

## Vaporization studies on laser-generated aerosols as used in LA-ICPMS

DETLEF GÜNTHER<sup>1\*</sup>, LUCA FLAMIGNI<sup>1</sup>, JOACHIM KOCH<sup>1</sup>,  
OLGA BOROVINSKAYA<sup>1</sup>, BODO HATTENDORF<sup>1</sup>,  
AND MARTIN TANNER

<sup>1</sup>ETH Zurich, Department of Chemistry and Applied  
Biosciences, Laboratory of Inorganic Chemistry

<sup>2</sup>Tofwerk AG, Uttigenstrasse 22, Thun, Switzerland

(\*correspondence: guenther@inorg.chem.ethz.ch)

Non-matrix matched calibration is one of the most widely applied strategies for quantification in laser ablation-inductively coupled plasma mass spectrometry. It relies on the assumption that sensitivities obtained for the elements in standards and samples are identical in relation to the internal standards used. Based on the observation that vaporization of the elements inside the ICP was found to be significantly affected by the matrix composition, various imaging techniques were applied to study vaporization of laser-generated aerosols within the ICP for different matrices. The results obtained indicate that vaporization points of particles in the plasma are species dependent (e.g. CaO, Ca, Na<sub>2</sub>O, Na). Therefore, the efficiency of sampling different elements is affected by their respective diffusion rates in the plasma. It will also be shown that optimization of gas flow, ICP Rf-power adjustment or optimization of the sampling position cannot overcome these matrix problems. Additionally, data acquisition at high time resolution, using an ICP-TOF-MS (Tofwerk AG, Thun, Switzerland) allows studying the signal structure in greater detail and variations in the vaporization of different elements will be discussed.

Finally, various mix gas additions to the carrier gas were tested to stimulate a more uniform vaporization process of laser-generated aerosols within the ICP and some of these results will be presented and discussed in detail.

[1] L. Flamigni *et al.* (2012), *Spectrochim. Acta B*, **76**, 70. [2] O. Borovinskaya *et al.* (2013), *J Anal Atom Spectrom*, **28**, 226.

## Crust–mantle interaction of Late Jurassic Qianlishan granites in South China: Constraints from geochemistry and in-situ analyses of zircon U–Pb–Hf–O isotopes

CHUN-LI GUO<sup>1\*</sup>, BING YIN<sup>2</sup> AND YI-MING XU<sup>3</sup>

<sup>1</sup>MLR Key Laboratory of Metallogeny and Mineral Assessment, Institute of Mineral Resources, Chinese Academy of Geological Sciences, Beijing, 100037, PR China

<sup>2</sup>Hu'nan Shizhuyuan Nonferrous Metals Liability Co. Ltd., Chenzhou, 423037, PR China

<sup>3</sup>Southern Hu'nan Institute of Geology and Survey, Chenzhou, 423000, PR China

The Qianlishan granitic pluton is closely related to the Shizhuyuan superlarge W–Sn–Mo–Bi polymetallic deposit. It is composed of two phases, porphyritic biotite granite and equigranular biotite granite. Representative samples from each phase were analyzed using SIMS zircon U–Pb technique, and results were 155–153 Ma and 153–152 Ma (2 $\sigma$ ) respectively. The granitic rocks have high SiO<sub>2</sub> contents (73.2–77.7 wt%) and total alkali (7.27–9.36 wt%). For example, ASI (aluminum saturation index) values of two phases are 0.91–1.01 and 1.01–1.27 respectively. K<sub>2</sub>O/Na<sub>2</sub>O ratios of two phases are 1.29–2.82 and 0.86–1.36 respectively. LREE/HREE ratios are 3.95–6.80 and 1.10–2.12 respectively. The second phase has more obvious Eu negative anomaly (Eu/Eu\* = 0.01–0.02) than the first one (Eu/Eu\* = 0.13–0.28) and the second one has more conspicuous Sr, P, Zr and Ti depletion than the first one. P<sub>2</sub>O<sub>5</sub> vs SiO<sub>2</sub>, Zr saturation thermometer, whole rock Sr–Nd and zircon  $\delta^{18}\text{O}$  values proved the Qianlishan granites are belong to a high evolved I-type. Whole rock  $\epsilon_{\text{Nd}}(t)$ , zircon  $\epsilon_{\text{Hf}}(t)$  and  $\delta^{18}\text{O}$  values fall into the ranges –9.3 to –6.4, –8.0 to –1.0, and 5.24‰–7.45‰ respectively, and combined with zircon Hf two-stage model ages ( $T_{\text{DM2}}$ ) of 1.45Ga–1.73Ga. Trace–element geochemistry and isotope systematics further imply that the Qianlishan granitic magmas were most probably derived by partial melting of Palaeo– to Mesoproterozoic metamorphic lower crustal rocks and there were obvious mantle materials participating in during the granite formed. Combined previous researches, it is inferred that the Qianlishan granite was produced in an extensional structural setting, which resulting in the lithosphere thinning and an influx of asthenosphere.