

rather specialized, account of the photocatalytic aspects of silver photography, and, as with other chapters in the book, the author concentrates on the molecular basis of the application. This is followed by a description of immobilized photosensitizers and photocatalysis (Julliard); although these topics do not strictly speaking fall under the title of the book, they are useful here and are not out of place. The final three chapters cover photochemical water splitting (Amouyal), organized media and photocatalysis (Rico-Lattes and Lattes) and photosynthesis (Mathis). The article on water splitting covers many aspects from relatively simple molecular to supramolecular systems, and gives a good account of the problems encountered and how they may be tackled. Homogeneous and heterogeneous media are well described, with micelles, microemulsions, surfactants and polymers all being covered. The final chapter, concerning photosynthesis, covers a variety of aspects of this important area but the size of this field of research means that anyone with a serious interest in the subject would be better directed to one of the specialist texts available. The book concludes with an adequate index.

The book is well produced with uniformly clear text and figures throughout. It is, inevitably, not without errors; for example, the structure of the important $\text{Ru}(\text{bpy})_3^{2+}$ ion is drawn incorrectly on p. 225 and some of the structural formulae on p. 211 are rather confusing, but these are relatively minor mistakes in an otherwise excellent volume. A wide range of chemists will find at least one or two chapters of interest, and the book is a useful addition to the first in the series, *Surface Photochemistry*.

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Advanced Applications of NMR to Organometallic Chemistry

M. Gielen, R. Willem and B. Wrackmeyer (Eds)
John Wiley, Chichester, 1996
396 pages. £100
ISBN 0471-959-38-3

This book is one of a series on physical organometallic chemistry intending to offer 'State of the art reviews of recent developments in methods and techniques applied to organometallic chemistry'. Some emphasis is given in the Preface to developments beyond the normal one-dimensional techniques and this is reflected in several of the chapters. Well-known techniques such as COSY and NOESY are not discussed in detail; this is a text on advanced applications.

The book is grouped into chapters dealing with particular topic areas. The first is concerned with new methodologies: Selective Excitation and Selective Detection in ^{29}Si NMR (Kupce and Wrackmeyer), Two-dimensional ^{13}C -Metal Nuclear Correlation (Berger *et al.*), Two-dimensional H - ^{119}Sn Proton Detect Correla-

tion Spectroscopy.... in Organotin Compounds (Kayser *et al.*), Indirect Nuclear ^{119}Sn -X Spin-Spin Coupling (Wrackmeyer).

A second set of chapters is concerned with applications to solids and those under exceptional conditions: Solid-state NMR Applications in Organotin and Organolead Chemistry (Sebald), Solid-state NMR Investigations of Metal Carbonyl Complexes (Aime *et al.*), High-pressure NMR in Organometallic Chemistry (Frey *et al.*), Multinuclear NMR Spectroscopy in Supercritical Fluids (Waugh and Lawless).

The third general theme covers a fairly disparate series of 'hot topics' related to particular elements: High-resolution $^6,^7\text{Li}$ NMR of Organolithium Compounds (Gunther), Metal NMR of Organo-vanadium, -niobium and -tantalum Compounds (Rehder and Rodewald), NMR of Metallic Nuclei in Clusters (Granger) and ^{171}Yb NMR Spectroscopy (Keates and Lawless).

In my view the book is a pretty specialist work, making it likely that either you will really need it or you can get by without it. It is a useful addition to libraries but many groups would probably want to prioritize on simpler spectroscopic works first, e.g. for the general benefit of the graduate students. The coverage of the book cannot readily be assessed as complete, or otherwise. It is a useful but fairly eclectic compilation of aspects of this growing and important field: if the hot topics are in your area, you need it; otherwise you can take a more relaxed view.

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Organolanthoid Chemistry: Synthesis, Structure, Catalysis

W. A. Herrmann (ed.)

Springer-Verlag, Heidelberg, 1996

Topics in Current Chemistry, Vol. 179

285 pages, £88.50

ISBN 3-540-61009-X

This book is a timely addition to the literature of lanthanide chemistry and will be of interest to practising lanthanide chemists as well as to those venturing into the area for the first time. The use of the word 'organolanthoid' in the title is misleading as the scope of the book goes beyond compounds with lanthanide-carbon bonds: the topics covered include lanthanide amides and alkoxides as well as complexes with heteroallylic ligands.

The opening chapter is a concise introduction to the area, dealing with properties of the lanthanide ions, and kinetic and thermodynamic aspects (frequently ignored), as well as giving some general comments on ligand types. A short section on preparation of suitable lanthanide starting materials will be particularly useful for readers new to the field.

The chapter on lanthanide amides covers not only the

well-known silylamide and dialkylamide complexes but also 'inorganic' amides (NH_2^-) and hydrazides. The definition of lanthanide amides has been stretched even further to include pyrazolylborates, porphyrins and other nitrogen-donor macrocycles. A wide range of applications of the complexes are described: homogeneous catalysis, materials synthesis, magnetic resonance imaging and catalytic RNA cleavage.

Heteroallylic ligands such as benzamidinates, diimino-sulphinates and phosphinates, and alkoxy-silylamides, are relative newcomers to lanthanide chemistry. Their chemistry, particularly with respect to their use as alternatives to the ubiquitous cyclopentadienyls in organo-lanthanide chemistry, is reviewed concisely.

Lanthanide alkoxides and their uses as precursors for oxide synthesis have been reviewed many times; the present text deals with these areas briefly, directing the reader to existing reviews. Although the chapter is entitled 'Routes to monomeric lanthanide alkoxides' the preparations of several bi- and poly-metallic complexes are described. Another surprise is a section dealing with Schiff base ligands containing OH groups, as well as a short section on calixarenes. The recent applications of lanthanide alkoxides as catalysts, catalyst precursors and reagents in organic chemistry are reviewed.

The only true organometallic chemistry appears in the final chapter, which deals with the applications of lanthanide metallocenes in homogeneous catalysis. This chapter gives an excellent account of the spectacular successes achieved in organolanthanide-catalysed olefin transformations such as hydrogenation, polymerization and hydroamination.

Overall this book gives a useful overview of contemporary lanthanide chemistry. Its title, and most of the chapter headings, are quite misleading, and the reader will no doubt be surprised at the inclusion of much of the material. This does not, however, detract from the usefulness of the book.

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Chemical Bonds: A Dialog

J. K. Burdett

Wiley, Chichester, 1997

166 pages. £17.99 (Paperback)

ISBN 0-471-97130-8

As the author's own cartoon on the front cover makes plain, the inspiration for the unconventional format employed here, a dialogue between two more-or-less expert chemists, comes from the Socratic method immortalized in Plato's work but updated for the teaching of chemical bonding some 50 years ago by Hume-Rothery with the discussions between the 'Old Metallurgist' and the 'Young Scientist' in his 1948 book *Electrons, Atoms, Metals and Alloys*. Its success in Burdett's hands should commend its use to others.

The prime objective of the present dialogue is summarized by the author using Coulson's dictum: 'The role of quantum chemistry is to understand the elementary concepts of chemistry and to show what are the essential features of chemical behaviour'.

The conversations here are wide-ranging, covering the bonding and structures of both molecular compounds and extended solids and starting with some very broad questions such as 'What is the nature of the chemical bond' and 'What is the basis of the molecular orbital method' before moving on to a series of more specific matters including the bonding in transition-metal complexes, the bonding in solids with particular reference to the key insulator-versus-conductor question, aromaticity and the shapes of molecules. These conversations are not aimed at beginners: Schrödinger's equation appears in paragraph 1, rapidly followed by both the Virial theorem and the Variation theorem. But for those who already have a smattering of knowledge in quantum mechanics, symmetry and bonding theory, these dialogues are both reasonably accessible (although quite concentrated in places) and highly informative. The accessibility is in fact enhanced both by the conversational format and by the relative brevity of the discussions, each of which is pithy and very much to the point: 17 really important questions are discussed in little more than 150 pages.

As required by Coulson, there are gems of new understanding to be found in every conversation; however, Coulson's second point about chemical behaviour is hardly addressed here, and it would be splendid if the author could now be persuaded to devise a similar series of conversations on the fundamentals of chemical reactivity, analysed from the same standpoint as is taken here.

Finally, a few necessary quibbles: surely, P. W. Atkins is well-enough known to merit the correct initials? And what about 'phosphorous' (*sic*!) as the name of the element?

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Tributyltin: Case Study of an Environmental Contaminant

S. J. De Mora (ed)

Cambridge University Press, Cambridge, 1996

301 pages. £50, hardback

ISBN 0-521-47046-3

This book is part of the CUP Environmental Chemistry Series. It is planned to serve a dual purpose, which I think it does. It exists as a monograph summarizing the latest research and is therefore an excellent resource for undergraduate courses in the biology-chemistry environment area (students doing project work on tributyltin (TBT) need look no further). I believe it is useful in its own right as a review of research in this field. The book is also aimed at the environmental legislation market: