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Geochemistry of the rare earth elements in the Baba Ali skarn (north-west of Hamadan);A key for determining of mineralization conditions

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Abstract: The Baba Ali deposit is located about 39 km to the north west of Hamadan city. The syenitic pluton intruded and metamorphosed the diorite host rock producing the skarn deposit. Geochemical considerations indicate that the concentration values of rare earth elements in the syenite and diorite range from 35.4 to 560 ppm. Rare earth elements variation in syenitic, skarn and diorite rock are similar indicating the similar source of the REE. Eu and Ce anomalies show varying values within the range 0.29 -1.24 and 0.8-1.09, respectively. Positive Ce anomalies occurred in the ores of low REE content and negative Ce anomalies occurred in the ores of high REE content. The concordance of the values of CaO with those of Eu revealed that the degree of plagioclase alteration. The Eu anomaly decreases with decreasing intensity of alteration. The La/Y values (suitable parameter for determination of pH in the environment of ore formation) range from 0.37 to 2.89. REE mobility depends on changes in pH. As a whole, epidote has been enriched in REE contents and actinolites, magnitite, are depleted in REE. These REE signatures indicate that hydrothermal fluids responsible for epidote were mostly magmatic origin and for actinolite and phlogopite were magmatic origin with low REE concentration or meteoric water involved in formation of these minerals.

Keywords *: Baba Ali, Almoughlagh, syenite, skarn, magnetite, epidote*

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