

Exploration for Potential Sources of Rare Earth Elements in Sri Lanka

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The global demand for rare earth elements (REEs) has been skyrocketing lately due to their excessive usage in numerous high-technologies. Therefore, the current study explores the REE potential in different geological formations of Sri Lanka. Accordingly, REE geochemistry and mineralogy of granites at Massenna (n=10), Arangala (n=6), and Thonigala (n=16); Eppawala phosphate deposit (EPD) (n=20); Ratthota pegmatite (n=6); southwest beach placers (n=18); and Walave alluvial placers (n=20) were analysed by the Inductively-Coupled-Plasma Mass-Spectrometer (ICP-MS) and X-ray Diffractometer (XRD), respectively. Based on the results, only EPD (2676.0-6486.3 mg/kg), Arangala (1634.9-4031.6 mg/kg), and Massenna (65.3-2153.4 mg/kg) showed high total REE (TREE) contents, and they contained REE minerals, such as apatite, monazite, rinkite, mosandrite, and eudialyte. Currently, carbonatites and ion-adsorption clays are the dominant REE sources in the world, and commercial REE extractions are only focused on the minerals: bastnaesite, monazite, and xenotime. In this context, the EPD is the most potential REE source in Sri Lanka (0.46% REO), especially for light rare earth elements considering not only its high TREE content but also the carbonatitic origin and the mineralisation of apatite and monazite. However, the EPD should be further explored for mineralogy, composition, and impurities to assess its viability as a future REE source in Sri Lanka.

Keywords: Eppawala phosphate deposit, Geochemistry, Rare earth exploration, Rare earth mineralogy

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