SEG-MJD 2016 Conference

Fluid Inclusion and Sulfur Isotope Studies on the Salu Bulo Prospect, South Sulawesi, Indonesia: A Metasedimentary Rock-Hosted Gold Deposit

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In the central part of the western metallogenic province of Sulawesi Island, Indonesia, several significant gold deposits hosted in metamorphic rocks have been discovered. One of them is located in Awak Mas, South Sulawesi Province. The Salu Bulo gold prospect in the Awak Mas project is located along Kandeapi fault zone. The deposit is hosted in metasedimentary rocks of pre-Cenozoic basement Latimojong Formation, which consists of chloritic, hematitic, and graphitic phyllites, siltstone, sandstone, and intercalated metavolcaniclastics. The measured and indicated resources were about 5.6 million tons at 2.2 g/t Au, plus an additional 0.5 million tons at 1.1 g/t Au as an inferred resource, reported by Tetra Tech in 2013.

Mineralized zones are approximately 3 m thick and gold grade is high in the central part of the mineralized zones, which is associated with quartz-albite-carbonate alteration and vein (stockwork) and altered cataclastic breccias with orientation subparallel and discordant to foliation. Alteration halos occur at cm scale along the mineralized vein and variably in clasts of breccia. Carbonatization (ankerite ± calcite/dolomite), silicification, albitization, and sulfidation (pyrite) are common, along with minor sericitization.

Native gold (<2–15 μm) was observed mainly as fracture filling in deformed pyrite and as inclusions in porous pyrite hosted in altered cataclastic breccia and alteration halos of veins and stockwork. Pyrite is the most common opaque mineral, occuring in veins, breccia matrix, and altered and unaltered host rocks. Trace amounts of galena, chalcopyrite, bornite, covellite, and rutile are also present.

Fluid inclusions in the mineralized veins are single-phase and two-phase inclusions. Two-phase inclusions present a low to moderate salinity range from 1.2 to 11.8 wt % (mean 6.9 wt %) NaCl equiv and three clusters of homogenization temperatures (Th) at 32° to 251°C, 271° to 276°C, and 301° to 336°C. Pyrites with different morphology, texture, and interpretation of formation timing show narrow $\delta^{34}S$ values, ranging from –1.7‰ to +3.4‰, which are probably related to a single source of sulfur.