

GCSE Chemistry required practical activity: Making salts

Student sheet

Required practical activity	Apparatus and techniques
Preparation of a pure, dry sample of a soluble salt from an insoluble oxide or carbonate, using a Bunsen burner to heat dilute acid and a water bath or electric heater to evaporate the solution.	AT 2, AT 3, AT 4, AT 6

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.

Learning outcomes - WS 2.3, WS 2.4

1. Safe use of appropriate heating devices and techniques including use of a Bunsen burner and a water bath or electric heater. (AT 2).
2. Use of appropriate apparatus and techniques for conducting chemical reactions, including appropriate reagents. (AT 3).
3. Safe use of a range of equipment to purify and/or separate chemical mixtures including evaporation, filtration, crystallisation. (AT 4).
4. Safe use and careful handling of liquids and solids, including careful mixing of reagents under controlled conditions. (AT 6).

Risk assessment

Safety goggles must be worn throughout.

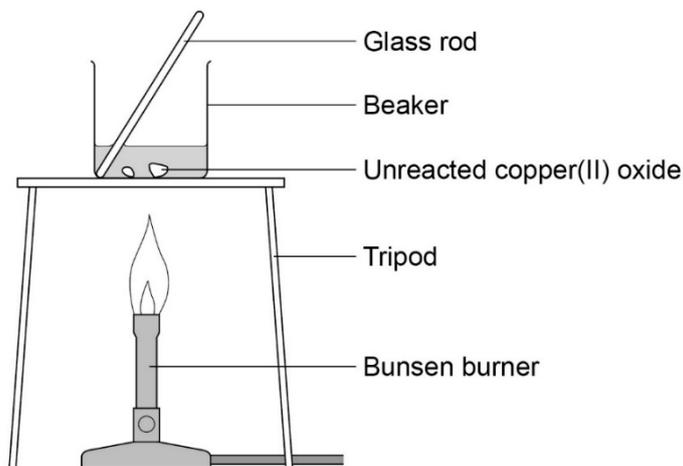
Method

You are provided with the following:

- * 40 cm³ 1.0 M dilute sulfuric acid
- * spatula
- * 100 cm³ beaker
- * Tripod and gauze
- * filter funnel
- * conical flask
- * evaporating basin
- * copper (II) oxide powder
- * stirring rod
- * Bunsen burner
- * heatproof mat
- * filter paper
- * porcelain triangle

Read these instructions carefully before you start work.

1. Measure 40 cm³ sulfuric acid into the 100 cm³ 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.



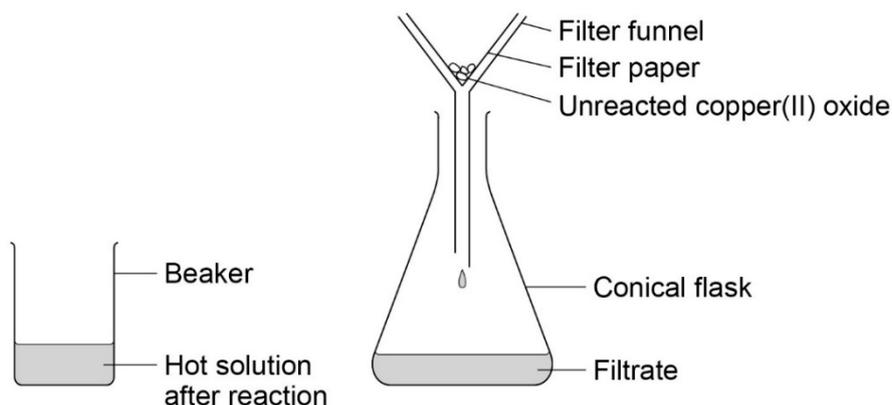
Q. Why should you not boil the acid?

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.

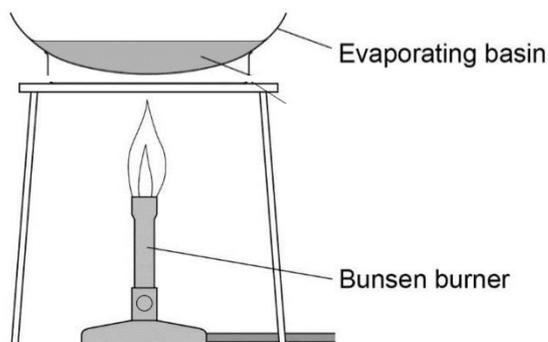
Q. What do you now know when some copper (II) oxide remains?

5. Set up the filter funnel and paper over the conical flask. Filter the contents of the beaker from step 3.



Q. Why filter the contents of the beaker?

6. When filtration is complete, pour the contents of the conical flask into the evaporating basin. Place the evaporating basin on the porcelain triangle, on the tripod, and evaporate this gently with a blue flame. Stop heating when half of the original liquid has evaporated.



7. Leave the remaining solution in a cool place for **at least 24 hours** to allow the crystals to form.

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.

WORD EQUATION:



SYMBOL EQUATION:

