

# “Deciphering Surface Mediated Thermo- and Electro- Catalytic Reactions with in-situ Spectroscopies”

171 Durham, Thursday, March 2<sup>nd</sup>, 11:00 a.m.



## Bingjun Xu

*Assistant Professor,  
Department of  
Chemical and  
Biomolecular  
Engineering,  
University of  
Delaware*

Developing active, selective and energy efficient heterogeneous catalytic processes is key to a sustainable future because heterogeneous thermo-/electro- catalysis is at the center of the chemicals and energy industries. Molecular level understanding of the interaction between the substrate and the surface provides the basis for rational catalyst design. Application and development of spectroscopic techniques capable of probing properties of catalytic sites and identifying reaction intermediates at or close to reaction conditions are key to establishing reliable structure-activity relations. We employ attenuated total reflection – surface enhanced infrared absorption spectroscopy (ATR-SEIRAS) to investigate the electrode surface mediated reactions, e.g., electrochemical reduction of CO<sub>2</sub>, and interplay between electrolytes and electrodes, e.g., the influence of nonspecific adsorption of cations on the adsorbates. Combining with isotopic labeling and electrokinetic techniques, a comprehensive mechanistic understanding of surface-mediated electrochemical processes could be achieved. Further, variations of infrared spectroscopic techniques are also powerful in obtaining mechanistic information in biomass upgrading processes, which will be demonstrated with the example of selective methyl lactate dehydration on cation exchanged zeolite catalysts.

**Refreshments will  
be provided in  
2061 Sweeney Hall  
at 10:30 a.m.**

*If you plan to attend,  
**email a question to**  
[bellinda@iastate.edu](mailto:bellinda@iastate.edu)  
and your question will  
be forwarded to the  
speaker!*

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