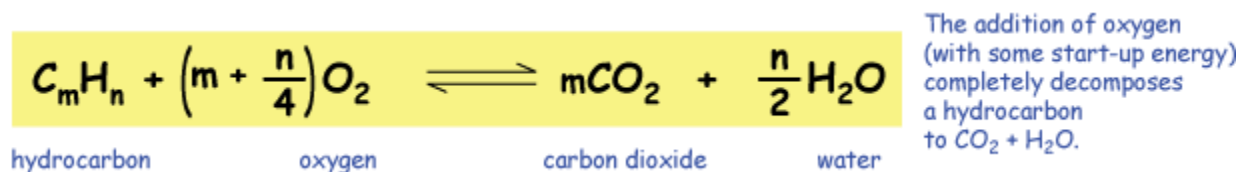


COMBUSTION REACTION AND REARRANGEMENT OR ISOMERIZATION REACTIONS

Combustion is rapid oxidation or burning. It is the (usually) rapid combination of oxygen with a hydrocarbon (composed only of C and H) or an oxy-hydrocarbon (also contains oxygen). Combustion generally releases a great deal of the energy stored in the chemical bonds of a molecule.

The model reaction below is a general form for balancing any hydrocarbon reaction. It's interesting, but I wouldn't spend any time trying to memorize it. It's better just to learn to balance any kind of reaction quickly and be done with it.



Examples of combustion reactions

$\text{CH}_4(\text{g}) + 2\text{O}_2(\text{g}) \rightleftharpoons \text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{g})$ Methane (CH_4) gas is combusted in the presence of oxygen to yield carbon dioxide and water.

$2\text{C}_2\text{H}_5\text{OC}_2\text{H}_5(\text{l}) + 13\text{O}_2(\text{g}) \rightleftharpoons 8\text{CO}_2(\text{g}) + 10\text{H}_2\text{O}(\text{g})$ Diethyl ether is burned in the presence of oxygen to yield carbon dioxide and water.

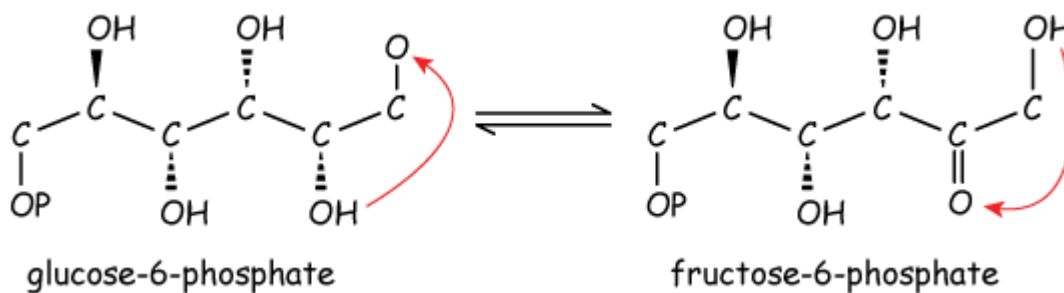
$2\text{C}_6\text{H}_6(\text{g}) + 15\text{O}_2(\text{g}) \rightleftharpoons 12\text{CO}_2(\text{g}) + 6\text{H}_2\text{O}(\text{g})$ Two molecules of benzene (C_6H_6) are burned in the presence of excess oxygen to yield 12 molecules of CO_2 and six molecules of H_2O .

Dimethyl ether, burned in the second reaction above, is an **oxy-hydrocarbon**.

Think of it as a hydrocarbon that carries around a bit of its own oxygen for combustion. In fact, molecules like these can help to ensure that combustion reactions go to completion, especially in unfavorable conditions — like cold weather. Diethyl ether is added to gasoline in some states in winter to help the gas combust fully, avoiding other products that are more harmful to life, such as carbon monoxide (CO).

Rearrangement or *isomerization* reactions

Some molecules can undergo an internal rearrangement of their structure under certain circumstances. Molecules that have the same number and type of atoms, but different bonding arrangements are called **isomers**, and interconversion between isomers is called **isomerization**. Here's an example, the rearrangement of a 6-carbon sugar molecule between two forms.



Source: http://www.drcruzan.com/Chemistry_Reactions.html