

New Books

J. F. Gerecht, Book Review Editor

Identification of Organic Compounds with the Aid of Gas Chromatography, Raymond C. Crippen (McGraw-Hill, New York, N.Y., 1973, 331 p. \$19.50).

This text describes the use of gas chromatography (GC) in the systematic identification of organic compounds. According to the author, the book has been designed as a supplement to standard procedures with the GC greatly speeding up the identification.

The chapters follow the usual order of preliminary tests, solubility studies, measurements of physical properties, and functional group tests. In each section, GC is used in some manner. For example, the permanganate test for unsaturation is described, and then the GC is used to check for a change in retention time to verify the color change. Optical rotation measurements are explained; and then a chromatogram of the isomers of dichlorobutane is shown, which, in fact, are diastereomers. Figures are shown plotting carbon number vs specific retention volume throughout the book. Other figures plot retention time vs mol wt, mp, density, molar refraction, refractive index, etc. These figures all relate to a homologous series. There are no tables of derivatives.

The concept of using instrumentation with physical testing is a good one, but the selection of GC is not; IR would be the obvious choice. We are told that the GC is a great help in the identification steps. However, as in the

above optical rotation test, its value is questionable; and the color change in the unsaturation test indicates a confirmation without having to isolate the oxidized product. Most of the GC portion is written as if the unknown was identified and it is one of a homologous series.

I cannot comprehend the chemist working in the field using GC in this manner, even if other instruments were not available. For the student, as a recent graduate said after reading the book, if the GC was available, all the different columns certainly would not be. The value of GC, when working with unknowns, is best explained by the author in the preface of the book: "If absolute identity is required, the compound can be collected on a preparative gas chromatograph and examined by other instrumental means."

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McCutcheon's Detergents and Emulsifiers, 1973 Annual (McCutcheon's Division, Allured Publishing, Ridgewood, N.J., 1973. North American Edition, 224 p., \$10.00; International Edition, 80 p., \$6.00).

This well established paperback appears this year in two

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editions. The North American volume contains information on surfactants produced in the U.S. plus Canada. The new international edition describes surfactants produced in other countries of the world. The combined editions, therefore, give fairly complete information on the world's surfactants.

The North American edition is divided into five sections, the format following the 1972 edition. A new section listing experimental materials has been included. This gives supplier information on materials that are available in small quantities for research and developmental purposes. The review of the detergent industry, which was included in the 1972 edition, has been omitted. The main section gives the usual listing of detergents and emulsifiers by trade name. The usual listing of manufacturer, class and formula, form, concentration, type, and usage are included. Also included are sections giving information on HLB values for many of the products listed and a company index containing complete addresses plus telephone numbers. This edition also contains several pages of advertisements which are arranged so that they do not detract from the technical content.

The international edition is organized in the same fashion as the North American volume. The main section gives a fairly complete tabulation of internationally available surfactants and also includes suppliers' addresses. A separate section describes manufacturers by countries.

Both volumes are extremely useful handbooks for chemists engaged in formulation work involving the use of surfactants and emulsifiers. They provide anyone working in the field with basic data in a condensed, efficient manner. The inclusion of supplier information provides a means to obtain more complete information as the need arises.

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Gas Chromatography in Inorganics and Organometallics, G. Guiochon and C. Pommier (Ann Arbor Science Publishers, Ann Arbor, Mich., 1973, 332 p. \$20.00).

This is a revised and translated edition of the original volume, *La Chromatographie en Phase Gazeuse en Chimie Inorganique (Gas Chromatography in Inorganic Chemistry)*, by Guiochon and Pommier published in 1970 in French.

The authors have commendably carried out the tremendous task of reviewing the applications of gas chromatography in the fields of inorganic chemistry and metal chemistry. The book contains over 1100 references which are as up to date as early 1973. Chromatographers unfamiliar with the applications of gas chromatography in inorganic chemistry may be surprised at the extensive work which has been done in the field.

In Chapter I, the authors present a brief, but adequate, coverage of theoretical concepts. Included are practical discussions of the uses and shortcomings of retention data for qualitative analyses and inherent errors in the measurement of peak area and peak heights and their contributions in quantitative analyses.

Chapter II is a discussion of apparatus and techniques as they apply to the fields of inorganics and organometallics. It is by no means comprehensive but, as the authors state, is meant to acquaint the inorganic chemist unfamiliar with gas chromatographic techniques with basic principles regarding carrier gases, sample introduction, column packings, and detectors, particularly as applied to inorganic analyses. The authors feel this is important since available equipment is not always suited for the analyses of inorganic compounds.

Chapters III-VIII cover techniques which have been used

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for the analyses of inorganic gases, halogens and nonmetallic halides, metals and metal halides, hydrides, organometallic compounds, metal chelates, isotopes, and isotopic compounds. Chapter VIII, "Metal Chelates," includes an appendix of information on the separation of mixtures of metal elements, complete with appropriate chelating agents, stationary phases, and references.

The remaining chapters (IX and X) are devoted to analytical and nonanalytical applications of gas chromatography as applied to inorganic chemistry. Subjects covered are analyses of gases in solids and liquids, analyses of carbon and sulfur in metals and alloys, trace analyses, applications to thermodynamic studies, and a brief discussion of preparative applications in inorganic chemistry. The book is completed with a comprehensive "Index of Analyzed Compounds."

This volume appears to be free of too many errors, although an extensive check of data extracted from the numerous references was not carried out. Errors were found, such as the unusually consistent misprinting of all page headings in Chapter III as inorganic cases, rather than inorganic gases. Another misprint, vpm for ppm on page 120 led to the discovery of an incorrectly stated lower detection limit for the analyses of ClF_3 . A check of the literature references disclosed a lower detection limit of less than 0.01 ppm ClF_3 rather than 0.001 ppm ClF_3 as stated on page 120.

One can disagree with the authors statement that one of the disadvantages of the internal standard method of quantitation (page 48) is: "compounds which are not eluted escape unseen, which is dangerous as it prevents detection of the accidental pollution of products." Quantitation, either by internal standard or absolute injection methods, enables the analyst to detect the presence of

noneluted components because the percentages obtained are based upon the entire sample, rather than only the chromatographable portion of the sample.

This book should serve the novice and the experienced chromatographer in the field of inorganics equally well. It was not written to be, nor is it recommended as, a basic text for the study of gas chromatography. It is more important for its presentation of a concise survey of gas chromatography as applied to inorganic chemistry. While one should not expect to find a completely detailed and finalized solution to a particular problem, the comprehensive coverage of the literature will surely aid the reader in choosing the proper approach. Although the authors have avoided any comprehensive review of atmospheric pollution analyses because of the extremely large number of recent publications in that area, the coverage of inorganic gases (195 references) and heavy metals should make the book of interest to those concerned with environmental analyses. In summary, this text should be a worthwhile addition to the library of any chromatographer concerned with diversified areas of investigation.

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● Meetings. . .

(Continued from page 337A)

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