

Catalysis

During the past few decades, catalytic reactions and catalysts have several times been considered as important enough to warrant the award of Nobel Prizes in chemistry. The importance of catalysis research is largely based on the improved energy efficiency and greater environmental friendliness of processes employing catalysts, rendering their application in chemical industries highly advantageous. Many catalytic processes also appeal through the elegance of the reaction cycles that they allow. Catalysis research, which originally belonged to the domains of organometallics, solid state chemistry (catalysts), or organic chemistry (substrates), nowadays draws on the full spectrum of the chemical sciences, and derives motivation from the related natural sciences of biology (biocatalysts), physics (characterization techniques), and engineering (e.g., reactor engineering).

The aim of the book *Catalysis—From Principles to Applications* is, in the words of its highly reputable editors Matthias Beller, Albert Renken, and Rutger A. van Santen, to be used as material for study in advanced courses on catalysis. It covers modern catalysis research in all its facets. The editors have assembled a variety of prominent representatives of catalysis research to contribute to this well-organized book of about 640 pages.

The first part of the book, Chapters 1–4, deals with basic aspects, ranging from historical accounts and the origins of catalysis research to the kinetics of both homogeneous and heterogeneous reactions, and to the basics of reactor design and reaction engineering. All these aspects are certainly of great value and interest for advanced students.

The second part of the book is devoted to the chemistry of catalytic reactivity. Chapters 5–9 deal with modern aspects of important topics that are of considerable current interest, such as electrocatalysis, photocatalysis, and biocatalysis. The classical subjects of homogeneous and heterogeneous catalysis are also covered, with emphasis on the basic reaction steps.

The third part of the book, Chapters 10–18, deals with some particularly important and technically relevant catalytic reactions. The editors describe a well-chosen selection of processes, which will certainly fuel the interests of the intended readers. These chapters show just how important catalysis is from an industrial point of view, and why further research efforts in this area are certainly justified.

The fourth part of the book, Chapters 19–22, is devoted to the synthesis of catalysts and materials. From molecular catalysts to surfaces, a broad spectrum of catalytically active entities is described, to give the reader both a broad overview and a quite detailed insight.

Part 5 of the book, Chapters 23–26, gives a clear and compelling insight into modern characterization methods that can be applied to catalysts. Again, the content is very well chosen, describing cutting-edge modern methods of catalyst characterization. Although this is advanced subject matter, the basics to understand the methods are also provided.

Part 6 consists solely of Chapter 27, which is devoted to the different types of reactors that can be applied for catalytic reactions of industrial relevance. The range extends from ideal reactors to real reactors, and the chapter gives important data for understanding reactor types and the reasons why they are suitable for certain catalytic reactions to get an optimal outcome.

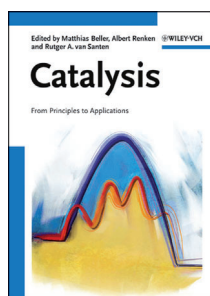
Despite including a wide-ranging multitude of contributions, the editors have managed to produce a largely consistent and easily readable book, which delivers the most important facts and figures that the interested (student) reader should know. The literature coverage is not excessive, but is concentrated on some well-chosen key publications that are good starting-points for further literature searching by readers who want to go deeper into specific topics.

Each of the six sections of the book starts with a brief summary, telling the reader what to expect. Looking through the chapters, it quickly becomes evident that they have been written by real experts who are devoted to and very familiar with their topics. Not long ago, good books about catalysis, providing deep insights as well as a good overview of catalysis, were quite rare. This book certainly contributes a great deal to finally close that gap. It is to be hoped that it will achieve a readership that matches its high quality and will encourage more students to choose their path to catalysis, be it in industry or academia. As a person working and lecturing on catalysis, I hope that many of my students will read this book during their studies and absorb as much as possible of the concepts within it. If that could be achieved, I and many of my colleagues would enjoy even better qualified co-workers and PhD students than we currently do.

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