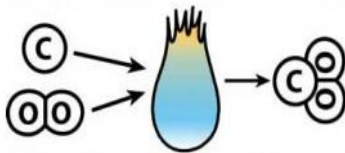


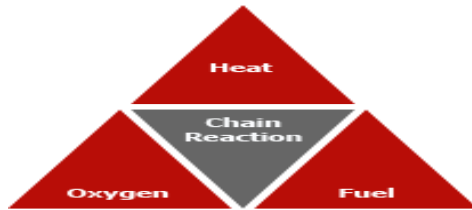
COMBUSTION



Combustion is a sudden and intense chemical reaction of loss of electrons of a combustible material with an oxidant, emitting light energy in form of heat in different intensities and converting matter into other chemical compounds. The release of heat can produce visible light as a flame.



For combustion to occur, it requires (1) a material with energy stored in its molecular bonds or a “fuel” that is easily combined with (2) an “oxidant” as oxygen in the air to generate the combustion by means of (3) sufficient energy in the form of “heat” to reach the combination of both the “ignition temperature” and hold a (4) “chain reaction” in the presence of greater quantities of fuel, oxidant and heat maintaining temperature .



These four elements must be combined at the time, place and the right proportion.

A power source will emit “photons” of light or heat to energize the molecules of “fuel” to a sufficient level to make decompose their bonds and release in form of a volatile gas, emitting energy in form of light and heat as a result of the breaking of the bonds of such molecules.

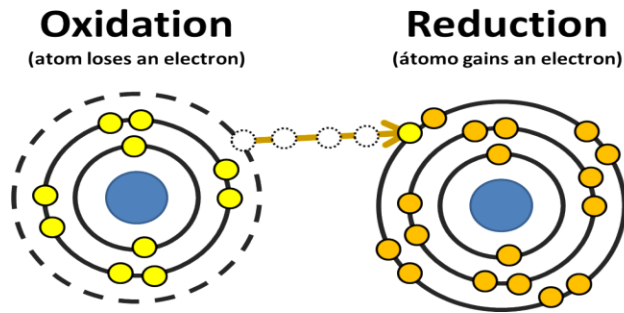
Its chemical formula is:

“Fuel” + Heat -> “nonvolatile product” + “volatile gas.”

The process of decomposition of molecules is called “photolysis”.

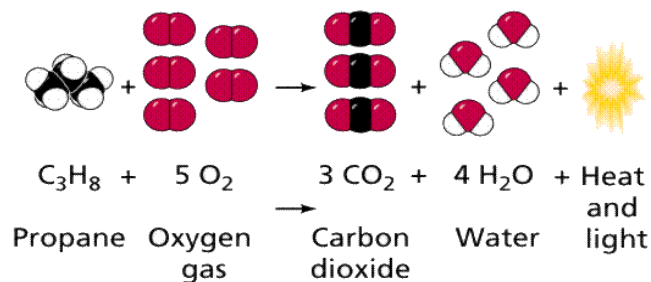
These “photons” and “phonons” energize electrons from the gas molecules and from the oxygen which should be present in the air, electronically exciting these particles and causing them to behave in a highly reactive manner.

The electrons in the “gas” will rise to higher energy levels so they will eventually leave their original molecules in an oxidation-reduction reaction.



When these electrons are received by reactive oxygen molecules, they will emit photons of light (visible flame) and heat phonons creating a chain reaction of energy release. This chain reaction is done suddenly will spread if there are sufficient supplies of fuel and oxidant, which hold the fire.

The gas molecules will be combined in various ways to form water, carbon dioxide and other products. The chemical equation is:



If the “fuel” has ”non-volatile” elements, ash and residues are formed as calcium and potassium, among others.

Many fuels are burned in one step as gasoline, where the “photolysis” vaporizes the fuel molecules and almost instantaneously combines with oxygen without ash or debris.

The color of a flame will depend on the characteristic of the atoms making up the material (the energy emitted when the electron returns to its original state) and in the fuel contains much heat of reaction. The hottest part of the flame at the base glows blue (1400 ° C) and the coldest part at the top is yellow or red (700 ° C)



On Earth, gravity determines how a flame burning. All hot gases in the flame is much hotter and less dense than the surrounding air, so move up looking less pressure.

A fire in a microgravity environment would form a sphere.

Source: <http://www.artinaid.com/2013/04/combustion/>