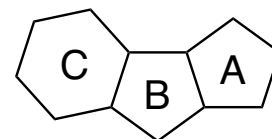


A 16-step synthesis of the isoryanodane diterpene (+)-perseanol

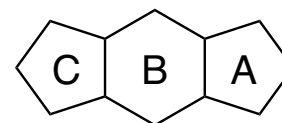
Arthur Han¹, Yujia Tao¹ & Sarah E. Reisman^{1*}

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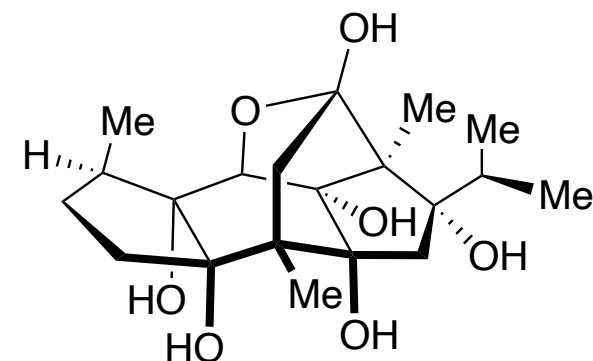
- Isolated from *Persea indica*, an evergreen shrub found in Azores, Madeira, and the Canary Islands.
- Ryanodane and isoryanodane natural products display insecticidal properties by allosterically binding to ryanodine receptors (RyR), which modulate Ca²⁺ release.
 - Mammalian isoforms require pyrrole-2-carboxylate ester for high-affinity binding.
- Central bridging 7-membered lactol core with six hydroxyl groups.
 - Two *syn*-diol motifs at the A-B and B-C ring fusions.
- This work: concise asymmetric total synthesis of (+)-perseanol from inexpensive (*R*)-pulegone (~\$20/g).



[6-5-5]
ryanodane core



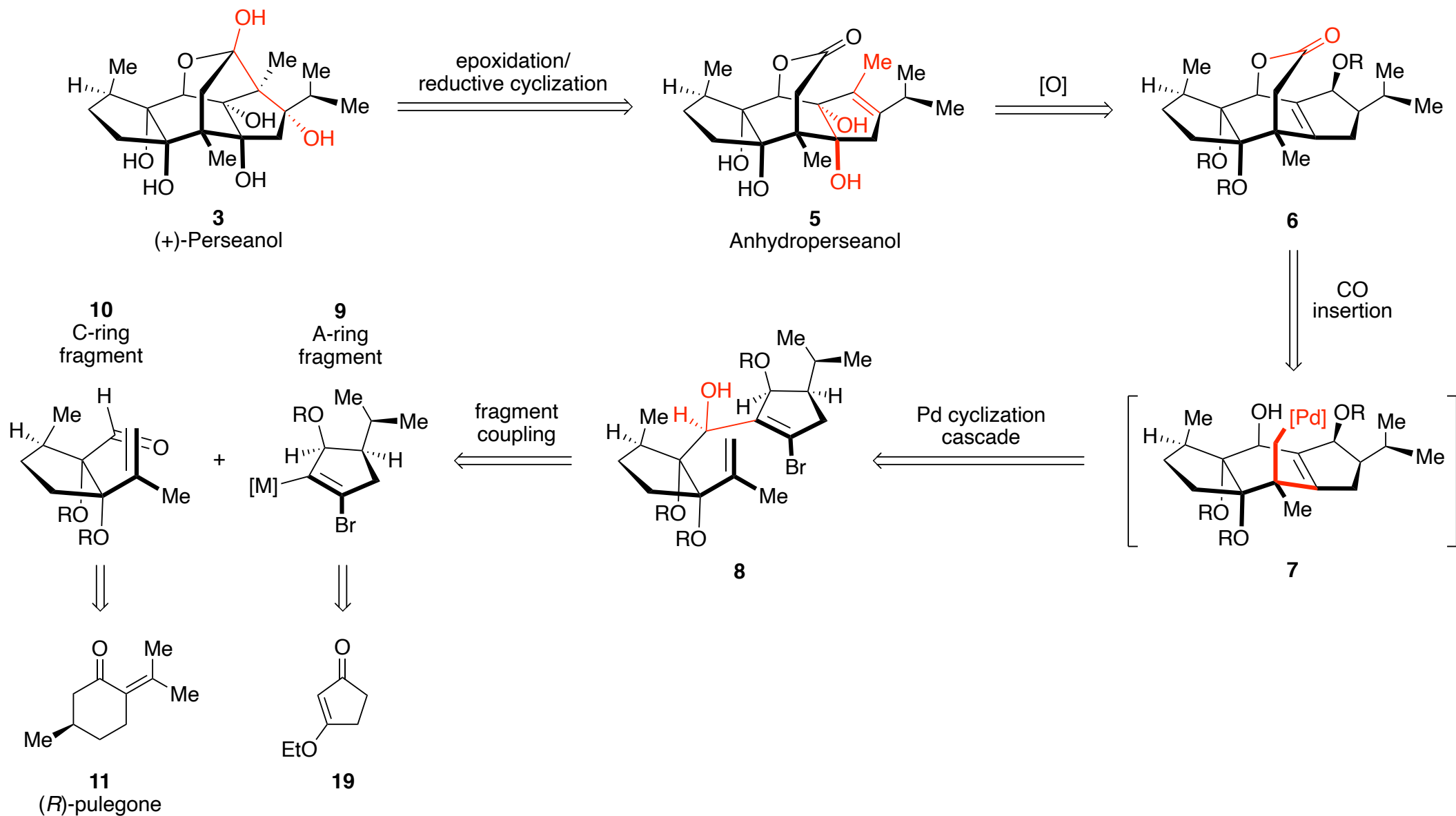
[5-6-5]
isoryanodane core

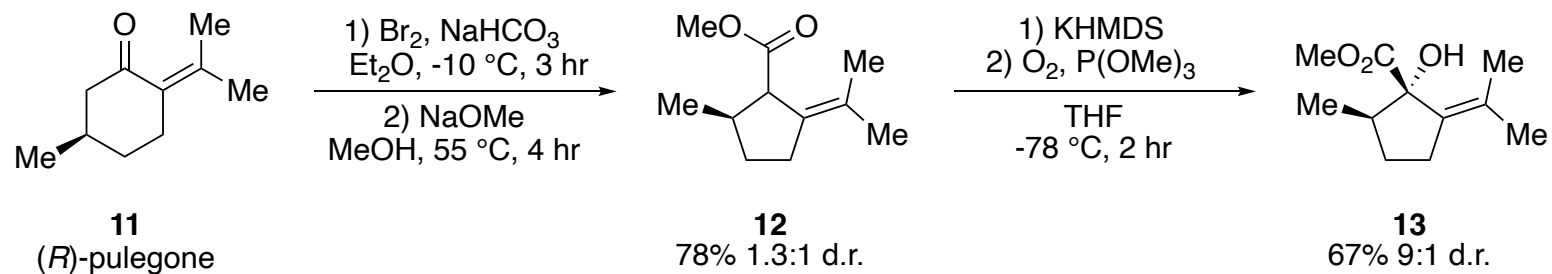


(+)-perseanol

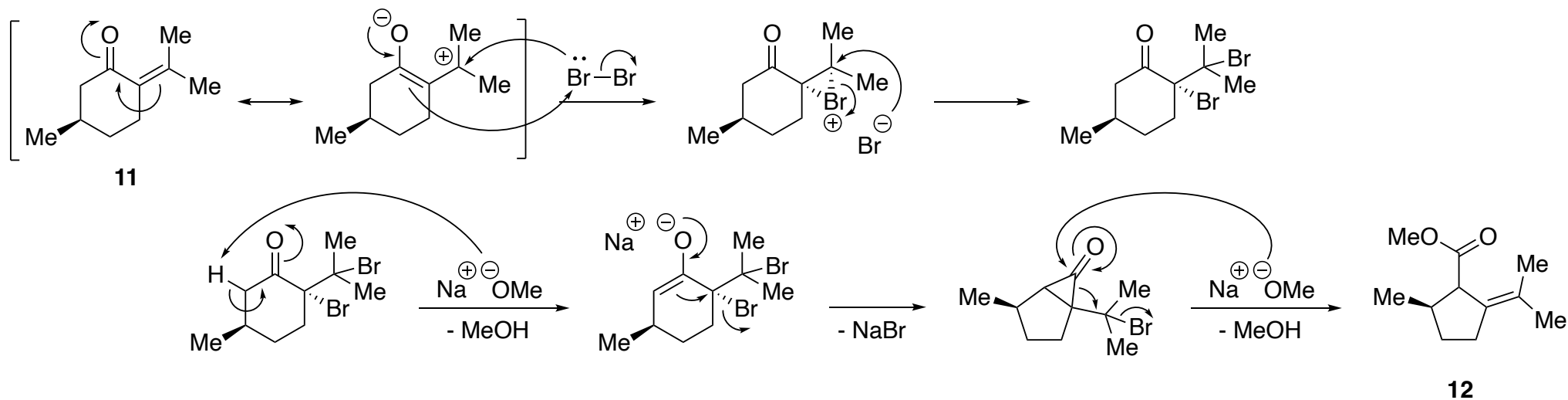
Kevin Byrne
Liu Research Group
January 21st, 2020

Retrosynthetic Analysis:

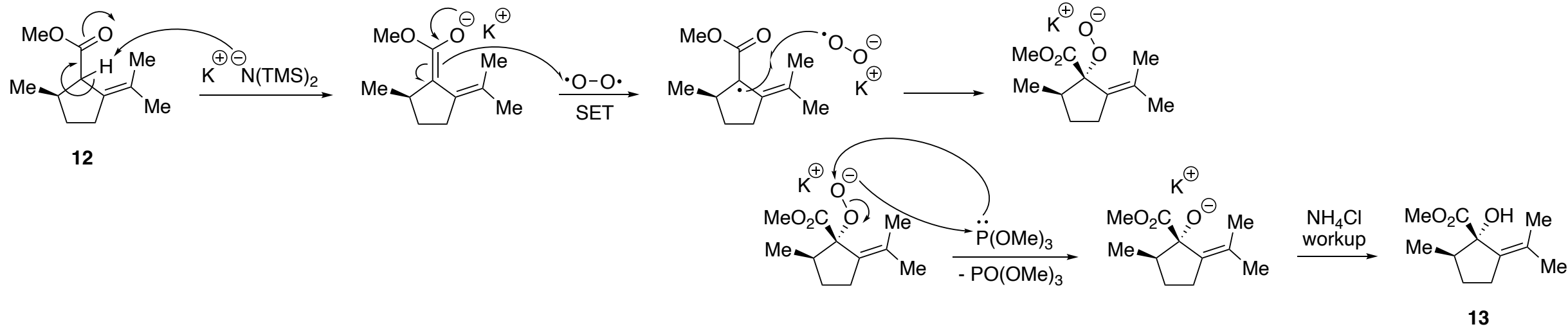


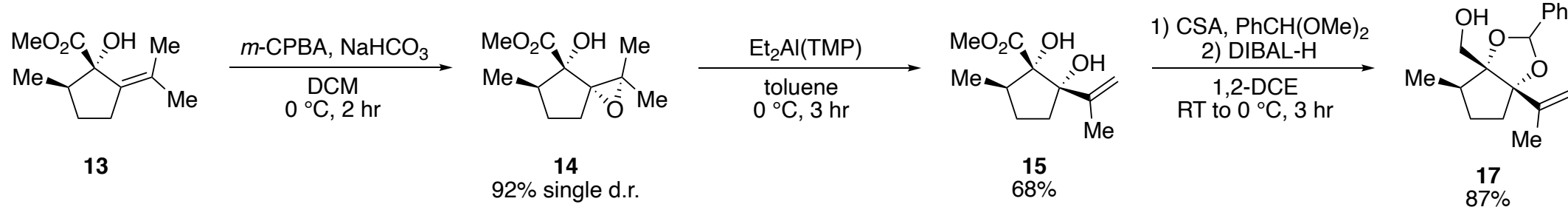


Ring Contraction

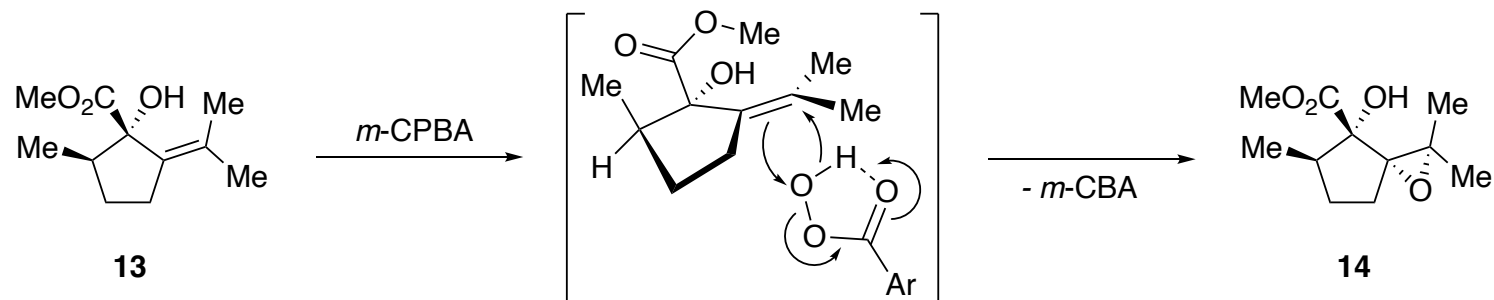


α-Hydroxylation

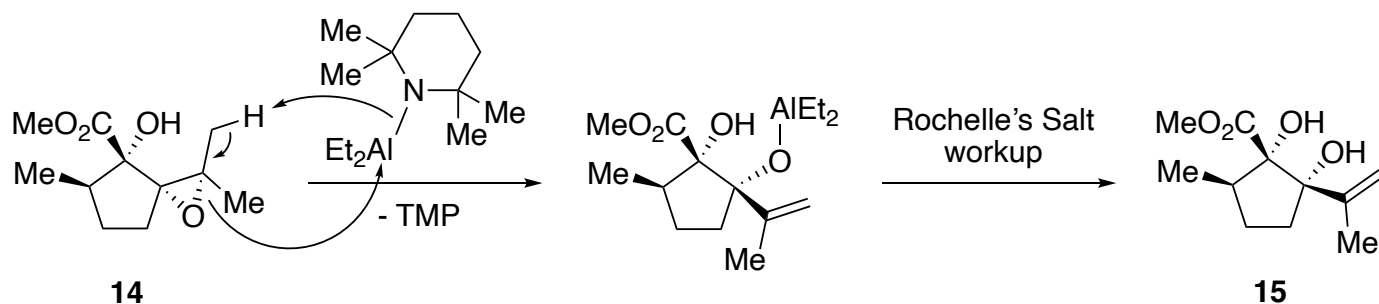




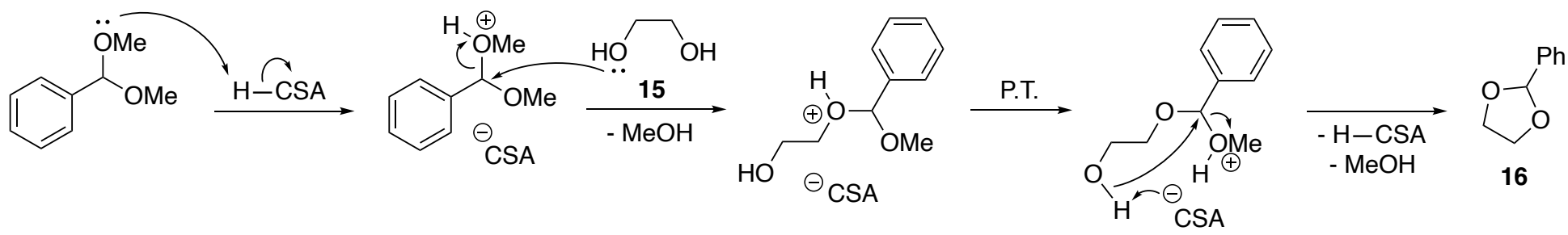
Epoxidation

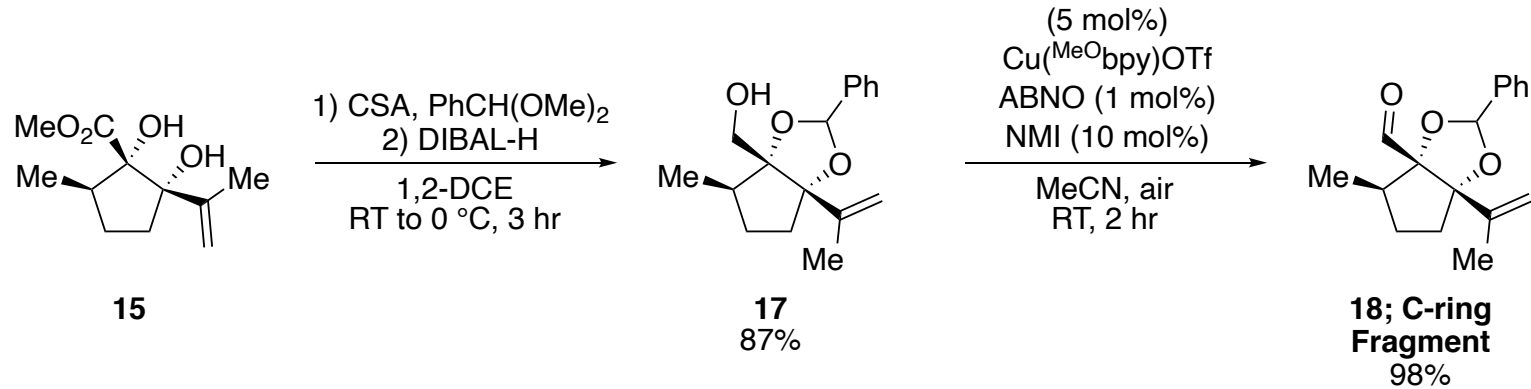


Allylic Alcohol Formation

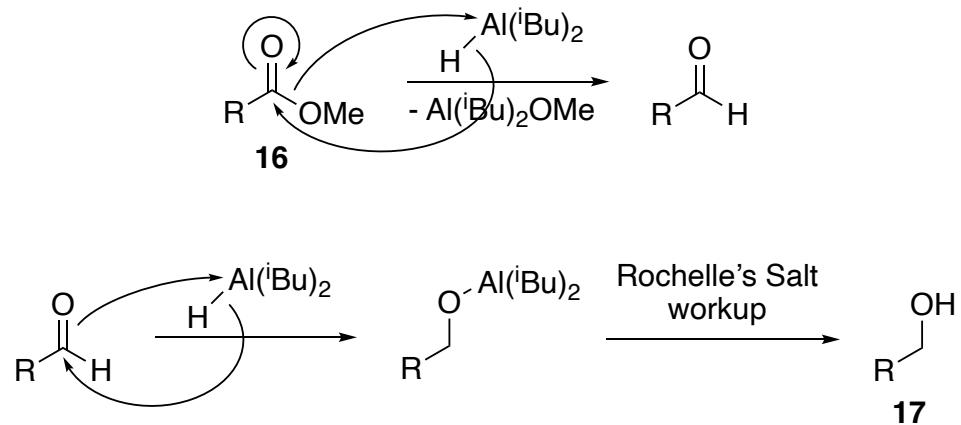


Diol Protection

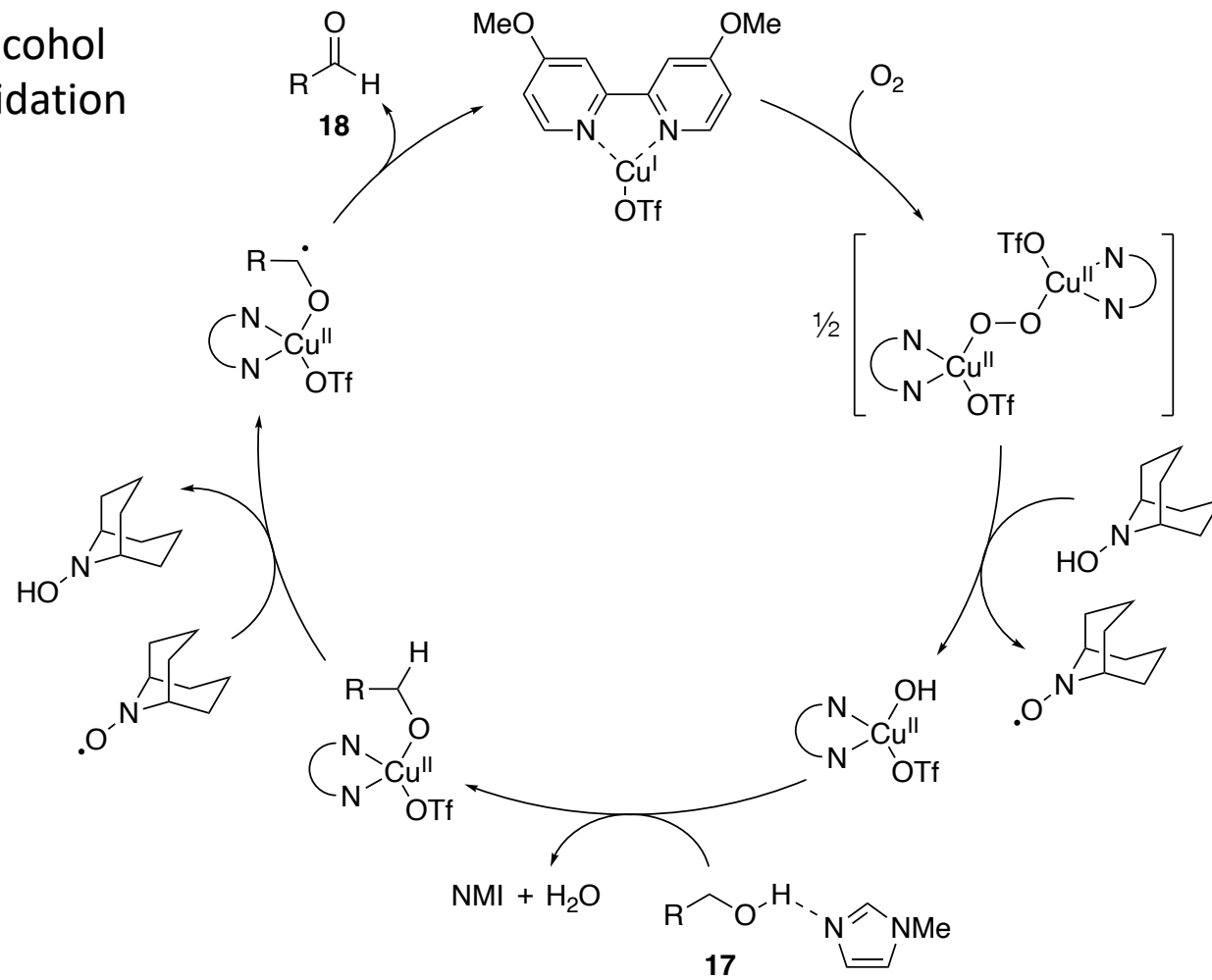


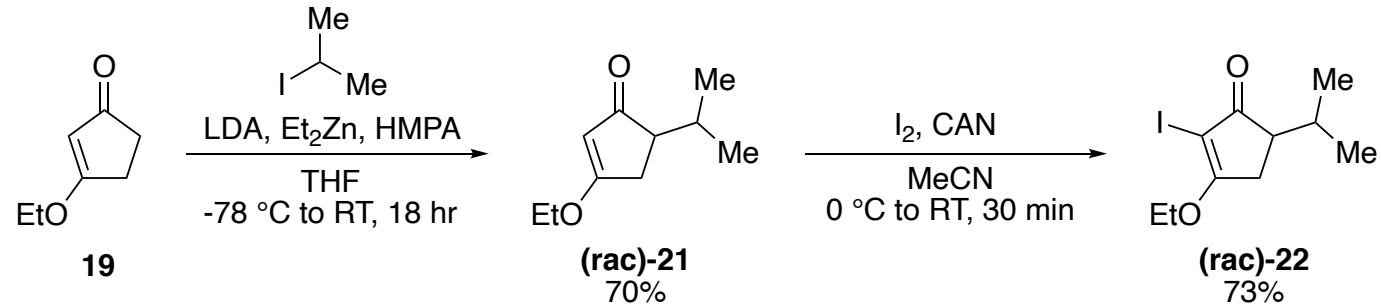


DIBAL Reduction

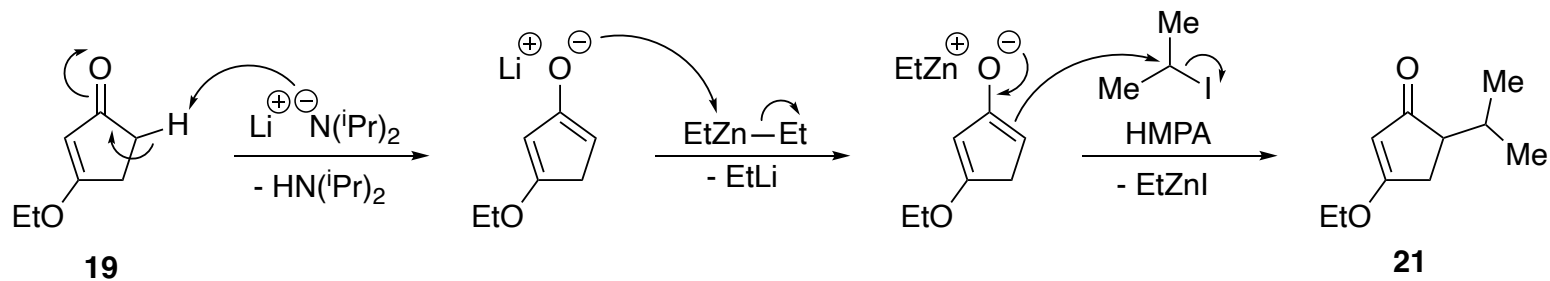


Alcohol Oxidation

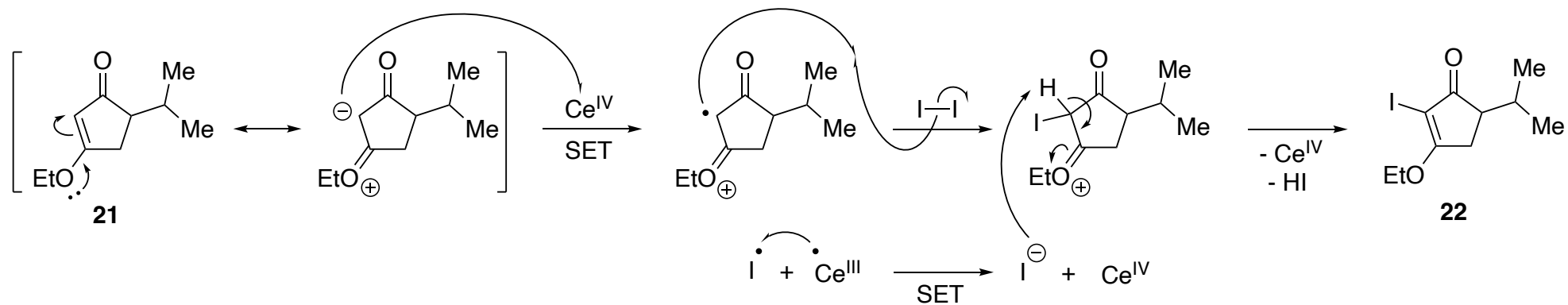


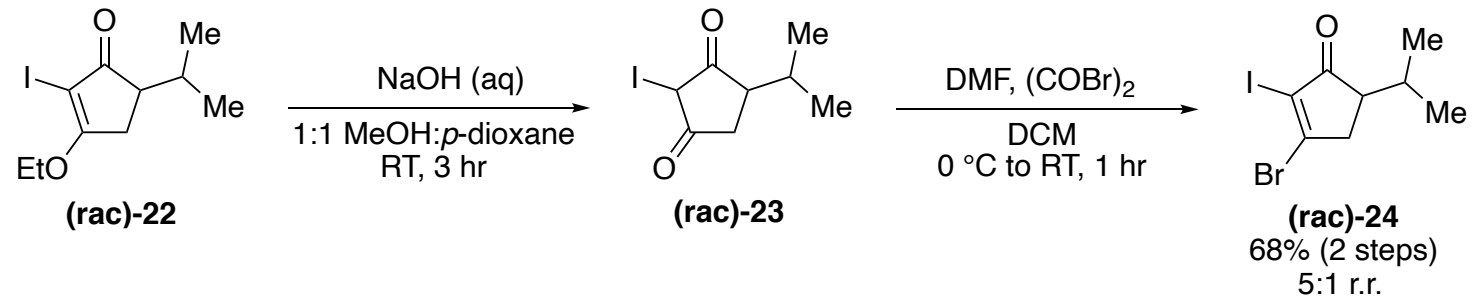


Alkylation

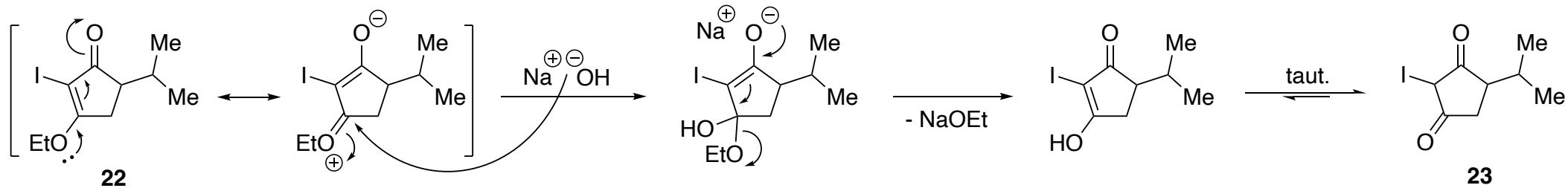


Iodination

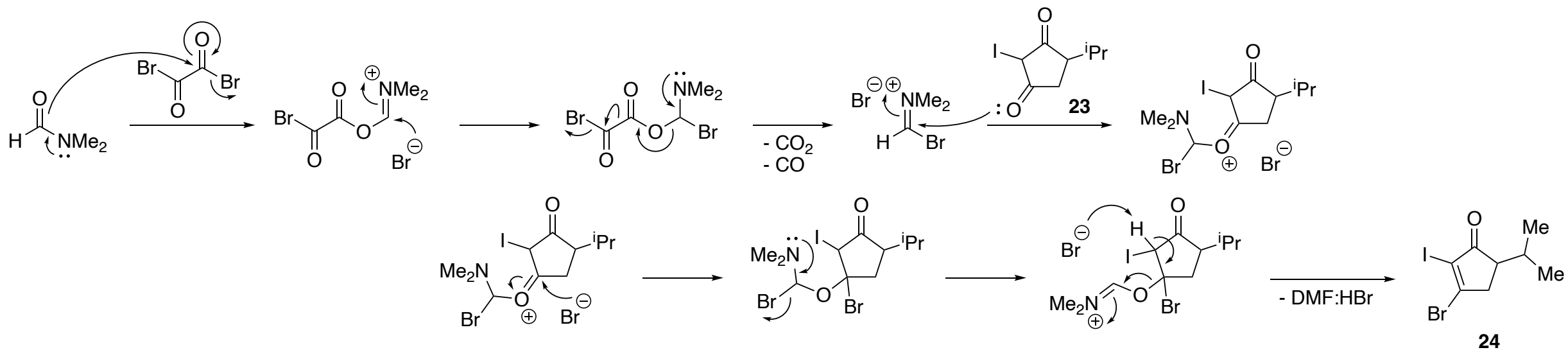


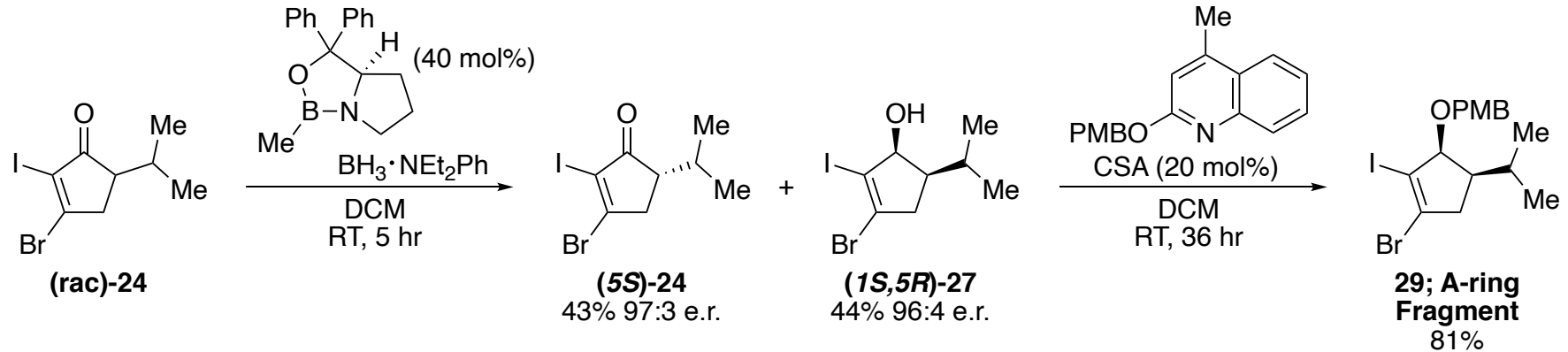


Hydrolysis

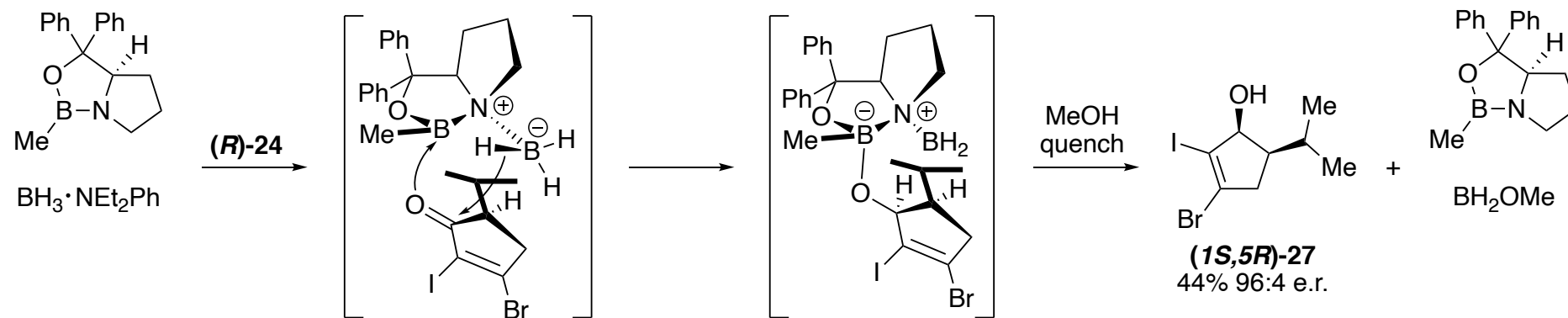


Bromination

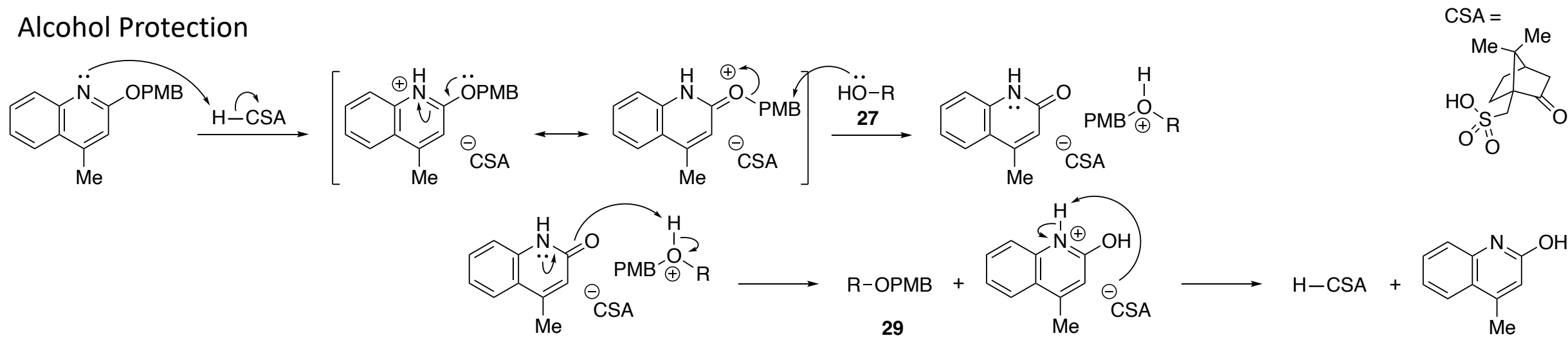


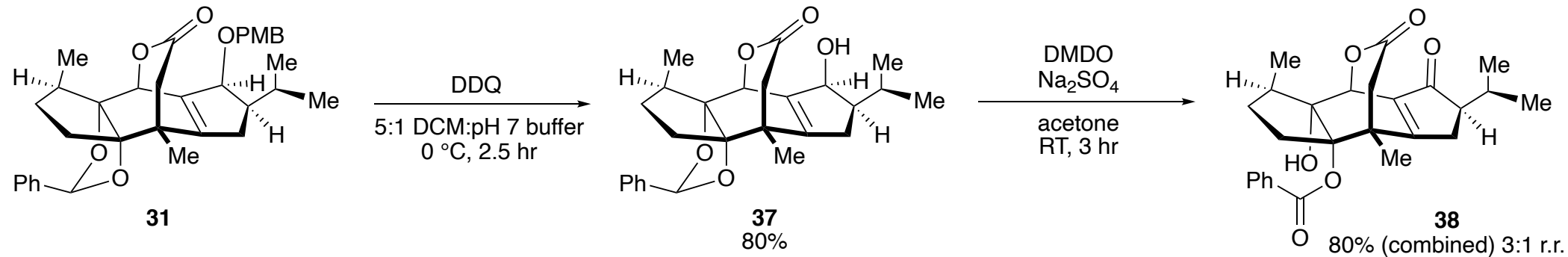


Reductive Kinetic Resolution

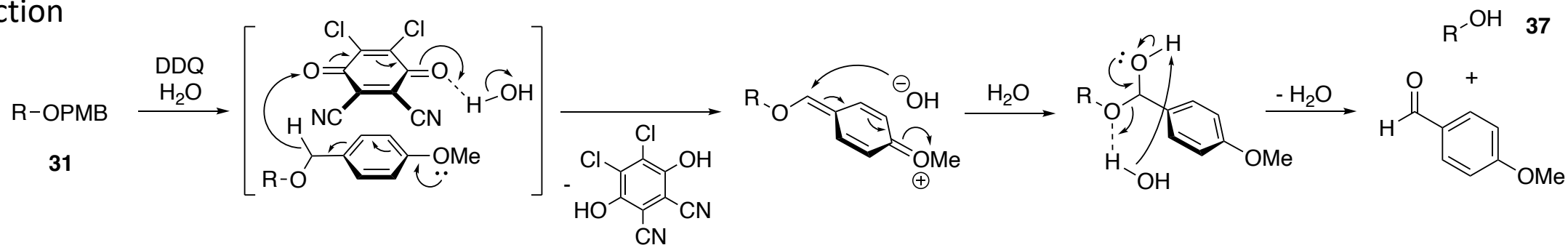


Alcohol Protection

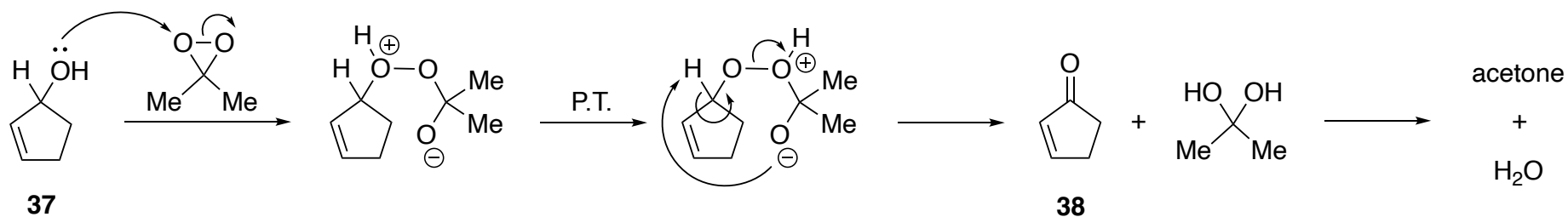




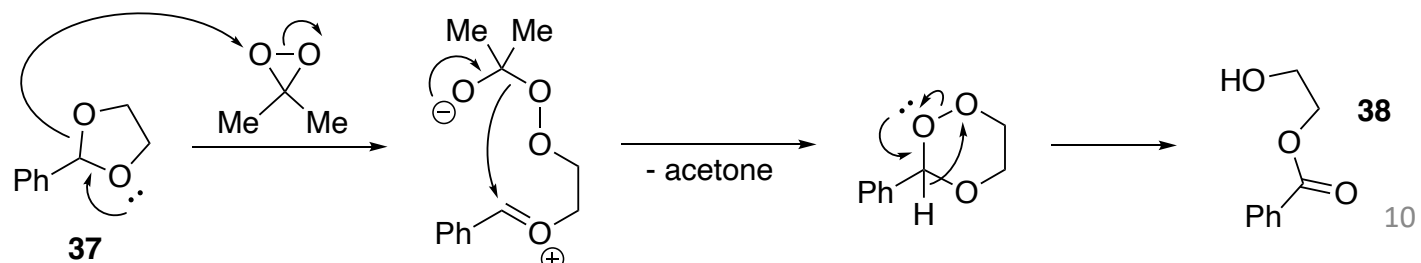
PMB Deprotection

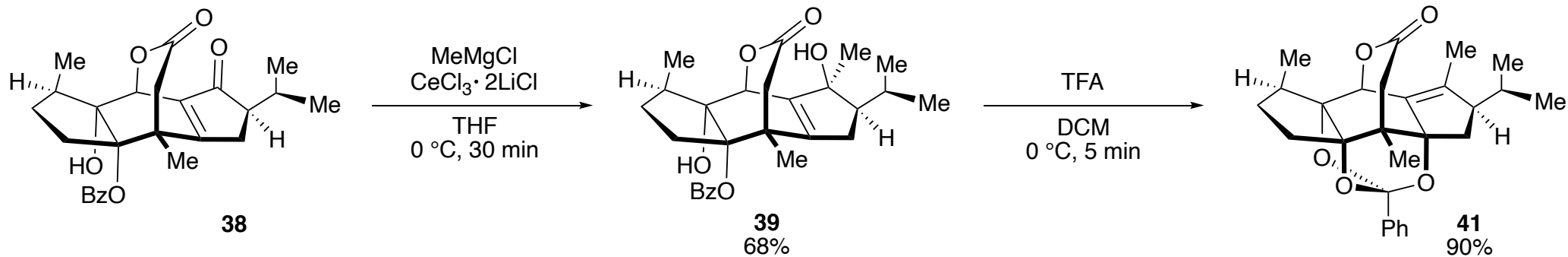


Alcohol Oxidation

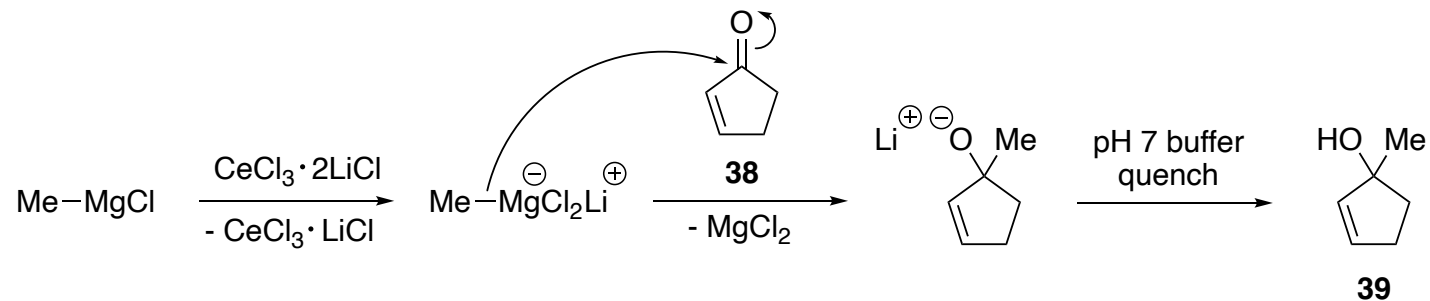


Acetal Semi-Deprotection

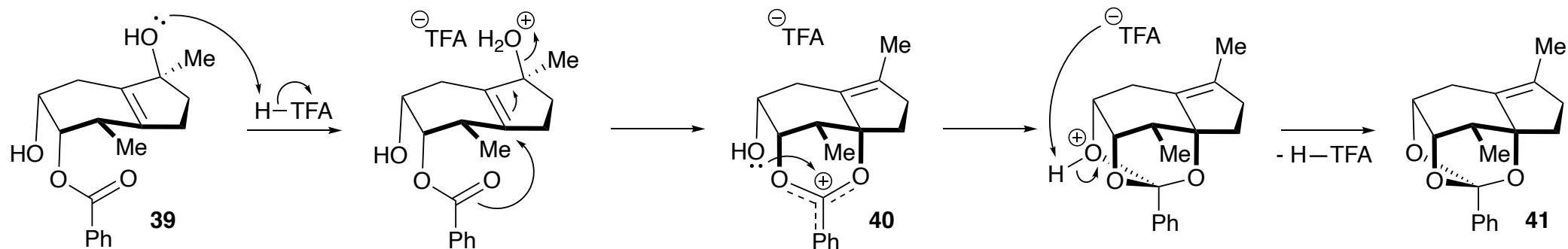


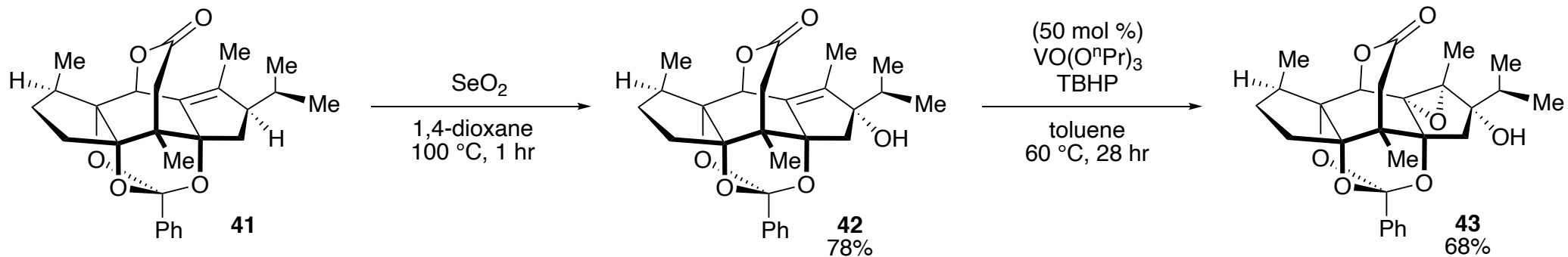


Turbo Grignard Addition

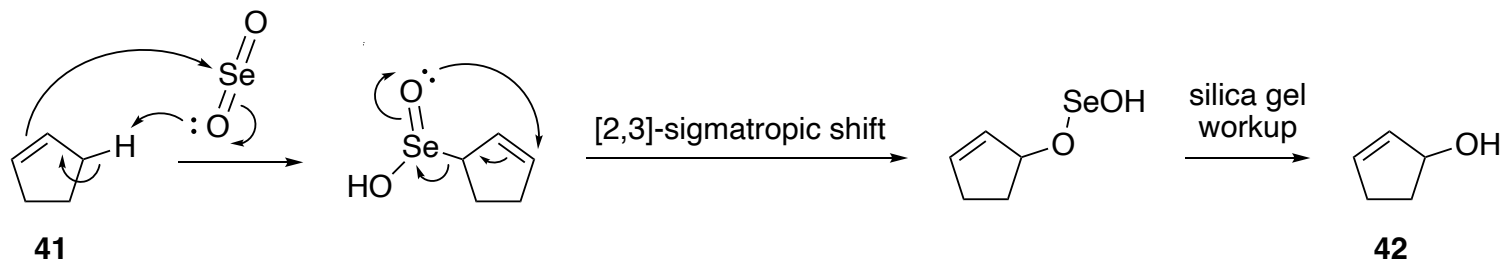


Orthobenzoate Formation

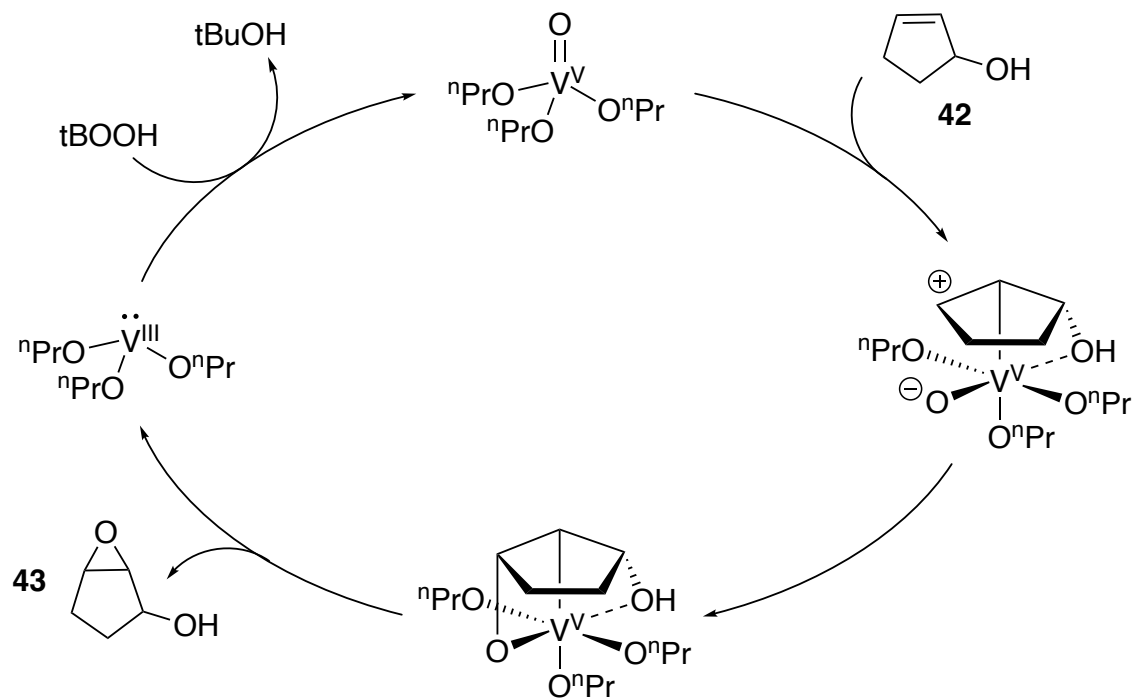


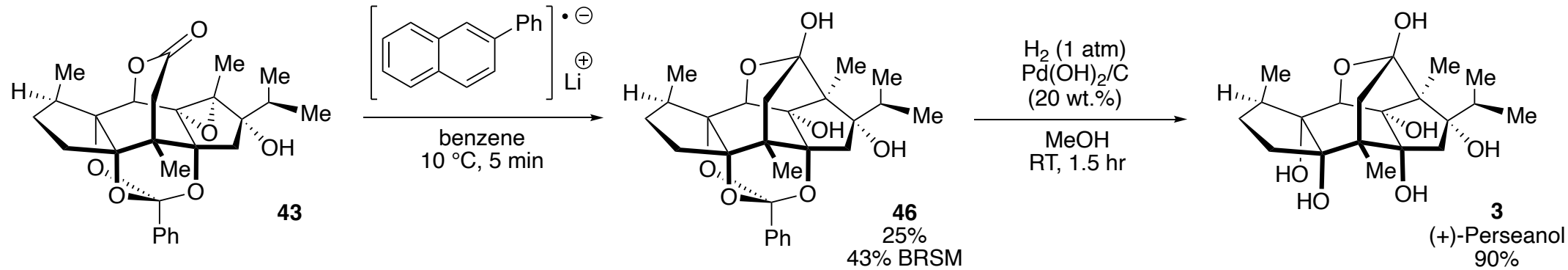


Allylic Oxidation

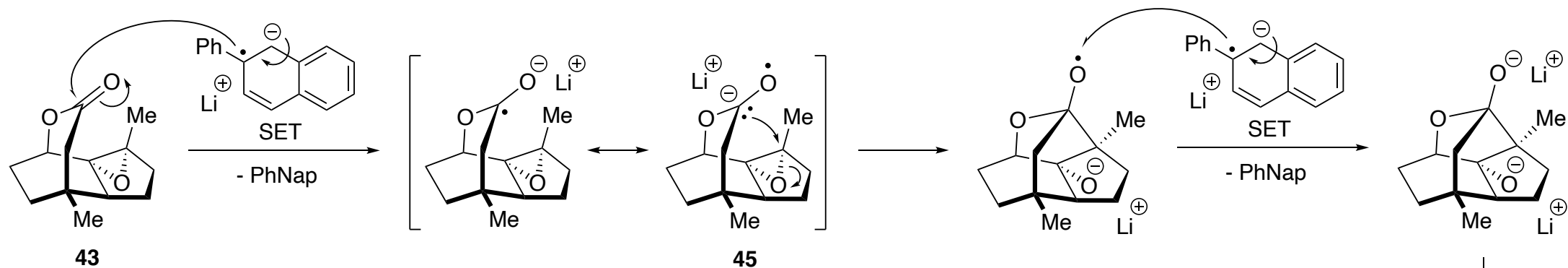


Epoxidation





Reductive Cyclization



Alcohol Deprotection

