

(+)-asteriscanolide

[4+4] cycloaddition

Brinkmeyer reduction

Claisen rearrangement

cyclooctadiene synthesis

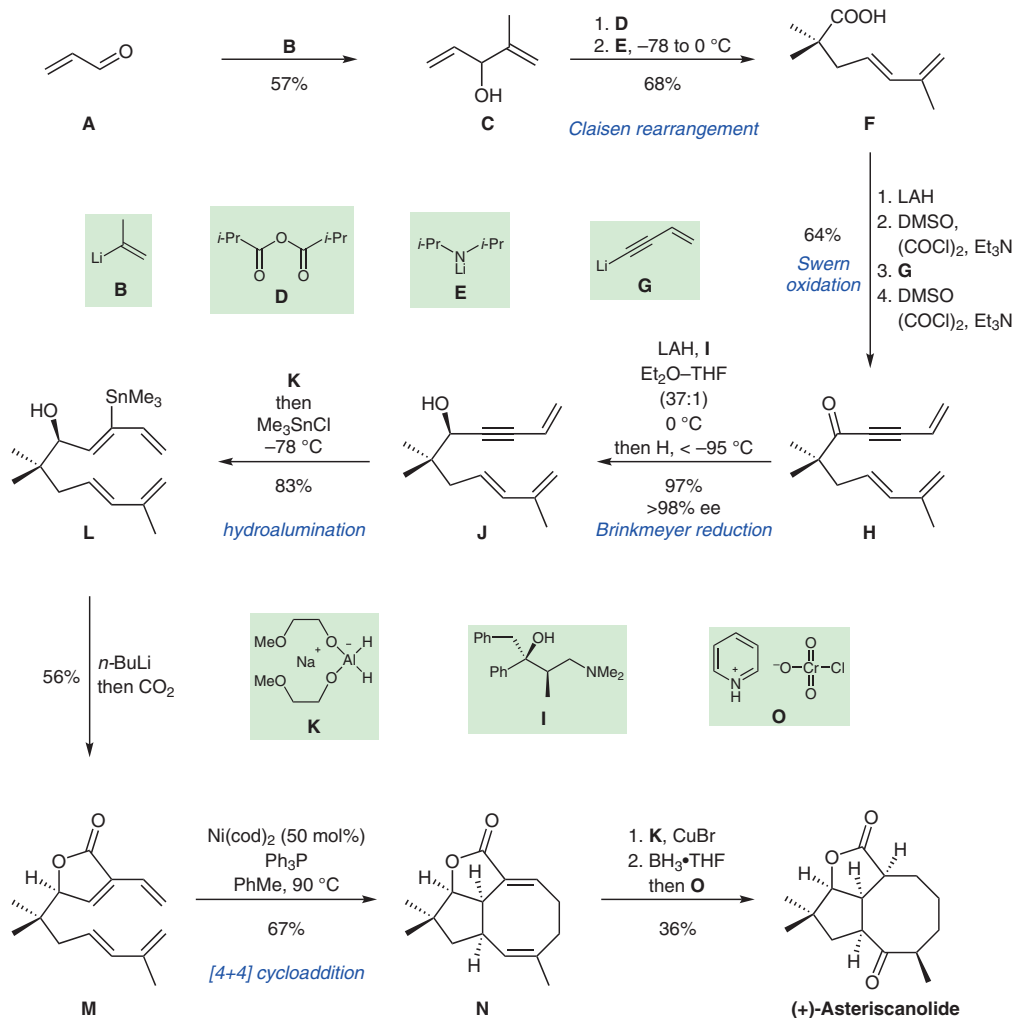
hydroalumination

Swern oxidation

Synfact Classic

P. A. WENDER\*, N. C. IHLE, C. R. D. CORREIA (STANFORD UNIVERSITY, USA)  
 Nickel-Catalyzed Intramolecular [4+4] Cycloadditions. 4. Enantioselective Total Synthesis of (+)-Asteriscanolide  
*J. Am. Chem. Soc.* **1988**, *110*, 5904–5906, DOI: 10.1021/ja00225a055.

## Synthesis of (+)-Asteriscanolide



**Significance:** Wender and co-workers report the first total synthesis of sesquiterpinoid lactone (+)-asteriscanolide. Key to their approach is a nickel-catalyzed [4+4]-cycloaddition methodology, which was developed in their group. They successfully establish the first asymmetric synthesis of a cyclooctane-containing terpenoid.

**Comment:** The synthesis commences with construction of acid **F** through a Claisen rearrangement. Asymmetric Brinkmeyer reduction of ketone **H** with LAH in presence of Darvon alcohol (**I**) as a chiral ligand gives rise to **J** with excellent enantioselectivity. Tetraene **M** was accessed by a hydroalumination stannylation sequence followed by lithiation and carboxylation. The key nickel-catalyzed intramolecular [4+4] cycloaddition forged cyclooctadiene **N**.