

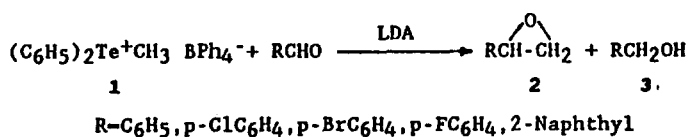
A FIRST NON-STABILIZED TELLURONIUM YLIDE ——— DIPHENYLTELLURONIUM METHYLIDE
AS A NOVEL REAGENT FOR SYNTHESIS OF OXIRANES*

Li-Lan Shi*, Zhang-Lin Zhou, Yao-Zeng Huang*
Shanghai Institute of Organic Chemistry, Academia Sinica
Lingling Lu 345, Shanghai 200032, China

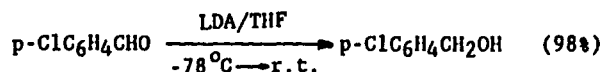
Abstract: Diphenyltelluronium methylide, generated from methyldiphenyltelluronium tetraphenylborate **1** with LiTMP, reacted with carbonyl compounds to afford substituted oxiranes in moderate to good yields.

The application of several stabilized and moderately stabilized telluronium ylides in organic synthesis has been described^[1]. To our knowledge, no report dealing with the non-stabilized telluronium ylide and its reactivity toward carbonyl compounds has appeared in the literature. We now wish to communicate that a first non-stabilized telluronium ylide — diphenyltelluronium methylide reacted with carbonyl compounds to give substituted oxiranes in moderate to good yields, which was generated from methyldiphenyltelluronium tetraphenylborate **1** with lithium 2,2,6,6-tetramethylpiperidine (LiTMP).

Attempts to generate the non-stabilized ylide from salt **1** with sodium hydride and potassium *t*-butoxide were unsuccessful. However, lithium diisopropylamide (LDA) was effective for generating the ylide, which reacted with aldehydes to give oxiranes **2** in 40-53 % yields.



Owing to the reductive behavior of LDA ^[2], the reducing products **3** of aldehydes were also isolated in 10-18% yields. It was confirmed by the following experiment.



We found that the base, lithium 2,2,6,6-tetramethylpiperidine^[3], which is less nucleophilic and more basic than LDA, is more suitable for generating ylide **4**. **4** reacted with carbonyl compounds to afford oxiranes **5** in moderate to good yields. No reducing products were detected. The results are shown in the Table.

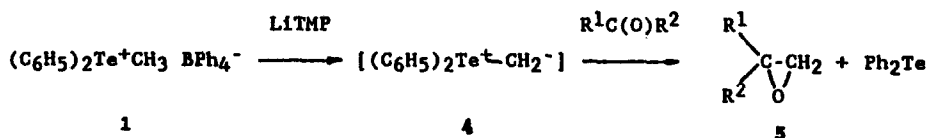


Table. Synthesis of oxiranes 5 via telluronium salt 1

| Entry | R ¹ | R ² | Epoxide 5 ^a Yield (%) |
|-------|-----------------------------------|-------------------------------|-------------------------------------|
| 1 | C ₆ H ₅ | H | 67 |
| 2 | p-ClC ₆ H ₄ | H | 65 |
| 3 | p-BrC ₆ H ₄ | H | 60 |
| 4 | p-FC ₆ H ₄ | H | 69 |
| 5 | 4-biphenyl | H | 74 |
| 6 | 2-naphthyl | H | 65 |
| 7 | C ₆ H ₅ | CH ₃ | 67 |
| 8 | C ₆ H ₅ | C ₆ H ₅ | 61 |
| 9 | cyclohexyl | H | 55 |

^a All the products were confirmed by ¹H-NMR, IR, and MS.

In short, 4 is a first non-stabilized telluronium ylide and a novel reagent for synthesis of oxiranes from carbonyl compounds.

General procedure:

A solution of LiTMP (1.2mmol) in THF was added to a solution of telluronium salt 1 (1.2mmol) in 8ml THF at -78°C under N₂. The mixture was warmed to -70°C and stirred for 30 min. After cooling to -78°C, carbonyl compound (1.0mmol) in 2ml THF was added. The reaction mixture was then allowed to warm to r.t. . After the reaction was completed (monitored by TLC), usual work up and flash chromatography gave the product.

Acknowledgement: Financial supports from the National Natural Science Foundation of China and Academia Sinica are gratefully acknowledged.

References and notes:

This paper is the 84th report on the synthetic application of elementorganic compounds of 15th and 16th groups.

- [1] a) A. Osuka, Y. Mori, H. Shimizu, and H. Suzuki, *Tetrahedron Lett.*, 1983, 24, 2599 ;
b) A. Osuka and H. Suzuki, *Tetrahedron Lett.*, 1983, 24, 5109 ; c) A. Osuka, Y. Hanasaki and H. Suzuki, *Nippon Kagaku Kaishi*, 1987, 1505; d) X. Huang, L. H. Xie and H. Wu, *J. Org. Chem.*, 1988, 53, 4862 and references cited therein.
- [2] M. Majewski, *Tetrahedron Lett.*, 1988, 29, 4057.
- [3] G. J. Upton and P. Beak, *J. Org. Chem.*, 1975, 46, 1094.

(Received in Japan 17 March 1990)