



## Mass Spectrometry and Gas-Phase Chemistry of Non-Covalent Complexes

Supramolecular chemists had to wait for the advent of soft ionization methods before mass spectrometry became a genuinely useful tool for the analysis of weakly-bound complexes. In the 20 years since electrospray ionization (ESI) and matrix-assisted laser desorption ionization (MALDI) instruments first became commercially available the field has developed considerably, and Schalley and Springer's book is a well-timed, well-written, and welcome summary of the state-of-the-art in the study of non-covalent complexes by mass spectrometry. The authors go well beyond the initial transfer of ions to the gas phase to show what techniques and methodologies can be best used to study equilibria, kinetics, stoichiometry, and structures of supramolecular complexes.

The relevant instrumentation is covered succinctly and descriptively without the distractions of an historical perspective, thus avoiding the description of the irrelevant and obsolete. The core concepts of supramolecular chemistry are introduced in a way geared to the novice. All key points and concepts are covered extremely quickly using an organizational scheme that is similar to longer volumes entirely devoted to supramolecular chemistry. The chapters on biomolecules are not given the same introductory treatment (although they could use one), but their content is well laid out for an audience of chemists.

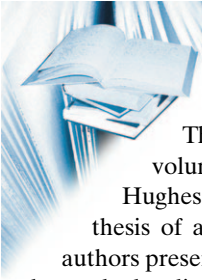
The figures are generally outstanding, with the majority redrawn or created specifically for this text. The effort spent in securing the originals rather than relying on reproduced figures has ensured excellent visual consistency throughout the book, and it is good to see the data presented in a way that matches the quality of the science. Over 1500 references provide comprehensive coverage of the best work in the field.

Numerous tutorials appear throughout the text, ranging in length from a one-page summary of double resonance and MS<sup>3</sup> experiments to a seven-page, 40-reference account of the interaction of DNA with cisplatin. Most tutorials provide short primers on a large area (e.g. ion mobility, peptide fragmentation), an introduction to a special topic (e.g. dendrimers, gas-phase thermochemistry), or a definitive answer to a key question (e.g. "Why is the S<sub>N</sub>2 reaction so much faster in the gas phase?"). The tutorials are particularly well-suited to the task of bringing a reader who is not an expert in a given area up to speed.

The book by Schalley and Springer will be of special value to supramolecular chemists aware of

the possibilities for real insight into systems of interest but unfamiliar with the tools and language of mass spectrometry. I highly recommend this excellent book.

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## Amino Acids, Peptides and Proteins in Organic Chemistry

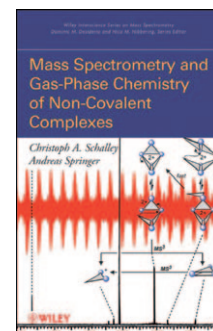
The first volume of this six-volume series edited by Andrew B.

Hughes deals with the origins and synthesis of amino acids. In 14 chapters, 30 authors present a range of topics that extends beyond the limits of organic chemistry, by covering aspects of biochemistry, biotechnology, and astrobiology.

The first chapter begins with the search for extra-terrestrial amino acids on asteroids, comets, and meteorites, and in the interstellar medium itself. This astrobiological discussion about the possible occurrence of organic molecules in space is followed by a second chapter that consists of an essay on terrestrial amino acids. Starting from a critical examination of the definition of "canonical amino acids", the author compares theories and research results concerning the origins of amino acids on earth and describes the conditions that led to the development of the 20 terrestrial amino acids. This well-written scientific and philosophical overview concludes the first part of the book, which is entitled "Origins of Amino Acids".

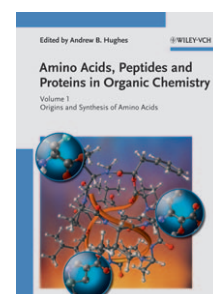
The much longer second part, "Production/Synthesis of Amino Acids", begins with the use of enzymes in the synthesis of amino acids, describing enzymatic procedures for chiral resolution and for generating enantiomerically pure  $\alpha$ -amino acids, as used in industry, from achiral precursors. The following chapter is concerned with the biosynthesis of  $\beta$ -amino acids as primary and secondary metabolites and with their occurrence in a variety of natural products. This detailed and well-structured essay is the first concise review of this complex field of research.

The following chapters deal with syntheses of various classes of amino acids, beginning with non-coded amino acids found in natural products and the already well-researched field of N-alkylated amino acids. The authors describe recent developments in the areas of  $\beta$ -amino acids, carbocyclic  $\beta$ -amino acids,  $\alpha,\beta$ -diamino acids, and halogenated



**Mass Spectrometry and Gas-Phase Chemistry of Non-Covalent Complexes**

Supramolecular Chemistry in the Gas Phase. Wiley-Interscience Series on Mass Spectrometry. By Christoph A. Schalley and Andreas Springer. John Wiley & Sons, Hoboken 2009. 571 pp., hardcover € 99.90.—ISBN 978-0470131152



**Amino Acids, Peptides and Proteins in Organic Chemistry**

Volume 1 – Origins and Synthesis of Amino Acids. Edited by Andrew B. Hughes. Wiley-VCH, Weinheim 2009. 714 pp., hardcover € 159.00.—ISBN 978-3527320967

amino acids. Syntheses of isotopically labeled amino acids and of non-natural amino acids are described, and the synthesis and importance of  $\gamma$ - and  $\delta$ -amino acids in the context of peptide mimetics and peptide nucleic acids is discussed. The last chapter gives a comprehensive overview of synthetic routes to GABA analogues and to  $\gamma$ -amino acids, thus conveying an idea of the vast functional and structural diversity of this class of compounds.

Whereas some authors have structured their reports on the basis of synthetic methods, others have arranged the contents of their chapters according to individual compounds or compound classes. The depth of treatment of the origins and occurrence of amino acids and their applications varies widely between chapters. The style of the individual chapters also differs greatly, ranging from straightforward compilations of published synthetic routes to discussions of established and novel procedures, and to a textbook-style concise summary of the most important methods with illustrative examples.

As promised on the book's cover, it includes experimental procedures for selected key steps and model compounds, albeit in only six of the twelve chapters on synthesis that make up the second part. A more uniform structure of the chapters might have rendered this collection more accessible for a fast overview. Likewise, a common layout for synthesis schemes would have improved the general look of several chapters.

However, the variety in the individual layout of the chapters makes reading more interesting. Thus, the most important topics that recur in several chapters are treated with attention to different aspects, such as the resolution of racemic mixtures, enzymatic synthesis, the chiral pool, asymmetric synthesis, chiral auxiliaries, and phase transfer catalysis. Recommendations to relevant review articles and comprehensive lists of references allow the reader to delve into individual topics in greater depth.

An introductory chapter or a preface by the editor could have elucidated the connection between the individual chapters and pointed out the enormous relevance of amino acid synthesis. Unfortunately, the editor's comment is limited to a short note on the back cover. The table of contents offers a helpful overview of the topics addressed in this volume. However, the index leaves out some important keywords and name reactions, and often lists only one page number for items that are treated in several chapters. Thus, browsing and comparison is made difficult.

Until now the literature has lacked a comprehensive collection of current synthetic methods and research results in the field of amino acid research. Apart from the textbook "Peptides—Chemistry and Biology" by Sewald und Jakubke, only individual aspects of amino acid science have been covered in monographs. The editor has managed to bring together a number of well-known authors of books and reviews for his project, thereby covering relevant fields of amino acid synthesis and aspects of the evolution of amino acids in a single volume. For scientists working in this field the book offers an interesting overview of their own and adjacent areas of research. The book is suitable for readers who already have a sound basic knowledge of the biochemistry of amino acids and asymmetric syntheses. It provides a comprehensive collection of topics for use in preparing advanced lectures and seminars, and will also be valuable for graduate students who wish to acquire a deeper expertise in the field of amino acids. This volume will certainly find its place in university libraries and in specialized libraries of chemical institutes and research institutions.

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