Thermo 2

Potentiel chimique :

$$\mu_i(T,P) = \left(\frac{\partial G}{\partial n_i}\right)_{T,P,n_{j\neq i}}$$

$$\frac{\partial \mu_i}{\partial T} = -S_{m,i}$$

$$\frac{\partial \mu_i}{\partial P} = V_{m,i}$$

$$\mu_i(T,P) = \mu_i^\circ(T) + RT\ln(a_i)$$

$$-S\,dT + V\,dP = \sum_i n_i\,d\mu_i$$

Gibbs-Duhem.

Evolution spontanée :

$\forall$ l'évolution spontanée d'un syst est tq

$$dG \leqslant 0$$

Equilibre sous deux phases

Si $\mu_{\varphi_1} = \mu_{\varphi_2}$.

$G = H - TS = H + T\left(\frac{\partial G}{\partial T}\right)_P \Rightarrow \frac{G}{T^2} + \frac{1}{T}\left(\frac{\partial G}{\partial T}\right)_P = -\frac{H}{T^2}$.

$$\frac{\partial}{\partial T}\left(\frac{G}{T}\right) = -\frac{H}{T^2}$$

Relation de Gibbs-Helmholtz.

$$\Delta_r G^\circ = \Delta_r H^\circ - T\,\Delta_r S^\circ$$

$$\frac{d}{dT}\left(\frac{\Delta_r G^\circ}{T}\right) = -\frac{\Delta_r H^\circ}{T^2}$$

$$\frac{d\left(\Delta_r G^\circ(T)\right)}{dT} = -\Delta_r S^\circ$$