Seminar

3:45 p.m.
Tuesday, January 10
331 Smith Hall

Postdoctoral Fellow

David Harris, Ph.D.

Harvard University

Molecular and Electronic Structure Considerations in Magnetic Relaxation and Multi-Electron Reactivity

Abstract

The presentation describes the utility of synthetic inorganic chemistry and simple electronic structure considerations in controlling magnetic phenomena at the molecular level and in directing multi-electron reaction chemistry using multinuclear transition metal clusters. In particular, judicious selection of electronic configuration in metal ions, coupled with a building block synthetic approach, is shown to provide the first examples of transition metal-based mononuclear single-molecule magnets, a cyano-bridged chain compound that features the strongest ferromagnetic coupling ever observed through cyanide, and a series of isostructural single-chain magnets with significant magnetic relaxation barriers. In addition, a weak-field hexaamide ligand is employed to direct the formation octahedral Fe_6 clusters. Within these clusters, the Fe_6 core can be stabilized and structurally characterized in eight oxidation states. Finally, the Fe_6 platform mediates a proton-induced reduction of six equivalents of nitrite to give an $Fe_6(NO)_6$ cluster, representing an overall six-electron reductive process.

Hosts: Professors Christopher Cramer and Wayne Gladfelter
Refreshments will be served prior to the seminar.