Goldschmidt 2024 Abstract
https://doi.org/10.46247/gold2024.23932

Ba oxide and Gd isobar effects on Eu isotope ratio measurement using MC-ICP-MS with a Sm internal standard

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Rare earth elements and their isotope geochemistry become an important indicator in understanding evolution process of the Earth or planets. Lee and Tanaka [1, 2] established an experimental method to accurately and precisely measure the Eu isotope ratio using MC-ICP-MS. And, Lee and Tanaka [3] also reported that the Eu isotope fractionation exists in highly differentiated igneous rocks. In this regard, Hu et al. [4] and Schauble [5], based on experimental results using Nuclear Resonant Inelastic X-ray Scattering(NRIXS) and Mössbauer Spectroscopy, suggested that Eu isotope fractionation could occur due to reaction with hydrothermal solution or feldspar crystallization during magma differentiation. Recently, Nicol et al. [6] also reported the method for precisely measuring Eu isotope ratio, and mentioned that the Eu isotope ratio change in highly differentiated rocks was not observed. However, Lee et al. [7] found that there existed a correlation between the Eu anomaly due to feldspar crystallization in the chondrite-normalized REE pattern and the Eu isotope fractionation in igneous rocks. These recent reports indicate that the experimental method for accurately measuring Eu isotope ratios is very important in order to correctly indicate the existence and geochemical significance of Eu isotope fractionation. Therefore, in this work, I re-checked problems (isobar and oxide interference) that might occur unknowingly when measuring isotope ratios with MC-ICP-MS to determine the presence or absence of Eu isotope fractionation in natural samples. In addition, I will discuss an optimal Eu fractional purification including recovery rate prior to MC-ICP-MS to clearly reveal the existence of Eu isotope fractionation.

[1] Lee and Tanaka (2019), *Spectrochim. Acta Part B* 156, 42-50. [2] Lee and Tanaka (2021a), *Inter. Jour. Mass Spec.* 469, 116668. [3] Lee and Tanaka (2021b), *Geochem. Jour.* 55, e9-e17. [4] Hu et al. (2023), *Geochim. Comochim. Acta* 348, 323-339. [5] Schauble (2023) *Geochem. Jour*. 57/4, 118-133. [6] Nicol et al. (2023), *Jour. Anal. Atom. Spec*. 38, 1261-1274. [7] Lee et al. (2023), Geosci. Jour., 27/3, 271-284.