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Effects of different cone combinations on accurate and precise determination of Li isotopic composition by MC-ICP-MS

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Abstract: The multiple collector inductively coupled plasma mass spectrometer (MC-ICP-MS) is booming to be a high-precision, fast, and accurate instrument in measuring lithium (Li) isotopes. Modified highly sensitive Jet sample and X skimmer cones have largely upgraded analytical sensitivity and reduced sample consumption with distinct instrumental mass bias behaviors. Herein, four available combinations of the sample and skimmer cones [Jet sample cone + X skimmer cone (Jet + X), Standard sample cone + X skimmer cone (Standard + X), Standard sample cone + H skimmer cone (Standard + H), and Jet sample cone + H skimmer cone (Jet + H)] were tested for their effects on peak shape, sensitivity, mass bias behavior, and accuracy and precision of Li isotopic measurements in solution mode. The results showed that all four combinations were able to attain an optimal peak shape by adjusting the “Focus Quad” and “Dispersion” parameters, with a positively linear relation between ⁷Li (and ⁶Li) signals and Li concentrations. For a given Li concentration, the sensitivities were enhanced 3–7 times using the Standard + X, the Jet + H, and the Jet + X combinations compared to that of using the Standard + H. The enhanced

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