Total Synthesis of (−)-Retigeranic Acid A: A Reductive Skeletal Rearrangement Strategy

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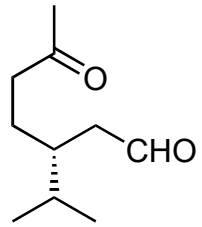

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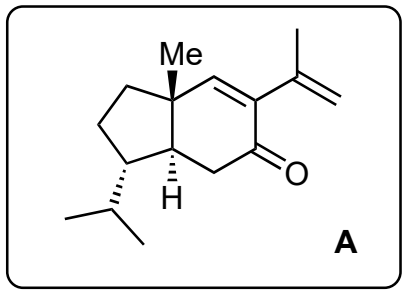
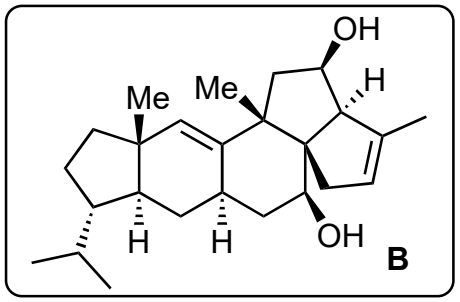


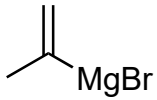
A

6-10



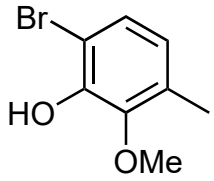
B

1) $EtNO_2$, NEt_3 *then* Ac_2O *then* DABCO, O_2
2) $MeOCH_2PPh_3Cl$, *t*-BuOK *then* aq. HCl
3) $Zr(n\text{-}PrO)_4$, $LiOH{\bullet}H_2O$
4) I_2, DMAP, K_2CO_3
5) $Pd(PPh_3)_4$, **1**, $ZnBr_2$



1

6) ICH_2Cl, LiBr, $TMSCH_2Li$
7) TosMIC, *t*-BuOK *then* DIBAL
8) NaH, *n*-BuLi, **2**
9) PIFA, K_2CO_3
10) SmI_2, *t*-BuOH, H_2O



2

1) Name of reactions? Please suggest synthesis of the starting material.
Henry condensation, Nef reaction

3) *Hint: formation of 5/6 system.* Name reaction.
Intramolecular Michael/Aldol sequence

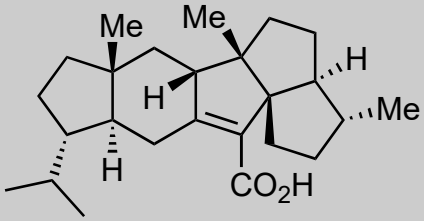
5) Name of the reaction?
Negishi coupling

6) Name of reaction?
Epoxidation/Meinwald rearrangement cascade

7) Name of the reaction?
Van Leusen homologation

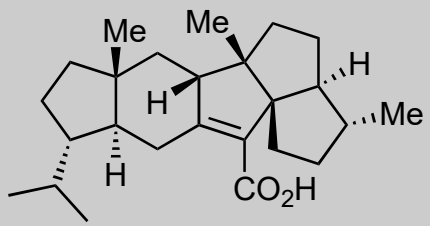
9) *Hint: 2 transformations, 2 rings are formed.* Name of reactions? Please show mechanism.
ODI-[5+2]/pinacol rearrangement (see later)

10) *Hint: 5 transformations.* Show mechanism and name reactions where possible. *(see later)*



(−)-retigeranic acid A

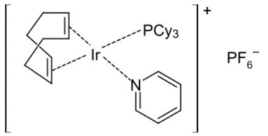
11-15



(−)-retigeranic acid A

11) Crabtree's cat., H_2 *then* TCDI, DMAP, 160 °C
12) Pd/C, H_2 *then* PCC
13) TrisN_3, hν, MeOH
14) PyHBr_3, DBU
15) Mn(dpm)$_3$, Ph(*i*-PrO)SiH_2 *then* aq. KOH

11) Structure of Crabtree? Name of reaction for second transformation?

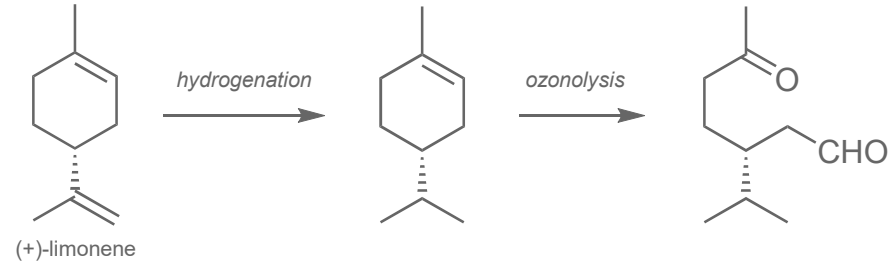


Chugaev elimination

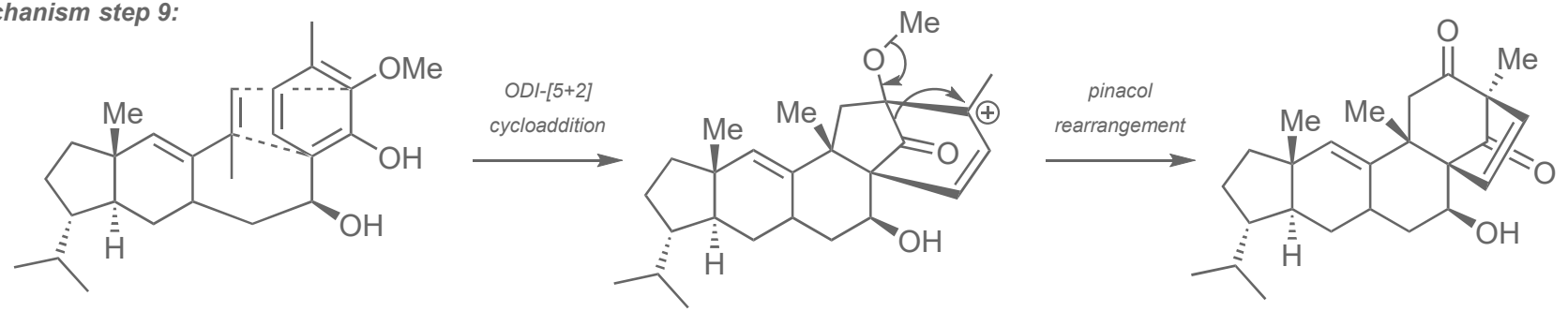
13) Name of reactions?

Regitz diazo transfer/Wolff rearrangement

Possible SM synthesis step 1:



Mechanism step 9:



Mechanism step 10: