

Properties and Applications of Cyclodextrins: Cyclodextrins and Their Complexes, edited by Helena Doziuk; Wiley-VCH: Weinheim, 2006, hardcover, 489 pp, €149, ISBN 3-527-31280-3

Over the past three decades cyclodextrins have gone from a chemical curiosity to a multifunctional class of compounds with many applications in the food and pharmaceutical industries. Because α -, β - and γ -cyclodextrins have readily available container-like architectures, they have been the subject of numerous supramolecular studies. The inherent chirality of cyclodextrins has led to a variety of analytical applications, which are currently considered as standard repertoire.

Helena Doziuk, a distinct expert in the chemistry of cyclodextrins, has edited a book on this established topic which is still an area for vivid research activities. The monograph has a clear textbook style, and most chapters are balanced in their content. It covers the basic concepts as well as the cutting-edge developments on this particular topic. For the inexperienced scientist this book provides a good introduction and state-of-the-art survey on the chemistry, analytical methods, and applications of cyclodextrins. Therefore, it addresses all scientists who work with cyclodextrins, from graduate students up to researchers.

From the arrangement of the 16 chapters it is difficult to find a clear outlining concept of the book. The introductory chapter by the editor communicates all the basic concepts and the specific vocabulary of the host-guest interaction of cyclodextrins. Some given data, such as the diameter of the cavities, are not clearly specified as pertaining to the primary or secondary face of the cyclodextrins. The second chapter is devoted to the modification of cyclodextrins and their chemistry. The survey on this large field spans only about 30 pages and is therefore limited to a small selection of examples. (This reviewer strongly recommends the book by Easton and Lincoln for a detailed survey on the selective chemical modification of cyclodextrins.) The next two chapters include typical applications for which cyclodextrins represent molecular recognition sites. The survey on self-assembled aggregates and polymeric structures is succeeded by a contribution on cyclodextrin-based catalysis, which covers not only enzyme models but also the concept of unimolecular micelles and their applications in biphasic catalysis. Chapters 5 and 6 treat chiral recognition and analytical applications thereof. The focus is on enantioseparations, as this is the most important analytical and preparative field.

The next 150 pages include analytical methods for studying complexes of cyclodextrins in the solid and solution phase by various methods. These contributions create an indispensable monograph for all scientists who work in this particular field. The whole range of spectroscopic, spectrometric, calorimetric, electrochemical, and diffraction methods is discussed in detail. In this reviewer's opinion, the part on UV/Vis spectroscopy is relatively poor and not supported by impressive examples. The analytical methods are completed by molecular modeling studies of cyclodextrins and the corresponding complexes. Two short chapters on rotaxanes/catenanes and large cyclodextrins follow. They would be better suited as parts of earlier chapters in this monograph where the same or similar topics are discussed (for example, daisy-chain polymers, page 363). The last section of the book consists of three chapters and is devoted to various aspects of technical applications of cyclodextrins and their derivatives. It represents an interesting survey on the typical release systems for drugs, fragrances, and fungicides. Furthermore, the application in dispersed systems is discussed.

In general, the book has been carefully made, but the quality of the chapters differs greatly. The mistakes range from incorrect structure names (for example, on page 10, nicotine is labeled as thalidomide), to incorrectly drawn structures (page 14). Several figures exhibit a very low resolution which does not fit to the general high quality of the book (pages 312 and 321, for example). The range of the literature coverage varies greatly between chapters, but most reports give a survey up to 2005. The figure on the front cover is slightly irritating, as an analogue of α -cyclodextrin is depicted involving α - and β -linked L-glucose units.

In summary, this monograph provides a good entry and survey on cyclodextrins and their complexes. Despite several weaknesses, this book will probably advance as a textbook in this area, because of the concise but still comprehensive section on analytical methods for cyclodextrin complexes. This book bridges gaps in the scientific literature and will consequently have its definite place in every good scientific library.

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