**STUDYING OF PLUTONIUM NANOPARTICLES WITH VARIOUS SYNCHROTRON METHODS**

**Gerber E.,a,b,c Romanchuk A.,c Hennig C.,a,b Trigub A.,d Scheinost A.,a,b Rossberg A.,a,b Vaughan G.,e Amidani L.,a,b Pidchenko I.,a,b Weiss S.,b Kalmykov S.,c Kvashnina K.a,b**

*a Rossendorf Beamline at ESRF – The European Synchrotron, CS40220, Grenoble Cedex 9, 38043, France, e-mail: evgeny.gerber@esrf.fr*

*bHelmholtz Zentrum Dresden-Rossendorf (HZDR), Institute of Resource Ecology, Dresden, PO Box 510119, 01314, Germany*

*cLomonosov Moscow State University, Department of Chemistry, Moscow 119991, Russia*

*dNational Research Centre “Kurchatov Institute”, Moscow, 123182, Russia*

*eEuropean Synchrotron Radiation Facility (ESRF), Grenoble, 38000, France*

Plutonium is one of the most significant elements among actinides due to its high radiotoxicity and long period of high-decay. The migration of plutonium in the environment is a challenging and global problem. Plutonium migrates at scale of kilometers from previously contaminated sites in the form of intrinsic colloids or “pseudocolloids”.1-2 In the last few years it was found that so called “colloidal Pu(IV) polymers” actually represents as aggregates of PuO2 nanoparticles with size ~ 2 nm.3-5 The revealing of the mechanism of these particles formation (including the consideration of different factors which may have an influence), as well as their characterization is a key to understanding the conditions for long-term storages for the nuclear waste.

With the combination of different laboratory and synchrotron techniques it was found that small (2 nm) nanoparticles are formed from Pu(III), Pu(IV), Pu(V) aqueous solutions at pH 8-12, with the crystal structure close to PuO2, and with only Pu(IV) oxidation state present. Any other Pu-O contributions except Pu(IV)-O (in oxide) were not revealed.

***References***

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