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The role of magmatic and meteoric water mixing in mineralization of Shurab polymetal ore deposit South of Ferdows: isotope geochemistry and microthermometry evidences

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Abstract: Shurab polymetal ore deposit is located in 77 km south of Ferdows in north of Lut structural zone. Geology of the area includes a Jurassic sedimentary rocks, comprises shale and sandstone of Shemshak Formation, Badamo limestone, and andesite, dacite, rhyodacite and rhyolite volcanic and subvolcanic-calc-alkaline Tertiary rocks as a hydrothermal mineralization host rock. In these rocks, mineralization occurs as both series of NW-SE and E-W trending fault and fracturing. Galena, sphalerite, stibnite, chalcopyrite and pyrite are present as major sulfide ore mineral and frequently shows open-space filling, vein-type and crustified textures. The mineralization is subdivided into two stages, base metal-bearing assemblage (Pb>Zn>Cu) accompanied by first generation pyrite and second stage, stibnite-bearing minerals (stibnite, chalcostibnite, tetrahedrite and bournonite) with subordinate arsenopyrite and late generation pyrite sulfide minerals. Microtermometric measurement of fluid inclusions in cogenetic quartz and sphalerite shows homogenization temperatures (Th_{total}) between 114°C and 275°C and salinities between 4.2 to 17.2 wt.% NaCl equiv. Geochemistry of oxygen isotope (relative to SMOW) indicate ranging between +12.5‰ to +14.8‰ (mean 13.6‰) which assume that mineralizing solutions in the area were a mixture of meteoric and magmatic waters. This study indicated that, mixing, cooling and fluid-rock interactions were the main controlling factors in formation of the Shurab polymetal ore deposit.

Keywords: *polymetal mineralization; fluid inclusion; isotope geochemistry; mixing; Shurab.*

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