

MINERAGRAPHIC AND PETROGRAPHIC DESCRIPTIONS

SAMPLE NO: Cowden – 1

TYPE: RC Chips

LOCATION: Tennant Creek

FIELD IDENTIFICATION: Sheared, hematite – stained granite porphyry.

SECTION TYPE: Polished Thin Section

CLASSIFICATION: *Brittle/ductile sheared and altered (quartz – sericite) and subsequently retrogressed (Fe chlorite – hematite) granite to granodiorite porphyry.*

DESCRIPTION:

MINERALS PRESENT:

Quartz - phenos	15%
- matrix	24%
Plagioclase – albite phenos	16%
Potash feldspar – microcline	4%
Sericite	18%
Secondary biotite to Fe chlorite	9%
Hematite/limonite	2%
Leucoxene	tr
Opaques	2%

Opaques (2%):

Hematite - dominant

TEXTURE:

Relict quartz, plagioclase and subordinate potash feldspar phenocrysts or phenoclasts exhibit a variable grain size with one chip containing coarse grained quartz (up to 6 mm) and plagioclase – albite (4 mm) phenocrysts in the foliated and altered matrix. The phenocrysts have been fractured and attenuated in the foliated matrix. The plagioclase phenocrysts have locally preserved equant to tabular forms and have been penetrated by secondary quartz along fractures. Relict plagioclase and potash feldspar phenoclasts have been penetrated by limonite (to hematite).

The presence of oriented and milled clasts in a fibrous sericite – Fe chlorite – microcrystalline quartz matrix that parallels an anastomosing schistosity in another chip is consistent with a protocataclastite.

The matrix comprises microcrystalline quartz associated with fibrous sericite that parallels an anastomosing schistosity. There is evidence of a later, probably penecontemporaneous deformation overprint comprising anastomosing fibrous sericite and Fe chlorite. Secondary green biotite to Fe chlorite has also penetrated late fractures in the foliated matrix. Fine granular limonite is dispersed through the matrix that contains equant opaques – hematite.

In reflected light, fine anhedral hematite occurs in the foliated matrix and typically exhibits a porous texture. The porous texture has preserved a rectilinear texture suggesting magnetite crystallographic axes. Original magnetite, as part of the granite porphyry host, has been replaced by leucoxene containing fine hematite inclusions.

ALTERATION/METAMORPHISM:

The granite porphyry has been progressively deformed and altered in a brittle/ductile regime. There is evidence of superposed deformation phases that have probably occurred penecontemporaneously and have been associated with quartz - sericite alteration of the matrix. Secondary biotite to Fe chlorite in late fractures represents a retrograde metasomatic phase that may be associated with the oxidation of magnetite to hematite. Hematite/limonite has also penetrated the matrix.

COMMENTS:

The preservation of coarse grained quartz and plagioclase phenocrysts as well as subordinate potash feldspar phenocrasts suggests a granite to granodiorite porphyry host that has been subsequently deformed and altered within a brittle/ductile regime. Magnetite, as part of the initial alteration phase has been oxidised to hematite during retrograde metasomatic alteration - probably during re-activation of the shear.

Photomicrograph