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Toward real-time intensity matching in MC-ICP-MS: Developments on a Nu Sapphire with ESI Isotope 2 syringe injection system

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The latest generation of multiple collector inductively coupled plasma mass spectrometers (MC-ICP-MS), equipped with collision-reaction cell (CRC) modules, has opened up several new lines of analytical pursuit including in-situ geochronology, multi-isotope assessment of mass-independent fractionation, and improved instrument sensitivity following removal of major interferents from the ion beam. These capabilities come with weaknesses, foremost among them being heightened sensitivity to mismatch in sample and standard concentrations. Here we present the latest developments toward a step-change in addressing concentration mismatch in MC-ICP-MS analysis. Using a microFAST Isotope 2 (ESI) syringe injection system coupled to a Sapphire MC-ICP-MS (Nu Instruments), we demonstrate the potential for real-time matching of sample signal intensity to the preceding bracketing standard via an automated software routine. This enables close matching of sample and standard intensities without additional manual dilution, which improves analytical precision while minimizing preparation time. We demonstrate the utility of this method using potassium isotope measurements and discuss other potential applications.