

Total Synthesis

11/01/2023

Emma

Enantioselective Total Syntheses of Cassane Furanoditerpenoids and Their Stimulation of Cellular Respiration in Brown Adipocytes

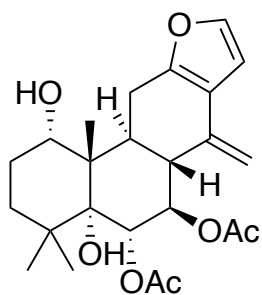
Hendrik H. Bulthaupt, Fabian Glatz, Sven M. Papidocha, Chunyan Wu, Shawn Teh, Susanne Wolfrum, Lucia Balážová, Christian Wolfrum, and Erick M. Carreira*



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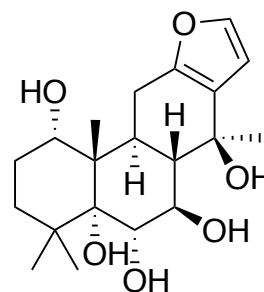
Read Online



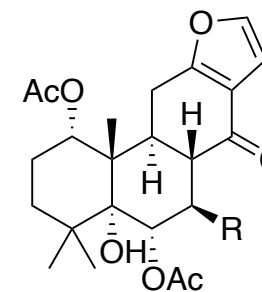
1
1-Deacetylcaesalmin C

Biological Activity:

- Identified from screen
 - Validated by total synthesis
 - Stimulates respiration in brown adipocytes
-
- **O₂ consumption**
 - **Thermogenesis**
 - **Metabolism**

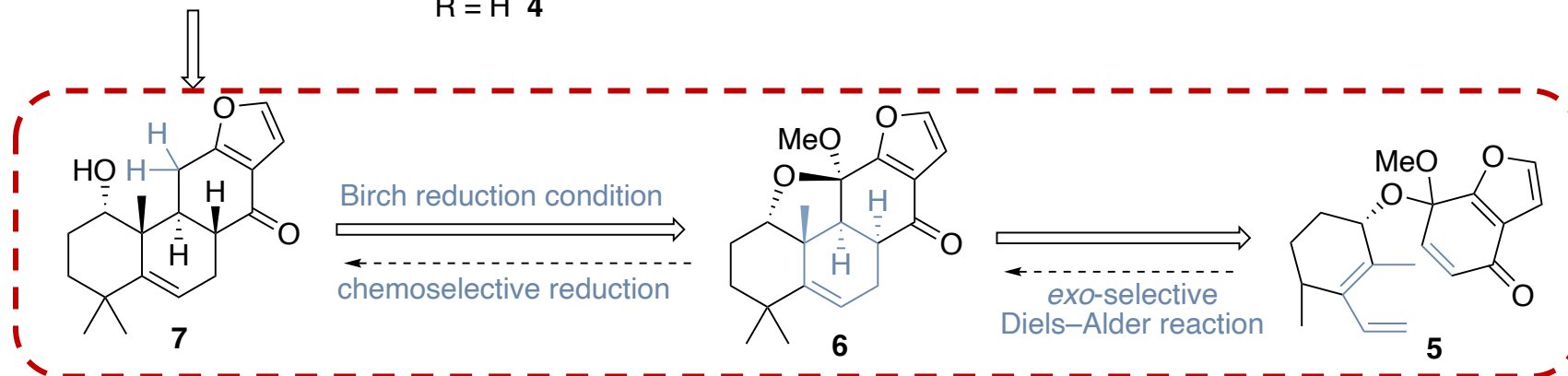
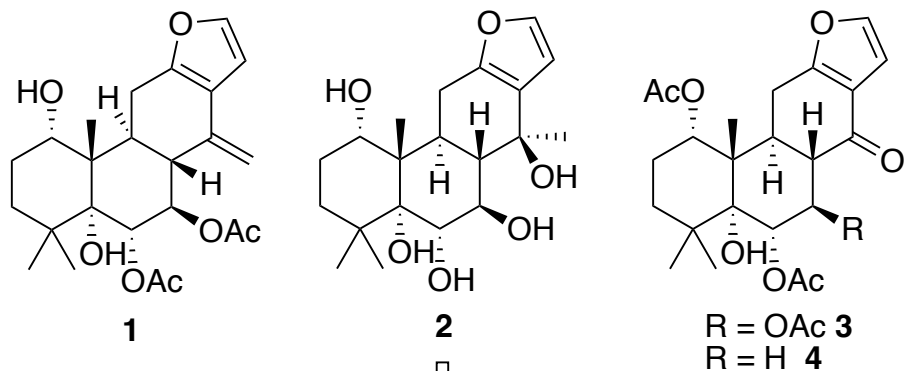


2
 δ -Caesalpin

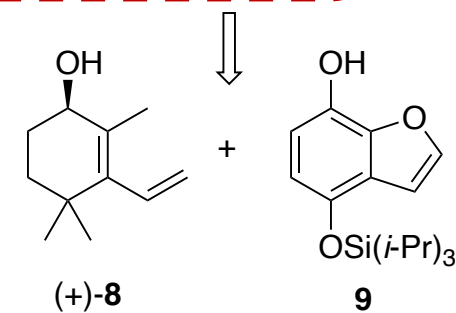


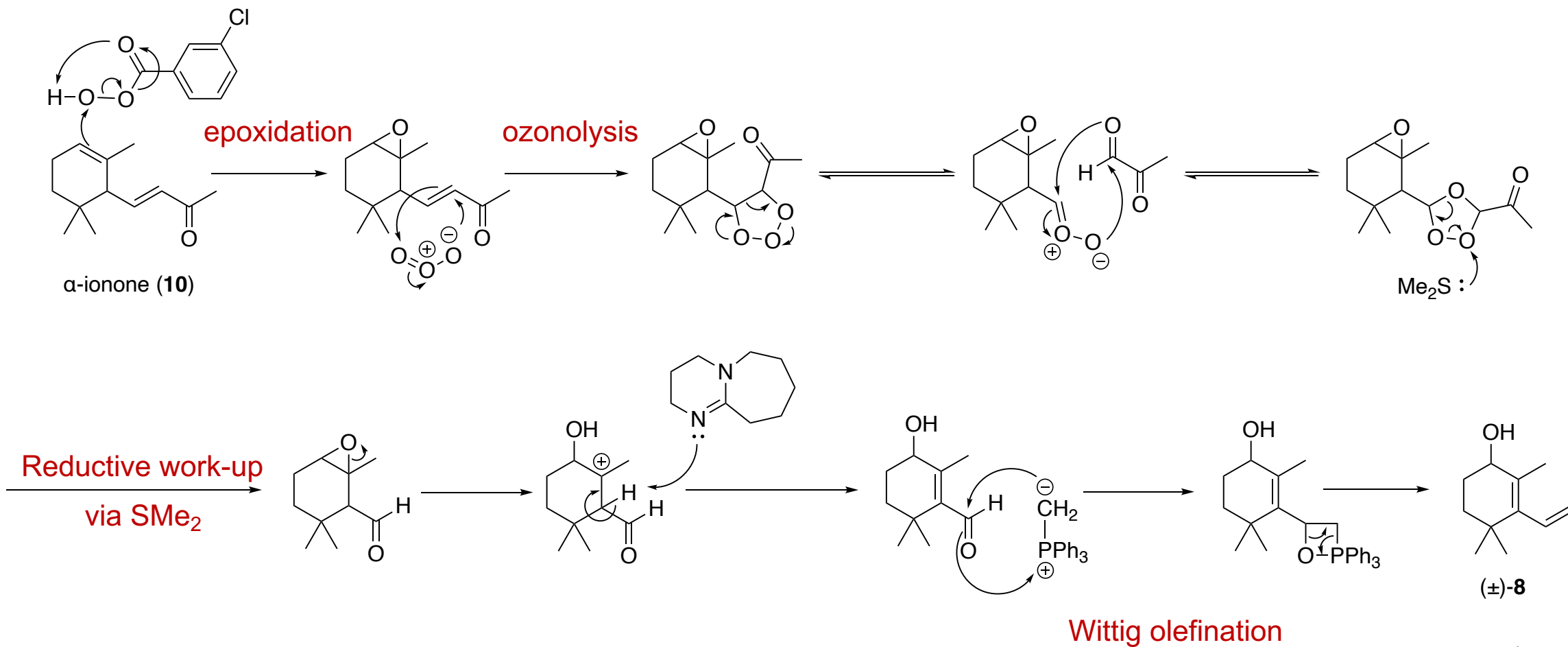
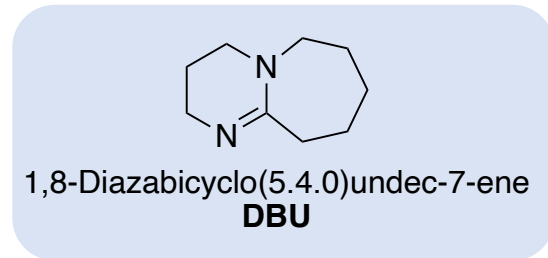
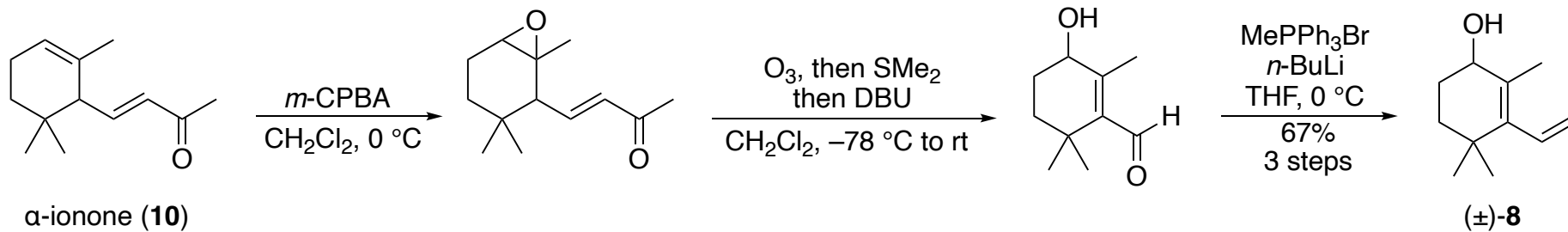
R = OAc Norcaesalpinin MC **3**
R = H Norcaesalpinin P **4**

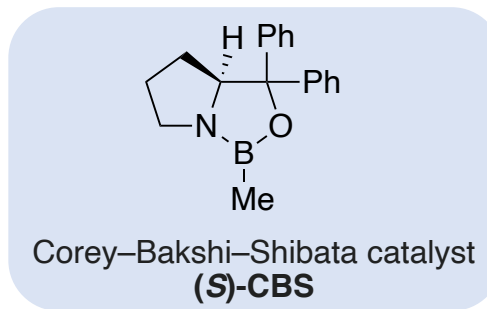
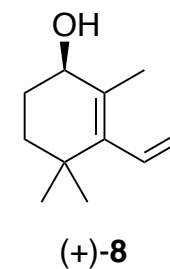
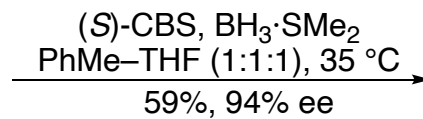
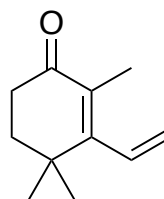
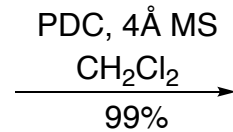
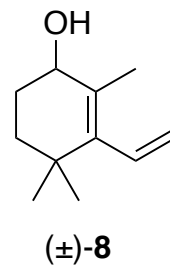
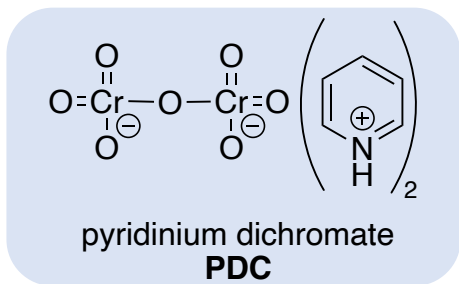
Retrosynthesis



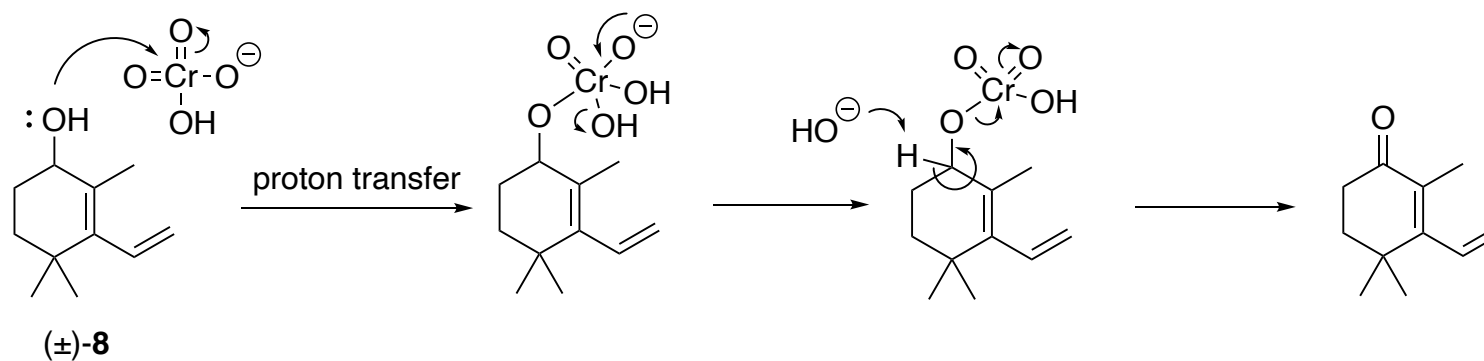
Key steps

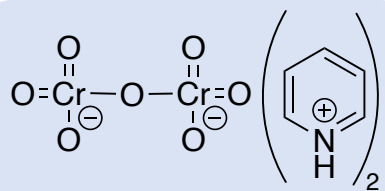




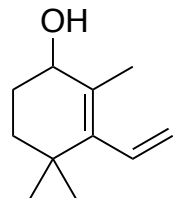


Oxidation with PDC

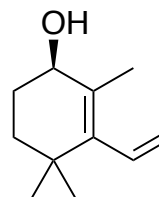
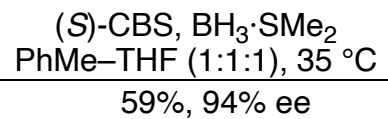
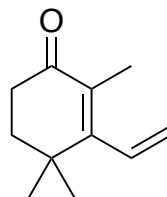
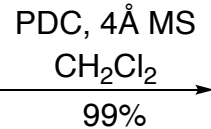




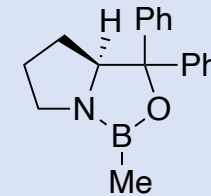
pyridinium dichromate
PDC



(±)-**8**

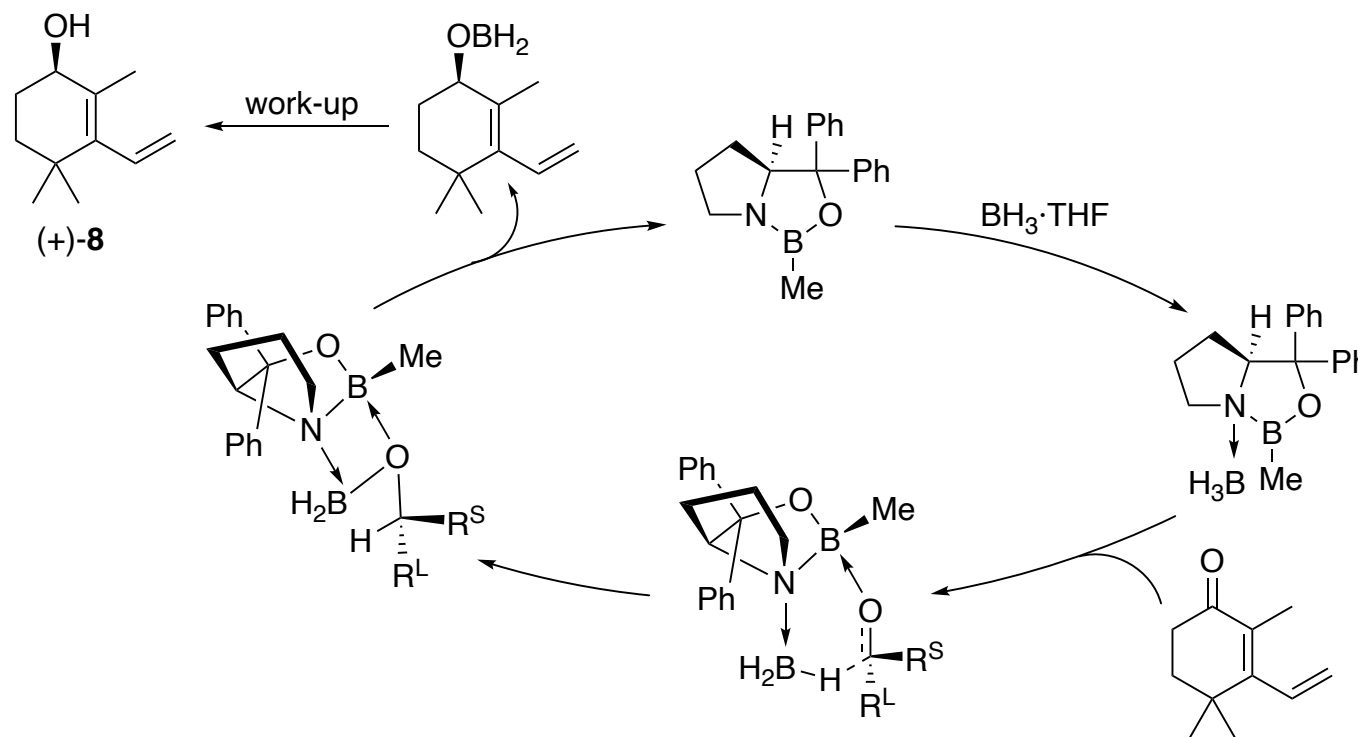


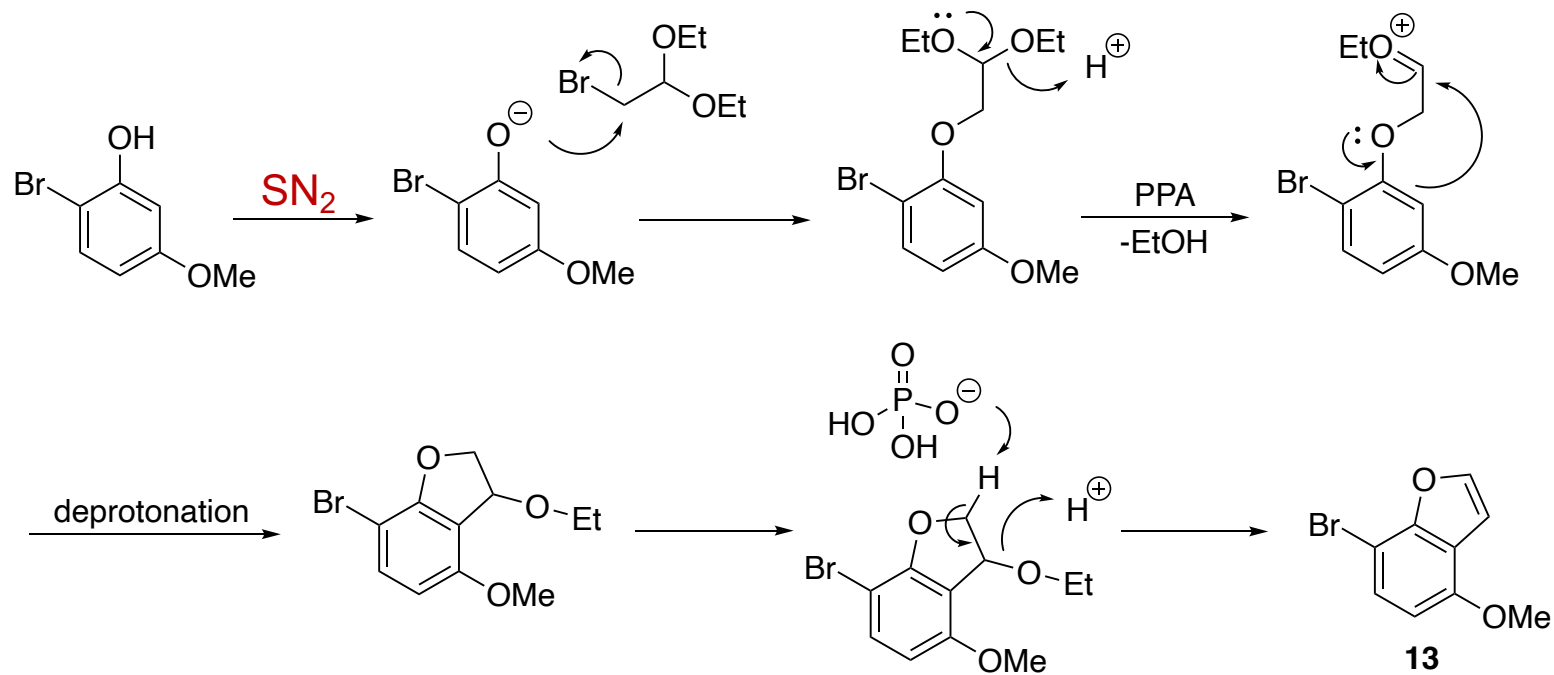
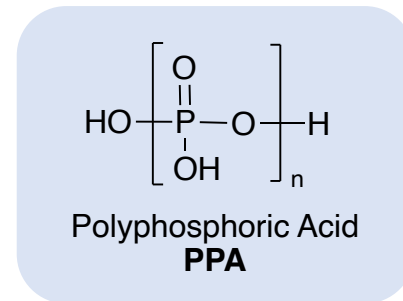
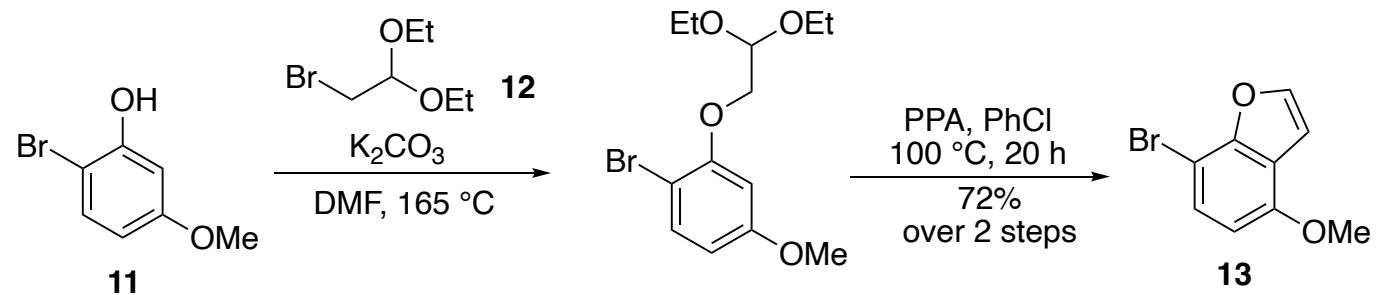
(+)-**8**

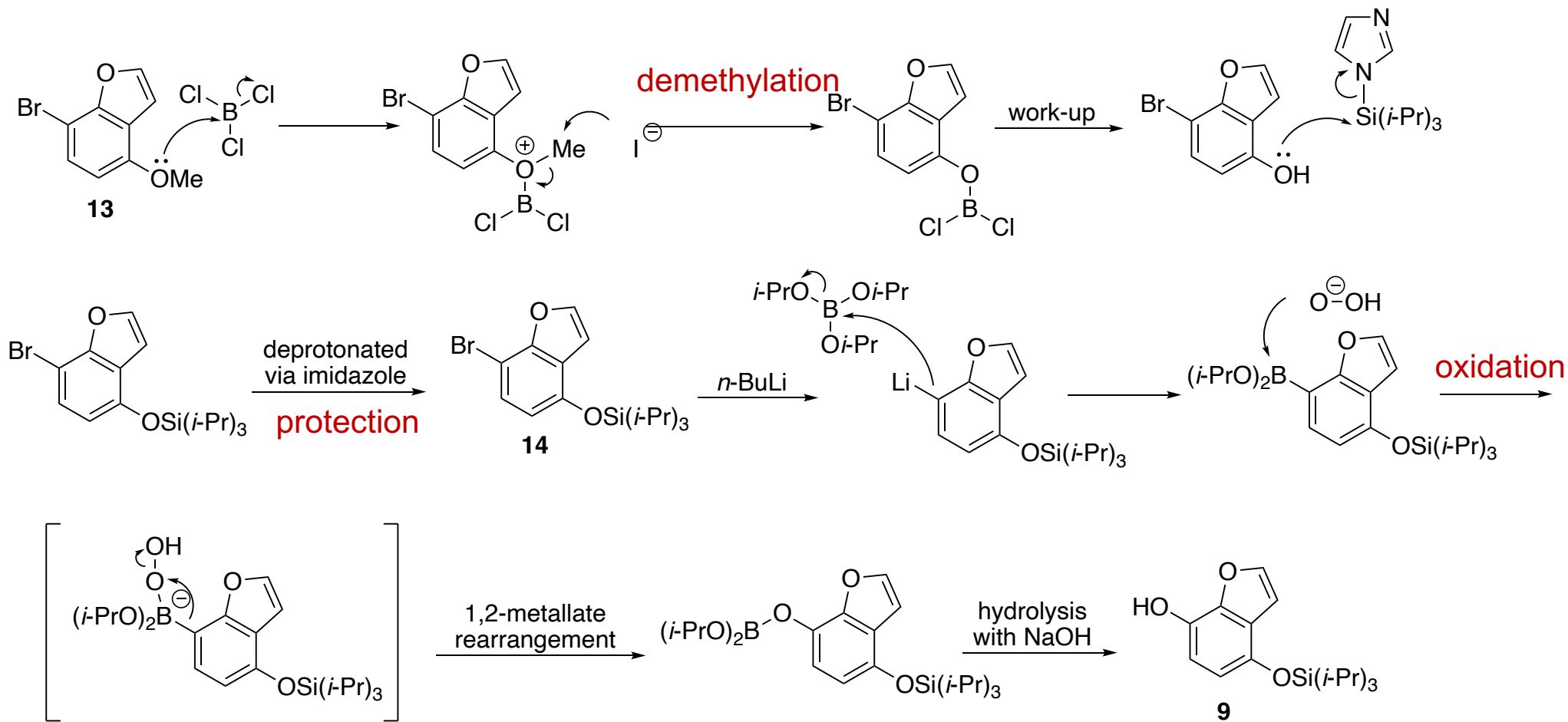
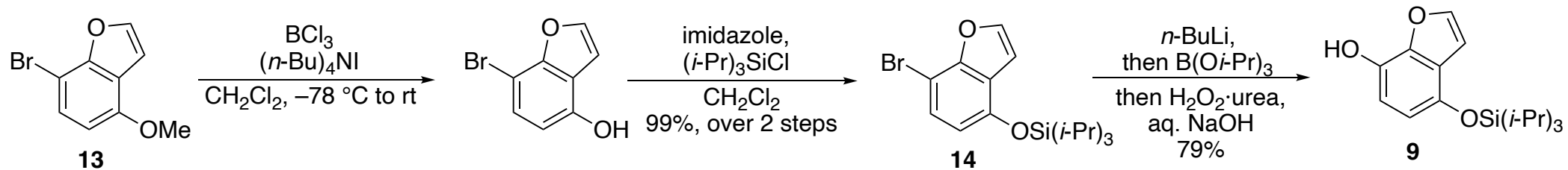


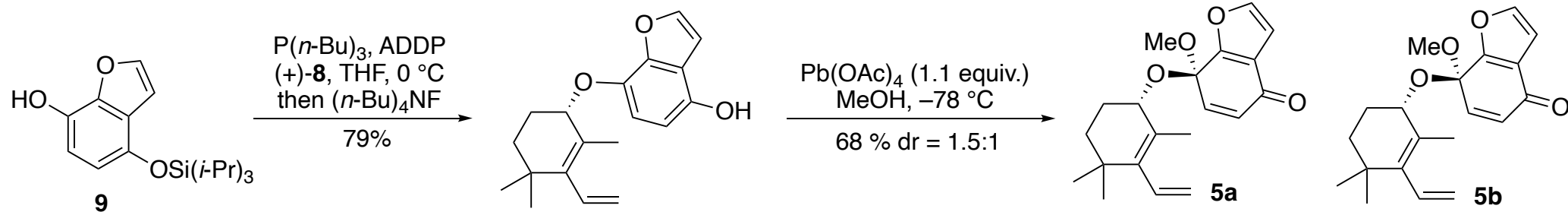
Corey-Bakshi-Shibata catalyst
(*S*)-CBS

Reduction with (*S*)-CBS

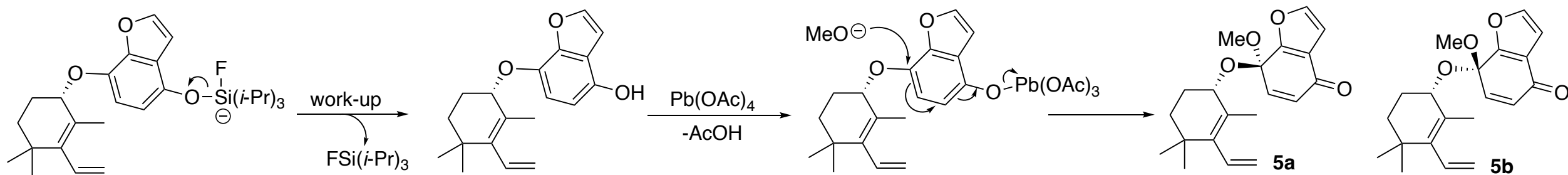
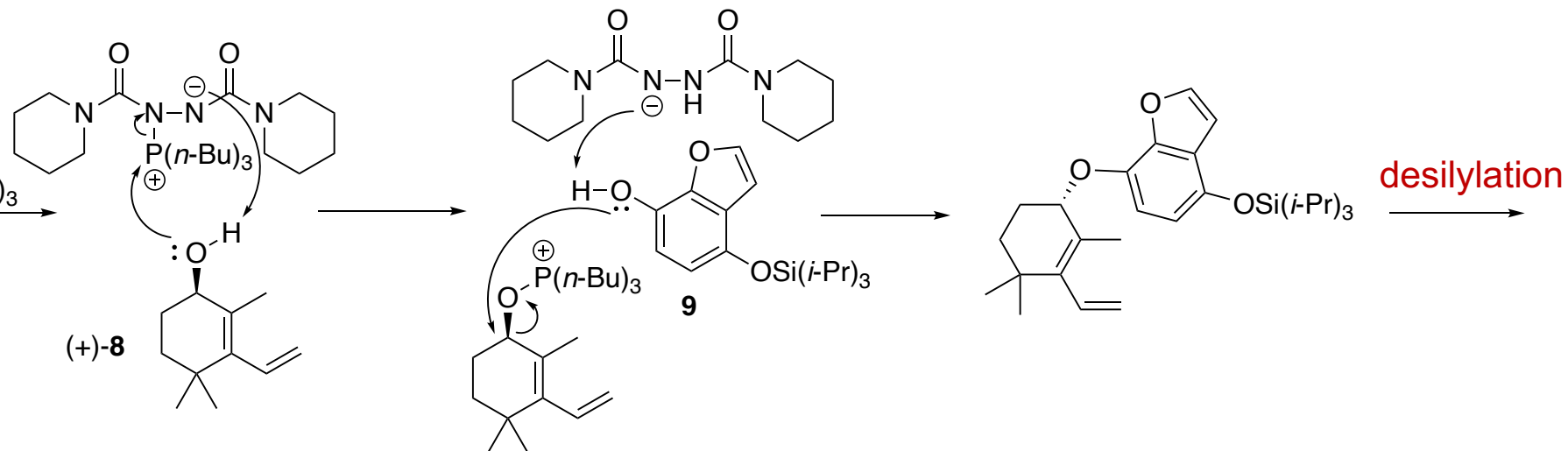
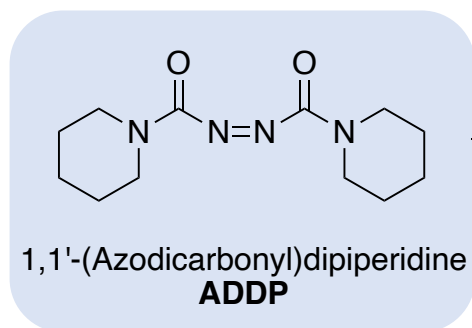






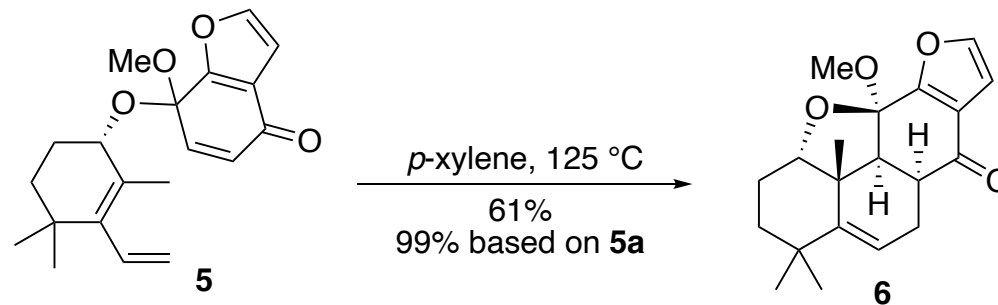


Mitsunobu reaction

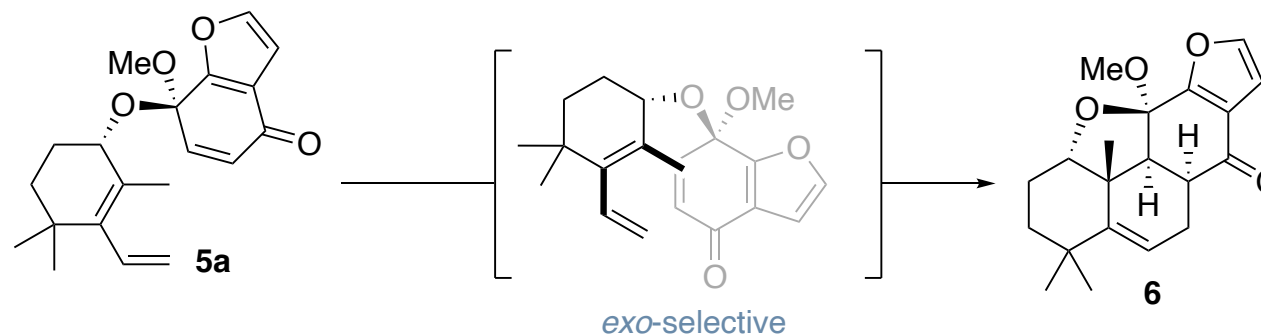


Oxidative dearomatization

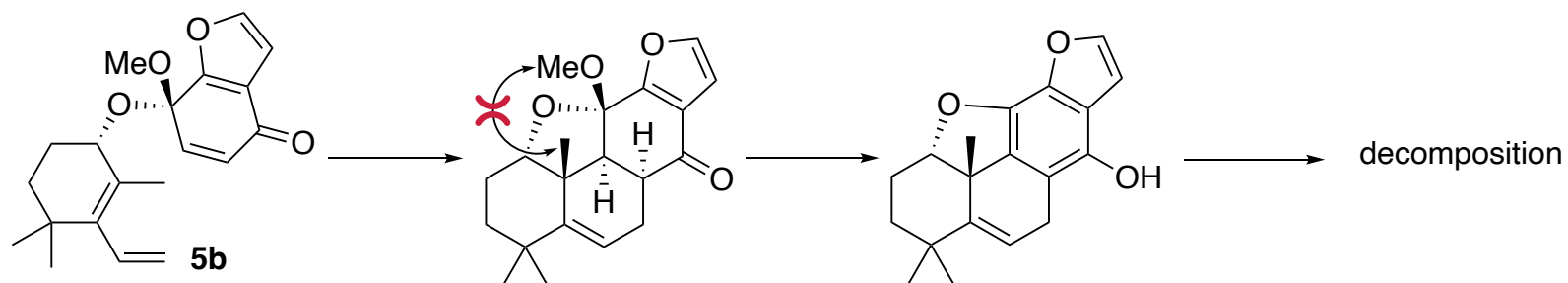
dr: 1.5:1
separable by
prep-TLC

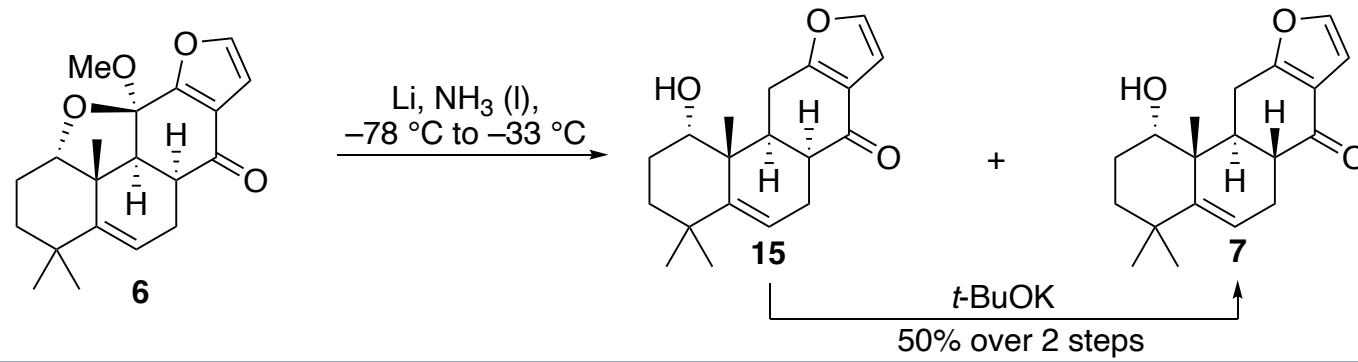


*“Heating the diastereomeric mixture of **5** to 125 °C in *p*-xylene led to the formation of Diels–Alder product **6** as a single diastereomer”*

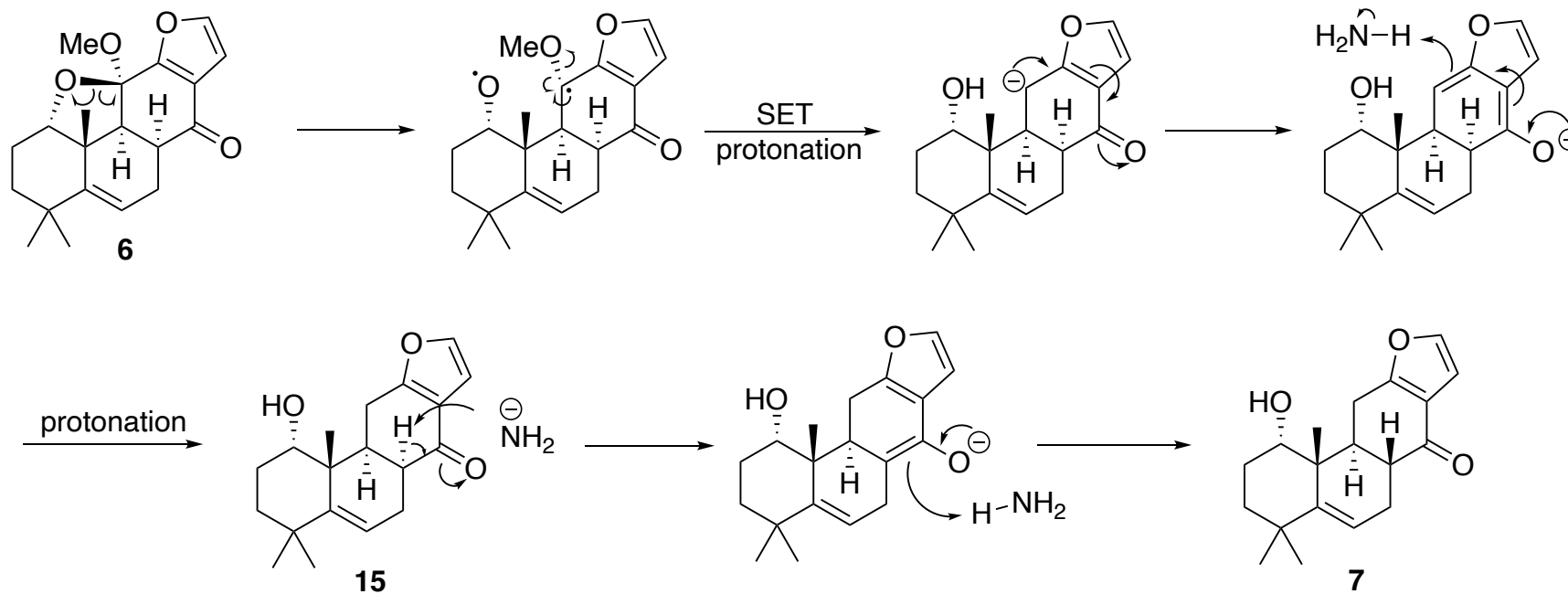


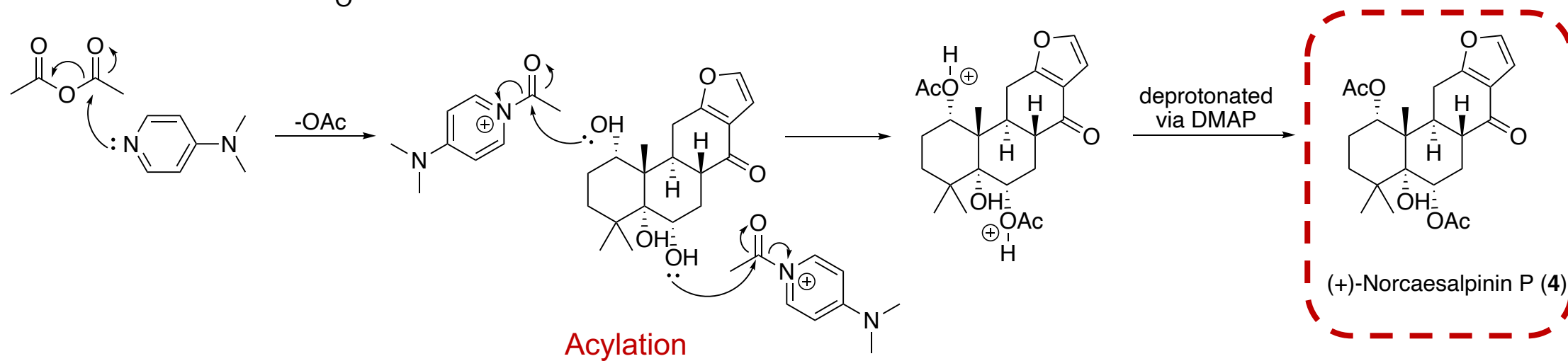
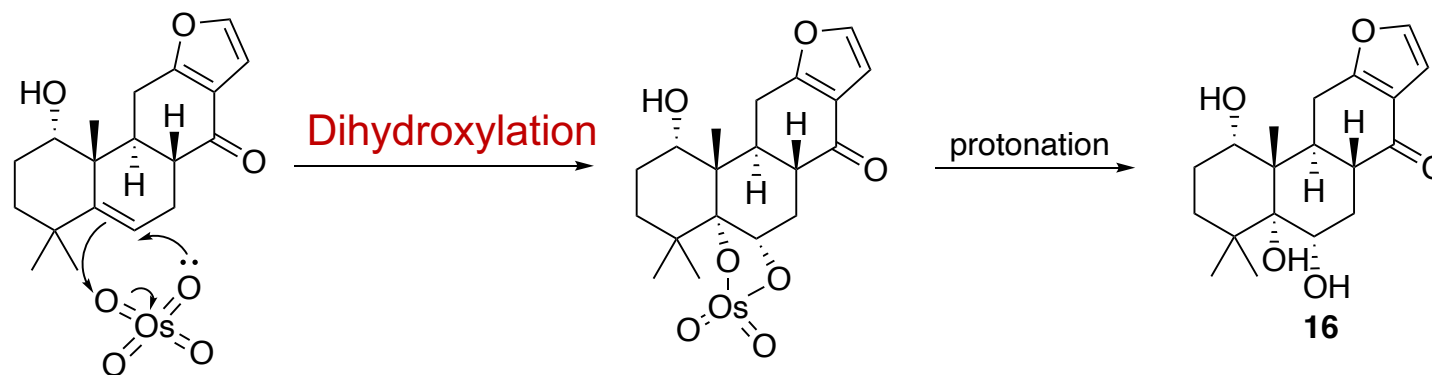
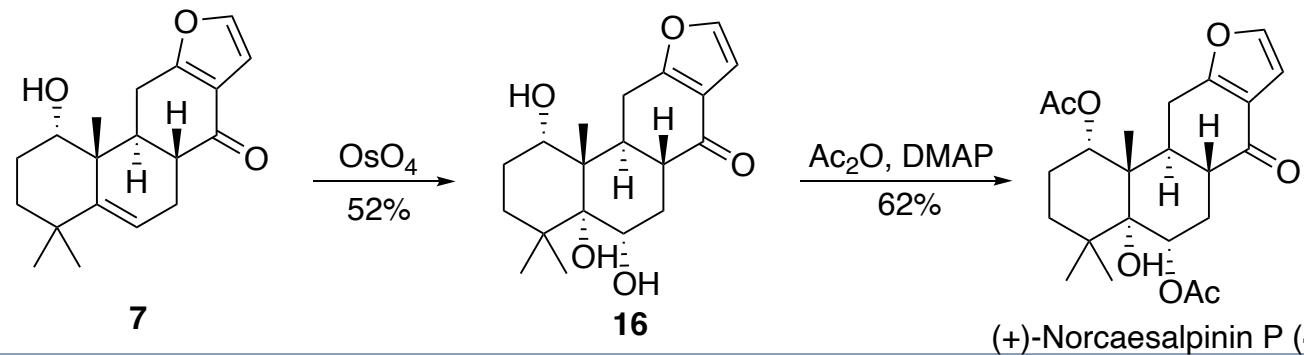
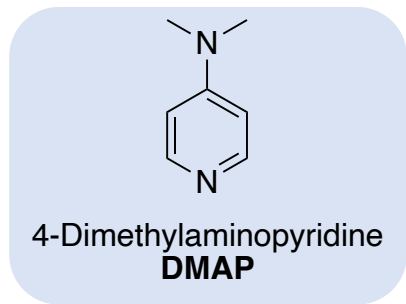
*“**5b** decomposes under the reaction conditions”*

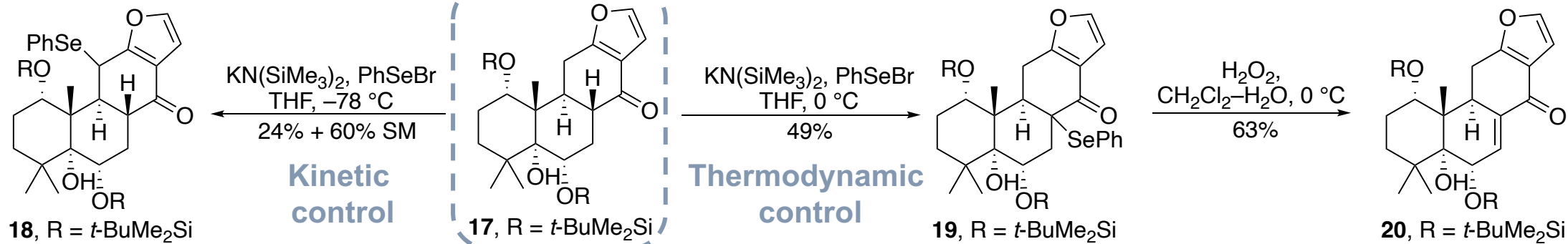




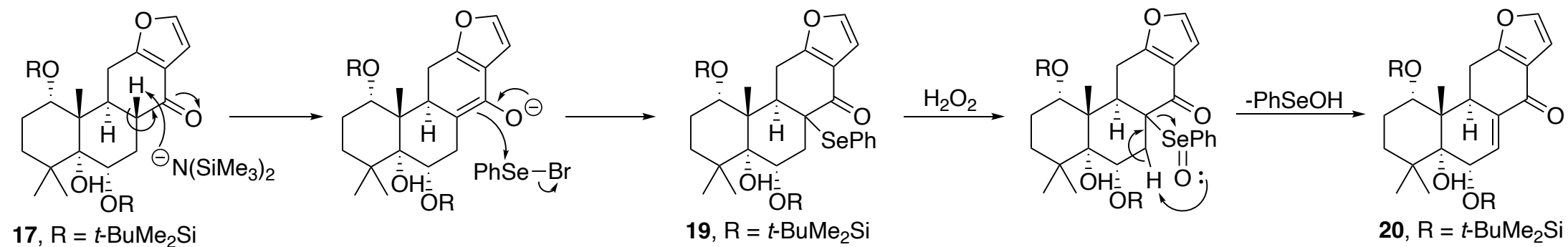
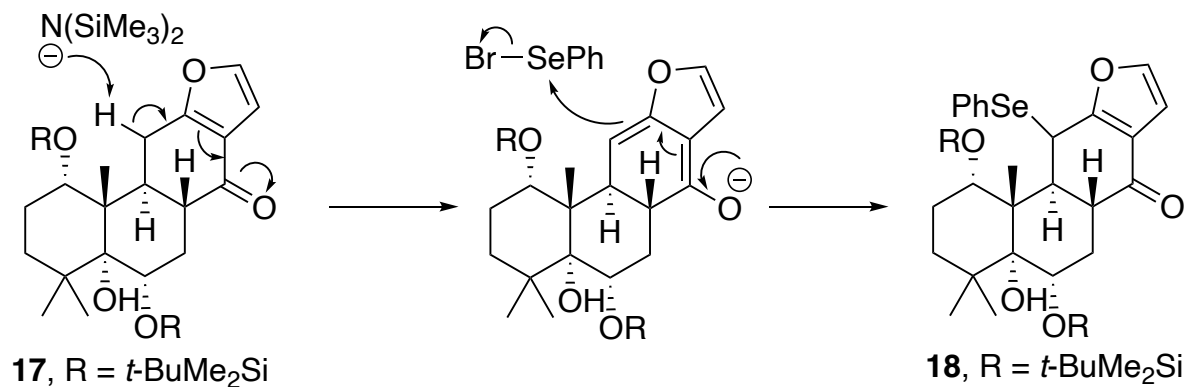
Birch reduction condition







Selenylation



H_2O_2 – induced selenoxide elimination

