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Catalysis Club of Philadelphia

Thursday January 22, 2008

Holiday Inn Select Hotel
Naamans Road and I-95, Claymont, DE

Catalytic Conversion of Biorenewable Molecules to Fuels and Chemicals

Prof. Robert Davis

University of Virginia

Social Hour: 5:30 PM

Dinner: 6:30 PM

Meeting: 7:30 PM

Members: \$30.00

Walk Ins & Non-members: \$35.00

Student & Retired Members:
\$15.00

Menu

Chicken Dijonaise - Served with a
Delicate Dijon Cream

Sliced Sirloin of Beef - Served with
a Mushroom Bordelaise Sauce

Vegan Portabella Pasta

Meal reservations - Please notify your company representative or Alan Lee Stottlemeyer (alan@udel.edu, phone: 302.831.6915, fax: 302.831.1048) by **Thursday, January 15.**

Company Representatives – We would like to encourage you to make meal/meeting reservations to your company representative.

Membership - Dues for the 2008-09 season will be \$10.00 (\$5.00 for the local chapter and \$5.00 for the national club). Dues for students and post-docs will be \$6.00 (\$5.00 for local club and \$1.00 for national club). Please send your payment to Steve Harris, Lyondell Chemical Co., 3801 West Chester Pike, Newtown Square, PA 19073-2387.

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Thursday January 22, 2008

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Catalytic Conversion of Biorenewable Molecules to Fuels and Chemicals

Prof. Robert Davis

University of Virginia

Abstract

The rising cost of fossil fuels has encouraged the exploration of alternative feedstocks for fuels and chemicals. For example, triglycerides derived from seed oils, algae and animal fats are possible sources of biodiesel by conversion to fuel-grade molecules through transesterification with short alcohols. A major side product of transesterification of triglycerides is glycerol, which constitutes about 10 wt% of the reaction products. In this presentation, solid bases derived from hydrotalcites will be explored as heterogeneous catalysts in the transesterification of tributyrin with methanol, a model reaction for biodiesel synthesis. The influence of interlayer anions and water on the activity and stability of the catalysts will be presented. The selective oxidation of glycerol to glyceric acid over supported Au catalysts and the selective hydrogenolysis of glycerol to glycols over supported Ru and Pt catalysts will also be discussed. The work illuminates specific research issues related to the use of heterogeneous catalysis in the conversion of biorenewable molecules.

Speaker's Bio

Robert Davis obtained his Ph.D. degree in Chemical Engineering from Stanford University in 1989. He subsequently worked as a postdoctoral research fellow in the Chemistry Department at the University of Namur in Belgium. He joined the faculty in Chemical Engineering at the University of Virginia in 1990 as an assistant professor, was promoted to associate professor in 1996 and to full professor in 2002. Professor Davis has also served as the Chair of Chemical Engineering since 2002. Professor Davis has extensively used in-situ spectroscopic methods coupled with both steady-state and transient kinetic methods to elucidate how oxide supports and basic promoters alter the active sites for a variety of catalytic reactions, including selective oxidation of hydrocarbons, acid/base reactions, and ammonia synthesis. He and his group have illustrated how changes in the elemental composition, atomic structure and reaction environment in the vicinity of a catalytic site influence both the activity and selectivity of chemical reactions. He has received the Emmett Award of the North American Catalysis Society, the NSF Young Investigator Award, the DuPont Young Professor Award, the Union Carbide Innovation Recognition Award, and the UVa Rodman Scholars Award for Excellence in Teaching. He has co-authored about 100 publications, 1 patent and 1 textbook, entitled "Fundamentals of Chemical Reaction Engineering". He has delivered 100 invited lectures at conferences, academic departments and industrial research groups, and has co-authored over 90 additional presentations at technical meetings. Professor Davis has served as President of the Southeastern Catalysis Society, Chair of the 2006 Gordon Research Conference on Catalysis, Chair of Catalysis Programming of the AIChE, Chair of a US government panel charged with worldwide assessment of Catalysis by Nanostructured Materials, Director of the Catalysis and Reaction Engineering Division of the AIChE, Co-Chair of an International Catalysis Workshop in China, member of the Advisory Board of the International Conferences on Solid Acid and Base Catalysis, and member of the editorial boards of *Applied Catalysis A* and *B* and *Journal of Molecular Catalysis A*.

