

Geochemical Characteristics and Behavior of Hydrothermal Fluids Related to Porphyry Cu-Au Mineralization of the Tujuh Bukit Deposit, Banyuwangi, Indonesia

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The Tujuh Bukit deposit in East Java, Indonesia, is a telescoping ore system where high-sulfidation epithermal gold-silver mineralization overprinted porphyry copper-gold mineralization. The mineralization in the Tujuh Bukit porphyry Cu-Au deposit occurs as veins, veinlets, stockwork veins, and dissemination mainly in the Old Tonalite. The porphyry-related veins and veinlets were classified into several types based on mineral assemblages and textures, i.e., M veins composed of quartz, magnetite, and hematite, stockwork veins of quartz, B veins of quartz with sulfide centerlines, B veins overprinted by epithermal mineralization, and D veins of pyrite cutting the other veins, in order of formation.

Based on fluid inclusion study, formation temperatures of the M veins, the stockwork veins, the B veins, and the B veins overprinted are 310-320 °C, 310-460 °C, 300-470 °C, and 340-480 °C, respectively. Bulk gas compositions of fluid inclusions in the M veins and the stockwork veins indicate magmatic signatures, while those in the B veins with or without overprinting indicate both magmatic and meteoric signatures.

Pyrite from the M vein has a $\delta^{34}\text{SCDT}$ value of +1.6 ‰, while those from the stockwork veins are -0.5 and +0.5 ‰. $\delta^{34}\text{SCDT}$ values of pyrite and chalcopyrite from the B veins range from -2.3 to -1.6 ‰, while those of pyrite from the B veins overprinted and the D veins range from -2.2 to -1.3 ‰ and -4.8 to -4.4 ‰, respectively. $\delta^{34}\text{SCDT}$ values of pyrite and prismatic enargite which fill fractures range from -4.0 to -2.0 ‰ and -7.7 to -1.9 ‰, respectively. Euhedral covellite which fills fractures has $\delta^{34}\text{SCDT}$ values of -8.4 ‰, but covellite disseminated in the host rocks has $\delta^{34}\text{SCDT}$ ranging from -4.0 to -1.9 ‰. The overall S-isotopic data indicates a gradual decrease from early to late stages of mineralization.