

Book Reviews

Chemical Mutagens, Principles and Methods for Their Detection. Volume 9. Edited by F. J. de Serres (National Institute of Environmental Health Sciences). Plenum Press: New York, 1984. xiv + 306 pp. \$42.50. ISBN 0-306-41696-4.

In any active field of research periodic compilation of reviews of new and old methodologies is necessary for continued progress. The series "Chemical Mutagens, Principles and Methods for Their Detection" has succeeded in compiling high-quality reviews for genetic toxicologists and other interested scientists for 13 years. The latest volume continues the tradition as each chapter has been written and introduced well enough to be understood by those outside the field. Because only selected subjects are reviewed, extensive descriptions of the methods have been included, making the information useful to novices as well as experts. Subjects covered include four new assays for detection of mutagens, four chapters involving refinements of established methodologies, and individual reviews of the emerging fields of mutagens produced during the cooking of food and fecal mutagens. Although the latter two reviews undoubtedly will have the greatest general appeal, almost every reader will find something interesting in the other chapters because of the diversity of methods covered. Besides the rodent granuloma pouch assay and the grasshopper embryo neuroblast assay for chromosomal alterations, the other relatively new procedures described involve prokaryotic systems. These are the arabinose resistance forward mutation assay and an assay based upon inhibition of *Bacillus subtilis* sporulation. Refinements and studies of the principles of established methods are found in chapters on quantitative mutagenesis of human fibroblasts, induction of bacteriophage lambda, use of multiply marked *E. coli* for host mediated mutagenesis, and the L5178Y murine lymphoma cell thymidine kinase forward mutation assay. Overall, this text shows that the field of genetic toxicology is beginning to mature yet retains the excitement of a young discipline with new methods and emerging subfields.

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The Fischer-Tropsch Synthesis. By R. B. Anderson (McMaster University). Academic Press: Orlando, FL, 1984. xiv + 301 pp. \$49.00. ISBN 0-12-058460-3.

The current literature has adapted the term Fischer-Tropsch synthesis (FTS) to span meanings from methanation to higher hydrocarbon production and surface science to practical catalysis. Anderson focuses on a classical definition, "...hydrogenation of oxides of carbon producing higher hydrocarbons and/or alcohols, the carbon chains of the molecules being predominantly straight in the range C₄ to C₁₀". His presentation is in six chapters. The introduction includes an illuminating historical sketch of the field as well as a brief appraisal of its present status. In discussing the equilibrium yields of a wide variety of FTS products and of the reactions of the catalytic metals, carbides and nitrides, Anderson substantially augments the work of the fifties with recent material. Chapter 3, devoted exclusively to iron, discusses catalyst preparation, FTS over carbides and nitrides, and the phases present in the catalyst during pretreatment and reaction. It draws heavily on work prior to 1960. In summarizing the effects of operating conditions (often at the pilot plant scale) and catalyst composition on the product distributions over weeks of operation, this chapter provides a strong foundation on which current research in the field can build. Chapter 4 presents effects of catalyst composition and operating conditions on the FTS behavior of

the platinum group metals including Ru; of Ni, Co, and Fe; and of Mo and W. This thorough review of the literature through 1982 includes effects of supports, promoters, and alloying, as well as the characteristics of the individual metals in the FTS reaction. Chapter 5 is an excellent presentation of the mechanism of FTS. It includes the "Bureau of Mines Equation" and other models for the distribution of carbon chain lengths, addresses the formation of branched chains, and discusses much of the recent research in both methanation and FTS on the nature of the kinetically important surface intermediates. Chapter 6 addresses sulfur poisoning of Co, Ni, Rh, Fe, Mo, and W catalysts. The final chapter, written by H. Kölbl and M. Ralek, describes the Kölbl-Engelhardt synthesis, a process combining FTS and the water-gas-shift reactions to allow hydrocarbon synthesis from CO and H₂O.

This book establishes both the foundations and the current state of the Fischer-Tropsch synthesis field through 1982. Anderson's nearly 40 years of leadership in the field bring an insight and experience to the presentation that make it essential reading for those interested in any aspect of hydrocarbon synthesis research.

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Electro-Organic Syntheses. Methods and Applications. Part 1: Oxidations. Monographs in Modern Chemistry. Volume 15. By S. Torii (School of Engineering, Okayama University, Okayama, Japan). VCH Publishers: Deerfield Beach, FL, 1985. xi + 330 pp. \$62.00. ISBN 0-444-99595-7.

This book has a preface and 13 chapters of varying lengths. The chapters are the following: 1. Electrooxidation and Product Selectivity; 2. Electro-decarboxylation of Carboxylic Acids; 3. Electrooxidation of Alkylbenzene Side-chains; 4. Electrooxidation of Aromatic Nucleus; 5. Electrooxidation of Nitrogen Compounds; 6. Electrooxidation of Sulfur Compounds; 7. Electrooxidation of Olefins; 8. Electrooxidation of Alcohols and Ethers; 9. Electrohalogenation and Electrooxidation of Halogenated Compounds; 10. Electrooxidation of Phosphorous, Boron, and Selenium Compounds; 11. Indirect Electrooxidation and the Use of Electron Carriers (Mediators); 12. Electrooxidation of Cyclopropanes and Adamantanes; 13. and Electrogenerated Acid-catalysed Functionalization.

The author's aim is to encourage the use of electroorganic chemistry as a versatile synthetic device. The first chapter contains a wealth of information needed to give an organic chemist, who is a novice electroorganic chemist, a rapid start in the successful use of electrochemistry. All of the chapters are thorough and well organized for ready reference by an organic chemist using the reaction schemes. Careful attention is given to yields in both reaction schemes and tables as well as to details of the solvent, electrolyte, and electrode systems used.

The reaction schemes are particularly valuable in rapidly showing the type of chemical transformations that are possible, while the tables can be used to select the optimum electrolysis conditions to maximize the yield of particular reaction products. The concentration of detailed information is extremely high.

Electroorganic chemistry may have less potential for environmental damage and has great potential for high-energy efficiency. Professor Torii has aimed well. This book will be a useful starting place for any organic chemist wishing to try electroorganic chemistry and a valuable addition to a library or individual collection.

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