

# To Prepare Crystals of Potash alum ( $K_2SO_4 \cdot Al_2(SO_4)_3 \cdot 24H_2O$ ) from the crude sample

## Theory

Potash alum (Fitkari) is highly soluble in water. The commercial sample is shaken with water when alum dissolves. The insoluble impurities are removed by filtration. The solution is concentrated and then cooled. On cooling pure crystals of alum separate. The soluble impurities are left behind in the mother liquor.

## Requirements

Crude sample of potash alum, a 400 ml beaker, a china dish, a funnel, an evaporating dish, a policeman (glass rod).

## Procedure

1. **Preparation of Solution.** Take a 400 ml beaker. Put in it about 5-6 gm of the crude sample of potash alum and 25-30 ml water. Stir the contents of the beaker to make the solution clear. Warm to dissolve the whole of alum present in the sample.

2. **Filtration of the Solution and Concentration of the Filtrate to Crystallisation Point.** Filter the solution and collect the filtrate in a china dish. The insoluble impurities are left as residue on the filter paper.

Heat the china dish on a sand bath/wire gauze till the solution is reduced to about one-third of its original volume. As the solution gets heated up, it is stirred well with a glass rod to avoid crust formation on the side of the dish. If the crust is formed, it is dissolved into the solution by removing it with glass rod.

Take out a drop of the solution at the end of glass rod and cool it by blowing. The appearance of a thin crust on the glass rod shows that the crystallisation point has reached. Stop heating at this stage by removing the burner. Transfer the hot saturated solution in a crystallising dish.

3. **Cooling the Hot Saturated Solution.** Place the dish containing hot saturated solution on a beaker containing water filled to the brim and allow it to cool slowly for sometime. Colourless, transparent and octahedral crystals of alum begin to separate. After about half an hour, the crystallisation is complete.

4. **Separation of Crystals and Drying.** Decant off the mother liquor carefully. Wash the crystals with cold solution of alcohol and water. Remove the crystals on a filter paper which soaks the solution. Transfer the crystals on another filter paper and dry them by pressing gently between the folds of the filter papers. Transfer the crystals to a dry test tube and cork it.

**The crystals of pure potash alum are colourless, transparent and octahedral.**

## **Precautions**

1. The filtrate should be evaporated slowly by gently heating during concentration.
2. The filtrate is to be evaporated only up to the crystallisation point. It should never be heated to dryness. Avoid over heating of the solution.
3. The solution should be cooled slowly without disturbing it. It should never be cooled rapidly.
4. Wash the crystals with the washing liquid 3-4 times using very small amount of the liquid each time.
5. In case the crystals obtained are very small, it means that the solution has been concentrated more than that required at the crystallisation stage.