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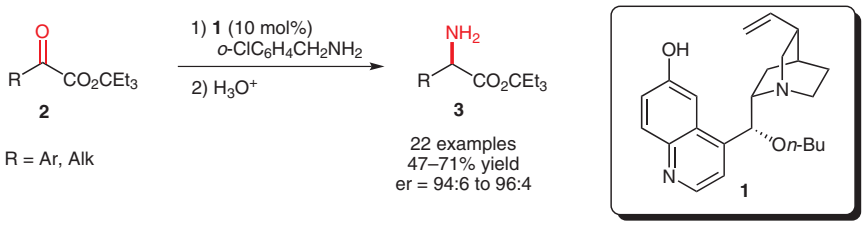
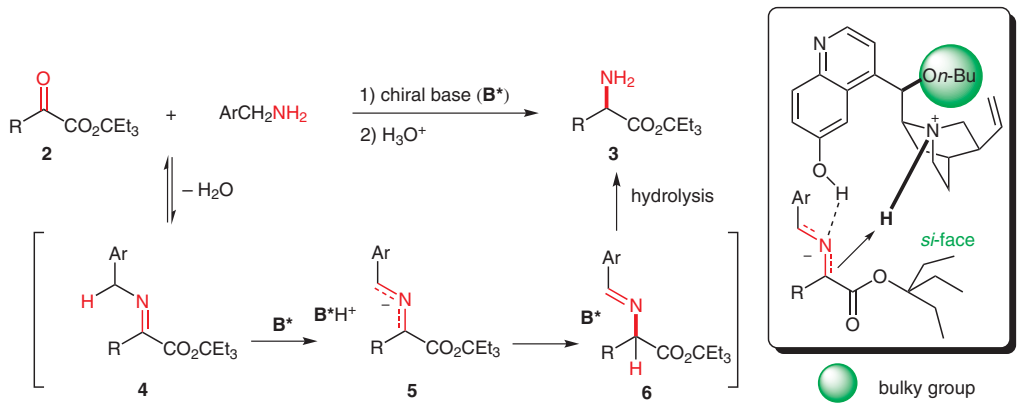
Organocatalytic Asymmetric Biomimetic Transamination: From α-Keto Esters to Optically Active α-Amino Acid Derivatives

J. Am. Chem. Soc. **2011**, *133*, 12914-12917.

Synthesis of α-Amino Acid Derivatives by Biomimetic Transamination



Plausible mechanism of the biomimetic transamination and proposed transition state:



Significance: Shi and co-workers have developed a methodology to synthesize α-amino acid derivatives **3** from α-keto esters **2**, catalyzed by cinchona alkaloid derivative **1**. This is the first catalytic highly enantioselective synthesis of α-amino acid derivatives **3** via biomimetic transamination. The proton of the ammonium ion in the transition state is delivered to the *si*-face of the substrate, affording the (*R*)-α-amino ester as the major enantiomer.

Comment: Optically active α-amino acids and their derivatives are an important class of molecules in biology and in organic synthesis. However, it remains a challenge to develop highly enantioselective syntheses of them to date. Here, a very efficient method for the synthesis of α-amino acid derivatives via biomimetic transamination has been reported, which also illustrates the synthetic potential of organocatalytic biomimetic transamination.

SYNFACTS Contributors: Benjamin List, Qinggang Wang
Synfacts 2011, 10, 1127-1127 Published online: 20.09.2011
DOI: 10.1055/s-0030-1261125; **Reg-No.:** B10111SF

Category

Organo- and Biocatalysis

Key words

biomimetic transamination

amino acids