Pot-Economic Organocatalytic Asymmetric Synthesis of the Corey Lactone

**Significance:** Hayashi and co-workers report an organocatalytic domino Michael/Michael reaction of α,β-unsaturated aldehydes and ethyl (E)-4-oxo-pent-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).

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**Category**
Organo- and Biocatalysis

**Key words**
Corey lactone, amine catalysis, Michael addition, cascade reaction, asymmetric synthesis

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