

Book reviews

Syntheses and Separations using Functional Polymers; edited by D.C. Sherrington and P. Hodge, John Wiley and Sons, Chichester, x + 454 pages, 1988, £53.50. ISBN 0-471-91848-2.

This volume is a sequel to the book by the same editors, *Polymer-supported Reactions in Organic Synthesis*, published in 1979. The topics chosen for consideration here represent the growth areas since that time. There are two distinct types of chapter. In cases in which the topic had been covered in the earlier volume, this account serves as an update of progress since 1979, but for new topics a more general coverage is given.

The first two chapters are very substantial ones dealing respectively with the synthesis and structure of polymer supports (A. Guyot) and organic reactions using polymer-supported catalysts, reagents or substrates (P. Hodge). Both of these fall largely into the update category. Few of the reactions here involve organometallics, but many useful fundamental processes involved in the preparation of polymer ligands for metals are considered in detail. The third chapter (P.E. Garrou and B.C. Gates) deals with polymer-bound transition metal complex catalysts, and it is this section that the organometallic chemist will probably find the most interesting. Again this is an update of recent developments. There is a good discussion of the problem which frequently limits the practical utility of such catalysts, the stability of the catalyst, both in relation to metal leaching and chemical instability. The general conclusion reached by the author is that the present generation of such catalysts are unlikely to find many viable applications, and new approaches are needed if the subject is not to become a backwater.

In Chapter 4, H. Widdecke discusses the design and industrial application of polymeric acid catalysts. Although a range of acid types are discussed, it is the sulphonated poly(styrene–divinyl benzene) resins which have found the widest application. The review of progress in the field of polymeric phase transfer catalysts (M. Tomoi and W.T. Ford) considers onium catalysts, supported crown ethers and cryptands, and polymer-supported solvents. D.C. Neckers reviews the properties of polymeric rose bengals as photochemical reagents and H.J. van den Berg and G. Challa consider polymeric models of reactive biological systems. In the latter account particular attention is paid to the use of polymers as models for hydrolytic and redox enzymes, with a number of the copper-dependent redox enzymes considered in detail. Two chapters (L. Jervis on polymers in affinity chromatography and W.H. Pirkle and G.S. Mahler on the uses of chiral polymers for separation of enantiomers in HPLC) deal with analytical uses of functionalised polymers. A. Warshawsky then reviews the use of polymeric ligands in hydrometallurgy, and the book concludes with an overview of polymer supports and reactivity by D.C. Sherrington. The editors had hoped to include chapters on solid phase synthesis,

and on polymer-supported cells and enzymes, but these accounts did not come to fruition, and the areas have in fact been well reviewed elsewhere.

Overall the volume is well produced, with clear diagrams, and relatively few errors. All the chapters are well referenced, generally into 1986, and the index is helpful.

The individual chapters of this book are generally very good, and take an incisive and critical view of the subject. Any individual reader will inevitably find some topics of more interest than others, but this volume should be indispensable reading for anyone working in the area of polymer-supported catalysts or reagents.

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Nitration, Methods and Mechanism; by G.A. Olah, R. Malhotra and S.C. Narang, Verlag Chemie, Weinheim, 1989, xii + 330 pages, £52.00, DM 145. ISBN 0-89573-144-4.

A consequence of the importance of nitration from both the mechanistic and preparative viewpoint has been the steady stream of books dealing either exclusively or substantially with this topic during the past 30 years or so. As might be expected in view of the principal author's interests, this latest book emphasizes the wide variety of conditions under which nitration may be achieved, and the mechanism of the reaction. By contrast, it contains few reactivity data or isomer distributions for nitration of aromatics. The interest for the organometallic chemist will stem from the fundamental importance of nitration, and the fact that some reactions described involve cleavage of organometallic compounds.

The book consists of four chapters entitled: "Introduction and General Aspects"; "Reagents and Methods of (sic) Aromatic Nitration"; "Mechanism of Aromatic Nitration"; and "Aliphatic Nitration".

The second chapter is subdivided into sections on acid-catalysed electrophilic nitration, homolytic nitration, and nucleophilic nitration. The first of these sections contains a useful description, with references, of some 45 reagents, including trimethylsilyl nitrate, and nitration with monodentate metal nitrates (among which ammonium nitrate is surprisingly included). Many of the reactions have mainly academic interest, but some show promise for circumventing the problems associated with disposal of the by-products of nitration. This section is, however, somewhat curiously titled, since a number of the reactions described take place without any added acid. Other topics here of interest to the organometallic chemist include nitration via palladiation (though there is no evidence that this is an electrophilic substitution) and two methods involving prior mercuriation. In one of these nitrosodemercuration then occurs, followed by oxidation, a similar process being involved in (overall) nitrodethallation. At this point some other surprising organisational aspects of the book are evident, for there follows a section on nitrodemetallation with (sic) other metal compounds, including nitrodesilylation accompanied by a 1978 reference (this reaction was discovered in 1907!). Subsequently a separate section entitled "desilylative nitration" appears, the authors