

$3n$; $a_9 = a_{10} = 2m + 3n$ ($m, n, = 1, 2, 3, \dots$) satisfies the necessary condition $\sum_{k=1}^{n/2} a_{2k-1} = \sum_{k=1}^{n/2} a_{2k}$ but not the condition $a_k = 0 \pmod{3}$. Oscillation photographs of members of this set are symmetric in respect to their equator.

The simplest examples of such structures are:

$$\begin{array}{ll} 30T(1\ 4\ 4\ 1\ 4\ 1\ 1\ 4\ 5\ 5) & (m = 1, n = 1) \\ 42T(2\ 5\ 5\ 2\ 5\ 2\ 2\ 5\ 7\ 7) & (m = 2, n = 1) \\ 48T(1\ 7\ 7\ 1\ 7\ 1\ 1\ 7\ 8\ 8) & (m = 1, n = 2) \end{array}$$

Other groups of such structures were found, but the general character of trigonal structures with symmetric oscillation photographs is not yet clear.

Concluding remarks

In view of the evidence presented here it is clear that the common practice of discarding non-symmetric structures during the identification procedure of a $P3m1$ structure with a symmetric oscillation photograph is inappropriate. While the given examples were restricted to close-packed structures

it is conceivable that similar effects may be found in other types of structures as well as in other space groups. The difficulties involved in the identification of structures with large unit cells, even with the aid of fast computers, can not be overstated and special features of the X-ray photographs are very helpful in simplifying the task. The knowledge of the necessary conditions for such features is therefore of great importance.

References

- LADD, M. F. C. & PALMER, R. A. (1985). *Structure Determination by X-ray Crystallography*, 2nd ed. New York: Plenum Press.
 PALOSZ, B. & PRZEDMOJSKI, J. (1980). *Z. Kristallogr.* **151**, 31–48.
 PATTERSON, A. L. (1944). *Phys. Rev.* **65**, 195–201.
 PRAGER, P. R. (1974). *Acta Cryst.* **A30**, 369–373.
 RAMSDELL, L. S. (1947). *Am. Mineral.* **32**, 64–82.
 RAMSDELL, L. S. & KOHN, J. A. (1951). *Acta Cryst.* **4**, 111–113.
 VERMA, A. R. & KRISHNA, P. (1966). *Polymorphism and Polytypism in Crystals*. New York: John Wiley.
 ZHDANOV, G. S. (1945). *C. R. Dokl. Acad. Sci. URSS*, **48**, 43.

Book Reviews

Works intended for notice in this column should be sent direct to the Book-Review Editor (R. O. Gould, Department of Chemistry, University of Edinburgh, West Mains Road, Edinburgh EH9 3JJ, Scotland). As far as practicable books will be reviewed in a country different from that of publication.

Acta Cryst. (1989). **B45**, 455–456

Molecular structure: chemical reactivity and biological activity. (IUCr Crystallographic Symposia No. 2).

Edited by J. J. STEZOWSKI, JIN-LING HUANG and M.-C. SHAO. Pp. xxvi+612. Oxford: International Union of Crystallography and Oxford University Press, 1988. Price £35.00.

This book reports the papers presented at an International Union of Crystallography Symposium which was held in Beijing, People's Republic of China, September 15–21, 1986. The symposium brought together structural scientists interested in the correlation of structural features to chemical or biochemical activity or to the physical properties of materials. The book contains a representation of the work presented in the symposium. The range of topics covered is impressive and encourages the reader to regard X-ray crystallographic results as a key to understanding molecules. However, the delay in the appearance of this book prevents it from being a useful source of primary structural information. Indeed, most of the papers seem to be summaries and compilations of the results of several previously published studies.

The useful features of the book are the focus on the use of structural information and the extensive scope of the studies included. These features make the book attractive as a summary of the field of molecular reactivity studies and useful as an introduction to the field. In addition, scientists working in the field can gain insight into new approaches for

structural analysis from the papers that cover different structural systems. The central focus on systematic consideration of structural properties and the import of such properties for reactivity makes the book a useful instructional tool. Many of the reports are instructive examples of novel approaches to structural correlation and to molecular design. The overview flavor of many of the papers included in the volume, and the convenient grouping of papers on similar subjects, allow the reader to reflect on the progress of a given subject area. For example, six papers on clathrates and cyclodextrins provide a perspective on the current understanding of the principles of molecular recognition, and the papers on the analysis of structure–drug–activity correlations are a eloquent tutorial on the methods of studying and of using structural results. The presentations covered in the book span most current areas of crystallography, including studies of enzymatic catalytic mechanisms, solid-state crystal chemistry, inorganic materials and molecules, drug activity, molecular recognition, development of direct methods, identification of predictive paradigms for structural trends, and structures of larger systems, like ribosomes and DNA.

The book suffers from poor proof-reading and editing. Many manuscripts were difficult to follow because there were no drawings of the molecules showing the atomic labeling even though the labeling was used extensively in the text. The typographical errors were mainly annoying; however, a misordering of pages in the introductory article obscured an otherwise fine report.

The book ends with a description of the determination of the penicillin structure by Dorothy Hodgkin and includes the electron density maps from that early work. This report is

wonderful to read and should be available to every student of crystallography.

The book provides an extensive overview of molecular reactivity studies that should be useful to those new to the field. The detailed analyses of structural information are instructive and can provide inspiration for new investigations of structural results. The book should be available to everyone who trains young crystallographers.

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Topics in nucleic acid structure, Part 3. (Volume 9 of **Topics in molecular and structural biology.**) Edited by S. NEIDLE. Pp. x+230. London: Macmillan, 1988. Price £42.50.

It is now more than 35 years since the historic discovery of the double helix by Francis Crick and James Watson, yet we are still a long way from understanding the subtleties of the relationship between the structure and function of nucleic acids. Major discoveries in recent years in the diverse areas of gene manipulation and chemical synthesis of DNA have provided scientists with the tools to probe the biological and physical properties of nucleic acids in a degree of detail that was not previously possible. The sudden advent of the AIDS epidemic with its tragic human consequences has concentrated the minds of chemists and biologists and provided further impetus for researchers in this area. At the same time, developments in X-ray crystallographic and, in particular, dramatic strides in high-field NMR technology have facilitated the study of nucleic acids and DNA-protein complexes at high resolution.

Volume 9 of *Topics in Molecular and Structural Biology* reviews a number of key areas which have received recent attention. The book contains chapters on the following subjects: biologically active nucleosides and nucleotides, the barrier to pseudorotation of the furanose ring, X-ray fibre-diffraction studies on DNA, side-by-side models of DNA, Z-DNA in solution, and, finally, restriction enzymes

and DNA. The contributions are presented in a clear and readable way with good illustrations and a wealth of references.

It is impossible to cover more than a tiny fraction of the important developments in this field in 230 pages of text, and many researchers would dispute the selection of material. The book is, however, well balanced, and the active research worker is likely to benefit substantially from reading the articles. The chapter on biologically active nucleosides by Burnbaum and Shugar is particularly interesting and topical as is the final chapter on restriction enzymes by Malcolm. The chapter on X-ray fibre diffraction will be of great interest to specialists in the field but the discussion of side-by-side models of DNA highlights some of the limitations of the technique. The review of Z-DNA by Singleton is concise and well worth reading, giving an overview of the possible biological role of Z-DNA. The chapter on the barrier to pseudorotation of the furanose ring gives a mathematical approach and is in parts difficult to follow.

In summary, this book contains a great deal of valuable and readily accessible information in a number of highly specialized areas.

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Book Received

The following book has been received by the Editor. Brief and generally uncritical notices are given of works of marginal crystallographic interest; occasionally a book of fundamental interest is included under this heading because of difficulty in finding a suitable reviewer without great delay.

Mineralogie. By *Siegfried Matthes*. Pp. xvii + 444. Berlin: Springer-Verlag, 1987. Price DM 69.

A review of this book, by J. E. Chisholm, has been published in the December 1988 issue of *Journal of Applied Crystallography*, page 996.