CAIE Chemistry A-level

5: Chemical Energetics

Definitions

Definitions and Concepts for CAIE Chemistry A-level

Chemical Energetics

Activation energy: The minimum amount of energy for particles to collide with for a successful reaction to take place.

Bond energy: The energy required to break one mole of the stated bond in the gas phase.

Endothermic: A reaction which takes in energy (ΔH is positive). The reaction mixture and surroundings will decrease in temperature as heat energy is absorbed.. The energy needed to break existing bonds is greater than the energy released from forming new bonds.

Energy profile: A graph used to show the relative energy levels of reaction species (including reactants and products) as a reaction proceeds.

Enthalpy change (ΔH): The heat energy change measured under a constant pressure.

Exothermic reaction: An exothermic reaction is one that releases energy to the surroundings so the temperature of the surroundings increases (ΔH is negative). The energy needed to break existing bonds is less than the energy released from forming new bonds.

Hess's law: The enthalpy change of a reaction is independent of the route taken.

Mean bond enthalpy: The enthalpy change when one mole of a specified covalent bond is broken, averaged out across a range of compounds.

Standard conditions: Solutions 1.0 mol dm^{-3} concentration, 298 K temperature and 100 kPa pressure.

Standard enthalpy change of neutralisation ($\Delta_{neut}H^{o}$): The enthalpy change when solutions of acid and alkali react together under standard conditions to produce one mole of water.

Standard enthalpy change of reaction ($\Delta_{r}H^{o}$): The enthalpy change when quantities of substances in standard states react completely under standard conditions.

Standard enthalpy of combustion ($\Delta_{c}H^{\ominus}$): The enthalpy change when one mole of a substance is burned in excess oxygen under standard conditions.

Standard enthalpy of formation ($\Delta_{f}H^{\ominus}$): The enthalpy change when one mole of a substance in its standard state is formed from its elements under standard conditions.