

Rare earth elements in core marine sediments of coastal East Malaysia by instrumental neutron activation analysis

ABSTRACT

A study was carried out on the concentration of REEs (Dy, Sm, Eu, Yb, Lu, La and Ce) that are present in the core marine sediments of East Malaysia from three locations at South China Sea and one location each at Sulu Sea and Sulawesi Sea. The sediment samples were collected at a depth of between 49 and 109 m, dried, and crushed to powdery form. The entire core sediments prepared for Instrumental Neutron Activation Analysis (INAA) were weighted approximately 0.0500 g to 0.1000 g for short irradiation and 0.1500 g to 0.2000 g for long irradiation. The samples were irradiated with a thermal neutron flux of $4.0 \times 10^{12} \text{ cm}^{-2} \text{ s}^{-1}$ in a TRIGA Mark II research reactor operated at 750 kW. Blank samples and standard reference materials SL-1 were also irradiated for calibration and quality control purposes. It was found that the concentration of REEs varies in the range from 0.11 to 36.84 mg/kg. The chondrite-normalized REEs for different stations suggest that all the REEs are from similar origins. There was no significant REEs contamination as the enrichment factors normalized for Fe fall in the range of 0.42–2.82.

Keyword: INAA; Rare earth elements; Enrichment factor; Core marine sediments; East Malaysia