ChE Graduate Seminar Series

Departmental Seminars Presented by Ph.D. Students

Presentation of Department Awards

9th May 2013, Thursday, 0400-0415 pm, ChE Seminar hall

Best Research Poster (MTech/PhD):

First Prize: Certificate + Rs. 5,000
Mr. Murali M. Seepana (PhD)
Title: Synthesis and Characterization of Ion-Exchange Membrane for Vanadium Redox Flow Battery (VRB)
Supervisor: Dr. Anupam Shukla

Second Prize: Certificate + Rs. 3,000
Ms. Hemlatha Annepu (PhD)
Title: Miniature Pattern Formation in Soft Thin Elsatic Film
Supervisor: Dr. Jayati Sarkar

Third Prize: Certificate
Mr. Amandeep Jindal (PhD)
Title: Development of Carbon Nitride Nanofibers and its Application for Oxygen Reduction Reaction in Fuel Cells
Supervisor: Prof. S. Basu

Best Design Projects (CHP311 - 2011 entry students):

First Prize: Certificate + Rs. 4,000
Yash Dalmia, Praduman Arora, Mayank Mishra, Kritagya Kumar
Title: Generation of Bio-Gas from kitchen waste fodder
Supervisor: Dr. Sanat Mohanty

Second Prize: Certificate
Rini Kapoor, Aayushi Dixit, Surbhi Soni, Priyanka Gupta, Shivangi
Title: Separation and Analysis of Mixtures of Dyes
Supervisor: Dr. Sanat Mohanty

Methane Activation over Bifunctional Zeolites

B. Pradeep Kumar (Advisor: Prof. Sreedevi)

9th May 2013, Thursday, 0415-0445 pm (20+10 mins), ChE Seminar hall

The conversion of methane directly to higher hydrocarbons and aromatics is extremely difficult. If technologies are made available for the conversion of the natural gas or methane to easily transportable less volatile value added products such as aromatic hydrocarbons, a far reaching economic impact can be achieved which will also lead to exploration of more gas-rich field and also natural gas hydrates increasing the natural gas reserves. Methane is the most stable and symmetric organic molecule consisting of four C–H covalence bonds with bond energy of 435 kJ/mol. accordingly, the effective activation and direct conversion of methane are also a great challenge in the science of catalysis. Methane direct conversion to aromatic at high temperature led to poor economics associated with a low yield of the desired hydrocarbon products and higher deactivation. Zeolites such as ZSM-5 have been found to be active for low temperature conversion to more valuable hydrocarbons with and without oxidants.

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This research work describes the process for the preparation of bifunctional zeolite (H-GaAlMFI, Nano-ZSM-5) catalyst by different methods and conversion of methane into aromatics and hydrocarbons in gasoline range. The prepared catalyst were characterized using X-ray diffraction, BET, FTIR, temperature programmed reduction and thermogravimetric analysis. The activity was tested in a fixed bed quartz tube reactor at different temperature and atmospheric pressure. The detailed kinetic investigation were performed on promising bifunctional zeolite catalyst, which comprises of treating the bifunctional zeolite catalyst, containing one or more transition elements, having strong dehydrogenation and acid sites with a mixture of (10%) N2,(90%) CH4and the prior to reaction catalysts were activated with mixture of H2 and CH4 at 5500C.Direct conversion of methane to Higher hydrocarbons also performed at temperature above 7000C.Oxygenate assisted methane conversion reactions were conducted at temperature starting from 4500C-6000C.Effects of methane and methanol mole ratio in the feed and flow rate wasstudied. The product selectivity of C2-C5 hydrocarbons was increased on modified Nano-HZSM-5. We have investigated 13C methanol labeled experiment to study the role of methanol in reaction mechanism. These studies show that product coming from methane and methanol are mixed and direct methane conversion was observed. Based on these results reaction mechanism was proposed.

0445 pm High Tea

CC
All ChE Faculty
Department N. B.
PhD Students (near biometric device)
Mr. Krishna (for audio/video help)
ChE office: refreshment arrangements
Ms. Tajinder: for information/coordination