Catalysis 1987 - Bernard Delmon - 1987

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In view of the substantial progress made in the fields of zeolites and related materials it was felt that an extended 2nd Edition of "Introduction to Zeolite Science and Practice" was...
The book offers a comprehensive review of recent developments in natural gas conversion technology, with a focus on catalysis and chemical processes. It covers a wide range of topics, including the chemical or biological process whereby the presence of an external compound, a catalyst, serves as an agent to cause a chemical reaction to occur or to improve reaction performance without altering the external compound. Catalysis is a very important process from an industrial point of view since the production of most industrially important chemicals involve catalysis. Research into catalysis is a major field in applied science, and involves many fields of chemistry and physics.

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The book is of interest to all students and researchers in the field of chemical engineering, as well as to practitioners in the industry. It provides a valuable resource for understanding the latest developments in catalysis and chemical processes, and is an essential reference for professionals and students working in the field of chemical engineering.

The book is divided into five sections: Synthesis, Characterization, Adsorption, Catalysis, and Novel applications. These sections are meant to provide a comprehensive overview of the latest research on porous materials, with a focus on zeolites and other microporous materials. The sections are divided into chapters, each of which covers a specific aspect of the topic. The chapters are written by leading experts in the field, and provide in-depth analyses of the latest research and developments in the field.

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Structure plays an important role in heterogeneous catalysis. It provides a framework for the arrangement and strategic placement of key catalytic elements, binding them in a prescribed manner so that their respective electronic properties can exhibit their desired catalytic functions and mutual interactions. Under reaction conditions these framework structures and their catalytic guests undergo dynamic processes becoming active participants of the overall catalytic process. They are not mere static geometric forms. The dynamics of catalytic structures are particularly crucial in heterogeneous catalysis since the latter is a set of reactions catalyzed by solid particles or solids. By choosing the right catalytic structure, the reaction mechanisms and the reaction pathways can be altered, thereby improving the selectivity and efficiency of the catalytic process. This book provides a deep understanding of how asphaltenes transform during hydroprocessing, offering insight on designing catalysts and processing for the upgrading of heavy oils.

Asphaltenes: Chemical Transformation during Hydroprocessing of Heavy Oils highlights the various changes that these heavy and complex molecules undergo during catalytic hydroprocessing. After defining and characterizing asphaltene structures, the authors also analyze the deactivation and characterization of spent hydroprocessing catalysts as well as the role played by asphaltenes. They cover sediments formation during hydroprocessing and the role of asphaltenes on it. The final chapters describe the hydrocracking and kinetics of asphaltenes and the fractionation of heavy crudes and asphaltenes. Due to the increasing production of heavy crude oils, asphaltene has become one of the most studied molecules.

Asphaltenes: Chemical Transformation during Hydroprocessing of Heavy Oils provides a comprehensive methodology and state-of-the-art toolbox for industrial catalysis. The book begins by introducing the reader to the interesting, challenging, and important field of catalysis and catalytic processes. The fundamentals of catalysis and catalytic processes are fully covered before delving into the important industrial applications of catalysis and catalytic processes, with a Megaphone on green and sustainable technologies. Four case studies illustrate ways of designing catalytic and catalytic processes. The intended audience of the book includes researchers in academia and industry, as well as chemical engineers, process development chemists, and technologists working in chemical industries and industrial research laboratories. Discusses the fundamentals of catalytic processes, catalyst preparation and characterization, and reaction engineering. Offers a comprehensive catalog of catalytic processes for researchers in academia and industry.