Characterization of zircon, monazite, apatite and xenotime reference materials via high-precision U-Pb LA-MC-ICP-MS

CRISTIANO LANA[1] ANA ALKMIM [1] ANTONIO C JARDIM

[1] *Applied Isotope Research Group, DEGEO/UFOP, Campus Universitário Morro do Cruzeiro s/n, 35400-000 Ouro Preto – MG, Brasil*

[2] *SENS – Advanced Mass Spectrometry, Abelardo Vergueiro Cesar, 555 – Vila Alexandria, São Paulo – SP, 04635-080*

While several development research have focused on the ever increasing spatial resolution of the U-Pb LA-MC-ICP-MS method [1], comparatively fewer experiments have explored the robustness and stability of multi-collector instruments for high-precision geochronology [2,3]. Here, we report on the precision and accuracy of Pb_c corrected, U-Pb ages obtained by LA-MC-ICP-MS, and discuss the homogeneity of potential zircon, apatite, monazite and xenotime reference materials for distribution. Experiments for enhanced sensitivity and stability were done over a period of 16 months, and allowed determination of Pb/U and Pb/Pb apparent (single-spot) ages with uncertainties of 0.3 to 1 % (2s). Short and long-term reproducibility of the $^{206}Pb/^{238}U$, $^{207}Pb/^{235}U$ and $^{207}Pb/^{206}Pb$ ratios were assessed based on a number of reference materials including, GJ-1 (96 analyses), M125 (96 analyses), Temora (34 analyses), 91500 (29 analyses), FC-1 (17 analyses), BB (121 analyses), Peixe (42 analyses) and Plešovice (133 analyses). Homogeneity tests were done in several zircon megacrysts from the Rio do Peixe (Brazil) and Hatnapura (Sry Lanka), monazite crystals from Bahia (Brazil), xenotime crystals from Datas (Brazil) and gem-quality apatite from Itapira and Parnaiba (Brazil). LA-MC-ICP-MS results showed that a number of the megacrysts analyzed constitute suitable reference materials for LA-ICP-MS analyses. Individual fragments have only minor U-Pb age variation that is only detectable by ID-TIMS analysis and is within uncertainty of the age precision obtained with LA-ICP-MS methodology (ca. 1-2%, 2SD).

[1] Cottle et al. (2012) *Chem Geol*, **345**, 136-147 [2] Santos et al. (2017) *Geos Resear*, *in press* [3] Kylander-Clark et al. (2013) *Chem Geol*, **345**, 99–112