PHYSICAL CHEMISTRY SEMINAR

Wednesday, January 17, 2023
10:30-11:30 a.m. BRWN 4102

"Understanding the Chemical Properties of Undercoordinated Transition Metal Complexes on Surfaces Using Ion Soft-Landing"

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Abstract:

Transition metal complexes are species of interest for electrocatalytic applications and the development of energy storage devices. Catalytically active transition metal complexes are typically formed through ligand loss at interfaces. Ligand loss is also believed to be a main degradation pathway for the degradation of photosensitizers. Undercoordinated transition metal complexes (UTMC) are elusive species in the condensed phase due to their high reactivity towards solvent molecules or background ions, making it challenging to isolate and characterize them. UTMCs can be generated inside a mass spectrometer using gas phase ion chemistry, where the vacuum conditions facilitate their isolation. The UTMCs prepared this way can then be gently deposited onto surfaces to study their chemical properties, a technique called ion soft-landing. In this presentation, I will show that both the identity of the metal center and ion-surface interactions influence the geometry and, consequently, the reactivity of fully coordinated and undercoordinated transition metal complexes on surfaces. Overall, the presentation will show that deposition of mass-selected ions onto surfaces is a powerful technique for preparing well-defined interfaces and facilitates the study of complex chemical processes happening at the interface.

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