

Book reviews

Comprehensive Organometallic Analysis, by T.R. Crompton, Plenum Press, 1987, xxv + 883 pages, US\$129.50, ISBN 0-306-42593-9.

It is now some 17 years since this author's first series of books on the analysis of organometallic compounds, and during that time techniques have been considerably improved. In particular techniques for analysis and identification of trace amounts of metals, particularly from environmental and biological sources have become considerably more sophisticated. The purpose of this volume is to provide a comprehensive treatise as to the state of the art in this field.

The first eight chapters of the book each deal with a specific technique for analysis, and within the chapters the material is organised according to metal. The first two chapters deal with determination of the metals and functional groups. Many approaches are discussed, though the main emphasis is on gravimetric and titration procedures. Chapter 3 considers spectroscopic techniques with good discussions of visible and UV spectroscopy, whilst Chapter 4 discusses the other available spectroscopic techniques, including IR, Raman and NMR spectroscopy and mass spectrometry. Chapter 5 reviews polarographic techniques, and in Chapter 6 I was surprised by how many organometallic compounds can be analysed by gas chromatography with appropriate equipment. Chapter 7 is devoted to chromatography of metal chelates, and describes how metal derivatives may be analysed after conversion to a chelated derivative, usually of the β -diketonate type. Again many of these are sufficiently stable to be analysed by gas chromatographic techniques, but liquid chromatography, size exclusion chromatography and high performance thin layer chromatography are also considered. Other chromatographic techniques are discussed in Chapter 8.

The final chapter of the book is devoted to the analysis of organometallic compounds in the environment, with sections devoted to water, sediments, plants, biological materials and air. The tragic effects of methylmercury contamination in fish, and the now well established deleterious effects of lead pollution on development in children, clearly remind us of the need for the accurate monitoring of metals in the environment.

The title of this book seemed to me to be little misleading, since its scope is in fact very much greater than "organometallic" implies. Whilst "classical" organometallics, compounds with a metal-carbon bond, are of course considered in detail, much of the material deals with coordination compounds, which may or may not even contain carbon in the ligands. Neither boron halides, nor organophosphorus compounds, could really be described as organometallics.

In the chemical industry, and in related areas, there is a substantial demand for trained analytical chemists. In spite of this, most academic departments teach few courses in this area, and it seems to be regarded as a Cinderella subject in many

undergraduate degrees. That analytical chemistry is both useful and important needs to be seen more clearly in the academic environment, and it is perhaps environmental concerns that will make this most apparent. In this area we shall undoubtedly see more demand for analytical chemistry courses, from "consumers", both the undergraduate and graduate consumers of courses, and the industrial consumers of graduates. The latter group at least are in a position to put pressure on academic departments, but hopefully, may feel themselves equally well placed to provide incentives and resources.

Despite a camera-ready text this book is well produced and there are extensive references. The index is adequate rather than generous; indeed it occupies fewer pages than the contents list. This is not a book for browsing; it is very definitely a reference text, packed densely with information. It should be available to every practising chemist.

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Gmelin Handbook of Inorganic Chemistry, 8th edition, *Sn — Organotin compounds, Part 14*, Springer-Verlag, Berlin, etc., 1987. xiv + 248 pages. DM 1119. ISBN 3-540-93551-7.

This volume (written by H. Schumann and I. Schumann) is the latest in the excellent current Gmelin series on organotin compounds that began in 1975. It continues the survey of mononuclear organotin compounds containing tin-oxygen bonds, and is concerned with compounds having two methyl, ethyl, or propyl ligands on a tin atom whose other ligands are bonded through oxygen. The main species considered are thus of the type $R_2Sn(OR')_2$ and $R_2Sn(OOCR')_2$, where $R = Me, Et, \text{ or } Pr$, and R' can be one of a wide range of hydrocarbyl or substituted-hydrocarbyl groups; the two oxygen atoms can also be part of a chelated ligand, as in $Me_2SnOCH_2CH_2O$, and bis(β -diketonates) are also covered. However, the oxygen atoms can also be bonded to B, Si, N, P, As, O, S, Se, or a transition metal, as in $Me_2Sn(OBO)_2$, $Me_2Sn(OSiMe_2)_2$, $Me_2Sn(ONO_2)_2$, $Me_2Sn(O(PO)Ph_2)_2$, $Me_2Sn(OAs(O)Me_2)_2$, $Me_2Sn(OOBu-t)_2$, $Me_2Sn(OSO_2F)_2$, and $Me_2Sn(OCrO_3)_2$ (in which each tin atom is linked to four oxygens in a polymeric six-coordinate structure). For most entries the details of the methods of preparation, physical properties, and reactions are summarized efficiently in tables.

The literature is surveyed up to the end of 1985. Some 24 pages of the book are devoted, very usefully, to a list of reviews of the chemistry and applications of organotin compounds and of relevant patents that have appeared since 1982. There are clear empirical formula and ligand formula indexes.

The accounts and the overall quality of production are up to the high standards we expect from Gmelin, and care has been taken with the English. The whole series on organotin compounds is recommended without reservation.

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