Chinese Chemical Letters Vol. 16, No. 10, pp 1333-1334, 2005

http://www.imm.ac.cn/journal/ccl.html

A Novel Efficient Method for Synthesis of β-Organoseleno Substituted Allyl Sulfoxides

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Abstract: Hydroselenation of 1, 2-allenyl sulfoxides give 2-organoseleno substituted allyl sulfoxides in high yields and the reaction is absolute regioselective.

Keywords: Hydroselenation, allenyl sulfoxides, regioselectivity.

In the last few decades, there has been remarkable interest in the synthesis of vinylic chalcogenides and their synthetic application[1]. Hydrochalcogenation reaction of electron-deficent C-C triple bond, *i.e.* 1-alkynylphosphonates[2], 1-alkynylphosphine oxides[3], propargylaldehydle[4], *etc*. have become a very powerful tool for the highly stereoselective synthesis of functionalized vinylic chalcogenides. We have reported the anti-hydrotelluration of acetylenic sulfones and acetylenic phosphonates[5a], hydrotelluration of acetylenic sulfoxides[5b], to prepare functionalized vinyl chalcogenides. Another class of compounds attracting our interest is electron-deficient 1,2-dienes, due to their high and unique reactivity[6,7]. Usually, one of the two C-C double bonds can be selectively reacted to give vinylic products *via* delicate the tuning of the steric and electronic factors.

On the other hand, allyl sulfoxides[8], are very important intermediates in organic synthesis. Considering the well-known chemical reactivities of vinylic chalcogenides[1], β-organoseleno substituted allyl sulfoxides, which combine the unit of vinylic chalcogenides and allyl sulfoxides into one molecule, will be intermediates of great syn-

Scheme 1

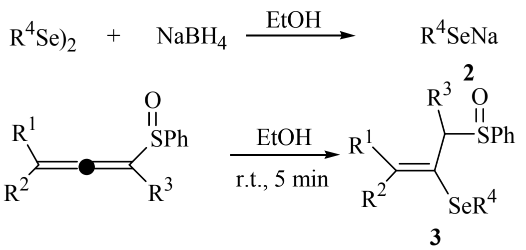

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Table 1 Preparation of β-organoseleno allyl sulfoxides

Entry	R^1	R^2	R^3	R^4Y	Yields(%)[a]	Products
1	H	H	H	C_6H_5Se	83	**3a**
2	H	H	H	n-C_4H_9Se	82	**3b**
3	H	H	H	C_6H_5Se	81	**3c**
4	H	H	H	n-C_4H_9Se	80	**3d**
5	-$(CH_2)_5$-		Ph	C_6H_5Se	84	**3e**
6	-$(CH_2)_5$-		Ph	n-C_4H_9Se	82	**3f**
7	CH_3	CH_3	H	C_6H_5Se	83	**3g**
8	CH_3	CH_3	H	n-C_4H_9Se	83	**3h**

[a] Isolated yield.

thetic potential. In connection with our continued work on this area[5], herein we wish to report the regioselectively hydroselenation reaction of allenyl sulfoxides to synthesize β-organoseleno allyl sulfoxides.

1, 2-Allenyl sulfoxides were added to a EtOH solution of sodium organoselenolates, prepared by reduction of diorganic selenides with sodium borohydride at room temperature. To our delight, the β-organoseleno allyl sulfoxides were formed in high yields with total regioselectivity. Results are summarized in **Table 1**. The substrates can be mono-(entry 1), di-(entry 2) and trisubstituted(entries 3,4) allenyl sulfoxides.

In summary, we disclose here the high efficient regioselective hydrohalcogenation of allenyl sulfoxides to afford synthetically important β-organoseleno allyl sulfoxides.

Acknowledgment

We are grateful to the National Natural Science Foundation of China (Project No. 20272050, 20332060) for financial support.

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Received 31 January, 2005