

BOOK REVIEWS

Crystal Structures. Supplement III. R. W. G. WYCKOFF. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1958. 556 pp. 20 × 24.5 cm. Price, \$20.00.

All who have a serious interest in the structure of crystals are undoubtedly familiar with the monumental task undertaken by Dr. Wyckoff in his publication of "Crystal Structures." Supplement III continues in the style established in sections published in 1948, 1951, 1953 and 1957. It provides in loose leaf form additions which will complete Chapters I-VIII of Sections I and II on Inorganic Compounds. New structural information for the elements and for compounds of the general types RX , RX_2 , R_mX_n , $R(MX_2)_n$, $R_n(MX_3)_p$ and $R_n(MX_4)_p$ is summarized. Some tables have been revised to include more recent data and are designated as replacements for those in the earlier publication. The majority of the material is supplementary, however, covering references over the period 1948-1954, with limited references to papers in 1955.

The present supplement is certainly essential for any library maintaining reference works on structural information. It is intended to fit into the previously published volumes and would lose much of its utility if purchased independently. Chemists concerned with the structure of inorganic substances will be particularly pleased to learn of the availability of this latest contribution.

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Contact Catalysis. By R. H. GRIFFITH, D. Phil., Director, London Research Station, The Gas Council, and J. D. F. MARSH, M. A., B. Sc., Research Department, The North Thames Gas Board. Third Edition of "The Mechanism of Contact Catalysis." Oxford University Press, 114 Fifth Avenue, New York 11, N. Y. 1957. x + 299 pp. 15 × 22 cm. Price, \$8.00.

The above book is the third expanded edition of "The Mechanism of Contact Catalysis." Ten years have elapsed since the second edition appeared and a very large amount of research in the field of both catalysis and catalytic chemistry has taken place. The new edition brings the theoretical and experimental results up-to-date and includes a wealth of new material.

The book is divided into the following ten chapters: (1) The Preparation and Evaluation of Catalysts; (2) Examination of the Catalyst Surface; (3) Adsorption; (4) The Electronic Factor in Catalysis; (5) Geometry of the Catalyst Surface; (6) Promoters and Carriers; (7) Poisoning, Retardation, Fouling, and Sintering; (8) The Reactions of Hydrocarbons; (9) The Mechanism of Catalysis and (10) The Development of Catalysts.

The material has been well chosen by the authors. This reviewer enjoyed particularly the pages regarding the effects of diffusion (p. 31), the electrical properties of catalysts (p. 48) and surface area measurements (p. 58), because of their clarity of presentation. For those who are interested in a concise, up-to-date book summarizing the results of physical-chemical research on contact catalysis, this book is highly recommended.

The authors state (p. 269): "With a full understanding of the underlying principles of catalysis, it should be possible to select suitable catalysts for hitherto unknown chemical reactions and to be certain that the best catalysts were already available for existing processes." In spite of the many elegant and precise methods introduced in past years by physical chemistry, this reviewer is left with a feeling of uneasiness and even doubt regarding the eventual success of reaching the above goal by present physico-chemical direction of catalytic research. Catalytic chemistry in our century has been advanced by such outstanding chemists as P. Sabatier, V. Ipatieff, F. Fisher and H. Tropsch, and in recent decades by W. Reppe. None of the above scientists (except Sabatier) are mentioned in the book. Their

approach in selecting "suitable catalysts for hitherto unknown chemical reactions," in the estimation of this reviewer, is *essentially different* from the approach taken by the authors of the above book. It should be understood that this is not a criticism of the authors, but more generally of the efforts of many outstanding physical chemists to reach the above goal.

This reviewer introduced the concept of *catalytic chemistry* about fifteen years ago¹ and has defined and described it as a natural development of classical organic and inorganic chemistry. Just as the advances of physical chemistry in our century, and they have been outstanding, have been independent of either inorganic or organic chemistry, so this reviewer feels that the advance of catalytic chemistry does not by necessity have to rely only on physical chemistry. He firmly believes that future catalytic chemists will reach the goal defined by the authors of the book, following the footsteps of Sabatier and Ipatieff.

(1) *Ind. Eng. Chem.*, **35**, 762 (1943).

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Cahiers de Synthèses Organique. Méthodes et Tableaux D'Application. Volume III. Collection Publiée sous la Direction de LÉON VELLUZ, JEAN MATHIEU ET ANDRÉ ALLAIS, Ingénieurs-Docteurs. Masson et Cie., 120, Boulevard Saint-Germain, Paris VI, France. 1957. 266 pp. 15.5 × 22.5 cm. Price, Broché: 4.200 frs.: Cartonné toile: 4.600 frs.

This is the third volume of a projected ten to twelve volume series, edited by Léon Velluz and written by J. Mathieu and A. Allais with the assistance of J. Walls and P. Poirier.

This volume consists of three chapters which are as follows:

6. This chapter deals with condensation reactions leading to the formation of compounds containing a carbon-carbon double or triple bond. The Azlactone, Knoevenagel, Perkin and Stobbe condensations, to mention only a few, are grouped together in this chapter.

7. This chapter is concerned with hydroxyalkylation and aminoalkylation in the aliphatic series. The reactions discussed here are those which result in the introduction of an alkyl group with an α -hydroxyl or amino group in an aliphatic compound. The reactions of active methylene and acetylenic compounds with carbonyl or imino compounds are grouped in this chapter together with the Grignard, Mannich and Reformatsky reactions. The Stevens rearrangement of ammonium or sulfonium compounds and the Wittig rearrangement of allylic or benzylic ethers seem to be misplaced in this section since they are concerned with an intramolecular type of reaction.

8. The last chapter of the book contains a discussion of hydroxyalkylation and aminoalkylation in the aromatic series. The reactions of aromatic Grignard reagents with carbonyl or imino compounds are described in this chapter together with some typical reactions restricted to the aromatic series, such as the Hammett reaction, and the condensation of phenols or aromatic amines with chloral, mesoxalic esters or alloxan.

Each chapter begins with a table of symbols which the reader will find very useful in locating, almost at a glance, any reaction discussed in the chapter. After a brief introduction concerning the principles of the reactions covered in the chapter, a section on the mechanisms of these reactions follows. However, the usefulness of this section on mechanisms is doubtful since only a very shallow treatment is given. The next section is concerned with applications, *i.e.*, the uses of the compounds obtained as intermediates for further reactions. The reaction types are then discussed in turn and the material included is arranged in a semi-tabular fashion. Each chapter closes with a tabular survey of a number of examples taken from the literature. The