An Unconventional Approach to the Enantioselective Synthesis of Caryophylloids


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Synthesis of (–)-β-Caryophyllene

Significance: The synthesis of β-caryophyllene and coraxenolide A by Larionov and Corey is distinctive because it is a rare example of the use of planar chirality in natural product synthesis. Both enantiomers of (2Z,6E)-6-methylcyclonona-2,6-dienone (H) were prepared and used as chiral precursors for the synthesis of the (–)-β-caryophyllene and coraxenolide A.

Comment: The absence of stereoselectivity in the reduction of C with NaBH₄ was overcome by using the CBS reduction. Planar chiral H was obtained as a single enantiomer that is stable against racemization at room temperature owing to restricted C–C bond rotation in the 9-membered ring. By contrast, cyclononene racemizes in a few minutes at room temperature.