MateriAlZ Seminar Series

Reading between the reflections: Order, disorder, transport and functionality

Friday, April 29, 2022, 11:00 am MST

Abstract

Transmission electron microscopy and electron diffraction have contributed to significant advances in our understanding of phase and microstructural evolution in a broad range of materials in response to *in situ* and *ex situ* stimuli. But in so many materials those changes, as well as the physical properties of the material hinge upon point defects or very localized heterogeneities that may be overlooked in conventional approaches. Here we will present several vignettes in which we interrogate the weak or diffuse electron scattering behavior for nominally homogenous, crystalline materials as a route to gain critical insight on the behavior of such point defects and their impact on the resilience of the bulk material. We'll approach this discussion from two angles: material systems that are forced to disorder via external bombardment of ions and material systems that are kinetically limited from achieving complete ordering. In the former, we'll explore fluorite and pyrochlore-based ceramic materials in which radiation damage influences defect mobility and recrystallization behavior. In the later, we'll interrogate short range ordering behavior in austenitic steels, including the challenges of rigorously characterizing these domains and the implications for hydrogen tolerance.

Prof. Jessica A. Krogstad
University of Illinois, Urbana-Champaign

Jessica A. Krogstad is an associate professor in the Department of Material Science and Engineering at the University of Illinois, Urbana-Champaign. She received her PhD in Materials at the University of California, Santa Barbara working with Prof. Carlos G. Levi and completed a postdoctoral at Johns Hopkins University with Prof. Kevin J. Hemker before joining UIUC in 2014. Her current research explores the interplay between phase or morphological evolution and material functionality in structural materials under extreme conditions. She is the recipient of a several awards including DOE Early Career Award, the ACerS Robert L. Coble Award for Young Scholars and the TMS Early Career Faculty Fellow Award.

Zoom link: https://asu.zoom.us/j/85958829294

https://material-az.org/

https://www.youtube.com/channel/UCzjjaFH2pnhbptPnJkrLaNQ

Follow us on Twitter @MaterialzS