

Topic 7 Chemical Reactions



Chemical Reaction Movies (So Cool!) <http://jchemed.chem.wisc.edu/jcesoft/cca/cca0/sampmovs.htm> Examples of Chemical Reactions <http://www.howe.k12.ok.us/~jimaskew/creact.htm>

Chemical Reactions in the body (see figure 2.47 on page 146)

Cellular Respiration is a chemical reaction that takes place in the cells in your body.

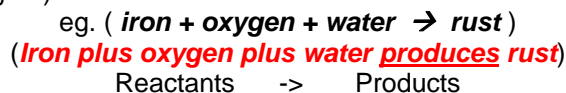
Animations of cellular respiration <http://science.nhmccd.edu/biol/bio1int.htm>

A **chemical reaction** takes place when two or more substances combine to form new substances. Different **types of chemical reactions** can occur, including **combination**, **decomposition**, **displacement** and **exchange** reactions. The substances at the beginning of the reaction are called **reactants**. The new materials produced by the reaction are called **products**. The properties of the products differ from those of the reactants, thus a chemical change has occurred. A **chemical change** results from a chemical reaction. Evidence that a chemical change has occurred include:

- A change in colour
- The formation of an odour
- The formation of a solid (precipitate) or a gas (bubbles)
- The release or absorption of energy
 - A chemical change, which **releases** energy, is called **EXOTHERMIC**.
 - A chemical change, which **absorbs** energy, is called **ENDOTHERMIC**

Chemical Equations

Chemical reactions can be written as **word equations** which gives the names of all the reactants (separated by a "plus" sign +) followed by an arrow which points to the names of all the products (separated by a 'plus' sign +)



Combustion is a chemical reaction that occurs when oxygen reacts with a substance to form a new substance and gives off energy.

Identification Tests:

- for **OXYGEN**

Light a wooden splint. Blow out the flame, allowing the splint to continue glowing. Hold the glowing splint in a small amount of the unknown gas. If the splint bursts into flame, then the gas being tested is oxygen.

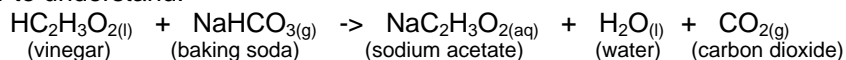
- for **HYDROGEN**

Light a wooden splint. Hold the glowing splint in a small amount of the unknown gas. If you hear a "**pop**", then the gas being tested is Hydrogen.

- for **CARBON DIOXIDE**

If you put a burning splint into Carbon Dioxide, the flame will go out and you will know the gas is not oxygen or hydrogen, but you will not know for sure that it is Carbon Dioxide. The test for Carbon Dioxide is not a combustion test, but rather uses a liquid called **limewater** (a clear colorless solution of calcium hydroxide, or slaked lime). Bubble the unknown gas through the limewater solution, or add a few drops of the limewater solution to the gas and swirl it around. If the limewater turns **milky**, the gas is Carbon Dioxide.

Although a chemical equation may look complicated, by knowing what you know now, it should be much easier to understand.



Breaking Chemical Bonds

Chemical bonds are forces that cause a group of atoms to behave as a unit. Energy is stored in these bonds. To break the bonds energy must be added. When bonds form, energy is released. All chemical reactions involve energy being absorbed **ENDOTHERMIC**, or released **EXOTHERMIC**. **Photosynthesis** is an endothermic reaction, because it needs light energy to occur, whereas **combustion** is an exothermic reaction, because it gives off light and heat.