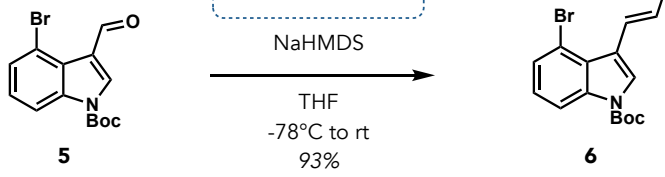
Kinetically Controlled aza-Michael/Epimerization Cascade Enables a Scalable Total Synthesis of Putative (+)-Fumigaclavine F

Adrian O. Dukes, Pathum M. Weerawarna, and Richard B. Silverman

Org. Lett. 2025, 27, 10174−10179

Draw the missing reagent.

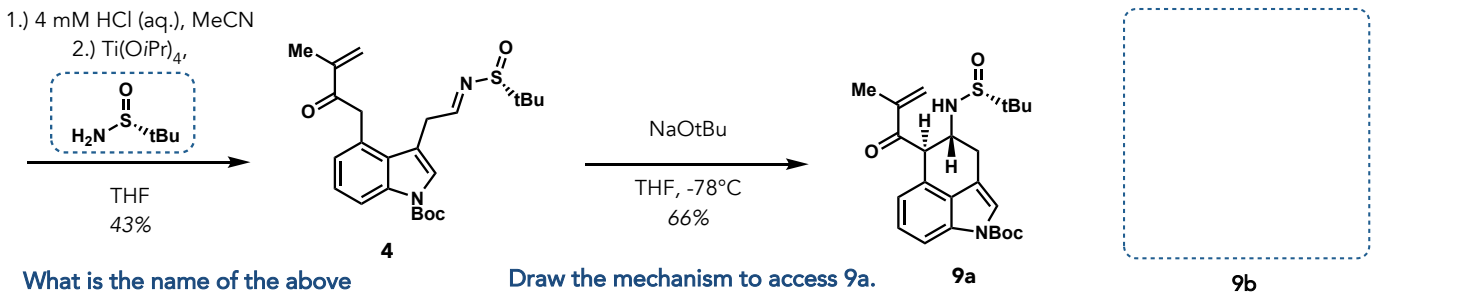


5 6

Predict the product.

8

BONUS: Undergrads, what named reaction is this?



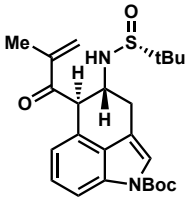
What is the name of the above reagent? Include the proper enantiomeric assignment.

Draw the mechanism to access 9a.

9b

When using KHMDS and KOtBu, the paper reports a mixture of 9a and another cyclohexane product 9b. What is the structure of 9b? (HINT: Draw the mechanism to access 9a first.)

Mechanism to access 9a.



9a

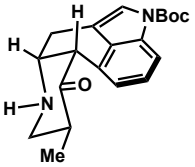
Aq. HCl/MeCN

MeOH

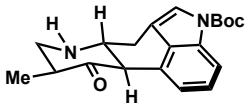
Draw the intermediate.

then K_2HPO_4

78%, 4:1 d.r.



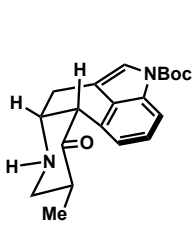
3a



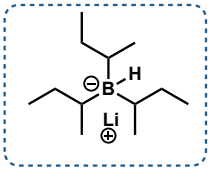
3b

Utilizing the previously drawn intermediate, draw stereochemical models to justify the conformations of 3a and 3b. Why is 3a the favored product?

Stereochemical models for 3a and 3b.

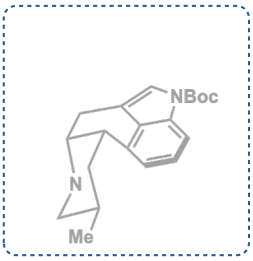


3a



-78°C, THF

What is the name of the above reagent?

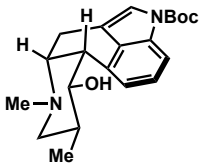


Draw the intermediate.

then

aq. CH_2O, $NaCNBH_3$

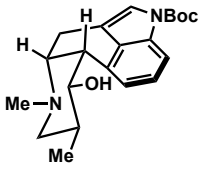
81%, >20:1 d.r.



12

Draw the mechanism to access 12.

Mechanism to access 12.



12

HFIP

reflux

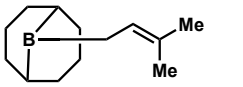
Draw the intermediate.

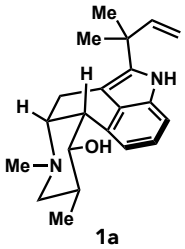
then
tBuOCl, NEt_3

THF

Draw the intermediate.

then





1a

Draw the transition state of the reverse-prenylation product.

Transition state to 1a.