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BOOK REVIEW

Future Opportunities in Catalytic and Separation Technology. Edited by M. MISONO, Y. MORO-OKA, AND S. KIMURA. **Studies in Surface Science and Catalysis,** vol. 54. (B. Delmon and J. T. Yates, Jr., series eds.). Elsevier, New York, 1990. $174.50.

The recently published book entitled "Future Opportunities in Catalytic and Separation Technology," edited by M. Masono, Y. Morokite, and S. Kumoro, is the 54th in the series in "Surface Science and Catalysis," published by Elsevier. It represents a compilation of 20 lectures presented at a symposium held in Japan in 1988 on "Selective Reactions and Separations." This meeting was sponsored by the Association for the Progress of New Chemistry, whose membership comprises major companies in the Japanese chemical industry. The book contains manuscripts covering a number of widely different topics in both catalyst and separation science. It is not meant to focus on any one area (such as catalysis with zeolites or membrane catalysis); rather it attempts to introduce the reader to a number of emerging technology areas in both catalysis and separation science with primary focus on catalysis.

The book is divided into four chapters, each of which comprises at least four manuscripts. The chapters are entitled: Present and Future of Catalytic and Separation Technology; New Aspects of Heterogeneous Catalysis; Catalysis Combined With Laser, Electrochemical and Membrane Technology; and Asymetric Synthesis and Separation. There is literally something here for everyone. There are multiple papers on the use of membranes primarily for catalytic process chemistry. Other papers deal with asymetric synthesis and the use of zeolites for the synthesis of specialty chemicals.

The topics discussed in some detail include research at the frontiers of catalysis and separation science. Many of the articles represent reviews or overviews by leading authorities in the respective areas. Several articles contain deliberate attempts to offer predictions, speculation, and future trends in the areas under discussion. Jim Roth's opening article entitled "Future Opportunities in Industrial Catalysis" focuses on three key elements of any catalytic process with his personal observations and predictions on a number of new developments in catalysis. Many of the other topics incorporate applied aspects of chemical catalysis, especially as they relate to the production of useful materials. For example, Y. Izumi and M. Onaka describe "Novel Catalytic Functions of Zeolites in Liquid Phase Organic Reactions." Here they summarize the use of zeolites as catalysts or promoters for the selective production of a number of specialty chemicals in the liquid phase. Y. Ono's article, entitled "Recent Advances and Future Developments in Zeolite Catalysis," focuses on selected topics incorporating zeolite -β, metallosilicates, and aluminophosphate molecular sieves, with attention to the application of zeolites to the synthesis of fine chemicals. H. Takaya, T. Ohta, K. Mashina, M. Kitamura, and R. Noyori report on "New Chiral Rh(I) and Ru(II) Complexes: Highly Efficient Catalysts for Homogeneous Asymmetric Hydrogenation." Here they describe the use of the BINAP ligands/complexes for the asymmetric hydrogenation of a number of unsaturated substrates to produce products such as citronellol with high optical purity.

In general, the papers provide a comprehensive treatment of emerging areas in catalysis with a limited treatment of newer areas related to separation science. This book should be of interest to those seeking information on topics at the cutting edge of catalytic technology and separations.

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