Colligative properties of electrolytes.

The colligative properties of solutions, viz. lowering of vapor pressure, osmotic pressure, elevation in b.p. and depression in freezing point, depend solely on the total number of solute particles present in solution. Since the electrolytes ionize and give more than one particle per formula unit in solution, the colligative effect of an electrolyte solution is always greater than that of a non-electrolyte of the same molar concentration. All colligative properties are used for calculating molecular masses of non-volatile solutes. However osmotic pressure is the best colligative property for determining molecular mass of a non-volatile substance.

Points to remember

(i) Colligative properties $\propto$ Number of particles

$\propto$ Number of molecules (in case of non-electrolytes)

$\propto$ Number of ions (In case of electrolytes)

$\propto$ Number of moles of solute

$\propto$ Mole fraction of solute

(ii) For different solutes of same molar concentration, the magnitude of the colligative properties is more for that solution which gives more number of particles on ionization.

(iii) For different solutions of same molar concentration of different non-electrolyte solutes, the magnitude of the colligative properties will be same for all.

(iv) For different molar concentrations of the same solute, the magnitude of colligative properties is more for the more concentrated solution.

(v) For solutions of different solutes but of same percent strength, the magnitude of colligative property is more for the solute with least molecular weight.

(vi) For solutions of different solutes of the same percent strength, the magnitude of colligative property is more for that solute which gives more number of particles, which can be known by the knowledge of molecular weight and its ionizationbehavior.