A convenient method of Lithium purification and its isotope measurement on geological standard materials by MC-ICP-MS

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A single-column method has been developed to purify Lithium (Li) from other matrix elements via AGMP50 cation-exchange resin in this study and high-precision Li isotope measurement were carried out on multi-collector inductively coupled plasma mass spectrometry (MC-ICPMS). Following above technique, Li can be separated from Al and high field strength elements (HFSEs), such as Ti, Zr and Hf et al through elution by a mix acid of 0.2N HCl+0.3N HF , then elution by 0.73 N HCl, after this, Li can be collected by using 0.73 N HCL as elution. This method enables us to collect the Li solution with recovery close to 100%, moreover, the possible matrix elements, such as Na and Ca, can be removed effectively. Compared with other purification methods, this method achieves low matrix interference (e.g., Na/Li<<1 and Ca/Li<<1 via single-column for rock and seawater, Ca/Li＜2 for carbonate via dual-column) and only consumes a small portion of elution volume and takes much short elution time (~5h) to purify Li of rock and seawater samples and the total operating procedure is completed by ~0.5 days. Using above method, we report high-precision Li isotope compositions of various geological reference materials including igneous rocks (JG-2, JR-2, BCR-2, JB-2, BHVO-2, AGV-2 and JA-2), seawater (IAPSO) and carbonate (JCp-1) here. The reproducibility of the most reference materials in this study is better than 0.36‰ (2SD) and the Li isotope compositions are consistent with the previously published results within analytical error, supporting that the method reported in this study is powerful and can be conveniently used to measure Li isotopes in all kinds of geological samples.