

Definitions and Concepts for OCR (A) Chemistry GCSE

Topic 2 - Elements, Compounds and Mixtures

*Definitions in **bold** are for higher tier only*

*Definitions marked by '**' are for separate sciences only*

Definitions have been taken, or modified from the [OCR \(A\) Specification for GCSE Chemistry. J248. Version 3.3 May 2020](#)

Alloys: A metal compound made by combining two or more metals together. This process is carried out to give greater strength or resistance to corrosion.

Chromatography: A process used to separate substances in a mixture. Separation of the substance depends on distribution between a mobile phase and a stationary phase.

Covalent bond: A shared pair of electrons between two non-metals.

Crystallisation: A separation technique to obtain soluble solids from solutions. The process involves heating the solution until crystals start to form, leaving the solution to cool and then filtering the formed crystals from the solution.

Diamond: A giant covalent structure which is made up of carbon atoms, each of which form four covalent bonds with four other carbon atoms.

Electron shell: Different energy levels in atoms, occupied by electrons.

Electrostatic forces: The strong forces of attraction between oppositely charged ions.

Element: A substance made up of only one type of atom.

Empirical formula: The simplest whole number ratio of atoms of each element in a compound.

Evaporation: A separation technique to separate soluble solids from solutions. The solution is slowly heated in an evaporating dish so that the solvent evaporates to leave the dry crystals.

Filtration: A separation technique used to separate an insoluble solid from a solution.

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Fractional distillation: A process used to separate a mixture of liquids. The liquids have different boiling points so can be separated into different fractions within a fractionating column.

Fullerenes: Molecules of carbon atoms with hollow shapes. The structures are based on hexagonal rings of carbon atoms but they may also contain rings with five or seven carbon atoms. Examples include Graphene and C_{60} .

Gas chromatography: A technique used to separate a mixture of volatile liquids. A tube is packed with a solid or a solid coated in a liquid (stationary phase) and a gas (mobile phase) is passed through the column under pressure at high temperature. Each component takes a different time to pass through the tube. This is called the retention time which can be used to identify the component.

Giant covalent structure: A molecular structure containing many atoms covalently bonded together. The strong covalent bonds mean that giant covalent structures have high melting points.

Graphene: A single layer of graphite with properties that make it useful in electronics and composites.

Graphite: A giant covalent structure which is made up of carbon atoms each of which form three covalent bonds with three other carbon atoms, forming layers of hexagonal rings which have no covalent bonds between them. There is one delocalised electron per carbon atom which is free to move to carry charge.

Group number: Determines how many electrons are in the element's outer electron shell. For example, elements in Group 2 have 2 electrons in their outer shell.

Group (periodic table): A column of the periodic table. Elements in the same group have similar chemical properties.

Intermolecular forces: The forces which exist between molecules. The strength of the intermolecular forces impact physical properties like boiling/melting point.

Ion: An atom or molecule with an electric charge due to the loss or gain of electrons.

Ionic bond: The bond formed between the oppositely charged ions when a metal atom loses electron(s) to form a positively charged ion and a non-metal gains these electron(s) to form a negatively charged ion.

Ionic compound: Chemical compound formed of ions, held together by strong electrostatic forces.



Locating agent: A chemical which reacts with a colourless substance to produce a coloured product. They are used in paper and thin layer chromatography to help identify the substances on the stationary phase.

Melting point data: Data which can be used to evaluate the purity of a substance. A pure substance should have a sharp melting point.

Metals: Elements that react to form positive ions. Found to the left and towards the bottom of the periodic table.

Mixture: Contains at least two different elements or compounds which are not chemically bonded together. Mixtures may melt or boil over a range of temperatures.

Mobile phase: The fluid (gas or liquid) which moves through the chromatography system, carrying the mixture which is to be separated.

Molecule: A group of at least two atoms held together by covalent bonds.

***Nanoparticles:** Particles with diameters between 1 nm to 100 nm in size. Nanoparticles can exhibit properties different to those for the same material in bulk.

Non-metals: Elements that react to form negative ions. Found towards the right and top of the periodic table.

Paper chromatography: A type of chromatography which uses paper as the stationary phase and a solvent as the mobile phase. The solvent carries the mixture up the paper where the substances in the mixture then separate, depending on how soluble they are in the mobile phase.

Period (periodic table): A row of the periodic table. Elements in the same period have the same number of electron shells.

Period number: Determines how many electron shells the element has. For example, elements in period 3 have 3 electron shells.

Periodic table: Table of elements arranged in order of increasing atomic number and such that elements with similar properties are in the same column (group).

Polymer: Large long-chain molecules made up of lots of small monomers joined together by covalent bonds.

Pure substance: The chemistry definition of a pure substance is a substance which contains only one compound or element. The everyday definition of a pure substance is a substance which has nothing added to it, e.g. pure milk. Pure substances can be identified using melting point.



Relative atomic mass: The average mass of an atom of an element compared to 1/12th the mass of an atom of carbon-12.

Relative formula mass: The sum of the relative atomic masses of the atoms in the numbers shown in the formula. It is numerically equal to the mass of one mole of a substance in grams.

Relative molecular mass: The average mass of one molecule of an element or compound compared to 1/12th the mass of an atom of carbon-12.

Rf value: A value used in chromatography which is calculated as the distance travelled by the dissolved substance divided by the distance travelled by the solvent. It can be used to identify substances within a mixture.

Simple distillation: A separation technique used to separate a liquid from a solution. The solution is heated so that only the liquid with the lowest boiling point evaporates. This gas is then condensed in a condenser before being collected as a liquid.

Simple molecules: Molecules containing a fixed number of atoms covalently bonded together. Simple molecular structures have low boiling points since they have weak intermolecular forces which are easy to overcome.

Stationary phase: The nonmoving phase which the mobile phase passes over during chromatography.

Thin layer chromatography: A technique used to separate mixtures. The stationary phase is a thin layer of alumina or silica fixed to a metal or glass plate. The plate is dotted with the mixture and placed in a beaker of solvent which is allowed to travel up the plate. The mixture separates due to the components having different solubilities in the mobile phase.

