

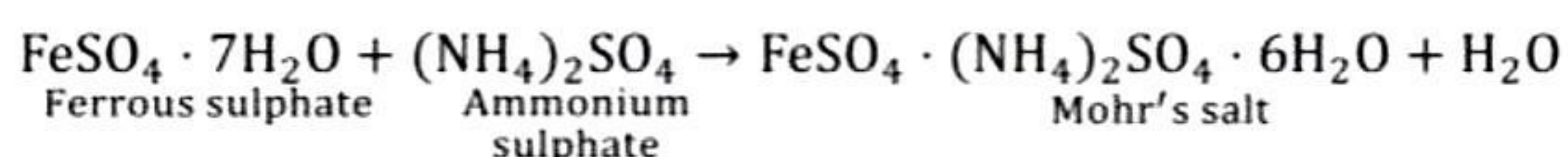
EXPERIMENT

Aim

To Prepare a Pure Sample of Ferrous Ammonium Sulphate (Mohr's salt), $\text{FeSO}_4 \cdot (\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$.

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 crystallization when light green crystals of ferrous ammonium sulphate, $\text{FeSO}_4 \cdot (\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$ separate out.



Material Required

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 crystallization 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.

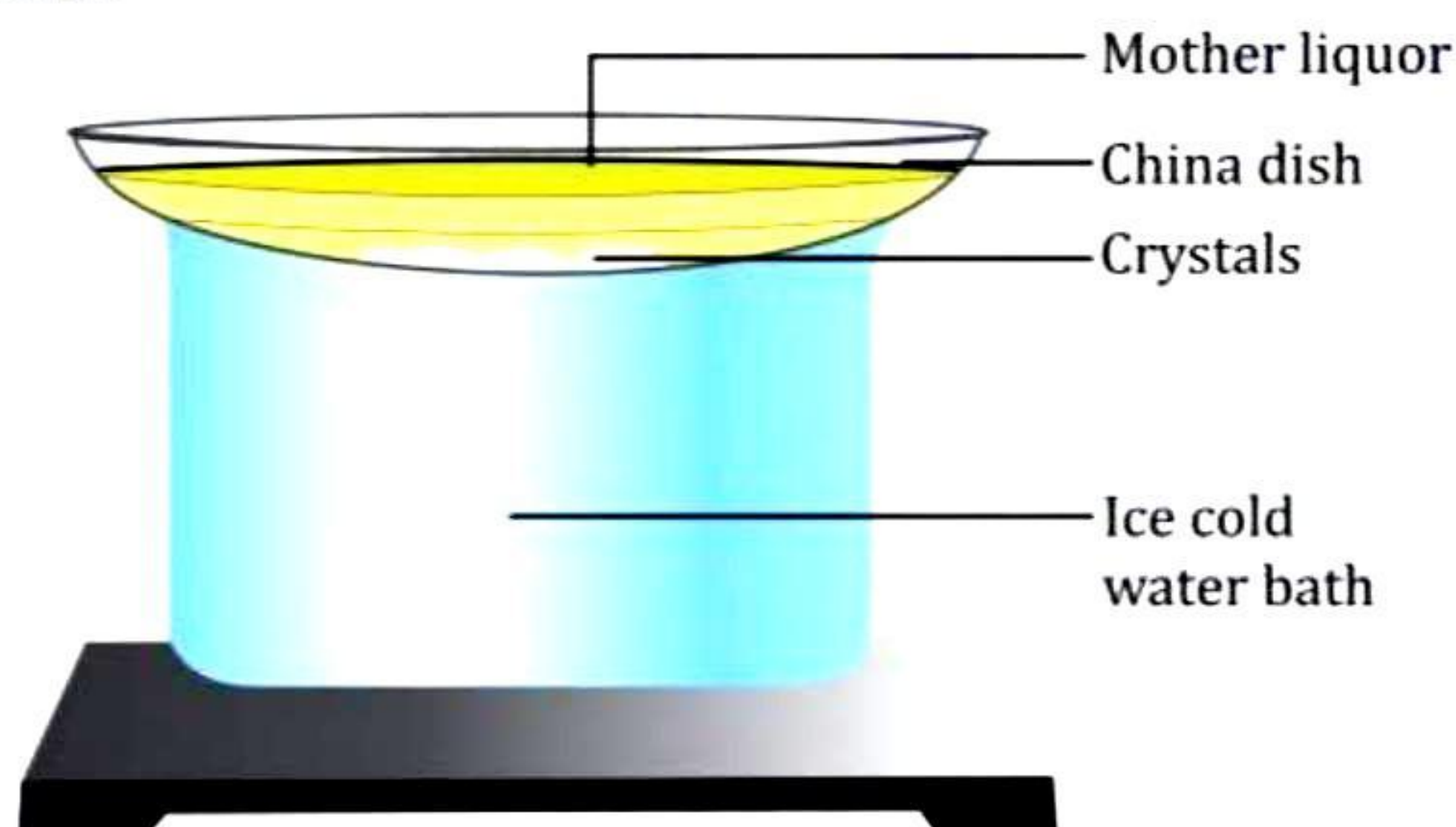


Fig.8. Preparation of Mohr's Salt

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.

Result

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

VIVA VOCE

Q 1. What is the chemical formula of ferrous ammonium sulfate?

Ans. The chemical formula of ferrous ammonium sulfate is $\text{FeSO}_4 \cdot (\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$.

Q 2. Why is ferrous ammonium sulfate often used in laboratories?

Ans. Ferrous ammonium sulfate is often used in laboratories because it serves as a stable and reliable reagent, particularly as a reducing agent in redox titrations and for calibrating iron solutions. Its well-known stoichiometry and ease of preparation make it suitable for various analytical and educational purposes.

Q 3. What is the purpose of preparing a pure sample of ferrous ammonium sulfate?

Ans. Ferrous ammonium sulfate is used in laboratories as a standard solution for experiments, calibrations, and educational demonstrations due to its defined stoichiometry and role in redox reactions. It ensures accurate and reliable results in various chemical analyses.

Q 5. Describe the procedure for preparing a pure sample of ferrous ammonium sulfate.

Ans. To prepare a pure sample of ferrous ammonium sulfate, weigh and dissolve crystals in distilled water, filter to remove impurities, adjust concentration if needed, and store the solution properly.

Q 6. Why is dilute sulfuric acid used in the preparation process?

Ans. Dilute sulfuric acid is used in the preparation process to maintain acidic conditions, prevent hydrolysis, and ensure the stability of ferrous ammonium sulfate during the dissolution of the crystals.

Q 7. Why is filtration necessary in the preparation?

Ans. Filtration is necessary in the preparation to separate impurities and undissolved particles, ensuring a pure sample of ferrous ammonium sulfate in the filtrate.