

Progress Towards Model Complexes of the Cu_z Center from Nitrous Oxide Reductase

Lei Yang, Urmila Chaudhuri, Laura Whiteaker and Robert P. Houser*

Department of Chemistry and Biochemistry, University of Oklahoma

The last step in the denitrification process is the reduction of N₂O to N₂, catalyzed by nitrous oxide reductase (N₂OR). Recently, a novel μ_4 -sulfide bridged tetranuclear copper cluster, Cu_z, was identified and shown to be the N₂O binding site by spectroscopic evidence. However, questions still remain about the properties and catalytic mechanism of this catalytic center. Furthermore, model complexes with a Cu₄S center like Cu_z are unknown and only a few compounds bearing (μ - η^1 : η^1 -disulfido)- and (μ - η^2 : η^2 -disulfido)dicopper centers have been developed. In an effort to gain insight into the properties and redox behavior of this discrete Cu-S center, we set out to synthesize model complexes of Cu_z and to investigate their spectroscopic and reactivity properties. We used a new class of low denticity pyridylmethyl amide ligands (HL^R), and have generated three new compounds that contain mixed-valence or Cu(I) centers. We will present the structural and spectroscopic aspects of these complexes, and progress toward copper sulfide species that model Cu_z center.