

**GCSE Chemistry A (Gateway Science)**

**J248/02 C4-C6 and C7 Foundation (Foundation Tier)**

**Question Set 9**

1 Zinc and dilute sulfuric acid react to make hydrogen.



A student measures the rate of this reaction by measuring the **loss in mass** of the reaction mixture.

She finds that the change in mass is very small and difficult to measure.

(a) Draw a labelled diagram to show a **better way** of measuring the rate of this reaction.

[3]

(b) The reaction between zinc and dilute sulfuric acid is slow.

The student decides to try and find a catalyst for this reaction.

She tests four possible substances.

Each time she adds 0.5 g of the substance to 1.0 g of zinc and 25 cm<sup>3</sup> of dilute sulfuric acid.

Look at her table of results.

Substance added	Colour of substance at start	Colour of substance at end	Relative rate of reaction
no substance			1
calcium sulfate powder	white	white	1
copper powder	pink	pink	10
copper(II) sulfate powder	blue	pink	30
manganese(IV) oxide powder	black	black	1

- (i) It is important to do the reaction with **only** zinc and dilute sulfuric acid and no substance added.

Explain why.

[1]

- (ii) It is important to do all of the reactions with the same concentration of acid.

Explain why.

[1]

- (iii) Which of the substances could be a catalyst for the reaction between zinc and dilute sulfuric acid?

Explain your answer.

[2]

- (iv) There is **not** enough evidence to confirm which substance is a catalyst.

Suggest an extra piece of experimental evidence that could be collected to confirm which substance is a catalyst.

[1]

- (v) The student does the experiment with copper, zinc and dilute sulfuric acid again.

This time she uses a lump of copper rather than copper powder. Predict, with reasons, the relative rate of reaction.

[2]

**Total Marks for Question Set 9: 10**

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