

all such relevant compounds are tabulated, with the oxygen-oxygen bond lengths being quoted. A very informative and detailed section on complexes of these metals containing the ligand dimethylphenyl-phosphine is included in this chapter. Aspects of isomerism and variations in geometry and structure are critically discussed, with particular reference to NMR data. All reported crystal structures of such complexes are included. The last section of this chapter examines the simple σ -bonded alkyl and aryl compounds of rhodium and iridium.

Chapter 3 continues in the same concise style, reviewing the chemistries of palladium and platinum. Considering the huge amount of research material available on these metals, Dr Cotton is to be congratulated on producing a thorough, concise and readable review which discusses all the known complexes with common donor ligands. Again, excellent use of physical data provides the reader with all the information required for a detailed understanding of the chemistry involved. A very good section describes the *trans*-effect, related to rates of reaction of various metal complexes. Theoretical explanation of the *trans*-effect (and *trans*-influence) is also included and critically reviewed. A series of Tables show spectroscopic evidence for the *trans*-influence and helps to illustrate the importance of this effect to the reader. The concluding section in this

chapter concerns the anti-tumour activity of certain platinum complexes. This section is both interesting and informative, describing the complexes which exhibit anti-tumour properties and discussing their utilisation and toxicity. A section on how Cisplatin works (that is how it forms an adduct with DNA) is also of great value.

The concluding chapter concerns the chemistry of silver and gold. While this chapter (which constitutes just under a quarter of the book) was just as interesting and valuable as the preceding chapters, it is not reviewed here.

In conclusion, although I am well acquainted with review articles written by this author (which are always of a high standard), Dr Cotton is to be particularly congratulated on writing an excellent readable text, which contains a large quantity of valuable physical data. I would highly recommend this book to those requiring a sound knowledge of the binary and co-ordination chemistry of these elements. Anyone involved in teaching this chemistry should also seriously consider purchasing the book. This book will additionally serve as a very useful reference text for researchers concerned with any aspect of the co-ordination chemistry of the precious metals and I would recommend that research supervisors involved with the precious metals make this book available to their research students.

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Highly Active and Enantioselective Rhodium Catalyst

The development of platinum group metals complexes with chiral ligands, and their potential uses have been discussed here recently, with enantioselective catalysis being singled out (1). Adding chiral bisphosphine ligands – BINAP being one of the best known – to catalysts has provided a range of enantioselective catalysts capable of a variety of asymmetric transformations.

Now, scientists at the Merck Research Laboratories in New Jersey have used the planar chiral bisphosphine ligand, [2.2]PHANEPHOS, (4,12-bis(diphenylphosphino)-[2.2]-paracyclophane) with the rhodium complex, bis(1,5-cyclooctadiene)rhodium(I) triflate to produce an active and highly enantioselective catalyst, [[2.2]-PHANEPHOS Rh]⁺OTf⁻ which can hydrogenate dehydroamino acid methyl esters under very mild conditions (2). Formation of the catalyst before

substrate addition enabled complete conversions to be achieved in under 60 minutes, by bubbling hydrogen through the reaction mixture, at temperatures as low as -45°C.

Further activity of this catalyst was demonstrated by its reduction of tetrahydropyrazine to produce the HIV protease inhibitor Crixivan intermediate precursor, at -40°C and 1.5 bar in 6 hours with 100 per cent conversion and 86 per cent ee. Until now this reduction had incomplete conversions, with only moderate enantioselectivity, and thus required forcing conditions.

References

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