

Of the three major sections into which the subject matter of this volume is divided, the first and predominant portion is devoted to methods of separation and identification of radioisotopes, sample preparation, the behavior of trace concentrations of elements in phase separations, isotope dilution methods and activation analysis. A concluding section deals with the biological effects of radiation and radioactive materials and suggests precautionary measures for handling radioactive substances. These safety rules appear to be adequate for activities up to about the millicurie level.

The second division of this volume is devoted to counting equipment. The physical principles of the operation of ionization chambers, scintillation counters, crystal counters and spark counters are treated in some detail. There are useful discussions of scattering and counting yields, background corrections, and of the statistical evaluation of counting data.

The concluding portion of this "Handbuch" deals somewhat briefly with the use of photographic methods in radiochemistry.

After an introductory section on the photographic process itself, the authors discuss the properties of various commercially available emulsions in terms of their applicability to the study of different types of radioactive decay. Directions are given for the development and fixation of plates and films and for their microscopic examination. The attention of the reader is directed to errors arising in photographic methods from fogging, fading, shrinkage and distortion of the emulsion.

A final section discusses some of the applications of the methods of autoradiography to radiochemistry.

Volume II of "Mikrochemischen Methoden" can be strongly recommended to all who have an interest in the practical application of radiochemistry to chemical research. An especially valuable feature of this volume is its thorough documentation, which extends to more than 2000 references.

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Calcul des Fonctions D'Onde Moléculaire. Centre National de la Recherche Scientifique, 13, Quai Anatole France, Paris 7, France. 1958. 415 pp. 16 × 24.5 cm. Price, 3,400 Fr.

This volume consists of a collection of about thirty-five papers, on the general subject of molecular wave functions. The papers were presented at a colloquium sponsored by the Centre National de la Recherche Scientifique of France. Comments and discussion by members of the colloquium are included. The papers give a comprehensive view of current applications of quantum mechanics to general problems of molecular structures, and of application to selected specific cases. The volume is attractively bound and it is clearly printed on good quality paper.

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Organic Syntheses with Isotopes. Part II. Organic Compounds Labeled with Isotopes of the Halogens, Hydrogen, Nitrogen, Oxygen, Phosphorus, and Sulfur. By ARTHUR MURRAY, III, and D. LLOYD WILLIAMS, University of California, Los Alamos Scientific Laboratory, Los Alamos, New Mexico. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1958. ix + pp. 1147-2096. 15.5 × 23.5 cm. Price, \$25.00.

The first part of this volume, which dealt with compounds of isotopic carbon, was reviewed in an earlier issue (THIS JOURNAL, 81, 2030 (1959)). Most of the remarks made in the earlier review are also applicable to Part II. The entire volume represents an excellent contribution to chemical literature.

Part II, and only Part II, contains the index for the entire volume. This index, which appears to be very complete, follows *Chemical Abstracts* usage with the addition of isotopic designations.

In Part II, as in Part I, the authors have attempted "to treat all labeling syntheses mentioned in the literature

through 1955." Descriptions of syntheses are presented in sufficient detail so that preparations may be carried out without further recourse to the literature. In addition, for the isotopes of hydrogen, the halogens and oxygen, there are tables listing exchange reactions that have been used to synthesize compounds containing these isotopes.

A major fraction of Part II, some 450 pages, is concerned with the hydrogen isotopes, but tritium syntheses take up only 50 pages of this section. The book was written before the recent upsurge of tritium's popularity, mostly occasioned by Wiltzsch's discovery that organic compounds can be labeled by simple exposure to tritium gas. However, anyone who wishes a specific labeling of either hydrogen isotope in a given molecule will find it worthwhile to read the synthetic procedures that are outlined in this book.

This volume (both parts) should be in all chemical libraries. Its price is so high (\$50.00), however, that it will have a limited appeal to individual purchasers.

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Catalysis. Alkylation, Isomerization, Polymerization, Cracking and Hydroreforming. Volume IV. Edited by PAUL H. EMMETT, W. R. Grace, Professor of Chemistry, The Johns Hopkins University, Baltimore, Maryland, Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N. Y. 1958. vi + 706 pp. 16.5 × 23.5 cm. Price, \$19.50.

The first five volumes of this series dealt primarily with the fundamental theories and mechanisms of catalysis. Volume VI is designated as "hydrocarbon catalysis" and it is concerned with some of the more important catalytic reactions pertaining to petroleum refining and petrochemicals.

The chapters consist of: 1. Catalytic Alkylation of Paraffins (42 pages) by R. M. Kennedy; 2. Catalytic Isomerization of Hydrocarbons (148 pages) by F. E. Condon; 3. Mechanism of Polymer Formation and Decomposition (150 pages) by R. Simha and L. A. Wall; 4. Polymerization of Olefins (66 pages) by A. G. Oblad, G. A. Mills and H. Heinemann; 5. Catalytic Cracking (87 pages) by H. E. Voge; and 6. Catalytic Reforming of Pure Hydrocarbons and Petroleum Naphthas (194 pages) by G. F. Ciapetta, R. M. Dobres and R. W. Baker.

All the chapters were written by recognized experts and all of the chapters with the exception of Chapter 3 deal with strictly catalytic reactions. It is to the credit of the Editor that he was able to embrace in this volume the various reactions which use catalysts which act in part at least by virtue of their acidic properties.

The chapter on Isomerization is probably one of the most comprehensive review articles in this field and it deserves special commendation.

In the chapter on Catalytic Cracking prime attention was paid to the basic knowledge of the reaction and to the theories which explain the reaction. The chemistry of the cracking catalyst was purposely omitted as it is to be discussed in another volume of this series.

Catalytic Reforming consists of three parts. Parts 1 and 2 deal with the reactions of pure hydrocarbons in the presence of metal oxides and in the presence of dual function catalysts. The third part summarizes the characteristics of the various commercial processes. The authors undertook a painstaking job in classifying and summarizing the various papers published on this subject. Although hydroforming reactions are of the most important catalytic reactions in the field of petroleum, relatively little attention was paid to the mechanism of these reactions. For that reason probably this chapter did not dwell too much upon the mechanism of hydroisomerization. It is regrettable that throughout the chapter degrees Centigrade and Fahrenheit were used interchangeably.

Chapter 3 deals with reactions involving large molecules; their formation and their breakdown. The chapter is very well and clearly written and presents an excellent summary of this subject. Most of the reactions discussed in this chapter are concerned with free radical initiated polymerization. For that reason it is debatable whether these reactions could be classified as catalytic. The inclusion, however, of "non-catalytic" polymerization reactions next to "catalytic"