
Enhancing Mechanical Testing Capabilities to Support High-throughput Nuclear Material Development

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Program: Scientific Infrastructure Support for Consolidated Innovative Nuclear Research

ABSTRACT:

The project seeks to enhance the advanced mechanical testing capabilities at Auburn University to support its existing nuclear research and education programs, and further develop high-throughput mechanical testing methods to support nuclear material discovery as well as advanced manufacturing. Through the requested DOE support, two instruments will be acquired to expand the current research capabilities in materials and mechanical engineering at Auburn University:

(1) The project will purchase an integrated micro- and nano-indentation platform with high-temperature capability (up to 600 °C) to cover mesoscale (10-100 grains) to microscale (grain scale) high-throughput mechanical evaluation. This additional capability can support the further development and validation of the spherical nano- or micro-indentation techniques to study irradiated materials and compositionally gradient specimens.

(2) The project will purchase a digital image correlation (DIC) system to develop a high-throughput macroscale (bulk property or mm scale) mechanical testing procedure of the compositionally and microstructurally gradient tensile specimens to maximize the neutron test efficiency.

The new capability will improve the current research and training opportunities at Auburn University to both undergraduate and graduate students and expand the existing nuclear research and education programs. The equipment will be placed in a shared user facility to promote public use. The external universities, institutes and industries can get access to the instruments, including minority education institute.