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Research and Development on Partitioning and Transmutation Technology based on Double-Strata Concept in JAEA

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Partitioning and Transmutation technology is expected to be effective to mitigate the burden of the high-level waste (HLW) disposal by reducing the radiological toxicity and heat generation. Based on the Strategic Energy Plan of Japan, research and development (R&D) on P&T are being accelerated in Japan. The Japan Atomic Energy Agency (JAEA) has been continuously implementing R&D on P&T technology. The R&D on P&T in JAEA are basing on two kinds of concepts: one is the homogeneous recycling of minor actinide (MA) in fast reactors and the other is the dedicated MA transmutation, so-called "double-strata" strategy, using an accelerator-driven system (ADS). The ADS proposed by JAEA is a lead-bismuth eutectic (LBE) cooled fast subcritical reactor with thermal output of 800 MW. Various R&D activities not only for ADS but also for advanced fuel cycle are progressing in JAEA. For the partitioning process of minor actinide from spent fuel, a new separation process, SELECT process, using new innovative extractants to improve the partitioning process from the viewpoints of the economy and the reduction of secondary wastes was developed. For the MA-bearing fuel for ADS and its fuel cycle are also being developed. Uranium-free nitride fuel was chosen as the first candidate for ADS. A pyrochemical process has been proposed as the first candidate for reprocessing of the spent nitride fuel. In this paper, recent R&D activities based on these policies are briefly shown.

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