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BOOK REVIEW

Progress in Catalyst Deactivation. Edited by J. L. FIGUEIREDO. NATO ASI Series, Series E, Applied Sciences, M. Nijhoff, The Hague, 1982. Vol. 54, $x + 401$ pp. $49.50.

This volume presents the proceedings of a NATO Advanced Study Institute on the subject of catalyst deactivation held in Portugal in May 1981. The title is perhaps not informative, since one certainly does not want to progress in catalyst deactivation, but rather go in the opposite direction. In spite of the misleading title, the contents do go in the other direction. The contributions present in a systematic way descriptions of various processes leading to catalyst deactivation and, in some instances, methods to cope with such. Contributions are divided according to deactivation mechanism: coke or carbon formation, poisoning, and solid state transformations.

Professor Trimm contributes an introductory section followed by an extensive discussion of coke and carbon formation—a general consideration is given to various systems, and specific attention is given to metals other than nickel and alloys. Professor Figueiredo then fills in the gap concerning carbon formation on Ni with his contribution, and Dr. Rostrup-Nielsen rounds out the discussion from a reaction point of view for carbon formation in steam reforming and methanation. Various aspects of deactivation by coking (as contrasted to carbon formation) are treated by Rollman and Walsh (coking of zeolites), Goodwin, Blackmond and Lester (infrared techniques in experimental studies of coking), and Froment (formation of activity models for various kinds of coking deactivation mechanisms).

Poisoning is treated primarily from a process point of view. This reviewer contributed a survey of the relationship between poisoning and chemical process dynamics, while Rostrup-Nielsen complements his discussion of carbon formation in steam reforming and methanation by an examination of the effects of sulfur poisoning on the same reactions. A nice general survey of poisoning processes was presented at the ASI by Hegedus; this did not find its way into the present volume but the interested reader can find it in *Catalysis Reviews—Science and Engineering* **23(3),** 377 (1981).

The traditional third of the three sinister sisters of catalyst deactivation, sintering, has been enlarged to include the more general field of solid state transformations, as suggested by Professors Delmon and Grange in their general review. Sintering data and correlation models for supported metal catalysts are surveyed by Wanke and Bolivar, and Professor Dowden contributes a most informative and useful article on the chemistry of water and halogens on catalytic surfaces. Finally, a very nice case history, involving aspects of all types of deactivation, is presented for catalytic reforming by Franck and Martino.

While some variations are inevitable in proceedings such as these, the volume does appear to have a cohesiveness that results from careful editing. It should certainly belong in any library concerned with catalysis or reaction engineering, and on an individual basis to anyone faced with the mortality of catalysts on a daily basis.

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