Unit 2

Solutions

Depression in freezing point:

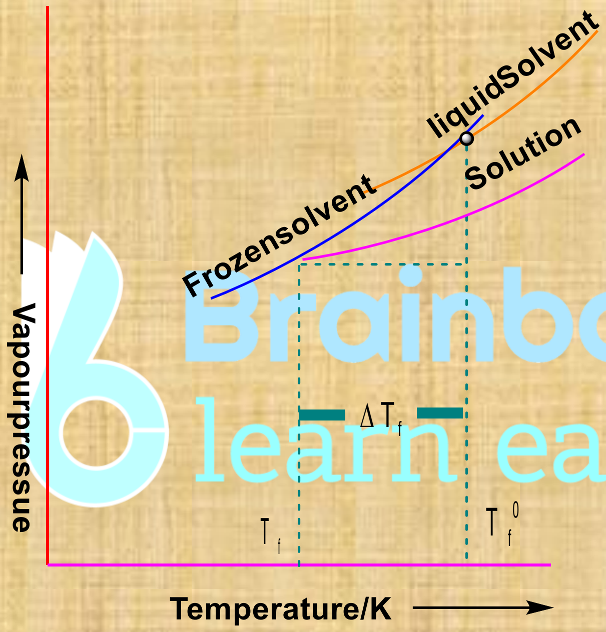

Fig. Diagram showing ΔT_f *depression of the freezing point of a solvent in a solution.*

Decrease in freezing point of solution compared to that of pure solvent is known as depression in freezing point.

$$\Delta T_f = T_f^0 - T_f$$

Depression in freezing point of dilute solution is directly proportional to its molarity.

$$\Delta T_f \ \alpha \ m \Rightarrow \Delta T_f = K_f.m$$

$$\Rightarrow \Delta T_f = \frac{K_f \times W_2 \times 1000}{M_2 \times W_1} \Rightarrow M_2 = \frac{K_f \times W_2 \times 1000}{\Delta T_f \times W_1}$$

K_f is known as molal depression constant value of K_f depends on nature of solvent.

Units of K_F are K kg mol^{-1}

Osmosis:

The phenomenon of flow of solvent molecules from solvent side to solution side is known is Osmosis.

Osmotic pressure:

The pressure to be applied on solution side to stop osmosis is known as Osmotic pressure (π).

Osmotic pressure of dilute solution is proportional to molarity (M) at given temperature(T).

$$\pi = MRT$$

$$\Rightarrow \pi = \frac{W_2 \times R \times T}{M_2 \times V} \Rightarrow M_2 = \frac{W_2RT}{\pi V}$$