MRSEC SEMINAR SERIES

Grain Boundary Engineering at the Nanoscale

Our research has demonstrated a new direction for materials development by introducing engineered microstructures at the nanoscale. Even though nanoscale materials have shown tremendous potential, there are typically two limiting factors to their applications: thermal stability and low ductility. Our research has focus on three main themes: (a) understanding the role of special boundaries for improving corrosion, thermal stability and ductility, (b) expanding experimental techniques in order to synthesize a wide range of materials with nanoscale growth twins (Σ3), and (c) performing mechanical studies to understand the effect of the growth twins across many materials and compositions. Overall, one of the main contributions of our work was the design of a protean twin thickness contour zone map that illustrates how the nucleation and mobility of twin boundaries affects the twin thickness of sputtered films. The twin thickness contour zone map can be used as a versatile guide to synthesize fully nanotwinned films with tailored twin thicknesses in materials with a wide range of stacking fault energies. This allows for designing materials with improved corrosion, thermal and mechanical properties. This presentation will also cover additional efforts regarding synthesis of thermally stable nanostructured materials.

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Vice-Provost for Undergraduate Programs

Wednesday, March 29, 2017
Ryall Hall, Room 4003
11:00 a.m. – 12:00 p.m.

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