ERRATA (for Second Printing, 2012)

An Introduction to Interfaces and Colloids: The Bridge to Nanoscience

The second printing of this book corrected a large number of typographical and other errors that appeared in the First Printing, but additional errors are still being found.

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Chapter 2

p. 27, Table 2-1: For Methylene iodide, the surface tension should be 50.8 mN/m.

p. 27, line 7 below Table 2-1: The reference to Jasper's database is:

Jasper, J.J., "The Surface Tension of Pure Liquid Compounds," *J. Phys. Chem. Ref. Data,* **1** [4], 841-1009 (1972).

p. 28, Line 3 from bottom: Delete "generally good for"

p. 38, Fig. 2-12: The word written as "molecuar" in the figure should be "molecular"

p. 42, Table 2-2: "Methyl iodide" should "Methylene iodide"

p. 57, second line from bottom: "btween" should be "between"

p. 69, line 3: "interracial" should be "interfacial"

p. 60-61, Eqs. (2.54), (2.55) and (2.57): The sign in front of the second term should be – instead of +, and after Eq. (2.54): "where Δ refers to the lower phase minus the upper phase."

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

$$\sigma = \frac{r}{2} p_{\max} - \frac{1}{2}\rho g r h - \frac{1}{3}\rho g r^2 - \frac{(\rho g)^2 r^3}{12(p_{\max} - \rho g h)},$$

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. 96, Line 12 from bottom: "is separated by phases" should be "separates phases"

p. 101, Eq. (2.125): The equation should read:

$$\rho g y = \sigma \frac{y''}{\left[1+(y')^2\right]^{3/2}} - \frac{A_{\text{eff}}}{6\pi x^3}$$

Chapter 3

p. 109, Eq. (3.6) should read: $dS = \dfrac{\delta Q_{\text{rev}}}{T} = \dfrac{C_{\text{v}}}{T} dT + \left(\dfrac{\partial p}{\partial T}\right)_V dV$

p.110, Eq. (3.11) should read: $dS = \dfrac{\delta Q_{\text{rev}}}{T} = \dfrac{C_{\text{v}}}{T} + \left(\dfrac{\partial p}{\partial T}\right)_V dV = \dfrac{C_p}{T} dT - \left(\dfrac{\partial V}{\partial T}\right)_p dp$

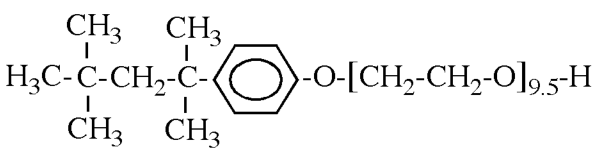
p. 130, the third line of Eq. (3.86) should read:

$$= -\left[s^{\sigma} + \Gamma_1\left(\frac{C's' - C''s''}{C_1' - C_1''}\right)\right] dT - \sum_{\text{i}=2}^{\text{m}}\left[\Gamma_{\text{i}} - \Gamma_1\left(\frac{C_{\text{i}}' - C_{\text{i}}''}{C_1' - C_1''}\right)\right] d\mu_{\text{i}}$$

p. 136, Caption to Fig. 3-15(b) should read: "Langmuir adsorption isotherm format"

p. 140, line below Table 3-4: “four” should be “five”

p. 142, middle of page: The formula for Triton X-100 should be



p. 166, Ref 62: “Zasadzinskil” should be “Zasadzinski”

p. 194, line 2 below Fig. 3-51: “and are be” should be: “and are to be”

p. 197, Fig. 3-55: x-axis should be C_2(mM)

p. 199, Fig. 3-58: x-axis should be C_2(mM)

Chapter 4

p. 224, line 4: no comma after “cosθ”

pp. 237 (bottom) and 238 (top): Should be precautions 1), 2) and 3)

p. 239, Fig. 4-31: Line F should read: Perfluorolauric acid (monolayer)

p. 250, Eq. (4.44) should read: $(CH_3)_2SiCl_2 + 2\ M\text{-}OH \rightarrow M_2O_2Si(CH_3)_2 + 2HCl$

p. 252, second line from bottom: "positive" should be "negative"

Eq. (4.47), last term should have "–" in front of it, i.e., $-V\int_{\infty}^{h}\frac{\Pi(z)}{z}dz$

p. 253, Eqs. (4.48)-(4.50) should read:

(4.48) $$\Pi(z) = -\frac{A_{\mathrm{Heff}}}{6\pi z^3}$$

(4.49) $$\Delta F_{\mathrm{f}} = -\frac{S_{\mathrm{L/S}}V}{h} - \frac{A_{\mathrm{Heff}}V}{18\pi h^3}$$

(4.50) $$h_{\mathrm{e}} = \left(-\frac{A_{\mathrm{Heff}}}{6\pi S_{\mathrm{L/S}}}\right)^{1/2}$$

p. 266, Line 6ff: Replace the sentence starting on line 6: "The maximum in W_A under these conditions…" with: "Thus for a given adherend (*i.e.*, given σ_S), the maximum in W_A occurs when $\sigma_L = \sigma_S$."

Chapter 5

p. 351, lines 1 and 2: should read: "in which case there is at least one aggregate spanning the entire volume of the system,"

p. 374, add to the paragraph ending after Eq. (5.17):

Equation (5.17) assumes that the sample size n is sufficiently large that it represents the whole population from which the sample is withdrawn. Otherwise, one needs the *sample variance*, which is obtained by multiplying the right hand side of Eq. (5.17) by the factor: $n/(n - 1)$.

p. 375, replace the text from the top with:

It is seen that the variance is the second moment of the distribution about the mean, m_2, while the mean itself is the first moment about the origin. Two higher moments are often used to further characterize distributions. The third moment about the mean, m_3, is a measure of the asymmetry of the distribution, and from it may be computed a dimensionless descriptor termed the *skewness*, *sk*:

$$sk = \frac{m_3}{m_2^{3/2}} = \frac{\Sigma f_{\mathrm{i}}(d_{\mathrm{i}} - \bar{d})^3}{(\sigma^2)^{3/2}}. \qquad (5.19)$$

Positive values of the skewness describe distributions that tail to the right, while for negative skewness values, they tail to the left. For the distribution of Fig. 5-20, $sk = 1.30$, indicating strong tailing toward the larger particle sizes. For finite samples representing a larger population, a *sample skewness* is obtained by multiplying sk by the factor: $\sqrt{n(n-1)}/(n-2)$.[1] A further descriptor of the distribution, termed the *kurtosis, ku*, is constructed from the from the fourth moment of the distribution, m_4, and is defined as:

$$ku = \frac{m_4}{m_2^2} = \frac{\Sigma f_i(d_i - \bar{d})^4}{(\sigma^2)^2}. \tag{5.20}$$

The *sample kurtosis* is obtained by multiplying by $\frac{(n-1)(n+1)}{(n-2)(n-3)}$. A high kurtosis (Greek = "peakedness"), for a symmetrical distribution, means the central peak is high and sharp. For a Gaussian distribution, described below, ku, has a value of 3, while for uniform (flat) distributions it is 1.8. The first four moments of a distribution (or parameters derived from them) allow a quite detailed reconstruction of any monomodal distribution.

[1] Joanes, D. N., and Gill, C. A., "Comparing Measures of Sample Skewness and Kurtosis, "*The Statistician*," **47** [1], 183 (1998).

pp. 377-378, Eqs. (5.29) and (5.34). The quantity designated as f_i in the last step of these equations is not the same as f_i defined in Eqs. (5.16). Equation (5.29) should be rewritten as:

$$f_i^s = \frac{n_i^s A_i}{\sum n_i^s A_i} \approx \frac{n_i A_i}{\sum n_i A_i} = \frac{n_i \pi d_i^2}{\sum n_i \pi d_i^2} = \frac{n_i d_i^2}{\sum n_i d_i^2}. \tag{5.29}$$

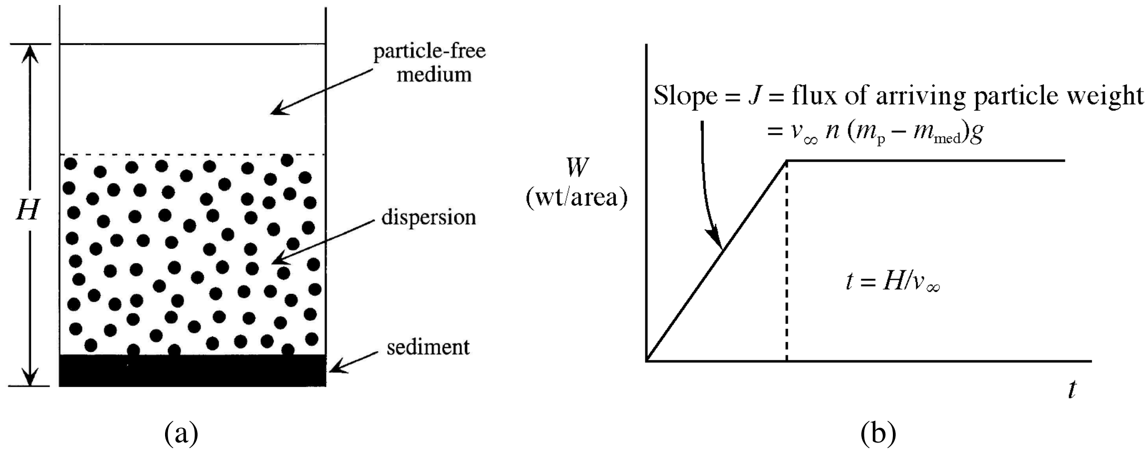
and Eq. (5.34) should be rewritten as:

$$f_i^v = \frac{n_i^v V_i}{\sum n_i^v V_i} \approx \frac{n_i V_i}{\sum n_i V_i} = \frac{n_i \frac{1}{6} \pi d_i^3}{\sum n_i \frac{1}{6} \pi d_i^3} = \frac{n_i d_i^3}{\sum n_i d_i^3}. \tag{5.34}$$

p. 382, Eq. (5.45) should read:

$$f(x) = \frac{1}{x\sigma_{\log x}\sqrt{2\pi}} \exp\left[-\frac{1}{2}\left(\frac{\log x - \overline{\log x}}{\sigma_{\log x}}\right)^2\right] \tag{5.45}$$

p. 392, Fig. 5-33 should be replaced with:



The caption should read:

Fig. 5-33: Settling of a monodisperse suspension: (a) the "falling curtain" of particles all settling at the same rate, and (b) the measured net sediment weight/area, W, as a function of time.

Equation (5.62) should read:

$$J = nv_\infty(m_\mathrm{p} - m_\mathrm{med})g = \frac{dW}{dt} \tag{5.62}$$

p. 388, line below Eq. (5.76): remove "#/cm^3"

p. 404, bottom: Remove the sentence starting with: "Assuming that the particles are.."

p. 409, Table 5-8" "Tubidimetry" should be "Turbidimetry"

p. 425, Fig. 5-55: the abscissa should be labeled: log(Qa_1)

p. 439, Caption to Fig. 5-65 should read: "Effect of the size of polystyrene latex spheres on the intensity fluctuations of scattered light over a period of 5 ms. Diameters of spheres: (a) 0.085 µm; (b) 0.220 µm; (c) 1.011 µm.

p. 440, Eq. (5.157) should read:

$$G(\tau) = A_0 + A\exp(-2\Gamma\tau) \tag{5.157}$$

Chapter 6

p. 457, line 1: Faraday's constant is: 96,485.5 Coul/mole

p. 468, Table 6-3, line 3: "laye" should be "layer"

p. 470, Eq. (6.21), rhs: "$n_{i,\infty}$" should be "n_∞"

p. 489, Eq. (6.77), the first "2" on the right hand side should be "8," i.e.,

$$-\bar{\sigma}_0 = \left[8kT\varepsilon\varepsilon_0 n_\infty\right]^{1/2} \sinh\frac{ze\psi_0}{2kT} \tag{6.77}$$

p. 502, Eq. (6.99): The prefatory constant should be 0.069

p. 507, line 5 from bottom: "$V_\mathrm{p} = \tau_\Delta \Delta$," should read: $V_\mathrm{p} = \Delta / \tau_\Delta$

p. 511, in Eq. (6.122), "$z_\pm$" should be "$z_\pm{}^2$"

p. 512, line 2: should read: with $\Lambda_\pm^0$ [=] $\mathrm{cm^2 ohm^{-1} equiv^{-1}}$: $\tilde{m}_\pm = 12.86(z_\pm^2 / \Lambda_\pm^0)$

lines following Eq. (6.123) should read: ([=] S $\mathrm{m^{-1}}$) and ([=] S)

Chapter 7

p. 527, Eq. (7.6), top line: should read:

$$\Phi = -\frac{A}{6}\left[\frac{2a_1a_2}{S_0^2 + 2a_1S_0 + 2a_2S_0} + \frac{2a_1a_2}{S_0^2 + 2a_1S_0 + 2a_2S_0 + 4a_1a_2}\right.$$

p. 533, Eq. (7.33) should read: $A_{213} = \frac{3}{2}kT\sum_{\mathrm{m=0}}^{\infty}{}'\sum_{\mathrm{s=1}}^{\infty}\frac{(\Delta_{12}\Delta_{13})^\mathrm{s}}{\mathrm{s}^3}$

p. 541, line 2 ff. $\overline{(d\psi/dx)}$ should be $-\overline{(d\psi/dx)}$, so that there should be a "–" in front of ρ_e in Eqs. (7.46) – (7.48).

p. 542, line 1 below Eq. (7.77): comma needed after "location"

line 1 above Eq. (7.57): "Eqs. (6.16) and (6.1)" should read: "Eqs. (6.18) and (6.19)"

p. 570, Eq. 7.139: Insert "*a*" in the denominator of the lhs of the equation, which should then read:

$$k_\mathrm{r} = \frac{2kT}{3\mu a}\left[\int_{2a}^{\infty}\frac{1}{r^2}\exp\left(\frac{\Phi}{kT}\right)dr\right]^{-1} = \frac{k_\mathrm{r}(\text{fast agg.})}{W}$$

p. 610: Eq. (7.200) should read: $d_f = 1.45 + 0.373\log_{10}W$

Chapter 8

p. 637, Footnote 25: The date of the reference should be (1950).

Chapter 9

p. 625, line 15: "Eq. (8.12)" should be: Eq. (8.14).

p. 645, line 15: "CNS^-" should read: "SCN^-"

p. 651, after Eq. (9.10) should be added ", and ρ_c is the density of the continuous phase."

Chapter 10

p. 713, Eq. (10.54) should be: $v_x = \frac{h}{2\mu}\left(\frac{d\sigma}{dT}\right)\left(\frac{dT}{dx}\right)\left[3\left(\frac{y}{h}\right)^2 - \left(\frac{y}{h}\right) - \frac{3}{2}\right]$ and line 5 from bottom: "2 mm/s" should be "4 mm/s."

Appendix 1

p. 763, Chapter 8 Prob. 1: last two lines should read: " …Mooney equation, Eq. (8.14), and (iii) the Krieger-Dougherty equation, Eq. (8.16)."

p. 764, Prob. 3: should read: "*Estimate* the yield stress of a weakly percolated dispersion of 200 nm silica particles…"