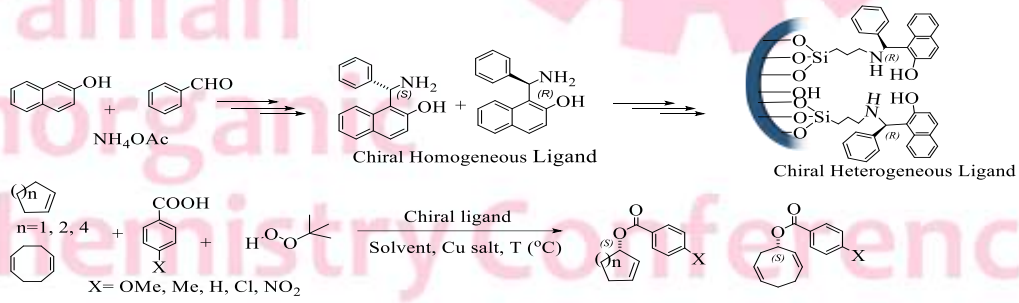
22nd Iranian Inorganic Chemistry Conference,
23-25 August, 2023
University of Kurdistan

Synthesis of chiral homogeneous and heterogeneous Betti bases and investigation of their catalytic activity in the Kharasch-Sosnosky reaction

Somaieh Rahimi, Yunes Naghdi, Shiva Majidian and Saadi samadi*

*Laboratory of Asymmetric Synthesis, Department of Chemistry, Faculty of Science, University of Kurdistan, Sanandaj, Iran.*E-mail: s.samadi@uok.ac.ir*

The enantioselective formation of C-H, C-C, C-O, and C-N bonds is an attractive method for producing single enantiomers, and chiral catalysts are the most effective means of achieving this goal [1]. Chiral Betti bases are one of the important classes of compounds that possess beneficial biological properties and have been extensively studied for their catalytic applications in asymmetric organic reactions. These compounds can be used as chiral ligands in asymmetric allylic C-H bond oxidation, also known as enantioselective Kharasch-Sosnovsky reaction to prepare functional alkenes such as chiral allylic esters [2, 3]. In this study, nanoporous silica SBA-15 was prepared using a hydrothermal method and functionalized with 3-chloropropyltrimethoxysilane. Chiral Betti base ligands were then synthesized via a multicomponent reaction of 2-naphthol, benzaldehyde, and ammonium acetate, and the resulting enantiomers were separated by diastereomeric crystallization [3]. The obtained chiral Betti bases were immobilized on functionalized SBA-15. The prepared chiral homogeneous and heterogeneous ligands were investigated in the Kharasch-Sosnovsky reaction by varying parameters such as temperature, solvent, and the amount of homogeneous and heterogeneous chiral ligands and copper salts (Scheme 1). The resulting chiral allylic esters were obtained in high yields and moderate enantioselectivities. These findings suggest that the mentioned ligands have promising applications as catalysts in the enantioselective Kharasch-Sosnovsky reaction.



Scheme 1: Enantioselective Kharasch–Sosnovsky reaction using chiral ligands

Keywords: Betti base, Chiral homogeneous and heterogeneous catalyst, Chiral allylic esters, Kharasch-Sosnovsky reaction

References

[1] P. McMorn, and G. Hutchings, *Chem. Soc. Rev.*, **2004**, 108, *33*.
[2] S. Samadi, H. Arvinnezhad, S. Nazari, and S. Majidian, *Top. Curr. Chem*., **2022**, *380*, 1.
[3] Z. Sehhat, S. Mansoori, H. Arvinnezhad, Y. Naghdi, and S. Samadi, *Mol. Catal*., **2023**, 538, 113011.