Keith J. Leonard

Oak Ridge National Laboratory

Senior Research Scientist

Pathway Lead, Light Water Reactor Sustainability Program

Group Leader, Nuclear Materials Science and Technology Group

Scientific Advisor, Low Activation Materials Development and Analysis Lab

MANAGEMENT

- *Lead, Materials Aging and Degradation Pathway of the Light Water Sustainability Program (2015 - current).* Materials research in the LWR program supports the long-term operation of existing US nuclear power plants by developing the scientific basis for understanding and predicting long-term environmental degradation behavior of nuclear power plant materials and is focused on reactor pressure vessel embrittlement, core internals degradation, concrete and cables.
- *Group Leader, Radiation Effects and Microstructural Analysis (2013-2016) and the Nuclear Materials Science and Technology Group (2016 - current).* The mission of the Nuclear Materials Science and Technology Group is to provide leadership in the development of scientific understanding of radiation-induced damage mechanisms and its effect on materials performance through the characterization of irradiated structural and functional materials.

RESEARCH ACTIVITIES and EXPERIENCE

- Manage projects within the LWRS program that include reactor pressure vessel integrity, irradiation assisted stress corrosion cracking, environmental fatigue and the modeling of long-term materials stability of core internals. Program also involves the performance of concrete structures, the long-term environmental effects on cable integrity and the development of non-destructive test methods for condition monitoring.
- Commercial and Naval Reactor research programs involving the examination of materials related issues of in-service performance, including stress corrosion cracking and irradiation creep of structural and cladding components. Mechanical and microstructural evaluations of irradiated Ni, Mo and Zr-base alloys.
- Irradiation and corrosion properties of base metal, welded and hydrogen charged Zr alloys and used in medical isotope reactor chambers and stainless steel peripheral support structures.
- Radiation-induced changes to optical, electrical and thermal properties of diagnostic (mirrors, insulators, antenna) materials, superconductors (RE-doped YBCO) and thermoelectric materials for fusion applications.
- Development of solution-based synthesis of nanoparticles and their incorporation into advanced polymeric composites for enhancing radiation tolerance of electrical insulators.

EDUCATION

- Ph.D. Materials Science and Engineering, Univ. of Cincinnati, Cincinnati, Ohio, 1999.
- M.S. Metallurgical and Materials Engineering, Illinois Inst. of Technology, Chicago, Illinois, 1995.
- B.S. Aerospace Engineering, Illinois Inst. of Technology, Chicago, Illinois, 1993.

HONORS AND AWARDS

- 2015 ORNL Significant Event Award: "Identification of leaf-spring cracking mechanism leads to better understanding of nuclear power plant fuel assembly performance".
- 2010 R&D 100 Award: "High-Performance, High-T_c Superconducting Wires Enabled via Self-assembly of Non-superconducting Columnar Defects".
- 2006 Nanotech Briefs Nano50 Award: "HTS Wires Enabled via 3D Self-Assembly of Insulating Nanodots".

Phone: (865) 576-3687
Email: leonardk@ornl.gov

LWRS
lwrs.inl.gov

LAMDA
http://web.ornl.gov/sci/psd/mst/lamda/