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Americium Retention During Metallic Fuel Fabrication

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Under the US Fuel Cycle Technologies program Advanced Fuels Campaign metallic fuel has been chosen as a leading candidate for fast reactor transmutation fuels. Significant losses were seen in an earlier attempt to incorporate americium into a metallic fuel, although the majority of the losses were likely not caused by the volatility of americium, these concerns have persisted. A furnace has been installed in a transuranic qualified glovebox in order to verify that americium losses can be controlled during the fuel casting process through atmospheric pressure. A charge of 81U-7.5Pu-1.5Am-10Zr was melted under an argon atmosphere a total of three times. Each time the charge was held at 1450℃ for approximately 10 minutes under flowing argon. After each melting cycle, the resulting fuel ingot was sampled for chemical analysis to verify americium content. Resulting analysis showed americium content remained stable throughout the heating cycles.

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