Inorganic prepartions
Experiment No. 11

Date: / /

Aim: To prepare a pure sample of Ferrous Ammonium Sulphate (Mohr's salt).

Theory: Mohr's salt is one of the important laboratory reagent and used as a reducing agent. Chemically Mohr's salt is Ferrous Ammonium Sulphate (F.A.S.), an example of 'double salt'. It is prepared by dissolving an equimolar mixture of hydrated ferrous sulphate ($FeSO_4.7H_2O$) and ammonium sulphate [$(NH_4)_2SO_4$] in acidified water. Mohr's salt [$FeSO_4.(NH_4)_2SO_4.6H_2O$] crystallize as faint green coloured solid.

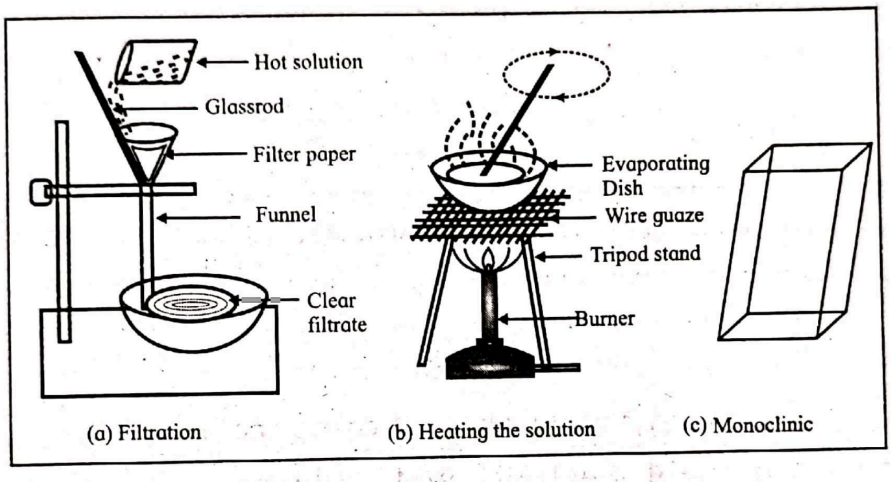
Chemical Equation:

$$\underset{(278)}{FeSO_4.7H_2O} + \underset{(132)}{(NH_4)_2SO_4} \longrightarrow \underset{(392)}{FeSO_4.(NH_4)_2SO_4.6H_2O} + H_2O$$

Apparatus: China dish, beakers, funnel, glass rod, tripod stand, wire gauze, pair of tongs etc.

Chemicals: Ammonium sulphate, ferrous sulphate, dilute sulphuric acid, etc.

Diagram:



Procedure:

1. Weigh accurately 3.5 g ferrous sulphate and 1.5 g ammonium sulphate and transfer into 100 mL beaker. Add about 2-3 mL of dilute sulphuric acid to prevent hydrolysis of ferrous sulphate.
2. In another 100 mL beaker boil about 20 mL of distilled water. Now add the boiling water to the contents of first beaker. Stir with a glass rod until the salts are completely dissolved.
3. Filter the hot solution to remove undissolved impurities and transfer the solution (filtrate) to a china dish. Heat the solution to concentrate up to the point of crystallization and cool it naturally to get good yield.
4. Filter the crystals to separate the mother liquor.
5. Wash the crystals with alcohol and dry it. The shape of Mohr's salt crystals is monoclinic.

Observations and Result:

1. Yield of ferrous ammonium sulphate crystals = 0.82 .....g
2. Colour of ferrous ammonium sulphate crystal is = light green
3. Shape of ferrous ammonium sulphate crystals = octahedral

Remark and sign of teacher: .....
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MCQ

Select [✓] the most appropriate answer from given alternatives of each sub question.

1. The mineral acid used in preparation of Mohr's salt is.....
   a. dil. HCl b. conc. HCl
   ✓c. dil. H_2SO_4 d. conc. H_2SO_4
2. Molar mass of Mohr's salt is ....
   ✓a. 392 g/mol b. 278 g/mol c. 132 g/mol d. 3.5 g
3. The shape of ferrous ammonium sulphate crystal is....
   a. monoclinic ✓b. octahedral c. hexagonal d. cubic
4. Concentration of filtrate leads to formation of pure crystals of Mohr's salt, the process involved is known as ....
   ✓a. crystallization b. fractional crystallization
   c. purification d. evaporation
5. The cooling of concentrated solution of F.A.S. is always done slowly....
   a. to get good colour b. to get shining crystals
   ✓c. to get good yield d. to get minimum crystals

Short answer questions

1. Why the concentrated solution should not be heated for a long time?

Ans. because small amount of remain will also get destroyed

2. What is crystalization point?

Ans. The temp. at which solid state begins to form, resulting in a mixture of solid particals and solutions.

3. Why dil. H_2SO_4 is added during preparation of Mohr's salt?

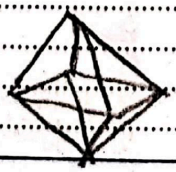
Ans. To prevent hydrolysis in aqueous solution the dil. H_2SO_4 is added during preparation of mohr's salt.

4. In which type of volumetric titration Mohr's salt is used.

Ans. Redox titration

5. Draw the shape of Mohr's salt crystals?

Ans. octahedral shape



Remark and sign of teacher: .....