

refractive indexes of crystals are not accidentally what they are, that indeed they derive from the internal arrangement of the atoms. Surely it would not hurt students of mineralogy to be prodded into wondering why quartz is optically positive and calcite negative! Despite these criticisms this book is a real contribution to the art of optical crystallography. If you use a polarizing microscope you should also have this book.

High Temperature Technology: Symp. Proc. (Asilomar Conf. Grounds, Calif., Oct. 1959). Edited by N. Hiester and D. Cubicotti. Arranged by Stanford Research Inst. 348 pp. McGraw-Hill Book Co., Inc., New York, 1960. \$15.00. *Reviewed by Joseph Katz, University of Chicago.*

HIGH-TEMPERATURE chemistry and physics are currently in vogue. To the increasingly large number of scientists becoming interested in problems at elevated temperatures, this book, which is a collection of review papers on the techniques and measurements, the materials, the processes, and the behavior of materials at elevated temperatures, will be very useful. In the technique and material section, for instance, there are, among others, excellent articles on the precision and accuracy of temperature measurements above 1000°K and on image furnace research. In the materials section the articles deal mainly with refractory materials such as refractory metals, graphite, carbide, nitride, and sulfide refractories, etc. The section on processes has articles on high-pressure methods, fused salt chemistry, pyrometallurgy, condensed state reactions, and high-temperature chemical synthesis. The review article by Janz on fused salt chemistry is an excellent introduction and survey of the present model theories and experiments. One should bear in mind that the articles in this book are reviews. As such they are an invaluable introduction but due to limitations of time and space they are only introductions (with, fortunately, very extensive lists of references). In addition, this book contains a large section on high-temperature research abroad, covering the United Kingdom, France, Germany, Japan, and Scandinavia. This reviewer feels that a review of the high-temperature research in the Soviet Union would also have been of value.

Progress in Cryogenics, Volume 1. Edited by K. Mendelssohn. 259 pp. Academic Press Inc., New York, 1959. \$11.00. *Reviewed by Robert L. Sproull, Cornell University.*

A NEW "Progress" series is initiated with this volume. Dr. Mendelssohn explains in his preface: "The aim of the present series is to provide summarizing articles on the whole field of low-temperature methods, as distinguished from low-temperature physics or chemistry. The ground to be covered ranges from the production, maintenance, and measurement of low

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This introduction to quantum mechanics, written at the senior-graduate level, emphasizes the physical basis of the subject, without undue neglect of its mathematical aspects. A noteworthy feature of the book is its careful, detailed explanation of scattering, matrix theory, transformation theory, angular momentum, radiation, and perturbation theory. Prominence is given to the role of symmetry operations, and to the essentially algebraic structure of quantum mechanical theory.

The early chapters of the book provide an introduction to the subject along essentially historical lines. The formal structure is then introduced through a discussion of linear operators, eigenfunctions, and commutation relations.

The text contains a large number of problems, which supplement the textual material and provide additional applications of the theory. Developed in classroom use by the authors over a period of six years, the book offers an excellent choice of topics for an introductory course, presented in an unusually lucid manner.

c. 544 pp, 96 illus, 1961—probably \$9.75

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Although it is fashionable to complain about the plethora of book series, this reviewer welcomes the cryogenic series. Dr. Mendelssohn has obviously obtained first-rate authors for his initial volume and established an appropriate balance among physics, techniques, and applications.

Formation and Trapping of Free Radicals. Edited by Arnold M. Bass and H. P. Broida. 522 pp. Academic Press Inc., New York, 1960. \$16.00. *Reviewed by D. J. E. Ingram, University College of North Staffordshire.*

THE study of free radicals, and the possibility of trapping high concentrations of them, has been the subject of much intensive investigation over the last few years, particularly so amongst the large group of scientists that were gathered together in the free radical program of the National Bureau of Standards at Washington. The two editors of this book were both active initiators of this project and a large number of the authors were also associated with the program in one way or another. In one sense this volume may therefore be taken as the distilled essence of all the thought and work that went into the three years research at Washington, and, as such, it contains a great deal of very interesting and authoritative data.

It would be unfair to suggest, however, that the content matter is entirely limited to the work carried out by these research groups. Professor Rice provides a short introductory chapter on the early history of "radical trapping", and this is followed by a chapter on radical formation and trapping from the gas phase by B. A. Thrush of Cambridge, England. There are, in fact, a total of sixteen chapters by different authors, all of whom are experts in their own particular fields. The general grouping of these chapters seems to fall under the three main headings of (1) methods and experimental techniques associated with radical formation and trapping, (2) methods of investigation and analysis of the trapped species, and (3) the theory and possible applications of studies on trapped radicals. The first group includes detailed descriptions of radical trapping from the gas phase and from gas discharges, as well as a consideration of the techniques for radical production in situ in the solid such as by electron bombardment, photolysis, and higher-energy irradiation.

The chapters on methods of investigation include authoritative accounts of the applications of optical spectroscopy, electron resonance, mass spectrometry, and x-ray diffraction. These are all very well illustrated by specific examples of analysis and interpretation, and the basic theories and experimental techniques of each