

## Book Reviews

**The Chemistry of the Fullerenes.** By A. Hirsch. Georg Thieme: Stuttgart, 1994, 203 pp., flexicover. DM 80. ISBN 3-13-136801-2.

Once fullerene C<sub>60</sub> had become readily available in comparatively large quantities, this carbon cage developed within only a few years into one of the best investigated molecules. After an especially intense interest in the physical properties initially, chemists attention was soon attracted more and more by the prospects of chemical modification. The aim of the book presented here, is to give the first comprehensive overview of this expanding field of research to the practising chemist, as well as to a broader readership, above all material scientists and biologists. It imparts a comprehensive knowledge of all aspects concerning fullerenes, as well as the chemical properties and reactions of the presented fullerene derivatives with reference to the data given in the literature until the summer of 1994, with the chemistry of C<sub>60</sub> being given priority.

The book begins with a description of both the discovery of fullerenes and methods of its production and isolation. Furthermore, the mechanism of fullerene formation, physical properties such as molecular structure, thermodynamic, electronic and spectroscopic properties as well as solubilities are discussed. The following chapters are arranged by the type of chemical transformation of the fullerenes. The latter include in separate chapters reductions, nucleophilic additions, cycloadditions, hydrogenation, radical additions, transition metal complex formation and oxidation and reactions with electrophiles. In each of these chapters both the experimental details and the theoretical investigation are sufficiently dealt with. In the final chapter the principles and perspectives of fullerene chemistry and the reactivity and regiochemistry are summarized.

Great importance is attached to a clear and distinct representation of the basics of the chemistry of the fullerenes as shown by a perspicuous and lucid division of the subject. Each chapter begins with a table of contents, followed by a short introduction, which is continued by an understandable logically constructed and succinct presentation of the specific topic. Numerous figures, summarizing graphs, reaction schemes and especially the detailed references at the end of each chapter facilitate

familiarizing oneself quickly with this new field of scientific research and enable the chemist to have immediate access to the original literature. This is also helped by the fact that it is a pocket size book of an adequate 200 pages volume.

The above mentioned aspects of this recommended work make it an outstanding and excellent source of information for those who are interested in this exciting new chapter of carbon chemistry. This first monograph on fullerenes should not be missing from any chemical and scientific libraries.

**H.-J. Bestmann and C. Moll**, University of Erlangen-Nürnberg, Germany.

**Organic Syntheses Based on Name Reactions and Unnamed Reactions.** By A. Hassner and C. Stumer. Elsevier: Oxford, 1994, 452 pp., flexicover. £ 28.00. ISBN 0-08-040279-8.

Those chemists who noted with regret the loss of the Organic Name Reactions section from The Merck Index when it was updated from the 10th to the current (11th) edition will be pleased to hear that Hassner and Stumer have now written a separate, modern text of the area. This new book in the excellent Tetrahedron Organic Chemistry Series covers over 400 of the most important reactions used in organic synthesis. Reactions are listed in alphabetical order according to the names of the principal pioneers of the processes. The naming of chemical reactions after discoverers or subsequent developers, whilst potentially contentious, nevertheless brings a welcome human touch to science. The original rather cramped format has been expanded to make the entries much more readable. Each named reaction generally begins on a new page; a one-line summary of the salient features of the process is followed by one or two reaction schemes which illustrate actual examples of the reaction. Selected references (up to 1991/92) include the original paper or papers, key developments and journal review articles, if available. Experimental procedures for some of the reaction schemes are included. Although it is unlikely that the reader will wish to conduct the exact

transformation described, the procedures are valuable in allowing a rapid initial assessment to be made of the general experimental conditions employed. Four separate indices are provided: name, reagents and functional group transformations. The name index is the most useful of these since one is most likely to use the book to find details of the reaction connected to a particular name. As several names can be associated with one reaction, the name index thus avoids the problem of having to know which name was used for the alphabetical ordering.

Hassner and Stumer have omitted a few of the less general and more obscure reactions found in the old Merck Index and have added some of the (arguably) more important reactions developed in last twenty years: for example the Dess–Martin oxidising agent, the use of the Evans chiral auxiliary, the Overman pyrrolidine synthesis and the Tebbe olefination reaction. It is a testament to the continuing vitality of organic synthesis, and the rapidity with which new reactions (or asymmetric variants of old reactions) are assimilated into the field, that already several recently developed processes, such as Jacobsen epoxidation and Grubbs ring-closing metathesis could now merit consideration for citation.

In summary, the book is a reference text which provides clear and swift answers to the often-asked question 'to what reaction does that name refer?' Advanced undergraduate and postgraduate students should find it particularly useful. It should be an essential acquisition for libraries and is strongly recommended for research groups engaged in organic synthesis. Its price, good value in soft-cover version, also puts it within reach for individual purchase by the dedicated research chemist.

**D. M. Hodgson**, The University of Reading, UK

**The Chemical Synthesis of Peptides.** By J. Jones. Clarendon Press: Oxford; 1994, 240 pp., paperback. £ 18.50. ISBN 0-19-855839-2.

For a long time peptide chemistry has been a fascinating and important field of research at the interface between chemistry and biology. The vast number of publications of the last few years has made it impossible for any one person to keep abreast of events. This is what promoted John Jones to draw all the synthetic aspects of peptide chemistry together and present them in compact form in "The Chemical Synthesis of Peptides".

The first edition of this book appeared in 1991 and summarized the state of the art in 1990. This new, second edition contains few changes. It is divided into two main parts, the first of which deals with the fundamental principles of peptide chemis-

try, such as protection, activation, and racemization. The second goes into selected total syntheses, first the preparation of ordinary peptides in solution and on the solid phase, then the synthesis of conjugated peptides, cyclopeptides and other, more complex structures, e.g. peptides with reduced peptide bonds or those containing  $\alpha,\beta$ -dehydroamino acids. The book also includes an extensive, most welcome appendix giving a list of the most common abbreviations used in peptide chemistry and a guide to further reading. The concept of "chemical synthesis" is defined in contrast to molecular genetic methods. The use of isolated enzymes in peptide bond formation is mentioned, but, regrettably, the possibilities of enzymatic cleavage of protecting groups are not.

The main emphasis of this book is on the principles of peptide chemistry, rather than the practice. In the early chapters the reaction conditions of peptide bond formation and the various protective group techniques are mentioned, but chiefly to give an idea of practicability and time requirements. Within a given class of reagents, e.g. the carbodiimides, the author describes recent developments, and weighs their advantages and disadvantages, but he does not go into the relative merits of different types of coupling reagents such as EEDQ and BOP. Here the reader is left to his own resources.

In the second part the capabilities of peptide chemistry are illustrated by selected examples of total syntheses. Along the way, the most important strategies used are elucidated. A short introductory chapter outlines the basic problems, such as the need for orthogonality of protective groups, or the difference between linear and convergent synthesis. The examples that follow are classified accordingly into solution and solid phase peptide synthesis, the latter encompassing the Merrifield approach, the Sheppard approach, and combined approaches. Finally, the preparation of more complex peptides and the particular problems encountered in these syntheses are detailed. This arrangement works well and it is easy to find one's way about in the book.

John Jones gives a far-reaching analysis and overview of the chemical synthesis of peptides. He does not lose the reader in too much detail, but restricts himself to fundamentals and essentials. Details are just given to illuminate strategies and tactics. For those with specific problems relating to synthesis, enough references are given to further reading. The structure and occurrence of the peptides and peptide conjugates mentioned are set out briefly and concisely.

One drawback of the book should be mentioned: in contrast to the extremely up-to-date first edition, in this edition only misprints have been corrected and the bibliography and guide to further

reading updated. The references within chapters have not been revised. Some important changes and additions are only mentioned in the preface as planned for future editions - multiple peptide synthesis methods and applications, for example - recent developments in the synthesis of peptide conjugates are not touched on at all.

This lack, however, is made up for by the other qualities of this excellent, well put-together

book. Those seeking to acquaint themselves with peptide chemistry, or wishing to organize and improve their knowledge in this field, will find this book a good choice.

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