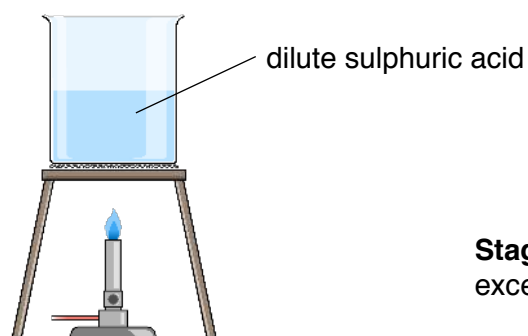
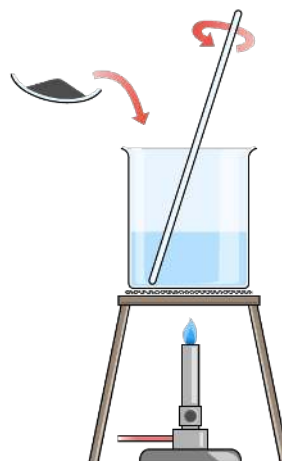


0 1

The diagram shows how hydrated copper(II) sulphate crystals can be made by reacting copper(II) oxide with dilute sulfuric acid.

Stage 1

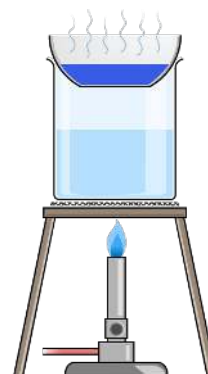
Stage 2 - add copper(II) oxide until in excess and stir



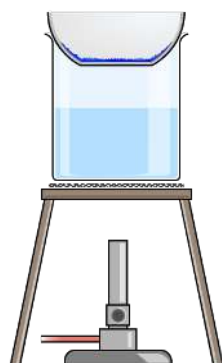
Stage 3 - filter the mixture from stage 2



Stage 4 - heat the solution from stage 3 until a hot, saturated solution forms



Stage 5 - allow the solution to cool so that hydrated copper(II) sulfate crystals form



0	1	.	1
---	---	---	---

Why is the sulfuric acid heated in stage 1?

[1 mark]

WARNING: to give the reaction energy is not sufficient, answers need to refer to activation energy or rate of reaction

To increase the rate/speed of the reaction [1]
accept to overcome the activation energy/to provide activation energy (for the reaction) [1]

0	1	.	2
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How would you know when the copper(II) oxide is in excess in stage 2? [1 mark]

it stops disappearing [1]

OR

there is a (black) suspension/solid/copper(II) oxide [1]

OR

the mixture/it turns cloudy/black [1]

IGNORE crystals

0	1	.	3
---	---	---	---

Why is the mixture filtered in stage 3

[1 mark]

0	1	.	4
---	---	---	---

to remove (unreacted/excess) copper(II) oxide [1]

IGNORE references to impurities/crystals [1]

Why do crystals form when the hot saturated solution is cooled in stage 5?

[1 mark]

0	1	.	5
---	---	---	---

copper(II) sulfate/the crystals are less soluble in cold water (than in hot water) [1]

OR solubility decreases with temperature [1]

IGNORE reference to water evaporating

State the colour of the crystals formed in stage 5.

[1 mark]

0	1	.	6
---	---	---	---

blue [1]

IGNORE shades of colour

The crystals are removed by filtration and then dried.

Suggest a suitable method of drying the crystals.

[1 mark]

on filter paper/kitchen towel/tissue paper [1]

OR

leave / in a warm place / in the sun / on a radiator / near a window / in a

(warm/drying) oven/dessicator [1]

(Total 6 marks)

End