

# Departmental Seminar

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**April 19, 2017  
CHEM 113 4:00 PM**

### **Manipulating the Redox Chemistry of Bimetallic Complexes and Organic Macrocycles for Small Molecule Activation and Water Remediation**

Multi-electron redox chemistry is an important topic in the area of energy conversion because systems dealing with the activation of small molecules require the addition or subtraction of more than one electron. The understanding of multi-electron redox chemistry at the molecular level, crucial for the reactivity of small molecules that have energy or environmental impact, is still at its infancy. My research group efforts have focused **in the area of the synthesis of molecular platforms that can perform (1) multi-electron redox chemistry and (2) environmental remediation**. To this end, we are using several approaches at the molecular, 3D crystalline materials and nanoparticles level to study the basic chemistry of multi-electron redox systems and their applications towards environmental science. We will describe our efforts in the synthesis of bimetallic complexes with open coordinating sites; the manipulation of the electronic structure of these bimetallic units; the electrocatalytic activities of organic macrocycles towards the reduction of protons to molecular hydrogen; the synthesis of novel 3D extended networks towards CO<sub>2</sub> adsorption; and our efforts in synthesizing novel nanoengineered materials for water remediation. We will discuss these projects, their motivation, our results, our ongoing efforts, and our future work.