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The mineralogy and genesis of barite mineralization at Shanjan (NW Iran): a case study from the barite occurrences in the Mishow Mountain

4 Vartan Simmonds¹, Leila Zolfi², Christine Jananeh
5 ¹ University of Tabriz, Tabriz, Iran

¹ University of Tabriz, Tabriz, Iran
 ² Islamic Azad University of Ahar, Ahar, Iran
 ³ University of Tabriz, Tabriz, Iran
 Email: simmonds_vartan@yahoo.co.uk

Abstract. The Precambrian Kahar Formation in the Mishow Mountain (NW Iran) hosts several occurrences of bedded, massive and vein-type barite mineralization within shale, schist and siltstone rocks. The Shanjan ore deposit is one of them, located on the southern slope of the Mishow Mountain. Barite mineralization in this deposit is in the form of several stratiform layers of barite, up to 1 m thick, accompanied by lesser chalcopyrite, pyrite and galena. Fluid inclusions within the barite crystals are dominantly of aqueous two-phase type, with salinity values from 3.0 to 10.0 wt.% NaCleq and homogenization temperatures between 150 and 250 °C, indicating a low-salinity and low to moderate temperature ore-forming fluid. The □34S values of barite and chalcopyrite samples are about 37.91-39.11 and 22.52-21.46 ‰, respectively. Such high \(\subseteq 34S \) values are in contrast with igneous source, and there are no evaporite sediments in the Mishow Mountains to be considered as a S source. S isotope composition of marine sediments has a wide range from -40% to +50%, which varies during the geologic time. The □34S value of marine sulfates at the end of Precambrian increased to about 32‰, which was declined later and never reached to this high point again. Therefore, it can be suggested that the seawater and the connate waters entrapped within the shale units of the Kahar Formation were responsible for the mineralization in the area, being heated by the emplacement of various intrusions within the Kahar Formation, leached metals from the shale and schist rocks and ascended through syn-sedimentary normal faults to the bottom of an extensional basin, forming buoyant plumes above the sea bottom and finally precipitated barite upon cool-

Keywords: Barite, Mishow Mountain, Kahar Formation, S isotope, Fluid inclusion.