**Dr.Manoj Kumar**

**Associate professor**

**Department of Chemistry**

**Raja Singh College,Siwan**

**Raoults law of Vapour pressure**

The relative lowering of vapoure pressure $\left(\frac{P0-P}{P0}\right)$ is equal to the mole fraction of the solute .If w g of a solute of mol.wt.m be dissolved in W g of a solvent of mol.wt M then the number of moles of solute and solvent will be w/m and W/M respectively and therefore the mole fraction of solute (Xn) = $\frac{w/m}{\frac{w}{m}+\frac{W}{M}}$

Since w is generally very small and m is very large therefore w/m is neglected from denominator and then Xn =$\frac{w/m}{W/M}$=$\frac{wM}{mW}$

So according to Raoults law

$\frac{Po-P}{Po}$=$\frac{wM}{mW}$

m = $\frac{wM}{W\left(\frac{Po-P}{Po}\right)}$

So if the relative lowering of vapour pressure is known for a solution containing a known weight of the solute in a given weight of the solvent the molecular weight m of the solute can easily be calculated with the help of above expression .

**Ideal and non ideal solution and their charecteristics**

**Ideal Solution:** Solution which obey Raoults law strictly at all temperature and concentration are called ideal solution .Further the heat change ($∆H$) and the volume change ($∆V$) on mixing of such solution are zero.Actually ideal solution are very rare but many solution e.g. benzene and toluene,ethyl bromide and ethyl iodide ,hexane and heptane practically behave as ideal.

**Non ideal solution:** Solution which donot obey Raoults law and there is a noticeable change in volume and heat energy when two components are mixed are called non-ideal solution.e.g.ethanol and cyclohexane,benzene and acetone,acetone and chloroform.

The charecteristics f ideal and non ideal solution may be given as below.

Ideal solution :

1. They follow Raoult’s Law. This implies that the partial pressure of components A and B in a solution will be PA = PA0 xA and PB = PB0 xB . PA0 and PB0 are respective vapour [pressure](https://www.toppr.com/guides/physics/force-and-pressure/introduction-to-pressure) in pure form. On the other hand, xA and xB are respective mole [fractions](https://www.toppr.com/guides/maths/fractions/introduction-to-fraction/) of components A and B

2. The enthalpy of mixing of two components should be zero, that is, Δmix H = 0. This signifies that no heat is released or absorbed during mixing of two pure components to form an ideal solution

Non ideal solution:

1. The solute-solute and solvent-solvent interaction is different from that of solute-solvent interaction

2. The enthalpy of mixing that is, Δmix H ≠ 0, which means that heat might have released if enthalpy of mixing is negative  (Δmix H < 0) or the heat might have observed if enthalpy of mixing is positive (Δmix H > 0)