

Silicon-mediated Transformations of Functional Groups; by Helmut Vorbrüggen; Wiley-VCH: Weinheim, 2004, hardcover, 378 pp, € 135, ISBN 3-527-30668-4

Practical guide for silylations and activation of functional groups by silicon moieties

When organic chemists think about silicon in organic synthesis, the first thing coming to their minds are silicon-based protective groups for alcohols or other functional moieties. However, the chemistry involving silylated intermediates has much more facets since the reactivity, regio-, and stereoselectivity of these transformations can be triggered in an impressive manner. Unfortunately, most scientists are not aware of these elegant synthetic features. Therefore, Helmut Vorbrüggen felt the need for a new compilation in this field with a high-quality book. The author of the monograph gathered almost 30 years of industrial research experience as department head of central research at the Schering AG. He is a well-known expert in that scientific area and has contributed many ground-breaking results. In particular, his stereoselective nucleoside synthesis involving silylated intermediates is considered as a named reaction.

The more general sections of the book are designed for advanced students of all disciplines in chemistry, whereas the whole monograph addresses professional researchers involved in organic synthesis.

The book is systematically organized in 14 chapters. The individual sections have their own reference list given as footnotes. The scientific surveys end with selected experimental procedures, which are representative and described in detail. Together with practical information and hints about pitfalls (in the written part), this book will evolve into a standard handbook in that particular field. The first three chapters deal with general aspects of silylations: different methodologies, various reagents, and common reactions of the by-products. Especially, the discussion about the properties and reactivity of different trialkyl/triarylsilanols is very useful. The leaving group character of siloxy moieties is clearly outlined and compared to the carbon analogues. However, the reactivity is often explained by the HSAB principle, whereas nowadays the stability of the bonds between silicon and attached atoms is used as argument. Therefore, a table with such values for bond energies would fit perfectly. The succeeding two chapters treat the silylation of carbonyl derivatives and its activating effect. The obtained silylated compounds represent attractive synthetic

intermediates which facilitate a variety of interesting transformations. Together with the next chapter, devoted to the conversion of alcohols exploiting silyl reagents, this part of the book should be compulsory reading for synthetically oriented chemists. Subsequently, a survey focuses on N–O systems. The oxophilic and reductive nature of these silyl reagents can be used for the selective conversion of aromatic and aliphatic *N*-oxides and related compounds. In Chapter 8, the specific reactivity towards S–O or Se–O bonds is discussed, including the Sila-Pummerer rearrangement as an elegant way towards vinyl sulfides. The next section deals with cyclizations based on condensation processes or Diels–Alder reactions. Chapter 10 is devoted to the Peterson olefination, a versatile transformation which can be directed in its stereoselectivity through specific work-up conditions by elimination of the silanol species. The next three chapters might be of more interest for an inorganic-oriented readership. The synthesis of carbon–phosphorous derivatives and dehydration, as well as the activation of metal salts, is described. Furthermore, oxidation and reduction protocols exploiting silyl reagents are presented. The final chapter reports the formation of organic and inorganic polymers and includes transformations which were mostly discussed before, but are now used to construct indefinite structures.

The literature up to 2002 is mostly covered, whereas some cutting-edge areas are not at all, or only sparsely, treated: e.g. the Sekiguchi chemistry, radical chemistry and chiral silanes. The term ‘recently’ should have been used more carefully, since it refers sometimes to 15-year-old literature (e.g. page 22). The book is well-made and the number of mistakes is on an acceptable level. Mainly, they consist of missing atom symbols (e.g. page 34) and parts cut off (e.g. page 237) in the schemes. The table of contents and the index are exquisite and the reader should have no problem in finding the corresponding section in the monograph.

In summary, this book represents a very valuable reference for the covered fields. It is recommended for every good library collection and will surely find a place on the shelves of the scientists acting in that area.

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