OCR (B) Chemistry A-Level

DF3 - Energetics

Flashcards

What is the meaning of the term ‘endothermic’?

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Endothermic reactions are those that take energy in from the surroundings: the energy needed to break the bonds is greater than the energy needed to make the bonds in the reaction.

What is the meaning of the term ‘exothermic’?

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Exothermic reactions are those that release energy into the surroundings: the energy needed to break the bonds is less than the energy needed to make the bonds in the reaction.

What are standard conditions?

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- A pressure of 100 kPa.
- A temperature of 298 K (room temperature).
- All solutions at a concentration of 1 mol dm^{-3} for electrode potentials.

Define the standard enthalpy change of reaction, $\Delta_r H^\theta$.

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The enthalpy change that occurs when species are reacted in the molar ratios as defined by a chemical equation. The reaction takes place under standard conditions with reactants and products in their standard states.

Define the standard enthalpy change of combustion, $\Delta_c H^{\theta}$.

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The enthalpy change when one mole of a compound is reacted completely with oxygen under standard conditions with products and reactants in their standard states.

Define the standard enthalpy change of formation, $\Delta_f H^\theta$.

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The enthalpy change that occurs when one mole of a compound is formed from its constituent elements in their standard states under standard conditions.

Define the standard enthalpy change of neutralisation, $\Delta_{neut}H^{\theta}$.

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The enthalpy change that occurs when one mole of water is produced from a neutralisation reaction that happens under standard conditions.

What is average bond enthalpy?

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The energy needed to break one mole of the stated bond under standard conditions.

What relation does bond enthalpy have to bond strength?

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The greater the bond enthalpy, the greater the bond strength. As the bond strength increases the length of the bond decreases.

Match the reaction processes to the thermal result:

Bond breaking	•	• exothermic
Bond making	•	• endothermic

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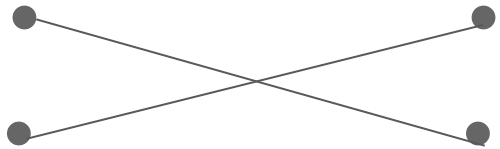
Bond breaking	Exothermic
Bond making	Endothermic



What does each term mean in $q = mc\Delta T$?

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q: The energy absorbed by the material (normally water) in J.

m: The mass of material being used in g.

c: The specific heat capacity of the material used (in your data sheet c of water = 4.18 J g^{-1} K^{-1}).

ΔT: The change in temperature of the material.