

U-Pb baddeleyite ages by SF-LA-ICP-MS

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Given SiO₂ undersaturated conditions of baddeleyite (ZrO₂) crystallization, it has been considered a key geochronometer for crystallization and emplacement of rocks formed under this condition (*e.g.* mafic-ultramafic). Here we report the implementation of the SF-LA-ICP-MS routine for U-Pb age determination in baddeleyite at the Isotopic Geology Laboratory-GI-UNICAMP.

The separation processes of baddeleyite is labourious and time-consuming comprising crushing, milling and density separation under water-shaking table, that we adapt from [1]. After that, the baddeleyite grains were handpicked under binocular microscope, mounted in epoxy resin and carefully polished to a flat surface; CL images were taken under SEM/Gatan Chroma CL detector. In order to achieve the ages, we measured masses ²⁰²Hg, ²⁰⁴Pb, ²⁰⁶Pb, ²⁰⁷Pb, ²⁰⁸Pb, ²³²Th, ²³⁵U and ²³⁸U using the LA system Photon Machines Excite .193 coupled to a SF-ICP-MS Element XR. Laser frequency was set up at 10 Hz, fluence of 9.45 J.cm⁻² and two spot sizes (25 and 35 μm) were tested. The ablation time was 60 s (20s-local gas blank). Iolite 2.5 (DRS_Vizualage) was used to data reduction offline. Kovdor [2] and Phalaborwa [3] baddeleyites were used as primary and secondary reference materials, respectively.

The tested spot sizes, revealed that the second is more effective recovering the Pb isotopes. Considering the uncertainties, our ²⁰⁶Pb/²³⁸U mean weighted age of 375 ± 5 Ma for Kovdor [2] match the ages of the literature. On the other hand, Phalaborwa [3] yielded a slightly younger ²⁰⁶Pb/²³⁸U mean weighted age 1957 ± 56 Ma that we attribute either to inhomogeneity or to the calibration.

In order to apply the routine, we studied four samples of alkaline rocks from southeastern Brazil, Cananéia syenite (TJCNN-9) and Jacupiranga carbonatite (TJJAC-M2, TJJAC-M4 and TJJACP-1B), which yielded ²⁰⁶Pb/²³⁸U mean weighted age between 74 ± 5 Ma and 120±3 Ma. These are more robust ages compared to previous Rb/Sr and Ar/Ar, permitting more consistence to the timing of southeast Brazilian alkaline magmatism [4, 5]. Nevertheless, to enlarge the knowledge of the rocks of this region more samples are being prepared for baddeleyite geochronology.

[1] Söderlund & Johansson,(2002). *Geochem. Geophys. Geosys.*, **3** (2), 1-7. [2] Rodionov *et al.*, (2012). *Gond. Reser.* **21**, 728-744. [3] Xie *et al.* (2008). *Chin. Sci. Bull.* **53**, 1565-1573. [4] . [4] Spinelli, (2007). *PhD thesis*. [5] Roden *et al.* (1985) *The J. of Geol.*, **93** (2), 212-220.

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