U.S. DEPARTMENT OF ENERGY
INTERNATIONAL NUCLEAR ENERGY RESEARCH INITIATIVE
DOE/ROK

ABSTRACT

Development and Test of Cladding Materials for Lead-Alloy Cooled Transmutation Reactors

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Collaborator: Seoul National University

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Within the work scope of AFCI and Gen IV LFR coolant and materials projects, LANL will collaborate with the KAERI/SNU team on several important aspects of materials testing and coolant chemistry control. Lead-alloy corrosion tests of candidate materials of interests to advanced nuclear systems for transmutation will be performed in the forced circulation loops developed by LANL, KAERI and SNU. The corrosion of materials in closed loops with coolant chemistry control (oxygen) is influenced not only by local conditions, but also by system configurations. LANL will apply the recently developed kinetic models to analyze the test results, to evaluate KAERI/SNU loop designs and choice of test conditions, and assess corrosion product transport and effects on loop performance. Corrosion product transport behavior will be monitored using liquid and particulate sampling techniques at LANL, KAERI and SNU. Oxygen sensor designs will be improved to alleviate current limitations, including potential bias, sluggish kinetics and long-term instability. Oxygen sensors will be tested at each institute to verify functions of sensors. Low temperature enmbrittlement of candidate steels will be tested and results will be analyzed to identify underlying mechanisms and develop mitigating means.