

# JEFFREY I. ZINK INORGANIC CHEMISTRY SEMINAR



## Prof. Van Sara Thoi

Department of Chemistry, Johns Hopkins University

### “Designing Functional Sites in Porous Materials for Energy Storage and Conversion”

**Abstract:** Despite their high theoretical specific energy of 2,600 Wh kg<sup>-1</sup>, the commercialization of lithium-sulfur batteries is hindered by irreversible capacity loss from the dissolution of polysulfide intermediates in the electrolyte solution. We report novel strategies to design reactive sites for polysulfide adsorption in metal-organic frameworks (MOFs) to improve capacity retention and ionic conductivity. Incorporation of redox-active moieties in the framework further enable fast charge and discharge capabilities. These design elements ultimately enhance the charge storage ability and cycle life of the batteries. In addition, we present new methods to convert carbon dioxide to value-added products electrochemically. The introduction of charged organic additives to the electrolyte allows fine control over the interfacial proton concentration, leading to high carbon product selectivity. Furthermore, we demonstrate the feasibility of carbon dioxide as a feedstock for electrochemical C-N coupling. Our work demonstrates the importance of precisely engineered electrolyte-electrode interfaces for selective activation and transformation of small molecules.

#### Meet the Speaker

11:00 a.m. | YH 3096

Wednesday, October 12<sup>th</sup>, 2022

UCLA College | Physical Sciences  
**Chemistry & Biochemistry**

More information: [stephanie.Lo@chem.ucla.edu](mailto:stephanie.Lo@chem.ucla.edu)

4:00 p.m. | YH4222 - Collaboratory  
Yoo Seminar & Conference Room