

**Circular Dichroism
and Magnetic Circular
Dichroism Spectroscopy
for Organic Chemists**

In the past 30 years, circular dichroism (CD) spectroscopy has enjoyed tremendous growth as a valuable tool for organic chemists that require a microscale technique for the determination of absolute stereochemistry of small molecules. Moreover, CD spectroscopy has been used successfully in studies of supramolecular structures that adopt helical and uniquely asymmetric conformations. A quick search of the published literature reveals the wide use of various CD spectroscopic methods throughout the organic chemistry community, although it is clearly not as routinely used as other spectroscopic techniques. Although CD spectroscopy is inherently a chiroptical technique, the unfamiliarity of organic chemists with various methodologies has hampered, in large part, its application as a routine application. The book by Kobayashi, Muranaka, and Mack describes and summarizes various types of CD spectroscopy. With the help of published examples, the authors detail the analysis of spectra correlated to the stereochemistry of the compounds. Along with describing more common CD experiments such as induced CD and exciton-coupled CD the book also focuses on a less widely known and developed aspect of CD spectroscopy, the magnetic circular dichroism spectroscopy (MCD) and describes its current uses.

Chapter 1 covers the basic rules and concepts of both CD and MCD. The authors provide a general and simplified explanation of the theoretical background and physical principles behind dichroic spectroscopy. Their explanations of the CD techniques are complete enough to satisfy an expert spectroscopist while at the same time written in a way that can be understood by a non-expert organic chemist that is well versed in introductory physical chemistry. The examples presented in this chapter include three- and four-chromophore systems and aggregates that are currently not discussed in most other available books on CD spectroscopy.

Chapters 2–7 summarize the various applications of CD spectroscopy in organic chemistry. The book is written as an extended review article of the published applications of CD on organic molecules, and is therefore useful for any organic spectroscopist and synthetic chemist who wants to explore

different ways to characterize their products. Overall, the authors have covered most of the methodologies that utilize circular dichroism. The only omission is the currently growing field of chromophoric host/chiral guest systems that lead to ECCD for determining the absolute stereochemistry of organic molecules. During the last 15 years, porphyrin hosts and alike capable of binding chiral guest molecules have been used for the absolute stereochemical determination of both small organic molecules and natural products.

Chapter 8 is a brief review of the applications of Circular Dichroism for biomolecules. This is a general chapter that covers only the basic concepts of biomolecular CD, without greatly delving into the literature in this field. On this specific topic, there are better reference books in the market.

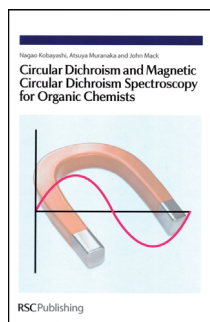
Chapters 9 and 10 include examples of how to use MCD and analyze the spectra generated from a number of studies. MCD is less often used and reported in the literature, however, can provide valuable and at times instructive information. The authors are experts in this area and present the basic theoretical concepts and applications of MCD-based systems very well. Considering that there are limited books on this topic, this present treatment is useful to a broad audience interested in the technique.

Overall, the book aims to explain theoretical circular dichroism to an audience not versed in the topic. Although they accomplish to do this for the most part, a typical organic chemist will find the explanations challenging to follow unless they brush up on their undergraduate level physical chemistry. Glancing through the book, the first thing the reader will notice is the poor quality of the included figures, due to the fact that they are all taken from the original journal articles, some of them originally published almost 30 years ago. The poor quality of the figures makes it difficult to follow some of the story lines in the text.

Although there are some shortcomings, the book offers a rather thorough review of specific topics of CD and MCD and can act as a good reference book for both students and researchers, especially organic chemists interested in applying circular dichroism spectroscopy methods for the characterization of their synthetic products.

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