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Geochemical characterization of acidic mine waters in Darrehzar copper deposit, Kerman province, Iran

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Darrehzar porphyry copper deposit is located in the south of Sar Cheshmeh copper mine. There are varieties of geological factors which control the composition of mine drainage waters. Surface samples were collected from the Darrehzar locality for chemical measurements. The measured quantities are: Cl-, Ca, Mg, Na, K, SO42-, Al. Cd, Co, Cr, Cu, Fe, Mn, Ni, Pb, Zn, As, Sb, Mo, HCO3-, EC, pH and Eh. Phyllic alteration has the highest influence on the production of acid mine drainage. Mineralogical studies and analysis of water samples indicate a good correlation between sulfide minerals and acid mine drainage. Analysis of water samples showed that samples with low pH values have high concentration of sulfate and heavy metals. Correlation coefficients between different quantities were calculated and binary diagram prepared. Heavy metals increase with a decrease in pH except for Mo. Sulfate and heavy metals are positively related in mine water. The high positive correlation between Fe and Mn with respect to heavy metals indicates their adsorption on Fe and Mn oxides and hydroxides.