



Book review

Fundamentals of Molecular Catalysis, Hideo Kurosawa and Akio Yamamoto (Eds.), Elsevier, Amsterdam, 2003, 536pp, hardcover. ISBN: 0-444-50921-6; US\$ 220; EUR 220.

It is stated in the preface to this monograph that the past half century has witnessed remarkable advances in both the understanding and industrial application of homogeneous, molecular (as opposed to polymerisation) catalysis. This multi-author volume, the third of a series highlighting current methods in inorganic chemistry, sets out to underline this progress and to give a succinct appraisal of the current 'state-of-the-art'. With an emphasis upon the molecular processes at work in some of the most important catalytic cycles, the book provides a series of quite detailed mechanistic accounts of the individual elementary processes at work in homogeneous catalysis. Authoritative experts from, in most cases, the United States and Japan, write each individual section.

Following a general introduction to the role of oxidative addition/reductive elimination and metathesis reactions in catalysis, the book is organised into eight chapters each of which deals with a different aspect of relevant transition-metal reactivity. The first, by Crabtree and Lee, provides a perspective on non-polar bond activation and the reactivity of H-H, C-H, Si-H, C-C and Si-Si bonds at both low- and high-valent metal centres. The relationship of this reactivity to compounds stabilised by α -agostic interactions is delineated, while a variety of activation pathways are clearly illustrated with appropriate examples. A further chapter treats the cleavage and activation of more polar single bonds in a similarly concise but informative manner.

The development of transition metal carbene complexes that are capable of olefin metathesis is summarised by Grubbs, Trnka and Sanford. Their chapter supplies a clear classification of both early and late transition-metal carbene complexes, while the chronological approach to the subject matter provides a clear perspective of the rationale that led to the development of the current crop of highly active catalysts.

Each of the subsequent five chapters describes a particular aspect of organometallic reactivity that is important in homogeneous catalysis. These deal in turn with, transmetalation, 1,2-insertion and α -elimination, 1,1-insertion into metal-carbon bonds, addition to unsaturated ligands and reductive elimination. All are illustrated by appropriate examples of catalytic and stoichiometric processes from the recent literature (many of the citations cover the period 1995–2000) and, while the coverage is broad in scope, they are described in sufficient detail to provide a useful starting point for further research.

The book is very well produced with clear reaction schemes and consistent typography. Although the price will probably restrict its availability to specialist libraries, the non-specific approach both to substrate and to catalyst identity will provide a source of valuable information for both specialist and non-specialist readers interested in the molecular principles of organometallic catalysis.

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