

Single crystals of α -tin were first successfully grown only in 1958.

High pressure research has expanded considerably since the appearance of P. W. Bridgman's "The Physics of High Pressures" in 1949, and the chapter entitled "Physics at High Pressures" by C. A. Swenson, with references covering the period from 1946 to date, is a timely review of developments in this area of research on the solid state. The article describes the application of new materials and techniques to such measurements as PVT data, phase transitions, resistivities of metals and semiconductors, superconductivity, nuclear magnetic resonance, dielectric constant, optical spectra and diffusion. Particular emphasis is given to studies of high pressure in the cryogenic region, a specialty of the author.

Continuing the theme of the dependence of the properties of a solid upon applied stress, the succeeding article by Robert W. Keyes reviews "The Effects of Elastic Deformation on the Electrical Conductivity of Semiconductors." The quite large piezoresistance effects observed in many semiconductors are a result of the disturbance of the electronic energy levels by an applied stress, and the author describes in detail the ways in which measurements of such phenomena can be interpreted to yield various features of the electronic structure.

In his chapter "Imperfection Ionization Energies in CdS-Type Materials by Photoelectronic Techniques," Richard H. Bube reviews some recent investigations of photoelectronic behavior in Group II-Group VI insulators. The location of the complex ionization levels introduced into such insulators by both impurities and defects is not always possible by standard techniques, and the author shows how such levels may be deduced from photoelectronic data and gives a generalized picture of their relative positions for different anions and cations.

The longest and most comprehensive chapter, "Cyclotron Resonance" by Benjamin Lax and John G. Mavroides, is a complete survey of the development of cyclotron resonance techniques, particularly as applied to solids, and draws upon the experience of a decade of pioneering in this field. The authors trace the maturing of this powerful technique to its present position as a sophisticated and valuable tool in the exploration of the basic electronic properties of charged carriers in solids, concluding with a summary of the achievements to date and some future prospects.

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Perchlorates. Their Properties, Manufacture and Uses. ACS Monograph No. 146. Edited by JOSEPH C. SCHUMACHER, Vice President, Research, American Potash and Chemical Corporation. Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N. Y. 1960. xii + 257 pp. 16 × 23.5 cm. Price, \$8.75.

This volume comes into the world of chemical literature well fortified by forewords. There is the general introduction for the ACS Monograph Series in which the observation is made that the line of demarcation between pure and applied science has virtually disappeared. A foreword by F. C. Mathers points up the delayed acceptance in this

country of perchlorates as interesting and useful compounds and expresses the hope that some stimulus toward the discovery of a cheap process will be brought about by this book. The same wish is found in the Editor's preface where acknowledgment is given to his associates in the American Potash and Chemical Corporation who have contributed most of the text. Chapter 1 is in a sense also an introduction. It gives a chronological account of the development of the production of perchlorates from their discovery in 1816 by Count Frederich von Standon to the new expansion brought about by the use of perchlorates in solid propellants.

The monograph was promoted by a desire to share the substantial bibliography on perchlorates which the Editor had collected over many years. This has been done generously. There are over a thousand references to the scientific and patent literature.

Four chapters by R. D. Stewart deal with the general chemistry of perchlorates. W. A. Gale also contributes to four chapters. The use of perchlorates mainly as desiccants and some solubility data on aqueous systems of several perchlorates are by this writer alone. He is co-author with the editor and T. W. Clapper in an important chapter on the manufacturing processes and with M. Weber in an interesting chapter on the uses of perchlorates in explosives and in solid propellants. The analysis of perchlorates and the use of perchlorates in analytical chemistry are discussed at length by H. A. Kerry. The biological activity of perchlorates and the precautions to be observed in handling perchlorates are described in separate chapters by E. Levins.

An organization of this kind leads inevitably to some duplication of references which are given at the end of each chapter and also to much repetition. Many common factors are encountered in discussing the biological action, the use in explosives and propellants, the hazards in manufacturing, and the precautions in handling. There are sections of the book where one has the impression that statements have been collected directly from reference cards and that there is lacking some critical comment by the authors and by the Editor. This restrained attitude toward the printed word is not helpful to the reader in evaluating some of the statements. On pages 133 and 176 we are confronted with apparently conflicting statements about the reaction of ammonium perchlorate with carbon taken from Carlson's British and Swedish patents, respectively. Some other observations could bear elaboration but none is given. "The first known complex perchlorate anions were formed from lead perchlorate," "Water was oxidized to hydrogen at the anode." "The solid phases were identified as basic salts by X-ray analysis" are some examples. There are some lapses in the index. The compound $P(OH)_4ClO_4$ is not to be found in the index although $Se(OH)_6ClO_4$ is listed. It is called selenium perchlorate and referred to in the text as a basic salt. A formula index would have been a useful addition.

This monograph belongs on the bookshelf to anyone who deals with perchlorates. The general reader would find much to interest him in its pages, but one is left with the impression that in some areas there is still a pronounced difference between applied and pure chemistry.

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