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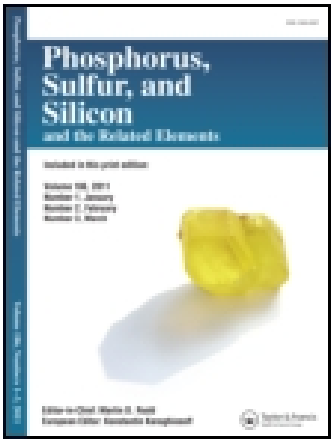

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Nucleophilic Epoxidation of α-Sulfonyl-α,β-Unsaturated Esters with m-CPBA

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Nucleophilic Epoxidation of α-Sulfonyl-α,β-Unsaturated Esters with *m*-CPBA

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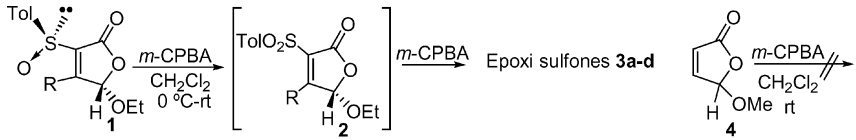
INTRODUCTION

m-CPBA is usually described as an electrophilic oxidant that transfers oxygen to non electron-poor alkenes. There are a few reports about the epoxidation with *m*-CPBA of deactivated olefins.[1a–d] The reactions of 1-phenyl-(2-*p*-tolylsulfonyl)ethane[1a,b] and 2-nitro-1-phenylpropene[1c] using *m*-CPBA in basic aqueous media were described. We report herein the results obtained in the reaction of the title sulfones with *m*-CPBA.

RESULTS

The reactions of sulfinylfuranones **1a–c** with an excess of *m*-CPBA in CH_2Cl_2 at 0°C for 1.5–8 h afforded the corresponding sulfones **2a–c**, which were not isolated and *in situ* evolved into the sulfonyl oxiranes **3a–c** in good yields (75–89%). The reactions are stereoselective, affording only the products resulting from the *anti* approach of the reagent with respect to the OEt group. Under similar conditions, furanone **4** did not evolve into its epoxide derivative (Scheme 1).



R = H (**1a, 2a, 3a**); R = Me (**1b, 2b, 3b**); R = Et (**1c, 2c, 3c**)

SCHEME 1

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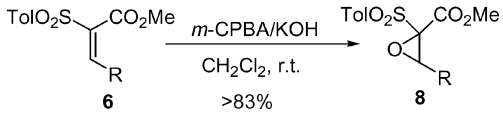
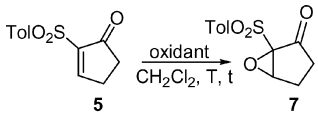
The above results suggest that *m*-CPBA is also able to act as a nucleophile on the proper substrates, which lead us to investigate the epoxidation of different α,β-unsaturated sulfones (**5–6**) with *m*-CPBA (Scheme 2 and Table I).



SCHEME 2

TABLE I



Eq. *m*-CPBA/eq. base	T (°C)	Time	Ratio 5:7
2.10/0	20	87 h	27:73
1.15/1.15 K_2CO_3	−20	40 min	0:100 (91)
1.15/1.15 KOH	−20	10 min	0:100 (88)

The reaction with *m*-CPBA in dichloromethane was complete to give oxirane only in the case of the furanones **2**. Cyclopentenone **5** afforded only 73% of oxirane **7** after 87 h and the open-chain compounds did not undergo epoxidation under these conditions. The addition of base to solution of *m*-CPBA allowed us to obtain the sulfonyl-oxiranes **8** in good yields; an increase in the reaction rate of **2** and **5** was also detected.

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