

Foreword to the Fifth, Revised Edition

Six years ago, in 1995, the Fourth Edition of Volume A appeared, followed by corrected reprints in 1996 and 1998. A list of corrections and innovations in the Fourth Edition was published in *Acta Cryst.* (1995). **A51**, 592–595.

The present Fifth Edition is much more extensively revised than any of its predecessors, even though the casual reader may not notice these changes. In keeping with the new millennium, the production of this edition has been completely computer-based. Although this involved an unusually large amount of effort at the start, it will permit easy and flexible modifications, additions and innovations in the future, including a possible electronic version of the volume. In the past, all corrections had to be done by ‘cut-and-paste’ work based on the printed version of the book.

The preparation of this new edition involved the following steps:

(i) The space-group tables (Parts 6 and 7) were reprogrammed and converted to \LaTeX by M. I. Aroyo and P. B. Konstantinov in Sofia, Bulgaria, and printed from the \LaTeX files. This work is described in the article ‘*Computer Production of Volume A*’.

(ii) The existing, recently prepared space-group diagrams were scanned and included in the \LaTeX files.

(iii) The text sections of the volume were re-keyed in SGML format under the supervision of S. E. Barnes and N. J. Ashcroft (Chester) and printed from the resulting SGML files.

The following scientific innovations of the Fifth Edition are noteworthy, apart from corrections of known errors and flaws; these changes will again be published in *Acta Cryst.* Section A.

(1) The incorporation of the new symbol for the ‘double’ glide plane ‘*e*’ into five space-group symbols, which was started in the Fourth Edition (*cf.* *Foreword to the Fourth Edition* and Chapter 1.3), has been completed:

In the headlines of space groups Nos. 39, 41, 64, 67 and 68, the new symbols containing the ‘*e*’ glide are now the ‘main’ symbols

and the old symbols are listed as ‘Former space-group symbol’; the new symbols also appear in the diagrams.

The symbol ‘*e*’ now also appears in the table in Section 1.3.1 and in Tables 3.1.4.1, 4.3.2.1, 12.3.4.1, 14.2.3.2 and 15.2.1.3.

(2) Several parts of the text have been substantially revised and reorganized, especially the article *Computer Production of Volume A*, Sections 2.2.13, 2.2.15 and 2.2.16, Parts 8, 9 and 10, Section 14.2.3, and Part 15.

(3) A few new topics have been added:

Section 9.1.8, with a description of the Delaunay reduction (H. Burzlaff & H. Zimmermann);

Chapter 9.3, *Further properties of lattices* (B. Gruber);

in Chapter 15.2, the affine normalizers of orthorhombic and monoclinic space groups are now replaced by Euclidean normalizers for special metrics (E. Koch, W. Fischer & U. Müller).

(4) The fonts for symbols for groups and for ‘augmented’ (4×4) matrices and (4×1) columns have been changed, *e.g.* \mathcal{G} instead of \mathfrak{G} , \mathbb{W} instead of \mathcal{W} and \mathfrak{r} instead of \mathfrak{r} ; *cf.* Chapter 1.1.

It is my pleasure to thank all those authors who have contributed new programs or sections or who have substantially revised existing articles: M. I. Aroyo (Sofia), H. Burzlaff (Erlangen), B. Gruber (Praha), E. Koch (Marburg), P. B. Konstantinov (Sofia), U. Müller (Marburg), H. Wondratschek (Karlsruhe) and H. Zimmermann (Erlangen). I am indebted to S. E. Barnes and N. J. Ashcroft (Chester) for the careful and dedicated technical editing of this volume. Finally, I wish to express my sincere thanks to K. Stróž (Katowice) for his extensive checking of the data in the space-group tables using his program *SPACER* [*J. Appl. Cryst.* (1997), **30**, 178–181], which has led to several subtle improvements in the present edition.

Aachen, November 2001

THEO HAHN