

Last time: Binary Phase Diagrams

$$G^{\text{mixed}} = G^{\text{unmixed}} + \Delta G^{\text{mix}}$$

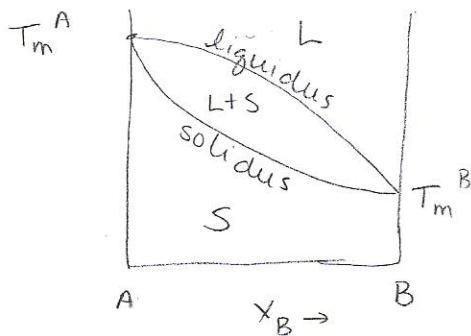
$$G = \sum \mu_i X_i = \mu_A X_A + \mu_B X_B$$

$$\Delta G^{\text{mix}} = \Delta H^{\text{mix}} - T \Delta S^{\text{mix}}$$

$$\Delta S^{\text{mix}} = -R X_A \ln X_A - R X_B \ln X_B \quad (\text{purely configurational})$$

$\Delta H^{\text{mix}} \rightarrow$ defines type of solution (phenomenological)

1) $\Delta H^{\text{mix}} = 0 \rightarrow$ ideal solution \rightarrow isomorphous system



$\Delta H^{\text{mix}} \neq 0$, often observe

2) $\Delta H^{\text{mix}} = \Omega X_A X_B \rightarrow$ regular solution, $\Omega = \text{constant}$.

this type of behavior can be predicted / understood using a quasi-chemical model

let bonds between different types of atoms have different energies:

$$E_{AA} : A-A$$

$$E_{BB} : B-B$$

$$E_{AB} : A-B$$

} one must be higher than the other, arbitrarily pick $E_{AA} > E_{BB}$

relative value of E_{AB} defines behavior