

Algar-Flynn-Oyamada synthesis of flavanols, the Bouis allene synthesis, the Brandt lithium hydride synthesis of aldehydes, the Darapsky amino acid synthesis, the Debus preparation of imidazoles, the Jones-Weedon synthesis of acetylenic aldehydes, the Kerp ketone reduction, the Landauer-Rydon triphenyl phosphite method for the preparation of alkyl halides, the Levinstein mustard gas synthesis, the Mayer diphenylamine-acridine synthesis, the Oddo synthesis of pyrrole ketones, the Robert chlorination reaction, the Täuber carbazole synthesis, the Vorländer diphenic acid synthesis, the Weil aryl aldehyde synthesis, the Werner aryl isothiocyanate synthesis, and a number of others, hardly detracts from the real value of this book, which to many users will consist mainly in its long overdue contribution to a more systematic and rational approach to organic reaction nomenclature. The omission of a number of more important name reactions, such as the Arens-Van Dorp synthesis of unsaturated aldehydes, the Bowman debenzoylation and dihydropyran methods for malonic ester-type syntheses, the Glaser synthesis of di-acetylenes, the Stork enamine alkylation and the Wagner-Jauregg reaction, is a little more disturbing, but the over-all coverage is so satisfactory that the book more than adequately fulfills the purpose for which it was written. May its consequences to the nomenclature of organic reactions be far-reaching and fruitful!

DEPARTMENT OF CHEMISTRY
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Tables of Constants and Numerical Data. Volume 12. Selected Constants Relative to Semiconductors. Established under the direction of P. AIGRAIN, Professeur, and M. BALKANSKI, Maître de Conférences, Faculté des Sciences de Paris. By C. BENOIT À LA GUILLAUME, R. COELHO, O. GARRETA, H. GUENOC, C. SÉBENNE and J. TAVERNIER. Pergamon Press Ltd., Headington Hill Hall, Oxford, England. 1961. i + 65 pp. 21.5 × 27.5 cm. Price, \$6.00.

The book is a compilation of numerical data describing the electronic and crystalline properties of roughly 80 semiconducting elements and compounds, chosen primarily on the basis of present or potential importance in semiconductor technology. Energy band structure, electron and hole effective masses and mobilities, crystal structure, magnetic, dielectric, thermal and elastic properties—some 20 to 30 physical constants in all—are tabulated for each material, to the extent that data are available. In the case of silicon and germanium there are additional tables of diffusion coefficients, binding energies, and solubility and segregation coefficients, for a number of impurity atoms. A literature reference is cited for each numerical constant listed, and there is an extensive supplementary bibliography as well. Explanatory textual material is presented in both French and English versions.

The information collected here is, for the most part, of relatively recent origin and is scattered widely in a voluminous international literature. Its compilation and critical evaluation would appear to have been a rather formidable task, which the authors have performed thoroughly and well. The data are presented in a convenient and adequately indexed format; the bibliography is unusually complete and is itself a valuable feature of the book. The volume should enjoy a very wide use indeed.

UNIVERSITY OF ROCHESTER
ROCHESTER, N. Y. DAVID DUTTON

Anodic Oxide Films. By L. YOUNG, British Columbia Research Council, University of British Columbia, Vancouver, British Columbia, Canada. Academic Press Inc., (London) Ltd., 17 Old Queen Street, London, S.W. 1, England. 1961. xiii + 377 pp. 16 × 23.5 cm. Price, \$11.00.

This is a satisfying book to read. It is well written, timely, provides good coverage of a field of current interest, contains pertinent illustrations, has few errors, and is well done from a mechanical point of view. Dr. Young has produced a suitable blend of theory and experiment.

The general characteristics of anodically produced oxides, the experimental methods of producing the oxides and of determining their characteristics—especially the film thickness, the theories of growth kinetics—are the concern of the first few chapters. Following this there is an extensive review of the work in this field on tantalum. This is one area of Young's own interest and shows the rather considerable attention he has given to it. There follows discussion on photo-effects, rectification, dielectric properties of anodic oxide films of the protective, high resistance, rectifying type, and on electrolytic capacitors. In all of the treatment the structural and mechanical character of the films are kept in mind. The final half of the book is concerned with the characteristics of anodic oxide films and of anodic processes of 33 metals, featuring aluminum and iron. The passivity phenomena, the postulates, and the models for passive behavior of iron are reviewed for the period starting with Faraday and continuing through 1960.

Related matters such as the structure and importance of the electrical double layer, adsorption, corrosion, semiconductor substrates, and other topics like these are introduced only where they serve to develop the main theme. Nonetheless there are numerous references given to these topics which point particularly to recent work and reviews. Also, there are two appendices with some more or less random thoughts of the author on the oxygen evolution reaction and on "electrochemical topics" such as electrode potentials, mixed potentials, etc.

As already implied this is a well organized book which should be very useful to those who want a critical review of the field or to those who need a good starting point to the literature of the field. It is not likely to start any controversy.

DEPARTMENT OF CHEMISTRY
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Scientific Foundations of Vacuum Technique. Second Edition. By SAUL DUSHMAN, Late Assistant Director, Research Laboratory, General Electric Company, Schenectady, New York. Revised by Members of the Research Staff, General Electric Research Laboratory. J. M. LAFFERTY, Editor. John Wiley and Sons, Inc., 440 Park Avenue South, New York 16, N. Y. 1962. xviii + 806 pp. 16 × 23.5 cm. Price, \$19.50.

The difficult problem of revising the classic and comprehensive first edition of "Scientific Foundations of Vacuum Technique" by Saul Dushman has been admirably handled by the revisers. To simplify the problem, a number of scientists with specialized knowledge from the General Electric Research Laboratory collaborated in the revision. With the advance of knowledge and vast accumulation of information in the vacuum field, it is unlikely that any one person today could have revised and improved the first edition. However, those who tackled the revision as a team effort have been able to do so.

The original plan of the book has been retained and a number of the sections of the first edition have been reprinted. Some less important material has been omitted to make room for the inclusion of new developments in the field.

The treatment of the kinetic theory is substantially the same as it appeared in Chapter 1 of the first edition. Even though there are a number of books on this subject, a treatise on vacuum technique would not be complete without a section on the kinetic theory. The treatment of the kinetic theory is concise and presented in a way to serve as background information for subsequent chapters.

In Chapter 2 the flow of gases through tubes and orifices is adequately covered. A new introductory section has been added summarizing the theoretical methods of flow analysis and describing the nature and boundaries of molecular flow, viscous flow and flow in the transition range. The chapter goes on as before to develop formulas for these flow regions applicable to various shapes of tubes and orifices. New material has been added dealing with corrections to be applied to short tubes and for junctions between tubes of different radii in the incompressible flow range. Additional material has been included on molecular flow through short

tubes and tubes with complex geometries. The section on flow through porous material has been removed. The authors believe that "this subject is comprehensively treated elsewhere and has become too specialized for adequate coverage in the space available."

Chapter 3 describes the major classes of vacuum pumps and their mode of operation. All the material on mechanical and vapor pumps has been reorganized and covered in this one chapter. Those interested in ultra-high vacuum will welcome the sections on ion and getter pumps and cryogenic pumping.

Chapter 4 treats vacuum pump applications, their proper selection, system design, and the use of traps and baffles. The discussion of the "choice and stability of work fluids for vapor stream pumps" should clarify any misunderstandings regarding the utility of "oils" as pump fluids and their almost universal use in place of mercury.

Chapter 5 remains as a comprehensive survey on the many different types of gauges for low gas pressure measurement. Major revisions have been made in the section on ionization type gauges and leak detectors. New material has been added on ultra-high vacuum ionization gauges, spectrometers and leak detection methods.

One might view Chapter 6 on the treatment of sorption of gases and vapors by solids as a special field and better omitted from this text as was the flow through porous material. However, since one of the most important problems in high vacuum technique is the removing of gases and vapors which are present both on the surface and in the interior of glass walls and metal parts, it seems fitting to include this material in the text.

In Chapter 7 "typical data are given on the sorption of various gases on non-metallic materials which are of importance in vacuum technology." The relative activities of materials like cellulose, charcoal and glass, and the effect of methods of preparation are discussed. Although the authors state that the chapter was not intended to be comprehensive but rather to present typical data together with a few interpretive comments, the chapter is sufficiently complete to give a theoretical understanding and a practical working knowledge of sorption techniques.

The subject of occluded or dissolved gases on metals is presented in Chapter 8. A knowledge of the manner in which metals may take up gases and of the condition under which these gases may be removed is of extreme importance in vacuum technology. A new section has been added on the behavior of rare gases propelled into metals by ion bombardment and nuclear processes. New experimental work in diffusion studies using nuclear magnetic resonance, internal friction measurements, and radioactive and stable isotopes has been added.

Chapter 9 on chemical and electrical clean-up and ultra-high vacuum contains several new sections on gas sorption. Extensive data are given for rates and total quantities of gas that can be sorbed under vacuum tube conditions. New getter materials are discussed and comparisons made with older types. Even though the section on ultra-high vacuum has been expanded, there may be some readers who would like to have seen an even greater expansion of this increasingly important phase of high vacuum.

Chapter 10 deals with vapor pressures and rates of evaporation. Data have been brought up to date and tables recalculated on the basis of recent available determinations. For those particularly interested in thin films, new material has been added to the section on vacuum distillation of metals and deposition of films.

Chapter 11, "Dissociation Pressures of Oxides, Hydrides, and Nitrides," treats principally the "non-elementary modes" of dissociation of oxides and of the reduction of the oxides of metals. The editors have removed the section on oxidative rates from the new edition, but they feel that the increasing interest in the properties of materials at high temperatures justifies the continuation of a section on dissociation. Although this chapter may seem peripheral to some, it is a handy reference for those who may have need for dissociation data.

In keeping with the thorough coverage of subject matter, each chapter ends with a generous list of references and notes. Also, there is a complete name and subject index at the end of the book. Anyone interested in vacuum technology either from a scientific or practical viewpoint will find the second edition a broad and solid foundation of pertinent information and data clearly and expertly pre-

sented. The specialists who combined their knowledge to revise the individual chapters and the editors are to be congratulated on the excellent results of their collaboration. Having known Dr. Dushman personally, I am sure he would have been pleased with their accomplishment.

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Physics in the Soviet Union. An Exposition of Theoretical Physics. By A. S. KOMPANEYETS. Philosophical Library, Inc., 15 East 40th Street, New York 16, N. Y. 1962. 592 pp. 14.5 × 22 cm. Price, \$7.50.

The title of this book is somewhat misleading. It is actually a summary of certain areas of Theoretical Physics and is stated by the author to be aimed at engineer-physicists and to specialists working in fields associated with physics. According to the author the reader is assumed only to be acquainted with the course of general physics and analysis. If this is the real intent, it is this reviewer's opinion that the book has failed: This does not imply anything about its quality, which is high, but only that it appears not to accomplish its aim realistically.

The text is divided into four principal sections entitled: I, Mechanics; II, Electrodynamics; III, Quantum Mechanics; IV, Statistical Physics. It should be noted that the section on Mechanics is restricted to point and rigid body mechanics. The level is high in all four sections and the coverage is quite extended and proceeds from a fundamental point of view. It is for this reason that the real utility of the book for its stated audience (at least by U.S. standards) seems questionable. The level of treatment of all the subjects is that of graduate level instruction in this country and with the compression required in this presentation, the above conclusion follows. On the other hand, it is certainly an excellent summary and reference for the individual who has had some exposure to the fields covered. The level of sophistication is similar to that attained in the series of texts on Theoretical Physics by Landau and Lifshitz and the author expresses his indebtedness to them.

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Reagent Chemicals and Standards with Methods of Testing and Assaying Them; also the Preparation and Standardization of Volumetric Solutions and Extensive Tables of Equivalents. Fourth Edition. By JOSEPH ROSIN, Member, American Chemical Society; the U. S. Pharmacopoeia Revision Committee; Formerly Chief Chemist and Chemical Director, Merck and Co., Inc. D. Van Nostrand Company, Inc., 120 Alexander Street, Princeton, New Jersey. 1961. 557 pp. 16 × 23.5 cm. Price, \$14.50.

In its previous three editions this book has become so well known—and respected—that there is no need to review the present fourth edition at length. It follows the same pattern, and maintains the same high standard, as its predecessors. Specifications have been added for about thirty new reagents and for ten of the amino acids that are most commonly used therapeutically or in special food products.

DEPARTMENT OF CHEMISTRY
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Spectroscopie Infrarouge. Partie I. Vibrations Moléculaires. By M. PIERRE BARCHEWITZ, Professeur à la Faculté des Sciences de Paris. Gauthier-Villars et Cie., 55, Quai des Grands-Augustins, Paris 6, France. 1961. vi + 238 pp. 16 × 24.5 cm. Price, NF. 42.--.

This brief account of the theory of molecular vibrations and their spectroscopic activity is based on a course of lec-