

OCR (A) Chemistry A-level

PAG 3: Enthalpy Determination

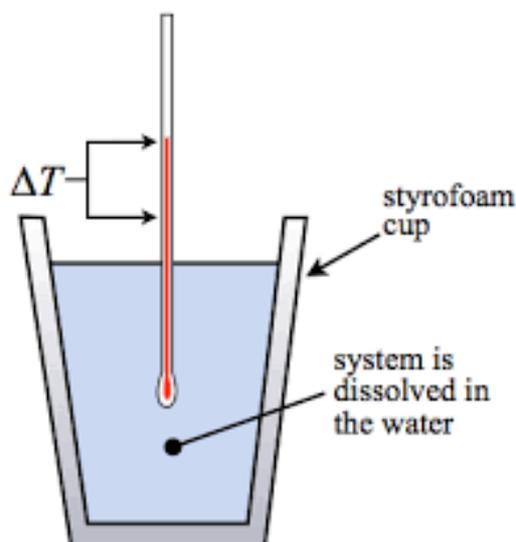
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3.1 Determination of the Enthalpy Change of Neutralisation

Method

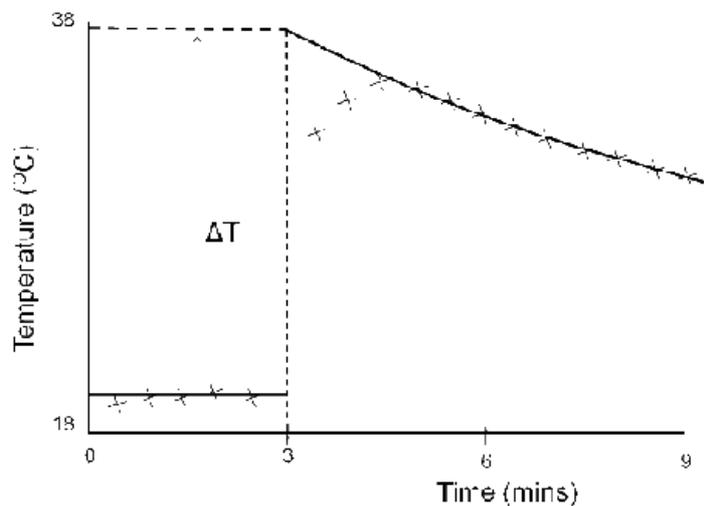
1. Measure 25 cm³ hydrochloric acid using a 25 cm³ measuring cylinder and add it to a polystyrene cup.
2. Place the cup in a 250 cm³ glass beaker.
3. Construct a suitable table to record the temperature of the acid at minute intervals for up to 10 minutes
4. Measure 25 cm³ of sodium hydroxide into a 25 cm³ measuring cylinder.
5. Start the timer and record the initial temperature of the hydrochloric acid in the cup.
6. Continue to record the temperature each minute for three minutes.
7. At the fourth minute, add the sodium hydroxide to the cup. Do not record the temperature.
8. At the fifth minute, continue recording the temperature up until 10 minutes. Stir the solution in the cup each time the temperature is recorded.



Calculations

- ❖ Plot a graph of temperature (y axis) against time (x axis).
- ❖ Draw a line of best fit through the points before the addition of the sodium hydroxide then draw a second line of best fit through the points after the addition of sodium hydroxide. Extrapolate both of these lines to 4 minutes.
- ❖ Use the graph to determine the temperature change at the fourth minute.
- ❖ Calculate the energy absorbed by the solution using the equation $q = mc\Delta T$.
- ❖ Calculate the amount of HCl used.
- ❖ Calculate the enthalpy change of neutralization.





Errors

- Heat transfer to and from surroundings.
- Inaccuracy in temperature measurement.
 - Electronic thermometer can be used.

Safety

- Sodium hydroxide - causes severe skin burns and eye damage.
- Hydrochloric acid – causes severe skin burns and eye damage.

