

Estaj manganese mineralization, an example of volcano - sedimentary type manganese mineralization in the south of West Sabzevar

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Abstract: Estaj manganese deposit is located close to the Estaj village, 40 km southwest of Sabzevar, in Central Iran and Sabzevar subzone. Based on field evidences and microscopic studies, the rock units of the study area are pyroxene hornblende tracy Andesite, crystallin andesitic tuff, pyroxen hornblende andesite, pyroxen andesite- basalt, chert and limestone. These rock units belong to Late Cretaceous and can be one of the geological evidences for the origin of volcano – sedimentary mineralization. Chemical and mineralogical analysis by XRF, ICP, XRD methods and microscopic studies were performed over Estaj manganese ores. The result of XRD analysis confirmed pyrolusite as the main Mn oxide but psilomelane was distinguished only by microscope. The Chemical analyses of Mn ore indicated the high values of Si (17.01 – 75.54 ppm), Ba (300 – 1965 ppm), Sr (200 – 844 ppm) and MnO/Fe₂O₃ (1.62 – 58.61) and low amounts of Zn (34 – 79 ppm), Co (2 – 16 ppm), Ni (2 – 10 ppm), U (20 – 71 ppm) and Th (2 – 5 ppm). The result of geochemical analysis is indicative of deposition of manganese solution along with silica due to physio -chemical changes of sea water and also reflects the submarine hydrothermal origin for this mineralization. Ore bodies form layer and lense within the pyroclastic rocks (andesitic green crystalline tuff and red tuff) and can be seen as strat form with host rocks. Also ore bodies form amygdaloidal with pyroxene andesite-basalt. The ore bodies has massive, dendritic, layer and spherulitic textures and the mineralogy is mainly pyrolusite, braunite and psilomelane. Wall rock alteration in foot wall consists mainly of chloritic, argillic and silicification. Estaj mineralization according to it's various characters such as volcano-sedimentary nature of the host sequence and the host rocks geometry, texture and structure and mineralogy, shows the most similarities to the volcano-sedimentary (exhalative –type) manganese deposits.

Keywords: *Manganese; volcano-sedimentary; Sabzevar; Estaj meaneralization.*

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