To Prepare a Pure Sample Of Potash Alum (Fitkari), [$K_2SO_4.Al_2(SO_4)_3.24H_20$]

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 crystallisation, when octahedral crystals of potash alum separate out.

$$\underset{\substack{\text{Potassium}\\\text{sulphate}\\174}}{K_2SO_4} + \underset{\substack{\text{Aluminium}\\\text{sulphate}\\666}}{Al_2(SO_4)_3.18H_2O} + 6H_2O \longrightarrow \underset{\text{Potash alum}}{K_2SO_4.Al_2(SO_4)_3.24H_2O.}$$

Requirements

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 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 add 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 crystallisation 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 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.

Precautions

1. Cool the solution slowly to get good crystals.
2. Do not disturb the solution while it is being cooled.