

## BOOK REVIEW

**Application of Zeolites in Catalysis.** The First All-Union Conference on Molecular Sieves in Catalysis, Novosibirsk, 1976. Edited by G. K. BORESKOV AND KH. M. MINACHEV. Akadémiai Kiadó, Budapest, 1979 (U.S. Distributor: Heyden, Philadelphia). 179 pp., hard-bound, \$17.00.

This English translation presents the plenary reports delivered at the conference by leading Soviet scientists. While the claimed emphasis is on zeolite catalysis in the oil refining industry, the reports are actually much more broadly applicable than that. Some of the more familiar authors include Antoshin, Davydov, Dubinin, Ione, Maksimov, Minachev, Mirsky, and Topchieva.

A survey of the use of zeolites in hydrocarbon catalysis by Minachev broadly reviews the subject and contains a good mix of both Soviet and foreign references, but has limited depth. There is a good discussion of basic materials science work in cracking catalyst preparation and modification, and some correlation with practical physical and chemical performance parameters. Considerable data are presented in Topchieva's paper to illustrate the effect of ion exchange and thermal treatments on zeolite systems, and the effect of composition on activity and acidic properties. The relations between the method of introduction, the state of transition metals in Y zeolites, and their catalytic properties are extensively discussed. Much detailed work is described using a variety of spectroscopic techniques to investigate the state of selected transition metal cations.

By way of adding balance, a relatively brief but lucid discussion is presented on diffusion processes. The biporous structure of zeolite catalysts and adsorbents is illustrated, and the conditions leading to dominance of one diffusion regime or another are examined. Ways of analyzing the effect of experimental conditions on

mass transfer rate are presented to aid in determining the pore structure requirements for catalysts and adsorbents.

The book's general emphasis is on oil industry applications, reflecting an increasing focus on relevance in Soviet science. However, the material is already four years old, and this is readily apparent, from the standpoint of both recent work not discussed and older concepts not modified. Nonetheless, there is considerable detail presented that may not be readily available to many workers. A number of Russian views and concepts are summarized and, for the most part, are well presented. While the depth and currency of the discussion in different chapters vary, those who are interested in an introduction to the subject of zeolites in catalysis, as well as those who are actively involved in this work, would benefit from this compilation.

The book is unfortunately marred by a number of translation and typographical errors. There are disconcerting errors and incomplete information in some of the references. The printing quality is mediocre. There are some obvious slips, such as the reversal of data for gas and coke makes as a function of  $\text{Na}_2\text{O}$  in cracking catalyst matrices, and the citation of the density of a cracking catalyst bead as 0.7 kg per cubic meter. In spite of this, the information and perspectives found in this volume should be quite useful to diverse groups of people and worth the modest cost.

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