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$K\alpha_1$ and $K\alpha_2$ wavelengths for sodium and magnesium.

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Abstract

The wavelengths of the $K\alpha_1$ and $K\alpha_2$ X-ray lines for Na and Mg are determined from the fine-structure splitting of the inverted doublets of the appropriate gas-phase ions and the experimental wavelengths of the unresolved blended lines.

Values are given for X-ray wavelengths in the authoritative review of Bearden (1967), with $K\alpha_1$ and $K\alpha_2$ wavelengths separately tabulated for $Z \geq 13$.

By making use of the fine-structure splitting of the inverted doublet for the nine-electron isoelectronic ions, given by Moore (1971) as 1364 cm^{-1} for Na^{2+} and 2226 cm^{-1} for Mg^{3+}, one is able to find the wavelengths of the two lines by means of

$$E(^2P_{1/2}) - E(^2P_{3/2}) = \frac{10^8}{n}\left[\frac{1}{\lambda_{K\alpha_1}\,(\text{Å}^*)} - \frac{1}{\lambda_{K\alpha_2}\,(\text{Å}^*)}\right],$$

together with the intensity ratio of 2:1 and Bearden's weighted average of the unresolved blended line positions of 11·9101 and 9·8900 Å* respectively. The refractive index n is given by Bearden as differing from unity by 160 p.p.m. in this region of the spectrum.

The results turn out to be 11·9095 and 11·9114 (Na) and 9·8893 and 9·8915 (Mg) Å* units for $K\alpha_1$ and $K\alpha_2$ respectively.

A tabulation of fine-structure splittings calculated in the above manner from Bearden's experimental wavelengths for the eight elements Al through Ca *vs* the optical splitting data of Moore shows agreement in each case within the experimental error quoted by Bearden (Riter, 1979).

References

Bearden, J. A. (1967). *Rev. Mod. Phys.* **39**, 78–124.

Moore, C. E. (1971). *Atomic Energy Levels.* Vol. I. Natl Stand. Ref. Data Ser., Natl Bur. Stand. (US Govt Print. Off., Washington, DC) No. 35. Reissue of NBS Circ. 467, Vol. I (1949), with which it is identical for the energy levels under consideration in this work.

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International Union of Crystallography

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Donation

On behalf of the International Union of Crystallography the Executive Committee wishes to record its gratitude to the Rigaku Corporation, Tokyo, Japan, for a generous donation to the General Fund of the Union.

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Twelfth General Assembly and International Congress of Crystallography

The Twelfth General Assembly of the IUCr and the Twelfth International Congress of Crystallography will be held in Ottawa, Canada, at Carleton University, under the sponsorship of the National Research Council of Canada, 16–25 August 1981. Registration will take place on Sunday 16 August. The Congress will open on Monday 17 August and sessions will continue until Tuesday 25 August.

The scientific programme will include invited general lectures, invited oral papers and open Commission meetings. Most contributed papers will be presented in poster sessions. Commercial and non-commercial apparatus will be exhibited and crystallographic data file demonstrations are planned. The Congress will cover recent advances in all aspects of crystallography.

Dr L. D. Calvert is Chairman of the Organizing Committee, and Dr F. R. Ahmed is Chairman of the Programme Committee.

Carleton University residences will provide economical and convenient accommodation, mostly in shared rooms. In addition, downtown hotels and camping facilities will be available. A first circular will be available in early 1980. A second circular with a call for papers, more details of the programme, the general arrangements and registration forms will be distributed in the autumn of 1980. Those wishing to receive these circulars should write to

Mr K. Charbonneau,
Executive Secretary,
XIIth IUCr Congress,
National Research Council of Canada,
Ottawa, Ontario, Canada, K1A 0R6.
Telephone (613) 993-9009.
Telex: 053-3145 NRC Admin OTT.

Associated Meetings

At present the following meetings are being considered.

1. An *International Summer School on Crystallographic Computing* is planned for the period before the Congress. For further details contact Dr D. Sayre, Research Division, IBM, PO Box 218, Yorktown Heights, NY 10598, USA.
2. A *Symposium on Neutron Diffraction* will be held on 12–13 August 1981 at Argonne National Laboratory, Argonne, Illinois (near Chicago) dealing with recent developments in neutron scattering with special emphasis on pulsed neutron sources; Local Chairman, Dr M. H. Mueller, Materials Science Division, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, IL 60439, USA; Program Chairman, Dr D. E. Cox, Physics Department, Brookhaven National Laboratory, Upton, NY 11973, USA.
3. A *Symposium on Crystallography in the Health Sciences: Crystalline Deposits in Human Tissues* will be held at Mt Sinai Hospital, Toronto, 13–14 August 1981; Local Chairman: Dr P. T. Cheng, Mt Sinai Hospital, 600 University Ave., Toronto, Canada, M5G 1X5. For further details write to Professor S. C. Nyburg, Chemistry Department, University of Toronto, Toronto, Canada, M5S 1A1.
4. A *Symposium on Biologically Active Molecules* will be held at the Medical Foundation of Buffalo, 26–28 August 1981. For details write to Dr W. L. Duax, Medical Foundation of Buffalo, 73 High Street, Buffalo, NY 14203, USA.

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Change of Publisher of *Structure Reports, Molecular Structures and Dimensions* and Other Publications

As from 1 January 1980, D. Reidel Publishing Company, PO Box 17, 3300 AA Dordrecht, The Netherlands, has taken over the publication and sales of all the publications of the International Union of Crystallography previously handled by Bohn, Scheltema and Holkema. These publications include *Structure Reports, Molecular Structures and Dimensions, Symmetry Aspects of M. C. Escher's Periodic Drawings, Fifty Years of X-ray Diffraction, Early Papers on Diffraction of X-rays by Crystals*, and miscellaneous other publications of the Union such as the bibliographies and the *Index of Crystallographic Supplies*. Orders for all these publications may be placed direct with the publishers or with Polycrystal Book Service, PO Box 11567, Pittsburgh, PA 15238, USA or with any bookseller.

Book Reviews

Works intended for notice in this column should be sent direct to the Book-Review Editor (J. H. Robertson, School of Chemistry, University of Leeds, Leeds LS2 9JT, England). As far as practicable books will be reviewed in a country different from that of publication.

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Crystallographic groups of four-dimensional space. By H. BROWN, R. BÜLOW, J. NEUBÜSER, H. WONDRATSCHEK and H. ZASSENHAUS. Pp. xiv + 443. New York, Chichester, Brisbane, Toronto: Wiley-Interscience, 1978. Price £27·00.

This book gives an original description of two-, three- and four-dimensional crystallographic objects, primarily by the use of tables. The two- and three-dimensional groups are included for completeness and in order to familiarize the reader with the classification and form of listing suggested by the authors, by using better known crystallographic groups. Complete listings of four-dimensional space groups are mainly computer produced by the group of authors and presented in this book for the first time.

The book has three main sections with a preceding short section on history. Chapter one gives algebraic definitions of the n-dimensional crystallographic groups and of various classifications of these groups. The authors define the main dimension-independent crystallographic concepts with the formal apparatus of group theory following the lines of development given by Bierberbach, Frobenius, Burckhard and later by Ascher and Janner.

Classification of n-dimensional crystallographic groups is based on distinguishing between the concept of a space group and that of a space-group type; the first means the set of all symmetry operations of a specific crystal structure, for example, of a specific NaCl crystal while the second means the space group of the NaCl-structure type, *i.e.* of $Fm3m$ (or O_h^5) type, to which the space group of the given crystal belongs.

The concept of arithmetic classes isomorphic to the types of symmorphic space groups is central to the suggested system of algebraic definitions.

Chapters two and three offer, for the first time, complete tables of crystallographic objects for dimensions 2, 3 and 4, particularly all types of space groups and invariants of these groups (the table takes 357 pages) and lattices hierarchically ordered according to crystal classes, Bravais types, crystal systems, and crystal families. In four dimensions, the number of space-group types is 4783 (112), the number of arithmetic crystal classes 710 (70), of geometric crystal classes 227 (44), of Bravais types of lattice 64 (10), of crystal systems 33 (7), of crystal families 23 (6). One of the phenomena of four-dimensional space is enantiomorphism, not only of the space-group types but also of arithmetic and geometric classes and Bravais lattices (the number of corresponding enantiomorphic pairs are given in parentheses).

Additionally, as an example, character tables are provided ($n = 4$) and normalizers in the full group of unimodular $n \times n$ matrices ($n = 2, 3, 4$) for the point groups (finite unimodular groups), used in the Zassenhaus algorithm.

The Appendix discusses the relevance of crystallographic groups in the general theory of symmetry groups.

The book will be supplied with an *errata* sheet in which the authors of the book correct some misprints and an error in the definition of the dimension-independent concept of the crystal system, found by them just after the book had been published. Not to mislead the reader by the old definition of a crystal system, the author's corrected text is quoted here.