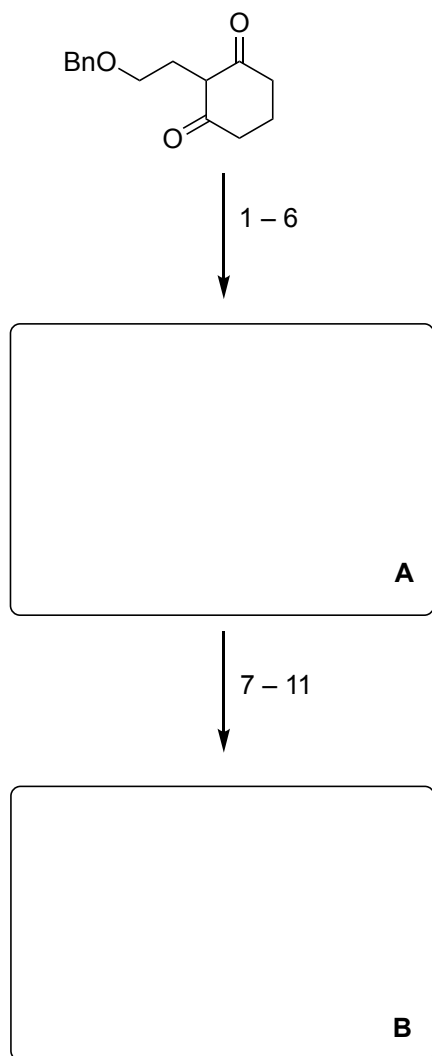


Enantioselective Total Synthesis of (-)-Caldaphnidine O via a Radical Cyclization Cascade

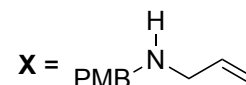
Lian-Dong Guo, Jingping Hu, Yan Zhang, Wentong Tu, Yue Zhang, Fan Pu, and Jing Xu
J. Am. Chem. Soc. **2019**, *141*, 13043–13048.



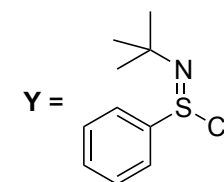
- 1) MVK, NEt₃,
then L-Prolinamide, HOAc
- 2) CH(OMe)₃, PTSA,
then HCHO, **X**
- 3) 1,3-Dimethylbarbituric acid, Pd(Ph₃)₄
then NaHCO₃, TsCl
- 4) ZnMe₂, LiBr, Ni(acac)₂
- 5) LiHMDS, **Y**
- 6) CAN

- 7) KHMDS, PhNTf₂,
then KHMDS, Davis' oxaziridine
- 8) Pd(OAc)₂, PPh₃, HCOOH, DIPEA
- 9) 3-butenylmagnesium bromide, CeCl₃
- 10) Pb(OAc)₄
- 11) NaBH₄

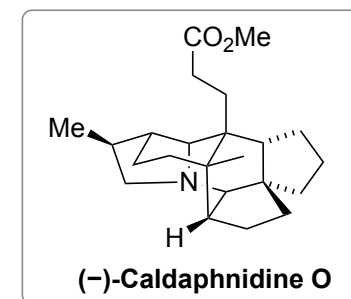
Hint: The (*R*)-enantiomer is formed in step 1.



Step 5: Name and mechanism?



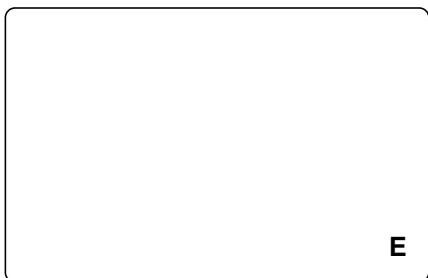
Step 7: How do you prepare Davis' oxaziridine?



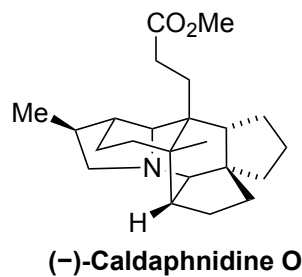
↓ 12 – 15



↓ 16 – 18



↓ 19 – 21



- 12) I₂, PPh₃, imidazole
13) LDA
14) 9-BBN, NaOMe, I₂
15) SmI₂, Fe(dbm)₃

- 16) SOCl₂, pyridine
17) Na-naph
then propargyl bromide
18) *n*-Bu₃SnH, AIBN
then *p*-TsOH

- 19) (COCl)₂, DMSO, TEA
20) *n*-BuLi, **Z**
then *p*-TsOH
then NaOMe
21) H₂, Pt/C

Hint for step 13: A 2:1 mixture of diastereomers is formed. It ultimately (step 16) converges back into the same intermediate.

Step 15: What are the names associated with and the mechanism of this reaction?

Step 18 - KEY STEP: Please provide a mechanism and classify each of the three steps happening in this cyclization cascade.

