

Homogenous Catalysis with Compounds of Rhodium and Iridium, by Ronald S. Dickson, D. Reidel Publishing Company, 1985, xv + 278 pages, £37.50, ISBN 90-277-1880-6.

This volume, part of the *Catalysis by Metal Complexes* series, is a companion to the author's earlier work on the organometallic chemistry of rhodium and iridium. It was decided, with justification, that reactions catalysed by rhodium and iridium complexes warranted a separate book.

After a brief introduction to transition metal catalysts, the second chapter considers activation of C—H and C—C bonds, H/D exchange and isomerisation reactions. The isomerisation section is the most thorough, dealing not only with the familiar double bond migrations but also with the fascinating and complex reactions observed on treatment of strained ring compounds with rhodium and iridium complexes. Hydrogenation, in Chapter 3, is organised according to catalyst with an excellent section on polymer supported species. This makes the interrelationships between various mechanisms particularly clear but is less useful when searching for a catalyst to effect a particular transformation. The section on asymmetric hydrogenation considers each of the major chiral ligand types, discusses mechanisms and origins of stereoselectivity. Hydrosilylation, both of C=O and C=C bonds, is also reviewed.

Chapter 4 deals with hydroformylation and carbonylation reactions including the water gas shift, the Fischer—Tropsch reaction and the reduction of NO. Coverage of carbonylations is by substrate, since catalyst types are fewer and mechanisms more varied. A brief chapter on oxidation follows, and chapter 6 considers functional group removal processes. There are mainly decarbonylations, but desulphonation and deoxygenation are also mentioned. One does not perhaps think first of rhodium and iridium as catalysts for oligomerisation and polymerisation, but there are a surprising number of reactions of this type to be reviewed, as well as other C—C bond forming reactions detailed in chapter 7. A useful appendix tabulates the various catalyst types and the reactions for which they are used.

Authors of books on transition metal catalysed reactions are invariably faced with a problem of approach. Should they treat the material from the point of view of the catalyst or from that of the substrate? Traditionally the inorganic chemist adopts the former and the synthetic organic chemist the latter standpoint. In this work the author has mixed the approaches to give a generally accessible and readable compromise. The book represents an excellent account of this important area and the text, though rather dense in parts, is well supported by almost 2000 references. These are relatively complete to 1982 with some material from 1983. The author himself notes that almost half of them are from the period 1979—82, which is a measure of the rapid progress being achieved in this area. The price of this volume is not beyond the realm of individual purchase, and it can be warmly recommended to workers in the field.

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