Enantioselective Homologation of \( \alpha \)-Keto Esters with \( \alpha \)-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 \( \alpha \)-keto esters with \( \alpha \)-diazo esters by using chiral \( N,N' \)-dioxide-yttrium(III) complexes. Both aryl- and alkyl-substituted \( \alpha \)-keto esters are applicable, providing the corresponding succinate derivatives in good yields and enantioselectivities.

**Comment:** The use of bulky adamantyl \( \alpha \)-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 \( \alpha \)-diazo ester occurs from \( re \)-face of the coordinating \( \alpha \)-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
- 70% yield, 94% ee
- 76% yield, 94% ee
- 70% yield, 94% ee

**Proposed stereochemical model:**

\( re \)-face attack favored

\( si \)-face attack disfavored