



# Préparation au bac : petit dictionnaire de chimie

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## A simplified chemistry dictionary

**accuracy:** When you measure something, the accuracy is how close your measured value is to the real value. For example, if you're actually six feet tall and your brother measures your height as six feet, one inch, he's pretty accurate. However, if your cousin measures your height as twelve feet, 13 inches, he's not accurate at all.

**acid:** This is anything that gives off  $\text{H}_3\text{O}^+$  ions in water. Acids have a pH less than 7 and are good at dissolving metals. They turn litmus paper red and phenolphthalein colorless.

**addition reaction:** A reaction where atoms add to a carbon-carbon multiple bond.

**alcohol:** An organic molecule containing an -OH group

**aldehyde:** An organic molecule containing a -COH group

**alkali metals:** Group I in the periodic table.

**alkaline earth metals:** Group II in the periodic table.

**alkane:** An organic molecule which contains only single carbon-carbon bonds.

**alkene:** An organic molecule containing at least one C=C bond

**alkyne:** An organic molecule containing at least one C-C triple bond.

**alloy:** A mixture of two metals. Usually, you add very small amounts of a different element to make the metal stronger and harder.

**amine:** An organic molecule which consists of an ammonia molecule where one or more of the hydrogen atoms has been replaced by organic groups.

**amphoteric:** When something is both an acid and a base.

**anode:** The electrode where oxidation occurs. In other words, this is where electrons are lost by a substance.

**aqueous:** dissolved in water

**atomic radius:** This is one half the distance between two bonded nuclei.

**base:** A compound that gives off  $\text{HO}^-$  ions in water. They are slippery and bitter and have a pH greater than 7.

**battery:** This is when a bunch of voltaic cells are stuck together.

**bond energy:** The amount of energy it takes to break one mole of bonds.

**bond length:** The average distance between the nuclei of two bonded atoms.

**buffer:** A liquid that resists change in pH by the addition of acid or base. It consists of a weak acid and its conjugate base (acetic acid and sodium acetate, for example).

**carboxylic acid:** An organic molecule with a -COOH group on it. Acetic acid is the most famous one.

**catalyst:** A substance that speeds up a chemical reaction without being used up by the reaction. Enzymes are catalysts because they allow the reactions that take place in the body to occur fast enough that we can live.

**cathode:** The electrode in which reduction occurs. Reduction is when a compound gains electrons.

**chemical equation:** The recipe that describes what you need to do to make a reaction take place.

**chemical properties:** Properties that can only be described by making a chemical change (by making or breaking bonds). For example, color isn't a chemical property because you don't need to change something chemically to see what color it is. Flammability, on the other hand, is a chemical property, because you can't



tell if something burns unless you actually try to burn it.

**chirality:** When a molecule has a nonsuperimposable mirror image. To imagine this, put your hands together. Although they are mirror images, you can't put them right on top of each other so they are interchangeable. Well, normal people can't, anyway.

**chromatography:** This is when you use a system containing a mobile phase (usually a liquid) and a stationary phase (something dissolved in the liquid) to separate different compounds.

**circuit:** The closed path in a circuit through which electrons flow.

**combustion:** When a compound combines with oxygen gas to form water, heat, and carbon dioxide

**common ion effect:** When the equilibrium position of a process is altered by adding another compound containing one of the same ions that's in the equilibrium.

**concentration:** A measurement of the amount of stuff (solute) dissolved in a liquid (solvent). The most common concentration unit is molarity (M), which is equal to the number of moles of solute divided by the number of liters of solution.

**condensation:** When a vapor reforms a liquid. This is what happens on your bathroom mirror when you take a shower.

**conjugate acid:** The compound formed when a base gains a proton (hydrogen atom).

**conjugate base:** The compound formed when an acid loses a proton  $H^+$

**covalent bond:** A chemical bond formed when two atoms share two electrons.

**decomposition:** When a big molecule falls apart to make two or more little ones.

**delocalization:** This is when electrons can move around all over a molecule. This happens when you have double bonds on adjacent atoms in a molecule (conjugated hydrocarbon)

**dilution:** When you add solvent to a solution to make it less concentrated.

**dissociation:** When water dissolves a compound.

**distillation:** This is when you separate a mixture of liquids by heating it up. The one with the lowest boiling point evaporates first, followed by the one with the next lowest boiling point, etc.

**electrolysis:** When electricity is used to break apart a chemical compound.

**electrolyte:** An ionic compound that dissolves in water to conduct electricity. Strong electrolytes break apart completely in water; weak electrolytes only fall apart a little bit.

**empirical formula:** A reduced molecular formula. If you have a molecular formula and you can reduce all of the subscripts by some constant number, the result is the empirical formula.(ex:  $C_xH_y$ )

**emulsion:** When very small drops of a liquid are suspended in another. An example of an emulsion is salad dressing after you've shaken it up.

**enantiomers:** molecules that are nonsuperimposable mirror images of each other.

**endothermic:** When a process absorbs energy (gets cold).

**endpoint:** The point where you actually stop a titration, usually because an indicator has changed color. This is different than the "equivalence point" because the indicator might not change colors at the exact instant that the solution is neutral.

**equilibrium:** When the forward rate of a chemical reaction is the same as the reverse rate. This only takes place in reversible reactions because these are the only type of reaction in which the forward and backward reactions can both take place.

**ester:** An organic molecule with  $R-CO-OR'$  functionality.

**excess reagent:** Sometimes when you do a chemical reaction, there's some of one reagent left over. That's called the excess reagent.

**exothermic:** When a process gives off energy



**family:** The same thing as a "group" (see above)

**functional group:** A generic term for a group of atoms that cause a molecule to react in a specific way. It's really common to talk about this in organic chemistry, where you have "aldehydes, carboxylic acids, amines" and so on.

**geometrical isomer:** isomerism where atoms or groups of atoms can take up different positions around a double bond or a ring. This is also called cis- trans- isomerism.

**group:** A column (the things up and down) in the periodic table. Elements in the same group tend to have the same properties. These are also called "families".

**half-reaction:** The oxidation or reduction part of a redox reaction.

**halogen:** The elements in group 17. They're really reactive.

**heat of reaction:** The amount of heat absorbed or released in a reaction.

**heat:** The kinetic energy of the particles in a system. The faster the particles move, the higher the heat.

**heterogeneous mixture:** A mixture where the substances aren't equally distributed (you often have 2 different phases: gas and liquid or solid)

**homogeneous mixture:** A mixture that looks really "smooth" because everything is mixed up really well.

**hydration:** When a molecule has water molecules attached to it.

**hydrocarbon:** A molecule containing carbon and hydrogen.

**hydrogenation:** When hydrogen is added to a carbon-carbon multiple bond.

**hydronium ion:** The  $\text{H}_3\text{O}^+$  ion, made famous by acids.

**hydroxide ion:** The  $\text{HO}^-$  ion, made famous by bases.

**ideal gas law:**  $PV=nRT$

**ideal gas:** A gas in which the particles are infinitely small, have a kinetic energy directly proportional to the temperature, travel in random straight lines, and don't attract or repel each other.

**immiscible:** When two substances don't dissolve in each other. Think of oil and water. They're immiscible. Organic compounds and water are frequently immiscible.

**indicator:** A compound that turns different colors at different pH values. We generally like to have the color change at a pH of around seven because that's where the equivalence point of a titration is.

**inhibitor:** A substance that slows down a chemical reaction.

**inorganic compound:** Any compound that doesn't contain carbon (except for carbon dioxide, carbon monoxide, and carbonates).

**insoluble:** When something doesn't dissolve.

**ionic bond:** A bond formed when charge particles stick together.

**ionization energy:** The amount of energy required to pull an electron off of a gaseous atom.

**irreversible reaction:** A chemical reaction in which the reagents make products but the products can't reform reagents. Most chemical reactions in basic chemistry classes are thought of as being irreversible.

**isotope:** When an element has more than one possibility for the number of neutrons, these are called isotopes. All known elements possess isotopes.

**Kelvin:** A unit used to measure temperature. One Kelvin is equal in size to one degree Celsius. To convert between degrees Celsius and Kelvins, simply add 273.15 to the temperature in degrees Celsius to get Kelvins.

**ketone:** A molecule containing a R-CO-R' functional group. Acetone (dimethyl ketone) is a common one.

**law of conservation of mass:** The amount of stuff after a chemical reaction takes place is the same as the amount of stuff you started with.

**Lewis acid:** An electron-pair acceptor (carbonyl groups are really good ones)

**Lewis base:** An electron-pair donor. Things with lone pairs like water and ammonia are really good ones.



**Lewis structure**: A structural formula that shows all of the atoms and valence electrons in a molecule.

**limiting reagent**: If you do a chemical reaction and one of the chemicals gets used up before the other one, the one that got used up is called the "limiting reagent" because it limited the amount of product that could be formed. The other one is called the excess reagent.

**line spectrum**: A spectrum showing only certain wavelengths.

**lone pair**: two electrons that aren't involved in chemical bonding. Also frequently referred to as an "unshared pair".

**mass**: The amount of matter in an object. The more mass, the more stuff is present.

**mechanism**: A step-by-step sequence that shows how the products of a reaction are made from the reagents. Mechanisms are very frequently shown during organic chemistry.

**molality (in mol.kg<sup>-1</sup>)**: The number of moles of solute per kilogram of solvent in a solution. Concentration that's not anywhere near as handy or common as molarity.

**molar mass**: The mass of one mole of particles.

**molar volume**: The volume of one mole of a substance at STP. If you believe that everything is an ideal gas, this is always 22.4 liters. Unfortunately, there's no such thing as an ideal gas.

**molarity (in mol.L<sup>-1</sup>)**: A unit of concentration equals to moles of solute divided by liters of solution.

**mole fraction**: The number of moles of matter in a mixture that are due to one of the compounds.

**mole**:  $6.02 \times 10^{23}$  units.

**molecular compound**: A compound held together by covalent bonds.

**molecular formula**: A formula that shows the correct quantity of all of the atoms in a molecule.

**monatomic ion**: An ion that has only one atom, like the chloride ion.

**neutralization reaction**: The reaction of an acid with a base to form water and a salt.

**normal boiling point**: The boiling point of a substance at 1.00 atm.

**normal melting point**: The melting point of a substance at 1.00 atm.

**nucleon**: A particle (such as proton or neutron) that's in the nucleus of an atom.

**octet rule**: All atoms want to be like the nearest noble gas. (Well, they all want to have the same number of valence electrons, anyway). To do this, they either gain or lose electrons (to form ionic compounds) or share electrons (to form covalent compounds).

**optical isomerism**: Isomerism in which the isomers cause plane polarized light to rotate in different directions.

**organic compound**: A compound that contains carbon (except carbon dioxide, carbon monoxide, and carbonates)

**oxidation number**: The apparent charge on an atom.

**oxidation**: When a substance loses electrons.

**partial pressure**: The pressure of one gas in a mixture. For example, if you had a 50:50 mix of helium and hydrogen gases and the total pressure was 2 atm, the partial pressure of hydrogen would be 1 atm.

**period**: A row (left to right) in the periodic table.

**pH**:  $-\log[\text{H}_3\text{O}^+]$

**phase**: The state of a compound (solid, liquid, or gas)

**polyatomic**: contains more than one atom.

**polymer**: A molecule containing many repeating units. Plastics are polymers and are formed by free radical chain reactions.

**polyprotic acid**: An acid that can give up more than one hydronium ion. Examples are sulfuric acid and phosphoric acid.

**precision**: A measurement of how repeatable a measurement is. The more significant figures, the more



precise the measurement.

**product:** The thing you make in a chemical reaction.

**redox reaction:** A reaction that has both an oxidation and reduction.

**reversible reaction:** A reaction in which the products can make reagents, as well as the reagents making products.

**salt:** An ionic compound.

**saturated:** When the maximum amount of solute is dissolved in a liquid

**significant figure:** The number of digits in a number that tell you useful information. For example, when you weigh yourself on a bathroom scale, it says something like 150 pounds rather than 150.32843737 pounds. Why? Because the thing can only weigh accurately to the nearest pound. Any other digits that are on this number don't mean anything, because they're probably wrong anyway.

**solubility:** A measurement of how much of a solute can dissolve in a liquid.

**solubility product constant:** Abbreviated  $K_{sp}$ , this value indicates the degree to which a compound dissociates in water. The higher the solubility product constant, the more soluble the compound.

**solute:** The solid that gets dissolved in a solution.

**solvent:** The liquid that dissolves the solid in a solution.

**specific heat capacity** ( $c$  in  $J.kg^{-1}.K^{-1}$ ) The amount of heat required to increase the temperature of one gram of a substance by one degree.

**spectator ions:** The ions in a reaction that don't react.

**standard temperature and pressure:** STP, One atmosphere and 273 K.

**steric hindrance:** This is the idea that the functional groups on big molecules get in the way of a chemical reaction, making it go slower. Imagine a fat guy trying to get into a Honda Prelude - that's steric hindrance.

**stoichiometry:** The art of figuring how much stuff you'll make in a chemical reaction from the amount of each reagent you start with.

**strong acid:** An acid that fully dissociates in water.

**structural formula:** See Lewis structure.

**sublimation:** When a solid can change directly into a gas. Dry ice does this.

**suspension:** A mixture (solid in liquid) that looks homogeneous when you stir it, but where the solids settle out when you stop. Mud is a very short-lived suspension, while peanut butter is a very long-lived suspension.

**synthesis:** When you make a big molecule from two or more smaller ones.

**system:** Everything you're talking about at the moment.

**temperature:** A measurement of the average kinetic energy of the particles in a system.

**theoretical yield:** The amount of product which should be made in a chemical reaction if everything goes perfectly.

**titration (acid/base):** When the concentration of an acid or base is determined by neutralizing it.

**unsaturated:** When you haven't yet dissolved all of the solute which is possible to dissolve in a liquid.

**unshared electron pair = lone pair:** two electrons that aren't involved in chemical bonding. Also frequently referred to as a "lone pair".

**valence electron:** The outermost electrons in an atom.

**vapor pressure:** The pressure of a substance that's present above its liquid. For example, you can tell that ammonia has a high vapor pressure because the smell of it is very strong above liquid ammonia.

**vaporization:** When you boil a liquid.

**volatile:** A substance that vaporises easily.