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Example lab report of Synthesis of potassium tris (oxalato) ferrate (III) trihydrate Posted by Nurul Yunaliyana Experiment 5: Synthesis of potassium tris (oxalato) ferrate (III) trihydrate Purpose: to synthesis potassium tris (oxalato) ferrate (III) trihydrate , K3 [Fe (C2O4)3]. 3H2O. Introduction: Ferrous ammonium sulfate, Fe(NH4)2(SO4)2. 6H2O is dissolved in a slightly acid solution, excess oxalic acid, H2C2O4, is added and the following reaction takes place: Fe(NH4)2(SO4)2. 6H2O + H2C3O4 FeC2O4(s) + H2SO4 + (NH4)2SO4 + 6H2O FeC2O4 is finely divided precipitate and tends to be colloidal.

However, heating the solution causes it to coagulate and facilitates separating the precipitate from the solution. Potassium oxalate is added to the FeC2O4 precipitate, which produces a slightly basic solution for the oxidation of the ferrous ion to the ferric ion, by hydroxide, H2O2. The following reaction takes place: H2O + HO2- +2Fe2+ 2Fe3+ + 3OH- The OH- ion concentration of the solution is high enough so that some of the Fe3+ reacts with OH- to form ferric hydroxide(brown precipitate) as follows: Fe3+ + 3OH- Fe(OH)3 With the addition of more H2C2O4, the Fe(OH)3 dissolves and the soluble complex K3[fe(c2o4)3]. h20 is formed according to : 3k2C2O4 + 2Fe(OH)3 + 3H2C2O4 2K3[Fe(c2o4)3]. 3H20 + 3h2o Ethanol is added to the solution to cause the complex iron salt to precipitate. Data analysis and Discussion: In this experiment, I have studied how to synthesis coordination compound. Coordination compounds are formed when a neutral metal atom: Fe acting as a Lewis acid, reacts with some neutral molecules, acting as Lewis bases; or when a metallic cation, acting as a Lewis acid, reacts with any of a variety of organic or inorganic molecules, cations, or anions, acting as Lewis bases.

These Lewis bases: C2O4 and H2O are called ligands. (Lewis acids are electron pair acceptors and Lewis bases are electron pair donors. Ferrous ammonium solution is added with oxalic acid dihydrate solution will form yellow solution with yellow precipitate. Fe(NH4)2(SO4)2. 6H2O + H2C3O4 FeC2O4(s) + H2SO4 + (NH4)2SO4 + 6H2O Then it is heated to boiling and the supernatant is decanted. As it is added with solid potassium oxalate, it is allowed to heat at 40 0 C and drop wise added with H2O2 and the solution turns to brown with precipitate for the oxidation of the ferrous ion to the ferric ion.

H2O + HO2- +2Fe2+ 2Fe3+ + 3OH- Fe3+ + 3OH- Fe (OH) 3 Next, more oxalic acid dihydrate is added until the solution turns to colourless. 3k2C2O4 + 2Fe (OH) 3 + 3H2C2O4 2K3 [Fe (c2o4)3]. 3H20 + 3h2O The colourless solution is boiled then it turns to pale green solution. The solution is filtered then leaves for crystallization. After that, the green crystal is filtered and washed with 1: 1 ethanol/ water and cooled acetone. The mass of bright (luminescent) green crystals is obtained which is 3. 2822 g. So, the percent yield of K3[Fe(C2O4)3]. H2O that I have obtained is 47. 72 %. The precautions that we must take are while heat the solution of ferrous ammonium sulfate and solution of oxalic acid dihydrate as it will bump. Next, beware of temperature (at least 40 0 C) of solution when add H2O2 into the solution. The next experiment is determination of the percentage of ligands in coordination compounds. Conclusion : I have studied how to synthesis coordination compound which is potassium tris (oxalato) ferrate (III) trihydrate , K3 [Fe (C2O4)3]. H2O. The mass of bright (luminescent) green crystals is obtained which is 3. 2822 g. So, the percent yield of K3[Fe(C2O4)3]. 3H2O that I have obtained is 47. 72 %.

## Reference:

1. 1. Hadariah Bahron, Kamariah Muda, S. Rohaiza S. Omar, Karimah Kassim (2011).
2. Inorganic Chemistry. Experiments for Undergraduates, UPENA UiTM 2008.
3. http://chem. science. oregonstate. edu/courses/ch221-3s/ch223s/2010\_U\_session\_1/Report\_Guideline\_Green\_Crystal\_Sp\_2010. pdf