

## **THE COPPERHEAD GOLD DEPOSIT: SKARN OR HIGH-TEMPERATURE OROGENIC GOLD DEPOSIT?**

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The majority of large gold deposits (50 t Au) in the Yilgarn Craton of Western Australia are orogenic lode-gold deposits hosted in greenschist-facies domains displaying sericite-carbonate-albite-chlorite alteration assemblages. However, there are a number of gold deposits in amphibolite-facies domains which have associated distinctive calc-silicate alteration. These have been termed skarns by some workers. The Copperhead gold deposit, located within the Southern Cross greenstone belt in the Yilgarn Craton, is sited in amphibolite-facies host rocks. Gold mineralisation is epigenetic and located in ductile and brittle-ductile shear zones associated with quartz-carbonate and carbonate shear veins and quartz extension veins with distinct calc-silicate, actinolite-biotite-calcite-hornblende alteration haloes. The high-temperature gold mineralisation shows a number of similarities to gold skarn deposits including similar calc-silicate alteration with surrounding K-enriched haloes, sulfide mineralogy and element associations within the ores. However, significant differences between the Copperhead gold deposit and gold skarn deposits include: (i) a lack of metal zonation on a deposit scale; (ii) a lack of calc-silicate alteration in all rock types and absence of diffuse hornfelsic calc-silicate aureoles; and (iii) a strong structural control on gold mineralisation. The Copperhead gold deposit is better classified as a hypozonal, high-temperature end-member within the crustal-continuum of Archaean lode-gold deposits in the Yilgarn Craton, with the distinctive calc-silicate alteration a reflection of the high-temperature of gold mineralisation, not a gold skarn environment. This interpretation has implications for the classification and origin of other amphibolite-facies gold deposits currently classified as gold skarns on the basis of their calc-silicate alteration.