e-16	-14.121	-15.323	-1.202	(0)
FeCl2+	4.238e-15	2.887e-15	-14.373	-14.540	-0.167	(0)
FeCl3	6.124e-17	6.124e-17	-16.213	-16.213	0.000	(0)
Fe(OH)4-	2.482e-17	1.718e-17	-16.605	-16.765	-0.160	(0)
Fe2(OH)2+4	1.678e-18	2.731e-24	-17.775	-23.564	-5.788	(0)
Fe3(OH)4+5	6.008e-24	5.425e-33	-23.221	-32.266	-9.044	(0)
FeHSe03+2	6.514e-26	2.327e-27	-25.186	-26.633	-1.447	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.560	-79.007	-1.447	(0)
H(0)	8.690e-16					
H2	4.345e-16	4.886e-16	-15.362	-15.311	0.051	(0)
Hg(0)	2.168e-09					
Hg	2.168e-09	2.168e-09	-8.664	-8.664	0.000	(0)
Hg(1)	1.459e-27					
Hg2+2	7.294e-28	2.605e-29	-27.137	-28.584	-1.447	(0)
Hg(2)	8.334e-15					
HgCl4-2	7.489e-15	2.675e-16	-14.126	-15.573	-1.447	(0)
HgCl3-	7.024e-16	3.054e-16	-15.153	-15.515	-0.362	(0)
HgCl2	1.427e-16	1.427e-16	-15.846	-15.846	0.000	(0)
HgClOH	9.906e-21	9.906e-21	-20.004	-20.004	0.000	(0)
HgCl+	2.624e-22	1.141e-22	-21.581	-21.943	-0.362	(0)
Hg(NH3)2+2	3.068e-23	1.096e-24	-22.513	-23.960	-1.447	(0)
Hg(OH)2	1.285e-25	1.446e-25	-24.891	-24.840	0.051	(0)
HgNH3+2	5.173e-26	1.848e-27	-25.286	-26.733	-1.447	(0)
HgOH+	2.125e-27	9.239e-28	-26.673	-27.034	-0.362	(0)
Hg+2	6.651e-28	2.376e-29	-27.177	-28.624	-1.447	(0)
HgS04	6.887e-29	6.887e-29	-28.162	-28.162	0.000	(0)
Hg(NH3)3+2	2.689e-29	9.605e-31	-28.570	-30.017	-1.447	(0)
Hg(HS)2	1.043e-34	1.043e-34	-33.982	-33.982	0.000	(0)
Hg(NH3)4+2	4.728e-35	1.689e-36	-34.325	-35.772	-1.447	(0)

	Hg(OH)3-	4.584e-35	1.993e-35	-34.339	-34.701	-0.362	(0)
	HgHS2-	1.067e-35	4.637e-36	-34.972	-35.334	-0.362	(0)
	HgS2-2	2.800e-38	1.000e-39	-37.553	-39.000	-1.447	(0)
	HgNO3+	0.000e+00	0.000e+00	-93.562	-93.924	-0.362	(0)
	Hg(NO3)2	0.000e+00	0.000e+00	-159.077	-159.077	0.000	(0)
K	6.007e-03						
	K+	5.455e-03	4.011e-03	-2.263	-2.397	-0.134	(0)
	KS04-	5.523e-04	3.823e-04	-3.258	-3.418	-0.160	(0)
	KHP04-	8.596e-08	5.950e-08	-7.066	-7.225	-0.160	(0)
Mg	5.995e-02						
	Mg+2	3.494e-02	1.021e-02	-1.457	-1.991	-0.534	(0)
	MgS04	2.479e-02	2.479e-02	-1.606	-1.606	0.000	(0)
	MgH2PO4+	2.045e-04	1.416e-04	-3.689	-3.849	-0.160	(0)
	MgHP04	1.281e-05	1.281e-05	-4.892	-4.892	0.000	(0)
	MgOH+	4.271e-09	3.069e-09	-8.369	-8.513	-0.143	(0)
	MgP04-	5.626e-11	3.894e-11	-10.250	-10.410	-0.160	(0)
Mn(2)	3.385e-03						
	Mn+2	3.075e-03	1.099e-04	-2.512	-3.959	-1.447	(0)
	MnS04	2.564e-04	2.564e-04	-3.591	-3.591	0.000	(0)
	MnCl+	4.306e-05	2.933e-05	-4.366	-4.533	-0.167	(0)
	MnCl2	8.789e-06	8.789e-06	-5.056	-5.056	0.000	(0)
	MnCl3-	7.536e-07	5.134e-07	-6.123	-6.290	-0.167	(0)
	MnOH+	3.266e-10	2.225e-10	-9.486	-9.653	-0.167	(0)
	MnSe	2.317e-11	2.317e-11	-10.635	-10.635	0.000	(0)
	Mn(OH)3-	3.287e-24	2.239e-24	-23.483	-23.650	-0.167	(0)
	Mn(OH)4-2	3.675e-32	7.917e-33	-31.435	-32.101	-0.667	(0)
	MnSe04	1.556e-36	1.556e-36	-35.808	-35.808	0.000	(0)
	MnNO3+	0.000e+00	0.000e+00	-68.170	-68.531	-0.362	(0)
	Mn(NO3)2	0.000e+00	0.000e+00	-132.899	-132.899	0.000	(0)
Mn(3)	4.824e-28						
	Mn+3	4.824e-28	3.030e-29	-27.317	-28.519	-1.202	(0)
Mn(6)	0.000e+00						
	Mn04-2	0.000e+00	0.000e+00	-78.906	-79.572	-0.667	(0)
Mn(7)	0.000e+00						
	Mn04-	0.000e+00	0.000e+00	-87.950	-88.163	-0.213	(0)
N(-3)	4.658e-03						
	NH4+	4.129e-03	2.441e-03	-2.384	-2.612	-0.228	(0)
	NH4S04-	5.287e-04	3.602e-04	-3.277	-3.443	-0.167	(0)
	NH3	1.152e-07	1.152e-07	-6.938	-6.938	0.000	(0)
	NiNH3+2	4.668e-08	1.668e-09	-7.331	-8.778	-1.447	(0)
	CaNH3+2	1.337e-08	4.777e-10	-7.874	-9.321	-1.447	(0)
	Co(NH3)+2	1.018e-08	3.636e-10	-7.992	-9.439	-1.447	(0)
	CuNH3+2	1.161e-11	4.145e-13	-10.935	-12.382	-1.447	(0)
	Ni(NH3)2+2	1.321e-12	4.718e-14	-11.879	-13.326	-1.447	(0)
	Co(NH3)2+2	4.659e-14	1.664e-15	-13.332	-14.779	-1.447	(0)
	Ca(NH3)2+2	8.161e-16	2.915e-17	-15.088	-16.535	-1.447	(0)
	Co(NH3)3+2	8.990e-20	3.211e-21	-19.046	-20.493	-1.447	(0)
	Hg(NH3)2+2	3.068e-23	1.096e-24	-22.513	-23.960	-1.447	(0)
	Co(NH3)4+2	7.231e-26	2.583e-27	-25.141	-26.588	-1.447	(0)
	HgNH3+2	5.173e-26	1.848e-27	-25.286	-26.733	-1.447	(0)
	Hg(NH3)3+2	2.689e-29	9.605e-31	-28.570	-30.017	-1.447	(0)
	Co(NH3)5+2	1.839e-32	6.570e-34	-31.735	-33.182	-1.447	(0)
	Hg(NH3)4+2	4.728e-35	1.689e-36	-34.325	-35.772	-1.447	(0)
	Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.520	-42.967	-1.447	(0)
	Co(NH3)6S04+	0.000e+00	0.000e+00	-52.424	-52.786	-0.362	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.028	-56.475	-1.447	(0)
	Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.867	-60.314	-1.447	(0)
N(3)	0.000e+00						
	N02-	0.000e+00	0.000e+00	-47.727	-47.939	-0.213	(0)
	CoN02+	0.000e+00	0.000e+00	-51.589	-51.951	-0.362	(0)
	CuN02+	0.000e+00	0.000e+00	-55.307	-55.669	-0.362	(0)
	Cu(N02)2	0.000e+00	0.000e+00	-102.598	-102.598	0.000	(0)
N(5)	0.000e+00						
	N03-	0.000e+00	0.000e+00	-64.639	-64.772	-0.134	(0)
	CaN03+	0.000e+00	0.000e+00	-66.504	-66.866	-0.362	(0)
	MnN03+	0.000e+00	0.000e+00	-68.170	-68.531	-0.362	(0)
	NiN03+	0.000e+00	0.000e+00	-68.863	-69.225	-0.362	(0)
	CoN03+	0.000e+00	0.000e+00	-69.070	-69.432	-0.362	(0)

	ZnNO3+	0.000e+00	0.000e+00	-69.770	-70.131	-0.362	(0)
	CdNO3+	0.000e+00	0.000e+00	-72.239	-72.600	-0.362	(0)
	PbNO3+	0.000e+00	0.000e+00	-72.240	-72.602	-0.362	(0)
	CuNO3+	0.000e+00	0.000e+00	-73.650	-74.012	-0.362	(0)
	FeNO3+2	0.000e+00	0.000e+00	-77.560	-79.007	-1.447	(0)
	HgNO3+	0.000e+00	0.000e+00	-93.562	-93.924	-0.362	(0)
	Mn(NO3)2	0.000e+00	0.000e+00	-132.899	-132.899	0.000	(0)
	Co(NO3)2	0.000e+00	0.000e+00	-133.895	-133.895	0.000	(0)
	Zn(NO3)2	0.000e+00	0.000e+00	-135.614	-135.614	0.000	(0)
	Pb(NO3)2	0.000e+00	0.000e+00	-137.124	-137.124	0.000	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-137.723	-137.723	0.000	(0)
	Cu(NO3)2	0.000e+00	0.000e+00	-139.694	-139.694	0.000	(0)
	Hg(NO3)2	0.000e+00	0.000e+00	-159.077	-159.077	0.000	(0)
Na		2.781e-01					
	Na+	2.580e-01	1.897e-01	-0.588	-0.722	-0.134	(0)
	NaSO4-	2.015e-02	1.395e-02	-1.696	-1.855	-0.160	(0)
	NaHPO4-	6.296e-06	4.358e-06	-5.201	-5.361	-0.160	(0)
Ni		1.032e-04					
	Ni+2	4.799e-05	1.403e-05	-4.319	-4.853	-0.534	(0)
	NiSO4	3.733e-05	3.733e-05	-4.428	-4.428	0.000	(0)
	NiCl+	1.732e-05	7.530e-06	-4.761	-5.123	-0.362	(0)
	Ni(SO4)2-2	4.919e-07	1.757e-08	-6.308	-7.755	-1.447	(0)
	NiNH3+2	4.668e-08	1.668e-09	-7.331	-8.778	-1.447	(0)
	NiCl2	8.131e-09	8.131e-09	-8.090	-8.090	0.000	(0)
	NiOH+	3.348e-10	1.456e-10	-9.475	-9.837	-0.362	(0)
	Ni(NH3)2+2	1.321e-12	4.718e-14	-11.879	-13.326	-1.447	(0)
	Ni(OH)2	1.682e-14	1.682e-14	-13.774	-13.774	0.000	(0)
	Ni(OH)3-	4.237e-20	1.842e-20	-19.373	-19.735	-0.362	(0)
	NiSeO4	3.453e-37	3.453e-37	-36.462	-36.462	0.000	(0)
	NiNO3+	0.000e+00	0.000e+00	-68.863	-69.225	-0.362	(0)
O(0)		0.000e+00					
	O2	0.000e+00	0.000e+00	-62.846	-62.795	0.051	(0)
P		8.285e-04					
	H2PO4-	4.468e-04	3.093e-04	-3.350	-3.510	-0.160	(0)
	MgH2PO4+	2.045e-04	1.416e-04	-3.689	-3.849	-0.160	(0)
	FeH2PO4+	1.177e-04	8.149e-05	-3.929	-4.089	-0.160	(0)
	CaH2PO4+	2.319e-05	1.605e-05	-4.635	-4.794	-0.160	(0)
	MgHPO4	1.281e-05	1.281e-05	-4.892	-4.892	0.000	(0)
	HPO4-2	9.856e-06	2.123e-06	-5.006	-5.673	-0.667	(0)
	NaHPO4-	6.296e-06	4.358e-06	-5.201	-5.361	-0.160	(0)
	FeHPO4	4.518e-06	4.518e-06	-5.345	-5.345	0.000	(0)
	CaHPO4	2.250e-06	2.250e-06	-5.648	-5.648	0.000	(0)
	H3PO4	3.782e-07	3.782e-07	-6.422	-6.422	0.000	(0)
	KHPO4-	8.596e-08	5.950e-08	-7.066	-7.225	-0.160	(0)
	CoHPO4	2.947e-08	2.947e-08	-7.531	-7.531	0.000	(0)
	CaPO4-	8.724e-10	6.039e-10	-9.059	-9.219	-0.160	(0)
	MgPO4-	5.626e-11	3.894e-11	-10.250	-10.410	-0.160	(0)
	FeHPO4+	1.313e-11	9.087e-12	-10.882	-11.042	-0.160	(0)
	PO4-3	1.446e-12	9.081e-14	-11.840	-13.042	-1.202	(0)
	FeH2PO4+2	1.103e-14	2.531e-15	-13.958	-14.597	-0.639	(0)
Pb		5.248e-08					
	PbCl+	1.670e-08	7.258e-09	-7.777	-8.139	-0.362	(0)
	Pb(SO4)2-2	1.585e-08	5.660e-10	-7.800	-9.247	-1.447	(0)
	PbSO4	6.822e-09	6.822e-09	-8.166	-8.166	0.000	(0)
	PbCl2	6.753e-09	6.753e-09	-8.170	-8.170	0.000	(0)
	Pb+2	3.461e-09	1.012e-09	-8.461	-8.995	-0.534	(0)
	PbCl4-2	1.525e-09	5.446e-11	-8.817	-10.264	-1.447	(0)
	PbCl3-	1.371e-09	5.959e-10	-8.863	-9.225	-0.362	(0)
	PbOH+	6.400e-12	2.782e-12	-11.194	-11.556	-0.362	(0)
	Pb(OH)2	9.635e-17	9.635e-17	-16.016	-16.016	0.000	(0)
	Pb2OH+3	8.043e-17	4.461e-20	-16.095	-19.351	-3.256	(0)
	Pb(OH)3-	2.427e-22	1.055e-22	-21.615	-21.977	-0.362	(0)
	Pb(OH)4-2	7.922e-28	2.830e-29	-27.101	-28.548	-1.447	(0)
	Pb3(OH)4+2	2.788e-30	9.959e-32	-29.555	-31.002	-1.447	(0)
	Pb4(OH)4+4	5.701e-31	9.279e-37	-30.244	-36.032	-5.788	(0)
	Pb(HS)2	4.901e-38	4.901e-38	-37.310	-37.310	0.000	(0)
	Pb(HS)3-	0.000e+00	0.000e+00	-57.440	-57.802	-0.362	(0)
	PbNO3+	0.000e+00	0.000e+00	-72.240	-72.602	-0.362	(0)

Pb(NO3)2	0.000e+00	0.000e+00	-137.124	-137.124	0.000	(0)
S(-2)	1.784e-20					
H2S	1.731e-20	1.731e-20	-19.762	-19.762	0.000	(0)
HS-	3.710e-22	1.613e-22	-21.431	-21.792	-0.362	(0)
CdHS+	1.582e-22	6.876e-23	-21.801	-22.163	-0.362	(0)
S5-2	1.745e-25	6.234e-27	-24.758	-26.205	-1.447	(0)
S6-2	6.540e-26	2.336e-27	-25.184	-26.632	-1.447	(0)
S4-2	4.387e-26	1.567e-27	-25.358	-26.805	-1.447	(0)
S3-2	6.750e-27	2.411e-28	-26.171	-27.618	-1.447	(0)
S2-2	6.357e-28	2.270e-29	-27.197	-28.644	-1.447	(0)
S-2	3.151e-34	6.789e-35	-33.502	-34.168	-0.667	(0)
Hg(HS)2	1.043e-34	1.043e-34	-33.982	-33.982	0.000	(0)
HgHS2-	1.067e-35	4.637e-36	-34.972	-35.334	-0.362	(0)
Zn(HS)2	2.918e-37	2.918e-37	-36.535	-36.535	0.000	(0)
Cd(HS)2	1.774e-37	1.774e-37	-36.751	-36.751	0.000	(0)
ZnS(HS)-	7.222e-38	3.140e-38	-37.141	-37.503	-0.362	(0)
Pb(HS)2	4.901e-38	4.901e-38	-37.310	-37.310	0.000	(0)
HgS2-2	2.800e-38	1.000e-39	-37.553	-39.000	-1.447	(0)
Cu(S4)2-3	1.886e-38	5.829e-39	-37.724	-38.234	-0.510	(0)
Fe(HS)2	1.346e-38	1.346e-38	-37.871	-37.871	0.000	(0)
CuS4S5-3	3.241e-39	1.085e-39	-38.489	-38.964	-0.475	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-48.866	-49.227	-0.362	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-54.685	-55.047	-0.362	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-56.282	-56.643	-0.362	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-57.265	-57.626	-0.362	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-57.440	-57.802	-0.362	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-58.538	-59.985	-1.447	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-74.793	-76.240	-1.447	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-76.853	-78.300	-1.447	(0)
S(6)	1.031e-01					
S04-2	4.711e-02	1.377e-02	-1.327	-1.861	-0.534	(0)
MgS04	2.479e-02	2.479e-02	-1.606	-1.606	0.000	(0)
NaS04-	2.015e-02	1.395e-02	-1.696	-1.855	-0.160	(0)
CaS04	7.511e-03	7.511e-03	-2.124	-2.124	0.000	(0)
FeS04	1.877e-03	1.877e-03	-2.727	-2.727	0.000	(0)
KS04-	5.523e-04	3.823e-04	-3.258	-3.418	-0.160	(0)
NH4S04-	5.287e-04	3.602e-04	-3.277	-3.443	-0.167	(0)
MnS04	2.564e-04	2.564e-04	-3.591	-3.591	0.000	(0)
AlS04+	1.598e-04	1.065e-04	-3.796	-3.973	-0.176	(0)
NiS04	3.733e-05	3.733e-05	-4.428	-4.428	0.000	(0)
CoS04	3.668e-05	3.668e-05	-4.436	-4.436	0.000	(0)
Al(S04)2-	2.576e-05	1.717e-05	-4.589	-4.765	-0.176	(0)
Zn(S04)2-2	1.717e-05	6.132e-07	-4.765	-6.212	-1.447	(0)
HS04-	1.625e-05	1.083e-05	-4.789	-4.965	-0.176	(0)
ZnS04	4.942e-06	4.942e-06	-5.306	-5.306	0.000	(0)
Ni(S04)2-2	4.919e-07	1.757e-08	-6.308	-7.755	-1.447	(0)
Cd(S04)2-2	7.024e-08	2.509e-09	-7.153	-8.601	-1.447	(0)
Pb(S04)2-2	1.585e-08	5.660e-10	-7.800	-9.247	-1.447	(0)
CdS04	1.288e-08	1.288e-08	-7.890	-7.890	0.000	(0)
PbS04	6.822e-09	6.822e-09	-8.166	-8.166	0.000	(0)
CuS04	5.355e-10	5.355e-10	-9.271	-9.271	0.000	(0)
FeS04+	9.405e-14	6.408e-14	-13.027	-13.193	-0.167	(0)
Fe(S04)2-	4.479e-14	1.947e-14	-13.349	-13.711	-0.362	(0)
HgS04	6.887e-29	6.887e-29	-28.162	-28.162	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.424	-52.786	-0.362	(0)
Se(-2)	1.102e-06					
HSe-	1.069e-06	4.649e-07	-5.971	-6.333	-0.362	(0)
H2Se	3.219e-08	3.219e-08	-7.492	-7.492	0.000	(0)
MnSe	2.317e-11	2.317e-11	-10.635	-10.635	0.000	(0)
Se-2	1.101e-15	3.932e-17	-14.958	-16.405	-1.447	(0)
Se(4)	4.916e-15					
HSeO3-	4.883e-15	2.123e-15	-14.311	-14.673	-0.362	(0)
SeO3-2	2.534e-17	9.053e-19	-16.596	-18.043	-1.447	(0)
H2SeO3	7.950e-18	7.950e-18	-17.100	-17.100	0.000	(0)
FeHSeO3+2	6.514e-26	2.327e-27	-25.186	-26.633	-1.447	(0)
Cd(SeO3)2-2	8.361e-38	2.986e-39	-37.078	-38.525	-1.447	(0)
Se(6)	1.968e-34					
SeO4-2	1.944e-34	5.683e-35	-33.711	-34.245	-0.534	(0)

MnSeO4	1.556e-36	1.556e-36	-35.808	-35.808	0.000	(0)
CoSeO4	3.684e-37	3.684e-37	-36.434	-36.434	0.000	(0)
NiSeO4	3.453e-37	3.453e-37	-36.462	-36.462	0.000	(0)
HSeO4-	5.245e-38	2.280e-38	-37.280	-37.642	-0.362	(0)
ZnSeO4	1.494e-38	1.494e-38	-37.826	-37.826	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.354	-40.354	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-70.618	-72.065	-1.447	(0)
Zn	2.960e-05					
Zn(SO4)2-2	1.717e-05	6.132e-07	-4.765	-6.212	-1.447	(0)
Zn+2	5.807e-06	1.697e-06	-5.236	-5.770	-0.534	(0)
ZnSO4	4.942e-06	4.942e-06	-5.306	-5.306	0.000	(0)
ZnCl+	1.350e-06	8.780e-07	-5.870	-6.057	-0.187	(0)
ZnCl2	2.482e-07	2.482e-07	-6.605	-6.605	0.000	(0)
ZnCl3-	6.324e-08	4.113e-08	-7.199	-7.386	-0.187	(0)
ZnCl4-2	1.961e-08	4.225e-09	-7.708	-8.374	-0.667	(0)
ZnOHCl	1.297e-09	1.297e-09	-8.887	-8.887	0.000	(0)
ZnOH+	3.148e-10	1.369e-10	-9.502	-9.864	-0.362	(0)
Zn(OH)2	3.226e-14	3.226e-14	-13.491	-13.491	0.000	(0)
Zn(OH)3-	4.073e-19	1.771e-19	-18.390	-18.752	-0.362	(0)
Zn(OH)4-2	2.161e-25	7.719e-27	-24.665	-26.112	-1.447	(0)
Zn(HS)2	2.918e-37	2.918e-37	-36.535	-36.535	0.000	(0)
ZnS(HS)-	7.222e-38	3.140e-38	-37.141	-37.503	-0.362	(0)
ZnSeO4	1.494e-38	1.494e-38	-37.826	-37.826	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-54.685	-55.047	-0.362	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-58.538	-59.985	-1.447	(0)
ZnNO3+	0.000e+00	0.000e+00	-69.770	-70.131	-0.362	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-70.618	-72.065	-1.447	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-76.853	-78.300	-1.447	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-135.614	-135.614	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-160.56	-154.28	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-30.62	-26.09	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-37.89	-26.09	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-233.88	-215.95	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-43.77	-23.66	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-39.92	-39.47	0.45	(NH4)2SeO4
Al(OH)3(am)	-1.89	9.17	11.06	Al(OH)3
Al2O3	-1.90	18.37	20.27	Al2O3
Al4(OH)10SO4	2.06	24.76	22.70	Al4(OH)10SO4
AlOHSO4	0.47	-2.76	-3.23	AlOHSO4
Alunite	7.20	6.30	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.04	-10.86	-7.82	PbSO4
Anhydrite	-0.12	-4.47	-4.34	CaSO4
Anilite	0.94	-31.37	-32.31	Cu0.25Cu1.5S
Antlerite	-19.75	-10.96	8.79	Cu3(OH)4SO4
Atacamite	-12.68	-5.06	7.61	Cu2(OH)3Cl
Bianchite	-5.90	-7.66	-1.76	ZnSO4·6H2O
Birnessite	-25.41	-7.31	18.09	MnO2
Bixbyite	-26.45	-26.80	-0.35	Mn2O3
BlaubleiI	-2.99	-27.15	-24.16	Cu0.9Cu0.2S
BlaubleiII	-1.82	-29.10	-27.28	Cu0.6Cu0.8S
Boehmite	0.32	9.18	8.86	AlOOH
Brochantite	-26.35	-10.64	15.71	Cu4(OH)6SO4
Brucite	-9.03	8.08	17.12	Mg(OH)2
Bunsenite	-7.46	5.23	12.68	NiO
Ca3(PO4)2(beta)	-4.85	-33.90	-29.05	Ca3(PO4)2
Ca4H(PO4)3·3H2O	-7.53	-54.61	-47.08	Ca4H(PO4)3·3H2O
CaHP04	-1.34	-20.69	-19.35	CaHP04
CaHP04·2H2O	-1.65	-20.70	-19.05	CaHP04·2H2O
Calomel	-11.80	-29.93	-18.13	Hg2Cl2
CaSeO3·2H2O	-15.11	-12.25	2.86	CaSeO3·2H2O
CaSeO4·2H2O	-33.86	-36.86	-3.00	CaSeO4·2H2O
Cd(OH)2	-12.17	1.69	13.87	Cd(OH)2
Cd(OH)2(am)	-12.24	1.69	13.94	Cd(OH)2

Cd3(OH)2(SO4)2	-25.49	-18.78	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-29.41	-6.85	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-18.62	-51.22	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-33.56	-5.16	28.40	Cd4(OH)6SO4
CdCl2	-9.11	-9.73	-0.61	CdCl2
CdCl2:1H2O	-8.06	-9.73	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-7.81	-9.74	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.17	-10.47	13.69	Cd
Cdmetal(gamma)	-24.27	-10.47	13.80	Cd
CdOHCl	-7.63	-4.02	3.61	CdOHCl
CdSe	10.71	-9.67	-20.38	CdSe
CdSeO4:2H2O	-40.78	-42.63	-1.85	CdSeO4:2H2O
CdSO4	-10.19	-10.24	-0.05	CdSO4
CdSO4:1H2O	-8.59	-10.24	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-8.42	-10.25	-1.83	CdSO4:2.67H2O
Chalcanthite	-8.98	-11.64	-2.65	CuSO4:5H2O
Chalcocite	2.32	-33.00	-35.32	Cu2S
Chalcopyrite	-10.86	-46.49	-35.62	CuFeS2
Cinnabar	-5.36	-51.66	-46.30	HgS
Clausthalite	17.10	-10.29	-27.39	PbSe
Co(OH)2	-7.88	5.21	13.09	Co(OH)2
Co(OH)3	-19.01	-21.10	-2.09	Co(OH)3
Co3(PO4)2	-5.98	-40.66	-34.69	Co3(PO4)2
Co3O4	-26.73	-36.97	-10.24	Co3O4
CoCl2	-14.66	-6.21	8.46	CoCl2
CoCl2:6H2O	-8.76	-6.24	2.52	CoCl2:6H2O
CoFe2O4	7.96	4.81	-3.15	CoFe2O4
CoHP04	-3.88	-22.94	-19.06	CoHP04
CoO	-8.62	5.22	13.84	CoO
CoS(alpha)	-14.17	-21.61	-7.44	CoS
CoS(beta)	-10.54	-21.61	-11.07	CoS
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-15.81	-14.49	1.32	CoSeO3
CoSeO4:6H2O	-37.61	-39.14	-1.53	CoSeO4:6H2O
CoSO4	-9.71	-6.72	2.99	CoSO4
CoSO4:6H2O	-4.28	-6.75	-2.48	CoSO4:6H2O
Cotunnite	-5.50	-10.34	-4.84	PbCl2
Covellite	-3.97	-26.50	-22.53	CuS
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.59	-69.16	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.77	-17.54	-46.31	Cu2Se
Cu2SO4	-16.20	-18.11	-1.90	Cu2SO4
Cu3(PO4)2	-18.48	-55.33	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-20.23	-55.35	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	35.72	-28.58	-64.30	Cu3Se2
Cumetal	-0.24	-9.17	-8.93	Cu
CuOCuSO4	-21.91	-11.28	10.63	CuOCuSO4
Cupricferrite	-6.57	-0.08	6.49	CuFe2O4
Cuprite	-5.06	-6.17	-1.11	Cu2O
Cuprousferrite	5.59	-3.29	-8.88	CuFeO2
CuSe	22.35	-11.04	-33.39	CuSe
CuSe2	23.46	-10.24	-33.70	CuSe2
CuSeO3:2H2O	-19.99	-19.39	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-41.58	-44.02	-2.44	CuSeO4:5H2O
CuSO4	-14.72	-11.61	3.11	CuSO4
Diaspore	2.06	9.18	7.12	AlOOH
Djurleite	1.83	-32.57	-34.40	Cu0.066Cu1.868S
Epsomite	-1.74	-3.89	-2.15	MgSO4:7H2O
Fe(OH)2	-6.73	6.84	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.11	-1.93	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-21.68	-20.13	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-38.92	-59.55	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-33.07	-36.23	-3.16	Fe2(SO4)3
Fe3(OH)8	-13.81	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.58	-0.21	3.37	Fe(OH)3
Ferroselite	14.99	-3.72	-18.71	FeSe2
FeS(ppt)	-17.06	-19.99	-2.92	FeS
FeSe	6.48	-4.53	-11.00	FeSe

Galena	-11.58	-25.75	-14.16	PbS
Gibbsite	0.66	9.17	8.52	Al(OH)3
Goethite	-0.84	-0.21	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4:7H2O
Greenockite	-10.64	-25.13	-14.49	CdS
Greigite	-55.85	-100.88	-45.03	Fe3S4
Gypsum	0.13	-4.48	-4.61	CaSO4:2H2O
H-Jarosite	-12.97	-24.52	-11.55	(H3O)Fe3(SO4)2(OH)6
H2S(g)	-18.82	-26.83	-8.01	H2S
H2Se(g)	-6.45	-11.37	-4.92	H2Se
Halite	-2.99	-1.40	1.59	NaCl
Hausmannite	-31.50	30.53	62.03	Mn3O4
Hematite	0.70	-0.41	-1.11	Fe2O3
Hercynite	1.57	25.21	23.64	FeAl2O4
Hg(g)	-7.41	-15.34	-7.93	Hg
Hg(OH)2	-21.34	-24.84	-3.50	Hg(OH)2
Hg2(g)	-15.59	-30.68	-15.09	Hg2
Hg2(OH)2	-23.77	-18.51	5.26	Hg2(OH)2
Hg2HP04	-21.89	-46.67	-24.77	Hg2HP04
Hg2S	-33.49	-45.33	-11.84	Hg2S
Hg2SeO3	-33.56	-38.22	-4.66	Hg2SeO3
Hg2SO4	-24.30	-30.45	-6.14	Hg2SO4
HgCl(g)	-34.85	-14.97	19.88	HgCl
HgCl2	-14.74	-36.26	-21.52	HgCl2
Hgmetal(l)	-1.69	-15.34	-13.65	Hg
HgSe	19.49	-36.20	-55.69	HgSe
HgSeO3	-32.11	-44.54	-12.43	HgSeO3
HgSO4	-27.32	-36.77	-9.45	HgSO4
Hinsdalite	-8.98	-11.48	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-2.79	-47.12	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-16.27	-79.06	-62.79	Pb5(P04)3OH
K-Alum	-6.88	-12.12	-5.24	KAl(SO4)2:12H2O
K-Jarosite	-7.38	-21.87	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-38.31	-39.04	-0.73	K2SeO4
Langite	-28.53	-10.65	17.88	Cu4(OH)6SO4:H2O
Larnakite	-9.39	-9.77	-0.38	PbO:PbSO4
Laurionite	-5.26	-4.63	0.62	PbOHCl
Lepidocrocite	-1.58	-0.21	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.77	1.08	12.85	PbO
Mackinawite	-16.39	-19.99	-3.60	FeS
Maghemite	-6.80	-0.41	6.39	Fe2O3
Magnesioferrite	-9.85	7.68	17.52	Fe2MgO4
Magnetite	2.53	6.43	3.90	Fe3O4
Manganite	-13.14	12.20	25.34	MnOOH
Massicot	-11.97	1.08	13.05	PbO
Melanothallite	-17.50	-11.10	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeSO4:7H2O
Metacinnabar	-5.96	-51.66	-45.70	HgS
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(P04)2	-8.78	-32.06	-23.28	Mg3(P04)2
MgHP04:3H2O	-1.92	-20.09	-18.18	MgHP04:3H2O
MgSeO3:6H2O	-14.70	-11.65	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-35.07	-36.27	-1.20	MgSeO4:6H2O
Minium	-59.10	15.42	74.53	Pb3O4
Mirabilite	-2.06	-3.36	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-57.30	-62.62	-5.32	Mn2(SO4)3
Mn3(P04)2	-14.11	-37.96	-23.85	Mn3(P04)2
MnCl2:4H2O	-8.07	-5.33	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnS(grn)	-20.96	-20.71	0.25	MnS
MnS(pnk)	-24.05	-20.71	3.34	MnS
MnSe	-8.98	-5.25	3.73	MnSe
MnSeO3	-14.72	-13.59	1.13	MnSeO3
MnSeO3:2H2O	-14.56	-13.60	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-36.18	-38.23	-2.05	MnSeO4:5H2O
MnSO4	-8.56	-5.82	2.74	MnSO4
Monteponite	-13.65	1.70	15.35	CdO

Montroydite	-21.29	-24.83	-3.55	HgO
Morenosite	-4.58	-6.75	-2.17	NiSO4:7H2O
Na-Jarosite	-9.35	-20.19	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-21.40	-11.10	10.30	Na2SeO3:5H2O
Na2SeO4	-36.97	-35.69	1.28	Na2SeO4
Nantokite	-1.97	-8.80	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(PO4)2	-9.34	-40.64	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-23.05	8.95	32.00	Ni4(OH)6SO4
NiS(alpha)	-16.00	-21.60	-5.60	NiS
NiS(beta)	-10.50	-21.60	-11.10	NiS
NiS(gamma)	-8.80	-21.60	-12.80	NiS
NiSe	11.56	-6.14	-17.70	NiSe
NiSeO3:2H2O	-17.38	-14.50	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-37.61	-39.13	-1.52	NiSeO4:6H2O
Nsutite	-24.82	-7.31	17.50	MnO2
O2(g)	-60.10	24.35	84.45	O2
Pb(OH)2	-7.21	1.08	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.35	-3.55	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-24.03	2.16	26.19	Pb2O(OH)2
Pb2O3	-46.70	14.34	61.04	Pb2O3
Pb3(PO4)2	-9.54	-53.07	-43.53	Pb3(PO4)2
Pb3O2SO4	-19.56	-8.69	10.87	Pb3O2SO4
Pb4(OH)6SO4	-28.72	-7.62	21.10	Pb4(OH)6SO4
Pb4O3SO4	-29.81	-7.61	22.20	Pb4O3SO4
PbHP04	-3.27	-27.08	-23.81	PbHP04
Pbmetal	-15.33	-11.09	4.24	Pb
PbO:0.3H2O	-11.90	1.08	12.98	PbO:0.33H2O
PbSeO4	-36.36	-43.24	-6.88	PbSeO4
Periclase	-13.86	8.09	21.94	MgO
Plattnerite	-37.05	13.26	50.31	PbO2
Plumbgummite	5.08	-27.71	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-15.64	7.47	23.11	Ca(OH)2
Pyrite	-16.02	-34.64	-18.63	FeS2
Pyrochroite	-9.31	6.11	15.43	Mn(OH)2
Pyrolusite	-23.74	18.29	42.03	MnO2
Pyromorphite	-0.34	-84.77	-84.43	Pb5(PO4)3Cl
Retgersite	-4.70	-6.75	-2.05	NiSO4:6H2O
Semetal(am)	7.94	0.80	-7.14	Se
Semetal(hex)	8.55	0.80	-7.75	Se
SeO2	-19.83	-19.71	0.12	SeO2
SeO3	-65.72	-44.32	21.39	SeO3
Sphalerite	-11.00	-22.52	-11.52	ZnS
Spinel	-11.32	26.45	37.77	MgAl2O4
Strengite	-2.00	-28.38	-26.38	FePO4:2H2O
Sulfur	-12.55	-14.66	-2.11	S
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.65	-3.31	0.34	Na2SO4
Tsumebite	-15.90	-25.69	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	0.16	-35.84	-36.00	Fe3(PO4)2:8H2O
Wurtzite	-13.52	-22.52	-9.00	ZnS
Zincite	-7.24	4.31	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnSO4
Zn(NO3)2:6H2O	-138.60	-135.35	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-7.90	4.30	12.20	Zn(OH)2
Zn(OH)2(am)	-8.36	4.30	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.65	4.30	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.43	4.30	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.43	4.30	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.83	-3.33	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.30	2.90	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-8.00	-43.42	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-30.48	-10.95	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-23.12	5.28	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-28.41	10.09	38.50	Zn5(OH)8Cl2
ZnCl2	-14.34	-7.12	7.22	ZnCl2
Znmetal	-34.02	-7.87	26.15	Zn
ZnO(active)	-7.09	4.31	11.40	ZnO

ZnS(am)	-13.43	-22.52	-9.09	ZnS
ZnSe	7.40	-7.06	-14.46	ZnSe
ZnSe04:6H2O	-38.53	-40.05	-1.52	ZnSe04:6H2O
ZnS04:1H2O	-7.10	-7.64	-0.53	ZnS04:1H2O

**For a gas, $SI = \log_{10}(\text{fugacity})$. Fugacity = pressure * phi / 1 atm.
 For ideal gases, phi = 1.

 End of simulation.

 Reading input data for simulation 11.

 End of Run after 0.415 Seconds.

Input file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\Phase II\PHREEQC\Mixing
 \Kanmantoo Scenario 2 mixing OCT19.pqi
 Output file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\Phase II\PHREEQC\Mixing
 \Kanmantoo Scenario 2 mixing OCT19.pqi
 Database file: C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
 \minteq.v4.dat

 Reading data base.

SOLUTION_MASTER_SPECIES
 SOLUTION_SPECIES
 SOLUTION_SPECIES
 PHASES
 PHASES
 SURFACE_MASTER_SPECIES
 SURFACE_SPECIES
 END

 Reading input data for simulation 1.

DATABASE C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
 \minteq.v4.dat
 SELECTED_OUTPUT 1
 file Kanmantoo Scenario 2 mixing OCT19.sel
 totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg
 Na K Alkalinity Cl S(6) Hg
 SOLUTION_MASTER_SPECIES
 Co Co+3 -1.0 Co 58.9332
 Co(2) Co+2 0.0 Co
 Co(3) Co+3 -1.0 Co
 END

 End of simulation.

 Reading input data for simulation 2.

PHASES
 CoO
 CoO + 2H+ = Co+2 + H2O
 log_k 13.5864
 delta_h -106.295 kJ
 Co(OH)2
 Co(OH)2 + 2H+ = Co+2 + 2H2O
 log_k 13.094
 delta_h -0 kJ
 Co(OH)3
 Co(OH)3 + 3H+ = Co+3 + 3H2O
 log_k -2.309
 delta_h -92.43 kJ
 Co3O4
 Co3O4 + 8H+ = Co+2 + 2Co+3 + 4H2O
 log_k -10.4956
 delta_h -107.5 kJ
 CoFe2O4
 CoFe2O4 + 8H+ = Co+2 + 2Fe+3 + 4H2O
 log_k -3.5281
 delta_h -158.82 kJ
 CoCl2
 CoCl2 = Co+2 + 2Cl-
 log_k 8.2672
 delta_h -79.815 kJ
 CoCl2:6H2O

```

      CoCl2:6H2O = Co+2 + 2Cl- + 6H2O
      log_k 2.5365
      delta_h      8.0598      kJ
(Co(NH3)6)Cl3
      (Co(NH3)6)Cl3 + 6H+ = Co+3 + 6NH4+ + 3Cl-
      log_k 20.0317
      delta_h      -33.1 kJ
(Co(NH3)5OH2)Cl3
      (Co(NH3)5OH2)Cl3 + 5H+ = Co+3 + 5NH4+ + 3Cl- + H2O
      log_k 11.7351
      delta_h      -25.37      kJ
(Co(NH3)5Cl)Cl2
      (Co(NH3)5Cl)Cl2 + 5H+ = Co+3 + 5NH4+ + 3Cl-
      log_k 4.5102
      delta_h      -10.74      kJ
CoCO3
      CoCO3 = Co+2 + CO3-2
      log_k -9.98
      delta_h      -12.7612    kJ
CoSO4
      CoSO4 = Co+2 + SO4-2
      log_k 2.8024
      delta_h      -79.277     kJ
CoSO4:6H2O
      CoSO4:6H2O = Co+2 + SO4-2 + 6H2O
      log_k -2.4726
      delta_h      1.0801      kJ
END

```

```

-----
End of simulation.
-----

```

```

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Reading input data for simulation 3.
-----

```

SOLUTION 1 # Mean Groundwater quality

```

temp      21
pH         6.79
pe         1
redox      pe
units      mg/l
density    1
Al         0.37
Alkalinity 0
As         0
Ba         0
Be         0
B          0
Cd         0.003
Co         2.34
Cr         0
Cu         0.31
Fe         100.34
Pb         0.003
Mn         12.2
Mo         0
V          0
Zn         0.17
Se         0.03
Ni         0.45
N          7
P          0.68
Ca         130
Mg         246
Na         1094
K          62
Cl         1533

```

S(6) 1485
 Hg 0.0002
 water 1 # kg
 REACTION 1
 H2O -1
 40
 END # Time-step 1

 Beginning of initial solution calculations.

Initial solution 1.

-----Solution composition-----

Elements	Molality	Moles
Al	1.378e-05	1.378e-05
Ca	3.259e-03	3.259e-03
Cd	2.681e-08	2.681e-08
Cl	4.344e-02	4.344e-02
Co	3.989e-05	3.989e-05
Cu	4.901e-06	4.901e-06
Fe	1.805e-03	1.805e-03
Hg	1.002e-09	1.002e-09
K	1.593e-03	1.593e-03
Mg	1.017e-02	1.017e-02
Mn	2.231e-04	2.231e-04
N	5.021e-04	5.021e-04
Na	4.781e-02	4.781e-02
Ni	7.703e-06	7.703e-06
P	2.206e-05	2.206e-05
Pb	1.455e-08	1.455e-08
S(6)	1.553e-02	1.553e-02
Se	3.817e-07	3.817e-07
Zn	2.612e-06	2.612e-06

-----Description of solution-----

pH	=	6.790
pe	=	1.000
Activity of water	=	0.998
Ionic strength (mol/kgw)	=	9.259e-02
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	6.274e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	21.00
Electrical balance (eq)	=	6.374e-03
Percent error, $100 \cdot (\text{Cat} - \text{An}) / (\text{Cat} + \text{An})$	=	4.58
Iterations	=	13
Total H	=	1.110158e+02
Total O	=	5.556909e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.061e-07	1.622e-07	-6.686	-6.790	-0.104	0.00
OH-	5.935e-08	4.562e-08	-7.227	-7.341	-0.114	(0)
H2O	5.551e+01	9.980e-01	1.744	-0.001	0.000	18.05
Al	1.378e-05					
Al(OH)4-	8.973e-06	7.024e-06	-5.047	-5.153	-0.106	(0)
Al(OH)2+	2.373e-06	1.884e-06	-5.625	-5.725	-0.100	(0)
Al(OH)3	2.329e-06	2.329e-06	-5.633	-5.633	0.000	(0)
AlOH+2	7.409e-08	2.945e-08	-7.130	-7.531	-0.401	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)

	Al+3	5.344e-09	6.178e-10	-8.272	-9.209	-0.937	(0)
	Al(SO4)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ca		3.259e-03					
	Ca+2	2.406e-03	9.221e-04	-2.619	-3.035	-0.416	(0)
	CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
	CaHP04	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
	CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
	CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
	CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
	CaOH+	1.001e-09	8.020e-10	-8.999	-9.096	-0.096	(0)
	Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
	CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
Cd		2.681e-08					
	CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
	Cd+2	7.874e-09	3.018e-09	-8.104	-8.520	-0.416	(0)
	CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
	CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
	Cd(SO4)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
	CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
	CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
	CdOH+	1.568e-12	1.100e-12	-11.805	-11.959	-0.154	(0)
	Cd(OH)2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
	Cd2OH+3	4.264e-19	1.748e-20	-18.370	-19.758	-1.387	(0)
	Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
	Cd(OH)3-	3.135e-21	2.198e-21	-20.504	-20.658	-0.154	(0)
	CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
	Cd(OH)4-2	9.222e-29	2.230e-29	-28.035	-28.652	-0.617	(0)
	CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cl		4.344e-02					
	Cl-	4.343e-02	3.417e-02	-1.362	-1.466	-0.104	(0)
	CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
	MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
	CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
	CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
	NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
	MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
	ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
	CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
	CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
	ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
	PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
	ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
	CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
	MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
	PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
	ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
	CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
	NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
	CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
	CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
	PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
	ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
	PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
	CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
	FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
	FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
	CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
	HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
	HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
	HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
	FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
	HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
	CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
	HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
	CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
	Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)

Co(2)	3.989e-05						
Co+2	3.225e-05	7.797e-06	-4.491	-5.108	-0.617	(0)	
CoSO4	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)	
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)	
CoHP04	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)	
CoOH+	1.375e-08	9.639e-09	-7.862	-8.016	-0.154	(0)	
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)	
Co(OH)2	4.744e-11	4.744e-11	-10.324	-10.324	0.000	(0)	
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)	
Co2OH+3	9.190e-14	3.766e-15	-13.037	-14.424	-1.387	(0)	
Co(OH)3-	8.364e-17	5.865e-17	-16.078	-16.232	-0.154	(0)	
CoOOH-	5.039e-18	3.533e-18	-17.298	-17.452	-0.154	(0)	
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)	
Co4(OH)4+4	5.041e-22	1.722e-24	-21.297	-23.764	-2.466	(0)	
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)	
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)	
Co(OH)4-2	2.382e-24	5.759e-25	-23.623	-24.240	-0.617	(0)	
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)	
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)	
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)	
Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)	
Co(3)	4.042e-31						
CoOH+2	4.042e-31	9.773e-32	-30.393	-31.010	-0.617	(0)	
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)	
Co+3	2.685e-36	3.104e-37	-35.571	-36.508	-0.937	(0)	
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)	
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)	
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)	
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)	
Cu(1)	4.900e-06						
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)	
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)	
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)	
Cu+	1.553e-08	1.089e-08	-7.809	-7.963	-0.154	(0)	
Cu(2)	8.967e-10						
Cu+2	6.026e-10	2.310e-10	-9.220	-9.636	-0.416	(0)	
CuSO4	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)	
CuOH+	4.792e-11	3.719e-11	-10.319	-10.430	-0.110	(0)	
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)	
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)	
Cu(OH)2	5.595e-13	5.595e-13	-12.252	-12.252	0.000	(0)	
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)	
Cu2(OH)2+2	1.398e-16	3.379e-17	-15.855	-16.471	-0.617	(0)	
Cu(OH)3-	1.014e-16	7.111e-17	-15.994	-16.148	-0.154	(0)	
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)	
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)	
Cu(OH)4-2	1.434e-22	3.468e-23	-21.843	-22.460	-0.617	(0)	
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)	
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)	
Cu(NO2)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)	
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)	
Fe(2)	1.805e-03						
Fe+2	1.454e-03	3.515e-04	-2.837	-3.454	-0.617	(0)	
FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)	
FeHP04	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)	
FeH2P04+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)	
FeOH+	8.090e-07	6.384e-07	-6.092	-6.195	-0.103	(0)	
Fe(OH)2	2.214e-11	2.214e-11	-10.655	-10.655	0.000	(0)	
Fe(OH)3-	5.296e-13	4.179e-13	-12.276	-12.379	-0.103	(0)	
Fe(3)	3.233e-07						
Fe(OH)2+	3.138e-07	2.491e-07	-6.503	-6.604	-0.100	(0)	
Fe(OH)3	9.382e-09	9.382e-09	-8.028	-8.028	0.000	(0)	
Fe(OH)4-	1.205e-10	9.565e-11	-9.919	-10.019	-0.100	(0)	
FeOH+2	2.119e-11	8.217e-12	-10.674	-11.085	-0.411	(0)	
FeHP04+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)	
FeSO4+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)	
Fe+3	2.235e-15	2.584e-16	-14.651	-15.588	-0.937	(0)	
Fe(SO4)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)	

FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
Fe2(OH)2+4	7.548e-19	2.579e-21	-18.122	-20.589	-2.466	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
Fe3(OH)4+5	6.361e-23	8.906e-27	-22.197	-26.050	-3.854	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
H(0)	3.796e-19					
H2	1.898e-19	1.939e-19	-18.722	-18.712	0.009	(0)
Hg(0)	1.002e-09					
Hg	1.002e-09	1.002e-09	-8.999	-8.999	0.000	(0)
Hg(1)	3.697e-29					
Hg2+2	1.848e-29	4.469e-30	-28.733	-29.350	-0.617	(0)
Hg(2)	2.362e-18					
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
Hg(OH)2	1.682e-22	1.718e-22	-21.774	-21.765	0.009	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
HgOH+	2.768e-26	1.941e-26	-25.558	-25.712	-0.154	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Hg+2	3.648e-29	8.820e-30	-28.438	-29.055	-0.617	(0)
HgSO4	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Hg(OH)3-	1.911e-30	1.340e-30	-29.719	-29.873	-0.154	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
K	1.593e-03					
K+	1.549e-03	1.219e-03	-2.810	-2.914	-0.104	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
Mg	1.017e-02					
Mg+2	7.920e-03	3.036e-03	-2.101	-2.518	-0.416	(0)
MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
MgOH+	6.402e-08	5.162e-08	-7.194	-7.287	-0.094	(0)
MgPO4-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
Mn(2)	2.231e-04					
Mn+2	1.882e-04	4.549e-05	-3.725	-4.342	-0.617	(0)
MnSO4	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
MnOH+	6.606e-09	5.213e-09	-8.180	-8.283	-0.103	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Mn(OH)3-	2.129e-19	1.680e-19	-18.672	-18.775	-0.103	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
Mn(OH)4-2	8.666e-26	3.361e-26	-25.062	-25.474	-0.411	(0)
MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Mn(3)	9.732e-29					
Mn+3	9.732e-29	1.125e-29	-28.012	-28.949	-0.937	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-65.730	-66.142	-0.411	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-74.661	-74.779	-0.119	(0)
N(-3)	5.021e-04					
NH4+	4.805e-04	3.617e-04	-3.318	-3.442	-0.123	(0)
NH4SO4-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
NH3	9.560e-07	9.560e-07	-6.020	-6.020	0.000	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)

CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
N(3)	1.148e-35					
N02-	1.148e-35	8.735e-36	-34.940	-35.059	-0.119	(0)
CoN02+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CuN02+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
Cu(N02)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-48.382	-48.486	-0.104	(0)
CaN03+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
MnN03+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
CoN03+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
NiN03+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
ZnN03+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
PbN03+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
CdN03+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
CuN03+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
FeN03+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
HgN03+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Mn(N03)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
Na	4.781e-02					
Na+	4.677e-02	3.680e-02	-1.330	-1.434	-0.104	(0)
NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
NaHP04-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
Ni	7.703e-06					
Ni+2	5.664e-06	2.171e-06	-5.247	-5.663	-0.416	(0)
NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
NiOH+	1.818e-09	1.275e-09	-8.741	-8.895	-0.154	(0)
Ni(SO4)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
Ni(OH)2	8.335e-12	8.335e-12	-11.079	-11.079	0.000	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Ni(OH)3-	7.365e-16	5.164e-16	-15.133	-15.287	-0.154	(0)
NiSe04	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.993	-55.984	0.009	(0)
P	2.206e-05					
H2P04-	6.634e-06	5.268e-06	-5.178	-5.278	-0.100	(0)
HP04-2	5.222e-06	2.025e-06	-5.282	-5.694	-0.411	(0)
MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
FeHP04	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2P04+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
NaHP04-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
MgH2P04+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
CaHP04	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2P04+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)

KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
CoHP04	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CaP04-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
MgP04-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
H3P04	1.150e-10	1.150e-10	-9.939	-9.939	0.000	(0)
P04-3	4.196e-11	4.850e-12	-10.377	-11.314	-0.937	(0)
FeHP04+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeH2P04+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
Pb	1.455e-08					
Pb+2	5.480e-09	2.100e-09	-8.261	-8.678	-0.416	(0)
PbS04	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
PbOH+	4.662e-10	3.269e-10	-9.331	-9.486	-0.154	(0)
Pb(S04)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
Pb(OH)2	6.405e-13	6.405e-13	-12.193	-12.193	0.000	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
Pb2OH+3	2.655e-16	1.088e-17	-15.576	-16.963	-1.387	(0)
Pb(OH)3-	5.660e-17	3.969e-17	-16.247	-16.401	-0.154	(0)
Pb(OH)4-2	2.491e-21	6.022e-22	-20.604	-21.220	-0.617	(0)
Pb3(OH)4+2	3.779e-23	9.137e-24	-22.423	-23.039	-0.617	(0)
Pb4(OH)4+4	5.175e-26	1.768e-28	-25.286	-27.753	-2.466	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
S(6)	1.553e-02					
S04-2	1.094e-02	4.194e-03	-1.961	-2.377	-0.416	(0)
MgS04	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
NaS04-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
CaS04	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
FeS04	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
MnS04	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
NH4S04-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
CoS04	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
NiS04	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
ZnS04	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(S04)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
HS04-	7.527e-08	5.892e-08	-7.123	-7.230	-0.106	(0)
AlS04+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
PbS04	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
CdS04	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
Al(S04)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ni(S04)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
Cd(S04)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
Pb(S04)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
CuS04	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
FeS04+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe(S04)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
HgS04	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Se(-2)	4.685e-09					
HSe-	4.677e-09	3.279e-09	-8.330	-8.484	-0.154	(0)
H2Se	4.054e-12	4.054e-12	-11.392	-11.392	0.000	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Se-2	6.423e-17	1.553e-17	-16.192	-16.809	-0.617	(0)
Se(4)	3.770e-07					
HSeO3-	3.526e-07	2.472e-07	-6.453	-6.607	-0.154	(0)
SeO3-2	2.442e-08	5.904e-09	-7.612	-8.229	-0.617	(0)
H2SeO3	1.653e-11	1.653e-11	-10.782	-10.782	0.000	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Se(6)	2.478e-21					
SeO4-2	2.463e-21	9.439e-22	-20.609	-21.025	-0.416	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)

	HSeO4-	9.645e-27	6.763e-27	-26.016	-26.170	-0.154	(0)
	CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
	Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
Zn	2.612e-06						
	Zn+2	1.813e-06	6.948e-07	-5.742	-6.158	-0.416	(0)
	ZnSO4	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
	Zn(SO4)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
	ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
	ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
	ZnOH+	4.520e-09	3.170e-09	-8.345	-8.499	-0.154	(0)
	ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
	ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
	Zn(OH)2	4.227e-11	4.227e-11	-10.374	-10.374	0.000	(0)
	ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
	Zn(OH)3-	1.872e-14	1.313e-14	-13.728	-13.882	-0.154	(0)
	Zn(OH)4-2	1.339e-19	3.238e-20	-18.873	-19.490	-0.617	(0)
	ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
	Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
	ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
	Zn(NO3)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-124.48	-118.20	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-28.70	-24.17	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.96	-24.17	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-179.81	-161.88	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.93	-20.82	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-28.36	-27.91	0.45	(NH4)2SeO4
Al(OH)3(am)	0.09	11.16	11.06	Al(OH)3
Al2O3	2.05	22.32	20.27	Al2O3
Al4(OH)10SO4	5.98	28.68	22.70	Al4(OH)10SO4
AlOHSO4	-1.57	-4.80	-3.23	AlOHSO4
Alunite	6.34	5.44	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.24	-11.06	-7.82	PbSO4
Anhydrite	-1.07	-5.41	-4.34	CaSO4
Antlerite	-12.92	-4.13	8.79	Cu3(OH)4SO4
Atacamite	-7.99	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.78	-8.54	-1.76	ZnSO4:6H2O
Birnessite	-18.88	-0.79	18.09	MnO2
Bixbyite	-16.81	-17.16	-0.35	Mn2O3
Boehmite	2.30	11.16	8.86	AlOOH
Brochantite	-15.89	-0.19	15.71	Cu4(OH)6SO4
Brucite	-6.06	11.06	17.12	Mg(OH)2
Bunsenite	-4.77	7.92	12.68	NiO
Ca3(PO4)2(beta)	-2.69	-31.73	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-5.80	-52.88	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.79	-21.14	-19.35	CaHP04
CaHP04:2H2O	-2.09	-21.14	-19.05	CaHP04:2H2O
Calomel	-14.15	-32.28	-18.13	Hg2Cl2
CaSeO3:2H2O	-5.71	-2.85	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-21.06	-24.06	-3.00	CaSeO4:2H2O
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-23.45	-16.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-23.34	-0.78	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-15.59	-48.19	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-24.12	4.28	28.40	Cd4(OH)6SO4
CdCl2	-10.84	-11.45	-0.61	CdCl2
CdCl2:1H2O	-9.78	-11.45	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-9.52	-11.46	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.21	-10.52	13.69	Cd
Cdmetal(gamma)	-24.32	-10.52	13.80	Cd
CdOHCl	-6.81	-3.20	3.61	CdOHCl
CdSe	10.17	-10.21	-20.38	CdSe
CdSeO4:2H2O	-27.70	-29.55	-1.85	CdSeO4:2H2O

CdS04	-10.85	-10.90	-0.05	CdS04
CdS04:1H2O	-9.25	-10.90	-1.65	CdS04:1H2O
CdS04:2.67H2O	-9.07	-10.90	-1.83	CdS04:2.67H2O
Chalcanthite	-9.36	-12.02	-2.65	CuS04:5H2O
Clausthalite	17.01	-10.37	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.05	-16.14	-2.09	Co(OH)3
Co3(P04)2	-3.27	-37.95	-34.69	Co3(P04)2
Co304	-13.57	-23.81	-10.24	Co304
CoCl2	-16.50	-8.04	8.46	CoCl2
CoCl2:6H2O	-10.56	-8.05	2.52	CoCl2:6H2O
CoFe204	21.18	18.03	-3.15	CoFe204
CoHP04	-4.15	-23.21	-19.06	CoHP04
CoO	-5.37	8.47	13.84	CoO
CoSe	9.40	-6.80	-16.20	CoSe
CoSe03	-6.24	-4.92	1.32	CoSe03
CoSe04:6H2O	-24.61	-26.14	-1.53	CoSe04:6H2O
CoS04	-10.48	-7.49	2.99	CoS04
CoS04:6H2O	-5.02	-7.49	-2.48	CoS04:6H2O
Cotunnite	-6.77	-11.61	-4.84	PbCl2
Cu(OH)2	-4.87	3.94	8.81	Cu(OH)2
Cu2(OH)3N03	-56.82	-47.39	9.42	Cu2(OH)3N03
Cu2Se(alpha)	28.69	-17.62	-46.31	Cu2Se
Cu2S04	-16.40	-18.30	-1.90	Cu2S04
Cu3(P04)2	-14.69	-51.54	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-16.42	-51.54	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.35	-28.95	-64.30	Cu3Se2
Cumetal	-0.04	-8.96	-8.93	Cu
Cu0CuS04	-18.70	-8.07	10.63	Cu0CuS04
Cupricferrite	7.02	13.50	6.49	CuFe204
Cuprite	-1.24	-2.35	-1.11	Cu2O
Cuprousferrite	12.49	3.61	-8.88	CuFe02
CuSe	22.06	-11.33	-33.39	CuSe
CuSe2	22.68	-11.02	-33.70	CuSe2
CuSe03:2H2O	-10.05	-9.46	0.60	CuSe03:2H2O
CuSe04:5H2O	-28.23	-30.67	-2.44	CuSe04:5H2O
CuS04	-15.13	-12.01	3.11	CuS04
Diaspore	4.04	11.16	7.12	Al00H
Epsomite	-2.75	-4.90	-2.15	MgS04:7H2O
Fe(OH)2	-3.44	10.12	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.34	2.30	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-5.39	-3.84	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H2O	-10.00	-30.63	-20.63	Fe2(Se03)3:2H2O
Fe2(S04)3	-35.15	-38.31	-3.16	Fe2(S04)3
Fe3(OH)8	-0.54	19.68	20.22	Fe3(OH)8
Ferrihydrite	1.41	4.78	3.37	Fe(OH)3
Ferroselite	13.87	-4.84	-18.71	FeSe2
FeSe	5.86	-5.15	-11.00	FeSe
Gibbsite	2.64	11.16	8.52	Al(OH)3
Goethite	4.15	4.78	0.64	Fe00H
Goslarite	-6.50	-8.54	-2.05	ZnS04:7H2O
Gypsum	-0.80	-5.41	-4.61	CaS04:2H2O
H-Jarosite	-6.02	-17.57	-11.55	(H30)Fe3(S04)2(OH)6
H2Se(g)	-10.35	-15.27	-4.92	H2Se
Halite	-4.49	-2.90	1.59	NaCl
Hausmannite	-18.74	43.29	62.03	Mn304
Hematite	10.67	9.56	-1.11	Fe203
Hercynite	8.80	32.44	23.64	FeAl204
Hg(g)	-7.75	-15.67	-7.93	Hg
Hg(OH)2	-18.27	-21.76	-3.50	Hg(OH)2
Hg2(g)	-16.26	-31.35	-15.09	Hg2
Hg2(OH)2	-21.03	-15.77	5.26	Hg2(OH)2
Hg2HP04	-22.68	-47.45	-24.77	Hg2HP04
Hg2Se03	-24.51	-29.17	-4.66	Hg2Se03
Hg2S04	-25.58	-31.73	-6.14	Hg2S04
HgCl(g)	-36.02	-16.14	19.88	HgCl
HgCl2	-16.76	-38.28	-21.52	HgCl2
Hgmetal(l)	-2.02	-15.67	-13.65	Hg

HgSe	18.66	-37.04	-55.69	HgSe
HgSeO3	-22.73	-35.16	-12.43	HgSeO3
HgSO4	-28.27	-37.72	-9.45	HgSO4
Hinsdalite	-6.76	-9.26	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	2.00	-42.33	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-7.75	-70.54	-62.79	Pb5(P04)3OH
K-Alum	-11.65	-16.89	-5.24	KAl(S04)2:12H2O
K-Jarosite	0.79	-13.70	-14.49	KFe3(S04)2(OH)6
K2SeO4	-26.12	-26.85	-0.73	K2SeO4
Langite	-18.07	-0.19	17.88	Cu4(OH)6S04:H2O
Larnakite	-5.77	-6.15	-0.38	Pb0:PbS04
Laurionite	-3.98	-3.35	0.62	PbOHCl
Lepidocrocite	3.41	4.78	1.37	FeOOH
Lime	-22.62	10.54	33.16	CaO
Litharge	-7.95	4.90	12.85	PbO
Maghemite	3.18	9.56	6.39	Fe2O3
Magnesioferrite	3.10	20.62	17.52	Fe2MgO4
Magnetite	15.79	19.69	3.90	Fe3O4
Manganite	-8.31	17.03	25.34	MnOOH
Massicot	-8.15	4.90	13.05	PbO
Melanothallite	-18.98	-12.57	6.41	CuCl2
Melanterite	-3.58	-5.84	-2.26	FeS04:7H2O
Mg(OH)2(active)	-7.73	11.06	18.79	Mg(OH)2
Mg3(P04)2	-6.90	-30.18	-23.28	Mg3(P04)2
MgHP04:3H2O	-2.45	-20.62	-18.18	MgHP04:3H2O
MgSeO3:6H2O	-5.38	-2.34	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-22.35	-23.55	-1.20	MgSeO4:6H2O
Minium	-44.24	30.28	74.53	Pb3O4
Mirabilite	-3.95	-5.25	-1.30	Na2S04:10H2O
Mn2(S04)3	-59.71	-65.03	-5.32	Mn2(S04)3
Mn3(P04)2	-11.81	-35.65	-23.85	Mn3(P04)2
MnCl2:4H2O	-10.02	-7.28	2.74	MnCl2:4H2O
MnHP04	2.95	-22.45	-25.40	MnHP04
MnSe	-9.77	-6.04	3.73	MnSe
MnSeO3	-5.29	-4.16	1.13	MnSeO3
MnSeO3:2H2O	-5.12	-4.16	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-23.32	-25.37	-2.05	MnSeO4:5H2O
MnSO4	-9.46	-6.72	2.74	MnSO4
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.22	-21.76	-3.55	HgO
Morenosite	-5.87	-8.05	-2.17	NiS04:7H2O
Na-Jarosite	-1.38	-12.22	-10.84	NaFe3(S04)2(OH)6
Na2SeO3:5H2O	-12.99	-2.69	10.30	Na2SeO3:5H2O
Na2SeO4	-25.17	-23.89	1.28	Na2SeO4
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.11	7.91	13.02	Ni(OH)2
Ni3(P04)2	-8.32	-39.62	-31.30	Ni3(P04)2
Ni4(OH)6S04	-16.30	15.70	32.00	Ni4(OH)6S04
NiSe	10.34	-7.36	-17.70	NiSe
NiSeO3:2H2O	-8.37	-5.48	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-25.17	-26.69	-1.52	NiSeO4:6H2O
Nsutite	-18.29	-0.79	17.50	MnO2
O2(g)	-53.29	31.16	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.25	1.55	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-16.39	9.80	26.19	Pb2O(OH)2
Pb2O3	-35.66	25.38	61.04	Pb2O3
Pb3(P04)2	-5.13	-48.66	-43.53	Pb3(P04)2
Pb3O2S04	-12.13	-1.25	10.87	Pb3O2S04
Pb4(OH)6S04	-17.45	3.65	21.10	Pb4(OH)6S04
Pb4O3S04	-18.55	3.65	22.20	Pb4O3S04
PbHP04	-2.98	-26.78	-23.81	PbHP04
Pbmetal	-14.92	-10.68	4.24	Pb
PbO:0.3H2O	-8.08	4.90	12.98	PbO:0.33H2O
PbSeO4	-22.83	-29.70	-6.88	PbSeO4
Periclase	-10.88	11.06	21.94	MgO
Plattnerite	-29.83	20.48	50.31	PbO2
Plumbgummite	7.80	-24.99	-32.79	PbAl3(P04)2(OH)5:H2O

Portlandite	-12.57	10.54	23.11	Ca(OH)2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-17.21	24.82	42.03	MnO2
Pyromorphite	5.63	-78.80	-84.43	Pb5(P04)3Cl
Retgersite	-6.00	-8.05	-2.05	NiSO4:6H2O
Semetal(am)	7.44	0.31	-7.14	Se
Semetal(hex	8.05	0.31	-7.75	Se
SeO2	-13.52	-13.40	0.12	SeO2
SeO3	-56.00	-34.60	21.39	SeO3
Spinel	-4.39	33.38	37.77	MgAl2O4
Strengite	-0.53	-26.90	-26.38	FeP04:2H2O
Tenorite	-3.86	3.94	7.80	CuO
Thenardite	-5.59	-5.25	0.34	Na2SO4
Tsumebite	-8.15	-17.94	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	3.00	-33.00	-36.00	Fe3(P04)2:8H2O
Zincite	-4.13	7.42	11.55	ZnO
Zincosite	-12.66	-8.54	4.13	ZnSO4
Zn(NO3)2:6H2O	-106.39	-103.14	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.78	7.42	12.20	Zn(OH)2
Zn(OH)2(am)	-5.25	7.42	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.42	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.31	7.42	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.42	11.73	Zn(OH)2
Zn2(OH)2SO4	-8.62	-1.12	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.61	6.58	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-5.69	-41.11	-35.42	Zn3(P04)2:4H2O
Zn3O(SO4)2	-29.18	-9.65	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-14.68	13.72	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.91	20.59	38.50	Zn5(OH)8Cl2
ZnCl2	-16.31	-9.09	7.22	ZnCl2
Znmetal	-34.31	-8.16	26.15	Zn
ZnO(active)	-3.98	7.42	11.40	ZnO
ZnSe	6.61	-7.85	-14.46	ZnSe
ZnSeO4:6H2O	-25.67	-27.19	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-8.00	-8.54	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using solution 1.

Using reaction 1.

Reaction 1.

4.000e+01 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000
Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	4.932e-05	1.378e-05
Ca	1.167e-02	3.259e-03

Cd	9.598e-08	2.681e-08
Cl	1.555e-01	4.344e-02
Co	1.428e-04	3.989e-05
Cu	1.754e-05	4.901e-06
Fe	6.461e-03	1.805e-03
Hg	3.586e-09	1.002e-09
K	5.703e-03	1.593e-03
Mg	3.640e-02	1.017e-02
Mn	7.986e-04	2.231e-04
N	1.797e-03	5.021e-04
Na	1.711e-01	4.781e-02
Ni	2.757e-05	7.703e-06
P	7.895e-05	2.206e-05
Pb	5.207e-08	1.455e-08
S	5.559e-02	1.553e-02
Se	1.366e-06	3.817e-07
Zn	9.350e-06	2.612e-06

-----Description of solution-----

pH	=	6.754	Charge balance
pe	=	1.473	Adjusted to redox equilibrium
Activity of water	=	0.993	
Ionic strength (mol/kgw)	=	3.059e-01	
Mass of water (kg)	=	2.794e-01	
Total alkalinity (eq/kg)	=	2.247e-04	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	6.374e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	4.82	
Iterations	=	10	
Total H	=	3.101575e+01	
Total O	=	1.556909e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.397e-07	1.761e-07	-6.620	-6.754	-0.134	0.00
OH-	6.202e-08	4.180e-08	-7.207	-7.379	-0.171	(0)
H2O	5.551e+01	9.929e-01	1.744	-0.003	0.000	18.05
Al	4.932e-05					
Al(OH)4-	3.106e-05	2.177e-05	-4.508	-4.662	-0.154	(0)
Al(OH)2+	9.639e-06	6.958e-06	-5.016	-5.158	-0.142	(0)
Al(OH)3	7.881e-06	7.881e-06	-5.103	-5.103	0.000	(0)
AlOH+2	4.373e-07	1.187e-07	-6.359	-6.926	-0.566	(0)
AlSO4+	2.299e-07	1.611e-07	-6.639	-6.793	-0.154	(0)
Al+3	4.361e-08	2.718e-09	-7.360	-8.566	-1.205	(0)
Al(SO4)2-	2.395e-08	1.679e-08	-7.621	-7.775	-0.154	(0)
Ca	1.167e-02					
Ca+2	7.420e-03	2.161e-03	-2.130	-2.665	-0.536	(0)
CaSO4	4.240e-03	4.240e-03	-2.373	-2.373	0.000	(0)
CaHP04	3.923e-06	3.923e-06	-5.406	-5.406	0.000	(0)
CaH2PO4+	7.519e-07	5.427e-07	-6.124	-6.265	-0.142	(0)
CaNH3+2	1.233e-07	9.339e-09	-6.909	-8.030	-1.121	(0)
CaPO4-	7.522e-08	5.430e-08	-7.124	-7.265	-0.142	(0)
CaOH+	2.346e-09	1.722e-09	-8.630	-8.764	-0.134	(0)
Ca(NH3)2+2	1.685e-13	1.276e-14	-12.773	-13.894	-1.121	(0)
CaNO3+	0.000e+00	0.000e+00	-46.472	-46.752	-0.280	(0)
Cd	9.598e-08					
CdCl+	5.635e-08	2.956e-08	-7.249	-7.529	-0.280	(0)
CdCl2	1.392e-08	1.392e-08	-7.856	-7.856	0.000	(0)
Cd+2	9.357e-09	2.726e-09	-8.029	-8.565	-0.536	(0)
Cd(SO4)2-2	9.022e-09	6.833e-10	-8.045	-9.165	-1.121	(0)
CdSO4	5.424e-09	5.424e-09	-8.266	-8.266	0.000	(0)
CdCl3-	1.840e-09	9.652e-10	-8.735	-9.015	-0.280	(0)

CdOHC1	6.263e-11	6.263e-11	-10.203	-10.203	0.000	(0)
CdOH+	1.734e-12	9.099e-13	-11.761	-12.041	-0.280	(0)
Cd(OH)2	4.402e-16	4.402e-16	-15.356	-15.356	0.000	(0)
Cd(SeO3)2-2	5.863e-18	4.441e-19	-17.232	-18.353	-1.121	(0)
Cd2OH+3	4.339e-18	1.306e-20	-17.363	-19.884	-2.522	(0)
Cd(OH)3-	2.910e-21	1.527e-21	-20.536	-20.816	-0.280	(0)
CdSeO4	8.266e-27	8.266e-27	-26.083	-26.083	0.000	(0)
Cd(OH)4-2	1.873e-28	1.418e-29	-27.728	-28.848	-1.121	(0)
CdHS+	0.000e+00	0.000e+00	-41.082	-41.362	-0.280	(0)
CdNO3+	0.000e+00	0.000e+00	-52.334	-52.615	-0.280	(0)
Cd(HS)2	0.000e+00	0.000e+00	-74.964	-74.964	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-97.565	-97.565	0.000	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-113.590	-113.870	-0.280	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-151.360	-152.480	-1.121	(0)
Cl	1.555e-01					
Cl-	1.554e-01	1.142e-01	-0.808	-0.942	-0.134	(0)
CuCl2-	1.605e-05	1.104e-05	-4.795	-4.957	-0.162	(0)
MnCl+	1.078e-05	7.686e-06	-4.967	-5.114	-0.147	(0)
CoCl+	6.784e-06	3.559e-06	-5.169	-5.449	-0.280	(0)
NiCl+	2.643e-06	1.386e-06	-5.578	-5.858	-0.280	(0)
MnCl2	1.240e-06	1.240e-06	-5.907	-5.907	0.000	(0)
CuCl3-2	1.028e-06	2.655e-07	-5.988	-6.576	-0.588	(0)
ZnCl+	4.856e-07	3.341e-07	-6.314	-6.476	-0.162	(0)
CuCl	4.584e-07	4.584e-07	-6.339	-6.339	0.000	(0)
CdCl+	5.635e-08	2.956e-08	-7.249	-7.529	-0.280	(0)
MnCl3-	5.470e-08	3.900e-08	-7.262	-7.409	-0.147	(0)
ZnCl2	5.085e-08	5.085e-08	-7.294	-7.294	0.000	(0)
ZnOHC1	2.558e-08	2.558e-08	-7.592	-7.592	0.000	(0)
PbCl+	1.853e-08	9.723e-09	-7.732	-8.012	-0.280	(0)
CdCl2	1.392e-08	1.392e-08	-7.856	-7.856	0.000	(0)
ZnCl3-	6.595e-09	4.537e-09	-8.181	-8.343	-0.162	(0)
PbCl2	4.871e-09	4.871e-09	-8.312	-8.312	0.000	(0)
CdCl3-	1.840e-09	9.652e-10	-8.735	-9.015	-0.280	(0)
ZnCl4-2	9.712e-10	2.509e-10	-9.013	-9.600	-0.588	(0)
NiCl2	8.060e-10	8.060e-10	-9.094	-9.094	0.000	(0)
PbCl3-	4.410e-10	2.314e-10	-9.356	-9.636	-0.280	(0)
PbCl4-2	1.503e-10	1.138e-11	-9.823	-10.944	-1.121	(0)
CdOHC1	6.263e-11	6.263e-11	-10.203	-10.203	0.000	(0)
CuCl+	5.049e-11	3.474e-11	-10.297	-10.459	-0.162	(0)
CuCl2	1.130e-12	1.130e-12	-11.947	-11.947	0.000	(0)
FeCl+2	1.084e-14	2.799e-15	-13.965	-14.553	-0.588	(0)
HgCl4-2	3.482e-15	2.637e-16	-14.458	-15.579	-1.121	(0)
FeCl2+	2.272e-15	1.620e-15	-14.644	-14.790	-0.147	(0)
CuCl3-	1.629e-15	1.121e-15	-14.788	-14.951	-0.162	(0)
HgCl3-	1.066e-15	5.591e-16	-14.972	-15.252	-0.280	(0)
HgCl2	4.853e-16	4.853e-16	-15.314	-15.314	0.000	(0)
FeCl3	1.850e-17	1.850e-17	-16.733	-16.733	0.000	(0)
HgClOH	3.244e-18	3.244e-18	-17.489	-17.489	0.000	(0)
CuCl4-2	2.844e-18	7.346e-19	-17.546	-18.134	-0.588	(0)
HgCl+	1.373e-21	7.205e-22	-20.862	-21.142	-0.280	(0)
CoCl+2	3.027e-34	2.293e-35	-33.519	-34.640	-1.121	(0)
Co(NH3)5Cl+2	7.585e-36	5.745e-37	-35.120	-36.241	-1.121	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-47.278	-48.399	-1.121	(0)
Co(2)	1.428e-04					
Co+2	1.202e-04	9.107e-06	-3.920	-5.041	-1.121	(0)
CoSO4	1.564e-05	1.564e-05	-4.806	-4.806	0.000	(0)
CoCl+	6.784e-06	3.559e-06	-5.169	-5.449	-0.280	(0)
Co(NH3)+2	7.087e-08	5.368e-09	-7.150	-8.270	-1.121	(0)
CoHPO4	3.881e-08	3.881e-08	-7.411	-7.411	0.000	(0)
CoOH+	1.966e-08	1.032e-08	-7.706	-7.987	-0.280	(0)
Co(OH)2	4.651e-11	4.651e-11	-10.332	-10.332	0.000	(0)
Co(NH3)2+2	7.264e-12	5.502e-13	-11.139	-12.259	-1.121	(0)
Co2OH+3	1.565e-12	4.708e-15	-11.806	-14.327	-2.522	(0)
Co(NH3)3+2	3.139e-16	2.377e-17	-15.503	-16.624	-1.121	(0)
Co(OH)3-	1.004e-16	5.268e-17	-15.998	-16.278	-0.280	(0)
CoOOH-	6.081e-18	3.190e-18	-17.216	-17.496	-0.280	(0)
Co4(OH)4+4	6.865e-20	2.259e-24	-19.163	-23.646	-4.483	(0)
Co(NH3)4+2	5.653e-21	4.282e-22	-20.248	-21.368	-1.121	(0)

CoSeO4	6.960e-23	6.960e-23	-22.157	-22.157	0.000	(0)
Co(OH)4-2	6.258e-24	4.740e-25	-23.204	-24.324	-1.121	(0)
Co(NH3)5+2	3.220e-26	2.439e-27	-25.492	-26.613	-1.121	(0)
CoNO2+	1.103e-36	5.787e-37	-35.957	-36.238	-0.280	(0)
CoNO3+	0.000e+00	0.000e+00	-49.160	-49.441	-0.280	(0)
Co(NO3)2	0.000e+00	0.000e+00	-93.732	-93.732	0.000	(0)
Co(3)	4.103e-30					
CoOH+2	4.103e-30	3.107e-31	-29.387	-30.508	-1.121	(0)
CoCl+2	3.027e-34	2.293e-35	-33.519	-34.640	-1.121	(0)
Co+3	1.728e-35	1.077e-36	-34.762	-35.968	-1.205	(0)
Co(NH3)5Cl+2	7.585e-36	5.745e-37	-35.120	-36.241	-1.121	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-44.350	-44.630	-0.280	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-47.278	-48.399	-1.121	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-49.133	-50.254	-1.121	(0)
Cu(1)	1.754e-05					
CuCl2-	1.605e-05	1.104e-05	-4.795	-4.957	-0.162	(0)
CuCl3-2	1.028e-06	2.655e-07	-5.988	-6.576	-0.588	(0)
CuCl	4.584e-07	4.584e-07	-6.339	-6.339	0.000	(0)
Cu+	6.078e-09	3.189e-09	-8.216	-8.496	-0.280	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-72.722	-73.210	-0.488	(0)
CuS4S5-3	0.000e+00	0.000e+00	-73.484	-73.940	-0.456	(0)
Cu(2)	1.314e-09					
Cu+2	6.896e-10	2.009e-10	-9.161	-9.697	-0.536	(0)
CuSO4	3.907e-10	3.907e-10	-9.408	-9.408	0.000	(0)
CuNH3+2	1.383e-10	1.047e-11	-9.859	-10.980	-1.121	(0)
CuCl+	5.049e-11	3.474e-11	-10.297	-10.459	-0.162	(0)
CuOH+	4.307e-11	2.963e-11	-10.366	-10.528	-0.162	(0)
CuCl2	1.130e-12	1.130e-12	-11.947	-11.947	0.000	(0)
Cu(OH)2	4.084e-13	4.084e-13	-12.389	-12.389	0.000	(0)
CuCl3-	1.629e-15	1.121e-15	-14.788	-14.951	-0.162	(0)
Cu2(OH)2+2	2.833e-16	2.146e-17	-15.548	-16.668	-1.121	(0)
Cu(OH)3-	9.066e-17	4.756e-17	-16.043	-16.323	-0.280	(0)
CuCl4-2	2.844e-18	7.346e-19	-17.546	-18.134	-0.588	(0)
Cu(OH)4-2	2.805e-22	2.125e-23	-21.552	-22.673	-1.121	(0)
CuNO2+	3.615e-40	1.897e-40	-39.442	-39.722	-0.280	(0)
CuNO3+	0.000e+00	0.000e+00	-53.507	-53.787	-0.280	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-70.757	-70.757	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-99.297	-99.297	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-105.936	-106.216	-0.280	(0)
Fe(2)	6.460e-03					
Fe+2	5.568e-03	4.217e-04	-2.254	-3.375	-1.121	(0)
FeSO4	8.821e-04	8.821e-04	-3.054	-3.054	0.000	(0)
FeHP04	6.558e-06	6.558e-06	-5.183	-5.183	0.000	(0)
FeH2P04+	3.178e-06	2.294e-06	-5.498	-5.639	-0.142	(0)
FeOH+	9.842e-07	7.017e-07	-6.007	-6.154	-0.147	(0)
Fe(OH)2	2.229e-11	2.229e-11	-10.652	-10.652	0.000	(0)
Fe(OH)3-	5.408e-13	3.855e-13	-12.267	-12.414	-0.147	(0)
Fe(HS)2	0.000e+00	0.000e+00	-76.037	-76.037	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-114.526	-114.806	-0.280	(0)
Fe(3)	1.059e-06					
Fe(OH)2+	1.033e-06	7.454e-07	-5.986	-6.128	-0.142	(0)
Fe(OH)3	2.571e-08	2.571e-08	-7.590	-7.590	0.000	(0)
Fe(OH)4-	3.327e-10	2.402e-10	-9.478	-9.619	-0.142	(0)
FeOH+2	1.039e-10	2.683e-11	-9.984	-10.571	-0.588	(0)
FeHP04+	4.867e-11	3.513e-11	-10.313	-10.454	-0.142	(0)
FeSO4+	1.125e-13	8.021e-14	-12.949	-13.096	-0.147	(0)
Fe(SO4)2-	3.005e-14	1.576e-14	-13.522	-13.802	-0.280	(0)
Fe+3	1.477e-14	9.209e-16	-13.831	-15.036	-1.205	(0)
FeCl+2	1.084e-14	2.799e-15	-13.965	-14.553	-0.588	(0)
FeCl2+	2.272e-15	1.620e-15	-14.644	-14.790	-0.147	(0)
Fe2(OH)2+4	8.356e-16	2.750e-20	-15.078	-19.561	-4.483	(0)
FeH2P04+2	6.990e-16	1.898e-16	-15.156	-15.722	-0.566	(0)
FeCl3	1.850e-17	1.850e-17	-16.733	-16.733	0.000	(0)
FeHSeO3+2	1.742e-17	1.320e-18	-16.759	-17.880	-1.121	(0)
Fe3(OH)4+5	2.869e-18	2.841e-25	-17.542	-24.546	-7.004	(0)
FeNO3+2	0.000e+00	0.000e+00	-57.427	-58.548	-1.121	(0)
H(0)	4.827e-20					
H2	2.414e-20	2.590e-20	-19.617	-19.587	0.031	(0)

Hg(0)	3.586e-09					
Hg	3.586e-09	3.586e-09	-8.445	-8.445	0.000	(0)
Hg(1)	1.335e-26					
Hg2+2	6.674e-27	5.055e-28	-26.176	-27.296	-1.121	(0)
Hg(2)	5.036e-15					
HgCl4-2	3.482e-15	2.637e-16	-14.458	-15.579	-1.121	(0)
HgCl3-	1.066e-15	5.591e-16	-14.972	-15.252	-0.280	(0)
HgCl2	4.853e-16	4.853e-16	-15.314	-15.314	0.000	(0)
HgClOH	3.244e-18	3.244e-18	-17.489	-17.489	0.000	(0)
Hg(NH3)2+2	8.513e-20	6.448e-21	-19.070	-20.191	-1.121	(0)
Hg(OH)2	4.247e-21	4.557e-21	-20.372	-20.341	0.031	(0)
HgCl+	1.373e-21	7.205e-22	-20.862	-21.142	-0.280	(0)
HgNH3+2	6.409e-24	4.854e-25	-23.193	-24.314	-1.121	(0)
Hg(NH3)3+2	1.671e-24	1.265e-25	-23.777	-24.898	-1.121	(0)
HgOH+	1.071e-24	5.619e-25	-23.970	-24.250	-0.280	(0)
Hg+2	3.680e-27	2.787e-28	-26.434	-27.555	-1.121	(0)
HgS04	5.225e-28	5.225e-28	-27.282	-27.282	0.000	(0)
Hg(NH3)4+2	6.577e-29	4.982e-30	-28.182	-29.303	-1.121	(0)
Hg(OH)3-	6.208e-29	3.257e-29	-28.207	-28.487	-0.280	(0)
HgHS2-	0.000e+00	0.000e+00	-70.299	-70.579	-0.280	(0)
Hg(HS)2	0.000e+00	0.000e+00	-70.939	-70.939	0.000	(0)
HgS2-2	0.000e+00	0.000e+00	-71.412	-72.533	-1.121	(0)
HgNO3+	0.000e+00	0.000e+00	-72.402	-72.682	-0.280	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-117.663	-117.663	0.000	(0)
K	5.703e-03					
K+	5.366e-03	3.942e-03	-2.270	-2.404	-0.134	(0)
KS04-	3.366e-04	2.430e-04	-3.473	-3.614	-0.142	(0)
KHP04-	1.618e-07	1.168e-07	-6.791	-6.933	-0.142	(0)
Mg	3.640e-02					
Mg+2	2.496e-02	7.272e-03	-1.603	-2.138	-0.536	(0)
MgS04	1.141e-02	1.141e-02	-1.943	-1.943	0.000	(0)
MgHP04	1.822e-05	1.822e-05	-4.739	-4.739	0.000	(0)
MgH2P04+	5.408e-06	3.903e-06	-5.267	-5.409	-0.142	(0)
MgOH+	1.523e-07	1.133e-07	-6.817	-6.946	-0.129	(0)
MgP04-	3.956e-09	2.856e-09	-8.403	-8.544	-0.142	(0)
Mn(2)	7.986e-04					
Mn+2	7.058e-04	5.346e-05	-3.151	-4.272	-1.121	(0)
MnS04	8.070e-05	8.070e-05	-4.093	-4.093	0.000	(0)
MnCl+	1.078e-05	7.686e-06	-4.967	-5.114	-0.147	(0)
MnCl2	1.240e-06	1.240e-06	-5.907	-5.907	0.000	(0)
MnCl3-	5.470e-08	3.900e-08	-7.262	-7.409	-0.147	(0)
MnOH+	7.872e-09	5.613e-09	-8.104	-8.251	-0.147	(0)
MnSe	2.498e-14	2.498e-14	-13.602	-13.602	0.000	(0)
Mn(OH)3-	2.129e-19	1.518e-19	-18.672	-18.819	-0.147	(0)
MnSe04	2.170e-22	2.170e-22	-21.663	-21.663	0.000	(0)
Mn(OH)4-2	1.077e-25	2.782e-26	-24.968	-25.556	-0.588	(0)
MnNO3+	0.000e+00	0.000e+00	-48.392	-48.672	-0.280	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-92.868	-92.868	0.000	(0)
Mn(3)	6.301e-28					
Mn+3	6.301e-28	3.928e-29	-27.201	-28.406	-1.205	(0)
Mn(6)	0.000e+00					
Mn04-2	0.000e+00	0.000e+00	-63.887	-64.475	-0.588	(0)
Mn(7)	0.000e+00					
Mn04-	0.000e+00	0.000e+00	-72.459	-72.640	-0.181	(0)
N(-3)	1.797e-03					
NH4+	1.652e-03	1.060e-03	-2.782	-2.975	-0.193	(0)
NH4S04-	1.419e-04	1.011e-04	-3.848	-3.995	-0.147	(0)
NH3	2.580e-06	2.580e-06	-5.588	-5.588	0.000	(0)
NiNH3+2	1.686e-07	1.277e-08	-6.773	-7.894	-1.121	(0)
CaNH3+2	1.233e-07	9.339e-09	-6.909	-8.030	-1.121	(0)
Co(NH3)+2	7.087e-08	5.368e-09	-7.150	-8.270	-1.121	(0)
CuNH3+2	1.383e-10	1.047e-11	-9.859	-10.980	-1.121	(0)
Ni(NH3)2+2	1.068e-10	8.090e-12	-9.971	-11.092	-1.121	(0)
Co(NH3)2+2	7.264e-12	5.502e-13	-11.139	-12.259	-1.121	(0)
Ca(NH3)2+2	1.685e-13	1.276e-14	-12.773	-13.894	-1.121	(0)
Co(NH3)3+2	3.139e-16	2.377e-17	-15.503	-16.624	-1.121	(0)
Hg(NH3)2+2	8.513e-20	6.448e-21	-19.070	-20.191	-1.121	(0)
Co(NH3)4+2	5.653e-21	4.282e-22	-20.248	-21.368	-1.121	(0)

HgNH3+2	6.409e-24	4.854e-25	-23.193	-24.314	-1.121	(0)
Hg(NH3)3+2	1.671e-24	1.265e-25	-23.777	-24.898	-1.121	(0)
Co(NH3)5+2	3.220e-26	2.439e-27	-25.492	-26.613	-1.121	(0)
Hg(NH3)4+2	6.577e-29	4.982e-30	-28.182	-29.303	-1.121	(0)
Co(NH3)5Cl+2	7.585e-36	5.745e-37	-35.120	-36.241	-1.121	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-44.350	-44.630	-0.280	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-47.278	-48.399	-1.121	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-49.133	-50.254	-1.121	(0)
N(3)	1.369e-32					
N02-	1.369e-32	9.016e-33	-31.864	-32.045	-0.181	(0)
CoN02+	1.103e-36	5.787e-37	-35.957	-36.238	-0.280	(0)
CuN02+	3.615e-40	1.897e-40	-39.442	-39.722	-0.280	(0)
Cu(N02)2	0.000e+00	0.000e+00	-70.757	-70.757	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-44.466	-44.600	-0.134	(0)
CaN03+	0.000e+00	0.000e+00	-46.472	-46.752	-0.280	(0)
MnN03+	0.000e+00	0.000e+00	-48.392	-48.672	-0.280	(0)
CoN03+	0.000e+00	0.000e+00	-49.160	-49.441	-0.280	(0)
NiN03+	0.000e+00	0.000e+00	-49.239	-49.519	-0.280	(0)
ZnN03+	0.000e+00	0.000e+00	-49.830	-50.110	-0.280	(0)
PbN03+	0.000e+00	0.000e+00	-51.754	-52.034	-0.280	(0)
CdN03+	0.000e+00	0.000e+00	-52.334	-52.615	-0.280	(0)
CuN03+	0.000e+00	0.000e+00	-53.507	-53.787	-0.280	(0)
FeN03+2	0.000e+00	0.000e+00	-57.427	-58.548	-1.121	(0)
HgN03+	0.000e+00	0.000e+00	-72.402	-72.682	-0.280	(0)
Mn(N03)2	0.000e+00	0.000e+00	-92.868	-92.868	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-93.732	-93.732	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-95.421	-95.421	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-96.383	-96.383	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-97.565	-97.565	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-99.297	-99.297	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-117.663	-117.663	0.000	(0)
Na	1.711e-01					
Na+	1.632e-01	1.199e-01	-0.787	-0.921	-0.134	(0)
NaS04-	7.900e-03	5.703e-03	-2.102	-2.244	-0.142	(0)
NaHP04-	7.624e-06	5.503e-06	-5.118	-5.259	-0.142	(0)
Ni	2.757e-05					
Ni+2	1.647e-05	4.797e-06	-4.783	-5.319	-0.536	(0)
NiS04	8.256e-06	8.256e-06	-5.083	-5.083	0.000	(0)
NiCl+	2.643e-06	1.386e-06	-5.578	-5.858	-0.280	(0)
NiNH3+2	1.686e-07	1.277e-08	-6.773	-7.894	-1.121	(0)
Ni(S04)2-2	3.318e-08	2.513e-09	-7.479	-8.600	-1.121	(0)
NiOH+	4.918e-09	2.580e-09	-8.308	-8.588	-0.280	(0)
NiCl2	8.060e-10	8.060e-10	-9.094	-9.094	0.000	(0)
Ni(NH3)2+2	1.068e-10	8.090e-12	-9.971	-11.092	-1.121	(0)
Ni(OH)2	1.546e-11	1.546e-11	-10.811	-10.811	0.000	(0)
Ni(OH)3-	1.673e-15	8.775e-16	-14.777	-15.057	-0.280	(0)
NiSe04	3.384e-23	3.384e-23	-22.471	-22.471	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-49.239	-49.519	-0.280	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-54.270	-54.239	0.031	(0)
P	7.895e-05					
MgHP04	1.822e-05	1.822e-05	-4.739	-4.739	0.000	(0)
H2P04-	1.660e-05	1.198e-05	-4.780	-4.922	-0.142	(0)
HP04-2	1.642e-05	4.241e-06	-4.785	-5.373	-0.588	(0)
NaHP04-	7.624e-06	5.503e-06	-5.118	-5.259	-0.142	(0)
FeHP04	6.558e-06	6.558e-06	-5.183	-5.183	0.000	(0)
MgH2P04+	5.408e-06	3.903e-06	-5.267	-5.409	-0.142	(0)
CaHP04	3.923e-06	3.923e-06	-5.406	-5.406	0.000	(0)
FeH2P04+	3.178e-06	2.294e-06	-5.498	-5.639	-0.142	(0)
CaH2P04+	7.519e-07	5.427e-07	-6.124	-6.265	-0.142	(0)
KHP04-	1.618e-07	1.168e-07	-6.791	-6.933	-0.142	(0)
CaP04-	7.522e-08	5.430e-08	-7.124	-7.265	-0.142	(0)
CoHP04	3.881e-08	3.881e-08	-7.411	-7.411	0.000	(0)
MgP04-	3.956e-09	2.856e-09	-8.403	-8.544	-0.142	(0)
H3P04	2.841e-10	2.841e-10	-9.547	-9.547	0.000	(0)
P04-3	1.500e-10	9.353e-12	-9.824	-11.029	-1.205	(0)
FeHP04+	4.867e-11	3.513e-11	-10.313	-10.454	-0.142	(0)

FeH2PO4+2	6.990e-16	1.898e-16	-15.156	-15.722	-0.566	(0)
Pb	5.207e-08					
PbCl+	1.853e-08	9.723e-09	-7.732	-8.012	-0.280	(0)
PbSO4	1.098e-08	1.098e-08	-7.960	-7.960	0.000	(0)
Pb+2	8.640e-09	2.517e-09	-8.063	-8.599	-0.536	(0)
Pb(SO4)2-2	7.775e-09	5.888e-10	-8.109	-9.230	-1.121	(0)
PbCl2	4.871e-09	4.871e-09	-8.312	-8.312	0.000	(0)
PbOH+	6.841e-10	3.589e-10	-9.165	-9.445	-0.280	(0)
PbCl3-	4.410e-10	2.314e-10	-9.356	-9.636	-0.280	(0)
PbCl4-2	1.503e-10	1.138e-11	-9.823	-10.944	-1.121	(0)
Pb(OH)2	6.442e-13	6.442e-13	-12.191	-12.191	0.000	(0)
Pb2OH+3	4.757e-15	1.431e-17	-14.323	-16.844	-2.522	(0)
Pb(OH)3-	6.971e-17	3.657e-17	-16.157	-16.437	-0.280	(0)
Pb(OH)4-2	6.713e-21	5.084e-22	-20.173	-21.294	-1.121	(0)
Pb3(OH)4+2	1.462e-22	1.108e-23	-21.835	-22.956	-1.121	(0)
Pb4(OH)4+4	7.803e-24	2.568e-28	-23.108	-27.590	-4.483	(0)
PbNO3+	0.000e+00	0.000e+00	-51.754	-52.034	-0.280	(0)
Pb(HS)2	0.000e+00	0.000e+00	-74.941	-74.941	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-96.383	-96.383	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-114.167	-114.447	-0.280	(0)
S(-2)	0.000e+00					
H2S	0.000e+00	0.000e+00	-40.488	-40.488	0.000	(0)
HS-	0.000e+00	0.000e+00	-40.526	-40.806	-0.280	(0)
CdHS+	0.000e+00	0.000e+00	-41.082	-41.362	-0.280	(0)
S5-2	0.000e+00	0.000e+00	-42.386	-43.506	-1.121	(0)
S6-2	0.000e+00	0.000e+00	-42.812	-43.933	-1.121	(0)
S4-2	0.000e+00	0.000e+00	-42.985	-44.106	-1.121	(0)
S3-2	0.000e+00	0.000e+00	-43.798	-44.919	-1.121	(0)
S2-2	0.000e+00	0.000e+00	-44.824	-45.945	-1.121	(0)
S-2	0.000e+00	0.000e+00	-50.882	-51.469	-0.588	(0)
HgHS2-	0.000e+00	0.000e+00	-70.299	-70.579	-0.280	(0)
Hg(HS)2	0.000e+00	0.000e+00	-70.939	-70.939	0.000	(0)
HgS2-2	0.000e+00	0.000e+00	-71.412	-72.533	-1.121	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-72.722	-73.210	-0.488	(0)
CuS4S5-3	0.000e+00	0.000e+00	-73.484	-73.940	-0.456	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-73.688	-73.969	-0.280	(0)
Zn(HS)2	0.000e+00	0.000e+00	-74.713	-74.713	0.000	(0)
Pb(HS)2	0.000e+00	0.000e+00	-74.941	-74.941	0.000	(0)
Cd(HS)2	0.000e+00	0.000e+00	-74.964	-74.964	0.000	(0)
Fe(HS)2	0.000e+00	0.000e+00	-76.037	-76.037	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-105.936	-106.216	-0.280	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-111.959	-112.239	-0.280	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-113.590	-113.870	-0.280	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-114.167	-114.447	-0.280	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-114.344	-115.465	-1.121	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-114.526	-114.806	-0.280	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-151.360	-152.480	-1.121	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-153.384	-154.505	-1.121	(0)
S(6)	5.559e-02					
SO4-2	3.057e-02	8.904e-03	-1.515	-2.050	-0.536	(0)
MgSO4	1.141e-02	1.141e-02	-1.943	-1.943	0.000	(0)
NaSO4-	7.900e-03	5.703e-03	-2.102	-2.244	-0.142	(0)
CaSO4	4.240e-03	4.240e-03	-2.373	-2.373	0.000	(0)
FeSO4	8.821e-04	8.821e-04	-3.054	-3.054	0.000	(0)
KS04-	3.366e-04	2.430e-04	-3.473	-3.614	-0.142	(0)
NH4SO4-	1.419e-04	1.011e-04	-3.848	-3.995	-0.147	(0)
MnSO4	8.070e-05	8.070e-05	-4.093	-4.093	0.000	(0)
CoSO4	1.564e-05	1.564e-05	-4.806	-4.806	0.000	(0)
NiSO4	8.256e-06	8.256e-06	-5.083	-5.083	0.000	(0)
Zn(SO4)2-2	2.393e-06	1.812e-07	-5.621	-6.742	-1.121	(0)
ZnSO4	2.259e-06	2.259e-06	-5.646	-5.646	0.000	(0)
AlSO4+	2.299e-07	1.611e-07	-6.639	-6.793	-0.154	(0)
HS04-	1.938e-07	1.358e-07	-6.713	-6.867	-0.154	(0)
Ni(SO4)2-2	3.318e-08	2.513e-09	-7.479	-8.600	-1.121	(0)
Al(SO4)2-	2.395e-08	1.679e-08	-7.621	-7.775	-0.154	(0)
PbSO4	1.098e-08	1.098e-08	-7.960	-7.960	0.000	(0)
Cd(SO4)2-2	9.022e-09	6.833e-10	-8.045	-9.165	-1.121	(0)
Pb(SO4)2-2	7.775e-09	5.888e-10	-8.109	-9.230	-1.121	(0)

CdSO4	5.424e-09	5.424e-09	-8.266	-8.266	0.000	(0)
CuSO4	3.907e-10	3.907e-10	-9.408	-9.408	0.000	(0)
FeSO4+	1.125e-13	8.021e-14	-12.949	-13.096	-0.147	(0)
Fe(SO4)2-	3.005e-14	1.576e-14	-13.522	-13.802	-0.280	(0)
HgSO4	5.225e-28	5.225e-28	-27.282	-27.282	0.000	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-44.350	-44.630	-0.280	(0)
Se(-2)	3.812e-11					
HSe-	3.806e-11	1.997e-11	-10.419	-10.700	-0.280	(0)
H2Se	2.681e-14	2.681e-14	-13.572	-13.572	0.000	(0)
MnSe	2.498e-14	2.498e-14	-13.602	-13.602	0.000	(0)
Se-2	1.150e-18	8.708e-20	-17.939	-19.060	-1.121	(0)
Se(4)	1.366e-06					
HSeO3-	1.186e-06	6.220e-07	-5.926	-6.206	-0.280	(0)
SeO3-2	1.806e-07	1.368e-08	-6.743	-7.864	-1.121	(0)
H2SeO3	4.517e-11	4.517e-11	-10.345	-10.345	0.000	(0)
FeHSeO3+2	1.742e-17	1.320e-18	-16.759	-17.880	-1.121	(0)
Cd(SeO3)2-2	5.863e-18	4.441e-19	-17.232	-18.353	-1.121	(0)
Se(6)	5.624e-20					
SeO4-2	5.591e-20	1.629e-20	-19.252	-19.788	-0.536	(0)
MnSeO4	2.170e-22	2.170e-22	-21.663	-21.663	0.000	(0)
CoSeO4	6.960e-23	6.960e-23	-22.157	-22.157	0.000	(0)
NiSeO4	3.384e-23	3.384e-23	-22.471	-22.471	0.000	(0)
ZnSeO4	3.026e-24	3.026e-24	-23.519	-23.519	0.000	(0)
HSeO4-	2.416e-25	1.267e-25	-24.617	-24.897	-0.280	(0)
CdSeO4	8.266e-27	8.266e-27	-26.083	-26.083	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-42.181	-43.301	-1.121	(0)
Zn	9.350e-06					
Zn+2	4.119e-06	1.200e-06	-5.385	-5.921	-0.536	(0)
Zn(SO4)2-2	2.393e-06	1.812e-07	-5.621	-6.742	-1.121	(0)
ZnSO4	2.259e-06	2.259e-06	-5.646	-5.646	0.000	(0)
ZnCl+	4.856e-07	3.341e-07	-6.314	-6.476	-0.162	(0)
ZnCl2	5.085e-08	5.085e-08	-7.294	-7.294	0.000	(0)
ZnOHCl	2.558e-08	2.558e-08	-7.592	-7.592	0.000	(0)
ZnOH+	9.559e-09	5.014e-09	-8.020	-8.300	-0.280	(0)
ZnCl3-	6.595e-09	4.537e-09	-8.181	-8.343	-0.162	(0)
ZnCl4-2	9.712e-10	2.509e-10	-9.013	-9.600	-0.588	(0)
Zn(OH)2	6.127e-11	6.127e-11	-10.213	-10.213	0.000	(0)
Zn(OH)3-	3.323e-14	1.743e-14	-13.478	-13.759	-0.280	(0)
Zn(OH)4-2	5.202e-19	3.940e-20	-18.284	-19.405	-1.121	(0)
ZnSeO4	3.026e-24	3.026e-24	-23.519	-23.519	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-42.181	-43.301	-1.121	(0)
ZnNO3+	0.000e+00	0.000e+00	-49.830	-50.110	-0.280	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-73.688	-73.969	-0.280	(0)
Zn(HS)2	0.000e+00	0.000e+00	-74.713	-74.713	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-95.421	-95.421	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-111.959	-112.239	-0.280	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-114.344	-115.465	-1.121	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-153.384	-154.505	-1.121	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-113.49	-107.21	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-24.43	-19.90	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-31.70	-19.90	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-165.02	-147.09	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-36.23	-16.12	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-26.19	-25.74	0.45	(NH4)2SeO4
Al(OH)3(am)	0.62	11.69	11.06	Al(OH)3
Al2O3	3.12	23.38	20.27	Al2O3
Al4(OH)10SO4	8.50	31.20	22.70	Al4(OH)10SO4
AlOHSO4	-0.64	-3.87	-3.23	AlOHSO4
Alunite	9.20	8.30	-0.90	KAl3(SO4)2(OH)6
Anglesite	-2.83	-10.65	-7.82	PbSO4
Anhydrite	-0.37	-4.72	-4.34	CaSO4
Anilite	-16.91	-49.22	-32.31	Cu0.25Cu1.5S
Antlerite	-12.93	-4.14	8.79	Cu3(OH)4SO4

Atacamite	-7.70	-0.08	7.61	Cu ₂ (OH) ₃ Cl
Bianchite	-6.23	-7.99	-1.76	ZnSO ₄ ·6H ₂ O
Birnessite	-18.01	0.08	18.09	MnO ₂
Bixbyite	-15.95	-16.30	-0.35	Mn ₂ O ₃
BlaubleiI	-20.32	-44.48	-24.16	Cu _{0.9} Cu _{0.2} S
BlaubleiII	-19.39	-46.67	-27.28	Cu _{0.6} Cu _{0.8} S
Boehmite	2.83	11.69	8.86	Al ₂ O ₃
Brochantite	-16.04	-0.33	15.71	Cu ₄ (OH) ₆ SO ₄
Brucite	-5.75	11.36	17.12	Mg(OH) ₂
Bunsenite	-4.50	8.19	12.68	NiO
Ca ₃ (PO ₄) ₂ (beta)	-1.01	-30.05	-29.05	Ca ₃ (PO ₄) ₂
Ca ₄ H(PO ₄) ₃ ·3H ₂ O	-3.43	-50.51	-47.08	Ca ₄ H(PO ₄) ₃ ·3H ₂ O
CaHP04	-1.10	-20.45	-19.35	CaHP04
CaHP04:2H2O	-1.40	-20.45	-19.05	CaHP04:2H2O
Calomel	-11.05	-29.18	-18.13	Hg ₂ Cl ₂
CaSeO ₃ ·2H ₂ O	-4.98	-2.12	2.86	CaSeO ₃ ·2H ₂ O
CaSeO ₄ ·2H ₂ O	-19.46	-22.46	-3.00	CaSeO ₄ ·2H ₂ O
Cd(OH) ₂	-8.93	4.94	13.87	Cd(OH) ₂
Cd(OH) ₂ (am)	-9.00	4.94	13.94	Cd(OH) ₂
Cd ₃ (OH) ₂ (SO ₄) ₂	-23.00	-16.29	6.71	Cd ₃ (OH) ₂ (SO ₄) ₂
Cd ₃ (OH) ₄ SO ₄	-23.30	-0.74	22.56	Cd ₃ (OH) ₄ SO ₄
Cd ₃ (PO ₄) ₂	-15.15	-47.75	-32.60	Cd ₃ (PO ₄) ₂
Cd ₄ (OH) ₆ SO ₄	-24.20	4.20	28.40	Cd ₄ (OH) ₆ SO ₄
CdCl ₂	-9.83	-10.45	-0.61	CdCl ₂
CdCl ₂ ·1H ₂ O	-8.78	-10.45	-1.68	CdCl ₂ ·1H ₂ O
CdCl ₂ ·2.5H ₂ O	-8.53	-10.46	-1.93	CdCl ₂ ·2.5H ₂ O
Cdmetal(alpha)	-25.20	-11.51	13.69	Cd
Cdmetal(gamma)	-25.31	-11.51	13.80	Cd
CdOHCl	-6.37	-2.76	3.61	CdOHCl
CdSe	7.87	-12.51	-20.38	CdSe
CdSeO ₄ ·2H ₂ O	-26.51	-28.36	-1.85	CdSeO ₄ ·2H ₂ O
CdSO ₄	-10.57	-10.61	-0.05	CdSO ₄
CdSO ₄ ·1H ₂ O	-8.97	-10.62	-1.65	CdSO ₄ ·1H ₂ O
CdSO ₄ ·2.67H ₂ O	-8.79	-10.62	-1.83	CdSO ₄ ·2.67H ₂ O
Chalcanthite	-9.11	-11.76	-2.65	CuSO ₄ ·5H ₂ O
Chalcocite	-15.72	-51.04	-35.32	Cu ₂ S
Chalcopyrite	-45.55	-81.18	-35.62	CuFeS ₂
Cinnabar	-21.60	-67.90	-46.30	HgS
Clausthalite	14.84	-12.54	-27.39	PbSe
Co(OH) ₂	-4.63	8.46	13.09	Co(OH) ₂
Co(OH) ₃	-13.63	-15.71	-2.09	Co(OH) ₃
Co ₃ (PO ₄) ₂	-2.49	-37.18	-34.69	Co ₃ (PO ₄) ₂
Co ₃ O ₄	-12.72	-22.95	-10.24	Co ₃ O ₄
CoCl ₂	-15.38	-6.93	8.46	CoCl ₂
CoCl ₂ ·6H ₂ O	-9.46	-6.94	2.52	CoCl ₂ ·6H ₂ O
CoFe ₂ O ₄	22.06	18.91	-3.15	CoFe ₂ O ₄
CoHP04	-3.76	-22.82	-19.06	CoHP04
CoO	-5.37	8.46	13.84	CoO
CoS(alpha)	-31.65	-39.09	-7.44	CoS
CoS(beta)	-28.02	-39.09	-11.07	CoS
CoSe	7.21	-8.99	-16.20	CoSe
CoSeO ₃	-5.81	-4.49	1.32	CoSeO ₃
CoSeO ₄ ·6H ₂ O	-23.32	-24.85	-1.53	CoSeO ₄ ·6H ₂ O
CoSO ₄	-10.08	-7.09	2.99	CoSO ₄
CoSO ₄ ·6H ₂ O	-4.63	-7.11	-2.48	CoSO ₄ ·6H ₂ O
Cotunnite	-5.64	-10.48	-4.84	PbCl ₂
Covellite	-21.22	-43.75	-22.53	CuS
Cu(OH) ₂	-5.00	3.81	8.81	Cu(OH) ₂
Cu ₂ (OH) ₃ NO ₃	-53.16	-43.74	9.42	Cu ₂ (OH) ₃ NO ₃
Cu ₂ Se(alpha)	25.37	-20.94	-46.31	Cu ₂ Se
Cu ₂ SO ₄	-17.14	-19.04	-1.90	Cu ₂ SO ₄
Cu ₃ (PO ₄) ₂	-14.30	-51.15	-36.85	Cu ₃ (PO ₄) ₂
Cu ₃ (PO ₄) ₂ ·3H ₂ O	-16.04	-51.16	-35.12	Cu ₃ (PO ₄) ₂ ·3H ₂ O
Cu ₃ Se ₂	29.72	-34.58	-64.30	Cu ₃ Se ₂
Cumetal	-1.04	-9.97	-8.93	Cu
CuOCuSO ₄	-18.57	-7.94	10.63	CuOCuSO ₄
Cupricferrite	7.76	14.25	6.49	CuFe ₂ O ₄
Cuprite	-2.38	-3.49	-1.11	Cu ₂ O

Cuprousferrite	12.36	3.48	-8.88	CuFeO2
CuSe	19.75	-13.64	-33.39	CuSe
CuSe2	19.06	-14.64	-33.70	CuSe2
CuSeO3:2H2O	-9.75	-9.16	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-27.06	-29.50	-2.44	CuSeO4:5H2O
CuSO4	-14.86	-11.75	3.11	CuSO4
Diaspore	4.57	11.69	7.12	AlOOH
Djurleite	-16.17	-50.56	-34.40	Cu0.066Cu1.868S
Epsomite	-2.06	-4.21	-2.15	MgSO4:7H2O
Fe(OH)2	-3.44	10.13	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.95	2.91	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-4.07	-2.52	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-7.81	-28.43	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-33.07	-36.22	-3.16	Fe2(SO4)3
Fe3(OH)8	0.34	20.56	20.22	Fe3(OH)8
Ferrihydrite	1.85	5.22	3.37	Fe(OH)3
Ferroselite	10.39	-8.32	-18.71	FeSe2
FeS(ppt)	-34.50	-37.43	-2.92	FeS
FeSe	3.68	-7.32	-11.00	FeSe
Galena	-28.49	-42.65	-14.16	PbS
Gibbsite	3.17	11.69	8.52	Al(OH)3
Goethite	4.59	5.22	0.64	FeOOH
Goslarite	-5.95	-7.99	-2.05	ZnSO4:7H2O
Greenockite	-28.13	-42.62	-14.49	CdS
Greigite	-124.62	-169.65	-45.03	Fe3S4
Gypsum	-0.11	-4.72	-4.61	CaSO4:2H2O
H-Jarosite	-3.91	-15.46	-11.55	(H3O)Fe3(SO4)2(OH)6
H2S(g)	-39.55	-47.56	-8.01	H2S
H2Se(g)	-12.53	-17.45	-4.92	H2Se
Halite	-3.46	-1.86	1.59	NaCl
Hausmannite	-17.88	44.15	62.03	Mn3O4
Hematite	11.55	10.44	-1.11	Fe2O3
Hercynite	9.87	33.51	23.64	FeAl2O4
Hg(g)	-7.20	-15.12	-7.93	Hg
Hg(OH)2	-16.84	-20.34	-3.50	Hg(OH)2
Hg2(g)	-15.15	-30.24	-15.09	Hg2
Hg2(OH)2	-19.05	-13.79	5.26	Hg2(OH)2
Hg2HPO4	-20.30	-45.08	-24.77	Hg2HPO4
Hg2S	-49.51	-61.35	-11.84	Hg2S
Hg2SeO3	-22.09	-26.75	-4.66	Hg2SeO3
Hg2SO4	-23.20	-29.35	-6.14	Hg2SO4
HgCl(g)	-34.47	-14.59	19.88	HgCl
HgCl2	-14.21	-35.73	-21.52	HgCl2
Hgmetal(l)	-1.47	-15.12	-13.65	Hg
HgSe	17.91	-37.79	-55.69	HgSe
HgSeO3	-20.87	-33.30	-12.43	HgSeO3
HgSO4	-26.44	-35.89	-9.45	HgSO4
Hinsdalite	-4.37	-6.87	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	4.67	-39.66	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-6.54	-69.33	-62.79	Pb5(PO4)3OH
K-Alum	-9.87	-15.11	-5.24	KAl(SO4)2:12H2O
K-Jarosite	3.38	-11.11	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-23.87	-24.60	-0.73	K2SeO4
Langite	-18.22	-0.34	17.88	Cu4(OH)6SO4:H2O
Larnakite	-5.36	-5.74	-0.38	PbO:PbSO4
Laurionite	-3.41	-2.79	0.62	PbOHCl
Lepidocrocite	3.85	5.22	1.37	FeOOH
Lime	-22.32	10.84	33.16	CaO
Litharge	-7.94	4.91	12.85	PbO
Mackinawite	-33.83	-37.43	-3.60	FeS
Maghemite	4.06	10.44	6.39	Fe2O3
Magnesioferrite	4.29	21.81	17.52	Fe2MgO4
Magnetite	16.67	20.57	3.90	Fe3O4
Manganite	-7.88	17.46	25.34	MnOOH
Massicot	-8.15	4.91	13.05	PbO
Melanothallite	-17.99	-11.58	6.41	CuCl2
Melanterite	-3.19	-5.45	-2.26	FeSO4:7H2O
Metacinnabar	-22.20	-67.90	-45.70	HgS

Mg(OH)2(active)	-7.43	11.36	18.79	Mg(OH)2
Mg3(P04)2	-5.19	-28.47	-23.28	Mg3(P04)2
MgHP04:3H2O	-1.76	-19.93	-18.18	MgHP04:3H2O
MgSe03:6H2O	-4.65	-1.61	3.04	MgSe03:6H2O
MgSe04:6H2O	-20.75	-21.95	-1.20	MgSe04:6H2O
Minium	-43.36	31.17	74.53	Pb304
Mirabilite	-2.62	-3.92	-1.30	Na2S04:10H2O
Mn2(S04)3	-57.64	-62.96	-5.32	Mn2(S04)3
Mn3(P04)2	-11.03	-34.87	-23.85	Mn3(P04)2
MnCl2:4H2O	-8.91	-6.17	2.74	MnCl2:4H2O
MnHP04	3.34	-22.06	-25.40	MnHP04
MnS(grn)	-38.57	-38.32	0.25	MnS
MnS(pnk)	-41.66	-38.32	3.34	MnS
MnSe	-11.95	-8.22	3.73	MnSe
MnSe03	-4.85	-3.72	1.13	MnSe03
MnSe03:2H2O	-4.69	-3.73	0.96	MnSe03:2H2O
MnSe04:5H2O	-22.03	-24.08	-2.05	MnSe04:5H2O
MnS04	-9.06	-6.32	2.74	MnS04
Monteponite	-10.41	4.94	15.35	Cd0
Montroydite	-16.79	-20.34	-3.55	Hg0
Morenosite	-5.22	-7.39	-2.17	NiS04:7H2O
Na-Jarosite	1.22	-9.62	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-11.61	-1.31	10.30	Na2Se03:5H2O
Na2Se04	-22.91	-21.63	1.28	Na2Se04
Nantokite	-2.61	-9.44	-6.83	CuCl
Ni(OH)2	-4.84	8.18	13.02	Ni(OH)2
Ni3(P04)2	-6.72	-38.02	-31.30	Ni3(P04)2
Ni4(OH)6S04	-14.82	17.18	32.00	Ni4(OH)6S04
NiS(alpha)	-33.77	-39.37	-5.60	NiS
NiS(beta)	-28.27	-39.37	-11.10	NiS
NiS(gamma)	-26.57	-39.37	-12.80	NiS
NiSe	8.44	-9.26	-17.70	NiSe
NiSe03:2H2O	-7.67	-4.78	2.89	NiSe03:2H2O
NiSe04:6H2O	-23.61	-25.13	-1.52	NiSe04:6H2O
Nsutite	-17.43	0.08	17.50	Mn02
O2(g)	-51.55	32.90	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-6.68	2.11	8.79	Pb2(OH)3Cl
Pb20(OH)2	-16.38	9.81	26.19	Pb20(OH)2
Pb203	-34.78	26.26	61.04	Pb203
Pb3(P04)2	-4.33	-47.86	-43.53	Pb3(P04)2
Pb302S04	-11.71	-0.84	10.87	Pb302S04
Pb4(OH)6S04	-17.04	4.06	21.10	Pb4(OH)6S04
Pb403S04	-18.13	4.07	22.20	Pb403S04
PbHP04	-2.58	-26.38	-23.81	PbHP04
Pbmetal	-15.79	-11.55	4.24	Pb
Pb0:0.3H2O	-8.07	4.91	12.98	Pb0:0.33H2O
PbSe04	-21.51	-28.39	-6.88	PbSe04
Periclase	-10.58	11.37	21.94	Mg0
Plattnerite	-28.95	21.36	50.31	Pb02
Plumbgummite	10.19	-22.60	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-12.27	10.84	23.11	Ca(OH)2
Pyrite	-49.91	-68.53	-18.63	FeS2
Pyrochroite	-6.19	9.23	15.43	Mn(OH)2
Pyrolusite	-16.34	25.68	42.03	Mn02
Pyromorphite	7.40	-77.03	-84.43	Pb5(P04)3Cl
Retgersite	-5.34	-7.39	-2.05	NiS04:6H2O
Semetal(am)	6.14	-1.00	-7.14	Se
Semetal(hex	6.75	-1.00	-7.75	Se
Se02	-13.08	-12.96	0.12	Se02
Se03	-54.69	-33.29	21.39	Se03
Sphalerite	-28.45	-39.97	-11.52	ZnS
Spinel	-3.02	34.75	37.77	MgAl204
Strengite	0.31	-26.07	-26.38	FeP04:2H2O
Sulfur	-29.00	-31.11	-2.11	S
Tenorite	-3.99	3.81	7.80	Cu0
Thenardite	-4.24	-3.89	0.34	Na2S04
Tsumebite	-7.89	-17.68	-9.79	Pb2CuP04(OH)3:3H2O

Vivianite	3.79	-32.21	-36.00	Fe3(P04)2:8H20
Wurtzite	-30.97	-39.97	-9.00	ZnS
Zincite	-3.96	7.58	11.55	ZnO
Zincosite	-12.10	-7.97	4.13	ZnS04
Zn(N03)2:6H20	-98.40	-95.14	3.26	Zn(N03)2:6H20
Zn(OH)2	-4.62	7.58	12.20	Zn(OH)2
Zn(OH)2(am)	-5.08	7.58	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.37	7.58	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.15	7.58	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.15	7.58	11.73	Zn(OH)2
Zn2(OH)2S04	-7.89	-0.39	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-7.72	7.47	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H20	-4.41	-39.83	-35.42	Zn3(P04)2:4H20
Zn30(S04)2	-27.89	-8.36	19.53	Zn30(S04)2
Zn4(OH)6S04	-13.63	14.77	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-15.98	22.52	38.50	Zn5(OH)8Cl2
ZnCl2	-15.03	-7.81	7.22	ZnCl2
Znmetal	-35.02	-8.87	26.15	Zn
Zn0(active)	-3.82	7.58	11.40	Zn0
ZnS(am)	-30.88	-39.97	-9.09	ZnS
ZnSe	4.59	-9.87	-14.46	ZnSe
ZnSe04:6H20	-24.21	-25.73	-1.52	ZnSe04:6H20
ZnS04:1H20	-7.44	-7.97	-0.53	ZnS04:1H20

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 4.

SOLUTION 2 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485

```

Hg      0.0002
water   1 # kg
SOLUTION 3 #Mean RWD water quality
temp    20
pH       4.05
pe       4
redox    pe
units    mg/l
density  1
Al       1.42
Alkalinity 0
As       0.002
Ba       0.04
Be       0.002
B        0.1
Cd       0.0008
Co       0.72
Cr       0.0033
Cu       6.25
Fe       24.67
Pb       0.02
Mn       5.22
Mo       0.11
Zn       0.49
Se       0.01
Ni       0.49
N        10.07
P        0.29
Ca       522
Mg       88
Na       343
K        245
Cl       490
S(6)    2222
Hg       0
water   1 # kg
MIX 1
1      0.03679
2      0.9632
3      1e-005
REACTION 2
H2O -1
2
END #Time-step 2

```

Beginning of initial solution calculations.

Initial solution 2.

-----Solution composition-----

Elements	Molality	Moles
Al	1.378e-05	1.378e-05
Ca	3.259e-03	3.259e-03
Cd	2.681e-08	2.681e-08
Cl	4.344e-02	4.344e-02
Co	3.989e-05	3.989e-05
Cu	4.901e-06	4.901e-06
Fe	1.805e-03	1.805e-03
Hg	1.002e-09	1.002e-09
K	1.593e-03	1.593e-03
Mg	1.017e-02	1.017e-02
Mn	2.231e-04	2.231e-04
N	5.021e-04	5.021e-04
Na	4.781e-02	4.781e-02
Ni	7.703e-06	7.703e-06

P	2.206e-05	2.206e-05
Pb	1.455e-08	1.455e-08
S(6)	1.553e-02	1.553e-02
Se	3.817e-07	3.817e-07
Zn	2.612e-06	2.612e-06

-----Description of solution-----

pH	=	6.790
pe	=	1.000
Activity of water	=	0.998
Ionic strength (mol/kgw)	=	9.259e-02
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	6.274e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	21.00
Electrical balance (eq)	=	6.374e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	4.58
Iterations	=	13
Total H	=	1.110158e+02
Total O	=	5.556909e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.061e-07	1.622e-07	-6.686	-6.790	-0.104	0.00
OH-	5.935e-08	4.562e-08	-7.227	-7.341	-0.114	(0)
H2O	5.551e+01	9.980e-01	1.744	-0.001	0.000	18.05
Al	1.378e-05					
Al(OH)4-	8.973e-06	7.024e-06	-5.047	-5.153	-0.106	(0)
Al(OH)2+	2.373e-06	1.884e-06	-5.625	-5.725	-0.100	(0)
Al(OH)3	2.329e-06	2.329e-06	-5.633	-5.633	0.000	(0)
AlOH+2	7.409e-08	2.945e-08	-7.130	-7.531	-0.401	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
Al+3	5.344e-09	6.178e-10	-8.272	-9.209	-0.937	(0)
Al(SO4)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ca	3.259e-03					
Ca+2	2.406e-03	9.221e-04	-2.619	-3.035	-0.416	(0)
CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CaOH+	1.001e-09	8.020e-10	-8.999	-9.096	-0.096	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
Cd	2.681e-08					
CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
Cd+2	7.874e-09	3.018e-09	-8.104	-8.520	-0.416	(0)
CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
Cd(SO4)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
CdOH+	1.568e-12	1.100e-12	-11.805	-11.959	-0.154	(0)
Cd(OH)2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
Cd2OH+3	4.264e-19	1.748e-20	-18.370	-19.758	-1.387	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Cd(OH)3-	3.135e-21	2.198e-21	-20.504	-20.658	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Cd(OH)4-2	9.222e-29	2.230e-29	-28.035	-28.652	-0.617	(0)
CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cl	4.344e-02					
Cl-	4.343e-02	3.417e-02	-1.362	-1.466	-0.104	(0)

CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(2)	3.989e-05					
Co+2	3.225e-05	7.797e-06	-4.491	-5.108	-0.617	(0)
CoSO4	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CoHPO4	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CoOH+	1.375e-08	9.639e-09	-7.862	-8.016	-0.154	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
Co(OH)2	4.744e-11	4.744e-11	-10.324	-10.324	0.000	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Co2OH+3	9.190e-14	3.766e-15	-13.037	-14.424	-1.387	(0)
Co(OH)3-	8.364e-17	5.865e-17	-16.078	-16.232	-0.154	(0)
CoOOH-	5.039e-18	3.533e-18	-17.298	-17.452	-0.154	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Co4(OH)4+4	5.041e-22	1.722e-24	-21.297	-23.764	-2.466	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
Co(OH)4-2	2.382e-24	5.759e-25	-23.623	-24.240	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Co(3)	4.042e-31					
CoOH+2	4.042e-31	9.773e-32	-30.393	-31.010	-0.617	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co+3	2.685e-36	3.104e-37	-35.571	-36.508	-0.937	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
Cu(1)	4.900e-06					
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)

CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
Cu+	1.553e-08	1.089e-08	-7.809	-7.963	-0.154	(0)
Cu(2)	8.967e-10					
Cu+2	6.026e-10	2.310e-10	-9.220	-9.636	-0.416	(0)
CuS04	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
CuOH+	4.792e-11	3.719e-11	-10.319	-10.430	-0.110	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
Cu(OH)2	5.595e-13	5.595e-13	-12.252	-12.252	0.000	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
Cu2(OH)2+2	1.398e-16	3.379e-17	-15.855	-16.471	-0.617	(0)
Cu(OH)3-	1.014e-16	7.111e-17	-15.994	-16.148	-0.154	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
Cu(OH)4-2	1.434e-22	3.468e-23	-21.843	-22.460	-0.617	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Fe(2)	1.805e-03					
Fe+2	1.454e-03	3.515e-04	-2.837	-3.454	-0.617	(0)
FeS04	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
FeHP04	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2P04+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
FeOH+	8.090e-07	6.384e-07	-6.092	-6.195	-0.103	(0)
Fe(OH)2	2.214e-11	2.214e-11	-10.655	-10.655	0.000	(0)
Fe(OH)3-	5.296e-13	4.179e-13	-12.276	-12.379	-0.103	(0)
Fe(3)	3.233e-07					
Fe(OH)2+	3.138e-07	2.491e-07	-6.503	-6.604	-0.100	(0)
Fe(OH)3	9.382e-09	9.382e-09	-8.028	-8.028	0.000	(0)
Fe(OH)4-	1.205e-10	9.565e-11	-9.919	-10.019	-0.100	(0)
FeOH+2	2.119e-11	8.217e-12	-10.674	-11.085	-0.411	(0)
FeHP04+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeS04+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe+3	2.235e-15	2.584e-16	-14.651	-15.588	-0.937	(0)
Fe(S04)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeH2P04+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
Fe2(OH)2+4	7.548e-19	2.579e-21	-18.122	-20.589	-2.466	(0)
FeHSe03+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
Fe3(OH)4+5	6.361e-23	8.906e-27	-22.197	-26.050	-3.854	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
H(0)	3.796e-19					
H2	1.898e-19	1.939e-19	-18.722	-18.712	0.009	(0)
Hg(0)	1.002e-09					
Hg	1.002e-09	1.002e-09	-8.999	-8.999	0.000	(0)
Hg(1)	3.697e-29					
Hg2+2	1.848e-29	4.469e-30	-28.733	-29.350	-0.617	(0)
Hg(2)	2.362e-18					
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
Hg(OH)2	1.682e-22	1.718e-22	-21.774	-21.765	0.009	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
HgOH+	2.768e-26	1.941e-26	-25.558	-25.712	-0.154	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Hg+2	3.648e-29	8.820e-30	-28.438	-29.055	-0.617	(0)
HgS04	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Hg(OH)3-	1.911e-30	1.340e-30	-29.719	-29.873	-0.154	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)

K	1.593e-03					
K+	1.549e-03	1.219e-03	-2.810	-2.914	-0.104	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
Mg	1.017e-02					
Mg+2	7.920e-03	3.036e-03	-2.101	-2.518	-0.416	(0)
MgS04	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
MgH2P04+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
MgOH+	6.402e-08	5.162e-08	-7.194	-7.287	-0.094	(0)
MgP04-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
Mn(2)	2.231e-04					
Mn+2	1.882e-04	4.549e-05	-3.725	-4.342	-0.617	(0)
MnS04	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
MnOH+	6.606e-09	5.213e-09	-8.180	-8.283	-0.103	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Mn(OH)3-	2.129e-19	1.680e-19	-18.672	-18.775	-0.103	(0)
MnSe04	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
Mn(OH)4-2	8.666e-26	3.361e-26	-25.062	-25.474	-0.411	(0)
MnN03+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
Mn(N03)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Mn(3)	9.732e-29					
Mn+3	9.732e-29	1.125e-29	-28.012	-28.949	-0.937	(0)
Mn(6)	0.000e+00					
Mn04-2	0.000e+00	0.000e+00	-65.730	-66.142	-0.411	(0)
Mn(7)	0.000e+00					
Mn04-	0.000e+00	0.000e+00	-74.661	-74.779	-0.119	(0)
N(-3)	5.021e-04					
NH4+	4.805e-04	3.617e-04	-3.318	-3.442	-0.123	(0)
NH4S04-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
NH3	9.560e-07	9.560e-07	-6.020	-6.020	0.000	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
N(3)	1.148e-35					
N02-	1.148e-35	8.735e-36	-34.940	-35.059	-0.119	(0)
CoN02+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CuN02+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
Cu(N02)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-48.382	-48.486	-0.104	(0)
CaN03+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
MnN03+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
CoN03+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
NiN03+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
ZnN03+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
PbN03+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
CdN03+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
CuN03+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
FeN03+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)

HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
Na	4.781e-02					
Na+	4.677e-02	3.680e-02	-1.330	-1.434	-0.104	(0)
NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
Ni	7.703e-06					
Ni+2	5.664e-06	2.171e-06	-5.247	-5.663	-0.416	(0)
NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
NiOH+	1.818e-09	1.275e-09	-8.741	-8.895	-0.154	(0)
Ni(SO4)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
Ni(OH)2	8.335e-12	8.335e-12	-11.079	-11.079	0.000	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Ni(OH)3-	7.365e-16	5.164e-16	-15.133	-15.287	-0.154	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.993	-55.984	0.009	(0)
P	2.206e-05					
H2PO4-	6.634e-06	5.268e-06	-5.178	-5.278	-0.100	(0)
HPO4-2	5.222e-06	2.025e-06	-5.282	-5.694	-0.411	(0)
MgHPO4	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
FeHPO4	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
CoHP04	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
MgPO4-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
H3PO4	1.150e-10	1.150e-10	-9.939	-9.939	0.000	(0)
PO4-3	4.196e-11	4.850e-12	-10.377	-11.314	-0.937	(0)
FeHPO4+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
Pb	1.455e-08					
Pb+2	5.480e-09	2.100e-09	-8.261	-8.678	-0.416	(0)
PbSO4	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
PbOH+	4.662e-10	3.269e-10	-9.331	-9.486	-0.154	(0)
Pb(SO4)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
Pb(OH)2	6.405e-13	6.405e-13	-12.193	-12.193	0.000	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
Pb2OH+3	2.655e-16	1.088e-17	-15.576	-16.963	-1.387	(0)
Pb(OH)3-	5.660e-17	3.969e-17	-16.247	-16.401	-0.154	(0)
Pb(OH)4-2	2.491e-21	6.022e-22	-20.604	-21.220	-0.617	(0)
Pb3(OH)4+2	3.779e-23	9.137e-24	-22.423	-23.039	-0.617	(0)
Pb4(OH)4+4	5.175e-26	1.768e-28	-25.286	-27.753	-2.466	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
S(6)	1.553e-02					
SO4-2	1.094e-02	4.194e-03	-1.961	-2.377	-0.416	(0)
MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)

KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
MnS04	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
NH4S04-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
CoS04	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
NiS04	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
ZnS04	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(S04)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
HS04-	7.527e-08	5.892e-08	-7.123	-7.230	-0.106	(0)
AlS04+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
PbS04	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
CdS04	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
Al(S04)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ni(S04)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
Cd(S04)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
Pb(S04)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
CuS04	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
FeS04+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe(S04)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
HgS04	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Se(-2)	4.685e-09					
HSe-	4.677e-09	3.279e-09	-8.330	-8.484	-0.154	(0)
H2Se	4.054e-12	4.054e-12	-11.392	-11.392	0.000	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Se-2	6.423e-17	1.553e-17	-16.192	-16.809	-0.617	(0)
Se(4)	3.770e-07					
HSeO3-	3.526e-07	2.472e-07	-6.453	-6.607	-0.154	(0)
SeO3-2	2.442e-08	5.904e-09	-7.612	-8.229	-0.617	(0)
H2SeO3	1.653e-11	1.653e-11	-10.782	-10.782	0.000	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Se(6)	2.478e-21					
SeO4-2	2.463e-21	9.439e-22	-20.609	-21.025	-0.416	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
HSeO4-	9.645e-27	6.763e-27	-26.016	-26.170	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
Zn	2.612e-06					
Zn+2	1.813e-06	6.948e-07	-5.742	-6.158	-0.416	(0)
ZnS04	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(S04)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
ZnOH+	4.520e-09	3.170e-09	-8.345	-8.499	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
Zn(OH)2	4.227e-11	4.227e-11	-10.374	-10.374	0.000	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
Zn(OH)3-	1.872e-14	1.313e-14	-13.728	-13.882	-0.154	(0)
Zn(OH)4-2	1.339e-19	3.238e-20	-18.873	-19.490	-0.617	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	124.48	-118.20	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-28.70	-24.17	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.96	-24.17	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-179.81	-161.88	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.93	-20.82	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-28.36	-27.91	0.45	(NH4)2SeO4

Al(OH)3(am)	0.09	11.16	11.06	Al(OH)3
Al2O3	2.05	22.32	20.27	Al2O3
Al4(OH)10SO4	5.98	28.68	22.70	Al4(OH)10SO4
AlOHSO4	-1.57	-4.80	-3.23	AlOHSO4
Alunite	6.34	5.44	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.24	-11.06	-7.82	PbSO4
Anhydrite	-1.07	-5.41	-4.34	CaSO4
Antlerite	-12.92	-4.13	8.79	Cu3(OH)4SO4
Atacamite	-7.99	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.78	-8.54	-1.76	ZnSO4:6H2O
Birnessite	-18.88	-0.79	18.09	MnO2
Bixbyite	-16.81	-17.16	-0.35	Mn2O3
Boehmite	2.30	11.16	8.86	AlOOH
Brochantite	-15.89	-0.19	15.71	Cu4(OH)6SO4
Brucite	-6.06	11.06	17.12	Mg(OH)2
Bunsenite	-4.77	7.92	12.68	NiO
Ca3(PO4)2(beta)	-2.69	-31.73	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-5.80	-52.88	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.79	-21.14	-19.35	CaHP04
CaHP04:2H2O	-2.09	-21.14	-19.05	CaHP04:2H2O
Calomel	-14.15	-32.28	-18.13	Hg2Cl2
CaSeO3:2H2O	-5.71	-2.85	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-21.06	-24.06	-3.00	CaSeO4:2H2O
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-23.45	-16.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-23.34	-0.78	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-15.59	-48.19	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-24.12	4.28	28.40	Cd4(OH)6SO4
CdCl2	-10.84	-11.45	-0.61	CdCl2
CdCl2:1H2O	-9.78	-11.45	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-9.52	-11.46	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.21	-10.52	13.69	Cd
Cdmetal(gamma)	-24.32	-10.52	13.80	Cd
CdOHCl	-6.81	-3.20	3.61	CdOHCl
CdSe	10.17	-10.21	-20.38	CdSe
CdSeO4:2H2O	-27.70	-29.55	-1.85	CdSeO4:2H2O
CdSO4	-10.85	-10.90	-0.05	CdSO4
CdSO4:1H2O	-9.25	-10.90	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-9.07	-10.90	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.36	-12.02	-2.65	CuSO4:5H2O
Clausthalite	17.01	-10.37	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.05	-16.14	-2.09	Co(OH)3
Co3(PO4)2	-3.27	-37.95	-34.69	Co3(PO4)2
Co3O4	-13.57	-23.81	-10.24	Co3O4
CoCl2	-16.50	-8.04	8.46	CoCl2
CoCl2:6H2O	-10.56	-8.05	2.52	CoCl2:6H2O
CoFe2O4	21.18	18.03	-3.15	CoFe2O4
CoHP04	-4.15	-23.21	-19.06	CoHP04
CoO	-5.37	8.47	13.84	CoO
CoSe	9.40	-6.80	-16.20	CoSe
CoSeO3	-6.24	-4.92	1.32	CoSeO3
CoSeO4:6H2O	-24.61	-26.14	-1.53	CoSeO4:6H2O
CoSO4	-10.48	-7.49	2.99	CoSO4
CoSO4:6H2O	-5.02	-7.49	-2.48	CoSO4:6H2O
Cotunnite	-6.77	-11.61	-4.84	PbCl2
Cu(OH)2	-4.87	3.94	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.82	-47.39	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.69	-17.62	-46.31	Cu2Se
Cu2SO4	-16.40	-18.30	-1.90	Cu2SO4
Cu3(PO4)2	-14.69	-51.54	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-16.42	-51.54	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	35.35	-28.95	-64.30	Cu3Se2
Cumetal	-0.04	-8.96	-8.93	Cu
CuOCuSO4	-18.70	-8.07	10.63	CuOCuSO4
Cupricferrite	7.02	13.50	6.49	CuFe2O4
Cuprite	-1.24	-2.35	-1.11	Cu2O

Cuprousferrite	12.49	3.61	-8.88	CuFeO2
CuSe	22.06	-11.33	-33.39	CuSe
CuSe2	22.68	-11.02	-33.70	CuSe2
CuSeO3:2H2O	-10.05	-9.46	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-28.23	-30.67	-2.44	CuSeO4:5H2O
CuSO4	-15.13	-12.01	3.11	CuSO4
Diaspore	4.04	11.16	7.12	AlOOH
Epsomite	-2.75	-4.90	-2.15	MgSO4:7H2O
Fe(OH)2	-3.44	10.12	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.34	2.30	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-5.39	-3.84	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-10.00	-30.63	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-35.15	-38.31	-3.16	Fe2(SO4)3
Fe3(OH)8	-0.54	19.68	20.22	Fe3(OH)8
Ferrihydrite	1.41	4.78	3.37	Fe(OH)3
Ferroselite	13.87	-4.84	-18.71	FeSe2
FeSe	5.86	-5.15	-11.00	FeSe
Gibbsite	2.64	11.16	8.52	Al(OH)3
Goethite	4.15	4.78	0.64	FeOOH
Goslarite	-6.50	-8.54	-2.05	ZnSO4:7H2O
Gypsum	-0.80	-5.41	-4.61	CaSO4:2H2O
H-Jarosite	-6.02	-17.57	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-10.35	-15.27	-4.92	H2Se
Halite	-4.49	-2.90	1.59	NaCl
Hausmannite	-18.74	43.29	62.03	Mn3O4
Hematite	10.67	9.56	-1.11	Fe2O3
Hercynite	8.80	32.44	23.64	FeAl2O4
Hg(g)	-7.75	-15.67	-7.93	Hg
Hg(OH)2	-18.27	-21.76	-3.50	Hg(OH)2
Hg2(g)	-16.26	-31.35	-15.09	Hg2
Hg2(OH)2	-21.03	-15.77	5.26	Hg2(OH)2
Hg2HPO4	-22.68	-47.45	-24.77	Hg2HPO4
Hg2SeO3	-24.51	-29.17	-4.66	Hg2SeO3
Hg2SO4	-25.58	-31.73	-6.14	Hg2SO4
HgCl(g)	-36.02	-16.14	19.88	HgCl
HgCl2	-16.76	-38.28	-21.52	HgCl2
Hgmetal(l)	-2.02	-15.67	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSeO3	-22.73	-35.16	-12.43	HgSeO3
HgSO4	-28.27	-37.72	-9.45	HgSO4
Hinsdalite	-6.76	-9.26	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	2.00	-42.33	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-7.75	-70.54	-62.79	Pb5(PO4)3OH
K-Alum	-11.65	-16.89	-5.24	KAl(SO4)2:12H2O
K-Jarosite	0.79	-13.70	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-26.12	-26.85	-0.73	K2SeO4
Langite	-18.07	-0.19	17.88	Cu4(OH)6SO4:H2O
Larnakite	-5.77	-6.15	-0.38	PbO:PbSO4
Laurionite	-3.98	-3.35	0.62	PbOHCl
Lepidocrocite	3.41	4.78	1.37	FeOOH
Lime	-22.62	10.54	33.16	CaO
Litharge	-7.95	4.90	12.85	PbO
Maghemite	3.18	9.56	6.39	Fe2O3
Magnesioferrite	3.10	20.62	17.52	Fe2MgO4
Magnetite	15.79	19.69	3.90	Fe3O4
Manganite	-8.31	17.03	25.34	MnOOH
Massicot	-8.15	4.90	13.05	PbO
Melanothallite	-18.98	-12.57	6.41	CuCl2
Melanterite	-3.58	-5.84	-2.26	FeSO4:7H2O
Mg(OH)2(active)	-7.73	11.06	18.79	Mg(OH)2
Mg3(PO4)2	-6.90	-30.18	-23.28	Mg3(PO4)2
MgHPO4:3H2O	-2.45	-20.62	-18.18	MgHPO4:3H2O
MgSeO3:6H2O	-5.38	-2.34	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-22.35	-23.55	-1.20	MgSeO4:6H2O
Minium	-44.24	30.28	74.53	Pb3O4
Mirabilite	-3.95	-5.25	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-59.71	-65.03	-5.32	Mn2(SO4)3
Mn3(PO4)2	-11.81	-35.65	-23.85	Mn3(PO4)2

MnCl2:4H2O	-10.02	-7.28	2.74	MnCl2:4H2O
MnHP04	2.95	-22.45	-25.40	MnHP04
MnSe	-9.77	-6.04	3.73	MnSe
MnSe03	-5.29	-4.16	1.13	MnSe03
MnSe03:2H2O	-5.12	-4.16	0.96	MnSe03:2H2O
MnSe04:5H2O	-23.32	-25.37	-2.05	MnSe04:5H2O
MnS04	-9.46	-6.72	2.74	MnS04
Monteponite	-10.29	5.06	15.35	Cd0
Montroydite	-18.22	-21.76	-3.55	Hg0
Morenosite	-5.87	-8.05	-2.17	NiS04:7H2O
Na-Jarosite	-1.38	-12.22	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-12.99	-2.69	10.30	Na2Se03:5H2O
Na2Se04	-25.17	-23.89	1.28	Na2Se04
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.11	7.91	13.02	Ni(OH)2
Ni3(P04)2	-8.32	-39.62	-31.30	Ni3(P04)2
Ni4(OH)6S04	-16.30	15.70	32.00	Ni4(OH)6S04
NiSe	10.34	-7.36	-17.70	NiSe
NiSe03:2H2O	-8.37	-5.48	2.89	NiSe03:2H2O
NiSe04:6H2O	-25.17	-26.69	-1.52	NiSe04:6H2O
Nsutite	-18.29	-0.79	17.50	Mn02
O2(g)	-53.29	31.16	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.25	1.55	8.79	Pb2(OH)3Cl
Pb20(OH)2	-16.39	9.80	26.19	Pb20(OH)2
Pb203	-35.66	25.38	61.04	Pb203
Pb3(P04)2	-5.13	-48.66	-43.53	Pb3(P04)2
Pb302S04	-12.13	-1.25	10.87	Pb302S04
Pb4(OH)6S04	-17.45	3.65	21.10	Pb4(OH)6S04
Pb403S04	-18.55	3.65	22.20	Pb403S04
PbHP04	-2.98	-26.78	-23.81	PbHP04
Pbmetal	-14.92	-10.68	4.24	Pb
Pb0:0.3H2O	-8.08	4.90	12.98	Pb0:0.33H2O
PbSe04	-22.83	-29.70	-6.88	PbSe04
Periclase	-10.88	11.06	21.94	Mg0
Plattnerite	-29.83	20.48	50.31	Pb02
Plumbgummite	7.80	-24.99	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-12.57	10.54	23.11	Ca(OH)2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-17.21	24.82	42.03	Mn02
Pyromorphite	5.63	-78.80	-84.43	Pb5(P04)3Cl
Retgersite	-6.00	-8.05	-2.05	NiS04:6H2O
Semetal(am)	7.44	0.31	-7.14	Se
Semetal(hex)	8.05	0.31	-7.75	Se
Se02	-13.52	-13.40	0.12	Se02
Se03	-56.00	-34.60	21.39	Se03
Spinel	-4.39	33.38	37.77	MgAl204
Strengite	-0.53	-26.90	-26.38	FeP04:2H2O
Tenorite	-3.86	3.94	7.80	Cu0
Thenardite	-5.59	-5.25	0.34	Na2S04
Tsumebite	-8.15	-17.94	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	3.00	-33.00	-36.00	Fe3(P04)2:8H2O
Zincite	-4.13	7.42	11.55	Zn0
Zincosite	-12.66	-8.54	4.13	ZnS04
Zn(N03)2:6H2O	-106.39	-103.14	3.26	Zn(N03)2:6H2O
Zn(OH)2	-4.78	7.42	12.20	Zn(OH)2
Zn(OH)2(am)	-5.25	7.42	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.42	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.31	7.42	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.42	11.73	Zn(OH)2
Zn2(OH)2S04	-8.62	-1.12	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-8.61	6.58	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-5.69	-41.11	-35.42	Zn3(P04)2:4H2O
Zn30(S04)2	-29.18	-9.65	19.53	Zn30(S04)2
Zn4(OH)6S04	-14.68	13.72	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-17.91	20.59	38.50	Zn5(OH)8Cl2
ZnCl2	-16.31	-9.09	7.22	ZnCl2
Znmetal	-34.31	-8.16	26.15	Zn

ZnO(active)	-3.98	7.42	11.40	ZnO
ZnSe	6.61	-7.85	-14.46	ZnSe
ZnSeO4:6H2O	-25.67	-27.19	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-8.00	-8.54	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Initial solution 3.

-----Solution composition-----

Elements	Molality	Moles
Al	5.284e-05	5.284e-05
As	2.680e-08	2.680e-08
B	9.287e-06	9.287e-06
Ba	2.924e-07	2.924e-07
Be	2.228e-07	2.228e-07
Ca	1.308e-02	1.308e-02
Cd	7.145e-09	7.145e-09
Cl	1.388e-02	1.388e-02
Co	1.227e-05	1.227e-05
Cr	6.372e-08	6.372e-08
Cu	9.874e-05	9.874e-05
Fe	4.435e-04	4.435e-04
K	6.291e-03	6.291e-03
Mg	3.635e-03	3.635e-03
Mn	9.539e-05	9.539e-05
Mo	1.151e-06	1.151e-06
N	7.218e-04	7.218e-04
Na	1.498e-02	1.498e-02
Ni	8.382e-06	8.382e-06
P	9.400e-06	9.400e-06
Pb	9.691e-08	9.691e-08
S(6)	2.322e-02	2.322e-02
Se	1.271e-07	1.271e-07
Zn	7.523e-06	7.523e-06

-----Description of solution-----

pH	=	4.050
pe	=	4.000
Activity of water	=	0.999
Ionic strength (mol/kgw)	=	7.235e-02
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	-1.741e-04
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	20.00
Electrical balance (eq)	=	-3.291e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	-3.64
Iterations	=	12
Total H	=	1.110168e+02
Total O	=	5.559979e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm³/mol
H+	1.112e-04	8.913e-05	-3.954	-4.050	-0.096	0.00
OH-	9.765e-11	7.686e-11	-10.010	-10.114	-0.104	(0)
H2O	5.551e+01	9.988e-01	1.744	-0.001	0.000	18.05
Al	5.284e-05					
AlSO4+	4.325e-05	3.456e-05	-4.364	-4.461	-0.097	(0)
Al+3	5.995e-06	8.162e-07	-5.222	-6.088	-0.866	(0)
Al(SO4)2-	3.425e-06	2.737e-06	-5.465	-5.563	-0.097	(0)

AlOH+2	1.549e-07	6.629e-08	-6.810	-7.179	-0.369	(0)
Al(OH)2+	1.021e-08	8.256e-09	-7.991	-8.083	-0.092	(0)
Al(OH)3	1.859e-11	1.859e-11	-10.731	-10.731	0.000	(0)
Al(OH)4-	1.003e-13	8.018e-14	-12.999	-13.096	-0.097	(0)
AlMo6021-3	3.639e-15	2.171e-16	-14.439	-15.663	-1.224	(0)
As(3)	2.521e-08					
H3AsO3	2.521e-08	2.521e-08	-7.598	-7.598	0.000	(0)
H4AsO3+	1.523e-12	1.113e-12	-11.817	-11.953	-0.136	(0)
H2AsO3-	1.643e-13	1.201e-13	-12.784	-12.920	-0.136	(0)
HAsO3-2	3.453e-21	9.864e-22	-20.462	-21.006	-0.544	(0)
AsO3-3	6.008e-30	3.584e-31	-29.221	-30.446	-1.224	(0)
As(5)	1.588e-09					
H2AsO4-	1.567e-09	1.145e-09	-8.805	-8.941	-0.136	(0)
H3AsO4	1.662e-11	1.690e-11	-10.779	-10.772	0.007	(0)
HAsO4-2	4.832e-12	1.380e-12	-11.316	-11.860	-0.544	(0)
AsO4-3	7.304e-19	4.357e-20	-18.136	-19.361	-1.224	(0)
B	9.287e-06					
H3BO3	9.287e-06	9.443e-06	-5.032	-5.025	0.007	(0)
H2BO3-	7.274e-11	5.627e-11	-10.138	-10.250	-0.111	(0)
CaH2BO3+	1.376e-11	1.065e-11	-10.861	-10.973	-0.111	(0)
MgH2BO3+	2.559e-12	1.980e-12	-11.592	-11.703	-0.111	(0)
NaH2BO3	1.131e-12	1.131e-12	-11.947	-11.947	0.000	(0)
H5(BO3)2-	6.034e-16	4.668e-16	-15.219	-15.331	-0.111	(0)
BaH2BO3+	2.636e-16	2.039e-16	-15.579	-15.691	-0.111	(0)
H8(BO3)3-	4.932e-19	3.815e-19	-18.307	-18.418	-0.111	(0)
Ba	2.924e-07					
Ba+2	2.924e-07	1.205e-07	-6.534	-6.919	-0.385	(0)
BaNH3+2	8.904e-16	2.544e-16	-15.050	-15.595	-0.544	(0)
BaH2BO3+	2.636e-16	2.039e-16	-15.579	-15.691	-0.111	(0)
BaOH+	4.857e-17	3.908e-17	-16.314	-16.408	-0.094	(0)
BaN03+	0.000e+00	0.000e+00	-58.243	-58.379	-0.136	(0)
Be	2.228e-07					
Be+2	1.589e-07	6.549e-08	-6.799	-7.184	-0.385	(0)
BeS04	5.495e-08	5.495e-08	-7.260	-7.260	0.000	(0)
Be(S04)2-2	3.956e-09	1.130e-09	-8.403	-8.947	-0.544	(0)
BeOH+	3.590e-09	2.942e-09	-8.445	-8.531	-0.086	(0)
BeCl+	1.430e-09	1.151e-09	-8.845	-8.939	-0.094	(0)
Be(OH)2	2.095e-13	2.095e-13	-12.679	-12.679	0.000	(0)
Be2OH+3	1.919e-13	3.197e-14	-12.717	-13.495	-0.778	(0)
Be3(OH)3+3	3.696e-18	6.156e-19	-17.432	-18.211	-0.778	(0)
Be(OH)3-	7.246e-19	5.938e-19	-18.140	-18.226	-0.086	(0)
Be(OH)4-2	9.377e-29	4.228e-29	-28.028	-28.374	-0.346	(0)
Ca	1.308e-02					
Ca+2	8.199e-03	3.380e-03	-2.086	-2.471	-0.385	(0)
CaS04	4.877e-03	4.877e-03	-2.312	-2.312	0.000	(0)
CaH2P04+	5.618e-07	4.544e-07	-6.250	-6.343	-0.092	(0)
CaHP04	6.463e-09	6.463e-09	-8.190	-8.190	0.000	(0)
CaNH3+2	4.981e-11	1.423e-11	-10.303	-10.847	-0.544	(0)
CaH2BO3+	1.376e-11	1.065e-11	-10.861	-10.973	-0.111	(0)
CaOH+	6.009e-12	4.895e-12	-11.221	-11.310	-0.089	(0)
CaP04-	2.137e-13	1.729e-13	-12.670	-12.762	-0.092	(0)
Ca(NH3)2+2	6.632e-20	1.894e-20	-19.178	-19.723	-0.544	(0)
CaN03+	0.000e+00	0.000e+00	-54.018	-54.154	-0.136	(0)
Cd	7.145e-09					
Cd+2	2.961e-09	1.221e-09	-8.529	-8.913	-0.385	(0)
CdS04	1.783e-09	1.783e-09	-8.749	-8.749	0.000	(0)
CdCl+	1.752e-09	1.281e-09	-8.757	-8.893	-0.136	(0)
Cd(S04)2-2	5.911e-10	1.689e-10	-9.228	-9.772	-0.544	(0)
CdCl2	5.825e-11	5.825e-11	-10.235	-10.235	0.000	(0)
CdCl3-	5.300e-13	3.875e-13	-12.276	-12.412	-0.136	(0)
CdOHC1	5.266e-15	5.266e-15	-14.279	-14.279	0.000	(0)
CdOH+	1.026e-15	7.503e-16	-14.989	-15.125	-0.136	(0)
Cd(OH)2	7.790e-22	7.790e-22	-21.108	-21.108	0.000	(0)
Cd2OH+3	8.185e-23	4.883e-24	-22.087	-23.311	-1.224	(0)
Cd(Se03)2-2	5.753e-26	1.643e-26	-25.240	-25.784	-0.544	(0)
Cd(OH)3-	7.346e-30	5.370e-30	-29.134	-29.270	-0.136	(0)
CdSe04	3.576e-31	3.576e-31	-30.447	-30.447	0.000	(0)
Cd(OH)4-2	3.472e-40	0.000e+00	-39.459	-40.004	-0.544	(0)

	CdNO3+	0.000e+00	0.000e+00	-60.413	-60.549	-0.136	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-113.111	-113.111	0.000	(0)
Cl		1.388e-02					
	Cl-	1.381e-02	1.106e-02	-1.860	-1.956	-0.096	(0)
	CuCl2-	2.907e-05	2.306e-05	-4.537	-4.637	-0.101	(0)
	CuCl	9.858e-06	9.858e-06	-5.006	-5.006	0.000	(0)
	MnCl+	3.569e-07	2.872e-07	-6.447	-6.542	-0.094	(0)
	CuCl+	3.164e-07	2.510e-07	-6.500	-6.600	-0.101	(0)
	CoCl+	1.315e-07	9.612e-08	-6.881	-7.017	-0.136	(0)
	CuCl3-2	1.276e-07	5.349e-08	-6.894	-7.272	-0.378	(0)
	NiCl+	8.574e-08	6.268e-08	-7.067	-7.203	-0.136	(0)
	ZnCl+	6.136e-08	4.867e-08	-7.212	-7.313	-0.101	(0)
	PbCl+	7.379e-09	5.395e-09	-8.132	-8.268	-0.136	(0)
	MnCl2	4.488e-09	4.488e-09	-8.348	-8.348	0.000	(0)
	CdCl+	1.752e-09	1.281e-09	-8.757	-8.893	-0.136	(0)
	BeCl+	1.430e-09	1.151e-09	-8.845	-8.939	-0.094	(0)
	CuCl2	7.521e-10	7.521e-10	-9.124	-9.124	0.000	(0)
	ZnCl2	6.866e-10	6.866e-10	-9.163	-9.163	0.000	(0)
	PbCl2	2.606e-10	2.606e-10	-9.584	-9.584	0.000	(0)
	CrCl+2	6.429e-11	1.836e-11	-10.192	-10.736	-0.544	(0)
	CdCl2	5.825e-11	5.825e-11	-10.235	-10.235	0.000	(0)
	MnCl3-	1.700e-11	1.367e-11	-10.770	-10.864	-0.094	(0)
	ZnOHCl	7.463e-12	7.463e-12	-11.127	-11.127	0.000	(0)
	ZnCl3-	7.451e-12	5.911e-12	-11.128	-11.228	-0.101	(0)
	NiCl2	3.540e-12	3.540e-12	-11.451	-11.451	0.000	(0)
	PbCl3-	1.659e-12	1.213e-12	-11.780	-11.916	-0.136	(0)
	CdCl3-	5.300e-13	3.875e-13	-12.276	-12.412	-0.136	(0)
	CuCl3-	8.945e-14	7.096e-14	-13.048	-13.149	-0.101	(0)
	ZnCl4-2	7.493e-14	3.140e-14	-13.125	-13.503	-0.378	(0)
	FeCl+2	4.146e-14	1.738e-14	-13.382	-13.760	-0.378	(0)
	PbCl4-2	1.993e-14	5.694e-15	-13.700	-14.245	-0.544	(0)
	CrCl2+	1.693e-14	1.238e-14	-13.771	-13.907	-0.136	(0)
	CdOHCl	5.266e-15	5.266e-15	-14.279	-14.279	0.000	(0)
	FeCl2+	1.250e-15	1.006e-15	-14.903	-14.997	-0.094	(0)
	CrOHCl2	2.136e-16	2.136e-16	-15.670	-15.670	0.000	(0)
	CuCl4-2	1.113e-17	4.664e-18	-16.954	-17.331	-0.378	(0)
	FeCl3	1.113e-18	1.113e-18	-17.954	-17.954	0.000	(0)
	CoCl+2	7.155e-34	2.044e-34	-33.145	-33.690	-0.544	(0)
	CrO3Cl-	0.000e+00	0.000e+00	-44.667	-44.803	-0.136	(0)
	Cr(NH3)6Cl+2	0.000e+00	0.000e+00	-47.366	-47.910	-0.544	(0)
	Co(NH3)5Cl+2	0.000e+00	0.000e+00	-49.862	-50.406	-0.544	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-65.026	-65.570	-0.544	(0)
Co(2)		1.227e-05					
	Co+2	8.914e-06	2.546e-06	-5.050	-5.594	-0.544	(0)
	CoSO4	3.220e-06	3.220e-06	-5.492	-5.492	0.000	(0)
	CoCl+	1.315e-07	9.612e-08	-6.881	-7.017	-0.136	(0)
	CoHP04	1.139e-11	1.139e-11	-10.944	-10.944	0.000	(0)
	CoOH+	7.843e-12	5.734e-12	-11.106	-11.242	-0.136	(0)
	Co(NH3)+2	5.605e-12	1.601e-12	-11.251	-11.796	-0.544	(0)
	Co(OH)2	5.139e-17	5.139e-17	-16.289	-16.289	0.000	(0)
	Co2OH+3	1.226e-17	7.317e-19	-16.911	-18.136	-1.224	(0)
	Co(NH3)2+2	5.113e-19	1.461e-19	-18.291	-18.835	-0.544	(0)
	Co(OH)3-	1.583e-25	1.157e-25	-24.801	-24.937	-0.136	(0)
	Co(NH3)3+2	2.153e-26	6.150e-27	-25.667	-26.211	-0.544	(0)
	CoOOH-	6.625e-27	4.844e-27	-26.179	-26.315	-0.136	(0)
	CoSeO4	1.849e-27	1.849e-27	-26.733	-26.733	0.000	(0)
	Co(NH3)4+2	3.778e-34	1.079e-34	-33.423	-33.967	-0.544	(0)
	Co4(OH)4+4	3.238e-35	2.156e-37	-34.490	-36.666	-2.177	(0)
	Co(OH)4-2	7.245e-36	2.070e-36	-35.140	-35.684	-0.544	(0)
	Co(NH3)5+2	0.000e+00	0.000e+00	-41.678	-42.223	-0.544	(0)
	CoNO2+	0.000e+00	0.000e+00	-43.791	-43.927	-0.136	(0)
	CoNO3+	0.000e+00	0.000e+00	-57.457	-57.593	-0.136	(0)
	Co(NO3)2	0.000e+00	0.000e+00	-109.483	-109.483	0.000	(0)
Co(3)		2.050e-31					
	CoOH+2	2.035e-31	5.813e-32	-30.691	-31.236	-0.544	(0)
	Co+3	7.446e-34	1.014e-34	-33.128	-33.994	-0.866	(0)
	CoCl+2	7.155e-34	2.044e-34	-33.145	-33.690	-0.544	(0)
	Co(NH3)5Cl+2	0.000e+00	0.000e+00	-49.862	-50.406	-0.544	(0)

Co(NH3)6SO4+	0.000e+00	0.000e+00	-60.792	-60.928	-0.136	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-65.026	-65.570	-0.544	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-68.505	-69.050	-0.544	(0)
Cr(2)	5.033e-20					
Cr+2	5.033e-20	1.438e-20	-19.298	-19.842	-0.544	(0)
Cr(3)	6.372e-08					
CrS04+	2.618e-08	1.914e-08	-7.582	-7.718	-0.136	(0)
Cr+3	2.571e-08	1.534e-09	-7.590	-8.814	-1.224	(0)
Cr(OH)+2	9.288e-09	2.653e-09	-8.032	-8.576	-0.544	(0)
CrOHS04	2.437e-09	2.437e-09	-8.613	-8.613	0.000	(0)
CrCl+2	6.429e-11	1.836e-11	-10.192	-10.736	-0.544	(0)
Cr(OH)2+	2.915e-11	2.131e-11	-10.535	-10.671	-0.136	(0)
CrH2PO4+2	7.383e-12	2.109e-12	-11.132	-11.676	-0.544	(0)
CrCl2+	1.693e-14	1.238e-14	-13.771	-13.907	-0.136	(0)
Cr2(OH)2SO4+2	1.197e-15	3.419e-16	-14.922	-15.466	-0.544	(0)
Cr(OH)3	9.036e-16	9.036e-16	-15.044	-15.044	0.000	(0)
CrOHC12	2.136e-16	2.136e-16	-15.670	-15.670	0.000	(0)
Cr2(OH)2(SO4)2	1.343e-16	1.343e-16	-15.872	-15.872	0.000	(0)
CrO2-	6.593e-21	4.820e-21	-20.181	-20.317	-0.136	(0)
Cr(OH)4-	5.552e-21	4.059e-21	-20.256	-20.392	-0.136	(0)
Cr(NH3)5OH+2	0.000e+00	0.000e+00	-40.611	-41.155	-0.544	(0)
Cr(NH3)6+3	0.000e+00	0.000e+00	-45.831	-47.056	-1.224	(0)
Cr(NH3)6Cl+2	0.000e+00	0.000e+00	-47.366	-47.910	-0.544	(0)
CrNO3+2	0.000e+00	0.000e+00	-62.020	-62.564	-0.544	(0)
Cr(6)	3.419e-40					
HCrO4-	3.419e-40	2.500e-40	-39.466	-39.602	-0.136	(0)
CrO4-2	0.000e+00	0.000e+00	-41.671	-42.056	-0.385	(0)
CrO3SO4-2	0.000e+00	0.000e+00	-42.797	-43.341	-0.544	(0)
NaCrO4-	0.000e+00	0.000e+00	-43.159	-43.295	-0.136	(0)
KCrO4-	0.000e+00	0.000e+00	-43.667	-43.803	-0.136	(0)
CrO3HP04-2	0.000e+00	0.000e+00	-43.693	-44.237	-0.544	(0)
H2CrO4	0.000e+00	0.000e+00	-43.854	-43.854	0.000	(0)
CrO3Cl-	0.000e+00	0.000e+00	-44.667	-44.803	-0.136	(0)
CrO3H2PO4-	0.000e+00	0.000e+00	-45.469	-45.605	-0.136	(0)
Cr2O7-2	0.000e+00	0.000e+00	-77.063	-77.607	-0.544	(0)
Cu(1)	4.003e-05					
CuCl2-	2.907e-05	2.306e-05	-4.537	-4.637	-0.101	(0)
CuCl	9.858e-06	9.858e-06	-5.006	-5.006	0.000	(0)
Cu+	9.682e-07	7.078e-07	-6.014	-6.150	-0.136	(0)
CuCl3-2	1.276e-07	5.349e-08	-6.894	-7.272	-0.378	(0)
Cu(2)	5.872e-05					
Cu+2	3.676e-05	1.515e-05	-4.435	-4.819	-0.385	(0)
CuS04	2.163e-05	2.163e-05	-4.665	-4.665	0.000	(0)
CuCl+	3.164e-07	2.510e-07	-6.500	-6.600	-0.101	(0)
CuOH+	5.328e-09	4.227e-09	-8.273	-8.374	-0.101	(0)
CuNH3+2	2.979e-09	8.511e-10	-8.526	-9.070	-0.544	(0)
CuCl2	7.521e-10	7.521e-10	-9.124	-9.124	0.000	(0)
Cu2(OH)2+2	1.518e-12	4.336e-13	-11.819	-12.363	-0.544	(0)
Cu(OH)2	1.218e-13	1.218e-13	-12.914	-12.914	0.000	(0)
CuCl3-	8.945e-14	7.096e-14	-13.048	-13.149	-0.101	(0)
CuCl4-2	1.113e-17	4.664e-18	-16.954	-17.331	-0.378	(0)
Cu(OH)3-	3.855e-20	2.818e-20	-19.414	-19.550	-0.136	(0)
Cu(OH)4-2	8.762e-29	2.503e-29	-28.057	-28.602	-0.544	(0)
CuNO2+	0.000e+00	0.000e+00	-41.845	-41.981	-0.136	(0)
CuNO3+	0.000e+00	0.000e+00	-56.370	-56.506	-0.136	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-80.152	-80.152	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-109.617	-109.617	0.000	(0)
Fe(2)	4.435e-04					
Fe+2	3.080e-04	8.798e-05	-3.511	-4.056	-0.544	(0)
FeS04	1.352e-04	1.352e-04	-3.869	-3.869	0.000	(0)
FeH2PO4+	3.142e-07	2.541e-07	-6.503	-6.595	-0.092	(0)
FeHP04	1.436e-09	1.436e-09	-8.843	-8.843	0.000	(0)
FeOH+	3.346e-10	2.692e-10	-9.475	-9.570	-0.094	(0)
Fe(OH)2	1.556e-17	1.556e-17	-16.808	-16.808	0.000	(0)
Fe(OH)3-	6.584e-22	5.298e-22	-21.182	-21.276	-0.094	(0)
Fe(3)	2.581e-10					
Fe(OH)2+	2.410e-10	1.949e-10	-9.618	-9.710	-0.092	(0)
FeOH+2	7.944e-12	3.329e-12	-11.100	-11.478	-0.378	(0)

FeS04+	4.732e-12	3.807e-12	-11.325	-11.419	-0.094	(0)
FeHP04+	3.147e-12	2.545e-12	-11.502	-11.594	-0.092	(0)
Fe(S04)2-	7.664e-13	5.603e-13	-12.116	-12.252	-0.136	(0)
Fe+3	4.475e-13	6.093e-14	-12.349	-13.215	-0.866	(0)
FeCl+2	4.146e-14	1.738e-14	-13.382	-13.760	-0.378	(0)
FeH2P04+2	1.558e-14	6.667e-15	-13.807	-14.176	-0.369	(0)
Fe(OH)3	1.156e-14	1.156e-14	-13.937	-13.937	0.000	(0)
FeCl2+	1.250e-15	1.006e-15	-14.903	-14.997	-0.094	(0)
FeHSe03+2	4.294e-17	1.227e-17	-16.367	-16.911	-0.544	(0)
FeCl3	1.113e-18	1.113e-18	-17.954	-17.954	0.000	(0)
Fe(OH)4-	3.068e-19	2.482e-19	-18.513	-18.605	-0.092	(0)
Fe2(OH)2+4	6.591e-20	4.389e-22	-19.181	-21.358	-2.177	(0)
Fe3(OH)4+5	2.953e-27	1.173e-30	-26.530	-29.931	-3.401	(0)
FeN03+2	0.000e+00	0.000e+00	-63.759	-64.303	-0.544	(0)
H(0)	1.164e-19					
H2	5.818e-20	5.915e-20	-19.235	-19.228	0.007	(0)
K	6.291e-03					
K+	6.020e-03	4.823e-03	-2.220	-2.317	-0.096	(0)
KS04-	2.715e-04	2.196e-04	-3.566	-3.658	-0.092	(0)
KHP04-	1.854e-10	1.500e-10	-9.732	-9.824	-0.092	(0)
KCr04-	0.000e+00	0.000e+00	-43.667	-43.803	-0.136	(0)
Mg	3.635e-03					
Mg+2	2.461e-03	1.015e-03	-2.609	-2.994	-0.385	(0)
MgS04	1.173e-03	1.173e-03	-2.931	-2.931	0.000	(0)
MgH2P04+	3.599e-07	2.911e-07	-6.444	-6.536	-0.092	(0)
MgHP04	2.678e-09	2.678e-09	-8.572	-8.572	0.000	(0)
MgOH+	3.488e-11	2.859e-11	-10.457	-10.544	-0.086	(0)
MgH2B03+	2.559e-12	1.980e-12	-11.592	-11.703	-0.111	(0)
MgP04-	1.003e-15	8.112e-16	-14.999	-15.091	-0.092	(0)
Mn(2)	9.539e-05					
Mn+2	7.219e-05	2.062e-05	-4.142	-4.686	-0.544	(0)
MnS04	2.285e-05	2.285e-05	-4.641	-4.641	0.000	(0)
MnCl+	3.569e-07	2.872e-07	-6.447	-6.542	-0.094	(0)
MnCl2	4.488e-09	4.488e-09	-8.348	-8.348	0.000	(0)
MnCl3-	1.700e-11	1.367e-11	-10.770	-10.864	-0.094	(0)
MnOH+	4.948e-12	3.981e-12	-11.306	-11.400	-0.094	(0)
MnSe	3.144e-17	3.144e-17	-16.503	-16.503	0.000	(0)
MnSe04	7.932e-27	7.932e-27	-26.101	-26.101	0.000	(0)
Mn(OH)3-	5.717e-28	4.600e-28	-27.243	-27.337	-0.094	(0)
Mn(OH)4-2	3.999e-37	1.676e-37	-36.398	-36.776	-0.378	(0)
MnN03+	0.000e+00	0.000e+00	-56.548	-56.684	-0.136	(0)
Mn(N03)2	0.000e+00	0.000e+00	-108.478	-108.478	0.000	(0)
Mn(3)	3.223e-26					
Mn+3	3.223e-26	4.387e-27	-25.492	-26.358	-0.866	(0)
Mn(6)	0.000e+00					
Mn04-2	0.000e+00	0.000e+00	-76.457	-76.834	-0.378	(0)
Mn(7)	0.000e+00					
Mn04-	0.000e+00	0.000e+00	-82.432	-82.540	-0.108	(0)
Mo	1.151e-06					
Mo04-2	4.714e-07	1.943e-07	-6.327	-6.712	-0.385	(0)
HMo04-	4.107e-07	3.003e-07	-6.386	-6.522	-0.136	(0)
H2Mo04	2.690e-07	2.690e-07	-6.570	-6.570	0.000	(0)
AlMo6021-3	3.639e-15	2.171e-16	-14.439	-15.663	-1.224	(0)
HMo7024-5	1.001e-20	3.977e-24	-20.000	-23.400	-3.401	(0)
H2Mo7024-4	3.158e-21	2.103e-23	-20.501	-22.677	-2.177	(0)
Mo7024-6	1.548e-21	1.962e-26	-20.810	-25.707	-4.897	(0)
H3Mo7024-3	5.612e-23	3.348e-24	-22.251	-23.475	-1.224	(0)
N(-3)	7.218e-04					
NH4+	6.757e-04	5.228e-04	-3.170	-3.282	-0.111	(0)
NH4S04-	4.605e-05	3.705e-05	-4.337	-4.431	-0.094	(0)
CuNH3+2	2.979e-09	8.511e-10	-8.526	-9.070	-0.544	(0)
NH3	2.338e-09	2.338e-09	-8.631	-8.631	0.000	(0)
CaNH3+2	4.981e-11	1.423e-11	-10.303	-10.847	-0.544	(0)
NiNH3+2	2.238e-11	6.394e-12	-10.650	-11.194	-0.544	(0)
Co(NH3)+2	5.605e-12	1.601e-12	-11.251	-11.796	-0.544	(0)
BaNH3+2	8.904e-16	2.544e-16	-15.050	-15.595	-0.544	(0)
Ni(NH3)2+2	1.471e-17	4.201e-18	-16.833	-17.377	-0.544	(0)
Co(NH3)2+2	5.113e-19	1.461e-19	-18.291	-18.835	-0.544	(0)

	Ca(NH3)2+2	6.632e-20	1.894e-20	-19.178	-19.723	-0.544	(0)
	Co(NH3)3+2	2.153e-26	6.150e-27	-25.667	-26.211	-0.544	(0)
	Co(NH3)4+2	3.778e-34	1.079e-34	-33.423	-33.967	-0.544	(0)
	Cr(NH3)5OH+2	0.000e+00	0.000e+00	-40.611	-41.155	-0.544	(0)
	Co(NH3)5+2	0.000e+00	0.000e+00	-41.678	-42.223	-0.544	(0)
	Cr(NH3)6+3	0.000e+00	0.000e+00	-45.831	-47.056	-1.224	(0)
	Cr(NH3)6Cl+2	0.000e+00	0.000e+00	-47.366	-47.910	-0.544	(0)
	Co(NH3)5Cl+2	0.000e+00	0.000e+00	-49.862	-50.406	-0.544	(0)
	Co(NH3)6SO4+	0.000e+00	0.000e+00	-60.792	-60.928	-0.136	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-65.026	-65.570	-0.544	(0)
	Co(NH3)6OH+2	0.000e+00	0.000e+00	-68.505	-69.050	-0.544	(0)
N(3)		8.441e-40					
	NO2-	8.441e-40	6.589e-40	-39.074	-39.181	-0.108	(0)
	CuNO2+	0.000e+00	0.000e+00	-41.845	-41.981	-0.136	(0)
	CoNO2+	0.000e+00	0.000e+00	-43.791	-43.927	-0.136	(0)
	Cu(NO2)2	0.000e+00	0.000e+00	-80.152	-80.152	0.000	(0)
N(5)		0.000e+00					
	NO3-	0.000e+00	0.000e+00	-52.103	-52.199	-0.096	(0)
	CaNO3+	0.000e+00	0.000e+00	-54.018	-54.154	-0.136	(0)
	CuNO3+	0.000e+00	0.000e+00	-56.370	-56.506	-0.136	(0)
	MnNO3+	0.000e+00	0.000e+00	-56.548	-56.684	-0.136	(0)
	NiNO3+	0.000e+00	0.000e+00	-57.311	-57.448	-0.136	(0)
	ZnNO3+	0.000e+00	0.000e+00	-57.389	-57.525	-0.136	(0)
	CoNO3+	0.000e+00	0.000e+00	-57.457	-57.593	-0.136	(0)
	BaNO3+	0.000e+00	0.000e+00	-58.243	-58.379	-0.136	(0)
	PbNO3+	0.000e+00	0.000e+00	-58.735	-58.871	-0.136	(0)
	CdNO3+	0.000e+00	0.000e+00	-60.413	-60.549	-0.136	(0)
	CrNO3+2	0.000e+00	0.000e+00	-62.020	-62.564	-0.544	(0)
	FeNO3+2	0.000e+00	0.000e+00	-63.759	-64.303	-0.544	(0)
	Mn(NO3)2	0.000e+00	0.000e+00	-108.478	-108.478	0.000	(0)
	Co(NO3)2	0.000e+00	0.000e+00	-109.483	-109.483	0.000	(0)
	Cu(NO3)2	0.000e+00	0.000e+00	-109.617	-109.617	0.000	(0)
	Zn(NO3)2	0.000e+00	0.000e+00	-110.438	-110.438	0.000	(0)
	Pb(NO3)2	0.000e+00	0.000e+00	-110.814	-110.814	0.000	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-113.111	-113.111	0.000	(0)
Na		1.498e-02					
	Na+	1.447e-02	1.160e-02	-1.839	-1.936	-0.096	(0)
	NaSO4-	5.058e-04	4.091e-04	-3.296	-3.388	-0.092	(0)
	NaHPO4-	6.904e-10	5.584e-10	-9.161	-9.253	-0.092	(0)
	NaH2BO3	1.131e-12	1.131e-12	-11.947	-11.947	0.000	(0)
	NaCrO4-	0.000e+00	0.000e+00	-43.159	-43.295	-0.136	(0)
Ni		8.382e-06					
	Ni+2	5.447e-06	2.245e-06	-5.264	-5.649	-0.385	(0)
	NiSO4	2.847e-06	2.847e-06	-5.546	-5.546	0.000	(0)
	NiCl+	8.574e-08	6.268e-08	-7.067	-7.203	-0.136	(0)
	Ni(SO4)2-2	2.272e-09	6.490e-10	-8.644	-9.188	-0.544	(0)
	NiNH3+2	2.238e-11	6.394e-12	-10.650	-11.194	-0.544	(0)
	NiCl2	3.540e-12	3.540e-12	-11.451	-11.451	0.000	(0)
	NiOH+	3.055e-12	2.233e-12	-11.515	-11.651	-0.136	(0)
	Ni(OH)2	2.859e-17	2.859e-17	-16.544	-16.544	0.000	(0)
	Ni(NH3)2+2	1.471e-17	4.201e-18	-16.833	-17.377	-0.544	(0)
	Ni(OH)3-	4.413e-24	3.226e-24	-23.355	-23.491	-0.136	(0)
	NiSeO4	1.501e-27	1.501e-27	-26.824	-26.824	0.000	(0)
	NiNO3+	0.000e+00	0.000e+00	-57.311	-57.448	-0.136	(0)
O(0)		0.000e+00					
	O2	0.000e+00	0.000e+00	-55.241	-55.234	0.007	(0)
P		9.400e-06					
	H2PO4-	8.064e-06	6.522e-06	-5.093	-5.186	-0.092	(0)
	CaH2PO4+	5.618e-07	4.544e-07	-6.250	-6.343	-0.092	(0)
	MgH2PO4+	3.599e-07	2.911e-07	-6.444	-6.536	-0.092	(0)
	FeH2PO4+	3.142e-07	2.541e-07	-6.503	-6.595	-0.092	(0)
	H3PO4	7.741e-08	7.741e-08	-7.111	-7.111	0.000	(0)
	HPO4-2	1.084e-08	4.544e-09	-7.965	-8.343	-0.378	(0)
	CaHPO4	6.463e-09	6.463e-09	-8.190	-8.190	0.000	(0)
	MgHPO4	2.678e-09	2.678e-09	-8.572	-8.572	0.000	(0)
	FeHPO4	1.436e-09	1.436e-09	-8.843	-8.843	0.000	(0)
	NaHPO4-	6.904e-10	5.584e-10	-9.161	-9.253	-0.092	(0)
	KHPO4-	1.854e-10	1.500e-10	-9.732	-9.824	-0.092	(0)

CoHP04	1.139e-11	1.139e-11	-10.944	-10.944	0.000	(0)
CrH2P04+2	7.383e-12	2.109e-12	-11.132	-11.676	-0.544	(0)
FeHP04+	3.147e-12	2.545e-12	-11.502	-11.594	-0.092	(0)
CaP04-	2.137e-13	1.729e-13	-12.670	-12.762	-0.092	(0)
FeH2P04+2	1.558e-14	6.667e-15	-13.807	-14.176	-0.369	(0)
MgP04-	1.003e-15	8.112e-16	-14.999	-15.091	-0.092	(0)
P04-3	1.424e-16	1.939e-17	-15.846	-16.712	-0.866	(0)
CrO3HP04-2	0.000e+00	0.000e+00	-43.693	-44.237	-0.544	(0)
CrO3H2P04-	0.000e+00	0.000e+00	-45.469	-45.605	-0.136	(0)
Pb	9.691e-08					
PbS04	4.727e-08	4.727e-08	-7.325	-7.325	0.000	(0)
Pb+2	3.540e-08	1.459e-08	-7.451	-7.836	-0.385	(0)
PbCl+	7.379e-09	5.395e-09	-8.132	-8.268	-0.136	(0)
Pb(S04)2-2	6.595e-09	1.884e-09	-8.181	-8.725	-0.544	(0)
PbCl2	2.606e-10	2.606e-10	-9.584	-9.584	0.000	(0)
PbOH+	5.657e-12	4.136e-12	-11.247	-11.383	-0.136	(0)
PbCl3-	1.659e-12	1.213e-12	-11.780	-11.916	-0.136	(0)
PbCl4-2	1.993e-14	5.694e-15	-13.700	-14.245	-0.544	(0)
Pb2OH+3	1.603e-17	9.564e-19	-16.795	-18.019	-1.224	(0)
Pb(OH)2	1.476e-17	1.476e-17	-16.831	-16.831	0.000	(0)
Pb(OH)3-	2.278e-24	1.666e-24	-23.642	-23.778	-0.136	(0)
Pb(OH)4-2	1.611e-31	4.603e-32	-30.793	-31.337	-0.544	(0)
Pb3(OH)4+2	1.005e-31	2.870e-32	-30.998	-31.542	-0.544	(0)
Pb4(OH)4+4	6.014e-34	4.005e-36	-33.221	-35.397	-2.177	(0)
PbNO3+	0.000e+00	0.000e+00	-58.735	-58.871	-0.136	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-110.814	-110.814	0.000	(0)
S(6)	2.322e-02					
S04-2	1.605e-02	6.614e-03	-1.795	-2.180	-0.385	(0)
CaS04	4.877e-03	4.877e-03	-2.312	-2.312	0.000	(0)
MgS04	1.173e-03	1.173e-03	-2.931	-2.931	0.000	(0)
NaS04-	5.058e-04	4.091e-04	-3.296	-3.388	-0.092	(0)
KS04-	2.715e-04	2.196e-04	-3.566	-3.658	-0.092	(0)
FeS04	1.352e-04	1.352e-04	-3.869	-3.869	0.000	(0)
HS04-	6.197e-05	4.952e-05	-4.208	-4.305	-0.097	(0)
NH4S04-	4.605e-05	3.705e-05	-4.337	-4.431	-0.094	(0)
AlS04+	4.325e-05	3.456e-05	-4.364	-4.461	-0.097	(0)
MnS04	2.285e-05	2.285e-05	-4.641	-4.641	0.000	(0)
CuS04	2.163e-05	2.163e-05	-4.665	-4.665	0.000	(0)
Al(S04)2-	3.425e-06	2.737e-06	-5.465	-5.563	-0.097	(0)
CoS04	3.220e-06	3.220e-06	-5.492	-5.492	0.000	(0)
NiS04	2.847e-06	2.847e-06	-5.546	-5.546	0.000	(0)
ZnS04	2.521e-06	2.521e-06	-5.598	-5.598	0.000	(0)
Zn(S04)2-2	5.305e-07	1.515e-07	-6.275	-6.819	-0.544	(0)
BeS04	5.495e-08	5.495e-08	-7.260	-7.260	0.000	(0)
PbS04	4.727e-08	4.727e-08	-7.325	-7.325	0.000	(0)
CrS04+	2.618e-08	1.914e-08	-7.582	-7.718	-0.136	(0)
Pb(S04)2-2	6.595e-09	1.884e-09	-8.181	-8.725	-0.544	(0)
Be(S04)2-2	3.956e-09	1.130e-09	-8.403	-8.947	-0.544	(0)
CrOHS04	2.437e-09	2.437e-09	-8.613	-8.613	0.000	(0)
Ni(S04)2-2	2.272e-09	6.490e-10	-8.644	-9.188	-0.544	(0)
CdS04	1.783e-09	1.783e-09	-8.749	-8.749	0.000	(0)
Cd(S04)2-2	5.911e-10	1.689e-10	-9.228	-9.772	-0.544	(0)
FeS04+	4.732e-12	3.807e-12	-11.325	-11.419	-0.094	(0)
Fe(S04)2-	7.664e-13	5.603e-13	-12.116	-12.252	-0.136	(0)
Cr2(OH)2S04+2	1.197e-15	3.419e-16	-14.922	-15.466	-0.544	(0)
Cr2(OH)2(S04)2	1.343e-16	1.343e-16	-15.872	-15.872	0.000	(0)
CrO3S04-2	0.000e+00	0.000e+00	-42.797	-43.341	-0.544	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-60.792	-60.928	-0.136	(0)
Se(-2)	6.740e-11					
HSe-	4.510e-11	3.297e-11	-10.346	-10.482	-0.136	(0)
H2Se	2.230e-11	2.230e-11	-10.652	-10.652	0.000	(0)
MnSe	3.144e-17	3.144e-17	-16.503	-16.503	0.000	(0)
Se-2	9.300e-22	2.657e-22	-21.032	-21.576	-0.544	(0)
Se(4)	1.271e-07					
HSeO3-	1.238e-07	9.049e-08	-6.907	-7.043	-0.136	(0)
H2SeO3	3.297e-09	3.297e-09	-8.482	-8.482	0.000	(0)
SeO3-2	1.367e-11	3.905e-12	-10.864	-11.408	-0.544	(0)
FeHSeO3+2	4.294e-17	1.227e-17	-16.367	-16.911	-0.544	(0)

Cd(SeO3)2-2	5.753e-26	1.643e-26	-25.240	-25.784	-0.544	(0)
Se(6)	3.837e-24					
SeO4-2	3.818e-24	1.574e-24	-23.418	-23.803	-0.385	(0)
HSeO4-	8.207e-27	6.000e-27	-26.086	-26.222	-0.136	(0)
MnSeO4	7.932e-27	7.932e-27	-26.101	-26.101	0.000	(0)
CoSeO4	1.849e-27	1.849e-27	-26.733	-26.733	0.000	(0)
NiSeO4	1.501e-27	1.501e-27	-26.824	-26.824	0.000	(0)
ZnSeO4	4.430e-28	4.430e-28	-27.354	-27.354	0.000	(0)
CdSeO4	3.576e-31	3.576e-31	-30.447	-30.447	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-50.607	-51.151	-0.544	(0)
Zn	7.523e-06					
Zn+2	4.410e-06	1.818e-06	-5.356	-5.740	-0.385	(0)
ZnSO4	2.521e-06	2.521e-06	-5.598	-5.598	0.000	(0)
Zn(SO4)2-2	5.305e-07	1.515e-07	-6.275	-6.819	-0.544	(0)
ZnCl+	6.136e-08	4.867e-08	-7.212	-7.313	-0.101	(0)
ZnCl2	6.866e-10	6.866e-10	-9.163	-9.163	0.000	(0)
ZnOH+	1.911e-11	1.397e-11	-10.719	-10.855	-0.136	(0)
ZnOHCl	7.463e-12	7.463e-12	-11.127	-11.127	0.000	(0)
ZnCl3-	7.451e-12	5.911e-12	-11.128	-11.228	-0.101	(0)
ZnCl4-2	7.493e-14	3.140e-14	-13.125	-13.503	-0.378	(0)
Zn(OH)2	3.669e-16	3.669e-16	-15.435	-15.435	0.000	(0)
Zn(OH)3-	2.838e-22	2.075e-22	-21.547	-21.683	-0.136	(0)
ZnSeO4	4.430e-28	4.430e-28	-27.354	-27.354	0.000	(0)
Zn(OH)4-2	3.263e-30	9.322e-31	-29.486	-30.031	-0.544	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-50.607	-51.151	-0.544	(0)
ZnNO3+	0.000e+00	0.000e+00	-57.389	-57.525	-0.136	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-110.438	-110.438	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2-142.78	-136.51	6.27	(Co(NH3)5Cl)(NO3)2	
(Co(NH3)5Cl)Cl2 -40.56	-36.02	4.54	(Co(NH3)5Cl)Cl2	
(Co(NH3)5OH2)Cl3 -47.83	-36.02	11.81	(Co(NH3)5OH2)Cl3	
(Co(NH3)6)(NO3)3-203.91	-185.98	17.93	(Co(NH3)6)(NO3)3	
(Co(NH3)6)Cl3 -55.38	-35.25	20.13	(Co(NH3)6)Cl3	
(NH4)2CrO4 -49.00	-48.62	0.38	(NH4)2CrO4	
(NH4)2SeO4 -30.82	-30.37	0.45	(NH4)2SeO4	
Al(OH)3(am) -5.07	6.06	11.13	Al(OH)3	
Al2(MoO4)3 -35.46	-32.31	3.15	Al2(MoO4)3	
Al2O3 -8.30	12.12	20.43	Al2O3	
Al4(OH)10SO4 -8.74	13.96	22.70	Al4(OH)10SO4	
AlAsO4:2H2O -9.51	-4.71	4.80	AlAsO4:2H2O	
AlOHSO4 -0.99	-4.22	-3.23	AlOHSO4	
Alunite 0.13	-0.64	-0.77	KAl3(SO4)2(OH)6	
Anglesite -2.19	-10.02	-7.83	PbSO4	
Anhydrite -0.31	-4.65	-4.34	CaSO4	
Antlerite -9.23	-0.44	8.79	Cu3(OH)4SO4	
Arsenolite -27.45	-30.39	-2.94	As4O6	
As2O5 -28.32	-21.54	6.77	As2O5	
Atacamite -7.12	0.55	7.67	Cu2(OH)3Cl	
Ba(OH)2:8H2O -23.38	1.18	24.56	Ba(OH)2:8H2O	
Ba3(AsO4)2 -9.06	-18.00	-8.94	Ba3(AsO4)2	
BaCrO4 -39.21	-48.97	-9.77	BaCrO4	
BaHPO4 -7.91	-27.68	-19.77	BaHPO4	
BaMoO4 -6.64	-13.63	-6.99	BaMoO4	
Barite 0.95	-9.10	-10.05	BaSO4	
BaSeO3 -11.71	-9.91	1.79	BaSeO3	
BaSeO4 -23.20	-30.72	-7.53	BaSeO4	
Be(OH)2(alpha) -5.98	0.92	6.89	Be(OH)2	
Be(OH)2(am) -6.28	0.92	7.19	Be(OH)2	
Be(OH)2(beta) -5.58	0.92	6.49	Be(OH)2	
BeMoO4 -12.28	-13.90	-1.61	BeMoO4	
BeSeO4:4H2O -28.05	-30.99	-2.94	BeSeO4:4H2O	
Bianchite -6.16	-7.92	-1.76	ZnSO4:6H2O	
Birnessite -24.25	-6.16	18.09	MnO2	
Bixbyite -28.14	-28.42	-0.27	Mn2O3	

Boehmite	-2.87	6.06	8.93	AlOOH
Brochantite	-12.99	2.84	15.83	Cu ₄ (OH) ₆ SO ₄
Brucite	-12.08	5.11	17.18	Mg(OH) ₂
Bunsenite	-10.29	2.45	12.74	NiO
Ca ₃ (AsO ₄) ₂ ·4H ₂ O	-26.96	-4.66	22.30	Ca ₃ (AsO ₄) ₂ ·4H ₂ O
Ca ₃ (PO ₄) ₂ (beta)	-11.76	-40.84	-29.08	Ca ₃ (PO ₄) ₂
Ca ₄ H(PO ₄) ₃ ·3H ₂ O	-16.99	-64.07	-47.08	Ca ₄ H(PO ₄) ₃ ·3H ₂ O
CaCrO ₄	-42.34	-44.53	-2.19	CaCrO ₄
CaHPO ₄	-3.87	-23.23	-19.37	CaHPO ₄
CaHPO ₄ ·2H ₂ O	-4.17	-23.23	-19.06	CaHPO ₄ ·2H ₂ O
CaMoO ₄	-1.24	-9.18	-7.94	CaMoO ₄
CaSeO ₃ ·2H ₂ O	-8.34	-5.47	2.87	CaSeO ₃ ·2H ₂ O
CaSeO ₄ ·2H ₂ O	-23.28	-26.28	-3.00	CaSeO ₄ ·2H ₂ O
Cd(BO ₂) ₂	-20.70	-10.86	9.84	Cd(BO ₂) ₂
Cd(OH) ₂	-14.74	-0.81	13.93	Cd(OH) ₂
Cd(OH) ₂ (am)	-14.80	-0.81	13.99	Cd(OH) ₂
Cd ₃ (OH) ₂ (SO ₄) ₂	-29.71	-23.00	6.71	Cd ₃ (OH) ₂ (SO ₄) ₂
Cd ₃ (OH) ₄ SO ₄	-35.28	-12.72	22.56	Cd ₃ (OH) ₄ SO ₄
Cd ₃ (PO ₄) ₂	-27.57	-60.17	-32.60	Cd ₃ (PO ₄) ₂
Cd ₄ (OH) ₆ SO ₄	-41.94	-13.54	28.40	Cd ₄ (OH) ₆ SO ₄
CdCl ₂	-12.22	-12.83	-0.60	CdCl ₂
CdCl ₂ ·1H ₂ O	-11.16	-12.83	-1.67	CdCl ₂ ·1H ₂ O
CdCl ₂ ·2.5H ₂ O	-10.89	-12.83	-1.93	CdCl ₂ ·2.5H ₂ O
Cdmetal(alpha)	-30.65	-16.91	13.74	Cd
Cdmetal(gamma)	-30.76	-16.91	13.84	Cd
CdMoO ₄	-1.42	-15.62	-14.21	CdMoO ₄
CdOHCl	-10.45	-6.82	3.63	CdOHCl
CdSe	5.08	-15.35	-20.43	CdSe
CdSeO ₄ ·2H ₂ O	-30.87	-32.72	-1.85	CdSeO ₄ ·2H ₂ O
CdSO ₄	-11.08	-11.09	-0.02	CdSO ₄
CdSO ₄ ·1H ₂ O	-9.46	-11.09	-1.63	CdSO ₄ ·1H ₂ O
CdSO ₄ ·2.67H ₂ O	-9.28	-11.09	-1.82	CdSO ₄ ·2.67H ₂ O
Chalcanthite	-4.34	-7.00	-2.66	CuSO ₄ ·5H ₂ O
Claudetite	-27.16	-30.39	-3.23	As ₄ O ₆
Clausthalite	13.19	-14.27	-27.46	PbSe
Co(BO ₂) ₂	-34.61	-7.54	27.07	Co(BO ₂) ₂
Co(OH) ₂	-10.59	2.50	13.09	Co(OH) ₂
Co(OH) ₃	-19.81	-21.85	-2.03	Co(OH) ₃
Co ₃ (AsO ₄) ₂	-27.06	-14.03	13.03	Co ₃ (AsO ₄) ₂
Co ₃ (PO ₄) ₂	-15.52	-50.21	-34.69	Co ₃ (PO ₄) ₂
Co ₃ O ₄	-31.01	-41.18	-10.17	Co ₃ O ₄
CoCl ₂	-18.01	-9.51	8.51	CoCl ₂
CoCl ₂ ·6H ₂ O	-12.02	-9.51	2.51	CoCl ₂ ·6H ₂ O
CoFe ₂ O ₄	3.43	0.37	-3.05	CoFe ₂ O ₄
CoHPO ₄	-7.30	-26.36	-19.06	CoHPO ₄
CoMoO ₄	-4.61	-12.31	-7.69	CoMoO ₄
CoO	-11.40	2.51	13.90	CoO
CoSe	4.17	-12.03	-16.20	CoSe
CoSeO ₃	-9.91	-8.59	1.32	CoSeO ₃
CoSeO ₄ ·6H ₂ O	-27.87	-29.40	-1.53	CoSeO ₄ ·6H ₂ O
CoSO ₄	-10.81	-7.77	3.04	CoSO ₄
CoSO ₄ ·6H ₂ O	-5.30	-7.78	-2.48	CoSO ₄ ·6H ₂ O
Cotunnite	-6.89	-11.75	-4.86	PbCl ₂
Cr(OH) ₂	-22.67	-11.74	10.93	Cr(OH) ₂
Cr(OH) ₃	-8.05	-6.62	1.42	Cr(OH) ₃
Cr(OH) ₃ (am)	-5.87	-6.62	-0.75	Cr(OH) ₃
Cr ₂ O ₃	-11.04	-13.24	-2.21	Cr ₂ O ₃
CrCl ₂	-38.18	-23.75	14.42	CrCl ₂
CrCl ₃	-40.11	-24.64	15.48	CrCl ₃
Crmetal	-58.84	-27.84	31.00	Cr
CrO ₃	-46.96	-50.16	-3.19	CrO ₃
Cu(OH) ₂	-5.56	3.28	8.84	Cu(OH) ₂
Cu ₂ (OH) ₃ NO ₃	-59.16	-49.69	9.47	Cu ₂ (OH) ₃ NO ₃
Cu ₂ Se(alpha)	27.71	-18.73	-46.44	Cu ₂ Se
Cu ₂ SO ₄	-12.59	-14.48	-1.89	Cu ₂ SO ₄
Cu ₃ (AsO ₄) ₂ ·2H ₂ O	-17.80	-11.70	6.10	Cu ₃ (AsO ₄) ₂ ·2H ₂ O
Cu ₃ (PO ₄) ₂	-11.03	-47.88	-36.85	Cu ₃ (PO ₄) ₂
Cu ₃ (PO ₄) ₂ ·3H ₂ O	-12.76	-47.88	-35.12	Cu ₃ (PO ₄) ₂ ·3H ₂ O

Cu3Se2	34.52	-29.98	-64.51	Cu3Se2
CuCrO4	-41.44	-46.88	-5.44	CuCrO4
Cumetal	-1.18	-10.15	-8.97	Cu
CuMoO4	1.58	-11.53	-13.11	CuMoO4
CuOCuSO4	-14.43	-3.72	10.71	CuOCuSO4
Cupricferrite	-5.47	1.15	6.62	CuFe2O4
Cuprite	-3.17	-4.20	-1.04	Cu2O
Cuprousferrite	5.70	-3.17	-8.87	CuFeO2
CuSe	22.21	-11.25	-33.46	CuSe
CuSe2	24.10	-9.68	-33.79	CuSe2
CuSeO3:2H2O	-8.44	-7.81	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-26.19	-28.63	-2.44	CuSeO4:5H2O
CuSO4	-10.16	-7.00	3.16	CuSO4
Diaspore	-1.12	6.06	7.18	AlOOH
Epsomite	-3.02	-5.18	-2.16	MgSO4:7H2O
Fe(OH)2	-9.52	4.04	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	0.17	-2.87	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-14.78	-13.23	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-14.79	-35.41	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-29.96	-32.97	-3.01	Fe2(SO4)3
Fe3(OH)8	-18.31	1.91	20.22	Fe3(OH)8
FeAsO4:2H2O	-12.24	-11.84	0.40	FeAsO4:2H2O
FeCr2O4	-16.82	-9.20	7.62	FeCr2O4
FeMoO4	-0.71	-10.77	-10.06	FeMoO4
Ferrihydrite	-4.48	-1.07	3.41	Fe(OH)3
Ferroselite	9.82	-8.92	-18.74	FeSe2
FeSe	0.52	-10.49	-11.01	FeSe
Gibbsite	-2.52	6.06	8.58	Al(OH)3
Goethite	-1.74	-1.07	0.67	FeOOH
Goslarite	-5.87	-7.92	-2.05	ZnSO4:7H2O
Gypsum	-0.04	-4.65	-4.61	CaSO4:2H2O
H-Jarosite	-12.35	-23.76	-11.41	(H3O)Fe3(SO4)2(OH)6
H2MoO4	-1.79	-14.81	-13.02	H2MoO4
H2Se(g)	-9.62	-14.53	-4.91	H2Se
Halite	-5.48	-3.89	1.59	NaCl
Hausmannite	-35.95	26.34	62.29	Mn3O4
Hematite	-1.10	-2.13	-1.03	Fe2O3
Hercynite	-7.67	16.17	23.83	FeAl2O4
Hinsdalite	-18.20	-20.70	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-14.11	-58.44	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-22.48	-85.27	-62.79	Pb5(PO4)3OH
K-Alum	-7.51	-12.77	-5.26	KAl(SO4)2:12H2O
K-Jarosite	-7.62	-22.02	-14.41	KFe3(SO4)2(OH)6
K2Cr2O7	-79.36	-96.85	-17.48	K2Cr2O7
K2CrO4	-46.12	-46.69	-0.57	K2CrO4
K2MoO4	-14.62	-11.34	3.27	K2MoO4
K2SeO4	-27.71	-28.44	-0.73	K2SeO4
Langite	-15.14	2.84	17.98	Cu4(OH)6SO4:H2O
Larnakite	-9.38	-9.75	-0.37	PbO:PbSO4
Laurionite	-6.37	-5.74	0.62	PbOHCl
Lepidocrocite	-2.44	-1.07	1.37	FeOOH
Lime	-27.65	5.63	33.28	CaO
Litharge	-12.63	0.26	12.89	PbO
Maghemite	-8.52	-2.13	6.39	Fe2O3
Magnesioferrite	-14.72	2.97	17.69	Fe2MgO4
Magnetite	-2.11	1.91	4.03	Fe3O4
Manganite	-13.88	11.46	25.34	MnOOH
Massicot	-12.83	0.26	13.09	PbO
Melanothallite	-15.18	-8.73	6.45	CuCl2
Melanterite	-3.97	-6.24	-2.27	FeSO4:7H2O
Mg(OH)2(active)	-13.69	5.11	18.79	Mg(OH)2
Mg3(PO4)2	-19.13	-42.41	-23.28	Mg3(PO4)2
MgCr2O4	-24.87	-8.14	16.74	MgCr2O4
MgCrO4	-50.70	-45.05	5.65	MgCrO4
MgHP04:3H2O	-5.58	-23.76	-18.18	MgHP04:3H2O
MgMoO4	-7.86	-9.71	-1.85	MgMoO4
MgSeO3:6H2O	-9.03	-5.99	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-25.60	-26.80	-1.20	MgSeO4:6H2O

Minium	-57.89	16.89	74.78	Pb3O4
Mirabilite	-4.70	-6.06	-1.35	Na2SO4:10H2O
Mn2(SO4)3	-54.03	-59.25	-5.22	Mn2(SO4)3
Mn3(AsO4)2:8H2O	-23.81	-11.31	12.50	Mn3(AsO4)2:8H2O
Mn3(PO4)2	-23.63	-47.48	-23.85	Mn3(PO4)2
MnCl2:4H2O	-11.35	-8.60	2.75	MnCl2:4H2O
MnHP04	-0.05	-25.45	-25.40	MnHP04
MnSe	-14.91	-11.12	3.79	MnSe
MnSeO3	-8.81	-7.68	1.13	MnSeO3
MnSeO3:2H2O	-8.64	-7.68	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-26.44	-28.49	-2.05	MnSeO4:5H2O
MnSO4	-9.64	-6.87	2.78	MnSO4
Monteponite	-16.23	-0.81	15.41	CdO
MoO3	-6.81	-14.81	-8.00	MoO3
Morenosite	-5.65	-7.83	-2.18	NiSO4:7H2O
Na-Jarosite	-10.90	-21.64	-10.75	NaFe3(SO4)2(OH)6
Na2Cr2O7	-86.12	-96.08	-9.96	Na2Cr2O7
Na2CrO4	-48.92	-45.93	2.99	Na2CrO4
Na2Mo2O7	-8.63	-25.39	-16.76	Na2Mo2O7
Na2MoO4	-12.10	-10.58	1.52	Na2MoO4
Na2MoO4:2H2O	-11.81	-10.58	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-17.17	-6.87	10.30	Na2SeO3:5H2O
Na2SeO4	-28.95	-27.67	1.28	Na2SeO4
Nantokite	-1.25	-8.11	-6.86	CuCl
Ni(OH)2	-10.63	2.45	13.08	Ni(OH)2
Ni3(AsO4)2:8H2O	-29.89	-14.19	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-19.07	-50.37	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-32.48	-0.48	32.00	Ni4(OH)6SO4
NiMoO4	-1.21	-12.36	-11.15	NiMoO4
NiSe	5.62	-12.08	-17.70	NiSe
NiSeO3:2H2O	-11.55	-8.64	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-27.93	-29.45	-1.52	NiSeO4:6H2O
Nsutite	-23.66	-6.16	17.50	MnO2
O2(g)	-52.60	32.20	84.80	O2
Pb(BO2)2	-16.35	-9.78	6.57	Pb(BO2)2
Pb(OH)2	-8.06	0.26	8.32	Pb(OH)2
Pb2(OH)3Cl	-14.27	-5.48	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-25.66	0.53	26.19	Pb2O(OH)2
Pb2O3	-44.41	16.63	61.04	Pb2O3
Pb3(AsO4)2	-26.55	-20.75	5.80	Pb3(AsO4)2
Pb3(PO4)2	-13.40	-56.93	-43.53	Pb3(PO4)2
Pb3O2SO4	-20.41	-9.49	10.92	Pb3O2SO4
Pb4(OH)6SO4	-30.33	-9.23	21.10	Pb4(OH)6SO4
Pb4O3SO4	-31.51	-9.22	22.28	Pb4O3SO4
PbCrO4	-37.16	-49.89	-12.73	PbCrO4
PbHP04	-4.79	-28.60	-23.81	PbHP04
Pbmetal	-20.08	-15.84	4.24	Pb
PbMoO4	1.23	-14.55	-15.78	PbMoO4
PbO:0.3H2O	-12.72	0.26	12.98	PbO:0.33H2O
PbSeO4	-24.75	-31.64	-6.88	PbSeO4
Periclase	-16.93	5.11	22.04	MgO
Plattnerite	-34.12	16.36	50.49	PbO2
Plumbgummite	-6.49	-39.28	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-17.56	5.63	23.19	Ca(OH)2
Pyrochroite	-12.07	3.41	15.48	Mn(OH)2
Pyrolusite	-22.68	19.51	42.19	MnO2
Pyromorphite	-6.84	-91.27	-84.43	Pb5(PO4)3Cl
Retgersite	-5.78	-7.83	-2.05	NiSO4:6H2O
Semetal(am)	8.71	1.57	-7.14	Se
Semetal(hex)	9.32	1.57	-7.76	Se
SeO2	-11.21	-11.09	0.12	SeO2
SeO3	-53.38	-31.90	21.48	SeO3
Spinel	-20.78	17.23	38.01	MgAl2O4
Strengite	-3.56	-29.93	-26.37	FePO4:2H2O
Tenorite	-4.56	3.28	7.84	CuO
Thenardite	-6.40	-6.05	0.35	Na2SO4
Tsumebite	-15.27	-25.06	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	-9.60	-45.60	-36.00	Fe3(PO4)2:8H2O

Zincite	-9.24	2.36	11.60	ZnO
Zincosite	-12.10	-7.92	4.18	ZnSO4
Zn(BO2)2	-15.98	-7.69	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-113.38	-110.14	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-9.84	2.36	12.20	Zn(OH)2
Zn(OH)2(am)	-10.36	2.36	12.71	Zn(OH)2
Zn(OH)2(beta)	-9.64	2.36	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-9.42	2.36	11.78	Zn(OH)2
Zn(OH)2(gamma)	-9.38	2.36	11.73	Zn(OH)2
Zn2(OH)2SO4	-13.06	-5.56	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-16.48	-1.29	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-28.12	-14.47	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-15.23	-50.65	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-33.17	-13.48	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-29.24	-0.84	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-38.72	-0.22	38.50	Zn5(OH)8Cl2
ZnCl2	-16.92	-9.65	7.27	ZnCl2
Znmetal	-39.99	-13.74	26.25	Zn
ZnMoO4	-2.36	-12.45	-10.09	ZnMoO4
ZnO(active)	-9.09	2.36	11.45	ZnO
ZnSe	2.30	-12.17	-14.48	ZnSe
ZnSeO4:6H2O	-28.03	-29.55	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.41	-7.92	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 1.
Using reaction 2.

Mixture 1.

3.679e-02 Solution 1
9.632e-01 Solution 2
1.000e-05 Solution 3

Reaction 2.

2.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000
Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	1.429e-05	1.378e-05
As	2.780e-13	2.680e-13
B	9.635e-11	9.287e-11
Ba	3.034e-12	2.924e-12
Be	2.311e-12	2.228e-12
Ca	3.381e-03	3.259e-03
Cd	2.782e-08	2.681e-08
Cl	4.507e-02	4.344e-02

Co	4.138e-05	3.989e-05
Cr	6.610e-13	6.372e-13
Cu	5.085e-06	4.902e-06
Fe	1.873e-03	1.805e-03
Hg	1.039e-09	1.002e-09
K	1.653e-03	1.593e-03
Mg	1.055e-02	1.017e-02
Mn	2.314e-04	2.231e-04
Mo	1.194e-11	1.151e-11
N	5.209e-04	5.021e-04
Na	4.960e-02	4.781e-02
Ni	7.991e-06	7.703e-06
P	2.288e-05	2.206e-05
Pb	1.509e-08	1.455e-08
S	1.611e-02	1.553e-02
Se	3.960e-07	3.817e-07
Zn	2.710e-06	2.612e-06

-----Description of solution-----

pH	=	6.789	Charge balance
pe	=	1.009	Adjusted to redox equilibrium
Activity of water	=	0.998	
Ionic strength (mol/kgw)	=	9.589e-02	
Mass of water (kg)	=	9.640e-01	
Total alkalinity (eq/kg)	=	6.509e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	6.373e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	4.58	
Iterations	=	10	
Total H	=	1.070158e+02	
Total O	=	5.356909e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.072e-07	1.626e-07	-6.684	-6.789	-0.105	0.00
OH-	5.940e-08	4.550e-08	-7.226	-7.342	-0.116	(0)
H2O	5.551e+01	9.979e-01	1.744	-0.001	0.000	18.05
Al	1.429e-05					
Al(OH)4-	9.300e-06	7.258e-06	-5.032	-5.139	-0.108	(0)
Al(OH)2+	2.471e-06	1.957e-06	-5.607	-5.708	-0.101	(0)
Al(OH)3	2.413e-06	2.413e-06	-5.617	-5.617	0.000	(0)
AlOH+2	7.799e-08	3.067e-08	-7.108	-7.513	-0.405	(0)
AlSO4+	2.359e-08	1.841e-08	-7.627	-7.735	-0.108	(0)
Al+3	5.708e-09	6.451e-10	-8.243	-9.190	-0.947	(0)
Al(SO4)2-	1.184e-09	9.240e-10	-8.927	-9.034	-0.108	(0)
AlMo6O21-3	0.000e+00	0.000e+00	-61.583	-62.995	-1.412	(0)
As(3)	6.972e-15					
H3AsO3	6.945e-15	6.945e-15	-14.158	-14.158	0.000	(0)
H2AsO3-	2.705e-17	1.885e-17	-16.568	-16.725	-0.157	(0)
H4AsO3+	8.029e-22	5.595e-22	-21.095	-21.252	-0.157	(0)
HAsO3-2	3.762e-22	8.870e-23	-21.425	-22.052	-0.627	(0)
AsO3-3	4.724e-28	1.830e-29	-27.326	-28.738	-1.412	(0)
As(5)	2.711e-13					
HAsO4-2	1.795e-13	4.232e-14	-12.746	-13.373	-0.627	(0)
H2AsO4-	9.155e-14	6.380e-14	-13.038	-13.195	-0.157	(0)
AsO4-3	1.935e-17	7.497e-19	-16.713	-18.125	-1.412	(0)
H3AsO4	1.696e-18	1.734e-18	-17.771	-17.761	0.010	(0)
B	9.635e-11					
H3BO3	9.582e-11	9.796e-11	-10.019	-10.009	0.010	(0)
H2BO3-	4.346e-13	3.258e-13	-12.362	-12.487	-0.125	(0)
MgH2BO3+	4.686e-14	3.513e-14	-13.329	-13.454	-0.125	(0)
CaH2BO3+	2.310e-14	1.732e-14	-13.636	-13.762	-0.125	(0)

	NaH2B03	2.111e-14	2.111e-14	-13.676	-13.676	0.000	(0)
	H5(B03)2-	3.716e-23	2.786e-23	-22.430	-22.555	-0.125	(0)
	BaH2B03+	1.512e-23	1.134e-23	-22.820	-22.945	-0.125	(0)
	H8(B03)3-	3.244e-31	2.432e-31	-30.489	-30.614	-0.125	(0)
Ba		3.034e-12					
	Ba+2	3.034e-12	1.151e-12	-11.518	-11.939	-0.421	(0)
	BaNH3+2	4.033e-18	9.510e-19	-17.394	-18.022	-0.627	(0)
	BaOH+	2.827e-19	2.224e-19	-18.549	-18.653	-0.104	(0)
	BaH2B03+	1.512e-23	1.134e-23	-22.820	-22.945	-0.125	(0)
	BaN03+	0.000e+00	0.000e+00	-59.463	-59.620	-0.157	(0)
Be		2.311e-12					
	BeOH+	2.028e-12	1.632e-12	-11.693	-11.787	-0.095	(0)
	Be+2	1.748e-13	6.633e-14	-12.757	-13.178	-0.421	(0)
	Be(OH)2	6.362e-14	6.362e-14	-13.196	-13.196	0.000	(0)
	BeS04	3.757e-14	3.757e-14	-13.425	-13.425	0.000	(0)
	BeCl+	4.733e-15	3.725e-15	-14.325	-14.429	-0.104	(0)
	Be(S04)2-2	2.040e-15	4.809e-16	-14.690	-15.318	-0.627	(0)
	Be(OH)3-	1.228e-16	9.876e-17	-15.911	-16.005	-0.095	(0)
	Be20H+3	1.273e-22	1.796e-23	-21.895	-22.746	-0.851	(0)
	Be(OH)4-2	9.196e-24	3.851e-24	-23.036	-23.414	-0.378	(0)
	Be3(OH)3+3	7.446e-28	1.050e-28	-27.128	-27.979	-0.851	(0)
Ca		3.381e-03					
	Ca+2	2.488e-03	9.441e-04	-2.604	-3.025	-0.421	(0)
	CaS04	8.919e-04	8.919e-04	-3.050	-3.050	0.000	(0)
	CaHP04	8.367e-07	8.367e-07	-6.077	-6.077	0.000	(0)
	CaH2P04+	1.349e-07	1.069e-07	-6.870	-6.971	-0.101	(0)
	CaP04-	1.584e-08	1.254e-08	-7.800	-7.902	-0.101	(0)
	CaNH3+2	6.600e-09	1.556e-09	-8.180	-8.808	-0.627	(0)
	CaOH+	1.025e-09	8.189e-10	-8.989	-9.087	-0.097	(0)
	CaH2B03+	2.310e-14	1.732e-14	-13.636	-13.762	-0.125	(0)
	Ca(NH3)2+2	3.441e-15	8.112e-16	-14.463	-15.091	-0.627	(0)
	CaN03+	0.000e+00	0.000e+00	-50.768	-50.925	-0.157	(0)
Cd		2.782e-08					
	CdCl+	1.461e-08	1.018e-08	-7.835	-7.992	-0.157	(0)
	Cd+2	7.991e-09	3.032e-09	-8.097	-8.518	-0.421	(0)
	CdS04	2.906e-09	2.906e-09	-8.537	-8.537	0.000	(0)
	CdCl2	1.485e-09	1.485e-09	-8.828	-8.828	0.000	(0)
	Cd(S04)2-2	7.476e-10	1.763e-10	-9.126	-9.754	-0.627	(0)
	CdCl3-	4.575e-11	3.188e-11	-10.340	-10.496	-0.157	(0)
	CdOHC1	2.349e-11	2.349e-11	-10.629	-10.629	0.000	(0)
	CdOH+	1.581e-12	1.102e-12	-11.801	-11.958	-0.157	(0)
	Cd(OH)2	5.804e-16	5.804e-16	-15.236	-15.236	0.000	(0)
	Cd20H+3	4.542e-19	1.760e-20	-18.343	-19.755	-1.412	(0)
	Cd(Se03)2-2	4.130e-19	9.737e-20	-18.384	-19.012	-0.627	(0)
	Cd(OH)3-	3.145e-21	2.191e-21	-20.502	-20.659	-0.157	(0)
	CdSe04	5.680e-28	5.680e-28	-27.246	-27.246	0.000	(0)
	Cd(OH)4-2	9.401e-29	2.217e-29	-28.027	-28.654	-0.627	(0)
	CdHS+	8.224e-39	5.731e-39	-38.085	-38.242	-0.157	(0)
	CdN03+	0.000e+00	0.000e+00	-56.224	-56.381	-0.157	(0)
	Cd(HS)2	0.000e+00	0.000e+00	-68.769	-68.769	0.000	(0)
	Cd(HS)3-	0.000e+00	0.000e+00	-104.444	-104.601	-0.157	(0)
	Cd(N03)2	0.000e+00	0.000e+00	-105.143	-105.143	0.000	(0)
	Cd(HS)4-2	0.000e+00	0.000e+00	-139.509	-140.136	-0.627	(0)
Cl		4.507e-02					
	Cl-	4.505e-02	3.536e-02	-1.346	-1.451	-0.105	(0)
	CuCl2-	4.532e-06	3.505e-06	-5.344	-5.455	-0.112	(0)
	MnCl+	2.604e-06	2.050e-06	-5.584	-5.688	-0.104	(0)
	CoCl+	1.370e-06	9.543e-07	-5.863	-6.020	-0.157	(0)
	CuCl	4.699e-07	4.699e-07	-6.328	-6.328	0.000	(0)
	NiCl+	2.852e-07	1.987e-07	-6.545	-6.702	-0.157	(0)
	MnCl2	1.024e-07	1.024e-07	-6.990	-6.990	0.000	(0)
	ZnCl+	7.908e-08	6.117e-08	-7.102	-7.213	-0.112	(0)
	CuCl3-2	6.802e-08	2.609e-08	-7.167	-7.584	-0.416	(0)
	CdCl+	1.461e-08	1.018e-08	-7.835	-7.992	-0.157	(0)
	ZnOHC1	5.097e-09	5.097e-09	-8.293	-8.293	0.000	(0)
	PbCl+	3.651e-09	2.544e-09	-8.438	-8.594	-0.157	(0)
	ZnCl2	2.882e-09	2.882e-09	-8.540	-8.540	0.000	(0)
	CdCl2	1.485e-09	1.485e-09	-8.828	-8.828	0.000	(0)

MnCl3-	1.267e-09	9.970e-10	-8.897	-9.001	-0.104	(0)
PbCl2	3.947e-10	3.947e-10	-9.404	-9.404	0.000	(0)
ZnCl3-	1.030e-10	7.964e-11	-9.987	-10.099	-0.112	(0)
CdCl3-	4.575e-11	3.188e-11	-10.340	-10.496	-0.157	(0)
NiCl2	3.577e-11	3.577e-11	-10.446	-10.446	0.000	(0)
CdOHCl	2.349e-11	2.349e-11	-10.629	-10.629	0.000	(0)
CuCl+	1.581e-11	1.223e-11	-10.801	-10.913	-0.112	(0)
PbCl3-	8.331e-12	5.805e-12	-11.079	-11.236	-0.157	(0)
ZnCl4-2	3.555e-12	1.364e-12	-11.449	-11.865	-0.416	(0)
PbCl4-2	3.751e-13	8.844e-14	-12.426	-13.053	-0.627	(0)
CuCl2	1.232e-13	1.232e-13	-12.909	-12.909	0.000	(0)
BeCl+	4.733e-15	3.725e-15	-14.325	-14.429	-0.104	(0)
FeCl+2	6.551e-16	2.512e-16	-15.184	-15.600	-0.416	(0)
FeCl2+	5.721e-17	4.502e-17	-16.243	-16.347	-0.104	(0)
CuCl3-	4.891e-17	3.783e-17	-16.311	-16.422	-0.112	(0)
CrCl+2	9.034e-18	2.130e-18	-17.044	-17.672	-0.627	(0)
HgCl2	1.591e-18	1.591e-18	-17.798	-17.798	0.000	(0)
HgCl3-	8.144e-19	5.675e-19	-18.089	-18.246	-0.157	(0)
HgCl4-2	3.515e-19	8.288e-20	-18.454	-19.082	-0.627	(0)
FeCl3	1.592e-19	1.592e-19	-18.798	-18.798	0.000	(0)
CrOHCl2	5.011e-20	5.011e-20	-19.300	-19.300	0.000	(0)
HgClOH	3.739e-20	3.739e-20	-19.427	-19.427	0.000	(0)
CuCl4-2	2.002e-20	7.678e-21	-19.699	-20.115	-0.416	(0)
CrCl2+	7.204e-21	5.020e-21	-20.142	-20.299	-0.157	(0)
HgCl+	1.095e-23	7.628e-24	-22.961	-23.118	-0.157	(0)
CoCl+2	8.957e-36	2.112e-36	-35.048	-35.675	-0.627	(0)
Cr(NH3)6Cl+2	2.520e-39	5.942e-40	-38.599	-39.226	-0.627	(0)
Co(NH3)5Cl+2	1.814e-39	4.277e-40	-38.741	-39.369	-0.627	(0)
CrO3Cl-	0.000e+00	0.000e+00	-43.998	-44.155	-0.157	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.318	-51.946	-0.627	(0)
Co(2)	4.138e-05					
Co+2	3.345e-05	7.888e-06	-4.476	-5.103	-0.627	(0)
CoSO4	6.522e-06	6.522e-06	-5.186	-5.186	0.000	(0)
CoCl+	1.370e-06	9.543e-07	-5.863	-6.020	-0.157	(0)
CoHP04	1.641e-08	1.641e-08	-7.785	-7.785	0.000	(0)
CoOH+	1.396e-08	9.726e-09	-7.855	-8.012	-0.157	(0)
Co(NH3)+2	7.522e-09	1.774e-09	-8.124	-8.751	-0.627	(0)
Co(OH)2	4.774e-11	4.774e-11	-10.321	-10.321	0.000	(0)
Co(NH3)2+2	2.942e-13	6.936e-14	-12.531	-13.159	-0.627	(0)
Co2OH+3	9.925e-14	3.845e-15	-13.003	-14.415	-1.412	(0)
Co(OH)3-	8.448e-17	5.887e-17	-16.073	-16.230	-0.157	(0)
CoOOH-	5.089e-18	3.547e-18	-17.293	-17.450	-0.157	(0)
Co(NH3)3+2	4.849e-18	1.143e-18	-17.314	-17.942	-0.627	(0)
Co4(OH)4+4	5.776e-22	1.785e-24	-21.238	-23.748	-2.510	(0)
Co(NH3)4+2	3.332e-23	7.856e-24	-22.477	-23.105	-0.627	(0)
CoSeO4	3.723e-24	3.723e-24	-23.429	-23.429	0.000	(0)
Co(OH)4-2	2.445e-24	5.765e-25	-23.612	-24.239	-0.627	(0)
Co(NH3)5+2	7.240e-29	1.707e-29	-28.140	-28.768	-0.627	(0)
CoNO2+	7.962e-40	5.548e-40	-39.099	-39.256	-0.157	(0)
CoNO3+	0.000e+00	0.000e+00	-53.159	-53.316	-0.157	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.419	-101.419	0.000	(0)
Co(3)	4.268e-31					
CoOH+2	4.268e-31	1.006e-31	-30.370	-30.997	-0.627	(0)
CoCl+2	8.957e-36	2.112e-36	-35.048	-35.675	-0.627	(0)
Co+3	2.836e-36	3.205e-37	-35.547	-36.494	-0.947	(0)
Co(NH3)5Cl+2	1.814e-39	4.277e-40	-38.741	-39.369	-0.627	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.828	-47.985	-0.157	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.318	-51.946	-0.627	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.627	-53.255	-0.627	(0)
Cr(2)	2.528e-24					
Cr+2	2.528e-24	5.960e-25	-23.597	-24.225	-0.627	(0)
Cr(3)	6.610e-13					
Cr(OH)2+	3.846e-13	2.680e-13	-12.415	-12.572	-0.157	(0)
Cr(OH)+2	2.318e-13	5.465e-14	-12.635	-13.262	-0.627	(0)
CrOHSO4	3.627e-14	3.627e-14	-13.441	-13.441	0.000	(0)
Cr(OH)3	6.222e-15	6.222e-15	-14.206	-14.206	0.000	(0)
Cr+3	1.386e-15	5.368e-17	-14.858	-16.270	-1.412	(0)
CrSO4+	6.506e-16	4.534e-16	-15.187	-15.344	-0.157	(0)

CrO2-	2.613e-17	1.821e-17	-16.583	-16.740	-0.157	(0)
Cr(OH)4-	2.197e-17	1.531e-17	-16.658	-16.815	-0.157	(0)
CrCl+2	9.034e-18	2.130e-18	-17.044	-17.672	-0.627	(0)
CrH2PO4+2	3.185e-19	7.509e-20	-18.497	-19.124	-0.627	(0)
CrOHCl2	5.011e-20	5.011e-20	-19.300	-19.300	0.000	(0)
CrCl2+	7.204e-21	5.020e-21	-20.142	-20.299	-0.157	(0)
Cr2(OH)2SO4+2	4.956e-25	1.168e-25	-24.305	-24.932	-0.627	(0)
Cr2(OH)2(SO4)2	2.976e-26	2.976e-26	-25.526	-25.526	0.000	(0)
Cr(NH3)5OH+2	6.268e-33	1.478e-33	-32.203	-32.830	-0.627	(0)
Cr(NH3)6+3	3.430e-38	1.329e-39	-37.465	-38.877	-1.412	(0)
Cr(NH3)6Cl+2	2.520e-39	5.942e-40	-38.599	-39.226	-0.627	(0)
CrNO3+2	0.000e+00	0.000e+00	-65.567	-66.195	-0.627	(0)
Cr(6)	1.344e-36					
CrO4-2	9.675e-37	3.671e-37	-36.014	-36.435	-0.421	(0)
HCrO4-	2.742e-37	1.911e-37	-36.562	-36.719	-0.157	(0)
NaCrO4-	9.965e-38	6.944e-38	-37.002	-37.158	-0.157	(0)
KCrO4-	2.467e-39	1.719e-39	-38.608	-38.765	-0.157	(0)
CrO3HP04-2	0.000e+00	0.000e+00	-40.799	-41.426	-0.627	(0)
CrO3SO4-2	0.000e+00	0.000e+00	-42.759	-43.386	-0.627	(0)
H2CrO4	0.000e+00	0.000e+00	-43.687	-43.687	0.000	(0)
CrO3Cl-	0.000e+00	0.000e+00	-43.998	-44.155	-0.157	(0)
CrO3H2PO4-	0.000e+00	0.000e+00	-45.375	-45.532	-0.157	(0)
Cr2O7-2	0.000e+00	0.000e+00	-71.224	-71.852	-0.627	(0)
Cu(1)	5.085e-06					
CuCl2-	4.532e-06	3.505e-06	-5.344	-5.455	-0.112	(0)
CuCl	4.699e-07	4.699e-07	-6.328	-6.328	0.000	(0)
CuCl3-2	6.802e-08	2.609e-08	-7.167	-7.584	-0.416	(0)
Cu+	1.515e-08	1.056e-08	-7.820	-7.977	-0.157	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.049	-66.472	-0.423	(0)
CuS4S5-3	0.000e+00	0.000e+00	-66.803	-67.202	-0.399	(0)
Cu(2)	8.990e-10					
Cu+2	6.020e-10	2.284e-10	-9.220	-9.641	-0.421	(0)
CuSO4	2.139e-10	2.139e-10	-9.670	-9.670	0.000	(0)
CuOH+	4.742e-11	3.668e-11	-10.324	-10.436	-0.112	(0)
CuNH3+2	1.927e-11	4.543e-12	-10.715	-11.343	-0.627	(0)
CuCl+	1.581e-11	1.223e-11	-10.801	-10.913	-0.112	(0)
Cu(OH)2	5.504e-13	5.504e-13	-12.259	-12.259	0.000	(0)
CuCl2	1.232e-13	1.232e-13	-12.909	-12.909	0.000	(0)
Cu2(OH)2+2	1.394e-16	3.288e-17	-15.856	-16.483	-0.627	(0)
Cu(OH)3-	1.001e-16	6.977e-17	-15.999	-16.156	-0.157	(0)
CuCl3-	4.891e-17	3.783e-17	-16.311	-16.422	-0.112	(0)
CuCl4-2	2.002e-20	7.678e-21	-19.699	-20.115	-0.416	(0)
Cu(OH)4-2	1.439e-22	3.393e-23	-21.842	-22.469	-0.627	(0)
CuNO2+	0.000e+00	0.000e+00	-42.465	-42.622	-0.157	(0)
CuNO3+	0.000e+00	0.000e+00	-57.387	-57.544	-0.157	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.613	-76.613	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.780	-96.937	-0.157	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-106.866	-106.866	0.000	(0)
Fe(2)	1.872e-03					
Fe+2	1.509e-03	3.558e-04	-2.821	-3.449	-0.627	(0)
FeSO4	3.584e-04	3.584e-04	-3.446	-3.446	0.000	(0)
FeHPO4	2.702e-06	2.702e-06	-5.568	-5.568	0.000	(0)
FeH2PO4+	1.102e-06	8.725e-07	-5.958	-6.059	-0.101	(0)
FeOH+	8.191e-07	6.446e-07	-6.087	-6.191	-0.104	(0)
Fe(OH)2	2.230e-11	2.230e-11	-10.652	-10.652	0.000	(0)
Fe(OH)3-	5.334e-13	4.197e-13	-12.273	-12.377	-0.104	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.962	-69.962	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.500	-105.656	-0.157	(0)
Fe(3)	3.331e-07					
Fe(OH)2+	3.233e-07	2.560e-07	-6.490	-6.592	-0.101	(0)
Fe(OH)3	9.616e-09	9.616e-09	-8.017	-8.017	0.000	(0)
Fe(OH)4-	1.235e-10	9.778e-11	-9.908	-10.010	-0.101	(0)
FeOH+2	2.208e-11	8.467e-12	-10.656	-11.072	-0.416	(0)
FeHPO4+	6.279e-12	4.972e-12	-11.202	-11.303	-0.101	(0)
FeSO4+	1.423e-14	1.119e-14	-13.847	-13.951	-0.104	(0)
Fe+3	2.362e-15	2.669e-16	-14.627	-15.574	-0.947	(0)
Fe(SO4)2-	1.520e-15	1.059e-15	-14.818	-14.975	-0.157	(0)
FeCl+2	6.551e-16	2.512e-16	-15.184	-15.600	-0.416	(0)

	FeH2PO4+2	6.305e-17	2.480e-17	-16.200	-16.606	-0.405	(0)
	FeCl2+	5.721e-17	4.502e-17	-16.243	-16.347	-0.104	(0)
	Fe2(OH)2+4	8.859e-19	2.738e-21	-18.053	-20.563	-2.510	(0)
	FeHSeO3+2	6.649e-19	1.568e-19	-18.177	-18.805	-0.627	(0)
	FeCl3	1.592e-19	1.592e-19	-18.798	-18.798	0.000	(0)
	Fe3(OH)4+5	8.117e-23	9.718e-27	-22.091	-26.012	-3.922	(0)
	FeNO3+2	0.000e+00	0.000e+00	-62.270	-62.898	-0.627	(0)
H(0)		3.660e-19					
H2		1.830e-19	1.871e-19	-18.738	-18.728	0.010	(0)
Hg(0)		1.039e-09					
Hg		1.039e-09	1.039e-09	-8.983	-8.983	0.000	(0)
Hg(1)		4.249e-29					
Hg2+2		2.124e-29	5.009e-30	-28.673	-29.300	-0.627	(0)
Hg(2)		2.795e-18					
HgCl2		1.591e-18	1.591e-18	-17.798	-17.798	0.000	(0)
HgCl3-		8.144e-19	5.675e-19	-18.089	-18.246	-0.157	(0)
HgCl4-2		3.515e-19	8.288e-20	-18.454	-19.082	-0.627	(0)
HgClOH		3.739e-20	3.739e-20	-19.427	-19.427	0.000	(0)
Hg(OH)2		1.806e-22	1.847e-22	-21.743	-21.734	0.010	(0)
Hg(NH3)2+2		1.361e-22	3.209e-23	-21.866	-22.494	-0.627	(0)
HgCl+		1.095e-23	7.628e-24	-22.961	-23.118	-0.157	(0)
HgOH+		3.002e-26	2.092e-26	-25.523	-25.680	-0.157	(0)
HgNH3+2		2.685e-26	6.332e-27	-25.571	-26.198	-0.627	(0)
Hg(NH3)3+2		1.019e-27	2.402e-28	-26.992	-27.619	-0.627	(0)
Hg+2		4.042e-29	9.530e-30	-28.393	-29.021	-0.627	(0)
HgSO4		8.603e-30	8.603e-30	-29.065	-29.065	0.000	(0)
Hg(OH)3-		2.062e-30	1.437e-30	-29.686	-29.843	-0.157	(0)
Hg(NH3)4+2		1.530e-32	3.608e-33	-31.815	-32.443	-0.627	(0)
HgHS2-		0.000e+00	0.000e+00	-65.705	-65.862	-0.157	(0)
Hg(HS)2		0.000e+00	0.000e+00	-66.257	-66.257	0.000	(0)
HgS2-2		0.000e+00	0.000e+00	-67.153	-67.781	-0.627	(0)
HgNO3+		0.000e+00	0.000e+00	-77.804	-77.961	-0.157	(0)
Hg(NO3)2		0.000e+00	0.000e+00	-126.754	-126.754	0.000	(0)
K		1.653e-03					
K+		1.606e-03	1.260e-03	-2.794	-2.900	-0.105	(0)
KS04-		4.722e-05	3.740e-05	-4.326	-4.427	-0.101	(0)
KHP04-		2.302e-08	1.823e-08	-7.638	-7.739	-0.101	(0)
KCr04-		2.467e-39	1.719e-39	-38.608	-38.765	-0.157	(0)
Mg		1.055e-02					
Mg+2		8.194e-03	3.109e-03	-2.086	-2.507	-0.421	(0)
MgSO4		2.350e-03	2.350e-03	-2.629	-2.629	0.000	(0)
MgHP04		3.804e-06	3.804e-06	-5.420	-5.420	0.000	(0)
MgH2PO4+		9.501e-07	7.524e-07	-6.022	-6.124	-0.101	(0)
MgOH+		6.556e-08	5.274e-08	-7.183	-7.278	-0.095	(0)
MgP04-		8.155e-10	6.458e-10	-9.089	-9.190	-0.101	(0)
MgH2B03+		4.686e-14	3.513e-14	-13.329	-13.454	-0.125	(0)
Mn(2)		2.314e-04					
Mn+2		1.953e-04	4.604e-05	-3.709	-4.337	-0.627	(0)
MnSO4		3.347e-05	3.347e-05	-4.475	-4.475	0.000	(0)
MnCl+		2.604e-06	2.050e-06	-5.584	-5.688	-0.104	(0)
MnCl2		1.024e-07	1.024e-07	-6.990	-6.990	0.000	(0)
MnOH+		6.687e-09	5.262e-09	-8.175	-8.279	-0.104	(0)
MnCl3-		1.267e-09	9.970e-10	-8.897	-9.001	-0.104	(0)
MnSe		3.547e-12	3.547e-12	-11.450	-11.450	0.000	(0)
Mn(OH)3-		2.143e-19	1.687e-19	-18.669	-18.773	-0.104	(0)
MnSeO4		1.154e-23	1.154e-23	-22.938	-22.938	0.000	(0)
Mn(OH)4-2		8.775e-26	3.365e-26	-25.057	-25.473	-0.416	(0)
MnNO3+		0.000e+00	0.000e+00	-52.392	-52.549	-0.157	(0)
Mn(NO3)2		0.000e+00	0.000e+00	-100.558	-100.558	0.000	(0)
Mn(3)		1.028e-28					
Mn+3		1.028e-28	1.162e-29	-27.988	-28.935	-0.947	(0)
Mn(6)		0.000e+00					
Mn04-2		0.000e+00	0.000e+00	-65.694	-66.110	-0.416	(0)
Mn(7)		0.000e+00					
Mn04-		0.000e+00	0.000e+00	-74.619	-74.739	-0.120	(0)
Mo		1.194e-11					
Mo04-2		1.192e-11	4.524e-12	-10.924	-11.344	-0.421	(0)
HMo04-		1.882e-14	1.312e-14	-13.725	-13.882	-0.157	(0)

H2MoO4	2.010e-17	2.010e-17	-16.697	-16.697	0.000	(0)
AlMo6O21-3	0.000e+00	0.000e+00	-61.583	-62.995	-1.412	(0)
Mo7O24-6	0.000e+00	0.000e+00	-74.538	-80.186	-5.647	(0)
HMo7O24-5	0.000e+00	0.000e+00	-76.690	-80.611	-3.922	(0)
H2Mo7O24-4	0.000e+00	0.000e+00	-80.115	-82.625	-2.510	(0)
H3Mo7O24-3	0.000e+00	0.000e+00	-84.752	-86.163	-1.412	(0)
N(-3)	5.209e-04					
NH4+	4.981e-04	3.734e-04	-3.303	-3.428	-0.125	(0)
NH4SO4-	2.180e-05	1.715e-05	-4.662	-4.766	-0.104	(0)
NH3	9.844e-07	9.844e-07	-6.007	-6.007	0.000	(0)
NiNH3+2	9.566e-09	2.255e-09	-8.019	-8.647	-0.627	(0)
Co(NH3)+2	7.522e-09	1.774e-09	-8.124	-8.751	-0.627	(0)
CaNH3+2	6.600e-09	1.556e-09	-8.180	-8.808	-0.627	(0)
CuNH3+2	1.927e-11	4.543e-12	-10.715	-11.343	-0.627	(0)
Ni(NH3)2+2	2.312e-12	5.452e-13	-11.636	-12.263	-0.627	(0)
Co(NH3)2+2	2.942e-13	6.936e-14	-12.531	-13.159	-0.627	(0)
Ca(NH3)2+2	3.441e-15	8.112e-16	-14.463	-15.091	-0.627	(0)
Co(NH3)3+2	4.849e-18	1.143e-18	-17.314	-17.942	-0.627	(0)
BaNH3+2	4.033e-18	9.510e-19	-17.394	-18.022	-0.627	(0)
Hg(NH3)2+2	1.361e-22	3.209e-23	-21.866	-22.494	-0.627	(0)
Co(NH3)4+2	3.332e-23	7.856e-24	-22.477	-23.105	-0.627	(0)
HgNH3+2	2.685e-26	6.332e-27	-25.571	-26.198	-0.627	(0)
Hg(NH3)3+2	1.019e-27	2.402e-28	-26.992	-27.619	-0.627	(0)
Co(NH3)5+2	7.240e-29	1.707e-29	-28.140	-28.768	-0.627	(0)
Hg(NH3)4+2	1.530e-32	3.608e-33	-31.815	-32.443	-0.627	(0)
Cr(NH3)5OH+2	6.268e-33	1.478e-33	-32.203	-32.830	-0.627	(0)
Cr(NH3)6+3	3.430e-38	1.329e-39	-37.465	-38.877	-1.412	(0)
Cr(NH3)6Cl+2	2.520e-39	5.942e-40	-38.599	-39.226	-0.627	(0)
Co(NH3)5Cl+2	1.814e-39	4.277e-40	-38.741	-39.369	-0.627	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.828	-47.985	-0.157	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.318	-51.946	-0.627	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.627	-53.255	-0.627	(0)
N(3)	1.317e-35					
NO2-	1.317e-35	9.981e-36	-34.881	-35.001	-0.120	(0)
CoNO2+	7.962e-40	5.548e-40	-39.099	-39.256	-0.157	(0)
CuNO2+	0.000e+00	0.000e+00	-42.465	-42.622	-0.157	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.613	-76.613	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-48.307	-48.412	-0.105	(0)
CaNO3+	0.000e+00	0.000e+00	-50.768	-50.925	-0.157	(0)
MnNO3+	0.000e+00	0.000e+00	-52.392	-52.549	-0.157	(0)
CoNO3+	0.000e+00	0.000e+00	-53.159	-53.316	-0.157	(0)
NiNO3+	0.000e+00	0.000e+00	-53.509	-53.666	-0.157	(0)
ZnNO3+	0.000e+00	0.000e+00	-53.994	-54.151	-0.157	(0)
PbNO3+	0.000e+00	0.000e+00	-55.763	-55.919	-0.157	(0)
CdNO3+	0.000e+00	0.000e+00	-56.224	-56.381	-0.157	(0)
CuNO3+	0.000e+00	0.000e+00	-57.387	-57.544	-0.157	(0)
BaNO3+	0.000e+00	0.000e+00	-59.463	-59.620	-0.157	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.270	-62.898	-0.627	(0)
CrNO3+2	0.000e+00	0.000e+00	-65.567	-66.195	-0.627	(0)
HgNO3+	0.000e+00	0.000e+00	-77.804	-77.961	-0.157	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.558	-100.558	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.419	-101.419	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.274	-103.274	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.081	-104.081	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.143	-105.143	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-106.866	-106.866	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.754	-126.754	0.000	(0)
Na	4.960e-02					
Na+	4.849e-02	3.806e-02	-1.314	-1.420	-0.105	(0)
NaSO4-	1.101e-03	8.716e-04	-2.958	-3.060	-0.101	(0)
NaHP04-	1.077e-06	8.529e-07	-5.968	-6.069	-0.101	(0)
NaH2B03	2.111e-14	2.111e-14	-13.676	-13.676	0.000	(0)
NaCrO4-	9.965e-38	6.944e-38	-37.002	-37.158	-0.157	(0)
Ni	7.991e-06					
Ni+2	5.853e-06	2.221e-06	-5.233	-5.653	-0.421	(0)
NiSO4	1.840e-06	1.840e-06	-5.735	-5.735	0.000	(0)
NiCl+	2.852e-07	1.987e-07	-6.545	-6.702	-0.157	(0)

NiNH3+2	9.566e-09	2.255e-09	-8.019	-8.647	-0.627	(0)
NiOH+	1.866e-09	1.300e-09	-8.729	-8.886	-0.157	(0)
Ni(SO4)2-2	1.144e-09	2.697e-10	-8.942	-9.569	-0.627	(0)
NiCl2	3.577e-11	3.577e-11	-10.446	-10.446	0.000	(0)
Ni(OH)2	8.482e-12	8.482e-12	-11.072	-11.072	0.000	(0)
Ni(NH3)2+2	2.312e-12	5.452e-13	-11.636	-12.263	-0.627	(0)
Ni(OH)3-	7.522e-16	5.242e-16	-15.124	-15.281	-0.157	(0)
NiSeO4	9.677e-25	9.677e-25	-24.014	-24.014	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-53.509	-53.666	-0.157	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.962	-55.953	0.010	(0)
P	2.288e-05					
H2PO4-	6.819e-06	5.400e-06	-5.166	-5.268	-0.101	(0)
HP04-2	5.400e-06	2.071e-06	-5.268	-5.684	-0.416	(0)
MgHP04	3.804e-06	3.804e-06	-5.420	-5.420	0.000	(0)
FeHP04	2.702e-06	2.702e-06	-5.568	-5.568	0.000	(0)
FeH2PO4+	1.102e-06	8.725e-07	-5.958	-6.059	-0.101	(0)
NaHP04-	1.077e-06	8.529e-07	-5.968	-6.069	-0.101	(0)
MgH2PO4+	9.501e-07	7.524e-07	-6.022	-6.124	-0.101	(0)
CaHP04	8.367e-07	8.367e-07	-6.077	-6.077	0.000	(0)
CaH2PO4+	1.349e-07	1.069e-07	-6.870	-6.971	-0.101	(0)
KHP04-	2.302e-08	1.823e-08	-7.638	-7.739	-0.101	(0)
CoHP04	1.641e-08	1.641e-08	-7.785	-7.785	0.000	(0)
CaP04-	1.584e-08	1.254e-08	-7.800	-7.902	-0.101	(0)
MgP04-	8.155e-10	6.458e-10	-9.089	-9.190	-0.101	(0)
H3P04	1.182e-10	1.182e-10	-9.927	-9.927	0.000	(0)
P04-3	4.377e-11	4.947e-12	-10.359	-11.306	-0.947	(0)
FeHP04+	6.279e-12	4.972e-12	-11.202	-11.303	-0.101	(0)
FeH2PO4+2	6.305e-17	2.480e-17	-16.200	-16.606	-0.405	(0)
CrH2PO4+2	3.185e-19	7.509e-20	-18.497	-19.124	-0.627	(0)
CrO3HP04-2	0.000e+00	0.000e+00	-40.799	-41.426	-0.627	(0)
CrO3H2PO4-	0.000e+00	0.000e+00	-45.375	-45.532	-0.157	(0)
Pb	1.509e-08					
Pb+2	5.606e-09	2.127e-09	-8.251	-8.672	-0.421	(0)
PbSO4	4.467e-09	4.467e-09	-8.350	-8.350	0.000	(0)
PbCl+	3.651e-09	2.544e-09	-8.438	-8.594	-0.157	(0)
Pb(SO4)2-2	4.894e-10	1.154e-10	-9.310	-9.938	-0.627	(0)
PbOH+	4.739e-10	3.302e-10	-9.324	-9.481	-0.157	(0)
PbCl2	3.947e-10	3.947e-10	-9.404	-9.404	0.000	(0)
PbCl3-	8.331e-12	5.805e-12	-11.079	-11.236	-0.157	(0)
Pb(OH)2	6.453e-13	6.453e-13	-12.190	-12.190	0.000	(0)
PbCl4-2	3.751e-13	8.844e-14	-12.426	-13.053	-0.627	(0)
Pb2OH+3	2.874e-16	1.113e-17	-15.542	-16.953	-1.412	(0)
Pb(OH)3-	5.722e-17	3.988e-17	-16.242	-16.399	-0.157	(0)
Pb(OH)4-2	2.560e-21	6.035e-22	-20.592	-21.219	-0.627	(0)
Pb3(OH)4+2	3.983e-23	9.392e-24	-22.400	-23.027	-0.627	(0)
Pb4(OH)4+4	5.955e-26	1.840e-28	-25.225	-27.735	-2.510	(0)
PbNO3+	0.000e+00	0.000e+00	-55.763	-55.919	-0.157	(0)
Pb(HS)2	0.000e+00	0.000e+00	-68.865	-68.865	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.081	-104.081	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.140	-105.297	-0.157	(0)
S(-2)	7.066e-38					
H2S	3.564e-38	3.564e-38	-37.448	-37.448	0.000	(0)
HS-	2.663e-38	1.855e-38	-37.575	-37.732	-0.157	(0)
CdHS+	8.224e-39	5.731e-39	-38.085	-38.242	-0.157	(0)
S5-2	1.699e-40	0.000e+00	-39.770	-40.397	-0.627	(0)
S6-2	0.000e+00	0.000e+00	-40.196	-40.824	-0.627	(0)
S4-2	0.000e+00	0.000e+00	-40.370	-40.997	-0.627	(0)
S3-2	0.000e+00	0.000e+00	-41.182	-41.810	-0.627	(0)
S2-2	0.000e+00	0.000e+00	-42.209	-42.836	-0.627	(0)
S-2	0.000e+00	0.000e+00	-47.944	-48.360	-0.416	(0)
HgHS2-	0.000e+00	0.000e+00	-65.705	-65.862	-0.157	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.049	-66.472	-0.423	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.257	-66.257	0.000	(0)
CuS4S5-3	0.000e+00	0.000e+00	-66.803	-67.202	-0.399	(0)
HgS2-2	0.000e+00	0.000e+00	-67.153	-67.781	-0.627	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-67.857	-68.013	-0.157	(0)
Cd(HS)2	0.000e+00	0.000e+00	-68.769	-68.769	0.000	(0)

Zn(HS)2	0.000e+00	0.000e+00	-68.792	-68.792	0.000	(0)
Pb(HS)2	0.000e+00	0.000e+00	-68.865	-68.865	0.000	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.962	-69.962	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.780	-96.937	-0.157	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.087	-103.244	-0.157	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-104.444	-104.601	-0.157	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.140	-105.297	-0.157	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.500	-105.656	-0.157	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-105.807	-106.435	-0.627	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.509	-140.136	-0.627	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-141.808	-142.435	-0.627	(0)
S(6)	1.611e-02					
S04-2	1.130e-02	4.287e-03	-1.947	-2.368	-0.421	(0)
MgS04	2.350e-03	2.350e-03	-2.629	-2.629	0.000	(0)
NaS04-	1.101e-03	8.716e-04	-2.958	-3.060	-0.101	(0)
CaS04	8.919e-04	8.919e-04	-3.050	-3.050	0.000	(0)
FeS04	3.584e-04	3.584e-04	-3.446	-3.446	0.000	(0)
KS04-	4.722e-05	3.740e-05	-4.326	-4.427	-0.101	(0)
MnS04	3.347e-05	3.347e-05	-4.475	-4.475	0.000	(0)
NH4S04-	2.180e-05	1.715e-05	-4.662	-4.766	-0.104	(0)
CoS04	6.522e-06	6.522e-06	-5.186	-5.186	0.000	(0)
NiS04	1.840e-06	1.840e-06	-5.735	-5.735	0.000	(0)
ZnS04	6.431e-07	6.431e-07	-6.192	-6.192	0.000	(0)
Zn(S04)2-2	1.054e-07	2.485e-08	-6.977	-7.605	-0.627	(0)
HS04-	7.737e-08	6.038e-08	-7.111	-7.219	-0.108	(0)
AlS04+	2.359e-08	1.841e-08	-7.627	-7.735	-0.108	(0)
PbS04	4.467e-09	4.467e-09	-8.350	-8.350	0.000	(0)
CdS04	2.906e-09	2.906e-09	-8.537	-8.537	0.000	(0)
Al(S04)2-	1.184e-09	9.240e-10	-8.927	-9.034	-0.108	(0)
Ni(S04)2-2	1.144e-09	2.697e-10	-8.942	-9.569	-0.627	(0)
Cd(S04)2-2	7.476e-10	1.763e-10	-9.126	-9.754	-0.627	(0)
Pb(S04)2-2	4.894e-10	1.154e-10	-9.310	-9.938	-0.627	(0)
CuS04	2.139e-10	2.139e-10	-9.670	-9.670	0.000	(0)
BeS04	3.757e-14	3.757e-14	-13.425	-13.425	0.000	(0)
CrOHS04	3.627e-14	3.627e-14	-13.441	-13.441	0.000	(0)
FeS04+	1.423e-14	1.119e-14	-13.847	-13.951	-0.104	(0)
Be(S04)2-2	2.040e-15	4.809e-16	-14.690	-15.318	-0.627	(0)
Fe(S04)2-	1.520e-15	1.059e-15	-14.818	-14.975	-0.157	(0)
CrS04+	6.506e-16	4.534e-16	-15.187	-15.344	-0.157	(0)
Cr2(OH)2S04+2	4.956e-25	1.168e-25	-24.305	-24.932	-0.627	(0)
Cr2(OH)2(S04)2	2.976e-26	2.976e-26	-25.526	-25.526	0.000	(0)
HgS04	8.603e-30	8.603e-30	-29.065	-29.065	0.000	(0)
CrO3S04-2	0.000e+00	0.000e+00	-42.759	-43.386	-0.627	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.828	-47.985	-0.157	(0)
Se(-2)	4.369e-09					
HSe-	4.362e-09	3.040e-09	-8.360	-8.517	-0.157	(0)
H2Se	3.768e-12	3.768e-12	-11.424	-11.424	0.000	(0)
MnSe	3.547e-12	3.547e-12	-11.450	-11.450	0.000	(0)
Se-2	6.089e-17	1.436e-17	-16.215	-16.843	-0.627	(0)
Se(4)	3.916e-07					
HSeO3-	3.658e-07	2.549e-07	-6.437	-6.594	-0.157	(0)
SeO3-2	2.575e-08	6.072e-09	-7.589	-8.217	-0.627	(0)
H2SeO3	1.709e-11	1.709e-11	-10.767	-10.767	0.000	(0)
FeHSeO3+2	6.649e-19	1.568e-19	-18.177	-18.805	-0.627	(0)
Cd(SeO3)2-2	4.130e-19	9.737e-20	-18.384	-19.012	-0.627	(0)
Se(6)	2.667e-21					
SeO4-2	2.651e-21	1.006e-21	-20.577	-20.997	-0.421	(0)
MnSeO4	1.154e-23	1.154e-23	-22.938	-22.938	0.000	(0)
CoSeO4	3.723e-24	3.723e-24	-23.429	-23.429	0.000	(0)
NiSeO4	9.677e-25	9.677e-25	-24.014	-24.014	0.000	(0)
ZnSeO4	1.105e-25	1.105e-25	-24.957	-24.957	0.000	(0)
HSeO4-	1.037e-26	7.225e-27	-25.984	-26.141	-0.157	(0)
CdSeO4	5.680e-28	5.680e-28	-27.246	-27.246	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.321	-45.948	-0.627	(0)
Zn	2.710e-06					
Zn+2	1.869e-06	7.093e-07	-5.728	-6.149	-0.421	(0)
ZnS04	6.431e-07	6.431e-07	-6.192	-6.192	0.000	(0)
Zn(S04)2-2	1.054e-07	2.485e-08	-6.977	-7.605	-0.627	(0)

ZnCl+	7.908e-08	6.117e-08	-7.102	-7.213	-0.112	(0)
ZnOHCl	5.097e-09	5.097e-09	-8.293	-8.293	0.000	(0)
ZnOH+	4.632e-09	3.228e-09	-8.334	-8.491	-0.157	(0)
ZnCl2	2.882e-09	2.882e-09	-8.540	-8.540	0.000	(0)
ZnCl3-	1.030e-10	7.964e-11	-9.987	-10.099	-0.112	(0)
Zn(OH)2	4.293e-11	4.293e-11	-10.367	-10.367	0.000	(0)
ZnCl4-2	3.555e-12	1.364e-12	-11.449	-11.865	-0.416	(0)
Zn(OH)3-	1.908e-14	1.330e-14	-13.719	-13.876	-0.157	(0)
Zn(OH)4-2	1.387e-19	3.271e-20	-18.858	-19.485	-0.627	(0)
ZnSeO4	1.105e-25	1.105e-25	-24.957	-24.957	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.321	-45.948	-0.627	(0)
ZnNO3+	0.000e+00	0.000e+00	-53.994	-54.151	-0.157	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-67.857	-68.013	-0.157	(0)
Zn(HS)2	0.000e+00	0.000e+00	-68.792	-68.792	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.087	-103.244	-0.157	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.274	-103.274	0.000	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-105.807	-106.435	-0.627	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-141.808	-142.435	-0.627	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-124.24	-117.97	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-28.58	-24.04	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.84	-24.04	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-179.50	-161.57	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.79	-20.68	20.11	(Co(NH3)6)Cl3
(NH4)2CrO4	-43.67	-43.29	0.38	(NH4)2CrO4
(NH4)2SeO4	-28.30	-27.85	0.45	(NH4)2SeO4
Al(OH)3(am)	0.11	11.17	11.06	Al(OH)3
Al2(MoO4)3	-55.40	-52.41	2.99	Al2(MoO4)3
Al2O3	2.08	22.35	20.27	Al2O3
Al4(OH)10SO4	6.05	28.75	22.70	Al4(OH)10SO4
AlAsO4:2H2O	-11.39	-6.59	4.80	AlAsO4:2H2O
AlOHSO4	-1.54	-4.77	-3.23	AlOHSO4
Alunite	6.42	5.52	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.22	-11.04	-7.82	PbSO4
Anhydrite	-1.05	-5.39	-4.34	CaSO4
Anilite	-13.01	-45.32	-32.31	Cu0.25Cu1.5S
Antlerite	-12.93	-4.14	8.79	Cu3(OH)4SO4
Arsenolite	-53.72	-56.63	-2.90	As4O6
As2O5	-42.28	-35.52	6.76	As2O5
Atacamite	-7.98	-0.37	7.61	Cu2(OH)3Cl
Ba(OH)2:8H2O	-22.89	1.63	24.52	Ba(OH)2:8H2O
Ba3(AsO4)2	-21.67	-30.61	-8.94	Ba3(AsO4)2
BaCrO4	-38.63	-48.37	-9.75	BaCrO4
BaHPO4	-10.26	-30.03	-19.77	BaHPO4
BaMoO4	-16.30	-23.28	-6.99	BaMoO4
Barite	-4.27	-14.31	-10.03	BaSO4
BaS	-59.06	-42.88	16.18	BaS
BaSeO3	-13.55	-11.74	1.80	BaSeO3
BaSeO4	-25.42	-32.94	-7.51	BaSeO4
Be(OH)2(alpha)	-6.50	0.40	6.89	Be(OH)2
Be(OH)2(am)	-6.80	0.40	7.19	Be(OH)2
Be(OH)2(beta)	-6.10	0.40	6.49	Be(OH)2
BeMoO4	-22.88	-24.52	-1.65	BeMoO4
BeS	-63.50	-44.12	19.38	BeS
BeSeO4:4H2O	-31.24	-34.18	-2.94	BeSeO4:4H2O
Bianchite	-6.76	-8.52	-1.76	ZnSO4:6H2O
Birnessite	-18.86	-0.77	18.09	MnO2
Bixbyite	-16.79	-17.14	-0.35	Mn2O3
BlaubleiI	-17.05	-41.22	-24.16	Cu0.9Cu0.2S
BlaubleiII	-15.83	-43.11	-27.28	Cu0.6Cu0.8S
Boehmite	2.32	11.17	8.86	AlOOH
Brochantite	-15.91	-0.21	15.71	Cu4(OH)6SO4
Brucite	-6.05	11.07	17.12	Mg(OH)2
Bunsenite	-4.76	7.92	12.68	NiO

Ca3(AsO4)2·4H2O	-26.17	-3.87	22.30	Ca3(AsO4)2·4H2O
Ca3(PO4)2(beta)	-2.64	-31.69	-29.05	Ca3(PO4)2
Ca4H(PO4)3·3H2O	-5.73	-52.81	-47.08	Ca4H(PO4)3·3H2O
CaCrO4	-37.26	-39.46	-2.20	CaCrO4
CaHP04	-1.77	-21.12	-19.35	CaHP04
CaHP04:2H2O	-2.07	-21.12	-19.05	CaHP04:2H2O
Calomel	-14.07	-32.20	-18.13	Hg2Cl2
CaMoO4	-6.42	-14.37	-7.95	CaMoO4
CaSeO3:2H2O	-5.69	-2.83	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-21.02	-24.02	-3.00	CaSeO4:2H2O
Cd(BO2)2	-24.80	-14.96	9.84	Cd(BO2)2
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-23.42	-16.71	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-23.33	-0.77	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-15.57	-48.17	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-24.11	4.29	28.40	Cd4(OH)6SO4
CdCl2	-10.81	-11.42	-0.61	CdCl2
CdCl2:1H2O	-9.75	-11.42	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-9.49	-11.42	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.23	-10.54	13.69	Cd
Cdmetal(gamma)	-24.33	-10.54	13.80	Cd
CdMoO4	-5.67	-19.86	-14.20	CdMoO4
CdOHCl	-6.79	-3.18	3.61	CdOHCl
CdSe	10.13	-10.25	-20.38	CdSe
CdSeO4:2H2O	-27.67	-29.52	-1.85	CdSeO4:2H2O
CdSO4	-10.84	-10.89	-0.05	CdSO4
CdSO4:1H2O	-9.24	-10.89	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-9.06	-10.89	-1.83	CdSO4:2.67H2O
Chalcantite	-9.36	-12.01	-2.65	CuSO4:5H2O
Chalcocite	-11.58	-46.90	-35.32	Cu2S
Chalcopyrite	-39.35	-74.98	-35.62	CuFeS2
Cinnabar	-19.95	-66.25	-46.30	HgS
Claudetite	-53.43	-56.63	-3.20	As4O6
Clausthalite	16.98	-10.40	-27.39	PbSe
Co(BO2)2	-38.61	-11.54	27.07	Co(BO2)2
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.04	-16.13	-2.09	Co(OH)3
Co3(AsO4)2	-23.13	-10.10	13.03	Co3(AsO4)2
Co3(PO4)2	-3.23	-37.92	-34.69	Co3(PO4)2
Co3O4	-13.54	-23.78	-10.24	Co3O4
CoCl2	-16.46	-8.01	8.46	CoCl2
CoCl2:6H2O	-10.53	-8.01	2.52	CoCl2:6H2O
CoFe2O4	21.21	18.06	-3.15	CoFe2O4
CoHP04	-4.14	-23.20	-19.06	CoHP04
CoMoO4	-8.74	-16.45	-7.71	CoMoO4
CoO	-5.37	8.47	13.84	CoO
CoS(alpha)	-28.61	-36.05	-7.44	CoS
CoS(beta)	-24.98	-36.05	-11.07	CoS
CoSe	9.37	-6.83	-16.20	CoSe
CoSeO3	-6.23	-4.91	1.32	CoSeO3
CoSeO4:6H2O	-24.58	-26.11	-1.53	CoSeO4:6H2O
CoSO4	-10.46	-7.47	2.99	CoSO4
CoSO4:6H2O	-5.00	-7.48	-2.48	CoSO4:6H2O
Cotunnite	-6.73	-11.58	-4.84	PbCl2
Covellite	-18.05	-40.58	-22.53	CuS
Cr(OH)2	-21.55	-10.65	10.90	Cr(OH)2
Cr(OH)3	-7.19	-5.78	1.41	Cr(OH)3
Cr(OH)3(am)	-5.03	-5.78	-0.75	Cr(OH)3
Cr2O3	-9.33	-11.56	-2.24	Cr2O3
CrCl2	-41.48	-27.13	14.36	CrCl2
CrCl3	-45.91	-30.50	15.40	CrCl3
Crmetal	-57.14	-26.24	30.89	Cr
CrO3	-46.81	-50.01	-3.20	CrO3
Cu(OH)2	-4.87	3.93	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.76	-47.33	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.63	-17.68	-46.31	Cu2Se
Cu2SO4	-16.42	-18.32	-1.90	Cu2SO4

Cu3(AsO4)2·2H2O	-29.81	-23.71	6.10	Cu3(AsO4)2·2H2O
Cu3(PO4)2	-14.69	-51.54	-36.85	Cu3(PO4)2
Cu3(PO4)2·3H2O	-16.42	-51.54	-35.12	Cu3(PO4)2·3H2O
Cu3Se2	35.25	-29.05	-64.30	Cu3Se2
CuCrO4	-40.64	-46.08	-5.44	CuCrO4
Cumetal	-0.06	-8.99	-8.93	Cu
CuMoO4	-7.88	-20.99	-13.11	CuMoO4
CuOCuSO4	-18.70	-8.07	10.63	CuOCuSO4
Cupricferrite	7.03	13.52	6.49	CuFe2O4
Cuprite	-1.27	-2.38	-1.11	Cu2O
Cuprousferrite	12.48	3.60	-8.88	CuFeO2
CuSe	22.02	-11.37	-33.39	CuSe
CuSe2	22.62	-11.08	-33.70	CuSe2
CuSeO3·2H2O	-10.05	-9.45	0.60	CuSeO3·2H2O
CuSeO4·5H2O	-28.20	-30.64	-2.44	CuSeO4·5H2O
CuSO4	-15.12	-12.01	3.11	CuSO4
Diaspore	4.06	11.17	7.12	AlOOH
Djurleite	-12.08	-46.48	-34.40	Cu0.066Cu1.868S
Epsomite	-2.73	-4.88	-2.15	MgSO4·7H2O
Fe(OH)2	-3.44	10.13	13.56	Fe(OH)2
Fe(OH)2·7Cl.3	5.36	2.32	-3.04	Fe(OH)2·7Cl.3
Fe2(OH)4SeO3	-5.35	-3.80	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3·2H2O	-9.94	-30.56	-20.63	Fe2(SeO3)3·2H2O
Fe2(SO4)3	-35.09	-38.25	-3.16	Fe2(SO4)3
Fe3(OH)8	-0.51	19.71	20.22	Fe3(OH)8
FeAsO4·2H2O	-13.37	-12.97	0.40	FeAsO4·2H2O
FeCr2O4	-8.97	-1.44	7.53	FeCr2O4
FeMoO4	-4.73	-14.79	-10.06	FeMoO4
Ferrihydrite	1.42	4.79	3.37	Fe(OH)3
Ferroselite	13.82	-4.89	-18.71	FeSe2
FeS(ppt)	-31.47	-34.39	-2.92	FeS
FeSe	5.83	-5.18	-11.00	FeSe
Galena	-25.45	-39.61	-14.16	PbS
Gibbsite	2.66	11.17	8.52	Al(OH)3
Goethite	4.16	4.79	0.64	FeOOH
Goslarite	-6.48	-8.52	-2.05	ZnSO4·7H2O
Greenockite	-24.97	-39.46	-14.49	CdS
Greigite	-113.33	-158.37	-45.03	Fe3S4
Gypsum	-0.78	-5.39	-4.61	CaSO4·2H2O
H-Jarosite	-5.97	-17.52	-11.55	(H3O)Fe3(SO4)2(OH)6
H2MoO4	-11.93	-24.92	-12.99	H2MoO4
H2S(g)	-36.51	-44.52	-8.01	H2S
H2Se(g)	-10.38	-15.31	-4.92	H2Se
Halite	-4.46	-2.87	1.59	NaCl
Hausmannite	-18.72	43.31	62.03	Mn3O4
Hematite	10.69	9.58	-1.11	Fe2O3
Hercynite	8.84	32.48	23.64	FeAl2O4
Hg(g)	-7.73	-15.66	-7.93	Hg
Hg(OH)2	-18.24	-21.73	-3.50	Hg(OH)2
Hg2(g)	-16.22	-31.32	-15.09	Hg2
Hg2(OH)2	-20.98	-15.72	5.26	Hg2(OH)2
Hg2CrO4	-57.04	-65.74	-8.70	Hg2CrO4
Hg2HP04	-22.62	-47.39	-24.77	Hg2HP04
Hg2S	-48.40	-60.24	-11.84	Hg2S
Hg2SeO3	-24.45	-29.10	-4.66	Hg2SeO3
Hg2SO4	-25.53	-31.67	-6.14	Hg2SO4
HgCl(g)	-35.98	-16.10	19.88	HgCl
HgCl2	-16.69	-38.21	-21.52	HgCl2
Hgmetal(l)	-2.01	-15.66	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSeO3	-22.68	-35.11	-12.43	HgSeO3
HgSO4	-28.22	-37.68	-9.45	HgSO4
Hinsdalite	-6.69	-9.19	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	2.08	-42.25	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-7.70	-70.49	-62.79	Pb5(PO4)3OH
K-Alum	-11.59	-16.84	-5.24	KAl(SO4)2·12H2O
K-Jarosite	0.86	-13.63	-14.49	KFe3(SO4)2(OH)6
K2Cr2O7	-74.81	-92.25	-17.43	K2Cr2O7

K2CrO4	-41.68	-42.23	-0.56	K2CrO4
K2MoO4	-20.41	-17.14	3.27	K2MoO4
K2SeO4	-26.07	-26.80	-0.73	K2SeO4
Langite	-18.09	-0.21	17.88	Cu4(OH)6SO4:H2O
Larnakite	-5.75	-6.14	-0.38	PbO:PbSO4
Laurionite	-3.96	-3.34	0.62	PbOHCl
Lepidocrocite	3.42	4.79	1.37	FeOOH
Lime	-22.61	10.55	33.16	CaO
Litharge	-7.95	4.90	12.85	PbO
Mackinawite	-30.79	-34.39	-3.60	FeS
Maghemite	3.20	9.58	6.39	Fe2O3
Magnesioferrite	3.13	20.65	17.52	Fe2MgO4
Magnetite	15.81	19.71	3.90	Fe3O4
Manganite	-8.30	17.04	25.34	MnOOH
Massicot	-8.15	4.90	13.05	PbO
Melanothallite	-18.95	-12.54	6.41	CuCl2
Melanterite	-3.57	-5.82	-2.26	FeSO4:7H2O
Metacinnabar	-20.55	-66.25	-45.70	HgS
Mg(OH)2(active)	-7.73	11.07	18.79	Mg(OH)2
Mg3(PO4)2	-6.85	-30.13	-23.28	Mg3(PO4)2
MgCr2O4	-17.12	-0.50	16.63	MgCr2O4
MgCrO4	-44.53	-38.94	5.59	MgCrO4
MgHP04:3H2O	-2.43	-20.60	-18.18	MgHP04:3H2O
MgMoO4	-12.00	-13.85	-1.85	MgMoO4
MgSeO3:6H2O	-5.36	-2.32	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-22.31	-23.51	-1.20	MgSeO4:6H2O
Minium	-44.22	30.31	74.53	Pb3O4
Mirabilite	-3.91	-5.22	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-59.65	-64.97	-5.32	Mn2(SO4)3
Mn3(AsO4)2:8H2O	-20.31	-7.81	12.50	Mn3(AsO4)2:8H2O
Mn3(PO4)2	-11.77	-35.62	-23.85	Mn3(PO4)2
MnCl2:4H2O	-9.98	-7.24	2.74	MnCl2:4H2O
MnHP04	2.97	-22.43	-25.40	MnHP04
MnS(grn)	-35.53	-35.28	0.25	MnS
MnS(pnk)	-38.62	-35.28	3.34	MnS
MnSe	-9.80	-6.07	3.73	MnSe
MnSeO3	-5.27	-4.14	1.13	MnSeO3
MnSeO3:2H2O	-5.11	-4.14	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-23.29	-25.34	-2.05	MnSeO4:5H2O
MnSO4	-9.44	-6.70	2.74	MnSO4
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.19	-21.73	-3.55	HgO
MoO3	-16.92	-24.92	-8.00	MoO3
Morenosite	-5.85	-8.03	-2.17	NiSO4:7H2O
MoS2	-58.37	-129.55	-71.19	MoS2
Na-Jarosite	-1.31	-12.15	-10.84	NaFe3(SO4)2(OH)6
Na2Cr2O7	-79.34	-89.29	-9.95	Na2Cr2O7
Na2CrO4	-42.25	-39.27	2.98	Na2CrO4
Na2Mo2O7	-22.37	-39.10	-16.73	Na2Mo2O7
Na2MoO4	-15.70	-14.18	1.51	Na2MoO4
Na2MoO4:2H2O	-15.41	-14.19	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-12.95	-2.65	10.30	Na2SeO3:5H2O
Na2SeO4	-25.12	-23.84	1.28	Na2SeO4
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.10	7.92	13.02	Ni(OH)2
Ni3(AsO4)2:8H2O	-27.46	-11.76	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-8.27	-39.57	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-16.25	15.75	32.00	Ni4(OH)6SO4
NiMoO4	-5.85	-17.00	-11.15	NiMoO4
NiS(alpha)	-31.00	-36.60	-5.60	NiS
NiS(beta)	-25.50	-36.60	-11.10	NiS
NiS(gamma)	-23.80	-36.60	-12.80	NiS
NiSe	10.32	-7.38	-17.70	NiSe
NiSeO3:2H2O	-8.35	-5.46	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-25.14	-26.66	-1.52	NiSeO4:6H2O
Nsutite	-18.28	-0.77	17.50	MnO2
O2(g)	-53.26	31.19	84.45	O2
Orpiment	-99.97	-161.87	-61.90	As2S3

Pb(B02)2	-21.67	-15.11	6.56	Pb(B02)2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.22	1.57	8.79	Pb2(OH)3Cl
Pb20(OH)2	-16.38	9.81	26.19	Pb20(OH)2
Pb203	-35.64	25.40	61.04	Pb203
Pb3(As04)2	-26.61	-20.81	5.80	Pb3(As04)2
Pb3(P04)2	-5.10	-48.63	-43.53	Pb3(P04)2
Pb302S04	-12.11	-1.23	10.87	Pb302S04
Pb4(OH)6S04	-17.43	3.67	21.10	Pb4(OH)6S04
Pb403S04	-18.53	3.67	22.20	Pb403S04
PbCr04	-32.40	-45.11	-12.71	PbCr04
PbHP04	-2.96	-26.77	-23.81	PbHP04
Pbmetal	-14.93	-10.69	4.24	Pb
PbMo04	-4.27	-20.02	-15.75	PbMo04
Pb0:0.3H2O	-8.08	4.90	12.98	Pb0:0.33H2O
PbSe04	-22.79	-29.67	-6.88	PbSe04
Periclase	-10.87	11.07	21.94	Mg0
Plattnerite	-29.81	20.50	50.31	Pb02
Plumbgummite	7.87	-24.92	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-12.56	10.55	23.11	Ca(OH)2
Pyrite	-44.69	-63.32	-18.63	FeS2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-17.19	24.83	42.03	Mn02
Pyromorphite	5.70	-78.73	-84.43	Pb5(P04)3Cl
Realgar	-46.42	-66.47	-20.05	AsS
Retgersite	-5.98	-8.03	-2.05	NiS04:6H2O
Semetal(am)	7.43	0.29	-7.14	Se
Semetal(hex)	8.04	0.29	-7.75	Se
Se02	-13.50	-13.38	0.12	Se02
Se03	-55.97	-34.57	21.39	Se03
Sphalerite	-25.57	-37.09	-11.52	ZnS
Spinel	-4.35	33.42	37.77	MgAl204
Strengite	-0.50	-26.88	-26.38	FeP04:2H2O
Sulfur	-26.82	-28.92	-2.11	S
Tenorite	-3.86	3.94	7.80	Cu0
Thenardite	-5.55	-5.21	0.34	Na2S04
Tsumebite	-8.14	-17.93	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	3.04	-32.96	-36.00	Fe3(P04)2:8H2O
Wurtzite	-28.09	-37.09	-9.00	ZnS
Zincite	-4.12	7.43	11.55	Zn0
Zincosite	-12.64	-8.52	4.13	ZnS04
Zn(B02)2	-20.88	-12.59	8.29	Zn(B02)2
Zn(N03)2:6H2O	-106.24	-102.98	3.26	Zn(N03)2:6H2O
Zn(OH)2	-4.77	7.43	12.20	Zn(OH)2
Zn(OH)2(am)	-5.24	7.43	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.43	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.30	7.43	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.43	11.73	Zn(OH)2
Zn2(OH)2S04	-8.59	-1.09	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-8.58	6.61	15.19	Zn2(OH)3Cl
Zn3(As04)2:2.5H2O	-26.89	-13.24	13.65	Zn3(As04)2:2.5H2O
Zn3(P04)2:4H2O	-5.64	-41.06	-35.42	Zn3(P04)2:4H2O
Zn30(S04)2	-29.13	-9.61	19.53	Zn30(S04)2
Zn4(OH)6S04	-14.64	13.76	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-17.84	20.66	38.50	Zn5(OH)8Cl2
ZnCl2	-16.27	-9.05	7.22	ZnCl2
Znmetal	-34.32	-8.17	26.15	Zn
ZnMo04	-7.39	-17.49	-10.10	ZnMo04
Zn0(active)	-3.97	7.43	11.40	Zn0
ZnS(am)	-28.00	-37.09	-9.09	ZnS
ZnSe	6.58	-7.88	-14.46	ZnSe
ZnSe04:6H2O	-25.63	-27.15	-1.52	ZnSe04:6H2O
ZnS04:1H2O	-7.98	-8.52	-0.53	ZnS04:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 5.

SOLUTION 4 # Mean Groundwater quality

temp 21
pH 6.79
pe 1
redox pe
units mg/l
density 1
Al 0.37
Alkalinity 0
As 0
Ba 0
Be 0
B 0
Cd 0.003
Co 2.34
Cr 0
Cu 0.31
Fe 100.34
Pb 0.003
Mn 12.2
Mo 0
V 0
Zn 0.17
Se 0.03
Ni 0.45
N 7
P 0.68
Ca 130
Mg 246
Na 1094
K 62
Cl 1533
S(6) 1485
Hg 0.0002
water 1 # kg

MIX 2
1 0.963
4 0.037

REACTION 3

H2O -1

2

END #Time-step 3

Beginning of initial solution calculations.

Initial solution 4.

-----Solution composition-----

Elements	Molality	Moles
Al	1.378e-05	1.378e-05
Ca	3.259e-03	3.259e-03
Cd	2.681e-08	2.681e-08
Cl	4.344e-02	4.344e-02
Co	3.989e-05	3.989e-05
Cu	4.901e-06	4.901e-06
Fe	1.805e-03	1.805e-03
Hg	1.002e-09	1.002e-09
K	1.593e-03	1.593e-03

Mg	1.017e-02	1.017e-02
Mn	2.231e-04	2.231e-04
N	5.021e-04	5.021e-04
Na	4.781e-02	4.781e-02
Ni	7.703e-06	7.703e-06
P	2.206e-05	2.206e-05
Pb	1.455e-08	1.455e-08
S(6)	1.553e-02	1.553e-02
Se	3.817e-07	3.817e-07
Zn	2.612e-06	2.612e-06

-----Description of solution-----

pH	=	6.790
pe	=	1.000
Activity of water	=	0.998
Ionic strength (mol/kgw)	=	9.259e-02
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	6.274e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	21.00
Electrical balance (eq)	=	6.374e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	4.58
Iterations	=	13
Total H	=	1.110158e+02
Total O	=	5.556909e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.061e-07	1.622e-07	-6.686	-6.790	-0.104	0.00
OH-	5.935e-08	4.562e-08	-7.227	-7.341	-0.114	(0)
H2O	5.551e+01	9.980e-01	1.744	-0.001	0.000	18.05
Al	1.378e-05					
Al(OH)4-	8.973e-06	7.024e-06	-5.047	-5.153	-0.106	(0)
Al(OH)2+	2.373e-06	1.884e-06	-5.625	-5.725	-0.100	(0)
Al(OH)3	2.329e-06	2.329e-06	-5.633	-5.633	0.000	(0)
AlOH+2	7.409e-08	2.945e-08	-7.130	-7.531	-0.401	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
Al+3	5.344e-09	6.178e-10	-8.272	-9.209	-0.937	(0)
Al(SO4)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ca	3.259e-03					
Ca+2	2.406e-03	9.221e-04	-2.619	-3.035	-0.416	(0)
CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CaOH+	1.001e-09	8.020e-10	-8.999	-9.096	-0.096	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
Cd	2.681e-08					
CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
Cd+2	7.874e-09	3.018e-09	-8.104	-8.520	-0.416	(0)
CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
Cd(SO4)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
CdOH+	1.568e-12	1.100e-12	-11.805	-11.959	-0.154	(0)
Cd(OH)2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
Cd2OH+3	4.264e-19	1.748e-20	-18.370	-19.758	-1.387	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Cd(OH)3-	3.135e-21	2.198e-21	-20.504	-20.658	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)

	Cd(OH)4-2	9.222e-29	2.230e-29	-28.035	-28.652	-0.617	(0)
	CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cl		4.344e-02					
	Cl-	4.343e-02	3.417e-02	-1.362	-1.466	-0.104	(0)
	CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
	MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
	CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
	CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
	NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
	MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
	ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
	CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
	CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
	ZnOHC1	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
	PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
	ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
	CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
	MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
	PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
	ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
	CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
	NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
	CdOHC1	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
	CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
	PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
	ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
	PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
	CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
	FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
	FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
	CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
	HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
	HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
	HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
	FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
	HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
	CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
	HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
	CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
	Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(2)		3.989e-05					
	Co+2	3.225e-05	7.797e-06	-4.491	-5.108	-0.617	(0)
	CoSO4	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
	CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
	CoHP04	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
	CoOH+	1.375e-08	9.639e-09	-7.862	-8.016	-0.154	(0)
	Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
	Co(OH)2	4.744e-11	4.744e-11	-10.324	-10.324	0.000	(0)
	Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
	Co2OH+3	9.190e-14	3.766e-15	-13.037	-14.424	-1.387	(0)
	Co(OH)3-	8.364e-17	5.865e-17	-16.078	-16.232	-0.154	(0)
	CoOOH-	5.039e-18	3.533e-18	-17.298	-17.452	-0.154	(0)
	Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
	Co4(OH)4+4	5.041e-22	1.722e-24	-21.297	-23.764	-2.466	(0)
	Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
	CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
	Co(OH)4-2	2.382e-24	5.759e-25	-23.623	-24.240	-0.617	(0)
	Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
	CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
	CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
	Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Co(3)		4.042e-31					
	CoOH+2	4.042e-31	9.773e-32	-30.393	-31.010	-0.617	(0)
	CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
	Co+3	2.685e-36	3.104e-37	-35.571	-36.508	-0.937	(0)
	Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)

Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
Cu(1)	4.900e-06					
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
Cu+	1.553e-08	1.089e-08	-7.809	-7.963	-0.154	(0)
Cu(2)	8.967e-10					
Cu+2	6.026e-10	2.310e-10	-9.220	-9.636	-0.416	(0)
CuSO4	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
CuOH+	4.792e-11	3.719e-11	-10.319	-10.430	-0.110	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
Cu(OH)2	5.595e-13	5.595e-13	-12.252	-12.252	0.000	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
Cu2(OH)2+2	1.398e-16	3.379e-17	-15.855	-16.471	-0.617	(0)
Cu(OH)3-	1.014e-16	7.111e-17	-15.994	-16.148	-0.154	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
Cu(OH)4-2	1.434e-22	3.468e-23	-21.843	-22.460	-0.617	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Fe(2)	1.805e-03					
Fe+2	1.454e-03	3.515e-04	-2.837	-3.454	-0.617	(0)
FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
FeHPO4	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
FeOH+	8.090e-07	6.384e-07	-6.092	-6.195	-0.103	(0)
Fe(OH)2	2.214e-11	2.214e-11	-10.655	-10.655	0.000	(0)
Fe(OH)3-	5.296e-13	4.179e-13	-12.276	-12.379	-0.103	(0)
Fe(3)	3.233e-07					
Fe(OH)2+	3.138e-07	2.491e-07	-6.503	-6.604	-0.100	(0)
Fe(OH)3	9.382e-09	9.382e-09	-8.028	-8.028	0.000	(0)
Fe(OH)4-	1.205e-10	9.565e-11	-9.919	-10.019	-0.100	(0)
FeOH+2	2.119e-11	8.217e-12	-10.674	-11.085	-0.411	(0)
FeHPO4+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeSO4+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe+3	2.235e-15	2.584e-16	-14.651	-15.588	-0.937	(0)
Fe(SO4)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
Fe2(OH)2+4	7.548e-19	2.579e-21	-18.122	-20.589	-2.466	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
Fe3(OH)4+5	6.361e-23	8.906e-27	-22.197	-26.050	-3.854	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
H(0)	3.796e-19					
H2	1.898e-19	1.939e-19	-18.722	-18.712	0.009	(0)
Hg(0)	1.002e-09					
Hg	1.002e-09	1.002e-09	-8.999	-8.999	0.000	(0)
Hg(1)	3.697e-29					
Hg2+2	1.848e-29	4.469e-30	-28.733	-29.350	-0.617	(0)
Hg(2)	2.362e-18					
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
Hg(OH)2	1.682e-22	1.718e-22	-21.774	-21.765	0.009	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
HgOH+	2.768e-26	1.941e-26	-25.558	-25.712	-0.154	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Hg+2	3.648e-29	8.820e-30	-28.438	-29.055	-0.617	(0)

	HgSO4	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
	Hg(OH)3-	1.911e-30	1.340e-30	-29.719	-29.873	-0.154	(0)
	Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
	HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
	Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
K	1.593e-03						
	K+	1.549e-03	1.219e-03	-2.810	-2.914	-0.104	(0)
	KSO4-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
	KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
Mg	1.017e-02						
	Mg+2	7.920e-03	3.036e-03	-2.101	-2.518	-0.416	(0)
	MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
	MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
	MgH2P04+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
	MgOH+	6.402e-08	5.162e-08	-7.194	-7.287	-0.094	(0)
	MgP04-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
Mn(2)	2.231e-04						
	Mn+2	1.882e-04	4.549e-05	-3.725	-4.342	-0.617	(0)
	MnSO4	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
	MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
	MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
	MnOH+	6.606e-09	5.213e-09	-8.180	-8.283	-0.103	(0)
	MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
	MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
	Mn(OH)3-	2.129e-19	1.680e-19	-18.672	-18.775	-0.103	(0)
	MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
	Mn(OH)4-2	8.666e-26	3.361e-26	-25.062	-25.474	-0.411	(0)
	MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
	Mn(NO3)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Mn(3)	9.732e-29						
	Mn+3	9.732e-29	1.125e-29	-28.012	-28.949	-0.937	(0)
Mn(6)	0.000e+00						
	MnO4-2	0.000e+00	0.000e+00	-65.730	-66.142	-0.411	(0)
Mn(7)	0.000e+00						
	MnO4-	0.000e+00	0.000e+00	-74.661	-74.779	-0.119	(0)
N(-3)	5.021e-04						
	NH4+	4.805e-04	3.617e-04	-3.318	-3.442	-0.123	(0)
	NH4SO4-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
	NH3	9.560e-07	9.560e-07	-6.020	-6.020	0.000	(0)
	NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
	Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
	CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
	CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
	Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
	Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
	Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
	Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
	Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
	Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
	HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
	Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
	Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
	Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
	Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
	Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
	Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
N(3)	1.148e-35						
	NO2-	1.148e-35	8.735e-36	-34.940	-35.059	-0.119	(0)
	CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
	CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
	Cu(NO2)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
N(5)	0.000e+00						
	NO3-	0.000e+00	0.000e+00	-48.382	-48.486	-0.104	(0)
	CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
	MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
	CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
	NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)

ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
Na	4.781e-02					
Na+	4.677e-02	3.680e-02	-1.330	-1.434	-0.104	(0)
NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
Ni	7.703e-06					
Ni+2	5.664e-06	2.171e-06	-5.247	-5.663	-0.416	(0)
NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
NiOH+	1.818e-09	1.275e-09	-8.741	-8.895	-0.154	(0)
Ni(SO4)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
Ni(OH)2	8.335e-12	8.335e-12	-11.079	-11.079	0.000	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Ni(OH)3-	7.365e-16	5.164e-16	-15.133	-15.287	-0.154	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.993	-55.984	0.009	(0)
P	2.206e-05					
H2PO4-	6.634e-06	5.268e-06	-5.178	-5.278	-0.100	(0)
HP04-2	5.222e-06	2.025e-06	-5.282	-5.694	-0.411	(0)
MgHPO4	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
FeHPO4	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
CoHPO4	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
MgPO4-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
H3PO4	1.150e-10	1.150e-10	-9.939	-9.939	0.000	(0)
PO4-3	4.196e-11	4.850e-12	-10.377	-11.314	-0.937	(0)
FeHPO4+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
Pb	1.455e-08					
Pb+2	5.480e-09	2.100e-09	-8.261	-8.678	-0.416	(0)
PbSO4	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
PbOH+	4.662e-10	3.269e-10	-9.331	-9.486	-0.154	(0)
Pb(SO4)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
Pb(OH)2	6.405e-13	6.405e-13	-12.193	-12.193	0.000	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
Pb2OH+3	2.655e-16	1.088e-17	-15.576	-16.963	-1.387	(0)
Pb(OH)3-	5.660e-17	3.969e-17	-16.247	-16.401	-0.154	(0)
Pb(OH)4-2	2.491e-21	6.022e-22	-20.604	-21.220	-0.617	(0)
Pb3(OH)4+2	3.779e-23	9.137e-24	-22.423	-23.039	-0.617	(0)
Pb4(OH)4+4	5.175e-26	1.768e-28	-25.286	-27.753	-2.466	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
S(6)	1.553e-02					

S04-2	1.094e-02	4.194e-03	-1.961	-2.377	-0.416	(0)
MgS04	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
NaS04-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
CaS04	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
FeS04	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
MnS04	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
NH4S04-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
CoS04	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
NiS04	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
ZnS04	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(S04)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
HS04-	7.527e-08	5.892e-08	-7.123	-7.230	-0.106	(0)
AlS04+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
PbS04	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
CdS04	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
Al(S04)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ni(S04)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
Cd(S04)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
Pb(S04)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
CuS04	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
FeS04+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe(S04)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
HgS04	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Se(-2)	4.685e-09					
HSe-	4.677e-09	3.279e-09	-8.330	-8.484	-0.154	(0)
H2Se	4.054e-12	4.054e-12	-11.392	-11.392	0.000	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Se-2	6.423e-17	1.553e-17	-16.192	-16.809	-0.617	(0)
Se(4)	3.770e-07					
HSeO3-	3.526e-07	2.472e-07	-6.453	-6.607	-0.154	(0)
SeO3-2	2.442e-08	5.904e-09	-7.612	-8.229	-0.617	(0)
H2SeO3	1.653e-11	1.653e-11	-10.782	-10.782	0.000	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Se(6)	2.478e-21					
SeO4-2	2.463e-21	9.439e-22	-20.609	-21.025	-0.416	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
HSeO4-	9.645e-27	6.763e-27	-26.016	-26.170	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
Zn	2.612e-06					
Zn+2	1.813e-06	6.948e-07	-5.742	-6.158	-0.416	(0)
ZnS04	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(S04)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
ZnOH+	4.520e-09	3.170e-09	-8.345	-8.499	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
Zn(OH)2	4.227e-11	4.227e-11	-10.374	-10.374	0.000	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
Zn(OH)3-	1.872e-14	1.313e-14	-13.728	-13.882	-0.154	(0)
Zn(OH)4-2	1.339e-19	3.238e-20	-18.873	-19.490	-0.617	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)
(Co(NH3)5Cl)(NO3)2	-124.48	-118.20	6.27

(Co(NH3)5Cl)Cl2	-28.70	-24.17	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.96	-24.17	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-179.81	-161.88	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.93	-20.82	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-28.36	-27.91	0.45	(NH4)2SeO4
Al(OH)3(am)	0.09	11.16	11.06	Al(OH)3
Al2O3	2.05	22.32	20.27	Al2O3
Al4(OH)10SO4	5.98	28.68	22.70	Al4(OH)10SO4
AlOHSO4	-1.57	-4.80	-3.23	AlOHSO4
Alunite	6.34	5.44	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.24	-11.06	-7.82	PbSO4
Anhydrite	-1.07	-5.41	-4.34	CaSO4
Antlerite	-12.92	-4.13	8.79	Cu3(OH)4SO4
Atacamite	-7.99	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.78	-8.54	-1.76	ZnSO4:6H2O
Birnessite	-18.88	-0.79	18.09	MnO2
Bixbyite	-16.81	-17.16	-0.35	Mn2O3
Boehmite	2.30	11.16	8.86	AlOOH
Brochantite	-15.89	-0.19	15.71	Cu4(OH)6SO4
Brucite	-6.06	11.06	17.12	Mg(OH)2
Bunsenite	-4.77	7.92	12.68	NiO
Ca3(P04)2(beta)	-2.69	-31.73	-29.05	Ca3(P04)2
Ca4H(P04)3:3H2O	-5.80	-52.88	-47.08	Ca4H(P04)3:3H2O
CaHP04	-1.79	-21.14	-19.35	CaHP04
CaHP04:2H2O	-2.09	-21.14	-19.05	CaHP04:2H2O
Calomel	-14.15	-32.28	-18.13	Hg2Cl2
CaSeO3:2H2O	-5.71	-2.85	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-21.06	-24.06	-3.00	CaSeO4:2H2O
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-23.45	-16.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-23.34	-0.78	22.56	Cd3(OH)4SO4
Cd3(P04)2	-15.59	-48.19	-32.60	Cd3(P04)2
Cd4(OH)6SO4	-24.12	4.28	28.40	Cd4(OH)6SO4
CdCl2	-10.84	-11.45	-0.61	CdCl2
CdCl2:1H2O	-9.78	-11.45	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-9.52	-11.46	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.21	-10.52	13.69	Cd
Cdmetal(gamma)	-24.32	-10.52	13.80	Cd
CdOHCl	-6.81	-3.20	3.61	CdOHCl
CdSe	10.17	-10.21	-20.38	CdSe
CdSeO4:2H2O	-27.70	-29.55	-1.85	CdSeO4:2H2O
CdSO4	-10.85	-10.90	-0.05	CdSO4
CdSO4:1H2O	-9.25	-10.90	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-9.07	-10.90	-1.83	CdSO4:2.67H2O
Chalcantite	-9.36	-12.02	-2.65	CuSO4:5H2O
Clausthalite	17.01	-10.37	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.05	-16.14	-2.09	Co(OH)3
Co3(P04)2	-3.27	-37.95	-34.69	Co3(P04)2
Co3O4	-13.57	-23.81	-10.24	Co3O4
CoCl2	-16.50	-8.04	8.46	CoCl2
CoCl2:6H2O	-10.56	-8.05	2.52	CoCl2:6H2O
CoFe2O4	21.18	18.03	-3.15	CoFe2O4
CoHP04	-4.15	-23.21	-19.06	CoHP04
CoO	-5.37	8.47	13.84	CoO
CoSe	9.40	-6.80	-16.20	CoSe
CoSeO3	-6.24	-4.92	1.32	CoSeO3
CoSeO4:6H2O	-24.61	-26.14	-1.53	CoSeO4:6H2O
CoSO4	-10.48	-7.49	2.99	CoSO4
CoSO4:6H2O	-5.02	-7.49	-2.48	CoSO4:6H2O
Cotunnite	-6.77	-11.61	-4.84	PbCl2
Cu(OH)2	-4.87	3.94	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.82	-47.39	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.69	-17.62	-46.31	Cu2Se
Cu2SO4	-16.40	-18.30	-1.90	Cu2SO4
Cu3(P04)2	-14.69	-51.54	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-16.42	-51.54	-35.12	Cu3(P04)2:3H2O

Cu3Se2	35.35	-28.95	-64.30	Cu3Se2
Cumetal	-0.04	-8.96	-8.93	Cu
Cu0CuS04	-18.70	-8.07	10.63	Cu0CuS04
Cupricferrite	7.02	13.50	6.49	CuFe204
Cuprite	-1.24	-2.35	-1.11	Cu20
Cuprousferrite	12.49	3.61	-8.88	CuFe02
CuSe	22.06	-11.33	-33.39	CuSe
CuSe2	22.68	-11.02	-33.70	CuSe2
CuSe03:2H20	-10.05	-9.46	0.60	CuSe03:2H20
CuSe04:5H20	-28.23	-30.67	-2.44	CuSe04:5H20
CuS04	-15.13	-12.01	3.11	CuS04
Diaspore	4.04	11.16	7.12	Al00H
Epsomite	-2.75	-4.90	-2.15	MgS04:7H20
Fe(OH)2	-3.44	10.12	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.34	2.30	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-5.39	-3.84	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H20	-10.00	-30.63	-20.63	Fe2(Se03)3:2H20
Fe2(S04)3	-35.15	-38.31	-3.16	Fe2(S04)3
Fe3(OH)8	-0.54	19.68	20.22	Fe3(OH)8
Ferrihydrite	1.41	4.78	3.37	Fe(OH)3
Ferroselite	13.87	-4.84	-18.71	FeSe2
FeSe	5.86	-5.15	-11.00	FeSe
Gibbsite	2.64	11.16	8.52	Al(OH)3
Goethite	4.15	4.78	0.64	Fe00H
Goslarite	-6.50	-8.54	-2.05	ZnS04:7H20
Gypsum	-0.80	-5.41	-4.61	CaS04:2H20
H-Jarosite	-6.02	-17.57	-11.55	(H30)Fe3(S04)2(OH)6
H2Se(g)	-10.35	-15.27	-4.92	H2Se
Halite	-4.49	-2.90	1.59	NaCl
Hausmannite	-18.74	43.29	62.03	Mn304
Hematite	10.67	9.56	-1.11	Fe203
Hercynite	8.80	32.44	23.64	FeAl204
Hg(g)	-7.75	-15.67	-7.93	Hg
Hg(OH)2	-18.27	-21.76	-3.50	Hg(OH)2
Hg2(g)	-16.26	-31.35	-15.09	Hg2
Hg2(OH)2	-21.03	-15.77	5.26	Hg2(OH)2
Hg2HP04	-22.68	-47.45	-24.77	Hg2HP04
Hg2Se03	-24.51	-29.17	-4.66	Hg2Se03
Hg2S04	-25.58	-31.73	-6.14	Hg2S04
HgCl(g)	-36.02	-16.14	19.88	HgCl
HgCl2	-16.76	-38.28	-21.52	HgCl2
Hgmetal(l)	-2.02	-15.67	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSe03	-22.73	-35.16	-12.43	HgSe03
HgS04	-28.27	-37.72	-9.45	HgS04
Hinsdalite	-6.76	-9.26	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	2.00	-42.33	-44.33	Ca5(P04)30H
Hydroxylpyromorphite	-7.75	-70.54	-62.79	Pb5(P04)30H
K-Alum	-11.65	-16.89	-5.24	KAl(S04)2:12H20
K-Jarosite	0.79	-13.70	-14.49	KFe3(S04)2(OH)6
K2Se04	-26.12	-26.85	-0.73	K2Se04
Langite	-18.07	-0.19	17.88	Cu4(OH)6S04:H20
Larnakite	-5.77	-6.15	-0.38	Pb0:PbS04
Laurionite	-3.98	-3.35	0.62	PbOHCl
Lepidocrocite	3.41	4.78	1.37	Fe00H
Lime	-22.62	10.54	33.16	Ca0
Litharge	-7.95	4.90	12.85	Pb0
Maghemite	3.18	9.56	6.39	Fe203
Magnesioferrite	3.10	20.62	17.52	Fe2Mg04
Magnetite	15.79	19.69	3.90	Fe304
Manganite	-8.31	17.03	25.34	Mn00H
Massicot	-8.15	4.90	13.05	Pb0
Melanothallite	-18.98	-12.57	6.41	CuCl2
Melanterite	-3.58	-5.84	-2.26	FeS04:7H20
Mg(OH)2(active)	-7.73	11.06	18.79	Mg(OH)2
Mg3(P04)2	-6.90	-30.18	-23.28	Mg3(P04)2
MgHP04:3H20	-2.45	-20.62	-18.18	MgHP04:3H20
MgSe03:6H20	-5.38	-2.34	3.04	MgSe03:6H20

MgSeO4:6H2O	-22.35	-23.55	-1.20	MgSeO4:6H2O
Minium	-44.24	30.28	74.53	Pb3O4
Mirabilite	-3.95	-5.25	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-59.71	-65.03	-5.32	Mn2(SO4)3
Mn3(PO4)2	-11.81	-35.65	-23.85	Mn3(PO4)2
MnCl2:4H2O	-10.02	-7.28	2.74	MnCl2:4H2O
MnHP04	2.95	-22.45	-25.40	MnHP04
MnSe	-9.77	-6.04	3.73	MnSe
MnSeO3	-5.29	-4.16	1.13	MnSeO3
MnSeO3:2H2O	-5.12	-4.16	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-23.32	-25.37	-2.05	MnSeO4:5H2O
MnSO4	-9.46	-6.72	2.74	MnSO4
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.22	-21.76	-3.55	HgO
Morenosite	-5.87	-8.05	-2.17	NiSO4:7H2O
Na-Jarosite	-1.38	-12.22	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-12.99	-2.69	10.30	Na2SeO3:5H2O
Na2SeO4	-25.17	-23.89	1.28	Na2SeO4
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.11	7.91	13.02	Ni(OH)2
Ni3(PO4)2	-8.32	-39.62	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-16.30	15.70	32.00	Ni4(OH)6SO4
NiSe	10.34	-7.36	-17.70	NiSe
NiSeO3:2H2O	-8.37	-5.48	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-25.17	-26.69	-1.52	NiSeO4:6H2O
Nsutite	-18.29	-0.79	17.50	MnO2
O2(g)	-53.29	31.16	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.25	1.55	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-16.39	9.80	26.19	Pb2O(OH)2
Pb2O3	-35.66	25.38	61.04	Pb2O3
Pb3(PO4)2	-5.13	-48.66	-43.53	Pb3(PO4)2
Pb3O2SO4	-12.13	-1.25	10.87	Pb3O2SO4
Pb4(OH)6SO4	-17.45	3.65	21.10	Pb4(OH)6SO4
Pb4O3SO4	-18.55	3.65	22.20	Pb4O3SO4
PbHP04	-2.98	-26.78	-23.81	PbHP04
Pbmetal	-14.92	-10.68	4.24	Pb
PbO:0.3H2O	-8.08	4.90	12.98	PbO:0.33H2O
PbSeO4	-22.83	-29.70	-6.88	PbSeO4
Periclase	-10.88	11.06	21.94	MgO
Plattnerite	-29.83	20.48	50.31	PbO2
Plumbgummite	7.80	-24.99	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-12.57	10.54	23.11	Ca(OH)2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-17.21	24.82	42.03	MnO2
Pyromorphite	5.63	-78.80	-84.43	Pb5(PO4)3Cl
Retgersite	-6.00	-8.05	-2.05	NiSO4:6H2O
Semetal(am)	7.44	0.31	-7.14	Se
Semetal(hex)	8.05	0.31	-7.75	Se
SeO2	-13.52	-13.40	0.12	SeO2
SeO3	-56.00	-34.60	21.39	SeO3
Spinel	-4.39	33.38	37.77	MgAl2O4
Strengite	-0.53	-26.90	-26.38	FePO4:2H2O
Tenorite	-3.86	3.94	7.80	CuO
Thenardite	-5.59	-5.25	0.34	Na2SO4
Tsumebite	-8.15	-17.94	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	3.00	-33.00	-36.00	Fe3(PO4)2:8H2O
Zincite	-4.13	7.42	11.55	ZnO
Zincosite	-12.66	-8.54	4.13	ZnSO4
Zn(NO3)2:6H2O	-106.39	-103.14	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.78	7.42	12.20	Zn(OH)2
Zn(OH)2(am)	-5.25	7.42	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.42	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.31	7.42	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.42	11.73	Zn(OH)2
Zn2(OH)2SO4	-8.62	-1.12	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.61	6.58	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-5.69	-41.11	-35.42	Zn3(PO4)2:4H2O

Zn3O(SO4)2	-29.18	-9.65	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-14.68	13.72	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.91	20.59	38.50	Zn5(OH)8Cl2
ZnCl2	-16.31	-9.09	7.22	ZnCl2
Znmetal	-34.31	-8.16	26.15	Zn
ZnO(active)	-3.98	7.42	11.40	ZnO
ZnSe	6.61	-7.85	-14.46	ZnSe
ZnSeO4:6H2O	-25.67	-27.19	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-8.00	-8.54	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 2.

Using reaction 3.

Mixture 2.

9.630e-01 Solution 1
3.700e-02 Solution 4

Reaction 3.

2.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000

Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	1.429e-05	1.378e-05
Ca	3.381e-03	3.259e-03
Cd	2.782e-08	2.681e-08
Cl	4.507e-02	4.344e-02
Co	4.138e-05	3.989e-05
Cu	5.084e-06	4.901e-06
Fe	1.873e-03	1.805e-03
Hg	1.039e-09	1.002e-09
K	1.653e-03	1.593e-03
Mg	1.055e-02	1.017e-02
Mn	2.315e-04	2.231e-04
N	5.209e-04	5.021e-04
Na	4.960e-02	4.781e-02
Ni	7.991e-06	7.703e-06
P	2.288e-05	2.206e-05
Pb	1.509e-08	1.455e-08
S	1.611e-02	1.553e-02
Se	3.960e-07	3.817e-07
Zn	2.710e-06	2.612e-06

-----Description of solution-----

pH = 6.789 Charge balance


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pe = 1.008 Adjusted to redox equilibrium
Activity of water = 0.998
Ionic strength (mol/kgw) = 9.589e-02
Mass of water (kg) = 9.640e-01
Total alkalinity (eq/kg) = 6.509e-05
Total carbon (mol/kg) = 0.000e+00
Total CO2 (mol/kg) = 0.000e+00
Temperature (°C) = 21.00
Electrical balance (eq) = 6.374e-03
Percent error, 100*(Cat-|An|)/(Cat+|An|) = 4.58
Iterations = 4
Total H = 1.070158e+02
Total O = 5.356909e+01

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-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.071e-07	1.626e-07	-6.684	-6.789	-0.105	0.00
OH-	5.941e-08	4.551e-08	-7.226	-7.342	-0.116	(0)
H2O	5.551e+01	9.979e-01	1.744	-0.001	0.000	18.05
Al	1.429e-05					
Al(OH)4-	9.301e-06	7.259e-06	-5.031	-5.139	-0.108	(0)
Al(OH)2+	2.470e-06	1.956e-06	-5.607	-5.709	-0.101	(0)
Al(OH)3	2.413e-06	2.413e-06	-5.618	-5.618	0.000	(0)
AlOH+2	7.793e-08	3.065e-08	-7.108	-7.514	-0.405	(0)
AlSO4+	2.357e-08	1.840e-08	-7.628	-7.735	-0.108	(0)
Al+3	5.703e-09	6.445e-10	-8.244	-9.191	-0.947	(0)
Al(SO4)2-	1.183e-09	9.231e-10	-8.927	-9.035	-0.108	(0)
Ca	3.381e-03					
Ca+2	2.488e-03	9.441e-04	-2.604	-3.025	-0.421	(0)
CaSO4	8.918e-04	8.918e-04	-3.050	-3.050	0.000	(0)
CaHPO4	8.368e-07	8.368e-07	-6.077	-6.077	0.000	(0)
CaH2PO4+	1.349e-07	1.068e-07	-6.870	-6.971	-0.101	(0)
CaPO4-	1.585e-08	1.255e-08	-7.800	-7.901	-0.101	(0)
CaNH3+2	6.602e-09	1.557e-09	-8.180	-8.808	-0.627	(0)
CaOH+	1.025e-09	8.191e-10	-8.989	-9.087	-0.097	(0)
Ca(NH3)2+2	3.442e-15	8.116e-16	-14.463	-15.091	-0.627	(0)
CaNO3+	0.000e+00	0.000e+00	-50.772	-50.929	-0.157	(0)
Cd	2.782e-08					
CdCl+	1.462e-08	1.018e-08	-7.835	-7.992	-0.157	(0)
Cd+2	7.991e-09	3.032e-09	-8.097	-8.518	-0.421	(0)
CdSO4	2.906e-09	2.906e-09	-8.537	-8.537	0.000	(0)
CdCl2	1.485e-09	1.485e-09	-8.828	-8.828	0.000	(0)
Cd(SO4)2-2	7.476e-10	1.763e-10	-9.126	-9.754	-0.627	(0)
CdCl3-	4.575e-11	3.188e-11	-10.340	-10.496	-0.157	(0)
CdOHCl	2.350e-11	2.350e-11	-10.629	-10.629	0.000	(0)
CdOH+	1.582e-12	1.102e-12	-11.801	-11.958	-0.157	(0)
Cd(OH)2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
Cd2OH+3	4.544e-19	1.760e-20	-18.343	-19.754	-1.412	(0)
Cd(SeO3)2-2	4.131e-19	9.740e-20	-18.384	-19.011	-0.627	(0)
Cd(OH)3-	3.147e-21	2.193e-21	-20.502	-20.659	-0.157	(0)
CdSeO4	5.664e-28	5.664e-28	-27.247	-27.247	0.000	(0)
Cd(OH)4-2	9.411e-29	2.219e-29	-28.026	-28.654	-0.627	(0)
CdHS+	8.317e-39	5.796e-39	-38.080	-38.237	-0.157	(0)
CdNO3+	0.000e+00	0.000e+00	-56.229	-56.385	-0.157	(0)
Cd(HS)2	0.000e+00	0.000e+00	-68.760	-68.760	0.000	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-104.429	-104.586	-0.157	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.153	-105.153	0.000	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.490	-140.117	-0.627	(0)
Cl	4.507e-02					
Cl-	4.505e-02	3.536e-02	-1.346	-1.451	-0.105	(0)
CuCl2-	4.531e-06	3.504e-06	-5.344	-5.455	-0.112	(0)
MnCl+	2.604e-06	2.050e-06	-5.584	-5.688	-0.104	(0)
CoCl+	1.370e-06	9.543e-07	-5.863	-6.020	-0.157	(0)
CuCl	4.698e-07	4.698e-07	-6.328	-6.328	0.000	(0)
NiCl+	2.852e-07	1.987e-07	-6.545	-6.702	-0.157	(0)

MnCl2	1.024e-07	1.024e-07	-6.990	-6.990	0.000	(0)
ZnCl+	7.908e-08	6.116e-08	-7.102	-7.213	-0.112	(0)
CuCl3-2	6.801e-08	2.608e-08	-7.167	-7.584	-0.416	(0)
CdCl+	1.462e-08	1.018e-08	-7.835	-7.992	-0.157	(0)
ZnOHCl	5.099e-09	5.099e-09	-8.293	-8.293	0.000	(0)
PbCl+	3.651e-09	2.544e-09	-8.438	-8.594	-0.157	(0)
ZnCl2	2.882e-09	2.882e-09	-8.540	-8.540	0.000	(0)
CdCl2	1.485e-09	1.485e-09	-8.828	-8.828	0.000	(0)
MnCl3-	1.267e-09	9.970e-10	-8.897	-9.001	-0.104	(0)
PbCl2	3.947e-10	3.947e-10	-9.404	-9.404	0.000	(0)
ZnCl3-	1.030e-10	7.964e-11	-9.987	-10.099	-0.112	(0)
CdCl3-	4.575e-11	3.188e-11	-10.340	-10.496	-0.157	(0)
NiCl2	3.578e-11	3.578e-11	-10.446	-10.446	0.000	(0)
CdOHCl	2.350e-11	2.350e-11	-10.629	-10.629	0.000	(0)
CuCl+	1.578e-11	1.221e-11	-10.802	-10.913	-0.112	(0)
PbCl3-	8.330e-12	5.805e-12	-11.079	-11.236	-0.157	(0)
ZnCl4-2	3.555e-12	1.364e-12	-11.449	-11.865	-0.416	(0)
PbCl4-2	3.751e-13	8.844e-14	-12.426	-13.053	-0.627	(0)
CuCl2	1.229e-13	1.229e-13	-12.910	-12.910	0.000	(0)
FeCl+2	6.540e-16	2.508e-16	-15.184	-15.601	-0.416	(0)
FeCl2+	5.711e-17	4.494e-17	-16.243	-16.347	-0.104	(0)
CuCl3-	4.882e-17	3.776e-17	-16.311	-16.423	-0.112	(0)
HgCl2	1.586e-18	1.586e-18	-17.800	-17.800	0.000	(0)
HgCl3-	8.117e-19	5.656e-19	-18.091	-18.247	-0.157	(0)
HgCl4-2	3.503e-19	8.260e-20	-18.456	-19.083	-0.627	(0)
FeCl3	1.589e-19	1.589e-19	-18.799	-18.799	0.000	(0)
HgClOH	3.727e-20	3.727e-20	-19.429	-19.429	0.000	(0)
CuCl4-2	1.998e-20	7.663e-21	-19.699	-20.116	-0.416	(0)
HgCl+	1.091e-23	7.602e-24	-22.962	-23.119	-0.157	(0)
CoCl+2	8.942e-36	2.108e-36	-35.049	-35.676	-0.627	(0)
Co(NH3)5Cl+2	1.813e-39	4.275e-40	-38.742	-39.369	-0.627	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.318	-51.946	-0.627	(0)
Co(2)	4.138e-05					
Co+2	3.345e-05	7.888e-06	-4.476	-5.103	-0.627	(0)
CoS04	6.522e-06	6.522e-06	-5.186	-5.186	0.000	(0)
CoCl+	1.370e-06	9.543e-07	-5.863	-6.020	-0.157	(0)
CoHP04	1.641e-08	1.641e-08	-7.785	-7.785	0.000	(0)
CoOH+	1.396e-08	9.729e-09	-7.855	-8.012	-0.157	(0)
Co(NH3)+2	7.525e-09	1.774e-09	-8.124	-8.751	-0.627	(0)
Co(OH)2	4.777e-11	4.777e-11	-10.321	-10.321	0.000	(0)
Co(NH3)2+2	2.943e-13	6.939e-14	-12.531	-13.159	-0.627	(0)
Co2OH+3	9.928e-14	3.846e-15	-13.003	-14.415	-1.412	(0)
Co(OH)3-	8.455e-17	5.892e-17	-16.073	-16.230	-0.157	(0)
CoOOH-	5.094e-18	3.550e-18	-17.293	-17.450	-0.157	(0)
Co(NH3)3+2	4.853e-18	1.144e-18	-17.314	-17.942	-0.627	(0)
Co4(OH)4+4	5.783e-22	1.787e-24	-21.238	-23.748	-2.510	(0)
Co(NH3)4+2	3.336e-23	7.865e-24	-22.477	-23.104	-0.627	(0)
CoSe04	3.713e-24	3.713e-24	-23.430	-23.430	0.000	(0)
Co(OH)4-2	2.448e-24	5.772e-25	-23.611	-24.239	-0.627	(0)
Co(NH3)5+2	7.250e-29	1.709e-29	-28.140	-28.767	-0.627	(0)
CoNO2+	7.898e-40	5.504e-40	-39.102	-39.259	-0.157	(0)
CoNO3+	0.000e+00	0.000e+00	-53.163	-53.320	-0.157	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.429	-101.429	0.000	(0)
Co(3)	4.262e-31					
CoOH+2	4.262e-31	1.005e-31	-30.370	-30.998	-0.627	(0)
CoCl+2	8.942e-36	2.108e-36	-35.049	-35.676	-0.627	(0)
Co+3	2.831e-36	3.199e-37	-35.548	-36.495	-0.947	(0)
Co(NH3)5Cl+2	1.813e-39	4.275e-40	-38.742	-39.369	-0.627	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.828	-47.985	-0.157	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.318	-51.946	-0.627	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.627	-53.255	-0.627	(0)
Cu(1)	5.084e-06					
CuCl2-	4.531e-06	3.504e-06	-5.344	-5.455	-0.112	(0)
CuCl	4.698e-07	4.698e-07	-6.328	-6.328	0.000	(0)
CuCl3-2	6.801e-08	2.608e-08	-7.167	-7.584	-0.416	(0)
Cu+	1.514e-08	1.055e-08	-7.820	-7.977	-0.157	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.039	-66.462	-0.423	(0)
CuS4S5-3	0.000e+00	0.000e+00	-66.793	-67.192	-0.399	(0)

Cu(2)	8.973e-10					
Cu+2	6.008e-10	2.280e-10	-9.221	-9.642	-0.421	(0)
CuSO4	2.135e-10	2.135e-10	-9.671	-9.671	0.000	(0)
CuOH+	4.734e-11	3.662e-11	-10.325	-10.436	-0.112	(0)
CuNH3+2	1.924e-11	4.535e-12	-10.716	-11.343	-0.627	(0)
CuCl+	1.578e-11	1.221e-11	-10.802	-10.913	-0.112	(0)
Cu(OH)2	5.497e-13	5.497e-13	-12.260	-12.260	0.000	(0)
CuCl2	1.229e-13	1.229e-13	-12.910	-12.910	0.000	(0)
Cu2(OH)2+2	1.390e-16	3.277e-17	-15.857	-16.485	-0.627	(0)
Cu(OH)3-	1.000e-16	6.969e-17	-16.000	-16.157	-0.157	(0)
CuCl3-	4.882e-17	3.776e-17	-16.311	-16.423	-0.112	(0)
CuCl4-2	1.998e-20	7.663e-21	-19.699	-20.116	-0.416	(0)
Cu(OH)4-2	1.438e-22	3.391e-23	-21.842	-22.470	-0.627	(0)
CuNO2+	0.000e+00	0.000e+00	-42.470	-42.626	-0.157	(0)
CuNO3+	0.000e+00	0.000e+00	-57.393	-57.550	-0.157	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.621	-76.621	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.766	-96.923	-0.157	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-106.876	-106.876	0.000	(0)
Fe(2)	1.872e-03					
Fe+2	1.509e-03	3.558e-04	-2.821	-3.449	-0.627	(0)
FeSO4	3.584e-04	3.584e-04	-3.446	-3.446	0.000	(0)
FeHP04	2.702e-06	2.702e-06	-5.568	-5.568	0.000	(0)
FeH2P04+	1.102e-06	8.724e-07	-5.958	-6.059	-0.101	(0)
FeOH+	8.193e-07	6.448e-07	-6.087	-6.191	-0.104	(0)
Fe(OH)2	2.231e-11	2.231e-11	-10.652	-10.652	0.000	(0)
Fe(OH)3-	5.338e-13	4.201e-13	-12.273	-12.377	-0.104	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.952	-69.952	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.485	-105.642	-0.157	(0)
Fe(3)	3.327e-07					
Fe(OH)2+	3.230e-07	2.557e-07	-6.491	-6.592	-0.101	(0)
Fe(OH)3	9.608e-09	9.608e-09	-8.017	-8.017	0.000	(0)
Fe(OH)4-	1.234e-10	9.772e-11	-9.909	-10.010	-0.101	(0)
FeOH+2	2.205e-11	8.455e-12	-10.657	-11.073	-0.416	(0)
FeHP04+	6.269e-12	4.964e-12	-11.203	-11.304	-0.101	(0)
FeSO4+	1.420e-14	1.118e-14	-13.848	-13.952	-0.104	(0)
Fe+3	2.358e-15	2.665e-16	-14.627	-15.574	-0.947	(0)
Fe(SO4)2-	1.518e-15	1.058e-15	-14.819	-14.976	-0.157	(0)
FeCl+2	6.540e-16	2.508e-16	-15.184	-15.601	-0.416	(0)
FeH2P04+2	6.293e-17	2.475e-17	-16.201	-16.606	-0.405	(0)
FeCl2+	5.711e-17	4.494e-17	-16.243	-16.347	-0.104	(0)
Fe2(OH)2+4	8.834e-19	2.730e-21	-18.054	-20.564	-2.510	(0)
FeHSeO3+2	6.637e-19	1.565e-19	-18.178	-18.806	-0.627	(0)
FeCl3	1.589e-19	1.589e-19	-18.799	-18.799	0.000	(0)
Fe3(OH)4+5	8.085e-23	9.679e-27	-22.092	-26.014	-3.922	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.276	-62.903	-0.627	(0)
H(0)	3.671e-19					
H2	1.835e-19	1.876e-19	-18.736	-18.727	0.010	(0)
Hg(0)	1.039e-09					
Hg	1.039e-09	1.039e-09	-8.983	-8.983	0.000	(0)
Hg(1)	4.234e-29					
Hg2+2	2.117e-29	4.992e-30	-28.674	-29.302	-0.627	(0)
Hg(2)	2.785e-18					
HgCl2	1.586e-18	1.586e-18	-17.800	-17.800	0.000	(0)
HgCl3-	8.117e-19	5.656e-19	-18.091	-18.247	-0.157	(0)
HgCl4-2	3.503e-19	8.260e-20	-18.456	-19.083	-0.627	(0)
HgClOH	3.727e-20	3.727e-20	-19.429	-19.429	0.000	(0)
Hg(OH)2	1.801e-22	1.841e-22	-21.744	-21.735	0.010	(0)
Hg(NH3)2+2	1.357e-22	3.200e-23	-21.867	-22.495	-0.627	(0)
HgCl+	1.091e-23	7.602e-24	-22.962	-23.119	-0.157	(0)
HgOH+	2.992e-26	2.085e-26	-25.524	-25.681	-0.157	(0)
HgNH3+2	2.677e-26	6.312e-27	-25.572	-26.200	-0.627	(0)
Hg(NH3)3+2	1.016e-27	2.396e-28	-26.993	-27.620	-0.627	(0)
Hg+2	4.028e-29	9.497e-30	-28.395	-29.022	-0.627	(0)
HgSO4	8.574e-30	8.574e-30	-29.067	-29.067	0.000	(0)
Hg(OH)3-	2.056e-30	1.433e-30	-29.687	-29.844	-0.157	(0)
Hg(NH3)4+2	1.527e-32	3.600e-33	-31.816	-32.444	-0.627	(0)
HgHS2-	0.000e+00	0.000e+00	-65.697	-65.853	-0.157	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.248	-66.248	0.000	(0)

	HgS2-2	0.000e+00	0.000e+00	-67.145	-67.772	-0.627	(0)
	HgNO3+	0.000e+00	0.000e+00	-77.810	-77.967	-0.157	(0)
	Hg(NO3)2	0.000e+00	0.000e+00	-126.765	-126.765	0.000	(0)
K		1.653e-03					
	K+	1.605e-03	1.260e-03	-2.794	-2.900	-0.105	(0)
	KS04-	4.722e-05	3.740e-05	-4.326	-4.427	-0.101	(0)
	KHP04-	2.302e-08	1.823e-08	-7.638	-7.739	-0.101	(0)
Mg		1.055e-02					
	Mg+2	8.194e-03	3.109e-03	-2.086	-2.507	-0.421	(0)
	MgS04	2.350e-03	2.350e-03	-2.629	-2.629	0.000	(0)
	MgHP04	3.804e-06	3.804e-06	-5.420	-5.420	0.000	(0)
	MgH2P04+	9.500e-07	7.523e-07	-6.022	-6.124	-0.101	(0)
	MgOH+	6.557e-08	5.275e-08	-7.183	-7.278	-0.095	(0)
	MgP04-	8.158e-10	6.460e-10	-9.088	-9.190	-0.101	(0)
Mn(2)		2.315e-04					
	Mn+2	1.953e-04	4.604e-05	-3.709	-4.337	-0.627	(0)
	MnS04	3.347e-05	3.347e-05	-4.475	-4.475	0.000	(0)
	MnCl+	2.604e-06	2.050e-06	-5.584	-5.688	-0.104	(0)
	MnCl2	1.024e-07	1.024e-07	-6.990	-6.990	0.000	(0)
	MnOH+	6.689e-09	5.264e-09	-8.175	-8.279	-0.104	(0)
	MnCl3-	1.267e-09	9.970e-10	-8.897	-9.001	-0.104	(0)
	MnSe	3.578e-12	3.578e-12	-11.446	-11.446	0.000	(0)
	Mn(OH)3-	2.145e-19	1.688e-19	-18.669	-18.773	-0.104	(0)
	MnSe04	1.151e-23	1.151e-23	-22.939	-22.939	0.000	(0)
	Mn(OH)4-2	8.784e-26	3.369e-26	-25.056	-25.472	-0.416	(0)
	MnNO3+	0.000e+00	0.000e+00	-52.397	-52.554	-0.157	(0)
	Mn(NO3)2	0.000e+00	0.000e+00	-100.567	-100.567	0.000	(0)
Mn(3)		1.026e-28					
	Mn+3	1.026e-28	1.160e-29	-27.989	-28.936	-0.947	(0)
Mn(6)		0.000e+00					
	MnO4-2	0.000e+00	0.000e+00	-65.696	-66.112	-0.416	(0)
Mn(7)		0.000e+00					
	MnO4-	0.000e+00	0.000e+00	-74.622	-74.742	-0.120	(0)
N(-3)		5.209e-04					
	NH4+	4.981e-04	3.734e-04	-3.303	-3.428	-0.125	(0)
	NH4S04-	2.180e-05	1.715e-05	-4.662	-4.766	-0.104	(0)
	NH3	9.847e-07	9.847e-07	-6.007	-6.007	0.000	(0)
	NiNH3+2	9.568e-09	2.256e-09	-8.019	-8.647	-0.627	(0)
	Co(NH3)+2	7.525e-09	1.774e-09	-8.124	-8.751	-0.627	(0)
	CaNH3+2	6.602e-09	1.557e-09	-8.180	-8.808	-0.627	(0)
	CuNH3+2	1.924e-11	4.535e-12	-10.716	-11.343	-0.627	(0)
	Ni(NH3)2+2	2.313e-12	5.455e-13	-11.636	-12.263	-0.627	(0)
	Co(NH3)2+2	2.943e-13	6.939e-14	-12.531	-13.159	-0.627	(0)
	Ca(NH3)2+2	3.442e-15	8.116e-16	-14.463	-15.091	-0.627	(0)
	Co(NH3)3+2	4.853e-18	1.144e-18	-17.314	-17.942	-0.627	(0)
	Hg(NH3)2+2	1.357e-22	3.200e-23	-21.867	-22.495	-0.627	(0)
	Co(NH3)4+2	3.336e-23	7.865e-24	-22.477	-23.104	-0.627	(0)
	HgNH3+2	2.677e-26	6.312e-27	-25.572	-26.200	-0.627	(0)
	Hg(NH3)3+2	1.016e-27	2.396e-28	-26.993	-27.620	-0.627	(0)
	Co(NH3)5+2	7.250e-29	1.709e-29	-28.140	-28.767	-0.627	(0)
	Hg(NH3)4+2	1.527e-32	3.600e-33	-31.816	-32.444	-0.627	(0)
	Co(NH3)5Cl+2	1.813e-39	4.275e-40	-38.742	-39.369	-0.627	(0)
	Co(NH3)6S04+	0.000e+00	0.000e+00	-47.828	-47.985	-0.157	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.318	-51.946	-0.627	(0)
	Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.627	-53.255	-0.627	(0)
N(3)		1.306e-35					
	N02-	1.306e-35	9.901e-36	-34.884	-35.004	-0.120	(0)
	CoN02+	7.898e-40	5.504e-40	-39.102	-39.259	-0.157	(0)
	CuN02+	0.000e+00	0.000e+00	-42.470	-42.626	-0.157	(0)
	Cu(N02)2	0.000e+00	0.000e+00	-76.621	-76.621	0.000	(0)
N(5)		0.000e+00					
	N03-	0.000e+00	0.000e+00	-48.312	-48.417	-0.105	(0)
	CaN03+	0.000e+00	0.000e+00	-50.772	-50.929	-0.157	(0)
	MnN03+	0.000e+00	0.000e+00	-52.397	-52.554	-0.157	(0)
	CoN03+	0.000e+00	0.000e+00	-53.163	-53.320	-0.157	(0)
	NiN03+	0.000e+00	0.000e+00	-53.514	-53.671	-0.157	(0)
	ZnN03+	0.000e+00	0.000e+00	-53.999	-54.155	-0.157	(0)
	PbN03+	0.000e+00	0.000e+00	-55.767	-55.924	-0.157	(0)

	CdNO3+	0.000e+00	0.000e+00	-56.229	-56.385	-0.157	(0)
	CuNO3+	0.000e+00	0.000e+00	-57.393	-57.550	-0.157	(0)
	FeNO3+2	0.000e+00	0.000e+00	-62.276	-62.903	-0.627	(0)
	HgNO3+	0.000e+00	0.000e+00	-77.810	-77.967	-0.157	(0)
	Mn(NO3)2	0.000e+00	0.000e+00	-100.567	-100.567	0.000	(0)
	Co(NO3)2	0.000e+00	0.000e+00	-101.429	-101.429	0.000	(0)
	Zn(NO3)2	0.000e+00	0.000e+00	-103.284	-103.284	0.000	(0)
	Pb(NO3)2	0.000e+00	0.000e+00	-104.091	-104.091	0.000	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-105.153	-105.153	0.000	(0)
	Cu(NO3)2	0.000e+00	0.000e+00	-106.876	-106.876	0.000	(0)
	Hg(NO3)2	0.000e+00	0.000e+00	-126.765	-126.765	0.000	(0)
Na		4.960e-02					
	Na+	4.850e-02	3.806e-02	-1.314	-1.420	-0.105	(0)
	NaSO4-	1.101e-03	8.716e-04	-2.958	-3.060	-0.101	(0)
	NaHPO4-	1.077e-06	8.530e-07	-5.968	-6.069	-0.101	(0)
Ni		7.991e-06					
	Ni+2	5.853e-06	2.221e-06	-5.233	-5.653	-0.421	(0)
	NiSO4	1.840e-06	1.840e-06	-5.735	-5.735	0.000	(0)
	NiCl+	2.852e-07	1.987e-07	-6.545	-6.702	-0.157	(0)
	NiNH3+2	9.568e-09	2.256e-09	-8.019	-8.647	-0.627	(0)
	NiOH+	1.867e-09	1.301e-09	-8.729	-8.886	-0.157	(0)
	Ni(SO4)2-2	1.144e-09	2.697e-10	-8.942	-9.569	-0.627	(0)
	NiCl2	3.578e-11	3.578e-11	-10.446	-10.446	0.000	(0)
	Ni(OH)2	8.487e-12	8.487e-12	-11.071	-11.071	0.000	(0)
	Ni(NH3)2+2	2.313e-12	5.455e-13	-11.636	-12.263	-0.627	(0)
	Ni(OH)3-	7.528e-16	5.246e-16	-15.123	-15.280	-0.157	(0)
	NiSeO4	9.651e-25	9.651e-25	-24.015	-24.015	0.000	(0)
	NiNO3+	0.000e+00	0.000e+00	-53.514	-53.671	-0.157	(0)
O(0)		0.000e+00					
	O2	0.000e+00	0.000e+00	-55.965	-55.955	0.010	(0)
P		2.288e-05					
	H2PO4-	6.818e-06	5.399e-06	-5.166	-5.268	-0.101	(0)
	HPO4-2	5.400e-06	2.071e-06	-5.268	-5.684	-0.416	(0)
	MgHPO4	3.804e-06	3.804e-06	-5.420	-5.420	0.000	(0)
	FeHPO4	2.702e-06	2.702e-06	-5.568	-5.568	0.000	(0)
	FeH2PO4+	1.102e-06	8.724e-07	-5.958	-6.059	-0.101	(0)
	NaHPO4-	1.077e-06	8.530e-07	-5.968	-6.069	-0.101	(0)
	MgH2PO4+	9.500e-07	7.523e-07	-6.022	-6.124	-0.101	(0)
	CaHPO4	8.368e-07	8.368e-07	-6.077	-6.077	0.000	(0)
	CaH2PO4+	1.349e-07	1.068e-07	-6.870	-6.971	-0.101	(0)
	KHPO4-	2.302e-08	1.823e-08	-7.638	-7.739	-0.101	(0)
	CoHPO4	1.641e-08	1.641e-08	-7.785	-7.785	0.000	(0)
	CaPO4-	1.585e-08	1.255e-08	-7.800	-7.901	-0.101	(0)
	MgPO4-	8.158e-10	6.460e-10	-9.088	-9.190	-0.101	(0)
	H3PO4	1.182e-10	1.182e-10	-9.927	-9.927	0.000	(0)
	PO4-3	4.379e-11	4.948e-12	-10.359	-11.306	-0.947	(0)
	FeHPO4+	6.269e-12	4.964e-12	-11.203	-11.304	-0.101	(0)
	FeH2PO4+2	6.293e-17	2.475e-17	-16.201	-16.606	-0.405	(0)
Pb		1.509e-08					
	Pb+2	5.605e-09	2.127e-09	-8.251	-8.672	-0.421	(0)
	PbSO4	4.467e-09	4.467e-09	-8.350	-8.350	0.000	(0)
	PbCl+	3.651e-09	2.544e-09	-8.438	-8.594	-0.157	(0)
	Pb(SO4)2-2	4.894e-10	1.154e-10	-9.310	-9.938	-0.627	(0)
	PbOH+	4.740e-10	3.303e-10	-9.324	-9.481	-0.157	(0)
	PbCl2	3.947e-10	3.947e-10	-9.404	-9.404	0.000	(0)
	PbCl3-	8.330e-12	5.805e-12	-11.079	-11.236	-0.157	(0)
	Pb(OH)2	6.456e-13	6.456e-13	-12.190	-12.190	0.000	(0)
	PbCl4-2	3.751e-13	8.844e-14	-12.426	-13.053	-0.627	(0)
	Pb2OH+3	2.874e-16	1.113e-17	-15.542	-16.953	-1.412	(0)
	Pb(OH)3-	5.727e-17	3.991e-17	-16.242	-16.399	-0.157	(0)
	Pb(OH)4-2	2.562e-21	6.041e-22	-20.591	-21.219	-0.627	(0)
	Pb3(OH)4+2	3.987e-23	9.401e-24	-22.399	-23.027	-0.627	(0)
	Pb4(OH)4+4	5.960e-26	1.842e-28	-25.225	-27.735	-2.510	(0)
	PbNO3+	0.000e+00	0.000e+00	-55.767	-55.924	-0.157	(0)
	Pb(HS)2	0.000e+00	0.000e+00	-68.856	-68.856	0.000	(0)
	Pb(NO3)2	0.000e+00	0.000e+00	-104.091	-104.091	0.000	(0)
	Pb(HS)3-	0.000e+00	0.000e+00	-105.125	-105.282	-0.157	(0)
S(-2)		7.145e-38					

H2S	3.603e-38	3.603e-38	-37.443	-37.443	0.000	(0)
HS-	2.693e-38	1.876e-38	-37.570	-37.727	-0.157	(0)
CdHS+	8.317e-39	5.796e-39	-38.080	-38.237	-0.157	(0)
S5-2	1.718e-40	0.000e+00	-39.765	-40.392	-0.627	(0)
S6-2	0.000e+00	0.000e+00	-40.191	-40.819	-0.627	(0)
S4-2	0.000e+00	0.000e+00	-40.365	-40.992	-0.627	(0)
S3-2	0.000e+00	0.000e+00	-41.177	-41.805	-0.627	(0)
S2-2	0.000e+00	0.000e+00	-42.204	-42.831	-0.627	(0)
S-2	0.000e+00	0.000e+00	-47.939	-48.355	-0.416	(0)
HgHS2-	0.000e+00	0.000e+00	-65.697	-65.853	-0.157	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.039	-66.462	-0.423	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.248	-66.248	0.000	(0)
CuS4S5-3	0.000e+00	0.000e+00	-66.793	-67.192	-0.399	(0)
HgS2-2	0.000e+00	0.000e+00	-67.145	-67.772	-0.627	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-67.847	-68.004	-0.157	(0)
Cd(HS)2	0.000e+00	0.000e+00	-68.760	-68.760	0.000	(0)
Zn(HS)2	0.000e+00	0.000e+00	-68.783	-68.783	0.000	(0)
Pb(HS)2	0.000e+00	0.000e+00	-68.856	-68.856	0.000	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.952	-69.952	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.766	-96.923	-0.157	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.072	-103.229	-0.157	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-104.429	-104.586	-0.157	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.125	-105.282	-0.157	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.485	-105.642	-0.157	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-105.793	-106.420	-0.627	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.490	-140.117	-0.627	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-141.788	-142.416	-0.627	(0)
S(6)	1.611e-02					
S04-2	1.130e-02	4.287e-03	-1.947	-2.368	-0.421	(0)
MgS04	2.350e-03	2.350e-03	-2.629	-2.629	0.000	(0)
NaS04-	1.101e-03	8.716e-04	-2.958	-3.060	-0.101	(0)
CaS04	8.918e-04	8.918e-04	-3.050	-3.050	0.000	(0)
FeS04	3.584e-04	3.584e-04	-3.446	-3.446	0.000	(0)
KS04-	4.722e-05	3.740e-05	-4.326	-4.427	-0.101	(0)
MnS04	3.347e-05	3.347e-05	-4.475	-4.475	0.000	(0)
NH4S04-	2.180e-05	1.715e-05	-4.662	-4.766	-0.104	(0)
CoS04	6.522e-06	6.522e-06	-5.186	-5.186	0.000	(0)
NiS04	1.840e-06	1.840e-06	-5.735	-5.735	0.000	(0)
ZnS04	6.431e-07	6.431e-07	-6.192	-6.192	0.000	(0)
Zn(S04)2-2	1.054e-07	2.485e-08	-6.977	-7.605	-0.627	(0)
HS04-	7.735e-08	6.036e-08	-7.112	-7.219	-0.108	(0)
AlS04+	2.357e-08	1.840e-08	-7.628	-7.735	-0.108	(0)
PbS04	4.467e-09	4.467e-09	-8.350	-8.350	0.000	(0)
CdS04	2.906e-09	2.906e-09	-8.537	-8.537	0.000	(0)
Al(S04)2-	1.183e-09	9.231e-10	-8.927	-9.035	-0.108	(0)
Ni(S04)2-2	1.144e-09	2.697e-10	-8.942	-9.569	-0.627	(0)
Cd(S04)2-2	7.476e-10	1.763e-10	-9.126	-9.754	-0.627	(0)
Pb(S04)2-2	4.894e-10	1.154e-10	-9.310	-9.938	-0.627	(0)
CuS04	2.135e-10	2.135e-10	-9.671	-9.671	0.000	(0)
FeS04+	1.420e-14	1.118e-14	-13.848	-13.952	-0.104	(0)
Fe(S04)2-	1.518e-15	1.058e-15	-14.819	-14.976	-0.157	(0)
HgS04	8.574e-30	8.574e-30	-29.067	-29.067	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.828	-47.985	-0.157	(0)
Se(-2)	4.407e-09					
HSe-	4.399e-09	3.066e-09	-8.357	-8.513	-0.157	(0)
H2Se	3.799e-12	3.799e-12	-11.420	-11.420	0.000	(0)
MnSe	3.578e-12	3.578e-12	-11.446	-11.446	0.000	(0)
Se-2	6.143e-17	1.448e-17	-16.212	-16.839	-0.627	(0)
Se(4)	3.916e-07					
HSeO3-	3.658e-07	2.549e-07	-6.437	-6.594	-0.157	(0)
SeO3-2	2.576e-08	6.073e-09	-7.589	-8.217	-0.627	(0)
H2SeO3	1.708e-11	1.708e-11	-10.767	-10.767	0.000	(0)
FeHSeO3+2	6.637e-19	1.565e-19	-18.178	-18.806	-0.627	(0)
Cd(SeO3)2-2	4.131e-19	9.740e-20	-18.384	-19.011	-0.627	(0)
Se(6)	2.660e-21					
SeO4-2	2.644e-21	1.003e-21	-20.578	-20.999	-0.421	(0)
MnSeO4	1.151e-23	1.151e-23	-22.939	-22.939	0.000	(0)
CoSeO4	3.713e-24	3.713e-24	-23.430	-23.430	0.000	(0)

	NiSeO4	9.651e-25	9.651e-25	-24.015	-24.015	0.000	(0)
	ZnSeO4	1.102e-25	1.102e-25	-24.958	-24.958	0.000	(0)
	HSeO4-	1.034e-26	7.204e-27	-25.986	-26.142	-0.157	(0)
	CdSeO4	5.664e-28	5.664e-28	-27.247	-27.247	0.000	(0)
	Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.323	-45.950	-0.627	(0)
Zn	2.710e-06						
	Zn+2	1.869e-06	7.093e-07	-5.728	-6.149	-0.421	(0)
	ZnSO4	6.431e-07	6.431e-07	-6.192	-6.192	0.000	(0)
	Zn(SO4)2-2	1.054e-07	2.485e-08	-6.977	-7.605	-0.627	(0)
	ZnCl+	7.908e-08	6.116e-08	-7.102	-7.213	-0.112	(0)
	ZnOHCl	5.099e-09	5.099e-09	-8.293	-8.293	0.000	(0)
	ZnOH+	4.633e-09	3.228e-09	-8.334	-8.491	-0.157	(0)
	ZnCl2	2.882e-09	2.882e-09	-8.540	-8.540	0.000	(0)
	ZnCl3-	1.030e-10	7.964e-11	-9.987	-10.099	-0.112	(0)
	Zn(OH)2	4.296e-11	4.296e-11	-10.367	-10.367	0.000	(0)
	ZnCl4-2	3.555e-12	1.364e-12	-11.449	-11.865	-0.416	(0)
	Zn(OH)3-	1.910e-14	1.331e-14	-13.719	-13.876	-0.157	(0)
	Zn(OH)4-2	1.389e-19	3.275e-20	-18.857	-19.485	-0.627	(0)
	ZnSeO4	1.102e-25	1.102e-25	-24.958	-24.958	0.000	(0)
	Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.323	-45.950	-0.627	(0)
	ZnNO3+	0.000e+00	0.000e+00	-53.999	-54.155	-0.157	(0)
	ZnS(HS)-	0.000e+00	0.000e+00	-67.847	-68.004	-0.157	(0)
	Zn(HS)2	0.000e+00	0.000e+00	-68.783	-68.783	0.000	(0)
	Zn(HS)3-	0.000e+00	0.000e+00	-103.072	-103.229	-0.157	(0)
	Zn(NO3)2	0.000e+00	0.000e+00	-103.284	-103.284	0.000	(0)
	ZnS(HS)2-2	0.000e+00	0.000e+00	-105.793	-106.420	-0.627	(0)
	Zn(HS)4-2	0.000e+00	0.000e+00	-141.788	-142.416	-0.627	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-124.25	-117.97	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-28.58	-24.04	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.84	-24.04	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-179.51	-161.58	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.79	-20.68	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-28.30	-27.85	0.45	(NH4)2SeO4
Al(OH)3(am)	0.11	11.17	11.06	Al(OH)3
Al2O3	2.08	22.35	20.27	Al2O3
Al4(OH)10SO4	6.05	28.75	22.70	Al4(OH)10SO4
AlOHSO4	-1.54	-4.77	-3.23	AlOHSO4
Alunite	6.42	5.52	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.22	-11.04	-7.82	PbSO4
Anhydrite	-1.05	-5.39	-4.34	CaSO4
Anilite	-13.00	-45.31	-32.31	Cu0.25Cu1.5S
Antlerite	-12.93	-4.14	8.79	Cu3(OH)4SO4
Atacamite	-7.98	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.76	-8.52	-1.76	ZnSO4:6H2O
Birnessite	-18.86	-0.77	18.09	MnO2
Bixbyite	-16.79	-17.14	-0.35	Mn2O3
BlaubleiI	-17.05	-41.21	-24.16	Cu0.9Cu0.2S
BlaubleiII	-15.83	-43.10	-27.28	Cu0.6Cu0.8S
Boehmite	2.32	11.17	8.86	AlOOH
Brochantite	-15.91	-0.21	15.71	Cu4(OH)6SO4
Brucite	-6.05	11.07	17.12	Mg(OH)2
Bunsenite	-4.76	7.92	12.68	NiO
Ca3(PO4)2(beta)	-2.64	-31.69	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-5.73	-52.81	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.77	-21.12	-19.35	CaHP04
CaHP04:2H2O	-2.07	-21.12	-19.05	CaHP04:2H2O
Calomel	-14.08	-32.20	-18.13	Hg2Cl2
CaSeO3:2H2O	-5.69	-2.83	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-21.03	-24.03	-3.00	CaSeO4:2H2O
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-23.42	-16.71	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-23.33	-0.77	22.56	Cd3(OH)4SO4

Cd3(P04)2	-15.57	-48.17	-32.60	Cd3(P04)2
Cd4(OH)6S04	-24.11	4.29	28.40	Cd4(OH)6S04
CdCl2	-10.81	-11.42	-0.61	CdCl2
CdCl2:1H2O	-9.75	-11.42	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-9.49	-11.42	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.23	-10.53	13.69	Cd
Cdmetal(gamma)	-24.33	-10.53	13.80	Cd
CdOHCl	-6.79	-3.18	3.61	CdOHCl
CdSe	10.14	-10.24	-20.38	CdSe
CdSe04:2H2O	-27.67	-29.52	-1.85	CdSe04:2H2O
CdS04	-10.84	-10.89	-0.05	CdS04
CdS04:1H2O	-9.24	-10.89	-1.65	CdS04:1H2O
CdS04:2.67H2O	-9.06	-10.89	-1.83	CdS04:2.67H2O
Chalcanthite	-9.36	-12.01	-2.65	CuS04:5H2O
Chalcocite	-11.57	-46.89	-35.32	Cu2S
Chalcopyrite	-39.34	-74.97	-35.62	CuFeS2
Cinnabar	-19.95	-66.25	-46.30	HgS
Clausthalite	16.99	-10.40	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.04	-16.13	-2.09	Co(OH)3
Co3(P04)2	-3.23	-37.92	-34.69	Co3(P04)2
Co304	-13.55	-23.78	-10.24	Co304
CoCl2	-16.46	-8.01	8.46	CoCl2
CoCl2:6H2O	-10.53	-8.01	2.52	CoCl2:6H2O
CoFe204	21.21	18.06	-3.15	CoFe204
CoHP04	-4.14	-23.20	-19.06	CoHP04
CoO	-5.37	8.47	13.84	CoO
CoS(alpha)	-28.60	-36.04	-7.44	CoS
CoS(beta)	-24.97	-36.04	-11.07	CoS
CoSe	9.37	-6.83	-16.20	CoSe
CoSe03	-6.23	-4.91	1.32	CoSe03
CoSe04:6H2O	-24.58	-26.11	-1.53	CoSe04:6H2O
CoS04	-10.46	-7.47	2.99	CoS04
CoS04:6H2O	-5.00	-7.48	-2.48	CoS04:6H2O
Cotunnite	-6.73	-11.58	-4.84	PbCl2
Covellite	-18.05	-40.58	-22.53	CuS
Cu(OH)2	-4.87	3.93	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.76	-47.34	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.63	-17.68	-46.31	Cu2Se
Cu2S04	-16.42	-18.32	-1.90	Cu2S04
Cu3(P04)2	-14.69	-51.54	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-16.42	-51.54	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.26	-29.04	-64.30	Cu3Se2
Cumetal	-0.06	-8.98	-8.93	Cu
CuOCuS04	-18.71	-8.07	10.63	CuOCuS04
Cupricferrite	7.03	13.52	6.49	CuFe204
Cuprite	-1.27	-2.38	-1.11	Cu2O
Cuprousferrite	12.48	3.60	-8.88	CuFe02
CuSe	22.02	-11.37	-33.39	CuSe
CuSe2	22.63	-11.07	-33.70	CuSe2
CuSe03:2H2O	-10.05	-9.45	0.60	CuSe03:2H2O
CuSe04:5H2O	-28.21	-30.65	-2.44	CuSe04:5H2O
CuS04	-15.12	-12.01	3.11	CuS04
Diaspore	4.06	11.17	7.12	Al00H
Djurleite	-12.08	-46.47	-34.40	Cu0.066Cu1.868S
Epsomite	-2.73	-4.88	-2.15	MgS04:7H2O
Fe(OH)2	-3.44	10.13	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.36	2.32	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-5.35	-3.80	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H2O	-9.94	-30.56	-20.63	Fe2(Se03)3:2H2O
Fe2(S04)3	-35.09	-38.25	-3.16	Fe2(S04)3
Fe3(OH)8	-0.51	19.71	20.22	Fe3(OH)8
Ferrihydrite	1.42	4.79	3.37	Fe(OH)3
Ferroselite	13.83	-4.88	-18.71	FeSe2
FeS(ppt)	-31.46	-34.39	-2.92	FeS
FeSe	5.83	-5.17	-11.00	FeSe
Galena	-25.45	-39.61	-14.16	PbS
Gibbsite	2.66	11.17	8.52	Al(OH)3

Goethite	4.16	4.79	0.64	FeOOH
Goslarite	-6.48	-8.52	-2.05	ZnSO4:7H2O
Greenockite	-24.96	-39.46	-14.49	CdS
Greigite	-113.31	-158.35	-45.03	Fe3S4
Gypsum	-0.78	-5.39	-4.61	CaSO4:2H2O
H-Jarosite	-5.97	-17.52	-11.55	(H3O)Fe3(SO4)2(OH)6
H2S(g)	-36.51	-44.52	-8.01	H2S
H2Se(g)	-10.38	-15.30	-4.92	H2Se
Halite	-4.46	-2.87	1.59	NaCl
Hausmannite	-18.72	43.31	62.03	Mn3O4
Hematite	10.69	9.58	-1.11	Fe2O3
Hercynite	8.84	32.48	23.64	FeAl2O4
Hg(g)	-7.73	-15.66	-7.93	Hg
Hg(OH)2	-18.24	-21.73	-3.50	Hg(OH)2
Hg2(g)	-16.22	-31.32	-15.09	Hg2
Hg2(OH)2	-20.99	-15.73	5.26	Hg2(OH)2
Hg2HPO4	-22.62	-47.40	-24.77	Hg2HPO4
Hg2S	-48.40	-60.24	-11.84	Hg2S
Hg2SeO3	-24.45	-29.11	-4.66	Hg2SeO3
Hg2SO4	-25.53	-31.67	-6.14	Hg2SO4
HgCl(g)	-35.99	-16.10	19.88	HgCl
HgCl2	-16.70	-38.21	-21.52	HgCl2
Hgmetal(l)	-2.01	-15.66	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSeO3	-22.69	-35.12	-12.43	HgSeO3
HgSO4	-28.22	-37.68	-9.45	HgSO4
Hinsdalite	-6.69	-9.19	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	2.08	-42.25	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-7.70	-70.49	-62.79	Pb5(PO4)3OH
K-Alum	-11.60	-16.84	-5.24	KAl(SO4)2:12H2O
K-Jarosite	0.86	-13.63	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-26.07	-26.80	-0.73	K2SeO4
Langite	-18.09	-0.21	17.88	Cu4(OH)6SO4:H2O
Larnakite	-5.75	-6.14	-0.38	PbO:PbSO4
Laurionite	-3.96	-3.34	0.62	PbOHCl
Lepidocrocite	3.42	4.79	1.37	FeOOH
Lime	-22.61	10.55	33.16	CaO
Litharge	-7.95	4.90	12.85	PbO
Mackinawite	-30.79	-34.39	-3.60	FeS
Maghemite	3.20	9.58	6.39	Fe2O3
Magnesioferrite	3.13	20.65	17.52	Fe2MgO4
Magnetite	15.81	19.71	3.90	Fe3O4
Manganite	-8.30	17.04	25.34	MnOOH
Massicot	-8.15	4.90	13.05	PbO
Melanothallite	-18.95	-12.55	6.41	CuCl2
Melanterite	-3.57	-5.82	-2.26	FeSO4:7H2O
Metacinnabar	-20.55	-66.25	-45.70	HgS
Mg(OH)2(active)	-7.73	11.07	18.79	Mg(OH)2
Mg3(PO4)2	-6.85	-30.13	-23.28	Mg3(PO4)2
MgHPO4:3H2O	-2.43	-20.60	-18.18	MgHPO4:3H2O
MgSeO3:6H2O	-5.36	-2.32	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-22.31	-23.51	-1.20	MgSeO4:6H2O
Minium	-44.22	30.31	74.53	Pb3O4
Mirabilite	-3.91	-5.22	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-59.65	-64.97	-5.32	Mn2(SO4)3
Mn3(PO4)2	-11.77	-35.62	-23.85	Mn3(PO4)2
MnCl2:4H2O	-9.98	-7.24	2.74	MnCl2:4H2O
MnHPO4	2.97	-22.43	-25.40	MnHPO4
MnS(grn)	-35.52	-35.27	0.25	MnS
MnS(pnk)	-38.61	-35.27	3.34	MnS
MnSe	-9.80	-6.06	3.73	MnSe
MnSeO3	-5.27	-4.14	1.13	MnSeO3
MnSeO3:2H2O	-5.11	-4.14	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-23.29	-25.34	-2.05	MnSeO4:5H2O
MnSO4	-9.44	-6.70	2.74	MnSO4
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.19	-21.73	-3.55	HgO
Morenosite	-5.85	-8.03	-2.17	NiSO4:7H2O

Na-Jarosite	-1.31	-12.15	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-12.95	-2.65	10.30	Na2SeO3:5H2O
Na2SeO4	-25.12	-23.84	1.28	Na2SeO4
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.10	7.92	13.02	Ni(OH)2
Ni3(PO4)2	-8.27	-39.57	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-16.25	15.75	32.00	Ni4(OH)6SO4
NiS(alpha)	-30.99	-36.59	-5.60	NiS
NiS(beta)	-25.49	-36.59	-11.10	NiS
NiS(gamma)	-23.79	-36.59	-12.80	NiS
NiSe	10.32	-7.38	-17.70	NiSe
NiSeO3:2H2O	-8.35	-5.46	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-25.14	-26.66	-1.52	NiSeO4:6H2O
Nsutite	-18.28	-0.77	17.50	MnO2
O2(g)	-53.26	31.19	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.22	1.57	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-16.38	9.81	26.19	Pb2O(OH)2
Pb2O3	-35.64	25.40	61.04	Pb2O3
Pb3(PO4)2	-5.10	-48.63	-43.53	Pb3(PO4)2
Pb3O2SO4	-12.11	-1.23	10.87	Pb3O2SO4
Pb4(OH)6SO4	-17.43	3.67	21.10	Pb4(OH)6SO4
Pb4O3SO4	-18.53	3.67	22.20	Pb4O3SO4
PbHPO4	-2.96	-26.77	-23.81	PbHPO4
Pbmetal	-14.93	-10.69	4.24	Pb
PbO:0.3H2O	-8.08	4.90	12.98	PbO:0.33H2O
PbSeO4	-22.80	-29.67	-6.88	PbSeO4
Periclase	-10.87	11.07	21.94	MgO
Plattnerite	-29.81	20.50	50.31	PbO2
Plumbgummite	7.87	-24.92	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-12.56	10.55	23.11	Ca(OH)2
Pyrite	-44.68	-63.31	-18.63	FeS2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-17.19	24.83	42.03	MnO2
Pyromorphite	5.70	-78.73	-84.43	Pb5(PO4)3Cl
Retgersite	-5.98	-8.03	-2.05	NiSO4:6H2O
Semetal(am)	7.43	0.29	-7.14	Se
Semetal(hex)	8.04	0.29	-7.75	Se
SeO2	-13.50	-13.38	0.12	SeO2
SeO3	-55.97	-34.58	21.39	SeO3
Sphalerite	-25.57	-37.09	-11.52	ZnS
Spinel	-4.35	33.42	37.77	MgAl2O4
Strengite	-0.50	-26.88	-26.38	FePO4:2H2O
Sulfur	-26.82	-28.92	-2.11	S
Tenorite	-3.86	3.94	7.80	CuO
Thenardite	-5.55	-5.21	0.34	Na2SO4
Tsumebite	-8.14	-17.93	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	3.04	-32.96	-36.00	Fe3(PO4)2:8H2O
Wurtzite	-28.09	-37.09	-9.00	ZnS
Zincite	-4.12	7.43	11.55	ZnO
Zincosite	-12.64	-8.52	4.13	ZnSO4
Zn(NO3)2:6H2O	-106.25	-102.99	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.77	7.43	12.20	Zn(OH)2
Zn(OH)2(am)	-5.24	7.43	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.43	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.30	7.43	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.43	11.73	Zn(OH)2
Zn2(OH)2SO4	-8.59	-1.09	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.58	6.61	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-5.64	-41.06	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-29.13	-9.61	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-14.64	13.76	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.84	20.66	38.50	Zn5(OH)8Cl2
ZnCl2	-16.27	-9.05	7.22	ZnCl2
Znmetal	-34.32	-8.17	26.15	Zn
ZnO(active)	-3.97	7.43	11.40	ZnO
ZnS(am)	-28.00	-37.09	-9.09	ZnS
ZnSe	6.59	-7.87	-14.46	ZnSe

ZnSeO4:6H2O	-25.63	-27.15	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.98	-8.52	-0.53	ZnSO4:1H2O

**For a gas, $SI = \log_{10}(\text{fugacity})$. Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 6.

SOLUTION 5 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
water	1 # kg

MIX 3
1 0.972
5 0.028

REACTION 4

H2O -1

2

END #Time-step 4

Beginning of initial solution calculations.

Initial solution 5.

-----Solution composition-----

Elements	Molality	Moles
Al	1.378e-05	1.378e-05
Ca	3.259e-03	3.259e-03

Cd	2.681e-08	2.681e-08
Cl	4.344e-02	4.344e-02
Co	3.989e-05	3.989e-05
Cu	4.901e-06	4.901e-06
Fe	1.805e-03	1.805e-03
Hg	1.002e-09	1.002e-09
K	1.593e-03	1.593e-03
Mg	1.017e-02	1.017e-02
Mn	2.231e-04	2.231e-04
N	5.021e-04	5.021e-04
Na	4.781e-02	4.781e-02
Ni	7.703e-06	7.703e-06
P	2.206e-05	2.206e-05
Pb	1.455e-08	1.455e-08
S(6)	1.553e-02	1.553e-02
Se	3.817e-07	3.817e-07
Zn	2.612e-06	2.612e-06

-----Description of solution-----

pH	=	6.790
pe	=	1.000
Activity of water	=	0.998
Ionic strength (mol/kgw)	=	9.259e-02
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	6.274e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	21.00
Electrical balance (eq)	=	6.374e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	4.58
Iterations	=	13
Total H	=	1.110158e+02
Total O	=	5.556909e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.061e-07	1.622e-07	-6.686	-6.790	-0.104	0.00
OH-	5.935e-08	4.562e-08	-7.227	-7.341	-0.114	(0)
H2O	5.551e+01	9.980e-01	1.744	-0.001	0.000	18.05
Al	1.378e-05					
Al(OH)4-	8.973e-06	7.024e-06	-5.047	-5.153	-0.106	(0)
Al(OH)2+	2.373e-06	1.884e-06	-5.625	-5.725	-0.100	(0)
Al(OH)3	2.329e-06	2.329e-06	-5.633	-5.633	0.000	(0)
AlOH+2	7.409e-08	2.945e-08	-7.130	-7.531	-0.401	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
Al+3	5.344e-09	6.178e-10	-8.272	-9.209	-0.937	(0)
Al(SO4)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ca	3.259e-03					
Ca+2	2.406e-03	9.221e-04	-2.619	-3.035	-0.416	(0)
CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
CaHP04	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CaOH+	1.001e-09	8.020e-10	-8.999	-9.096	-0.096	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
Cd	2.681e-08					
CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
Cd+2	7.874e-09	3.018e-09	-8.104	-8.520	-0.416	(0)
CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
Cd(SO4)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)

CdOHC1	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
CdOH+	1.568e-12	1.100e-12	-11.805	-11.959	-0.154	(0)
Cd(OH)2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
Cd2OH+3	4.264e-19	1.748e-20	-18.370	-19.758	-1.387	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Cd(OH)3-	3.135e-21	2.198e-21	-20.504	-20.658	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Cd(OH)4-2	9.222e-29	2.230e-29	-28.035	-28.652	-0.617	(0)
CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cl	4.344e-02					
Cl-	4.343e-02	3.417e-02	-1.362	-1.466	-0.104	(0)
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
ZnOHC1	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
CdOHC1	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(2)	3.989e-05					
Co+2	3.225e-05	7.797e-06	-4.491	-5.108	-0.617	(0)
CoSO4	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CoHPO4	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CoOH+	1.375e-08	9.639e-09	-7.862	-8.016	-0.154	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
Co(OH)2	4.744e-11	4.744e-11	-10.324	-10.324	0.000	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Co2OH+3	9.190e-14	3.766e-15	-13.037	-14.424	-1.387	(0)
Co(OH)3-	8.364e-17	5.865e-17	-16.078	-16.232	-0.154	(0)
CoOOH-	5.039e-18	3.533e-18	-17.298	-17.452	-0.154	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Co4(OH)4+4	5.041e-22	1.722e-24	-21.297	-23.764	-2.466	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
Co(OH)4-2	2.382e-24	5.759e-25	-23.623	-24.240	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)

CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
Co(N03)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Co(3)	4.042e-31					
CoOH+2	4.042e-31	9.773e-32	-30.393	-31.010	-0.617	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co+3	2.685e-36	3.104e-37	-35.571	-36.508	-0.937	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
Cu(1)	4.900e-06					
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
Cu+	1.553e-08	1.089e-08	-7.809	-7.963	-0.154	(0)
Cu(2)	8.967e-10					
Cu+2	6.026e-10	2.310e-10	-9.220	-9.636	-0.416	(0)
CuS04	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
CuOH+	4.792e-11	3.719e-11	-10.319	-10.430	-0.110	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
Cu(OH)2	5.595e-13	5.595e-13	-12.252	-12.252	0.000	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
Cu2(OH)2+2	1.398e-16	3.379e-17	-15.855	-16.471	-0.617	(0)
Cu(OH)3-	1.014e-16	7.111e-17	-15.994	-16.148	-0.154	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
Cu(OH)4-2	1.434e-22	3.468e-23	-21.843	-22.460	-0.617	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Fe(2)	1.805e-03					
Fe+2	1.454e-03	3.515e-04	-2.837	-3.454	-0.617	(0)
FeS04	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
FeHP04	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2P04+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
FeOH+	8.090e-07	6.384e-07	-6.092	-6.195	-0.103	(0)
Fe(OH)2	2.214e-11	2.214e-11	-10.655	-10.655	0.000	(0)
Fe(OH)3-	5.296e-13	4.179e-13	-12.276	-12.379	-0.103	(0)
Fe(3)	3.233e-07					
Fe(OH)2+	3.138e-07	2.491e-07	-6.503	-6.604	-0.100	(0)
Fe(OH)3	9.382e-09	9.382e-09	-8.028	-8.028	0.000	(0)
Fe(OH)4-	1.205e-10	9.565e-11	-9.919	-10.019	-0.100	(0)
FeOH+2	2.119e-11	8.217e-12	-10.674	-11.085	-0.411	(0)
FeHP04+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeS04+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe+3	2.235e-15	2.584e-16	-14.651	-15.588	-0.937	(0)
Fe(S04)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeH2P04+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
Fe2(OH)2+4	7.548e-19	2.579e-21	-18.122	-20.589	-2.466	(0)
FeHSe03+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
Fe3(OH)4+5	6.361e-23	8.906e-27	-22.197	-26.050	-3.854	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
H(0)	3.796e-19					
H2	1.898e-19	1.939e-19	-18.722	-18.712	0.009	(0)
Hg(0)	1.002e-09					
Hg	1.002e-09	1.002e-09	-8.999	-8.999	0.000	(0)
Hg(1)	3.697e-29					
Hg2+2	1.848e-29	4.469e-30	-28.733	-29.350	-0.617	(0)
Hg(2)	2.362e-18					
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)

	Hg(OH)2	1.682e-22	1.718e-22	-21.774	-21.765	0.009	(0)
	Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
	HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
	HgOH+	2.768e-26	1.941e-26	-25.558	-25.712	-0.154	(0)
	HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
	Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
	Hg+2	3.648e-29	8.820e-30	-28.438	-29.055	-0.617	(0)
	HgSO4	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
	Hg(OH)3-	1.911e-30	1.340e-30	-29.719	-29.873	-0.154	(0)
	Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
	HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
	Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
K		1.593e-03					
	K+	1.549e-03	1.219e-03	-2.810	-2.914	-0.104	(0)
	KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
	KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
Mg		1.017e-02					
	Mg+2	7.920e-03	3.036e-03	-2.101	-2.518	-0.416	(0)
	MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
	MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
	MgH2P04+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
	MgOH+	6.402e-08	5.162e-08	-7.194	-7.287	-0.094	(0)
	MgP04-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
Mn(2)		2.231e-04					
	Mn+2	1.882e-04	4.549e-05	-3.725	-4.342	-0.617	(0)
	MnSO4	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
	MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
	MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
	MnOH+	6.606e-09	5.213e-09	-8.180	-8.283	-0.103	(0)
	MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
	MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
	Mn(OH)3-	2.129e-19	1.680e-19	-18.672	-18.775	-0.103	(0)
	MnSe04	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
	Mn(OH)4-2	8.666e-26	3.361e-26	-25.062	-25.474	-0.411	(0)
	MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
	Mn(NO3)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Mn(3)		9.732e-29					
	Mn+3	9.732e-29	1.125e-29	-28.012	-28.949	-0.937	(0)
Mn(6)		0.000e+00					
	MnO4-2	0.000e+00	0.000e+00	-65.730	-66.142	-0.411	(0)
Mn(7)		0.000e+00					
	MnO4-	0.000e+00	0.000e+00	-74.661	-74.779	-0.119	(0)
N(-3)		5.021e-04					
	NH4+	4.805e-04	3.617e-04	-3.318	-3.442	-0.123	(0)
	NH4SO4-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
	NH3	9.560e-07	9.560e-07	-6.020	-6.020	0.000	(0)
	NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
	Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
	CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
	CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
	Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
	Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
	Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
	Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
	Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
	Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
	HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
	Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
	Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
	Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
	Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
	Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
	Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
N(3)		1.148e-35					
	NO2-	1.148e-35	8.735e-36	-34.940	-35.059	-0.119	(0)
	CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
	CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)

Cu(NO2)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-48.382	-48.486	-0.104	(0)
CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
Na	4.781e-02					
Na+	4.677e-02	3.680e-02	-1.330	-1.434	-0.104	(0)
NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
Ni	7.703e-06					
Ni+2	5.664e-06	2.171e-06	-5.247	-5.663	-0.416	(0)
NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
NiOH+	1.818e-09	1.275e-09	-8.741	-8.895	-0.154	(0)
Ni(SO4)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
Ni(OH)2	8.335e-12	8.335e-12	-11.079	-11.079	0.000	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Ni(OH)3-	7.365e-16	5.164e-16	-15.133	-15.287	-0.154	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.993	-55.984	0.009	(0)
P	2.206e-05					
H2PO4-	6.634e-06	5.268e-06	-5.178	-5.278	-0.100	(0)
HPO4-2	5.222e-06	2.025e-06	-5.282	-5.694	-0.411	(0)
MgHPO4	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
FeHPO4	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
KHPO4-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
CoHPO4	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
MgPO4-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
H3PO4	1.150e-10	1.150e-10	-9.939	-9.939	0.000	(0)
PO4-3	4.196e-11	4.850e-12	-10.377	-11.314	-0.937	(0)
FeHPO4+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
Pb	1.455e-08					
Pb+2	5.480e-09	2.100e-09	-8.261	-8.678	-0.416	(0)
PbSO4	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
PbOH+	4.662e-10	3.269e-10	-9.331	-9.486	-0.154	(0)
Pb(SO4)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
Pb(OH)2	6.405e-13	6.405e-13	-12.193	-12.193	0.000	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
Pb2OH+3	2.655e-16	1.088e-17	-15.576	-16.963	-1.387	(0)

Pb(OH)3-	5.660e-17	3.969e-17	-16.247	-16.401	-0.154	(0)
Pb(OH)4-2	2.491e-21	6.022e-22	-20.604	-21.220	-0.617	(0)
Pb3(OH)4+2	3.779e-23	9.137e-24	-22.423	-23.039	-0.617	(0)
Pb4(OH)4+4	5.175e-26	1.768e-28	-25.286	-27.753	-2.466	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
S(6)	1.553e-02					
S04-2	1.094e-02	4.194e-03	-1.961	-2.377	-0.416	(0)
MgS04	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
NaS04-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
CaS04	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
FeS04	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
MnS04	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
NH4S04-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
CoS04	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
NiS04	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
ZnS04	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(S04)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
HS04-	7.527e-08	5.892e-08	-7.123	-7.230	-0.106	(0)
AlS04+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
PbS04	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
CdS04	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
Al(S04)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ni(S04)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
Cd(S04)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
Pb(S04)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
CuS04	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
FeS04+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe(S04)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
HgS04	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Se(-2)	4.685e-09					
HSe-	4.677e-09	3.279e-09	-8.330	-8.484	-0.154	(0)
H2Se	4.054e-12	4.054e-12	-11.392	-11.392	0.000	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Se-2	6.423e-17	1.553e-17	-16.192	-16.809	-0.617	(0)
Se(4)	3.770e-07					
HSeO3-	3.526e-07	2.472e-07	-6.453	-6.607	-0.154	(0)
SeO3-2	2.442e-08	5.904e-09	-7.612	-8.229	-0.617	(0)
H2SeO3	1.653e-11	1.653e-11	-10.782	-10.782	0.000	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Se(6)	2.478e-21					
SeO4-2	2.463e-21	9.439e-22	-20.609	-21.025	-0.416	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
HSeO4-	9.645e-27	6.763e-27	-26.016	-26.170	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
Zn	2.612e-06					
Zn+2	1.813e-06	6.948e-07	-5.742	-6.158	-0.416	(0)
ZnS04	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(S04)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
ZnOH+	4.520e-09	3.170e-09	-8.345	-8.499	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
Zn(OH)2	4.227e-11	4.227e-11	-10.374	-10.374	0.000	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
Zn(OH)3-	1.872e-14	1.313e-14	-13.728	-13.882	-0.154	(0)
Zn(OH)4-2	1.339e-19	3.238e-20	-18.873	-19.490	-0.617	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)

Zn(NO3)2 0.000e+00 0.000e+00 -103.430 -103.430 0.000 (0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-124.48	-118.20	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-28.70	-24.17	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.96	-24.17	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-179.81	-161.88	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.93	-20.82	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-28.36	-27.91	0.45	(NH4)2SeO4
Al(OH)3(am)	0.09	11.16	11.06	Al(OH)3
Al2O3	2.05	22.32	20.27	Al2O3
Al4(OH)10SO4	5.98	28.68	22.70	Al4(OH)10SO4
AlOHSO4	-1.57	-4.80	-3.23	AlOHSO4
Alunite	6.34	5.44	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.24	-11.06	-7.82	PbSO4
Anhydrite	-1.07	-5.41	-4.34	CaSO4
Antlerite	-12.92	-4.13	8.79	Cu3(OH)4SO4
Atacamite	-7.99	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.78	-8.54	-1.76	ZnSO4:6H2O
Birnessite	-18.88	-0.79	18.09	MnO2
Bixbyite	-16.81	-17.16	-0.35	Mn2O3
Boehmite	2.30	11.16	8.86	AlOOH
Brochantite	-15.89	-0.19	15.71	Cu4(OH)6SO4
Brucite	-6.06	11.06	17.12	Mg(OH)2
Bunsenite	-4.77	7.92	12.68	NiO
Ca3(PO4)2(beta)	-2.69	-31.73	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-5.80	-52.88	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.79	-21.14	-19.35	CaHP04
CaHP04:2H2O	-2.09	-21.14	-19.05	CaHP04:2H2O
Calomel	-14.15	-32.28	-18.13	Hg2Cl2
CaSeO3:2H2O	-5.71	-2.85	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-21.06	-24.06	-3.00	CaSeO4:2H2O
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-23.45	-16.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-23.34	-0.78	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-15.59	-48.19	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-24.12	4.28	28.40	Cd4(OH)6SO4
CdCl2	-10.84	-11.45	-0.61	CdCl2
CdCl2:1H2O	-9.78	-11.45	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-9.52	-11.46	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.21	-10.52	13.69	Cd
Cdmetal(gamma)	-24.32	-10.52	13.80	Cd
CdOHCl	-6.81	-3.20	3.61	CdOHCl
CdSe	10.17	-10.21	-20.38	CdSe
CdSeO4:2H2O	-27.70	-29.55	-1.85	CdSeO4:2H2O
CdSO4	-10.85	-10.90	-0.05	CdSO4
CdSO4:1H2O	-9.25	-10.90	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-9.07	-10.90	-1.83	CdSO4:2.67H2O
Chalcantite	-9.36	-12.02	-2.65	CuSO4:5H2O
Clausthalite	17.01	-10.37	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.05	-16.14	-2.09	Co(OH)3
Co3(PO4)2	-3.27	-37.95	-34.69	Co3(PO4)2
Co3O4	-13.57	-23.81	-10.24	Co3O4
CoCl2	-16.50	-8.04	8.46	CoCl2
CoCl2:6H2O	-10.56	-8.05	2.52	CoCl2:6H2O
CoFe2O4	21.18	18.03	-3.15	CoFe2O4
CoHP04	-4.15	-23.21	-19.06	CoHP04
CoO	-5.37	8.47	13.84	CoO
CoSe	9.40	-6.80	-16.20	CoSe
CoSeO3	-6.24	-4.92	1.32	CoSeO3
CoSeO4:6H2O	-24.61	-26.14	-1.53	CoSeO4:6H2O
CoSO4	-10.48	-7.49	2.99	CoSO4
CoSO4:6H2O	-5.02	-7.49	-2.48	CoSO4:6H2O

Cotunnite	-6.77	-11.61	-4.84	PbCl ₂
Cu(OH) ₂	-4.87	3.94	8.81	Cu(OH) ₂
Cu ₂ (OH) ₃ NO ₃	-56.82	-47.39	9.42	Cu ₂ (OH) ₃ NO ₃
Cu ₂ Se(alpha)	28.69	-17.62	-46.31	Cu ₂ Se
Cu ₂ SO ₄	-16.40	-18.30	-1.90	Cu ₂ SO ₄
Cu ₃ (PO ₄) ₂	-14.69	-51.54	-36.85	Cu ₃ (PO ₄) ₂
Cu ₃ (PO ₄) ₂ :3H ₂ O	-16.42	-51.54	-35.12	Cu ₃ (PO ₄) ₂ :3H ₂ O
Cu ₃ Se ₂	35.35	-28.95	-64.30	Cu ₃ Se ₂
Cumetal	-0.04	-8.96	-8.93	Cu
CuOCuSO ₄	-18.70	-8.07	10.63	CuOCuSO ₄
Cupricferrite	7.02	13.50	6.49	CuFe ₂ O ₄
Cuprite	-1.24	-2.35	-1.11	Cu ₂ O
Cuprousferrite	12.49	3.61	-8.88	CuFeO ₂
CuSe	22.06	-11.33	-33.39	CuSe
CuSe ₂	22.68	-11.02	-33.70	CuSe ₂
CuSeO ₃ :2H ₂ O	-10.05	-9.46	0.60	CuSeO ₃ :2H ₂ O
CuSeO ₄ :5H ₂ O	-28.23	-30.67	-2.44	CuSeO ₄ :5H ₂ O
CuSO ₄	-15.13	-12.01	3.11	CuSO ₄
Diaspore	4.04	11.16	7.12	Al ₂ O ₃
Epsomite	-2.75	-4.90	-2.15	MgSO ₄ :7H ₂ O
Fe(OH) ₂	-3.44	10.12	13.56	Fe(OH) ₂
Fe(OH) ₂ .7Cl ₂ .3	5.34	2.30	-3.04	Fe(OH) ₂ .7Cl ₂ .3
Fe ₂ (OH) ₄ SeO ₃	-5.39	-3.84	1.55	Fe ₂ (OH) ₄ SeO ₃
Fe ₂ (SeO ₃) ₃ :2H ₂ O	-10.00	-30.63	-20.63	Fe ₂ (SeO ₃) ₃ :2H ₂ O
Fe ₂ (SO ₄) ₃	-35.15	-38.31	-3.16	Fe ₂ (SO ₄) ₃
Fe ₃ (OH) ₈	-0.54	19.68	20.22	Fe ₃ (OH) ₈
Ferrihydrite	1.41	4.78	3.37	Fe(OH) ₃
Ferroselite	13.87	-4.84	-18.71	FeSe ₂
FeSe	5.86	-5.15	-11.00	FeSe
Gibbsite	2.64	11.16	8.52	Al(OH) ₃
Goethite	4.15	4.78	0.64	FeOOH
Goslarite	-6.50	-8.54	-2.05	ZnSO ₄ :7H ₂ O
Gypsum	-0.80	-5.41	-4.61	CaSO ₄ :2H ₂ O
H-Jarosite	-6.02	-17.57	-11.55	(H ₃ O)Fe ₃ (SO ₄) ₂ (OH) ₆
H ₂ Se(g)	-10.35	-15.27	-4.92	H ₂ Se
Halite	-4.49	-2.90	1.59	NaCl
Hausmannite	-18.74	43.29	62.03	Mn ₃ O ₄
Hematite	10.67	9.56	-1.11	Fe ₂ O ₃
Hercynite	8.80	32.44	23.64	FeAl ₂ O ₄
Hg(g)	-7.75	-15.67	-7.93	Hg
Hg(OH) ₂	-18.27	-21.76	-3.50	Hg(OH) ₂
Hg ₂ (g)	-16.26	-31.35	-15.09	Hg ₂
Hg ₂ (OH) ₂	-21.03	-15.77	5.26	Hg ₂ (OH) ₂
Hg ₂ HPO ₄	-22.68	-47.45	-24.77	Hg ₂ HPO ₄
Hg ₂ SeO ₃	-24.51	-29.17	-4.66	Hg ₂ SeO ₃
Hg ₂ SO ₄	-25.58	-31.73	-6.14	Hg ₂ SO ₄
HgCl(g)	-36.02	-16.14	19.88	HgCl
HgCl ₂	-16.76	-38.28	-21.52	HgCl ₂
Hgmetal(l)	-2.02	-15.67	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSeO ₃	-22.73	-35.16	-12.43	HgSeO ₃
HgSO ₄	-28.27	-37.72	-9.45	HgSO ₄
Hinsdalite	-6.76	-9.26	-2.50	PbAl ₃ PO ₄ SO ₄ (OH) ₆
Hydroxylapatite	2.00	-42.33	-44.33	Ca ₅ (PO ₄) ₃ OH
Hydroxylpyromorphite	-7.75	-70.54	-62.79	Pb ₅ (PO ₄) ₃ OH
K-Alum	-11.65	-16.89	-5.24	KAl(SO ₄) ₂ :12H ₂ O
K-Jarosite	0.79	-13.70	-14.49	KFe ₃ (SO ₄) ₂ (OH) ₆
K ₂ SeO ₄	-26.12	-26.85	-0.73	K ₂ SeO ₄
Langite	-18.07	-0.19	17.88	Cu ₄ (OH) ₆ SO ₄ :H ₂ O
Larnakite	-5.77	-6.15	-0.38	PbO:PbSO ₄
Laurionite	-3.98	-3.35	0.62	PbOHCl
Lepidocrocite	3.41	4.78	1.37	FeOOH
Lime	-22.62	10.54	33.16	CaO
Litharge	-7.95	4.90	12.85	PbO
Maghemite	3.18	9.56	6.39	Fe ₂ O ₃
Magnesioferrite	3.10	20.62	17.52	Fe ₂ MgO ₄
Magnetite	15.79	19.69	3.90	Fe ₃ O ₄
Manganite	-8.31	17.03	25.34	MnOOH

Massicot	-8.15	4.90	13.05	PbO
Melanothallite	-18.98	-12.57	6.41	CuCl ₂
Melanterite	-3.58	-5.84	-2.26	FeSO ₄ ·7H ₂ O
Mg(OH) ₂ (active)	-7.73	11.06	18.79	Mg(OH) ₂
Mg ₃ (PO ₄) ₂	-6.90	-30.18	-23.28	Mg ₃ (PO ₄) ₂
MgHP04:3H ₂ O	-2.45	-20.62	-18.18	MgHP04:3H ₂ O
MgSe03:6H ₂ O	-5.38	-2.34	3.04	MgSe03:6H ₂ O
MgSe04:6H ₂ O	-22.35	-23.55	-1.20	MgSe04:6H ₂ O
Minium	-44.24	30.28	74.53	Pb ₃ O ₄
Mirabilite	-3.95	-5.25	-1.30	Na ₂ SO ₄ ·10H ₂ O
Mn ₂ (SO ₄) ₃	-59.71	-65.03	-5.32	Mn ₂ (SO ₄) ₃
Mn ₃ (PO ₄) ₂	-11.81	-35.65	-23.85	Mn ₃ (PO ₄) ₂
MnCl ₂ ·4H ₂ O	-10.02	-7.28	2.74	MnCl ₂ ·4H ₂ O
MnHP04	2.95	-22.45	-25.40	MnHP04
MnSe	-9.77	-6.04	3.73	MnSe
MnSe03	-5.29	-4.16	1.13	MnSe03
MnSe03:2H ₂ O	-5.12	-4.16	0.96	MnSe03:2H ₂ O
MnSe04:5H ₂ O	-23.32	-25.37	-2.05	MnSe04:5H ₂ O
MnSO ₄	-9.46	-6.72	2.74	MnSO ₄
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.22	-21.76	-3.55	HgO
Morenosite	-5.87	-8.05	-2.17	NiSO ₄ ·7H ₂ O
Na-Jarosite	-1.38	-12.22	-10.84	NaFe ₃ (SO ₄) ₂ (OH) ₆
Na ₂ Se03:5H ₂ O	-12.99	-2.69	10.30	Na ₂ Se03:5H ₂ O
Na ₂ Se04	-25.17	-23.89	1.28	Na ₂ Se04
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH) ₂	-5.11	7.91	13.02	Ni(OH) ₂
Ni ₃ (PO ₄) ₂	-8.32	-39.62	-31.30	Ni ₃ (PO ₄) ₂
Ni ₄ (OH) ₆ SO ₄	-16.30	15.70	32.00	Ni ₄ (OH) ₆ SO ₄
NiSe	10.34	-7.36	-17.70	NiSe
NiSe03:2H ₂ O	-8.37	-5.48	2.89	NiSe03:2H ₂ O
NiSe04:6H ₂ O	-25.17	-26.69	-1.52	NiSe04:6H ₂ O
Nsutite	-18.29	-0.79	17.50	MnO ₂
O ₂ (g)	-53.29	31.16	84.45	O ₂
Pb(OH) ₂	-3.39	4.90	8.29	Pb(OH) ₂
Pb ₂ (OH) ₃ Cl	-7.25	1.55	8.79	Pb ₂ (OH) ₃ Cl
Pb ₂ O(OH) ₂	-16.39	9.80	26.19	Pb ₂ O(OH) ₂
Pb ₂ O ₃	-35.66	25.38	61.04	Pb ₂ O ₃
Pb ₃ (PO ₄) ₂	-5.13	-48.66	-43.53	Pb ₃ (PO ₄) ₂
Pb ₃ O ₂ SO ₄	-12.13	-1.25	10.87	Pb ₃ O ₂ SO ₄
Pb ₄ (OH) ₆ SO ₄	-17.45	3.65	21.10	Pb ₄ (OH) ₆ SO ₄
Pb ₄ O ₃ SO ₄	-18.55	3.65	22.20	Pb ₄ O ₃ SO ₄
PbHP04	-2.98	-26.78	-23.81	PbHP04
Pbmetal	-14.92	-10.68	4.24	Pb
PbO:0.3H ₂ O	-8.08	4.90	12.98	PbO:0.33H ₂ O
PbSe04	-22.83	-29.70	-6.88	PbSe04
Periclase	-10.88	11.06	21.94	MgO
Plattnerite	-29.83	20.48	50.31	PbO ₂
Plumbgummite	7.80	-24.99	-32.79	PbAl ₃ (PO ₄) ₂ (OH) ₅ ·H ₂ O
Portlandite	-12.57	10.54	23.11	Ca(OH) ₂
Pyrochroite	-6.19	9.24	15.43	Mn(OH) ₂
Pyrolusite	-17.21	24.82	42.03	MnO ₂
Pyromorphite	5.63	-78.80	-84.43	Pb ₅ (PO ₄) ₃ Cl
Retgersite	-6.00	-8.05	-2.05	NiSO ₄ ·6H ₂ O
Semetal(am)	7.44	0.31	-7.14	Se
Semetal(hex)	8.05	0.31	-7.75	Se
SeO ₂	-13.52	-13.40	0.12	SeO ₂
SeO ₃	-56.00	-34.60	21.39	SeO ₃
Spinel	-4.39	33.38	37.77	MgAl ₂ O ₄
Strengite	-0.53	-26.90	-26.38	FePO ₄ ·2H ₂ O
Tenorite	-3.86	3.94	7.80	CuO
Thenardite	-5.59	-5.25	0.34	Na ₂ SO ₄
Tsumebite	-8.15	-17.94	-9.79	Pb ₂ CuPO ₄ (OH) ₃ ·3H ₂ O
Vivianite	3.00	-33.00	-36.00	Fe ₃ (PO ₄) ₂ ·8H ₂ O
Zincite	-4.13	7.42	11.55	ZnO
Zincosite	-12.66	-8.54	4.13	ZnSO ₄
Zn(NO ₃) ₂ ·6H ₂ O	-106.39	-103.14	3.26	Zn(NO ₃) ₂ ·6H ₂ O
Zn(OH) ₂	-4.78	7.42	12.20	Zn(OH) ₂

Zn(OH)2(am)	-5.25	7.42	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.42	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.31	7.42	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.42	11.73	Zn(OH)2
Zn2(OH)2SO4	-8.62	-1.12	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.61	6.58	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-5.69	-41.11	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-29.18	-9.65	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-14.68	13.72	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.91	20.59	38.50	Zn5(OH)8Cl2
ZnCl2	-16.31	-9.09	7.22	ZnCl2
Znmetal	-34.31	-8.16	26.15	Zn
ZnO(active)	-3.98	7.42	11.40	ZnO
ZnSe	6.61	-7.85	-14.46	ZnSe
ZnSeO4:6H2O	-25.67	-27.19	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-8.00	-8.54	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 3.

Using reaction 4.

Mixture 3.

9.720e-01 Solution 1
2.800e-02 Solution 5

Reaction 4.

2.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000
Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	1.429e-05	1.378e-05
Ca	3.381e-03	3.259e-03
Cd	2.782e-08	2.681e-08
Cl	4.507e-02	4.344e-02
Co	4.138e-05	3.989e-05
Cu	5.084e-06	4.901e-06
Fe	1.873e-03	1.805e-03
Hg	1.039e-09	1.002e-09
K	1.653e-03	1.593e-03
Mg	1.055e-02	1.017e-02
Mn	2.315e-04	2.231e-04
N	5.209e-04	5.021e-04
Na	4.960e-02	4.781e-02
Ni	7.991e-06	7.703e-06
P	2.288e-05	2.206e-05
Pb	1.509e-08	1.455e-08

S	1.611e-02	1.553e-02
Se	3.960e-07	3.817e-07
Zn	2.710e-06	2.612e-06

-----Description of solution-----

pH	=	6.789	Charge balance
pe	=	1.008	Adjusted to redox equilibrium
Activity of water	=	0.998	
Ionic strength (mol/kgw)	=	9.589e-02	
Mass of water (kg)	=	9.640e-01	
Total alkalinity (eq/kg)	=	6.509e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	6.374e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	4.58	
Iterations	=	4	
Total H	=	1.070158e+02	
Total O	=	5.356909e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.071e-07	1.626e-07	-6.684	-6.789	-0.105	0.00
OH-	5.941e-08	4.551e-08	-7.226	-7.342	-0.116	(0)
H2O	5.551e+01	9.979e-01	1.744	-0.001	0.000	18.05
Al	1.429e-05					
Al(OH)4-	9.301e-06	7.259e-06	-5.031	-5.139	-0.108	(0)
Al(OH)2+	2.470e-06	1.956e-06	-5.607	-5.709	-0.101	(0)
Al(OH)3	2.413e-06	2.413e-06	-5.618	-5.618	0.000	(0)
AlOH+2	7.793e-08	3.065e-08	-7.108	-7.514	-0.405	(0)
AlSO4+	2.357e-08	1.840e-08	-7.628	-7.735	-0.108	(0)
Al+3	5.703e-09	6.445e-10	-8.244	-9.191	-0.947	(0)
Al(SO4)2-	1.183e-09	9.231e-10	-8.927	-9.035	-0.108	(0)
Ca	3.381e-03					
Ca+2	2.488e-03	9.441e-04	-2.604	-3.025	-0.421	(0)
CaSO4	8.918e-04	8.918e-04	-3.050	-3.050	0.000	(0)
CaHPO4	8.368e-07	8.368e-07	-6.077	-6.077	0.000	(0)
CaH2PO4+	1.349e-07	1.068e-07	-6.870	-6.971	-0.101	(0)
CaPO4-	1.585e-08	1.255e-08	-7.800	-7.901	-0.101	(0)
CaNH3+2	6.602e-09	1.557e-09	-8.180	-8.808	-0.627	(0)
CaOH+	1.025e-09	8.191e-10	-8.989	-9.087	-0.097	(0)
Ca(NH3)2+2	3.442e-15	8.116e-16	-14.463	-15.091	-0.627	(0)
CaNO3+	0.000e+00	0.000e+00	-50.772	-50.929	-0.157	(0)
Cd	2.782e-08					
CdCl+	1.462e-08	1.018e-08	-7.835	-7.992	-0.157	(0)
Cd+2	7.991e-09	3.032e-09	-8.097	-8.518	-0.421	(0)
CdSO4	2.906e-09	2.906e-09	-8.537	-8.537	0.000	(0)
CdCl2	1.485e-09	1.485e-09	-8.828	-8.828	0.000	(0)
Cd(SO4)2-2	7.476e-10	1.763e-10	-9.126	-9.754	-0.627	(0)
CdCl3-	4.575e-11	3.188e-11	-10.340	-10.496	-0.157	(0)
CdOHCl	2.350e-11	2.350e-11	-10.629	-10.629	0.000	(0)
CdOH+	1.582e-12	1.102e-12	-11.801	-11.958	-0.157	(0)
Cd(OH)2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
Cd2OH+3	4.544e-19	1.760e-20	-18.343	-19.754	-1.412	(0)
Cd(SeO3)2-2	4.131e-19	9.740e-20	-18.384	-19.011	-0.627	(0)
Cd(OH)3-	3.147e-21	2.193e-21	-20.502	-20.659	-0.157	(0)
CdSeO4	5.664e-28	5.664e-28	-27.247	-27.247	0.000	(0)
Cd(OH)4-2	9.411e-29	2.219e-29	-28.026	-28.654	-0.627	(0)
CdHS+	8.317e-39	5.796e-39	-38.080	-38.237	-0.157	(0)
CdNO3+	0.000e+00	0.000e+00	-56.229	-56.385	-0.157	(0)
Cd(HS)2	0.000e+00	0.000e+00	-68.760	-68.760	0.000	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-104.429	-104.586	-0.157	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.153	-105.153	0.000	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.490	-140.117	-0.627	(0)

Cl	4.507e-02						
Cl-	4.505e-02	3.536e-02	-1.346	-1.451	-0.105	(0)	
CuCl2-	4.531e-06	3.504e-06	-5.344	-5.455	-0.112	(0)	
MnCl+	2.604e-06	2.050e-06	-5.584	-5.688	-0.104	(0)	
CoCl+	1.370e-06	9.543e-07	-5.863	-6.020	-0.157	(0)	
CuCl	4.698e-07	4.698e-07	-6.328	-6.328	0.000	(0)	
NiCl+	2.852e-07	1.987e-07	-6.545	-6.702	-0.157	(0)	
MnCl2	1.024e-07	1.024e-07	-6.990	-6.990	0.000	(0)	
ZnCl+	7.908e-08	6.116e-08	-7.102	-7.213	-0.112	(0)	
CuCl3-2	6.801e-08	2.608e-08	-7.167	-7.584	-0.416	(0)	
CdCl+	1.462e-08	1.018e-08	-7.835	-7.992	-0.157	(0)	
ZnOHCl	5.099e-09	5.099e-09	-8.293	-8.293	0.000	(0)	
PbCl+	3.651e-09	2.544e-09	-8.438	-8.594	-0.157	(0)	
ZnCl2	2.882e-09	2.882e-09	-8.540	-8.540	0.000	(0)	
CdCl2	1.485e-09	1.485e-09	-8.828	-8.828	0.000	(0)	
MnCl3-	1.267e-09	9.970e-10	-8.897	-9.001	-0.104	(0)	
PbCl2	3.947e-10	3.947e-10	-9.404	-9.404	0.000	(0)	
ZnCl3-	1.030e-10	7.964e-11	-9.987	-10.099	-0.112	(0)	
CdCl3-	4.575e-11	3.188e-11	-10.340	-10.496	-0.157	(0)	
NiCl2	3.578e-11	3.578e-11	-10.446	-10.446	0.000	(0)	
CdOHCl	2.350e-11	2.350e-11	-10.629	-10.629	0.000	(0)	
CuCl+	1.578e-11	1.221e-11	-10.802	-10.913	-0.112	(0)	
PbCl3-	8.330e-12	5.805e-12	-11.079	-11.236	-0.157	(0)	
ZnCl4-2	3.555e-12	1.364e-12	-11.449	-11.865	-0.416	(0)	
PbCl4-2	3.751e-13	8.844e-14	-12.426	-13.053	-0.627	(0)	
CuCl2	1.229e-13	1.229e-13	-12.910	-12.910	0.000	(0)	
FeCl+2	6.540e-16	2.508e-16	-15.184	-15.601	-0.416	(0)	
FeCl2+	5.711e-17	4.494e-17	-16.243	-16.347	-0.104	(0)	
CuCl3-	4.882e-17	3.776e-17	-16.311	-16.423	-0.112	(0)	
HgCl2	1.586e-18	1.586e-18	-17.800	-17.800	0.000	(0)	
HgCl3-	8.117e-19	5.656e-19	-18.091	-18.247	-0.157	(0)	
HgCl4-2	3.503e-19	8.260e-20	-18.456	-19.083	-0.627	(0)	
FeCl3	1.589e-19	1.589e-19	-18.799	-18.799	0.000	(0)	
HgClOH	3.727e-20	3.727e-20	-19.429	-19.429	0.000	(0)	
CuCl4-2	1.998e-20	7.663e-21	-19.699	-20.116	-0.416	(0)	
HgCl+	1.091e-23	7.602e-24	-22.962	-23.119	-0.157	(0)	
CoCl+2	8.942e-36	2.108e-36	-35.049	-35.676	-0.627	(0)	
Co(NH3)5Cl+2	1.813e-39	4.275e-40	-38.742	-39.369	-0.627	(0)	
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.318	-51.946	-0.627	(0)	
Co(2)	4.138e-05						
Co+2	3.345e-05	7.888e-06	-4.476	-5.103	-0.627	(0)	
CoSO4	6.522e-06	6.522e-06	-5.186	-5.186	0.000	(0)	
CoCl+	1.370e-06	9.543e-07	-5.863	-6.020	-0.157	(0)	
CoHPO4	1.641e-08	1.641e-08	-7.785	-7.785	0.000	(0)	
CoOH+	1.396e-08	9.729e-09	-7.855	-8.012	-0.157	(0)	
Co(NH3)+2	7.525e-09	1.774e-09	-8.124	-8.751	-0.627	(0)	
Co(OH)2	4.777e-11	4.777e-11	-10.321	-10.321	0.000	(0)	
Co(NH3)2+2	2.943e-13	6.939e-14	-12.531	-13.159	-0.627	(0)	
Co2OH+3	9.928e-14	3.846e-15	-13.003	-14.415	-1.412	(0)	
Co(OH)3-	8.455e-17	5.892e-17	-16.073	-16.230	-0.157	(0)	
CoOOH-	5.094e-18	3.550e-18	-17.293	-17.450	-0.157	(0)	
Co(NH3)3+2	4.853e-18	1.144e-18	-17.314	-17.942	-0.627	(0)	
Co4(OH)4+4	5.783e-22	1.787e-24	-21.238	-23.748	-2.510	(0)	
Co(NH3)4+2	3.336e-23	7.865e-24	-22.477	-23.104	-0.627	(0)	
CoSeO4	3.713e-24	3.713e-24	-23.430	-23.430	0.000	(0)	
Co(OH)4-2	2.448e-24	5.772e-25	-23.611	-24.239	-0.627	(0)	
Co(NH3)5+2	7.250e-29	1.709e-29	-28.140	-28.767	-0.627	(0)	
CoNO2+	7.898e-40	5.504e-40	-39.102	-39.259	-0.157	(0)	
CoNO3+	0.000e+00	0.000e+00	-53.163	-53.320	-0.157	(0)	
Co(NO3)2	0.000e+00	0.000e+00	-101.429	-101.429	0.000	(0)	
Co(3)	4.262e-31						
CoOH+2	4.262e-31	1.005e-31	-30.370	-30.998	-0.627	(0)	
CoCl+2	8.942e-36	2.108e-36	-35.049	-35.676	-0.627	(0)	
Co+3	2.831e-36	3.199e-37	-35.548	-36.495	-0.947	(0)	
Co(NH3)5Cl+2	1.813e-39	4.275e-40	-38.742	-39.369	-0.627	(0)	
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.828	-47.985	-0.157	(0)	
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.318	-51.946	-0.627	(0)	
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.627	-53.255	-0.627	(0)	

Cu(1)	5.084e-06					
CuCl2-	4.531e-06	3.504e-06	-5.344	-5.455	-0.112	(0)
CuCl	4.698e-07	4.698e-07	-6.328	-6.328	0.000	(0)
CuCl3-2	6.801e-08	2.608e-08	-7.167	-7.584	-0.416	(0)
Cu+	1.514e-08	1.055e-08	-7.820	-7.977	-0.157	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.039	-66.462	-0.423	(0)
CuS4S5-3	0.000e+00	0.000e+00	-66.793	-67.192	-0.399	(0)
Cu(2)	8.973e-10					
Cu+2	6.008e-10	2.280e-10	-9.221	-9.642	-0.421	(0)
CuS04	2.135e-10	2.135e-10	-9.671	-9.671	0.000	(0)
CuOH+	4.734e-11	3.662e-11	-10.325	-10.436	-0.112	(0)
CuNH3+2	1.924e-11	4.535e-12	-10.716	-11.343	-0.627	(0)
CuCl+	1.578e-11	1.221e-11	-10.802	-10.913	-0.112	(0)
Cu(OH)2	5.497e-13	5.497e-13	-12.260	-12.260	0.000	(0)
CuCl2	1.229e-13	1.229e-13	-12.910	-12.910	0.000	(0)
Cu2(OH)2+2	1.390e-16	3.277e-17	-15.857	-16.485	-0.627	(0)
Cu(OH)3-	1.000e-16	6.969e-17	-16.000	-16.157	-0.157	(0)
CuCl3-	4.882e-17	3.776e-17	-16.311	-16.423	-0.112	(0)
CuCl4-2	1.998e-20	7.663e-21	-19.699	-20.116	-0.416	(0)
Cu(OH)4-2	1.438e-22	3.391e-23	-21.842	-22.470	-0.627	(0)
CuNO2+	0.000e+00	0.000e+00	-42.470	-42.626	-0.157	(0)
CuNO3+	0.000e+00	0.000e+00	-57.393	-57.550	-0.157	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.621	-76.621	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.766	-96.923	-0.157	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-106.876	-106.876	0.000	(0)
Fe(2)	1.872e-03					
Fe+2	1.509e-03	3.558e-04	-2.821	-3.449	-0.627	(0)
FeS04	3.584e-04	3.584e-04	-3.446	-3.446	0.000	(0)
FeHP04	2.702e-06	2.702e-06	-5.568	-5.568	0.000	(0)
FeH2P04+	1.102e-06	8.724e-07	-5.958	-6.059	-0.101	(0)
FeOH+	8.193e-07	6.448e-07	-6.087	-6.191	-0.104	(0)
Fe(OH)2	2.231e-11	2.231e-11	-10.652	-10.652	0.000	(0)
Fe(OH)3-	5.338e-13	4.201e-13	-12.273	-12.377	-0.104	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.952	-69.952	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.485	-105.642	-0.157	(0)
Fe(3)	3.327e-07					
Fe(OH)2+	3.230e-07	2.557e-07	-6.491	-6.592	-0.101	(0)
Fe(OH)3	9.608e-09	9.608e-09	-8.017	-8.017	0.000	(0)
Fe(OH)4-	1.234e-10	9.772e-11	-9.909	-10.010	-0.101	(0)
FeOH+2	2.205e-11	8.455e-12	-10.657	-11.073	-0.416	(0)
FeHP04+	6.269e-12	4.964e-12	-11.203	-11.304	-0.101	(0)
FeS04+	1.420e-14	1.118e-14	-13.848	-13.952	-0.104	(0)
Fe+3	2.358e-15	2.665e-16	-14.627	-15.574	-0.947	(0)
Fe(S04)2-	1.518e-15	1.058e-15	-14.819	-14.976	-0.157	(0)
FeCl+2	6.540e-16	2.508e-16	-15.184	-15.601	-0.416	(0)
FeH2P04+2	6.293e-17	2.475e-17	-16.201	-16.606	-0.405	(0)
FeCl2+	5.711e-17	4.494e-17	-16.243	-16.347	-0.104	(0)
Fe2(OH)2+4	8.834e-19	2.730e-21	-18.054	-20.564	-2.510	(0)
FeHSe03+2	6.637e-19	1.565e-19	-18.178	-18.806	-0.627	(0)
FeCl3	1.589e-19	1.589e-19	-18.799	-18.799	0.000	(0)
Fe3(OH)4+5	8.085e-23	9.679e-27	-22.092	-26.014	-3.922	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.276	-62.903	-0.627	(0)
H(0)	3.671e-19					
H2	1.835e-19	1.876e-19	-18.736	-18.727	0.010	(0)
Hg(0)	1.039e-09					
Hg	1.039e-09	1.039e-09	-8.983	-8.983	0.000	(0)
Hg(1)	4.234e-29					
Hg2+2	2.117e-29	4.992e-30	-28.674	-29.302	-0.627	(0)
Hg(2)	2.785e-18					
HgCl2	1.586e-18	1.586e-18	-17.800	-17.800	0.000	(0)
HgCl3-	8.117e-19	5.656e-19	-18.091	-18.247	-0.157	(0)
HgCl4-2	3.503e-19	8.260e-20	-18.456	-19.083	-0.627	(0)
HgCl0H	3.727e-20	3.727e-20	-19.429	-19.429	0.000	(0)
Hg(OH)2	1.801e-22	1.841e-22	-21.744	-21.735	0.010	(0)
Hg(NH3)2+2	1.357e-22	3.200e-23	-21.867	-22.495	-0.627	(0)
HgCl+	1.091e-23	7.602e-24	-22.962	-23.119	-0.157	(0)
HgOH+	2.992e-26	2.085e-26	-25.524	-25.681	-0.157	(0)
HgNH3+2	2.677e-26	6.312e-27	-25.572	-26.200	-0.627	(0)

	Hg(NH3)3+2	1.016e-27	2.396e-28	-26.993	-27.620	-0.627	(0)
	Hg+2	4.028e-29	9.497e-30	-28.395	-29.022	-0.627	(0)
	HgS04	8.574e-30	8.574e-30	-29.067	-29.067	0.000	(0)
	Hg(OH)3-	2.056e-30	1.433e-30	-29.687	-29.844	-0.157	(0)
	Hg(NH3)4+2	1.527e-32	3.600e-33	-31.816	-32.444	-0.627	(0)
	HgHS2-	0.000e+00	0.000e+00	-65.697	-65.853	-0.157	(0)
	Hg(HS)2	0.000e+00	0.000e+00	-66.248	-66.248	0.000	(0)
	HgS2-2	0.000e+00	0.000e+00	-67.145	-67.772	-0.627	(0)
	HgNO3+	0.000e+00	0.000e+00	-77.810	-77.967	-0.157	(0)
	Hg(NO3)2	0.000e+00	0.000e+00	-126.765	-126.765	0.000	(0)
K		1.653e-03					
	K+	1.605e-03	1.260e-03	-2.794	-2.900	-0.105	(0)
	KS04-	4.722e-05	3.740e-05	-4.326	-4.427	-0.101	(0)
	KHP04-	2.302e-08	1.823e-08	-7.638	-7.739	-0.101	(0)
Mg		1.055e-02					
	Mg+2	8.194e-03	3.109e-03	-2.086	-2.507	-0.421	(0)
	MgS04	2.350e-03	2.350e-03	-2.629	-2.629	0.000	(0)
	MgHP04	3.804e-06	3.804e-06	-5.420	-5.420	0.000	(0)
	MgH2P04+	9.500e-07	7.523e-07	-6.022	-6.124	-0.101	(0)
	MgOH+	6.557e-08	5.275e-08	-7.183	-7.278	-0.095	(0)
	MgP04-	8.158e-10	6.460e-10	-9.088	-9.190	-0.101	(0)
Mn(2)		2.315e-04					
	Mn+2	1.953e-04	4.604e-05	-3.709	-4.337	-0.627	(0)
	MnS04	3.347e-05	3.347e-05	-4.475	-4.475	0.000	(0)
	MnCl+	2.604e-06	2.050e-06	-5.584	-5.688	-0.104	(0)
	MnCl2	1.024e-07	1.024e-07	-6.990	-6.990	0.000	(0)
	MnOH+	6.689e-09	5.264e-09	-8.175	-8.279	-0.104	(0)
	MnCl3-	1.267e-09	9.970e-10	-8.897	-9.001	-0.104	(0)
	MnSe	3.578e-12	3.578e-12	-11.446	-11.446	0.000	(0)
	Mn(OH)3-	2.145e-19	1.688e-19	-18.669	-18.773	-0.104	(0)
	MnSe04	1.151e-23	1.151e-23	-22.939	-22.939	0.000	(0)
	Mn(OH)4-2	8.784e-26	3.369e-26	-25.056	-25.472	-0.416	(0)
	MnNO3+	0.000e+00	0.000e+00	-52.397	-52.554	-0.157	(0)
	Mn(NO3)2	0.000e+00	0.000e+00	-100.567	-100.567	0.000	(0)
Mn(3)		1.026e-28					
	Mn+3	1.026e-28	1.160e-29	-27.989	-28.936	-0.947	(0)
Mn(6)		0.000e+00					
	Mn04-2	0.000e+00	0.000e+00	-65.696	-66.112	-0.416	(0)
Mn(7)		0.000e+00					
	Mn04-	0.000e+00	0.000e+00	-74.622	-74.742	-0.120	(0)
N(-3)		5.209e-04					
	NH4+	4.981e-04	3.734e-04	-3.303	-3.428	-0.125	(0)
	NH4S04-	2.180e-05	1.715e-05	-4.662	-4.766	-0.104	(0)
	NH3	9.847e-07	9.847e-07	-6.007	-6.007	0.000	(0)
	NiNH3+2	9.568e-09	2.256e-09	-8.019	-8.647	-0.627	(0)
	Co(NH3)+2	7.525e-09	1.774e-09	-8.124	-8.751	-0.627	(0)
	CaNH3+2	6.602e-09	1.557e-09	-8.180	-8.808	-0.627	(0)
	CuNH3+2	1.924e-11	4.535e-12	-10.716	-11.343	-0.627	(0)
	Ni(NH3)2+2	2.313e-12	5.455e-13	-11.636	-12.263	-0.627	(0)
	Co(NH3)2+2	2.943e-13	6.939e-14	-12.531	-13.159	-0.627	(0)
	Ca(NH3)2+2	3.442e-15	8.116e-16	-14.463	-15.091	-0.627	(0)
	Co(NH3)3+2	4.853e-18	1.144e-18	-17.314	-17.942	-0.627	(0)
	Hg(NH3)2+2	1.357e-22	3.200e-23	-21.867	-22.495	-0.627	(0)
	Co(NH3)4+2	3.336e-23	7.865e-24	-22.477	-23.104	-0.627	(0)
	HgNH3+2	2.677e-26	6.312e-27	-25.572	-26.200	-0.627	(0)
	Hg(NH3)3+2	1.016e-27	2.396e-28	-26.993	-27.620	-0.627	(0)
	Co(NH3)5+2	7.250e-29	1.709e-29	-28.140	-28.767	-0.627	(0)
	Hg(NH3)4+2	1.527e-32	3.600e-33	-31.816	-32.444	-0.627	(0)
	Co(NH3)5Cl+2	1.813e-39	4.275e-40	-38.742	-39.369	-0.627	(0)
	Co(NH3)6S04+	0.000e+00	0.000e+00	-47.828	-47.985	-0.157	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.318	-51.946	-0.627	(0)
	Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.627	-53.255	-0.627	(0)
N(3)		1.306e-35					
	N02-	1.306e-35	9.901e-36	-34.884	-35.004	-0.120	(0)
	CoN02+	7.898e-40	5.504e-40	-39.102	-39.259	-0.157	(0)
	CuN02+	0.000e+00	0.000e+00	-42.470	-42.626	-0.157	(0)
	Cu(N02)2	0.000e+00	0.000e+00	-76.621	-76.621	0.000	(0)
N(5)		0.000e+00					

N03-	0.000e+00	0.000e+00	-48.312	-48.417	-0.105	(0)
CaN03+	0.000e+00	0.000e+00	-50.772	-50.929	-0.157	(0)
MnN03+	0.000e+00	0.000e+00	-52.397	-52.554	-0.157	(0)
CoN03+	0.000e+00	0.000e+00	-53.163	-53.320	-0.157	(0)
NiN03+	0.000e+00	0.000e+00	-53.514	-53.671	-0.157	(0)
ZnN03+	0.000e+00	0.000e+00	-53.999	-54.155	-0.157	(0)
PbN03+	0.000e+00	0.000e+00	-55.767	-55.924	-0.157	(0)
CdN03+	0.000e+00	0.000e+00	-56.229	-56.385	-0.157	(0)
CuN03+	0.000e+00	0.000e+00	-57.393	-57.550	-0.157	(0)
FeN03+2	0.000e+00	0.000e+00	-62.276	-62.903	-0.627	(0)
HgN03+	0.000e+00	0.000e+00	-77.810	-77.967	-0.157	(0)
Mn(N03)2	0.000e+00	0.000e+00	-100.567	-100.567	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-101.429	-101.429	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-103.284	-103.284	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-104.091	-104.091	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-105.153	-105.153	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-106.876	-106.876	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-126.765	-126.765	0.000	(0)
Na	4.960e-02					
Na+	4.850e-02	3.806e-02	-1.314	-1.420	-0.105	(0)
NaS04-	1.101e-03	8.716e-04	-2.958	-3.060	-0.101	(0)
NaHP04-	1.077e-06	8.530e-07	-5.968	-6.069	-0.101	(0)
Ni	7.991e-06					
Ni+2	5.853e-06	2.221e-06	-5.233	-5.653	-0.421	(0)
NiS04	1.840e-06	1.840e-06	-5.735	-5.735	0.000	(0)
NiCl+	2.852e-07	1.987e-07	-6.545	-6.702	-0.157	(0)
NiNH3+2	9.568e-09	2.256e-09	-8.019	-8.647	-0.627	(0)
NiOH+	1.867e-09	1.301e-09	-8.729	-8.886	-0.157	(0)
Ni(S04)2-2	1.144e-09	2.697e-10	-8.942	-9.569	-0.627	(0)
NiCl2	3.578e-11	3.578e-11	-10.446	-10.446	0.000	(0)
Ni(OH)2	8.487e-12	8.487e-12	-11.071	-11.071	0.000	(0)
Ni(NH3)2+2	2.313e-12	5.455e-13	-11.636	-12.263	-0.627	(0)
Ni(OH)3-	7.528e-16	5.246e-16	-15.123	-15.280	-0.157	(0)
NiSe04	9.651e-25	9.651e-25	-24.015	-24.015	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-53.514	-53.671	-0.157	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.965	-55.955	0.010	(0)
P	2.288e-05					
H2P04-	6.818e-06	5.399e-06	-5.166	-5.268	-0.101	(0)
HP04-2	5.400e-06	2.071e-06	-5.268	-5.684	-0.416	(0)
MgHP04	3.804e-06	3.804e-06	-5.420	-5.420	0.000	(0)
FeHP04	2.702e-06	2.702e-06	-5.568	-5.568	0.000	(0)
FeH2P04+	1.102e-06	8.724e-07	-5.958	-6.059	-0.101	(0)
NaHP04-	1.077e-06	8.530e-07	-5.968	-6.069	-0.101	(0)
MgH2P04+	9.500e-07	7.523e-07	-6.022	-6.124	-0.101	(0)
CaHP04	8.368e-07	8.368e-07	-6.077	-6.077	0.000	(0)
CaH2P04+	1.349e-07	1.068e-07	-6.870	-6.971	-0.101	(0)
KHP04-	2.302e-08	1.823e-08	-7.638	-7.739	-0.101	(0)
CoHP04	1.641e-08	1.641e-08	-7.785	-7.785	0.000	(0)
CaP04-	1.585e-08	1.255e-08	-7.800	-7.901	-0.101	(0)
MgP04-	8.158e-10	6.460e-10	-9.088	-9.190	-0.101	(0)
H3P04	1.182e-10	1.182e-10	-9.927	-9.927	0.000	(0)
P04-3	4.379e-11	4.948e-12	-10.359	-11.306	-0.947	(0)
FeHP04+	6.269e-12	4.964e-12	-11.203	-11.304	-0.101	(0)
FeH2P04+2	6.293e-17	2.475e-17	-16.201	-16.606	-0.405	(0)
Pb	1.509e-08					
Pb+2	5.605e-09	2.127e-09	-8.251	-8.672	-0.421	(0)
PbS04	4.467e-09	4.467e-09	-8.350	-8.350	0.000	(0)
PbCl+	3.651e-09	2.544e-09	-8.438	-8.594	-0.157	(0)
Pb(S04)2-2	4.894e-10	1.154e-10	-9.310	-9.938	-0.627	(0)
PbOH+	4.740e-10	3.303e-10	-9.324	-9.481	-0.157	(0)
PbCl2	3.947e-10	3.947e-10	-9.404	-9.404	0.000	(0)
PbCl3-	8.330e-12	5.805e-12	-11.079	-11.236	-0.157	(0)
Pb(OH)2	6.456e-13	6.456e-13	-12.190	-12.190	0.000	(0)
PbCl4-2	3.751e-13	8.844e-14	-12.426	-13.053	-0.627	(0)
Pb2OH+3	2.874e-16	1.113e-17	-15.542	-16.953	-1.412	(0)
Pb(OH)3-	5.727e-17	3.991e-17	-16.242	-16.399	-0.157	(0)
Pb(OH)4-2	2.562e-21	6.041e-22	-20.591	-21.219	-0.627	(0)

Pb3(OH)4+2	3.987e-23	9.401e-24	-22.399	-23.027	-0.627	(0)
Pb4(OH)4+4	5.960e-26	1.842e-28	-25.225	-27.735	-2.510	(0)
PbNO3+	0.000e+00	0.000e+00	-55.767	-55.924	-0.157	(0)
Pb(HS)2	0.000e+00	0.000e+00	-68.856	-68.856	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.091	-104.091	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.125	-105.282	-0.157	(0)
S(-2)	7.145e-38					
H2S	3.603e-38	3.603e-38	-37.443	-37.443	0.000	(0)
HS-	2.693e-38	1.876e-38	-37.570	-37.727	-0.157	(0)
CdHS+	8.317e-39	5.796e-39	-38.080	-38.237	-0.157	(0)
S5-2	1.718e-40	0.000e+00	-39.765	-40.392	-0.627	(0)
S6-2	0.000e+00	0.000e+00	-40.191	-40.819	-0.627	(0)
S4-2	0.000e+00	0.000e+00	-40.365	-40.992	-0.627	(0)
S3-2	0.000e+00	0.000e+00	-41.177	-41.805	-0.627	(0)
S2-2	0.000e+00	0.000e+00	-42.204	-42.831	-0.627	(0)
S-2	0.000e+00	0.000e+00	-47.939	-48.355	-0.416	(0)
HgHS2-	0.000e+00	0.000e+00	-65.697	-65.853	-0.157	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.039	-66.462	-0.423	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.248	-66.248	0.000	(0)
CuS4S5-3	0.000e+00	0.000e+00	-66.793	-67.192	-0.399	(0)
HgS2-2	0.000e+00	0.000e+00	-67.145	-67.772	-0.627	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-67.847	-68.004	-0.157	(0)
Cd(HS)2	0.000e+00	0.000e+00	-68.760	-68.760	0.000	(0)
Zn(HS)2	0.000e+00	0.000e+00	-68.783	-68.783	0.000	(0)
Pb(HS)2	0.000e+00	0.000e+00	-68.856	-68.856	0.000	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.952	-69.952	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.766	-96.923	-0.157	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.072	-103.229	-0.157	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-104.429	-104.586	-0.157	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.125	-105.282	-0.157	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.485	-105.642	-0.157	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-105.793	-106.420	-0.627	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.490	-140.117	-0.627	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-141.788	-142.416	-0.627	(0)
S(6)	1.611e-02					
S04-2	1.130e-02	4.287e-03	-1.947	-2.368	-0.421	(0)
MgS04	2.350e-03	2.350e-03	-2.629	-2.629	0.000	(0)
NaS04-	1.101e-03	8.716e-04	-2.958	-3.060	-0.101	(0)
CaS04	8.918e-04	8.918e-04	-3.050	-3.050	0.000	(0)
FeS04	3.584e-04	3.584e-04	-3.446	-3.446	0.000	(0)
KS04-	4.722e-05	3.740e-05	-4.326	-4.427	-0.101	(0)
MnS04	3.347e-05	3.347e-05	-4.475	-4.475	0.000	(0)
NH4S04-	2.180e-05	1.715e-05	-4.662	-4.766	-0.104	(0)
CoS04	6.522e-06	6.522e-06	-5.186	-5.186	0.000	(0)
NiS04	1.840e-06	1.840e-06	-5.735	-5.735	0.000	(0)
ZnS04	6.431e-07	6.431e-07	-6.192	-6.192	0.000	(0)
Zn(S04)2-2	1.054e-07	2.485e-08	-6.977	-7.605	-0.627	(0)
HS04-	7.735e-08	6.036e-08	-7.112	-7.219	-0.108	(0)
AlS04+	2.357e-08	1.840e-08	-7.628	-7.735	-0.108	(0)
PbS04	4.467e-09	4.467e-09	-8.350	-8.350	0.000	(0)
CdS04	2.906e-09	2.906e-09	-8.537	-8.537	0.000	(0)
Al(S04)2-	1.183e-09	9.231e-10	-8.927	-9.035	-0.108	(0)
Ni(S04)2-2	1.144e-09	2.697e-10	-8.942	-9.569	-0.627	(0)
Cd(S04)2-2	7.476e-10	1.763e-10	-9.126	-9.754	-0.627	(0)
Pb(S04)2-2	4.894e-10	1.154e-10	-9.310	-9.938	-0.627	(0)
CuS04	2.135e-10	2.135e-10	-9.671	-9.671	0.000	(0)
FeS04+	1.420e-14	1.118e-14	-13.848	-13.952	-0.104	(0)
Fe(S04)2-	1.518e-15	1.058e-15	-14.819	-14.976	-0.157	(0)
HgS04	8.574e-30	8.574e-30	-29.067	-29.067	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.828	-47.985	-0.157	(0)
Se(-2)	4.407e-09					
HSe-	4.399e-09	3.066e-09	-8.357	-8.513	-0.157	(0)
H2Se	3.799e-12	3.799e-12	-11.420	-11.420	0.000	(0)
MnSe	3.578e-12	3.578e-12	-11.446	-11.446	0.000	(0)
Se-2	6.143e-17	1.448e-17	-16.212	-16.839	-0.627	(0)
Se(4)	3.916e-07					
HSeO3-	3.658e-07	2.549e-07	-6.437	-6.594	-0.157	(0)
SeO3-2	2.576e-08	6.073e-09	-7.589	-8.217	-0.627	(0)

H2SeO3	1.708e-11	1.708e-11	-10.767	-10.767	0.000	(0)
FeHSeO3+2	6.637e-19	1.565e-19	-18.178	-18.806	-0.627	(0)
Cd(SeO3)2-2	4.131e-19	9.740e-20	-18.384	-19.011	-0.627	(0)
Se(6)	2.660e-21					
SeO4-2	2.644e-21	1.003e-21	-20.578	-20.999	-0.421	(0)
MnSeO4	1.151e-23	1.151e-23	-22.939	-22.939	0.000	(0)
CoSeO4	3.713e-24	3.713e-24	-23.430	-23.430	0.000	(0)
NiSeO4	9.651e-25	9.651e-25	-24.015	-24.015	0.000	(0)
ZnSeO4	1.102e-25	1.102e-25	-24.958	-24.958	0.000	(0)
HSeO4-	1.034e-26	7.204e-27	-25.986	-26.142	-0.157	(0)
CdSeO4	5.664e-28	5.664e-28	-27.247	-27.247	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.323	-45.950	-0.627	(0)
Zn	2.710e-06					
Zn+2	1.869e-06	7.093e-07	-5.728	-6.149	-0.421	(0)
ZnSO4	6.431e-07	6.431e-07	-6.192	-6.192	0.000	(0)
Zn(SO4)2-2	1.054e-07	2.485e-08	-6.977	-7.605	-0.627	(0)
ZnCl+	7.908e-08	6.116e-08	-7.102	-7.213	-0.112	(0)
ZnOHCl	5.099e-09	5.099e-09	-8.293	-8.293	0.000	(0)
ZnOH+	4.633e-09	3.228e-09	-8.334	-8.491	-0.157	(0)
ZnCl2	2.882e-09	2.882e-09	-8.540	-8.540	0.000	(0)
ZnCl3-	1.030e-10	7.964e-11	-9.987	-10.099	-0.112	(0)
Zn(OH)2	4.296e-11	4.296e-11	-10.367	-10.367	0.000	(0)
ZnCl4-2	3.555e-12	1.364e-12	-11.449	-11.865	-0.416	(0)
Zn(OH)3-	1.910e-14	1.331e-14	-13.719	-13.876	-0.157	(0)
Zn(OH)4-2	1.389e-19	3.275e-20	-18.857	-19.485	-0.627	(0)
ZnSeO4	1.102e-25	1.102e-25	-24.958	-24.958	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.323	-45.950	-0.627	(0)
ZnNO3+	0.000e+00	0.000e+00	-53.999	-54.155	-0.157	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-67.847	-68.004	-0.157	(0)
Zn(HS)2	0.000e+00	0.000e+00	-68.783	-68.783	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.072	-103.229	-0.157	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.284	-103.284	0.000	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-105.793	-106.420	-0.627	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-141.788	-142.416	-0.627	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-124.25	-117.97	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-28.58	-24.04	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.84	-24.04	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-179.51	-161.58	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.79	-20.68	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-28.30	-27.85	0.45	(NH4)2SeO4
Al(OH)3(am)	0.11	11.17	11.06	Al(OH)3
Al2O3	2.08	22.35	20.27	Al2O3
Al4(OH)10SO4	6.05	28.75	22.70	Al4(OH)10SO4
AlOHSO4	-1.54	-4.77	-3.23	AlOHSO4
Alunite	6.42	5.52	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.22	-11.04	-7.82	PbSO4
Anhydrite	-1.05	-5.39	-4.34	CaSO4
Anilite	-13.00	-45.31	-32.31	Cu0.25Cu1.5S
Antlerite	-12.93	-4.14	8.79	Cu3(OH)4SO4
Atacamite	-7.98	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.76	-8.52	-1.76	ZnSO4:6H2O
Birnessite	-18.86	-0.77	18.09	MnO2
Bixbyite	-16.79	-17.14	-0.35	Mn2O3
BlaubleiI	-17.05	-41.21	-24.16	Cu0.9Cu0.2S
BlaubleiII	-15.83	-43.10	-27.28	Cu0.6Cu0.8S
Boehmite	2.32	11.17	8.86	AlOOH
Brochantite	-15.91	-0.21	15.71	Cu4(OH)6SO4
Brucite	-6.05	11.07	17.12	Mg(OH)2
Bunsenite	-4.76	7.92	12.68	NiO
Ca3(PO4)2(beta)	-2.64	-31.69	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-5.73	-52.81	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.77	-21.12	-19.35	CaHP04
CaHP04:2H2O	-2.07	-21.12	-19.05	CaHP04:2H2O

Calomel	-14.08	-32.20	-18.13	Hg2Cl2
CaSeO3:2H2O	-5.69	-2.83	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-21.03	-24.03	-3.00	CaSeO4:2H2O
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-23.42	-16.71	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-23.33	-0.77	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-15.57	-48.17	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-24.11	4.29	28.40	Cd4(OH)6SO4
CdCl2	-10.81	-11.42	-0.61	CdCl2
CdCl2:1H2O	-9.75	-11.42	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-9.49	-11.42	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.23	-10.53	13.69	Cd
Cdmetal(gamma)	-24.33	-10.53	13.80	Cd
CdOHCl	-6.79	-3.18	3.61	CdOHCl
CdSe	10.14	-10.24	-20.38	CdSe
CdSeO4:2H2O	-27.67	-29.52	-1.85	CdSeO4:2H2O
CdSO4	-10.84	-10.89	-0.05	CdSO4
CdSO4:1H2O	-9.24	-10.89	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-9.06	-10.89	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.36	-12.01	-2.65	CuSO4:5H2O
Chalcocite	-11.57	-46.89	-35.32	Cu2S
Chalcopyrite	-39.34	-74.97	-35.62	CuFeS2
Cinnabar	-19.95	-66.25	-46.30	HgS
Clausthalite	16.99	-10.40	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.04	-16.13	-2.09	Co(OH)3
Co3(PO4)2	-3.23	-37.92	-34.69	Co3(PO4)2
Co3O4	-13.55	-23.78	-10.24	Co3O4
CoCl2	-16.46	-8.01	8.46	CoCl2
CoCl2:6H2O	-10.53	-8.01	2.52	CoCl2:6H2O
CoFe2O4	21.21	18.06	-3.15	CoFe2O4
CoHP04	-4.14	-23.20	-19.06	CoHP04
CoO	-5.37	8.47	13.84	CoO
CoS(alpha)	-28.60	-36.04	-7.44	CoS
CoS(beta)	-24.97	-36.04	-11.07	CoS
CoSe	9.37	-6.83	-16.20	CoSe
CoSeO3	-6.23	-4.91	1.32	CoSeO3
CoSeO4:6H2O	-24.58	-26.11	-1.53	CoSeO4:6H2O
CoSO4	-10.46	-7.47	2.99	CoSO4
CoSO4:6H2O	-5.00	-7.48	-2.48	CoSO4:6H2O
Cotunnite	-6.73	-11.58	-4.84	PbCl2
Covellite	-18.05	-40.58	-22.53	CuS
Cu(OH)2	-4.87	3.93	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.76	-47.34	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.63	-17.68	-46.31	Cu2Se
Cu2SO4	-16.42	-18.32	-1.90	Cu2SO4
Cu3(PO4)2	-14.69	-51.54	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-16.42	-51.54	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	35.26	-29.04	-64.30	Cu3Se2
Cumetal	-0.06	-8.98	-8.93	Cu
CuOCuSO4	-18.71	-8.07	10.63	CuOCuSO4
Cupricferrite	7.03	13.52	6.49	CuFe2O4
Cuprite	-1.27	-2.38	-1.11	Cu2O
Cuprousferrite	12.48	3.60	-8.88	CuFeO2
CuSe	22.02	-11.37	-33.39	CuSe
CuSe2	22.63	-11.07	-33.70	CuSe2
CuSeO3:2H2O	-10.05	-9.45	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-28.21	-30.65	-2.44	CuSeO4:5H2O
CuSO4	-15.12	-12.01	3.11	CuSO4
Diaspore	4.06	11.17	7.12	AlOOH
Djurleite	-12.08	-46.47	-34.40	Cu0.066Cu1.868S
Epsomite	-2.73	-4.88	-2.15	MgSO4:7H2O
Fe(OH)2	-3.44	10.13	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.36	2.32	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-5.35	-3.80	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-9.94	-30.56	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-35.09	-38.25	-3.16	Fe2(SO4)3

Fe3(OH)8	-0.51	19.71	20.22	Fe3(OH)8
Ferrihydrite	1.42	4.79	3.37	Fe(OH)3
Ferroselite	13.83	-4.88	-18.71	FeSe2
FeS(ppt)	-31.46	-34.39	-2.92	FeS
FeSe	5.83	-5.17	-11.00	FeSe
Galena	-25.45	-39.61	-14.16	PbS
Gibbsite	2.66	11.17	8.52	Al(OH)3
Goethite	4.16	4.79	0.64	FeOOH
Goslarite	-6.48	-8.52	-2.05	ZnSO4:7H2O
Greenockite	-24.96	-39.46	-14.49	CdS
Greigite	-113.31	-158.35	-45.03	Fe3S4
Gypsum	-0.78	-5.39	-4.61	CaSO4:2H2O
H-Jarosite	-5.97	-17.52	-11.55	(H3O)Fe3(SO4)2(OH)6
H2S(g)	-36.51	-44.52	-8.01	H2S
H2Se(g)	-10.38	-15.30	-4.92	H2Se
Halite	-4.46	-2.87	1.59	NaCl
Hausmannite	-18.72	43.31	62.03	Mn3O4
Hematite	10.69	9.58	-1.11	Fe2O3
Hercynite	8.84	32.48	23.64	FeAl2O4
Hg(g)	-7.73	-15.66	-7.93	Hg
Hg(OH)2	-18.24	-21.73	-3.50	Hg(OH)2
Hg2(g)	-16.22	-31.32	-15.09	Hg2
Hg2(OH)2	-20.99	-15.73	5.26	Hg2(OH)2
Hg2HPO4	-22.62	-47.40	-24.77	Hg2HPO4
Hg2S	-48.40	-60.24	-11.84	Hg2S
Hg2SeO3	-24.45	-29.11	-4.66	Hg2SeO3
Hg2SO4	-25.53	-31.67	-6.14	Hg2SO4
HgCl(g)	-35.99	-16.10	19.88	HgCl
HgCl2	-16.70	-38.21	-21.52	HgCl2
Hgmetal(l)	-2.01	-15.66	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSeO3	-22.69	-35.12	-12.43	HgSeO3
HgSO4	-28.22	-37.68	-9.45	HgSO4
Hinsdalite	-6.69	-9.19	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	2.08	-42.25	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-7.70	-70.49	-62.79	Pb5(PO4)3OH
K-Alum	-11.60	-16.84	-5.24	KAl(SO4)2:12H2O
K-Jarosite	0.86	-13.63	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-26.07	-26.80	-0.73	K2SeO4
Langite	-18.09	-0.21	17.88	Cu4(OH)6SO4:H2O
Larnakite	-5.75	-6.14	-0.38	PbO:PbSO4
Laurionite	-3.96	-3.34	0.62	PbOHCl
Lepidocrocite	3.42	4.79	1.37	FeOOH
Lime	-22.61	10.55	33.16	CaO
Litharge	-7.95	4.90	12.85	PbO
Mackinawite	-30.79	-34.39	-3.60	FeS
Maghemite	3.20	9.58	6.39	Fe2O3
Magnesioferrite	3.13	20.65	17.52	Fe2MgO4
Magnetite	15.81	19.71	3.90	Fe3O4
Manganite	-8.30	17.04	25.34	MnOOH
Massicot	-8.15	4.90	13.05	PbO
Melanothallite	-18.95	-12.55	6.41	CuCl2
Melanterite	-3.57	-5.82	-2.26	FeSO4:7H2O
Metacinnabar	-20.55	-66.25	-45.70	HgS
Mg(OH)2(active)	-7.73	11.07	18.79	Mg(OH)2
Mg3(PO4)2	-6.85	-30.13	-23.28	Mg3(PO4)2
MgHPO4:3H2O	-2.43	-20.60	-18.18	MgHPO4:3H2O
MgSeO3:6H2O	-5.36	-2.32	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-22.31	-23.51	-1.20	MgSeO4:6H2O
Minium	-44.22	30.31	74.53	Pb3O4
Mirabilite	-3.91	-5.22	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-59.65	-64.97	-5.32	Mn2(SO4)3
Mn3(PO4)2	-11.77	-35.62	-23.85	Mn3(PO4)2
MnCl2:4H2O	-9.98	-7.24	2.74	MnCl2:4H2O
MnHPO4	2.97	-22.43	-25.40	MnHPO4
MnS(grn)	-35.52	-35.27	0.25	MnS
MnS(pnk)	-38.61	-35.27	3.34	MnS
MnSe	-9.80	-6.06	3.73	MnSe

MnSeO3	-5.27	-4.14	1.13	MnSeO3
MnSeO3:2H2O	-5.11	-4.14	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-23.29	-25.34	-2.05	MnSeO4:5H2O
MnSO4	-9.44	-6.70	2.74	MnSO4
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.19	-21.73	-3.55	HgO
Morenosite	-5.85	-8.03	-2.17	NiSO4:7H2O
Na-Jarosite	-1.31	-12.15	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-12.95	-2.65	10.30	Na2SeO3:5H2O
Na2SeO4	-25.12	-23.84	1.28	Na2SeO4
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.10	7.92	13.02	Ni(OH)2
Ni3(PO4)2	-8.27	-39.57	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-16.25	15.75	32.00	Ni4(OH)6SO4
NiS(alpha)	-30.99	-36.59	-5.60	NiS
NiS(beta)	-25.49	-36.59	-11.10	NiS
NiS(gamma)	-23.79	-36.59	-12.80	NiS
NiSe	10.32	-7.38	-17.70	NiSe
NiSeO3:2H2O	-8.35	-5.46	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-25.14	-26.66	-1.52	NiSeO4:6H2O
Nsutite	-18.28	-0.77	17.50	MnO2
O2(g)	-53.26	31.19	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.22	1.57	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-16.38	9.81	26.19	Pb2O(OH)2
Pb2O3	-35.64	25.40	61.04	Pb2O3
Pb3(PO4)2	-5.10	-48.63	-43.53	Pb3(PO4)2
Pb3O2SO4	-12.11	-1.23	10.87	Pb3O2SO4
Pb4(OH)6SO4	-17.43	3.67	21.10	Pb4(OH)6SO4
Pb4O3SO4	-18.53	3.67	22.20	Pb4O3SO4
PbHPbO4	-2.96	-26.77	-23.81	PbHPbO4
Pbmetal	-14.93	-10.69	4.24	Pb
PbO:0.3H2O	-8.08	4.90	12.98	PbO:0.33H2O
PbSeO4	-22.80	-29.67	-6.88	PbSeO4
Periclase	-10.87	11.07	21.94	MgO
Plattnerite	-29.81	20.50	50.31	PbO2
Plumbgummite	7.87	-24.92	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-12.56	10.55	23.11	Ca(OH)2
Pyrite	-44.68	-63.31	-18.63	FeS2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-17.19	24.83	42.03	MnO2
Pyromorphite	5.70	-78.73	-84.43	Pb5(PO4)3Cl
Retgersite	-5.98	-8.03	-2.05	NiSO4:6H2O
Semetal(am)	7.43	0.29	-7.14	Se
Semetal(hex)	8.04	0.29	-7.75	Se
SeO2	-13.50	-13.38	0.12	SeO2
SeO3	-55.97	-34.58	21.39	SeO3
Sphalerite	-25.57	-37.09	-11.52	ZnS
Spinel	-4.35	33.42	37.77	MgAl2O4
Strengite	-0.50	-26.88	-26.38	FePO4:2H2O
Sulfur	-26.82	-28.92	-2.11	S
Tenorite	-3.86	3.94	7.80	CuO
Thenardite	-5.55	-5.21	0.34	Na2SO4
Tsumebite	-8.14	-17.93	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	3.04	-32.96	-36.00	Fe3(PO4)2:8H2O
Wurtzite	-28.09	-37.09	-9.00	ZnS
Zincite	-4.12	7.43	11.55	ZnO
Zincosite	-12.64	-8.52	4.13	ZnSO4
Zn(NO3)2:6H2O	-106.25	-102.99	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.77	7.43	12.20	Zn(OH)2
Zn(OH)2(am)	-5.24	7.43	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.43	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.30	7.43	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.43	11.73	Zn(OH)2
Zn2(OH)2SO4	-8.59	-1.09	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.58	6.61	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-5.64	-41.06	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-29.13	-9.61	19.53	Zn3O(SO4)2

Zn4(OH)6SO4	-14.64	13.76	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.84	20.66	38.50	Zn5(OH)8Cl2
ZnCl2	-16.27	-9.05	7.22	ZnCl2
Znmetal	-34.32	-8.17	26.15	Zn
Zn0(active)	-3.97	7.43	11.40	Zn0
ZnS(am)	-28.00	-37.09	-9.09	ZnS
ZnSe	6.59	-7.87	-14.46	ZnSe
ZnSe04:6H2O	-25.63	-27.15	-1.52	ZnSe04:6H2O
ZnS04:1H2O	-7.98	-8.52	-0.53	ZnS04:1H2O

**For a gas, $SI = \log_{10}(\text{fugacity})$. Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 7.

SOLUTION 6 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
water	1 # kg

MIX 4

1	0.973
6	0.027

REACTION 5

H2O -1

2

END #Time-step 5

Beginning of initial solution calculations.

Initial solution 6.

-----Solution composition-----

Elements	Molality	Moles
Al	1.378e-05	1.378e-05
Ca	3.259e-03	3.259e-03
Cd	2.681e-08	2.681e-08
Cl	4.344e-02	4.344e-02
Co	3.989e-05	3.989e-05
Cu	4.901e-06	4.901e-06
Fe	1.805e-03	1.805e-03
Hg	1.002e-09	1.002e-09
K	1.593e-03	1.593e-03
Mg	1.017e-02	1.017e-02
Mn	2.231e-04	2.231e-04
N	5.021e-04	5.021e-04
Na	4.781e-02	4.781e-02
Ni	7.703e-06	7.703e-06
P	2.206e-05	2.206e-05
Pb	1.455e-08	1.455e-08
S(6)	1.553e-02	1.553e-02
Se	3.817e-07	3.817e-07
Zn	2.612e-06	2.612e-06

-----Description of solution-----

pH	=	6.790
pe	=	1.000
Activity of water	=	0.998
Ionic strength (mol/kgw)	=	9.259e-02
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	6.274e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	21.00
Electrical balance (eq)	=	6.374e-03
Percent error, $100 \cdot (\text{Cat} - \text{An}) / (\text{Cat} + \text{An})$	=	4.58
Iterations	=	13
Total H	=	1.110158e+02
Total O	=	5.556909e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.061e-07	1.622e-07	-6.686	-6.790	-0.104	0.00
OH-	5.935e-08	4.562e-08	-7.227	-7.341	-0.114	(0)
H2O	5.551e+01	9.980e-01	1.744	-0.001	0.000	18.05
Al	1.378e-05					
Al(OH)4-	8.973e-06	7.024e-06	-5.047	-5.153	-0.106	(0)
Al(OH)2+	2.373e-06	1.884e-06	-5.625	-5.725	-0.100	(0)
Al(OH)3	2.329e-06	2.329e-06	-5.633	-5.633	0.000	(0)
AlOH+2	7.409e-08	2.945e-08	-7.130	-7.531	-0.401	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
Al+3	5.344e-09	6.178e-10	-8.272	-9.209	-0.937	(0)
Al(SO4)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ca	3.259e-03					
Ca+2	2.406e-03	9.221e-04	-2.619	-3.035	-0.416	(0)
CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CaOH+	1.001e-09	8.020e-10	-8.999	-9.096	-0.096	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)

Cd	2.681e-08					
CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
Cd+2	7.874e-09	3.018e-09	-8.104	-8.520	-0.416	(0)
CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
Cd(SO4)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
CdOH+	1.568e-12	1.100e-12	-11.805	-11.959	-0.154	(0)
Cd(OH)2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
Cd2OH+3	4.264e-19	1.748e-20	-18.370	-19.758	-1.387	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Cd(OH)3-	3.135e-21	2.198e-21	-20.504	-20.658	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Cd(OH)4-2	9.222e-29	2.230e-29	-28.035	-28.652	-0.617	(0)
CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cl	4.344e-02					
Cl-	4.343e-02	3.417e-02	-1.362	-1.466	-0.104	(0)
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(2)	3.989e-05					
Co+2	3.225e-05	7.797e-06	-4.491	-5.108	-0.617	(0)
CoSO4	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CoHPO4	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CoOH+	1.375e-08	9.639e-09	-7.862	-8.016	-0.154	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
Co(OH)2	4.744e-11	4.744e-11	-10.324	-10.324	0.000	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Co2OH+3	9.190e-14	3.766e-15	-13.037	-14.424	-1.387	(0)
Co(OH)3-	8.364e-17	5.865e-17	-16.078	-16.232	-0.154	(0)
CoOOH-	5.039e-18	3.533e-18	-17.298	-17.452	-0.154	(0)

Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Co4(OH)4+4	5.041e-22	1.722e-24	-21.297	-23.764	-2.466	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
Co(OH)4-2	2.382e-24	5.759e-25	-23.623	-24.240	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Co(3)	4.042e-31					
CoOH+2	4.042e-31	9.773e-32	-30.393	-31.010	-0.617	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co+3	2.685e-36	3.104e-37	-35.571	-36.508	-0.937	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
Cu(1)	4.900e-06					
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
Cu+	1.553e-08	1.089e-08	-7.809	-7.963	-0.154	(0)
Cu(2)	8.967e-10					
Cu+2	6.026e-10	2.310e-10	-9.220	-9.636	-0.416	(0)
CuSO4	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
CuOH+	4.792e-11	3.719e-11	-10.319	-10.430	-0.110	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
Cu(OH)2	5.595e-13	5.595e-13	-12.252	-12.252	0.000	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
Cu2(OH)2+2	1.398e-16	3.379e-17	-15.855	-16.471	-0.617	(0)
Cu(OH)3-	1.014e-16	7.111e-17	-15.994	-16.148	-0.154	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
Cu(OH)4-2	1.434e-22	3.468e-23	-21.843	-22.460	-0.617	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Fe(2)	1.805e-03					
Fe+2	1.454e-03	3.515e-04	-2.837	-3.454	-0.617	(0)
FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
FeHP04	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
FeOH+	8.090e-07	6.384e-07	-6.092	-6.195	-0.103	(0)
Fe(OH)2	2.214e-11	2.214e-11	-10.655	-10.655	0.000	(0)
Fe(OH)3-	5.296e-13	4.179e-13	-12.276	-12.379	-0.103	(0)
Fe(3)	3.233e-07					
Fe(OH)2+	3.138e-07	2.491e-07	-6.503	-6.604	-0.100	(0)
Fe(OH)3	9.382e-09	9.382e-09	-8.028	-8.028	0.000	(0)
Fe(OH)4-	1.205e-10	9.565e-11	-9.919	-10.019	-0.100	(0)
FeOH+2	2.119e-11	8.217e-12	-10.674	-11.085	-0.411	(0)
FeHP04+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeSO4+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe+3	2.235e-15	2.584e-16	-14.651	-15.588	-0.937	(0)
Fe(SO4)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
Fe2(OH)2+4	7.548e-19	2.579e-21	-18.122	-20.589	-2.466	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
Fe3(OH)4+5	6.361e-23	8.906e-27	-22.197	-26.050	-3.854	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
H(0)	3.796e-19					
H2	1.898e-19	1.939e-19	-18.722	-18.712	0.009	(0)
Hg(0)	1.002e-09					
Hg	1.002e-09	1.002e-09	-8.999	-8.999	0.000	(0)

Hg(1)	3.697e-29					
Hg2+2	1.848e-29	4.469e-30	-28.733	-29.350	-0.617	(0)
Hg(2)	2.362e-18					
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
Hg(OH)2	1.682e-22	1.718e-22	-21.774	-21.765	0.009	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
HgOH+	2.768e-26	1.941e-26	-25.558	-25.712	-0.154	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Hg+2	3.648e-29	8.820e-30	-28.438	-29.055	-0.617	(0)
HgSO4	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Hg(OH)3-	1.911e-30	1.340e-30	-29.719	-29.873	-0.154	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
K	1.593e-03					
K+	1.549e-03	1.219e-03	-2.810	-2.914	-0.104	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
Mg	1.017e-02					
Mg+2	7.920e-03	3.036e-03	-2.101	-2.518	-0.416	(0)
MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
MgOH+	6.402e-08	5.162e-08	-7.194	-7.287	-0.094	(0)
MgPO4-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
Mn(2)	2.231e-04					
Mn+2	1.882e-04	4.549e-05	-3.725	-4.342	-0.617	(0)
MnSO4	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
MnOH+	6.606e-09	5.213e-09	-8.180	-8.283	-0.103	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Mn(OH)3-	2.129e-19	1.680e-19	-18.672	-18.775	-0.103	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
Mn(OH)4-2	8.666e-26	3.361e-26	-25.062	-25.474	-0.411	(0)
MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Mn(3)	9.732e-29					
Mn+3	9.732e-29	1.125e-29	-28.012	-28.949	-0.937	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-65.730	-66.142	-0.411	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-74.661	-74.779	-0.119	(0)
N(-3)	5.021e-04					
NH4+	4.805e-04	3.617e-04	-3.318	-3.442	-0.123	(0)
NH4SO4-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
NH3	9.560e-07	9.560e-07	-6.020	-6.020	0.000	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)

Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
N(3)	1.148e-35					
NO2-	1.148e-35	8.735e-36	-34.940	-35.059	-0.119	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-48.382	-48.486	-0.104	(0)
CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
Na	4.781e-02					
Na+	4.677e-02	3.680e-02	-1.330	-1.434	-0.104	(0)
NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
Ni	7.703e-06					
Ni+2	5.664e-06	2.171e-06	-5.247	-5.663	-0.416	(0)
NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
NiOH+	1.818e-09	1.275e-09	-8.741	-8.895	-0.154	(0)
Ni(SO4)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
Ni(OH)2	8.335e-12	8.335e-12	-11.079	-11.079	0.000	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Ni(OH)3-	7.365e-16	5.164e-16	-15.133	-15.287	-0.154	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.993	-55.984	0.009	(0)
P	2.206e-05					
H2PO4-	6.634e-06	5.268e-06	-5.178	-5.278	-0.100	(0)
HPO4-2	5.222e-06	2.025e-06	-5.282	-5.694	-0.411	(0)
MgHPO4	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
FeHPO4	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
NaHPO4-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
KHPO4-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
CoHPO4	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
MgPO4-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
H3PO4	1.150e-10	1.150e-10	-9.939	-9.939	0.000	(0)
PO4-3	4.196e-11	4.850e-12	-10.377	-11.314	-0.937	(0)
FeHPO4+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
Pb	1.455e-08					
Pb+2	5.480e-09	2.100e-09	-8.261	-8.678	-0.416	(0)
PbSO4	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)

PbOH+	4.662e-10	3.269e-10	-9.331	-9.486	-0.154	(0)
Pb(SO4)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
Pb(OH)2	6.405e-13	6.405e-13	-12.193	-12.193	0.000	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
Pb2OH+3	2.655e-16	1.088e-17	-15.576	-16.963	-1.387	(0)
Pb(OH)3-	5.660e-17	3.969e-17	-16.247	-16.401	-0.154	(0)
Pb(OH)4-2	2.491e-21	6.022e-22	-20.604	-21.220	-0.617	(0)
Pb3(OH)4+2	3.779e-23	9.137e-24	-22.423	-23.039	-0.617	(0)
Pb4(OH)4+4	5.175e-26	1.768e-28	-25.286	-27.753	-2.466	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
S(6)	1.553e-02					
SO4-2	1.094e-02	4.194e-03	-1.961	-2.377	-0.416	(0)
MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
MnSO4	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
NH4SO4-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
CoSO4	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
ZnSO4	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(SO4)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
HSO4-	7.527e-08	5.892e-08	-7.123	-7.230	-0.106	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
PbSO4	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
Al(SO4)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ni(SO4)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
Cd(SO4)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
Pb(SO4)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
CuSO4	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
FeSO4+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe(SO4)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
HgSO4	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Se(-2)	4.685e-09					
HSe-	4.677e-09	3.279e-09	-8.330	-8.484	-0.154	(0)
H2Se	4.054e-12	4.054e-12	-11.392	-11.392	0.000	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Se-2	6.423e-17	1.553e-17	-16.192	-16.809	-0.617	(0)
Se(4)	3.770e-07					
HSeO3-	3.526e-07	2.472e-07	-6.453	-6.607	-0.154	(0)
SeO3-2	2.442e-08	5.904e-09	-7.612	-8.229	-0.617	(0)
H2SeO3	1.653e-11	1.653e-11	-10.782	-10.782	0.000	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Se(6)	2.478e-21					
SeO4-2	2.463e-21	9.439e-22	-20.609	-21.025	-0.416	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
HSeO4-	9.645e-27	6.763e-27	-26.016	-26.170	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
Zn	2.612e-06					
Zn+2	1.813e-06	6.948e-07	-5.742	-6.158	-0.416	(0)
ZnSO4	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(SO4)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
ZnOHC1	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
ZnOH+	4.520e-09	3.170e-09	-8.345	-8.499	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)

Zn(OH)2	4.227e-11	4.227e-11	-10.374	-10.374	0.000	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
Zn(OH)3-	1.872e-14	1.313e-14	-13.728	-13.882	-0.154	(0)
Zn(OH)4-2	1.339e-19	3.238e-20	-18.873	-19.490	-0.617	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2-124.48	-118.20	6.27	(Co(NH3)5Cl)(NO3)2	
(Co(NH3)5Cl)Cl2 -28.70	-24.17	4.54	(Co(NH3)5Cl)Cl2	
(Co(NH3)5OH2)Cl3 -35.96	-24.17	11.80	(Co(NH3)5OH2)Cl3	
(Co(NH3)6)(NO3)3-179.81	-161.88	17.93	(Co(NH3)6)(NO3)3	
(Co(NH3)6)Cl3 -40.93	-20.82	20.11	(Co(NH3)6)Cl3	
(NH4)2SeO4 -28.36	-27.91	0.45	(NH4)2SeO4	
Al(OH)3(am) 0.09	11.16	11.06	Al(OH)3	
Al2O3 2.05	22.32	20.27	Al2O3	
Al4(OH)10SO4 5.98	28.68	22.70	Al4(OH)10SO4	
AlOHSO4 -1.57	-4.80	-3.23	AlOHSO4	
Alunite 6.34	5.44	-0.90	KAl3(SO4)2(OH)6	
Anglesite -3.24	-11.06	-7.82	PbSO4	
Anhydrite -1.07	-5.41	-4.34	CaSO4	
Antlerite -12.92	-4.13	8.79	Cu3(OH)4SO4	
Atacamite -7.99	-0.37	7.61	Cu2(OH)3Cl	
Bianchite -6.78	-8.54	-1.76	ZnSO4:6H2O	
Birnessite -18.88	-0.79	18.09	MnO2	
Bixbyite -16.81	-17.16	-0.35	Mn2O3	
Boehmite 2.30	11.16	8.86	AlOOH	
Brochantite -15.89	-0.19	15.71	Cu4(OH)6SO4	
Brucite -6.06	11.06	17.12	Mg(OH)2	
Bunsenite -4.77	7.92	12.68	NiO	
Ca3(PO4)2(beta) -2.69	-31.73	-29.05	Ca3(PO4)2	
Ca4H(PO4)3:3H2O -5.80	-52.88	-47.08	Ca4H(PO4)3:3H2O	
CaHP04 -1.79	-21.14	-19.35	CaHP04	
CaHP04:2H2O -2.09	-21.14	-19.05	CaHP04:2H2O	
Calomel -14.15	-32.28	-18.13	Hg2Cl2	
CaSeO3:2H2O -5.71	-2.85	2.86	CaSeO3:2H2O	
CaSeO4:2H2O -21.06	-24.06	-3.00	CaSeO4:2H2O	
Cd(OH)2 -8.81	5.06	13.87	Cd(OH)2	
Cd(OH)2(am) -8.88	5.06	13.94	Cd(OH)2	
Cd3(OH)2(SO4)2 -23.45	-16.74	6.71	Cd3(OH)2(SO4)2	
Cd3(OH)4SO4 -23.34	-0.78	22.56	Cd3(OH)4SO4	
Cd3(PO4)2 -15.59	-48.19	-32.60	Cd3(PO4)2	
Cd4(OH)6SO4 -24.12	4.28	28.40	Cd4(OH)6SO4	
CdCl2 -10.84	-11.45	-0.61	CdCl2	
CdCl2:1H2O -9.78	-11.45	-1.68	CdCl2:1H2O	
CdCl2:2.5H2O -9.52	-11.46	-1.93	CdCl2:2.5H2O	
Cdmetal(alpha) -24.21	-10.52	13.69	Cd	
Cdmetal(gamma) -24.32	-10.52	13.80	Cd	
CdOHCl -6.81	-3.20	3.61	CdOHCl	
CdSe 10.17	-10.21	-20.38	CdSe	
CdSeO4:2H2O -27.70	-29.55	-1.85	CdSeO4:2H2O	
CdSO4 -10.85	-10.90	-0.05	CdSO4	
CdSO4:1H2O -9.25	-10.90	-1.65	CdSO4:1H2O	
CdSO4:2.67H2O -9.07	-10.90	-1.83	CdSO4:2.67H2O	
Chalcanthite -9.36	-12.02	-2.65	CuSO4:5H2O	
Clausthalite 17.01	-10.37	-27.39	PbSe	
Co(OH)2 -4.62	8.47	13.09	Co(OH)2	
Co(OH)3 -14.05	-16.14	-2.09	Co(OH)3	
Co3(PO4)2 -3.27	-37.95	-34.69	Co3(PO4)2	
Co3O4 -13.57	-23.81	-10.24	Co3O4	
CoCl2 -16.50	-8.04	8.46	CoCl2	
CoCl2:6H2O -10.56	-8.05	2.52	CoCl2:6H2O	
CoFe2O4 21.18	18.03	-3.15	CoFe2O4	

CoHP04	-4.15	-23.21	-19.06	CoHP04
CoO	-5.37	8.47	13.84	CoO
CoSe	9.40	-6.80	-16.20	CoSe
CoSe03	-6.24	-4.92	1.32	CoSe03
CoSe04:6H2O	-24.61	-26.14	-1.53	CoSe04:6H2O
CoS04	-10.48	-7.49	2.99	CoS04
CoS04:6H2O	-5.02	-7.49	-2.48	CoS04:6H2O
Cotunnite	-6.77	-11.61	-4.84	PbCl2
Cu(OH)2	-4.87	3.94	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.82	-47.39	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.69	-17.62	-46.31	Cu2Se
Cu2S04	-16.40	-18.30	-1.90	Cu2S04
Cu3(P04)2	-14.69	-51.54	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-16.42	-51.54	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.35	-28.95	-64.30	Cu3Se2
Cumetal	-0.04	-8.96	-8.93	Cu
Cu0CuS04	-18.70	-8.07	10.63	Cu0CuS04
Cupricferrite	7.02	13.50	6.49	CuFe204
Cuprite	-1.24	-2.35	-1.11	Cu2O
Cuprousferrite	12.49	3.61	-8.88	CuFe02
CuSe	22.06	-11.33	-33.39	CuSe
CuSe2	22.68	-11.02	-33.70	CuSe2
CuSe03:2H2O	-10.05	-9.46	0.60	CuSe03:2H2O
CuSe04:5H2O	-28.23	-30.67	-2.44	CuSe04:5H2O
CuS04	-15.13	-12.01	3.11	CuS04
Diaspore	4.04	11.16	7.12	Al00H
Epsomite	-2.75	-4.90	-2.15	MgS04:7H2O
Fe(OH)2	-3.44	10.12	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.34	2.30	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-5.39	-3.84	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H2O	-10.00	-30.63	-20.63	Fe2(Se03)3:2H2O
Fe2(S04)3	-35.15	-38.31	-3.16	Fe2(S04)3
Fe3(OH)8	-0.54	19.68	20.22	Fe3(OH)8
Ferrihydrite	1.41	4.78	3.37	Fe(OH)3
Ferroselite	13.87	-4.84	-18.71	FeSe2
FeSe	5.86	-5.15	-11.00	FeSe
Gibbsite	2.64	11.16	8.52	Al(OH)3
Goethite	4.15	4.78	0.64	Fe00H
Goslarite	-6.50	-8.54	-2.05	ZnS04:7H2O
Gypsum	-0.80	-5.41	-4.61	CaS04:2H2O
H-Jarosite	-6.02	-17.57	-11.55	(H30)Fe3(S04)2(OH)6
H2Se(g)	-10.35	-15.27	-4.92	H2Se
Halite	-4.49	-2.90	1.59	NaCl
Hausmannite	-18.74	43.29	62.03	Mn304
Hematite	10.67	9.56	-1.11	Fe203
Hercynite	8.80	32.44	23.64	FeAl204
Hg(g)	-7.75	-15.67	-7.93	Hg
Hg(OH)2	-18.27	-21.76	-3.50	Hg(OH)2
Hg2(g)	-16.26	-31.35	-15.09	Hg2
Hg2(OH)2	-21.03	-15.77	5.26	Hg2(OH)2
Hg2HP04	-22.68	-47.45	-24.77	Hg2HP04
Hg2Se03	-24.51	-29.17	-4.66	Hg2Se03
Hg2S04	-25.58	-31.73	-6.14	Hg2S04
HgCl(g)	-36.02	-16.14	19.88	HgCl
HgCl2	-16.76	-38.28	-21.52	HgCl2
Hgmetal(l)	-2.02	-15.67	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSe03	-22.73	-35.16	-12.43	HgSe03
HgS04	-28.27	-37.72	-9.45	HgS04
Hinsdalite	-6.76	-9.26	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	2.00	-42.33	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-7.75	-70.54	-62.79	Pb5(P04)3OH
K-Alum	-11.65	-16.89	-5.24	KAl(S04)2:12H2O
K-Jarosite	0.79	-13.70	-14.49	KFe3(S04)2(OH)6
K2Se04	-26.12	-26.85	-0.73	K2Se04
Langite	-18.07	-0.19	17.88	Cu4(OH)6S04:H2O
Larnakite	-5.77	-6.15	-0.38	Pb0:PbS04
Laurionite	-3.98	-3.35	0.62	PbOHCl

Lepidocrocite	3.41	4.78	1.37	FeOOH
Lime	-22.62	10.54	33.16	CaO
Litharge	-7.95	4.90	12.85	PbO
Maghemite	3.18	9.56	6.39	Fe ₂ O ₃
Magnesioferrite	3.10	20.62	17.52	Fe ₂ MgO ₄
Magnetite	15.79	19.69	3.90	Fe ₃ O ₄
Manganite	-8.31	17.03	25.34	MnOOH
Massicot	-8.15	4.90	13.05	PbO
Melanothallite	-18.98	-12.57	6.41	CuCl ₂
Melanterite	-3.58	-5.84	-2.26	FeSO ₄ :7H ₂ O
Mg(OH) ₂ (active)	-7.73	11.06	18.79	Mg(OH) ₂
Mg ₃ (PO ₄) ₂	-6.90	-30.18	-23.28	Mg ₃ (PO ₄) ₂
MgHP04:3H ₂ O	-2.45	-20.62	-18.18	MgHP04:3H ₂ O
MgSe03:6H ₂ O	-5.38	-2.34	3.04	MgSe03:6H ₂ O
MgSe04:6H ₂ O	-22.35	-23.55	-1.20	MgSe04:6H ₂ O
Minium	-44.24	30.28	74.53	Pb ₃ O ₄
Mirabilite	-3.95	-5.25	-1.30	Na ₂ SO ₄ :10H ₂ O
Mn ₂ (SO ₄) ₃	-59.71	-65.03	-5.32	Mn ₂ (SO ₄) ₃
Mn ₃ (PO ₄) ₂	-11.81	-35.65	-23.85	Mn ₃ (PO ₄) ₂
MnCl ₂ :4H ₂ O	-10.02	-7.28	2.74	MnCl ₂ :4H ₂ O
MnHP04	2.95	-22.45	-25.40	MnHP04
MnSe	-9.77	-6.04	3.73	MnSe
MnSe03	-5.29	-4.16	1.13	MnSe03
MnSe03:2H ₂ O	-5.12	-4.16	0.96	MnSe03:2H ₂ O
MnSe04:5H ₂ O	-23.32	-25.37	-2.05	MnSe04:5H ₂ O
MnSO ₄	-9.46	-6.72	2.74	MnSO ₄
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.22	-21.76	-3.55	HgO
Morenosite	-5.87	-8.05	-2.17	NiSO ₄ :7H ₂ O
Na-Jarosite	-1.38	-12.22	-10.84	NaFe ₃ (SO ₄) ₂ (OH) ₆
Na ₂ Se03:5H ₂ O	-12.99	-2.69	10.30	Na ₂ Se03:5H ₂ O
Na ₂ Se04	-25.17	-23.89	1.28	Na ₂ Se04
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH) ₂	-5.11	7.91	13.02	Ni(OH) ₂
Ni ₃ (PO ₄) ₂	-8.32	-39.62	-31.30	Ni ₃ (PO ₄) ₂
Ni ₄ (OH) ₆ SO ₄	-16.30	15.70	32.00	Ni ₄ (OH) ₆ SO ₄
NiSe	10.34	-7.36	-17.70	NiSe
NiSe03:2H ₂ O	-8.37	-5.48	2.89	NiSe03:2H ₂ O
NiSe04:6H ₂ O	-25.17	-26.69	-1.52	NiSe04:6H ₂ O
Nsutite	-18.29	-0.79	17.50	MnO ₂
O ₂ (g)	-53.29	31.16	84.45	O ₂
Pb(OH) ₂	-3.39	4.90	8.29	Pb(OH) ₂
Pb ₂ (OH) ₃ Cl	-7.25	1.55	8.79	Pb ₂ (OH) ₃ Cl
Pb ₂ O(OH) ₂	-16.39	9.80	26.19	Pb ₂ O(OH) ₂
Pb ₂ O ₃	-35.66	25.38	61.04	Pb ₂ O ₃
Pb ₃ (PO ₄) ₂	-5.13	-48.66	-43.53	Pb ₃ (PO ₄) ₂
Pb ₃ O ₂ SO ₄	-12.13	-1.25	10.87	Pb ₃ O ₂ SO ₄
Pb ₄ (OH) ₆ SO ₄	-17.45	3.65	21.10	Pb ₄ (OH) ₆ SO ₄
Pb ₄ O ₃ SO ₄	-18.55	3.65	22.20	Pb ₄ O ₃ SO ₄
PbHP04	-2.98	-26.78	-23.81	PbHP04
Pbmetal	-14.92	-10.68	4.24	Pb
PbO:0.3H ₂ O	-8.08	4.90	12.98	PbO:0.33H ₂ O
PbSe04	-22.83	-29.70	-6.88	PbSe04
Periclase	-10.88	11.06	21.94	MgO
Plattnerite	-29.83	20.48	50.31	PbO ₂
Plumbgummite	7.80	-24.99	-32.79	PbAl ₃ (PO ₄) ₂ (OH) ₅ :H ₂ O
Portlandite	-12.57	10.54	23.11	Ca(OH) ₂
Pyrochroite	-6.19	9.24	15.43	Mn(OH) ₂
Pyrolusite	-17.21	24.82	42.03	MnO ₂
Pyromorphite	5.63	-78.80	-84.43	Pb ₅ (PO ₄) ₃ Cl
Retgersite	-6.00	-8.05	-2.05	NiSO ₄ :6H ₂ O
Semetal(am)	7.44	0.31	-7.14	Se
Semetal(hex)	8.05	0.31	-7.75	Se
SeO ₂	-13.52	-13.40	0.12	SeO ₂
SeO ₃	-56.00	-34.60	21.39	SeO ₃
Spinel	-4.39	33.38	37.77	MgAl ₂ O ₄
Strengite	-0.53	-26.90	-26.38	FePO ₄ :2H ₂ O
Tenorite	-3.86	3.94	7.80	CuO

Thenardite	-5.59	-5.25	0.34	Na2SO4
Tsumebite	-8.15	-17.94	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	3.00	-33.00	-36.00	Fe3(PO4)2:8H2O
Zincite	-4.13	7.42	11.55	ZnO
Zincosite	-12.66	-8.54	4.13	ZnSO4
Zn(NO3)2:6H2O	-106.39	-103.14	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.78	7.42	12.20	Zn(OH)2
Zn(OH)2(am)	-5.25	7.42	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.42	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.31	7.42	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.42	11.73	Zn(OH)2
Zn2(OH)2SO4	-8.62	-1.12	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.61	6.58	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-5.69	-41.11	-35.42	Zn3(PO4)2:4H2O
Zn30(SO4)2	-29.18	-9.65	19.53	Zn30(SO4)2
Zn4(OH)6SO4	-14.68	13.72	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.91	20.59	38.50	Zn5(OH)8Cl2
ZnCl2	-16.31	-9.09	7.22	ZnCl2
Znmetal	-34.31	-8.16	26.15	Zn
ZnO(active)	-3.98	7.42	11.40	ZnO
ZnSe	6.61	-7.85	-14.46	ZnSe
ZnSeO4:6H2O	-25.67	-27.19	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-8.00	-8.54	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 4.
Using reaction 5.

Mixture 4.

9.730e-01 Solution 1
2.700e-02 Solution 6

Reaction 5.

2.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000
Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	1.429e-05	1.378e-05
Ca	3.381e-03	3.259e-03
Cd	2.782e-08	2.681e-08
Cl	4.507e-02	4.344e-02
Co	4.138e-05	3.989e-05
Cu	5.084e-06	4.901e-06
Fe	1.873e-03	1.805e-03
Hg	1.039e-09	1.002e-09
K	1.653e-03	1.593e-03

Mg	1.055e-02	1.017e-02
Mn	2.315e-04	2.231e-04
N	5.209e-04	5.021e-04
Na	4.960e-02	4.781e-02
Ni	7.991e-06	7.703e-06
P	2.288e-05	2.206e-05
Pb	1.509e-08	1.455e-08
S	1.611e-02	1.553e-02
Se	3.960e-07	3.817e-07
Zn	2.710e-06	2.612e-06

-----Description of solution-----

pH	=	6.789	Charge balance
pe	=	1.008	Adjusted to redox equilibrium
Activity of water	=	0.998	
Ionic strength (mol/kgw)	=	9.589e-02	
Mass of water (kg)	=	9.640e-01	
Total alkalinity (eq/kg)	=	6.509e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	6.374e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	4.58	
Iterations	=	4	
Total H	=	1.070158e+02	
Total O	=	5.356909e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.071e-07	1.626e-07	-6.684	-6.789	-0.105	0.00
OH-	5.941e-08	4.551e-08	-7.226	-7.342	-0.116	(0)
H2O	5.551e+01	9.979e-01	1.744	-0.001	0.000	18.05
Al	1.429e-05					
Al(OH)4-	9.301e-06	7.259e-06	-5.031	-5.139	-0.108	(0)
Al(OH)2+	2.470e-06	1.956e-06	-5.607	-5.709	-0.101	(0)
Al(OH)3	2.413e-06	2.413e-06	-5.618	-5.618	0.000	(0)
AlOH+2	7.793e-08	3.065e-08	-7.108	-7.514	-0.405	(0)
AlSO4+	2.357e-08	1.840e-08	-7.628	-7.735	-0.108	(0)
Al+3	5.703e-09	6.445e-10	-8.244	-9.191	-0.947	(0)
Al(SO4)2-	1.183e-09	9.231e-10	-8.927	-9.035	-0.108	(0)
Ca	3.381e-03					
Ca+2	2.488e-03	9.441e-04	-2.604	-3.025	-0.421	(0)
CaSO4	8.918e-04	8.918e-04	-3.050	-3.050	0.000	(0)
CaHPO4	8.368e-07	8.368e-07	-6.077	-6.077	0.000	(0)
CaH2PO4+	1.349e-07	1.068e-07	-6.870	-6.971	-0.101	(0)
CaPO4-	1.585e-08	1.255e-08	-7.800	-7.901	-0.101	(0)
CaNH3+2	6.602e-09	1.557e-09	-8.180	-8.808	-0.627	(0)
CaOH+	1.025e-09	8.191e-10	-8.989	-9.087	-0.097	(0)
Ca(NH3)2+2	3.442e-15	8.116e-16	-14.463	-15.091	-0.627	(0)
CaNO3+	0.000e+00	0.000e+00	-50.772	-50.929	-0.157	(0)
Cd	2.782e-08					
CdCl+	1.462e-08	1.018e-08	-7.835	-7.992	-0.157	(0)
Cd+2	7.991e-09	3.032e-09	-8.097	-8.518	-0.421	(0)
CdSO4	2.906e-09	2.906e-09	-8.537	-8.537	0.000	(0)
CdCl2	1.485e-09	1.485e-09	-8.828	-8.828	0.000	(0)
Cd(SO4)2-2	7.476e-10	1.763e-10	-9.126	-9.754	-0.627	(0)
CdCl3-	4.575e-11	3.188e-11	-10.340	-10.496	-0.157	(0)
CdOHCl	2.350e-11	2.350e-11	-10.629	-10.629	0.000	(0)
CdOH+	1.582e-12	1.102e-12	-11.801	-11.958	-0.157	(0)
Cd(OH)2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
Cd2OH+3	4.544e-19	1.760e-20	-18.343	-19.754	-1.412	(0)
Cd(SeO3)2-2	4.131e-19	9.740e-20	-18.384	-19.011	-0.627	(0)
Cd(OH)3-	3.147e-21	2.193e-21	-20.502	-20.659	-0.157	(0)
CdSeO4	5.664e-28	5.664e-28	-27.247	-27.247	0.000	(0)

Cd(OH)4-2	9.411e-29	2.219e-29	-28.026	-28.654	-0.627	(0)
CdHS+	8.317e-39	5.796e-39	-38.080	-38.237	-0.157	(0)
CdNO3+	0.000e+00	0.000e+00	-56.229	-56.385	-0.157	(0)
Cd(HS)2	0.000e+00	0.000e+00	-68.760	-68.760	0.000	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-104.429	-104.586	-0.157	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.153	-105.153	0.000	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.490	-140.117	-0.627	(0)
Cl	4.507e-02					
Cl-	4.505e-02	3.536e-02	-1.346	-1.451	-0.105	(0)
CuCl2-	4.531e-06	3.504e-06	-5.344	-5.455	-0.112	(0)
MnCl+	2.604e-06	2.050e-06	-5.584	-5.688	-0.104	(0)
CoCl+	1.370e-06	9.543e-07	-5.863	-6.020	-0.157	(0)
CuCl	4.698e-07	4.698e-07	-6.328	-6.328	0.000	(0)
NiCl+	2.852e-07	1.987e-07	-6.545	-6.702	-0.157	(0)
MnCl2	1.024e-07	1.024e-07	-6.990	-6.990	0.000	(0)
ZnCl+	7.908e-08	6.116e-08	-7.102	-7.213	-0.112	(0)
CuCl3-2	6.801e-08	2.608e-08	-7.167	-7.584	-0.416	(0)
CdCl+	1.462e-08	1.018e-08	-7.835	-7.992	-0.157	(0)
ZnOHCl	5.099e-09	5.099e-09	-8.293	-8.293	0.000	(0)
PbCl+	3.651e-09	2.544e-09	-8.438	-8.594	-0.157	(0)
ZnCl2	2.882e-09	2.882e-09	-8.540	-8.540	0.000	(0)
CdCl2	1.485e-09	1.485e-09	-8.828	-8.828	0.000	(0)
MnCl3-	1.267e-09	9.970e-10	-8.897	-9.001	-0.104	(0)
PbCl2	3.947e-10	3.947e-10	-9.404	-9.404	0.000	(0)
ZnCl3-	1.030e-10	7.964e-11	-9.987	-10.099	-0.112	(0)
CdCl3-	4.575e-11	3.188e-11	-10.340	-10.496	-0.157	(0)
NiCl2	3.578e-11	3.578e-11	-10.446	-10.446	0.000	(0)
CdOHCl	2.350e-11	2.350e-11	-10.629	-10.629	0.000	(0)
CuCl+	1.578e-11	1.221e-11	-10.802	-10.913	-0.112	(0)
PbCl3-	8.330e-12	5.805e-12	-11.079	-11.236	-0.157	(0)
ZnCl4-2	3.555e-12	1.364e-12	-11.449	-11.865	-0.416	(0)
PbCl4-2	3.751e-13	8.844e-14	-12.426	-13.053	-0.627	(0)
CuCl2	1.229e-13	1.229e-13	-12.910	-12.910	0.000	(0)
FeCl+2	6.540e-16	2.508e-16	-15.184	-15.601	-0.416	(0)
FeCl2+	5.711e-17	4.494e-17	-16.243	-16.347	-0.104	(0)
CuCl3-	4.882e-17	3.776e-17	-16.311	-16.423	-0.112	(0)
HgCl2	1.586e-18	1.586e-18	-17.800	-17.800	0.000	(0)
HgCl3-	8.117e-19	5.656e-19	-18.091	-18.247	-0.157	(0)
HgCl4-2	3.503e-19	8.260e-20	-18.456	-19.083	-0.627	(0)
FeCl3	1.589e-19	1.589e-19	-18.799	-18.799	0.000	(0)
HgClOH	3.727e-20	3.727e-20	-19.429	-19.429	0.000	(0)
CuCl4-2	1.998e-20	7.663e-21	-19.699	-20.116	-0.416	(0)
HgCl+	1.091e-23	7.602e-24	-22.962	-23.119	-0.157	(0)
CoCl+2	8.942e-36	2.108e-36	-35.049	-35.676	-0.627	(0)
Co(NH3)5Cl+2	1.813e-39	4.275e-40	-38.742	-39.369	-0.627	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.318	-51.946	-0.627	(0)
Co(2)	4.138e-05					
Co+2	3.345e-05	7.888e-06	-4.476	-5.103	-0.627	(0)
CoSO4	6.522e-06	6.522e-06	-5.186	-5.186	0.000	(0)
CoCl+	1.370e-06	9.543e-07	-5.863	-6.020	-0.157	(0)
CoHP04	1.641e-08	1.641e-08	-7.785	-7.785	0.000	(0)
CoOH+	1.396e-08	9.729e-09	-7.855	-8.012	-0.157	(0)
Co(NH3)+2	7.525e-09	1.774e-09	-8.124	-8.751	-0.627	(0)
Co(OH)2	4.777e-11	4.777e-11	-10.321	-10.321	0.000	(0)
Co(NH3)2+2	2.943e-13	6.939e-14	-12.531	-13.159	-0.627	(0)
Co2OH+3	9.928e-14	3.846e-15	-13.003	-14.415	-1.412	(0)
Co(OH)3-	8.455e-17	5.892e-17	-16.073	-16.230	-0.157	(0)
CoOOH-	5.094e-18	3.550e-18	-17.293	-17.450	-0.157	(0)
Co(NH3)3+2	4.853e-18	1.144e-18	-17.314	-17.942	-0.627	(0)
Co4(OH)4+4	5.783e-22	1.787e-24	-21.238	-23.748	-2.510	(0)
Co(NH3)4+2	3.336e-23	7.865e-24	-22.477	-23.104	-0.627	(0)
CoSeO4	3.713e-24	3.713e-24	-23.430	-23.430	0.000	(0)
Co(OH)4-2	2.448e-24	5.772e-25	-23.611	-24.239	-0.627	(0)
Co(NH3)5+2	7.250e-29	1.709e-29	-28.140	-28.767	-0.627	(0)
CoNO2+	7.898e-40	5.504e-40	-39.102	-39.259	-0.157	(0)
CoNO3+	0.000e+00	0.000e+00	-53.163	-53.320	-0.157	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.429	-101.429	0.000	(0)
Co(3)	4.262e-31					

CoOH+2	4.262e-31	1.005e-31	-30.370	-30.998	-0.627	(0)
CoCl+2	8.942e-36	2.108e-36	-35.049	-35.676	-0.627	(0)
Co+3	2.831e-36	3.199e-37	-35.548	-36.495	-0.947	(0)
Co(NH3)5Cl+2	1.813e-39	4.275e-40	-38.742	-39.369	-0.627	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.828	-47.985	-0.157	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.318	-51.946	-0.627	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.627	-53.255	-0.627	(0)
Cu(1)	5.084e-06					
CuCl2-	4.531e-06	3.504e-06	-5.344	-5.455	-0.112	(0)
CuCl	4.698e-07	4.698e-07	-6.328	-6.328	0.000	(0)
CuCl3-2	6.801e-08	2.608e-08	-7.167	-7.584	-0.416	(0)
Cu+	1.514e-08	1.055e-08	-7.820	-7.977	-0.157	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.039	-66.462	-0.423	(0)
CuS4S5-3	0.000e+00	0.000e+00	-66.793	-67.192	-0.399	(0)
Cu(2)	8.973e-10					
Cu+2	6.008e-10	2.280e-10	-9.221	-9.642	-0.421	(0)
CuSO4	2.135e-10	2.135e-10	-9.671	-9.671	0.000	(0)
CuOH+	4.734e-11	3.662e-11	-10.325	-10.436	-0.112	(0)
CuNH3+2	1.924e-11	4.535e-12	-10.716	-11.343	-0.627	(0)
CuCl+	1.578e-11	1.221e-11	-10.802	-10.913	-0.112	(0)
Cu(OH)2	5.497e-13	5.497e-13	-12.260	-12.260	0.000	(0)
CuCl2	1.229e-13	1.229e-13	-12.910	-12.910	0.000	(0)
Cu2(OH)2+2	1.390e-16	3.277e-17	-15.857	-16.485	-0.627	(0)
Cu(OH)3-	1.000e-16	6.969e-17	-16.000	-16.157	-0.157	(0)
CuCl3-	4.882e-17	3.776e-17	-16.311	-16.423	-0.112	(0)
CuCl4-2	1.998e-20	7.663e-21	-19.699	-20.116	-0.416	(0)
Cu(OH)4-2	1.438e-22	3.391e-23	-21.842	-22.470	-0.627	(0)
CuNO2+	0.000e+00	0.000e+00	-42.470	-42.626	-0.157	(0)
CuNO3+	0.000e+00	0.000e+00	-57.393	-57.550	-0.157	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.621	-76.621	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.766	-96.923	-0.157	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-106.876	-106.876	0.000	(0)
Fe(2)	1.872e-03					
Fe+2	1.509e-03	3.558e-04	-2.821	-3.449	-0.627	(0)
FeSO4	3.584e-04	3.584e-04	-3.446	-3.446	0.000	(0)
FeHPO4	2.702e-06	2.702e-06	-5.568	-5.568	0.000	(0)
FeH2PO4+	1.102e-06	8.724e-07	-5.958	-6.059	-0.101	(0)
FeOH+	8.193e-07	6.448e-07	-6.087	-6.191	-0.104	(0)
Fe(OH)2	2.231e-11	2.231e-11	-10.652	-10.652	0.000	(0)
Fe(OH)3-	5.338e-13	4.201e-13	-12.273	-12.377	-0.104	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.952	-69.952	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.485	-105.642	-0.157	(0)
Fe(3)	3.327e-07					
Fe(OH)2+	3.230e-07	2.557e-07	-6.491	-6.592	-0.101	(0)
Fe(OH)3	9.608e-09	9.608e-09	-8.017	-8.017	0.000	(0)
Fe(OH)4-	1.234e-10	9.772e-11	-9.909	-10.010	-0.101	(0)
FeOH+2	2.205e-11	8.455e-12	-10.657	-11.073	-0.416	(0)
FeHPO4+	6.269e-12	4.964e-12	-11.203	-11.304	-0.101	(0)
FeSO4+	1.420e-14	1.118e-14	-13.848	-13.952	-0.104	(0)
Fe+3	2.358e-15	2.665e-16	-14.627	-15.574	-0.947	(0)
Fe(SO4)2-	1.518e-15	1.058e-15	-14.819	-14.976	-0.157	(0)
FeCl+2	6.540e-16	2.508e-16	-15.184	-15.601	-0.416	(0)
FeH2PO4+2	6.293e-17	2.475e-17	-16.201	-16.606	-0.405	(0)
FeCl2+	5.711e-17	4.494e-17	-16.243	-16.347	-0.104	(0)
Fe2(OH)2+4	8.834e-19	2.730e-21	-18.054	-20.564	-2.510	(0)
FeHSeO3+2	6.637e-19	1.565e-19	-18.178	-18.806	-0.627	(0)
FeCl3	1.589e-19	1.589e-19	-18.799	-18.799	0.000	(0)
Fe3(OH)4+5	8.085e-23	9.679e-27	-22.092	-26.014	-3.922	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.276	-62.903	-0.627	(0)
H(0)	3.671e-19					
H2	1.835e-19	1.876e-19	-18.736	-18.727	0.010	(0)
Hg(0)	1.039e-09					
Hg	1.039e-09	1.039e-09	-8.983	-8.983	0.000	(0)
Hg(1)	4.234e-29					
Hg2+2	2.117e-29	4.992e-30	-28.674	-29.302	-0.627	(0)
Hg(2)	2.785e-18					
HgCl2	1.586e-18	1.586e-18	-17.800	-17.800	0.000	(0)
HgCl3-	8.117e-19	5.656e-19	-18.091	-18.247	-0.157	(0)

	HgCl4-2	3.503e-19	8.260e-20	-18.456	-19.083	-0.627	(0)
	HgClOH	3.727e-20	3.727e-20	-19.429	-19.429	0.000	(0)
	Hg(OH)2	1.801e-22	1.841e-22	-21.744	-21.735	0.010	(0)
	Hg(NH3)2+2	1.357e-22	3.200e-23	-21.867	-22.495	-0.627	(0)
	HgCl+	1.091e-23	7.602e-24	-22.962	-23.119	-0.157	(0)
	HgOH+	2.992e-26	2.085e-26	-25.524	-25.681	-0.157	(0)
	HgNH3+2	2.677e-26	6.312e-27	-25.572	-26.200	-0.627	(0)
	Hg(NH3)3+2	1.016e-27	2.396e-28	-26.993	-27.620	-0.627	(0)
	Hg+2	4.028e-29	9.497e-30	-28.395	-29.022	-0.627	(0)
	HgS04	8.574e-30	8.574e-30	-29.067	-29.067	0.000	(0)
	Hg(OH)3-	2.056e-30	1.433e-30	-29.687	-29.844	-0.157	(0)
	Hg(NH3)4+2	1.527e-32	3.600e-33	-31.816	-32.444	-0.627	(0)
	HgHS2-	0.000e+00	0.000e+00	-65.697	-65.853	-0.157	(0)
	Hg(HS)2	0.000e+00	0.000e+00	-66.248	-66.248	0.000	(0)
	HgS2-2	0.000e+00	0.000e+00	-67.145	-67.772	-0.627	(0)
	HgNO3+	0.000e+00	0.000e+00	-77.810	-77.967	-0.157	(0)
	Hg(NO3)2	0.000e+00	0.000e+00	-126.765	-126.765	0.000	(0)
K		1.653e-03					
	K+	1.605e-03	1.260e-03	-2.794	-2.900	-0.105	(0)
	KS04-	4.722e-05	3.740e-05	-4.326	-4.427	-0.101	(0)
	KHP04-	2.302e-08	1.823e-08	-7.638	-7.739	-0.101	(0)
Mg		1.055e-02					
	Mg+2	8.194e-03	3.109e-03	-2.086	-2.507	-0.421	(0)
	MgS04	2.350e-03	2.350e-03	-2.629	-2.629	0.000	(0)
	MgHP04	3.804e-06	3.804e-06	-5.420	-5.420	0.000	(0)
	MgH2P04+	9.500e-07	7.523e-07	-6.022	-6.124	-0.101	(0)
	MgOH+	6.557e-08	5.275e-08	-7.183	-7.278	-0.095	(0)
	MgP04-	8.158e-10	6.460e-10	-9.088	-9.190	-0.101	(0)
Mn(2)		2.315e-04					
	Mn+2	1.953e-04	4.604e-05	-3.709	-4.337	-0.627	(0)
	MnS04	3.347e-05	3.347e-05	-4.475	-4.475	0.000	(0)
	MnCl+	2.604e-06	2.050e-06	-5.584	-5.688	-0.104	(0)
	MnCl2	1.024e-07	1.024e-07	-6.990	-6.990	0.000	(0)
	MnOH+	6.689e-09	5.264e-09	-8.175	-8.279	-0.104	(0)
	MnCl3-	1.267e-09	9.970e-10	-8.897	-9.001	-0.104	(0)
	MnSe	3.578e-12	3.578e-12	-11.446	-11.446	0.000	(0)
	Mn(OH)3-	2.145e-19	1.688e-19	-18.669	-18.773	-0.104	(0)
	MnSe04	1.151e-23	1.151e-23	-22.939	-22.939	0.000	(0)
	Mn(OH)4-2	8.784e-26	3.369e-26	-25.056	-25.472	-0.416	(0)
	MnNO3+	0.000e+00	0.000e+00	-52.397	-52.554	-0.157	(0)
	Mn(NO3)2	0.000e+00	0.000e+00	-100.567	-100.567	0.000	(0)
Mn(3)		1.026e-28					
	Mn+3	1.026e-28	1.160e-29	-27.989	-28.936	-0.947	(0)
Mn(6)		0.000e+00					
	Mn04-2	0.000e+00	0.000e+00	-65.696	-66.112	-0.416	(0)
Mn(7)		0.000e+00					
	Mn04-	0.000e+00	0.000e+00	-74.622	-74.742	-0.120	(0)
N(-3)		5.209e-04					
	NH4+	4.981e-04	3.734e-04	-3.303	-3.428	-0.125	(0)
	NH4S04-	2.180e-05	1.715e-05	-4.662	-4.766	-0.104	(0)
	NH3	9.847e-07	9.847e-07	-6.007	-6.007	0.000	(0)
	NiNH3+2	9.568e-09	2.256e-09	-8.019	-8.647	-0.627	(0)
	Co(NH3)+2	7.525e-09	1.774e-09	-8.124	-8.751	-0.627	(0)
	CaNH3+2	6.602e-09	1.557e-09	-8.180	-8.808	-0.627	(0)
	CuNH3+2	1.924e-11	4.535e-12	-10.716	-11.343	-0.627	(0)
	Ni(NH3)2+2	2.313e-12	5.455e-13	-11.636	-12.263	-0.627	(0)
	Co(NH3)2+2	2.943e-13	6.939e-14	-12.531	-13.159	-0.627	(0)
	Ca(NH3)2+2	3.442e-15	8.116e-16	-14.463	-15.091	-0.627	(0)
	Co(NH3)3+2	4.853e-18	1.144e-18	-17.314	-17.942	-0.627	(0)
	Hg(NH3)2+2	1.357e-22	3.200e-23	-21.867	-22.495	-0.627	(0)
	Co(NH3)4+2	3.336e-23	7.865e-24	-22.477	-23.104	-0.627	(0)
	HgNH3+2	2.677e-26	6.312e-27	-25.572	-26.200	-0.627	(0)
	Hg(NH3)3+2	1.016e-27	2.396e-28	-26.993	-27.620	-0.627	(0)
	Co(NH3)5+2	7.250e-29	1.709e-29	-28.140	-28.767	-0.627	(0)
	Hg(NH3)4+2	1.527e-32	3.600e-33	-31.816	-32.444	-0.627	(0)
	Co(NH3)5Cl+2	1.813e-39	4.275e-40	-38.742	-39.369	-0.627	(0)
	Co(NH3)6S04+	0.000e+00	0.000e+00	-47.828	-47.985	-0.157	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.318	-51.946	-0.627	(0)

Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.627	-53.255	-0.627	(0)
N(3)	1.306e-35					
N02-	1.306e-35	9.901e-36	-34.884	-35.004	-0.120	(0)
CoN02+	7.898e-40	5.504e-40	-39.102	-39.259	-0.157	(0)
CuN02+	0.000e+00	0.000e+00	-42.470	-42.626	-0.157	(0)
Cu(N02)2	0.000e+00	0.000e+00	-76.621	-76.621	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-48.312	-48.417	-0.105	(0)
CaN03+	0.000e+00	0.000e+00	-50.772	-50.929	-0.157	(0)
MnN03+	0.000e+00	0.000e+00	-52.397	-52.554	-0.157	(0)
CoN03+	0.000e+00	0.000e+00	-53.163	-53.320	-0.157	(0)
NiN03+	0.000e+00	0.000e+00	-53.514	-53.671	-0.157	(0)
ZnN03+	0.000e+00	0.000e+00	-53.999	-54.155	-0.157	(0)
PbN03+	0.000e+00	0.000e+00	-55.767	-55.924	-0.157	(0)
CdN03+	0.000e+00	0.000e+00	-56.229	-56.385	-0.157	(0)
CuN03+	0.000e+00	0.000e+00	-57.393	-57.550	-0.157	(0)
FeN03+2	0.000e+00	0.000e+00	-62.276	-62.903	-0.627	(0)
HgN03+	0.000e+00	0.000e+00	-77.810	-77.967	-0.157	(0)
Mn(N03)2	0.000e+00	0.000e+00	-100.567	-100.567	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-101.429	-101.429	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-103.284	-103.284	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-104.091	-104.091	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-105.153	-105.153	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-106.876	-106.876	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-126.765	-126.765	0.000	(0)
Na	4.960e-02					
Na+	4.850e-02	3.806e-02	-1.314	-1.420	-0.105	(0)
NaS04-	1.101e-03	8.716e-04	-2.958	-3.060	-0.101	(0)
NaHP04-	1.077e-06	8.530e-07	-5.968	-6.069	-0.101	(0)
Ni	7.991e-06					
Ni+2	5.853e-06	2.221e-06	-5.233	-5.653	-0.421	(0)
NiS04	1.840e-06	1.840e-06	-5.735	-5.735	0.000	(0)
NiCl+	2.852e-07	1.987e-07	-6.545	-6.702	-0.157	(0)
NiNH3+2	9.568e-09	2.256e-09	-8.019	-8.647	-0.627	(0)
NiOH+	1.867e-09	1.301e-09	-8.729	-8.886	-0.157	(0)
Ni(S04)2-2	1.144e-09	2.697e-10	-8.942	-9.569	-0.627	(0)
NiCl2	3.578e-11	3.578e-11	-10.446	-10.446	0.000	(0)
Ni(OH)2	8.487e-12	8.487e-12	-11.071	-11.071	0.000	(0)
Ni(NH3)2+2	2.313e-12	5.455e-13	-11.636	-12.263	-0.627	(0)
Ni(OH)3-	7.528e-16	5.246e-16	-15.123	-15.280	-0.157	(0)
NiSe04	9.651e-25	9.651e-25	-24.015	-24.015	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-53.514	-53.671	-0.157	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.965	-55.955	0.010	(0)
P	2.288e-05					
H2P04-	6.818e-06	5.399e-06	-5.166	-5.268	-0.101	(0)
HP04-2	5.400e-06	2.071e-06	-5.268	-5.684	-0.416	(0)
MgHP04	3.804e-06	3.804e-06	-5.420	-5.420	0.000	(0)
FeHP04	2.702e-06	2.702e-06	-5.568	-5.568	0.000	(0)
FeH2P04+	1.102e-06	8.724e-07	-5.958	-6.059	-0.101	(0)
NaHP04-	1.077e-06	8.530e-07	-5.968	-6.069	-0.101	(0)
MgH2P04+	9.500e-07	7.523e-07	-6.022	-6.124	-0.101	(0)
CaHP04	8.368e-07	8.368e-07	-6.077	-6.077	0.000	(0)
CaH2P04+	1.349e-07	1.068e-07	-6.870	-6.971	-0.101	(0)
KHP04-	2.302e-08	1.823e-08	-7.638	-7.739	-0.101	(0)
CoHP04	1.641e-08	1.641e-08	-7.785	-7.785	0.000	(0)
CaP04-	1.585e-08	1.255e-08	-7.800	-7.901	-0.101	(0)
MgP04-	8.158e-10	6.460e-10	-9.088	-9.190	-0.101	(0)
H3P04	1.182e-10	1.182e-10	-9.927	-9.927	0.000	(0)
P04-3	4.379e-11	4.948e-12	-10.359	-11.306	-0.947	(0)
FeHP04+	6.269e-12	4.964e-12	-11.203	-11.304	-0.101	(0)
FeH2P04+2	6.293e-17	2.475e-17	-16.201	-16.606	-0.405	(0)
Pb	1.509e-08					
Pb+2	5.605e-09	2.127e-09	-8.251	-8.672	-0.421	(0)
PbS04	4.467e-09	4.467e-09	-8.350	-8.350	0.000	(0)
PbCl+	3.651e-09	2.544e-09	-8.438	-8.594	-0.157	(0)
Pb(S04)2-2	4.894e-10	1.154e-10	-9.310	-9.938	-0.627	(0)
Pb0H+	4.740e-10	3.303e-10	-9.324	-9.481	-0.157	(0)

PbCl2	3.947e-10	3.947e-10	-9.404	-9.404	0.000	(0)
PbCl3-	8.330e-12	5.805e-12	-11.079	-11.236	-0.157	(0)
Pb(OH)2	6.456e-13	6.456e-13	-12.190	-12.190	0.000	(0)
PbCl4-2	3.751e-13	8.844e-14	-12.426	-13.053	-0.627	(0)
Pb2OH+3	2.874e-16	1.113e-17	-15.542	-16.953	-1.412	(0)
Pb(OH)3-	5.727e-17	3.991e-17	-16.242	-16.399	-0.157	(0)
Pb(OH)4-2	2.562e-21	6.041e-22	-20.591	-21.219	-0.627	(0)
Pb3(OH)4+2	3.987e-23	9.401e-24	-22.399	-23.027	-0.627	(0)
Pb4(OH)4+4	5.960e-26	1.842e-28	-25.225	-27.735	-2.510	(0)
PbNO3+	0.000e+00	0.000e+00	-55.767	-55.924	-0.157	(0)
Pb(HS)2	0.000e+00	0.000e+00	-68.856	-68.856	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.091	-104.091	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.125	-105.282	-0.157	(0)
S(-2)	7.145e-38					
H2S	3.603e-38	3.603e-38	-37.443	-37.443	0.000	(0)
HS-	2.693e-38	1.876e-38	-37.570	-37.727	-0.157	(0)
CdHS+	8.317e-39	5.796e-39	-38.080	-38.237	-0.157	(0)
S5-2	1.718e-40	0.000e+00	-39.765	-40.392	-0.627	(0)
S6-2	0.000e+00	0.000e+00	-40.191	-40.819	-0.627	(0)
S4-2	0.000e+00	0.000e+00	-40.365	-40.992	-0.627	(0)
S3-2	0.000e+00	0.000e+00	-41.177	-41.805	-0.627	(0)
S2-2	0.000e+00	0.000e+00	-42.204	-42.831	-0.627	(0)
S-2	0.000e+00	0.000e+00	-47.939	-48.355	-0.416	(0)
HgHS2-	0.000e+00	0.000e+00	-65.697	-65.853	-0.157	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.039	-66.462	-0.423	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.248	-66.248	0.000	(0)
CuS4S5-3	0.000e+00	0.000e+00	-66.793	-67.192	-0.399	(0)
HgS2-2	0.000e+00	0.000e+00	-67.145	-67.772	-0.627	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-67.847	-68.004	-0.157	(0)
Cd(HS)2	0.000e+00	0.000e+00	-68.760	-68.760	0.000	(0)
Zn(HS)2	0.000e+00	0.000e+00	-68.783	-68.783	0.000	(0)
Pb(HS)2	0.000e+00	0.000e+00	-68.856	-68.856	0.000	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.952	-69.952	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.766	-96.923	-0.157	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.072	-103.229	-0.157	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-104.429	-104.586	-0.157	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.125	-105.282	-0.157	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.485	-105.642	-0.157	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-105.793	-106.420	-0.627	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.490	-140.117	-0.627	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-141.788	-142.416	-0.627	(0)
S(6)	1.611e-02					
S04-2	1.130e-02	4.287e-03	-1.947	-2.368	-0.421	(0)
MgS04	2.350e-03	2.350e-03	-2.629	-2.629	0.000	(0)
NaS04-	1.101e-03	8.716e-04	-2.958	-3.060	-0.101	(0)
CaS04	8.918e-04	8.918e-04	-3.050	-3.050	0.000	(0)
FeS04	3.584e-04	3.584e-04	-3.446	-3.446	0.000	(0)
KS04-	4.722e-05	3.740e-05	-4.326	-4.427	-0.101	(0)
MnS04	3.347e-05	3.347e-05	-4.475	-4.475	0.000	(0)
NH4S04-	2.180e-05	1.715e-05	-4.662	-4.766	-0.104	(0)
CoS04	6.522e-06	6.522e-06	-5.186	-5.186	0.000	(0)
NiS04	1.840e-06	1.840e-06	-5.735	-5.735	0.000	(0)
ZnS04	6.431e-07	6.431e-07	-6.192	-6.192	0.000	(0)
Zn(S04)2-2	1.054e-07	2.485e-08	-6.977	-7.605	-0.627	(0)
HS04-	7.735e-08	6.036e-08	-7.112	-7.219	-0.108	(0)
AlS04+	2.357e-08	1.840e-08	-7.628	-7.735	-0.108	(0)
PbS04	4.467e-09	4.467e-09	-8.350	-8.350	0.000	(0)
CdS04	2.906e-09	2.906e-09	-8.537	-8.537	0.000	(0)
Al(S04)2-	1.183e-09	9.231e-10	-8.927	-9.035	-0.108	(0)
Ni(S04)2-2	1.144e-09	2.697e-10	-8.942	-9.569	-0.627	(0)
Cd(S04)2-2	7.476e-10	1.763e-10	-9.126	-9.754	-0.627	(0)
Pb(S04)2-2	4.894e-10	1.154e-10	-9.310	-9.938	-0.627	(0)
CuS04	2.135e-10	2.135e-10	-9.671	-9.671	0.000	(0)
FeS04+	1.420e-14	1.118e-14	-13.848	-13.952	-0.104	(0)
Fe(S04)2-	1.518e-15	1.058e-15	-14.819	-14.976	-0.157	(0)
HgS04	8.574e-30	8.574e-30	-29.067	-29.067	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.828	-47.985	-0.157	(0)
Se(-2)	4.407e-09					

HSe-	4.399e-09	3.066e-09	-8.357	-8.513	-0.157	(0)
H2Se	3.799e-12	3.799e-12	-11.420	-11.420	0.000	(0)
MnSe	3.578e-12	3.578e-12	-11.446	-11.446	0.000	(0)
Se-2	6.143e-17	1.448e-17	-16.212	-16.839	-0.627	(0)
Se(4)	3.916e-07					
HSeO3-	3.658e-07	2.549e-07	-6.437	-6.594	-0.157	(0)
SeO3-2	2.576e-08	6.073e-09	-7.589	-8.217	-0.627	(0)
H2SeO3	1.708e-11	1.708e-11	-10.767	-10.767	0.000	(0)
FeHSeO3+2	6.637e-19	1.565e-19	-18.178	-18.806	-0.627	(0)
Cd(SeO3)2-2	4.131e-19	9.740e-20	-18.384	-19.011	-0.627	(0)
Se(6)	2.660e-21					
SeO4-2	2.644e-21	1.003e-21	-20.578	-20.999	-0.421	(0)
MnSeO4	1.151e-23	1.151e-23	-22.939	-22.939	0.000	(0)
CoSeO4	3.713e-24	3.713e-24	-23.430	-23.430	0.000	(0)
NiSeO4	9.651e-25	9.651e-25	-24.015	-24.015	0.000	(0)
ZnSeO4	1.102e-25	1.102e-25	-24.958	-24.958	0.000	(0)
HSeO4-	1.034e-26	7.204e-27	-25.986	-26.142	-0.157	(0)
CdSeO4	5.664e-28	5.664e-28	-27.247	-27.247	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.323	-45.950	-0.627	(0)
Zn	2.710e-06					
Zn+2	1.869e-06	7.093e-07	-5.728	-6.149	-0.421	(0)
ZnSO4	6.431e-07	6.431e-07	-6.192	-6.192	0.000	(0)
Zn(SO4)2-2	1.054e-07	2.485e-08	-6.977	-7.605	-0.627	(0)
ZnCl+	7.908e-08	6.116e-08	-7.102	-7.213	-0.112	(0)
ZnOHCl	5.099e-09	5.099e-09	-8.293	-8.293	0.000	(0)
ZnOH+	4.633e-09	3.228e-09	-8.334	-8.491	-0.157	(0)
ZnCl2	2.882e-09	2.882e-09	-8.540	-8.540	0.000	(0)
ZnCl3-	1.030e-10	7.964e-11	-9.987	-10.099	-0.112	(0)
Zn(OH)2	4.296e-11	4.296e-11	-10.367	-10.367	0.000	(0)
ZnCl4-2	3.555e-12	1.364e-12	-11.449	-11.865	-0.416	(0)
Zn(OH)3-	1.910e-14	1.331e-14	-13.719	-13.876	-0.157	(0)
Zn(OH)4-2	1.389e-19	3.275e-20	-18.857	-19.485	-0.627	(0)
ZnSeO4	1.102e-25	1.102e-25	-24.958	-24.958	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.323	-45.950	-0.627	(0)
ZnNO3+	0.000e+00	0.000e+00	-53.999	-54.155	-0.157	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-67.847	-68.004	-0.157	(0)
Zn(HS)2	0.000e+00	0.000e+00	-68.783	-68.783	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.072	-103.229	-0.157	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.284	-103.284	0.000	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-105.793	-106.420	-0.627	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-141.788	-142.416	-0.627	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	124.25	-117.97	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-28.58	-24.04	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.84	-24.04	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-179.51	-161.58	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.79	-20.68	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-28.30	-27.85	0.45	(NH4)2SeO4
Al(OH)3(am)	0.11	11.17	11.06	Al(OH)3
Al2O3	2.08	22.35	20.27	Al2O3
Al4(OH)10SO4	6.05	28.75	22.70	Al4(OH)10SO4
AlOHSO4	-1.54	-4.77	-3.23	AlOHSO4
Alunite	6.42	5.52	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.22	-11.04	-7.82	PbSO4
Anhydrite	-1.05	-5.39	-4.34	CaSO4
Anilite	-13.00	-45.31	-32.31	Cu0.25Cu1.5S
Antlerite	-12.93	-4.14	8.79	Cu3(OH)4SO4
Atacamite	-7.98	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.76	-8.52	-1.76	ZnSO4·6H2O
Birnessite	-18.86	-0.77	18.09	MnO2
Bixbyite	-16.79	-17.14	-0.35	Mn2O3
BlaubleiI	-17.05	-41.21	-24.16	Cu0.9Cu0.2S
BlaubleiII	-15.83	-43.10	-27.28	Cu0.6Cu0.8S
Boehmite	2.32	11.17	8.86	AlOOH

Brochantite	-15.91	-0.21	15.71	Cu ₄ (OH) ₆ SO ₄
Brucite	-6.05	11.07	17.12	Mg(OH) ₂
Bunsenite	-4.76	7.92	12.68	NiO
Ca ₃ (PO ₄) ₂ (beta)	-2.64	-31.69	-29.05	Ca ₃ (PO ₄) ₂
Ca ₄ H(PO ₄) ₃ ·3H ₂ O	-5.73	-52.81	-47.08	Ca ₄ H(PO ₄) ₃ ·3H ₂ O
CaHP04	-1.77	-21.12	-19.35	CaHP04
CaHP04:2H2O	-2.07	-21.12	-19.05	CaHP04:2H2O
Calomel	-14.08	-32.20	-18.13	Hg ₂ Cl ₂
CaSe03:2H2O	-5.69	-2.83	2.86	CaSe03:2H2O
CaSe04:2H2O	-21.03	-24.03	-3.00	CaSe04:2H2O
Cd(OH) ₂	-8.81	5.06	13.87	Cd(OH) ₂
Cd(OH) ₂ (am)	-8.88	5.06	13.94	Cd(OH) ₂
Cd ₃ (OH) ₂ (SO ₄) ₂	-23.42	-16.71	6.71	Cd ₃ (OH) ₂ (SO ₄) ₂
Cd ₃ (OH) ₄ SO ₄	-23.33	-0.77	22.56	Cd ₃ (OH) ₄ SO ₄
Cd ₃ (PO ₄) ₂	-15.57	-48.17	-32.60	Cd ₃ (PO ₄) ₂
Cd ₄ (OH) ₆ SO ₄	-24.11	4.29	28.40	Cd ₄ (OH) ₆ SO ₄
CdCl ₂	-10.81	-11.42	-0.61	CdCl ₂
CdCl ₂ :1H ₂ O	-9.75	-11.42	-1.68	CdCl ₂ :1H ₂ O
CdCl ₂ :2.5H ₂ O	-9.49	-11.42	-1.93	CdCl ₂ :2.5H ₂ O
Cdmetal(alpha)	-24.23	-10.53	13.69	Cd
Cdmetal(gamma)	-24.33	-10.53	13.80	Cd
CdOHCl	-6.79	-3.18	3.61	CdOHCl
CdSe	10.14	-10.24	-20.38	CdSe
CdSe04:2H2O	-27.67	-29.52	-1.85	CdSe04:2H2O
CdSO ₄	-10.84	-10.89	-0.05	CdSO ₄
CdSO ₄ :1H ₂ O	-9.24	-10.89	-1.65	CdSO ₄ :1H ₂ O
CdSO ₄ :2.67H ₂ O	-9.06	-10.89	-1.83	CdSO ₄ :2.67H ₂ O
Chalcanthite	-9.36	-12.01	-2.65	CuSO ₄ :5H ₂ O
Chalcocite	-11.57	-46.89	-35.32	Cu ₂ S
Chalcopyrite	-39.34	-74.97	-35.62	CuFeS ₂
Cinnabar	-19.95	-66.25	-46.30	HgS
Clausthalite	16.99	-10.40	-27.39	PbSe
Co(OH) ₂	-4.62	8.47	13.09	Co(OH) ₂
Co(OH) ₃	-14.04	-16.13	-2.09	Co(OH) ₃
Co ₃ (PO ₄) ₂	-3.23	-37.92	-34.69	Co ₃ (PO ₄) ₂
Co ₃ O ₄	-13.55	-23.78	-10.24	Co ₃ O ₄
CoCl ₂	-16.46	-8.01	8.46	CoCl ₂
CoCl ₂ :6H ₂ O	-10.53	-8.01	2.52	CoCl ₂ :6H ₂ O
CoFe ₂ O ₄	21.21	18.06	-3.15	CoFe ₂ O ₄
CoHP04	-4.14	-23.20	-19.06	CoHP04
CoO	-5.37	8.47	13.84	CoO
CoS(alpha)	-28.60	-36.04	-7.44	CoS
CoS(beta)	-24.97	-36.04	-11.07	CoS
CoSe	9.37	-6.83	-16.20	CoSe
CoSe03	-6.23	-4.91	1.32	CoSe03
CoSe04:6H2O	-24.58	-26.11	-1.53	CoSe04:6H2O
CoSO ₄	-10.46	-7.47	2.99	CoSO ₄
CoSO ₄ :6H2O	-5.00	-7.48	-2.48	CoSO ₄ :6H2O
Cotunnite	-6.73	-11.58	-4.84	PbCl ₂
Covellite	-18.05	-40.58	-22.53	CuS
Cu(OH) ₂	-4.87	3.93	8.81	Cu(OH) ₂
Cu ₂ (OH) ₃ NO ₃	-56.76	-47.34	9.42	Cu ₂ (OH) ₃ NO ₃
Cu ₂ Se(alpha)	28.63	-17.68	-46.31	Cu ₂ Se
Cu ₂ SO ₄	-16.42	-18.32	-1.90	Cu ₂ SO ₄
Cu ₃ (PO ₄) ₂	-14.69	-51.54	-36.85	Cu ₃ (PO ₄) ₂
Cu ₃ (PO ₄) ₂ ·3H ₂ O	-16.42	-51.54	-35.12	Cu ₃ (PO ₄) ₂ ·3H ₂ O
Cu ₃ Se ₂	35.26	-29.04	-64.30	Cu ₃ Se ₂
Cumetal	-0.06	-8.98	-8.93	Cu
CuOCuSO ₄	-18.71	-8.07	10.63	CuOCuSO ₄
Cupricferrite	7.03	13.52	6.49	CuFe ₂ O ₄
Cuprite	-1.27	-2.38	-1.11	Cu ₂ O
Cuprousferrite	12.48	3.60	-8.88	CuFeO ₂
CuSe	22.02	-11.37	-33.39	CuSe
CuSe ₂	22.63	-11.07	-33.70	CuSe ₂
CuSe03:2H2O	-10.05	-9.45	0.60	CuSe03:2H2O
CuSe04:5H2O	-28.21	-30.65	-2.44	CuSe04:5H2O
CuSO ₄	-15.12	-12.01	3.11	CuSO ₄
Diaspore	4.06	11.17	7.12	Al ₂ O ₃

Djurleite	-12.08	-46.47	-34.40	Cu0.066Cu1.868S
Epsomite	-2.73	-4.88	-2.15	MgSO4:7H2O
Fe(OH)2	-3.44	10.13	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.36	2.32	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-5.35	-3.80	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-9.94	-30.56	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-35.09	-38.25	-3.16	Fe2(SO4)3
Fe3(OH)8	-0.51	19.71	20.22	Fe3(OH)8
Ferrihydrite	1.42	4.79	3.37	Fe(OH)3
Ferroselite	13.83	-4.88	-18.71	FeSe2
FeS(ppt)	-31.46	-34.39	-2.92	FeS
FeSe	5.83	-5.17	-11.00	FeSe
Galena	-25.45	-39.61	-14.16	PbS
Gibbsite	2.66	11.17	8.52	Al(OH)3
Goethite	4.16	4.79	0.64	FeOOH
Goslarite	-6.48	-8.52	-2.05	ZnSO4:7H2O
Greenockite	-24.96	-39.46	-14.49	CdS
Greigite	-113.31	-158.35	-45.03	Fe3S4
Gypsum	-0.78	-5.39	-4.61	CaSO4:2H2O
H-Jarosite	-5.97	-17.52	-11.55	(H3O)Fe3(SO4)2(OH)6
H2S(g)	-36.51	-44.52	-8.01	H2S
H2Se(g)	-10.38	-15.30	-4.92	H2Se
Halite	-4.46	-2.87	1.59	NaCl
Hausmannite	-18.72	43.31	62.03	Mn3O4
Hematite	10.69	9.58	-1.11	Fe2O3
Hercynite	8.84	32.48	23.64	FeAl2O4
Hg(g)	-7.73	-15.66	-7.93	Hg
Hg(OH)2	-18.24	-21.73	-3.50	Hg(OH)2
Hg2(g)	-16.22	-31.32	-15.09	Hg2
Hg2(OH)2	-20.99	-15.73	5.26	Hg2(OH)2
Hg2HP04	-22.62	-47.40	-24.77	Hg2HP04
Hg2S	-48.40	-60.24	-11.84	Hg2S
Hg2SeO3	-24.45	-29.11	-4.66	Hg2SeO3
Hg2SO4	-25.53	-31.67	-6.14	Hg2SO4
HgCl(g)	-35.99	-16.10	19.88	HgCl
HgCl2	-16.70	-38.21	-21.52	HgCl2
Hgmetal(l)	-2.01	-15.66	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSeO3	-22.69	-35.12	-12.43	HgSeO3
HgSO4	-28.22	-37.68	-9.45	HgSO4
Hinsdalite	-6.69	-9.19	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	2.08	-42.25	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-7.70	-70.49	-62.79	Pb5(P04)3OH
K-Alum	-11.60	-16.84	-5.24	KAl(SO4)2:12H2O
K-Jarosite	0.86	-13.63	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-26.07	-26.80	-0.73	K2SeO4
Langite	-18.09	-0.21	17.88	Cu4(OH)6SO4:H2O
Larnakite	-5.75	-6.14	-0.38	PbO:PbSO4
Laurionite	-3.96	-3.34	0.62	PbOHCl
Lepidocrocite	3.42	4.79	1.37	FeOOH
Lime	-22.61	10.55	33.16	CaO
Litharge	-7.95	4.90	12.85	PbO
Mackinawite	-30.79	-34.39	-3.60	FeS
Maghemite	3.20	9.58	6.39	Fe2O3
Magnesioferrite	3.13	20.65	17.52	Fe2MgO4
Magnetite	15.81	19.71	3.90	Fe3O4
Manganite	-8.30	17.04	25.34	MnOOH
Massicot	-8.15	4.90	13.05	PbO
Melanothallite	-18.95	-12.55	6.41	CuCl2
Melanterite	-3.57	-5.82	-2.26	FeSO4:7H2O
Metacinnabar	-20.55	-66.25	-45.70	HgS
Mg(OH)2(active)	-7.73	11.07	18.79	Mg(OH)2
Mg3(P04)2	-6.85	-30.13	-23.28	Mg3(P04)2
MgHP04:3H2O	-2.43	-20.60	-18.18	MgHP04:3H2O
MgSeO3:6H2O	-5.36	-2.32	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-22.31	-23.51	-1.20	MgSeO4:6H2O
Minium	-44.22	30.31	74.53	Pb3O4
Mirabilite	-3.91	-5.22	-1.30	Na2SO4:10H2O

Mn2(SO4)3	-59.65	-64.97	-5.32	Mn2(SO4)3
Mn3(PO4)2	-11.77	-35.62	-23.85	Mn3(PO4)2
MnCl2:4H2O	-9.98	-7.24	2.74	MnCl2:4H2O
MnHP04	2.97	-22.43	-25.40	MnHP04
MnS(grn)	-35.52	-35.27	0.25	MnS
MnS(pnk)	-38.61	-35.27	3.34	MnS
MnSe	-9.80	-6.06	3.73	MnSe
MnSeO3	-5.27	-4.14	1.13	MnSeO3
MnSeO3:2H2O	-5.11	-4.14	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-23.29	-25.34	-2.05	MnSeO4:5H2O
MnSO4	-9.44	-6.70	2.74	MnSO4
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.19	-21.73	-3.55	HgO
Morenosite	-5.85	-8.03	-2.17	NiSO4:7H2O
Na-Jarosite	-1.31	-12.15	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-12.95	-2.65	10.30	Na2SeO3:5H2O
Na2SeO4	-25.12	-23.84	1.28	Na2SeO4
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.10	7.92	13.02	Ni(OH)2
Ni3(PO4)2	-8.27	-39.57	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-16.25	15.75	32.00	Ni4(OH)6SO4
NiS(alpha)	-30.99	-36.59	-5.60	NiS
NiS(beta)	-25.49	-36.59	-11.10	NiS
NiS(gamma)	-23.79	-36.59	-12.80	NiS
NiSe	10.32	-7.38	-17.70	NiSe
NiSeO3:2H2O	-8.35	-5.46	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-25.14	-26.66	-1.52	NiSeO4:6H2O
Nsutite	-18.28	-0.77	17.50	MnO2
O2(g)	-53.26	31.19	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.22	1.57	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-16.38	9.81	26.19	Pb2O(OH)2
Pb2O3	-35.64	25.40	61.04	Pb2O3
Pb3(PO4)2	-5.10	-48.63	-43.53	Pb3(PO4)2
Pb3O2SO4	-12.11	-1.23	10.87	Pb3O2SO4
Pb4(OH)6SO4	-17.43	3.67	21.10	Pb4(OH)6SO4
Pb4O3SO4	-18.53	3.67	22.20	Pb4O3SO4
PbHP04	-2.96	-26.77	-23.81	PbHP04
Pbmetal	-14.93	-10.69	4.24	Pb
PbO:0.3H2O	-8.08	4.90	12.98	PbO:0.33H2O
PbSeO4	-22.80	-29.67	-6.88	PbSeO4
Periclase	-10.87	11.07	21.94	MgO
Plattnerite	-29.81	20.50	50.31	PbO2
Plumbgummite	7.87	-24.92	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-12.56	10.55	23.11	Ca(OH)2
Pyrite	-44.68	-63.31	-18.63	FeS2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-17.19	24.83	42.03	MnO2
Pyromorphite	5.70	-78.73	-84.43	Pb5(PO4)3Cl
Retgersite	-5.98	-8.03	-2.05	NiSO4:6H2O
Semetal(am)	7.43	0.29	-7.14	Se
Semetal(hex)	8.04	0.29	-7.75	Se
SeO2	-13.50	-13.38	0.12	SeO2
SeO3	-55.97	-34.58	21.39	SeO3
Sphalerite	-25.57	-37.09	-11.52	ZnS
Spinel	-4.35	33.42	37.77	MgAl2O4
Strengite	-0.50	-26.88	-26.38	FePO4:2H2O
Sulfur	-26.82	-28.92	-2.11	S
Tenorite	-3.86	3.94	7.80	CuO
Thenardite	-5.55	-5.21	0.34	Na2SO4
Tsumebite	-8.14	-17.93	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	3.04	-32.96	-36.00	Fe3(PO4)2:8H2O
Wurtzite	-28.09	-37.09	-9.00	ZnS
Zincite	-4.12	7.43	11.55	ZnO
Zincosite	-12.64	-8.52	4.13	ZnSO4
Zn(NO3)2:6H2O	-106.25	-102.99	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.77	7.43	12.20	Zn(OH)2
Zn(OH)2(am)	-5.24	7.43	12.67	Zn(OH)2

Zn(OH)2(beta)	-4.53	7.43	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.30	7.43	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.43	11.73	Zn(OH)2
Zn2(OH)2SO4	-8.59	-1.09	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.58	6.61	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-5.64	-41.06	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-29.13	-9.61	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-14.64	13.76	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.84	20.66	38.50	Zn5(OH)8Cl2
ZnCl2	-16.27	-9.05	7.22	ZnCl2
Znmetal	-34.32	-8.17	26.15	Zn
Zn0(active)	-3.97	7.43	11.40	Zn0
ZnS(am)	-28.00	-37.09	-9.09	ZnS
ZnSe	6.59	-7.87	-14.46	ZnSe
ZnSeO4:6H2O	-25.63	-27.15	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.98	-8.52	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 8.

SOLUTION 7 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485
Hg	0.0002
water	1 # kg
MIX	5
1	0.988
7	0.012
REACTION	6
H2O	-1

2
END #Time-step 6

Beginning of initial solution calculations.

Initial solution 7.

-----Solution composition-----

Elements	Molality	Moles
Al	1.378e-05	1.378e-05
Ca	3.259e-03	3.259e-03
Cd	2.681e-08	2.681e-08
Cl	4.344e-02	4.344e-02
Co	3.989e-05	3.989e-05
Cu	4.901e-06	4.901e-06
Fe	1.805e-03	1.805e-03
Hg	1.002e-09	1.002e-09
K	1.593e-03	1.593e-03
Mg	1.017e-02	1.017e-02
Mn	2.231e-04	2.231e-04
N	5.021e-04	5.021e-04
Na	4.781e-02	4.781e-02
Ni	7.703e-06	7.703e-06
P	2.206e-05	2.206e-05
Pb	1.455e-08	1.455e-08
S(6)	1.553e-02	1.553e-02
Se	3.817e-07	3.817e-07
Zn	2.612e-06	2.612e-06

-----Description of solution-----

pH	=	6.790
pe	=	1.000
Activity of water	=	0.998
Ionic strength (mol/kgw)	=	9.259e-02
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	6.274e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	21.00
Electrical balance (eq)	=	6.374e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	4.58
Iterations	=	13
Total H	=	1.110158e+02
Total O	=	5.556909e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.061e-07	1.622e-07	-6.686	-6.790	-0.104	0.00
OH-	5.935e-08	4.562e-08	-7.227	-7.341	-0.114	(0)
H2O	5.551e+01	9.980e-01	1.744	-0.001	0.000	18.05
Al	1.378e-05					
Al(OH)4-	8.973e-06	7.024e-06	-5.047	-5.153	-0.106	(0)
Al(OH)2+	2.373e-06	1.884e-06	-5.625	-5.725	-0.100	(0)
Al(OH)3	2.329e-06	2.329e-06	-5.633	-5.633	0.000	(0)
AlOH+2	7.409e-08	2.945e-08	-7.130	-7.531	-0.401	(0)
AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
Al+3	5.344e-09	6.178e-10	-8.272	-9.209	-0.937	(0)
Al(SO4)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ca	3.259e-03					
Ca+2	2.406e-03	9.221e-04	-2.619	-3.035	-0.416	(0)
CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)

CaHP04	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2P04+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
CaP04-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CaOH+	1.001e-09	8.020e-10	-8.999	-9.096	-0.096	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
Cd	2.681e-08					
CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
Cd+2	7.874e-09	3.018e-09	-8.104	-8.520	-0.416	(0)
CdS04	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
Cd(S04)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
CdOHC1	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
CdOH+	1.568e-12	1.100e-12	-11.805	-11.959	-0.154	(0)
Cd(OH)2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
Cd2OH+3	4.264e-19	1.748e-20	-18.370	-19.758	-1.387	(0)
Cd(Se03)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Cd(OH)3-	3.135e-21	2.198e-21	-20.504	-20.658	-0.154	(0)
CdSe04	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Cd(OH)4-2	9.222e-29	2.230e-29	-28.035	-28.652	-0.617	(0)
CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cl	4.344e-02					
Cl-	4.343e-02	3.417e-02	-1.362	-1.466	-0.104	(0)
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
ZnOHC1	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
CdOHC1	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(2)	3.989e-05					
Co+2	3.225e-05	7.797e-06	-4.491	-5.108	-0.617	(0)
CoS04	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CoHP04	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)

CoOH+	1.375e-08	9.639e-09	-7.862	-8.016	-0.154	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
Co(OH)2	4.744e-11	4.744e-11	-10.324	-10.324	0.000	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Co2OH+3	9.190e-14	3.766e-15	-13.037	-14.424	-1.387	(0)
Co(OH)3-	8.364e-17	5.865e-17	-16.078	-16.232	-0.154	(0)
CoOOH-	5.039e-18	3.533e-18	-17.298	-17.452	-0.154	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Co4(OH)4+4	5.041e-22	1.722e-24	-21.297	-23.764	-2.466	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
Co(OH)4-2	2.382e-24	5.759e-25	-23.623	-24.240	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Co(3)	4.042e-31					
CoOH+2	4.042e-31	9.773e-32	-30.393	-31.010	-0.617	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co+3	2.685e-36	3.104e-37	-35.571	-36.508	-0.937	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
Cu(1)	4.900e-06					
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
Cu+	1.553e-08	1.089e-08	-7.809	-7.963	-0.154	(0)
Cu(2)	8.967e-10					
Cu+2	6.026e-10	2.310e-10	-9.220	-9.636	-0.416	(0)
CuSO4	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
CuOH+	4.792e-11	3.719e-11	-10.319	-10.430	-0.110	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
Cu(OH)2	5.595e-13	5.595e-13	-12.252	-12.252	0.000	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
Cu2(OH)2+2	1.398e-16	3.379e-17	-15.855	-16.471	-0.617	(0)
Cu(OH)3-	1.014e-16	7.111e-17	-15.994	-16.148	-0.154	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
Cu(OH)4-2	1.434e-22	3.468e-23	-21.843	-22.460	-0.617	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Fe(2)	1.805e-03					
Fe+2	1.454e-03	3.515e-04	-2.837	-3.454	-0.617	(0)
FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
FeHPO4	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
FeOH+	8.090e-07	6.384e-07	-6.092	-6.195	-0.103	(0)
Fe(OH)2	2.214e-11	2.214e-11	-10.655	-10.655	0.000	(0)
Fe(OH)3-	5.296e-13	4.179e-13	-12.276	-12.379	-0.103	(0)
Fe(3)	3.233e-07					
Fe(OH)2+	3.138e-07	2.491e-07	-6.503	-6.604	-0.100	(0)
Fe(OH)3	9.382e-09	9.382e-09	-8.028	-8.028	0.000	(0)
Fe(OH)4-	1.205e-10	9.565e-11	-9.919	-10.019	-0.100	(0)
FeOH+2	2.119e-11	8.217e-12	-10.674	-11.085	-0.411	(0)
FeHPO4+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeSO4+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe+3	2.235e-15	2.584e-16	-14.651	-15.588	-0.937	(0)
Fe(SO4)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
Fe2(OH)2+4	7.548e-19	2.579e-21	-18.122	-20.589	-2.466	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)

FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
Fe3(OH)4+5	6.361e-23	8.906e-27	-22.197	-26.050	-3.854	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
H(0)	3.796e-19					
H2	1.898e-19	1.939e-19	-18.722	-18.712	0.009	(0)
Hg(0)	1.002e-09					
Hg	1.002e-09	1.002e-09	-8.999	-8.999	0.000	(0)
Hg(1)	3.697e-29					
Hg2+2	1.848e-29	4.469e-30	-28.733	-29.350	-0.617	(0)
Hg(2)	2.362e-18					
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
Hg(OH)2	1.682e-22	1.718e-22	-21.774	-21.765	0.009	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
HgOH+	2.768e-26	1.941e-26	-25.558	-25.712	-0.154	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Hg+2	3.648e-29	8.820e-30	-28.438	-29.055	-0.617	(0)
HgSO4	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Hg(OH)3-	1.911e-30	1.340e-30	-29.719	-29.873	-0.154	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
K	1.593e-03					
K+	1.549e-03	1.219e-03	-2.810	-2.914	-0.104	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
Mg	1.017e-02					
Mg+2	7.920e-03	3.036e-03	-2.101	-2.518	-0.416	(0)
MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
MgH2P04+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
MgOH+	6.402e-08	5.162e-08	-7.194	-7.287	-0.094	(0)
MgP04-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
Mn(2)	2.231e-04					
Mn+2	1.882e-04	4.549e-05	-3.725	-4.342	-0.617	(0)
MnSO4	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
MnOH+	6.606e-09	5.213e-09	-8.180	-8.283	-0.103	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Mn(OH)3-	2.129e-19	1.680e-19	-18.672	-18.775	-0.103	(0)
MnSe04	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
Mn(OH)4-2	8.666e-26	3.361e-26	-25.062	-25.474	-0.411	(0)
MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Mn(3)	9.732e-29					
Mn+3	9.732e-29	1.125e-29	-28.012	-28.949	-0.937	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-65.730	-66.142	-0.411	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-74.661	-74.779	-0.119	(0)
N(-3)	5.021e-04					
NH4+	4.805e-04	3.617e-04	-3.318	-3.442	-0.123	(0)
NH4SO4-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
NH3	9.560e-07	9.560e-07	-6.020	-6.020	0.000	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)

	Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
	Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
	HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
	Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
	Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
	Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
	Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
	Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
	Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
N(3)		1.148e-35					
	N02-	1.148e-35	8.735e-36	-34.940	-35.059	-0.119	(0)
	CoN02+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
	CuN02+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
	Cu(N02)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
N(5)		0.000e+00					
	N03-	0.000e+00	0.000e+00	-48.382	-48.486	-0.104	(0)
	CaN03+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
	MnN03+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
	CoN03+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
	NiN03+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
	ZnN03+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
	PbN03+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
	CdN03+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
	CuN03+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
	FeN03+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
	HgN03+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
	Mn(N03)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
	Co(N03)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
	Zn(N03)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)
	Pb(N03)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
	Cd(N03)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
	Cu(N03)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
	Hg(N03)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
Na		4.781e-02					
	Na+	4.677e-02	3.680e-02	-1.330	-1.434	-0.104	(0)
	NaS04-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
	NaHP04-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
Ni		7.703e-06					
	Ni+2	5.664e-06	2.171e-06	-5.247	-5.663	-0.416	(0)
	NiS04	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
	NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
	NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
	NiOH+	1.818e-09	1.275e-09	-8.741	-8.895	-0.154	(0)
	Ni(S04)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
	NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
	Ni(OH)2	8.335e-12	8.335e-12	-11.079	-11.079	0.000	(0)
	Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
	Ni(OH)3-	7.365e-16	5.164e-16	-15.133	-15.287	-0.154	(0)
	NiSe04	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
	NiN03+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
O(0)		0.000e+00					
	O2	0.000e+00	0.000e+00	-55.993	-55.984	0.009	(0)
P		2.206e-05					
	H2P04-	6.634e-06	5.268e-06	-5.178	-5.278	-0.100	(0)
	HP04-2	5.222e-06	2.025e-06	-5.282	-5.694	-0.411	(0)
	MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
	FeHP04	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
	FeH2P04+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
	NaHP04-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
	MgH2P04+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
	CaHP04	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
	CaH2P04+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
	KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
	CoHP04	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
	CaP04-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
	MgP04-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
	H3P04	1.150e-10	1.150e-10	-9.939	-9.939	0.000	(0)

P04-3	4.196e-11	4.850e-12	-10.377	-11.314	-0.937	(0)
FeHP04+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeH2P04+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
Pb	1.455e-08					
Pb+2	5.480e-09	2.100e-09	-8.261	-8.678	-0.416	(0)
PbS04	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
PbOH+	4.662e-10	3.269e-10	-9.331	-9.486	-0.154	(0)
Pb(S04)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
Pb(OH)2	6.405e-13	6.405e-13	-12.193	-12.193	0.000	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
Pb2OH+3	2.655e-16	1.088e-17	-15.576	-16.963	-1.387	(0)
Pb(OH)3-	5.660e-17	3.969e-17	-16.247	-16.401	-0.154	(0)
Pb(OH)4-2	2.491e-21	6.022e-22	-20.604	-21.220	-0.617	(0)
Pb3(OH)4+2	3.779e-23	9.137e-24	-22.423	-23.039	-0.617	(0)
Pb4(OH)4+4	5.175e-26	1.768e-28	-25.286	-27.753	-2.466	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
S(6)	1.553e-02					
S04-2	1.094e-02	4.194e-03	-1.961	-2.377	-0.416	(0)
MgS04	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
NaS04-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
CaS04	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
FeS04	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
MnS04	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
NH4S04-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
CoS04	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
NiS04	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
ZnS04	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(S04)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
HS04-	7.527e-08	5.892e-08	-7.123	-7.230	-0.106	(0)
AlS04+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
PbS04	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
CdS04	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
Al(S04)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ni(S04)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
Cd(S04)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
Pb(S04)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
CuS04	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
FeS04+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe(S04)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
HgS04	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Se(-2)	4.685e-09					
HSe-	4.677e-09	3.279e-09	-8.330	-8.484	-0.154	(0)
H2Se	4.054e-12	4.054e-12	-11.392	-11.392	0.000	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Se-2	6.423e-17	1.553e-17	-16.192	-16.809	-0.617	(0)
Se(4)	3.770e-07					
HSeO3-	3.526e-07	2.472e-07	-6.453	-6.607	-0.154	(0)
SeO3-2	2.442e-08	5.904e-09	-7.612	-8.229	-0.617	(0)
H2SeO3	1.653e-11	1.653e-11	-10.782	-10.782	0.000	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Se(6)	2.478e-21					
SeO4-2	2.463e-21	9.439e-22	-20.609	-21.025	-0.416	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
HSeO4-	9.645e-27	6.763e-27	-26.016	-26.170	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
Zn	2.612e-06					
Zn+2	1.813e-06	6.948e-07	-5.742	-6.158	-0.416	(0)

ZnSO4	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(SO4)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
ZnOH+	4.520e-09	3.170e-09	-8.345	-8.499	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
Zn(OH)2	4.227e-11	4.227e-11	-10.374	-10.374	0.000	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
Zn(OH)3-	1.872e-14	1.313e-14	-13.728	-13.882	-0.154	(0)
Zn(OH)4-2	1.339e-19	3.238e-20	-18.873	-19.490	-0.617	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2-124.48	-118.20	6.27	(Co(NH3)5Cl)(NO3)2	
(Co(NH3)5Cl)Cl2 -28.70	-24.17	4.54	(Co(NH3)5Cl)Cl2	
(Co(NH3)5OH2)Cl3 -35.96	-24.17	11.80	(Co(NH3)5OH2)Cl3	
(Co(NH3)6)(NO3)3-179.81	-161.88	17.93	(Co(NH3)6)(NO3)3	
(Co(NH3)6)Cl3 -40.93	-20.82	20.11	(Co(NH3)6)Cl3	
(NH4)2SeO4 -28.36	-27.91	0.45	(NH4)2SeO4	
Al(OH)3(am) 0.09	11.16	11.06	Al(OH)3	
Al2O3 2.05	22.32	20.27	Al2O3	
Al4(OH)10SO4 5.98	28.68	22.70	Al4(OH)10SO4	
AlOHSO4 -1.57	-4.80	-3.23	AlOHSO4	
Alunite 6.34	5.44	-0.90	KAl3(SO4)2(OH)6	
Anglesite -3.24	-11.06	-7.82	PbSO4	
Anhydrite -1.07	-5.41	-4.34	CaSO4	
Antlerite -12.92	-4.13	8.79	Cu3(OH)4SO4	
Atacamite -7.99	-0.37	7.61	Cu2(OH)3Cl	
Bianchite -6.78	-8.54	-1.76	ZnSO4:6H2O	
Birnessite -18.88	-0.79	18.09	MnO2	
Bixbyite -16.81	-17.16	-0.35	Mn2O3	
Boehmite 2.30	11.16	8.86	AlOOH	
Brochantite -15.89	-0.19	15.71	Cu4(OH)6SO4	
Brucite -6.06	11.06	17.12	Mg(OH)2	
Bunsenite -4.77	7.92	12.68	NiO	
Ca3(PO4)2(beta) -2.69	-31.73	-29.05	Ca3(PO4)2	
Ca4H(PO4)3:3H2O -5.80	-52.88	-47.08	Ca4H(PO4)3:3H2O	
CaHP04 -1.79	-21.14	-19.35	CaHP04	
CaHP04:2H2O -2.09	-21.14	-19.05	CaHP04:2H2O	
Calomel -14.15	-32.28	-18.13	Hg2Cl2	
CaSeO3:2H2O -5.71	-2.85	2.86	CaSeO3:2H2O	
CaSeO4:2H2O -21.06	-24.06	-3.00	CaSeO4:2H2O	
Cd(OH)2 -8.81	5.06	13.87	Cd(OH)2	
Cd(OH)2(am) -8.88	5.06	13.94	Cd(OH)2	
Cd3(OH)2(SO4)2 -23.45	-16.74	6.71	Cd3(OH)2(SO4)2	
Cd3(OH)4SO4 -23.34	-0.78	22.56	Cd3(OH)4SO4	
Cd3(PO4)2 -15.59	-48.19	-32.60	Cd3(PO4)2	
Cd4(OH)6SO4 -24.12	4.28	28.40	Cd4(OH)6SO4	
CdCl2 -10.84	-11.45	-0.61	CdCl2	
CdCl2:1H2O -9.78	-11.45	-1.68	CdCl2:1H2O	
CdCl2:2.5H2O -9.52	-11.46	-1.93	CdCl2:2.5H2O	
Cdmetal(alpha) -24.21	-10.52	13.69	Cd	
Cdmetal(gamma) -24.32	-10.52	13.80	Cd	
CdOHCl -6.81	-3.20	3.61	CdOHCl	
CdSe 10.17	-10.21	-20.38	CdSe	
CdSeO4:2H2O -27.70	-29.55	-1.85	CdSeO4:2H2O	
CdSO4 -10.85	-10.90	-0.05	CdSO4	
CdSO4:1H2O -9.25	-10.90	-1.65	CdSO4:1H2O	
CdSO4:2.67H2O -9.07	-10.90	-1.83	CdSO4:2.67H2O	
Chalcanthite -9.36	-12.02	-2.65	CuSO4:5H2O	
Clausthalite 17.01	-10.37	-27.39	PbSe	

Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.05	-16.14	-2.09	Co(OH)3
Co3(P04)2	-3.27	-37.95	-34.69	Co3(P04)2
Co304	-13.57	-23.81	-10.24	Co304
CoCl2	-16.50	-8.04	8.46	CoCl2
CoCl2:6H2O	-10.56	-8.05	2.52	CoCl2:6H2O
CoFe204	21.18	18.03	-3.15	CoFe204
CoHP04	-4.15	-23.21	-19.06	CoHP04
CoO	-5.37	8.47	13.84	CoO
CoSe	9.40	-6.80	-16.20	CoSe
CoSe03	-6.24	-4.92	1.32	CoSe03
CoSe04:6H2O	-24.61	-26.14	-1.53	CoSe04:6H2O
CoS04	-10.48	-7.49	2.99	CoS04
CoS04:6H2O	-5.02	-7.49	-2.48	CoS04:6H2O
Cotunnite	-6.77	-11.61	-4.84	PbCl2
Cu(OH)2	-4.87	3.94	8.81	Cu(OH)2
Cu2(OH)3N03	-56.82	-47.39	9.42	Cu2(OH)3N03
Cu2Se(alpha)	28.69	-17.62	-46.31	Cu2Se
Cu2S04	-16.40	-18.30	-1.90	Cu2S04
Cu3(P04)2	-14.69	-51.54	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-16.42	-51.54	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.35	-28.95	-64.30	Cu3Se2
Cumetal	-0.04	-8.96	-8.93	Cu
Cu0CuS04	-18.70	-8.07	10.63	Cu0CuS04
Cupricferrite	7.02	13.50	6.49	CuFe204
Cuprite	-1.24	-2.35	-1.11	Cu2O
Cuprousferrite	12.49	3.61	-8.88	CuFe02
CuSe	22.06	-11.33	-33.39	CuSe
CuSe2	22.68	-11.02	-33.70	CuSe2
CuSe03:2H2O	-10.05	-9.46	0.60	CuSe03:2H2O
CuSe04:5H2O	-28.23	-30.67	-2.44	CuSe04:5H2O
CuS04	-15.13	-12.01	3.11	CuS04
Diaspore	4.04	11.16	7.12	Al00H
Epsomite	-2.75	-4.90	-2.15	MgS04:7H2O
Fe(OH)2	-3.44	10.12	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.34	2.30	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-5.39	-3.84	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H2O	-10.00	-30.63	-20.63	Fe2(Se03)3:2H2O
Fe2(S04)3	-35.15	-38.31	-3.16	Fe2(S04)3
Fe3(OH)8	-0.54	19.68	20.22	Fe3(OH)8
Ferrihydrite	1.41	4.78	3.37	Fe(OH)3
Ferroselite	13.87	-4.84	-18.71	FeSe2
FeSe	5.86	-5.15	-11.00	FeSe
Gibbsite	2.64	11.16	8.52	Al(OH)3
Goethite	4.15	4.78	0.64	Fe00H
Goslarite	-6.50	-8.54	-2.05	ZnS04:7H2O
Gypsum	-0.80	-5.41	-4.61	CaS04:2H2O
H-Jarosite	-6.02	-17.57	-11.55	(H30)Fe3(S04)2(OH)6
H2Se(g)	-10.35	-15.27	-4.92	H2Se
Halite	-4.49	-2.90	1.59	NaCl
Hausmannite	-18.74	43.29	62.03	Mn304
Hematite	10.67	9.56	-1.11	Fe203
Hercynite	8.80	32.44	23.64	FeAl204
Hg(g)	-7.75	-15.67	-7.93	Hg
Hg(OH)2	-18.27	-21.76	-3.50	Hg(OH)2
Hg2(g)	-16.26	-31.35	-15.09	Hg2
Hg2(OH)2	-21.03	-15.77	5.26	Hg2(OH)2
Hg2HP04	-22.68	-47.45	-24.77	Hg2HP04
Hg2Se03	-24.51	-29.17	-4.66	Hg2Se03
Hg2S04	-25.58	-31.73	-6.14	Hg2S04
HgCl(g)	-36.02	-16.14	19.88	HgCl
HgCl2	-16.76	-38.28	-21.52	HgCl2
Hgmetal(l)	-2.02	-15.67	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSe03	-22.73	-35.16	-12.43	HgSe03
HgS04	-28.27	-37.72	-9.45	HgS04
Hinsdalite	-6.76	-9.26	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	2.00	-42.33	-44.33	Ca5(P04)3OH

Hydroxylpyromorphite	-7.75	-70.54	-62.79	Pb5(P04)30H
K-Alum	-11.65	-16.89	-5.24	KAl(S04)2:12H20
K-Jarosite	0.79	-13.70	-14.49	KFe3(S04)2(OH)6
K2Se04	-26.12	-26.85	-0.73	K2Se04
Langite	-18.07	-0.19	17.88	Cu4(OH)6S04:H20
Larnakite	-5.77	-6.15	-0.38	Pb0:PbS04
Laurionite	-3.98	-3.35	0.62	Pb0HCl
Lepidocrocite	3.41	4.78	1.37	Fe00H
Lime	-22.62	10.54	33.16	Ca0
Litharge	-7.95	4.90	12.85	Pb0
Maghemite	3.18	9.56	6.39	Fe203
Magnesioferrite	3.10	20.62	17.52	Fe2Mg04
Magnetite	15.79	19.69	3.90	Fe304
Manganite	-8.31	17.03	25.34	Mn00H
Massicot	-8.15	4.90	13.05	Pb0
Melanothallite	-18.98	-12.57	6.41	CuCl2
Melanterite	-3.58	-5.84	-2.26	FeS04:7H20
Mg(OH)2(active)	-7.73	11.06	18.79	Mg(OH)2
Mg3(P04)2	-6.90	-30.18	-23.28	Mg3(P04)2
MgHP04:3H20	-2.45	-20.62	-18.18	MgHP04:3H20
MgSe03:6H20	-5.38	-2.34	3.04	MgSe03:6H20
MgSe04:6H20	-22.35	-23.55	-1.20	MgSe04:6H20
Minium	-44.24	30.28	74.53	Pb304
Mirabilite	-3.95	-5.25	-1.30	Na2S04:10H20
Mn2(S04)3	-59.71	-65.03	-5.32	Mn2(S04)3
Mn3(P04)2	-11.81	-35.65	-23.85	Mn3(P04)2
MnCl2:4H20	-10.02	-7.28	2.74	MnCl2:4H20
MnHP04	2.95	-22.45	-25.40	MnHP04
MnSe	-9.77	-6.04	3.73	MnSe
MnSe03	-5.29	-4.16	1.13	MnSe03
MnSe03:2H20	-5.12	-4.16	0.96	MnSe03:2H20
MnSe04:5H20	-23.32	-25.37	-2.05	MnSe04:5H20
MnS04	-9.46	-6.72	2.74	MnS04
Monteponite	-10.29	5.06	15.35	Cd0
Montroydite	-18.22	-21.76	-3.55	Hg0
Morenosite	-5.87	-8.05	-2.17	NiS04:7H20
Na-Jarosite	-1.38	-12.22	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H20	-12.99	-2.69	10.30	Na2Se03:5H20
Na2Se04	-25.17	-23.89	1.28	Na2Se04
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.11	7.91	13.02	Ni(OH)2
Ni3(P04)2	-8.32	-39.62	-31.30	Ni3(P04)2
Ni4(OH)6S04	-16.30	15.70	32.00	Ni4(OH)6S04
NiSe	10.34	-7.36	-17.70	NiSe
NiSe03:2H20	-8.37	-5.48	2.89	NiSe03:2H20
NiSe04:6H20	-25.17	-26.69	-1.52	NiSe04:6H20
Nsutite	-18.29	-0.79	17.50	Mn02
O2(g)	-53.29	31.16	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.25	1.55	8.79	Pb2(OH)3Cl
Pb20(OH)2	-16.39	9.80	26.19	Pb20(OH)2
Pb203	-35.66	25.38	61.04	Pb203
Pb3(P04)2	-5.13	-48.66	-43.53	Pb3(P04)2
Pb302S04	-12.13	-1.25	10.87	Pb302S04
Pb4(OH)6S04	-17.45	3.65	21.10	Pb4(OH)6S04
Pb403S04	-18.55	3.65	22.20	Pb403S04
PbHP04	-2.98	-26.78	-23.81	PbHP04
Pbmetal	-14.92	-10.68	4.24	Pb
Pb0:0.3H20	-8.08	4.90	12.98	Pb0:0.33H20
PbSe04	-22.83	-29.70	-6.88	PbSe04
Periclase	-10.88	11.06	21.94	Mg0
Plattnerite	-29.83	20.48	50.31	Pb02
Plumbgummite	7.80	-24.99	-32.79	PbAl3(P04)2(OH)5:H20
Portlandite	-12.57	10.54	23.11	Ca(OH)2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-17.21	24.82	42.03	Mn02
Pyromorphite	5.63	-78.80	-84.43	Pb5(P04)3Cl
Retgersite	-6.00	-8.05	-2.05	NiS04:6H20

Semetal(am)	7.44	0.31	-7.14	Se
Semetal(hex	8.05	0.31	-7.75	Se
SeO2	-13.52	-13.40	0.12	SeO2
SeO3	-56.00	-34.60	21.39	SeO3
Spinel	-4.39	33.38	37.77	MgAl2O4
Strengite	-0.53	-26.90	-26.38	FePO4:2H2O
Tenorite	-3.86	3.94	7.80	CuO
Thenardite	-5.59	-5.25	0.34	Na2SO4
Tsumebite	-8.15	-17.94	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	3.00	-33.00	-36.00	Fe3(P04)2:8H2O
Zincite	-4.13	7.42	11.55	ZnO
Zincosite	-12.66	-8.54	4.13	ZnSO4
Zn(NO3)2:6H2O	-106.39	-103.14	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.78	7.42	12.20	Zn(OH)2
Zn(OH)2(am)	-5.25	7.42	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.42	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.31	7.42	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.42	11.73	Zn(OH)2
Zn2(OH)2SO4	-8.62	-1.12	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.61	6.58	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-5.69	-41.11	-35.42	Zn3(P04)2:4H2O
Zn3O(SO4)2	-29.18	-9.65	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-14.68	13.72	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.91	20.59	38.50	Zn5(OH)8Cl2
ZnCl2	-16.31	-9.09	7.22	ZnCl2
Znmetal	-34.31	-8.16	26.15	Zn
ZnO(active)	-3.98	7.42	11.40	ZnO
ZnSe	6.61	-7.85	-14.46	ZnSe
ZnSeO4:6H2O	-25.67	-27.19	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-8.00	-8.54	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 5.
Using reaction 6.

Mixture 5.

9.880e-01 Solution 1
1.200e-02 Solution 7

Reaction 6.

2.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000
Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	1.429e-05	1.378e-05
Ca	3.381e-03	3.259e-03

Cd	2.782e-08	2.681e-08
Cl	4.507e-02	4.344e-02
Co	4.138e-05	3.989e-05
Cu	5.084e-06	4.901e-06
Fe	1.873e-03	1.805e-03
Hg	1.039e-09	1.002e-09
K	1.653e-03	1.593e-03
Mg	1.055e-02	1.017e-02
Mn	2.315e-04	2.231e-04
N	5.209e-04	5.021e-04
Na	4.960e-02	4.781e-02
Ni	7.991e-06	7.703e-06
P	2.288e-05	2.206e-05
Pb	1.509e-08	1.455e-08
S	1.611e-02	1.553e-02
Se	3.960e-07	3.817e-07
Zn	2.710e-06	2.612e-06

-----Description of solution-----

pH	=	6.789	Charge balance
pe	=	1.008	Adjusted to redox equilibrium
Activity of water	=	0.998	
Ionic strength (mol/kgw)	=	9.589e-02	
Mass of water (kg)	=	9.640e-01	
Total alkalinity (eq/kg)	=	6.509e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	6.374e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	4.58	
Iterations	=	4	
Total H	=	1.070158e+02	
Total O	=	5.356909e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.071e-07	1.626e-07	-6.684	-6.789	-0.105	0.00
OH-	5.941e-08	4.551e-08	-7.226	-7.342	-0.116	(0)
H2O	5.551e+01	9.979e-01	1.744	-0.001	0.000	18.05
Al	1.429e-05					
Al(OH)4-	9.301e-06	7.259e-06	-5.031	-5.139	-0.108	(0)
Al(OH)2+	2.470e-06	1.956e-06	-5.607	-5.709	-0.101	(0)
Al(OH)3	2.413e-06	2.413e-06	-5.618	-5.618	0.000	(0)
AlOH+2	7.793e-08	3.065e-08	-7.108	-7.514	-0.405	(0)
AlSO4+	2.357e-08	1.840e-08	-7.628	-7.735	-0.108	(0)
Al+3	5.703e-09	6.445e-10	-8.244	-9.191	-0.947	(0)
Al(SO4)2-	1.183e-09	9.231e-10	-8.927	-9.035	-0.108	(0)
Ca	3.381e-03					
Ca+2	2.488e-03	9.441e-04	-2.604	-3.025	-0.421	(0)
CaSO4	8.918e-04	8.918e-04	-3.050	-3.050	0.000	(0)
CaHP04	8.368e-07	8.368e-07	-6.077	-6.077	0.000	(0)
CaH2PO4+	1.349e-07	1.068e-07	-6.870	-6.971	-0.101	(0)
CaPO4-	1.585e-08	1.255e-08	-7.800	-7.901	-0.101	(0)
CaNH3+2	6.602e-09	1.557e-09	-8.180	-8.808	-0.627	(0)
CaOH+	1.025e-09	8.191e-10	-8.989	-9.087	-0.097	(0)
Ca(NH3)2+2	3.442e-15	8.116e-16	-14.463	-15.091	-0.627	(0)
CaNO3+	0.000e+00	0.000e+00	-50.772	-50.929	-0.157	(0)
Cd	2.782e-08					
CdCl+	1.462e-08	1.018e-08	-7.835	-7.992	-0.157	(0)
Cd+2	7.991e-09	3.032e-09	-8.097	-8.518	-0.421	(0)
CdSO4	2.906e-09	2.906e-09	-8.537	-8.537	0.000	(0)
CdCl2	1.485e-09	1.485e-09	-8.828	-8.828	0.000	(0)
Cd(SO4)2-2	7.476e-10	1.763e-10	-9.126	-9.754	-0.627	(0)
CdCl3-	4.575e-11	3.188e-11	-10.340	-10.496	-0.157	(0)

CdOHC1	2.350e-11	2.350e-11	-10.629	-10.629	0.000	(0)
CdOH+	1.582e-12	1.102e-12	-11.801	-11.958	-0.157	(0)
Cd(OH)2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
Cd2OH+3	4.544e-19	1.760e-20	-18.343	-19.754	-1.412	(0)
Cd(SeO3)2-2	4.131e-19	9.740e-20	-18.384	-19.011	-0.627	(0)
Cd(OH)3-	3.147e-21	2.193e-21	-20.502	-20.659	-0.157	(0)
CdSeO4	5.664e-28	5.664e-28	-27.247	-27.247	0.000	(0)
Cd(OH)4-2	9.411e-29	2.219e-29	-28.026	-28.654	-0.627	(0)
CdHS+	8.317e-39	5.796e-39	-38.080	-38.237	-0.157	(0)
CdNO3+	0.000e+00	0.000e+00	-56.229	-56.385	-0.157	(0)
Cd(HS)2	0.000e+00	0.000e+00	-68.760	-68.760	0.000	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-104.429	-104.586	-0.157	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.153	-105.153	0.000	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.490	-140.117	-0.627	(0)
Cl	4.507e-02					
Cl-	4.505e-02	3.536e-02	-1.346	-1.451	-0.105	(0)
CuCl2-	4.531e-06	3.504e-06	-5.344	-5.455	-0.112	(0)
MnCl+	2.604e-06	2.050e-06	-5.584	-5.688	-0.104	(0)
CoCl+	1.370e-06	9.543e-07	-5.863	-6.020	-0.157	(0)
CuCl	4.698e-07	4.698e-07	-6.328	-6.328	0.000	(0)
NiCl+	2.852e-07	1.987e-07	-6.545	-6.702	-0.157	(0)
MnCl2	1.024e-07	1.024e-07	-6.990	-6.990	0.000	(0)
ZnCl+	7.908e-08	6.116e-08	-7.102	-7.213	-0.112	(0)
CuCl3-2	6.801e-08	2.608e-08	-7.167	-7.584	-0.416	(0)
CdCl+	1.462e-08	1.018e-08	-7.835	-7.992	-0.157	(0)
ZnOHC1	5.099e-09	5.099e-09	-8.293	-8.293	0.000	(0)
PbCl+	3.651e-09	2.544e-09	-8.438	-8.594	-0.157	(0)
ZnCl2	2.882e-09	2.882e-09	-8.540	-8.540	0.000	(0)
CdCl2	1.485e-09	1.485e-09	-8.828	-8.828	0.000	(0)
MnCl3-	1.267e-09	9.970e-10	-8.897	-9.001	-0.104	(0)
PbCl2	3.947e-10	3.947e-10	-9.404	-9.404	0.000	(0)
ZnCl3-	1.030e-10	7.964e-11	-9.987	-10.099	-0.112	(0)
CdCl3-	4.575e-11	3.188e-11	-10.340	-10.496	-0.157	(0)
NiCl2	3.578e-11	3.578e-11	-10.446	-10.446	0.000	(0)
CdOHC1	2.350e-11	2.350e-11	-10.629	-10.629	0.000	(0)
CuCl+	1.578e-11	1.221e-11	-10.802	-10.913	-0.112	(0)
PbCl3-	8.330e-12	5.805e-12	-11.079	-11.236	-0.157	(0)
ZnCl4-2	3.555e-12	1.364e-12	-11.449	-11.865	-0.416	(0)
PbCl4-2	3.751e-13	8.844e-14	-12.426	-13.053	-0.627	(0)
CuCl2	1.229e-13	1.229e-13	-12.910	-12.910	0.000	(0)
FeCl+2	6.540e-16	2.508e-16	-15.184	-15.601	-0.416	(0)
FeCl2+	5.711e-17	4.494e-17	-16.243	-16.347	-0.104	(0)
CuCl3-	4.882e-17	3.776e-17	-16.311	-16.423	-0.112	(0)
HgCl2	1.586e-18	1.586e-18	-17.800	-17.800	0.000	(0)
HgCl3-	8.117e-19	5.656e-19	-18.091	-18.247	-0.157	(0)
HgCl4-2	3.503e-19	8.260e-20	-18.456	-19.083	-0.627	(0)
FeCl3	1.589e-19	1.589e-19	-18.799	-18.799	0.000	(0)
HgClOH	3.727e-20	3.727e-20	-19.429	-19.429	0.000	(0)
CuCl4-2	1.998e-20	7.663e-21	-19.699	-20.116	-0.416	(0)
HgCl+	1.091e-23	7.602e-24	-22.962	-23.119	-0.157	(0)
CoCl+2	8.942e-36	2.108e-36	-35.049	-35.676	-0.627	(0)
Co(NH3)5Cl+2	1.813e-39	4.275e-40	-38.742	-39.369	-0.627	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.318	-51.946	-0.627	(0)
Co(2)	4.138e-05					
Co+2	3.345e-05	7.888e-06	-4.476	-5.103	-0.627	(0)
CoSO4	6.522e-06	6.522e-06	-5.186	-5.186	0.000	(0)
CoCl+	1.370e-06	9.543e-07	-5.863	-6.020	-0.157	(0)
CoHPO4	1.641e-08	1.641e-08	-7.785	-7.785	0.000	(0)
CoOH+	1.396e-08	9.729e-09	-7.855	-8.012	-0.157	(0)
Co(NH3)+2	7.525e-09	1.774e-09	-8.124	-8.751	-0.627	(0)
Co(OH)2	4.777e-11	4.777e-11	-10.321	-10.321	0.000	(0)
Co(NH3)2+2	2.943e-13	6.939e-14	-12.531	-13.159	-0.627	(0)
Co2OH+3	9.928e-14	3.846e-15	-13.003	-14.415	-1.412	(0)
Co(OH)3-	8.455e-17	5.892e-17	-16.073	-16.230	-0.157	(0)
CoOOH-	5.094e-18	3.550e-18	-17.293	-17.450	-0.157	(0)
Co(NH3)3+2	4.853e-18	1.144e-18	-17.314	-17.942	-0.627	(0)
Co4(OH)4+4	5.783e-22	1.787e-24	-21.238	-23.748	-2.510	(0)
Co(NH3)4+2	3.336e-23	7.865e-24	-22.477	-23.104	-0.627	(0)

CoSeO4	3.713e-24	3.713e-24	-23.430	-23.430	0.000	(0)
Co(OH)4-2	2.448e-24	5.772e-25	-23.611	-24.239	-0.627	(0)
Co(NH3)5+2	7.250e-29	1.709e-29	-28.140	-28.767	-0.627	(0)
CoNO2+	7.898e-40	5.504e-40	-39.102	-39.259	-0.157	(0)
CoNO3+	0.000e+00	0.000e+00	-53.163	-53.320	-0.157	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.429	-101.429	0.000	(0)
Co(3)	4.262e-31					
CoOH+2	4.262e-31	1.005e-31	-30.370	-30.998	-0.627	(0)
CoCl+2	8.942e-36	2.108e-36	-35.049	-35.676	-0.627	(0)
Co+3	2.831e-36	3.199e-37	-35.548	-36.495	-0.947	(0)
Co(NH3)5Cl+2	1.813e-39	4.275e-40	-38.742	-39.369	-0.627	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.828	-47.985	-0.157	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.318	-51.946	-0.627	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.627	-53.255	-0.627	(0)
Cu(1)	5.084e-06					
CuCl2-	4.531e-06	3.504e-06	-5.344	-5.455	-0.112	(0)
CuCl	4.698e-07	4.698e-07	-6.328	-6.328	0.000	(0)
CuCl3-2	6.801e-08	2.608e-08	-7.167	-7.584	-0.416	(0)
Cu+	1.514e-08	1.055e-08	-7.820	-7.977	-0.157	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.039	-66.462	-0.423	(0)
CuS4S5-3	0.000e+00	0.000e+00	-66.793	-67.192	-0.399	(0)
Cu(2)	8.973e-10					
Cu+2	6.008e-10	2.280e-10	-9.221	-9.642	-0.421	(0)
CuSO4	2.135e-10	2.135e-10	-9.671	-9.671	0.000	(0)
CuOH+	4.734e-11	3.662e-11	-10.325	-10.436	-0.112	(0)
CuNH3+2	1.924e-11	4.535e-12	-10.716	-11.343	-0.627	(0)
CuCl+	1.578e-11	1.221e-11	-10.802	-10.913	-0.112	(0)
Cu(OH)2	5.497e-13	5.497e-13	-12.260	-12.260	0.000	(0)
CuCl2	1.229e-13	1.229e-13	-12.910	-12.910	0.000	(0)
Cu2(OH)2+2	1.390e-16	3.277e-17	-15.857	-16.485	-0.627	(0)
Cu(OH)3-	1.000e-16	6.969e-17	-16.000	-16.157	-0.157	(0)
CuCl3-	4.882e-17	3.776e-17	-16.311	-16.423	-0.112	(0)
CuCl4-2	1.998e-20	7.663e-21	-19.699	-20.116	-0.416	(0)
Cu(OH)4-2	1.438e-22	3.391e-23	-21.842	-22.470	-0.627	(0)
CuNO2+	0.000e+00	0.000e+00	-42.470	-42.626	-0.157	(0)
CuNO3+	0.000e+00	0.000e+00	-57.393	-57.550	-0.157	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.621	-76.621	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.766	-96.923	-0.157	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-106.876	-106.876	0.000	(0)
Fe(2)	1.872e-03					
Fe+2	1.509e-03	3.558e-04	-2.821	-3.449	-0.627	(0)
FeSO4	3.584e-04	3.584e-04	-3.446	-3.446	0.000	(0)
FeHP04	2.702e-06	2.702e-06	-5.568	-5.568	0.000	(0)
FeH2P04+	1.102e-06	8.724e-07	-5.958	-6.059	-0.101	(0)
FeOH+	8.193e-07	6.448e-07	-6.087	-6.191	-0.104	(0)
Fe(OH)2	2.231e-11	2.231e-11	-10.652	-10.652	0.000	(0)
Fe(OH)3-	5.338e-13	4.201e-13	-12.273	-12.377	-0.104	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.952	-69.952	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.485	-105.642	-0.157	(0)
Fe(3)	3.327e-07					
Fe(OH)2+	3.230e-07	2.557e-07	-6.491	-6.592	-0.101	(0)
Fe(OH)3	9.608e-09	9.608e-09	-8.017	-8.017	0.000	(0)
Fe(OH)4-	1.234e-10	9.772e-11	-9.909	-10.010	-0.101	(0)
FeOH+2	2.205e-11	8.455e-12	-10.657	-11.073	-0.416	(0)
FeHP04+	6.269e-12	4.964e-12	-11.203	-11.304	-0.101	(0)
FeSO4+	1.420e-14	1.118e-14	-13.848	-13.952	-0.104	(0)
Fe+3	2.358e-15	2.665e-16	-14.627	-15.574	-0.947	(0)
Fe(SO4)2-	1.518e-15	1.058e-15	-14.819	-14.976	-0.157	(0)
FeCl+2	6.540e-16	2.508e-16	-15.184	-15.601	-0.416	(0)
FeH2P04+2	6.293e-17	2.475e-17	-16.201	-16.606	-0.405	(0)
FeCl2+	5.711e-17	4.494e-17	-16.243	-16.347	-0.104	(0)
Fe2(OH)2+4	8.834e-19	2.730e-21	-18.054	-20.564	-2.510	(0)
FeHSeO3+2	6.637e-19	1.565e-19	-18.178	-18.806	-0.627	(0)
FeCl3	1.589e-19	1.589e-19	-18.799	-18.799	0.000	(0)
Fe3(OH)4+5	8.085e-23	9.679e-27	-22.092	-26.014	-3.922	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.276	-62.903	-0.627	(0)
H(0)	3.671e-19					
H2	1.835e-19	1.876e-19	-18.736	-18.727	0.010	(0)

Hg(0)	1.039e-09					
Hg	1.039e-09	1.039e-09	-8.983	-8.983	0.000	(0)
Hg(1)	4.234e-29					
Hg2+2	2.117e-29	4.992e-30	-28.674	-29.302	-0.627	(0)
Hg(2)	2.785e-18					
HgCl2	1.586e-18	1.586e-18	-17.800	-17.800	0.000	(0)
HgCl3-	8.117e-19	5.656e-19	-18.091	-18.247	-0.157	(0)
HgCl4-2	3.503e-19	8.260e-20	-18.456	-19.083	-0.627	(0)
HgClOH	3.727e-20	3.727e-20	-19.429	-19.429	0.000	(0)
Hg(OH)2	1.801e-22	1.841e-22	-21.744	-21.735	0.010	(0)
Hg(NH3)2+2	1.357e-22	3.200e-23	-21.867	-22.495	-0.627	(0)
HgCl+	1.091e-23	7.602e-24	-22.962	-23.119	-0.157	(0)
HgOH+	2.992e-26	2.085e-26	-25.524	-25.681	-0.157	(0)
HgNH3+2	2.677e-26	6.312e-27	-25.572	-26.200	-0.627	(0)
Hg(NH3)3+2	1.016e-27	2.396e-28	-26.993	-27.620	-0.627	(0)
Hg+2	4.028e-29	9.497e-30	-28.395	-29.022	-0.627	(0)
HgSO4	8.574e-30	8.574e-30	-29.067	-29.067	0.000	(0)
Hg(OH)3-	2.056e-30	1.433e-30	-29.687	-29.844	-0.157	(0)
Hg(NH3)4+2	1.527e-32	3.600e-33	-31.816	-32.444	-0.627	(0)
HgHS2-	0.000e+00	0.000e+00	-65.697	-65.853	-0.157	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.248	-66.248	0.000	(0)
HgS2-2	0.000e+00	0.000e+00	-67.145	-67.772	-0.627	(0)
HgNO3+	0.000e+00	0.000e+00	-77.810	-77.967	-0.157	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.765	-126.765	0.000	(0)
K	1.653e-03					
K+	1.605e-03	1.260e-03	-2.794	-2.900	-0.105	(0)
KS04-	4.722e-05	3.740e-05	-4.326	-4.427	-0.101	(0)
KHP04-	2.302e-08	1.823e-08	-7.638	-7.739	-0.101	(0)
Mg	1.055e-02					
Mg+2	8.194e-03	3.109e-03	-2.086	-2.507	-0.421	(0)
MgSO4	2.350e-03	2.350e-03	-2.629	-2.629	0.000	(0)
MgHPO4	3.804e-06	3.804e-06	-5.420	-5.420	0.000	(0)
MgH2PO4+	9.500e-07	7.523e-07	-6.022	-6.124	-0.101	(0)
MgOH+	6.557e-08	5.275e-08	-7.183	-7.278	-0.095	(0)
MgP04-	8.158e-10	6.460e-10	-9.088	-9.190	-0.101	(0)
Mn(2)	2.315e-04					
Mn+2	1.953e-04	4.604e-05	-3.709	-4.337	-0.627	(0)
MnSO4	3.347e-05	3.347e-05	-4.475	-4.475	0.000	(0)
MnCl+	2.604e-06	2.050e-06	-5.584	-5.688	-0.104	(0)
MnCl2	1.024e-07	1.024e-07	-6.990	-6.990	0.000	(0)
MnOH+	6.689e-09	5.264e-09	-8.175	-8.279	-0.104	(0)
MnCl3-	1.267e-09	9.970e-10	-8.897	-9.001	-0.104	(0)
MnSe	3.578e-12	3.578e-12	-11.446	-11.446	0.000	(0)
Mn(OH)3-	2.145e-19	1.688e-19	-18.669	-18.773	-0.104	(0)
MnSeO4	1.151e-23	1.151e-23	-22.939	-22.939	0.000	(0)
Mn(OH)4-2	8.784e-26	3.369e-26	-25.056	-25.472	-0.416	(0)
MnNO3+	0.000e+00	0.000e+00	-52.397	-52.554	-0.157	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.567	-100.567	0.000	(0)
Mn(3)	1.026e-28					
Mn+3	1.026e-28	1.160e-29	-27.989	-28.936	-0.947	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-65.696	-66.112	-0.416	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-74.622	-74.742	-0.120	(0)
N(-3)	5.209e-04					
NH4+	4.981e-04	3.734e-04	-3.303	-3.428	-0.125	(0)
NH4SO4-	2.180e-05	1.715e-05	-4.662	-4.766	-0.104	(0)
NH3	9.847e-07	9.847e-07	-6.007	-6.007	0.000	(0)
NiNH3+2	9.568e-09	2.256e-09	-8.019	-8.647	-0.627	(0)
Co(NH3)+2	7.525e-09	1.774e-09	-8.124	-8.751	-0.627	(0)
CaNH3+2	6.602e-09	1.557e-09	-8.180	-8.808	-0.627	(0)
CuNH3+2	1.924e-11	4.535e-12	-10.716	-11.343	-0.627	(0)
Ni(NH3)2+2	2.313e-12	5.455e-13	-11.636	-12.263	-0.627	(0)
Co(NH3)2+2	2.943e-13	6.939e-14	-12.531	-13.159	-0.627	(0)
Ca(NH3)2+2	3.442e-15	8.116e-16	-14.463	-15.091	-0.627	(0)
Co(NH3)3+2	4.853e-18	1.144e-18	-17.314	-17.942	-0.627	(0)
Hg(NH3)2+2	1.357e-22	3.200e-23	-21.867	-22.495	-0.627	(0)
Co(NH3)4+2	3.336e-23	7.865e-24	-22.477	-23.104	-0.627	(0)

HgNH3+2	2.677e-26	6.312e-27	-25.572	-26.200	-0.627	(0)
Hg(NH3)3+2	1.016e-27	2.396e-28	-26.993	-27.620	-0.627	(0)
Co(NH3)5+2	7.250e-29	1.709e-29	-28.140	-28.767	-0.627	(0)
Hg(NH3)4+2	1.527e-32	3.600e-33	-31.816	-32.444	-0.627	(0)
Co(NH3)5Cl+2	1.813e-39	4.275e-40	-38.742	-39.369	-0.627	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.828	-47.985	-0.157	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.318	-51.946	-0.627	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.627	-53.255	-0.627	(0)
N(3)	1.306e-35					
N02-	1.306e-35	9.901e-36	-34.884	-35.004	-0.120	(0)
CoN02+	7.898e-40	5.504e-40	-39.102	-39.259	-0.157	(0)
CuN02+	0.000e+00	0.000e+00	-42.470	-42.626	-0.157	(0)
Cu(N02)2	0.000e+00	0.000e+00	-76.621	-76.621	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-48.312	-48.417	-0.105	(0)
CaN03+	0.000e+00	0.000e+00	-50.772	-50.929	-0.157	(0)
MnN03+	0.000e+00	0.000e+00	-52.397	-52.554	-0.157	(0)
CoN03+	0.000e+00	0.000e+00	-53.163	-53.320	-0.157	(0)
NiN03+	0.000e+00	0.000e+00	-53.514	-53.671	-0.157	(0)
ZnN03+	0.000e+00	0.000e+00	-53.999	-54.155	-0.157	(0)
PbN03+	0.000e+00	0.000e+00	-55.767	-55.924	-0.157	(0)
CdN03+	0.000e+00	0.000e+00	-56.229	-56.385	-0.157	(0)
CuN03+	0.000e+00	0.000e+00	-57.393	-57.550	-0.157	(0)
FeN03+2	0.000e+00	0.000e+00	-62.276	-62.903	-0.627	(0)
HgN03+	0.000e+00	0.000e+00	-77.810	-77.967	-0.157	(0)
Mn(N03)2	0.000e+00	0.000e+00	-100.567	-100.567	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-101.429	-101.429	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-103.284	-103.284	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-104.091	-104.091	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-105.153	-105.153	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-106.876	-106.876	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-126.765	-126.765	0.000	(0)
Na	4.960e-02					
Na+	4.850e-02	3.806e-02	-1.314	-1.420	-0.105	(0)
NaS04-	1.101e-03	8.716e-04	-2.958	-3.060	-0.101	(0)
NaHP04-	1.077e-06	8.530e-07	-5.968	-6.069	-0.101	(0)
Ni	7.991e-06					
Ni+2	5.853e-06	2.221e-06	-5.233	-5.653	-0.421	(0)
NiS04	1.840e-06	1.840e-06	-5.735	-5.735	0.000	(0)
NiCl+	2.852e-07	1.987e-07	-6.545	-6.702	-0.157	(0)
NiNH3+2	9.568e-09	2.256e-09	-8.019	-8.647	-0.627	(0)
NiOH+	1.867e-09	1.301e-09	-8.729	-8.886	-0.157	(0)
Ni(S04)2-2	1.144e-09	2.697e-10	-8.942	-9.569	-0.627	(0)
NiCl2	3.578e-11	3.578e-11	-10.446	-10.446	0.000	(0)
Ni(OH)2	8.487e-12	8.487e-12	-11.071	-11.071	0.000	(0)
Ni(NH3)2+2	2.313e-12	5.455e-13	-11.636	-12.263	-0.627	(0)
Ni(OH)3-	7.528e-16	5.246e-16	-15.123	-15.280	-0.157	(0)
NiSe04	9.651e-25	9.651e-25	-24.015	-24.015	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-53.514	-53.671	-0.157	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.965	-55.955	0.010	(0)
P	2.288e-05					
H2P04-	6.818e-06	5.399e-06	-5.166	-5.268	-0.101	(0)
HP04-2	5.400e-06	2.071e-06	-5.268	-5.684	-0.416	(0)
MgHP04	3.804e-06	3.804e-06	-5.420	-5.420	0.000	(0)
FeHP04	2.702e-06	2.702e-06	-5.568	-5.568	0.000	(0)
FeH2P04+	1.102e-06	8.724e-07	-5.958	-6.059	-0.101	(0)
NaHP04-	1.077e-06	8.530e-07	-5.968	-6.069	-0.101	(0)
MgH2P04+	9.500e-07	7.523e-07	-6.022	-6.124	-0.101	(0)
CaHP04	8.368e-07	8.368e-07	-6.077	-6.077	0.000	(0)
CaH2P04+	1.349e-07	1.068e-07	-6.870	-6.971	-0.101	(0)
KHP04-	2.302e-08	1.823e-08	-7.638	-7.739	-0.101	(0)
CoHP04	1.641e-08	1.641e-08	-7.785	-7.785	0.000	(0)
CaP04-	1.585e-08	1.255e-08	-7.800	-7.901	-0.101	(0)
MgP04-	8.158e-10	6.460e-10	-9.088	-9.190	-0.101	(0)
H3P04	1.182e-10	1.182e-10	-9.927	-9.927	0.000	(0)
P04-3	4.379e-11	4.948e-12	-10.359	-11.306	-0.947	(0)
FeHP04+	6.269e-12	4.964e-12	-11.203	-11.304	-0.101	(0)

FeH2PO4+2	6.293e-17	2.475e-17	-16.201	-16.606	-0.405	(0)
Pb	1.509e-08					
Pb+2	5.605e-09	2.127e-09	-8.251	-8.672	-0.421	(0)
PbSO4	4.467e-09	4.467e-09	-8.350	-8.350	0.000	(0)
PbCl+	3.651e-09	2.544e-09	-8.438	-8.594	-0.157	(0)
Pb(SO4)2-2	4.894e-10	1.154e-10	-9.310	-9.938	-0.627	(0)
PbOH+	4.740e-10	3.303e-10	-9.324	-9.481	-0.157	(0)
PbCl2	3.947e-10	3.947e-10	-9.404	-9.404	0.000	(0)
PbCl3-	8.330e-12	5.805e-12	-11.079	-11.236	-0.157	(0)
Pb(OH)2	6.456e-13	6.456e-13	-12.190	-12.190	0.000	(0)
PbCl4-2	3.751e-13	8.844e-14	-12.426	-13.053	-0.627	(0)
Pb2OH+3	2.874e-16	1.113e-17	-15.542	-16.953	-1.412	(0)
Pb(OH)3-	5.727e-17	3.991e-17	-16.242	-16.399	-0.157	(0)
Pb(OH)4-2	2.562e-21	6.041e-22	-20.591	-21.219	-0.627	(0)
Pb3(OH)4+2	3.987e-23	9.401e-24	-22.399	-23.027	-0.627	(0)
Pb4(OH)4+4	5.960e-26	1.842e-28	-25.225	-27.735	-2.510	(0)
PbNO3+	0.000e+00	0.000e+00	-55.767	-55.924	-0.157	(0)
Pb(HS)2	0.000e+00	0.000e+00	-68.856	-68.856	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.091	-104.091	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.125	-105.282	-0.157	(0)
S(-2)	7.145e-38					
H2S	3.603e-38	3.603e-38	-37.443	-37.443	0.000	(0)
HS-	2.693e-38	1.876e-38	-37.570	-37.727	-0.157	(0)
CdHS+	8.317e-39	5.796e-39	-38.080	-38.237	-0.157	(0)
S5-2	1.718e-40	0.000e+00	-39.765	-40.392	-0.627	(0)
S6-2	0.000e+00	0.000e+00	-40.191	-40.819	-0.627	(0)
S4-2	0.000e+00	0.000e+00	-40.365	-40.992	-0.627	(0)
S3-2	0.000e+00	0.000e+00	-41.177	-41.805	-0.627	(0)
S2-2	0.000e+00	0.000e+00	-42.204	-42.831	-0.627	(0)
S-2	0.000e+00	0.000e+00	-47.939	-48.355	-0.416	(0)
HgHS2-	0.000e+00	0.000e+00	-65.697	-65.853	-0.157	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.039	-66.462	-0.423	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.248	-66.248	0.000	(0)
CuS4S5-3	0.000e+00	0.000e+00	-66.793	-67.192	-0.399	(0)
HgS2-2	0.000e+00	0.000e+00	-67.145	-67.772	-0.627	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-67.847	-68.004	-0.157	(0)
Cd(HS)2	0.000e+00	0.000e+00	-68.760	-68.760	0.000	(0)
Zn(HS)2	0.000e+00	0.000e+00	-68.783	-68.783	0.000	(0)
Pb(HS)2	0.000e+00	0.000e+00	-68.856	-68.856	0.000	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.952	-69.952	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.766	-96.923	-0.157	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.072	-103.229	-0.157	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-104.429	-104.586	-0.157	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.125	-105.282	-0.157	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.485	-105.642	-0.157	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-105.793	-106.420	-0.627	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.490	-140.117	-0.627	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-141.788	-142.416	-0.627	(0)
S(6)	1.611e-02					
SO4-2	1.130e-02	4.287e-03	-1.947	-2.368	-0.421	(0)
MgSO4	2.350e-03	2.350e-03	-2.629	-2.629	0.000	(0)
NaSO4-	1.101e-03	8.716e-04	-2.958	-3.060	-0.101	(0)
CaSO4	8.918e-04	8.918e-04	-3.050	-3.050	0.000	(0)
FeSO4	3.584e-04	3.584e-04	-3.446	-3.446	0.000	(0)
KS04-	4.722e-05	3.740e-05	-4.326	-4.427	-0.101	(0)
MnSO4	3.347e-05	3.347e-05	-4.475	-4.475	0.000	(0)
NH4SO4-	2.180e-05	1.715e-05	-4.662	-4.766	-0.104	(0)
CoSO4	6.522e-06	6.522e-06	-5.186	-5.186	0.000	(0)
NiSO4	1.840e-06	1.840e-06	-5.735	-5.735	0.000	(0)
ZnSO4	6.431e-07	6.431e-07	-6.192	-6.192	0.000	(0)
Zn(SO4)2-2	1.054e-07	2.485e-08	-6.977	-7.605	-0.627	(0)
HSO4-	7.735e-08	6.036e-08	-7.112	-7.219	-0.108	(0)
AlSO4+	2.357e-08	1.840e-08	-7.628	-7.735	-0.108	(0)
PbSO4	4.467e-09	4.467e-09	-8.350	-8.350	0.000	(0)
CdSO4	2.906e-09	2.906e-09	-8.537	-8.537	0.000	(0)
Al(SO4)2-	1.183e-09	9.231e-10	-8.927	-9.035	-0.108	(0)
Ni(SO4)2-2	1.144e-09	2.697e-10	-8.942	-9.569	-0.627	(0)
Cd(SO4)2-2	7.476e-10	1.763e-10	-9.126	-9.754	-0.627	(0)

Pb(SO4)2-2	4.894e-10	1.154e-10	-9.310	-9.938	-0.627	(0)
CuSO4	2.135e-10	2.135e-10	-9.671	-9.671	0.000	(0)
FeSO4+	1.420e-14	1.118e-14	-13.848	-13.952	-0.104	(0)
Fe(SO4)2-	1.518e-15	1.058e-15	-14.819	-14.976	-0.157	(0)
HgSO4	8.574e-30	8.574e-30	-29.067	-29.067	0.000	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.828	-47.985	-0.157	(0)
Se(-2)	4.407e-09					
HSe-	4.399e-09	3.066e-09	-8.357	-8.513	-0.157	(0)
H2Se	3.799e-12	3.799e-12	-11.420	-11.420	0.000	(0)
MnSe	3.578e-12	3.578e-12	-11.446	-11.446	0.000	(0)
Se-2	6.143e-17	1.448e-17	-16.212	-16.839	-0.627	(0)
Se(4)	3.916e-07					
HSeO3-	3.658e-07	2.549e-07	-6.437	-6.594	-0.157	(0)
SeO3-2	2.576e-08	6.073e-09	-7.589	-8.217	-0.627	(0)
H2SeO3	1.708e-11	1.708e-11	-10.767	-10.767	0.000	(0)
FeHSeO3+2	6.637e-19	1.565e-19	-18.178	-18.806	-0.627	(0)
Cd(SeO3)2-2	4.131e-19	9.740e-20	-18.384	-19.011	-0.627	(0)
Se(6)	2.660e-21					
SeO4-2	2.644e-21	1.003e-21	-20.578	-20.999	-0.421	(0)
MnSeO4	1.151e-23	1.151e-23	-22.939	-22.939	0.000	(0)
CoSeO4	3.713e-24	3.713e-24	-23.430	-23.430	0.000	(0)
NiSeO4	9.651e-25	9.651e-25	-24.015	-24.015	0.000	(0)
ZnSeO4	1.102e-25	1.102e-25	-24.958	-24.958	0.000	(0)
HSeO4-	1.034e-26	7.204e-27	-25.986	-26.142	-0.157	(0)
CdSeO4	5.664e-28	5.664e-28	-27.247	-27.247	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.323	-45.950	-0.627	(0)
Zn	2.710e-06					
Zn+2	1.869e-06	7.093e-07	-5.728	-6.149	-0.421	(0)
ZnSO4	6.431e-07	6.431e-07	-6.192	-6.192	0.000	(0)
Zn(SO4)2-2	1.054e-07	2.485e-08	-6.977	-7.605	-0.627	(0)
ZnCl+	7.908e-08	6.116e-08	-7.102	-7.213	-0.112	(0)
ZnOHCl	5.099e-09	5.099e-09	-8.293	-8.293	0.000	(0)
ZnOH+	4.633e-09	3.228e-09	-8.334	-8.491	-0.157	(0)
ZnCl2	2.882e-09	2.882e-09	-8.540	-8.540	0.000	(0)
ZnCl3-	1.030e-10	7.964e-11	-9.987	-10.099	-0.112	(0)
Zn(OH)2	4.296e-11	4.296e-11	-10.367	-10.367	0.000	(0)
ZnCl4-2	3.555e-12	1.364e-12	-11.449	-11.865	-0.416	(0)
Zn(OH)3-	1.910e-14	1.331e-14	-13.719	-13.876	-0.157	(0)
Zn(OH)4-2	1.389e-19	3.275e-20	-18.857	-19.485	-0.627	(0)
ZnSeO4	1.102e-25	1.102e-25	-24.958	-24.958	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.323	-45.950	-0.627	(0)
ZnNO3+	0.000e+00	0.000e+00	-53.999	-54.155	-0.157	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-67.847	-68.004	-0.157	(0)
Zn(HS)2	0.000e+00	0.000e+00	-68.783	-68.783	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.072	-103.229	-0.157	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.284	-103.284	0.000	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-105.793	-106.420	-0.627	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-141.788	-142.416	-0.627	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	124.25	-117.97	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-28.58	-24.04	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.84	-24.04	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	179.51	-161.58	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.79	-20.68	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-28.30	-27.85	0.45	(NH4)2SeO4
Al(OH)3(am)	0.11	11.17	11.06	Al(OH)3
Al2O3	2.08	22.35	20.27	Al2O3
Al4(OH)10SO4	6.05	28.75	22.70	Al4(OH)10SO4
AlOHSO4	-1.54	-4.77	-3.23	AlOHSO4
Alunite	6.42	5.52	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.22	-11.04	-7.82	PbSO4
Anhydrite	-1.05	-5.39	-4.34	CaSO4
Anilite	-13.00	-45.31	-32.31	Cu0.25Cu1.5S
Antlerite	-12.93	-4.14	8.79	Cu3(OH)4SO4

Atacamite	-7.98	-0.37	7.61	Cu ₂ (OH) ₃ Cl
Bianchite	-6.76	-8.52	-1.76	ZnSO ₄ ·6H ₂ O
Birnessite	-18.86	-0.77	18.09	MnO ₂
Bixbyite	-16.79	-17.14	-0.35	Mn ₂ O ₃
BlaubleiI	-17.05	-41.21	-24.16	Cu _{0.9} Cu _{0.2} S
BlaubleiII	-15.83	-43.10	-27.28	Cu _{0.6} Cu _{0.8} S
Boehmite	2.32	11.17	8.86	Al ₂ O ₃
Brochantite	-15.91	-0.21	15.71	Cu ₄ (OH) ₆ SO ₄
Brucite	-6.05	11.07	17.12	Mg(OH) ₂
Bunsenite	-4.76	7.92	12.68	NiO
Ca ₃ (PO ₄) ₂ (beta)	-2.64	-31.69	-29.05	Ca ₃ (PO ₄) ₂
Ca ₄ H(PO ₄) ₃ ·3H ₂ O	-5.73	-52.81	-47.08	Ca ₄ H(PO ₄) ₃ ·3H ₂ O
CaHP04	-1.77	-21.12	-19.35	CaHP04
CaHP04:2H2O	-2.07	-21.12	-19.05	CaHP04:2H2O
Calomel	-14.08	-32.20	-18.13	Hg ₂ Cl ₂
CaSeO ₃ ·2H ₂ O	-5.69	-2.83	2.86	CaSeO ₃ ·2H ₂ O
CaSeO ₄ ·2H ₂ O	-21.03	-24.03	-3.00	CaSeO ₄ ·2H ₂ O
Cd(OH) ₂	-8.81	5.06	13.87	Cd(OH) ₂
Cd(OH) ₂ (am)	-8.88	5.06	13.94	Cd(OH) ₂
Cd ₃ (OH) ₂ (SO ₄) ₂	-23.42	-16.71	6.71	Cd ₃ (OH) ₂ (SO ₄) ₂
Cd ₃ (OH) ₄ SO ₄	-23.33	-0.77	22.56	Cd ₃ (OH) ₄ SO ₄
Cd ₃ (PO ₄) ₂	-15.57	-48.17	-32.60	Cd ₃ (PO ₄) ₂
Cd ₄ (OH) ₆ SO ₄	-24.11	4.29	28.40	Cd ₄ (OH) ₆ SO ₄
CdCl ₂	-10.81	-11.42	-0.61	CdCl ₂
CdCl ₂ ·1H ₂ O	-9.75	-11.42	-1.68	CdCl ₂ ·1H ₂ O
CdCl ₂ ·2.5H ₂ O	-9.49	-11.42	-1.93	CdCl ₂ ·2.5H ₂ O
Cdmetal(alpha)	-24.23	-10.53	13.69	Cd
Cdmetal(gamma)	-24.33	-10.53	13.80	Cd
CdOHCl	-6.79	-3.18	3.61	CdOHCl
CdSe	10.14	-10.24	-20.38	CdSe
CdSeO ₄ ·2H ₂ O	-27.67	-29.52	-1.85	CdSeO ₄ ·2H ₂ O
CdSO ₄	-10.84	-10.89	-0.05	CdSO ₄
CdSO ₄ ·1H ₂ O	-9.24	-10.89	-1.65	CdSO ₄ ·1H ₂ O
CdSO ₄ ·2.67H ₂ O	-9.06	-10.89	-1.83	CdSO ₄ ·2.67H ₂ O
Chalcanthite	-9.36	-12.01	-2.65	CuSO ₄ ·5H ₂ O
Chalcocite	-11.57	-46.89	-35.32	Cu ₂ S
Chalcopyrite	-39.34	-74.97	-35.62	CuFeS ₂
Cinnabar	-19.95	-66.25	-46.30	HgS
Clausthalite	16.99	-10.40	-27.39	PbSe
Co(OH) ₂	-4.62	8.47	13.09	Co(OH) ₂
Co(OH) ₃	-14.04	-16.13	-2.09	Co(OH) ₃
Co ₃ (PO ₄) ₂	-3.23	-37.92	-34.69	Co ₃ (PO ₄) ₂
Co ₃ O ₄	-13.55	-23.78	-10.24	Co ₃ O ₄
CoCl ₂	-16.46	-8.01	8.46	CoCl ₂
CoCl ₂ ·6H ₂ O	-10.53	-8.01	2.52	CoCl ₂ ·6H ₂ O
CoFe ₂ O ₄	21.21	18.06	-3.15	CoFe ₂ O ₄
CoHP04	-4.14	-23.20	-19.06	CoHP04
CoO	-5.37	8.47	13.84	CoO
CoS(alpha)	-28.60	-36.04	-7.44	CoS
CoS(beta)	-24.97	-36.04	-11.07	CoS
CoSe	9.37	-6.83	-16.20	CoSe
CoSeO ₃	-6.23	-4.91	1.32	CoSeO ₃
CoSeO ₄ ·6H ₂ O	-24.58	-26.11	-1.53	CoSeO ₄ ·6H ₂ O
CoSO ₄	-10.46	-7.47	2.99	CoSO ₄
CoSO ₄ ·6H ₂ O	-5.00	-7.48	-2.48	CoSO ₄ ·6H ₂ O
Cotunnite	-6.73	-11.58	-4.84	PbCl ₂
Covellite	-18.05	-40.58	-22.53	CuS
Cu(OH) ₂	-4.87	3.93	8.81	Cu(OH) ₂
Cu ₂ (OH) ₃ NO ₃	-56.76	-47.34	9.42	Cu ₂ (OH) ₃ NO ₃
Cu ₂ Se(alpha)	28.63	-17.68	-46.31	Cu ₂ Se
Cu ₂ SO ₄	-16.42	-18.32	-1.90	Cu ₂ SO ₄
Cu ₃ (PO ₄) ₂	-14.69	-51.54	-36.85	Cu ₃ (PO ₄) ₂
Cu ₃ (PO ₄) ₂ ·3H ₂ O	-16.42	-51.54	-35.12	Cu ₃ (PO ₄) ₂ ·3H ₂ O
Cu ₃ Se ₂	35.26	-29.04	-64.30	Cu ₃ Se ₂
Cumetal	-0.06	-8.98	-8.93	Cu
CuOCuSO ₄	-18.71	-8.07	10.63	CuOCuSO ₄
Cupricferrite	7.03	13.52	6.49	CuFe ₂ O ₄
Cuprite	-1.27	-2.38	-1.11	Cu ₂ O

Cuprousferrite	12.48	3.60	-8.88	CuFeO2
CuSe	22.02	-11.37	-33.39	CuSe
CuSe2	22.63	-11.07	-33.70	CuSe2
CuSeO3:2H2O	-10.05	-9.45	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-28.21	-30.65	-2.44	CuSeO4:5H2O
CuSO4	-15.12	-12.01	3.11	CuSO4
Diaspore	4.06	11.17	7.12	AlOOH
Djurleite	-12.08	-46.47	-34.40	Cu0.066Cu1.868S
Epsomite	-2.73	-4.88	-2.15	MgSO4:7H2O
Fe(OH)2	-3.44	10.13	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.36	2.32	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-5.35	-3.80	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-9.94	-30.56	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-35.09	-38.25	-3.16	Fe2(SO4)3
Fe3(OH)8	-0.51	19.71	20.22	Fe3(OH)8
Ferrihydrite	1.42	4.79	3.37	Fe(OH)3
Ferroselite	13.83	-4.88	-18.71	FeSe2
FeS(ppt)	-31.46	-34.39	-2.92	FeS
FeSe	5.83	-5.17	-11.00	FeSe
Galena	-25.45	-39.61	-14.16	PbS
Gibbsite	2.66	11.17	8.52	Al(OH)3
Goethite	4.16	4.79	0.64	FeOOH
Goslarite	-6.48	-8.52	-2.05	ZnSO4:7H2O
Greenockite	-24.96	-39.46	-14.49	CdS
Greigite	-113.31	-158.35	-45.03	Fe3S4
Gypsum	-0.78	-5.39	-4.61	CaSO4:2H2O
H-Jarosite	-5.97	-17.52	-11.55	(H3O)Fe3(SO4)2(OH)6
H2S(g)	-36.51	-44.52	-8.01	H2S
H2Se(g)	-10.38	-15.30	-4.92	H2Se
Halite	-4.46	-2.87	1.59	NaCl
Hausmannite	-18.72	43.31	62.03	Mn3O4
Hematite	10.69	9.58	-1.11	Fe2O3
Hercynite	8.84	32.48	23.64	FeAl2O4
Hg(g)	-7.73	-15.66	-7.93	Hg
Hg(OH)2	-18.24	-21.73	-3.50	Hg(OH)2
Hg2(g)	-16.22	-31.32	-15.09	Hg2
Hg2(OH)2	-20.99	-15.73	5.26	Hg2(OH)2
Hg2HPO4	-22.62	-47.40	-24.77	Hg2HPO4
Hg2S	-48.40	-60.24	-11.84	Hg2S
Hg2SeO3	-24.45	-29.11	-4.66	Hg2SeO3
Hg2SO4	-25.53	-31.67	-6.14	Hg2SO4
HgCl(g)	-35.99	-16.10	19.88	HgCl
HgCl2	-16.70	-38.21	-21.52	HgCl2
Hgmetal(l)	-2.01	-15.66	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSeO3	-22.69	-35.12	-12.43	HgSeO3
HgSO4	-28.22	-37.68	-9.45	HgSO4
Hinsdalite	-6.69	-9.19	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	2.08	-42.25	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-7.70	-70.49	-62.79	Pb5(PO4)3OH
K-Alum	-11.60	-16.84	-5.24	KAl(SO4)2:12H2O
K-Jarosite	0.86	-13.63	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-26.07	-26.80	-0.73	K2SeO4
Langite	-18.09	-0.21	17.88	Cu4(OH)6SO4:H2O
Larnakite	-5.75	-6.14	-0.38	PbO:PbSO4
Laurionite	-3.96	-3.34	0.62	PbOHCl
Lepidocrocite	3.42	4.79	1.37	FeOOH
Lime	-22.61	10.55	33.16	CaO
Litharge	-7.95	4.90	12.85	PbO
Mackinawite	-30.79	-34.39	-3.60	FeS
Maghemite	3.20	9.58	6.39	Fe2O3
Magnesioferrite	3.13	20.65	17.52	Fe2MgO4
Magnetite	15.81	19.71	3.90	Fe3O4
Manganite	-8.30	17.04	25.34	MnOOH
Massicot	-8.15	4.90	13.05	PbO
Melanothallite	-18.95	-12.55	6.41	CuCl2
Melanterite	-3.57	-5.82	-2.26	FeSO4:7H2O
Metacinnabar	-20.55	-66.25	-45.70	HgS

Mg(OH)2(active)	-7.73	11.07	18.79	Mg(OH)2
Mg3(P04)2	-6.85	-30.13	-23.28	Mg3(P04)2
MgHP04:3H2O	-2.43	-20.60	-18.18	MgHP04:3H2O
MgSe03:6H2O	-5.36	-2.32	3.04	MgSe03:6H2O
MgSe04:6H2O	-22.31	-23.51	-1.20	MgSe04:6H2O
Minium	-44.22	30.31	74.53	Pb304
Mirabilite	-3.91	-5.22	-1.30	Na2S04:10H2O
Mn2(S04)3	-59.65	-64.97	-5.32	Mn2(S04)3
Mn3(P04)2	-11.77	-35.62	-23.85	Mn3(P04)2
MnCl2:4H2O	-9.98	-7.24	2.74	MnCl2:4H2O
MnHP04	2.97	-22.43	-25.40	MnHP04
MnS(grn)	-35.52	-35.27	0.25	MnS
MnS(pnk)	-38.61	-35.27	3.34	MnS
MnSe	-9.80	-6.06	3.73	MnSe
MnSe03	-5.27	-4.14	1.13	MnSe03
MnSe03:2H2O	-5.11	-4.14	0.96	MnSe03:2H2O
MnSe04:5H2O	-23.29	-25.34	-2.05	MnSe04:5H2O
MnS04	-9.44	-6.70	2.74	MnS04
Monteponite	-10.29	5.06	15.35	Cd0
Montroydite	-18.19	-21.73	-3.55	Hg0
Morenosite	-5.85	-8.03	-2.17	NiS04:7H2O
Na-Jarosite	-1.31	-12.15	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-12.95	-2.65	10.30	Na2Se03:5H2O
Na2Se04	-25.12	-23.84	1.28	Na2Se04
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.10	7.92	13.02	Ni(OH)2
Ni3(P04)2	-8.27	-39.57	-31.30	Ni3(P04)2
Ni4(OH)6S04	-16.25	15.75	32.00	Ni4(OH)6S04
NiS(alpha)	-30.99	-36.59	-5.60	NiS
NiS(beta)	-25.49	-36.59	-11.10	NiS
NiS(gamma)	-23.79	-36.59	-12.80	NiS
NiSe	10.32	-7.38	-17.70	NiSe
NiSe03:2H2O	-8.35	-5.46	2.89	NiSe03:2H2O
NiSe04:6H2O	-25.14	-26.66	-1.52	NiSe04:6H2O
Nsutite	-18.28	-0.77	17.50	Mn02
O2(g)	-53.26	31.19	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.22	1.57	8.79	Pb2(OH)3Cl
Pb20(OH)2	-16.38	9.81	26.19	Pb20(OH)2
Pb203	-35.64	25.40	61.04	Pb203
Pb3(P04)2	-5.10	-48.63	-43.53	Pb3(P04)2
Pb302S04	-12.11	-1.23	10.87	Pb302S04
Pb4(OH)6S04	-17.43	3.67	21.10	Pb4(OH)6S04
Pb403S04	-18.53	3.67	22.20	Pb403S04
PbHP04	-2.96	-26.77	-23.81	PbHP04
Pbmetal	-14.93	-10.69	4.24	Pb
Pb0:0.3H2O	-8.08	4.90	12.98	Pb0:0.33H2O
PbSe04	-22.80	-29.67	-6.88	PbSe04
Periclase	-10.87	11.07	21.94	Mg0
Plattnerite	-29.81	20.50	50.31	Pb02
Plumbgummite	7.87	-24.92	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-12.56	10.55	23.11	Ca(OH)2
Pyrite	-44.68	-63.31	-18.63	FeS2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-17.19	24.83	42.03	Mn02
Pyromorphite	5.70	-78.73	-84.43	Pb5(P04)3Cl
Retgersite	-5.98	-8.03	-2.05	NiS04:6H2O
Semetal(am)	7.43	0.29	-7.14	Se
Semetal(hex	8.04	0.29	-7.75	Se
Se02	-13.50	-13.38	0.12	Se02
Se03	-55.97	-34.58	21.39	Se03
Sphalerite	-25.57	-37.09	-11.52	ZnS
Spinel	-4.35	33.42	37.77	MgAl204
Strengite	-0.50	-26.88	-26.38	FeP04:2H2O
Sulfur	-26.82	-28.92	-2.11	S
Tenorite	-3.86	3.94	7.80	Cu0
Thenardite	-5.55	-5.21	0.34	Na2S04
Tsumebite	-8.14	-17.93	-9.79	Pb2CuP04(OH)3:3H2O

Vivianite	3.04	-32.96	-36.00	Fe3(P04)2:8H20
Wurtzite	-28.09	-37.09	-9.00	ZnS
Zincite	-4.12	7.43	11.55	ZnO
Zincosite	-12.64	-8.52	4.13	ZnS04
Zn(N03)2:6H20	-106.25	-102.99	3.26	Zn(N03)2:6H20
Zn(OH)2	-4.77	7.43	12.20	Zn(OH)2
Zn(OH)2(am)	-5.24	7.43	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.43	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.30	7.43	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.43	11.73	Zn(OH)2
Zn2(OH)2S04	-8.59	-1.09	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-8.58	6.61	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H20	-5.64	-41.06	-35.42	Zn3(P04)2:4H20
Zn30(S04)2	-29.13	-9.61	19.53	Zn30(S04)2
Zn4(OH)6S04	-14.64	13.76	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-17.84	20.66	38.50	Zn5(OH)8Cl2
ZnCl2	-16.27	-9.05	7.22	ZnCl2
Znmetal	-34.32	-8.17	26.15	Zn
Zn0(active)	-3.97	7.43	11.40	Zn0
ZnS(am)	-28.00	-37.09	-9.09	ZnS
ZnSe	6.59	-7.87	-14.46	ZnSe
ZnSe04:6H20	-25.63	-27.15	-1.52	ZnSe04:6H20
ZnS04:1H20	-7.98	-8.52	-0.53	ZnS04:1H20

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 9.

SOLUTION 8 # Mean Groundwater quality

temp	21
pH	6.79
pe	1
redox	pe
units	mg/l
density	1
Al	0.37
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.003
Co	2.34
Cr	0
Cu	0.31
Fe	100.34
Pb	0.003
Mn	12.2
Mo	0
V	0
Zn	0.17
Se	0.03
Ni	0.45
N	7
P	0.68
Ca	130
Mg	246
Na	1094
K	62
Cl	1533
S(6)	1485

```

      Hg      0.0002
      water  1 # kg
MIX 6
      1      0.988
      8      0.012
REACTION 7
H2O -1
      2
END #Time-step 7

```

Beginning of initial solution calculations.

Initial solution 8.

-----Solution composition-----

Elements	Molality	Moles
Al	1.378e-05	1.378e-05
Ca	3.259e-03	3.259e-03
Cd	2.681e-08	2.681e-08
Cl	4.344e-02	4.344e-02
Co	3.989e-05	3.989e-05
Cu	4.901e-06	4.901e-06
Fe	1.805e-03	1.805e-03
Hg	1.002e-09	1.002e-09
K	1.593e-03	1.593e-03
Mg	1.017e-02	1.017e-02
Mn	2.231e-04	2.231e-04
N	5.021e-04	5.021e-04
Na	4.781e-02	4.781e-02
Ni	7.703e-06	7.703e-06
P	2.206e-05	2.206e-05
Pb	1.455e-08	1.455e-08
S(6)	1.553e-02	1.553e-02
Se	3.817e-07	3.817e-07
Zn	2.612e-06	2.612e-06

-----Description of solution-----

```

                                pH = 6.790
                                pe = 1.000
                    Activity of water = 0.998
    Ionic strength (mol/kgw) = 9.259e-02
      Mass of water (kg) = 1.000e+00
    Total alkalinity (eq/kg) = 6.274e-05
      Total carbon (mol/kg) = 0.000e+00
      Total CO2 (mol/kg) = 0.000e+00
      Temperature (°C) = 21.00
      Electrical balance (eq) = 6.374e-03
Percent error, 100*(Cat-|An|)/(Cat+|An|) = 4.58
                    Iterations = 13
                    Total H = 1.110158e+02
                    Total O = 5.556909e+01

```

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.061e-07	1.622e-07	-6.686	-6.790	-0.104	0.00
OH-	5.935e-08	4.562e-08	-7.227	-7.341	-0.114	(0)
H2O	5.551e+01	9.980e-01	1.744	-0.001	0.000	18.05
Al	1.378e-05					
Al(OH)4-	8.973e-06	7.024e-06	-5.047	-5.153	-0.106	(0)
Al(OH)2+	2.373e-06	1.884e-06	-5.625	-5.725	-0.100	(0)
Al(OH)3	2.329e-06	2.329e-06	-5.633	-5.633	0.000	(0)

		AlOH+2	7.409e-08	2.945e-08	-7.130	-7.531	-0.401	(0)
		AlS04+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
		Al+3	5.344e-09	6.178e-10	-8.272	-9.209	-0.937	(0)
		Al(S04)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ca	3.259e-03							
		Ca+2	2.406e-03	9.221e-04	-2.619	-3.035	-0.416	(0)
		CaS04	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
		CaHP04	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
		CaH2P04+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
		CaP04-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
		CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
		CaOH+	1.001e-09	8.020e-10	-8.999	-9.096	-0.096	(0)
		Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
		CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
Cd	2.681e-08							
		CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
		Cd+2	7.874e-09	3.018e-09	-8.104	-8.520	-0.416	(0)
		CdS04	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
		CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
		Cd(S04)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
		CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
		CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
		CdOH+	1.568e-12	1.100e-12	-11.805	-11.959	-0.154	(0)
		Cd(OH)2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
		Cd2OH+3	4.264e-19	1.748e-20	-18.370	-19.758	-1.387	(0)
		Cd(Se03)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
		Cd(OH)3-	3.135e-21	2.198e-21	-20.504	-20.658	-0.154	(0)
		CdSe04	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
		Cd(OH)4-2	9.222e-29	2.230e-29	-28.035	-28.652	-0.617	(0)
		CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
		Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cl	4.344e-02							
		Cl-	4.343e-02	3.417e-02	-1.362	-1.466	-0.104	(0)
		CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
		MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
		CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
		CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
		NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
		MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
		ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
		CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
		CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
		ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
		PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
		ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
		CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
		MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
		PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
		ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
		CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
		NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
		CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
		CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
		PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
		ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
		PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
		CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
		FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
		FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
		CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
		HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
		HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
		HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
		FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
		HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
		CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
		HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
		CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)

Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(2)	3.989e-05					
Co+2	3.225e-05	7.797e-06	-4.491	-5.108	-0.617	(0)
CoS04	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CoHP04	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CoOH+	1.375e-08	9.639e-09	-7.862	-8.016	-0.154	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
Co(OH)2	4.744e-11	4.744e-11	-10.324	-10.324	0.000	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Co2OH+3	9.190e-14	3.766e-15	-13.037	-14.424	-1.387	(0)
Co(OH)3-	8.364e-17	5.865e-17	-16.078	-16.232	-0.154	(0)
Co0OH-	5.039e-18	3.533e-18	-17.298	-17.452	-0.154	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Co4(OH)4+4	5.041e-22	1.722e-24	-21.297	-23.764	-2.466	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
CoSe04	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
Co(OH)4-2	2.382e-24	5.759e-25	-23.623	-24.240	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Co(3)	4.042e-31					
CoOH+2	4.042e-31	9.773e-32	-30.393	-31.010	-0.617	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co+3	2.685e-36	3.104e-37	-35.571	-36.508	-0.937	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
Cu(1)	4.900e-06					
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
Cu+	1.553e-08	1.089e-08	-7.809	-7.963	-0.154	(0)
Cu(2)	8.967e-10					
Cu+2	6.026e-10	2.310e-10	-9.220	-9.636	-0.416	(0)
CuS04	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
CuOH+	4.792e-11	3.719e-11	-10.319	-10.430	-0.110	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
Cu(OH)2	5.595e-13	5.595e-13	-12.252	-12.252	0.000	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
Cu2(OH)2+2	1.398e-16	3.379e-17	-15.855	-16.471	-0.617	(0)
Cu(OH)3-	1.014e-16	7.111e-17	-15.994	-16.148	-0.154	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
Cu(OH)4-2	1.434e-22	3.468e-23	-21.843	-22.460	-0.617	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Fe(2)	1.805e-03					
Fe+2	1.454e-03	3.515e-04	-2.837	-3.454	-0.617	(0)
FeS04	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
FeHP04	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2P04+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
FeOH+	8.090e-07	6.384e-07	-6.092	-6.195	-0.103	(0)
Fe(OH)2	2.214e-11	2.214e-11	-10.655	-10.655	0.000	(0)
Fe(OH)3-	5.296e-13	4.179e-13	-12.276	-12.379	-0.103	(0)
Fe(3)	3.233e-07					
Fe(OH)2+	3.138e-07	2.491e-07	-6.503	-6.604	-0.100	(0)
Fe(OH)3	9.382e-09	9.382e-09	-8.028	-8.028	0.000	(0)
Fe(OH)4-	1.205e-10	9.565e-11	-9.919	-10.019	-0.100	(0)
FeOH+2	2.119e-11	8.217e-12	-10.674	-11.085	-0.411	(0)
FeHP04+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeS04+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)

Fe+3	2.235e-15	2.584e-16	-14.651	-15.588	-0.937	(0)
Fe(SO4)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
Fe2(OH)2+4	7.548e-19	2.579e-21	-18.122	-20.589	-2.466	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
Fe3(OH)4+5	6.361e-23	8.906e-27	-22.197	-26.050	-3.854	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
H(0)	3.796e-19					
H2	1.898e-19	1.939e-19	-18.722	-18.712	0.009	(0)
Hg(0)	1.002e-09					
Hg	1.002e-09	1.002e-09	-8.999	-8.999	0.000	(0)
Hg(1)	3.697e-29					
Hg2+2	1.848e-29	4.469e-30	-28.733	-29.350	-0.617	(0)
Hg(2)	2.362e-18					
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
Hg(OH)2	1.682e-22	1.718e-22	-21.774	-21.765	0.009	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
HgOH+	2.768e-26	1.941e-26	-25.558	-25.712	-0.154	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Hg+2	3.648e-29	8.820e-30	-28.438	-29.055	-0.617	(0)
HgSO4	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Hg(OH)3-	1.911e-30	1.340e-30	-29.719	-29.873	-0.154	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
HgNO3+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
K	1.593e-03					
K+	1.549e-03	1.219e-03	-2.810	-2.914	-0.104	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
Mg	1.017e-02					
Mg+2	7.920e-03	3.036e-03	-2.101	-2.518	-0.416	(0)
MgSO4	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
MgOH+	6.402e-08	5.162e-08	-7.194	-7.287	-0.094	(0)
MgPO4-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
Mn(2)	2.231e-04					
Mn+2	1.882e-04	4.549e-05	-3.725	-4.342	-0.617	(0)
MnSO4	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
MnOH+	6.606e-09	5.213e-09	-8.180	-8.283	-0.103	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Mn(OH)3-	2.129e-19	1.680e-19	-18.672	-18.775	-0.103	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
Mn(OH)4-2	8.666e-26	3.361e-26	-25.062	-25.474	-0.411	(0)
MnNO3+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Mn(3)	9.732e-29					
Mn+3	9.732e-29	1.125e-29	-28.012	-28.949	-0.937	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-65.730	-66.142	-0.411	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-74.661	-74.779	-0.119	(0)
N(-3)	5.021e-04					
NH4+	4.805e-04	3.617e-04	-3.318	-3.442	-0.123	(0)
NH4SO4-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
NH3	9.560e-07	9.560e-07	-6.020	-6.020	0.000	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)

Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
N(3)	1.148e-35					
N02-	1.148e-35	8.735e-36	-34.940	-35.059	-0.119	(0)
CoN02+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CuN02+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
Cu(N02)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-48.382	-48.486	-0.104	(0)
CaN03+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
MnN03+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
CoN03+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
NiN03+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
ZnN03+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
PbN03+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
CdN03+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
CuN03+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
FeN03+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
HgN03+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Mn(N03)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
Na	4.781e-02					
Na+	4.677e-02	3.680e-02	-1.330	-1.434	-0.104	(0)
NaSO4-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
NaHP04-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
Ni	7.703e-06					
Ni+2	5.664e-06	2.171e-06	-5.247	-5.663	-0.416	(0)
NiSO4	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
NiOH+	1.818e-09	1.275e-09	-8.741	-8.895	-0.154	(0)
Ni(SO4)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
Ni(OH)2	8.335e-12	8.335e-12	-11.079	-11.079	0.000	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Ni(OH)3-	7.365e-16	5.164e-16	-15.133	-15.287	-0.154	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.993	-55.984	0.009	(0)
P	2.206e-05					
H2PO4-	6.634e-06	5.268e-06	-5.178	-5.278	-0.100	(0)
HP04-2	5.222e-06	2.025e-06	-5.282	-5.694	-0.411	(0)
MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
FeHP04	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
NaHP04-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)

CaHP04	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2P04+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
CoHP04	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CaP04-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
MgP04-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
H3P04	1.150e-10	1.150e-10	-9.939	-9.939	0.000	(0)
P04-3	4.196e-11	4.850e-12	-10.377	-11.314	-0.937	(0)
FeHP04+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeH2P04+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
Pb	1.455e-08					
Pb+2	5.480e-09	2.100e-09	-8.261	-8.678	-0.416	(0)
PbS04	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
PbOH+	4.662e-10	3.269e-10	-9.331	-9.486	-0.154	(0)
Pb(S04)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
Pb(OH)2	6.405e-13	6.405e-13	-12.193	-12.193	0.000	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
Pb2OH+3	2.655e-16	1.088e-17	-15.576	-16.963	-1.387	(0)
Pb(OH)3-	5.660e-17	3.969e-17	-16.247	-16.401	-0.154	(0)
Pb(OH)4-2	2.491e-21	6.022e-22	-20.604	-21.220	-0.617	(0)
Pb3(OH)4+2	3.779e-23	9.137e-24	-22.423	-23.039	-0.617	(0)
Pb4(OH)4+4	5.175e-26	1.768e-28	-25.286	-27.753	-2.466	(0)
PbN03+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
Pb(N03)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
S(6)	1.553e-02					
S04-2	1.094e-02	4.194e-03	-1.961	-2.377	-0.416	(0)
MgS04	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
NaS04-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
CaS04	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
FeS04	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
MnS04	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
NH4S04-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
CoS04	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
NiS04	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
ZnS04	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(S04)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
HS04-	7.527e-08	5.892e-08	-7.123	-7.230	-0.106	(0)
AlS04+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
PbS04	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
CdS04	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
Al(S04)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ni(S04)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
Cd(S04)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
Pb(S04)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
CuS04	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
FeS04+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe(S04)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
HgS04	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Se(-2)	4.685e-09					
HSe-	4.677e-09	3.279e-09	-8.330	-8.484	-0.154	(0)
H2Se	4.054e-12	4.054e-12	-11.392	-11.392	0.000	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Se-2	6.423e-17	1.553e-17	-16.192	-16.809	-0.617	(0)
Se(4)	3.770e-07					
HSe03-	3.526e-07	2.472e-07	-6.453	-6.607	-0.154	(0)
Se03-2	2.442e-08	5.904e-09	-7.612	-8.229	-0.617	(0)
H2Se03	1.653e-11	1.653e-11	-10.782	-10.782	0.000	(0)
FeHSe03+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
Cd(Se03)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Se(6)	2.478e-21					
Se04-2	2.463e-21	9.439e-22	-20.609	-21.025	-0.416	(0)
MnSe04	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
CoSe04	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)

	NiSe04	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
	ZnSe04	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
	HSe04-	9.645e-27	6.763e-27	-26.016	-26.170	-0.154	(0)
	CdSe04	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
	Zn(Se04)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
Zn	2.612e-06						
	Zn+2	1.813e-06	6.948e-07	-5.742	-6.158	-0.416	(0)
	ZnS04	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
	Zn(S04)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
	ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
	ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
	ZnOH+	4.520e-09	3.170e-09	-8.345	-8.499	-0.154	(0)
	ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
	ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
	Zn(OH)2	4.227e-11	4.227e-11	-10.374	-10.374	0.000	(0)
	ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
	Zn(OH)3-	1.872e-14	1.313e-14	-13.728	-13.882	-0.154	(0)
	Zn(OH)4-2	1.339e-19	3.238e-20	-18.873	-19.490	-0.617	(0)
	ZnSe04	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
	Zn(Se04)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
	ZnN03+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
	Zn(N03)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(N03)2	-124.48	-118.20	6.27	(Co(NH3)5Cl)(N03)2
(Co(NH3)5Cl)Cl2	-28.70	-24.17	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.96	-24.17	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(N03)3	-179.81	-161.88	17.93	(Co(NH3)6)(N03)3
(Co(NH3)6)Cl3	-40.93	-20.82	20.11	(Co(NH3)6)Cl3
(NH4)2Se04	-28.36	-27.91	0.45	(NH4)2Se04
Al(OH)3(am)	0.09	11.16	11.06	Al(OH)3
Al2O3	2.05	22.32	20.27	Al2O3
Al4(OH)10S04	5.98	28.68	22.70	Al4(OH)10S04
AlOHS04	-1.57	-4.80	-3.23	AlOHS04
Alunite	6.34	5.44	-0.90	KAl3(S04)2(OH)6
Anglesite	-3.24	-11.06	-7.82	PbS04
Anhydrite	-1.07	-5.41	-4.34	CaS04
Antlerite	-12.92	-4.13	8.79	Cu3(OH)4S04
Atacamite	-7.99	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.78	-8.54	-1.76	ZnS04:6H2O
Birnessite	-18.88	-0.79	18.09	MnO2
Bixbyite	-16.81	-17.16	-0.35	Mn2O3
Boehmite	2.30	11.16	8.86	AlOOH
Brochantite	-15.89	-0.19	15.71	Cu4(OH)6S04
Brucite	-6.06	11.06	17.12	Mg(OH)2
Bunsenite	-4.77	7.92	12.68	NiO
Ca3(P04)2(beta)	-2.69	-31.73	-29.05	Ca3(P04)2
Ca4H(P04)3:3H2O	-5.80	-52.88	-47.08	Ca4H(P04)3:3H2O
CaHP04	-1.79	-21.14	-19.35	CaHP04
CaHP04:2H2O	-2.09	-21.14	-19.05	CaHP04:2H2O
Calomel	-14.15	-32.28	-18.13	Hg2Cl2
CaSe03:2H2O	-5.71	-2.85	2.86	CaSe03:2H2O
CaSe04:2H2O	-21.06	-24.06	-3.00	CaSe04:2H2O
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2
Cd3(OH)2(S04)2	-23.45	-16.74	6.71	Cd3(OH)2(S04)2
Cd3(OH)4S04	-23.34	-0.78	22.56	Cd3(OH)4S04
Cd3(P04)2	-15.59	-48.19	-32.60	Cd3(P04)2
Cd4(OH)6S04	-24.12	4.28	28.40	Cd4(OH)6S04
CdCl2	-10.84	-11.45	-0.61	CdCl2
CdCl2:1H2O	-9.78	-11.45	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-9.52	-11.46	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.21	-10.52	13.69	Cd
Cdmetal(gamma)	-24.32	-10.52	13.80	Cd
CdOHCl	-6.81	-3.20	3.61	CdOHCl

CdSe	10.17	-10.21	-20.38	CdSe
CdSeO4:2H2O	-27.70	-29.55	-1.85	CdSeO4:2H2O
CdSO4	-10.85	-10.90	-0.05	CdSO4
CdSO4:1H2O	-9.25	-10.90	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-9.07	-10.90	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.36	-12.02	-2.65	CuSO4:5H2O
Clausthalite	17.01	-10.37	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.05	-16.14	-2.09	Co(OH)3
Co3(P04)2	-3.27	-37.95	-34.69	Co3(P04)2
Co3O4	-13.57	-23.81	-10.24	Co3O4
CoCl2	-16.50	-8.04	8.46	CoCl2
CoCl2:6H2O	-10.56	-8.05	2.52	CoCl2:6H2O
CoFe2O4	21.18	18.03	-3.15	CoFe2O4
CoHP04	-4.15	-23.21	-19.06	CoHP04
CoO	-5.37	8.47	13.84	CoO
CoSe	9.40	-6.80	-16.20	CoSe
CoSeO3	-6.24	-4.92	1.32	CoSeO3
CoSeO4:6H2O	-24.61	-26.14	-1.53	CoSeO4:6H2O
CoSO4	-10.48	-7.49	2.99	CoSO4
CoSO4:6H2O	-5.02	-7.49	-2.48	CoSO4:6H2O
Cotunnite	-6.77	-11.61	-4.84	PbCl2
Cu(OH)2	-4.87	3.94	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.82	-47.39	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.69	-17.62	-46.31	Cu2Se
Cu2SO4	-16.40	-18.30	-1.90	Cu2SO4
Cu3(P04)2	-14.69	-51.54	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-16.42	-51.54	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.35	-28.95	-64.30	Cu3Se2
Cumetal	-0.04	-8.96	-8.93	Cu
Cu0CuSO4	-18.70	-8.07	10.63	Cu0CuSO4
Cupricferrite	7.02	13.50	6.49	CuFe2O4
Cuprite	-1.24	-2.35	-1.11	Cu2O
Cuprousferrite	12.49	3.61	-8.88	CuFeO2
CuSe	22.06	-11.33	-33.39	CuSe
CuSe2	22.68	-11.02	-33.70	CuSe2
CuSeO3:2H2O	-10.05	-9.46	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-28.23	-30.67	-2.44	CuSeO4:5H2O
CuSO4	-15.13	-12.01	3.11	CuSO4
Diaspore	4.04	11.16	7.12	AlOOH
Epsomite	-2.75	-4.90	-2.15	MgSO4:7H2O
Fe(OH)2	-3.44	10.12	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.34	2.30	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-5.39	-3.84	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-10.00	-30.63	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-35.15	-38.31	-3.16	Fe2(SO4)3
Fe3(OH)8	-0.54	19.68	20.22	Fe3(OH)8
Ferrihydrite	1.41	4.78	3.37	Fe(OH)3
Ferroselite	13.87	-4.84	-18.71	FeSe2
FeSe	5.86	-5.15	-11.00	FeSe
Gibbsite	2.64	11.16	8.52	Al(OH)3
Goethite	4.15	4.78	0.64	FeOOH
Goslarite	-6.50	-8.54	-2.05	ZnSO4:7H2O
Gypsum	-0.80	-5.41	-4.61	CaSO4:2H2O
H-Jarosite	-6.02	-17.57	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-10.35	-15.27	-4.92	H2Se
Halite	-4.49	-2.90	1.59	NaCl
Hausmannite	-18.74	43.29	62.03	Mn3O4
Hematite	10.67	9.56	-1.11	Fe2O3
Hercynite	8.80	32.44	23.64	FeAl2O4
Hg(g)	-7.75	-15.67	-7.93	Hg
Hg(OH)2	-18.27	-21.76	-3.50	Hg(OH)2
Hg2(g)	-16.26	-31.35	-15.09	Hg2
Hg2(OH)2	-21.03	-15.77	5.26	Hg2(OH)2
Hg2HP04	-22.68	-47.45	-24.77	Hg2HP04
Hg2SeO3	-24.51	-29.17	-4.66	Hg2SeO3
Hg2SO4	-25.58	-31.73	-6.14	Hg2SO4
HgCl(g)	-36.02	-16.14	19.88	HgCl

HgCl2	-16.76	-38.28	-21.52	HgCl2
Hgmetal(l)	-2.02	-15.67	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSeO3	-22.73	-35.16	-12.43	HgSeO3
HgSO4	-28.27	-37.72	-9.45	HgSO4
Hinsdalite	-6.76	-9.26	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	2.00	-42.33	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-7.75	-70.54	-62.79	Pb5(PO4)3OH
K-Alum	-11.65	-16.89	-5.24	KAl(SO4)2·12H2O
K-Jarosite	0.79	-13.70	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-26.12	-26.85	-0.73	K2SeO4
Langite	-18.07	-0.19	17.88	Cu4(OH)6SO4·H2O
Larnakite	-5.77	-6.15	-0.38	PbO:PbSO4
Laurionite	-3.98	-3.35	0.62	PbOHCl
Lepidocrocite	3.41	4.78	1.37	FeOOH
Lime	-22.62	10.54	33.16	CaO
Litharge	-7.95	4.90	12.85	PbO
Maghemite	3.18	9.56	6.39	Fe2O3
Magnesioferrite	3.10	20.62	17.52	Fe2MgO4
Magnetite	15.79	19.69	3.90	Fe3O4
Manganite	-8.31	17.03	25.34	MnOOH
Massicot	-8.15	4.90	13.05	PbO
Melanothallite	-18.98	-12.57	6.41	CuCl2
Melanterite	-3.58	-5.84	-2.26	FeSO4·7H2O
Mg(OH)2(active)	-7.73	11.06	18.79	Mg(OH)2
Mg3(PO4)2	-6.90	-30.18	-23.28	Mg3(PO4)2
MgHP04:3H2O	-2.45	-20.62	-18.18	MgHP04:3H2O
MgSeO3:6H2O	-5.38	-2.34	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-22.35	-23.55	-1.20	MgSeO4:6H2O
Minium	-44.24	30.28	74.53	Pb3O4
Mirabilite	-3.95	-5.25	-1.30	Na2SO4·10H2O
Mn2(SO4)3	-59.71	-65.03	-5.32	Mn2(SO4)3
Mn3(PO4)2	-11.81	-35.65	-23.85	Mn3(PO4)2
MnCl2:4H2O	-10.02	-7.28	2.74	MnCl2:4H2O
MnHP04	2.95	-22.45	-25.40	MnHP04
MnSe	-9.77	-6.04	3.73	MnSe
MnSeO3	-5.29	-4.16	1.13	MnSeO3
MnSeO3:2H2O	-5.12	-4.16	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-23.32	-25.37	-2.05	MnSeO4:5H2O
MnSO4	-9.46	-6.72	2.74	MnSO4
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.22	-21.76	-3.55	HgO
Morenosite	-5.87	-8.05	-2.17	NiSO4·7H2O
Na-Jarosite	-1.38	-12.22	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-12.99	-2.69	10.30	Na2SeO3:5H2O
Na2SeO4	-25.17	-23.89	1.28	Na2SeO4
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.11	7.91	13.02	Ni(OH)2
Ni3(PO4)2	-8.32	-39.62	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-16.30	15.70	32.00	Ni4(OH)6SO4
NiSe	10.34	-7.36	-17.70	NiSe
NiSeO3:2H2O	-8.37	-5.48	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-25.17	-26.69	-1.52	NiSeO4:6H2O
Nsutite	-18.29	-0.79	17.50	MnO2
O2(g)	-53.29	31.16	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.25	1.55	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-16.39	9.80	26.19	Pb2O(OH)2
Pb2O3	-35.66	25.38	61.04	Pb2O3
Pb3(P04)2	-5.13	-48.66	-43.53	Pb3(P04)2
Pb3O2SO4	-12.13	-1.25	10.87	Pb3O2SO4
Pb4(OH)6SO4	-17.45	3.65	21.10	Pb4(OH)6SO4
Pb4O3SO4	-18.55	3.65	22.20	Pb4O3SO4
PbHP04	-2.98	-26.78	-23.81	PbHP04
Pbmetal	-14.92	-10.68	4.24	Pb
PbO:0.3H2O	-8.08	4.90	12.98	PbO:0.33H2O
PbSeO4	-22.83	-29.70	-6.88	PbSeO4
Periclase	-10.88	11.06	21.94	MgO

Plattnerite	-29.83	20.48	50.31	PbO2
Plumbgummite	7.80	-24.99	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-12.57	10.54	23.11	Ca(OH)2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-17.21	24.82	42.03	MnO2
Pyromorphite	5.63	-78.80	-84.43	Pb5(P04)3Cl
Retgersite	-6.00	-8.05	-2.05	NiS04:6H2O
Semetal(am)	7.44	0.31	-7.14	Se
Semetal(hex)	8.05	0.31	-7.75	Se
SeO2	-13.52	-13.40	0.12	SeO2
SeO3	-56.00	-34.60	21.39	SeO3
Spinel	-4.39	33.38	37.77	MgAl2O4
Strengite	-0.53	-26.90	-26.38	FeP04:2H2O
Tenorite	-3.86	3.94	7.80	CuO
Thenardite	-5.59	-5.25	0.34	Na2S04
Tsumebite	-8.15	-17.94	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	3.00	-33.00	-36.00	Fe3(P04)2:8H2O
Zincite	-4.13	7.42	11.55	ZnO
Zincosite	-12.66	-8.54	4.13	ZnS04
Zn(NO3)2:6H2O	-106.39	-103.14	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.78	7.42	12.20	Zn(OH)2
Zn(OH)2(am)	-5.25	7.42	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.42	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.31	7.42	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.42	11.73	Zn(OH)2
Zn2(OH)2S04	-8.62	-1.12	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-8.61	6.58	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-5.69	-41.11	-35.42	Zn3(P04)2:4H2O
Zn3O(S04)2	-29.18	-9.65	19.53	Zn3O(S04)2
Zn4(OH)6S04	-14.68	13.72	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-17.91	20.59	38.50	Zn5(OH)8Cl2
ZnCl2	-16.31	-9.09	7.22	ZnCl2
Znmetal	-34.31	-8.16	26.15	Zn
ZnO(active)	-3.98	7.42	11.40	ZnO
ZnSe	6.61	-7.85	-14.46	ZnSe
ZnSeO4:6H2O	-25.67	-27.19	-1.52	ZnSeO4:6H2O
ZnS04:1H2O	-8.00	-8.54	-0.53	ZnS04:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 6.
Using reaction 7.

Mixture 6.

9.880e-01 Solution 1
1.200e-02 Solution 8

Reaction 7.

2.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000
Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	1.429e-05	1.378e-05
Ca	3.381e-03	3.259e-03
Cd	2.782e-08	2.681e-08
Cl	4.507e-02	4.344e-02
Co	4.138e-05	3.989e-05
Cu	5.084e-06	4.901e-06
Fe	1.873e-03	1.805e-03
Hg	1.039e-09	1.002e-09
K	1.653e-03	1.593e-03
Mg	1.055e-02	1.017e-02
Mn	2.315e-04	2.231e-04
N	5.209e-04	5.021e-04
Na	4.960e-02	4.781e-02
Ni	7.991e-06	7.703e-06
P	2.288e-05	2.206e-05
Pb	1.509e-08	1.455e-08
S	1.611e-02	1.553e-02
Se	3.960e-07	3.817e-07
Zn	2.710e-06	2.612e-06

-----Description of solution-----

pH	=	6.789	Charge balance
pe	=	1.008	Adjusted to redox equilibrium
Activity of water	=	0.998	
Ionic strength (mol/kgw)	=	9.589e-02	
Mass of water (kg)	=	9.640e-01	
Total alkalinity (eq/kg)	=	6.509e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	6.374e-03	
Percent error, $100 \cdot (\text{Cat} - \text{An}) / (\text{Cat} + \text{An})$	=	4.58	
Iterations	=	4	
Total H	=	1.070158e+02	
Total O	=	5.356909e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.071e-07	1.626e-07	-6.684	-6.789	-0.105	0.00
OH-	5.941e-08	4.551e-08	-7.226	-7.342	-0.116	(0)
H2O	5.551e+01	9.979e-01	1.744	-0.001	0.000	18.05
Al	1.429e-05					
Al(OH)4-	9.301e-06	7.259e-06	-5.031	-5.139	-0.108	(0)
Al(OH)2+	2.470e-06	1.956e-06	-5.607	-5.709	-0.101	(0)
Al(OH)3	2.413e-06	2.413e-06	-5.618	-5.618	0.000	(0)
AlOH+2	7.793e-08	3.065e-08	-7.108	-7.514	-0.405	(0)
AlSO4+	2.357e-08	1.840e-08	-7.628	-7.735	-0.108	(0)
Al+3	5.703e-09	6.445e-10	-8.244	-9.191	-0.947	(0)
Al(SO4)2-	1.183e-09	9.231e-10	-8.927	-9.035	-0.108	(0)
Ca	3.381e-03					
Ca+2	2.488e-03	9.441e-04	-2.604	-3.025	-0.421	(0)
CaSO4	8.918e-04	8.918e-04	-3.050	-3.050	0.000	(0)
CaHP04	8.368e-07	8.368e-07	-6.077	-6.077	0.000	(0)
CaH2P04+	1.349e-07	1.068e-07	-6.870	-6.971	-0.101	(0)
CaP04-	1.585e-08	1.255e-08	-7.800	-7.901	-0.101	(0)
CaNH3+2	6.602e-09	1.557e-09	-8.180	-8.808	-0.627	(0)
CaOH+	1.025e-09	8.191e-10	-8.989	-9.087	-0.097	(0)
Ca(NH3)2+2	3.442e-15	8.116e-16	-14.463	-15.091	-0.627	(0)
CaNO3+	0.000e+00	0.000e+00	-50.772	-50.929	-0.157	(0)

Cd	2.782e-08					
CdCl+	1.462e-08	1.018e-08	-7.835	-7.992	-0.157	(0)
Cd+2	7.991e-09	3.032e-09	-8.097	-8.518	-0.421	(0)
CdSO4	2.906e-09	2.906e-09	-8.537	-8.537	0.000	(0)
CdCl2	1.485e-09	1.485e-09	-8.828	-8.828	0.000	(0)
Cd(SO4)2-2	7.476e-10	1.763e-10	-9.126	-9.754	-0.627	(0)
CdCl3-	4.575e-11	3.188e-11	-10.340	-10.496	-0.157	(0)
CdOHCl	2.350e-11	2.350e-11	-10.629	-10.629	0.000	(0)
CdOH+	1.582e-12	1.102e-12	-11.801	-11.958	-0.157	(0)
Cd(OH)2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
Cd2OH+3	4.544e-19	1.760e-20	-18.343	-19.754	-1.412	(0)
Cd(SeO3)2-2	4.131e-19	9.740e-20	-18.384	-19.011	-0.627	(0)
Cd(OH)3-	3.147e-21	2.193e-21	-20.502	-20.659	-0.157	(0)
CdSeO4	5.664e-28	5.664e-28	-27.247	-27.247	0.000	(0)
Cd(OH)4-2	9.411e-29	2.219e-29	-28.026	-28.654	-0.627	(0)
CdHS+	8.317e-39	5.796e-39	-38.080	-38.237	-0.157	(0)
CdNO3+	0.000e+00	0.000e+00	-56.229	-56.385	-0.157	(0)
Cd(HS)2	0.000e+00	0.000e+00	-68.760	-68.760	0.000	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-104.429	-104.586	-0.157	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.153	-105.153	0.000	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.490	-140.117	-0.627	(0)
Cl	4.507e-02					
Cl-	4.505e-02	3.536e-02	-1.346	-1.451	-0.105	(0)
CuCl2-	4.531e-06	3.504e-06	-5.344	-5.455	-0.112	(0)
MnCl+	2.604e-06	2.050e-06	-5.584	-5.688	-0.104	(0)
CoCl+	1.370e-06	9.543e-07	-5.863	-6.020	-0.157	(0)
CuCl	4.698e-07	4.698e-07	-6.328	-6.328	0.000	(0)
NiCl+	2.852e-07	1.987e-07	-6.545	-6.702	-0.157	(0)
MnCl2	1.024e-07	1.024e-07	-6.990	-6.990	0.000	(0)
ZnCl+	7.908e-08	6.116e-08	-7.102	-7.213	-0.112	(0)
CuCl3-2	6.801e-08	2.608e-08	-7.167	-7.584	-0.416	(0)
CdCl+	1.462e-08	1.018e-08	-7.835	-7.992	-0.157	(0)
ZnOHCl	5.099e-09	5.099e-09	-8.293	-8.293	0.000	(0)
PbCl+	3.651e-09	2.544e-09	-8.438	-8.594	-0.157	(0)
ZnCl2	2.882e-09	2.882e-09	-8.540	-8.540	0.000	(0)
CdCl2	1.485e-09	1.485e-09	-8.828	-8.828	0.000	(0)
MnCl3-	1.267e-09	9.970e-10	-8.897	-9.001	-0.104	(0)
PbCl2	3.947e-10	3.947e-10	-9.404	-9.404	0.000	(0)
ZnCl3-	1.030e-10	7.964e-11	-9.987	-10.099	-0.112	(0)
CdCl3-	4.575e-11	3.188e-11	-10.340	-10.496	-0.157	(0)
NiCl2	3.578e-11	3.578e-11	-10.446	-10.446	0.000	(0)
CdOHCl	2.350e-11	2.350e-11	-10.629	-10.629	0.000	(0)
CuCl+	1.578e-11	1.221e-11	-10.802	-10.913	-0.112	(0)
PbCl3-	8.330e-12	5.805e-12	-11.079	-11.236	-0.157	(0)
ZnCl4-2	3.555e-12	1.364e-12	-11.449	-11.865	-0.416	(0)
PbCl4-2	3.751e-13	8.844e-14	-12.426	-13.053	-0.627	(0)
CuCl2	1.229e-13	1.229e-13	-12.910	-12.910	0.000	(0)
FeCl+2	6.540e-16	2.508e-16	-15.184	-15.601	-0.416	(0)
FeCl2+	5.711e-17	4.494e-17	-16.243	-16.347	-0.104	(0)
CuCl3-	4.882e-17	3.776e-17	-16.311	-16.423	-0.112	(0)
HgCl2	1.586e-18	1.586e-18	-17.800	-17.800	0.000	(0)
HgCl3-	8.117e-19	5.656e-19	-18.091	-18.247	-0.157	(0)
HgCl4-2	3.503e-19	8.260e-20	-18.456	-19.083	-0.627	(0)
FeCl3	1.589e-19	1.589e-19	-18.799	-18.799	0.000	(0)
HgClOH	3.727e-20	3.727e-20	-19.429	-19.429	0.000	(0)
CuCl4-2	1.998e-20	7.663e-21	-19.699	-20.116	-0.416	(0)
HgCl+	1.091e-23	7.602e-24	-22.962	-23.119	-0.157	(0)
CoCl+2	8.942e-36	2.108e-36	-35.049	-35.676	-0.627	(0)
Co(NH3)5Cl+2	1.813e-39	4.275e-40	-38.742	-39.369	-0.627	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.318	-51.946	-0.627	(0)
Co(2)	4.138e-05					
Co+2	3.345e-05	7.888e-06	-4.476	-5.103	-0.627	(0)
CoSO4	6.522e-06	6.522e-06	-5.186	-5.186	0.000	(0)
CoCl+	1.370e-06	9.543e-07	-5.863	-6.020	-0.157	(0)
CoHPO4	1.641e-08	1.641e-08	-7.785	-7.785	0.000	(0)
CoOH+	1.396e-08	9.729e-09	-7.855	-8.012	-0.157	(0)
Co(NH3)+2	7.525e-09	1.774e-09	-8.124	-8.751	-0.627	(0)
Co(OH)2	4.777e-11	4.777e-11	-10.321	-10.321	0.000	(0)

Co(NH3)2+2	2.943e-13	6.939e-14	-12.531	-13.159	-0.627	(0)
Co2OH+3	9.928e-14	3.846e-15	-13.003	-14.415	-1.412	(0)
Co(OH)3-	8.455e-17	5.892e-17	-16.073	-16.230	-0.157	(0)
CoOOH-	5.094e-18	3.550e-18	-17.293	-17.450	-0.157	(0)
Co(NH3)3+2	4.853e-18	1.144e-18	-17.314	-17.942	-0.627	(0)
Co4(OH)4+4	5.783e-22	1.787e-24	-21.238	-23.748	-2.510	(0)
Co(NH3)4+2	3.336e-23	7.865e-24	-22.477	-23.104	-0.627	(0)
CoSeO4	3.713e-24	3.713e-24	-23.430	-23.430	0.000	(0)
Co(OH)4-2	2.448e-24	5.772e-25	-23.611	-24.239	-0.627	(0)
Co(NH3)5+2	7.250e-29	1.709e-29	-28.140	-28.767	-0.627	(0)
CoNO2+	7.898e-40	5.504e-40	-39.102	-39.259	-0.157	(0)
CoNO3+	0.000e+00	0.000e+00	-53.163	-53.320	-0.157	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.429	-101.429	0.000	(0)
Co(3)	4.262e-31					
CoOH+2	4.262e-31	1.005e-31	-30.370	-30.998	-0.627	(0)
CoCl+2	8.942e-36	2.108e-36	-35.049	-35.676	-0.627	(0)
Co+3	2.831e-36	3.199e-37	-35.548	-36.495	-0.947	(0)
Co(NH3)5Cl+2	1.813e-39	4.275e-40	-38.742	-39.369	-0.627	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.828	-47.985	-0.157	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.318	-51.946	-0.627	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.627	-53.255	-0.627	(0)
Cu(1)	5.084e-06					
CuCl2-	4.531e-06	3.504e-06	-5.344	-5.455	-0.112	(0)
CuCl	4.698e-07	4.698e-07	-6.328	-6.328	0.000	(0)
CuCl3-2	6.801e-08	2.608e-08	-7.167	-7.584	-0.416	(0)
Cu+	1.514e-08	1.055e-08	-7.820	-7.977	-0.157	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.039	-66.462	-0.423	(0)
CuS4S5-3	0.000e+00	0.000e+00	-66.793	-67.192	-0.399	(0)
Cu(2)	8.973e-10					
Cu+2	6.008e-10	2.280e-10	-9.221	-9.642	-0.421	(0)
CuSO4	2.135e-10	2.135e-10	-9.671	-9.671	0.000	(0)
CuOH+	4.734e-11	3.662e-11	-10.325	-10.436	-0.112	(0)
CuNH3+2	1.924e-11	4.535e-12	-10.716	-11.343	-0.627	(0)
CuCl+	1.578e-11	1.221e-11	-10.802	-10.913	-0.112	(0)
Cu(OH)2	5.497e-13	5.497e-13	-12.260	-12.260	0.000	(0)
CuCl2	1.229e-13	1.229e-13	-12.910	-12.910	0.000	(0)
Cu2(OH)2+2	1.390e-16	3.277e-17	-15.857	-16.485	-0.627	(0)
Cu(OH)3-	1.000e-16	6.969e-17	-16.000	-16.157	-0.157	(0)
CuCl3-	4.882e-17	3.776e-17	-16.311	-16.423	-0.112	(0)
CuCl4-2	1.998e-20	7.663e-21	-19.699	-20.116	-0.416	(0)
Cu(OH)4-2	1.438e-22	3.391e-23	-21.842	-22.470	-0.627	(0)
CuNO2+	0.000e+00	0.000e+00	-42.470	-42.626	-0.157	(0)
CuNO3+	0.000e+00	0.000e+00	-57.393	-57.550	-0.157	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.621	-76.621	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.766	-96.923	-0.157	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-106.876	-106.876	0.000	(0)
Fe(2)	1.872e-03					
Fe+2	1.509e-03	3.558e-04	-2.821	-3.449	-0.627	(0)
FeSO4	3.584e-04	3.584e-04	-3.446	-3.446	0.000	(0)
FeHPO4	2.702e-06	2.702e-06	-5.568	-5.568	0.000	(0)
FeH2PO4+	1.102e-06	8.724e-07	-5.958	-6.059	-0.101	(0)
FeOH+	8.193e-07	6.448e-07	-6.087	-6.191	-0.104	(0)
Fe(OH)2	2.231e-11	2.231e-11	-10.652	-10.652	0.000	(0)
Fe(OH)3-	5.338e-13	4.201e-13	-12.273	-12.377	-0.104	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.952	-69.952	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.485	-105.642	-0.157	(0)
Fe(3)	3.327e-07					
Fe(OH)2+	3.230e-07	2.557e-07	-6.491	-6.592	-0.101	(0)
Fe(OH)3	9.608e-09	9.608e-09	-8.017	-8.017	0.000	(0)
Fe(OH)4-	1.234e-10	9.772e-11	-9.909	-10.010	-0.101	(0)
FeOH+2	2.205e-11	8.455e-12	-10.657	-11.073	-0.416	(0)
FeHPO4+	6.269e-12	4.964e-12	-11.203	-11.304	-0.101	(0)
FeSO4+	1.420e-14	1.118e-14	-13.848	-13.952	-0.104	(0)
Fe+3	2.358e-15	2.665e-16	-14.627	-15.574	-0.947	(0)
Fe(SO4)2-	1.518e-15	1.058e-15	-14.819	-14.976	-0.157	(0)
FeCl+2	6.540e-16	2.508e-16	-15.184	-15.601	-0.416	(0)
FeH2PO4+2	6.293e-17	2.475e-17	-16.201	-16.606	-0.405	(0)
FeCl2+	5.711e-17	4.494e-17	-16.243	-16.347	-0.104	(0)

Fe2(OH)2+4	8.834e-19	2.730e-21	-18.054	-20.564	-2.510	(0)
FeHSeO3+2	6.637e-19	1.565e-19	-18.178	-18.806	-0.627	(0)
FeCl3	1.589e-19	1.589e-19	-18.799	-18.799	0.000	(0)
Fe3(OH)4+5	8.085e-23	9.679e-27	-22.092	-26.014	-3.922	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.276	-62.903	-0.627	(0)
H(0)	3.671e-19					
H2	1.835e-19	1.876e-19	-18.736	-18.727	0.010	(0)
Hg(0)	1.039e-09					
Hg	1.039e-09	1.039e-09	-8.983	-8.983	0.000	(0)
Hg(1)	4.234e-29					
Hg2+2	2.117e-29	4.992e-30	-28.674	-29.302	-0.627	(0)
Hg(2)	2.785e-18					
HgCl2	1.586e-18	1.586e-18	-17.800	-17.800	0.000	(0)
HgCl3-	8.117e-19	5.656e-19	-18.091	-18.247	-0.157	(0)
HgCl4-2	3.503e-19	8.260e-20	-18.456	-19.083	-0.627	(0)
HgClOH	3.727e-20	3.727e-20	-19.429	-19.429	0.000	(0)
Hg(OH)2	1.801e-22	1.841e-22	-21.744	-21.735	0.010	(0)
Hg(NH3)2+2	1.357e-22	3.200e-23	-21.867	-22.495	-0.627	(0)
HgCl+	1.091e-23	7.602e-24	-22.962	-23.119	-0.157	(0)
HgOH+	2.992e-26	2.085e-26	-25.524	-25.681	-0.157	(0)
HgNH3+2	2.677e-26	6.312e-27	-25.572	-26.200	-0.627	(0)
Hg(NH3)3+2	1.016e-27	2.396e-28	-26.993	-27.620	-0.627	(0)
Hg+2	4.028e-29	9.497e-30	-28.395	-29.022	-0.627	(0)
HgSO4	8.574e-30	8.574e-30	-29.067	-29.067	0.000	(0)
Hg(OH)3-	2.056e-30	1.433e-30	-29.687	-29.844	-0.157	(0)
Hg(NH3)4+2	1.527e-32	3.600e-33	-31.816	-32.444	-0.627	(0)
HgHS2-	0.000e+00	0.000e+00	-65.697	-65.853	-0.157	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.248	-66.248	0.000	(0)
HgS2-2	0.000e+00	0.000e+00	-67.145	-67.772	-0.627	(0)
HgNO3+	0.000e+00	0.000e+00	-77.810	-77.967	-0.157	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.765	-126.765	0.000	(0)
K	1.653e-03					
K+	1.605e-03	1.260e-03	-2.794	-2.900	-0.105	(0)
KS04-	4.722e-05	3.740e-05	-4.326	-4.427	-0.101	(0)
KHP04-	2.302e-08	1.823e-08	-7.638	-7.739	-0.101	(0)
Mg	1.055e-02					
Mg+2	8.194e-03	3.109e-03	-2.086	-2.507	-0.421	(0)
MgSO4	2.350e-03	2.350e-03	-2.629	-2.629	0.000	(0)
MgHP04	3.804e-06	3.804e-06	-5.420	-5.420	0.000	(0)
MgH2PO4+	9.500e-07	7.523e-07	-6.022	-6.124	-0.101	(0)
MgOH+	6.557e-08	5.275e-08	-7.183	-7.278	-0.095	(0)
MgPO4-	8.158e-10	6.460e-10	-9.088	-9.190	-0.101	(0)
Mn(2)	2.315e-04					
Mn+2	1.953e-04	4.604e-05	-3.709	-4.337	-0.627	(0)
MnSO4	3.347e-05	3.347e-05	-4.475	-4.475	0.000	(0)
MnCl+	2.604e-06	2.050e-06	-5.584	-5.688	-0.104	(0)
MnCl2	1.024e-07	1.024e-07	-6.990	-6.990	0.000	(0)
MnOH+	6.689e-09	5.264e-09	-8.175	-8.279	-0.104	(0)
MnCl3-	1.267e-09	9.970e-10	-8.897	-9.001	-0.104	(0)
MnSe	3.578e-12	3.578e-12	-11.446	-11.446	0.000	(0)
Mn(OH)3-	2.145e-19	1.688e-19	-18.669	-18.773	-0.104	(0)
MnSeO4	1.151e-23	1.151e-23	-22.939	-22.939	0.000	(0)
Mn(OH)4-2	8.784e-26	3.369e-26	-25.056	-25.472	-0.416	(0)
MnNO3+	0.000e+00	0.000e+00	-52.397	-52.554	-0.157	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.567	-100.567	0.000	(0)
Mn(3)	1.026e-28					
Mn+3	1.026e-28	1.160e-29	-27.989	-28.936	-0.947	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-65.696	-66.112	-0.416	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-74.622	-74.742	-0.120	(0)
N(-3)	5.209e-04					
NH4+	4.981e-04	3.734e-04	-3.303	-3.428	-0.125	(0)
NH4SO4-	2.180e-05	1.715e-05	-4.662	-4.766	-0.104	(0)
NH3	9.847e-07	9.847e-07	-6.007	-6.007	0.000	(0)
NiNH3+2	9.568e-09	2.256e-09	-8.019	-8.647	-0.627	(0)
Co(NH3)+2	7.525e-09	1.774e-09	-8.124	-8.751	-0.627	(0)
CaNH3+2	6.602e-09	1.557e-09	-8.180	-8.808	-0.627	(0)

CuNH3+2	1.924e-11	4.535e-12	-10.716	-11.343	-0.627	(0)
Ni(NH3)2+2	2.313e-12	5.455e-13	-11.636	-12.263	-0.627	(0)
Co(NH3)2+2	2.943e-13	6.939e-14	-12.531	-13.159	-0.627	(0)
Ca(NH3)2+2	3.442e-15	8.116e-16	-14.463	-15.091	-0.627	(0)
Co(NH3)3+2	4.853e-18	1.144e-18	-17.314	-17.942	-0.627	(0)
Hg(NH3)2+2	1.357e-22	3.200e-23	-21.867	-22.495	-0.627	(0)
Co(NH3)4+2	3.336e-23	7.865e-24	-22.477	-23.104	-0.627	(0)
HgNH3+2	2.677e-26	6.312e-27	-25.572	-26.200	-0.627	(0)
Hg(NH3)3+2	1.016e-27	2.396e-28	-26.993	-27.620	-0.627	(0)
Co(NH3)5+2	7.250e-29	1.709e-29	-28.140	-28.767	-0.627	(0)
Hg(NH3)4+2	1.527e-32	3.600e-33	-31.816	-32.444	-0.627	(0)
Co(NH3)5Cl+2	1.813e-39	4.275e-40	-38.742	-39.369	-0.627	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.828	-47.985	-0.157	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.318	-51.946	-0.627	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.627	-53.255	-0.627	(0)
N(3)	1.306e-35					
N02-	1.306e-35	9.901e-36	-34.884	-35.004	-0.120	(0)
CoN02+	7.898e-40	5.504e-40	-39.102	-39.259	-0.157	(0)
CuN02+	0.000e+00	0.000e+00	-42.470	-42.626	-0.157	(0)
Cu(N02)2	0.000e+00	0.000e+00	-76.621	-76.621	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-48.312	-48.417	-0.105	(0)
CaN03+	0.000e+00	0.000e+00	-50.772	-50.929	-0.157	(0)
MnN03+	0.000e+00	0.000e+00	-52.397	-52.554	-0.157	(0)
CoN03+	0.000e+00	0.000e+00	-53.163	-53.320	-0.157	(0)
NiN03+	0.000e+00	0.000e+00	-53.514	-53.671	-0.157	(0)
ZnN03+	0.000e+00	0.000e+00	-53.999	-54.155	-0.157	(0)
PbN03+	0.000e+00	0.000e+00	-55.767	-55.924	-0.157	(0)
CdN03+	0.000e+00	0.000e+00	-56.229	-56.385	-0.157	(0)
CuN03+	0.000e+00	0.000e+00	-57.393	-57.550	-0.157	(0)
FeN03+2	0.000e+00	0.000e+00	-62.276	-62.903	-0.627	(0)
HgN03+	0.000e+00	0.000e+00	-77.810	-77.967	-0.157	(0)
Mn(N03)2	0.000e+00	0.000e+00	-100.567	-100.567	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-101.429	-101.429	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-103.284	-103.284	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-104.091	-104.091	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-105.153	-105.153	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-106.876	-106.876	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-126.765	-126.765	0.000	(0)
Na	4.960e-02					
Na+	4.850e-02	3.806e-02	-1.314	-1.420	-0.105	(0)
NaSO4-	1.101e-03	8.716e-04	-2.958	-3.060	-0.101	(0)
NaHP04-	1.077e-06	8.530e-07	-5.968	-6.069	-0.101	(0)
Ni	7.991e-06					
Ni+2	5.853e-06	2.221e-06	-5.233	-5.653	-0.421	(0)
NiSO4	1.840e-06	1.840e-06	-5.735	-5.735	0.000	(0)
NiCl+	2.852e-07	1.987e-07	-6.545	-6.702	-0.157	(0)
NiNH3+2	9.568e-09	2.256e-09	-8.019	-8.647	-0.627	(0)
NiOH+	1.867e-09	1.301e-09	-8.729	-8.886	-0.157	(0)
Ni(SO4)2-2	1.144e-09	2.697e-10	-8.942	-9.569	-0.627	(0)
NiCl2	3.578e-11	3.578e-11	-10.446	-10.446	0.000	(0)
Ni(OH)2	8.487e-12	8.487e-12	-11.071	-11.071	0.000	(0)
Ni(NH3)2+2	2.313e-12	5.455e-13	-11.636	-12.263	-0.627	(0)
Ni(OH)3-	7.528e-16	5.246e-16	-15.123	-15.280	-0.157	(0)
NiSe04	9.651e-25	9.651e-25	-24.015	-24.015	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-53.514	-53.671	-0.157	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.965	-55.955	0.010	(0)
P	2.288e-05					
H2P04-	6.818e-06	5.399e-06	-5.166	-5.268	-0.101	(0)
HP04-2	5.400e-06	2.071e-06	-5.268	-5.684	-0.416	(0)
MgHP04	3.804e-06	3.804e-06	-5.420	-5.420	0.000	(0)
FeHP04	2.702e-06	2.702e-06	-5.568	-5.568	0.000	(0)
FeH2P04+	1.102e-06	8.724e-07	-5.958	-6.059	-0.101	(0)
NaHP04-	1.077e-06	8.530e-07	-5.968	-6.069	-0.101	(0)
MgH2P04+	9.500e-07	7.523e-07	-6.022	-6.124	-0.101	(0)
CaHP04	8.368e-07	8.368e-07	-6.077	-6.077	0.000	(0)
CaH2P04+	1.349e-07	1.068e-07	-6.870	-6.971	-0.101	(0)

KHP04-	2.302e-08	1.823e-08	-7.638	-7.739	-0.101	(0)
CoHP04	1.641e-08	1.641e-08	-7.785	-7.785	0.000	(0)
CaP04-	1.585e-08	1.255e-08	-7.800	-7.901	-0.101	(0)
MgP04-	8.158e-10	6.460e-10	-9.088	-9.190	-0.101	(0)
H3P04	1.182e-10	1.182e-10	-9.927	-9.927	0.000	(0)
P04-3	4.379e-11	4.948e-12	-10.359	-11.306	-0.947	(0)
FeHP04+	6.269e-12	4.964e-12	-11.203	-11.304	-0.101	(0)
FeH2P04+2	6.293e-17	2.475e-17	-16.201	-16.606	-0.405	(0)
Pb	1.509e-08					
Pb+2	5.605e-09	2.127e-09	-8.251	-8.672	-0.421	(0)
PbS04	4.467e-09	4.467e-09	-8.350	-8.350	0.000	(0)
PbCl+	3.651e-09	2.544e-09	-8.438	-8.594	-0.157	(0)
Pb(S04)2-2	4.894e-10	1.154e-10	-9.310	-9.938	-0.627	(0)
PbOH+	4.740e-10	3.303e-10	-9.324	-9.481	-0.157	(0)
PbCl2	3.947e-10	3.947e-10	-9.404	-9.404	0.000	(0)
PbCl3-	8.330e-12	5.805e-12	-11.079	-11.236	-0.157	(0)
Pb(OH)2	6.456e-13	6.456e-13	-12.190	-12.190	0.000	(0)
PbCl4-2	3.751e-13	8.844e-14	-12.426	-13.053	-0.627	(0)
Pb2OH+3	2.874e-16	1.113e-17	-15.542	-16.953	-1.412	(0)
Pb(OH)3-	5.727e-17	3.991e-17	-16.242	-16.399	-0.157	(0)
Pb(OH)4-2	2.562e-21	6.041e-22	-20.591	-21.219	-0.627	(0)
Pb3(OH)4+2	3.987e-23	9.401e-24	-22.399	-23.027	-0.627	(0)
Pb4(OH)4+4	5.960e-26	1.842e-28	-25.225	-27.735	-2.510	(0)
PbNO3+	0.000e+00	0.000e+00	-55.767	-55.924	-0.157	(0)
Pb(HS)2	0.000e+00	0.000e+00	-68.856	-68.856	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.091	-104.091	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.125	-105.282	-0.157	(0)
S(-2)	7.145e-38					
H2S	3.603e-38	3.603e-38	-37.443	-37.443	0.000	(0)
HS-	2.693e-38	1.876e-38	-37.570	-37.727	-0.157	(0)
CdHS+	8.317e-39	5.796e-39	-38.080	-38.237	-0.157	(0)
S5-2	1.718e-40	0.000e+00	-39.765	-40.392	-0.627	(0)
S6-2	0.000e+00	0.000e+00	-40.191	-40.819	-0.627	(0)
S4-2	0.000e+00	0.000e+00	-40.365	-40.992	-0.627	(0)
S3-2	0.000e+00	0.000e+00	-41.177	-41.805	-0.627	(0)
S2-2	0.000e+00	0.000e+00	-42.204	-42.831	-0.627	(0)
S-2	0.000e+00	0.000e+00	-47.939	-48.355	-0.416	(0)
HgHS2-	0.000e+00	0.000e+00	-65.697	-65.853	-0.157	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.039	-66.462	-0.423	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.248	-66.248	0.000	(0)
CuS4S5-3	0.000e+00	0.000e+00	-66.793	-67.192	-0.399	(0)
HgS2-2	0.000e+00	0.000e+00	-67.145	-67.772	-0.627	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-67.847	-68.004	-0.157	(0)
Cd(HS)2	0.000e+00	0.000e+00	-68.760	-68.760	0.000	(0)
Zn(HS)2	0.000e+00	0.000e+00	-68.783	-68.783	0.000	(0)
Pb(HS)2	0.000e+00	0.000e+00	-68.856	-68.856	0.000	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.952	-69.952	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.766	-96.923	-0.157	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.072	-103.229	-0.157	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-104.429	-104.586	-0.157	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.125	-105.282	-0.157	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.485	-105.642	-0.157	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-105.793	-106.420	-0.627	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.490	-140.117	-0.627	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-141.788	-142.416	-0.627	(0)
S(6)	1.611e-02					
S04-2	1.130e-02	4.287e-03	-1.947	-2.368	-0.421	(0)
MgS04	2.350e-03	2.350e-03	-2.629	-2.629	0.000	(0)
NaS04-	1.101e-03	8.716e-04	-2.958	-3.060	-0.101	(0)
CaS04	8.918e-04	8.918e-04	-3.050	-3.050	0.000	(0)
FeS04	3.584e-04	3.584e-04	-3.446	-3.446	0.000	(0)
KS04-	4.722e-05	3.740e-05	-4.326	-4.427	-0.101	(0)
MnS04	3.347e-05	3.347e-05	-4.475	-4.475	0.000	(0)
NH4S04-	2.180e-05	1.715e-05	-4.662	-4.766	-0.104	(0)
CoS04	6.522e-06	6.522e-06	-5.186	-5.186	0.000	(0)
NiS04	1.840e-06	1.840e-06	-5.735	-5.735	0.000	(0)
ZnS04	6.431e-07	6.431e-07	-6.192	-6.192	0.000	(0)
Zn(S04)2-2	1.054e-07	2.485e-08	-6.977	-7.605	-0.627	(0)

HSO4-	7.735e-08	6.036e-08	-7.112	-7.219	-0.108	(0)
AlSO4+	2.357e-08	1.840e-08	-7.628	-7.735	-0.108	(0)
PbSO4	4.467e-09	4.467e-09	-8.350	-8.350	0.000	(0)
CdSO4	2.906e-09	2.906e-09	-8.537	-8.537	0.000	(0)
Al(SO4)2-	1.183e-09	9.231e-10	-8.927	-9.035	-0.108	(0)
Ni(SO4)2-2	1.144e-09	2.697e-10	-8.942	-9.569	-0.627	(0)
Cd(SO4)2-2	7.476e-10	1.763e-10	-9.126	-9.754	-0.627	(0)
Pb(SO4)2-2	4.894e-10	1.154e-10	-9.310	-9.938	-0.627	(0)
CuSO4	2.135e-10	2.135e-10	-9.671	-9.671	0.000	(0)
FeSO4+	1.420e-14	1.118e-14	-13.848	-13.952	-0.104	(0)
Fe(SO4)2-	1.518e-15	1.058e-15	-14.819	-14.976	-0.157	(0)
HgSO4	8.574e-30	8.574e-30	-29.067	-29.067	0.000	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.828	-47.985	-0.157	(0)
Se(-2)	4.407e-09					
HSe-	4.399e-09	3.066e-09	-8.357	-8.513	-0.157	(0)
H2Se	3.799e-12	3.799e-12	-11.420	-11.420	0.000	(0)
MnSe	3.578e-12	3.578e-12	-11.446	-11.446	0.000	(0)
Se-2	6.143e-17	1.448e-17	-16.212	-16.839	-0.627	(0)
Se(4)	3.916e-07					
HSeO3-	3.658e-07	2.549e-07	-6.437	-6.594	-0.157	(0)
SeO3-2	2.576e-08	6.073e-09	-7.589	-8.217	-0.627	(0)
H2SeO3	1.708e-11	1.708e-11	-10.767	-10.767	0.000	(0)
FeHSeO3+2	6.637e-19	1.565e-19	-18.178	-18.806	-0.627	(0)
Cd(SeO3)2-2	4.131e-19	9.740e-20	-18.384	-19.011	-0.627	(0)
Se(6)	2.660e-21					
SeO4-2	2.644e-21	1.003e-21	-20.578	-20.999	-0.421	(0)
MnSeO4	1.151e-23	1.151e-23	-22.939	-22.939	0.000	(0)
CoSeO4	3.713e-24	3.713e-24	-23.430	-23.430	0.000	(0)
NiSeO4	9.651e-25	9.651e-25	-24.015	-24.015	0.000	(0)
ZnSeO4	1.102e-25	1.102e-25	-24.958	-24.958	0.000	(0)
HSeO4-	1.034e-26	7.204e-27	-25.986	-26.142	-0.157	(0)
CdSeO4	5.664e-28	5.664e-28	-27.247	-27.247	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.323	-45.950	-0.627	(0)
Zn	2.710e-06					
Zn+2	1.869e-06	7.093e-07	-5.728	-6.149	-0.421	(0)
ZnSO4	6.431e-07	6.431e-07	-6.192	-6.192	0.000	(0)
Zn(SO4)2-2	1.054e-07	2.485e-08	-6.977	-7.605	-0.627	(0)
ZnCl+	7.908e-08	6.116e-08	-7.102	-7.213	-0.112	(0)
ZnOHCl	5.099e-09	5.099e-09	-8.293	-8.293	0.000	(0)
ZnOH+	4.633e-09	3.228e-09	-8.334	-8.491	-0.157	(0)
ZnCl2	2.882e-09	2.882e-09	-8.540	-8.540	0.000	(0)
ZnCl3-	1.030e-10	7.964e-11	-9.987	-10.099	-0.112	(0)
Zn(OH)2	4.296e-11	4.296e-11	-10.367	-10.367	0.000	(0)
ZnCl4-2	3.555e-12	1.364e-12	-11.449	-11.865	-0.416	(0)
Zn(OH)3-	1.910e-14	1.331e-14	-13.719	-13.876	-0.157	(0)
Zn(OH)4-2	1.389e-19	3.275e-20	-18.857	-19.485	-0.627	(0)
ZnSeO4	1.102e-25	1.102e-25	-24.958	-24.958	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.323	-45.950	-0.627	(0)
ZnNO3+	0.000e+00	0.000e+00	-53.999	-54.155	-0.157	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-67.847	-68.004	-0.157	(0)
Zn(HS)2	0.000e+00	0.000e+00	-68.783	-68.783	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.072	-103.229	-0.157	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.284	-103.284	0.000	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-105.793	-106.420	-0.627	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-141.788	-142.416	-0.627	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-124.25	-117.97	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-28.58	-24.04	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.84	-24.04	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-179.51	-161.58	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.79	-20.68	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-28.30	-27.85	0.45	(NH4)2SeO4
Al(OH)3(am)	0.11	11.17	11.06	Al(OH)3
Al2O3	2.08	22.35	20.27	Al2O3

Al4(OH)10S04	6.05	28.75	22.70	Al4(OH)10S04
AlOHS04	-1.54	-4.77	-3.23	AlOHS04
Alunite	6.42	5.52	-0.90	KAl3(S04)2(OH)6
Anglesite	-3.22	-11.04	-7.82	PbS04
Anhydrite	-1.05	-5.39	-4.34	CaS04
Anilite	-13.00	-45.31	-32.31	Cu0.25Cu1.5S
Antlerite	-12.93	-4.14	8.79	Cu3(OH)4S04
Atacamite	-7.98	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.76	-8.52	-1.76	ZnS04:6H2O
Birnessite	-18.86	-0.77	18.09	MnO2
Bixbyite	-16.79	-17.14	-0.35	Mn2O3
BlaubleiI	-17.05	-41.21	-24.16	Cu0.9Cu0.2S
BlaubleiII	-15.83	-43.10	-27.28	Cu0.6Cu0.8S
Boehmite	2.32	11.17	8.86	AlOOH
Brochantite	-15.91	-0.21	15.71	Cu4(OH)6S04
Brucite	-6.05	11.07	17.12	Mg(OH)2
Bunsenite	-4.76	7.92	12.68	NiO
Ca3(P04)2(beta)	-2.64	-31.69	-29.05	Ca3(P04)2
Ca4H(P04)3:3H2O	-5.73	-52.81	-47.08	Ca4H(P04)3:3H2O
CaHP04	-1.77	-21.12	-19.35	CaHP04
CaHP04:2H2O	-2.07	-21.12	-19.05	CaHP04:2H2O
Calomel	-14.08	-32.20	-18.13	Hg2Cl2
CaSe03:2H2O	-5.69	-2.83	2.86	CaSe03:2H2O
CaSe04:2H2O	-21.03	-24.03	-3.00	CaSe04:2H2O
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2
Cd3(OH)2(S04)2	-23.42	-16.71	6.71	Cd3(OH)2(S04)2
Cd3(OH)4S04	-23.33	-0.77	22.56	Cd3(OH)4S04
Cd3(P04)2	-15.57	-48.17	-32.60	Cd3(P04)2
Cd4(OH)6S04	-24.11	4.29	28.40	Cd4(OH)6S04
CdCl2	-10.81	-11.42	-0.61	CdCl2
CdCl2:1H2O	-9.75	-11.42	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-9.49	-11.42	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.23	-10.53	13.69	Cd
Cdmetal(gamma)	-24.33	-10.53	13.80	Cd
CdOHCl	-6.79	-3.18	3.61	CdOHCl
CdSe	10.14	-10.24	-20.38	CdSe
CdSe04:2H2O	-27.67	-29.52	-1.85	CdSe04:2H2O
CdS04	-10.84	-10.89	-0.05	CdS04
CdS04:1H2O	-9.24	-10.89	-1.65	CdS04:1H2O
CdS04:2.67H2O	-9.06	-10.89	-1.83	CdS04:2.67H2O
Chalcanthite	-9.36	-12.01	-2.65	CuS04:5H2O
Chalcocite	-11.57	-46.89	-35.32	Cu2S
Chalcopyrite	-39.34	-74.97	-35.62	CuFeS2
Cinnabar	-19.95	-66.25	-46.30	HgS
Clausthalite	16.99	-10.40	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.04	-16.13	-2.09	Co(OH)3
Co3(P04)2	-3.23	-37.92	-34.69	Co3(P04)2
Co3O4	-13.55	-23.78	-10.24	Co3O4
CoCl2	-16.46	-8.01	8.46	CoCl2
CoCl2:6H2O	-10.53	-8.01	2.52	CoCl2:6H2O
CoFe2O4	21.21	18.06	-3.15	CoFe2O4
CoHP04	-4.14	-23.20	-19.06	CoHP04
CoO	-5.37	8.47	13.84	CoO
CoS(alpha)	-28.60	-36.04	-7.44	CoS
CoS(beta)	-24.97	-36.04	-11.07	CoS
CoSe	9.37	-6.83	-16.20	CoSe
CoSe03	-6.23	-4.91	1.32	CoSe03
CoSe04:6H2O	-24.58	-26.11	-1.53	CoSe04:6H2O
CoS04	-10.46	-7.47	2.99	CoS04
CoS04:6H2O	-5.00	-7.48	-2.48	CoS04:6H2O
Cotunnite	-6.73	-11.58	-4.84	PbCl2
Covellite	-18.05	-40.58	-22.53	CuS
Cu(OH)2	-4.87	3.93	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.76	-47.34	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.63	-17.68	-46.31	Cu2Se
Cu2S04	-16.42	-18.32	-1.90	Cu2S04

Cu3(P04)2	-14.69	-51.54	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-16.42	-51.54	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.26	-29.04	-64.30	Cu3Se2
Cumetal	-0.06	-8.98	-8.93	Cu
Cu0CuS04	-18.71	-8.07	10.63	Cu0CuS04
Cupricferrite	7.03	13.52	6.49	CuFe204
Cuprite	-1.27	-2.38	-1.11	Cu2O
Cuprousferrite	12.48	3.60	-8.88	CuFe02
CuSe	22.02	-11.37	-33.39	CuSe
CuSe2	22.63	-11.07	-33.70	CuSe2
CuSe03:2H2O	-10.05	-9.45	0.60	CuSe03:2H2O
CuSe04:5H2O	-28.21	-30.65	-2.44	CuSe04:5H2O
CuS04	-15.12	-12.01	3.11	CuS04
Diaspore	4.06	11.17	7.12	Al00H
Djurleite	-12.08	-46.47	-34.40	Cu0.066Cu1.868S
Epsomite	-2.73	-4.88	-2.15	MgS04:7H2O
Fe(OH)2	-3.44	10.13	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.36	2.32	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-5.35	-3.80	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H2O	-9.94	-30.56	-20.63	Fe2(Se03)3:2H2O
Fe2(S04)3	-35.09	-38.25	-3.16	Fe2(S04)3
Fe3(OH)8	-0.51	19.71	20.22	Fe3(OH)8
Ferrihydrite	1.42	4.79	3.37	Fe(OH)3
Ferroselite	13.83	-4.88	-18.71	FeSe2
FeS(ppt)	-31.46	-34.39	-2.92	FeS
FeSe	5.83	-5.17	-11.00	FeSe
Galena	-25.45	-39.61	-14.16	PbS
Gibbsite	2.66	11.17	8.52	Al(OH)3
Goethite	4.16	4.79	0.64	Fe00H
Goslarite	-6.48	-8.52	-2.05	ZnS04:7H2O
Greenockite	-24.96	-39.46	-14.49	CdS
Greigite	-113.31	-158.35	-45.03	Fe3S4
Gypsum	-0.78	-5.39	-4.61	CaS04:2H2O
H-Jarosite	-5.97	-17.52	-11.55	(H3O)Fe3(S04)2(OH)6
H2S(g)	-36.51	-44.52	-8.01	H2S
H2Se(g)	-10.38	-15.30	-4.92	H2Se
Halite	-4.46	-2.87	1.59	NaCl
Hausmannite	-18.72	43.31	62.03	Mn304
Hematite	10.69	9.58	-1.11	Fe203
Hercynite	8.84	32.48	23.64	FeAl204
Hg(g)	-7.73	-15.66	-7.93	Hg
Hg(OH)2	-18.24	-21.73	-3.50	Hg(OH)2
Hg2(g)	-16.22	-31.32	-15.09	Hg2
Hg2(OH)2	-20.99	-15.73	5.26	Hg2(OH)2
Hg2HP04	-22.62	-47.40	-24.77	Hg2HP04
Hg2S	-48.40	-60.24	-11.84	Hg2S
Hg2Se03	-24.45	-29.11	-4.66	Hg2Se03
Hg2S04	-25.53	-31.67	-6.14	Hg2S04
HgCl(g)	-35.99	-16.10	19.88	HgCl
HgCl2	-16.70	-38.21	-21.52	HgCl2
Hgmetal(l)	-2.01	-15.66	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSe03	-22.69	-35.12	-12.43	HgSe03
HgS04	-28.22	-37.68	-9.45	HgS04
Hinsdalite	-6.69	-9.19	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	2.08	-42.25	-44.33	Ca5(P04)30H
Hydroxylpyromorphite	-7.70	-70.49	-62.79	Pb5(P04)30H
K-Alum	-11.60	-16.84	-5.24	KAl(S04)2:12H2O
K-Jarosite	0.86	-13.63	-14.49	KFe3(S04)2(OH)6
K2Se04	-26.07	-26.80	-0.73	K2Se04
Langite	-18.09	-0.21	17.88	Cu4(OH)6S04:H2O
Larnakite	-5.75	-6.14	-0.38	Pb0:PbS04
Laurionite	-3.96	-3.34	0.62	PbOHCl
Lepidocrocite	3.42	4.79	1.37	Fe00H
Lime	-22.61	10.55	33.16	Ca0
Litharge	-7.95	4.90	12.85	Pb0
Mackinawite	-30.79	-34.39	-3.60	FeS
Maghemite	3.20	9.58	6.39	Fe203

Magnesioferrite	3.13	20.65	17.52	Fe2MgO4
Magnetite	15.81	19.71	3.90	Fe3O4
Manganite	-8.30	17.04	25.34	MnOOH
Massicot	-8.15	4.90	13.05	PbO
Melanothallite	-18.95	-12.55	6.41	CuCl2
Melanterite	-3.57	-5.82	-2.26	FeSO4·7H2O
Metacinnabar	-20.55	-66.25	-45.70	HgS
Mg(OH)2(active)	-7.73	11.07	18.79	Mg(OH)2
Mg3(P04)2	-6.85	-30.13	-23.28	Mg3(P04)2
MgHP04:3H2O	-2.43	-20.60	-18.18	MgHP04:3H2O
MgSe03:6H2O	-5.36	-2.32	3.04	MgSe03:6H2O
MgSe04:6H2O	-22.31	-23.51	-1.20	MgSe04:6H2O
Minium	-44.22	30.31	74.53	Pb3O4
Mirabilite	-3.91	-5.22	-1.30	Na2SO4:10H2O
Mn2(S04)3	-59.65	-64.97	-5.32	Mn2(S04)3
Mn3(P04)2	-11.77	-35.62	-23.85	Mn3(P04)2
MnCl2:4H2O	-9.98	-7.24	2.74	MnCl2:4H2O
MnHP04	2.97	-22.43	-25.40	MnHP04
MnS(grn)	-35.52	-35.27	0.25	MnS
MnS(pnk)	-38.61	-35.27	3.34	MnS
MnSe	-9.80	-6.06	3.73	MnSe
MnSe03	-5.27	-4.14	1.13	MnSe03
MnSe03:2H2O	-5.11	-4.14	0.96	MnSe03:2H2O
MnSe04:5H2O	-23.29	-25.34	-2.05	MnSe04:5H2O
MnSO4	-9.44	-6.70	2.74	MnSO4
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.19	-21.73	-3.55	HgO
Morenosite	-5.85	-8.03	-2.17	NiSO4:7H2O
Na-Jarosite	-1.31	-12.15	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-12.95	-2.65	10.30	Na2Se03:5H2O
Na2Se04	-25.12	-23.84	1.28	Na2Se04
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.10	7.92	13.02	Ni(OH)2
Ni3(P04)2	-8.27	-39.57	-31.30	Ni3(P04)2
Ni4(OH)6S04	-16.25	15.75	32.00	Ni4(OH)6S04
NiS(alpha)	-30.99	-36.59	-5.60	NiS
NiS(beta)	-25.49	-36.59	-11.10	NiS
NiS(gamma)	-23.79	-36.59	-12.80	NiS
NiSe	10.32	-7.38	-17.70	NiSe
NiSe03:2H2O	-8.35	-5.46	2.89	NiSe03:2H2O
NiSe04:6H2O	-25.14	-26.66	-1.52	NiSe04:6H2O
Nsutite	-18.28	-0.77	17.50	MnO2
O2(g)	-53.26	31.19	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.22	1.57	8.79	Pb2(OH)3Cl
Pb20(OH)2	-16.38	9.81	26.19	Pb20(OH)2
Pb2O3	-35.64	25.40	61.04	Pb2O3
Pb3(P04)2	-5.10	-48.63	-43.53	Pb3(P04)2
Pb3O2S04	-12.11	-1.23	10.87	Pb3O2S04
Pb4(OH)6S04	-17.43	3.67	21.10	Pb4(OH)6S04
Pb4O3S04	-18.53	3.67	22.20	Pb4O3S04
PbHP04	-2.96	-26.77	-23.81	PbHP04
Pbmetal	-14.93	-10.69	4.24	Pb
PbO:0.3H2O	-8.08	4.90	12.98	PbO:0.33H2O
PbSe04	-22.80	-29.67	-6.88	PbSe04
Periclase	-10.87	11.07	21.94	MgO
Plattnerite	-29.81	20.50	50.31	PbO2
Plumbgummite	7.87	-24.92	-32.79	PbAl3(P04)2(OH)5·H2O
Portlandite	-12.56	10.55	23.11	Ca(OH)2
Pyrite	-44.68	-63.31	-18.63	FeS2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-17.19	24.83	42.03	MnO2
Pyromorphite	5.70	-78.73	-84.43	Pb5(P04)3Cl
Retgersite	-5.98	-8.03	-2.05	NiSO4:6H2O
Semetal(am)	7.43	0.29	-7.14	Se
Semetal(hex)	8.04	0.29	-7.75	Se
SeO2	-13.50	-13.38	0.12	SeO2
SeO3	-55.97	-34.58	21.39	SeO3

Sphalerite	-25.57	-37.09	-11.52	ZnS
Spinel	-4.35	33.42	37.77	MgAl2O4
Strengite	-0.50	-26.88	-26.38	FePO4:2H2O
Sulfur	-26.82	-28.92	-2.11	S
Tenorite	-3.86	3.94	7.80	CuO
Thenardite	-5.55	-5.21	0.34	Na2SO4
Tsumebite	-8.14	-17.93	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	3.04	-32.96	-36.00	Fe3(PO4)2:8H2O
Wurtzite	-28.09	-37.09	-9.00	ZnS
Zincite	-4.12	7.43	11.55	ZnO
Zincosite	-12.64	-8.52	4.13	ZnSO4
Zn(NO3)2:6H2O	-106.25	-102.99	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.77	7.43	12.20	Zn(OH)2
Zn(OH)2(am)	-5.24	7.43	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.43	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.30	7.43	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.43	11.73	Zn(OH)2
Zn2(OH)2SO4	-8.59	-1.09	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.58	6.61	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-5.64	-41.06	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-29.13	-9.61	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-14.64	13.76	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.84	20.66	38.50	Zn5(OH)8Cl2
ZnCl2	-16.27	-9.05	7.22	ZnCl2
Znmetal	-34.32	-8.17	26.15	Zn
ZnO(active)	-3.97	7.43	11.40	ZnO
ZnS(am)	-28.00	-37.09	-9.09	ZnS
ZnSe	6.59	-7.87	-14.46	ZnSe
ZnSeO4:6H2O	-25.63	-27.15	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.98	-8.52	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 10.

SOLUTION 9 # Mean Groundwater quality

temp 21
pH 6.79
pe 1
redox pe
units mg/l
density 1
Al 0.37
Alkalinity 0
As 0
Ba 0
Be 0
B 0
Cd 0.003
Co 2.34
Cr 0
Cu 0.31
Fe 100.34
Pb 0.003
Mn 12.2
Mo 0
V 0
Zn 0.17
Se 0.03
Ni 0.45
N 7

```

P          0.68
Ca         130
Mg         246
Na        1094
K          62
Cl        1533
S(6)      1485
Hg         0.0002
water     1 # kg
MIX 7
  1      0.988
  9      0.012
REACTION 8
H2O -1
  2
END #Time-step 8

```

Beginning of initial solution calculations.

Initial solution 9.

-----Solution composition-----

Elements	Molality	Moles
Al	1.378e-05	1.378e-05
Ca	3.259e-03	3.259e-03
Cd	2.681e-08	2.681e-08
Cl	4.344e-02	4.344e-02
Co	3.989e-05	3.989e-05
Cu	4.901e-06	4.901e-06
Fe	1.805e-03	1.805e-03
Hg	1.002e-09	1.002e-09
K	1.593e-03	1.593e-03
Mg	1.017e-02	1.017e-02
Mn	2.231e-04	2.231e-04
N	5.021e-04	5.021e-04
Na	4.781e-02	4.781e-02
Ni	7.703e-06	7.703e-06
P	2.206e-05	2.206e-05
Pb	1.455e-08	1.455e-08
S(6)	1.553e-02	1.553e-02
Se	3.817e-07	3.817e-07
Zn	2.612e-06	2.612e-06

-----Description of solution-----

```

pH = 6.790
pe = 1.000
Activity of water = 0.998
Ionic strength (mol/kgw) = 9.259e-02
Mass of water (kg) = 1.000e+00
Total alkalinity (eq/kg) = 6.274e-05
Total carbon (mol/kg) = 0.000e+00
Total CO2 (mol/kg) = 0.000e+00
Temperature (°C) = 21.00
Electrical balance (eq) = 6.374e-03
Percent error, 100*(Cat-|An|)/(Cat+|An|) = 4.58
Iterations = 13
Total H = 1.110158e+02
Total O = 5.556909e+01

```

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol

	H+	2.061e-07	1.622e-07	-6.686	-6.790	-0.104	0.00
	OH-	5.935e-08	4.562e-08	-7.227	-7.341	-0.114	(0)
	H2O	5.551e+01	9.980e-01	1.744	-0.001	0.000	18.05
Al		1.378e-05					
	Al(OH)4-	8.973e-06	7.024e-06	-5.047	-5.153	-0.106	(0)
	Al(OH)2+	2.373e-06	1.884e-06	-5.625	-5.725	-0.100	(0)
	Al(OH)3	2.329e-06	2.329e-06	-5.633	-5.633	0.000	(0)
	AlOH+2	7.409e-08	2.945e-08	-7.130	-7.531	-0.401	(0)
	AlSO4+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
	Al+3	5.344e-09	6.178e-10	-8.272	-9.209	-0.937	(0)
	Al(SO4)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ca		3.259e-03					
	Ca+2	2.406e-03	9.221e-04	-2.619	-3.035	-0.416	(0)
	CaSO4	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
	CaHPO4	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
	CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
	CaPO4-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
	CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
	CaOH+	1.001e-09	8.020e-10	-8.999	-9.096	-0.096	(0)
	Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
	CaNO3+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
Cd		2.681e-08					
	CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
	Cd+2	7.874e-09	3.018e-09	-8.104	-8.520	-0.416	(0)
	CdSO4	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
	CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
	Cd(SO4)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
	CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
	CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
	CdOH+	1.568e-12	1.100e-12	-11.805	-11.959	-0.154	(0)
	Cd(OH)2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
	Cd2OH+3	4.264e-19	1.748e-20	-18.370	-19.758	-1.387	(0)
	Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
	Cd(OH)3-	3.135e-21	2.198e-21	-20.504	-20.658	-0.154	(0)
	CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
	Cd(OH)4-2	9.222e-29	2.230e-29	-28.035	-28.652	-0.617	(0)
	CdNO3+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cl		4.344e-02					
	Cl-	4.343e-02	3.417e-02	-1.362	-1.466	-0.104	(0)
	CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
	MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
	CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
	CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
	NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
	MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
	ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
	CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
	CdCl+	1.397e-08	9.796e-09	-7.855	-8.009	-0.154	(0)
	ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
	PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
	ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
	CdCl2	1.380e-09	1.380e-09	-8.860	-8.860	0.000	(0)
	MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
	PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
	ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
	CdCl3-	4.084e-11	2.864e-11	-10.389	-10.543	-0.154	(0)
	NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
	CdOHCl	2.265e-11	2.265e-11	-10.645	-10.645	0.000	(0)
	CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
	PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
	ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
	PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
	CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
	FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
	FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
	CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
	HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)

HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(2)	3.989e-05					
Co+2	3.225e-05	7.797e-06	-4.491	-5.108	-0.617	(0)
CoSO4	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
CoCl+	1.300e-06	9.116e-07	-5.886	-6.040	-0.154	(0)
CoHPO4	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CoOH+	1.375e-08	9.639e-09	-7.862	-8.016	-0.154	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
Co(OH)2	4.744e-11	4.744e-11	-10.324	-10.324	0.000	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Co2OH+3	9.190e-14	3.766e-15	-13.037	-14.424	-1.387	(0)
Co(OH)3-	8.364e-17	5.865e-17	-16.078	-16.232	-0.154	(0)
CoOOH-	5.039e-18	3.533e-18	-17.298	-17.452	-0.154	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Co4(OH)4+4	5.041e-22	1.722e-24	-21.297	-23.764	-2.466	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
Co(OH)4-2	2.382e-24	5.759e-25	-23.623	-24.240	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
CoNO2+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CoNO3+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Co(3)	4.042e-31					
CoOH+2	4.042e-31	9.773e-32	-30.393	-31.010	-0.617	(0)
CoCl+2	8.177e-36	1.977e-36	-35.087	-35.704	-0.617	(0)
Co+3	2.685e-36	3.104e-37	-35.571	-36.508	-0.937	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
Cu(1)	4.900e-06					
CuCl2-	4.354e-06	3.378e-06	-5.361	-5.471	-0.110	(0)
CuCl	4.686e-07	4.686e-07	-6.329	-6.329	0.000	(0)
CuCl3-2	6.265e-08	2.430e-08	-7.203	-7.614	-0.411	(0)
Cu+	1.553e-08	1.089e-08	-7.809	-7.963	-0.154	(0)
Cu(2)	8.967e-10					
Cu+2	6.026e-10	2.310e-10	-9.220	-9.636	-0.416	(0)
CuSO4	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
CuOH+	4.792e-11	3.719e-11	-10.319	-10.430	-0.110	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
CuCl+	1.540e-11	1.195e-11	-10.812	-10.923	-0.110	(0)
Cu(OH)2	5.595e-13	5.595e-13	-12.252	-12.252	0.000	(0)
CuCl2	1.163e-13	1.163e-13	-12.934	-12.934	0.000	(0)
Cu2(OH)2+2	1.398e-16	3.379e-17	-15.855	-16.471	-0.617	(0)
Cu(OH)3-	1.014e-16	7.111e-17	-15.994	-16.148	-0.154	(0)
CuCl3-	4.450e-17	3.452e-17	-16.352	-16.462	-0.110	(0)
CuCl4-2	1.746e-20	6.772e-21	-19.758	-20.169	-0.411	(0)
Cu(OH)4-2	1.434e-22	3.468e-23	-21.843	-22.460	-0.617	(0)
CuNO2+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
CuNO3+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Fe(2)	1.805e-03					
Fe+2	1.454e-03	3.515e-04	-2.837	-3.454	-0.617	(0)
FeSO4	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
FeHPO4	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
FeOH+	8.090e-07	6.384e-07	-6.092	-6.195	-0.103	(0)
Fe(OH)2	2.214e-11	2.214e-11	-10.655	-10.655	0.000	(0)
Fe(OH)3-	5.296e-13	4.179e-13	-12.276	-12.379	-0.103	(0)

Fe(3)	3.233e-07					
Fe(OH)2+	3.138e-07	2.491e-07	-6.503	-6.604	-0.100	(0)
Fe(OH)3	9.382e-09	9.382e-09	-8.028	-8.028	0.000	(0)
Fe(OH)4-	1.205e-10	9.565e-11	-9.919	-10.019	-0.100	(0)
FeOH+2	2.119e-11	8.217e-12	-10.674	-11.085	-0.411	(0)
FeHP04+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeS04+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe+3	2.235e-15	2.584e-16	-14.651	-15.588	-0.937	(0)
Fe(S04)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
FeCl+2	6.060e-16	2.350e-16	-15.218	-15.629	-0.411	(0)
FeH2P04+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
FeCl2+	5.157e-17	4.070e-17	-16.288	-16.390	-0.103	(0)
Fe2(OH)2+4	7.548e-19	2.579e-21	-18.122	-20.589	-2.466	(0)
FeHSe03+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
FeCl3	1.391e-19	1.391e-19	-18.857	-18.857	0.000	(0)
Fe3(OH)4+5	6.361e-23	8.906e-27	-22.197	-26.050	-3.854	(0)
FeN03+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
H(0)	3.796e-19					
H2	1.898e-19	1.939e-19	-18.722	-18.712	0.009	(0)
Hg(0)	1.002e-09					
Hg	1.002e-09	1.002e-09	-8.999	-8.999	0.000	(0)
Hg(1)	3.697e-29					
Hg2+2	1.848e-29	4.469e-30	-28.733	-29.350	-0.617	(0)
Hg(2)	2.362e-18					
HgCl2	1.375e-18	1.375e-18	-17.862	-17.862	0.000	(0)
HgCl3-	6.761e-19	4.741e-19	-18.170	-18.324	-0.154	(0)
HgCl4-2	2.768e-19	6.691e-20	-18.558	-19.175	-0.617	(0)
HgClOH	3.353e-20	3.353e-20	-19.475	-19.475	0.000	(0)
Hg(OH)2	1.682e-22	1.718e-22	-21.774	-21.765	0.009	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
HgCl+	9.730e-24	6.823e-24	-23.012	-23.166	-0.154	(0)
HgOH+	2.768e-26	1.941e-26	-25.558	-25.712	-0.154	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Hg+2	3.648e-29	8.820e-30	-28.438	-29.055	-0.617	(0)
HgS04	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Hg(OH)3-	1.911e-30	1.340e-30	-29.719	-29.873	-0.154	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
HgN03+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Hg(N03)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
K	1.593e-03					
K+	1.549e-03	1.219e-03	-2.810	-2.914	-0.104	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
Mg	1.017e-02					
Mg+2	7.920e-03	3.036e-03	-2.101	-2.518	-0.416	(0)
MgS04	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
MgH2P04+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
MgOH+	6.402e-08	5.162e-08	-7.194	-7.287	-0.094	(0)
MgP04-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
Mn(2)	2.231e-04					
Mn+2	1.882e-04	4.549e-05	-3.725	-4.342	-0.617	(0)
MnS04	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
MnCl+	2.480e-06	1.957e-06	-5.606	-5.708	-0.103	(0)
MnCl2	9.447e-08	9.447e-08	-7.025	-7.025	0.000	(0)
MnOH+	6.606e-09	5.213e-09	-8.180	-8.283	-0.103	(0)
MnCl3-	1.127e-09	8.891e-10	-8.948	-9.051	-0.103	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Mn(OH)3-	2.129e-19	1.680e-19	-18.672	-18.775	-0.103	(0)
MnSe04	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
Mn(OH)4-2	8.666e-26	3.361e-26	-25.062	-25.474	-0.411	(0)
MnN03+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
Mn(N03)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Mn(3)	9.732e-29					
Mn+3	9.732e-29	1.125e-29	-28.012	-28.949	-0.937	(0)
Mn(6)	0.000e+00					
Mn04-2	0.000e+00	0.000e+00	-65.730	-66.142	-0.411	(0)

Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-74.661	-74.779	-0.119	(0)
N(-3)	5.021e-04					
NH4+	4.805e-04	3.617e-04	-3.318	-3.442	-0.123	(0)
NH4S04-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
NH3	9.560e-07	9.560e-07	-6.020	-6.020	0.000	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
Co(NH3)+2	7.042e-09	1.703e-09	-8.152	-8.769	-0.617	(0)
CaNH3+2	6.106e-09	1.476e-09	-8.214	-8.831	-0.617	(0)
CuNH3+2	1.845e-11	4.461e-12	-10.734	-11.351	-0.617	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Co(NH3)2+2	2.674e-13	6.465e-14	-12.573	-13.189	-0.617	(0)
Ca(NH3)2+2	3.091e-15	7.473e-16	-14.510	-15.127	-0.617	(0)
Co(NH3)3+2	4.281e-18	1.035e-18	-17.368	-17.985	-0.617	(0)
Hg(NH3)2+2	1.159e-22	2.801e-23	-21.936	-22.553	-0.617	(0)
Co(NH3)4+2	2.857e-23	6.907e-24	-22.544	-23.161	-0.617	(0)
HgNH3+2	2.354e-26	5.691e-27	-25.628	-26.245	-0.617	(0)
Hg(NH3)3+2	8.423e-28	2.036e-28	-27.075	-27.691	-0.617	(0)
Co(NH3)5+2	6.029e-29	1.457e-29	-28.220	-28.836	-0.617	(0)
Hg(NH3)4+2	1.229e-32	2.970e-33	-31.911	-32.527	-0.617	(0)
Co(NH3)5Cl+2	1.430e-39	3.458e-40	-38.845	-39.461	-0.617	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.434	-52.051	-0.617	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.727	-53.344	-0.617	(0)
N(3)	1.148e-35					
N02-	1.148e-35	8.735e-36	-34.940	-35.059	-0.119	(0)
CoN02+	6.844e-40	4.799e-40	-39.165	-39.319	-0.154	(0)
CuN02+	0.000e+00	0.000e+00	-42.521	-42.675	-0.154	(0)
Cu(N02)2	0.000e+00	0.000e+00	-76.724	-76.724	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-48.382	-48.486	-0.104	(0)
CaN03+	0.000e+00	0.000e+00	-50.854	-51.008	-0.154	(0)
MnN03+	0.000e+00	0.000e+00	-52.474	-52.628	-0.154	(0)
CoN03+	0.000e+00	0.000e+00	-53.240	-53.394	-0.154	(0)
NiN03+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
ZnN03+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
PbN03+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
CdN03+	0.000e+00	0.000e+00	-56.302	-56.456	-0.154	(0)
CuN03+	0.000e+00	0.000e+00	-57.458	-57.612	-0.154	(0)
FeN03+2	0.000e+00	0.000e+00	-62.369	-62.985	-0.617	(0)
HgN03+	0.000e+00	0.000e+00	-77.913	-78.068	-0.154	(0)
Mn(N03)2	0.000e+00	0.000e+00	-100.710	-100.710	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-101.571	-101.571	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-105.292	-105.292	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-107.008	-107.008	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-126.935	-126.935	0.000	(0)
Na	4.781e-02					
Na+	4.677e-02	3.680e-02	-1.330	-1.434	-0.104	(0)
NaS04-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
NaHP04-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
Ni	7.703e-06					
Ni+2	5.664e-06	2.171e-06	-5.247	-5.663	-0.416	(0)
NiS04	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
NiCl+	2.677e-07	1.877e-07	-6.572	-6.726	-0.154	(0)
NiNH3+2	8.856e-09	2.141e-09	-8.053	-8.669	-0.617	(0)
NiOH+	1.818e-09	1.275e-09	-8.741	-8.895	-0.154	(0)
Ni(S04)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
NiCl2	3.266e-11	3.266e-11	-10.486	-10.486	0.000	(0)
Ni(OH)2	8.335e-12	8.335e-12	-11.079	-11.079	0.000	(0)
Ni(NH3)2+2	2.079e-12	5.026e-13	-11.682	-12.299	-0.617	(0)
Ni(OH)3-	7.365e-16	5.164e-16	-15.133	-15.287	-0.154	(0)
NiSe04	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-53.595	-53.749	-0.154	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.993	-55.984	0.009	(0)
P	2.206e-05					

H2PO4-	6.634e-06	5.268e-06	-5.178	-5.278	-0.100	(0)
HP04-2	5.222e-06	2.025e-06	-5.282	-5.694	-0.411	(0)
MgHP04	3.632e-06	3.632e-06	-5.440	-5.440	0.000	(0)
FeHP04	2.610e-06	2.610e-06	-5.583	-5.583	0.000	(0)
FeH2PO4+	1.059e-06	8.408e-07	-5.975	-6.075	-0.100	(0)
NaHP04-	1.016e-06	8.065e-07	-5.993	-6.093	-0.100	(0)
MgH2PO4+	9.025e-07	7.166e-07	-6.045	-6.145	-0.100	(0)
CaHP04	7.992e-07	7.992e-07	-6.097	-6.097	0.000	(0)
CaH2PO4+	1.282e-07	1.018e-07	-6.892	-6.992	-0.100	(0)
KHP04-	2.171e-08	1.724e-08	-7.663	-7.763	-0.100	(0)
CoHP04	1.587e-08	1.587e-08	-7.800	-7.800	0.000	(0)
CaP04-	1.513e-08	1.201e-08	-7.820	-7.920	-0.100	(0)
MgP04-	7.785e-10	6.181e-10	-9.109	-9.209	-0.100	(0)
H3P04	1.150e-10	1.150e-10	-9.939	-9.939	0.000	(0)
P04-3	4.196e-11	4.850e-12	-10.377	-11.314	-0.937	(0)
FeHP04+	5.928e-12	4.707e-12	-11.227	-11.327	-0.100	(0)
FeH2PO4+2	5.891e-17	2.341e-17	-16.230	-16.631	-0.401	(0)
Pb	1.455e-08					
Pb+2	5.480e-09	2.100e-09	-8.261	-8.678	-0.416	(0)
PbS04	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
PbCl+	3.463e-09	2.428e-09	-8.461	-8.615	-0.154	(0)
PbOH+	4.662e-10	3.269e-10	-9.331	-9.486	-0.154	(0)
Pb(S04)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
PbCl2	3.640e-10	3.640e-10	-9.439	-9.439	0.000	(0)
PbCl3-	7.378e-12	5.173e-12	-11.132	-11.286	-0.154	(0)
Pb(OH)2	6.405e-13	6.405e-13	-12.193	-12.193	0.000	(0)
PbCl4-2	3.151e-13	7.617e-14	-12.502	-13.118	-0.617	(0)
Pb2OH+3	2.655e-16	1.088e-17	-15.576	-16.963	-1.387	(0)
Pb(OH)3-	5.660e-17	3.969e-17	-16.247	-16.401	-0.154	(0)
Pb(OH)4-2	2.491e-21	6.022e-22	-20.604	-21.220	-0.617	(0)
Pb3(OH)4+2	3.779e-23	9.137e-24	-22.423	-23.039	-0.617	(0)
Pb4(OH)4+4	5.175e-26	1.768e-28	-25.286	-27.753	-2.466	(0)
PbNO3+	0.000e+00	0.000e+00	-55.844	-55.998	-0.154	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.234	-104.234	0.000	(0)
S(6)	1.553e-02					
S04-2	1.094e-02	4.194e-03	-1.961	-2.377	-0.416	(0)
MgS04	2.244e-03	2.244e-03	-2.649	-2.649	0.000	(0)
NaS04-	1.038e-03	8.244e-04	-2.984	-3.084	-0.100	(0)
CaS04	8.522e-04	8.522e-04	-3.069	-3.069	0.000	(0)
FeS04	3.464e-04	3.464e-04	-3.460	-3.460	0.000	(0)
KS04-	4.456e-05	3.538e-05	-4.351	-4.451	-0.100	(0)
MnS04	3.235e-05	3.235e-05	-4.490	-4.490	0.000	(0)
NH4S04-	2.060e-05	1.626e-05	-4.686	-4.789	-0.103	(0)
CoS04	6.307e-06	6.307e-06	-5.200	-5.200	0.000	(0)
NiS04	1.760e-06	1.760e-06	-5.754	-5.754	0.000	(0)
ZnS04	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(S04)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
HS04-	7.527e-08	5.892e-08	-7.123	-7.230	-0.106	(0)
AlS04+	2.204e-08	1.725e-08	-7.657	-7.763	-0.106	(0)
PbS04	4.315e-09	4.315e-09	-8.365	-8.365	0.000	(0)
CdS04	2.829e-09	2.829e-09	-8.548	-8.548	0.000	(0)
Al(S04)2-	1.082e-09	8.468e-10	-8.966	-9.072	-0.106	(0)
Ni(S04)2-2	1.044e-09	2.523e-10	-8.981	-9.598	-0.617	(0)
Cd(S04)2-2	6.945e-10	1.679e-10	-9.158	-9.775	-0.617	(0)
Pb(S04)2-2	4.511e-10	1.091e-10	-9.346	-9.962	-0.617	(0)
CuS04	2.116e-10	2.116e-10	-9.674	-9.674	0.000	(0)
FeS04+	1.343e-14	1.060e-14	-13.872	-13.975	-0.103	(0)
Fe(S04)2-	1.399e-15	9.813e-16	-14.854	-15.008	-0.154	(0)
HgS04	7.790e-30	7.790e-30	-29.108	-29.108	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.930	-48.085	-0.154	(0)
Se(-2)	4.685e-09					
HSe-	4.677e-09	3.279e-09	-8.330	-8.484	-0.154	(0)
H2Se	4.054e-12	4.054e-12	-11.392	-11.392	0.000	(0)
MnSe	3.791e-12	3.791e-12	-11.421	-11.421	0.000	(0)
Se-2	6.423e-17	1.553e-17	-16.192	-16.809	-0.617	(0)
Se(4)	3.770e-07					
HSeO3-	3.526e-07	2.472e-07	-6.453	-6.607	-0.154	(0)
SeO3-2	2.442e-08	5.904e-09	-7.612	-8.229	-0.617	(0)

H2SeO3	1.653e-11	1.653e-11	-10.782	-10.782	0.000	(0)
FeHSeO3+2	6.087e-19	1.472e-19	-18.216	-18.832	-0.617	(0)
Cd(SeO3)2-2	3.790e-19	9.162e-20	-18.421	-19.038	-0.617	(0)
Se(6)	2.478e-21					
SeO4-2	2.463e-21	9.439e-22	-20.609	-21.025	-0.416	(0)
MnSeO4	1.070e-23	1.070e-23	-22.970	-22.970	0.000	(0)
CoSeO4	3.453e-24	3.453e-24	-23.462	-23.462	0.000	(0)
NiSeO4	8.876e-25	8.876e-25	-24.052	-24.052	0.000	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
HSeO4-	9.645e-27	6.763e-27	-26.016	-26.170	-0.154	(0)
CdSeO4	5.305e-28	5.305e-28	-27.275	-27.275	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
Zn	2.612e-06					
Zn+2	1.813e-06	6.948e-07	-5.742	-6.158	-0.416	(0)
ZnSO4	6.162e-07	6.162e-07	-6.210	-6.210	0.000	(0)
Zn(SO4)2-2	9.634e-08	2.329e-08	-7.016	-7.633	-0.617	(0)
ZnCl+	7.462e-08	5.790e-08	-7.127	-7.237	-0.110	(0)
ZnOHCl	4.838e-09	4.838e-09	-8.315	-8.315	0.000	(0)
ZnOH+	4.520e-09	3.170e-09	-8.345	-8.499	-0.154	(0)
ZnCl2	2.637e-09	2.637e-09	-8.579	-8.579	0.000	(0)
ZnCl3-	9.073e-11	7.040e-11	-10.042	-10.152	-0.110	(0)
Zn(OH)2	4.227e-11	4.227e-11	-10.374	-10.374	0.000	(0)
ZnCl4-2	3.004e-12	1.165e-12	-11.522	-11.934	-0.411	(0)
Zn(OH)3-	1.872e-14	1.313e-14	-13.728	-13.882	-0.154	(0)
Zn(OH)4-2	1.339e-19	3.238e-20	-18.873	-19.490	-0.617	(0)
ZnSeO4	1.016e-25	1.016e-25	-24.993	-24.993	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.396	-46.012	-0.617	(0)
ZnNO3+	0.000e+00	0.000e+00	-54.079	-54.233	-0.154	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.430	-103.430	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-124.48	-118.20	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-28.70	-24.17	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.96	-24.17	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-179.81	-161.88	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.93	-20.82	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-28.36	-27.91	0.45	(NH4)2SeO4
Al(OH)3(am)	0.09	11.16	11.06	Al(OH)3
Al2O3	2.05	22.32	20.27	Al2O3
Al4(OH)10SO4	5.98	28.68	22.70	Al4(OH)10SO4
AlOHSO4	-1.57	-4.80	-3.23	AlOHSO4
Alunite	6.34	5.44	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.24	-11.06	-7.82	PbSO4
Anhydrite	-1.07	-5.41	-4.34	CaSO4
Antlerite	-12.92	-4.13	8.79	Cu3(OH)4SO4
Atacamite	-7.99	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.78	-8.54	-1.76	ZnSO4·6H2O
Birnessite	-18.88	-0.79	18.09	MnO2
Bixbyite	-16.81	-17.16	-0.35	Mn2O3
Boehmite	2.30	11.16	8.86	AlOOH
Brochantite	-15.89	-0.19	15.71	Cu4(OH)6SO4
Brucite	-6.06	11.06	17.12	Mg(OH)2
Bunsenite	-4.77	7.92	12.68	NiO
Ca3(PO4)2(beta)	-2.69	-31.73	-29.05	Ca3(PO4)2
Ca4H(PO4)3·3H2O	-5.80	-52.88	-47.08	Ca4H(PO4)3·3H2O
CaHP04	-1.79	-21.14	-19.35	CaHP04
CaHP04·2H2O	-2.09	-21.14	-19.05	CaHP04·2H2O
Calomel	-14.15	-32.28	-18.13	Hg2Cl2
CaSeO3·2H2O	-5.71	-2.85	2.86	CaSeO3·2H2O
CaSeO4·2H2O	-21.06	-24.06	-3.00	CaSeO4·2H2O
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-23.45	-16.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-23.34	-0.78	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-15.59	-48.19	-32.60	Cd3(PO4)2

Cd4(OH)6SO4	-24.12	4.28	28.40	Cd4(OH)6SO4
CdCl2	-10.84	-11.45	-0.61	CdCl2
CdCl2:1H2O	-9.78	-11.45	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-9.52	-11.46	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.21	-10.52	13.69	Cd
Cdmetal(gamma)	-24.32	-10.52	13.80	Cd
CdOHCl	-6.81	-3.20	3.61	CdOHCl
CdSe	10.17	-10.21	-20.38	CdSe
CdSeO4:2H2O	-27.70	-29.55	-1.85	CdSeO4:2H2O
CdSO4	-10.85	-10.90	-0.05	CdSO4
CdSO4:1H2O	-9.25	-10.90	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-9.07	-10.90	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.36	-12.02	-2.65	CuSO4:5H2O
Clausthalite	17.01	-10.37	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.05	-16.14	-2.09	Co(OH)3
Co3(P04)2	-3.27	-37.95	-34.69	Co3(P04)2
Co3O4	-13.57	-23.81	-10.24	Co3O4
CoCl2	-16.50	-8.04	8.46	CoCl2
CoCl2:6H2O	-10.56	-8.05	2.52	CoCl2:6H2O
CoFe2O4	21.18	18.03	-3.15	CoFe2O4
CoHP04	-4.15	-23.21	-19.06	CoHP04
CoO	-5.37	8.47	13.84	CoO
CoSe	9.40	-6.80	-16.20	CoSe
CoSeO3	-6.24	-4.92	1.32	CoSeO3
CoSeO4:6H2O	-24.61	-26.14	-1.53	CoSeO4:6H2O
CoSO4	-10.48	-7.49	2.99	CoSO4
CoSO4:6H2O	-5.02	-7.49	-2.48	CoSO4:6H2O
Cotunnite	-6.77	-11.61	-4.84	PbCl2
Cu(OH)2	-4.87	3.94	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.82	-47.39	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.69	-17.62	-46.31	Cu2Se
Cu2SO4	-16.40	-18.30	-1.90	Cu2SO4
Cu3(P04)2	-14.69	-51.54	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-16.42	-51.54	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.35	-28.95	-64.30	Cu3Se2
Cumetal	-0.04	-8.96	-8.93	Cu
CuOCuSO4	-18.70	-8.07	10.63	CuOCuSO4
Cupricferrite	7.02	13.50	6.49	CuFe2O4
Cuprite	-1.24	-2.35	-1.11	Cu2O
Cuprousferrite	12.49	3.61	-8.88	CuFeO2
CuSe	22.06	-11.33	-33.39	CuSe
CuSe2	22.68	-11.02	-33.70	CuSe2
CuSeO3:2H2O	-10.05	-9.46	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-28.23	-30.67	-2.44	CuSeO4:5H2O
CuSO4	-15.13	-12.01	3.11	CuSO4
Diaspore	4.04	11.16	7.12	AlOOH
Epsomite	-2.75	-4.90	-2.15	MgSO4:7H2O
Fe(OH)2	-3.44	10.12	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.34	2.30	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-5.39	-3.84	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-10.00	-30.63	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-35.15	-38.31	-3.16	Fe2(SO4)3
Fe3(OH)8	-0.54	19.68	20.22	Fe3(OH)8
Ferrihydrite	1.41	4.78	3.37	Fe(OH)3
Ferroselite	13.87	-4.84	-18.71	FeSe2
FeSe	5.86	-5.15	-11.00	FeSe
Gibbsite	2.64	11.16	8.52	Al(OH)3
Goethite	4.15	4.78	0.64	FeOOH
Goslarite	-6.50	-8.54	-2.05	ZnSO4:7H2O
Gypsum	-0.80	-5.41	-4.61	CaSO4:2H2O
H-Jarosite	-6.02	-17.57	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-10.35	-15.27	-4.92	H2Se
Halite	-4.49	-2.90	1.59	NaCl
Hausmannite	-18.74	43.29	62.03	Mn3O4
Hematite	10.67	9.56	-1.11	Fe2O3
Hercynite	8.80	32.44	23.64	FeAl2O4
Hg(g)	-7.75	-15.67	-7.93	Hg

Hg(OH)2	-18.27	-21.76	-3.50	Hg(OH)2
Hg2(g)	-16.26	-31.35	-15.09	Hg2
Hg2(OH)2	-21.03	-15.77	5.26	Hg2(OH)2
Hg2HP04	-22.68	-47.45	-24.77	Hg2HP04
Hg2Se03	-24.51	-29.17	-4.66	Hg2Se03
Hg2S04	-25.58	-31.73	-6.14	Hg2S04
HgCl(g)	-36.02	-16.14	19.88	HgCl
HgCl2	-16.76	-38.28	-21.52	HgCl2
Hgmetal(l)	-2.02	-15.67	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSe03	-22.73	-35.16	-12.43	HgSe03
HgS04	-28.27	-37.72	-9.45	HgS04
Hinsdalite	-6.76	-9.26	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	2.00	-42.33	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-7.75	-70.54	-62.79	Pb5(P04)3OH
K-Alum	-11.65	-16.89	-5.24	KAl(S04)2:12H2O
K-Jarosite	0.79	-13.70	-14.49	KFe3(S04)2(OH)6
K2Se04	-26.12	-26.85	-0.73	K2Se04
Langite	-18.07	-0.19	17.88	Cu4(OH)6S04:H2O
Larnakite	-5.77	-6.15	-0.38	Pb0:PbS04
Laurionite	-3.98	-3.35	0.62	PbOHCl
Lepidocrocite	3.41	4.78	1.37	Fe00H
Lime	-22.62	10.54	33.16	Ca0
Litharge	-7.95	4.90	12.85	Pb0
Maghemite	3.18	9.56	6.39	Fe203
Magnesioferrite	3.10	20.62	17.52	Fe2Mg04
Magnetite	15.79	19.69	3.90	Fe304
Manganite	-8.31	17.03	25.34	Mn00H
Massicot	-8.15	4.90	13.05	Pb0
Melanothallite	-18.98	-12.57	6.41	CuCl2
Melanterite	-3.58	-5.84	-2.26	FeS04:7H2O
Mg(OH)2(active)	-7.73	11.06	18.79	Mg(OH)2
Mg3(P04)2	-6.90	-30.18	-23.28	Mg3(P04)2
MgHP04:3H2O	-2.45	-20.62	-18.18	MgHP04:3H2O
MgSe03:6H2O	-5.38	-2.34	3.04	MgSe03:6H2O
MgSe04:6H2O	-22.35	-23.55	-1.20	MgSe04:6H2O
Minium	-44.24	30.28	74.53	Pb304
Mirabilite	-3.95	-5.25	-1.30	Na2S04:10H2O
Mn2(S04)3	-59.71	-65.03	-5.32	Mn2(S04)3
Mn3(P04)2	-11.81	-35.65	-23.85	Mn3(P04)2
MnCl2:4H2O	-10.02	-7.28	2.74	MnCl2:4H2O
MnHP04	2.95	-22.45	-25.40	MnHP04
MnSe	-9.77	-6.04	3.73	MnSe
MnSe03	-5.29	-4.16	1.13	MnSe03
MnSe03:2H2O	-5.12	-4.16	0.96	MnSe03:2H2O
MnSe04:5H2O	-23.32	-25.37	-2.05	MnSe04:5H2O
MnS04	-9.46	-6.72	2.74	MnS04
Monteponite	-10.29	5.06	15.35	Cd0
Montroydite	-18.22	-21.76	-3.55	Hg0
Morenosite	-5.87	-8.05	-2.17	NiS04:7H2O
Na-Jarosite	-1.38	-12.22	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-12.99	-2.69	10.30	Na2Se03:5H2O
Na2Se04	-25.17	-23.89	1.28	Na2Se04
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.11	7.91	13.02	Ni(OH)2
Ni3(P04)2	-8.32	-39.62	-31.30	Ni3(P04)2
Ni4(OH)6S04	-16.30	15.70	32.00	Ni4(OH)6S04
NiSe	10.34	-7.36	-17.70	NiSe
NiSe03:2H2O	-8.37	-5.48	2.89	NiSe03:2H2O
NiSe04:6H2O	-25.17	-26.69	-1.52	NiSe04:6H2O
Nsutite	-18.29	-0.79	17.50	Mn02
O2(g)	-53.29	31.16	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.25	1.55	8.79	Pb2(OH)3Cl
Pb20(OH)2	-16.39	9.80	26.19	Pb20(OH)2
Pb203	-35.66	25.38	61.04	Pb203
Pb3(P04)2	-5.13	-48.66	-43.53	Pb3(P04)2
Pb302S04	-12.13	-1.25	10.87	Pb302S04

Pb4(OH)6SO4	-17.45	3.65	21.10	Pb4(OH)6SO4
Pb4O3SO4	-18.55	3.65	22.20	Pb4O3SO4
PbHPO4	-2.98	-26.78	-23.81	PbHPO4
Pbmetal	-14.92	-10.68	4.24	Pb
PbO:0.3H2O	-8.08	4.90	12.98	PbO:0.33H2O
PbSeO4	-22.83	-29.70	-6.88	PbSeO4
Periclase	-10.88	11.06	21.94	MgO
Plattnerite	-29.83	20.48	50.31	PbO2
Plumbgummite	7.80	-24.99	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-12.57	10.54	23.11	Ca(OH)2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2
Pyrolusite	-17.21	24.82	42.03	MnO2
Pyromorphite	5.63	-78.80	-84.43	Pb5(PO4)3Cl
Retgersite	-6.00	-8.05	-2.05	NiSO4:6H2O
Semetal(am)	7.44	0.31	-7.14	Se
Semetal(hex)	8.05	0.31	-7.75	Se
SeO2	-13.52	-13.40	0.12	SeO2
SeO3	-56.00	-34.60	21.39	SeO3
Spinel	-4.39	33.38	37.77	MgAl2O4
Strengite	-0.53	-26.90	-26.38	FePO4:2H2O
Tenorite	-3.86	3.94	7.80	CuO
Thenardite	-5.59	-5.25	0.34	Na2SO4
Tsumebite	-8.15	-17.94	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	3.00	-33.00	-36.00	Fe3(PO4)2:8H2O
Zincite	-4.13	7.42	11.55	ZnO
Zincosite	-12.66	-8.54	4.13	ZnSO4
Zn(NO3)2:6H2O	-106.39	-103.14	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-4.78	7.42	12.20	Zn(OH)2
Zn(OH)2(am)	-5.25	7.42	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.42	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.31	7.42	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.42	11.73	Zn(OH)2
Zn2(OH)2SO4	-8.62	-1.12	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-8.61	6.58	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-5.69	-41.11	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-29.18	-9.65	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-14.68	13.72	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-17.91	20.59	38.50	Zn5(OH)8Cl2
ZnCl2	-16.31	-9.09	7.22	ZnCl2
Znmetal	-34.31	-8.16	26.15	Zn
ZnO(active)	-3.98	7.42	11.40	ZnO
ZnSe	6.61	-7.85	-14.46	ZnSe
ZnSeO4:6H2O	-25.67	-27.19	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-8.00	-8.54	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 7.
Using reaction 8.

Mixture 7.

9.880e-01 Solution 1
1.200e-02 Solution 9

Reaction 8.

2.000e+00 moles of the following reaction have been added:

	Relative
Reactant	moles

H2O -1.00000

Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	1.429e-05	1.378e-05
Ca	3.381e-03	3.259e-03
Cd	2.782e-08	2.681e-08
Cl	4.507e-02	4.344e-02
Co	4.138e-05	3.989e-05
Cu	5.084e-06	4.901e-06
Fe	1.873e-03	1.805e-03
Hg	1.039e-09	1.002e-09
K	1.653e-03	1.593e-03
Mg	1.055e-02	1.017e-02
Mn	2.315e-04	2.231e-04
N	5.209e-04	5.021e-04
Na	4.960e-02	4.781e-02
Ni	7.991e-06	7.703e-06
P	2.288e-05	2.206e-05
Pb	1.509e-08	1.455e-08
S	1.611e-02	1.553e-02
Se	3.960e-07	3.817e-07
Zn	2.710e-06	2.612e-06

-----Description of solution-----

pH	=	6.789	Charge balance
pe	=	1.008	Adjusted to redox equilibrium
Activity of water	=	0.998	
Ionic strength (mol/kgw)	=	9.589e-02	
Mass of water (kg)	=	9.640e-01	
Total alkalinity (eq/kg)	=	6.509e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	6.374e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	4.58	
Iterations	=	4	
Total H	=	1.070158e+02	
Total O	=	5.356909e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	2.071e-07	1.626e-07	-6.684	-6.789	-0.105	0.00
OH-	5.941e-08	4.551e-08	-7.226	-7.342	-0.116	(0)
H2O	5.551e+01	9.979e-01	1.744	-0.001	0.000	18.05
Al	1.429e-05					
Al(OH)4-	9.301e-06	7.259e-06	-5.031	-5.139	-0.108	(0)
Al(OH)2+	2.470e-06	1.956e-06	-5.607	-5.709	-0.101	(0)
Al(OH)3	2.413e-06	2.413e-06	-5.618	-5.618	0.000	(0)
AlOH+2	7.793e-08	3.065e-08	-7.108	-7.514	-0.405	(0)
AlSO4+	2.357e-08	1.840e-08	-7.628	-7.735	-0.108	(0)
Al+3	5.703e-09	6.445e-10	-8.244	-9.191	-0.947	(0)
Al(SO4)2-	1.183e-09	9.231e-10	-8.927	-9.035	-0.108	(0)
Ca	3.381e-03					
Ca+2	2.488e-03	9.441e-04	-2.604	-3.025	-0.421	(0)
CaSO4	8.918e-04	8.918e-04	-3.050	-3.050	0.000	(0)

	CaHPO4	8.368e-07	8.368e-07	-6.077	-6.077	0.000	(0)
	CaH2PO4+	1.349e-07	1.068e-07	-6.870	-6.971	-0.101	(0)
	CaPO4-	1.585e-08	1.255e-08	-7.800	-7.901	-0.101	(0)
	CaNH3+2	6.602e-09	1.557e-09	-8.180	-8.808	-0.627	(0)
	CaOH+	1.025e-09	8.191e-10	-8.989	-9.087	-0.097	(0)
	Ca(NH3)2+2	3.442e-15	8.116e-16	-14.463	-15.091	-0.627	(0)
	CaNO3+	0.000e+00	0.000e+00	-50.772	-50.929	-0.157	(0)
Cd	2.782e-08						
	CdCl+	1.462e-08	1.018e-08	-7.835	-7.992	-0.157	(0)
	Cd+2	7.991e-09	3.032e-09	-8.097	-8.518	-0.421	(0)
	CdSO4	2.906e-09	2.906e-09	-8.537	-8.537	0.000	(0)
	CdCl2	1.485e-09	1.485e-09	-8.828	-8.828	0.000	(0)
	Cd(SO4)2-2	7.476e-10	1.763e-10	-9.126	-9.754	-0.627	(0)
	CdCl3-	4.575e-11	3.188e-11	-10.340	-10.496	-0.157	(0)
	CdOHCl	2.350e-11	2.350e-11	-10.629	-10.629	0.000	(0)
	CdOH+	1.582e-12	1.102e-12	-11.801	-11.958	-0.157	(0)
	Cd(OH)2	5.807e-16	5.807e-16	-15.236	-15.236	0.000	(0)
	Cd2OH+3	4.544e-19	1.760e-20	-18.343	-19.754	-1.412	(0)
	Cd(SeO3)2-2	4.131e-19	9.740e-20	-18.384	-19.011	-0.627	(0)
	Cd(OH)3-	3.147e-21	2.193e-21	-20.502	-20.659	-0.157	(0)
	CdSeO4	5.664e-28	5.664e-28	-27.247	-27.247	0.000	(0)
	Cd(OH)4-2	9.411e-29	2.219e-29	-28.026	-28.654	-0.627	(0)
	CdHS+	8.317e-39	5.796e-39	-38.080	-38.237	-0.157	(0)
	CdNO3+	0.000e+00	0.000e+00	-56.229	-56.385	-0.157	(0)
	Cd(HS)2	0.000e+00	0.000e+00	-68.760	-68.760	0.000	(0)
	Cd(HS)3-	0.000e+00	0.000e+00	-104.429	-104.586	-0.157	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-105.153	-105.153	0.000	(0)
	Cd(HS)4-2	0.000e+00	0.000e+00	-139.490	-140.117	-0.627	(0)
Cl	4.507e-02						
	Cl-	4.505e-02	3.536e-02	-1.346	-1.451	-0.105	(0)
	CuCl2-	4.531e-06	3.504e-06	-5.344	-5.455	-0.112	(0)
	MnCl+	2.604e-06	2.050e-06	-5.584	-5.688	-0.104	(0)
	CoCl+	1.370e-06	9.543e-07	-5.863	-6.020	-0.157	(0)
	CuCl	4.698e-07	4.698e-07	-6.328	-6.328	0.000	(0)
	NiCl+	2.852e-07	1.987e-07	-6.545	-6.702	-0.157	(0)
	MnCl2	1.024e-07	1.024e-07	-6.990	-6.990	0.000	(0)
	ZnCl+	7.908e-08	6.116e-08	-7.102	-7.213	-0.112	(0)
	CuCl3-2	6.801e-08	2.608e-08	-7.167	-7.584	-0.416	(0)
	CdCl+	1.462e-08	1.018e-08	-7.835	-7.992	-0.157	(0)
	ZnOHCl	5.099e-09	5.099e-09	-8.293	-8.293	0.000	(0)
	PbCl+	3.651e-09	2.544e-09	-8.438	-8.594	-0.157	(0)
	ZnCl2	2.882e-09	2.882e-09	-8.540	-8.540	0.000	(0)
	CdCl2	1.485e-09	1.485e-09	-8.828	-8.828	0.000	(0)
	MnCl3-	1.267e-09	9.970e-10	-8.897	-9.001	-0.104	(0)
	PbCl2	3.947e-10	3.947e-10	-9.404	-9.404	0.000	(0)
	ZnCl3-	1.030e-10	7.964e-11	-9.987	-10.099	-0.112	(0)
	CdCl3-	4.575e-11	3.188e-11	-10.340	-10.496	-0.157	(0)
	NiCl2	3.578e-11	3.578e-11	-10.446	-10.446	0.000	(0)
	CdOHCl	2.350e-11	2.350e-11	-10.629	-10.629	0.000	(0)
	CuCl+	1.578e-11	1.221e-11	-10.802	-10.913	-0.112	(0)
	PbCl3-	8.330e-12	5.805e-12	-11.079	-11.236	-0.157	(0)
	ZnCl4-2	3.555e-12	1.364e-12	-11.449	-11.865	-0.416	(0)
	PbCl4-2	3.751e-13	8.844e-14	-12.426	-13.053	-0.627	(0)
	CuCl2	1.229e-13	1.229e-13	-12.910	-12.910	0.000	(0)
	FeCl+2	6.540e-16	2.508e-16	-15.184	-15.601	-0.416	(0)
	FeCl2+	5.711e-17	4.494e-17	-16.243	-16.347	-0.104	(0)
	CuCl3-	4.882e-17	3.776e-17	-16.311	-16.423	-0.112	(0)
	HgCl2	1.586e-18	1.586e-18	-17.800	-17.800	0.000	(0)
	HgCl3-	8.117e-19	5.656e-19	-18.091	-18.247	-0.157	(0)
	HgCl4-2	3.503e-19	8.260e-20	-18.456	-19.083	-0.627	(0)
	FeCl3	1.589e-19	1.589e-19	-18.799	-18.799	0.000	(0)
	HgClOH	3.727e-20	3.727e-20	-19.429	-19.429	0.000	(0)
	CuCl4-2	1.998e-20	7.663e-21	-19.699	-20.116	-0.416	(0)
	HgCl+	1.091e-23	7.602e-24	-22.962	-23.119	-0.157	(0)
	CoCl+2	8.942e-36	2.108e-36	-35.049	-35.676	-0.627	(0)
	Co(NH3)5Cl+2	1.813e-39	4.275e-40	-38.742	-39.369	-0.627	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.318	-51.946	-0.627	(0)
Co(2)	4.138e-05						

Co+2	3.345e-05	7.888e-06	-4.476	-5.103	-0.627	(0)
CoS04	6.522e-06	6.522e-06	-5.186	-5.186	0.000	(0)
CoCl+	1.370e-06	9.543e-07	-5.863	-6.020	-0.157	(0)
CoHP04	1.641e-08	1.641e-08	-7.785	-7.785	0.000	(0)
CoOH+	1.396e-08	9.729e-09	-7.855	-8.012	-0.157	(0)
Co(NH3)+2	7.525e-09	1.774e-09	-8.124	-8.751	-0.627	(0)
Co(OH)2	4.777e-11	4.777e-11	-10.321	-10.321	0.000	(0)
Co(NH3)2+2	2.943e-13	6.939e-14	-12.531	-13.159	-0.627	(0)
Co2OH+3	9.928e-14	3.846e-15	-13.003	-14.415	-1.412	(0)
Co(OH)3-	8.455e-17	5.892e-17	-16.073	-16.230	-0.157	(0)
Co00H-	5.094e-18	3.550e-18	-17.293	-17.450	-0.157	(0)
Co(NH3)3+2	4.853e-18	1.144e-18	-17.314	-17.942	-0.627	(0)
Co4(OH)4+4	5.783e-22	1.787e-24	-21.238	-23.748	-2.510	(0)
Co(NH3)4+2	3.336e-23	7.865e-24	-22.477	-23.104	-0.627	(0)
CoSe04	3.713e-24	3.713e-24	-23.430	-23.430	0.000	(0)
Co(OH)4-2	2.448e-24	5.772e-25	-23.611	-24.239	-0.627	(0)
Co(NH3)5+2	7.250e-29	1.709e-29	-28.140	-28.767	-0.627	(0)
CoNO2+	7.898e-40	5.504e-40	-39.102	-39.259	-0.157	(0)
CoNO3+	0.000e+00	0.000e+00	-53.163	-53.320	-0.157	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.429	-101.429	0.000	(0)
Co(3)	4.262e-31					
CoOH+2	4.262e-31	1.005e-31	-30.370	-30.998	-0.627	(0)
CoCl+2	8.942e-36	2.108e-36	-35.049	-35.676	-0.627	(0)
Co+3	2.831e-36	3.199e-37	-35.548	-36.495	-0.947	(0)
Co(NH3)5Cl+2	1.813e-39	4.275e-40	-38.742	-39.369	-0.627	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.828	-47.985	-0.157	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.318	-51.946	-0.627	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.627	-53.255	-0.627	(0)
Cu(1)	5.084e-06					
CuCl2-	4.531e-06	3.504e-06	-5.344	-5.455	-0.112	(0)
CuCl	4.698e-07	4.698e-07	-6.328	-6.328	0.000	(0)
CuCl3-2	6.801e-08	2.608e-08	-7.167	-7.584	-0.416	(0)
Cu+	1.514e-08	1.055e-08	-7.820	-7.977	-0.157	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.039	-66.462	-0.423	(0)
CuS4S5-3	0.000e+00	0.000e+00	-66.793	-67.192	-0.399	(0)
Cu(2)	8.973e-10					
Cu+2	6.008e-10	2.280e-10	-9.221	-9.642	-0.421	(0)
CuS04	2.135e-10	2.135e-10	-9.671	-9.671	0.000	(0)
CuOH+	4.734e-11	3.662e-11	-10.325	-10.436	-0.112	(0)
CuNH3+2	1.924e-11	4.535e-12	-10.716	-11.343	-0.627	(0)
CuCl+	1.578e-11	1.221e-11	-10.802	-10.913	-0.112	(0)
Cu(OH)2	5.497e-13	5.497e-13	-12.260	-12.260	0.000	(0)
CuCl2	1.229e-13	1.229e-13	-12.910	-12.910	0.000	(0)
Cu2(OH)2+2	1.390e-16	3.277e-17	-15.857	-16.485	-0.627	(0)
Cu(OH)3-	1.000e-16	6.969e-17	-16.000	-16.157	-0.157	(0)
CuCl3-	4.882e-17	3.776e-17	-16.311	-16.423	-0.112	(0)
CuCl4-2	1.998e-20	7.663e-21	-19.699	-20.116	-0.416	(0)
Cu(OH)4-2	1.438e-22	3.391e-23	-21.842	-22.470	-0.627	(0)
CuNO2+	0.000e+00	0.000e+00	-42.470	-42.626	-0.157	(0)
CuNO3+	0.000e+00	0.000e+00	-57.393	-57.550	-0.157	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.621	-76.621	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.766	-96.923	-0.157	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-106.876	-106.876	0.000	(0)
Fe(2)	1.872e-03					
Fe+2	1.509e-03	3.558e-04	-2.821	-3.449	-0.627	(0)
FeS04	3.584e-04	3.584e-04	-3.446	-3.446	0.000	(0)
FeHP04	2.702e-06	2.702e-06	-5.568	-5.568	0.000	(0)
FeH2P04+	1.102e-06	8.724e-07	-5.958	-6.059	-0.101	(0)
FeOH+	8.193e-07	6.448e-07	-6.087	-6.191	-0.104	(0)
Fe(OH)2	2.231e-11	2.231e-11	-10.652	-10.652	0.000	(0)
Fe(OH)3-	5.338e-13	4.201e-13	-12.273	-12.377	-0.104	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.952	-69.952	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.485	-105.642	-0.157	(0)
Fe(3)	3.327e-07					
Fe(OH)2+	3.230e-07	2.557e-07	-6.491	-6.592	-0.101	(0)
Fe(OH)3	9.608e-09	9.608e-09	-8.017	-8.017	0.000	(0)
Fe(OH)4-	1.234e-10	9.772e-11	-9.909	-10.010	-0.101	(0)
FeOH+2	2.205e-11	8.455e-12	-10.657	-11.073	-0.416	(0)

FeHP04+	6.269e-12	4.964e-12	-11.203	-11.304	-0.101	(0)
FeS04+	1.420e-14	1.118e-14	-13.848	-13.952	-0.104	(0)
Fe+3	2.358e-15	2.665e-16	-14.627	-15.574	-0.947	(0)
Fe(S04)2-	1.518e-15	1.058e-15	-14.819	-14.976	-0.157	(0)
FeCl+2	6.540e-16	2.508e-16	-15.184	-15.601	-0.416	(0)
FeH2P04+2	6.293e-17	2.475e-17	-16.201	-16.606	-0.405	(0)
FeCl2+	5.711e-17	4.494e-17	-16.243	-16.347	-0.104	(0)
Fe2(OH)2+4	8.834e-19	2.730e-21	-18.054	-20.564	-2.510	(0)
FeHSe03+2	6.637e-19	1.565e-19	-18.178	-18.806	-0.627	(0)
FeCl3	1.589e-19	1.589e-19	-18.799	-18.799	0.000	(0)
Fe3(OH)4+5	8.085e-23	9.679e-27	-22.092	-26.014	-3.922	(0)
FeN03+2	0.000e+00	0.000e+00	-62.276	-62.903	-0.627	(0)
H(0)	3.671e-19					
H2	1.835e-19	1.876e-19	-18.736	-18.727	0.010	(0)
Hg(0)	1.039e-09					
Hg	1.039e-09	1.039e-09	-8.983	-8.983	0.000	(0)
Hg(1)	4.234e-29					
Hg2+2	2.117e-29	4.992e-30	-28.674	-29.302	-0.627	(0)
Hg(2)	2.785e-18					
HgCl2	1.586e-18	1.586e-18	-17.800	-17.800	0.000	(0)
HgCl3-	8.117e-19	5.656e-19	-18.091	-18.247	-0.157	(0)
HgCl4-2	3.503e-19	8.260e-20	-18.456	-19.083	-0.627	(0)
HgCl0H	3.727e-20	3.727e-20	-19.429	-19.429	0.000	(0)
Hg(OH)2	1.801e-22	1.841e-22	-21.744	-21.735	0.010	(0)
Hg(NH3)2+2	1.357e-22	3.200e-23	-21.867	-22.495	-0.627	(0)
HgCl+	1.091e-23	7.602e-24	-22.962	-23.119	-0.157	(0)
HgOH+	2.992e-26	2.085e-26	-25.524	-25.681	-0.157	(0)
HgNH3+2	2.677e-26	6.312e-27	-25.572	-26.200	-0.627	(0)
Hg(NH3)3+2	1.016e-27	2.396e-28	-26.993	-27.620	-0.627	(0)
Hg+2	4.028e-29	9.497e-30	-28.395	-29.022	-0.627	(0)
HgS04	8.574e-30	8.574e-30	-29.067	-29.067	0.000	(0)
Hg(OH)3-	2.056e-30	1.433e-30	-29.687	-29.844	-0.157	(0)
Hg(NH3)4+2	1.527e-32	3.600e-33	-31.816	-32.444	-0.627	(0)
HgHS2-	0.000e+00	0.000e+00	-65.697	-65.853	-0.157	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.248	-66.248	0.000	(0)
HgS2-2	0.000e+00	0.000e+00	-67.145	-67.772	-0.627	(0)
HgN03+	0.000e+00	0.000e+00	-77.810	-77.967	-0.157	(0)
Hg(N03)2	0.000e+00	0.000e+00	-126.765	-126.765	0.000	(0)
K	1.653e-03					
K+	1.605e-03	1.260e-03	-2.794	-2.900	-0.105	(0)
KS04-	4.722e-05	3.740e-05	-4.326	-4.427	-0.101	(0)
KHP04-	2.302e-08	1.823e-08	-7.638	-7.739	-0.101	(0)
Mg	1.055e-02					
Mg+2	8.194e-03	3.109e-03	-2.086	-2.507	-0.421	(0)
MgS04	2.350e-03	2.350e-03	-2.629	-2.629	0.000	(0)
MgHP04	3.804e-06	3.804e-06	-5.420	-5.420	0.000	(0)
MgH2P04+	9.500e-07	7.523e-07	-6.022	-6.124	-0.101	(0)
MgOH+	6.557e-08	5.275e-08	-7.183	-7.278	-0.095	(0)
MgP04-	8.158e-10	6.460e-10	-9.088	-9.190	-0.101	(0)
Mn(2)	2.315e-04					
Mn+2	1.953e-04	4.604e-05	-3.709	-4.337	-0.627	(0)
MnS04	3.347e-05	3.347e-05	-4.475	-4.475	0.000	(0)
MnCl+	2.604e-06	2.050e-06	-5.584	-5.688	-0.104	(0)
MnCl2	1.024e-07	1.024e-07	-6.990	-6.990	0.000	(0)
MnOH+	6.689e-09	5.264e-09	-8.175	-8.279	-0.104	(0)
MnCl3-	1.267e-09	9.970e-10	-8.897	-9.001	-0.104	(0)
MnSe	3.578e-12	3.578e-12	-11.446	-11.446	0.000	(0)
Mn(OH)3-	2.145e-19	1.688e-19	-18.669	-18.773	-0.104	(0)
MnSe04	1.151e-23	1.151e-23	-22.939	-22.939	0.000	(0)
Mn(OH)4-2	8.784e-26	3.369e-26	-25.056	-25.472	-0.416	(0)
MnN03+	0.000e+00	0.000e+00	-52.397	-52.554	-0.157	(0)
Mn(N03)2	0.000e+00	0.000e+00	-100.567	-100.567	0.000	(0)
Mn(3)	1.026e-28					
Mn+3	1.026e-28	1.160e-29	-27.989	-28.936	-0.947	(0)
Mn(6)	0.000e+00					
Mn04-2	0.000e+00	0.000e+00	-65.696	-66.112	-0.416	(0)
Mn(7)	0.000e+00					
Mn04-	0.000e+00	0.000e+00	-74.622	-74.742	-0.120	(0)

N(-3)	5.209e-04					
NH4+	4.981e-04	3.734e-04	-3.303	-3.428	-0.125	(0)
NH4SO4-	2.180e-05	1.715e-05	-4.662	-4.766	-0.104	(0)
NH3	9.847e-07	9.847e-07	-6.007	-6.007	0.000	(0)
NiNH3+2	9.568e-09	2.256e-09	-8.019	-8.647	-0.627	(0)
Co(NH3)+2	7.525e-09	1.774e-09	-8.124	-8.751	-0.627	(0)
CaNH3+2	6.602e-09	1.557e-09	-8.180	-8.808	-0.627	(0)
CuNH3+2	1.924e-11	4.535e-12	-10.716	-11.343	-0.627	(0)
Ni(NH3)2+2	2.313e-12	5.455e-13	-11.636	-12.263	-0.627	(0)
Co(NH3)2+2	2.943e-13	6.939e-14	-12.531	-13.159	-0.627	(0)
Ca(NH3)2+2	3.442e-15	8.116e-16	-14.463	-15.091	-0.627	(0)
Co(NH3)3+2	4.853e-18	1.144e-18	-17.314	-17.942	-0.627	(0)
Hg(NH3)2+2	1.357e-22	3.200e-23	-21.867	-22.495	-0.627	(0)
Co(NH3)4+2	3.336e-23	7.865e-24	-22.477	-23.104	-0.627	(0)
HgNH3+2	2.677e-26	6.312e-27	-25.572	-26.200	-0.627	(0)
Hg(NH3)3+2	1.016e-27	2.396e-28	-26.993	-27.620	-0.627	(0)
Co(NH3)5+2	7.250e-29	1.709e-29	-28.140	-28.767	-0.627	(0)
Hg(NH3)4+2	1.527e-32	3.600e-33	-31.816	-32.444	-0.627	(0)
Co(NH3)5Cl+2	1.813e-39	4.275e-40	-38.742	-39.369	-0.627	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-47.828	-47.985	-0.157	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.318	-51.946	-0.627	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-52.627	-53.255	-0.627	(0)
N(3)	1.306e-35					
NO2-	1.306e-35	9.901e-36	-34.884	-35.004	-0.120	(0)
CoNO2+	7.898e-40	5.504e-40	-39.102	-39.259	-0.157	(0)
CuNO2+	0.000e+00	0.000e+00	-42.470	-42.626	-0.157	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-76.621	-76.621	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-48.312	-48.417	-0.105	(0)
CaNO3+	0.000e+00	0.000e+00	-50.772	-50.929	-0.157	(0)
MnNO3+	0.000e+00	0.000e+00	-52.397	-52.554	-0.157	(0)
CoNO3+	0.000e+00	0.000e+00	-53.163	-53.320	-0.157	(0)
NiNO3+	0.000e+00	0.000e+00	-53.514	-53.671	-0.157	(0)
ZnNO3+	0.000e+00	0.000e+00	-53.999	-54.155	-0.157	(0)
PbNO3+	0.000e+00	0.000e+00	-55.767	-55.924	-0.157	(0)
CdNO3+	0.000e+00	0.000e+00	-56.229	-56.385	-0.157	(0)
CuNO3+	0.000e+00	0.000e+00	-57.393	-57.550	-0.157	(0)
FeNO3+2	0.000e+00	0.000e+00	-62.276	-62.903	-0.627	(0)
HgNO3+	0.000e+00	0.000e+00	-77.810	-77.967	-0.157	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-100.567	-100.567	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-101.429	-101.429	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.284	-103.284	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.091	-104.091	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-105.153	-105.153	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-106.876	-106.876	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-126.765	-126.765	0.000	(0)
Na	4.960e-02					
Na+	4.850e-02	3.806e-02	-1.314	-1.420	-0.105	(0)
NaSO4-	1.101e-03	8.716e-04	-2.958	-3.060	-0.101	(0)
NaHPO4-	1.077e-06	8.530e-07	-5.968	-6.069	-0.101	(0)
Ni	7.991e-06					
Ni+2	5.853e-06	2.221e-06	-5.233	-5.653	-0.421	(0)
NiSO4	1.840e-06	1.840e-06	-5.735	-5.735	0.000	(0)
NiCl+	2.852e-07	1.987e-07	-6.545	-6.702	-0.157	(0)
NiNH3+2	9.568e-09	2.256e-09	-8.019	-8.647	-0.627	(0)
NiOH+	1.867e-09	1.301e-09	-8.729	-8.886	-0.157	(0)
Ni(SO4)2-2	1.144e-09	2.697e-10	-8.942	-9.569	-0.627	(0)
NiCl2	3.578e-11	3.578e-11	-10.446	-10.446	0.000	(0)
Ni(OH)2	8.487e-12	8.487e-12	-11.071	-11.071	0.000	(0)
Ni(NH3)2+2	2.313e-12	5.455e-13	-11.636	-12.263	-0.627	(0)
Ni(OH)3-	7.528e-16	5.246e-16	-15.123	-15.280	-0.157	(0)
NiSeO4	9.651e-25	9.651e-25	-24.015	-24.015	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-53.514	-53.671	-0.157	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-55.965	-55.955	0.010	(0)
P	2.288e-05					
H2PO4-	6.818e-06	5.399e-06	-5.166	-5.268	-0.101	(0)
HPO4-2	5.400e-06	2.071e-06	-5.268	-5.684	-0.416	(0)

MgHP04	3.804e-06	3.804e-06	-5.420	-5.420	0.000	(0)
FeHP04	2.702e-06	2.702e-06	-5.568	-5.568	0.000	(0)
FeH2P04+	1.102e-06	8.724e-07	-5.958	-6.059	-0.101	(0)
NaHP04-	1.077e-06	8.530e-07	-5.968	-6.069	-0.101	(0)
MgH2P04+	9.500e-07	7.523e-07	-6.022	-6.124	-0.101	(0)
CaHP04	8.368e-07	8.368e-07	-6.077	-6.077	0.000	(0)
CaH2P04+	1.349e-07	1.068e-07	-6.870	-6.971	-0.101	(0)
KHP04-	2.302e-08	1.823e-08	-7.638	-7.739	-0.101	(0)
CoHP04	1.641e-08	1.641e-08	-7.785	-7.785	0.000	(0)
CaP04-	1.585e-08	1.255e-08	-7.800	-7.901	-0.101	(0)
MgP04-	8.158e-10	6.460e-10	-9.088	-9.190	-0.101	(0)
H3P04	1.182e-10	1.182e-10	-9.927	-9.927	0.000	(0)
P04-3	4.379e-11	4.948e-12	-10.359	-11.306	-0.947	(0)
FeHP04+	6.269e-12	4.964e-12	-11.203	-11.304	-0.101	(0)
FeH2P04+2	6.293e-17	2.475e-17	-16.201	-16.606	-0.405	(0)
Pb	1.509e-08					
Pb+2	5.605e-09	2.127e-09	-8.251	-8.672	-0.421	(0)
PbS04	4.467e-09	4.467e-09	-8.350	-8.350	0.000	(0)
PbCl+	3.651e-09	2.544e-09	-8.438	-8.594	-0.157	(0)
Pb(S04)2-2	4.894e-10	1.154e-10	-9.310	-9.938	-0.627	(0)
PbOH+	4.740e-10	3.303e-10	-9.324	-9.481	-0.157	(0)
PbCl2	3.947e-10	3.947e-10	-9.404	-9.404	0.000	(0)
PbCl3-	8.330e-12	5.805e-12	-11.079	-11.236	-0.157	(0)
Pb(OH)2	6.456e-13	6.456e-13	-12.190	-12.190	0.000	(0)
PbCl4-2	3.751e-13	8.844e-14	-12.426	-13.053	-0.627	(0)
Pb2OH+3	2.874e-16	1.113e-17	-15.542	-16.953	-1.412	(0)
Pb(OH)3-	5.727e-17	3.991e-17	-16.242	-16.399	-0.157	(0)
Pb(OH)4-2	2.562e-21	6.041e-22	-20.591	-21.219	-0.627	(0)
Pb3(OH)4+2	3.987e-23	9.401e-24	-22.399	-23.027	-0.627	(0)
Pb4(OH)4+4	5.960e-26	1.842e-28	-25.225	-27.735	-2.510	(0)
PbNO3+	0.000e+00	0.000e+00	-55.767	-55.924	-0.157	(0)
Pb(HS)2	0.000e+00	0.000e+00	-68.856	-68.856	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-104.091	-104.091	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.125	-105.282	-0.157	(0)
S(-2)	7.145e-38					
H2S	3.603e-38	3.603e-38	-37.443	-37.443	0.000	(0)
HS-	2.693e-38	1.876e-38	-37.570	-37.727	-0.157	(0)
CdHS+	8.317e-39	5.796e-39	-38.080	-38.237	-0.157	(0)
S5-2	1.718e-40	0.000e+00	-39.765	-40.392	-0.627	(0)
S6-2	0.000e+00	0.000e+00	-40.191	-40.819	-0.627	(0)
S4-2	0.000e+00	0.000e+00	-40.365	-40.992	-0.627	(0)
S3-2	0.000e+00	0.000e+00	-41.177	-41.805	-0.627	(0)
S2-2	0.000e+00	0.000e+00	-42.204	-42.831	-0.627	(0)
S-2	0.000e+00	0.000e+00	-47.939	-48.355	-0.416	(0)
HgHS2-	0.000e+00	0.000e+00	-65.697	-65.853	-0.157	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-66.039	-66.462	-0.423	(0)
Hg(HS)2	0.000e+00	0.000e+00	-66.248	-66.248	0.000	(0)
CuS4S5-3	0.000e+00	0.000e+00	-66.793	-67.192	-0.399	(0)
HgS2-2	0.000e+00	0.000e+00	-67.145	-67.772	-0.627	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-67.847	-68.004	-0.157	(0)
Cd(HS)2	0.000e+00	0.000e+00	-68.760	-68.760	0.000	(0)
Zn(HS)2	0.000e+00	0.000e+00	-68.783	-68.783	0.000	(0)
Pb(HS)2	0.000e+00	0.000e+00	-68.856	-68.856	0.000	(0)
Fe(HS)2	0.000e+00	0.000e+00	-69.952	-69.952	0.000	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-96.766	-96.923	-0.157	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.072	-103.229	-0.157	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-104.429	-104.586	-0.157	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-105.125	-105.282	-0.157	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-105.485	-105.642	-0.157	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-105.793	-106.420	-0.627	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-139.490	-140.117	-0.627	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-141.788	-142.416	-0.627	(0)
S(6)	1.611e-02					
S04-2	1.130e-02	4.287e-03	-1.947	-2.368	-0.421	(0)
MgS04	2.350e-03	2.350e-03	-2.629	-2.629	0.000	(0)
NaS04-	1.101e-03	8.716e-04	-2.958	-3.060	-0.101	(0)
CaS04	8.918e-04	8.918e-04	-3.050	-3.050	0.000	(0)
FeS04	3.584e-04	3.584e-04	-3.446	-3.446	0.000	(0)

KS04-	4.722e-05	3.740e-05	-4.326	-4.427	-0.101	(0)
MnS04	3.347e-05	3.347e-05	-4.475	-4.475	0.000	(0)
NH4S04-	2.180e-05	1.715e-05	-4.662	-4.766	-0.104	(0)
CoS04	6.522e-06	6.522e-06	-5.186	-5.186	0.000	(0)
NiS04	1.840e-06	1.840e-06	-5.735	-5.735	0.000	(0)
ZnS04	6.431e-07	6.431e-07	-6.192	-6.192	0.000	(0)
Zn(S04)2-2	1.054e-07	2.485e-08	-6.977	-7.605	-0.627	(0)
HS04-	7.735e-08	6.036e-08	-7.112	-7.219	-0.108	(0)
AlS04+	2.357e-08	1.840e-08	-7.628	-7.735	-0.108	(0)
PbS04	4.467e-09	4.467e-09	-8.350	-8.350	0.000	(0)
CdS04	2.906e-09	2.906e-09	-8.537	-8.537	0.000	(0)
Al(S04)2-	1.183e-09	9.231e-10	-8.927	-9.035	-0.108	(0)
Ni(S04)2-2	1.144e-09	2.697e-10	-8.942	-9.569	-0.627	(0)
Cd(S04)2-2	7.476e-10	1.763e-10	-9.126	-9.754	-0.627	(0)
Pb(S04)2-2	4.894e-10	1.154e-10	-9.310	-9.938	-0.627	(0)
CuS04	2.135e-10	2.135e-10	-9.671	-9.671	0.000	(0)
FeS04+	1.420e-14	1.118e-14	-13.848	-13.952	-0.104	(0)
Fe(S04)2-	1.518e-15	1.058e-15	-14.819	-14.976	-0.157	(0)
HgS04	8.574e-30	8.574e-30	-29.067	-29.067	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-47.828	-47.985	-0.157	(0)
Se(-2)	4.407e-09					
HSe-	4.399e-09	3.066e-09	-8.357	-8.513	-0.157	(0)
H2Se	3.799e-12	3.799e-12	-11.420	-11.420	0.000	(0)
MnSe	3.578e-12	3.578e-12	-11.446	-11.446	0.000	(0)
Se-2	6.143e-17	1.448e-17	-16.212	-16.839	-0.627	(0)
Se(4)	3.916e-07					
HSeO3-	3.658e-07	2.549e-07	-6.437	-6.594	-0.157	(0)
SeO3-2	2.576e-08	6.073e-09	-7.589	-8.217	-0.627	(0)
H2SeO3	1.708e-11	1.708e-11	-10.767	-10.767	0.000	(0)
FeHSeO3+2	6.637e-19	1.565e-19	-18.178	-18.806	-0.627	(0)
Cd(SeO3)2-2	4.131e-19	9.740e-20	-18.384	-19.011	-0.627	(0)
Se(6)	2.660e-21					
SeO4-2	2.644e-21	1.003e-21	-20.578	-20.999	-0.421	(0)
MnSeO4	1.151e-23	1.151e-23	-22.939	-22.939	0.000	(0)
CoSeO4	3.713e-24	3.713e-24	-23.430	-23.430	0.000	(0)
NiSeO4	9.651e-25	9.651e-25	-24.015	-24.015	0.000	(0)
ZnSeO4	1.102e-25	1.102e-25	-24.958	-24.958	0.000	(0)
HSeO4-	1.034e-26	7.204e-27	-25.986	-26.142	-0.157	(0)
CdSeO4	5.664e-28	5.664e-28	-27.247	-27.247	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.323	-45.950	-0.627	(0)
Zn	2.710e-06					
Zn+2	1.869e-06	7.093e-07	-5.728	-6.149	-0.421	(0)
ZnS04	6.431e-07	6.431e-07	-6.192	-6.192	0.000	(0)
Zn(S04)2-2	1.054e-07	2.485e-08	-6.977	-7.605	-0.627	(0)
ZnCl+	7.908e-08	6.116e-08	-7.102	-7.213	-0.112	(0)
ZnOHCl	5.099e-09	5.099e-09	-8.293	-8.293	0.000	(0)
ZnOH+	4.633e-09	3.228e-09	-8.334	-8.491	-0.157	(0)
ZnCl2	2.882e-09	2.882e-09	-8.540	-8.540	0.000	(0)
ZnCl3-	1.030e-10	7.964e-11	-9.987	-10.099	-0.112	(0)
Zn(OH)2	4.296e-11	4.296e-11	-10.367	-10.367	0.000	(0)
ZnCl4-2	3.555e-12	1.364e-12	-11.449	-11.865	-0.416	(0)
Zn(OH)3-	1.910e-14	1.331e-14	-13.719	-13.876	-0.157	(0)
Zn(OH)4-2	1.389e-19	3.275e-20	-18.857	-19.485	-0.627	(0)
ZnSeO4	1.102e-25	1.102e-25	-24.958	-24.958	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-45.323	-45.950	-0.627	(0)
ZnNO3+	0.000e+00	0.000e+00	-53.999	-54.155	-0.157	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-67.847	-68.004	-0.157	(0)
Zn(HS)2	0.000e+00	0.000e+00	-68.783	-68.783	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-103.072	-103.229	-0.157	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-103.284	-103.284	0.000	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-105.793	-106.420	-0.627	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-141.788	-142.416	-0.627	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)
(Co(NH3)5Cl)(NO3)2	-124.25	-117.97	6.27

(Co(NH3)5Cl)Cl2	-28.58	-24.04	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-35.84	-24.04	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-179.51	-161.58	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.79	-20.68	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-28.30	-27.85	0.45	(NH4)2SeO4
Al(OH)3(am)	0.11	11.17	11.06	Al(OH)3
Al2O3	2.08	22.35	20.27	Al2O3
Al4(OH)10SO4	6.05	28.75	22.70	Al4(OH)10SO4
AlOHSO4	-1.54	-4.77	-3.23	AlOHSO4
Alunite	6.42	5.52	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.22	-11.04	-7.82	PbSO4
Anhydrite	-1.05	-5.39	-4.34	CaSO4
Anilite	-13.00	-45.31	-32.31	Cu0.25Cu1.5S
Antlerite	-12.93	-4.14	8.79	Cu3(OH)4SO4
Atacamite	-7.98	-0.37	7.61	Cu2(OH)3Cl
Bianchite	-6.76	-8.52	-1.76	ZnSO4:6H2O
Birnessite	-18.86	-0.77	18.09	MnO2
Bixbyite	-16.79	-17.14	-0.35	Mn2O3
BlaubleiI	-17.05	-41.21	-24.16	Cu0.9Cu0.2S
BlaubleiII	-15.83	-43.10	-27.28	Cu0.6Cu0.8S
Boehmite	2.32	11.17	8.86	AlOOH
Brochantite	-15.91	-0.21	15.71	Cu4(OH)6SO4
Brucite	-6.05	11.07	17.12	Mg(OH)2
Bunsenite	-4.76	7.92	12.68	NiO
Ca3(P04)2(beta)	-2.64	-31.69	-29.05	Ca3(P04)2
Ca4H(P04)3:3H2O	-5.73	-52.81	-47.08	Ca4H(P04)3:3H2O
CaHP04	-1.77	-21.12	-19.35	CaHP04
CaHP04:2H2O	-2.07	-21.12	-19.05	CaHP04:2H2O
Calomel	-14.08	-32.20	-18.13	Hg2Cl2
CaSeO3:2H2O	-5.69	-2.83	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-21.03	-24.03	-3.00	CaSeO4:2H2O
Cd(OH)2	-8.81	5.06	13.87	Cd(OH)2
Cd(OH)2(am)	-8.88	5.06	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-23.42	-16.71	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-23.33	-0.77	22.56	Cd3(OH)4SO4
Cd3(P04)2	-15.57	-48.17	-32.60	Cd3(P04)2
Cd4(OH)6SO4	-24.11	4.29	28.40	Cd4(OH)6SO4
CdCl2	-10.81	-11.42	-0.61	CdCl2
CdCl2:1H2O	-9.75	-11.42	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-9.49	-11.42	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.23	-10.53	13.69	Cd
Cdmetal(gamma)	-24.33	-10.53	13.80	Cd
CdOHCl	-6.79	-3.18	3.61	CdOHCl
CdSe	10.14	-10.24	-20.38	CdSe
CdSeO4:2H2O	-27.67	-29.52	-1.85	CdSeO4:2H2O
CdSO4	-10.84	-10.89	-0.05	CdSO4
CdSO4:1H2O	-9.24	-10.89	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-9.06	-10.89	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.36	-12.01	-2.65	CuSO4:5H2O
Chalcocite	-11.57	-46.89	-35.32	Cu2S
Chalcopyrite	-39.34	-74.97	-35.62	CuFeS2
Cinnabar	-19.95	-66.25	-46.30	HgS
Clausthalite	16.99	-10.40	-27.39	PbSe
Co(OH)2	-4.62	8.47	13.09	Co(OH)2
Co(OH)3	-14.04	-16.13	-2.09	Co(OH)3
Co3(P04)2	-3.23	-37.92	-34.69	Co3(P04)2
Co3O4	-13.55	-23.78	-10.24	Co3O4
CoCl2	-16.46	-8.01	8.46	CoCl2
CoCl2:6H2O	-10.53	-8.01	2.52	CoCl2:6H2O
CoFe2O4	21.21	18.06	-3.15	CoFe2O4
CoHP04	-4.14	-23.20	-19.06	CoHP04
CoO	-5.37	8.47	13.84	CoO
CoS(alpha)	-28.60	-36.04	-7.44	CoS
CoS(beta)	-24.97	-36.04	-11.07	CoS
CoSe	9.37	-6.83	-16.20	CoSe
CoSeO3	-6.23	-4.91	1.32	CoSeO3
CoSeO4:6H2O	-24.58	-26.11	-1.53	CoSeO4:6H2O
CoSO4	-10.46	-7.47	2.99	CoSO4

CoS04:6H2O	-5.00	-7.48	-2.48	CoS04:6H2O
Cotunnite	-6.73	-11.58	-4.84	PbCl2
Covellite	-18.05	-40.58	-22.53	CuS
Cu(OH)2	-4.87	3.93	8.81	Cu(OH)2
Cu2(OH)3NO3	-56.76	-47.34	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.63	-17.68	-46.31	Cu2Se
Cu2S04	-16.42	-18.32	-1.90	Cu2S04
Cu3(P04)2	-14.69	-51.54	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-16.42	-51.54	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.26	-29.04	-64.30	Cu3Se2
Cumetal	-0.06	-8.98	-8.93	Cu
Cu0CuS04	-18.71	-8.07	10.63	Cu0CuS04
Cupricferrite	7.03	13.52	6.49	CuFe204
Cuprite	-1.27	-2.38	-1.11	Cu2O
Cuprousferrite	12.48	3.60	-8.88	CuFe02
CuSe	22.02	-11.37	-33.39	CuSe
CuSe2	22.63	-11.07	-33.70	CuSe2
CuSe03:2H2O	-10.05	-9.45	0.60	CuSe03:2H2O
CuSe04:5H2O	-28.21	-30.65	-2.44	CuSe04:5H2O
CuS04	-15.12	-12.01	3.11	CuS04
Diaspore	4.06	11.17	7.12	Al00H
Djurleite	-12.08	-46.47	-34.40	Cu0.066Cu1.868S
Epsomite	-2.73	-4.88	-2.15	MgS04:7H2O
Fe(OH)2	-3.44	10.13	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	5.36	2.32	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-5.35	-3.80	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H2O	-9.94	-30.56	-20.63	Fe2(Se03)3:2H2O
Fe2(S04)3	-35.09	-38.25	-3.16	Fe2(S04)3
Fe3(OH)8	-0.51	19.71	20.22	Fe3(OH)8
Ferrihydrite	1.42	4.79	3.37	Fe(OH)3
Ferroselite	13.83	-4.88	-18.71	FeSe2
FeS(ppt)	-31.46	-34.39	-2.92	FeS
FeSe	5.83	-5.17	-11.00	FeSe
Galena	-25.45	-39.61	-14.16	PbS
Gibbsite	2.66	11.17	8.52	Al(OH)3
Goethite	4.16	4.79	0.64	Fe00H
Goslarite	-6.48	-8.52	-2.05	ZnS04:7H2O
Greenockite	-24.96	-39.46	-14.49	CdS
Greigite	-113.31	-158.35	-45.03	Fe3S4
Gypsum	-0.78	-5.39	-4.61	CaS04:2H2O
H-Jarosite	-5.97	-17.52	-11.55	(H30)Fe3(S04)2(OH)6
H2S(g)	-36.51	-44.52	-8.01	H2S
H2Se(g)	-10.38	-15.30	-4.92	H2Se
Halite	-4.46	-2.87	1.59	NaCl
Hausmannite	-18.72	43.31	62.03	Mn304
Hematite	10.69	9.58	-1.11	Fe203
Hercynite	8.84	32.48	23.64	FeAl204
Hg(g)	-7.73	-15.66	-7.93	Hg
Hg(OH)2	-18.24	-21.73	-3.50	Hg(OH)2
Hg2(g)	-16.22	-31.32	-15.09	Hg2
Hg2(OH)2	-20.99	-15.73	5.26	Hg2(OH)2
Hg2HP04	-22.62	-47.40	-24.77	Hg2HP04
Hg2S	-48.40	-60.24	-11.84	Hg2S
Hg2Se03	-24.45	-29.11	-4.66	Hg2Se03
Hg2S04	-25.53	-31.67	-6.14	Hg2S04
HgCl(g)	-35.99	-16.10	19.88	HgCl
HgCl2	-16.70	-38.21	-21.52	HgCl2
Hgmetal(l)	-2.01	-15.66	-13.65	Hg
HgSe	18.66	-37.04	-55.69	HgSe
HgSe03	-22.69	-35.12	-12.43	HgSe03
HgS04	-28.22	-37.68	-9.45	HgS04
Hinsdalite	-6.69	-9.19	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	2.08	-42.25	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-7.70	-70.49	-62.79	Pb5(P04)3OH
K-Alum	-11.60	-16.84	-5.24	KAl(S04)2:12H2O
K-Jarosite	0.86	-13.63	-14.49	KFe3(S04)2(OH)6
K2Se04	-26.07	-26.80	-0.73	K2Se04
Langite	-18.09	-0.21	17.88	Cu4(OH)6S04:H2O

Larnakite	-5.75	-6.14	-0.38	PbO:PbSO4
Laurionite	-3.96	-3.34	0.62	PbOHCl
Lepidocrocite	3.42	4.79	1.37	FeOOH
Lime	-22.61	10.55	33.16	CaO
Litharge	-7.95	4.90	12.85	PbO
Mackinawite	-30.79	-34.39	-3.60	FeS
Maghemite	3.20	9.58	6.39	Fe2O3
Magnesioferrite	3.13	20.65	17.52	Fe2MgO4
Magnetite	15.81	19.71	3.90	Fe3O4
Manganite	-8.30	17.04	25.34	MnOOH
Massicot	-8.15	4.90	13.05	PbO
Melanothallite	-18.95	-12.55	6.41	CuCl2
Melanterite	-3.57	-5.82	-2.26	FeSO4:7H2O
Metacinnabar	-20.55	-66.25	-45.70	HgS
Mg(OH)2(active)	-7.73	11.07	18.79	Mg(OH)2
Mg3(P04)2	-6.85	-30.13	-23.28	Mg3(P04)2
MgHP04:3H2O	-2.43	-20.60	-18.18	MgHP04:3H2O
MgSe03:6H2O	-5.36	-2.32	3.04	MgSe03:6H2O
MgSe04:6H2O	-22.31	-23.51	-1.20	MgSe04:6H2O
Minium	-44.22	30.31	74.53	Pb3O4
Mirabilite	-3.91	-5.22	-1.30	Na2SO4:10H2O
Mn2(S04)3	-59.65	-64.97	-5.32	Mn2(S04)3
Mn3(P04)2	-11.77	-35.62	-23.85	Mn3(P04)2
MnCl2:4H2O	-9.98	-7.24	2.74	MnCl2:4H2O
MnHP04	2.97	-22.43	-25.40	MnHP04
MnS(grn)	-35.52	-35.27	0.25	MnS
MnS(pnk)	-38.61	-35.27	3.34	MnS
MnSe	-9.80	-6.06	3.73	MnSe
MnSe03	-5.27	-4.14	1.13	MnSe03
MnSe03:2H2O	-5.11	-4.14	0.96	MnSe03:2H2O
MnSe04:5H2O	-23.29	-25.34	-2.05	MnSe04:5H2O
MnSO4	-9.44	-6.70	2.74	MnSO4
Monteponite	-10.29	5.06	15.35	CdO
Montroydite	-18.19	-21.73	-3.55	HgO
Morenosite	-5.85	-8.03	-2.17	NiSO4:7H2O
Na-Jarosite	-1.31	-12.15	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-12.95	-2.65	10.30	Na2Se03:5H2O
Na2Se04	-25.12	-23.84	1.28	Na2Se04
Nantokite	-2.60	-9.43	-6.83	CuCl
Ni(OH)2	-5.10	7.92	13.02	Ni(OH)2
Ni3(P04)2	-8.27	-39.57	-31.30	Ni3(P04)2
Ni4(OH)6S04	-16.25	15.75	32.00	Ni4(OH)6S04
NiS(alpha)	-30.99	-36.59	-5.60	NiS
NiS(beta)	-25.49	-36.59	-11.10	NiS
NiS(gamma)	-23.79	-36.59	-12.80	NiS
NiSe	10.32	-7.38	-17.70	NiSe
NiSe03:2H2O	-8.35	-5.46	2.89	NiSe03:2H2O
NiSe04:6H2O	-25.14	-26.66	-1.52	NiSe04:6H2O
Nsutite	-18.28	-0.77	17.50	MnO2
O2(g)	-53.26	31.19	84.45	O2
Pb(OH)2	-3.39	4.90	8.29	Pb(OH)2
Pb2(OH)3Cl	-7.22	1.57	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-16.38	9.81	26.19	Pb2O(OH)2
Pb2O3	-35.64	25.40	61.04	Pb2O3
Pb3(P04)2	-5.10	-48.63	-43.53	Pb3(P04)2
Pb3O2S04	-12.11	-1.23	10.87	Pb3O2S04
Pb4(OH)6S04	-17.43	3.67	21.10	Pb4(OH)6S04
Pb4O3S04	-18.53	3.67	22.20	Pb4O3S04
PbHP04	-2.96	-26.77	-23.81	PbHP04
Pbmetal	-14.93	-10.69	4.24	Pb
PbO:0.3H2O	-8.08	4.90	12.98	PbO:0.33H2O
PbSe04	-22.80	-29.67	-6.88	PbSe04
Periclase	-10.87	11.07	21.94	MgO
Plattnerite	-29.81	20.50	50.31	PbO2
Plumbgummite	7.87	-24.92	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-12.56	10.55	23.11	Ca(OH)2
Pyrite	-44.68	-63.31	-18.63	FeS2
Pyrochroite	-6.19	9.24	15.43	Mn(OH)2

Pyrolusite	-17.19	24.83	42.03	MnO2
Pyromorphite	5.70	-78.73	-84.43	Pb5(P04)3Cl
Retgersite	-5.98	-8.03	-2.05	NiS04:6H2O
Semetal(am)	7.43	0.29	-7.14	Se
Semetal(hex)	8.04	0.29	-7.75	Se
SeO2	-13.50	-13.38	0.12	SeO2
SeO3	-55.97	-34.58	21.39	SeO3
Sphalerite	-25.57	-37.09	-11.52	ZnS
Spinel	-4.35	33.42	37.77	MgAl2O4
Strengite	-0.50	-26.88	-26.38	FeP04:2H2O
Sulfur	-26.82	-28.92	-2.11	S
Tenorite	-3.86	3.94	7.80	CuO
Thenardite	-5.55	-5.21	0.34	Na2S04
Tsumebite	-8.14	-17.93	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	3.04	-32.96	-36.00	Fe3(P04)2:8H2O
Wurtzite	-28.09	-37.09	-9.00	ZnS
Zincite	-4.12	7.43	11.55	ZnO
Zincosite	-12.64	-8.52	4.13	ZnS04
Zn(N03)2:6H2O	-106.25	-102.99	3.26	Zn(N03)2:6H2O
Zn(OH)2	-4.77	7.43	12.20	Zn(OH)2
Zn(OH)2(am)	-5.24	7.43	12.67	Zn(OH)2
Zn(OH)2(beta)	-4.53	7.43	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-4.30	7.43	11.73	Zn(OH)2
Zn(OH)2(gamma)	-4.31	7.43	11.73	Zn(OH)2
Zn2(OH)2S04	-8.59	-1.09	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-8.58	6.61	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-5.64	-41.06	-35.42	Zn3(P04)2:4H2O
Zn3O(S04)2	-29.13	-9.61	19.53	Zn3O(S04)2
Zn4(OH)6S04	-14.64	13.76	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-17.84	20.66	38.50	Zn5(OH)8Cl2
ZnCl2	-16.27	-9.05	7.22	ZnCl2
Znmetal	-34.32	-8.17	26.15	Zn
ZnO(active)	-3.97	7.43	11.40	ZnO
ZnS(am)	-28.00	-37.09	-9.09	ZnS
ZnSe	6.59	-7.87	-14.46	ZnSe
ZnSeO4:6H2O	-25.63	-27.15	-1.52	ZnSeO4:6H2O
ZnS04:1H2O	-7.98	-8.52	-0.53	ZnS04:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 11.

End of Run after 0.663 Seconds.

Input file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\Phase II\PHREEQC\Mixing
 \Kanmantoo Scenario 2a mixing worst case OCT19.pqi
 Output file: C:\Users\rebecca.fraser\Projects\Valenza\Kanmantoo\Phase II\PHREEQC\Mixing
 \Kanmantoo Scenario 2a mixing worst case OCT19.pqi
 Database file: C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
 \minteq.v4.dat

 Reading data base.

SOLUTION_MASTER_SPECIES
 SOLUTION_SPECIES
 SOLUTION_SPECIES
 PHASES
 PHASES
 SURFACE_MASTER_SPECIES
 SURFACE_SPECIES
 END

 Reading input data for simulation 1.

DATABASE C:\Program Files (x86)\USGS\Phreeqc Interactive 3.3.12-12704\database
 \minteq.v4.dat
 SELECTED_OUTPUT 1
 file Kanmantoo Scenario 2 mixing worst case OCT19.sel
 totals Al As Be Ba B Co Cd Cr Cu Fe Mn Mo Pb Se Ni Zn N P Ca Mg
 Na K Alkalinity Cl S(6) Hg
 SOLUTION_MASTER_SPECIES
 Co Co+3 -1.0 Co 58.9332
 Co(2) Co+2 0.0 Co
 Co(3) Co+3 -1.0 Co
 END

 End of simulation.

 Reading input data for simulation 2.

PHASES
 CoO
 CoO + 2H+ = Co+2 + H2O
 log_k 13.5864
 delta_h -106.295 kJ
 Co(OH)2
 Co(OH)2 + 2H+ = Co+2 + 2H2O
 log_k 13.094
 delta_h -0 kJ
 Co(OH)3
 Co(OH)3 + 3H+ = Co+3 + 3H2O
 log_k -2.309
 delta_h -92.43 kJ
 Co3O4
 Co3O4 + 8H+ = Co+2 + 2Co+3 + 4H2O
 log_k -10.4956
 delta_h -107.5 kJ
 CoFe2O4
 CoFe2O4 + 8H+ = Co+2 + 2Fe+3 + 4H2O
 log_k -3.5281
 delta_h -158.82 kJ
 CoCl2
 CoCl2 = Co+2 + 2Cl-
 log_k 8.2672
 delta_h -79.815 kJ
 CoCl2:6H2O

```

      CoCl2:6H2O = Co+2 + 2Cl- + 6H2O
      log_k 2.5365
      delta_h      8.0598      kJ
(Co(NH3)6)Cl3
      (Co(NH3)6)Cl3 + 6H+ = Co+3 + 6NH4+ + 3Cl-
      log_k 20.0317
      delta_h      -33.1 kJ
(Co(NH3)5OH2)Cl3
      (Co(NH3)5OH2)Cl3 + 5H+ = Co+3 + 5NH4+ + 3Cl- + H2O
      log_k 11.7351
      delta_h      -25.37      kJ
(Co(NH3)5Cl)Cl2
      (Co(NH3)5Cl)Cl2 + 5H+ = Co+3 + 5NH4+ + 3Cl-
      log_k 4.5102
      delta_h      -10.74      kJ
CoCO3
      CoCO3 = Co+2 + CO3-2
      log_k -9.98
      delta_h      -12.7612    kJ
CoSO4
      CoSO4 = Co+2 + SO4-2
      log_k 2.8024
      delta_h      -79.277     kJ
CoSO4:6H2O
      CoSO4:6H2O = Co+2 + SO4-2 + 6H2O
      log_k -2.4726
      delta_h      1.0801      kJ
END

```

```

-----
End of simulation.
-----

```

```

-----
Reading input data for simulation 3.
-----

```

SOLUTION 1 #Groundwater worst case maximum values

```

temp      21
pH         5.05
pe         1
redox      pe
units      mg/l
density    1
Al         5.21
Alkalinity 0
As         0
Ba         0
Be         0
B          0
Cd         0.04
Co         24.2
Cr         0
Cu         9.29
Fe         937
Pb         0.01
Mn         171
Mo         0
V          0
Zn         1.78
Se         0.08
Ni         5.57
N          60
P          23.6
Ca         590
Mg         1340
Na         5880
K          216
Cl         9420

```

S(6) 9110
 Hg 0.0004
 water 1 # kg
 REACTION 1
 H2O -1
 40
 END # Time-step 1

 Beginning of initial solution calculations.

Initial solution 1.

-----Solution composition-----

Elements	Molality	Moles
Al	1.986e-04	1.986e-04
Ca	1.514e-02	1.514e-02
Cd	3.660e-07	3.660e-07
Cl	2.733e-01	2.733e-01
Co	4.224e-04	4.224e-04
Cu	1.504e-04	1.504e-04
Fe	1.726e-02	1.726e-02
Hg	2.051e-09	2.051e-09
K	5.682e-03	5.682e-03
Mg	5.671e-02	5.671e-02
Mn	3.202e-03	3.202e-03
N	4.406e-03	4.406e-03
Na	2.631e-01	2.631e-01
Ni	9.762e-05	9.762e-05
P	7.837e-04	7.837e-04
Pb	4.964e-08	4.964e-08
S(6)	9.754e-02	9.754e-02
Se	1.042e-06	1.042e-06
Zn	2.800e-05	2.800e-05

-----Description of solution-----

pH	=	5.050
pe	=	1.000
Activity of water	=	0.988
Ionic strength (mol/kgw)	=	4.862e-01
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	1.381e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	21.00
Electrical balance (eq)	=	-9.552e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.26
Iterations	=	14
Total H	=	1.110329e+02
Total O	=	5.590014e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.214e-05	8.913e-06	-4.916	-5.050	-0.134	0.00
OH-	1.292e-09	8.222e-10	-8.889	-9.085	-0.196	(0)
H2O	5.551e+01	9.883e-01	1.744	-0.005	0.000	18.05
Al	1.986e-04					
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Al+3	1.839e-05	1.139e-06	-4.735	-5.943	-1.208	(0)
AlOH+2	4.197e-06	9.786e-07	-5.377	-6.009	-0.632	(0)
Al(OH)2+	1.624e-06	1.128e-06	-5.790	-5.948	-0.158	(0)

	Al(OH)3	2.514e-08	2.514e-08	-7.600	-7.600	0.000	(0)
	Al(OH)4-	2.040e-09	1.366e-09	-8.690	-8.864	-0.174	(0)
Ca		1.514e-02					
	Ca+2	8.161e-03	2.370e-03	-2.088	-2.625	-0.537	(0)
	CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
	CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
	CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
	CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
	CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
	CaOH+	5.236e-11	3.715e-11	-10.281	-10.430	-0.149	(0)
	Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
	CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
Cd		3.660e-07					
	CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
	CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
	Cd(SO4)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
	CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
	Cd+2	1.502e-08	4.363e-09	-7.823	-8.360	-0.537	(0)
	CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
	CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
	CdOH+	6.462e-14	2.865e-14	-13.190	-13.543	-0.353	(0)
	Cd2OH+3	9.945e-19	6.582e-22	-18.002	-21.182	-3.179	(0)
	Cd(OH)2	2.726e-19	2.726e-19	-18.564	-18.564	0.000	(0)
	Cd(OH)3-	4.195e-26	1.860e-26	-25.377	-25.730	-0.353	(0)
	Cd(OH)4-2	8.799e-35	3.400e-36	-34.056	-35.469	-1.413	(0)
	Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
	CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
	CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cl		2.733e-01					
	Cl-	2.729e-01	2.003e-01	-0.564	-0.698	-0.134	(0)
	CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
	MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
	CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
	CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
	NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
	MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
	CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
	ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
	MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
	ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
	CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
	CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
	ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
	CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
	PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
	ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
	NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
	PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
	ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
	PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
	PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
	CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
	CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
	CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
	FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
	CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
	HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
	FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
	HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
	HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
	FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
	CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
	HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
	HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
	CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
	Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)

Co(2)	4.224e-04					
Co+2	3.644e-04	1.408e-05	-3.438	-4.851	-1.413	(0)
CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CoHP04	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CoOH+	7.075e-10	3.137e-10	-9.150	-9.504	-0.353	(0)
Co2OH+3	3.344e-13	2.213e-16	-12.476	-15.655	-3.179	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Co(OH)2	2.782e-14	2.782e-14	-13.556	-13.556	0.000	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Co(OH)3-	1.398e-21	6.199e-22	-20.854	-21.208	-0.353	(0)
CoOOH-	8.505e-23	3.771e-23	-22.070	-22.424	-0.353	(0)
Co4(OH)4+4	8.668e-25	1.932e-30	-24.062	-29.714	-5.652	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
Co(OH)4-2	2.839e-30	1.097e-31	-29.547	-30.960	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Co(3)	8.287e-32					
CoOH+2	8.232e-32	3.180e-33	-31.085	-32.498	-1.413	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co+3	9.049e-36	5.605e-37	-35.043	-36.251	-1.208	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
Cu(1)	1.504e-04					
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
Cu+	1.823e-08	8.082e-09	-7.739	-8.092	-0.353	(0)
Cu(2)	1.182e-09					
Cu+2	5.900e-10	1.714e-10	-9.229	-9.766	-0.537	(0)
CuSO4	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
CuOH+	7.604e-13	4.972e-13	-12.119	-12.303	-0.185	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
Cu(OH)2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
Cu2(OH)2+2	1.564e-19	6.042e-21	-18.806	-20.219	-1.413	(0)
Cu(OH)3-	6.965e-22	3.088e-22	-21.157	-21.510	-0.353	(0)
Cu(OH)4-2	7.024e-29	2.714e-30	-28.153	-29.566	-1.413	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Fe(2)	1.726e-02					
Fe+2	1.529e-02	5.907e-04	-1.816	-3.229	-1.413	(0)
FeSO4	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
FeHP04	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
FeOH+	2.826e-08	1.934e-08	-7.549	-7.714	-0.165	(0)
Fe(OH)2	1.209e-14	1.209e-14	-13.918	-13.918	0.000	(0)
Fe(OH)3-	6.009e-18	4.111e-18	-17.221	-17.386	-0.165	(0)
Fe(3)	2.087e-10					
Fe(OH)2+	1.957e-10	1.360e-10	-9.708	-9.867	-0.158	(0)
FeHP04+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
FeOH+2	1.136e-12	2.489e-13	-11.945	-12.604	-0.659	(0)
Fe(OH)3	9.228e-14	9.228e-14	-13.035	-13.035	0.000	(0)
FeSO4+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(SO4)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)

Fe+3	7.010e-15	4.342e-16	-14.154	-15.362	-1.208	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
Fe(OH)4-	2.440e-17	1.696e-17	-16.613	-16.771	-0.158	(0)
Fe2(OH)2+4	1.061e-18	2.365e-24	-17.974	-23.626	-5.652	(0)
Fe3(OH)4+5	3.023e-24	4.459e-33	-23.520	-32.351	-8.831	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
H(0)	1.047e-15					
H2	5.235e-16	5.855e-16	-15.281	-15.232	0.049	(0)
Hg(0)	2.051e-09					
Hg	2.051e-09	2.051e-09	-8.688	-8.688	0.000	(0)
Hg(1)	9.698e-28					
Hg2+2	4.849e-28	1.874e-29	-27.314	-28.727	-1.413	(0)
Hg(2)	4.726e-15					
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Hg(OH)2	1.022e-25	1.143e-25	-24.991	-24.942	0.049	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
HgOH+	1.615e-27	7.162e-28	-26.792	-27.145	-0.353	(0)
Hg+2	4.674e-28	1.806e-29	-27.330	-28.743	-1.413	(0)
HgSO4	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Hg(OH)3-	3.623e-35	1.606e-35	-34.441	-34.794	-0.353	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
K	5.682e-03					
K+	5.178e-03	3.801e-03	-2.286	-2.420	-0.134	(0)
KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
Mg	5.671e-02					
Mg+2	3.360e-02	9.758e-03	-1.474	-2.011	-0.537	(0)
MgSO4	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
MgHPO4	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
MgOH+	4.148e-09	2.990e-09	-8.382	-8.524	-0.142	(0)
MgPO4-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
Mn(2)	3.202e-03					
Mn+2	2.899e-03	1.120e-04	-2.538	-3.951	-1.413	(0)
MnSO4	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
MnOH+	3.381e-10	2.313e-10	-9.471	-9.636	-0.165	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Mn(OH)3-	3.538e-24	2.421e-24	-23.451	-23.616	-0.165	(0)
Mn(OH)4-2	3.983e-32	8.727e-33	-31.400	-32.059	-0.659	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Mn(3)	4.471e-28					
Mn+3	4.471e-28	2.769e-29	-27.350	-28.558	-1.208	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-79.028	-79.687	-0.659	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-88.115	-88.325	-0.210	(0)
N(-3)	4.406e-03					
NH4+	3.919e-03	2.335e-03	-2.407	-2.632	-0.225	(0)
NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
NH3	1.123e-07	1.123e-07	-6.950	-6.950	0.000	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)

CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
N(3)	0.000e+00					
N02-	0.000e+00	0.000e+00	-47.968	-48.177	-0.210	(0)
CoN02+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CuN02+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
Cu(N02)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-64.954	-65.088	-0.134	(0)
CaN03+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
MnN03+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
NiN03+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
CoN03+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
ZnN03+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
CdN03+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
PbN03+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
CuN03+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
FeN03+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
HgN03+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Mn(N03)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
Na	2.631e-01					
Na+	2.447e-01	1.796e-01	-0.611	-0.746	-0.134	(0)
NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
NaHP04-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
Ni	9.762e-05					
Ni+2	4.671e-05	1.357e-05	-4.331	-4.867	-0.537	(0)
NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
Ni(SO4)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
NiOH+	3.238e-10	1.435e-10	-9.490	-9.843	-0.353	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Ni(OH)2	1.692e-14	1.692e-14	-13.772	-13.772	0.000	(0)
Ni(OH)3-	4.261e-20	1.889e-20	-19.371	-19.724	-0.353	(0)
NiSe04	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-63.001	-62.952	0.049	(0)
P	7.837e-04					
H2P04-	4.270e-04	2.967e-04	-3.370	-3.528	-0.158	(0)
MgH2P04+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
FeH2P04+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
CaH2P04+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
MgHP04	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
HP04-2	9.473e-06	2.076e-06	-5.024	-5.683	-0.659	(0)
NaHP04-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
FeHP04	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
CaHP04	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)

H3P04	3.560e-07	3.560e-07	-6.449	-6.449	0.000	(0)
KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
CoHP04	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
CaP04-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
MgP04-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
FeHP04+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
P04-3	1.460e-12	9.045e-14	-11.836	-13.044	-1.208	(0)
FeH2P04+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Pb	4.964e-08					
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
Pb(S04)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
PbS04	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
Pb+2	3.636e-09	1.056e-09	-8.439	-8.976	-0.537	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
PbOH+	6.682e-12	2.963e-12	-11.175	-11.528	-0.353	(0)
Pb(OH)2	1.046e-16	1.046e-16	-15.980	-15.980	0.000	(0)
Pb2OH+3	7.494e-17	4.960e-20	-16.125	-19.305	-3.179	(0)
Pb(OH)3-	2.635e-22	1.168e-22	-21.579	-21.933	-0.353	(0)
Pb(OH)4-2	8.268e-28	3.195e-29	-27.083	-28.496	-1.413	(0)
Pb3(OH)4+2	3.173e-30	1.226e-31	-29.499	-30.912	-1.413	(0)
Pb4(OH)4+4	5.352e-31	1.193e-36	-30.271	-35.923	-5.652	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
S(6)	9.754e-02					
S04-2	4.586e-02	1.332e-02	-1.339	-1.875	-0.537	(0)
MgS04	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
NaS04-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
CaS04	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
FeS04	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
NH4S04-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
MnS04	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
AlS04+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
CoS04	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
NiS04	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
Al(S04)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Zn(S04)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
HS04-	1.536e-05	1.028e-05	-4.814	-4.988	-0.174	(0)
ZnS04	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
Ni(S04)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
Cd(S04)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
Pb(S04)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
CdS04	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
PbS04	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
CuS04	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
FeS04+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(S04)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
HgS04	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Se(-2)	1.042e-06					
HSe-	1.012e-06	4.485e-07	-5.995	-6.348	-0.353	(0)
H2Se	3.047e-08	3.047e-08	-7.516	-7.516	0.000	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Se-2	1.000e-15	3.865e-17	-15.000	-16.413	-1.413	(0)
Se(4)	2.708e-15					
HSeO3-	2.690e-15	1.193e-15	-14.570	-14.923	-0.353	(0)
SeO3-2	1.341e-17	5.183e-19	-16.872	-18.285	-1.413	(0)
H2SeO3	4.383e-18	4.383e-18	-17.358	-17.358	0.000	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
Se(6)	9.467e-35					
SeO4-2	9.354e-35	2.717e-35	-34.029	-34.566	-0.537	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
HSeO4-	2.413e-38	1.070e-38	-37.617	-37.971	-0.353	(0)

	ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
	CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
	Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn		2.800e-05					
	Zn(SO4)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
	Zn+2	6.051e-06	1.758e-06	-5.218	-5.755	-0.537	(0)
	ZnSO4	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
	ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
	ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
	ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
	ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
	ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
	ZnOH+	3.259e-10	1.445e-10	-9.487	-9.840	-0.353	(0)
	Zn(OH)2	3.473e-14	3.473e-14	-13.459	-13.459	0.000	(0)
	Zn(OH)3-	4.384e-19	1.944e-19	-18.358	-18.711	-0.353	(0)
	Zn(OH)4-2	2.236e-25	8.641e-27	-24.650	-26.063	-1.413	(0)
	ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
	ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
	Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
	Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-161.31	-155.03	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-30.79	-26.25	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-38.05	-26.26	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-234.94	-217.01	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-43.95	-23.84	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-40.28	-39.83	0.45	(NH4)2SeO4
Al(OH)3(am)	-1.87	9.19	11.06	Al(OH)3
Al2O3	-1.87	18.40	20.27	Al2O3
Al4(OH)10SO4	2.10	24.80	22.70	Al4(OH)10SO4
AlOHSO4	0.46	-2.77	-3.23	AlOHSO4
Alunite	7.17	6.27	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.03	-10.85	-7.82	PbSO4
Anhydrite	-0.16	-4.50	-4.34	CaSO4
Antlerite	-19.78	-10.99	8.79	Cu3(OH)4SO4
Atacamite	-12.71	-5.10	7.61	Cu2(OH)3Cl
Bianchite	-5.90	-7.66	-1.76	ZnSO4:6H2O
Birnessite	-25.46	-7.37	18.09	MnO2
Bixbyite	-26.48	-26.83	-0.35	Mn2O3
Boehmite	0.34	9.20	8.86	AlOOH
Brochantite	-26.38	-10.67	15.71	Cu4(OH)6SO4
Brucite	-9.04	8.08	17.12	Mg(OH)2
Bunsenite	-7.46	5.23	12.68	NiO
Ca3(PO4)2(beta)	-4.91	-33.96	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-7.62	-54.70	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.37	-20.72	-19.35	CaHP04
CaHP04:2H2O	-1.68	-20.73	-19.05	CaHP04:2H2O
Calomel	-11.99	-30.12	-18.13	Hg2Cl2
CaSeO3:2H2O	-15.37	-12.51	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-34.20	-37.20	-3.00	CaSeO4:2H2O
Cd(OH)2	-12.14	1.73	13.87	Cd(OH)2
Cd(OH)2(am)	-12.21	1.73	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-25.45	-18.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-29.34	-6.78	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-18.57	-51.17	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-33.45	-5.05	28.40	Cd4(OH)6SO4
CdCl2	-9.14	-9.76	-0.61	CdCl2
CdCl2:1H2O	-8.09	-9.76	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-7.84	-9.77	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.05	-10.36	13.69	Cd
Cdmetal(gamma)	-24.16	-10.36	13.80	Cd
CdOHCl	-7.62	-4.01	3.61	CdOHCl
CdSe	10.72	-9.66	-20.38	CdSe
CdSeO4:2H2O	-41.09	-42.94	-1.85	CdSeO4:2H2O

CdSO4	-10.19	-10.24	-0.05	CdSO4
CdSO4:1H2O	-8.59	-10.24	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-8.42	-10.25	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.01	-11.67	-2.65	CuSO4:5H2O
Clausthalite	17.11	-10.27	-27.39	PbSe
Co(OH)2	-7.86	5.24	13.09	Co(OH)2
Co(OH)3	-19.03	-21.12	-2.09	Co(OH)3
Co3(P04)2	-5.95	-40.64	-34.69	Co3(P04)2
Co3O4	-26.74	-36.97	-10.24	Co3O4
CoCl2	-14.71	-6.25	8.46	CoCl2
CoCl2:6H2O	-8.80	-6.28	2.52	CoCl2:6H2O
CoFe2O4	7.95	4.80	-3.15	CoFe2O4
CoHP04	-3.88	-22.95	-19.06	CoHP04
CoO	-8.60	5.24	13.84	CoO
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-16.04	-14.72	1.32	CoSeO3
CoSeO4:6H2O	-37.92	-39.45	-1.53	CoSeO4:6H2O
CoSO4	-9.72	-6.73	2.99	CoSO4
CoSO4:6H2O	-4.28	-6.76	-2.48	CoSO4:6H2O
Cotunnite	-5.53	-10.37	-4.84	PbCl2
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.91	-69.49	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.83	-17.48	-46.31	Cu2Se
Cu2SO4	-16.16	-18.06	-1.90	Cu2SO4
Cu3(P04)2	-18.54	-55.39	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-20.28	-55.40	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.75	-28.55	-64.30	Cu3Se2
Cumetal	-0.17	-9.09	-8.93	Cu
CuOCuSO4	-21.94	-11.31	10.63	CuOCuSO4
Cupricferrite	-6.60	-0.11	6.49	CuFe2O4
Cuprite	-4.98	-6.09	-1.11	Cu2O
Cuprousferrite	5.61	-3.27	-8.88	CuFeO2
CuSe	22.32	-11.06	-33.39	CuSe
CuSe2	23.34	-10.36	-33.70	CuSe2
CuSeO3:2H2O	-20.25	-19.65	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-41.92	-44.36	-2.44	CuSeO4:5H2O
CuSO4	-14.76	-11.64	3.11	CuSO4
Diaspore	2.08	9.20	7.12	AlOOH
Epsomite	-1.77	-3.92	-2.15	MgSO4:7H2O
Fe(OH)2	-6.70	6.86	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.09	-1.95	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-21.97	-20.42	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-39.73	-60.36	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-33.19	-36.35	-3.16	Fe2(SO4)3
Fe3(OH)8	-13.82	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.59	-0.23	3.37	Fe(OH)3
Ferroselite	14.88	-3.83	-18.71	FeSe2
FeSe	6.48	-4.53	-11.00	FeSe
Gibbsite	0.67	9.19	8.52	Al(OH)3
Goethite	-0.86	-0.22	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4:7H2O
Gypsum	0.10	-4.51	-4.61	CaSO4:2H2O
H-Jarosite	-13.07	-24.62	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-6.47	-11.40	-4.92	H2Se
Halite	-3.04	-1.44	1.59	NaCl
Hausmannite	-31.51	30.53	62.03	Mn3O4
Hematite	0.67	-0.44	-1.11	Fe2O3
Hercynite	1.62	25.26	23.64	FeAl2O4
Hg(g)	-7.44	-15.36	-7.93	Hg
Hg(OH)2	-21.45	-24.94	-3.50	Hg(OH)2
Hg2(g)	-15.63	-30.73	-15.09	Hg2
Hg2(OH)2	-23.90	-18.64	5.26	Hg2(OH)2
Hg2HP04	-22.05	-46.82	-24.77	Hg2HP04
Hg2SeO3	-33.94	-38.60	-4.66	Hg2SeO3
Hg2SO4	-24.46	-30.60	-6.14	Hg2SO4
HgCl(g)	-34.94	-15.06	19.88	HgCl
HgCl2	-14.91	-36.43	-21.52	HgCl2
Hgmetal(l)	-1.71	-15.36	-13.65	Hg

HgSe	19.36	-36.33	-55.69	HgSe
HgSeO3	-32.48	-44.91	-12.43	HgSeO3
HgSO4	-27.45	-36.91	-9.45	HgSO4
Hinsdalite	-8.96	-11.46	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	-2.88	-47.21	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-16.18	-78.97	-62.79	Pb5(P04)3OH
K-Alum	-6.93	-12.18	-5.24	KAl(S04)2:12H2O
K-Jarosite	-7.50	-21.99	-14.49	KFe3(S04)2(OH)6
K2SeO4	-38.68	-39.41	-0.73	K2SeO4
Langite	-28.56	-10.68	17.88	Cu4(OH)6S04:H2O
Larnakite	-9.35	-9.73	-0.38	Pb0:PbS04
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.59	-0.22	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.73	1.12	12.85	PbO
Maghemite	-6.83	-0.44	6.39	Fe2O3
Magnesioferrite	-9.88	7.64	17.52	Fe2MgO4
Magnetite	2.53	6.43	3.90	Fe3O4
Manganite	-13.15	12.19	25.34	MnOOH
Massicot	-11.93	1.12	13.05	PbO
Melanothallite	-17.57	-11.16	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeS04:7H2O
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(P04)2	-8.84	-32.12	-23.28	Mg3(P04)2
MgHP04:3H2O	-1.94	-20.12	-18.18	MgHP04:3H2O
MgSeO3:6H2O	-14.96	-11.91	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-35.41	-36.61	-1.20	MgSeO4:6H2O
Minium	-59.08	15.45	74.53	Pb3O4
Mirabilite	-2.11	-3.42	-1.30	Na2S04:10H2O
Mn2(S04)3	-57.42	-62.74	-5.32	Mn2(S04)3
Mn3(P04)2	-14.09	-37.94	-23.85	Mn3(P04)2
MnCl2:4H2O	-8.11	-5.37	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnSe	-8.98	-5.25	3.73	MnSe
MnSeO3	-14.95	-13.82	1.13	MnSeO3
MnSeO3:2H2O	-14.80	-13.83	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-36.49	-38.54	-2.05	MnSeO4:5H2O
MnSO4	-8.56	-5.83	2.74	MnSO4
Monteponite	-13.62	1.73	15.35	CdO
Montroydite	-21.39	-24.94	-3.55	HgO
Morenosite	-4.60	-6.78	-2.17	NiS04:7H2O
Na-Jarosite	-9.47	-20.31	-10.84	NaFe3(S04)2(OH)6
Na2SeO3:5H2O	-21.69	-11.39	10.30	Na2SeO3:5H2O
Na2SeO4	-37.34	-36.06	1.28	Na2SeO4
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(P04)2	-9.39	-40.69	-31.30	Ni3(P04)2
Ni4(OH)6S04	-23.08	8.92	32.00	Ni4(OH)6S04
NiSe	11.53	-6.17	-17.70	NiSe
NiSeO3:2H2O	-17.64	-14.75	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-37.94	-39.46	-1.52	NiSeO4:6H2O
Nsutite	-24.87	-7.37	17.50	MnO2
O2(g)	-60.26	24.19	84.45	O2
Pb(OH)2	-7.18	1.11	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.31	-3.52	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-23.96	2.23	26.19	Pb2O(OH)2
Pb2O3	-46.71	14.33	61.04	Pb2O3
Pb3(P04)2	-9.49	-53.02	-43.53	Pb3(P04)2
Pb3O2S04	-19.49	-8.61	10.87	Pb3O2S04
Pb4(OH)6S04	-28.61	-7.51	21.10	Pb4(OH)6S04
Pb4O3S04	-29.70	-7.50	22.20	Pb4O3S04
PbHP04	-3.26	-27.07	-23.81	PbHP04
Pbmetal	-15.22	-10.98	4.24	Pb
PbO:0.3H2O	-11.86	1.12	12.98	PbO:0.33H2O
PbSeO4	-36.67	-43.54	-6.88	PbSeO4
Periclase	-13.86	8.08	21.94	MgO
Plattnerite	-37.09	13.21	50.31	PbO2
Plumbgummite	5.12	-27.67	-32.79	PbAl3(P04)2(OH)5:H2O

Portlandite	-15.65	7.46	23.11	Ca(OH)2
Pyrochroite	-9.29	6.14	15.43	Mn(OH)2
Pyrolusite	-23.79	18.24	42.03	MnO2
Pyromorphite	-0.28	-84.71	-84.43	Pb5(P04)3Cl
Retgersite	-4.72	-6.77	-2.05	NiSO4:6H2O
Semetal(am)	7.84	0.70	-7.14	Se
Semetal(hex	8.45	0.70	-7.75	Se
SeO2	-20.09	-19.97	0.12	SeO2
SeO3	-66.05	-44.66	21.39	SeO3
Spinel	-11.29	26.48	37.77	MgAl2O4
Strengite	-2.04	-28.42	-26.38	FePO4:2H2O
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.71	-3.37	0.34	Na2SO4
Tsumebite	-15.85	-25.64	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	0.19	-35.81	-36.00	Fe3(P04)2:8H2O
Zincite	-7.21	4.34	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnSO4
Zn(NO3)2:6H2O	-139.22	-135.96	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-7.87	4.33	12.20	Zn(OH)2
Zn(OH)2(am)	-8.33	4.33	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.62	4.33	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.39	4.33	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.40	4.33	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.80	-3.30	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.26	2.93	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-7.95	-43.37	-35.42	Zn3(P04)2:4H2O
Zn3O(SO4)2	-30.45	-10.92	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-23.03	5.37	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-28.31	10.19	38.50	Zn5(OH)8Cl2
ZnCl2	-14.37	-7.15	7.22	ZnCl2
Znmetal	-33.91	-7.76	26.15	Zn
ZnO(active)	-7.06	4.34	11.40	ZnO
ZnSe	7.41	-7.05	-14.46	ZnSe
ZnSeO4:6H2O	-38.83	-40.35	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.10	-7.64	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using solution 1.

Using reaction 1.

Reaction 1.

4.000e+01 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000
Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	7.109e-04	1.986e-04
Ca	5.420e-02	1.514e-02

Cd	1.310e-06	3.660e-07
Cl	9.783e-01	2.733e-01
Co	1.512e-03	4.224e-04
Cu	5.383e-04	1.504e-04
Fe	6.177e-02	1.726e-02
Hg	7.342e-09	2.051e-09
K	2.034e-02	5.682e-03
Mg	2.030e-01	5.671e-02
Mn	1.146e-02	3.202e-03
N	1.577e-02	4.406e-03
Na	9.417e-01	2.631e-01
Ni	3.494e-04	9.762e-05
P	2.805e-03	7.837e-04
Pb	1.777e-07	4.964e-08
S	3.492e-01	9.754e-02
Se	3.730e-06	1.042e-06
Zn	1.002e-04	2.800e-05

-----Description of solution-----

pH	=	4.809	Charge balance
pe	=	1.835	Adjusted to redox equilibrium
Activity of water	=	0.960	
Ionic strength (mol/kgw)	=	1.365e+00	
Mass of water (kg)	=	2.794e-01	
Total alkalinity (eq/kg)	=	4.944e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	-9.552e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.46	
Iterations	=	11	
Total H	=	3.103286e+01	
Total O	=	1.590014e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.805e-05	1.552e-05	-4.744	-4.809	-0.065	0.00
OH-	8.211e-10	4.587e-10	-9.086	-9.338	-0.253	(0)
H2O	5.551e+01	9.604e-01	1.744	-0.018	0.000	18.05
Al	7.109e-04					
AlSO4+	5.541e-04	3.360e-04	-3.256	-3.474	-0.217	(0)
Al(SO4)2-	1.400e-04	8.486e-05	-3.854	-4.071	-0.217	(0)
Al+3	9.081e-06	2.339e-06	-5.042	-5.631	-0.589	(0)
AlOH+2	6.624e-06	1.121e-06	-5.179	-5.950	-0.772	(0)
Al(OH)2+	1.124e-06	7.210e-07	-5.949	-6.142	-0.193	(0)
Al(OH)3	8.962e-09	8.962e-09	-8.048	-8.048	0.000	(0)
Al(OH)4-	4.482e-10	2.717e-10	-9.349	-9.566	-0.217	(0)
Ca	5.420e-02					
CaSO4	3.903e-02	3.903e-02	-1.409	-1.409	0.000	(0)
Ca+2	1.500e-02	8.209e-03	-1.824	-2.086	-0.262	(0)
CaH2PO4+	1.605e-04	1.029e-04	-3.795	-3.987	-0.193	(0)
CaHPO4	8.442e-06	8.442e-06	-5.074	-5.074	0.000	(0)
CaNH3+2	5.878e-07	2.520e-09	-6.231	-8.599	-2.368	(0)
CaPO4-	2.067e-09	1.326e-09	-8.685	-8.878	-0.193	(0)
CaOH+	1.085e-10	7.178e-11	-9.965	-10.144	-0.179	(0)
Ca(NH3)2+2	5.707e-14	2.447e-16	-13.244	-15.611	-2.368	(0)
CaNO3+	0.000e+00	0.000e+00	-61.383	-61.975	-0.592	(0)
Cd	1.310e-06					
CdCl3-	4.845e-07	1.240e-07	-6.315	-6.907	-0.592	(0)
Cd(SO4)2-2	3.024e-07	1.296e-09	-6.519	-8.887	-2.368	(0)
CdCl+	2.744e-07	7.021e-08	-6.562	-7.154	-0.592	(0)
CdCl2	2.431e-07	2.431e-07	-6.614	-6.614	0.000	(0)
CdSO4	4.245e-09	4.245e-09	-8.372	-8.372	0.000	(0)
Cd+2	1.609e-09	8.802e-10	-8.794	-9.055	-0.262	(0)

CdOHC1	1.632e-12	1.632e-12	-11.787	-11.787	0.000	(0)
CdOH+	1.260e-14	3.225e-15	-13.900	-14.492	-0.592	(0)
Cd2OH+3	3.178e-18	1.494e-23	-17.498	-22.826	-5.328	(0)
Cd(OH)2	1.712e-20	1.712e-20	-19.766	-19.766	0.000	(0)
CdHS+	6.177e-27	1.581e-27	-26.209	-26.801	-0.592	(0)
Cd(OH)3-	2.547e-27	6.516e-28	-26.594	-27.186	-0.592	(0)
Cd(SeO3)2-2	7.641e-31	3.276e-33	-30.117	-32.485	-2.368	(0)
Cd(OH)4-2	1.550e-35	6.645e-38	-34.810	-37.178	-2.368	(0)
CdSeO4	2.662e-37	2.662e-37	-36.575	-36.575	0.000	(0)
Cd(HS)2	0.000e+00	0.000e+00	-45.351	-45.351	0.000	(0)
CdNO3+	0.000e+00	0.000e+00	-68.315	-68.907	-0.592	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-68.613	-69.205	-0.592	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-90.395	-92.762	-2.368	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-129.659	-129.659	0.000	(0)
Cl	9.783e-01					
Cl-	9.764e-01	8.398e-01	-0.010	-0.076	-0.065	(0)
CuCl2-	3.218e-04	1.878e-04	-3.492	-3.726	-0.234	(0)
CuCl3-2	2.154e-04	3.320e-05	-3.667	-4.479	-0.812	(0)
NiCl+	1.925e-04	4.926e-05	-3.716	-4.307	-0.592	(0)
MnCl+	8.046e-05	5.042e-05	-4.094	-4.297	-0.203	(0)
CoCl+	6.828e-05	1.747e-05	-4.166	-4.758	-0.592	(0)
MnCl2	5.981e-05	5.981e-05	-4.223	-4.223	0.000	(0)
MnCl3-	2.208e-05	1.383e-05	-4.656	-4.859	-0.203	(0)
ZnCl4-2	1.762e-06	2.716e-07	-5.754	-6.566	-0.812	(0)
ZnCl+	1.558e-06	9.093e-07	-5.808	-6.041	-0.234	(0)
ZnCl3-	1.144e-06	6.678e-07	-5.942	-6.175	-0.234	(0)
CuCl	1.060e-06	1.060e-06	-5.975	-5.975	0.000	(0)
ZnCl2	1.018e-06	1.018e-06	-5.992	-5.992	0.000	(0)
CdCl3-	4.845e-07	1.240e-07	-6.315	-6.907	-0.592	(0)
CdCl+	2.744e-07	7.021e-08	-6.562	-7.154	-0.592	(0)
CdCl2	2.431e-07	2.431e-07	-6.614	-6.614	0.000	(0)
NiCl2	2.106e-07	2.106e-07	-6.677	-6.677	0.000	(0)
PbCl4-2	1.452e-07	6.223e-10	-6.838	-9.206	-2.368	(0)
PbCl3-	6.721e-09	1.720e-09	-8.173	-8.765	-0.592	(0)
PbCl+	5.223e-09	1.336e-09	-8.282	-8.874	-0.592	(0)
PbCl2	4.923e-09	4.923e-09	-8.308	-8.308	0.000	(0)
HgCl4-2	1.540e-09	6.603e-12	-8.812	-11.180	-2.368	(0)
ZnOHC1	7.639e-10	7.639e-10	-9.117	-9.117	0.000	(0)
CuCl+	3.168e-10	1.850e-10	-9.499	-9.733	-0.234	(0)
CuCl2	4.424e-11	4.424e-11	-10.354	-10.354	0.000	(0)
HgCl3-	7.440e-12	1.904e-12	-11.128	-11.720	-0.592	(0)
CdOHC1	1.632e-12	1.632e-12	-11.787	-11.787	0.000	(0)
CuCl3-	5.527e-13	3.227e-13	-12.257	-12.491	-0.234	(0)
HgCl2	2.247e-13	2.247e-13	-12.648	-12.648	0.000	(0)
FeCl2+	1.975e-13	1.237e-13	-12.704	-12.908	-0.203	(0)
FeCl+2	1.887e-13	2.907e-14	-12.724	-13.536	-0.812	(0)
FeCl3	1.039e-14	1.039e-14	-13.983	-13.983	0.000	(0)
CuCl4-2	1.009e-14	1.555e-15	-13.996	-14.808	-0.812	(0)
HgClOH	2.241e-18	2.241e-18	-17.649	-17.649	0.000	(0)
HgCl+	1.773e-19	4.536e-20	-18.751	-19.343	-0.592	(0)
CoCl+2	6.044e-32	2.591e-34	-31.219	-33.587	-2.368	(0)
Co(NH3)5Cl+2	2.742e-39	0.000e+00	-38.562	-40.930	-2.368	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.869	-54.237	-2.368	(0)
Co(2)	1.512e-03					
Co+2	1.418e-03	6.080e-06	-2.848	-5.216	-2.368	(0)
CoCl+	6.828e-05	1.747e-05	-4.166	-4.758	-0.592	(0)
CoSO4	2.530e-05	2.530e-05	-4.597	-4.597	0.000	(0)
Co(NH3)+2	5.939e-08	2.546e-10	-7.226	-9.594	-2.368	(0)
CoHPO4	1.468e-08	1.468e-08	-7.833	-7.833	0.000	(0)
CoOH+	2.953e-10	7.557e-11	-9.530	-10.122	-0.592	(0)
Co2OH+3	4.897e-12	2.303e-17	-11.310	-16.638	-5.328	(0)
Co(NH3)2+2	4.325e-13	1.854e-15	-12.364	-14.732	-2.368	(0)
Co(OH)2	3.740e-15	3.740e-15	-14.427	-14.427	0.000	(0)
Co(NH3)3+2	1.328e-18	5.693e-21	-17.877	-20.245	-2.368	(0)
Co(OH)3-	1.817e-22	4.649e-23	-21.741	-22.333	-0.592	(0)
Co4(OH)4+4	1.927e-23	6.509e-33	-22.715	-32.186	-9.471	(0)
CoOOH-	1.137e-23	2.910e-24	-22.944	-23.536	-0.592	(0)
Co(NH3)4+2	1.699e-24	7.286e-27	-23.770	-26.138	-2.368	(0)

Co(OH)4-2	1.071e-30	4.590e-33	-29.970	-32.338	-2.368	(0)
Co(NH3)5+2	6.878e-31	2.949e-33	-30.163	-32.530	-2.368	(0)
CoSeO4	4.633e-33	4.633e-33	-32.334	-32.334	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-48.442	-49.034	-0.592	(0)
CoNO3+	0.000e+00	0.000e+00	-64.826	-65.418	-0.592	(0)
Co(NO3)2	0.000e+00	0.000e+00	-125.511	-125.511	0.000	(0)
Co(3)	1.283e-30					
CoOH+2	1.222e-30	5.241e-33	-29.913	-32.281	-2.368	(0)
CoCl+2	6.044e-32	2.591e-34	-31.219	-33.587	-2.368	(0)
Co+3	6.428e-36	1.655e-36	-35.192	-35.781	-0.589	(0)
Co(NH3)5Cl+2	2.742e-39	0.000e+00	-38.562	-40.930	-2.368	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-50.357	-50.949	-0.592	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.869	-54.237	-2.368	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-56.550	-58.918	-2.368	(0)
Cu(1)	5.383e-04					
CuCl2-	3.218e-04	1.878e-04	-3.492	-3.726	-0.234	(0)
CuCl3-2	2.154e-04	3.320e-05	-3.667	-4.479	-0.812	(0)
CuCl	1.060e-06	1.060e-06	-5.975	-5.975	0.000	(0)
Cu+	3.919e-09	1.003e-09	-8.407	-8.999	-0.592	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-46.955	-47.498	-0.543	(0)
CuS4S5-3	0.000e+00	0.000e+00	-47.725	-48.228	-0.504	(0)
Cu(2)	1.439e-09					
CuSO4	6.855e-10	6.855e-10	-9.164	-9.164	0.000	(0)
CuCl+	3.168e-10	1.850e-10	-9.499	-9.733	-0.234	(0)
Cu+2	2.658e-10	1.454e-10	-9.575	-9.837	-0.262	(0)
CuNH3+2	1.257e-10	5.387e-13	-9.901	-12.269	-2.368	(0)
CuCl2	4.424e-11	4.424e-11	-10.354	-10.354	0.000	(0)
CuCl3-	5.527e-13	3.227e-13	-12.257	-12.491	-0.234	(0)
CuOH+	4.033e-13	2.354e-13	-12.394	-12.628	-0.234	(0)
CuCl4-2	1.009e-14	1.555e-15	-13.996	-14.808	-0.812	(0)
Cu(OH)2	3.561e-17	3.561e-17	-16.448	-16.448	0.000	(0)
Cu2(OH)2+2	3.159e-19	1.354e-21	-18.500	-20.868	-2.368	(0)
Cu(OH)3-	1.778e-22	4.551e-23	-21.750	-22.342	-0.592	(0)
Cu(OH)4-2	5.205e-29	2.231e-31	-28.284	-30.651	-2.368	(0)
CuNO2+	0.000e+00	0.000e+00	-51.891	-52.483	-0.592	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-60.608	-61.200	-0.592	(0)
CuNO3+	0.000e+00	0.000e+00	-69.137	-69.729	-0.592	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-96.139	-96.139	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-131.041	-131.041	0.000	(0)
Fe(2)	6.177e-02					
Fe+2	6.035e-02	2.587e-04	-1.219	-3.587	-2.368	(0)
FeSO4	1.312e-03	1.312e-03	-2.882	-2.882	0.000	(0)
FeH2PO4+	1.096e-04	7.028e-05	-3.960	-4.153	-0.193	(0)
FeHPO4	2.280e-06	2.280e-06	-5.642	-5.642	0.000	(0)
FeOH+	7.540e-09	4.724e-09	-8.123	-8.326	-0.203	(0)
Fe(OH)2	1.647e-15	1.647e-15	-14.783	-14.783	0.000	(0)
Fe(OH)3-	4.990e-19	3.127e-19	-18.302	-18.505	-0.203	(0)
Fe(HS)2	0.000e+00	0.000e+00	-46.145	-46.145	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-69.269	-69.861	-0.592	(0)
Fe(3)	2.457e-10					
Fe(OH)2+	1.977e-10	1.268e-10	-9.704	-9.897	-0.193	(0)
FeHPO4+	4.383e-11	2.811e-11	-10.358	-10.551	-0.193	(0)
FeOH+2	2.699e-12	4.159e-13	-11.569	-12.381	-0.812	(0)
Fe(SO4)2-	5.110e-13	1.308e-13	-12.292	-12.884	-0.592	(0)
FeSO4+	4.382e-13	2.745e-13	-12.358	-12.561	-0.203	(0)
FeCl2+	1.975e-13	1.237e-13	-12.704	-12.908	-0.203	(0)
FeCl+2	1.887e-13	2.907e-14	-12.724	-13.536	-0.812	(0)
FeH2PO4+2	7.911e-14	1.339e-14	-13.102	-13.873	-0.772	(0)
Fe(OH)3	4.800e-14	4.800e-14	-13.319	-13.319	0.000	(0)
Fe2(OH)2+4	1.956e-14	6.606e-24	-13.709	-23.180	-9.471	(0)
FeCl3	1.039e-14	1.039e-14	-13.983	-13.983	0.000	(0)
Fe+3	5.050e-15	1.301e-15	-14.297	-14.886	-0.589	(0)
Fe(OH)4-	7.672e-18	4.921e-18	-17.115	-17.308	-0.193	(0)
Fe3(OH)4+5	7.309e-18	1.161e-32	-17.136	-31.935	-14.799	(0)
FeHSeO3+2	5.791e-21	2.483e-23	-20.237	-22.605	-2.368	(0)
FeNO3+2	0.000e+00	0.000e+00	-71.832	-74.199	-2.368	(0)
H(0)	5.546e-17					
H2	2.773e-17	3.797e-17	-16.557	-16.421	0.137	(0)

Hg(0)	5.794e-09					
Hg	5.794e-09	5.794e-09	-8.237	-8.237	0.000	(0)
Hg(1)	3.262e-24					
Hg2+2	1.631e-24	6.993e-27	-23.787	-26.155	-2.368	(0)
Hg(2)	1.548e-09					
HgCl4-2	1.540e-09	6.603e-12	-8.812	-11.180	-2.368	(0)
HgCl3-	7.440e-12	1.904e-12	-11.128	-11.720	-0.592	(0)
HgCl2	2.247e-13	2.247e-13	-12.648	-12.648	0.000	(0)
HgClOH	2.241e-18	2.241e-18	-17.649	-17.649	0.000	(0)
HgCl+	1.773e-19	4.536e-20	-18.751	-19.343	-0.592	(0)
Hg(NH3)2+2	6.501e-20	2.787e-22	-19.187	-21.555	-2.368	(0)
HgNH3+2	6.888e-23	2.953e-25	-22.162	-24.530	-2.368	(0)
Hg(OH)2	3.432e-24	4.699e-24	-23.464	-23.328	0.137	(0)
Hg+2	5.566e-25	2.386e-27	-24.254	-26.622	-2.368	(0)
HgOH+	2.063e-25	5.280e-26	-24.685	-25.277	-0.592	(0)
Hg(NH3)3+2	9.065e-26	3.886e-28	-25.043	-27.410	-2.368	(0)
HgSO4	1.084e-26	1.084e-26	-25.965	-25.965	0.000	(0)
Hg(NH3)4+2	2.536e-31	1.087e-33	-30.596	-32.964	-2.368	(0)
Hg(OH)3-	1.440e-33	3.686e-34	-32.842	-33.433	-0.592	(0)
Hg(HS)2	1.252e-40	1.252e-40	-39.902	-39.902	0.000	(0)
HgHS2-	0.000e+00	0.000e+00	-40.895	-41.487	-0.592	(0)
HgS2-2	0.000e+00	0.000e+00	-43.018	-45.386	-2.368	(0)
HgNO3+	0.000e+00	0.000e+00	-86.959	-87.551	-0.592	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-148.334	-148.334	0.000	(0)
K	2.034e-02					
K+	1.695e-02	1.457e-02	-1.771	-1.836	-0.065	(0)
KS04-	3.394e-03	2.177e-03	-2.469	-2.662	-0.193	(0)
KHP04-	3.815e-07	2.447e-07	-6.418	-6.611	-0.193	(0)
Mg	2.030e-01					
MgSO4	1.361e-01	1.361e-01	-0.866	-0.866	0.000	(0)
Mg+2	6.537e-02	3.577e-02	-1.185	-1.446	-0.262	(0)
MgH2PO4+	1.495e-03	9.590e-04	-2.825	-3.018	-0.193	(0)
MgHP04	5.078e-05	5.078e-05	-4.294	-4.294	0.000	(0)
MgOH+	9.038e-09	6.116e-09	-8.044	-8.214	-0.170	(0)
MgP04-	1.408e-10	9.030e-11	-9.851	-10.044	-0.193	(0)
Mn(2)	1.146e-02					
Mn+2	1.112e-02	4.769e-05	-1.954	-4.322	-2.368	(0)
MnSO4	1.745e-04	1.745e-04	-3.758	-3.758	0.000	(0)
MnCl+	8.046e-05	5.042e-05	-4.094	-4.297	-0.203	(0)
MnCl2	5.981e-05	5.981e-05	-4.223	-4.223	0.000	(0)
MnCl3-	2.208e-05	1.383e-05	-4.656	-4.859	-0.203	(0)
MnOH+	8.769e-11	5.494e-11	-10.057	-10.260	-0.203	(0)
MnSe	1.173e-11	1.173e-11	-10.931	-10.931	0.000	(0)
Mn(OH)3-	2.857e-25	1.790e-25	-24.544	-24.747	-0.203	(0)
MnSeO4	1.930e-32	1.930e-32	-31.714	-31.714	0.000	(0)
Mn(OH)4-2	2.336e-33	3.600e-34	-32.632	-33.444	-0.812	(0)
MnNO3+	0.000e+00	0.000e+00	-63.931	-64.523	-0.592	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-124.521	-124.521	0.000	(0)
Mn(3)	3.132e-28					
Mn+3	3.132e-28	8.065e-29	-27.504	-28.093	-0.589	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-77.883	-78.696	-0.812	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-86.223	-86.498	-0.275	(0)
N(-3)	1.577e-02					
NH4+	1.332e-02	6.639e-03	-1.876	-2.178	-0.302	(0)
NH4SO4-	2.450e-03	1.535e-03	-2.611	-2.814	-0.203	(0)
NiNH3+2	1.023e-06	4.384e-09	-5.990	-8.358	-2.368	(0)
CaNH3+2	5.878e-07	2.520e-09	-6.231	-8.599	-2.368	(0)
NH3	1.833e-07	1.833e-07	-6.737	-6.737	0.000	(0)
Co(NH3)+2	5.939e-08	2.546e-10	-7.226	-9.594	-2.368	(0)
CuNH3+2	1.257e-10	5.387e-13	-9.901	-12.269	-2.368	(0)
Ni(NH3)2+2	4.604e-11	1.974e-13	-10.337	-12.705	-2.368	(0)
Co(NH3)2+2	4.325e-13	1.854e-15	-12.364	-14.732	-2.368	(0)
Ca(NH3)2+2	5.707e-14	2.447e-16	-13.244	-15.611	-2.368	(0)
Co(NH3)3+2	1.328e-18	5.693e-21	-17.877	-20.245	-2.368	(0)
Hg(NH3)2+2	6.501e-20	2.787e-22	-19.187	-21.555	-2.368	(0)
HgNH3+2	6.888e-23	2.953e-25	-22.162	-24.530	-2.368	(0)

Co(NH3)4+2	1.699e-24	7.286e-27	-23.770	-26.138	-2.368	(0)
Hg(NH3)3+2	9.065e-26	3.886e-28	-25.043	-27.410	-2.368	(0)
Co(NH3)5+2	6.878e-31	2.949e-33	-30.163	-32.530	-2.368	(0)
Hg(NH3)4+2	2.536e-31	1.087e-33	-30.596	-32.964	-2.368	(0)
Co(NH3)5Cl+2	2.742e-39	0.000e+00	-38.562	-40.930	-2.368	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-50.357	-50.949	-0.592	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-51.869	-54.237	-2.368	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-56.550	-58.918	-2.368	(0)
N(3)	0.000e+00					
N02-	0.000e+00	0.000e+00	-44.391	-44.666	-0.275	(0)
CoN02+	0.000e+00	0.000e+00	-48.442	-49.034	-0.592	(0)
CuN02+	0.000e+00	0.000e+00	-51.891	-52.483	-0.592	(0)
Cu(N02)2	0.000e+00	0.000e+00	-96.139	-96.139	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-60.336	-60.402	-0.065	(0)
CaN03+	0.000e+00	0.000e+00	-61.383	-61.975	-0.592	(0)
MnN03+	0.000e+00	0.000e+00	-63.931	-64.523	-0.592	(0)
NiN03+	0.000e+00	0.000e+00	-64.045	-64.637	-0.592	(0)
CoN03+	0.000e+00	0.000e+00	-64.826	-65.418	-0.592	(0)
ZnN03+	0.000e+00	0.000e+00	-65.751	-66.343	-0.592	(0)
CdN03+	0.000e+00	0.000e+00	-68.315	-68.907	-0.592	(0)
PbN03+	0.000e+00	0.000e+00	-68.972	-69.564	-0.592	(0)
CuN03+	0.000e+00	0.000e+00	-69.137	-69.729	-0.592	(0)
FeN03+2	0.000e+00	0.000e+00	-71.832	-74.199	-2.368	(0)
HgN03+	0.000e+00	0.000e+00	-86.959	-87.551	-0.592	(0)
Mn(N03)2	0.000e+00	0.000e+00	-124.521	-124.521	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-125.511	-125.511	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-127.456	-127.456	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-129.659	-129.659	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-129.715	-129.715	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-131.041	-131.041	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-148.334	-148.334	0.000	(0)
Na	9.417e-01					
Na+	8.156e-01	7.015e-01	-0.089	-0.154	-0.065	(0)
NaS04-	1.261e-01	8.085e-02	-0.899	-1.092	-0.193	(0)
NaHP04-	2.844e-05	1.824e-05	-4.546	-4.739	-0.193	(0)
Ni	3.494e-04					
NiCl+	1.925e-04	4.926e-05	-3.716	-4.307	-0.592	(0)
NiS04	9.668e-05	9.668e-05	-4.015	-4.015	0.000	(0)
Ni+2	4.236e-05	2.318e-05	-4.373	-4.635	-0.262	(0)
Ni(S04)2-2	1.664e-05	7.132e-08	-4.779	-7.147	-2.368	(0)
NiNH3+2	1.023e-06	4.384e-09	-5.990	-8.358	-2.368	(0)
NiCl2	2.106e-07	2.106e-07	-6.677	-6.677	0.000	(0)
NiOH+	5.347e-10	1.368e-10	-9.272	-9.864	-0.592	(0)
Ni(NH3)2+2	4.604e-11	1.974e-13	-10.337	-12.705	-2.368	(0)
Ni(OH)2	8.996e-15	8.996e-15	-14.046	-14.046	0.000	(0)
Ni(OH)3-	2.190e-20	5.604e-21	-19.660	-20.251	-0.592	(0)
NiSe04	1.630e-32	1.630e-32	-31.788	-31.788	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-64.045	-64.637	-0.592	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-60.737	-60.601	0.137	(0)
P	2.805e-03					
MgH2P04+	1.495e-03	9.590e-04	-2.825	-3.018	-0.193	(0)
H2P04-	9.328e-04	5.983e-04	-3.030	-3.223	-0.193	(0)
CaH2P04+	1.605e-04	1.029e-04	-3.795	-3.987	-0.193	(0)
FeH2P04+	1.096e-04	7.028e-05	-3.960	-4.153	-0.193	(0)
MgHP04	5.078e-05	5.078e-05	-4.294	-4.294	0.000	(0)
NaHP04-	2.844e-05	1.824e-05	-4.546	-4.739	-0.193	(0)
HP04-2	1.559e-05	2.403e-06	-4.807	-5.619	-0.812	(0)
CaHP04	8.442e-06	8.442e-06	-5.074	-5.074	0.000	(0)
FeHP04	2.280e-06	2.280e-06	-5.642	-5.642	0.000	(0)
H3P04	1.250e-06	1.250e-06	-5.903	-5.903	0.000	(0)
KHP04-	3.815e-07	2.447e-07	-6.418	-6.611	-0.193	(0)
CoHP04	1.468e-08	1.468e-08	-7.833	-7.833	0.000	(0)
CaP04-	2.067e-09	1.326e-09	-8.685	-8.878	-0.193	(0)
MgP04-	1.408e-10	9.030e-11	-9.851	-10.044	-0.193	(0)
FeHP04+	4.383e-11	2.811e-11	-10.358	-10.551	-0.193	(0)
P04-3	2.335e-13	6.012e-14	-12.632	-13.221	-0.589	(0)

FeH2PO4+2	7.911e-14	1.339e-14	-13.102	-13.873	-0.772	(0)
Pb	1.777e-07					
PbCl4-2	1.452e-07	6.223e-10	-6.838	-9.206	-2.368	(0)
Pb(SO4)2-2	1.508e-08	6.465e-11	-7.822	-10.189	-2.368	(0)
PbCl3-	6.721e-09	1.720e-09	-8.173	-8.765	-0.592	(0)
PbCl+	5.223e-09	1.336e-09	-8.282	-8.874	-0.592	(0)
PbCl2	4.923e-09	4.923e-09	-8.308	-8.308	0.000	(0)
PbSO4	4.972e-10	4.972e-10	-9.303	-9.303	0.000	(0)
Pb+2	8.597e-11	4.704e-11	-10.066	-10.328	-0.262	(0)
PbOH+	2.877e-13	7.361e-14	-12.541	-13.133	-0.592	(0)
Pb2OH+3	1.167e-17	5.488e-23	-16.933	-22.261	-5.328	(0)
Pb(OH)2	1.450e-18	1.450e-18	-17.839	-17.839	0.000	(0)
Pb(OH)3-	3.531e-24	9.034e-25	-23.452	-24.044	-0.592	(0)
Pb(OH)4-2	3.215e-29	1.378e-31	-28.493	-30.861	-2.368	(0)
Pb4(OH)4+4	1.346e-33	0.000e+00	-32.871	-42.342	-9.471	(0)
Pb3(OH)4+2	2.447e-34	1.049e-36	-33.611	-35.979	-2.368	(0)
Pb(HS)2	0.000e+00	0.000e+00	-46.565	-46.565	0.000	(0)
PbNO3+	0.000e+00	0.000e+00	-68.972	-69.564	-0.592	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-70.427	-71.019	-0.592	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-129.715	-129.715	0.000	(0)
S(-2)	3.309e-24					
H2S	3.233e-24	3.233e-24	-23.490	-23.490	0.000	(0)
HS-	6.890e-26	1.763e-26	-25.162	-25.754	-0.592	(0)
CdHS+	6.177e-27	1.581e-27	-26.209	-26.801	-0.592	(0)
S5-2	9.299e-29	3.987e-31	-28.032	-30.399	-2.368	(0)
S6-2	3.484e-29	1.494e-31	-28.458	-30.826	-2.368	(0)
S4-2	2.337e-29	1.002e-31	-28.631	-30.999	-2.368	(0)
S3-2	3.597e-30	1.542e-32	-29.444	-31.812	-2.368	(0)
S2-2	3.387e-31	1.452e-33	-30.470	-32.838	-2.368	(0)
S-2	2.817e-38	4.341e-39	-37.550	-38.362	-0.812	(0)
Hg(HS)2	1.252e-40	1.252e-40	-39.902	-39.902	0.000	(0)
HgHS2-	0.000e+00	0.000e+00	-40.895	-41.487	-0.592	(0)
HgS2-2	0.000e+00	0.000e+00	-43.018	-45.386	-2.368	(0)
Zn(HS)2	0.000e+00	0.000e+00	-45.040	-45.040	0.000	(0)
Cd(HS)2	0.000e+00	0.000e+00	-45.351	-45.351	0.000	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-45.649	-46.241	-0.592	(0)
Fe(HS)2	0.000e+00	0.000e+00	-46.145	-46.145	0.000	(0)
Pb(HS)2	0.000e+00	0.000e+00	-46.565	-46.565	0.000	(0)
Cu(S4)2-3	0.000e+00	0.000e+00	-46.955	-47.498	-0.543	(0)
CuS4S5-3	0.000e+00	0.000e+00	-47.725	-48.228	-0.504	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-60.608	-61.200	-0.592	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-66.922	-67.514	-0.592	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-68.613	-69.205	-0.592	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-69.269	-69.861	-0.592	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-70.317	-72.685	-2.368	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-70.427	-71.019	-0.592	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-90.395	-92.762	-2.368	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-92.360	-94.728	-2.368	(0)
S(6)	3.492e-01					
MgSO4	1.361e-01	1.361e-01	-0.866	-0.866	0.000	(0)
NaSO4-	1.261e-01	8.085e-02	-0.899	-1.092	-0.193	(0)
SO4-2	3.944e-02	2.158e-02	-1.404	-1.666	-0.262	(0)
CaSO4	3.903e-02	3.903e-02	-1.409	-1.409	0.000	(0)
KS04-	3.394e-03	2.177e-03	-2.469	-2.662	-0.193	(0)
NH4SO4-	2.450e-03	1.535e-03	-2.611	-2.814	-0.203	(0)
FeSO4	1.312e-03	1.312e-03	-2.882	-2.882	0.000	(0)
AlSO4+	5.541e-04	3.360e-04	-3.256	-3.474	-0.217	(0)
MnSO4	1.745e-04	1.745e-04	-3.758	-3.758	0.000	(0)
Al(SO4)2-	1.400e-04	8.486e-05	-3.854	-4.071	-0.217	(0)
NiSO4	9.668e-05	9.668e-05	-4.015	-4.015	0.000	(0)
Zn(SO4)2-2	9.190e-05	3.940e-07	-4.037	-6.405	-2.368	(0)
HSO4-	4.786e-05	2.901e-05	-4.320	-4.537	-0.217	(0)
CoSO4	2.530e-05	2.530e-05	-4.597	-4.597	0.000	(0)
Ni(SO4)2-2	1.664e-05	7.132e-08	-4.779	-7.147	-2.368	(0)
ZnSO4	2.026e-06	2.026e-06	-5.693	-5.693	0.000	(0)
Cd(SO4)2-2	3.024e-07	1.296e-09	-6.519	-8.887	-2.368	(0)
Pb(SO4)2-2	1.508e-08	6.465e-11	-7.822	-10.189	-2.368	(0)
CdSO4	4.245e-09	4.245e-09	-8.372	-8.372	0.000	(0)

CuSO4	6.855e-10	6.855e-10	-9.164	-9.164	0.000	(0)
PbSO4	4.972e-10	4.972e-10	-9.303	-9.303	0.000	(0)
Fe(SO4)2-	5.110e-13	1.308e-13	-12.292	-12.884	-0.592	(0)
FeSO4+	4.382e-13	2.745e-13	-12.358	-12.561	-0.203	(0)
HgSO4	1.084e-26	1.084e-26	-25.965	-25.965	0.000	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-50.357	-50.949	-0.592	(0)
Se(-2)	3.730e-06					
HSe-	3.621e-06	9.265e-07	-5.441	-6.033	-0.592	(0)
H2Se	1.096e-07	1.096e-07	-6.960	-6.960	0.000	(0)
MnSe	1.173e-11	1.173e-11	-10.931	-10.931	0.000	(0)
Se-2	1.069e-14	4.584e-17	-13.971	-16.339	-2.368	(0)
Se(4)	3.292e-11					
HSeO3-	3.238e-11	8.286e-12	-10.490	-11.082	-0.592	(0)
SeO3-2	4.822e-13	2.067e-15	-12.317	-14.685	-2.368	(0)
H2SeO3	5.304e-14	5.304e-14	-13.275	-13.275	0.000	(0)
FeHSeO3+2	5.791e-21	2.483e-23	-20.237	-22.605	-2.368	(0)
Cd(SeO3)2-2	7.641e-31	3.276e-33	-30.117	-32.485	-2.368	(0)
Se(6)	3.012e-30					
SeO4-2	2.968e-30	1.624e-30	-29.528	-29.789	-0.262	(0)
MnSeO4	1.930e-32	1.930e-32	-31.714	-31.714	0.000	(0)
NiSeO4	1.630e-32	1.630e-32	-31.788	-31.788	0.000	(0)
CoSeO4	4.633e-33	4.633e-33	-32.334	-32.334	0.000	(0)
HSeO4-	4.352e-33	1.114e-33	-32.361	-32.953	-0.592	(0)
ZnSeO4	1.117e-34	1.117e-34	-33.952	-33.952	0.000	(0)
CdSeO4	2.662e-37	2.662e-37	-36.575	-36.575	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-61.368	-63.735	-2.368	(0)
Zn	1.002e-04					
Zn(SO4)2-2	9.190e-05	3.940e-07	-4.037	-6.405	-2.368	(0)
ZnSO4	2.026e-06	2.026e-06	-5.693	-5.693	0.000	(0)
ZnCl4-2	1.762e-06	2.716e-07	-5.754	-6.566	-0.812	(0)
ZnCl+	1.558e-06	9.093e-07	-5.808	-6.041	-0.234	(0)
ZnCl3-	1.144e-06	6.678e-07	-5.942	-6.175	-0.234	(0)
ZnCl2	1.018e-06	1.018e-06	-5.992	-5.992	0.000	(0)
Zn+2	8.115e-07	4.440e-07	-6.091	-6.353	-0.262	(0)
ZnOHCl	7.639e-10	7.639e-10	-9.117	-9.117	0.000	(0)
ZnOH+	7.959e-11	2.037e-11	-10.099	-10.691	-0.592	(0)
Zn(OH)2	2.731e-15	2.731e-15	-14.564	-14.564	0.000	(0)
Zn(OH)3-	3.333e-20	8.528e-21	-19.477	-20.069	-0.592	(0)
Zn(OH)4-2	4.933e-26	2.115e-28	-25.307	-27.675	-2.368	(0)
ZnSeO4	1.117e-34	1.117e-34	-33.952	-33.952	0.000	(0)
Zn(HS)2	0.000e+00	0.000e+00	-45.040	-45.040	0.000	(0)
ZnS(HS)-	0.000e+00	0.000e+00	-45.649	-46.241	-0.592	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-61.368	-63.735	-2.368	(0)
ZnNO3+	0.000e+00	0.000e+00	-65.751	-66.343	-0.592	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-66.922	-67.514	-0.592	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-70.317	-72.685	-2.368	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-92.360	-94.728	-2.368	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-127.456	-127.456	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-149.78	-143.50	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-27.39	-22.85	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-34.67	-22.87	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-219.13	-201.20	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-40.33	-20.22	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-34.60	-34.15	0.45	(NH4)2SeO4
Al(OH)3(am)	-2.32	8.74	11.06	Al(OH)3
Al2O3	-2.73	17.54	20.27	Al2O3
Al4(OH)10SO4	1.02	23.72	22.70	Al4(OH)10SO4
AlOHSO4	0.72	-2.51	-3.23	AlOHSO4
Alunite	7.59	6.69	-0.90	KAl3(SO4)2(OH)6
Anglesite	-4.17	-11.99	-7.82	PbSO4
Anhydrite	0.59	-3.75	-4.34	CaSO4
Anilite	-4.59	-36.90	-32.31	Cu0.25Cu1.5S
Antlerite	-20.80	-12.01	8.79	Cu3(OH)4SO4

Atacamite	-12.99	-5.38	7.61	Cu ₂ (OH) ₃ Cl
Bianchite	-6.36	-8.12	-1.76	ZnSO ₄ ·6H ₂ O
Birnessite	-25.15	-7.06	18.09	MnO ₂
Bixbyite	-27.04	-27.39	-0.35	Mn ₂ O ₃
BlaubleiI	-7.44	-31.60	-24.16	Cu _{0.9} Cu _{0.2} S
BlaubleiII	-6.77	-34.05	-27.28	Cu _{0.6} Cu _{0.8} S
Boehmite	-0.10	8.76	8.86	Al ₂ O ₃
Brochantite	-27.97	-12.27	15.71	Cu ₄ (OH) ₆ SO ₄
Brucite	-8.98	8.14	17.12	Mg(OH) ₂
Bunsenite	-7.72	4.97	12.68	NiO
Ca ₃ (PO ₄) ₂ (beta)	-3.65	-32.70	-29.05	Ca ₃ (PO ₄) ₂
Ca ₄ H(PO ₄) ₃ ·3H ₂ O	-5.79	-52.87	-47.08	Ca ₄ H(PO ₄) ₃ ·3H ₂ O
CaHPO ₄	-0.77	-20.12	-19.35	CaHPO ₄
CaHPO ₄ ·2H ₂ O	-1.10	-20.15	-19.05	CaHPO ₄ ·2H ₂ O
Calomel	-8.18	-26.31	-18.13	Hg ₂ Cl ₂
CaSeO ₃ ·2H ₂ O	-11.25	-8.39	2.86	CaSeO ₃ ·2H ₂ O
CaSeO ₄ ·2H ₂ O	-28.91	-31.91	-3.00	CaSeO ₄ ·2H ₂ O
Cd(OH) ₂	-13.34	0.53	13.87	Cd(OH) ₂
Cd(OH) ₂ (am)	-13.41	0.53	13.94	Cd(OH) ₂
Cd ₃ (OH) ₂ (SO ₄) ₂	-27.63	-20.92	6.71	Cd ₃ (OH) ₂ (SO ₄) ₂
Cd ₃ (OH) ₄ SO ₄	-32.23	-9.67	22.56	Cd ₃ (OH) ₄ SO ₄
Cd ₃ (PO ₄) ₂	-21.01	-53.61	-32.60	Cd ₃ (PO ₄) ₂
Cd ₄ (OH) ₆ SO ₄	-37.54	-9.14	28.40	Cd ₄ (OH) ₆ SO ₄
CdCl ₂	-8.59	-9.21	-0.61	CdCl ₂
CdCl ₂ ·1H ₂ O	-7.55	-9.22	-1.68	CdCl ₂ ·1H ₂ O
CdCl ₂ ·2.5H ₂ O	-7.32	-9.25	-1.93	CdCl ₂ ·2.5H ₂ O
Cdmetal(alpha)	-26.42	-12.73	13.69	Cd
Cdmetal(gamma)	-26.52	-12.73	13.80	Cd
CdOHCl	-7.95	-4.34	3.61	CdOHCl
CdSe	10.10	-10.28	-20.38	CdSe
CdSeO ₄ ·2H ₂ O	-37.03	-38.88	-1.85	CdSeO ₄ ·2H ₂ O
CdSO ₄	-10.67	-10.72	-0.05	CdSO ₄
CdSO ₄ ·1H ₂ O	-9.09	-10.74	-1.65	CdSO ₄ ·1H ₂ O
CdSO ₄ ·2.67H ₂ O	-8.94	-10.77	-1.83	CdSO ₄ ·2.67H ₂ O
Chalcanthite	-8.94	-11.59	-2.65	CuSO ₄ ·5H ₂ O
Chalcocite	-3.62	-38.94	-35.32	Cu ₂ S
Chalcopyrite	-19.69	-55.31	-35.62	CuFeS ₂
Cinnabar	-7.56	-53.86	-46.30	HgS
Clausthalite	15.83	-11.55	-27.39	PbSe
Co(OH) ₂	-8.73	4.37	13.09	Co(OH) ₂
Co(OH) ₃	-19.32	-21.41	-2.09	Co(OH) ₃
Co ₃ (PO ₄) ₂	-7.40	-42.09	-34.69	Co ₃ (PO ₄) ₂
Co ₃ O ₄	-28.14	-38.38	-10.24	Co ₃ O ₄
CoCl ₂	-13.83	-5.37	8.46	CoCl ₂
CoCl ₂ ·6H ₂ O	-7.99	-5.47	2.52	CoCl ₂ ·6H ₂ O
CoFe ₂ O ₄	6.56	3.41	-3.15	CoFe ₂ O ₄
CoHPO ₄	-4.19	-23.25	-19.06	CoHPO ₄
CoO	-9.46	4.38	13.84	CoO
CoS(alpha)	-18.72	-26.16	-7.44	CoS
CoS(beta)	-15.09	-26.16	-11.07	CoS
CoSe	9.76	-6.44	-16.20	CoSe
CoSeO ₃	-12.81	-11.49	1.32	CoSeO ₃
CoSeO ₄ ·6H ₂ O	-33.58	-35.11	-1.53	CoSeO ₄ ·6H ₂ O
CoSO ₄	-9.87	-6.88	2.99	CoSO ₄
CoSO ₄ ·6H ₂ O	-4.51	-6.99	-2.48	CoSO ₄ ·6H ₂ O
Cotunnite	-5.64	-10.48	-4.84	PbCl ₂
Covellite	-8.25	-30.78	-22.53	CuS
Cu(OH) ₂	-9.06	-0.25	8.81	Cu(OH) ₂
Cu ₂ (OH) ₃ NO ₃	-75.13	-65.70	9.42	Cu ₂ (OH) ₃ NO ₃
Cu ₂ Se(alpha)	27.09	-19.22	-46.31	Cu ₂ Se
Cu ₂ SO ₄	-17.76	-19.66	-1.90	Cu ₂ SO ₄
Cu ₃ (PO ₄) ₂	-19.10	-55.95	-36.85	Cu ₃ (PO ₄) ₂
Cu ₃ (PO ₄) ₂ ·3H ₂ O	-20.89	-56.01	-35.12	Cu ₃ (PO ₄) ₂ ·3H ₂ O
Cu ₃ Se ₂	34.02	-30.28	-64.30	Cu ₃ Se ₂
Cumetal	-1.91	-10.83	-8.93	Cu
CuOCuSO ₄	-22.37	-11.74	10.63	CuOCuSO ₄
Cupricferrite	-7.70	-1.21	6.49	CuFe ₂ O ₄
Cuprite	-7.29	-8.40	-1.11	Cu ₂ O

Cuprousferrite	4.20	-4.68	-8.88	CuFeO2
CuSe	22.33	-11.06	-33.39	CuSe
CuSe2	25.08	-8.62	-33.70	CuSe2
CuSeO3:2H2O	-16.74	-16.15	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-37.27	-39.71	-2.44	CuSeO4:5H2O
CuSO4	-14.62	-11.50	3.11	CuSO4
Diaspore	1.64	8.76	7.12	AlOOH
Djurleite	-4.01	-38.40	-34.40	Cu0.066Cu1.868S
Epsomite	-1.08	-3.24	-2.15	MgSO4:7H2O
Fe(OH)2	-7.57	6.00	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.07	-1.97	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-18.43	-16.88	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-28.00	-48.62	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-31.61	-34.77	-3.16	Fe2(SO4)3
Fe3(OH)8	-15.25	4.97	20.22	Fe3(OH)8
Ferrihydrite	-3.88	-0.51	3.37	Fe(OH)3
Ferroselite	16.34	-2.37	-18.71	FeSe2
FeS(ppt)	-21.61	-24.53	-2.92	FeS
FeSe	6.19	-4.81	-11.00	FeSe
Galena	-17.11	-31.27	-14.16	PbS
Gibbsite	0.23	8.74	8.52	Al(OH)3
Goethite	-1.13	-0.49	0.64	FeOOH
Goslarite	-6.10	-8.14	-2.05	ZnSO4:7H2O
Greenockite	-15.51	-30.00	-14.49	CdS
Greigite	-72.10	-117.14	-45.03	Fe3S4
Gypsum	0.83	-3.79	-4.61	CaSO4:2H2O
H-Jarosite	-12.52	-24.07	-11.55	(H3O)Fe3(SO4)2(OH)6
H2S(g)	-22.55	-30.56	-8.01	H2S
H2Se(g)	-5.92	-10.84	-4.92	H2Se
Halite	-1.82	-0.23	1.59	NaCl
Hausmannite	-32.93	29.11	62.03	Mn3O4
Hematite	0.14	-0.97	-1.11	Fe2O3
Hercynite	-0.09	23.55	23.64	FeAl2O4
Hg(g)	-6.99	-14.91	-7.93	Hg
Hg(OH)2	-19.83	-23.33	-3.50	Hg(OH)2
Hg2(g)	-14.73	-29.83	-15.09	Hg2
Hg2(OH)2	-21.83	-16.57	5.26	Hg2(OH)2
Hg2HPO4	-19.41	-44.19	-24.77	Hg2HPO4
Hg2S	-35.26	-47.10	-11.84	Hg2S
Hg2SeO3	-27.77	-32.43	-4.66	Hg2SeO3
Hg2SO4	-21.68	-27.82	-6.14	Hg2SO4
HgCl(g)	-33.04	-13.15	19.88	HgCl
HgCl2	-11.54	-33.06	-21.52	HgCl2
Hgmetal(l)	-1.26	-14.91	-13.65	Hg
HgSe	21.56	-34.14	-55.69	HgSe
HgSeO3	-26.75	-39.18	-12.43	HgSeO3
HgSO4	-25.12	-34.58	-9.45	HgSO4
Hinsdalite	-10.86	-13.36	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-0.97	-45.30	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-23.72	-86.51	-62.79	Pb5(PO4)3OH
K-Alum	-5.77	-11.01	-5.24	KAl(SO4)2:12H2O
K-Jarosite	-6.59	-21.08	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-32.73	-33.46	-0.73	K2SeO4
Langite	-30.17	-12.28	17.88	Cu4(OH)6SO4:H2O
Larnakite	-12.34	-12.72	-0.38	PbO:PbSO4
Laurionite	-6.23	-5.61	0.62	PbOHCl
Lepidocrocite	-1.86	-0.49	1.37	FeOOH
Lime	-25.65	7.51	33.16	CaO
Litharge	-13.58	-0.73	12.85	PbO
Mackinawite	-20.93	-24.53	-3.60	FeS
Maghemite	-7.36	-0.97	6.39	Fe2O3
Magnesioferrite	-10.34	7.18	17.52	Fe2MgO4
Magnetite	1.14	5.04	3.90	Fe3O4
Manganite	-13.43	11.91	25.34	MnOOH
Massicot	-13.78	-0.73	13.05	PbO
Melanothallite	-16.40	-9.99	6.41	CuCl2
Melanterite	-3.12	-5.38	-2.26	FeSO4:7H2O
Metacinnabar	-8.16	-53.86	-45.70	HgS

Mg(OH)2(active)	-10.66	8.14	18.79	Mg(OH)2
Mg3(P04)2	-7.50	-30.78	-23.28	Mg3(P04)2
MgHP04:3H2O	-1.35	-19.53	-18.18	MgHP04:3H2O
MgSe03:6H2O	-10.87	-7.82	3.04	MgSe03:6H2O
MgSe04:6H2O	-30.14	-31.34	-1.20	MgSe04:6H2O
Minium	-63.44	11.09	74.53	Pb304
Mirabilite	-0.85	-2.15	-1.30	Na2S04:10H2O
Mn2(S04)3	-55.86	-61.18	-5.32	Mn2(S04)3
Mn3(P04)2	-15.56	-39.41	-23.85	Mn3(P04)2
MnCl2:4H2O	-7.28	-4.54	2.74	MnCl2:4H2O
MnHP04	3.05	-22.35	-25.40	MnHP04
MnS(grn)	-25.51	-25.27	0.25	MnS
MnS(pnk)	-28.61	-25.27	3.34	MnS
MnSe	-9.28	-5.55	3.73	MnSe
MnSe03	-11.72	-10.59	1.13	MnSe03
MnSe03:2H2O	-11.59	-10.63	0.96	MnSe03:2H2O
MnSe04:5H2O	-32.15	-34.20	-2.05	MnSe04:5H2O
MnS04	-8.73	-5.99	2.74	MnS04
Monteponite	-14.80	0.55	15.35	Cd0
Montroydite	-19.76	-23.31	-3.55	Hg0
Morenosite	-4.25	-6.42	-2.17	NiS04:7H2O
Na-Jarosite	-8.56	-19.39	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-16.97	-6.67	10.30	Na2Se03:5H2O
Na2Se04	-31.38	-30.10	1.28	Na2Se04
Nantokite	-2.24	-9.07	-6.83	CuCl
Ni(OH)2	-8.07	4.95	13.02	Ni(OH)2
Ni3(P04)2	-9.05	-40.35	-31.30	Ni3(P04)2
Ni4(OH)6S04	-23.46	8.54	32.00	Ni4(OH)6S04
NiS(alpha)	-19.98	-25.58	-5.60	NiS
NiS(beta)	-14.48	-25.58	-11.10	NiS
NiS(gamma)	-12.78	-25.58	-12.80	NiS
NiSe	11.84	-5.86	-17.70	NiSe
NiSe03:2H2O	-13.83	-10.94	2.89	NiSe03:2H2O
NiSe04:6H2O	-33.01	-34.53	-1.52	NiSe04:6H2O
Nsutite	-24.56	-7.06	17.50	Mn02
O2(g)	-57.91	26.54	84.45	O2
Pb(OH)2	-9.03	-0.74	8.29	Pb(OH)2
Pb2(OH)3Cl	-15.15	-6.36	8.79	Pb2(OH)3Cl
Pb20(OH)2	-27.66	-1.47	26.19	Pb20(OH)2
Pb203	-49.22	11.82	61.04	Pb203
Pb3(P04)2	-13.89	-57.42	-43.53	Pb3(P04)2
Pb302S04	-24.32	-13.45	10.87	Pb302S04
Pb4(OH)6S04	-35.33	-14.23	21.10	Pb4(OH)6S04
Pb403S04	-36.38	-14.17	22.20	Pb403S04
PbHP04	-4.55	-28.36	-23.81	PbHP04
Pbmetal	-18.24	-14.00	4.24	Pb
Pb0:0.3H2O	-13.71	-0.73	12.98	Pb0:0.33H2O
PbSe04	-33.24	-40.12	-6.88	PbSe04
Periclase	-13.79	8.15	21.94	Mg0
Plattnerite	-37.76	12.54	50.31	Pb02
Plumbgummite	3.07	-29.72	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-15.61	7.50	23.11	Ca(OH)2
Pyrite	-23.18	-41.81	-18.63	FeS2
Pyrochroite	-10.16	5.26	15.43	Mn(OH)2
Pyrolusite	-23.48	18.55	42.03	Mn02
Pyromorphite	-6.95	-91.38	-84.43	Pb5(P04)3Cl
Retgersite	-4.36	-6.41	-2.05	NiS04:6H2O
Semetal(am)	9.58	2.45	-7.14	Se
Semetal(hex	10.19	2.45	-7.75	Se
Se02	-15.99	-15.87	0.12	Se02
Se03	-60.78	-39.39	21.39	Se03
Sphalerite	-15.78	-27.30	-11.52	ZnS
Spinel	-12.08	25.69	37.77	MgAl204
Strengite	-1.76	-28.14	-26.38	FeP04:2H2O
Sulfur	-15.17	-17.27	-2.11	S
Tenorite	-8.04	-0.24	7.80	Cu0
Thenardite	-2.32	-1.97	0.34	Na2S04
Tsumebite	-19.60	-29.39	-9.79	Pb2CuP04(OH)3:3H2O

Vivianite	-1.34	-37.34	-36.00	Fe3(P04)2:8H20
Wurtzite	-18.30	-27.30	-9.00	ZnS
Zincite	-8.30	3.25	11.55	Zn0
Zincosite	-12.14	-8.02	4.13	ZnS04
Zn(N03)2:6H20	-130.52	-127.26	3.26	Zn(N03)2:6H20
Zn(OH)2	-8.97	3.23	12.20	Zn(OH)2
Zn(OH)2(am)	-9.44	3.23	12.67	Zn(OH)2
Zn(OH)2(beta)	-8.72	3.23	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-8.50	3.23	11.73	Zn(OH)2
Zn(OH)2(gamma)	-8.50	3.23	11.73	Zn(OH)2
Zn2(OH)2S04	-12.29	-4.79	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-13.60	1.59	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H20	-10.15	-45.57	-35.42	Zn3(P04)2:4H20
Zn30(S04)2	-32.32	-12.79	19.53	Zn30(S04)2
Zn4(OH)6S04	-26.73	1.67	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-32.08	6.42	38.50	Zn5(OH)8Cl2
ZnCl2	-13.73	-6.50	7.22	ZnCl2
Znmetal	-36.18	-10.02	26.15	Zn
Zn0(active)	-8.15	3.25	11.40	Zn0
ZnS(am)	-18.21	-27.30	-9.09	ZnS
ZnSe	6.88	-7.58	-14.46	ZnSe
ZnSe04:6H20	-34.73	-36.25	-1.52	ZnSe04:6H20
ZnS04:1H20	-7.50	-8.04	-0.53	ZnS04:1H20

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 4.

SOLUTION 2 #Groundwater worst case maximum values

temp 21
pH 5.05
pe 1
redox pe
units mg/l
density 1
Al 5.21
Alkalinity 0
As 0
Ba 0
Be 0
B 0
Cd 0.04
Co 24.2
Cr 0
Cu 9.29
Fe 937
Pb 0.01
Mn 171
Mo 0
V 0
Zn 1.78
Se 0.08
Ni 5.57
N 60
P 23.6
Ca 590
Mg 1340
Na 5880
K 216
Cl 9420
S(6) 9110

```

Hg      0.0004
water   1 # kg
SOLUTION 3 #Mean RWD untreated water quality
temp    20
pH      4.05
pe      4
redox   pe
units   mg/l
density  1
Al      1.42
Alkalinity 0
As      0.002
Ba      0.04
Be      0.002
B       0.1
Cd      0.0008
Co      0.72
Cr      0.0033
Cu      6.25
Fe      24.67
Pb      0.02
Mn      5.22
Mo      0.11
Zn      0.49
Se      0.01
Ni      0.49
N       10.07
P       0.29
Ca      522
Mg      88
Na      343
K       245
Cl      490
S(6)    2222
Hg      0
water   1 # kg
MIX 1
1       0.03679
2       0.9632
3       1e-005
REACTION 2
H2O -1
2
END #Time-step 2

```

Beginning of initial solution calculations.

Initial solution 2.

-----Solution composition-----

Elements	Molality	Moles
Al	1.986e-04	1.986e-04
Ca	1.514e-02	1.514e-02
Cd	3.660e-07	3.660e-07
Cl	2.733e-01	2.733e-01
Co	4.224e-04	4.224e-04
Cu	1.504e-04	1.504e-04
Fe	1.726e-02	1.726e-02
Hg	2.051e-09	2.051e-09
K	5.682e-03	5.682e-03
Mg	5.671e-02	5.671e-02
Mn	3.202e-03	3.202e-03
N	4.406e-03	4.406e-03
Na	2.631e-01	2.631e-01
Ni	9.762e-05	9.762e-05

P	7.837e-04	7.837e-04
Pb	4.964e-08	4.964e-08
S(6)	9.754e-02	9.754e-02
Se	1.042e-06	1.042e-06
Zn	2.800e-05	2.800e-05

-----Description of solution-----

pH	=	5.050
pe	=	1.000
Activity of water	=	0.988
Ionic strength (mol/kgw)	=	4.862e-01
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	1.381e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	21.00
Electrical balance (eq)	=	-9.552e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.26
Iterations	=	14
Total H	=	1.110329e+02
Total O	=	5.590014e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.214e-05	8.913e-06	-4.916	-5.050	-0.134	0.00
OH-	1.292e-09	8.222e-10	-8.889	-9.085	-0.196	(0)
H2O	5.551e+01	9.883e-01	1.744	-0.005	0.000	18.05
Al	1.986e-04					
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Al+3	1.839e-05	1.139e-06	-4.735	-5.943	-1.208	(0)
AlOH+2	4.197e-06	9.786e-07	-5.377	-6.009	-0.632	(0)
Al(OH)2+	1.624e-06	1.128e-06	-5.790	-5.948	-0.158	(0)
Al(OH)3	2.514e-08	2.514e-08	-7.600	-7.600	0.000	(0)
Al(OH)4-	2.040e-09	1.366e-09	-8.690	-8.864	-0.174	(0)
Ca	1.514e-02					
Ca+2	8.161e-03	2.370e-03	-2.088	-2.625	-0.537	(0)
CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
CaOH+	5.236e-11	3.715e-11	-10.281	-10.430	-0.149	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
Cd	3.660e-07					
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
Cd(SO4)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
Cd+2	1.502e-08	4.363e-09	-7.823	-8.360	-0.537	(0)
CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CdOH+	6.462e-14	2.865e-14	-13.190	-13.543	-0.353	(0)
Cd2OH+3	9.945e-19	6.582e-22	-18.002	-21.182	-3.179	(0)
Cd(OH)2	2.726e-19	2.726e-19	-18.564	-18.564	0.000	(0)
Cd(OH)3-	4.195e-26	1.860e-26	-25.377	-25.730	-0.353	(0)
Cd(OH)4-2	8.799e-35	3.400e-36	-34.056	-35.469	-1.413	(0)
Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cl	2.733e-01					
Cl-	2.729e-01	2.003e-01	-0.564	-0.698	-0.134	(0)

CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(2)	4.224e-04					
Co+2	3.644e-04	1.408e-05	-3.438	-4.851	-1.413	(0)
CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CoOH+	7.075e-10	3.137e-10	-9.150	-9.504	-0.353	(0)
Co2OH+3	3.344e-13	2.213e-16	-12.476	-15.655	-3.179	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Co(OH)2	2.782e-14	2.782e-14	-13.556	-13.556	0.000	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Co(OH)3-	1.398e-21	6.199e-22	-20.854	-21.208	-0.353	(0)
CoOOH-	8.505e-23	3.771e-23	-22.070	-22.424	-0.353	(0)
Co4(OH)4+4	8.668e-25	1.932e-30	-24.062	-29.714	-5.652	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
Co(OH)4-2	2.839e-30	1.097e-31	-29.547	-30.960	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Co(3)	8.287e-32					
CoOH+2	8.232e-32	3.180e-33	-31.085	-32.498	-1.413	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co+3	9.049e-36	5.605e-37	-35.043	-36.251	-1.208	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
Cu(1)	1.504e-04					
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)

CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
Cu+	1.823e-08	8.082e-09	-7.739	-8.092	-0.353	(0)
Cu(2)	1.182e-09					
Cu+2	5.900e-10	1.714e-10	-9.229	-9.766	-0.537	(0)
CuS04	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
CuOH+	7.604e-13	4.972e-13	-12.119	-12.303	-0.185	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
Cu(OH)2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
Cu2(OH)2+2	1.564e-19	6.042e-21	-18.806	-20.219	-1.413	(0)
Cu(OH)3-	6.965e-22	3.088e-22	-21.157	-21.510	-0.353	(0)
Cu(OH)4-2	7.024e-29	2.714e-30	-28.153	-29.566	-1.413	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Fe(2)	1.726e-02					
Fe+2	1.529e-02	5.907e-04	-1.816	-3.229	-1.413	(0)
FeS04	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
FeH2P04+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
FeHP04	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
FeOH+	2.826e-08	1.934e-08	-7.549	-7.714	-0.165	(0)
Fe(OH)2	1.209e-14	1.209e-14	-13.918	-13.918	0.000	(0)
Fe(OH)3-	6.009e-18	4.111e-18	-17.221	-17.386	-0.165	(0)
Fe(3)	2.087e-10					
Fe(OH)2+	1.957e-10	1.360e-10	-9.708	-9.867	-0.158	(0)
FeHP04+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
FeOH+2	1.136e-12	2.489e-13	-11.945	-12.604	-0.659	(0)
Fe(OH)3	9.228e-14	9.228e-14	-13.035	-13.035	0.000	(0)
FeS04+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(S04)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
FeH2P04+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Fe+3	7.010e-15	4.342e-16	-14.154	-15.362	-1.208	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
Fe(OH)4-	2.440e-17	1.696e-17	-16.613	-16.771	-0.158	(0)
Fe2(OH)2+4	1.061e-18	2.365e-24	-17.974	-23.626	-5.652	(0)
Fe3(OH)4+5	3.023e-24	4.459e-33	-23.520	-32.351	-8.831	(0)
FeHSe03+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
H(0)	1.047e-15					
H2	5.235e-16	5.855e-16	-15.281	-15.232	0.049	(0)
Hg(0)	2.051e-09					
Hg	2.051e-09	2.051e-09	-8.688	-8.688	0.000	(0)
Hg(1)	9.698e-28					
Hg2+2	4.849e-28	1.874e-29	-27.314	-28.727	-1.413	(0)
Hg(2)	4.726e-15					
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Hg(OH)2	1.022e-25	1.143e-25	-24.991	-24.942	0.049	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
HgOH+	1.615e-27	7.162e-28	-26.792	-27.145	-0.353	(0)
Hg+2	4.674e-28	1.806e-29	-27.330	-28.743	-1.413	(0)
HgS04	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Hg(OH)3-	3.623e-35	1.606e-35	-34.441	-34.794	-0.353	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)

K	5.682e-03					
K+	5.178e-03	3.801e-03	-2.286	-2.420	-0.134	(0)
KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
Mg	5.671e-02					
Mg+2	3.360e-02	9.758e-03	-1.474	-2.011	-0.537	(0)
MgS04	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
MgH2P04+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
MgHP04	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
MgOH+	4.148e-09	2.990e-09	-8.382	-8.524	-0.142	(0)
MgP04-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
Mn(2)	3.202e-03					
Mn+2	2.899e-03	1.120e-04	-2.538	-3.951	-1.413	(0)
MnS04	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
MnOH+	3.381e-10	2.313e-10	-9.471	-9.636	-0.165	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Mn(OH)3-	3.538e-24	2.421e-24	-23.451	-23.616	-0.165	(0)
Mn(OH)4-2	3.983e-32	8.727e-33	-31.400	-32.059	-0.659	(0)
MnSe04	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
MnN03+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
Mn(N03)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Mn(3)	4.471e-28					
Mn+3	4.471e-28	2.769e-29	-27.350	-28.558	-1.208	(0)
Mn(6)	0.000e+00					
Mn04-2	0.000e+00	0.000e+00	-79.028	-79.687	-0.659	(0)
Mn(7)	0.000e+00					
Mn04-	0.000e+00	0.000e+00	-88.115	-88.325	-0.210	(0)
N(-3)	4.406e-03					
NH4+	3.919e-03	2.335e-03	-2.407	-2.632	-0.225	(0)
NH4S04-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
NH3	1.123e-07	1.123e-07	-6.950	-6.950	0.000	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
N(3)	0.000e+00					
N02-	0.000e+00	0.000e+00	-47.968	-48.177	-0.210	(0)
CoN02+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CuN02+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
Cu(N02)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-64.954	-65.088	-0.134	(0)
CaN03+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
MnN03+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
NiN03+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
CoN03+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
ZnN03+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
CdN03+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
PbN03+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
CuN03+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
FeN03+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)

HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
Na	2.631e-01					
Na+	2.447e-01	1.796e-01	-0.611	-0.746	-0.134	(0)
NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
Ni	9.762e-05					
Ni+2	4.671e-05	1.357e-05	-4.331	-4.867	-0.537	(0)
NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
Ni(SO4)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
NiOH+	3.238e-10	1.435e-10	-9.490	-9.843	-0.353	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Ni(OH)2	1.692e-14	1.692e-14	-13.772	-13.772	0.000	(0)
Ni(OH)3-	4.261e-20	1.889e-20	-19.371	-19.724	-0.353	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-63.001	-62.952	0.049	(0)
P	7.837e-04					
H2PO4-	4.270e-04	2.967e-04	-3.370	-3.528	-0.158	(0)
MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
MgHPO4	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
HPO4-2	9.473e-06	2.076e-06	-5.024	-5.683	-0.659	(0)
NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
H3PO4	3.560e-07	3.560e-07	-6.449	-6.449	0.000	(0)
KHPO4-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
MgPO4-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
PO4-3	1.460e-12	9.045e-14	-11.836	-13.044	-1.208	(0)
FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Pb	4.964e-08					
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
Pb(SO4)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
Pb+2	3.636e-09	1.056e-09	-8.439	-8.976	-0.537	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
PbOH+	6.682e-12	2.963e-12	-11.175	-11.528	-0.353	(0)
Pb(OH)2	1.046e-16	1.046e-16	-15.980	-15.980	0.000	(0)
Pb2OH+3	7.494e-17	4.960e-20	-16.125	-19.305	-3.179	(0)
Pb(OH)3-	2.635e-22	1.168e-22	-21.579	-21.933	-0.353	(0)
Pb(OH)4-2	8.268e-28	3.195e-29	-27.083	-28.496	-1.413	(0)
Pb3(OH)4+2	3.173e-30	1.226e-31	-29.499	-30.912	-1.413	(0)
Pb4(OH)4+4	5.352e-31	1.193e-36	-30.271	-35.923	-5.652	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
S(6)	9.754e-02					
SO4-2	4.586e-02	1.332e-02	-1.339	-1.875	-0.537	(0)
MgSO4	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
FeSO4	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)

KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
NH4S04-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
MnS04	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
AlS04+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
CoS04	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
NiS04	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
Al(S04)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Zn(S04)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
HS04-	1.536e-05	1.028e-05	-4.814	-4.988	-0.174	(0)
ZnS04	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
Ni(S04)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
Cd(S04)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
Pb(S04)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
CdS04	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
PbS04	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
CuS04	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
FeS04+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(S04)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
HgS04	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Se(-2)	1.042e-06					
HSe-	1.012e-06	4.485e-07	-5.995	-6.348	-0.353	(0)
H2Se	3.047e-08	3.047e-08	-7.516	-7.516	0.000	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Se-2	1.000e-15	3.865e-17	-15.000	-16.413	-1.413	(0)
Se(4)	2.708e-15					
HSeO3-	2.690e-15	1.193e-15	-14.570	-14.923	-0.353	(0)
SeO3-2	1.341e-17	5.183e-19	-16.872	-18.285	-1.413	(0)
H2SeO3	4.383e-18	4.383e-18	-17.358	-17.358	0.000	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
Se(6)	9.467e-35					
SeO4-2	9.354e-35	2.717e-35	-34.029	-34.566	-0.537	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
HSeO4-	2.413e-38	1.070e-38	-37.617	-37.971	-0.353	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn	2.800e-05					
Zn(S04)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
Zn+2	6.051e-06	1.758e-06	-5.218	-5.755	-0.537	(0)
ZnS04	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
ZnOH+	3.259e-10	1.445e-10	-9.487	-9.840	-0.353	(0)
Zn(OH)2	3.473e-14	3.473e-14	-13.459	-13.459	0.000	(0)
Zn(OH)3-	4.384e-19	1.944e-19	-18.358	-18.711	-0.353	(0)
Zn(OH)4-2	2.236e-25	8.641e-27	-24.650	-26.063	-1.413	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	161.31	-155.03	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-30.79	-26.25	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-38.05	-26.26	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-234.94	-217.01	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-43.95	-23.84	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-40.28	-39.83	0.45	(NH4)2SeO4

Al(OH)3(am)	-1.87	9.19	11.06	Al(OH)3
Al2O3	-1.87	18.40	20.27	Al2O3
Al4(OH)10SO4	2.10	24.80	22.70	Al4(OH)10SO4
AlOHSO4	0.46	-2.77	-3.23	AlOHSO4
Alunite	7.17	6.27	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.03	-10.85	-7.82	PbSO4
Anhydrite	-0.16	-4.50	-4.34	CaSO4
Antlerite	-19.78	-10.99	8.79	Cu3(OH)4SO4
Atacamite	-12.71	-5.10	7.61	Cu2(OH)3Cl
Bianchite	-5.90	-7.66	-1.76	ZnSO4:6H2O
Birnessite	-25.46	-7.37	18.09	MnO2
Bixbyite	-26.48	-26.83	-0.35	Mn2O3
Boehmite	0.34	9.20	8.86	AlOOH
Brochantite	-26.38	-10.67	15.71	Cu4(OH)6SO4
Brucite	-9.04	8.08	17.12	Mg(OH)2
Bunsenite	-7.46	5.23	12.68	NiO
Ca3(PO4)2(beta)	-4.91	-33.96	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-7.62	-54.70	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.37	-20.72	-19.35	CaHP04
CaHP04:2H2O	-1.68	-20.73	-19.05	CaHP04:2H2O
Calomel	-11.99	-30.12	-18.13	Hg2Cl2
CaSeO3:2H2O	-15.37	-12.51	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-34.20	-37.20	-3.00	CaSeO4:2H2O
Cd(OH)2	-12.14	1.73	13.87	Cd(OH)2
Cd(OH)2(am)	-12.21	1.73	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-25.45	-18.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-29.34	-6.78	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-18.57	-51.17	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-33.45	-5.05	28.40	Cd4(OH)6SO4
CdCl2	-9.14	-9.76	-0.61	CdCl2
CdCl2:1H2O	-8.09	-9.76	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-7.84	-9.77	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.05	-10.36	13.69	Cd
Cdmetal(gamma)	-24.16	-10.36	13.80	Cd
CdOHCl	-7.62	-4.01	3.61	CdOHCl
CdSe	10.72	-9.66	-20.38	CdSe
CdSeO4:2H2O	-41.09	-42.94	-1.85	CdSeO4:2H2O
CdSO4	-10.19	-10.24	-0.05	CdSO4
CdSO4:1H2O	-8.59	-10.24	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-8.42	-10.25	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.01	-11.67	-2.65	CuSO4:5H2O
Clausthalite	17.11	-10.27	-27.39	PbSe
Co(OH)2	-7.86	5.24	13.09	Co(OH)2
Co(OH)3	-19.03	-21.12	-2.09	Co(OH)3
Co3(PO4)2	-5.95	-40.64	-34.69	Co3(PO4)2
Co3O4	-26.74	-36.97	-10.24	Co3O4
CoCl2	-14.71	-6.25	8.46	CoCl2
CoCl2:6H2O	-8.80	-6.28	2.52	CoCl2:6H2O
CoFe2O4	7.95	4.80	-3.15	CoFe2O4
CoHP04	-3.88	-22.95	-19.06	CoHP04
CoO	-8.60	5.24	13.84	CoO
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-16.04	-14.72	1.32	CoSeO3
CoSeO4:6H2O	-37.92	-39.45	-1.53	CoSeO4:6H2O
CoSO4	-9.72	-6.73	2.99	CoSO4
CoSO4:6H2O	-4.28	-6.76	-2.48	CoSO4:6H2O
Cotunnite	-5.53	-10.37	-4.84	PbCl2
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.91	-69.49	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.83	-17.48	-46.31	Cu2Se
Cu2SO4	-16.16	-18.06	-1.90	Cu2SO4
Cu3(PO4)2	-18.54	-55.39	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-20.28	-55.40	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	35.75	-28.55	-64.30	Cu3Se2
Cumetal	-0.17	-9.09	-8.93	Cu
CuOCuSO4	-21.94	-11.31	10.63	CuOCuSO4
Cupricferrite	-6.60	-0.11	6.49	CuFe2O4
Cuprite	-4.98	-6.09	-1.11	Cu2O

Cuprousferrite	5.61	-3.27	-8.88	CuFeO2
CuSe	22.32	-11.06	-33.39	CuSe
CuSe2	23.34	-10.36	-33.70	CuSe2
CuSeO3:2H2O	-20.25	-19.65	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-41.92	-44.36	-2.44	CuSeO4:5H2O
CuSO4	-14.76	-11.64	3.11	CuSO4
Diaspore	2.08	9.20	7.12	AlOOH
Epsomite	-1.77	-3.92	-2.15	MgSO4:7H2O
Fe(OH)2	-6.70	6.86	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.09	-1.95	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-21.97	-20.42	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-39.73	-60.36	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-33.19	-36.35	-3.16	Fe2(SO4)3
Fe3(OH)8	-13.82	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.59	-0.23	3.37	Fe(OH)3
Ferroselite	14.88	-3.83	-18.71	FeSe2
FeSe	6.48	-4.53	-11.00	FeSe
Gibbsite	0.67	9.19	8.52	Al(OH)3
Goethite	-0.86	-0.22	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4:7H2O
Gypsum	0.10	-4.51	-4.61	CaSO4:2H2O
H-Jarosite	-13.07	-24.62	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-6.47	-11.40	-4.92	H2Se
Halite	-3.04	-1.44	1.59	NaCl
Hausmannite	-31.51	30.53	62.03	Mn3O4
Hematite	0.67	-0.44	-1.11	Fe2O3
Hercynite	1.62	25.26	23.64	FeAl2O4
Hg(g)	-7.44	-15.36	-7.93	Hg
Hg(OH)2	-21.45	-24.94	-3.50	Hg(OH)2
Hg2(g)	-15.63	-30.73	-15.09	Hg2
Hg2(OH)2	-23.90	-18.64	5.26	Hg2(OH)2
Hg2HPO4	-22.05	-46.82	-24.77	Hg2HPO4
Hg2SeO3	-33.94	-38.60	-4.66	Hg2SeO3
Hg2SO4	-24.46	-30.60	-6.14	Hg2SO4
HgCl(g)	-34.94	-15.06	19.88	HgCl
HgCl2	-14.91	-36.43	-21.52	HgCl2
Hgmetal(l)	-1.71	-15.36	-13.65	Hg
HgSe	19.36	-36.33	-55.69	HgSe
HgSeO3	-32.48	-44.91	-12.43	HgSeO3
HgSO4	-27.45	-36.91	-9.45	HgSO4
Hinsdalite	-8.96	-11.46	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-2.88	-47.21	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-16.18	-78.97	-62.79	Pb5(PO4)3OH
K-Alum	-6.93	-12.18	-5.24	KAl(SO4)2:12H2O
K-Jarosite	-7.50	-21.99	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-38.68	-39.41	-0.73	K2SeO4
Langite	-28.56	-10.68	17.88	Cu4(OH)6SO4:H2O
Larnakite	-9.35	-9.73	-0.38	PbO:PbSO4
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.59	-0.22	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.73	1.12	12.85	PbO
Maghemite	-6.83	-0.44	6.39	Fe2O3
Magnesioferrite	-9.88	7.64	17.52	Fe2MgO4
Magnetite	2.53	6.43	3.90	Fe3O4
Manganite	-13.15	12.19	25.34	MnOOH
Massicot	-11.93	1.12	13.05	PbO
Melanothallite	-17.57	-11.16	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeSO4:7H2O
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(PO4)2	-8.84	-32.12	-23.28	Mg3(PO4)2
MgHPO4:3H2O	-1.94	-20.12	-18.18	MgHPO4:3H2O
MgSeO3:6H2O	-14.96	-11.91	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-35.41	-36.61	-1.20	MgSeO4:6H2O
Minium	-59.08	15.45	74.53	Pb3O4
Mirabilite	-2.11	-3.42	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-57.42	-62.74	-5.32	Mn2(SO4)3
Mn3(PO4)2	-14.09	-37.94	-23.85	Mn3(PO4)2

MnCl ₂ :4H ₂ O	-8.11	-5.37	2.74	MnCl ₂ :4H ₂ O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnSe	-8.98	-5.25	3.73	MnSe
MnSe03	-14.95	-13.82	1.13	MnSe03
MnSe03:2H ₂ O	-14.80	-13.83	0.96	MnSe03:2H ₂ O
MnSe04:5H ₂ O	-36.49	-38.54	-2.05	MnSe04:5H ₂ O
MnS04	-8.56	-5.83	2.74	MnS04
Monteponite	-13.62	1.73	15.35	Cd0
Montroydite	-21.39	-24.94	-3.55	Hg0
Morenosite	-4.60	-6.78	-2.17	NiS04:7H ₂ O
Na-Jarosite	-9.47	-20.31	-10.84	NaFe ₃ (S04) ₂ (OH) ₆
Na ₂ Se03:5H ₂ O	-21.69	-11.39	10.30	Na ₂ Se03:5H ₂ O
Na ₂ Se04	-37.34	-36.06	1.28	Na ₂ Se04
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni(OH) ₂	-7.80	5.22	13.02	Ni(OH) ₂
Ni ₃ (P04) ₂	-9.39	-40.69	-31.30	Ni ₃ (P04) ₂
Ni ₄ (OH) ₆ S04	-23.08	8.92	32.00	Ni ₄ (OH) ₆ S04
NiSe	11.53	-6.17	-17.70	NiSe
NiSe03:2H ₂ O	-17.64	-14.75	2.89	NiSe03:2H ₂ O
NiSe04:6H ₂ O	-37.94	-39.46	-1.52	NiSe04:6H ₂ O
Nsutite	-24.87	-7.37	17.50	Mn02
O2(g)	-60.26	24.19	84.45	O2
Pb(OH) ₂	-7.18	1.11	8.29	Pb(OH) ₂
Pb ₂ (OH) ₃ Cl	-12.31	-3.52	8.79	Pb ₂ (OH) ₃ Cl
Pb ₂ O(OH) ₂	-23.96	2.23	26.19	Pb ₂ O(OH) ₂
Pb ₂ O ₃	-46.71	14.33	61.04	Pb ₂ O ₃
Pb ₃ (P04) ₂	-9.49	-53.02	-43.53	Pb ₃ (P04) ₂
Pb ₃ O ₂ S04	-19.49	-8.61	10.87	Pb ₃ O ₂ S04
Pb ₄ (OH) ₆ S04	-28.61	-7.51	21.10	Pb ₄ (OH) ₆ S04
Pb ₄ O ₃ S04	-29.70	-7.50	22.20	Pb ₄ O ₃ S04
PbHP04	-3.26	-27.07	-23.81	PbHP04
Pbmetal	-15.22	-10.98	4.24	Pb
PbO:0.3H ₂ O	-11.86	1.12	12.98	PbO:0.33H ₂ O
PbSe04	-36.67	-43.54	-6.88	PbSe04
Periclase	-13.86	8.08	21.94	Mg0
Plattnerite	-37.09	13.21	50.31	Pb02
Plumbgummite	5.12	-27.67	-32.79	PbAl ₃ (P04) ₂ (OH) ₅ :H ₂ O
Portlandite	-15.65	7.46	23.11	Ca(OH) ₂
Pyrochroite	-9.29	6.14	15.43	Mn(OH) ₂
Pyrolusite	-23.79	18.24	42.03	Mn02
Pyromorphite	-0.28	-84.71	-84.43	Pb ₅ (P04) ₃ Cl
Retgersite	-4.72	-6.77	-2.05	NiS04:6H ₂ O
Semetal(am)	7.84	0.70	-7.14	Se
Semetal(hex)	8.45	0.70	-7.75	Se
Se02	-20.09	-19.97	0.12	Se02
Se03	-66.05	-44.66	21.39	Se03
Spinel	-11.29	26.48	37.77	MgAl ₂ O ₄
Strengite	-2.04	-28.42	-26.38	FeP04:2H ₂ O
Tenorite	-7.47	0.33	7.80	Cu0
Thenardite	-3.71	-3.37	0.34	Na ₂ S04
Tsumebite	-15.85	-25.64	-9.79	Pb ₂ CuP04(OH) ₃ :3H ₂ O
Vivianite	0.19	-35.81	-36.00	Fe ₃ (P04) ₂ :8H ₂ O
Zincite	-7.21	4.34	11.55	Zn0
Zincosite	-11.76	-7.63	4.13	ZnS04
Zn(NO ₃) ₂ :6H ₂ O	-139.22	-135.96	3.26	Zn(NO ₃) ₂ :6H ₂ O
Zn(OH) ₂	-7.87	4.33	12.20	Zn(OH) ₂
Zn(OH) ₂ (am)	-8.33	4.33	12.67	Zn(OH) ₂
Zn(OH) ₂ (beta)	-7.62	4.33	11.95	Zn(OH) ₂
Zn(OH) ₂ (epsilon)	-7.39	4.33	11.73	Zn(OH) ₂
Zn(OH) ₂ (gamma)	-7.40	4.33	11.73	Zn(OH) ₂
Zn ₂ (OH) ₂ S04	-10.80	-3.30	7.50	Zn ₂ (OH) ₂ S04
Zn ₂ (OH) ₃ Cl	-12.26	2.93	15.19	Zn ₂ (OH) ₃ Cl
Zn ₃ (P04) ₂ :4H ₂ O	-7.95	-43.37	-35.42	Zn ₃ (P04) ₂ :4H ₂ O
Zn ₃ O(S04) ₂	-30.45	-10.92	19.53	Zn ₃ O(S04) ₂
Zn ₄ (OH) ₆ S04	-23.03	5.37	28.40	Zn ₄ (OH) ₆ S04
Zn ₅ (OH) ₈ Cl ₂	-28.31	10.19	38.50	Zn ₅ (OH) ₈ Cl ₂
ZnCl ₂	-14.37	-7.15	7.22	ZnCl ₂
Znmetal	-33.91	-7.76	26.15	Zn

ZnO(active)	-7.06	4.34	11.40	ZnO
ZnSe	7.41	-7.05	-14.46	ZnSe
ZnSeO4:6H2O	-38.83	-40.35	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.10	-7.64	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Initial solution 3.

-----Solution composition-----

Elements	Molality	Moles
Al	5.284e-05	5.284e-05
As	2.680e-08	2.680e-08
B	9.287e-06	9.287e-06
Ba	2.924e-07	2.924e-07
Be	2.228e-07	2.228e-07
Ca	1.308e-02	1.308e-02
Cd	7.145e-09	7.145e-09
Cl	1.388e-02	1.388e-02
Co	1.227e-05	1.227e-05
Cr	6.372e-08	6.372e-08
Cu	9.874e-05	9.874e-05
Fe	4.435e-04	4.435e-04
K	6.291e-03	6.291e-03
Mg	3.635e-03	3.635e-03
Mn	9.539e-05	9.539e-05
Mo	1.151e-06	1.151e-06
N	7.218e-04	7.218e-04
Na	1.498e-02	1.498e-02
Ni	8.382e-06	8.382e-06
P	9.400e-06	9.400e-06
Pb	9.691e-08	9.691e-08
S(6)	2.322e-02	2.322e-02
Se	1.271e-07	1.271e-07
Zn	7.523e-06	7.523e-06

-----Description of solution-----

pH	=	4.050
pe	=	4.000
Activity of water	=	0.999
Ionic strength (mol/kgw)	=	7.235e-02
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	-1.741e-04
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	20.00
Electrical balance (eq)	=	-3.291e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	-3.64
Iterations	=	12
Total H	=	1.110168e+02
Total O	=	5.559979e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm³/mol
H+	1.112e-04	8.913e-05	-3.954	-4.050	-0.096	0.00
OH-	9.765e-11	7.686e-11	-10.010	-10.114	-0.104	(0)
H2O	5.551e+01	9.988e-01	1.744	-0.001	0.000	18.05
Al	5.284e-05					
AlSO4+	4.325e-05	3.456e-05	-4.364	-4.461	-0.097	(0)
Al+3	5.995e-06	8.162e-07	-5.222	-6.088	-0.866	(0)
Al(SO4)2-	3.425e-06	2.737e-06	-5.465	-5.563	-0.097	(0)

AlOH+2	1.549e-07	6.629e-08	-6.810	-7.179	-0.369	(0)
Al(OH)2+	1.021e-08	8.256e-09	-7.991	-8.083	-0.092	(0)
Al(OH)3	1.859e-11	1.859e-11	-10.731	-10.731	0.000	(0)
Al(OH)4-	1.003e-13	8.018e-14	-12.999	-13.096	-0.097	(0)
AlMo6021-3	3.639e-15	2.171e-16	-14.439	-15.663	-1.224	(0)
As(3)	2.521e-08					
H3AsO3	2.521e-08	2.521e-08	-7.598	-7.598	0.000	(0)
H4AsO3+	1.523e-12	1.113e-12	-11.817	-11.953	-0.136	(0)
H2AsO3-	1.643e-13	1.201e-13	-12.784	-12.920	-0.136	(0)
HAsO3-2	3.453e-21	9.864e-22	-20.462	-21.006	-0.544	(0)
AsO3-3	6.008e-30	3.584e-31	-29.221	-30.446	-1.224	(0)
As(5)	1.588e-09					
H2AsO4-	1.567e-09	1.145e-09	-8.805	-8.941	-0.136	(0)
H3AsO4	1.662e-11	1.690e-11	-10.779	-10.772	0.007	(0)
HAsO4-2	4.832e-12	1.380e-12	-11.316	-11.860	-0.544	(0)
AsO4-3	7.304e-19	4.357e-20	-18.136	-19.361	-1.224	(0)
B	9.287e-06					
H3BO3	9.287e-06	9.443e-06	-5.032	-5.025	0.007	(0)
H2BO3-	7.274e-11	5.627e-11	-10.138	-10.250	-0.111	(0)
CaH2BO3+	1.376e-11	1.065e-11	-10.861	-10.973	-0.111	(0)
MgH2BO3+	2.559e-12	1.980e-12	-11.592	-11.703	-0.111	(0)
NaH2BO3	1.131e-12	1.131e-12	-11.947	-11.947	0.000	(0)
H5(BO3)2-	6.034e-16	4.668e-16	-15.219	-15.331	-0.111	(0)
BaH2BO3+	2.636e-16	2.039e-16	-15.579	-15.691	-0.111	(0)
H8(BO3)3-	4.932e-19	3.815e-19	-18.307	-18.418	-0.111	(0)
Ba	2.924e-07					
Ba+2	2.924e-07	1.205e-07	-6.534	-6.919	-0.385	(0)
BaNH3+2	8.904e-16	2.544e-16	-15.050	-15.595	-0.544	(0)
BaH2BO3+	2.636e-16	2.039e-16	-15.579	-15.691	-0.111	(0)
BaOH+	4.857e-17	3.908e-17	-16.314	-16.408	-0.094	(0)
BaN03+	0.000e+00	0.000e+00	-58.243	-58.379	-0.136	(0)
Be	2.228e-07					
Be+2	1.589e-07	6.549e-08	-6.799	-7.184	-0.385	(0)
BeS04	5.495e-08	5.495e-08	-7.260	-7.260	0.000	(0)
Be(S04)2-2	3.956e-09	1.130e-09	-8.403	-8.947	-0.544	(0)
BeOH+	3.590e-09	2.942e-09	-8.445	-8.531	-0.086	(0)
BeCl+	1.430e-09	1.151e-09	-8.845	-8.939	-0.094	(0)
Be(OH)2	2.095e-13	2.095e-13	-12.679	-12.679	0.000	(0)
Be2OH+3	1.919e-13	3.197e-14	-12.717	-13.495	-0.778	(0)
Be3(OH)3+3	3.696e-18	6.156e-19	-17.432	-18.211	-0.778	(0)
Be(OH)3-	7.246e-19	5.938e-19	-18.140	-18.226	-0.086	(0)
Be(OH)4-2	9.377e-29	4.228e-29	-28.028	-28.374	-0.346	(0)
Ca	1.308e-02					
Ca+2	8.199e-03	3.380e-03	-2.086	-2.471	-0.385	(0)
CaS04	4.877e-03	4.877e-03	-2.312	-2.312	0.000	(0)
CaH2P04+	5.618e-07	4.544e-07	-6.250	-6.343	-0.092	(0)
CaHP04	6.463e-09	6.463e-09	-8.190	-8.190	0.000	(0)
CaNH3+2	4.981e-11	1.423e-11	-10.303	-10.847	-0.544	(0)
CaH2BO3+	1.376e-11	1.065e-11	-10.861	-10.973	-0.111	(0)
CaOH+	6.009e-12	4.895e-12	-11.221	-11.310	-0.089	(0)
CaP04-	2.137e-13	1.729e-13	-12.670	-12.762	-0.092	(0)
Ca(NH3)2+2	6.632e-20	1.894e-20	-19.178	-19.723	-0.544	(0)
CaN03+	0.000e+00	0.000e+00	-54.018	-54.154	-0.136	(0)
Cd	7.145e-09					
Cd+2	2.961e-09	1.221e-09	-8.529	-8.913	-0.385	(0)
CdS04	1.783e-09	1.783e-09	-8.749	-8.749	0.000	(0)
CdCl+	1.752e-09	1.281e-09	-8.757	-8.893	-0.136	(0)
Cd(S04)2-2	5.911e-10	1.689e-10	-9.228	-9.772	-0.544	(0)
CdCl2	5.825e-11	5.825e-11	-10.235	-10.235	0.000	(0)
CdCl3-	5.300e-13	3.875e-13	-12.276	-12.412	-0.136	(0)
CdOHC1	5.266e-15	5.266e-15	-14.279	-14.279	0.000	(0)
CdOH+	1.026e-15	7.503e-16	-14.989	-15.125	-0.136	(0)
Cd(OH)2	7.790e-22	7.790e-22	-21.108	-21.108	0.000	(0)
Cd2OH+3	8.185e-23	4.883e-24	-22.087	-23.311	-1.224	(0)
Cd(Se03)2-2	5.753e-26	1.643e-26	-25.240	-25.784	-0.544	(0)
Cd(OH)3-	7.346e-30	5.370e-30	-29.134	-29.270	-0.136	(0)
CdSe04	3.576e-31	3.576e-31	-30.447	-30.447	0.000	(0)
Cd(OH)4-2	3.472e-40	0.000e+00	-39.459	-40.004	-0.544	(0)

	CdNO3+	0.000e+00	0.000e+00	-60.413	-60.549	-0.136	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-113.111	-113.111	0.000	(0)
Cl		1.388e-02					
	Cl-	1.381e-02	1.106e-02	-1.860	-1.956	-0.096	(0)
	CuCl2-	2.907e-05	2.306e-05	-4.537	-4.637	-0.101	(0)
	CuCl	9.858e-06	9.858e-06	-5.006	-5.006	0.000	(0)
	MnCl+	3.569e-07	2.872e-07	-6.447	-6.542	-0.094	(0)
	CuCl+	3.164e-07	2.510e-07	-6.500	-6.600	-0.101	(0)
	CoCl+	1.315e-07	9.612e-08	-6.881	-7.017	-0.136	(0)
	CuCl3-2	1.276e-07	5.349e-08	-6.894	-7.272	-0.378	(0)
	NiCl+	8.574e-08	6.268e-08	-7.067	-7.203	-0.136	(0)
	ZnCl+	6.136e-08	4.867e-08	-7.212	-7.313	-0.101	(0)
	PbCl+	7.379e-09	5.395e-09	-8.132	-8.268	-0.136	(0)
	MnCl2	4.488e-09	4.488e-09	-8.348	-8.348	0.000	(0)
	CdCl+	1.752e-09	1.281e-09	-8.757	-8.893	-0.136	(0)
	BeCl+	1.430e-09	1.151e-09	-8.845	-8.939	-0.094	(0)
	CuCl2	7.521e-10	7.521e-10	-9.124	-9.124	0.000	(0)
	ZnCl2	6.866e-10	6.866e-10	-9.163	-9.163	0.000	(0)
	PbCl2	2.606e-10	2.606e-10	-9.584	-9.584	0.000	(0)
	CrCl+2	6.429e-11	1.836e-11	-10.192	-10.736	-0.544	(0)
	CdCl2	5.825e-11	5.825e-11	-10.235	-10.235	0.000	(0)
	MnCl3-	1.700e-11	1.367e-11	-10.770	-10.864	-0.094	(0)
	ZnOHCl	7.463e-12	7.463e-12	-11.127	-11.127	0.000	(0)
	ZnCl3-	7.451e-12	5.911e-12	-11.128	-11.228	-0.101	(0)
	NiCl2	3.540e-12	3.540e-12	-11.451	-11.451	0.000	(0)
	PbCl3-	1.659e-12	1.213e-12	-11.780	-11.916	-0.136	(0)
	CdCl3-	5.300e-13	3.875e-13	-12.276	-12.412	-0.136	(0)
	CuCl3-	8.945e-14	7.096e-14	-13.048	-13.149	-0.101	(0)
	ZnCl4-2	7.493e-14	3.140e-14	-13.125	-13.503	-0.378	(0)
	FeCl+2	4.146e-14	1.738e-14	-13.382	-13.760	-0.378	(0)
	PbCl4-2	1.993e-14	5.694e-15	-13.700	-14.245	-0.544	(0)
	CrCl2+	1.693e-14	1.238e-14	-13.771	-13.907	-0.136	(0)
	CdOHCl	5.266e-15	5.266e-15	-14.279	-14.279	0.000	(0)
	FeCl2+	1.250e-15	1.006e-15	-14.903	-14.997	-0.094	(0)
	CrOHCl2	2.136e-16	2.136e-16	-15.670	-15.670	0.000	(0)
	CuCl4-2	1.113e-17	4.664e-18	-16.954	-17.331	-0.378	(0)
	FeCl3	1.113e-18	1.113e-18	-17.954	-17.954	0.000	(0)
	CoCl+2	7.155e-34	2.044e-34	-33.145	-33.690	-0.544	(0)
	CrO3Cl-	0.000e+00	0.000e+00	-44.667	-44.803	-0.136	(0)
	Cr(NH3)6Cl+2	0.000e+00	0.000e+00	-47.366	-47.910	-0.544	(0)
	Co(NH3)5Cl+2	0.000e+00	0.000e+00	-49.862	-50.406	-0.544	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-65.026	-65.570	-0.544	(0)
Co(2)		1.227e-05					
	Co+2	8.914e-06	2.546e-06	-5.050	-5.594	-0.544	(0)
	CoSO4	3.220e-06	3.220e-06	-5.492	-5.492	0.000	(0)
	CoCl+	1.315e-07	9.612e-08	-6.881	-7.017	-0.136	(0)
	CoHP04	1.139e-11	1.139e-11	-10.944	-10.944	0.000	(0)
	CoOH+	7.843e-12	5.734e-12	-11.106	-11.242	-0.136	(0)
	Co(NH3)+2	5.605e-12	1.601e-12	-11.251	-11.796	-0.544	(0)
	Co(OH)2	5.139e-17	5.139e-17	-16.289	-16.289	0.000	(0)
	Co2OH+3	1.226e-17	7.317e-19	-16.911	-18.136	-1.224	(0)
	Co(NH3)2+2	5.113e-19	1.461e-19	-18.291	-18.835	-0.544	(0)
	Co(OH)3-	1.583e-25	1.157e-25	-24.801	-24.937	-0.136	(0)
	Co(NH3)3+2	2.153e-26	6.150e-27	-25.667	-26.211	-0.544	(0)
	CoOOH-	6.625e-27	4.844e-27	-26.179	-26.315	-0.136	(0)
	CoSeO4	1.849e-27	1.849e-27	-26.733	-26.733	0.000	(0)
	Co(NH3)4+2	3.778e-34	1.079e-34	-33.423	-33.967	-0.544	(0)
	Co4(OH)4+4	3.238e-35	2.156e-37	-34.490	-36.666	-2.177	(0)
	Co(OH)4-2	7.245e-36	2.070e-36	-35.140	-35.684	-0.544	(0)
	Co(NH3)5+2	0.000e+00	0.000e+00	-41.678	-42.223	-0.544	(0)
	CoNO2+	0.000e+00	0.000e+00	-43.791	-43.927	-0.136	(0)
	CoNO3+	0.000e+00	0.000e+00	-57.457	-57.593	-0.136	(0)
	Co(NO3)2	0.000e+00	0.000e+00	-109.483	-109.483	0.000	(0)
Co(3)		2.050e-31					
	CoOH+2	2.035e-31	5.813e-32	-30.691	-31.236	-0.544	(0)
	Co+3	7.446e-34	1.014e-34	-33.128	-33.994	-0.866	(0)
	CoCl+2	7.155e-34	2.044e-34	-33.145	-33.690	-0.544	(0)
	Co(NH3)5Cl+2	0.000e+00	0.000e+00	-49.862	-50.406	-0.544	(0)

Co(NH3)6SO4+	0.000e+00	0.000e+00	-60.792	-60.928	-0.136	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-65.026	-65.570	-0.544	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-68.505	-69.050	-0.544	(0)
Cr(2)	5.033e-20					
Cr+2	5.033e-20	1.438e-20	-19.298	-19.842	-0.544	(0)
Cr(3)	6.372e-08					
CrSO4+	2.618e-08	1.914e-08	-7.582	-7.718	-0.136	(0)
Cr+3	2.571e-08	1.534e-09	-7.590	-8.814	-1.224	(0)
Cr(OH)+2	9.288e-09	2.653e-09	-8.032	-8.576	-0.544	(0)
CrOHSO4	2.437e-09	2.437e-09	-8.613	-8.613	0.000	(0)
CrCl+2	6.429e-11	1.836e-11	-10.192	-10.736	-0.544	(0)
Cr(OH)2+	2.915e-11	2.131e-11	-10.535	-10.671	-0.136	(0)
CrH2PO4+2	7.383e-12	2.109e-12	-11.132	-11.676	-0.544	(0)
CrCl2+	1.693e-14	1.238e-14	-13.771	-13.907	-0.136	(0)
Cr2(OH)2SO4+2	1.197e-15	3.419e-16	-14.922	-15.466	-0.544	(0)
Cr(OH)3	9.036e-16	9.036e-16	-15.044	-15.044	0.000	(0)
CrOHCl2	2.136e-16	2.136e-16	-15.670	-15.670	0.000	(0)
Cr2(OH)2(SO4)2	1.343e-16	1.343e-16	-15.872	-15.872	0.000	(0)
CrO2-	6.593e-21	4.820e-21	-20.181	-20.317	-0.136	(0)
Cr(OH)4-	5.552e-21	4.059e-21	-20.256	-20.392	-0.136	(0)
Cr(NH3)5OH+2	0.000e+00	0.000e+00	-40.611	-41.155	-0.544	(0)
Cr(NH3)6+3	0.000e+00	0.000e+00	-45.831	-47.056	-1.224	(0)
Cr(NH3)6Cl+2	0.000e+00	0.000e+00	-47.366	-47.910	-0.544	(0)
CrNO3+2	0.000e+00	0.000e+00	-62.020	-62.564	-0.544	(0)
Cr(6)	3.419e-40					
HCrO4-	3.419e-40	2.500e-40	-39.466	-39.602	-0.136	(0)
CrO4-2	0.000e+00	0.000e+00	-41.671	-42.056	-0.385	(0)
CrO3SO4-2	0.000e+00	0.000e+00	-42.797	-43.341	-0.544	(0)
NaCrO4-	0.000e+00	0.000e+00	-43.159	-43.295	-0.136	(0)
KCrO4-	0.000e+00	0.000e+00	-43.667	-43.803	-0.136	(0)
CrO3HP04-2	0.000e+00	0.000e+00	-43.693	-44.237	-0.544	(0)
H2CrO4	0.000e+00	0.000e+00	-43.854	-43.854	0.000	(0)
CrO3Cl-	0.000e+00	0.000e+00	-44.667	-44.803	-0.136	(0)
CrO3H2PO4-	0.000e+00	0.000e+00	-45.469	-45.605	-0.136	(0)
Cr2O7-2	0.000e+00	0.000e+00	-77.063	-77.607	-0.544	(0)
Cu(1)	4.003e-05					
CuCl2-	2.907e-05	2.306e-05	-4.537	-4.637	-0.101	(0)
CuCl	9.858e-06	9.858e-06	-5.006	-5.006	0.000	(0)
Cu+	9.682e-07	7.078e-07	-6.014	-6.150	-0.136	(0)
CuCl3-2	1.276e-07	5.349e-08	-6.894	-7.272	-0.378	(0)
Cu(2)	5.872e-05					
Cu+2	3.676e-05	1.515e-05	-4.435	-4.819	-0.385	(0)
CuSO4	2.163e-05	2.163e-05	-4.665	-4.665	0.000	(0)
CuCl+	3.164e-07	2.510e-07	-6.500	-6.600	-0.101	(0)
CuOH+	5.328e-09	4.227e-09	-8.273	-8.374	-0.101	(0)
CuNH3+2	2.979e-09	8.511e-10	-8.526	-9.070	-0.544	(0)
CuCl2	7.521e-10	7.521e-10	-9.124	-9.124	0.000	(0)
Cu2(OH)2+2	1.518e-12	4.336e-13	-11.819	-12.363	-0.544	(0)
Cu(OH)2	1.218e-13	1.218e-13	-12.914	-12.914	0.000	(0)
CuCl3-	8.945e-14	7.096e-14	-13.048	-13.149	-0.101	(0)
CuCl4-2	1.113e-17	4.664e-18	-16.954	-17.331	-0.378	(0)
Cu(OH)3-	3.855e-20	2.818e-20	-19.414	-19.550	-0.136	(0)
Cu(OH)4-2	8.762e-29	2.503e-29	-28.057	-28.602	-0.544	(0)
CuNO2+	0.000e+00	0.000e+00	-41.845	-41.981	-0.136	(0)
CuNO3+	0.000e+00	0.000e+00	-56.370	-56.506	-0.136	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-80.152	-80.152	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-109.617	-109.617	0.000	(0)
Fe(2)	4.435e-04					
Fe+2	3.080e-04	8.798e-05	-3.511	-4.056	-0.544	(0)
FeSO4	1.352e-04	1.352e-04	-3.869	-3.869	0.000	(0)
FeH2PO4+	3.142e-07	2.541e-07	-6.503	-6.595	-0.092	(0)
FeHP04	1.436e-09	1.436e-09	-8.843	-8.843	0.000	(0)
FeOH+	3.346e-10	2.692e-10	-9.475	-9.570	-0.094	(0)
Fe(OH)2	1.556e-17	1.556e-17	-16.808	-16.808	0.000	(0)
Fe(OH)3-	6.584e-22	5.298e-22	-21.182	-21.276	-0.094	(0)
Fe(3)	2.581e-10					
Fe(OH)2+	2.410e-10	1.949e-10	-9.618	-9.710	-0.092	(0)
FeOH+2	7.944e-12	3.329e-12	-11.100	-11.478	-0.378	(0)

FeS04+	4.732e-12	3.807e-12	-11.325	-11.419	-0.094	(0)
FeHP04+	3.147e-12	2.545e-12	-11.502	-11.594	-0.092	(0)
Fe(S04)2-	7.664e-13	5.603e-13	-12.116	-12.252	-0.136	(0)
Fe+3	4.475e-13	6.093e-14	-12.349	-13.215	-0.866	(0)
FeCl+2	4.146e-14	1.738e-14	-13.382	-13.760	-0.378	(0)
FeH2P04+2	1.558e-14	6.667e-15	-13.807	-14.176	-0.369	(0)
Fe(OH)3	1.156e-14	1.156e-14	-13.937	-13.937	0.000	(0)
FeCl2+	1.250e-15	1.006e-15	-14.903	-14.997	-0.094	(0)
FeHSe03+2	4.294e-17	1.227e-17	-16.367	-16.911	-0.544	(0)
FeCl3	1.113e-18	1.113e-18	-17.954	-17.954	0.000	(0)
Fe(OH)4-	3.068e-19	2.482e-19	-18.513	-18.605	-0.092	(0)
Fe2(OH)2+4	6.591e-20	4.389e-22	-19.181	-21.358	-2.177	(0)
Fe3(OH)4+5	2.953e-27	1.173e-30	-26.530	-29.931	-3.401	(0)
FeN03+2	0.000e+00	0.000e+00	-63.759	-64.303	-0.544	(0)
H(0)	1.164e-19					
H2	5.818e-20	5.915e-20	-19.235	-19.228	0.007	(0)
K	6.291e-03					
K+	6.020e-03	4.823e-03	-2.220	-2.317	-0.096	(0)
KS04-	2.715e-04	2.196e-04	-3.566	-3.658	-0.092	(0)
KHP04-	1.854e-10	1.500e-10	-9.732	-9.824	-0.092	(0)
KCr04-	0.000e+00	0.000e+00	-43.667	-43.803	-0.136	(0)
Mg	3.635e-03					
Mg+2	2.461e-03	1.015e-03	-2.609	-2.994	-0.385	(0)
MgS04	1.173e-03	1.173e-03	-2.931	-2.931	0.000	(0)
MgH2P04+	3.599e-07	2.911e-07	-6.444	-6.536	-0.092	(0)
MgHP04	2.678e-09	2.678e-09	-8.572	-8.572	0.000	(0)
MgOH+	3.488e-11	2.859e-11	-10.457	-10.544	-0.086	(0)
MgH2B03+	2.559e-12	1.980e-12	-11.592	-11.703	-0.111	(0)
MgP04-	1.003e-15	8.112e-16	-14.999	-15.091	-0.092	(0)
Mn(2)	9.539e-05					
Mn+2	7.219e-05	2.062e-05	-4.142	-4.686	-0.544	(0)
MnS04	2.285e-05	2.285e-05	-4.641	-4.641	0.000	(0)
MnCl+	3.569e-07	2.872e-07	-6.447	-6.542	-0.094	(0)
MnCl2	4.488e-09	4.488e-09	-8.348	-8.348	0.000	(0)
MnCl3-	1.700e-11	1.367e-11	-10.770	-10.864	-0.094	(0)
MnOH+	4.948e-12	3.981e-12	-11.306	-11.400	-0.094	(0)
MnSe	3.144e-17	3.144e-17	-16.503	-16.503	0.000	(0)
MnSe04	7.932e-27	7.932e-27	-26.101	-26.101	0.000	(0)
Mn(OH)3-	5.717e-28	4.600e-28	-27.243	-27.337	-0.094	(0)
Mn(OH)4-2	3.999e-37	1.676e-37	-36.398	-36.776	-0.378	(0)
MnN03+	0.000e+00	0.000e+00	-56.548	-56.684	-0.136	(0)
Mn(N03)2	0.000e+00	0.000e+00	-108.478	-108.478	0.000	(0)
Mn(3)	3.223e-26					
Mn+3	3.223e-26	4.387e-27	-25.492	-26.358	-0.866	(0)
Mn(6)	0.000e+00					
Mn04-2	0.000e+00	0.000e+00	-76.457	-76.834	-0.378	(0)
Mn(7)	0.000e+00					
Mn04-	0.000e+00	0.000e+00	-82.432	-82.540	-0.108	(0)
Mo	1.151e-06					
Mo04-2	4.714e-07	1.943e-07	-6.327	-6.712	-0.385	(0)
HMo04-	4.107e-07	3.003e-07	-6.386	-6.522	-0.136	(0)
H2Mo04	2.690e-07	2.690e-07	-6.570	-6.570	0.000	(0)
AlMo6021-3	3.639e-15	2.171e-16	-14.439	-15.663	-1.224	(0)
HMo7024-5	1.001e-20	3.977e-24	-20.000	-23.400	-3.401	(0)
H2Mo7024-4	3.158e-21	2.103e-23	-20.501	-22.677	-2.177	(0)
Mo7024-6	1.548e-21	1.962e-26	-20.810	-25.707	-4.897	(0)
H3Mo7024-3	5.612e-23	3.348e-24	-22.251	-23.475	-1.224	(0)
N(-3)	7.218e-04					
NH4+	6.757e-04	5.228e-04	-3.170	-3.282	-0.111	(0)
NH4S04-	4.605e-05	3.705e-05	-4.337	-4.431	-0.094	(0)
CuNH3+2	2.979e-09	8.511e-10	-8.526	-9.070	-0.544	(0)
NH3	2.338e-09	2.338e-09	-8.631	-8.631	0.000	(0)
CaNH3+2	4.981e-11	1.423e-11	-10.303	-10.847	-0.544	(0)
NiNH3+2	2.238e-11	6.394e-12	-10.650	-11.194	-0.544	(0)
Co(NH3)+2	5.605e-12	1.601e-12	-11.251	-11.796	-0.544	(0)
BaNH3+2	8.904e-16	2.544e-16	-15.050	-15.595	-0.544	(0)
Ni(NH3)2+2	1.471e-17	4.201e-18	-16.833	-17.377	-0.544	(0)
Co(NH3)2+2	5.113e-19	1.461e-19	-18.291	-18.835	-0.544	(0)

	Ca(NH3)2+2	6.632e-20	1.894e-20	-19.178	-19.723	-0.544	(0)
	Co(NH3)3+2	2.153e-26	6.150e-27	-25.667	-26.211	-0.544	(0)
	Co(NH3)4+2	3.778e-34	1.079e-34	-33.423	-33.967	-0.544	(0)
	Cr(NH3)5OH+2	0.000e+00	0.000e+00	-40.611	-41.155	-0.544	(0)
	Co(NH3)5+2	0.000e+00	0.000e+00	-41.678	-42.223	-0.544	(0)
	Cr(NH3)6+3	0.000e+00	0.000e+00	-45.831	-47.056	-1.224	(0)
	Cr(NH3)6Cl+2	0.000e+00	0.000e+00	-47.366	-47.910	-0.544	(0)
	Co(NH3)5Cl+2	0.000e+00	0.000e+00	-49.862	-50.406	-0.544	(0)
	Co(NH3)6SO4+	0.000e+00	0.000e+00	-60.792	-60.928	-0.136	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-65.026	-65.570	-0.544	(0)
	Co(NH3)6OH+2	0.000e+00	0.000e+00	-68.505	-69.050	-0.544	(0)
N(3)		8.441e-40					
	NO2-	8.441e-40	6.589e-40	-39.074	-39.181	-0.108	(0)
	CuNO2+	0.000e+00	0.000e+00	-41.845	-41.981	-0.136	(0)
	CoNO2+	0.000e+00	0.000e+00	-43.791	-43.927	-0.136	(0)
	Cu(NO2)2	0.000e+00	0.000e+00	-80.152	-80.152	0.000	(0)
N(5)		0.000e+00					
	NO3-	0.000e+00	0.000e+00	-52.103	-52.199	-0.096	(0)
	CaNO3+	0.000e+00	0.000e+00	-54.018	-54.154	-0.136	(0)
	CuNO3+	0.000e+00	0.000e+00	-56.370	-56.506	-0.136	(0)
	MnNO3+	0.000e+00	0.000e+00	-56.548	-56.684	-0.136	(0)
	NiNO3+	0.000e+00	0.000e+00	-57.311	-57.448	-0.136	(0)
	ZnNO3+	0.000e+00	0.000e+00	-57.389	-57.525	-0.136	(0)
	CoNO3+	0.000e+00	0.000e+00	-57.457	-57.593	-0.136	(0)
	BaNO3+	0.000e+00	0.000e+00	-58.243	-58.379	-0.136	(0)
	PbNO3+	0.000e+00	0.000e+00	-58.735	-58.871	-0.136	(0)
	CdNO3+	0.000e+00	0.000e+00	-60.413	-60.549	-0.136	(0)
	CrNO3+2	0.000e+00	0.000e+00	-62.020	-62.564	-0.544	(0)
	FeNO3+2	0.000e+00	0.000e+00	-63.759	-64.303	-0.544	(0)
	Mn(NO3)2	0.000e+00	0.000e+00	-108.478	-108.478	0.000	(0)
	Co(NO3)2	0.000e+00	0.000e+00	-109.483	-109.483	0.000	(0)
	Cu(NO3)2	0.000e+00	0.000e+00	-109.617	-109.617	0.000	(0)
	Zn(NO3)2	0.000e+00	0.000e+00	-110.438	-110.438	0.000	(0)
	Pb(NO3)2	0.000e+00	0.000e+00	-110.814	-110.814	0.000	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-113.111	-113.111	0.000	(0)
Na		1.498e-02					
	Na+	1.447e-02	1.160e-02	-1.839	-1.936	-0.096	(0)
	NaSO4-	5.058e-04	4.091e-04	-3.296	-3.388	-0.092	(0)
	NaHPO4-	6.904e-10	5.584e-10	-9.161	-9.253	-0.092	(0)
	NaH2BO3	1.131e-12	1.131e-12	-11.947	-11.947	0.000	(0)
	NaCrO4-	0.000e+00	0.000e+00	-43.159	-43.295	-0.136	(0)
Ni		8.382e-06					
	Ni+2	5.447e-06	2.245e-06	-5.264	-5.649	-0.385	(0)
	NiSO4	2.847e-06	2.847e-06	-5.546	-5.546	0.000	(0)
	NiCl+	8.574e-08	6.268e-08	-7.067	-7.203	-0.136	(0)
	Ni(SO4)2-2	2.272e-09	6.490e-10	-8.644	-9.188	-0.544	(0)
	NiNH3+2	2.238e-11	6.394e-12	-10.650	-11.194	-0.544	(0)
	NiCl2	3.540e-12	3.540e-12	-11.451	-11.451	0.000	(0)
	NiOH+	3.055e-12	2.233e-12	-11.515	-11.651	-0.136	(0)
	Ni(OH)2	2.859e-17	2.859e-17	-16.544	-16.544	0.000	(0)
	Ni(NH3)2+2	1.471e-17	4.201e-18	-16.833	-17.377	-0.544	(0)
	Ni(OH)3-	4.413e-24	3.226e-24	-23.355	-23.491	-0.136	(0)
	NiSeO4	1.501e-27	1.501e-27	-26.824	-26.824	0.000	(0)
	NiNO3+	0.000e+00	0.000e+00	-57.311	-57.448	-0.136	(0)
O(0)		0.000e+00					
	O2	0.000e+00	0.000e+00	-55.241	-55.234	0.007	(0)
P		9.400e-06					
	H2PO4-	8.064e-06	6.522e-06	-5.093	-5.186	-0.092	(0)
	CaH2PO4+	5.618e-07	4.544e-07	-6.250	-6.343	-0.092	(0)
	MgH2PO4+	3.599e-07	2.911e-07	-6.444	-6.536	-0.092	(0)
	FeH2PO4+	3.142e-07	2.541e-07	-6.503	-6.595	-0.092	(0)
	H3PO4	7.741e-08	7.741e-08	-7.111	-7.111	0.000	(0)
	HPO4-2	1.084e-08	4.544e-09	-7.965	-8.343	-0.378	(0)
	CaHPO4	6.463e-09	6.463e-09	-8.190	-8.190	0.000	(0)
	MgHPO4	2.678e-09	2.678e-09	-8.572	-8.572	0.000	(0)
	FeHPO4	1.436e-09	1.436e-09	-8.843	-8.843	0.000	(0)
	NaHPO4-	6.904e-10	5.584e-10	-9.161	-9.253	-0.092	(0)
	KHPO4-	1.854e-10	1.500e-10	-9.732	-9.824	-0.092	(0)

CoHP04	1.139e-11	1.139e-11	-10.944	-10.944	0.000	(0)
CrH2P04+2	7.383e-12	2.109e-12	-11.132	-11.676	-0.544	(0)
FeHP04+	3.147e-12	2.545e-12	-11.502	-11.594	-0.092	(0)
CaP04-	2.137e-13	1.729e-13	-12.670	-12.762	-0.092	(0)
FeH2P04+2	1.558e-14	6.667e-15	-13.807	-14.176	-0.369	(0)
MgP04-	1.003e-15	8.112e-16	-14.999	-15.091	-0.092	(0)
P04-3	1.424e-16	1.939e-17	-15.846	-16.712	-0.866	(0)
CrO3HP04-2	0.000e+00	0.000e+00	-43.693	-44.237	-0.544	(0)
CrO3H2P04-	0.000e+00	0.000e+00	-45.469	-45.605	-0.136	(0)
Pb	9.691e-08					
PbS04	4.727e-08	4.727e-08	-7.325	-7.325	0.000	(0)
Pb+2	3.540e-08	1.459e-08	-7.451	-7.836	-0.385	(0)
PbCl+	7.379e-09	5.395e-09	-8.132	-8.268	-0.136	(0)
Pb(S04)2-2	6.595e-09	1.884e-09	-8.181	-8.725	-0.544	(0)
PbCl2	2.606e-10	2.606e-10	-9.584	-9.584	0.000	(0)
PbOH+	5.657e-12	4.136e-12	-11.247	-11.383	-0.136	(0)
PbCl3-	1.659e-12	1.213e-12	-11.780	-11.916	-0.136	(0)
PbCl4-2	1.993e-14	5.694e-15	-13.700	-14.245	-0.544	(0)
Pb2OH+3	1.603e-17	9.564e-19	-16.795	-18.019	-1.224	(0)
Pb(OH)2	1.476e-17	1.476e-17	-16.831	-16.831	0.000	(0)
Pb(OH)3-	2.278e-24	1.666e-24	-23.642	-23.778	-0.136	(0)
Pb(OH)4-2	1.611e-31	4.603e-32	-30.793	-31.337	-0.544	(0)
Pb3(OH)4+2	1.005e-31	2.870e-32	-30.998	-31.542	-0.544	(0)
Pb4(OH)4+4	6.014e-34	4.005e-36	-33.221	-35.397	-2.177	(0)
PbNO3+	0.000e+00	0.000e+00	-58.735	-58.871	-0.136	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-110.814	-110.814	0.000	(0)
S(6)	2.322e-02					
S04-2	1.605e-02	6.614e-03	-1.795	-2.180	-0.385	(0)
CaS04	4.877e-03	4.877e-03	-2.312	-2.312	0.000	(0)
MgS04	1.173e-03	1.173e-03	-2.931	-2.931	0.000	(0)
NaS04-	5.058e-04	4.091e-04	-3.296	-3.388	-0.092	(0)
KS04-	2.715e-04	2.196e-04	-3.566	-3.658	-0.092	(0)
FeS04	1.352e-04	1.352e-04	-3.869	-3.869	0.000	(0)
HS04-	6.197e-05	4.952e-05	-4.208	-4.305	-0.097	(0)
NH4S04-	4.605e-05	3.705e-05	-4.337	-4.431	-0.094	(0)
AlS04+	4.325e-05	3.456e-05	-4.364	-4.461	-0.097	(0)
MnS04	2.285e-05	2.285e-05	-4.641	-4.641	0.000	(0)
CuS04	2.163e-05	2.163e-05	-4.665	-4.665	0.000	(0)
Al(S04)2-	3.425e-06	2.737e-06	-5.465	-5.563	-0.097	(0)
CoS04	3.220e-06	3.220e-06	-5.492	-5.492	0.000	(0)
NiS04	2.847e-06	2.847e-06	-5.546	-5.546	0.000	(0)
ZnS04	2.521e-06	2.521e-06	-5.598	-5.598	0.000	(0)
Zn(S04)2-2	5.305e-07	1.515e-07	-6.275	-6.819	-0.544	(0)
BeS04	5.495e-08	5.495e-08	-7.260	-7.260	0.000	(0)
PbS04	4.727e-08	4.727e-08	-7.325	-7.325	0.000	(0)
CrS04+	2.618e-08	1.914e-08	-7.582	-7.718	-0.136	(0)
Pb(S04)2-2	6.595e-09	1.884e-09	-8.181	-8.725	-0.544	(0)
Be(S04)2-2	3.956e-09	1.130e-09	-8.403	-8.947	-0.544	(0)
CrOHS04	2.437e-09	2.437e-09	-8.613	-8.613	0.000	(0)
Ni(S04)2-2	2.272e-09	6.490e-10	-8.644	-9.188	-0.544	(0)
CdS04	1.783e-09	1.783e-09	-8.749	-8.749	0.000	(0)
Cd(S04)2-2	5.911e-10	1.689e-10	-9.228	-9.772	-0.544	(0)
FeS04+	4.732e-12	3.807e-12	-11.325	-11.419	-0.094	(0)
Fe(S04)2-	7.664e-13	5.603e-13	-12.116	-12.252	-0.136	(0)
Cr2(OH)2S04+2	1.197e-15	3.419e-16	-14.922	-15.466	-0.544	(0)
Cr2(OH)2(S04)2	1.343e-16	1.343e-16	-15.872	-15.872	0.000	(0)
CrO3S04-2	0.000e+00	0.000e+00	-42.797	-43.341	-0.544	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-60.792	-60.928	-0.136	(0)
Se(-2)	6.740e-11					
HSe-	4.510e-11	3.297e-11	-10.346	-10.482	-0.136	(0)
H2Se	2.230e-11	2.230e-11	-10.652	-10.652	0.000	(0)
MnSe	3.144e-17	3.144e-17	-16.503	-16.503	0.000	(0)
Se-2	9.300e-22	2.657e-22	-21.032	-21.576	-0.544	(0)
Se(4)	1.271e-07					
HSeO3-	1.238e-07	9.049e-08	-6.907	-7.043	-0.136	(0)
H2SeO3	3.297e-09	3.297e-09	-8.482	-8.482	0.000	(0)
SeO3-2	1.367e-11	3.905e-12	-10.864	-11.408	-0.544	(0)
FeHSeO3+2	4.294e-17	1.227e-17	-16.367	-16.911	-0.544	(0)

Cd(SeO3)2-2	5.753e-26	1.643e-26	-25.240	-25.784	-0.544	(0)
Se(6)	3.837e-24					
SeO4-2	3.818e-24	1.574e-24	-23.418	-23.803	-0.385	(0)
HSeO4-	8.207e-27	6.000e-27	-26.086	-26.222	-0.136	(0)
MnSeO4	7.932e-27	7.932e-27	-26.101	-26.101	0.000	(0)
CoSeO4	1.849e-27	1.849e-27	-26.733	-26.733	0.000	(0)
NiSeO4	1.501e-27	1.501e-27	-26.824	-26.824	0.000	(0)
ZnSeO4	4.430e-28	4.430e-28	-27.354	-27.354	0.000	(0)
CdSeO4	3.576e-31	3.576e-31	-30.447	-30.447	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-50.607	-51.151	-0.544	(0)
Zn	7.523e-06					
Zn+2	4.410e-06	1.818e-06	-5.356	-5.740	-0.385	(0)
ZnSO4	2.521e-06	2.521e-06	-5.598	-5.598	0.000	(0)
Zn(SO4)2-2	5.305e-07	1.515e-07	-6.275	-6.819	-0.544	(0)
ZnCl+	6.136e-08	4.867e-08	-7.212	-7.313	-0.101	(0)
ZnCl2	6.866e-10	6.866e-10	-9.163	-9.163	0.000	(0)
ZnOH+	1.911e-11	1.397e-11	-10.719	-10.855	-0.136	(0)
ZnOHCl	7.463e-12	7.463e-12	-11.127	-11.127	0.000	(0)
ZnCl3-	7.451e-12	5.911e-12	-11.128	-11.228	-0.101	(0)
ZnCl4-2	7.493e-14	3.140e-14	-13.125	-13.503	-0.378	(0)
Zn(OH)2	3.669e-16	3.669e-16	-15.435	-15.435	0.000	(0)
Zn(OH)3-	2.838e-22	2.075e-22	-21.547	-21.683	-0.136	(0)
ZnSeO4	4.430e-28	4.430e-28	-27.354	-27.354	0.000	(0)
Zn(OH)4-2	3.263e-30	9.322e-31	-29.486	-30.031	-0.544	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-50.607	-51.151	-0.544	(0)
ZnNO3+	0.000e+00	0.000e+00	-57.389	-57.525	-0.136	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-110.438	-110.438	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(293 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2-142.78	-136.51	6.27	(Co(NH3)5Cl)(NO3)2	
(Co(NH3)5Cl)Cl2 -40.56	-36.02	4.54	(Co(NH3)5Cl)Cl2	
(Co(NH3)5OH2)Cl3 -47.83	-36.02	11.81	(Co(NH3)5OH2)Cl3	
(Co(NH3)6)(NO3)3-203.91	-185.98	17.93	(Co(NH3)6)(NO3)3	
(Co(NH3)6)Cl3 -55.38	-35.25	20.13	(Co(NH3)6)Cl3	
(NH4)2CrO4 -49.00	-48.62	0.38	(NH4)2CrO4	
(NH4)2SeO4 -30.82	-30.37	0.45	(NH4)2SeO4	
Al(OH)3(am) -5.07	6.06	11.13	Al(OH)3	
Al2(MoO4)3 -35.46	-32.31	3.15	Al2(MoO4)3	
Al2O3 -8.30	12.12	20.43	Al2O3	
Al4(OH)10SO4 -8.74	13.96	22.70	Al4(OH)10SO4	
AlAsO4:2H2O -9.51	-4.71	4.80	AlAsO4:2H2O	
AlOHSO4 -0.99	-4.22	-3.23	AlOHSO4	
Alunite 0.13	-0.64	-0.77	KAl3(SO4)2(OH)6	
Anglesite -2.19	-10.02	-7.83	PbSO4	
Anhydrite -0.31	-4.65	-4.34	CaSO4	
Antlerite -9.23	-0.44	8.79	Cu3(OH)4SO4	
Arsenolite -27.45	-30.39	-2.94	As4O6	
As2O5 -28.32	-21.54	6.77	As2O5	
Atacamite -7.12	0.55	7.67	Cu2(OH)3Cl	
Ba(OH)2:8H2O -23.38	1.18	24.56	Ba(OH)2:8H2O	
Ba3(AsO4)2 -9.06	-18.00	-8.94	Ba3(AsO4)2	
BaCrO4 -39.21	-48.97	-9.77	BaCrO4	
BaHPO4 -7.91	-27.68	-19.77	BaHPO4	
BaMoO4 -6.64	-13.63	-6.99	BaMoO4	
Barite 0.95	-9.10	-10.05	BaSO4	
BaSeO3 -11.71	-9.91	1.79	BaSeO3	
BaSeO4 -23.20	-30.72	-7.53	BaSeO4	
Be(OH)2(alpha) -5.98	0.92	6.89	Be(OH)2	
Be(OH)2(am) -6.28	0.92	7.19	Be(OH)2	
Be(OH)2(beta) -5.58	0.92	6.49	Be(OH)2	
BeMoO4 -12.28	-13.90	-1.61	BeMoO4	
BeSeO4:4H2O -28.05	-30.99	-2.94	BeSeO4:4H2O	
Bianchite -6.16	-7.92	-1.76	ZnSO4:6H2O	
Birnessite -24.25	-6.16	18.09	MnO2	
Bixbyite -28.14	-28.42	-0.27	Mn2O3	

Boehmite	-2.87	6.06	8.93	AlOOH
Brochantite	-12.99	2.84	15.83	Cu ₄ (OH) ₆ SO ₄
Brucite	-12.08	5.11	17.18	Mg(OH) ₂
Bunsenite	-10.29	2.45	12.74	NiO
Ca ₃ (AsO ₄) ₂ ·4H ₂ O	-26.96	-4.66	22.30	Ca ₃ (AsO ₄) ₂ ·4H ₂ O
Ca ₃ (PO ₄) ₂ (beta)	-11.76	-40.84	-29.08	Ca ₃ (PO ₄) ₂
Ca ₄ H(PO ₄) ₃ ·3H ₂ O	-16.99	-64.07	-47.08	Ca ₄ H(PO ₄) ₃ ·3H ₂ O
CaCrO ₄	-42.34	-44.53	-2.19	CaCrO ₄
CaHPO ₄	-3.87	-23.23	-19.37	CaHPO ₄
CaHPO ₄ ·2H ₂ O	-4.17	-23.23	-19.06	CaHPO ₄ ·2H ₂ O
CaMoO ₄	-1.24	-9.18	-7.94	CaMoO ₄
CaSeO ₃ ·2H ₂ O	-8.34	-5.47	2.87	CaSeO ₃ ·2H ₂ O
CaSeO ₄ ·2H ₂ O	-23.28	-26.28	-3.00	CaSeO ₄ ·2H ₂ O
Cd(BO ₂) ₂	-20.70	-10.86	9.84	Cd(BO ₂) ₂
Cd(OH) ₂	-14.74	-0.81	13.93	Cd(OH) ₂
Cd(OH) ₂ (am)	-14.80	-0.81	13.99	Cd(OH) ₂
Cd ₃ (OH) ₂ (SO ₄) ₂	-29.71	-23.00	6.71	Cd ₃ (OH) ₂ (SO ₄) ₂
Cd ₃ (OH) ₄ SO ₄	-35.28	-12.72	22.56	Cd ₃ (OH) ₄ SO ₄
Cd ₃ (PO ₄) ₂	-27.57	-60.17	-32.60	Cd ₃ (PO ₄) ₂
Cd ₄ (OH) ₆ SO ₄	-41.94	-13.54	28.40	Cd ₄ (OH) ₆ SO ₄
CdCl ₂	-12.22	-12.83	-0.60	CdCl ₂
CdCl ₂ ·1H ₂ O	-11.16	-12.83	-1.67	CdCl ₂ ·1H ₂ O
CdCl ₂ ·2.5H ₂ O	-10.89	-12.83	-1.93	CdCl ₂ ·2.5H ₂ O
Cdmetal(alpha)	-30.65	-16.91	13.74	Cd
Cdmetal(gamma)	-30.76	-16.91	13.84	Cd
CdMoO ₄	-1.42	-15.62	-14.21	CdMoO ₄
CdOHCl	-10.45	-6.82	3.63	CdOHCl
CdSe	5.08	-15.35	-20.43	CdSe
CdSeO ₄ ·2H ₂ O	-30.87	-32.72	-1.85	CdSeO ₄ ·2H ₂ O
CdSO ₄	-11.08	-11.09	-0.02	CdSO ₄
CdSO ₄ ·1H ₂ O	-9.46	-11.09	-1.63	CdSO ₄ ·1H ₂ O
CdSO ₄ ·2.67H ₂ O	-9.28	-11.09	-1.82	CdSO ₄ ·2.67H ₂ O
Chalcanthite	-4.34	-7.00	-2.66	CuSO ₄ ·5H ₂ O
Claudetite	-27.16	-30.39	-3.23	As ₄ O ₆
Clausthalite	13.19	-14.27	-27.46	PbSe
Co(BO ₂) ₂	-34.61	-7.54	27.07	Co(BO ₂) ₂
Co(OH) ₂	-10.59	2.50	13.09	Co(OH) ₂
Co(OH) ₃	-19.81	-21.85	-2.03	Co(OH) ₃
Co ₃ (AsO ₄) ₂	-27.06	-14.03	13.03	Co ₃ (AsO ₄) ₂
Co ₃ (PO ₄) ₂	-15.52	-50.21	-34.69	Co ₃ (PO ₄) ₂
Co ₃ O ₄	-31.01	-41.18	-10.17	Co ₃ O ₄
CoCl ₂	-18.01	-9.51	8.51	CoCl ₂
CoCl ₂ ·6H ₂ O	-12.02	-9.51	2.51	CoCl ₂ ·6H ₂ O
CoFe ₂ O ₄	3.43	0.37	-3.05	CoFe ₂ O ₄
CoHPO ₄	-7.30	-26.36	-19.06	CoHPO ₄
CoMoO ₄	-4.61	-12.31	-7.69	CoMoO ₄
CoO	-11.40	2.51	13.90	CoO
CoSe	4.17	-12.03	-16.20	CoSe
CoSeO ₃	-9.91	-8.59	1.32	CoSeO ₃
CoSeO ₄ ·6H ₂ O	-27.87	-29.40	-1.53	CoSeO ₄ ·6H ₂ O
CoSO ₄	-10.81	-7.77	3.04	CoSO ₄
CoSO ₄ ·6H ₂ O	-5.30	-7.78	-2.48	CoSO ₄ ·6H ₂ O
Cotunnite	-6.89	-11.75	-4.86	PbCl ₂
Cr(OH) ₂	-22.67	-11.74	10.93	Cr(OH) ₂
Cr(OH) ₃	-8.05	-6.62	1.42	Cr(OH) ₃
Cr(OH) ₃ (am)	-5.87	-6.62	-0.75	Cr(OH) ₃
Cr ₂ O ₃	-11.04	-13.24	-2.21	Cr ₂ O ₃
CrCl ₂	-38.18	-23.75	14.42	CrCl ₂
CrCl ₃	-40.11	-24.64	15.48	CrCl ₃
Crmetal	-58.84	-27.84	31.00	Cr
CrO ₃	-46.96	-50.16	-3.19	CrO ₃
Cu(OH) ₂	-5.56	3.28	8.84	Cu(OH) ₂
Cu ₂ (OH) ₃ NO ₃	-59.16	-49.69	9.47	Cu ₂ (OH) ₃ NO ₃
Cu ₂ Se(alpha)	27.71	-18.73	-46.44	Cu ₂ Se
Cu ₂ SO ₄	-12.59	-14.48	-1.89	Cu ₂ SO ₄
Cu ₃ (AsO ₄) ₂ ·2H ₂ O	-17.80	-11.70	6.10	Cu ₃ (AsO ₄) ₂ ·2H ₂ O
Cu ₃ (PO ₄) ₂	-11.03	-47.88	-36.85	Cu ₃ (PO ₄) ₂
Cu ₃ (PO ₄) ₂ ·3H ₂ O	-12.76	-47.88	-35.12	Cu ₃ (PO ₄) ₂ ·3H ₂ O

Cu3Se2	34.52	-29.98	-64.51	Cu3Se2
CuCrO4	-41.44	-46.88	-5.44	CuCrO4
Cumetal	-1.18	-10.15	-8.97	Cu
CuMoO4	1.58	-11.53	-13.11	CuMoO4
CuOCuSO4	-14.43	-3.72	10.71	CuOCuSO4
Cupricferrite	-5.47	1.15	6.62	CuFe2O4
Cuprite	-3.17	-4.20	-1.04	Cu2O
Cuprousferrite	5.70	-3.17	-8.87	CuFeO2
CuSe	22.21	-11.25	-33.46	CuSe
CuSe2	24.10	-9.68	-33.79	CuSe2
CuSeO3:2H2O	-8.44	-7.81	0.62	CuSeO3:2H2O
CuSeO4:5H2O	-26.19	-28.63	-2.44	CuSeO4:5H2O
CuSO4	-10.16	-7.00	3.16	CuSO4
Diaspore	-1.12	6.06	7.18	AlOOH
Epsomite	-3.02	-5.18	-2.16	MgSO4:7H2O
Fe(OH)2	-9.52	4.04	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	0.17	-2.87	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-14.78	-13.23	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-14.79	-35.41	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-29.96	-32.97	-3.01	Fe2(SO4)3
Fe3(OH)8	-18.31	1.91	20.22	Fe3(OH)8
FeAsO4:2H2O	-12.24	-11.84	0.40	FeAsO4:2H2O
FeCr2O4	-16.82	-9.20	7.62	FeCr2O4
FeMoO4	-0.71	-10.77	-10.06	FeMoO4
Ferrihydrite	-4.48	-1.07	3.41	Fe(OH)3
Ferroselite	9.82	-8.92	-18.74	FeSe2
FeSe	0.52	-10.49	-11.01	FeSe
Gibbsite	-2.52	6.06	8.58	Al(OH)3
Goethite	-1.74	-1.07	0.67	FeOOH
Goslarite	-5.87	-7.92	-2.05	ZnSO4:7H2O
Gypsum	-0.04	-4.65	-4.61	CaSO4:2H2O
H-Jarosite	-12.35	-23.76	-11.41	(H3O)Fe3(SO4)2(OH)6
H2MoO4	-1.79	-14.81	-13.02	H2MoO4
H2Se(g)	-9.62	-14.53	-4.91	H2Se
Halite	-5.48	-3.89	1.59	NaCl
Hausmannite	-35.95	26.34	62.29	Mn3O4
Hematite	-1.10	-2.13	-1.03	Fe2O3
Hercynite	-7.67	16.17	23.83	FeAl2O4
Hinsdalite	-18.20	-20.70	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-14.11	-58.44	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-22.48	-85.27	-62.79	Pb5(PO4)3OH
K-Alum	-7.51	-12.77	-5.26	KAl(SO4)2:12H2O
K-Jarosite	-7.62	-22.02	-14.41	KFe3(SO4)2(OH)6
K2Cr2O7	-79.36	-96.85	-17.48	K2Cr2O7
K2CrO4	-46.12	-46.69	-0.57	K2CrO4
K2MoO4	-14.62	-11.34	3.27	K2MoO4
K2SeO4	-27.71	-28.44	-0.73	K2SeO4
Langite	-15.14	2.84	17.98	Cu4(OH)6SO4:H2O
Larnakite	-9.38	-9.75	-0.37	PbO:PbSO4
Laurionite	-6.37	-5.74	0.62	PbOHCl
Lepidocrocite	-2.44	-1.07	1.37	FeOOH
Lime	-27.65	5.63	33.28	CaO
Litharge	-12.63	0.26	12.89	PbO
Maghemite	-8.52	-2.13	6.39	Fe2O3
Magnesioferrite	-14.72	2.97	17.69	Fe2MgO4
Magnetite	-2.11	1.91	4.03	Fe3O4
Manganite	-13.88	11.46	25.34	MnOOH
Massicot	-12.83	0.26	13.09	PbO
Melanothallite	-15.18	-8.73	6.45	CuCl2
Melanterite	-3.97	-6.24	-2.27	FeSO4:7H2O
Mg(OH)2(active)	-13.69	5.11	18.79	Mg(OH)2
Mg3(PO4)2	-19.13	-42.41	-23.28	Mg3(PO4)2
MgCr2O4	-24.87	-8.14	16.74	MgCr2O4
MgCrO4	-50.70	-45.05	5.65	MgCrO4
MgHP04:3H2O	-5.58	-23.76	-18.18	MgHP04:3H2O
MgMoO4	-7.86	-9.71	-1.85	MgMoO4
MgSeO3:6H2O	-9.03	-5.99	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-25.60	-26.80	-1.20	MgSeO4:6H2O

Minium	-57.89	16.89	74.78	Pb3O4
Mirabilite	-4.70	-6.06	-1.35	Na2SO4:10H2O
Mn2(SO4)3	-54.03	-59.25	-5.22	Mn2(SO4)3
Mn3(AsO4)2:8H2O	-23.81	-11.31	12.50	Mn3(AsO4)2:8H2O
Mn3(PO4)2	-23.63	-47.48	-23.85	Mn3(PO4)2
MnCl2:4H2O	-11.35	-8.60	2.75	MnCl2:4H2O
MnHP04	-0.05	-25.45	-25.40	MnHP04
MnSe	-14.91	-11.12	3.79	MnSe
MnSeO3	-8.81	-7.68	1.13	MnSeO3
MnSeO3:2H2O	-8.64	-7.68	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-26.44	-28.49	-2.05	MnSeO4:5H2O
MnSO4	-9.64	-6.87	2.78	MnSO4
Monteponite	-16.23	-0.81	15.41	CdO
MoO3	-6.81	-14.81	-8.00	MoO3
Morenosite	-5.65	-7.83	-2.18	NiSO4:7H2O
Na-Jarosite	-10.90	-21.64	-10.75	NaFe3(SO4)2(OH)6
Na2Cr2O7	-86.12	-96.08	-9.96	Na2Cr2O7
Na2CrO4	-48.92	-45.93	2.99	Na2CrO4
Na2Mo2O7	-8.63	-25.39	-16.76	Na2Mo2O7
Na2MoO4	-12.10	-10.58	1.52	Na2MoO4
Na2MoO4:2H2O	-11.81	-10.58	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-17.17	-6.87	10.30	Na2SeO3:5H2O
Na2SeO4	-28.95	-27.67	1.28	Na2SeO4
Nantokite	-1.25	-8.11	-6.86	CuCl
Ni(OH)2	-10.63	2.45	13.08	Ni(OH)2
Ni3(AsO4)2:8H2O	-29.89	-14.19	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-19.07	-50.37	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-32.48	-0.48	32.00	Ni4(OH)6SO4
NiMoO4	-1.21	-12.36	-11.15	NiMoO4
NiSe	5.62	-12.08	-17.70	NiSe
NiSeO3:2H2O	-11.55	-8.64	2.91	NiSeO3:2H2O
NiSeO4:6H2O	-27.93	-29.45	-1.52	NiSeO4:6H2O
Nsutite	-23.66	-6.16	17.50	MnO2
O2(g)	-52.60	32.20	84.80	O2
Pb(BO2)2	-16.35	-9.78	6.57	Pb(BO2)2
Pb(OH)2	-8.06	0.26	8.32	Pb(OH)2
Pb2(OH)3Cl	-14.27	-5.48	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-25.66	0.53	26.19	Pb2O(OH)2
Pb2O3	-44.41	16.63	61.04	Pb2O3
Pb3(AsO4)2	-26.55	-20.75	5.80	Pb3(AsO4)2
Pb3(PO4)2	-13.40	-56.93	-43.53	Pb3(PO4)2
Pb3O2SO4	-20.41	-9.49	10.92	Pb3O2SO4
Pb4(OH)6SO4	-30.33	-9.23	21.10	Pb4(OH)6SO4
Pb4O3SO4	-31.51	-9.22	22.28	Pb4O3SO4
PbCrO4	-37.16	-49.89	-12.73	PbCrO4
PbHP04	-4.79	-28.60	-23.81	PbHP04
Pbmetal	-20.08	-15.84	4.24	Pb
PbMoO4	1.23	-14.55	-15.78	PbMoO4
PbO:0.3H2O	-12.72	0.26	12.98	PbO:0.33H2O
PbSeO4	-24.75	-31.64	-6.88	PbSeO4
Periclase	-16.93	5.11	22.04	MgO
Plattnerite	-34.12	16.36	50.49	PbO2
Plumbgummite	-6.49	-39.28	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-17.56	5.63	23.19	Ca(OH)2
Pyrochroite	-12.07	3.41	15.48	Mn(OH)2
Pyrolusite	-22.68	19.51	42.19	MnO2
Pyromorphite	-6.84	-91.27	-84.43	Pb5(PO4)3Cl
Retgersite	-5.78	-7.83	-2.05	NiSO4:6H2O
Semetal(am)	8.71	1.57	-7.14	Se
Semetal(hex)	9.32	1.57	-7.76	Se
SeO2	-11.21	-11.09	0.12	SeO2
SeO3	-53.38	-31.90	21.48	SeO3
Spinel	-20.78	17.23	38.01	MgAl2O4
Strengite	-3.56	-29.93	-26.37	FePO4:2H2O
Tenorite	-4.56	3.28	7.84	CuO
Thenardite	-6.40	-6.05	0.35	Na2SO4
Tsumebite	-15.27	-25.06	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	-9.60	-45.60	-36.00	Fe3(PO4)2:8H2O

Zincite	-9.24	2.36	11.60	ZnO
Zincosite	-12.10	-7.92	4.18	ZnSO4
Zn(BO2)2	-15.98	-7.69	8.29	Zn(BO2)2
Zn(NO3)2:6H2O	-113.38	-110.14	3.24	Zn(NO3)2:6H2O
Zn(OH)2	-9.84	2.36	12.20	Zn(OH)2
Zn(OH)2(am)	-10.36	2.36	12.71	Zn(OH)2
Zn(OH)2(beta)	-9.64	2.36	12.00	Zn(OH)2
Zn(OH)2(epsilon)	-9.42	2.36	11.78	Zn(OH)2
Zn(OH)2(gamma)	-9.38	2.36	11.73	Zn(OH)2
Zn2(OH)2SO4	-13.06	-5.56	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-16.48	-1.29	15.19	Zn2(OH)3Cl
Zn3(AsO4)2:2.5H2O	-28.12	-14.47	13.65	Zn3(AsO4)2:2.5H2O
Zn3(PO4)2:4H2O	-15.23	-50.65	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-33.17	-13.48	19.68	Zn3O(SO4)2
Zn4(OH)6SO4	-29.24	-0.84	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-38.72	-0.22	38.50	Zn5(OH)8Cl2
ZnCl2	-16.92	-9.65	7.27	ZnCl2
Znmetal	-39.99	-13.74	26.25	Zn
ZnMoO4	-2.36	-12.45	-10.09	ZnMoO4
ZnO(active)	-9.09	2.36	11.45	ZnO
ZnSe	2.30	-12.17	-14.48	ZnSe
ZnSeO4:6H2O	-28.03	-29.55	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.41	-7.92	-0.51	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 1.
Using reaction 2.

Mixture 1.

3.679e-02 Solution 1
9.632e-01 Solution 2
1.000e-05 Solution 3

Reaction 2.

2.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000
Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	2.060e-04	1.986e-04
As	2.780e-13	2.680e-13
B	9.635e-11	9.287e-11
Ba	3.034e-12	2.924e-12
Be	2.311e-12	2.228e-12
Ca	1.571e-02	1.514e-02
Cd	3.797e-07	3.660e-07
Cl	2.835e-01	2.733e-01

Co	4.382e-04	4.224e-04
Cr	6.610e-13	6.372e-13
Cu	1.560e-04	1.504e-04
Fe	1.790e-02	1.726e-02
Hg	2.128e-09	2.051e-09
K	5.895e-03	5.682e-03
Mg	5.883e-02	5.671e-02
Mn	3.321e-03	3.202e-03
Mo	1.194e-11	1.151e-11
N	4.571e-03	4.406e-03
Na	2.729e-01	2.631e-01
Ni	1.013e-04	9.762e-05
P	8.130e-04	7.837e-04
Pb	5.150e-08	4.964e-08
S	1.012e-01	9.754e-02
Se	1.081e-06	1.042e-06
Zn	2.905e-05	2.800e-05

-----Description of solution-----

pH	=	5.045	Charge balance
pe	=	1.186	Adjusted to redox equilibrium
Activity of water	=	0.988	
Ionic strength (mol/kgw)	=	5.018e-01	
Mass of water (kg)	=	9.640e-01	
Total alkalinity (eq/kg)	=	1.433e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	-9.552e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.26	
Iterations	=	15	
Total H	=	1.070329e+02	
Total O	=	5.390014e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.228e-05	9.024e-06	-4.911	-5.045	-0.134	0.00
OH-	1.280e-09	8.116e-10	-8.893	-9.091	-0.198	(0)
H2O	5.551e+01	9.879e-01	1.744	-0.005	0.000	18.05
Al	2.060e-04					
AlSO4+	1.567e-04	1.046e-04	-3.805	-3.980	-0.175	(0)
Al(SO4)2-	2.498e-05	1.667e-05	-4.602	-4.778	-0.175	(0)
Al+3	1.847e-05	1.154e-06	-4.734	-5.938	-1.204	(0)
AlOH+2	4.242e-06	9.789e-07	-5.372	-6.009	-0.637	(0)
Al(OH)2+	1.607e-06	1.114e-06	-5.794	-5.953	-0.159	(0)
Al(OH)3	2.451e-08	2.451e-08	-7.611	-7.611	0.000	(0)
Al(OH)4-	1.970e-09	1.315e-09	-8.706	-8.881	-0.175	(0)
AlMo6O21-3	0.000e+00	0.000e+00	-46.991	-50.221	-3.230	(0)
As(3)	2.779e-13					
H3AsO3	2.779e-13	2.779e-13	-12.556	-12.556	0.000	(0)
H2AsO3-	3.105e-17	1.359e-17	-16.508	-16.867	-0.359	(0)
H4AsO3+	2.839e-18	1.242e-18	-17.547	-17.906	-0.359	(0)
HAsO3-2	3.141e-23	1.152e-24	-22.503	-23.938	-1.435	(0)
AsO3-3	7.271e-30	4.284e-33	-29.138	-32.368	-3.230	(0)
As(5)	8.727e-17					
H2AsO4-	7.634e-17	3.341e-17	-16.117	-16.476	-0.359	(0)
HAsO4-2	1.088e-17	3.993e-19	-16.963	-18.399	-1.435	(0)
H3AsO4	4.489e-20	5.039e-20	-19.348	-19.298	0.050	(0)
AsO4-3	2.164e-22	1.275e-25	-21.665	-24.895	-3.230	(0)
B	9.635e-11					
H3BO3	9.633e-11	1.081e-10	-10.016	-9.966	0.050	(0)
H2BO3-	1.093e-14	6.480e-15	-13.961	-14.188	-0.227	(0)
MgH2BO3+	3.811e-15	2.259e-15	-14.419	-14.646	-0.227	(0)
NaH2BO3	2.053e-15	2.053e-15	-14.688	-14.688	0.000	(0)

	CaH2B03+	1.501e-15	8.899e-16	-14.824	-15.051	-0.227	(0)
	H5(B03)2-	1.032e-24	6.116e-25	-23.987	-24.214	-0.227	(0)
	BaH2B03+	2.923e-25	1.733e-25	-24.534	-24.761	-0.227	(0)
	H8(B03)3-	9.940e-33	5.893e-33	-32.003	-32.230	-0.227	(0)
Ba		3.034e-12					
	Ba+2	3.034e-12	8.847e-13	-11.518	-12.053	-0.535	(0)
	BaNh3+2	2.312e-18	8.481e-20	-17.636	-19.072	-1.435	(0)
	BaOH+	4.470e-21	3.049e-21	-20.350	-20.516	-0.166	(0)
	BaH2B03+	2.923e-25	1.733e-25	-24.534	-24.761	-0.227	(0)
	BaN03+	0.000e+00	0.000e+00	-74.607	-74.965	-0.359	(0)
Be		2.311e-12					
	Be+2	9.531e-13	2.780e-13	-12.021	-12.556	-0.535	(0)
	Be(S04)2-2	5.540e-13	2.033e-14	-12.256	-13.692	-1.435	(0)
	BeS04	5.000e-13	5.000e-13	-12.301	-12.301	0.000	(0)
	BeOH+	1.695e-13	1.220e-13	-12.771	-12.914	-0.143	(0)
	BeCl+	1.346e-13	9.183e-14	-12.871	-13.037	-0.166	(0)
	Be(OH)2	8.484e-17	8.484e-17	-16.071	-16.071	0.000	(0)
	Be(OH)3-	3.265e-21	2.349e-21	-20.486	-20.629	-0.143	(0)
	Be2OH+3	1.089e-22	5.627e-24	-21.963	-23.250	-1.287	(0)
	Be(OH)4-2	6.099e-30	1.634e-30	-29.215	-29.787	-0.572	(0)
	Be3(OH)3+3	8.496e-31	4.388e-32	-30.071	-31.358	-1.287	(0)
Ca		1.571e-02					
	Ca+2	8.365e-03	2.439e-03	-2.078	-2.613	-0.535	(0)
	CaS04	7.318e-03	7.318e-03	-2.136	-2.136	0.000	(0)
	CaH2P04+	2.250e-05	1.559e-05	-4.648	-4.807	-0.159	(0)
	CaHP04	2.200e-06	2.200e-06	-5.658	-5.658	0.000	(0)
	CaNH3+2	1.272e-08	4.666e-10	-7.896	-9.331	-1.435	(0)
	CaP04-	8.574e-10	5.942e-10	-9.067	-9.226	-0.159	(0)
	CaOH+	5.331e-11	3.775e-11	-10.273	-10.423	-0.150	(0)
	CaH2B03+	1.501e-15	8.899e-16	-14.824	-15.051	-0.227	(0)
	Ca(NH3)2+2	7.693e-16	2.823e-17	-15.114	-16.549	-1.435	(0)
	CaN03+	0.000e+00	0.000e+00	-65.384	-65.743	-0.359	(0)
Cd		3.797e-07					
	CdCl+	1.917e-07	8.388e-08	-6.717	-7.076	-0.359	(0)
	CdCl2	7.195e-08	7.195e-08	-7.143	-7.143	0.000	(0)
	Cd(S04)2-2	6.784e-08	2.489e-09	-7.169	-8.604	-1.435	(0)
	CdCl3-	2.076e-08	9.088e-09	-7.683	-8.042	-0.359	(0)
	Cd+2	1.456e-08	4.246e-09	-7.837	-8.372	-0.535	(0)
	CdS04	1.292e-08	1.292e-08	-7.889	-7.889	0.000	(0)
	CdOHC1	3.451e-12	3.451e-12	-11.462	-11.462	0.000	(0)
	CdOH+	6.288e-14	2.752e-14	-13.201	-13.560	-0.359	(0)
	Cd2OH+3	1.044e-18	6.152e-22	-17.981	-21.211	-3.230	(0)
	Cd(OH)2	2.586e-19	2.586e-19	-18.587	-18.587	0.000	(0)
	CdHS+	1.161e-23	5.081e-24	-22.935	-23.294	-0.359	(0)
	Cd(OH)3-	3.979e-26	1.741e-26	-25.400	-25.759	-0.359	(0)
	Cd(OH)4-2	8.564e-35	3.142e-36	-34.067	-35.503	-1.435	(0)
	Cd(Se03)2-2	4.045e-36	1.484e-37	-35.393	-36.829	-1.435	(0)
	Cd(HS)2	9.547e-40	9.547e-40	-39.020	-39.020	0.000	(0)
	CdSe04	6.026e-40	6.026e-40	-39.220	-39.220	0.000	(0)
	Cd(HS)3-	0.000e+00	0.000e+00	-59.691	-60.050	-0.359	(0)
	CdN03+	0.000e+00	0.000e+00	-71.106	-71.465	-0.359	(0)
	Cd(HS)4-2	0.000e+00	0.000e+00	-79.349	-80.784	-1.435	(0)
	Cd(N03)2	0.000e+00	0.000e+00	-135.458	-135.458	0.000	(0)
Cl		2.835e-01					
	Cl-	2.831e-01	2.080e-01	-0.548	-0.682	-0.134	(0)
	CuCl2-	1.360e-04	8.864e-05	-3.866	-4.052	-0.186	(0)
	MnCl+	4.245e-05	2.896e-05	-4.372	-4.538	-0.166	(0)
	CoCl+	2.261e-05	9.898e-06	-4.646	-5.004	-0.359	(0)
	CuCl3-2	1.791e-05	3.881e-06	-4.747	-5.411	-0.664	(0)
	NiCl+	1.668e-05	7.302e-06	-4.778	-5.137	-0.359	(0)
	MnCl2	8.511e-06	8.511e-06	-5.070	-5.070	0.000	(0)
	CuCl	2.020e-06	2.020e-06	-5.695	-5.695	0.000	(0)
	ZnCl+	1.338e-06	8.717e-07	-5.874	-6.060	-0.186	(0)
	MnCl3-	7.147e-07	4.876e-07	-6.146	-6.312	-0.166	(0)
	ZnCl2	2.417e-07	2.417e-07	-6.617	-6.617	0.000	(0)
	CdCl+	1.917e-07	8.388e-08	-6.717	-7.076	-0.359	(0)
	CdCl2	7.195e-08	7.195e-08	-7.143	-7.143	0.000	(0)
	ZnCl3-	6.029e-08	3.928e-08	-7.220	-7.406	-0.186	(0)

CdCl3-	2.076e-08	9.088e-09	-7.683	-8.042	-0.359	(0)
ZnCl4-2	1.826e-08	3.957e-09	-7.738	-8.403	-0.664	(0)
PbCl+	1.651e-08	7.227e-09	-7.782	-8.141	-0.359	(0)
NiCl2	7.733e-09	7.733e-09	-8.112	-8.112	0.000	(0)
PbCl2	6.595e-09	6.595e-09	-8.181	-8.181	0.000	(0)
PbCl4-2	1.394e-09	5.115e-11	-8.856	-10.291	-1.435	(0)
PbCl3-	1.304e-09	5.707e-10	-8.885	-9.244	-0.359	(0)
ZnOHCl	1.296e-09	1.296e-09	-8.887	-8.887	0.000	(0)
CuCl+	1.213e-10	7.905e-11	-9.916	-10.102	-0.186	(0)
CuCl2	4.683e-12	4.683e-12	-11.329	-11.329	0.000	(0)
CdOHCl	3.451e-12	3.451e-12	-11.462	-11.462	0.000	(0)
BeCl+	1.346e-13	9.183e-14	-12.871	-13.037	-0.166	(0)
FeCl+2	1.683e-14	3.646e-15	-13.774	-14.438	-0.664	(0)
CuCl3-	1.299e-14	8.461e-15	-13.887	-14.073	-0.186	(0)
HgCl4-2	1.252e-14	4.594e-16	-13.902	-15.338	-1.435	(0)
FeCl2+	5.633e-15	3.843e-15	-14.249	-14.415	-0.166	(0)
CrCl+2	1.825e-15	6.697e-17	-14.739	-16.174	-1.435	(0)
HgCl3-	1.222e-15	5.347e-16	-14.913	-15.272	-0.359	(0)
HgCl2	2.548e-16	2.548e-16	-15.594	-15.594	0.000	(0)
FeCl3	7.995e-17	7.995e-17	-16.097	-16.097	0.000	(0)
CuCl4-2	4.663e-17	1.010e-17	-16.331	-16.996	-0.664	(0)
CrCl2+	2.122e-18	9.285e-19	-17.673	-18.032	-0.359	(0)
CrOHCl2	1.653e-19	1.653e-19	-18.782	-18.782	0.000	(0)
HgClOH	1.816e-20	1.816e-20	-19.741	-19.741	0.000	(0)
HgCl+	4.744e-22	2.076e-22	-21.324	-21.683	-0.359	(0)
CoCl+2	8.974e-34	3.293e-35	-33.047	-34.482	-1.435	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.417	-42.853	-1.435	(0)
Cr(NH3)6Cl+2	0.000e+00	0.000e+00	-41.905	-43.341	-1.435	(0)
CrO3Cl-	0.000e+00	0.000e+00	-52.246	-52.605	-0.359	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-54.930	-56.365	-1.435	(0)
Co(2)	4.382e-04					
Co+2	3.790e-04	1.391e-05	-3.421	-4.857	-1.435	(0)
CoSO4	3.651e-05	3.651e-05	-4.438	-4.438	0.000	(0)
CoCl+	2.261e-05	9.898e-06	-4.646	-5.004	-0.359	(0)
CoHPO4	2.944e-08	2.944e-08	-7.531	-7.531	0.000	(0)
Co(NH3)+2	9.889e-09	3.628e-10	-8.005	-9.440	-1.435	(0)
CoOH+	6.988e-10	3.058e-10	-9.156	-9.515	-0.359	(0)
Co2OH+3	3.618e-13	2.131e-16	-12.442	-15.671	-3.230	(0)
Co(NH3)2+2	4.488e-14	1.647e-15	-13.348	-14.783	-1.435	(0)
Co(OH)2	2.678e-14	2.678e-14	-13.572	-13.572	0.000	(0)
Co(NH3)3+2	8.584e-20	3.150e-21	-19.066	-20.502	-1.435	(0)
Co(OH)3-	1.346e-21	5.890e-22	-20.871	-21.230	-0.359	(0)
CoOOH-	8.190e-23	3.585e-23	-22.087	-22.446	-0.359	(0)
Co4(OH)4+4	9.634e-25	1.746e-30	-24.016	-29.758	-5.742	(0)
Co(NH3)4+2	6.845e-26	2.512e-27	-25.165	-26.600	-1.435	(0)
Co(OH)4-2	2.805e-30	1.029e-31	-29.552	-30.988	-1.435	(0)
Co(NH3)5+2	1.726e-32	6.334e-34	-31.763	-33.198	-1.435	(0)
CoSeO4	4.974e-36	4.974e-36	-35.303	-35.303	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-50.743	-51.101	-0.359	(0)
CoNO3+	0.000e+00	0.000e+00	-67.941	-68.300	-0.359	(0)
Co(NO3)2	0.000e+00	0.000e+00	-131.635	-131.635	0.000	(0)
Co(3)	1.306e-31					
CoOH+2	1.297e-31	4.758e-33	-30.887	-32.323	-1.435	(0)
CoCl+2	8.974e-34	3.293e-35	-33.047	-34.482	-1.435	(0)
Co+3	1.359e-35	8.493e-37	-34.867	-36.071	-1.204	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.417	-42.853	-1.435	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.313	-52.672	-0.359	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-54.930	-56.365	-1.435	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.757	-60.192	-1.435	(0)
Cr(2)	5.775e-23					
Cr+2	5.775e-23	2.119e-24	-22.238	-23.674	-1.435	(0)
Cr(3)	6.610e-13					
Cr+3	4.870e-13	2.869e-16	-12.313	-15.542	-3.230	(0)
Cr(OH)+2	1.420e-13	5.210e-15	-12.848	-14.283	-1.435	(0)
CrSO4+	1.758e-14	7.695e-15	-13.755	-14.114	-0.359	(0)
CrOHSO4	1.098e-14	1.098e-14	-13.959	-13.959	0.000	(0)
CrCl+2	1.825e-15	6.697e-17	-14.739	-16.174	-1.435	(0)
Cr(OH)2+	1.041e-15	4.558e-16	-14.982	-15.341	-0.359	(0)

CrH2PO4+2	6.177e-16	2.266e-17	-15.209	-16.645	-1.435	(0)
CrCl2+	2.122e-18	9.285e-19	-17.673	-18.032	-0.359	(0)
Cr(OH)3	1.888e-19	1.888e-19	-18.724	-18.724	0.000	(0)
CrOHC12	1.653e-19	1.653e-19	-18.782	-18.782	0.000	(0)
CrO2-	2.297e-23	1.005e-23	-22.639	-22.998	-0.359	(0)
Cr(OH)4-	1.893e-23	8.284e-24	-22.723	-23.082	-0.359	(0)
Cr2(OH)2SO4+2	9.192e-26	3.372e-27	-25.037	-26.472	-1.435	(0)
Cr2(OH)2(SO4)2	2.728e-27	2.728e-27	-26.564	-26.564	0.000	(0)
Cr(NH3)5OH+2	8.081e-38	2.965e-39	-37.093	-38.528	-1.435	(0)
Cr(NH3)6+3	0.000e+00	0.000e+00	-40.531	-43.761	-3.230	(0)
Cr(NH3)6Cl+2	0.000e+00	0.000e+00	-41.905	-43.341	-1.435	(0)
CrNO3+2	0.000e+00	0.000e+00	-79.262	-80.698	-1.435	(0)
Cr(6)	0.000e+00					
HCrO4-	0.000e+00	0.000e+00	-47.328	-47.687	-0.359	(0)
CrO4-2	0.000e+00	0.000e+00	-48.613	-49.148	-0.535	(0)
NaCrO4-	0.000e+00	0.000e+00	-48.823	-49.182	-0.359	(0)
CrO3HP04-2	0.000e+00	0.000e+00	-49.203	-50.638	-1.435	(0)
KCrO4-	0.000e+00	0.000e+00	-50.624	-50.983	-0.359	(0)
CrO3SO4-2	0.000e+00	0.000e+00	-50.669	-52.104	-1.435	(0)
CrO3Cl-	0.000e+00	0.000e+00	-52.246	-52.605	-0.359	(0)
CrO3H2PO4-	0.000e+00	0.000e+00	-52.641	-53.000	-0.359	(0)
H2CrO4	0.000e+00	0.000e+00	-52.911	-52.911	0.000	(0)
Cr2O7-2	0.000e+00	0.000e+00	-92.349	-93.784	-1.435	(0)
Cu(1)	1.560e-04					
CuCl2-	1.360e-04	8.864e-05	-3.866	-4.052	-0.186	(0)
CuCl3-2	1.791e-05	3.881e-06	-4.747	-5.411	-0.664	(0)
CuCl	2.020e-06	2.020e-06	-5.695	-5.695	0.000	(0)
Cu+	1.762e-08	7.713e-09	-7.754	-8.113	-0.359	(0)
Cu(S4)2-3	1.037e-40	0.000e+00	-39.984	-40.494	-0.509	(0)
CuS4S5-3	0.000e+00	0.000e+00	-40.749	-41.224	-0.475	(0)
Cu(2)	1.750e-09					
Cu+2	8.604e-10	2.509e-10	-9.065	-9.600	-0.535	(0)
CuSO4	7.462e-10	7.462e-10	-9.127	-9.127	0.000	(0)
CuCl+	1.213e-10	7.905e-11	-9.916	-10.102	-0.186	(0)
CuNH3+2	1.578e-11	5.791e-13	-10.802	-12.237	-1.435	(0)
CuCl2	4.683e-12	4.683e-12	-11.329	-11.329	0.000	(0)
CuOH+	1.103e-12	7.187e-13	-11.957	-12.143	-0.186	(0)
CuCl3-	1.299e-14	8.461e-15	-13.887	-14.073	-0.186	(0)
Cu(OH)2	1.924e-16	1.924e-16	-15.716	-15.716	0.000	(0)
CuCl4-2	4.663e-17	1.010e-17	-16.331	-16.996	-0.664	(0)
Cu2(OH)2+2	3.441e-19	1.262e-20	-18.463	-19.899	-1.435	(0)
Cu(OH)3-	9.940e-22	4.350e-22	-21.003	-21.361	-0.359	(0)
Cu(OH)4-2	1.029e-28	3.774e-30	-27.988	-29.423	-1.435	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-52.133	-52.492	-0.359	(0)
CuNO2+	0.000e+00	0.000e+00	-54.314	-54.673	-0.359	(0)
CuNO3+	0.000e+00	0.000e+00	-72.375	-72.734	-0.359	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-100.756	-100.756	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-137.287	-137.287	0.000	(0)
Fe(2)	1.790e-02					
Fe+2	1.591e-02	5.839e-04	-1.798	-3.234	-1.435	(0)
FeSO4	1.868e-03	1.868e-03	-2.729	-2.729	0.000	(0)
FeH2PO4+	1.167e-04	8.085e-05	-3.933	-4.092	-0.159	(0)
FeHP04	4.511e-06	4.511e-06	-5.346	-5.346	0.000	(0)
FeOH+	2.765e-08	1.887e-08	-7.558	-7.724	-0.166	(0)
Fe(OH)2	1.164e-14	1.164e-14	-13.934	-13.934	0.000	(0)
Fe(OH)3-	5.730e-18	3.909e-18	-17.242	-17.408	-0.166	(0)
Fe(HS)2	0.000e+00	0.000e+00	-40.144	-40.144	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-60.678	-61.037	-0.359	(0)
Fe(3)	3.100e-10					
Fe(OH)2+	2.899e-10	2.010e-10	-9.538	-9.697	-0.159	(0)
FeHP04+	1.801e-11	1.248e-11	-10.745	-10.904	-0.159	(0)
FeOH+2	1.719e-12	3.726e-13	-11.765	-12.429	-0.664	(0)
Fe(OH)3	1.346e-13	1.346e-13	-12.871	-12.871	0.000	(0)
FeSO4+	1.285e-13	8.769e-14	-12.891	-13.057	-0.166	(0)
Fe(SO4)2-	6.021e-14	2.635e-14	-13.220	-13.579	-0.359	(0)
FeCl+2	1.683e-14	3.646e-15	-13.774	-14.438	-0.664	(0)
FeH2PO4+2	1.497e-14	3.454e-15	-13.825	-14.462	-0.637	(0)
Fe+3	1.054e-14	6.584e-16	-13.977	-15.182	-1.204	(0)

FeCl2+	5.633e-15	3.843e-15	-14.249	-14.415	-0.166	(0)
FeCl3	7.995e-17	7.995e-17	-16.097	-16.097	0.000	(0)
Fe(OH)4-	3.523e-17	2.442e-17	-16.453	-16.612	-0.159	(0)
Fe2(OH)2+4	2.925e-18	5.301e-24	-17.534	-23.276	-5.742	(0)
Fe3(OH)4+5	1.383e-23	1.477e-32	-22.859	-31.831	-8.972	(0)
FeHSeO3+2	6.103e-25	2.239e-26	-24.214	-25.650	-1.435	(0)
FeNO3+2	0.000e+00	0.000e+00	-76.301	-77.737	-1.435	(0)
H(0)	4.544e-16					
H2	2.272e-16	2.550e-16	-15.644	-15.593	0.050	(0)
Hg(0)	2.128e-09					
Hg	2.128e-09	2.128e-09	-8.672	-8.672	0.000	(0)
Hg(1)	2.587e-27					
Hg2+2	1.293e-27	4.746e-29	-26.888	-28.324	-1.435	(0)
Hg(2)	1.400e-14					
HgCl4-2	1.252e-14	4.594e-16	-13.902	-15.338	-1.435	(0)
HgCl3-	1.222e-15	5.347e-16	-14.913	-15.272	-0.359	(0)
HgCl2	2.548e-16	2.548e-16	-15.594	-15.594	0.000	(0)
HgClOH	1.816e-20	1.816e-20	-19.741	-19.741	0.000	(0)
HgCl+	4.744e-22	2.076e-22	-21.324	-21.683	-0.359	(0)
Hg(NH3)2+2	5.450e-23	2.000e-24	-22.264	-23.699	-1.435	(0)
Hg(OH)2	2.422e-25	2.719e-25	-24.616	-24.566	0.050	(0)
HgNH3+2	9.267e-26	3.400e-27	-25.033	-26.469	-1.435	(0)
HgOH+	3.945e-27	1.726e-27	-26.404	-26.763	-0.359	(0)
Hg+2	1.202e-27	4.410e-29	-26.920	-28.356	-1.435	(0)
HgSO4	1.264e-28	1.264e-28	-27.898	-27.898	0.000	(0)
Hg(NH3)3+2	4.735e-29	1.737e-30	-28.325	-29.760	-1.435	(0)
Hg(OH)3-	8.622e-35	3.774e-35	-34.064	-34.423	-0.359	(0)
Hg(NH3)4+2	8.253e-35	3.028e-36	-34.083	-35.519	-1.435	(0)
Hg(HS)2	1.027e-36	1.027e-36	-35.988	-35.988	0.000	(0)
HgHS2-	1.050e-37	4.596e-38	-36.979	-37.338	-0.359	(0)
HgS2-2	2.719e-40	0.000e+00	-39.566	-41.001	-1.435	(0)
HgNO3+	0.000e+00	0.000e+00	-92.167	-92.526	-0.359	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-156.551	-156.551	0.000	(0)
K	5.895e-03					
K+	5.359e-03	3.938e-03	-2.271	-2.405	-0.134	(0)
KS04-	5.355e-04	3.712e-04	-3.271	-3.430	-0.159	(0)
KHP04-	8.366e-08	5.798e-08	-7.078	-7.237	-0.159	(0)
KCr04-	0.000e+00	0.000e+00	-50.624	-50.983	-0.359	(0)
Mg	5.883e-02					
Mg+2	3.448e-02	1.006e-02	-1.462	-1.998	-0.535	(0)
MgSO4	2.413e-02	2.413e-02	-1.617	-1.617	0.000	(0)
MgH2PO4+	1.983e-04	1.374e-04	-3.703	-3.862	-0.159	(0)
MgHP04	1.252e-05	1.252e-05	-4.902	-4.902	0.000	(0)
MgOH+	4.229e-09	3.042e-09	-8.374	-8.517	-0.143	(0)
MgPO4-	5.525e-11	3.829e-11	-10.258	-10.417	-0.159	(0)
MgH2BO3+	3.811e-15	2.259e-15	-14.419	-14.646	-0.227	(0)
Mn(2)	3.321e-03					
Mn+2	3.014e-03	1.106e-04	-2.521	-3.956	-1.435	(0)
MnSO4	2.553e-04	2.553e-04	-3.593	-3.593	0.000	(0)
MnCl+	4.245e-05	2.896e-05	-4.372	-4.538	-0.166	(0)
MnCl2	8.511e-06	8.511e-06	-5.070	-5.070	0.000	(0)
MnCl3-	7.147e-07	4.876e-07	-6.146	-6.312	-0.166	(0)
MnOH+	3.305e-10	2.255e-10	-9.481	-9.647	-0.166	(0)
MnSe	2.320e-11	2.320e-11	-10.635	-10.635	0.000	(0)
Mn(OH)3-	3.371e-24	2.300e-24	-23.472	-23.638	-0.166	(0)
Mn(OH)4-2	3.777e-32	8.185e-33	-31.423	-32.087	-0.664	(0)
MnSeO4	2.101e-35	2.101e-35	-34.678	-34.678	0.000	(0)
MnNO3+	0.000e+00	0.000e+00	-67.041	-67.399	-0.359	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-130.639	-130.639	0.000	(0)
Mn(3)	6.714e-28					
Mn+3	6.714e-28	4.196e-29	-27.173	-28.377	-1.204	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-78.329	-78.993	-0.664	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-87.234	-87.445	-0.212	(0)
Mo	1.194e-11					
MoO4-2	1.075e-11	3.134e-12	-10.969	-11.504	-0.535	(0)
HMoO4-	1.152e-12	5.042e-13	-11.939	-12.297	-0.359	(0)

H2MoO4	4.290e-14	4.290e-14	-13.368	-13.368	0.000	(0)
AlMo6O21-3	0.000e+00	0.000e+00	-46.991	-50.221	-3.230	(0)
Mo7O24-6	0.000e+00	0.000e+00	-54.411	-67.330	-12.919	(0)
HMo7O24-5	0.000e+00	0.000e+00	-57.040	-66.012	-8.972	(0)
H2Mo7O24-4	0.000e+00	0.000e+00	-60.539	-66.281	-5.742	(0)
H3Mo7O24-3	0.000e+00	0.000e+00	-64.845	-68.075	-3.230	(0)
N(-3)	4.571e-03					
NH4+	4.056e-03	2.405e-03	-2.392	-2.619	-0.227	(0)
NH4SO4-	5.143e-04	3.509e-04	-3.289	-3.455	-0.166	(0)
NH3	1.142e-07	1.142e-07	-6.942	-6.942	0.000	(0)
NiNH3+2	4.455e-08	1.635e-09	-7.351	-8.787	-1.435	(0)
CaNH3+2	1.272e-08	4.666e-10	-7.896	-9.331	-1.435	(0)
Co(NH3)+2	9.889e-09	3.628e-10	-8.005	-9.440	-1.435	(0)
CuNH3+2	1.578e-11	5.791e-13	-10.802	-12.237	-1.435	(0)
Ni(NH3)2+2	1.250e-12	4.585e-14	-11.903	-13.339	-1.435	(0)
Co(NH3)2+2	4.488e-14	1.647e-15	-13.348	-14.783	-1.435	(0)
Ca(NH3)2+2	7.693e-16	2.823e-17	-15.114	-16.549	-1.435	(0)
BaNH3+2	2.312e-18	8.481e-20	-17.636	-19.072	-1.435	(0)
Co(NH3)3+2	8.584e-20	3.150e-21	-19.066	-20.502	-1.435	(0)
Hg(NH3)2+2	5.450e-23	2.000e-24	-22.264	-23.699	-1.435	(0)
HgNH3+2	9.267e-26	3.400e-27	-25.033	-26.469	-1.435	(0)
Co(NH3)4+2	6.845e-26	2.512e-27	-25.165	-26.600	-1.435	(0)
Hg(NH3)3+2	4.735e-29	1.737e-30	-28.325	-29.760	-1.435	(0)
Co(NH3)5+2	1.726e-32	6.334e-34	-31.763	-33.198	-1.435	(0)
Hg(NH3)4+2	8.253e-35	3.028e-36	-34.083	-35.519	-1.435	(0)
Cr(NH3)5OH+2	8.081e-38	2.965e-39	-37.093	-38.528	-1.435	(0)
Cr(NH3)6+3	0.000e+00	0.000e+00	-40.531	-43.761	-3.230	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.417	-42.853	-1.435	(0)
Cr(NH3)6Cl+2	0.000e+00	0.000e+00	-41.905	-43.341	-1.435	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.313	-52.672	-0.359	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-54.930	-56.365	-1.435	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.757	-60.192	-1.435	(0)
N(3)	0.000e+00					
NO2-	0.000e+00	0.000e+00	-46.881	-47.093	-0.212	(0)
CoNO2+	0.000e+00	0.000e+00	-50.743	-51.101	-0.359	(0)
CuNO2+	0.000e+00	0.000e+00	-54.314	-54.673	-0.359	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-100.756	-100.756	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-63.509	-63.643	-0.134	(0)
CaNO3+	0.000e+00	0.000e+00	-65.384	-65.743	-0.359	(0)
MnNO3+	0.000e+00	0.000e+00	-67.041	-67.399	-0.359	(0)
NiNO3+	0.000e+00	0.000e+00	-67.742	-68.101	-0.359	(0)
CoNO3+	0.000e+00	0.000e+00	-67.941	-68.300	-0.359	(0)
ZnNO3+	0.000e+00	0.000e+00	-68.638	-68.997	-0.359	(0)
CdNO3+	0.000e+00	0.000e+00	-71.106	-71.465	-0.359	(0)
PbNO3+	0.000e+00	0.000e+00	-71.107	-71.466	-0.359	(0)
CuNO3+	0.000e+00	0.000e+00	-72.375	-72.734	-0.359	(0)
BaNO3+	0.000e+00	0.000e+00	-74.607	-74.965	-0.359	(0)
FeNO3+2	0.000e+00	0.000e+00	-76.301	-77.737	-1.435	(0)
CrNO3+2	0.000e+00	0.000e+00	-79.262	-80.698	-1.435	(0)
HgNO3+	0.000e+00	0.000e+00	-92.167	-92.526	-0.359	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-130.639	-130.639	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-131.635	-131.635	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-133.351	-133.351	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-134.859	-134.859	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-135.458	-135.458	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-137.287	-137.287	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-156.551	-156.551	0.000	(0)
Na	2.729e-01					
Na+	2.534e-01	1.862e-01	-0.596	-0.730	-0.134	(0)
NaSO4-	1.954e-02	1.354e-02	-1.709	-1.868	-0.159	(0)
NaHPO4-	6.125e-06	4.246e-06	-5.213	-5.372	-0.159	(0)
NaH2B03	2.053e-15	2.053e-15	-14.688	-14.688	0.000	(0)
NaCrO4-	0.000e+00	0.000e+00	-48.823	-49.182	-0.359	(0)
Ni	1.013e-04					
Ni+2	4.756e-05	1.387e-05	-4.323	-4.858	-0.535	(0)
NiSO4	3.650e-05	3.650e-05	-4.438	-4.438	0.000	(0)
NiCl+	1.668e-05	7.302e-06	-4.778	-5.137	-0.359	(0)

Ni(SO4)2-2	4.631e-07	1.699e-08	-6.334	-7.770	-1.435	(0)
NiNH3+2	4.455e-08	1.635e-09	-7.351	-8.787	-1.435	(0)
NiCl2	7.733e-09	7.733e-09	-8.112	-8.112	0.000	(0)
NiOH+	3.310e-10	1.449e-10	-9.480	-9.839	-0.359	(0)
Ni(NH3)2+2	1.250e-12	4.585e-14	-11.903	-13.339	-1.435	(0)
Ni(OH)2	1.686e-14	1.686e-14	-13.773	-13.773	0.000	(0)
Ni(OH)3-	4.245e-20	1.858e-20	-19.372	-19.731	-0.359	(0)
NiSeO4	4.580e-36	4.580e-36	-35.339	-35.339	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-67.742	-68.101	-0.359	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-62.281	-62.230	0.050	(0)
P	8.130e-04					
H2PO4-	4.400e-04	3.050e-04	-3.357	-3.516	-0.159	(0)
MgH2PO4+	1.983e-04	1.374e-04	-3.703	-3.862	-0.159	(0)
FeH2PO4+	1.167e-04	8.085e-05	-3.933	-4.092	-0.159	(0)
CaH2PO4+	2.250e-05	1.559e-05	-4.648	-4.807	-0.159	(0)
MgHPO4	1.252e-05	1.252e-05	-4.902	-4.902	0.000	(0)
HPO4-2	9.725e-06	2.107e-06	-5.012	-5.676	-0.664	(0)
NaHPO4-	6.125e-06	4.246e-06	-5.213	-5.372	-0.159	(0)
FeHPO4	4.511e-06	4.511e-06	-5.346	-5.346	0.000	(0)
CaHPO4	2.200e-06	2.200e-06	-5.658	-5.658	0.000	(0)
H3PO4	3.705e-07	3.705e-07	-6.431	-6.431	0.000	(0)
KHP04-	8.366e-08	5.798e-08	-7.078	-7.237	-0.159	(0)
CoHP04	2.944e-08	2.944e-08	-7.531	-7.531	0.000	(0)
CaP04-	8.574e-10	5.942e-10	-9.067	-9.226	-0.159	(0)
MgP04-	5.525e-11	3.829e-11	-10.258	-10.417	-0.159	(0)
FeHP04+	1.801e-11	1.248e-11	-10.745	-10.904	-0.159	(0)
P04-3	1.451e-12	9.069e-14	-11.838	-13.042	-1.204	(0)
FeH2P04+2	1.497e-14	3.454e-15	-13.825	-14.462	-0.637	(0)
CrH2P04+2	6.177e-16	2.266e-17	-15.209	-16.645	-1.435	(0)
CrO3HP04-2	0.000e+00	0.000e+00	-49.203	-50.638	-1.435	(0)
CrO3H2P04-	0.000e+00	0.000e+00	-52.641	-53.000	-0.359	(0)
Pb	5.150e-08					
PbCl+	1.651e-08	7.227e-09	-7.782	-8.141	-0.359	(0)
Pb(SO4)2-2	1.532e-08	5.619e-10	-7.815	-9.250	-1.435	(0)
PbSO4	6.849e-09	6.849e-09	-8.164	-8.164	0.000	(0)
PbCl2	6.595e-09	6.595e-09	-8.181	-8.181	0.000	(0)
Pb+2	3.522e-09	1.027e-09	-8.453	-8.988	-0.535	(0)
PbCl4-2	1.394e-09	5.115e-11	-8.856	-10.291	-1.435	(0)
PbCl3-	1.304e-09	5.707e-10	-8.885	-9.244	-0.359	(0)
PbOH+	6.498e-12	2.844e-12	-11.187	-11.546	-0.359	(0)
Pb(OH)2	9.913e-17	9.913e-17	-16.004	-16.004	0.000	(0)
Pb2OH+3	7.857e-17	4.629e-20	-16.105	-19.335	-3.230	(0)
Pb(OH)3-	2.497e-22	1.093e-22	-21.603	-21.961	-0.359	(0)
Pb(OH)4-2	8.041e-28	2.950e-29	-27.095	-28.530	-1.435	(0)
Pb3(OH)4+2	2.917e-30	1.070e-31	-29.535	-30.971	-1.435	(0)
Pb4(OH)4+4	5.587e-31	1.012e-36	-30.253	-35.995	-5.742	(0)
Pb(HS)2	2.640e-40	2.640e-40	-39.578	-39.578	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-60.850	-61.208	-0.359	(0)
PbNO3+	0.000e+00	0.000e+00	-71.107	-71.466	-0.359	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-134.859	-134.859	0.000	(0)
S(-2)	1.291e-21					
H2S	1.253e-21	1.253e-21	-20.902	-20.902	0.000	(0)
HS-	2.684e-23	1.175e-23	-22.571	-22.930	-0.359	(0)
CdHS+	1.161e-23	5.081e-24	-22.935	-23.294	-0.359	(0)
S5-2	1.246e-26	4.570e-28	-25.905	-27.340	-1.435	(0)
S6-2	4.667e-27	1.712e-28	-26.331	-27.766	-1.435	(0)
S4-2	3.130e-27	1.149e-28	-26.504	-27.940	-1.435	(0)
S3-2	4.817e-28	1.767e-29	-27.317	-28.753	-1.435	(0)
S2-2	4.536e-29	1.664e-30	-28.343	-29.779	-1.435	(0)
S-2	2.297e-35	4.976e-36	-34.639	-35.303	-0.664	(0)
Hg(HS)2	1.027e-36	1.027e-36	-35.988	-35.988	0.000	(0)
HgHS2-	1.050e-37	4.596e-38	-36.979	-37.338	-0.359	(0)
Zn(HS)2	1.567e-39	1.567e-39	-38.805	-38.805	0.000	(0)
Cd(HS)2	9.547e-40	9.547e-40	-39.020	-39.020	0.000	(0)
ZnS(HS)-	3.878e-40	1.697e-40	-39.411	-39.770	-0.359	(0)
HgS2-2	2.719e-40	0.000e+00	-39.566	-41.001	-1.435	(0)
Pb(HS)2	2.640e-40	2.640e-40	-39.578	-39.578	0.000	(0)

Cu(S4)2-3	1.037e-40	0.000e+00	-39.984	-40.494	-0.509	(0)
Fe(HS)2	0.000e+00	0.000e+00	-40.144	-40.144	0.000	(0)
CuS4S5-3	0.000e+00	0.000e+00	-40.749	-41.224	-0.475	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-52.133	-52.492	-0.359	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-58.096	-58.455	-0.359	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-59.691	-60.050	-0.359	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-60.678	-61.037	-0.359	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-60.850	-61.208	-0.359	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-61.955	-63.390	-1.435	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-79.349	-80.784	-1.435	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-81.409	-82.845	-1.435	(0)
S(6)	1.012e-01					
S04-2	4.669e-02	1.362e-02	-1.331	-1.866	-0.535	(0)
MgS04	2.413e-02	2.413e-02	-1.617	-1.617	0.000	(0)
NaS04-	1.954e-02	1.354e-02	-1.709	-1.868	-0.159	(0)
CaS04	7.318e-03	7.318e-03	-2.136	-2.136	0.000	(0)
FeS04	1.868e-03	1.868e-03	-2.729	-2.729	0.000	(0)
KS04-	5.355e-04	3.712e-04	-3.271	-3.430	-0.159	(0)
NH4S04-	5.143e-04	3.509e-04	-3.289	-3.455	-0.166	(0)
MnS04	2.553e-04	2.553e-04	-3.593	-3.593	0.000	(0)
AlS04+	1.567e-04	1.046e-04	-3.805	-3.980	-0.175	(0)
CoS04	3.651e-05	3.651e-05	-4.438	-4.438	0.000	(0)
NiS04	3.650e-05	3.650e-05	-4.438	-4.438	0.000	(0)
Al(S04)2-	2.498e-05	1.667e-05	-4.602	-4.778	-0.175	(0)
Zn(S04)2-2	1.655e-05	6.071e-07	-4.781	-6.217	-1.435	(0)
HS04-	1.594e-05	1.064e-05	-4.797	-4.973	-0.175	(0)
ZnS04	4.948e-06	4.948e-06	-5.306	-5.306	0.000	(0)
Ni(S04)2-2	4.631e-07	1.699e-08	-6.334	-7.770	-1.435	(0)
Cd(S04)2-2	6.784e-08	2.489e-09	-7.169	-8.604	-1.435	(0)
Pb(S04)2-2	1.532e-08	5.619e-10	-7.815	-9.250	-1.435	(0)
CdS04	1.292e-08	1.292e-08	-7.889	-7.889	0.000	(0)
PbS04	6.849e-09	6.849e-09	-8.164	-8.164	0.000	(0)
CuS04	7.462e-10	7.462e-10	-9.127	-9.127	0.000	(0)
Be(S04)2-2	5.540e-13	2.033e-14	-12.256	-13.692	-1.435	(0)
BeS04	5.000e-13	5.000e-13	-12.301	-12.301	0.000	(0)
FeS04+	1.285e-13	8.769e-14	-12.891	-13.057	-0.166	(0)
Fe(S04)2-	6.021e-14	2.635e-14	-13.220	-13.579	-0.359	(0)
CrS04+	1.758e-14	7.695e-15	-13.755	-14.114	-0.359	(0)
CrOHS04	1.098e-14	1.098e-14	-13.959	-13.959	0.000	(0)
Cr2(OH)2S04+2	9.192e-26	3.372e-27	-25.037	-26.472	-1.435	(0)
Cr2(OH)2(S04)2	2.728e-27	2.728e-27	-26.564	-26.564	0.000	(0)
HgS04	1.264e-28	1.264e-28	-27.898	-27.898	0.000	(0)
CrO3S04-2	0.000e+00	0.000e+00	-50.669	-52.104	-1.435	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.313	-52.672	-0.359	(0)
Se(-2)	1.081e-06					
HSe-	1.049e-06	4.593e-07	-5.979	-6.338	-0.359	(0)
H2Se	3.160e-08	3.160e-08	-7.500	-7.500	0.000	(0)
MnSe	2.320e-11	2.320e-11	-10.635	-10.635	0.000	(0)
Se-2	1.065e-15	3.909e-17	-14.972	-16.408	-1.435	(0)
Se(4)	3.396e-14					
HSeO3-	3.373e-14	1.476e-14	-13.472	-13.831	-0.359	(0)
SeO3-2	1.727e-16	6.336e-18	-15.763	-17.198	-1.435	(0)
H2SeO3	5.493e-17	5.493e-17	-16.260	-16.260	0.000	(0)
FeHSeO3+2	6.103e-25	2.239e-26	-24.214	-25.650	-1.435	(0)
Cd(SeO3)2-2	4.045e-36	1.484e-37	-35.393	-36.829	-1.435	(0)
Se(6)	2.645e-33					
SeO4-2	2.614e-33	7.623e-34	-32.583	-33.118	-0.535	(0)
MnSeO4	2.101e-35	2.101e-35	-34.678	-34.678	0.000	(0)
CoSeO4	4.974e-36	4.974e-36	-35.303	-35.303	0.000	(0)
NiSeO4	4.580e-36	4.580e-36	-35.339	-35.339	0.000	(0)
HSeO4-	6.944e-37	3.039e-37	-36.158	-36.517	-0.359	(0)
ZnSeO4	2.029e-37	2.029e-37	-36.693	-36.693	0.000	(0)
CdSeO4	6.026e-40	6.026e-40	-39.220	-39.220	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-68.369	-69.805	-1.435	(0)
Zn	2.905e-05					
Zn(S04)2-2	1.655e-05	6.071e-07	-4.781	-6.217	-1.435	(0)
Zn+2	5.893e-06	1.718e-06	-5.230	-5.765	-0.535	(0)
ZnS04	4.948e-06	4.948e-06	-5.306	-5.306	0.000	(0)

ZnCl+	1.338e-06	8.717e-07	-5.874	-6.060	-0.186	(0)
ZnCl2	2.417e-07	2.417e-07	-6.617	-6.617	0.000	(0)
ZnCl3-	6.029e-08	3.928e-08	-7.220	-7.406	-0.186	(0)
ZnCl4-2	1.826e-08	3.957e-09	-7.738	-8.403	-0.664	(0)
ZnOHCl	1.296e-09	1.296e-09	-8.887	-8.887	0.000	(0)
ZnOH+	3.187e-10	1.395e-10	-9.497	-9.855	-0.359	(0)
Zn(OH)2	3.310e-14	3.310e-14	-13.480	-13.480	0.000	(0)
Zn(OH)3-	4.178e-19	1.829e-19	-18.379	-18.738	-0.359	(0)
Zn(OH)4-2	2.187e-25	8.025e-27	-24.660	-26.096	-1.435	(0)
ZnSeO4	2.029e-37	2.029e-37	-36.693	-36.693	0.000	(0)
Zn(HS)2	1.567e-39	1.567e-39	-38.805	-38.805	0.000	(0)
ZnS(HS)-	3.878e-40	1.697e-40	-39.411	-39.770	-0.359	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-58.096	-58.455	-0.359	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-61.955	-63.390	-1.435	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-68.369	-69.805	-1.435	(0)
ZnNO3+	0.000e+00	0.000e+00	-68.638	-68.997	-0.359	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-81.409	-82.845	-1.435	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-133.351	-133.351	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-158.18	-151.91	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-30.52	-25.99	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-37.79	-25.99	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-230.38	-212.45	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-43.67	-23.56	20.11	(Co(NH3)6)Cl3
(NH4)2CrO4	-54.77	-54.39	0.38	(NH4)2CrO4
(NH4)2SeO4	-38.81	-38.36	0.45	(NH4)2SeO4
Al(OH)3(am)	-1.88	9.18	11.06	Al(OH)3
Al2(MoO4)3	-49.38	-46.39	2.99	Al2(MoO4)3
Al2O3	-1.89	18.38	20.27	Al2O3
Al4(OH)10SO4	2.08	24.78	22.70	Al4(OH)10SO4
AlAsO4:2H2O	-14.91	-10.11	4.80	AlAsO4:2H2O
AlOHSO4	0.47	-2.76	-3.23	AlOHSO4
Alunite	7.19	6.29	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.04	-10.85	-7.82	PbSO4
Anhydrite	-0.14	-4.48	-4.34	CaSO4
Anilite	-0.14	-32.45	-32.31	Cu0.25Cu1.5S
Antlerite	-19.30	-10.51	8.79	Cu3(OH)4SO4
Arsenolite	-47.29	-50.19	-2.90	As4O6
As2O5	-45.34	-38.58	6.76	As2O5
Atacamite	-12.38	-4.76	7.61	Cu2(OH)3Cl
Ba(OH)2:8H2O	-26.54	-2.02	24.52	Ba(OH)2:8H2O
Ba3(AsO4)2	-35.55	-44.49	-8.94	Ba3(AsO4)2
BaCrO4	-51.45	-61.20	-9.75	BaCrO4
BaHPO4	-10.37	-30.14	-19.77	BaHPO4
BaMoO4	-16.57	-23.56	-6.99	BaMoO4
Barite	-3.88	-13.92	-10.03	BaSO4
BaS	-46.12	-29.94	16.18	BaS
BaSeO3	-22.64	-20.84	1.80	BaSeO3
BaSeO4	-37.66	-45.17	-7.51	BaSeO4
Be(OH)2(alpha)	-9.37	-2.48	6.89	Be(OH)2
Be(OH)2(am)	-9.67	-2.48	7.19	Be(OH)2
Be(OH)2(beta)	-8.97	-2.48	6.49	Be(OH)2
BeMoO4	-22.41	-24.06	-1.65	BeMoO4
BeS	-49.82	-30.44	19.38	BeS
BeSeO4:4H2O	-42.76	-45.70	-2.94	BeSeO4:4H2O
Bianchite	-5.90	-7.66	-1.76	ZnSO4:6H2O
Birnessite	-25.11	-7.02	18.09	MnO2
Bixbyite	-26.15	-26.50	-0.35	Mn2O3
BlaubleiI	-3.99	-28.15	-24.16	Cu0.9Cu0.2S
BlaubleiII	-2.86	-30.14	-27.28	Cu0.6Cu0.8S
Boehmite	0.33	9.19	8.86	AlOOH
Brochantite	-25.74	-10.03	15.71	Cu4(OH)6SO4
Brucite	-9.03	8.08	17.12	Mg(OH)2
Bunsenite	-7.46	5.23	12.68	NiO

Ca3(AsO4)2·4H2O	-38.49	-16.19	22.30	Ca3(AsO4)2·4H2O
Ca3(PO4)2(beta)	-4.87	-33.92	-29.05	Ca3(PO4)2
Ca4H(PO4)3·3H2O	-7.56	-54.64	-47.08	Ca4H(PO4)3·3H2O
CaCrO4	-49.56	-51.76	-2.20	CaCrO4
CaHP04	-1.35	-20.70	-19.35	CaHP04
CaHP04:2H2O	-1.66	-20.71	-19.05	CaHP04:2H2O
Calomel	-11.56	-29.69	-18.13	Hg2Cl2
CaMoO4	-6.17	-14.12	-7.95	CaMoO4
CaSeO3:2H2O	-14.27	-11.41	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-32.74	-35.74	-3.00	CaSeO4:2H2O
Cd(BO2)2	-28.04	-18.20	9.84	Cd(BO2)2
Cd(OH)2	-12.16	1.71	13.87	Cd(OH)2
Cd(OH)2(am)	-12.23	1.71	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-25.48	-18.77	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-29.38	-6.82	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-18.60	-51.20	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-33.52	-5.12	28.40	Cd4(OH)6SO4
CdCl2	-9.12	-9.74	-0.61	CdCl2
CdCl2:1H2O	-8.07	-9.74	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-7.82	-9.75	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.44	-10.74	13.69	Cd
Cdmetal(gamma)	-24.54	-10.74	13.80	Cd
CdMoO4	-5.68	-19.88	-14.20	CdMoO4
CdOHCl	-7.63	-4.01	3.61	CdOHCl
CdSe	10.72	-9.67	-20.38	CdSe
CdSeO4:2H2O	-39.65	-41.50	-1.85	CdSeO4:2H2O
CdSO4	-10.19	-10.24	-0.05	CdSO4
CdSO4:1H2O	-8.59	-10.24	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-8.42	-10.25	-1.83	CdSO4:2.67H2O
Chalcantite	-8.84	-11.49	-2.65	CuSO4:5H2O
Chalcocite	1.21	-34.11	-35.32	Cu2S
Chalcopyrite	-12.98	-48.60	-35.62	CuFeS2
Cinnabar	-6.23	-52.53	-46.30	HgS
Claudetite	-47.00	-50.19	-3.20	As4O6
Clausthalite	17.10	-10.28	-27.39	PbSe
Co(BO2)2	-41.76	-14.69	27.07	Co(BO2)2
Co(OH)2	-7.87	5.22	13.09	Co(OH)2
Co(OH)3	-18.86	-20.95	-2.09	Co(OH)3
Co3(AsO4)2	-35.93	-22.90	13.03	Co3(AsO4)2
Co3(PO4)2	-5.97	-40.66	-34.69	Co3(PO4)2
Co3O4	-26.42	-36.66	-10.24	Co3O4
CoCl2	-14.68	-6.22	8.46	CoCl2
CoCl2:6H2O	-8.77	-6.25	2.52	CoCl2:6H2O
CoFe2O4	8.27	5.12	-3.15	CoFe2O4
CoHP04	-3.88	-22.94	-19.06	CoHP04
CoMoO4	-8.66	-16.36	-7.71	CoMoO4
CoO	-8.61	5.23	13.84	CoO
CoS(alpha)	-15.30	-22.74	-7.44	CoS
CoS(beta)	-11.67	-22.74	-11.07	CoS
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-14.96	-13.64	1.32	CoSeO3
CoSeO4:6H2O	-36.48	-38.01	-1.53	CoSeO4:6H2O
CoSO4	-9.71	-6.72	2.99	CoSO4
CoSO4:6H2O	-4.28	-6.75	-2.48	CoSO4:6H2O
Cotunnite	-5.51	-10.35	-4.84	PbCl2
Covellite	-4.95	-27.49	-22.53	CuS
Cr(OH)2	-24.50	-13.60	10.90	Cr(OH)2
Cr(OH)3	-11.71	-10.30	1.41	Cr(OH)3
Cr(OH)3(am)	-9.55	-10.30	-0.75	Cr(OH)3
Cr2O3	-18.35	-20.59	-2.24	Cr2O3
CrCl2	-39.39	-25.04	14.36	CrCl2
CrCl3	-42.87	-27.47	15.40	CrCl3
Crmetal	-56.94	-26.05	30.89	Cr
CrO3	-56.03	-59.23	-3.20	CrO3
Cu(OH)2	-8.33	0.48	8.81	Cu(OH)2
Cu2(OH)3NO3	-77.15	-67.73	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.79	-17.52	-46.31	Cu2Se
Cu2SO4	-16.19	-18.09	-1.90	Cu2SO4

Cu3(AsO4)2·2H2O	-43.24	-37.14	6.10	Cu3(AsO4)2·2H2O
Cu3(PO4)2	-18.04	-54.89	-36.85	Cu3(PO4)2
Cu3(PO4)2·3H2O	-19.78	-54.90	-35.12	Cu3(PO4)2·3H2O
Cu3Se2	35.89	-28.41	-64.30	Cu3Se2
CuCrO4	-53.31	-58.75	-5.44	CuCrO4
Cumetal	-0.37	-9.30	-8.93	Cu
CuMoO4	-8.00	-21.10	-13.11	CuMoO4
CuOCuSO4	-21.61	-10.98	10.63	CuOCuSO4
Cupricferrite	-6.12	0.37	6.49	CuFe2O4
Cuprite	-5.03	-6.14	-1.11	Cu2O
Cuprousferrite	5.75	-3.13	-8.88	CuFeO2
CuSe	22.49	-10.89	-33.39	CuSe
CuSe2	23.89	-9.82	-33.70	CuSe2
CuSeO3·2H2O	-19.00	-18.40	0.60	CuSeO3·2H2O
CuSeO4·5H2O	-40.30	-42.74	-2.44	CuSeO4·5H2O
CuSO4	-14.58	-11.47	3.11	CuSO4
Diaspore	2.07	9.19	7.12	AlOOH
Djurleite	0.72	-33.67	-34.40	Cu0.066Cu1.868S
Epsomite	-1.75	-3.90	-2.15	MgSO4·7H2O
Fe(OH)2	-6.72	6.84	13.56	Fe(OH)2
Fe(OH)2·7Cl.3	1.26	-1.78	-3.04	Fe(OH)2·7Cl.3
Fe2(OH)4SeO3	-20.55	-18.99	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3·2H2O	-36.11	-56.73	-20.63	Fe2(SeO3)3·2H2O
Fe2(SO4)3	-32.80	-35.96	-3.16	Fe2(SO4)3
Fe3(OH)8	-13.50	6.72	20.22	Fe3(OH)8
FeAsO4·2H2O	-19.76	-19.36	0.40	FeAsO4·2H2O
FeCr2O4	-21.27	-13.74	7.53	FeCr2O4
FeMoO4	-4.67	-14.74	-10.06	FeMoO4
Ferrihydrite	-3.43	-0.06	3.37	Fe(OH)3
Ferroselite	15.26	-3.45	-18.71	FeSe2
FeS(ppt)	-18.20	-21.12	-2.92	FeS
FeSe	6.48	-4.53	-11.00	FeSe
Galena	-12.71	-26.87	-14.16	PbS
Gibbsite	0.66	9.18	8.52	Al(OH)3
Goethite	-0.69	-0.06	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4·7H2O
Greenockite	-11.77	-26.26	-14.49	CdS
Greigite	-60.10	-105.14	-45.03	Fe3S4
Gypsum	0.12	-4.49	-4.61	CaSO4·2H2O
H-Jarosite	-12.54	-24.09	-11.55	(H3O)Fe3(SO4)2(OH)6
H2MoO4	-8.60	-21.59	-12.99	H2MoO4
H2S(g)	-19.96	-27.97	-8.01	H2S
H2Se(g)	-6.46	-11.38	-4.92	H2Se
Halite	-3.01	-1.41	1.59	NaCl
Hausmannite	-31.19	30.84	62.03	Mn3O4
Hematite	1.00	-0.11	-1.11	Fe2O3
Hercynite	1.59	25.23	23.64	FeAl2O4
Hg(g)	-7.42	-15.35	-7.93	Hg
Hg(OH)2	-21.07	-24.57	-3.50	Hg(OH)2
Hg2(g)	-15.60	-30.70	-15.09	Hg2
Hg2(OH)2	-23.51	-18.25	5.26	Hg2(OH)2
Hg2CrO4	-68.77	-77.47	-8.70	Hg2CrO4
Hg2HP04	-21.64	-46.41	-24.77	Hg2HP04
Hg2S	-34.37	-46.21	-11.84	Hg2S
Hg2SeO3	-32.45	-37.11	-4.66	Hg2SeO3
Hg2SO4	-24.05	-30.19	-6.14	Hg2SO4
HgCl(g)	-34.73	-14.84	19.88	HgCl
HgCl2	-14.49	-36.01	-21.52	HgCl2
Hgmetal(l)	-1.70	-15.35	-13.65	Hg
HgSe	19.76	-35.94	-55.69	HgSe
HgSeO3	-31.00	-43.43	-12.43	HgSeO3
HgSO4	-27.06	-36.51	-9.45	HgSO4
Hinsdalite	-8.97	-11.47	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-2.82	-47.15	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-16.24	-79.03	-62.79	Pb5(PO4)3OH
K-Alum	-6.90	-12.14	-5.24	KAl(SO4)2·12H2O
K-Jarosite	-6.96	-21.45	-14.49	KFe3(SO4)2(OH)6
K2Cr2O7	-95.75	-113.19	-17.43	K2Cr2O7

K2CrO4	-53.40	-53.96	-0.56	K2CrO4
K2MoO4	-19.58	-16.31	3.27	K2MoO4
K2SeO4	-37.20	-37.93	-0.73	K2SeO4
Langite	-27.92	-10.04	17.88	Cu4(OH)6SO4:H2O
Larnakite	-9.38	-9.76	-0.38	PbO:PbSO4
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.43	-0.06	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.75	1.10	12.85	PbO
Mackinawite	-17.52	-21.12	-3.60	FeS
Maghemite	-6.50	-0.11	6.39	Fe2O3
Magnesioferrite	-9.55	7.98	17.52	Fe2MgO4
Magnetite	2.84	6.74	3.90	Fe3O4
Manganite	-12.99	12.35	25.34	MnOOH
Massicot	-11.96	1.10	13.05	PbO
Melanothallite	-17.37	-10.96	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeSO4:7H2O
Metacinnabar	-6.83	-52.53	-45.70	HgS
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(PO4)2	-8.80	-32.08	-23.28	Mg3(PO4)2
MgCr2O4	-29.13	-12.50	16.63	MgCr2O4
MgCrO4	-56.74	-51.15	5.59	MgCrO4
MgHP04:3H2O	-1.93	-20.10	-18.18	MgHP04:3H2O
MgMoO4	-11.65	-13.50	-1.85	MgMoO4
MgSeO3:6H2O	-13.86	-10.82	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-33.95	-35.15	-1.20	MgSeO4:6H2O
Minium	-58.78	15.74	74.53	Pb3O4
Mirabilite	-2.08	-3.38	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-57.03	-62.35	-5.32	Mn2(SO4)3
Mn3(AsO4)2:8H2O	-32.74	-20.24	12.50	Mn3(AsO4)2:8H2O
Mn3(PO4)2	-14.11	-37.95	-23.85	Mn3(PO4)2
MnCl2:4H2O	-8.08	-5.34	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnS(grn)	-22.09	-21.84	0.25	MnS
MnS(pnk)	-25.18	-21.84	3.34	MnS
MnSe	-8.98	-5.25	3.73	MnSe
MnSeO3	-13.87	-12.74	1.13	MnSeO3
MnSeO3:2H2O	-13.72	-12.75	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-35.05	-37.10	-2.05	MnSeO4:5H2O
MnSO4	-8.56	-5.82	2.74	MnSO4
Monteponite	-13.64	1.71	15.35	CdO
Montroydite	-21.01	-24.56	-3.55	HgO
MoO3	-13.59	-21.59	-8.00	MoO3
Morenosite	-4.59	-6.76	-2.17	NiSO4:7H2O
MoS2	-18.80	-89.98	-71.19	MoS2
Na-Jarosite	-8.93	-19.77	-10.84	NaFe3(SO4)2(OH)6
Na2Cr2O7	-99.89	-109.84	-9.95	Na2Cr2O7
Na2CrO4	-53.58	-50.61	2.98	Na2CrO4
Na2Mo2O7	-17.82	-34.55	-16.73	Na2Mo2O7
Na2MoO4	-14.48	-12.96	1.51	Na2MoO4
Na2MoO4:2H2O	-14.20	-12.97	1.22	Na2MoO4:2H2O
Na2SeO3:5H2O	-20.57	-10.27	10.30	Na2SeO3:5H2O
Na2SeO4	-35.86	-34.58	1.28	Na2SeO4
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(AsO4)2:8H2O	-38.64	-22.94	15.70	Ni3(AsO4)2:8H2O
Ni3(PO4)2	-9.36	-40.66	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-23.06	8.94	32.00	Ni4(OH)6SO4
NiMoO4	-5.22	-16.36	-11.15	NiMoO4
NiS(alpha)	-17.14	-22.74	-5.60	NiS
NiS(beta)	-11.64	-22.74	-11.10	NiS
NiS(gamma)	-9.94	-22.74	-12.80	NiS
NiSe	11.55	-6.15	-17.70	NiSe
NiSeO3:2H2O	-16.54	-13.65	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-36.49	-38.01	-1.52	NiSeO4:6H2O
Nsutite	-24.53	-7.02	17.50	MnO2
O2(g)	-59.54	24.91	84.45	O2
Orpiment	-47.10	-109.00	-61.90	As2S3

Pb(B02)2	-25.38	-18.82	6.56	Pb(B02)2
Pb(OH)2	-7.20	1.09	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.33	-3.54	8.79	Pb2(OH)3Cl
Pb20(OH)2	-24.00	2.19	26.19	Pb20(OH)2
Pb203	-46.39	14.65	61.04	Pb203
Pb3(As04)2	-41.09	-35.29	5.80	Pb3(As04)2
Pb3(P04)2	-9.52	-53.05	-43.53	Pb3(P04)2
Pb302S04	-19.54	-8.66	10.87	Pb302S04
Pb4(OH)6S04	-28.68	-7.58	21.10	Pb4(OH)6S04
Pb403S04	-29.77	-7.57	22.20	Pb403S04
PbCr04	-45.43	-58.14	-12.71	PbCr04
PbHP04	-3.27	-27.08	-23.81	PbHP04
Pbmetal	-15.60	-11.36	4.24	Pb
PbMo04	-4.74	-20.49	-15.75	PbMo04
Pb0:0.3H2O	-11.89	1.09	12.98	Pb0:0.33H2O
PbSe04	-35.23	-42.11	-6.88	PbSe04
Periclase	-13.86	8.09	21.94	Mg0
Plattnerite	-36.75	13.55	50.31	Pb02
Plumbgummite	5.09	-27.70	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-15.64	7.47	23.11	Ca(OH)2
Pyrite	-18.01	-36.63	-18.63	FeS2
Pyrochroite	-9.30	6.12	15.43	Mn(OH)2
Pyrolusite	-23.44	18.58	42.03	Mn02
Pyromorphite	-0.32	-84.75	-84.43	Pb5(P04)3Cl
Realgar	-26.69	-46.75	-20.05	AsS
Retgersite	-4.70	-6.76	-2.05	NiS04:6H2O
Semetal(am)	8.21	1.08	-7.14	Se
Semetal(hex)	8.82	1.08	-7.75	Se
Se02	-18.99	-18.87	0.12	Se02
Se03	-64.59	-43.20	21.39	Se03
Sphalerite	-12.13	-23.65	-11.52	ZnS
Spinel	-11.31	26.46	37.77	MgAl204
Strengite	-1.86	-28.23	-26.38	FeP04:2H2O
Sulfur	-13.41	-15.51	-2.11	S
Tenorite	-7.32	0.48	7.80	Cu0
Thenardite	-3.67	-3.33	0.34	Na2S04
Tsumebite	-15.73	-25.52	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	0.17	-35.83	-36.00	Fe3(P04)2:8H2O
Wurtzite	-14.65	-23.65	-9.00	ZnS
Zincite	-7.23	4.32	11.55	Zn0
Zincosite	-11.76	-7.63	4.13	ZnS04
Zn(B02)2	-23.89	-15.60	8.29	Zn(B02)2
Zn(N03)2:6H2O	-136.34	-133.08	3.26	Zn(N03)2:6H2O
Zn(OH)2	-7.89	4.31	12.20	Zn(OH)2
Zn(OH)2(am)	-8.35	4.31	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.64	4.31	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.42	4.31	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.42	4.31	11.73	Zn(OH)2
Zn2(OH)2S04	-10.82	-3.32	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-12.28	2.91	15.19	Zn2(OH)3Cl
Zn3(As04)2:2.5H2O	-39.29	-25.64	13.65	Zn3(As04)2:2.5H2O
Zn3(P04)2:4H2O	-7.98	-43.40	-35.42	Zn3(P04)2:4H2O
Zn30(S04)2	-30.47	-10.94	19.53	Zn30(S04)2
Zn4(OH)6S04	-23.09	5.31	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-28.37	10.13	38.50	Zn5(OH)8Cl2
ZnCl2	-14.35	-7.13	7.22	ZnCl2
Znmetal	-34.29	-8.14	26.15	Zn
ZnMo04	-7.17	-17.27	-10.10	ZnMo04
Zn0(active)	-7.08	4.32	11.40	Zn0
ZnS(am)	-14.56	-23.65	-9.09	ZnS
ZnSe	7.40	-7.06	-14.46	ZnSe
ZnSe04:6H2O	-37.39	-38.91	-1.52	ZnSe04:6H2O
ZnS04:1H2O	-7.10	-7.64	-0.53	ZnS04:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 5.

SOLUTION 4 #Groundwater worst case maximum values

temp 21
pH 5.05
pe 1
redox pe
units mg/l
density 1
Al 5.21
Alkalinity 0
As 0
Ba 0
Be 0
B 0
Cd 0.04
Co 24.2
Cr 0
Cu 9.29
Fe 937
Pb 0.01
Mn 171
Mo 0
V 0
Zn 1.78
Se 0.08
Ni 5.57
N 60
P 23.6
Ca 590
Mg 1340
Na 5880
K 216
Cl 9420
S(6) 9110
Hg 0.0004
water 1 # kg

MIX 2
1 0.963
4 0.037

REACTION 3

H2O -1

2

END #Time-step 3

Beginning of initial solution calculations.

Initial solution 4.

-----Solution composition-----

Elements	Molality	Moles
Al	1.986e-04	1.986e-04
Ca	1.514e-02	1.514e-02
Cd	3.660e-07	3.660e-07
Cl	2.733e-01	2.733e-01
Co	4.224e-04	4.224e-04
Cu	1.504e-04	1.504e-04
Fe	1.726e-02	1.726e-02
Hg	2.051e-09	2.051e-09
K	5.682e-03	5.682e-03

Mg	5.671e-02	5.671e-02
Mn	3.202e-03	3.202e-03
N	4.406e-03	4.406e-03
Na	2.631e-01	2.631e-01
Ni	9.762e-05	9.762e-05
P	7.837e-04	7.837e-04
Pb	4.964e-08	4.964e-08
S(6)	9.754e-02	9.754e-02
Se	1.042e-06	1.042e-06
Zn	2.800e-05	2.800e-05

-----Description of solution-----

pH	=	5.050
pe	=	1.000
Activity of water	=	0.988
Ionic strength (mol/kgw)	=	4.862e-01
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	1.381e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	21.00
Electrical balance (eq)	=	-9.552e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.26
Iterations	=	14
Total H	=	1.110329e+02
Total O	=	5.590014e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.214e-05	8.913e-06	-4.916	-5.050	-0.134	0.00
OH-	1.292e-09	8.222e-10	-8.889	-9.085	-0.196	(0)
H2O	5.551e+01	9.883e-01	1.744	-0.005	0.000	18.05
Al	1.986e-04					
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Al+3	1.839e-05	1.139e-06	-4.735	-5.943	-1.208	(0)
AlOH+2	4.197e-06	9.786e-07	-5.377	-6.009	-0.632	(0)
Al(OH)2+	1.624e-06	1.128e-06	-5.790	-5.948	-0.158	(0)
Al(OH)3	2.514e-08	2.514e-08	-7.600	-7.600	0.000	(0)
Al(OH)4-	2.040e-09	1.366e-09	-8.690	-8.864	-0.174	(0)
Ca	1.514e-02					
Ca+2	8.161e-03	2.370e-03	-2.088	-2.625	-0.537	(0)
CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
CaOH+	5.236e-11	3.715e-11	-10.281	-10.430	-0.149	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
Cd	3.660e-07					
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
Cd(SO4)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
Cd+2	1.502e-08	4.363e-09	-7.823	-8.360	-0.537	(0)
CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CdOH+	6.462e-14	2.865e-14	-13.190	-13.543	-0.353	(0)
Cd2OH+3	9.945e-19	6.582e-22	-18.002	-21.182	-3.179	(0)
Cd(OH)2	2.726e-19	2.726e-19	-18.564	-18.564	0.000	(0)
Cd(OH)3-	4.195e-26	1.860e-26	-25.377	-25.730	-0.353	(0)
Cd(OH)4-2	8.799e-35	3.400e-36	-34.056	-35.469	-1.413	(0)
Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)

CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cl	2.733e-01					
Cl-	2.729e-01	2.003e-01	-0.564	-0.698	-0.134	(0)
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(2)	4.224e-04					
Co+2	3.644e-04	1.408e-05	-3.438	-4.851	-1.413	(0)
CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CoHP04	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CoOH+	7.075e-10	3.137e-10	-9.150	-9.504	-0.353	(0)
Co2OH+3	3.344e-13	2.213e-16	-12.476	-15.655	-3.179	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Co(OH)2	2.782e-14	2.782e-14	-13.556	-13.556	0.000	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Co(OH)3-	1.398e-21	6.199e-22	-20.854	-21.208	-0.353	(0)
CoOOH-	8.505e-23	3.771e-23	-22.070	-22.424	-0.353	(0)
Co4(OH)4+4	8.668e-25	1.932e-30	-24.062	-29.714	-5.652	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
Co(OH)4-2	2.839e-30	1.097e-31	-29.547	-30.960	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Co(3)	8.287e-32					
CoOH+2	8.232e-32	3.180e-33	-31.085	-32.498	-1.413	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co+3	9.049e-36	5.605e-37	-35.043	-36.251	-1.208	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)

Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
Cu(1)	1.504e-04					
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
Cu+	1.823e-08	8.082e-09	-7.739	-8.092	-0.353	(0)
Cu(2)	1.182e-09					
Cu+2	5.900e-10	1.714e-10	-9.229	-9.766	-0.537	(0)
CuSO4	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
CuOH+	7.604e-13	4.972e-13	-12.119	-12.303	-0.185	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
Cu(OH)2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
Cu2(OH)2+2	1.564e-19	6.042e-21	-18.806	-20.219	-1.413	(0)
Cu(OH)3-	6.965e-22	3.088e-22	-21.157	-21.510	-0.353	(0)
Cu(OH)4-2	7.024e-29	2.714e-30	-28.153	-29.566	-1.413	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Fe(2)	1.726e-02					
Fe+2	1.529e-02	5.907e-04	-1.816	-3.229	-1.413	(0)
FeSO4	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
FeHP04	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
FeOH+	2.826e-08	1.934e-08	-7.549	-7.714	-0.165	(0)
Fe(OH)2	1.209e-14	1.209e-14	-13.918	-13.918	0.000	(0)
Fe(OH)3-	6.009e-18	4.111e-18	-17.221	-17.386	-0.165	(0)
Fe(3)	2.087e-10					
Fe(OH)2+	1.957e-10	1.360e-10	-9.708	-9.867	-0.158	(0)
FeHP04+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
FeOH+2	1.136e-12	2.489e-13	-11.945	-12.604	-0.659	(0)
Fe(OH)3	9.228e-14	9.228e-14	-13.035	-13.035	0.000	(0)
FeSO4+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(SO4)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Fe+3	7.010e-15	4.342e-16	-14.154	-15.362	-1.208	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
Fe(OH)4-	2.440e-17	1.696e-17	-16.613	-16.771	-0.158	(0)
Fe2(OH)2+4	1.061e-18	2.365e-24	-17.974	-23.626	-5.652	(0)
Fe3(OH)4+5	3.023e-24	4.459e-33	-23.520	-32.351	-8.831	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
H(0)	1.047e-15					
H2	5.235e-16	5.855e-16	-15.281	-15.232	0.049	(0)
Hg(0)	2.051e-09					
Hg	2.051e-09	2.051e-09	-8.688	-8.688	0.000	(0)
Hg(1)	9.698e-28					
Hg2+2	4.849e-28	1.874e-29	-27.314	-28.727	-1.413	(0)
Hg(2)	4.726e-15					
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Hg(OH)2	1.022e-25	1.143e-25	-24.991	-24.942	0.049	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
HgOH+	1.615e-27	7.162e-28	-26.792	-27.145	-0.353	(0)
Hg+2	4.674e-28	1.806e-29	-27.330	-28.743	-1.413	(0)
HgSO4	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)

	Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
	Hg(OH)3-	3.623e-35	1.606e-35	-34.441	-34.794	-0.353	(0)
	Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
	HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
	Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
K	5.682e-03						
	K+	5.178e-03	3.801e-03	-2.286	-2.420	-0.134	(0)
	KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
	KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
Mg	5.671e-02						
	Mg+2	3.360e-02	9.758e-03	-1.474	-2.011	-0.537	(0)
	MgS04	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
	MgH2P04+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
	MgHP04	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
	MgOH+	4.148e-09	2.990e-09	-8.382	-8.524	-0.142	(0)
	MgP04-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
Mn(2)	3.202e-03						
	Mn+2	2.899e-03	1.120e-04	-2.538	-3.951	-1.413	(0)
	MnS04	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
	MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
	MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
	MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
	MnOH+	3.381e-10	2.313e-10	-9.471	-9.636	-0.165	(0)
	MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
	Mn(OH)3-	3.538e-24	2.421e-24	-23.451	-23.616	-0.165	(0)
	Mn(OH)4-2	3.983e-32	8.727e-33	-31.400	-32.059	-0.659	(0)
	MnSe04	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
	MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
	Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Mn(3)	4.471e-28						
	Mn+3	4.471e-28	2.769e-29	-27.350	-28.558	-1.208	(0)
Mn(6)	0.000e+00						
	Mn04-2	0.000e+00	0.000e+00	-79.028	-79.687	-0.659	(0)
Mn(7)	0.000e+00						
	Mn04-	0.000e+00	0.000e+00	-88.115	-88.325	-0.210	(0)
N(-3)	4.406e-03						
	NH4+	3.919e-03	2.335e-03	-2.407	-2.632	-0.225	(0)
	NH4S04-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
	NH3	1.123e-07	1.123e-07	-6.950	-6.950	0.000	(0)
	NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
	CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
	Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
	CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
	Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
	Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
	Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
	Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
	Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
	Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
	HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
	Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
	Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
	Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
	Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
	Co(NH3)6S04+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
	Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
N(3)	0.000e+00						
	N02-	0.000e+00	0.000e+00	-47.968	-48.177	-0.210	(0)
	CoN02+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
	CuN02+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
	Cu(N02)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
N(5)	0.000e+00						
	N03-	0.000e+00	0.000e+00	-64.954	-65.088	-0.134	(0)
	CaN03+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
	MnN03+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
	NiN03+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
	CoN03+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)

	ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
	CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
	PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
	CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
	FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
	HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
	Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
	Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
	Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)
	Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
	Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
	Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
Na		2.631e-01					
	Na+	2.447e-01	1.796e-01	-0.611	-0.746	-0.134	(0)
	NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
	NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
Ni		9.762e-05					
	Ni+2	4.671e-05	1.357e-05	-4.331	-4.867	-0.537	(0)
	NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
	NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
	Ni(SO4)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
	NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
	NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
	NiOH+	3.238e-10	1.435e-10	-9.490	-9.843	-0.353	(0)
	Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
	Ni(OH)2	1.692e-14	1.692e-14	-13.772	-13.772	0.000	(0)
	Ni(OH)3-	4.261e-20	1.889e-20	-19.371	-19.724	-0.353	(0)
	NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
	NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
O(0)		0.000e+00					
	O2	0.000e+00	0.000e+00	-63.001	-62.952	0.049	(0)
P		7.837e-04					
	H2PO4-	4.270e-04	2.967e-04	-3.370	-3.528	-0.158	(0)
	MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
	FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
	CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
	MgHPO4	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
	HPO4-2	9.473e-06	2.076e-06	-5.024	-5.683	-0.659	(0)
	NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
	FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
	CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
	H3PO4	3.560e-07	3.560e-07	-6.449	-6.449	0.000	(0)
	KHPO4-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
	CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
	CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
	MgPO4-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
	FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
	PO4-3	1.460e-12	9.045e-14	-11.836	-13.044	-1.208	(0)
	FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Pb		4.964e-08					
	PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
	Pb(SO4)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
	PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
	PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
	Pb+2	3.636e-09	1.056e-09	-8.439	-8.976	-0.537	(0)
	PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
	PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
	PbOH+	6.682e-12	2.963e-12	-11.175	-11.528	-0.353	(0)
	Pb(OH)2	1.046e-16	1.046e-16	-15.980	-15.980	0.000	(0)
	Pb2OH+3	7.494e-17	4.960e-20	-16.125	-19.305	-3.179	(0)
	Pb(OH)3-	2.635e-22	1.168e-22	-21.579	-21.933	-0.353	(0)
	Pb(OH)4-2	8.268e-28	3.195e-29	-27.083	-28.496	-1.413	(0)
	Pb3(OH)4+2	3.173e-30	1.226e-31	-29.499	-30.912	-1.413	(0)
	Pb4(OH)4+4	5.352e-31	1.193e-36	-30.271	-35.923	-5.652	(0)
	PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
	Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
S(6)		9.754e-02					

S04-2	4.586e-02	1.332e-02	-1.339	-1.875	-0.537	(0)
MgS04	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
NaS04-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
CaS04	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
FeS04	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
NH4S04-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
MnS04	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
AlS04+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
CoS04	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
NiS04	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
Al(S04)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Zn(S04)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
HS04-	1.536e-05	1.028e-05	-4.814	-4.988	-0.174	(0)
ZnS04	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
Ni(S04)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
Cd(S04)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
Pb(S04)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
CdS04	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
PbS04	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
CuS04	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
FeS04+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(S04)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
HgS04	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Se(-2)	1.042e-06					
HSe-	1.012e-06	4.485e-07	-5.995	-6.348	-0.353	(0)
H2Se	3.047e-08	3.047e-08	-7.516	-7.516	0.000	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Se-2	1.000e-15	3.865e-17	-15.000	-16.413	-1.413	(0)
Se(4)	2.708e-15					
HSeO3-	2.690e-15	1.193e-15	-14.570	-14.923	-0.353	(0)
SeO3-2	1.341e-17	5.183e-19	-16.872	-18.285	-1.413	(0)
H2SeO3	4.383e-18	4.383e-18	-17.358	-17.358	0.000	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
Se(6)	9.467e-35					
SeO4-2	9.354e-35	2.717e-35	-34.029	-34.566	-0.537	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
HSeO4-	2.413e-38	1.070e-38	-37.617	-37.971	-0.353	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn	2.800e-05					
Zn(S04)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
Zn+2	6.051e-06	1.758e-06	-5.218	-5.755	-0.537	(0)
ZnS04	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
ZnOH+	3.259e-10	1.445e-10	-9.487	-9.840	-0.353	(0)
Zn(OH)2	3.473e-14	3.473e-14	-13.459	-13.459	0.000	(0)
Zn(OH)3-	4.384e-19	1.944e-19	-18.358	-18.711	-0.353	(0)
Zn(OH)4-2	2.236e-25	8.641e-27	-24.650	-26.063	-1.413	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)
(Co(NH3)5Cl)(NO3)2	-161.31	-155.03	6.27

(Co(NH3)5Cl)Cl2	-30.79	-26.25	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-38.05	-26.26	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-234.94	-217.01	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-43.95	-23.84	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-40.28	-39.83	0.45	(NH4)2SeO4
Al(OH)3(am)	-1.87	9.19	11.06	Al(OH)3
Al2O3	-1.87	18.40	20.27	Al2O3
Al4(OH)10SO4	2.10	24.80	22.70	Al4(OH)10SO4
AlOHSO4	0.46	-2.77	-3.23	AlOHSO4
Alunite	7.17	6.27	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.03	-10.85	-7.82	PbSO4
Anhydrite	-0.16	-4.50	-4.34	CaSO4
Antlerite	-19.78	-10.99	8.79	Cu3(OH)4SO4
Atacamite	-12.71	-5.10	7.61	Cu2(OH)3Cl
Bianchite	-5.90	-7.66	-1.76	ZnSO4:6H2O
Birnessite	-25.46	-7.37	18.09	MnO2
Bixbyite	-26.48	-26.83	-0.35	Mn2O3
Boehmite	0.34	9.20	8.86	AlOOH
Brochantite	-26.38	-10.67	15.71	Cu4(OH)6SO4
Brucite	-9.04	8.08	17.12	Mg(OH)2
Bunsenite	-7.46	5.23	12.68	NiO
Ca3(P04)2(beta)	-4.91	-33.96	-29.05	Ca3(P04)2
Ca4H(P04)3:3H2O	-7.62	-54.70	-47.08	Ca4H(P04)3:3H2O
CaHP04	-1.37	-20.72	-19.35	CaHP04
CaHP04:2H2O	-1.68	-20.73	-19.05	CaHP04:2H2O
Calomel	-11.99	-30.12	-18.13	Hg2Cl2
CaSeO3:2H2O	-15.37	-12.51	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-34.20	-37.20	-3.00	CaSeO4:2H2O
Cd(OH)2	-12.14	1.73	13.87	Cd(OH)2
Cd(OH)2(am)	-12.21	1.73	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-25.45	-18.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-29.34	-6.78	22.56	Cd3(OH)4SO4
Cd3(P04)2	-18.57	-51.17	-32.60	Cd3(P04)2
Cd4(OH)6SO4	-33.45	-5.05	28.40	Cd4(OH)6SO4
CdCl2	-9.14	-9.76	-0.61	CdCl2
CdCl2:1H2O	-8.09	-9.76	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-7.84	-9.77	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.05	-10.36	13.69	Cd
Cdmetal(gamma)	-24.16	-10.36	13.80	Cd
CdOHCl	-7.62	-4.01	3.61	CdOHCl
CdSe	10.72	-9.66	-20.38	CdSe
CdSeO4:2H2O	-41.09	-42.94	-1.85	CdSeO4:2H2O
CdSO4	-10.19	-10.24	-0.05	CdSO4
CdSO4:1H2O	-8.59	-10.24	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-8.42	-10.25	-1.83	CdSO4:2.67H2O
Chalcantite	-9.01	-11.67	-2.65	CuSO4:5H2O
Clausthalite	17.11	-10.27	-27.39	PbSe
Co(OH)2	-7.86	5.24	13.09	Co(OH)2
Co(OH)3	-19.03	-21.12	-2.09	Co(OH)3
Co3(P04)2	-5.95	-40.64	-34.69	Co3(P04)2
Co3O4	-26.74	-36.97	-10.24	Co3O4
CoCl2	-14.71	-6.25	8.46	CoCl2
CoCl2:6H2O	-8.80	-6.28	2.52	CoCl2:6H2O
CoFe2O4	7.95	4.80	-3.15	CoFe2O4
CoHP04	-3.88	-22.95	-19.06	CoHP04
CoO	-8.60	5.24	13.84	CoO
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-16.04	-14.72	1.32	CoSeO3
CoSeO4:6H2O	-37.92	-39.45	-1.53	CoSeO4:6H2O
CoSO4	-9.72	-6.73	2.99	CoSO4
CoSO4:6H2O	-4.28	-6.76	-2.48	CoSO4:6H2O
Cotunnite	-5.53	-10.37	-4.84	PbCl2
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.91	-69.49	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.83	-17.48	-46.31	Cu2Se
Cu2SO4	-16.16	-18.06	-1.90	Cu2SO4
Cu3(P04)2	-18.54	-55.39	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-20.28	-55.40	-35.12	Cu3(P04)2:3H2O

Cu3Se2	35.75	-28.55	-64.30	Cu3Se2
Cumetal	-0.17	-9.09	-8.93	Cu
Cu0CuS04	-21.94	-11.31	10.63	Cu0CuS04
Cupricferrite	-6.60	-0.11	6.49	CuFe204
Cuprite	-4.98	-6.09	-1.11	Cu20
Cuprousferrite	5.61	-3.27	-8.88	CuFe02
CuSe	22.32	-11.06	-33.39	CuSe
CuSe2	23.34	-10.36	-33.70	CuSe2
CuSe03:2H20	-20.25	-19.65	0.60	CuSe03:2H20
CuSe04:5H20	-41.92	-44.36	-2.44	CuSe04:5H20
CuS04	-14.76	-11.64	3.11	CuS04
Diaspore	2.08	9.20	7.12	Al00H
Epsomite	-1.77	-3.92	-2.15	MgS04:7H20
Fe(OH)2	-6.70	6.86	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.09	-1.95	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-21.97	-20.42	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H20	-39.73	-60.36	-20.63	Fe2(Se03)3:2H20
Fe2(S04)3	-33.19	-36.35	-3.16	Fe2(S04)3
Fe3(OH)8	-13.82	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.59	-0.23	3.37	Fe(OH)3
Ferroselite	14.88	-3.83	-18.71	FeSe2
FeSe	6.48	-4.53	-11.00	FeSe
Gibbsite	0.67	9.19	8.52	Al(OH)3
Goethite	-0.86	-0.22	0.64	Fe00H
Goslarite	-5.62	-7.67	-2.05	ZnS04:7H20
Gypsum	0.10	-4.51	-4.61	CaS04:2H20
H-Jarosite	-13.07	-24.62	-11.55	(H30)Fe3(S04)2(OH)6
H2Se(g)	-6.47	-11.40	-4.92	H2Se
Halite	-3.04	-1.44	1.59	NaCl
Hausmannite	-31.51	30.53	62.03	Mn304
Hematite	0.67	-0.44	-1.11	Fe203
Hercynite	1.62	25.26	23.64	FeAl204
Hg(g)	-7.44	-15.36	-7.93	Hg
Hg(OH)2	-21.45	-24.94	-3.50	Hg(OH)2
Hg2(g)	-15.63	-30.73	-15.09	Hg2
Hg2(OH)2	-23.90	-18.64	5.26	Hg2(OH)2
Hg2HP04	-22.05	-46.82	-24.77	Hg2HP04
Hg2Se03	-33.94	-38.60	-4.66	Hg2Se03
Hg2S04	-24.46	-30.60	-6.14	Hg2S04
HgCl(g)	-34.94	-15.06	19.88	HgCl
HgCl2	-14.91	-36.43	-21.52	HgCl2
Hgmetal(l)	-1.71	-15.36	-13.65	Hg
HgSe	19.36	-36.33	-55.69	HgSe
HgSe03	-32.48	-44.91	-12.43	HgSe03
HgS04	-27.45	-36.91	-9.45	HgS04
Hinsdalite	-8.96	-11.46	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	-2.88	-47.21	-44.33	Ca5(P04)30H
Hydroxylpyromorphite	-16.18	-78.97	-62.79	Pb5(P04)30H
K-Alum	-6.93	-12.18	-5.24	KAl(S04)2:12H20
K-Jarosite	-7.50	-21.99	-14.49	KFe3(S04)2(OH)6
K2Se04	-38.68	-39.41	-0.73	K2Se04
Langite	-28.56	-10.68	17.88	Cu4(OH)6S04:H20
Larnakite	-9.35	-9.73	-0.38	Pb0:PbS04
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.59	-0.22	1.37	Fe00H
Lime	-25.69	7.47	33.16	Ca0
Litharge	-11.73	1.12	12.85	Pb0
Maghemite	-6.83	-0.44	6.39	Fe203
Magnesioferrite	-9.88	7.64	17.52	Fe2Mg04
Magnetite	2.53	6.43	3.90	Fe304
Manganite	-13.15	12.19	25.34	Mn00H
Massicot	-11.93	1.12	13.05	Pb0
Melanothallite	-17.57	-11.16	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeS04:7H20
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(P04)2	-8.84	-32.12	-23.28	Mg3(P04)2
MgHP04:3H20	-1.94	-20.12	-18.18	MgHP04:3H20
MgSe03:6H20	-14.96	-11.91	3.04	MgSe03:6H20

MgSeO4:6H2O	-35.41	-36.61	-1.20	MgSeO4:6H2O
Minium	-59.08	15.45	74.53	Pb3O4
Mirabilite	-2.11	-3.42	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-57.42	-62.74	-5.32	Mn2(SO4)3
Mn3(PO4)2	-14.09	-37.94	-23.85	Mn3(PO4)2
MnCl2:4H2O	-8.11	-5.37	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnSe	-8.98	-5.25	3.73	MnSe
MnSeO3	-14.95	-13.82	1.13	MnSeO3
MnSeO3:2H2O	-14.80	-13.83	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-36.49	-38.54	-2.05	MnSeO4:5H2O
MnSO4	-8.56	-5.83	2.74	MnSO4
Monteponite	-13.62	1.73	15.35	CdO
Montroydite	-21.39	-24.94	-3.55	HgO
Morenosite	-4.60	-6.78	-2.17	NiSO4:7H2O
Na-Jarosite	-9.47	-20.31	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-21.69	-11.39	10.30	Na2SeO3:5H2O
Na2SeO4	-37.34	-36.06	1.28	Na2SeO4
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(PO4)2	-9.39	-40.69	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-23.08	8.92	32.00	Ni4(OH)6SO4
NiSe	11.53	-6.17	-17.70	NiSe
NiSeO3:2H2O	-17.64	-14.75	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-37.94	-39.46	-1.52	NiSeO4:6H2O
Nsutite	-24.87	-7.37	17.50	MnO2
O2(g)	-60.26	24.19	84.45	O2
Pb(OH)2	-7.18	1.11	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.31	-3.52	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-23.96	2.23	26.19	Pb2O(OH)2
Pb2O3	-46.71	14.33	61.04	Pb2O3
Pb3(PO4)2	-9.49	-53.02	-43.53	Pb3(PO4)2
Pb3O2SO4	-19.49	-8.61	10.87	Pb3O2SO4
Pb4(OH)6SO4	-28.61	-7.51	21.10	Pb4(OH)6SO4
Pb4O3SO4	-29.70	-7.50	22.20	Pb4O3SO4
PbHP04	-3.26	-27.07	-23.81	PbHP04
Pbmetal	-15.22	-10.98	4.24	Pb
PbO:0.3H2O	-11.86	1.12	12.98	PbO:0.33H2O
PbSeO4	-36.67	-43.54	-6.88	PbSeO4
Periclase	-13.86	8.08	21.94	MgO
Plattnerite	-37.09	13.21	50.31	PbO2
Plumbgummite	5.12	-27.67	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-15.65	7.46	23.11	Ca(OH)2
Pyrochroite	-9.29	6.14	15.43	Mn(OH)2
Pyrolusite	-23.79	18.24	42.03	MnO2
Pyromorphite	-0.28	-84.71	-84.43	Pb5(PO4)3Cl
Retgersite	-4.72	-6.77	-2.05	NiSO4:6H2O
Semetal(am)	7.84	0.70	-7.14	Se
Semetal(hex)	8.45	0.70	-7.75	Se
SeO2	-20.09	-19.97	0.12	SeO2
SeO3	-66.05	-44.66	21.39	SeO3
Spinel	-11.29	26.48	37.77	MgAl2O4
Strengite	-2.04	-28.42	-26.38	FePO4:2H2O
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.71	-3.37	0.34	Na2SO4
Tsumebite	-15.85	-25.64	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	0.19	-35.81	-36.00	Fe3(PO4)2:8H2O
Zincite	-7.21	4.34	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnSO4
Zn(NO3)2:6H2O	-139.22	-135.96	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-7.87	4.33	12.20	Zn(OH)2
Zn(OH)2(am)	-8.33	4.33	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.62	4.33	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.39	4.33	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.40	4.33	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.80	-3.30	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.26	2.93	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-7.95	-43.37	-35.42	Zn3(PO4)2:4H2O

Zn3O(SO4)2	-30.45	-10.92	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-23.03	5.37	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-28.31	10.19	38.50	Zn5(OH)8Cl2
ZnCl2	-14.37	-7.15	7.22	ZnCl2
Znmetal	-33.91	-7.76	26.15	Zn
ZnO(active)	-7.06	4.34	11.40	ZnO
ZnSe	7.41	-7.05	-14.46	ZnSe
ZnSeO4:6H2O	-38.83	-40.35	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.10	-7.64	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 2.

Using reaction 3.

Mixture 2.

9.630e-01 Solution 1
3.700e-02 Solution 4

Reaction 3.

2.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000

Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	2.060e-04	1.986e-04
Ca	1.571e-02	1.514e-02
Cd	3.797e-07	3.660e-07
Cl	2.835e-01	2.733e-01
Co	4.382e-04	4.224e-04
Cu	1.560e-04	1.504e-04
Fe	1.790e-02	1.726e-02
Hg	2.128e-09	2.051e-09
K	5.895e-03	5.682e-03
Mg	5.883e-02	5.671e-02
Mn	3.321e-03	3.202e-03
N	4.571e-03	4.406e-03
Na	2.729e-01	2.631e-01
Ni	1.013e-04	9.762e-05
P	8.130e-04	7.837e-04
Pb	5.150e-08	4.964e-08
S	1.012e-01	9.754e-02
Se	1.081e-06	1.042e-06
Zn	2.905e-05	2.800e-05

-----Description of solution-----

pH = 5.045 Charge balance

```

pe = 1.031 Adjusted to redox equilibrium
Activity of water = 0.988
Ionic strength (mol/kgw) = 5.018e-01
Mass of water (kg) = 9.640e-01
Total alkalinity (eq/kg) = 1.433e-05
Total carbon (mol/kg) = 0.000e+00
Total CO2 (mol/kg) = 0.000e+00
Temperature (°C) = 21.00
Electrical balance (eq) = -9.552e-03
Percent error, 100*(Cat-|An|)/(Cat+|An|) = -1.26
Iterations = 4
Total H = 1.070329e+02
Total O = 5.390014e+01

```

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.228e-05	9.024e-06	-4.911	-5.045	-0.134	0.00
OH-	1.280e-09	8.117e-10	-8.893	-9.091	-0.198	(0)
H2O	5.551e+01	9.879e-01	1.744	-0.005	0.000	18.05
Al	2.060e-04					
AlSO4+	1.567e-04	1.046e-04	-3.805	-3.980	-0.175	(0)
Al(SO4)2-	2.498e-05	1.667e-05	-4.602	-4.778	-0.175	(0)
Al+3	1.847e-05	1.154e-06	-4.734	-5.938	-1.204	(0)
AlOH+2	4.242e-06	9.789e-07	-5.372	-6.009	-0.637	(0)
Al(OH)2+	1.608e-06	1.114e-06	-5.794	-5.953	-0.159	(0)
Al(OH)3	2.451e-08	2.451e-08	-7.611	-7.611	0.000	(0)
Al(OH)4-	1.970e-09	1.315e-09	-8.706	-8.881	-0.175	(0)
Ca	1.571e-02					
Ca+2	8.365e-03	2.439e-03	-2.078	-2.613	-0.535	(0)
CaSO4	7.318e-03	7.318e-03	-2.136	-2.136	0.000	(0)
CaH2PO4+	2.250e-05	1.559e-05	-4.648	-4.807	-0.159	(0)
CaHPO4	2.200e-06	2.200e-06	-5.658	-5.658	0.000	(0)
CaNH3+2	1.272e-08	4.666e-10	-7.896	-9.331	-1.435	(0)
CaPO4-	8.574e-10	5.943e-10	-9.067	-9.226	-0.159	(0)
CaOH+	5.331e-11	3.775e-11	-10.273	-10.423	-0.150	(0)
Ca(NH3)2+2	7.694e-16	2.823e-17	-15.114	-16.549	-1.435	(0)
CaNO3+	0.000e+00	0.000e+00	-66.621	-66.980	-0.359	(0)
Cd	3.797e-07					
CdCl+	1.917e-07	8.388e-08	-6.717	-7.076	-0.359	(0)
CdCl2	7.195e-08	7.195e-08	-7.143	-7.143	0.000	(0)
Cd(SO4)2-2	6.784e-08	2.489e-09	-7.169	-8.604	-1.435	(0)
CdCl3-	2.076e-08	9.088e-09	-7.683	-8.042	-0.359	(0)
Cd+2	1.456e-08	4.245e-09	-7.837	-8.372	-0.535	(0)
CdSO4	1.292e-08	1.292e-08	-7.889	-7.889	0.000	(0)
CdOHCl	3.451e-12	3.451e-12	-11.462	-11.462	0.000	(0)
CdOH+	6.289e-14	2.752e-14	-13.201	-13.560	-0.359	(0)
Cd2OH+3	1.044e-18	6.153e-22	-17.981	-21.211	-3.230	(0)
Cd(OH)2	2.586e-19	2.586e-19	-18.587	-18.587	0.000	(0)
CdHS+	2.002e-22	8.763e-23	-21.698	-22.057	-0.359	(0)
Cd(OH)3-	3.979e-26	1.742e-26	-25.400	-25.759	-0.359	(0)
Cd(OH)4-2	8.565e-35	3.142e-36	-34.067	-35.503	-1.435	(0)
Cd(HS)2	2.841e-37	2.841e-37	-36.547	-36.547	0.000	(0)
Cd(SeO3)2-2	5.647e-38	2.072e-39	-37.248	-38.684	-1.435	(0)
CdSeO4	0.000e+00	0.000e+00	-40.457	-40.457	0.000	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-55.981	-56.340	-0.359	(0)
CdNO3+	0.000e+00	0.000e+00	-72.343	-72.702	-0.359	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-74.402	-75.837	-1.435	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-137.932	-137.932	0.000	(0)
Cl	2.835e-01					
Cl-	2.831e-01	2.080e-01	-0.548	-0.682	-0.134	(0)
CuCl2-	1.360e-04	8.864e-05	-3.866	-4.052	-0.186	(0)
MnCl+	4.245e-05	2.896e-05	-4.372	-4.538	-0.166	(0)
CoCl+	2.261e-05	9.898e-06	-4.646	-5.004	-0.359	(0)
CuCl3-2	1.791e-05	3.881e-06	-4.747	-5.411	-0.664	(0)
NiCl+	1.668e-05	7.302e-06	-4.778	-5.137	-0.359	(0)

MnCl2	8.511e-06	8.511e-06	-5.070	-5.070	0.000	(0)
CuCl	2.020e-06	2.020e-06	-5.695	-5.695	0.000	(0)
ZnCl+	1.338e-06	8.717e-07	-5.874	-6.060	-0.186	(0)
MnCl3-	7.147e-07	4.876e-07	-6.146	-6.312	-0.166	(0)
ZnCl2	2.417e-07	2.417e-07	-6.617	-6.617	0.000	(0)
CdCl+	1.917e-07	8.388e-08	-6.717	-7.076	-0.359	(0)
CdCl2	7.195e-08	7.195e-08	-7.143	-7.143	0.000	(0)
ZnCl3-	6.029e-08	3.928e-08	-7.220	-7.406	-0.186	(0)
CdCl3-	2.076e-08	9.088e-09	-7.683	-8.042	-0.359	(0)
ZnCl4-2	1.826e-08	3.957e-09	-7.738	-8.403	-0.664	(0)
PbCl+	1.651e-08	7.227e-09	-7.782	-8.141	-0.359	(0)
NiCl2	7.733e-09	7.733e-09	-8.112	-8.112	0.000	(0)
PbCl2	6.595e-09	6.595e-09	-8.181	-8.181	0.000	(0)
PbCl4-2	1.394e-09	5.115e-11	-8.856	-10.291	-1.435	(0)
PbCl3-	1.304e-09	5.707e-10	-8.885	-9.244	-0.359	(0)
ZnOHCl	1.296e-09	1.296e-09	-8.887	-8.887	0.000	(0)
CuCl+	8.498e-11	5.537e-11	-10.071	-10.257	-0.186	(0)
CdOHCl	3.451e-12	3.451e-12	-11.462	-11.462	0.000	(0)
CuCl2	3.280e-12	3.280e-12	-11.484	-11.484	0.000	(0)
FeCl+2	1.179e-14	2.554e-15	-13.929	-14.593	-0.664	(0)
CuCl3-	9.096e-15	5.927e-15	-14.041	-14.227	-0.186	(0)
HgCl4-2	6.144e-15	2.254e-16	-14.212	-15.647	-1.435	(0)
FeCl2+	3.946e-15	2.692e-15	-14.404	-14.570	-0.166	(0)
HgCl3-	5.995e-16	2.624e-16	-15.222	-15.581	-0.359	(0)
HgCl2	1.250e-16	1.250e-16	-15.903	-15.903	0.000	(0)
FeCl3	5.601e-17	5.601e-17	-16.252	-16.252	0.000	(0)
CuCl4-2	3.266e-17	7.077e-18	-16.486	-17.150	-0.664	(0)
HgClOH	8.909e-21	8.909e-21	-20.050	-20.050	0.000	(0)
HgCl+	2.328e-22	1.019e-22	-21.633	-21.992	-0.359	(0)
CoCl+2	6.287e-34	2.306e-35	-33.202	-34.637	-1.435	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.572	-43.007	-1.435	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.084	-56.520	-1.435	(0)
Co(2)	4.382e-04					
Co+2	3.790e-04	1.391e-05	-3.421	-4.857	-1.435	(0)
CoS04	3.651e-05	3.651e-05	-4.438	-4.438	0.000	(0)
CoCl+	2.261e-05	9.898e-06	-4.646	-5.004	-0.359	(0)
CoHP04	2.944e-08	2.944e-08	-7.531	-7.531	0.000	(0)
Co(NH3)+2	9.890e-09	3.629e-10	-8.005	-9.440	-1.435	(0)
CoOH+	6.988e-10	3.058e-10	-9.156	-9.514	-0.359	(0)
Co2OH+3	3.618e-13	2.131e-16	-12.442	-15.671	-3.230	(0)
Co(NH3)2+2	4.488e-14	1.647e-15	-13.348	-14.783	-1.435	(0)
Co(OH)2	2.678e-14	2.678e-14	-13.572	-13.572	0.000	(0)
Co(NH3)3+2	8.585e-20	3.150e-21	-19.066	-20.502	-1.435	(0)
Co(OH)3-	1.346e-21	5.891e-22	-20.871	-21.230	-0.359	(0)
Co0OH-	8.191e-23	3.585e-23	-22.087	-22.446	-0.359	(0)
Co4(OH)4+4	9.635e-25	1.746e-30	-24.016	-29.758	-5.742	(0)
Co(NH3)4+2	6.846e-26	2.512e-27	-25.165	-26.600	-1.435	(0)
Co(OH)4-2	2.805e-30	1.029e-31	-29.552	-30.987	-1.435	(0)
Co(NH3)5+2	1.727e-32	6.334e-34	-31.763	-33.198	-1.435	(0)
CoSe04	2.884e-37	2.884e-37	-36.540	-36.540	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.670	-52.029	-0.359	(0)
CoNO3+	0.000e+00	0.000e+00	-69.178	-69.537	-0.359	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.108	-134.108	0.000	(0)
Co(3)	9.147e-32					
CoOH+2	9.083e-32	3.333e-33	-31.042	-32.477	-1.435	(0)
CoCl+2	6.287e-34	2.306e-35	-33.202	-34.637	-1.435	(0)
Co+3	9.519e-36	5.949e-37	-35.021	-36.226	-1.204	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.572	-43.007	-1.435	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.468	-52.826	-0.359	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.084	-56.520	-1.435	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.911	-60.347	-1.435	(0)
Cu(1)	1.560e-04					
CuCl2-	1.360e-04	8.864e-05	-3.866	-4.052	-0.186	(0)
CuCl3-2	1.791e-05	3.881e-06	-4.747	-5.411	-0.664	(0)
CuCl	2.020e-06	2.020e-06	-5.695	-5.695	0.000	(0)
Cu+	1.762e-08	7.713e-09	-7.754	-8.113	-0.359	(0)
Cu(S4)2-3	3.085e-38	9.548e-39	-37.511	-38.020	-0.509	(0)
CuS4S5-3	5.302e-39	1.778e-39	-38.276	-38.750	-0.475	(0)

Cu(2)	1.225e-09					
Cu+2	6.027e-10	1.758e-10	-9.220	-9.755	-0.535	(0)
CuSO4	5.227e-10	5.227e-10	-9.282	-9.282	0.000	(0)
CuCl+	8.498e-11	5.537e-11	-10.071	-10.257	-0.186	(0)
CuNH3+2	1.106e-11	4.057e-13	-10.956	-12.392	-1.435	(0)
CuCl2	3.280e-12	3.280e-12	-11.484	-11.484	0.000	(0)
CuOH+	7.727e-13	5.034e-13	-12.112	-12.298	-0.186	(0)
CuCl3-	9.096e-15	5.927e-15	-14.041	-14.227	-0.186	(0)
Cu(OH)2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	3.266e-17	7.077e-18	-16.486	-17.150	-0.664	(0)
Cu2(OH)2+2	1.688e-19	6.194e-21	-18.773	-20.208	-1.435	(0)
Cu(OH)3-	6.963e-22	3.047e-22	-21.157	-21.516	-0.359	(0)
Cu(OH)4-2	7.206e-29	2.644e-30	-28.142	-29.578	-1.435	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-48.577	-48.936	-0.359	(0)
CuNO2+	0.000e+00	0.000e+00	-55.396	-55.755	-0.359	(0)
CuNO3+	0.000e+00	0.000e+00	-73.766	-74.125	-0.359	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-102.766	-102.766	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-139.915	-139.915	0.000	(0)
Fe(2)	1.790e-02					
Fe+2	1.591e-02	5.839e-04	-1.798	-3.234	-1.435	(0)
FeSO4	1.868e-03	1.868e-03	-2.729	-2.729	0.000	(0)
FeH2PO4+	1.167e-04	8.085e-05	-3.933	-4.092	-0.159	(0)
FeHPO4	4.511e-06	4.511e-06	-5.346	-5.346	0.000	(0)
FeOH+	2.765e-08	1.887e-08	-7.558	-7.724	-0.166	(0)
Fe(OH)2	1.164e-14	1.164e-14	-13.934	-13.934	0.000	(0)
Fe(OH)3-	5.730e-18	3.910e-18	-17.242	-17.408	-0.166	(0)
Fe(HS)2	2.137e-38	2.137e-38	-37.670	-37.670	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-56.968	-57.326	-0.359	(0)
Fe(3)	2.172e-10					
Fe(OH)2+	2.031e-10	1.408e-10	-9.692	-9.851	-0.159	(0)
FeHPO4+	1.261e-11	8.742e-12	-10.899	-11.058	-0.159	(0)
FeOH+2	1.204e-12	2.610e-13	-11.919	-12.583	-0.664	(0)
Fe(OH)3	9.432e-14	9.432e-14	-13.025	-13.025	0.000	(0)
FeSO4+	9.003e-14	6.143e-14	-13.046	-13.212	-0.166	(0)
Fe(SO4)2-	4.218e-14	1.846e-14	-13.375	-13.734	-0.359	(0)
FeCl+2	1.179e-14	2.554e-15	-13.929	-14.593	-0.664	(0)
FeH2PO4+2	1.048e-14	2.420e-15	-13.979	-14.616	-0.637	(0)
Fe+3	7.380e-15	4.612e-16	-14.132	-15.336	-1.204	(0)
FeCl2+	3.946e-15	2.692e-15	-14.404	-14.570	-0.166	(0)
FeCl3	5.601e-17	5.601e-17	-16.252	-16.252	0.000	(0)
Fe(OH)4-	2.468e-17	1.711e-17	-16.608	-16.767	-0.159	(0)
Fe2(OH)2+4	1.435e-18	2.601e-24	-17.843	-23.585	-5.742	(0)
Fe3(OH)4+5	4.755e-24	5.076e-33	-23.323	-32.294	-8.972	(0)
FeHSeO3+2	5.051e-26	1.853e-27	-25.297	-26.732	-1.435	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.692	-79.128	-1.435	(0)
H(0)	9.260e-16					
H2	4.630e-16	5.197e-16	-15.334	-15.284	0.050	(0)
Hg(0)	2.128e-09					
Hg	2.128e-09	2.128e-09	-8.672	-8.672	0.000	(0)
Hg(1)	1.269e-27					
Hg2+2	6.347e-28	2.329e-29	-27.197	-28.633	-1.435	(0)
Hg(2)	6.869e-15					
HgCl4-2	6.144e-15	2.254e-16	-14.212	-15.647	-1.435	(0)
HgCl3-	5.995e-16	2.624e-16	-15.222	-15.581	-0.359	(0)
HgCl2	1.250e-16	1.250e-16	-15.903	-15.903	0.000	(0)
HgClOH	8.909e-21	8.909e-21	-20.050	-20.050	0.000	(0)
HgCl+	2.328e-22	1.019e-22	-21.633	-21.992	-0.359	(0)
Hg(NH3)2+2	2.674e-23	9.812e-25	-22.573	-24.008	-1.435	(0)
Hg(OH)2	1.189e-25	1.334e-25	-24.925	-24.875	0.050	(0)
HgNH3+2	4.547e-26	1.668e-27	-25.342	-26.778	-1.435	(0)
HgOH+	1.936e-27	8.472e-28	-26.713	-27.072	-0.359	(0)
Hg+2	5.897e-28	2.164e-29	-27.229	-28.665	-1.435	(0)
HgSO4	6.203e-29	6.203e-29	-28.207	-28.207	0.000	(0)
Hg(NH3)3+2	2.324e-29	8.525e-31	-28.634	-30.069	-1.435	(0)
Hg(HS)2	1.500e-34	1.500e-34	-33.824	-33.824	0.000	(0)
Hg(OH)3-	4.231e-35	1.852e-35	-34.374	-34.732	-0.359	(0)
Hg(NH3)4+2	4.050e-35	1.486e-36	-34.393	-35.828	-1.435	(0)
HgHS2-	1.533e-35	6.709e-36	-34.814	-35.173	-0.359	(0)

	HgS2-2	3.969e-38	1.456e-39	-37.401	-38.837	-1.435	(0)
	HgNO3+	0.000e+00	0.000e+00	-93.713	-94.072	-0.359	(0)
	Hg(NO3)2	0.000e+00	0.000e+00	-159.333	-159.333	0.000	(0)
K		5.895e-03					
	K+	5.359e-03	3.938e-03	-2.271	-2.405	-0.134	(0)
	KS04-	5.355e-04	3.712e-04	-3.271	-3.430	-0.159	(0)
	KHP04-	8.366e-08	5.798e-08	-7.077	-7.237	-0.159	(0)
Mg		5.883e-02					
	Mg+2	3.448e-02	1.006e-02	-1.462	-1.998	-0.535	(0)
	MgS04	2.414e-02	2.414e-02	-1.617	-1.617	0.000	(0)
	MgH2P04+	1.983e-04	1.374e-04	-3.703	-3.862	-0.159	(0)
	MgHP04	1.252e-05	1.252e-05	-4.902	-4.902	0.000	(0)
	MgOH+	4.229e-09	3.042e-09	-8.374	-8.517	-0.143	(0)
	MgP04-	5.525e-11	3.829e-11	-10.258	-10.417	-0.159	(0)
Mn(2)		3.321e-03					
	Mn+2	3.014e-03	1.106e-04	-2.521	-3.956	-1.435	(0)
	MnS04	2.553e-04	2.553e-04	-3.593	-3.593	0.000	(0)
	MnCl+	4.245e-05	2.896e-05	-4.372	-4.538	-0.166	(0)
	MnCl2	8.511e-06	8.511e-06	-5.070	-5.070	0.000	(0)
	MnCl3-	7.147e-07	4.876e-07	-6.146	-6.312	-0.166	(0)
	MnOH+	3.305e-10	2.255e-10	-9.481	-9.647	-0.166	(0)
	MnSe	2.320e-11	2.320e-11	-10.635	-10.635	0.000	(0)
	Mn(OH)3-	3.371e-24	2.300e-24	-23.472	-23.638	-0.166	(0)
	Mn(OH)4-2	3.778e-32	8.186e-33	-31.423	-32.087	-0.664	(0)
	MnSe04	1.218e-36	1.218e-36	-35.914	-35.914	0.000	(0)
	MnNO3+	0.000e+00	0.000e+00	-68.277	-68.636	-0.359	(0)
	Mn(NO3)2	0.000e+00	0.000e+00	-133.112	-133.112	0.000	(0)
Mn(3)		4.703e-28					
	Mn+3	4.703e-28	2.939e-29	-27.328	-28.532	-1.204	(0)
Mn(6)		0.000e+00					
	MnO4-2	0.000e+00	0.000e+00	-78.947	-79.611	-0.664	(0)
Mn(7)		0.000e+00					
	MnO4-	0.000e+00	0.000e+00	-88.006	-88.218	-0.212	(0)
N(-3)		4.571e-03					
	NH4+	4.056e-03	2.405e-03	-2.392	-2.619	-0.227	(0)
	NH4S04-	5.143e-04	3.509e-04	-3.289	-3.455	-0.166	(0)
	NH3	1.142e-07	1.142e-07	-6.942	-6.942	0.000	(0)
	NiNH3+2	4.455e-08	1.635e-09	-7.351	-8.787	-1.435	(0)
	CaNH3+2	1.272e-08	4.666e-10	-7.896	-9.331	-1.435	(0)
	Co(NH3)+2	9.890e-09	3.629e-10	-8.005	-9.440	-1.435	(0)
	CuNH3+2	1.106e-11	4.057e-13	-10.956	-12.392	-1.435	(0)
	Ni(NH3)2+2	1.250e-12	4.585e-14	-11.903	-13.339	-1.435	(0)
	Co(NH3)2+2	4.488e-14	1.647e-15	-13.348	-14.783	-1.435	(0)
	Ca(NH3)2+2	7.694e-16	2.823e-17	-15.114	-16.549	-1.435	(0)
	Co(NH3)3+2	8.585e-20	3.150e-21	-19.066	-20.502	-1.435	(0)
	Hg(NH3)2+2	2.674e-23	9.812e-25	-22.573	-24.008	-1.435	(0)
	Co(NH3)4+2	6.846e-26	2.512e-27	-25.165	-26.600	-1.435	(0)
	HgNH3+2	4.547e-26	1.668e-27	-25.342	-26.778	-1.435	(0)
	Hg(NH3)3+2	2.324e-29	8.525e-31	-28.634	-30.069	-1.435	(0)
	Co(NH3)5+2	1.727e-32	6.334e-34	-31.763	-33.198	-1.435	(0)
	Hg(NH3)4+2	4.050e-35	1.486e-36	-34.393	-35.828	-1.435	(0)
	Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.572	-43.007	-1.435	(0)
	Co(NH3)6S04+	0.000e+00	0.000e+00	-52.468	-52.826	-0.359	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.084	-56.520	-1.435	(0)
	Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.911	-60.347	-1.435	(0)
N(3)		0.000e+00					
	N02-	0.000e+00	0.000e+00	-47.809	-48.020	-0.212	(0)
	CoN02+	0.000e+00	0.000e+00	-51.670	-52.029	-0.359	(0)
	CuN02+	0.000e+00	0.000e+00	-55.396	-55.755	-0.359	(0)
	Cu(N02)2	0.000e+00	0.000e+00	-102.766	-102.766	0.000	(0)
N(5)		0.000e+00					
	N03-	0.000e+00	0.000e+00	-64.746	-64.880	-0.134	(0)
	CaN03+	0.000e+00	0.000e+00	-66.621	-66.980	-0.359	(0)
	MnN03+	0.000e+00	0.000e+00	-68.277	-68.636	-0.359	(0)
	NiN03+	0.000e+00	0.000e+00	-68.979	-69.338	-0.359	(0)
	CoN03+	0.000e+00	0.000e+00	-69.178	-69.537	-0.359	(0)
	ZnN03+	0.000e+00	0.000e+00	-69.875	-70.234	-0.359	(0)
	CdN03+	0.000e+00	0.000e+00	-72.343	-72.702	-0.359	(0)

PbNO3+	0.000e+00	0.000e+00	-72.344	-72.703	-0.359	(0)
CuNO3+	0.000e+00	0.000e+00	-73.766	-74.125	-0.359	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.692	-79.128	-1.435	(0)
HgNO3+	0.000e+00	0.000e+00	-93.713	-94.072	-0.359	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.112	-133.112	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.108	-134.108	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-135.825	-135.825	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.333	-137.333	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-137.932	-137.932	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-139.915	-139.915	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.333	-159.333	0.000	(0)
Na	2.729e-01					
Na+	2.534e-01	1.862e-01	-0.596	-0.730	-0.134	(0)
NaSO4-	1.954e-02	1.354e-02	-1.709	-1.868	-0.159	(0)
NaHPO4-	6.126e-06	4.246e-06	-5.213	-5.372	-0.159	(0)
Ni	1.013e-04					
Ni+2	4.756e-05	1.387e-05	-4.323	-4.858	-0.535	(0)
NiSO4	3.650e-05	3.650e-05	-4.438	-4.438	0.000	(0)
NiCl+	1.668e-05	7.302e-06	-4.778	-5.137	-0.359	(0)
Ni(SO4)2-2	4.631e-07	1.699e-08	-6.334	-7.770	-1.435	(0)
NiNH3+2	4.455e-08	1.635e-09	-7.351	-8.787	-1.435	(0)
NiCl2	7.733e-09	7.733e-09	-8.112	-8.112	0.000	(0)
NiOH+	3.310e-10	1.449e-10	-9.480	-9.839	-0.359	(0)
Ni(NH3)2+2	1.250e-12	4.585e-14	-11.903	-13.339	-1.435	(0)
Ni(OH)2	1.686e-14	1.686e-14	-13.773	-13.773	0.000	(0)
Ni(OH)3-	4.246e-20	1.858e-20	-19.372	-19.731	-0.359	(0)
NiSeO4	2.655e-37	2.655e-37	-36.576	-36.576	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-68.979	-69.338	-0.359	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-62.899	-62.849	0.050	(0)
P	8.130e-04					
H2PO4-	4.400e-04	3.050e-04	-3.357	-3.516	-0.159	(0)
MgH2PO4+	1.983e-04	1.374e-04	-3.703	-3.862	-0.159	(0)
FeH2PO4+	1.167e-04	8.085e-05	-3.933	-4.092	-0.159	(0)
CaH2PO4+	2.250e-05	1.559e-05	-4.648	-4.807	-0.159	(0)
MgHPO4	1.252e-05	1.252e-05	-4.902	-4.902	0.000	(0)
HPO4-2	9.725e-06	2.107e-06	-5.012	-5.676	-0.664	(0)
NaHPO4-	6.126e-06	4.246e-06	-5.213	-5.372	-0.159	(0)
FeHPO4	4.511e-06	4.511e-06	-5.346	-5.346	0.000	(0)
CaHPO4	2.200e-06	2.200e-06	-5.658	-5.658	0.000	(0)
H3PO4	3.705e-07	3.705e-07	-6.431	-6.431	0.000	(0)
KHPO4-	8.366e-08	5.798e-08	-7.077	-7.237	-0.159	(0)
CoHPO4	2.944e-08	2.944e-08	-7.531	-7.531	0.000	(0)
CaPO4-	8.574e-10	5.943e-10	-9.067	-9.226	-0.159	(0)
MgPO4-	5.525e-11	3.829e-11	-10.258	-10.417	-0.159	(0)
FeHPO4+	1.261e-11	8.742e-12	-10.899	-11.058	-0.159	(0)
PO4-3	1.451e-12	9.070e-14	-11.838	-13.042	-1.204	(0)
FeH2PO4+2	1.048e-14	2.420e-15	-13.979	-14.616	-0.637	(0)
Pb	5.150e-08					
PbCl+	1.651e-08	7.227e-09	-7.782	-8.141	-0.359	(0)
Pb(SO4)2-2	1.532e-08	5.619e-10	-7.815	-9.250	-1.435	(0)
PbSO4	6.849e-09	6.849e-09	-8.164	-8.164	0.000	(0)
PbCl2	6.595e-09	6.595e-09	-8.181	-8.181	0.000	(0)
Pb+2	3.522e-09	1.027e-09	-8.453	-8.988	-0.535	(0)
PbCl4-2	1.394e-09	5.115e-11	-8.856	-10.291	-1.435	(0)
PbCl3-	1.304e-09	5.707e-10	-8.885	-9.244	-0.359	(0)
PbOH+	6.498e-12	2.844e-12	-11.187	-11.546	-0.359	(0)
Pb(OH)2	9.914e-17	9.914e-17	-16.004	-16.004	0.000	(0)
Pb2OH+3	7.857e-17	4.629e-20	-16.105	-19.335	-3.230	(0)
Pb(OH)3-	2.497e-22	1.093e-22	-21.603	-21.961	-0.359	(0)
Pb(OH)4-2	8.042e-28	2.950e-29	-27.095	-28.530	-1.435	(0)
Pb3(OH)4+2	2.917e-30	1.070e-31	-29.535	-30.971	-1.435	(0)
Pb4(OH)4+4	5.587e-31	1.012e-36	-30.253	-35.995	-5.742	(0)
Pb(HS)2	7.853e-38	7.853e-38	-37.105	-37.105	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-57.139	-57.498	-0.359	(0)
PbNO3+	0.000e+00	0.000e+00	-72.344	-72.703	-0.359	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.333	-137.333	0.000	(0)
S(-2)	2.227e-20					

H2S	2.160e-20	2.160e-20	-19.665	-19.665	0.000	(0)
HS-	4.630e-22	2.026e-22	-21.334	-21.693	-0.359	(0)
CdHS+	2.002e-22	8.763e-23	-21.698	-22.057	-0.359	(0)
S5-2	2.148e-25	7.883e-27	-24.668	-26.103	-1.435	(0)
S6-2	8.050e-26	2.954e-27	-25.094	-26.530	-1.435	(0)
S4-2	5.400e-26	1.981e-27	-25.268	-26.703	-1.435	(0)
S3-2	8.309e-27	3.049e-28	-26.080	-27.516	-1.435	(0)
S2-2	7.825e-28	2.871e-29	-27.107	-28.542	-1.435	(0)
S-2	3.961e-34	8.583e-35	-33.402	-34.066	-0.664	(0)
Hg(HS)2	1.500e-34	1.500e-34	-33.824	-33.824	0.000	(0)
HgHS2-	1.533e-35	6.709e-36	-34.814	-35.173	-0.359	(0)
Zn(HS)2	4.662e-37	4.662e-37	-36.331	-36.331	0.000	(0)
Cd(HS)2	2.841e-37	2.841e-37	-36.547	-36.547	0.000	(0)
ZnS(HS)-	1.154e-37	5.049e-38	-36.938	-37.297	-0.359	(0)
Pb(HS)2	7.853e-38	7.853e-38	-37.105	-37.105	0.000	(0)
HgS2-2	3.969e-38	1.456e-39	-37.401	-38.837	-1.435	(0)
Cu(S4)2-3	3.085e-38	9.548e-39	-37.511	-38.020	-0.509	(0)
Fe(HS)2	2.137e-38	2.137e-38	-37.670	-37.670	0.000	(0)
CuS4S5-3	5.302e-39	1.778e-39	-38.276	-38.750	-0.475	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-48.577	-48.936	-0.359	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-54.386	-54.745	-0.359	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-55.981	-56.340	-0.359	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-56.968	-57.326	-0.359	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-57.139	-57.498	-0.359	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-58.245	-59.680	-1.435	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-74.402	-75.837	-1.435	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-76.462	-77.898	-1.435	(0)
S(6)	1.012e-01					
S04-2	4.669e-02	1.362e-02	-1.331	-1.866	-0.535	(0)
MgS04	2.414e-02	2.414e-02	-1.617	-1.617	0.000	(0)
NaS04-	1.954e-02	1.354e-02	-1.709	-1.868	-0.159	(0)
CaS04	7.318e-03	7.318e-03	-2.136	-2.136	0.000	(0)
FeS04	1.868e-03	1.868e-03	-2.729	-2.729	0.000	(0)
KS04-	5.355e-04	3.712e-04	-3.271	-3.430	-0.159	(0)
NH4S04-	5.143e-04	3.509e-04	-3.289	-3.455	-0.166	(0)
MnS04	2.553e-04	2.553e-04	-3.593	-3.593	0.000	(0)
AlS04+	1.567e-04	1.046e-04	-3.805	-3.980	-0.175	(0)
CoS04	3.651e-05	3.651e-05	-4.438	-4.438	0.000	(0)
NiS04	3.650e-05	3.650e-05	-4.438	-4.438	0.000	(0)
Al(S04)2-	2.498e-05	1.667e-05	-4.602	-4.778	-0.175	(0)
Zn(S04)2-2	1.655e-05	6.071e-07	-4.781	-6.217	-1.435	(0)
HS04-	1.594e-05	1.064e-05	-4.797	-4.973	-0.175	(0)
ZnS04	4.948e-06	4.948e-06	-5.306	-5.306	0.000	(0)
Ni(S04)2-2	4.631e-07	1.699e-08	-6.334	-7.770	-1.435	(0)
Cd(S04)2-2	6.784e-08	2.489e-09	-7.169	-8.604	-1.435	(0)
Pb(S04)2-2	1.532e-08	5.619e-10	-7.815	-9.250	-1.435	(0)
CdS04	1.292e-08	1.292e-08	-7.889	-7.889	0.000	(0)
PbS04	6.849e-09	6.849e-09	-8.164	-8.164	0.000	(0)
CuS04	5.227e-10	5.227e-10	-9.282	-9.282	0.000	(0)
FeS04+	9.003e-14	6.143e-14	-13.046	-13.212	-0.166	(0)
Fe(S04)2-	4.218e-14	1.846e-14	-13.375	-13.734	-0.359	(0)
HgS04	6.203e-29	6.203e-29	-28.207	-28.207	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.468	-52.826	-0.359	(0)
Se(-2)	1.081e-06					
HSe-	1.049e-06	4.593e-07	-5.979	-6.338	-0.359	(0)
H2Se	3.160e-08	3.160e-08	-7.500	-7.500	0.000	(0)
MnSe	2.320e-11	2.320e-11	-10.635	-10.635	0.000	(0)
Se-2	1.065e-15	3.909e-17	-14.972	-16.408	-1.435	(0)
Se(4)	4.012e-15					
HSe03-	3.985e-15	1.744e-15	-14.400	-14.758	-0.359	(0)
Se03-2	2.040e-17	7.486e-19	-16.690	-18.126	-1.435	(0)
H2Se03	6.489e-18	6.489e-18	-17.188	-17.188	0.000	(0)
FeHSe03+2	5.051e-26	1.853e-27	-25.297	-26.732	-1.435	(0)
Cd(Se03)2-2	5.647e-38	2.072e-39	-37.248	-38.684	-1.435	(0)
Se(6)	1.534e-34					
Se04-2	1.516e-34	4.420e-35	-33.819	-34.355	-0.535	(0)
MnSe04	1.218e-36	1.218e-36	-35.914	-35.914	0.000	(0)
CoSe04	2.884e-37	2.884e-37	-36.540	-36.540	0.000	(0)

NiSeO4	2.655e-37	2.655e-37	-36.576	-36.576	0.000	(0)
HSeO4-	4.026e-38	1.762e-38	-37.395	-37.754	-0.359	(0)
ZnSeO4	1.176e-38	1.176e-38	-37.929	-37.929	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.457	-40.457	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-70.843	-72.278	-1.435	(0)
Zn	2.905e-05					
Zn(SO4)2-2	1.655e-05	6.071e-07	-4.781	-6.217	-1.435	(0)
Zn+2	5.893e-06	1.718e-06	-5.230	-5.765	-0.535	(0)
ZnSO4	4.948e-06	4.948e-06	-5.306	-5.306	0.000	(0)
ZnCl+	1.338e-06	8.717e-07	-5.874	-6.060	-0.186	(0)
ZnCl2	2.417e-07	2.417e-07	-6.617	-6.617	0.000	(0)
ZnCl3-	6.029e-08	3.928e-08	-7.220	-7.406	-0.186	(0)
ZnCl4-2	1.826e-08	3.957e-09	-7.738	-8.403	-0.664	(0)
ZnOHCl	1.296e-09	1.296e-09	-8.887	-8.887	0.000	(0)
ZnOH+	3.187e-10	1.395e-10	-9.497	-9.855	-0.359	(0)
Zn(OH)2	3.310e-14	3.310e-14	-13.480	-13.480	0.000	(0)
Zn(OH)3-	4.178e-19	1.829e-19	-18.379	-18.738	-0.359	(0)
Zn(OH)4-2	2.187e-25	8.025e-27	-24.660	-26.096	-1.435	(0)
Zn(HS)2	4.662e-37	4.662e-37	-36.331	-36.331	0.000	(0)
ZnS(HS)-	1.154e-37	5.049e-38	-36.938	-37.297	-0.359	(0)
ZnSeO4	1.176e-38	1.176e-38	-37.929	-37.929	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-54.386	-54.745	-0.359	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-58.245	-59.680	-1.435	(0)
ZnNO3+	0.000e+00	0.000e+00	-69.875	-70.234	-0.359	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-70.843	-72.278	-1.435	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-76.462	-77.898	-1.435	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-135.825	-135.825	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-160.81	-154.54	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-30.68	-26.14	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-37.94	-26.15	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-234.24	-216.31	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-43.83	-23.72	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-40.04	-39.59	0.45	(NH4)2SeO4
Al(OH)3(am)	-1.88	9.18	11.06	Al(OH)3
Al2O3	-1.89	18.38	20.27	Al2O3
Al4(OH)10SO4	2.08	24.78	22.70	Al4(OH)10SO4
AlOHSO4	0.47	-2.76	-3.23	AlOHSO4
Alunite	7.19	6.29	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.04	-10.85	-7.82	PbSO4
Anhydrite	-0.14	-4.48	-4.34	CaSO4
Anilite	1.06	-31.26	-32.31	Cu0.25Cu1.5S
Antlerite	-19.76	-10.97	8.79	Cu3(OH)4SO4
Atacamite	-12.69	-5.07	7.61	Cu2(OH)3Cl
Bianchite	-5.90	-7.66	-1.76	ZnSO4:6H2O
Birnessite	-25.42	-7.33	18.09	MnO2
Bixbyite	-26.46	-26.81	-0.35	Mn2O3
BlaubleiI	-2.89	-27.05	-24.16	Cu0.9Cu0.2S
BlaubleiII	-1.71	-28.99	-27.28	Cu0.6Cu0.8S
Boehmite	0.33	9.19	8.86	AlOOH
Brochantite	-26.36	-10.65	15.71	Cu4(OH)6SO4
Brucite	-9.03	8.08	17.12	Mg(OH)2
Bunsenite	-7.46	5.23	12.68	NiO
Ca3(PO4)2(beta)	-4.87	-33.92	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-7.56	-54.64	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.35	-20.70	-19.35	CaHP04
CaHP04:2H2O	-1.66	-20.71	-19.05	CaHP04:2H2O
Calomel	-11.87	-30.00	-18.13	Hg2Cl2
CaSeO3:2H2O	-15.20	-12.34	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-33.98	-36.98	-3.00	CaSeO4:2H2O
Cd(OH)2	-12.16	1.71	13.87	Cd(OH)2
Cd(OH)2(am)	-12.23	1.71	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-25.48	-18.77	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-29.38	-6.82	22.56	Cd3(OH)4SO4

Cd3(P04)2	-18.60	-51.20	-32.60	Cd3(P04)2
Cd4(OH)6S04	-33.52	-5.12	28.40	Cd4(OH)6S04
CdCl2	-9.12	-9.74	-0.61	CdCl2
CdCl2:1H2O	-8.07	-9.74	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-7.82	-9.75	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.13	-10.43	13.69	Cd
Cdmetal(gamma)	-24.23	-10.43	13.80	Cd
CdOHCl	-7.63	-4.01	3.61	CdOHCl
CdSe	10.72	-9.67	-20.38	CdSe
CdSe04:2H2O	-40.89	-42.74	-1.85	CdSe04:2H2O
CdS04	-10.19	-10.24	-0.05	CdS04
CdS04:1H2O	-8.59	-10.24	-1.65	CdS04:1H2O
CdS04:2.67H2O	-8.42	-10.25	-1.83	CdS04:2.67H2O
Chalcanthite	-8.99	-11.65	-2.65	CuS04:5H2O
Chalcocite	2.45	-32.87	-35.32	Cu2S
Chalcopyrite	-10.66	-46.29	-35.62	CuFeS2
Cinnabar	-5.30	-51.60	-46.30	HgS
Clausthalite	17.10	-10.28	-27.39	PbSe
Co(OH)2	-7.87	5.22	13.09	Co(OH)2
Co(OH)3	-19.02	-21.11	-2.09	Co(OH)3
Co3(P04)2	-5.97	-40.66	-34.69	Co3(P04)2
Co304	-26.73	-36.97	-10.24	Co304
CoCl2	-14.68	-6.22	8.46	CoCl2
CoCl2:6H2O	-8.77	-6.25	2.52	CoCl2:6H2O
CoFe204	7.96	4.81	-3.15	CoFe204
CoHP04	-3.88	-22.94	-19.06	CoHP04
CoO	-8.61	5.23	13.84	CoO
CoS(alpha)	-14.07	-21.51	-7.44	CoS
CoS(beta)	-10.44	-21.51	-11.07	CoS
CoSe	10.05	-6.15	-16.20	CoSe
CoSe03	-15.89	-14.57	1.32	CoSe03
CoSe04:6H2O	-37.71	-39.24	-1.53	CoSe04:6H2O
CoS04	-9.71	-6.72	2.99	CoS04
CoS04:6H2O	-4.28	-6.75	-2.48	CoS04:6H2O
Cotunnite	-5.51	-10.35	-4.84	PbCl2
Covellite	-3.87	-26.40	-22.53	CuS
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3N03	-78.70	-69.27	9.42	Cu2(OH)3N03
Cu2Se(alpha)	28.79	-17.52	-46.31	Cu2Se
Cu2S04	-16.19	-18.09	-1.90	Cu2S04
Cu3(P04)2	-18.50	-55.35	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-20.25	-55.37	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.73	-28.57	-64.30	Cu3Se2
Cumetal	-0.22	-9.14	-8.93	Cu
CuOCuS04	-21.92	-11.29	10.63	CuOCuS04
Cupricferrite	-6.58	-0.09	6.49	CuFe204
Cuprite	-5.03	-6.14	-1.11	Cu2O
Cuprousferrite	5.60	-3.28	-8.88	CuFe02
CuSe	22.34	-11.05	-33.39	CuSe
CuSe2	23.42	-10.28	-33.70	CuSe2
CuSe03:2H2O	-20.08	-19.48	0.60	CuSe03:2H2O
CuSe04:5H2O	-41.70	-44.14	-2.44	CuSe04:5H2O
CuS04	-14.73	-11.62	3.11	CuS04
Diaspore	2.07	9.19	7.12	Al00H
Djurleite	1.95	-32.45	-34.40	Cu0.066Cu1.868S
Epsomite	-1.75	-3.90	-2.15	MgS04:7H2O
Fe(OH)2	-6.72	6.84	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.11	-1.93	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-21.78	-20.23	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H2O	-39.20	-59.82	-20.63	Fe2(Se03)3:2H2O
Fe2(S04)3	-33.11	-36.27	-3.16	Fe2(S04)3
Fe3(OH)8	-13.81	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.58	-0.22	3.37	Fe(OH)3
Ferroselite	14.95	-3.76	-18.71	FeSe2
FeS(ppt)	-16.96	-19.88	-2.92	FeS
FeSe	6.48	-4.53	-11.00	FeSe
Galena	-11.48	-25.64	-14.16	PbS
Gibbsite	0.66	9.18	8.52	Al(OH)3

Goethite	-0.85	-0.21	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4:7H2O
Greenockite	-10.53	-25.02	-14.49	CdS
Greigite	-55.47	-100.50	-45.03	Fe3S4
Gypsum	0.12	-4.49	-4.61	CaSO4:2H2O
H-Jarosite	-13.00	-24.55	-11.55	(H30)Fe3(SO4)2(OH)6
H2S(g)	-18.73	-26.74	-8.01	H2S
H2Se(g)	-6.46	-11.38	-4.92	H2Se
Halite	-3.01	-1.41	1.59	NaCl
Hausmannite	-31.50	30.53	62.03	Mn3O4
Hematite	0.69	-0.42	-1.11	Fe2O3
Hercynite	1.59	25.23	23.64	FeAl2O4
Hg(g)	-7.42	-15.35	-7.93	Hg
Hg(OH)2	-21.38	-24.87	-3.50	Hg(OH)2
Hg2(g)	-15.60	-30.70	-15.09	Hg2
Hg2(OH)2	-23.81	-18.55	5.26	Hg2(OH)2
Hg2HP04	-21.94	-46.72	-24.77	Hg2HP04
Hg2S	-33.44	-45.28	-11.84	Hg2S
Hg2SeO3	-33.69	-38.35	-4.66	Hg2SeO3
Hg2SO4	-24.36	-30.50	-6.14	Hg2SO4
HgCl(g)	-34.88	-15.00	19.88	HgCl
HgCl2	-14.80	-36.32	-21.52	HgCl2
Hgmetal(l)	-1.70	-15.35	-13.65	Hg
HgSe	19.45	-36.25	-55.69	HgSe
HgSeO3	-32.24	-44.67	-12.43	HgSeO3
HgSO4	-27.37	-36.82	-9.45	HgSO4
Hinsdalite	-8.97	-11.47	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-2.82	-47.15	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-16.24	-79.03	-62.79	Pb5(P04)3OH
K-Alum	-6.90	-12.14	-5.24	KAl(SO4)2:12H2O
K-Jarosite	-7.42	-21.91	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-38.43	-39.16	-0.73	K2SeO4
Langite	-28.54	-10.66	17.88	Cu4(OH)6SO4:H2O
Larnakite	-9.38	-9.76	-0.38	PbO:PbSO4
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.58	-0.21	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.75	1.10	12.85	PbO
Mackinawite	-16.28	-19.88	-3.60	FeS
Maghemite	-6.81	-0.42	6.39	Fe2O3
Magnesioferrite	-9.86	7.67	17.52	Fe2MgO4
Magnetite	2.53	6.43	3.90	Fe3O4
Manganite	-13.14	12.20	25.34	MnOOH
Massicot	-11.96	1.10	13.05	PbO
Melanothallite	-17.53	-11.12	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeSO4:7H2O
Metacinnabar	-5.90	-51.60	-45.70	HgS
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(P04)2	-8.80	-32.08	-23.28	Mg3(P04)2
MgHP04:3H2O	-1.93	-20.10	-18.18	MgHP04:3H2O
MgSeO3:6H2O	-14.79	-11.74	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-35.18	-36.38	-1.20	MgSeO4:6H2O
Minium	-59.09	15.43	74.53	Pb3O4
Mirabilite	-2.08	-3.38	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-57.34	-62.66	-5.32	Mn2(SO4)3
Mn3(P04)2	-14.11	-37.95	-23.85	Mn3(P04)2
MnCl2:4H2O	-8.08	-5.34	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnS(grn)	-20.85	-20.60	0.25	MnS
MnS(pnk)	-23.94	-20.60	3.34	MnS
MnSe	-8.98	-5.25	3.73	MnSe
MnSeO3	-14.80	-13.67	1.13	MnSeO3
MnSeO3:2H2O	-14.64	-13.68	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-36.29	-38.34	-2.05	MnSeO4:5H2O
MnSO4	-8.56	-5.82	2.74	MnSO4
Monteponite	-13.64	1.71	15.35	CdO
Montroydite	-21.32	-24.87	-3.55	HgO
Morenosite	-4.59	-6.76	-2.17	NiSO4:7H2O

Na-Jarosite	-9.39	-20.23	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-21.50	-11.20	10.30	Na2SeO3:5H2O
Na2SeO4	-37.09	-35.81	1.28	Na2SeO4
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(PO4)2	-9.36	-40.66	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-23.06	8.94	32.00	Ni4(OH)6SO4
NiS(alpha)	-15.91	-21.51	-5.60	NiS
NiS(beta)	-10.41	-21.51	-11.10	NiS
NiS(gamma)	-8.71	-21.51	-12.80	NiS
NiSe	11.55	-6.15	-17.70	NiSe
NiSeO3:2H2O	-17.47	-14.58	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-37.72	-39.24	-1.52	NiSeO4:6H2O
Nsutite	-24.84	-7.33	17.50	MnO2
O2(g)	-60.16	24.29	84.45	O2
Pb(OH)2	-7.20	1.09	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.33	-3.54	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-24.00	2.19	26.19	Pb2O(OH)2
Pb2O3	-46.70	14.34	61.04	Pb2O3
Pb3(PO4)2	-9.52	-53.05	-43.53	Pb3(PO4)2
Pb3O2SO4	-19.54	-8.66	10.87	Pb3O2SO4
Pb4(OH)6SO4	-28.68	-7.58	21.10	Pb4(OH)6SO4
Pb4O3SO4	-29.77	-7.57	22.20	Pb4O3SO4
PbHP04	-3.27	-27.08	-23.81	PbHP04
Pbmetal	-15.29	-11.05	4.24	Pb
PbO:0.3H2O	-11.89	1.09	12.98	PbO:0.33H2O
PbSeO4	-36.47	-43.34	-6.88	PbSeO4
Periclase	-13.86	8.09	21.94	MgO
Plattnerite	-37.06	13.24	50.31	PbO2
Plumbgummite	5.10	-27.69	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-15.64	7.47	23.11	Ca(OH)2
Pyrite	-15.84	-34.47	-18.63	FeS2
Pyrochroite	-9.30	6.12	15.43	Mn(OH)2
Pyrolusite	-23.75	18.27	42.03	MnO2
Pyromorphite	-0.32	-84.75	-84.43	Pb5(PO4)3Cl
Retgersite	-4.70	-6.76	-2.05	NiSO4:6H2O
Semetal(am)	7.91	0.77	-7.14	Se
Semetal(hex)	8.52	0.77	-7.75	Se
SeO2	-19.92	-19.80	0.12	SeO2
SeO3	-65.83	-44.44	21.39	SeO3
Sphalerite	-10.89	-22.41	-11.52	ZnS
Spinel	-11.31	26.46	37.77	MgAl2O4
Strengite	-2.01	-28.39	-26.38	FePO4:2H2O
Sulfur	-12.48	-14.59	-2.11	S
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.67	-3.33	0.34	Na2SO4
Tsumebite	-15.88	-25.67	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	0.17	-35.83	-36.00	Fe3(PO4)2:8H2O
Wurtzite	-13.41	-22.41	-9.00	ZnS
Zincite	-7.23	4.32	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnSO4
Zn(NO3)2:6H2O	-138.81	-135.56	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-7.89	4.31	12.20	Zn(OH)2
Zn(OH)2(am)	-8.35	4.31	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.64	4.31	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.42	4.31	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.42	4.31	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.82	-3.32	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.28	2.91	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-7.98	-43.40	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-30.47	-10.94	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-23.09	5.31	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-28.37	10.13	38.50	Zn5(OH)8Cl2
ZnCl2	-14.35	-7.13	7.22	ZnCl2
Znmetal	-33.98	-7.83	26.15	Zn
ZnO(active)	-7.08	4.32	11.40	ZnO
ZnS(am)	-13.32	-22.41	-9.09	ZnS
ZnSe	7.40	-7.06	-14.46	ZnSe

ZnSeO4:6H2O	-38.63	-40.15	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.10	-7.64	-0.53	ZnSO4:1H2O

**For a gas, $SI = \log_{10}(\text{fugacity})$. Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 6.

SOLUTION 5 #Groundwater worst case maximum values

temp	21
pH	5.05
pe	1
redox	pe
units	mg/l
density	1
Al	5.21
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.04
Co	24.2
Cr	0
Cu	9.29
Fe	937
Pb	0.01
Mn	171
Mo	0
V	0
Zn	1.78
Se	0.08
Ni	5.57
N	60
P	23.6
Ca	590
Mg	1340
Na	5880
K	216
Cl	9420
S(6)	9110
Hg	0.0004
water	1 # kg

MIX 3
1 0.972
5 0.028

REACTION 4

H2O -1

2

END #Time-step 4

Beginning of initial solution calculations.

Initial solution 5.

-----Solution composition-----

Elements	Molality	Moles
Al	1.986e-04	1.986e-04
Ca	1.514e-02	1.514e-02

Cd	3.660e-07	3.660e-07
Cl	2.733e-01	2.733e-01
Co	4.224e-04	4.224e-04
Cu	1.504e-04	1.504e-04
Fe	1.726e-02	1.726e-02
Hg	2.051e-09	2.051e-09
K	5.682e-03	5.682e-03
Mg	5.671e-02	5.671e-02
Mn	3.202e-03	3.202e-03
N	4.406e-03	4.406e-03
Na	2.631e-01	2.631e-01
Ni	9.762e-05	9.762e-05
P	7.837e-04	7.837e-04
Pb	4.964e-08	4.964e-08
S(6)	9.754e-02	9.754e-02
Se	1.042e-06	1.042e-06
Zn	2.800e-05	2.800e-05

-----Description of solution-----

pH	=	5.050
pe	=	1.000
Activity of water	=	0.988
Ionic strength (mol/kgw)	=	4.862e-01
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	1.381e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	21.00
Electrical balance (eq)	=	-9.552e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.26
Iterations	=	14
Total H	=	1.110329e+02
Total O	=	5.590014e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.214e-05	8.913e-06	-4.916	-5.050	-0.134	0.00
OH-	1.292e-09	8.222e-10	-8.889	-9.085	-0.196	(0)
H2O	5.551e+01	9.883e-01	1.744	-0.005	0.000	18.05
Al	1.986e-04					
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Al+3	1.839e-05	1.139e-06	-4.735	-5.943	-1.208	(0)
AlOH+2	4.197e-06	9.786e-07	-5.377	-6.009	-0.632	(0)
Al(OH)2+	1.624e-06	1.128e-06	-5.790	-5.948	-0.158	(0)
Al(OH)3	2.514e-08	2.514e-08	-7.600	-7.600	0.000	(0)
Al(OH)4-	2.040e-09	1.366e-09	-8.690	-8.864	-0.174	(0)
Ca	1.514e-02					
Ca+2	8.161e-03	2.370e-03	-2.088	-2.625	-0.537	(0)
CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
CaOH+	5.236e-11	3.715e-11	-10.281	-10.430	-0.149	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
Cd	3.660e-07					
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
Cd(SO4)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
Cd+2	1.502e-08	4.363e-09	-7.823	-8.360	-0.537	(0)
CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)

CdOHC1	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CdOH+	6.462e-14	2.865e-14	-13.190	-13.543	-0.353	(0)
Cd2OH+3	9.945e-19	6.582e-22	-18.002	-21.182	-3.179	(0)
Cd(OH)2	2.726e-19	2.726e-19	-18.564	-18.564	0.000	(0)
Cd(OH)3-	4.195e-26	1.860e-26	-25.377	-25.730	-0.353	(0)
Cd(OH)4-2	8.799e-35	3.400e-36	-34.056	-35.469	-1.413	(0)
Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cl	2.733e-01					
Cl-	2.729e-01	2.003e-01	-0.564	-0.698	-0.134	(0)
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
ZnOHC1	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CdOHC1	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(2)	4.224e-04					
Co+2	3.644e-04	1.408e-05	-3.438	-4.851	-1.413	(0)
CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CoOH+	7.075e-10	3.137e-10	-9.150	-9.504	-0.353	(0)
Co2OH+3	3.344e-13	2.213e-16	-12.476	-15.655	-3.179	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Co(OH)2	2.782e-14	2.782e-14	-13.556	-13.556	0.000	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Co(OH)3-	1.398e-21	6.199e-22	-20.854	-21.208	-0.353	(0)
CoOOH-	8.505e-23	3.771e-23	-22.070	-22.424	-0.353	(0)
Co4(OH)4+4	8.668e-25	1.932e-30	-24.062	-29.714	-5.652	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
Co(OH)4-2	2.839e-30	1.097e-31	-29.547	-30.960	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)

CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
Co(N03)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Co(3)	8.287e-32					
CoOH+2	8.232e-32	3.180e-33	-31.085	-32.498	-1.413	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co+3	9.049e-36	5.605e-37	-35.043	-36.251	-1.208	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
Cu(1)	1.504e-04					
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
Cu+	1.823e-08	8.082e-09	-7.739	-8.092	-0.353	(0)
Cu(2)	1.182e-09					
Cu+2	5.900e-10	1.714e-10	-9.229	-9.766	-0.537	(0)
CuS04	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
CuOH+	7.604e-13	4.972e-13	-12.119	-12.303	-0.185	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
Cu(OH)2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
Cu2(OH)2+2	1.564e-19	6.042e-21	-18.806	-20.219	-1.413	(0)
Cu(OH)3-	6.965e-22	3.088e-22	-21.157	-21.510	-0.353	(0)
Cu(OH)4-2	7.024e-29	2.714e-30	-28.153	-29.566	-1.413	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Fe(2)	1.726e-02					
Fe+2	1.529e-02	5.907e-04	-1.816	-3.229	-1.413	(0)
FeS04	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
FeH2P04+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
FeHP04	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
FeOH+	2.826e-08	1.934e-08	-7.549	-7.714	-0.165	(0)
Fe(OH)2	1.209e-14	1.209e-14	-13.918	-13.918	0.000	(0)
Fe(OH)3-	6.009e-18	4.111e-18	-17.221	-17.386	-0.165	(0)
Fe(3)	2.087e-10					
Fe(OH)2+	1.957e-10	1.360e-10	-9.708	-9.867	-0.158	(0)
FeHP04+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
FeOH+2	1.136e-12	2.489e-13	-11.945	-12.604	-0.659	(0)
Fe(OH)3	9.228e-14	9.228e-14	-13.035	-13.035	0.000	(0)
FeS04+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(S04)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
FeH2P04+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Fe+3	7.010e-15	4.342e-16	-14.154	-15.362	-1.208	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
Fe(OH)4-	2.440e-17	1.696e-17	-16.613	-16.771	-0.158	(0)
Fe2(OH)2+4	1.061e-18	2.365e-24	-17.974	-23.626	-5.652	(0)
Fe3(OH)4+5	3.023e-24	4.459e-33	-23.520	-32.351	-8.831	(0)
FeHSe03+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
H(0)	1.047e-15					
H2	5.235e-16	5.855e-16	-15.281	-15.232	0.049	(0)
Hg(0)	2.051e-09					
Hg	2.051e-09	2.051e-09	-8.688	-8.688	0.000	(0)
Hg(1)	9.698e-28					
Hg2+2	4.849e-28	1.874e-29	-27.314	-28.727	-1.413	(0)
Hg(2)	4.726e-15					
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
HgCl0H	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)

	HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
	Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
	Hg(OH)2	1.022e-25	1.143e-25	-24.991	-24.942	0.049	(0)
	HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
	HgOH+	1.615e-27	7.162e-28	-26.792	-27.145	-0.353	(0)
	Hg+2	4.674e-28	1.806e-29	-27.330	-28.743	-1.413	(0)
	HgSO4	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
	Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
	Hg(OH)3-	3.623e-35	1.606e-35	-34.441	-34.794	-0.353	(0)
	Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
	HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
	Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
K		5.682e-03					
	K+	5.178e-03	3.801e-03	-2.286	-2.420	-0.134	(0)
	KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
	KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
Mg		5.671e-02					
	Mg+2	3.360e-02	9.758e-03	-1.474	-2.011	-0.537	(0)
	MgSO4	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
	MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
	MgHP04	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
	MgOH+	4.148e-09	2.990e-09	-8.382	-8.524	-0.142	(0)
	MgPO4-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
Mn(2)		3.202e-03					
	Mn+2	2.899e-03	1.120e-04	-2.538	-3.951	-1.413	(0)
	MnSO4	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
	MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
	MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
	MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
	MnOH+	3.381e-10	2.313e-10	-9.471	-9.636	-0.165	(0)
	MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
	Mn(OH)3-	3.538e-24	2.421e-24	-23.451	-23.616	-0.165	(0)
	Mn(OH)4-2	3.983e-32	8.727e-33	-31.400	-32.059	-0.659	(0)
	MnSe04	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
	MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
	Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Mn(3)		4.471e-28					
	Mn+3	4.471e-28	2.769e-29	-27.350	-28.558	-1.208	(0)
Mn(6)		0.000e+00					
	MnO4-2	0.000e+00	0.000e+00	-79.028	-79.687	-0.659	(0)
Mn(7)		0.000e+00					
	MnO4-	0.000e+00	0.000e+00	-88.115	-88.325	-0.210	(0)
N(-3)		4.406e-03					
	NH4+	3.919e-03	2.335e-03	-2.407	-2.632	-0.225	(0)
	NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
	NH3	1.123e-07	1.123e-07	-6.950	-6.950	0.000	(0)
	NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
	CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
	Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
	CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
	Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
	Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
	Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
	Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
	Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
	Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
	HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
	Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
	Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
	Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
	Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
	Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
	Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
N(3)		0.000e+00					
	NO2-	0.000e+00	0.000e+00	-47.968	-48.177	-0.210	(0)
	CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
	CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)

Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-64.954	-65.088	-0.134	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
Na	2.631e-01					
Na+	2.447e-01	1.796e-01	-0.611	-0.746	-0.134	(0)
NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
Ni	9.762e-05					
Ni+2	4.671e-05	1.357e-05	-4.331	-4.867	-0.537	(0)
NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
Ni(SO4)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
NiOH+	3.238e-10	1.435e-10	-9.490	-9.843	-0.353	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Ni(OH)2	1.692e-14	1.692e-14	-13.772	-13.772	0.000	(0)
Ni(OH)3-	4.261e-20	1.889e-20	-19.371	-19.724	-0.353	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-63.001	-62.952	0.049	(0)
P	7.837e-04					
H2PO4-	4.270e-04	2.967e-04	-3.370	-3.528	-0.158	(0)
MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
MgHPO4	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
HPO4-2	9.473e-06	2.076e-06	-5.024	-5.683	-0.659	(0)
NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
H3PO4	3.560e-07	3.560e-07	-6.449	-6.449	0.000	(0)
KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
MgPO4-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
FeHP04+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
PO4-3	1.460e-12	9.045e-14	-11.836	-13.044	-1.208	(0)
FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Pb	4.964e-08					
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
Pb(SO4)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
Pb+2	3.636e-09	1.056e-09	-8.439	-8.976	-0.537	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
PbOH+	6.682e-12	2.963e-12	-11.175	-11.528	-0.353	(0)
Pb(OH)2	1.046e-16	1.046e-16	-15.980	-15.980	0.000	(0)
Pb2OH+3	7.494e-17	4.960e-20	-16.125	-19.305	-3.179	(0)

Pb(OH)3-	2.635e-22	1.168e-22	-21.579	-21.933	-0.353	(0)
Pb(OH)4-2	8.268e-28	3.195e-29	-27.083	-28.496	-1.413	(0)
Pb3(OH)4+2	3.173e-30	1.226e-31	-29.499	-30.912	-1.413	(0)
Pb4(OH)4+4	5.352e-31	1.193e-36	-30.271	-35.923	-5.652	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
S(6)	9.754e-02					
S04-2	4.586e-02	1.332e-02	-1.339	-1.875	-0.537	(0)
MgS04	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
NaS04-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
CaS04	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
FeS04	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
NH4S04-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
MnS04	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
AlS04+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
CoS04	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
NiS04	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
Al(S04)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Zn(S04)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
HS04-	1.536e-05	1.028e-05	-4.814	-4.988	-0.174	(0)
ZnS04	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
Ni(S04)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
Cd(S04)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
Pb(S04)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
CdS04	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
PbS04	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
CuS04	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
FeS04+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(S04)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
HgS04	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Se(-2)	1.042e-06					
HSe-	1.012e-06	4.485e-07	-5.995	-6.348	-0.353	(0)
H2Se	3.047e-08	3.047e-08	-7.516	-7.516	0.000	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Se-2	1.000e-15	3.865e-17	-15.000	-16.413	-1.413	(0)
Se(4)	2.708e-15					
HSeO3-	2.690e-15	1.193e-15	-14.570	-14.923	-0.353	(0)
SeO3-2	1.341e-17	5.183e-19	-16.872	-18.285	-1.413	(0)
H2SeO3	4.383e-18	4.383e-18	-17.358	-17.358	0.000	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
Se(6)	9.467e-35					
SeO4-2	9.354e-35	2.717e-35	-34.029	-34.566	-0.537	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
HSeO4-	2.413e-38	1.070e-38	-37.617	-37.971	-0.353	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn	2.800e-05					
Zn(SO4)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
Zn+2	6.051e-06	1.758e-06	-5.218	-5.755	-0.537	(0)
ZnS04	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
ZnOH+	3.259e-10	1.445e-10	-9.487	-9.840	-0.353	(0)
Zn(OH)2	3.473e-14	3.473e-14	-13.459	-13.459	0.000	(0)
Zn(OH)3-	4.384e-19	1.944e-19	-18.358	-18.711	-0.353	(0)
Zn(OH)4-2	2.236e-25	8.641e-27	-24.650	-26.063	-1.413	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)

Zn(NO3)2 0.000e+00 0.000e+00 -136.232 -136.232 0.000 (0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-161.31	-155.03	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-30.79	-26.25	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-38.05	-26.26	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-234.94	-217.01	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-43.95	-23.84	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-40.28	-39.83	0.45	(NH4)2SeO4
Al(OH)3(am)	-1.87	9.19	11.06	Al(OH)3
Al2O3	-1.87	18.40	20.27	Al2O3
Al4(OH)10SO4	2.10	24.80	22.70	Al4(OH)10SO4
AlOHSO4	0.46	-2.77	-3.23	AlOHSO4
Alunite	7.17	6.27	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.03	-10.85	-7.82	PbSO4
Anhydrite	-0.16	-4.50	-4.34	CaSO4
Antlerite	-19.78	-10.99	8.79	Cu3(OH)4SO4
Atacamite	-12.71	-5.10	7.61	Cu2(OH)3Cl
Bianchite	-5.90	-7.66	-1.76	ZnSO4:6H2O
Birnessite	-25.46	-7.37	18.09	MnO2
Bixbyite	-26.48	-26.83	-0.35	Mn2O3
Boehmite	0.34	9.20	8.86	AlOOH
Brochantite	-26.38	-10.67	15.71	Cu4(OH)6SO4
Brucite	-9.04	8.08	17.12	Mg(OH)2
Bunsenite	-7.46	5.23	12.68	NiO
Ca3(PO4)2(beta)	-4.91	-33.96	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-7.62	-54.70	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.37	-20.72	-19.35	CaHP04
CaHP04:2H2O	-1.68	-20.73	-19.05	CaHP04:2H2O
Calomel	-11.99	-30.12	-18.13	Hg2Cl2
CaSeO3:2H2O	-15.37	-12.51	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-34.20	-37.20	-3.00	CaSeO4:2H2O
Cd(OH)2	-12.14	1.73	13.87	Cd(OH)2
Cd(OH)2(am)	-12.21	1.73	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-25.45	-18.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-29.34	-6.78	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-18.57	-51.17	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-33.45	-5.05	28.40	Cd4(OH)6SO4
CdCl2	-9.14	-9.76	-0.61	CdCl2
CdCl2:1H2O	-8.09	-9.76	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-7.84	-9.77	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.05	-10.36	13.69	Cd
Cdmetal(gamma)	-24.16	-10.36	13.80	Cd
CdOHCl	-7.62	-4.01	3.61	CdOHCl
CdSe	10.72	-9.66	-20.38	CdSe
CdSeO4:2H2O	-41.09	-42.94	-1.85	CdSeO4:2H2O
CdSO4	-10.19	-10.24	-0.05	CdSO4
CdSO4:1H2O	-8.59	-10.24	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-8.42	-10.25	-1.83	CdSO4:2.67H2O
Chalcantite	-9.01	-11.67	-2.65	CuSO4:5H2O
Clausthalite	17.11	-10.27	-27.39	PbSe
Co(OH)2	-7.86	5.24	13.09	Co(OH)2
Co(OH)3	-19.03	-21.12	-2.09	Co(OH)3
Co3(PO4)2	-5.95	-40.64	-34.69	Co3(PO4)2
Co3O4	-26.74	-36.97	-10.24	Co3O4
CoCl2	-14.71	-6.25	8.46	CoCl2
CoCl2:6H2O	-8.80	-6.28	2.52	CoCl2:6H2O
CoFe2O4	7.95	4.80	-3.15	CoFe2O4
CoHP04	-3.88	-22.95	-19.06	CoHP04
CoO	-8.60	5.24	13.84	CoO
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-16.04	-14.72	1.32	CoSeO3
CoSeO4:6H2O	-37.92	-39.45	-1.53	CoSeO4:6H2O
CoSO4	-9.72	-6.73	2.99	CoSO4
CoSO4:6H2O	-4.28	-6.76	-2.48	CoSO4:6H2O

Cotunnite	-5.53	-10.37	-4.84	PbCl ₂
Cu(OH) ₂	-8.48	0.32	8.81	Cu(OH) ₂
Cu ₂ (OH) ₃ NO ₃	-78.91	-69.49	9.42	Cu ₂ (OH) ₃ NO ₃
Cu ₂ Se(alpha)	28.83	-17.48	-46.31	Cu ₂ Se
Cu ₂ SO ₄	-16.16	-18.06	-1.90	Cu ₂ SO ₄
Cu ₃ (PO ₄) ₂	-18.54	-55.39	-36.85	Cu ₃ (PO ₄) ₂
Cu ₃ (PO ₄) ₂ :3H ₂ O	-20.28	-55.40	-35.12	Cu ₃ (PO ₄) ₂ :3H ₂ O
Cu ₃ Se ₂	35.75	-28.55	-64.30	Cu ₃ Se ₂
Cumetal	-0.17	-9.09	-8.93	Cu
CuOCuSO ₄	-21.94	-11.31	10.63	CuOCuSO ₄
Cupricferrite	-6.60	-0.11	6.49	CuFe ₂ O ₄
Cuprite	-4.98	-6.09	-1.11	Cu ₂ O
Cuprousferrite	5.61	-3.27	-8.88	CuFeO ₂
CuSe	22.32	-11.06	-33.39	CuSe
CuSe ₂	23.34	-10.36	-33.70	CuSe ₂
CuSeO ₃ :2H ₂ O	-20.25	-19.65	0.60	CuSeO ₃ :2H ₂ O
CuSeO ₄ :5H ₂ O	-41.92	-44.36	-2.44	CuSeO ₄ :5H ₂ O
CuSO ₄	-14.76	-11.64	3.11	CuSO ₄
Diaspore	2.08	9.20	7.12	Al ₂ O ₃
Epsomite	-1.77	-3.92	-2.15	MgSO ₄ :7H ₂ O
Fe(OH) ₂	-6.70	6.86	13.56	Fe(OH) ₂
Fe(OH) ₂ .7Cl.3	1.09	-1.95	-3.04	Fe(OH) ₂ .7Cl.3
Fe ₂ (OH) ₄ SeO ₃	-21.97	-20.42	1.55	Fe ₂ (OH) ₄ SeO ₃
Fe ₂ (SeO ₃) ₃ :2H ₂ O	-39.73	-60.36	-20.63	Fe ₂ (SeO ₃) ₃ :2H ₂ O
Fe ₂ (SO ₄) ₃	-33.19	-36.35	-3.16	Fe ₂ (SO ₄) ₃
Fe ₃ (OH) ₈	-13.82	6.41	20.22	Fe ₃ (OH) ₈
Ferrihydrite	-3.59	-0.23	3.37	Fe(OH) ₃
Ferroselite	14.88	-3.83	-18.71	FeSe ₂
FeSe	6.48	-4.53	-11.00	FeSe
Gibbsite	0.67	9.19	8.52	Al(OH) ₃
Goethite	-0.86	-0.22	0.64	FeO(OH)
Goslarite	-5.62	-7.67	-2.05	ZnSO ₄ :7H ₂ O
Gypsum	0.10	-4.51	-4.61	CaSO ₄ :2H ₂ O
H-Jarosite	-13.07	-24.62	-11.55	(H ₃ O)Fe ₃ (SO ₄) ₂ (OH) ₆
H ₂ Se(g)	-6.47	-11.40	-4.92	H ₂ Se
Halite	-3.04	-1.44	1.59	NaCl
Hausmannite	-31.51	30.53	62.03	Mn ₃ O ₄
Hematite	0.67	-0.44	-1.11	Fe ₂ O ₃
Hercynite	1.62	25.26	23.64	FeAl ₂ O ₄
Hg(g)	-7.44	-15.36	-7.93	Hg
Hg(OH) ₂	-21.45	-24.94	-3.50	Hg(OH) ₂
Hg ₂ (g)	-15.63	-30.73	-15.09	Hg ₂
Hg ₂ (OH) ₂	-23.90	-18.64	5.26	Hg ₂ (OH) ₂
Hg ₂ HPO ₄	-22.05	-46.82	-24.77	Hg ₂ HPO ₄
Hg ₂ SeO ₃	-33.94	-38.60	-4.66	Hg ₂ SeO ₃
Hg ₂ SO ₄	-24.46	-30.60	-6.14	Hg ₂ SO ₄
HgCl(g)	-34.94	-15.06	19.88	HgCl
HgCl ₂	-14.91	-36.43	-21.52	HgCl ₂
Hgmetal(l)	-1.71	-15.36	-13.65	Hg
HgSe	19.36	-36.33	-55.69	HgSe
HgSeO ₃	-32.48	-44.91	-12.43	HgSeO ₃
HgSO ₄	-27.45	-36.91	-9.45	HgSO ₄
Hinsdalite	-8.96	-11.46	-2.50	PbAl ₃ PO ₄ SO ₄ (OH) ₆
Hydroxylapatite	-2.88	-47.21	-44.33	Ca ₅ (PO ₄) ₃ OH
Hydroxylpyromorphite	-16.18	-78.97	-62.79	Pb ₅ (PO ₄) ₃ OH
K-Alum	-6.93	-12.18	-5.24	KAl(SO ₄) ₂ :12H ₂ O
K-Jarosite	-7.50	-21.99	-14.49	KFe ₃ (SO ₄) ₂ (OH) ₆
K ₂ SeO ₄	-38.68	-39.41	-0.73	K ₂ SeO ₄
Langite	-28.56	-10.68	17.88	Cu ₄ (OH) ₆ SO ₄ :H ₂ O
Larnakite	-9.35	-9.73	-0.38	PbO:PbSO ₄
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.59	-0.22	1.37	FeO(OH)
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.73	1.12	12.85	PbO
Maghemite	-6.83	-0.44	6.39	Fe ₂ O ₃
Magnesioferrite	-9.88	7.64	17.52	Fe ₂ MgO ₄
Magnetite	2.53	6.43	3.90	Fe ₃ O ₄
Manganite	-13.15	12.19	25.34	MnOOH

Massicot	-11.93	1.12	13.05	PbO
Melanothallite	-17.57	-11.16	6.41	CuCl ₂
Melanterite	-2.88	-5.14	-2.26	FeSO ₄ :7H ₂ O
Mg(OH) ₂ (active)	-10.71	8.08	18.79	Mg(OH) ₂
Mg ₃ (PO ₄) ₂	-8.84	-32.12	-23.28	Mg ₃ (PO ₄) ₂
MgHP04:3H ₂ O	-1.94	-20.12	-18.18	MgHP04:3H ₂ O
MgSe03:6H ₂ O	-14.96	-11.91	3.04	MgSe03:6H ₂ O
MgSe04:6H ₂ O	-35.41	-36.61	-1.20	MgSe04:6H ₂ O
Minium	-59.08	15.45	74.53	Pb ₃ O ₄
Mirabilite	-2.11	-3.42	-1.30	Na ₂ SO ₄ :10H ₂ O
Mn ₂ (SO ₄) ₃	-57.42	-62.74	-5.32	Mn ₂ (SO ₄) ₃
Mn ₃ (PO ₄) ₂	-14.09	-37.94	-23.85	Mn ₃ (PO ₄) ₂
MnCl ₂ :4H ₂ O	-8.11	-5.37	2.74	MnCl ₂ :4H ₂ O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnSe	-8.98	-5.25	3.73	MnSe
MnSe03	-14.95	-13.82	1.13	MnSe03
MnSe03:2H ₂ O	-14.80	-13.83	0.96	MnSe03:2H ₂ O
MnSe04:5H ₂ O	-36.49	-38.54	-2.05	MnSe04:5H ₂ O
MnSO ₄	-8.56	-5.83	2.74	MnSO ₄
Monteponite	-13.62	1.73	15.35	CdO
Montroydite	-21.39	-24.94	-3.55	HgO
Morenosite	-4.60	-6.78	-2.17	NiSO ₄ :7H ₂ O
Na-Jarosite	-9.47	-20.31	-10.84	NaFe ₃ (SO ₄) ₂ (OH) ₆
Na ₂ Se03:5H ₂ O	-21.69	-11.39	10.30	Na ₂ Se03:5H ₂ O
Na ₂ Se04	-37.34	-36.06	1.28	Na ₂ Se04
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni(OH) ₂	-7.80	5.22	13.02	Ni(OH) ₂
Ni ₃ (PO ₄) ₂	-9.39	-40.69	-31.30	Ni ₃ (PO ₄) ₂
Ni ₄ (OH) ₆ SO ₄	-23.08	8.92	32.00	Ni ₄ (OH) ₆ SO ₄
NiSe	11.53	-6.17	-17.70	NiSe
NiSe03:2H ₂ O	-17.64	-14.75	2.89	NiSe03:2H ₂ O
NiSe04:6H ₂ O	-37.94	-39.46	-1.52	NiSe04:6H ₂ O
Nsutite	-24.87	-7.37	17.50	MnO ₂
O ₂ (g)	-60.26	24.19	84.45	O ₂
Pb(OH) ₂	-7.18	1.11	8.29	Pb(OH) ₂
Pb ₂ (OH) ₃ Cl	-12.31	-3.52	8.79	Pb ₂ (OH) ₃ Cl
Pb ₂ O(OH) ₂	-23.96	2.23	26.19	Pb ₂ O(OH) ₂
Pb ₂ O ₃	-46.71	14.33	61.04	Pb ₂ O ₃
Pb ₃ (PO ₄) ₂	-9.49	-53.02	-43.53	Pb ₃ (PO ₄) ₂
Pb ₃ O ₂ SO ₄	-19.49	-8.61	10.87	Pb ₃ O ₂ SO ₄
Pb ₄ (OH) ₆ SO ₄	-28.61	-7.51	21.10	Pb ₄ (OH) ₆ SO ₄
Pb ₄ O ₃ SO ₄	-29.70	-7.50	22.20	Pb ₄ O ₃ SO ₄
PbHP04	-3.26	-27.07	-23.81	PbHP04
Pbmetal	-15.22	-10.98	4.24	Pb
PbO:0.3H ₂ O	-11.86	1.12	12.98	PbO:0.33H ₂ O
PbSe04	-36.67	-43.54	-6.88	PbSe04
Periclase	-13.86	8.08	21.94	MgO
Plattnerite	-37.09	13.21	50.31	PbO ₂
Plumbgummite	5.12	-27.67	-32.79	PbAl ₃ (PO ₄) ₂ (OH) ₅ :H ₂ O
Portlandite	-15.65	7.46	23.11	Ca(OH) ₂
Pyrochroite	-9.29	6.14	15.43	Mn(OH) ₂
Pyrolusite	-23.79	18.24	42.03	MnO ₂
Pyromorphite	-0.28	-84.71	-84.43	Pb ₅ (PO ₄) ₃ Cl
Retgersite	-4.72	-6.77	-2.05	NiSO ₄ :6H ₂ O
Semetal(am)	7.84	0.70	-7.14	Se
Semetal(hex)	8.45	0.70	-7.75	Se
SeO ₂	-20.09	-19.97	0.12	SeO ₂
SeO ₃	-66.05	-44.66	21.39	SeO ₃
Spinel	-11.29	26.48	37.77	MgAl ₂ O ₄
Strengite	-2.04	-28.42	-26.38	FePO ₄ :2H ₂ O
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.71	-3.37	0.34	Na ₂ SO ₄
Tsumebite	-15.85	-25.64	-9.79	Pb ₂ CuPO ₄ (OH) ₃ :3H ₂ O
Vivianite	0.19	-35.81	-36.00	Fe ₃ (PO ₄) ₂ :8H ₂ O
Zincite	-7.21	4.34	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnSO ₄
Zn(NO ₃) ₂ :6H ₂ O	-139.22	-135.96	3.26	Zn(NO ₃) ₂ :6H ₂ O
Zn(OH) ₂	-7.87	4.33	12.20	Zn(OH) ₂

Zn(OH)2(am)	-8.33	4.33	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.62	4.33	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.39	4.33	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.40	4.33	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.80	-3.30	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.26	2.93	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-7.95	-43.37	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-30.45	-10.92	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-23.03	5.37	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-28.31	10.19	38.50	Zn5(OH)8Cl2
ZnCl2	-14.37	-7.15	7.22	ZnCl2
Znmetal	-33.91	-7.76	26.15	Zn
Zn0(active)	-7.06	4.34	11.40	Zn0
ZnSe	7.41	-7.05	-14.46	ZnSe
ZnSeO4:6H2O	-38.83	-40.35	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.10	-7.64	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 3.

Using reaction 4.

Mixture 3.

9.720e-01 Solution 1
2.800e-02 Solution 5

Reaction 4.

2.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000
Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	2.060e-04	1.986e-04
Ca	1.571e-02	1.514e-02
Cd	3.797e-07	3.660e-07
Cl	2.835e-01	2.733e-01
Co	4.382e-04	4.224e-04
Cu	1.560e-04	1.504e-04
Fe	1.790e-02	1.726e-02
Hg	2.128e-09	2.051e-09
K	5.895e-03	5.682e-03
Mg	5.883e-02	5.671e-02
Mn	3.321e-03	3.202e-03
N	4.571e-03	4.406e-03
Na	2.729e-01	2.631e-01
Ni	1.013e-04	9.762e-05
P	8.130e-04	7.837e-04
Pb	5.150e-08	4.964e-08

S	1.012e-01	9.754e-02
Se	1.081e-06	1.042e-06
Zn	2.905e-05	2.800e-05

-----Description of solution-----

pH	=	5.045	Charge balance
pe	=	1.031	Adjusted to redox equilibrium
Activity of water	=	0.988	
Ionic strength (mol/kgw)	=	5.018e-01	
Mass of water (kg)	=	9.640e-01	
Total alkalinity (eq/kg)	=	1.433e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	-9.552e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.26	
Iterations	=	4	
Total H	=	1.070329e+02	
Total O	=	5.390014e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.228e-05	9.024e-06	-4.911	-5.045	-0.134	0.00
OH-	1.280e-09	8.117e-10	-8.893	-9.091	-0.198	(0)
H2O	5.551e+01	9.879e-01	1.744	-0.005	0.000	18.05
Al	2.060e-04					
AlSO4+	1.567e-04	1.046e-04	-3.805	-3.980	-0.175	(0)
Al(SO4)2-	2.498e-05	1.667e-05	-4.602	-4.778	-0.175	(0)
Al+3	1.847e-05	1.154e-06	-4.734	-5.938	-1.204	(0)
AlOH+2	4.242e-06	9.789e-07	-5.372	-6.009	-0.637	(0)
Al(OH)2+	1.608e-06	1.114e-06	-5.794	-5.953	-0.159	(0)
Al(OH)3	2.451e-08	2.451e-08	-7.611	-7.611	0.000	(0)
Al(OH)4-	1.970e-09	1.315e-09	-8.706	-8.881	-0.175	(0)
Ca	1.571e-02					
Ca+2	8.365e-03	2.439e-03	-2.078	-2.613	-0.535	(0)
CaSO4	7.318e-03	7.318e-03	-2.136	-2.136	0.000	(0)
CaH2PO4+	2.250e-05	1.559e-05	-4.648	-4.807	-0.159	(0)
CaHPO4	2.200e-06	2.200e-06	-5.658	-5.658	0.000	(0)
CaNH3+2	1.272e-08	4.666e-10	-7.896	-9.331	-1.435	(0)
CaPO4-	8.574e-10	5.943e-10	-9.067	-9.226	-0.159	(0)
CaOH+	5.331e-11	3.775e-11	-10.273	-10.423	-0.150	(0)
Ca(NH3)2+2	7.694e-16	2.823e-17	-15.114	-16.549	-1.435	(0)
CaNO3+	0.000e+00	0.000e+00	-66.621	-66.980	-0.359	(0)
Cd	3.797e-07					
CdCl+	1.917e-07	8.388e-08	-6.717	-7.076	-0.359	(0)
CdCl2	7.195e-08	7.195e-08	-7.143	-7.143	0.000	(0)
Cd(SO4)2-2	6.784e-08	2.489e-09	-7.169	-8.604	-1.435	(0)
CdCl3-	2.076e-08	9.088e-09	-7.683	-8.042	-0.359	(0)
Cd+2	1.456e-08	4.245e-09	-7.837	-8.372	-0.535	(0)
CdSO4	1.292e-08	1.292e-08	-7.889	-7.889	0.000	(0)
CdOHCl	3.451e-12	3.451e-12	-11.462	-11.462	0.000	(0)
CdOH+	6.289e-14	2.752e-14	-13.201	-13.560	-0.359	(0)
Cd2OH+3	1.044e-18	6.153e-22	-17.981	-21.211	-3.230	(0)
Cd(OH)2	2.586e-19	2.586e-19	-18.587	-18.587	0.000	(0)
CdHS+	2.002e-22	8.762e-23	-21.699	-22.057	-0.359	(0)
Cd(OH)3-	3.979e-26	1.742e-26	-25.400	-25.759	-0.359	(0)
Cd(OH)4-2	8.565e-35	3.142e-36	-34.067	-35.503	-1.435	(0)
Cd(HS)2	2.840e-37	2.840e-37	-36.547	-36.547	0.000	(0)
Cd(SeO3)2-2	5.647e-38	2.072e-39	-37.248	-38.684	-1.435	(0)
CdSeO4	0.000e+00	0.000e+00	-40.457	-40.457	0.000	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-55.981	-56.340	-0.359	(0)
CdNO3+	0.000e+00	0.000e+00	-72.343	-72.702	-0.359	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-74.402	-75.837	-1.435	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-137.932	-137.932	0.000	(0)

Cl	2.835e-01					
Cl-	2.831e-01	2.080e-01	-0.548	-0.682	-0.134	(0)
CuCl2-	1.360e-04	8.864e-05	-3.866	-4.052	-0.186	(0)
MnCl+	4.245e-05	2.896e-05	-4.372	-4.538	-0.166	(0)
CoCl+	2.261e-05	9.898e-06	-4.646	-5.004	-0.359	(0)
CuCl3-2	1.791e-05	3.881e-06	-4.747	-5.411	-0.664	(0)
NiCl+	1.668e-05	7.302e-06	-4.778	-5.137	-0.359	(0)
MnCl2	8.511e-06	8.511e-06	-5.070	-5.070	0.000	(0)
CuCl	2.020e-06	2.020e-06	-5.695	-5.695	0.000	(0)
ZnCl+	1.338e-06	8.717e-07	-5.874	-6.060	-0.186	(0)
MnCl3-	7.147e-07	4.876e-07	-6.146	-6.312	-0.166	(0)
ZnCl2	2.417e-07	2.417e-07	-6.617	-6.617	0.000	(0)
CdCl+	1.917e-07	8.388e-08	-6.717	-7.076	-0.359	(0)
CdCl2	7.195e-08	7.195e-08	-7.143	-7.143	0.000	(0)
ZnCl3-	6.029e-08	3.928e-08	-7.220	-7.406	-0.186	(0)
CdCl3-	2.076e-08	9.088e-09	-7.683	-8.042	-0.359	(0)
ZnCl4-2	1.826e-08	3.957e-09	-7.738	-8.403	-0.664	(0)
PbCl+	1.651e-08	7.227e-09	-7.782	-8.141	-0.359	(0)
NiCl2	7.733e-09	7.733e-09	-8.112	-8.112	0.000	(0)
PbCl2	6.595e-09	6.595e-09	-8.181	-8.181	0.000	(0)
PbCl4-2	1.394e-09	5.115e-11	-8.856	-10.291	-1.435	(0)
PbCl3-	1.304e-09	5.707e-10	-8.885	-9.244	-0.359	(0)
ZnOHCl	1.296e-09	1.296e-09	-8.887	-8.887	0.000	(0)
CuCl+	8.498e-11	5.537e-11	-10.071	-10.257	-0.186	(0)
CdOHCl	3.451e-12	3.451e-12	-11.462	-11.462	0.000	(0)
CuCl2	3.280e-12	3.280e-12	-11.484	-11.484	0.000	(0)
FeCl+2	1.179e-14	2.554e-15	-13.929	-14.593	-0.664	(0)
CuCl3-	9.096e-15	5.927e-15	-14.041	-14.227	-0.186	(0)
HgCl4-2	6.144e-15	2.254e-16	-14.212	-15.647	-1.435	(0)
FeCl2+	3.946e-15	2.692e-15	-14.404	-14.570	-0.166	(0)
HgCl3-	5.995e-16	2.624e-16	-15.222	-15.581	-0.359	(0)
HgCl2	1.250e-16	1.250e-16	-15.903	-15.903	0.000	(0)
FeCl3	5.601e-17	5.601e-17	-16.252	-16.252	0.000	(0)
CuCl4-2	3.266e-17	7.077e-18	-16.486	-17.150	-0.664	(0)
HgClOH	8.909e-21	8.909e-21	-20.050	-20.050	0.000	(0)
HgCl+	2.328e-22	1.019e-22	-21.633	-21.992	-0.359	(0)
CoCl+2	6.287e-34	2.307e-35	-33.202	-34.637	-1.435	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.572	-43.007	-1.435	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.084	-56.520	-1.435	(0)
Co(2)	4.382e-04					
Co+2	3.790e-04	1.391e-05	-3.421	-4.857	-1.435	(0)
CoSO4	3.651e-05	3.651e-05	-4.438	-4.438	0.000	(0)
CoCl+	2.261e-05	9.898e-06	-4.646	-5.004	-0.359	(0)
CoHPO4	2.944e-08	2.944e-08	-7.531	-7.531	0.000	(0)
Co(NH3)+2	9.890e-09	3.629e-10	-8.005	-9.440	-1.435	(0)
CoOH+	6.988e-10	3.058e-10	-9.156	-9.514	-0.359	(0)
Co2OH+3	3.618e-13	2.131e-16	-12.442	-15.671	-3.230	(0)
Co(NH3)2+2	4.488e-14	1.647e-15	-13.348	-14.783	-1.435	(0)
Co(OH)2	2.678e-14	2.678e-14	-13.572	-13.572	0.000	(0)
Co(NH3)3+2	8.585e-20	3.150e-21	-19.066	-20.502	-1.435	(0)
Co(OH)3-	1.346e-21	5.891e-22	-20.871	-21.230	-0.359	(0)
CoOOH-	8.191e-23	3.585e-23	-22.087	-22.446	-0.359	(0)
Co4(OH)4+4	9.635e-25	1.746e-30	-24.016	-29.758	-5.742	(0)
Co(NH3)4+2	6.846e-26	2.512e-27	-25.165	-26.600	-1.435	(0)
Co(OH)4-2	2.805e-30	1.029e-31	-29.552	-30.987	-1.435	(0)
Co(NH3)5+2	1.727e-32	6.334e-34	-31.763	-33.198	-1.435	(0)
CoSeO4	2.884e-37	2.884e-37	-36.540	-36.540	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.670	-52.029	-0.359	(0)
CoNO3+	0.000e+00	0.000e+00	-69.178	-69.537	-0.359	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.108	-134.108	0.000	(0)
Co(3)	9.147e-32					
CoOH+2	9.083e-32	3.333e-33	-31.042	-32.477	-1.435	(0)
CoCl+2	6.287e-34	2.307e-35	-33.202	-34.637	-1.435	(0)
Co+3	9.519e-36	5.949e-37	-35.021	-36.226	-1.204	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.572	-43.007	-1.435	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.468	-52.826	-0.359	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.084	-56.520	-1.435	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.911	-60.347	-1.435	(0)

Cu(1)	1.560e-04					
CuCl2-	1.360e-04	8.864e-05	-3.866	-4.052	-0.186	(0)
CuCl3-2	1.791e-05	3.881e-06	-4.747	-5.411	-0.664	(0)
CuCl	2.020e-06	2.020e-06	-5.695	-5.695	0.000	(0)
Cu+	1.762e-08	7.713e-09	-7.754	-8.113	-0.359	(0)
Cu(S4)2-3	3.084e-38	9.546e-39	-37.511	-38.020	-0.509	(0)
CuS4S5-3	5.301e-39	1.778e-39	-38.276	-38.750	-0.475	(0)
Cu(2)	1.226e-09					
Cu+2	6.027e-10	1.758e-10	-9.220	-9.755	-0.535	(0)
CuS04	5.227e-10	5.227e-10	-9.282	-9.282	0.000	(0)
CuCl+	8.498e-11	5.537e-11	-10.071	-10.257	-0.186	(0)
CuNH3+2	1.106e-11	4.057e-13	-10.956	-12.392	-1.435	(0)
CuCl2	3.280e-12	3.280e-12	-11.484	-11.484	0.000	(0)
CuOH+	7.727e-13	5.034e-13	-12.112	-12.298	-0.186	(0)
CuCl3-	9.096e-15	5.927e-15	-14.041	-14.227	-0.186	(0)
Cu(OH)2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	3.266e-17	7.077e-18	-16.486	-17.150	-0.664	(0)
Cu2(OH)2+2	1.688e-19	6.194e-21	-18.773	-20.208	-1.435	(0)
Cu(OH)3-	6.963e-22	3.047e-22	-21.157	-21.516	-0.359	(0)
Cu(OH)4-2	7.206e-29	2.644e-30	-28.142	-29.578	-1.435	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-48.577	-48.936	-0.359	(0)
CuNO2+	0.000e+00	0.000e+00	-55.396	-55.755	-0.359	(0)
CuNO3+	0.000e+00	0.000e+00	-73.766	-74.125	-0.359	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-102.765	-102.765	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-139.915	-139.915	0.000	(0)
Fe(2)	1.790e-02					
Fe+2	1.591e-02	5.839e-04	-1.798	-3.234	-1.435	(0)
FeS04	1.868e-03	1.868e-03	-2.729	-2.729	0.000	(0)
FeH2PO4+	1.167e-04	8.085e-05	-3.933	-4.092	-0.159	(0)
FeHP04	4.511e-06	4.511e-06	-5.346	-5.346	0.000	(0)
FeOH+	2.765e-08	1.887e-08	-7.558	-7.724	-0.166	(0)
Fe(OH)2	1.164e-14	1.164e-14	-13.934	-13.934	0.000	(0)
Fe(OH)3-	5.730e-18	3.910e-18	-17.242	-17.408	-0.166	(0)
Fe(HS)2	2.137e-38	2.137e-38	-37.670	-37.670	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-56.968	-57.327	-0.359	(0)
Fe(3)	2.172e-10					
Fe(OH)2+	2.031e-10	1.408e-10	-9.692	-9.851	-0.159	(0)
FeHP04+	1.261e-11	8.742e-12	-10.899	-11.058	-0.159	(0)
FeOH+2	1.204e-12	2.610e-13	-11.919	-12.583	-0.664	(0)
Fe(OH)3	9.432e-14	9.432e-14	-13.025	-13.025	0.000	(0)
FeS04+	9.003e-14	6.143e-14	-13.046	-13.212	-0.166	(0)
Fe(S04)2-	4.218e-14	1.846e-14	-13.375	-13.734	-0.359	(0)
FeCl+2	1.179e-14	2.554e-15	-13.929	-14.593	-0.664	(0)
FeH2PO4+2	1.048e-14	2.420e-15	-13.979	-14.616	-0.637	(0)
Fe+3	7.380e-15	4.612e-16	-14.132	-15.336	-1.204	(0)
FeCl2+	3.946e-15	2.692e-15	-14.404	-14.570	-0.166	(0)
FeCl3	5.601e-17	5.601e-17	-16.252	-16.252	0.000	(0)
Fe(OH)4-	2.468e-17	1.711e-17	-16.608	-16.767	-0.159	(0)
Fe2(OH)2+4	1.435e-18	2.601e-24	-17.843	-23.585	-5.742	(0)
Fe3(OH)4+5	4.755e-24	5.076e-33	-23.323	-32.294	-8.972	(0)
FeHSe03+2	5.051e-26	1.853e-27	-25.297	-26.732	-1.435	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.692	-79.128	-1.435	(0)
H(0)	9.260e-16					
H2	4.630e-16	5.197e-16	-15.334	-15.284	0.050	(0)
Hg(0)	2.128e-09					
Hg	2.128e-09	2.128e-09	-8.672	-8.672	0.000	(0)
Hg(1)	1.269e-27					
Hg2+2	6.347e-28	2.329e-29	-27.197	-28.633	-1.435	(0)
Hg(2)	6.869e-15					
HgCl4-2	6.144e-15	2.254e-16	-14.212	-15.647	-1.435	(0)
HgCl3-	5.995e-16	2.624e-16	-15.222	-15.581	-0.359	(0)
HgCl2	1.250e-16	1.250e-16	-15.903	-15.903	0.000	(0)
HgClOH	8.909e-21	8.909e-21	-20.050	-20.050	0.000	(0)
HgCl+	2.328e-22	1.019e-22	-21.633	-21.992	-0.359	(0)
Hg(NH3)2+2	2.674e-23	9.812e-25	-22.573	-24.008	-1.435	(0)
Hg(OH)2	1.189e-25	1.334e-25	-24.925	-24.875	0.050	(0)
HgNH3+2	4.547e-26	1.668e-27	-25.342	-26.778	-1.435	(0)
HgOH+	1.936e-27	8.472e-28	-26.713	-27.072	-0.359	(0)

	Hg+2	5.898e-28	2.164e-29	-27.229	-28.665	-1.435	(0)
	HgS04	6.204e-29	6.204e-29	-28.207	-28.207	0.000	(0)
	Hg(NH3)3+2	2.324e-29	8.525e-31	-28.634	-30.069	-1.435	(0)
	Hg(HS)2	1.500e-34	1.500e-34	-33.824	-33.824	0.000	(0)
	Hg(OH)3-	4.231e-35	1.852e-35	-34.374	-34.732	-0.359	(0)
	Hg(NH3)4+2	4.050e-35	1.486e-36	-34.393	-35.828	-1.435	(0)
	HgHS2-	1.533e-35	6.708e-36	-34.815	-35.173	-0.359	(0)
	HgS2-2	3.969e-38	1.456e-39	-37.401	-38.837	-1.435	(0)
	HgNO3+	0.000e+00	0.000e+00	-93.713	-94.072	-0.359	(0)
	Hg(NO3)2	0.000e+00	0.000e+00	-159.333	-159.333	0.000	(0)
K		5.895e-03					
	K+	5.359e-03	3.938e-03	-2.271	-2.405	-0.134	(0)
	KS04-	5.355e-04	3.712e-04	-3.271	-3.430	-0.159	(0)
	KHP04-	8.366e-08	5.798e-08	-7.077	-7.237	-0.159	(0)
Mg		5.883e-02					
	Mg+2	3.448e-02	1.006e-02	-1.462	-1.998	-0.535	(0)
	MgS04	2.414e-02	2.414e-02	-1.617	-1.617	0.000	(0)
	MgH2P04+	1.983e-04	1.374e-04	-3.703	-3.862	-0.159	(0)
	MgHP04	1.252e-05	1.252e-05	-4.902	-4.902	0.000	(0)
	MgOH+	4.229e-09	3.042e-09	-8.374	-8.517	-0.143	(0)
	MgP04-	5.525e-11	3.829e-11	-10.258	-10.417	-0.159	(0)
Mn(2)		3.321e-03					
	Mn+2	3.014e-03	1.106e-04	-2.521	-3.956	-1.435	(0)
	MnS04	2.553e-04	2.553e-04	-3.593	-3.593	0.000	(0)
	MnCl+	4.245e-05	2.896e-05	-4.372	-4.538	-0.166	(0)
	MnCl2	8.511e-06	8.511e-06	-5.070	-5.070	0.000	(0)
	MnCl3-	7.147e-07	4.876e-07	-6.146	-6.312	-0.166	(0)
	MnOH+	3.305e-10	2.255e-10	-9.481	-9.647	-0.166	(0)
	MnSe	2.320e-11	2.320e-11	-10.635	-10.635	0.000	(0)
	Mn(OH)3-	3.371e-24	2.300e-24	-23.472	-23.638	-0.166	(0)
	Mn(OH)4-2	3.778e-32	8.186e-33	-31.423	-32.087	-0.664	(0)
	MnSe04	1.218e-36	1.218e-36	-35.914	-35.914	0.000	(0)
	MnNO3+	0.000e+00	0.000e+00	-68.277	-68.636	-0.359	(0)
	Mn(NO3)2	0.000e+00	0.000e+00	-133.112	-133.112	0.000	(0)
Mn(3)		4.703e-28					
	Mn+3	4.703e-28	2.939e-29	-27.328	-28.532	-1.204	(0)
Mn(6)		0.000e+00					
	Mn04-2	0.000e+00	0.000e+00	-78.947	-79.611	-0.664	(0)
Mn(7)		0.000e+00					
	Mn04-	0.000e+00	0.000e+00	-88.006	-88.218	-0.212	(0)
N(-3)		4.571e-03					
	NH4+	4.056e-03	2.405e-03	-2.392	-2.619	-0.227	(0)
	NH4S04-	5.143e-04	3.509e-04	-3.289	-3.455	-0.166	(0)
	NH3	1.142e-07	1.142e-07	-6.942	-6.942	0.000	(0)
	NiNH3+2	4.455e-08	1.635e-09	-7.351	-8.787	-1.435	(0)
	CaNH3+2	1.272e-08	4.666e-10	-7.896	-9.331	-1.435	(0)
	Co(NH3)+2	9.890e-09	3.629e-10	-8.005	-9.440	-1.435	(0)
	CuNH3+2	1.106e-11	4.057e-13	-10.956	-12.392	-1.435	(0)
	Ni(NH3)2+2	1.250e-12	4.585e-14	-11.903	-13.339	-1.435	(0)
	Co(NH3)2+2	4.488e-14	1.647e-15	-13.348	-14.783	-1.435	(0)
	Ca(NH3)2+2	7.694e-16	2.823e-17	-15.114	-16.549	-1.435	(0)
	Co(NH3)3+2	8.585e-20	3.150e-21	-19.066	-20.502	-1.435	(0)
	Hg(NH3)2+2	2.674e-23	9.812e-25	-22.573	-24.008	-1.435	(0)
	Co(NH3)4+2	6.846e-26	2.512e-27	-25.165	-26.600	-1.435	(0)
	HgNH3+2	4.547e-26	1.668e-27	-25.342	-26.778	-1.435	(0)
	Hg(NH3)3+2	2.324e-29	8.525e-31	-28.634	-30.069	-1.435	(0)
	Co(NH3)5+2	1.727e-32	6.334e-34	-31.763	-33.198	-1.435	(0)
	Hg(NH3)4+2	4.050e-35	1.486e-36	-34.393	-35.828	-1.435	(0)
	Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.572	-43.007	-1.435	(0)
	Co(NH3)6S04+	0.000e+00	0.000e+00	-52.468	-52.826	-0.359	(0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.084	-56.520	-1.435	(0)
	Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.911	-60.347	-1.435	(0)
N(3)		0.000e+00					
	N02-	0.000e+00	0.000e+00	-47.809	-48.020	-0.212	(0)
	CoN02+	0.000e+00	0.000e+00	-51.670	-52.029	-0.359	(0)
	CuN02+	0.000e+00	0.000e+00	-55.396	-55.755	-0.359	(0)
	Cu(N02)2	0.000e+00	0.000e+00	-102.765	-102.765	0.000	(0)
N(5)		0.000e+00					

N03-	0.000e+00	0.000e+00	-64.746	-64.880	-0.134	(0)
CaN03+	0.000e+00	0.000e+00	-66.621	-66.980	-0.359	(0)
MnN03+	0.000e+00	0.000e+00	-68.277	-68.636	-0.359	(0)
NiN03+	0.000e+00	0.000e+00	-68.979	-69.338	-0.359	(0)
CoN03+	0.000e+00	0.000e+00	-69.178	-69.537	-0.359	(0)
ZnN03+	0.000e+00	0.000e+00	-69.875	-70.234	-0.359	(0)
CdN03+	0.000e+00	0.000e+00	-72.343	-72.702	-0.359	(0)
PbN03+	0.000e+00	0.000e+00	-72.344	-72.703	-0.359	(0)
CuN03+	0.000e+00	0.000e+00	-73.766	-74.125	-0.359	(0)
FeN03+2	0.000e+00	0.000e+00	-77.692	-79.128	-1.435	(0)
HgN03+	0.000e+00	0.000e+00	-93.713	-94.072	-0.359	(0)
Mn(N03)2	0.000e+00	0.000e+00	-133.112	-133.112	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-134.108	-134.108	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-135.825	-135.825	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-137.332	-137.332	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-137.932	-137.932	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-139.915	-139.915	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-159.333	-159.333	0.000	(0)
Na	2.729e-01					
Na+	2.534e-01	1.862e-01	-0.596	-0.730	-0.134	(0)
NaS04-	1.954e-02	1.354e-02	-1.709	-1.868	-0.159	(0)
NaHP04-	6.126e-06	4.246e-06	-5.213	-5.372	-0.159	(0)
Ni	1.013e-04					
Ni+2	4.756e-05	1.387e-05	-4.323	-4.858	-0.535	(0)
NiS04	3.650e-05	3.650e-05	-4.438	-4.438	0.000	(0)
NiCl+	1.668e-05	7.302e-06	-4.778	-5.137	-0.359	(0)
Ni(S04)2-2	4.631e-07	1.699e-08	-6.334	-7.770	-1.435	(0)
NiNH3+2	4.455e-08	1.635e-09	-7.351	-8.787	-1.435	(0)
NiCl2	7.733e-09	7.733e-09	-8.112	-8.112	0.000	(0)
NiOH+	3.310e-10	1.449e-10	-9.480	-9.839	-0.359	(0)
Ni(NH3)2+2	1.250e-12	4.585e-14	-11.903	-13.339	-1.435	(0)
Ni(OH)2	1.686e-14	1.686e-14	-13.773	-13.773	0.000	(0)
Ni(OH)3-	4.246e-20	1.858e-20	-19.372	-19.731	-0.359	(0)
NiSe04	2.656e-37	2.656e-37	-36.576	-36.576	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-68.979	-69.338	-0.359	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-62.899	-62.849	0.050	(0)
P	8.130e-04					
H2P04-	4.400e-04	3.050e-04	-3.357	-3.516	-0.159	(0)
MgH2P04+	1.983e-04	1.374e-04	-3.703	-3.862	-0.159	(0)
FeH2P04+	1.167e-04	8.085e-05	-3.933	-4.092	-0.159	(0)
CaH2P04+	2.250e-05	1.559e-05	-4.648	-4.807	-0.159	(0)
MgHP04	1.252e-05	1.252e-05	-4.902	-4.902	0.000	(0)
HP04-2	9.725e-06	2.107e-06	-5.012	-5.676	-0.664	(0)
NaHP04-	6.126e-06	4.246e-06	-5.213	-5.372	-0.159	(0)
FeHP04	4.511e-06	4.511e-06	-5.346	-5.346	0.000	(0)
CaHP04	2.200e-06	2.200e-06	-5.658	-5.658	0.000	(0)
H3P04	3.705e-07	3.705e-07	-6.431	-6.431	0.000	(0)
KHP04-	8.366e-08	5.798e-08	-7.077	-7.237	-0.159	(0)
CoHP04	2.944e-08	2.944e-08	-7.531	-7.531	0.000	(0)
CaP04-	8.574e-10	5.943e-10	-9.067	-9.226	-0.159	(0)
MgP04-	5.525e-11	3.829e-11	-10.258	-10.417	-0.159	(0)
FeHP04+	1.261e-11	8.742e-12	-10.899	-11.058	-0.159	(0)
P04-3	1.451e-12	9.070e-14	-11.838	-13.042	-1.204	(0)
FeH2P04+2	1.048e-14	2.420e-15	-13.979	-14.616	-0.637	(0)
Pb	5.150e-08					
PbCl+	1.651e-08	7.227e-09	-7.782	-8.141	-0.359	(0)
Pb(S04)2-2	1.532e-08	5.619e-10	-7.815	-9.250	-1.435	(0)
PbS04	6.849e-09	6.849e-09	-8.164	-8.164	0.000	(0)
PbCl2	6.595e-09	6.595e-09	-8.181	-8.181	0.000	(0)
Pb+2	3.522e-09	1.027e-09	-8.453	-8.988	-0.535	(0)
PbCl4-2	1.394e-09	5.115e-11	-8.856	-10.291	-1.435	(0)
PbCl3-	1.304e-09	5.707e-10	-8.885	-9.244	-0.359	(0)
PbOH+	6.498e-12	2.844e-12	-11.187	-11.546	-0.359	(0)
Pb(OH)2	9.914e-17	9.914e-17	-16.004	-16.004	0.000	(0)
Pb2OH+3	7.857e-17	4.629e-20	-16.105	-19.335	-3.230	(0)
Pb(OH)3-	2.497e-22	1.093e-22	-21.603	-21.961	-0.359	(0)
Pb(OH)4-2	8.042e-28	2.950e-29	-27.095	-28.530	-1.435	(0)

Pb3(OH)4+2	2.917e-30	1.070e-31	-29.535	-30.971	-1.435	(0)
Pb4(OH)4+4	5.587e-31	1.012e-36	-30.253	-35.995	-5.742	(0)
Pb(HS)2	7.852e-38	7.852e-38	-37.105	-37.105	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-57.139	-57.498	-0.359	(0)
PbNO3+	0.000e+00	0.000e+00	-72.344	-72.703	-0.359	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.332	-137.332	0.000	(0)
S(-2)	2.227e-20					
H2S	2.160e-20	2.160e-20	-19.666	-19.666	0.000	(0)
HS-	4.630e-22	2.026e-22	-21.334	-21.693	-0.359	(0)
CdHS+	2.002e-22	8.762e-23	-21.699	-22.057	-0.359	(0)
S5-2	2.148e-25	7.882e-27	-24.668	-26.103	-1.435	(0)
S6-2	8.049e-26	2.953e-27	-25.094	-26.530	-1.435	(0)
S4-2	5.399e-26	1.981e-27	-25.268	-26.703	-1.435	(0)
S3-2	8.309e-27	3.048e-28	-26.080	-27.516	-1.435	(0)
S2-2	7.824e-28	2.871e-29	-27.107	-28.542	-1.435	(0)
S-2	3.961e-34	8.583e-35	-33.402	-34.066	-0.664	(0)
Hg(HS)2	1.500e-34	1.500e-34	-33.824	-33.824	0.000	(0)
HgHS2-	1.533e-35	6.708e-36	-34.815	-35.173	-0.359	(0)
Zn(HS)2	4.662e-37	4.662e-37	-36.331	-36.331	0.000	(0)
Cd(HS)2	2.840e-37	2.840e-37	-36.547	-36.547	0.000	(0)
ZnS(HS)-	1.153e-37	5.048e-38	-36.938	-37.297	-0.359	(0)
Pb(HS)2	7.852e-38	7.852e-38	-37.105	-37.105	0.000	(0)
HgS2-2	3.969e-38	1.456e-39	-37.401	-38.837	-1.435	(0)
Cu(S4)2-3	3.084e-38	9.546e-39	-37.511	-38.020	-0.509	(0)
Fe(HS)2	2.137e-38	2.137e-38	-37.670	-37.670	0.000	(0)
CuS4S5-3	5.301e-39	1.778e-39	-38.276	-38.750	-0.475	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-48.577	-48.936	-0.359	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-54.386	-54.745	-0.359	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-55.981	-56.340	-0.359	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-56.968	-57.327	-0.359	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-57.139	-57.498	-0.359	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-58.245	-59.680	-1.435	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-74.402	-75.837	-1.435	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-76.463	-77.898	-1.435	(0)
S(6)	1.012e-01					
S04-2	4.669e-02	1.362e-02	-1.331	-1.866	-0.535	(0)
MgS04	2.414e-02	2.414e-02	-1.617	-1.617	0.000	(0)
NaS04-	1.954e-02	1.354e-02	-1.709	-1.868	-0.159	(0)
CaS04	7.318e-03	7.318e-03	-2.136	-2.136	0.000	(0)
FeS04	1.868e-03	1.868e-03	-2.729	-2.729	0.000	(0)
KS04-	5.355e-04	3.712e-04	-3.271	-3.430	-0.159	(0)
NH4S04-	5.143e-04	3.509e-04	-3.289	-3.455	-0.166	(0)
MnS04	2.553e-04	2.553e-04	-3.593	-3.593	0.000	(0)
AlS04+	1.567e-04	1.046e-04	-3.805	-3.980	-0.175	(0)
CoS04	3.651e-05	3.651e-05	-4.438	-4.438	0.000	(0)
NiS04	3.650e-05	3.650e-05	-4.438	-4.438	0.000	(0)
Al(S04)2-	2.498e-05	1.667e-05	-4.602	-4.778	-0.175	(0)
Zn(S04)2-2	1.655e-05	6.071e-07	-4.781	-6.217	-1.435	(0)
HS04-	1.594e-05	1.064e-05	-4.797	-4.973	-0.175	(0)
ZnS04	4.948e-06	4.948e-06	-5.306	-5.306	0.000	(0)
Ni(S04)2-2	4.631e-07	1.699e-08	-6.334	-7.770	-1.435	(0)
Cd(S04)2-2	6.784e-08	2.489e-09	-7.169	-8.604	-1.435	(0)
Pb(S04)2-2	1.532e-08	5.619e-10	-7.815	-9.250	-1.435	(0)
CdS04	1.292e-08	1.292e-08	-7.889	-7.889	0.000	(0)
PbS04	6.849e-09	6.849e-09	-8.164	-8.164	0.000	(0)
CuS04	5.227e-10	5.227e-10	-9.282	-9.282	0.000	(0)
FeS04+	9.003e-14	6.143e-14	-13.046	-13.212	-0.166	(0)
Fe(S04)2-	4.218e-14	1.846e-14	-13.375	-13.734	-0.359	(0)
HgS04	6.204e-29	6.204e-29	-28.207	-28.207	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.468	-52.826	-0.359	(0)
Se(-2)	1.081e-06					
HSe-	1.049e-06	4.593e-07	-5.979	-6.338	-0.359	(0)
H2Se	3.160e-08	3.160e-08	-7.500	-7.500	0.000	(0)
MnSe	2.320e-11	2.320e-11	-10.635	-10.635	0.000	(0)
Se-2	1.065e-15	3.909e-17	-14.972	-16.408	-1.435	(0)
Se(4)	4.012e-15					
HSe03-	3.985e-15	1.744e-15	-14.400	-14.758	-0.359	(0)
Se03-2	2.040e-17	7.486e-19	-16.690	-18.126	-1.435	(0)

H2SeO3	6.490e-18	6.490e-18	-17.188	-17.188	0.000	(0)
FeHSeO3+2	5.051e-26	1.853e-27	-25.297	-26.732	-1.435	(0)
Cd(SeO3)2-2	5.647e-38	2.072e-39	-37.248	-38.684	-1.435	(0)
Se(6)	1.534e-34					
SeO4-2	1.516e-34	4.420e-35	-33.819	-34.355	-0.535	(0)
MnSeO4	1.218e-36	1.218e-36	-35.914	-35.914	0.000	(0)
CoSeO4	2.884e-37	2.884e-37	-36.540	-36.540	0.000	(0)
NiSeO4	2.656e-37	2.656e-37	-36.576	-36.576	0.000	(0)
HSeO4-	4.026e-38	1.762e-38	-37.395	-37.754	-0.359	(0)
ZnSeO4	1.176e-38	1.176e-38	-37.929	-37.929	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.457	-40.457	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-70.843	-72.278	-1.435	(0)
Zn	2.905e-05					
Zn(SO4)2-2	1.655e-05	6.071e-07	-4.781	-6.217	-1.435	(0)
Zn+2	5.893e-06	1.718e-06	-5.230	-5.765	-0.535	(0)
ZnSO4	4.948e-06	4.948e-06	-5.306	-5.306	0.000	(0)
ZnCl+	1.338e-06	8.717e-07	-5.874	-6.060	-0.186	(0)
ZnCl2	2.417e-07	2.417e-07	-6.617	-6.617	0.000	(0)
ZnCl3-	6.029e-08	3.928e-08	-7.220	-7.406	-0.186	(0)
ZnCl4-2	1.826e-08	3.957e-09	-7.738	-8.403	-0.664	(0)
ZnOHCl	1.296e-09	1.296e-09	-8.887	-8.887	0.000	(0)
ZnOH+	3.187e-10	1.395e-10	-9.497	-9.855	-0.359	(0)
Zn(OH)2	3.310e-14	3.310e-14	-13.480	-13.480	0.000	(0)
Zn(OH)3-	4.178e-19	1.829e-19	-18.379	-18.738	-0.359	(0)
Zn(OH)4-2	2.187e-25	8.025e-27	-24.660	-26.096	-1.435	(0)
Zn(HS)2	4.662e-37	4.662e-37	-36.331	-36.331	0.000	(0)
ZnS(HS)-	1.153e-37	5.048e-38	-36.938	-37.297	-0.359	(0)
ZnSeO4	1.176e-38	1.176e-38	-37.929	-37.929	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-54.386	-54.745	-0.359	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-58.245	-59.680	-1.435	(0)
ZnNO3+	0.000e+00	0.000e+00	-69.875	-70.234	-0.359	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-70.843	-72.278	-1.435	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-76.463	-77.898	-1.435	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-135.825	-135.825	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2-160.81	-154.54	6.27	(Co(NH3)5Cl)(NO3)2	
(Co(NH3)5Cl)Cl2 -30.68	-26.14	4.54	(Co(NH3)5Cl)Cl2	
(Co(NH3)5OH2)Cl3 -37.94	-26.15	11.80	(Co(NH3)5OH2)Cl3	
(Co(NH3)6)(NO3)3-234.24	-216.31	17.93	(Co(NH3)6)(NO3)3	
(Co(NH3)6)Cl3 -43.83	-23.72	20.11	(Co(NH3)6)Cl3	
(NH4)2SeO4 -40.04	-39.59	0.45	(NH4)2SeO4	
Al(OH)3(am) -1.88	9.18	11.06	Al(OH)3	
Al2O3 -1.89	18.38	20.27	Al2O3	
Al4(OH)10SO4 2.08	24.78	22.70	Al4(OH)10SO4	
AlOHSO4 0.47	-2.76	-3.23	AlOHSO4	
Alunite 7.19	6.29	-0.90	KAl3(SO4)2(OH)6	
Anglesite -3.04	-10.85	-7.82	PbSO4	
Anhydrite -0.14	-4.48	-4.34	CaSO4	
Anilite 1.06	-31.26	-32.31	Cu0.25Cu1.5S	
Antlerite -19.76	-10.97	8.79	Cu3(OH)4SO4	
Atacamite -12.69	-5.07	7.61	Cu2(OH)3Cl	
Bianchite -5.90	-7.66	-1.76	ZnSO4:6H2O	
Birnessite -25.42	-7.33	18.09	MnO2	
Bixbyite -26.46	-26.81	-0.35	Mn2O3	
BlaubleiI -2.89	-27.05	-24.16	Cu0.9Cu0.2S	
BlaubleiII -1.71	-28.99	-27.28	Cu0.6Cu0.8S	
Boehmite 0.33	9.19	8.86	AlOOH	
Brochantite -26.36	-10.65	15.71	Cu4(OH)6SO4	
Brucite -9.03	8.08	17.12	Mg(OH)2	
Bunsenite -7.46	5.23	12.68	NiO	
Ca3(PO4)2(beta) -4.87	-33.92	-29.05	Ca3(PO4)2	
Ca4H(PO4)3:3H2O -7.56	-54.64	-47.08	Ca4H(PO4)3:3H2O	
CaHP04 -1.35	-20.70	-19.35	CaHP04	
CaHP04:2H2O -1.66	-20.71	-19.05	CaHP04:2H2O	

Calomel	-11.87	-30.00	-18.13	Hg2Cl2
CaSeO3:2H2O	-15.20	-12.34	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-33.98	-36.98	-3.00	CaSeO4:2H2O
Cd(OH)2	-12.16	1.71	13.87	Cd(OH)2
Cd(OH)2(am)	-12.23	1.71	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-25.48	-18.77	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-29.38	-6.82	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-18.60	-51.20	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-33.52	-5.12	28.40	Cd4(OH)6SO4
CdCl2	-9.12	-9.74	-0.61	CdCl2
CdCl2:1H2O	-8.07	-9.74	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-7.82	-9.75	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.13	-10.43	13.69	Cd
Cdmetal(gamma)	-24.23	-10.43	13.80	Cd
CdOHCl	-7.63	-4.01	3.61	CdOHCl
CdSe	10.72	-9.67	-20.38	CdSe
CdSeO4:2H2O	-40.89	-42.74	-1.85	CdSeO4:2H2O
CdSO4	-10.19	-10.24	-0.05	CdSO4
CdSO4:1H2O	-8.59	-10.24	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-8.42	-10.25	-1.83	CdSO4:2.67H2O
Chalcanthite	-8.99	-11.65	-2.65	CuSO4:5H2O
Chalcocite	2.45	-32.87	-35.32	Cu2S
Chalcopyrite	-10.66	-46.29	-35.62	CuFeS2
Cinnabar	-5.30	-51.60	-46.30	HgS
Clausthalite	17.10	-10.28	-27.39	PbSe
Co(OH)2	-7.87	5.22	13.09	Co(OH)2
Co(OH)3	-19.02	-21.11	-2.09	Co(OH)3
Co3(PO4)2	-5.97	-40.66	-34.69	Co3(PO4)2
Co3O4	-26.73	-36.97	-10.24	Co3O4
CoCl2	-14.68	-6.22	8.46	CoCl2
CoCl2:6H2O	-8.77	-6.25	2.52	CoCl2:6H2O
CoFe2O4	7.96	4.81	-3.15	CoFe2O4
CoHP04	-3.88	-22.94	-19.06	CoHP04
CoO	-8.61	5.23	13.84	CoO
CoS(alpha)	-14.07	-21.51	-7.44	CoS
CoS(beta)	-10.44	-21.51	-11.07	CoS
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-15.89	-14.57	1.32	CoSeO3
CoSeO4:6H2O	-37.71	-39.24	-1.53	CoSeO4:6H2O
CoSO4	-9.71	-6.72	2.99	CoSO4
CoSO4:6H2O	-4.28	-6.75	-2.48	CoSO4:6H2O
Cotunnite	-5.51	-10.35	-4.84	PbCl2
Covellite	-3.87	-26.40	-22.53	CuS
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.70	-69.27	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.79	-17.52	-46.31	Cu2Se
Cu2SO4	-16.19	-18.09	-1.90	Cu2SO4
Cu3(PO4)2	-18.50	-55.35	-36.85	Cu3(PO4)2
Cu3(PO4)2:3H2O	-20.25	-55.37	-35.12	Cu3(PO4)2:3H2O
Cu3Se2	35.73	-28.57	-64.30	Cu3Se2
Cumetal	-0.22	-9.14	-8.93	Cu
CuOCuSO4	-21.92	-11.29	10.63	CuOCuSO4
Cupricferrite	-6.58	-0.09	6.49	CuFe2O4
Cuprite	-5.03	-6.14	-1.11	Cu2O
Cuprousferrite	5.60	-3.28	-8.88	CuFeO2
CuSe	22.34	-11.05	-33.39	CuSe
CuSe2	23.42	-10.28	-33.70	CuSe2
CuSeO3:2H2O	-20.08	-19.48	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-41.70	-44.14	-2.44	CuSeO4:5H2O
CuSO4	-14.73	-11.62	3.11	CuSO4
Diaspore	2.07	9.19	7.12	AlOOH
Djurleite	1.95	-32.45	-34.40	Cu0.066Cu1.868S
Epsomite	-1.75	-3.90	-2.15	MgSO4:7H2O
Fe(OH)2	-6.72	6.84	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.11	-1.93	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-21.78	-20.23	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-39.20	-59.82	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-33.11	-36.27	-3.16	Fe2(SO4)3

Fe3(OH)8	-13.81	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.58	-0.22	3.37	Fe(OH)3
Ferroselite	14.95	-3.76	-18.71	FeSe2
FeS(ppt)	-16.96	-19.88	-2.92	FeS
FeSe	6.48	-4.53	-11.00	FeSe
Galena	-11.48	-25.64	-14.16	PbS
Gibbsite	0.66	9.18	8.52	Al(OH)3
Goethite	-0.85	-0.21	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4:7H2O
Greenockite	-10.53	-25.02	-14.49	CdS
Greigite	-55.47	-100.50	-45.03	Fe3S4
Gypsum	0.12	-4.49	-4.61	CaSO4:2H2O
H-Jarosite	-13.00	-24.55	-11.55	(H3O)Fe3(SO4)2(OH)6
H2S(g)	-18.73	-26.74	-8.01	H2S
H2Se(g)	-6.46	-11.38	-4.92	H2Se
Halite	-3.01	-1.41	1.59	NaCl
Hausmannite	-31.50	30.53	62.03	Mn3O4
Hematite	0.69	-0.42	-1.11	Fe2O3
Hercynite	1.59	25.23	23.64	FeAl2O4
Hg(g)	-7.42	-15.35	-7.93	Hg
Hg(OH)2	-21.38	-24.87	-3.50	Hg(OH)2
Hg2(g)	-15.60	-30.70	-15.09	Hg2
Hg2(OH)2	-23.81	-18.55	5.26	Hg2(OH)2
Hg2HPO4	-21.94	-46.72	-24.77	Hg2HPO4
Hg2S	-33.44	-45.28	-11.84	Hg2S
Hg2SeO3	-33.69	-38.35	-4.66	Hg2SeO3
Hg2SO4	-24.36	-30.50	-6.14	Hg2SO4
HgCl(g)	-34.88	-15.00	19.88	HgCl
HgCl2	-14.80	-36.32	-21.52	HgCl2
Hgmetal(l)	-1.70	-15.35	-13.65	Hg
HgSe	19.45	-36.25	-55.69	HgSe
HgSeO3	-32.24	-44.67	-12.43	HgSeO3
HgSO4	-27.37	-36.82	-9.45	HgSO4
Hinsdalite	-8.97	-11.47	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-2.82	-47.15	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-16.24	-79.03	-62.79	Pb5(PO4)3OH
K-Alum	-6.90	-12.14	-5.24	KAl(SO4)2:12H2O
K-Jarosite	-7.42	-21.91	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-38.43	-39.16	-0.73	K2SeO4
Langite	-28.54	-10.66	17.88	Cu4(OH)6SO4:H2O
Larnakite	-9.38	-9.76	-0.38	PbO:PbSO4
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.58	-0.21	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.75	1.10	12.85	PbO
Mackinawite	-16.28	-19.88	-3.60	FeS
Maghemite	-6.81	-0.42	6.39	Fe2O3
Magnesioferrite	-9.86	7.67	17.52	Fe2MgO4
Magnetite	2.53	6.43	3.90	Fe3O4
Manganite	-13.14	12.20	25.34	MnOOH
Massicot	-11.96	1.10	13.05	PbO
Melanothallite	-17.53	-11.12	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeSO4:7H2O
Metacinnabar	-5.90	-51.60	-45.70	HgS
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(PO4)2	-8.80	-32.08	-23.28	Mg3(PO4)2
MgHPO4:3H2O	-1.93	-20.10	-18.18	MgHPO4:3H2O
MgSeO3:6H2O	-14.79	-11.74	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-35.18	-36.38	-1.20	MgSeO4:6H2O
Minium	-59.09	15.43	74.53	Pb3O4
Mirabilite	-2.08	-3.38	-1.30	Na2SO4:10H2O
Mn2(SO4)3	-57.34	-62.66	-5.32	Mn2(SO4)3
Mn3(PO4)2	-14.11	-37.95	-23.85	Mn3(PO4)2
MnCl2:4H2O	-8.08	-5.34	2.74	MnCl2:4H2O
MnHPO4	3.36	-22.04	-25.40	MnHPO4
MnS(grn)	-20.85	-20.60	0.25	MnS
MnS(pnk)	-23.94	-20.60	3.34	MnS
MnSe	-8.98	-5.25	3.73	MnSe

MnSeO3	-14.80	-13.67	1.13	MnSeO3
MnSeO3:2H2O	-14.64	-13.68	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-36.29	-38.34	-2.05	MnSeO4:5H2O
MnSO4	-8.56	-5.82	2.74	MnSO4
Monteponite	-13.64	1.71	15.35	CdO
Montroydite	-21.32	-24.87	-3.55	HgO
Morenosite	-4.59	-6.76	-2.17	NiSO4:7H2O
Na-Jarosite	-9.39	-20.23	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-21.50	-11.20	10.30	Na2SeO3:5H2O
Na2SeO4	-37.09	-35.81	1.28	Na2SeO4
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(PO4)2	-9.36	-40.66	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-23.06	8.94	32.00	Ni4(OH)6SO4
NiS(alpha)	-15.91	-21.51	-5.60	NiS
NiS(beta)	-10.41	-21.51	-11.10	NiS
NiS(gamma)	-8.71	-21.51	-12.80	NiS
NiSe	11.55	-6.15	-17.70	NiSe
NiSeO3:2H2O	-17.47	-14.58	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-37.72	-39.24	-1.52	NiSeO4:6H2O
Nsutite	-24.84	-7.33	17.50	MnO2
O2(g)	-60.16	24.29	84.45	O2
Pb(OH)2	-7.20	1.09	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.33	-3.54	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-24.00	2.19	26.19	Pb2O(OH)2
Pb2O3	-46.70	14.34	61.04	Pb2O3
Pb3(PO4)2	-9.52	-53.05	-43.53	Pb3(PO4)2
Pb3O2SO4	-19.54	-8.66	10.87	Pb3O2SO4
Pb4(OH)6SO4	-28.68	-7.58	21.10	Pb4(OH)6SO4
Pb4O3SO4	-29.77	-7.57	22.20	Pb4O3SO4
PbHPO4	-3.27	-27.08	-23.81	PbHPO4
Pbmetal	-15.30	-11.05	4.24	Pb
PbO:0.3H2O	-11.89	1.09	12.98	PbO:0.33H2O
PbSeO4	-36.47	-43.34	-6.88	PbSeO4
Periclase	-13.86	8.09	21.94	MgO
Plattnerite	-37.06	13.24	50.31	PbO2
Plumbgummite	5.10	-27.69	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-15.64	7.47	23.11	Ca(OH)2
Pyrite	-15.84	-34.47	-18.63	FeS2
Pyrochroite	-9.30	6.12	15.43	Mn(OH)2
Pyrolusite	-23.75	18.27	42.03	MnO2
Pyromorphite	-0.32	-84.75	-84.43	Pb5(PO4)3Cl
Retgersite	-4.70	-6.76	-2.05	NiSO4:6H2O
Semetal(am)	7.91	0.77	-7.14	Se
Semetal(hex)	8.52	0.77	-7.75	Se
SeO2	-19.92	-19.80	0.12	SeO2
SeO3	-65.83	-44.44	21.39	SeO3
Sphalerite	-10.89	-22.41	-11.52	ZnS
Spinel	-11.31	26.46	37.77	MgAl2O4
Strengite	-2.01	-28.39	-26.38	FePO4:2H2O
Sulfur	-12.48	-14.59	-2.11	S
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.67	-3.33	0.34	Na2SO4
Tsumebite	-15.88	-25.67	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	0.17	-35.83	-36.00	Fe3(PO4)2:8H2O
Wurtzite	-13.41	-22.41	-9.00	ZnS
Zincite	-7.23	4.32	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnSO4
Zn(NO3)2:6H2O	-138.81	-135.56	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-7.89	4.31	12.20	Zn(OH)2
Zn(OH)2(am)	-8.35	4.31	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.64	4.31	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.42	4.31	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.42	4.31	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.82	-3.32	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.28	2.91	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-7.98	-43.40	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-30.47	-10.94	19.53	Zn3O(SO4)2

Zn4(OH)6SO4	-23.09	5.31	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-28.37	10.13	38.50	Zn5(OH)8Cl2
ZnCl2	-14.35	-7.13	7.22	ZnCl2
Znmetal	-33.98	-7.83	26.15	Zn
Zn0(active)	-7.08	4.32	11.40	Zn0
ZnS(am)	-13.32	-22.41	-9.09	ZnS
ZnSe	7.40	-7.06	-14.46	ZnSe
ZnSe04:6H2O	-38.63	-40.15	-1.52	ZnSe04:6H2O
ZnSO4:1H2O	-7.10	-7.64	-0.53	ZnSO4:1H2O

**For a gas, $SI = \log_{10}(\text{fugacity})$. Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 7.

SOLUTION 6 #Groundwater worst case maximum values

```

temp      21
pH         5.05
pe         1
redox      pe
units      mg/l
density    1
Al         5.21
Alkalinity 0
As         0
Ba         0
Be         0
B          0
Cd         0.04
Co         24.2
Cr         0
Cu         9.29
Fe         937
Pb         0.01
Mn         171
Mo         0
V          0
Zn         1.78
Se         0.08
Ni         5.57
N          60
P          23.6
Ca         590
Mg         1340
Na         5880
K          216
Cl         9420
S(6)       9110
Hg         0.0004
water      1 # kg
MIX 4
  1      0.973
  6      0.027
REACTION 5
H2O -1
  2
END #Time-step 5

```

Beginning of initial solution calculations.

Initial solution 6.

-----Solution composition-----

Elements	Molality	Moles
Al	1.986e-04	1.986e-04
Ca	1.514e-02	1.514e-02
Cd	3.660e-07	3.660e-07
Cl	2.733e-01	2.733e-01
Co	4.224e-04	4.224e-04
Cu	1.504e-04	1.504e-04
Fe	1.726e-02	1.726e-02
Hg	2.051e-09	2.051e-09
K	5.682e-03	5.682e-03
Mg	5.671e-02	5.671e-02
Mn	3.202e-03	3.202e-03
N	4.406e-03	4.406e-03
Na	2.631e-01	2.631e-01
Ni	9.762e-05	9.762e-05
P	7.837e-04	7.837e-04
Pb	4.964e-08	4.964e-08
S(6)	9.754e-02	9.754e-02
Se	1.042e-06	1.042e-06
Zn	2.800e-05	2.800e-05

-----Description of solution-----

pH	=	5.050
pe	=	1.000
Activity of water	=	0.988
Ionic strength (mol/kgw)	=	4.862e-01
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	1.381e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	21.00
Electrical balance (eq)	=	-9.552e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.26
Iterations	=	14
Total H	=	1.110329e+02
Total O	=	5.590014e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.214e-05	8.913e-06	-4.916	-5.050	-0.134	0.00
OH-	1.292e-09	8.222e-10	-8.889	-9.085	-0.196	(0)
H2O	5.551e+01	9.883e-01	1.744	-0.005	0.000	18.05
Al	1.986e-04					
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Al+3	1.839e-05	1.139e-06	-4.735	-5.943	-1.208	(0)
AlOH+2	4.197e-06	9.786e-07	-5.377	-6.009	-0.632	(0)
Al(OH)2+	1.624e-06	1.128e-06	-5.790	-5.948	-0.158	(0)
Al(OH)3	2.514e-08	2.514e-08	-7.600	-7.600	0.000	(0)
Al(OH)4-	2.040e-09	1.366e-09	-8.690	-8.864	-0.174	(0)
Ca	1.514e-02					
Ca+2	8.161e-03	2.370e-03	-2.088	-2.625	-0.537	(0)
CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
CaHP04	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
CaOH+	5.236e-11	3.715e-11	-10.281	-10.430	-0.149	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)

Cd	3.660e-07					
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
Cd(SO4)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
Cd+2	1.502e-08	4.363e-09	-7.823	-8.360	-0.537	(0)
CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
CdOHC1	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CdOH+	6.462e-14	2.865e-14	-13.190	-13.543	-0.353	(0)
Cd2OH+3	9.945e-19	6.582e-22	-18.002	-21.182	-3.179	(0)
Cd(OH)2	2.726e-19	2.726e-19	-18.564	-18.564	0.000	(0)
Cd(OH)3-	4.195e-26	1.860e-26	-25.377	-25.730	-0.353	(0)
Cd(OH)4-2	8.799e-35	3.400e-36	-34.056	-35.469	-1.413	(0)
Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cl	2.733e-01					
Cl-	2.729e-01	2.003e-01	-0.564	-0.698	-0.134	(0)
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
ZnOHC1	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CdOHC1	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(2)	4.224e-04					
Co+2	3.644e-04	1.408e-05	-3.438	-4.851	-1.413	(0)
CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CoOH+	7.075e-10	3.137e-10	-9.150	-9.504	-0.353	(0)
Co2OH+3	3.344e-13	2.213e-16	-12.476	-15.655	-3.179	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Co(OH)2	2.782e-14	2.782e-14	-13.556	-13.556	0.000	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Co(OH)3-	1.398e-21	6.199e-22	-20.854	-21.208	-0.353	(0)

CoOOH-	8.505e-23	3.771e-23	-22.070	-22.424	-0.353	(0)
Co4(OH)4+4	8.668e-25	1.932e-30	-24.062	-29.714	-5.652	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
Co(OH)4-2	2.839e-30	1.097e-31	-29.547	-30.960	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Co(3)	8.287e-32					
CoOH+2	8.232e-32	3.180e-33	-31.085	-32.498	-1.413	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co+3	9.049e-36	5.605e-37	-35.043	-36.251	-1.208	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
Cu(1)	1.504e-04					
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
Cu+	1.823e-08	8.082e-09	-7.739	-8.092	-0.353	(0)
Cu(2)	1.182e-09					
Cu+2	5.900e-10	1.714e-10	-9.229	-9.766	-0.537	(0)
CuSO4	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
CuOH+	7.604e-13	4.972e-13	-12.119	-12.303	-0.185	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
Cu(OH)2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
Cu2(OH)2+2	1.564e-19	6.042e-21	-18.806	-20.219	-1.413	(0)
Cu(OH)3-	6.965e-22	3.088e-22	-21.157	-21.510	-0.353	(0)
Cu(OH)4-2	7.024e-29	2.714e-30	-28.153	-29.566	-1.413	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Fe(2)	1.726e-02					
Fe+2	1.529e-02	5.907e-04	-1.816	-3.229	-1.413	(0)
FeSO4	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
FeOH+	2.826e-08	1.934e-08	-7.549	-7.714	-0.165	(0)
Fe(OH)2	1.209e-14	1.209e-14	-13.918	-13.918	0.000	(0)
Fe(OH)3-	6.009e-18	4.111e-18	-17.221	-17.386	-0.165	(0)
Fe(3)	2.087e-10					
Fe(OH)2+	1.957e-10	1.360e-10	-9.708	-9.867	-0.158	(0)
FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
FeOH+2	1.136e-12	2.489e-13	-11.945	-12.604	-0.659	(0)
Fe(OH)3	9.228e-14	9.228e-14	-13.035	-13.035	0.000	(0)
FeSO4+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(SO4)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Fe+3	7.010e-15	4.342e-16	-14.154	-15.362	-1.208	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
Fe(OH)4-	2.440e-17	1.696e-17	-16.613	-16.771	-0.158	(0)
Fe2(OH)2+4	1.061e-18	2.365e-24	-17.974	-23.626	-5.652	(0)
Fe3(OH)4+5	3.023e-24	4.459e-33	-23.520	-32.351	-8.831	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
H(0)	1.047e-15					
H2	5.235e-16	5.855e-16	-15.281	-15.232	0.049	(0)
Hg(0)	2.051e-09					
Hg	2.051e-09	2.051e-09	-8.688	-8.688	0.000	(0)

Hg(1)	9.698e-28					
Hg2+2	4.849e-28	1.874e-29	-27.314	-28.727	-1.413	(0)
Hg(2)	4.726e-15					
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Hg(OH)2	1.022e-25	1.143e-25	-24.991	-24.942	0.049	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
HgOH+	1.615e-27	7.162e-28	-26.792	-27.145	-0.353	(0)
Hg+2	4.674e-28	1.806e-29	-27.330	-28.743	-1.413	(0)
HgS04	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Hg(OH)3-	3.623e-35	1.606e-35	-34.441	-34.794	-0.353	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
K	5.682e-03					
K+	5.178e-03	3.801e-03	-2.286	-2.420	-0.134	(0)
KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
Mg	5.671e-02					
Mg+2	3.360e-02	9.758e-03	-1.474	-2.011	-0.537	(0)
MgS04	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
MgH2P04+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
MgHP04	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
MgOH+	4.148e-09	2.990e-09	-8.382	-8.524	-0.142	(0)
MgP04-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
Mn(2)	3.202e-03					
Mn+2	2.899e-03	1.120e-04	-2.538	-3.951	-1.413	(0)
MnS04	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
MnOH+	3.381e-10	2.313e-10	-9.471	-9.636	-0.165	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Mn(OH)3-	3.538e-24	2.421e-24	-23.451	-23.616	-0.165	(0)
Mn(OH)4-2	3.983e-32	8.727e-33	-31.400	-32.059	-0.659	(0)
MnSe04	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Mn(3)	4.471e-28					
Mn+3	4.471e-28	2.769e-29	-27.350	-28.558	-1.208	(0)
Mn(6)	0.000e+00					
Mn04-2	0.000e+00	0.000e+00	-79.028	-79.687	-0.659	(0)
Mn(7)	0.000e+00					
Mn04-	0.000e+00	0.000e+00	-88.115	-88.325	-0.210	(0)
N(-3)	4.406e-03					
NH4+	3.919e-03	2.335e-03	-2.407	-2.632	-0.225	(0)
NH4S04-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
NH3	1.123e-07	1.123e-07	-6.950	-6.950	0.000	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)

Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
N(3)	0.000e+00					
NO2-	0.000e+00	0.000e+00	-47.968	-48.177	-0.210	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-64.954	-65.088	-0.134	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
Na	2.631e-01					
Na+	2.447e-01	1.796e-01	-0.611	-0.746	-0.134	(0)
NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
Ni	9.762e-05					
Ni+2	4.671e-05	1.357e-05	-4.331	-4.867	-0.537	(0)
NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
Ni(SO4)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
NiOH+	3.238e-10	1.435e-10	-9.490	-9.843	-0.353	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Ni(OH)2	1.692e-14	1.692e-14	-13.772	-13.772	0.000	(0)
Ni(OH)3-	4.261e-20	1.889e-20	-19.371	-19.724	-0.353	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-63.001	-62.952	0.049	(0)
P	7.837e-04					
H2PO4-	4.270e-04	2.967e-04	-3.370	-3.528	-0.158	(0)
MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
MgHPO4	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
HPO4-2	9.473e-06	2.076e-06	-5.024	-5.683	-0.659	(0)
NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
H3PO4	3.560e-07	3.560e-07	-6.449	-6.449	0.000	(0)
KHPO4-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
MgPO4-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
PO4-3	1.460e-12	9.045e-14	-11.836	-13.044	-1.208	(0)
FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Pb	4.964e-08					
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
Pb(SO4)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)

PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
Pb+2	3.636e-09	1.056e-09	-8.439	-8.976	-0.537	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
PbOH+	6.682e-12	2.963e-12	-11.175	-11.528	-0.353	(0)
Pb(OH)2	1.046e-16	1.046e-16	-15.980	-15.980	0.000	(0)
Pb2OH+3	7.494e-17	4.960e-20	-16.125	-19.305	-3.179	(0)
Pb(OH)3-	2.635e-22	1.168e-22	-21.579	-21.933	-0.353	(0)
Pb(OH)4-2	8.268e-28	3.195e-29	-27.083	-28.496	-1.413	(0)
Pb3(OH)4+2	3.173e-30	1.226e-31	-29.499	-30.912	-1.413	(0)
Pb4(OH)4+4	5.352e-31	1.193e-36	-30.271	-35.923	-5.652	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
S(6)	9.754e-02					
S04-2	4.586e-02	1.332e-02	-1.339	-1.875	-0.537	(0)
MgS04	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
NaS04-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
CaS04	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
FeS04	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
NH4S04-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
MnS04	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
AlS04+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
CoS04	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
NiS04	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
Al(S04)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Zn(S04)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
HS04-	1.536e-05	1.028e-05	-4.814	-4.988	-0.174	(0)
ZnS04	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
Ni(S04)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
Cd(S04)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
Pb(S04)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
CdS04	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
PbS04	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
CuS04	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
FeS04+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(S04)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
HgS04	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Se(-2)	1.042e-06					
HSe-	1.012e-06	4.485e-07	-5.995	-6.348	-0.353	(0)
H2Se	3.047e-08	3.047e-08	-7.516	-7.516	0.000	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Se-2	1.000e-15	3.865e-17	-15.000	-16.413	-1.413	(0)
Se(4)	2.708e-15					
HSe03-	2.690e-15	1.193e-15	-14.570	-14.923	-0.353	(0)
Se03-2	1.341e-17	5.183e-19	-16.872	-18.285	-1.413	(0)
H2Se03	4.383e-18	4.383e-18	-17.358	-17.358	0.000	(0)
FeHSe03+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
Cd(Se03)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
Se(6)	9.467e-35					
Se04-2	9.354e-35	2.717e-35	-34.029	-34.566	-0.537	(0)
MnSe04	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
CoSe04	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
NiSe04	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
HSe04-	2.413e-38	1.070e-38	-37.617	-37.971	-0.353	(0)
ZnSe04	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
CdSe04	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
Zn(Se04)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn	2.800e-05					
Zn(S04)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
Zn+2	6.051e-06	1.758e-06	-5.218	-5.755	-0.537	(0)
ZnS04	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)

ZnOH+	3.259e-10	1.445e-10	-9.487	-9.840	-0.353	(0)
Zn(OH)2	3.473e-14	3.473e-14	-13.459	-13.459	0.000	(0)
Zn(OH)3-	4.384e-19	1.944e-19	-18.358	-18.711	-0.353	(0)
Zn(OH)4-2	2.236e-25	8.641e-27	-24.650	-26.063	-1.413	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2-161.31	-155.03	6.27	(Co(NH3)5Cl)(NO3)2	
(Co(NH3)5Cl)Cl2 -30.79	-26.25	4.54	(Co(NH3)5Cl)Cl2	
(Co(NH3)5OH2)Cl3 -38.05	-26.26	11.80	(Co(NH3)5OH2)Cl3	
(Co(NH3)6)(NO3)3-234.94	-217.01	17.93	(Co(NH3)6)(NO3)3	
(Co(NH3)6)Cl3 -43.95	-23.84	20.11	(Co(NH3)6)Cl3	
(NH4)2SeO4 -40.28	-39.83	0.45	(NH4)2SeO4	
Al(OH)3(am) -1.87	9.19	11.06	Al(OH)3	
Al2O3 -1.87	18.40	20.27	Al2O3	
Al4(OH)10SO4 2.10	24.80	22.70	Al4(OH)10SO4	
AlOHSO4 0.46	-2.77	-3.23	AlOHSO4	
Alunite 7.17	6.27	-0.90	KAl3(SO4)2(OH)6	
Anglesite -3.03	-10.85	-7.82	PbSO4	
Anhydrite -0.16	-4.50	-4.34	CaSO4	
Antlerite -19.78	-10.99	8.79	Cu3(OH)4SO4	
Atacamite -12.71	-5.10	7.61	Cu2(OH)3Cl	
Bianchite -5.90	-7.66	-1.76	ZnSO4:6H2O	
Birnessite -25.46	-7.37	18.09	MnO2	
Bixbyite -26.48	-26.83	-0.35	Mn2O3	
Boehmite 0.34	9.20	8.86	AlOOH	
Brochantite -26.38	-10.67	15.71	Cu4(OH)6SO4	
Brucite -9.04	8.08	17.12	Mg(OH)2	
Bunsenite -7.46	5.23	12.68	NiO	
Ca3(PO4)2(beta) -4.91	-33.96	-29.05	Ca3(PO4)2	
Ca4H(PO4)3:3H2O -7.62	-54.70	-47.08	Ca4H(PO4)3:3H2O	
CaHP04 -1.37	-20.72	-19.35	CaHP04	
CaHP04:2H2O -1.68	-20.73	-19.05	CaHP04:2H2O	
Calomel -11.99	-30.12	-18.13	Hg2Cl2	
CaSeO3:2H2O -15.37	-12.51	2.86	CaSeO3:2H2O	
CaSeO4:2H2O -34.20	-37.20	-3.00	CaSeO4:2H2O	
Cd(OH)2 -12.14	1.73	13.87	Cd(OH)2	
Cd(OH)2(am) -12.21	1.73	13.94	Cd(OH)2	
Cd3(OH)2(SO4)2 -25.45	-18.74	6.71	Cd3(OH)2(SO4)2	
Cd3(OH)4SO4 -29.34	-6.78	22.56	Cd3(OH)4SO4	
Cd3(PO4)2 -18.57	-51.17	-32.60	Cd3(PO4)2	
Cd4(OH)6SO4 -33.45	-5.05	28.40	Cd4(OH)6SO4	
CdCl2 -9.14	-9.76	-0.61	CdCl2	
CdCl2:1H2O -8.09	-9.76	-1.68	CdCl2:1H2O	
CdCl2:2.5H2O -7.84	-9.77	-1.93	CdCl2:2.5H2O	
Cdmetal(alpha) -24.05	-10.36	13.69	Cd	
Cdmetal(gamma) -24.16	-10.36	13.80	Cd	
CdOHCl -7.62	-4.01	3.61	CdOHCl	
CdSe 10.72	-9.66	-20.38	CdSe	
CdSeO4:2H2O -41.09	-42.94	-1.85	CdSeO4:2H2O	
CdSO4 -10.19	-10.24	-0.05	CdSO4	
CdSO4:1H2O -8.59	-10.24	-1.65	CdSO4:1H2O	
CdSO4:2.67H2O -8.42	-10.25	-1.83	CdSO4:2.67H2O	
Chalcanthite -9.01	-11.67	-2.65	CuSO4:5H2O	
Clausthalite 17.11	-10.27	-27.39	PbSe	
Co(OH)2 -7.86	5.24	13.09	Co(OH)2	
Co(OH)3 -19.03	-21.12	-2.09	Co(OH)3	
Co3(PO4)2 -5.95	-40.64	-34.69	Co3(PO4)2	
Co3O4 -26.74	-36.97	-10.24	Co3O4	
CoCl2 -14.71	-6.25	8.46	CoCl2	
CoCl2:6H2O -8.80	-6.28	2.52	CoCl2:6H2O	
CoFe2O4 7.95	4.80	-3.15	CoFe2O4	

CoHP04	-3.88	-22.95	-19.06	CoHP04
CoO	-8.60	5.24	13.84	CoO
CoSe	10.05	-6.15	-16.20	CoSe
CoSe03	-16.04	-14.72	1.32	CoSe03
CoSe04:6H2O	-37.92	-39.45	-1.53	CoSe04:6H2O
CoS04	-9.72	-6.73	2.99	CoS04
CoS04:6H2O	-4.28	-6.76	-2.48	CoS04:6H2O
Cotunnite	-5.53	-10.37	-4.84	PbCl2
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.91	-69.49	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.83	-17.48	-46.31	Cu2Se
Cu2S04	-16.16	-18.06	-1.90	Cu2S04
Cu3(P04)2	-18.54	-55.39	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-20.28	-55.40	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.75	-28.55	-64.30	Cu3Se2
Cumetal	-0.17	-9.09	-8.93	Cu
Cu0CuS04	-21.94	-11.31	10.63	Cu0CuS04
Cupricferrite	-6.60	-0.11	6.49	CuFe204
Cuprite	-4.98	-6.09	-1.11	Cu2O
Cuprousferrite	5.61	-3.27	-8.88	CuFe02
CuSe	22.32	-11.06	-33.39	CuSe
CuSe2	23.34	-10.36	-33.70	CuSe2
CuSe03:2H2O	-20.25	-19.65	0.60	CuSe03:2H2O
CuSe04:5H2O	-41.92	-44.36	-2.44	CuSe04:5H2O
CuS04	-14.76	-11.64	3.11	CuS04
Diaspore	2.08	9.20	7.12	Al00H
Epsomite	-1.77	-3.92	-2.15	MgS04:7H2O
Fe(OH)2	-6.70	6.86	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.09	-1.95	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-21.97	-20.42	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H2O	-39.73	-60.36	-20.63	Fe2(Se03)3:2H2O
Fe2(S04)3	-33.19	-36.35	-3.16	Fe2(S04)3
Fe3(OH)8	-13.82	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.59	-0.23	3.37	Fe(OH)3
Ferroselite	14.88	-3.83	-18.71	FeSe2
FeSe	6.48	-4.53	-11.00	FeSe
Gibbsite	0.67	9.19	8.52	Al(OH)3
Goethite	-0.86	-0.22	0.64	Fe00H
Goslarite	-5.62	-7.67	-2.05	ZnS04:7H2O
Gypsum	0.10	-4.51	-4.61	CaS04:2H2O
H-Jarosite	-13.07	-24.62	-11.55	(H30)Fe3(S04)2(OH)6
H2Se(g)	-6.47	-11.40	-4.92	H2Se
Halite	-3.04	-1.44	1.59	NaCl
Hausmannite	-31.51	30.53	62.03	Mn304
Hematite	0.67	-0.44	-1.11	Fe203
Hercynite	1.62	25.26	23.64	FeAl204
Hg(g)	-7.44	-15.36	-7.93	Hg
Hg(OH)2	-21.45	-24.94	-3.50	Hg(OH)2
Hg2(g)	-15.63	-30.73	-15.09	Hg2
Hg2(OH)2	-23.90	-18.64	5.26	Hg2(OH)2
Hg2HP04	-22.05	-46.82	-24.77	Hg2HP04
Hg2Se03	-33.94	-38.60	-4.66	Hg2Se03
Hg2S04	-24.46	-30.60	-6.14	Hg2S04
HgCl(g)	-34.94	-15.06	19.88	HgCl
HgCl2	-14.91	-36.43	-21.52	HgCl2
Hgmetal(l)	-1.71	-15.36	-13.65	Hg
HgSe	19.36	-36.33	-55.69	HgSe
HgSe03	-32.48	-44.91	-12.43	HgSe03
HgS04	-27.45	-36.91	-9.45	HgS04
Hinsdalite	-8.96	-11.46	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	-2.88	-47.21	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-16.18	-78.97	-62.79	Pb5(P04)3OH
K-Alum	-6.93	-12.18	-5.24	KAl(S04)2:12H2O
K-Jarosite	-7.50	-21.99	-14.49	KFe3(S04)2(OH)6
K2Se04	-38.68	-39.41	-0.73	K2Se04
Langite	-28.56	-10.68	17.88	Cu4(OH)6S04:H2O
Larnakite	-9.35	-9.73	-0.38	Pb0:PbS04
Laurionite	-5.25	-4.63	0.62	PbOHCl

Lepidocrocite	-1.59	-0.22	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.73	1.12	12.85	PbO
Maghemite	-6.83	-0.44	6.39	Fe ₂ O ₃
Magnesioferrite	-9.88	7.64	17.52	Fe ₂ MgO ₄
Magnetite	2.53	6.43	3.90	Fe ₃ O ₄
Manganite	-13.15	12.19	25.34	MnOOH
Massicot	-11.93	1.12	13.05	PbO
Melanothallite	-17.57	-11.16	6.41	CuCl ₂
Melanterite	-2.88	-5.14	-2.26	FeSO ₄ :7H ₂ O
Mg(OH) ₂ (active)	-10.71	8.08	18.79	Mg(OH) ₂
Mg ₃ (PO ₄) ₂	-8.84	-32.12	-23.28	Mg ₃ (PO ₄) ₂
MgHP04:3H ₂ O	-1.94	-20.12	-18.18	MgHP04:3H ₂ O
MgSe03:6H ₂ O	-14.96	-11.91	3.04	MgSe03:6H ₂ O
MgSe04:6H ₂ O	-35.41	-36.61	-1.20	MgSe04:6H ₂ O
Minium	-59.08	15.45	74.53	Pb ₃ O ₄
Mirabilite	-2.11	-3.42	-1.30	Na ₂ SO ₄ :10H ₂ O
Mn ₂ (SO ₄) ₃	-57.42	-62.74	-5.32	Mn ₂ (SO ₄) ₃
Mn ₃ (PO ₄) ₂	-14.09	-37.94	-23.85	Mn ₃ (PO ₄) ₂
MnCl ₂ :4H ₂ O	-8.11	-5.37	2.74	MnCl ₂ :4H ₂ O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnSe	-8.98	-5.25	3.73	MnSe
MnSe03	-14.95	-13.82	1.13	MnSe03
MnSe03:2H ₂ O	-14.80	-13.83	0.96	MnSe03:2H ₂ O
MnSe04:5H ₂ O	-36.49	-38.54	-2.05	MnSe04:5H ₂ O
MnSO ₄	-8.56	-5.83	2.74	MnSO ₄
Monteponite	-13.62	1.73	15.35	CdO
Montroydite	-21.39	-24.94	-3.55	HgO
Morenosite	-4.60	-6.78	-2.17	NiSO ₄ :7H ₂ O
Na-Jarosite	-9.47	-20.31	-10.84	NaFe ₃ (SO ₄) ₂ (OH) ₆
Na ₂ Se03:5H ₂ O	-21.69	-11.39	10.30	Na ₂ Se03:5H ₂ O
Na ₂ Se04	-37.34	-36.06	1.28	Na ₂ Se04
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni(OH) ₂	-7.80	5.22	13.02	Ni(OH) ₂
Ni ₃ (PO ₄) ₂	-9.39	-40.69	-31.30	Ni ₃ (PO ₄) ₂
Ni ₄ (OH) ₆ SO ₄	-23.08	8.92	32.00	Ni ₄ (OH) ₆ SO ₄
NiSe	11.53	-6.17	-17.70	NiSe
NiSe03:2H ₂ O	-17.64	-14.75	2.89	NiSe03:2H ₂ O
NiSe04:6H ₂ O	-37.94	-39.46	-1.52	NiSe04:6H ₂ O
Nsutite	-24.87	-7.37	17.50	MnO ₂
O ₂ (g)	-60.26	24.19	84.45	O ₂
Pb(OH) ₂	-7.18	1.11	8.29	Pb(OH) ₂
Pb ₂ (OH) ₃ Cl	-12.31	-3.52	8.79	Pb ₂ (OH) ₃ Cl
Pb ₂ O(OH) ₂	-23.96	2.23	26.19	Pb ₂ O(OH) ₂
Pb ₂ O ₃	-46.71	14.33	61.04	Pb ₂ O ₃
Pb ₃ (PO ₄) ₂	-9.49	-53.02	-43.53	Pb ₃ (PO ₄) ₂
Pb ₃ O ₂ SO ₄	-19.49	-8.61	10.87	Pb ₃ O ₂ SO ₄
Pb ₄ (OH) ₆ SO ₄	-28.61	-7.51	21.10	Pb ₄ (OH) ₆ SO ₄
Pb ₄ O ₃ SO ₄	-29.70	-7.50	22.20	Pb ₄ O ₃ SO ₄
PbHP04	-3.26	-27.07	-23.81	PbHP04
Pbmetal	-15.22	-10.98	4.24	Pb
PbO:0.3H ₂ O	-11.86	1.12	12.98	PbO:0.33H ₂ O
PbSe04	-36.67	-43.54	-6.88	PbSe04
Periclase	-13.86	8.08	21.94	MgO
Plattnerite	-37.09	13.21	50.31	PbO ₂
Plumbgummite	5.12	-27.67	-32.79	PbAl ₃ (PO ₄) ₂ (OH) ₅ :H ₂ O
Portlandite	-15.65	7.46	23.11	Ca(OH) ₂
Pyrochroite	-9.29	6.14	15.43	Mn(OH) ₂
Pyrolusite	-23.79	18.24	42.03	MnO ₂
Pyromorphite	-0.28	-84.71	-84.43	Pb ₅ (PO ₄) ₃ Cl
Retgersite	-4.72	-6.77	-2.05	NiSO ₄ :6H ₂ O
Semetal(am)	7.84	0.70	-7.14	Se
Semetal(hex)	8.45	0.70	-7.75	Se
SeO ₂	-20.09	-19.97	0.12	SeO ₂
SeO ₃	-66.05	-44.66	21.39	SeO ₃
Spinel	-11.29	26.48	37.77	MgAl ₂ O ₄
Strengite	-2.04	-28.42	-26.38	FePO ₄ :2H ₂ O
Tenorite	-7.47	0.33	7.80	CuO

Thenardite	-3.71	-3.37	0.34	Na2SO4
Tsumebite	-15.85	-25.64	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	0.19	-35.81	-36.00	Fe3(PO4)2:8H2O
Zincite	-7.21	4.34	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnSO4
Zn(NO3)2:6H2O	-139.22	-135.96	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-7.87	4.33	12.20	Zn(OH)2
Zn(OH)2(am)	-8.33	4.33	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.62	4.33	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.39	4.33	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.40	4.33	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.80	-3.30	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.26	2.93	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-7.95	-43.37	-35.42	Zn3(PO4)2:4H2O
Zn30(SO4)2	-30.45	-10.92	19.53	Zn30(SO4)2
Zn4(OH)6SO4	-23.03	5.37	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-28.31	10.19	38.50	Zn5(OH)8Cl2
ZnCl2	-14.37	-7.15	7.22	ZnCl2
Znmetal	-33.91	-7.76	26.15	Zn
ZnO(active)	-7.06	4.34	11.40	ZnO
ZnSe	7.41	-7.05	-14.46	ZnSe
ZnSeO4:6H2O	-38.83	-40.35	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.10	-7.64	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
 For ideal gases, phi = 1.

 Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 4.
 Using reaction 5.

Mixture 4.

9.730e-01 Solution 1
 2.700e-02 Solution 6

Reaction 5.

2.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000
Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	2.060e-04	1.986e-04
Ca	1.571e-02	1.514e-02
Cd	3.797e-07	3.660e-07
Cl	2.835e-01	2.733e-01
Co	4.382e-04	4.224e-04
Cu	1.560e-04	1.504e-04
Fe	1.790e-02	1.726e-02
Hg	2.128e-09	2.051e-09
K	5.895e-03	5.682e-03

Mg	5.883e-02	5.671e-02
Mn	3.321e-03	3.202e-03
N	4.571e-03	4.406e-03
Na	2.729e-01	2.631e-01
Ni	1.013e-04	9.762e-05
P	8.130e-04	7.837e-04
Pb	5.150e-08	4.964e-08
S	1.012e-01	9.754e-02
Se	1.081e-06	1.042e-06
Zn	2.905e-05	2.800e-05

-----Description of solution-----

pH	=	5.045	Charge balance
pe	=	1.031	Adjusted to redox equilibrium
Activity of water	=	0.988	
Ionic strength (mol/kgw)	=	5.018e-01	
Mass of water (kg)	=	9.640e-01	
Total alkalinity (eq/kg)	=	1.433e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	-9.552e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.26	
Iterations	=	4	
Total H	=	1.070329e+02	
Total O	=	5.390014e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.228e-05	9.024e-06	-4.911	-5.045	-0.134	0.00
OH-	1.280e-09	8.117e-10	-8.893	-9.091	-0.198	(0)
H2O	5.551e+01	9.879e-01	1.744	-0.005	0.000	18.05
Al	2.060e-04					
AlSO4+	1.567e-04	1.046e-04	-3.805	-3.980	-0.175	(0)
Al(SO4)2-	2.498e-05	1.667e-05	-4.602	-4.778	-0.175	(0)
Al+3	1.847e-05	1.154e-06	-4.734	-5.938	-1.204	(0)
AlOH+2	4.242e-06	9.789e-07	-5.372	-6.009	-0.637	(0)
Al(OH)2+	1.608e-06	1.114e-06	-5.794	-5.953	-0.159	(0)
Al(OH)3	2.451e-08	2.451e-08	-7.611	-7.611	0.000	(0)
Al(OH)4-	1.970e-09	1.315e-09	-8.706	-8.881	-0.175	(0)
Ca	1.571e-02					
Ca+2	8.365e-03	2.439e-03	-2.078	-2.613	-0.535	(0)
CaSO4	7.318e-03	7.318e-03	-2.136	-2.136	0.000	(0)
CaH2PO4+	2.250e-05	1.559e-05	-4.648	-4.807	-0.159	(0)
CaHPO4	2.200e-06	2.200e-06	-5.658	-5.658	0.000	(0)
CaNH3+2	1.272e-08	4.666e-10	-7.896	-9.331	-1.435	(0)
CaPO4-	8.574e-10	5.943e-10	-9.067	-9.226	-0.159	(0)
CaOH+	5.331e-11	3.775e-11	-10.273	-10.423	-0.150	(0)
Ca(NH3)2+2	7.694e-16	2.823e-17	-15.114	-16.549	-1.435	(0)
CaNO3+	0.000e+00	0.000e+00	-66.621	-66.980	-0.359	(0)
Cd	3.797e-07					
CdCl+	1.917e-07	8.388e-08	-6.717	-7.076	-0.359	(0)
CdCl2	7.195e-08	7.195e-08	-7.143	-7.143	0.000	(0)
Cd(SO4)2-2	6.784e-08	2.489e-09	-7.169	-8.604	-1.435	(0)
CdCl3-	2.076e-08	9.088e-09	-7.683	-8.042	-0.359	(0)
Cd+2	1.456e-08	4.245e-09	-7.837	-8.372	-0.535	(0)
CdSO4	1.292e-08	1.292e-08	-7.889	-7.889	0.000	(0)
CdOHCl	3.451e-12	3.451e-12	-11.462	-11.462	0.000	(0)
CdOH+	6.289e-14	2.752e-14	-13.201	-13.560	-0.359	(0)
Cd2OH+3	1.044e-18	6.153e-22	-17.981	-21.211	-3.230	(0)
Cd(OH)2	2.586e-19	2.586e-19	-18.587	-18.587	0.000	(0)
CdHS+	2.002e-22	8.762e-23	-21.699	-22.057	-0.359	(0)
Cd(OH)3-	3.979e-26	1.742e-26	-25.400	-25.759	-0.359	(0)
Cd(OH)4-2	8.565e-35	3.142e-36	-34.067	-35.503	-1.435	(0)

Cd(HS)2	2.840e-37	2.840e-37	-36.547	-36.547	0.000	(0)
Cd(SeO3)2-2	5.648e-38	2.072e-39	-37.248	-38.684	-1.435	(0)
CdSeO4	0.000e+00	0.000e+00	-40.457	-40.457	0.000	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-55.981	-56.340	-0.359	(0)
CdNO3+	0.000e+00	0.000e+00	-72.343	-72.702	-0.359	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-74.402	-75.837	-1.435	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-137.932	-137.932	0.000	(0)
Cl	2.835e-01					
Cl-	2.831e-01	2.080e-01	-0.548	-0.682	-0.134	(0)
CuCl2-	1.360e-04	8.864e-05	-3.866	-4.052	-0.186	(0)
MnCl+	4.245e-05	2.896e-05	-4.372	-4.538	-0.166	(0)
CoCl+	2.261e-05	9.898e-06	-4.646	-5.004	-0.359	(0)
CuCl3-2	1.791e-05	3.881e-06	-4.747	-5.411	-0.664	(0)
NiCl+	1.668e-05	7.302e-06	-4.778	-5.137	-0.359	(0)
MnCl2	8.511e-06	8.511e-06	-5.070	-5.070	0.000	(0)
CuCl	2.020e-06	2.020e-06	-5.695	-5.695	0.000	(0)
ZnCl+	1.338e-06	8.717e-07	-5.874	-6.060	-0.186	(0)
MnCl3-	7.147e-07	4.876e-07	-6.146	-6.312	-0.166	(0)
ZnCl2	2.417e-07	2.417e-07	-6.617	-6.617	0.000	(0)
CdCl+	1.917e-07	8.388e-08	-6.717	-7.076	-0.359	(0)
CdCl2	7.195e-08	7.195e-08	-7.143	-7.143	0.000	(0)
ZnCl3-	6.029e-08	3.928e-08	-7.220	-7.406	-0.186	(0)
CdCl3-	2.076e-08	9.088e-09	-7.683	-8.042	-0.359	(0)
ZnCl4-2	1.826e-08	3.957e-09	-7.738	-8.403	-0.664	(0)
PbCl+	1.651e-08	7.227e-09	-7.782	-8.141	-0.359	(0)
NiCl2	7.733e-09	7.733e-09	-8.112	-8.112	0.000	(0)
PbCl2	6.595e-09	6.595e-09	-8.181	-8.181	0.000	(0)
PbCl4-2	1.394e-09	5.115e-11	-8.856	-10.291	-1.435	(0)
PbCl3-	1.304e-09	5.707e-10	-8.885	-9.244	-0.359	(0)
ZnOHCl	1.296e-09	1.296e-09	-8.887	-8.887	0.000	(0)
CuCl+	8.498e-11	5.537e-11	-10.071	-10.257	-0.186	(0)
CdOHCl	3.451e-12	3.451e-12	-11.462	-11.462	0.000	(0)
CuCl2	3.280e-12	3.280e-12	-11.484	-11.484	0.000	(0)
FeCl+2	1.179e-14	2.554e-15	-13.929	-14.593	-0.664	(0)
CuCl3-	9.096e-15	5.927e-15	-14.041	-14.227	-0.186	(0)
HgCl4-2	6.144e-15	2.254e-16	-14.212	-15.647	-1.435	(0)
FeCl2+	3.946e-15	2.692e-15	-14.404	-14.570	-0.166	(0)
HgCl3-	5.995e-16	2.624e-16	-15.222	-15.581	-0.359	(0)
HgCl2	1.250e-16	1.250e-16	-15.903	-15.903	0.000	(0)
FeCl3	5.601e-17	5.601e-17	-16.252	-16.252	0.000	(0)
CuCl4-2	3.266e-17	7.077e-18	-16.486	-17.150	-0.664	(0)
HgClOH	8.909e-21	8.909e-21	-20.050	-20.050	0.000	(0)
HgCl+	2.328e-22	1.019e-22	-21.633	-21.992	-0.359	(0)
CoCl+2	6.287e-34	2.307e-35	-33.202	-34.637	-1.435	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.572	-43.007	-1.435	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.084	-56.520	-1.435	(0)
Co(2)	4.382e-04					
Co+2	3.790e-04	1.391e-05	-3.421	-4.857	-1.435	(0)
CoSO4	3.651e-05	3.651e-05	-4.438	-4.438	0.000	(0)
CoCl+	2.261e-05	9.898e-06	-4.646	-5.004	-0.359	(0)
CoHPO4	2.944e-08	2.944e-08	-7.531	-7.531	0.000	(0)
Co(NH3)+2	9.890e-09	3.629e-10	-8.005	-9.440	-1.435	(0)
CoOH+	6.988e-10	3.058e-10	-9.156	-9.514	-0.359	(0)
Co2OH+3	3.618e-13	2.131e-16	-12.442	-15.671	-3.230	(0)
Co(NH3)2+2	4.488e-14	1.647e-15	-13.348	-14.783	-1.435	(0)
Co(OH)2	2.678e-14	2.678e-14	-13.572	-13.572	0.000	(0)
Co(NH3)3+2	8.585e-20	3.150e-21	-19.066	-20.502	-1.435	(0)
Co(OH)3-	1.346e-21	5.891e-22	-20.871	-21.230	-0.359	(0)
CoOOH-	8.191e-23	3.585e-23	-22.087	-22.446	-0.359	(0)
Co4(OH)4+4	9.635e-25	1.746e-30	-24.016	-29.758	-5.742	(0)
Co(NH3)4+2	6.846e-26	2.512e-27	-25.165	-26.600	-1.435	(0)
Co(OH)4-2	2.805e-30	1.029e-31	-29.552	-30.987	-1.435	(0)
Co(NH3)5+2	1.727e-32	6.334e-34	-31.763	-33.198	-1.435	(0)
CoSeO4	2.884e-37	2.884e-37	-36.540	-36.540	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.670	-52.029	-0.359	(0)
CoNO3+	0.000e+00	0.000e+00	-69.178	-69.537	-0.359	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.108	-134.108	0.000	(0)
Co(3)	9.147e-32					

CoOH+2	9.083e-32	3.333e-33	-31.042	-32.477	-1.435	(0)
CoCl+2	6.287e-34	2.307e-35	-33.202	-34.637	-1.435	(0)
Co+3	9.520e-36	5.949e-37	-35.021	-36.226	-1.204	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.572	-43.007	-1.435	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.468	-52.826	-0.359	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.084	-56.520	-1.435	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.911	-60.347	-1.435	(0)
Cu(1)	1.560e-04					
CuCl2-	1.360e-04	8.864e-05	-3.866	-4.052	-0.186	(0)
CuCl3-2	1.791e-05	3.881e-06	-4.747	-5.411	-0.664	(0)
CuCl	2.020e-06	2.020e-06	-5.695	-5.695	0.000	(0)
Cu+	1.762e-08	7.713e-09	-7.754	-8.113	-0.359	(0)
Cu(S4)2-3	3.084e-38	9.545e-39	-37.511	-38.020	-0.509	(0)
CuS4S5-3	5.300e-39	1.777e-39	-38.276	-38.750	-0.475	(0)
Cu(2)	1.226e-09					
Cu+2	6.027e-10	1.758e-10	-9.220	-9.755	-0.535	(0)
CuSO4	5.227e-10	5.227e-10	-9.282	-9.282	0.000	(0)
CuCl+	8.498e-11	5.537e-11	-10.071	-10.257	-0.186	(0)
CuNH3+2	1.106e-11	4.057e-13	-10.956	-12.392	-1.435	(0)
CuCl2	3.280e-12	3.280e-12	-11.484	-11.484	0.000	(0)
CuOH+	7.727e-13	5.034e-13	-12.112	-12.298	-0.186	(0)
CuCl3-	9.096e-15	5.927e-15	-14.041	-14.227	-0.186	(0)
Cu(OH)2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	3.266e-17	7.077e-18	-16.486	-17.150	-0.664	(0)
Cu2(OH)2+2	1.688e-19	6.194e-21	-18.773	-20.208	-1.435	(0)
Cu(OH)3-	6.963e-22	3.047e-22	-21.157	-21.516	-0.359	(0)
Cu(OH)4-2	7.206e-29	2.644e-30	-28.142	-29.578	-1.435	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-48.577	-48.936	-0.359	(0)
CuNO2+	0.000e+00	0.000e+00	-55.396	-55.755	-0.359	(0)
CuNO3+	0.000e+00	0.000e+00	-73.766	-74.125	-0.359	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-102.765	-102.765	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-139.915	-139.915	0.000	(0)
Fe(2)	1.790e-02					
Fe+2	1.591e-02	5.839e-04	-1.798	-3.234	-1.435	(0)
FeSO4	1.868e-03	1.868e-03	-2.729	-2.729	0.000	(0)
FeH2PO4+	1.167e-04	8.085e-05	-3.933	-4.092	-0.159	(0)
FeHP04	4.511e-06	4.511e-06	-5.346	-5.346	0.000	(0)
FeOH+	2.765e-08	1.887e-08	-7.558	-7.724	-0.166	(0)
Fe(OH)2	1.164e-14	1.164e-14	-13.934	-13.934	0.000	(0)
Fe(OH)3-	5.730e-18	3.910e-18	-17.242	-17.408	-0.166	(0)
Fe(HS)2	2.136e-38	2.136e-38	-37.670	-37.670	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-56.968	-57.327	-0.359	(0)
Fe(3)	2.172e-10					
Fe(OH)2+	2.031e-10	1.408e-10	-9.692	-9.851	-0.159	(0)
FeHP04+	1.261e-11	8.742e-12	-10.899	-11.058	-0.159	(0)
FeOH+2	1.204e-12	2.610e-13	-11.919	-12.583	-0.664	(0)
Fe(OH)3	9.432e-14	9.432e-14	-13.025	-13.025	0.000	(0)
FeSO4+	9.004e-14	6.143e-14	-13.046	-13.212	-0.166	(0)
Fe(SO4)2-	4.218e-14	1.846e-14	-13.375	-13.734	-0.359	(0)
FeCl+2	1.179e-14	2.554e-15	-13.929	-14.593	-0.664	(0)
FeH2PO4+2	1.049e-14	2.420e-15	-13.979	-14.616	-0.637	(0)
Fe+3	7.380e-15	4.612e-16	-14.132	-15.336	-1.204	(0)
FeCl2+	3.946e-15	2.692e-15	-14.404	-14.570	-0.166	(0)
FeCl3	5.601e-17	5.601e-17	-16.252	-16.252	0.000	(0)
Fe(OH)4-	2.468e-17	1.711e-17	-16.608	-16.767	-0.159	(0)
Fe2(OH)2+4	1.435e-18	2.601e-24	-17.843	-23.585	-5.742	(0)
Fe3(OH)4+5	4.755e-24	5.076e-33	-23.323	-32.294	-8.972	(0)
FeHSeO3+2	5.051e-26	1.853e-27	-25.297	-26.732	-1.435	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.692	-79.128	-1.435	(0)
H(0)	9.260e-16					
H2	4.630e-16	5.197e-16	-15.334	-15.284	0.050	(0)
Hg(0)	2.128e-09					
Hg	2.128e-09	2.128e-09	-8.672	-8.672	0.000	(0)
Hg(1)	1.269e-27					
Hg2+2	6.347e-28	2.329e-29	-27.197	-28.633	-1.435	(0)
Hg(2)	6.869e-15					
HgCl4-2	6.144e-15	2.254e-16	-14.212	-15.647	-1.435	(0)
HgCl3-	5.995e-16	2.624e-16	-15.222	-15.581	-0.359	(0)

	HgCl ₂	1.250e-16	1.250e-16	-15.903	-15.903	0.000	(0)
	HgClOH	8.909e-21	8.909e-21	-20.050	-20.050	0.000	(0)
	HgCl+	2.328e-22	1.019e-22	-21.633	-21.992	-0.359	(0)
	Hg(NH ₃) ₂ +2	2.674e-23	9.812e-25	-22.573	-24.008	-1.435	(0)
	Hg(OH) ₂	1.189e-25	1.334e-25	-24.925	-24.875	0.050	(0)
	HgNH ₃ +2	4.547e-26	1.668e-27	-25.342	-26.778	-1.435	(0)
	HgOH+	1.936e-27	8.472e-28	-26.713	-27.072	-0.359	(0)
	Hg+2	5.898e-28	2.164e-29	-27.229	-28.665	-1.435	(0)
	HgSO ₄	6.204e-29	6.204e-29	-28.207	-28.207	0.000	(0)
	Hg(NH ₃) ₃ +2	2.324e-29	8.525e-31	-28.634	-30.069	-1.435	(0)
	Hg(HS) ₂	1.499e-34	1.499e-34	-33.824	-33.824	0.000	(0)
	Hg(OH) ₃ -	4.231e-35	1.852e-35	-34.374	-34.732	-0.359	(0)
	Hg(NH ₃) ₄ +2	4.050e-35	1.486e-36	-34.393	-35.828	-1.435	(0)
	HgHS ₂ -	1.532e-35	6.707e-36	-34.815	-35.173	-0.359	(0)
	HgS ₂ -2	3.968e-38	1.456e-39	-37.401	-38.837	-1.435	(0)
	HgNO ₃ +	0.000e+00	0.000e+00	-93.713	-94.072	-0.359	(0)
	Hg(NO ₃) ₂	0.000e+00	0.000e+00	-159.333	-159.333	0.000	(0)
K		5.895e-03					
	K+	5.359e-03	3.938e-03	-2.271	-2.405	-0.134	(0)
	KS ₀₄ -	5.355e-04	3.712e-04	-3.271	-3.430	-0.159	(0)
	KHP ₀₄ -	8.366e-08	5.798e-08	-7.077	-7.237	-0.159	(0)
Mg		5.883e-02					
	Mg+2	3.448e-02	1.006e-02	-1.462	-1.998	-0.535	(0)
	MgSO ₄	2.414e-02	2.414e-02	-1.617	-1.617	0.000	(0)
	MgH ₂ P ₀₄ +	1.983e-04	1.374e-04	-3.703	-3.862	-0.159	(0)
	MgHP ₀₄	1.252e-05	1.252e-05	-4.902	-4.902	0.000	(0)
	MgOH+	4.229e-09	3.042e-09	-8.374	-8.517	-0.143	(0)
	MgP ₀₄ -	5.525e-11	3.829e-11	-10.258	-10.417	-0.159	(0)
Mn(2)		3.321e-03					
	Mn+2	3.014e-03	1.106e-04	-2.521	-3.956	-1.435	(0)
	MnSO ₄	2.553e-04	2.553e-04	-3.593	-3.593	0.000	(0)
	MnCl+	4.245e-05	2.896e-05	-4.372	-4.538	-0.166	(0)
	MnCl ₂	8.511e-06	8.511e-06	-5.070	-5.070	0.000	(0)
	MnCl ₃ -	7.147e-07	4.876e-07	-6.146	-6.312	-0.166	(0)
	MnOH+	3.305e-10	2.255e-10	-9.481	-9.647	-0.166	(0)
	MnSe	2.320e-11	2.320e-11	-10.635	-10.635	0.000	(0)
	Mn(OH) ₃ -	3.371e-24	2.300e-24	-23.472	-23.638	-0.166	(0)
	Mn(OH) ₄ -2	3.778e-32	8.186e-33	-31.423	-32.087	-0.664	(0)
	MnSe ₀₄	1.218e-36	1.218e-36	-35.914	-35.914	0.000	(0)
	MnNO ₃ +	0.000e+00	0.000e+00	-68.277	-68.636	-0.359	(0)
	Mn(NO ₃) ₂	0.000e+00	0.000e+00	-133.112	-133.112	0.000	(0)
Mn(3)		4.703e-28					
	Mn+3	4.703e-28	2.939e-29	-27.328	-28.532	-1.204	(0)
Mn(6)		0.000e+00					
	MnO ₄ -2	0.000e+00	0.000e+00	-78.947	-79.611	-0.664	(0)
Mn(7)		0.000e+00					
	MnO ₄ -	0.000e+00	0.000e+00	-88.006	-88.218	-0.212	(0)
N(-3)		4.571e-03					
	NH ₄ +	4.056e-03	2.405e-03	-2.392	-2.619	-0.227	(0)
	NH ₄ SO ₄ -	5.143e-04	3.509e-04	-3.289	-3.455	-0.166	(0)
	NH ₃	1.142e-07	1.142e-07	-6.942	-6.942	0.000	(0)
	NiNH ₃ +2	4.455e-08	1.635e-09	-7.351	-8.787	-1.435	(0)
	CaNH ₃ +2	1.272e-08	4.666e-10	-7.896	-9.331	-1.435	(0)
	Co(NH ₃) ₂ +2	9.890e-09	3.629e-10	-8.005	-9.440	-1.435	(0)
	CuNH ₃ +2	1.106e-11	4.057e-13	-10.956	-12.392	-1.435	(0)
	Ni(NH ₃) ₂ +2	1.250e-12	4.585e-14	-11.903	-13.339	-1.435	(0)
	Co(NH ₃) ₂ +2	4.488e-14	1.647e-15	-13.348	-14.783	-1.435	(0)
	Ca(NH ₃) ₂ +2	7.694e-16	2.823e-17	-15.114	-16.549	-1.435	(0)
	Co(NH ₃) ₃ +2	8.585e-20	3.150e-21	-19.066	-20.502	-1.435	(0)
	Hg(NH ₃) ₂ +2	2.674e-23	9.812e-25	-22.573	-24.008	-1.435	(0)
	Co(NH ₃) ₄ +2	6.846e-26	2.512e-27	-25.165	-26.600	-1.435	(0)
	HgNH ₃ +2	4.547e-26	1.668e-27	-25.342	-26.778	-1.435	(0)
	Hg(NH ₃) ₃ +2	2.324e-29	8.525e-31	-28.634	-30.069	-1.435	(0)
	Co(NH ₃) ₅ +2	1.727e-32	6.334e-34	-31.763	-33.198	-1.435	(0)
	Hg(NH ₃) ₄ +2	4.050e-35	1.486e-36	-34.393	-35.828	-1.435	(0)
	Co(NH ₃) ₅ Cl+2	0.000e+00	0.000e+00	-41.572	-43.007	-1.435	(0)
	Co(NH ₃) ₆ SO ₄ +	0.000e+00	0.000e+00	-52.468	-52.826	-0.359	(0)
	Co(NH ₃) ₆ Cl+2	0.000e+00	0.000e+00	-55.084	-56.520	-1.435	(0)

Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.911	-60.347	-1.435	(0)
N(3)	0.000e+00					
NO2-	0.000e+00	0.000e+00	-47.809	-48.020	-0.212	(0)
CoNO2+	0.000e+00	0.000e+00	-51.670	-52.029	-0.359	(0)
CuNO2+	0.000e+00	0.000e+00	-55.396	-55.755	-0.359	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-102.765	-102.765	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-64.746	-64.880	-0.134	(0)
CaNO3+	0.000e+00	0.000e+00	-66.621	-66.980	-0.359	(0)
MnNO3+	0.000e+00	0.000e+00	-68.277	-68.636	-0.359	(0)
NiNO3+	0.000e+00	0.000e+00	-68.979	-69.338	-0.359	(0)
CoNO3+	0.000e+00	0.000e+00	-69.178	-69.537	-0.359	(0)
ZnNO3+	0.000e+00	0.000e+00	-69.875	-70.234	-0.359	(0)
CdNO3+	0.000e+00	0.000e+00	-72.343	-72.702	-0.359	(0)
PbNO3+	0.000e+00	0.000e+00	-72.344	-72.703	-0.359	(0)
CuNO3+	0.000e+00	0.000e+00	-73.766	-74.125	-0.359	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.692	-79.128	-1.435	(0)
HgNO3+	0.000e+00	0.000e+00	-93.713	-94.072	-0.359	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.112	-133.112	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.108	-134.108	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-135.825	-135.825	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.332	-137.332	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-137.932	-137.932	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-139.915	-139.915	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.333	-159.333	0.000	(0)
Na	2.729e-01					
Na+	2.534e-01	1.862e-01	-0.596	-0.730	-0.134	(0)
NaSO4-	1.954e-02	1.354e-02	-1.709	-1.868	-0.159	(0)
NaHPO4-	6.126e-06	4.246e-06	-5.213	-5.372	-0.159	(0)
Ni	1.013e-04					
Ni+2	4.756e-05	1.387e-05	-4.323	-4.858	-0.535	(0)
NiSO4	3.650e-05	3.650e-05	-4.438	-4.438	0.000	(0)
NiCl+	1.668e-05	7.302e-06	-4.778	-5.137	-0.359	(0)
Ni(SO4)2-2	4.631e-07	1.699e-08	-6.334	-7.770	-1.435	(0)
NiNH3+2	4.455e-08	1.635e-09	-7.351	-8.787	-1.435	(0)
NiCl2	7.733e-09	7.733e-09	-8.112	-8.112	0.000	(0)
NiOH+	3.310e-10	1.449e-10	-9.480	-9.839	-0.359	(0)
Ni(NH3)2+2	1.250e-12	4.585e-14	-11.903	-13.339	-1.435	(0)
Ni(OH)2	1.686e-14	1.686e-14	-13.773	-13.773	0.000	(0)
Ni(OH)3-	4.246e-20	1.858e-20	-19.372	-19.731	-0.359	(0)
NiSeO4	2.656e-37	2.656e-37	-36.576	-36.576	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-68.979	-69.338	-0.359	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-62.899	-62.849	0.050	(0)
P	8.130e-04					
H2PO4-	4.400e-04	3.050e-04	-3.357	-3.516	-0.159	(0)
MgH2PO4+	1.983e-04	1.374e-04	-3.703	-3.862	-0.159	(0)
FeH2PO4+	1.167e-04	8.085e-05	-3.933	-4.092	-0.159	(0)
CaH2PO4+	2.250e-05	1.559e-05	-4.648	-4.807	-0.159	(0)
MgHPO4	1.252e-05	1.252e-05	-4.902	-4.902	0.000	(0)
HPO4-2	9.725e-06	2.107e-06	-5.012	-5.676	-0.664	(0)
NaHPO4-	6.126e-06	4.246e-06	-5.213	-5.372	-0.159	(0)
FeHPO4	4.511e-06	4.511e-06	-5.346	-5.346	0.000	(0)
CaHPO4	2.200e-06	2.200e-06	-5.658	-5.658	0.000	(0)
H3PO4	3.705e-07	3.705e-07	-6.431	-6.431	0.000	(0)
KHPO4-	8.366e-08	5.798e-08	-7.077	-7.237	-0.159	(0)
CoHPO4	2.944e-08	2.944e-08	-7.531	-7.531	0.000	(0)
CaPO4-	8.574e-10	5.943e-10	-9.067	-9.226	-0.159	(0)
MgPO4-	5.525e-11	3.829e-11	-10.258	-10.417	-0.159	(0)
FeHPO4+	1.261e-11	8.742e-12	-10.899	-11.058	-0.159	(0)
PO4-3	1.451e-12	9.070e-14	-11.838	-13.042	-1.204	(0)
FeH2PO4+2	1.049e-14	2.420e-15	-13.979	-14.616	-0.637	(0)
Pb	5.150e-08					
PbCl+	1.651e-08	7.227e-09	-7.782	-8.141	-0.359	(0)
Pb(SO4)2-2	1.532e-08	5.619e-10	-7.815	-9.250	-1.435	(0)
PbSO4	6.849e-09	6.849e-09	-8.164	-8.164	0.000	(0)
PbCl2	6.595e-09	6.595e-09	-8.181	-8.181	0.000	(0)
Pb+2	3.522e-09	1.027e-09	-8.453	-8.988	-0.535	(0)

PbCl4-2	1.394e-09	5.115e-11	-8.856	-10.291	-1.435	(0)
PbCl3-	1.304e-09	5.707e-10	-8.885	-9.244	-0.359	(0)
PbOH+	6.498e-12	2.844e-12	-11.187	-11.546	-0.359	(0)
Pb(OH)2	9.914e-17	9.914e-17	-16.004	-16.004	0.000	(0)
Pb2OH+3	7.857e-17	4.629e-20	-16.105	-19.335	-3.230	(0)
Pb(OH)3-	2.497e-22	1.093e-22	-21.603	-21.961	-0.359	(0)
Pb(OH)4-2	8.042e-28	2.950e-29	-27.095	-28.530	-1.435	(0)
Pb3(OH)4+2	2.917e-30	1.070e-31	-29.535	-30.971	-1.435	(0)
Pb4(OH)4+4	5.587e-31	1.012e-36	-30.253	-35.995	-5.742	(0)
Pb(HS)2	7.850e-38	7.850e-38	-37.105	-37.105	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-57.140	-57.498	-0.359	(0)
PbNO3+	0.000e+00	0.000e+00	-72.344	-72.703	-0.359	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.332	-137.332	0.000	(0)
S(-2)	2.226e-20					
H2S	2.160e-20	2.160e-20	-19.666	-19.666	0.000	(0)
HS-	4.629e-22	2.026e-22	-21.334	-21.693	-0.359	(0)
CdHS+	2.002e-22	8.762e-23	-21.699	-22.057	-0.359	(0)
S5-2	2.148e-25	7.881e-27	-24.668	-26.103	-1.435	(0)
S6-2	8.049e-26	2.953e-27	-25.094	-26.530	-1.435	(0)
S4-2	5.399e-26	1.981e-27	-25.268	-26.703	-1.435	(0)
S3-2	8.308e-27	3.048e-28	-26.081	-27.516	-1.435	(0)
S2-2	7.823e-28	2.870e-29	-27.107	-28.542	-1.435	(0)
S-2	3.961e-34	8.582e-35	-33.402	-34.066	-0.664	(0)
Hg(HS)2	1.499e-34	1.499e-34	-33.824	-33.824	0.000	(0)
HgHS2-	1.532e-35	6.707e-36	-34.815	-35.173	-0.359	(0)
Zn(HS)2	4.661e-37	4.661e-37	-36.332	-36.332	0.000	(0)
Cd(HS)2	2.840e-37	2.840e-37	-36.547	-36.547	0.000	(0)
ZnS(HS)-	1.153e-37	5.047e-38	-36.938	-37.297	-0.359	(0)
Pb(HS)2	7.850e-38	7.850e-38	-37.105	-37.105	0.000	(0)
HgS2-2	3.968e-38	1.456e-39	-37.401	-38.837	-1.435	(0)
Cu(S4)2-3	3.084e-38	9.545e-39	-37.511	-38.020	-0.509	(0)
Fe(HS)2	2.136e-38	2.136e-38	-37.670	-37.670	0.000	(0)
CuS4S5-3	5.300e-39	1.777e-39	-38.276	-38.750	-0.475	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-48.577	-48.936	-0.359	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-54.386	-54.745	-0.359	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-55.981	-56.340	-0.359	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-56.968	-57.327	-0.359	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-57.140	-57.498	-0.359	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-58.245	-59.680	-1.435	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-74.402	-75.837	-1.435	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-76.463	-77.898	-1.435	(0)
S(6)	1.012e-01					
S04-2	4.669e-02	1.362e-02	-1.331	-1.866	-0.535	(0)
MgS04	2.414e-02	2.414e-02	-1.617	-1.617	0.000	(0)
NaS04-	1.954e-02	1.354e-02	-1.709	-1.868	-0.159	(0)
CaS04	7.318e-03	7.318e-03	-2.136	-2.136	0.000	(0)
FeS04	1.868e-03	1.868e-03	-2.729	-2.729	0.000	(0)
KS04-	5.355e-04	3.712e-04	-3.271	-3.430	-0.159	(0)
NH4S04-	5.143e-04	3.509e-04	-3.289	-3.455	-0.166	(0)
MnS04	2.553e-04	2.553e-04	-3.593	-3.593	0.000	(0)
AlS04+	1.567e-04	1.046e-04	-3.805	-3.980	-0.175	(0)
CoS04	3.651e-05	3.651e-05	-4.438	-4.438	0.000	(0)
NiS04	3.650e-05	3.650e-05	-4.438	-4.438	0.000	(0)
Al(S04)2-	2.498e-05	1.667e-05	-4.602	-4.778	-0.175	(0)
Zn(S04)2-2	1.655e-05	6.071e-07	-4.781	-6.217	-1.435	(0)
HS04-	1.594e-05	1.064e-05	-4.797	-4.973	-0.175	(0)
ZnS04	4.948e-06	4.948e-06	-5.306	-5.306	0.000	(0)
Ni(S04)2-2	4.631e-07	1.699e-08	-6.334	-7.770	-1.435	(0)
Cd(S04)2-2	6.784e-08	2.489e-09	-7.169	-8.604	-1.435	(0)
Pb(S04)2-2	1.532e-08	5.619e-10	-7.815	-9.250	-1.435	(0)
CdS04	1.292e-08	1.292e-08	-7.889	-7.889	0.000	(0)
PbS04	6.849e-09	6.849e-09	-8.164	-8.164	0.000	(0)
CuS04	5.227e-10	5.227e-10	-9.282	-9.282	0.000	(0)
FeS04+	9.004e-14	6.143e-14	-13.046	-13.212	-0.166	(0)
Fe(S04)2-	4.218e-14	1.846e-14	-13.375	-13.734	-0.359	(0)
HgS04	6.204e-29	6.204e-29	-28.207	-28.207	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.468	-52.826	-0.359	(0)
Se(-2)	1.081e-06					

HSe-	1.049e-06	4.593e-07	-5.979	-6.338	-0.359	(0)
H2Se	3.160e-08	3.160e-08	-7.500	-7.500	0.000	(0)
MnSe	2.320e-11	2.320e-11	-10.635	-10.635	0.000	(0)
Se-2	1.065e-15	3.909e-17	-14.972	-16.408	-1.435	(0)
Se(4)	4.013e-15					
HSeO3-	3.986e-15	1.744e-15	-14.399	-14.758	-0.359	(0)
SeO3-2	2.041e-17	7.487e-19	-16.690	-18.126	-1.435	(0)
H2SeO3	6.490e-18	6.490e-18	-17.188	-17.188	0.000	(0)
FeHSeO3+2	5.051e-26	1.853e-27	-25.297	-26.732	-1.435	(0)
Cd(SeO3)2-2	5.648e-38	2.072e-39	-37.248	-38.684	-1.435	(0)
Se(6)	1.534e-34					
SeO4-2	1.516e-34	4.420e-35	-33.819	-34.355	-0.535	(0)
MnSeO4	1.218e-36	1.218e-36	-35.914	-35.914	0.000	(0)
CoSeO4	2.884e-37	2.884e-37	-36.540	-36.540	0.000	(0)
NiSeO4	2.656e-37	2.656e-37	-36.576	-36.576	0.000	(0)
HSeO4-	4.026e-38	1.762e-38	-37.395	-37.754	-0.359	(0)
ZnSeO4	1.176e-38	1.176e-38	-37.929	-37.929	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.457	-40.457	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-70.843	-72.278	-1.435	(0)
Zn	2.905e-05					
Zn(SO4)2-2	1.655e-05	6.071e-07	-4.781	-6.217	-1.435	(0)
Zn+2	5.893e-06	1.718e-06	-5.230	-5.765	-0.535	(0)
ZnSO4	4.948e-06	4.948e-06	-5.306	-5.306	0.000	(0)
ZnCl+	1.338e-06	8.717e-07	-5.874	-6.060	-0.186	(0)
ZnCl2	2.417e-07	2.417e-07	-6.617	-6.617	0.000	(0)
ZnCl3-	6.029e-08	3.928e-08	-7.220	-7.406	-0.186	(0)
ZnCl4-2	1.826e-08	3.957e-09	-7.738	-8.403	-0.664	(0)
ZnOHCl	1.296e-09	1.296e-09	-8.887	-8.887	0.000	(0)
ZnOH+	3.187e-10	1.395e-10	-9.497	-9.855	-0.359	(0)
Zn(OH)2	3.310e-14	3.310e-14	-13.480	-13.480	0.000	(0)
Zn(OH)3-	4.178e-19	1.829e-19	-18.379	-18.738	-0.359	(0)
Zn(OH)4-2	2.187e-25	8.025e-27	-24.660	-26.096	-1.435	(0)
Zn(HS)2	4.661e-37	4.661e-37	-36.332	-36.332	0.000	(0)
ZnS(HS)-	1.153e-37	5.047e-38	-36.938	-37.297	-0.359	(0)
ZnSeO4	1.176e-38	1.176e-38	-37.929	-37.929	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-54.386	-54.745	-0.359	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-58.245	-59.680	-1.435	(0)
ZnNO3+	0.000e+00	0.000e+00	-69.875	-70.234	-0.359	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-70.843	-72.278	-1.435	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-76.463	-77.898	-1.435	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-135.825	-135.825	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	160.81	-154.54	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-30.68	-26.14	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-37.94	-26.15	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	234.24	-216.31	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-43.83	-23.72	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-40.04	-39.59	0.45	(NH4)2SeO4
Al(OH)3(am)	-1.88	9.18	11.06	Al(OH)3
Al2O3	-1.89	18.38	20.27	Al2O3
Al4(OH)10SO4	2.08	24.78	22.70	Al4(OH)10SO4
AlOHSO4	0.47	-2.76	-3.23	AlOHSO4
Alunite	7.19	6.29	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.04	-10.85	-7.82	PbSO4
Anhydrite	-0.14	-4.48	-4.34	CaSO4
Anilite	1.06	-31.26	-32.31	Cu0.25Cu1.5S
Antlerite	-19.76	-10.97	8.79	Cu3(OH)4SO4
Atacamite	-12.69	-5.07	7.61	Cu2(OH)3Cl
Bianchite	-5.90	-7.66	-1.76	ZnSO4:6H2O
Birnessite	-25.42	-7.33	18.09	MnO2
Bixbyite	-26.46	-26.81	-0.35	Mn2O3
BlaubleiI	-2.89	-27.05	-24.16	Cu0.9Cu0.2S
BlaubleiII	-1.71	-28.99	-27.28	Cu0.6Cu0.8S
Boehmite	0.33	9.19	8.86	AlOOH

Brochantite	-26.36	-10.65	15.71	Cu ₄ (OH) ₆ SO ₄
Brucite	-9.03	8.08	17.12	Mg(OH) ₂
Bunsenite	-7.46	5.23	12.68	NiO
Ca ₃ (PO ₄) ₂ (beta)	-4.87	-33.92	-29.05	Ca ₃ (PO ₄) ₂
Ca ₄ H(PO ₄) ₃ ·3H ₂ O	-7.56	-54.64	-47.08	Ca ₄ H(PO ₄) ₃ ·3H ₂ O
CaHPO ₄	-1.35	-20.70	-19.35	CaHPO ₄
CaHPO ₄ ·2H ₂ O	-1.66	-20.71	-19.05	CaHPO ₄ ·2H ₂ O
Calomel	-11.87	-30.00	-18.13	Hg ₂ Cl ₂
CaSeO ₃ ·2H ₂ O	-15.20	-12.34	2.86	CaSeO ₃ ·2H ₂ O
CaSeO ₄ ·2H ₂ O	-33.98	-36.98	-3.00	CaSeO ₄ ·2H ₂ O
Cd(OH) ₂	-12.16	1.71	13.87	Cd(OH) ₂
Cd(OH) ₂ (am)	-12.23	1.71	13.94	Cd(OH) ₂
Cd ₃ (OH) ₂ (SO ₄) ₂	-25.48	-18.77	6.71	Cd ₃ (OH) ₂ (SO ₄) ₂
Cd ₃ (OH) ₄ SO ₄	-29.38	-6.82	22.56	Cd ₃ (OH) ₄ SO ₄
Cd ₃ (PO ₄) ₂	-18.60	-51.20	-32.60	Cd ₃ (PO ₄) ₂
Cd ₄ (OH) ₆ SO ₄	-33.52	-5.12	28.40	Cd ₄ (OH) ₆ SO ₄
CdCl ₂	-9.12	-9.74	-0.61	CdCl ₂
CdCl ₂ ·1H ₂ O	-8.07	-9.74	-1.68	CdCl ₂ ·1H ₂ O
CdCl ₂ ·2.5H ₂ O	-7.82	-9.75	-1.93	CdCl ₂ ·2.5H ₂ O
Cdmetal(alpha)	-24.13	-10.43	13.69	Cd
Cdmetal(gamma)	-24.23	-10.43	13.80	Cd
CdOHCl	-7.63	-4.01	3.61	CdOHCl
CdSe	10.72	-9.67	-20.38	CdSe
CdSeO ₄ ·2H ₂ O	-40.89	-42.74	-1.85	CdSeO ₄ ·2H ₂ O
CdSO ₄	-10.19	-10.24	-0.05	CdSO ₄
CdSO ₄ ·1H ₂ O	-8.59	-10.24	-1.65	CdSO ₄ ·1H ₂ O
CdSO ₄ ·2.67H ₂ O	-8.42	-10.25	-1.83	CdSO ₄ ·2.67H ₂ O
Chalcanthite	-8.99	-11.65	-2.65	CuSO ₄ ·5H ₂ O
Chalcocite	2.45	-32.87	-35.32	Cu ₂ S
Chalcopyrite	-10.66	-46.29	-35.62	CuFeS ₂
Cinnabar	-5.30	-51.60	-46.30	HgS
Clausthalite	17.10	-10.28	-27.39	PbSe
Co(OH) ₂	-7.87	5.22	13.09	Co(OH) ₂
Co(OH) ₃	-19.02	-21.11	-2.09	Co(OH) ₃
Co ₃ (PO ₄) ₂	-5.97	-40.66	-34.69	Co ₃ (PO ₄) ₂
Co ₃ O ₄	-26.73	-36.97	-10.24	Co ₃ O ₄
CoCl ₂	-14.68	-6.22	8.46	CoCl ₂
CoCl ₂ ·6H ₂ O	-8.77	-6.25	2.52	CoCl ₂ ·6H ₂ O
CoFe ₂ O ₄	7.96	4.81	-3.15	CoFe ₂ O ₄
CoHPO ₄	-3.88	-22.94	-19.06	CoHPO ₄
CoO	-8.61	5.23	13.84	CoO
CoS(alpha)	-14.07	-21.51	-7.44	CoS
CoS(beta)	-10.44	-21.51	-11.07	CoS
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO ₃	-15.89	-14.57	1.32	CoSeO ₃
CoSeO ₄ ·6H ₂ O	-37.71	-39.24	-1.53	CoSeO ₄ ·6H ₂ O
CoSO ₄	-9.71	-6.72	2.99	CoSO ₄
CoSO ₄ ·6H ₂ O	-4.28	-6.75	-2.48	CoSO ₄ ·6H ₂ O
Cotunnite	-5.51	-10.35	-4.84	PbCl ₂
Covellite	-3.87	-26.40	-22.53	CuS
Cu(OH) ₂	-8.48	0.32	8.81	Cu(OH) ₂
Cu ₂ (OH) ₃ NO ₃	-78.70	-69.27	9.42	Cu ₂ (OH) ₃ NO ₃
Cu ₂ Se(alpha)	28.79	-17.52	-46.31	Cu ₂ Se
Cu ₂ SO ₄	-16.19	-18.09	-1.90	Cu ₂ SO ₄
Cu ₃ (PO ₄) ₂	-18.50	-55.35	-36.85	Cu ₃ (PO ₄) ₂
Cu ₃ (PO ₄) ₂ ·3H ₂ O	-20.25	-55.37	-35.12	Cu ₃ (PO ₄) ₂ ·3H ₂ O
Cu ₃ Se ₂	35.73	-28.57	-64.30	Cu ₃ Se ₂
Cumetal	-0.22	-9.14	-8.93	Cu
CuOCuSO ₄	-21.92	-11.29	10.63	CuOCuSO ₄
Cupricferrite	-6.58	-0.09	6.49	CuFe ₂ O ₄
Cuprite	-5.03	-6.14	-1.11	Cu ₂ O
Cuprousferrite	5.60	-3.28	-8.88	CuFeO ₂
CuSe	22.34	-11.05	-33.39	CuSe
CuSe ₂	23.42	-10.28	-33.70	CuSe ₂
CuSeO ₃ ·2H ₂ O	-20.08	-19.48	0.60	CuSeO ₃ ·2H ₂ O
CuSeO ₄ ·5H ₂ O	-41.70	-44.14	-2.44	CuSeO ₄ ·5H ₂ O
CuSO ₄	-14.73	-11.62	3.11	CuSO ₄
Diaspore	2.07	9.19	7.12	Al ₂ O ₃

Djurleite	1.95	-32.45	-34.40	Cu0.066Cu1.868S
Epsomite	-1.75	-3.90	-2.15	MgSO4:7H2O
Fe(OH)2	-6.72	6.84	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.11	-1.93	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-21.78	-20.23	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-39.20	-59.82	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-33.11	-36.27	-3.16	Fe2(SO4)3
Fe3(OH)8	-13.81	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.58	-0.22	3.37	Fe(OH)3
Ferroselite	14.95	-3.76	-18.71	FeSe2
FeS(ppt)	-16.96	-19.88	-2.92	FeS
FeSe	6.48	-4.53	-11.00	FeSe
Galena	-11.48	-25.64	-14.16	PbS
Gibbsite	0.66	9.18	8.52	Al(OH)3
Goethite	-0.85	-0.21	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4:7H2O
Greenockite	-10.53	-25.02	-14.49	CdS
Greigite	-55.47	-100.50	-45.03	Fe3S4
Gypsum	0.12	-4.49	-4.61	CaSO4:2H2O
H-Jarosite	-13.00	-24.55	-11.55	(H3O)Fe3(SO4)2(OH)6
H2S(g)	-18.73	-26.74	-8.01	H2S
H2Se(g)	-6.46	-11.38	-4.92	H2Se
Halite	-3.01	-1.41	1.59	NaCl
Hausmannite	-31.50	30.53	62.03	Mn3O4
Hematite	0.69	-0.42	-1.11	Fe2O3
Hercynite	1.59	25.23	23.64	FeAl2O4
Hg(g)	-7.42	-15.35	-7.93	Hg
Hg(OH)2	-21.38	-24.87	-3.50	Hg(OH)2
Hg2(g)	-15.60	-30.70	-15.09	Hg2
Hg2(OH)2	-23.81	-18.55	5.26	Hg2(OH)2
Hg2HPO4	-21.94	-46.72	-24.77	Hg2HPO4
Hg2S	-33.44	-45.28	-11.84	Hg2S
Hg2SeO3	-33.69	-38.35	-4.66	Hg2SeO3
Hg2SO4	-24.36	-30.50	-6.14	Hg2SO4
HgCl(g)	-34.88	-15.00	19.88	HgCl
HgCl2	-14.80	-36.32	-21.52	HgCl2
Hgmetal(l)	-1.70	-15.35	-13.65	Hg
HgSe	19.45	-36.25	-55.69	HgSe
HgSeO3	-32.24	-44.67	-12.43	HgSeO3
HgSO4	-27.37	-36.82	-9.45	HgSO4
Hinsdalite	-8.97	-11.47	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-2.82	-47.15	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-16.24	-79.03	-62.79	Pb5(PO4)3OH
K-Alum	-6.90	-12.14	-5.24	KAl(SO4)2:12H2O
K-Jarosite	-7.42	-21.91	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-38.43	-39.16	-0.73	K2SeO4
Langite	-28.54	-10.66	17.88	Cu4(OH)6SO4:H2O
Larnakite	-9.38	-9.76	-0.38	PbO:PbSO4
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.58	-0.21	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.75	1.10	12.85	PbO
Mackinawite	-16.28	-19.88	-3.60	FeS
Maghemite	-6.81	-0.42	6.39	Fe2O3
Magnesioferrite	-9.86	7.67	17.52	Fe2MgO4
Magnetite	2.53	6.43	3.90	Fe3O4
Manganite	-13.14	12.20	25.34	MnOOH
Massicot	-11.96	1.10	13.05	PbO
Melanothallite	-17.53	-11.12	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeSO4:7H2O
Metacinnabar	-5.90	-51.60	-45.70	HgS
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(PO4)2	-8.80	-32.08	-23.28	Mg3(PO4)2
MgHPO4:3H2O	-1.93	-20.10	-18.18	MgHPO4:3H2O
MgSeO3:6H2O	-14.79	-11.74	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-35.18	-36.38	-1.20	MgSeO4:6H2O
Minium	-59.09	15.43	74.53	Pb3O4
Mirabilite	-2.08	-3.38	-1.30	Na2SO4:10H2O

Mn2(SO4)3	-57.34	-62.66	-5.32	Mn2(SO4)3
Mn3(PO4)2	-14.11	-37.95	-23.85	Mn3(PO4)2
MnCl2:4H2O	-8.08	-5.34	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnS(grn)	-20.85	-20.61	0.25	MnS
MnS(pnk)	-23.95	-20.61	3.34	MnS
MnSe	-8.98	-5.25	3.73	MnSe
MnSeO3	-14.80	-13.67	1.13	MnSeO3
MnSeO3:2H2O	-14.64	-13.68	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-36.29	-38.34	-2.05	MnSeO4:5H2O
MnSO4	-8.56	-5.82	2.74	MnSO4
Monteponite	-13.64	1.71	15.35	CdO
Montroydite	-21.32	-24.87	-3.55	HgO
Morenosite	-4.59	-6.76	-2.17	NiSO4:7H2O
Na-Jarosite	-9.39	-20.23	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-21.50	-11.20	10.30	Na2SeO3:5H2O
Na2SeO4	-37.09	-35.81	1.28	Na2SeO4
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(PO4)2	-9.36	-40.66	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-23.06	8.94	32.00	Ni4(OH)6SO4
NiS(alpha)	-15.91	-21.51	-5.60	NiS
NiS(beta)	-10.41	-21.51	-11.10	NiS
NiS(gamma)	-8.71	-21.51	-12.80	NiS
NiSe	11.55	-6.15	-17.70	NiSe
NiSeO3:2H2O	-17.47	-14.58	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-37.72	-39.24	-1.52	NiSeO4:6H2O
Nsutite	-24.84	-7.33	17.50	MnO2
O2(g)	-60.16	24.29	84.45	O2
Pb(OH)2	-7.20	1.09	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.33	-3.54	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-24.00	2.19	26.19	Pb2O(OH)2
Pb2O3	-46.70	14.34	61.04	Pb2O3
Pb3(PO4)2	-9.52	-53.05	-43.53	Pb3(PO4)2
Pb3O2SO4	-19.54	-8.66	10.87	Pb3O2SO4
Pb4(OH)6SO4	-28.68	-7.58	21.10	Pb4(OH)6SO4
Pb4O3SO4	-29.77	-7.57	22.20	Pb4O3SO4
PbHP04	-3.27	-27.08	-23.81	PbHP04
Pbmetal	-15.30	-11.05	4.24	Pb
PbO:0.3H2O	-11.89	1.09	12.98	PbO:0.33H2O
PbSeO4	-36.47	-43.34	-6.88	PbSeO4
Periclase	-13.86	8.09	21.94	MgO
Plattnerite	-37.06	13.24	50.31	PbO2
Plumbgummite	5.10	-27.69	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-15.64	7.47	23.11	Ca(OH)2
Pyrite	-15.84	-34.47	-18.63	FeS2
Pyrochroite	-9.30	6.12	15.43	Mn(OH)2
Pyrolusite	-23.75	18.27	42.03	MnO2
Pyromorphite	-0.32	-84.75	-84.43	Pb5(PO4)3Cl
Retgersite	-4.70	-6.76	-2.05	NiSO4:6H2O
Semetal(am)	7.91	0.77	-7.14	Se
Semetal(hex)	8.52	0.77	-7.75	Se
SeO2	-19.92	-19.80	0.12	SeO2
SeO3	-65.83	-44.44	21.39	SeO3
Sphalerite	-10.89	-22.41	-11.52	ZnS
Spinel	-11.31	26.46	37.77	MgAl2O4
Strengite	-2.01	-28.39	-26.38	FePO4:2H2O
Sulfur	-12.48	-14.59	-2.11	S
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.67	-3.33	0.34	Na2SO4
Tsumebite	-15.88	-25.67	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	0.17	-35.83	-36.00	Fe3(PO4)2:8H2O
Wurtzite	-13.41	-22.41	-9.00	ZnS
Zincite	-7.23	4.32	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnSO4
Zn(NO3)2:6H2O	-138.81	-135.56	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-7.89	4.31	12.20	Zn(OH)2
Zn(OH)2(am)	-8.35	4.31	12.67	Zn(OH)2

Zn(OH)2(beta)	-7.64	4.31	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.42	4.31	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.42	4.31	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.82	-3.32	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.28	2.91	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-7.98	-43.40	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-30.47	-10.94	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-23.09	5.31	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-28.37	10.13	38.50	Zn5(OH)8Cl2
ZnCl2	-14.35	-7.13	7.22	ZnCl2
Znmetal	-33.98	-7.83	26.15	Zn
Zn0(active)	-7.08	4.32	11.40	Zn0
ZnS(am)	-13.33	-22.41	-9.09	ZnS
ZnSe	7.40	-7.06	-14.46	ZnSe
ZnSeO4:6H2O	-38.63	-40.15	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.10	-7.64	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 8.

SOLUTION 7 #Groundwater worst case maximum values

temp	21
pH	5.05
pe	1
redox	pe
units	mg/l
density	1
Al	5.21
Alkalinity	0
As	0
Ba	0
Be	0
B	0
Cd	0.04
Co	24.2
Cr	0
Cu	9.29
Fe	937
Pb	0.01
Mn	171
Mo	0
V	0
Zn	1.78
Se	0.08
Ni	5.57
N	60
P	23.6
Ca	590
Mg	1340
Na	5880
K	216
Cl	9420
S(6)	9110
Hg	0.0004
water	1 # kg
MIX	5
1	0.988
7	0.012
REACTION	6
H2O	-1

2
END #Time-step 6

Beginning of initial solution calculations.

Initial solution 7.

-----Solution composition-----

Elements	Molality	Moles
Al	1.986e-04	1.986e-04
Ca	1.514e-02	1.514e-02
Cd	3.660e-07	3.660e-07
Cl	2.733e-01	2.733e-01
Co	4.224e-04	4.224e-04
Cu	1.504e-04	1.504e-04
Fe	1.726e-02	1.726e-02
Hg	2.051e-09	2.051e-09
K	5.682e-03	5.682e-03
Mg	5.671e-02	5.671e-02
Mn	3.202e-03	3.202e-03
N	4.406e-03	4.406e-03
Na	2.631e-01	2.631e-01
Ni	9.762e-05	9.762e-05
P	7.837e-04	7.837e-04
Pb	4.964e-08	4.964e-08
S(6)	9.754e-02	9.754e-02
Se	1.042e-06	1.042e-06
Zn	2.800e-05	2.800e-05

-----Description of solution-----

pH	=	5.050
pe	=	1.000
Activity of water	=	0.988
Ionic strength (mol/kgw)	=	4.862e-01
Mass of water (kg)	=	1.000e+00
Total alkalinity (eq/kg)	=	1.381e-05
Total carbon (mol/kg)	=	0.000e+00
Total CO2 (mol/kg)	=	0.000e+00
Temperature (°C)	=	21.00
Electrical balance (eq)	=	-9.552e-03
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.26
Iterations	=	14
Total H	=	1.110329e+02
Total O	=	5.590014e+01

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.214e-05	8.913e-06	-4.916	-5.050	-0.134	0.00
OH-	1.292e-09	8.222e-10	-8.889	-9.085	-0.196	(0)
H2O	5.551e+01	9.883e-01	1.744	-0.005	0.000	18.05
Al	1.986e-04					
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Al+3	1.839e-05	1.139e-06	-4.735	-5.943	-1.208	(0)
AlOH+2	4.197e-06	9.786e-07	-5.377	-6.009	-0.632	(0)
Al(OH)2+	1.624e-06	1.128e-06	-5.790	-5.948	-0.158	(0)
Al(OH)3	2.514e-08	2.514e-08	-7.600	-7.600	0.000	(0)
Al(OH)4-	2.040e-09	1.366e-09	-8.690	-8.864	-0.174	(0)
Ca	1.514e-02					
Ca+2	8.161e-03	2.370e-03	-2.088	-2.625	-0.537	(0)
CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)

	CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158 (0)
	CaHP04	2.106e-06	2.106e-06	-5.677	-5.677	0.000 (0)
	CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413 (0)
	CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158 (0)
	CaOH+	5.236e-11	3.715e-11	-10.281	-10.430	-0.149 (0)
	Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413 (0)
	CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353 (0)
Cd	3.660e-07					
	CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353 (0)
	CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000 (0)
	Cd(SO4)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413 (0)
	CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353 (0)
	Cd+2	1.502e-08	4.363e-09	-7.823	-8.360	-0.537 (0)
	CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000 (0)
	CdOHC1	3.460e-12	3.460e-12	-11.461	-11.461	0.000 (0)
	CdOH+	6.462e-14	2.865e-14	-13.190	-13.543	-0.353 (0)
	Cd2OH+3	9.945e-19	6.582e-22	-18.002	-21.182	-3.179 (0)
	Cd(OH)2	2.726e-19	2.726e-19	-18.564	-18.564	0.000 (0)
	Cd(OH)3-	4.195e-26	1.860e-26	-25.377	-25.730	-0.353 (0)
	Cd(OH)4-2	8.799e-35	3.400e-36	-34.056	-35.469	-1.413 (0)
	Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413 (0)
	CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000 (0)
	CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353 (0)
	Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000 (0)
Cl	2.733e-01					
	Cl-	2.729e-01	2.003e-01	-0.564	-0.698	-0.134 (0)
	CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185 (0)
	MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165 (0)
	CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353 (0)
	CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659 (0)
	NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353 (0)
	MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000 (0)
	CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000 (0)
	ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185 (0)
	MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165 (0)
	ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000 (0)
	CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353 (0)
	CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000 (0)
	ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185 (0)
	CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353 (0)
	PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353 (0)
	ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659 (0)
	NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000 (0)
	PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000 (0)
	ZnOHC1	1.293e-09	1.293e-09	-8.888	-8.888	0.000 (0)
	PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353 (0)
	PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413 (0)
	CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185 (0)
	CdOHC1	3.460e-12	3.460e-12	-11.461	-11.461	0.000 (0)
	CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000 (0)
	FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659 (0)
	CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185 (0)
	HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413 (0)
	FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165 (0)
	HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353 (0)
	HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000 (0)
	FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000 (0)
	CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659 (0)
	HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000 (0)
	HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353 (0)
	CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413 (0)
	Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413 (0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413 (0)
Co(2)	4.224e-04					
	Co+2	3.644e-04	1.408e-05	-3.438	-4.851	-1.413 (0)
	CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000 (0)
	CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353 (0)
	CoHP04	2.936e-08	2.936e-08	-7.532	-7.532	0.000 (0)

Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CoOH+	7.075e-10	3.137e-10	-9.150	-9.504	-0.353	(0)
Co2OH+3	3.344e-13	2.213e-16	-12.476	-15.655	-3.179	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Co(OH)2	2.782e-14	2.782e-14	-13.556	-13.556	0.000	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Co(OH)3-	1.398e-21	6.199e-22	-20.854	-21.208	-0.353	(0)
CoOOH-	8.505e-23	3.771e-23	-22.070	-22.424	-0.353	(0)
Co4(OH)4+4	8.668e-25	1.932e-30	-24.062	-29.714	-5.652	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
Co(OH)4-2	2.839e-30	1.097e-31	-29.547	-30.960	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Co(3)	8.287e-32					
CoOH+2	8.232e-32	3.180e-33	-31.085	-32.498	-1.413	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co+3	9.049e-36	5.605e-37	-35.043	-36.251	-1.208	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
Cu(1)	1.504e-04					
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
Cu+	1.823e-08	8.082e-09	-7.739	-8.092	-0.353	(0)
Cu(2)	1.182e-09					
Cu+2	5.900e-10	1.714e-10	-9.229	-9.766	-0.537	(0)
CuSO4	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
CuOH+	7.604e-13	4.972e-13	-12.119	-12.303	-0.185	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
Cu(OH)2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
Cu2(OH)2+2	1.564e-19	6.042e-21	-18.806	-20.219	-1.413	(0)
Cu(OH)3-	6.965e-22	3.088e-22	-21.157	-21.510	-0.353	(0)
Cu(OH)4-2	7.024e-29	2.714e-30	-28.153	-29.566	-1.413	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Fe(2)	1.726e-02					
Fe+2	1.529e-02	5.907e-04	-1.816	-3.229	-1.413	(0)
FeSO4	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
FeOH+	2.826e-08	1.934e-08	-7.549	-7.714	-0.165	(0)
Fe(OH)2	1.209e-14	1.209e-14	-13.918	-13.918	0.000	(0)
Fe(OH)3-	6.009e-18	4.111e-18	-17.221	-17.386	-0.165	(0)
Fe(3)	2.087e-10					
Fe(OH)2+	1.957e-10	1.360e-10	-9.708	-9.867	-0.158	(0)
FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
FeOH+2	1.136e-12	2.489e-13	-11.945	-12.604	-0.659	(0)
Fe(OH)3	9.228e-14	9.228e-14	-13.035	-13.035	0.000	(0)
FeSO4+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(SO4)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Fe+3	7.010e-15	4.342e-16	-14.154	-15.362	-1.208	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
Fe(OH)4-	2.440e-17	1.696e-17	-16.613	-16.771	-0.158	(0)
Fe2(OH)2+4	1.061e-18	2.365e-24	-17.974	-23.626	-5.652	(0)

Fe3(OH)4+5	3.023e-24	4.459e-33	-23.520	-32.351	-8.831	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
H(0)	1.047e-15					
H2	5.235e-16	5.855e-16	-15.281	-15.232	0.049	(0)
Hg(0)	2.051e-09					
Hg	2.051e-09	2.051e-09	-8.688	-8.688	0.000	(0)
Hg(1)	9.698e-28					
Hg2+2	4.849e-28	1.874e-29	-27.314	-28.727	-1.413	(0)
Hg(2)	4.726e-15					
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Hg(OH)2	1.022e-25	1.143e-25	-24.991	-24.942	0.049	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
HgOH+	1.615e-27	7.162e-28	-26.792	-27.145	-0.353	(0)
Hg+2	4.674e-28	1.806e-29	-27.330	-28.743	-1.413	(0)
HgSO4	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Hg(OH)3-	3.623e-35	1.606e-35	-34.441	-34.794	-0.353	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
K	5.682e-03					
K+	5.178e-03	3.801e-03	-2.286	-2.420	-0.134	(0)
KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
Mg	5.671e-02					
Mg+2	3.360e-02	9.758e-03	-1.474	-2.011	-0.537	(0)
MgSO4	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
MgHP04	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
MgOH+	4.148e-09	2.990e-09	-8.382	-8.524	-0.142	(0)
MgPO4-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
Mn(2)	3.202e-03					
Mn+2	2.899e-03	1.120e-04	-2.538	-3.951	-1.413	(0)
MnSO4	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
MnOH+	3.381e-10	2.313e-10	-9.471	-9.636	-0.165	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Mn(OH)3-	3.538e-24	2.421e-24	-23.451	-23.616	-0.165	(0)
Mn(OH)4-2	3.983e-32	8.727e-33	-31.400	-32.059	-0.659	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Mn(3)	4.471e-28					
Mn+3	4.471e-28	2.769e-29	-27.350	-28.558	-1.208	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-79.028	-79.687	-0.659	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-88.115	-88.325	-0.210	(0)
N(-3)	4.406e-03					
NH4+	3.919e-03	2.335e-03	-2.407	-2.632	-0.225	(0)
NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
NH3	1.123e-07	1.123e-07	-6.950	-6.950	0.000	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)

Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
N(3)	0.000e+00					
N02-	0.000e+00	0.000e+00	-47.968	-48.177	-0.210	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-64.954	-65.088	-0.134	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
Na	2.631e-01					
Na+	2.447e-01	1.796e-01	-0.611	-0.746	-0.134	(0)
NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
NaHP04-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
Ni	9.762e-05					
Ni+2	4.671e-05	1.357e-05	-4.331	-4.867	-0.537	(0)
NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
Ni(SO4)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
NiOH+	3.238e-10	4.435e-10	-9.490	-9.843	-0.353	(0)
Ni(NH3)2+2	1.122e-12	1.436e-14	-11.950	-13.363	-1.413	(0)
Ni(OH)2	1.692e-14	1.692e-14	-13.772	-13.772	0.000	(0)
Ni(OH)3-	4.261e-20	1.889e-20	-19.371	-19.724	-0.353	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-63.001	-62.952	0.049	(0)
P	7.837e-04					
H2PO4-	4.270e-04	2.967e-04	-3.370	-3.528	-0.158	(0)
MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
MgHP04	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
HP04-2	9.473e-06	2.076e-06	-5.024	-5.683	-0.659	(0)
NaHP04-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
FeHP04	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
CaHP04	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
H3PO4	3.560e-07	3.560e-07	-6.449	-6.449	0.000	(0)
KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
CoHP04	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
CaP04-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
MgP04-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)

	FeHP04+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
	P04-3	1.460e-12	9.045e-14	-11.836	-13.044	-1.208	(0)
	FeH2P04+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Pb		4.964e-08					
	PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
	Pb(S04)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
	PbS04	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
	PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
	Pb+2	3.636e-09	1.056e-09	-8.439	-8.976	-0.537	(0)
	PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
	PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
	PbOH+	6.682e-12	2.963e-12	-11.175	-11.528	-0.353	(0)
	Pb(OH)2	1.046e-16	1.046e-16	-15.980	-15.980	0.000	(0)
	Pb2OH+3	7.494e-17	4.960e-20	-16.125	-19.305	-3.179	(0)
	Pb(OH)3-	2.635e-22	1.168e-22	-21.579	-21.933	-0.353	(0)
	Pb(OH)4-2	8.268e-28	3.195e-29	-27.083	-28.496	-1.413	(0)
	Pb3(OH)4+2	3.173e-30	1.226e-31	-29.499	-30.912	-1.413	(0)
	Pb4(OH)4+4	5.352e-31	1.193e-36	-30.271	-35.923	-5.652	(0)
	PbN03+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
	Pb(N03)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
S(6)		9.754e-02					
	S04-2	4.586e-02	1.332e-02	-1.339	-1.875	-0.537	(0)
	MgS04	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
	NaS04-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
	CaS04	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
	FeS04	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
	KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
	NH4S04-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
	MnS04	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
	AlS04+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
	CoS04	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
	NiS04	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
	Al(S04)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
	Zn(S04)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
	HS04-	1.536e-05	1.028e-05	-4.814	-4.988	-0.174	(0)
	ZnS04	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
	Ni(S04)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
	Cd(S04)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
	Pb(S04)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
	CdS04	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
	PbS04	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
	CuS04	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
	FeS04+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
	Fe(S04)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
	HgS04	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
	Co(NH3)6S04+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Se(-2)		1.042e-06					
	HSe-	1.012e-06	4.485e-07	-5.995	-6.348	-0.353	(0)
	H2Se	3.047e-08	3.047e-08	-7.516	-7.516	0.000	(0)
	MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
	Se-2	1.000e-15	3.865e-17	-15.000	-16.413	-1.413	(0)
Se(4)		2.708e-15					
	HSe03-	2.690e-15	1.193e-15	-14.570	-14.923	-0.353	(0)
	Se03-2	1.341e-17	5.183e-19	-16.872	-18.285	-1.413	(0)
	H2Se03	4.383e-18	4.383e-18	-17.358	-17.358	0.000	(0)
	FeHSe03+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
	Cd(Se03)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
Se(6)		9.467e-35					
	Se04-2	9.354e-35	2.717e-35	-34.029	-34.566	-0.537	(0)
	MnSe04	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
	CoSe04	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
	NiSe04	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
	HSe04-	2.413e-38	1.070e-38	-37.617	-37.971	-0.353	(0)
	ZnSe04	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
	CdSe04	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
	Zn(Se04)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn		2.800e-05					
	Zn(S04)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)

Zn+2	6.051e-06	1.758e-06	-5.218	-5.755	-0.537	(0)
ZnS04	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
ZnOH+	3.259e-10	1.445e-10	-9.487	-9.840	-0.353	(0)
Zn(OH)2	3.473e-14	3.473e-14	-13.459	-13.459	0.000	(0)
Zn(OH)3-	4.384e-19	1.944e-19	-18.358	-18.711	-0.353	(0)
Zn(OH)4-2	2.236e-25	8.641e-27	-24.650	-26.063	-1.413	(0)
ZnSe04	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
Zn(Se04)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-161.31	-155.03	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-30.79	-26.25	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-38.05	-26.26	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-234.94	-217.01	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-43.95	-23.84	20.11	(Co(NH3)6)Cl3
(NH4)2Se04	-40.28	-39.83	0.45	(NH4)2Se04
Al(OH)3(am)	-1.87	9.19	11.06	Al(OH)3
Al2O3	-1.87	18.40	20.27	Al2O3
Al4(OH)10S04	2.10	24.80	22.70	Al4(OH)10S04
AlOHS04	0.46	-2.77	-3.23	AlOHS04
Alunite	7.17	6.27	-0.90	KAl3(S04)2(OH)6
Anglesite	-3.03	-10.85	-7.82	PbS04
Anhydrite	-0.16	-4.50	-4.34	CaS04
Antlerite	-19.78	-10.99	8.79	Cu3(OH)4S04
Atacamite	-12.71	-5.10	7.61	Cu2(OH)3Cl
Bianchite	-5.90	-7.66	-1.76	ZnS04:6H2O
Birnessite	-25.46	-7.37	18.09	MnO2
Bixbyite	-26.48	-26.83	-0.35	Mn2O3
Boehmite	0.34	9.20	8.86	AlOOH
Brochantite	-26.38	-10.67	15.71	Cu4(OH)6S04
Brucite	-9.04	8.08	17.12	Mg(OH)2
Bunsenite	-7.46	5.23	12.68	NiO
Ca3(P04)2(beta)	-4.91	-33.96	-29.05	Ca3(P04)2
Ca4H(P04)3:3H2O	-7.62	-54.70	-47.08	Ca4H(P04)3:3H2O
CaHP04	-1.37	-20.72	-19.35	CaHP04
CaHP04:2H2O	-1.68	-20.73	-19.05	CaHP04:2H2O
Calomel	-11.99	-30.12	-18.13	Hg2Cl2
CaSe03:2H2O	-15.37	-12.51	2.86	CaSe03:2H2O
CaSe04:2H2O	-34.20	-37.20	-3.00	CaSe04:2H2O
Cd(OH)2	-12.14	1.73	13.87	Cd(OH)2
Cd(OH)2(am)	-12.21	1.73	13.94	Cd(OH)2
Cd3(OH)2(S04)2	-25.45	-18.74	6.71	Cd3(OH)2(S04)2
Cd3(OH)4S04	-29.34	-6.78	22.56	Cd3(OH)4S04
Cd3(P04)2	-18.57	-51.17	-32.60	Cd3(P04)2
Cd4(OH)6S04	-33.45	-5.05	28.40	Cd4(OH)6S04
CdCl2	-9.14	-9.76	-0.61	CdCl2
CdCl2:1H2O	-8.09	-9.76	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-7.84	-9.77	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.05	-10.36	13.69	Cd
Cdmetal(gamma)	-24.16	-10.36	13.80	Cd
CdOHCl	-7.62	-4.01	3.61	CdOHCl
CdSe	10.72	-9.66	-20.38	CdSe
CdSe04:2H2O	-41.09	-42.94	-1.85	CdSe04:2H2O
CdS04	-10.19	-10.24	-0.05	CdS04
CdS04:1H2O	-8.59	-10.24	-1.65	CdS04:1H2O
CdS04:2.67H2O	-8.42	-10.25	-1.83	CdS04:2.67H2O
Chalcanthite	-9.01	-11.67	-2.65	CuS04:5H2O
Clausthalite	17.11	-10.27	-27.39	PbSe

Co(OH)2	-7.86	5.24	13.09	Co(OH)2
Co(OH)3	-19.03	-21.12	-2.09	Co(OH)3
Co3(P04)2	-5.95	-40.64	-34.69	Co3(P04)2
Co3O4	-26.74	-36.97	-10.24	Co3O4
CoCl2	-14.71	-6.25	8.46	CoCl2
CoCl2:6H2O	-8.80	-6.28	2.52	CoCl2:6H2O
CoFe2O4	7.95	4.80	-3.15	CoFe2O4
CoHP04	-3.88	-22.95	-19.06	CoHP04
CoO	-8.60	5.24	13.84	CoO
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-16.04	-14.72	1.32	CoSeO3
CoSeO4:6H2O	-37.92	-39.45	-1.53	CoSeO4:6H2O
CoS04	-9.72	-6.73	2.99	CoS04
CoS04:6H2O	-4.28	-6.76	-2.48	CoS04:6H2O
Cotunnite	-5.53	-10.37	-4.84	PbCl2
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.91	-69.49	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.83	-17.48	-46.31	Cu2Se
Cu2S04	-16.16	-18.06	-1.90	Cu2S04
Cu3(P04)2	-18.54	-55.39	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-20.28	-55.40	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.75	-28.55	-64.30	Cu3Se2
Cumetal	-0.17	-9.09	-8.93	Cu
Cu0CuS04	-21.94	-11.31	10.63	Cu0CuS04
Cupricferrite	-6.60	-0.11	6.49	CuFe2O4
Cuprite	-4.98	-6.09	-1.11	Cu2O
Cuprousferrite	5.61	-3.27	-8.88	CuFeO2
CuSe	22.32	-11.06	-33.39	CuSe
CuSe2	23.34	-10.36	-33.70	CuSe2
CuSeO3:2H2O	-20.25	-19.65	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-41.92	-44.36	-2.44	CuSeO4:5H2O
CuS04	-14.76	-11.64	3.11	CuS04
Diaspore	2.08	9.20	7.12	AlOOH
Epsomite	-1.77	-3.92	-2.15	MgS04:7H2O
Fe(OH)2	-6.70	6.86	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.09	-1.95	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-21.97	-20.42	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-39.73	-60.36	-20.63	Fe2(SeO3)3:2H2O
Fe2(S04)3	-33.19	-36.35	-3.16	Fe2(S04)3
Fe3(OH)8	-13.82	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.59	-0.23	3.37	Fe(OH)3
Ferroselite	14.88	-3.83	-18.71	FeSe2
FeSe	6.48	-4.53	-11.00	FeSe
Gibbsite	0.67	9.19	8.52	Al(OH)3
Goethite	-0.86	-0.22	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnS04:7H2O
Gypsum	0.10	-4.51	-4.61	CaS04:2H2O
H-Jarosite	-13.07	-24.62	-11.55	(H3O)Fe3(S04)2(OH)6
H2Se(g)	-6.47	-11.40	-4.92	H2Se
Halite	-3.04	-1.44	1.59	NaCl
Hausmannite	-31.51	30.53	62.03	Mn3O4
Hematite	0.67	-0.44	-1.11	Fe2O3
Hercynite	1.62	25.26	23.64	FeAl2O4
Hg(g)	-7.44	-15.36	-7.93	Hg
Hg(OH)2	-21.45	-24.94	-3.50	Hg(OH)2
Hg2(g)	-15.63	-30.73	-15.09	Hg2
Hg2(OH)2	-23.90	-18.64	5.26	Hg2(OH)2
Hg2HP04	-22.05	-46.82	-24.77	Hg2HP04
Hg2SeO3	-33.94	-38.60	-4.66	Hg2SeO3
Hg2S04	-24.46	-30.60	-6.14	Hg2S04
HgCl(g)	-34.94	-15.06	19.88	HgCl
HgCl2	-14.91	-36.43	-21.52	HgCl2
Hgmetal(l)	-1.71	-15.36	-13.65	Hg
HgSe	19.36	-36.33	-55.69	HgSe
HgSeO3	-32.48	-44.91	-12.43	HgSeO3
HgS04	-27.45	-36.91	-9.45	HgS04
Hinsdalite	-8.96	-11.46	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	-2.88	-47.21	-44.33	Ca5(P04)3OH

Hydroxylpyromorphite	-16.18	-78.97	-62.79	Pb5(P04)30H
K-Alum	-6.93	-12.18	-5.24	KAl(S04)2:12H20
K-Jarosite	-7.50	-21.99	-14.49	KFe3(S04)2(OH)6
K2Se04	-38.68	-39.41	-0.73	K2Se04
Langite	-28.56	-10.68	17.88	Cu4(OH)6S04:H20
Larnakite	-9.35	-9.73	-0.38	Pb0:PbS04
Laurionite	-5.25	-4.63	0.62	Pb0HCl
Lepidocrocite	-1.59	-0.22	1.37	Fe00H
Lime	-25.69	7.47	33.16	Ca0
Litharge	-11.73	1.12	12.85	Pb0
Maghemite	-6.83	-0.44	6.39	Fe203
Magnesioferrite	-9.88	7.64	17.52	Fe2Mg04
Magnetite	2.53	6.43	3.90	Fe304
Manganite	-13.15	12.19	25.34	Mn00H
Massicot	-11.93	1.12	13.05	Pb0
Melanothallite	-17.57	-11.16	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeS04:7H20
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(P04)2	-8.84	-32.12	-23.28	Mg3(P04)2
MgHP04:3H20	-1.94	-20.12	-18.18	MgHP04:3H20
MgSe03:6H20	-14.96	-11.91	3.04	MgSe03:6H20
MgSe04:6H20	-35.41	-36.61	-1.20	MgSe04:6H20
Minium	-59.08	15.45	74.53	Pb304
Mirabilite	-2.11	-3.42	-1.30	Na2S04:10H20
Mn2(S04)3	-57.42	-62.74	-5.32	Mn2(S04)3
Mn3(P04)2	-14.09	-37.94	-23.85	Mn3(P04)2
MnCl2:4H20	-8.11	-5.37	2.74	MnCl2:4H20
MnHP04	3.36	-22.04	-25.40	MnHP04
MnSe	-8.98	-5.25	3.73	MnSe
MnSe03	-14.95	-13.82	1.13	MnSe03
MnSe03:2H20	-14.80	-13.83	0.96	MnSe03:2H20
MnSe04:5H20	-36.49	-38.54	-2.05	MnSe04:5H20
MnS04	-8.56	-5.83	2.74	MnS04
Monteponite	-13.62	1.73	15.35	Cd0
Montroydite	-21.39	-24.94	-3.55	Hg0
Morenosite	-4.60	-6.78	-2.17	NiS04:7H20
Na-Jarosite	-9.47	-20.31	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H20	-21.69	-11.39	10.30	Na2Se03:5H20
Na2Se04	-37.34	-36.06	1.28	Na2Se04
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(P04)2	-9.39	-40.69	-31.30	Ni3(P04)2
Ni4(OH)6S04	-23.08	8.92	32.00	Ni4(OH)6S04
NiSe	11.53	-6.17	-17.70	NiSe
NiSe03:2H20	-17.64	-14.75	2.89	NiSe03:2H20
NiSe04:6H20	-37.94	-39.46	-1.52	NiSe04:6H20
Nsutite	-24.87	-7.37	17.50	Mn02
O2(g)	-60.26	24.19	84.45	O2
Pb(OH)2	-7.18	1.11	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.31	-3.52	8.79	Pb2(OH)3Cl
Pb20(OH)2	-23.96	2.23	26.19	Pb20(OH)2
Pb203	-46.71	14.33	61.04	Pb203
Pb3(P04)2	-9.49	-53.02	-43.53	Pb3(P04)2
Pb302S04	-19.49	-8.61	10.87	Pb302S04
Pb4(OH)6S04	-28.61	-7.51	21.10	Pb4(OH)6S04
Pb403S04	-29.70	-7.50	22.20	Pb403S04
PbHP04	-3.26	-27.07	-23.81	PbHP04
Pbmetal	-15.22	-10.98	4.24	Pb
Pb0:0.3H20	-11.86	1.12	12.98	Pb0:0.33H20
PbSe04	-36.67	-43.54	-6.88	PbSe04
Periclase	-13.86	8.08	21.94	Mg0
Plattnerite	-37.09	13.21	50.31	Pb02
Plumbgummite	5.12	-27.67	-32.79	PbAl3(P04)2(OH)5:H20
Portlandite	-15.65	7.46	23.11	Ca(OH)2
Pyrochroite	-9.29	6.14	15.43	Mn(OH)2
Pyrolusite	-23.79	18.24	42.03	Mn02
Pyromorphite	-0.28	-84.71	-84.43	Pb5(P04)3Cl
Retgersite	-4.72	-6.77	-2.05	NiS04:6H20

Semetal(am)	7.84	0.70	-7.14	Se
Semetal(hex	8.45	0.70	-7.75	Se
SeO2	-20.09	-19.97	0.12	SeO2
SeO3	-66.05	-44.66	21.39	SeO3
Spinel	-11.29	26.48	37.77	MgAl2O4
Strengite	-2.04	-28.42	-26.38	FePO4:2H2O
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.71	-3.37	0.34	Na2SO4
Tsumebite	-15.85	-25.64	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	0.19	-35.81	-36.00	Fe3(P04)2:8H2O
Zincite	-7.21	4.34	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnSO4
Zn(NO3)2:6H2O	-139.22	-135.96	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-7.87	4.33	12.20	Zn(OH)2
Zn(OH)2(am)	-8.33	4.33	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.62	4.33	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.39	4.33	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.40	4.33	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.80	-3.30	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.26	2.93	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-7.95	-43.37	-35.42	Zn3(P04)2:4H2O
Zn3O(SO4)2	-30.45	-10.92	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-23.03	5.37	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-28.31	10.19	38.50	Zn5(OH)8Cl2
ZnCl2	-14.37	-7.15	7.22	ZnCl2
Znmetal	-33.91	-7.76	26.15	Zn
ZnO(active)	-7.06	4.34	11.40	ZnO
ZnSe	7.41	-7.05	-14.46	ZnSe
ZnSeO4:6H2O	-38.83	-40.35	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.10	-7.64	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 5.
Using reaction 6.

Mixture 5.

9.880e-01 Solution 1
1.200e-02 Solution 7

Reaction 6.

2.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000
Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	2.060e-04	1.986e-04
Ca	1.571e-02	1.514e-02

Cd	3.797e-07	3.660e-07
Cl	2.835e-01	2.733e-01
Co	4.382e-04	4.224e-04
Cu	1.560e-04	1.504e-04
Fe	1.790e-02	1.726e-02
Hg	2.128e-09	2.051e-09
K	5.895e-03	5.682e-03
Mg	5.883e-02	5.671e-02
Mn	3.321e-03	3.202e-03
N	4.571e-03	4.406e-03
Na	2.729e-01	2.631e-01
Ni	1.013e-04	9.762e-05
P	8.130e-04	7.837e-04
Pb	5.150e-08	4.964e-08
S	1.012e-01	9.754e-02
Se	1.081e-06	1.042e-06
Zn	2.905e-05	2.800e-05

-----Description of solution-----

pH	=	5.045	Charge balance
pe	=	1.031	Adjusted to redox equilibrium
Activity of water	=	0.988	
Ionic strength (mol/kgw)	=	5.018e-01	
Mass of water (kg)	=	9.640e-01	
Total alkalinity (eq/kg)	=	1.433e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	-9.552e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.26	
Iterations	=	4	
Total H	=	1.070329e+02	
Total O	=	5.390014e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.228e-05	9.024e-06	-4.911	-5.045	-0.134	0.00
OH-	1.280e-09	8.117e-10	-8.893	-9.091	-0.198	(0)
H2O	5.551e+01	9.879e-01	1.744	-0.005	0.000	18.05
Al	2.060e-04					
AlSO4+	1.567e-04	1.046e-04	-3.805	-3.980	-0.175	(0)
Al(SO4)2-	2.498e-05	1.667e-05	-4.602	-4.778	-0.175	(0)
Al+3	1.847e-05	1.154e-06	-4.734	-5.938	-1.204	(0)
AlOH+2	4.242e-06	9.789e-07	-5.372	-6.009	-0.637	(0)
Al(OH)2+	1.608e-06	1.114e-06	-5.794	-5.953	-0.159	(0)
Al(OH)3	2.451e-08	2.451e-08	-7.611	-7.611	0.000	(0)
Al(OH)4-	1.970e-09	1.315e-09	-8.706	-8.881	-0.175	(0)
Ca	1.571e-02					
Ca+2	8.365e-03	2.439e-03	-2.078	-2.613	-0.535	(0)
CaSO4	7.318e-03	7.318e-03	-2.136	-2.136	0.000	(0)
CaH2PO4+	2.250e-05	1.559e-05	-4.648	-4.807	-0.159	(0)
CaHPO4	2.200e-06	2.200e-06	-5.658	-5.658	0.000	(0)
CaNH3+2	1.272e-08	4.666e-10	-7.896	-9.331	-1.435	(0)
CaPO4-	8.574e-10	5.943e-10	-9.067	-9.226	-0.159	(0)
CaOH+	5.331e-11	3.775e-11	-10.273	-10.423	-0.150	(0)
Ca(NH3)2+2	7.694e-16	2.823e-17	-15.114	-16.549	-1.435	(0)
CaNO3+	0.000e+00	0.000e+00	-66.621	-66.980	-0.359	(0)
Cd	3.797e-07					
CdCl+	1.917e-07	8.388e-08	-6.717	-7.076	-0.359	(0)
CdCl2	7.195e-08	7.195e-08	-7.143	-7.143	0.000	(0)
Cd(SO4)2-2	6.784e-08	2.489e-09	-7.169	-8.604	-1.435	(0)
CdCl3-	2.076e-08	9.088e-09	-7.683	-8.042	-0.359	(0)
Cd+2	1.456e-08	4.245e-09	-7.837	-8.372	-0.535	(0)
CdSO4	1.292e-08	1.292e-08	-7.889	-7.889	0.000	(0)

CdOHC1	3.451e-12	3.451e-12	-11.462	-11.462	0.000	(0)
CdOH+	6.289e-14	2.752e-14	-13.201	-13.560	-0.359	(0)
Cd2OH+3	1.044e-18	6.153e-22	-17.981	-21.211	-3.230	(0)
Cd(OH)2	2.586e-19	2.586e-19	-18.587	-18.587	0.000	(0)
CdHS+	2.002e-22	8.762e-23	-21.699	-22.057	-0.359	(0)
Cd(OH)3-	3.979e-26	1.742e-26	-25.400	-25.759	-0.359	(0)
Cd(OH)4-2	8.565e-35	3.142e-36	-34.067	-35.503	-1.435	(0)
Cd(HS)2	2.840e-37	2.840e-37	-36.547	-36.547	0.000	(0)
Cd(SeO3)2-2	5.647e-38	2.072e-39	-37.248	-38.684	-1.435	(0)
CdSeO4	0.000e+00	0.000e+00	-40.457	-40.457	0.000	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-55.981	-56.340	-0.359	(0)
CdNO3+	0.000e+00	0.000e+00	-72.343	-72.702	-0.359	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-74.402	-75.837	-1.435	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-137.932	-137.932	0.000	(0)
Cl	2.835e-01					
Cl-	2.831e-01	2.080e-01	-0.548	-0.682	-0.134	(0)
CuCl2-	1.360e-04	8.864e-05	-3.866	-4.052	-0.186	(0)
MnCl+	4.245e-05	2.896e-05	-4.372	-4.538	-0.166	(0)
CoCl+	2.261e-05	9.898e-06	-4.646	-5.004	-0.359	(0)
CuCl3-2	1.791e-05	3.881e-06	-4.747	-5.411	-0.664	(0)
NiCl+	1.668e-05	7.302e-06	-4.778	-5.137	-0.359	(0)
MnCl2	8.511e-06	8.511e-06	-5.070	-5.070	0.000	(0)
CuCl	2.020e-06	2.020e-06	-5.695	-5.695	0.000	(0)
ZnCl+	1.338e-06	8.717e-07	-5.874	-6.060	-0.186	(0)
MnCl3-	7.147e-07	4.876e-07	-6.146	-6.312	-0.166	(0)
ZnCl2	2.417e-07	2.417e-07	-6.617	-6.617	0.000	(0)
CdCl+	1.917e-07	8.388e-08	-6.717	-7.076	-0.359	(0)
CdCl2	7.195e-08	7.195e-08	-7.143	-7.143	0.000	(0)
ZnCl3-	6.029e-08	3.928e-08	-7.220	-7.406	-0.186	(0)
CdCl3-	2.076e-08	9.088e-09	-7.683	-8.042	-0.359	(0)
ZnCl4-2	1.826e-08	3.957e-09	-7.738	-8.403	-0.664	(0)
PbCl+	1.651e-08	7.227e-09	-7.782	-8.141	-0.359	(0)
NiCl2	7.733e-09	7.733e-09	-8.112	-8.112	0.000	(0)
PbCl2	6.595e-09	6.595e-09	-8.181	-8.181	0.000	(0)
PbCl4-2	1.394e-09	5.115e-11	-8.856	-10.291	-1.435	(0)
PbCl3-	1.304e-09	5.707e-10	-8.885	-9.244	-0.359	(0)
ZnOHC1	1.296e-09	1.296e-09	-8.887	-8.887	0.000	(0)
CuCl+	8.498e-11	5.537e-11	-10.071	-10.257	-0.186	(0)
CdOHC1	3.451e-12	3.451e-12	-11.462	-11.462	0.000	(0)
CuCl2	3.280e-12	3.280e-12	-11.484	-11.484	0.000	(0)
FeCl+2	1.179e-14	2.554e-15	-13.929	-14.593	-0.664	(0)
CuCl3-	9.096e-15	5.927e-15	-14.041	-14.227	-0.186	(0)
HgCl4-2	6.144e-15	2.254e-16	-14.212	-15.647	-1.435	(0)
FeCl2+	3.946e-15	2.692e-15	-14.404	-14.570	-0.166	(0)
HgCl3-	5.995e-16	2.624e-16	-15.222	-15.581	-0.359	(0)
HgCl2	1.250e-16	1.250e-16	-15.903	-15.903	0.000	(0)
FeCl3	5.601e-17	5.601e-17	-16.252	-16.252	0.000	(0)
CuCl4-2	3.266e-17	7.077e-18	-16.486	-17.150	-0.664	(0)
HgClOH	8.909e-21	8.909e-21	-20.050	-20.050	0.000	(0)
HgCl+	2.328e-22	1.019e-22	-21.633	-21.992	-0.359	(0)
CoCl+2	6.287e-34	2.307e-35	-33.202	-34.637	-1.435	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.572	-43.007	-1.435	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.084	-56.520	-1.435	(0)
Co(2)	4.382e-04					
Co+2	3.790e-04	1.391e-05	-3.421	-4.857	-1.435	(0)
CoSO4	3.651e-05	3.651e-05	-4.438	-4.438	0.000	(0)
CoCl+	2.261e-05	9.898e-06	-4.646	-5.004	-0.359	(0)
CoHPO4	2.944e-08	2.944e-08	-7.531	-7.531	0.000	(0)
Co(NH3)+2	9.890e-09	3.629e-10	-8.005	-9.440	-1.435	(0)
CoOH+	6.988e-10	3.058e-10	-9.156	-9.514	-0.359	(0)
Co2OH+3	3.618e-13	2.131e-16	-12.442	-15.671	-3.230	(0)
Co(NH3)2+2	4.488e-14	1.647e-15	-13.348	-14.783	-1.435	(0)
Co(OH)2	2.678e-14	2.678e-14	-13.572	-13.572	0.000	(0)
Co(NH3)3+2	8.585e-20	3.150e-21	-19.066	-20.502	-1.435	(0)
Co(OH)3-	1.346e-21	5.891e-22	-20.871	-21.230	-0.359	(0)
CoOOH-	8.191e-23	3.585e-23	-22.087	-22.446	-0.359	(0)
Co4(OH)4+4	9.635e-25	1.746e-30	-24.016	-29.758	-5.742	(0)
Co(NH3)4+2	6.846e-26	2.512e-27	-25.165	-26.600	-1.435	(0)

Co(OH)4-2	2.805e-30	1.029e-31	-29.552	-30.987	-1.435	(0)
Co(NH3)5+2	1.727e-32	6.334e-34	-31.763	-33.198	-1.435	(0)
CoSeO4	2.884e-37	2.884e-37	-36.540	-36.540	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.670	-52.029	-0.359	(0)
CoNO3+	0.000e+00	0.000e+00	-69.178	-69.537	-0.359	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.108	-134.108	0.000	(0)
Co(3)	9.147e-32					
CoOH+2	9.083e-32	3.333e-33	-31.042	-32.477	-1.435	(0)
CoCl+2	6.287e-34	2.307e-35	-33.202	-34.637	-1.435	(0)
Co+3	9.519e-36	5.949e-37	-35.021	-36.226	-1.204	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.572	-43.007	-1.435	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.468	-52.826	-0.359	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.084	-56.520	-1.435	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.911	-60.347	-1.435	(0)
Cu(1)	1.560e-04					
CuCl2-	1.360e-04	8.864e-05	-3.866	-4.052	-0.186	(0)
CuCl3-2	1.791e-05	3.881e-06	-4.747	-5.411	-0.664	(0)
CuCl	2.020e-06	2.020e-06	-5.695	-5.695	0.000	(0)
Cu+	1.762e-08	7.713e-09	-7.754	-8.113	-0.359	(0)
Cu(S4)2-3	3.084e-38	9.546e-39	-37.511	-38.020	-0.509	(0)
CuS4S5-3	5.301e-39	1.778e-39	-38.276	-38.750	-0.475	(0)
Cu(2)	1.226e-09					
Cu+2	6.027e-10	1.758e-10	-9.220	-9.755	-0.535	(0)
CuSO4	5.227e-10	5.227e-10	-9.282	-9.282	0.000	(0)
CuCl+	8.498e-11	5.537e-11	-10.071	-10.257	-0.186	(0)
CuNH3+2	1.106e-11	4.057e-13	-10.956	-12.392	-1.435	(0)
CuCl2	3.280e-12	3.280e-12	-11.484	-11.484	0.000	(0)
CuOH+	7.727e-13	5.034e-13	-12.112	-12.298	-0.186	(0)
CuCl3-	9.096e-15	5.927e-15	-14.041	-14.227	-0.186	(0)
Cu(OH)2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	3.266e-17	7.077e-18	-16.486	-17.150	-0.664	(0)
Cu2(OH)2+2	1.688e-19	6.194e-21	-18.773	-20.208	-1.435	(0)
Cu(OH)3-	6.963e-22	3.047e-22	-21.157	-21.516	-0.359	(0)
Cu(OH)4-2	7.206e-29	2.644e-30	-28.142	-29.578	-1.435	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-48.577	-48.936	-0.359	(0)
CuNO2+	0.000e+00	0.000e+00	-55.396	-55.755	-0.359	(0)
CuNO3+	0.000e+00	0.000e+00	-73.766	-74.125	-0.359	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-102.765	-102.765	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-139.915	-139.915	0.000	(0)
Fe(2)	1.790e-02					
Fe+2	1.591e-02	5.839e-04	-1.798	-3.234	-1.435	(0)
FeSO4	1.868e-03	1.868e-03	-2.729	-2.729	0.000	(0)
FeH2PO4+	1.167e-04	8.085e-05	-3.933	-4.092	-0.159	(0)
FeHPO4	4.511e-06	4.511e-06	-5.346	-5.346	0.000	(0)
FeOH+	2.765e-08	1.887e-08	-7.558	-7.724	-0.166	(0)
Fe(OH)2	1.164e-14	1.164e-14	-13.934	-13.934	0.000	(0)
Fe(OH)3-	5.730e-18	3.910e-18	-17.242	-17.408	-0.166	(0)
Fe(HS)2	2.137e-38	2.137e-38	-37.670	-37.670	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-56.968	-57.327	-0.359	(0)
Fe(3)	2.172e-10					
Fe(OH)2+	2.031e-10	1.408e-10	-9.692	-9.851	-0.159	(0)
FeHPO4+	1.261e-11	8.742e-12	-10.899	-11.058	-0.159	(0)
FeOH+2	1.204e-12	2.610e-13	-11.919	-12.583	-0.664	(0)
Fe(OH)3	9.432e-14	9.432e-14	-13.025	-13.025	0.000	(0)
FeSO4+	9.003e-14	6.143e-14	-13.046	-13.212	-0.166	(0)
Fe(SO4)2-	4.218e-14	1.846e-14	-13.375	-13.734	-0.359	(0)
FeCl+2	1.179e-14	2.554e-15	-13.929	-14.593	-0.664	(0)
FeH2PO4+2	1.048e-14	2.420e-15	-13.979	-14.616	-0.637	(0)
Fe+3	7.380e-15	4.612e-16	-14.132	-15.336	-1.204	(0)
FeCl2+	3.946e-15	2.692e-15	-14.404	-14.570	-0.166	(0)
FeCl3	5.601e-17	5.601e-17	-16.252	-16.252	0.000	(0)
Fe(OH)4-	2.468e-17	1.711e-17	-16.608	-16.767	-0.159	(0)
Fe2(OH)2+4	1.435e-18	2.601e-24	-17.843	-23.585	-5.742	(0)
Fe3(OH)4+5	4.755e-24	5.076e-33	-23.323	-32.294	-8.972	(0)
FeHSeO3+2	5.051e-26	1.853e-27	-25.297	-26.732	-1.435	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.692	-79.128	-1.435	(0)
H(0)	9.260e-16					
H2	4.630e-16	5.197e-16	-15.334	-15.284	0.050	(0)

Hg(0)	2.128e-09					
Hg	2.128e-09	2.128e-09	-8.672	-8.672	0.000	(0)
Hg(1)	1.269e-27					
Hg2+2	6.347e-28	2.329e-29	-27.197	-28.633	-1.435	(0)
Hg(2)	6.869e-15					
HgCl4-2	6.144e-15	2.254e-16	-14.212	-15.647	-1.435	(0)
HgCl3-	5.995e-16	2.624e-16	-15.222	-15.581	-0.359	(0)
HgCl2	1.250e-16	1.250e-16	-15.903	-15.903	0.000	(0)
HgClOH	8.909e-21	8.909e-21	-20.050	-20.050	0.000	(0)
HgCl+	2.328e-22	1.019e-22	-21.633	-21.992	-0.359	(0)
Hg(NH3)2+2	2.674e-23	9.812e-25	-22.573	-24.008	-1.435	(0)
Hg(OH)2	1.189e-25	1.334e-25	-24.925	-24.875	0.050	(0)
HgNH3+2	4.547e-26	1.668e-27	-25.342	-26.778	-1.435	(0)
HgOH+	1.936e-27	8.472e-28	-26.713	-27.072	-0.359	(0)
Hg+2	5.898e-28	2.164e-29	-27.229	-28.665	-1.435	(0)
HgS04	6.204e-29	6.204e-29	-28.207	-28.207	0.000	(0)
Hg(NH3)3+2	2.324e-29	8.525e-31	-28.634	-30.069	-1.435	(0)
Hg(HS)2	1.500e-34	1.500e-34	-33.824	-33.824	0.000	(0)
Hg(OH)3-	4.231e-35	1.852e-35	-34.374	-34.732	-0.359	(0)
Hg(NH3)4+2	4.050e-35	1.486e-36	-34.393	-35.828	-1.435	(0)
HgHS2-	1.533e-35	6.708e-36	-34.815	-35.173	-0.359	(0)
HgS2-2	3.969e-38	1.456e-39	-37.401	-38.837	-1.435	(0)
HgNO3+	0.000e+00	0.000e+00	-93.713	-94.072	-0.359	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.333	-159.333	0.000	(0)
K	5.895e-03					
K+	5.359e-03	3.938e-03	-2.271	-2.405	-0.134	(0)
KS04-	5.355e-04	3.712e-04	-3.271	-3.430	-0.159	(0)
KHP04-	8.366e-08	5.798e-08	-7.077	-7.237	-0.159	(0)
Mg	5.883e-02					
Mg+2	3.448e-02	1.006e-02	-1.462	-1.998	-0.535	(0)
MgS04	2.414e-02	2.414e-02	-1.617	-1.617	0.000	(0)
MgH2P04+	1.983e-04	1.374e-04	-3.703	-3.862	-0.159	(0)
MgHP04	1.252e-05	1.252e-05	-4.902	-4.902	0.000	(0)
MgOH+	4.229e-09	3.042e-09	-8.374	-8.517	-0.143	(0)
MgP04-	5.525e-11	3.829e-11	-10.258	-10.417	-0.159	(0)
Mn(2)	3.321e-03					
Mn+2	3.014e-03	1.106e-04	-2.521	-3.956	-1.435	(0)
MnS04	2.553e-04	2.553e-04	-3.593	-3.593	0.000	(0)
MnCl+	4.245e-05	2.896e-05	-4.372	-4.538	-0.166	(0)
MnCl2	8.511e-06	8.511e-06	-5.070	-5.070	0.000	(0)
MnCl3-	7.147e-07	4.876e-07	-6.146	-6.312	-0.166	(0)
MnOH+	3.305e-10	2.255e-10	-9.481	-9.647	-0.166	(0)
MnSe	2.320e-11	2.320e-11	-10.635	-10.635	0.000	(0)
Mn(OH)3-	3.371e-24	2.300e-24	-23.472	-23.638	-0.166	(0)
Mn(OH)4-2	3.778e-32	8.186e-33	-31.423	-32.087	-0.664	(0)
MnSe04	1.218e-36	1.218e-36	-35.914	-35.914	0.000	(0)
MnNO3+	0.000e+00	0.000e+00	-68.277	-68.636	-0.359	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.112	-133.112	0.000	(0)
Mn(3)	4.703e-28					
Mn+3	4.703e-28	2.939e-29	-27.328	-28.532	-1.204	(0)
Mn(6)	0.000e+00					
Mn04-2	0.000e+00	0.000e+00	-78.947	-79.611	-0.664	(0)
Mn(7)	0.000e+00					
Mn04-	0.000e+00	0.000e+00	-88.006	-88.218	-0.212	(0)
N(-3)	4.571e-03					
NH4+	4.056e-03	2.405e-03	-2.392	-2.619	-0.227	(0)
NH4S04-	5.143e-04	3.509e-04	-3.289	-3.455	-0.166	(0)
NH3	1.142e-07	1.142e-07	-6.942	-6.942	0.000	(0)
NiNH3+2	4.455e-08	1.635e-09	-7.351	-8.787	-1.435	(0)
CaNH3+2	1.272e-08	4.666e-10	-7.896	-9.331	-1.435	(0)
Co(NH3)+2	9.890e-09	3.629e-10	-8.005	-9.440	-1.435	(0)
CuNH3+2	1.106e-11	4.057e-13	-10.956	-12.392	-1.435	(0)
Ni(NH3)2+2	1.250e-12	4.585e-14	-11.903	-13.339	-1.435	(0)
Co(NH3)2+2	4.488e-14	1.647e-15	-13.348	-14.783	-1.435	(0)
Ca(NH3)2+2	7.694e-16	2.823e-17	-15.114	-16.549	-1.435	(0)
Co(NH3)3+2	8.585e-20	3.150e-21	-19.066	-20.502	-1.435	(0)
Hg(NH3)2+2	2.674e-23	9.812e-25	-22.573	-24.008	-1.435	(0)
Co(NH3)4+2	6.846e-26	2.512e-27	-25.165	-26.600	-1.435	(0)

HgNH3+2	4.547e-26	1.668e-27	-25.342	-26.778	-1.435	(0)
Hg(NH3)3+2	2.324e-29	8.525e-31	-28.634	-30.069	-1.435	(0)
Co(NH3)5+2	1.727e-32	6.334e-34	-31.763	-33.198	-1.435	(0)
Hg(NH3)4+2	4.050e-35	1.486e-36	-34.393	-35.828	-1.435	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.572	-43.007	-1.435	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.468	-52.826	-0.359	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.084	-56.520	-1.435	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.911	-60.347	-1.435	(0)
N(3)	0.000e+00					
N02-	0.000e+00	0.000e+00	-47.809	-48.020	-0.212	(0)
CoN02+	0.000e+00	0.000e+00	-51.670	-52.029	-0.359	(0)
CuN02+	0.000e+00	0.000e+00	-55.396	-55.755	-0.359	(0)
Cu(N02)2	0.000e+00	0.000e+00	-102.765	-102.765	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-64.746	-64.880	-0.134	(0)
CaN03+	0.000e+00	0.000e+00	-66.621	-66.980	-0.359	(0)
MnN03+	0.000e+00	0.000e+00	-68.277	-68.636	-0.359	(0)
NiN03+	0.000e+00	0.000e+00	-68.979	-69.338	-0.359	(0)
CoN03+	0.000e+00	0.000e+00	-69.178	-69.537	-0.359	(0)
ZnN03+	0.000e+00	0.000e+00	-69.875	-70.234	-0.359	(0)
CdN03+	0.000e+00	0.000e+00	-72.343	-72.702	-0.359	(0)
PbN03+	0.000e+00	0.000e+00	-72.344	-72.703	-0.359	(0)
CuN03+	0.000e+00	0.000e+00	-73.766	-74.125	-0.359	(0)
FeN03+2	0.000e+00	0.000e+00	-77.692	-79.128	-1.435	(0)
HgN03+	0.000e+00	0.000e+00	-93.713	-94.072	-0.359	(0)
Mn(N03)2	0.000e+00	0.000e+00	-133.112	-133.112	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-134.108	-134.108	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-135.825	-135.825	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-137.332	-137.332	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-137.932	-137.932	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-139.915	-139.915	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-159.333	-159.333	0.000	(0)
Na	2.729e-01					
Na+	2.534e-01	1.862e-01	-0.596	-0.730	-0.134	(0)
NaS04-	1.954e-02	1.354e-02	-1.709	-1.868	-0.159	(0)
NaHP04-	6.126e-06	4.246e-06	-5.213	-5.372	-0.159	(0)
Ni	1.013e-04					
Ni+2	4.756e-05	1.387e-05	-4.323	-4.858	-0.535	(0)
NiS04	3.650e-05	3.650e-05	-4.438	-4.438	0.000	(0)
NiCl+	1.668e-05	7.302e-06	-4.778	-5.137	-0.359	(0)
Ni(S04)2-2	4.631e-07	1.699e-08	-6.334	-7.770	-1.435	(0)
NiNH3+2	4.455e-08	1.635e-09	-7.351	-8.787	-1.435	(0)
NiCl2	7.733e-09	7.733e-09	-8.112	-8.112	0.000	(0)
NiOH+	3.310e-10	1.449e-10	-9.480	-9.839	-0.359	(0)
Ni(NH3)2+2	1.250e-12	4.585e-14	-11.903	-13.339	-1.435	(0)
Ni(OH)2	1.686e-14	1.686e-14	-13.773	-13.773	0.000	(0)
Ni(OH)3-	4.246e-20	1.858e-20	-19.372	-19.731	-0.359	(0)
NiSe04	2.656e-37	2.656e-37	-36.576	-36.576	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-68.979	-69.338	-0.359	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-62.899	-62.849	0.050	(0)
P	8.130e-04					
H2P04-	4.400e-04	3.050e-04	-3.357	-3.516	-0.159	(0)
MgH2P04+	1.983e-04	1.374e-04	-3.703	-3.862	-0.159	(0)
FeH2P04+	1.167e-04	8.085e-05	-3.933	-4.092	-0.159	(0)
CaH2P04+	2.250e-05	1.559e-05	-4.648	-4.807	-0.159	(0)
MgHP04	1.252e-05	1.252e-05	-4.902	-4.902	0.000	(0)
HP04-2	9.725e-06	2.107e-06	-5.012	-5.676	-0.664	(0)
NaHP04-	6.126e-06	4.246e-06	-5.213	-5.372	-0.159	(0)
FeHP04	4.511e-06	4.511e-06	-5.346	-5.346	0.000	(0)
CaHP04	2.200e-06	2.200e-06	-5.658	-5.658	0.000	(0)
H3P04	3.705e-07	3.705e-07	-6.431	-6.431	0.000	(0)
KHP04-	8.366e-08	5.798e-08	-7.077	-7.237	-0.159	(0)
CoHP04	2.944e-08	2.944e-08	-7.531	-7.531	0.000	(0)
CaP04-	8.574e-10	5.943e-10	-9.067	-9.226	-0.159	(0)
MgP04-	5.525e-11	3.829e-11	-10.258	-10.417	-0.159	(0)
FeHP04+	1.261e-11	8.742e-12	-10.899	-11.058	-0.159	(0)
P04-3	1.451e-12	9.070e-14	-11.838	-13.042	-1.204	(0)

FeH2PO4+2	1.048e-14	2.420e-15	-13.979	-14.616	-0.637	(0)
Pb	5.150e-08					
PbCl+	1.651e-08	7.227e-09	-7.782	-8.141	-0.359	(0)
Pb(SO4)2-2	1.532e-08	5.619e-10	-7.815	-9.250	-1.435	(0)
PbSO4	6.849e-09	6.849e-09	-8.164	-8.164	0.000	(0)
PbCl2	6.595e-09	6.595e-09	-8.181	-8.181	0.000	(0)
Pb+2	3.522e-09	1.027e-09	-8.453	-8.988	-0.535	(0)
PbCl4-2	1.394e-09	5.115e-11	-8.856	-10.291	-1.435	(0)
PbCl3-	1.304e-09	5.707e-10	-8.885	-9.244	-0.359	(0)
PbOH+	6.498e-12	2.844e-12	-11.187	-11.546	-0.359	(0)
Pb(OH)2	9.914e-17	9.914e-17	-16.004	-16.004	0.000	(0)
Pb2OH+3	7.857e-17	4.629e-20	-16.105	-19.335	-3.230	(0)
Pb(OH)3-	2.497e-22	1.093e-22	-21.603	-21.961	-0.359	(0)
Pb(OH)4-2	8.042e-28	2.950e-29	-27.095	-28.530	-1.435	(0)
Pb3(OH)4+2	2.917e-30	1.070e-31	-29.535	-30.971	-1.435	(0)
Pb4(OH)4+4	5.587e-31	1.012e-36	-30.253	-35.995	-5.742	(0)
Pb(HS)2	7.852e-38	7.852e-38	-37.105	-37.105	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-57.139	-57.498	-0.359	(0)
PbNO3+	0.000e+00	0.000e+00	-72.344	-72.703	-0.359	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.332	-137.332	0.000	(0)
S(-2)	2.227e-20					
H2S	2.160e-20	2.160e-20	-19.666	-19.666	0.000	(0)
HS-	4.630e-22	2.026e-22	-21.334	-21.693	-0.359	(0)
CdHS+	2.002e-22	8.762e-23	-21.699	-22.057	-0.359	(0)
S5-2	2.148e-25	7.882e-27	-24.668	-26.103	-1.435	(0)
S6-2	8.049e-26	2.953e-27	-25.094	-26.530	-1.435	(0)
S4-2	5.399e-26	1.981e-27	-25.268	-26.703	-1.435	(0)
S3-2	8.309e-27	3.048e-28	-26.080	-27.516	-1.435	(0)
S2-2	7.824e-28	2.871e-29	-27.107	-28.542	-1.435	(0)
S-2	3.961e-34	8.583e-35	-33.402	-34.066	-0.664	(0)
Hg(HS)2	1.500e-34	1.500e-34	-33.824	-33.824	0.000	(0)
HgHS2-	1.533e-35	6.708e-36	-34.815	-35.173	-0.359	(0)
Zn(HS)2	4.662e-37	4.662e-37	-36.331	-36.331	0.000	(0)
Cd(HS)2	2.840e-37	2.840e-37	-36.547	-36.547	0.000	(0)
ZnS(HS)-	1.153e-37	5.048e-38	-36.938	-37.297	-0.359	(0)
Pb(HS)2	7.852e-38	7.852e-38	-37.105	-37.105	0.000	(0)
HgS2-2	3.969e-38	1.456e-39	-37.401	-38.837	-1.435	(0)
Cu(S4)2-3	3.084e-38	9.546e-39	-37.511	-38.020	-0.509	(0)
Fe(HS)2	2.137e-38	2.137e-38	-37.670	-37.670	0.000	(0)
CuS4S5-3	5.301e-39	1.778e-39	-38.276	-38.750	-0.475	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-48.577	-48.936	-0.359	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-54.386	-54.745	-0.359	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-55.981	-56.340	-0.359	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-56.968	-57.327	-0.359	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-57.139	-57.498	-0.359	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-58.245	-59.680	-1.435	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-74.402	-75.837	-1.435	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-76.463	-77.898	-1.435	(0)
S(6)	1.012e-01					
SO4-2	4.669e-02	1.362e-02	-1.331	-1.866	-0.535	(0)
MgSO4	2.414e-02	2.414e-02	-1.617	-1.617	0.000	(0)
NaSO4-	1.954e-02	1.354e-02	-1.709	-1.868	-0.159	(0)
CaSO4	7.318e-03	7.318e-03	-2.136	-2.136	0.000	(0)
FeSO4	1.868e-03	1.868e-03	-2.729	-2.729	0.000	(0)
KS04-	5.355e-04	3.712e-04	-3.271	-3.430	-0.159	(0)
NH4SO4-	5.143e-04	3.509e-04	-3.289	-3.455	-0.166	(0)
MnSO4	2.553e-04	2.553e-04	-3.593	-3.593	0.000	(0)
AlSO4+	1.567e-04	1.046e-04	-3.805	-3.980	-0.175	(0)
CoSO4	3.651e-05	3.651e-05	-4.438	-4.438	0.000	(0)
NiSO4	3.650e-05	3.650e-05	-4.438	-4.438	0.000	(0)
Al(SO4)2-	2.498e-05	1.667e-05	-4.602	-4.778	-0.175	(0)
Zn(SO4)2-2	1.655e-05	6.071e-07	-4.781	-6.217	-1.435	(0)
HSO4-	1.594e-05	1.064e-05	-4.797	-4.973	-0.175	(0)
ZnSO4	4.948e-06	4.948e-06	-5.306	-5.306	0.000	(0)
Ni(SO4)2-2	4.631e-07	1.699e-08	-6.334	-7.770	-1.435	(0)
Cd(SO4)2-2	6.784e-08	2.489e-09	-7.169	-8.604	-1.435	(0)
Pb(SO4)2-2	1.532e-08	5.619e-10	-7.815	-9.250	-1.435	(0)
CdSO4	1.292e-08	1.292e-08	-7.889	-7.889	0.000	(0)

PbSO4	6.849e-09	6.849e-09	-8.164	-8.164	0.000	(0)
CuSO4	5.227e-10	5.227e-10	-9.282	-9.282	0.000	(0)
FeSO4+	9.003e-14	6.143e-14	-13.046	-13.212	-0.166	(0)
Fe(SO4)2-	4.218e-14	1.846e-14	-13.375	-13.734	-0.359	(0)
HgSO4	6.204e-29	6.204e-29	-28.207	-28.207	0.000	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.468	-52.826	-0.359	(0)
Se(-2)	1.081e-06					
HSe-	1.049e-06	4.593e-07	-5.979	-6.338	-0.359	(0)
H2Se	3.160e-08	3.160e-08	-7.500	-7.500	0.000	(0)
MnSe	2.320e-11	2.320e-11	-10.635	-10.635	0.000	(0)
Se-2	1.065e-15	3.909e-17	-14.972	-16.408	-1.435	(0)
Se(4)	4.012e-15					
HSeO3-	3.985e-15	1.744e-15	-14.400	-14.758	-0.359	(0)
SeO3-2	2.040e-17	7.486e-19	-16.690	-18.126	-1.435	(0)
H2SeO3	6.490e-18	6.490e-18	-17.188	-17.188	0.000	(0)
FeHSeO3+2	5.051e-26	1.853e-27	-25.297	-26.732	-1.435	(0)
Cd(SeO3)2-2	5.647e-38	2.072e-39	-37.248	-38.684	-1.435	(0)
Se(6)	1.534e-34					
SeO4-2	1.516e-34	4.420e-35	-33.819	-34.355	-0.535	(0)
MnSeO4	1.218e-36	1.218e-36	-35.914	-35.914	0.000	(0)
CoSeO4	2.884e-37	2.884e-37	-36.540	-36.540	0.000	(0)
NiSeO4	2.656e-37	2.656e-37	-36.576	-36.576	0.000	(0)
HSeO4-	4.026e-38	1.762e-38	-37.395	-37.754	-0.359	(0)
ZnSeO4	1.176e-38	1.176e-38	-37.929	-37.929	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.457	-40.457	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-70.843	-72.278	-1.435	(0)
Zn	2.905e-05					
Zn(SO4)2-2	1.655e-05	6.071e-07	-4.781	-6.217	-1.435	(0)
Zn+2	5.893e-06	1.718e-06	-5.230	-5.765	-0.535	(0)
ZnSO4	4.948e-06	4.948e-06	-5.306	-5.306	0.000	(0)
ZnCl+	1.338e-06	8.717e-07	-5.874	-6.060	-0.186	(0)
ZnCl2	2.417e-07	2.417e-07	-6.617	-6.617	0.000	(0)
ZnCl3-	6.029e-08	3.928e-08	-7.220	-7.406	-0.186	(0)
ZnCl4-2	1.826e-08	3.957e-09	-7.738	-8.403	-0.664	(0)
ZnOHCl	1.296e-09	1.296e-09	-8.887	-8.887	0.000	(0)
ZnOH+	3.187e-10	1.395e-10	-9.497	-9.855	-0.359	(0)
Zn(OH)2	3.310e-14	3.310e-14	-13.480	-13.480	0.000	(0)
Zn(OH)3-	4.178e-19	1.829e-19	-18.379	-18.738	-0.359	(0)
Zn(OH)4-2	2.187e-25	8.025e-27	-24.660	-26.096	-1.435	(0)
Zn(HS)2	4.662e-37	4.662e-37	-36.331	-36.331	0.000	(0)
ZnS(HS)-	1.153e-37	5.048e-38	-36.938	-37.297	-0.359	(0)
ZnSeO4	1.176e-38	1.176e-38	-37.929	-37.929	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-54.386	-54.745	-0.359	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-58.245	-59.680	-1.435	(0)
ZnNO3+	0.000e+00	0.000e+00	-69.875	-70.234	-0.359	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-70.843	-72.278	-1.435	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-76.463	-77.898	-1.435	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-135.825	-135.825	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-160.81	-154.54	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-30.68	-26.14	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-37.94	-26.15	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-234.24	-216.31	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-43.83	-23.72	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-40.04	-39.59	0.45	(NH4)2SeO4
Al(OH)3(am)	-1.88	9.18	11.06	Al(OH)3
Al2O3	-1.89	18.38	20.27	Al2O3
Al4(OH)10SO4	2.08	24.78	22.70	Al4(OH)10SO4
AlOHSO4	0.47	-2.76	-3.23	AlOHSO4
Alunite	7.19	6.29	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.04	-10.85	-7.82	PbSO4
Anhydrite	-0.14	-4.48	-4.34	CaSO4
Anilite	1.06	-31.26	-32.31	Cu0.25Cu1.5S
Antlerite	-19.76	-10.97	8.79	Cu3(OH)4SO4

Atacamite	-12.69	-5.07	7.61	Cu ₂ (OH) ₃ Cl
Bianchite	-5.90	-7.66	-1.76	ZnSO ₄ ·6H ₂ O
Birnessite	-25.42	-7.33	18.09	MnO ₂
Bixbyite	-26.46	-26.81	-0.35	Mn ₂ O ₃
BlaubleiI	-2.89	-27.05	-24.16	Cu _{0.9} Cu _{0.2} S
BlaubleiII	-1.71	-28.99	-27.28	Cu _{0.6} Cu _{0.8} S
Boehmite	0.33	9.19	8.86	Al ₂ O ₃
Brochantite	-26.36	-10.65	15.71	Cu ₄ (OH) ₆ SO ₄
Brucite	-9.03	8.08	17.12	Mg(OH) ₂
Bunsenite	-7.46	5.23	12.68	NiO
Ca ₃ (PO ₄) ₂ (beta)	-4.87	-33.92	-29.05	Ca ₃ (PO ₄) ₂
Ca ₄ H(PO ₄) ₃ ·3H ₂ O	-7.56	-54.64	-47.08	Ca ₄ H(PO ₄) ₃ ·3H ₂ O
CaHPO ₄	-1.35	-20.70	-19.35	CaHPO ₄
CaHPO ₄ ·2H ₂ O	-1.66	-20.71	-19.05	CaHPO ₄ ·2H ₂ O
Calomel	-11.87	-30.00	-18.13	Hg ₂ Cl ₂
CaSeO ₃ ·2H ₂ O	-15.20	-12.34	2.86	CaSeO ₃ ·2H ₂ O
CaSeO ₄ ·2H ₂ O	-33.98	-36.98	-3.00	CaSeO ₄ ·2H ₂ O
Cd(OH) ₂	-12.16	1.71	13.87	Cd(OH) ₂
Cd(OH) ₂ (am)	-12.23	1.71	13.94	Cd(OH) ₂
Cd ₃ (OH) ₂ (SO ₄) ₂	-25.48	-18.77	6.71	Cd ₃ (OH) ₂ (SO ₄) ₂
Cd ₃ (OH) ₄ SO ₄	-29.38	-6.82	22.56	Cd ₃ (OH) ₄ SO ₄
Cd ₃ (PO ₄) ₂	-18.60	-51.20	-32.60	Cd ₃ (PO ₄) ₂
Cd ₄ (OH) ₆ SO ₄	-33.52	-5.12	28.40	Cd ₄ (OH) ₆ SO ₄
CdCl ₂	-9.12	-9.74	-0.61	CdCl ₂
CdCl ₂ ·1H ₂ O	-8.07	-9.74	-1.68	CdCl ₂ ·1H ₂ O
CdCl ₂ ·2.5H ₂ O	-7.82	-9.75	-1.93	CdCl ₂ ·2.5H ₂ O
Cdmetal(alpha)	-24.13	-10.43	13.69	Cd
Cdmetal(gamma)	-24.23	-10.43	13.80	Cd
CdOHCl	-7.63	-4.01	3.61	CdOHCl
CdSe	10.72	-9.67	-20.38	CdSe
CdSeO ₄ ·2H ₂ O	-40.89	-42.74	-1.85	CdSeO ₄ ·2H ₂ O
CdSO ₄	-10.19	-10.24	-0.05	CdSO ₄
CdSO ₄ ·1H ₂ O	-8.59	-10.24	-1.65	CdSO ₄ ·1H ₂ O
CdSO ₄ ·2.67H ₂ O	-8.42	-10.25	-1.83	CdSO ₄ ·2.67H ₂ O
Chalcanthite	-8.99	-11.65	-2.65	CuSO ₄ ·5H ₂ O
Chalcocite	2.45	-32.87	-35.32	Cu ₂ S
Chalcopyrite	-10.66	-46.29	-35.62	CuFeS ₂
Cinnabar	-5.30	-51.60	-46.30	HgS
Clausthalite	17.10	-10.28	-27.39	PbSe
Co(OH) ₂	-7.87	5.22	13.09	Co(OH) ₂
Co(OH) ₃	-19.02	-21.11	-2.09	Co(OH) ₃
Co ₃ (PO ₄) ₂	-5.97	-40.66	-34.69	Co ₃ (PO ₄) ₂
Co ₃ O ₄	-26.73	-36.97	-10.24	Co ₃ O ₄
CoCl ₂	-14.68	-6.22	8.46	CoCl ₂
CoCl ₂ ·6H ₂ O	-8.77	-6.25	2.52	CoCl ₂ ·6H ₂ O
CoFe ₂ O ₄	7.96	4.81	-3.15	CoFe ₂ O ₄
CoHPO ₄	-3.88	-22.94	-19.06	CoHPO ₄
CoO	-8.61	5.23	13.84	CoO
CoS(alpha)	-14.07	-21.51	-7.44	CoS
CoS(beta)	-10.44	-21.51	-11.07	CoS
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO ₃	-15.89	-14.57	1.32	CoSeO ₃
CoSeO ₄ ·6H ₂ O	-37.71	-39.24	-1.53	CoSeO ₄ ·6H ₂ O
CoSO ₄	-9.71	-6.72	2.99	CoSO ₄
CoSO ₄ ·6H ₂ O	-4.28	-6.75	-2.48	CoSO ₄ ·6H ₂ O
Cotunnite	-5.51	-10.35	-4.84	PbCl ₂
Covellite	-3.87	-26.40	-22.53	CuS
Cu(OH) ₂	-8.48	0.32	8.81	Cu(OH) ₂
Cu ₂ (OH) ₃ NO ₃	-78.70	-69.27	9.42	Cu ₂ (OH) ₃ NO ₃
Cu ₂ Se(alpha)	28.79	-17.52	-46.31	Cu ₂ Se
Cu ₂ SO ₄	-16.19	-18.09	-1.90	Cu ₂ SO ₄
Cu ₃ (PO ₄) ₂	-18.50	-55.35	-36.85	Cu ₃ (PO ₄) ₂
Cu ₃ (PO ₄) ₂ ·3H ₂ O	-20.25	-55.37	-35.12	Cu ₃ (PO ₄) ₂ ·3H ₂ O
Cu ₃ Se ₂	35.73	-28.57	-64.30	Cu ₃ Se ₂
Cumetal	-0.22	-9.14	-8.93	Cu
CuOCuSO ₄	-21.92	-11.29	10.63	CuOCuSO ₄
Cupricferrite	-6.58	-0.09	6.49	CuFe ₂ O ₄
Cuprite	-5.03	-6.14	-1.11	Cu ₂ O

Cuprousferrite	5.60	-3.28	-8.88	CuFeO2
CuSe	22.34	-11.05	-33.39	CuSe
CuSe2	23.42	-10.28	-33.70	CuSe2
CuSeO3:2H2O	-20.08	-19.48	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-41.70	-44.14	-2.44	CuSeO4:5H2O
CuSO4	-14.73	-11.62	3.11	CuSO4
Diaspore	2.07	9.19	7.12	AlOOH
Djurleite	1.95	-32.45	-34.40	Cu0.066Cu1.868S
Epsomite	-1.75	-3.90	-2.15	MgSO4:7H2O
Fe(OH)2	-6.72	6.84	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.11	-1.93	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-21.78	-20.23	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-39.20	-59.82	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-33.11	-36.27	-3.16	Fe2(SO4)3
Fe3(OH)8	-13.81	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.58	-0.22	3.37	Fe(OH)3
Ferroselite	14.95	-3.76	-18.71	FeSe2
FeS(ppt)	-16.96	-19.88	-2.92	FeS
FeSe	6.48	-4.53	-11.00	FeSe
Galena	-11.48	-25.64	-14.16	PbS
Gibbsite	0.66	9.18	8.52	Al(OH)3
Goethite	-0.85	-0.21	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4:7H2O
Greenockite	-10.53	-25.02	-14.49	CdS
Greigite	-55.47	-100.50	-45.03	Fe3S4
Gypsum	0.12	-4.49	-4.61	CaSO4:2H2O
H-Jarosite	-13.00	-24.55	-11.55	(H3O)Fe3(SO4)2(OH)6
H2S(g)	-18.73	-26.74	-8.01	H2S
H2Se(g)	-6.46	-11.38	-4.92	H2Se
Halite	-3.01	-1.41	1.59	NaCl
Hausmannite	-31.50	30.53	62.03	Mn3O4
Hematite	0.69	-0.42	-1.11	Fe2O3
Hercynite	1.59	25.23	23.64	FeAl2O4
Hg(g)	-7.42	-15.35	-7.93	Hg
Hg(OH)2	-21.38	-24.87	-3.50	Hg(OH)2
Hg2(g)	-15.60	-30.70	-15.09	Hg2
Hg2(OH)2	-23.81	-18.55	5.26	Hg2(OH)2
Hg2HPO4	-21.94	-46.72	-24.77	Hg2HPO4
Hg2S	-33.44	-45.28	-11.84	Hg2S
Hg2SeO3	-33.69	-38.35	-4.66	Hg2SeO3
Hg2SO4	-24.36	-30.50	-6.14	Hg2SO4
HgCl(g)	-34.88	-15.00	19.88	HgCl
HgCl2	-14.80	-36.32	-21.52	HgCl2
Hgmetal(l)	-1.70	-15.35	-13.65	Hg
HgSe	19.45	-36.25	-55.69	HgSe
HgSeO3	-32.24	-44.67	-12.43	HgSeO3
HgSO4	-27.37	-36.82	-9.45	HgSO4
Hinsdalite	-8.97	-11.47	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-2.82	-47.15	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-16.24	-79.03	-62.79	Pb5(PO4)3OH
K-Alum	-6.90	-12.14	-5.24	KAl(SO4)2:12H2O
K-Jarosite	-7.42	-21.91	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-38.43	-39.16	-0.73	K2SeO4
Langite	-28.54	-10.66	17.88	Cu4(OH)6SO4:H2O
Larnakite	-9.38	-9.76	-0.38	PbO:PbSO4
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.58	-0.21	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.75	1.10	12.85	PbO
Mackinawite	-16.28	-19.88	-3.60	FeS
Maghemite	-6.81	-0.42	6.39	Fe2O3
Magnesioferrite	-9.86	7.67	17.52	Fe2MgO4
Magnetite	2.53	6.43	3.90	Fe3O4
Manganite	-13.14	12.20	25.34	MnOOH
Massicot	-11.96	1.10	13.05	PbO
Melanothallite	-17.53	-11.12	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeSO4:7H2O
Metacinnabar	-5.90	-51.60	-45.70	HgS

Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(P04)2	-8.80	-32.08	-23.28	Mg3(P04)2
MgHP04:3H2O	-1.93	-20.10	-18.18	MgHP04:3H2O
MgSe03:6H2O	-14.79	-11.74	3.04	MgSe03:6H2O
MgSe04:6H2O	-35.18	-36.38	-1.20	MgSe04:6H2O
Minium	-59.09	15.43	74.53	Pb304
Mirabilite	-2.08	-3.38	-1.30	Na2S04:10H2O
Mn2(S04)3	-57.34	-62.66	-5.32	Mn2(S04)3
Mn3(P04)2	-14.11	-37.95	-23.85	Mn3(P04)2
MnCl2:4H2O	-8.08	-5.34	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnS(grn)	-20.85	-20.60	0.25	MnS
MnS(pnk)	-23.94	-20.60	3.34	MnS
MnSe	-8.98	-5.25	3.73	MnSe
MnSe03	-14.80	-13.67	1.13	MnSe03
MnSe03:2H2O	-14.64	-13.68	0.96	MnSe03:2H2O
MnSe04:5H2O	-36.29	-38.34	-2.05	MnSe04:5H2O
MnS04	-8.56	-5.82	2.74	MnS04
Monteponite	-13.64	1.71	15.35	Cd0
Montroydite	-21.32	-24.87	-3.55	Hg0
Morenosite	-4.59	-6.76	-2.17	NiS04:7H2O
Na-Jarosite	-9.39	-20.23	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-21.50	-11.20	10.30	Na2Se03:5H2O
Na2Se04	-37.09	-35.81	1.28	Na2Se04
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(P04)2	-9.36	-40.66	-31.30	Ni3(P04)2
Ni4(OH)6S04	-23.06	8.94	32.00	Ni4(OH)6S04
NiS(alpha)	-15.91	-21.51	-5.60	NiS
NiS(beta)	-10.41	-21.51	-11.10	NiS
NiS(gamma)	-8.71	-21.51	-12.80	NiS
NiSe	11.55	-6.15	-17.70	NiSe
NiSe03:2H2O	-17.47	-14.58	2.89	NiSe03:2H2O
NiSe04:6H2O	-37.72	-39.24	-1.52	NiSe04:6H2O
Nsutite	-24.84	-7.33	17.50	Mn02
O2(g)	-60.16	24.29	84.45	O2
Pb(OH)2	-7.20	1.09	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.33	-3.54	8.79	Pb2(OH)3Cl
Pb20(OH)2	-24.00	2.19	26.19	Pb20(OH)2
Pb203	-46.70	14.34	61.04	Pb203
Pb3(P04)2	-9.52	-53.05	-43.53	Pb3(P04)2
Pb302S04	-19.54	-8.66	10.87	Pb302S04
Pb4(OH)6S04	-28.68	-7.58	21.10	Pb4(OH)6S04
Pb403S04	-29.77	-7.57	22.20	Pb403S04
PbHP04	-3.27	-27.08	-23.81	PbHP04
Pbmetal	-15.30	-11.05	4.24	Pb
Pb0:0.3H2O	-11.89	1.09	12.98	Pb0:0.33H2O
PbSe04	-36.47	-43.34	-6.88	PbSe04
Periclase	-13.86	8.09	21.94	Mg0
Plattnerite	-37.06	13.24	50.31	Pb02
Plumbgummite	5.10	-27.69	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-15.64	7.47	23.11	Ca(OH)2
Pyrite	-15.84	-34.47	-18.63	FeS2
Pyrochroite	-9.30	6.12	15.43	Mn(OH)2
Pyrolusite	-23.75	18.27	42.03	Mn02
Pyromorphite	-0.32	-84.75	-84.43	Pb5(P04)3Cl
Retgersite	-4.70	-6.76	-2.05	NiS04:6H2O
Semetal(am)	7.91	0.77	-7.14	Se
Semetal(hex	8.52	0.77	-7.75	Se
Se02	-19.92	-19.80	0.12	Se02
Se03	-65.83	-44.44	21.39	Se03
Sphalerite	-10.89	-22.41	-11.52	ZnS
Spinel	-11.31	26.46	37.77	MgAl204
Strengite	-2.01	-28.39	-26.38	FeP04:2H2O
Sulfur	-12.48	-14.59	-2.11	S
Tenorite	-7.47	0.33	7.80	Cu0
Thenardite	-3.67	-3.33	0.34	Na2S04
Tsumebite	-15.88	-25.67	-9.79	Pb2CuP04(OH)3:3H2O

Vivianite	0.17	-35.83	-36.00	Fe3(P04)2:8H20
Wurtzite	-13.41	-22.41	-9.00	ZnS
Zincite	-7.23	4.32	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnS04
Zn(N03)2:6H20	-138.81	-135.56	3.26	Zn(N03)2:6H20
Zn(OH)2	-7.89	4.31	12.20	Zn(OH)2
Zn(OH)2(am)	-8.35	4.31	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.64	4.31	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.42	4.31	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.42	4.31	11.73	Zn(OH)2
Zn2(OH)2S04	-10.82	-3.32	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-12.28	2.91	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H20	-7.98	-43.40	-35.42	Zn3(P04)2:4H20
Zn30(S04)2	-30.47	-10.94	19.53	Zn30(S04)2
Zn4(OH)6S04	-23.09	5.31	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-28.37	10.13	38.50	Zn5(OH)8Cl2
ZnCl2	-14.35	-7.13	7.22	ZnCl2
Znmetal	-33.98	-7.83	26.15	Zn
Zn0(active)	-7.08	4.32	11.40	Zn0
ZnS(am)	-13.32	-22.41	-9.09	ZnS
ZnSe	7.40	-7.06	-14.46	ZnSe
ZnSe04:6H20	-38.63	-40.15	-1.52	ZnSe04:6H20
ZnS04:1H20	-7.10	-7.64	-0.53	ZnS04:1H20

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 9.

SOLUTION 8 #Groundwater worst case maximum values

temp 21
pH 5.05
pe 1
redox pe
units mg/l
density 1
Al 5.21
Alkalinity 0
As 0
Ba 0
Be 0
B 0
Cd 0.04
Co 24.2
Cr 0
Cu 9.29
Fe 937
Pb 0.01
Mn 171
Mo 0
V 0
Zn 1.78
Se 0.08
Ni 5.57
N 60
P 23.6
Ca 590
Mg 1340
Na 5880
K 216
Cl 9420
S(6) 9110

```

Hg      0.0004
water  1 # kg
MIX 6
1      0.988
8      0.012
REACTION 7
H2O -1
2
END #Time-step 7

```

Beginning of initial solution calculations.

Initial solution 8.

-----Solution composition-----

Elements	Molality	Moles
Al	1.986e-04	1.986e-04
Ca	1.514e-02	1.514e-02
Cd	3.660e-07	3.660e-07
Cl	2.733e-01	2.733e-01
Co	4.224e-04	4.224e-04
Cu	1.504e-04	1.504e-04
Fe	1.726e-02	1.726e-02
Hg	2.051e-09	2.051e-09
K	5.682e-03	5.682e-03
Mg	5.671e-02	5.671e-02
Mn	3.202e-03	3.202e-03
N	4.406e-03	4.406e-03
Na	2.631e-01	2.631e-01
Ni	9.762e-05	9.762e-05
P	7.837e-04	7.837e-04
Pb	4.964e-08	4.964e-08
S(6)	9.754e-02	9.754e-02
Se	1.042e-06	1.042e-06
Zn	2.800e-05	2.800e-05

-----Description of solution-----

```

pH = 5.050
pe = 1.000
Activity of water = 0.988
Ionic strength (mol/kgw) = 4.862e-01
Mass of water (kg) = 1.000e+00
Total alkalinity (eq/kg) = 1.381e-05
Total carbon (mol/kg) = 0.000e+00
Total CO2 (mol/kg) = 0.000e+00
Temperature (°C) = 21.00
Electrical balance (eq) = -9.552e-03
Percent error, 100*(Cat-|An|)/(Cat+|An|) = -1.26
Iterations = 14
Total H = 1.110329e+02
Total O = 5.590014e+01

```

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.214e-05	8.913e-06	-4.916	-5.050	-0.134	0.00
OH-	1.292e-09	8.222e-10	-8.889	-9.085	-0.196	(0)
H2O	5.551e+01	9.883e-01	1.744	-0.005	0.000	18.05
Al	1.986e-04					
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Al+3	1.839e-05	1.139e-06	-4.735	-5.943	-1.208	(0)

	AlOH+2	4.197e-06	9.786e-07	-5.377	-6.009	-0.632	(0)
	Al(OH)2+	1.624e-06	1.128e-06	-5.790	-5.948	-0.158	(0)
	Al(OH)3	2.514e-08	2.514e-08	-7.600	-7.600	0.000	(0)
	Al(OH)4-	2.040e-09	1.366e-09	-8.690	-8.864	-0.174	(0)
Ca	1.514e-02						
	Ca+2	8.161e-03	2.370e-03	-2.088	-2.625	-0.537	(0)
	CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
	CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
	CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
	CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
	CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
	CaOH+	5.236e-11	3.715e-11	-10.281	-10.430	-0.149	(0)
	Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
	CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
Cd	3.660e-07						
	CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
	CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
	Cd(SO4)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
	CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
	Cd+2	1.502e-08	4.363e-09	-7.823	-8.360	-0.537	(0)
	CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
	CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
	CdOH+	6.462e-14	2.865e-14	-13.190	-13.543	-0.353	(0)
	Cd2OH+3	9.945e-19	6.582e-22	-18.002	-21.182	-3.179	(0)
	Cd(OH)2	2.726e-19	2.726e-19	-18.564	-18.564	0.000	(0)
	Cd(OH)3-	4.195e-26	1.860e-26	-25.377	-25.730	-0.353	(0)
	Cd(OH)4-2	8.799e-35	3.400e-36	-34.056	-35.469	-1.413	(0)
	Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
	CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
	CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
	Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cl	2.733e-01						
	Cl-	2.729e-01	2.003e-01	-0.564	-0.698	-0.134	(0)
	CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
	MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
	CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
	CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
	NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
	MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
	CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
	ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
	MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
	ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
	CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
	CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
	ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
	CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
	PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
	ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
	NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
	PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
	ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
	PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
	PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
	CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
	CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
	CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
	FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
	CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
	HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
	FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
	HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
	HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
	FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
	CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
	HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
	HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
	CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)

Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(2)	4.224e-04					
Co+2	3.644e-04	1.408e-05	-3.438	-4.851	-1.413	(0)
CoS04	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CoOH+	7.075e-10	3.137e-10	-9.150	-9.504	-0.353	(0)
Co2OH+3	3.344e-13	2.213e-16	-12.476	-15.655	-3.179	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Co(OH)2	2.782e-14	2.782e-14	-13.556	-13.556	0.000	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Co(OH)3-	1.398e-21	6.199e-22	-20.854	-21.208	-0.353	(0)
CoOOH-	8.505e-23	3.771e-23	-22.070	-22.424	-0.353	(0)
Co4(OH)4+4	8.668e-25	1.932e-30	-24.062	-29.714	-5.652	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
Co(OH)4-2	2.839e-30	1.097e-31	-29.547	-30.960	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Co(3)	8.287e-32					
CoOH+2	8.232e-32	3.180e-33	-31.085	-32.498	-1.413	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co+3	9.049e-36	5.605e-37	-35.043	-36.251	-1.208	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
Cu(1)	1.504e-04					
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
Cu+	1.823e-08	8.082e-09	-7.739	-8.092	-0.353	(0)
Cu(2)	1.182e-09					
Cu+2	5.900e-10	1.714e-10	-9.229	-9.766	-0.537	(0)
CuS04	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
CuOH+	7.604e-13	4.972e-13	-12.119	-12.303	-0.185	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
Cu(OH)2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
Cu2(OH)2+2	1.564e-19	6.042e-21	-18.806	-20.219	-1.413	(0)
Cu(OH)3-	6.965e-22	3.088e-22	-21.157	-21.510	-0.353	(0)
Cu(OH)4-2	7.024e-29	2.714e-30	-28.153	-29.566	-1.413	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Fe(2)	1.726e-02					
Fe+2	1.529e-02	5.907e-04	-1.816	-3.229	-1.413	(0)
FeS04	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
FeH2P04+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
FeOH+	2.826e-08	1.934e-08	-7.549	-7.714	-0.165	(0)
Fe(OH)2	1.209e-14	1.209e-14	-13.918	-13.918	0.000	(0)
Fe(OH)3-	6.009e-18	4.111e-18	-17.221	-17.386	-0.165	(0)
Fe(3)	2.087e-10					
Fe(OH)2+	1.957e-10	1.360e-10	-9.708	-9.867	-0.158	(0)
FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
FeOH+2	1.136e-12	2.489e-13	-11.945	-12.604	-0.659	(0)
Fe(OH)3	9.228e-14	9.228e-14	-13.035	-13.035	0.000	(0)
FeS04+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(S04)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)

FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Fe+3	7.010e-15	4.342e-16	-14.154	-15.362	-1.208	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
Fe(OH)4-	2.440e-17	1.696e-17	-16.613	-16.771	-0.158	(0)
Fe2(OH)2+4	1.061e-18	2.365e-24	-17.974	-23.626	-5.652	(0)
Fe3(OH)4+5	3.023e-24	4.459e-33	-23.520	-32.351	-8.831	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
H(0)	1.047e-15					
H2	5.235e-16	5.855e-16	-15.281	-15.232	0.049	(0)
Hg(0)	2.051e-09					
Hg	2.051e-09	2.051e-09	-8.688	-8.688	0.000	(0)
Hg(1)	9.698e-28					
Hg2+2	4.849e-28	1.874e-29	-27.314	-28.727	-1.413	(0)
Hg(2)	4.726e-15					
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Hg(OH)2	1.022e-25	1.143e-25	-24.991	-24.942	0.049	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
HgOH+	1.615e-27	7.162e-28	-26.792	-27.145	-0.353	(0)
Hg+2	4.674e-28	1.806e-29	-27.330	-28.743	-1.413	(0)
HgSO4	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Hg(OH)3-	3.623e-35	1.606e-35	-34.441	-34.794	-0.353	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
K	5.682e-03					
K+	5.178e-03	3.801e-03	-2.286	-2.420	-0.134	(0)
KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
Mg	5.671e-02					
Mg+2	3.360e-02	9.758e-03	-1.474	-2.011	-0.537	(0)
MgSO4	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
MgHPO4	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
MgOH+	4.148e-09	2.990e-09	-8.382	-8.524	-0.142	(0)
MgPO4-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
Mn(2)	3.202e-03					
Mn+2	2.899e-03	1.120e-04	-2.538	-3.951	-1.413	(0)
MnSO4	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
MnOH+	3.381e-10	2.313e-10	-9.471	-9.636	-0.165	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Mn(OH)3-	3.538e-24	2.421e-24	-23.451	-23.616	-0.165	(0)
Mn(OH)4-2	3.983e-32	8.727e-33	-31.400	-32.059	-0.659	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Mn(3)	4.471e-28					
Mn+3	4.471e-28	2.769e-29	-27.350	-28.558	-1.208	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-79.028	-79.687	-0.659	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-88.115	-88.325	-0.210	(0)
N(-3)	4.406e-03					
NH4+	3.919e-03	2.335e-03	-2.407	-2.632	-0.225	(0)
NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
NH3	1.123e-07	1.123e-07	-6.950	-6.950	0.000	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)

CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
N(3)	0.000e+00					
N02-	0.000e+00	0.000e+00	-47.968	-48.177	-0.210	(0)
CoN02+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CuN02+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
Cu(N02)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-64.954	-65.088	-0.134	(0)
CaN03+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
MnN03+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
NiN03+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
CoN03+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
ZnN03+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
CdN03+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
PbN03+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
CuN03+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
FeN03+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
HgN03+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Mn(N03)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
Na	2.631e-01					
Na+	2.447e-01	1.796e-01	-0.611	-0.746	-0.134	(0)
NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
NaHP04-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
Ni	9.762e-05					
Ni+2	4.671e-05	1.357e-05	-4.331	-4.867	-0.537	(0)
NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
Ni(SO4)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
NiOH+	3.238e-10	1.435e-10	-9.490	-9.843	-0.353	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Ni(OH)2	1.692e-14	1.692e-14	-13.772	-13.772	0.000	(0)
Ni(OH)3-	4.261e-20	1.889e-20	-19.371	-19.724	-0.353	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-63.001	-62.952	0.049	(0)
P	7.837e-04					
H2PO4-	4.270e-04	2.967e-04	-3.370	-3.528	-0.158	(0)
MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
MgHP04	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
HP04-2	9.473e-06	2.076e-06	-5.024	-5.683	-0.659	(0)
NaHP04-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)

FeHP04	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
CaHP04	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
H3P04	3.560e-07	3.560e-07	-6.449	-6.449	0.000	(0)
KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
CoHP04	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
CaP04-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
MgP04-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
FeHP04+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
P04-3	1.460e-12	9.045e-14	-11.836	-13.044	-1.208	(0)
FeH2P04+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Pb	4.964e-08					
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
Pb(S04)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
PbS04	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
Pb+2	3.636e-09	1.056e-09	-8.439	-8.976	-0.537	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
PbOH+	6.682e-12	2.963e-12	-11.175	-11.528	-0.353	(0)
Pb(OH)2	1.046e-16	1.046e-16	-15.980	-15.980	0.000	(0)
Pb2OH+3	7.494e-17	4.960e-20	-16.125	-19.305	-3.179	(0)
Pb(OH)3-	2.635e-22	1.168e-22	-21.579	-21.933	-0.353	(0)
Pb(OH)4-2	8.268e-28	3.195e-29	-27.083	-28.496	-1.413	(0)
Pb3(OH)4+2	3.173e-30	1.226e-31	-29.499	-30.912	-1.413	(0)
Pb4(OH)4+4	5.352e-31	1.193e-36	-30.271	-35.923	-5.652	(0)
PbN03+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
Pb(N03)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
S(6)	9.754e-02					
S04-2	4.586e-02	1.332e-02	-1.339	-1.875	-0.537	(0)
MgS04	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
NaS04-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
CaS04	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
FeS04	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
NH4S04-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
MnS04	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
AlS04+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
CoS04	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
NiS04	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
Al(S04)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Zn(S04)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
HS04-	1.536e-05	1.028e-05	-4.814	-4.988	-0.174	(0)
ZnS04	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
Ni(S04)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
Cd(S04)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
Pb(S04)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
CdS04	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
PbS04	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
CuS04	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
FeS04+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(S04)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
HgS04	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Se(-2)	1.042e-06					
HSe-	1.012e-06	4.485e-07	-5.995	-6.348	-0.353	(0)
H2Se	3.047e-08	3.047e-08	-7.516	-7.516	0.000	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Se-2	1.000e-15	3.865e-17	-15.000	-16.413	-1.413	(0)
Se(4)	2.708e-15					
HSe03-	2.690e-15	1.193e-15	-14.570	-14.923	-0.353	(0)
Se03-2	1.341e-17	5.183e-19	-16.872	-18.285	-1.413	(0)
H2Se03	4.383e-18	4.383e-18	-17.358	-17.358	0.000	(0)
FeHSe03+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
Cd(Se03)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
Se(6)	9.467e-35					
Se04-2	9.354e-35	2.717e-35	-34.029	-34.566	-0.537	(0)
MnSe04	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
CoSe04	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)

	NiSe04	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
	HSe04-	2.413e-38	1.070e-38	-37.617	-37.971	-0.353	(0)
	ZnSe04	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
	CdSe04	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
	Zn(Se04)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn	2.800e-05						
	Zn(S04)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
	Zn+2	6.051e-06	1.758e-06	-5.218	-5.755	-0.537	(0)
	ZnS04	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
	ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
	ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
	ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
	ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
	ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
	ZnOH+	3.259e-10	1.445e-10	-9.487	-9.840	-0.353	(0)
	Zn(OH)2	3.473e-14	3.473e-14	-13.459	-13.459	0.000	(0)
	Zn(OH)3-	4.384e-19	1.944e-19	-18.358	-18.711	-0.353	(0)
	Zn(OH)4-2	2.236e-25	8.641e-27	-24.650	-26.063	-1.413	(0)
	ZnSe04	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
	ZnN03+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
	Zn(Se04)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
	Zn(N03)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(N03)2	-161.31	-155.03	6.27	(Co(NH3)5Cl)(N03)2
(Co(NH3)5Cl)Cl2	-30.79	-26.25	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-38.05	-26.26	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(N03)3	-234.94	-217.01	17.93	(Co(NH3)6)(N03)3
(Co(NH3)6)Cl3	-43.95	-23.84	20.11	(Co(NH3)6)Cl3
(NH4)2Se04	-40.28	-39.83	0.45	(NH4)2Se04
Al(OH)3(am)	-1.87	9.19	11.06	Al(OH)3
Al2O3	-1.87	18.40	20.27	Al2O3
Al4(OH)10S04	2.10	24.80	22.70	Al4(OH)10S04
AlOHS04	0.46	-2.77	-3.23	AlOHS04
Alunite	7.17	6.27	-0.90	KAl3(S04)2(OH)6
Anglesite	-3.03	-10.85	-7.82	PbS04
Anhydrite	-0.16	-4.50	-4.34	CaS04
Antlerite	-19.78	-10.99	8.79	Cu3(OH)4S04
Atacamite	-12.71	-5.10	7.61	Cu2(OH)3Cl
Bianchite	-5.90	-7.66	-1.76	ZnS04:6H2O
Birnessite	-25.46	-7.37	18.09	MnO2
Bixbyite	-26.48	-26.83	-0.35	Mn2O3
Boehmite	0.34	9.20	8.86	AlOOH
Brochantite	-26.38	-10.67	15.71	Cu4(OH)6S04
Brucite	-9.04	8.08	17.12	Mg(OH)2
Bunsenite	-7.46	5.23	12.68	NiO
Ca3(P04)2(beta)	-4.91	-33.96	-29.05	Ca3(P04)2
Ca4H(P04)3:3H2O	-7.62	-54.70	-47.08	Ca4H(P04)3:3H2O
CaHP04	-1.37	-20.72	-19.35	CaHP04
CaHP04:2H2O	-1.68	-20.73	-19.05	CaHP04:2H2O
Calomel	-11.99	-30.12	-18.13	Hg2Cl2
CaSe03:2H2O	-15.37	-12.51	2.86	CaSe03:2H2O
CaSe04:2H2O	-34.20	-37.20	-3.00	CaSe04:2H2O
Cd(OH)2	-12.14	1.73	13.87	Cd(OH)2
Cd(OH)2(am)	-12.21	1.73	13.94	Cd(OH)2
Cd3(OH)2(S04)2	-25.45	-18.74	6.71	Cd3(OH)2(S04)2
Cd3(OH)4S04	-29.34	-6.78	22.56	Cd3(OH)4S04
Cd3(P04)2	-18.57	-51.17	-32.60	Cd3(P04)2
Cd4(OH)6S04	-33.45	-5.05	28.40	Cd4(OH)6S04
CdCl2	-9.14	-9.76	-0.61	CdCl2
CdCl2:1H2O	-8.09	-9.76	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-7.84	-9.77	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.05	-10.36	13.69	Cd
Cdmetal(gamma)	-24.16	-10.36	13.80	Cd
CdOHCl	-7.62	-4.01	3.61	CdOHCl

CdSe	10.72	-9.66	-20.38	CdSe
CdSeO4:2H2O	-41.09	-42.94	-1.85	CdSeO4:2H2O
CdSO4	-10.19	-10.24	-0.05	CdSO4
CdSO4:1H2O	-8.59	-10.24	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-8.42	-10.25	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.01	-11.67	-2.65	CuSO4:5H2O
Clausthalite	17.11	-10.27	-27.39	PbSe
Co(OH)2	-7.86	5.24	13.09	Co(OH)2
Co(OH)3	-19.03	-21.12	-2.09	Co(OH)3
Co3(P04)2	-5.95	-40.64	-34.69	Co3(P04)2
Co3O4	-26.74	-36.97	-10.24	Co3O4
CoCl2	-14.71	-6.25	8.46	CoCl2
CoCl2:6H2O	-8.80	-6.28	2.52	CoCl2:6H2O
CoFe2O4	7.95	4.80	-3.15	CoFe2O4
CoHP04	-3.88	-22.95	-19.06	CoHP04
CoO	-8.60	5.24	13.84	CoO
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-16.04	-14.72	1.32	CoSeO3
CoSeO4:6H2O	-37.92	-39.45	-1.53	CoSeO4:6H2O
CoSO4	-9.72	-6.73	2.99	CoSO4
CoSO4:6H2O	-4.28	-6.76	-2.48	CoSO4:6H2O
Cotunnite	-5.53	-10.37	-4.84	PbCl2
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.91	-69.49	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.83	-17.48	-46.31	Cu2Se
Cu2SO4	-16.16	-18.06	-1.90	Cu2SO4
Cu3(P04)2	-18.54	-55.39	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-20.28	-55.40	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.75	-28.55	-64.30	Cu3Se2
Cumetal	-0.17	-9.09	-8.93	Cu
CuOCuSO4	-21.94	-11.31	10.63	CuOCuSO4
Cupricferrite	-6.60	-0.11	6.49	CuFe2O4
Cuprite	-4.98	-6.09	-1.11	Cu2O
Cuprousferrite	5.61	-3.27	-8.88	CuFeO2
CuSe	22.32	-11.06	-33.39	CuSe
CuSe2	23.34	-10.36	-33.70	CuSe2
CuSeO3:2H2O	-20.25	-19.65	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-41.92	-44.36	-2.44	CuSeO4:5H2O
CuSO4	-14.76	-11.64	3.11	CuSO4
Diaspore	2.08	9.20	7.12	AlOOH
Epsomite	-1.77	-3.92	-2.15	MgSO4:7H2O
Fe(OH)2	-6.70	6.86	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.09	-1.95	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-21.97	-20.42	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-39.73	-60.36	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-33.19	-36.35	-3.16	Fe2(SO4)3
Fe3(OH)8	-13.82	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.59	-0.23	3.37	Fe(OH)3
Ferroselite	14.88	-3.83	-18.71	FeSe2
FeSe	6.48	-4.53	-11.00	FeSe
Gibbsite	0.67	9.19	8.52	Al(OH)3
Goethite	-0.86	-0.22	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4:7H2O
Gypsum	0.10	-4.51	-4.61	CaSO4:2H2O
H-Jarosite	-13.07	-24.62	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-6.47	-11.40	-4.92	H2Se
Halite	-3.04	-1.44	1.59	NaCl
Hausmannite	-31.51	30.53	62.03	Mn3O4
Hematite	0.67	-0.44	-1.11	Fe2O3
Hercynite	1.62	25.26	23.64	FeAl2O4
Hg(g)	-7.44	-15.36	-7.93	Hg
Hg(OH)2	-21.45	-24.94	-3.50	Hg(OH)2
Hg2(g)	-15.63	-30.73	-15.09	Hg2
Hg2(OH)2	-23.90	-18.64	5.26	Hg2(OH)2
Hg2HP04	-22.05	-46.82	-24.77	Hg2HP04
Hg2SeO3	-33.94	-38.60	-4.66	Hg2SeO3
Hg2SO4	-24.46	-30.60	-6.14	Hg2SO4
HgCl(g)	-34.94	-15.06	19.88	HgCl

HgCl2	-14.91	-36.43	-21.52	HgCl2
Hgmetal(l)	-1.71	-15.36	-13.65	Hg
HgSe	19.36	-36.33	-55.69	HgSe
HgSeO3	-32.48	-44.91	-12.43	HgSeO3
HgSO4	-27.45	-36.91	-9.45	HgSO4
Hinsdalite	-8.96	-11.46	-2.50	PbAl3PO4SO4(OH)6
Hydroxylapatite	-2.88	-47.21	-44.33	Ca5(PO4)3OH
Hydroxylpyromorphite	-16.18	-78.97	-62.79	Pb5(PO4)3OH
K-Alum	-6.93	-12.18	-5.24	KAl(SO4)2·12H2O
K-Jarosite	-7.50	-21.99	-14.49	KFe3(SO4)2(OH)6
K2SeO4	-38.68	-39.41	-0.73	K2SeO4
Langite	-28.56	-10.68	17.88	Cu4(OH)6SO4·H2O
Larnakite	-9.35	-9.73	-0.38	PbO:PbSO4
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.59	-0.22	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.73	1.12	12.85	PbO
Maghemite	-6.83	-0.44	6.39	Fe2O3
Magnesioferrite	-9.88	7.64	17.52	Fe2MgO4
Magnetite	2.53	6.43	3.90	Fe3O4
Manganite	-13.15	12.19	25.34	MnOOH
Massicot	-11.93	1.12	13.05	PbO
Melanothallite	-17.57	-11.16	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeSO4·7H2O
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(PO4)2	-8.84	-32.12	-23.28	Mg3(PO4)2
MgHP04:3H2O	-1.94	-20.12	-18.18	MgHP04:3H2O
MgSeO3:6H2O	-14.96	-11.91	3.04	MgSeO3:6H2O
MgSeO4:6H2O	-35.41	-36.61	-1.20	MgSeO4:6H2O
Minium	-59.08	15.45	74.53	Pb3O4
Mirabilite	-2.11	-3.42	-1.30	Na2SO4·10H2O
Mn2(SO4)3	-57.42	-62.74	-5.32	Mn2(SO4)3
Mn3(PO4)2	-14.09	-37.94	-23.85	Mn3(PO4)2
MnCl2:4H2O	-8.11	-5.37	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnSe	-8.98	-5.25	3.73	MnSe
MnSeO3	-14.95	-13.82	1.13	MnSeO3
MnSeO3:2H2O	-14.80	-13.83	0.96	MnSeO3:2H2O
MnSeO4:5H2O	-36.49	-38.54	-2.05	MnSeO4:5H2O
MnSO4	-8.56	-5.83	2.74	MnSO4
Monteponite	-13.62	1.73	15.35	CdO
Montroydite	-21.39	-24.94	-3.55	HgO
Morenosite	-4.60	-6.78	-2.17	NiSO4·7H2O
Na-Jarosite	-9.47	-20.31	-10.84	NaFe3(SO4)2(OH)6
Na2SeO3:5H2O	-21.69	-11.39	10.30	Na2SeO3:5H2O
Na2SeO4	-37.34	-36.06	1.28	Na2SeO4
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(PO4)2	-9.39	-40.69	-31.30	Ni3(PO4)2
Ni4(OH)6SO4	-23.08	8.92	32.00	Ni4(OH)6SO4
NiSe	11.53	-6.17	-17.70	NiSe
NiSeO3:2H2O	-17.64	-14.75	2.89	NiSeO3:2H2O
NiSeO4:6H2O	-37.94	-39.46	-1.52	NiSeO4:6H2O
Nsutite	-24.87	-7.37	17.50	MnO2
O2(g)	-60.26	24.19	84.45	O2
Pb(OH)2	-7.18	1.11	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.31	-3.52	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-23.96	2.23	26.19	Pb2O(OH)2
Pb2O3	-46.71	14.33	61.04	Pb2O3
Pb3(PO4)2	-9.49	-53.02	-43.53	Pb3(PO4)2
Pb3O2SO4	-19.49	-8.61	10.87	Pb3O2SO4
Pb4(OH)6SO4	-28.61	-7.51	21.10	Pb4(OH)6SO4
Pb4O3SO4	-29.70	-7.50	22.20	Pb4O3SO4
PbHP04	-3.26	-27.07	-23.81	PbHP04
Pbmetal	-15.22	-10.98	4.24	Pb
PbO:0.3H2O	-11.86	1.12	12.98	PbO:0.33H2O
PbSeO4	-36.67	-43.54	-6.88	PbSeO4
Periclase	-13.86	8.08	21.94	MgO

Plattnerite	-37.09	13.21	50.31	PbO2
Plumbgummite	5.12	-27.67	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-15.65	7.46	23.11	Ca(OH)2
Pyrochroite	-9.29	6.14	15.43	Mn(OH)2
Pyrolusite	-23.79	18.24	42.03	MnO2
Pyromorphite	-0.28	-84.71	-84.43	Pb5(PO4)3Cl
Retgersite	-4.72	-6.77	-2.05	NiSO4:6H2O
Semetal(am)	7.84	0.70	-7.14	Se
Semetal(hex)	8.45	0.70	-7.75	Se
SeO2	-20.09	-19.97	0.12	SeO2
SeO3	-66.05	-44.66	21.39	SeO3
Spinel	-11.29	26.48	37.77	MgAl2O4
Strengite	-2.04	-28.42	-26.38	FePO4:2H2O
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.71	-3.37	0.34	Na2SO4
Tsumebite	-15.85	-25.64	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	0.19	-35.81	-36.00	Fe3(PO4)2:8H2O
Zincite	-7.21	4.34	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnSO4
Zn(NO3)2:6H2O	-139.22	-135.96	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-7.87	4.33	12.20	Zn(OH)2
Zn(OH)2(am)	-8.33	4.33	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.62	4.33	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.39	4.33	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.40	4.33	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.80	-3.30	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.26	2.93	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-7.95	-43.37	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-30.45	-10.92	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-23.03	5.37	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-28.31	10.19	38.50	Zn5(OH)8Cl2
ZnCl2	-14.37	-7.15	7.22	ZnCl2
Znmetal	-33.91	-7.76	26.15	Zn
ZnO(active)	-7.06	4.34	11.40	ZnO
ZnSe	7.41	-7.05	-14.46	ZnSe
ZnSeO4:6H2O	-38.83	-40.35	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.10	-7.64	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 6.
Using reaction 7.

Mixture 6.

9.880e-01 Solution 1
1.200e-02 Solution 8

Reaction 7.

2.000e+00 moles of the following reaction have been added:

Reactant	Relative moles
H2O	-1.00000
Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	2.060e-04	1.986e-04
Ca	1.571e-02	1.514e-02
Cd	3.797e-07	3.660e-07
Cl	2.835e-01	2.733e-01
Co	4.382e-04	4.224e-04
Cu	1.560e-04	1.504e-04
Fe	1.790e-02	1.726e-02
Hg	2.128e-09	2.051e-09
K	5.895e-03	5.682e-03
Mg	5.883e-02	5.671e-02
Mn	3.321e-03	3.202e-03
N	4.571e-03	4.406e-03
Na	2.729e-01	2.631e-01
Ni	1.013e-04	9.762e-05
P	8.130e-04	7.837e-04
Pb	5.150e-08	4.964e-08
S	1.012e-01	9.754e-02
Se	1.081e-06	1.042e-06
Zn	2.905e-05	2.800e-05

-----Description of solution-----

pH	=	5.045	Charge balance
pe	=	1.031	Adjusted to redox equilibrium
Activity of water	=	0.988	
Ionic strength (mol/kgw)	=	5.018e-01	
Mass of water (kg)	=	9.640e-01	
Total alkalinity (eq/kg)	=	1.433e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	-9.552e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.26	
Iterations	=	4	
Total H	=	1.070329e+02	
Total O	=	5.390014e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.228e-05	9.024e-06	-4.911	-5.045	-0.134	0.00
OH-	1.280e-09	8.117e-10	-8.893	-9.091	-0.198	(0)
H2O	5.551e+01	9.879e-01	1.744	-0.005	0.000	18.05
Al	2.060e-04					
AlSO4+	1.567e-04	1.046e-04	-3.805	-3.980	-0.175	(0)
Al(SO4)2-	2.498e-05	1.667e-05	-4.602	-4.778	-0.175	(0)
Al+3	1.847e-05	1.154e-06	-4.734	-5.938	-1.204	(0)
AlOH+2	4.242e-06	9.789e-07	-5.372	-6.009	-0.637	(0)
Al(OH)2+	1.608e-06	1.114e-06	-5.794	-5.953	-0.159	(0)
Al(OH)3	2.451e-08	2.451e-08	-7.611	-7.611	0.000	(0)
Al(OH)4-	1.970e-09	1.315e-09	-8.706	-8.881	-0.175	(0)
Ca	1.571e-02					
Ca+2	8.365e-03	2.439e-03	-2.078	-2.613	-0.535	(0)
CaSO4	7.318e-03	7.318e-03	-2.136	-2.136	0.000	(0)
CaH2PO4+	2.250e-05	1.559e-05	-4.648	-4.807	-0.159	(0)
CaHP04	2.200e-06	2.200e-06	-5.658	-5.658	0.000	(0)
CaNH3+2	1.272e-08	4.666e-10	-7.896	-9.331	-1.435	(0)
CaPO4-	8.574e-10	5.943e-10	-9.067	-9.226	-0.159	(0)
CaOH+	5.331e-11	3.775e-11	-10.273	-10.423	-0.150	(0)
Ca(NH3)2+2	7.694e-16	2.823e-17	-15.114	-16.549	-1.435	(0)
CaNO3+	0.000e+00	0.000e+00	-66.621	-66.980	-0.359	(0)

Cd	3.797e-07					
CdCl+	1.917e-07	8.388e-08	-6.717	-7.076	-0.359	(0)
CdCl2	7.195e-08	7.195e-08	-7.143	-7.143	0.000	(0)
Cd(SO4)2-2	6.784e-08	2.489e-09	-7.169	-8.604	-1.435	(0)
CdCl3-	2.076e-08	9.088e-09	-7.683	-8.042	-0.359	(0)
Cd+2	1.456e-08	4.245e-09	-7.837	-8.372	-0.535	(0)
CdSO4	1.292e-08	1.292e-08	-7.889	-7.889	0.000	(0)
CdOHCl	3.451e-12	3.451e-12	-11.462	-11.462	0.000	(0)
CdOH+	6.289e-14	2.752e-14	-13.201	-13.560	-0.359	(0)
Cd2OH+3	1.044e-18	6.153e-22	-17.981	-21.211	-3.230	(0)
Cd(OH)2	2.586e-19	2.586e-19	-18.587	-18.587	0.000	(0)
CdHS+	2.002e-22	8.762e-23	-21.699	-22.057	-0.359	(0)
Cd(OH)3-	3.979e-26	1.742e-26	-25.400	-25.759	-0.359	(0)
Cd(OH)4-2	8.565e-35	3.142e-36	-34.067	-35.503	-1.435	(0)
Cd(HS)2	2.840e-37	2.840e-37	-36.547	-36.547	0.000	(0)
Cd(SeO3)2-2	5.647e-38	2.072e-39	-37.248	-38.684	-1.435	(0)
CdSeO4	0.000e+00	0.000e+00	-40.457	-40.457	0.000	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-55.981	-56.340	-0.359	(0)
CdNO3+	0.000e+00	0.000e+00	-72.343	-72.702	-0.359	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-74.402	-75.837	-1.435	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-137.932	-137.932	0.000	(0)
Cl	2.835e-01					
Cl-	2.831e-01	2.080e-01	-0.548	-0.682	-0.134	(0)
CuCl2-	1.360e-04	8.864e-05	-3.866	-4.052	-0.186	(0)
MnCl+	4.245e-05	2.896e-05	-4.372	-4.538	-0.166	(0)
CoCl+	2.261e-05	9.898e-06	-4.646	-5.004	-0.359	(0)
CuCl3-2	1.791e-05	3.881e-06	-4.747	-5.411	-0.664	(0)
NiCl+	1.668e-05	7.302e-06	-4.778	-5.137	-0.359	(0)
MnCl2	8.511e-06	8.511e-06	-5.070	-5.070	0.000	(0)
CuCl	2.020e-06	2.020e-06	-5.695	-5.695	0.000	(0)
ZnCl+	1.338e-06	8.717e-07	-5.874	-6.060	-0.186	(0)
MnCl3-	7.147e-07	4.876e-07	-6.146	-6.312	-0.166	(0)
ZnCl2	2.417e-07	2.417e-07	-6.617	-6.617	0.000	(0)
CdCl+	1.917e-07	8.388e-08	-6.717	-7.076	-0.359	(0)
CdCl2	7.195e-08	7.195e-08	-7.143	-7.143	0.000	(0)
ZnCl3-	6.029e-08	3.928e-08	-7.220	-7.406	-0.186	(0)
CdCl3-	2.076e-08	9.088e-09	-7.683	-8.042	-0.359	(0)
ZnCl4-2	1.826e-08	3.957e-09	-7.738	-8.403	-0.664	(0)
PbCl+	1.651e-08	7.227e-09	-7.782	-8.141	-0.359	(0)
NiCl2	7.733e-09	7.733e-09	-8.112	-8.112	0.000	(0)
PbCl2	6.595e-09	6.595e-09	-8.181	-8.181	0.000	(0)
PbCl4-2	1.394e-09	5.115e-11	-8.856	-10.291	-1.435	(0)
PbCl3-	1.304e-09	5.707e-10	-8.885	-9.244	-0.359	(0)
ZnOHCl	1.296e-09	1.296e-09	-8.887	-8.887	0.000	(0)
CuCl+	8.498e-11	5.537e-11	-10.071	-10.257	-0.186	(0)
CdOHCl	3.451e-12	3.451e-12	-11.462	-11.462	0.000	(0)
CuCl2	3.280e-12	3.280e-12	-11.484	-11.484	0.000	(0)
FeCl+2	1.179e-14	2.554e-15	-13.929	-14.593	-0.664	(0)
CuCl3-	9.096e-15	5.927e-15	-14.041	-14.227	-0.186	(0)
HgCl4-2	6.144e-15	2.254e-16	-14.212	-15.647	-1.435	(0)
FeCl2+	3.946e-15	2.692e-15	-14.404	-14.570	-0.166	(0)
HgCl3-	5.995e-16	2.624e-16	-15.222	-15.581	-0.359	(0)
HgCl2	1.250e-16	1.250e-16	-15.903	-15.903	0.000	(0)
FeCl3	5.601e-17	5.601e-17	-16.252	-16.252	0.000	(0)
CuCl4-2	3.266e-17	7.077e-18	-16.486	-17.150	-0.664	(0)
HgClOH	8.909e-21	8.909e-21	-20.050	-20.050	0.000	(0)
HgCl+	2.328e-22	1.019e-22	-21.633	-21.992	-0.359	(0)
CoCl+2	6.287e-34	2.307e-35	-33.202	-34.637	-1.435	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.572	-43.007	-1.435	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.084	-56.520	-1.435	(0)
Co(2)	4.382e-04					
Co+2	3.790e-04	1.391e-05	-3.421	-4.857	-1.435	(0)
CoSO4	3.651e-05	3.651e-05	-4.438	-4.438	0.000	(0)
CoCl+	2.261e-05	9.898e-06	-4.646	-5.004	-0.359	(0)
CoHPO4	2.944e-08	2.944e-08	-7.531	-7.531	0.000	(0)
Co(NH3)+2	9.890e-09	3.629e-10	-8.005	-9.440	-1.435	(0)
CoOH+	6.988e-10	3.058e-10	-9.156	-9.514	-0.359	(0)
Co2OH+3	3.618e-13	2.131e-16	-12.442	-15.671	-3.230	(0)

Co(NH3)2+2	4.488e-14	1.647e-15	-13.348	-14.783	-1.435	(0)
Co(OH)2	2.678e-14	2.678e-14	-13.572	-13.572	0.000	(0)
Co(NH3)3+2	8.585e-20	3.150e-21	-19.066	-20.502	-1.435	(0)
Co(OH)3-	1.346e-21	5.891e-22	-20.871	-21.230	-0.359	(0)
CoOOH-	8.191e-23	3.585e-23	-22.087	-22.446	-0.359	(0)
Co4(OH)4+4	9.635e-25	1.746e-30	-24.016	-29.758	-5.742	(0)
Co(NH3)4+2	6.846e-26	2.512e-27	-25.165	-26.600	-1.435	(0)
Co(OH)4-2	2.805e-30	1.029e-31	-29.552	-30.987	-1.435	(0)
Co(NH3)5+2	1.727e-32	6.334e-34	-31.763	-33.198	-1.435	(0)
CoSeO4	2.884e-37	2.884e-37	-36.540	-36.540	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.670	-52.029	-0.359	(0)
CoNO3+	0.000e+00	0.000e+00	-69.178	-69.537	-0.359	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.108	-134.108	0.000	(0)
Co(3)	9.147e-32					
CoOH+2	9.083e-32	3.333e-33	-31.042	-32.477	-1.435	(0)
CoCl+2	6.287e-34	2.307e-35	-33.202	-34.637	-1.435	(0)
Co+3	9.519e-36	5.949e-37	-35.021	-36.226	-1.204	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.572	-43.007	-1.435	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.468	-52.826	-0.359	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.084	-56.520	-1.435	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.911	-60.347	-1.435	(0)
Cu(1)	1.560e-04					
CuCl2-	1.360e-04	8.864e-05	-3.866	-4.052	-0.186	(0)
CuCl3-2	1.791e-05	3.881e-06	-4.747	-5.411	-0.664	(0)
CuCl	2.020e-06	2.020e-06	-5.695	-5.695	0.000	(0)
Cu+	1.762e-08	7.713e-09	-7.754	-8.113	-0.359	(0)
Cu(S4)2-3	3.084e-38	9.546e-39	-37.511	-38.020	-0.509	(0)
CuS4S5-3	5.301e-39	1.778e-39	-38.276	-38.750	-0.475	(0)
Cu(2)	1.226e-09					
Cu+2	6.027e-10	1.758e-10	-9.220	-9.755	-0.535	(0)
CuSO4	5.227e-10	5.227e-10	-9.282	-9.282	0.000	(0)
CuCl+	8.498e-11	5.537e-11	-10.071	-10.257	-0.186	(0)
CuNH3+2	1.106e-11	4.057e-13	-10.956	-12.392	-1.435	(0)
CuCl2	3.280e-12	3.280e-12	-11.484	-11.484	0.000	(0)
CuOH+	7.727e-13	5.034e-13	-12.112	-12.298	-0.186	(0)
CuCl3-	9.096e-15	5.927e-15	-14.041	-14.227	-0.186	(0)
Cu(OH)2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	3.266e-17	7.077e-18	-16.486	-17.150	-0.664	(0)
Cu2(OH)2+2	1.688e-19	6.194e-21	-18.773	-20.208	-1.435	(0)
Cu(OH)3-	6.963e-22	3.047e-22	-21.157	-21.516	-0.359	(0)
Cu(OH)4-2	7.206e-29	2.644e-30	-28.142	-29.578	-1.435	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-48.577	-48.936	-0.359	(0)
CuNO2+	0.000e+00	0.000e+00	-55.396	-55.755	-0.359	(0)
CuNO3+	0.000e+00	0.000e+00	-73.766	-74.125	-0.359	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-102.765	-102.765	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-139.915	-139.915	0.000	(0)
Fe(2)	1.790e-02					
Fe+2	1.591e-02	5.839e-04	-1.798	-3.234	-1.435	(0)
FeSO4	1.868e-03	1.868e-03	-2.729	-2.729	0.000	(0)
FeH2PO4+	1.167e-04	8.085e-05	-3.933	-4.092	-0.159	(0)
FeHPO4	4.511e-06	4.511e-06	-5.346	-5.346	0.000	(0)
FeOH+	2.765e-08	1.887e-08	-7.558	-7.724	-0.166	(0)
Fe(OH)2	1.164e-14	1.164e-14	-13.934	-13.934	0.000	(0)
Fe(OH)3-	5.730e-18	3.910e-18	-17.242	-17.408	-0.166	(0)
Fe(HS)2	2.137e-38	2.137e-38	-37.670	-37.670	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-56.968	-57.327	-0.359	(0)
Fe(3)	2.172e-10					
Fe(OH)2+	2.031e-10	1.408e-10	-9.692	-9.851	-0.159	(0)
FeHPO4+	1.261e-11	8.742e-12	-10.899	-11.058	-0.159	(0)
FeOH+2	1.204e-12	2.610e-13	-11.919	-12.583	-0.664	(0)
Fe(OH)3	9.432e-14	9.432e-14	-13.025	-13.025	0.000	(0)
FeSO4+	9.003e-14	6.143e-14	-13.046	-13.212	-0.166	(0)
Fe(SO4)2-	4.218e-14	1.846e-14	-13.375	-13.734	-0.359	(0)
FeCl+2	1.179e-14	2.554e-15	-13.929	-14.593	-0.664	(0)
FeH2PO4+2	1.048e-14	2.420e-15	-13.979	-14.616	-0.637	(0)
Fe+3	7.380e-15	4.612e-16	-14.132	-15.336	-1.204	(0)
FeCl2+	3.946e-15	2.692e-15	-14.404	-14.570	-0.166	(0)
FeCl3	5.601e-17	5.601e-17	-16.252	-16.252	0.000	(0)

Fe(OH)4-	2.468e-17	1.711e-17	-16.608	-16.767	-0.159	(0)
Fe2(OH)2+4	1.435e-18	2.601e-24	-17.843	-23.585	-5.742	(0)
Fe3(OH)4+5	4.755e-24	5.076e-33	-23.323	-32.294	-8.972	(0)
FeHSeO3+2	5.051e-26	1.853e-27	-25.297	-26.732	-1.435	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.692	-79.128	-1.435	(0)
H(0)	9.260e-16					
H2	4.630e-16	5.197e-16	-15.334	-15.284	0.050	(0)
Hg(0)	2.128e-09					
Hg	2.128e-09	2.128e-09	-8.672	-8.672	0.000	(0)
Hg(1)	1.269e-27					
Hg2+2	6.347e-28	2.329e-29	-27.197	-28.633	-1.435	(0)
Hg(2)	6.869e-15					
HgCl4-2	6.144e-15	2.254e-16	-14.212	-15.647	-1.435	(0)
HgCl3-	5.995e-16	2.624e-16	-15.222	-15.581	-0.359	(0)
HgCl2	1.250e-16	1.250e-16	-15.903	-15.903	0.000	(0)
HgClOH	8.909e-21	8.909e-21	-20.050	-20.050	0.000	(0)
HgCl+	2.328e-22	1.019e-22	-21.633	-21.992	-0.359	(0)
Hg(NH3)2+2	2.674e-23	9.812e-25	-22.573	-24.008	-1.435	(0)
Hg(OH)2	1.189e-25	1.334e-25	-24.925	-24.875	0.050	(0)
HgNH3+2	4.547e-26	1.668e-27	-25.342	-26.778	-1.435	(0)
HgOH+	1.936e-27	8.472e-28	-26.713	-27.072	-0.359	(0)
Hg+2	5.898e-28	2.164e-29	-27.229	-28.665	-1.435	(0)
HgSO4	6.204e-29	6.204e-29	-28.207	-28.207	0.000	(0)
Hg(NH3)3+2	2.324e-29	8.525e-31	-28.634	-30.069	-1.435	(0)
Hg(HS)2	1.500e-34	1.500e-34	-33.824	-33.824	0.000	(0)
Hg(OH)3-	4.231e-35	1.852e-35	-34.374	-34.732	-0.359	(0)
Hg(NH3)4+2	4.050e-35	1.486e-36	-34.393	-35.828	-1.435	(0)
HgHS2-	1.533e-35	6.708e-36	-34.815	-35.173	-0.359	(0)
HgS2-2	3.969e-38	1.456e-39	-37.401	-38.837	-1.435	(0)
HgNO3+	0.000e+00	0.000e+00	-93.713	-94.072	-0.359	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.333	-159.333	0.000	(0)
K	5.895e-03					
K+	5.359e-03	3.938e-03	-2.271	-2.405	-0.134	(0)
KS04-	5.355e-04	3.712e-04	-3.271	-3.430	-0.159	(0)
KHP04-	8.366e-08	5.798e-08	-7.077	-7.237	-0.159	(0)
Mg	5.883e-02					
Mg+2	3.448e-02	1.006e-02	-1.462	-1.998	-0.535	(0)
MgSO4	2.414e-02	2.414e-02	-1.617	-1.617	0.000	(0)
MgH2PO4+	1.983e-04	1.374e-04	-3.703	-3.862	-0.159	(0)
MgHPO4	1.252e-05	1.252e-05	-4.902	-4.902	0.000	(0)
MgOH+	4.229e-09	3.042e-09	-8.374	-8.517	-0.143	(0)
MgPO4-	5.525e-11	3.829e-11	-10.258	-10.417	-0.159	(0)
Mn(2)	3.321e-03					
Mn+2	3.014e-03	1.106e-04	-2.521	-3.956	-1.435	(0)
MnSO4	2.553e-04	2.553e-04	-3.593	-3.593	0.000	(0)
MnCl+	4.245e-05	2.896e-05	-4.372	-4.538	-0.166	(0)
MnCl2	8.511e-06	8.511e-06	-5.070	-5.070	0.000	(0)
MnCl3-	7.147e-07	4.876e-07	-6.146	-6.312	-0.166	(0)
MnOH+	3.305e-10	2.255e-10	-9.481	-9.647	-0.166	(0)
MnSe	2.320e-11	2.320e-11	-10.635	-10.635	0.000	(0)
Mn(OH)3-	3.371e-24	2.300e-24	-23.472	-23.638	-0.166	(0)
Mn(OH)4-2	3.778e-32	8.186e-33	-31.423	-32.087	-0.664	(0)
MnSeO4	1.218e-36	1.218e-36	-35.914	-35.914	0.000	(0)
MnNO3+	0.000e+00	0.000e+00	-68.277	-68.636	-0.359	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.112	-133.112	0.000	(0)
Mn(3)	4.703e-28					
Mn+3	4.703e-28	2.939e-29	-27.328	-28.532	-1.204	(0)
Mn(6)	0.000e+00					
MnO4-2	0.000e+00	0.000e+00	-78.947	-79.611	-0.664	(0)
Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-88.006	-88.218	-0.212	(0)
N(-3)	4.571e-03					
NH4+	4.056e-03	2.405e-03	-2.392	-2.619	-0.227	(0)
NH4SO4-	5.143e-04	3.509e-04	-3.289	-3.455	-0.166	(0)
NH3	1.142e-07	1.142e-07	-6.942	-6.942	0.000	(0)
NiNH3+2	4.455e-08	1.635e-09	-7.351	-8.787	-1.435	(0)
CaNH3+2	1.272e-08	4.666e-10	-7.896	-9.331	-1.435	(0)
Co(NH3)+2	9.890e-09	3.629e-10	-8.005	-9.440	-1.435	(0)

CuNH3+2	1.106e-11	4.057e-13	-10.956	-12.392	-1.435	(0)
Ni(NH3)2+2	1.250e-12	4.585e-14	-11.903	-13.339	-1.435	(0)
Co(NH3)2+2	4.488e-14	1.647e-15	-13.348	-14.783	-1.435	(0)
Ca(NH3)2+2	7.694e-16	2.823e-17	-15.114	-16.549	-1.435	(0)
Co(NH3)3+2	8.585e-20	3.150e-21	-19.066	-20.502	-1.435	(0)
Hg(NH3)2+2	2.674e-23	9.812e-25	-22.573	-24.008	-1.435	(0)
Co(NH3)4+2	6.846e-26	2.512e-27	-25.165	-26.600	-1.435	(0)
HgNH3+2	4.547e-26	1.668e-27	-25.342	-26.778	-1.435	(0)
Hg(NH3)3+2	2.324e-29	8.525e-31	-28.634	-30.069	-1.435	(0)
Co(NH3)5+2	1.727e-32	6.334e-34	-31.763	-33.198	-1.435	(0)
Hg(NH3)4+2	4.050e-35	1.486e-36	-34.393	-35.828	-1.435	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.572	-43.007	-1.435	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.468	-52.826	-0.359	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.084	-56.520	-1.435	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.911	-60.347	-1.435	(0)
N(3)	0.000e+00					
N02-	0.000e+00	0.000e+00	-47.809	-48.020	-0.212	(0)
CoN02+	0.000e+00	0.000e+00	-51.670	-52.029	-0.359	(0)
CuN02+	0.000e+00	0.000e+00	-55.396	-55.755	-0.359	(0)
Cu(N02)2	0.000e+00	0.000e+00	-102.765	-102.765	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-64.746	-64.880	-0.134	(0)
CaN03+	0.000e+00	0.000e+00	-66.621	-66.980	-0.359	(0)
MnN03+	0.000e+00	0.000e+00	-68.277	-68.636	-0.359	(0)
NiN03+	0.000e+00	0.000e+00	-68.979	-69.338	-0.359	(0)
CoN03+	0.000e+00	0.000e+00	-69.178	-69.537	-0.359	(0)
ZnN03+	0.000e+00	0.000e+00	-69.875	-70.234	-0.359	(0)
CdN03+	0.000e+00	0.000e+00	-72.343	-72.702	-0.359	(0)
PbN03+	0.000e+00	0.000e+00	-72.344	-72.703	-0.359	(0)
CuN03+	0.000e+00	0.000e+00	-73.766	-74.125	-0.359	(0)
FeN03+2	0.000e+00	0.000e+00	-77.692	-79.128	-1.435	(0)
HgN03+	0.000e+00	0.000e+00	-93.713	-94.072	-0.359	(0)
Mn(N03)2	0.000e+00	0.000e+00	-133.112	-133.112	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-134.108	-134.108	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-135.825	-135.825	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-137.332	-137.332	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-137.932	-137.932	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-139.915	-139.915	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-159.333	-159.333	0.000	(0)
Na	2.729e-01					
Na+	2.534e-01	1.862e-01	-0.596	-0.730	-0.134	(0)
NaSO4-	1.954e-02	1.354e-02	-1.709	-1.868	-0.159	(0)
NaHP04-	6.126e-06	4.246e-06	-5.213	-5.372	-0.159	(0)
Ni	1.013e-04					
Ni+2	4.756e-05	1.387e-05	-4.323	-4.858	-0.535	(0)
NiSO4	3.650e-05	3.650e-05	-4.438	-4.438	0.000	(0)
NiCl+	1.668e-05	7.302e-06	-4.778	-5.137	-0.359	(0)
Ni(SO4)2-2	4.631e-07	1.699e-08	-6.334	-7.770	-1.435	(0)
NiNH3+2	4.455e-08	1.635e-09	-7.351	-8.787	-1.435	(0)
NiCl2	7.733e-09	7.733e-09	-8.112	-8.112	0.000	(0)
NiOH+	3.310e-10	1.449e-10	-9.480	-9.839	-0.359	(0)
Ni(NH3)2+2	1.250e-12	4.585e-14	-11.903	-13.339	-1.435	(0)
Ni(OH)2	1.686e-14	1.686e-14	-13.773	-13.773	0.000	(0)
Ni(OH)3-	4.246e-20	1.858e-20	-19.372	-19.731	-0.359	(0)
NiSe04	2.656e-37	2.656e-37	-36.576	-36.576	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-68.979	-69.338	-0.359	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-62.899	-62.849	0.050	(0)
P	8.130e-04					
H2P04-	4.400e-04	3.050e-04	-3.357	-3.516	-0.159	(0)
MgH2P04+	1.983e-04	1.374e-04	-3.703	-3.862	-0.159	(0)
FeH2P04+	1.167e-04	8.085e-05	-3.933	-4.092	-0.159	(0)
CaH2P04+	2.250e-05	1.559e-05	-4.648	-4.807	-0.159	(0)
MgHP04	1.252e-05	1.252e-05	-4.902	-4.902	0.000	(0)
HP04-2	9.725e-06	2.107e-06	-5.012	-5.676	-0.664	(0)
NaHP04-	6.126e-06	4.246e-06	-5.213	-5.372	-0.159	(0)
FeHP04	4.511e-06	4.511e-06	-5.346	-5.346	0.000	(0)
CaHP04	2.200e-06	2.200e-06	-5.658	-5.658	0.000	(0)

H3PO4	3.705e-07	3.705e-07	-6.431	-6.431	0.000	(0)
KHP04-	8.366e-08	5.798e-08	-7.077	-7.237	-0.159	(0)
CoHP04	2.944e-08	2.944e-08	-7.531	-7.531	0.000	(0)
CaP04-	8.574e-10	5.943e-10	-9.067	-9.226	-0.159	(0)
MgP04-	5.525e-11	3.829e-11	-10.258	-10.417	-0.159	(0)
FeHP04+	1.261e-11	8.742e-12	-10.899	-11.058	-0.159	(0)
P04-3	1.451e-12	9.070e-14	-11.838	-13.042	-1.204	(0)
FeH2P04+2	1.048e-14	2.420e-15	-13.979	-14.616	-0.637	(0)
Pb	5.150e-08					
PbCl+	1.651e-08	7.227e-09	-7.782	-8.141	-0.359	(0)
Pb(S04)2-2	1.532e-08	5.619e-10	-7.815	-9.250	-1.435	(0)
PbS04	6.849e-09	6.849e-09	-8.164	-8.164	0.000	(0)
PbCl2	6.595e-09	6.595e-09	-8.181	-8.181	0.000	(0)
Pb+2	3.522e-09	1.027e-09	-8.453	-8.988	-0.535	(0)
PbCl4-2	1.394e-09	5.115e-11	-8.856	-10.291	-1.435	(0)
PbCl3-	1.304e-09	5.707e-10	-8.885	-9.244	-0.359	(0)
PbOH+	6.498e-12	2.844e-12	-11.187	-11.546	-0.359	(0)
Pb(OH)2	9.914e-17	9.914e-17	-16.004	-16.004	0.000	(0)
Pb2OH+3	7.857e-17	4.629e-20	-16.105	-19.335	-3.230	(0)
Pb(OH)3-	2.497e-22	1.093e-22	-21.603	-21.961	-0.359	(0)
Pb(OH)4-2	8.042e-28	2.950e-29	-27.095	-28.530	-1.435	(0)
Pb3(OH)4+2	2.917e-30	1.070e-31	-29.535	-30.971	-1.435	(0)
Pb4(OH)4+4	5.587e-31	1.012e-36	-30.253	-35.995	-5.742	(0)
Pb(HS)2	7.852e-38	7.852e-38	-37.105	-37.105	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-57.139	-57.498	-0.359	(0)
PbNO3+	0.000e+00	0.000e+00	-72.344	-72.703	-0.359	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.332	-137.332	0.000	(0)
S(-2)	2.227e-20					
H2S	2.160e-20	2.160e-20	-19.666	-19.666	0.000	(0)
HS-	4.630e-22	2.026e-22	-21.334	-21.693	-0.359	(0)
CdHS+	2.002e-22	8.762e-23	-21.699	-22.057	-0.359	(0)
S5-2	2.148e-25	7.882e-27	-24.668	-26.103	-1.435	(0)
S6-2	8.049e-26	2.953e-27	-25.094	-26.530	-1.435	(0)
S4-2	5.399e-26	1.981e-27	-25.268	-26.703	-1.435	(0)
S3-2	8.309e-27	3.048e-28	-26.080	-27.516	-1.435	(0)
S2-2	7.824e-28	2.871e-29	-27.107	-28.542	-1.435	(0)
S-2	3.961e-34	8.583e-35	-33.402	-34.066	-0.664	(0)
Hg(HS)2	1.500e-34	1.500e-34	-33.824	-33.824	0.000	(0)
HgHS2-	1.533e-35	6.708e-36	-34.815	-35.173	-0.359	(0)
Zn(HS)2	4.662e-37	4.662e-37	-36.331	-36.331	0.000	(0)
Cd(HS)2	2.840e-37	2.840e-37	-36.547	-36.547	0.000	(0)
ZnS(HS)-	1.153e-37	5.048e-38	-36.938	-37.297	-0.359	(0)
Pb(HS)2	7.852e-38	7.852e-38	-37.105	-37.105	0.000	(0)
HgS2-2	3.969e-38	1.456e-39	-37.401	-38.837	-1.435	(0)
Cu(S4)2-3	3.084e-38	9.546e-39	-37.511	-38.020	-0.509	(0)
Fe(HS)2	2.137e-38	2.137e-38	-37.670	-37.670	0.000	(0)
CuS4S5-3	5.301e-39	1.778e-39	-38.276	-38.750	-0.475	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-48.577	-48.936	-0.359	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-54.386	-54.745	-0.359	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-55.981	-56.340	-0.359	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-56.968	-57.327	-0.359	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-57.139	-57.498	-0.359	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-58.245	-59.680	-1.435	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-74.402	-75.837	-1.435	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-76.463	-77.898	-1.435	(0)
S(6)	1.012e-01					
S04-2	4.669e-02	1.362e-02	-1.331	-1.866	-0.535	(0)
MgS04	2.414e-02	2.414e-02	-1.617	-1.617	0.000	(0)
NaS04-	1.954e-02	1.354e-02	-1.709	-1.868	-0.159	(0)
CaS04	7.318e-03	7.318e-03	-2.136	-2.136	0.000	(0)
FeS04	1.868e-03	1.868e-03	-2.729	-2.729	0.000	(0)
KS04-	5.355e-04	3.712e-04	-3.271	-3.430	-0.159	(0)
NH4S04-	5.143e-04	3.509e-04	-3.289	-3.455	-0.166	(0)
MnS04	2.553e-04	2.553e-04	-3.593	-3.593	0.000	(0)
AlS04+	1.567e-04	1.046e-04	-3.805	-3.980	-0.175	(0)
CoS04	3.651e-05	3.651e-05	-4.438	-4.438	0.000	(0)
NiS04	3.650e-05	3.650e-05	-4.438	-4.438	0.000	(0)
Al(S04)2-	2.498e-05	1.667e-05	-4.602	-4.778	-0.175	(0)

Zn(SO4)2-2	1.655e-05	6.071e-07	-4.781	-6.217	-1.435	(0)
HSO4-	1.594e-05	1.064e-05	-4.797	-4.973	-0.175	(0)
ZnSO4	4.948e-06	4.948e-06	-5.306	-5.306	0.000	(0)
Ni(SO4)2-2	4.631e-07	1.699e-08	-6.334	-7.770	-1.435	(0)
Cd(SO4)2-2	6.784e-08	2.489e-09	-7.169	-8.604	-1.435	(0)
Pb(SO4)2-2	1.532e-08	5.619e-10	-7.815	-9.250	-1.435	(0)
CdSO4	1.292e-08	1.292e-08	-7.889	-7.889	0.000	(0)
PbSO4	6.849e-09	6.849e-09	-8.164	-8.164	0.000	(0)
CuSO4	5.227e-10	5.227e-10	-9.282	-9.282	0.000	(0)
FeSO4+	9.003e-14	6.143e-14	-13.046	-13.212	-0.166	(0)
Fe(SO4)2-	4.218e-14	1.846e-14	-13.375	-13.734	-0.359	(0)
HgSO4	6.204e-29	6.204e-29	-28.207	-28.207	0.000	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.468	-52.826	-0.359	(0)
Se(-2)	1.081e-06					
HSe-	1.049e-06	4.593e-07	-5.979	-6.338	-0.359	(0)
H2Se	3.160e-08	3.160e-08	-7.500	-7.500	0.000	(0)
MnSe	2.320e-11	2.320e-11	-10.635	-10.635	0.000	(0)
Se-2	1.065e-15	3.909e-17	-14.972	-16.408	-1.435	(0)
Se(4)	4.012e-15					
HSeO3-	3.985e-15	1.744e-15	-14.400	-14.758	-0.359	(0)
SeO3-2	2.040e-17	7.486e-19	-16.690	-18.126	-1.435	(0)
H2SeO3	6.490e-18	6.490e-18	-17.188	-17.188	0.000	(0)
FeHSeO3+2	5.051e-26	1.853e-27	-25.297	-26.732	-1.435	(0)
Cd(SeO3)2-2	5.647e-38	2.072e-39	-37.248	-38.684	-1.435	(0)
Se(6)	1.534e-34					
SeO4-2	1.516e-34	4.420e-35	-33.819	-34.355	-0.535	(0)
MnSeO4	1.218e-36	1.218e-36	-35.914	-35.914	0.000	(0)
CoSeO4	2.884e-37	2.884e-37	-36.540	-36.540	0.000	(0)
NiSeO4	2.656e-37	2.656e-37	-36.576	-36.576	0.000	(0)
HSeO4-	4.026e-38	1.762e-38	-37.395	-37.754	-0.359	(0)
ZnSeO4	1.176e-38	1.176e-38	-37.929	-37.929	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.457	-40.457	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-70.843	-72.278	-1.435	(0)
Zn	2.905e-05					
Zn(SO4)2-2	1.655e-05	6.071e-07	-4.781	-6.217	-1.435	(0)
Zn+2	5.893e-06	1.718e-06	-5.230	-5.765	-0.535	(0)
ZnSO4	4.948e-06	4.948e-06	-5.306	-5.306	0.000	(0)
ZnCl+	1.338e-06	8.717e-07	-5.874	-6.060	-0.186	(0)
ZnCl2	2.417e-07	2.417e-07	-6.617	-6.617	0.000	(0)
ZnCl3-	6.029e-08	3.928e-08	-7.220	-7.406	-0.186	(0)
ZnCl4-2	1.826e-08	3.957e-09	-7.738	-8.403	-0.664	(0)
ZnOHCl	1.296e-09	1.296e-09	-8.887	-8.887	0.000	(0)
ZnOH+	3.187e-10	1.395e-10	-9.497	-9.855	-0.359	(0)
Zn(OH)2	3.310e-14	3.310e-14	-13.480	-13.480	0.000	(0)
Zn(OH)3-	4.178e-19	1.829e-19	-18.379	-18.738	-0.359	(0)
Zn(OH)4-2	2.187e-25	8.025e-27	-24.660	-26.096	-1.435	(0)
Zn(HS)2	4.662e-37	4.662e-37	-36.331	-36.331	0.000	(0)
ZnS(HS)-	1.153e-37	5.048e-38	-36.938	-37.297	-0.359	(0)
ZnSeO4	1.176e-38	1.176e-38	-37.929	-37.929	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-54.386	-54.745	-0.359	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-58.245	-59.680	-1.435	(0)
ZnNO3+	0.000e+00	0.000e+00	-69.875	-70.234	-0.359	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-70.843	-72.278	-1.435	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-76.463	-77.898	-1.435	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-135.825	-135.825	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2-160.81	-154.54	6.27	(Co(NH3)5Cl)(NO3)2	
(Co(NH3)5Cl)Cl2 -30.68	-26.14	4.54	(Co(NH3)5Cl)Cl2	
(Co(NH3)5OH2)Cl3 -37.94	-26.15	11.80	(Co(NH3)5OH2)Cl3	
(Co(NH3)6)(NO3)3-234.24	-216.31	17.93	(Co(NH3)6)(NO3)3	
(Co(NH3)6)Cl3 -43.83	-23.72	20.11	(Co(NH3)6)Cl3	
(NH4)2SeO4 -40.04	-39.59	0.45	(NH4)2SeO4	
Al(OH)3(am) -1.88	9.18	11.06	Al(OH)3	
Al2O3 -1.89	18.38	20.27	Al2O3	

Al4(OH)10SO4	2.08	24.78	22.70	Al4(OH)10SO4
AlOHSO4	0.47	-2.76	-3.23	AlOHSO4
Alunite	7.19	6.29	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.04	-10.85	-7.82	PbSO4
Anhydrite	-0.14	-4.48	-4.34	CaSO4
Anilite	1.06	-31.26	-32.31	Cu0.25Cu1.5S
Antlerite	-19.76	-10.97	8.79	Cu3(OH)4SO4
Atacamite	-12.69	-5.07	7.61	Cu2(OH)3Cl
Bianchite	-5.90	-7.66	-1.76	ZnSO4:6H2O
Birnessite	-25.42	-7.33	18.09	MnO2
Bixbyite	-26.46	-26.81	-0.35	Mn2O3
BlaubleiI	-2.89	-27.05	-24.16	Cu0.9Cu0.2S
BlaubleiII	-1.71	-28.99	-27.28	Cu0.6Cu0.8S
Boehmite	0.33	9.19	8.86	AlOOH
Brochantite	-26.36	-10.65	15.71	Cu4(OH)6SO4
Brucite	-9.03	8.08	17.12	Mg(OH)2
Bunsenite	-7.46	5.23	12.68	NiO
Ca3(PO4)2(beta)	-4.87	-33.92	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-7.56	-54.64	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.35	-20.70	-19.35	CaHP04
CaHP04:2H2O	-1.66	-20.71	-19.05	CaHP04:2H2O
Calomel	-11.87	-30.00	-18.13	Hg2Cl2
CaSeO3:2H2O	-15.20	-12.34	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-33.98	-36.98	-3.00	CaSeO4:2H2O
Cd(OH)2	-12.16	1.71	13.87	Cd(OH)2
Cd(OH)2(am)	-12.23	1.71	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-25.48	-18.77	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-29.38	-6.82	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-18.60	-51.20	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-33.52	-5.12	28.40	Cd4(OH)6SO4
CdCl2	-9.12	-9.74	-0.61	CdCl2
CdCl2:1H2O	-8.07	-9.74	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-7.82	-9.75	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.13	-10.43	13.69	Cd
Cdmetal(gamma)	-24.23	-10.43	13.80	Cd
CdOHCl	-7.63	-4.01	3.61	CdOHCl
CdSe	10.72	-9.67	-20.38	CdSe
CdSeO4:2H2O	-40.89	-42.74	-1.85	CdSeO4:2H2O
CdSO4	-10.19	-10.24	-0.05	CdSO4
CdSO4:1H2O	-8.59	-10.24	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-8.42	-10.25	-1.83	CdSO4:2.67H2O
Chalcanthite	-8.99	-11.65	-2.65	CuSO4:5H2O
Chalcocite	2.45	-32.87	-35.32	Cu2S
Chalcopyrite	-10.66	-46.29	-35.62	CuFeS2
Cinnabar	-5.30	-51.60	-46.30	HgS
Clausthalite	17.10	-10.28	-27.39	PbSe
Co(OH)2	-7.87	5.22	13.09	Co(OH)2
Co(OH)3	-19.02	-21.11	-2.09	Co(OH)3
Co3(PO4)2	-5.97	-40.66	-34.69	Co3(PO4)2
Co3O4	-26.73	-36.97	-10.24	Co3O4
CoCl2	-14.68	-6.22	8.46	CoCl2
CoCl2:6H2O	-8.77	-6.25	2.52	CoCl2:6H2O
CoFe2O4	7.96	4.81	-3.15	CoFe2O4
CoHP04	-3.88	-22.94	-19.06	CoHP04
CoO	-8.61	5.23	13.84	CoO
CoS(alpha)	-14.07	-21.51	-7.44	CoS
CoS(beta)	-10.44	-21.51	-11.07	CoS
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-15.89	-14.57	1.32	CoSeO3
CoSeO4:6H2O	-37.71	-39.24	-1.53	CoSeO4:6H2O
CoSO4	-9.71	-6.72	2.99	CoSO4
CoSO4:6H2O	-4.28	-6.75	-2.48	CoSO4:6H2O
Cotunnite	-5.51	-10.35	-4.84	PbCl2
Covellite	-3.87	-26.40	-22.53	CuS
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.70	-69.27	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.79	-17.52	-46.31	Cu2Se
Cu2SO4	-16.19	-18.09	-1.90	Cu2SO4

Cu3(P04)2	-18.50	-55.35	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-20.25	-55.37	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.73	-28.57	-64.30	Cu3Se2
Cumetal	-0.22	-9.14	-8.93	Cu
Cu0CuS04	-21.92	-11.29	10.63	Cu0CuS04
Cupricferrite	-6.58	-0.09	6.49	CuFe204
Cuprite	-5.03	-6.14	-1.11	Cu2O
Cuprousferrite	5.60	-3.28	-8.88	CuFe02
CuSe	22.34	-11.05	-33.39	CuSe
CuSe2	23.42	-10.28	-33.70	CuSe2
CuSe03:2H2O	-20.08	-19.48	0.60	CuSe03:2H2O
CuSe04:5H2O	-41.70	-44.14	-2.44	CuSe04:5H2O
CuS04	-14.73	-11.62	3.11	CuS04
Diaspore	2.07	9.19	7.12	Al00H
Djurleite	1.95	-32.45	-34.40	Cu0.066Cu1.868S
Epsomite	-1.75	-3.90	-2.15	MgS04:7H2O
Fe(OH)2	-6.72	6.84	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.11	-1.93	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-21.78	-20.23	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H2O	-39.20	-59.82	-20.63	Fe2(Se03)3:2H2O
Fe2(S04)3	-33.11	-36.27	-3.16	Fe2(S04)3
Fe3(OH)8	-13.81	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.58	-0.22	3.37	Fe(OH)3
Ferroselite	14.95	-3.76	-18.71	FeSe2
FeS(ppt)	-16.96	-19.88	-2.92	FeS
FeSe	6.48	-4.53	-11.00	FeSe
Galena	-11.48	-25.64	-14.16	PbS
Gibbsite	0.66	9.18	8.52	Al(OH)3
Goethite	-0.85	-0.21	0.64	Fe00H
Goslarite	-5.62	-7.67	-2.05	ZnS04:7H2O
Greenockite	-10.53	-25.02	-14.49	CdS
Greigite	-55.47	-100.50	-45.03	Fe3S4
Gypsum	0.12	-4.49	-4.61	CaS04:2H2O
H-Jarosite	-13.00	-24.55	-11.55	(H3O)Fe3(S04)2(OH)6
H2S(g)	-18.73	-26.74	-8.01	H2S
H2Se(g)	-6.46	-11.38	-4.92	H2Se
Halite	-3.01	-1.41	1.59	NaCl
Hausmannite	-31.50	30.53	62.03	Mn3O4
Hematite	0.69	-0.42	-1.11	Fe2O3
Hercynite	1.59	25.23	23.64	FeAl2O4
Hg(g)	-7.42	-15.35	-7.93	Hg
Hg(OH)2	-21.38	-24.87	-3.50	Hg(OH)2
Hg2(g)	-15.60	-30.70	-15.09	Hg2
Hg2(OH)2	-23.81	-18.55	5.26	Hg2(OH)2
Hg2HP04	-21.94	-46.72	-24.77	Hg2HP04
Hg2S	-33.44	-45.28	-11.84	Hg2S
Hg2Se03	-33.69	-38.35	-4.66	Hg2Se03
Hg2S04	-24.36	-30.50	-6.14	Hg2S04
HgCl(g)	-34.88	-15.00	19.88	HgCl
HgCl2	-14.80	-36.32	-21.52	HgCl2
Hgmetal(l)	-1.70	-15.35	-13.65	Hg
HgSe	19.45	-36.25	-55.69	HgSe
HgSe03	-32.24	-44.67	-12.43	HgSe03
HgS04	-27.37	-36.82	-9.45	HgS04
Hinsdalite	-8.97	-11.47	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	-2.82	-47.15	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-16.24	-79.03	-62.79	Pb5(P04)3OH
K-Alum	-6.90	-12.14	-5.24	KAl(S04)2:12H2O
K-Jarosite	-7.42	-21.91	-14.49	KFe3(S04)2(OH)6
K2Se04	-38.43	-39.16	-0.73	K2Se04
Langite	-28.54	-10.66	17.88	Cu4(OH)6S04:H2O
Larnakite	-9.38	-9.76	-0.38	PbO:PbS04
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.58	-0.21	1.37	Fe00H
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.75	1.10	12.85	PbO
Mackinawite	-16.28	-19.88	-3.60	FeS
Maghemite	-6.81	-0.42	6.39	Fe2O3

Magnesioferrite	-9.86	7.67	17.52	Fe2MgO4
Magnetite	2.53	6.43	3.90	Fe3O4
Manganite	-13.14	12.20	25.34	MnOOH
Massicot	-11.96	1.10	13.05	PbO
Melanothallite	-17.53	-11.12	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeSO4·7H2O
Metacinnabar	-5.90	-51.60	-45.70	HgS
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(P04)2	-8.80	-32.08	-23.28	Mg3(P04)2
MgHP04:3H2O	-1.93	-20.10	-18.18	MgHP04:3H2O
MgSe03:6H2O	-14.79	-11.74	3.04	MgSe03:6H2O
MgSe04:6H2O	-35.18	-36.38	-1.20	MgSe04:6H2O
Minium	-59.09	15.43	74.53	Pb3O4
Mirabilite	-2.08	-3.38	-1.30	Na2SO4:10H2O
Mn2(S04)3	-57.34	-62.66	-5.32	Mn2(S04)3
Mn3(P04)2	-14.11	-37.95	-23.85	Mn3(P04)2
MnCl2:4H2O	-8.08	-5.34	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnS(grn)	-20.85	-20.60	0.25	MnS
MnS(pnk)	-23.94	-20.60	3.34	MnS
MnSe	-8.98	-5.25	3.73	MnSe
MnSe03	-14.80	-13.67	1.13	MnSe03
MnSe03:2H2O	-14.64	-13.68	0.96	MnSe03:2H2O
MnSe04:5H2O	-36.29	-38.34	-2.05	MnSe04:5H2O
MnSO4	-8.56	-5.82	2.74	MnSO4
Monteponite	-13.64	1.71	15.35	CdO
Montroydite	-21.32	-24.87	-3.55	HgO
Morenosite	-4.59	-6.76	-2.17	NiSO4:7H2O
Na-Jarosite	-9.39	-20.23	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-21.50	-11.20	10.30	Na2Se03:5H2O
Na2Se04	-37.09	-35.81	1.28	Na2Se04
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(P04)2	-9.36	-40.66	-31.30	Ni3(P04)2
Ni4(OH)6S04	-23.06	8.94	32.00	Ni4(OH)6S04
NiS(alpha)	-15.91	-21.51	-5.60	NiS
NiS(beta)	-10.41	-21.51	-11.10	NiS
NiS(gamma)	-8.71	-21.51	-12.80	NiS
NiSe	11.55	-6.15	-17.70	NiSe
NiSe03:2H2O	-17.47	-14.58	2.89	NiSe03:2H2O
NiSe04:6H2O	-37.72	-39.24	-1.52	NiSe04:6H2O
Nsutite	-24.84	-7.33	17.50	MnO2
O2(g)	-60.16	24.29	84.45	O2
Pb(OH)2	-7.20	1.09	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.33	-3.54	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-24.00	2.19	26.19	Pb2O(OH)2
Pb2O3	-46.70	14.34	61.04	Pb2O3
Pb3(P04)2	-9.52	-53.05	-43.53	Pb3(P04)2
Pb3O2S04	-19.54	-8.66	10.87	Pb3O2S04
Pb4(OH)6S04	-28.68	-7.58	21.10	Pb4(OH)6S04
Pb4O3S04	-29.77	-7.57	22.20	Pb4O3S04
PbHP04	-3.27	-27.08	-23.81	PbHP04
Pbmetal	-15.30	-11.05	4.24	Pb
PbO:0.3H2O	-11.89	1.09	12.98	PbO:0.33H2O
PbSe04	-36.47	-43.34	-6.88	PbSe04
Periclase	-13.86	8.09	21.94	MgO
Plattnerite	-37.06	13.24	50.31	PbO2
Plumbgummite	5.10	-27.69	-32.79	PbAl3(P04)2(OH)5·H2O
Portlandite	-15.64	7.47	23.11	Ca(OH)2
Pyrite	-15.84	-34.47	-18.63	FeS2
Pyrochroite	-9.30	6.12	15.43	Mn(OH)2
Pyrolusite	-23.75	18.27	42.03	MnO2
Pyromorphite	-0.32	-84.75	-84.43	Pb5(P04)3Cl
Retgersite	-4.70	-6.76	-2.05	NiSO4:6H2O
Semetal(am)	7.91	0.77	-7.14	Se
Semetal(hex)	8.52	0.77	-7.75	Se
SeO2	-19.92	-19.80	0.12	SeO2
SeO3	-65.83	-44.44	21.39	SeO3

Sphalerite	-10.89	-22.41	-11.52	ZnS
Spinel	-11.31	26.46	37.77	MgAl2O4
Strengite	-2.01	-28.39	-26.38	FePO4:2H2O
Sulfur	-12.48	-14.59	-2.11	S
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.67	-3.33	0.34	Na2SO4
Tsumebite	-15.88	-25.67	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	0.17	-35.83	-36.00	Fe3(PO4)2:8H2O
Wurtzite	-13.41	-22.41	-9.00	ZnS
Zincite	-7.23	4.32	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnSO4
Zn(NO3)2:6H2O	-138.81	-135.56	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-7.89	4.31	12.20	Zn(OH)2
Zn(OH)2(am)	-8.35	4.31	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.64	4.31	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.42	4.31	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.42	4.31	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.82	-3.32	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.28	2.91	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-7.98	-43.40	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-30.47	-10.94	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-23.09	5.31	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-28.37	10.13	38.50	Zn5(OH)8Cl2
ZnCl2	-14.35	-7.13	7.22	ZnCl2
Znmetal	-33.98	-7.83	26.15	Zn
ZnO(active)	-7.08	4.32	11.40	ZnO
ZnS(am)	-13.32	-22.41	-9.09	ZnS
ZnSe	7.40	-7.06	-14.46	ZnSe
ZnSeO4:6H2O	-38.63	-40.15	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.10	-7.64	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 10.

SOLUTION 9 #Groundwater worst case maximum values

temp 21
pH 5.05
pe 1
redox pe
units mg/l
density 1
Al 5.21
Alkalinity 0
As 0
Ba 0
Be 0
B 0
Cd 0.04
Co 24.2
Cr 0
Cu 9.29
Fe 937
Pb 0.01
Mn 171
Mo 0
V 0
Zn 1.78
Se 0.08
Ni 5.57
N 60


```

P      23.6
Ca     590
Mg    1340
Na    5880
K      216
Cl    9420
S(6)   9110
Hg     0.0004
water  1 # kg
MIX 7
  1    0.988
  9    0.012
REACTION 8
H2O -1
  2
END #Time-step 8

```

Beginning of initial solution calculations.

Initial solution 9.

-----Solution composition-----

Elements	Molality	Moles
Al	1.986e-04	1.986e-04
Ca	1.514e-02	1.514e-02
Cd	3.660e-07	3.660e-07
Cl	2.733e-01	2.733e-01
Co	4.224e-04	4.224e-04
Cu	1.504e-04	1.504e-04
Fe	1.726e-02	1.726e-02
Hg	2.051e-09	2.051e-09
K	5.682e-03	5.682e-03
Mg	5.671e-02	5.671e-02
Mn	3.202e-03	3.202e-03
N	4.406e-03	4.406e-03
Na	2.631e-01	2.631e-01
Ni	9.762e-05	9.762e-05
P	7.837e-04	7.837e-04
Pb	4.964e-08	4.964e-08
S(6)	9.754e-02	9.754e-02
Se	1.042e-06	1.042e-06
Zn	2.800e-05	2.800e-05

-----Description of solution-----

```

pH = 5.050
pe = 1.000
Activity of water = 0.988
Ionic strength (mol/kgw) = 4.862e-01
Mass of water (kg) = 1.000e+00
Total alkalinity (eq/kg) = 1.381e-05
Total carbon (mol/kg) = 0.000e+00
Total CO2 (mol/kg) = 0.000e+00
Temperature (°C) = 21.00
Electrical balance (eq) = -9.552e-03
Percent error, 100*(Cat-|An|)/(Cat+|An|) = -1.26
Iterations = 14
Total H = 1.110329e+02
Total O = 5.590014e+01

```

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol

H+	1.214e-05	8.913e-06	-4.916	-5.050	-0.134	0.00
OH-	1.292e-09	8.222e-10	-8.889	-9.085	-0.196	(0)
H2O	5.551e+01	9.883e-01	1.744	-0.005	0.000	18.05
Al	1.986e-04					
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Al+3	1.839e-05	1.139e-06	-4.735	-5.943	-1.208	(0)
AlOH+2	4.197e-06	9.786e-07	-5.377	-6.009	-0.632	(0)
Al(OH)2+	1.624e-06	1.128e-06	-5.790	-5.948	-0.158	(0)
Al(OH)3	2.514e-08	2.514e-08	-7.600	-7.600	0.000	(0)
Al(OH)4-	2.040e-09	1.366e-09	-8.690	-8.864	-0.174	(0)
Ca	1.514e-02					
Ca+2	8.161e-03	2.370e-03	-2.088	-2.625	-0.537	(0)
CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
CaOH+	5.236e-11	3.715e-11	-10.281	-10.430	-0.149	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
Cd	3.660e-07					
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
Cd(SO4)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
Cd+2	1.502e-08	4.363e-09	-7.823	-8.360	-0.537	(0)
CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CdOH+	6.462e-14	2.865e-14	-13.190	-13.543	-0.353	(0)
Cd2OH+3	9.945e-19	6.582e-22	-18.002	-21.182	-3.179	(0)
Cd(OH)2	2.726e-19	2.726e-19	-18.564	-18.564	0.000	(0)
Cd(OH)3-	4.195e-26	1.860e-26	-25.377	-25.730	-0.353	(0)
Cd(OH)4-2	8.799e-35	3.400e-36	-34.056	-35.469	-1.413	(0)
Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cl	2.733e-01					
Cl-	2.729e-01	2.003e-01	-0.564	-0.698	-0.134	(0)
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
CdCl+	1.872e-07	8.301e-08	-6.728	-7.081	-0.353	(0)
CdCl2	6.857e-08	6.857e-08	-7.164	-7.164	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
CdCl3-	1.881e-08	8.341e-09	-7.726	-8.079	-0.353	(0)
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CdOHCl	3.460e-12	3.460e-12	-11.461	-11.461	0.000	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)

HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(2)	4.224e-04					
Co+2	3.644e-04	1.408e-05	-3.438	-4.851	-1.413	(0)
CoS04	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
CoCl+	2.177e-05	9.651e-06	-4.662	-5.015	-0.353	(0)
CoHP04	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CoOH+	7.075e-10	3.137e-10	-9.150	-9.504	-0.353	(0)
Co2OH+3	3.344e-13	2.213e-16	-12.476	-15.655	-3.179	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Co(OH)2	2.782e-14	2.782e-14	-13.556	-13.556	0.000	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Co(OH)3-	1.398e-21	6.199e-22	-20.854	-21.208	-0.353	(0)
Co0OH-	8.505e-23	3.771e-23	-22.070	-22.424	-0.353	(0)
Co4(OH)4+4	8.668e-25	1.932e-30	-24.062	-29.714	-5.652	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
Co(OH)4-2	2.839e-30	1.097e-31	-29.547	-30.960	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
CoSe04	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Co(3)	8.287e-32					
CoOH+2	8.232e-32	3.180e-33	-31.085	-32.498	-1.413	(0)
CoCl+2	5.416e-34	2.093e-35	-33.266	-34.679	-1.413	(0)
Co+3	9.049e-36	5.605e-37	-35.043	-36.251	-1.208	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
Cu(1)	1.504e-04					
CuCl2-	1.317e-04	8.614e-05	-3.880	-4.065	-0.185	(0)
CuCl3-2	1.658e-05	3.632e-06	-4.780	-5.440	-0.659	(0)
CuCl	2.038e-06	2.038e-06	-5.691	-5.691	0.000	(0)
Cu+	1.823e-08	8.082e-09	-7.739	-8.092	-0.353	(0)
Cu(2)	1.182e-09					
Cu+2	5.900e-10	1.714e-10	-9.229	-9.766	-0.537	(0)
CuS04	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
CuCl+	7.951e-11	5.199e-11	-10.100	-10.284	-0.185	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
CuCl2	2.966e-12	2.966e-12	-11.528	-11.528	0.000	(0)
CuOH+	7.604e-13	4.972e-13	-12.119	-12.303	-0.185	(0)
CuCl3-	7.893e-15	5.161e-15	-14.103	-14.287	-0.185	(0)
Cu(OH)2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	2.709e-17	5.935e-18	-16.567	-17.227	-0.659	(0)
Cu2(OH)2+2	1.564e-19	6.042e-21	-18.806	-20.219	-1.413	(0)
Cu(OH)3-	6.965e-22	3.088e-22	-21.157	-21.510	-0.353	(0)
Cu(OH)4-2	7.024e-29	2.714e-30	-28.153	-29.566	-1.413	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Fe(2)	1.726e-02					
Fe+2	1.529e-02	5.907e-04	-1.816	-3.229	-1.413	(0)
FeS04	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
FeH2P04+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
FeHP04	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
FeOH+	2.826e-08	1.934e-08	-7.549	-7.714	-0.165	(0)
Fe(OH)2	1.209e-14	1.209e-14	-13.918	-13.918	0.000	(0)
Fe(OH)3-	6.009e-18	4.111e-18	-17.221	-17.386	-0.165	(0)

Fe(3)	2.087e-10					
Fe(OH)2+	1.957e-10	1.360e-10	-9.708	-9.867	-0.158	(0)
FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
FeOH+2	1.136e-12	2.489e-13	-11.945	-12.604	-0.659	(0)
Fe(OH)3	9.228e-14	9.228e-14	-13.035	-13.035	0.000	(0)
FeS04+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(S04)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
FeCl+2	1.057e-14	2.315e-15	-13.976	-14.635	-0.659	(0)
FeH2P04+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Fe+3	7.010e-15	4.342e-16	-14.154	-15.362	-1.208	(0)
FeCl2+	3.436e-15	2.351e-15	-14.464	-14.629	-0.165	(0)
FeCl3	4.709e-17	4.709e-17	-16.327	-16.327	0.000	(0)
Fe(OH)4-	2.440e-17	1.696e-17	-16.613	-16.771	-0.158	(0)
Fe2(OH)2+4	1.061e-18	2.365e-24	-17.974	-23.626	-5.652	(0)
Fe3(OH)4+5	3.023e-24	4.459e-33	-23.520	-32.351	-8.831	(0)
FeHSe03+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
FeN03+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
H(0)	1.047e-15					
H2	5.235e-16	5.855e-16	-15.281	-15.232	0.049	(0)
Hg(0)	2.051e-09					
Hg	2.051e-09	2.051e-09	-8.688	-8.688	0.000	(0)
Hg(1)	9.698e-28					
Hg2+2	4.849e-28	1.874e-29	-27.314	-28.727	-1.413	(0)
Hg(2)	4.726e-15					
HgCl4-2	4.188e-15	1.618e-16	-14.378	-15.791	-1.413	(0)
HgCl3-	4.412e-16	1.956e-16	-15.355	-15.709	-0.353	(0)
HgCl2	9.678e-17	9.678e-17	-16.014	-16.014	0.000	(0)
HgClOH	7.253e-21	7.253e-21	-20.139	-20.139	0.000	(0)
HgCl+	1.847e-22	8.190e-23	-21.733	-22.087	-0.353	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Hg(OH)2	1.022e-25	1.143e-25	-24.991	-24.942	0.049	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
HgOH+	1.615e-27	7.162e-28	-26.792	-27.145	-0.353	(0)
Hg+2	4.674e-28	1.806e-29	-27.330	-28.743	-1.413	(0)
HgS04	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Hg(OH)3-	3.623e-35	1.606e-35	-34.441	-34.794	-0.353	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
HgN03+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Hg(N03)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
K	5.682e-03					
K+	5.178e-03	3.801e-03	-2.286	-2.420	-0.134	(0)
KS04-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
KHP04-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
Mg	5.671e-02					
Mg+2	3.360e-02	9.758e-03	-1.474	-2.011	-0.537	(0)
MgS04	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
MgH2P04+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
MgHP04	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
MgOH+	4.148e-09	2.990e-09	-8.382	-8.524	-0.142	(0)
MgP04-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
Mn(2)	3.202e-03					
Mn+2	2.899e-03	1.120e-04	-2.538	-3.951	-1.413	(0)
MnS04	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
MnCl+	4.129e-05	2.825e-05	-4.384	-4.549	-0.165	(0)
MnCl2	7.993e-06	7.993e-06	-5.097	-5.097	0.000	(0)
MnCl3-	6.446e-07	4.410e-07	-6.191	-6.356	-0.165	(0)
MnOH+	3.381e-10	2.313e-10	-9.471	-9.636	-0.165	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Mn(OH)3-	3.538e-24	2.421e-24	-23.451	-23.616	-0.165	(0)
Mn(OH)4-2	3.983e-32	8.727e-33	-31.400	-32.059	-0.659	(0)
MnSe04	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
MnN03+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
Mn(N03)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Mn(3)	4.471e-28					
Mn+3	4.471e-28	2.769e-29	-27.350	-28.558	-1.208	(0)
Mn(6)	0.000e+00					
Mn04-2	0.000e+00	0.000e+00	-79.028	-79.687	-0.659	(0)

Mn(7)	0.000e+00					
MnO4-	0.000e+00	0.000e+00	-88.115	-88.325	-0.210	(0)
N(-3)	4.406e-03					
NH4+	3.919e-03	2.335e-03	-2.407	-2.632	-0.225	(0)
NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
NH3	1.123e-07	1.123e-07	-6.950	-6.950	0.000	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
CaNH3+2	1.154e-08	4.459e-10	-7.938	-9.351	-1.413	(0)
Co(NH3)+2	9.349e-09	3.612e-10	-8.029	-9.442	-1.413	(0)
CuNH3+2	1.007e-11	3.889e-13	-10.997	-12.410	-1.413	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Co(NH3)2+2	4.172e-14	1.612e-15	-13.380	-14.793	-1.413	(0)
Ca(NH3)2+2	6.864e-16	2.652e-17	-15.163	-16.576	-1.413	(0)
Co(NH3)3+2	7.846e-20	3.032e-21	-19.105	-20.518	-1.413	(0)
Hg(NH3)2+2	2.049e-23	7.917e-25	-22.688	-24.101	-1.413	(0)
Co(NH3)4+2	6.152e-26	2.377e-27	-25.211	-26.624	-1.413	(0)
HgNH3+2	3.544e-26	1.369e-27	-25.451	-26.864	-1.413	(0)
Hg(NH3)3+2	1.751e-29	6.763e-31	-28.757	-30.170	-1.413	(0)
Co(NH3)5+2	1.525e-32	5.894e-34	-31.817	-33.230	-1.413	(0)
Hg(NH3)4+2	3.000e-35	1.159e-36	-34.523	-35.936	-1.413	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.673	-43.086	-1.413	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.193	-56.606	-1.413	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.998	-60.411	-1.413	(0)
N(3)	0.000e+00					
NO2-	0.000e+00	0.000e+00	-47.968	-48.177	-0.210	(0)
CoNO2+	0.000e+00	0.000e+00	-51.827	-52.181	-0.353	(0)
CuNO2+	0.000e+00	0.000e+00	-55.570	-55.923	-0.353	(0)
Cu(NO2)2	0.000e+00	0.000e+00	-103.090	-103.090	0.000	(0)
N(5)	0.000e+00					
NO3-	0.000e+00	0.000e+00	-64.954	-65.088	-0.134	(0)
CaNO3+	0.000e+00	0.000e+00	-66.847	-67.201	-0.353	(0)
MnNO3+	0.000e+00	0.000e+00	-68.486	-68.839	-0.353	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
CoNO3+	0.000e+00	0.000e+00	-69.387	-69.740	-0.353	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
CdNO3+	0.000e+00	0.000e+00	-72.545	-72.899	-0.353	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
CuNO3+	0.000e+00	0.000e+00	-73.991	-74.345	-0.353	(0)
FeNO3+2	0.000e+00	0.000e+00	-77.950	-79.363	-1.413	(0)
HgNO3+	0.000e+00	0.000e+00	-94.006	-94.359	-0.353	(0)
Mn(NO3)2	0.000e+00	0.000e+00	-133.524	-133.524	0.000	(0)
Co(NO3)2	0.000e+00	0.000e+00	-134.520	-134.520	0.000	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
Cd(NO3)2	0.000e+00	0.000e+00	-138.337	-138.337	0.000	(0)
Cu(NO3)2	0.000e+00	0.000e+00	-140.343	-140.343	0.000	(0)
Hg(NO3)2	0.000e+00	0.000e+00	-159.829	-159.829	0.000	(0)
Na	2.631e-01					
Na+	2.447e-01	1.796e-01	-0.611	-0.746	-0.134	(0)
NaSO4-	1.839e-02	1.278e-02	-1.735	-1.893	-0.158	(0)
NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
Ni	9.762e-05					
Ni+2	4.671e-05	1.357e-05	-4.331	-4.867	-0.537	(0)
NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
NiCl+	1.551e-05	6.879e-06	-4.809	-5.163	-0.353	(0)
Ni(SO4)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
NiNH3+2	4.069e-08	1.572e-09	-7.391	-8.804	-1.413	(0)
NiCl2	7.015e-09	7.015e-09	-8.154	-8.154	0.000	(0)
NiOH+	3.238e-10	1.435e-10	-9.490	-9.843	-0.353	(0)
Ni(NH3)2+2	1.122e-12	4.336e-14	-11.950	-13.363	-1.413	(0)
Ni(OH)2	1.692e-14	1.692e-14	-13.772	-13.772	0.000	(0)
Ni(OH)3-	4.261e-20	1.889e-20	-19.371	-19.724	-0.353	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
NiNO3+	0.000e+00	0.000e+00	-69.203	-69.556	-0.353	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-63.001	-62.952	0.049	(0)
P	7.837e-04					

H2PO4-	4.270e-04	2.967e-04	-3.370	-3.528	-0.158	(0)
MgH2PO4+	1.867e-04	1.297e-04	-3.729	-3.887	-0.158	(0)
FeH2PO4+	1.145e-04	7.958e-05	-3.941	-4.099	-0.158	(0)
CaH2PO4+	2.121e-05	1.474e-05	-4.673	-4.831	-0.158	(0)
MgHPO4	1.197e-05	1.197e-05	-4.922	-4.922	0.000	(0)
HP04-2	9.473e-06	2.076e-06	-5.024	-5.683	-0.659	(0)
NaHPO4-	5.806e-06	4.035e-06	-5.236	-5.394	-0.158	(0)
FeHPO4	4.496e-06	4.496e-06	-5.347	-5.347	0.000	(0)
CaHPO4	2.106e-06	2.106e-06	-5.677	-5.677	0.000	(0)
H3PO4	3.560e-07	3.560e-07	-6.449	-6.449	0.000	(0)
KHPO4-	7.933e-08	5.513e-08	-7.101	-7.259	-0.158	(0)
CoHPO4	2.936e-08	2.936e-08	-7.532	-7.532	0.000	(0)
CaPO4-	8.288e-10	5.759e-10	-9.082	-9.240	-0.158	(0)
MgPO4-	5.333e-11	3.706e-11	-10.273	-10.431	-0.158	(0)
FeHPO4+	1.167e-11	8.107e-12	-10.933	-11.091	-0.158	(0)
PO4-3	1.460e-12	9.045e-14	-11.836	-13.044	-1.208	(0)
FeH2PO4+2	9.505e-15	2.216e-15	-14.022	-14.654	-0.632	(0)
Pb	4.964e-08					
PbCl+	1.615e-08	7.158e-09	-7.792	-8.145	-0.353	(0)
Pb(SO4)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
PbCl2	6.291e-09	6.291e-09	-8.201	-8.201	0.000	(0)
Pb+2	3.636e-09	1.056e-09	-8.439	-8.976	-0.537	(0)
PbCl3-	1.182e-09	5.242e-10	-8.927	-9.280	-0.353	(0)
PbCl4-2	1.171e-09	4.525e-11	-8.931	-10.344	-1.413	(0)
PbOH+	6.682e-12	2.963e-12	-11.175	-11.528	-0.353	(0)
Pb(OH)2	1.046e-16	1.046e-16	-15.980	-15.980	0.000	(0)
Pb2OH+3	7.494e-17	4.960e-20	-16.125	-19.305	-3.179	(0)
Pb(OH)3-	2.635e-22	1.168e-22	-21.579	-21.933	-0.353	(0)
Pb(OH)4-2	8.268e-28	3.195e-29	-27.083	-28.496	-1.413	(0)
Pb3(OH)4+2	3.173e-30	1.226e-31	-29.499	-30.912	-1.413	(0)
Pb4(OH)4+4	5.352e-31	1.193e-36	-30.271	-35.923	-5.652	(0)
PbNO3+	0.000e+00	0.000e+00	-72.546	-72.899	-0.353	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.737	-137.737	0.000	(0)
S(6)	9.754e-02					
SO4-2	4.586e-02	1.332e-02	-1.339	-1.875	-0.537	(0)
MgSO4	2.291e-02	2.291e-02	-1.640	-1.640	0.000	(0)
NaSO4-	1.839e-02	2.278e-02	-1.735	-1.893	-0.158	(0)
CaSO4	6.958e-03	6.958e-03	-2.158	-2.158	0.000	(0)
FeSO4	1.849e-03	1.849e-03	-2.733	-2.733	0.000	(0)
KSO4-	5.044e-04	3.505e-04	-3.297	-3.455	-0.158	(0)
NH4SO4-	4.872e-04	3.334e-04	-3.312	-3.477	-0.165	(0)
MnSO4	2.529e-04	2.529e-04	-3.597	-3.597	0.000	(0)
AlSO4+	1.509e-04	1.010e-04	-3.821	-3.996	-0.174	(0)
CoSO4	3.617e-05	3.617e-05	-4.442	-4.442	0.000	(0)
NiSO4	3.493e-05	3.493e-05	-4.457	-4.457	0.000	(0)
Al(SO4)2-	2.352e-05	1.575e-05	-4.629	-4.803	-0.174	(0)
Zn(SO4)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
HSO4-	1.536e-05	1.028e-05	-4.814	-4.988	-0.174	(0)
ZnSO4	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
Ni(SO4)2-2	4.117e-07	1.591e-08	-6.385	-7.798	-1.413	(0)
Cd(SO4)2-2	6.337e-08	2.448e-09	-7.198	-8.611	-1.413	(0)
Pb(SO4)2-2	1.432e-08	5.532e-10	-7.844	-9.257	-1.413	(0)
CdSO4	1.299e-08	1.299e-08	-7.886	-7.886	0.000	(0)
PbSO4	6.892e-09	6.892e-09	-8.162	-8.162	0.000	(0)
CuSO4	4.986e-10	4.986e-10	-9.302	-9.302	0.000	(0)
FeSO4+	8.270e-14	5.658e-14	-13.082	-13.247	-0.165	(0)
Fe(SO4)2-	3.752e-14	1.664e-14	-13.426	-13.779	-0.353	(0)
HgSO4	5.066e-29	5.066e-29	-28.295	-28.295	0.000	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.553	-52.906	-0.353	(0)
Se(-2)	1.042e-06					
HSe-	1.012e-06	4.485e-07	-5.995	-6.348	-0.353	(0)
H2Se	3.047e-08	3.047e-08	-7.516	-7.516	0.000	(0)
MnSe	2.323e-11	2.323e-11	-10.634	-10.634	0.000	(0)
Se-2	1.000e-15	3.865e-17	-15.000	-16.413	-1.413	(0)
Se(4)	2.708e-15					
HSeO3-	2.690e-15	1.193e-15	-14.570	-14.923	-0.353	(0)
SeO3-2	1.341e-17	5.183e-19	-16.872	-18.285	-1.413	(0)

H2SeO3	4.383e-18	4.383e-18	-17.358	-17.358	0.000	(0)
FeHSeO3+2	3.088e-26	1.193e-27	-25.510	-26.923	-1.413	(0)
Cd(SeO3)2-2	2.641e-38	1.020e-39	-37.578	-38.991	-1.413	(0)
Se(6)	9.467e-35					
SeO4-2	9.354e-35	2.717e-35	-34.029	-34.566	-0.537	(0)
MnSeO4	7.585e-37	7.585e-37	-36.120	-36.120	0.000	(0)
CoSeO4	1.795e-37	1.795e-37	-36.746	-36.746	0.000	(0)
NiSeO4	1.597e-37	1.597e-37	-36.797	-36.797	0.000	(0)
HSeO4-	2.413e-38	1.070e-38	-37.617	-37.971	-0.353	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.656	-40.656	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn	2.800e-05					
Zn(SO4)2-2	1.538e-05	5.943e-07	-4.813	-6.226	-1.413	(0)
Zn+2	6.051e-06	1.758e-06	-5.218	-5.755	-0.537	(0)
ZnSO4	4.951e-06	4.951e-06	-5.305	-5.305	0.000	(0)
ZnCl+	1.313e-06	8.586e-07	-5.882	-6.066	-0.185	(0)
ZnCl2	2.292e-07	2.292e-07	-6.640	-6.640	0.000	(0)
ZnCl3-	5.488e-08	3.588e-08	-7.261	-7.445	-0.185	(0)
ZnCl4-2	1.589e-08	3.481e-09	-7.799	-8.458	-0.659	(0)
ZnOHCl	1.293e-09	1.293e-09	-8.888	-8.888	0.000	(0)
ZnOH+	3.259e-10	1.445e-10	-9.487	-9.840	-0.353	(0)
Zn(OH)2	3.473e-14	3.473e-14	-13.459	-13.459	0.000	(0)
Zn(OH)3-	4.384e-19	1.944e-19	-18.358	-18.711	-0.353	(0)
Zn(OH)4-2	2.236e-25	8.641e-27	-24.650	-26.063	-1.413	(0)
ZnSeO4	7.396e-39	7.396e-39	-38.131	-38.131	0.000	(0)
ZnNO3+	0.000e+00	0.000e+00	-70.079	-70.432	-0.353	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-71.278	-72.691	-1.413	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-136.232	-136.232	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)	
(Co(NH3)5Cl)(NO3)2	-161.31	-155.03	6.27	(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)Cl2	-30.79	-26.25	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-38.05	-26.26	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-234.94	-217.01	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-43.95	-23.84	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-40.28	-39.83	0.45	(NH4)2SeO4
Al(OH)3(am)	-1.87	9.19	11.06	Al(OH)3
Al2O3	-1.87	18.40	20.27	Al2O3
Al4(OH)10SO4	2.10	24.80	22.70	Al4(OH)10SO4
AlOHSO4	0.46	-2.77	-3.23	AlOHSO4
Alunite	7.17	6.27	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.03	-10.85	-7.82	PbSO4
Anhydrite	-0.16	-4.50	-4.34	CaSO4
Antlerite	-19.78	-10.99	8.79	Cu3(OH)4SO4
Atacamite	-12.71	-5.10	7.61	Cu2(OH)3Cl
Bianchite	-5.90	-7.66	-1.76	ZnSO4:6H2O
Birnessite	-25.46	-7.37	18.09	MnO2
Bixbyite	-26.48	-26.83	-0.35	Mn2O3
Boehmite	0.34	9.20	8.86	AlOOH
Brochantite	-26.38	-10.67	15.71	Cu4(OH)6SO4
Brucite	-9.04	8.08	17.12	Mg(OH)2
Bunsenite	-7.46	5.23	12.68	NiO
Ca3(PO4)2(beta)	-4.91	-33.96	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-7.62	-54.70	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.37	-20.72	-19.35	CaHP04
CaHP04:2H2O	-1.68	-20.73	-19.05	CaHP04:2H2O
Calomel	-11.99	-30.12	-18.13	Hg2Cl2
CaSeO3:2H2O	-15.37	-12.51	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-34.20	-37.20	-3.00	CaSeO4:2H2O
Cd(OH)2	-12.14	1.73	13.87	Cd(OH)2
Cd(OH)2(am)	-12.21	1.73	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-25.45	-18.74	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-29.34	-6.78	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-18.57	-51.17	-32.60	Cd3(PO4)2

Cd4(OH)6SO4	-33.45	-5.05	28.40	Cd4(OH)6SO4
CdCl2	-9.14	-9.76	-0.61	CdCl2
CdCl2:1H2O	-8.09	-9.76	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-7.84	-9.77	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.05	-10.36	13.69	Cd
Cdmetal(gamma)	-24.16	-10.36	13.80	Cd
CdOHCl	-7.62	-4.01	3.61	CdOHCl
CdSe	10.72	-9.66	-20.38	CdSe
CdSeO4:2H2O	-41.09	-42.94	-1.85	CdSeO4:2H2O
CdSO4	-10.19	-10.24	-0.05	CdSO4
CdSO4:1H2O	-8.59	-10.24	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-8.42	-10.25	-1.83	CdSO4:2.67H2O
Chalcanthite	-9.01	-11.67	-2.65	CuSO4:5H2O
Clausthalite	17.11	-10.27	-27.39	PbSe
Co(OH)2	-7.86	5.24	13.09	Co(OH)2
Co(OH)3	-19.03	-21.12	-2.09	Co(OH)3
Co3(P04)2	-5.95	-40.64	-34.69	Co3(P04)2
Co3O4	-26.74	-36.97	-10.24	Co3O4
CoCl2	-14.71	-6.25	8.46	CoCl2
CoCl2:6H2O	-8.80	-6.28	2.52	CoCl2:6H2O
CoFe2O4	7.95	4.80	-3.15	CoFe2O4
CoHP04	-3.88	-22.95	-19.06	CoHP04
CoO	-8.60	5.24	13.84	CoO
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-16.04	-14.72	1.32	CoSeO3
CoSeO4:6H2O	-37.92	-39.45	-1.53	CoSeO4:6H2O
CoSO4	-9.72	-6.73	2.99	CoSO4
CoSO4:6H2O	-4.28	-6.76	-2.48	CoSO4:6H2O
Cotunnite	-5.53	-10.37	-4.84	PbCl2
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.91	-69.49	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.83	-17.48	-46.31	Cu2Se
Cu2SO4	-16.16	-18.06	-1.90	Cu2SO4
Cu3(P04)2	-18.54	-55.39	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-20.28	-55.40	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.75	-28.55	-64.30	Cu3Se2
Cumetal	-0.17	-9.09	-8.93	Cu
CuOCuSO4	-21.94	-11.31	10.63	CuOCuSO4
Cupricferrite	-6.60	-0.11	6.49	CuFe2O4
Cuprite	-4.98	-6.09	-1.11	Cu2O
Cuprousferrite	5.61	-3.27	-8.88	CuFeO2
CuSe	22.32	-11.06	-33.39	CuSe
CuSe2	23.34	-10.36	-33.70	CuSe2
CuSeO3:2H2O	-20.25	-19.65	0.60	CuSeO3:2H2O
CuSeO4:5H2O	-41.92	-44.36	-2.44	CuSeO4:5H2O
CuSO4	-14.76	-11.64	3.11	CuSO4
Diaspore	2.08	9.20	7.12	AlOOH
Epsomite	-1.77	-3.92	-2.15	MgSO4:7H2O
Fe(OH)2	-6.70	6.86	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.09	-1.95	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4SeO3	-21.97	-20.42	1.55	Fe2(OH)4SeO3
Fe2(SeO3)3:2H2O	-39.73	-60.36	-20.63	Fe2(SeO3)3:2H2O
Fe2(SO4)3	-33.19	-36.35	-3.16	Fe2(SO4)3
Fe3(OH)8	-13.82	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.59	-0.23	3.37	Fe(OH)3
Ferroselite	14.88	-3.83	-18.71	FeSe2
FeSe	6.48	-4.53	-11.00	FeSe
Gibbsite	0.67	9.19	8.52	Al(OH)3
Goethite	-0.86	-0.22	0.64	FeOOH
Goslarite	-5.62	-7.67	-2.05	ZnSO4:7H2O
Gypsum	0.10	-4.51	-4.61	CaSO4:2H2O
H-Jarosite	-13.07	-24.62	-11.55	(H3O)Fe3(SO4)2(OH)6
H2Se(g)	-6.47	-11.40	-4.92	H2Se
Halite	-3.04	-1.44	1.59	NaCl
Hausmannite	-31.51	30.53	62.03	Mn3O4
Hematite	0.67	-0.44	-1.11	Fe2O3
Hercynite	1.62	25.26	23.64	FeAl2O4
Hg(g)	-7.44	-15.36	-7.93	Hg

Hg(OH)2	-21.45	-24.94	-3.50	Hg(OH)2
Hg2(g)	-15.63	-30.73	-15.09	Hg2
Hg2(OH)2	-23.90	-18.64	5.26	Hg2(OH)2
Hg2HP04	-22.05	-46.82	-24.77	Hg2HP04
Hg2Se03	-33.94	-38.60	-4.66	Hg2Se03
Hg2S04	-24.46	-30.60	-6.14	Hg2S04
HgCl(g)	-34.94	-15.06	19.88	HgCl
HgCl2	-14.91	-36.43	-21.52	HgCl2
Hgmetal(l)	-1.71	-15.36	-13.65	Hg
HgSe	19.36	-36.33	-55.69	HgSe
HgSe03	-32.48	-44.91	-12.43	HgSe03
HgS04	-27.45	-36.91	-9.45	HgS04
Hinsdalite	-8.96	-11.46	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	-2.88	-47.21	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-16.18	-78.97	-62.79	Pb5(P04)3OH
K-Alum	-6.93	-12.18	-5.24	KAl(S04)2:12H2O
K-Jarosite	-7.50	-21.99	-14.49	KFe3(S04)2(OH)6
K2Se04	-38.68	-39.41	-0.73	K2Se04
Langite	-28.56	-10.68	17.88	Cu4(OH)6S04:H2O
Larnakite	-9.35	-9.73	-0.38	Pb0:PbS04
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.59	-0.22	1.37	Fe00H
Lime	-25.69	7.47	33.16	Ca0
Litharge	-11.73	1.12	12.85	Pb0
Maghemite	-6.83	-0.44	6.39	Fe203
Magnesioferrite	-9.88	7.64	17.52	Fe2Mg04
Magnetite	2.53	6.43	3.90	Fe304
Manganite	-13.15	12.19	25.34	Mn00H
Massicot	-11.93	1.12	13.05	Pb0
Melanothallite	-17.57	-11.16	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeS04:7H2O
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(P04)2	-8.84	-32.12	-23.28	Mg3(P04)2
MgHP04:3H2O	-1.94	-20.12	-18.18	MgHP04:3H2O
MgSe03:6H2O	-14.96	-11.91	3.04	MgSe03:6H2O
MgSe04:6H2O	-35.41	-36.61	-1.20	MgSe04:6H2O
Minium	-59.08	15.45	74.53	Pb304
Mirabilite	-2.11	-3.42	-1.30	Na2S04:10H2O
Mn2(S04)3	-57.42	-62.74	-5.32	Mn2(S04)3
Mn3(P04)2	-14.09	-37.94	-23.85	Mn3(P04)2
MnCl2:4H2O	-8.11	-5.37	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnSe	-8.98	-5.25	3.73	MnSe
MnSe03	-14.95	-13.82	1.13	MnSe03
MnSe03:2H2O	-14.80	-13.83	0.96	MnSe03:2H2O
MnSe04:5H2O	-36.49	-38.54	-2.05	MnSe04:5H2O
MnS04	-8.56	-5.83	2.74	MnS04
Monteponite	-13.62	1.73	15.35	Cd0
Montroydite	-21.39	-24.94	-3.55	Hg0
Morenosite	-4.60	-6.78	-2.17	NiS04:7H2O
Na-Jarosite	-9.47	-20.31	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-21.69	-11.39	10.30	Na2Se03:5H2O
Na2Se04	-37.34	-36.06	1.28	Na2Se04
Nantokite	-19.96	-8.79	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(P04)2	-9.39	-40.69	-31.30	Ni3(P04)2
Ni4(OH)6S04	-23.08	8.92	32.00	Ni4(OH)6S04
NiSe	11.53	-6.17	-17.70	NiSe
NiSe03:2H2O	-17.64	-14.75	2.89	NiSe03:2H2O
NiSe04:6H2O	-37.94	-39.46	-1.52	NiSe04:6H2O
Nsutite	-24.87	-7.37	17.50	Mn02
O2(g)	-60.26	24.19	84.45	O2
Pb(OH)2	-7.18	1.11	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.31	-3.52	8.79	Pb2(OH)3Cl
Pb20(OH)2	-23.96	2.23	26.19	Pb20(OH)2
Pb203	-46.71	14.33	61.04	Pb203
Pb3(P04)2	-9.49	-53.02	-43.53	Pb3(P04)2
Pb302S04	-19.49	-8.61	10.87	Pb302S04

Pb4(OH)6SO4	-28.61	-7.51	21.10	Pb4(OH)6SO4
Pb4O3SO4	-29.70	-7.50	22.20	Pb4O3SO4
PbHPO4	-3.26	-27.07	-23.81	PbHPO4
Pbmetal	-15.22	-10.98	4.24	Pb
PbO:0.3H2O	-11.86	1.12	12.98	PbO:0.33H2O
PbSeO4	-36.67	-43.54	-6.88	PbSeO4
Periclase	-13.86	8.08	21.94	MgO
Plattnerite	-37.09	13.21	50.31	PbO2
Plumbgummite	5.12	-27.67	-32.79	PbAl3(PO4)2(OH)5:H2O
Portlandite	-15.65	7.46	23.11	Ca(OH)2
Pyrochroite	-9.29	6.14	15.43	Mn(OH)2
Pyrolusite	-23.79	18.24	42.03	MnO2
Pyromorphite	-0.28	-84.71	-84.43	Pb5(PO4)3Cl
Retgersite	-4.72	-6.77	-2.05	NiSO4:6H2O
Semetal(am)	7.84	0.70	-7.14	Se
Semetal(hex)	8.45	0.70	-7.75	Se
SeO2	-20.09	-19.97	0.12	SeO2
SeO3	-66.05	-44.66	21.39	SeO3
Spinel	-11.29	26.48	37.77	MgAl2O4
Strengite	-2.04	-28.42	-26.38	FePO4:2H2O
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.71	-3.37	0.34	Na2SO4
Tsumebite	-15.85	-25.64	-9.79	Pb2CuPO4(OH)3:3H2O
Vivianite	0.19	-35.81	-36.00	Fe3(PO4)2:8H2O
Zincite	-7.21	4.34	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnSO4
Zn(NO3)2:6H2O	-139.22	-135.96	3.26	Zn(NO3)2:6H2O
Zn(OH)2	-7.87	4.33	12.20	Zn(OH)2
Zn(OH)2(am)	-8.33	4.33	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.62	4.33	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.39	4.33	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.40	4.33	11.73	Zn(OH)2
Zn2(OH)2SO4	-10.80	-3.30	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-12.26	2.93	15.19	Zn2(OH)3Cl
Zn3(PO4)2:4H2O	-7.95	-43.37	-35.42	Zn3(PO4)2:4H2O
Zn3O(SO4)2	-30.45	-10.92	19.53	Zn3O(SO4)2
Zn4(OH)6SO4	-23.03	5.37	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-28.31	10.19	38.50	Zn5(OH)8Cl2
ZnCl2	-14.37	-7.15	7.22	ZnCl2
Znmetal	-33.91	-7.76	26.15	Zn
ZnO(active)	-7.06	4.34	11.40	ZnO
ZnSe	7.41	-7.05	-14.46	ZnSe
ZnSeO4:6H2O	-38.83	-40.35	-1.52	ZnSeO4:6H2O
ZnSO4:1H2O	-7.10	-7.64	-0.53	ZnSO4:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 7.
Using reaction 8.

Mixture 7.

9.880e-01 Solution 1
1.200e-02 Solution 9

Reaction 8.

2.000e+00 moles of the following reaction have been added:

	Relative
Reactant	moles

H2O -1.00000

Element	Relative moles
H	-2.00000
O	-1.00000

-----Solution composition-----

Elements	Molality	Moles
Al	2.060e-04	1.986e-04
Ca	1.571e-02	1.514e-02
Cd	3.797e-07	3.660e-07
Cl	2.835e-01	2.733e-01
Co	4.382e-04	4.224e-04
Cu	1.560e-04	1.504e-04
Fe	1.790e-02	1.726e-02
Hg	2.128e-09	2.051e-09
K	5.895e-03	5.682e-03
Mg	5.883e-02	5.671e-02
Mn	3.321e-03	3.202e-03
N	4.571e-03	4.406e-03
Na	2.729e-01	2.631e-01
Ni	1.013e-04	9.762e-05
P	8.130e-04	7.837e-04
Pb	5.150e-08	4.964e-08
S	1.012e-01	9.754e-02
Se	1.081e-06	1.042e-06
Zn	2.905e-05	2.800e-05

-----Description of solution-----

pH	=	5.045	Charge balance
pe	=	1.031	Adjusted to redox equilibrium
Activity of water	=	0.988	
Ionic strength (mol/kgw)	=	5.018e-01	
Mass of water (kg)	=	9.640e-01	
Total alkalinity (eq/kg)	=	1.433e-05	
Total carbon (mol/kg)	=	0.000e+00	
Total CO2 (mol/kg)	=	0.000e+00	
Temperature (°C)	=	21.00	
Electrical balance (eq)	=	-9.552e-03	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-1.26	
Iterations	=	4	
Total H	=	1.070329e+02	
Total O	=	5.390014e+01	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma	mole V cm ³ /mol
H+	1.228e-05	9.024e-06	-4.911	-5.045	-0.134	0.00
OH-	1.280e-09	8.117e-10	-8.893	-9.091	-0.198	(0)
H2O	5.551e+01	9.879e-01	1.744	-0.005	0.000	18.05
Al	2.060e-04					
AlSO4+	1.567e-04	1.046e-04	-3.805	-3.980	-0.175	(0)
Al(SO4)2-	2.498e-05	1.667e-05	-4.602	-4.778	-0.175	(0)
Al+3	1.847e-05	1.154e-06	-4.734	-5.938	-1.204	(0)
AlOH+2	4.242e-06	9.789e-07	-5.372	-6.009	-0.637	(0)
Al(OH)2+	1.608e-06	1.114e-06	-5.794	-5.953	-0.159	(0)
Al(OH)3	2.451e-08	2.451e-08	-7.611	-7.611	0.000	(0)
Al(OH)4-	1.970e-09	1.315e-09	-8.706	-8.881	-0.175	(0)
Ca	1.571e-02					
Ca+2	8.365e-03	2.439e-03	-2.078	-2.613	-0.535	(0)
CaSO4	7.318e-03	7.318e-03	-2.136	-2.136	0.000	(0)

	CaH2PO4+	2.250e-05	1.559e-05	-4.648	-4.807	-0.159 (0)
	CaHP04	2.200e-06	2.200e-06	-5.658	-5.658	0.000 (0)
	CaNH3+2	1.272e-08	4.666e-10	-7.896	-9.331	-1.435 (0)
	CaP04-	8.574e-10	5.943e-10	-9.067	-9.226	-0.159 (0)
	CaOH+	5.331e-11	3.775e-11	-10.273	-10.423	-0.150 (0)
	Ca(NH3)2+2	7.694e-16	2.823e-17	-15.114	-16.549	-1.435 (0)
	CaNO3+	0.000e+00	0.000e+00	-66.621	-66.980	-0.359 (0)
Cd	3.797e-07					
	CdCl+	1.917e-07	8.388e-08	-6.717	-7.076	-0.359 (0)
	CdCl2	7.195e-08	7.195e-08	-7.143	-7.143	0.000 (0)
	Cd(SO4)2-2	6.784e-08	2.489e-09	-7.169	-8.604	-1.435 (0)
	CdCl3-	2.076e-08	9.088e-09	-7.683	-8.042	-0.359 (0)
	Cd+2	1.456e-08	4.245e-09	-7.837	-8.372	-0.535 (0)
	CdSO4	1.292e-08	1.292e-08	-7.889	-7.889	0.000 (0)
	CdOHC1	3.451e-12	3.451e-12	-11.462	-11.462	0.000 (0)
	CdOH+	6.289e-14	2.752e-14	-13.201	-13.560	-0.359 (0)
	Cd2OH+3	1.044e-18	6.153e-22	-17.981	-21.211	-3.230 (0)
	Cd(OH)2	2.586e-19	2.586e-19	-18.587	-18.587	0.000 (0)
	CdHS+	2.002e-22	8.762e-23	-21.699	-22.057	-0.359 (0)
	Cd(OH)3-	3.979e-26	1.742e-26	-25.400	-25.759	-0.359 (0)
	Cd(OH)4-2	8.565e-35	3.142e-36	-34.067	-35.503	-1.435 (0)
	Cd(HS)2	2.840e-37	2.840e-37	-36.547	-36.547	0.000 (0)
	Cd(SeO3)2-2	5.647e-38	2.072e-39	-37.248	-38.684	-1.435 (0)
	CdSeO4	0.000e+00	0.000e+00	-40.457	-40.457	0.000 (0)
	Cd(HS)3-	0.000e+00	0.000e+00	-55.981	-56.340	-0.359 (0)
	CdNO3+	0.000e+00	0.000e+00	-72.343	-72.702	-0.359 (0)
	Cd(HS)4-2	0.000e+00	0.000e+00	-74.402	-75.837	-1.435 (0)
	Cd(NO3)2	0.000e+00	0.000e+00	-137.932	-137.932	0.000 (0)
Cl	2.835e-01					
	Cl-	2.831e-01	2.080e-01	-0.548	-0.682	-0.134 (0)
	CuCl2-	1.360e-04	8.864e-05	-3.866	-4.052	-0.186 (0)
	MnCl+	4.245e-05	2.896e-05	-4.372	-4.538	-0.166 (0)
	CoCl+	2.261e-05	9.898e-06	-4.646	-5.004	-0.359 (0)
	CuCl3-2	1.791e-05	3.881e-06	-4.747	-5.411	-0.664 (0)
	NiCl+	1.668e-05	7.302e-06	-4.778	-5.137	-0.359 (0)
	MnCl2	8.511e-06	8.511e-06	-5.070	-5.070	0.000 (0)
	CuCl	2.020e-06	2.020e-06	-5.695	-5.695	0.000 (0)
	ZnCl+	1.338e-06	8.717e-07	-5.874	-6.060	-0.186 (0)
	MnCl3-	7.147e-07	4.876e-07	-6.146	-6.312	-0.166 (0)
	ZnCl2	2.417e-07	2.417e-07	-6.617	-6.617	0.000 (0)
	CdCl+	1.917e-07	8.388e-08	-6.717	-7.076	-0.359 (0)
	CdCl2	7.195e-08	7.195e-08	-7.143	-7.143	0.000 (0)
	ZnCl3-	6.029e-08	3.928e-08	-7.220	-7.406	-0.186 (0)
	CdCl3-	2.076e-08	9.088e-09	-7.683	-8.042	-0.359 (0)
	ZnCl4-2	1.826e-08	3.957e-09	-7.738	-8.403	-0.664 (0)
	PbCl+	1.651e-08	7.227e-09	-7.782	-8.141	-0.359 (0)
	NiCl2	7.733e-09	7.733e-09	-8.112	-8.112	0.000 (0)
	PbCl2	6.595e-09	6.595e-09	-8.181	-8.181	0.000 (0)
	PbCl4-2	1.394e-09	5.115e-11	-8.856	-10.291	-1.435 (0)
	PbCl3-	1.304e-09	5.707e-10	-8.885	-9.244	-0.359 (0)
	ZnOHC1	1.296e-09	1.296e-09	-8.887	-8.887	0.000 (0)
	CuCl+	8.498e-11	5.537e-11	-10.071	-10.257	-0.186 (0)
	CdOHC1	3.451e-12	3.451e-12	-11.462	-11.462	0.000 (0)
	CuCl2	3.280e-12	3.280e-12	-11.484	-11.484	0.000 (0)
	FeCl+2	1.179e-14	2.554e-15	-13.929	-14.593	-0.664 (0)
	CuCl3-	9.096e-15	5.927e-15	-14.041	-14.227	-0.186 (0)
	HgCl4-2	6.144e-15	2.254e-16	-14.212	-15.647	-1.435 (0)
	FeCl2+	3.946e-15	2.692e-15	-14.404	-14.570	-0.166 (0)
	HgCl3-	5.995e-16	2.624e-16	-15.222	-15.581	-0.359 (0)
	HgCl2	1.250e-16	1.250e-16	-15.903	-15.903	0.000 (0)
	FeCl3	5.601e-17	5.601e-17	-16.252	-16.252	0.000 (0)
	CuCl4-2	3.266e-17	7.077e-18	-16.486	-17.150	-0.664 (0)
	HgClOH	8.909e-21	8.909e-21	-20.050	-20.050	0.000 (0)
	HgCl+	2.328e-22	1.019e-22	-21.633	-21.992	-0.359 (0)
	CoCl+2	6.287e-34	2.307e-35	-33.202	-34.637	-1.435 (0)
	Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.572	-43.007	-1.435 (0)
	Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.084	-56.520	-1.435 (0)
Co(2)	4.382e-04					

Co+2	3.790e-04	1.391e-05	-3.421	-4.857	-1.435	(0)
CoS04	3.651e-05	3.651e-05	-4.438	-4.438	0.000	(0)
CoCl+	2.261e-05	9.898e-06	-4.646	-5.004	-0.359	(0)
CoHP04	2.944e-08	2.944e-08	-7.531	-7.531	0.000	(0)
Co(NH3)+2	9.890e-09	3.629e-10	-8.005	-9.440	-1.435	(0)
CoOH+	6.988e-10	3.058e-10	-9.156	-9.514	-0.359	(0)
Co2OH+3	3.618e-13	2.131e-16	-12.442	-15.671	-3.230	(0)
Co(NH3)2+2	4.488e-14	1.647e-15	-13.348	-14.783	-1.435	(0)
Co(OH)2	2.678e-14	2.678e-14	-13.572	-13.572	0.000	(0)
Co(NH3)3+2	8.585e-20	3.150e-21	-19.066	-20.502	-1.435	(0)
Co(OH)3-	1.346e-21	5.891e-22	-20.871	-21.230	-0.359	(0)
Co0OH-	8.191e-23	3.585e-23	-22.087	-22.446	-0.359	(0)
Co4(OH)4+4	9.635e-25	1.746e-30	-24.016	-29.758	-5.742	(0)
Co(NH3)4+2	6.846e-26	2.512e-27	-25.165	-26.600	-1.435	(0)
Co(OH)4-2	2.805e-30	1.029e-31	-29.552	-30.987	-1.435	(0)
Co(NH3)5+2	1.727e-32	6.334e-34	-31.763	-33.198	-1.435	(0)
CoSe04	2.884e-37	2.884e-37	-36.540	-36.540	0.000	(0)
CoN02+	0.000e+00	0.000e+00	-51.670	-52.029	-0.359	(0)
CoN03+	0.000e+00	0.000e+00	-69.178	-69.537	-0.359	(0)
Co(N03)2	0.000e+00	0.000e+00	-134.108	-134.108	0.000	(0)
Co(3)	9.147e-32					
CoOH+2	9.083e-32	3.333e-33	-31.042	-32.477	-1.435	(0)
CoCl+2	6.287e-34	2.307e-35	-33.202	-34.637	-1.435	(0)
Co+3	9.519e-36	5.949e-37	-35.021	-36.226	-1.204	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.572	-43.007	-1.435	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.468	-52.826	-0.359	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.084	-56.520	-1.435	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.911	-60.347	-1.435	(0)
Cu(1)	1.560e-04					
CuCl2-	1.360e-04	8.864e-05	-3.866	-4.052	-0.186	(0)
CuCl3-2	1.791e-05	3.881e-06	-4.747	-5.411	-0.664	(0)
CuCl	2.020e-06	2.020e-06	-5.695	-5.695	0.000	(0)
Cu+	1.762e-08	7.713e-09	-7.754	-8.113	-0.359	(0)
Cu(S4)2-3	3.084e-38	9.546e-39	-37.511	-38.020	-0.509	(0)
CuS4S5-3	5.301e-39	1.778e-39	-38.276	-38.750	-0.475	(0)
Cu(2)	1.226e-09					
Cu+2	6.027e-10	1.758e-10	-9.220	-9.755	-0.535	(0)
CuS04	5.227e-10	5.227e-10	-9.282	-9.282	0.000	(0)
CuCl+	8.498e-11	5.537e-11	-10.071	-10.257	-0.186	(0)
CuNH3+2	1.106e-11	4.057e-13	-10.956	-12.392	-1.435	(0)
CuCl2	3.280e-12	3.280e-12	-11.484	-11.484	0.000	(0)
CuOH+	7.727e-13	5.034e-13	-12.112	-12.298	-0.186	(0)
CuCl3-	9.096e-15	5.927e-15	-14.041	-14.227	-0.186	(0)
Cu(OH)2	1.348e-16	1.348e-16	-15.870	-15.870	0.000	(0)
CuCl4-2	3.266e-17	7.077e-18	-16.486	-17.150	-0.664	(0)
Cu2(OH)2+2	1.688e-19	6.194e-21	-18.773	-20.208	-1.435	(0)
Cu(OH)3-	6.963e-22	3.047e-22	-21.157	-21.516	-0.359	(0)
Cu(OH)4-2	7.206e-29	2.644e-30	-28.142	-29.578	-1.435	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-48.577	-48.936	-0.359	(0)
CuN02+	0.000e+00	0.000e+00	-55.396	-55.755	-0.359	(0)
CuN03+	0.000e+00	0.000e+00	-73.766	-74.125	-0.359	(0)
Cu(N02)2	0.000e+00	0.000e+00	-102.765	-102.765	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-139.915	-139.915	0.000	(0)
Fe(2)	1.790e-02					
Fe+2	1.591e-02	5.839e-04	-1.798	-3.234	-1.435	(0)
FeS04	1.868e-03	1.868e-03	-2.729	-2.729	0.000	(0)
FeH2P04+	1.167e-04	8.085e-05	-3.933	-4.092	-0.159	(0)
FeHP04	4.511e-06	4.511e-06	-5.346	-5.346	0.000	(0)
FeOH+	2.765e-08	1.887e-08	-7.558	-7.724	-0.166	(0)
Fe(OH)2	1.164e-14	1.164e-14	-13.934	-13.934	0.000	(0)
Fe(OH)3-	5.730e-18	3.910e-18	-17.242	-17.408	-0.166	(0)
Fe(HS)2	2.137e-38	2.137e-38	-37.670	-37.670	0.000	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-56.968	-57.327	-0.359	(0)
Fe(3)	2.172e-10					
Fe(OH)2+	2.031e-10	1.408e-10	-9.692	-9.851	-0.159	(0)
FeHP04+	1.261e-11	8.742e-12	-10.899	-11.058	-0.159	(0)
FeOH+2	1.204e-12	2.610e-13	-11.919	-12.583	-0.664	(0)
Fe(OH)3	9.432e-14	9.432e-14	-13.025	-13.025	0.000	(0)

FeS04+	9.003e-14	6.143e-14	-13.046	-13.212	-0.166	(0)
Fe(S04)2-	4.218e-14	1.846e-14	-13.375	-13.734	-0.359	(0)
FeCl+2	1.179e-14	2.554e-15	-13.929	-14.593	-0.664	(0)
FeH2P04+2	1.048e-14	2.420e-15	-13.979	-14.616	-0.637	(0)
Fe+3	7.380e-15	4.612e-16	-14.132	-15.336	-1.204	(0)
FeCl2+	3.946e-15	2.692e-15	-14.404	-14.570	-0.166	(0)
FeCl3	5.601e-17	5.601e-17	-16.252	-16.252	0.000	(0)
Fe(OH)4-	2.468e-17	1.711e-17	-16.608	-16.767	-0.159	(0)
Fe2(OH)2+4	1.435e-18	2.601e-24	-17.843	-23.585	-5.742	(0)
Fe3(OH)4+5	4.755e-24	5.076e-33	-23.323	-32.294	-8.972	(0)
FeHSe03+2	5.051e-26	1.853e-27	-25.297	-26.732	-1.435	(0)
FeN03+2	0.000e+00	0.000e+00	-77.692	-79.128	-1.435	(0)
H(0)	9.260e-16					
H2	4.630e-16	5.197e-16	-15.334	-15.284	0.050	(0)
Hg(0)	2.128e-09					
Hg	2.128e-09	2.128e-09	-8.672	-8.672	0.000	(0)
Hg(1)	1.269e-27					
Hg2+2	6.347e-28	2.329e-29	-27.197	-28.633	-1.435	(0)
Hg(2)	6.869e-15					
HgCl4-2	6.144e-15	2.254e-16	-14.212	-15.647	-1.435	(0)
HgCl3-	5.995e-16	2.624e-16	-15.222	-15.581	-0.359	(0)
HgCl2	1.250e-16	1.250e-16	-15.903	-15.903	0.000	(0)
HgCl0H	8.909e-21	8.909e-21	-20.050	-20.050	0.000	(0)
HgCl+	2.328e-22	1.019e-22	-21.633	-21.992	-0.359	(0)
Hg(NH3)2+2	2.674e-23	9.812e-25	-22.573	-24.008	-1.435	(0)
Hg(OH)2	1.189e-25	1.334e-25	-24.925	-24.875	0.050	(0)
HgNH3+2	4.547e-26	1.668e-27	-25.342	-26.778	-1.435	(0)
HgOH+	1.936e-27	8.472e-28	-26.713	-27.072	-0.359	(0)
Hg+2	5.898e-28	2.164e-29	-27.229	-28.665	-1.435	(0)
HgS04	6.204e-29	6.204e-29	-28.207	-28.207	0.000	(0)
Hg(NH3)3+2	2.324e-29	8.525e-31	-28.634	-30.069	-1.435	(0)
Hg(HS)2	1.500e-34	1.500e-34	-33.824	-33.824	0.000	(0)
Hg(OH)3-	4.231e-35	1.852e-35	-34.374	-34.732	-0.359	(0)
Hg(NH3)4+2	4.050e-35	1.486e-36	-34.393	-35.828	-1.435	(0)
HgHS2-	1.533e-35	6.708e-36	-34.815	-35.173	-0.359	(0)
HgS2-2	3.969e-38	1.456e-39	-37.401	-38.837	-1.435	(0)
HgN03+	0.000e+00	0.000e+00	-93.713	-94.072	-0.359	(0)
Hg(N03)2	0.000e+00	0.000e+00	-159.333	-159.333	0.000	(0)
K	5.895e-03					
K+	5.359e-03	3.938e-03	-2.271	-2.405	-0.134	(0)
KS04-	5.355e-04	3.712e-04	-3.271	-3.430	-0.159	(0)
KHP04-	8.366e-08	5.798e-08	-7.077	-7.237	-0.159	(0)
Mg	5.883e-02					
Mg+2	3.448e-02	1.006e-02	-1.462	-1.998	-0.535	(0)
MgS04	2.414e-02	2.414e-02	-1.617	-1.617	0.000	(0)
MgH2P04+	1.983e-04	1.374e-04	-3.703	-3.862	-0.159	(0)
MgHP04	1.252e-05	1.252e-05	-4.902	-4.902	0.000	(0)
MgOH+	4.229e-09	3.042e-09	-8.374	-8.517	-0.143	(0)
MgP04-	5.525e-11	3.829e-11	-10.258	-10.417	-0.159	(0)
Mn(2)	3.321e-03					
Mn+2	3.014e-03	1.106e-04	-2.521	-3.956	-1.435	(0)
MnS04	2.553e-04	2.553e-04	-3.593	-3.593	0.000	(0)
MnCl+	4.245e-05	2.896e-05	-4.372	-4.538	-0.166	(0)
MnCl2	8.511e-06	8.511e-06	-5.070	-5.070	0.000	(0)
MnCl3-	7.147e-07	4.876e-07	-6.146	-6.312	-0.166	(0)
MnOH+	3.305e-10	2.255e-10	-9.481	-9.647	-0.166	(0)
MnSe	2.320e-11	2.320e-11	-10.635	-10.635	0.000	(0)
Mn(OH)3-	3.371e-24	2.300e-24	-23.472	-23.638	-0.166	(0)
Mn(OH)4-2	3.778e-32	8.186e-33	-31.423	-32.087	-0.664	(0)
MnSe04	1.218e-36	1.218e-36	-35.914	-35.914	0.000	(0)
MnN03+	0.000e+00	0.000e+00	-68.277	-68.636	-0.359	(0)
Mn(N03)2	0.000e+00	0.000e+00	-133.112	-133.112	0.000	(0)
Mn(3)	4.703e-28					
Mn+3	4.703e-28	2.939e-29	-27.328	-28.532	-1.204	(0)
Mn(6)	0.000e+00					
Mn04-2	0.000e+00	0.000e+00	-78.947	-79.611	-0.664	(0)
Mn(7)	0.000e+00					
Mn04-	0.000e+00	0.000e+00	-88.006	-88.218	-0.212	(0)

N(-3)	4.571e-03					
NH4+	4.056e-03	2.405e-03	-2.392	-2.619	-0.227	(0)
NH4SO4-	5.143e-04	3.509e-04	-3.289	-3.455	-0.166	(0)
NH3	1.142e-07	1.142e-07	-6.942	-6.942	0.000	(0)
NiNH3+2	4.455e-08	1.635e-09	-7.351	-8.787	-1.435	(0)
CaNH3+2	1.272e-08	4.666e-10	-7.896	-9.331	-1.435	(0)
Co(NH3)+2	9.890e-09	3.629e-10	-8.005	-9.440	-1.435	(0)
CuNH3+2	1.106e-11	4.057e-13	-10.956	-12.392	-1.435	(0)
Ni(NH3)2+2	1.250e-12	4.585e-14	-11.903	-13.339	-1.435	(0)
Co(NH3)2+2	4.488e-14	1.647e-15	-13.348	-14.783	-1.435	(0)
Ca(NH3)2+2	7.694e-16	2.823e-17	-15.114	-16.549	-1.435	(0)
Co(NH3)3+2	8.585e-20	3.150e-21	-19.066	-20.502	-1.435	(0)
Hg(NH3)2+2	2.674e-23	9.812e-25	-22.573	-24.008	-1.435	(0)
Co(NH3)4+2	6.846e-26	2.512e-27	-25.165	-26.600	-1.435	(0)
HgNH3+2	4.547e-26	1.668e-27	-25.342	-26.778	-1.435	(0)
Hg(NH3)3+2	2.324e-29	8.525e-31	-28.634	-30.069	-1.435	(0)
Co(NH3)5+2	1.727e-32	6.334e-34	-31.763	-33.198	-1.435	(0)
Hg(NH3)4+2	4.050e-35	1.486e-36	-34.393	-35.828	-1.435	(0)
Co(NH3)5Cl+2	0.000e+00	0.000e+00	-41.572	-43.007	-1.435	(0)
Co(NH3)6SO4+	0.000e+00	0.000e+00	-52.468	-52.826	-0.359	(0)
Co(NH3)6Cl+2	0.000e+00	0.000e+00	-55.084	-56.520	-1.435	(0)
Co(NH3)6OH+2	0.000e+00	0.000e+00	-58.911	-60.347	-1.435	(0)
N(3)	0.000e+00					
N02-	0.000e+00	0.000e+00	-47.809	-48.020	-0.212	(0)
CoN02+	0.000e+00	0.000e+00	-51.670	-52.029	-0.359	(0)
CuN02+	0.000e+00	0.000e+00	-55.396	-55.755	-0.359	(0)
Cu(N02)2	0.000e+00	0.000e+00	-102.765	-102.765	0.000	(0)
N(5)	0.000e+00					
N03-	0.000e+00	0.000e+00	-64.746	-64.880	-0.134	(0)
CaN03+	0.000e+00	0.000e+00	-66.621	-66.980	-0.359	(0)
MnN03+	0.000e+00	0.000e+00	-68.277	-68.636	-0.359	(0)
NiN03+	0.000e+00	0.000e+00	-68.979	-69.338	-0.359	(0)
CoN03+	0.000e+00	0.000e+00	-69.178	-69.537	-0.359	(0)
ZnN03+	0.000e+00	0.000e+00	-69.875	-70.234	-0.359	(0)
CdN03+	0.000e+00	0.000e+00	-72.343	-72.702	-0.359	(0)
PbN03+	0.000e+00	0.000e+00	-72.344	-72.703	-0.359	(0)
CuN03+	0.000e+00	0.000e+00	-73.766	-74.125	-0.359	(0)
FeN03+2	0.000e+00	0.000e+00	-77.692	-79.128	-1.435	(0)
HgN03+	0.000e+00	0.000e+00	-93.713	-94.072	-0.359	(0)
Mn(N03)2	0.000e+00	0.000e+00	-133.112	-133.112	0.000	(0)
Co(N03)2	0.000e+00	0.000e+00	-134.108	-134.108	0.000	(0)
Zn(N03)2	0.000e+00	0.000e+00	-135.825	-135.825	0.000	(0)
Pb(N03)2	0.000e+00	0.000e+00	-137.332	-137.332	0.000	(0)
Cd(N03)2	0.000e+00	0.000e+00	-137.932	-137.932	0.000	(0)
Cu(N03)2	0.000e+00	0.000e+00	-139.915	-139.915	0.000	(0)
Hg(N03)2	0.000e+00	0.000e+00	-159.333	-159.333	0.000	(0)
Na	2.729e-01					
Na+	2.534e-01	1.862e-01	-0.596	-0.730	-0.134	(0)
NaSO4-	1.954e-02	1.354e-02	-1.709	-1.868	-0.159	(0)
NaHPO4-	6.126e-06	4.246e-06	-5.213	-5.372	-0.159	(0)
Ni	1.013e-04					
Ni+2	4.756e-05	1.387e-05	-4.323	-4.858	-0.535	(0)
NiSO4	3.650e-05	3.650e-05	-4.438	-4.438	0.000	(0)
NiCl+	1.668e-05	7.302e-06	-4.778	-5.137	-0.359	(0)
Ni(SO4)2-2	4.631e-07	1.699e-08	-6.334	-7.770	-1.435	(0)
NiNH3+2	4.455e-08	1.635e-09	-7.351	-8.787	-1.435	(0)
NiCl2	7.733e-09	7.733e-09	-8.112	-8.112	0.000	(0)
NiOH+	3.310e-10	1.449e-10	-9.480	-9.839	-0.359	(0)
Ni(NH3)2+2	1.250e-12	4.585e-14	-11.903	-13.339	-1.435	(0)
Ni(OH)2	1.686e-14	1.686e-14	-13.773	-13.773	0.000	(0)
Ni(OH)3-	4.246e-20	1.858e-20	-19.372	-19.731	-0.359	(0)
NiSeO4	2.656e-37	2.656e-37	-36.576	-36.576	0.000	(0)
NiN03+	0.000e+00	0.000e+00	-68.979	-69.338	-0.359	(0)
O(0)	0.000e+00					
O2	0.000e+00	0.000e+00	-62.899	-62.849	0.050	(0)
P	8.130e-04					
H2PO4-	4.400e-04	3.050e-04	-3.357	-3.516	-0.159	(0)
MgH2PO4+	1.983e-04	1.374e-04	-3.703	-3.862	-0.159	(0)

FeH2PO4+	1.167e-04	8.085e-05	-3.933	-4.092	-0.159	(0)
CaH2PO4+	2.250e-05	1.559e-05	-4.648	-4.807	-0.159	(0)
MgHPO4	1.252e-05	1.252e-05	-4.902	-4.902	0.000	(0)
HP04-2	9.725e-06	2.107e-06	-5.012	-5.676	-0.664	(0)
NaHP04-	6.126e-06	4.246e-06	-5.213	-5.372	-0.159	(0)
FeHP04	4.511e-06	4.511e-06	-5.346	-5.346	0.000	(0)
CaHP04	2.200e-06	2.200e-06	-5.658	-5.658	0.000	(0)
H3P04	3.705e-07	3.705e-07	-6.431	-6.431	0.000	(0)
KHP04-	8.366e-08	5.798e-08	-7.077	-7.237	-0.159	(0)
CoHP04	2.944e-08	2.944e-08	-7.531	-7.531	0.000	(0)
CaP04-	8.574e-10	5.943e-10	-9.067	-9.226	-0.159	(0)
MgP04-	5.525e-11	3.829e-11	-10.258	-10.417	-0.159	(0)
FeHP04+	1.261e-11	8.742e-12	-10.899	-11.058	-0.159	(0)
P04-3	1.451e-12	9.070e-14	-11.838	-13.042	-1.204	(0)
FeH2PO4+2	1.048e-14	2.420e-15	-13.979	-14.616	-0.637	(0)
Pb	5.150e-08					
PbCl+	1.651e-08	7.227e-09	-7.782	-8.141	-0.359	(0)
Pb(S04)2-2	1.532e-08	5.619e-10	-7.815	-9.250	-1.435	(0)
PbS04	6.849e-09	6.849e-09	-8.164	-8.164	0.000	(0)
PbCl2	6.595e-09	6.595e-09	-8.181	-8.181	0.000	(0)
Pb+2	3.522e-09	1.027e-09	-8.453	-8.988	-0.535	(0)
PbCl4-2	1.394e-09	5.115e-11	-8.856	-10.291	-1.435	(0)
PbCl3-	1.304e-09	5.707e-10	-8.885	-9.244	-0.359	(0)
PbOH+	6.498e-12	2.844e-12	-11.187	-11.546	-0.359	(0)
Pb(OH)2	9.914e-17	9.914e-17	-16.004	-16.004	0.000	(0)
Pb2OH+3	7.857e-17	4.629e-20	-16.105	-19.335	-3.230	(0)
Pb(OH)3-	2.497e-22	1.093e-22	-21.603	-21.961	-0.359	(0)
Pb(OH)4-2	8.042e-28	2.950e-29	-27.095	-28.530	-1.435	(0)
Pb3(OH)4+2	2.917e-30	1.070e-31	-29.535	-30.971	-1.435	(0)
Pb4(OH)4+4	5.587e-31	1.012e-36	-30.253	-35.995	-5.742	(0)
Pb(HS)2	7.852e-38	7.852e-38	-37.105	-37.105	0.000	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-57.139	-57.498	-0.359	(0)
PbNO3+	0.000e+00	0.000e+00	-72.344	-72.703	-0.359	(0)
Pb(NO3)2	0.000e+00	0.000e+00	-137.332	-137.332	0.000	(0)
S(-2)	2.227e-20					
H2S	2.160e-20	2.160e-20	-19.666	-19.666	0.000	(0)
HS-	4.630e-22	2.026e-22	-21.334	-21.693	-0.359	(0)
CdHS+	2.002e-22	8.762e-23	-21.699	-22.057	-0.359	(0)
S5-2	2.148e-25	7.882e-27	-24.668	-26.103	-1.435	(0)
S6-2	8.049e-26	2.953e-27	-25.094	-26.530	-1.435	(0)
S4-2	5.399e-26	1.981e-27	-25.268	-26.703	-1.435	(0)
S3-2	8.309e-27	3.048e-28	-26.080	-27.516	-1.435	(0)
S2-2	7.824e-28	2.871e-29	-27.107	-28.542	-1.435	(0)
S-2	3.961e-34	8.583e-35	-33.402	-34.066	-0.664	(0)
Hg(HS)2	1.500e-34	1.500e-34	-33.824	-33.824	0.000	(0)
HgHS2-	1.533e-35	6.708e-36	-34.815	-35.173	-0.359	(0)
Zn(HS)2	4.662e-37	4.662e-37	-36.331	-36.331	0.000	(0)
Cd(HS)2	2.840e-37	2.840e-37	-36.547	-36.547	0.000	(0)
ZnS(HS)-	1.153e-37	5.048e-38	-36.938	-37.297	-0.359	(0)
Pb(HS)2	7.852e-38	7.852e-38	-37.105	-37.105	0.000	(0)
HgS2-2	3.969e-38	1.456e-39	-37.401	-38.837	-1.435	(0)
Cu(S4)2-3	3.084e-38	9.546e-39	-37.511	-38.020	-0.509	(0)
Fe(HS)2	2.137e-38	2.137e-38	-37.670	-37.670	0.000	(0)
CuS4S5-3	5.301e-39	1.778e-39	-38.276	-38.750	-0.475	(0)
Cu(HS)3-	0.000e+00	0.000e+00	-48.577	-48.936	-0.359	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-54.386	-54.745	-0.359	(0)
Cd(HS)3-	0.000e+00	0.000e+00	-55.981	-56.340	-0.359	(0)
Fe(HS)3-	0.000e+00	0.000e+00	-56.968	-57.327	-0.359	(0)
Pb(HS)3-	0.000e+00	0.000e+00	-57.139	-57.498	-0.359	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-58.245	-59.680	-1.435	(0)
Cd(HS)4-2	0.000e+00	0.000e+00	-74.402	-75.837	-1.435	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-76.463	-77.898	-1.435	(0)
S(6)	1.012e-01					
S04-2	4.669e-02	1.362e-02	-1.331	-1.866	-0.535	(0)
MgS04	2.414e-02	2.414e-02	-1.617	-1.617	0.000	(0)
NaS04-	1.954e-02	1.354e-02	-1.709	-1.868	-0.159	(0)
CaS04	7.318e-03	7.318e-03	-2.136	-2.136	0.000	(0)
FeS04	1.868e-03	1.868e-03	-2.729	-2.729	0.000	(0)

KS04-	5.355e-04	3.712e-04	-3.271	-3.430	-0.159	(0)
NH4S04-	5.143e-04	3.509e-04	-3.289	-3.455	-0.166	(0)
MnS04	2.553e-04	2.553e-04	-3.593	-3.593	0.000	(0)
AlS04+	1.567e-04	1.046e-04	-3.805	-3.980	-0.175	(0)
CoS04	3.651e-05	3.651e-05	-4.438	-4.438	0.000	(0)
NiS04	3.650e-05	3.650e-05	-4.438	-4.438	0.000	(0)
Al(S04)2-	2.498e-05	1.667e-05	-4.602	-4.778	-0.175	(0)
Zn(S04)2-2	1.655e-05	6.071e-07	-4.781	-6.217	-1.435	(0)
HS04-	1.594e-05	1.064e-05	-4.797	-4.973	-0.175	(0)
ZnS04	4.948e-06	4.948e-06	-5.306	-5.306	0.000	(0)
Ni(S04)2-2	4.631e-07	1.699e-08	-6.334	-7.770	-1.435	(0)
Cd(S04)2-2	6.784e-08	2.489e-09	-7.169	-8.604	-1.435	(0)
Pb(S04)2-2	1.532e-08	5.619e-10	-7.815	-9.250	-1.435	(0)
CdS04	1.292e-08	1.292e-08	-7.889	-7.889	0.000	(0)
PbS04	6.849e-09	6.849e-09	-8.164	-8.164	0.000	(0)
CuS04	5.227e-10	5.227e-10	-9.282	-9.282	0.000	(0)
FeS04+	9.003e-14	6.143e-14	-13.046	-13.212	-0.166	(0)
Fe(S04)2-	4.218e-14	1.846e-14	-13.375	-13.734	-0.359	(0)
HgS04	6.204e-29	6.204e-29	-28.207	-28.207	0.000	(0)
Co(NH3)6S04+	0.000e+00	0.000e+00	-52.468	-52.826	-0.359	(0)
Se(-2)	1.081e-06					
HSe-	1.049e-06	4.593e-07	-5.979	-6.338	-0.359	(0)
H2Se	3.160e-08	3.160e-08	-7.500	-7.500	0.000	(0)
MnSe	2.320e-11	2.320e-11	-10.635	-10.635	0.000	(0)
Se-2	1.065e-15	3.909e-17	-14.972	-16.408	-1.435	(0)
Se(4)	4.012e-15					
HSeO3-	3.985e-15	1.744e-15	-14.400	-14.758	-0.359	(0)
SeO3-2	2.040e-17	7.486e-19	-16.690	-18.126	-1.435	(0)
H2SeO3	6.490e-18	6.490e-18	-17.188	-17.188	0.000	(0)
FeHSeO3+2	5.051e-26	1.853e-27	-25.297	-26.732	-1.435	(0)
Cd(SeO3)2-2	5.647e-38	2.072e-39	-37.248	-38.684	-1.435	(0)
Se(6)	1.534e-34					
SeO4-2	1.516e-34	4.420e-35	-33.819	-34.355	-0.535	(0)
MnSeO4	1.218e-36	1.218e-36	-35.914	-35.914	0.000	(0)
CoSeO4	2.884e-37	2.884e-37	-36.540	-36.540	0.000	(0)
NiSeO4	2.656e-37	2.656e-37	-36.576	-36.576	0.000	(0)
HSeO4-	4.026e-38	1.762e-38	-37.395	-37.754	-0.359	(0)
ZnSeO4	1.176e-38	1.176e-38	-37.929	-37.929	0.000	(0)
CdSeO4	0.000e+00	0.000e+00	-40.457	-40.457	0.000	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-70.843	-72.278	-1.435	(0)
Zn	2.905e-05					
Zn(S04)2-2	1.655e-05	6.071e-07	-4.781	-6.217	-1.435	(0)
Zn+2	5.893e-06	1.718e-06	-5.230	-5.765	-0.535	(0)
ZnS04	4.948e-06	4.948e-06	-5.306	-5.306	0.000	(0)
ZnCl+	1.338e-06	8.717e-07	-5.874	-6.060	-0.186	(0)
ZnCl2	2.417e-07	2.417e-07	-6.617	-6.617	0.000	(0)
ZnCl3-	6.029e-08	3.928e-08	-7.220	-7.406	-0.186	(0)
ZnCl4-2	1.826e-08	3.957e-09	-7.738	-8.403	-0.664	(0)
ZnOHCl	1.296e-09	1.296e-09	-8.887	-8.887	0.000	(0)
ZnOH+	3.187e-10	1.395e-10	-9.497	-9.855	-0.359	(0)
Zn(OH)2	3.310e-14	3.310e-14	-13.480	-13.480	0.000	(0)
Zn(OH)3-	4.178e-19	1.829e-19	-18.379	-18.738	-0.359	(0)
Zn(OH)4-2	2.187e-25	8.025e-27	-24.660	-26.096	-1.435	(0)
Zn(HS)2	4.662e-37	4.662e-37	-36.331	-36.331	0.000	(0)
ZnS(HS)-	1.153e-37	5.048e-38	-36.938	-37.297	-0.359	(0)
ZnSeO4	1.176e-38	1.176e-38	-37.929	-37.929	0.000	(0)
Zn(HS)3-	0.000e+00	0.000e+00	-54.386	-54.745	-0.359	(0)
ZnS(HS)2-2	0.000e+00	0.000e+00	-58.245	-59.680	-1.435	(0)
ZnNO3+	0.000e+00	0.000e+00	-69.875	-70.234	-0.359	(0)
Zn(SeO4)2-2	0.000e+00	0.000e+00	-70.843	-72.278	-1.435	(0)
Zn(HS)4-2	0.000e+00	0.000e+00	-76.463	-77.898	-1.435	(0)
Zn(NO3)2	0.000e+00	0.000e+00	-135.825	-135.825	0.000	(0)

-----Saturation indices-----

Phase	SI**	log IAP	log K(294 K, 1 atm)
(Co(NH3)5Cl)(NO3)2	-160.81	-154.54	6.27

(Co(NH3)5Cl)Cl2	-30.68	-26.14	4.54	(Co(NH3)5Cl)Cl2
(Co(NH3)5OH2)Cl3	-37.94	-26.15	11.80	(Co(NH3)5OH2)Cl3
(Co(NH3)6)(NO3)3	-234.24	-216.31	17.93	(Co(NH3)6)(NO3)3
(Co(NH3)6)Cl3	-43.83	-23.72	20.11	(Co(NH3)6)Cl3
(NH4)2SeO4	-40.04	-39.59	0.45	(NH4)2SeO4
Al(OH)3(am)	-1.88	9.18	11.06	Al(OH)3
Al2O3	-1.89	18.38	20.27	Al2O3
Al4(OH)10SO4	2.08	24.78	22.70	Al4(OH)10SO4
AlOHSO4	0.47	-2.76	-3.23	AlOHSO4
Alunite	7.19	6.29	-0.90	KAl3(SO4)2(OH)6
Anglesite	-3.04	-10.85	-7.82	PbSO4
Anhydrite	-0.14	-4.48	-4.34	CaSO4
Anilite	1.06	-31.26	-32.31	Cu0.25Cu1.5S
Antlerite	-19.76	-10.97	8.79	Cu3(OH)4SO4
Atacamite	-12.69	-5.07	7.61	Cu2(OH)3Cl
Bianchite	-5.90	-7.66	-1.76	ZnSO4:6H2O
Birnessite	-25.42	-7.33	18.09	MnO2
Bixbyite	-26.46	-26.81	-0.35	Mn2O3
BlaubleiI	-2.89	-27.05	-24.16	Cu0.9Cu0.2S
BlaubleiII	-1.71	-28.99	-27.28	Cu0.6Cu0.8S
Boehmite	0.33	9.19	8.86	AlOOH
Brochantite	-26.36	-10.65	15.71	Cu4(OH)6SO4
Brucite	-9.03	8.08	17.12	Mg(OH)2
Bunsenite	-7.46	5.23	12.68	NiO
Ca3(PO4)2(beta)	-4.87	-33.92	-29.05	Ca3(PO4)2
Ca4H(PO4)3:3H2O	-7.56	-54.64	-47.08	Ca4H(PO4)3:3H2O
CaHP04	-1.35	-20.70	-19.35	CaHP04
CaHP04:2H2O	-1.66	-20.71	-19.05	CaHP04:2H2O
Calomel	-11.87	-30.00	-18.13	Hg2Cl2
CaSeO3:2H2O	-15.20	-12.34	2.86	CaSeO3:2H2O
CaSeO4:2H2O	-33.98	-36.98	-3.00	CaSeO4:2H2O
Cd(OH)2	-12.16	1.71	13.87	Cd(OH)2
Cd(OH)2(am)	-12.23	1.71	13.94	Cd(OH)2
Cd3(OH)2(SO4)2	-25.48	-18.77	6.71	Cd3(OH)2(SO4)2
Cd3(OH)4SO4	-29.38	-6.82	22.56	Cd3(OH)4SO4
Cd3(PO4)2	-18.60	-51.20	-32.60	Cd3(PO4)2
Cd4(OH)6SO4	-33.52	-5.12	28.40	Cd4(OH)6SO4
CdCl2	-9.12	-9.74	-0.61	CdCl2
CdCl2:1H2O	-8.07	-9.74	-1.68	CdCl2:1H2O
CdCl2:2.5H2O	-7.82	-9.75	-1.93	CdCl2:2.5H2O
Cdmetal(alpha)	-24.13	-10.43	13.69	Cd
Cdmetal(gamma)	-24.23	-10.43	13.80	Cd
CdOHCl	-7.63	-4.01	3.61	CdOHCl
CdSe	10.72	-9.67	-20.38	CdSe
CdSeO4:2H2O	-40.89	-42.74	-1.85	CdSeO4:2H2O
CdSO4	-10.19	-10.24	-0.05	CdSO4
CdSO4:1H2O	-8.59	-10.24	-1.65	CdSO4:1H2O
CdSO4:2.67H2O	-8.42	-10.25	-1.83	CdSO4:2.67H2O
Chalcanthite	-8.99	-11.65	-2.65	CuSO4:5H2O
Chalcocite	2.45	-32.87	-35.32	Cu2S
Chalcopyrite	-10.66	-46.29	-35.62	CuFeS2
Cinnabar	-5.30	-51.60	-46.30	HgS
Clausthalite	17.10	-10.28	-27.39	PbSe
Co(OH)2	-7.87	5.22	13.09	Co(OH)2
Co(OH)3	-19.02	-21.11	-2.09	Co(OH)3
Co3(PO4)2	-5.97	-40.66	-34.69	Co3(PO4)2
Co3O4	-26.73	-36.97	-10.24	Co3O4
CoCl2	-14.68	-6.22	8.46	CoCl2
CoCl2:6H2O	-8.77	-6.25	2.52	CoCl2:6H2O
CoFe2O4	7.96	4.81	-3.15	CoFe2O4
CoHP04	-3.88	-22.94	-19.06	CoHP04
CoO	-8.61	5.23	13.84	CoO
CoS(alpha)	-14.07	-21.51	-7.44	CoS
CoS(beta)	-10.44	-21.51	-11.07	CoS
CoSe	10.05	-6.15	-16.20	CoSe
CoSeO3	-15.89	-14.57	1.32	CoSeO3
CoSeO4:6H2O	-37.71	-39.24	-1.53	CoSeO4:6H2O
CoSO4	-9.71	-6.72	2.99	CoSO4

CoS04:6H2O	-4.28	-6.75	-2.48	CoS04:6H2O
Cotunnite	-5.51	-10.35	-4.84	PbCl2
Covellite	-3.87	-26.40	-22.53	CuS
Cu(OH)2	-8.48	0.32	8.81	Cu(OH)2
Cu2(OH)3NO3	-78.70	-69.27	9.42	Cu2(OH)3NO3
Cu2Se(alpha)	28.79	-17.52	-46.31	Cu2Se
Cu2S04	-16.19	-18.09	-1.90	Cu2S04
Cu3(P04)2	-18.50	-55.35	-36.85	Cu3(P04)2
Cu3(P04)2:3H2O	-20.25	-55.37	-35.12	Cu3(P04)2:3H2O
Cu3Se2	35.73	-28.57	-64.30	Cu3Se2
Cumetal	-0.22	-9.14	-8.93	Cu
Cu0CuS04	-21.92	-11.29	10.63	Cu0CuS04
Cupricferrite	-6.58	-0.09	6.49	CuFe204
Cuprite	-5.03	-6.14	-1.11	Cu2O
Cuprousferrite	5.60	-3.28	-8.88	CuFe02
CuSe	22.34	-11.05	-33.39	CuSe
CuSe2	23.42	-10.28	-33.70	CuSe2
CuSe03:2H2O	-20.08	-19.48	0.60	CuSe03:2H2O
CuSe04:5H2O	-41.70	-44.14	-2.44	CuSe04:5H2O
CuS04	-14.73	-11.62	3.11	CuS04
Diaspore	2.07	9.19	7.12	Al00H
Djurleite	1.95	-32.45	-34.40	Cu0.066Cu1.868S
Epsomite	-1.75	-3.90	-2.15	MgS04:7H2O
Fe(OH)2	-6.72	6.84	13.56	Fe(OH)2
Fe(OH)2.7Cl.3	1.11	-1.93	-3.04	Fe(OH)2.7Cl.3
Fe2(OH)4Se03	-21.78	-20.23	1.55	Fe2(OH)4Se03
Fe2(Se03)3:2H2O	-39.20	-59.82	-20.63	Fe2(Se03)3:2H2O
Fe2(S04)3	-33.11	-36.27	-3.16	Fe2(S04)3
Fe3(OH)8	-13.81	6.41	20.22	Fe3(OH)8
Ferrihydrite	-3.58	-0.22	3.37	Fe(OH)3
Ferroselite	14.95	-3.76	-18.71	FeSe2
FeS(ppt)	-16.96	-19.88	-2.92	FeS
FeSe	6.48	-4.53	-11.00	FeSe
Galena	-11.48	-25.64	-14.16	PbS
Gibbsite	0.66	9.18	8.52	Al(OH)3
Goethite	-0.85	-0.21	0.64	Fe00H
Goslarite	-5.62	-7.67	-2.05	ZnS04:7H2O
Greenockite	-10.53	-25.02	-14.49	CdS
Greigite	-55.47	-100.50	-45.03	Fe3S4
Gypsum	0.12	-4.49	-4.61	CaS04:2H2O
H-Jarosite	-13.00	-24.55	-11.55	(H30)Fe3(S04)2(OH)6
H2S(g)	-18.73	-26.74	-8.01	H2S
H2Se(g)	-6.46	-11.38	-4.92	H2Se
Halite	-3.01	-1.41	1.59	NaCl
Hausmannite	-31.50	30.53	62.03	Mn304
Hematite	0.69	-0.42	-1.11	Fe203
Hercynite	1.59	25.23	23.64	FeAl204
Hg(g)	-7.42	-15.35	-7.93	Hg
Hg(OH)2	-21.38	-24.87	-3.50	Hg(OH)2
Hg2(g)	-15.60	-30.70	-15.09	Hg2
Hg2(OH)2	-23.81	-18.55	5.26	Hg2(OH)2
Hg2HP04	-21.94	-46.72	-24.77	Hg2HP04
Hg2S	-33.44	-45.28	-11.84	Hg2S
Hg2Se03	-33.69	-38.35	-4.66	Hg2Se03
Hg2S04	-24.36	-30.50	-6.14	Hg2S04
HgCl(g)	-34.88	-15.00	19.88	HgCl
HgCl2	-14.80	-36.32	-21.52	HgCl2
Hgmetal(l)	-1.70	-15.35	-13.65	Hg
HgSe	19.45	-36.25	-55.69	HgSe
HgSe03	-32.24	-44.67	-12.43	HgSe03
HgS04	-27.37	-36.82	-9.45	HgS04
Hinsdalite	-8.97	-11.47	-2.50	PbAl3P04S04(OH)6
Hydroxylapatite	-2.82	-47.15	-44.33	Ca5(P04)3OH
Hydroxylpyromorphite	-16.24	-79.03	-62.79	Pb5(P04)3OH
K-Alum	-6.90	-12.14	-5.24	KAl(S04)2:12H2O
K-Jarosite	-7.42	-21.91	-14.49	KFe3(S04)2(OH)6
K2Se04	-38.43	-39.16	-0.73	K2Se04
Langite	-28.54	-10.66	17.88	Cu4(OH)6S04:H2O

Larnakite	-9.38	-9.76	-0.38	PbO:PbSO4
Laurionite	-5.25	-4.63	0.62	PbOHCl
Lepidocrocite	-1.58	-0.21	1.37	FeOOH
Lime	-25.69	7.47	33.16	CaO
Litharge	-11.75	1.10	12.85	PbO
Mackinawite	-16.28	-19.88	-3.60	FeS
Maghemite	-6.81	-0.42	6.39	Fe2O3
Magnesioferrite	-9.86	7.67	17.52	Fe2MgO4
Magnetite	2.53	6.43	3.90	Fe3O4
Manganite	-13.14	12.20	25.34	MnOOH
Massicot	-11.96	1.10	13.05	PbO
Melanothallite	-17.53	-11.12	6.41	CuCl2
Melanterite	-2.88	-5.14	-2.26	FeSO4:7H2O
Metacinnabar	-5.90	-51.60	-45.70	HgS
Mg(OH)2(active)	-10.71	8.08	18.79	Mg(OH)2
Mg3(P04)2	-8.80	-32.08	-23.28	Mg3(P04)2
MgHP04:3H2O	-1.93	-20.10	-18.18	MgHP04:3H2O
MgSe03:6H2O	-14.79	-11.74	3.04	MgSe03:6H2O
MgSe04:6H2O	-35.18	-36.38	-1.20	MgSe04:6H2O
Minium	-59.09	15.43	74.53	Pb3O4
Mirabilite	-2.08	-3.38	-1.30	Na2SO4:10H2O
Mn2(S04)3	-57.34	-62.66	-5.32	Mn2(S04)3
Mn3(P04)2	-14.11	-37.95	-23.85	Mn3(P04)2
MnCl2:4H2O	-8.08	-5.34	2.74	MnCl2:4H2O
MnHP04	3.36	-22.04	-25.40	MnHP04
MnS(grn)	-20.85	-20.60	0.25	MnS
MnS(pnk)	-23.94	-20.60	3.34	MnS
MnSe	-8.98	-5.25	3.73	MnSe
MnSe03	-14.80	-13.67	1.13	MnSe03
MnSe03:2H2O	-14.64	-13.68	0.96	MnSe03:2H2O
MnSe04:5H2O	-36.29	-38.34	-2.05	MnSe04:5H2O
MnSO4	-8.56	-5.82	2.74	MnSO4
Monteponite	-13.64	1.71	15.35	CdO
Montroydite	-21.32	-24.87	-3.55	HgO
Morenosite	-4.59	-6.76	-2.17	NiSO4:7H2O
Na-Jarosite	-9.39	-20.23	-10.84	NaFe3(S04)2(OH)6
Na2Se03:5H2O	-21.50	-11.20	10.30	Na2Se03:5H2O
Na2Se04	-37.09	-35.81	1.28	Na2Se04
Nantokite	-1.96	-8.79	-6.83	CuCl
Ni(OH)2	-7.80	5.22	13.02	Ni(OH)2
Ni3(P04)2	-9.36	-40.66	-31.30	Ni3(P04)2
Ni4(OH)6S04	-23.06	8.94	32.00	Ni4(OH)6S04
NiS(alpha)	-15.91	-21.51	-5.60	NiS
NiS(beta)	-10.41	-21.51	-11.10	NiS
NiS(gamma)	-8.71	-21.51	-12.80	NiS
NiSe	11.55	-6.15	-17.70	NiSe
NiSe03:2H2O	-17.47	-14.58	2.89	NiSe03:2H2O
NiSe04:6H2O	-37.72	-39.24	-1.52	NiSe04:6H2O
Nsutite	-24.84	-7.33	17.50	MnO2
O2(g)	-60.16	24.29	84.45	O2
Pb(OH)2	-7.20	1.09	8.29	Pb(OH)2
Pb2(OH)3Cl	-12.33	-3.54	8.79	Pb2(OH)3Cl
Pb2O(OH)2	-24.00	2.19	26.19	Pb2O(OH)2
Pb2O3	-46.70	14.34	61.04	Pb2O3
Pb3(P04)2	-9.52	-53.05	-43.53	Pb3(P04)2
Pb3O2S04	-19.54	-8.66	10.87	Pb3O2S04
Pb4(OH)6S04	-28.68	-7.58	21.10	Pb4(OH)6S04
Pb4O3S04	-29.77	-7.57	22.20	Pb4O3S04
PbHP04	-3.27	-27.08	-23.81	PbHP04
Pbmetal	-15.30	-11.05	4.24	Pb
PbO:0.3H2O	-11.89	1.09	12.98	PbO:0.33H2O
PbSe04	-36.47	-43.34	-6.88	PbSe04
Periclase	-13.86	8.09	21.94	MgO
Plattnerite	-37.06	13.24	50.31	PbO2
Plumbgummite	5.10	-27.69	-32.79	PbAl3(P04)2(OH)5:H2O
Portlandite	-15.64	7.47	23.11	Ca(OH)2
Pyrite	-15.84	-34.47	-18.63	FeS2
Pyrochroite	-9.30	6.12	15.43	Mn(OH)2

Pyrolusite	-23.75	18.27	42.03	MnO2
Pyromorphite	-0.32	-84.75	-84.43	Pb5(P04)3Cl
Retgersite	-4.70	-6.76	-2.05	NiS04:6H2O
Semetal(am)	7.91	0.77	-7.14	Se
Semetal(hex)	8.52	0.77	-7.75	Se
SeO2	-19.92	-19.80	0.12	SeO2
SeO3	-65.83	-44.44	21.39	SeO3
Sphalerite	-10.89	-22.41	-11.52	ZnS
Spinel	-11.31	26.46	37.77	MgAl2O4
Strengite	-2.01	-28.39	-26.38	FeP04:2H2O
Sulfur	-12.48	-14.59	-2.11	S
Tenorite	-7.47	0.33	7.80	CuO
Thenardite	-3.67	-3.33	0.34	Na2S04
Tsumebite	-15.88	-25.67	-9.79	Pb2CuP04(OH)3:3H2O
Vivianite	0.17	-35.83	-36.00	Fe3(P04)2:8H2O
Wurtzite	-13.41	-22.41	-9.00	ZnS
Zincite	-7.23	4.32	11.55	ZnO
Zincosite	-11.76	-7.63	4.13	ZnS04
Zn(N03)2:6H2O	-138.81	-135.56	3.26	Zn(N03)2:6H2O
Zn(OH)2	-7.89	4.31	12.20	Zn(OH)2
Zn(OH)2(am)	-8.35	4.31	12.67	Zn(OH)2
Zn(OH)2(beta)	-7.64	4.31	11.95	Zn(OH)2
Zn(OH)2(epsilon)	-7.42	4.31	11.73	Zn(OH)2
Zn(OH)2(gamma)	-7.42	4.31	11.73	Zn(OH)2
Zn2(OH)2S04	-10.82	-3.32	7.50	Zn2(OH)2S04
Zn2(OH)3Cl	-12.28	2.91	15.19	Zn2(OH)3Cl
Zn3(P04)2:4H2O	-7.98	-43.40	-35.42	Zn3(P04)2:4H2O
Zn3O(S04)2	-30.47	-10.94	19.53	Zn3O(S04)2
Zn4(OH)6S04	-23.09	5.31	28.40	Zn4(OH)6S04
Zn5(OH)8Cl2	-28.37	10.13	38.50	Zn5(OH)8Cl2
ZnCl2	-14.35	-7.13	7.22	ZnCl2
Znmetal	-33.98	-7.83	26.15	Zn
ZnO(active)	-7.08	4.32	11.40	ZnO
ZnS(am)	-13.32	-22.41	-9.09	ZnS
ZnSe	7.40	-7.06	-14.46	ZnSe
ZnSeO4:6H2O	-38.63	-40.15	-1.52	ZnSeO4:6H2O
ZnS04:1H2O	-7.10	-7.64	-0.53	ZnS04:1H2O

**For a gas, SI = log10(fugacity). Fugacity = pressure * phi / 1 atm.
For ideal gases, phi = 1.

End of simulation.

Reading input data for simulation 11.

End of Run after 0.437 Seconds.
