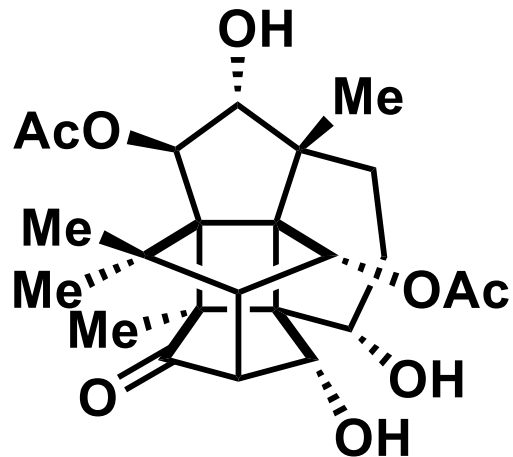


# Total synthesis of the complex taxane diterpene canataxpropellane

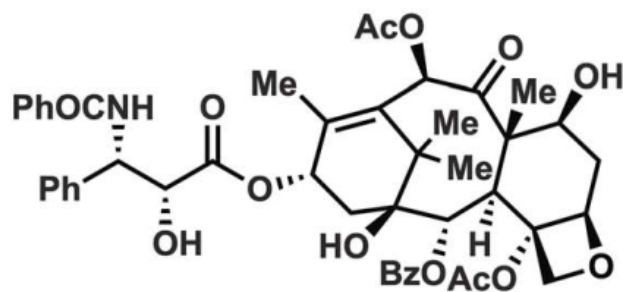
Fabian Schneider, Konstantin Samarin, Simone Zanella, Tanja Gaich\*



- a vital family of natural products exhibiting potent anticancer activity
- isolated from *Taxus canadensis*
- this highly oxygenated diterpene is one of the most intricate and complex natural products that has ever been isolated

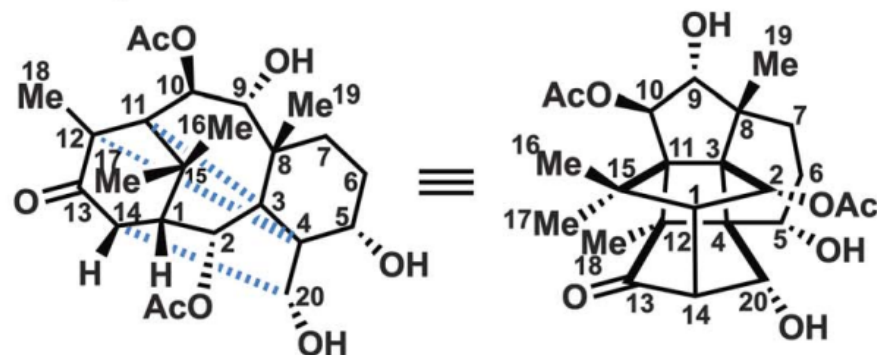
## Canataxpropellane

A Classic taxane core



Taxol (1)

B Complex taxane core

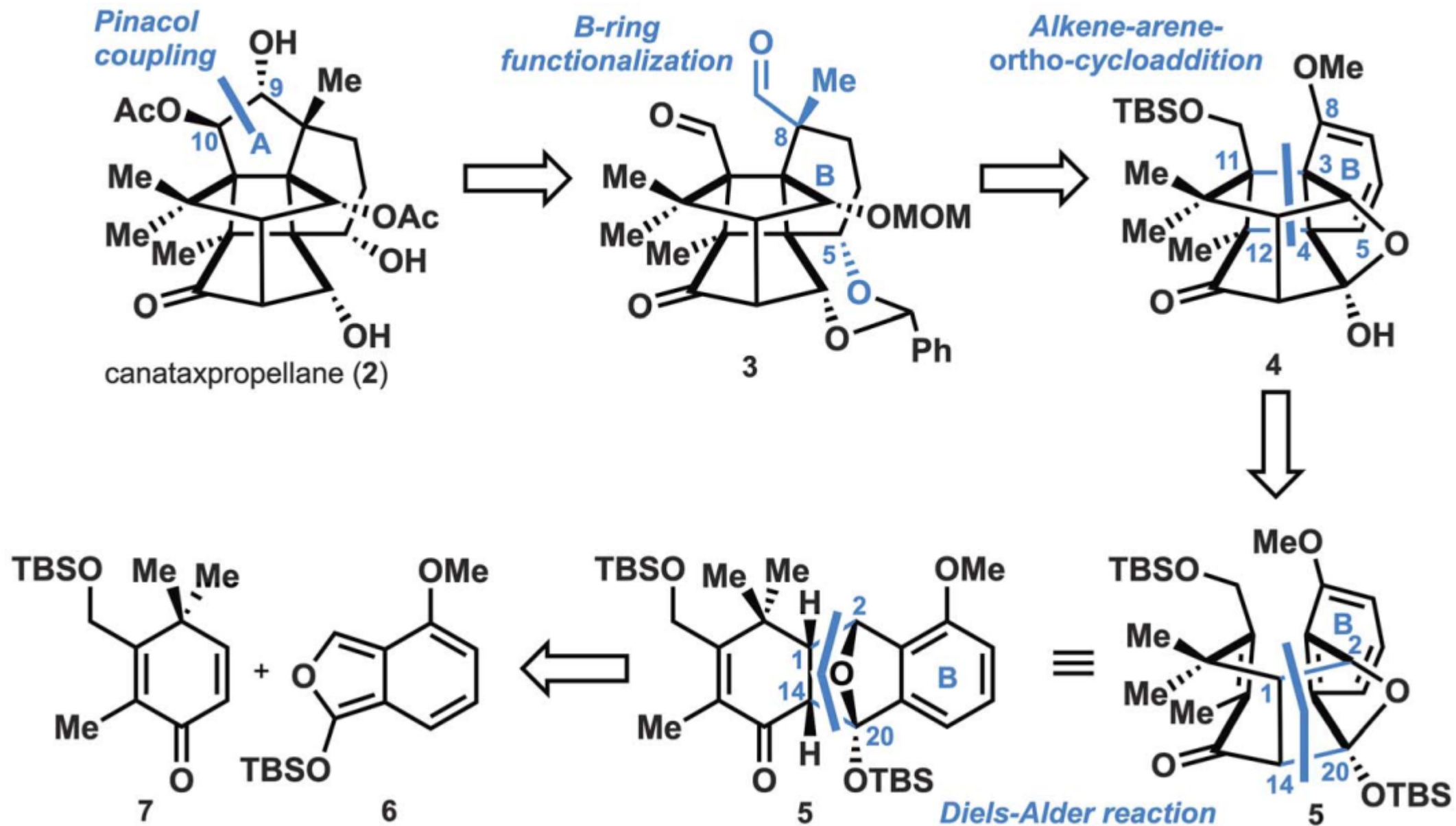


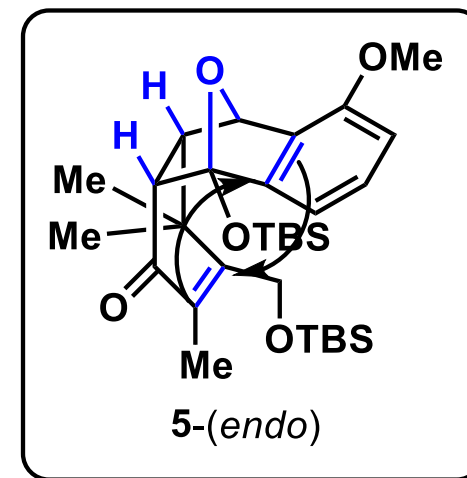
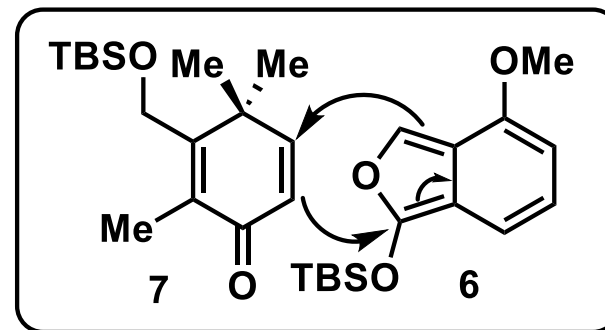
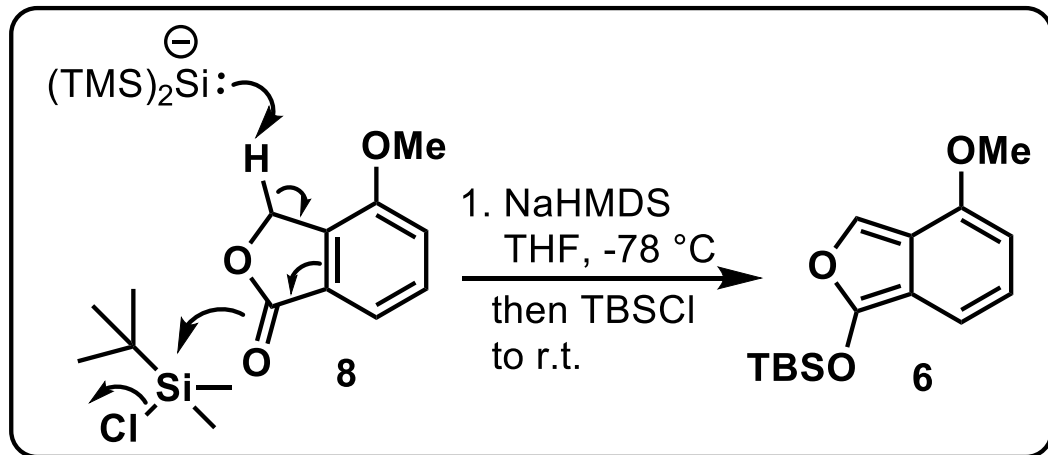
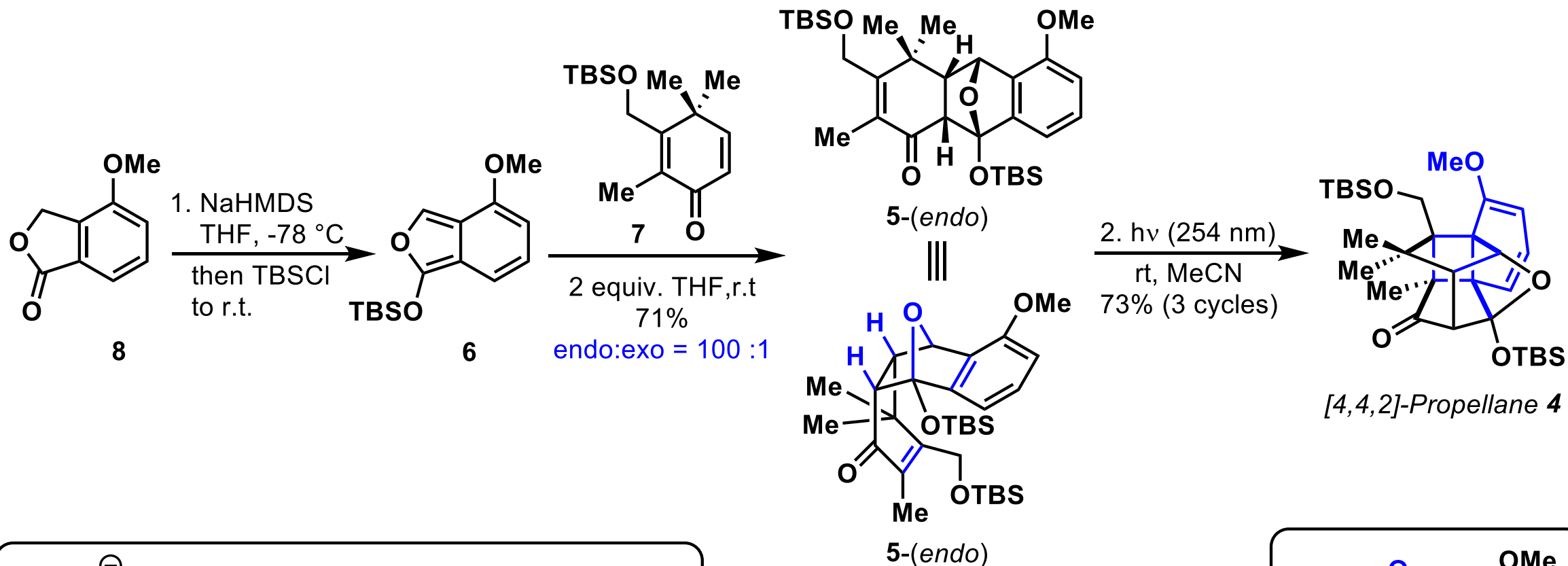
3 additional C-C-bonds

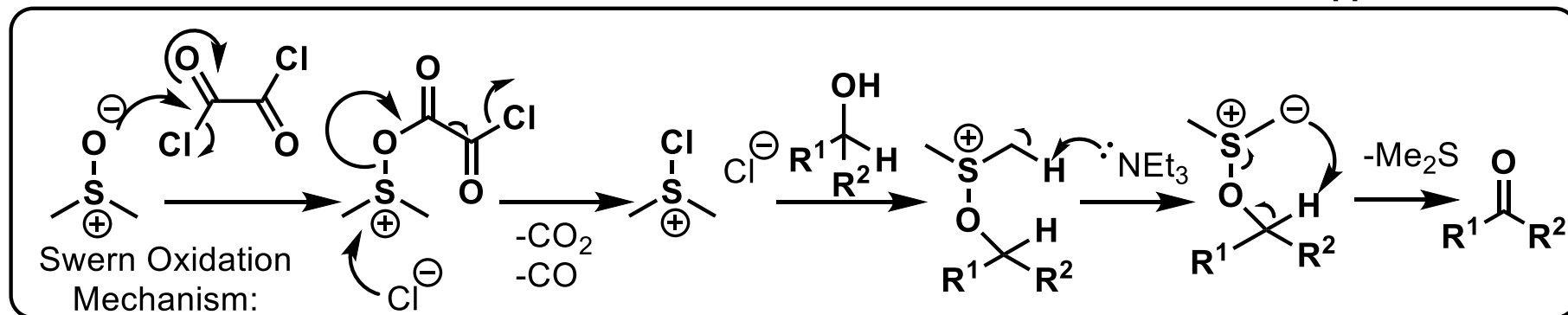
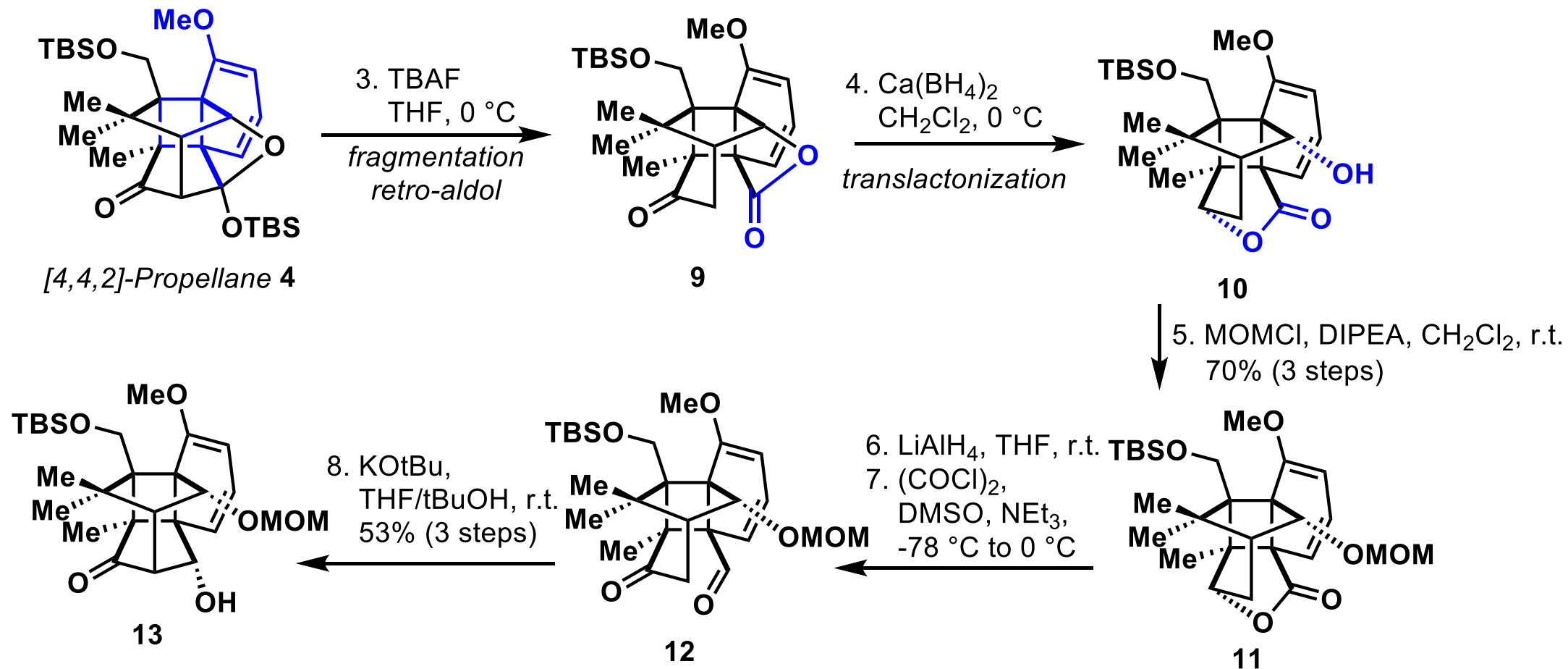
canataxpropellane (2)

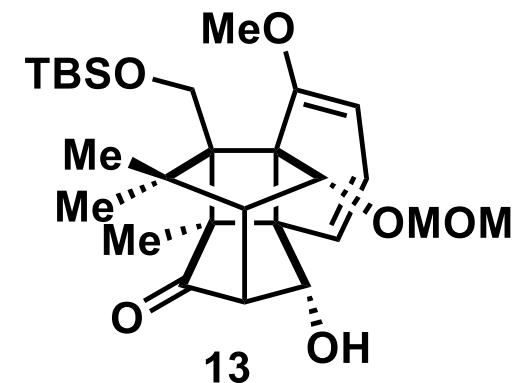
Ziyong Wang  
Liu Research Group  
Total synthesis  
presentation

# Retrosynthetic analysis of (-)-canataxpropellane

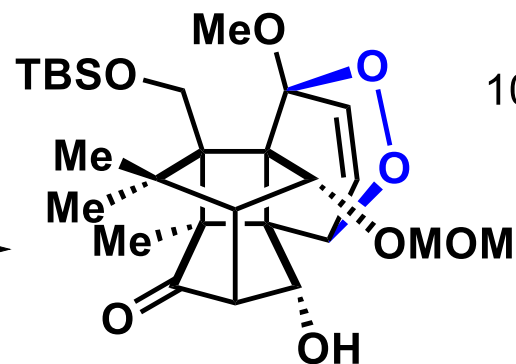
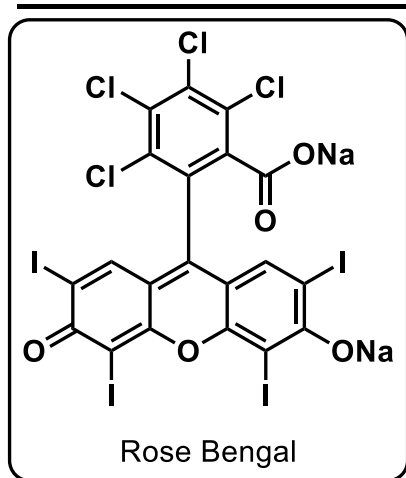




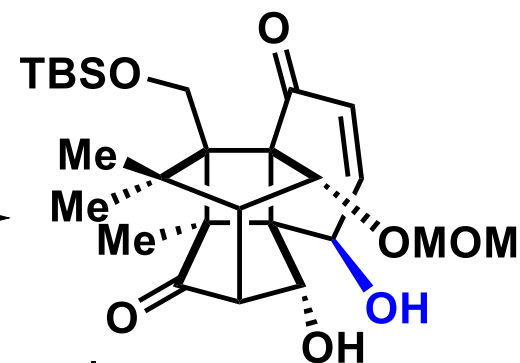
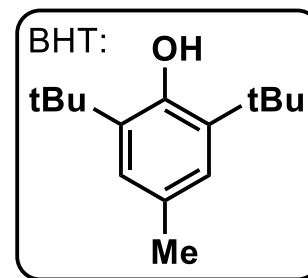




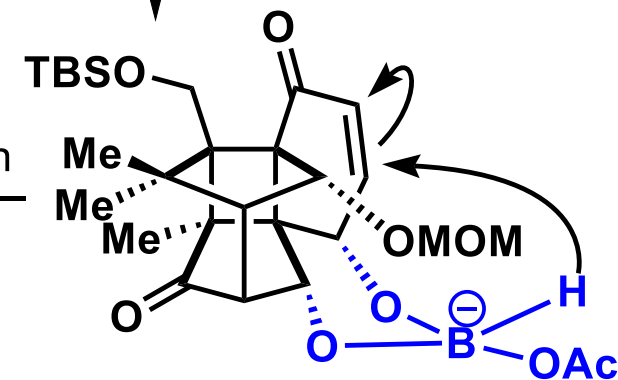
9. O<sub>2</sub>, hv(>530 nm)  
Rose Bengal B  
CDCl<sub>3</sub>/MeOH-d<sub>4</sub>



10. BHT, KOAc, THF  
r.t. then silica gel  
71% (2 steps)

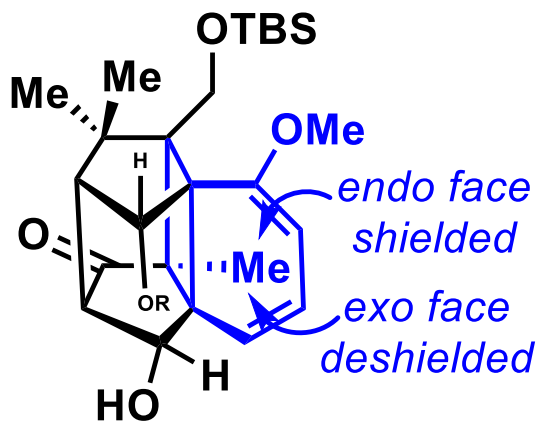


11. IBX, DMSO, r.t.  
12. Me<sub>4</sub>NBH(OAc)<sub>3</sub>  
THF, r.t.; dr 3.5:1

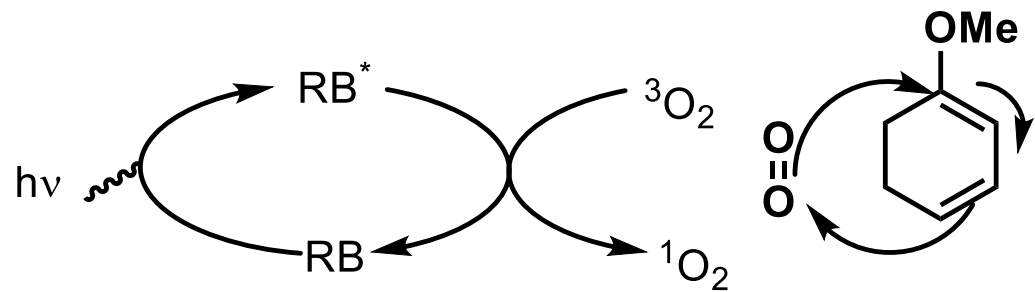


partial  
1,4-reduction

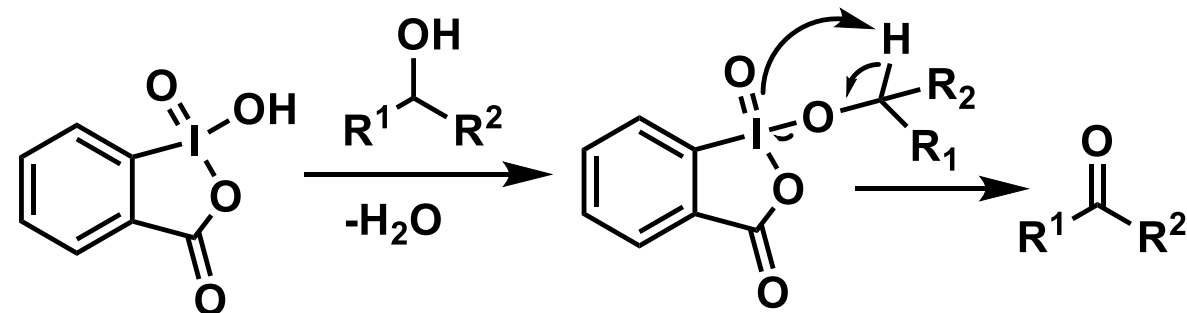
HC=CH: 17 enone 51%  
H<sub>2</sub>C-CH<sub>2</sub>: 18 ketone 10%



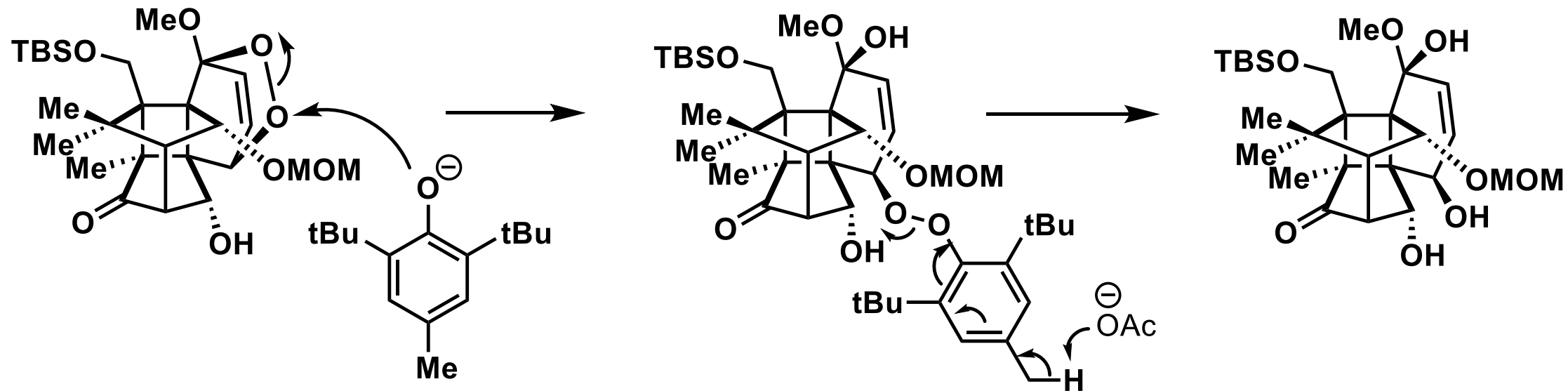
Step 9 mechanism:

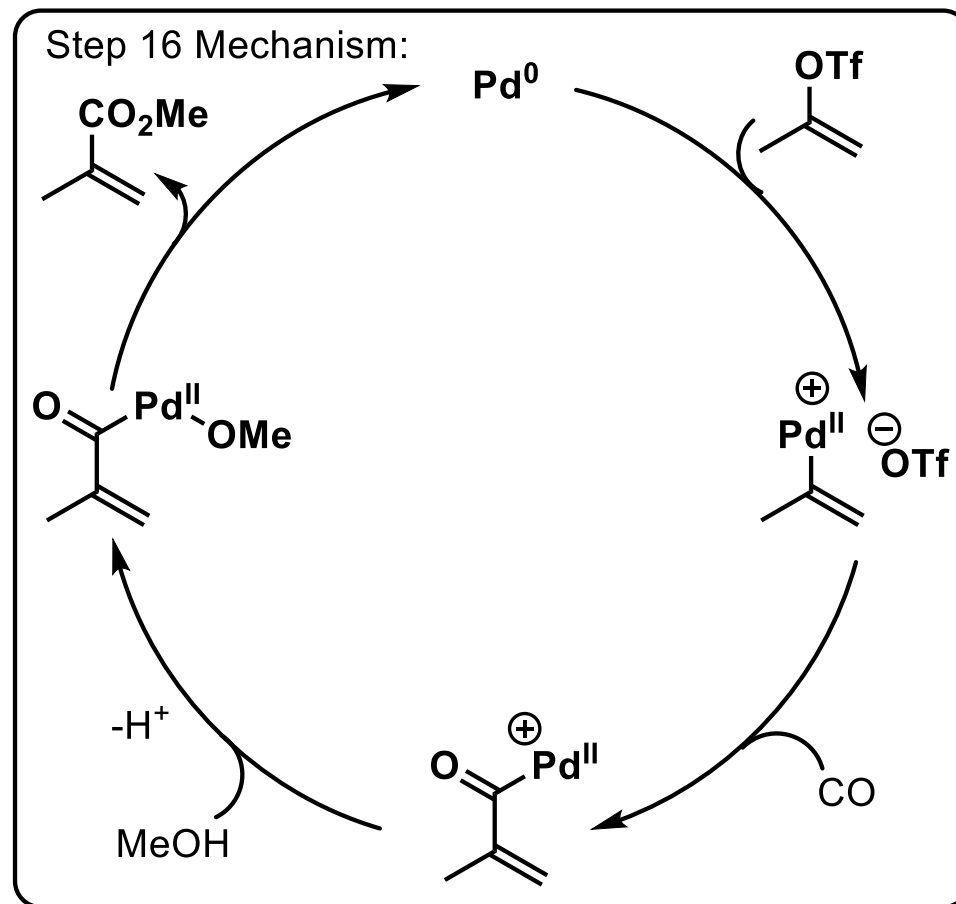
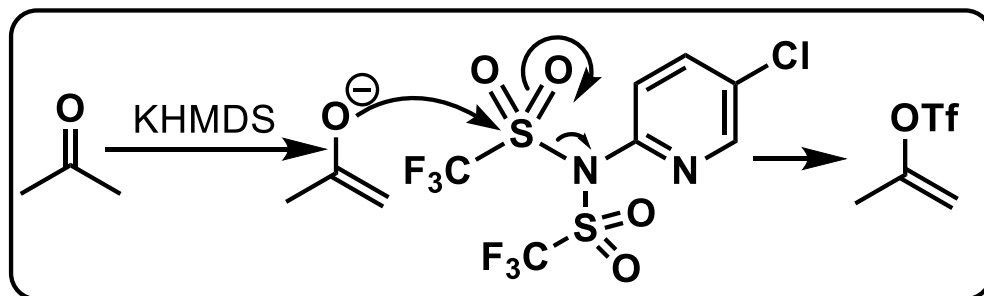
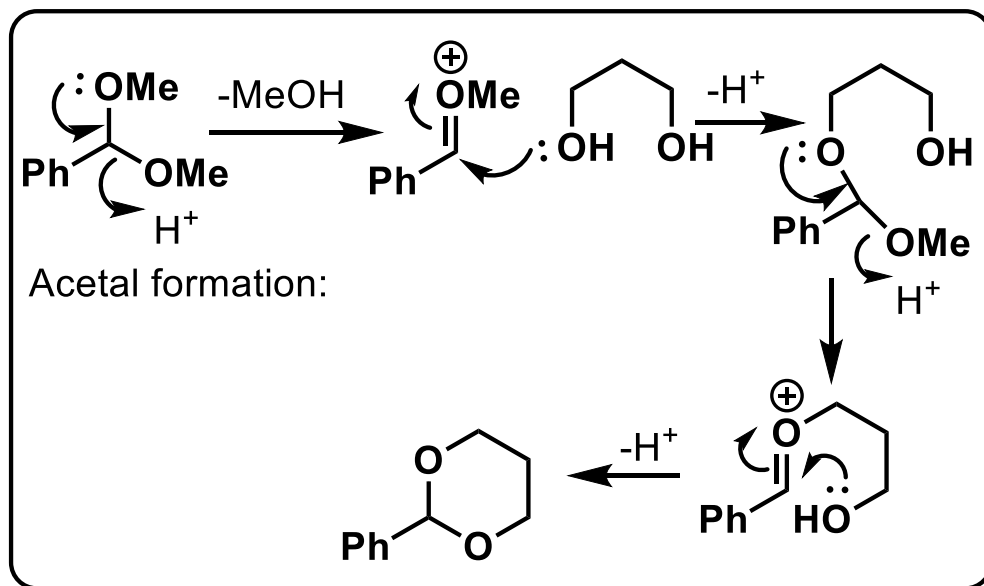
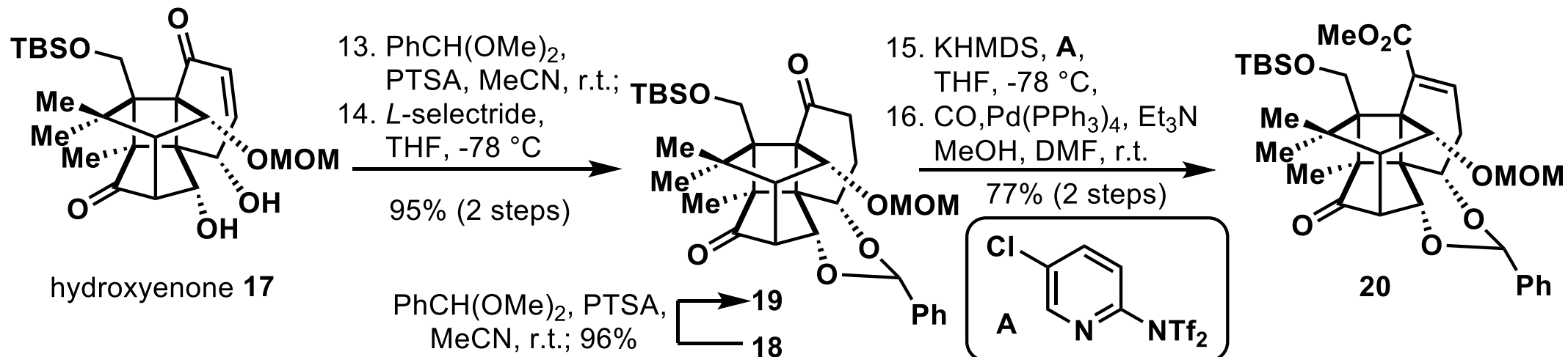


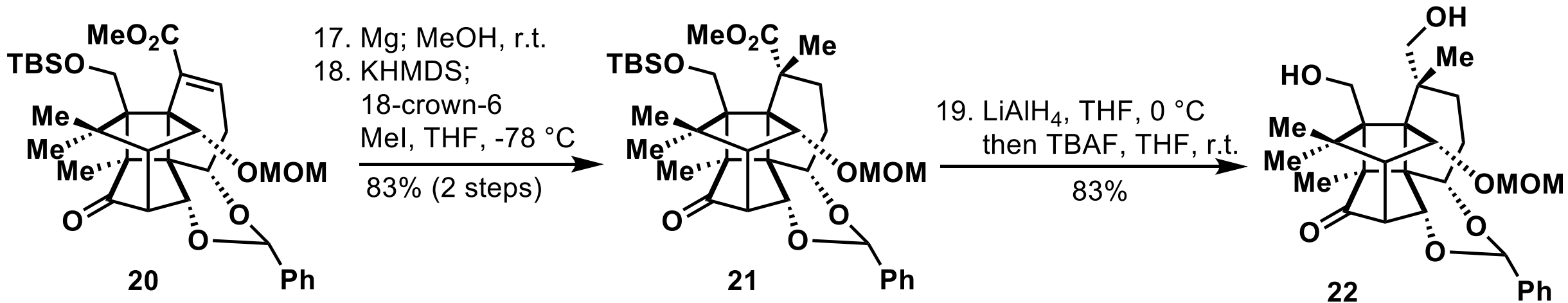
IBX Oxidation Mechanism:



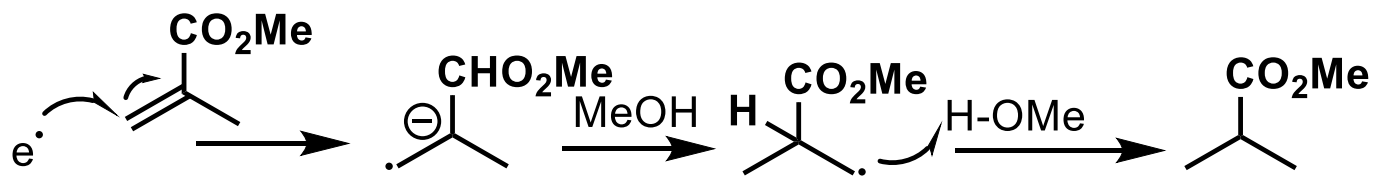
Step 10 mechanism:



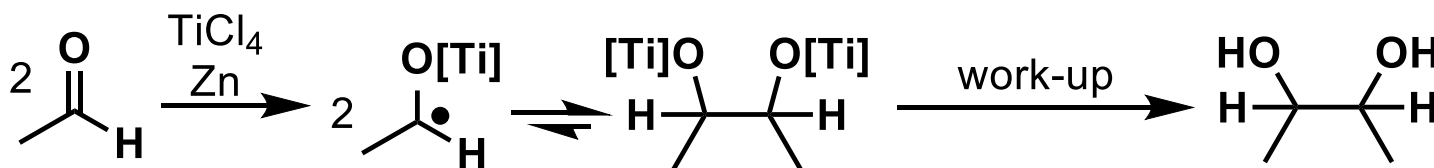




Step 17 Mechanism:

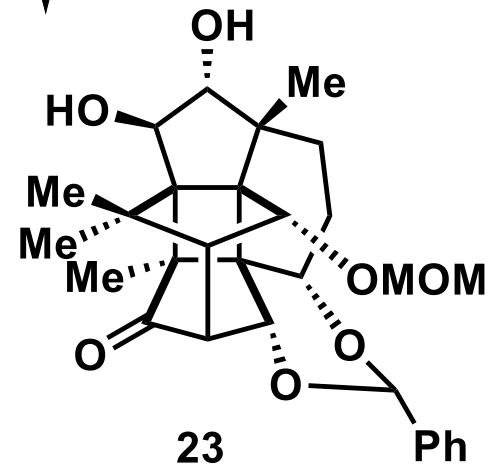


Step 21 Mechanism: (McMurry-type reaction)

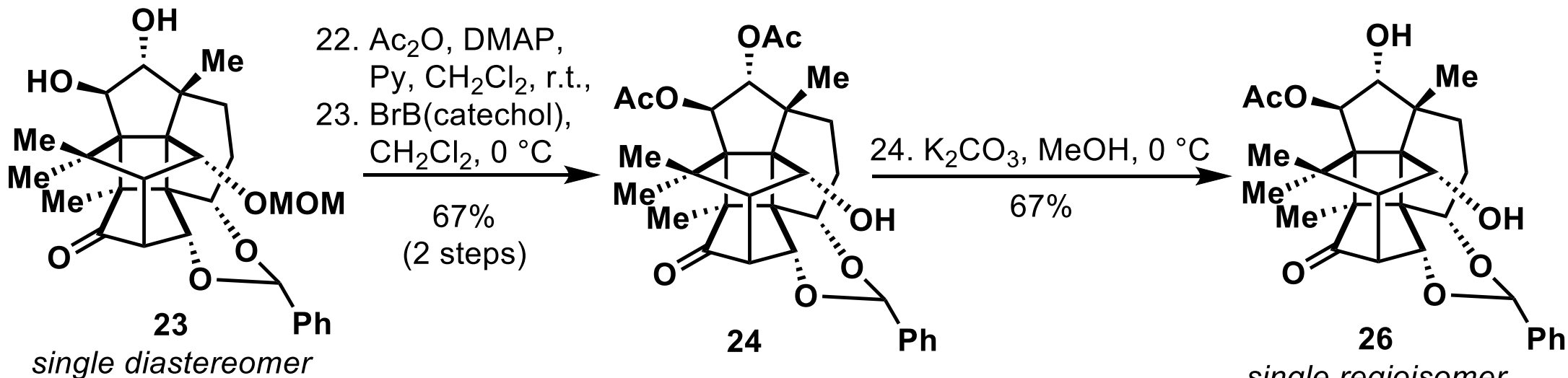


55% (2 steps)

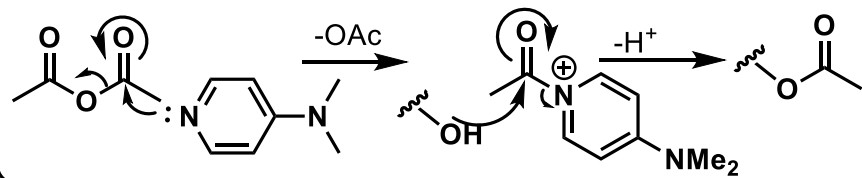
20. Swern Ox.  
 21. TiCl<sub>4</sub>, Zn,  
 Py, THF, r.t.



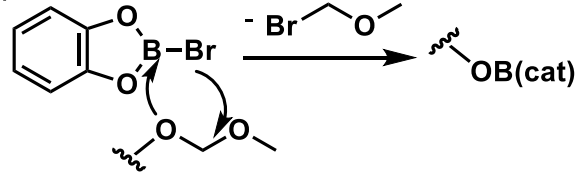




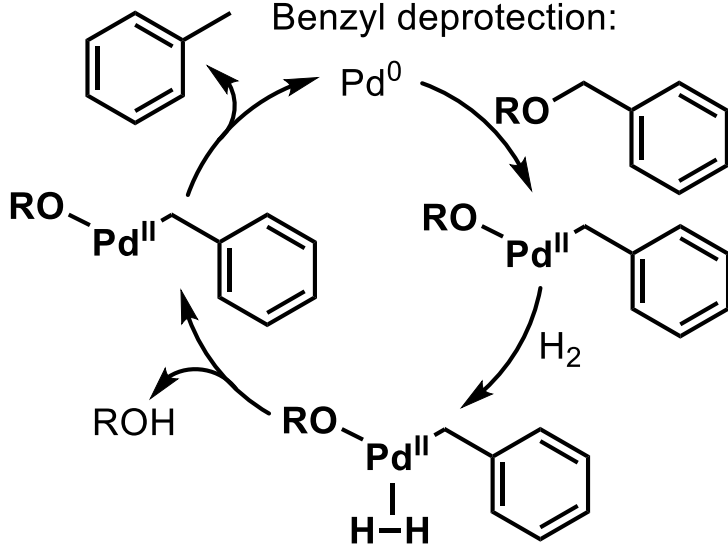
Acetylation of alcohol mechanism:



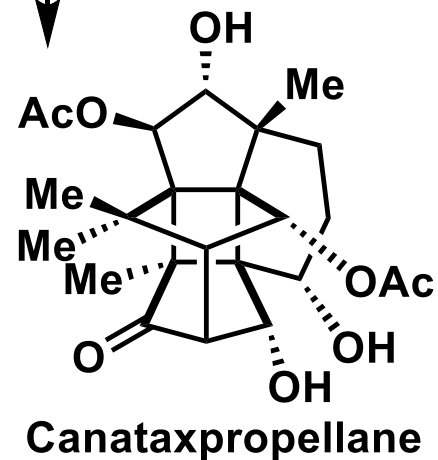
MOM deprotection:



Benzyl deprotection:



25.  $\text{Ac}_2\text{O}$ , DMAP, Py  
 $\text{CH}_2\text{Cl}_2$ , r.t. 45%  
 26.  $\text{H}_2$ , Pd/C, MeOH  
 r.t. 97%



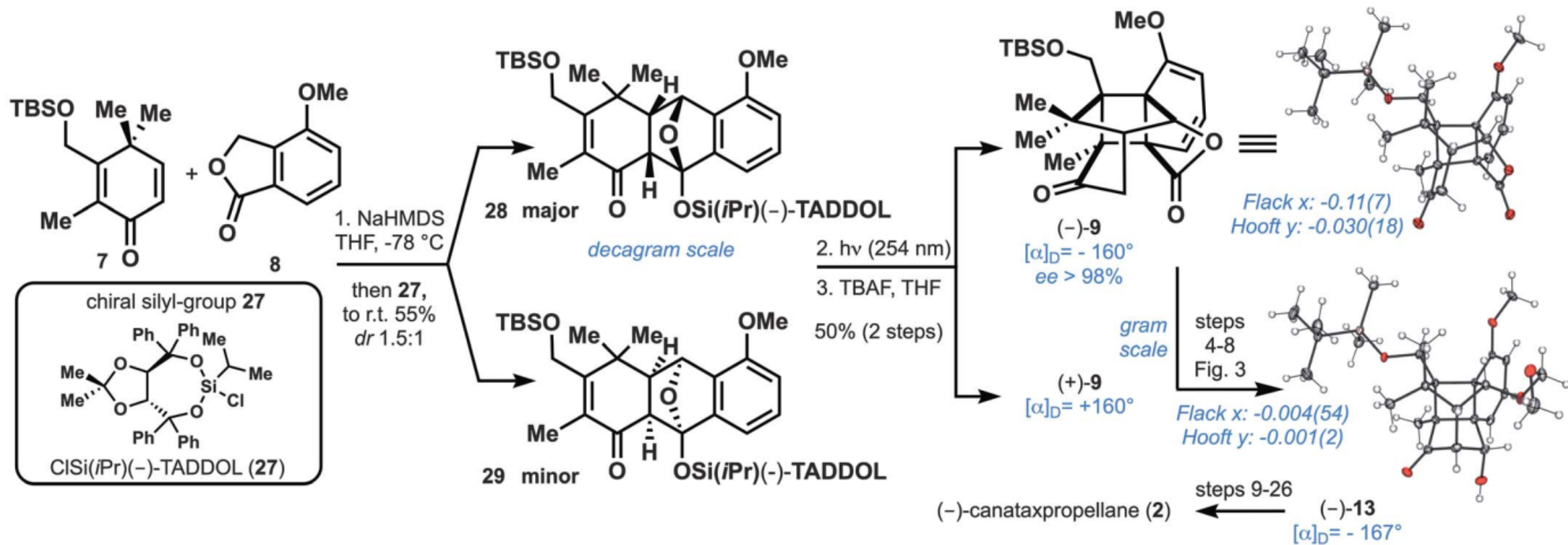


Fig. 5. Access to enantiopure key intermediate (-)-9 and (-)-13 for the enantiopure synthesis of (-)-2.

