

Investigation of mineralization, REE geochemistry, and fluid inclusions studies of the Shalang vein-type polymetallic ore deposit, southwest of Kerman

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Abstract: The Shalang vein-type polymetallic ore deposit is located about 10 km southwest of Kerman and 70 km northeast of Sirjan, and lies in the central part of the Dehaj-Sardueih metallogenic belt. This deposit is hosted by dacitic and andesitic vitric and crystal tuffs along with andesitic-dacitic lava flows of Eocene age. The alteration zones related to this deposit are propylitic, intermediate argillic, silicic, and carbonatized. Mineralization occurred principally as veins/veinlets in two separate stages, the hypogene (Chalcopyrite, Pyrite, Magnetite) and the supergene (Bornite, Chalcocite, Malachite, Azurite, & Hematite). The hypogene mineralization also took place in two distinct episodes, (1) formation of quartz-sulfide veins/veinlets and (2) development of carbonate-sulfide veins/veinlets. The average concentration values of Cu, Pb, Zn, Au, and Ag within the ore-bearing veins/veinlets are 2.5%, 0.26%, 0.16%, 1.3ppm, and 28ppm, respectively. The strong positive anomaly values of Eu (5.03-10.31) and Ce (1.48-5.06) indicate an alkaline pH and reduced nature, respectively for the ore-forming fluids in the depositional environment. The microthermometric studies on fluid inclusions within the cogenetic quartz crystals were carried out. The studied fluid inclusions were chiefly of liquid-rich two-phase type and all of them were homogenized into liquid state. The obtained homogenization temperatures (Th) of the analyzed fluid inclusions varied within the range of 226°-313°C. The salinities of the studied fluid inclusions range from 3.4wt% to 9.9 wt% NaCl equivalent. Based upon microthermometric results, the boiling concurrent with cooling were two essential mechanisms in development and evolution of this deposit. Presence of colloform, cockad, bladed, and replacement textures in the ores, development of intermediate argillic and carbonatized alteration zones, and the low salinities and temperatures of the studied fluid inclusions provide persuasive evidence that the Shalang vein-type polymetallic ores have the most similarity to the low-sulfidation epithermal deposits.

Keywords: *Mineralization; alteration; fluid inclusions; low-sulfidation epithermal; Shalang ore deposit; Dehaj-Sardueih.*

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