

Vein Textures at the Moss Low-Sulfidation Epithermal Gold Deposit, Arizona: Constraints on the Processes of Mineral Deposition

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The Miocene low-sulfidation epithermal deposits of the Oatman district in northwestern Arizona are located in the south-central portion of the Basin and Range province. Discovered in the late 1800s, mining in the district has yielded over two million ounces of gold. Historically, high-grade ores have reached concentrations exceeding 30 g/t Au. Open-pit mining operations are currently active at the Moss deposit on the west side of the Oatman district. Hosted in the Peach Springs Tuff and the Moss monzonite porphyry, the mining targets at the Moss mine comprise the Moss, Ruth, and West veins. The Peach Springs Tuff is a product of an eruption event from the Silver Creek caldera ~18.8 Ma. Free gold is the dominant presentation of gold in the colloform quartz of this system. Small dendritic aggregates of the free gold and other ore minerals hosted by fine-grained quartz have formed in distinct ginguero bands. The textures are similar to those encountered in low-sulfidation epithermal deposits formed by the flashing of the hydrothermal liquids. Bladed calcite -- a frequent gangue texture commonly replaced by quartz -- suggests the gentle boiling of the hydrothermal fluids in addition to flashing. Late open-space filling of the veins, including the formation of comb quartz, appears to have occurred during periods of steady-state flow. Further petrographic analysis will enhance our understanding of the processes resulting in diverse quartz textures in the veins and the textural relationships between the ore and gangue minerals.