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## Noble Gas measurements of nuclear fuel particles from Chernobyl

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During the Chernobyl reactor accident on April 26, 1986, radioactivity was in part released in the form of nuclear fuel particles. These so-called “hot particles” have various structures that belong to specific oxidation states of uranium. These oxidation states behave differently in the environment. We obtain individual particles by density separation with a poly tungsten solution. Via radiometric scanning with a Geiger counter we locate the particles. The extraction is performed on tungsten needles with a micromanipulator in a scanning electron microscope (SEM).

The particle surface was analyzed by different nondestructive methods such as SIMS, rL-SNMS and EDX. Gamma measurements and optical analyses in SEM were also performed. The particles are then heated to over 1000°C using a laser beam. This releases the noble gases Kr and Xe from the particles, which can be analyzed using a static mass spectrometer. The age and the neutron flux that the particle has experienced in the reactor can be determined individually for each particle.

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