List of errors in Magnetism and Magnetic Materials

The Magnetic Periodic Table:

- 1. Oxygen should have Néel temperature of 24 K
- 2. Cobalt should a Curie temperature of 1360 K
- 3. Tm should have Néel temperature of 25 K

Preface:

1. Second last line of first page of preface: should be Sara McMurry instead of Sara McMurray.

Chapter 1: Introduction

- 1. Page 1: Name in picture should be "Shen Kua"
- 2. Page 2: Third line "magnetic levitation" is misspelled.
- 3. Page 4: "Analogous" is misspelled in the 10th line.
- 4. Page 10: "Anisotropy" is misspelled in line 9
- 5. **Page 10:** Change "Anisotropy limits the coercivity" to "Anisotropy sets an upper bound on the coercivity" in line 14
- 6. Page 23: Add exercise 1.7: "Deduce Faraday's law of electromagnetic induction $\varepsilon = -d\Phi/dt$ from Maxwell's equation 1.1 (d) where Φ , the flux through a magnetic circuit of area S, is defined as $\int_{S} \mathbf{B} \cdot \mathbf{dA}$ and ε is the emf induced in the circuit."

Chapter 2: Magnetostatics

- 1. Page 31: "high-frequency" is misspelled in line 5.
- 2. **Page 44:** Figure 2.13(b) label should be j_{ms} instead of j_m .

Chapter 3: Magnetism of electrons

- 1. **Page 64:** Table 3.1: Value for spin angular momentum of the electron should be 5.273×10^{-35} rather than 5.273×10^{-34} .
- 2. Page 65: Second last line the word "magnetic" appears twice when it should only appear once.
- 3. Page 77: Figure 3.4 The element at atomic number 55 is "Cs" not "Ca"

Chapter 4: Magnetism of localized electrons on the atom

1. **Page 124:** Insert table in the margin: "Values of A_2^0 at the rare-earth site in some intermetallic compounds:"

	$A_2^0({\rm K}a_0^{-2})$
SmCo_5	-200
$\mathrm{Sm}_{2}\mathrm{Fe}_{1}7\mathrm{N}_{3}$	-240
Nd_2Fe_14B	310

Chapter 5: Ferromagnetism and exchange

- 1. Page 181: line 6 should say "with T_C around 320 K" instead of "with T_C as 320 K"
- 2. **Page 185:** Last line on the page Should be "A magnetic" rather than "Amagnetic" (the space is missing).
- 3. Page 187: Unnecessary indentation after equation $MR = [\rho(H) \rho(0)]/\rho(H)$

Chapter 6: Antiferromagnetism and other magnetic order

- 1. **Page 204:** Figure 6.7(a) bottom left arrow should point down rather than up in the square ring.
- 2. Page 230: Exercise 6.2 2nd line should have $\chi_{\parallel} = \chi_{\perp}$ instead of $\chi_{\parallel} = \chi_1$.

Chapter 7: Micromagnetism, domains and hysteresis

- 1. Page 245: line 10 "Earnshaw's theorem" is misspelled.
- 2. **Page 247:** 6th line from bottom of page should refer to equation (5.63) instead of (5.62)

Chapter 8: Nanoscale magnetism

1. Page 297: Table 8.5 – units for Radius should be (nm) rather than (mm)

Chapter 9: Magnetic resonance

1. **Page 306:** "energy" is misspelled in the caption of the figure at the side of the page.

Chapter 10: Experimental methods

Chapter 11: Magnetic Materials

- 1. **Page 386:** Include (Fig. 8.27) reference at the end of the first paragraph of the Related Materials section.
- 2. **Page 390:** Error in the image of the hcp crystal structure of cobalt. It should look the same as Dysprosium on page 398.
- 3. Page 393: Related compounds section add "MnP is orthorhombic, with $T_C = 291$ K"
- 4. Page 401: Last line on page should say "60,000 tonnes" instead of "50,000 tonnes"

Chapter 12: Applications of Soft Magnets

- 1. Page 463: Exercise 12.1 Error in formula for P_{ed} . Should be $P_e d \propto (tf B_{max})^2 / \rho$
- 2. **Page 463:** Exercise 12.5(c) Error in units for elastic limit of steel; should be MPa instead of MN^{-2} .

Chapter 13: Applications of Hard Magnets

- 1. Page 465: Table 13.1 "Magnetometry" is misspelled
- 2. Page 471: Table 13.3 Error in the value of $\mu_0 M_r$ for Nd₂Fe₁4*B*; should be 1.34 instead of 1.28
- 3. Page 471: Table 13.3 Error in the value of $\mu_0 M_r^2/4$ for Nd₂Fe₁4*B*; should be 359 instead of 326
- 4. Page 475: Figure 13.6(c) $-r_1$ and r_2 labels are inverted must be switched
- 5. **Page 486:** Last line Insert the word "Sintered" before Nd-Fe-B in the last sentence.
- 6. **Page 489:** Second last sentence in first paragraph to become "The cup-type rotor is another flat low-inertia design used for spindle motors in hard disc drives with a bonded Nd-Fe-B ring magnet"

Chapter 14: Spin electronics and magnetic recording

- 1. **Page 502:** Table 14.2 The sign is wrong for the values of P_1 for Cobalt(Co) and Nickel(Ni). It should be positive.
- 2. Page 518: Figure 14.19(a) Should be " φ " instead of " ϕ " for the angle in the image.
- 3. Page 518: Everything from "Using the equilibrium condition that..." to the end of the paragraph should be replaced with the following: "Using the equilibrium condition that there is no net torque on the magnetization due to the internal field in the film, the demagnetizing field $-\mathcal{N}_y M \sin \varphi$ balances the transverse applied field H'_y which is the sum of the bias field H_0 and the measured field H_y . For small rotations, $\varphi \simeq \pi/4$, the deviation $\delta \varphi \simeq H_y/2\mathcal{N}_y M$ and the variation of resistivity with field is

$$\delta\rho(H_y) \simeq \Delta\rho H_y/2\mathcal{N}_y M$$
 (14.22)

The response is linear for small fields."

- 4. Page 532: Last sentence should become "... are both permanent-magnet motors making use of the best grades of sintered and bonded Nd_2Fe_14B respectively"
- 5. Page 541: Exercise 14.3 Exercise to become: "Derive (14.22). Derive an analogous expression considering the optimisation of the complete response function in terms of field sensitivity $d\rho/dH$. Show that the optimal bias angle is not $\pi/4$. Show that the optimal field sensitivity of a planar Hall sensor is the same as that of an AMR sensor operating at $\varphi = \pi/4$."

Chapter 15: Special topics

- 1. Page 551: Figure 15.4(b) "Graphite" misspelled.
- 2. Page 573: 5th last line "Ma" instead of "My"
- 3. Page 573: 2nd last line "Ga" instead of "Gy"
- 4. **Page 573:** Insert sentence "We know from the remanence of ancient, dated rocks that the field has been in existence for 3.5Ga" before last sentence.
- 5. Page 575: From 6th last line on "Thankfully, these energetic charged particles are deflected by the Earth's magnetic field high above the surface, but some find their way towards th Earth at high latitudes where they dissipate their energy in collisions in the ionized upper atmosphere." is to become instead "Thankfully, these energetic charged particles are deflected by the Earth's magnetic field high above the surface. Life on earth would be impossible without the field. Some particles find their way towards the Earth at high latitudes where they dissipate their energy in collisions in the ionized upper atmosphere."

- 6. Page 579: Exercise 15.3 to become "By assimilating a line of particles to a uniformly magnetized cylinder of the same volume, and considering only shape anisotropy, deduce an expression for the minimum radius $r_{min}(n)$ for which the configuration is stable at room temperature, using (8.22). What is the radius r_{min} for n = 10? Compare this with the coherence radius for magnetite. Will the magnetocrystalline anisotropy of magnetite have a substantial effect on $r_{min}(n)$? Why do the magnetite particles in a magnetotactic bacteria align in a row?"
- 7. Page 579: Exercise 15.11 2nd sentence: "What is the value of ∇B^2 required for high gradient magnetic separation of red blood cells?" instead of "What is the field gradient required..."
- 8. Page 579: Exercise 15.15 Should say "Fig. 15.25" instead of "Fig. 15.26"

Appendices: Appendix B Units and dimensions

1. Page 590: "teslas" is misspelled in fourth paragraph

Appendices: Appendix D Demagnetizing factors for ellipsoids of revolution

1. Page 597: Insert $\alpha = c/a$ at the bottom of the table in appendix D.

Index

Page numbers shown here in bold to be added to the index

- 1. Page 607: Fermi-Dirac statistics, 79, 82, 95
- 2. Page 607: Goudsmit, Samuel, 5, 7
- 3. Page 610: motors \rightarrow spindle, 489, 532
- 4. Page 611: neutron scattering, inelastic, 348, 165, 200
- 5. Page 614: Uhlenbeck, George, 5, 7