

Actinide Dioxide Nanoparticles: Low Temperature Synthesis for Materials

Olaf Walter

European Commission, DG Joint Research Centre
Germany

Nano-sized actinide dioxides are example formed at the end of nuclear fuel and found in so called 'high burn-up' structures of spent fuel. We have developed an easy to perform low temperature preparative access towards these materials: this allows us now to study their properties more in detail and to compare them to those of their corresponding bulks. Our synthetic approach based on the hydrothermal decomposition of actinide oxalates at temperatures below 250°C leads to highly crystalline dioxides.

The presentation will cover from synthesis characterisation of pure and mixed phases but as well pellet properties and some mechanistic aspects of the particle formation. Additionally the kinetics of the particle growth and the relevance to the nuclear fuel will be presented as oxalates are an industrial intermediate in fuel production and recycling.