Inorganic Seminar

Title: "Multimetallic cylcophanates: unravelling redox cooperativity with small molecules activation"

Guest Speaker:

Professor
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Friday, November 2, 9:00am
Hutchison Hall 473
University of Rochester
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Abstract:: Biological systems utilize metal-ion redox cooperativity within metal clusters to catalyze multi-electron redox reactions under ambient conditions and at biologically-accessible reduction potentials (e.g., N_2 reduction). These reactions are essential to atom cycles in biosphere and are of great societal value for renewable energy and improved food production. In contrast, few synthetic clusters are capable of performing these reactions, suggesting that the protein matrix affords unique control of electronic and steric effects to access this reactivity. To understand how structural and electronic parameters dictate cooperative effects in metal clusters, we employ macrobicycles as ligands to enforce *a priori* control of the electronic environment and the relative spatial arrangement of metal ions within metal clusters. Recent results from our ongoing work on small molecule activation employing these template multimetallic compounds include N_2 fixation and CO_2 reduction. These results are a departure from the reactivity of the monometallic analogs, providing a framework for harnessing and understanding cooperative reactivity.

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