NECP Nanoscale Engineering Certificate Program

Fall 2004 Seminar Series

Membrane-Based Nanostructured Materials for Environmental Applications

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The incorporation of selected types of polypeptides and the in-situ synthesis of nanoparticles in membranes allows highly tunable separations and toxic organic destruction at room temperature. For example, the use of polypeptides with helix-coil transitions allows nano-domain interactions in membrane pores for selective environmental separations (using layer-by-layer nano-assembly in pores) and for the capture of various metals. The presentation will include the role of nano-domain interactions for separations, synthesis methods of nano-structured metals (bimetallic systems, Fe/Ni and Fe/Pd) in membrane domain, and the use of these materials for toxic metal separations and organic dechlorination at room temperature. With membranes containing nanosized metals (25 – 30 nm) we have demonstrated highly enhanced organic dechlorination rates at room temperature and a significant reduction in materials usage.

Brief Bio: Prof. Dibakar Bhattacharyya (DB) is the University of Kentucky Alumni Professor of Chemical Engineering and a Fellow of the American Institute of Chemical Engineers. He is the Co-Founder of the Center for Membrane Sciences at the University of Kentucky. He has published over 160 refereed journal articles and 20 book chapters, and has recently received four U.S. Patents (on functionalized membranes and hazardous waste destruction technology). Dr. Bhattacharyya has received a number of awards for his research and educational accomplishments, including the 2004 Kirwan Prize for Outstanding Research, Larry K. Cecil AIChE Environmental Division Award, the Kentucky Academy of Sciences Distinguished Scientist Award, Henry M. Lutes Award for Outstanding Undergraduate Engineering Educator, AIChE Outstanding Student Chapter Counselor Awards, and the University of Kentucky Great Teacher (1984 and 1996) Awards. He is the Editor (with A. Butterfield as Co-Editor) of a recently published book on "New Insights Into Membrane Science and Technology: Polymeric and Biofunctional Membranes", Elsevier, 2003.

This NECP Seminar is jointly sponsored by the Center for Nano-Scale Science and Engineering (CeNSE), and the Departments of Chemical and Materials Engineering, Electrical and Computer Engineering, and Mechanical Engineering.

Refreshments and pastries will be available before the seminar starts.

September 30, 2004
Physics/Chemistry Auditorium 155
University of Kentucky, Lexington, KY
12 – 1 pm