

Seminar

Interfacial Electrochemistry of Hydrogen Evolution and Carbon Dioxide Reduction Reactions: From Understanding to Engineering

Nandita Mohandas

TIFR, Hyderabad

Electrochemical energy systems are central for the development of sustainable technologies, steering the transition towards a carbon-neutral future. Important heterogeneous electron transfer processes, such as the hydrogen evolution reaction (HER) and the carbon dioxide reduction reaction (CO₂RR), which are integral to this transition, are governed by a rich interplay of processes occurring at the electrochemical interface. In this talk, I will discuss how surface-sensitive vibrational spectroscopic techniques (IR and Raman) and molecular dynamics simulations can be used to understand the interfacial electrochemistry. I will also present how I used targeted electrode–electrolyte interface engineering strategies to tune the interfacial water structure, thereby enhancing the activity and selectivity of electrochemical processes like HER and CO₂RR. These studies highlight the importance of understanding and engineering the electrochemical interface, opening several avenues for the development of better electrochemical systems.

Monday, May 11th 2026

11:30 Hrs (Tea / Coffee 11:15 Hrs)

Auditorium, TIFRH