

## A Potential New Zircon Reference Material for Micro-beam Analysis

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In this study, we introduce natural zircon SA01 as potential new working reference materials for the micro-beam analysis of U-Pb geochronology, O and Hf isotope geochemistry. The SA01 zircon megacrysts were found to be fairly homogeneous in U-Pb age, O and Hf isotopes based on large numbers of measurements by laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS) and secondary ion mass spectrometry (SIMS).

Zircon SA01 has TIMS-determined mean  $^{206}\text{Pb}/^{238}\text{U}$  age of  $535.73 \pm 0.33\text{Ma}$  (uncertainty quoted at the 95% confidence level), the best reference values for SA01 zircon. Returned results of assessment by SIMS and LA-ICP-MS from individual crystals are within uncertainty equivalent to the TIMS ages. The  $\delta^{18}\text{O}$  value determined by laser fluorination is  $6.17 \pm 0.38\text{‰}$  VSMOW (2s), and the mean  $^{176}\text{Hf} / ^{177}\text{Hf}$  ratio determined by solution MC-ICP-MS is  $0.282292 \pm 0.000003$  (2s), which are in good agreement with the statistical mean of micro-beam analysis. The SIMS-determined  $\delta^7\text{Li}$  value ranged from  $-5.49$  to  $+7.94\text{‰}$ , making the SA01 zircons unsuitable as a lithium isotope determination reference material for calibration of unknown samples by micro-beam analysis.

SA01 are stored in the MC-ICP-MS laboratory at the Institute of Geology and Geophysics, Chinese Academy of Science in Beijing, and are available on request from the lead author of this article.

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