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Development of a High Precision Protocol for Tantalum Isotope Measurements by MC-ICPMS.

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Tantalum-180 is the rarest observationally stable nuclide in the solar system with a relative isotope abundance of 0.012% and is produced by both the p- and s-process. High precision Ta isotope measurements can potentially complement previous findings of p-process isotope anomalies in acid leachates and residues of chondrites [1]. However, measurements are challenged by the extremely low $^{180}\text{Ta}/^{181}\text{Ta}$ ratio.

Tantalum was separated from different terrestrial and meteoritic samples by anion exchange chromatography modified from [2], [3] and analysed for its isotope composition with a Neptune MC-ICPMS. The low abundances masses ^{180}Ta and ^{178}Hf (^{180}Hf interference monitor) were measured with $10^{12}\Omega$ amplifiers. Instrumental mass bias was corrected externally using doped Yb. Chemical separation is sufficient to keep Hf/Ta and W/Ta element ratios below 0.00002. The typical external reproducibility is $\pm 7\epsilon$ for a 45V signal of ^{181}Ta .

First results indicate no resolvable difference between bulk chondrites and terrestrial samples.

[1] Elfers et al. (2013) Mineral. Mag. 77, 1034. [2]

Münker et al. (2001) G³ 12, 2001GC000183. [3] Weyer et

+ al. (2002) Chem. Geol. 187, 295.

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