Contribution ID: **14** Type: **not specified**

Talk: Location, Isolation, RIMS and Dissolution of Hot Particles from the Chornobyl Exclusion Zone

Friday 29 March 2024 12:00 (30 minutes)

Micron sized fragments of nuclear fuel, so called “hot particles”have been released during the Chornobyl nuclear accident in 1986 into the exclusion zone (CEZ). The combination of flotation with high-density-solutions, electron microscopy and a micromanipulator allow the isolation of single hot particles from soil samples of the CEZ [1]. Non-destructive mass spectrometry is performed on individual particles to characterize them. The RIMS-setup at the University of Hannover combines the spatial resolution of a commercially available IONTOF TOF.SIMS 5 with the elemental selectivity of resonant laser ionisation. The isotopic fingerprint of these particles allows to links them to the nuclear accident as well as identifying particles with unusual isotope ratios.
After the determination of the isotope ratios for different actinides, sequential leaching can be applied to the particles. Combined with non-destructive x-ray absorption spectroscopy at different beamlines the results of the sequential leaching give an insight on the chemical structure of the particles. Furthermore, a method to cut the particles in half was developed in cooperation with the Forschungszentrum Jülich. With that, it is possible to have a sample in reserve and study the inner core of the particle.
[1] DOI:10.1039/9781837670758-00001

Workshop Themes

Sample analysis and standards

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Session Classification: Friday Session 2