

Errata in the book:

Ernő Keszei: Chemical Thermodynamics; An Introduction

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Corrections or insertions are indicated by underlined italic Calibri characters, when applicable.

(Not in equations.)

p. 14

Up to now, all we know about the partial derivative of the energy function $U(S, V, \mathbf{n})$ with respect to ...

p. 21

We should not be surprised as we know that the ideal gas is a good approximation at high temperatures and it cannot be applied at very low temperatures at all.

p. 28

Correct form of the 1st equation:

$$U = \frac{3nRT}{2}$$

p. 45

Correct typesetting of the formula (4.8):

$$H = H(S, P, \mathbf{n}) \quad (4.8)$$

p. 51

Correct typesetting: ... the functions $H(S, P, \mathbf{n})$, $F(T, V, \mathbf{n})$ and $G(T, P, \mathbf{n})$ as the factors ...

p. 74

Correct form of equation (5.4):

$$|W_{\text{out}}| - |W_{\text{in}}| = |Q_{\text{in}}| - |Q_{\text{out}}| \quad (5.4)$$

p. 95

As the chemical potential $\underline{\mu}_i$ is given relative to μ_i^* ...

p. 102

... the reference state is almost always 1 mol dm⁻³ or 1 mol kg⁻¹; ...

p. 109

Correct form of equation (6.94):

$$\mu_{c,i}^{\ominus}(T, P) = \lim_{c_i \rightarrow 0} \left[\mu_i(T, P, c_i) - RT \ln \frac{c_i}{c_i^{\ominus}} \right] \quad (6.94)$$

p. 155

The thermodynamic behavior of this “solvated component” is of course different from that of the nearly pure substance, which is reflected in the partial pressures obeying Henry’s law.

p. 156

... it is enough to write one of the two mole fractions, which we will denote by x ; the other component having a concentration of $1 - x$:

p. 158

Existing nearly-ideal solid mixtures illustrate this principle; typical examples are, e. g. ...

p. 166

Correct forms of equations (7.87), (7.90), (7.92), (7.93) and (7.94) are as follows:

$$\ln x_A = \frac{\mu_{A,s}^*(T) - \mu_{A,l}^*(T)}{RT} = -\frac{\Delta_{\text{fus}} g_A^*(T)}{RT} \quad (7.87)$$

$$\Delta_{\text{fus}} s_A^*(T_{\text{fus,A}}^*) = \frac{\Delta_{\text{fus}} h_A^*(T_{\text{fus,A}}^*)}{T_{\text{fus,A}}^*} \quad (7.90)$$

$$\ln x_A = -\frac{1}{RT} \Delta_{\text{fus}} h_A^* \left(1 - \frac{T}{T_{\text{fus,A}}^*} \right) = -\frac{\Delta_{\text{fus}} h_A^*}{R} \left(\frac{1}{T} - \frac{1}{T_{\text{fus,A}}^*} \right) \quad (7.92)$$

$$x_A = e^{-\frac{\Delta_{\text{fus}} h_A^*}{R} \left(\frac{1}{T} - \frac{1}{T_{\text{fus,A}}^*} \right)} \quad (7.93)$$

$$x_B = e^{-\frac{\Delta_{\text{fus}} h_B^*}{R} \left(\frac{1}{T} - \frac{1}{T_{\text{fus,B}}^*} \right)} \quad (7.94)$$

p. 177

Correct form of equation (7.109):



p. 180

Correct form of equation (7.114):

$$\frac{1}{T_{\text{fus,A}}^*} - \frac{1}{T} = \frac{R}{\Delta_{\text{fus}} h_A^*} \ln x_A \quad (7.114)$$

p. 181

Thus, let us write $x_B = \underline{m_B} \underline{M_A}$ into the expression of the freezing point depression, ...

Correct form of equation (7.114):

$$\ln x_A = \frac{\mu_{A,g}^*(T) - \mu_{A,l}^*(T)}{RT} = \frac{\Delta_{\text{vap}} g_A^*(T)}{RT} \quad (7.121)$$

p. 183; footnote 18

It refers to the increased tension ...

p. 184

V is the volume of the solution, but it is not much different from the volume of the solvent. ...

p. 202

Correct form of equation (8.8):

$$\sum_{i=1}^R (\mu_i^\ominus + RT \ln a_i) dn_i = 0 \quad (8.8)$$

p. 207

Comparing this result with [8.13] we can state that ...

p. 216

Correct form of the second equation (8.57):

$$\Delta_r G^\ominus = \mu_{\text{CaO}}^*(s) + \mu_{\text{CO}_2}^\ominus(P^\ominus) - \mu_{\text{CaCO}_3}^*(s) \quad (8.57)$$

p. 235

... the equalities $-dV^s = dV^l$ and $-dn^s = dn^l$ hold. (the $-$ sign at the end of line belongs to dV^s)

p. 246

Correct form of equation (9.67):

$$\mu_{\text{Zn}^{2+}} + 2\mu_{\text{Cl}^-} = \mu_{\text{ZnCl}_2}, \quad (9.67)$$

p. 251

... the deviation from ideality outlasts for quite high dilutions.

p. 256

Making use of the equalities (9.103) and (9.104), ...

p. 268

... the function $S(E, V, N)$ differs only by a constant factor from the function $\ln \Omega(E, V, N)$:

p. 270

Using combinatorial terms, this is the number of permutations of $U/\hbar\omega_0 + 3N - 1$ elements with repetition, ...

p. 277

The entropy function $S_{res}(E_{tot} - E_i)$ can be expanded around the energy $\frac{E_{tot} - U}{U}$:

$$S_{res}(E_{tot} - E_i) = S_{res}(E_{tot} - U + U - E_i) = S_{res}(E_{tot} - U) + \frac{\partial S_{res}}{\partial U}(U - E_i) + \dots \quad (10.25)$$

p. 300

Correct form of equation (10.125):

$$F = F(0) - NkT \ln q + kT(N \ln N - N) = F(0) - NkT \ln q + NkT(\ln N - 1). \quad (10.125)$$

p. 301

Let us substitute $RT = N_A kT$ in place of NkT , ...

p. 307; footnote 1

There is an exception from this rule; in a potential field, there might be a continuous change of the equilibrium value of an intensive variable.

p. 313

Correct form of equations (11.12) and (11.13):

$$\left(\frac{dc}{dt}\right)_{out} = \frac{-(J_z + dJ_z)A}{Adz} = \frac{-(J_z + dJ_z)}{dz}. \quad (11.12)$$

$$\left(\frac{dc}{dt}\right) = \left(\frac{dc}{dt}\right)_{in} - \left(\frac{dc}{dt}\right)_{out} = \frac{J_z - (J_z + dJ_z)}{dz} = -\frac{dJ_z}{dz}. \quad (11.13)$$

p. 316

11.3 Principal transport processes and coupled processes

This kind of transport is called a principal process driven by a *conjugate force*.

An important example is the separation of isotopes due to thermal diffusion; the difference in their thermodiffusion coefficient can lead to a difference in their flux across a temperature gradient, ...

p. 332

Steam engines were already in use in the eighteenth century.