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Thiosilanes Based Delivery of Sulfur Functionalities in Organic Synthesis

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THIOSILANES BASED DELIVERY OF SULFUR FUNCTIONALITIES IN ORGANIC SYNTHESIS.

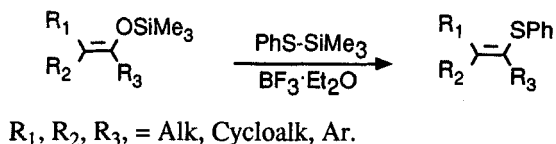
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Abstract: Thiosilanes have been proved efficient reagents in the transfer of sulfur functionalities onto organic substrates.

Vinyl sulfides have recently emerged as valuable synthetic intermediates¹, taking part in a number of interesting chemical transformations. Nonetheless, their synthesis is not straightforward, although a number of methodologies have been proposed in the literature². Moreover, 1,3-bisphenylthiopropanes have been shown extremely versatile intermediates, being used by Corey³ and Cohen⁴ for some key steps in the total synthesis of some prostaglandin and prostacyclin systems.

We report in this note on a novel synthetic approach to these classes of compounds⁵. We have found that upon treatment of a variety of silyl enol ethers in the presence of equimolar amounts of BF₃·Et₂O with different silyl sulfides, a clean reaction occurs, leading to the corresponding substituted vinyl derivatives as shown in Scheme 1.



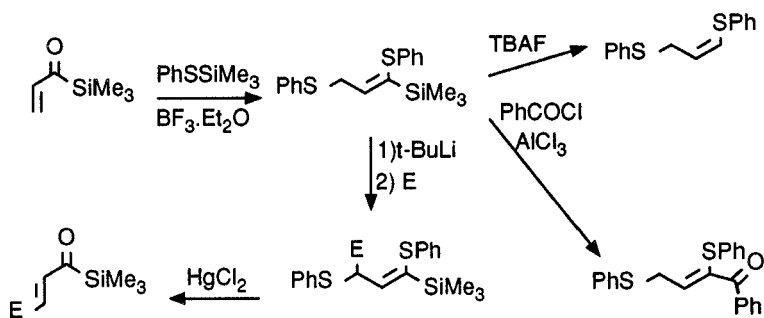
SCHEME 1

This reaction possesses a broad generality, occurring smoothly with different substrates, ranging from linear to cyclic enol ethers, leading to a wide variety of vinyl sulfides, a major advantage being the availability of silyl enol ethers from formally every carbonyl compound possessing an α hydrogen. Moreover, the reaction is regiospecific, as shown in the reaction of

6-methyl-1-cyclohexenyloxytrimethylsilane that affords 6-methyl-1-phenylthio-1-cyclohexene exclusively.

A further valuable extension of this reactivity may be achieved when reacting α -enones with 2 equivalents of PhSSiMe_3 . In this case, a direct and convenient entry to 1,3-bis-phenylthiopropenes can be achieved⁶.

When using propenoylsilane as the reacting enone, the corresponding silyl derivative may be obtained in a stereospecific fashion, and the C-Si bond further functionalized to more valuable compounds or simply desilylated with retention of configuration to afford a stereospecific access to 1,3-bisphenylthiopropene formally deriving from acrolein. Alternatively treatment with $t\text{-BuLi}$ followed by quench with



SCHEME 2

different electrophiles yields functionalized silyl-bis-phenylthiopropenes which may be conveniently reacted with HgCl_2 to afford a general entry to variously functionalized propenoylsilanes (Scheme 2).

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