Oak Ridge National Laboratory - ORNL
Materials Science & Technology Div.
Oak Ridge, TN, USA

Prof. Dr. David T. Hoelzer
Senior Research Scientist

Presentation Title
Nanostructured Ferritic Alloys for Advanced Nuclear Reactors

Abstract
Much excitement arose in nuclear energy research communities around the globe with the discovery of nanostructured ferritic alloys (NFA) at the beginning of the 21st century. NFA's evolved from oxide dispersion strengthened (ODS) alloys, which have been around for many decades, due to refinement in the microstructure consisting of an ultra-fine grain structure and high concentration of nano-size (~2-5 nm) oxide particles. Many studies have demonstrated that NFA's possess remarkable high-temperature strength resulting in outstanding creep performance combined with very low swelling rates and less hardening during exposure to high-dose irradiations. This presentation will cover the goals of the US DOE's Nuclear Technology Research and Development Program's Advanced Fuels Campaign that emphasizes understanding fabrication methods for producing thin wall tubing, including studies dealing with recrystallization, texture and plastic deformation, joining thin components by friction stir welding and the response of microstructure and mechanical properties of NFA exposed to neutron irradiation.

Co-Authors
S.A. Maloy[1], D.T. Hoelzer[2], G.R. Odette[3]
[1]Los Alamos National Laboratory, Los Alamos, NM 87545, USA
[2]Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA
[3]University of California, Santa Barbara, CA 93106, USA

Biography
Dr. David Hoelzer is a Senior R&D staff member at Oak Ridge National Laboratory in the Alloy Behavior and Design Group and a Research Associate Professor in the Nuclear Engineering Department at the University of Tennessee, Knoxville. He has over 20 years of experience in physical metallurgy and radiation effects in materials, and since 2000 has served as the PI on several projects that developed the internationally recognized 14YWT ODS ferritic alloy for advanced nuclear energy systems with superior tensile strength, thermal creep and radiation resistance. He obtained his PhD, MS and BS degrees from the Materials Science and Engineering Department at the University of Florida, Florida, USA. He worked as an Adjunct Faculty and TEM Technical Specialist II at the New York State College of Ceramics at Alfred University, Alfred, New York from 1992 to 1998 prior to joining the research staff at Oak Ridge National Laboratory in 1998 to the present followed by joining the Department of Nuclear Engineering, University of Tennessee, Knoxville, Tennessee as a Research Associate Professor in 2016.

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ORNL hosts the Center for Nanophase Materials Sciences, the BioEnergy Science Center, and the Consortium for Advanced Simulation of Light-Water Reactors.