

Book reviews

Protecting groups

Philip J. Kocienski

Georg Thieme, Stuttgart, 2000

xv + 260 pages. 99 DM (corrected edition)

ISBN 3-13-137002-5 (Stuttgart); 0-86577-993-7 (New York)

As the author quotes from Disraeli in the first chapter of this book, 'Protection is not a principle, but an expedient'. There will always be a need for the synthesis of new organic compounds for evaluation of their biological properties, for use as new materials, or to establish a scientific principle. Although, ideally, any synthesis should proceed in one step and give a 100% yield of the required substance, we have a long way to go to achieve this objective in the synthesis of most organic compounds. In the meantime, in the syntheses of complex, sensitive, multifunctional organic compounds, the use of protecting groups is a necessary strategy to control chemo- and regio-selectivity.

The author surveys the 50 or so most popular protecting groups currently used in organic synthesis. It is not intended to be a comprehensive review, since other books include many more, albeit less well-used, protecting groups. Rather, the emphasis is on those protecting groups that most synthetic organic chemists are likely to need to use on a fairly regular basis. The use of compatible protecting groups for the selective protection of multifunctional organic compounds, so-called orthogonal protection, is emphasized, with the identification, in the first chapter, of 12 orthogonal sets of protecting groups that are cleaved by base, acids, heavy metals, fluoride, reductive elimination using zinc, β -elimination, hydrogenolysis, oxidation, dissolving metal reduction, nucleophilic cleavage, allylic deprotection and by photolysis. The protection of alcohols, diols and carboxyl, carbonyl and amino groups is then discussed. In each chapter, after a brief introduction, protecting groups for each class of compounds are discussed with the emphasis on methods for their removal and introduction, which are illustrated by many examples taken from total syntheses. At the end of each chapter, as well as copious references to the original literature, there are comprehensive lists of recent reviews relevant to the protecting groups being discussed.

The most significant feature of this book is the presentation of protecting groups in the context of sympathetic discussions of natural product synthesis. The author demonstrates his deep understanding of synthetic organic chemistry and his appreciation of the pitfalls that can face anybody involved in the synthesis of complex organic molecules. For these reasons, the book makes a really good, pleasurable read and is full of tips

and helpful insights. As well as being a very useful reference source, this is a book you really could read from cover to cover.

The approach taken is designed to instruct the reader in the use of protecting groups, a didactic approach, and so is essential general reading for any graduate student or postdoctoral researcher with an interest in organic synthesis. It is, however, an invaluable source of reference for all synthetic organic chemists who need to use protecting groups in their research. It is recommended as an essential purchase for any practising synthetic chemist, and clearly must be purchased by all scientific libraries.

The first edition of this book was published in 1994 with literature coverage up to the end of 1992. This corrected edition is essentially the same book, and is not a second edition, but the lists of reviews and references to the secondary literature at the end of each chapter have been updated.

So, to summarize, this is a very enjoyable and informative book on the chemistry of protecting groups. By concentrating on the uses of the 50 or so most widely used protecting groups and their uses in complex natural product synthesis, the author has produced a fine, readable and informative monograph that is warmly recommended to all graduate students and researchers in organic synthesis.

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Metal-organic and organic molecular magnets

P. Day and A. E. Underhill (eds)

Royal Society of Chemistry, Cambridge, 2000

viii + 324 pages. £69.50

ISBN 0-85404-764-6

This is a book for those who already have a basic knowledge of magnetochemistry and the underlying physical principles; it is not for the uninitiated. The

chapters are based on many of the lectures delivered at a Royal Society Discussion Meeting held in March 1999, and the book gives a very good perspective of developments in this fast-moving field.

There are 15 chapters, excluding a scene setter provided by the editors, and a thought-provoking epilogue written by Joel Miller. The contents range from the discovery of the first organic ferromagnets (Kino shita), through new developments in organic radicals (Veciana, Awaga) to metal-containing systems based on cyano-complexes (Verdaguer, Ohkoshi, Kahn), polymeric oxalato-bridged complexes (Descrignès), cobalt hydroxide layer structures (Kurmoo), metallomesogens (Bruce), metal clusters (Powell, Winpenny) and magnetic species based on mixed cyanometallate-macrocyclic complexes (Mallah). There is also an extremely interesting description of quantum size effects in molecular magnetism, especially oxo-manganese and -iron clusters (Gatteschi), and a masterly overview of the molecular chemistry of magnets and superconductors (Day).

The cognoscenti can expect to find very interesting reports of nitroxides, spin ladders, spin gaps, Kagomé lattices, muon-spin-rotation, metamagnets, nanomagnetism, magnetism in biominerals, cage, network and other supramolecular compounds, and photomagnetic effects. Throughout the book, most attention is devoted to structure-property relationships and attempts to interpret the mechanisms of magnetic interactions. There is only a brief description of the syntheses of these fascinating materials.

The book as a whole conveys very well the excitement of this rapidly developing field between chemistry, physics and materials science. As a part-time player in this area, I thought the collection of articles was very stimulating, and revealing of the different approaches of some of the world's leading groups in this area. Being based on a Royal Society 'Discussion', some chapters carry question and answer sections at their end, some of which were illuminating while others were not. The text is liberally illustrated, and most of the diagrams are clear and easy to understand.

Though the book is an excellent snapshot of much of the activity in molecular magnetism in 1999, it is not comprehensive. For example, there is little to be found about metalloporphyrins and phthalocyanins, or metal-locenes and other purely organometallic compounds; this is surprising perhaps, since these are important subsets in molecular magnetism. Notwithstanding these omissions, this book should be in the hands of every group that is seriously interested in this interdisciplinary field, and it should find a place in the libraries of every institution that has activity (research or teaching) in the chemistry and physics of materials.

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Pharmaceutical substances: syntheses, patents, applications

Axel Kleemann, Jürgen Engel (eds), B. Kutscher and D. Reichert

Georg Thieme, Stuttgart, 2001

xxxiv + 2488 pages (2 volumes). DM 998

ISBN 3-13-558404-6

This is the fourth, revised and expanded version of the previous single-volume edition of this pharmaceutical substance reference work, the last edition of which was published in autumn 1998.

This new edition comprises monographs of 2267 active drug compounds, including organometallic drugs, and provides a significant amount of chemical information on each substance. This includes: chemical structure; route of synthesis, including intermediates in diagram form; CAS nomenclature and registry number; international nonproprietary name (INN), as well as standard and trivial names; synonyms; anatomical therapeutic chemical (ATC) codes; European inventory of existing commercial chemical substances (EINECS) number (where appropriate); therapeutic category; toxicological data; pharmaceutical dosage forms; patent number and patent information, including applications for different indications, application date, holder, and expected expiry date; trade names in major worldwide markets; bibliographic information; and references to enantiospecific syntheses where appropriate.

This book, which is also available on CD ROM and as a server-based CD ROM for intranet access, provides more chemical information than the *Merck Index* (12th edn) but fewer monographs, as it concentrates only on 'pharmaceutical compounds of significance'. All compounds are organized alphabetically according to their INN and are extensively cross-referenced in comprehensive indexes. These include indexes of trade names, intermediate compounds, enzymes and micro-organisms used in synthesis, plants and animal tissues from which compounds are derived and substance classes.

I like this two-volume set and found it easy to use, largely because of its superb cross-referencing. Given that the publisher intends to update the book and CD with 50 to 100 new pharmaceuticals every year, it is a very good starting point in finding chemical, synthesis, patent and bibliographic information on a wide range of launched pharmaceuticals and should be the book reached for first when you need this kind of information.

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