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Chiral calixarene derived from resorcinol. Part 4: Diastereoselective closure of the oxazine ring [†]

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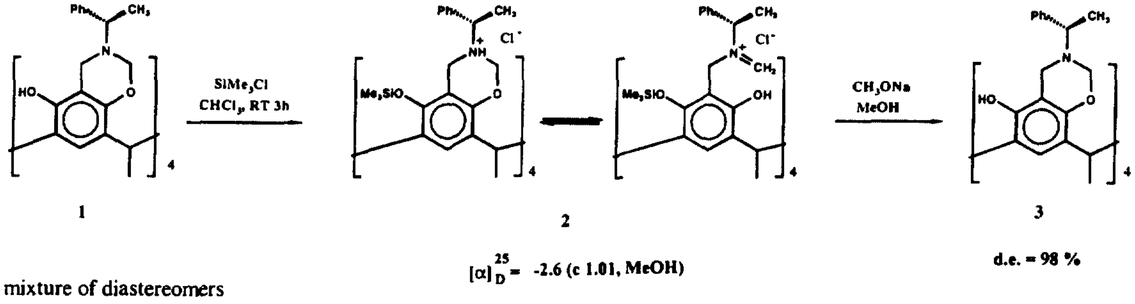
Abstract

A method for the preparation of a single diastereomer of the oxazine derivative of calixresorc[4]arene **3** has been developed. Lewis acids were employed for opening of the oxazine ring. © 1998 Elsevier Science Ltd. All rights reserved.

Recently, we,[1] Böhmer,[2] and Heaney[3] reported on the synthesis and the X-ray analysis of chiral oxazine derivatives of resorc[4]arenes. The Mannich reaction of tetramethylresorc[4]arene with *R*-(+)- or *S*-(−)-1-phenylethylamine at room temperature affords a diastereomeric mixture of the oxazine derivative of resorc[4]arene **1** in a ratio of approx. 4:1. A single diastereomer was prepared selectively in good yield in a mixture of ethanol/toluene under reflux by Böhmer et al.[2]

This paper demonstrates the possibility for the selective preparation of a single diastereomer from the diastereomeric mixture of the oxazine derivative of resorc[4]arene **1**, which forms at room temperature. The reaction shown in Scheme 1 consists of opening of the oxazine ring (from *S*-(−)-1-phenylethylamine) followed by its diastereoselective closure.



Scheme 1.

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[†] Part 3: W. Iwanek, *Tetrahedron: Asymmetry* **1998**, *9*, 3131.

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Diastereoselective opening of the chiral oxazine ring has been known for over 20 years.[4] The most common opening agents are organometallic compounds.[5,6] In this work, the agents for opening the oxazine ring were Lewis acids, namely $SOCl_2$ and $SiMe_3Cl$. The reaction was carried out in chloroform at room temperature. Addition of an equimolar amount of the Lewis acid to the chloroform solution of the diastereomeric mixture **1** results in precipitation of the salt of the aminomethyl derivative of the resorc[4]arene **2**. The ^1H NMR signals for the product **2** are broad and poorly resolved, which indicates a dynamic effect typical for high-molecular mass compounds with strong dipolar interactions of the nuclei and steric hindrance to rotation. The signals due to the iminium group, $H_2C{=}N^+R_1R_2$, in the ^{13}C NMR were not observed.

IR spectra [ν=3360, 3200, 2570 and 1695 cm^{-1} (low intensity), 1790 cm^{-1} (low intensity)] testify that compound **2** is propably in an equilibrium between the salt of the oxazine derivative of the resorc[4]arene and the iminium salt of the resorc[4]arene. The molecular ion peak (M=1125.8), as measured by LSI-MS(+) (NBA) for compound **2**, corresponds to the molecular mass of product **3**.

Dissolution of **2** in methanol followed by addition of an equimolar amount of sodium methoxide resulted in precipitation of a single diastereomer of the oxazine derivative of resorc[4]arene **3**. Its diastereomeric purity (de) was 96%, as determined from the ^1H NMR spectrum. The spectral data for **3** are identical to those previously reported.[1]

Acknowledgements

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References

1. Iwanek, W.; Mattay, J. *Liebigs Ann.* **1995**, 1463.
2. Arnecke, R.; Böhmer, V.; Friebe, S.; Gebauer, S.; Krauss, G.; Thondorf, I.; Vogt, W. *Tetrahedron Lett.* **1995**, *35*, 6221.
3. El Gihani, M. T.; Heaney, H.; Slawin, A. M. Z. *Tetrahedron Lett.* **1995**, *36*, 4905.
4. Neelakantan, L. *J. Org. Chem.* **1971**, *36*, 2256.
5. For recent references, see: (a) Higashiyama, H.; Inoue, H.; Yamauchi, T.; Takahashi, H. *J. Chem. Soc., Perkin Trans. 1* **1995**, 111; (b) Higashiyama, H.; Inoue, H.; Takahashi, H. *Tetrahedron* **1994**, *50*, 1083; (c) Davidsen, S. K.; Chu-Moyer, M. Y. *J. Org. Chem.* **1989**, *54*, 5558.
6. For recent references, see: (a) Ahn, J. S.; Hahm, D. G.; Heaney, H.; Wikins, R. F. *Bull. Korean Chem. Soc.* **1994**, *15*, 329; (b) Heaney, H.; Papageorgiu, G.; Wilkins, R. F. *Tetrahedron Lett.* **1988**, *29*, 2377; (c) Cooper, M. S.; Earle, M. J.; Fairhurst, R. A.; Heaney, H.; Papageorgiu, G.; Wilkins, R. *Synlett* **1990**, 167.