

MS 7: Laser-SNMS

Time: Wednesday 14:00–14:30

Location: f128

Invited Talk

MS 7.1 Wed 14:00 f128

Spatially resolved ultra-trace analysis of actinides on hot particles by resonant laser-SNMS — ●HAUKE BOSCO¹, MARTIN WEISS¹, MANUEL RAIWA¹, NINA KNEIP², KLAUS WENDT², and CLEMENS WALTHER¹ — ¹Institute of Radioecology and Radiation Protection, Leibniz University Hannover — ²Institute of Physics, Johannes Gutenberg-University Mainz

A titanium:sapphire resonance excitation laser system for element selective ionization of sputtered neutrals has been linked to a commercial TOF-SIMS for spatially resolved ultra-trace isotope detection [1]. The system allows analysis of stable and radioactive isotope ratios with 70nm spatial resolution. Synthetic as well as environmental samples

are measured on either conducting or non-conducting samples. As an example, investigations of hot particles from the Chernobyl exclusion zone will be presented and discussed with respect to isotopic ratios of uranium, plutonium, americium and strontium. By suppression of isobaric interferences minor actinide isotopes on the scale of a few fg were detected within the analyzed fuel matrix. Additionally, Pu-238 was unambiguously identified despite five orders of magnitude of U-238 isobaric contamination. Ongoing excitation scheme development, influences of the plutonium hyperfine structure on the resulting isotope signal and single particle analysis will be presented as a part of the BMBF funded project SIRIUS.

[1] Franzmann et al., Resonant laser-SNMS for spatially resolved and element selective ultra-trace analysis of radionuclides, JAAS 2018