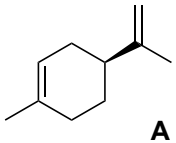
Scalable Total Synthesis of (−)-Vinigrol

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



A

1-5

B

6-8

C

9-11

1) H_2, PtO_2, EtOH
2) CCl_3COCl, Zn, Et_2O, ultrasound
3) NaOMe, MeOH, Δ
4) DIBAL-H
5) Me_3SiI

6) $CeCl_3$, isopropenylmagnesium bromide
7) KH, 18-crown-6
8) LAH

9) (+)-$IpcBH_2$, *then* CH_3CHO, pinacol
10) vinyl lithium, *then* I_2, *then* NaOMe
11) DMP

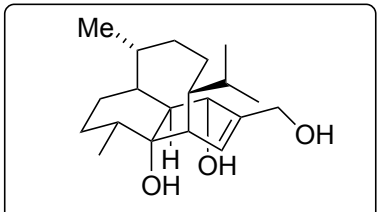
What is the name of the starting material?

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

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

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

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



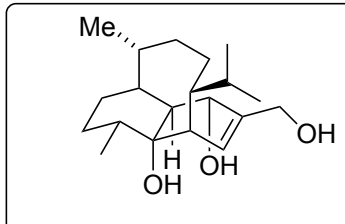
(−)-Vinigrol

D

12-14

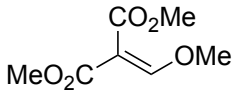
E

15-19



(–)-Vinigrol

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

X = 

15) $^1O_2$, 0°C
16) H_2, Pd/C
17) Burgess reagent (1.0 eq)
18) DIBAL-H
19) $^1O_2$, *then* PMe_3

Hint: Step 13 is the inversion of a stereocenter to the thermodynamically more stable product.

Provide a mechanism for step 14.

What is the name reaction that occurs in step 19?