

REE-Ion Adsorption Clay Type Deposit Characteristics in Kuantan's Weathered Granite Profiles

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Abstract

Kuantan district, Pahang is part of The Eastern Belt Granite of Peninsular Malaysia consist mainly of I-type granites. Three weathered granite profiles from Kuantan, were sampled and analyzed for their mineralogy and rare earth elements (REEs) characteristics. The I-type parent granites of Kuantan consist of quartz (29- 35 %), K-feldspar (23-30 %), plagioclase (18-28%), biotite (10%), hornblende (5-8 %) and 0.6-1.4 % accessory minerals (zircon, apatite, monazite-(Ce) and chlorite) respectively. The granite weathering profiles have been divided into three main horizons with increasing depth above the parent granite: 1) saprock horizon (slightly weathered); 2) saprolite horizon (highly weathered) and 3) topsoil (completely weathered with rich organic matters). The concentrations of REEs in the weathering profiles considered to be economic for ion adsorption clay type deposits with rule of thumb >500 ppm in 1 g of sample. In order to produce an exploration model for REEs in Peninsula Malaysia, the formation process of the different weathering horizons was investigated, and the REEs concentrations has been identified. All the soil samples show prominent positive Ce anomalies with lower REEs contents (64 – 107 ppm). In contrast, the saprolite horizon is a leached zone characterized by a negative Ce anomaly and elevated REEs contents. The negative Ce anomaly and REEs enrichment in the saprolite layer indicates immobilization of REE³⁺ by adsorption and distribution into secondary REEs minerals with REEs distribution agent such as clay minerals. The ion-adsorption (leached) fraction was enriched in light rare earth elements (LREE) with accounted for 80–90 % of the total REE content in the investigated saprolite and saprock samples

Keywords: Ce Anomaly; Ion adsorption clay; I-type weathering granites; Rare earth elements.