

## The Reactivity Series:

The order of the reactivity is as follows; Potassium, Sodium, Lithium, Calcium, Magnesium, Aluminum, Carbon, Zinc, Iron, Hydrogen, Copper, Silver, Gold. (PSL, CM, AC, ZIH).

Displacement reaction is when a more reactive metal displaces a less reactive metal compound. For example,  $(C + 2CuO = CO_2 + Cu)$ .

If a substance is oxidized, it means it gains oxygen. If a substance is reduced, it means it loses oxygen. For example, in a reaction between  $(Mg + CuO = MgO + Cu)$ , Mg becomes oxidized and copper becomes reduced. Copper turns brown/black. A redox reaction is when both reduction and oxidation occurs.

A reducing agent is a substance that reduces something else. In the reaction above, Magnesium is the reducing agent. The oxidizing agent is copper.

Another theory is OILRIG (Oxidation is loss of electrons & reduction is gain of electrons). An ion that is not affected during a reaction is called a spectator ion.

Metals above hydrogen in the reactivity series react with water or steam to produce hydrogen. If a metal reacts with cold water, metal hydroxide and hydrogen is formed. If the metal reacts with steam, metal oxide and steam are formed. Metals below hydrogen do not react with hydrogen.

1. Metal + Water = Metal Hydroxide + Hydrogen
2. Metal + Steam = Metal Oxide + Hydrogen

Potassium, sodium and lithium react vigorously in water. During the reaction, hydroxide and hydrogen is formed. Calcium, on the other hand, reacts gently with cold water. The mixture becomes warm during the reaction. Calcium hydroxide is formed, a white insoluble solid. In magnesium and cold water, there is no reaction. Maybe a few bubbles are given off. This is because magnesium is coated with Magnesium Hydroxide, prevents water encountering magnesium. Between magnesium and steam, Magnesium Oxide and Hydrogen is formed.