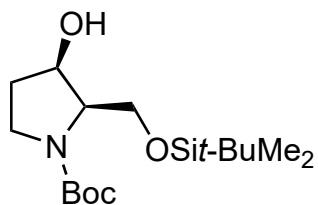


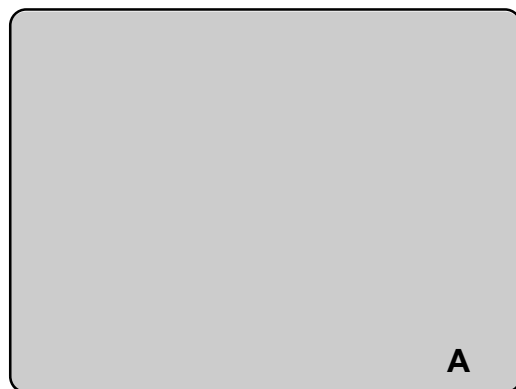
# Total Synthesis of (-)-Nummularine F

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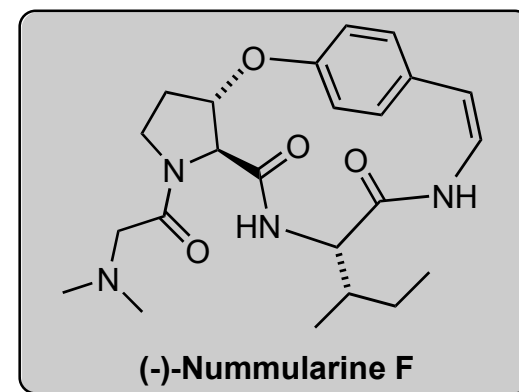
9-11

- 1) *p*-Cyanophenol, Ph<sub>3</sub>P, DEAD, THF
- 2) HOAc:H<sub>2</sub>O:THF
- 3) TFAA, DMSO, CH<sub>2</sub>Cl<sub>2</sub>, Et<sub>3</sub>N, -78 °C
- 4) KMnO<sub>4</sub>, NaH<sub>2</sub>PO<sub>4</sub>, *t*-BuOH, 5 °C
- 5) DCC, DMAP, MeOH, CH<sub>2</sub>Cl<sub>2</sub>
- 6) Raney Ni, NaH<sub>2</sub>PO<sub>2</sub>·H<sub>2</sub>O, pyridine:HOAc:H<sub>2</sub>O
- 7) MeNO<sub>2</sub>, NaOMe, 0 °C then *t*-BuMe<sub>2</sub>SiCl, DMF, imidazole
- 8) HCO<sub>2</sub>NH<sub>4</sub>, MeOH, 10% Pd/C

- 9) *Z*-L-Isoleucine, DCC, THF, HOBT,
- 10) LiOH/H<sub>2</sub>O, MeOH then pentafluorophenol, DCC, CH<sub>2</sub>Cl<sub>2</sub>,
- 11) 10% Pd/C, cyclohexene, dioxane, 4-pyrrolidinopyridine then TBAF, THF

3) Name of the reaction:

7) name of the reaction?





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- 12) MsCl, NEt<sub>3</sub>, CH<sub>2</sub>Cl<sub>2</sub>, -5 °C
- 13) Diphenyl diselenide, NaBH<sub>4</sub>, ethanol
- 14) H<sub>2</sub>O<sub>2</sub>, pyridine, CH<sub>2</sub>Cl<sub>2</sub>
- 15) Benzene, 60 °C
- 16) TFA *then* N,N-Dimethylglycine, DCC

