

Chiral Mesoporous Silica for Asymmetric Metal-free Catalysis: Enhancement of Chirality thorough Confinement Space by Plug Effect

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The addition of a carbanion to α,β -unsaturated carbonyl compounds is of importance in the C-C bond formation reactions for modern pharmaceuticals and organic synthesis. Recently, heterogeneous asymmetric catalysis became more attractive area of research because of the easy recovery and separation of the catalyst from the reaction system. Most of synthetic methods for heterogeneous catalysts were grafting or immobilization of homogeneous catalyst onto the solid supports.

Trans-1,2-Diaminocyclohexane(DACH) and L-proline ligands have been enormously used as chiral ligands in several catalytic transformation under homogenous conditions. Our group prepared l-proline functionalized mesoporous silica was synthesized under acidic condition using a poly(ethylene oxide)-poly(propylene oxide)-poly(ethylene oxide) triblock copolymer template (EO20PO70EO20, Pluronic P-123, BASF). Furthermore, we successfully directly synthesized trans-1,2 diaminocyclohexane functionalized mesoporous silica by using microwave method. The direct functionalization of chiral ligand into the framework of mesoporous materials is expected to be useful for the heterogeneous asymmetric catalysis.

So, we adopt the direct synthesis of chiral ligand functionalized mesoporous silica by using thermal and microwave irradiation. Then, chiral ligand functionalized mesoporous silicas were applied to enantioselective asymmetric catalytic reactions.

Keywords: Trans-1,2-Diaminocyclohexane (DACH), L-proline ,enantioselective asymmetric catalytic reactions