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Investigation of major, trace and rare earth elements variations in Esfezar bentonite deposit, east of Birjand, South Khorasan Province

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Abstract: The Esfezar bentonite deposit is located 50 km east of Birjand, in south Khorasan Province and as a part of eastern boundary of lut Block. This deposit is a diagenetic bentonite type, because of its layering, existence of gypsum between bentonite layers, and expanded shape. Petrography and chemical analysis of host rocks in Esfezar bentonite deposit indicate that they are mainly of dacite and trachyandesite. X ray diffraction analysis shows that the main minerals of Esfezar bentonite deposit are Na-montmorilonite, Ca-Na montmorilonite, plagioclase, cristobalit, gypsum, illite, K feldspar and quartz. The loss and gain diagrams of bentonites compare with their volcanic host rocks show that the elements of Na , K , Ca and Al are lost, while the Si , Fe , Mg , Ti and S elements are gained. The lithophile elements such as Rb, Cs and Ba similar to K in bentonite samples are lost. Sr, as the same as Ca, has gained. Elements such as Cu, Ni, Cr, V and Ti, because of surface adsorption of montmorilonite, have increased and vanadium show more enrichment than other elements. REE pattern in bentonite samples from Esfezar deposit and host rocks are similar and LREE are more than HREE. It might be possible some reaction happened between volcanic rocks or glass with sea water resulting rapid coolness which results some elements such as Ca, Al, K, Na cleared, volcanic glasses are altered and bentonite formed by receiving Mg and Fe from sea water. Existing of silicon in that environment causes opal and crystobalite to be formed.

Keyword: *Bentonite; montmorilonite; diagenetic; ducite; trachyandesite.*

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