

**Concepts of Modern Catalysis and Kinetics**; by I. Chorkendoff and J. W. Niemantsverdriet; Wiley-VCH: Weinheim, 2003, 452 pages, hardcover, 69 €, ISBN 3-527-30574-2

Catalysis plays a key role in modern organic chemistry. A multitude of industrial bulk and fine chemicals processes rely on catalysts for at least one of their component steps. The book provides a wide-ranging coverage of both fundamental and applied aspects of heterogeneous catalysis. An emphasis is placed on the understanding of catalytic reactions at the molecular and mesoscopic levels. After an introduction to the general features of catalysis, including its industrial and environmental importance, chapters are devoted to kinetics and reaction rate theory, describing in considerable detail the fundamental physical chemistry underlying heterogeneous catalysis. Following this, the variety of modern instrumental techniques used for characterisation of heterogeneous catalysts are discussed, ranging from X-ray diffraction to the range of spectroscopic and surface science techniques, including scanning probe microscopy and related methods. The structural features of different classes of solid catalysts and catalyst supports are then summarized, including metals, metal oxides, carbon and zeolites. The two themes of kinetics and surfaces are next brought together by considering surface reactivity and the kinetics of reactions on surfaces. The book concludes with three chapters which illustrate significant practical examples of heterogeneous catalytic processes. The examples covered are reactions involving hydrogen (e.g. steam reforming, methanol and ammonia synthesis); oil refining and petrochemistry (e.g. hydrotreating, gasoline production, alkylation, epoxidation, partial oxidation, poly-

merization); environmental catalysis (e.g. catalytic converters and selective catalytic reduction).

The text is aimed at students in chemistry, physics and chemical engineering. It is based upon lecture courses developed over many years by the authors. Exercises and questions associated with each chapter are included at the end of the book and solutions to the exercises have been made available online at [www.catalysis.nl/kica/](http://www.catalysis.nl/kica/). The book is well-structured and written in a coherent, fluent style. The fundamental physical chemistry is rigorous and integrated well with the more applied aspects. Clearly presented figures and graphs are used extensively to illustrate key concepts.

This book will be a valuable addition to many chemistry libraries. Although synthetic organic chemists are probably not the prime intended readership, most use catalysis to a varying extent in their reactions. In many cases, the catalyst is viewed somewhat like a 'black-box', and the underlying principles may sometimes be neglected. While this book goes into more detail than will be required by many organic chemists, there are many items of interest regarding the nature of heterogeneous catalysts and their reactivity. There are also some useful practical suggestions such as the 'Ten Commandments for the Testing of Catalysts'. The Introduction and concluding chapters on practical aspects of catalysis will make informative reading for any chemist, and provide an insight into the important role of catalysis in the chemical industry and in the environment. For the specialist in heterogeneous catalysis, the book provides a wealth of information regarding both fundamentals and applications.

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