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Cooperative Transition-Metal and Chiral Brønsted Acid Catalysis: Enantioselective Hydrogenation of Imines to Form Amines

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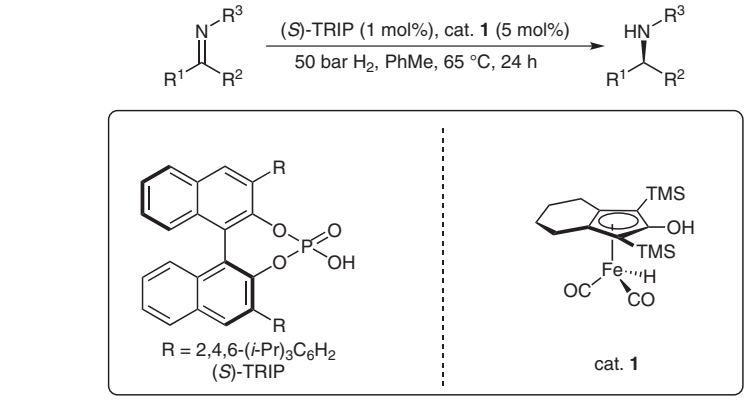
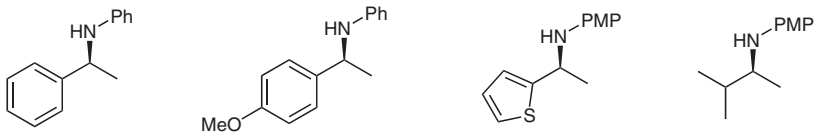
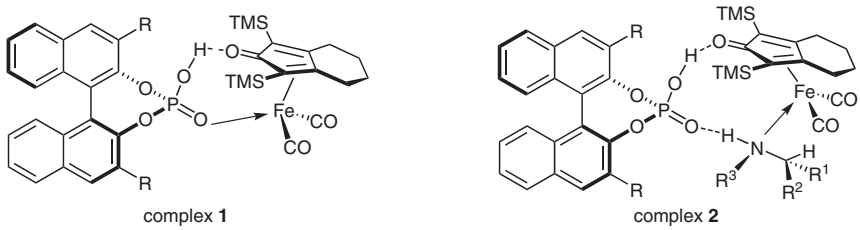
Cooperative Transition-Metal and Chiral Brønsted Acid Catalysis



Selected examples:



Proposed reaction intermediates:



Significance: The authors report a protocol for the enantioselective hydrogenation of various ketimines in the presence of a chiral Brønsted catalyst and a well-defined nonchiral iron catalyst. This work demonstrates that enantioselective reduction reactions with hydrogen can be performed without employing precious-metal catalysts and chiral ligands yielding products with high yields and enantioselectivities.

Comment: NMR spectroscopic studies revealed the formation of complex **1** when a 1:1 mixture of TRIP and the Knölker iron complex (cat. **1**) were mixed. Upon addition of a ketimine to the reaction mixture, the formation of complex **2** was observed. These results suggest that a cooperative catalytic system is operative for this transformation.

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