

then there have been supplements on organogallium compounds (1987) and the present volume on coordination compounds. This covers the chemistry of complexes with oxygen-containing ligands such as water, alcohols, aldehydes, ketones, quinones, ethers, *O*-heterocycles and carboxylic acids, and complexes with ammonia, amines and *N*-heterocycles containing one nitrogen atom. Complexes of heterocycles containing two or more nitrogen atoms will be covered in the next volume, D2.

The literature has been comprehensively surveyed up to 1990 and in some cases the references cover even more recent work. The presentation, as always with Gmelin, is superb and the diagrams and formulae beautifully clear. By systematically considering classes of oxygen-containing molecules the authors have condensed a vast amount of information into a logical and manageable form. Thus at the beginning of each section the ligands are defined and sub-sections follow on complexes in the gaseous state, complexes in solution, and complexes isolated in the pure state and fully characterised.

Although organometallic compounds per se are not included, the volume will be of considerable interest and value to researchers in organogallium chemistry because of the many structural analogies between carbon, nitrogen and oxygen ligands and because coordination compounds are used in the analysis and characterisation of many organometallic compounds. The interplay between molecular and ionic forms: e.g. $2\text{LGaX}_3 \rightleftharpoons [\text{L}_2\text{GaX}_2][\text{GaX}_4]$ is familiar in organometallic chemistry and also a recurring theme in the coordination chemistry of gallium.

The research described in this volume is also important because of the industrial uses of coordination compounds of gallium; for example, in the semiconductor industry, and in the synthesis of modern materials. Another spur to the development of the chemistry of coordination compounds of gallium comes from the use of gallium in positron emission tomography. The speciation of gallium in the presence of the complex oxygen and nitrogen donors found in vivo is crucial to the successful exploitation of ^{67}Ga and ^{68}Ga in diagnosis or radiotherapy. In bringing the known information together and making it accessible the authors from the Gmelin Institute have performed an important task comprehensively and well.

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Transition Metals in the Synthesis of Complex Organic Molecules

Louis S. Hegedus, University Science Books, Mill Valley, California, USA, 1994, 358 pages. ISBN 0-93570Z-28-8

This book is based on a series of short industrial courses and graduate lectures. It was originally intended to be part of the third edition of 'Principles and Applications of Organotransition Metal Chemistry' but it is now presented as an independent volume. Its objective is to show how transition metal organometallic chemistry can be of use to synthetic organic chemists.

The first chapters form an introduction describing oxidation states, electronic configurations and bonding. The basic mechanisms of organometallic reactions are outlined. The main body of the book contains chapters on particular areas of synthetic application. These include synthetic applications of transition metal hydrides, of complexes containing metal-carbon σ bonds, transition metal carbonyl and carbene complexes, transition metal alkene, diene and alkyne complexes, η^3 -allyl transition metal complexes, and finally transition metal arene complexes. The coverage is therefore quite wide. There are many references to the original literature including a substantial number from the period 1986–1992. The book is well-written and indexed, and is copiously illustrated with examples which reveal the wide application of various methods. The emphasis throughout is on the role of the metal complex in the synthesis. Of particular interest to the organic chemist are the ways in which these modify the conventional regiochemistry of well-established reactions.

The book is easy to read and clearly produced. It can be recommended to synthetic organic chemists as a useful introduction to the application of transition metal organometallic chemistry in synthesis.

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Lanthanides in Organic Synthesis

Tsuneo Imamoto (*Best Synthetic Methods*, Series Editors A.R. Katritzky, O. Meth-Cohn and C.W. Rees) Academic Press Limited, London, 1994. £30.00
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As the author rightly points out, organic syntheses involving lanthanide elements have become increas-