

Detoxing Nuclear Waste using Molten Salts

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The management of used nuclear fuel is a long-standing challenge. The absence of a solution to the disposal of used nuclear fuel negatively affects the sustainability of nuclear energy. Used nuclear fuel is a highly complex mixture of a number of isotopes. It has over 40 elements and 400 isotopes across alkali metals, alkali earth metals, transition metals, noble metals, semi-metals, non-metals, noble gases, rare earth, and actinides. Among them, highly heat-generating isotopes are Sr-90/Y-90, Cs-137/Ba-137m, and alpha-emitting isotopes are transuranic elements. To enhance the safety, security, and environmental friendliness of used nuclear fuel management, it is worthwhile separating them and providing customized treatments for a group of isotopes having similar characteristics. Unfortunately, conventional reprocessing is not accessible for many countries running nuclear power plants due to Pu diversion concerns. Molten salt has been used to develop an alternative proliferation-resistant technique. This talk will present advances and developments in the molten salt treatment of used nuclear fuel.