

Applied Homogeneous Catalysis

Applied Homogeneous Catalysis. By Arno Behr and Peter Neubert. Wiley-VCH, Weinheim, 2012. 688 + XXVII pp. €69. ISBN 978-3-527-32633-4.

I am always a little bit suspicious of books with the word “applied” in the title, if not written by industrial scientists. In this case the authors have truly embraced the industrial applications of homogeneous catalysis, and there is much within the 41 chapters to interest the process research and development chemist.

There is insufficient space here to mention all the chapters—all written by the two coauthors—but I will highlight those of industrial importance. Early on in the book, the history of homogeneous catalysis is traced through its progress through inorganic basic chemicals, then refinery processes and acetylene chemistry, industrial petrochemicals, and finally the fine chemical and specialty chemicals industries. A short chapter on the economic importance of homogeneous catalysis then follows.

The more academic aspects of the subject are covered in several chapters, but the authors must be commended for devoting separate chapters to “Solvents: The Reaction Medium” and to “Spectroscopic Monitoring Techniques”. Thermodynamics and kinetics, the latter with a focus on selectivity, are clearly elucidated in the first part of the book.

Part II is entitled Process Engineering Fundamentals and covers key issues such as reactor types, catalyst recycling, product separation, and immobilization of catalysts.

Part III focuses on the types of reactions including hydroformylation, carbonylation, metathesis, oligomerisation and polymerisation, oxidations and reductions, C–C bond formation and aminations, and each one includes a wide range of industrial case studies.

Part IV looks at new trends—in fact this section is very trendy with topics such as tandem reactions, high-throughput catalyst screening, green solvents, and electrocatalysis/photocatalysis/microwave/extreme pressure (alternative methods of activation). Process chemists will particularly enjoy a short chapter on “Process Development in Miniplants”, and all will want to read the authors’ views on “The Future of Homogeneous Catalysis: A Look Ahead”.

Clearly, the authors are influenced by green chemistry and engineering principles throughout the book (there is even a chapter on green solvents!), and thus, the topics have given a modern slant on catalysis of relevance to industry, although biocatalysis and organocatalysis are naturally outside the scope. While the book is aimed at students, industrial chemists not working directly in homogeneous catalysis will learn a lot. The mechanistic approach will appeal to all organic chemists, but the focus on turnover number/frequency and space-time-yield is particularly attractive for process chemists and engineers.

I highly recommend it and find it to be an excellent value in the paperback format.

Trevor Laird, Editor

■ AUTHOR INFORMATION

Notes

The authors declare no competing financial interest.