

Synthesis of Heterogeneous Chiral Co(III)-Salens into Mesoporous Silicas linked Sulfonic Acid Groups

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Since chiral terminal epoxides are significant component for drug synthesis, the hydrolytic kinetic resolution (HKR) reaction is very important procedure. Accordingly, we investigated that homogeneous chiral Co(III)-salen complexes having a sulfonic acid groups (-SO₃H) showed the high activity and enantioselectivity for asymmetric ring opening (ARO) of racemic epoxides. However, homogeneous catalysis system and Co(III)-salens attached directly sulfonic acid groups lead disadvantages. For that reason, we tried to immobilize heterogeneous Co(III)-salen into mesoporous functionalized sulfonic acid groups and tested the properties of catalysts.

For sulfonic acid groups modified mesoporous material synthesis, MPTES (or CSPTMS) is added into SBA-15 or SBA-16 to make mercapto groups(-SH) on their pore wall and oxidize using H₂O₂. As a results, mercapto groups(-SH) can be converted into sulfonic groups(-SO₃H). And introduce Co(II)-salens with toluene then Co(II)-salens are oxidized to Co(III)-salens.

According to results, we analyzed the heterogeneous Co(III)-salens into mesoporous functionalized sulfonic acid groups have similar reactivity and structure relative to homogeneous system in HKR of (±)ECH. Thus, the enantioselectivity and yield of the chiral Co(III)-salens linked -SO₃ are very increased. Therefore, controlling the amount of MPTES (or CSPTMS) for making the sulfonic acid groups is very important because of improving catalytically active sites. Conclusively, we can prove the heterogeneous catalysts system exhibit the advantages about recovery and reuse as compared with homogeneous system

because Co(III)-salens are powerfully attached and stable during catalysis. This means they can maintain the high level reaction procedures and so easy to separate the catalysts into the pores.

Integrate analysis result, we demonstrated the heterogeneous chiral Co(III)-SO₃ salen complexes exhibit morphologically ordered pores and outstanding enantioselectivity for ARO of racemic epoxides, recovery for green chemistry.

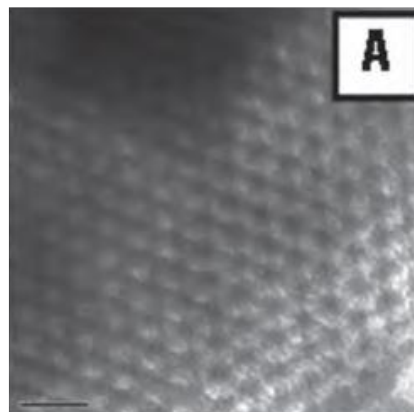


Fig. 1 (A) 10% CSPTMS containing SBA-15; regular hexagonal array

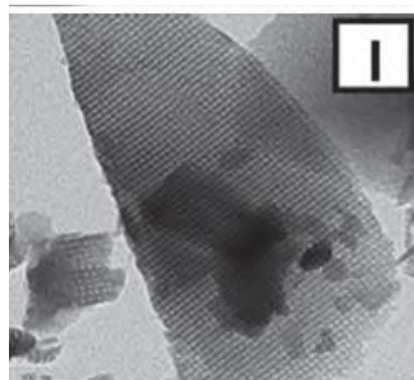


Fig. 2 (I) 30% CSPTMS containing SBA-16; arranged cubic lattice

Reference

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