

Please ensure that your abstract fits into one column on one page and complies with the *Instructions to Authors* available from the Abstract Submission web page.

Evaluation of potential standards for oxygen isotope microanalysis

A. THOMEN¹, K. NAGASHIMA¹, C. COUAPEL², M. SONZOGNI², A. ALEXANDRE², G. R. HUSS¹, A. N. KROT¹

¹HIGP, University of Hawai'i at Mānoa, 1680 East-West, Honolulu, HI, 96822, USA (authomen@higp.hawaii.edu)
²CEREGE, Eurôpole Méditerranéen de l'Arbois, Avenue Louis Philibert, BP 80, 13545, Aix En Provence, France

Asteroidal metasomatism on CV chondrite parent body produced a large variety of relatively fine-grained (10-20 μm) secondary phases, including andradite, hedenbergite, grossular, Na-rich melilite, nepheline, sodalite, and wollastonite [1]. Accurate oxygen-isotope compositions of these minerals measured with SIMS can provide important constraints on physico-chemical conditions of the metasomatic alteration, such as temperature [2]. Oxygen-isotope analyses with SIMS require matrix-matched standards, which are largely absent for the secondary phases. To establish O-isotope standards for these minerals, we prepared a number of natural silicates (anorthite, andradite, augite, melilite, nepheline, sodalite, wollastonite) and oxides (sapphire, spinel, hibonite).

Major element compositions for each mineral are homogeneous within analytical uncertainty of EPMA. Millimeter-scale $\delta^{18}\text{O}$ homogeneity of the minerals was investigated with the Cameca ims-1280 SIMS at Univ. of Hawai'i. From 12 to 25 measurements per mineral were made: 4-6 spots per group and groups were separated by 1.5 to 3 mm. Most of the minerals show reproducibility of ~ 0.2 - 0.6‰ (2SD), comparable to the daily reproducibility on San Carlos olivine measurements. Hibonite and wollastonite had slightly larger $\delta^{18}\text{O}$ variations of ~ 0.7 and $\sim 0.9\text{‰}$, respectively. Bulk O-isotope compositions of the minerals were measured with laser-fluorination mass spectrometry at CEREGE, France [3]. $\delta^{18}\text{O}$ values of duplicate analyses per mineral (except for andradite and sodalite) are consistent each other within a reproducibility of internal quartz standard measurements ($\sim 0.4\text{‰}$, 2SD). Two measurements of the wollastonite were different by $\sim 0.6\text{‰}$, suggesting possible $\delta^{18}\text{O}$ heterogeneity.

While more work may be necessary for andradite, sodalite, and wollastonite; most of the minerals appear to be homogeneous in chemical and O-isotope compositions and thus could be suitable for O-isotope microanalysis with SIMS. More details including $\delta^{18}\text{O}$ values of the minerals will be given at the meeting.

[1] Brearley & Krot, in *Lecture Notes in Earth System Sciences*, 659-789, 2012. [2] Choi *et al.*, MPAS, 1239-1248,

**This abstract is too long to be accepted for publication.
Please revise it so that it fits into the column on one
page.**

2000. [3] Alexandre *et al.*, GCA, 70, 2827–2835,
2006.