

## Book Reviews

*J. Nat. Prod.*, **1993**, 56 (1), 158-159 • DOI:  
10.1021/np50091a026 • Publication Date (Web): 01 July 2004

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Journal of Natural Products is published by the American  
Chemical Society, 1155 Sixteenth Street N.W., Washington,  
DC 20036

## BOOK REVIEWS

*Synthetic Fluorine Chemistry*. Edited by G.A. OLAH, R.D. CHAMBERS, AND G.K. SURYA PRAKASH. John Wiley and Sons, New York, 1992. xii+402 pp. 16×24 cm. \$95.00. ISBN 0-471-54370-5.

The book *Synthetic Fluorine Chemistry* is a result of a symposium organized in February 1990 by the Loker Hydrocarbon Research Institute of the University of Southern California. The monograph consists of 17 chapters, contributed by 29 experts, on the preparation, reactions, and properties of fluorine compounds.

Topics discussed are: Chapter 1 acid properties of fluorinated noble gas cations, Chapter 2 replacement of fluorine by oxygen in inorganic polyfluorides using nitrates and sulfates, Chapter 3 synthesis of transition metal salts of strong protonic acids, Chapter 4 preparation of compounds containing =SF<sub>2</sub>, =SF<sub>4</sub>, and ≡SF<sub>3</sub> groups, Chapters 5-7 new methods using fluorine for the preparation of mono and polyfluoro compounds containing functional groups, and Chapter 8 application of onium poly(hydrogen fluorides) (known as "Olah's reagents") in the preparation of organic fluorides from alkenes, alkynes, alcohols, and nitrogen-containing compounds, by ring opening and other reactions. Chapter 9 describes preparation and reactions of perfluoro organometallics of copper, zinc, and cadmium, Chapter 10 discusses nucleophilic perfluoroalkylation using perfluoroalkyltrialkylsilanes, Chapter 11 synthesis of poly and perfluorinated compounds using silicon derivatives, Chapter 12 electrophilic *ipso* reactions in polyfluoroarenes, Chapter 13 rearrangements of perfluorobenzene oxide to perfluorooxepin, Chapter 14 perhalodioxins, Chapter 15 asymmetric synthesis using Claisen rearrangement of fluoroacetamide acetal, Chapter 16 fluoride-ion-initiated oligomerization of perfluoroalkenes, and Chapter 17 fluorinated nitrogen-containing monomers.

While most of the chapters are narrowly specialized, some, such as those on the use of elemental fluorine for the preparation of polyfluorinated functional derivatives, on new organometallics of copper, zinc, and cadmium, and on applications of onium poly(hydrogen fluorides), have a much more general scope. All the chapters are abundantly referenced (total of 907 references). Unlike many publications resulting from symposia and reproduced in an ad hoc manner, the text of this monograph is typeset and only the formulae are reprinted from camera-ready copy.

The book *Synthetic Fluorine Chemistry* is certainly a very useful contribution to the fluorine literature. Although fluorinated natural products are rare, fluorinated analogues of natural products have an important place in medicine. This volume would be a good starting point for anyone wishing to prepare such analogues.

MILOS HUDLICKY, *Virginia Polytechnic Institute and State University*

*Studies in Natural Products Chemistry. Volume 9. Structure and Chemistry, Part B*. Edited by ATTA-UR-RAHMAN. Elsevier Science Publishing Co., P.O. Box 882, Madison Square Station, New York, NY 10159. 1992. xviii+714 pp. 16.5×24 cm. \$220.50. ISBN 0-444-89165-X.

This volume is part of a continuing series published by Elsevier that focuses on studies in natural product chemistry. Stereoselective synthesis, structure elucidation, and structure and chemistry are the three major areas that have been addressed in previous volumes. The newest addition to this series is the second volume devoted to structure and chemistry. The twenty-four chapters within this volume offer an extremely wide spectrum of natural products structure and chemistry topics. These chapters are interesting and timely and are authored by outstanding scientists who are leaders in their fields of research activity.

A good portion of this volume emphasizes or deals exclusively with various techniques that have been applied to structure elucidation. The chapter authors describe in detail how these powerful methods were applied to determine the structures of chemically complex natural products that were encountered in their research efforts. Chapter 1 describes the application of the single crystal X-ray diffraction technique to three new and structurally complex secondary metabolites from marine animals. Chapter 5 focuses on the use of nmr spectral methods in the structure elucidation of two novel but chemically complex heptanortriterpenoid derivatives. Chalcogen nmr spectroscopy is the interesting subject of Chapter 6. In Chapter 7, the various 2D nmr experiments are described, and several applications of these powerful techniques are presented very well. Chapter 8 outlines a useful method of rapidly identifying trace amounts of indole alkaloids by analysis of the aromatic patterns from <sup>1</sup>H-nmr spectra. Chapters 11, 12, and 13 all deal with the application of various contemporary techniques in solving structure elucidation problems associated with chemically complex

natural products. Chapter 18 presents various chromatographic and mass spectral methods that have been used alone or in combination to analyze steryl esters. The ever-increasing importance of biologically active peptides and proteins underscores the significance of the tandem mass spectrometry (fabms/ms) protein/peptide analytical technique that is presented in Chapter 19.

Marine organisms produce a diverse array of novel but chemically complex secondary metabolites that have surprisingly potent biological activities. Chapters 2-4 present selected examples of unusual compounds from marine sources. The treatise on the biosynthesis of cyclopropane-containing sterols that appears in Chapter 3 is very well done and of considerable interest.

Biosynthesis is the major thrust in two other chapters. In Chapter 9, the fungal genus *Fusarium* is examined with regard to its biosynthetic versatility in producing mycotoxins. Chapter 24 provides a detailed inspection of the mechanistic and evolutionary aspects of microbial vitamin B<sub>12</sub> biosynthesis.

The chemistry of microbial metabolites is the main topic of three chapters. Chapter 10 deals with self-inhibitors of fungal spore germination, while Chapter 17 presents the bio-organic chemistry of ansamycin and mitomycin antibiotics. The research appearing in Chapter 22 concerning peptide siderophores from *Pseudomonas* species and other bacteria is appealing because of the general novelty of the concept.

Chapter 15 describes three bioassays that can be used to direct phytochemical research toward the isolation and characterization of compounds that have useful bioactivity. This chapter also details ten interesting examples of the application of these "bench top" bioassays yielding novel metabolites with potentially useful activity.

The remaining chapters in this volume provide good coverage of a wide variety of topics. Chapter 21 examines the essential oils from *Artemisia* species and nicely blends chemotaxonomical considerations with the oil constituents that are important for characteristic odors. The phosphaheterocyclic chemistry associated with the synthesis of a phosphorous analogue of vitamin D<sub>3</sub> presented in Chapter 20 is interesting and different, while Chapter 16 is concerned with microbial metabolic transformations involving corticoid hormones. Lipoxxygenase catalysis is the impressive subject covered in Chapter 23, and the chemistry of non-isoprenoid phenolic lipids is thoroughly covered in Chapter 14.

The editor of this volume, Professor Atta-ur-Rahman, has offered a wide range of topics concerning structure and chemistry of natural products. Most chapters are well written and provide sufficient detail to stimulate the curiosity of research scientists ranging from graduate students to active senior level investigators. Considering the number of pages, there is a wealth of information in this volume. However, at a price of \$220.50, it would seem that phytochemists and other natural product scientists will be reading this very interesting compilation only when it becomes part of their institutional library.

WILLIAM J. KELLER, *Northeast Louisiana University*

*Crystallography in Modern Chemistry*. T.C.W. MAK and G.-D. ZHOU. Wiley-Interscience, 605 Third Avenue, New York, NY 10158. 1992. xiii + 1323 pp. 17.5 × 25 cm. \$175.00. ISBN 0-471-54702-6.

This large book is subtitled "A Resource Book of Crystal Structures," and it consists largely of detailed descriptions of crystal structures of 141 compounds, ranging from fundamental structures such as copper, diamond, and NaCl to organic and organometallic compounds and inclusion compounds. The number of natural product structures discussed is very small, however; only four structures (vitamin B<sub>12</sub> coenzyme, glycine, valinomycin, and sucrose) could be identified as natural products, and the book is thus unlikely to be of general interest in the natural products community. X-ray crystallographers will doubtless find the book helpful, and it would be particularly useful as a supplement to a course on X-ray crystallography.

DAVID G.I. KINGSTON, *Virginia Polytechnic Institute and State University*