

Preface

Supramolecular Chemistry, conceptually founded as a research field in its own in the 1960s, is a rapidly growing field at the borderline of several disciplines such as bio(organic) chemistry, material sciences, and certainly the classical chemistry topics, i.e. (in)organic and physical chemistry. Historically, the development of supramolecular chemistry certainly depended on the development of analytical methods which could solve the questions associated to the complex architectures held together by noncovalent bonds and those arising from weak intermolecular bonding and the highly dynamic features of many supramolecular species. However, not only supramolecular chemistry benefited from the methodological development. Vice versa, the problems faced by supramolecular chemists led to specific methodological solutions and thus mediated their development to a great extent.

Several excellent textbooks on Supramolecular Chemistry exist, starting with Fritz Vögtle's seminal best-seller "Supramolekulare Chemie" [1], which was translated into several languages and thus found a broad international readership not only among experts in the field, but also among chemistry students. Other authors: Jean-Marie Lehn [2], Jerry Atwood and Johnathan Steed [3], and most recently Katsuhiko Ariga and Toyoki Kunitake [4], have provided expertly written textbooks. These textbooks focus on and are organized along the chemistry involved, but do not focus much on the methods utilized to study this chemistry – with one notable exception: Hans-Jörg Schneider's and Anatoly Yatsimirski's fine introduction into the "Principles and Methods in Supramolecular Chemistry" [5]. The present book aims at a more in-depth description of different methods utilized in this branch of chemical research.

Clearly, a choice had to be made as to which of the many methods available today should be included. This choice is likely biased to some extent by the editor's own preferences and a reader might arrive at the conclusion that another choice would have been better. Some chapters deal with methods of fundamental importance. For example, Chapter 2 provides a practical guide to the determination of binding constants by NMR and UV methods and thus covers an aspect imminently important to the field, which deals with noncovalent binding and weak interactions. Similar arguments hold for the next two chapters on isothermal titration calorimetry and extraction methods. The following chapters on mass spectrometry, diffusion-ordered NMR spectroscopy, photochemistry, and circular dichroism do

not primarily provide an in-depth introduction into these so-to-say classical methods, but focus on exciting new achievements in the context of Supramolecular Chemistry. Chapters 9 and 10 discuss methods used to address quite complex architectures, for example generated by crystal engineering and through surface attachment and self-assembly processes at surfaces. The functional aspect of many supramolecular systems appears most pronounced in Chapter 11 which introduces methods for the characterization of membrane channels. The book terminates with a discussion of the contributions that theory can make to Supramolecular Chemistry, a field which adds valuable insight, although it is often believed to be very limited due to the sheer size of the complexes and architectures under study.

Each of the chapters introduces the reader to a particular method. However, the reader will probably need to have at least some basic knowledge of supramolecular chemistry itself. Although the book begins with a short introductory chapter to provide some necessary background, it is impossible to give a concise and comprehensive overview after more than four decades of quick growth in the field. In that sense, it aims at an already somewhat experienced readership.

I am grateful to all authors of the individual chapters for their excellent contributions to the book. Particularly, I would like to thank Dr. Steffen Pauly from Wiley-VCH for his great help in preparing the final manuscript and his guidance through the production process. It was great joy to assemble this book and I sincerely hope that it is fun to read.

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References

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