Understanding the Properties and Reactivity of Bio-inspired Manganese Complexes.

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Manganese-dependent enzymes mediate biological process ranging from the detoxification of reactive oxygen species in humans to the conversion of water to dioxygen, protons, and electrons in plants.[1-2] Proposed mechanisms for these enzymes involve formation and decay of manganese-oxygen intermediates (such as manganese-hydroperoxo and manganese-hydroxo species).[3-4] The goal of this project is to use synthetic, spectroscopic, and kinetic methods to understand the physical properties and reactivities of model complexes that mimic enzymatic intermediates (Figure 1). A particular focus is to determine how the coordination environment controls proton-coupled electron-transfer reactions. REU participants will receive training in i) synthesis of organic ligands,[5] ii) generation of transition-metal complexes,[6] iii) spectroscopic methods,[7] and iv) kinetic techniques.[8-10] Past undergraduates have applied methods such as magnetic circular dichroism,[7] electron paramagnetic resonance,[11-12] and ^{1}H NMR spectroscopy[13-14] to characterize manganese-oxygen complexes. These research experiences greatly expand the range of inorganic methods to which an undergraduate is typically trained.

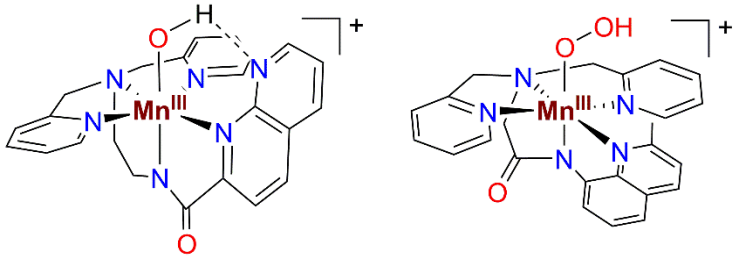

Figure 1. Representative examples of Mn^{III}-hydroxo (left) and Mn^{III}-hydroperoxo (right) model complexes.

References.

Names of non-KU REU authors are in **bold**; Names of other undergraduates are underlined.

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