

Source of Iron for Sulfidation and Gold Deposition, Twin Creeks Carlin-Type Deposit, Nevada

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Abstract

This study was undertaken to determine the source of iron in Comus Formation sedimentary rocks that were sulfidized during deposition of gold in the Megapit area of the Twin Creeks Carlin-type deposit. Sedimentary rocks in and near the Megapit contain ferroan dolomite, largely as overgrowths on iron-poor dolomite. Iron to form these overgrowths appears to have been released from mafic volcanic rocks that are interlayered with the sedimentary rocks. These igneous rocks have undergone two stages of hydrothermal alteration. The first stage involved formation of albite and iron-rich chlorite, possibly caused by interaction with seawater. The second stage involved destruction of the iron-rich chlorite by illite or sericite, which released iron to form ferroan dolomite in the sedimentary rocks. Comparisons show that transfer of iron from the igneous rocks to the sedimentary rocks can account for the present distributions of iron in these rocks. Relative to basalts, Comus Formation igneous rocks are enriched in iron and potassium. These results suggest that ferroan dolomite in sedimentary rocks is not solely a product of diagenetic processes and can form when iron is released from adjacent iron-bearing igneous rocks. Recognition of this additional mechanism for formation of ferroan dolomite expands the range of geologic settings that can be favorable for formation of gold deposits formed by sulfidation.

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