Moles

Avogadro's number	6.02×10^{23}
Molar Mass	the mass of one mol of a substance

Gas Laws

Boyle's Law (Constant Temp)	P1V1 = P2V2
Graph Shape	a decreasing curve
Charle's Law (Constant Pressure)	V1/T1 = V2/T2
Graph Shape	an increasing line
Gay-Lussac's Law (Constant Volume)	P1/T1 = P2/T2
Graph Shape	an increasing line
General Law	P1V1/T1 = P2V2/T2
Ideal Gas Law	PV = nRT (R = 0.082)
Standard Conditions (STP)	temp = 273 K / 0 C and P = 1 atm
Avogadro's Principle	equal volumes of gases have equal number of particles at the same temp and pressure

Chemical Potential Energy and Heat

Chemical Potential Energy	the stored energy in the structure of matter
Heat	the energy transferred between objects (Joules)
Calorie	the amount of energy required to raise 1 gram of water by 1 degree C
Heat Content (H)	the amount of stored heat energy per mol under constant pressure
Change in Heat Content / Enthalpy (ΔH)	the energy absorbed or released in a reaction
Enthalpy Formula	ΔH = H (products) - H (reactants)
H (products) < H (reactants)	the reaction is exothermic, and will have a negative value
H (products) > H (reactants)	the reaction is endothermic, and will have a positive value

Chemical Potential Energy and Heat (cont)

Hess's law	states that regardless of the multiple stages, the total enthalpy change is the sum of all the changes
Standard heat of formation	The change in heat content when 1 mol of compound is formed from its elements in standard conditions

endothermic = positive = cold reactions

exothermic = negative = warm reactions

the heat of formation in standard conditions = 0

Empirical and Molecular Formulas

Percent composition of A in AB	(Mass of A / Mass of AB) x 100%
Empirical Formula	The simplest whole number ratio of atoms (Ex: CH)
Molecular Formula	The actual number of atoms in a molecule (Ex: C6H6)
N whole Number	N = molecular formula mass / empirical formula mass
Hydrated Salts	salts with water molecules in it's crystals

when hydrated salts are heated, they lose their water

Calculations In Gases

Limiting Reactant	the substance that is used up completely
Excess Reactant	the substance that is not used up and remains after the reaction
Theoretical yield	the largest amount of product that can be produced
Actual Yield	the amount produced by the experiment
Percent Yield	= (actual yield / theoretical yield) x 100

Kinetic Molecular Theory of Gases

a gas is comprised of molecules whose **average distance** between each other is **greater than the size of its particles**

The particles of a gas exert **no attractive forces on each other or the container**

The particles are in **constant random motion**

The KE of a particle depends on its **mass and velocity**

Gas Behavior	
Diffusion	the movement of particles from areas of high concentration to areas of low concentration
Graham's Law of Diffusion	Rate1 / Rate2 = √(molar mass 2 / molar mass 1)
Flowing	the movement of gases through small holes

Pressure	
Pressure	the force applied perpendicularly to the surface of an object per unit area
SI unit	Pascal (N/m^2)
Barometer	measures atmospheric pressure
Manometer	measures the pressure of a trapped gas
Dalton's Law of partial pressure	the total pressure of a mixture of gases is equal to the sum of the individual pressures

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