**Synthesis and catalytic studies of metalloporphyrin complexes as biomimetic models for cytochrome P450 enzymes**

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**Abstract:**

 Metabolic oxidations relating to the protein class known as the cytochrome P450 enzymes hold key knowledge about biological chemistry and the efficient processes undergone to maintain life. These enzymes are present in most metabolic reactions and can function out of body in crucial industrial processes; however, there exist gaping unknowns with respect to them due to their immense nature. In this work, synthesis and characterization of iron and manganese complexes supported by a 5, 10,15, 20-tetrakis-(2,6 dichlorophenyl)porphyrin ligand, abbreviated as MIII(TDCPP)Cl (M = Fe, Mn) was conducted. Oxidation reactions catalyzed by these synthetic catalysts were investigated. As determined by GC-MS spectrometer, remarkable efficiency and high selectivity were observed for a variety of organic substrates. Mechanistic studies were performed to probe for the nature of oxidizing intermediaries relevant to the catalytic reaction. Specifically, the porphyrin-iron(IV)-oxo Compound II models were generated under a known chemical and a novel photochemical method.