Organic Process Research & Development

Book Review

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Solid State NMR: Basic Principles and Practice

Solid State NMR: Basic Principles and Practice. By David C. Apperley, Robin K. Harris, and Paul Hodgkinson. Momentum Press LLC: New York, 2012. ISBN: 978-1-60650-350-8. 276 pages (including indices). $109.95.

An Organic Chemist's Perspective. In its preface, the authors state that this is not a book for the novice, which I can confirm, but even as a novice, I found the book provided some very interesting insights into both the power and the complexity of solid-state NMR. Of particular note to me was the use of solid-state NMR to supplement and complement X-ray crystallographic techniques for enhanced structural understanding, importantly perhaps in fields such as cocrystal analysis. It did not set out to be a first choice for those new to the subject, but a bridge between those with limited experience and the specialist, and I feel it will have achieved that goal. I suspect that organic chemists that are either heavily involved in solid state analysis or those considering a career move in that direction will find the book interesting and helpful. All diagrams are in black and white, but clear and well positioned in relation to the text, with a number of figures having additional explanatory insets. The contents page is clear and broken down into smaller subsections to readily locate main packets of information supported by a good index.

Solid-State NMR Specialist's Perspective. The book covers many areas of solid-state NMR of interest to researchers or students of organic and inorganic chemistry. Although specific coverage is not given to biological NMR, the basic principles introduced in this book should be useful in the biological field as well.

The book is aimed at people working in (or studying) chemistry, but who are not necessarily spectroscopists, and assumes some familiarity with solution-state NMR, although no extensive expertise is required to understand this book. It is not a "how to" book but rather introduces the capabilities and applications of solid-state NMR with sufficient explanations of the experiments and terminologies of this large and expanding field to make it more accessible.

The book avoids thorough quantitative descriptions of experiments (several recent books on NMR give very clear descriptions of product−operator calculations anyway), instead relying on the clarity of explanation, which is generally very good throughout. Many figures are included (scarcely a page lacks an illustration) which complement the text. Some introduction to the relevant quantum mechanical tools is given, but this coverage is quite brief (nevertheless space is found to introduce Floquet theory).

The areas in the entirety of this volume include spin interactions (highlighting the difference between the solution and solid states), the various components and considerations of setting up a solid-state NMR experiment, quantum theory for NMR, and thereafter more detailed treatments of multidimensional NMR, quadrupolar nuclei, relaxation and considerations of extracting quantitative information from solid-state NMR. Often, the authors make analogies to solution-state NMR, although still provide sufficient detail of the many terms and parameters common in solid-state NMR to make the book comprehensible.

It is, by and large, a very well-written introduction which could only be made more complete by increasing its length and then being at risk of becoming too dense to be readable by its target audience. In this regard, the balance of detail and completeness is about right, and each chapter can be read almost in a stand-alone fashion.

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