

1) Grubbs 1 (30%), DCM, rfx
 2) H₂, Pd/C, THF
 3) Recryst. -> 99% ee

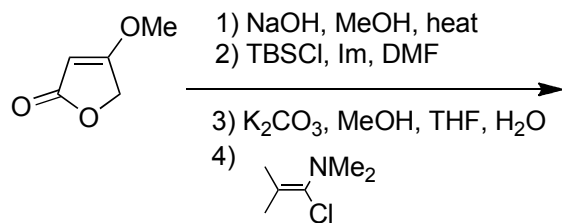
9

1) 50 eq. NH₄OAc
 Ti(OiPr)₄, propanoic acid
 140 °C
 2) KH, SEMCl, DMF

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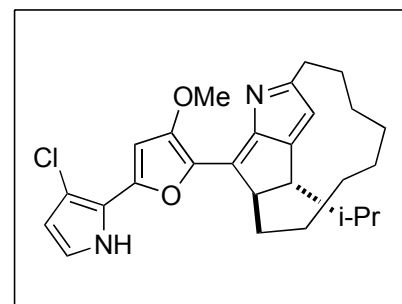
SEM: 2-(TMS)ethoxymethyl

11



12

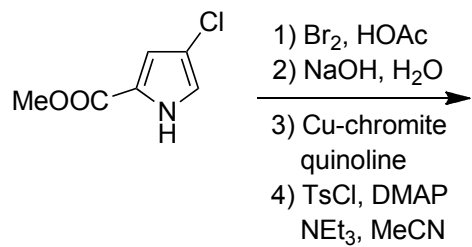
1) sBuLi, THF, -50 °C
 ii) CeCl₃
 iii) **11** -78 °C to rt
 2) TBAF, 50 °C
 3) aq. HCl



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1) PPTS, MeOH, 65 °C
 2) K₂CO₃, MeOH
 3) KH, TIPSCl, THF

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1) nBuLi, -78 °C
 2) ZnCl₂, -78 to 0 °C
 3) cat. Pd(PPh₃)₄, **12**