Fe(II), Fe(III) and Co(II)-Complexes with Aromatic Nitrogen-Containing Ligands

Hilde Grove, Karl W. Törnroos, *Department of Chemistry, University of Bergen, Norway.* E-mail: hilde.grove@kj.uib.no

Spin crossover compounds change electronic state in response to external perturbations such as change in temperature, pressure or irradiation. Complexes of Fe(II), Fe(III) and Co(II) can exhibit spin crossover behavior combined with suitable ligands. In this work 2,6-bis(2-pyridyl)-4(1*H*)-pyridone (OHterpy) 4'-Chloro-2,2':6',2''-terpyridine (Clterpy), 2,3,7,8-Tetrakis(2-pyridiyl)pyrazino[2,3-g] quinoxaline (BL2), and 2,3,2',3'-tetrakis(2-pyridyl)-6,6'-biquinoxalinyl (BL3) are used as ligands to obtain new spin crossover compounds. The spin crossover and possible hysteresis effects are highly dependent on intermolecular interactions within the crystals; changing the counter ion or solvent can affect both the crossover temperature and the evolution of it, as well as the hysteresis properties. $[Co(II)(OHterpy)_2]X_2{\cdot}nH_2O$ exhibits spin crossover with X = ClO_4^- [1]. $[Co(II)(OHterpy)_2](NO_3)_2{\cdot}0.5H_2O$ was synthesized and crystals were obtained by slow diffusion of $Co(NO_3)_2{\cdot}6H_2O$ and OHterpy in methanol. The compound crystallizes in the triclinic space group P-1 with unit cell dimensions: a = 8.831 Å, b = 8.875 Å, c = 18.588 Å, α = 86.13º, β = 84.01º, γ = 89.00º. Co-N distances in this hexacoordinated complex are 1.893 Å for both Co-$N_{central}$, and vary from 2.069 to 2.086 Å for the four Co-N_{distal}. The data were collected at 153 K, and judging from the Co-N distances only, the compound is predominantly low spin at this temperature.

[1] Gaspar A.B., Munoz M.C., Niel V., Real J.A., *Inorg. Chem*, 2001, **40**, 9.

Keywords: transition metal complexes, aromatic nitrogen-containing ligands, spin crossover