



*NEBRASKA CENTER FOR MATERIALS AND
NANOSCIENCE SEMINAR SERIES PRESENTS*



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DEVELOPMENT OF HYBRID ANALYTICAL TECHNIQUES FOR THE CHARACTERIZATION OF NANOPOROUS ELECTRODES

Nanostructured, porous materials offer great promise for application in areas such as energy storage, photovoltaics, and catalysis. These materials are often difficult to characterize because they are structurally and compositionally inhomogeneous and with features too small to be resolved by scanning probe techniques such as atomic force microscopy (AFM) and scanning electron microscopy (SEM). These shortcomings require development of new analytical techniques that can be applied to real world systems to elucidate how the interplay of material composition and structure alters their performance.

Towards this end, we have worked to combine complimentary techniques which together allow us to simultaneously probe electrochemical, optical, and physical characteristics of advanced materials. For example, the development of a hybrid quartz crystal microbalance/ellipsometric porosimetry (QCM/EP) technique has been pursued to facilitate the determination of a number of material parameters such as porosity, pore size distribution and surface area. Simultaneous acquisition of both mass-based and refractive index based adsorption isotherms fosters mechanistic understanding about the behavior of adsorbates confined in mesopores while at the same time reducing the uncertainty in the analysis of the optical parameters acquired via ellipsometry.

**Wednesday, January 13, 2010
Nebraska Hall W129
12:30 p.m.**

**Host:
Professor
Mathias Schubert
Electrical Eng.**

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