

Characteristics and Ore Genesis of the
Mount Cuthbert Deposit, Kalkadoon-
Leichardt Belt, Mt Isa Inlier, North
West Queensland.

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ABSTRACT

The Mount Cuthbert mine is situated ~100km NE of Mt Isa near the eastern edge of the Kalkadoon Leichhardt Belt (KLB); a Proterozoic block of the Mt Isa Inlier that divides the world class mineral regions of the IOCG-style Eastern Fold Belt (EFB) and the Mount Isa style copper deposits of the Western Fold Belt (WFB). KLB hosted deposits display characteristics related to both the EFB and WFB style of mineralisation; however mineralisation at Mount Cuthbert is indicative of a genesis for KLB hosted deposits related to metasomatic and tectonic events responsible for mineralisation in the EFB.

The Mount Cuthbert mine is a low tonnage-high grade, shear controlled, retrograde chalcopyrite-pyrite-pyrrhotite deposit hosted within silica-dolomite and biotite-chlorite altered schists and felsic volcanic units of the Leichhardt Volcanics. The paragenetic alteration sequence is composed of 5 alteration stages: Stage 1) sodic alteration (albite + quartz); Stage 2) K-Fe-Ca alteration (siderite + calcite + dolomite + quartz + biotite ± magnetite ± ilmenite ± apatite ± pyrite); Stage 3) mineralisation (chalcopyrite + quartz ± pyrite ± pyrrhotite ± calcite ± chlorite); Stage 4) major chloritisation; Stage 5) oxidation and localised enrichment to chalcocite. The alteration halo within the deposit is characterised by a proximal alteration envelope (<50m) consisting of chalcopyrite, pyrite, quartz, dolomite and chlorite, an intermediate alteration envelope (50-500m) described by quartz-carbonate veining with minor chalcopyrite, pyrite and pyrrhotite, in addition to extensive biotite and chlorite alteration and minor magnetite alteration. A distal alteration envelope (>500m) is identified tentatively as albite dominant.

The trace geochemistry of the main chalcopyrite ± pyrite ore phase reveals elevated Ni, Zn, Cd and Hg in pyrite and elevated Sn, Pb, Se, V, Cr, Te, Ga, As, Cd, Mo, Bi and Sb in chalcopyrite. Differing elemental trends within the ore minerals supports paragenetic evidence suggesting several phases of sulphide growth.

The characteristics and features of the Mount Cuthbert deposit outlined in this study show the greatest number of similarities to other low tonnage-high grade, shear hosted deposits present in the KLB (i.e. Mighty Atom, Orphan). This suggests that despite having a genesis related to that of the EFB, KLB deposits are uniquely their own style of mineralisation. This supports a shear-zone associated exploration model that is specific to the KLB.

KEYWORDS

Mount Isa Inlier, Kalkadoon-Leichhardt Belt, Mount Cuthbert, ore genesis, ore geochemistry

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