

Gay-Lussac's Law of combining Volume:-

When gases react, they do so in volume which bear a simple ratio to one another and to the volume of gaseous product provided that all the volumes are measured at the same temperature and pressure.

e.g.



Simple ratio :- 1:3:2

Q1 what volume of oxygen would be required to burn completely 200ml of acetylene (C_2H_2)? What would be the vol. of CO_2 formed?

soln:-



On balancing:-



2 vol. of C_2H_2 require 5 vol. of O_2

1 vol. of C_2H_2 requires $\frac{5}{2}$ vol. of O_2

$$\therefore 200 \text{ ml } C_2H_2 \text{ requires } = \frac{5}{2} \times 200 = 500 \text{ ml of } O_2$$

2 vol. of C_2H_2 forms 4 vol. of CO_2

$$1 \text{ vol. of } C_2H_2 \text{ forms } = \frac{4}{2}$$

$$200 \text{ ml } C_2H_2 \text{ forms } = \frac{4}{2} \times 200$$

$$= 400 \text{ ml}$$

400 ml of CO_2

Avagadro's Law:- Avagadro's Law states that equal vol. of all gases under similar conditions of temperature & pressure contain same number of molecules.

Q:- If 50cc of a gas A contain γ molecules, how many molecules of gas B will be present in 25cc of B under same conditions?

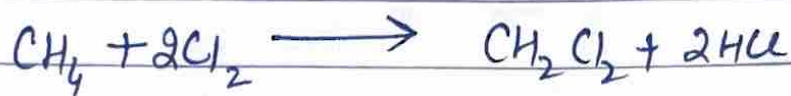
Ans:- Acc. to Avagadro's Law

50cc of A will contain equal mol. of 50cc of B.

$\therefore$ 25cc will contain half of what 50cc

$\therefore$ 25cc will contain $\frac{\gamma}{2}$

Q:- what vol. of HCl gas formed & Chlorine gas required when 40ml of methane react completely with Chlorine at ST.P?



Ans:- 1 vol. of CH_4 react with 2 vol. of Cl_2

40ml " " " $40 \times 2 = 80\text{ml}$ of Cl_2

1 vol. of CH_4 produce 2 vol. of HCl

40ml " " " $40 \times 2 = 80\text{ml}$ of HCl

Q:- what vol. of propane is burnt for every 500cm³ of air used in the reaction under the same conditions? (Assuming oxygen is $\frac{1}{5}$ th of air)



Ans:- 500cm³ of air contains only 100cm³ of O_2 as it is given oxygen is $\frac{1}{5}$ th of air.

5 vol. of O_2 requires to burn 1 vol. of C_3H_8

1 vol. ————— $\frac{1}{5}$

100 vol. ————— $\frac{1}{5} \times 100 = 20$

= 20cm³