

PRECIPITATION OF GOLD IN A LOW-SULFIDATION EPITHERMAL GOLD DEPOSIT:
INSIGHTS FROM A SUBMILLIMETER-SCALE OXYGEN ISOTOPE ANALYSIS OF VEIN QUARTZ

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Abstract

The physical and chemical mechanisms of gold precipitation in the typical low-sulfidation epithermal gold deposit at Hishikari (southern Japan) were quantified by submillimeter-scale oxygen isotope analyses of vein quartz. In situ CO₂ laser-ablated fluorination was used to measure temporal δ¹⁸O excursions. The calculated oxygen isotope compositions of the ore-forming fluid indicate a dynamic process of epithermal vein formation. Intermittent opening of the vein allowed introduction of metal-bearing deep fluid to the epithermal system, and associated boiling and subsequent mixing with meteoric water caused precipitation of precious metals.