

BASE METAL MINERALIZATION IN THE
KANMANTOO GROUP, S.A. :
THE SOUTH HILL, BREMER AND
WHEAL ELLEN AREAS

by

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ABSTRACT

The Kanmantoo Group in the Strathalbyn-Kanmantoo-Callington areas has been regionally metamorphosed and at least three deformations have affected the original greywacke-shale sediments to reach mid-amphibolite facies during the Delamerian orogeny. The metamorphic assemblages indicate a temperature of between 500 and 640°C and pressures between 1.8 and 3.8 kb. The presence of andalusite and fibrolite suggests pressures close to the upper value. Two deformations at quartz-muscovite-biotite grade followed, producing non-penetrative crenulation cleavages.

Evidence suggests that base metals were present in the schists at a very early stage either during sedimentation or introduced at least in the earliest stages of metamorphism, and to have been localized during the first deformation.

Sulphur isotope ratios of the sulphides are compatible with a hydrothermal origin and derivation from metamorphic fluids which had differing mixtures of meteoric, sea and possibly magmatic waters. Wide variations in isotope values between mineralization and pyritic schists and the Nairne Pyrite Formation suggest that the Cu-Pb-Zn was not derived from these pyritic horizons.

P-T conditions of sulphide recrystallization as derived from sphalerite geobarometry and sulphur isotopes indicate a temperature near 420°C and a pressure of 4.4 (± 0.5) kb. The pressure is slightly higher than that deduced by silicate stabilities.

The andalusite schist is closely related to mineralization, not as a major source, but is structurally related being the lithology where folding and shearing were favourable for mineralization.

It is concluded that the mineralization is epigenetic, resulting from mobilization of disseminated sulphides in the country rocks by hydrothermal fluids into shear zones and tight folds.

Epigenetic - at or near the surface