## SESSION IV
## CHAIRMAN: T. WAKABAYASHI

Six papers were presented on reactor irradiation:

- The management of Am and Cm was presented with various options – from once-through transmutation to a multiple recycling scheme. Cm transmutation greatly reduces the radiotoxicity but has substantial consequences on the fuel cycle facilities.

- On the activity of IPPE in Russia, calculational and experimental studies on MA transmutation were presented. The potential radiotoxicity reduction in the waste storage was discussed in three scenarios.

- Schemes for recycling Am targets in PWR/MOX cores were shown to be feasible, provided that enriched $UO_2$ is used in support of MOX fuel. Pu multiple recycling is complicated and results in a significant cost penalty.

- The neutronic performance of a small, critical, dedicated MA burner was presented. The lead-cooled, dense fuel cores are favourable for increasing the MA mass consumption rate and enable an indefinite recycling. The use of a moderator ensures an effective Doppler feedback.

- The status of fast reactor transmutation studies at JNC was presented. The future approach to FBRs and the related fuel cycle system in Japan was also introduced.

- The mass flows of Pu and MA in an LWR-FBR fuel cycle model were shown. Pu and MAs from LWRs can be consistently consumed avoiding further accumulation by gradually implementing similar scale FBRs and the new fuel cycle.

The main issue is the transmutation of Am and Cm. While the reduction in radiotoxicity due to Am and Cm transmutation is necessary, there are the problems associated with fuel fabrication and separation of Am, Cm and rare earth elements. In collaboration with experts on separation and fabrication, further investigation into recycling Am and Cm should be made to provide various options in finding the best way to transmute Am and Cm.

Three papers introduced comparisons of critical reactors with ADS:

- A comparison of neutronic characteristics and possible future R&D work for fast neutron spectrum designs of critical reactor and ADS was presented. The possibility of a thermal ADS was discussed.

- A point kinetics comparison was studied for an ADS and a traditional reactor. The ADS has a great advantage in the case of a TOP but a less favourable behaviour for a LOFWS type accident.

- The reactivity effects in molten lead energy amplifiers was investigated. To avoid reaching criticality in abnormal conditions, the normal k-eff value limitations impose restrictions on the neutron flux.

The comparison of neutronics, thermal-hydraulic characteristics, safety and cost between critical reactors and ADS should be continued in the second phase of the P&T system studies by the OECD-NEA.