

Thesis Title                    Michael Reaction of  $\alpha$ -Chloro  
Sulfonyl Carbanion  
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## ABSTRACT

The purpose of this research is to study the reaction of  $\alpha$ -chloro sulfonyl carbanion with various  $\alpha, \beta$ -unsaturated compounds of monoesters, diesters, mononitrile, dinitrile, aldehydes, ketones, 1,3-ketoester, and 1,3-diketone.

The two method for generating the  $\alpha$ -chloro sulfonyl carbanion were investigated i.e.:

1. Lithium diisopropylamide (LDA) in tetrahydrofuran (THF) with hexamethylphosphoramide (HMPA) as a cosolvent (LDA method)
2.  $K_2CO_3$  / benzyltriethylammonium chloride (TEBA) / aprotic solvent (PTC method)

The results from the investigations could be summarized as follows :

1. Reaction of lithio chloromethyl phenyl sulfone anion with  $\alpha, \beta$ -unsaturated monoesters, diesters, mono and dinitrile gave the corresponding cyclopropanes.

2. Reaction of  $\alpha$ -chloro sulfonyl carbanion with methyl acrylate and crotonitrile yielded the cyclopentyl products in low yields. These products derived from a 1+2+2 MIMI-RC reaction. The reaction of methyl acrylate with  $\alpha$ -chloro sulfonyl carbanion gave cyclohexyl derivative. This product could be derived from a Michael-Michael-Dieckmann reaction.

3. The products from the reaction of  $\alpha$ -chloro sulfonyl carbanion with  $\alpha, \beta$ -unsaturated ketones depended on the type of ketones. The results obtained are as follows.

a. Methyl vinyl ketone, the major products are the corresponding cyclopropane and cyclohexyl compounds derived from Michael-Michael-Aldol reaction.

b. Chalcone gave cyclopropanes and cyclopropyl epoxide.

c. Dibenzalacetone, only cyclopropyl products were isolated.

d. Cyclopentenone and cyclohexenone yielded cyclopropyl derivatives and the tricyclic compounds. These reactions provide a quick entry to polycyclic compounds.

4. The addition of lithio chloromethyl phenyl sulfone anion to  $\alpha, \beta$ -unsaturated aldehydes gave 1,2-addition product exclusively.

5. The reaction of  $\alpha, \beta$ -unsaturated 1,3-keto ester with lithio chloromethyl phenyl sulfone anion gave the expected cyclopropane in good yield. For  $\alpha, \beta$ -unsaturated 1,3-diketone, dihydrofuran derivative was isolated in high yield.