SCH4U 2005
TO REVIEW IN EACH UNIT
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ATOMIC STRUCTURE

- *Dalton, Thompson, Rutherford, and Bohr*
- *Atomic Radius, Electronegativity, Melting Point Boiling Point, Ionization Energy and Electron Affinity Periodic Table Trends*
- *The four quantum numbers: n, l, ml, ms*
- *Electron configuration*
- *Wave mechanical model of the Atom*
- *Atomic Spectroscopy: $E=hf$ $c=f\lambda$*
- *$E=-(\text{constant})/n^2$*
- *Relation of λ with frequency*
- *Lewis Diagrams, octet rule, resonance*
- *VSPER*
- *Ionic bonds, molecular crystals*
- *IMFA's*
- *Giant Covalent, Metallic*

TEST: ATOMIC STRUCTURE (REVIEW)

ORGANICS

- *Organic Nomenclature (see table and handout)*
- *Reaction Mechanisms: Alkanes, Alkenes, ~~Alcohol~~s, Aromatic, complete and incomplete combustion*
- *Reaction types: addition, Markovnikov's Rule, substitution, oxidation, dehydration, condensation*
- *Structural and Geometric Isomerism*
- *Polymerization: addition and condensation, peptide linkage.*
- *More hybridization*

- ***Test: ORGANICS AND ORGANIC NOMENCLATURE***

THERMOCHEMISTRY

- *Kinetic and Potential Energy, Definition of Enthalpy*
- *Specific heat capacity, $Q = mc\Delta T$, also recall: $Q = C\Delta T$*
- *c = heat capacity/mass $\{c=C/m\}$*
- *molar heat of fusion, solidification, condensation…*
- *calculating enthalpy changes for warming substances and for changes of state*
- *experimental determination of enthalpy change, measuring enthalpy change solution*
- *Enthalpy: standard heats of reaction*
- *Hess's Law of heat summation, and heats of formation*
- *Bond Energies*
- *Experimental determination of enthalpies of reaction, neutralization, combustion*
- ***TEST: Thermochemistry***

KINETICS

- *Rate=change in conc/time, rate of rxn =…average number of mols per L of reactants being consumed or products being formed…*
- *Rate curves: explanations using collision theory*
- *Reaction Rates and Stoichiometry: relative rates*
- *Reaction conditions and rate (nature, concentration, etc) – factors that affect rate of rxn*
- *Collision theory: molecular orientation and kinetic energy: Ea*
- *Maxwell/Boltzmann Distribution: effect of temp and catalyst*
- *Energy and Kinetics – activation energy and 'rate determining (slow) step'*
- *Catalysis: heterogeneous, homogeneous, adsorption and intermediate compound theory*
- *Reaction Mechanisms: Determining the order of the rxn*
- *Determining the rate law of the rxn*
- ***TEST: Kinetics***

EQUILIBRIUM

- *Dynamic equilibria, macroscopic changes and microscopic changes*
- *Phase change and solute-solution equilibria*
- *Rate of forward rxn is equal to rate of reverse reaction at equilibrium*
- *Factors that affect equilibrium: concentration, temperature, pressure, volume*
- *NO effect with catalyst – why?*
- *Le Chatelier's principle: predicting shifts in equilibrium due to changes in: conc., press, volume, temp., catalyst, inert gas at constant volume*
- *Quantitative Equilibrium – Kc and the equilibrium law: writing equilibrium constant expressions.*
- *Large Kc value means… small Kc value means…*
- *Effect of temperature changes on the numerical value of Kc*
- *ICE charts: calculation types*
- *The reaction quotient, Q*
- *Q>Kc means… Q=Kc means… Q<Kc means*
- *Explanation of shifts in equilibrium using experimental data.*
- ***Test: Equilibrium***

EQUILIBRIUM: SOLUBILITY

- *Solution Equilibria – factors that affect solubility*
- *Saturated / unsaturated*
- *Ksp: the solubility product constant, a low Ksp means… a high Ksp means…*
- *Ksp problems: calculating Ksp from molar solubility data, molar solubility from Ksp data, common ion effect and solubility, determining if a precipitate will form: ion product-- Q*
- ***Quiz: Solubility***

ACID-BASE

- *Properties of Acids and Bases*
- *Arrhenius, Bronsted-Lowry, and Lewis definitions of acid-base,*
- *conjugate acid-base pairs, amphiprotic*
- *Strong and weak acid – base pairs, significance of numerical value of Ka and Kb*
- *Ka and Kb, pKa and pKb*
- *pOH and pH relationship*
- *Kw and pKw, Ka x Kb = Kw*
- *Titration: experimental techniques, definitions: tirant, standardization, indicator, end point, equivalence point.*
- ***TEST: Acid-Base***

REDOX

- Definitions: Assigning Oxidation Numbers
- Balancing using Oxidation Numbers, Ion-electron method
- Electrochemical Cells