

Mineralogy, geochemistry, and fluid inclusion studies of Kuh-Sorbi Barite-lead \pm copper deposit, northeast of Iran

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Abstract: The Kuh-Sorbi barite-Pb \pm Cu deposit, which is located southeast of Mashhad in Khorasan Razavi Province of Iran, occurs as vein, open space filling, host rock replacement, and cement within the fault breccia in the Upper Triassic Nayband Formation metamorphosed carbonate rock unit. This deposit contains of barite (80–85%) and galena (10–15%), with small amounts of chalcopyrite and quartz. Barite is marked by very low concentrations of Sr (2.5–3%) and belongs to the barite end-member of the barite-celestite solid solution series. Hydrothermal alteration, such as silicification and dolomitization, provided appropriate physical and chemical conditions that permitted the passage of ore-bearing fluids and participated in precipitation and ore localization. Carbonate-hosted ore contains \sim 1% Pb, \sim 0.15% Cu, and maximum 288 ppm Sb, whereas Ag (< 40 ppm) and Bi (< 10 ppm) is very low. In addition, concentrations of Ag, Bi, and Sb in separated galena samples ranged from 12 to 175 ppm, 43 to 101 ppm, and 137 to 270 ppm, respectively. The ratios of Sb/Bi in galena from the Kuh-Sorbi deposit range from 2.25 to 5.63 indicate medium-temperature galena, which formed at medium pressure. The galena samples are Sb-rich. Microthermometric analyses in two-phases (liquid and vapour) fluid inclusions suggest that barite and ore minerals were precipitated by a medium-temperature (250 to 386°C) low-saline (4.9 to 1.8 wt. % NaCl equivalent) solution originated possibly from a metamorphic fluid. Temperature decreasing may have played an important role during barite-Pb \pm Cu mineralization. Based on geology, mineralogy, texture and fluid characteristics, the Kuh-Sorbi deposit is classified as a mesothermal-type deposit.

Keywords: *Mineralogy; geochemistry; fluid inclusions; barite-lead \pm copper deposit; Mesothermal.*

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