EQUILIBRIO LÍQUIDO – SÓLIDO

CONDICIONES DE EQUILIBRIO LÍQUIDO – SÓLIDO

$$T^L = T^S$$

$$P^L = P^S$$

$$f_1^L = f_1^S$$

$$f_2^L = f_2^S$$

$$\vdots$$

$$f_i^L = f_i^S$$

$$\vdots$$

$$f_C^L = f_C^S$$

EQUILIBRIO LÍQUIDO – SÓLIDO

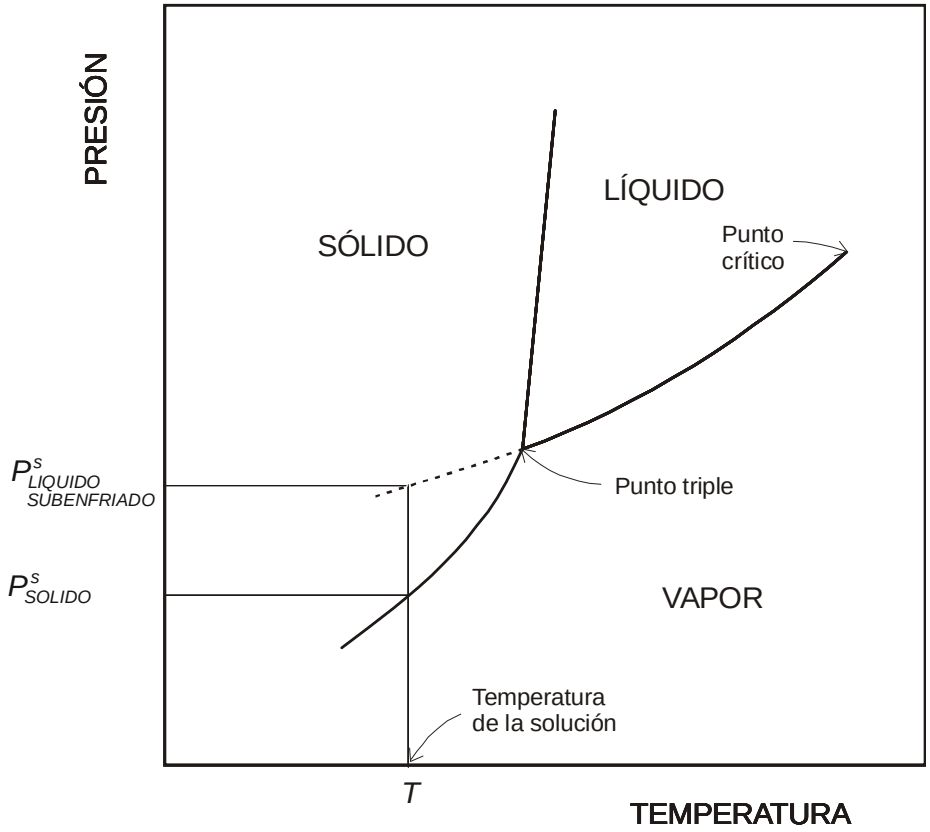
SOLUBILIDAD DE SÓLIDOS EN LÍQUIDOS

$$f_2^S = f_{2,\,puro}^S = f_2^L$$

$$f_{2,\,puro}^S = x_2\ \gamma_2\ f_2^0$$

$$x_2 = \frac{f_{2,\,puro}^S}{\gamma_2\ f_2^0}$$

$$x_2^{id} = \frac{P_{2,\,\text{sólido puro}}^s}{P_{2,\,\text{líquido subenfriado puro}}^s}$$

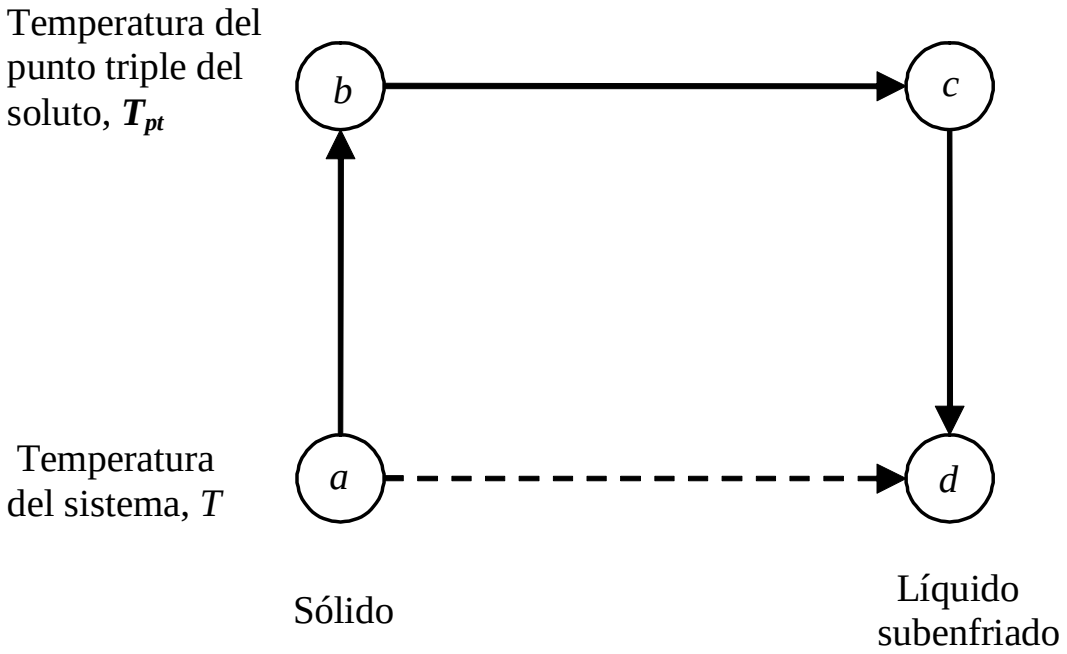


EQUILIBRIO LÍQUIDO – SÓLIDO

SOLUBILIDAD DE SÓLIDOS EN LÍQUIDOS

$$x_2 = \frac{f^{S}_{2,\,puro}}{\gamma_2 \; f^{0}_{2}}$$

$$x_2 = \frac{f^{S}_{2,\,puro}}{\gamma_2 \; f^{L}_{2,\,puro}}$$



$$(G^{*}_{m,2})^{L} - (G^{*}_{m,2})^{S} = (\Delta G^{*}_{m,2})_{a \to d} = R\,T \ln \frac{f^{L}_{2,\,puro}}{f^{S}_{2,\,puro}}$$

EQUILIBRIO LÍQUIDO – SÓLIDO

SOLUBILIDAD DE SÓLIDOS EN LÍQUIDOS

$$\ln \frac{f_{2,puro}^{L}}{f_{2,puro}^{S}} = \frac{(\Delta_{\text{fus}} H_{m,2}^{*})_{pt}}{R\,T_{pt}} \left[\frac{T_{pt}}{T} - 1 \right] - \frac{\Delta C_{p,2}}{R} \left[\frac{T_{pt}}{T} - 1 - \ln \frac{T_{pt}}{T} \right]$$

$$x_2 = \frac{1}{\gamma_2} \exp \left[\frac{(\Delta_{\text{fus}} H_{m,2}^{*})_{pt}}{R\,T_{pt}} \left(1 - \frac{T_{pt}}{T} \right) - \frac{\Delta C_{p,2}}{R} \left(1 - \frac{T_{pt}}{T} + \ln \frac{T_{pt}}{T} \right) \right]$$

$$x_2 = \frac{1}{\gamma_2} \exp \left[\frac{(\Delta_{\text{fus}} H_{m,2}^{*})_{pf}}{R\,T_{pf}} \left(1 - \frac{T_{pf}}{T} \right) \right]$$

$$x_2^{id} = \exp \left[\frac{(\Delta_{\text{fus}} H_{m,2}^{*})_{pf}}{R\,T_{pf}} \left(1 - \frac{T_{pf}}{T} \right) \right] = \exp \left[\frac{(\Delta_{\text{fus}} H_{m,2}^{*})_{pf}}{R} \left(\frac{1}{T_{pf}} - \frac{1}{T} \right) \right]$$

EQUILIBRIO LÍQUIDO – SÓLIDO

SOLUBILIDAD DE SÓLIDOS EN LÍQUIDOS

$$x_2^{id} = \exp\left[\frac{(\Delta_{fus}H^*_{m,2})_{pf}}{R\,T_{pf}}\left(1-\frac{T_{pf}}{T}\right)\right] = \exp\left[\frac{(\Delta_{fus}H^*_{m,2})_{pf}}{R}\left(\frac{1}{T_{pf}}-\frac{1}{T}\right)\right]$$

Tabla 8.1. Solubilidades ideales de tres isómeros de cloronitrobenceno a 300 K

Isómero, 2	$(\Delta_{fus}H^*_{m,2})_{pf}$	T_{pf}	x_2
Orto-cloronitrobenceno	19,02	307,5	0,8303
Meta-cloronitrobenceno	19,37	317,6	0,6503
Para-cloronitrobenceno	20,77	356,7	0,2661
	kJ/mol	K	

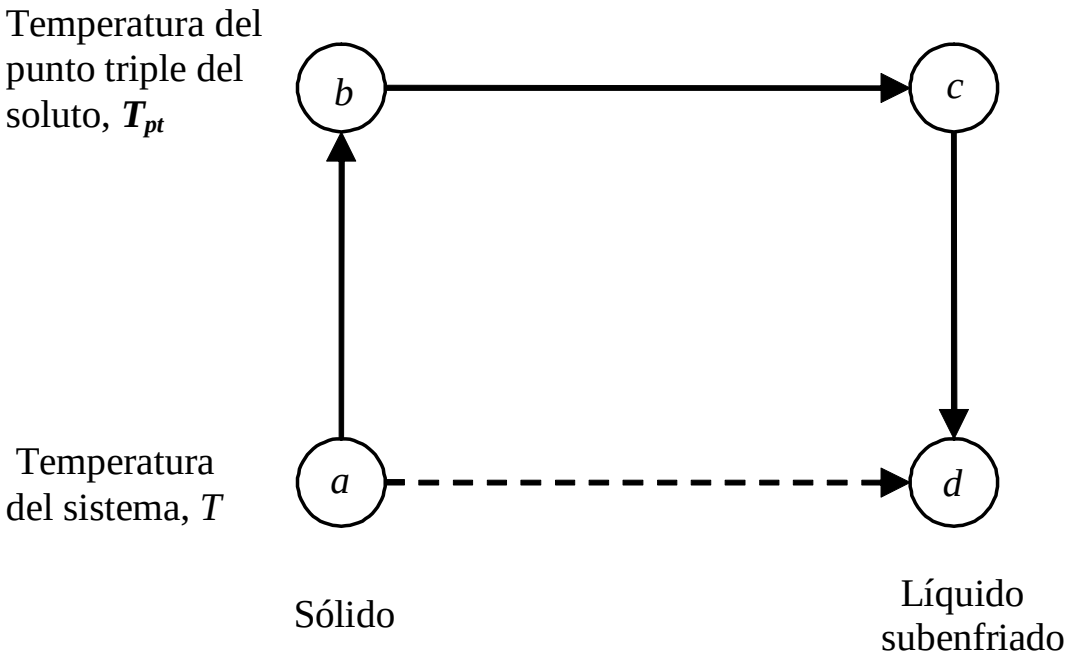
EQUILIBRIO LÍQUIDO – SÓLIDO

SOLUBILIDAD DE SÓLIDOS EN LÍQUIDOS

$$x_2 = \frac{f_{2,\,puro}^{S}}{\gamma_2 \; f_2^{0}}$$

$$\ln \gamma_2 = \frac{(V_{m,2}^{*})^{L}}{R\,T}(\delta_1 - \delta_2)^2 \; \phi_1^2$$

$$\phi_1 = \frac{x_1 \, (V_{m,1}^{*})^{L}}{x_1 \, (V_{m,1}^{*})^{L} + x_2 \, (V_{m,2}^{*})^{L}}$$



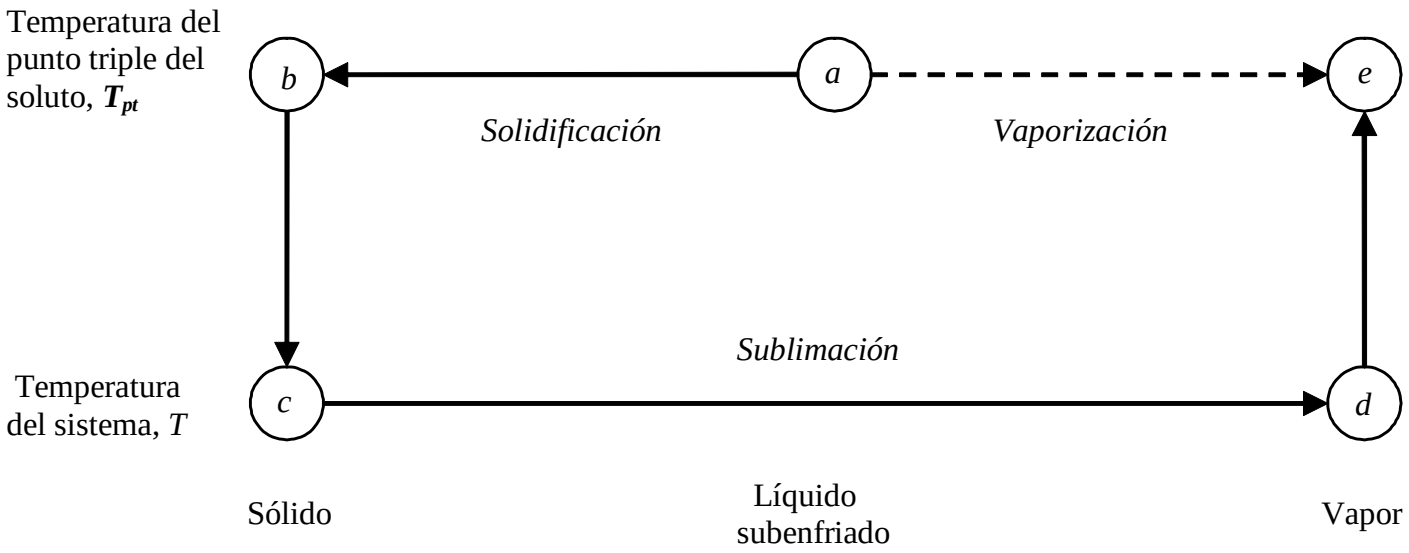
$$(V_{m,2}^{*})_T^{L} = (V_{m,2}^{*})_T^{S} + (\Delta_{\text{fus}} V_{m,2}^{*})_{pt} + \left[(V_{m,2}^{*})_{pt}^{S} \; \alpha_2^{S} - (V_{m,2}^{*})_{pt}^{L} \; \alpha_2^{L}\right](T_{pt} - T)$$

EQUILIBRIO LÍQUIDO – SÓLIDO

SOLUBILIDAD DE SÓLIDOS EN LÍQUIDOS

$$\ln \gamma_2 = \frac{(V^*_{m,2})^L}{R\,T}(\delta_1 - \delta_2)^2\,\phi_1^2$$

$$\delta_2^2 = \frac{(\Delta_{vap}U^*_{m,2})}{(V^*_{m,2})^L}$$



$$(\Delta_{vap}U^*_{m,2}) = -(\Delta_{fus}H^*_{m,2})_{pt} + (\Delta_{sub}H^*_{m,2})_T + \Delta C_{p,2}\,(T_{pt} - T) - P_2^s\,\Delta_{vap}V^*_{m,2}$$