

as sodium, lithium and zinc. Considerable discussion ensues as to the merits or otherwise of preforming a Grignard reagent before addition of the substrate: the 'two-step process'.

The mechanism of the Barbier reaction is the subject of the fourth chapter but, because of the limited amount of published data, the discussion focuses more on the mode of formation of Grignard reagents and the attack of organic halides on metal surfaces in general. Metal vapour co-deposition gets a brief introduction at this point in the monograph. The fifth, and last, chapter reviews experimental procedures used in Barbier reactions, particularly the methods of activating the chosen metal. Ultrasonic activation promises to be a powerful new development in Barbier chemistry.

The book is produced in typical Springer style and I found only a few trivial printing errors. In total, just under 500 references have been cited but only about 175 of these date from 1980 or later. Whilst the subject matter is presented in an interesting 'narrative' style, one is left with the feeling that there is perhaps insufficient published work on the Barbier reaction to warrant a full-scale book rather than, say, a script for *Chemical Reviews*.

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The Organometallic Chemistry of the Transition Metals 2nd Edition

R H Crabtree

Wiley, New York, 1994

487 pages. £49.50

ISBN 0471 59240 4

The second edition of this excellent textbook is slightly expanded in comparison with the first edition (422 pages). The author says in the preface that he has been careful to make changes only when really needed and to avoid the temptation to add too many new sections. Both editions have 16 chapters, with only very slight changes in the chapter titles.

The Organometallic Chemistry of the Transition Metals is a general textbook written mainly from an inorganic chemist's point of view, although applications to organic synthesis (including non-transition metal organometallics) and homogeneous catalysis are also described. Each chapter contains about 40 references to the original literature, and problems at the end, with solutions at the back of the book. The first one I tried (No. 3 on p. 332) had a typographical error, but in general the book is remarkably free of these. Professor Crabtree is evidently an experienced teacher and on p. 26 spells out the two conventions of electron counting used in this field. I think it is true to say that most inorganic chemists regard ferrocene as a compound of Fe(II) with two $C_5H_5^-$ six-electron ligands; but the alternative Fe(0) with two C_5H_5 five-electron ligands is also used by some very eminent chemists. A very

helpful chapter, particularly for someone entering the field, is the account of the characterization of organometallic compounds. This has 22 pages on multinuclear NMR spectroscopy, with shorter sections on IR spectroscopy, X-ray crystallography and other methods. I would have liked to see more emphasis on elemental analysis; the figure of acceptability is ten times better than normal: i.e. the result is usually acceptable at $\pm 0.3\%$, not $\pm 0.03\%$ as stated in this text.

The book is intended for senior undergraduate and graduate students, who I feel sure will find the clarity of the text to their liking. I certainly gained the impression that it was all in the mind of one person, which regrettably cannot be said of some multi-author efforts in this field. There are some omissions, such as the new *ansa*-metallocene catalysts for isotactic polypropylene from the section on the polymerization of alkenes.

In summary, this is a highly recommendable textbook in the area of organotransition metal chemistry, although I have some doubts as to whether the revisions have been extensive enough. Finally, as a plea from European students, could we please abandon the use of the kilocalorie?

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Energetics of Organometallic Species

J. A. Martinho Simoes (ed)

Kluwer Academic Publishers Group, Dordrecht

Dfl215.00, £75.00

ISBN 0 7923 1707 6

Considering the fundamental importance of thermodynamics in any branch of chemistry, studies in the area of organometallic chemistry have sadly been rather few. This volume comprises 20 chapters, each of which deals with a particular aspect of organometallic thermochemistry. The subjects range from the quite general to the esoteric. In all, the volume contains a large body of information and, more to the point, a not inconsiderable collection of hard thermochemical data. It is thus a very useful addition to the reference literature for organometallic chemistry.

The contents of each chapter are as follows: historical perspectives (H. A. Skinner)—a good concise account of the background; the application of combustion calorimetry (G. Pilcher); organo-*f*-element thermochemistry (T. J. Marks and coworkers); the role of bond energies in hydrocarbon activation by transition metal centres (W. D. Jones and coworkers); organometallic rhodium porphyrins (B. B. Wayland); a very interesting chapter on the use of photoacoustic calorimetry (T. J. Burkey); the electrochemistry of radicals (D. D. M. Wayner); derivative cyclic voltammetry (M. Tilset); the use of calorimetric and sublimation techniques to study bond properties (A. S. Carson); the estimation of enthalpies of sublimation of hydrocar-

bonds (J. S. Chickos and coworkers); the derivation of thermodynamic quantities from kinetic measurements in gas-phase silane chemistry (R. Walsh); bond enthalpy transferability (J. A. Connor); a critical survey of the energetics of organometallic reactions (J. A. Martino Simoes); bonding and solvation energetics for gas-phase organometallic species (D. E. Richardson); gas-phase acidities of transition-metal carbonyl and trifluorophosphine hydrides (A. E. Stevens Miller); bond strengths of transition-metal carbonyl anions (R. R. Squires); gas-phase studies of the mechanism and thermochemistry of organometallic reactions (J. L. Beauchamp); ion-beam studies of the energetics of organometallic species (P. B. Armentrout); the application of density function theory to the energetics of organometallic species (T. Ziegler); and theoretical models for organometallic reactions (M. R. A. Blomberg and coworkers).

Overall the volume gives a very good account of the present state of organometallic thermochemistry, a wide range of different chemical systems are discussed, main-group element and transition-metal species, solution and gas phase. It is quite well indexed and contains over 400 pages of text. It will, therefore, constitute a very useful addition to the shelves of the general organometallic chemist.

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Organic Synthesis via Organometallics
D. Enders, H.-J. Gais and W. Klein (eds.)
Vieweg, Aachen 1993.
ISBN 3-528-06481-1

Synthesis Meeting. Their conclusion was that taking notes in conference lectures was a waste of effort as they were either never used again or thrown away. This book is an account of a series of lectures that took place at the 4th meeting on *Organic Synthesis via Organometallics* in Aachen between 15 and 18 July 1992. For those who were at the meeting it is a supplement to their own lecture notes and for those of us who were not present it is a chance to read short reviews by several leaders in this important field. There are 15 chapters which will be of interest to synthetic chemists and organometallic chemists. As a synthetic chemist I was most interested in the chapters by A. Alexakis on chiral diamines, M. Shibasaki on rare-earth alkoxides, R. W. Hoffmann on chiral lithium compounds, J.-E. Bäckvall on palladium-catalysed oxidations, B. Giese on radicals, P. J. Kocienski on 1,2-metallate rearrangements and G. van Koten on zinc-mediated organic synthesis. Readers with a more inorganic background will find the other chapters more interesting; they include R. van Eldik on the application of high-pressure techniques, L. Dahlenburg on carbon-hydrogen bond cleavage, R. H. Crabtree on mercury photosensitization, M S. Brookhart on olefin dimerization, H. Roesky on application of organometallic compounds as precursors of new materials, R. Beckhaus on methylenetitanacyclobutane and W. König on chiral zirconocene/aluminium catalysts. Each one of these articles provides a useful review of recent progress in the field of organometallic chemistry. Taken together, the book gives an overview of the state of health of this most virile of subjects which will be of interest to both organic and inorganic chemists.

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In my youth I remember hearing a conversation between two eminent British chemists at the Oxford

Publications received

Frontiers of Organogermanium, -tin and -lead Chemistry (eds E. Lukevics and L. Ignatovich), pub Latvian Institute of Organic Synthesis, Riga, Latvia, 347 pp, 1993. Price \$US26.00.

Xth International Symposium on Organosilicon Chemistry, 15–20 August 1993, Poznan, Poland. Abstracts of Lectures, and oral and poster contributions.