

## **Advanced characterization of annular fast reactor MOX**

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Uranium and plutonium mixed oxide (MOX) fuels are historically considered the reference fuel system for sodium-cooled fast reactor (SFR). SFR technology is one of the selected advanced reactors within the Generation IV nuclear forum, an international platform aimed at improving safety, reliability and proliferation resistance of nuclear reactors, optimizing resource utilization and minimizing nuclear waste burden. A configuration employing solid pellets is the most common form of fuel, but annular concepts have been explored in some irradiation testing. Post-irradiation examination (PIE) data related to this type of fuel concept are relatively scarce, particularly in the mid-burnup range between 3-6% fission of initial metal atom (FIMA).

Recently, new PIE data have been gathered on MOX with HT-9 cladding pins irradiated in the Fast Flux Test Facility (FFTF) in this burnup range. Optical microscopy data have highlighted onset of fuel-cladding chemical interaction (FCCI) already at these burnups. In this work, further advanced characterization techniques such as Electron Microscopy and Electron Probe Microanalyzer (EPMA) are employed to determine the characteristics and chemical composition of the FCCI layer and fuel microstructure.