Silicon isotope composition of major zircon reference materials

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Silicon isotopes in silicates potentially reflect events encountered by magmas during ascension and cooling. Zircon are targets of choice because of their stability at high P-T, age (U-Pb) and provenance (Hf, O, REE) records[1]. Current analytical methods make Si isotope analysis of zircon cumbersome: HF digestion produces SiF_4 gas, SIMS analysis suffers from matrix effects and limited precision at high spatial resolution. Femtosecond laser ablation/MC-ICP-MS is matrix effect free thanks to non-thermal sampling and proved reliable for isotope analysis[2]. To test the limits of accuracy and spatial resolution, we analysed reference zircons (Table1). We used NIST610 for sample-standard bracketing, and BHVO-2G as secondary standard. Ablations spots were of 18 to 37µm in diameter.

	$\delta^{29}Si$	*2SD*	$\delta^{30}Si$	*2SD*	n	$\delta^{30}Si_{Ref}$
BHVO2G	-0.20	*0.20*	-0.39	*0.23*	36	-0.27
Mudtank	-0.01	*0.20*	-0.03	*0.20*	27	-
GJ1	0.04	*0.11*	0.08	*0.14*	27	-
Temora 2	0.03	*0.17*	0.02	*0.21*	27	-
91500	0.03	*0.21*	0.05	*0.17*	40	-
Plešovice	0.04	*0.18*	0.10	*0.24*	33	-

Table1: δ values (‰ rel. to NIST8546), reproducibility, replicates over 3 days (n) and reference value for BHVO2G.

The $\delta^{30}Si$ of zircons is higher than that of the expected bulk silicate Earth, suggesting isotopic fractionation of >0.2‰ between host magmas and crystals. We aim at a better reproducibility in order to decipher variations of <0.1‰ in high temperature zircons.

[1] Schaltegger *et al.* (2015) *Chem. Geol*. **402**, 89-110 [2] Poitrasson and d'Abzac (2017) *J.Anal.At.Spectr*. **32**, 1075-1091.