

state materials that involve electronic conductivity. However, Chap. 7 does cover the electrochemistry of mixed ionic-electronic conduction where the electronic conductivity component can vary from very low to very high. An interesting formula index shows that halogen/oxide compounds are of dominant interest with particular emphasis on sodium aluminates and compounds of copper, lithium, and silver. There is a good chapter on the theoretical aspects of solid electrolytes which sets the tone for the subsequent four chapters which deal with specific materials, e.g., β -aluminas, halogenides. The chapters are well referenced covering the literature through 1976. For a small book of 226 pages, there is a lot of information which will be of substantial help to workers in this field.

Graydon B. Larrabee
Texas Instruments, Inc.
Dallas, Texas

"Thin Films—Interdiffusion and Reactions," edited by J. M. Poate, K. N. Tu, and J. W. Mayor. Published by John Wiley & Sons, New York (1978). 578 pages; \$35.00.

The subject matter of the book, as the title describes, is concerned with the history and the future of a thin film as it contacts other films and surfaces and as electrical current flows through it. Rather than being ignored, the crystalline grain boundary is brought front and center to be given its rightful place as a provocative and troublesome cousin. The grain boundary exhibits its own characteristics and problems throughout the book. The book is concerned with metal-metal, metal-elemental semiconductor, and metal-compound semiconductor interfaces and interactions both structural and electrical.

This book is a much needed update on the science and technology of thin films. Although the applications are strongly oriented to the electronics industry there is also interesting reading for any scientist who uses thin films as a research tool. The subtitle, "Interdiffusion and Reactions," is accurate, but a descriptive subtitle could also have been "Interactions" for the book is very descriptive of the interactions that occur when fresh, metallic films, only tens of atoms thick, are brought into intimate contact with each other.

This book does not use valuable space with explanations of topics such as basic vacuum system technology which is adequately covered in earlier texts. However, a chapter is devoted to analytical techniques which primarily describes only the newer tools used for film characterization.

The book is well edited and makes dynamic reading. The basic format of each chapter is to start with introductory material designed to give a reader, who has a basic knowledge of the area, a quick review and update and to put

him at ease with definitions and terminology that is used in the more in-depth parts of the chapter.

Each chapter has its own table of contents which, in addition to a general subject index and materials index that covers the entire book, makes this book a good reference text for both engineers and managers in the semiconductor industry. Furthermore, each chapter has adequate reference such that the reader can either refresh himself on the more basic aspects of the subject or extend beyond the scope of the present book. The editors were either authors or co-authors on six of the fourteen chapters and it is obvious that good communication was maintained among all participants for the book is remarkably smooth flowing. Some overlap exists but this is necessary for it is assumed that the book will probably not be read cover to cover.

In conclusion, this book should be added to the library of materials scientists, semiconductor device engineers and physicists, and anyone else who is interested in either the nature of surfaces and interfaces or is involved in semiconductor processing technology.

Archibald L. Fripp
NASA Langley Research Center
Hampton, Virginia

detailed treatment. Discussion of the physical properties of thin films focuses on their mechanical, electrical, magnetic, and optical properties; emphasis is placed on their characteristic distinction from bulk properties. The final part presents applications, mostly electronic, of thin film technology.

Thermoelectricity in Metallic Conductors, edited by F. J. Blatt and P. A. Schroeder.

1978, Plenum Press, 227 W. 17th St., New York, NY 10011. 422 pages, bound. \$42.50.

Thermoelectricity in metallic conductors has significant applications in numerous fields of research, providing a unique and fruitful technique for securing important data that are frequently difficult to obtain by any other means. This book presents a compilation of the most recent research, as well as comprehensive reviews of the field, and examines a number of disparate subjects all of which employ this useful technique. Included among the many topics covered are critical phenomena, superconductivity, many-body theory, quasi-one-dimensional systems, liquid metals, and phase transitions.

Electromagnetic Fields: Sources and Media, by A. M. Portis.

1978, John Wiley & Sons, Inc., 605 Third Ave., New York, NY. 775 pages, bound. \$22.95.

Nonlinear Optics, edited by P. G. Harper and B. S. Wherrett.

1977, Academic Press Inc., 111 Fifth Ave., New York, NY 10003. 434 pages, bound. \$40.35.

McGraw-Hill Dictionary of Scientific and Technical Terms, 2nd ed., edited by D. N. Lapedes.

1978, McGraw-Hill Book Co., 1221 Ave. of the Americas, New York, NY 10020. 1814 pages, bound. \$39.50.

Dictionary of Engineering and Technology, Vol. 1, by R. Ernst.

1974, Oxford University Press, 200 Madison Ave., New York, NY 10016. 2 volumes. Vol. 1, 1061 pages; Vol. 2, 1146 pages, bound. \$49.50 each.

Optical Properties of the Atmosphere, edited by R. C. Sepucha.

1978, Society of Photo-Optical Instrumentation Engineers, P.O. Box 10, 405 Fieldston Rd., Bellingham, WA 98225. 162 pages, paper. \$35.00.

Optical Coatings 11, Applications and Utilization, edited by G. W. DeBell and D. H. Harrison.

1978, Society of Photo-Optical Instrumentation Engineers, P.O. Box 10, 405 Fieldston Rd., Bellingham, WA 98225. 172 pages paper. \$35.00.

Alternative Energy Sources, edited by T. Nejat Veziroglu.

1978, Hemisphere Publishing Co., 1025 Vermont Ave., N.W., Washington, DC 20005. 11 volume set. 5170 pages, bound. \$495.00.

Except where noted, these books have been prepared by the staff of The Engineering Societies Library, and were selected for inclusion in the *Journal* by Dr. Daniel Cubicciotti of Stanford Research Institute. The Electrochemical Society does not have copies available for sale or loan. Orders for the books should be forwarded directly to the publishers.

NEW BOOKS

Electronic Measurements, by P. Kantrowitz et al.

1979, Prentice-Hall, Englewood Cliffs, NJ 07632. 398 pages, bound. \$18.95.

Each chapter contains a discussion of the principles of operation, some basic theory, and in some cases a description of some particular instruments. Emphasis is on the measurement rather than the instrument. If the instrument is unique or has special characteristics, then the instrument is discussed. The material in the text first contains the limiting constraining factors such as sensitivity, reproducibility, accuracy percent error, response, range, etc. The text is also subdivided into groups of the most recent measuring techniques of the various areas in the electronic fields (i.e., meter measurements, transistor devices, digital instrumentation, high fidelity audio systems and testing, recorders and recording systems, transducer systems, signal generation, applications and measurements, radio frequency systems and testing, etc.).

Physics of Thin Films, by L. Eckertova. 1977, Plenum Press, 227 W. 17th St., New York, NY 10011. 254 pages, bound.

This book serves as an introduction to the physics and technology of thin films, which in recent years have influenced many areas of scientific activity, the most important fields of application being microelectronics and optics. The first part presents methods for thin film preparation, with emphasis on cathodic sputtering and evaporation in vacuo. Current methods for measuring and monitoring thickness and deposition rates are surveyed as well. The next part deals with the physical foundations of thin film formation; it covers the most important theories of nucleation and growth, with special attention to the factors that affect the final structure of films, including epitaxial films. Various electron microscopic and diffraction methods for examining chemical composition, morphology, and structure of thin films, and modern methods of surface examination (LEED, SIMS, Auger spectroscopy) are given