Errata – * indicates changes since the Dover printing
Chemical Kinetics and Reaction Dynamics
by Paul Houston
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p 36, After Eq (2.3), ... the rate constant will have units of time^{-1} concentration$^{-(q-1)}$

p 59, Example 2.5, third sentence: change to "Assume that the principal destruction mechanism for ozone ..."

*p 60, Example 2.5, last equation: the second term in the denominator should be $k_{-1}[O_2][M\}$.

p 62, next to last line: replace kT with RT

p 63, eq. 2.73: relace kT with RT (twice)

p 99: In equation 3.7 replace v_r with $<v_r>$

p 99, Figure 3.8 at the second level should be $\sigma(\epsilon_r)$ rather that $\epsilon(\sigma_r)$.

p 100, Example 3.1, eq. 3.9: 3.6 x 10^{10} m should be 3.6 x 10^{-10} m

p 109, Equation 3.25: replace $H^{\ddagger}$ by $\Delta H^{\ddagger}$

*p109, Equation 3.27 is correct as written but is for the case when the reaction takes place in the condensed phase, where $\Delta(PV)=0$. In this case $\Delta H^{\ddagger} = \Delta E^{\ddagger} = E_a$ - RT. [This last equation can be derived by taking the derivative of the ln of (3.18) with respect to T and comparing the result to the derviative of the Arrhenius equation with respect to T] For gas phase reactions, $\Delta n^{\ddagger} = -1$, and 3.27 should read $A = \exp(2)\,(kT/h)\exp(\Delta S^{\ddagger}/R)$.

p 112, first line. There should be a close bracket after the ϵ^* on this line.

*p 114, Problem 3.14: It should say "you may assume that $h\nu << kT$ "

p 121, one line after Equation 4.4: replace "was performed in equation 1.31" by "was performed in deriving equation 1.31"

p 121, two lines before equations 4.5
$1/4\pi<v>$ should be $(1/4\pi)<v>$

p 126, two lines under equation 4.14: replace "so that n_2*=n*" with "so that n_1*=n*"

p 136, example 4.8, Method: replace "example 4.43" with "equation 4.43"

p 143, problem 4.18, part b, first equation: both ½ in the denominator should be replaced by (1/2).

p 149, eq. 5.14 should read

$$J_{A-B} = (J_A + J_B) = -(D_A + D_B)\nabla B(r, \theta, \varphi).$$

p 150, eq. 5.15: insert minus sign before (D_A+D_B)... on rhs.

p 150, eq. 5.17: replace $\partial^2\theta$ by $\partial\theta^2$

*p155, , last line: replace (D^+A^+) by (D^+A^-)

*p165, Eq. 5.35: the lhs should read $\log_{10}k$ rather than $\log_{10}k_0$

*p168, Eq. 5.57: the rhs should be $4\pi(D_A+D_B)\mathrm{d}[B(r)e^{U(r)/kT}]$

*p168, following Eq. 5.58 it should say "then integration of both sides of equation 5.57 over ..."

*p168, between Eq. 5.59 and 5.60: delete sentence beginning "Note that $U(R)$ is ..."

*p168, Eq. 5.60: replace 1 in denominator by $e^{U(R)//kT}$

*p168, Add after Eq.5.60.

Equation 5.60 can be rearranged to give

$$\frac{d[\mathrm{P}]}{dt} = \frac{4\pi(D_A + D_B)\beta}{\dfrac{4\pi(D_A + D_B)\beta}{k_r e^{-U(R)/kT}} + 1}[\mathrm{A}][\mathrm{B}]$$

Recall that k_r is the reaction rate within the cage. When the ions are of opposite charge, this rate will be very large compared to the rate at which ions diffuse together, so the first term in the denominator will be less than unity. Consequently, we obtain Eq. 5.61 as the overall rate constant.

*p 176, footnote c: The page number for the first article should be 2221.

p 184, three lines from bottom: replace $D = \frac{1}{2}x_{rms}^2/t$ with $D_0 = \frac{1}{2}x_{rms}^2/t$

p 185, Solution to Example 6.4: The correct answer is not 0.7×10^{-6} m^2 s^{-1} but rather 5.9×10^{-16} m^2 s^{-1}.

p 192, Equation 6.24, second line: should be "A-S → S + P" with rate constant k over the arrow.

p. 193, line after Equation 6.26 should read "From the equation $S(t) = kC(t)$, we obtain $s(\omega)=kc(\omega)$, so" ($s(\omega)$ and c(ω) should be lower case)

p. 193, figure 6.18: the hypotenuse of the triangle should be labeled $a(\omega)/s_0$

p 199, Add at the end of Problem 6.7: “Even though it actually dissociatively adsorbs, for this problem assume the H_2 adsorbs molecularly.”

*p 200, third line of Problem 6.12: change “adsorption of the H atom” to “adsorption of the D atom”

p 206, just below equation 7.10: Replace sentence with “The density of light in a particular interval, $\rho(\nu)d\nu$, times its speed, c, is the intensity in that interval: $\rho(\nu)cd\nu = I(\nu)d\nu$.

p 207, Eq. 7.13: the exponent of π in the numerator should be 4 rather than 2.

p 224, chemical equations: the product of ClOO + M should be Cl + O_2 + M

p 225, the right-hand axis of Fig. 7.17 should have the numbers 1000, 2000, 3000 rather than 1000, 1000, 1000

p 262, Example 8.1 Objective line 4: replace equal sign by times sign

p 262, Example 8.1 third line from bottom: insert v_r after $\int\pi d^2$

p 266, line 2: m_1m2/M should be m_1m_2/M

p 267, two lines before Fig. 8.9: $d^3\sigma(v_r,\theta)/d^2\omega dv_r'$ should be $d^3\sigma(v_r',\theta)/d^2\omega dv_r'$

p 269, three lines before eq. 8.12 and, again, five lines after eq. 8.12: $d^2\sigma(v_r,\theta)/d^2\omega dv_r'$ should be $d^3\sigma(v_r',\theta)/d^2\omega dv_r'$ (two mistakes each); a dv_r' is missing at the end of Eq. 8.12.

p 286, line 6: delete “that do react”

p 288, Equation 8.27, the exponent should be $-i(E_i-E_\rho)t/\hbar$

p 289, fourth line after Eq. 8.30: “give by equation 8.29" should be replaced by “given by equation 8.30"

p 291, Equation 8.34, the exponent of the first term in the square brackets should be 12 rather than ½

*p 293, Figure 8.29, in the interior caption to the figure, replace “HCI” by “HCl” twice

*p 294, end of paragraph after (8.38), replace $v/\rho \le \omega$ with $v/\rho \le \omega/(2\pi)$

*p 294, line after (8.39), replace $\xi = 2\pi\omega\rho/v$ with $\xi = (2\pi)^{-1}\omega\rho/v$

p 295, example 8.4, method: replace “be considering” with “by considering”

*p 305, Figure 8.38, in the interior caption to the figure, the second line for the products

should read “OH +HD” rather than “OD + HD”

Solution Manual
Problem 1.14 on pages 12 and 13: on page 13 relacce V_s with v_s, and on page 14 replace V_{walk} with v_{walk}.

Problem 3.12 on page 74: the exponent of $(8kT/\pi\mu)$ should be ½ in both numerator and denominator in the first equation on this page.

Problem 4.2, last line. Should read “κ and D vary as $1/\sqrt{m}$, whereas η varies as $\sqrt{m}$. Why?”

Problem 4.14 on the bottom of page 85: the rhs of the equation should be raised to the ½ power.

Problem 7.21, page 134, solution: the number 3.1×10^{-4} should be 7.2×10^{-4} (two changes), and the final answer should be 9.0×10^{12}.