

## Book Reviews

**Gmelin Handbuch der Anorganischen Chemie. 8 Auflage. Band 19. Borverbindungen. Teil 3: Verbindungen des Bor mit den Nichtmetallen S, Se, Te, P, As, Sb, Si und mit Metallen.** Prepared by Gmelin Institute for Inorganic Chemistry. Springer-Verlag, Berlin-Heidelberg-New York. 1975. x, x + 201 pp. \$147.50.

This volume of *Borverbindungen* concentrates on catching many of the loose ends of boron chemistry not covered in other volumes. It includes discussion of boron directly bonded to some of the lesser studied nonmetals. It also includes a chapter on metal-boron compounds and a chapter on metal compounds of higher boron hydrides. The latter chapter is the only reference to higher boron hydrides in this volume. About 60% of this work is devoted to a review of boron-sulfur and boron-phosphorus compounds with only 27 pages needed to cover the remaining boron-nonmetal compounds listed in the title.

About 25% of this Volume is in English, but marginal headings in English are included in the chapters in German. As an added convenience, the preface and table of contents are in both languages. This style, which is also present in the other volumes under review, makes reference work rather easy with minimal skill in German. Literature is covered from 1950 through 1973.

As is typical of Gmelin, the material reviewed seems extensive and complete. Since this volume contains syntheses, chemical behavior, and physical constants of the compounds described above, an investigator in any of these areas would benefit from having access to this book.

Leo J. Malone, *Saint Louis University*

**Gmelin Handbuch der Anorganischen Chemie. 8 Auflage. Band 22. Borverbindungen. Teil 4: Verbindungen mit Isolierem Trigonaalem Boratom und Kovalenter Bor-Stickstoff-Bindung.** Prepared by Gmelin Institute for Inorganic Chemistry. Springer-Verlag, Berlin-Heidelberg-New York. 1975. x, x + 360 pp. \$240.30.

Because of the large volume of work in the area, the review of boron-nitrogen chemistry by Gmelin has been divided into two volumes, "Borverbindungen 4 and 5". In addition, boron-nitrogen-carbon heterocycles were previously reviewed in "Borverbindungen 1". Boron-nitrogen heterocycles containing annular oxygen will be presented in a subsequent volume in this series. "Borverbindungen 4" contains chemical, physical, and synthetic data on trigonal boron-nitrogen compounds. The compounds discussed are classified according to number of B-N  $\sigma$  bonds. For example, there are separate chapters on trisaminoboranes, bisaminoboranes, and monoamino-boranes. In addition to these compounds other chapters cover imino-, imido-, hydrazino-, and azidoboranes, amino derivatives of diborane(4), di- and triborylamines, cyclic compounds with only boron and nitrogen as annular atoms, borazines, and cyclic compounds with additional heteroatoms in the ring. Literature is covered from 1950 through 1973 with some more recent additions.

Although only one chapter is in English (borazines), the style discussed in the previous review affords easy reference work for the investigator. The organization is easy to follow, and the reader will find useful reference to other review works and a helpful discussion of nomenclature in the chapters on cyclic systems. The researcher in this area would profit by having access to this volume as well as "Borverbindungen 5" reviewed below.

Leo J. Malone, *Saint Louis University*

**Gmelin Handbuch der Anorganischen Chemie. 8 Auflage. Band 23. Borverbindungen. Teil 5: Bor-pyrazol-Derivate und Spektroskopie Trigonaaler B-N-Verbindungen.** Prepared by Gmelin Institute for Inorganic Chemistry. Springer-Verlag, Berlin-Heidelberg-New York. 1975. x, vi + 277 pp. \$185.00.

"Borverbindungen 5" is more or less a continuation of "Borverbindungen 4". The first chapter on boron-pyrazoles and related compounds can be considered as hydrazino derivatives that are discussed in Chapter 7 of "Borverbindungen 4". However, since these

compounds usually involve tetracoordinate boron because of their dimeric behavior, the editors treated this topic separately in this volume. The significant amount of research in this field also warrants its separate treatment.

The bulk of this volume concerns presentation of spectroscopic data of many of the trigonal boron-nitrogen compounds discussed in "Borverbindungen 4". Mass spectra, vibrational spectra, photoelectron spectra, and  $^{11}\text{B}$  and  $^{14}\text{N}$  NMR spectra are all reviewed in separate chapters. The investigator will find it somewhat inconvenient to have to look in several chapters in two different volumes to review data on a class of compounds, but the wealth of information available will reward the effort. Despite the inconvenience the organization seems appropriate in view of the large amount of spectroscopic data now available. In any case, the final volume of this series, which will include a joint index for all boron volumes and an ordered sequence of chapters, will remove any difficulties the reader may have in locating topics. The literature for this volume has been reviewed from 1950 through 1973.

Leo J. Malone, *Saint Louis University*

**Gmelin Handbuch der Anorganischen Chemie. 8 Auflage. Band 28. Borverbindungen. Teil 7: Boroxide, Borsauern, Borate.** Prepared by Gmelin Institute for Inorganic Chemistry. Springer-Verlag, Berlin-Heidelberg-New York. 1975. x, x + 237 pp. \$203.00.

This volume of *Borverbindungen* covers a vast number of boron-oxygen compounds both synthetic and naturally occurring. There is a detailed discussion of boron oxides and boric acids including compounds containing only boron, oxygen, and hydrogen. Chapter 4 is devoted to a systematic treatment of borate and polyborate structures. The metal borates are discussed in two chapters, one listing anhydrous borates, the other hydrated borates. Chapter 7 covers heteropolyborates (both anhydrous and hydrated species with anion forming elements besides  $\text{B}_2\text{O}_3$ ). The final chapter concentrates on a discussion of peroxoborates.

Although this volume is entirely in German, the marginal headings in English and the systematic listing of compounds according to the principles of the periodic table will make reference work simple. The investigator in these areas will find access to the comprehensive amount of data and references in this volume of great value. The literature is covered from 1950 to 1973 with some more recent work included.

Leo J. Malone, *Saint Louis University*

**Reactivity of Flavins.** Edited by K. YAGI (University of Nagoya, Japan). University Park Press, Baltimore, Md. 1975. xiii + 185 pp. \$19.50.

The proceedings of a symposium dedicated to Leonor Michaelis on the fiftieth anniversary of the Institute of Biochemistry in Nagoya are presented in this text. The monograph contains papers by many of the leaders in flavin chemistry. Work includes the chemistry and spectroscopy of flavins and flavoenzymes and kinetics and mechanism of flavin and flavoprotein oxidations and reductions. The text is well written and contains much of the important work in the field. However, the symposium at which these papers were presented was held in September 1973, and consequently much of the work subsequently has been published and also has been updated.

Richard B. Silverman, *Northwestern University*

**Advances in Radiation Chemistry. Volume 5.** Edited by MILTON BURTON and JOHN L. MAGEE (University of Notre Dame). John Wiley & Sons, Inc., New York, N.Y. 1976. xi + 337 pp. \$37.50.

The book presents another milestone in the radiation chemistry of gases and liquids owing to the excellent editing attempts of the famous radiation chemists, and to which several authorities in radiation chemistry have contributed their expertise to their areas of research. In the first chapter, the authors have provided good insight into the

spectroscopy of the excited states of noble gases and their decay mechanisms. Various energy-excited mechanisms would provide good reference material to both the radiation chemist and the student on spectroscopy interested in the theory and mechanisms of noble gases.

In the second chapter, the author, who is an extremely accomplished scientist and an authority on the pulse radiolysis of gases, has made an excellent attempt at reviewing in great detail the theory, mechanisms, and kinetic parameters of gases in organic and inorganic media. Electron-capture reactions, discussion on the lifetimes of the electronically excited states and their decay mechanisms, ion-molecule reactions, and a good description of the experimental set-up would certainly enlighten the reader with an in-depth knowledge of the reaction mechanisms of gases. This chapter is also an excellent contribution to radiation chemistry, providing update reference material on the pulse radiolysis of gases.

In the third chapter, author John W. Hunt has elucidated and given an in-depth description of the picosecond and nanosecond pulse radiolysis techniques, which are extremely powerful mechanistic ways of studying the early events in radiation chemistry of liquids. The author has provided a great deal of insight between agreements and disagreements of the relationships in experimental observations vs. theories of hydrated electron. In my opinion, the spectrum of inconsistencies that exist in literature in the experimental data of "so-called" fast and diffusion-controlled reactions of  $e^-_{aq}$  that have been explained to justify the gross assumptions of hydrated electron concept should be very carefully reviewed as to whether  $e^-_{aq}$  is the correct scientific answer to "so-called" fast and diffusion-controlled reactions. In my opinion,  $e^-_{aq}$  is a grossly erroneous concept, as judged from the experimental data in literature, but this concept is in conformity with theories of water as we know them today. This reviewer's graduate work at University of Windsor from 1966 to 1969 [*Chem. Eng. News*, 28 (May 9, 1977)] appears to have generated extremely valuable preliminary evidence which if followed up could answer the complexities on the structure and mechanisms of "so-called"  $e^-_{aq}$ . To date, there is no spectroscopic evidence in literature of  $N_2O^-$  and/or  $SF_6^-$  from the supposed reactions of  $e^-_{aq}$  with  $N_2O$  and/or  $SF_6$  in water alone. The ESR signal observed in presence of organic liquids in water, which has been interpreted as due to  $e^-_{aq}$  [E. C. Avery, J. R. Remko, B. Smaller, *J. Chem. Phys.*, **49**, 951, 1968] has not been observed in water alone. The gross discrepancies in kinetic parameters of almost all the reactions of  $e^-_{aq}$  including the simplest ones, such as  $e^-_{aq} + H^+$ , have been justified on the basis of all kinds of elaborate reaction mechanisms and theories. It may be wise to reconsider the validity of  $e^-_{aq}$  concept in the wake of findings of this critic [R. K. Singal, *Indian J. Chem.*, **9**, 724 (1971); **10**, 718, (1972)]. Hunt's review of  $e^-_{aq}$  yields and the disagreements between the observed product yields and kinetics of decay of spurs further accentuate my concerns about the validity of the  $e^-_{aq}$  concept. The author has summarized the subject objectively in the conclusions of this chapter by pointing out several discrepancies.

The book is highly recommended to every radiation chemist who wants to enrich his knowledge about the fast reaction studies in gases and liquids. Also, every radiation chemist owes a depth of gratitude to the painstaking efforts of the editors in bringing out another excellent book on advances in radiation chemistry series to whom I wish good luck and continued success in the future in bringing out more volumes on advances in this subject.

R. K. Singal, *Cadillac Motors*  
Division of General Motors Corporation

**Colorimetric and Fluorimetric Analysis of Steroids.** By J. BAROTS and M. PESEZ (Roussel-Uclaf, France). Academic Press, London and New York, 1976. xii + 274 pp. \$21.50.

The authors have stated their selection of methods is based upon an emphasis on compounds of physiological interest which yield a color or fluorescence by chemical reaction in solution. Where several procedures exist based upon the same reaction, they have attempted to include methods tested in their own laboratories, as documented by numerous references to their own publications, or those which have been used by other analysts subsequent to publication.

Following general chapters on nomenclature, functional group analysis, and halo-chromism and fluorism (reaction with strong acids to produce color or fluorescence), there are chapters on methods as applied to classes of steroids. These include Steroids and Vitamin D,

Bile Acids, Estrogens, Gestagens, Androgens, Corticosteroids, Contraceptive Progestagens, Cardiac Glycosides, Steroid Saponins and Sapogenins, and Steroid Alkaloids.

The strengths of the book are its cataloging of accepted methods and an extensive listing of references. The emphasis on accepted methods, however, has essentially led to a lack of methods published after 1970. Also unfortunately, there is only limited critical review of procedures. There is little discussion of the limitations, advantages, and comparisons of procedures.

Joseph E. Sinsheimer, *The University of Michigan*

**The Scientific Study of Marihuana.** Edited by E. L. ABEL (University of Toronto, Canada). Nelson-Hall Publishers, Chicago, Ill. 1976. xviii + 299 pp. \$12.50.

In spite of one glaringly neglected area (biosynthesis), our chemical and biochemical knowledge concerning the cannabinoids has advanced rapidly since the structural elucidation of  $\Delta^1$ -THC in 1964. With the consolidation of our knowledge in these areas, major advances in methods of detection, mechanism of pharmacological action, and structure-activity relationships have become possible recently.

The title of the present book is a misnomer since chemical, metabolic, and, to a large extent, pharmacological studies are not included. It contains a collection of 31 reprinted articles concerning the physiological and psychological aspects of marijuana. In chapters of three to four papers from the pertinent scientific literature of 1969-1972 (exception: "Les Paradis Artificiels" by C. Baudelaire published in 1859), such topics as the effects of cannabis on hunger, memory, time distortion, and adverse social behavior are covered. Each chapter is prefaced by editorial commentary.

The book cannot be recommended to "all those seriously concerned with the (marijuana) problem who want facts and not arguments" since it is not edited with the general scientific audience in mind. Most of the articles are too technical for the comprehension by nonspecialists, and the editorial comments do not facilitate evaluation of the contained information. There is much of value and of interest here, e.g., studies of soldiers in Viet Nam, effect on driving performance. However, the book would have been much more successful if the editor, using his broad experience in marijuana research (seven contributed papers), would have undertaken to write it himself. The excellent, although somewhat outdated, closing article by Hollister [*Science*, **172**, 21 (1972)] shows what should be done to comprehensibly bring this complex subject to the general reader.

V. Snieckus, *University of Waterloo*

**Crystallography and Crystal Chemistry of Materials with Layered Structures. Volume 2.** Edited by F. LEVY (University of Cambridge). D. Reidel Publishing Co., Dordrecht-Boston, 1976. i + 369 pp. \$39.50.

This is the second volume in the series "Physics and Chemistry of Materials with Layered Structures". It contains seven contributions by various authors covering topics such as the crystal structure and crystal growth of di- and ternary chalcogenides in great detail. A researcher entering this field will find a fairly complete survey up to 1974, with a few references to 1975. The currently very active topic of charge density waves and their coupling to periodic lattice distortions and the consequences to physical behavior receives an excellent treatment. Of special interest to chemists should be the chapter on nonstoichiometry, and crystallographers, who frequently report structures in which atomic sites have less than full occupancy, may often miss the subtleties and complexities present in a phase because the technique samples composition over thousands of unit cells. A reading of this chapter impresses one with the incredible complexity of this subject matter and with the many unsolved problems that await clarification in a classical field in which the "law of definite proportions" appears to be correct but not in the "ratio of small integers". Anyone involved in corrosion studies of oil well pipe in sour crude oil wells would surely welcome a better understanding of the Fe-S system even though its presentation here is strictly from a fundamental structural chemistry approach. The volume contains a chapter on the layer silicate minerals, as well, although the overall emphasis is definitely on the chalcogenides. The editor's aim to make this a valuable reference work to researchers in the physics and chemistry of these materials, at least for the next few years, has been achieved.

Hugo Steinfink, *University of Texas*