

## 8. INTRODUCTION TO SPACE-GROUP SYMMETRY

## References

## 8.1

- Brown, H., Bülow, R., Neubüser, J., Wondratschek, H. & Zassenhaus, H. (1978). *Crystallographic groups of four-dimensional space*. New York: Wiley.
- Burckhardt, J. J. (1988). *Die Symmetrie der Kristalle*. Basel: Birkhäuser.
- Flack, H. D., Wondratschek, H., Hahn, Th. & Abrahams, S. C. (2000). *Symmetry elements in space groups and point groups. Addenda to two IUCr reports on the nomenclature of symmetry*. *Acta Cryst.* **A56**, 96–98.
- Giacovazzo, C. (2002). Editor. *Fundamentals of crystallography*, 2nd ed. *IUCr texts on crystallography*, No. 7. Oxford University Press.
- Hermann, C. (1949). *Kristallographie in Räumen beliebiger Dimensionszahl. I. Die Symmetrioperationen*. *Acta Cryst.* **2**, 139–145.
- International Tables for Crystallography* (2002). Vol. E. *Subperiodic groups*, edited by V. Kopsky & D. B. Litvin. Dordrecht: Kluwer Academic Publishers.
- Janner, A. (2001). *Introduction to a general crystallography*. *Acta Cryst.* **A57**, 378–388.
- Janssen, T., Janner, A., Looijenga-Vos, A. & de Wolff, P. M. (2004). *International tables for crystallography*, Vol. C, 3rd ed., edited by E. Prince, ch. 9.8. Dordrecht: Kluwer Academic Publishers.
- Ledermann, W. (1976). *Introduction to group theory*. London: Longman.
- Lima-de-Faria, J. (1990). *Historical atlas of crystallography*. Dordrecht: Kluwer Academic Publishers.
- Ogpenorth, J., Plesken, W. & Schulz, T. (1998). *Crystallographic algorithms and tables*. *Acta Cryst.* **A54**, 517–531.
- Plesken, W. & Schulz, T. (2000). *Counting crystallographic groups in low dimensions*. *Exp. Math.* **9**, 407–411.
- Schwarzenberger, R. L. E. (1980). *N-dimensional crystallography*. San Francisco: Pitman.
- Shubnikov, A. V. & Koptsik, V. A. (1974). *Symmetry in science and art*. New York: Plenum.
- Smaalen, S. van (1995). *Incommensurate crystal structures*. *Crystallogr. Rev.* **4**, 79–202.
- Souvignier, B. (2003). *Enantiomorphism of crystallographic groups in higher dimensions with results in dimensions up to 6*. *Acta Cryst.* **A59**, 210–220.
- Vainshtein, B. K. (1994). *Fundamentals of crystals*. Berlin: Springer-Verlag.
- Wolff, P. M. de, Billiet, Y., Donnay, J. D. H., Fischer, W., Galiulin, R. B., Glazer, A. M., Hahn, Th., Senechal, M., Shoemaker, D. P., Wondratschek, H., Wilson, A. J. C. & Abrahams, S. C. (1992). *Symbols for symmetry elements and symmetry operations*. *Acta Cryst.* **A48**, 727–732.
- Wolff, P. M. de, Billiet, Y., Donnay, J. D. H., Fischer, W., Galiulin, R. B., Glazer, A. M., Senechal, M., Shoemaker, D. P., Wondratschek, H., Hahn, Th., Wilson, A. J. C. & Abrahams, S. C. (1989). *Definition of symmetry elements in space groups and point groups*. *Acta Cryst.* **A45**, 494–499.
- Yamamoto, A. (1996). *Crystallography of quasiperiodic crystals*. *Acta Cryst.* **A52**, 509–560.

## 8.2

- Ascher, E. & Janner, A. (1965). *Algebraic aspects of crystallography. I. Space groups as extensions*. *Helv. Phys. Acta*, **38**, 551–572.
- Ascher, E. & Janner, A. (1968/69). *Algebraic aspects of crystallography. II. Non-primitive translations in space groups*. *Commun. Math. Phys.* **11**, 138–167.
- Brown, H., Bülow, R., Neubüser, J., Wondratschek, H. & Zassenhaus, H. (1978). *Crystallographic groups of four-dimensional space*. New York: Wiley.
- Giacovazzo, C. (2002). Editor. *Fundamentals of crystallography*, 2nd ed. *IUCr texts on crystallography*, No. 7. Oxford University Press.

- Neubüser, J., Wondratschek, H. & Bülow, R. (1971). *On crystallography in higher dimensions. I. General definitions*. *Acta Cryst.* **A27**, 517–520.
- Wolff, P. M. de, Belov, N. V., Bertaut, E. F., Buerger, M. J., Donnay, J. D. H., Fischer, W., Hahn, Th., Koptsik, V. A., Mackay, A. L., Wondratschek, H., Wilson, A. J. C. & Abrahams, S. C. (1985). *Nomenclature for crystal families, Bravais-lattice types and arithmetic classes. Report of the International Union of Crystallography Ad-Hoc Committee on the Nomenclature of Symmetry*. *Acta Cryst.* **A41**, 278–280.

## 8.3

- Ascher, E., Gramlich, V. & Wondratschek, H. (1969). *Korrekturen zu den Angaben 'Untergruppen' in den Raumgruppen der Internationalen Tabellen zur Bestimmung von Kristallstrukturen (1935), Band 1*. *Acta Cryst.* **B25**, 2154–2156.
- Boisen, M. B. Jr, Gibbs, G. V. & Wondratschek, H. (1990). *Derivation of the normalizers of the space groups*. *Acta Cryst.* **A46**, 545–552.
- Boyle, L. L. & Lawrenson, J. E. (1973). *The origin dependence of the Wyckoff site description of a crystal structure*. *Acta Cryst.* **A29**, 353–357.
- Boyle, L. L. & Lawrenson, J. E. (1978). *The dependence of the Wyckoff site description of a crystal structure on the labelling of the axes*. *Comm. R. Soc. Edinburgh (Phys. Sci.)*, **1**, 169–175.
- Brown, H., Bülow, R., Neubüser, J., Wondratschek, H. & Zassenhaus, H. (1978). *Crystallographic groups of four-dimensional space*. New York: Wiley.
- Burzlaff, H. & Zimmermann, H. (1980). *On the choice of origins in the description of space groups*. *Z. Kristallogr.* **153**, 151–179.
- Fedorov, E. S. (1891). *The symmetry of regular systems of figures*. (In Russian.) [English translation by D. & K. Harker (1971). *Symmetry of crystals*, pp. 50–131. American Crystallographic Association, Monograph No. 7.]
- Fischer, W. & Koch, E. (1974). *Eine Definition des Begriffs 'Gitterkomplex'*. *Z. Kristallogr.* **139**, 268–278.
- Fischer, W. & Koch, E. (1978). *Limiting forms and comprehensive complexes for crystallographic point groups, rod groups and layer groups*. *Z. Kristallogr.* **147**, 255–273.
- Hermann, C. (1929). *Zur systematischen Strukturtheorie. IV. Untergruppen*. *Z. Kristallogr.* **69**, 533–555.
- Hermann, C. (1935). *Internationale Tabellen zur Bestimmung von Kristallstrukturen, Band 1*. Berlin: Borntraeger.
- Hirshfeld, F. L. (1968). *Symmetry in the generation of trial structures*. *Acta Cryst.* **A24**, 301–311.
- International Tables for Crystallography* (2004). Vol. A1, *Symmetry relations between space groups*, edited by H. Wondratschek & U. Müller. Dordrecht: Kluwer Academic Publishers.
- International Tables for X-ray Crystallography* (1952). Vol. I. *Symmetry groups*, edited by N. F. M. Henry & K. Lonsdale. Birmingham: Kynoch Press.
- Koch, E. & Fischer, W. (1975). *Automorphismengruppen von Raumgruppen und die Zuordnung von Punktlagen zu Konfigurationslagen*. *Acta Cryst.* **A31**, 88–95.
- Ledermann, W. (1976). *Introduction to group theory*. London: Longman.
- Matsumoto, T. & Wondratschek, H. (1979). *Possible superlattices of extraordinary orbits in 3-dimensional space*. *Z. Kristallogr.* **150**, 181–198.
- Niggli, P. (1919). *Geometrische Kristallographie des Diskontinuums*. Leipzig: Borntraeger. [Reprint: Sändig, Wiesbaden (1973).]
- Schoenflies, A. (1891). *Krystallsysteme und Krystallstruktur*. Leipzig: Teubner. [Reprint: Springer, Berlin (1984).]
- Sohncke, L. (1879). *Entwicklung einer Theorie der Krystallstruktur*. Leipzig: Teubner.
- Wondratschek, H. (1976). *Extraordinary orbits of space groups. Theoretical considerations*. *Z. Kristallogr.* **143**, 460–470.
- Wondratschek, H. (1980). *Crystallographic orbits, lattice complexes, and orbit types*. *Match*, **9**, 121–125.