

Materials Chemistry Seminar

Monday, 3:30 pm
October 12, 2015

Room 1315
Chemistry Building

“Heterogeneous Catalysts Controlled at the Atomic Level”



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Catalysis—the essential technology for accelerating and directing chemical transformation—is the key to realizing environmentally friendly and economical processes for the conversion of fossil energy feedstocks. Catalysis is also the key to developing new technologies for converting alternative feedstocks, such as biomass, carbon dioxide, and water to chemicals and fuels. The two grand challenges of heterogeneous catalysis, understanding mechanisms and dynamics of catalyzed reactions as well as the design and controlled synthesis of catalyst structures, require an atomic and electronic-level understanding of catalysts and catalytic processes. However, due to the structure complexity, especially under reaction conditions (high temperature and pressure), the exact catalytic active site and the molecule-catalyst interaction are extremely difficult to describe. In this presentation, I will discuss the synthesis, characterization, reaction study, and modeling of heterogeneous catalysts precisely synthesized at atomic level using intermetallic compounds and metal-organic frameworks, which provide the means for meeting the two grand challenges of heterogeneous catalysis. The synthesis of these heterogeneous catalysts is based on nanoscience and nanotechnology.