The last step in the denitrification process is the reduction of N₂O to N₂, catalyzed by nitrous oxide reductase (N₂OR). Recently, a novel \( \mu_4 \) -sulfide bridged tetranuclear copper cluster, \( \text{Cu}_4 \), 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 Cu₄ are unknown and only a few compounds bearing \( (\mu-\eta^1:\eta^1\text{-disulfido}) \) and \( (\mu-\eta^2:\eta^2\text{-disulfido}) \) dicopper centers have been developed. In an effort to gain insight into the properties and reactivity behavior of this discrete Cu-S center, we set out to synthesize model complexes of \( \text{Cu}_2 \) 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 \( \text{Cu}_2 \) center.