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Design of accelerator-driven system consistent to partitioning technology

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Partitioning and transmutation technology will be a promising technology to reduce the burden of high-level waste disposal problem. The Japan Atomic Energy Agency (JAEA) has investigated accelerator-driven system (ADS) to transmute minor actinides (MAs) in the transmutation cycle and obtained various results. On the other hand, the neutronics design of the ADS had used the ideal fuel composition which did not include impurities such as rare earth elements or uranium.
This study aims to investigate a new ADS fuel composition based on a separation process called SELECT (Solvent Extraction from Liquid-waste using Extractants of CHON-type for Transmutation) process developed for extracting U, Pu, and MAs from dissolution solution of spent nuclear fuels and/or high-level liquid waste. By performing the neutronics calculation of the ADS with the new fuel composition, it is confirmed that the new fuel composition based on the SELECT process is acceptable. These results also indicate that the decontamination factors for RE in the reprocessing process are also adequate.

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