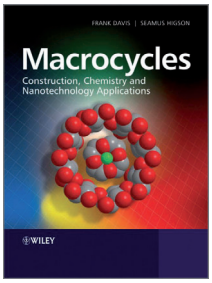

Macrocycles
Construction, Chemistry and Nanotechnology Applications. By Frank Davis and Séamus Higson. John Wiley & Sons, Hoboken 2011. 608 pp., softcover, € 57.90.—ISBN 978-0470714638

Macrocycles

The aim of *Macrocycles: Construction, Chemistry and Nanotechnology Applications* is to present a general overview of the synthesis and structure of a broad range of macrocyclic hosts, as well as offer commentary on their established and potential uses in nanotechnological applications. The main body covers the following classes of macromolecules: cyclophanes, crown ethers and cryptands, calixarenes, cyclodextrins, cyclotriveratylenes and cryptophanes, cucurbiturils, rotaxanes, and catenanes. The final chapter describes the potential utility of these compounds to function as molecular machines and motors.

Each chapter begins by presenting a brief history of the compounds followed by a fairly clear and easy-to-read account of their synthesis, and how further elaboration of the core structures can provide more complex host molecules. The subject of synthesis is usually followed by a brief account of their molecular recognition and encapsulation properties, often drawing upon relevant and up-to-date examples from the literature. Unfortunately, binding constants are generally omitted from the text and essential experimental details such as the complexation medium used are not mentioned—resulting in a lack of context.

Although the text is easy to read, each chapter is presented in a rather formulaic style; alternative synthetic procedures and binding properties for different molecules are listed in a predictable catalogue-like format. However, the use of language is sometimes clumsy and repetitive. For example, the phrase "What is interesting about these compounds is that they are" is repeated numerous times in the text.

The major issue with this work is the nature and style of the figures and illustrations. The structures lack consistency in size and style and often contain unacceptable distortions in bond lengths and angles (e.g. p. 289, Fig. 7.33a). Certain figures are incorrectly drawn, e.g., Fig. 3.28 purports to show the clinical agent Prohance, but is drawn as [Gd.TETA] that is not sufficiently stable to be safely used as a contrast agent. Furthermore, attempts to provide insight into the three-dimensional (3D) conformation of structures are limited and often confusing (e.g. p. 468, Figure 9.75; p. 442, Figure 9.52b). This limitation becomes more pronounced when host–guest conformations are discussed, as the reader is unable to gain a significant understanding of the binding between host and guest. For example in Chapter 9, 3D structures are used intermittently to illustrate how rotaxane formation occurs. In most cases, 2D depictions of macrocycle and axis are given separately, leaving the reader to work out how the components are effectively assembled.

The authors strive to reach a broad readership, including "undergraduate and postgraduate students, and researchers in other fields". The simple writing style is well-suited to undergraduate students and the introductory topic on small ring systems provides enough background information to allow an understanding of more complex systems in later chapters. However, I would hesitate to recommend this book to undergraduate students as the low-quality figures accompanying the text may confuse rather than inform beginners. Newcomers seeking a brief overview to the expanding field of macrocyclic chemistry will benefit from the large number of references, of which a significant proportion are from the year 2000 onwards. In summary, this book serves as a fairly useful general account of the major classes of traditional macrocyclic hosts, but lacks the polish and critical commentary that this field of research needs.

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