

# MATERIALS CHEMISTRY SEMINAR



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### “Electrochemical Synthesis of Electrode Materials with Controlled Architectures for Use in Clean Energy Production.”

Most modern power generation devices (e.g. photovoltaics, photoelectrochemical cells, fuel cells, and batteries) are composed of semiconducting and metallic thin film type electrodes and catalysts. When the electrodes are processed as polycrystalline films to meet the cost constraint for commercial viability, particle shapes, sizes, orientations, and interconnections significantly affect the chemical and physical factors that define the energetics and kinetics of these electrode materials. Therefore, rationally controlling micro- and nano-scale structures of electrode materials that compose polycrystalline films, and understanding the effects that micro- and nanostructures have on functional properties are the keys to producing highly efficient and cost effective electrode materials. To address these issues, we have been developing new electrochemical synthetic strategies to systematically and precisely direct micro and nano-level morphologies in polycrystalline electrodes (Figure 1). In this presentation, we will discuss in detail the design, control, and optimization of various electrode morphologies (semiconductors, catalysts, conducting polymers), and their applications for clean energy production (e.g. solar energy conversion).

Thursday, April 21, 2011  
12:15 pm in 1315 Chemistry