

## BOOK REVIEWS

**Organic Syntheses.** Volume 35. T. L. CAIRNS, Editor-in-Chief. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1955. vi + 122 pp. 15.5 × 23.5 cm. Price, \$3.75.

Volume 35 of "Organic Syntheses" contains directions for the preparation of thirty-six organic compounds. The editing and presentation of the experiments in this latest addition to the annual series are very good and follow the pattern of previous volumes. Without doubt this is a work of considerable value to the practicing organic chemist.

Actually, one wonders how the editors manage so well to meet the requirements of a new volume each year without including many over-specialized preparations which would seriously weaken the series.

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**High Vacuum Technique. Theory, Practice, Industrial Applications and Properties of Materials.** Third Edition. Revised. By J. YARWOOD, M.Sc., F. Inst. P., Head of Department of Mathematics and Physics, The Polytechnic, Regent Street, London W. 1. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1955. viii + 208 pp. 14 × 22 cm. Price, \$5.50.

The salient feature of this book is conciseness. The type and illustrations are clear, the paper robust, and the book well suited for travel between work bench and office desk. Although likely to be acquired by most operators in high vacuum, it will appeal particularly to the student or technician and the occasional user of vacuum methods, where the crisp, didactic style will provide answers uncomplicated by qualifications or alternatives.

The subject-matter is presented functionally rather than historically, much of the information being derived from catalogs. This leads to curious inversions of authority. Burch, inventor of the oil diffusion pump, receives one reference, Langmuir 3, Gaede 9, Distillation Products, Inc., 5, and W. Edwards Co. 29. One result of this preoccupation is a valuable summary of pumps, mechanical, diffusion and ejector, obtainable commercially throughout the world. Throughputs, energy consumption and ultimate vacuum are listed comparatively (pp. 49-57).

The chapters on gas kinetics and measurement of pump speeds are excellent. The lesser methods of leak detection are well recounted, but the important mass spectrometer type is dismissed as too expensive to warrant inclusion. A similar lapse is noted in connection with the vacuum furnace, which is not treated.

The 6th and last chapter gives a compilation of chemical data and physical constants—a Critical Table in miniature—which will save the vacuum technologist much searching through larger reference volumes. Chapters 4 and 5, on "gettering" and application of vacuum to industry, provide a token initiation which should at least encourage the student to read elsewhere.

In summary, it may be said that within the limits set by the author, this is an admirable small textbook for the occasional worker in high vacuum which will be welcomed in its third edition by the American reader.

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**Diffusion in Metallen. Platzwechselreaktionen.** Volume 3. By WOLFGANG SEITH, Professor für physikalische Chemie an der Universität Münster and Theodor Hennmann, Dozent für physikalische Chemie an der Universität Münster. Springer-Verlag, Reichpietschufer 20, Berlin W 35 (West-Berlin), Germany. 1955. vi + 306 pp. 16.5 × 24 cm. Price, Ganzleinen geb. DM 39,—.

The field of metallic diffusion has shown a remarkable growth in the 15 years since the appearance of the first

edition of "Diffusion in Metallen." The quality and quantity of experimental data has increased tremendously, due in large part to the widespread availability of artificially produced radioisotopes; notable progress in understanding the mechanism of the diffusion process has resulted from both the theoretical and experimental attacks; a start has been made toward putting the problem of "structure-sensitive" diffusion on a rational and quantitative basis. It is not surprising, therefore, to find this second edition to be thoroughly revised and greatly expanded.

The first third of the book, dealing largely with experimental aspects, is mainly an updating of corresponding chapters in the first edition. An extensive, well-arranged and very useful tabulation of experimental results is included. However, the organization of this section does not seem to be the most desirable. For example, after the discussion of experimental techniques and tabulation of results, there is a chapter on general theory and mechanism, after which the authors return to discuss the measurement of concentration-dependent diffusion coefficients.

The middle third of the book is almost entirely new. Included here are discussions of the Kirkendall Effect and its implications, Darken's phenomenological treatment of diffusion in binary systems, diffusion in systems with intermediate phases, and grain boundary and surface diffusion.

A series of nine special topics occupy the last third. These subjects range from the influence of third components on the diffusion of solutes, to the theories of precipitation and sintering, to diffusion in liquid metals. This portion is again essentially a revision of the last half of the first edition. As might be expected in a book dealing with the broad subject of diffusion in metals, these special topics are not covered in any great depth.

The appendix includes pertinent mathematical tables and a table of experimental results that were published after the preparation of the manuscript.

Perhaps the best recommendation for the book is that it gives a fairly comprehensive survey of the important literature of the field. (The excellent thermodynamic treatment of diffusion in alloys by Bardeen and Herring is a notable exception.) As such, it will serve as a useful addition to the libraries of those who desire a handy source book. On the other hand, those who wish a discriminating critique of the present state of knowledge will probably do better to look elsewhere.

GENERAL ELECTRIC RESEARCH LABORATORY

THE KNOLLS  
SCHENECTADY, NEW YORK

R. E. HOFFMAN

**Molecular Vibrations. The Theory of Infrared and Raman Vibrational Spectra.** By E. BRIGHT WILSON, JR., Professor of Chemistry, Harvard University, Cambridge 38, Massachusetts, J. C. DECUS, Associate Professor of Chemistry, Oregon State College, Corvallis, Oregon, and PAUL C. CROSS, Professor of Chemistry, University of Washington, Seattle 5, Washington. McGraw-Hill Book Company, Inc., Publishers, 330 W. 42nd Street, New York 36, N. Y. 1955. xi + 388 pp. 16 × 23.5 cm. Price, \$8.50.

No authors could have been more competent to undertake a work on this subject and within the limits they have set for themselves, this book is highly successful. Most of the published infrared and Raman spectra have their origin in molecular vibrations and in this work the authors develop all of the essential elements of the theory of such vibrations.

Except for some very important new methods in the Chapter "Advanced Applications of Group Theory," most of the material presented is available in the literature. However, the original papers are widely scattered, and the importance of the present work is that it takes up its subject from the beginning, develops the frequently obscure mathematical techniques in an extremely lucid way without making any strenuous demands on the mathematical background of the reader, and includes most of what is relevant to cur-