

## SEQUENCES OF CHALCOPYRITE ALTERATIONS IN THE ARDAKAN BARITE MINE, ARDAKAN, IRAN

<sup>1</sup>SHEKARIFARD, A., <sup>2</sup>RAHIMPOUR-BONAB, H., AND <sup>3</sup>ROOHSABAZ, J., <sup>1&2</sup>  
Dept. of Geology, University of Tehran, Tehran, Iran, <sup>3</sup>Dept. of Mine, University of  
Tehran, Tehran, Iran

Two types of copper ore minerals have been distinguished in the Ardakan Barite Mine in central Iran, which includes (1) primary ore minerals, mainly chalcopryrite and pyrite; (2) oxidized ore minerals, mainly secondary copper sulfides (e.g., covellite, yarrowite, anilite) and copper carbonates (malachite, azurite). Chalcopryrite is the main copper bearing mineral in these ore deposits. The process of chalcopryrite tarnishing developed along the joints, fractures and grain boundaries as films and veinlets. The tarnish color on the chalcopryrite varies from deep blue, pale blue, pink, yellow and dark gray. The tarnish phases on the chalcopryrite were studied with SEM - EDXA. Sequences of the chalcopryrite alterations by the continued oxidation are as following: chalcopryrite ( $\text{CuFeS}_2$ ), covellite ( $\text{CuS}$ ) - yarrowite ( $\text{Cu}_9\text{S}_8$ ) - spionkopite ( $\text{Cu}_{39}\text{S}_{28}$ ) - geerite ( $\text{Cu}_{1.6}\text{S}$ ) and anilite ( $\text{Cu}_{1.75}\text{S}$ ). The alteration of chalcopryrite to covellite results in a decrease of iron with simultaneous increase of copper. Subsequent alterations of covellite to anilite caused increase in CU/S ratio from 0.9 in covellite to 1.12 in yarrowite, to 1.45 in spionkopite, to 1.64 in geerite, and to 1.77 in anilite. The alterations of Ardakan Barite Mine chalcopryrite is due to galvanic interactions. The copper-bearing acid solutions neutralized by carbonate rocks (host rock) which resulted deposition of copper carbonates in the ore body.