

Chem11 Some Important Chemical Reactions : Notes - 25

For animals (respiration) : $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + \text{Energy}$

In this reaction glucose (a sugar) is burned in the body.

For plants (photosynthesis) :

Sunlight Energy + $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$

Plants make glucose.

Iron smelting : $2Fe_2O_3(\text{ore}) + 3C(\text{coal/charcoal}) \rightarrow 4Fe(l) + 3CO_2$

or; $FeS_2(\text{ore}) + O_2 \rightarrow Fe_2O_3 + SO_2$ (then above reaction)

Bronze-age metallurgy : $CuCO_3 + \text{heat} \rightarrow CuO + CO_2$

then; $2CuO + C \rightarrow 2Cu(l) + CO_2 + \text{heat}$

The ore, copper (II) carbonate, when heated, gives off CO_2 gas. The copper (II) oxide remaining, is combined with coal (carbon) and heated. Liquid copper forms and carbon dioxide gas is given off.

Car battery : $PbO_2 + Pb + 2H_2SO_4 \leftrightarrow 2PbSO_4 + 2H_2O + \text{electrical energy}$

The above reaction takes place in a lead-acid storage battery. The double arrow means that the reaction can proceed either way. The reactants represent the charged state and the products represent the discharged state. The battery can be recharged by applying a voltage across the terminals in the opposite sense.

Gunpowder explosion : $2KNO_3 + S + 3C \rightarrow K_2S + 3CO_2 + N_2 + \text{heat}$

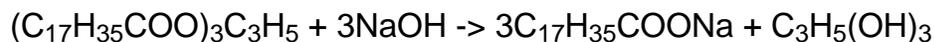
In any chemical explosion, a rapid reaction occurs which produces a lot of hot gases.

Nitroglycerine explosion : $4C_3H_5(NO_3)_3 \rightarrow 12CO_2 + 10H_2O + 6N_2 + O_2$

For beer and wine : $C_6H_{12}O_6 \rightarrow 2C_2H_6O + 2CO_2$

Sugar (glucose) is fermented by yeast. The products of this reaction are alcohol and carbon dioxide.

Making soap :



In this reaction, beef fat and sodium hydroxide are mixed together in water and heated. A chemical reaction occurs in which soap and the compound glycerol ($C_3H_5(OH)_3$) are formed.

The setting of mortar : $CaO \cdot H_2O + CO_2 \rightarrow CaCO_3 + H_2O$

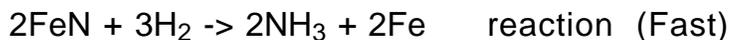
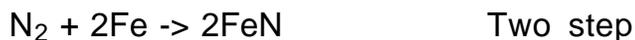
or; $Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$

Slaked lime or mortar (CaO plus water) will slowly combine with CO_2 from the air to form hard calcium carbonate.

Fire extinguisher : $2NaHCO_3 + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O + 2CO_2$

Sodium Bicarbonate (baking soda) when combined with sulfuric acid produces carbon dioxide which smothers the flame.

An example of a reaction using a catalyst.



In the above reaction, ammonia is produced. The catalyst is Fe. It speeds up the reaction and is unused in the overall reaction even though the new reaction is a two step reaction.