Graduate Student Research Seminar

Spring 2025

Grain Rotation in Coarse Grained TiMo15

Benjamin Elbrecht (PhD student)
Advisor: Garrett Pataky

Monday, April 14th
3:00 pm (EST) – 132 Fluor Daniel Building

Abstract

Advancements in creep deformation mechanism analysis have the potential to improve future lightweight material capabilities. Grain rotation, a creep deformation mechanism, was found and analyzed using a novel experimental technique that *in-situ* captures full-field kinematic data at high spatial and temporal resolutions. Grain rotation was found in the creep testing of TiMo15, a model metastable ß Ti, at a very coarse grain size, >250 µm. This result was previously thought to be unlikely due to the large grain size making grain rotation energetically unfavored. The trends of rotation and strain with respect to the grain boundary were used to better understand how grain rotation was observed in a very coarse-grained material. Electron microscopy was used to further investigate the underlying mechanistic activity driving the grain rotation; dislocation structures, alloy composition fluctuations, and phase transformations were analyzed to understand this result and its implications in future material development for aggressive environments.

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