SACRAMENTO STATE

Department of Physics & Astronomy Spring 2006

Physics Colloquium Series
Student Talks

Questioning a Future That Can Meet Our Energy Demands

Over the past one hundred years, global demand for energy has grown as populations worldwide continue to expand at an exponential rate. An exploration and analysis of energy expenditure and consideration for alternative forms of new and old technologies will be the key to supply the demands for future generations.

Jon Villalva

Kinetic Measurements of Solid State Metal Cation Migration Through Zeolite Material Using Diffuse Reflectance Fourier Transform Infrared Spectroscopy

Zeolites are extremely porous crystalline aluminosilicate materials with large surface areas. This facilitates their extensive use in research and industry as heterogeneous catalysts, purification media, separation substrates and ion exchange materials. Solid state metal cation migration through zeolites has been shown to play a fundamental role in dictating adsorption, catalytic reactivity, contributing to catalyst deactivation and contamination, and facilitating the synthesis of new catalysts through solid state ion exchange with salts. In the present work, Diffuse Reflectance Fourier Transform Infrared Spectroscopy (DRIFT) and a pyridine probe molecule have been employed to measure the rate of metal ion migration through a series of zeolite structures. It has been observed that the rate of metal ion migration depends strongly on the size and complexity of the pore system, the relative humidity, and the character of the metal ions involved. These results along with a proposed mechanism supported by our kinetic observations will be presented.

Benjamin Topham

Tuesday, May 9, 2006
4:00-5:20 PM MND 1015

OPEN & FREE TO ALL STUDENTS, FACULTY & PUBLIC