

Magnesium isotope analysis of environmental samples

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Stable isotopes (SI) is utilized as a fingerprint of an element to trace its behavior in the environment.

Magnesium is a major element of terrestrial rocks and widely distributed throughout the lithosphere and biosphere. The element has been utilized to provide valuable information about geological, biological, and atmospheric processes. With the advent of multi-collector ICP-MS, it is possible to measure precise value of $^{25}\text{Mg}/^{24}\text{Mg}$ and $^{26}\text{Mg}/^{24}\text{Mg}$ in Mg solution.

To promote the environmental SI fingerprint, RIHN is desired to determine the isotope ratios of magnesium in an environmental sample with high precision and accuracy, rapidness, and convenience. Further, as biota, soil, and rock is composed of different components (bone, meat, mineral, etc.), whose magnesium concentrations and isotope ratios differ one another. Analytical precision affected sensitively by matrix component of Mg solution according to various sample processing should be evaluated.

Here, I report a simple and efficient one-step separation method and the resulting matrix component of various environmental standards samples. Furthermore, an analytical method was tested using cool plasma and hot plasma-middle resolution by environmental standards from the National Metrology Institute of Japan (NMIJ) and international rock standards (AIST and USGS) with high-resolution multi-collector ICP-MS of NEPTUNE (Thermo Fisher Scientific K. K.).

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