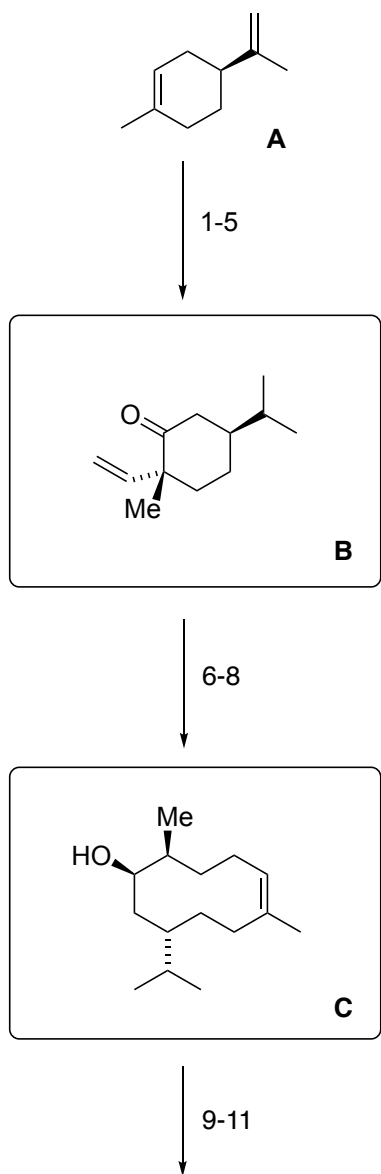


# Scalable Total Synthesis of (-)-Vinigrol

Xuerong Yu, Lianghong Xiao, Zechun Wang, Tuoping Luo, *JACS* **2019**, *141*, 3440–3443.



- 1) H<sub>2</sub>, PtO<sub>2</sub>, EtOH
- 2) CCl<sub>3</sub>COCl, Zn, Et<sub>2</sub>O, ultrasound
- 3) NaOMe, MeOH, Δ
- 4) DIBAL-H
- 5) Me<sub>3</sub>Si

- 6) CeCl<sub>3</sub>, isopropenylmagnesium bromide
- 7) KH, 18-crown-6
- 8) LAH

- 9) (+)-IpcBH<sub>2</sub>, then CH<sub>3</sub>CHO, pinacol
- 10) vinyl lithium, then I<sub>2</sub>, then NaOMe
- 11) DMP

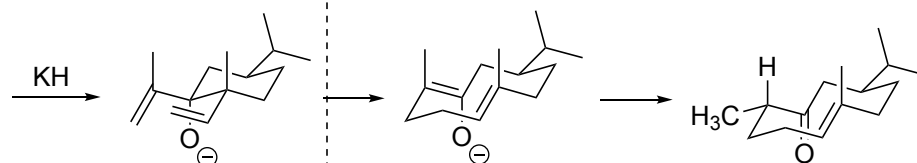
What is the name of the starting material?

(S)-(-)-Limonene

Step 3: Propose a mechanism for the ring contraction that takes place.

Step 5 triggers another rearrangement. What is the name of it?

*cyclopropylcarbinyl-cyclobutyl-homoallyl-rearrangement*



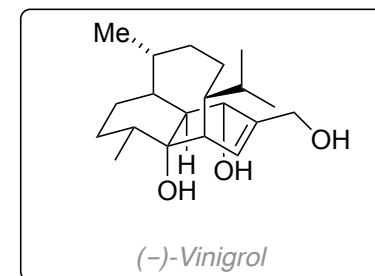
*chair-chair-chair conformation prefers Me in equatorial position*

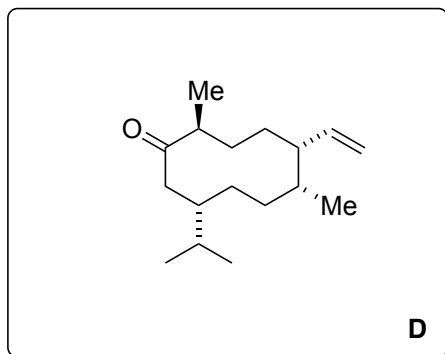
Step 7: Draw a transition state of this transformation and rationalize why the Me-(R)-stereoisomer could be the major product.

*Oxy-Cope rearrangement*

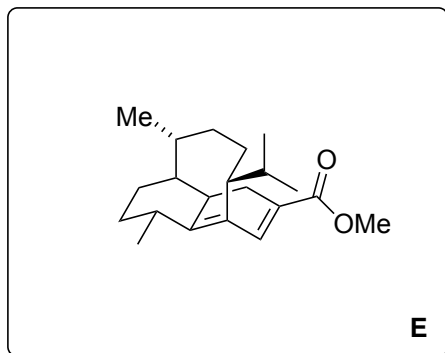
Which name reaction is associated with step 10? Provide a mechanism for it.

*Zweifel olefination*

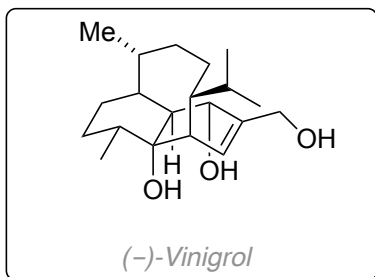




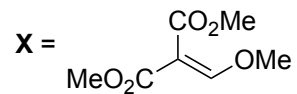
12-14



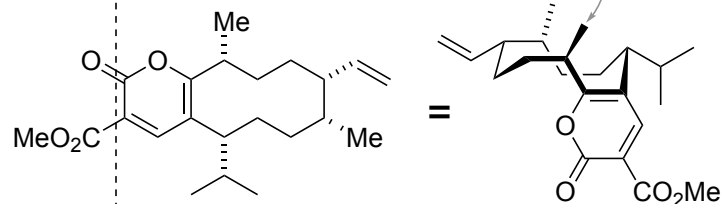
15-19



- 12) LDA, **X**  
 then DBU, 40°C  
 13) DBU, 100°C  
 14) *o*-DCB, MW, 200°C



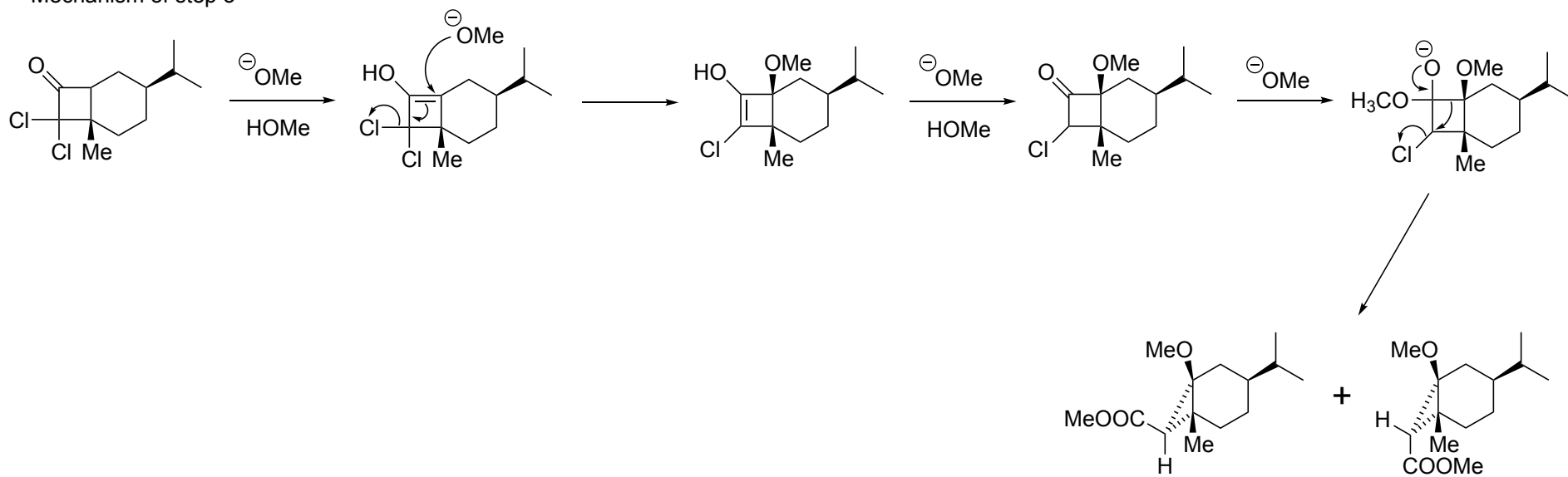
Hint: Step 13 is the inversion of a stereocenter to the thermodynamically more stable product.  
 Provide a mechanism for step 14.



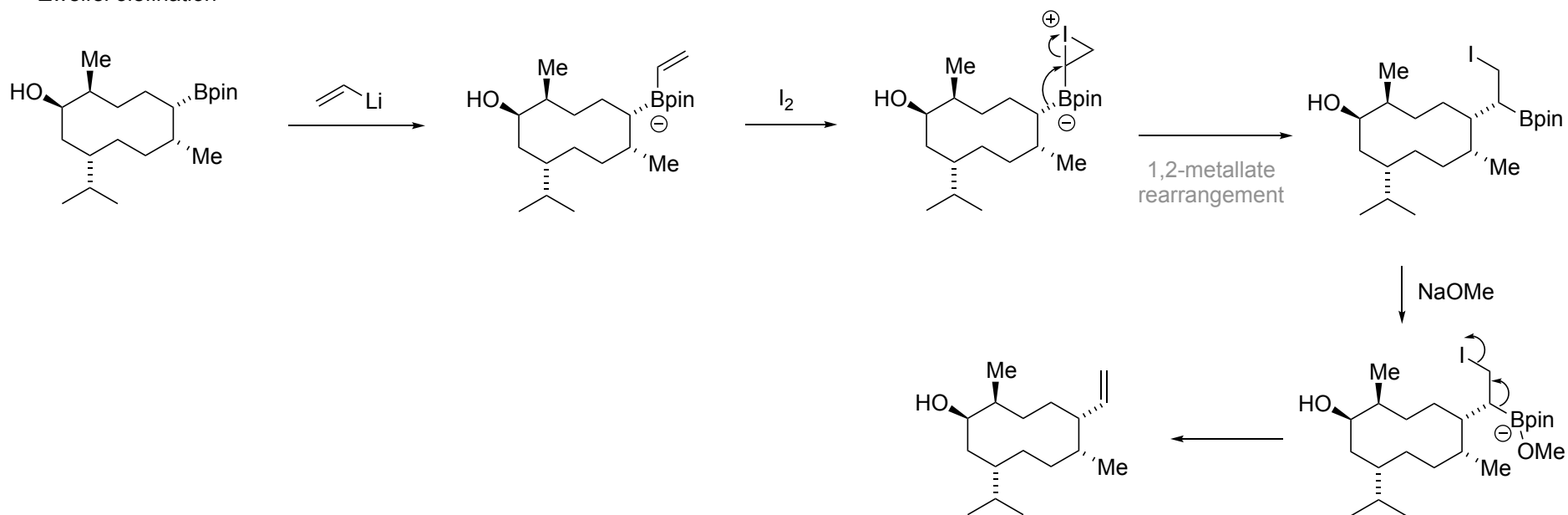
- 15) <sup>1</sup>O<sub>2</sub>, 0°C  
 16) H<sub>2</sub>, Pd/C  
 17) Burgess reagent (1.0 eq)  
 18) DIBAL-H  
 19) <sup>1</sup>O<sub>2</sub>, then PMe<sub>3</sub>

What is the name reaction that occurs in step 19?  
*Schenck ene reaction*

Mechanism of step 3



Zweifel olefination



Step 14: Inverse electron demand Diels Alder/Retro Hetero-DA

