OUTLINE OF CHAPTER 12

SOLUBILITY OF SOLIDS IN LIQUIDS

Starting Point (of surprise!!!!!)

\[ f_1^S(T, P) = \bar{f}_1^S(T, P, \chi) \]

But

\[ f_1^S(T, P) = x_1 \gamma_1(T, P, \chi) f_1^L(T, P) \]

Also

\[ f_1^S(T_m) = f_1^L(T_m) \]

Thus at the melting point we would have:

\[ x_1 = 1 / \gamma_1(T_m, P, \chi) \]

The solid is below its melting point, that is, \( f_1^L > f_1^S \) so the above equation is not valid. We need to compute the liquid fugacity differently (see eq 9-7-8a)

\[
f_1^L(T, P) = f_1^S(T, P) \exp \left[ -\frac{1}{RT} \left( \Delta_{\text{fus}} H(T) \left( 1 - \frac{T}{T_m} \right) + \int_{T_m}^{T} \Delta C_P \, dT - T \int_{T_m}^{T} \frac{\Delta C_P}{T} \, dT \right) \right]
\]
**FREEZING POINT DEPRESSION**

*Solid frozen is the pure solvent, the liquid phase is the solution with a solute.*

*Starting Point (where is this coming from?)*

\[
f^S_1(T_f, P) = \bar{f}^L_1(T_f, P, \bar{\varepsilon}) = x_1\gamma_1(T_f, P, \bar{\varepsilon})f^L_1(T_f, P)
\]