

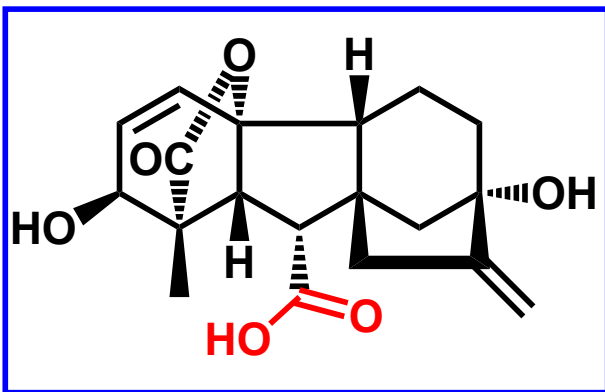
Total Synthesis of Gibberellic Acid



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CH-845 Course on Organic Synthesis

Corey's Total Synthesis of Gibberellic Acid



- **Gibberellic acid (GA₃)** is a plant hormone belonging to **gibberellins**
- Plants produce low amount of GA₃, therefore this hormone is produced by **microorganisms**

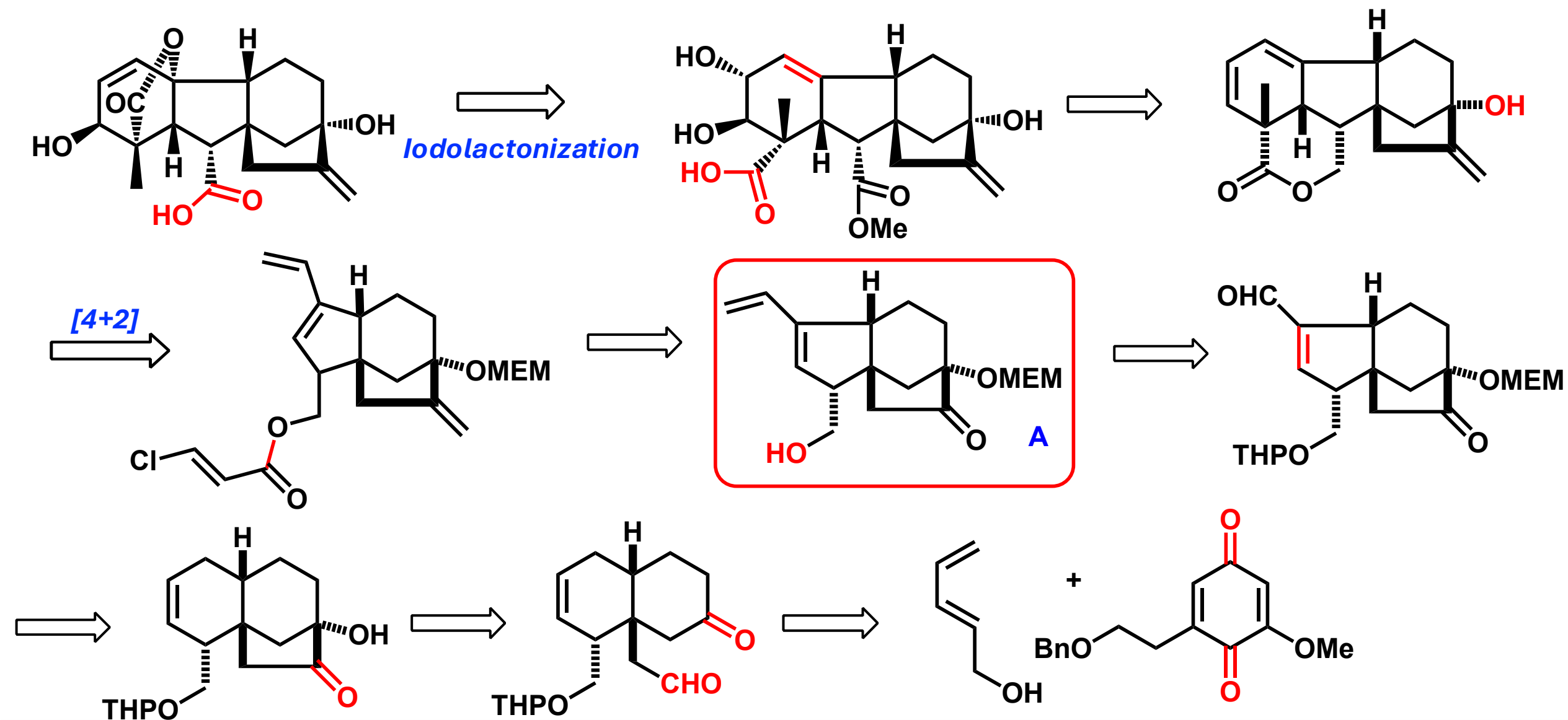
Yubuta and Sumuki, *J. Agric. Chem. Soc.. Japan*, **1938**, 14, 1526
 Corey, E. J., et.al., *J. Am. Chem. Soc.*, **1982**, 104, 6129
Pak. J. Bot., **2013**, 45, 2057,

Synthetic Challenges

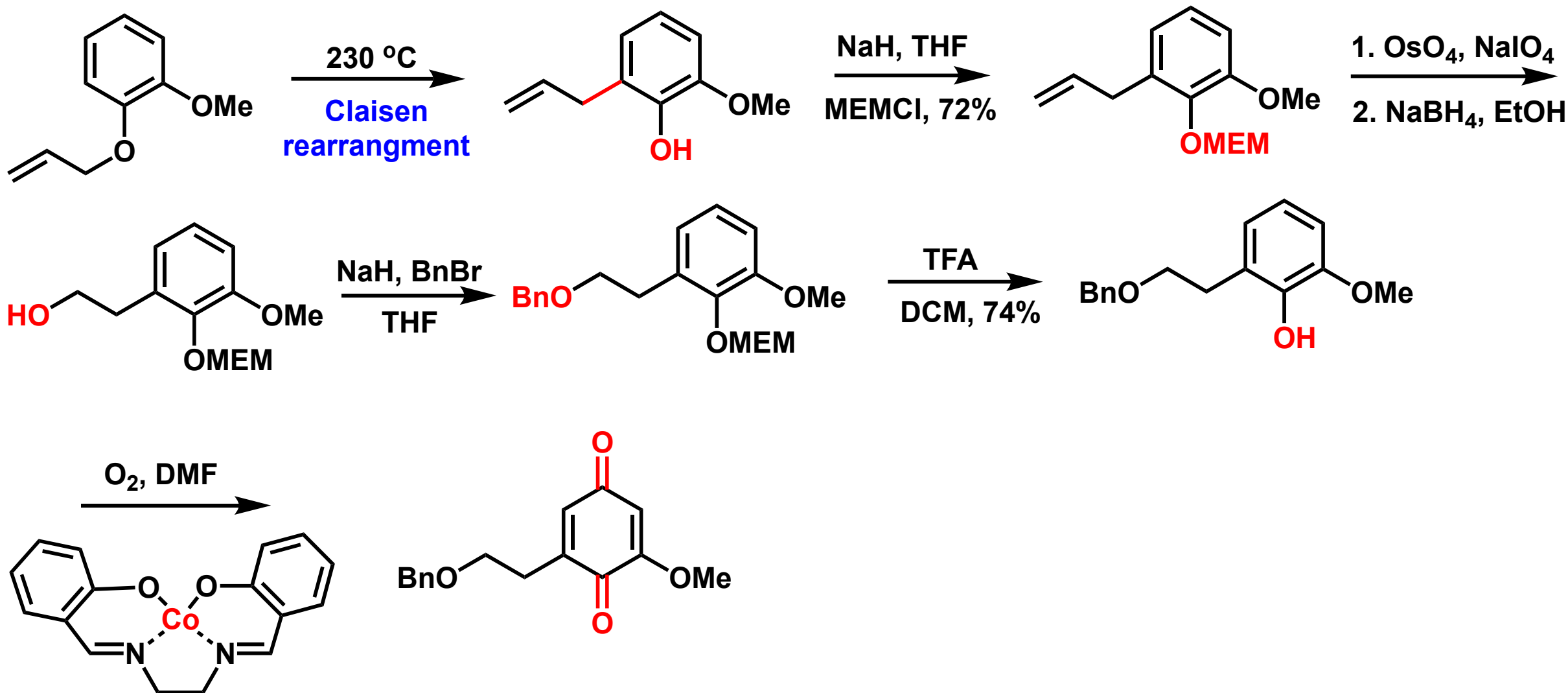
- The total chemical synthesis of gibberellic acid face a lot of challenges:
 - i. **molecular complexity**,
 - ii. centers of high sensitivity toward many reagents, and
 - iii. 8 stereocenters
- The first total synthesis of gibberellic acid by a route which is structurally unambiguous and stereospecific was reported by **E. J. Corey**

Corey, E. J. et.al., *J. Am. Chem. Soc.*, **1978**, 100, 8034

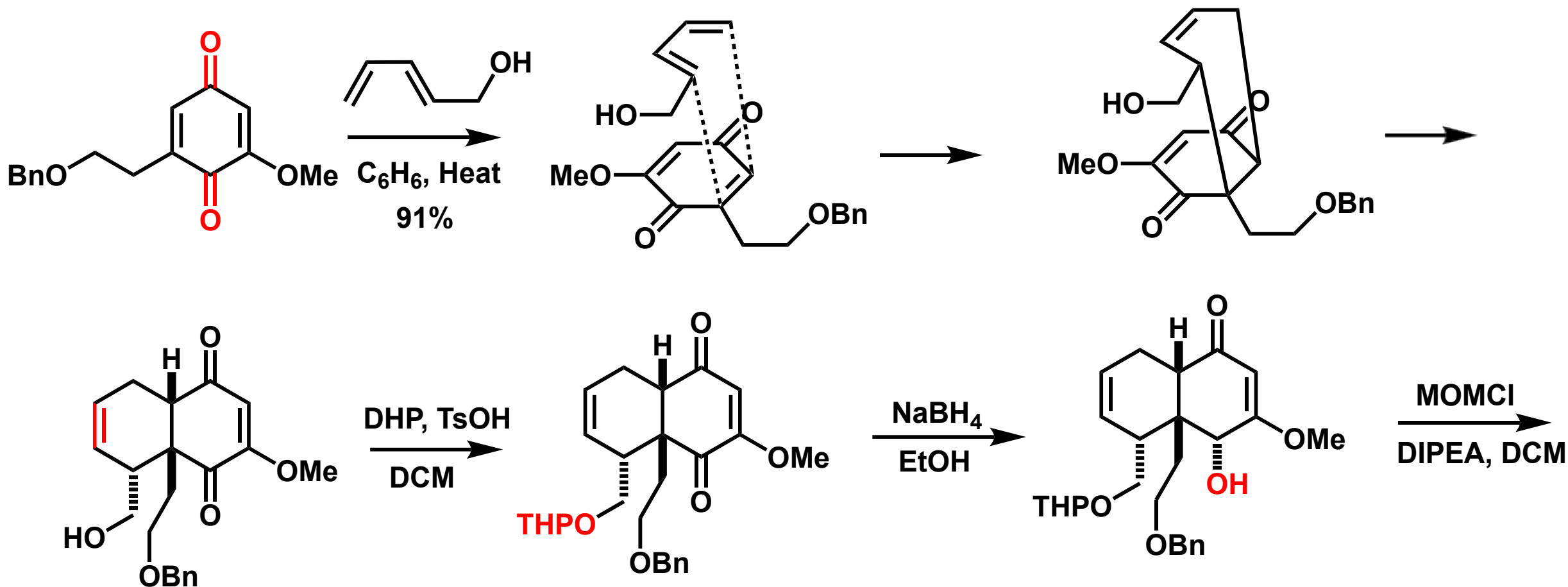
Corey's Retrosynthesis of Gibberellic Acid



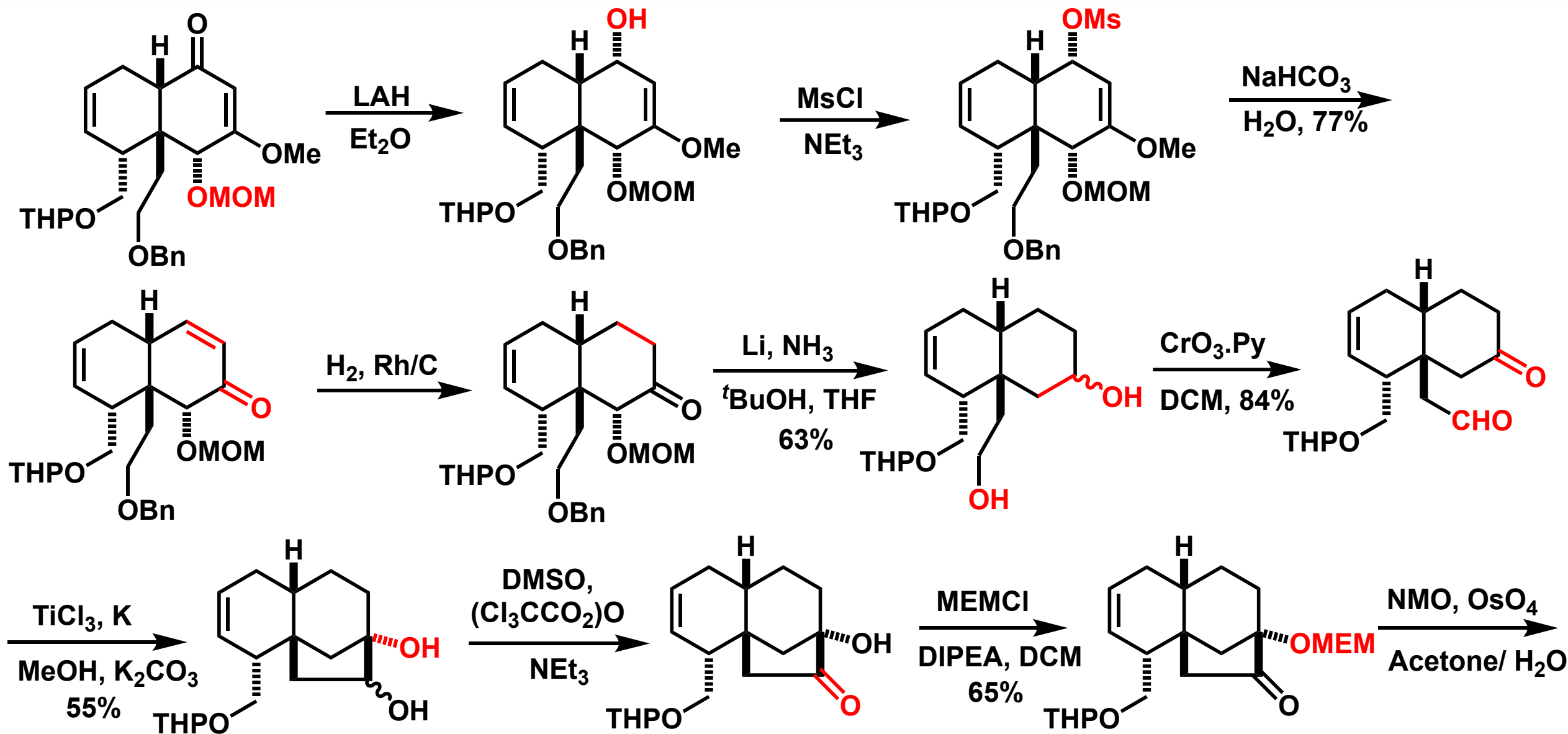
Synthesis of Dienophile



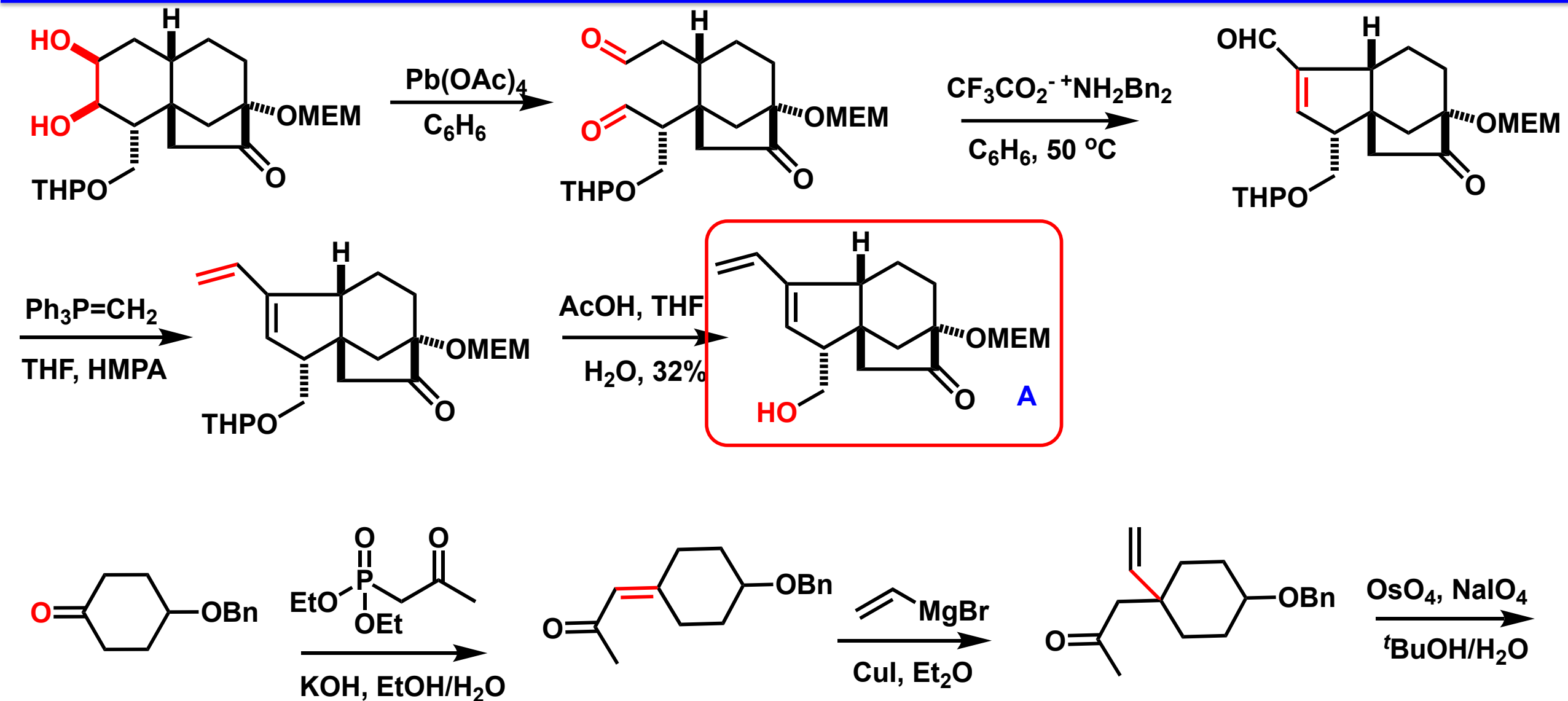
Diels-Alder Reaction



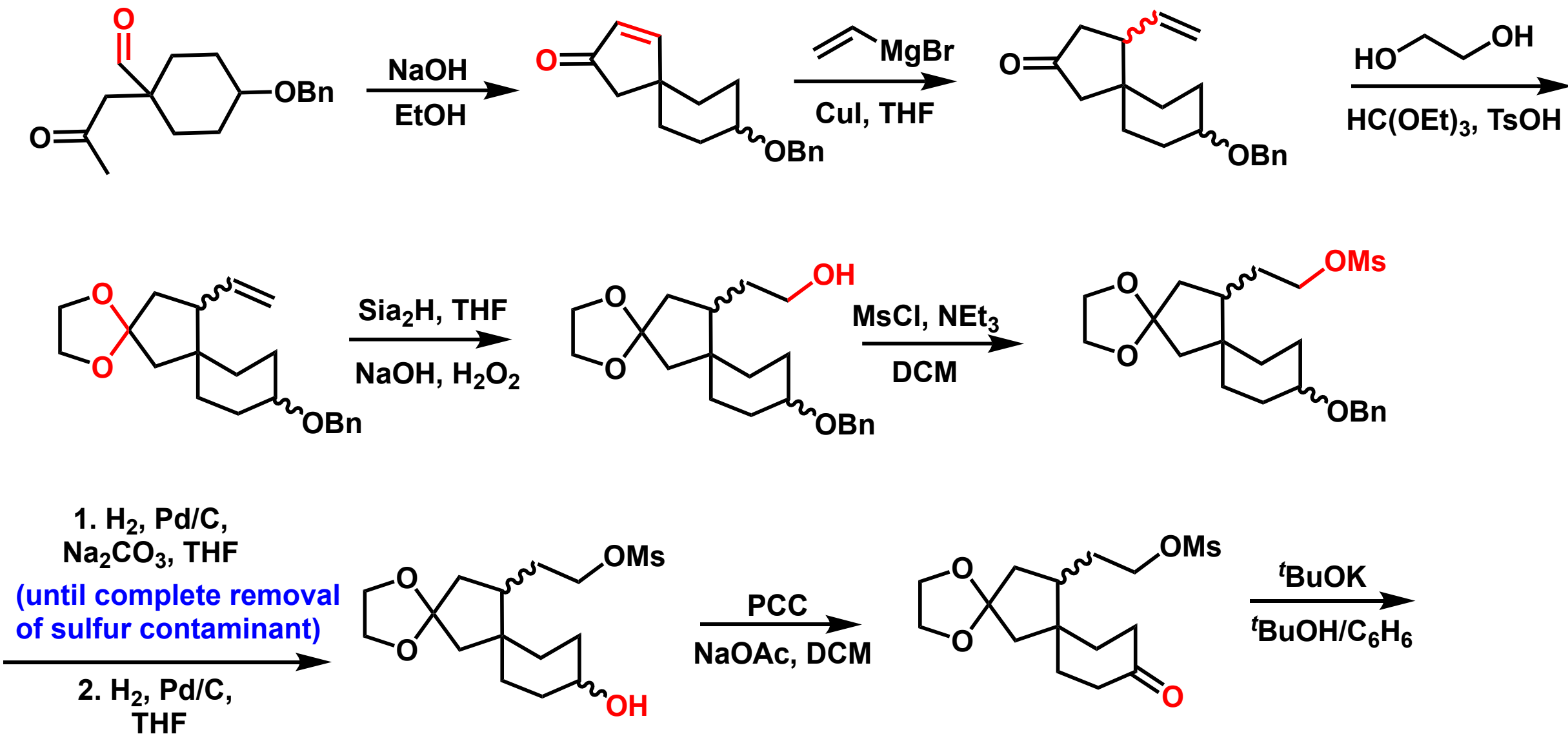
Total Synthesis of Gibberellic Acid



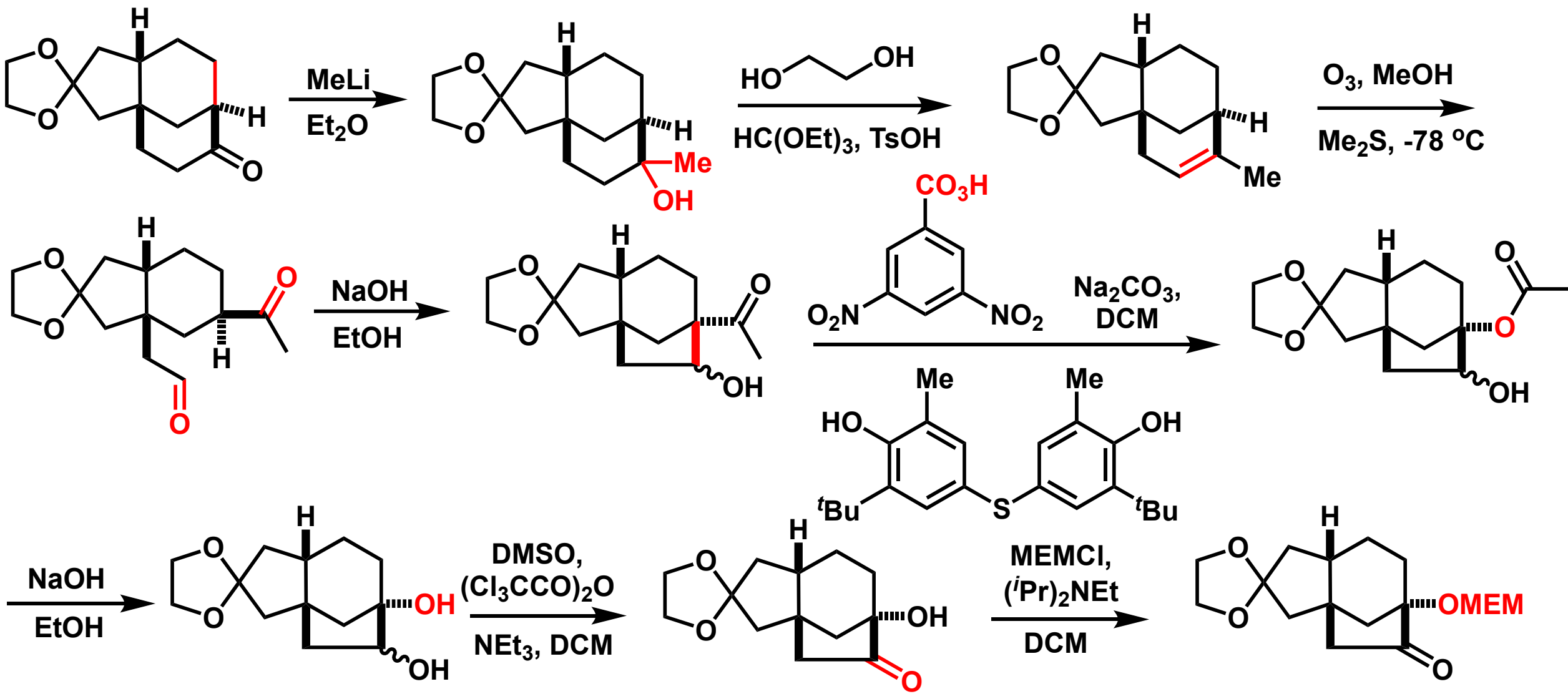
Synthesis of Intermediate A



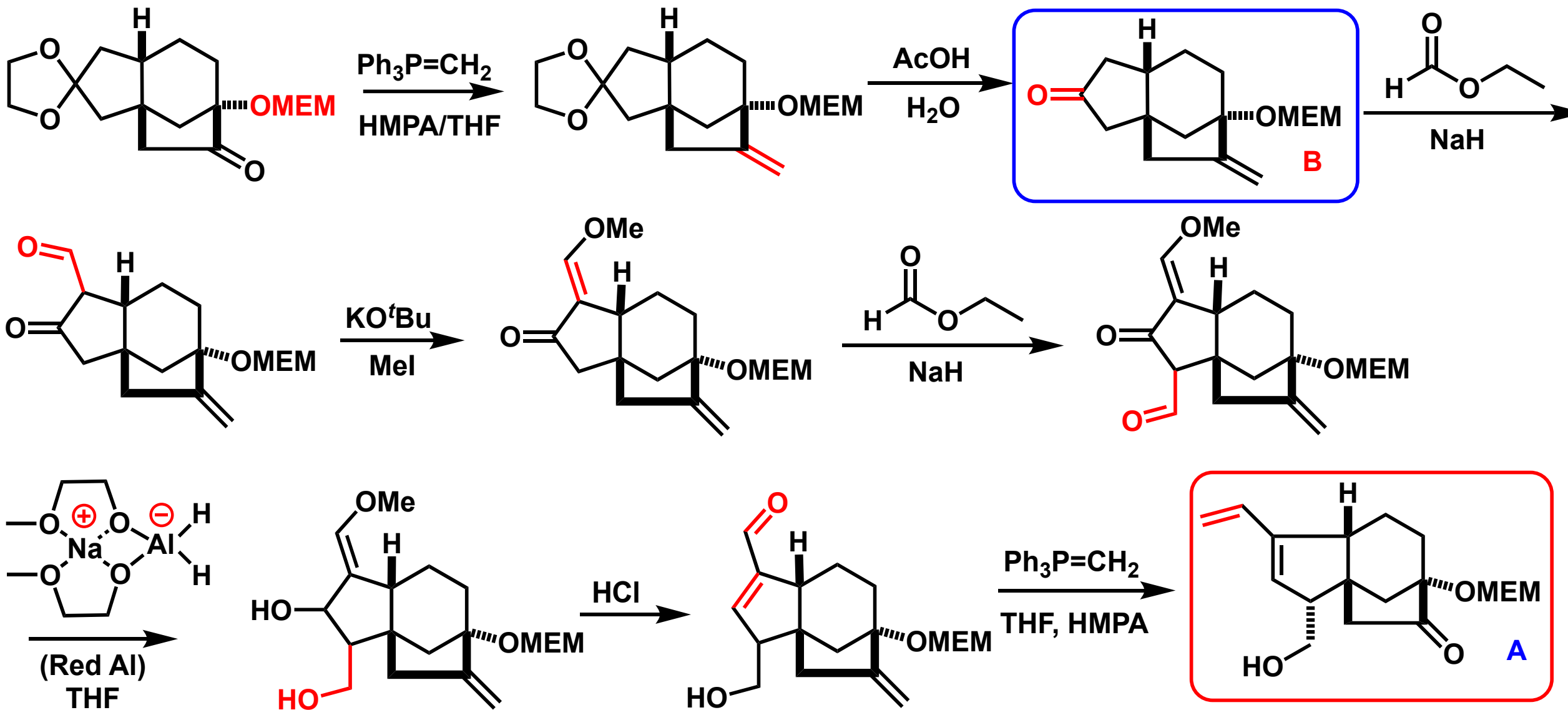
Synthesis of Intermediate A



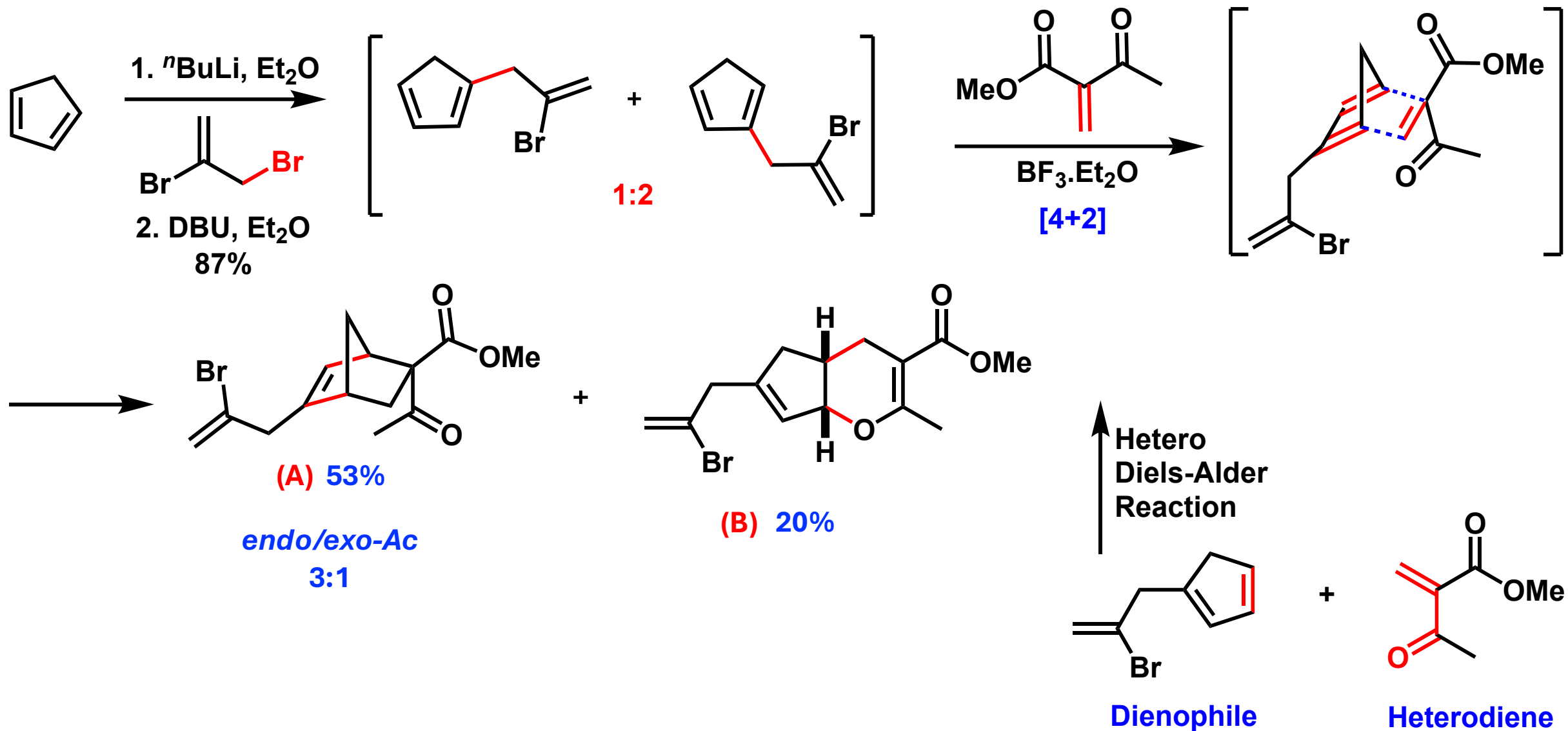
Synthesis of Intermediate A



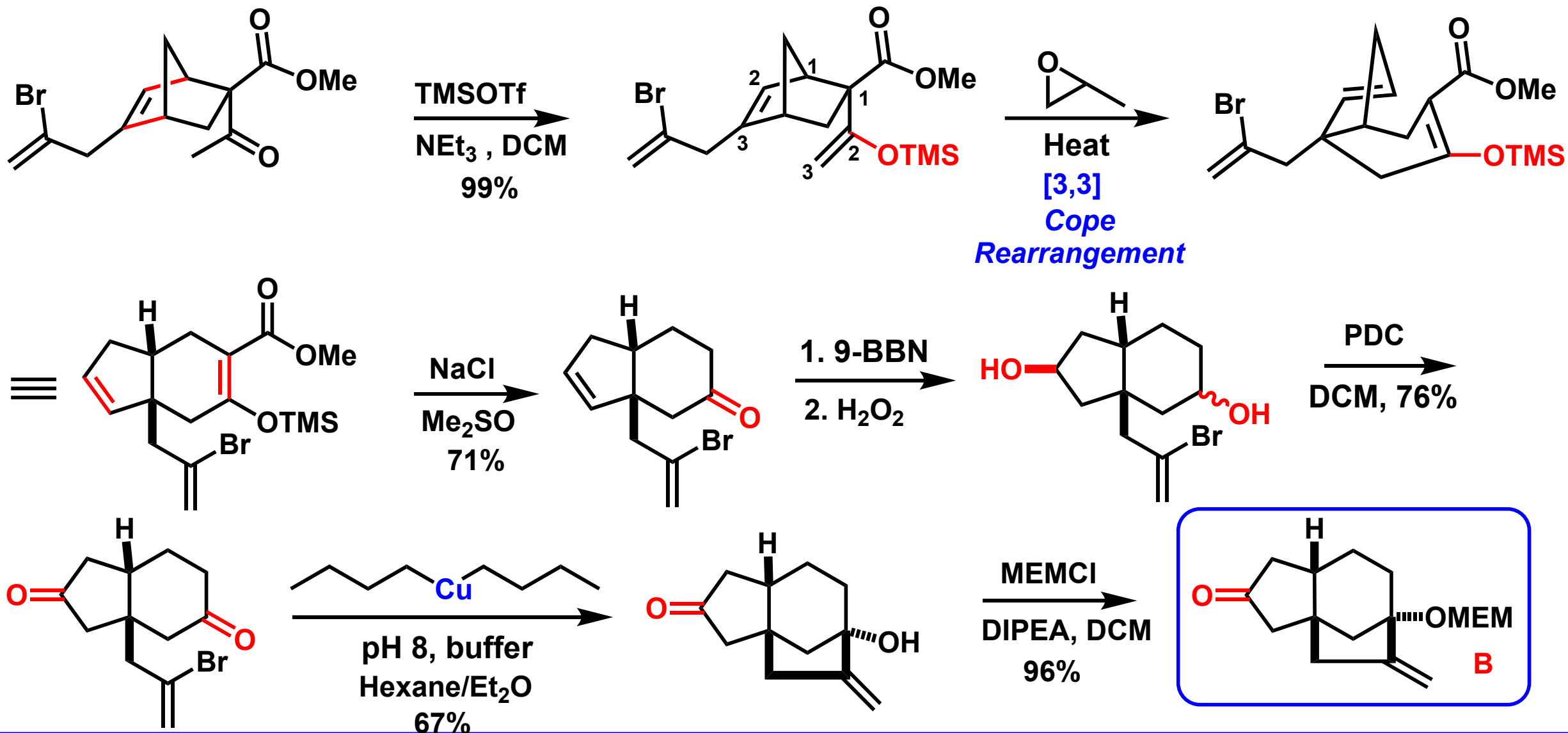
Synthesis of Intermediate A



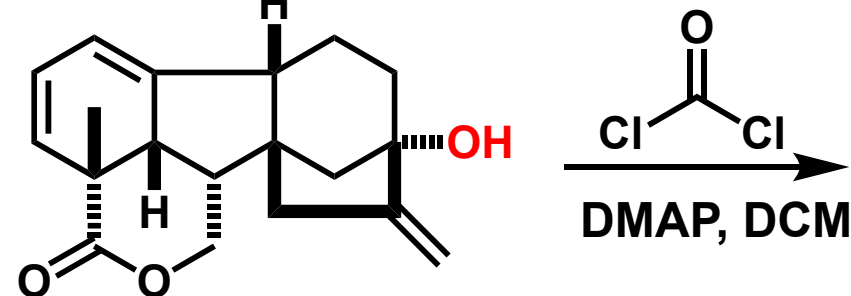
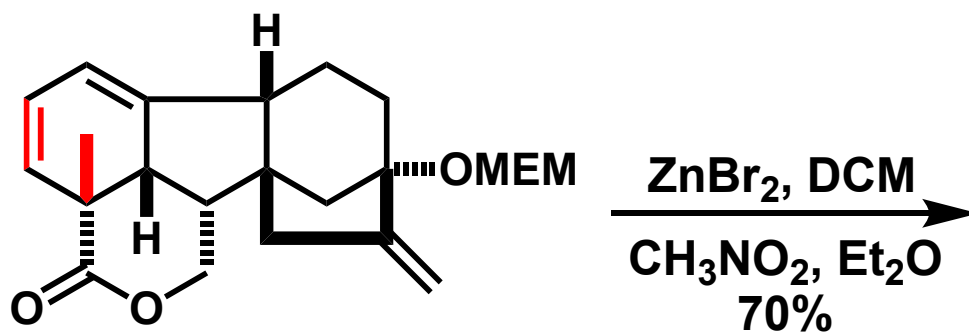
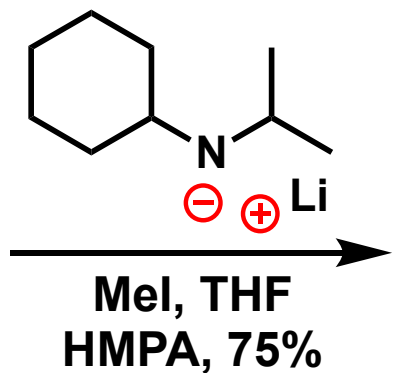
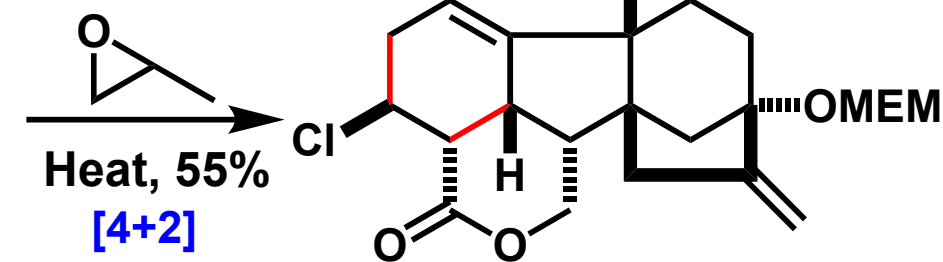
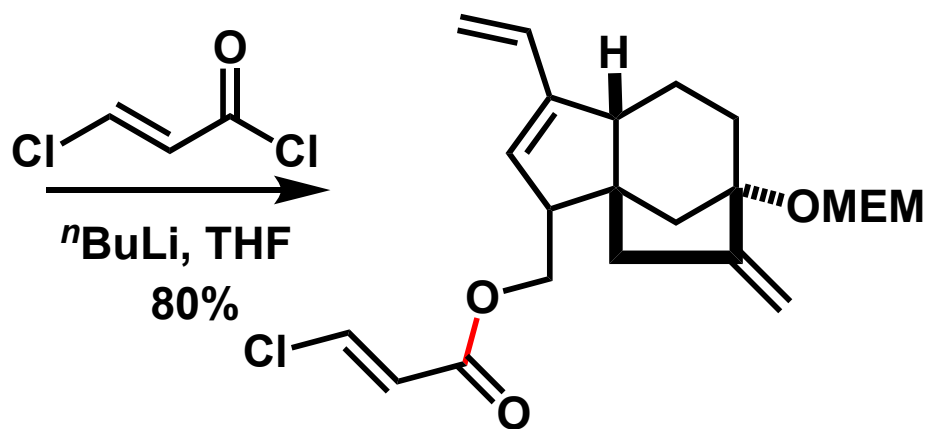
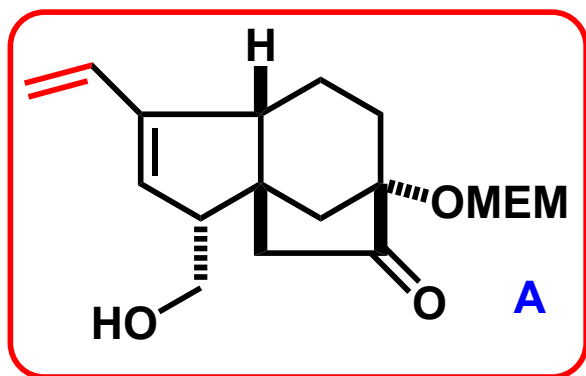
Synthesis of Intermediate B



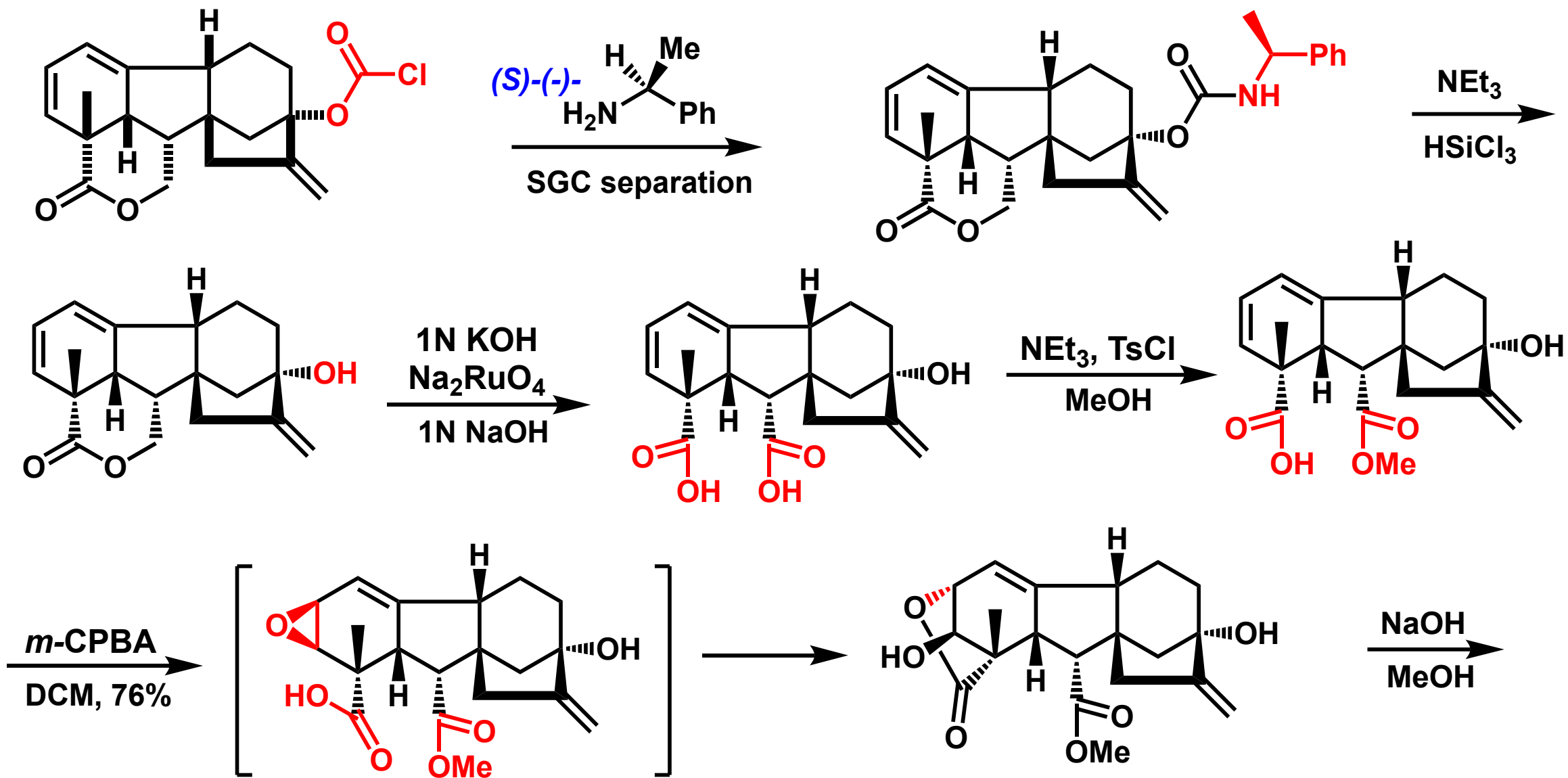
Synthesis of Intermediate B



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