Ligand K-Edge Study of M(Pdtc)L Complexes

Alexander Fryett *, Biological and Physical Science, Montana State University - Billings, Billings
Kyle Pickens, Biological and Physical Science, Montana State University - Billings, Billings
Siana Wiles, Biological and Physical Science, Montana State University - Billings, Billings
Dr. Matt Queen, Biological and Physical Science, Montana State University - Billings, Billings

*Indicates Presenter

Carbon tetrachloride is a known carcinogen that can cause cancer related illnesses when it is dechlorinated by Cytochrome P450, located in the human liver. Environmental reduction of carbon tetrachloride can produce lesser chlorinated intermediates, such as the trichloromethyl radical, which is harmful to living organisms. [Cu(PDTC)L]- has shown to be able to dechlorinate carbon tetrachloride so that it will produce CO2 and chloride, which are environmentally safe compared to lesser chlorinated intermediates. The mechanism between [Cu(PDTC)L]- and carbon tetrachloride is poorly understood. This study links the dechlorination reactivity of a series of [M(PDTC)L]- complexes (L = Cl-, CN-, and PPh3 and M = Cu and Ni) to the individual electronic structures of each complex by using sulfur k-edge. We find that reactivity of a given [Cu(PDTC)L]- species is linked to the lability of L in a given solvent rather than to the relative covalency of the M-S bond in each species.