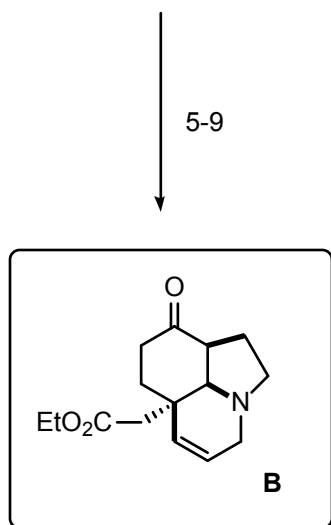
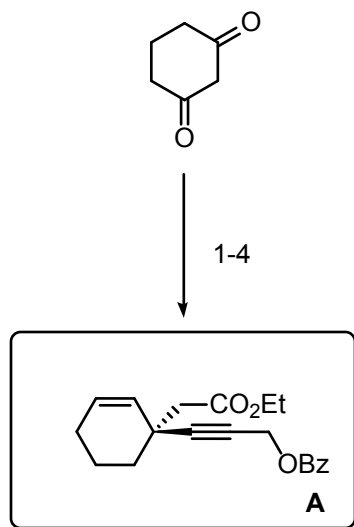


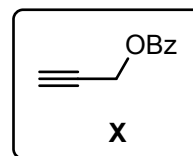
Total Syntheses of (-)-Deoxoapodine, (-)-Kapsifoline D and (-)-Beninine

Yi-Guo Zhou, Henry N. C. Wong and Xiao-Shui Peng

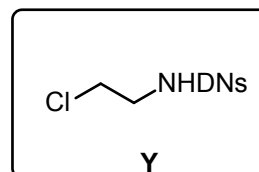
J. Org. Chem. **2020**, *85*, 2, 967-976.



- 1) Tf_2O (1.5 equiv), 2,6-lutidine
- 2) **X**, $\text{PdCl}_2(\text{PPh}_3)_2$, CuI
- 3) CBS-Cat, Catecholborane
- 4) *o*-Nitrophenol, $(\text{EtO})_3\text{CCH}_3$



- 5) K_2CO_3 , EtOH
- 6) Lindlar-Cat, H_2
- 7) **Y**, PPh_3 , DIAD
- 8) CrO_3 , TBHP
- 9) PhONa

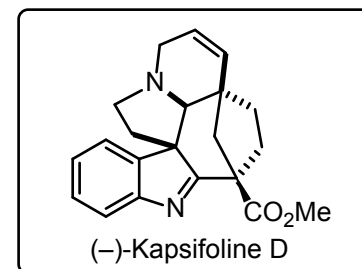


Name of step 4 and characterization?

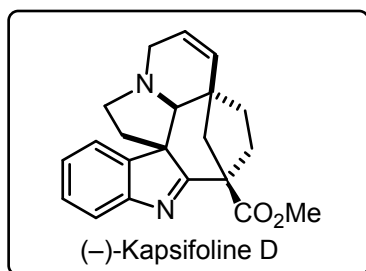
Johnson-Claisen rearrangement,
[3,3]-sigmatropic rearrangement

Name and structure of protecting group of **Y**? 2,4-dinitrobenzenesulfonyl

Mechanism for step 9?



10-17



- 10) PhNHNH₂, TFA
- 11) TFA, Et₃SiH
- 12) LiAlH₄
- 13) TBSCl, imH
- 14) (COCl)₂, DMSO, Et₃N
- 15) *n*-BuLi, Mander's reagent
- 16) TBAF
- 17) TsCl, Et₃N, *t*-BuOK

Name, mechanism and characterization of key-step of 10

hint: two products isolated

Fischer indole synthesis, [3,3]-sigmatropic rearrangement

Structure of Mander's reagent?

NCCO₂Me

Step 9

