

OCR Chemistry A-Level

PAG 03 - Enthalpy Determination

Determination of the enthalpy change of
neutralisation

Flashcards

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What is calorimetry?



What is calorimetry?

Calorimetry is a process used to find the amount of energy released or used in a chemical reaction.



What type of reaction releases energy to the surroundings?



What type of reaction releases energy to the surroundings?

Exothermic



What type of reaction takes in energy from the surroundings?



What type of reaction takes in energy from the surroundings?

Endothermic



What is a neutralisation reaction?



What is a neutralisation reaction?

A reaction between an acid and a base,
form a salt and water



What is meant by the term standard enthalpy change of neutralisation?



What is meant by the term enthalpy change of neutralisation?

The enthalpy change that accompanies the formation of 1 mole of water from a neutralisation reaction under standard conditions.

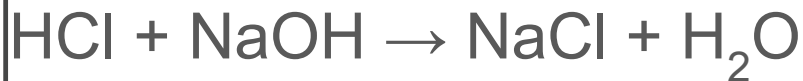


Write the word and chemical equations for the neutralisation reaction between sodium hydroxide and hydrochloric acid



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Hydrochloric acid + sodium hydroxide → sodium chloride + water



The enthalpy change of a neutralisation reaction is being investigated. Why might this reaction be carried out in a styrofoam cup?



The enthalpy change of a neutralisation reaction is being investigated. Why might this reaction be carried out in a styrofoam cup?

A styrofoam cup is a better thermal insulator than a glass beaker so the less heat will be lost to the surroundings meaning the calculated temperature change is more accurate.



What equation is used to calculate the energy absorbed by the solution?



What equation is used to calculate the energy absorbed by the solution?

$$Q = mc\Delta T$$

m - mass of the solution (g)

c - specific heat capacity of the solution (the value for water is used)

ΔT - temperature change ($^{\circ}\text{C}$ or K)

Q - heat energy (J)



How is the enthalpy change of neutralisation calculated from Q , the energy absorbed by the solution?



How is the enthalpy change of neutralisation calculated from Q , the energy absorbed by the solution?

$Q \div \text{mol}$

The number of moles can be calculated by using
 $\text{mol} = \text{volume} \times \text{concentration}$ for the hydrochloric acid used



How can you find the maximum temperature reached during a neutralisation reaction?



How can you find the maximum temperature reached during a neutralisation reaction?

Plot a graph of temperature (y axis) against time (x axis) and extrapolating to the time that the reactants were combined



Suggest 3 possible sources of error when investigating the enthalpy change of neutralisation. How could these errors be reduced?



Suggest 3 possible sources of error when investigating the enthalpy change of neutralisation. How could these errors be reduced?

- Heat transfer to and from surroundings
- Incomplete combustion if using fuel
 - Bomb calorimeter could be used to combat these two errors
- Inaccuracy in temperature measurement
 - Use an electronic thermometer



Describe and experiment to investigate the enthalpy change of neutralisation of a reaction between hydrochloric acid and sodium hydroxide



Describe and experiment to investigate the enthalpy change of neutralisation of a reaction between hydrochloric acid and sodium hydroxide

1. Add 25cm^3 $\text{HCl}(\text{aq})$ to a polystyrene cup. Place the cup in a glass beaker. Measure 25cm^3 $\text{NaOH}(\text{aq})$.
2. Start the timer. Record the initial temperature of the HCl at minute intervals for 3 minutes.
3. At the fourth minute, add the sodium hydroxide. Do not record the temperature.
4. Continue recording the temperature at minute intervals from 5 to 10 minutes. Stir the solution when measuring the temperature.

