FIORD errata list

(Typographical errors in **Fundamentals of Ionizing Radiation Dosimetry**, Wiley 2017)

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PAGE

20 - In Table 1.3 the c_0 and c_1 fitting coefficients for the L-shell fluorescence yield in the Z range 26-51 should be

Fluorescence yield	Range of Z	Fitting coefficient c_0	c_1	c_2	c_3	c_4
ω_{L}	26-51	-9.2521×10^{-2}	8.7531×10^{-3}	-2.8087×10^{-4}	3.4823×10^{-6}	–

21 - The legend of Figure 1.6(b) should read "Mean fluorescence x-ray energies, $\bar{k}_i$ (dashed lines), in the K, L1 and M1 shells; for comparison, the binding energies, $U_{\mathrm{B}}(i)$ are also shown (solid lines)".

99 - In Figure 2.34, the labelling of the electronic stopping power curves (S_{el}/ρ) is incorrect: C should be the top curve and U the bottom curve, i.e.,

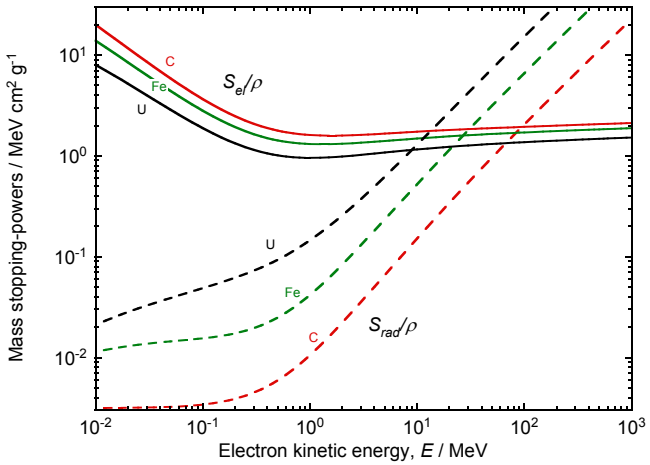

Figure 2.34. Mass radiative (dashed lines) and electronic (solid lines) stopping powers as a function of the kinetic energy of electrons in carbon ($Z = 6$), iron ($Z = 26$), and uranium ($Z = 92$). (Data from ICRU, 1984b).

156 - In eqs. (3.31) – (3.34), the polarization angle ϕ should be replaced by φ, and the last term of eq. (3.33) should have E_0^2 instead of E_0, i.e.,

$$B_{\mathrm{out}} = \frac{e}{4\pi\varepsilon_0}\,\frac{\dot{v}\,\sin\varphi}{c^3\,r} = \frac{E_{\mathrm{out}}}{c} \tag{3.31}$$

$$S_{\mathrm{out}} = \frac{E_{\mathrm{out}}B_{\mathrm{out}}}{\mu_0} = \frac{E_{\mathrm{out}}^2}{c\,\mu_0} = \varepsilon_0\,c\,E_{\mathrm{out}}^2 = \varepsilon_0\,c\left(\frac{e}{4\pi\varepsilon_0 c^2}\,\frac{\dot{v}\,\sin\varphi}{r}\right)^2 \tag{3.32}$$

$$S_{\rm out} = \varepsilon_0\, c \left(\frac{e}{4\pi\varepsilon_0 c^2} \frac{\sin\varphi}{r} \right)^2 \left(\frac{e}{m_{\rm e}} E_0 \sin\omega t \right)^2 = \varepsilon_0\, c\, \frac{r_{\rm e}^2\, E_0^2\, \sin^2\omega t\, \sin^2\varphi}{r^2} \tag{3.33}$$

$$\bar{S}_{\rm out} = \varepsilon_0\, c\, \overline{E_{\rm out}^2} = \varepsilon_0\, c\, \frac{r_{\rm e}^2\, E_0^2\, \overline{\sin^2\omega t}\; \overline{\sin^2\varphi}}{r^2} = \frac{1}{2}\, \varepsilon_0\, c\, r_{\rm e}^2\, E_0^2\, \frac{\overline{\sin^2\varphi}}{r^2} \tag{3.34}$$

169 - In Figure 3.16(b), the label of the y-axis should be "$\mathrm{d}\sigma_{\rm c,KN}/\mathrm{d}\phi$ /(mb electron^{-1} rad^{-1})"

173 - In eq. (3.95), $m_{\rm e}c^2$ on both sides of the equation should be squared, i.e.,

$$E'^{\,2}_{\rm tot} - \left(m_{\rm e}c^2\right)^2 = c^2 \left(q^2 + 2\,\mathbf{q}\cdot\mathbf{p}_{\rm e}\right) + E_{\rm tot}^2 - \left(m_{\rm e}c^2\right)^2 \tag{3.95}$$

249 - In Table 4.2 the photon attenuation values should be

Primary radiation energy (MeV)	Photon attenuation (%) over maximum secondary electron range	Neutron attenuation (%) over maximum secondary proton range
0.1	0.25	0.05
1.0	2.31	0.04
10	10.2	0.5
30	20.0	1.5

258 - The answer to exercise #13 should be:
Answer: $K = 7.65 \times 10^5\,\mathrm{erg\,g^{-1}} = 76.5\,\mathrm{Gy}$; $K_{\rm el} = 5.58 \times 10^5\,\mathrm{erg\,g^{-1}} = 55.8\,\mathrm{Gy}$.

as there was a typo in the erg–to–MeV conversion. The full solution (for the Exercises book) then becomes

(a) For the total kerma, $K = \Psi\,(\mu_{\rm tr}/\rho)_{\rm Pb}$, where

$$\Psi = 3.5 \times 10^6\, \frac{\rm phot}{\rm cm^2\,s} \times 6.048 \times 10^5\,\mathrm{s} \times \frac{6\,\mathrm{MeV}}{\rm phot} \times \frac{1.6022 \times 10^{-6}\,\mathrm{erg}}{\rm MeV} = 2.0349 \times 10^7\, \frac{\rm erg}{\rm cm^2}$$

and from the Data Tables

$$(\mu_{\rm tr}/\rho)_{\rm Pb,6MeV} = 0.0376\,\mathrm{cm^2/g}$$

therefore

$$K = 2.0349 \times 10^7\, \frac{\rm erg}{\rm cm^2} \times 0.0376\, \frac{\rm cm^2}{\rm g} = 7.6513 \times 10^5\, \frac{\rm erg}{\rm g} = 76.51\ \mathrm{Gy}$$

(b) For the electronic kerma, $K_{\rm el} = \Psi\,(\mu_{\rm en}/\rho)_{\rm Pb}$

$$(\mu_{\rm en}/\rho)_{\rm Pb,6MeV} = 0.0274\,\mathrm{cm^2/g}$$

therefore

$$K_{\rm el} = 2.0349 \times 10^7\, \frac{\rm erg}{\rm cm^2} \times 0.0274\, \frac{\rm cm^2}{\rm g} = 5.5757 \times 10^5\, \frac{\rm erg}{\rm g} = 55.76\ \mathrm{Gy}$$

417 - In Figure 9.11, the label of the x-axis should be “y / MV”

524 - Six lines after eq. (12.35), the Boag *et al.* reference should be 1996, instead of 1966

842 - In Table A.1, under “Atomic mass constant”, delete the factor $\times 10^8$ for the unit of m_{u} in MeV, i.e., $m_{\mathrm{u}} = 931.494\,061(21)$ MeV