

Practical 6 – Chapter 1

Synthesis of alum, $\text{KAl}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$

The aim of this experiment is to determine the percentage yield when crystals of potassium aluminium sulfate are made from aluminium foil.

Safety

- 3 mol dm^{-3} potassium hydroxide solution is corrosive.
- 3 mol dm^{-3} sulfuric acid is corrosive.
- Ethanol is highly flammable and must be kept away from naked flames.
- Wear eye protection.
- Avoid skin contact with the solutions.

What to do

- 1 Weigh out accurately about 1 g of aluminium foil. Tear the foil into small pieces and put it in a 250 cm^3 beaker.
- 2 Slowly add 25 cm^3 of 3 mol dm^{-3} potassium hydroxide solution (**Care!**). The reaction will start quite slowly but when it starts going it will be very vigorous. The reaction is best carried out in a fume hood.
- 3 When all the foil has reacted filter the solution through a Buchner funnel while it is still hot. Rinse the filter paper with a little distilled water.
- 4 Cool the solution. Now add 35 cm^3 of 3 mol dm^{-3} sulfuric acid slowly and with constant stirring (**Care!**). Continue adding sulfuric acid slowly until the precipitate just dissolves.
- 5 Place the mixture on a tripod and gauze and boil the solution until sufficient water has evaporated to give a volume of about 50 cm^3 of solution.
- 6 Cool the solution in an ice/water bath for about 15 minutes. If no crystals form then scrape the bottom of the beaker with a glass rod.
- 7 Filter the mixture using a Buchner funnel and pre-weighed piece of filter paper.
- 8 Wash the crystals by pouring about 50 cm^3 of a 50 : 50 ethanol/water mixture over the crystals in the Buchner funnel (**Care!**).
- 9 Allow the crystals to dry at room temperature.
- 10 Determine the mass of alum formed.
- 11 Calculate the percentage yield of alum that you have obtained.