

## Accurate Determination of Cadmium Isotopic Composition of Solution Standards and Geological Reference Materials by MC-ICP-MS

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Precise and accurate analysis of stable Cd isotope ratios in geological materials is crucial to application of Cd isotopes to environmental and other fields. We use AGMP-1M anion exchange resin to purify Cd in geological samples after high-temperature PTFE bomb dissolution. The stable Cd isotope ratios were measured at both *Neptune plus* multicollector inductively coupled plasma mass spectrometry (MC-ICP-MS) at the State Key Laboratory of Geological Processes Mineral and Resources, China University of Geosciences (Beijing) and *Nu Plasma II* MC-ICP-MS at State Key Lab of Environmental Geochemistry, Institute of Geochemistry, the Chinese Academy of Sciences at low resolution mode. Both sample-standard bracketing (SSB) and double spike techniques (DS) were utilized for mass bias calibration. The interference peaks over Cd isotopes can be separated completely. Cd recovery was higher than 98%, and the total procedural blank was less than 100 pg compared with the total amount of Cd in samples (> 200 ng). Samples with high Zn concentration, such as sphalerite, can be completely purified by one step column. Cadmium isotopic data of solution standards and geological reference materials (BAM 1012 Cd, Spex Cd, Alfa Aesar Cd, GSB Cd, GSS-1, GXR-1, GXR-2, GSD-12, NIST SRM 2711 and BCR 176) are reported relative to an international Cd solution (NIST SRM 3108). The Cd isotopic compositions (SSB) of solution standards and geological reference materials obtained during different analytical sessions are consistent with the values measured by double-spike method. The long-term external reproducibility was evaluated to be  $\pm 0.10\%$  (2SD) for  $^{114}\text{Cd}/^{110}\text{Cd}$  ratios based on replicated measurements of reference solutions and natural samples over one year. Spex Cd (Lot: CL8-71CDY) was used as a secondary reference material for Cd isotopic measurement and we obtained a  $\delta^{114}\text{Cd}/^{110}\text{Cd}$  value of  $-2.13 \pm 0.10\%$  (2SD). The soil NIST SRM 2711 has a significantly heavier isotopic composition than other soil reference materials, GXR-1, GXR-2 and GSS-1.