

Panana Kitiphaisalnont 2010: Effect of Dicarboxylic Acids on the Formation of the Metal Organic Framework Complexes Containing 1,10-Phenanthroline. Doctor of Philosophy (Chemistry), Major Field: Chemistry, Department of Chemistry. Thesis Advisor: Associate Professor Sutatip Siripaisarnpipat, Ph.D. 169 pages.

Under solvothermal conditions at 150°C 24 hr and 72 hr, the effect of anions of copper salt on the reactions of Cu(II) ions, phenanthroline and hydroxyl dicarboxylate anions was observed. $\text{Cu}(\text{NO}_3)_2 \cdot 3\text{H}_2\text{O}$ cleaved malate and tartrate into oxalate resulting in two different structures. The former is mononuclear complex, $[\text{Cu}(\text{ox})(\text{phen})(\text{H}_2\text{O})] \cdot \text{H}_2\text{O}$ (**1**) and the latter is polymeric complex, $[\text{Cu}(\mu\text{-ox})(\text{phen})]_n$ (**3**). Their structures are different from the complex **4**, which is synthesized by direct reaction of $\text{Cu}(\text{NO}_3)_2 \cdot 3\text{H}_2\text{O}$ and oxalic acid at the same condition. The non-hydroxycarboxylate succinate anions solvothermally react with $\text{Cu}(\text{NO}_3)_2 \cdot 3\text{H}_2\text{O}$ and phenanthroline yielding tetranuclear complex **2**, $[\text{Cu}_4(\mu\text{-suc})_2(\text{phen})_4(\text{H}_2\text{O})_4](\text{NO}_3)_4 \cdot 4\text{H}_2\text{O}$. The solvothermal reactions of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ with malate and with tartrate give isostructural sulfato copper(II) complexes, $[\text{Cu}(\mu\text{-SO}_4)(\text{phen})(\text{H}_2\text{O})_2]_n$, (**6**). The elemental and infrared analyses reveal that the complexes obtained from the reaction of $\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$, malate (or tartrate) and phenanthroline (**7**, **8**) are isostructure with the formula $[\text{Cu}(\text{phen})_2\text{Cl}_2]$.

The complexes obtained from the reactions of $\text{MnCl}_2 \cdot 4\text{H}_2\text{O}$ with malate, tartrate or succinate by simple wet method have same structures as that obtained by solvothermal method. Their structural formula is *cis*- $[\text{Mn}(\text{phen})_2\text{Cl}_2]$.

The infrared, UV-Vis and thermal analyses are consistent with their crystal structures.

Student's signature

Thesis Advisor's signature