Category

Metal-Catalyzed Asymmetric Synthesis and Stereoselective Reactions

Key Words

aldehydes
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Enantioselective Addition of Diethylzinc to Aldehydes Catalyzed by (1*R*,2*R*)-10-(Dialkylamino)isoborneols
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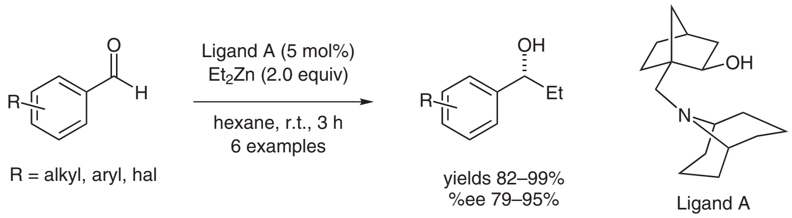
Enantioselective Diethylzinc Addition to Aldehydes Catalyzed by Dialkylaminoisoborneols



Significance: A novel ligand based on the (1*R*,2*R*)-10-dialkylaminoisoborneol structure possessing a 9-azabicyclo[3.3.1]nonan-9-yl group has efficiently catalyzed the enantioselective addition of diethylzinc to aldehydes. The ligand can be easily prepared in three steps from camphorsulfonyl chloride. Eight other ligands based on the dialkylaminoisoborneol structure were also evaluated, but the bulky 9-azabicyclo[3.3.1]nonan-9-yl group gave the highest enantioselectivity and yield. The application of alkylzinc addition to aromatic, aliphatic and vinylic aldehydes was reported.

Comment: Amino alcohols with isoborneol structures are commonly used as catalysts for the addition of diethylzinc to aldehydes. By varying the amino substituent, it was discovered that the steric hindrance and ring size of the amino group had a significant influence on the yield and enantioselectivity of the reaction, leading to the discovery of the highly efficient 9-azabicyclo[3.3.1]nonan-9-yl amine substituent. The ease of synthesis of the ligand makes this an attractive approach.

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