

Solid-phase Synthesis of Vinyl Sulfones Using Polystyrene-supported Selenomethyl Phenyl Sulfone

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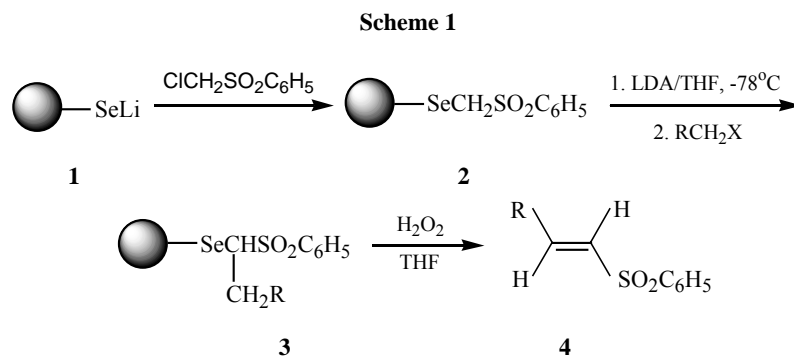
Abstract: The solid-phase preparation of vinyl sulfones *via* a novel polystyrene-supported selenomethyl phenyl sulfone reagent has been reported.

Keywords: Solid-phase organic synthesis, polystyrene-supported selenomethyl phenyl sulfone, vinyl sulfone.

Synthesis on a polymer support shows a number of advantages as compared to solution chemistry. The most important one is the possibility to apply and remove the excess of reagents and removing them without involving time-consuming separation techniques¹. Vinyl sulfones have now become generally accepted useful intermediates in organic synthesis, *e.g.*, serving efficiently as both Michael acceptors and π partners in cycloaddition reaction. Among many methods for preparing vinyl sulfones the ionic and radical addition of selenosulfonate to alkenes and alkynes is important procedure². However, organic selenium reagents usually have a foul smell and are quite toxic, which is often problematic in organic synthesis. Polymer-supported selenium reagents have been recently developed to solve this problem³. In connection our research with the application of seleno-resins in organic synthesis⁴, we here report a novel facile route to vinyl sulfone using polystyrene-supported selenomethyl phenyl sulfone reagent **2** (**Scheme 1**).

Reaction of polystyrene-supported lithium selenide **1**³ with chloromethyl phenyl sulfone afforded polymer reagent **2**, which exhibited two strong characteristic sulfone stretches at 1317 and 1145 cm^{-1} in FT-IR spectrum and contained a loading of 1.25 mmol S/g by elemental analysis. Treatment of the lithio derivative of resin **2** (1.0 mmol) with representative primary alkyl halides (2.0 mmol) furnished the α -selenylated alkyl phenyl sulfone resin **3**, which was easily converted into the corresponding vinyl sulfones **4** by oxidation-elimination with 30 % hydrogen peroxide at 0 °C and then at room temperature in good yields (86-93%) and the crude materials (in 92-96 % of purities) was shown in **Table 1**. It should be noted that *trans*-1-alkenylsulfones are formed exclusively except for compound **4e**. The residual resin with no $-\text{SO}_2-$ absorption in FT-IR spectrum indicated the oxidation-elimination was complete.

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**Table 1** Yields and purities of vinyl sulfones

Entry	RCH ₂ X	Product	Yield (%) ^a	Purity (%) ^b
1	C ₆ H ₅ CH ₂ Br	4a	90	92
2	NCCH ₂ Cl	4b	86	95
3	CH ₃ OCOCH ₂ Br	4c	91	92
4	CH ₃ CH ₂ Br	4d	93	96
5	CH ₃ I	4e	93	96

a) Overall yields based on the loading of resin **2**. b) Determined by HPLC.

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References

1. R. E. Sammelson, M. J. Kurth, *Chem. Rev.*, **2001**, *101*, 137.
2. T. G. Back, S. Collins, *J. Org. Chem.*, **1981**, *46*, 3249.
3. K. C. Nicolaou, J. Pastor, S. Barluenga, N. Winssinger, *Chem. Commun.*, **1998**, 1947.
4. S. R. Sheng, L. L. Wu, X. Huang, *Chin. Chem. Lett.*, **2003**, *14*, 456.

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