To Prepare a Pure Sample Of the Complex Potassium Trioxalatoferrate (III), $Kg[Fe(C_2O_4)_3l . 3H_20$

Theory

The complex potassium Trioxalatoferrate (III) can be prepared by dissolving freshly prepared ferric hydroxide in a solution of potassium oxalate and oxalic acid.

$$\underset{162.7}{FeCl_3} + 3KOH \longrightarrow \underset{107}{Fe(OH)_3} + 3KCl$$

$$\underset{2 \times 107}{2Fe(OH)_3} + 3\underset{3 \times 126}{\begin{vmatrix} COOH \\ | \\ COOH \end{vmatrix}} . 2H_2O \longrightarrow \underset{376}{Fe_2(C_2O_4)_3} + 12H_2O$$

$$\underset{376}{Fe_2(C_2O_4)_3} + 3\underset{3 \times 184}{\begin{vmatrix} COOK \\ | \\ COOK \end{vmatrix}} . H_2O \longrightarrow \underset{2 \times 491}{2K_3[Fe(C_2O_4)_3]} . 3H_2O$$

Requirements

Three beakers (250 mL), china dish, funnel, funnel-stand, glass-rod, wash bottle, tripod stand and wire gauze. Ferric chloride, oxalic acid hydrated, potassium oxalate and potassium hydroxide.

Procedure

1. Dissolve 3.5 g of anhydrous ferric chloride 50 mL of distilled water in a 250 mL beaker.
2. In another beaker dissolve 4 g of potassium hydroxide in 50 mL of water.
3. Add KOH solution to $FeCl_3$ solution in small portions with constant stirring. Filter the precipitates of ferric hydroxide so formed through a buchner funnel. Wash the ppt. with distilled water.
4. In another beaker (250 mL) take 4 g of hydrated oxalic acid and 5.5 g of hydrated potassium oxalate. Add about 100 mL of water and stir thoroughly to get a clear solution.
5. Add the freshly prepared $Fe(OH)_3$ ppt. in small amounts to the above solution with constant stirring. The ppt. get dissolved. If ppt. does not dissolve then warm it and leave the contents for some time.
6. Filter and transfer the filtrate to china dish and heat on a sand bath or wire-gauze to obtain crystallisation point.

7. Now place the china dish on a beaker full of cold water and keep it aside for crystallisation. China dish should be covered with a black paper as the complex is sensitive to light.
8. Decant off the mother liquor, wash the crystals with a small amount of ethyl alcohol and dry them between the folds of filter paper.
9. Find out the weight of the crystals.

Observations

Weight of the crystals obtained = ……..g
Colour of the crystals is……..

Precautions

1. Do not concentrate the solution too much.
2. Let the concentrated solution cool slowly and undisturbed to get large crystals.