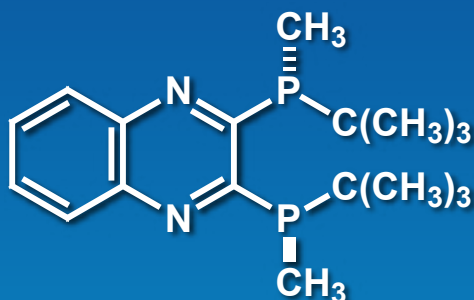


Bidentate Phosphine Ligands Useful for Asymmetric Synthesis QuinoxP*



(*R,R*)-enantiomer [B5301]

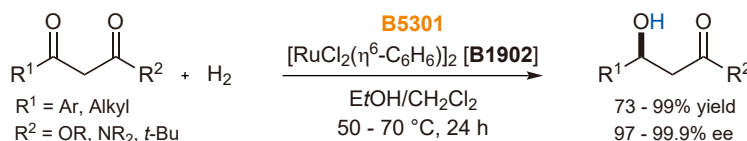
(*S,S*)-enantiomer [B5302]

Advantages

- Relatively Stable and Easy-to-handle Crystalline Solid
- Optically Active Phosphines which Have a Chiral Center at Phosphorus and Can Coordinate to Transition Metals
- Applicable to Asymmetric Hydrogenation under Mild Conditions

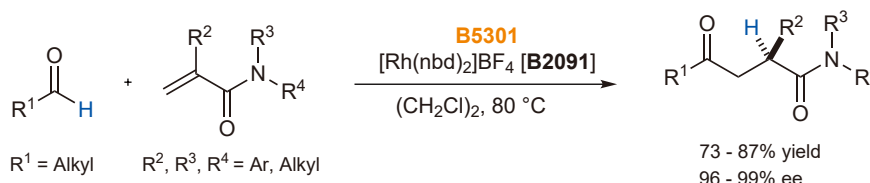
Applications

Ruthenium-Catalyzed Asymmetric Hydrogenation of Malonic Acid Derivatives



Reference T. Imamoto, M. Nishimura, A. Koide, K. Yoshida, *J. Org. Chem.* **2007**, 72, 7413.

Rhodium-Catalyzed Asymmetric Hydroacylation of Acrylic Amide Derivatives



Reference Y. Shibata, T. Tanaka, *J. Am. Chem. Soc.* **2009**, 131, 12552.

Copper-Catalyzed Asymmetric Conjugate Addition



Reference I. Chen, L. Yin, W. Itano, M. Kanai, M. Shibasaki, *J. Am. Chem. Soc.* **2009**, 131, 11664.

(*R,R*)-QuinoxP*
(*S,S*)-QuinoxP*

100mg [B5301]

100mg [B5302]

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