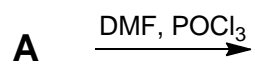
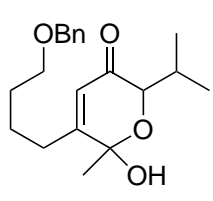
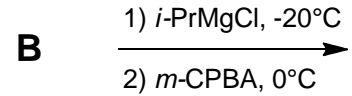


- 1) Red-Al then I<sub>2</sub>, -78°C
- 2) Pd(PPh<sub>3</sub>)<sub>4</sub>, trimethylsilyl acetylene, *i*-PrNEt<sub>2</sub>, NEt<sub>3</sub>, CuI
- 3) K<sub>2</sub>CO<sub>3</sub>, MeOH
- 4) Ph<sub>3</sub>PAuCl, AgOTf

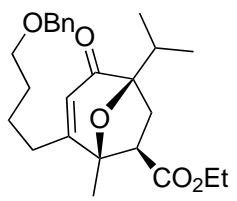
Give the name and the mechanism of this reaction



Give the name and the mechanism of the second reaction



?



Give the name and the mechanism of the third reaction

- 1) PtO<sub>2</sub>, H<sub>2</sub>
- 2) Pd/C, H<sub>2</sub>
- 3) ArSeCN, *n*-Bu<sub>3</sub>P then *m*-CPBA then DBU, 80°C

**C**

- 1) PdCl<sub>2</sub> cat., CuCl cat., O<sub>2</sub> (1 atm.), DMF/H<sub>2</sub>O
- 2) KHMDS (2.2 eq), -10°C
- 3) NaBH<sub>4</sub>, CeCl<sub>3</sub>

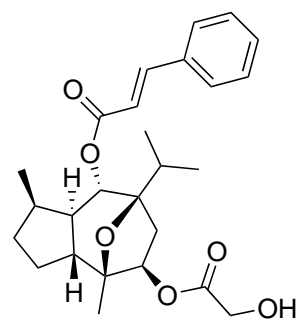
**D**

- 1) Crabtree cat., H<sub>2</sub> (1 atm.)
- 2) *i*-PrMgCl, MeNH(OMe).HCl
- 3) MeLi, -78°C

**E**

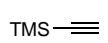
Give the name of the second step

- 1) *m*-CPBA
- 2) 2,4,6-trichlorobenzoyl chloride, cinnamic acid, DMAP, 80°C
- 3) K<sub>2</sub>CO<sub>3</sub>
- 4) **1**, 2,4,6-trichlorobenzoyl chloride, NEt<sub>3</sub>, then DMAP, starting material
- 5) TBAF

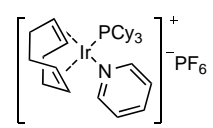


**(-)-Englerin A** by Nicolaou, *JACS*, **2010**, 132, 8219-8222

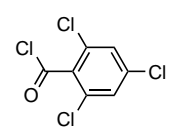
Trimethylsilyl acetylene



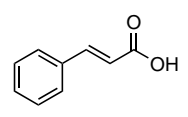
Crabtree cat.



2,4,6-trichlorobenzoyl chloride



Cinnamic acid



**1**

