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Department of Chemistry

Seminar

9:45 a.m. Thursday, November 13, 2014 • 331 Smith Hall



Associate Professor

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Department of Chemistry
University of Michigan

New Frontiers in Semiconductor Electrochemistry: Electrochemical Liquid-Liquid-Solid (ec-LLS) Crystal Growth

Research interests: Understanding, designing, and developing more efficient electrode surfaces for systems based on interfacial charge transfer.

Website: http://www.lsa.umich.edu/chem/people/faculty/ci.maldonadostephen_ci.detail

Abstract

This presentation will describe our latest results in the area of direct electrodeposition of crystalline Groups IV and III-V semiconductors. The central thesis of the talk is that liquid metals represent powerful platforms to perform both electrochemistry and crystal growth in concert. A brief historical overview of liquid metals in electroanalytical chemistry will be given, highlighting the long-recognized limitation of liquid metal electrodes for the analysis of metals through stripping voltammetry. This 'problem' is the same phenomenon we are now exploiting as a controllable covalent semiconductor crystal growth method. Data will be presented that shows the direct electrodeposition of desirable Group IV and III-V semiconductors with liquid metal electrodes immersed in aqueous and non-aqueous solutions. Through a process we refer to as an electrochemical liquid-liquid-solid (ec-LLS) crystal growth, we demonstrate the capacity to electrodeposit both crystalline semiconductors AND semiconductor devices. A final discussion will be given on the broader utility of viewing conductive metal electrodes as useful reactants in metallurgical reactions.

Host: Professor Wayne Gladfelter
Refreshments will be served prior to the seminar.