# Sn stable isotope analysis: A new method for Sn separation for geological materials

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With ten stable isotopes, Sn is the element with the highest number of stable isotopes. It allows for the study of mass-dependent and mass-independent isotope fractionation in different terrestrial and planetary materials. Recent Sn isotope studies have mostly focused on the provenance of terrestrial cassiterites ($SnO_2$) [1] [2]. However, Sn isotopes also have the potential to elucidate stable isotope fractionation associated with magmatic differentiation and planetary moderately volatile element loss.

Here we report a new technique for separating Sn efficiently from its sample matrix, which can also be applied to samples with low Sn concentrations. The Sn separation from the sample matrix is achieved using a two-stage liquid-chromatography. The Bio-Rad AG1-X8 (200-400 mesh) resin in the first step removes most matrix elements and in the second stage, Eichrom Tru resin (100-150$\mu$m) separates Sn from the remaining Zn, Cd and In. By using a two-step approach, larger sample sizes (up to 0.5g) can be efficiently separated. The yields and the efficiency of the separation were tested on the basalt BHVO-2 (Hawaiian basalt) and two Icelandic basalts.

Isotope measurements were performed on an MC-ICPMS (NU Plasma II, Nu Instruments) using a setup, which allows for the simultaneous detection of all Sn isotopes and the monitoring of isobaric interferences of Cd, Te and Xe. This is desirable for cosmochemical investigations. Internally normalised to $^{116}Sn/^{120}Sn$ = 0.4460 [3], the instrumental precision for the 100 ppb Sn standard (NIST 3161a) for the $^{118}Sn/^{120}Sn$ ratio is 10 ppm (2SD, n = 30) and the measured ratio is in good agreement with values reported by Lee et al. [4]. First tests using the standard-sample bracketing method reveal that an instrumental precision of ± 0.063‰ (2SD, n = 24) on $\delta^{116}Sn/^{120}Sn$ for a 100 ppb Sn standard solution can be achieved. Stable isotope data for different basalts and samples from lake sediments with high concentrations of inorganic Sn will be presented at the conference.

[1] Haustein et al. (2010) *ARCM* **52**(5), 816 [2] Yamazaki et al. (2013) *GeochemJ* **47**(1), 21. [3] Devillers et al. (1983) *IJMS* **50**(1-2), 205. [4] Lee et al. (1995) *IJMS* **146-147**, 35.