## Category

Metal-Catalyzed Asymmetric Synthesis and Stereoselective Reactions

Key words

asymmetric [3+2] cycloaddition

epoxides

furans

nickel

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An Asymmetric [3+2] Cycloaddition of Alkynes with Oxiranes by Selective C–C Bond Cleavage of Epoxides: Highly Efficient Synthesis of Chiral Furan Derivatives *Chem. Commun.* 2014, *50*, 11480–11483.

## Chiral Furans via Asymmetric [3+2] Cycloaddition



**Significance:** Tetrahydrofurans and 2,5-dihydrofurans containing a stereocenter are often found in natural products and medicinal compounds. Ni(ClO<sub>4</sub>)<sub>2</sub>·6H<sub>2</sub>O in the presence of an *N*,*N*'-dioxide ligand promotes the asymmetric [3+2] cycloaddition of alkynes with epoxides via a regioselective C–C bond cleavage to give 2,5-dihydrofurans. A catalytic amount of LiNTf<sub>2</sub> was necessary to increase the yield of the cycloaddition process.

SYNFACTS Contributors: Hisashi Yamamoto, Sukalyan Bhadra Synfacts 2015, 11(1), 0054 Published online: 15.12.2014 DOI: 10.1055/s-0034-1379747; Reg-No.: H15314SF

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**Comment:** Notably, the asymmetric [3+2] cycloaddition of an alkene and an epoxide under optimized conditions afforded an optically active tetrahydrofuran derivative. According to the proposed activation model, the chiral nickel complex activates the epoxide to form a carbonyl ylide intermediate, through which the alkyne attacks from the *re* face, leading to the *R*-configured product.