CHEMISTRY
Chairman: L.H. Baetslé

The development of the DIAMEX process (CEA, France) has led to a successful treatment of highly active waste (HAW) without acidity reduction. The decontamination factor for the Am-Cm-RE fraction is $\geq 10^3$ which is sufficient to reduce the α activitiy of HLW.

Progress has also been made in the An/Ln separation by tests with TPTZ and Picolinamide. The oxydation of Am to Am(IV) with Ag(II) permits to envisage the selective separations of this element from a Am-Cm mixture.

The DIDPA process (JAERI, Japan) has been completed by a An/Ln separation and a Np co-separation. The previously reported processes have been confirmed and were ready for hot cell tests. The HAW solution has to be de-acidified to O.5-1M HNO_3 to be operational.

The PYROMETALLURGICAL separation process (CRIEPI, Japan) of MA by electro-reduction in a molten salt bath has been seriously improved by using liquid Bi instead of liquid Cd as reductor. The process is very complex and the experimental conditions (O_2 free atmosphere), as well as, the corrosive materials used remain a matter of concern.

A method using Crown ethers (ORNL, US) has been developed for the extraction of Tc from neutralized waste solutions.

The control of Np in the first extraction cycle of the PUREX process (JAERI, Japan) has been made possible by introducing a selective reduction step of Np(VI) to Np(V) with butyraldehyde. The process will be tested in the NUCEF hot cell.

The TRUEX process has been improved (PNC, Japan) by introducting salt free reagents. The process has been tested systematically in hot cells and constitutes one of the most effective MA extraction methods. The difficulty of stripping the loaded solvent remains a drawback.

The AEA (United Kingdom) has worked out medium level waste management and treatment methods based on electro-ion exchange, Ag(II) peroxidation of organic matter and dissolution of PuO_2.

A comparative test has been carried out at ITU Karlsruhe on the MA extraction ability of the TRPO, CMPO and DIPPA processes. This experimental "benchmark" exercise is a great step forward in assessing the extraction methods. The TRPO process is the most promising, because of its very high reversibility in the extraction and stripping steps. A critical analysis at AEA has shown that the existing MA extraction processes have a similar production of secondary effluents.

The AAEC emphasized the merits of SYNROC as a possible matrix for MA extracted from HAW solutions. The thermodynamic stability is a great advantage with respect to glass, but the fabrication conditions are not suitable for industrial upscaling with high activities.