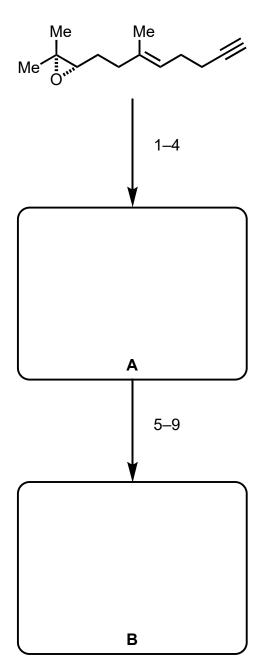
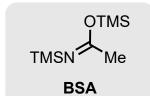
## Total Synthesis of (+)-Cyclobutastellettolide B

Zhongchao Zhang, Sijia Chen, Fu Tang, Kai Guo, Xin-Ting Liang, Jun Huang, Zhen Yang *J. Am. Chem. Soc.* **2021**, *143*, 18287–18293.



- 1) TiCl<sub>4</sub>, CH<sub>2</sub>Br<sub>2</sub>
- 2) tBuLi, DMF
- 3) NaBH₄
- 4) Pivalic acid (cat.), MeC(OEt)<sub>3</sub>, neat, reflux; then AcOH, Ac<sub>2</sub>O; then Et<sub>3</sub>N, 4-DMAP



- 5) mCPBA
- 6)  $B(C_6F_5)_3$
- 7) **BSA**, DBU
- 8) TFA, Et<sub>2</sub>Zn,CH<sub>2</sub>I<sub>2</sub>
- 9) conc. HCI, acetone, reflux

## **Extras**

- (a) For all intermediates that are at least bicyclic: find reasonable 3D representations.
- (b) Form proposals for diastereoselectivities (i.e. propose the major diastereomer) based on these representations.
- (c) Make suggestion as to why the authors had to apply the three-step-sequence 7–9.

Propose a route to the starting material.

- 1) Hint: Product data:
- <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 141.0, 120.9, 78.9, 49.1, 38.72, 38.70, 37.2, 36.9, 28.0, 27.7, 21.2, 20.9, 15.4 ppm.
- 2) Name of the reaction?
- 4) Name the reaction.

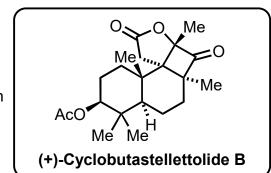
Hint: All functional groups competent of reacting with the ortho ester under these reaction conditions reacted. The telescoped steps constitute a protecting group manipulation.

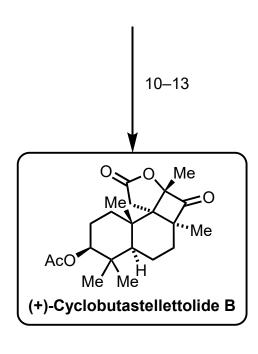
6) Name the reaction.

Additional: Whose favorite Lewis acid is this? Which is your

favorite one & why?

- 8) Name the reaction.
- 9) *Hint:* The structural motif generated in step 8 is known to shapeshift to a different constitutional isomer. Think Kulinkovich reaction.





- 10) EtPPh<sub>3</sub>Br, nBuLi

- 11) K<sub>2</sub>OsO<sub>4</sub>, NMO 12) (COCI)<sub>2</sub>, DMSO, Et<sub>3</sub>N 13) Compact fluorescent lamp (CFL), CHCl<sub>3</sub>

10–13) Name the reactions.

For 13: Also consider writing the detailed reaction mechanism.