UNIVERSITY OF RHODE ISLAND
Department of Chemistry
SEMINAR

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Prof. Michael B. Ross
University of Massachusetts Lowell
Lowell, MA

"Manipulating the Structure and Properties of Noble Metals Using Post-Transition Elements"

HOST

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Manipulating the Structure and Properties of Noble Metals Using Post-Transition Elements

Michael B. Ross
Department of Chemistry, University of Massachusetts Lowell

Noble metal nanoparticles exhibit remarkable chemical and physical properties. They efficiently absorb visible and infrared light, can be synthetically manipulated to reveal complex surface morphologies, and are stable under harsh chemical conditions. Often, however, multimetallic nanoparticles are desirable because they can exhibit superior catalytic, mechanical, or corrosion-resistant behavior compared to their unary constituent counterparts. Despite these advantages, designing multimetallic plasmonic materials remains challenging because, except for Au, Ag, and Al, most metallic elements exhibit poor plasmonic behavior and are challenging to structurally integrate with the noble metals. This talk will describe recent efforts that highlight how post-transition metals can be used to independently tailor the optical and structural properties of noble metals in a highly systematic way, including access to higher energy plasmonic absorption and highly concave anisotropic nanoparticles. Consequently, post-transition metal alloying can provide a general strategy for realizing a new and diverse class of tunable plasmonic and nanostructured materials. A primary interest is elucidating how size, shape, and composition together enable the enhancement of photo- and electro-catalytic processes.

Biography

Michael Ross is an Assistant Professor in the Chemistry Department at University of Massachusetts Lowell. His research interests focus on understanding the unique optical, chemical, and catalytic properties of metallic nanomaterials, and leveraging those properties to address challenges in energy, environmental detection, and photonics. In particular, these efforts have focused on using renewable electricity to generate hydrogen and fuels from water and CO_2. Before that, he was awarded a CIFAR Bio-Inspired Solar Energy Postdoctoral Fellowship to study with Peidong Yang at University of California, Berkeley. There he investigated the properties of electrocatalysts that recycle carbon dioxide into fuels and chemicals. Michael earned his Ph.D. at Northwestern University as a National Defense Science and Engineering (NDSEG) Fellow. At Northwestern, under the guidance of Chad Mirkin and George Schatz, he focused on the design of optical properties in nanoparticle systems whose structure was programmed by DNA. He earned his B.S. in biochemistry at Providence College.