Catalytic Deoxygenation

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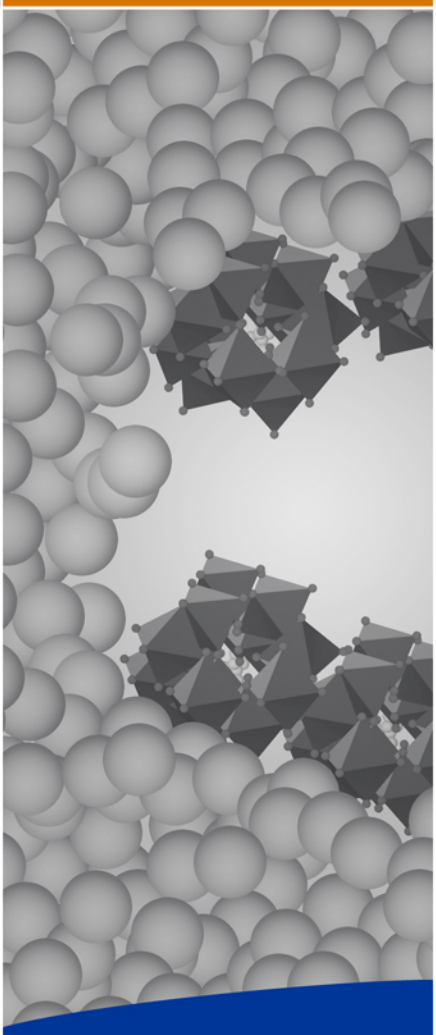
Frontiers in Catalysis Science and Engineering
Seminar Series

Presented by…

Aditya Bhan

•Associate Professor
•Dept. of Chemical Eng. & Materials Science
•University of Minnesota



Abstract

The $(CH_2O)_n$ stoichiometry of biomass implies that its conversion to energy carriers and other petroleum-derived hydrocarbons centers on the removal of oxygen. This talk will discuss cases studies of deoxygenation chemistry on metal carbide catalysts. Specifically, the talk will include a discussion of: (i) the potential for using CH_4 – instead of molecular hydrogen – so that in essence, CH_4 serves as a surrogate for molecular hydrogen for biomass deoxygenation while biomass serves as the oxygen carrier for hydrogen removal from CH_4; and (ii) the site requirements and mechanism for selectively cleaving C=O and C-O linkages in sugar and lignin monomers for the synthesis of bulk and specialty chemicals.

More info: http://research.cems.umn.edu/bhan/

Catalytic science will play a critical role in developing alternative energy sources and new conversion technologies for the 21st century. Our goal is to develop catalytic technologies that solve a key piece of this challenge by efficiently controlling hydrocarbon-based reaction pathways important in energy conversion and use, chemical synthesis, and environmental control. With these goals in mind our research focuses on developing new catalytic conversion technologies for renewable biomass-derived feedstocks and activation of light alkanes that are major constituents of natural gas.

The functional characterization of reactivity is accomplished by isotopic tracer and transient studies, chemical transient methods, and steady-state kinetic measurements to determine the evolution of surface species and reaction intermediates prevalent under reaction conditions. These kinetics and mechanistic studies are complemented by general structural and chemical characterization studies using X-ray diffraction, electron microscopy, porosity measurements, thermal analysis techniques and infrared and NMR spectroscopies. In intimate collaboration with these experimental studies, computational studies using Density Functional Theory (DFT) are done to examine molecule-surface interactions and chemical rearrangements relevant for these chemistries.

Hosted by: Chuck Peden
Admin: Brooke Lanigan

Dec. 3, 2013

EMSL Auditorium

9:00 am