

Molecular Structures of Pyridine Derivatives of Some First Row Transition Metal Sulfates

James Golen¹, Duyen Pham², David Manke³, Ava Park⁴

¹*UMass Dartmouth* ²*University of Massachusetts Dartmouth*, ³*University of Massachusetts Dartmouth*, ⁴*Portsmouth Abbey School*
jgolen@umassd.edu

In continuation of our studies on pyridine derivatives with first row transition metal sulfates we determined the molecular structures of a series of pyridine, 4-methylpyridine, 3-methylpyridine, and 3,5-dimethylpyridine aqua transition metal sulfate complexes. The pyridine and methylpyridine aqua metal sulfate complexes generate structures that show infinite one dimensional polymeric chains of alternating metal ions and sulfato ligands with the general form $\{[M(H_2O)_2(Py)_2]SO_4\}_x$. The metal ions are in octahedral environments with aqua ligands cis to each other and trans to pyridine ligands. Intermolecular hydrogen bonding of many of these complexes generate coupled rows. The 3,5-dimethylpyridine aqua metal sulfate complexes form an isostructural series of ionic complexes with the form $[M(H_2O)_5(Py^{**})]SO_4$. The hydrogen bonding for this series is between the aqua ligands and the sulfate ions. At higher concentrations of the transition metal sulfates, nonaqueous complexes are formed for many of the pyridine derivatives. Some of the more unique structural features of these complexes will be presented.