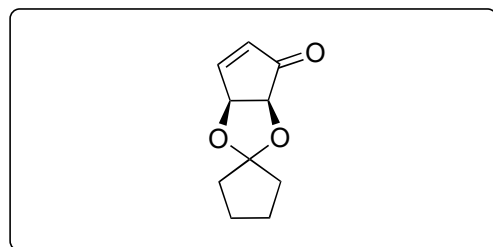


Formal Syntheses of (-)- and (+)-Phalarine by a hypervalent iodine mediated oxidative double cyclization

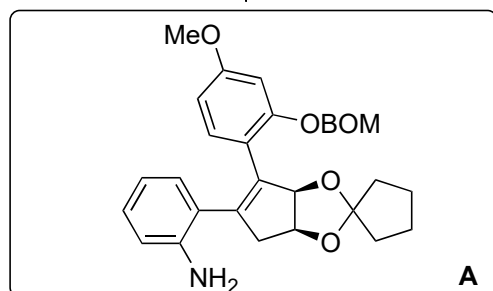
Hanfeng Ding and David Y.-K. Chen

Angew. Chem. Int. Ed. **2011**, 50, 676

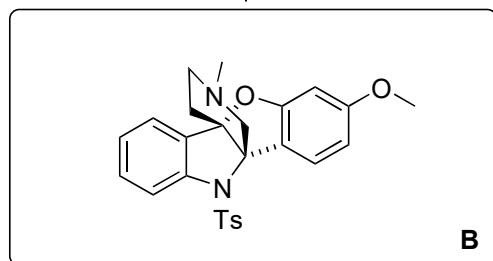
J. Am. Chem. Soc. **2010**, 132, 8506-8512



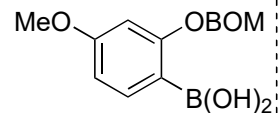
1-6



7-11



- 1) I₂, pyridine, DMAP
- 2) **1**, PdCl₂(PhCN)₂, CuI
- 3) K-selectride
- 4) NaH, PhNTf₂
- 5) **2**, [Pd(PPh₃)₄]
- 6) H₂, Pd/C

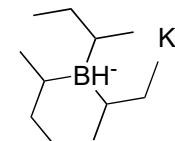


- 7) TsCl, pyridine
- 8) H₂, Pd(OH)₂
- 9) AcOH/H₂O (4:1)
- 10) PIFA
- 11) Pb(OAc)₄, MeNH₂, NaBH(OAc)₃

Step 2: Reaction name

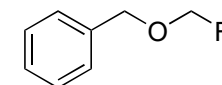
Stille Cross Coupling

Step 3: Structure of K-selectride



Step 5: Structure of BOM, reaction name

Suzuki Cross Coupling

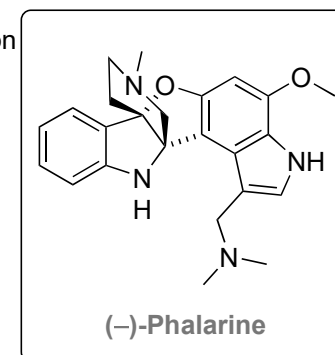


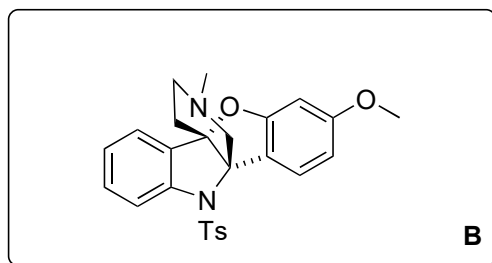
Step 10 (hint): (+)(-)-Diastereomers are formed

Step 10: Structure of PIFA, propose a mechanism

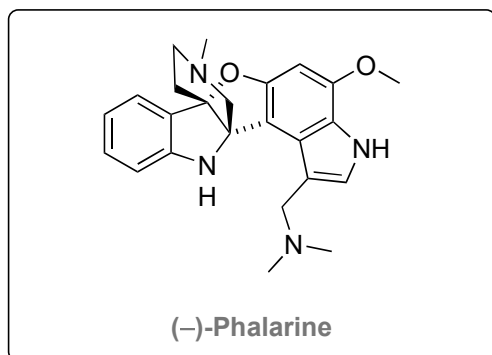
Step 11: Name the transformation

Reductive Amination

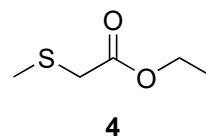
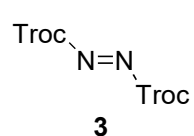




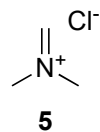
12-18



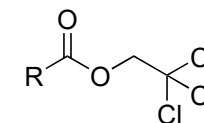
- 12) **3**, TFA
- 13) Zn, AcOH
- 14) **4**, SO₂Cl₂, then NEt₃
- 15) BH₃
- 16) RaNi



- 17) **5**, AcOH
- 18) Na(Hg), Na₂HPO₄, MeOH



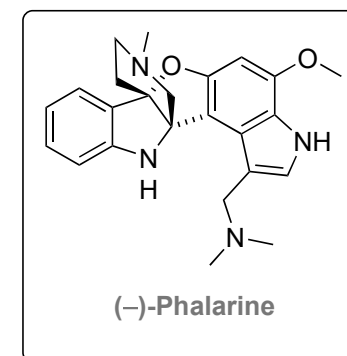
Step 12: Structure of Troc



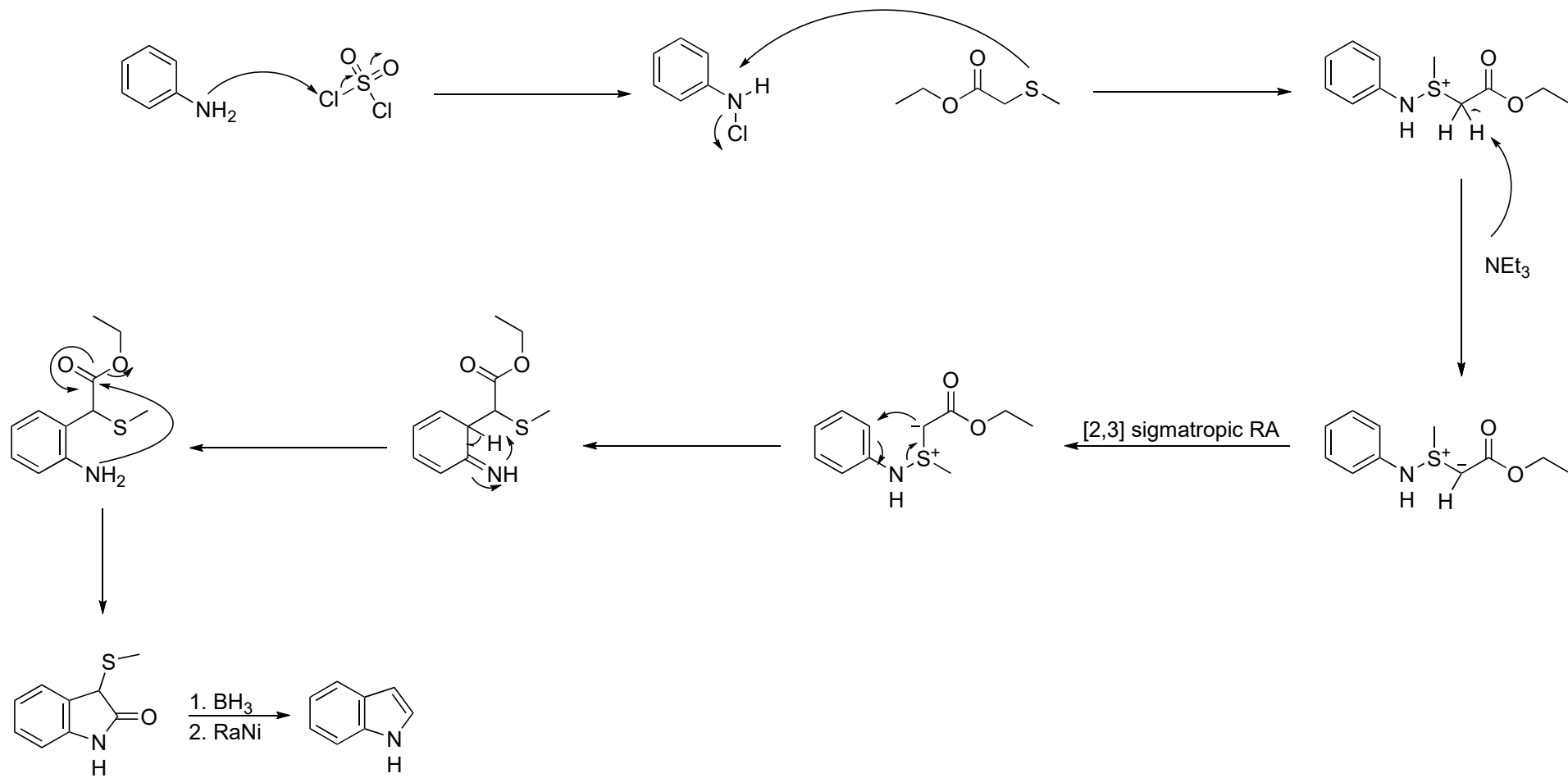
Step 14: Reaction name, propose a mechanism and classify the key step, name 3 other accesses to this class of heterocycle
 Gassmann Oxindole Synthesis
 [2,3] sigmatropic rearrangement

Bartoli Indole Synthesis
 Fischer Indole Synthesis
 Fukuyama Indole Synthesis
 Larock Indole Synthesis
 Leimgruber-Batcho Indole Synthesis
 Reissert Indole Synthesis

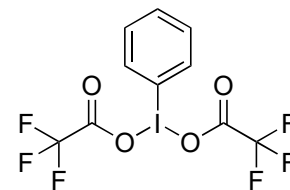
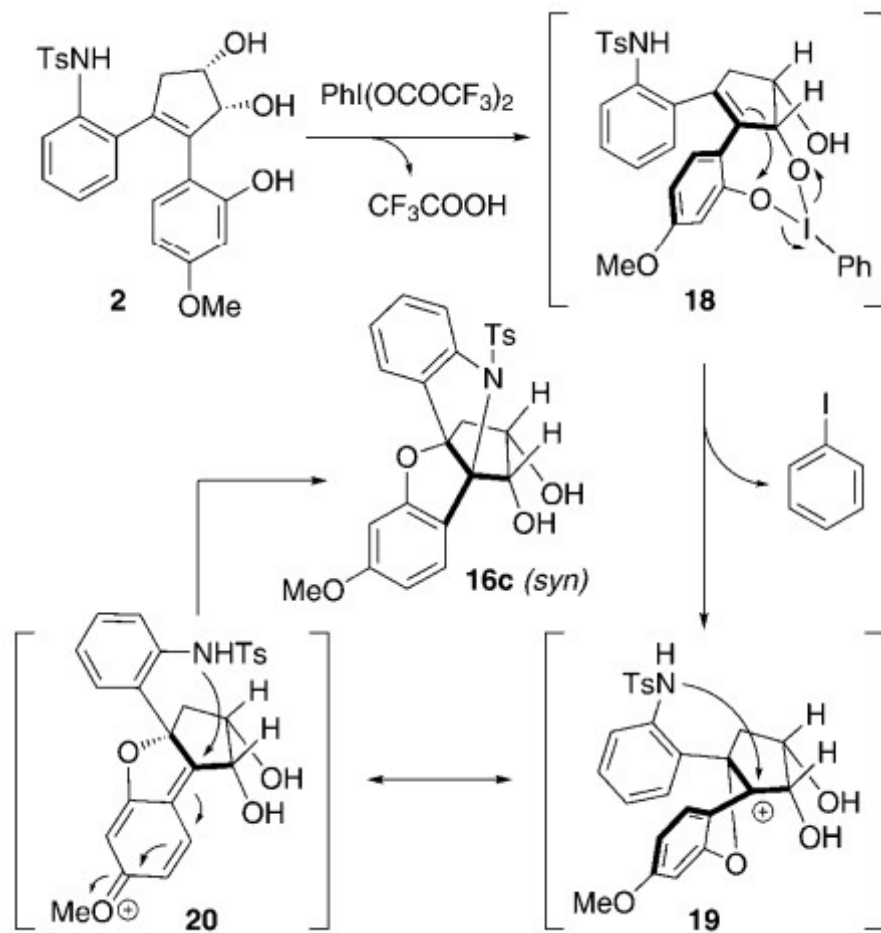
...



Step 14: Gassmann Oxindole synthesis



Step 10: Hypervalent iodine mediated cyclization



phenyliodine-bis-trifluoroacetate