Total Synthesis of the *Cephalotaxus* Norditerpenoids ( )-Cephanolides A–D

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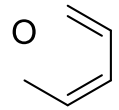
The larger family of Cephalotaxus diterpenoids have shown a broad range of bioactivity that includes plant growth inhibition as well as antineoplastic, antiviral, and antitumor properties.

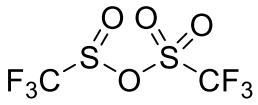
Construction of the carbon framework through:
iterative -coupling,
intramolecular inverse-cycloaddition,
strategic late-stage oxidations,
facilitated

Retrosynthesis

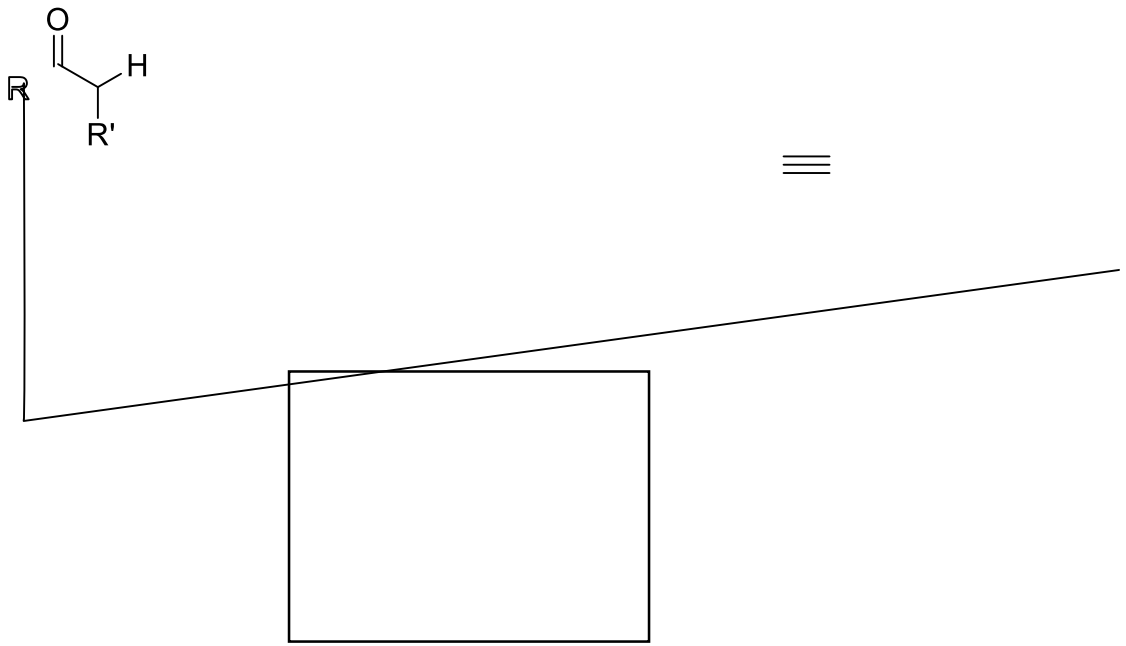


(1) Tf_2O, pyridine

Alcohol functionalization

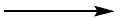


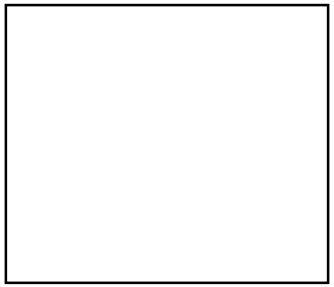
Selective [4+2] cycloaddition



Mukaiyama hydration, then base elimination

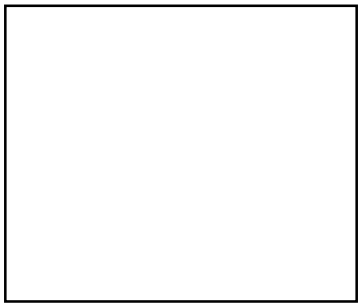
Olefination using a modified protocol



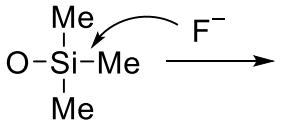


(7) Pd/C, H_2 →

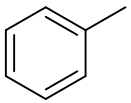
Heterogeneous Pd-catalyzed hydrogenation

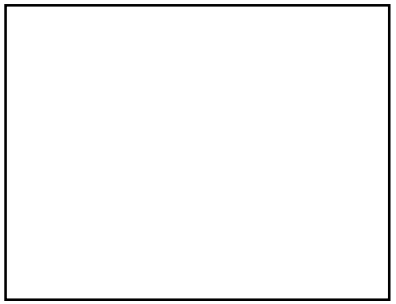


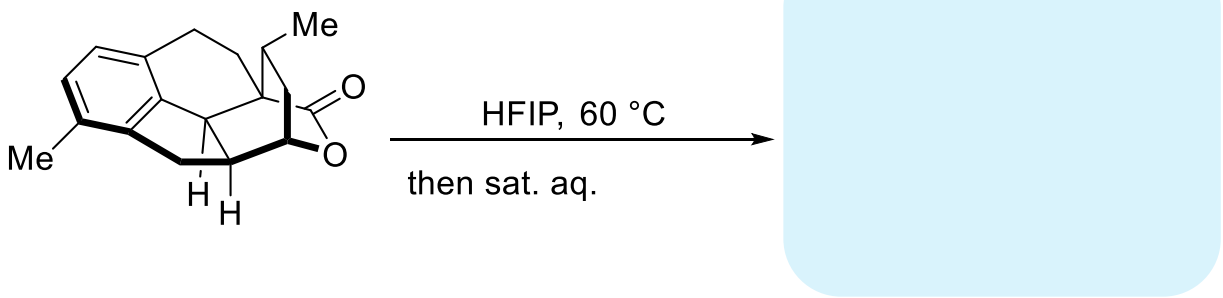
Silyl deprotection with fluoride



Ionic deoxygenation



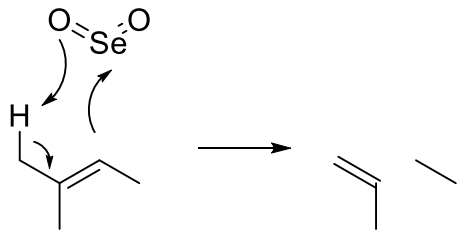



Me
O
Me
O
H
H
HFIP, 60 °C
then sat. aq.

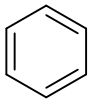
O

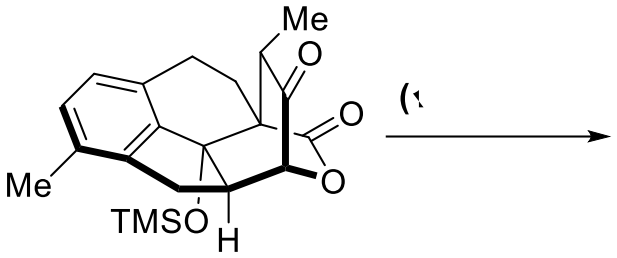
Oxime-directed arene acetylation

Allylic oxidation with selenium dioxide

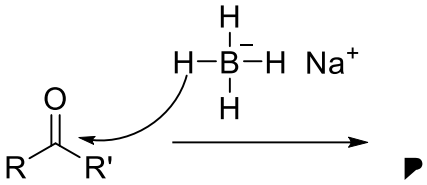


Dess-Martin Oxidation

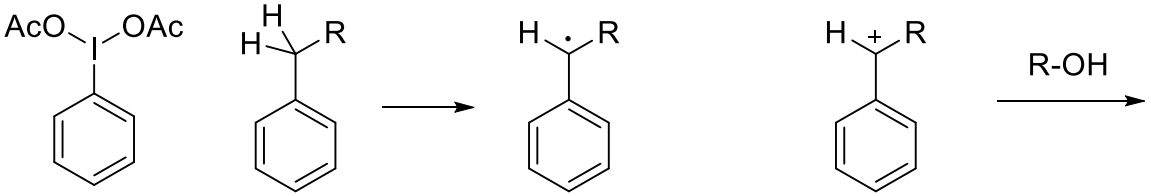




Ketone reduction with sodium borohydride



Intramolecular benzylic oxidation



Formation of xanthate ester

Barton-McCombie deoxygenation