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(2006-2007 Season)

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Catalysis Club of Philadelphia

http://www.catalysisclubphilly.org

Joint meeting with Catalysis Society of Metropolitan New York

Thursday, November 9, 2006

Sheraton Bucks County Hotel
400 Oxford Valley Road
Langhorne, PA 19047

"Supported Metal Catalysts: Some Interesting New Leads In An Old Field And Use Of Zeta Potential Measurements In Catalyst Characterization"

Dr. Stu Soled
ExxonMobil Research and Engineering Co.

Social Hour	**6:00 p.m.**
Dinner	**7:00 p.m.**
Meeting	**7:45 p.m.**

Menu:
Dinner Buffet
Usually includes Chicken, Beef, or Fish

Members	$30.00
Walk Ins & Non-members	$35.00
Students & Retired Members	$15.00

For meal reservations, please notify your **company representative** or **Carl Menning** (phone: 302-893-9398, fax: 302-831-1048, e-mail: menning23@gmail.com) by **Thursday, November 2nd.**

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

Membership – dues for the 2006-2007 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.

Next Meeting will be held on Thursday, January 25, 2007. The speaker will be Prof. Lanny Schmidt of University of Minnesota.

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Abstract

In the first part of the presentation, we will illustrate in detail the importance of nanoscale site location in developing highly dispersed and homogeneously distributed Ru on silica hydrogenation catalysts. High dispersion provides better metal utilization and uniformity of nanoscale metal distribution (i.e., maximizing metal particle separation) can be an important factor in minimizing coalescence. In the approach discussed, Ru-impregnates prepared with bifunctional dispersion aids convert during partial oxidation into strongly interacting complexes that bond to and spread on silica. This avoids the rapid oxidative sintering of Ru oxide precursors on silica. Reduction of this complex produces small Ru crystallites (12-15Å) homogeneously distributed on silica, in sharp contrast to the distribution found using traditional impregnation procedures. This homogeneous distribution leads to enhanced resistance to reductive sintering compared to conventionally prepared supported Ru catalysts.

Although finely divided particle technology constitutes an integral part of heterogeneous catalysis, the techniques of colloid chemistry have not been widely applied to catalyst characterization. In the second part of the presentation we will describe several applications where we have used zeta potential measurements to better understand catalysts. Small particles often contain charged surfaces arising from surface groups ionizing, charged ions adsorbing from solution, or isomorphous cations or anions substituting into a lattice. In addition a layer of counter ions is firmly held to the particle to achieve partial neutrality. Zeta potential measures the potential at the shear plane separating this compact layer from the weaker held diffuse layer. With this technique information reflecting the chemical character of the surface layer can be obtained even in relatively concentrated slurries.

We will show an excellent correlation between the isoelectric point (the pH at which the zeta potential is zero) of a suite of Faujasites with the surface Si/Al ratio as determined from XPS measurements, giving us a simple way of monitoring surface changes. We have used these surface properties in controlling the strength of composite FCC catalysts. We will also show how zeta potential measurements can help in understanding metal dispersion on supports by using electrostatic interactions to improve dispersion of the metal precursors. In a final example, we use zeta potential measurements to compare differences between surface and bulk properties in zirconia-silica cogelled supports.

Speaker's Biography

Stu Soled received his Ph.D. in chemistry focused primarily on x-ray crystallography from Brown University in 1973. He then did 4 year of post-doctoral work in solid state chemistry both at Brown University and in France, focusing on the synthesis and characterization of novel oxide and sulfide materials. He has been at Exxon's Corporate Research Labs for more than 25 years. His research interests lie in the synthesis, characterization and evaluation of novel catalytic materials. He has worked extensively on Fischer-Tropsch chemistry, solid acid and metal catalysis, and hydrotreating. He is the coauthor of more than 70 publications and 80 U.S. patents. He is credited with the discovery of the Nebula catalyst and has worked on a joint ExxonMobil-Albemarle team to bring it to commercial reality. Nebula has been producing low sulfur diesel fuels in over a dozen refinery units worldwide. He is the recipient of the New York Catalysis Society Excellence in Catalysis Award, the North American Catalysis Society Frank Ciapetta Lectureship Award, and the American Chemical Society Northeast Division Industrial Innovation Award.

Driving Direction to
Sheraton Bucks County Hotel
400 Oxford Valley Road
Langhorne, PA 19047
Ph: (215) 547-4100

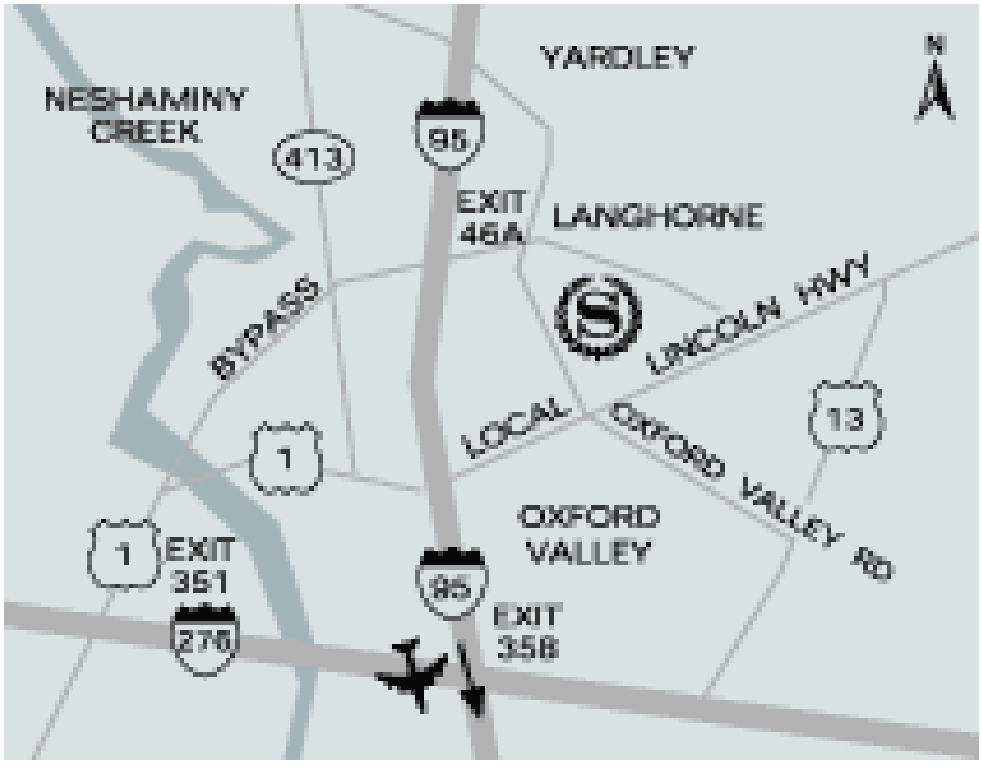
From Harrisburg/Lancaster
Take the Pennsylvania Turnpike East to Exit 351. After the tollbooth, take Route 1 North to the Oxford Valley Exit. At the top of the ramp, turn right and the hotel is 1/4 mile further on the left.

From New York City
Follow the New Jersey Turnpike South to Exit 7A. Take Interstate 195 West to Route 29 North. Go through the tunnel and take the exit for Route 1 South to the Oxford Valley Exit. Turn left at the traffic light, and the hotel will be one mile further on the left.

From Philadelphia International Airport
Take Interstate 95 North to Exit 46A. Continue on Route 1 North to the Oxford Valley Exit. At the top of the ramp, turn right and the hotel is 1/4 of a mile further on the right.

From U.S. Route 1 South
Take U.S. Route 1 South to the Oxford Valley Road Exit and turn left at the light. The hotel is a 1/4 of a mile further on the left.

From I-95 South
Take I-95 South to Exit 46A to Route 1 North. Follow Route 1 North to the Oxford Valley Road Exit and turn right at the light. The hotel will be on the left.



The Catalysis Club of Philadelphia: 2006-2007 Meeting Schedule

Thursday, 9/28/06
Prof. James Dumesic, University of Wisconsin
2006 Catalysis Club of Philadelphia Award Lecture
"*Catalytic Production of Liquid Fuels and Chemicals from Biomass-derived Oxygenated Hydrocarbons*"
Rohit Vijay,University of Delaware – Student Talk (15 min)
"Discovery and Mechanistic Investigation of Cobalt Containing NSR Catalysts"

Thursday, 10/19/06
Dr. Steven H. Overbury, Oak Ridge National Laboratory
"Experimental and Computational Studies of Reaction Pathways and Size Dependence in Au Catalysis"
Parag R. Shah, University of Pennsylvania – Student Talk (15 min)
"Redox Properties of Supported Vanadia Systems"

Thursday, 11/9/06
(Joint w CSNY)
Dr. Stu Soled, ExxonMobil
"Supported Metal Catalysts: Some Interesting New Leads in an Old Field and Use of Zeta Potential Measurements in Catalyst Characterization"

Thursday, 1/25/07
Prof. Lanny Schmidt, University of Minnesota
"Hydrogen from Renewable Fuels in Millisecond Reactors"

Thursday, 2/22/07
Prof. Galen Stucky, University of California at Santa Barbara
"Title to be announced"

Thursday, 3/22/07
Dr. Andy Walker, Johnson Matthey
"Autocatalysts: Past, Present, and Future"

Thursday, 4/19/07
Dr. Stacey Zones, Chevron
"Complexities in Understanding the Synthesis and Characterization Features for High Silica Zeolites"

Thursday, 5/17/07
Spring Symposium

Catalysis Club of Philadelphia Company Representatives 2006-2007

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