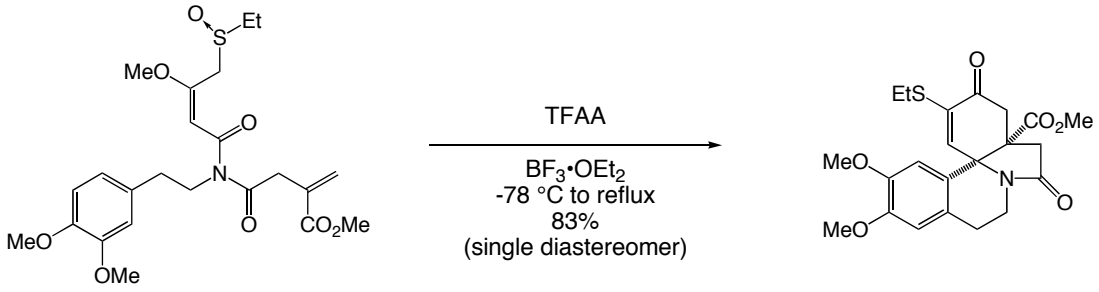
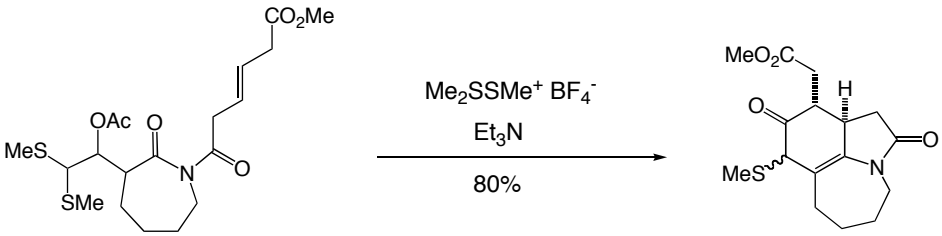
Provide a mechanism for the following transformations:

1)



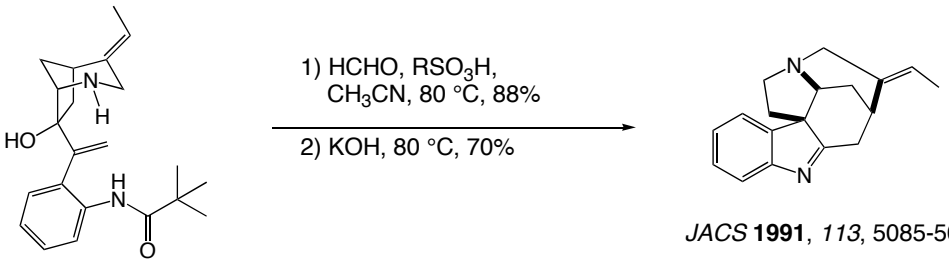
JOC **1998**, *63*, 1144-1155.

2)



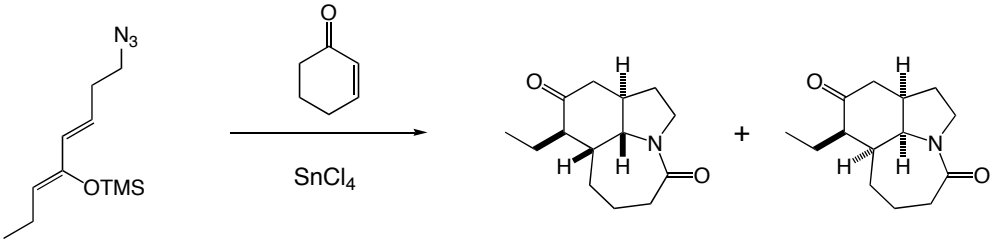
Org. Lett. **2002**, *4*, 1515-1126.
JOC **2005**, *70*, 5197-5206.

3)



JACS **1991**, *113*, 5085-5086.

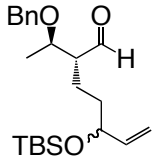
4)



70% (dr 3:1)

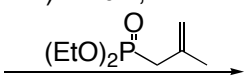
JACS **2005**, *127*, 15712-15713.

5) Provide the structures **H** to **J** and rationalize <u>all</u> diastereoselectivities (*Org. Lett.* **2004**, *6*, 1123-1126).



$C_{22}H_{36}O_3Si$

1) *n*-BuLi, THF



2) H_2SiF_6, MeCN, 0°C, 4 h
3) PCC, CH_2Cl_2
65%, 3 steps
d.r. = 5:1*

H
$C_{20}H_{26}O_2$

1) d.r. = 94:6
2) NaOMe then

NaH, DMSO,
Ph_3PCH_3I
70%, 2 steps,
3) Na, NH_3, THF
91%

I
$C_{14}H_{22}O_2$

1) Dess-Martin Periodinane, CH_2Cl_2, 85%

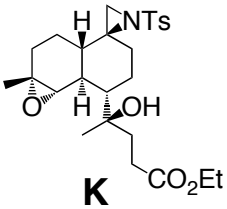
2) PhI=NTs
$Cu(OTf)_2$ (cat)
CH_3CN, 8 h, rt
72% (5:1)

*minor component of the dr is actually the combined yield of three undesired stereoisomers

J
$C_{21}H_{27}NO_4S$

1) ethyl propiolate
n-BuLi, THF,
-78 °C to 0 °C, 1.5 h

89%, d.r. = 98:2
2) H_2, Pd/C, EtOAc
98%



K
$C_{26}H_{37}NO_6S$

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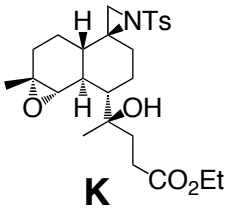
6) Provide the structures **L** to **O** (*Org. Lett.* **2004**, *6*, 1123-1126).



K
$C_{26}H_{37}NO_6S$

1) DiBAl-H,toluene
0 °C to rt, 2 h ;

2) *n*-BuLi,
$(CH_3)_2CHPPh_3I$
THF, 0 °C to rt, 3 h
62%, 2 steps

L
$C_{27}H_{39}NO_4S$

1) PhSeCl, Pyr
2) *m*-CPBA, CH_2Cl_2

78%, 2 steps
d.r. = 3:2

M
$C_{27}H_{37}NO_4S$

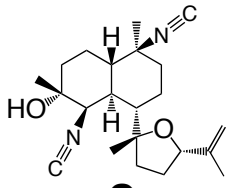
1) $Li(Et)_3BH$
2) NaN_3, NH_4Cl
(71 %, 2 steps)

3) Na, NH_3

N
$C_{20}H_{36}N_2O_2$

1)

2) TsCl, Pyr
(39%, 3 steps)



O
$C_{22}H_{32}N_2O_2$