Book Reviews

Synthetic Fluorine Chemistry
G.A. Olah, R.D. Chambers and G.K. Surya Prakash (eds.), Wiley, New York, 1992, 393 pages. £75.00. ISBN 0-471-54370-5

This well produced and informative source book is a must for all practising fluorine chemists. It is a great pity that the title of the book is somewhat of a misnomer. The implication is that the book is about synthesis in fluorine chemistry when really it is not. It is a series of very useful review articles on methods available for the introduction of fluorine or fluorinated groups into molecules. A title of "Topics in Fluorine Chemistry" or something similar would have been more appropriate. However this minor point does not detract from the value of the book.

The book consists of some seventeen chapters covering a wide range of topics from an excellent chapter (14) which illustrates in a very clear manner the interplay between theoretical chemistry and synthetic methodology to the use of elementary fluorine in the preparation of complex fluorocarbons.

The first three chapters are devoted to the formation and reactions of complex metal and rare gas compounds, and present comprehensive reviews of these areas. These chapters are followed by a very interesting article concerned with the stabilisation of carbon–sulphur multiple bonds, another good example of the remarkable effects of fluorine substitution on the stability of hitherto unstable materials.

The remainder of the book is devoted to various aspects of organofluorine chemistry. Three chapters are devoted to the rapidly devloping field of the use of elemental fluorine in fluorination. The first, from Lagow's group, deals with solid phase fluorination of high molecular weight materials; the second is a review of the specialist technique of aerosol fluorination by Adcock (a very good review of this area); and the third is an excellent overall review by Rozen of more general aspects of the field. These three chapters are well complementary, and represent as good a selection of reviews of the current state of the art as are available.

The long awaited comprehensive review of pyridine/HF chemistry by Olah appears as Chapter 8 and beautifully brings together a great deal of work concerned with the use of this reagent. Particularly useful is the literature coverage.

There follows in Chapter 9 an extended and more comprehesive overview of the use of fluorinated organometallic reagents by Burton (concentrating on copper cadmium and zinc reagents only) than appears in his Tetrahedron report. This review contains many useful examples of the chemistry of these reagents, points out the problems that may be encountered in their use, and gives a view on reagent and solvent choice for particular transformations. This chapter the reviewer found to be one of the most useful in the book.

Chapter 10 is the first full review of the use of polyfluoroalkylsilanes in synthesis and is particularly timely. It provides an excellent summary of the current situation in this growing area. The literature is again well covered. Chapter 11 is complementary to Chapter 10 in that it highlights a practical application of silicon chemistry and points the way to a possible a rethink on the use of perfluoroalkyl organometallics in the preparation of silanes.

Chapter 12 is rather disappointing in its review of ipso reactions in polyfluoroarenes, since it differs very little from a previous review by the same author published in the *Journal of Fluorine Chemistry* some time ago. Chapter 13 an excellent cameo on the perfluorobenzene oxide–oxepin system beautifully presented by Lemal, illustrates the point made earlier about the book title, since, as good as this chapter, is it can hardly come under the title of the book. The next chapter illustrates the point concerning the use of a marriage of theory and practice and covers in an unusal but very cogent manner the chemistry of perhalo dioxins, an excellent chapter.

In the next section Welch extends his earlier review on asymmetric synthesis in fluorocarbon chemistry, a chapter which makes essential reading for those concerned with stereo and regio specific introduction of fluorine into bioactive molecules. Chapter 16, by Chambers, bring together a recent series of exciting results by the Durham group concerned with the chemistry of fluorinated alkenes and dienes. This is an excellent chapter which brings out the fascination of polyfluoroolefin chemistry in a very graphic, well-presented, manner and again is well referenced.

This volume is doubt, essential reading for the dedicated fluorine chemist, containing as is does articles by leaders in the field. But at the same time it is an excellent source book for anyone wishing to get a feel for a particular area of fluorine chemistry.

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