Catalysis Center for Energy Innovation

Ph.D. Candidate Seminar

Wednesday, November 9, 2016

10:00 AM ▪ 322 ISE

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"Bimetallic Nanocrystal Catalysts for Hydrodeoxygenation of 5-Hydroxymethylfurfural"

Abstract: In order to reduce the demand on using fossil fuels for the production of liquid fuels and chemicals, lignocellulosic biomass is providing us a sustainable solution for alternative carbon resources. The 2,5-dimethylfuran (DMF), as a promising candidate for biofuel application, is obtained by the hydrodeoxygenation (HDO) of 5-hydroxymethylfurfural (HMF). A suitable catalyst is the keystone for realizing this process with high yield, in which bimetallic catalysts are emerging as one of the most promising materials with enhanced activity and selectivity. This presentation will focus on the synthesis and characterization of colloidal nanocrystals (NCs) as high performance catalysts for DMF production. A high degree of control over size, shape and composition of NCs were achieved via solvothermal method and two types of bimetallic catalysts will be introduced, Pt-based (PtNi, PtCu, PtZn) NCs and transition metal-based (NiCu) NCs. Subsequently, we will describe the composition-dependent HDO performance using a continuous flow reactor system over carbon-supported NC catalysts. Lastly, the design of novel heterostructures with applications in other model catalytic reactions will be discussed.

Biography: Jennifer D. Lee received a B.S. degree in Chemistry from National Taiwan University in 2011 and a Master degree in Chemistry from the same institute in 2013. Her master thesis focused on the synthesis and application of DNA-templated silver nanoclusters. She is currently a Ph.D. candidate at the University of Pennsylvania (Philadelphia, PA) in the Department of Chemistry under the supervision of Professor Christopher B. Murray. Her research focuses on the preparation and characterization of tailored nanostructures for catalysis and magnetic applications.

Advisor: Christopher B. Murray

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