"Enantioselective epoxidation of simple alkenes based upon the concept of pi-interactions-facial recognition"

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Abstract
The aim of our project is to build new catalysts for the asymmetric epoxidation of alkenes using π-interactions as fundamental factors for the control of the facial selectivity. It was decided to employ cinchona alkaloid derivatives as the basic core of our catalysts. We envisage that the alkene would interact selectively with the aromatic rings of the catalyst to give the corresponding epoxide in good enantiomeric excess. Quinuclidine derived catalysts of simplified structures were synthesised to find the best conditions for the experiments using chiral cinchona derivatives. An important result to be taken into account in the development of the chiral catalysts was the influence of the counterion on the conversion rate. The triflate gave the highest epoxidation rates for trans-α-methylstyrene. The use of a mixture MeOH/ DMM/ H2O led to a two fold increase in reaction rate and is recommended to increase the van der Waals interactions between the aromatic rings of the catalyst and th...

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