Spring 2019 Joint Colloquium
Materials Department & Materials Research Laboratory

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11:00 am, ESB 1001

Heusler interfaces – opportunities beyond spintronics?

Heusler compounds, in both cubic and hexagonal polymorphs, are a ripe platform for engineering emergent electronic, magnetic, topological, and ferroic properties at crystalline interfaces. In these applications, the ability to control interfaces with near atomic level control is of tantamount importance; however, challenges such as interdiffusion have hampered their development. Here, I will discuss our efforts to control the properties of Heusler interfaces using precision growth by molecular beam epitaxy (MBE). I will focus on the following topics: (1) the use of epitaxial strain to stabilize the hexagonal phase of several polar metal and ferroelectric candidates, (2) the use of monolayer graphene diffusion barriers for enhanced atomic ordering across interfaces, and (3) the phase segregation of ferromagnetic nanostructures from a semiconducting FeVSb matrix with coherent epitaxial interfaces. Together, these examples illustrate the power of epitaxy and interfaces in controlling the properties of Heuslers and other intermetallic compounds.

Bio

Jason Kawasaki is an Assistant Professor of Materials Science and Engineering at the University of Wisconsin-Madison. He received his B.S.E. in Mechanical Engineering from Princeton in 2009 and Ph.D. in Materials from UCSB in 2014. From 2014-2016 he was a Kavli Postdoctoral Fellow at Cornell. He began his appointment at UW-Madison in 2016. His work focuses on the epitaxial growth and electronic structure of Heusler compounds and transition metal oxides. Recent awards include: AVS Holloway Young Investigator (2018), NSF Career (2018), ARO Young Investigator (2017), and MRS Graduate Student Gold (2012).

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Hosted by Chris Palmstrom.