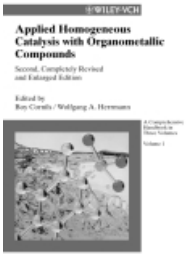
scientific journals. The field is a hot research topic. It is worth noting that the book summarizes very well the field up to 2002, and that most cited publications are from 1999 to 2001. The book will also be useful to any student interested in biological chemistry, especially because of the clear and concise introduction by the editors.

Jean-Luc Jestin
Unite de Chimie Organique
Institut Pasteur
Paris (France)

Applied Homogeneous Catalysis with Organometallic Compounds. Vols. 1–3. 2nd. Edition. Edited by *Boy Cornils* and *Wolfgang A. Herrmann.* Wiley-VCH, Weinheim 2002. 1450 pp., hardcover € 499.00.—ISBN 3-527-30434-7

The immense interest in homogeneous catalysis since the "roaring sixties", and its capability to illuminate new fundamental issues and to address new challenges of chemical technology, has led to this new edition of THE comprehensive handbook of homogeneous catalysis, which was first published in 1996 (see *Angew. Chem. Int. Ed. Engl.*, **1997**, *36*, 1547–1549). Within six years several breakthroughs have been achieved, including the introduction of neoteric reaction media, new tailored catalysts, high-throughput approaches, etc. Therefore, as stated on the cover, this second edition is "completely revised and enlarged". This is true for the second point, but much less for the first one. The treatise now comprises 1450 pages which are divided into three volumes. The first one is mostly dedicated to proven catalytic processes. The other two deal with recent developments in homogeneous catalysis and conclude with an enlarged "Quo vadis?" and a comprehensive subject index. Each volume starts with a list of contents of the complete set.



The book has kept its partition into four chapters, with the central ones devoted to proven catalytic processes (Chapter 2, "Applied Homogeneous Catalysis", now 597 pages instead of 568) and exploratory research (Chapter 3, "Recent Developments in Homogeneous Catalysis", 741 pages instead of 588). The editors have assembled a team of 123 well-known contributors from academia (74) and industry (59). This larger team brings some completely new contributions (5 for Chapter 2, 14 for Chapter 3) and others that are updated versions of articles in the first edition (8 for Chapter 2, 9 for Chapter 3).

The introduction has been slightly modified, with additions on the synoptic presentation of the development of organometallic chemistry and homogeneous catalysis. In the portrait gallery, the Nobel Prize laureates are introduced, and the importance of homogeneous catalysis demonstrated by the endowment of a third award.

Chapter 2 deals with basic transformations using transition-metal species. They are arranged according to either reaction types (hydrogenation, oxidation, hydrosilylation, hydroamination, asymmetric syntheses) or reactants (carbon monoxide and synthesis gas, unsaturated compounds, hydrogen cyanide, hydrocarbons). This chapter too has been slightly modified and reflects the mature state of most of the reactions described: the newly introduced BP Cativa process is described in the section on acetic acid and acetic anhydride written by P. Torrence. Metathesis is reviewed by J. C. Mol, but unfortunately, despite rapid developments in the area, no examples of the use of ROMP and RCM for the synthesis of complex structures are provided. The major additions are related to the synthesis and/or use of new ligands and complexes, extensions of the reactions to new families of products, and new trends and prospects. The contribution by L. Resconi et al. from Basell provides a good overview of the industrial syntheses of Group 4 metallocene catalysts, and reflects the strong increase of commercial interest for the polymerization of olefins. In the same way, the short contribution by W. A. Herrmann on "Ferrocene as a gasoline and fuel additive" comments on practical large-scale routes to ferrocene and its application as a catalytic fuel additive. Several articles describe how the development of new concepts such as large bite-angle ligands (hydroformylation), hemilabile ligands (hydroformylation, oligomerization), etc. lead to increases in selectivity and very often in activity. However, the use of late transition metal complexes for oligomerization and polymerization of olefins is not covered, despite the rapid developments in the last ten years. As expected, new examples of asymmetric syntheses are provided by R. Noyori et al.: more than 60 additional citations refer to the enantioselective synthesis of secondary alcohols, carboxylic acids, alkaloids, and sulfoxides. The contribution by R. A. Sheldon emphasizes recent developments and compares homogeneous catalysts with the Enichem TS-1 heterogeneous catalyst which has reached the industrial stage. The review on hydrosilylation has been completely rewritten by B. Marciniec and, with the incorporation of more than 50 recent references, provides a clearer view of a field that is still very active. Finally, a new contribution by W. A. Herrmann points out the feasibility of the Suzuki coupling for the synthesis of pharmaceutical intermediates and materials for nonlinear optics.

Some articles have moved within the book. Only one sentence (the last one) has been added to the former contribution by E. Drent et al., "A clean route to methacrylates via carbonylation of alkynes"; is that related to a shift towards commercial operation? Another "movement" concerns oxidation using palladium(II) species: the well-merited introduction of the article by I. I. Moiseev on "Homogeneous oxidative acetoxylation of alkenes" has resulted in the comprehensive (and updated) contribution by R. Jira on "Acetoxylation and other palladium-promoted or palladium-catalyzed reactions" being moved to the end of Chapter 3.

Chapter 3 (in Vols. 2–3) has been considerably expanded, gaining 145 pages and more than 700 citations. The chapter keeps the division into three parts devoted to development of methods, special catalysts and processes, and special products. Development of methods takes the lion's share, with updated surveys of immobilization in the aqueous phase (B. Cornils and W. A. Herrmann) and of fluorinated phases (I. T. Horvath), and new reviews on ionic liquids

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(V. P. W. Böhm), micellar systems (G. Oehme), and supercritical fluids (W. Leitner). It is a pity that the contribution on chemical reaction engineering has not been updated and expanded to cover aspects of catalyst recycling, a key issue for the development of molecular catalysis. The short contribution by J. Herwig on "New reactions" demonstrates the interest in multiphase or multifunctional systems for increasing selectivity. High-throughput approaches to homogeneous catalysis are discussed in a (too short) contribution from Symyx. On the other hand, the fully rewritten section by R. Schmid et al. on applications of molecular modeling in homogeneous catalysis offers a good introduction to the application of computational methods in the investigation and optimization of some important catalytic processes. The sections on catalytic C–C coupling reactions (Heck reaction, cyclopropanation, Fischer–Tropsch synthesis, arene coupling reactions) are updated, especially for the Heck reaction. Some concepts for catalyst design are discussed in a new contribution by W.A. Herrmann et al., with the example of N-heterocyclic carbenes applied to olefin metathesis and the Heck reaction.

The second subdivision of Chapter 3 is still a patchwork of contributions on methods, catalysts, reactants, and processes. Surveys on biocatalysis, enzyme-analogous processes, and membrane reactors contain new references on recent work. One should mention the article by R. Anwander about the advantages of using rare-earth complexes in homogeneous catalysis (over 100 additional citations), the new contribution by F. Agbossou-Niedercorn on phosphorus-containing ligands for homogeneous enantioselective catalysis (ca. 200 references), and the more realistic essay by C. Bianchini et al. on catalytic hydrogenation of heterocyclic sulfur and nitrogen compounds for understanding industrial HDS and HDN processes for clean fuels (ca. 40 additional citations).

The third subdivision of Chapter 3 remains as such, with updated references to recent literature. Enantioselective reactions and processes are discussed in the contributions by H.-U. Blaser, B. Pugin, and F. Spindler (technical applications), M. Beller and K. B. Sharpless (osmium-catalyzed dihydroxylation), and P. W. Jolly and G. Wilke (hydrovinylation): they complement the personal view by R. Noyori. As noticeable changes, one can mention the introduction of catalyzed formation of organic carbonates in the review on "Carbon dioxide as a C_1-building block" (E. Dinjus et al.) and the completely rewritten reviews on reductive carbonylation of nitro compounds (M. Dugal et al.) and the Pauson–Khand reaction (W. A. Herrmann). Moreover, new topics are introduced in "Chemicals from renewable sources" (J. P. Zoller, 24 references), and "Chemistry of methyltrioxorhenium" (F. E. Kuhn and M. Groarke on reactivity, with 31 references, and W. A. Herrmann on technical synthesis with 9 references).

Chapter 4 sums up the personal view of the editors on prospects regarding the scientific and industrial issues of homogeneous catalysis, routes to immobilization, applications to colloids, and exploitation of multicomponent and multifunctional catalysts. The key aims of homogeneous catalysis, namely efficiency and selectivity, lead to initiatives for new reactions (activation of C–H, C–C, and C–F bonds) and improved catalysts (tailored ligands, rare earths, etc.).

Anyone who already has some knowledge of molecular transition-metal chemistry will find this book extremely useful for a thorough account of the state of the art in homogeneous catalysis, both in its accomplishments (Chapter 2) and trends (Chapter 3). The reader wishing to study topics in greater depth has access to over 6000 literature references, with some from 2002!

To summarize, the second edition of this comprehensive handbook is not a clone. A lot of new material has been introduced, especially in the domain of methodologies and organic syntheses which require catalysts. It should be present in every laboratory concerned with the future of catalysis and sustainable chemistry.

Igor Tkatchenko
Laboratoire de Synthèse et Electrosynthèse Organométalliques
CNRS/Université de Bourgogne
Dijon (France)

Host–Guest Chemistry. Mimetic Approaches to Study Carbohydrate Recognition. Edited by *Soledad Penadés*. (Series: Topics in Current Chemistry.) Springer-Verlag, Heidelberg 2002. 241 pp., hardcover € 144.00.—ISBN 3-540-42096-7

This book, in the well-known format of *Topics in Current Chemistry*, is a collection of various reviews covering emerging areas of interest in the field of carbohydrate recognition. It is aimed at PhD students and researchers other than specialists in the field.

It has only recently been recognized that carbohydrate–carbohydrate interactions can play a key role in cell adhesion, recognition, and communication. Previously the study of such interactions has been hindered by the structural complexity of carbohydrates and by the fact that these interactions are polyvalent and made up of very weak monovalent interactions. Recent developments of new model systems, and the adaptation of new analytical techniques to study carbohydrate–carbohydrate interactions, have boosted research in this area.

The results of these new investigations are treated in the seven chapters of the book: 1. Model Systems for Studying Polyvalent Interactions; 2. Carbohydrate–Carbohydrate Interactions in Biological and Model Systems; 3. Unravelling Carbohydrate–Carbohydrate Interactions with Biosensors Using Surface Plasmon Resonance (SPR) Detection; 4. Interaction Forces with Carbohydrates Measured by Atomic Force Microscopy (AFM); 5. Recognition Processes with Amphiphilic Carbohydrates in Water; 6. Artificial Receptors as Chemosensors for Carbohydrates. 7. Artificial Multivalent Sugar Ligands to Understand and Manipulate Carbohydrate–Protein Interactions. In each chapter a general introduction to the specific topic is followed by a detailed discussion with a wealth of examples. An adequate list of references is given at the end of each chapter to help the reader in search of more detailed information.

The first chapter, as the title indicates, deals with model systems that are used to investigate carbohydrate–carbohydrate interactions. These are divided into low-valency and high-valency mod-

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