Category

Reactions

Key words

Brønsted acid cooperative catalysis

iridium

Metal-Catalyzed Asymmetric

Synthesis and

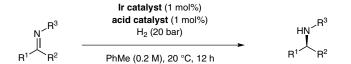
Stereoselective

W. TANG, S. JOHNSTON, C. LI, J. A. IGGO, J. BACSA, J. XIAO* (UNIVERSITY OF LIVERPOOL, UK)

Cooperative Catalysis: Combining an Achiral Metal Catalyst with a Chiral Brønsted Acid Enables Highly Enantioselective Hydrogenation of Imines

Chem. Eur. J. 2013, 19, 14187-14193.

Enantioselective Hydrogenation of Imines Using Cooperative Catalysis



up to 97% yield up to 98% ee 33 examples

Ar
$$Ar = 2,4,6-i-Pr_3C_6H_2$$
acid catalyst

Selected examples:

Significance: Optically active amines are common in many fine chemicals, agrochemicals, and pharmaceuticals. The authors report a cooperative metal-organo catalytic system utilizing a chiral Brønsted acid and an achiral iridium catalyst (see below for a Review on transfer hydrogenation).

Review: C. Zheng, S.-L. You *Chem. Soc. Rev.* **2012**, *41*, 2498–2518.

Comment: The authors have reported the cooperative use of a chiral iridium catalyst with a chiral phosphoric acid in the asymmetric hydrogenation of acyclic imines with H_2 (*J. Am. Chem. Soc.* **2008**, 130, 14450). Here, they report an achiral iridium catalyst with a chiral phosphoric acid in a similar reaction. Alkyl imines, which are known to be difficult substrates for asymmetric hydrogenation, were shown to be excellent substrates in this system, giving enantioselectivities up to 97%.

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