

NANOSCALE CHARACTERISATION OF CORROSION AND DAMAGE MECHANISMS IN NUCLEAR MATERIALS



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HH 202

metallurgy.mines.edu

There have been several developments in high resolution analytical techniques over the past 15 years that have allowed degradation mechanisms in nuclear materials to be studied in unprecedented detail. This talk will present some recent results on the application of advanced Transmission Electron Microscopy, Electron Backscattered Diffraction, Secondary Ion Mass Spectrometry and Atom Probe Tomography techniques to the study of oxidation mechanisms in zirconium fuel cladding alloys (both autoclave and ex-reactor materials) and in the response of oxide dispersion strengthened steels to heavy ion irradiation used as a proxy for in-service neutron damage. We have been able to reveal new mechanisms of degradation and recovery at the atomic scale, and can thus suggest ways of improving the performance of these important metallurgical alloys by adjustments to the chemistry and microstructure of both Zr and ODS steels.

Chris Grovenor holds a PhD from Oxford University, and after a visiting scientist position at the IBM Thomas J Watson Research Center has made his career in Oxford. Appointed to a faculty position in 1986, he was promoted to full professor in 2004 and served as Chair of the Materials Department for 10 years until 2015. His research interests lie in the application of advanced microstructural analysis techniques to a wide range of materials (including superconductors and biological materials), and he is director of the Oxfordshire Centre for Applied Superconductivity.

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