

Moles (amounts of substance)

Mass	moles =	mass olar mass	moles molar		g ss = g mol ⁻¹
Solution	moles = con	centration	x volum	ne	concentration = mol dm ⁻³ volume = dm ³
Gas	pV = nRT				= gas constant (8.31 J K ⁻¹ mol ⁻¹) = temperature (K)

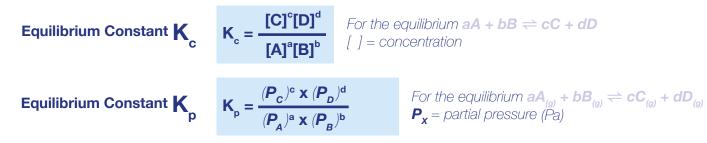
Energy, Enthalpy and Entropy

Calorimetry	$\mathbf{a} = \mathbf{m} \mathbf{c} \mathbf{A} \mathbf{I}$	g = energy change J or kJ)	c = specific heat capacity (J g-1 K-1) $\Delta T = temperature change (K or °C)$		
Bond Enthalpies	ΔH = ∑(bond end	ergies of react	ants) - ∑(bond energies of products)		
	ΔH = change in enthalpy (kJ mol ⁻¹), bond enthalpies = kJ mol ⁻¹)				
Enthalpy	enthalpy =	oles y change (q)	$enthalpy = kJ mol^{-1}$ energy change (q) = kJ		
Gibbs Free Energy	ΔG = ΔH - ΤΔS		ee Energy (kJ mol ⁻¹) $\Delta H = enthalpy change (kJ mol-1)hange (kJ K-1 mol-1) T =temperature (K)$		
Entropy Change	ΔS = ∑S° (product	ts) - ∑S° (reactar	$\Delta S = entropy \ change \ (J \ K^{-1} \ mol^{-1})$ $S^{\circ} = standard \ entropy \ (J \ K^{-1} \ mol^{-1})$		
Entropy	$\Delta S_{(Surroundings)} = -$		_{adings)} = entropy change of surroundings (kJ K ⁻¹ mol ⁻¹) nthalpy change (kJ mol ⁻¹) perature (K)		





Equilibrium



Rates of Reaction

Rate Equation	rate = k × [A] ^x [B] ^y [C] ^z		nol dm ⁻³ s ⁻¹ , [] = concentration lers with respect to A, B and C
Arrhenius Equation	$\mathbf{k} = \mathbf{A}\mathbf{e}^{\frac{-\mathbf{E}_a}{\mathbf{R}\mathbf{T}}}$	k = rate con A = constan e = base of	t	E _a = activation energy (kJ mol ⁻¹) T = temperature R = gas constant (8.31 J K ⁻¹ mol ⁻¹)
	$\ln \mathbf{k} = -\frac{\mathbf{E}_{a}}{\mathbf{E}_{a}}$	+ In A In	= natural lo	paarithm

Acids, Bases and pH

Acid Dissociation Constant \mathbf{K}_{a}	$\mathbf{K}_{a} = \frac{[\mathbf{H}_{aq}^{+}][\mathbf{A}_{aq}^{-}]}{[\mathbf{H}\mathbf{A}_{aq}]}$	For the weak acid dissociation $HA \rightleftharpoons H^+ + A^-$ [] = concentration $K_a = acid dissociation constant (mol dm-3)$
pK _a	$\mathbf{pK}_{a} = -\mathbf{log}_{10}\mathbf{K}_{a}$	
Ionic Product of Water \mathbf{K}_{w}	$\mathbf{K}_{\mathbf{w}} = [\mathbf{H}_{\text{\tiny (aq)}}^{+}][\mathbf{OH}_{\text{\tiny aq)}}^{-}]$	K _w = ionic product of water (mol² dm ⁻⁶) at 298K, K _w = 1.00 x 10 ⁻¹⁴ mol² dm ⁻⁶
рН	$\mathbf{pH} = -\mathbf{log}_{10}[\mathbf{H}_{\text{\tiny (ac)}}^+]$	$[H^+_{\scriptscriptstyle (aq)}] = concentration of H^+_{\scriptscriptstyle (aq)}$
	$[H^+_{\text{\tiny (aq)}}] = 10^{-pH}$	+

RT





Electrochemistry

Electromotive Force E

 $\mathbf{E}_{cell} = \mathbf{E}_{reduction} - \mathbf{E}_{oxidation}$

$$\begin{split} E_{cell} &= EMF \text{ (electromotive force) of electrochemical cell (V)} \\ E_{redution} &= standard electrode potential of cathode \\ E_{oxidation} &= standard electrode potential of anode \end{split}$$

Conditions for standard electrode potentials = 298K, 1 mol dm⁻³ and 100kPa

Chromatography

Retention Factor \mathbf{R}_{f}	$\mathbf{R}_{f} = \mathbf{D}$	Distance travelled by sample	$R_{\rm f} = no \ units$
		Solvent Front	solvent front = distance travelled by solvent

Assorted

