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Partitioning of High Level Liquid Waste in China

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The main development of high level liquid waste (HLLW) partitioning in China was briefly reviewed. Chinese high level liquid waste has been stored for several decades. How to manage the historic HLLW is a serious problem. A total partitioning process has been developed at Tsinghua University. The process consists of the following three extraction cycles: actinides removal by TRPO extraction, Sr-90 removal by dicyclohexyl-18-crown-6-ether extraction and Cs-137 removal by calix[4]arene extraction. Based on the partitioning process, the hot test facility including 72-stage miniature centrifugal contactors was set up in the hot cell. About 300Ci HLLW was continuously partitioned within 160 hours through this facility. After 120-hour operation, 30%TRPO-kerosene was recycled without any treatment. The average values of decontamination factor were determined to be more than 3⊠103 for ⊠ activity and more than 104 for Sr-90/Cs-137, respectively. These results demonstrate that Chinese historic HLLW can be transferred into non-⊠ and intermediate/low level waste by the total partitioning process.

On the other hand, developing nuclear energy has been chosen as one of important direction for energy resources in China. The development of nuclear energy cannot be separated from the support of the nuclear fuel cycle. How to effectively manage the nuclear fuel cycle, especially high level waste from the commercial reprocessing plant, to support the sustainable development of nuclear energy is an intractable problem in China. Partitioning of HLLW provides an option to reduce the high level waste which needs be disposed in the geological repository. The research work on partitioning of commercial HLLW is under process in China.

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Primary authors: XU, Cao; CHEN, Jing; SUN, Taoxiang

Presenter: CHEN, Jing

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