

Paper Number: 4052

Fluid inclusions and sulfur isotope constraints on the genesis of the stratiform ores of Jiguanzui Au-Cu skarn deposit, Middle-Lower Yangtze River Metallogenic Belt, Eastern China

Wang, H.Q.¹, Li J.W.^{1,2}, Deng X.D.^{1,2}

¹ Faculty of Earth Resources, China University of Geosciences, Wuhan 430074, China

² State Key Laboratory of Geological Processes and Mineral Resources, China University of Geosciences, Wuhan 430074, China

The Jiguanzui Au-Cu deposit in the Daye district, Middle–Lower Yangtze River Metallogenic Belt, Eastern China is associated with an intermediate intrusive complex consisting of quartz diorite, porphyritic diorite and diorite that intruded intermittently the Triassic marine carbonate sequences in the 146~135 Ma interval. The deposit consists of skarn ores having a hydrothermal titanite U-Pb age of 139.6 ± 4.0 Ma in the upper zone (>-600 m elevation) and stratiform ores with a pyrite Re-Os isochron age of 141 ± 18 Ma (2σ) in the lower zone (<-600 m elevation). The skarn ores are localized along contact zone between porphyritic diorite-quartz diorite and carbonates, and characterized by well development of prograde and retrograde skarn assemblages followed by sulfide and calcite stages, whereas the stratiform ores are stratabound by the Triassic carbonates with little skarn alteration and abundant hydrothermal calcite texturally associated with sulfides. Hydrothermal breccias containing fractures of pyrite, chalcopyrite, quartz, chlorite, minor diopside and epidote are extensively developed in the stratiform ores.

Calcite in stratiform ores hosts abundant boiling fluid inclusion assemblages (FIAs) consisting of abundant gas-rich aqueous inclusions coexisting with daughter mineral-bearing, liquid-rich and gas-only varieties. The total homogenization temperature mostly varies from 281.2 to 368.6 °C, being 20-40 °C lower than values of fluid inclusions in quartz from skarn ores, but a few microthermometric measurements recorded values up to 450-550 °C. The calculated salinities are 1.1-19.6 wt.% and 28.1-59.4 wt.% based on ice melting temperatures of the two-phase aqueous and halite dissolution temperatures of daughter mineral-bearing inclusions, respectively. Pyrite and chalcopyrite have $\delta^{34}\text{S}$ values ranging from -0.7‰ to +4.5‰, which are consistent with values of skarn ores (+1.3‰ to 3.5‰).

The stratiform orebodies of the Jiguanzui deposit share many common features with Manto-type Cu deposits in Arica-Iquequi and Tocopilla-Taltal of Northern Chile, such as intimate spatial relations with intrusions and their associated skarn ores, presence of hydrothermal breccias, predominance of

disseminated and massive ores, and locally developed alteration assemblages including calcic alteration (calcite and chlorite) with poor potassic alteration. This similarity, together with consistency of FIAs and their microthermometric data and magmatic-like S isotopic compositions, indicate the stratabound ore of Jiguanzui deposit can be classified as Manto-type ores that precipitated directly from magmatic-derived fluids.

Research work is supported by the National Basic Research Program of China (2012CB416802).

