

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].

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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.

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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