*. PARACHOR :-

Macelod showed an interesting relationship between the surface tension (γ) and density (ρ) for normal liquid by the following equation :-

$$\gamma = C(\rho - \rho')^4 \quad \text{——} (1)$$

Where 'ρ' is the density of the liquid.

ρ' is the density of the saturated vapour of the liquid at the same temperature.

'C' is a constant which holds good over a wide range of temperature.

Eq^n -(1) may also be written as —

$$\gamma^{1/4} = C^{1/4}(\rho - \rho')$$

$$\text{or} \quad C^{1/4} = \frac{\gamma^{1/4}}{(\rho - \rho')} \quad \text{——} (2)$$

on multiplyed both side of eq^n - (2) with M (mol. weight)

$$MC^{1/4} = \frac{M\gamma^{1/4}}{(\rho - \rho')} = [P] \quad \text{——} (3)$$

The resulting constant [P] is called Parachor.

continued.....

At ordinary temperature the density of vapour (ρ') will be very smaller in comparision with liquid.

$\therefore$ ρ' is dropped from eqs— (3)

$$[P] = \frac{M\rho^{1/4}}{\rho} \quad \text{—— (4)}$$

or $$[P] = V_m \cdot \rho^{1/4} \quad \text{—— (5)}$$

density = $\frac{\text{Mass}}{\text{Blume}}$

$\rho = \frac{M}{V_m}$

$V_m = \frac{M}{\rho}$

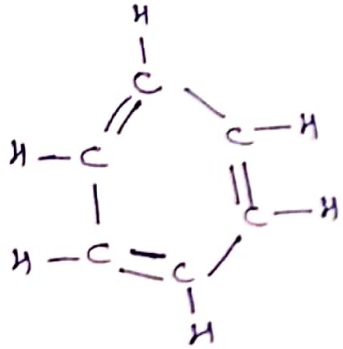
If the temperature is such that ρ is unity. then,

$$[P] = V_m \quad \text{—— (6)}$$

Thus, Parachore may be defined as the molecular Blume of a liquid at a temperature at which the surface tension is unity.

* Application :-

1) A number of structures were suggested for benzene. Out of these Kekule's structure may be possible structure by Parachor measurement.



a). 6 Carbon = $6 \times 8.6 = 51.6$

b) 6 Hydrogen = $6 \times 15.7 = 94.2$

c) 3 double bond = $3 \times 19.9 = 59.7$

d) One six membered ring = $1 \times 1.4 = 1.4$

Total $\Rightarrow$ 206.9

observed Parachor $\Rightarrow$ 206.2

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