

CONTRASTING FLUID TYPES AT THE NEVORIA GOLD DEPOSIT IN THE SOUTHERN
CROSS
GREENSTONE BELT, WESTERN AUSTRALIA: IMPLICATIONS OF AURIFEROUS FLUIDS
DEPOSITING ORES WITHIN AN ARCHEAN BANDED IRON-FORMATION

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Abstract

Two main hydrothermal mineral assemblages have been identified in the banded iron-formation-hosted gold mine at Nevoria. The earlier quartz ± garnet ± clinopyroxene ± calcite vein group formed pre- or synmetamorphic, and the later quartz ± pyrrhotite ± pyrite vein group appears to be postmetamorphic and related to gold mineralization. Fluid inclusion characteristics are obviously different in those two vein groups. Microthermometric analysis indicates that the fluids with metamorphic alteration are aqueous, CO₂-rich or CO₂-absent solutions; no or very small amounts of CH₄ were involved in this fluid. Mineralizing fluids were a CH₄-CO₂-H₂O solution. The initial auriferous fluids were CH₄ dominant. Heterogeneous trapping, interaction of the hydrothermal fluid with graphite-bearing rocks, or fluid mixing may cause large variations of CH₄/CO₂ ratios or a \bar{X}_{CH_4} of CH₄-CO₂-H₂O inclusions, particularly in mineralized quartz-pyrrhotite veins. Phase mixing or separating, resulting in an increase in pH and f_{O_2} , together with loss of reduced sulfur by mineral-fluid reactions and precipitation of sulfides, led to the breakdown of the gold-transporting complexes.