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Asymmetric Diboration of Terminal Alkenes with a Rhodium Catalyst and Subsequent Oxidation: Enantioselective Synthesis of Optically Active 1,2-Diols

Rhodium-Catalyzed Enantioselective Synthesis of 1,2-Diols

Significance: Chiral diols are useful synthetic motifs in organic synthesis. Common methods for their synthesis include dihydroxylation, hydrogenation of hydroxyketones, and hydrolysis of epoxides. The authors report an enantioselective 1,2-diboration of alkenes leading to optically active diols after oxidation.

Comment: Morken showed a similar diboration of terminal alkenes with a platinum catalyst with enantioselectivities up to 94% (J. Am. Chem. Soc. 2009, 131, 13210). The authors present a rhodium-catalyzed diboration–oxidation of terminal alkenes providing enantioselectivities up to 99%. However, disubstituted alkenes proved to be more difficult. 1-Methylstyrene gave the diol with a moderate 76% ee, whereas β-methylstyrene, 1,2-dihydronaphthalene, and trans-stilbene did not react.