BIG energy seminar series

Addressing the scale and complexity of the global energy challenge.

Materials Design for Electrochemical Energy Storage and Catalysis

Dr. Hailiang Wang
University of California, Berkeley

Date: Thursday, February 13, 2014 at 2:30 pm
Location: Caruthers Biotechnology Building, A115 (East Campus)

Abstract:

Increasing energy consumption and air pollution have been demanding better materials for energy production, storage and conversion. This talk will cover my research on design, synthesis, characterization and application of nanostructured materials for electrochemical energy storage and catalysis. I will present our approach of developing inorganic/carbon hybrid electrode materials and electrocatalysts with enhanced capacitance/capacity, higher activity, increased rate performance and improved cycling stability. The approach includes design and synthesis of inorganic/graphene and inorganic/carbon-nanotube hybrid materials, assessment of their performance in supercapacitors, batteries and electrocatalysis, and spectroscopic understanding of strong chemical and electrical coupling in the hybrid materials. I will also present molecular level study of structure sensitivity in nanoparticle catalysis, including size dependence of Pt nanoparticles in gas phase methanol oxidation reaction and composition dependence of Pt-Fe bimetallic nanoparticles in ethylene hydrogenation reaction. Probing of reaction intermediates and chemical states on catalyst surface under reaction conditions using vibrational spectroscopy and synchrotron X-ray spectroscopy will be shown.

Bio:

Dr. Hailiang Wang is currently a Postdoctoral Fellow at the University of California, Berkeley. He received a Ph.D. in Chemistry from Stanford University in 2012. His research interests include: design and synthesis of inorganic/carbon hybrid materials for electrochemical energy storage and conversion (batteries, supercapacitors and fuel cells); catalysis and surface chemistry of alcohol oxidations reactions in both gas and liquid phases; dynamic structure-property correlations in electrochemical catalytic processes.

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