

Fe(III)-Catalyzed Enantioselective Conia-ene Reaction

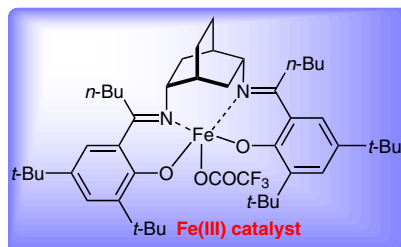
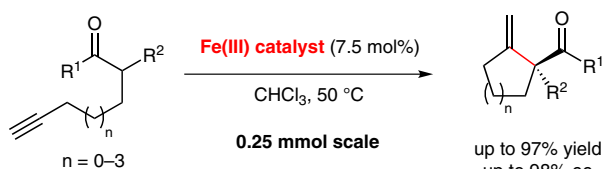
Category

Metal-Catalyzed
Asymmetric
Synthesis and
Stereoselective
Reactions

Key words

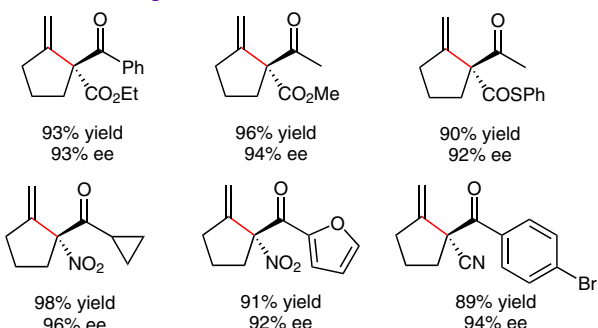
iron
salen ligands
Conia-ene reaction
carbocyclization

SYNFACT
of the month

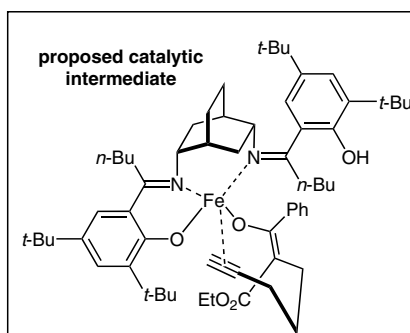
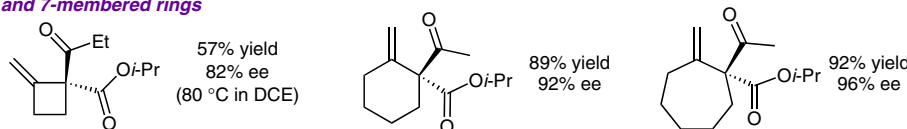


Selected examples:

5-membered rings



4-, 6-, and 7-membered rings



Significance: The Conia-ene reaction represents a powerful approach to form chiral all-carbon quaternary centers (see Review below). Current methods for the enantioselective Conia-ene reaction commonly employ a dual catalytic system comprised of a hard and a soft Lewis acid (selected references: B. K. Corkey, F. D. Toste *J. Am. Chem. Soc.* **2005**, *127*, 17168; T. Yang et al. *J. Am. Chem. Soc.* **2009**, *131*, 9140; A. Matsuzawa et al. *Angew. Chem. Int. Ed.* **2011**, *50*, 7616). White and co-workers now report that a single Fe(III)-salen catalyst can efficiently promote the enantioselective Conia-ene reaction with high enantioselectivities.

Review: F. Dénès et al. *Chem. Rev.* **2010**, *110*, 2366-2447.

SYNFACTS Contributors: Mark Lautens, Christine M. Le
Synfacts 2014, 10(12), 1273 Published online: 18.11.2014
DOI: 10.1055/s-0034-1379531; Reg-No.: L14214SF

Comment: The method developed by White and co-workers provides access to the desired carbocycles in generally very high yields (>90%) and enantioselectivities (>90%). In addition to the formation of 5-membered rings, larger (6,7) and smaller (4) rings can also be formed – albeit in lower yields and enantioselectivities in the latter case. The authors propose that the Fe(III) catalyst serves to simultaneously activate the alkyne towards nucleophilic attack, as well as form the key metal enolate species.