

## Book Reviews \*

**Cross Coupling Reactions: A Practical Guide.** Edited by N. Miyaura. Topics in Current Chemistry, Vol. 219. Springer-Verlag: Heidelberg. 2002. 248 pp. \$169 (£104.50, 149 Euros). ISBN 3-540-42175-0.

The subject of catalytic bond formation via cross-coupling reactions is now 30 years old, with many significant advances made in the last 10 years. This truly practical guide covers the topics of coupling reactions of organoboron compounds, organosilicon compounds and organotin compounds, as well as chapters on palladium catalysts for C–N and C–O bond formation, and direct arylation via cleavage of activated and unactivated C–H bonds.

The chapter authors include experts in the field such as the editor himself, Hiyama, and Buchwald and Kosugi, who I was surprised to read, published three papers on tin coupling reactions in 1977, a year prior to Stille.

Each chapter focuses on practical aspects—choice of reagents, catalysts, ligands, solvents, reaction conditions to get the best yield and best catalyst turnover. In each chapter a selection of the best experimental procedures is given—these might have been better highlighted by using a different type face from the rest of the text.

Literature coverage is, in many chapters, to late 2000, although occasional references to 2001 are made. Given that this subject area is a hot topic at present, the reviews are a little out of date by the time of going to press. Surely in these days of desktop publishing, the time taken from receipt of manuscript to publication could be considerably shortened. Despite these minor criticisms, the reviews are very comprehensive, concentrate on the work in the 1998–2001 period, and are full of useful information which the practicing process chemist will find invaluable.

Of course, there are many areas of cross coupling which are not covered in these chapters—Heck, Sonogashira, Negishi, and Kumada couplings are mentioned in the short introductory chapter (nine pages) but not elsewhere in the book, as far as I could tell. It was, however, difficult to check this, since there is no subject index—a severe limitation on a book priced at over £100.

In conclusion, the volume contains five comprehensive and well-written chapters and is highly recommended reading. At over £100 for 241 pages, however, it is not good value for money, given the limitations mentioned above.

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**Industrial Organic Chemistry, Completely Revised 4th ed.** By K. Weissmehl and H.-J. Arpe. Wiley-VCH: Weinheim. 2003. 491 pp. £119. ISBN 3-527-30578-5.

\*Unsigned book reviews are by the Editor.

The fourth edition of this established work follows in the excellent tradition of the previous three editions. It retains the concept of the original, providing technological and economic information on the key building blocks of the chemical industry.

The book is packed with information, much of which cannot easily be found elsewhere, and certainly not in such a readily digestible form. The companies and innovators responsible for the chemistry described are clearly credited, and indeed this volume provides an excellent history of the worldwide bulk organic chemicals industry. Throughout the book the authors indicate potential future developments in the manufacture of these important precursors and intermediates.

The reader-friendly format seen in the previous editions is retained, wherein each chapter or subsection is provided with a chemical flow diagram illustrating the interrelationship of the products, these flow diagrams folding out such that they can be constantly referred to whilst reading the text. In addition, the main text is accompanied by a synopsis in the margin, which concisely presents all of the essential points, thus facilitating browsing. The contents are logically and clearly organised, and there are detailed reference lists for each chapter, together with an extensive index. This latest edition also includes updated statistics and adopts the new IUPAC nomenclature guidelines.

Although Professor Weissmehl died soon after the publication of the third edition, Professor Arpe has fittingly elected to retain the late coauthor's name with this edition.

This book will be a positive addition to the libraries and bookshelves of chemists and chemical engineers working in the organic sector, including those by whom many of the molecules described are considered to be “commercially available starting materials”. Nonscientists (e.g. industrial economists, lawyers) will also gain an appreciation of the complex technological, scientific, and economic interrelationships (and potential developments) which characterise industrial organic chemistry.

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**Catalysis in Application.** Edited by S. D. Jackson, J. S. J. Hargreaves, and D. Lennon. Royal Society of Chemistry: Cambridge. 2003. 318 pp. £99.95. ISBN 0-8540-4608-9

The Royal Society of Chemistry (RSC) are to be complimented on sending this volume for review on July 24, 2003,

when it contains papers from the International Symposium on Applied Catalysis held at University of Glasgow only a few days earlier (July 16–18, 2003). This was a joint meeting of the Surface Reactivity and Catalysis, Applied Catalysis, and Process Technology subject groups of the RSC and the Institute of Chemical Engineers and focused on hydrogenation, deactivation, chiral heterogeneous catalysis, and environmental catalysis. The title of the book, *Catalysis in Application*, is slightly misleading, since it really only deals with heterogeneous catalysis and the applications are mainly in the bulk chemical industry rather than in fine chemicals and pharmaceuticals. The process development chemist will find little of interest, except for an occasional short chapter such as selective hydrogenation of cinnamaldehyde to cinnamyl alcohol using an Ir/C catalyst, where pre-reduction of the catalyst increases selectivity. Other topics of interest include aldol condensations over solid catalysts, selective hydrogenations in ionic liquids, and enantioselective hydrogenations over alkaloid-modified palladium.

In conclusion, these conference proceedings will be of interest to those chemists and engineers working in the petrochemical and bulk chemical industries, but not to those in the fine chemicals, agrochemicals, and pharmaceutical sectors.

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**Handbook of Reagents for Organic Synthesis: Chiral Reagents for Asymmetric Synthesis.** Edited by L. Paquette. Wiley: Chichester. 2003. 594 pp. £75. ISBN 0-4708-5625-4.

Those of you who are familiar with the outstanding *Encyclopedia of Reagents for Organic Synthesis* (Wiley, 1995) will recognise the format of this single-volume work. The editor and his many co-workers have assembled and updated appropriate sections from the earlier work and produced this useful volume on chiral reagents at a reasonable price. Approx 250 reagents are covered, and for each the physical properties and reactions are shown. Chiral ligands for asymmetric catalysis are also included.

The major criticism is that most of the contributions have clearly not been updated from the original, and often the latest references are only to 1994. Those that have been updated (or maybe they are new entries) have references to 2001. Thus, for phase-transfer catalysts, the newer catalysts of, for example, Corey and Lygo are not listed in the index. For more up-to-date material, the electronic version of the *Encyclopedia of Reagents for Organic Synthesis* (e-EROS) will be preferable. This deficiency is most notable in the two main sections covering enzyme reagents, esterases and lipases, both of which have not been updated—the latest references being to the early 1990s. All the excellent work of the past decade is thus not available to the reader.

The list of contributors may be accurate, but their addresses are not. One academic has not been at his listed address for over 10 years and has moved twice since then. One industrial

chemist has been in industry for over 10 years, whereas his address is listed at a university. It is clear that this has not been updated since 1995 either.

A comprehensive 40-page index helps to find the reagent for a particular transformation although there are some mistakes (e.g. for DuPhos, the index has the incorrect name and page, being confused with MinaPhos). Anyone who could not remember the structure for DuPhos would have difficulty finding the correct entry.

At the front of the volume, recent (to 2001) review articles and monographs are listed, and there is a list of Organic Synthesis procedures featuring Chiral Nonracemic Reagent Preparation.

In conclusion, the compilation is a useful volume to have in your library, particularly if you do not have access to e-EROS. The limitations expressed earlier, however, should be borne in mind, before purchasing.

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**Solvents and Solvent Effects in Organic Chemistry, 3rd updated and enlarged edition.** C. Reichardt. Wiley-VCH: Weinheim, 2003. 653 pp. 129 Euros. ISBN 3-527-30618-8.

Anyone who needs to know anything about solvents and solvent effects in organic chemistry must read this book. The second edition was popular and was reprinted in 1990 but is no longer available, and so this 3rd expanded edition is most welcome. It retains the same chapters as the previous edition, but each has been updated. Thus, chapter 5 includes sections on ionic liquids and fluorinated phase reactions.

What I like about the book is the information on how change of solvent affects position of equilibria and rate of reaction for specific reactions or types of reactions. The numbers presented in the reaction schemes should help process chemists decide on optimum choice of solvent for reactions. Unfortunately, there is little data on mixed solvents, except where one component is water.

The new edition maintains the high standard set by earlier editions. Each of the chapters has hundreds of references which unfortunately only go to 2001. A minor criticism is that the references are presented in a format which makes the particular reference more difficult to find. I also noted some omissions, such as the lack of reference to Smallwood's "Solvent Recovery Handbook" when discussing solvent purification methods.

The appendices, references, and index are almost 150 pages and are a useful feature of the work.

In conclusion, there is no other book which covers the subject in so much depth, and the volume should be an essential part of every organic chemist's library.

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