

Peterson Olefination using Phenylsulphonyltrimethylsilylmethane. A New Preparation of Vinylic Sulphones

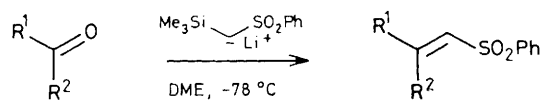
Steven V. Ley* and Nigel S. Simpkins

Department of Chemistry, Imperial College, London SW7 2AY, U.K.

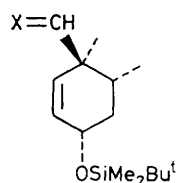
The anion from phenylsulphonyltrimethylsilylmethane reacts, in 1,2-dimethoxyethane at $-78\text{ }^{\circ}\text{C}$, with both aldehydes and ketones to give the corresponding alkenyl phenyl sulphones in good yield.

Vinyl sulphones are now well recognised as being useful synthetic intermediates,¹ and consequently methods for their

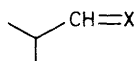
preparation are important.² Here we describe the use of the Peterson olefination procedure³ for the conversion of various



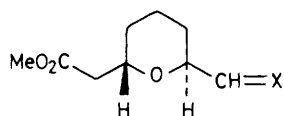
Scheme 1



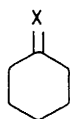
- (1) X = O
(9) X = CHSO₂Ph (*E*)



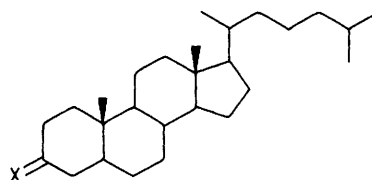
- (2) X = O
(10) X = CHSO₂Ph



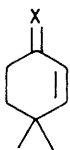
- (3) X = O
(11) X = CHSO₂Ph



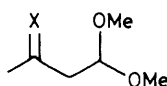
- (4) X = O
(12) X = CHSO₂Ph



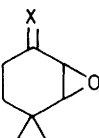
- (5) X = O
(13) X = CHSO₂Ph



- (6) X = O
(14) X = CHSO₂Ph



- (7) X = O
(15) X = CHSO₂Ph



- (8) X = O
(16) X = CHSO₂Ph

carbonyl compounds into vinyl sulphones (Scheme 1). Surprisingly this version of the Peterson reaction has not been reported previously.⁴

In a typical experiment, aldehydes or ketones were added to the anion generated from phenylsulphonyltrimethylsilylmethane⁵ using *n*-butyl-lithium (1.0 equiv.) in 1,2-dimethoxyethane† (DME) at -78°C . In this way the carbonyl

Table 1

Carbonyl compound	Product ^a	% Yield
(1)	(9)	92
(2)	(10)	70
(3)	(11)	50
(4)	(12)	82
(5)	(13)	85
(6)	(14)	81
(7)	(15)	57
(8)	(16)	84

^a All new compounds were fully characterised by spectroscopic, and accurate mass and/or microanalytical methods. All unsymmetrical products were *ca.* 1:1 *E-Z* mixtures, except (9) which was exclusively *E*.

compounds (1)–(8) directly afford the corresponding vinyl sulphones (9)–(16) upon work up with saturated ammonium chloride (Table 1). Crucial to the success of the reaction, especially with ketone derivatives, was the use of DME as solvent. Other solvents commonly used in these types of reaction, such as tetrahydrofuran, were much less successful.

The entries in Table 1 demonstrate that the method is mild and tolerates other functional groups, notably esters, acetals, epoxides, and silyl ethers.

In all these reactions it has so far been impossible to trap the initially formed adducts prior to elimination of the elements of Me₃SiOH. In very sterically encumbered environments aldehydes do react, but alternative sequences are necessary to generate the vinyl sulphones.

These conditions were used during an important homologation step in the synthesis of the insect antifeedant ajugarin I.⁶

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† Dry DME was obtained by distillation from benzophenone ketyl radical.