

## BOOK REVIEWS

**Gas Chromatography**, Orion Edwin Schupp III, Interscience, New York, 1968. \$16.50

This book is volume XIII of the series "Technique of Organic Chemistry." As the editor of the series, A. Weissberger, states "The present series is devoted to a comprehensive presentation of the techniques which are used in the organic laboratory and which are available for the investigation of organic compounds. . . . It is hoped that the series will contribute to a better understanding and a more rational and effective application of the respective techniques." Volume XIII certainly meets these objectives and is a valuable book for those in the field of gas chromatographers. The volume contains 403 pages; 1212 references of useful information spanning from the early work to the middle of 1967; and thorough subject and author indexes. These features make it particularly useful as the first source for selecting references to read from the more than 18,000 articles on gas chromatography.

The book is organized to present the fundamentals and major references dealing with development of the technique. Chapter I introduces the technique and the nomenclature; it emphasizes the role of temperature programming which is a major change and improvement from most other gas chromatography books. Even the less known technique of vacancy gas chromatography is introduced.

Chapter II describes the Plate Concept, Random Walk Theory, and Rate Theory. Space does not permit a rigorous derivation of these theories, however the implications of these theories are given.

Chapter III describes the components of instruments used and their operations. The treatment of inlet systems, detector characteristics and the thermal conductivity cell are good. The reviewer feels that the flame ionization detector, which is the most popular detector at this time, deserves a more thorough treatment.

Chapter IV on Columns treats the solid support, liquid phase and column design parameters in detail. A useful list of stationary phases and maximum operating temperatures is also provided.

Chapter V on Special Techniques treats multiple columns, pretreatment of samples, trace analysis and pyrolysis. Unfortunately no mention is made of preparative scale separations, or the use of porous polymer bead column packings. These techniques could be very important to the organic chemist.

Chapter VI is a good treatment of Qualitative Analysis. It explains the numerous chromatographic techniques available to help identify a component. Proper treatment of other auxiliary techniques such as M.S., I.R., and N.M.R. is also provided.

Chapter VII on Quantitative Analysis is the weakest chapter. Although a thorough treatment of integrating chromatographic peaks is provided, the essential steps of sampling, determination and use of response factors, use of internal standards, and the procedure for checking the linearity of a detector are omitted. The sections on resolution and minimum time operation seem out of place.

On page 8 the author uses "isothermal" to describe both constant flow and constant temperature. Isothermal refers properly only to temperature.

On page 94 the decrease in flow with temperature programming is ascribed to the change in column resistance. The major factor is the increase of carrier gas viscosity. Even empty tubes will show a drop in flow rate with increased temperature.

In the treatment of electron capture detectors, the widely used concentric tube version is not described. The concentric tube is particularly appealing because no voltage pulser is required, and ordinary nitrogen can be used as the carrier gas.

Little mention is made of applications or of the many thermodynamic properties which can be calculated readily from gas chromatography data. These suggestions however would require additional pages and additional expense.

The book is a must for the organic chemist who wants to have a practical and current treatise on gas chromatography. It is also recommended for other workers in the field, particularly as the primary source for relevant, not exhaustive, references to the technique. The price is reasonable for the length and quality of the book.

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**Fundamental Processes in Radiation Chemistry.** P. AUSLOOS, Wiley, New York, 1968. 753 + ix pp. \$25.00

It is a pleasure to review a book edited by an outstanding researcher—there are more references to Dr. Ausloos' papers than to any other individual—with chapters by acknowledged authorities who critically and clearly summarize recent research in selected topics in radiation chemistry. The editor has presented the views and styles of the authors with no suggestion of the difficulties one has come to expect in an edited volume.

In ten chapters the authors describe a number of important facets of the field: energy deposition mechanisms, fragmentation processes, and gas, liquid-, and solid-phase reactions. The treatment is fairly advanced, so that maximum usefulness will be realized by the reader familiar with quantum chemistry, spectroscopy, and statistical mechanics—subjects important to the serious worker in the field.

The section on radiation-induced polymerization emphasizes kinetics and mechanisms of the homopolymerization of ethylene, isobutene, acrylamide, styrene, and cyclopentadiene—all systems for which much data are reported. Polymer chemists will benefit from the physicochemical approach to radiation polymerization: a more or less detailed presentation is given of primary processes that occur in spurs within  $10^{-7}$  sec after impact and which lead to the radicals and ions responsible for polymerization. Unfortunately, the author omits, for the several valid reasons of space and personal interests, the especially interesting topics of copolymerization kinetics, polymerization of crystalline monomers, polymerization in the glassy state, radiation effects on macromolecules, and biological systems.

This volume is a valuable addition to the literature for a combination of reasons: it is a readable, informative, and authoritative presentation of the status of radiation chemistry.

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