

## SYNFACTS Highlights in Current Synthetic Organic Chemistry

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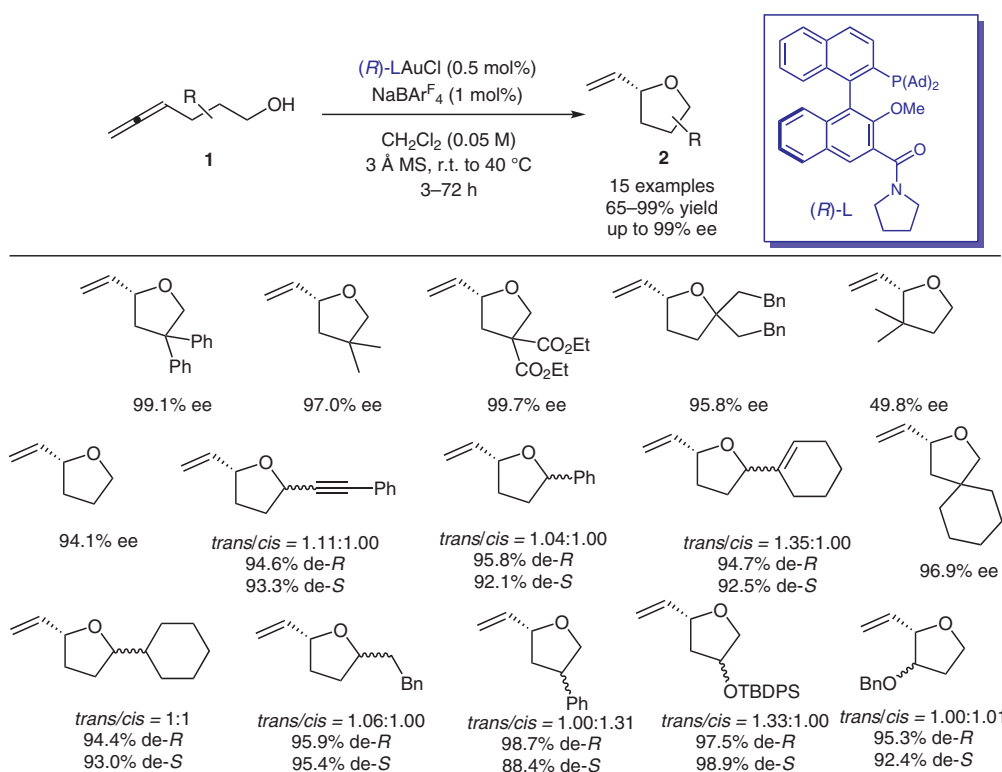
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Remote Cooperative Group Strategy Enables Ligands for Accelerative Asymmetric Gold Catalysis  
*J. Am. Chem. Soc.* **2017**, *139*, 16064–16067.

## Gold Catalysis in an Asymmetric Synthesis of Tetrahydrofurans



**Significance:** The present work reports the development of an axially chiral ligand bearing a remote Lewis basic group that permits the asymmetric Au-catalyzed cyclization of (3-hydroxypropyl)-allenes **1** to give substituted tetrahydrofurans in a very efficient manner. The structure and stereochemistry of the gold–ligand complex was determined by X-ray diffraction analysis. High allene *re*-face selectivity was observed at catalysts loadings down to 100 ppm. Steric hindrance near the OH group had no detrimental effects. However, substitution near the allene moiety led to a decrease in the ee. Racemic substrates with existing stereogenic centers were also tested, and the *re*-face selectivity was maintained in all cases. This new method was applied to the synthesis of C-glycosides.

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**Comment:** The use of gold complexes in asymmetric catalysis is a challenge because of the linear coordination favored by Au(I) complexes, which places the substrate outside the chiral environment of the chiral ligand. Some strategies addressed to overcome this issue are the use of bimetallic Au complexes with atropisomeric biphosphine ligands and the employment of a chiral counteranion to effect achiral Au catalysts (see Review below). In the present work, the concept of ligand-accelerated catalysis in which the addition of a ligand increases the reaction rate of a known transformation is explored to promote a highly enantioselective gold-catalyzed allene cyclization to produce 2-vinyltetrahydrofurans **2**.

**Review:** W. Zi, F. D. Toste *Chem. Soc. Rev.* **2016**, *45*, 4567–4589.