

POST-IRRADIATION ANNEALING STUDIES OF SMALL-SCALE U-MO MONOLITHIC FUEL SAMPLES

Monday, September 22, 2014 4:30 PM (30 minutes)

Monolithic uranium-molybdenum (U-Mo) has been proposed as one fuel design capable of converting some of the world's highest power research reactors from using high-enriched uranium (HEU) to low enriched uranium (LEU) fuel. One aspect of the fuel development and qualification process is to demonstrate the extent of fission product release from the fuel under anticipated service environments. To obtain this information, a multi-component materials characterization apparatus was designed and placed within a customized hot-cell. Small-scale samples cut from larger, irradiated fuel segments, were subjected to thermogravimetric/differential thermal analysis (TG/DTA) over a specified temperature profile. A controlled atmosphere was maintained during the thermal profile by flowing sweep gas of known composition over the sample and real time fission gas release data was obtained via mass spectrometry of the effluent from the TG/DTA. Additional fission product release data was obtained via chemical analysis of getters and cold traps that were included between the TG/DTA and mass spectrometer to capture species with limited volatility. This paper will discuss features of the apparatus, studies to optimize experimental parameters, and initial measurements to investigate fission product release from small samples. The mechanisms responsible for release of fission gas from irradiated samples will also be discussed.

Primary author: Dr BURKES, Douglas (Pacific Northwest National Laboratory)

Co-authors: Dr CASELLA, Amanda (Pacific Northwest National Laboratory); Dr CASELLA, Andrew (Pacific Northwest National Laboratory); Mrs RICE, Francine (Idaho National Laboratory); Dr POOL, Karl (Pacific Northwest National Laboratory); Dr LUSCHER, Walter (Pacific Northwest National Laboratory)

Presenter: Dr BURKES, Douglas (Pacific Northwest National Laboratory)

Session Classification: PIE