Establishment of Hot Cell Irradiated Materials Micro and Nano-Mechanical Testing at the University of New Mexico

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Collaborators: N/A
Program: General Scientific Infrastructure

ABSTRACT:

This proposal requests $209,305 in funding from the U.S. Department of Energy's Scientific Infrastructure Support for Consolidated Innovative Nuclear Research General Scientific Infrastructure (GSI) Support Program. The equipment requested here will enhance the materials characterization capabilities at the University of New Mexico hot cell facilities. This includes a microhardness tester, an *in situ* SEM picoindenter, and a digital image correlation system. To best meet the needs of the DOE-NE R&D program, the requested upgrades to the UNM hot cell facilities will enhance the ability of the UNM-NE Department to conduct research on irradiated materials at various length scales and provide teaching opportunities for mechanical testing laboratory courses for undergraduate and graduate students. These upgrades will complement the hot cell facilities at UNM and the previously-funded GSI proposal to enable remote operation of a tensile frame in the hot cell by supplying secondary characterization equipment at both different length scales and with non-destructive evaluation. We envision expanding the materials characterization capabilities at UNM to enable irradiated materials characterization on various length scales: to perform standardized tests on reactor-scale specimens, while performing small-scale tests to elucidate the mechanisms dictating material failure, both with real-time measurements of stress and strain to evaluate materials in a safe and secure environment for teaching and research.
The proposal under the direction of Drs. Lang and Anderoglu will proceed with procurement and installation of equipment in the existing hot cell at UNM. Upon award, bids will be issued for the requested equipment to acquire them to UNM. Following acquisition, equipment will be installed and commissioned. The hot cell at UNM enables material handling up to 2.5 Ci, and will be the testing location of the microhardness facilities. The *in situ* SEM picoindenter will enable testing of irradiated and unirradiated materials. The PI is working with UNM's Division of Radiation Safety to ensure the safe operation of the proposed equipment. The proposed equipment will enable increased research activities at UNM with outside collaborators and complement existing courses to ensure students receive hands-on experience with materials testing and characterization to best prepare them for nuclear engineering careers.