Science Glossary

**Chemistry - C2**

Science Glossary

Chemistry Unit 2.1 – **Structure and Bonding.**

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| **Key Word** | **Definition** |
| Covalent Bonding | A pair of electrons shared between two ato,s, forming a bond that holds the atoms together within a molecule. |
| Delocalised Electrons | Delocalised electrons are electrons that have dissociated from their individual atoms. |
| Element | A substance containing only one type of atom. |
| Giant Ionic Lattice | C:\Users\harris.a\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\images[1].jpgRegular 3D arrangement of oppositely charged ions to form a giant ionic lattice. |
| Giant Covalent Structure | A structure containing billions of atoms in a network joined together by covalent bonds: also called a macromolecular structure. |
| Ion | An electrically charged particle, containing different numbers of protons and electrons. An ion is an atom or molecule that has either lost (positively charged metal) or gained (negatively charged non-metal) one or more electrons. |
| Ionic Bonding | A chemical bond formed by the electrostatic attraction between oppositely charged ions. |

Chemistry Unit 2.2 – **Structure and Properties.**

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| **Key Word** | **Definition** |
| Allotrope | Different structural forms of the same element e.g. diamond, graphite, buckminsterfullerene, grapheme, carbon nanotubes. |
| Fullerenes | A form of element carbon; a molecule made up of at least 60 carbon atoms linked together in rings to form a hollow sphere or tube. |
| Giant covalent structures | A structure containing billions of atoms in a network joined together by covalent bonds; also called a macromolecular structure. |
| Intermolecular forces | A weak force between simple molecules. They can be easily broken so simple molecules have low melting and boiling points. |
| Macromolecular | A macromolecular substance has a giant covalent structure e.g. diamond and silicon dioxide. |
| Nanoscience | The study of nanoparticles. |
| Nanoparticles | Particles between 1-100nm in size. They have different properties to normal sized particles of the same substance. |
| Polymers | A long-chain molecule made by joining many short molecules (monomers) together. |
| Shape Memory Alloys | An alloy that reverts to its original shape when it is heated after being deformed. |
| Thermosetting Polymers | Plastics unable to soften and melt on heating. Applies to polymers with strong covalent bonds (cross links) between the polymer chains. These polymers cannot be recycled by melting and remoulding. |
| Thermosoftening Polymers | Plastics that are able to soften and melt on heating. Applies to polymers with weak forces between the polymer chains. These polymers can be recycled by melting and remoulding. |

Chemistry Unit 2.3 – **How Much?**

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| **Key Word** | **Definition** |
| Chromatography | A technique used for separating a mixture of substances using their relative attractions for the stationary and mobile phases. |
| Empirical Formula | The simplest whole number ratio of atoms (or ions) of each element in a substance. |
| Gas Chromatography | A technique used for separating a mixture of substances in a very small sample. It can be used to separate fragments of DNA to make a DNA profile. |
| Instrumental analysis | Using an instrumental technique to identify substances e.g. Gas chromatography, mass spectrometry.  These techniques use smaller sample sizes, are faster, more accurate, more reliable, more sensitive and can be automated easily, compared to other methods. |
| Isotopes | Two atoms of the same element with different numbers of neutrons but the same number of protons and electrons e.g., 35CI and 37CI; both have 17 protons, but one has 18 neutrons and one has 20 neurons. |
| Mass Spectrometer | An analytical technique that involves breaking molecules into charged fragments and measuring their mass/charge ratios. Also known as spectrometry. |
| Mole(s) | The mass of one mole of a substance equals the relative formula mass (Mr) in grams. |
| Molecular Formula | The chemical formula showing the different elements and the number of atoms of each element in a molecule, for example CH4 (methane) |
| Molecular Ion | The ion formed by the otherwise unfragmented molecule in mass spectroscopy. |
| Percentage Yield | Actual mass of product produced x 100  Theoretical mass of product produced |
| Relative Atomic Mass (Ar) | The average mass of the atoms in an element (their individual mass numbers will differ because of the existence of isotopes). |
| Relative Formula Mass (Mr) | The sum of the relative atomic masses of all the atoms in the formula. |
| Retention Time | The time taken for a substance to reach the detector at the end of a gas chromatography column. |
| Reversible Reaction | A reaction is reversible if both the forward and reverse reaction can take place; for example, if you cool brown NO2 gas it forms N2O4, but if you heat N2O4 it thermally decomposes to give NO2.  If the forward reaction is exothermic then the backward reaction is endothermic. |

Chemistry Unit 2.4 – **How Fast?**

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| **Key Word** | **Definition** |
| Activation Energy | The minimum amount of energy particles must have to react when they collide. |
| Anhydrous | A substance that does not contain any water. |
| Catalyst | A chemical compound that speeds up a reaction but is not used up by the reaction. It lowers activation energy so less energy is needed for the reactants to react. |
| Collision theory | In Chemistry, a theory that relates the rate of a chemical reaction to the number of collisions between particles that have activation energy or above. |
| Endothermic | The temperature of the surroundings decreases and feels colder as heat energy is taken in from the surroundings. (Chemical reactions in which the products have more stored chemical energy than the reactants.) |
| Exothermic | The temperature of the surroundings increases and feels hotter as heat energy is given out to the surroundings. (Chemical reactions in which the products have less stored chemical energy than the reactants.) |
| Hydration | A chemical reaction involving the addition of water to a compound, for example the hydration of ethene to form ethanol. |
| Precision | A high level of precision is where experimental measurements are close to each other and the mean of the results. Precision is not the same as accuracy. |
| Respiration | The breakdown of glucose in cells to release energy, carbon dioxide and water. |

Chemistry Unit 2.5 – S**alts and Electrolysis.**

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| **Key Word** | **Definition** |
| Acid(s) | A compound with a pH of less than 7, which turns litmus paper red and releases hydrogen ions in solution. (H+ ions) |
| Alkali(s) | A base that dissolves in water to form hydroxide ions (OH- ions) and gives a solution of pH greater than 7. |
| Aqueous Solution | A substance that is dissolved in water to form a solution. |
| Base(s) | A compound, usually a metal oxide or metal hydroxide that reacts with an acid to neutralise it. |
| Brine | Water that contains a large amount of dissolved salt. |
| Electrolyte | The molten or dissolved ionic substance that is decomposed during electrolysis. |
| Electroplating | Applying a thin layer of metal to an object by electrolysis. The object is attached to the negativeelectrode. |
| Half Equations | A balanced equation, including electrons, that represents the reaction at one electrode during electrolysis.  e.g. 2Cl- → Cl2 + 2e- |
| Inert | A substance that is unreactive e.g. noble gases that have full outer shells of electrons are inert gases. |
| Neutral | Does not have a charge or an overall charge e.g. neutrons and atoms. |
| Neutralisation | Make a solution neither acid nor alkaline (pH7). In a neutralisation reaction an acid and alkali (or base) that produces water and a neutral salt.  OH-  + H+ → H2O |
| Oxidation | A type of chemical reaction. When a compound is oxidised it gains oxygen, loses hydrogen or loses electrons. |
| pH Scale | A measure of the acidity or alkalinity of a solution. pH 1 is strongly acidic, pH7 is neutral and pH14 is strongly alkaline. |
| Precipitate | An insoluble solid formed by a chemical reaction, such as the reaction between two soluble salts. |
| Salts | Ionic compounds formed from the neutralization reaction of an acid and a base. They are composed of positively charged metal ions and negatively charged non-metal ions so that the salt is electrically neutral overall. |
| State Symbol | Symbols used in balanced equations to show the physical state of each reactant and product: (s) solid, (l) liquid, (g) gas or (aq) aqueous solution. |
| Universal Indicator (UI) | A mixture of dyes that changes colour over a range of pH values and is used to test for acids and alkalis. |