

Heat of Combustion, The heat produced when one mole of a substance is completely burnt in excess oxygen.

Heat of Formation, The heat change when one mole of a compound in its standard phase is formed from each of its elements in their standard phases.

Heat of Reaction, The heat change when the numbers of moles indicated in the balanced equation for the reaction reacts completely.

Heat of Neutralization, The heat change when one mole of H^+ ions from an acid reacts with one mole of OH^- ions from a base.

Hess's Law of Heat Summation, The heat change for a reaction is the same whether the reaction takes place in one step or several steps.

Law of Lavoisier and Laplace, Heat change for reverse reaction is equal but opposite in sign to forward reaction

Exothermic, Gives out heat. Feels hot. ΔH is negative

Endothermic, Takes in heat. Feels cold. ΔH is positive

Atom, Smallest particle of matter that can exist by itself

Matter, Anything that occupies space

Element, Substance made up of one type of atom - cant be broken into anything simpler by chemical means

Molecule, Smallest particle of substance that shows properties of that substance
Group of atoms chemically joined

Solution, Mixture of solute [solid] and solvent [liquid]. Cannot be separated by filtration.

Mixture, Two or more substances not chemically joined. Composition can vary.

Isotopes, Forms of element with different mass number due to different numbers of neutrons

The Mole, 1 mole = 1 mole = RMM (relative molecular mass) in grams = Avogadro's number (6×10^{23}) = 22.4l of any gas at STP [273 K and 760mm of Hg]

Avogadro's Law, 1 mole of any gas at STP occupies 22.4 L

Kinetic Energy, = $\frac{1}{2} mv^2$ [m = mass, v = velocity]

Atomic Number, Number of protons in an atom. Determines what the element is.

Mass number, Number of Protons + neutrons in an atom

Relative Atomic Mass, 1. average of the mass numbers of the isotopes of the element. 2. as they occur naturally 3. taking their abundances into account 4. expressed on a scale on which atoms of the carbon 12 isotope have a mass of exactly 12 units.

Relative Molecular Mass, 1. The sum of the relative atomic masses of all the atoms in a molecule of the compound. 2. The mass of one molecule of that compound compared with one twelfth of the mass of the carbon 12 isotope. 3. Mass of one mole of a compound = Relative Molecular Mass in grams.

Energy Level, The fixed energy value that an electron in an atom may have.

Atomic Orbital, The region in space within which there is a high probability of finding an electron.

Hund's Rule of Maximum Multiplicity, When 2 or more orbitals of equal energy are available, the electrons occupy them singularly before filling them in pairs.

Aufbau Principle, Electrons occupy the lowest available energy level.

Pauli Exclusion Principle, No more than 2 electrons may occupy an orbital and they must have opposite spin.

Heisenberg's Uncertainty Principle, The more accurately we know the position of a particle the less accurately we know its velocity.

First Ionisation Energy, The energy required to completely remove the most loosely bound electron from a neutral gaseous atom in its Ground State. [$X - e^- = X^+$]

Second Ionisation Energy, The energy required to completely remove the second most loosely bound electron from the ion $X^+ - e^- = X^{2+}$

Atomic Radius, Half the distance between 2 adjacent atoms of the same element joined by a single covalent bond

Oxidation Number, The charge that an atom has or appears to have when electrons are distributed according to certain arbitrary rules.

Electronegativity, The relative attraction that an atom in a molecule has for the shared pair of electrons in a covalent bond.

Boyle's Law ,At constant temperature, the volume of a fixed mass of gas is inversely proportional to its pressure.

Charles's Law, At constant pressure, the volume of a fixed mass of gas is directly proportional to its temperature measured on the Kelvin scale.

Equation of State [for an ideal gas], $PV = nRT$ [n = number of moles, V =volume in m^3 ; T = Kelvin; R = gas constant 8.31; p = pressure]

Avogadro's Law, Equal volumes of gases contain equal numbers of molecules, under the same conditions of temperature and pressure.

EDTA, Ethylenediaminetetraacetic acid

Acid, Arrhenius: a substance that dissociates in water to produce H^+ ions. Bronsted-Lowry a proton [H^+] donor.

$pH, -\log_{10}[H^+]$ or $-\log_{10}[H_3O^+]$ = $14 - pOH = -\log_{10}(K_a * [H_3O^+])$

Base, Arrhenius: a substance that dissociates in water to produce OH^- ions. Bronstead-Lowry: a proton $[\text{H}^+]$ acceptor.

Amphoteric, Has both acid and basic properties at the same time. E.g. Aluminium, aluminium oxide

$\text{pOH}, -\log_{10}[\text{OH}^-]$

Radioactivity, The spontaneous breaking up of unstable nuclei with the emission of one or more types of radiation.

Half-life, The time taken for half of the nuclei in any given sample to decay.