DEPARTMENT OF MINES AND ENERGY
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MISCELLANEOUS THIN SECTIONS OF ARCHAEAN AND EARLY PROTEROZOIC ROCKS FROM THE GAWLER CRATON

GEOLOGICAL SURVEY

by

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DEPARTMENT OF MINES AND ENERGY
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MISCELLANEOUS THIN SECTIONS OF ARCHAEAN AND EARLY PROTEROZOIC ROCKS FROM THE BARTON 1: 250 000 MAP SHEET AREA, NORTHWEST GAWLER CRATON

ABSTRACT

Archaean and Early Proterozoic rock samples from the BARTON 1:250 000 mapsheet area, northwest Gawler Craton are mainly of granitoid composition with minor intermediate and mafic types. Textures include gneissic, schistose, aplitic and mylonitic. A deep crustal origin is suggested by the presence of orthopyroxene and garnet in a few granitoids and one is of charnockitic affinity. Retrograde metamorphism is associated with silicification and widespread grainsize refinement by dynamic recrystallisation. One specimen is of a banded iron formation.

INTRODUCTION

Twenty-two thin sections of Archaean and Early Proterozoic rocks from the BARTON 1:250 000 map sheet area, northwest Gawler Craton were received for brief petrographic description from L Rankin of Regional Geology.

PETROGRAPHY

Specimen 5437 RS 24, TS C 51654, 2249/48/3

Age Archaean

Rock Name Plagioclase gneiss

Thin Section

Grain size is bimodal; large crystals of plagioclase, quartz and microcline are close to 1 mm across while interstitial biotite, opaques, quartz and feldspar vary in grain size but average about 0.2 mm across.

Plagioclase is by far the most abundant constituent and consists of equant grains with irregular, embayed margins. Grains are fractured but little altered. Most are multiply-twinned and many of these display a cross-hatched twinning. Symmetrical extinction indicates that the plagioclase is andesine.

Quartz occurs as discrete grains, as mosaic quartz and as inclusions and embayments in plagioclase. Much of the quartz retains a strain polarisation.

A few of the coarse grains with cross-hatched twinning appear to be microcline rather than plagioclase.

Interstitial material is dominated by biotite which occurs as randomly oriented and mutually interfering grains. Biotite has invaded plagioclase along the margins and in fractures of the coarse grains. Irregular grains of opaque minerals also occur interstitially. Fine grained quartz and a feldspar which is probably plagioclase are closely interlocked with interstitial biotite and may have been derived from coarse grains by recrystallisation. Some quartz which embays coarse plagioclase grains may have been redistributed within the sectioned rock but alternatively may have been introduced from outside.

Specimen 5437 RS 26, TS C 51639, 2249/48/9
Age Archaean
Rock Name Gneissic granite
Thin Section

Coarse grains of feldspar up to 2 mm across occur separately and in clusters. Finer grains of quartz occur interstitially, as embayments and as inclusions in the feldspars. Some cataclasis and much replacement are evident.

The feldspar includes oligoclase, perthitic orthoclase and a little microcline. Many of the crystals are fractured, often the fractures have been resealed, but little alteration is present. Patches of myrmekite are occasionally marginal to plagioclase grains. Grains are irregular in shape. There is evidence of substantial recrystallisation.

Quartz is very abundant as irregular grains, as patches of mosaic, as interstitial and embaying grains and as round to irregular inclusions in feldspar. Textures suggest that a considerable proportion of the quartz has been introduced.

Biotite is widespread as clusters of flakes and as the filling of fractures in individual grains of feldspar and in thin planes throughout the rock. Some structural control is evident and a weak preferred orientation can be discerned. Some alteration to chlorite is apparent. A few stumpy prisms of apatite are scattered through the rock.

Specimen 5437 RS 28, TS C 51645, 2249/48/6

Age Archaean

Rock Name Garnet gneiss

Thin Section

Spheroidal to irregular garnets, generally in clusters with biotite, are scattered throughout a quartz, plagioclase, orthoclase, microcline host. On the scale of the thin section, only a weak fabric is apparent.
Garnets are up to 6 mm across in clusters up to 16 mm across. The clusters contain biotite and occasionally opaque material. Occasionally small and irregular garnets occur separately. The garnets are intensely fractured and altered along the fractures to a pale mica.

Biotite occurs as clusters of flakes, with and without garnet, as interstitial stringers and as fracture fillings. Individual flakes are up to 1 mm across and clusters up to 6 mm.

The remainder of the rock consists of a closely interlocked mosaic of irregular grains of a wide range of sizes and textural relationships. Microcline is the most abundant phase, in fractured and variably altered grains up to 7 mm across. Plagioclase grains are much less frequent and of finer grain size. Quartz is almost as abundant as microcline and forms mosaic patches up to 5 mm across, frequent inclusions in feldspar and patches of myrmekitic intergrowth with feldspar.

Patches of sericitic alteration of feldspar are up to 8 mm across and sericitic is widespread as fracture filling of feldspar and garnet and as marginal replacement of some feldspar grains.

Limonitic opaque minerals and altered sphene are minor constituents while zircon and apatite are traces.

A weak and irregular banding of felsic and dark minerals is detectable on the scale of the thin section.

Specimen 5537 RS 37, TS C 51646, 2229/80/2

Age Archaean

Rock Name Banded iron formation

Thin Section

The rock is essentially a two-phase system of quartz and an opaque oxide now altered to limonite. A strong but incomplete separation of the phases has produced a laminated fabric of bands 2-5 mm wide.

Quartz grains vary in size between 6 mm and about 0.1 mm and from mosaics in bands with relatively uniform grain sizes. Boundaries between grains are simple lines meeting at points which are often 120° triple junctions. Some grains display undulose extinction but most appear to be in equilibrium.

Opaque material is composed of individual grains, in irregular masses and in thin, interstitial layers. The latter two forms of occurrence involve mobility and a higher degree of oxidation and hydration than the grains. Some interstitial material is highly birefringent and may be crystalline jarosite.

Specimen 5536 RS 48, TS C 51644, 2227/16/4
Age Early Proterozoic
Rock Name Gneissic granite
Thin Section

Grain size has been diminished by dynamic recrystallisation by exsolution of feldspars, and by the development of fine-grained mosaic quartz. The mineralogy is granitic but the grain size is largely aplitic.

Relict crystals of microcline and plagioclase are up to 2 mm across but even these carry patches of respectively perthitic plagioclase and anti-perthitic microcline. The feldspars are little altered.

Relict crystals are separated by closely interlocked fine grains of feldspar, which are often altered to sericite and clay, and of quartz either separate or as part of a mosaic. Patches of myrmekite and rare clusters of altered biotite flakes are also present.

The quartz frequently displays equilibrium grain relationships but the presence of annealing textures and retention of undulose extinction indicate continuous dynamic recrystallisation in a sheer strain environment.

Specimen 5536 RS 49, TS C 51650, 2227/16/4

Age Early Proterozoic

Rock Name Metagabbro

Thin Section

Both pyroxene and amphibole are included in large poikilitic plates of altered feldspar. A pale, branched band of light colour across the section contains poikilitic feldspar in which microcline is recognisable in places. A thin vein of secondary amphibole cuts the section.

Textural relationships between euhedral to subhedral pyroxene and amphibole grains indicate that they are both original phases. There is some evidence of recrystallisation but no evidence that the latter was derived by alteration of the former. There is evidence in colour variation at amphibole contacts of reaction between amphibole and the introduced feldspar of the light coloured band. One of the products appears to be clinozoisite. Redistribution of amphibole is evident in the vein.

Poikilitic plates of feldspar are heavily altered to sericite and clay minerals although plagioclase twinning is occasionally recognisable. However, finer grains of both microcline and plagioclase are evident, particularly in the light coloured band, with almost no alteration. There appear to be two generations of feldspar. Patches of fine mica flakes are probably recrystallised sericitic alteration of feldspar.

Euhedral crystals of fine grained sphene are frequent in a few patches in the light coloured band but absent from most of the section.

Scattered grains of limonite indicate the former presence of magnetite or ilmenite. Limonite along grain boundaries and cleavages is a product of weathering.

Specimen 5536 RS 50, TS C 51640, 2227/16/8

Age Early Proterozoic

Rock Name Gneissic granite

Thin Section

Porphyritic plagioclase and microcline are surrounded by fine grained quartz, feldspar, epidote and altered mica with a strongly oriented fabric. Foliation is due to grainsize reduction by dynamic recrystallisation of feldspar, quartz and mica.

Porphyritic grains of feldspar are often compound and include both perthitic microcline and plagioclase in the same grains. Porphyritic grains display a weakly oriented fabric. Alteration varies but is generally light. It includes sericitic, clay and epidote. Feldspar in the bands of recrystallisation is varied in grain size and displays fragmentation and strain polarisation.

Quartz is the most abundant mineral in the bands and displays a complex sequence of granulation, annealing and renewed stress. It forms mosaics of partly annealed subgrains in elongated lenticular stringers along contorted bands. The grains have retained a strongly marked strain polarisation.

Biotite includes optically homogeneous flakes which may be recrystallised but is mainly poorly crystallised in contorted bands of fine grained flakes. Some chloritic alteration is apparent.
Fragmented epidote is widely distributed in the recrystallised bands and is mainly associated with biotite.

Opaque grains, sphene and coarse grains of zircon are common accessory minerals.

Specimen 5437 RS 23, TS C 51655 , 2249/52/8

Age Early Proterozoic

Rock Name Aplitic granitoid

Thin Section

The rock is not a true aplite since it contains biotite and has been silicified. However, it is mainly composed of feldspar and quartz in an even grained aggregate. Grain size is about 1 mm.

Closely intergrown microcline and plagioclase are lightly sericitised but otherwise unaltered. Some quartz is of similar grain size and forms part of the aplitic mosaic.

Irregular patches of quartz up to 3 mm across are superimposed on the regular mosaic. The coarser grained patches are sometimes single grains but are often multigranular and rarely a granulated mosaic. The quartz is distinguished by a strong undulose extinction although even the quartz of the regular mosaic is often strongly biaxial and most of it is biaxial to some extent. Some patches which are 5 mm apart in the plane of section are in optical continuity and hence part of a single crystal. These quartz patches are probably introduced.

Fine-grained flakes of both brown and green biotite form interstitial patches and stringers and fill fractures in other minerals. Clay minerals also occur in biotite patches as flakes of low birefringence in tight clusters. The clay may be an alteration product of the biotite but may have been introduced with it as a mobile hydrous phase.

The hydrous phases are associated with a system of fine fractures which are marked by thin layers of limonite where not occupied by mica or clay.

Occasional grains of opaque minerals are partly associated with the limonite but partly independent and probably original to the granitoid.

Specimen 5437 RS 25, TS C 51637, 2249/48/3

Age Early Proterozoic

Rock Name Ultramylonite

Thin Section

Feldspar and quartz grains up to 3 mm across have been rounded by dynamic recrystallisation along grain boundaries and are surrounded by a recrystallised, grain-sized matrix of quartz and feldspar, with frequent fine grains of garnet. Thin bands of fine grained biotite are roughly parallel through the matrix defining an intense foliation.

Plagioclase is the most common and most coarsely grained of the megacrysts, followed by quartz and minor microcline. Dynamic recrystallisation along the megacryst grain boundaries has produced ellipsoidal to almost perfectly spherical grains which remain unaltered.

The finely recrystallised material consists of quartz and feldspar with fine flakes of biotite. Many fine grained, and often perfectly euhedral, pink garnets are distributed through the mylonite rock, probably as porphyroblasts. They are up to 0.2 mm across.

One band contains single grains and ellipsoidal aggregates of grains of a hornblende pleochroic from blue green through green to pinkish brown.

A pale and weakly pleochroic biotite is abundant as small flakes in the recrystallised part of the rock and, with a strong preferred orientation, imparts a foliation along the length of the bands. The biotite is densely concentrated in thin bands which are accentuated by concentration of fine opaque granules.

Fractures at a high angle to the mylonitic fabric are emphasised by a filling of amorphous limonite. These are most likely the expression of the final movement strain within the mylonite.

Specimen 5437 RS 27, TS C 51642, 2249/52/7
Age Early Proterozoic
Rock Name Gneiss
Thin Section

From the abundance of plagioclase and the presence of relict pyroxene, the original composition of the gneiss was probably intermediate. A combination of retrograde metamorphism and potash-silica metasomatism has resulted in the development of low temperature equilibrium in the plagioclase and in the introduction of quartz, biotite, muscovite, microcline and apatite.

The main constituent is plagioclase which forms an interlocking mosaic of grains up to 3 mm across. It is now an albite with positive optical sign, relatively low 2V and a symmetrical extinction angle of 16^{o}. Microcline is a minor feldspathic constituent.

Quartz is present as inclusions of single fine grains in plagioclase and as patches of mosaic interstitial to the feldspar but with a replacive textural relationship to it.

Pyroxene occurs as altered relics in clusters of biotite flakes. Alteration to biotite has proceeded along cleavage planes, disrupting the pyroxene into acicular prisms. Biotite within and surrounding relict pyroxene is green and in places retains the acicular form of replaced pyroxene. However, biotite is more extensive than this and forms large clusters up to 5 mm across and irregular stringers several centimetres long. In these occurrences, the biotite is brown, strongly pleochroic and usually associated with grains and patches of opaque minerals. Stringers of biotite contain patches of flakes with low birefringence which are probably clay minerals.

The stringers cut across grains of feldspar as well as extending along grain boundaries. They are subparallel and impact a directional fabric to the rock.

Muscovite flakes are much less abundant than biotite and occur interstitially to and cutting across grains of quartz and feldspar. Muscovite is sometimes associated with biotite but more often occurs as monomineralic clusters of flakes.

Thick prisms of apatite are frequent accessory minerals and may have formed from calcium rejected when an intermediate feldspar equilibrated at a low temperature.

Specimen 5537 RS 26, TS C 51648, 2248/102/1
Age Early Proterozoic
Rock Name Metadolerite
Thin Section

Plagioclase laths up to 3 mm long are enclosed in ophitic and interstitial ferromagnesian minerals up to 5 mm across. The latter include both pyroxene and amphibole. Some amphibole apparently formed by alteration of pyroxene but many crystals are complete and may have been primary phases. Opaque minerals are abundant. Minor biotite and quartz are probably late stage components.
The plagioclase is labradorite and probably has not changed much in composition since the rock cooled. There is no alteration.

Preservation of pyroxene is generally poor. Even in grains not partly replaced by amphibole, the cleavages have often been invaded by an iron mineral now represented by limonite. The pyroxene itself has often been replaced by an alteration product resembling antigorite. It is possible that some altered material may have originated as olivine.
The amphibole is a hornblende pleochroic from green to pale brown. Much of it appears to be primary and some is almost unaltered. Much appears to be poorly crystalline and without well defined optical properties.

Opaque minerals are abundant and are closely associated with the ferromagnesian minerals. Most of the opaque material consists of irregular patches enclosed in amphibole but some individual grains are included in other minerals.

Biotite occurs as large flakes at the margins of hornblende clusters and opaque patches. It appears to be a late alteration.

Quartz is frequent as small interstitial grains between earlier feldspars and ferromagnesian minerals. Some evidence of replacement is apparent.

Specimen 5537 RS 27, TS C 51634, 2249/44/1
Age Early Proterozoic
Rock Name Silicified aplite
Thin Section

A closely interlocked mosaic of plagioclase, microcline and quartz with an average grain size of about 0.7 mm and no directional fabric has been invaded by lenticular pods of quartz mosaic up to 15 mm long with a strong preferred orientation.

Plagioclase rarely displays sharply defined twinning and the composition is not obtainable. Sericitic alteration is present. Microcline is present but is also poorly defined. Patches of myrmekitic intergrowth are frequent.

Quartz in the aplitic mosaic is distinguished by a dusty appearance from finely granular inclusions. In the pods of introduced quartz, the mineral is clear and glassy.

Fine flakes of biotite are widespread but not abundant. They display a weak tendency towards preferential orientation parallel to the pods of introduced quartz.

Opaque grain, fine flakes of muscovite and fine grains of zircon are very rare.

Specimen 5537 RS 28, TS C 51638, 22949/40/7
Age Early Proterozoic
Rock Name Quartzitic gneiss
Thin Section

The main part of the rock consists of a strongly oriented mosaic of granulated, annealed and restressed quartz with minor plagioclase. Knots within the fabric with contiguous stringers along the plane of gneissosity consist of iron oxides, biotite, relict pyroxene and associated alteration products.

Quartz grains are of various sizes and shapes with a dominant elongation along the gneissosity. Almost all grains display undulose extinction. Scattered plagioclase grains are also strained.

In the knots, iron oxides vary from opaque to translucent and amorphous to crystalline. Alteration products may include leucoxene and possibly jarosite. Biotite is not ubiquitous, but tends to be highly concentrated in a few knots. It is partly altered and, in places, replaced by iron oxide. Pyroxene relics are surrounded by platy alteration products varying from weakly birefringent to moderately birefringent. These probably include chlorites and serpentine minerals such as antigorite.

Rare accessory minerals include sphene, rutile and zircon.

Specimen 5537 RS 29, TS C 51649, 2248/102/2
Age Early Proterozoic
Rock Name Quartz - mica schist
Thin Section

Quartz and mica predominate in the rock and elongation of quartz grains with a parallel orientation of mica produce a strong schistose fabric. Coarse grains of microcline, quartz and plagioclase vary in shape from equant to elongated.

Quartz occurs as individual grains and as elongated pods of mosaic. There is no sharp distinction between the two types.
Microcline and minor plagioclase occur with quartz as part of the main fabric as well as in coarse grains. Neither type is strongly altered.

Biotite is the main mica. It tends to be poorly crystalline and is often without clearly defined optical properties. Muscovite is less abundant except in a few planes of schistosity where it is the main mica with minor biotite.

Muscovite occasionally occurs in large clusters of coarse flakes.
Apatite and zircon occur as some accessory minerals.

Specimen 5537 RS 31, TS C 51653, 2248/102/2a

Age Early Proterozoic

Rock Name Granite gneiss

Thin Section

Microcline in coarse and fine grains and quartz in separate grains and elongate mosaic pods are similar in abundance. Biotite and muscovite occur in irregular bands because the rock has been sectioned in a plane at a low angle to the schistosity.

Microcline is little altered and twin planes are sharp enough to suggest good crystal structure. Plagioclase is present in much lower abundance than microcline. Myrmekite is common.

Quartz is slightly more dusty in the main part of the rock than in pods of mosaics. Since the pods are lenticular in the orientation of the plane of section, they are almost certainly spindle shaped.

Both biotite and muscovite occur in orientations which indicate that the plane of section is close to the plane of the foliation.

A few grains of opaque minerals are present.

Specimen 5537 RS 32, TS C 51652, 2229/86/6

Age Early Proterozoic

Rock Name Garnetiferous gneiss

Thin Section

Microcline in grains up to 12 mm across, quartz and minor plagioclase have been partly replaced by spherical to lobate porphyroblasts of garnet up to 6 mm across and clusters of biotite flakes.

Microcline and plagioclase are fractured but unaltered except by sericite and iron oxide precipitation along the fractures. Myrmekite is common.
Quartz is not only fractured but recrystallized along grain boundaries as fine grained mosaics.

Isolated flakes of biotite may be original to the granite but the majority of the biotite flakes cluster around the margins of garnet grains. The garnet is fractured with a pale mica filling the fractures. Garnet crystals are without crystal faces. Outer surfaces are round to lobate and inclusions are bounded by round margins.

Patches of opaque material and sphene are associated with biotite clusters. Rare zircon prisms are accessories.

Specimen 5537 RS 33, TS C 51651, 2249/40/8

Age Early Proterozoic

Rock Name Quartz microdiorite

Thin Section

A closely intergrown mosaic with an average grain size of about 0.5 mm consists of plagioclase, quartz and biotite. A weak tendency towards preferential orientation is displayed mainly by the biotite.

Plagioclase exhibits some alteration, particularly in grains which were originally zoned. A central zone is often altered while the margin remains clear.

Quartz is mainly interstitial and may be introduced.

Biotite is generally poorly crystalline. It tends to be interstitial but often cuts across grains of plagioclase, probably by invasion along fractures.

Specimen 5537 RS 34, TS C 51636, 2249/40/7

Age Early Proterozoic

Rock Name Silicified garnetiferous microcline granite

Thin Section

Porphyritic microcline granite with garnet and plagioclase has been invaded by quartz and a little muscovite.

Microcline crystals are up to 20 mm across. They are perthitic but not altered and contain numerous irregular to graphic inclusion of quartz. Plagioclase is much finer grained and rare.

Quartz occurs in dusty grains as part of the original granite but is more widespread as clear, highly strained inclusions distributed throughout the rock. Quartz grains which are not contiguous in the plane of section are optically continuous and may be physically continuous in rock beyond the plane of section. This type of quartz is probably a late introduction to the solid rock.

Garnets are not frequent, round to irregular in shape, less than 2 mm across, strongly fractured, altered to iron oxide and earlier than the second generation of quartz.

Muscovite occurs in ragged patches and fracture fillings. It is also a late introduction and in places is closely associated with second generation quartz. A little very poorly crystalline dark mica, translucent limonite and sphene are present in some muscovite clusters.

Opaque grains are rare accessory minerals.

Specimen 5537 RS 35, TS C 51647, 2229/10/3
Age Early Proterozoic
Rock Name Silicified granitoid
Thin Section

A somewhat altered granitic rock has been silicified.

The potassium feldspar is a perthitic orthoclase with restricted patches in some grains where faint cross hatched twinning indicates a microcline crystal lattice. A light sericitisation affects the exsolved lamellae of plagioclase more than the host orthoclase. Plagioclase is similar in abundance to potash feldspar and is moderately to strongly sericitised. Twinning is too poorly developed to permit an estimation of composition. Minor myrmekite is present.

Quartz is interstitial but embays adjacent minerals. It has been introduced but has not penetrated earlier minerals deeply enough to appear as inclusions. The quartz forms mosaic patches in which grains are in contact along complex sutures. Margins of patches are often granulated but only as a thin layer. Annealing has not proceeded far and the assembly remains out of equilibrium. Undulose extinction is evident. However, both strain and recrystallisation are less evident in this rock than in others described above.

Biotite is mainly interstitial but is an early mineral on the evidence of sericitisation which has affected the margins of many biotite flakes as well as adjacent plagioclase. Epidote is also present in zones of alteration between biotite and plagioclase. However, some fine flakes of biotite occupy fractures in feldspar so that the age of the biotite is post-plagioclase but pre-sericitisation.

Opaque material is associated with clusters of biotite.

Zircon and apatite are rare accessory minerals.

Specimen 5537 RS 41, TS C 51641, 2229/10/3

Age Early Proterozoic

Rock Name Blastomylonitic granite

Thin Section

A granite has been strongly recrystallised in a series of episodes overlapping in time.

A feldspathic component of microcline and plagioclase is coherent in places but over most of the section is broken apart, fractured and reduced to fine granules by dynamic recrystallisation.

Dusty quartz is part of the original granite. Some clear quartz fills fractures in feldspar and thus postdates the first imposition of stress. Much quartz was introduced into bands of recrystallisation as broad lenses. This has been recrystallized into fine-grained mosaics. Some annealing has taken place but some of this has been recrystallized and the whole mass of quartz is subject to stress and displays a strain polarisation.

Bands of strong recrystallisation contain abundant fine grains of epidote and epidote occurs as inclusions and fracture filings in plagioclase. Some bands are almost completely replaced by an epidote mosaic. A few such bands contain occasional poorly crystalline flakes of biotite.

Specimen 5537 RS 42, TS C 51635, 2249/40/8

Age Early Proterozoic

Rock Name Gneissic and charnockitic granite

Thin Section

Bands of recrystallisation and lenticular quartz pods with a preferred orientation have produced a gneissic texture in a potassic granite with minor garnet and orthopyroxene.

Microcline is the dominant feldspar with porphyritic crystals up to 1 cm across. Porphyritic microcline is weakly twinned and contains many fine blebs of exsolved plagioclase in an oriented array. Strong fracturing and recrystallization produce sharp twinning and remove perthitic exsolution in the fragments, probably through recrystallisation.

Plagioclase is rare.

Quartz occurs as highly strained, elongate grains up to more than 1 cm long in clusters over 2 cm long. Grain

boundaries are often lobate and some are partially annealed. Where no recrystallisation is apparent, grain boundaries are extremely complex and it is clear that the quartz is far from equilibrium. Bands and patches of recrystallised quartz are common.
A few patches of fine grained, pale biotite are present and contain fragmented garnet. Rare flakes of muscovite are also present.

Pyroxene occurs as a few scattered, anhedral grains and a cluster of euhedral grains. It is non-pleochroic but straight extinguishing. The optic axial angle is small. It is possibly enstatite inverting to pigeonite. The rock cannot be classified as a true charnockite but has several charnockitic characteristics.

Zircon, sphene and opaque minerals are accessories.

Specimen 5537 RS 43, TS C 51643, 2248/102/5
Age Early Proterozoic
Rock Name Pyroxene granitoid gneiss
Thin Section

Grain size is strongly bimodal with porphyritic microcline, quartz and plagioclase crystals up to 1 cm across in a groundmass of highly recrystallised quartz and feldspar and bands of biotite, pyroxene, sphene, apatite and opaque minerals.

Microcline is poorly twinned and contains perthitic patches of plagioclase. It is almost unaltered. Plagioclase is poorly twinned and is often strongly sericitised in inner zones but almost unaltered at the margins. Myrmekite is abundant.

Recrystallised quartz forms a mosaic of grains with relatively simple grain boundaries. Despite this apparent equilibrium, both the quartz of the mosaics and porphyritic quartz exhibit strain polarisation.

Biotite is pale in colour and varies from a green with almost no pleochroism to a greenish brown, pleochroic to very pale yellow brown. It occurs in irregular, discontinuous bands and individual flakes are strongly though not entirely oriented parallel to the bands.

Pyroxene grains also tend to be associated with and oriented parallel to the bands and very from euhedral to anhedral. A faint pleochroism is evident and many sections are straight extinguishing with negative optical sign. The latter are probably orthopyroxenes of hypersthene type but without the pink to green pleochroism typical of hypersthene itself. No alteration to amphibole is evident.

Opaque to translucent iron oxides and sphene which is leucoxenised to varied extents are common components of the mafic bands. Thick prisms of apatite are accessory minerals.

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