

## Book reviews

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*Gmelin handbook of inorganic chemistry*, 8<sup>th</sup> edition, *Pt — Platinum, Supplement Volume A1: Technology of Platinum-Group Metals*, Springer-Verlag, Berlin, Heidelberg, New York, Tokyo, 1986, xiv + 340 pages, DM 1225. ISBN 3-540-93528-2.

Platinum (System Number 68, and not 65 as incorrectly printed on the title page of this volume) is an element which has been much ignored by the Gmelin Institute in recent years. Although this is the fifteenth volume in the series, it is the first to be published since 1957 and the first to be published in English. However, the sub-title “Technology” does not appear to offer much hope that this will be a particularly interesting volume to the coordination and organometallic chemist — after all, the manufacture of jewelry and furnace windings may be important, but it does not make for gripping reading. The reality is that this is the most interesting volume of the Gmelin Handbook that I have seen for many years. Moreover, although the main volume title is Platinum, this volume also covers the “technology” of ruthenium, osmium, rhodium, iridium and palladium.

The first chapter (R.I. Edwards, W.A.M. te Riele and G.J. Bernfeld; 23 pages) reviews the recovery of the six platinum group metals, and includes sections describing their history and sources, the production of concentrates, refining, solvent extraction, leaching, ion exchange and analytical techniques. This is a very unfortunate choice as an opening chapter, as it is by far the least satisfactory section in the book. It contains no specific references to statements and facts (instead, a list of general references is included at the end of the article), no illustrations or flow schemes to help the reader (cf. the excellent use of flow diagrams in Chapter 2), and really does not come up to the normal Gmelin standards. Fortunately, this is the only chapter of this type. The second chapter (W. Westwood; 42 pages) is concerned with high purity platinum group metals, and reviews their production, purification by chemical precipitation methods, melting, casting and working, and zone refining. In addition, this lucid and informed account covers the preparation of thin films by the pyrolysis of halides, carbonyls, 1,3-diketones, cyclopentadienyl, or alkyl and aryl derivatives of the platinum group metals, as well as by electrodeposition, vacuum evaporation and sputtering, and concludes with a discussion of the analytical methods for testing the purity of the metals. The account is referenced, interesting and well written. Chapter 3 (C.J. Raub and F. Simon; 26 pages) continues with an excellent and detailed account of the electrodeposition or plating of each of the six metals.

The largest section of this volume is Chapter 4 (A.J. Bird; 226 pages), and is of direct and prime interest to all organometallic chemists: it describes the use of the metals, alloys and compounds of the platinum group metals in catalysis. A review of this kind is tremendously difficult to write, and the author has discharged this task in a scholarly and lucid manner. His account will become the established definitive

review in this area, and I cannot recommend this chapter strongly enough — alone, it would justify the high cost of the volume. After an excellent overview of the area, the preparation, properties and reactions of unsupported metals and alloys are considered, followed by a similar account of the supported catalysts (including their applications to the petroleum industry, as automobile emission catalysts, as Fischer–Tropsch catalysts, in the control of toxic emissions, and to catalytic combustion). The final section of this chapter describes catalysis by the platinum group metal compounds, specifically considering hydrides, borides, carbides, graphite intercalates, carboxylates, cyanides, phthalocyanins, silicides, silicates, phosphides, oxides, chalcogenides and halides, and concluding with a discussion of homogeneous catalysis (hydroformylation, carbonylation, hydrogenation, hydrosilylation, and alkene oligomerization and telomerization).

The final chapter (P. Köpf-Maier and H. Köpf; 21 pages) reviews the medical use of cytostatic platinum compounds. Whilst obviously focusing upon *cis*-diamminedichloroplatinum(II), “cisplatin”, and discussing its antitumour effects, clinical trials, organ distribution, pharmacokinetics, side effects and toxicity, this fascinating account also discusses “second generation” drugs, and examines the cytostatic complexes of the other platinum group metals.

Overall, ignoring the disappointing opening chapter, this is a splendid book which should be in all chemical, industrial and medical libraries. It is expensive, but can you afford not to have access to it?

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*Stereochemistry of Organometallic and Inorganic Compounds*; edited by I. Bernal, Elsevier, Amsterdam, 1986, xii + 451 pages, D Fl 275.00, US\$ 101.75, ISBN 0-444-42605-1

This book is intended to be the first of a new series. It has been prepared in camera ready copy, which is easily legible, although a different type of print has been used in every chapter. One of the disadvantages of this method of manuscript preparation is that the authors have no opportunity to correct errors in proofs and, certainly, typographical errors have been noticed, for example in some of the references to Chapter 1. The connection between the various chapters is at the best tenuous, and it is unlikely that the average reader of this Journal will find all the chapters of interest. Some of these, notably numbers 3 and 4, have only a somewhat peripheral connection with the topic of “stereochemistry”, despite their titles.

The five chapters are the following: Chapter 1, “Stereochemistry of 1,3-Diene Complexes and the Steric Course of their Reactions”, by A. Nakamura, K. Tatsumi, and H. Yasuda (49 pages, 76 refs.); Chapter 2, “Stereochemistry of the Phosphates of Divalent Metals”, by A.G. Nord (94 pages, 260 refs.); Chapter 3, “Transition Metal Complexes with Carbon Disulfide; Correlations between Stereochemistry and Reactivity”, by C. Bianchini, C. Mealli, A. Meli, and M. Sabat (107 pages, 170 refs.); Chapter 4, “Stereochemistry of the Bailar Inversion and Related Metal Ion