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Book Review

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Organosilanes in radical chemistry: principles, methods and applications

Wiley, 2003, pp 227.
price £90.
ISBN 0-471-49870-X

As pointed out by the author in the Preface, there are no books devoted to the chemistry of silyl radicals. This book, in covering the many different aspects of the chemistry of silyl radicals, constitutes a much needed reference text in the area. Given the prevalence of these reactive intermediates in organic synthesis, mechanistic studies and, more recently, material sciences, this book will be welcomed by both specialists and non-specialists alike. The coverage of the subject is not intended to be comprehensive; rather, it focuses on recent work on silyl radicals in the liquid phase and highlights the most exciting developments in the area.

In Chapters 1 and 2 the fundamental aspects of silyl radical chemistry are covered, including formation, structure and thermochemistry. Useful compilations of bond dissociation enthalpies are included. In Chapter 3, the hydrogen donor abilities of various silicon hydrides are discussed. Again, the chapter contains useful tables of rate constants for the reaction of silicon hydrides with carbon-, nitrogen-, oxygen- and sulfur-centred radicals. The applications of silyl radicals in organic chemistry are covered in Chapters 4 to 7. The use of silanes as reducing agents is presented in Chapter 4, which contains a significant section on the chemistry of tris(trimethylsilyl)silane as a radical-based reducing agent. The addition of silyl radicals to unsaturated bonds (the hydrosilylation reaction) is discussed in Chapter 5 and illustrates that the radical-based hydrosilylation method is a useful, complementary method to the transition-metal-catalysed variation of this reaction. Chapters 6 and 7 describe unimolecular rearrangements and consecutive silyl radical reactions, respectively. Finally, the applications of silyl radicals in polymer and materials chemistry are presented in Chapter 8. The book also includes a list of abbreviations and a substantial subject index.

The author has provided sufficient background information throughout the book to make the content easily understood by non-specialists. Furthermore, he often discusses the practical aspects of the chemistry, which will be very useful to chemists unfamiliar with common practices in the field. Finally, he provides, on occasion, a personal retrospective on aspects of silyl radical chemistry in which he has worked. This enhances the readability of the text.

Although the book is only 227 pages long, it is dense with useful information. The quality and the layout of the drawings are excellent. The text is well written and easy to read. The text and drawings are remarkably free of typographical errors. Unfortunately, the list price (£90) of the book will prevent most practising chemists from acquiring a copy for their personal library.

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