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Book Reviews

Organosilicon Chemistry: From Molecules to Materials
N. Auner and J. Weis (eds.), VCH, Weinheim, 1994,
349 pages, DM128.00.
ISBN 3-527-29061-3

This volume is a compilation of the lectures and posters (or in some cases seemingly brief summaries of them) presented during a meeting entitled "Munich Silicon Days '92" held in Munich in 1992. They are organized under five headings, viz.: Tetravalent organosilicon compounds: chemistry and structure; Subvalent and unsaturated organosilicon compounds: formation and structure; Hypervalent organosilicon compounds: formation and chemistry; Organosilicon–metal compounds: coordination chemistry and catalysis; Silicon polymers: formation and application.

A good number of the best known names in the field are represented among the authors. Much of the material has appeared elsewhere, but overall the volume gives a fair idea of the current scope of organosilicon chemistry.

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Oxygenates by Homologation or CO Hydrogenation with Metal Complexes

G. Braca (ed.), Kluwer, Dordrecht 226 pages, £64.00,
ISBN 0-7923-2628-8.

The book is the 16th volume in the series *Catalysis by Metal Complexes* from the same publisher.

The escalating oil prices in the 1970s and early 1980s have given a strong impetus to the development of new catalytic chemistry for the production of industrial chemicals from syngas. This book gives an overview of advances in this field but limited to homogeneously metal-complex catalyzed hydrocarbonylation reactions with syngas, which were described in papers and patents appearing mainly after 1982.

The review is organized in three chapters. The first deals with CO hydrogenation for the direct conversion of syngas into oxygenates and is titled "Monoalcohols, glycols, and their ethers and esters by CO hydrogenation" (with 136 references). The second chapter deals with the indirect synthesis of oxygenates from syngas via homologation of alcohols and their derivatives ("Alcohols and derivatives by homologation with syngas"; with 226 references) and the third with their synthesis via aldehyde hydrocarbonylation ("Hydrocarbonylation of aldehydes and their derivatives; with 85 references). The first two chapters (88 and 101 pages, respectively) are written by G. Braca, A.M. Raspolli Galletti and G. Sbrana and the last chapter (30 pages) by M. Marchionna.

The authors did not have an easy task in collecting and systematically organizing the large body of results on the subject, and at the same time giving a meaningful interpretation of catalytic phenomena underlying the experimental data. Often the experimental results cited, and not only those in patent literature, are conflicting and incomplete. In many cases selectivity data towards the various products are unreliable; for instance, hydrocarbon formation in syngas reactions is almost never accounted for.

Nevertheless, the authors have attempted to discuss the subject systematically in terms of a common scheme, first presenting the catalytic performance of the various metal complexes and then a general discussion of the reaction mechanisms, involving the various successive steps in the proposed catalytic cycles. Since most catalytic systems consist of complicated mixtures of metal complexes (and often of more than one metal) with so-called promoters, a discussion of reaction mechanisms, involving simultaneous and/or sequential carbonylation and hydrogenation reaction steps, is bound to be rather speculative. Rarely can direct experimental evidence for postulated intermediate metal complexes be given.

The review shows that selective and efficient formation of target oxygenate chemicals, such as the C₂-chemicals ethylene glycol and ethanol, via direct or indirect hydrocarbonylation reactions with syngas, is still an elusive goal. In addition to the effect of the fall