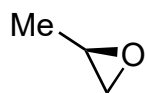
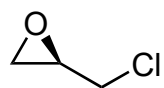


Total Synthesis of Limaol

S. N. Hess, X. Mo, C. Wirtz, and A. Fürstner
J. Am. Chem. Soc. **2021**, *143*, 6, 2464–2469.



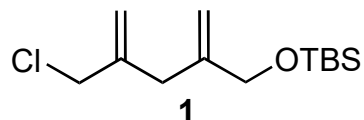
1–11



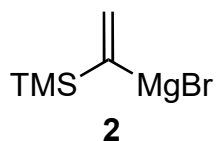
12–15



- 1) $\text{H}_2\text{C}=\text{CHMgBr}$, CuI
- 2) TBDPSCl, imidazole
- 3) Grubbs II, $\text{H}_2\text{C}=\text{CHCO}_2\text{Me}$
- 4) TMS-SEt , AlCl_3
- 5) MeMgBr , $\text{CuBr}\cdot\text{SMe}_2$, (*S,R*)-Josiphos (2%)
- 6) Et_3SiH , Pd/C
- 7) Ohira-Bestmann reagent, K_2CO_3 , MeOH
- 8) 9-I-9-BBN, *then* AcOH
- 9) Zn , LiCl , *then* **1**, $\text{Pd}(\text{PPh}_3)_4$
- 10) TBAF
- 11) Ac_2O , pyr, DMAP

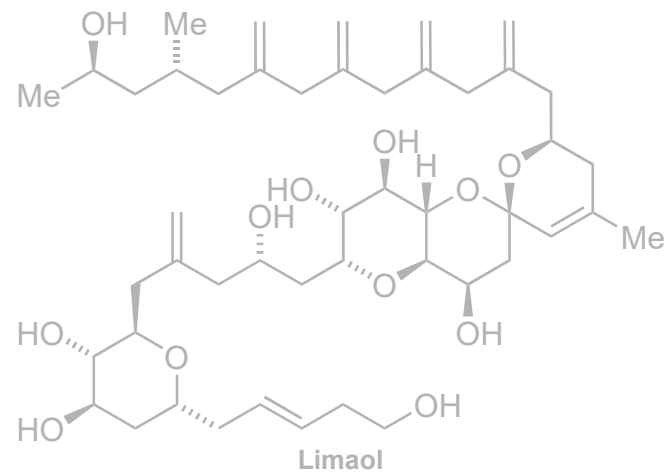


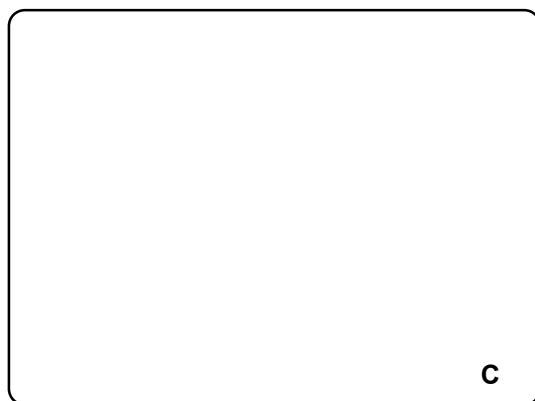
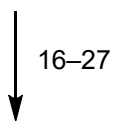
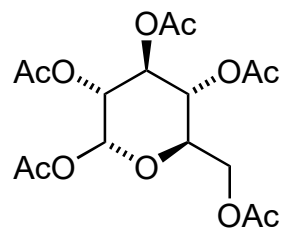
- 12) **2**, CuCN
- 13) NaOH
- 14) ICl , *then* TBAF
- 15) *t* BuLi , *then* ethyl vinyl ether, $\text{BF}_3\cdot\text{OEt}_2$, *then* aq HCl



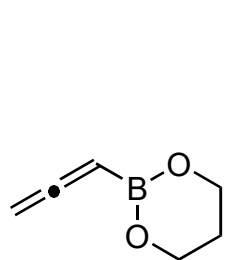
5) Structure (*S,R*)-Josiphos?

8) Structure 9-I-9-BBN?

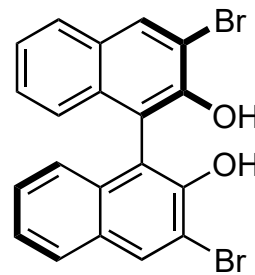




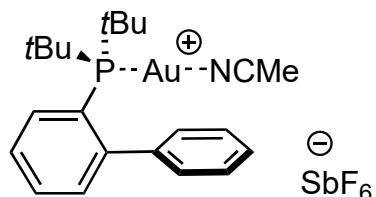
- 16) allyltrimethylsilane, $\text{BF}_3 \cdot \text{OEt}_2$
- 17) NaOMe
- 18) $\text{MeOC}_6\text{H}_4\text{CH}(\text{OMe})_2$, *p*TsOH
- 19) TBSOTf (2.6 equiv), 2,6-lutidine
- 20) DIBAL
- 21) $(\text{COCl})_2$, DMSO, Et_3N
- 22) **3**, **4** (cat.)
- 23) TBSOTf, 2,6-lutidine
- 24) DDQ
- 25) **B**, $\text{Pd}_2(\text{dba})_3$, PPh_3 , CuI, $\text{HN}(i\text{Pr})_2$
- 26) **5** (cat), PPTS
- 27) OsO_4 , NaIO₄



3



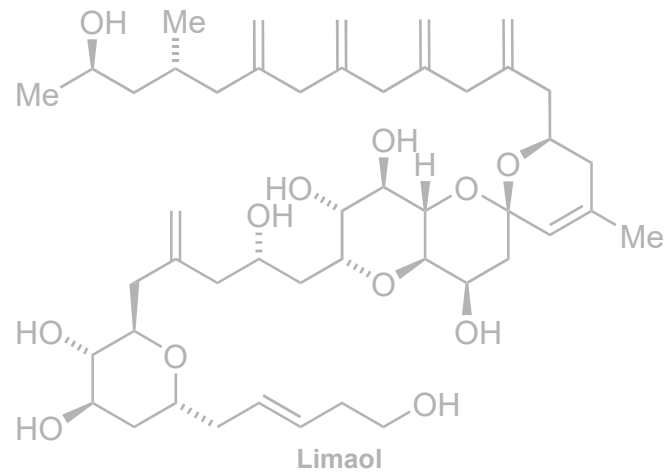
4

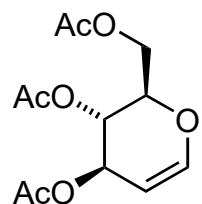


5

25) Name the reaction

26) Hint: 2 rings are formed

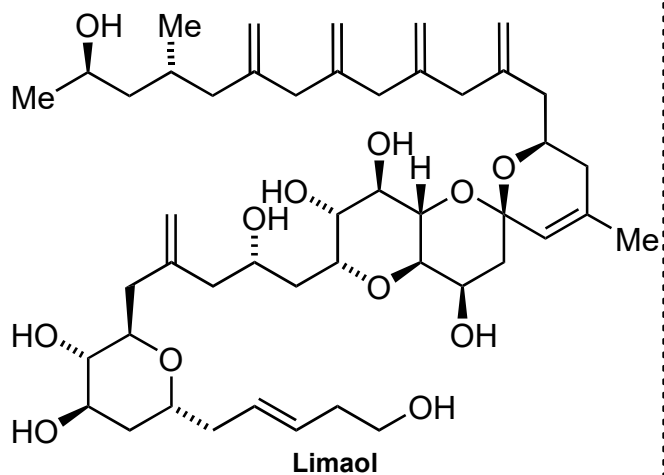




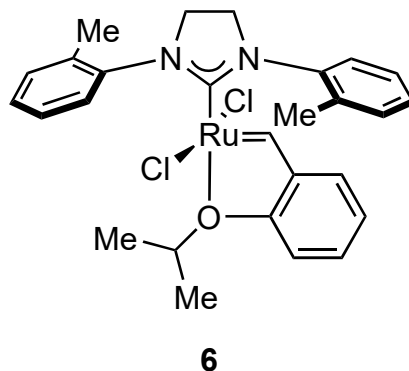
28–34



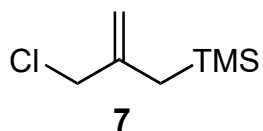
35–45



- 28) $\text{CeCl}_3 \cdot 7\text{H}_2\text{O}$, NaI
- 29) TMSOTf, allyltrimethylsilane
- 30) K_2CO_3
- 31) TBSOTf (excess), 2,6-lutidine
- 32) **6** (cat), 3-buten-1-ol
- 33) TBDPSCI, imidazole
- 34) CSA



- 35) $\text{Pb}(\text{OAc})_4$
- 36) **7**, SnCl_4
- 37) $n\text{BuLi}$, $(\text{Bu}_3\text{Sn})_2$
- 38) $\text{MgBr}_2 \cdot \text{OEt}_2$, **C**
- 39) PPh_3 , 4-nitrobenzoic acid, DEAD
- 40) NaOH
- 41) TBSOTf, 2,6-lutidine
- 42) Ph_3CK , PhNTf_2
- 43) $(\text{Bu}_3\text{Sn})_2\text{CuCNLi}$
- 44) **A**, $\text{Pd}(\text{PPh}_3)_4$, CuTC, $[\text{Bu}_4\text{N}][\text{Ph}_2\text{P}(=\text{O})\text{O}]$
- 45) $\text{HF} \cdot \text{pyridine}$



29) Draw a transition state to explain the stereochemical outcome

44) Name the reaction