Category

Organo- and Biocatalysis

Key words

N-heterocyclic carbenes

hydroxylation

single electron transfer

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Enantioselective N-Heterocyclic Carbene-Catalyzed β-Hydroxylation of Enals Using Nitroarenes: An Atom Transfer Reaction That Proceeds via Single Electron Transfer

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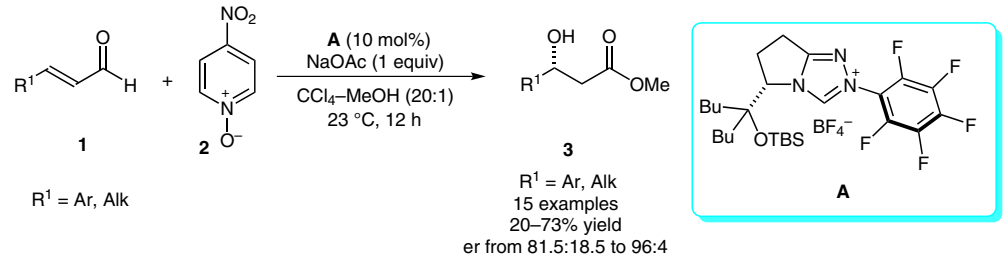
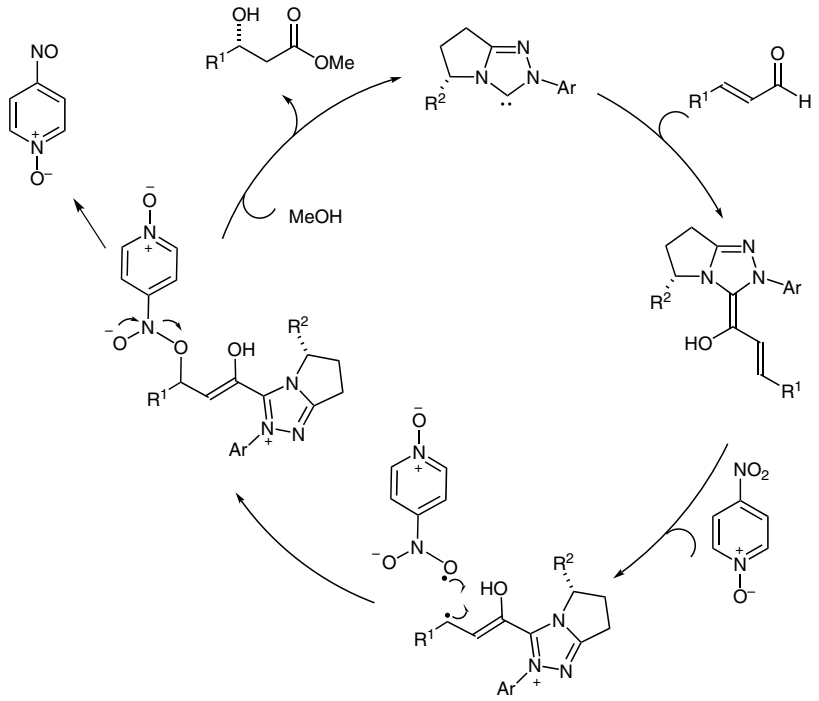
Asymmetric β-Hydroxylation of Enals Catalyzed by an N-Heterocyclic Carbene



Proposed catalytic cycle:



Significance: White and Rovis report an asymmetric β-hydroxylation of alkyl and aryl enals via oxygen transfer from electron-deficient nitroarenes. The reaction is catalyzed by an N-heterocyclic carbene to furnish the corresponding β-hydroxy esters in moderate to good yields (up to 73%) and with good to excellent enantioselectivities (er up to 96:4).

Comment: N-Heterocyclic carbenes are powerful catalysts in organic synthesis, with applications in various transformations. In this report, the authors present a novel NHC-catalyzed reaction that proceeds by a radical pathway. A significantly reduced yield of product was observed when the reaction was conducted in the presence of a radical inhibitor. Investigations of the stereoselectivities of the reaction when using *cis* and *trans* enals further support the proposed radical mechanism.

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