

## Book reviews

### Organometallics in Synthesis; A Manual

M. Schlosser (ed)

Wiley, Chichester, UK, 1994

614 pp. £60 (UK), \$95 (USA)

ISBN 0-471-93637-5

There are by now many texts describing the use of organometallic compounds in synthesis. Most restrict themselves to an overall description of reaction types and synthetic possibilities. Few go the extra mile and include actual experimental recipe details of how to *do* the synthesis. To its credits this book does that, and this extra feature makes the book particularly useful in its class. The experimental details are given in full, together with a reference to the original literature source. Accompanying the experimental details are numerous discussions of practical handling and safety aspects of the work. So as a book of recipes, this work has value in itself.

What adds an extra dimension is the combination of the experimental details with the descriptive sections where the history, scope, variety and limitations of the particular reaction type are discussed. Many of the most important synthetic organometallics are covered, namely organoalkali reagents (M. Schlosser), titanium (M. T. Reetz), organocopper reagents (B. H. Lipschutz), palladium (L. S. Hegadus), organoboron chemistry (K. Smith), organoaluminium compounds (H. Yamamoto) and organotin chemistry (H. Nozaki). The chapter on the industrial applications of organolithium compounds (F. Totter and P. Rittmeyer) does not contain experimental details. These are covered in the chapter by Schlosser, however.

Although the experimental details are reproduced in detail and, as the editor notes, the co-authors have 'shared their expertise with the reader', there is no claim that the syntheses would have been personally verified by the individual authors. With only nine authors, this would seem to be impossible. However, this would not detract from the usefulness of the book as all are very experienced in the practical use of the synthesis types they describe. There are numerous references to chiral synthetic work in the text.

The chapters are sufficiently referenced (Chapter 1, 126; Chapter 2, 55; Chapter 3, 328; Chapter 4, 172; Chapter 5, 168; Chapter 6, 103; Chapter 7, 52; Chapter 8, 183). The subject index occupies 16½ pages. The formula index covers about 400 compounds. The experimental descriptions are not presented in uniform quantity but, by way of example, the chapter on titanium in synthesis has 48 experimental descriptions, that on organocopper 124 experiments, palladium chemistry has 19, organoboron 41, aluminium a disappointing 3, tin 9, alkali metals 67. Clearly the coverage is not uniform, but the totality of the synthetic procedures described makes this a very useful handbook in the

areas with which it is concerned. It is disappointing that there are no chapters on magnesium species, nor on Group IIB (Group 12) or on the use of organotransition metals generally. There is still room for a companion volume.

At £60 (UK) I cannot rate this as an over-expensive book. Indeed, I might propose that the proud parents of newly enrolled Ph.D. students in the area consider making a personal copy of this book as a gift to their offspring as they embark on their research careers. I rate this a useful starter pack for new researchers. I also believe that research groups would benefit from holding a laboratory copy. The book should be a standard text for organometallic libraries.

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### Inorganic Experiments

J. Derek Woollins (ed)

VCH, Weinheim, 1994

DM148

ISBN 0-527-29253-5 (hardback);

0-527-29235-7 (paperback)

Over the years our department has built up a large collection of undergraduate experiments in inorganic chemistry. Even so, we are always eager to find new ones and the appearance of this well-produced text is therefore very welcome. The stated aim of the editor, J. Derek Woollins, is to provide 'meaningful experiments which develop laboratory skills, introduce interesting chemistry and are reliable and not always easy to find'. Those goals are achieved in some at least of the 65 (or so) experiments. With some 70 authors there are the expected variations in style and the amount of information provided. Each experiment is said to have been tested by the contributing author(s); however, the editor does add the disclaimer '... so we can *optimistically assume* that they "work" ...'. He has subdivided the experiments into 'introductory', 'intermediate' and 'advanced'. This classification should only be taken as a rough guide; for example experiment 2.11 on the preparation of two phosphate esters (not identified) and the use of their <sup>1</sup>H and <sup>31</sup>P NMR spectra for identification would seem, to me at least, to be too difficult as an introductory experiment. A fair number of the experiments have appeared in older inorganic texts and have certainly been in our collection for at least 20 years, e.g. experiments 2.1 (preparation and investigation of some co-ordination compounds), 2.4 (copper oxalate) and 2.7 (linkage isomerism). The method of preparation of ferrocene and its acetylation (3.1) are long-established procedures used in most courses (incidentally, we find that using half the quantities advocated is more than sufficient).

My one major criticism is the lack of information accompanying a large number of the experiments, i.e.

the aims of the experiment, the time required, the expected yields and any likely pitfalls—essential information for laboratory instructors.

My recommendations are that all who teach inorganic chemistry should make use of this text and that we should inform the editor of the success or otherwise of the experiments we try.

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### **Dictionary of Organometallic Compounds**

B. J. Aylett, M. F. Lappert and P. L. Pauson (eds)

Chapman and Hall, London

£2950 (hardback). £3500 CD ROM (single user).

£8750 CD ROM (network).

ISBN 0 412 43060 6 (five-volume set)

The first edition of this well-known reference work was published in three volumes in 1984, and the same editors have now expanded the text to five volumes in the 1995 second edition. A feature of this edition will be the issue of a regular series of updates of new compounds or data from mid-1995 in either hard copy or CD-ROM form. Researchers are also invited to send details of new compounds or groups of compounds to the Editors for possible inclusion.

The original concept of the *Dictionary* was to provide 'a well organised compendium of essential facts on selected organometallic compounds' and the Editors believe that this 'has been shown to fulfil a real need amongst chemists'. This, together with the manifest expansion of the field over the last ten years, has led to the second edition. Each entry has been revised and updated, with a further focus on synthetic routes, including a new index of synthetic reagents. The present edition contains more than 10 000 *extra* entries over the first edition, making a total of over 40 000.

The format of the *Dictionary* is well known to organometallic chemists. The essential feature is the ordering of compounds in element sections by alphabetical listing of the metallic element. Within each section the arrangement of entries is in order of molecular formula using the Hill convention (i.e. C, H and then the remaining elements in alphabetical sequence of chemical symbol).

Compounds containing more than one metal are cross-referenced. Each entry contains essential physical details about the compound and also the CAS number. A series of literature references is then given which includes a brief description of the main thrust of that reference (e.g. synth., use, pmr, uv, etc.). Each entry is also numbered at the point of entry to assist searching. Volume 5 includes the three indexes: an index of synthetic reagents, a molecular formula index in Hill convention order and a CAS Registry number index in serial order. Although the *Dictionary* does not claim to be a comprehensive source on hazard data, such information is given briefly in a proportion of entries. Each element section also provides a structure index.

In the view of this Reviewer, the *Dictionary* is an essential resource for the library of a Department

specializing in organometallic chemistry at the research or undergraduate level. The cost probably makes this the only location where the volumes will be available.

The *Dictionary* is now also available on CD ROM, at a cost of £3500 for a single user and £8750 for a network version. In any event, the *Dictionary* is an invaluable source of information to the organometallic chemist and access to it is essential.

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### **Organic Syntheses, Volume 72**

D. L. Coffen (ed)

Wiley, New York, 1995

£36.95 (UK)

ISBN 0 471 30727 0

The first volume of the series *Organic Syntheses* was published in 1921; Roger Adams was Editor-in-Chief. The subtitle says it all: 'an annual publication of satisfactory methods for the preparation of organic chemicals.' The current volume is the 72nd: the length of the publishing run and the vigour and rigour shown in its production attest to the continuing need for this series and its popularity.

Many of the 32 syntheses detailed in Vol. 72 employ organometallic reagents, reflecting the current trend, and it is not unreasonable to view much of the methodology as applied organometallic chemistry. Specific examples include:

- (1) the asymmetric hydrogenation of allylic alcohols using BINAP-ruthenium complexes: the preparation of {S}-(-)-citronellol from geraniol. The preparation of the catalyst is given although the word 'catalyst' hardly appears in the description.
- (2) The rearrangement of *trans*-stilbene to diphenylacetaldehyde with methylaluminiumbis(4-bromo-2,6-di-*tert*-butylphenoxide) (MABR) as catalyst.
- (3) The synthesis of functionalized enynes by palladium/copper-catalysed coupling reactions.
- (4) The use of highly reactive calcium for the preparation of organocalcium reagents.
- (5) The use of tributyltin hydride in the stereoselective synthesis of 2,2-disubstituted 1-fluoroalkenes.
- (6) The use of Me<sub>3</sub>SiCF<sub>3</sub> in the synthesis of 1-trifluoromethyl-1-cyclohexanol.
- (7) The preparation of a water-soluble tin hydride, tris [3-(2-methoxyethoxy)propyl]stannane.

The dedicated team of submitters and checkers appears to have done their commendable best to ensure clarity in the text. The publishers are to be congratulated in making available to members of various chemical societies this volume and some preceding ones (Vol. 62 onward) in an inexpensive soft-cover edition. Hard-cover versions and their indexes should be part of all libraries.

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