

Book Reviews

Gmelin Handbook of Inorganic and Organometallic Chemistry. 8th edn. Pb. Organolead Compounds. Part 5. Springer-Verlag, Berlin, 1996. ix + 191 pages. DM 1150; US\$ 809; £497.50. ISBN 354093748X.

This volume in the valuable series on organolead compounds was written by Friedo Huber. It is concerned mainly with unsymmetrical tetraorgano derivatives of the types $R_2PbR'_2$, R_2PbR'' and $RPbR'R''$ (130 pages) but there is also a much shorter section (44 pages) on organolead hydrides $R_{4-n}PbH_n$ ($n = 1-3$). The R groups cover the usual range, i.e. mainly alkyl, cycloalkyl, aryl, alkenyl, alkynyl and heterocyclic.

The book opens with a very useful five-page list of references to general aspects of organolead chemistry to supplement the lists given in the earlier volumes 1 (1987) and 3 (1992) of the series. It includes references to uses and toxicological, health, and environmental aspects as well as to synthesis, physical properties, spectra, reactions and analysis. This is followed by the usual systematic and well-ordered summary of information on all the individual species falling within the scope of the volume, much of it given economically in tabular form. About 300 compounds are considered.

It is interesting that no organolead hydrides stable at room temperature are described, but quite a lot is known about the physical properties of Me_3PbH , Et_3PbH , and especially Bu_3PbH ; it appears that the stability increases with the size of the alkyl group, the tributyl compound requiring a few days for complete decomposition at room temperature, and it seems likely that compounds bearing sufficiently bulky groups would be fairly stable. Surprisingly, no triaryllead hydrides have been isolated or even unambiguously identified.

The dihydride Me_2PbH_2 has been isolated at low temperatures and some other R_2PbH_2 compounds generated in solution. No organosilicon trihydride has been isolated (a peak in a gas-liquid chromatogram has been assigned to $MePbH_3$) and information on such species is confined to the results of theoretical calculations. One particularly interesting set of calculations was that by H Basch on the complex between the ion $[PbH_3]^+$ and toluene, the results indicating that the ion is located

above the C-4 atom of the ring at a distance of 242.4 pm, with a bond dissociation energy of 30.5 kcal mol⁻¹.

The literature search is complete through 1995 and there are some later references. The material and the presentation are of the very high standard associated with the Gmelin series, and access (which can be via the Internet) to this volume and the earlier ones will be invaluable to those concerned in any way with the chemistry of organolead compounds. The next volume will deal with organolead halides.

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The Systematic Identification of Organic Compounds by R.L. Shriner, C.K.F. Hermann, T.C. Morill, D.Y. Curtin and R.C. Fuson, 7th edition, Wiley, New York, 1997, 669 pages, £27.50, ISBN 0 471 59748 1.

Studies on the scope and mechanism of action of organometallic compounds and their application in preparative organic chemistry involve a thorough examination not just of the major products of model reactions, but also of the minor products. The separation and identification of these products, often derived from relatively simple substrates, involve many of the procedures of qualitative organic analysis. This new edition of Shriner and Fuson's well-established textbook on the systematic identification of organic compounds is therefore a useful addition to the resources of any laboratory involved in this type of investigation.

The book contains chapters on the techniques involved in the separation of mixtures and on the spectroscopic identification of organic compounds, as well as on the chemical tests for functional groups and the experimental procedures involved in the preparation of derivatives. It also contains a useful collection of 'route

map' problems to help the student develop a systematic approach to organic analysis.

Although the level of the problems and of some of the sections on spectroscopic analysis are those of an undergraduate course, the book could be used with profit by a new postgraduate student. There are extensive tables of spectroscopic data and the physical constants of a very wide range of organic compounds are given in the appendix. There are also some useful tables of other data such as freezing mixtures, drying agents and chromatographic solvents. However, even quite simple organometallic compounds are not listed and methods for the detection of elements other than nitrogen, sulfur and the halogens are not described.

Within these limitations, this new edition of a well-established book can be recommended as a source of useful information for a laboratory involved in the identification of organic compounds.

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Worked solutions in Organic Chemistry by J.M. Coxon and J.A. Gerrard, Blackie Academic and Professional, London, 1998, 516 pages, £29.99 (soft cover), ISBN 0 7514 0422 5.

The application of organometallic compounds to synthetic organic chemistry has provided the basis for many novel syntheses. Any postgraduate course on organometallic chemistry will have lectures reflecting

these developments. This book of worked solutions in organic chemistry is a companion volume to the most recent edition by Professor Coxon of Norman's 'Principles of Organic Synthesis'. The problems to which solutions are provided are those at the ends of the chapters in Norman's book. The chapters of the two books correspond and there are clear cross-references from the solutions to the parent book.

The book is in two sections. The first, shorter section covers the underlying thermodynamic, structural and mechanistic principles of organic reactivity, whereas the second section deals with specific groups of reactions of synthetic utility. Whilst not all the chapters are of direct relevance to the organometallic chemist, a number of problems are of help in placing organometallic reagents in a synthetic context. Chapters 6, 7, 15, 17 and 18–20 in particular, contain problems that may be of relevance to a student of organometallic chemistry interested in seeing the application of organometallic reagents. The parent book, 'Principles of Organic Synthesis', was written for second and third year undergraduates. However, sections could be studied with profit at the postgraduate level. The discussion in these worked solutions is sufficiently advanced to be of use in a taught postgraduate course. This book is a useful adjunct to Norman's 'Principles of Organic Synthesis' and my only reservation is that it is a pity that this relationship was not made more obvious in the title on the front cover.

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