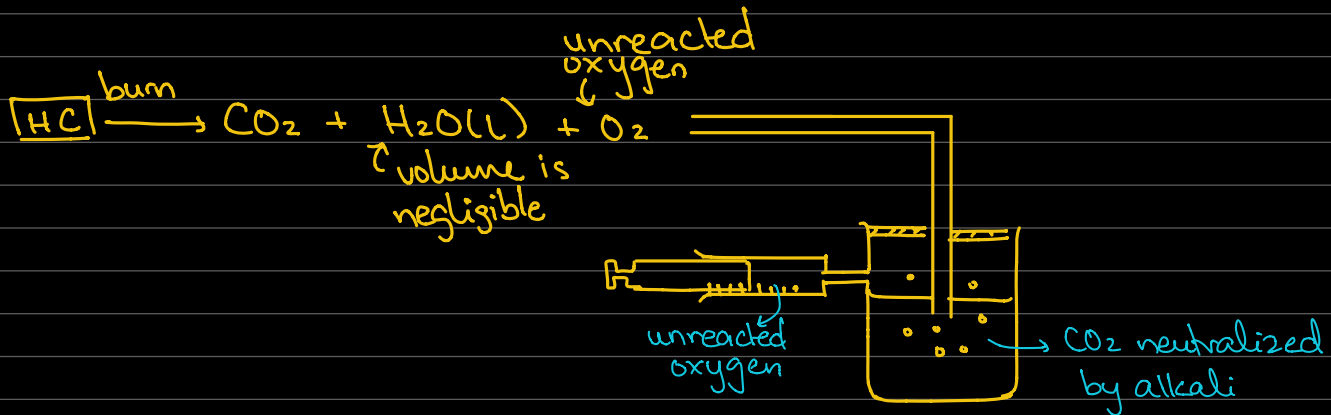# COMBUSTION ANALYSIS

- Combustion analysis is used to deduce the formula of an organic compound and then it's combustion equation

- A hydrocarbon in the vapour phase is burnt in excess oxygen to form CO_2 and water vapour. When the mixture of gases is cooled, the water vapour condenses to occupy a very small volume.

- The gaseous mixture consists of CO_2 and any unreacted oxygen

- The volume of CO_2 can be found by bubbling it through an alkali like NaOH (aq) or KOH (aq).

  · CO_2 will be absorbed by the alkali (because it's acidic)
  · The only gas that will come out will be the unreacted oxygen
  · From these volumes of gases, the equation for the reaction + the molecular formula of the hydrocarbon can be determined

$$\boxed{HC} \xrightarrow{\text{burn}} CO_2 + H_2O(l) + O_2$$

unreacted oxygen

↳ volume is negligible

unreacted oxygen

CO_2 neutralized by alkali

Total volume of gases = CO_2 + unreacted O_2

Complete combustion of any hydrocarbon (General Equation)

$$C_xH_y + (x + \frac{y}{4}) O_2 (g) \xrightarrow{\text{burn}} x CO_2 (g) + \frac{y}{2} H_2O (l)$$

Avogadro's law : Equal volumes of gas under the same conditions of temperature and pressure contain equal number of moles

ie. CH_4	+	$2O_2$	→	CO_2	+	$2H_2O$
1	:	2	→	1	:	2
mol		mol		mol		mol
ie. $1dm^3$		$2dm^3$		$1dm^3$		$2dm^3$
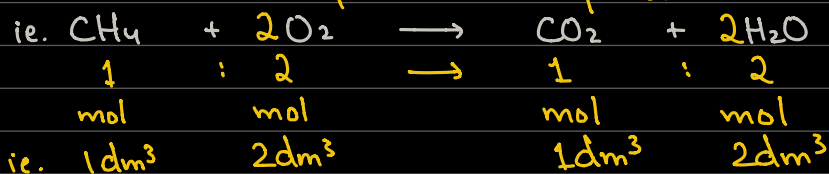
order of balancing combustion equations :
1. Carbon
2. Hydrogen
3. Oxygen

↳ Mole ratio is equal to the volume ratio

10cm³ of a gaseous alkane is burnt in excess O_2 and the product gases are passed through a NaOH solution. The vol. of gas decreased by 30cm³. Deduce the equation for this combustion reaction

$$C_xH_y + (x+\frac{y}{4}) O_2 \longrightarrow x CO_2 + \frac{yH_2O}{2}$$

$$\begin{array}{ccc} 10 & & x=30 \\ 1 & : & 3 \end{array}$$

C_3H_y

Alkane $\longrightarrow$ C_nH_{2n+2}

$$= C_3H_8 + 5O_2 \longrightarrow 3CO_2 + 4H_2O$$