

Chemical separation and isotope analysis for environmental studies using standards samples

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Stable Isotopes (SI), especially Sr-Nd-Pb isotopes, had been successfully applied to the biogeochemical tracer in environmental research. To promote the biochemical isotope study, we improved a sequential separation of Sr, Pb, and Nd with Sr speciation resin and ion exchange resin for biota standards from AIST and NIST. These new steps reduce the total processing time, the amount of acid reagent solution, and evaporation steps. The new methods show higher recovery rate with cleaner samples than the older methods.

We determined the stable isotope ratios of Sr, Nd, and Pb for the samples using thermal ionization mass spectrometer of TRITON and high-resolution multi-collector ICP-MS of NEPTUNE (ThermoFisher Scientific Inc.). Preliminary results using TRITON showed that the external variation of $^{87}\text{Sr}/^{86}\text{Sr}$ ratios falls in a narrow range of 10 ppm, this variation being two times as the internal one. This difference between the external and internal variation is also observed when NEPTUNE was used. We suggest that this difference is ascribed to the measurement stage by mass-spectrometry rather than sample heterogeneity and sampling procedure.