

CIMTEC 2010 - Abstract Submission

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Session: FF-10.2
Presentation: Oral

Recovery of long-lived minor actinides from high active waste solutions using innovative partitioning processes

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The selective recovery of long-lived minor actinides from high active waste solutions and separate treatment by transmutation (P&T) or conditioning in tailored- ceramics (P&C) can considerably improve long-term safety of nuclear disposal. The present paper will give a summary about the ongoing research activities at Forschungszentrum Jülich on the field of actinide (III) partitioning by innovative hydrometallurgical solvent extraction processes. However, partitioning of the trivalent actinides (Am, Cm) is not possible with the present reprocessing technique according to the PUREX process. This additionally requires more complex partitioning steps and is the subject matter of our investigations. These are based on the co-separation of trivalent actinides and lanthanides (e.g. TODGA/TBP process) from the PUREX raffinate, followed by the subsequent actinide(III)/lanthanide(III) group separation in the SANEX process. The main objectives of our research are on the one hand fundamental research on partitioning, to improve the knowledge of the chemistry of actinides and the extraction agents and on the other hand process development involving testing of extraction devices with cold and genuine radioactive waste solutions.