

Towards the electronic structure of actinide oxides nanoparticles

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Understanding the mechanisms of different chemical reactions with actinides at the atomic level is a key step towards safe disposal of nuclear wastes and towards the identification of physical-chemical processes of radionuclides in the environment. This contribution will provide an overview of the recently performed studies on Uranium, Thorium, Plutonium and Cerium oxide nanoparticles at the Rossendorf Beamline (ROBL)^[1] of the European Synchrotron (ESRF) in Grenoble (France). This innovative, recently upgraded, world-wide unique experimental station, funded and operated by HZDR in Dresden (Germany) was used to study actinide systems by several experimental methods, mainly by X-ray absorption spectroscopy in high energy resolution fluorescence detection (HERFD) mode and resonant inelastic X-ray scattering (RIXS) at the An/Ln L₃ and An M_{4,5} edge ^[2-5]. The experimental results have been analysed using a number of theoretical methods based on density functional theory and atomic multiplet theory. This research has received funding from European Research Council (ERC) under grant agreement 759696.

References:

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