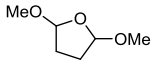
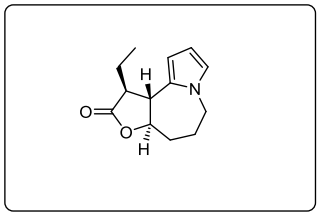
Total Syntheses of Bisdehydroneostemoninine and Bisdehydrostemoninine

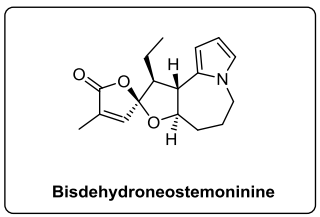
Kaiqing Ma, Xianglin Yin, Mingji Dai, *ACIE* **2018**, *57*, 15209–15212.



1) **A**, NaOAc, H_2O, CH_2Cl_2, reflux
2) MeNH(OMe)•HCl, *i*-PrMgCl, THF
3) VinylMgBr
4) $NaBH_4$, $CeCl_3$•$7H_2O$, MeOH
5) methyl acrylate, Grubbs 2nd, PhOH/PhMe, 110 °C
6) BF_3•OEt_2, CH_2Cl_2
7) LDA, ethyl iodide, HMPA, THF
8) K_2CO_3, MeOH, rt

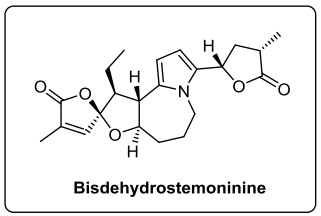


9) $(OiPr)_3TiCl$, EtMgBr, THF
10) $[Pd(neoc)(OAc)]_2(OTf)_2$, benzoquinone, CO (1 atm), DCE
11) Eschenmoser's salt, LiHMDS, THF
12) MeI, CH_2Cl_2/Et_2O, *then* DBU, THF
13) $Ru_3(CO)_{12}$, NEt_3, dioxane, 100 °C

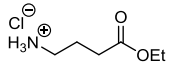


Bisdehydroneostemoninine

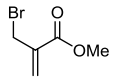
14) $(COCl)_2$, DMF, AcONa, H_2O
15) **B**, Zn, THF
16) K_2CO_3, *t*BuOH
17) Pd/C, H_2, PhH/pyr



Bisdehydrostemoninine



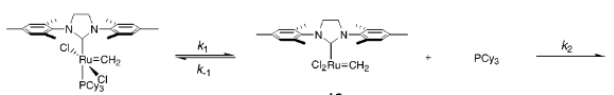
A



B

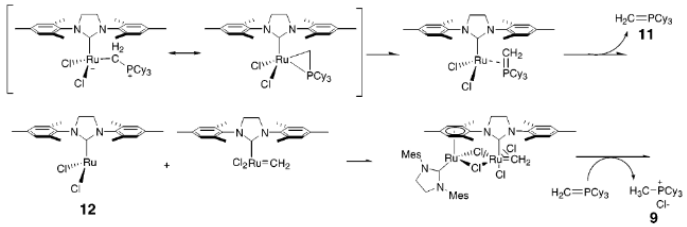
Step 1: Name Reaction?
Step 2: What is the role of the Grignard reagent?

Step 5: PhOH prevents a typical side reaction for these reactants. Which side reaction is it and what exactly is the role of PhOH?



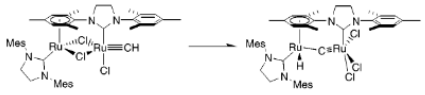
10

bimolecular decomposition into a Ru-hydride:



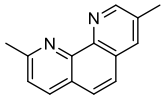
12 **11** **9**

Step 9: Name Reaction + Mechanism
Step 10: Mechanism



13 **8**

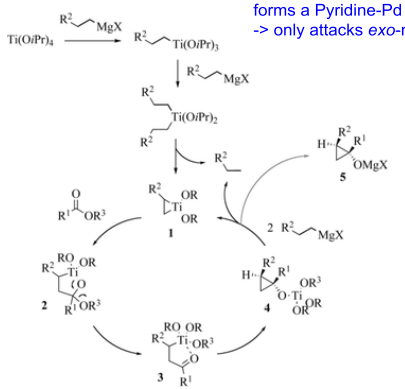
neoc = Neocuproine

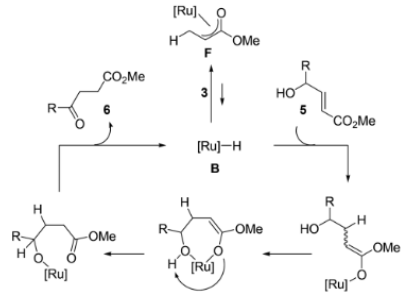


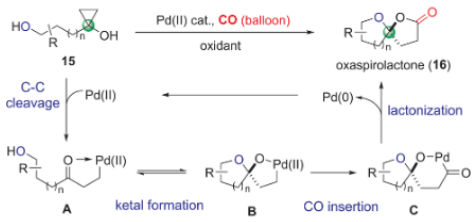
Presumably, phenol coordinates to the catalytically active 14-electron species, leading to a retarded catalyst decomposition

Step 17: What is the role of pyridine?

forms a Pyridine-Pd complex->more bulky -> only attacks *exo*-methylene







15 oxaspirolactone (**16**)

Pd(II) cat., **CO** (balloon), oxidant; C-C cleavage; Pd(II); Pd(0); lactonization; ketal formation; CO insertion

A **B** **C**