

spectroscopic data from chemical and analytical companies such as those from Nicolet, Aldrich and Sigma, but this is the first single reference work devoted entirely to pharmaceutical excipients.

The purpose of this volume is to provide IR, Raman and NMR (mainly ^{13}C) spectroscopic data on pharmaceutical excipients (many of which are also used as food additives) such as lubricants, plasticizers and dispersants. Previous excipient analyses have focused more generally on their bulk and particulate properties and have provided few, if any, molecular data. One of the most well-known textbooks in this field, the *Handbook of Pharmaceutical Excipients*, presents no molecular spectroscopy information at all.

The three introductory chapters deal with the theory behind vibrational spectroscopy and NMR spectroscopy and then discuss the practical application of these methods, especially solid-state NMR, to pharmaceutical analyses, describing how these spectra are obtained. The authors, both practising pharmaceutical analysts, have set out the rest of this textbook of spectral data, in alphabetical order of the generic name of each excipient. Data for each excipient are presented as a two-page section which clearly presents the chemical name of the excipient, its CAS registry number, its other names including trade and proprietary names, excipient class, molecular weight and structure (where applicable) as well as NMR, IR and Raman spectra, providing peak listings where appropriate. Two appendices provide a summary of characteristic Raman and IR frequencies in addition to chemical shift values for NMR spectroscopy.

Very few organometallic compounds are used as pharmaceutical excipients. Some notable examples, however, include the organosilicon polymers, dimethicone, used as an antifoaming agent and water repellent, and simethicone, used as an antibloating agent. Nevertheless, this book will be of value to anyone in the pharmaceutical industry involved in formulating organometallic compounds. It will also be of interest to pharmaceutical analysts and forensic scientists involved in drug analyses. This volume is certainly a worthy addition to the superb *Drugs and the Pharmaceutical Sciences* series.

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Advanced Inorganic Chemistry

F. Albert Cotton, Geoffrey Wilkinson, Carlos A. Murillo and Manfred Bochmann

6th edn. John Wiley & Sons, Chichester, 1999

xv + 1353 pages. £58.50

ISBN 0-471-19957-5

The new edition of this well-known textbook breaks fresh ground on several counts. The number of authors

has been expanded and an expert, Russell N. Grimes, has been drafted in to write the chapter on boron chemistry. These developments bring a certain vigour to the text, together with something of a change in emphasis. This is particularly apparent in the treatment of organometallic chemistry, aspects of which now feature much more prominently. In addition there has been considerable reorganization of the material, with many of the topics which were discussed in the 'Survey of Selected Areas' section of the 5th edition now appearing under the chemistry of the appropriate elements in the new edition.

As with earlier editions, the book opens with a section on 'general principles'. Some of the topics dealt with here have naturally been carried over from previous editions, and are unsurprising and predictable: structures of coordination and cluster compounds, and classification of ligands. Others are a welcome addition and recognition that inorganic chemistry has moved on since publication of the 5th edition in 1988: fluxionality, and isoelectronic and isolobal principles. At the same time others are rather esoteric: bond stretch isomerism, zintl compounds, and chemical vapour deposition. Notable by its omission from the introductory material in this edition is a discussion of the structures of ionic solids.

The majority of the book is organized as in previous editions, with the descriptive chemistry of the elements dealt with in two parts: main-group elements in *ca* 580 pages, and transition elements in *ca* 530 pages. The coverage of these is as comprehensive as in earlier editions and for many elements includes substantial updating of the content. For example, in the discussion of the chemistry of hydrogen there are new sections on η^2 -dihydrogen complexes and agostic interactions, and of course for carbon there is discussion of the fullerenes. The new chapter on boron provides a useful overview of the chemistry of boranes, carboranes and metalloboranes and has benefited greatly by being written by an author who is a specialist in the area.

The introduction to the section of the book which deals with the transition-metal elements is very different from that found in earlier editions. Previously this had largely focused on spectroscopic and magnetic properties; in the new edition the focus is on the bonding of ligands to transition metals. While much of the content of the following chapters is not new, there is considerable reorganization of material. For example, the biochemistry of iron now appears in the appropriate chapter rather than being dealt with in isolation as a 'selected topic'. While much of the material in the chapters on the lanthanides and actinides is similar to that in the previous edition, this does not hold true for the organometallic chemistry of the actinides, where a considerable amount of new, well-referenced, material is described.

The real innovation in this edition is the inclusion of Part 4, 'The role of organometallic chemistry in catalysis', (*ca* 130 pages), by Manfred Bochmann. The section comprises two chapters: 'Fundamental reaction steps of transition metal catalyzed reactions' and 'Homogeneous catalysis by transition metal complexes'.

The first of these includes a discussion of coordinative unsaturation, oxidative addition, cyclometallation and migration/insertion reactions. The description of oxidative addition is particularly exhaustive, with a discussion of the general principles followed by an extensive series of examples. In the second there is comprehensive coverage of the complete spectrum of homogeneously catalysed reactions ranging from hydrogenation to olefin metathesis by way of hydroboration, hydroformylation and polymerization reactions, and the chapter concludes with a short section on supported homogeneous and phase-transfer catalysis. Many of the examples are from recent literature and this chapter is particularly well referenced.

The book concludes with four appendices: units and fundamental constants, ionization enthalpies of atoms, ionic radii, and basic concepts of molecular symmetry and character tables. These appear to be identical to the appendices in the 5th edition.

In conclusion, the new edition represents a significant advance on the previous one, which was becoming somewhat dated. There is no doubt that every chemistry library should have a copy of this comprehensive reference work. However at £58.50 (hardback) it is debatable whether many undergraduates will be persuaded to purchase it as a textbook.

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Organozinc Reagents
Paul Knochel and Philip Jones (eds)
Oxford University Press, Oxford, 1999
xvi + 354 pages. £75
ISBN 0-19-850121-8

The preparation of diethylzinc and ethylzinc iodide, reported by Edward Frankland in 1849, was a landmark in chemistry; here were compounds which had many of the properties of typical organic compounds, yet contained a metal. However, although the potential usefulness of such organozinc reagents in synthesis was recognized and investigated, they were rapidly overshadowed, first by organomagnesium compounds and then by organolithium compounds. Recent years have seen a resurgence of interest in organozinc reagents (and in related zinc-mediated reactions). An important factor in this revival of interest has been the introduction of very reactive forms of zinc metal, which allow many more reagents to be prepared directly from the metal and an organic halide. The improved availability of the reagents has in turn led to recognition of their particular patterns of reactivity, either alone or in conjunction with other metals.

Both the preparation of organozinc reagents and their

use in uncatalysed and catalysed reactions are covered in this book, together with the preparation and reactions of organozincates and other bimetallic reagents, and the Reformatsky reaction and zinc-mediated Barbier reactions. Each chapter includes a summary of the chemistry covered, but the book is subtitled *A Practical Approach*, and its heart is a collection of detailed experimental protocols. These will be a very valuable resource for chemists wishing to exploit these reagents, though it is a pity that more thought was not given to the format of the book. For use as a laboratory manual it would have been better to use some form of ring binding so that the pages of the open book lay flat, and to paginate protocols so that the second page faced the first.

Besides the main text there is a list of organozinc reagents with references (useful); a list of suppliers (not very useful, as there is only limited reference to named suppliers in the text, and some named suppliers are omitted from the list); and an index (almost useless — a full list of the experimental protocols would have been much more valuable).

Organozinc Reagents is expensive, but not excessively so for a specialized book. Chemists involved in organic synthesis will certainly wish to have access to it, in the library if they cannot afford a personal copy.

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General Aspects of the Chemistry of Free Radicals

Z. B. Alfassi (ed.)
John Wiley & Sons, Chichester, 1999
x + 563 pages. £150
ISBN 0-471-98760-3

This is one volume from the series on the *Chemistry of Free Radicals*, edited by Zeev Alfassi (Ben Gurion University, Israel), the other titles to date being *Peroxy Radicals*, *N-Centered Radicals*, and *S-Centered Radicals*. There should be scope here for a series which would be the successor to the two classics in the field, Walling's *Free Radicals in Solution* (Wiley, 1957) and Kochi's edited *Free Radicals* (Wiley, 1973), but none of the present series has a foreword which sets out the editor's intentions. What results is rather like one of Patai's series on *Functional Groups* (Wiley): a series of vignettes at various levels reflecting the special interest of the authors, rather than a source of first resort on the general properties of radicals. The word 'general' in the title should not be taken to imply that some of the contents are not specialized or specific.

The first chapter, by G. R. Buettner, falls between two stools in trying to compress the basics of ESR spectroscopy into 18 pages. It cannot go deeply enough to be