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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.

Acta Cryst. (1985). B**41**, 453-454

Sulphide minerals: crystal chemistry, parageneses and systematics. By I. KOSTOV and J. MINCERA-STEFANOVA. Pp. 212, Figs. 144. Stuttgart: E. Schweizerbart'sche Verlagsbuchandlung, 1982. Price DM 64.00.

Although the sulphide minerals form an important group of ore minerals and, furthermore, display unique properties in the fields of semiconductivity and optical activity, comprehensive compilations of data on the entire group of sulphide minerals appear at very infrequent intervals. The authors of this small monograph have, therefore, performed a valuable service in assembling the data from the extensive, but widely dispersed, literature dealing with these compounds.

In their opening statement, the authors indicate that under the title 'sulphide minerals' they include also a large group of related mineral compounds, such as selenides, tellurides, arsenides, antimonides and bismuthides; as well as the natural sulphosalts. Certain native elements and their intermetallic compounds are also included for completeness.

After a brief introduction, the first half of the book is devoted to the crystal chemistry of the sulphides. The authors propose a classification of these minerals which is based on the axial ratios of the actual or reduced unit cell, resulting in the subdivision into axial, planar, pseudoisometric and isometric structural types. This classification has merit but is unlikely to replace established systems. Detailed data on the crystal structures of the individual sulphides and sulphosalts are recorded within the framework of this classification. This is probably the most valuable section of the book and is amply referenced and well illustrated with numerous diagrams of specific crystal structures.

The second section of the book deals with phase equilibria and natural assemblages. Six assemblages are defined on the basis of geochemical criteria: Pt-Pd, Ni-Co-Fe, Zn-Cu-Fe, Cu-Sn-Pb, Ag-Au, and the sulphosalts; these are discussed in turn. Relevant phase diagrams are used to illustrate the phase relations between the sulphides and sulphosalts of each assemblage, and brief descriptions of

naturally occurring assemblages are accompanied by photomicrographs of ore mineral suites. Apart from the brevity of the descriptions, the occurrences described are necessarily selective. However, an exhaustive treatment of this aspect was not the authors' objective. Again, many references to more detailed accounts are quoted.

In the final section of the book, the authors incorporate the 'natural assemblages' concept into their crystal-chemical classification to produce an overall classification system which they suggest fits best 'the peculiarities and genesis' of these minerals. All the sulphides known up to the end of January 1981 are tabulated according to this classification, together with their chemical formula, symmetry and unit-cell parameters.

Over 400 references constitute a most extensive source of information. However, the index is disappointing, consisting only of a list of mineral names and their major X-ray diffraction lines. There is no topic index and the entire central section on natural assemblages has been omitted from the index.

This is a well produced book, free from typographic errors. Those involved in sulphide mineralogy and crystal chemistry will find it a valuable source of reference. However, its appeal will probably be restricted to this group of specialists.

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Topics in nucleic acid structure. Part 2. Edited by S. NEIDLE. Pp. ix+309. London: Macmillan, 1982. Price £47.00.

This book is the second volume in what appears to be an excellent series on nucleic acid structure. It is geared for graduate students and researchers in the field, and, in fact, I have recently recommended two of the articles from it to be assigned reading for an international school on 'The Structure of Chromatin and DNA'. Its seven chapters cover a wide area of the field from analysis of the three-dimensional structures of nucleic acids and proteins through functional and topological implications of hairpin loops in supercoiled DNA.

Some of the topics covered include a timely review by D. Patel and his collaborators on the energetics and structural dynamics of the DNA double-helix dodecamer d(CGCGAATTCGCG) and selectively modified analogues of it. They focus on the power of techniques applied to nucleic acids in solution, *e.g.* NMR and differential scanning calorimetry, to elucidate structural information. In the case of DNA-B, this is especially important as at present only one such structure has been determined by X-ray crystallographic methods, *i.e.* this same dodecamer by R. Dickerson's group [Wing *et al.* (1980). *Nature* (*London*), **286**, 567]. The conformational effects of single base insertions, *i.e.* precursors of 'nonsense' mutations, as well as the change from a G-C to a G-U base pair, *i.e.* a 'missense' mutation, are examined.

W. Olson gives a comprehensive review of theoretical studies on nucleic acid conformation covering potential-energy studies, chain statistics and model building. The conformational analysis of the building blocks of nucleic acids is examined in detail, paying special attention to the furanose ring, which plays a pivotal role in DNA and RNA structures. From this she goes on to build a coherent theoretical picture of the flexibility of long-chain polynucleotides including various models of novel helical structures as well as a model for the interconnection between right- and left-handed double-helical DNA structures.

H. T. Wright presents an in-depth look at four recently determined tRNA crystal structures and compares them with that of the first tRNA structure: yeast $tRNA^{Phe}$. These consist of chain *initiator* tRNA's from yeast and *E. coli*, and two yeast chain *elongator* tRNA's: $tRNA^{Asp}$ and $tRNA^{Gly}$. He discusses "What is unique about initiator tRNA's" relative to chain elongators, and although the X-ray refinement is still in a preliminary stage and the crystallization conditions used are quite different from $tRNA^{Phe}$, he is able to point out some *key* differences between these two classes of tRNA's. In parallel for the newly determined chain *elongator* yeast $tRNA^{Asp}$, which was determined to higher resolution, he describes how the angle between the two major double-helical stems opens up, giving a kind of 'boomerang' shape to the structure as contrasted with the 'L' shape of $tRNA^{Phe}$ and the two initiator tRNA's. The structure of yeast $tRNA^{Gly}$, grown from 50% dioxane, is also discussed. Here, however, due to the low resolution (4-5 Å) of the X-ray data, and the poor final figures of merit, 0·55, the author is extremely careful in not over-interpreting the structural results.

A. McPherson presents an up-to-date survey of crystallographic studies on nucleic acid binding proteins. In order to give some experimental feel for the quality of the work, he includes photographs of the protein crystals and X-ray diffraction patterns, as well as a schematic illustration of a model of the current state of each structure.

Additional topics include 'Hairpin Loops in Supercoiled DNA' by D. M. J. Lilley, 'Recognition of Natural and Chemically-Damaged Nucleic Acids by Peptides and Proteins' by C. Hélène and collaborators, and a paper by D. Rhodes on 'The Helical Periodicities of DNA in Solution and in Chromatin'.

Dr Neidle has done an excellent job editing this volume, which is also quite well illustrated. It should reside in most technical libraries and the personal collections of serious researchers in the field.

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Solid state chemistry and its applications. By ANTHONY R. WEST. Pp. 734. Chichester: John Wiley, 1984. Price £37.00.

In his introductory chapter author West of the Department of Chemistry at the University of Aberdeen writes 'Solid state chemistry is concerned with the synthesis, structure,