Exploration of Potential Sources for Extraction of Rare Earth Elements (REEs) in Sri Lanka

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Abstract

Rare Earth Elements (REEs) are a set of seventeen chemically similar elements in the periodic table, including fifteen metallic elements of the lanthanide series, Yttrium and Scandium. REEs are significantly used in numerous high-tech applications in sectors, such as metallurgy, military, petroleum and agriculture. Therefore, REEs are considered as critical and strategic elements in the industrial revolution towards a green economy in the future. However, China is the world's largest producer, consumer and exporter of REEs, currently controlling more than 90% of the global supply. According to the recent Chinese industrial policies, they have reduced their REEs export in 2010 in order to build up a REEs stockpile for future domestic uses. As a result, currently, REEs supply is at a risk of disrupting in the world market, which has created many concerns among REEs stakeholders. Thus, worldwide explorations for REEs are carried out to prospect new potential sources. In this context, Sri Lanka is a country, which has geological settings implying the presence of probable primary REEs sources (e.g. apatite in carbonatites, granitic and synitic pegmatites, granitic rocks and hydrothermal veins) and secondary REEs sources (e.g. mineral sand, gem gravel, stream sediments, clay deposits and laterite deposits). According to previous studies in Sri Lanka, considerable contents of REEs have already been identified in a few locations of the country, such as well-known monazite deposit in Pulmoddai containing Cerium (28%), Lanthanum (15%), Neodymium (10%), Promethium (3%), Samarium (2%), Gadolinium (2%) and Yttrium (1%).Therefore, aforesaid potential sources will be explored as a worthwhile approach to address the impending REEs problems in both local and global context. However, available resources on land will not be enough to cater the future demand, and therefore, offshore sources, including upwelling areas in southern coast of Sri Lanka are also needed to be investigated as a promising solution for future REEs scarcity. However, effectiveness of extraction of REEs depends on the quality of the resources and the degree to which the resources have been explored. Based on the REE concentrations in aforesaid sources, novel extraction technologies will be developed to get the maximum benefits to the Sri Lankan mineral industry and ultimately to the national economy of the country.

Keywords: Rare Earth Elements (REEs), Sri Lanka, Rare earth sources, Rare earth exploration, Rare earth demand

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