

4. PRODUCTION AND PROPERTIES OF RADIATIONS

References

4.1

- Bonse, U. (1980). *X-ray sources. Characterization of crystal growth defects by X-ray methods*, edited by B. K. Tanner & D. K. Bowen, Chap. 11, pp. 298–319. New York: Plenum. [NATO Advanced Study Institute Series B63.]
- Bordas, J. (1980). *A synchrotron radiation camera and data acquisition system for time resolved X-ray scattering studies*. *J. Phys. E*, **13**, 938–944.
- Cowley, J. M. (1975). *Diffraction physics*, Chap. 1. Amsterdam: North-Holland.
- Ertl, G. & Küppers, J. (1974). *Monographs in modern chemistry*, Vol. 4. *Energy electrons and surface chemistry*, edited by H. F. Ebel, Chap. 9, pp. 129–192. Weinheim: Verlag Chemie.
- Feldman, C., Mayer, J. W. & Picraux, S. T. (1982). *Materials analysis by ion channeling*. London: Academic Press.
- Frankel, R. D. & Forsyth, J. M. (1979). *Nanosecond X-ray diffraction from biological samples with a laser-produced plasma source*. *Science*, **204**, 622–624.
- Grasselli, J. G., Snively, M. K. & Bulkin, B. J. (1980). *Applications of Raman spectroscopy*. *Physics reports* 65, No. 4, pp. 231–344. Amsterdam: North-Holland.
- Gyax, F. N., Kündig, W. & Meier, P. F. (1979). Editors. *Muon spin rotation*. Amsterdam: North-Holland.
- Hansen, N. K. & Schneider, J. R. (1984). *Charge-density distribution of Be metal studied by γ -ray diffractometry*. *Phys. Rev. B*, **29**, 917–926.
- Kaufmann, E. N. & Shenoy, G. K. (1981). Editors. *MRS symposia proceedings*, Vol. 3. *Nuclear and electron resonance spectroscopies applied to materials science*. New York: North-Holland.
- Kunz, C. (1979). Editor. *Topics in current physics*, Vol. 10. *Synchrotron radiation, techniques and applications*. Berlin: Springer Verlag.
- Kuz'min, R. N., Kolpakov, A. V. & Zhdanov, G. S. (1966). *Rassejanie messbauerovskovo izlutschenija kristallami*. *Kristallografiya*, **11**, 511–519. [English translation: *Sov. Phys. Crystallogr.* (1967), **11**, 457–465.]
- Lee, P. A., Citrin, P. H., Eisenberger, P. & Kincaid, B. M. (1981). *Extended X-ray absorption fine structure – its strengths and limitations as a structural tool*. *Rev. Mod. Phys.* **53**, 769–806.
- Marshall, W. & Lovesey, S. W. (1971). *Theory of thermal neutron scattering*. Oxford: Clarendon Press.
- Parsons, D. F. (1980). Editor. *Ultrasoft X-ray microscopy: its application to biological and physical sciences*. New York: New York Academy of Sciences.
- Plummer, E. W. & Eberhardt, W. (1982). *Advances in chemical physics*, Vol. XLIX. *Angle-resolved photoemission as a tool for the study of surfaces*, edited by I. Prigogine & S. I. Rice. New York: John Wiley.
- Rosier, D. J. de & Klug, A. (1968). *Reconstruction of three dimensional structures from electron micrographs*. *Nature (London)*, **217**, 130–134.
- Schneider, J. R. (1983). *Characterization of crystals by γ -ray and neutron diffraction methods*. *J. Cryst. Growth*, **65**, 660–671.
- Siegel, R. W. (1980). *Positron annihilation spectroscopy*. *Annu. Rev. Mater. Sci.* **10**, 393–425.
- Tanner, B. K. & Bowen, D. K. (1980). Editors. *Characterization of crystal growth defects by X-ray methods*. NATO Advanced Study Institute Series B63. New York: Plenum.

- Windsor, C. G. (1981). *Pulsed neutron scattering*. London: Taylor and Francis.

4.2.1

- Bailey, R. L. (1978). *The design and operation of magnetic liquid shaft seals*. In *Thermomechanics of magnetic fluids*, edited by B. Berkovsky. London: Hemisphere.
- Buras, B. (1985). *The European Synchrotron Radiation Project*. *Nucl. Sci. Appl.* **2**, 127–143.
- Buras, B. & Marr, G. V. (1979). Editors. *European Synchrotron Radiation Facility*. Suppl. III: *Instrumentation*. Strasbourg: ESF.
- Buras, B. & Tazzari, S. (1984). Editors. *European Synchrotron Radiation Facility*. Geneva: ESRP c/o CERN.
- Byer, R. L., Kuhn, K., Reed, M. & Trail, J. (1983). *Progress in high peak and average power lasers for soft X-ray production*. *Proc. SPIE*, **448**, 2–7.
- Castaing, R. & Descamps, J. (1955). *Sur les bases physiques de l'analyse ponctuelle par spectrographie X*. *J. Phys. Radium*, **16**, 304–317.
- Clay, R. E. (1934). *A 5 kW X-ray generator with a spinning target*. *Proc. Phys. Soc. London*, **46**, 703–712.
- Cohen, E. R. & Taylor, B. N. (1987). *The 1986 adjustment of the fundamental physical constants*. *Rev. Mod. Phys.* **89**, 1121–1148.
- Collins, C. B., Davanloo, F. & Bowen, T. S. (1986). *Flash X-ray source of intense nanosecond pulses produced at high repetition rates*. *Rev. Sci. Instrum.* **57**, 863–865.
- Compton, A. H. & Allison, S. K. (1935). *X-rays in theory and experiment*. New York: Van Nostrand.
- Cosslett, V. E. & Nixon, W. C. (1951). *X-ray shadow microscope*. *Nature (London)*, **168**, 24–25.
- Cosslett, V. E. & Nixon, W. C. (1960). *X-ray microscopy*, pp. 217–222. Cambridge University Press.
- Dyson, N. A. (1973). *X-rays in atomic and nuclear physics*. London: Longman.
- Ehrenberg, W. & Spear, W. E. (1951). *An electrostatic focusing system and its application to a fine focus X-ray tube*. *Proc. Phys. Soc. London Sect. B*, **64**, 67–75.
- Farge, Y. & Duke, P. J. (1979). Editors. *European Synchrotron Radiation Facility*. Suppl. 1: *The scientific case*. Strasbourg: ESF.
- Fiorito, R. B., Rule, D. W., Piestrup, M. A., Li, Q., Ho, A. H. & Maruyama, X. K. (1993). *Parametric X-ray generation from moderate-energy electron beams*. *Nucl. Instrum. Methods*, **B79**, 758–761.
- Forsyth, J. M. & Frankel, R. D. (1980). *Flash X-ray diffraction from biological specimens using a laser-produced plasma source*. Report No. 106. Laboratory for Laser Energetics, University of Rochester, USA.
- Forsyth, J. M. & Frankel, R. D. (1984). *Experimental facility for nanosecond time-resolved low-angle X-ray diffraction experiments using a laser-produced plasma source*. *Rev. Sci. Instrum.* **55**, 1235–1242.
- Fourme, R. (1992). *Sources X intenses et cristallographie biologique*. *Ann. Phys. (Leipzig)*, **17**, 247–255.
- Frankel, R. D. & Forsyth, J. M. (1979). *Nanosecond exposure X-ray diffraction patterns from biological specimens using a laser plasma source*. *Science*, **204**, 622–624.

REFERENCES

4.2.1 (cont.)

- Frankel, R. D. & Forsyth, J. M. (1985). *Time-resolved X-ray diffraction study of photo stimulated purple membrane*. *Biophys. J.* **47**, 387–393.
- Godwin, R. P. (1968). *Synchrotron radiation light source*. *Springer Tracts Mod. Phys.* **51**, 1–69.
- Goldberg, M. (1961). *Intensités relatives des raies X du spectre L excité par bombardement électronique des éléments lourds*. *J. Phys. Radium*, **22**, 743–748.
- Goldsztäub, S. (1947). *Tube à rayons X de grande brillance à foyer ponctuel*. *CR Acad. Sci.* **224**, 458–459.
- Green, M. (1963). *The target absorption correction in X-ray microanalysis*. *X-ray optics and X-ray microanalysis*, edited by H. Pattee, V. E. Cosslett & A. Engstrom, pp. 361–377. London: Academic Press.
- Green, M. & Cosslett, V. E. (1968). *Measurement of K, L and M shell X-ray production efficiencies*. *Br. J. Appl. Phys. Ser. 2*, **1**, 425–436.
- Guo, C.-L. & Wu, Y.-Q. (1985). *Empirical relationship between the characteristic X-ray intensity and the incident electron energy*. *Kexue Tongbao*, **30**, 1621–1627.
- Helliwell, J. R. (1984). *Synchrotron X-radiation protein crystallography*. *Rep. Progr. Phys.* **47**, 1403–1497.
- Hofmann, A. (1978). *Quasi-monochromatic synchrotron radiation from undulators*. *Nucl. Instrum. Methods*, **152**, 17–21.
- Honkimaki, V., Sleight, J. & Suortti, P. (1990). *Characteristic X-ray flux from sealed Cr, Cu, Mo, Ag and W tubes*. *J. Appl. Cryst.* **23**, 412–417.
- Huke, K. & Kobayakawa, M. (1989). *World-wide census of SR facilities*. *Rev. Sci. Instrum.* **60**, 2548–2561.
- Ishimura, T., Shiraiwa, Y. & Sawada, M. (1957). *The input power limit of the cylindrical rotating anode of an X-ray tube*. *J. Phys. Soc. Jpn*, **12**, 1064–1070.
- Jenkins, R., Manne, R., Robin, J. & Senemaud, C. (1991). *Nomenclature, symbols, units and their usage in spectrochemical analysis. VIII Nomenclature system for X-ray spectroscopy*. *Pure Appl. Chem.* **63**, 735–746.
- Kirkpatrick, P. & Wiedmann, L. (1945). *Theoretical continuous X-ray energy and polarization*. *Phys. Rev.* **67**, 321–339.
- Koch, E. E. (1983). Editor. *Handbook on synchrotron radiation*. Amsterdam: North-Holland.
- Kramers, H. A. (1923). *On the theory of X-ray absorption and of the continuous X-ray spectrum*. *Philos. Mag.* **46**, 836–871.
- Kulenkampff, H. & Schmidt, L. (1943). *Die Energieverteilung im Spektrum der Röntgen Bremsstrahlung*. *Ann. Phys. (Leipzig)*, **43**, 494–512.
- Kulipanov, G. N. & Strinskii, A. N. (1977). *Utilization of synchrotron radiation: current status and prospects*. *Usp. Fiz. Nauk*, **122**, 369–418. English translation: *Sov. Phys. Usp.* **20**, 559–586.
- Kunz, C. (1979). Editor. *Synchrotron radiation*. Berlin: Springer.
- Kusev, S. V., Raiko, V. I. & Skuratowski, I., Ya. (1992). *The status of beam lines for macromolecular crystallography at the Siberia-2 storage ring*. *Rev. Sci. Instrum.* **63**, 1055–1057.
- Laclare, J. L. (1994). *Target specifications and performance of the ESRF source*. *J. Synchrotron Rad.* **1**, 12–18.
- Lea, K. (1978). *Highlights of synchrotron radiation*. *Phys. Rep.* **43**, 337–375.
- Maruyama, X. K., Di Nova, K., Snyder, D., Piestrup, M. A., Li, Q., Fiorito, R. B. & Rule, D. W. (1993). *A compact tunable X-ray source based on parametric X-ray generation by moderate-energy linacs*. *Proc. 1993 Particle Accelerator Conference*. *IEEE*, **2**, 1620–1622.
- Metchnik, V. & Tomlin, S. G. (1963). *On the absolute intensity of emission of characteristic X radiation*. *Proc. Phys. Soc. London*, **81**, 956–964.
- Müller, A. (1927). *Input limits of X-ray generators*. *Proc. R. Soc. London Ser. A*, **117**, 30–42.
- Müller, A. (1929). *A spinning-target X-ray generator and its input limit*. *Proc. R. Soc. London Ser. A*, **125**, 507–516.
- Müller, A. (1931). *Further estimates of the input limits of X-ray generators*. *Proc. R. Soc. London Ser. A*, **132**, 646–649.
- Nagel, D. J. (1980). *Comparison of X-ray sources for exposure of photo resists*. *Ann. NY Acad. Sci.* **342**, 235–247.
- Oosterkamp, W. J. (1948). *The heat dissipation in the anode of an X-ray tube*. *Philips Res.* **3**, 49–59, 161–173, 303–317.
- Phillips, W. C. (1985). *X-ray sources*. *Methods Enzymol.* **114**, 300–316.
- Piestrup, M. A., Boyers, D. G., Pincus, C. I., Harris, J. L., Maruyama, X. K., Bergstrom, J. C., Caplan, H. S., Silzer, R. M. & Skopik, D. M. (1991). *Quasimonochromatic X-ray source using photo-absorption edge transition radiation*. *Phys. Rev. A*, **43**, 3653–3661.
- Piestrup, M. A., Moran, M. J., Boyers, D. G., Pincus, C. I., Kephart, J. O., Gearhart, R. A. & Maruyama, X. K. (1991). *Generation of hard X-rays from transition radiation using high-density foils and moderate-energy electrons*. *Phys. Rev. A*, **43**, 2387–2396.
- Reed, S. J. B. (1975). *Electron microprobe analysis*. Cambridge University Press.
- Rudakov, L. I., Baigarin, K. A., Kalinin, Y. G., Korolev, V. D. & Kumachov, M. A. (1991). *Pulsed-plasma-based X-ray source and new X-ray optics*. *Phys. Fluids B (Plasma Phys.)*, **3**, 2414–2419.
- Sakurai, K. (1993). *High-intensity X-ray line-focal spot for laboratory EXAFS measurements*. *Rev. Sci. Instrum.* **64**, 267–268.
- Sakurai, K. & Sakurai, H. (1994). *Comment on High intensity low tube-voltage X-ray source for laboratory EXAFS measurements*. *Rev. Sci. Instrum.* **65**, 2417–2418.
- Schwinger, J. (1949). *On the classical radiation of accelerated electrons*. *Phys. Rev.* **75**, 1912–1925.
- Scott, V. D. & Love, G. (1983). *Quantitative electron microprobe analysis*. Cambridge University Press.
- Seka, W., Soures, J. M., Lewis, O., Bunkenburg, J., Brown, D., Jacobs, S., Mourou, X. & Zimmermann, J. (1980). *High-power phosphate-glass laser system: design and performance characteristics*. *Appl. Opt.* **19**, 409–419.
- Seka, W., Soures, J. M., Lund, L. & Craxton, R. S. (1981). *GDL: a high-power 0.35 μm laser irradiation facility*. *IEEE J. Quantum Electron.* **QE-17**, 1689–1693.
- Siegbahn, M. (1925). *The spectroscopy of X-rays*. Oxford University Press.
- Stephenson, S. T. (1957). *The continuous X-ray spectrum*. *Handbuch der Physik*. XXX: X-rays, edited by S. Flügge, pp. 337–370. Berlin: Springer.
- Stern, E. A. (1980). Editor. *Laboratory EXAFS facilities 1980*. *AIP Conf. Proc.* No. 64.
- Stuhrmann, H. (1982). Editor. *Uses of synchrotron radiation in biology*. *Esp. Properties of synchrotron radiation*, Chap. 1, by G. Materlik. London: Academic Press.
- Suller, V. P. (1992). *Review of the status of synchrotron radiation storage rings*. *Third European Particle Accelerator Conference*. *Editions Frontières*, **1**, 77–81.
- Taylor, A. (1949). *A 5 kW crystallographic X-ray tube with a rotating anode*. *J. Sci. Instrum.* **26**, 225–229.
- Taylor, A. (1956). *Improved demountable crystallographic rotating anode X-ray tube*. *Rev. Sci. Instrum.* **27**, 757–759.

4. PRODUCTION AND PROPERTIES OF RADIATIONS

4.2.1 (cont.)

- Thompson, D. J. & Poole, M. W. (1979). Editors. *European Synchrotron Radiation Facility*. Suppl. II: *The machine*. Strasbourg: ESF.
- Tohji, K., Udagawa, Y., Kawasaki, T. & Masuda, K. (1983). *Laboratory EXAFS spectrometer with a bent-crystal, a solid-state detector, and a fast detection system*. *Rev. Sci. Instrum.* **54**, 1482–1487.
- Wilson, R. R. (1941). *A vacuum-tight sliding seal*. *Rev. Sci. Instrum.* **12**, 91–93.
- Winick, H. (1980). *Properties of synchrotron radiation*. In *Synchrotron radiation research*, edited by H. Winick & S. Doniach. New York: Plenum.
- Winick, H. & Bienenstock, A. (1978). *Synchrotron radiation research*. *Ann. Rev. Nucl. Sci.* **28**, 33–113.
- Yaakobi, B., Boehli, T., Bourke, P., Conturie, Y., Craxton, R. S., Delettrez, J., Forsyth, J. M., Frankel, R. D., Goldman, L. M., McCrory, L. R., Richardson, M. C., Seka, W., Shvarts, D. & Soures, J. M. (1981). *Characteristics of target interaction with high-power UV laser radiation*. *Opt. Commun.* **39**, 175–179.
- Yaakobi, B., Bourke, P., Conturie, Y., Delettrez, J., Forsyth, J. M., Frankel, R. D., Goldman, L. M., McCrory, L. R., Seka, W., Soures, J. M., Burek, A. J. & Deslattes, R. D. (1981). *High X-ray conversion efficiency with target irradiation by a frequency-tripled Nd:glass laser*. *Opt. Commun.* **38**, 196–200.
- Yao, T. (1992). *Lanthanum hexaboride filament in an X-ray generator of a laboratory EXAFS facility*. *Rev. Sci. Instrum.* **63**, 2103–2104.
- Yoshimatsu, M. & Kozaki, S. (1977). *High-brilliance X-ray sources*. *X-ray optics*, edited by H.-J. Queisser, Chap. 2. Berlin: Springer.
- Becker, P., Dorenwendt, K., Ebeling, G., Lauer, R., Lucas, W., Probst, R., Rademacher, H.-J., Reim, G., Seyfried, P. & Siegert, H. (1981). *Absolute measurement of the (220) lattice plane spacing in a silicon crystal*. *Phys. Rev. Lett.* **46**, 1540–1543.
- Becker, P., Seyfried, P. & Siegert, H. (1982). *The lattice parameter of highly pure silicon single crystals*. *Z. Phys.* **B48**, 17–21.
- Beyer, H., Indelicato, P., Finlayson, H., Liesen, D. & Deslattes, R. D. (1991). *Measurement of the 1s Lamb-shift in hydrogenlike nickel*. *Phys. Rev. A*, **43**, 223–227.
- Blundell, S. A. (1993a). *Ab initio calculations of QED effects of Li-like, Na-like and Cu-like ions*. *Phys. Scr.* **T46**, 144–149.
- Blundell, S. A. (1993b). *Calculations of the screened self-energy and vacuum polarization in Li-like, Na-like and Cu-like ions*. *Phys. Rev. A*, **47**, 1790–1803.
- Blundell, S. A., Johnson, W. R. & Sapirstein, J. (1990). *Improved many-body perturbation theory calculations of the $n=2$ states of lithiumlike uranium*. *Phys. Rev. A*, **41**, 1698–1700.
- Blundell, S. A., Mohr, P. J., Johnson, W. R. & Sapirstein, J. (1993). *Evaluation of two-photon exchange graphs for highly charged heliumlike ions*. *Phys. Rev. A*, **48**, 2615–2626.
- Bonse, U. & Hart, M. (1965). *An X-ray interferometer*. *Appl. Phys. Lett.* **6**, 155–156.
- Borchert, G. L. (1976). *Precise energies of K-Röntgen-lines of Tm, Th, U and Pu*. *Z. Naturforsch. Teil A*, **31**, 102–104.
- Borchert, G. L., Hansen, P. G., Jonson, B., Ravn, H. L. & Desclaux, J. P. (1980). *Comparison of the K X-ray energy ratios of high Z and low Z elements with relativistic SCF DF calculations*. *Atomic masses and fundamental constants*, edited by J. E. Nolen & W. Benenson, Vol. 6, pp. 189–201. New York: Plenum Press.
- Burr, A. F. (1996). Personal communication.
- Cardona, M. & Ley, L. (1978). *Photemission in Solids I. Top*. *Appl. Phys.* **26**, 265–276.
- Cauchois, Y. & Hulubei, H. (1947). *Tables de constantes et données numériques. I. Longueurs d'onde des émissions X et des discontinuités d'absorption X*. Paris: Herman.
- Cauchois, Y. & Senemaud, C. (1978). *Tables internationales de constantes sélectionnées. 18. Longueurs d'onde des émissions X et des discontinuités d'absorption X*. London: Pergamon Press.
- Cohen, E. R. & Taylor, B. N. (1973). *The 1973 least-squares adjustment of the fundamental constants*. *J. Phys. Chem. Ref. Data*, **2**, 663–734.
- Desclaux, J. P. (1975). *A multiconfiguration relativistic Dirac-Fock program*. *Comput. Phys. Commun.* **9**, 31–45.
- Desclaux, J. P. (1993). *Relativistic multiconfiguration Dirac-Fock package. Methods and techniques in computational chemistry - 94*, Vol. A, edited by E. Clementi. Cagliari: STEF.
- Deslattes, R. D. & Henins, A. (1973). *X-ray to visible wavelength ratios*. *Phys. Rev. Lett.* **31**, 972–975.
- Deslattes, R. D. & Kessler, E. G. Jr (1985). *Experimental evaluation of inner-vacancy level energies for comparison with theory*. *Atomic inner-shell physics*, edited by B. Crasemann, pp. 181–235. New York: Plenum.
- Deslattes, R. D., Tanaka, M., Greene, G. L., Henins, A. & Kessler, E. G. (1987). *Remeasurement of a silicon lattice period*. *IEEE Trans. Instrum. Meas.* **IM-36**, 166.
- Fuggle, J. C., Burr, A. F., Watson, L. M., Fabian, D. J. & Lang, W. (1974). *X-ray photoelectron studies of thorium and uranium*. *J. Phys. F*, **4**, 335–342.

REFERENCES

4.2.2 (cont.)

- Fujimoto, Z., Fujii, K., Tanaka, M. & Nakayama, K. (1997). *Lattice measurement in silicon*. *IEEE Trans. Instrum. Meas.* **50**, 123–124.
- Härtwig, J., Hölzer, G., Förster, E., Goetz, K., Wokulska, K. & Wolf, J. (1994). *Remeasurement of characteristic X-ray emission lines and their application to line profile analysis and lattice parameter determination*. *Phys. Status Solidi. A*, **143**, 23–34.
- Härtwig, J., Hölzer, G., Wolf, J. & Förster, E. (1993). *Remeasurement of the profile of the characteristic Cu $K\alpha$ emission line with high precision and accuracy*. *J. Appl. Cryst.* **26**, 539–548.
- Henins, A. (1971). *Ruled grating measurements of the Al $K\alpha_{1,2}$ wavelength*. *Precision measurements and fundamental constants*, edited by D. N. Langenberg & B. N. Taylor, pp. 255–258. *Natl. Bur. Stand. (US) Spec. Publ. No. 343*. Gaithersburg, Maryland: National Bureau of Standards.
- Hölzer, G., Fritsch, M., Deutsch, M., Härtwig, J. & Förster, E. (1997). *$K\alpha_{1,2}$ and $K\beta_{1,3}$ X-ray emission lines of the 3d transition metals*. *Phys. Rev. A*, **56**, 4554–4568.
- Indelicato, P. (1990). *$K\alpha$ transitions in few-electron ions and in atoms*. *X-ray and inner-shell processes*, edited by T. A. Carlson, M. O. Krause & S. T. Manson, pp. 591–601. New York: American Institute of Physics.
- Indelicato, P. & Desclaux, J. P. (1990). *Multiconfiguration Dirac–Fock calculations of transition energies with QED corrections in three-electron ions*. *Phys. Rev. A*, **42**, 5139–5149.
- Indelicato, P., Gorceix, O. & Desclaux, J. P. (1987). *MCDF studies of two electron ions II: radiative corrections and comparison with experiment*. *J. Phys. B*, **20**, 651.
- Indelicato, P. & Lindroth, E. (1992). *Relativistic effects, correlation, and QED corrections on $K\alpha$ transitions in medium to very heavy atoms*. *Phys. Rev. A*, **46**, 2426–2436.
- Indelicato, P. & Lindroth, E. (1996). *Current status of the relativistic theory of inner hole states in heavy atoms*. *Comments At. Mol. Phys.* **32**, 197–208.
- Indelicato, P. & Mohr, P. J. (1990). *Electron screening correction to the self energy in high-Z atoms*. 12th International Conference on Atomic Physics, Ann Arbor, Michigan, USA.
- Indelicato, P. & Mohr, P. J. (1991). *Quantum electrodynamic effects in atomic structure*. *Theor. Chim. Acta*, **80**, 207–214.
- Johnson, W. R. & Soff, G. (1985). *The Lamb shift in hydrogenlike atoms, $1 \leq Z \leq 110$* . *At. Data Nucl. Data Tables*, **33**, 405.
- Kessler, E. G. Jr, Deslattes, R. D. & Henins, A. (1979). *Wavelength of the W $K\alpha_1$ X-ray line*. *Phys. Rev. A*, **19**, 215–218.
- Kim, Y. K., Baik, D. H., Indelicato, P. & Desclaux, J. P. (1991). *Resonance transition energies of Li-, Na-, and Cu-like ions*. *Phys. Rev. A*, **44**, 148–166.
- Kraft, S., Stümpel, J., Becker, P. & Kuetgens, U. (1996). *High resolution X-ray absorption spectroscopy with absolute energy calibration for the determination of absorption edge energies*. *Rev. Sci. Instrum.* **67**, 681–687.
- Lebugle, A., Axelsson, U., Nyholm, R. & Mårtensson, N. (1981). *Experimental L and M core level binding energies for the metals 22Ti to 30Zn*. *Phys. Scr.* **23**, 825–827.
- Lindgren, I., Persson, H., Salomonson, S. & Labzowsky, L. (1995). *Full QED calculations of two-photon exchange for heliumlike systems: analysis in the Coulomb and Feynman gauge*. *Phys. Rev. A*, **51**, 1167–1195.
- Lindroth, E. & Indelicato, P. (1993). *Inner shell transitions in heavy atoms*. *Phys. Scr.* **T46**, 139–143.
- Lindroth, E. & Indelicato, P. (1994). *High precision calculations of inner shell transitions in heavy elements*. *Nucl. Instrum. Methods*, **B87**, 222–226.
- Lum, G. K., Wiegand, C. E., Kessler, E. G. Jr, Deslattes, R. D., Jacobs, L., Schwitz, W. & Seki, R. (1981). *Kaonic mass by critical absorption of kaonic-atom X-rays*. *Phys. Rev. D*, **23**, 2522–2532.
- Mohr, P. J. (1974a). *Numerical evaluation of the $1S1/2$ state radiative level shift*. *Ann. Phys. (Leipzig)*, **88**, 52–87.
- Mohr, P. J. (1974b). *Self-energy radiative corrections in hydrogen-like systems*. *Ann. Phys. (Leipzig)*, **88**, 26–51.
- Mohr, P. J. (1975). *Lamb shift in a strong Coulomb potential*. *Phys. Rev. Lett.* **34**, 1050–1052.
- Mohr, P. J. (1982). *Self-energy of the $n = 2$ states in a strong Coulomb field*. *Phys. Rev. A*, **26**, 2338–2354.
- Mohr, P. J. (1992). *Self-energy correction to one-electron energy levels in a strong Coulomb field*. *Phys. Rev. A*, **46**, 4421–4424.
- Mohr, P. J. & Soff, G. (1993). *Nuclear size correction to the electron self-energy*. *Phys. Rev. Lett.* **70**, 158–161.
- Mohr, P. J. & Taylor, B. N. (2000). *CODATA recommended values of the fundamental physical constants: 1998*. *Rev. Mod. Phys.* **72**, 351–495.
- Mooney, T., Lindroth, E., Indelicato, P., Kessler, E. & Deslattes, R. D. (1992). *Precision measurements of K and L transitions in xenon: experiment and theory for the K, L and M levels*. *Phys. Rev. A*, **45**, 1531–1543.
- Mooney, T. M. (1996). Personal communication.
- Nyholm, R., Berndtsson, A. & Mårtensson, N. (1980). *Core level binding energies for the elements Hf to Bi ($Z = 72$ –83)*. *J. Phys. C*, **13**, L1091–L1096.
- Nyholm, R. & Mårtensson, N. (1980). *Core level binding energies for the elements Zr–Te ($Z = 40$ –52)*. *J. Phys. C*, **13**, L279–L284.
- Parratt, L. G. (1959). *Electronic band structure of solids by X-ray spectroscopy*. *Rev. Mod. Phys.* **31**, 616–645.
- Powell, C. J. (1995). *Elemental binding energies for X-ray photoelectron spectroscopy*. *Appl. Surf. Sci.* **89**, 141–149.
- Rieck, C. D. (1962). *Tables relating to the production, wavelengths, and intensities of X-rays*. *International tables for X-ray crystallography*, Vol. III, edited by C. H. MacGillivray & G. D. Rieck, pp. 59–72. Birmingham: Kynoch Press.
- Schwarzenbach, D., Abrahams, S. C., Flack, H. D., Prince, E. & Wilson, A. J. C. (1995). *Statistical descriptors in crystallography. II. Report of a Working Group on Expression of Uncertainty in Measurement*. *Acta Cryst.* **A51**, 565–569.
- Schweppe, J., Deslattes, R. D., Mooney, T. & Powell, C. J. (1994). *Accurate measurement of Mg and Al $K\alpha_{1,2}$ X-ray energy profiles*. *J. Electron Spectrosc. Relat. Phenom.* **67**, 463–478.
- Schweppe, J. E. (1995). Personal communication.
- Soff, G. & Mohr, P. J. (1988). *Vacuum polarization in a strong external field*. *Phys. Rev. A*, **38**, 5066–5075.
- Taylor, B. N. & Kuyatt, C. E. (1994). *Guidelines for evaluating and expressing the uncertainty of NIST measurement results*. *NIST Technical Note No. 1297*. Gaithersburg, MD: National Institute of Standards and Technology.
- Thomsen, J. S. & Burr, A. F. (1968). *Biography of the x-unit – the X-ray wavelength scale*. *Am. J. Phys.* **36**, 803–810.
- Uehling, E. A. (1935). *Polarization effects in the positron theory*. *Phys. Rev.* **48**, 55–63.

4. PRODUCTION AND PROPERTIES OF RADIATIONS

4.2.2 (cont.)

Wichmann, E. H. & Kroll, N. M. (1956). *Vacuum polarization in a strong Coulomb field*. *Phys. Rev.* **101**, 843–859.

4.2.3

- Alvarez, L. W., Crawford, F. S. & Stevenson, M. L. (1958). *Elastic scattering of 1.6 MeV gamma rays from H, Li, C and Al nuclei*. *Phys. Rev.* **112**, 1267–1273.
- Azaroff, L. V. & Pease, D. M. (1974). *X-ray absorption spectra*. *X-ray spectroscopy*, edited by L. V. Azaroff, Chap. 6, pp. 284–337. New York: McGraw-Hill.
- Bertin, E. P. (1975). *Principles and practice of X-ray spectrometric analysis*. New York: Plenum.
- Bianconi, A., Incoccia, L. & Stipcich, S. (1983). Editors. *EXAFS and near edge structure*. Berlin: Springer.
- Bowen, D. K., Stock, S. R., Davies, S. T., Pantos, E., Birnbaum, H. R. & Chen, H. (1984). *Topographic EXAFS*. *Nature (London)*, **309**, 336–338.
- Bunker, G., Hasnain, S. S. & Sayers, D. E. (1990). *Report of the International Workshops on Standards and Criteria in XAFS*. In *X-ray absorption spectroscopy*, edited by S. S. Hasnain. London: Ellis Horwood.
- Caballero, A., Villain, F., Dexpert, H., Le Peltier, F. & Lynch, J. (1993). *Characterization by in situ EXAFS spectroscopy of Pt/Al₂O₃ and PtRe/Al₂O₃ catalysts under reaction conditions*. *Jpn. J. Appl. Phys.* **32**, Suppl. 32–2, 439–441.
- Chipman, D. R. (1969). *Conversion of relative intensities to an absolute scale*. *Acta Cryst.* **A25**, 209–214.
- Citrin, P. H., Eisenberger, P. & Hewitt, R. (1978). *Extended X-ray absorption fine structure of surface atoms on single crystal substrates: iodine absorbed on Ag(111)*. *Phys. Rev. Lett.* **41**, 309–312.
- Cohen, E. R. & Taylor, B. N. (1987). *The 1986 adjustment of the fundamental physical constants*. *Rev. Mod. Phys.* **89**, 1121–1148.
- Cooper, M. J. (1985). *Compton scattering and electron momentum determination*. *Rep. Prog. Phys.* **48**, 415–481.
- Creagh, D. C. (1985). *Theoretical and experimental techniques for the determination of X-ray dispersion corrections*. *Aust. J. Phys.* **38**, 371–404.
- Creagh, D. C. (1987a). *The resolution of discrepancies in tables of photon attenuation coefficients*. *Nucl. Instrum. Methods*, **A255**, 1–16.
- Creagh, D. C. (1987b). *The X-ray anomalous dispersion corrections and their use for the characterization of materials*. In *Progress in crystal growth and characterization*, Vol. 14, edited by P. Krishna, Chap. 7, pp. 1–46. Oxford: Pergamon Press.
- Creagh, D. C. & Hubbell, J. H. (1987). *Problems associated with the measurement of X-ray attenuation coefficients. I. Silicon*. *Acta Cryst.* **A43**, 102–112.
- Crozier, E. D. & Seary, A. J. (1980). *Asymmetric effects in the extended X-ray absorption fine structure. Analysis of solid and liquid zinc*. *Can. J. Phys.* **58**, 1388–1399.
- Dreier, P., Rabe, P., Matzfeld, W. & Niemann, W. (1984). *Anomalous X-ray scattering factors calculated from experimental absorption factor*. *J. Phys. C*, **17**, 3123–3136.
- Durham, P. J. (1983). *Multiple scattering calculations of XANES*. *EXAFS and near edge structure*, edited by A. Bianconi, L. Incoccia & S. Stipcich, pp. 37–43. Berlin: Springer.
- Fricke, H. (1920). *The K-characteristic absorption frequencies for the chemical elements magnesium to chromium*. *Phys. Rev.* **16**, 202–212.
- Fuoss, P. H., Eisenberger, P., Warburton, W. K. & Bienenstock, A. (1981). *Application of differential anomalous X-ray scattering to structural studies of amorphous materials*. *Phys. Rev. Lett.* **46**, 1537–1540.
- Gerstenberg, H. & Hubbell, J. H. (1982). *Comparison of experimental with theoretical photon attenuation cross sections between 10 eV and 100 GeV*. *Nuclear data for science and technology*, edited by K. H. Bockhoff, pp. 1007–1009. Amsterdam: North-Holland.
- Gerward, L. (1981). *X-ray attenuation coefficients and atomic photoelectric absorption cross sections of silicon*. *J. Phys. B*, **14**, 3389–3395.
- Gerward, L. (1982). *X-ray attenuation coefficients of copper in the energy range 5 to 50 keV*. *Z. Naturforsch. Teil A*, **37**, 451–459.
- Gerward, L. (1983). *X-ray attenuation coefficients of carbon in the energy range 5 to 50 keV*. *Acta Cryst.* **A39**, 322–325.
- Gerward, L., Thuesen, G., Stibius-Jensen, M. & Alstrup, I. (1979). *X-ray anomalous scattering factors for silicon and germanium*. *Acta Cryst.* **A35**, 852–857.
- Gurman, S. J. (1988). *The small atom approximation in EXAFS and surface EXAFS*. *J. Phys. C*, **21**, 3699–3717.
- Gurman, S. J. (1995). *Interpretation of EXAFS data*. *J. Synchrotron Rad.* **2**, 56–63.
- Hasnain, S. S. (1990). *X-ray absorption fine structure*. London: Ellis Horwood.
- Hastings, J. B., Eisenberger, P., Lengeler, B. & Perlman, M. L. (1975). *Local structure determination at high dilution: internal oxidation at 75 ppm Fe in Cu*. *Phys. Rev. Lett.* **43**, 1807–1810.
- Helliwell, J. R. (1984). *Synchrotron X-radiation protein crystallography*. *Rep. Prog. Phys.* **A7**, 1403–1497.
- Hertz, G. (1920). *Über die Absorptionsgrenzen in den L-Serie*. *Z. Phys.* **3**, 19–27.
- Hida, M., Wada, N., Maeda, H., Hikaru, T., Tsu, Y. & Kamino, N. (1985). *An EXAFS investigation on the lattice relaxation of Ni fine particles prepared by gas evaporation*. *Jpn. J. Appl. Phys.* **24**, L3–L5.
- Hubbell, J. H. (1969). *Phonon cross sections, attenuation coefficients, and energy absorption coefficients from 10 keV to 100 GeV*. Report NRDS-NBS29. National Institute of Standards and Technology, Gaithersburg, MD, USA.
- Hubbell, J. H., Gerstenberg, H. M. & Saloman, E. B. (1986). *Bibliography of photon total cross section (attenuation coefficient) measurements 10 eV to 13.5 GeV*. Report NBSIR 86-3461. US Department of Commerce, Gaithersburg, MD, USA.
- Hubbell, J. H., McMaster, W. H., Del Grande, N. K. & Mallett, J. H. (1974). *X-ray cross sections and attenuation coefficients*. *International tables for X-ray crystallography*, Vol. IV, edited by J. A. Ibers & W. C. Hamilton, pp. 47–70. Birmingham: Kynoch Press. (Present distributor Kluwer Academic Publishers, Dordrecht.)
- Hubbell, J. H. & Øverbø, I. (1979). *Relativistic atomic form factors and photon coherent scattering cross sections*. *J. Phys. Chem. Ref. Data*, **8**, 69–105.
- International Tables for X-ray Crystallography* (1974). Vol. IV. Birmingham: Kynoch Press. (Present distributor Kluwer Academic Publishers, Dordrecht.)
- Jennings, L. D. (1984). *The polarization ratio of crystal monochromators*. *Acta Cryst.* **A40**, 12–16.

REFERENCES

4.2.3 (cont.)

- Joy, D. C. & Maher, D. (1985). *Quantitative electron energy loss spectroscopy: an introduction to the power of Kevex Elstar software*. *Kevex Analyst*, **10**, 6–9.
- Kostarev, A. L. (1941). *Theory of the fine structure of X-ray absorption spectra in solids*. *Zh. Eksper. Teor. Fiz.* **11**, 60–73.
- Kostarev, A. L. (1949). *Elucidation of the super-fine structure of X-ray absorption spectra in solids*. *Zh. Eksper. Teor. Fiz.* **19**, 413–420.
- Kronig, R. de L. (1932a). *Zur Theorie der Feinstruktur in den Röntgenabsorptionsspektren II*. *Z. Phys.* **75**, 191–210.
- Kronig, R. de L. (1932b). *Zur Theorie der Feinstruktur in den Röntgenabsorptionsspektren III*. *Z. Phys.* **75**, 468–475.
- Kuroda, H., Ohta, T., Murata, T., Udagawa, Y. & Nomura, M. (1992). *XAFS VII: Proceedings of the Seventh Conference on X-ray Absorption Fine Structure*. *Jpn. J. Appl. Phys.* **32**, Suppl. 32–2.
- Kutzler, F. W., Natoli, C. R., Misemer, D. K., Doniach, S. & Hodgson, K. O. (1981). *Use of one electron theory for the interpretation of near edge structure in K-shell X-ray absorption spectra of transition metal complexes*. *J. Chem. Phys.* **73**, 3274–3288.
- Leapman, R. D. & Cosslet, V. E. (1976). *Extended fine structure above the X-ray edge in electron energy loss spectra*. *J. Phys. D*, **9**, L29–L31.
- Lee, P. A. (1981). *Theory of extended X-ray absorption fine structure*. *EXAFS spectroscopy: techniques and applications*, edited by B. K. Teo & D. C. Joy, Chap. 2, pp. 5–13. New York: Plenum.
- Lee, P. A. & Beni, G. (1977). *New method for the calculation of atomic phase shifts: application to extended X-ray absorption fine structure (EXAFS) in molecules and crystals*. *Phys. Rev. B*, **15**, 2862–2883.
- Lee, P. A., Citrin, P. H., Eisenberger, P. & Kincaid, B. M. (1981). *Extended X-ray absorption fine structure – its strengths and limitations as a structural tool*. *Rev. Mod. Phys.* **53**, 769–787.
- Lengeler, B., Materlik, G. & Müller, J. E. (1983). *Near edge structure in cerium and cerium compounds*. *EXAFS and near edge structure*, edited by A. Bianconi, L. Incoccia & S. Stipcich, pp. 150–153. Berlin: Springer.
- Lereboures, B., Dürr, J., d'Huysser, A., Bonelle, J. P. & Lenglet, M. (1980). *Phys. Status Solidi*, **62**, K175.
- Lytle, F. W., Sayers, D. E. & Stern, E. A. (1989). *Report of the International Workshops on Standards and Criteria in XAFS*. In *X-ray absorption spectroscopy*. *Physica (Utrecht)*, **B158**, 701–722.
- Lytle, F. W., Stern, E. A. & Sayers, D. E. (1975). *Extended X-ray-absorption fine-structure technique II. Experimental practice and selected results*. *Phys. Rev. B*, **11**, 4825–4835.
- Marcus, M., Powers, L. S., Storm, A. R., Kincaid, B. M. & Chance, B. (1980). *Curved-crystal (LiF) X-ray focusing array for fluorescence EXAFS in dilute samples*. *Rev. Sci. Instrum.* **51**, 1023–1029.
- Martens, G. & Rabe, P. (1980). *EXAFS studies on superficial regions by means of total reflection*. *Phys. Status Solidi A*, **58**, 415–425.
- Materlik, G., Bedzyk, M. J. & Frahm, A. (1984). Report SR-84-07. DESY, Hamburg, Germany.
- Mustre de Leon, J., Stern, E. A., Sayers, D. E., Ma, Y. & Rehr, J. J. (1988). *XAFS V: Proceedings of the Fifth International Conference on X-ray Absorption Fine Structure*. Amsterdam: North-Holland.
- Natoli, C. R. (1990). *Multichannel multiple scattering theory with general potentials*. *Phys. Rev. B*, **42**, 1944–1968.
- Natoli, C. R., Misemer, D. K., Doniach, S. & Kutzler, F. W. (1980). *First principles calculation of X-ray absorption edge structure in molecular clusters*. *Phys. Rev. A*, **22**, 1104–1108.
- Nordfors, B. (1960). *The statistical error in X-ray absorption measurements*. *Ark. Fys.* **18**, 37–47.
- Norman, D., Durham, P. J. & Pendry, J. B. (1983). *The absorption of oxygen on nickel (001) studied by XANES*. *EXAFS and near edge structure*, edited by A. Bianconi, L. Incoccia & S. Stipcich, pp. 144–146. Berlin: Springer.
- Oyanagi, H., Ihara, H., Matsushita, T., Hirabayashi, M., Terada, N., Tokumoto, M., Senzaki, K., Kimura, T. & Yao, T. (1987). *Short range order in high T_c superconductors $Ba_xY_{1-x}CuO_{3-y}$ and $Sr_xLa_{2-x}CuO_{4-7}$* . *Jpn. J. Appl. Phys.* **26**, L828–L831.
- Oyanagi, H., Martini, M., Saito, M. & Haga, K. (1995). *Nineteen element high purity Ge solid state detector array for fluorescence X-ray absorption fine structure studies*. Submitted to *Rev. Sci. Instrum.*
- Oyanagi, H., Matsushita, T., Tanoue, H., Ishiguro, T. & Kohra, K. (1985). *Fluorescence-detected X-ray absorption spectroscopy applied to structural characterization of very thin films: ion-beam-induced modification of thin Ni layers on Si (100)*. *Jpn. J. Appl. Phys.* **24**, 610–619.
- Oyanagi, H., Takeda, T., Matsushita, T., Ishiguro, T. & Sasaki, A. (1986). *Local structure in InGaAsP I quaternary alloys*. *J. Phys. (Paris)*, **28**, Suppl. 12, C8, 423–426.
- Pantos, E. (1982). *The SRS program library documentation*. Daresbury: SRC.
- Papatzacos, P. & Mort, K. (1975). *Delbrück scattering calculations*. *Phys. Rev. D*, **12**, 206–221.
- Parratt, L. G., Porteus, I. O., Schnopper, H. W. & Watanabe, T. (1959). *X-ray absorption coefficients and geometrical collimation of the beam*. *Rev. Sci. Instrum.* **30**, 344–347.
- Pendry, J. B. (1983). *The transition region between XANES and EXAFS*. *EXAFS and near edge structure*, edited by A. Bianconi, L. Incoccia & S. Stipcich, pp. 4–10. Berlin: Springer.
- Petiau, J. & Calas, G. (1983). *EXAFS for inorganic systems*, pp. 127–129. Daresbury: SRC.
- Rehr, J. J. & Albers, R. C. (1990). *Phys. Rev. B*, **41**, 8139–8144.
- Riggs, P. J., Mei, R., Yocum, C. F. & Penner-Hahn, J. E. (1993). *The characterization of the Mn site in the photosynthetic oxygen evolving complexes: the effect of hydroxylamine and hydroquinone on the XAFS*. *Jpn. J. Appl. Phys.* **32**, Suppl. 32–2, 527–529.
- Saloman, E. B. & Hubbell, J. H. (1986). *X-ray attenuation coefficients (total cross sections): comparison of the data base with the experimental values of Henke and the theoretical values of Schofield for energies between 0.1–100 keV*. Report NBSIR 86–3431. US Department of Commerce, Gaithersburg, MD, USA.
- Sawada, M., Tsutsumi, K., Shiraiwa, T., Ishimura, T. & Obashi, M. (1959). *Some contributions to the X-ray spectroscopy of solid state*. *Annu. Rep. Sci. Works Osaka Univ.* **7**, R–87.
- Sayers, D. E., Lytle, F. W. & Stern, E. A. (1970). *Point scattering theory of X-ray K absorption fine structure*. *Adv. X-ray Anal.* **13**, 248–256.
- Schmidt, V. V. (1961a). *Contribution to the theory of the temperature dependence of the fine structure of X-ray absorption spectra*. *Bull. Acad. Sci. USSR Phys. Ser.* **25**, 988–993.

4. PRODUCTION AND PROPERTIES OF RADIATIONS

4.2.3 (cont.)

- Schmidt, V. V. (1961b). *On the effect of the temperature dependence of the fine structure of X-ray absorption spectra.* *J. Exp. Theor. Phys.* **12**, 886–890.
- Schmidt, V. V. (1963). *Contributions to the theory of the dependence of the fine structure of X-ray absorption spectra II. Case of high temperatures.* *Bull. Acad. Sci. USSR Phys. Ser.* **27**, 392–397.
- Scofield, J. H. (1973). *Theoretical photoionization cross sections from 1 to 1500 keV.* Report UCRL-51326. Lawrence Livermore Laboratory, Livermore, CA, USA.
- Sears, V. F. (1983). *Optimum sample thickness for total cross section measurements.* *Nucl. Instrum. Methods*, **213**, 561–562.
- Sevillano, E., Meuth, H. & Rehr, J. J. (1978). *Extended X-ray absorption fine structure Debye Waller factors. I. Monatomic crystals.* *Phys. Rev. B*, **20**, 4908–4911.
- Shulman, R. G., Weisenberger, P., Teo, B. K., Kincaid, B. M. & Brown, G. S. (1978). *Fluorescence X-ray absorption studies of rubendoxin and its compounds.* *J. Mol. Biol.* **124**, 305–315.
- Sinfelt, J. H., Via, G. H. & Lytle, F. W. (1980). *Structures of biometallic clusters. Extended X-ray absorption fine structure (EXAFS) studies of Ru–Cu clusters.* *J. Chem. Phys.* **72**, 4832–4843.
- Sorenson, L. B., Cross, J. O., Newville, M., Ravel, B., Rehr, J. J., Stragier, H., Bouldin, C. E. & Woicik, J. C. (1994). *Diffraction anomalous fine structure: unifying X-ray diffraction and X-ray absorption with DAFS. Diffraction anomalous fine structure*, edited by G. Materlik, C. J. Sparks & K. Fischer, pp. 389–420. Amsterdam: North Holland.
- Stern, E. A., Bunker, B. & Heald, A. (1981). *Understanding the causes of non-transferability of EXAFS amplitude. EXAFS spectroscopy: techniques and applications*, edited by B. K. Teo & D. C. Joy, pp. 59–79. New York: Plenum.
- Stern, E. A., Sayers, D. E. & Lytle, F. W. (1975). *Extended X-ray absorption fine structure technique. III. Determination of physical parameters.* *Phys. Rev. B*, **11**, 4836–4846.
- Stohr, J., Denley, D. & Perfettii, P. (1978). *Surface extended X-ray absorption fine structure in the soft X-ray region: study of an oxidized Al surface.* *Phys. Rev. B*, **18**, 4132–4135.
- Templeton, D. H. & Templeton, L. K. (1982). *X-ray dichroism and polarized anomalous scattering of the uranyl ion.* *Acta Cryst.* **A38**, 62–67.
- Templeton, D. H. & Templeton, L. K. (1985). *X-ray dichroism and anomalous scattering of potassium tetrachloroplatinate.* *Acta Cryst.* **A41**, 133–142.
- Templeton, D. H. & Templeton, L. K. (1986). *X-ray birefringence and forbidden reflections in sodium bromate.* *Acta Cryst.* **A42**, 478–481.
- Teo, B. K. (1981). *EXAFS spectroscopy: techniques and applications*, edited by B. K. Teo & D. C. Joy, Chap. 3, pp. 13–59. New York: Plenum.
- Teo, B. K. & Joy, D. C. (1981). Editors. *EXAFS spectroscopy: techniques and applications.* New York: Plenum.
- Teo, B. K. & Lee, P. A. (1979). *Ab initio calculations of amplitude and phase functions for extended X-ray absorption fine structure spectroscopy.* *J. Am. Chem. Soc.* **101**, 2815–2832.
- Teo, B. K., Lee, P. A., Simons, A. L., Eisenberger, P. & Kincaid, B. M. (1977). *EXAFS. Approximation, parameterization and chemical transferability of amplitude function.* *J. Am. Chem. Soc.* **99**, 3854–3856.
- Winick, H. & Doniach, S. (1980). Editors. *Synchrotron radiation research.* New York: Plenum.

Woodruff, D. P. (1986). *Fine structure in ionization cross sections and applications to surface science.* *Rep. Prog. Phys.* **49**, 683–723.

Yamaguchi, T., Mitsunaga, T., Yoshida, N., Wakita, H., Fujiwara, M., Matsushita, T., Ikeda, S. & Nomura, M. (1993). *XAFS study with an in situ electrochemical cell on manganese Schiff base complexes as a model of a photosystem.* *Jpn. J. Appl. Phys.* **32**, Suppl. 32-2, 533–535.

4.2.4

Allen, S. J. M. (1935). *X-rays in theory and experiment*, edited by A. H. Compton & S. K. Allison, pp. 799–806. New York: Van Nostrand.

Allen, S. J. M. (1969). *Handbook of chemistry and physics*, edited by R. C. Weast, pp. E143–E144. Cleveland: The Chemical Rubber Co.

Band, I. M., Kharitonov, Yu. I. & Trzhaskovskaya, M. B. (1979). *Photoionization cross sections and photoelectron angular distributions for X-ray line energies in the range 0.132–4.509 keV.* *At. Data Nucl. Data Tables*, **23**, 443–505.

Creagh, D. C. (1987). *Resolution of discrepancies in tables of photon attenuation cross sections.* *Nucl. Instrum. Methods*, **A255**, 38–42.

Creagh, D. C. (1990). *An evaluation of tabulations of X-ray attenuation coefficients: the new versus the old.* *Nucl. Instrum. Methods*, **A295**, 417–439.

Creagh, D. C. & Hubbell, J. H. (1987). *Problems associated with the measurement of X-ray attenuation coefficients. I. Silicon.* *Acta Cryst.* **A43**, 102–112.

Creagh, D. C. & Hubbell, J. H. (1990). *Problems associated with the measurement of X-ray attenuation coefficients. II. Carbon.* *Acta Cryst.* **A46**, 402–408.

Cromer, D. T. (1969). *Anomalous dispersion corrections computed from self consistent field relativistic Dirac–Slater wavefunctions.* *J. Chem. Phys.* **50**, 4857–4859.

Cromer, D. T. & Liberman, D. (1970). *Relativistic calculation of anomalous scattering for X-rays.* *J. Chem. Phys.* **53**, 1891–1898.

Cromer, D. T. & Mann, J. B. (1967). *Compton scattering factors for spherically symmetric free atoms.* *J. Chem. Phys.* **47**, 1892–1893.

Cromer, D. T. & Waber, J. T. (1974). *Atomic scattering factors for X-rays. Section 2.2. International tables for X-ray crystallography, Vol. IV*, edited by J. A. Ibers & W. C. Hamilton, pp. 71–147. Birmingham: Kynoch Press. (Present distributor Kluwer Academic Publishers, Dordrecht.)

De Marco, J. J. & Suortti, P. (1971). *Effect of scattering on the attenuation of X-rays.* *Phys. Rev. B*, **4**, 1028–1033.

Doyle, P. A. & Turner, P. S. (1968). *Relativistic Hartree–Fock X-ray and electron scattering factors.* *Acta Cryst.* **A24**, 390–397.

Gerward, L. (1986). *Empirical absorption equations for use in X-ray spectrometric analysis.* *X-ray Spectrom.* **15**, 29–33.

Heinrich, K. F. J. (1966). *X-ray absorption uncertainty. The electron microprobe*, edited by T. D. McKinley, K. F. J. Heinrich & D. B. Wittrey, pp. 296–377. New York: John Wiley.

Henke, B. L., Lee, P., Tanaka, T. J., Shimambukuro, R. L. & Fujikawa, B. K. (1982). *Low-energy X-ray interaction coefficients: photoabsorption, scattering and reflection.* *At. Data Nucl. Data Tables*, **27**, 1–144.

REFERENCES

4.2.4 (cont.)

- Hubbell, J. H., Gerstenberg, H. M. & Saloman, E. B. (1986). *Bibliography of photon total cross section (attenuation coefficient) measurements 10 eV to 13.5 GeV*. Report NBSIR 86-3461. National Institute of Standards and Technology, Gaithersburg, MD, USA.
- Hubbell, J. H., McMaster, W. H., Del Grande, N. K. & Mallett, J. H. (1974). *X-ray cross sections and attenuation coefficients. International tables for X-ray crystallography*, Vol. IV, pp. 47-70. Birmingham: Kynoch Press. (Present distributor Kluwer Academic Publishers, Dordrecht.)
- Hubbell, J. H. & Øverbø, I. (1979). *Relativistic atomic form factors and photon coherent scattering cross sections*. *J. Phys. Chem. Ref. Data*, **8**, 69-105.
- Hubbell, J. H., Veigele, W. J., Briggs, E. A., Brown, R. T., Cromer, D. T. & Howerton, R. J. (1975). *Atomic form factors, incoherent scattering functions and photon scattering cross sections*. *J. Phys. Chem. Ref. Data*, **4**, 471-538.
- Jackson, D. F. & Hawkes, D. J. (1981). *X-ray attenuation coefficients of elements and mixtures*. *Phys. Rep.* **70**, 169-233.
- Kane, P. P., Kissel, L., Pratt, R. H. & Roy, S. C. (1986). *Elastic scattering of γ -rays and X-rays by atoms*. *Phys. Rep.* **150**, 75-159.
- Kissel, L., Roy, S. C. & Pratt, R. H. (1980). *Rayleigh scattering by neutral atoms 100 eV to 10 MeV*. *Phys. Rev. A*, **22**, 1970-2004.
- Koch, B., MacGillavry, C. H. & Milledge, H. J. (1962). *Absorption. International tables for X-ray crystallography*, Vol. III, Section 2.2, pp. 157-192. Birmingham: Kynoch Press.
- Leroux, J. & Thinh, T. P. (1977). *Revised tables of X-ray mass attenuation coefficients*. Quebec: Corporation Scientifique Claisse, Inc.
- Levinger, J. S. (1952). *Small angle coherent scattering of gammas by bound electrons*. *Phys. Rev.* **87**, 656-662.
- Liebhaufsky, H. A., Pfeiffer, H. G., Winslow, E. H. & Zeman, P. D. (1960). *X-ray absorption and emission analytical chemistry*, pp. 313-317. New York: John Wiley.
- McMaster, W. H., Del Grande, N. K., Mallett, J. H. & Hubbell, J. H. (1969/1970). *Compilation of X-ray cross sections*. Report UCRL-50174. (Section I, 1970; Section II, 1969; Section III, 1969; Section IV 1969.) Lawrence Livermore National Laboratory, Livermore, CA, USA.
- Montenegro, E. C., Baptista, G. B. & Duarte, P. W. E. P. (1978). *K and L X-rays mass attenuation coefficients for low-Z materials*. *At. Data Nucl. Data Tables*, **22**, 131-177.
- Øverbø, I. (1977). *The Coulomb correction to electron pair production by intermediate-energy photons*. *Phys. Lett. B*, **71**, 412-414.
- Øverbø, I. (1978). *Large-q form factors for light atoms*. *Phys. Scr.* **17**, 547-549.
- Pirenne, M. H. (1946). *The diffraction of X-rays and electrons by free molecules*. Cambridge University Press.
- Plechaty, E. F., Cullen, E. E. & Howerton, R. J. (1981). *Tables and graphs of photon-interaction cross sections from 0.1 keV to 100 MeV*. Derived from the LLL Evaluated-Nuclear-Data Library. Report UCRL-50400, Vol. 6, Rev. 3. Lawrence Livermore National Laboratory, Livermore, CA, USA.
- Saloman, E. B. & Hubbell, J. H. (1986). *X-ray attenuation coefficients (total cross sections): comparison of the experimental data base with the recommended values of Henke and the theoretical values of Scofield for energies between 0.1-100 keV*. Report NBSIR 86-3431. National Institute of Standards and Technology, Gaithersburg, MD, USA.
- Saloman, E. B. & Hubbell, J. H. (1987). *Critical analysis of soft X-ray cross section data*. *Nucl. Instrum. Methods*, **A255**, 38-42.
- Saloman, E. B., Hubbell, J. H. & Scofield, J. H. (1988). *At. Data Nucl. Data Tables*, **38**, 1-197.
- Sano, H., Ohtaka, K. & Ohtsuki, Y. H. (1969). *Normal and abnormal absorption coefficients of X-rays*. *J. Phys. Soc. Jpn.*, **27**, 1254-1261.
- Schaupp, D., Schumacher, M., Smend, F., Rullhausen, P. & Hubbell, J. H. (1983). *Small-angle Rayleigh scattering of photons at high energies: tabulations of relativistic HFS modified atomic form factors*. *J. Phys. Chem. Ref. Data*, **12**, 467-512.
- Scofield, J. H. (1973). *Theoretical photoionization cross sections from 1 to 1500 keV*. UCRL-51326. Lawrence Livermore National Laboratory, Livermore, CA, USA.
- Scofield, J. H. (1986). Personal communication to E. B. Saloman and J. H. Hubbell. *Calculated photoeffect values 0.1 to 1.0 keV*. [Presented in Saloman & Hubbell (1986) and Saloman *et al.* (1988).]
- Storm, E. & Israel, H. I. (1970). *Photon cross sections from 0.001 to 100 MeV for elements 1 through 100*. *Nucl. Data Tables*, **A7**, 565-681.
- Theisen, R. & Vollath, D. (1967). *Tables of X-ray mass attenuation coefficients*. Düsseldorf: Verlag Stahl-Verlag.
- Veigele, W. J. (1973). *Photon cross sections from 0.1 keV to 1 MeV for elements Z = 1 to Z = 94*. *At. Data*, **5**, 51-111.
- Victoreen, J. A. (1949). *The calculation of X-ray mass absorption coefficients*. *J. Appl. Phys.* **20**, 1141-1147.
- Yeh, J. J. & Lindau, I. (1985). *Atomic subshell photoionization cross sections and asymmetry parameters: $1 \leq Z \leq 103$* . *At. Data Nucl. Data Tables*, **32**, 1-156.

4.2.5

- Balaic, D. X., Barnea, Z., Nugent, K. A., Garrett, R. F., Varghese, J. N. & Wilkins, S. W. (1996). *Protein crystal diffraction patterns using a capillary-focused synchrotron X-ray beam*. *J. Synchrotron Rad.* **3**, 289-295.
- Balaic, D. X. & Nugent, K. A. (1995). *The X-ray optics of tapered capillaries*. *Appl. Opt.* **34**, 7263-7272.
- Balaic, D. X., Nugent, K. A., Barnea, Z., Garrett, R. & Wilkins, S. W. (1995). *Focusing of X-rays by total external reflection from a paraboloidally tapered glass capillary*. *J. Synchrotron Rad.* **2**, 296-299.
- Beaumont, J. H. & Hart, M. (1973). *Multiple-Bragg reflection monochromators for synchrotron radiation*. *J. Phys. E*, **7**, 823-829.
- Berman, L. E. & Hart, M. (1991). *Adaptive crystal optics for high power synchrotron sources*. *Nucl. Instrum. Methods*, **A302**, 558-562.
- Bilderback, D. H., Thiel, D. J., Pahl, R. & Brister, K. E. (1994). *X-ray applications with glass-capillary optics*. *J. Synchrotron Rad.* **1**, 37-42.
- Bonse, U. & Hart, M. (1965). *Tailless X-ray single-crystal reflection curves obtained by multiple reflection*. *Appl. Phys. Lett.* **7**, 238-240.
- Brodsky, A. (1982). Editor. *Handbook of radiation measurement and protection*, Vols. 1 and 2. Florida: CRC Press.

4. PRODUCTION AND PROPERTIES OF RADIATIONS

4.2.5 (cont.)

- Creagh, D. C. & Garrett, R. F. (1995). *Testing of a sagittal focusing monochromator at BL 20B at the Photon Factory. Access to major facilities program*, edited by J. W. Boldeman, pp. 251–252. Sydney: ANSTO.
- Delf, B. W. (1961). *The effect of absorption in the β -filter on the mean wavelength of X-ray emission lines*. *Proc. Phys. Soc. London*, **78**, 305–306.
- Engström, P., Rindby, A. & Vincze, L. (1996). *Capillary optics*. *ESRF Newsletter*, **26**, 30–31.
- Freund, A. K. (1993). *Thin is beautiful*. *ESRF Newsletter*, **19**, 11–13.
- Fukumachi, T., Nakano, Y. & Kawamura, T. (1986). *Energy dependence of X-ray reflectivity from multi-layer mirrors. X-ray instrumentation for the Photon Factory: dynamic analyses of micro-structures in matter*, edited by S. Hosoya, Y. Iitaka & H. Hashizume, pp. 25–34. Japan: Photon Factory.
- Giles, C., Vettier, C., de Bergevin, F., Grubel, G., Goulon, J. & Grossi, F. (1994). *X-ray polarimetry with phase plates*. *ESRF Newsletter*, **21**, 16–17.
- Grey, D. (1996). *Instrumentation developments and observations in hard X-ray astronomy*. PhD thesis. The University of New South Wales, Australia.
- Hanfand, M., Häusermann, D., Snigirev, A., Snigireva, I., Ahahama, Y. & McMahon, M. (1994). *Bragg–Fresnel lens for high pressure studies*. *ESRF Newsletter*, **22**, 8–9.
- Hart, M. (1971). *Bragg reflection X-ray optics*. *Rep. Prog. Phys.* **34**, 435–490.
- Hart, M. & Rodrigues, A. R. D. (1978). *Harmonic-free single-crystal monochromators for neutrons and X-rays*. *J. Appl. Cryst.* **11**, 248–253.
- Hashizume, H. (1983). *Asymmetrically grooved monolithic crystal monochromators for suppression of harmonics in synchrotron X-radiation*. *J. Appl. Cryst.* **16**, 420–427.
- Holt, S. A., Brown, A. S., Creagh, D. C. & Leon, R. (1997). *The application of grazing incidence X-ray diffraction and specular reflectivity to the structural investigation of multiple quantum well and quantum dot semiconductor devices*. *J. Synchrotron Rad.* **4**, 169–174.
- Jennings, L. D. (1981). *Extinction, polarization and crystal monochromators*. *Acta Cryst.* **A37**, 584–593.
- Kikuta, S. (1971). *X-ray crystal monochromators using successive asymmetric diffractions and their applications to measurements of diffraction curves. II. Type I collimator*. *J. Phys. Soc. Jpn.* **30**, 222–227.
- Kikuta, S. & Kohra, K. (1970). *X-ray crystal collimators using successive asymmetric diffractions and their applications to measurements of diffraction curves. I. General considerations on collimators*. *J. Phys. Soc. Jpn.* **29**, 1322–1328.
- Kumakov, M. A. & Komarov, F. F. (1990). *Multiple reflection from surface X-ray optics*. *Phys. Rep.* **191**(5), 284–350.
- Matsushita, T., Ishikawa, T. & Oyanagi, H. (1986). *Sagittally focusing double-crystal monochromator with constant exit height at the Photon Factory*. *Nucl. Instrum. Methods*, **A246**, 377–379.
- Matsushita, T., Kikuta, S. & Kohra, K. (1971). *X-ray crystal monochromators using successive asymmetric diffractions and their applications to measurements of diffraction curves. III. Type II collimators*. *J. Phys. Soc. Jpn.* **30**, 1136–1144.
- Oshima, K., Harada, J. & Sakabe, N. (1986). *Curved crystal monochromator. X-ray instrumentation for the Photon Factory: dynamic analyses of micro-structures in matter*, edited by S. Hosoya, Y. Iitaka & H. Hashizume, pp. 35–41. Japan: Photon Factory.
- OSMIC (1996). *Catalogue. A new family of collimating and focusing optics for X-ray analysis*. OSMIC, Michigan, USA.
- Peele, A. G., Nugent, K. A., Rode, A. V., Gabel, K., Richardson, M. C. M., Strack, R. & Siegmund, W. (1996). *X-ray focusing with lobster-eye optics: a comparison of theory with experiment*. *Appl. Opt.* **35**, 4420–4425.
- Siemens (1996a). *Parallel beam optics for measurements of samples with irregularly shaped surfaces*. Laboratory Report X-ray Analysis, DXRD, 13. Karlsruhe: Siemens.
- Siemens (1996b). *Goebel mirrors for X-ray reflectometry investigations*. Laboratory Report X-ray Analysis, DXRD, 14. Karlsruhe: Siemens.
- Siemens (1996c). *Grazing incidence diffraction with Goebel mirrors*. Laboratory Report X-ray Analysis, DXRD, 15. Karlsruhe: Siemens.
- Snigirev, A. (1994). *Bragg–Fresnel optics: new fields of applications*. *ESRF Newsletter*, **22**, 20–21.
- Stephens, P. W., Eng, P. J. & Tse, T. (1992). *Construction and performance of a bent crystal X-ray monochromator*. *Rev. Sci. Instrum.* **64**, 374–378.
- Sussini, J. & Laberge, D. (1995). *Bi-morph piezo-electric mirror: a novel active mirror*. *Synchrotron Rad. News*, **8**, 21–26.
- Warren, B. E. (1968). *X-ray diffraction*. New York: Addison-Wesley.
- Young, R. A. (1963). *Balanced filters for X-ray diffractometry*. *Z. Kristallogr.* **118**, 233–247.
- Young, R. A. (1993). *The Rietveld method*. Oxford University Press.

4.2.6

- Agarwal, B. K. (1979). *X-ray spectroscopy*, p. 215. Berlin: Springer-Verlag.
- Akhiezer, A. I. & Berestetsky, V. B. (1957). *Quantum electrodynamics*. TESE, Oak Ridge, Tennessee, USA.
- Aldred, P. J. E. & Hart, M. (1973a). *The electron distribution in silicon. I. Experiment*. *Proc. R. Soc. London Ser. A*, **332**, 233–238.
- Aldred, P. J. E. & Hart, M. (1973b). *The electron distribution in silicon. II. Theoretical interpretation*. *Proc. R. Soc. London Ser. A*, **332**, 239–254.
- Aristov, V. V., Shmytko, I. M. & Shulakov, E. V. (1977). *Dynamical contrast of the topographic image of a crystal with continuous X-radiation*. *Acta Cryst.* **A33**, 412–418.
- Begum, R., Hart, M., Lea, K. R. & Siddons, D. P. (1986). *Direct measurements of the complex X-ray atomic scattering factors for elements by X-ray interferometry at the Daresbury synchrotron radiation source*. *Acta Cryst.* **A42**, 456–463.
- Bijvoet, J. M., Peerdeman, A. F. & Van Bommel, A. J. (1951). *Determination of the absolute configuration of optically active compounds by means of X-rays*. *Nature (London)*, **168**, 271.
- Blume, M. (1994). *Magnetic effects in anomalous dispersion. Resonant anomalous X-ray scattering*, edited by G. Materlik, C. J. Sparks & K. Fischer, pp. 495–512. Amsterdam: North Holland.
- Bonse, U. & Hart, M. (1965). *Tailless X-ray single crystal reflection curves obtained by multiple reflection*. *Appl. Phys. Lett.* **1**, 238–242.
- Bonse, U. & Hart, M. (1966a). *A Laue-case X-ray interferometer*. *Z. Phys.* **188**, 154–162.
- Bonse, U. & Hart, M. (1966b). *An X-ray interferometer with Bragg-case beam splitting*. *Z. Phys.* **194**, 1–17.

REFERENCES

4.2.6 (cont.)

- Bonse, U. & Hart, M. (1966c). *Moire patterns of atomic planes obtained by X-ray interferometry*. *Z. Phys.* **190**, 455–467.
- Bonse, U. & Hart, M. (1966d). *Small single X-ray scattering by spherical particles*. *Z. Phys.* **189**, 151–165.
- Bonse, U. & Hart, M. (1970). *Interferometry with X-rays*. *Phys. Today*, **23**(8), 26–31.
- Bonse, U. & Hartmann-Lotsch, I. (1984). *Kramers–Kronig correlation of measured $f'(E)$ and $f''(E)$ values*. *Nucl. Instrum. Methods*, **222**, 185–188.
- Bonse, U., Hartmann-Lotsch, I. & Lotsch, H. (1983a). *Interferometric measurement of absorption $\mu(E)$ and dispersion $f'(E)$ at the K edge of copper*. *EXAFS and near edge structure*, edited by A. Bianconi, I. Incoccia & A. S. Stipcich, pp. 376–377. Berlin: Springer.
- Bonse, U., Hartmann-Lotsch, I. & Lotsch, H. (1983b). *The X-ray interferometer for high resolution measurement of anomalous dispersion at HASYLAB*. *Nucl. Instrum. Methods*, **208**, 603–604.
- Bonse, U. & Hellkötter, H. (1969). *Interferometrische Messung des Brechungsindex für Röntgenstrahlen*. *Z. Phys.* **223**, 345–352.
- Bonse, U. & Henning, A. (1986). *Measurement of polarization isotropy of the anomalous forward scattering amplitude at the niobium K-edge in LiNbO_3* . *Nucl. Instrum. Methods*, **A246**, 814–816.
- Bonse, U. & Materlik, G. (1972). *Dispersionskorrektur für Nickel nahe der K-Absorptionskante*. *Z. Phys.* **253**, 232–239.
- Bonse, U. & Materlik, G. (1975). *Dispersion correction measurements by X-ray interferometry*. *Anomalous scattering*, edited by S. Ramaseshan & S. C. Abrahams, pp. 107–109. Copenhagen: Munksgaard.
- Brown, G. E., Peierls, R. E. & Woodward, J. B. (1955). *The coherent scattering of γ -rays by K electrons in heavy atoms: method*. *Proc. R. Soc. London Ser. A*, **227**, 51–63.
- Brysk, H. & Zerby, C. D. (1968). *Photoelectric cross sections in the keV range*. *Phys. Rev.* **171**, 292–298.
- Buras, B. & Tazzari, S. (1985). *The European Synchrotron Radiation Facility. Report of the ESRP*, pp. 6–32. European Synchrotron Radiation Project, CERN, LEP Division, Geneva, Switzerland.
- Chantler, C. T. (1994). *Towards improved form factor tables. Resonant anomalous X-ray scattering*, edited by G. Materlik, C. J. Sparks & K. Fischer, pp. 61–79. Amsterdam: North Holland.
- Chantler, C. T. (1995). *Theoretical form factor, attenuation and scattering tabulation for $Z=1-92$ from $1-10\text{eV}$ to $E=0.4-1.0\text{MeV}$* . *J. Phys. Chem. Ref. Data*, **24**, 71–643.
- Chapuis, G., Templeton, D. H. & Templeton, L. K. (1985). *Solving crystal structures using several wavelengths from conventional sources. Anomalous scattering by holmium*. *Acta Cryst.* **A41**, 274–278.
- Cole, H. & Stemple, N. R. (1962). *Effect of crystal perfection and polarity on absorption edges seen in Bragg diffraction*. *J. Appl. Phys.* **33**, 2227–2233.
- Creagh, D. C. (1970). *On the measurement of X-ray dispersion corrections using X-ray interferometers*. *Aust. J. Phys.* **23**, 99–103.
- Creagh, D. C. (1977). *Determination of the mass attenuation coefficients and the anomalous dispersion corrections for calcium at X-ray wavelengths from $\text{I K}\alpha_1$ to $\text{Cu K}\alpha_1$* . *Phys. Status Solidi A*, **39**, 705–715.
- Creagh, D. C. (1978). *A new device for the precise measurement of X-ray attenuation coefficients and dispersion corrections*. *Advances in X-ray analysis*, Vol. 21, edited by C. S. Barrett & D. E. Leyden, pp. 149–153. New York: Plenum.
- Creagh, D. C. (1980). *X-ray interferometer measurements of the anomalous dispersion correction $f'(\omega, 0)$ for some low Z elements*. *Phys. Lett. A*, **77**, 129–132.
- Creagh, D. C. (1982). *On the use of photoelectric attenuation coefficients for the determination of the anomalous dispersion coefficient f' for X-rays*. *Phys. Lett. A*, **103**, 52–56.
- Creagh, D. C. (1984). *The real part of the forward scattering factor for aluminium*. Unpublished.
- Creagh, D. C. (1985). *Theoretical and experimental techniques for the determination of X-ray anomalous dispersion corrections*. *Aust. J. Phys.* **38**, 371–404.
- Creagh, D. C. (1986). *The X-ray anomalous dispersion of materials*. In *Recent advances in X-ray characterization of materials*, edited by P. Krishna, Chap. 7. Oxford: Pergamon Press.
- Creagh, D. C. (1990). *Tables of X-ray dispersion corrections and attenuation coefficients: the new versus the old*. *Nucl. Instrum. Methods*, **A295**, 417–434.
- Creagh, D. C. (1993). *f' : its present and its future*. *Ind. J. Phys.* **67B**, 511–525.
- Creagh, D. C. & Cookson, D. J. (1995). *Diffraction anomalous fine structure study of basic zinc sulphate and basic zinc sulphonate*. In *Photon Factory Activity Report 1994*, edited by K. Nasu. National Laboratory for High Energy Physics, Tsukuba 93-0305, Japan.
- Creagh, D. C. & Hart, M. (1970). *X-ray interferometric measurements of the forward scattering amplitude of lithium fluoride*. *Phys. Status Solidi*, **37**, 753–758.
- Creagh, D. C. & Hubbell, J. H. (1987). *Problems associated with the measurement of X-ray attenuation coefficients. I. Silicon*. *Acta Cryst.* **A43**, 102–112.
- Creagh, D. C. & Hubbell, J. H. (1990). *Problems associated with the measurement of X-ray attenuation coefficients. II. Carbon*. *Acta Cryst.* **A46**, 402–408.
- Cromer, D. T. & Liberman, D. A. (1970). *Relativistic calculation of anomalous scattering factors for X-rays*. *J. Chem. Phys.* **53**, 1891–1898.
- Cromer, D. T. & Liberman, D. A. (1981). *Anomalous dispersion calculations near to and on the long-wavelength side of an absorption edge*. *Acta Cryst.* **A37**, 267–268.
- Cromer, D. T. & Liberman, D. A. (1983). *Calculation of anomalous scattering factors at arbitrary wavelengths*. *J. Appl. Cryst.* **16**, 437.
- Cromer, D. T. & Waber, J. T. (1974). *Atomic scattering factors for X-rays. International tables for X-ray crystallography*, Vol. IV, edited by J. A. Ibers & W. C. Hamilton, Chap. 2.2, pp. 71–147. Birmingham: Kynoch Press. (Present distributor Kluwer Academic Publishers, Dordrecht.)
- Cusatis, C. & Hart, M. (1975). *Dispersion correction measurements by X-ray interferometry*. *Anomalous scattering*, edited by S. Ramaseshan & S. C. Abrahams, pp. 57–68. Copenhagen: Munksgaard.
- Cusatis, C. & Hart, M. (1977). *The anomalous dispersion corrections for zirconium*. *Proc. R. Soc. London Ser. A*, **354**, 291–302.
- Deutsch, M. & Hart, M. (1982). *Wavelength energy shape and structure of the $\text{Cu K}\alpha_1$ X-ray emission line*. *Phys. Rev. B*, **26**, 5550–5567.
- Deutsch, M. & Hart, M. (1984a). *Noninterferometric measurement of the X-ray refractive index of beryllium*. *Phys. Rev. B*, **30**, 643–646.

4. PRODUCTION AND PROPERTIES OF RADIATIONS

4.2.6 (cont.)

- Deutsch, M. & Hart, M. (1984b). *X-ray refractive-index measurement in silicon and lithium fluoride*. *Phys. Rev. B*, **30**, 640–642.
- Deutsch, M. & Hart, M. (1985). *A new approach to the measurement of X-ray structure amplitudes determined by the Pendellösung method*. *Acta Cryst.* **A41**, 48–55.
- Dreier, P., Rabe, P., Malzfeldt, W. & Niemann, W. (1984). *Anomalous X-ray scattering factors calculated from experimental absorption factor*. *J. Phys. C*, **7**, 3123–3136.
- Engel, D. H. & Sturm, M. (1975). *Experimental determination of f'' for heavy atoms*. *Anomalous scattering*, edited by S. Ramaseshan & S. C. Abrahams, pp. 93–100. Copenhagen: Munksgaard.
- Fermi, E. (1928). *Eine statistische Methode zur Bestimmung einiger geschafften des Atoms und ihre Anwendung auf die Theorie des periodische Systems der Elemente*. *Z. Phys.* **48**, 73–79.
- Fock, V. (1930). *Näherungsmethode zur Lösung des quantenmechanischen Mehrkörperproblems*. *Z. Phys.* **61**, 126–148.
- Freund, A. (1975). *Anomalous scattering of X-rays in copper*. *Anomalous scattering*, edited by S. Ramaseshan & S. C. Abrahams, pp. 69–86. Copenhagen: Munksgaard.
- Fuoss, P. H. & Bienenstock, A. (1981). *X-ray anomalous scattering factors – measurements and applications*. *Inner-shell and X-ray physics of atoms and solids*, edited by D. J. Fabian, A. Kleinpoppen & L. M. Watson, pp. 875–884. New York: Plenum.
- Gavrila, M. (1981). *Photon atom elastic scattering in inner-shell and X-ray physics of atoms and solids*, edited by B. Craseman. New York: Plenum.
- Gerward, L. (1982). *X-ray attenuation coefficients of copper in the energy range 5 to 50 keV*. *Z. Naturforsch. Teil A*, **37**, 451–459.
- Gerward, L. (1983). *X-ray attenuation coefficients of carbon in the energy range 5 to 20 keV*. *Acta Cryst.* **A39**, 322–325.
- Gerward, L., Thuesen, G., Stibius-Jensen, M. & Alstrup, I. (1979). *X-ray anomalous scattering factors for silicon and germanium*. *Acta Cryst.* **A35**, 852–857.
- Grimvall, G. & Persson, E. (1969). *Absorption of X-rays in germanium*. *Acta Cryst.* **A25**, 417–422.
- Hart, M. (1968). *An ångström ruler*. *J. Phys. D*, **1**, 1405–1408.
- Hart, M. (1985). *Private communication*.
- Hart, M. (1994). *Polarizing X-ray optics and anomalous dispersion in chiral systems*. *Resonant anomalous X-ray scattering*, edited by G. Materlik, C. J. Sparks & K. Fischer, pp. 103–118. Amsterdam: North Holland.
- Hart, M. & Siddons, D. P. (1981). *Measurements of anomalous dispersion corrections made from X-ray interferometers*. *Proc. R. Soc. London Ser. A*, **376**, 465–482.
- Hartree, D. R. (1928). *The wavemechanics of an atom with a non-Coulomb central field*. *Proc. Cambridge Philos. Soc.* **24**, 89–132.
- Hashimoto, H., Kozaki, S. & Ohkawa, T. (1965). *Observations of Pendellösung fringes and images of dislocations by X-ray shadow micrographs of silicon crystals*. *Appl. Phys. Lett.* **6**, 16–17.
- Helliwell, J. R. (1984). *Synchrotron X-radiation protein crystallography*. *Rep. Prog. Phys.* **47**, 1403–1497.
- Hendrickson, W. A. (1994). *MAD phasing for macromolecular structures*. *Resonant anomalous X-ray scattering*, edited by G. Materlik, C. J. Sparks & K. Fischer, pp. 159–173. Amsterdam: North Holland.
- Henke, B. L., Lee, P., Tanaka, T. J., Shimambukuro, R. L. & Fujikawa, B. K. (1982). *Low-energy interaction coefficients: photoabsorption, scattering, and reflection*. *At. Data Nucl. Data Tables*, **27**, 1–144.
- Hönl, H. (1933a). *Zur Dispersions theorie der Röntgenstrahlen*. *Z. Phys.* **84**, 1–16.
- Hönl, H. (1933b). *Atomfactor für Röntgenstrahlen als Problem der Dispersionstheorie (K-Schale)*. *Ann. Phys. (Leipzig)*, **18**, 625–657.
- Hosoya, S. (1975). *Anomalous scattering measurements and amplitude and phase determinations with continuous X-rays*. *Anomalous scattering*, edited by S. Ramaseshan & S. C. Abrahams, pp. 275–287. Copenhagen: Munksgaard.
- Hubbell, J. H., Veigele, W. J., Briggs, E. A., Brown, R. T., Cromer, D. T. & Howerton, R. J. (1975). *Atomic form factors, incoherent scattering functions and photon scattering cross section*. *J. Chem. Phys. Ref. Data*, **4**, 471–538.
- International Tables for Crystallography* (1995). Vol. B. Dordrecht: Kluwer Academic Publishers.
- International Tables for X-ray Crystallography* (1974). Vol. IV. Birmingham: Kynoch Press. (Present distributor Kluwer Academic Publishers, Dordrecht.)
- Ishida, K. & Katoh, H. (1982). *Use of multiple reflection diffraction to measure X-ray refractive index*. *Jpn. J. Appl. Phys.* **21**, 1109.
- James, R. W. (1955). *The optical principles of the diffraction of X-rays*. Ithaca: Cornell University Press.
- Karle, J. (1980). *Anomalous dispersion and the use of triplet phase invariants*. *Int. J. Quantum. Chem.* **7**, 357–367.
- Karle, J. (1984a). *Rules for evaluating triplet phase invariants by use of anomalous dispersion data*. *Acta Cryst.* **A40**, 366–379.
- Karle, J. (1984b). *The relative scaling of multiple wavelength anomalous dispersion data*. *Acta Cryst.* **A40**, 1–4.
- Karle, J. (1984c). *Triplet phase invariants from and exact algebraic analysis of anomalous dispersion*. *Acta Cryst.* **A40**, 526–532.
- Karle, J. (1985). *Many algebraic formulas for the evaluation of triplet phase invariants from isomorphous replacement and anomalous dispersion data*. *Acta Cryst.* **A41**, 182–189.
- Katoh, H., Shimakura, H., Ogawa, T., Hattori, S., Kobayashi, Y., Umezawa, K., Ishikawa, T. & Ishida, K. (1985a). *Measurement of X-ray refractive index by multiple reflection diffractometer*. Activity Report, KEK, Tsukuba, Japan.
- Katoh, H., Shimakura, H., Ogawa, T., Hattori, S., Kobayashi, Y., Umezawa, K., Ishikawa, T. & Ishida, K. (1985b). *Measurement of the X-ray anomalous scattering of the germanium K-edge with synchrotron radiation*. *J. Phys. Soc. Jpn*, **54**, 881–884.
- Kirfel, A. (1994). *Anisotropy of anomalous scattering in single crystals*. *Resonant anomalous X-ray scattering*, edited by G. Materlik, C. J. Sparks & K. Fischer, pp. 231–256. Amsterdam: North Holland.
- Kissel, L. (1977). *Rayleigh scattering: elastic scattering by bound electrons*. PhD thesis, University of Pittsburgh, PA, USA.
- Kissel, L. & Pratt, R. H. (1985). *Rayleigh scattering: elastic photon scattering by bound electrons*. In *Atomic inner-shell physics*, edited by B. Craseman. New York: Plenum.
- Kissel, L., Pratt, R. H., Kane, P. P. & Roy, S. C. (1985). *Elastic scattering of X-rays and γ -rays by atoms*. Sandia Report SANDE5-0501J. Sandia, Albuquerque, NM, USA.
- Kissel, L., Pratt, R. H. & Roy, S. C. (1980). *Rayleigh scattering by neutral atoms, 100 eV to 10 MeV*. *Phys. Rev. A*, **22**, 1970–2004.

REFERENCES

4.2.6 (cont.)

- Kohn, W. & Sham, L. S. (1965). *Self consistent equations including exchange and correlation effects*. *Phys. Rev. A*, **140**, 1133–1138.
- Lengeler, B. (1994). *Experimental determination of the dispersion correction $f'(E)$ to the atomic scattering factor*. *Resonant anomalous X-ray scattering*, edited by G. Materlik, C. J. Sparks & K. Fischer, pp. 35–69. Amsterdam: North Holland.
- Liberman, D., Waber, J. T. & Cromer, D. T. (1965). *Self-consistent field Dirac-Slater wavefunctions for atoms and ions. I. Comparison with previous calculations*. *Phys. Rev. A*, **137**, 27–34.
- Morgenroth, W., Kirfel, A. & Fischer, K. (1994). *Computing kinematic diffraction intensities with anomalous scatterers – ‘forbidden’ axial reflections in space groups up to orthorhombic symmetry*. *Resonant anomalous X-ray scattering*, edited by G. Materlik, C. J. Sparks & K. Fischer, pp. 257–264. Amsterdam: North Holland.
- Nelms, A. T. & Oppenheimer, I. (1955). *J. Res. Natl Bur. Stand.* **55**, 53–62.
- Philips, J. C. & Hodgson, K. O. (1985). *Single-crystal X-ray diffraction and anomalous scattering using synchrotron radiation*. *Synchrotron radiation research*, edited by H. Winick & S. Doniach, pp. 565–604. New York: Plenum.
- Philips, J. C., Templeton, D. H., Templeton, L. K. & Hodgson, K. O. (1978). *L-III edge anomalous X-ray scattering by cesium measured with synchrotron radiation*. *Science*, **201**, 257–259.
- Pratt, R. H., Kissel, L. & Bergstrom, P. M. Jr (1994). *New relativistic S-matrix results for scattering – beyond the anomalous factors/beyond impulse approximation*. *Resonant anomalous X-ray scattering*, edited by G. Materlik, C. J. Sparks & K. Fischer, pp. 9–34. Amsterdam: North Holland.
- Price, P. F., Maslen, E. N. & Mair, S. L. (1978). *Electron-density studies. III. A re-evaluation of the electron distribution in crystalline silicon*. *Acta Cryst.* **A34**, 183–193.
- Ramaseshan, S. & Abrahams, S. C. (1975). *Anomalous scattering*. Copenhagen: Munksgaard.
- Roy, S. C., Kissel, L. & Pratt, R. H. (1983). *Elastic photon scattering at small momentum transfer and validity of form-factor theories*. *Phys. Rev. A*, **27**, 285–290.
- Roy, S. C. & Pratt, R. H. (1982). *Validity of non relativistic dipole approximation for forward Rayleigh scattering*. *Phys. Rev. A*, **26**, 651–653.
- Schaupp, D., Schumacher, M., Smend, F., Rullhausen, P. & Hubbell, J. H. (1983). *Small-angle Rayleigh scattering of photons at high energies: tabulations of relativistic HFS modified atomic form factors*. *J. Phys. Chem. Ref. Data*, **12**, 467–511.
- Scofield, J. (1973). *Theoretical photoionization cross sections from 1 to 1500 keV*. Report UCRL-51326. Lawrence Livermore National Laboratory, Livermore, USA.
- Siddons, P. & Hart, M. (1983). *Simultaneous measurements of the real and imaginary parts of the X-ray anomalous dispersion using X-ray interferometers*. *EXAFS and near edge structure*, edited by A. Branconi, L. Incoccia & S. Stipcich, pp. 373–375. Berlin: Springer.
- Smith, D. Y. (1987). *Anomalous X-ray scattering: relativistic effects in X-ray dispersion analysis*. *Phys. Rev. A*, **35**, 3381–3387.
- Sorenson, L. O. (1994). *Diffraction anomalous fine structure*, edited by G. Materlik, C. J. Sparks & K. Fischer, pp. 389–420. Amsterdam: North Holland.
- Stanglmeier, F., Lengeler, B., Weber, W., Gobel, H. & Schuster, M. (1992). *Determination of the dispersive correction $f'(E)$ to the atomic form factor from X-ray reflection*. *Acta Cryst.* **A48**, 626–639.
- Stearns, D. G. (1984). *Broadening of extended X-ray absorption fine structure ensuing from the finite lifetime of the K hole*. *Philos. Mag.* **49**, 541–558.
- Stibius-Jensen, M. (1979). *Some remarks on the anomalous scattering factors for X-rays*. *Phys. Lett. A*, **74**, 41–44.
- Stibius-Jensen, M. (1980). *Atomic X-ray scattering factors for forward scattering beyond the dipole approximation*. Personal communication.
- Storm, E. & Israel, H. (1970). *Photon cross sections from 0.001 to 100 MeV for elements 1 through 100*. *Nucl. Data Tables*, **A7**, 565–681.
- Suortti, P., Hastings, J. B. & Cox, D. E. (1985). *Powder diffraction with synchrotron radiation. II. Dispersion factors of Ni*. *Acta Cryst.* **A41**, 417–420.
- Takama, T., Iwasaki, N. & Sato, S. (1980). *Measurement of X-ray Pendellösung intensity beats in diffracted white radiation from silicon wafers*. *Acta Cryst.* **A36**, 1025–1030.
- Takama, T., Kobayashi, K., Hyogah, H., Wittono, G. & Sato, S. (1984). *Atomic scattering factors of Zn determined from measurement of Pendellösung intensity beats using white radiation*. *Jpn. J. Appl. Phys.* **23**, 11–14.
- Takama, T., Kobayashi, K. & Sato, S. (1982). *Determination of the atomic scattering factor of aluminium by the Pendellösung-beat measurement using white radiation*. *Trans. Jpn. Inst. Met.* **23**, 153–160.
- Takama, T. & Sato, S. (1982). *Atomic scattering factors of copper determined by Pendellösung beat measurements using white radiation*. *Philos. Mag.* **45**, 615–626.
- Takama, T. & Sato, S. (1984). *Determination of the atomic scattering factors of germanium by means of the Pendellösung beat measurement using white radiation*. *Jpn. J. Appl. Phys.* **20**, 1183–1190.
- Templeton, D. H. (1994). *X-ray resonance, then and now*. *Resonant anomalous X-ray scattering*, edited by G. Materlik, C. J. Sparks & K. Fischer, pp. 1–7. Amsterdam: North Holland.
- Templeton, D. H. & Templeton, L. K. (1978). *Cesium hydrogen tartrate and anomalous dispersion of cesium*. *Acta Cryst.* **A34**, 368–373.
- Templeton, D. H. & Templeton, L. K. (1985). *Tensor X-ray optical properties of the bromate ion*. *Acta Cryst.* **A41**, 133–142.
- Templeton, D. H., Templeton, L. K., Philips, J. C. & Hodgson, K. O. (1980). *Anomalous scattering of X-rays by cesium and cobalt measured with synchrotron radiation*. *Acta Cryst.* **A36**, 436–442.
- Thomas, L. H. (1927). *The calculation of atomic fields*. *Proc. Cambridge Philos. Soc.* **23**, 542–548.
- Wagenfeld, H. (1975). *Theoretical computations of X-ray dispersion corrections*. *Anomalous scattering*, edited by S. Ramaseshan & S. C. Abrahams, pp. 12–23. Copenhagen: Munksgaard.
- Waller, I. (1928). *Über eine verallgemeinerte Streuungsformel*. *Z. Phys.* **51**, 213–231.
- Wang, M. S. (1986). *Relativistic dispersion relation for X-ray anomalous scattering factor*. *Phys. Ref. A*, **34**, 636–637.
- Wang, M. S. & Pratt, R. H. (1983). *Importance of bound-bound transitions in the dispersion relation for calculation of soft-X-ray forward Rayleigh scattering from light elements*. *Phys. Rev. A*, **28**, 3115–3116.

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4.2.6 (cont.)

Zachariasen, W. H. (1945). *Theory of X-ray diffraction in crystals*. New York: Dover.

4.3.1

Bethe, H. A. (1928). *Theorie der Beugung von Elektronen an Kristallen*. *Ann. Phys (Leipzig)*, **87**, 55–129.

Blackman, M. (1939). *On the intensities of electron diffraction rings*. *Proc. R. Soc. London Ser A*, **173**, 68–82.

Coulthard, M. A. (1967). *A relativistic Hartree–Fock atomic field calculation*. *Proc. Phys. Soc.* **91**, 44–49.

Cowley, J. M. & Moodie, A. F. (1957). *The scattering of electrons by atoms and crystals. I. A new theoretical approach*. *Acta Cryst.* **10**, 609–619.

Cromer, D. T. & Waber, J. T. (1974). *Atomic scattering factors for X-rays. International tables for X-ray crystallography*, Vol. IV, Section 2.2. Birmingham: Kynoch Press. (Present distributor Kluwer Academic Publishers, Dordrecht.)

Doyle, P. A. & Turner, P. S. (1968). *Relativistic Hartree–Fock X-ray and electron scattering factors*. *Acta Cryst.* **A24**, 390–397.

Fox, A. G., O’Keefe, M. A. & Tabernor, M. A. (1989). *Relativistic Hartree–Fock X-ray and electron atomic scattering factors at high angles*. *Acta Cryst.* **A45**, 786–793.

Fujiwara, K. (1959). *Application of higher-order Born approximation to multiple elastic scattering of electrons in crystals*. *J. Phys. Soc. Jpn*, **14**, 1513–1524.

Fujiwara, K. (1961). *Relativistic dynamical theory of electron diffraction*. *J. Phys. Soc. Jpn*, **16**, 2226–2238.

Ibers, J. A. (1958). *Atomic scattering amplitudes for electrons*. *Acta Cryst.* **11**, 178–183.

International Tables for Crystallography (1992). Vol. B. Dordrecht: Kluwer Academic Publishers.

International Tables for X-ray Crystallography (1974). Vol. IV. Birmingham: Kynoch Press. (Present distributor Kluwer Academic Publishers, Dordrecht.)

MacGillavry, C. H. (1940). *Zur Prufung der Dynamischen Theorie der Elektronenbeugung an Kristallgitter*. *Physica (Utrecht)*, **7**, 329–343.

Mann, J. B. (1968). Los Alamos Scientific Laboratory Report LA3691, p. 168.

Peng, L. M. & Cowley, J. M. (1988). *Errors arising from numerical use of the Mott formula in electron image simulation*. *Acta Cryst.* **A44**, 1–5.

Rez, D., Rez, P. & Grant, I. (1994). *Dirac–Fock calculations of X-ray scattering factors and contributions to the mean inner potential for electron scattering*. *Acta Cryst.* **A50**, 481–497.

4.3.2

Bird, D. M. & King, Q. A. (1990). *Absorptive form factors for high-energy electron diffraction*. *Acta Cryst.* **A46**, 202–208.

Doyle, P. A. & Turner, P. S. (1968). *Relativistic Hartree–Fock X-ray and electron scattering factors*. *Acta Cryst.* **A24**, 390–397.

Fox, A. G., O’Keefe, M. A. & Tabernor, M. A. (1989). *Relativistic Hartree–Fock X-ray and electron atomic scattering factors at high angles*. *Acta Cryst.* **A45**, 786–793.

Peng, L.-M. (1998). *Electron scattering factors of ions and their parameterization*. *Acta Cryst.* **A54**, 481–485.

Peng, L. M., Ren, G., Dudarev, S. L. & Whelan, M. J. (1996). *Robust parameterization of elastic and absorptive electron atomic scattering factors*. *Acta Cryst.* **A52**, 257–276.

Rez, D., Rez, P. & Grant, I. (1994). *Dirac–Fock calculations of X-ray scattering factors and contributions to the mean inner potential for electron scattering*. *Acta Cryst.* **A50**, 481–497.

Weickenmeier, A. & Kohl, H. (1991). *Computation of absorptive form factors for high-energy electron diffraction*. *Acta Cryst.* **A47**, 590–597.

4.3.3

Arnesen, S. P. & Seip, H. M. (1966). *Studies on the failure of the first Born approximation in electron diffraction. V. Molybdenum- and tungsten hexacarbonyl*. *Acta Chem. Scand.* **20**, 2711–2727.

Bartell, L. S. (1975). *Modification of Glauber theory for dynamic scattering of electrons by polyatomic molecules*. *J. Chem. Phys.* **63**, 3750–3755.

Bartell, L. S. & Brockway, L. O. (1953). *The investigation of electron distribution in atoms by electron diffraction*. *Phys Rev.* **90**, 833–838.

Bartell, L. S. & Gavin, R. M. Jr (1964). *Effects of electron correlation in X-ray and electron diffraction*. *J. Am. Chem. Soc.* **86**, 3493–3498.

Bartell, L. S. & Miller, B. (1980). *Extension of Glauber theory to account for intratarget diffraction in multicenter scattering*. *J. Chem. Phys.* **72**, 800–807.

Bartell, L. S. & Wong, T. C. (1972). *Three-atom scattering in gas-phase electron diffraction: a tractable limiting case*. *J. Chem. Phys.* **56**, 2364–2367.

Bethe, H. A. (1930). *Zur Theorie des Durchgangs Schneller Korpuskularstrahlen durch Materie*. *Ann. Phys. (Leipzig)*, **5**, 325–400.

Biggs, F., Mendelsohn, L. B. & Mann, J. B. (1975). *Hartree–Fock Compton profiles for the elements*. *At. Data Nucl. Data Tables*, **16**, 210–309.

Bonham, R. A. (1965a). *Multiple elastic intramolecular scattering in gas electron diffraction*. *J. Chem. Phys.* **43**, 1103–1109.

Bonham, R. A. (1965b). *Corrections to the incoherent scattering factor for electrons and X-rays*. *J. Chem. Phys.* **43**, 1460–1464.

Bonham, R. A. (1966). *Dynamic effects in gas electron diffraction*. *Trans. Am. Crystallogr. Assoc.* **2**, 165–172.

Bonham, R. A. (1967). *Some new relations connecting molecular properties and electron and X-ray diffraction intensities*. *J. Phys. Chem.* **71**, 856–862.

Bonham, R. A. & Cox, H. L. Jr (1967). *40-kV electron scattering from Ne, Ar, Kr, and Xe measured by the sector-microphotometer electron-diffraction method*. *J. Chem. Phys.* **47**, 3508–3517.

Bonham, R. A. & Fink, M. (1974). *High energy electron scattering*, Chaps. 5 and 6. New York: Van Nostrand Reinhold.

Bonham, R. A. & Iijima, T. (1965). *Preliminary electron-diffraction study of H₂ at small scattering angles*. *J. Chem. Phys.* **42**, 2612–2614.

Bonham, R. A. & Su, L. S. (1966). *Use of Hellman–Feynman and hyperviral theorems to obtain anharmonic vibration-rotation expectation values and their application to gas diffraction*. *J. Chem. Phys.* **45**, 2827–2831.