

Angewandte homogene Katalyse; by A. Behr, Wiley-VCH: Weinheim, 2008, softcover, 837 pp., € 99, ISBN 978-3-527-31666-3

Homogeneous catalysis is not only a subject which is of foremost interest in academic research, but it has also been successfully applied in many industrial processes. Surprisingly, despite a plethora of specialized monographs about this topic, an authoritative textbook dedicated to this subject has been missed by both students and teachers for a long time. Not anymore – because Arno Behr, a well-known researcher in this field, has closed this gap and written an excellent textbook that provides a didactically clever introduction to the subject of homogeneous catalysis, and which has scientific depth and an amazingly broad scope.

The book is organized into four major parts. The first, encompassing twelve chapters, deals with the ‘Chemical Principles’ of homogeneous catalysis. It provides a concise but instructive introduction to the basic structural and mechanistic concepts of organometallic chemistry, in which the importance of metal, ligand, and solvent receives special attention. I especially liked chapter 7 about ligands. In it I learned about the different electronic properties of various ligand classes, found tables with values for basicity, Tolman angles, and natural bite angles of phosphine ligands, a list of the prices of frequently used ligands and links to commercial sources where one could buy these ligands. The chapter is complemented by an account on the synthesis of phosphines and on the various decomposition pathways of phosphines that are of relevance in practical applications. The seven chapters of the second part, ‘Engineering Principles’, inform the reader about the reactor types used in homogeneous catalysis and all important methods of catalyst separation and recycling, such as immobilization, two-phase catalysis, membrane reactors, and others. The 300 pages of part III, ‘Homogeneous Catalyzed Reactions’ provide the reader with short (10–20 pages) but excellent introductions to all relevant types of metal-catalyzed reactions. What I found very useful were the representative experimental procedures given at the end of each chapter, which give an impression of the simplicity or sophistication of the handling

of organometallic compounds and the workup for certain reaction types. The last part, ‘New Trends’, provides a very informative collection of chapters ranging from ‘process development in mini-plants’, over ‘renewable resources’ and ‘nanocatalysis’, to the ‘activation of alkanes’. I found the concept of the book of vertically integrating fundamental organometallic chemistry with engineering aspects absolutely convincing. On the other hand, notably missing is a discussion about other homogeneous catalytic processes such as acid/base catalysis or organocatalysis which have been explicitly excluded by the author, although I see many parallels and synergies in them with homogeneous metal catalysis.

There are many unique features in this book that I appreciated as a reader. At the end of each chapter, there is a half-page summary (‘Take-home messages’) followed by a questionnaire (the answers can be found in the final pages of the book) which allow the student to repeat and apply the learned concepts and solidify the freshly acquired knowledge. The book also masterfully succeeds in being understandable for the novice, but also providing so much scientific depth that it also remains interesting for the very experienced scientist. The latter will appreciate the extensive literature collection at the end of each chapter, in which the references also include the title of the publications, with the most recent from the year 2006. The author has decided to not only name the key innovators of this field in the text, but also present them with a portrait picture, which I regard as a very good idea as it honours those individuals who have contributed to the progress of science through their creativity and hard work.

In summary, I can highly recommend this authoritative textbook to every student and researcher interested in homogeneous catalysis as it is a highly readable book rich in information and insight. At the moment it is available only in German, but the publisher is well advised to prepare an English version, which will serve the interest of an even larger readership.

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