

Chapter 8

Another common type of reaction is called **Oxidation-Reduction** or abbreviated as **REDOX**.

Oxidation – Reaction in which a substance loses electrons. Also, a gain of O atoms. Also, a loss of H atoms. Examples:

$N_2 + O_2 \rightarrow NO$ (N_2 gained O atoms and is oxidized. N_2 went from 0 charge to +3; it lost electrons; again showing it is oxidized).

$2H_2 + O_2 \rightarrow 2 H_2O$ (H_2 lost H atoms and is oxidized; also, H_2 went from 0 charge to +1, losing an electron, again showing it is oxidized.)

Reduction – Reaction in which a substance gains electrons. Also, a loss of O atoms or a gain of H atoms.

(O_2 lost O atoms and is reduced. O_2 went from 0 charge to -2; again showing it is reduced).

In second reaction, O_2 gained H atoms and is reduced. Also, O_2 went from 0 charge to -2, gaining 2 electrons, again showing it is reduced.)

Oxidation cannot occur without reduction occurring at the same time. If one substance loses electrons then another substance has to gain those electrons.

Oxidizing agent – Substance that causes oxidation to take place. **It is reduced.**

Reducing agent – Substance that causes reduction to take place. **It is oxidized.**

One important modern application of REDOX reactions are batteries. Each different type of battery is based on different chemical reactions. When the reactants are used up, the battery no longer produces electricity. Some of these reactions can be reversed simply by putting electricity into the battery, thus returning the battery to its original condition so that it can work again. These are called rechargeable batteries.

Rusting of metals is a REDOX reaction; the metal is oxidized by the O_2 in the air.

There are many oxidation-reduction reactions in our bodies. Many are beneficial but some are harmful. By taking certain chemicals as additives, either naturally or artificially, called antioxidants, we can prevent harmful oxidation reactions from taking place, at least to some extent. Two of the most common antioxidants in our diets are Vitamins C and E.