ERRATA

An Introduction to Interfaces and Colloids: The Bridge to Nanoscience

The first printing of this book contains a large number of typographical and other errors. Some of the more serious ones are listed below.

John Berg

Chapter 2

p. 24, Fig. 2-1 Caption, line 3: the second "r*" should be "ρ*"

p. 31, line 13: "free electrons" should be "conductance electrons"

p. 53, lines 1 and 2 from bottom: "R₂" should be "R₁"

p. 57, line 8 from bottom, and p. 58, line 6 from bottom: "capillary constant" should be "capillary length." In Eq. (2.50), it should read: "–ρgy"

p. 67, below Table 2-6: it should read "The first estimate is \( a = \sqrt{rh} \)" and "The next estimate is \( a = \sqrt{bh} \"

p. 73, Eq. (2.73): The equation should read:

\[ \sigma = \frac{r}{2} p_{\text{max}} - \frac{1}{2} \rho grh - \frac{1}{3} \rho gr^2 - \frac{(\rho g)^2 r^3}{12(p_{\text{max}} - \rho gh)}, \]

and it should be referenced as: Based on an approximation for small tubes given in: Johnson, C. H. J., and Lane, J. E., J. Colloid Interface Sci., 47, 117 (1974).

p. 90, line 4 from bottom: "0°C" should be "20°C"

p. 96, Eq. (2.113): It should be \( h \to \infty \) (not 0, as written)

Chapter 3

p. 117, lines 7-8 should read: "The element of segment area \( dA \) is the width of the slice, \( Rd\psi \), times its circumference, \( 2\pi r' = 2\pi Rsin\psi \)." and Fig. 3-4 should be:
p. 135, Fig. 3-14: The units on the x-axis are moles/liter, M

p. 145, Fig. 3-19 should have the curves labeled, as shown.

p. 147, line 6: "DS⁻ Na⁺" should be "DS⁻ + Na⁺"

p. 150, below Eq. (3.120) should read: "where $K_N$ is the equilibrium constant for the formation of N-mers. $x_1$ is the mole fraction of the surfactant as free monomer, while $x_N$ is the fraction of the total number of monomers which find themselves in N-mers. ($x_N / N$) is thus the mole fraction of N-mers themselves."

p. 173, after Eq. (3.148) "surface equation of state" should be "adsorption isotherm";

line 14: "0.70 µs" should be "0.5 ms"

p. 175, Eq. (3.154) should be: \[
\frac{d\Gamma}{dt} = k_i C_\infty (B - \Gamma) - k_{-1}\Gamma;
\]

second line from bottom: "$k_i / k_{-1}$" should be "$k_i / k_{-1}$";
Eq. (3.155) should be: \( \Gamma = \Gamma_{eq}\left[1-e^{-k_1a(t+k)\mu}\right] \)

p. 183, Fig. 3-45 should be as follows. (The types of multilayers were mislabeled in the original.)

![Diagram showing X-type, Y-type, and Z-type multilayers]

p. 186, Eq. (3.160) should be:
\[
\frac{d\Gamma}{dt} = D_s \frac{\partial^2 \Gamma}{\partial x^2} - k_{\Gamma} \Gamma + k_1(hC), \text{ and } k \text{ should be } k_1 \text{ in the line beneath it.}
\]

**Chapter 4**

p. 216, caption to Fig. 4-3: "(a)" and "(b)" should be inserted under the left and right figures, respectively.

p. 224, line 6: "cos\(\theta\)" should be "cos\(\theta_0\)" , and line 10: "cos\(^{-1}\)\(\theta\)" should be: "cos\(^{-1}\)\(\theta_0\)"

p. 238, Eq. (4.20) should be: \(\sigma_c = \sigma_{SG}\)

p. 252, line 13: "absorbed" should be "adsorbed"

p. 256, Eq. (4.61) should read:
\[
U = \frac{dr}{dt} \propto \frac{V^3\sigma}{\mu} \cdot \frac{1}{r^9}
\]

p. 260, line 16: "Eq. (2.107)" should be "Eq. (2.109)"

p. 268, Footnote 74: "(\(\sigma - \sigma^b\))" should be "(\(\sigma - \sigma^d\))"

p. 276, Third line from bottom: "Eq. (4.86)" should be "Eq. (4.87)"

**Chapter 5**

p. 353, line 20: should be "\(d^2G > 0\)"

p. 395, line 9: "perpendicular" should be "parallel"; Eq. (5.71): \((R_1/R_2)\) should be \((R_2/R_1)\)
p. 397, Eq. (5.74) should read: \[ \frac{m_p}{f} = S \left( 1 - \frac{\rho}{\rho_p} \right)^{-1} \]

p. 402, Eq. (5.86) should read: \[ \frac{f}{f_0} = \frac{(1 - \beta^2)^{1/2}}{\beta^{2/3} \ln \left[ \frac{1 + (1 - \beta^2)^{1/2}}{\beta} \right]} \]

p. 404, line 5: the variable should be \( n \) rather than \( C_A \).

p. 404, line 10: should read "Eqs. (5.50) and.."

p. 408, line 8 from bottom: should read "...Eq. (5.50). \( Y \) must exceed...

p. 409, line 9 in Table 5-8 should read: "Classical light scattering ( 1 nm < \( d \) < 10 \( \mu m \))"

p. 410, line 18: "one mm" should be "one \( \mu m \)"

p. 415, Fig. 5-48 should have \( \phi_L \) measured off the \( z \)-axis, as shown below.

\[
\tau = \frac{1}{V_s} \int \left( \frac{I_\theta}{I_0} \right) \, dA
\]

p. 419, Eq. (5.114) should read: \[ \tau = \frac{1}{V_s} \int \left( \frac{I_\theta}{I_0} \right) \, dA \]

p. 423, line 5 from bottom: Should read "For rods of length \( L \): \[ R_g = \frac{1}{2\sqrt{3}} L \]"
p. 425, Fig. 5-55: the slope should be \(-d_i\)

p. 426, line 4: "P(Q)" should be "P(\theta)"

p. 427, line 1: “disymmetry” should be “dissymmetry”

p. 433, line 11: Remove redundant text and Eq. (5.150)

p. 439, lines 15ff should read as follows:
"the smaller particles produce fluctuations of higher frequency. Over a time interval, \(\tau\), beginning at time \(t\), and short relative to the changes in particle positions, two values of the measured intensity would “correlate” strongly, i.e., \(I(t)\) and \(I(t + \tau)\) would be nearly the same. If many pairs of intensity-values were measured over this short time interval, the average value of the intensity product, \(I(t)I(t+ \tau)\), would be very nearly equal to \(\langle \dot{P}(t) \rangle\), the average of the square of the instantaneous intensity."

p. 440, line 10. Insert the sentence: "As the experimental time \(T\) is extended, \(G(\tau)\) evolves into an unchanging function for a given dispersion."

p. 447, line 3: "Fig. 5-68" should be "Fig. 5-72(b)."

**Chapter 6**

p. 470, line 7: "Eq. (6.18)" should be "Eq. (6.20)"

p. 482, line 16: "Eq. (6.58)" should be "Eq. 6.60"

p. 511, Eq. (6.122) should be: 
\[
\tilde{m}_z = \frac{2\varepsilon_0 RT}{3\mu} \frac{z_\sigma}{N_r}
\]

p. 512, lines 3-5: the text "and when \(m_+\) and \(m_-\) differ, one may compute \(\tilde{m}\) as the harmonic mean between them: \(\tilde{m} = m_+m_-/(m_+ + m_-)\)" should be omitted.

p. 517, Eq. (6.127): “\(w\)” should be “\(\omega\)"

p. 518, Eq. (6.129): should read \(\varepsilon_r = \varepsilon'_r + i\varepsilon''_r + \frac{k_1}{i\omega}\) (the notation for conductivity has been changed to \(k_1\) in this equation and in Eq. (6.130).

**Chapter 7**

p. 526, footnote 1 should be: "Hamaker, H. C., *Physica*, 4, 1058 (1937)"
p. 528, lines 13 and 14 should read: "...molecules j (2 or 3), and $\varepsilon_i (i\nu_m)$ is the dielectric constant of the medium 1, all at imaginary frequencies $i\nu_m$, where the real frequencies are given by"

p. 534, lines 11-14 and Eq. (7.39) should be: "For the case of slabs of material 2 and material 3 interacting across a medium 1, and assuming that the UV absorption frequencies are approximately the same for the slabs and the medium, viz. $\nu_1$ (again, typically $\approx 3\times10^{13}$ s$^{-1}$), Eq. (7.33) becomes

$$A_{213} = \frac{3}{4} kT \left( \frac{\varepsilon_1 - \varepsilon_3}{\varepsilon_1 + \varepsilon_3} \right) \left( \frac{\varepsilon_1 - \varepsilon_2}{\varepsilon_1 + \varepsilon_2} \right) + \frac{3h\nu_1}{8\sqrt{2}} \frac{(n_3^2 - n_1^2)(n_2^2 - n_1^2)}{(n_1^2 + n_2^2)^{1/2}(n_2^2 + n_3^2)^{1/2} + (n_1^2 + n_3^2)^{1/2}}$$

(7.39)

where the $\varepsilon$'s are the static dielectric constants, and the $n$'s are the refractive indices in the visible range."

p. 545, line 6 from bottom: "Dejaguin" should be "Derjaguin"

p. 565, Table 7-3(b): in left column, "$D$" should be "$d$"

p. 566, line 12: "number of aggregates" should be "number of singlets plus aggregates"

p. 567, line 2 from bottom: "Eq.(7.117)" should be "Eq. (7.120)"

p. 570, line 4: "Eq. (7.127)" should be "Eq.(7.130)"

p. 573, Eq. (7.145) should be: $\frac{1}{W_{\text{total}}} = \frac{x_1^2}{W_{11}} + \frac{x_1 x_2}{W_{12}} + \frac{x_2^2}{W_{22}}$, and

Eq. (7.147) should be: $W_{\text{total}} = \frac{W_{12}}{x_1 x_2}$

p. 591, line 7: "$S_0 \geq \delta$" should be: "$\delta \leq S_0 \leq 2\delta$"

p. 598, line 7 from bottom: "Eq. (7.179)" should be "Eq. (7.187)"

p. 600, line 9: "50-100 mm" should be "50-100 µm"

p. 602, after Eq. (7.190): "$w$" should be “$\Delta w$”

p. 603, Fig. 7-35: The horizontal axis should be labeled: “volume fraction, $\phi$”

**Chapter 8**

p. 622, line 1: "cone-and-bob" should be "cup-and-bob"

p. 622, after Eq. (8.6): "$\mu$" should be "$\mu_0$"
p. 622, second line after Eq. (8.6): add "for spheres" after "2.5"

Chapter 9

p. 643, lines 11-12: "order of 100 nm or less" should be "order of 5 - 50 nm or more"

p. 648, line 2 from bottom: "n" should be "N"

p. 650, in Eqs. (9.6) and (9.7), and line 16: "n" should be "N"

p. 653, Fig. 9-9: The images for (a) and (b) should be reversed, and the caption should read: (a) Stabilization of an O/W emulsion by a monovalent metal soap, and (b) stabilization of a W/O emulsion by a divalent metal soap.

p. 655, line 3: "1" should be "0"

p. 656, Table 9-2: Caption should read "HLB = 7.0 + Σ(Group Numbers)"

p. 662, Fig. 9-21: "n/n_0" should be "N/N_0"

p. 662, Fig. 9-21 caption, line 3: should read “acetone out of water drops into benzene”

p. 685, Eq. (9.26) should read: \( S = \sigma_A - \sigma_B - \sigma_{A/B} > 0 \)

Chapter 10

p. 713, line 5 from bottom: "mN/cm°K" should be "mN/m·°K"

p. 716, Eq. (10.61) should read: \( v_z = \frac{2\mu}{3(2\mu + 3\mu')} \left[ \frac{3\alpha\mu}{(2 + k'/k)} \frac{dT}{dz} + a^2(\rho' - \rho)g(\mu + \mu') \right] \)

p. 722, Eq. (10.82): The first term on the lhs should be preceded by a "-"

Appendix 1

p. 753. Prob. 1: \( T_b \) for benzene should be listed as 353.2K (not 259.0K)
p. 760, Prob. 4, last line: units of 61.7 should be: 1/ohm·cm²·mol

p. 761, Prob. 5: replace "ε" with "εε₀"

p. 763, line 2: after (CCC), insert: “for NaCl”

p. 763, Chapter 8, Prob. 1: “Moody” should be “Mooney”

p. 763, Prob. 3: insert "200-nm diameter" in front of "silica particles"

p. 764, Prob. 4, second line from bottom: "MPa" should be "kPa"