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signatures of molten salt reactors

Molten salt reactors (MSRs) utilize a molten salt mixture as the primary coolant, and some systems also have fuel dissolved in the coolant. Whilst the concept is not new, and was established in the 1950s, there has been renewed interest as part of the development of Generation IV reactor designs. In particular they are seen as a promising technology for utilizing thorium or spent light water reactor (LWR) fuel. Their unique molten design has important implications for the radionuclide signatures that could be detectable by the International Monitoring System (IMS). As the fuel is not encapsulated like LWR systems, short-lived gaseous and volatile radionuclides could more readily escape, producing emissions with a different radioxenon isotopic signature, and also potentially a variety of long-lived particulate decay products. This effect could be further enhanced by the online removal of accumulating fission products in MSR designs. This research examines these effects and discusses the potential impacts on the IMS.

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