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, diiminosulphinates and phosphinates, and alkoxysilylamides, are relative newcomers to lanthanide chemistry. Their chemistry, particularly with respect to their use as alternatives to the ubiquitous cyclopentadienyls in organolanthanide 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:

courses in environmental law, planning and science. I have my doubts as to whether the lawyers will understand all of it; the analytical chapter, for example, will not be easily followed by those without a chemistry background. For this latter market, though, the book is generally successful; but perhaps even more usefully, it provides a source of information for the laboratory worker to see some of the 'real world' consequences of his/her toxicity or analytical studies.

The work is multi-authored by distinguished workers in the TBT field. In general, it is sensibly divided into chapters concerned with the manufacture, analysis, occurrence, fate and toxicity/biological aspects. The last two chapters discuss legislative and other legal aspects. The first chapter, by the editor, sets out the pros and cons of TBT use in the antifouling area. The chapter on manufacture (41 pages) is probably rather long for the bulk of the readership. My only structural criticism of the work is the existence of some overlap in Chapters 4–6, particularly in the fate and toxicity areas. Mention of 'imposex' and discussions thereon are scattered throughout the book, leading to something of a multiple coverage of this aspect. This is a small criticism, however, of a very useful work which I am very happy to recommend. It is very good value at £50.

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Organic Reactions, Vol. 50: The Stille Reaction

V. Farina, V. Krishnamurthy and W. J. Scott

John Wiley, New York, 1997
xx + 676 pages. £70
ISBN 0-471-15657-4

This Golden Anniversary volume of *Organic Reactions* is devoted entirely to a review of the Stille reaction. This reaction, which was developed by J. K. Stille in 1978, involves the reaction of an organotin(IV) compound $R^1SnR^2_3$ and a compound R^3X in the presence of a palladium(0) catalyst, $Pd(0)L_n$, to give the carbon–carbon-coupled product R^1-R^3. R^1 Is typically a vinyl, aryl, alkynyl, allyl or alkyl group, R^3 is usually vinyl, aryl, allyl, benzyl or acyl, and X is a halide or sulphonate.

Similar reactions of the organic compounds of magnesium, zinc, boron and silicon are known, but the stannanes show a convenient balance of stability and reactivity: their use has been widely developed and exploited in recent years, and the Stille reaction has been used with spectacular success in the final or late stages of synthesis of some natural products. The reaction was reviewed by J. K. Stille in 1986 and by T. N. Mitchell in 1992, and recent advances were described by V. Farina and G. P. Roth in 1997, but a comprehensive and authoritative review has been urgently needed before the subject grows to an unmanageable size.

Following the established pattern of *Organic Reactions,* the volume starts with a rather brief discussion of the mechanism, regiochemistry and stereochemistry of the reaction, and of its scope and limitations. The stannane reactants are usually stable to air and moisture, and are unreactive towards most types of functional groups which may be present in R^3X, and which therefore do not need protecting. When the reactivity of the stannane is low (e.g. when R^1 is alkyl), the reactivity can be enhanced by working with a polar aprotic solvent such as DMF, DMSO or HMPA, and a weak ligand L, such as triphenylarsine or tri(2-furyl)-phosphine, rather than triphenylphosphine. If the reactions are run under an atmosphere of carbon monoxide, a carbonyl group can be incorporated into the product R^1COR^3; further modifications of the process involve organostannanes where R^1 is H, R_3Sn, RO or R_2N. This introductory section of 60 pages ends with a discussion of the experimental conditions and nine examples of typical preparations.

The rest of the book is occupied by a series of tables, classified mainly on the basis of the nature of the group R^3 in the electrophile R^3X. The substrate, stannane, conditions, yield and reference are given, and the literature is covered up to the end of 1994, with some selected references from 1995. These tables occupy 560 pages and include some 5000 examples of the reaction. There are 865 references.

This is a worthy anniversary volume in this renowned series, and will be a valuable source of information for all synthetic organic chemists.

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Theoretical Aspects and Computer Modelling of the Molecular Solid State

Angelo Gavezzotti (ed)

John Wiley and Sons, Chichester, 1997
237 pages, £70
ISBN 0-471-96187-6

Molecular solids are those solids where the forces between neighbouring particles are much weaker than the forces within the particle. Solid phases of neutral organics and organometallics are molecular; ionic, covalent and metallic solids are not. In this book, Volume 1 in the series *The Molecular Solid State*, the structures and morphologies of molecular solids and their thermodynamic properties and phase transitions are described and explained in terms of the intermolecular forces which keep the molecules together. It is a welcome and timely addition to the scientific literature in the rapidly developing field of computer simulation of intermolecular interactions. It comprises seven chapters, each written by an expert or experts. In his foreword J. D. Dunitz, the Series editor, points out that the weak intermolecular interactions, which include hydrogen bonding, are responsible for the existence of the organic world; that the long-range periodic order of a crystal is a