

IGCSE Co-ordinated Sciences Chemistry Glossary

- **acid** = any substance that produces hydrogen ions, H^+ , when dissolved in water
- **acidic solution** = a solution with a pH less than 7
- **acid rain** = rain with a pH less than 5.6; acid rain has been made more acidic than normal rain because sulfur oxides and nitrogen oxides have dissolved in it; acid rain causes damage to buildings made from limestone, damages metal structures, kills fish, damages leaves in trees so they photosynthesise less
- **acidic soil** = soil with a pH less than 7
- **activation energy** = minimum amount of energy needed to start the reaction/for a successful collision.
- **actual yield** = the amount of product obtained when carrying out a reaction
- **addition reaction** = a reaction in which atoms are added to an unsaturated carbon compound; the atoms are added using the double bond as one of the double bonds breaks and is used to make two new bonds, e.g. alkenes and halogens
- **addition polymer** = polymer formed by addition polymerization; adding many unsaturated monomers using double bonds
- **addition polymerization** = the joining together of many unsaturated monomer molecules (double bonds) to form a long molecule; new monomers are added to the chain at the double bonds
- **alcohol** = a homologous series of organic compounds which has -OH as its functional group; ethanol is a member of this homologous series
- **alkanes** = a homologous series of hydrocarbons which are saturated as they have only single bonds between the carbon atoms
- **alkenes** = a homologous series of hydrocarbons which are unsaturated as they have at least 1 double bond somewhere in the chain
- **allotrope** = different forms of the same element e.g. diamond, graphite and the fullerenes are allotropes of carbon
- **alloys** = mixture of a metal and small amounts of other metals and non-metals, made to have certain improved properties eg harder, stronger, increased resistance to corrosion, increased

heat or electrical resistance

- **alkali** = any base which is soluble in water
- **alkali metal** = any metal in group 1 of the Periodic Table, most reactive metals
- **alkali solution** = a solution with a pH larger than 7
- **anions** = negative ions; attracted to anode
- **anode** = positive electrode in electrolysis
- **arrangement** = how particles are positioned compared to each other e.g. close together, far apart, in fixed positions
- **atom** = the smallest particle that can exist of an element
- **atomic number** = number of protons in the nucleus of an atom, determines the order and place of each element in the Periodic Table
- **avogadro's constant** = 6.02×10^{23}
- **balanced equation** = numbers of atoms are the same on either side of the equation (any equation should be balanced as in any chemical reaction particles are only re-arranged and are not destroyed or created); also shows the ratio in which reactants react and products are produced during a chemical reaction
- **base** = a substance which can neutralise an acid to make a salt and water examples: metal oxides, metal hydroxides,
- **bauxite** = ore containing aluminium oxide from which aluminium is extracted
- **blast furnace** = a furnace used for getting iron from iron oxide with the help of carbon
- **boiling** = a process during which a liquid changes into a gas as its particles gain more energy and move a lot faster and also much farther apart from each other. further from gas to liquid; only happens at the boiling temperature as opposed to evaporation
- **brine** = concentrated sodium chloride solution
- **catalyst** = a substance which speeds up a reaction but which remains unchanged at the end of the reaction
- **catalytic converter** = a piece of equipment which is part of the exhaust of a car and which changes nitrogen oxides into nitrogen before they are released into the atmosphere
- **cathode** = negative electrode in electrolysis
- **cation** = positive ion ; attracted to cathode
- **chain length** = number of carbon atoms one after the other in an

organic compound

- **chemical bond** = electrostatic attraction between atoms or ions
- **chemical property** = how it reacts
- **chromatogram** = the result of a chromatography
- **chromatography** = a separating technique which uses the difference in solubility in a given solvent between the different parts of a mixture to separate them;
- **combustion** = burning, the reacting of a substance with oxygen, exothermic
- **complete combustion** = combustion in sufficient oxygen which in the case of hydrocarbons produces carbon dioxide and water
- **compound** = a pure substance made from two or more different atoms joined together chemically
- **concentration** = the number of moles of per liter of solution; tells us how much solute is dissolved in a solvent
- **condensation** = a process during which a gas changes into a liquid because its particles are having less energy, slow down and come much closer together
- **condensation polymer** = a long molecule formed by condensation polymerization e.g. nylon
- **condensation polymerization** = the joining together of many of two different monomer molecules to form one single long molecule during which a small molecule is removed for each link between the monomers.
- **covalent bond** = force of attraction between a pair of shared electrons and the nuclei of both atoms
- **cracking** = the breaking down of long-chain alkanes into smaller alkanes and alkenes using a catalyst and heat (500 C)
- **crude oil** (or petroleum) = a mixture of organic compounds formed, as a result of high temperatures and pressures, from the remains of living plants and animals which died millions of years ago; a fossil fuel
- **crystallisation** = the forming of crystals from a saturated solution
- **decomposition** = breaking down a compound into simpler substances
- **delocalised electrons** = electrons that can move between atoms; they are not part of 1 atom
- **diatomic** = 2 atoms only
- **diffusion** = the movement of particles by which different substances mix as a result of the random motion of each of

their particles

- **displacement reaction** = a reaction in which a more reactive metal or halogen takes the place of a less reactive metal or halogen in its compound
- **distillate** = the liquid obtained from distillation; the liquid which has evaporated and condensed
- **distillation** = a separating technique in which a mixture is heated, the substance with the lowest boiling point evaporates and is condensed back to liquid form
- **ductile** = can easily be drawn into wires, what metals are
- **endothermic** = absorbs energy
- **electrical conductivity** = conducts electricity for which it needs mobile charged particles
- **electrodes** = rods of usually carbon which are used to make electrical contact with the electrolyte
- **electrolysis** = a reaction which uses electricity to decompose a compound
- **electrolyte** = an ionic compound or acid which conducts electricity (molten or in solution) and which is decomposed as it conducts
- **electrolytic cell** = a beaker with an electrolyte, 2 electrodes, a power supply and leads which changes electrical energy into chemical energy
- **electron** = a sub-atomic particle which has a negative charge and no relative mass
- **electronic configuration** = the number of electrons on each energy level in an atom
- **element** = a pure substance that consists of 1 type of atom only
- **empirical formula** = the formula which gives the most simple ratio of atoms/ions in a molecule/formula unit
- **equilibrium** = is reached when the forward reaction and reverse reaction are going on at the same time; at this point the amount of reactant or product does not change.
- **evaporation** = a process during which a liquid changes into a gas as some of its particles at the surface gain more energy, move a lot faster and farther apart from each other and eventually escape from the liquid; happens at any temperature between melting and boiling point. e = changing of particles at the surface from a liquid into a gas state; at any temperature between the melting and boiling point of a liquid.

- **exothermic** = releases/gives out energy
- **fermentation** = the changing of sugars dissolved in water into alcohol and carbon dioxide by the enzymes in yeast at a temperature of between 30 C to 40 C.
- **filtrate** = the liquid/solution that goes through the filter paper
- **forces of attraction** = forces which hold/pull particles together
- **forward reaction** = the reaction which produces the products
- **fraction** = a group of substances which has a specific boiling point/range/condenses at similar temperature (because they have a similar number of carbon atoms in them);
- **fractional distillation** = crude oil is heated to evaporate most components which then condense back at different levels in the fractionating column because they have differing boiling points;
- **freezing** = process during which a liquid changes into a solid as its particles lose energy, slow down and come closer together again
- fuel = a substance that can release a lot of energy e.g. by burning
- gas = a state of matter in which particles are far apart, have a lot of energy and move fast and randomly
- galvanising = the coating of steel or iron by zinc to protect it from rusting
- giant structure = a structure in which a very large number of atoms or ions are joined together strongly and continuously in all 3 directions; a large network of particles
- group = vertical column in Periodic Table
- half equation = equation showing what goes on at each electrode in electrolysis
- halogen = any element from group 7 in the Periodic table
- homologous series = a group of organic compounds which all have the same general formula, similar chemical properties because they have the same functional group, have a gradual trend in physical properties, and differ by one CH₂ unit.
- hydrocarbon = a compound which has carbon and hydrogen only
- incomplete combustion = burning in not enough oxygen
- indicator = any chemical which can change colour when added to different chemicals, usually acids and bases
- inert = very unreactive
- inert gases = gases in group 0

- intermolecular forces = weak forces of attraction between molecules
- ion = a charged atom or group of atoms (which has become charged because it has either lost or gained an electron(s))
- ionic bond = strong electrostatic attraction between two oppositely charged ions, formed between metals and non-metals
- isomers = compounds with the same molecular formula but different structures or displayed formula and therefore different properties
- isotopes = atoms with the same number of protons and electrons but different number of neutrons; same mass number but different mass number
- lattice = regular 3-dimensional arrangement of the particles (atoms, ions or molecules)
- limestone = calcium carbonate
- liquid = a state of matter in which particles are close together but in a disorderly arrangement, they can move past one another and have energy to move from their positions
- lubricant = an oily but soft substance used to reduce friction between two moving surfaces
- malleable = easily shaped without breaking, what metals are
- mass number = the total number of protons and neutrons in the nucleus of an atom
- melting = a process during which a solid changes into a liquid as its particles have gained more energy and move from their positions and past one another into an irregular arrangement
- metallic bond = attraction between positive metal ions and delocalised (mobile 'sea' of electrons electrons
- metallic character = behaves like a metal, gives away electron (s) when it reacts to form a positive ion, conducts, shiny, malleable
- mixture = 2 or more substances mixed together which have not reacted and which are therefore easily separated by physical processes like evaporation/distillation/filtration
- molar mass = the actual mass of 1 mole or 6.02×10^{23} particles (atoms, ions, molecules or formula units) of that substance
- molar volume = the volume of 1 mole of a gas = 24L at rtp
- mole = the name given to a certain number and that number is 6.02×10^{23} .

- molecular formula= shows the type of atoms/ions and their number/molar ratio in a molecule/formula unit
- molecule = a particle made up of 2 or more atoms held together by covalent bonds
- monomer = a small molecule which can be joined together to make a long molecule called a polymer; a monomer must have a double bond or a functional group at either end
- movement = how particles move e.g. fast, vibrate
- neutron = a sub-atomic particle with no charge and which is in the nucleus and has a relative mass of 1
- neutralisation = a reaction between an acid and a base to produce water and a salt and sometimes also carbon dioxide
- noble gas = any element from the last group in the Periodic Table
- noble gas electronic configuration = the way in which electrons are arranged in the noble gas atoms which is that they have their outer shell full! This 2 electrons in the helium atom and 8 in the other noble gases
- ore = a mixture of rock which contains a useful chemical
- organic compounds = compounds that have the element CARBON in it
- oxidation = a reaction during which a substance gains oxygen; oxygen is added to the element or compound increasing its mass; also a reaction during which a substance loses an electron
- oxide = a compound which ends with oxygen
- oxidizing agent = a chemical which oxidises another chemical; it loses oxygen/gains electrons and becomes reduced
- oxide layer = layer of an oxygen compound
- % yield = the actual yield expressed as percentage of the theoretical yield
- period = horizontal row in the Periodic Table
- periodic trends = gradual changes in properties of the elements in the same period
- petroleum = a mixture of organic compounds formed, as a result of high temperatures and pressures, from the remains of living plants and animals which died millions of years ago; contains fossil fuels.
- **pH** = a number between 1 and 14 which tells us how strong or how weak an acid or alkali is
- **pH scale** = a scale running from 1- 14 used to show how acid or

alkaline a substance is

- **physical property** = properties like melting and boiling point, volatility, conductivity, appearance, colour
- **poly(ethene)** = polymer made from polymerising ethene molecules - addition polymer
- **polymer** = a large molecule made from many small molecules that have been joined together; each polymer is made up of many repeated units
- **polymerisation** = a chemical reaction in which many small molecules or monomers are joined together to form a long molecule called a polymer
- **position of equilibrium** = gives an idea of how much reactant or product there is at equilibrium
- **precipitation** = a reaction between 2 salt solutions which produces an insoluble salt which sinks to the bottom of the test tube
- precipitate = insoluble solid formed during a reaction
- product = substance on right hand of equation
- pure substance = a single chemical element or compound which melts and boils at fixed temperatures
- rate of a reaction = amount of change in a reactant or product over a period of time; tells us how fast a reaction is going
- reactant = substance on left side of equation
- reactivity = refers to the ease with which a substance reacts with other substances
- reactivity series = a list of metals with the most reactive metal first based on results from experiments
- redox = a reaction during which both a chemical is oxidised and another is reduced
- reducing agent = a chemical which reduces another chemical; it gains oxygen/loses electrons and becomes oxidised
- reduction = a reaction during which a substance loses oxygen and has its mass decreases; also a reaction during which a substance gains electrons
- relative atomic mass = the mass of an atom as compared to 1/12th of the mass of a carbon-12 atom; it is also the average mass of all isotopes
- relative molecular mass = the sum of the relative atomic masses (multiplied by the number of times they are in the molecule) of the atoms in the molecule
- relative formula mass = the sum of the relative atomic masses

(multiplied by the number of times they are in the formula) of the atoms or ions in the giant structure

- residue = the insoluble part that remains behind in the filter paper during a filtration or what is left in the flask
- reverse reaction = reaction which changes products back into reactants
- reversible reaction = a reaction during which products are made but are also changed back again into reactants
- rust = a loose orange brown flaky layer of hydrated iron oxide
- sacrificial protection = method of rust protection in which blocks of more reactive metal are attached to iron; the more reactive metal reacts with the air and water instead of the iron
- saturated solution = a solution which contains as much solute as possible
- saturated organic compound = each carbon atom in the organic compound has made 4 single covalent bonds
- simple molecular substance = substance made up of individual molecules held together by covalent bonds and has weak intermolecular forces between these molecules
- solid = a state of matter in which particles are close together and in a regular arrangement, can only vibrate in fixed positions and have little energy
- solvent = a liquid that does the dissolving
- solvent front = the height the solvent goes up to on the chromatography paper
- solute = a solid which dissolves
- solution = a mixture made by dissolving a solute in a solvent
- steel = an alloy of iron with other elements
- sub-atomic particle = very small particles from which atoms are made: electrons, protons and neutrons
- sublimation = a process during which a solid changes directly into a gas because its particles have a lot more energy, move around very fast and are very far apart.
- system = the reactants and products of a reaction
- theoretical yield = the amount of product you should obtain according to the balanced equation and calculations
- thermal decomposition = breaking down of a compound by heating it
- transition element = metal in the transition block of the Periodic Table

- universal indicator = a mixture of indicators used to measure the pH because it goes different colours
- unsaturated organic compound = has at least one double bond; decolourizes brown bromine water
- valency = the combining power of an atom or group of atoms; in an ionic compound the valency of an ion is its charge; in a molecule the valency of an atom is the number of bonds it makes
- valency electrons = the electrons on the most outer shell;
- vapourise = change from liquid into gas
- vibrate = move forwards and backwards but in the same fixed position
- volatile = vapourises easily, low boiling point

word equation = an equation in which the names of the chemicals are used