

CHEMICAL ENGINEERING

SEMINAR SERIES



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Ohio University

Electrochemical Conversion of Biorefinery Waste to Industrial Chemicals

ABSTRACT: Shifting reliance of transportation fuels and industrial chemicals from petroleum to more domestically-sourced, renewable raw materials could address the issues of climate change and United States energy and materials security. Next-generation lignocellulosic biofuels represent a prime example. These fuels are generated from a diverse range of biomass, including grasses, woody biomass and agricultural residue such as corn stover. Unfortunately, the conversion process can be energy-intensive, and the cost of the resulting biofuel cannot compete with petroleum-derived fuels on a per-gallon basis. One reason for this is that lignin, which lends support to plant cell walls and typically comprises 20-30% of biomass, cannot readily be converted to biofuel, and leaves the process as a waste stream. Biorefining facilities currently burn this lignin waste to recover some process energy. Lignin's polyaromatic structure, however, lends to this biopolymer potential applications beyond that of a low-grade fuel. Unfortunately, lignin is difficult to depolymerize in an efficient, controlled manner. Our group is investigating electrochemical depolymerization pathways to convert lignin to precursors useful for resin synthesis. Electrochemical techniques could potentially result in a more controlled depolymerization mechanism, and have the added advantage of simultaneous co-generation of hydrogen. This seminar will focus on our efforts in developing this electrochemical depolymerization process, and will address some of the challenges we face with this process.

BIOGRAPHY: John Staser is an associate professor in the Department of Chemical and Biomolecular Engineering at Ohio University and an affiliated faculty member of the Center for Electrochemical Engineering Research. John's research encompasses electrochemical conversion of biomass, electrochemical supercapacitors, electrochemical sensors and batteries. He is a member of the Nanoscale and Quantum Phenomena Institute at Ohio University and the chair of the Industrial Electrochemistry and Electrochemical Engineering division of the Electrochemical Society.

RECEPTION 3:30 • LECTURE 4:00 – 5:00
PHYSICS ASTRONOMY BLDG. PAA A 114

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