Synthesis Challenge # 39

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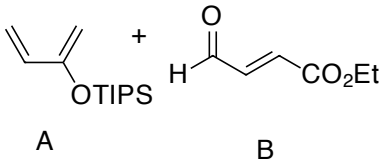


A B

1-7

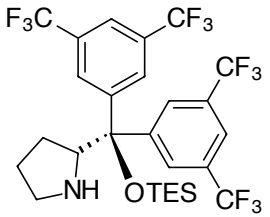
C

8-11

D

1) **I** (0.1 equiv), TFA (20 mol%), toluene, −10 °C
2) $AlMe_3$ (2.3 equiv), MeMgBr (1.5 equiv), CH_2Cl_2, −78 °C
3) DMP (1.1 equiv), $NaHCO_3$ (8.0 equiv), CH_2Cl_2, rt
4) MeMgCl, THF, −78 to −25 °C
5) KHMDS (2.0 equiv), THF, −78 to 0 °C followed by addition of $P(OMe)_3$ (2.0 equiv), O_2, 0 °C, 1 h, then TESCl (1.2 equiv)
6) KOtBu (10.0 equiv), $CHBr_3$ (7.5 equiv)
7) $AgClO_4$· H2O (2.5 equiv), acetone, rt

8) ethynyltrimethylsilane (1.25 equiv), DIPA (3.0 equiv), $Pd(PPh_3)_2Cl_2$ (0.06 equiv), CuI (20 mol%), THF,
9) (3-methylbut-3-en-1-yl)magnesium bromide $CeCl_3$ (3.0 equiv), THF, 0 °C
10) $Co_2(CO)_8$ (0.5 equiv), Celite (10 wt), toluene, reflux
11) AgF (10.0 equiv), THF, MeOH, H_2O, 80 °C

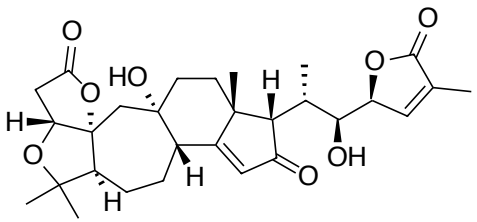


Please, provide a detailed mechanism for step 10).

12-17

D

18-19



12) $Pd(OH)_2/C$ (0.7 wt), CH_2Cl_2, rt
13) *m*-CPBA (2.5 equiv), CH_2Cl_2, rt,
14) Ac_2O (3.0 equiv), Et_3N (10.0 equiv), CH_2Cl_2, 0 °C
15) LiHMDS (2.5 equiv), THF, –78 to –40 °C
16) Martin's sulfuran (1.8 equiv), CH_2Cl_2, rt
17) $Pd_2dba_3{\cdot}CHCl_3$ (0.1 equiv), $n Bu_3P$ (0.2 equiv), HCOOH (5.0 equiv), DIPEA (2.0 equiv), dioxane, 45 °C

18) TIPOTf (1.5 equiv), Et_3N (2.0 equiv) then enolsilane **II**, CAN (4.5 equiv), DTBP (10 equiv), CH_3CN, –50 to –30 °C
19) 18-crown-6 (15.0 equiv), KHMDS (5.0 equiv), **III** (5.0 equiv)
20) OsO4 (0.07 equiv), NMO (2.0 equiv), THF/H2O (1:1), 4 °C, 72 h

What is Martin's Sulfuran and how does it work?

Step 18 furnishes a mixture of isomers. Which ones and why?