Journal Years in Review: Organic Letters 2001, Volume 3

Ruben Eckermann
Gaich-Group Seminar
April 23rd, 2015

Statistics

OL 2001 facts:

- 4325 pages
- 2188 published articles
- 117 articles with title „Total Synthesis“

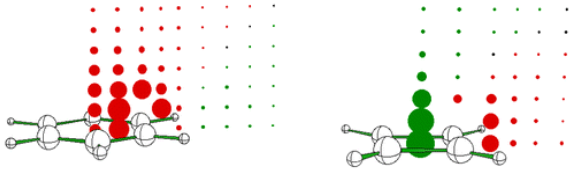
Most profilic authors:

- Daniel H. Rich (14)
- Amos B. Smith (14)
- Elias J. Corey (13)
- Luis Castedo (13)
- Raymond L. Funk (12)
- Paul J. Reider (12)

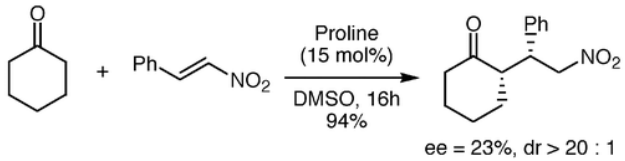
Statistics

Most cited papers (general):

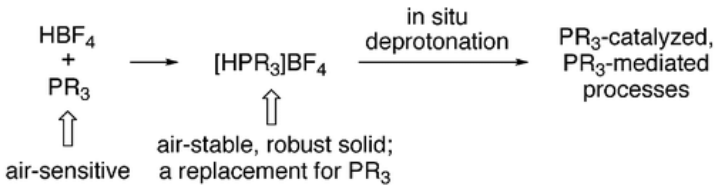
- Dissected Nucleus-Independent Chemical Shift Analysis of n-Aromaticity and Antiaromaticity (*Paul von Ragué Schleyer*); 2465 - 2468
  citings: **519**



- Efficient proline-catalyzed Michael additons of unmodified ketones to nitro olefins (*Benjamin List*); 2423 - 2425
  citings: **488**



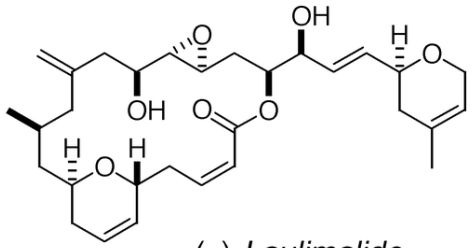
- Air-Stable Trialkylphosphonium Salts: Simple, Practical, and Versatile Replacement for Air-Sensitive Trialkylphosphines
  (*Gregory C. Fu*); 4295 - 4298
  citings: **482**



Statistics

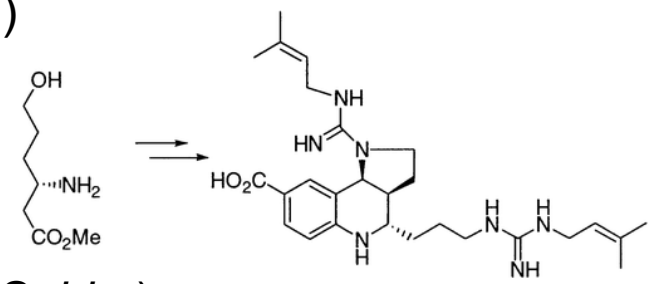
Most cited papers (total synthesis):

- Total Synthesis of the Mirotubule-Stabilizing Agent (-)-Laulimalide (*Ian Paterson*); 3149 - 3152
  citings: **90**

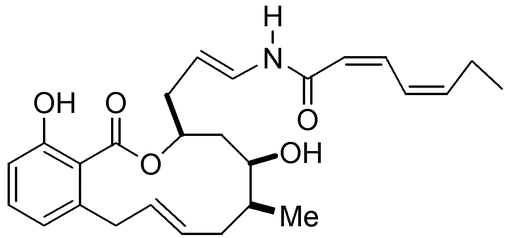


(–)-*Laulimalide*

- First Total Synthesis of Martinellic Acid (*Dawei Ma*) 2189 - 2191
  citings: **87**

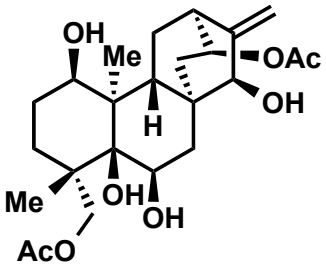


- Total Synthesis of (-)-Salicylihalamide A (*Barry B. Snider*) 1817 - 1820
  citings: **86**



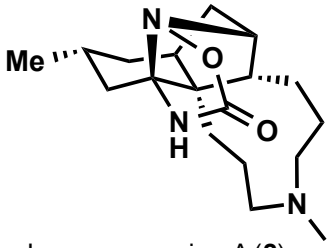
Salicylihalamide A

Isolations



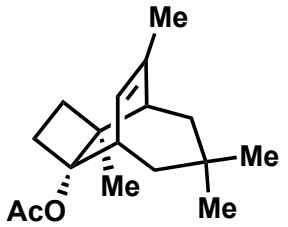
Artisane (**1**)

No. 26, 4243 - 4245



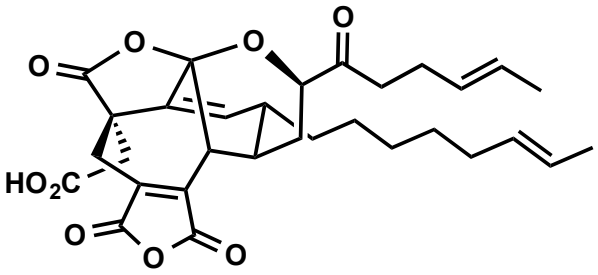
Lycoposerramine A (**2**)

No. 26, 4165 - 4167



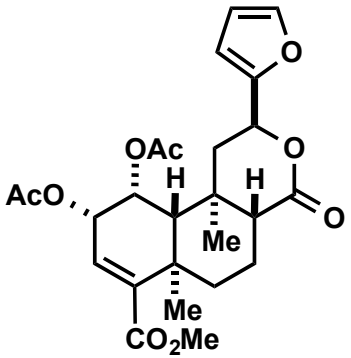
Passlerin A (**3**)

No. 10, 1415 - 1417



Phomoidride D (**4**)

No. 10, 1443 - 1445

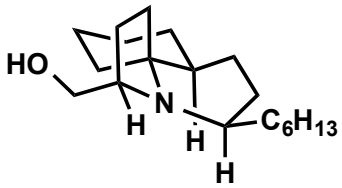


Salvionorin C (**5**)

No. 24, 3935 - 3937

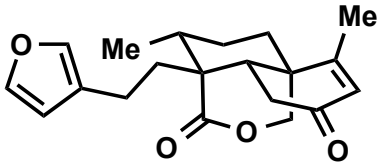
Total syntheses in detail

Total Synthesis



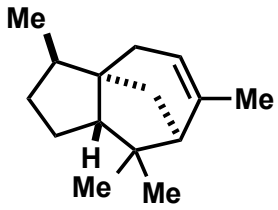
Lepardiformine (6)

Steven M. Weinreb, 3507 - 3510

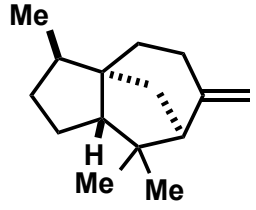


(±) - Sacacarin (7)

Robert B. Grossman, 4027 - 4030

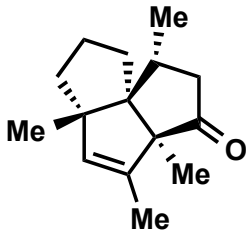


(±) - α-Cedrene (8)



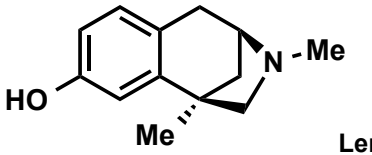
(±) - β-Cedrene (9)

William J. Kerr, 2945 - 2948

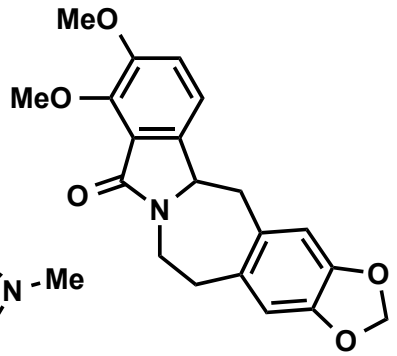


(+) - Aminocenone (10)

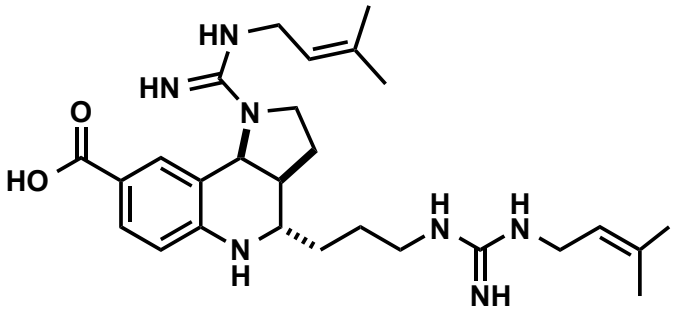
Kunio Ogasawara, 291 - 293



Aphanorphine (11)



Lennoxamine (12)



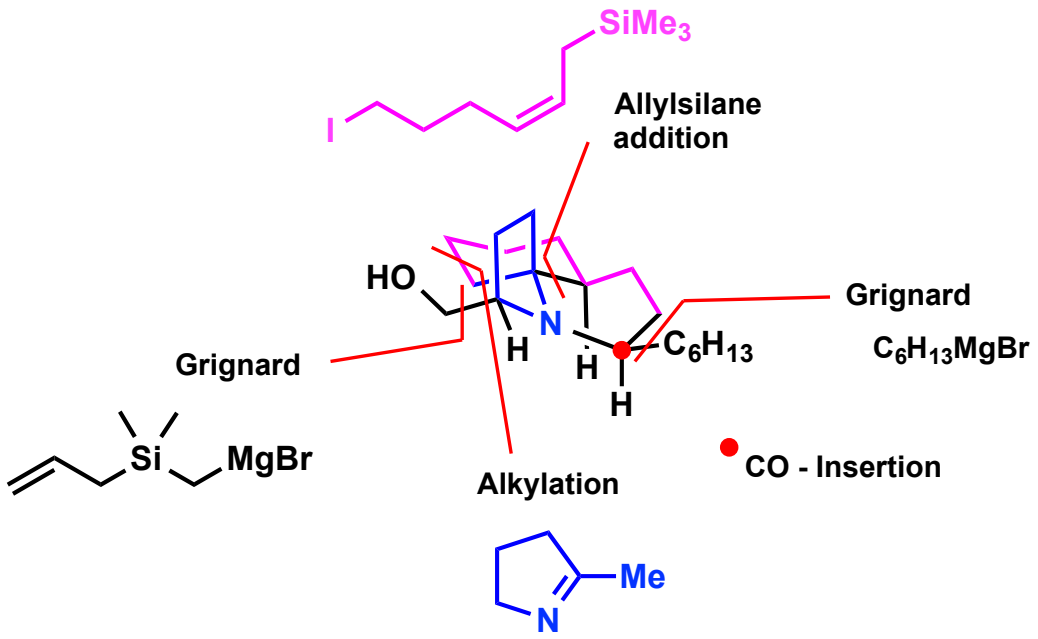
(±) - Martinellic Acid (13)

Barry B. Snider, 4217 - 4220

Raymond L. Funk, 3923 - 3925

Lepadiformine

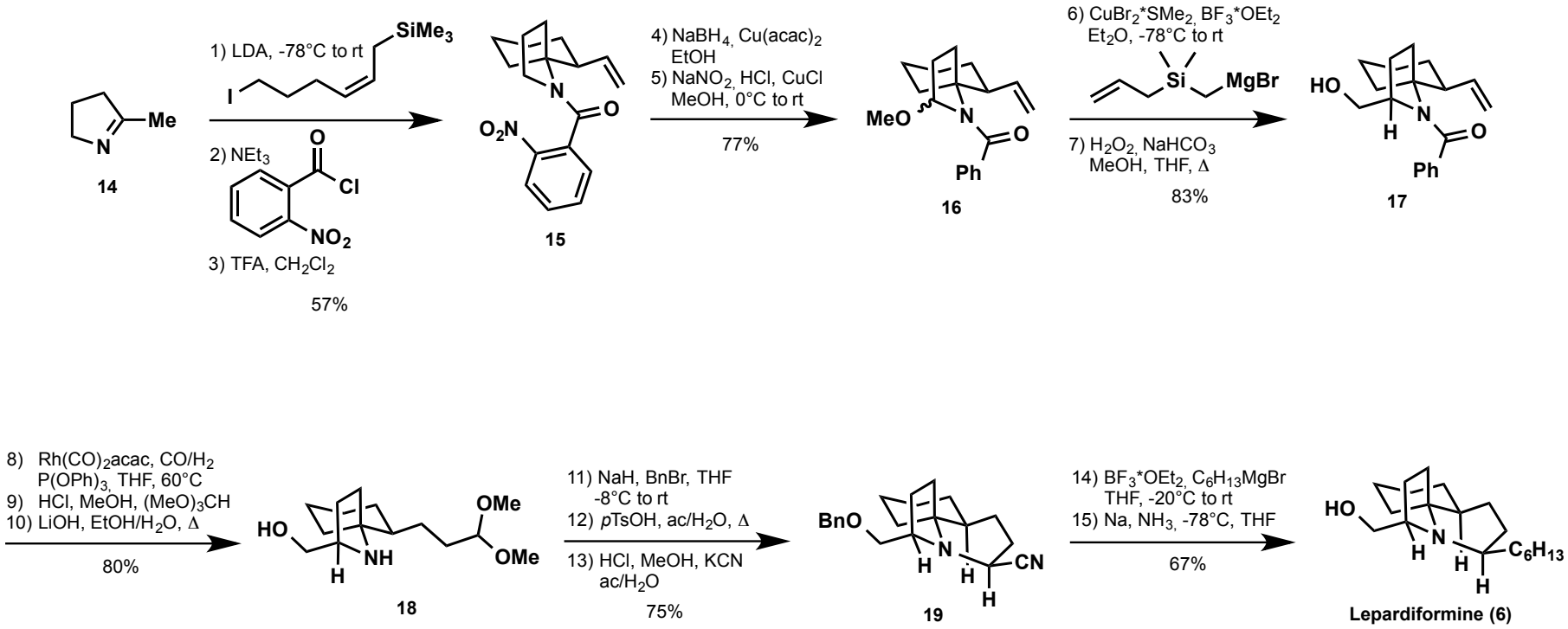
Pu Sun, Cuixiang Sun, Steven M. Weinreb, *No. 22*, 3507 - 3510



Key features:

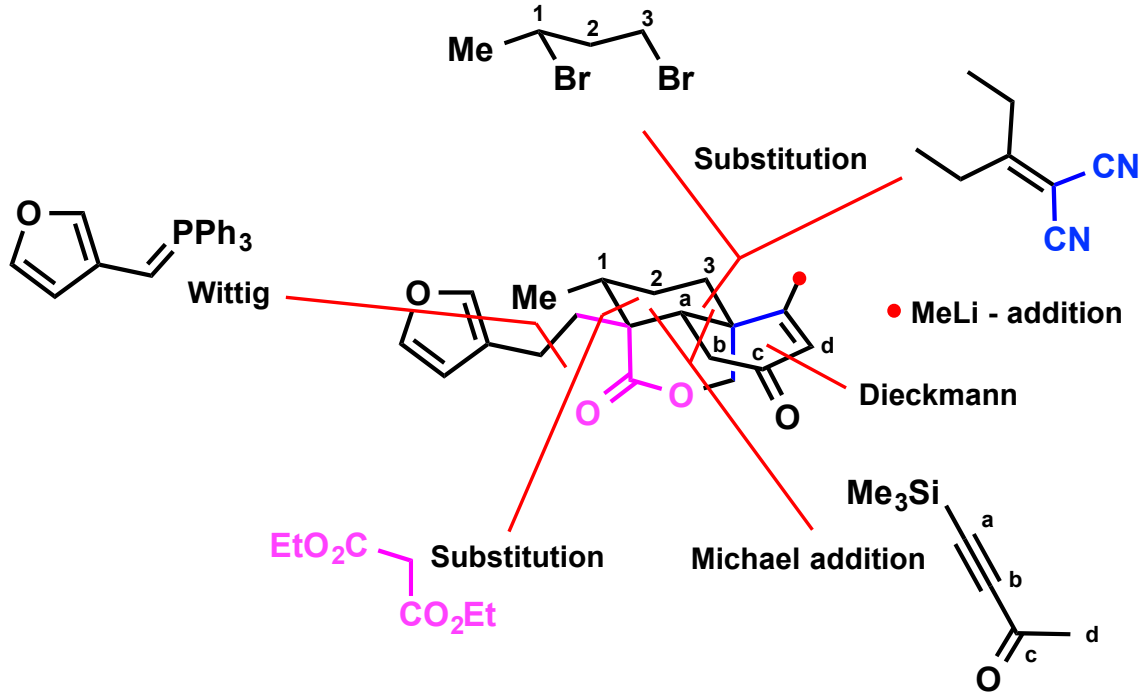
- Spirocyclization of allylsilane/*N*-acyliminium ion
- Radical-based α-oxidation of an amide
- *N*-acyliminium ion additions

Lepadiformine



(±) - Sacacarin

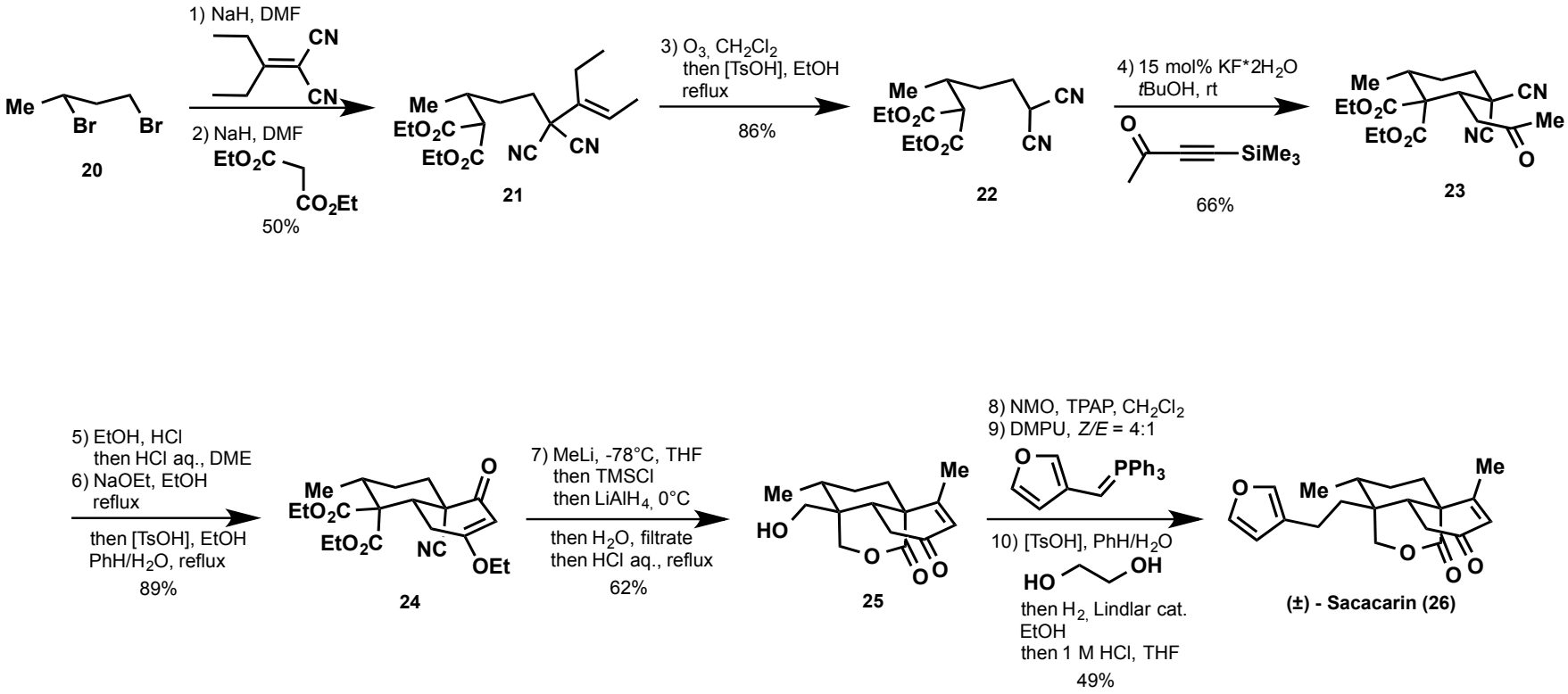
Ravindra M. Rasne, Robert B. Grossman, No. 25, 4027 - 4030



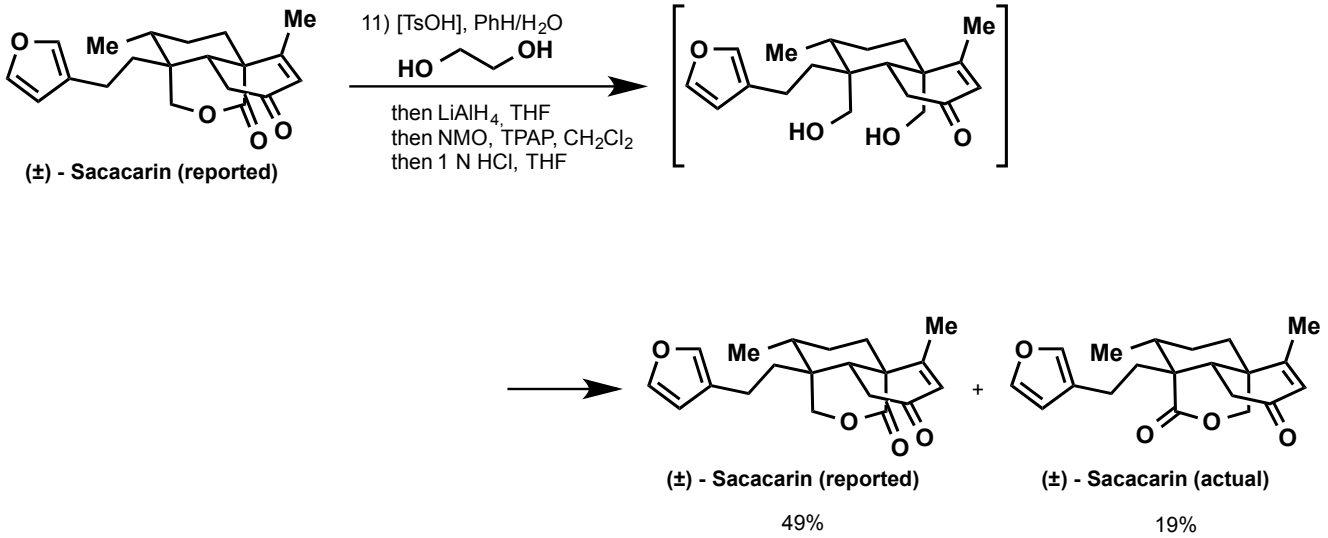
Key features:

- Selective mono – alkylation of malonates
- Double annulation strategy

(±) - Sacacarin

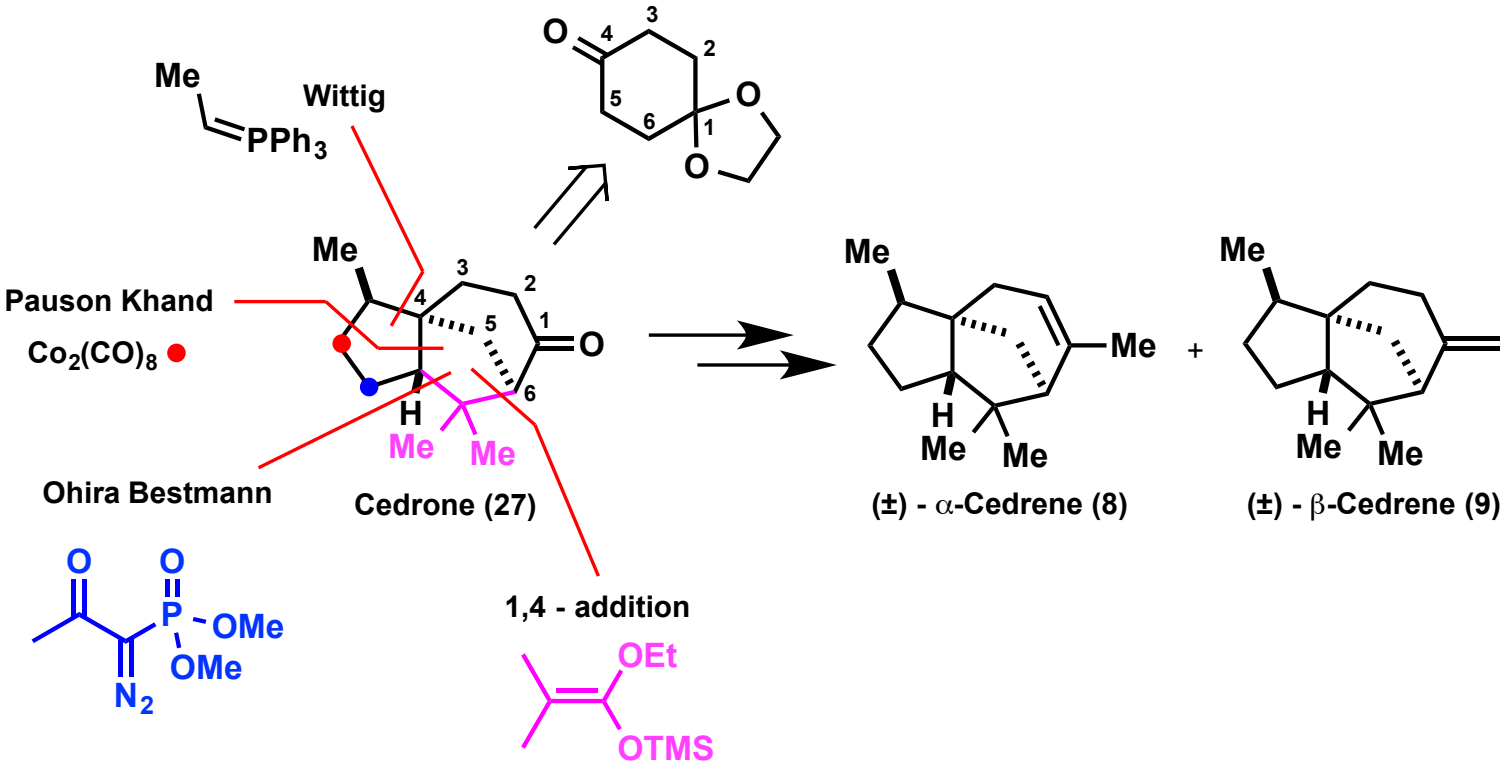

1) NaH, DMF
2) NaH, DMF
50%
3) O3, CH2Cl2
then [TsOH], EtOH
reflux
86%
4) 15 mol% KF*2H2O
tBuOH, rt
66%
5) EtOH, HCl
then HCl aq., DME
6) NaOEt, EtOH
reflux
then [TsOH], EtOH
PhH/H2O, reflux
89%
7) MeLi, -78°C, THF
then TMSCl
then LiAlH4, 0°C
then H2O, filtrate
then HCl aq., reflux
62%
8) NMO, TPAP, CH2Cl2
9) DMPU, Z/E = 4:1
10) [TsOH], PhH/H2O
then H2, Lindlar cat.
EtOH
then 1 M HCl, THF
49%
20
21
22
23
24
25
(±) - Sacacarin (26)

(±) - Sacacarin


Me
Me
O
O
O
O
(±) - Sacacarin (reported)
11) [TsOH], PhH/H2O
HO
OH
then LiAlH4, THF
then NMO, TPAP, CH2Cl2
then 1 N HCl, THF
Me
Me
O
HO
HO
O
Me
Me
O
O
O
O
(±) - Sacacarin (reported)
49%
+
Me
Me
O
O
O
O
(±) - Sacacarin (actual)
19%

Cedrone

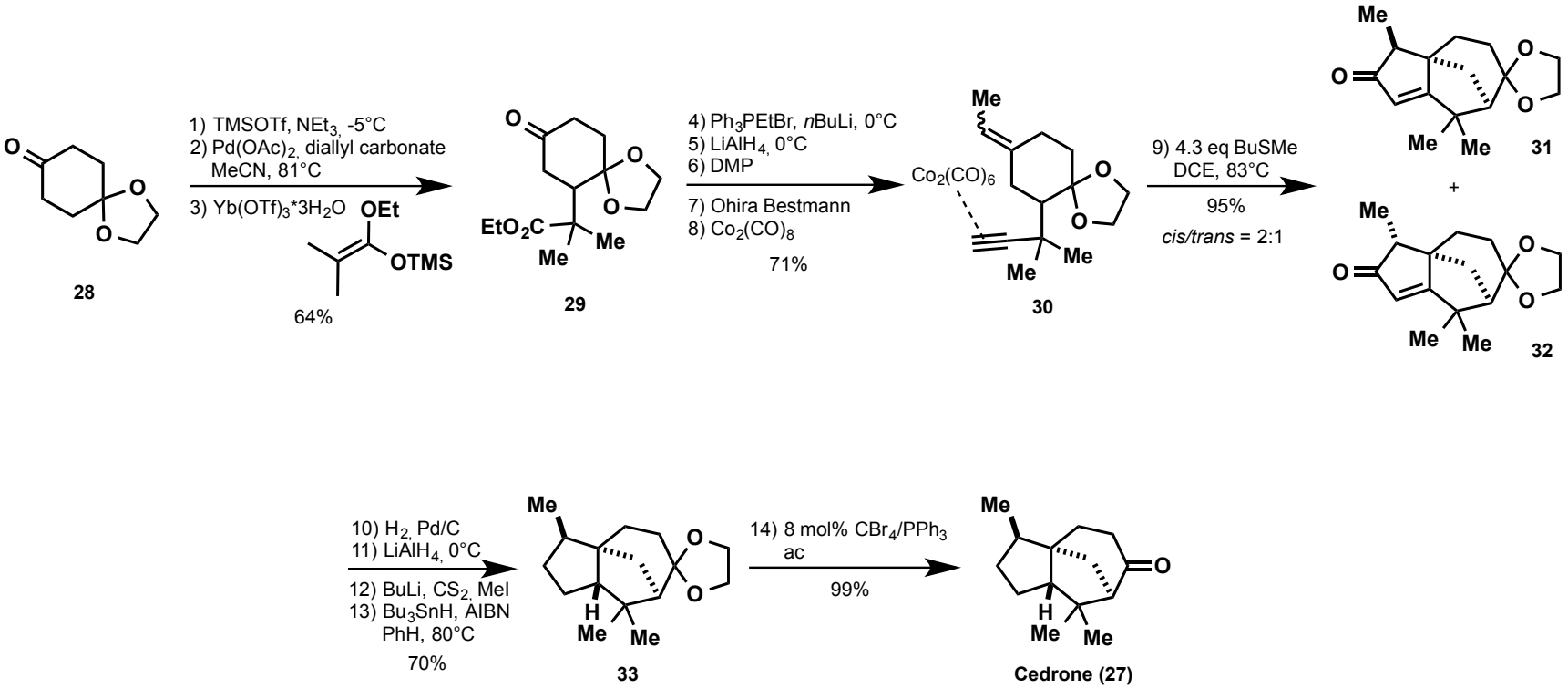
Peter L. Pauson, Angus J. Morrison, Mark McLaughlin, William J. Kerr, *No. 19*, 2945 - 2948



Key features:

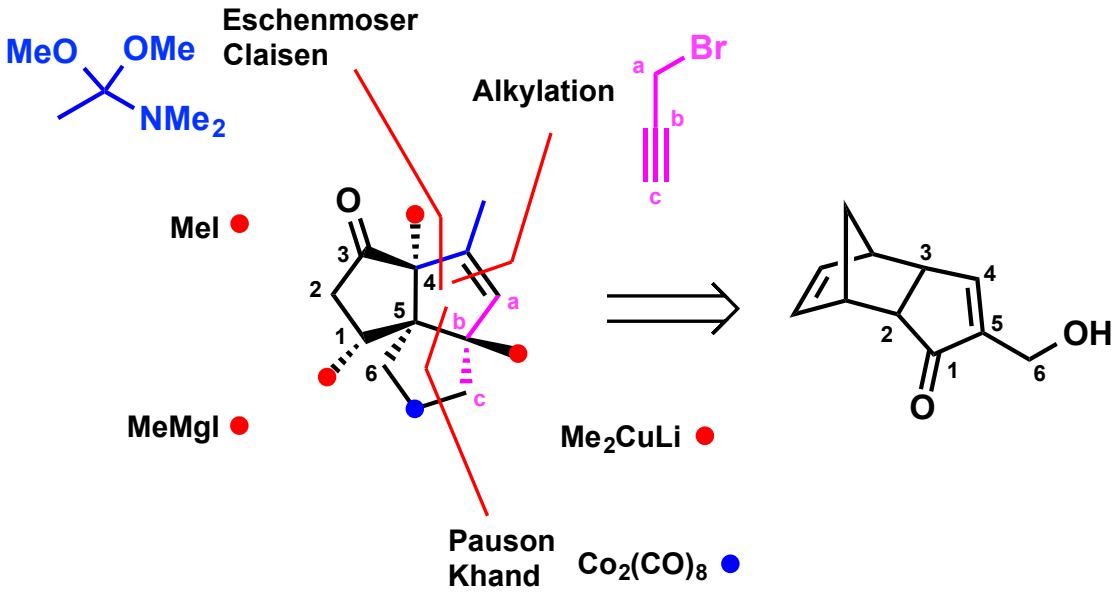
- Pauson Khand reaction

Cedrone


1) TMSOTf, NEt3, -5°C
2) Pd(OAc)2, diallyl carbonate
MeCN, 81°C
3) Yb(OTf)3*3H2O
OEt
OTMS
64%
28
29
4) Ph3PEtBr, nBuLi, 0°C
5) LiAlH4, 0°C
6) DMP
7) Ohira Bestmann
8) Co2(CO)8
71%
Co2(CO)6
30
9) 4.3 eq BuSMe
DCE, 83°C
95%
cis/trans = 2:1
31
32
10) H2, Pd/C
11) LiAlH4, 0°C
12) BuLi, CS2, MeI
13) Bu3SnH, AIBN
PhH, 80°C
70%
33
14) 8 mol% CBr4/PPh3
ac
99%
Cedrone (27)

(+) - Arnicenone

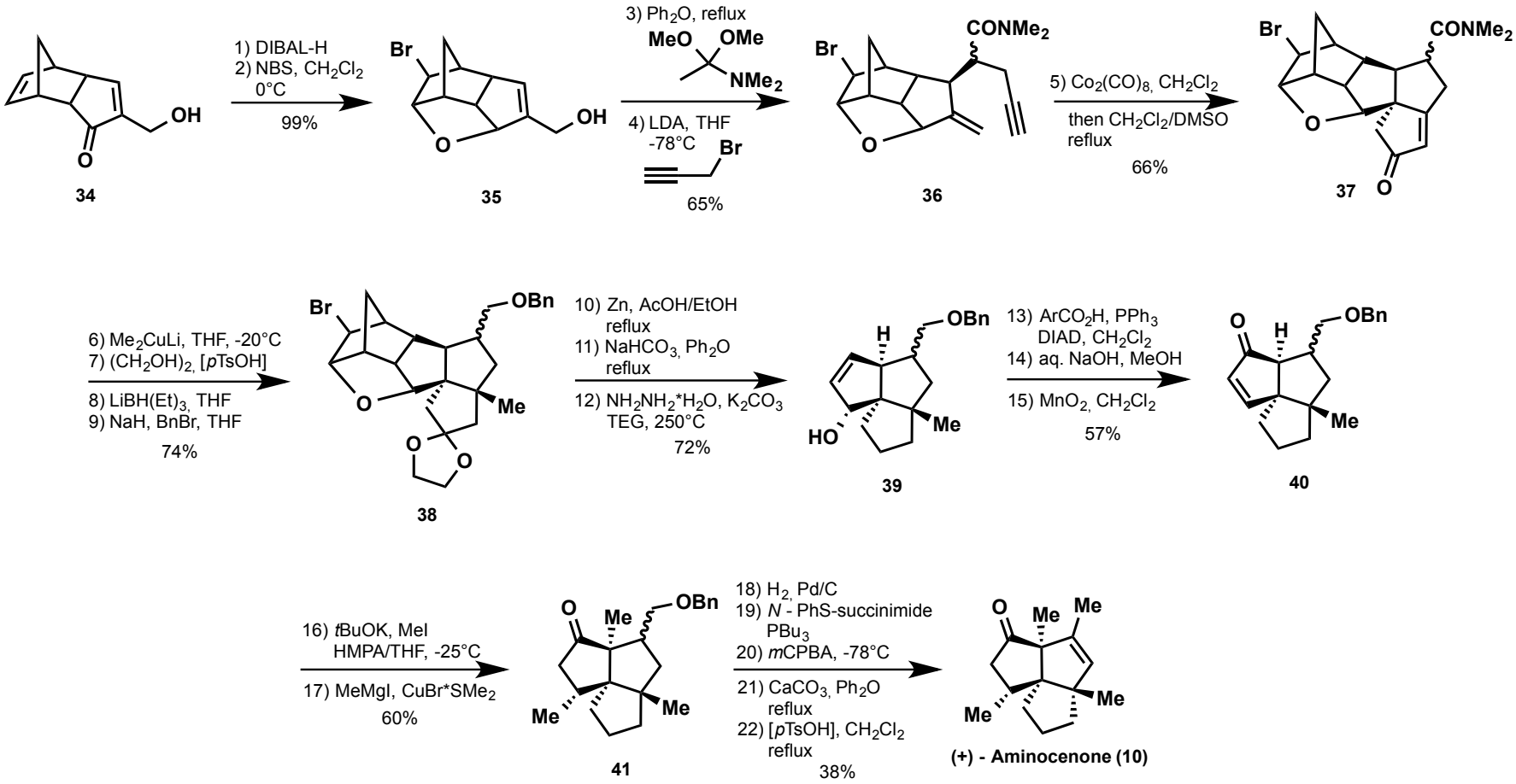
Yosuke Iura, Tsutomu Sugahara, Kunio Ogasawara, *No. 2*, 291 - 293



Key features:

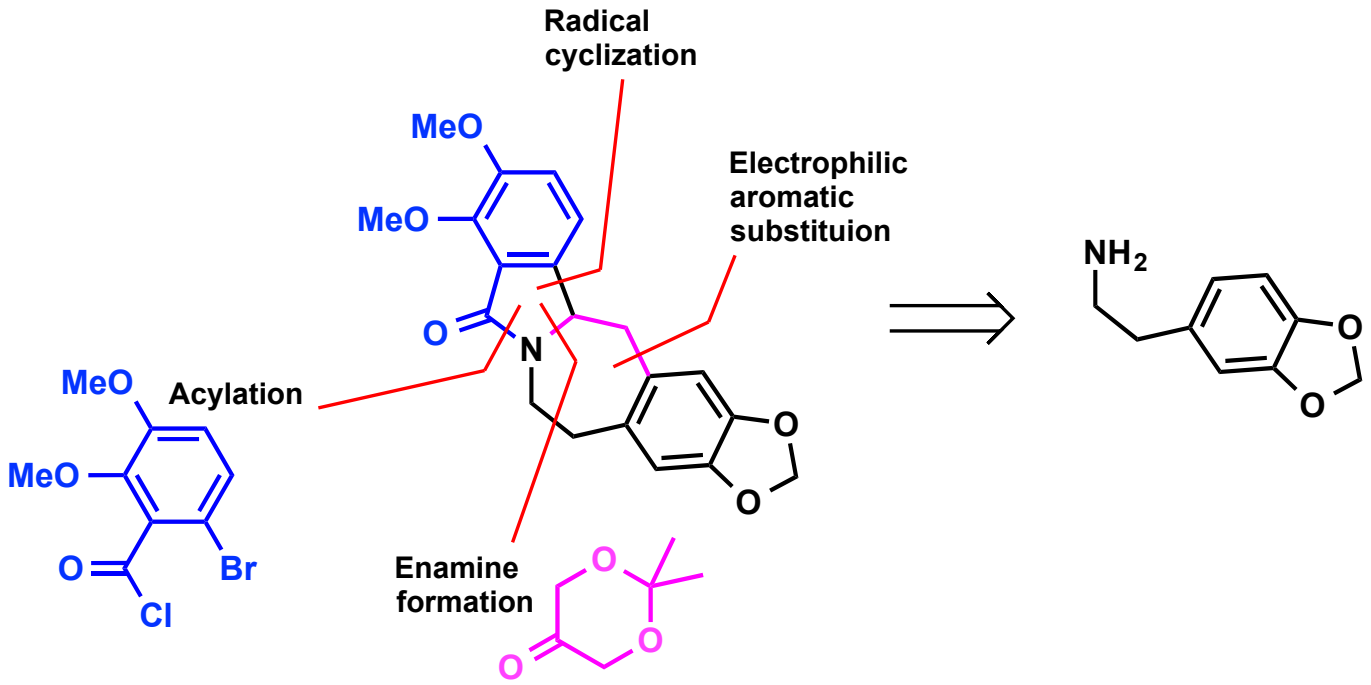
- Pauson Khand reaction
- Eschenmoser Claisen rearrangement
- Chirality transfer via DA / retro-DA

(+) - Arnicenone


1) DIBAL-H
2) NBS, CH_2Cl_2
0°C
99%
3) Ph_2O, reflux
4) LDA, THF
-78°C
65%
5) $Co_2(CO)_8$, CH_2Cl_2
then CH_2Cl_2/DMSO
reflux
66%
6) Me_2CuLi, THF, -20°C
7) $(CH_2OH)_2$, [*p*TsOH]
8) $LiBH(Et)_3$, THF
9) NaH, BnBr, THF
74%
10) Zn, AcOH/EtOH
reflux
11) $NaHCO_3$, Ph_2O
reflux
12) $NH_2NH_2{*}H_2O$, K_2CO_3
TEG, 250°C
72%
13) $ArCO_2H$, PPh_3
DIAD, CH_2Cl_2
14) aq. NaOH, MeOH
15) MnO_2, CH_2Cl_2
57%
16) *t*BuOK, MeI
HMPA/THF, -25°C
17) MeMgI, $CuBr{*}SMe_2$
60%
18) H_2, Pd/C
19) *N* - PhS-succinimide
PBu_3
20) *m*CPBA, -78°C
21) $CaCO_3$, Ph_2O
reflux
22) [*p*TsOH], CH_2Cl_2
reflux
38%
34
35
36
37
38
39
40
41
(+) - Aminocenone (10)

(±) - Lennoxamine

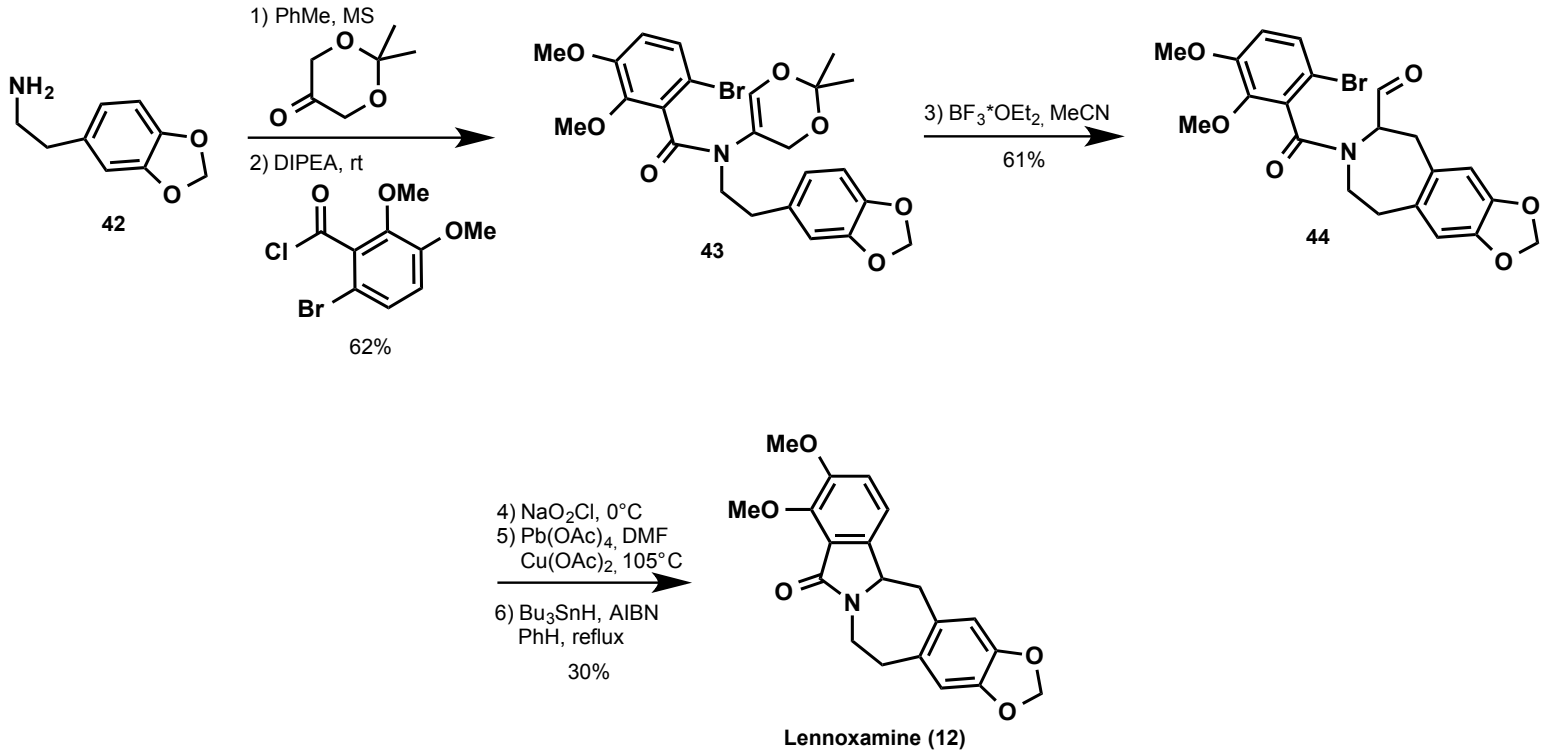
James R. Fuchs, Raymond L. Funk, No. 24, 3923 - 3925



Key features:

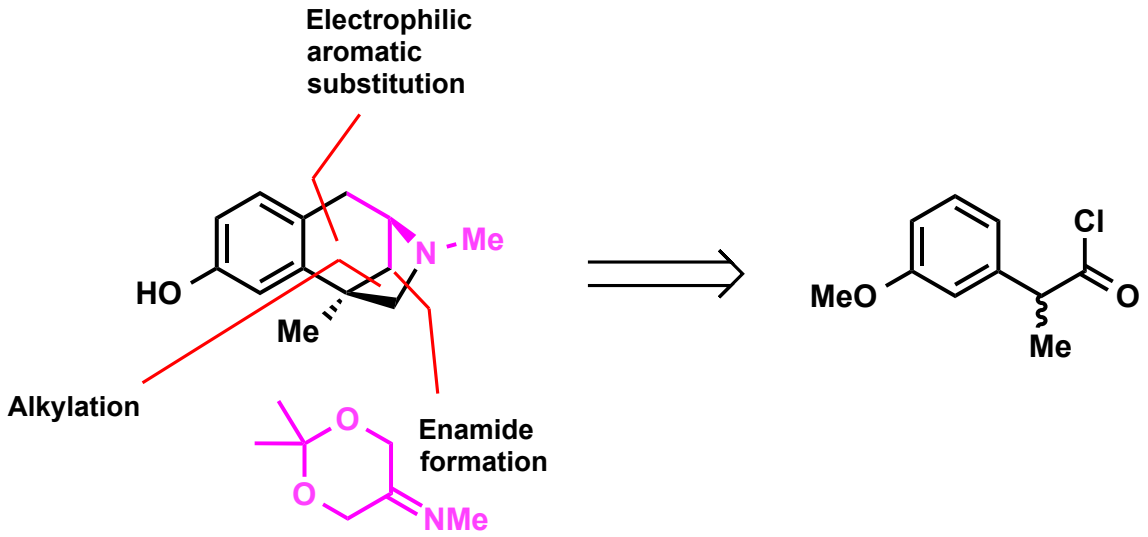
- Masked acrolein-unit
- Electrophilic aromatic substitution

(±) - Lennoxamine



(±) - Aphanorphine

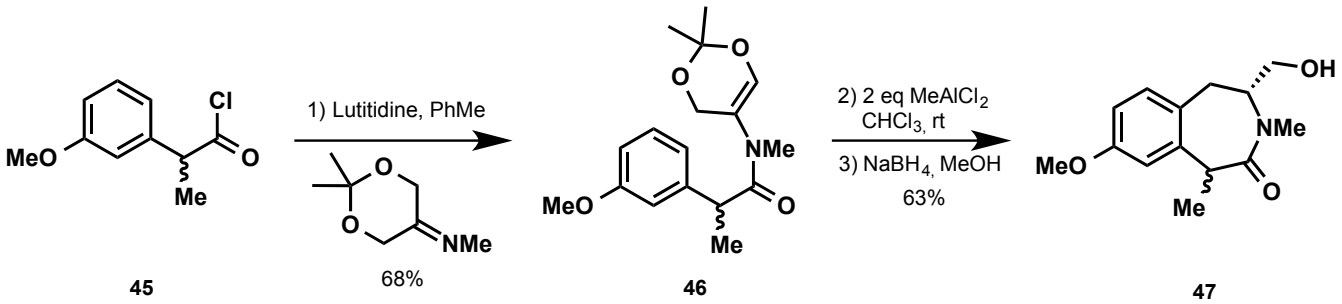
James R. Fuchs, Raymond L. Funk, No. 24, 3923 - 3925

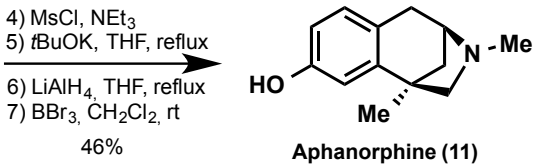


Key features:

- Masked acrolein-unit
- Electrophilic aromatic substitution

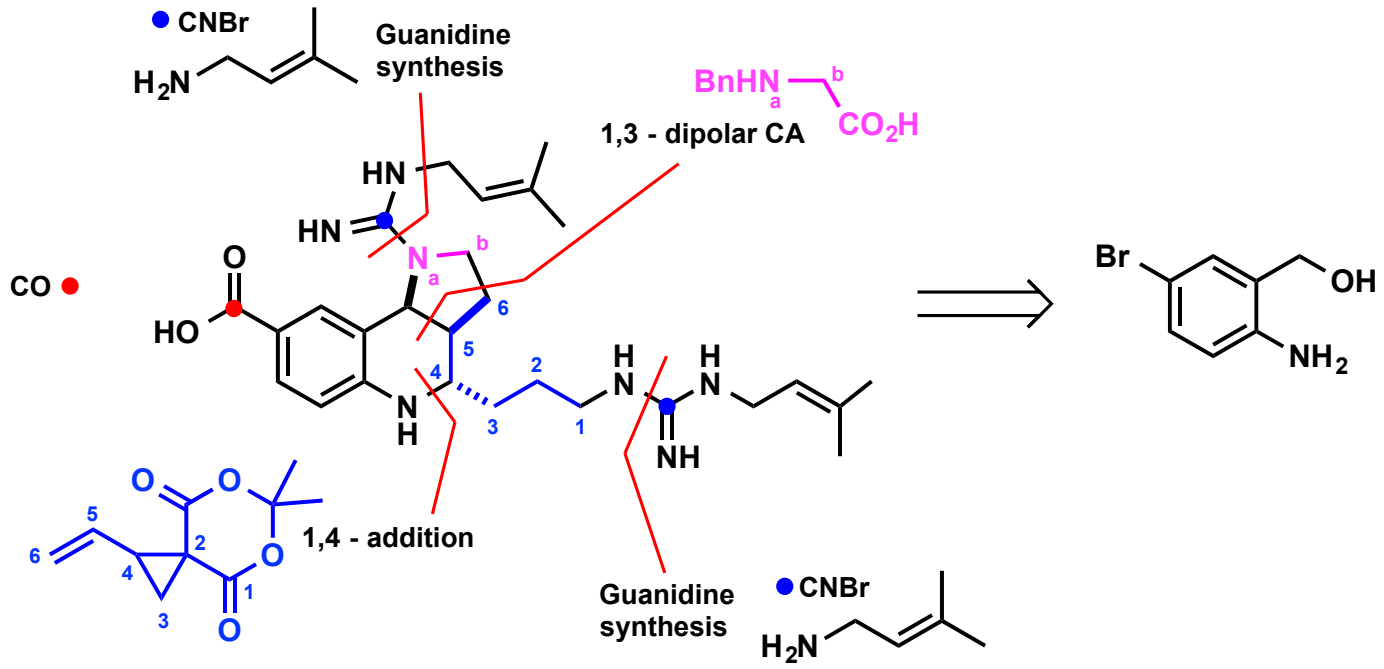
(±) - Aphanorphine





(±) – Martinellic Acid

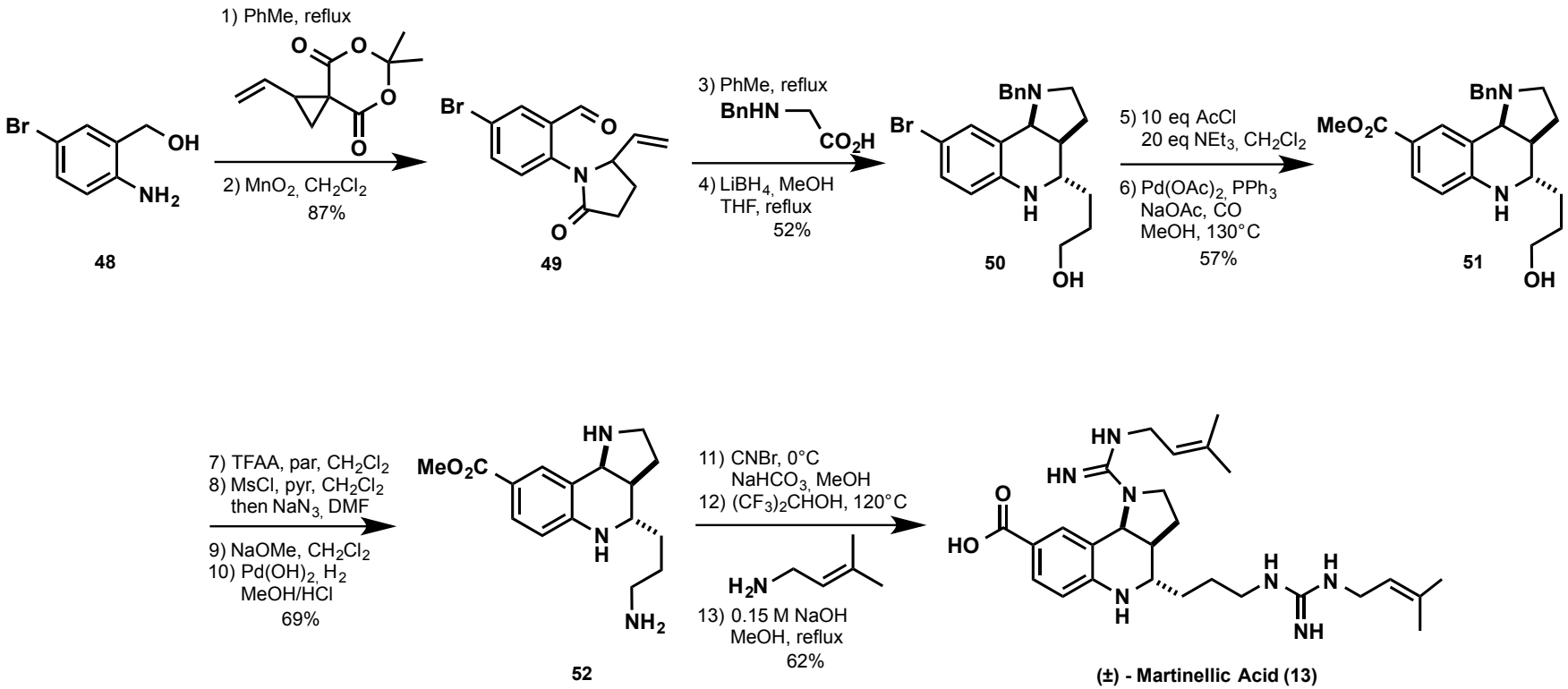
Sean M. O'Hare, Yong Ahn, Barry B. Snider, *No. 26*, 4217 - 4220



Key features:

- Vinyl – pyrrolidinone synthesis
- Azomethine ylide 1,3 – dipolar CA
- Guanidine synthesis

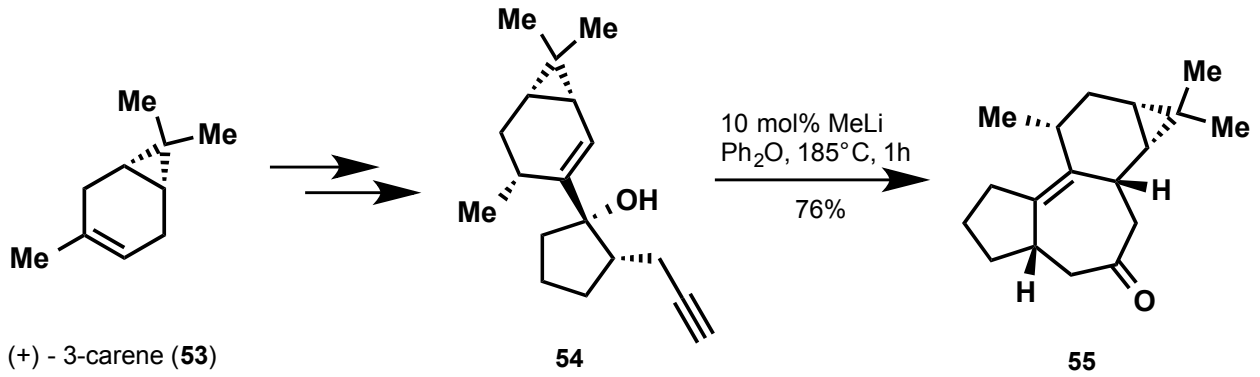
(±) – Martinellic Acid



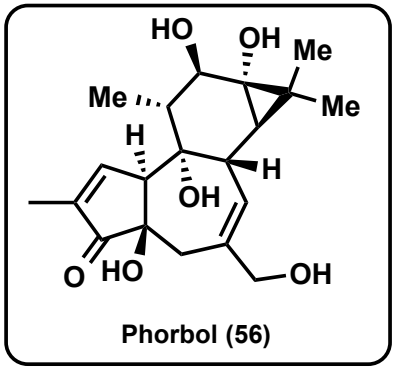
Core structures
&
Key steps

5-7-6-3 Tigliane ring system

Meghan A. Flynn, Sarah E. Reisman, Timo V. Ovaska, *No. 1*, 115 - 117

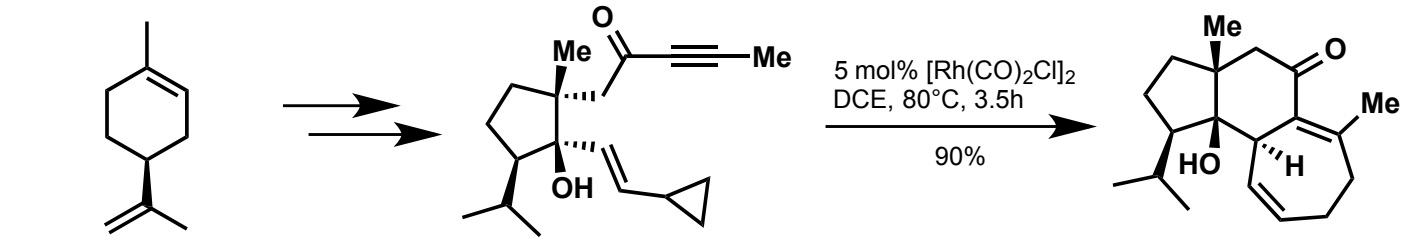


tandem 5-exo-dig cyclization / Claisen rearrangement



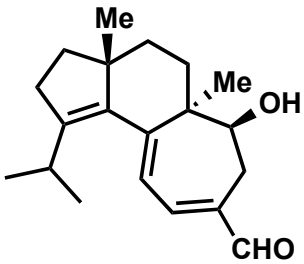
Cyathane Diterpenes

Francis Gosselin, Michael A. Brodney, F. Christopher Bi, Paul A. Wender, *No. 13*, 2105 - 2108



(*S*) - (-) - Limonene (**57**) **58** **59**

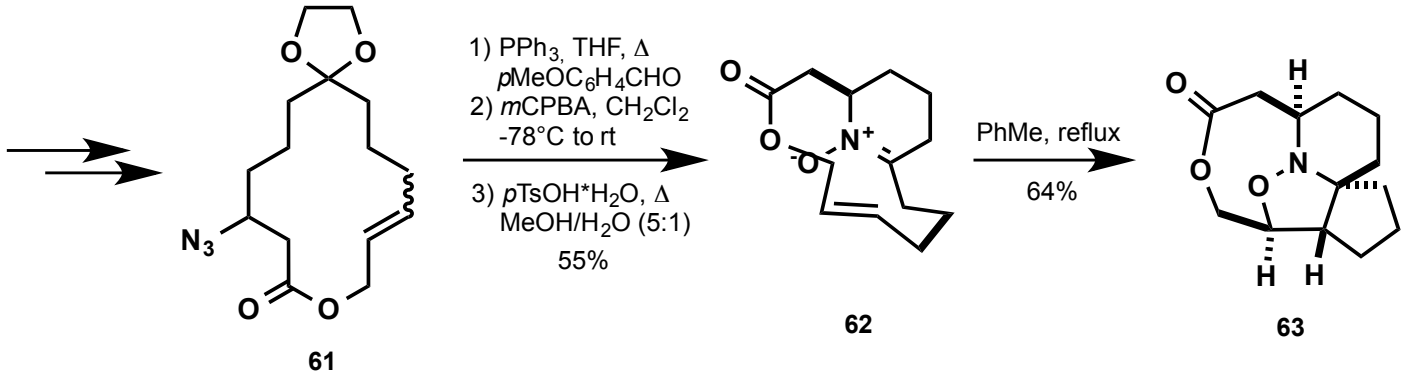
Intramolecular [5+2] - cycloaddition



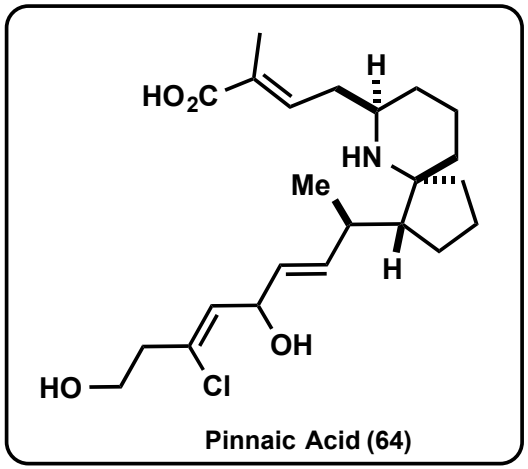
(+) - Allocyathin B_2 (60)

Pinnaic acid core

Alexandre F. T. Yokochi, Eric A. Korf, Paul R. Blakemore, James D. White, *No. 3*, 413 - 415

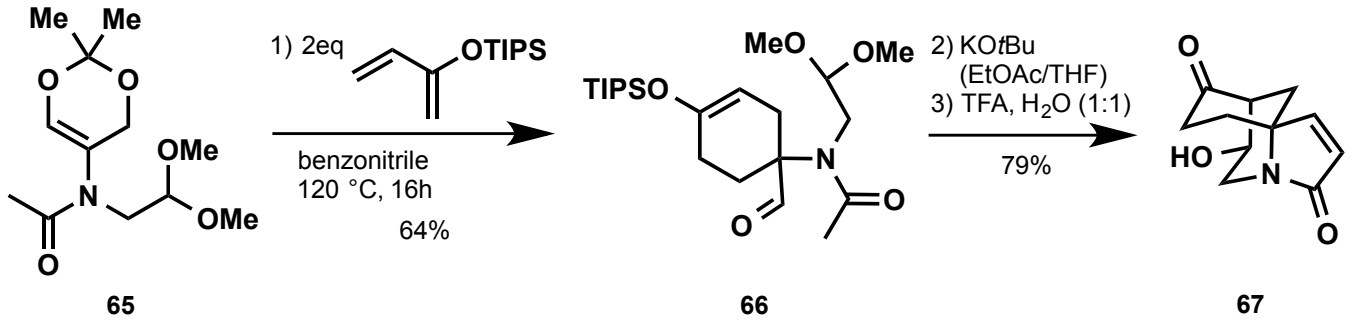


Nitrone formation
Dipolar [3+2] cycloaddition

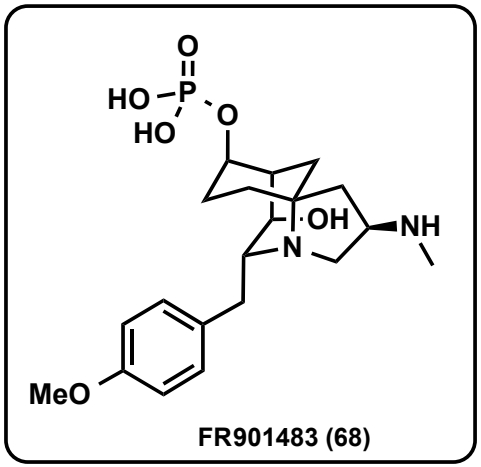


FR901483 core

Jun-Ho Maeng, Raymond L. Funk, *No. 8*, 1125 - 1128



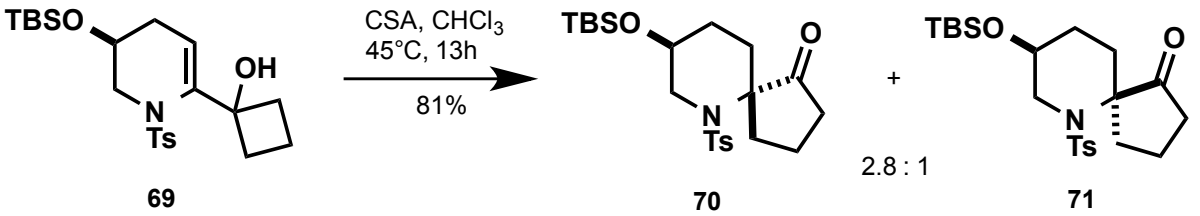
Acrolein synthone for Diels Alder
Two sequential Aldol caclizations



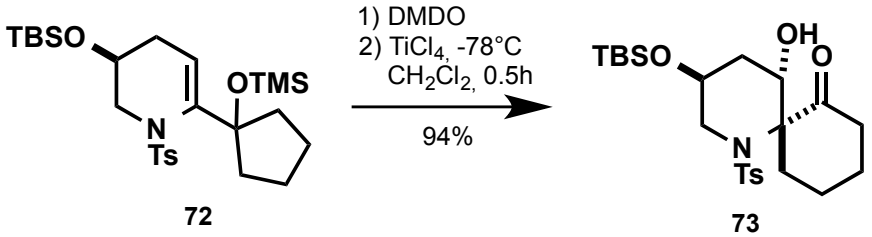
Methodologies

Semipinacol rearrangements

Michael D. B. Fenster, Brian O. Patrick, Gregory R. Dake, *No. 13*, 2109 - 2112



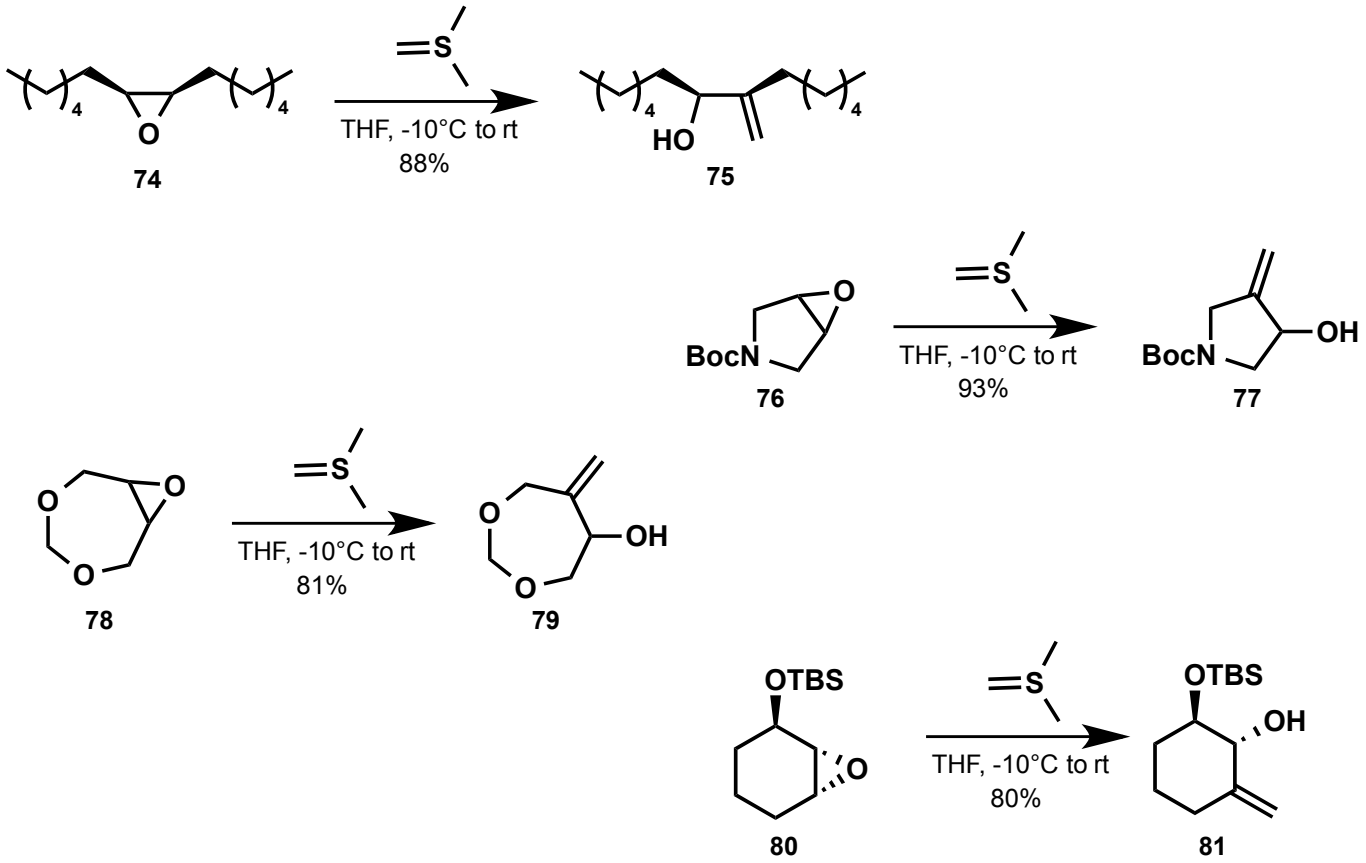
69 70 71



72 73

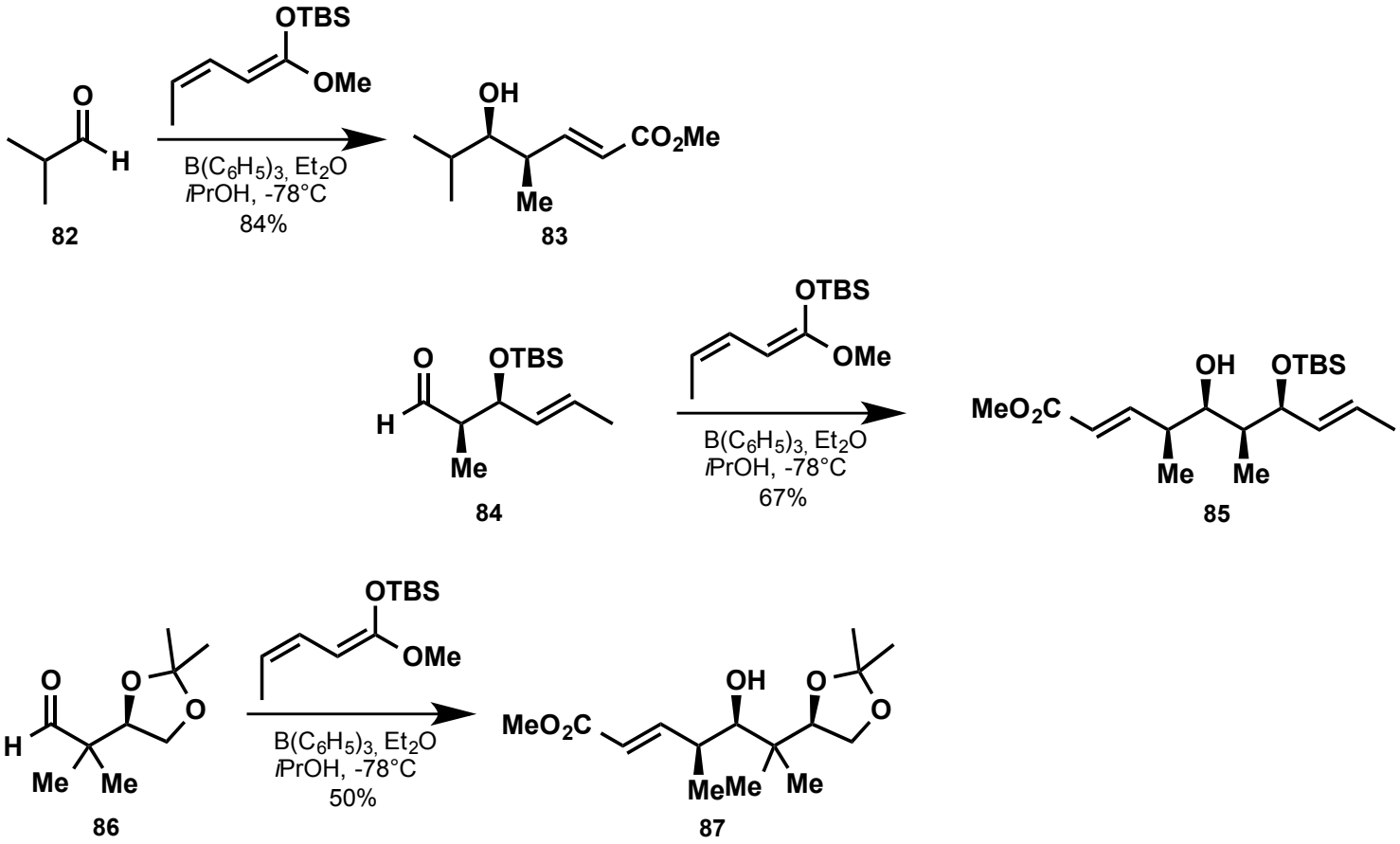
Homologated Allylic alcohols

Elizabeth Kinchin, Andrew Cridland, Lilian Alcaraz, *No. 25*, 4051 - 4053



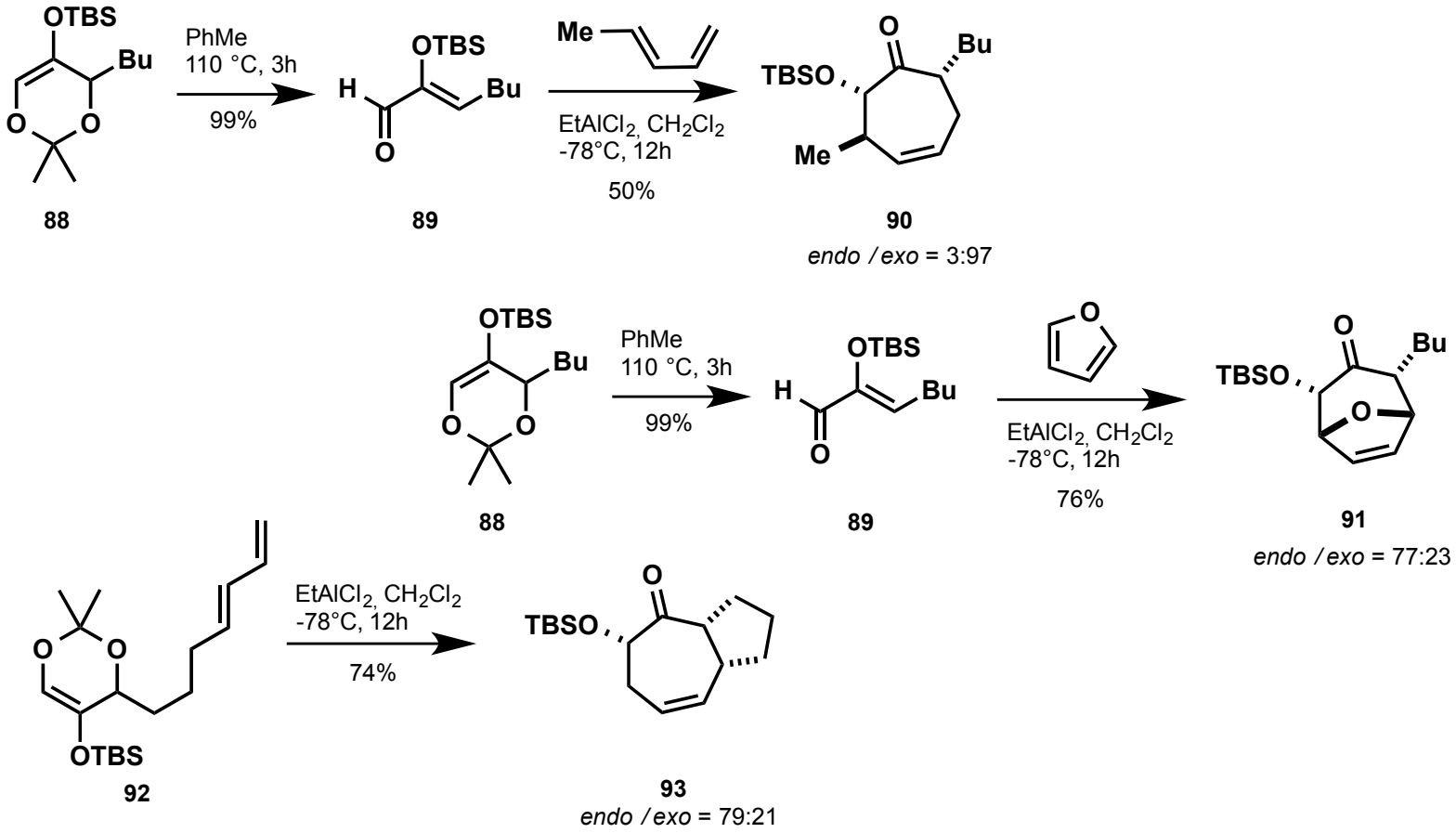
Vinylogous Mukaiyama Aldol

Jorma Hassfeld, Mathias Christmann, Markus Kalesse, *No. 22*, 3561 - 3564



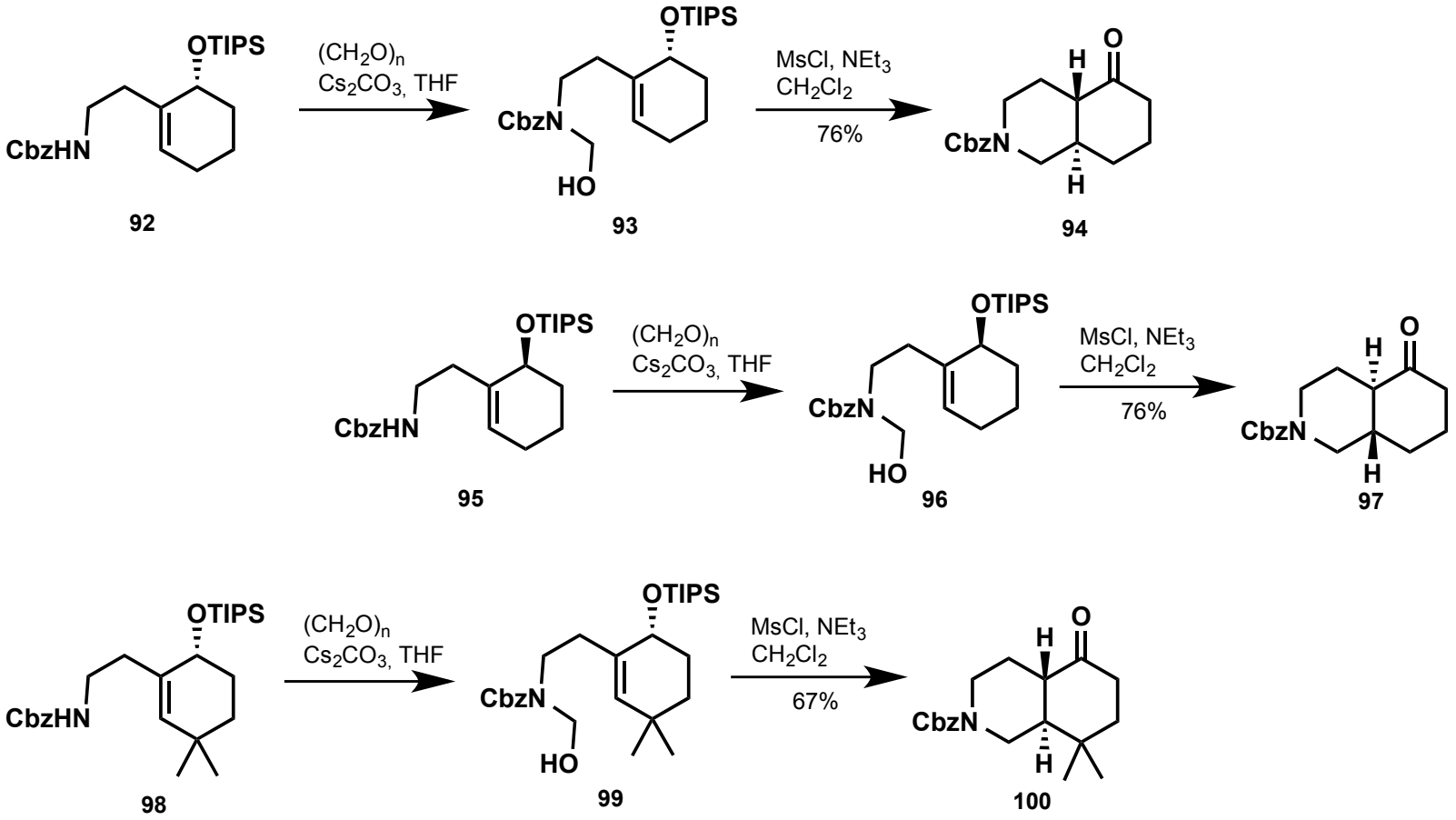
LA – catalyzed [4 + 3] - cyclizations

Ronald A. Aungst, Raymond L. Funk, *No. 22*, 3553 - 3555



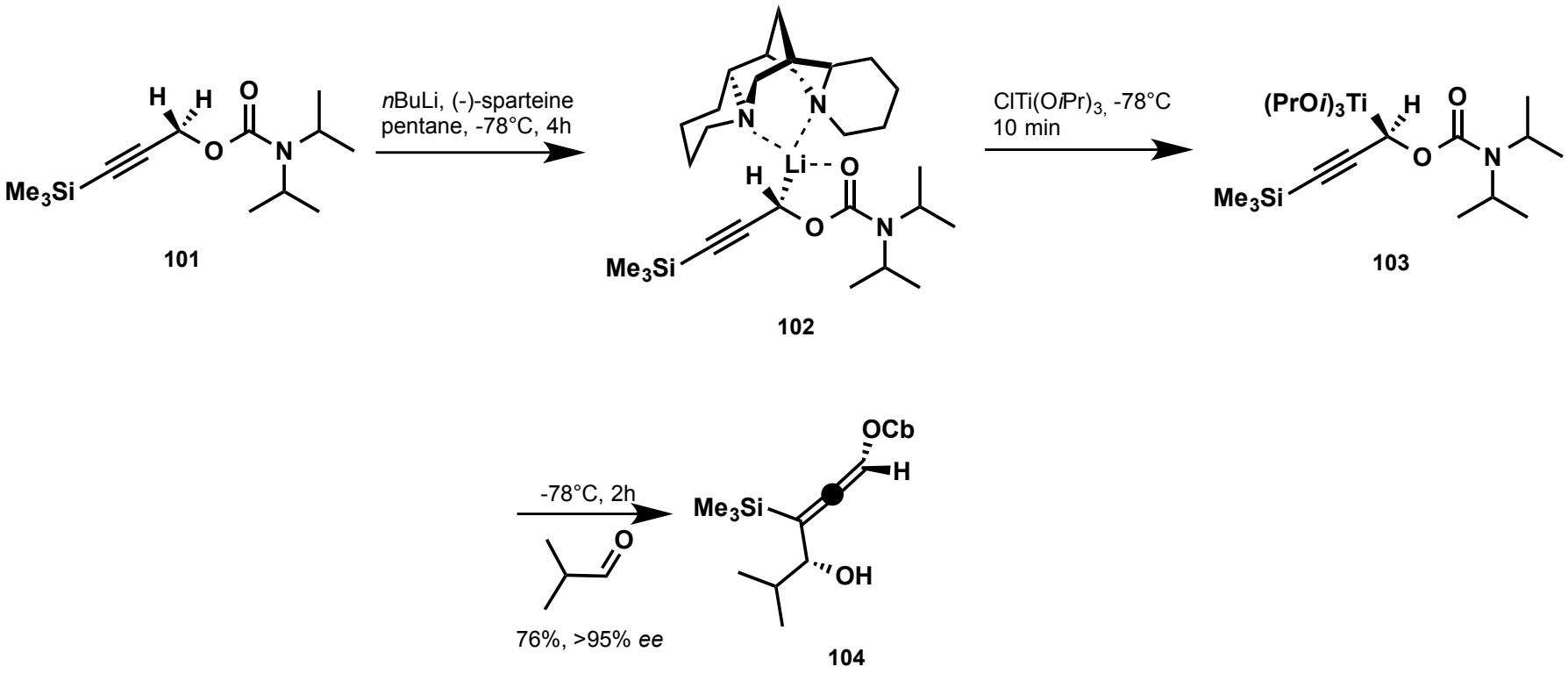
trans - Hydroisoquinolones

Asayuki Kamatani, Larry E. Overman, *No. 8*, 1229 - 1232



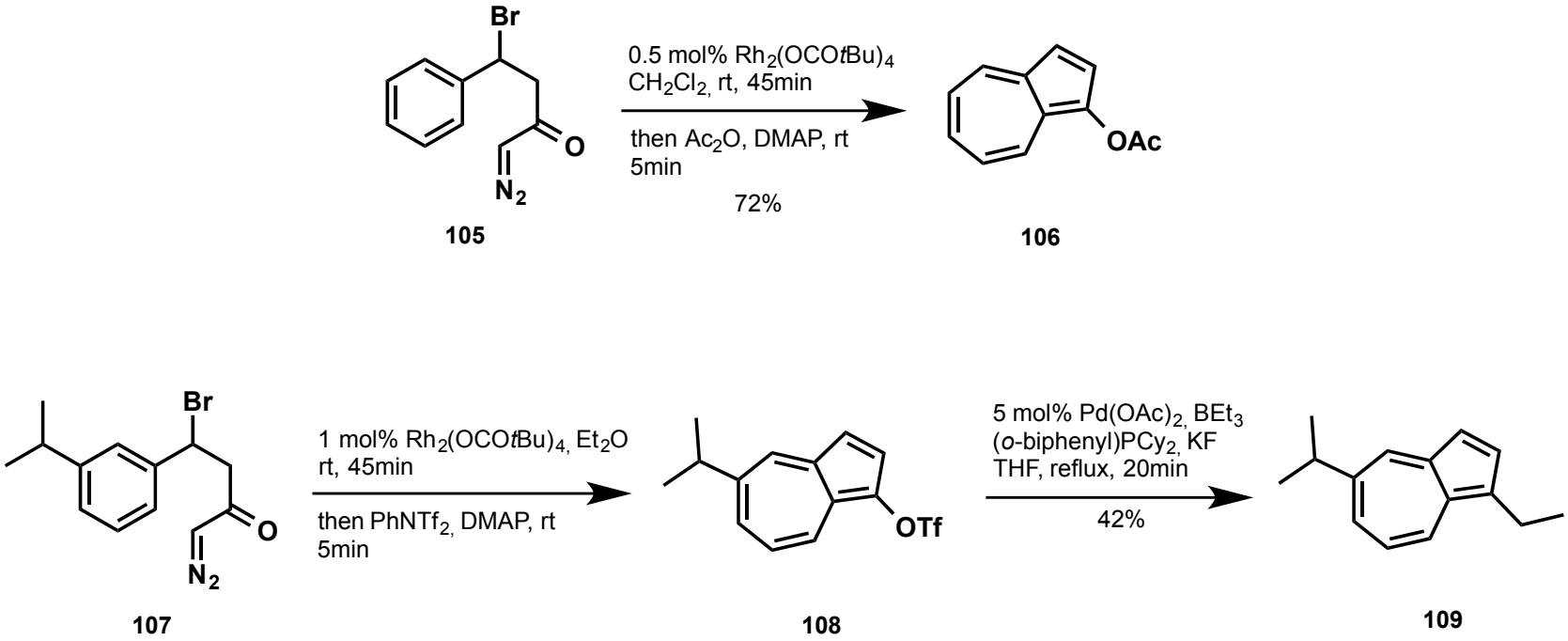
Allenes by (-) – Sparteine mediated lithiation

Carsten Schulz-Fademrecht, Birgit Wibbeling, Roland Fröhlich, Dieter Hoppe, *No. 8*, 1221 - 1224



Substituted Azulenes

John L. Kane, Kevin M. Shea, Aimee L. Crombie, Rick L. Danheiser, *No. 7*, 1081 - 1084



Questions & Answers