Book reviews

Catalysis Reviews, vol. 11, edited by H. Heinemann and J.J. Carberry, Marcel Dekker, Inc., New York, 1975, xvi + 325 pages, $32.50.

This volume contains seven chapters: Nitric Oxide: Surface Reactions and Removal from Auto Exhaust (Shelef); Selectivity in Catalysis by Alloys (Ponec); Application of Raman Spectroscopy to Surface Chemical Studies (Egerton and Hardin); Mössbauer Spectroscopy (Gager and Hobson); The Influence of Inert, Diluent Gases on the Rates of Heterogeneous Catalytic Reactions (Hudgins and Silverston); Molton Salt Catalysis of Gas Reactions (Kenny); The Contribution of Organometallic Chemistry and Homogeneous Catalysis to the Understanding of Surface Reactions (Ugo).

The last of these is of the most immediate interest to organometallic chemists. Ugo's intent is to outline the structural features of transition metal complexes that might offer models for species present as intermediates in heterogeneous transition metal-catalyzed reactions. A great deal is now known about structure and bonding in transition metal complexes; almost nothing is known with any certainty about structures or bonding in surface species. It is thus difficult to judge the relevance of the former to studies of the latter, although it is possible to imagine a priori a surface analog for almost every type of solution complex. Ugo reviews the structure of a broad spectrum of soluble complexes, and summarizes conclusions concerning the structures of surface intermediates that are sometimes at variance with those expected by analogy with solution experiments but more often in agreement with them. Although it is clear that individual metal atoms in a surface can have electronic characteristics different from those in soluble complexes, it is not presently evident whether surface species have properties uniquely different from these model complexes. Ugo's bias is that most of surface chemistry can in fact be explained using solution analogs. He probably overstates his case, but no firm refuting evidence from surface chemistry is available. This chapter serves the useful purpose of collecting and summarizing a number of studies relevant to the structures of surface species, and is interesting reading, so long as it is not taken seriously.

Several other chapters are relevant to the relationship between organometallic chemistry and heterogeneous catalysis. Chapters on Raman and Mössbauer spectroscopy offer useful discussions concerning the strong and weak points of each in examining surface species. The transformation of nitric oxide to more acceptable substances can be accomplished both heterogeneously and homogeneously, and the differences between the heterogeneous reactions (outlined here) and the homogeneous ones contain hints concerning the characteristics of surface sites. Molten salts are remarkable solvents for many inorganic materials, and are potentially useful in applications beside catalysis: properties of several of the most useful molten salt systems are outlined. Alloy catalysts show, in some instances, selectivity and resistance to poisoning that makes them more useful

than pure metals: comparisons of pure and alloy catalysts shed some light on the mode(s) of operation of each.

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Reagents for Organic Synthesis, Vol. 5; by M. Fieser and L.F. Fieser, Wiley-Interscience, New York/London/Sydney/Toronto, 1975, 864 pages, $32.15, £16.15.

Volume five of this now well established series should prove valuable to both the synthetic organic and organometallic chemist. Following the same format as previous volumes, this volume covers 350 new reagents and adds new information on 400 reagents previously described in this series. The references generally cover the period 1972 to August 1974 although some older references have been included for the first time. The authors have alphabetically listed each reagent, usually according to its chemical name but occasionally by more familiar names, such as crown ethers or Simmons—Smith reagent. References to previous entries in earlier volumes are followed by a list of commercial suppliers and/or an indication of the procedure by which the reagent may be prepared. A brief description of the reagent's synthetic utility and appropriate literature references follow. Although the general utility of many of these reagents remains to be established, their presence provides food for thought.

This volume once again contains extensive indices including (1) the type of reaction involved or the type of products formed, (2) an author index, and (3) a general subject index. The somewhat unfortunate organization of reagents according to alphabet, instead of reaction type, demands these detailed indices. Even so, with five volumes at hand and undoubtedly more on the way, this series forces the chemist to look through every volume to find all reagents which will, for example, reduce a ketone to an alcohol. In the future one might hope for larger and fewer volumes, more like the first in this series (1457 pages), perhaps somewhat more judiciously edited so as to cover a larger time period. Perhaps collective volumes on the order of "Organic Syntheses" would be desirable, coordinating and editing the massive amount of material presented in previous volumes. This would certainly prove of immense value to the synthetic organic chemist. In spite of these drawbacks this volume and the series as a whole are invaluable to the synthetic organic chemist.

The organometallic chemist will once again find browsing in this volume most rewarding. Organo-boron, -copper, -lithium and -selenium reagents receive considerable attention, as do a variety of transition metal complexes. The ease with which the literature preparations are found makes this series especially useful. However, considering the cost and utility of this volume, many organometallic chemists may find this volume too expensive for