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MOLYBDENUM-99 PRODUCTION TECHNOLOGY DEVELOPMENT**

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**Experimental study of the shrinking UAlx core and digestion kinetics in
alkaline solution**

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ABSTRACT

The ROMOL-99 is a well-known process to recover Mo-99 from irradiated UAlx fuel. An alkaline solution is used to digest this latter into sodium diuranate (NaDU). However, little is known about actual fuel digestion kinetics. To study the conversion mechanism, digestion experiments were performed with various concentrations of alkaline media, with and without Al6061 cladding. The conversion of NaDU was interrupted at various digestion times by cold quenching and diluting aliquot samples. The quenched samples were polished to expose the undigested cores and their digested coatings, and were examined by SEM and EDX spectroscopy. The growth of NaDU on UAL₃ was found to grow significantly faster during the first 10 minutes, where almost no digestion of UAL₂ occurred. After 6 μm of NaDU coating, the growth rate slowed significantly. The understanding of this shrinking fuel core can help optimization of the digestion of UAlx based targets.