Making a pure, dry soluble salt

Chemistry required practical | AQA Combined Science 8464 and AQA GCSE Chemistry 8462 | 14 questions, 35 marks

GCSE science required practicals

This practical online

Name: _____ **Date:** _____ **Score:** _____ / 35

Aim: To make pure, dry crystals of a soluble salt (copper(II) sulfate) by reacting an insoluble metal oxide with a dilute acid.

Equipment: 25 cm^3 measuring cylinder; 100 cm^3 beaker; dilute sulfuric acid; copper(II) oxide powder; spatula and glass rod; Bunsen burner, tripod, gauze and heatproof mat; filter funnel and filter paper; conical flask; evaporating basin and water bath; balance; safety goggles.

Results

Five groups in Mr Okafor's class each warmed 25 cm^3 of the same sulfuric acid and added 1.50 g of copper(II) oxide. After filtering, each group dried and weighed the unreacted copper(II) oxide left on the filter paper. A week later they weighed their dry crystals.

Group	Mass of copper(II) oxide added in g	Mass of unreacted copper(II) oxide on filter paper in g	Mass of dry crystals in g
A	1.50	0.52	2.61
B	1.50	0.49	2.48
C	1.50	0.55	2.55
D	1.50	0.51	1.37
E	1.50	0.50	2.66

Questions

1 Name the salt made when copper(II) oxide reacts with sulfuric acid. (1 mark)

2 Explain how a pupil can tell that the copper(II) oxide is in excess. (2 marks)

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3 Give two variables the groups kept the same so that their masses of crystals could be compared fairly.

(2 marks)

4 During evaporation, one pupil heats the basin strongly until the solution boils hard. Give one hazard of doing this and one way to reduce the risk.

(2 marks)

5 Explain why the mixture is filtered before it is evaporated.

(2 marks)

6 Use the table to calculate the mass of copper(II) oxide that reacted for Group A.

(2 marks)

7 Which group's mass of crystals is anomalous? Suggest one reason for this result, and say what the class should do with it.

(3 marks)

8 Calculate the mean mass of dry crystals made by the class. Do not include the anomalous result. Give your answer to 2 decimal places. Show your working.

(3 marks)

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9 Calculate the percentage of the copper(II) oxide added by Group A that reacted with the acid. Use your answer to question 6. Give your answer to 2 significant figures. Show your working.

(3 marks)

10 The masses of unreacted copper(II) oxide are all close to 0.5 g. Explain what this tells you about the amount of acid each group used, and why Group D's low mass of crystals was not caused by using less acid.

(3 marks)

11 Write a balanced symbol equation, with state symbols, for the reaction between copper(II) oxide and sulfuric acid.

(2 marks)

12 **Higher tier**

Kwame says the crystals would be larger if he evaporated all the water quickly on a hot gauze. Explain why he is wrong.

(2 marks)

13 Group B's crystals still looked wet when they weighed them. Explain what effect this has on their mass, and suggest how they could improve their method.

(2 marks)

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14 Describe how you would make pure, dry crystals of zinc chloride from zinc carbonate powder and dilute hydrochloric acid.

(6 marks)

End of questions | Total 35 marks | The answers sheet has the full method as revision notes.

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