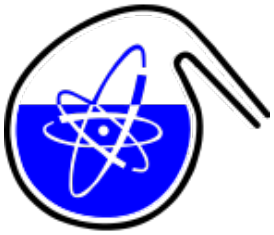

Contribution ID: **890** Type: **Invited**

Selective actinide(III) separation using 2,6-bis[1-(propan-1-ol)-1,2,3-triazol-4-yl]pyridine (PyTri-Diol) in the innovative-SANEX process: laboratory scale counter current centrifugal contactor demonstration

Thursday, 19 May 2022 10:30 (30 minutes)

An innovative-SANEX process for the selective separation of the trivalent actinides americium and curium from a simulated PUREX raffinate solution was successfully demonstrated on the laboratory scale using a 16-stage 1 cm annular centrifugal contactor setup. The solvent was composed of 0.2 mol L^{−1} N,N,N’,N’-tetra-n-octyl-diglycolamide (TODGA) and 5% v/v 1-octanol in a kerosene diluent. Zr(IV) and Pd(II) co-extraction was prevented using trans-1,2-diaminocyclohexane-N,N,N’,N’-tetraacetic acid (CDTA) as a masking agent in the feed. The actinide(III) selective back-extraction was achieved using 2,6-bis[1-(propan-1-ol)-1,2,3-triazol-4-yl]pyridine (PyTri-Diol) in 0.45 mol L^{−1} HNO₃ as a CHON alternative to the sulfur-containing stripping agent used in a previous version of the innovative-SANEX process. The new process described in this paper showed excellent performance for the recovery of An(III). An An(III) product with a quasi-quantitative recovery of americium and curium (≥99.9%) and very good separation from fission and activation products was obtained (decontamination factors ≥4,000). Only a slight contamination with Zr and Ru was observed. This test demonstrates the successful use of molecules containing only carbon, hydrogen, oxygen, and nitrogen atoms (so-called CHON molecules) for the selective separation of An(III) from a simulated PUREX raffinate solution. By avoiding sulfur- or phosphorous-containing molecules, the generation of secondary radioactive waste during process operation can be reduced drastically. The results of the demonstration test will be presented and discussed.

Primary author: Dr WILDEN, Andreas (Forschungszentrum Jülich GmbH)

Co-authors: SCHNEIDER, Dimitri (Forschungszentrum Jülich GmbH); PAPARIGAS, Zaina (Forschungszentrum Jülich GmbH); HENKES, Maximilian (Forschungszentrum Jülich GmbH); KREFT, Fabian (Forschungszentrum Jülich GmbH); GEIST, Andreas (Karlsruhe Institute of Technology (KIT)); MOSSINI, Eros (Politecnico di Milano); MACERATA, Elena (Politecnico di Milano); MARIANI, Mario (Politecnico di Milano); GULLO, Maria Chiara (Università di Parma); CASNATI, Alessandro (Università di Parma); MODOLO, Giuseppe (Forschungszentrum Jülich GmbH)

Presenter: Dr WILDEN, Andreas (Forschungszentrum Jülich GmbH)

Session Classification: Separation & Speciation

Track Classification: Separation Methods, Speciation