

Year 2 Definitions and Laws

Module 5: Physical Chemistry and Transition Elements

Lattice enthalpy $\Delta_{LE}H$	The enthalpy change on formation of 1 mole of an ionic lattice from gaseous ions.	
First ionisation energy	Energy required to remove 1 mole of electrons from 1 mole of gaseous atoms.	
Enthalpy change of formation Δ_fH	The enthalpy change on formation of 1 mole of a compound from its elements.	
Enthalpy change of atomisation $\Delta_{at}H$	Enthalpy change on forming one mole of gaseous atoms from an element in its standard state	
Electron Affinity	The enthalpy change when an electron is added to every atom or ion in one mole of gaseous atoms or ions.	
Enthalpy change of solution $\Delta_{sol}H$	The enthalpy change on dissolving 1 mole of a solute in water	
Enthalpy change of hydration $\Delta_{hyd}H$	The enthalpy change on dissolving 1 moles of gaseous ions in water.	
Rate of reaction	The change in concentration of a given species with time.	Units: $\text{mol dm}^{-3} \text{s}^{-1}$
Rate equation	For any reaction it is possible to write a rate equation of the form: $\text{rate} = k[A]^m[B]^n$ where m and n are small whole numbers	
Order of reaction	A reaction with a rate equation: $\text{rate} = k[A]^m[B]^n$ is said to be order m with respect to A, order n with respect to B and order (m+n) overall.	
Overall order of reaction	Sum of the orders of reaction of the species in the rate equation	
Half-life	Time taken for the concentration of a reactant to decrease to half its original value.	
Rate-determining step	The slowest step in a multi-step reaction	
Mole fraction	The amount in moles of a component of a gaseous mixture, divided by the total number of moles of gas present.	
Partial pressure	= mole fraction x total pressure	
Bronsted-Lowry theory	A Brønsted–Lowry acid is a species that donates a proton. A Brønsted–Lowry base as a species that accepts a proton.	
Strong acid	An acid which completely dissociates into ions in solution	
Weak acid	An acid which partially dissociates into ions in solution	
pH	= $-\log[H^+]$	
K_w	= $[H^+][OH^-]$ (The Ionic Product of Water)	

$$K_a = \frac{[H^+][A^-]}{[HA]} \quad (\text{The Acid Dissociation Constant})$$

$$pK_a = -\log K_a$$

Buffer solution	A system that minimises pH changes on addition of small amounts of an acid or a base
Oxidising agent	Takes electrons from the species been oxidised and is itself reduced.
Reducing agent	Gives electrons to the species been reduced and is itself oxidised.
Standard electrode (redox) potential, E⁰	E.m.f. of a half-cell connected to a standard hydrogen half-cell under standard conditions (298K, 1mol dm ⁻³ solutions, 100kPa)
Fuel cell	A fuel cell uses the energy from the reaction of a fuel with oxygen to create a voltage.
Transition element	d-block elements that have an ion with an incomplete d-sub-shell
Ligand	Species capable of donating a lone pair of electrons and forming a coordinate (dative covalent) bond to a central metal ion or metal

Module 6: Organic Chemistry and Analysis

Alpha amino acid	Amine and carboxylic acid groups are attached to the same carbon General formula: RCH(NH ₂)COOH
Optical isomers	Non-superimposable mirror images about a chiral centre (carbon atom attached to four different atoms or groups)
Condensation polymerisation	Many monomer molecules join together to form a long chain with loss of a small molecule such as H ₂ O
Reflux	Continuous evaporation and condensation allowing prolonged heating without loss of material
Recrystallisation of organic solid	Dissolve in <u>minimum</u> volume of <u>hot</u> solvent Cool, filter, leave to dry

NB: Year 1 Definitions and Laws must also be learnt.