

# Lithium and boron isotope analysis of whole-rock nano-particle pressed powder tablets by LA-MC-ICP-MS

PETRUS LE ROUX<sup>1\*</sup>, DIETER GARBE-SCHÖNBERG<sup>2</sup> AND KERRY GRAY<sup>1</sup>

<sup>1</sup>Department of Geological Sciences, University of Cape Town, Rondebosch, South Africa petrus.leroux@uct.ac.za kerryn.gray@uct.ac.za

<sup>2</sup>CAU Kiel University, Institute of Geosciences, Kiel, Germany dgs@gpi.uni-kiel.de

The ability to obtaining reliable lithium and/or boron isotope compositions of whole rock samples without dissolution and elemental separation chemistry would make these isotope systems significantly more accessible in hardrock geoscience research.

Here we evaluate a new method to obtain such Li and B isotope compositions through the processing of whole rock samples to yield nano-particle pressed powder tablets [1] suitable for LA-MC-ICP-MS analysis. A selection of reference materials (BIR-1, BHVO-2, UB-N, and SCOL) spanning a large range in Li and B concentrations and isotope compositions (Li: 1.6-27ppm, -3 to 4.9‰  $\delta^7\text{Li}$ ; B: 0.3-140ppm, -0.7 to 13.1‰  $\delta^{11}\text{B}$ ) were prepared as pressed tablets. These were analysed by LA-MC-ICP-MS, using a NewWave solid-state UP193 coupled to a NuPlasma HR, for Li and B isotope compositions. Instrumental protocols build on previous success with similar analysis of natural or synthetic glass samples [2, 3], but here using 100 $\mu\text{m}$  spot analyses and not trenches.

Preliminary results indicate sufficient sensitivity (0.3-0.6V total B) for meaningful B isotope analysis using faraday detectors. These nano-particle pressed powder tablets show B isotopic homogeneity at the external 2 $\sigma$  reproducibility level of this method ( $\pm 0.2$ -0.5‰). Using BHVO-2 as bracketing standard, geologically meaningful results are obtained for BIR-1 ( $-1.11 \pm 0.68$  ‰  $\delta^{11}\text{B}$ ), but at present not for UB-N.

Results of the evaluation of these nano-particle pressed powder tablets for similar Li isotope analysis by LA-MC-ICP-MS will be presented.

[1] Garbe-Schönberg & Müller (2014), *J. Anal. At. Spectrom.* **29**, 990-1000 [2] Le Roux (2010), *J. Anal. At. Spectrom.* **25**, 1033-1038 [3] Le Roux, Shirey, Benton, Hauri & Mock (2004), *Chem. Geol.* **203**, 123-138