

Pot-Economic Organocatalytic Asymmetric Synthesis of the Corey Lactone

Category

Organo- and Biocatalysis

Key words

Corey lactone

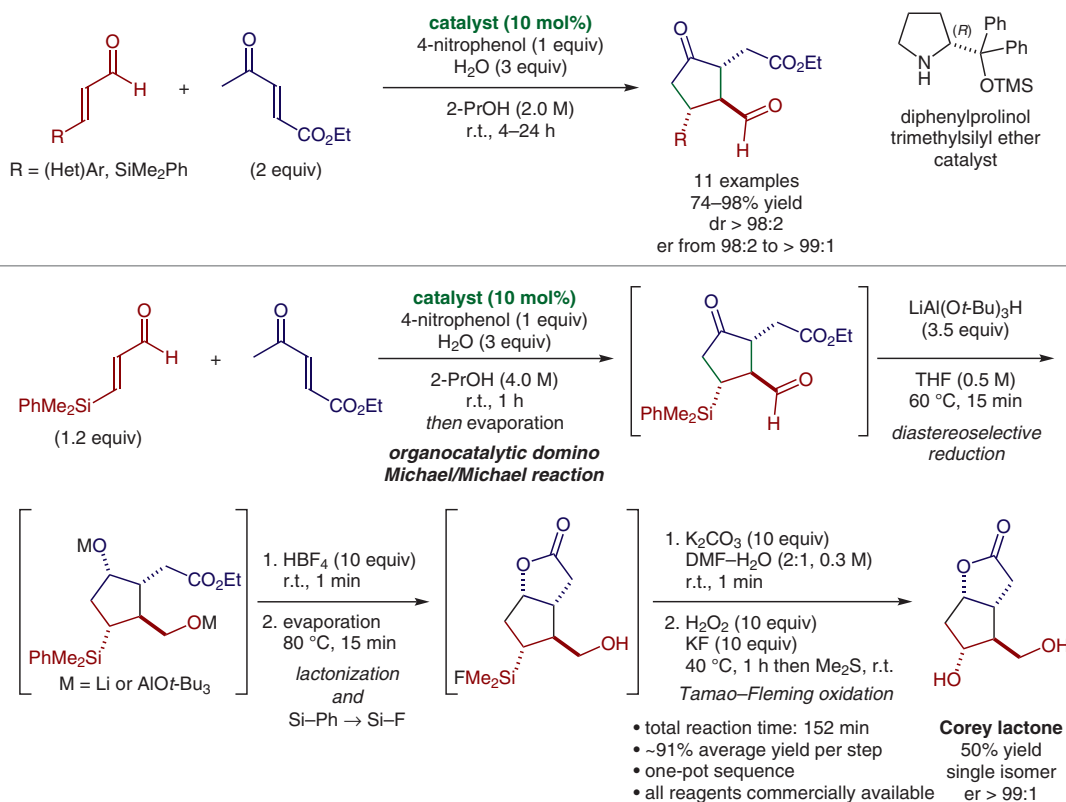
amine catalysis

Michael addition

cascade reaction

asymmetric synthesis

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Month



Significance: Hayashi and co-workers report an organocatalytic domino Michael/Michael reaction of α,β -unsaturated aldehydes and ethyl (*E*)-4-oxopent-2-enoate that uses a diphenylprolinol silyl ether as catalyst. The desired cyclopentanones were obtained in good to excellent yields and with excellent diastereo- and enantioselectivities. The newly developed formal (3+2) cycloaddition was applied as the key step in a concise and highly stereoselective route towards the Corey lactone.

Comment: Due to its importance as a crucial intermediate for the synthesis of various prostaglandin hormones, efficient, selective, and practical routes toward the Corey lactone are desirable. The authors have developed a time-efficient organocatalytic protocol consisting of seven steps in a single reaction vessel that furnishes enantiopure Corey lactone. The required silyl acrylaldehyde is accessible through an atom-economic trimerization of ethyne, carbon monoxide, and dimethyl(phenyl)silane (I. Matsuda, A. Ogiso, S. Sato, Y. Izumi *J. Am. Chem. Soc.* **1989**, *111*, 2332).