

## Mineralogical and geochemical characteristics of the Siahrudbar bauxite deposit, Golestan Province, north of Iran

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**Abstract:** The Siahrudbar deposit is located about 25 km southwest of Aliabad-Katool city in the Golestan Province, north of Iran. This deposit lies between the Triassic limestone (Elika Formation) and Jurassic sandstone (Shemshak Formation). Mineralogical studies indicate the presence of major minerals such as diaspore, hematite, anatase, kaolinite, and chamosite accompanied by minor minerals such as boehmite, goethite, rutile, calcite, moscovite, clinoclar, quartz, and tridymite. Calculation of enrichment factor showed that the bauxitization processes at Siahrudbar were accompanied by enrichment of elements such as Al, Fe, Ti, V, Cr, Co, Ni, Ga, Th, U, Y, Zr, Ta, Nb, Hf, and REEs. While elements such as Si, Mg, Na, K, P, Ba and Rb were leached out of the profile and suffered depletion. Furthermore, elements like Ca, Mn, Sr and Cs experienced both partial leaching and fixation. Based on the results of geochemical studies, changes in pH and Eh of the weathering solutions, adsorption, presence of organic matter, function of carbonate bed rock as a geochemical barrier, existence in resistant minerals, and fixation in neomorph mineral phases played crucial role in distribution of the trace and rare earth elements in the studied ores. Consideration of the correlation coefficients among elements demonstrated that the neomorph phosphate minerals can be conceived as the potential host of rare earth elements.

**Keywords:** *Bauxite; Siahrudbar; Golestan province, trace and rare earth elements; Ce and Eu anomalies; Enrichment factor.*

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