SEMINAR SERIES

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SUSTAINABLE MANUFACTURING OF CHEMICALS AND NANOMATERIALS

This presentation will first highlight electrochemical manufacturing of chemicals from renewable feedstocks. Our efforts on synthesis / assembly / characterization / testing of catalysts, electrodes, electrolysis reactor designs, and process intensification approaches have led to several promising systems for the electroreduction of CO2 to chemicals such as CO, ethylene, and ethanol on the cathode, as well is the same in co-conversion with the oxidation of biomass adducts like glycerol to value-added products on the anode. We applied technoeconomic and life cycle analysis to evaluate the different processes for application in chemical manufacturing at scale.

The second part will cover autonomous flow synthesis systems for the efficient discovery and production of nanomaterials such as quantum dots that enable the energy efficient high tech applications that our modern society demands. Precise control over temperature and residence time made possible in multi-zone continuous flow reactor designs provides improved control over the composition, size, and shape of semiconducting nanoparticles that are key for their optical properties. Automation of all components, inclusion of inline spectroscopic characterization and automated spectral analysis, as well as ensemble neural network-based machine learning enabled fully autonomous discovery and mapping of synthesis space.

JOHNS HOPKINS
WHITING SCHOOL of ENGINEERING
Materials Science and Engineering

Wednesday, October 6
@ 2:30 pm
Mudd Hall Room 26
See event page for Zoom info