

EXPERIMENT

Aim

To Prepare a Pure Sample of Potash Alum (Fitkari), $[K_2SO_4 \cdot Al_2(SO_4)_3 \cdot 24H_2O]$.

Theory

Potash alum is prepared by dissolving an equimolar mixture of hydrated aluminium sulphate and potassium sulphate in minimum amount of water containing a little of sulphuric acid and then subjecting the resulting solution to crystallization, when octahedral crystals of potash alum separate out.

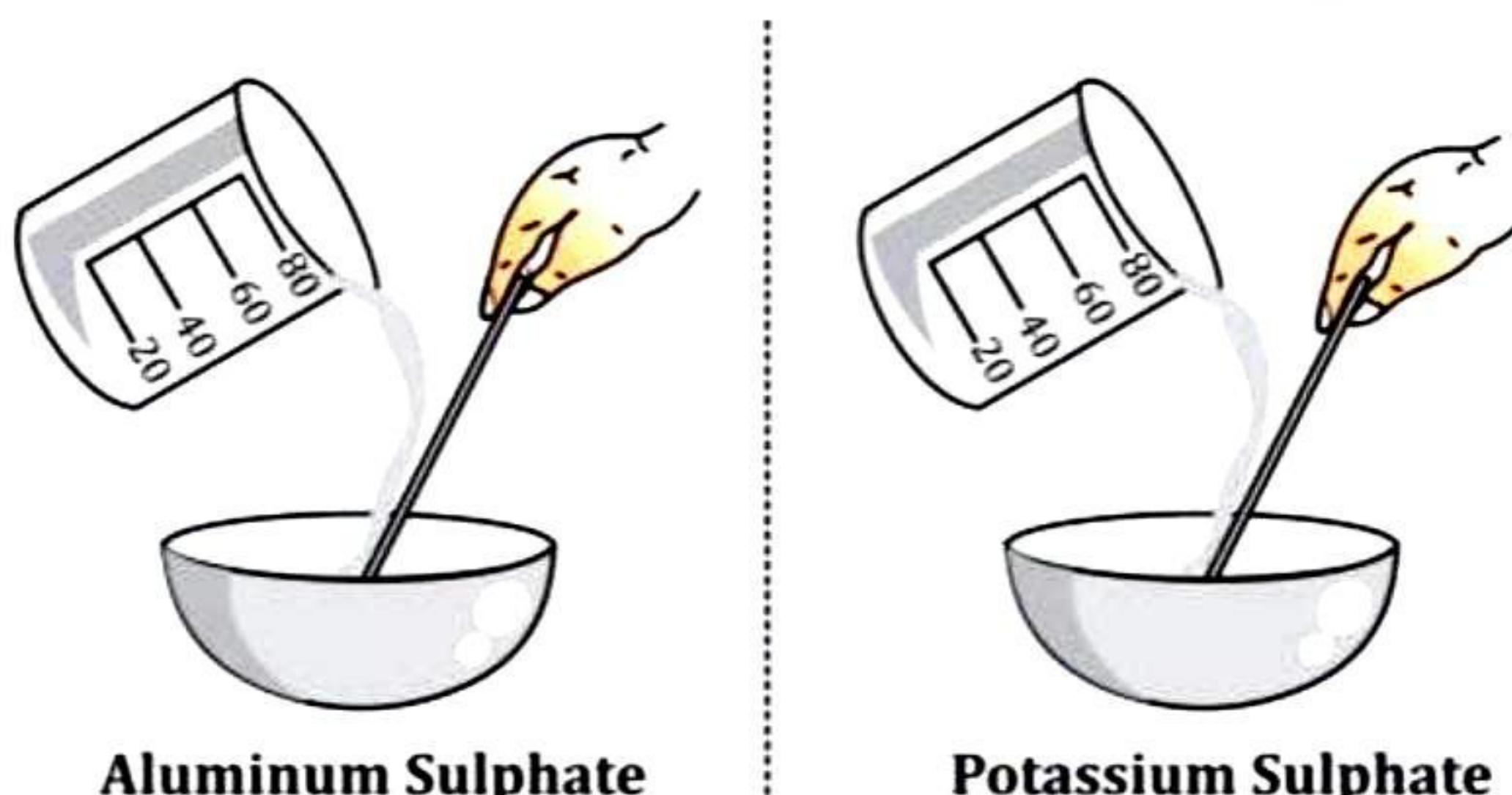
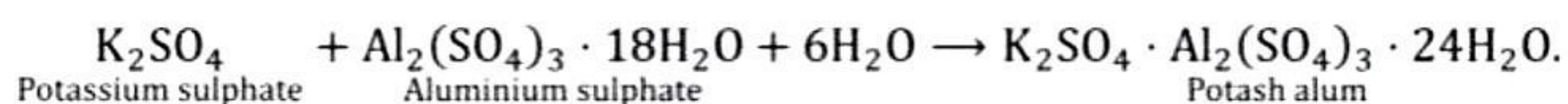


Fig.9.

Material Required

Two beakers (250 ml), China-dish, funnel, funnel-stand, glass-rod, wash-bottle, tripod stand and wire-gauze. Potassium sulphate, aluminium sulphate, and dil. sulphuric acid.

Procedure

1. Take a 250 ml beaker. Wash it with water and then transfer 2.5 g potassium sulphate crystals to it. Add about 20 ml of water. Stir to dissolve the crystals. Warm it if required.
2. Take the other 250 ml beaker, wash it with water and then transfer 10 g aluminium sulphate crystals to it. Add about 20 ml of water and 1 ml of dilute sulphuric acid to prevent hydrolysis of aluminium sulphate. Heat for about 5 minutes. If milkiness still persists, filter the solution.
3. Mix the two solutions in a China-dish and place the China-dish on a wire-gauze placed over a burner. Stir the solution with a glass-rod. Concentrate the solution till the crystallization point is reached. Place the dish over a beaker containing cold water.
4. Soon the crystals of potash alum separate out. Decant off the mother liquor and wash the crystals with a small quantity of ice-cold water.

5. Dry the crystals by placing them between filter paper pads or by spreading them over a porous plate.

Observations

Weight of crystals obtained =g

Expected yield =g

Colour of the crystals =

Shape of the crystals =

Note: The crystals of potash alum are octahedral in shape

Result

1. Weight of crystals obtained = ____ gm

2. Colour of the crystals = ____

3. The crystals of potash alum are octahedral in shape.

Precautions

1. To prevent hydrolysis of aluminium sulphate, dilute sulphuric acid should be added while preparing the saturated solution.
2. Cool the solution slowly to get good crystals.
3. Do not disturb the solution while it is being cooled.

VIVA VOCE

Q 1. Why is potash alum considered a double salt?

Ans. Potash alum is a double salt because it contains two different cations (potassium and aluminum) and two sulfate anions.

Q 2. What is the role of dilute sulfuric acid in the preparation of potash alum?

Ans. Dilute sulfuric acid is used to acidify the solution and provide the necessary acidic medium for the reaction to occur.

Q 3. Why is it important to cool the solution slowly during the preparation process?

Ans. Slow cooling ensures the formation of large, well-formed crystals of potash alum, contributing to the purity of the sample.

Q 4. Explain the principle behind the preparation of potash alum.

Ans. The preparation of potash alum involves the double displacement reaction between aluminum sulfate and potassium sulfate.

Q 5. Discuss the applications of potash alum in various industries.

Ans. Potash alum is used in water purification, cosmetics, food industry, and as a mordant in dyeing.

Q 6. Explain the role of potassium bisulfate in the reaction for potash alum preparation.

Ans. Potassium bisulfate is formed during the reaction and contributes to the formation of potash alum crystals.

Q 7. Describe the process of recrystallization and its significance in obtaining a pure sample.

Ans. Recrystallization involves dissolving the impure sample and allowing it to crystallize again. It helps eliminate impurities, yielding a purer sample.