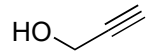
Asymmetric Total Synthesis of Solandelactone E: Stereocontrolled Synthesis of the 1,4-diol-2-ene core via Lithiation-Borylation-Allylation Sequence

A. Robinson and V. K. Aggarwal, *Angew. Chem. Int. Ed.* **2010**, *49*, 6673–6675



1) Allylbromide, In
2) (–)-DET, Ti(*i*OPr)$_4$, *t*BuOOH
3) $PhSO_2Cl$, Et_3N, DMAP

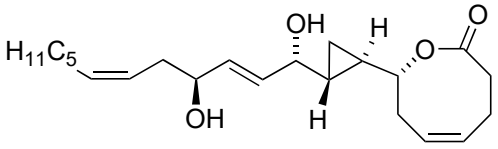
A

4) NaHMDS, CH_3CN
5) DHP, PPTS
6) $K_2OsO_4 \cdot 2H_2O$ (cat.), $NaIO_4$, 2,6-lutidine
7) $HO_2C(CH_2)_3PPh_3Br$, NaHMDS
8) HCl (aq.)

B

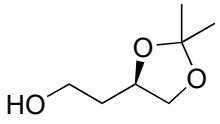
How would you rationalize the outcome of step 1) ?

provide a Mechanism for step 4)



solandelactone E

C

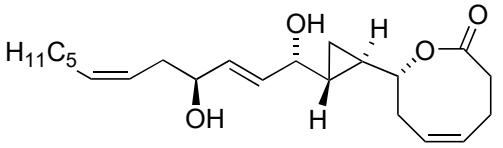


D

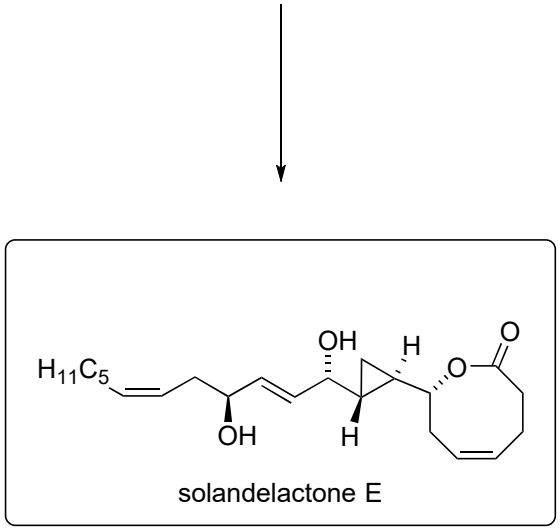
9) 1,3,5-trichlorobenzoyl chloride, Et_3N,
then DMAP, toluene 90 °C
10) Raney-Ni, $NaH_2PO_2 \bullet H_2O$

11) *N*,*N*-diisopropyl carbamoyl chloride, NaH
12) *s*-BuLi, *then* Bu_3SnCl
13) HCl
14) $NaHCO_3$, $NaIO_4$
15) $C_6H_{13}PPh_3Br$, NaHMDS

provide a name and mechanism for step 9)
what alternatives to step 9) come to mind?



solandelactone E



solandelactone E

16) *n*-BuLi, TMEDA, *then* **1**, *then* aldehyde **C**
H_2O_2, NaOH
17) *t*-BuOOH, Ti(*i*OPr)$_4$
18) AcOH, MeOH

provide a Mechanism for step 16)

1: