

## GAS ANALYSIS OR EUDIOMETRY

Eudiometry relies on Avogadro's law, which asserts that under identical conditions of temperature and pressure, equal volumes of gases contain an equivalent number of molecules or moles. In the process of gas analysis, a Eudiometer tube filled with mercury is inverted over a mercury-filled trough. A specific volume of the gas or gaseous mixture is introduced, displacing an equal volume of mercury. Subsequently, an excess of oxygen is introduced and ignited electrically, causing the combustion of combustible materials. The resulting gaseous products, such as  $\text{CO}_2$  and  $\text{H}_2\text{O}$ , are then determined by absorption in suitable reagents.

Assumptions made during Eudiometric calculations include:

1. Assuming room temperature ( $25^\circ\text{C}$ ) if temperature is not provided.
2. The mentioned volumes pertain to gases.
3.  $\text{N}_2$  gas is considered inert by definition.
4. The volume of  $\text{H}_2\text{O}$  vapor is disregarded when gas volumes are specified.
5. Awareness of the reagent that absorbs gases is crucial:
  - (i) Acidic gases ( $\text{CO}_2$ ,  $\text{SO}_2$ ,  $\text{NO}_2$ ,  $\text{X}_2$ ) are absorbed by  $\text{NaOH}$  or  $\text{KOH}$  solution.
  - (ii) Gases like  $\text{CO}$ ,  $\text{C}_2\text{H}_2$  are absorbed by Ammoniacal  $\text{Cu}_2\text{Cl}_2$ .
  - (iii)  $\text{O}_3$  is absorbed by turpentine oil.
  - (iv)  $\text{NO}$  is absorbed by  $\text{FeSO}_4$  solution.
  - (v)  $\text{N}_2$  is absorbed by heated  $\text{Mg}$ .
  - (vi)  $\text{O}_2$  is absorbed by alkaline pyrogallol.
  - (vii)  $\text{NH}_3$  is absorbed by acids and  $\text{CuSO}_4$  solution.

Water vapor produced during the reaction can be determined by observing the volume contraction resulting from cooling. The data obtained from Eudiometry allows for various conclusions regarding gas reactions, including volume-volume relationships, composition of gaseous mixtures, and molecular formulas of gases.