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High-precision Mo and Ru isotope measurements using a Nu TIMS

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Nu Instruments

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"Extremely high precision isotope analysis for non-traditional transition metals (e.g., Mo, W) in terrestrial and extra-terrestrial materials could provide new insights into the studies of dynamical and chemical processes in the early Solar System" [3].

The Nu TIMS instrument equipped with 16 Faraday detectors, can be connected to 10^{11}, 10^{12} and 10^{13} Ω software controlled switchable amplifier resistors, and utilizes a zoom optics that system facilitates the acquisition of multiple static or dynamic measurements for a variety of elements including Mo and Ru.

Here we report measured values for Mo and Ru standard solutions (SPEX). The standard solutions were measured on 1µg loads using a La electron emitter for Mo [2] and BaHO for Ru [1] as negative ions. Measurements were acquired using 4 lines multidynamic settings and lasted ~ 15 hours for Ru and 22 hours for Mo. Measured values are: $^{97}/^{96}$Mo = 0.573941 ± 3.4 ppm (2rsd) and $^{100}/^{101}$Ru = 0.737097 ± 6.7 ppm (2rsd) using the method [3].

These results demonstrate the capability of the Nu TIMS to determine Mo and Ru isotope ratios to a precision better than 5 ppm and 7ppm respectively. The instrument offers the additional benefits of a large number of detectors that can be dynamically connected to different resistors, providing the opportunity to explore high-precision isotopic measurements of other isotopic systems.

[1] K.R. Bermingham et al. (IJMS 2016), [2] Emily A. Worsham et al. (IJMS 2016), [3]Yuichiro Nagai et al. (JAAS 2016)