DO NOT USE PENCIL ****** DO NOT STAPLE

Submit a COPY of these notes to the GenChem Office

Course 565/665 Lecturer Prof. Cavagnero

Day 3. 23. 04 Date 9:55 am

Notes Taken By J. Hong Total Number of Pages ______

S change as a fn. of P.

$$dS = \left(\frac{\partial S}{\partial P}\right)_{T,N} dP$$

maxwell relation $\left(\frac{\partial S}{\partial P}\right)_{T,N} = -\left(\frac{\partial V}{\partial T}\right)_{P,N} = -V\alpha$

α is tabulated for many substances.

$$dS = -\alpha V dP \qquad \Delta S = \int_{P_1}^{P_2} -\alpha V dP$$

for IG. $\alpha = \frac{1}{T}$ $\qquad \Delta S = \int_{P_1}^{P_2} -\frac{V}{T} dP = -nR \int_{P_1}^{P_2} \frac{dP}{P} = -nR \ln \frac{P_2}{P_1}$

3 of 5

*DO NOT USE PENCIL ****** DO NOT STAPLE*
Submit a COPY of these notes to the GenChem Office

Course 565/665 Lecturer Prof. Cavagnero
Day 3.23.04 Date 9:55 am
Notes Taken By J. Hong Total Number of Pages ______

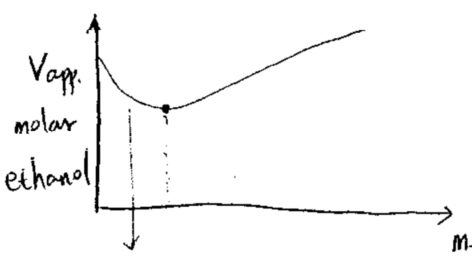
Partial molar quantities

1. one-component system $\bar{V} = \frac{V}{n}$ $g = \frac{G}{n}$ (at const. T.P)
2. multi-component system.

$$V_j = \left(\frac{\partial V}{\partial n_j}\right)_{T.P.\, n_{i \neq j}}$$

$$dV = \sum_{j=1}^{n} \left(\frac{\partial V}{\partial n_j}\right)_{T.P.\, n_{i \neq j}} \cdot dn_j = \sum_{j=1}^{n} V_j \, dn_j$$

different component sometimes interact.



electrostriction

$$V_{app\ ETOH} = \frac{V_{tot} - n_w V_w}{n_{ethh}}$$

chemical potential. $\mu_i = \left(\frac{\partial u}{\partial N_j}\right)_{V.S.\, N_{i \neq j}} = \left(\frac{\partial F}{\partial N_j}\right)_{T.V.\, N_{i \neq j}}$

$$= \left(\frac{\partial H}{\partial N_j}\right)_{P.S.\, N_{i \neq j}} = \left(\frac{\partial G}{\partial N_j}\right)_{T.P.\, N_{i \neq j}}$$

4 of 5

DO NOT USE PENCIL ****** DO NOT STAPLE
Submit a COPY of these notes to the GenChem Office

Course 565 / 665 Lecturer Prof. Cavagnero
Day 3-23 04 Date 9:55 am
Notes Taken By J. Hong. Total Number of Pages

μ_j → partial molar G.

$G = H - TS \Rightarrow \mu_j = h_j - Ts_j$

relationship among partial molar quantities:

$$V_{tot} = \sum_{j=1}^{N} N_j V_j$$

$$\left.\begin{array}{l} dV = \sum_{j=1}^{N} N_j dV_j + \sum_{j=1}^{N} V_j dN_j \\ \text{known already } dV = \sum_{j=1}^{N} V_j dN_j \end{array}\right\} \Rightarrow \sum_{j=1}^{N} N_j dV_j = 0$$

similarly. $\sum_{j=1}^{N} N_j d\mu_j = 0$. Gibbs-Duhem eqn.

5 of 5