

## ABSTRACT

This thesis consists of three parts.

In the first part the influence of electron-withdrawing substituents on alkenes in the ene reaction with singlet oxygen ( $^1\text{O}_2$ ) was investigated.

The initially formed secondary and tertiary allylic hydroperoxides underwent subsequent reactions like cyclization or epoxide formation. The epoxides were obtained exclusively under basic conditions.

The photochemical properties of several acridinium salts as sensitizers were examined in the second part. It was proven that 9-mesityl-10-methylacridinium perchlorate is a dual photocatalyst which can photooxygenate alkenes not only via  $^1\text{O}_2$ -pathway but also by an electron transfer process. Moreover, this salt showed different behaviour as a photoinduced electron transfer catalyst compared with other dual catalysts like 9,10-dicyanoanthracene.

The third part concerns the photooxygenation in microemulsions. A change in the regio- and chemoselectivity was observed in the photooxygenation in various microemulsion systems.