



A2 5.1/A

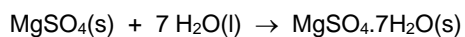
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HESS'S LAW 1

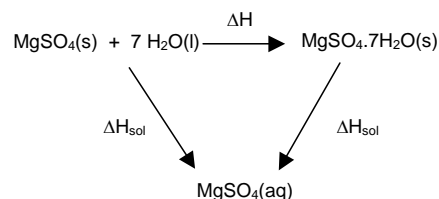
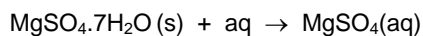
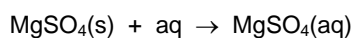


Aim

The aim of this experiment is to find ΔH for the following reaction:



It is impossible to measure ΔH for this reaction directly because the process cannot be controlled. However, we can use Hess's law to find ΔH using a cycle involving two other reactions.



Safety

Magnesium sulphate is a low hazard.

Method

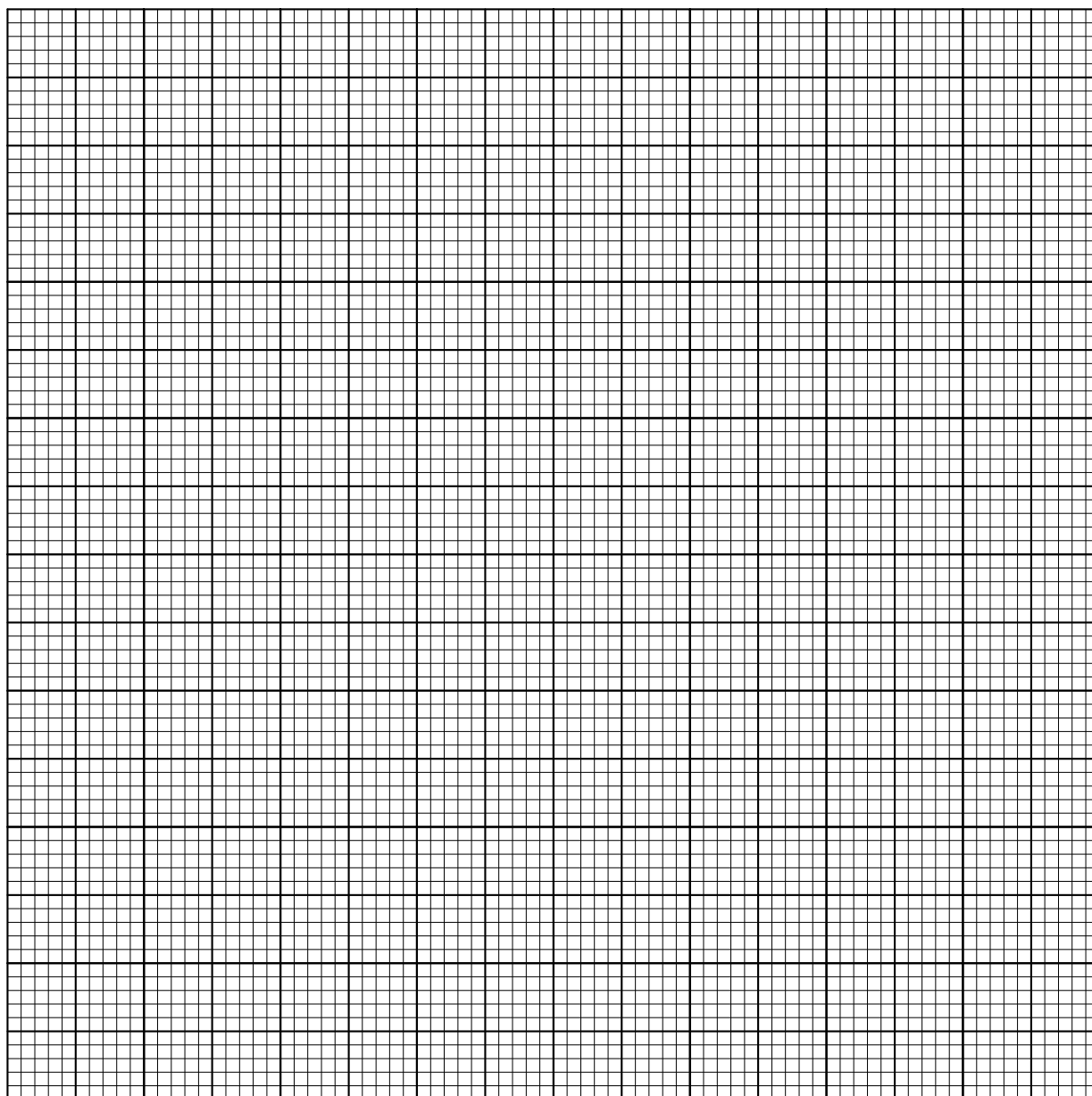
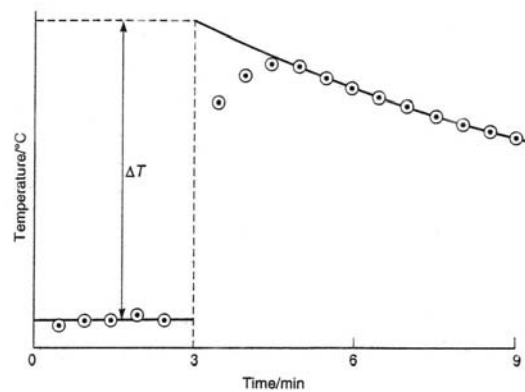
- 1) Place 45 cm³ of distilled water into a polystyrene cup.
- 2) Weigh a stoppered test tube containing about 3.0 g of magnesium sulphate.
- 3) Clamp the stoppered tube in the water for three minutes so that the solid and water acquire the same temperature. Record this temperature every 30 seconds.
- 4) At exactly three minutes, tip the solid into the water, place the lid on the cup and stir the mixture as the crystals dissolve. Record the temperature every 30 seconds for the next 7 minutes.
- 5) Reweigh the empty stoppered tube to find the exact mass of magnesium sulphate dissolved.
- 6) Repeat the experiment using about 6.0 g of hydrated magnesium sulphate.

Results

- 7) Record your results in clear tables.

Analysis

- 8) Plot a graph of temperature against time, for each experiment, and extrapolate it back to 3 minutes to find the maximum temperature rise (or fall).



Evaluation

- 13) The accepted value for ΔH for this reaction is -104 kJ mol^{-1} . Calculate your percentage experimental error.

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- 14) Taking the apparatus error for this experiment to be the larger apparatus error calculated in (12), state whether your results are accurate and explain your answer.

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- 15) Identify the major source of error in this experiment and suggest ways to reduce it.

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- 16) Identify two other sources of error in this experiment and suggest ways to reduce them.

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