Catalysis Club of Philadelphia

Thursday, September 18, 2008
Holiday Inn Select Hotel
Naamans Road and I-95, Claymont, DE

2008 CCP Award Lecture:
Benefits of Diffusion Control in Chemical Processes

Dr. David Olson
Rutgers University

&

Nanoparticle precursors and phase selectivity in hydrothermal synthesis of zeolite beta

Nathan Hould
University of Delaware
(Student Talk, 15 minutes)

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 Hawaiian *- Served with Grilled Pineapple & Sweet and Sour Sauce*
Broiled Filet of Salmon *- Served with a Pomerey Mustard Sauce*
Penne Pommodoro

Meal reservations - Please notify your company representative or Alan Lee Stottlemyer (alan@udel.edu, phone: 302.831.6915, fax: 302.831.1048) by ***Thursday, September 11***.

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.

Catalysis Club of Philadelphia

Thursday, September 18, 2008

Holiday Inn Select Hotel

Naamans Road and I-95, Claymont, DE

2008 CCP Award Lecture:

Benefits of Diffusion Control in Chemical Processes

Dr. David Olson

Rutgers University

Abstract

Typically the economics of commercial chemical processes require that there be sufficient reaction time for the reactants to achieve near equilibrium concentrations. Fast reactions put special demands on catalyst design in order to minimize mesopore and micropore diffusion limitations. However some reactions benefit from differences in the diffusion rates of the reaction components especially where the fast diffusing component is the desired product and where the yield of the desired product reaches a maximum before the system reaches equilibrium. The reactions of light aromatics catalyzed by the medium pore zeolite ZSM-5 provides several examples of this phenomenon. Catalysts can be designed to maximize this benefit. Also, several examples of the benefits of diffusion control in separations have been studied and will be discussed. At least one of these is practiced commercially. The unique structural features responsible for these benefits will be discussed.

Speaker's Bio

Dr. Olson has been involved in zeolite research for over 40 years, including 33 years at Mobil and since then has served as Adjunct Professor at the University of Pennsylvania and more recently at Rutgers University. Illustrative of his many significant scientific and technological achievements are his structural works on rare earth X and Y zeolites, ZSM-5 and their application to petrochemical processes, including the use of ZSM-5 as a xylene isomerization catalyst. He is cofounder of the Structure Commission of the International Zeolite Association and served as its chair for over six years. In addition, he organized and for many years chaired the North East Corridor Zeolite Association (NECZA). He is co-author of the Atlas of Zeolite Structure Types, which is a well-known handbook for researchers in the field of zeolites. He is also the recipient of the 2008 Catalysis Club of Philadelphia Award. The 2008 Award recognizes Dr. Olson for his innovative and pioneering work in the field of zeolite crystal chemistry, adsorption and catalysis and for his organizational leadership.

Catalysis Club of Philadelphia

Thursday, September 18, 2008

Holiday Inn Select Hotel

Naamans Road and I-95, Claymont, DE

Nanoparticle precursors and phase selectivity in hydrothermal synthesis of zeolite beta

Nathan Hould

Department of Chemical Engineering

University of Delaware

(Student Talk, 15 minutes)

Abstract

The crystallization mechanism of zeolite beta in relatively dilute solutions composed of 1 SiO_2/80 H_2O/0.25 TEA_2O/4 EtOH/(0.05 + Y) Na_2O/Y Al_2O_3 where Y is 0 and 0.01 was investigated using small angle x-ray scattering, dynamic light scattering, x-ray diffraction, and electron microscopy. In this system there is a critical aggregation concentration (cac) for silica above which silica monomers and oligomers aggregate into primary nanoparticles (< 3 nm). When these solutions are heated (120 ^{o}C) some of the primary particles transform into larger secondary particles (6 - 50 nm). In solutions without aluminum the secondary particles remain stable for extended periods of time. In solutions with aluminum the secondary particles aggregate into tertiary particles (zeolite beta, > 200 nm). The tertiary particles initially have poor long range order and an oblate morphology. They evolve into zeolite beta crystals with longer range order, a smoother surface, and a square bipyramidal morphology by solution mediated silica reorganization.