Nishant Jindal

S = II

1, 2, 12

① $x_A =$ x_B

$y_A \Longrightarrow x_A'$

$x_A' \downarrow y_A'$

② 0.5 atm

90°C = b.pt

$P_{ext} = vap.\ pr$

$P_T = 380\ torr = x_A P_A^\circ + x_B P_B^\circ$

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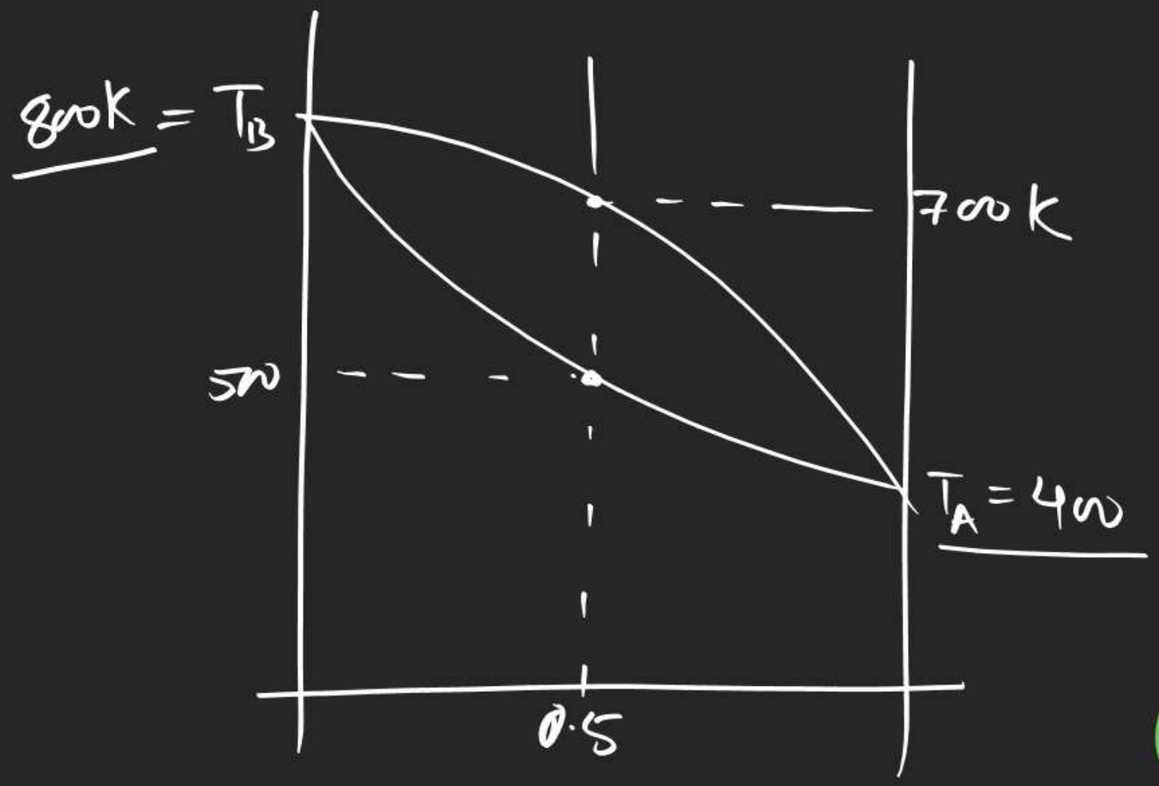


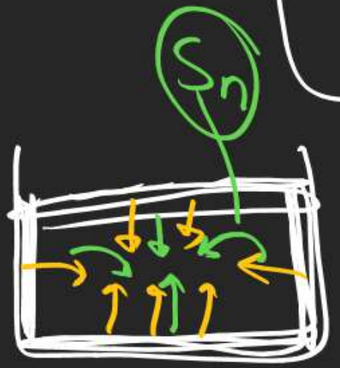
Zn – Cd

450K 350K

400K

Zn – Sn alloy

50% 50% by mass



Zone refining

Solution of solid in liq :- (Colligative properties)

in general solids are non-volatile (vap. pr = 0)

Certain properties of a solution containing non-volatile solute in liquid depends only on no. of moles of non-volatile solute and is independent of its nature, are called Colligative properties.

① Relative lowering in vapour :→

P_0 = vapour pressure of pure solvent

$P_T = P_S$ = " " of Solution

$P_0 - P_S$ = lowering in vapour pressure

$\frac{P_0 - P_S}{P_0}$ = Relative lowering in vapour

$P_T = X_A P_A^0 + \cancel{X_B P_B^0}^{\,0}$

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$$P_T = X_A P_A^0 + X_B P_B^0$$ (B → solute)

$$P_S = (1 - x_{solute})\, P_0$$

$$P_S = P_0 - x_{solute}\, P_0$$

$$\frac{P_0 - P_S}{P_0} = x_{solute} = \frac{n}{n+N}$$

$$\text{Molality} = \frac{n}{\text{mass of solvent (gm)}} \times 1000$$

$$\frac{n+N}{n} - 1 = \frac{P_0}{P_0 - P_S} - 1$$

$$\frac{N}{n} = \frac{P_S}{P_0 - P_S}$$

$$\frac{P_0 - P_S}{P_S} = \frac{n}{N} = \frac{n}{W/M} = \frac{n}{W} \times 1000 \frac{M}{1000}$$

$$\frac{P_0 - P_S}{P_S} = m \times \frac{M_{solvent}}{1000}$$

for a dilute soln

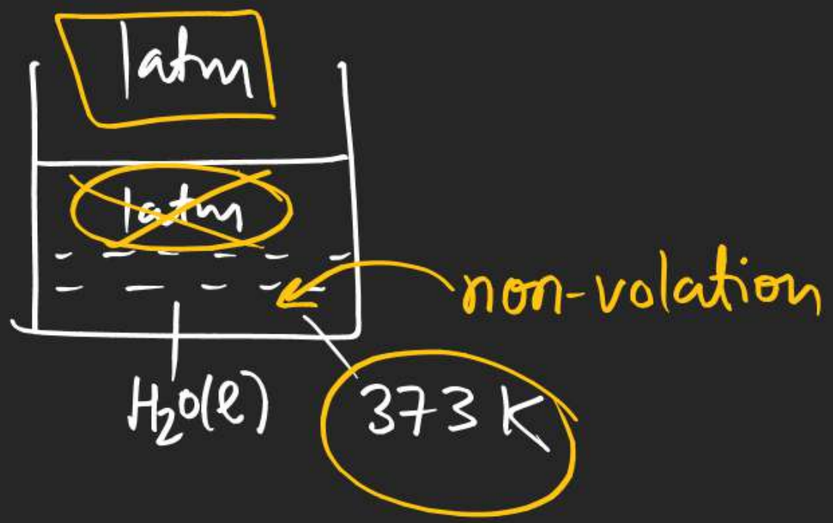
$$\frac{P_0 - P_s}{P_0} = \frac{n}{n + N} = \frac{n}{N}$$

$$\boxed{\frac{P_0 - P_s}{P_0} = m \times \frac{M_{solvent}}{1000}}$$

② Elevation in boiling point :→

for B.pt P_{ext} = vap pr

at 373 K vap pr = 1 atm



due to addⁿ of non-volatile solute vap pr of solvent decreases, therefore b. pt increases.

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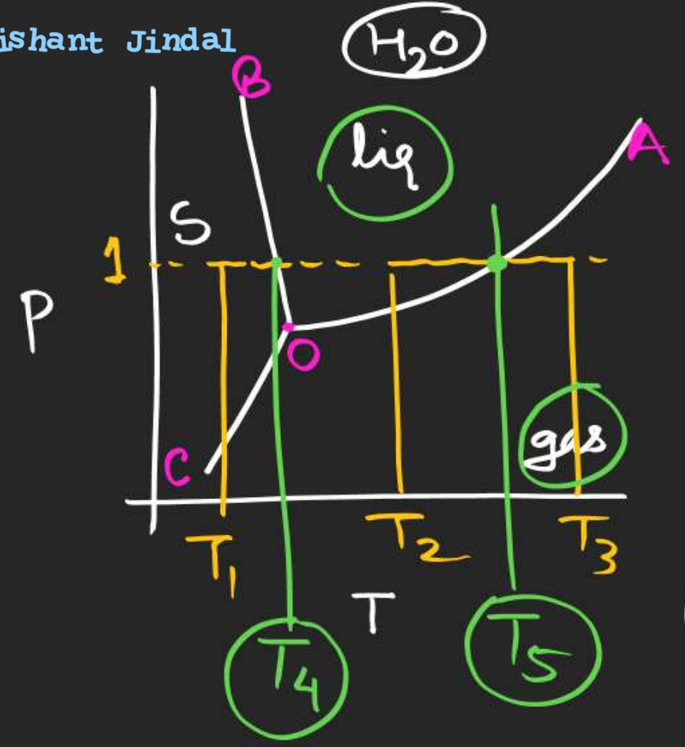

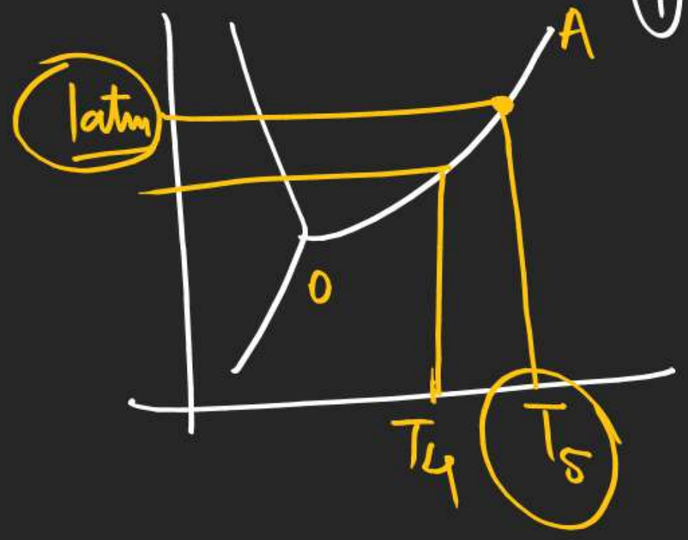

① Phase diagram tells us about the physical state of a substance at given 'T' & 'P'

② OA curve → about variation b.pt with 'P'
OB " → " " m.pt "
OC " → " " Sub pt "

③ Point 'O' → Triple point

④ OA Curve tells us about variation of vap. pr of liq with 'T'
OC " " " " " " " Solid with T

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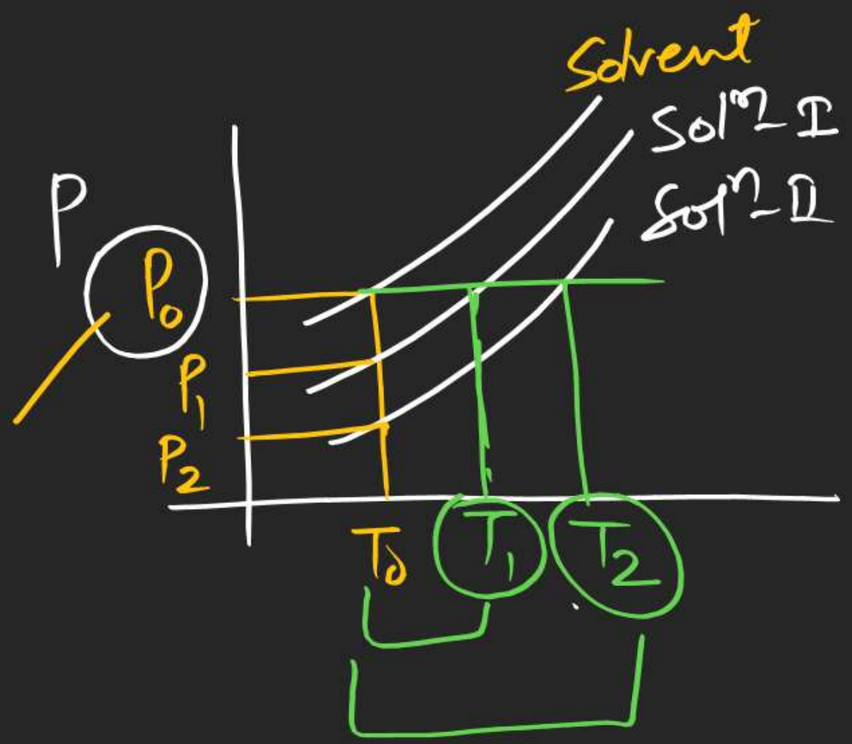

O-I	23 — 29
S-I	14 — 20

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