

Vinylic epoxides cannot be prepared in a suitable way from allylic dimethylsulfonium ylides which undergo [2,3] sigmatropic rearrangements³ nor from allylic diphenyl sulfonium ylides which are difficult to prepare⁴. In sharp contrast, triphenylarsine, being more nucleophilic than diphenyl sulfide, reacts nicely with allylic bromides to give the corresponding allylic arsonium salt and therefore the corresponding allylic arsonium ylide⁵.

In a preceding paper⁶ we have shown that semistabilized arsonium ylides give selectively epoxides if the right solvent system is used. As shown in Table I, allylic arsonium ylides react in THF with carbonyles to give high yields of the corresponding vinylic epoxides.

In a typical experiment ylide 1 ($R^1 = R^2 = H$) was prepared by adding 1.1 equiv. of LDA (Lithium di-isopropylamide) to the corresponding arsonium salt⁵ in THF at -40°C (1 hour). Then 0.8 equiv. of α -naphthaldehyde was added at -78°C and the reaction mixture allowed to warm slowly to room temperature.

Aqueous work-up, followed by chromatography on silicagel impregnated with triethylamine, gives a mixture of cis and trans epoxides⁷. Triphenyl arsine can be recycled or removed before chromatography by oxidation with neutral H_2O_2 in DME/ H_2O (1:1) at room temperature when the chromatographic separation is difficult.


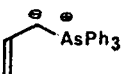
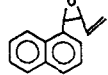

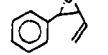
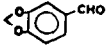
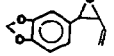

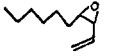
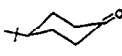

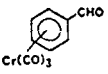
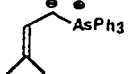
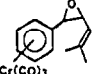
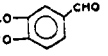
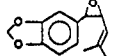



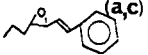

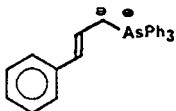
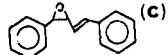



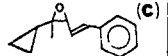
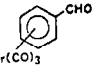
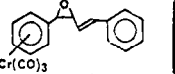

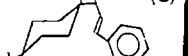
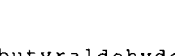
The survey of the results presented in Table 1 shows that the scope of this reaction is quite broad: aliphatic and aromatic aldehydes and ketones as well as α,β -unsaturated aldehydes give good yields of the corresponding vinylic epoxides.

Acknowledgments. This work was generously supported by a grant from Laboratoires Fournier, Dijon; we also thank Dr. F. Bellamy and Dr. J.B. Chazan for helpful discussions.

References.

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- 3) B.M. Trost and L.S. Melvin "Sulfur Ylides" Academic Press, New-York 1965

TABLE I

	Carbonyl Compound <u>2</u>	Ylide <u>1</u>	Epoxide <u>3</u> (cis + trans)	Yield % ^(b)
1				65
2				55
3				76
4				65
5				70
6	 Cr(CO) ₃		 Cr(CO) ₃	55
7				90
8				95
9				85
10				83
11				75
12				81
13	 Cr(CO) ₃		 Cr(CO) ₃	57
14				75
				

a) benzene was used as solvent and butyraldehyde added at 5°C.

b) Yields based on carbonyl compound 2.

c) from ref. 6.

- 4) a) R.W. La Rochelle, B.M. Trost and L. Krepski, *J. Org. Chem.* 36, 1126 (1971)
- b) J.P. Beny, J.C. Pommelet and J. Chuche, *Bull. Soc. Chim. France* II-369 (1981)
- c) B.M. Trost and M.J. Bogdanowicz, *J. Am. Chem. Soc.* 95, 5298 (1973) and 95, 5307, 5311 (1973)
- 5) In a typical experiment 1.2 equiv. of triphenyl arsine was added to a solution of cinnamyl bromide in acetonitrile. After stirring at room temperature for 72 h., the solvent was removed under vacuum. The residue was dissolved in methylene chloride and the salt precipitated by adding ether. Yield : 85%
- 6) J.B. Ousset, C. Mioskowski and G. Solladié, *Synth. Commun.* in the press.
- 7) The cis/trans ratio was generally between 60/40 to 40/60.

(Received in France 30 June 1983)