



ELSEVIER

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

SCIENCE @ DIRECT®

Journal of Organometallic Chemistry 688 (2003) 286

Journal  
of Organo  
metallic  
Chemistry

[www.elsevier.com/locate/jorganchem](http://www.elsevier.com/locate/jorganchem)

## Book review

### Clathrochelates: synthesis, structure and properties

Edited by Y.Z. Voloshin, N.A. Kostromina and R. Krämer, Elsevier Science B.V., Amsterdam, 2002, pp. 419 + xii, EUR 185, US\$ 185, ISBN 0-444-51223-3

Clathrochelates are coordination complexes that contain a metal ion within a three-dimensional cavity formed by a macropolycyclic ligand. Typically such compounds contain at least two atoms that belong to all formal moieties of the macropolycyclic ligand. That being so, what are the reasons for singling out such species from the wealth of coordination compounds, apart, that is, from the lugubrious sense of humour of those who defined particular sub-species as sarcophagines, sepulchrates, etc.? Apart from using this rather gruesome terminology, that is unfortunately generally current, the authors of this volume also invent stereochemical descriptors where good IUPAC proposals already exist. For example they use TP to indicate hexacoordinate trigonal prismatic geometry, though IUPAC has recommended TPR-6, and they propose TAP for trigonal anti-prism, which IUPAC has yet to consider. Later they talk of free ligands, though, to maintain the sense of humour, that is as illogical as talking of live corpses. Ligands are, by definition, bound to something else. Such thoughts did not prepare the reviewer to read the rest of the book in a completely objective fashion.

However, this was a premature judgement. There are indeed specific features of clathrochelate complexes that merit special attention. Chapter 2 deals with the synthesis of such complexes, and concentrates on the use of metal ions as templates. This is actually rather a *tour de force*, some 100 pages and 200 references dealing with the whole range of complexes, concentrating on methods that are specific for clathrochelates rather than just extensions of methods for macrocyclic ligands. This should be of great benefit to newcomers to the area. Chapter 3 is entitled: Spatial and electronic structure of clathrochelates. This is another review, covering observed and theoretical structures, and the whole range of spectral data, including some IR data. There are extensive tables to allow easy reference. The theoretical

basis for spectroscopic techniques is not dealt with. This is a book for researchers, not a textbook.

Chapter 4 is a mere 30 pages, but since it deals with the less studied areas of kinetics and mechanisms of synthesis and decomposition this is hardly surprising. In fact, it deals both with solution data and with the less generally useful gas-phase data, so that this is probably an area where more work is needed. Chapter 5 is called: Properties of clathrochelates. This rather unilluminating title is actually the nub of the book. In another 100 pages the authors review principally the electrochemical and photochemical properties of clathrochelates. Electron-transfer reactions during which the integrity of the complexes is relatively robust seem to distinguish these compounds. The practical and theoretical implications are considerable, as are the consequences for understanding the functions of metal ions in biological systems. Again there are many tabulated data, and again this is a section for researchers, not undergraduates.

The last two short chapters, exercises in futurology, are not of the same quality. Chapter 6 on possible applications occupies 5 pages. Chapter 7 discusses new types of complex. It is not of much value to say, as the authors do, that the most promising strategies are those that can be implemented soonest. These 15 pages are full of schemes for new syntheses. I feel that the last two Chapters are not of the standard of the rest of the book, nor are they really appropriate.

In summary, this book contains three apparently comprehensive reviews, well referenced, that will be a useful addition to the libraries of new and established researchers in the field. This is the bulk of the contents. The rest, especially Chapter 4, may suggest new areas of research. There is relatively little that will not be of use to most workers in the field. As a reference and a source of inspiration this book is to be recommended.

G.J. Leigh

Chemistry Department, School of Life Sciences,  
University of Sussex, Brighton BN1 9QJ, UK  
E-mail address: [g.j.leigh@sussex.ac.uk](mailto:g.j.leigh@sussex.ac.uk)