US, the 'peak behaviour' only occurs if the sample has been cooled in zero magnetic field through T_c to low temperatures before a constant field is applied and the temperature is increased. Cooling through T_c in a magnetic field leads to a 'normal' magnetization curve. It has been suggested in the above references that this behaviour arises from the large anisotropy and consequent thin domain walls that are found for these ferromagnetic materials.

The Physics of Actinide Compounds will not only serve as a valuable extension to the existing reviews on actinide compounds, but especially stands out as a clear introduction to the fascinating subject of magnetic and electronic properties of these materials. It is highly recommended to graduate students who enter this rather active field of study, and it will also be equally valuable to research workers with a current or planned interest in this field. For more information on specialized topics the reader may also like to consult some of the other reviews quoted in the book, as well as chapters from *Handbook of the Physics and Chemistry of the Actinides* [G. H. Lander & A. J. Freeman (1984). Editors. Amsterdam: North-Holland].

PAUL DE V. DU PLESSIS

Department of Physics
Rand Afrikaans University
PO Box 524
Johannesburg
South Africa

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Comparative crystal chemistry. Temperature, pressure, composition and the variation of crystal structure. By R. M. HAZEN and L. W. FINGER. Pp. xv+231. London: John Wiley, 1982. Price £19.50.

Although materials scientists, solid-state physicists and chemists, and geoscientists are confronted with problems involving crystalline matter at extreme conditions of temperature and pressure, there is to date no comprehensive compilation of data or techniques. Information on experimental apparatus and techniques is not commonly available in the published literature.

This book has been written as an introduction and review of 'comparative chemistry' or the study of crystal structure variations with temperature, pressure and composition; it is divided into two sections, which are largely independent. The first is designed as a handbook for high-pressure and high-temperature crystallography. Chapters 1 to 5 deal with techniques for the operation of high-temperature and high-pressure single-crystal X-ray devices. Current experimental methods (single-crystal heaters, diamond cell, high-temperature diamond cell) have been described in sufficient detail. Diagrams of experimental apparatus and detailed descriptions of crystal mounting, orientation, calibration and computational procedures have also been included. Appendices to this section include program listings for strain-tensor and polyhedral-volume calculations, which are useful for practical applications.

The second section of the book is a summary of the results of high-temperature and high-pressure crystallographic studies known to mid-1981. Chapters 6 to 9 contain data on the continuous variation in structure of ionic crystals resulting from continuous change of temperature, pressure or composition. Chapter 10 deals with structural variations and the prediction of phase equilibria. The phase transitions are excellently interpreted using concepts developed in the previous chapters.

This book will be useful for geologists, mineralogists, solid-state physicists and solid-state chemists, who are interested in the crystalline state at non-ambient conditions. This book is also valuable for the structural studies of complicated organic compounds or metal complexes at extreme conditions.

AKIKO KOBAYASHI

Department of Chemistry
Faculty of Science
The University of Tokyo
Hongo
Tokyo 113
Japan

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The Jahn–Teller effect and vibronic interactions in modern chemistry. By I. B. BERSUKER, Pp. ix+290, Figs. 120. **Series on Modern Inorganic Chemistry,** edited by J. P. FACKLER JR. New York, London: Plenum, 1984. Price $45·00.

This is the third volume in *Series on Modern Inorganic Chemistry.* It is certainly to the credit of the editor to have selected a subject that has become increasingly important in chemistry within the last few decades. The book is concerned with the theory of vibronic interactions between electronic states and nuclear motions and its widespread manifestations and applications in chemistry. The author, who is one of the pioneers in the field, introduces and defines a general concept of vibronic coupling, which comprises the different aspects of the Jahn-Teller effect. The first and second Chapters are devoted to the basic theory and the underlying symmetry aspects. In Chapter 3 the dynamic and static properties in the ground states of molecular systems, which follow from vibronic instability, are discussed. The fourth chapter surveys the numerous implications of vibronic interactions in spectroscopy. Evidence is given that a deeper understanding of finer spectroscopic details is hardly possible without this concept. Chapter 5 deals with the consequences of vibronic coupling effects in stereochemistry and crystal chemistry. It is devoted to applications and introduces some empirical concepts such as vibronic amplification and the plasticity effect, which show the general validity of the vibronic model. It also considers the cooperative Jahn-Teller effect with respect to structural phase transitions. Finally, many examples - also from inorganic biochemistry - illustrate how useful the very general concept of the pseudo-Jahn-Teller effect is for the understanding of dynamic and static distortions in molecular systems with non-degenerate ground states. The subject of the last chapter is molecular dynamics in chemical reactions. After a discussion of the vibronic instability of the activated state the usefulness of the vibronic approach for the understanding of the elementary steps in chemical reactions and catalysis is pointed

out. The correlation with classical orbital symmetry rules is further examined.

The reviewer considers that the main value of the book is the new synopsis of the otherwise well established theory of vibronic coupling. The author convincingly demonstrates the general validity and usefulness of the vibronic approach for chemical problems and gives an illustrative survey over a broad range of applications of the concept. The book is well written and restricts itself to only the necessary mathematical formalism. Some errors in citing experimental data (Table 5.4) are not serious and do not affect the attractiveness of this original book.

Though about 530 references are cited, this is only a selection of 3204, which have been collected up to 1980, and classified with short codified abstracts, in a separate volume:

The Jahn–Teller effect, a bibliographic review. By I. B. BERSUKER *et al.* Pp. ix+589. New York, London: Plenum, 1984. Price $85·00.

This volume will be extremely helpful for chemists and physicists, who are actively engaged in research activities connected with or related to vibronic theory and experimental manifestations of the Jahn–Teller effect. The references are classified according to five main headings, each of which is subdivided into four to eight subtitles. A clear key system facilitiates access to the literature data. Additional information can be drawn from the key-word and subject, substance, formula and author indexes. In all, a highly useful compilation of reference data - not only for the scientists, who are directly involved in vibronic theory and its applications.

D. REINEN

Fachbereich Chemie
der Philipps-Universität
Hans-Meerwein-Strasse
D-3550 *Marburg* 1
Federal Republic of Germany

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X-ray crystallography and drug action. Edited by A. S. HORN and C. J. DE RANTER. Pp. xii+514. Oxford: Clarendon Press, 1984. Price £30.00.

This volume includes 27 papers presented at the ninth International School of Crystallography held in 1983 at Erice, Italy. It is essentially a collection of works on molecular modelling and drug design and reflects one of the most exciting areas of science to which X-ray crystallographers are turning their attention. Many of the contributions are by well known and distinguished authors. The papers are extremely stimulating to read; the meeting in Italy must have been a resounding success. The contents range from reports on relatively simple molecular systems, such as conformationally restricted analogues of neurotransmitters like noradrenaline, to current ideas and work on actual drug receptors. Other articles concentrate on the unravelling of the types of interactions operating between aggregating molecules, a subject of the utmost importance to all concerned with the use of computer graphics as a tool for drug design. The limitations of current methodology are highlighted and reviewed.

The articles cover a broad range of topics and, although each one tends to stand alone, the whole set gives a clear snapshot of this approach to the understanding of drug action, and to drug design. The X-ray crystallographer has an obvious and useful role to play in this work.

The book is highly recommended to anyone with an interest in drug design and the use of computer graphics in organic chemistry.

P. G. SAMMES

Department of Organic Chemistry
University of Leeds
Leeds LS2 9JT
England