GCSE Chemistry required practical activity: Making salts

Student sheet

Preparation of pure dry copper sulfate crystals

You will react an acid and an insoluble base to prepare an aqueous solution of a salt. The unreacted base from the reaction will need to be filtered. You will evaporate the filtrate to leave a concentrated solution of the salt, which will crystallise as it cools and evaporates further. When dry the crystals will have a high purity.

Risk assessment

- Safety goggles must be worn throughout.

Method

You are provided with the following:

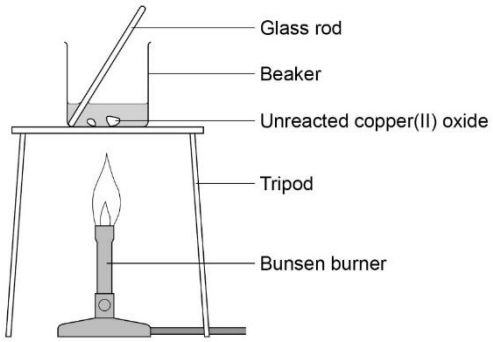
- 40 cm^3 1.0 M dilute sulfuric acid
- copper (II) oxide powder
- spatula
- glass rod
- 100 cm^3 beaker
- Bunsen burner
- tripod
- gauze
- heatproof mat
- filter funnel and paper
- clamp stand
- conical flask
- 250 cm^3 beaker
- evaporating basin
- crystallising dish

Read these instructions carefully before you start work.

1. Measure 40 cm^3 sulfuric acid into the 100 cm^3 beaker.

   The volume does not need to be very accurate, so you can use the graduations on the beaker.

2. Set up the tripod, gauze and heatproof mat. Heat the acid **gently** using the Bunsen burner until it is almost boiling. Turn off the Bunsen burner.



3. Use the spatula to add **small** amounts of copper (II) oxide powder. Stir with the glass rod.

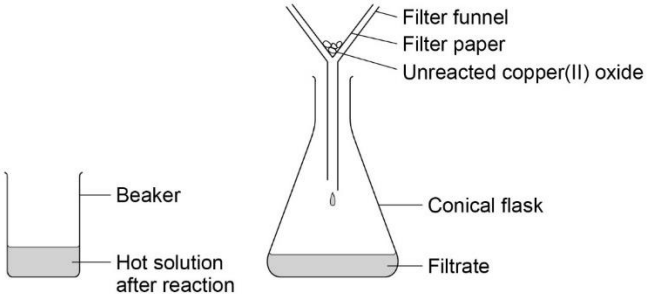
   Continue to add copper (II) oxide if it keeps disappearing when stirred. When the copper (II) oxide disappears the solution is clear blue.

4. Stop adding the copper (II) oxide when some of it remains after stirring.

   Allow apparatus to cool completely.

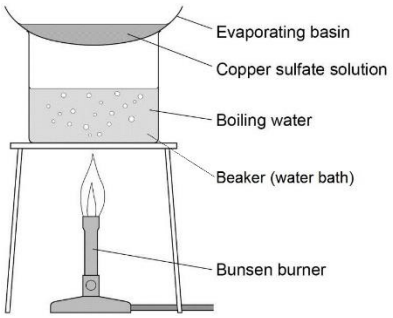
5. Set up the filter funnel and paper over the conical flask. Use the clamp stand to hold the funnel.

   Filter the contents of the beaker from step **3**.



6. When filtration is complete, pour the contents of the conical flask into the evaporating basin.

   Evaporate this gently using a water bath (250 cm^3 beaker with boiling water) on the tripod and gauze (see diagram). Stop heating once crystals start to form.



7. Transfer the remaining solution to the crystallising dish. Leave this in a cool place for **at least 24 hours**.

8. Remove the crystals from the concentrated solution with a spatula. **Gently** pat the crystals dry between two pieces of filter paper.

   These are pure dry crystals of copper (II) sulfate.