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Book reviews

Laboratory Guide to Proton NMR Spectroscopy; by S.A. Richards, Blackwell Scientific Publications, Oxford etc., 1988, ix + 229 pages. £10.50 (Softcover), ISBN 0-632-02015-6.

The aim of this book as stated by the author is "to guide the relatively inexperienced through the NMR spectrum in the real world". On the whole this aim is achieved, and as such it provides a bridge between undergraduate texts (such as those by Banwell and by Williams and Fleming) on general spectroscopic methods and specialised books (such as those by Derome and by Sanders and Hunter, both of which have been reviewed recently in this journal; see vol. 329 page C34 and vol. 332 page C21, respectively) on advanced techniques in NMR spectroscopy.

The eight chapters are titled "Basic theory"; "Sample preparation"; "Running your spectrum"; "Interpretation"; "Delving deeper"; "Further techniques — chemical"; "Further techniques — instrumental"; and "Questions". There is an almost complete absence (even in the "Basic theory" chapter) of mathematics in the book, the emphasis being, as the title suggests, on how to prepare a sample and record and interpret a proton NMR spectrum under normal laboratory conditions. The spectra (of which there are many) used for illustration are from a 90 MHz continuous wave or a 250 MHz Fourier transform spectrometer. They are, on the whole, clearly reproduced, and are well chosen examples to illustrate particular points. The spectra could, however be better labelled, for example, spectrum 21 on page 94 has an "*f*" type proton in the spectrum but this is not labelled in the structure of the compound alongside, and the "*j*" proton labelled in the structure by spectrum 29 on page 112 is not labelled on the spectrum.

The short chapters on sample preparation and "running" your spectrum (I would prefer to record a spectrum) are particularly useful for novices as is the chapter on interpretation which includes an extensive table of chemical shifts for common solvents and their impurities which even experienced NMR spectroscopists would find helpful. The further techniques chapters cover subjects such as deuteration, lanthanide shift reagents, decoupling, variable temperature spectra, resolution enhancement, the nuclear Overhauser effect and 2D spectra. Of the wide variety of pulse sequences available on FT spectrometers only the COSY techniques are dealt with. The final chapter gives 20 questions of varying difficulty together with hints and worked answers.

The book (like Derome's) is written in the first person singular and in a fairly colloquial style, and I would have preferred not to see slang terms, such as "crash out" (page 19), meaning to precipitate, which new students might be tempted to copy.

On the whole this book provides a very good guide for all those who will be recording and interpreting their own proton NMR spectra for the first time, and its very reasonable price should mean that many personal copies will be bought.

School of Chemistry and Molecular Sciences
University of Sussex, Brighton BN1 9QJ (Great Britain)

Paul D. Lickiss

Gmelin Handbook of Inorganic Chemistry, 8th edit. B — Boron Compounds, 3rd Supplement, Vol 3; by A. Meller (Universität Göttingen, Institut für Anorganische Chemie), Springer, Berlin, 1988 xvi + 380 pages ISBN 3-540-93557-6 DM1777.

This volume of Gmelin is one of a series making up the third supplement on boron compounds, and covering the literature from 1980 to 1984. It has been written entirely by Professor Meller and covers boron–nitrogen (227 pages) and boron–fluorine compounds (164 pages).

There is a long section (91 pages) on boron nitride dealing with its synthesis and structure, its optical and electrical properties, and its uses as ceramic, in composites, and as a filler in organic polymers. As expected, much of the literature on this subject is in the form of patent applications and, as usual in volumes of Gmelin, the references are extremely thoroughly documented. The section which follows deals with boron–nitrogen compounds containing hydrogen, and derivatives obtained by replacing the hydrogen by organic groups. Tris-, bis-, and mono-aminoboranes, borazines, and boron-nitrogen heterocycles are covered in about 70 pages, and many preparative and spectroscopic data are presented in tabulations. Unstable species such as HN=BH, characterised mainly by theoretical studies, are briefly described as well as the crystalline compounds obtained by replacement of the hydrogen atoms by large groups such as Bu^t. The preparation of amine-boranes is still of considerable interest and many references are given to the use of these compounds in organic syntheses. A wide range of substituted pyrazoboles (pyrazolylborane dimers in which pyrazole units bridge boron atoms to form six-membered B_2N_4 rings) has been made and there is a comprehensive survey including B-halogen- and B-sulfur-substituted species so that data on numerous compounds can be easily compared. The B–N section concludes with an account of the new and interesting two- and three-coordinate boron cations, and the five- and six-coordinate aminoborate anions. In these compounds the range of boron environments encountered in organoboron chemistry is significantly extended.

The section on boron–fluorine compounds is dominated by discussion of the preparation, properties, and uses of trifluoroborane. Applications in catalysis, polymerisations, and condensation reactions are documented with hundreds of references to the patent literature. In addition there are 432 references to $Et_2O \cdot BF_3$, all published in the four years covered by the present volume. The final 50 pages of the book cover tetrafluoroborates, with many structural and thermodynamic data and extensive references to industrial and analytical applications.

Volumes of Gmelin are always of immense value to those working in the areas they cover. Sadly, they are always so expensive that few chemists have ready access to them.

School of Chemistry and Molecular Sciences
University of Sussex, Brighton BN1 9QJ (Great Britain)

J.D. Smith