Determination of the thermal range of mineralization in the Chahar-Gonbad copper mine by using pyrite crystals morphology

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Abstract: Chahar-Gonbad copper mine, in Kerman province, has mainly formed as veins with low reserves and medium grade. Mineralization is mainly occurred as chalcopyrite, pyrite, rare galena and sphalerite. Sericitic, argillic and propylitic alterations have been identified in this are deposit. These alteration occurred in the thermal range of about 350 °C. In this research, the morphology of pyrite crystals is used for determination of the thermal range of mineralization. It is possible that the pyrite form in a mineralization zone shows the state of thermal range during mineralization. Based on this assumption, the needle crystals are formed in temperatures below or equal to 250 °C, abundant grooves while with increasing temperature to 450 °C the cubic crystals with abundant grooves and a few octahedral surfaces are formed. Investigations of collected pyrite crystals from alteration zones of this ore deposit show that the cubic types with abundant pyritohedron surfaces are common and crystals with high density with groove surfaces are seen with smooth surfaces crystals. Therefore it is interpreted that pyrites have formed in the thermal range between 250 to 450 °C. According to the temperature range for alteration (mean 350 °C), it seems copper that the mineralization have occurred between 350 to 450 °C.

Keywords: Chahar- Gonbad, pyrite, Morphology, Temperature