Fizikai kémia 1: összefüggések példamegoldásokhoz

$$\left(\frac{\partial x}{\partial w}\right)_z = \left(\frac{\partial x}{\partial y}\right)_z \left(\frac{\partial y}{\partial w}\right)_z \qquad \left(\frac{\partial x}{\partial y}\right)_z = \left(\frac{\partial x}{\partial y}\right)_w + \left(\frac{\partial x}{\partial w}\right)_y \left(\frac{\partial w}{\partial y}\right)_z \qquad \left(\frac{\partial x}{\partial y}\right)_z \left(\frac{\partial y}{\partial z}\right)_x \left(\frac{\partial z}{\partial x}\right)_y = -1$$

$$df = \left(\frac{\partial f}{\partial x_1}\right)_{x_2} dx_1 + \left(\frac{\partial f}{\partial x_2}\right)_{x_1} dx_2 \qquad \frac{\partial}{\partial x_2}\left(\frac{\partial f}{\partial x_1}\right)_{x_2} = \left(\frac{\partial^2 f}{\partial x_2 \partial x_1}\right); \qquad \frac{\partial}{\partial x_1}\left(\frac{\partial f}{\partial x_2}\right)_{x_1} = \left(\frac{\partial^2 f}{\partial x_1 \partial x_2}\right)$$

$$p = p^* \cdot \exp\left(V_m \Delta P / RT\right) \qquad a_i = \frac{f_i}{p^\ominus} = \frac{\varphi_i p_i}{p^\ominus} \qquad \frac{\partial \ln K}{\partial (1/T)} = -\frac{\Delta_r H^\ominus}{\mathrm{R}} \qquad \left(\frac{\partial \mu}{\partial T}\right)_p = -S_m \qquad \left(\frac{\partial \mu}{\partial p}\right)_T = V_m$$

$$\frac{\mathrm{d}p}{\mathrm{d}T} = \frac{\Delta_{\mathrm{trs}} H}{T \Delta_{\mathrm{trs}} V} \qquad \ln\frac{p}{p_0} = \frac{-\Delta_{\mathrm{trs}} H}{R}\left(\frac{1}{T} - \frac{1}{T_0}\right) \qquad \frac{\mathrm{d}\ln p}{\mathrm{d}(1/T)} = -\frac{\Delta_{\mathrm{trs}} H}{R} \qquad p = \rho g h = \frac{2\gamma}{r} \qquad p - p_0 = \frac{\Delta_{\mathrm{trs}} H}{\Delta_{\mathrm{trs}} V} \ln\frac{T}{T_0}$$

$$y_A = \frac{p_A}{p} \qquad p_A = x_A \cdot p_A^* \qquad p_A = x_A \cdot K_A \qquad p = x_A \cdot p_A^* + x_B \cdot p_B^* \qquad \Delta T_{bp} = \frac{R T^{*2}}{\Delta_{vap} H} \cdot x_B = K_b b_B$$

$$F = U - TS \qquad p = p^* \cdot \exp\left(-2\gamma V_m / rRT\right) \qquad Sz = K - F + 2 \qquad \frac{1}{p} = \frac{y_A}{p_A^*} + \frac{y_B}{p_B^*} \qquad \alpha = \frac{1}{V}\left(\frac{\partial V}{\partial T}\right)_P$$

$$\kappa_T = -\frac{1}{V}\left(\frac{\partial V}{\partial P}\right)_T \qquad H = U + PV \qquad \mu_i = \mu_i^\mathrm{e} + RT \ln a_i \qquad c_V = \frac{T}{n}\left(\frac{\partial S}{\partial T}\right)_V \qquad G = U - TS + PV$$

$$n_g (y_A - z_A) = n_f (z_A - x_A) \qquad dH = TdS + VdP - \sum_{i=1}^{k} \mu_\mathrm{i} dn_\mathrm{i} \qquad c_P = \frac{T}{n}\left(\frac{\partial S}{\partial T}\right)_P \qquad dW = -PdV$$

$$dU = TdS - PdV + \sum_{i=1}^{k} \mu_\mathrm{i} dn_\mathrm{i} \qquad \frac{1}{A}\frac{\partial n_i}{\partial t} = -D_i \frac{\partial c_i}{\partial z} \qquad dQ = TdS \qquad \frac{\mu_i}{T}(U,V,N) = -\left(\frac{\partial S}{\partial n_i}\right)_{U,V,n_{j\neq i}}$$

$$a_i = \frac{f_i}{p^\Theta} = \frac{\varphi_i p_i}{p^\Theta} \qquad \frac{\partial \ln K}{\partial (1/T)} = -\frac{\Delta_\mathrm{r} H^\Theta}{\mathrm{R}} \qquad \left(\frac{\partial \mu}{\partial T}\right)_p = -S_m \qquad \left(\frac{\partial \mu}{\partial p}\right)_T = V_m \qquad dW = -PdV$$

$$Sz = K - F + 2 \qquad \gamma(T,P,A,\boldsymbol{n}) = \left(\frac{\partial G}{\partial A}\right)_{T,P,\boldsymbol{n}} \qquad P_\mathrm{in} = P_\mathrm{ex} \pm \frac{2\gamma}{r} \qquad P_r = P_0 e^{\frac{2\gamma M}{RTr\rho}} \qquad F = U - TS$$

$$G = H - TS \qquad \Delta T = K_b m_B \qquad \Delta T = K_f m_B \qquad dG = -SdT + VdP + \sum_{i=1}^{k} \mu_\mathrm{i} dn_\mathrm{i} \qquad \left\langle r^2 \right\rangle^{1/2} = \sqrt{6Dt} \qquad p = \rho g h = \frac{2\gamma}{r}$$

$$dH = TdS + VdP + \sum_{i=1}^{k} \mu_\mathrm{i} dn_\mathrm{i} \qquad \Delta T_{bp} = \frac{R T^{*2}}{\Delta_{vap} H} \cdot x_B = K_b b_B \qquad U = TS - PV + \sum_{i=1}^{k} \mu_\mathrm{i} n_\mathrm{i} \qquad dU = TdS - PdV + \sum_{i=1}^{k} \mu_\mathrm{i} dn_\mathrm{i}$$

$$dS = \frac{1}{T} dU + \frac{P}{T} dV - \sum_{i=1}^{k} \frac{\mu_\mathrm{i}}{T} dn_\mathrm{i} \qquad \frac{dV}{dt} = \frac{(p_1^2 - p_2^2)\pi r^4}{16 \cdot l \cdot \eta \cdot p_0} \qquad \left\langle x^2 \right\rangle^{1/2} = \sqrt{2Dt} \qquad \left(\frac{\partial c}{\partial t}\right) = D\left(\frac{\partial^2 c}{\partial z^2}\right) - v_{k\ddot{o}zeg}\left(\frac{\partial c}{\partial z}\right)$$

$$p = p^* \exp\left(\frac{2\gamma V_\mathrm{m}}{rRT}\right) \qquad \frac{dV}{dt} = \frac{(p_1 - p_2)\pi r^4}{8 \cdot l \cdot \eta} \qquad \left(\frac{\partial (G/T)}{\partial T}\right)_{P,\boldsymbol{n}} = -\frac{H}{T^2} \qquad \left(\frac{\partial (F/T)}{\partial T}\right)_{V,\boldsymbol{n}} = -\frac{U}{T^2}$$

$$\eta = 1 - \frac{T_\mathrm{h}}{T_\mathrm{m}} \qquad \varepsilon = \frac{T_\mathrm{h}}{T_\mathrm{m} - T_\mathrm{h}} \qquad \varepsilon' = \frac{T_\mathrm{m}}{T_\mathrm{m} - T_\mathrm{h}} \qquad X_i = \left(\frac{\partial X}{\partial n_i}\right)_{T,P,n_{j\neq i}} \qquad X = \sum_{i=1}^{K} n_i X_i \qquad d\mu_i = -S_i\, dT + V_i\, dP + \sum_{i=1}^{K}\left(\frac{\partial \mu_i}{\partial x_i}\right)_{T,P,x_{j\neq i}} dx_i$$

$$\mu_i = \mu_i^* + RT \ln x_i \qquad \mu_\pm = \mu_\pm^\ominus + RT \ln \gamma_\pm m_\pm \qquad \mu_i = \mu_i^\ominus + RT \ln a_i \qquad \mu_i = \mu_i^\ominus + RT \ln p_i \qquad \Delta_\mathrm{r} G^\ominus = -RT \ln \prod_{i=1}^{R} (a_i)^{\nu_i}$$