Northeastern University
College *of* Engineering

Please join us for a

SPECIAL SEMINAR

Thursday, March 17, 2011
448 Curry Student Center
1:30 p.m. – 2:30 p.m.

"Thin Film Atomic Layer Deposition: Surface Reactions and Applications in Solar Energy Conversion"

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ABSTRACT

Solar photovoltaic devices convert sunlight into electrical energy. However, storing large amounts of electrical energy is a significant challenge, especially for portable uses such as personal transportation. Solar photoelectrochemistry is gaining attention as a means to convert sunlight directly into chemical forms (such as hydrogen) that can then be used to form liquid fuels that are easy and safe to transport, and where the energy density is much a larger than in batteries. A key roadblock is that active photoelectrochemical semiconductor surfaces often suffer from parasitic corrosion that degrades performance over time. Our research group explores chemical reactions during vapor phase atomic layer deposition (ALD) and related molecular layer deposition (MLD) processes to prepare nanoscale thin film semiconductors, metals, insulators, and polymers for electronic, photovoltaic and other applications. We find that ALD offers unique opportunities in semiconductor photoelectrochemistry, including surface passivation and nanostructure surface modification, and may help enable low-cost photoelectrochemical water dissociation into hydrogen and oxygen. This presentation will include an overview of ALD surface reaction chemistry, and I will discuss recent advances in our lab where we apply ALD to problems in dye sensitized solar cells and photoelectrochemistry. I will also touch on opportunities for ALD and MLD to form hybrid organic/inorganic framework polymers as well as porous nanolayers and coatings for energy conversion, chemical separations and other applications.

Refreshments will be served.