

Genesis of the Changarzeh deposit (southern Natanz) in middle Triassic sedimentary sequence: A typical example of Pb±Ag Mississippi valley type deposit at Malayer-Esfahan metallogenic belt

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Recieved: 2020/10/4 Accepted: 2020/11/11

Abstract

Carbonate-hosted base metal deposits are an important source of the world lead and zinc resources in Iran and were formed in late Proterozoic to Cenozoic age. The Changarzeh Pb±Ag deposit with Middle Triassic faulted-dolostone, is located 75 km northeast Esfahan Province, southern part of the MEMB. Mineralization occurs as two hypogene (sulfide) and supergene (oxide, carbonate and silicate), orebodies. Sulfide mineralization with cavity filling, vein-veinlets and replacement textures is mainly composed of galena, sphalerite, pyrite and tetrahedrite-tennantite series. According to mineral chemistry data, FeS mol% content in sphalerites varies from 1.14 to 3.88 mol%, which corresponds to intermediate sulfidation state ($\text{Log}f_{\text{S}_2} \approx -13$). The Co/Ni ratio in pyrites varies from 0.12 and 0.25, which belong to sedimentary to hydrothermal fluids. The temperature and salinity values of fluid inclusions in sulfide mineralization of the Changarzeh deposit are closely related to the composition of FeCl₂-MgCl₂ basinal brines (combination of paleo-oceanic waters and trapped high-brine fluids in cavities of rocks), which mixed by meteoric water in final mineralization stage. Considering all the evidence such as tectonic setting, dolostone host rock, silicification and dolomitic alterations, simple sulfide ore mineral, lithological-structural controls, marine sulfates as the main source of sulfur and metals released from the lower sedimentary bedrock, it can be said that the Changarzeh deposit is most similar to the Mississippi Valley Type (MVT) deposits.

Keywords: Dolomitization alteration, Mineralization, Pb-Ag, Changarzeh