Pr Linus CHANG / University of the Fraser Valley, British Columbia, Canada

University of the Fraser Valley, British Columbia, Canada
https://www.ufv.ca/chemistry/contact-us/faculty/chiang-linus.htm

Biologically inspired mono- and bi-metallic complexes coordinated by redox-active ligands.

Summary: In Nature, metalloenzymes utilize earth abundant metals in their active sites towards substrate activation. These reactivities are often attributed to the formation of metal-containing intermediates with unique electronic structures, such as oxidized metal centers and/or ligand species, or involvement of multiple metals cooperatively. These observations have attracted significant research interest towards the isolation and characterization of synthetic analogues in attempts to harness, or even improve upon these impressive reactivity feats.

To this end, this seminar will discuss our group's efforts on the synthesis, spectroscopic (UV-Vis-NIR, X-ray absorption, EPR) and theoretical (DFT, TD-DFT) characterization, and electrochemistry of biologically inspired metal complexes. Their unique electronic structures were accomplished via ligand design: for example, we have recently reported a novel tetradentate bis(amidateanilido) ligand that not only stabilizes oxidized metal centers upon deprotonation, but can also undergoes ligand oxidation upon the addition of a suitable chemical oxidant. The resulting species, which contains an oxidized metal center coordinated by a ligand radical, are akin to Compound I in Cytochrome P450. Similarly, the synthesis and characterization of pyridazine-bridge bimetallic complexes coordinated by redox active iminosemiquinone ligands, inspired by particulate methane monooxygenase and galactose oxidase respectively, will also be discussed.