

Book review

Catalytic Conversions of Synthesis Gas and Alcohols to Chemicals; edited by Richard G. Herman, Plenum Press, New York, N.Y., 1984, ISBN 0-306-41614-X, pp. 476 + xi, \$59.50.

The proceedings of a symposium on Catalytic Conversions of Synthesis Gas to Alcohols and Chemicals held in Pennsylvania in April 1983 have been turned into a useful and slightly unusual book. The editor states in his preface that it is directed towards professional engineers and chemists, but that it should be usable as a reference book for graduate and undergraduate courses in catalysis. He is not without justification, but the emphasis is on heterogeneous systems. For this reason many of the names one might readily associate with academic organometallic catalysis are absent, and there is considerable emphasis on consumption of energy and availability of feedstocks. Even the title reflects this different viewpoint, for most academics would consider alcohols themselves to be chemicals.

The book is in four principal sections. The first fifty pages (Introductory Orientation) concern the production and use of energy and feedstocks in the U.S. economy (Herman) and the production of synthesis gas (Graboski). The next one hundred and twenty pages contain some eight contributions concerning the production of chemicals from synthesis gas. The last two sections are on reactions of synthesis gas to form chemicals (about one hundred pages) and the use of alcohols to form olefins, aldehydes, etc. (one hundred and fifty pages).

The level of treatment is very diverse, and since many of the systems presented are heterogeneous there is often little of the discussion of mechanisms so favoured by organometallic chemists. The contributions are often research papers, but others, such as a discussion by Rofer-DePoorter on the interconnection of the Fischer-Tropsch process and the water-gas shift, are considerable reviews. A paper by Deem reports a study on oxidative addition and hydrogen transfer using organorhodium compounds and is a conventional organometallic study. Another by Peltzman on the conversion of synthesis gas to formic acid is so unsure of the quality of its audience that it needs to remind it that H₂O is water, NH₃ is ammonia and CO is carbon monoxide!

Overall, this book presents a useful picture of the current industrial practices involving synthesis gas, and of the directions in which this chemistry is likely to move. It concerns itself principally with heterogeneous systems and will provide only limited information of direct concern to organometallic chemists. However, it is of general interest for all those concerned with synthesis gas, and many will benefit from a selective perusal of the material presented.