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**UNIT:II: LIQUID STATE**

**MOLAR VOLUME**

The volume occupied by one mole of the substance under specified condition of temparature and pressure.It is denoted by Vm.

Vm = $\frac{Molar mass}{Density}$

**Vapour pressure**

The pressure exerted by vapours of liquid on the surface of liquid once equilibrium is established between liquid and it's vapour is called vapour pressure of liquid.

 The force per unit area of the liquid depends on the character of the liquid and temperature. With increase of unit force of attraction force per unit area of liquid decrease and with rise of temperature force per unit area of liquid will increase.

 Mercury pressure gauge could also be wont to verify force per unit area of liquid.

 **Troutons Rule**

Trouton's rule says that for many liquids, the entropy of vaporization is approximately the same at ~85 J mol-1 K-1. The success of the rule is thanks to the very fact that the entropy of a gas is considerably larger than that of any liquid.

Sgas≫Sliquid

Therefore, the entropy of the initial state e.g.liquid is negligible in determining the entropy of vaporization

ΔSvap=Sgas−Sliquid≈Sgas

When a liquid vaporizes its entropy goes from a modest value to a significantly larger one. This is related to the ratio of the enthalpy of vaporization and the temperature of the transition:

ΔSvap=ΔHvapT

ΔSvap is found to be approximately constant at the boiling point.

ΔSvap≈85Jmol−1 K−1

This is Trouton’s rule, which is valid for many liquids e.g, the entropy of vaporization of toluene is 87.30 J K-1 mol-1, that of benzene is 89.45 J K-1 mol-1, Because of its convenience, the rule is employed to estimate the enthalpy of vaporization of liquids whose boiling points are known.

 **Surface Tension**

A molecules well within a liquid is attracted equally by surrounding molecules in all direction and so cancel the effect of one another.But a molecules at the surface is being pulled by molecules directly below it and those lying on its sides.The downward attractive forces are greater than the upward forces because there are more molecules of the liquid below than above the surface .These unbalanced attractive forces acting downward tend to draw the surface molecules into the body of the liquid and so tend to minimize the surface .Therefore molecules at the surface of the liquid are under tension .This is called surface tension of a liquid.It is denoted by $γ$.