

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.

*School of Chemistry and Molecular Sciences,
University of Sussex, Falmer, Brighton (U.K.)*

Penny A. Chaloner

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

seeming to be unaware that this process involves nitrosodesilylation followed by oxidation under most conditions.

Under homolytic nitration, sections describe the promotion of nitration with N_2O_4 by metal complexes such as acetylacetonates (though this method is evidently diadvantageous compared to traditional ones), and the use of bidentate metal nitrates such as $Ti(NO_3)_4$, useful for nitrating π -deficient heteroaromatics. The section on bidentate metal nitrates includes the use of ceric ammonium nitrate under conditions involving both homolytic and electrophilic conditions. Nitrodesilylation involving copper(II) nitrate in Ac_2O is described incorrectly here as homolytic (but elsewhere in the book as an acid-catalysed electrophilic nitration).

The chapter on nitration mechanisms gives a good overall account of the important material, though the section on the effect of nitrous acid is rather misleading in stating at the beginning that nitrous acid has an anticatalytic effect, but then subsequently notes that in some cases the opposite is true. This chapter naturally includes a full description of the principal author's experimental results (partially conceded here to involve mixing control) that led to the proposal of a mechanism involving rate-determining formation of a π -complex. Included is an impressive table showing the isomer yields obtained in nitration of toluene under no less than 109 sets of conditions! The chapter also includes a very useful review of the relevance of the electron transfer mechanism (likely to apply to nitration only of polycyclic aromatics with oxidation potentials lower than that of NO_2^+).

The last chapter, on aliphatic nitration, is perhaps the most valuable since this topic has not been covered elsewhere; both electrophilic and nucleophilic nitration are described. Surprisingly, although the electrophilic nitration of alkanes and alkenes by both nitrodesilylation and nitrodestannylation are described in separate sections, the similar formation of nitroalkynes is not, which rather emphasizes the somewhat uneven presentation of this book.

Overall this book covers most of the ground, and at the end of each chapter there is a valuable summary of the main points within. There is a small index, which could usefully have been longer. I noted for example the omission of a number of *ipso* substitutions, e.g. nitrodeacylation, and since there is no sub-heading for these in the contents pages, tracking them down took some effort. I believe a little more effort on preparation and organisation of this book by the authors would have been worthwhile. I noted a number of typographical errors and also some reference errors; these latter are fortunately obvious where the authors refer in the text, as they often do, to the principal worker. The book complements those that emphasise nitration rate data, and will doubtless be of interest to all those working in the field, and libraries should have a copy. The price is typical of current specialist texts with high quality printing and production, which this most certainly has.

*School of Chemistry and Molecular Sciences,
University of Sussex, Brighton BN1 9QJ (U.K.)*

Roger Taylor