

UNIVERSITY OF RHODE ISLAND
Department of Chemistry

SEMINAR

Room 234 Pastore Hall
3:00 p.m, Monday, March 7, 2016

Prof. Kristie J. Koski

Department of Chemistry
Brown University
Providence, RI

**“2D Materials:
From Innovative Chemistries
To Novel Applications”**

HOST

Brett Lucht
Department of Chemistry
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Engineering 2D Materials: From Innovative Chemistries to Novel Applications

Kristie Koski, Chemistry Department Brown University

Abstract:

Two-dimensional (2D) materials, such as layered chalcogenides, graphene, and oxides, are an exciting new class of materials with extraordinary physical and chemical behaviors. These high-performance materials have the potential to enable an entire fleet of new technological applications ranging from electronics to photonics. To realize this potential requires (i) the synthesis of novel, high-quality 2D materials, (ii) a broad spectrum of chemical modification techniques, and (iii) a thorough understanding of how these modifications control the material physics.

In this presentation, I will show new synthetic growth methods to create high-quality 2D chalcogenide materials including a new semiconductor, Si_2Te_3 . I will present a novel chemical method to reversibly intercalate and deintercalate high concentrations of multiple, zero-valent atoms into 2D materials. The zero-valent nature of the intercalant species allows for high-density intercalation of metal atoms (Ag, Au, Co, Cu, Fe, In, Ni, and Sn) effectively doubling the number of atoms of the material. This method can be used to intercalate more than one elemental species and enables synthesis of 2D heterostructures, an outstanding goal of 2D materials. Finally, I will show how this work achieves opto-electronic application such as color-changing Smart Materials.

Biographical:

Dr. Kristie Koski graduated from the University of Wyoming in 2002 with a B.S. in Physics and a second B.S. in Chemistry. She attended graduate school at the University of California: Berkeley in Physical Chemistry working with Dr. Paul Alivisatos. She did a short postdoc at Arizona State University measuring mechanical properties of spider silk and then moved on to a postdoc at Stanford University in Materials Science and Engineering with professor Yi Cui. Dr. Koski has received the NSF CAREER Award and is funded by the Office of Naval Research. When not doing science, Professor Koski is an adrenaline junky known for: surfing massive waves, rock-climbing, and driving her over-powered muscle car way too fast.