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Pb-Cu-Zn vein mineralization in Gheshlagh Abbas Abad, Qazvin, NW Iran

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The Gheshlagh Abbasabad Pb-Cu-Zn deposit is located in 135 km northwest of Qazvin city. This area is geologically a part of western Alborz named Tarom Mountains. The Tarom Mountains that are southern part of western Alborz strike NW or SE. The major rock units in the area are those of the Karaj formation which is consisted of a thick sequence of Eocene volcanic, pyroclastic and volcanoclastic rocks. Major part of volcanism had occurred in the Eocene Sea. Oligocene granitic rocks are other major rocks in the Tarom zone. Local geology consists of fine-grained tuffs, andesitic tuff, andesite, andesitic basalt, trachy-andesite, basalt, olivine basalt, and pillow lava. Mineralization occurs in open space fillings mainly along fracture planes in the above rocks. The mineralization can be divided into hypogene and supergene types. The hypogene type mineralization occurs as symmetric banding in ten veins and several veinlets in the Gheshlagh Abbas Abad ore deposit. The veins are vertical and range from 100 to 147 m in length and 40 to 120 cm in width trending almost W-E. Sulfide mineralization was focused in quartz in the veins which are accompanied by narrow envelopes of wall-rock alteration. Silicification and argillic alterations are more common alteration around the veins. The main sulfide minerals are galena, chalcopyrite, sphalerite, tetrahedrite with minor pyrite, covellite and bornite. The supergene mineralization occurs mainly in breccia zones as cavities and geode fillings in surface parts of the area. Gangue minerals in this type mineralization are quartz, zeolite, clay minerals and iron oxides. Main ore mineral during the supergene mineralization had been native copper which associated with cuprite, malachite and azurite. Galena was first-formed ore mineral during the hypogene mineralization followed by chalcopyrite, tetrahedrite and sphalerite, respectively. During the supergene stage bornite and covellite formed in a reduced condition, whereas native copper and cuprite formed in an oxide environment. The hypogene mineralization is clearly epigenetic and formed by the hydrothermal solution after last magmatism in the area. The hypogene ores exposed at near-surface were subjected to supergene processes and their sulfide minerals have been replaced by the supergene minerals.

Keywords: Tarom Mountains, NW Iran, hypogene mineralization, supergene enrichment, sulfides