Precise and Accurate Determination of Iron, Silicon and Sulfur Isotope Ratios in Geological Samples by High Resolution MC-ICP-MS

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MC-ICP-MS is now becoming a widespread technique to determine natural variations in most of radiogenic and stable isotope compositions. However, during Fe, Si and S isotope ratios analysis by MC-ICP-MS, there is much of interference (polyatomic ions) which influence the data accuracy and precision of results. This work describes using a high resolution MC-ICP-MS Nu 1700 and through careful control of analytical procedures at high resolution (RP > 10000) via solution nebulizer to get good data with high precision and accuracy. The measured $\delta^{56}Fe_{IRMM-014}$ of BCR-2 (0.085±0.042‰), BHVO-2 (0.098±0.045‰), AGV-2 (0.091±0.048‰), GSR-2 (0.073±0.051‰), GSR-3 (0.143±0.036‰) were in good agreement with the reference or published values within 2s measurement uncertainties, the obtained precision is better than 0.03‰/AMU (2SD); and the measured $\delta^{29}Si_{NBS-28}$ of IRMM-018a ($\delta^{29}Si_{NBS-28}$:-0.90±0.09‰), BHVO-2 (-0.14±0.06‰), AGV-2 (-0.10±0.08‰), BIR-1 (-0.17±0.06‰), BCR-2 (-0.14±0.05‰) were in good agreement with the reference or published values within 2s measurement uncertainties, the obtained precision is better than 0.04‰/AMU (2SD);and the measured $\delta^{34}S_{V-CDT}$ of IAEA-S-1 (-0.27±0.11‰), IAEA-S-2 (22.29±0.22‰), IAEA-S-3 (32.16±0.27‰), and NBS-123 (17.81±0.21‰) were in good agreement with the reference or published values within 2s measurement uncertainties, the obtained precision is better than 0.12‰/AMU (2SD).