Mineralogy and REEs geochemistry of the Zaraj-Sou bauxite deposit, southwest of Ramsar, north Iran

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Abstract: The Zaraj-Sou bauxite deposit (southwest of Ramsar, Mazandaran Province, northern Iran) was developed as discontinuous stratified layers and/or lenses along the boundary between carbonate rocks of the Elika (Triassic) and shales and sandstones of the Shemshak (Lower Jurassic) formations. Diaspore, kaolinite, hematite, and anatase are the major mineral phases of the ores. Texturally, the bauxite ores have typical textures of clastic, rounded-grain, and nodular which are often accompanied by certain forms of concretions, ooids, and pisoids in restricted quantities. Concentration values of REEs within the ores in the selected profile vary from 149.97-348.10 ppm and the ratios of Eu/Eu* and Ce/Ce* are within the range of 0.75-1.04 and 0.64-1.28, respectively. Investigations showed that changes in the values of these parameters are controlled by degree of scavenging hematite. The calculation of mass changes of elements and the study of the trend of variation of elemental ratios in a selected profile across this deposit revealed that the distribution of REE in ores is a function of factors such as changes in pH of ore-making solutions, presence of carbonate bed rock as an active buffer, co-precipitation with metallic oxides, and fixation in neomorph mineral phases. Correlation coefficients among elements suggest that minerals such as hematite and secondary phosphates are the potential hosts for lanthanides in the studied ores.

Keywords: Bauxite; rare earth elements; host minerals; Zaraj-Sou; Iran.

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