

Asymmetric Michael addition over heterogenized porphyrin tetra-silsesquioxane bridged periodic mesoporous organosilica as an efficient metal-free catalyst

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Periodic mesoporous organosilicas are a special type of ordered mesoporous silica in which organic moieties are integrated onto the silica framework entirely or randomly to form hybrid organic-inorganic materials. The organic moieties of PMOs mainly rely on various silsesquioxanes of such as disilanes, trisilanes, and tetrasilanes with different organic bridging groups. However, organosilane precursors in the form of trisilanes and tetrasilanes were rarely used. Herein, we would like to present several types of porphyrin tetra-silsesquioxane bridged periodic mesoporous organosilica with chiral ligand, which will be useful for various reactions and could overcome such limitations. The catalytic activity of these supported complexes was explored for the asymmetric Michael addition of various styrene with cyclohexanone at 25 °C. Excellent yields (up to 92 %) with an ee of up to 94% were achieved in the case of cis- β -methyl styrene as substrate. Significantly, the performance of the supported catalyst was better in terms of enantioselectivity than the complex under homogenous conditions.