Electronic Appendix 4

Experimental conditions during the acquisition of ^{7}Li signals from the contaminated cones and by conventional LA-ICPMS

(a-b) ^{7}Li background noise related to the contamination of the sampler and skimmer cones of an Element XR sector-field ICPMS. (c) ^{7}Li signal obtained by the raster laser ablation of a NIST SRM 612 glass using the same ICPMS equipped with clean sampler and skimmer cones. As the lithium background from the cones is slightly transient and slowly decreases with time, relatively short acquisitions consisting of 75 sweeps were used, which allows minimising the transience and simplifying the uncertainty computation. The measurements were carried out in the low-resolution peak-hopping mode. The dwell time per isotope was set at 20 ms. In all experiments, an aluminium sampler and a nickel skimmer cone (H-type, ~cylindrical orifice) were employed. The sampling position of the torch was set at 6.5 mm. The sample argon gas flow was optimised at 0.85 l/min, helium (ablation cell) gas flow - at 1.00 l/min, RF power - at 1300 W, focus lens voltage - at -1176 V. The guard electrode of the torch was ungrounded. (a) ^{6}Li (not shown) and ^{7}Li were analysed in the electric scan mode using a static magnetic field; the settle times were 300 and 1 ms, respectively, breaking short-term signal patterns, if there were any, and approaching the acquisition time division typical of multi-element LA-ICPMS analyses; (b) ^{7}Li and ^{36}Ar^{40}Ar (not shown, but demonstrates an excess variance) were analysed using combined electric-magnetic scans with very short settle times of 25 and 9 ns, respectively; the magnet was operated in the scan speed regime; despite the adverse scanning conditions, the ^{7}Li signal still remains fairly precise; (c) ^{6}Li (not shown) and ^{7}Li were analysed according to a protocol identical to (a), except the signal was acquired by laser ablation of a NIST SRM 612 glass; an UP-193 excimer laser was operated at a repetition rate of 20 Hz, energy density of 4 J/cm^{2} and pit size of 150 μm. The beam was rastered by translating the ablation cell at a speed of 20 μm/s along a pre-set line to reduce signal transience. The signal shows a strong excess variance at approximately the same mean count number value as in (a) and (b).