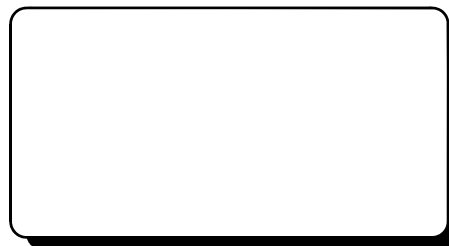
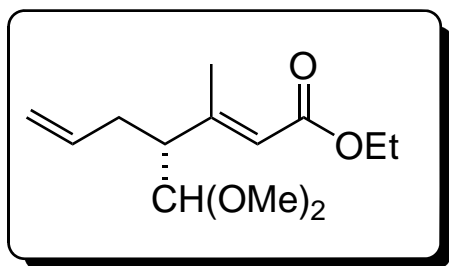


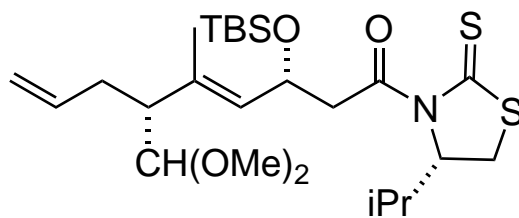
1. Ni-(*R*)-BINAP(OTf)<sub>2</sub>, 2,6-lut., BF<sub>3</sub>·OEt<sub>2</sub>, HC(OMe)<sub>3</sub>
2. *i*PrMgCl, HO<sub>2</sub>CCH<sub>2</sub>CO<sub>2</sub>Et



1. LiHMDS, CIPO(OEt)<sub>2</sub>
2. Fe(acac)<sub>3</sub>, MeMgCl

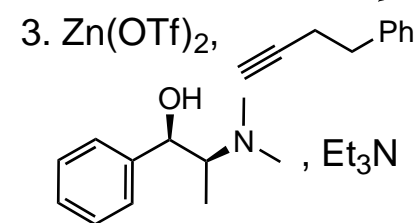


1. DIBAL-H
2. MnO<sub>2</sub>
3. Sn(OTf)<sub>2</sub>, *N*-ethylpiperidine



4. TBSOTf, 2,6-lut.
- 

1. K<sub>2</sub>CO<sub>3</sub>, MeOH
2. OsO<sub>4</sub>, NMO; NaIO<sub>4</sub>



1. BOMCl, NaHMDS
2. Lindlar catalyst, H<sub>2</sub>
3. K<sub>2</sub>OsO<sub>4</sub>, NMO, citric acid; Pb(OAc)<sub>4</sub>, K<sub>2</sub>CO<sub>3</sub>



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