

The book can be recommended to those wishing an interesting and easily readable survey of some important current problems of structural inorganic chemistry. It seems less suitable as an introductory textbook of valence theory.

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**Catalysis. Volume IV. Hydrocarbon Synthesis, Hydrogenation and Cyclization.** Edited by PAUL H. EMMETT, W. R. Grace Professor of Chemistry, The Johns Hopkins University, Baltimore, Maryland. Contributing Authors: ROBERT B. ANDERSON, ERNST M. COHN, MURRAY GREYSON, L. J. E. HOFER, H. STEINER AND S. W. WELLER. Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N. Y. 1956. vi + 570 pp. 16 × 23.5 cm. Price, \$12.50.

The first three chapters in this fourth volume on Catalysis are written by Robert B. Anderson of the Bureau of Mines, Pittsburgh. They reflect therefore the authoritative viewpoint of this organization's researches on coal to oil, principally the Fischer-Tropsch synthesis from carbon monoxide-hydrogen mixtures. The initial chapter deals with the thermodynamics of possible surface processes and reactions, the second with the catalysts for, and the third with the mechanism of, the Fischer-Tropsch process. While the thermodynamical data on products formed provide the necessary information as to reaction possibilities, the reviewer has never been able to convince himself that similar calculations with respect to the reactions of the catalyst have any value. The science still awaits an authoritative treatment of this problem which will illumine why surface reactions occur, as with poisons, under conditions where the equilibrium value of the ratio of reactants is  $10^4$ - $10^6$  times greater. The second chapter of 225 pages covers exhaustively the catalysts, the factors determining their behavior, the history of process development and experimental and industrial reactors, the products and poisons. The author rightly calls it a formidable problem which he has discharged with considerable skill. More than 200 references are reviewed. The third chapter surveys kinetics and mechanism of the Fischer-Tropsch process. Here is to be seen how the earlier postulates lead to experimentally verifiable conclusions as to mechanism from isotopic tracer studies in which the Editor of these volumes has played so conspicuous a role.

There follows a 70 page discussion of the crystalline phases possible in the Fischer-Tropsch catalysts and involved in their formation, activation and deactivation. These include not only the metals but such compounds as the carbides, nitrides and borides as well as the oxides and hydroxides used as the starting materials. The four final chapters of the book deal successively with the isosynthesis, methanation, liquid phase hydrogenation of coal and tar and, finally, the catalytic cyclization and aromatization of hydrocarbons. This last is a brief, well balanced survey of a development in the decade around the opening of World War II which had a great significance for the provision of ex-

plosives and high-octane fuels. The whole volume is a welcome addition to the literature of catalysis.

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## BOOKS RECEIVED

December 10, 1956-January 10, 1957

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F. S. DAINTON. "Chain Reactions. An Introduction." John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1956. 183 pp. \$2.90.

VICTOR GOLD. "pH Measurements. Their Theory and Practice." John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1956. 125 pp. \$2.25.

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FRITZ MICHEEL AND ALMUTH KLEMER. "Chemie der Zucker und Polysaccharide." Akademische Verlagsgesellschaft, Geest und Portig K.-G., Sternwartenstrasse 8, Leipzig C 1, Germany. 1956. 512 pp. 36.- DM.

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ANDERS NIELSEN. "An Investigation on Promoted Iron Catalysts for the Synthesis of Ammonia." Second Edition. Jul. Gjellerups Forlag, Copenhagen, Denmark. 1956. 233 pp. Paper bound, 28.00 Danish Kroner; cloth bound, 33.00 Danish Kroner.

EDMUND C. POTTER. "Electrochemistry. Principles and Applications." The Macmillan Company, 60 Fifth Avenue, New York 11, N. Y. 1957. 418 pp. \$10.00.

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L. ZECHMEISTER, edited by. "Fortschritte der Chemie Organischer Naturstoffe." (Progress in the Chemistry of Organic Natural Products). Vol. XIII. Springer-Verlag, Mülkerbastei 5, Wien 1, Austria. 1956. 624 pp. \$24.75, Ganzleinen \$25.60.