Chemistry Study Materials for Class 9
(NCERT Based notes of Chapter -03)

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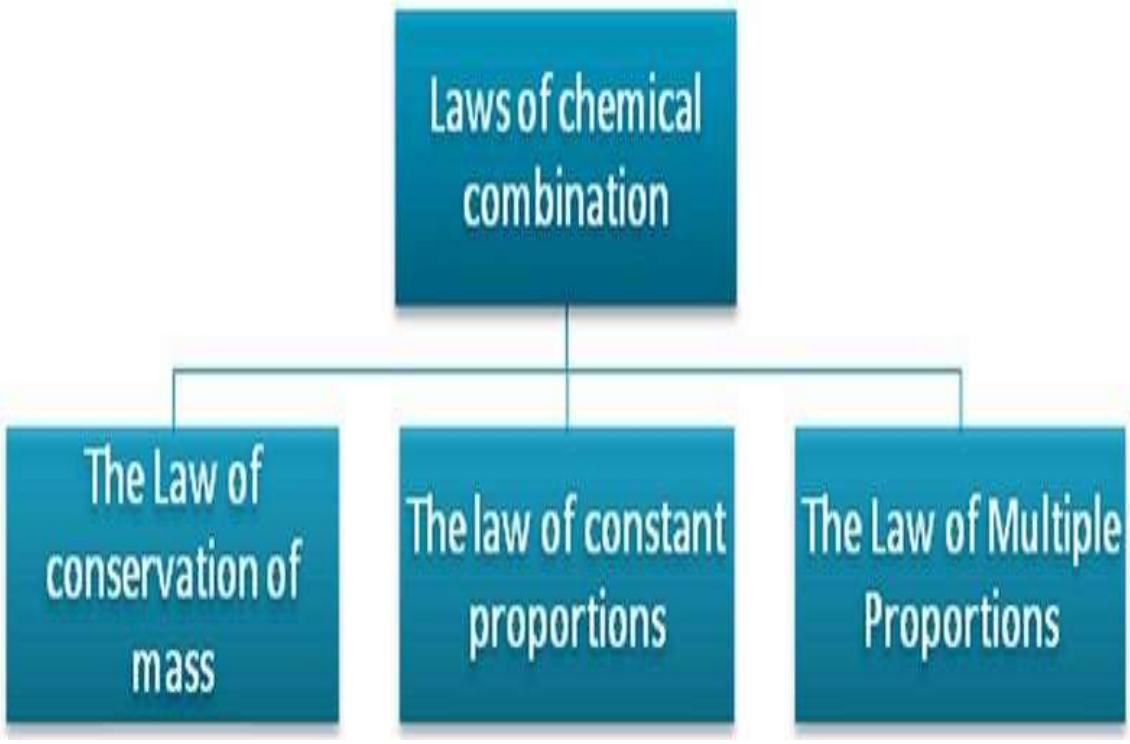
Atoms and Molecules

LAWS OF CHEMICAL COMBINATIONS

Before Dalton concept of atom was mere philosophical. Dalton explained about atom on the basis of Laws of Chemical Combinations.

There are three laws of chemical combination.

1. Law of Conservation of Mass
2. Law of Constant Proportions
3. Law of Multiple Proportions



LAW OF CONSERVATION OF MASS

Antoine L. Lavoisier, a French scientist, established the theory of Law of Conservation of Mass. The law of conservation of mass states,

"**Mass can neither be created nor destroyed in a chemical reaction**".

All matters in the universe exist in three states. There are two ways of classification of matter.

1.According to physical state as solid, liquid or gas.

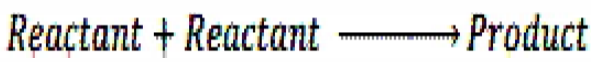
2.According to its composition as element, compound or mixture.

According to this law mass of an isolated system will remain constant over time. This means when mass is enclosed in a system and none is allowed in or out, its quantity will never change. That is mass will be conserved, and hence this is called Law of Conservation of Mass. This means total mass of products is always equal to the total mass of reactants. As there is no loss of mass of substances, i.e. mass is conserved, that's why Lavoisier called this the law of conservation of mass.

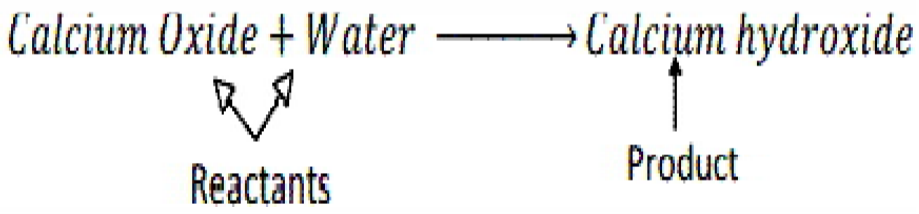
REACTANTS AND PRODUCTS:

In a chemical reaction the substances that combine or react are known as reactants and the new substance/substances formed are called product or products.

A chemical reaction can be represented in general as follows:

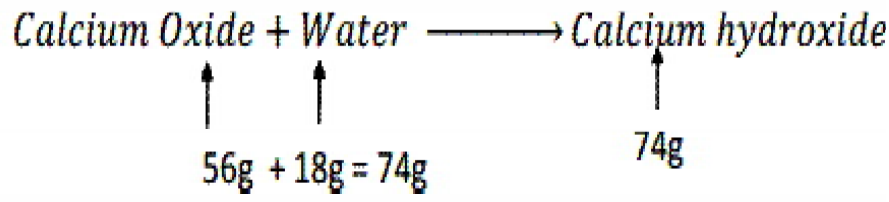


Example: When calcium oxide is dissolved in water calcium hydroxide is formed. The reaction involve in this can be written as:

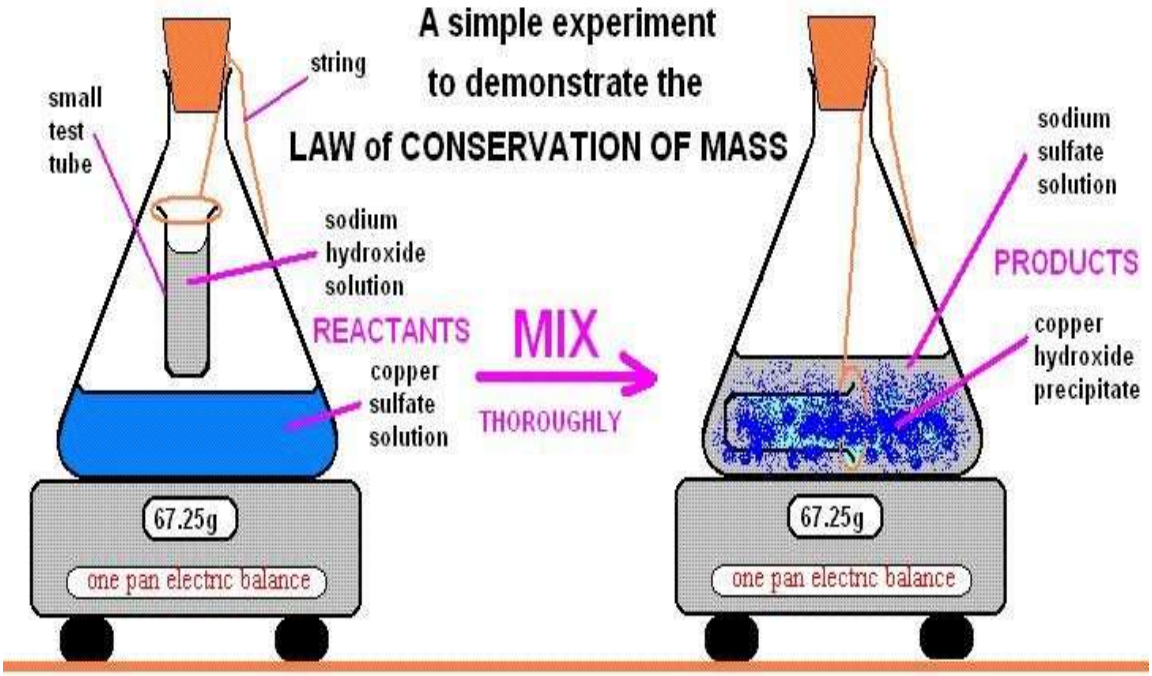


In this reaction calcium oxide and water are reactants while calcium hydroxide is product.

In this reaction 74 g of calcium hydroxide is obtained when 56 g of calcium oxide reacts with 18 g of water, which is proved by experiment.



Here the total mass of reactants, i.e. calcium oxide and water is equal to 74 g. And the mass of product, i.e. calcium hydroxide is also equal to 74g. This proves that the total mass of reactants is always equal to the total mass of product, which proves the Law of Conservation of Mass.


A simple experiment
to demonstrate the
LAW of CONSERVATION OF MASS
small
test
tube
string
sodium
hydroxide
solution
REACTANTS
copper
sulfate
solution
MIX
THOROUGHLY
67.25g
one pan electric balance
sodium
sulfate
solution
PRODUCTS
copper
hydroxide
precipitate
67.25g
one pan electric balance

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