

Book Reviews

Gmelin Handbuch der anorganischen Chemie. Achte Auflage. Kohlenstoff. Teil D3. Halogen-Verbindungen. Teil D5. Schwefel-Verbindungen. System No. 14. Wissenschaftliche Mitarbeiter: D3—KARL BEEKER, PETER MERLET, SIGRID RUPRECHT, DIETRICH SCHNEIDER, and URSULA TROBISCH-RAUSSENDORF; D5—VERA HASSE, LORE IWAN-HILTERHAUS, PETER KUHN, PETER MERLET, and SIGRID RUPRECHT. Hauptredakteur: DIETER KOSCHEL. Springer-Verlag, New York, N.Y. D3, 1976; D5, 1977. D3, xxviii + 294 pp. D5, xvi + 237 pp. 18.5 × 25.5 cm. D3, \$272.40; D5, \$251.30.

Inasmuch as these two volumes present related portions of the general treatment of carbon compounds, they are conveniently considered together.

Teil D3 continues the discussion of simple carbon-halogen compounds that began in Teil D2, wherein partially or completely halogenated derivatives of CH, CH₂, and CH₃, as well as the perhalogenated methanes, were described. Topics in Teil D3 appear in the order: XCO radicals and ions; carbonyl halides (COX₂); halogen derivatives of urea; carbamoyl halides; halogen isocyanates, the cyclic dimer (CINCO)₂, trihaloisocyanuric acids (XNCO)₃; halogen cyanides and isocyanides; cyanuric halides (XCN)₃; and the radical F₂CN and the halogenated cyanamides NF₂CN and NHCICN. Emphasis is placed upon reactions with inorganic species, whereas those with organic species are treated only in general terms. The literature closing date is mid-1974, but many more recent references are included.

Teil D5 continues the discussion of simple carbon-sulfur compounds, again with emphasis upon reactions with inorganic species. Presented in order are C₃OS; OCS; OCS⁺, OCS²⁺, OCS³⁺, and OCS⁻ ions; the van der Waals molecule ArOCS; NCS radical; NCS⁺, NCS⁻, and NCS²⁻ ions; CNS⁻ ion; (SCN)₂⁻, (SCN)₃⁻, and (S₂C₂N₂)⁻ ions; cyanosulfanes, S_X(CN)₂, X = 1-8; and NCNCS. Literature has been covered to 1975, but with many more recent references included.

The general pattern of discussion for each species includes in sequence its formation and preparation; molecular structure, including determining physical properties and their interpretation; crystallographic data; other physical properties; and electrochemical and/or chemical properties. Of course, not all types of data are available for every species discussed. Both volumes are replete in numerical data, particularly spectroscopic data of various types. Tabulations are used frequently and effectively, and graphic representations are given whenever possible. Literature citations are very extensive.

These volumes are unequalled in their detailed coverage of the topics treated. As is true of other volumes in the Gmelin series, they provide all interested persons with unparalleled direct access to pertinent literature as well as to detailed summaries.

Therald Moeller, Arizona State University

Gmelin Handbuch der anorganischen Chemie. Achte Auflage. Silber. Teil B6. Silber(I)-Komplexe mit N- und O-haltigen Liganden. System No. 61. Wissenschaftliche Mitarbeiter: ALFRED DRESCHLER, BRIGITTE HEIBEL, KONRAD HOLZAPFEL, PHILLIP STIESS, and SUSANNE WASCHK. Hauptredakteur: RUDOLF KEIM. Springer-Verlag, New York N.Y. 1975. viii + 356 pp. 18.5 × 25.5 cm. \$264.50.

This volume, the first of two dealing with compounds of silver formed from neutral ligands and those yielding inner complexes, is restricted to silver(I) compounds containing O and N donors. It serves as a supplement to Silber B1-B5, in which complexes based upon anionic and organo ligands are described. In Silber B7, comparable compounds formed between silver(I) and S, Se, Te, P, As, Sb, Bi, and Ge donors, as well as those formed by silver(II) and -(III), are to be included.

The volume is introduced by a short section of general remarks, in both German and English, dealing with coordination numbers and reviewing the Ahrland-Chart-Davies-Williams conclusion that

coordination number increases with d_π bonding. Compounds with the inorganic ligands H₂O, NH₃, N₂H₄, and NH₂OH are described first. Those with organic ligands follow in the order amines, N-heterocycles, alcohols, aldehydes, ketones, ethers, O-heterocycles, amino alcohols, amino acids, amine-N-polycarboxylic acids, Schiff bases, azo compounds, oximes, acid amides, and nitriles. As is usual practice in the Gmelin system, the syntheses and numerical properties of each isolable compound are given. Where studies of complexation in solution are reported, formation-constant data and thermodynamic functions are given, as available. For comparable species, data are commonly tabulated. For those few compounds for which molecular or crystal structures have been determined, diagrammatic representations are given. Each compound is referenced, either in the discussion or in a summary, for the section where it appears. Considerable emphasis is given to those complexes that contain biologically active ligands. Literature coverage extends to mid-1974, with more recent data covered in many instances.

The volume exemplifies characteristic Gmelin detail and thoroughness. By itself, it provides unrivaled background for complexes of the types indicated. In combination with Silver B1-5, and ultimately B7, it provides the most comprehensive coverage of silver complexes extant.

Therald Moeller, Arizona State University

Gmelin Handbuch der anorganischen Chemie. Ergänzungswerk zur achte Auflage. Band 27. Borverbindungen. Teil 6. Carborane 2. Bearbeiter: JEROME F. DITTER, J. R. WASSON, and I. VON WILUCKI. Redakteure: KURT NIEDENZU, KARL-CHRISTIAN BUSCHBECK. Springer-Verlag, New York, N.Y. 1975. vi + 150 pp. 18.5 × 25.5 cm. \$149.20.

Within the framework of the New Supplement Series of the 8th Edition, which is designed to provide complete surveys, this volume continues the discussion of carboranes begun in Teil 2 (Band 15 of the Supplement Series) and scheduled for completion in Teil 3. Chapters 1 and 4 are in English; Chapters 2 and 3 in German.

The content and coverage of the volume are accurately and succinctly given by the editors in their Preface: "The initial chapter of Borverbindungen 6 contains a general discussion of the electronic properties of *closo*-carboranes, especially those of the dicarbalo-*closo*-dodecarboranes(12) system. In Chapter 2 heterocarboranes are discussed, i.e., species that contain additional polyhedral atoms besides boron and carbon. Metal complexes containing carborane anions are viewed as metallocarboranes; these are presented in Chapter 4. The sequence of discussion reflects the atomic number and group of the central metal atom as well as the size of the carborane ligands. The metallocarboranes are presented primarily in table form since their discussion is one of the objectives of those volumes of Ergänzungswerk dealing with metallorganic species. In addition, Borverbindungen 6 contains a chapter dealing with polymeric species that have carborane moieties either in the polymer backbone or as side groups. In this chapter an attempt was made to survey the experimental results with particular emphasis on practical applications; based on their technical significance polycarboranesiloxanes dominate this chapter. NMR data for those compounds contained in Chapters 2 and 3 are compiled in tables that conclude the present volume". Literature coverage is from 1950 through 1974 for Chapters 1 and 4 and from 1950 through 1971 for the other chapters, with a limited number of more recent references.

The treatment throughout continues the highly systematic approach and the comprehensive, yet concise, treatment that so strongly recommended the regular Gmelin volumes. Tables, figures, the printing, and the production in general are characteristically excellent. As a source of information on the syntheses and properties of the compounds covered, this volume is unequalled. It is recommended enthusiastically and without reservation to all persons interested in this area of chemistry.

Therald Moeller, Arizona State University

Gmelin Handbuch der anorganischen chemie. Achte völlig neu bearbeitete Auflage. Tellur. Teil B1. Verbindungen mit Wasserstoff, Sauerstoff, und Stickstoff. System No. 11. Hauptredakteur: GERHART HANTKE. Springer-Verlag, New York, N.Y. 1976. xii + 153 pp. 18.5 × 25.5 cm. \$148.30.

Tellurium-hydrogen compounds described are the TeH radical, H₂Te, TeH₂⁺ ion, HDTe, and H₂Te₂. In addition, the alkali-metal hydrogen tellurides, tellurides, and polytellurides and the ammonium tellurides are discussed (26 pp). Tellurium-oxygen compounds included are TeO, (TeO)_n, TeO⁺ ion, TeO₂ and the ions TeO₂⁻ and TeO₂⁺, Te₂O₅, TeO₃, TeO₃⁻ ion, H₂TeO₃ and its aqueous solutions and ions, alkali-metal and ammonium tellurates(IV), H₂Te^{IV}Te^{VI}O₆, H₆TeO₆, (H₂TeO₄)_n, and alkali and ammonium tellurates(VI) (123 pp). Tellurium-nitrogen species are limited to TeN, Te₄N₄, Te₃N₄, Te(NH₂)₂, Te(NH)₂, K₂Te(NH)₃, Te(NO₃)₂, Te(NO₃)₄, Te₂O₄-HNO₃, and the TeO₂-HNO₃-H₂O system (4 pp). Literature coverage extends through 1973. As is true of all recent volumes in the Gmelin series, the Table of Contents is given in both German and English, and all headings in the body of the volume are given in English in the margins of the pages.

The synthesis and properties of each species are presented in detail. A wealth of physico-chemical data is presented—often in tables and in uniformly and clearly drawn graphs. Crystal and/or molecular structures are given diagrammatically, again in uniform fashion. Each entry is followed by a detailed listing of cited literature references, and review articles are cited where pertinent. All of these items, together with the ordering of topics, headings, and subheadings follow the consistent and very logical Gmelin practice, as do also printing and production in general. Like all other volumes in the series, this one is a compliment to the publisher.

This volume is recommended without reservation to anyone seeking information in the area covered. Although the price will limit single-copy sales, no technical library can afford to be without it.

Therald Moeller, Arizona State University

Gmelin Handbuch der anorganischen Chemie. Ergänzungsband zur achte Auflage. Thorium. System No. 44. Teil C2. Ternäre und polynäre Oxide des Thoriums. Bearbeiter: CORNELIUS KELLER. Redakteur: RUDOLF KEIM. Springer-Verlag, New York, N.Y. 1976. 145 pp. 18.5 × 25.5 cm. \$151.00.

That this, the initial volume of the supplementary series on thorium, has appeared out of sequence is a consequence of the significance of ThO₂ and some of its mixed oxides as fuels for the production of ²³³U in high-temperature nuclear reactors. For completeness, all ternary and polynary metal oxide systems containing thorium that have not been treated in a new Gmelin volume are included. The literature has been covered through 1975, with some references previously cited in the 1954 main volume on thorium also included.

Compounds of thorium oxide are presented in the order of main periodic group species (groups IA through VA) and then subperiodic group species (groups IB through VIII B). Within each periodic group, the compounds are described in order of increasing atomic number, e.g., Be, Mg, Ca, Sr, Ba, Ra. Commonly a discussion of a particular periodic group is preceded by a review in English. As is now standard practice in the Gmelin volumes, the Table of Contents and marginal subject notes are in English.

Each thorium oxide-metal oxide system is discussed in terms of synthesis, composition, and properties. Many phase diagrams, particularly for binary systems, are included and interpreted. Physical constants are included, whenever available. Crystal structures are diagrammed and structural data summarized, as available. Throughout, the discussions are complete, thorough, and easy to follow. The production is up to Gmelin standards.

It is doubtful that this volume will be of broad general interest, but it will serve as an excellent source of information to chemists, physicists, and engineers who are interested in the crystal structures,

properties, and potential applications of mixed oxide systems. Within this limited framework, the book is comprehensive and authoritative.

Therald Moeller, Arizona State University

Gmelin Handbuch der anorganischen Chemie. Ergänzungswerk zur achte Auflage. Band 24. Perfluorhalogenorgano-Verbindungen der Hauptgruppenelemente. Teil 3. Verbindungen von Phosphor, Arsen, Antimon und Wismut. Bearbeiter: ALOIS HAAS and HANS-GEORG HORN. Redakteur: DIETER KOSCHEL. Springer-Verlag, New York, N.Y. 1975. vi + 233 pp. 18.5 × 25.5 cm. \$172.50.

As a volume in the New Supplement Series, this book is the third of four devoted to the perfluorohalogeno-organo compounds of the main-group elements. A perfluorohalogeno-organo group is defined as one that contains at least one fluorine atom, with the remaining valences being satisfied by atoms of other halogens. Each compound is discussed in terms of its preparation, physical properties, and chemical reactions. Commendably complete mass, vibrational, and nuclear magnetic resonance (¹⁹F, ¹H, ³¹P, as applicable) data are included, often in readily accessible tabular form. Nomenclature adheres closely to IUPAC guidelines. Literature coverage is indicated to be complete through 1973, with more recent data included in many instances. Useful reviews are cited prior to the detailed presentations of compounds.

The volume is devoted largely to phosphorus compounds (186 pp). The much shorter sections on arsenic (39 pp), antimony (7 pp), and bismuth (1 p) compounds reflect reduced investigative effort. Subject matter for each element is arranged in terms of the general Gmelin system of classification. Thus, major classes of phosphorus derivatives are presented in the order homo- and heterocyclic species; phosphanes; phosphoranes; phosphorus-oxygen compounds; phosphanyloxyboranes and -silanes; phosphoric acids, their ions and salts; phosphoric and phosphinic acid halides; phosphorus-nitrogen compounds; alkyl, vinyl, and phenyl phosphanes and phosphoranes; partially and non-protonated trifluoromethylfluorophosphate anions; alkyl and phenyl phosphorus-sulfur compounds; phosphorus-selenium compounds; phosphorus-boron compounds; a phosphanylsilane; di- and polyphosphanes; and di[bis(trifluoromethyl)phosphanyl]mercury.

Excellence in composition, editing, printing, and production are characteristic of the Gmelin series. Inasmuch as the coverage is highly specific, this volume will be chiefly useful to specialists in the area, but to them it will be indispensable.

Therald Moeller, Arizona State University

Advances in Modern Toxicology. Volume 2. Toxicology of Trace Elements. Edited by R. A. GOYER (University of Western Ontario) and M. A. MEHLMAN (National Institutes of Health). Halsted Press (John Wiley), New York, N.Y. 1977. xiv + 303 pp. \$24.50.

This volume is comprised of nine independently authored chapters which cover the following topics (with authors): Metabolism of Mercurial Compounds (T. Suzuki), Lead Toxicity Laboratory Aspects (R. A. Goyer and P. Mushak), Toxicology of Environmental Arsenic (B. A. Fowler), Toxicology of Copper (C. H. Hill), Nickel Toxicity (F. H. Nielsen), Toxicology of Vanadium (M. D. Waters), Toxicology of Selenium and Tellurium (L. Fishbein), Nutrient Interactions with Toxic Elements (H. H. Sandstead), and Metal Carcinogenesis (F. W. Sunderman, Jr.). These chapters appear to be well prepared and cover the literature through 1975. The chapters consider laboratory diagnosis, metal forms and levels responsible for human as well as nonhuman toxic effects, and in some cases clinical analysis procedures. Comments regarding safe levels of exposure are provided as well. This volume should provide a convenient and useful resource of detailed information for toxicologists and related scientists.

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