

Further Studies on Copper-Cyanide Networks

Dr. Peter WR Corfield¹, Alvin M F Varona¹, Tristan B DaCunha¹, Nurul B Eisha¹, Ahmed Elsayed¹

¹Chemistry Dept. Fordham University

pcorfield@fordham.edu

Copper(I) cyanide networks incorporating amine bases exist in a variety of forms, depending on the bases used. Our goal is to understand how the bases template the CuCN network which forms, so that we can learn how to design specific networks. The structures of three new CuCN network compounds involving isopropylethanolamines have been determined, each with its own CuCN network. We will compare network classifications and cation-network interactions for these with our other structures. Thermal gravimetric analyses of seven of our CuCN network solids incorporating cations from substituted ethanolamines show that in each case the original base is liberated as a first step, along with HCN gas. We have also prepared neutral mixed-valent copper cyanide 2D network structures in which the Cu(II) atoms are integrated into the network. Reactions including bases 3-aminopropanol or 2-aminoisopropanol form green crystals composed of planar CuCN 18-membered ring networks with alternating Cu(I) and Cu(II) atoms. The Cu(II) atoms are in an uncommon trigonal bipyramidal coordination, with equatorial CN groups and N-bonded bases in the axial positions. The 3-aminopropanol syntheses also yielded red crystals composed of 2D networks in which linear Cu(I)CN chains are linked by dimeric Cu(II) units with chelating anions formed from the bases by loss of OH protons.

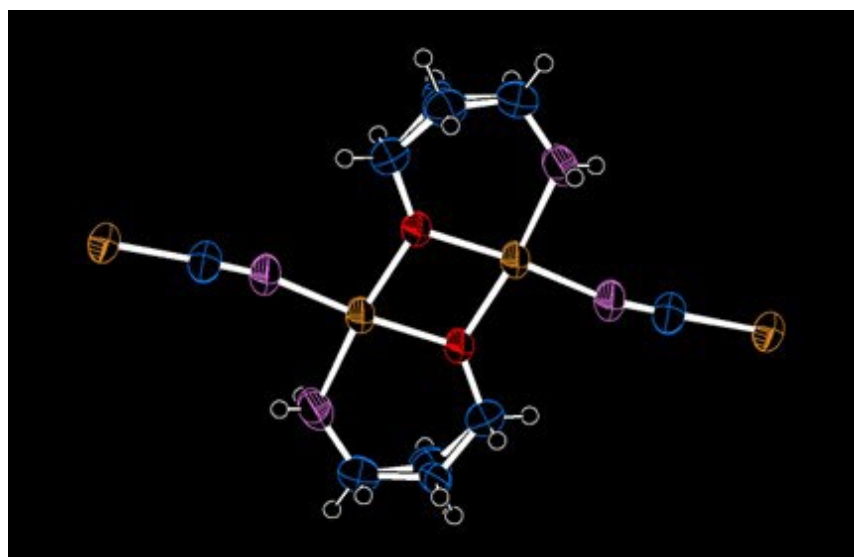


Figure 1