

## Book reviews

### Homogeneous Catalysis

G W Parshall and S D Ittel 2nd edn.

Wiley-Interscience, New York

356 pp. £54.

ISBN 0-471-53829-9

Organometallic chemists will have looked forward hopefully to the second edition of *Homogeneous Catalysis*. Indeed, it appears to be needed in view of the doubling in the industrial applications of soluble transition-metal catalysts since the first edition was published. The text clearly benefits from the greater cohesiveness that arises from having only two authors, even though this represents a doubling in the authorship since the first edition.

The authors have attempted to include every documented example of a homogeneous catalytic reaction used in a current commercial process. This ambitious target also covers organometallic processes such as ethylene polymerization where the catalyst is insoluble in the medium. As far as I can determine, the authors have achieved their aim in this respect. Certainly the text contains all that a teacher or student in this area would require for normal purposes.

The main processes covered are (briefly): olefin isomerization, hydrogenation, polymerization and oxidation; reactions of carbon monoxide; reactions of arenes and acetylenes; the role of carbene complexes; hydrocarbon oxidation; esterification, polycondensation and related processes; and homogeneous catalysis in halocarbon chemistry. There is also a useful Appendix on literature searching and patents.

The approach is, as would be expected, up to date. The references cited go as far as the 1990s and many patents are quoted. The index is comprehensive (27 pages) and includes entries to all the topical areas, e.g. chirality.

As a single-volume reference source for those teaching organometallic chemistry at degree or postgraduate level, this work is ideal. It will be of similar value to researchers in industry who will, I am sure, find many new ideas and directions after perusing its pages. For research students, not only will the book be a refresher to half-forgotten final-year lectures on the subject, but it will also save much time in eliminating searches, consultations with multivolume works, and so on.

Parshall and Ittel costs £54 and I think it is worth it. This is one book that really should be on every organometallic chemist's desk.

### Metal Complexes in Cancer Chemotherapy

B. K. Keppler (ed)

VCH, Weinheim and New York, 1993

429 pp. DM 196

ISBN 3-527-28425-7 (VCH, Weinheim); ISBN 1-56081-216-8 (VCH, New York)

Metal ions are known to be very important for life processes and their role in cell growth, carcinogenesis and anticarcinogenic cancer chemotherapy is a subject of continuous activity. Beside platinum complexes, whose importance as anticancer drugs is now widely recognized, various compounds of almost all the other metals have also been tested for potential antitumour activity.

This book is devoted to researches on metal compounds as anticancer drugs, and contains several contributions of specialists in this field.

After an introduction containing general remarks about metal compounds in cancer chemotherapy, a first chapter (14 pages) is devoted to the current status concerning platinum and non-platinum (i.e. germanium, gallium and titanium) complexes which have reached the phase of clinical trials. The next chapter (10 pages) presents the general requirements for a metal compound to be advised as anticancer drug.

An overview on the mechanism of action of platinum complexes, and platinum compounds with specific activity against hormone-dependent tumors and bone malignancies, respectively, are the subject of Chapters 4 (35 pages), 5 (11 pages) and 6 (42 pages).

The following chapters of this book are devoted to the antitumor properties of non-platinum metals. The potential role of ruthenium compounds as anticancer pharmaceuticals (prodrugs, agents for diagnostic imaging, radiosensitizers as adjuvants to radiotherapy, complexes of bio-macromolecules and interactions with nucleic acids) is overviewed in chapter 7 (26 pages). The antitumor properties of ruthenium(II) and ruthenium(III) complexes of dimethyl sulfoxide, as well as structure-activity relationships, are discussed in Chapter 8 (28 pages). In Chapter 9 (32 pages), after a general review on tumor-inhibiting ruthenium complexes, recent results (structures, hydrolysis reactions, interaction with serum proteins, as well as antitumor activity) concerning new ruthenium complexes of nitrogen-donor ligands (e.g. pyrazole, imidazole, benzimidazole, indazole, etc.) are presented.

Chapter 10 (26 pages) deals with gold complexes as drugs. After some chemical considerations concerning gold compounds, their use in the treatment of rheumatoid arthritis and their anticancer and antiviral properties are reviewed.

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The antitumor properties of bis(cyclopentadienyl) metal complexes is the subject of Chapter 12 (36 pages). After a short presentation of the structural (neutral or ionic) types of the compounds subjected to antitumor studies, the results obtained on animal tumor systems with titanocene derivatives and other metal (vanadium, niobium, molybdenum, rhenium, iron) analogues are discussed. Considerations on the toxicological properties, organ and subcellular distribution, mode of action, and, finally, on the perspectives as antitumor drugs of this class of organometallic compounds, are presented.

Chapter 13 (25 pages) is concerned with bis( $\beta$ -diketonato)metal complexes,  $M(\beta\text{-diketonato})_2X_2$ , and especially with the *cis*-diethoxytitanium(IV) complex (Budotitane). Physicochemical and structural characterization of these compounds, as well as structure-antitumor activity relationships (modifications of the diketonato ligand, central metal atom of X group), are discussed. The results obtained with Budotitane in toxicity and clinical phase I studies are also included.

A review of comparative studies on the activity against colorectal tumors of transition-metal complexes (including titanium, zirconium, hafnium, molybdenum, ruthenium) vs platinum complexes and other non-metal compounds used in clinical treatment is the subject of Chapter 14 (23 pages).

Not only the transition-metal complexes, but also Main Group inorganic and organometallic compounds, have been tested for antitumor activity, and some of

the results obtained with gallium and tin compounds are presented in four chapters. Thus, Chapter 11 (8 pages) summarizes the clinical experience with gallium complexes used as anticancer drugs, while Chapters 15 (16 pages), 16 (10 pages) and 17 (8 pages) are devoted to organotin compounds (derivatives of dipeptides and mercaptoamino acids, tin analogues of cisplatin, and complexes of salicylic acid and related compounds, respectively).

Finally, Chapter 18 (37 pages) deals with the interactions between antitumor metal (platinum and non-platinum) complexes and serum proteins, and future strategies for anticancer drug development of metal complexes are discussed.

All the chapters are excellently illustrated graphically and contain rich reference material.

The book is warmly recommended to chemists, biochemists and physicians who are interested in the investigation of the antitumor properties of metal compounds. The importance of this new class of anticancer drugs is pointed out by the clinical success of platinum complexes. Further studies using organometallic and inorganic metal compounds are likely to improve the present knowledge in the field and to provide new surprises, with a major impact in the treatment of cancer diseases.

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