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**Abstract Title: Discovering chelate Copper(I) and Gold (I) Compounds**

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The coinage metals are all relatively inert and corrosion resistant. However, their coordinated cations are not chemically unreactive as their metal elements. The +1 cation of the group 11 elements have  $d^{10}$  electron configuration. These cations prefer a tetrahedral geometry. On the contrary, the constraints of our PNP ligand prohibited this approach. Thus, making PNP<sub>2</sub>Cu or PNP<sub>2</sub>Au monomer is not very energetically favorable.

<sup>1</sup>H and <sup>31</sup>P NMR data suggests C<sub>2v</sub> symmetry for both copper and gold PNP complex. Even though they both have only 16 electrons, Lewis acidic behavior of CuPNP or AuPNP is limited. The copper or gold PNP complex does not react with acetonitrile, carbon monoxide, triphenylphosphine and 4-Dimethylaminopyridine.

Because of the low oxidation state of copper and gold, reactivity of PNP<sub>2</sub>Cu or PNP<sub>2</sub>Au with oxidative compounds is investigated. Oxygen gas have been shown to have very slow reaction rates with the CuPNP complex to generate a dark green product. Xenon difluoride reacts with CuPNP within mixing even at -40 degrees to produce a red to purple product, then slowly degrades back to colorless again.