



Laws of chemical combinations

1. Law of conservation of mass
2. Law of Definite proportions
3. Law of Multiple proportions
4. Law of Reciprocal proportions
5. Gay Lussac's law
6. Avogadro's law

1. Law of conservation of mass

“The mass can neither be created nor destroyed but it can be transformed from one form to another”



Reactants

Products

According to this law

“sum of mass of Reactants = sum of mass of Products”

Example



The atomic mass of H = 1

The atomic mass of C = 12

The atomic mass of O = 16

The total masses of Reactants are $12 + (1 \times 4) + 2 \times 16 \times 2 = 80g$

The total masses of Products are $12 + (16 \times 2) + 4 + (16 \times 2) = 80g$



Q1. On heating 10.0 grams of sodium carbonate (Na_2CO_3), 4.4g of carbon dioxide(CO_2) and 5.6 g of sodium oxide (Na_2O) are produced. Prove that this reaction obeys the law of conservation of mass.



According to the question given that the mass of reactants is 10.0 grams and the mass of products is 4.4 grams + 5.6 grams = 10.0g.

Hence the mass of reactants is equal to the mass of products so this reaction obeys the law of conservation of mass.

2. Law of Definite Proportions / Constant Proportions

This law was given by Joseph Proust in the year 1797.

According to this law,

A compound can be obtained from different sources, but the ratio of each compound (by weight) remains the same.



Here H_2O may be sea water, rain water, Ganga water, river water etc.

3. Law of Multiple Proportions

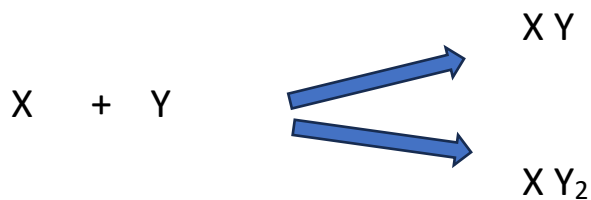
This law was given by Dalton in the year 1803.

According to this law,

When two elements combine to form more than one compound, Then the different masses of one element which combines



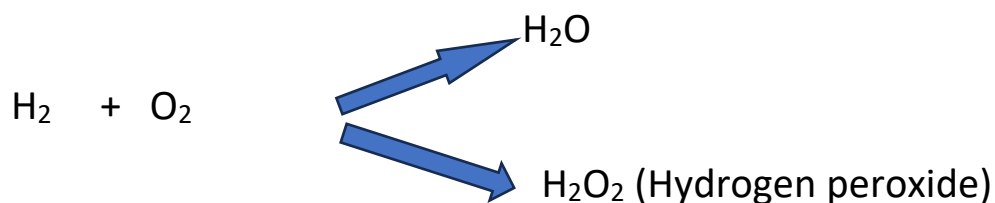
with the fixed mass of other elements bear a small whole number ratio to one other.



Where X has the same mass

Y and Y_2 have different masses

Example;



Here Y(O) and Y_2 (O_2) have different masses

O =16

O_2 =32

So the ratio of O and O_2 = 16: 32

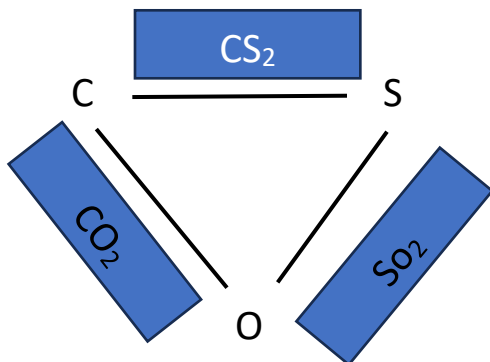
That is 1:2 this small whole number.

4. Low Reciprocal proportions:-

When 2 elements combine separately with a fixed mass of 3rd element then the ratio of masses in which they do so bears a



small whole on the ratio to the ratio of masses in which they themselves combine



5. Gay Lussac's law

When gases react, they do so in volume which bears a small whole-number ratio to one another and to the volume of produced.



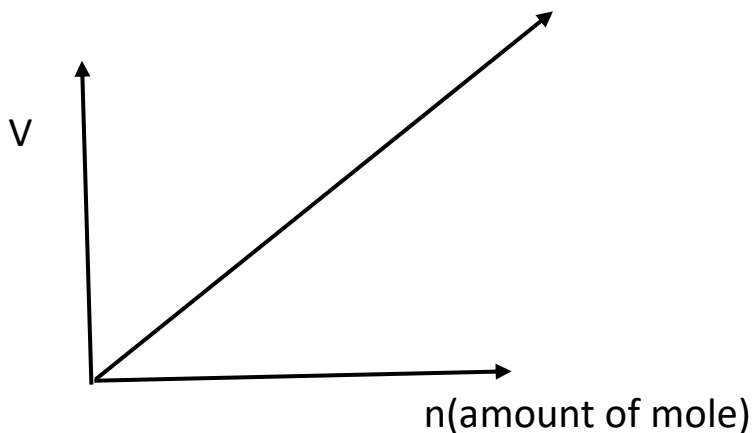
1 volume of H₂ gas

1 volume of Cl₂ gas



2 volumes of HCl gas

6. Avogadro's law





V Directly proportional to the n