Enantioselective Homologation of α-Keto Esters with α-Diazo Esters

**Significance:** The Lewis acid catalyzed homologation of carbonyl compounds with diazo compounds can realize synthetically useful carbon chain extension. The authors achieve the asymmetric homologation of acyclic α-keto esters with α-diazo esters by using chiral N,N’-dioxide-yttrium(III) complexes. Both aryl- and alkyl-substituted α-keto esters are applicable, providing the corresponding succinate derivatives in good yields and enantioselectivities.

**Comment:** The use of bulky adamantyl α-diazo esters can suppress the formation of undesired by-products. Steric hindrance on the 2,6-positions of the phenyl ring in the ligand is also essential to improve both enantioselectivity and reactivity. The attack of α-diazo ester occurs from re-face of the coordinating α-keto ester preferably due to the obstruction of si-face by the aryl group in the N,N’-dioxide ligand.

**Selected examples:**
- 73% yield, 92% ee
- 73% yield, 95% ee
- 70% yield, 93% ee
- 71% yield, 92% ee
- 55% yield, 86% ee
- 65% yield, 91% ee
- 76% yield, 94% ee
- 70% yield, 94% ee

**Proposed stereochemical model:**
- re-face attack favored
- si-face attack disfavored

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