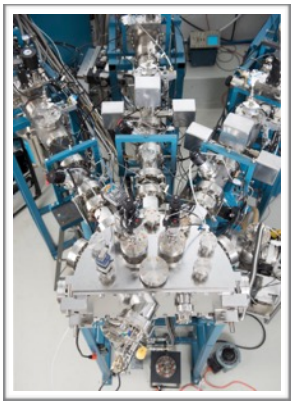
NEBRASKA CENTER FOR MATERIALS AND NANOSCIENCE
2017 SEMINAR SERIES PRESENTS

Professor Gary S. Was

University of Michigan

Ion Irradiation as a Surrogate for Radiation Damage in Reactors

Reactor core materials in both fast reactors and LWRs granted life extension must withstand irradiation to high doses at high temperature. Ferritic-martensitic (F-M) alloys are attractive candidates for structural components of fast and thermal reactors, and high chromium and high nickel-containing austenitic steels are potential replacement alloys for LWR core materials. Both require high dpa, for which self-ion irradiation is ideally suited. To reach high dpa, self-ion irradiation is conducted with simultaneous He injection into both F-M and austenitic alloys, accompanied by reactor irradiations conducted in the BOR-60 fast reactor to assess the capability of ion irradiation to emulate the evolution of microstructure and mechanical properties in reactor. Computational models for defect cluster evolution are being developed and benchmarked against experimental data to ultimately provide predictive capability for the response of both microstructure (loops, voids, precipitates, etc.), and mechanical properties (hardening, ductility, slip behavior) to irradiation. Results will be presented on the microstructure and mechanical property evolution in ion and reactor irradiation integrated with computational modeling.



Professor Was is the Walter J. Weber, Jr. Professor of Sustainable Energy, Environmental and Earth Systems Engineering and holds appointments in Nuclear Engineering and Radiological Sciences, and Materials Science and Engineering at the University of Michigan. He has held positions as Director of the Michigan Memorial Phoenix Energy Institute, Associate Dean of the College of Engineering and Chair of the Nuclear Engineering and Radiological Sciences Department. Professor Was's research is focused on materials for advanced nuclear energy systems and radiation materials science, including environmental effects on materials, radiation effects, ion beam surface modification of materials and nuclear fuels. He is a Fellow of the Materials Research Society, ASM International, NACE International and the American Nuclear Society and Editor-in-Chief of the Journal of Nuclear Materials. Professor Was has published over 240 technical articles in referred, archival journals, presented over 375 conference papers, delivered 200 invited talks and seminars, and has published a graduate level textbook on Radiation Materials Science in 2007 and a second edition in 2016. Professor Was received the *Presidential Young Investigator* award from NSF, the *Champion H. Matthewson Award* from TMS, the *Outstanding and Special Achievement Awards* by the Materials Science and Technology Division of the American Nuclear Society, the *Henry Marion Howe Medal* from ASM, and the *Lee Hsun Award* from the Chinese Academy of Sciences. He will be inducted into the 2017 class of TMS Fellows at the 2017 TMS Annual Meeting in February.

Tuesday, February 7, 3:30 p.m. | 110 Jorgensen Hall

Host:
Professor Bai Cui

Department of Mechanical & Materials Engineering

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