

BOOK REVIEWS

Heterogeneous Catalysis in Industrial Practice, Second Edition. BY CHARLES N. SATTERFIELD. McGraw-Hill, New York, 1991.

Like the first edition, this comprehensive, authoritative, and pragmatic overview of applied heterogeneous catalysis is a truly valuable book for chemical engineers and chemists working with solid catalysts in laboratory, pilot-plant, or commercial installations. It can also provide useful practical information to those working on more fundamental aspects of catalysis.

The scope is very similar to that of the first edition, but a good part of the material has been updated and now provides more chemical insight into the underlying phenomena. Throughout the book, Professor Satterfield remains consistent with the revised title: Only concepts and techniques having had a proven impact on industrial catalysis are discussed. The book, after all, does not seek to educate students but rather to serve as a reference book and as a starting point for professionals. It is therefore appropriate that the interesting problem collection of the first edition has now been deleted.

Is the second edition a must for those having direct access to the first edition? Yes, in my opinion, although the extent of revision varies significantly from one chapter to the next. Thus, Chapters 1 to 5 and 11 have changed very little (basic concepts, adsorption, kinetic models, catalyst preparation, physical characterization, experimental methods). This is obviously not due to the lack of research progress in these areas during the last decade, but rather due to the filtering of this progress through the stringent criterion of industrial impact.

Chapter 6 (supported catalysts) has been revised to provide a brief overview of SMSI and spillover effects and to discuss, albeit briefly, the relevance of UHV studies to industrial catalysis. Most of the revision was made in Chapter 7 (zeolites) and Chapter 8 (catalytic oxidation, with more emphasis now on automotive exhaust catalysis). Less material has changed in Chapters 9 (petroleum processing) and 10 (synthesis gas reactions), but this again reflects the limited industrial process changes in these areas over the past decade. Chapter 11 provides some useful guidelines for obtaining diffusional-free kinetic data, but it does require a decent reaction engineering background.

The book is a valuable source of information on applied heterogeneous catalysis. It is a must for professionals, both practitioners and researchers.

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Catalytic Chemistry. BY BRUCE C. GATES. Wiley, New York, 1992. xxi + 458 pp.

An author who undertakes the task of writing a book about catalysis is immediately faced with two fundamental problems which relate to the enormous scope of the subject and to the complexity of the material in detail: that is, how to define and limit the area to be covered, and how to structure the material in a manner that has reasonable internal logic. A traditional solution to this problem, which is often used, is to separate heterogeneous from homogeneous catalysis, and then to approach heterogeneous catalysis via adsorption at solid surfaces, and homogeneous catalysis via organometallic chemistry or some appropriate aspect of solution chemistry. An advantage of this approach is that it readily allows the formal development of heterogeneous catalytic kinetics at an early stage in the overall treatment, but it has the disadvantage that it tends to focus attention on classical catalytic archetypes rather than recognizing the great diversity of modern catalysts as materials. On the other hand, this diversity of catalytic materials can, of itself, lead to undue fragmentation of treatment unless strenuous efforts are made to oppose this.

The author of the present book, Professor Bruce C. Gates, will be very well known to all practitioners of catalytic science, particularly as a coauthor of an earlier standard, and highly respected reference book, "Chemistry of Catalytic Processes." The present book, "Catalytic Chemistry," is in no sense another version of, or even a successor to, "Chemistry of Catalytic Process." As is made clear in the Introduction, and as will be immediately evident at first inspection, "Catalytic Chemistry" is unashamedly a teaching book. This is in no way to imply that it concentrates on elementary material: on the contrary, it contains an enormous amount of detailed catalytic chemistry, much at a level of considerable sophistication. While its original, primary purpose may be as a teaching book, it will undoubtedly find wide use as a reference work in catalytic fundamentals.