Selenium and tellurium abundances in mafic and ultramafic rock reference samples by ID-ICP-MS

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The abundance and geochemical behavior of Se and Te in the Earth's mantle and in mantle derived melts is little constrained, mainly because of analytical difficulties. Here, we present a method that allows for the accurate and precise determination of Te and Se at low abundances.

To this end, isotope dilution, hydride generation and thiol cellulose powder (TCP) separation [1] were combined. The use of isotope dilution allows for some analyte loss during sample preparation without loss in accuracy. For chemical separation, the sample solution was loaded onto thiol cellulose powder in HCl and Se was first eluted using ammonium hydroxide, followed by Te elution in concentrated HNO_3. Hydride generation boosted the ion signal intensities for Se and Te by about 15-fold (normalized to uptake rate). A Scott-type double-pass glass spray chamber was used as gas liquid separator [2] and the reductant ($NaBH_4$) and sample solution were simply fed through the drain into the spray chamber via T and Y connectors. For hydride generation, Se had to be reoxidized to selenite. This observation, together with the elution of Se by ammonium hydroxide is consistent with the formation of selenotrisulfide by the reaction of selenite with the thiol groups of the TCP as previously suggested ([1] and references therein). Se and Te isotope ratios were determined using sector-field ICP-MS in low resolution mode. The instrumental background was determined right before sample analysis and subtracted.

Analyses of two basalts (BHVO-2 and BE-N) and two ultramafic samples (serpentinite UB-N and dunite DTS-2b) yielded between 5.8 and 166 ng/g Se. The Se data from two repeated digestions and separations reproduced between 1 and 7% (2 sd). Se data for UB-N and BE-N agrees with published data [3, 4] to within 15%. Te concentrations were between 0.84 and 9.3 ng/g (DTS-2b was not analyzed). One repeated digestion and separation from BHVO-2 yielded indistinguishable Te concentrations.

[1] Elwaer & Hintelmann (2008) *JAAS* **23**, 733-743. [2] Zhang & Combs (1996) *JAAS* **11**, 1043-1048. [3] Savard *et al*. (2006) *Talanta* **70**, 566-571. [4] Terashima & Imai (2006) *Geost. Newslett.* **24**, 83-86.

Zircon Lu-Hf isotopic constraints on the suture boundary of the eastern South China Block

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The Jianshan-Shaoxing (JSFZ) Fault Zone in Zhejiang Province has been proposed to represent the suture between the Yangtze and Cathaysia blocks in South China. Limited Neoproterozoic outcrops and similar Sr and Nd isotopic data across the fault zone do not show distinctive characteristics for the two separate blocks. Thirteen Cretaceous granitic bodies within the fault zone, 6 and 7 from the NW and SE sides of the fault zone have been collected for this study. These samples have compositions of diorites to granites (SiO_2 = 56.2 to 76.6 wt.%). In-situ zircon U-Pb and Hf isotopic compositions have been analyzed. These granitoids yielded U-Pb ages from 87 to 134 Ma, and show systematic differences in Hf isotopic compositions (εHf(t) = 6.67 to -7.01 in the NW side vs 1.91 to -12.63 in the SE side, and T_{DM}^{C} = 0.52 to 1.48 Ga in the NW side vs 0.58 to 2.85 Ga in the SE side). The T_{DM}^{C} data from NW side shows two peaks at 876 and 1170 Ma respectively, whereas those for the SE side show a single peak at 1135 Ma. The Hf isotopic disparity for the two sides may indicate the different basement compositions for the Yangtze and Cathaysia blocks. The available geological data indicate that the Neoproterozoic magmatic activities are important for the Yangtze Block, possibly due to the break-up of the Rodinia supercontinent, but such activities are weak for the Cathaysia Block. This study shows that the Neoproterozoic juvenile materials are important component of the eastern Yangtze basement, but the Cathaysia basement is mainly made up of Mesoproterozoic materials. Our data may also imply that the two continental blocks were away from each other in the Neoproterozoic. Relatively wide range distribution of T_{DM}^{C} (820 to 900 Ma) from NW side and lack of 800 to 900 Ma records from SE side also suggests that the Cathaysia block is underneath the JSFZ, implying a northward subduction of the Cathaysia Block.

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