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Monte Carlo Neutronic Calculations on Laser Inertial Fusion Energy (LIFE)

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Abstract : In this study, time dependent neutronic analysis of incineration of minor actinides of a Laser Fusion Inertial Confinement Fusion Fission Energy (LIFE) engine was performed. The calculations were carried out by using MCNP codes with ENDF/B.VI neutron data library. In the neutronic calculations, TRISO particles fueled with minor actinides with natural lithium coolant were performed. The natural lithium cooled LIFE engine used 10 % TRISO fuel minor actinides composition. Tritium breeding ratios (TBR) and energy multiplication factor (M) burnup values were computed as 1.46 and 3.75, respectively. The reactor operation time was calculated as ~ 21 years. The burnup values were obtained as ~1060 GWD/MT, respectively. As a result, the very higher burnup were achieved of LIFE engine.

Keywords : Monte Carlo, minor actinides, nuclear waste, LIFE engine
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