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Journal of Organometallic Chemistry 492 (1995) C8–C9

Journal of Organometallic Chemistry

Book Reviews

Organometallics 1,
M. Bochmann, Complexes with Transition Metal–Carbon σ-Bonds, pp. 92, Oxford University Press, Oxford, 1994, £4.99
ISBN 0-19-855750-7;
Organometallics 2,
M. Bochmann, Complexes with Transition Metal–Carbon π-Bonds, pp. 91, Oxford University Press, Oxford, 1994, £4.99
ISBN 0-19-855813-9.

These two paperbacks (they are also available in hardback) are volumes 12 and 13 in the Oxford Chemistry Primers series. They are intended to provide a more comprehensive account at an undergraduate (UK) level of material which is probably not available in a more comprehensive chemistry text. The prices, subsidised in this case by ZENECA Ltd., should make them accessible to most students.

Volume 1 starts with a chapter on a few basics, such as the 18-electron rule, electron-counting, and the classification of carbon ligands in terms of the number of electrons they provide for bonding to metals. The next three chapters deal with metal carbonyls, metal alkyls, and alkylidene and alkylidyne complexes. The patterns of all the chapters are similar, with a brief but very pertinent discussion of theory (stability, spectroscopy, structure, etc.), an account of preparative methods, and a presentation of general reactions. The margins contain occasional advisory remarks, and the chapters conclude with a few general references.

The first volume seems to be an admirable production for the stated purpose, excellently presented. It is therefore a pity that the title is misleading. In the introduction the η-designator is introduced, and the ligands described in this volume are binding as η^1. Alkylidene is then classified as a π-ligand and alkylidyne as a 3-electron ligand. Of course, σ and π are quantum numbers and should never be used as structural designators. This may create problems, but in the long term would create less confusion for students.

Volume 2 starts with a brief recapitulation of the introductory information in volume 1, and then discusses alkene complexes, alkyne complexes, cyclopentadienyl complexes, allyl and dienyl complexes, and arene complexes. The pattern is the same as that of volume 1. The treatment is straightforward, easy to read, but not patronising. It should be a useful resource for many undergraduate courses.

These two little volumes fulfil a need that has not yet been met by other books. Students, at least in the UK, often no longer have the funds to buy as many text books as one might desire, and these books appear to achieve comprehensiveness and cheapness at the same time. They are to be welcomed.

Transition Metal Chemistry,
M. Gerloch and E.C. Constable, pp. 211 + xi, VCH Weinheim, 1994, DM58
ISBN 3-527-29219-5

This small volume (which is also available in hard cover) is an introduction to transition-metal chemistry. It covers at least the basic transition metal chemistry that a student at the University of Sussex, if not elsewhere, might be expected to know at graduation, but in the non-mathematical format that students prefer, and which few of them, or their teachers, ever need to elaborate.

The authors state their belief that their approach differs from others in that they focus on the changes in chemistry observed when oxidation states change. It is reasonable therefore to judge the book in the light of this aim. Other comments made by the authors suggest to me that they are hinting at issues that the average undergraduate would not be interested in.

Chapter 1 contains a description of the main characteristics of complex compounds, closing with a list of observed oxidation states, but no rationalisations. Chapter 2 is entitled "Focus on the d^n Configuration". This is a description of typical transition-metal properties, such as colour and the formation of Werner-type complexes. Chapter 3 concerns crystal-field splittings, and covers the usual range of material in a clear and comprehensive fashion, including term symbols and Tanabe–Sugano and Orgel diagrams. The treatment is non-mathematical.

Chapter 4 carries this analysis further, by discussing the intensities of "d–d" spectra, and Chapter 5 introduces spin and magnetism. This is again very clear, though the authors make heavy weather of showing that μ_{eff} is a pure number. Chapter 6 moves on to