To Prepare a Pure Sample Of Ferrous Ammonium Sulphate (Mohr's salt), [$FeSO_4$. $(NH_4)_2$ SO_4.$6HO_20$]

Theory

Mohr's salt is prepared by dissolving an equimolar mixture of hydrated ferrous sulphate and ammonium sulphate in water containing a little of sulphuric acid, and then subjecting the resulting solution to crystallisation when light green crystals of ferrous ammonium sulphate. $FeS0_4$. $(NH_4)2S0_4.6H_20$ separate out.

$$\underset{\substack{\text{Ferrous sulphate}\\ 278}}{FeSO_4.7H_2O} + \underset{\substack{\text{Ammonium sulphate}\\ 132}}{(NH_4)_2SO_4} \longrightarrow \underset{\substack{\text{Mohr's salt}\\ 392}}{FeSO_4.(NH_4)_2SO_4.6H_2O} + H_2O$$

Requirements

Two beakers (250 ml), china-dish, funnel, funnel-stand, glass-rod, wash-bottle, tripod stand and wire-gauze. Ferrous sulphate crystals, ammonium sulphate crystals, dilute sulphuric acid and ethyl alcohol.

Procedure

1. Take a 250 ml beaker and wash it with water. Transfer 7.0 g ferrous sulphate and 3.5 g ammonium sulphate crystals to it. Add about 2-3 ml of dilute sulphuric acid to prevent the hydrolysis of ferrous sulphate.
2. In another beaker boil about 20 ml of water for about 5 minutes to expel dissolved air.
3. Add the boiling hot water to the contents in the first beaker in small instalments at a time. Stir with a glass rod until the salts have completely dissolved.
4. Filter the solution to remove undissolved impurities and transfer the filtrate to a china-dish.
5. Heat the solution in the china-dish for some time to concentrate it to the crystallisation point.
6. Place the china-dish containing saturated solution over a beaker full of cold water. On cooling crystals of Mohr's salt separate out.
7. Decant off the mother liquor quickly. Wash the crystals in the china-dish with a small quantity of alcohol to remove any sulphuric acid sticking to the crystals.
8. Dry the crystals by placing them between filter paper pads.

Observations

Weight of crystals obtained =…….. g
Expected yield = ……..g
Colour of the crystals = ……..
Shape of the crystals =……

Note: The crystals of Mohr's salt are monoclinic in shape.

Precautions

1. Cool the solution slowly to get good crystals.
2. Do not disturb the solution while it is being cooled.
3. Do not heat the solution for a long time as it may oxidize ferrous ions to ferric ions.