

Rare Earth Elements Resources Potential in Granite Areas of Northern Thailand

Akira Imai[1]; Takafumi Sueoka[2]; Kenzo Sanematsu[3]; Jarupong Boosayasak[4]

[1] Earth Resource Engineering, Kyushu Univ.; [2] Kyushu Univ.; [3] AIST; [4] Chulalongkorn Univ.

Rare earth elements (REE) are essential resources for pioneering industry and vehicle industry. Currently China occupies over 90 % of REE production in the world. Especially heavy REE (HREE) are produced from ion-adsorption type deposits such as Longnan and Xunwu deposits located in southern China. Comparing with the other REE deposits, the ore grade of ion-adsorption type deposits is not high, but REE are easily extracted in these deposits. In addition, this type of deposits is not enriched in heavy minerals containing radioactive elements.

Since thick weathered crusts are well developed due to much rainfall and high temperature annually in Thailand, ion-adsorption type REE mineralization is expected. In this study, we surveyed their granite areas in northern Thailand where the Triassic S-type biotite granites are widely distributed, and analyzed chemical compositions of the granite samples in order to evaluate a potential of REE resources. Totally 153 weathered crust samples and 17 granite samples were collected for chemical analyses. Major and trace elements were determined by X-ray Fluorescence Spectrometry (XRF) and Inductively Coupled Plasma Mass Spectrometry (ICP-MS).

The results indicate that the mean total REE content (TREE) of fresh granites was 228 ppm with the maximum of 415 ppm. On the other hand, the mean TREE of weathered granites was 273 ppm with the maximum of 974 ppm. The thickness of weathered crust varies from 2 to 15 meters and it is generally well developed. However, granite plutons which indicate high TREE are unlikely to show well-developed weathered crusts. The thickness of the weathered crust of The Mae Sariang Pluton is about 12 meters and it is widely distributed in the range of 100 km times 10 km. TREE of weathered granite varies 346 to 543 ppm whereas TREE of the parent rock is 415 ppm, which is not highly concentrated. However, it is the most prospective area for REE resources in northern Thailand if ion-adsorption type REE mineralization is identified.