Comparison of REE tetrad effect using ID-ICP-QMS, conventional ICP-QMS and LA-ICP-QMS Methods

SEUNG-GU LEE[1], TSUYOSHI TANAKA[2], YOSHIYAKI KON[3], TAKAFUMI HIRATA[4]

[1]KIGAM, Daejeon 34132, Korea, sgl@kigam.re.kr
[2]Nagoya University, Nagoya 464-8601, Japan, tanakat@nagoya-u.jp
[3]AIST, Ibaraki 305-8567, Japan, yoshoyaki-kon@aist.go.jp
[4]University of Tokyo, Tokyo 113-0033, Japan, hrt1@eqchem.s.u-tokyo.ac.jp

Chondrite-normalized REE pattern based on the REE abundance in the terrestrial and extra-terrestrial materials have been used as one of the poweful tools for geochemical and cosmochemical processes. And, the REE tetrad effect with large negative Eu anomaly is one of the representatve enigma of the REE geochemistry that was not completely solved in the field of REE geochemistry. High quality data for REE concentration is prerequsite for studying REE tetrad effect from the geological sample.

In this paper, we will report new technique using isotope dilution(ID)-ICP-MS for precise determination of REE abundance in the granite with REE tetrad effect. and then, compared it with conventional ICP-MS and laser ablation ICP-MS data. The isotope spikes used in this study were ^{138}La, ^{142}Ce, ^{145}Nd, ^{149}Sm, ^{151}Eu, ^{157}Gd, ^{163}Dy, ^{167}Er, ^{171}Yb, and ^{176}Lu.

Our results (Fig. 1) showed that all REE data corresponded well within 5% error range. In addition, we also could confirm that the REE tetrad effect from highly fractionated-granite is one of the specific geochemical phenomena duirng granitic magma evolution.

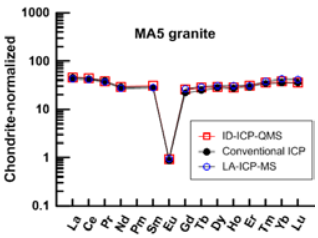

Figure 1. Chondrte-normalized pattern of rare earth element from a highly fractionated granite