Nitrogen, Oxygen and Sulfur Ylide Chemistry; edited by J. S. Clark; Oxford University Press: Oxford, **2002**; hardback, £80.00, pp 292, ISBN 0-19-850017-3.

Ammonium and sulfonium ylides have been recognised and utilised as intermediates in various reactions since the discovery of the Stevens rearrangement some seventy-five years ago. In the past two or three decades, however, the field has undergone a rapid expansion and now incorporates many useful transformations of oxonium, as well as ammonium and sulfonium ylides. The reasons for this expansion are twofold – firstly, there has been a recognition of the power and versatility of these intermediates for synthesis of complex organic molecules; and secondly, catalytic methods for their generation have been developed which are milder, cleaner and more flexible than the traditional method of salt deprotonation.

This book is the latest in OUP's 'Practical Approach in Chemistry' series. Its aim is to introduce the field to a non-specialist reader and, through the inclusion of selected experimental procedures, to serve as a laboratory manual for chemists wishing to use these methods for the first time. The scope of the book is ambitious, as it includes not only ammonium, oxonium and sulfonium ylides, but also a range of 1,3-dipoles and their cycloaddition chemistry. The focus is, naturally, on the more modern methods of ylide generation such as diazodecomposition.

The opening chapter is a comprehensive overview of the development of ylide chemistry. This is followed by a series of sections on individual methods, written by the leading authors in the field.

Chapter 2 deals with the synthesis and reactions of ammonium, oxonium and sulfonium ylides. Most of the protocols reported in this section involve the reaction of amines, ethers or sulfides with diazo compounds, with either metal catalysis or photochemical generation of a carbene. In view of the central role diazo compounds play in this chemistry, it would perhaps have been better to start the chapter with some information on methods for their synthesis, rather than including a single diazo-transfer protocol midway through. In addition to the carbene- and carbenoid-mediated methods in this chapter, two sections by Sato deal with the desilylation of α-silylated ammonium and sulfonium salts.

The following chapter, on azomethine, carbonyl and thiocarbonyl ylides, encompasses a wider range of synthetic methods. In addition to the use of diazo compounds in both intra- and intermolecular reactions, there are sections on the generation of azomethine ylides by condensation of amines with aldehydes and by oxidation of bis(silylmethyl)amines, and on the generation of carbonyl ylides by reduction of bis(chloroalkyl)ethers. The final short chapter, on nitrile ylide chemistry, covers two methods: the reaction of nitriles with metal carbenes and the thermolysis of oxazaphospholines.

Overall, the book achieves its aim of providing a useful introduction to modern practical methods in ylide chemistry, although it suffers slightly from the bane of multi-author volumes – namely an element of redundancy arising from more than one author writing about the same subject. For example, two separate sections give protocols for the intramolecular reaction of an α-diazo-β-ketoester with a sulfide, catalysed by rhodium acetate in refluxing benzene! Moreover, some of the protocols included have, at best, a tangential relationship to the subject of ylide chemistry – in particular, a series of five experimental procedures on the synthesis of a complex diazoketone could easily have been omitted.

While the coverage of methods is not comprehensive – I personally would have liked to see protocols on the synthesis of epoxides from aldehydes, and on the generation of azomethine ylides by aziridine opening – this book is an excellent and useful addition to the 'Practical Approach' series. The opening chapter is a fine overview of the subject, and the clearly written experimental procedures should make the book a first port of call for chemists wishing to try their hand in this area.

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