Synthesis, Characterization, and Reactivity of Heterobimetallic Copper-Metal Oxo Intermediates

John T. York and William B. Tolman

Department of Chemistry and Center for Metals in Biocatalysis, University of Minnesota, Minneapolis, Minnesota, USA.

The reactivity of synthetic copper(I) complexes with dioxygen has been well studied, with many forming dinuclear Cu_2O_2 intermediates at low temperature. These 2:1 Cu/O_2 species generally result from the rapid reaction of free copper(I) complex with monomeric 1:1 Cu/O_2 adducts in solution. While much effort has been directed towards understanding the effect of ligand environment on the structural nature and reactivity of these dicopper-O_2 intermediates, little is known about the effect of substituting one copper center with another metal ion. In this investigation, we are exploring the reactivity of various copper(I) complexes with monomeric metal oxo and peroxo species at low temperature. The synthesis, characterization, and reactivity of several heterobimetallic oxo intermediates will be presented.