

experience in the field will find much of interest in this very wide-ranging book.

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Gmelin Handbook of Inorganic Chemistry, 8th edition, *B — Boron Compounds*, System Number 13, 3rd Supplement Volume 4, by G. Heller, A. Meller, and T. Onak, Springer-Verlag, Heidelberg, 1988, xviii + 256 pages, DM1198, ISBN 3-540-93567-3.

The present volume concludes the 3rd Supplement issue of boron compounds. It deals with the chemistry of boron compounds with (1) Cl, Br, and I (by A. Meller, 101 pages); (2) S, Se, Te, and Po (by G. Heller, 49 pages, 43 of these dealing with B-S); and (3) carboranes (by T. Onak, 101 pages).

The volume is of the quality to which one has become accustomed with the Gmelin series. It is remarkably free from errors, although two have been noted (on page 76, in the first line of the second paragraph, a sulfur atom is missing in the formula; and ref. 17, on page 89, has a minor clerical error). There are the usual details and helpful Tables; in many of the latter, compounds are listed, with comments on items of interest that have been reported, and appropriate reference numbers.

The literature coverage is to the end of 1984, although there is the occasional later reference; the 2nd Supplement, Volume 2 provided details of the bibliography through 1980.

Among compound types which will be of particular interest to readers of this Journal are those of formula $RB(H)Hal$, $RBHal_2$, R_2BHal , $RB(ER')_2$, and $R_2B(ER')$ ($E = S, Se, \text{ or } Te$), as well as carboranes.

The carborane coverage includes data on compounds having from 1-13, 16-20, 26, 30, 34, 40, and 42 boron atoms. There is also a section dealing with polymers based on carboranes containing 10 boron atoms, and on metallacarboranes of various types.

The authors, editors (K.-C. Buschbeck and K. Niedenzu), and publishers are to be commended on a fine achievement.

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Chromatographic Enantioseparation; methods and applications; by Stig G. Allenmark, Ellis Horwood, Chichester, 1988, 224 pages, £38.50, ISBN 0-84312-988-6.

Any chemist currently working in the field of chiral synthesis will tell you that the use of polarimetry for the assessment of optical purity leaves much to be desired. In a recent search of the literature for the rotation of the pure enantiomer of a compound which we had synthesized, we found seven different values, none of which proved to be strictly accurate. In addition, the measurement of optical

rotation requires very high standards of purity, and very great care in sample handling to ensure reproducible results. The chemist interested in the optical purity of a sample has increasingly turned to NMR spectroscopic techniques, and to enantioselective chromatography, which forms the subject of this monograph.

The book opens with introductory chapters on modern stereochemistry, methods for the determination of optical purity, and basic theories of chromatography. The separation of enantiomers by chromatography following conversion to diastereoisomers is considered, and many examples are given. The next chapter deals with the theory of chiral chromatography for direct optical resolution, and considers the types of interaction which are used, together with thermodynamic and kinetic considerations.

Chapter 6 considers chiral gas chromatography, which has principally been used for the analytical separation of amino acid derivatives. Most of the stationary phases interact with the substrates through hydrogen bonding, but more recent examples based on chiral metal complexes and inclusion effects are also discussed. Chiral liquid chromatography is a more complex, but also more versatile technique. Enantiodifferentiation may take place either by chiral recognition between a chiral stationary phase and the compound of interest, or by formation of a diastereomeric complex between the analyte and a chiral constituent of the mobile phase in the presence of an achiral stationary phase. Chiral stationary phases both of "natural" and "synthetic" origin are considered in detail, with a briefer section on chiral additives for the mobile phase. Chapter 8 goes on to consider analytical applications of the technique, these being drawn mainly from natural product and pharmaceutical chemistry. In the next chapters the problems of large scale preparative separations are considered, and prospects for future developments discussed. The final chapter contains experimental details for the preparation of some of the chiral phases, and there is a useful appendix giving the manufacturers of materials for chiral gas and liquid chromatography.

It remains an open question whether enantioselective chromatography will become a technique which most chemists will understand and practice themselves, or will be a job best left to the experts. As with non-routine NMR spectroscopy it seems that industrial and academic laboratories are taking different routes. In the industrial context such jobs are very much left to the specialists. Few academic laboratories have the resources to allow this, and research workers must get down to the intricacies of learning to use the instruments themselves. They will particularly welcome this volume. The time which must be invested in mastering the use of a modern HPLC instrument is considerable, and guidance as to the choice of appropriate phases is invaluable.

This book is well-written and well-produced. The diagrams are clear, and there appeared to be few typographic errors. There are many useful references and an adequate index. The level of consideration is appropriate for a novice in the field; the theory of chromatography is treated in adequate but not excessive detail.

The organometallic chemist is generally interested in chiral compounds for one of two reasons. Firstly, he may be making complexes with intrinsically interesting chiroptical properties; as yet there are few chromatographic techniques which allow the separation of the antipodes of organometallics. More likely, he is using organometallics as either reagents or catalysts in enantioselective synthesis, and needs to assess the optical purity of the compounds which he has made. This book

will be invaluable to him, and should be available in all serious chemistry libraries. It did not give me an instant solution to our own current separation problem, but then neither has anyone else!

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Penny A. Chaloner

Organometallics: A concise introduction; by Ch. Elschenbroich and A. Salzer, VCH Publishers, 1989, £47.45, DM138 (hard cover), £20, DM58 (soft cover), xi + 479 pages, ISBN 3-527-27817-6.

This volume grew out of a thirty lecture, one semester course in organometallic chemistry, for students with no previous experience in the field. Any student who absorbs the material here, in a single semester, will have worked hard indeed, but will have mastered all the fundamentals and a good deal more. This is a really excellent introduction to the subject, and I shall be recommending it to all my own students.

The organisation of the book is fairly conventional, with an introduction followed by chapters on main-group organometallics, organised by group. The second half of the book, dealing with transition metal organometallics, is divided into chapters by ligand type, with additional sections on metal-metal bonds, transition metal atom clusters and organometallic catalysis. Such a layout might have been dull, but in fact the style is very stimulating, and gives a real feeling for the exciting modern developments in the subject. The material is presented very clearly, but without a slowing of the pace. I particularly enjoyed the "excursions" in which a few pages are taken out of the main text to discuss an interesting, but perhaps not essential, topic. For example, the chapter on σ -donor/ π -acceptor ligands contains an excursion into the photochemical reactivity of transition metal complexes. There is also quite a lengthy excursion into the ^1H and ^{13}C NMR spectra of organometallics, and spectroscopic techniques are emphasised throughout the book.

The book is provided with a good clear index; I found everything I tried to look up. Numerous additional references are provided for each chapter, mainly to review articles. The one feature which I found irritating was that there were also numerous references in the text, which gave only the senior author's name and the year of publication, the authors' names also being collected in an author index. Locating these references is not difficult if you are familiar with the area under discussion, but few students will have the patience to work their way through Chemical Abstracts to find the relevant paper. How many papers did Wilkinson publish in 1968?

The standard of production of this work is high, with clear layout and excellent quality diagrams. Although it is a translation of the 1988 German edition, the translation has been accomplished with commendable speed, and is largely free from any signs of awkwardness.

Overall this is an excellent book, and the authors are to be congratulated for producing such a clear and comprehensive view of the field. It will be useful both to advanced undergraduates and to graduate students, and most research workers in the area will want a copy on their own shelves. Libraries should buy several copies. I