Acetic Acid or CH_3COOH is a weak acid because it releases very few hydrogen ions during disassociation

Afbau principle states that the groundstate configuration of an electron is built by filling the lowest orbitals first

Alloys are mixtures of metallic substances that contain two or more elements

Ammonia contains four atoms that are arranged based on the bonding capacities of each atom, as well as their electron densities

Amorphous solids do not have any patterns or repeating structures, while crystalline solids do

Arithmetic mean is the average, and it is the central value for a set of data points. It is found by summing all of the data points, and dividing the sum by the total number of points

Atomic mass is the sum of the amount of space occupied by the atom's subatomic particles

Atomic mass refers to the number of protons and neutrons in a single isotope of the element

Atomic weight is the average of all the atomic masses of the isotopes of the element

Avogadro's law states that if two gases have the same temperature, pressure, and volume then they have the same number of molecules

Blue litmus paper is used to measure acids that turn red during exposure

Bohr's law is more appropriately called Bohr's model and it depicts the atom with a positively charged nucleus with electrons that orbit it

Boiling point elevation is a function of the number of molecules that are condensing to liquids

Boron is in Group 3A, has three electrons in its valence shell, and can form 3 bonds

Boron triflouride (BF_3) contains four atoms that are arranged based on the bonding capacities of each atom, as well as their electron densities

Boyle's law states that at constant temperature, the product of the gas's pressure and volume is always constant

Brønsted-Lowry method describes acids and bases in terms of their ability to accept and donate electron pairs

Buffer is a solution in which the pH changes very little when a small amount of acid or base is added to it

Bunsen burner provide a quick and easy way to provide flames needed for chemistry

Buret is used in titration to measure precisely how much liquid is used

Butane is a four carbon hydrocarbon that contains 10 hydrogen atoms

Butanoic acid is the carboxylic acid of butane, which has the molecular formula C_4H_{10}

Butanol is the simple alcohol formed from Butane

Carbon is a representative element, and the number of bonds it can form is indicative of its placement in the periodic table

Charles's law states that if an ideal gas is held at constant pressure, the volume is directly proportional to the temperature. It is also called the Law of Volumes.

Colligative properties are dependent on the number of molecules of a compound in a solution, because the molecules work together to display the property

Combustion is the burning of hydrocarbons such as methane (CH_4) by their oxidation with molecular oxygen (O_2)

Condensation is one of the phase changes experienced by the gas state of matter

Covalent bonds are strong interactions between atoms that are relatively closer apart, and are therefore intermolecular forces. They are not easily broken

Critical temperature is the temperature above which the gas cannot be liquefied

Crubicle is used to heat small quantities to very high temperature

Dalton's gas law or the law of partial pressures states that the total pressure exerted by a mixture of gases is equal to the sum of the partial pressures of each gas

Dalton's law can refer to one of the three laws that Dalton formulated to describe the behavior of atoms

Density is the ratio of the mass of a compound to its volume

Electrochemical cells are also called voltaic cells, and they are used to produce energy. It is often referred to as a battery; however the voltaic cell is singular while batteries usually have more than one cell

Electron configuration is the arrangement of the electrons in an element's energy shells

Electron density is the likelihood that an electron is present at a specific location in space

Electronegativity is the degree to which an atom can attract electrons, generally increases from left to right in the periodic table

Empirical formula is the lowest whole number ratio of the elements that make up a compound, and it allows calculations from percentages to formulas. It is not always the same as the molecular formula

Enantiomer is one of a pair of stereoisomers that are not super-imposable mirror-images of each other

Energy is described as the sum of the hat and work in a system

Enthalpy measures the total energy of the system, and it is calculated by subtracting the heat of formation of the reactants from the heat of formation of the products

Equilibrium constant is written as the ratio of the products of the forward reaction, divided by the ratio of the products of the reverse reaction. Each molecule is raised to the power of its coefficient

Erlenmeyer flask is used to heat and store liquid

First Law of Thermodynamics states that energy can neither be created nor destroyed

Fluorine is in Group 7A, has 7 electrons, and readily accepts one electron to form a stable octet

Freezing point depression is a function of the number of particles that are dissolved in the solution

Gay Lusac's law states that the ratio between the volumes of gases in a reaction and the products formed can be expressed as whole numbers

Half-life is defined as the amount of time it takes for the concentration of a reactant in a chemical reaction to decrease by half of its initial value

Heat is the type of energy that is transferred from one region of a thermodynamic system to another, or between different systems

Hess's Law states that if two or more thermochemical equations are added to give a product, then the heats of the reaction ca also be added to give the final heat of the reaction

Hund's multiplicity rule states that electron pairing in any orbital cannot take place until each orbital of the same sub-level contains 1 electron

Hydrochloric acid or HCl is a strong acid that forms hydrogen and chloride ions

Hydrogen bonds are weak interactions between a hydrogen atom and neighboring electronegative atoms

Ideal gas law is expressed as PV=nRT, where P is the pressure, V is the volume, n is the amount of moles, T is the temperature, and R is the universal gas constant

Intermolecular forces are transient interactions between molecules

Ionization energy of an atom is described at the minimum amount of energy needed to remove an electron from an atom in a gaseous solution

Ionization potential is defined as the energy required to remove the outermost (highest energy) electron from a neutral atom in its ground state

Isomers are compounds that have the same molecular formula, but have different structural formulas

Isotopes are elements with the same identity, or proton number, but contain different numbers of neutrons

K_a is the dissociation constant of an acid

K_b is the dissociation constant of a base

Kelvin scale is the dominant temperature scale used in the physical sciences. It represents an absolute zero temperature at which molecules are no longer in motion, and heat is no longer transferred

Kelvin's law refers to a concept in electrical economics that states that the most economical area for an electric conductor is the one for which the cost of energy lost in a set period of time equals the interest for the same period of the capital

Kinetic energy is energy in motion

Kinetic molecular theory of gases explains the behavior and arrangement of gas particles

Le Châtelier's Principle states that if stress is applied to the reaction mixture while it is in equilibrium, the reaction occurs in the opposite direction to relieve the stress

Lewis-Dot diagram shows that bonds between atoms are represented as lines and each line represents two electrons

Liquid crystal is an unusual state of matter that exists between a liquid and a solid

Litmus paper is used to measure the pH of substances, both unknown and known, in the laboratory

London Dispersion Forces are instantaneous dipoles, or the concentration of electrons in one region of a molecule

Magnetism is the ability of a material to respond to a magnetic field

Manganese (Mn) is a transition metal in the periodic table, and it adopts several oxidation states

Miscibility is the ability of two more compounds to form a homogenous solution

Molality is a way of measuring the concentration of the solute in a solution. It is the moles of solute/kg of solvent.

Mole is the amount of a substance that contains its basic elements, and the coefficient before each molecule in the equation indicates the number of moles

Molecular weight is used to find number of moles of each reactant at the beginning of the reaction

Neutral litmus paper is purple and it can be used to identify both acids and bases. Bases turn purple litmus paper blue, and acids turn it red

Nitric Acid or HNO_3 is also a strong acid and it readily disassociates into hydrogen and nitrate ions

Nitrogen dioxide is a reddish-brown toxic gas that forms when dinitrogen tetroxide is heated

Noble gases are nonmetals that are located in Group 8A of the periodic table. They have eight electrons in their outer shell, or a complete octet, and this makes them nonreactive or inert. Since they have filled outer shells, they do not need additional electrons

Normal force is the force that is perpendicular to the surface of a contact of an object

Nuclear reactions take place when the force that olds the nucleus of an atom together is disrupted

Osmosis is the movement of water from an area of higher concentration to an area of lower concentration

Osmotic pressure is the force with which a pure solvent moves across a semi-permeable barrier into a container that holds a solution

Osmotic pressure is the pressure required to prevent osmosis

Oxidants are the chemical species that gains electrons

Oxidation is the loss of electrons

Oxyacids are compounds that contain oxygen atoms and behave as acids in solution

Oxyanions are polyatomic ions that contain oxygen

Percent composition is the mass percent of an element is a compound

pH is a measure of the acidity or basicity of a solution.

Phase diagram shows the conditions during which distinct phases of matter exist for a given substance

Photons are particles of light, and are not technically considered subatomic particles

Planck's constant is a physical constant that relates the unvarying ratio of the energy of one quantum of radiation to its frequency

Plasma is an ionized gas, and it has indefinite shape and volume, as all gasses do

Polarity is important in the formulation of solutions, because it influences the type of solvent that can be used to dissolve the solute

Positrons in nuclear chemistry are positively charged electrons

Potassium Hydroxide is a strong base

Potential energy is the energy that is stored inside molecules

Precipitates are formed in double displacement reactions, in which the cations and ions of two different compounds are swapped

Precipitation occurs when a solid is formed in a solution during a chemical reaction

Quantum is the smallest unit of radiant energy

Quantum number are used to describe the valence electrons in an atom

Quantum theory is used to describe the behavior of light as a particle of energy called a photon

Raoult's law is used to calculate the vapor pressure of a compound at a specific temperature

Red litmus paper is used to identify bases. If the substance is a base, the litmus paper turns blue

Redox reaction is when reducing agents are oxidized by the loss of electrons, while oxidizing agents are reduced by the gain of electrons

Reduction is the gain of electrons

Scandium is a transition element that is located in group 3B or 3 in the new system, and in period number 4

Scoopa is used in chemistry lab to transfer solids to a weigh paper for weighing

Second Law of Thermodynamics which was formulated by Kelvin states that it is impossible to extract energy by heat from high-temperature energy sources, and then convert the energy unto work

Solubility product constant (K_{SP}) is an equilibrium constant that describes the dissolution of a liquid or solid compound

Standard deviation indicates the degree to which the points in a dataset deviate from the arithmetic mean

Stereoisomer is a pair of compounds in which the bond structure is the same, but the positions of the atoms in space are different

Sulfuric acid readily forms hydrogen and sulfate ions

Test tubes are not used for measuring, but for holding liquids before, after and during reactions

Thermal Energy is the internal energy of a system that gives it a temperature

Thermodynamics is the study of the relationships between heat and other types of energy

Third Law of Thermodynamics states that it is impossible to cool a system to absolute zero

Titration is a standard technique used to determine the concentration of an unknown solution

Total energy is the sum of the heat or energy that is transferred, and the work is the energy used to transfer the energy

Valence shell electron pair repulsion (VSEPR) theory and hybridization are used to explain the shapes of molecules

Van't Hoof factor represented as "i", is used to explain the effect of a solute on the colligative properties of a solution

Vapor pressure is the pressure that exists when a substance is in equilibrium with its condensed state

Viscosity is the measurement of a liquid's resistant to flow.

Watch glass is used to hold solids when being weighed or transported

Weigh boats are plastic bowl-like objects used to measure the mass of solids using a scale, such as an electronic balance

Work in terms of thermodynamics, is the amount of energy transferred to one system by another and it is measure outside the system

FORMULAS:

Melting Point of solution = Melting Point of solvent + T_f;

$$T_f = m * K_f * i,$$

m is the molality, K_f is the cryoscopic/freezing constant for the solute, and i is the Van't Hoff factor.

Charles's law is expressed as $V1/T1=V2/T2$

Boyle's Law is expressed as P1V1=P2(V2)

The pH is a measure of the acidity or basicity of a solution. The pH is calculated by using the following equation:

$$pH = -\log_{10}[H^+] = \log_{10} 1/[H^+] = 10^{-pH}$$

Ideal gas law is expressed as **PV=nRT**, where **P** is the pressure, **V** is the volume, **n** is the amount of moles, **T** is the temperature, and **R** is the universal gas constant

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Percent Mass or Mass Percentage of a solute in a solution, is the ratio of the mass of the solute to the total mass of the solution times 100

Concepts you should have committed to memory:

Density of H_2O	= 1 g/1 mL
Molecular weight of H_2O	= 18.0 g
Molecular weight of O	= 16.0g
Molecular weight of C	= 12.0 g
Molecular weight of H	= 1.0 g

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There are two mole ratios:

2 moles of aluminum oxide produce 3 moles of oxygen:

$$2 \text{ moles } Al_2O_3 / 3 \text{ mole } O_2$$

3 moles of oxygen are produced by 2 moles of aluminum oxide:

$$3 \text{ mole } O_2 / 2 \text{ moles } Al_2O_3$$

The specific heat of a substance is the amount of heat that is required to change its temperature by a set amount. It can be found using the following equation in which q is the heat, m is the mass of the substance, ΔT is the change in the temperature, and C is the specific heat of the substance:

$$q = \text{mass (in grams)} \times \Delta T \times C$$

Raoult's law is represented as:

$$P_A = X_A P^*_A$$

The pH is calculated by using the following equations:

$$pH = -\log_{10}\left[H^+\right] = \log_{10} 1/\left[H^+\right] = 10^{-pH}$$

The combustion of glucose is expressed by the following equation:

$$C_6H_{12}O_6\,(s) + 6O_2\,(g) \rightarrow 6CO_2\,(g) + 6H_2O\,(l)$$

The combustion of ammonia is:

$$NH_3 + O_2 \rightarrow NO + H_2O$$

The equation for the density is:

$D=(P*MW)/(RT)$

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Osmotic pressure is expressed by:

$$\pi = M_s \cdot R \cdot T$$

Quantum theory is used to describe the behavior of light as a particle of energy called a photon.
The equation:

$$E = hf$$

Ionization energy of an atom is expressed as:

$$X\,(g) \rightarrow X^{+}\,(g) + e^{-}$$

The density of a substance is a ratio of its mass to its volume:

$$D = m/V$$

Vapor density(D) = ½ Molecular weight(M)

Rydberg equation : $1 / \lambda = R [1 / n_1^2 - 1 / n_2^2]$

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