JEFFREY I. ZINK INORGANIC CHEMISTRY SEMINAR SERIES

Prof. Matthew Gebbie

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“Exploring how ionic correlations influence ion transport and electron transfer in electrochemical systems”

Abstract: Electrochemistry will play a key role in mitigation of waste associated with energy and chemical production. In electrochemical devices, high ion concentrations and large electrode potentials often induce strong ion-ion correlations, driving ions to assemble into nanostructured networks. While ion interactions are known to govern properties in concentrated electrolytes, many questions persist surrounding how ion assembly influences ion transport and electron transfer. We aim to address these questions by using ionic liquids as model systems for investigating how collective ion assembly can promote selective redox ion transport and alter electrocatalytic activity. I will discuss three examples of how we are studying ionic liquids to explore the link between ion correlations, transport, and electron transfer in electrochemical systems. I will discuss our research aimed at linking electric double layer formation to rates and selectivity of electrocatalytic reactions. I will then highlight a microscopy approach to quantifying lithium flux in ionic liquids, opening the door to direct observation of redox ion flux in electrolytes. I will conclude by explaining how we are using entropic driving forces to design electrolytes that bridge the gap between existing solids and liquids for next-generation batteries. Using these examples, I will highlight how modulation of nanoscale ion assembly provides opportunities to address emerging needs in energy storage and chemical production.

Meet the Speaker
11:45 a.m. | YH 3096

Wednesday, October 7th, 2026
4:00 p.m. | YH4222 - Collaboratory
Dongwon Yoo Seminar & Conference Hall

UCLA College | Physical Sciences Chemistry & Biochemistry

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