Geochemistry and mass changes at the Mombi Bauxite Deposit, SW Iran

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Abstract: The Mombi bauxite deposit is located about 160Km northwest of Dehdasht in the Zagros Simply Folded Belt. The bauxite deposit exhibits an oolitic and pisolithic texture. It contains higher amount of boehmite than those of diasporite, hematite, kaolinite, and anatase. This study uses the geochemistry of immobile elements in order to calculate the mass changes that took place during weathering and bauxitization. The results reveal that elements such as Si, Fe, Mg, K, Ba, Sr and Zn are depleted, while Al, Zr, V, Cr, Ni, Ga, Y and LREEs indicate positive mass changes during the weathering and bauxitization processes. In addition, Nb, Hf, Ta, Rb, Cs, U and HREE exhibit little changes, suggesting relatively immobile feature. Inter elemental relationship analyses of the ores, by using R-mode factor analysis, revealed number of key findings: (i) some low solubility elements were concentrated in detrital zircon (Zr), in anatase (Ti), and possibly in boehmite, hematite and detrital minerals (Ga) during later stages of bauxitisation; (ii) Fe was concentrated during humid climatic conditions, whereas Al accumulated during dry conditions; (iii) similar and meaningful weightings for U and Th suggest that heavy minerals frequency would be locally important in controlling the uranium behavior; (iv) distributions of LREEs and HREEs are controlled by the stability of the carrier complexes of REEs and the existence of REE-bearing mineral phases; and (v) (La/Yb)n values suggest that little LREE/HREE fractionation occurred during bauxite formation at (La/Yb)n, ratio fluctuations may also be indicative of fluctuations of pH in soil solution.

Keywords: Geochemistry; R-mode Factor Analysis; Mass Changes; Karst Bauxite; Mombi.

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