



Sunggak Kim

Born: March 17, 1946 in Kyungbuk province, Korea.

Undergraduate studies: Seoul National University, 1969.

Doctoral studies: McGill University, Canada, 1972-1976
(advisor: George Just).

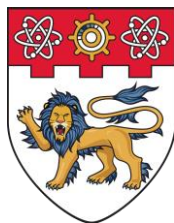
Postdoctoral Fellow: Harvard University, 1976-1979
(advisor: E.J.Corey).

Independent career: Korea Advanced Institute of Science and Technology (KAIST, 1979-2009, from 1986, promoted to professor of chemistry);

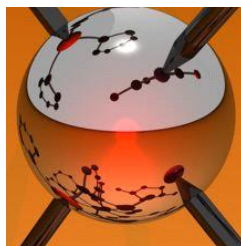
Nanyang Technological University (NTU), Singapore,
(2009-2014, professor);

Ewha Womans University, South Korea,
(2014-2016, visting professor).

From 2016, retired.



Research Interests



organometallics reactions



the building of KAIST

Selected Awards and Honors:

Academic Affairs of the Korean Chemical Society (Vice president, 1998)

Bulletin of Korean Chemical Society and *Synlett* (Editorial board)

Korean Chemical Society Award for Young Chemists (1985)

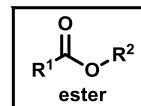
Korean Federation of Science and Technology Societies Award (1991)

Korea Science Prize in Chemistry (1994)

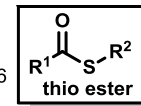
KAIST Research Award (1997)

Publicitions: ~296 papers, 1 book chapter (from SciFinder®)

1981~1990 mainly developed new reactions and reagents



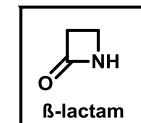
J.C.S. Chem. Comm., **1981**, 1231
Bull. Korean Chem. Soc. **1982**, 3, 70
Bull. Korean Chem. Soc. **1982**, 3, 166
JOC, **1984**, 49, 1712



CL, **1981**, 1, 133
Bull. Korean Chem. Soc.
1982, 3, 70

reduction reaction (carbonyl, halide...)

JOC, **1982**, 47, 4581
Bull. Korean Chem. Soc. **1982**, 3, 81
JOC, **1982**, 47, 3311
ACIE, **1983**, 22, 562
JOC, **1985**, 50, 1927



TL, **1987**, 28, 2735
Bull. Korean Chem. Soc.
1988, 9, 189
J.C.S. Chem. Comm., **1988**, 1242

oxidation reaction (alcohol)

Bull. Korean Chem. Soc. **1986**, 59, 3257
Bull. Korean Chem. Soc. **1986**, 7, 86

1991~2010 Radical Chemistry (main)

2010~2016 mainly developed organometallics reactions

Au catalysis

ACIE, **2010**, 49, 6806
JOC, **2010**, 25, 7928
CC, **2011**, 47, 7851

Fe catalysis

Synlett, **2011**, 3, 415
JOC, **2012**, 77, 5856
JOC, **2012**, 77, 5239
EJOC, **2013**, 3, 533

Rh catalysis

OBC, **2013**, 11, 6879

Pd catalysis

OL, **2013**, 15, 2186
CC, **2013**, 49, 4682
OL, **2013**, 15, 2692
OL, **2013**, 15, 1910

1981~1990

Selective Reductive Dehalogenation of Tertiary and Benzylic Halides

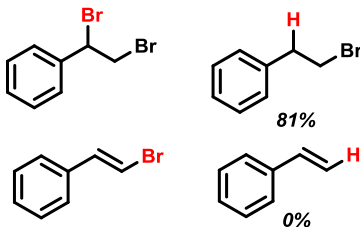
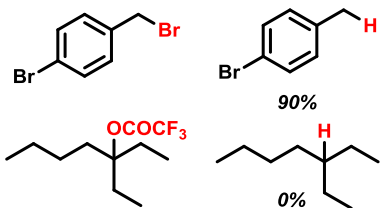


substrates

products

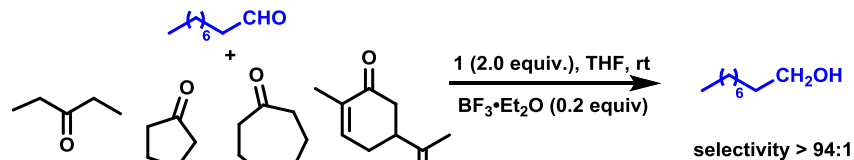
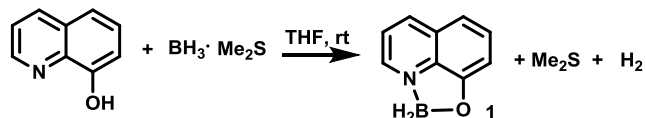
substrates

products



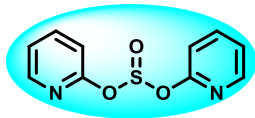
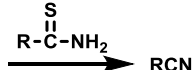
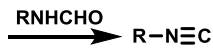
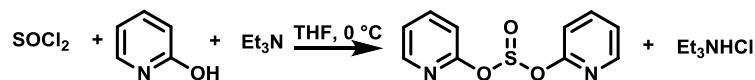
ACIE, 1983, 22, 562

Selective Reduction of Aldehydes in the Presence of Ketones

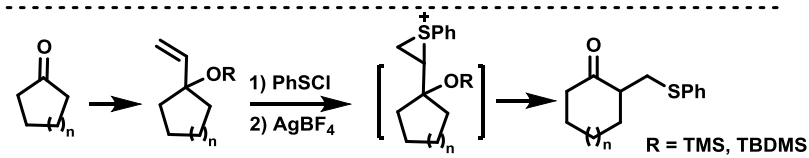
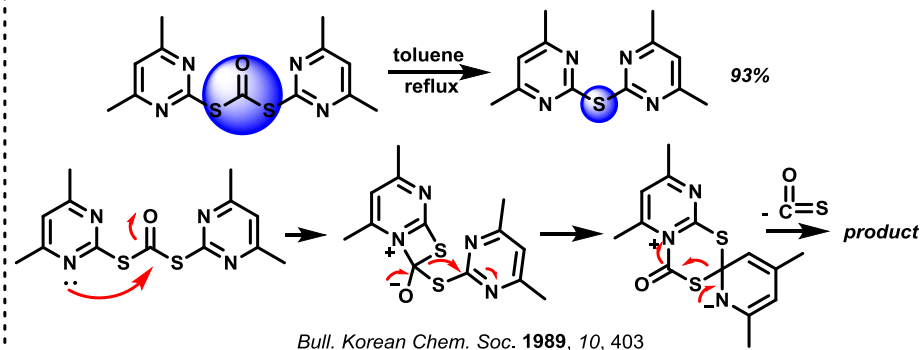


TL, 1984, 25, 2985

Bull. Korean Chem. Soc. 1984, 5, 240



TL, 1986, 27, 1925

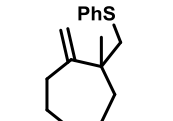
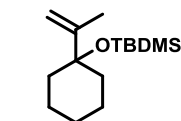
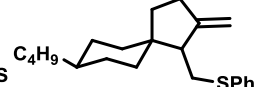
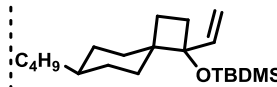
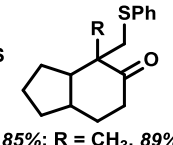
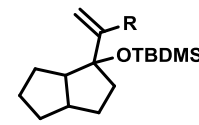
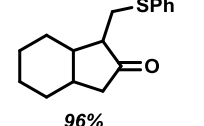
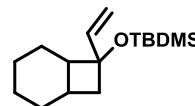


substrates

products

substrates

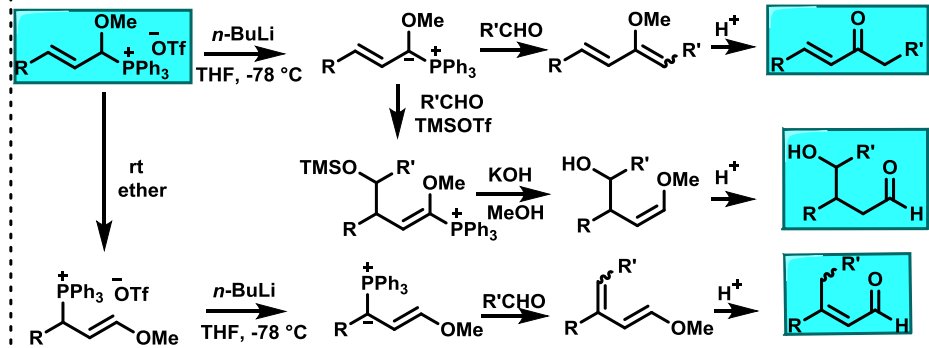
products



TL, 1989, 30, 6181

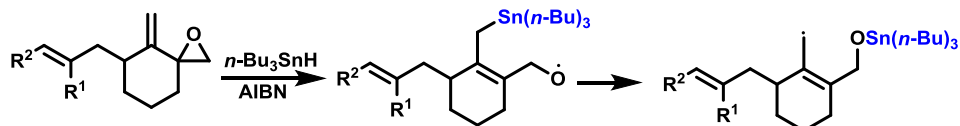
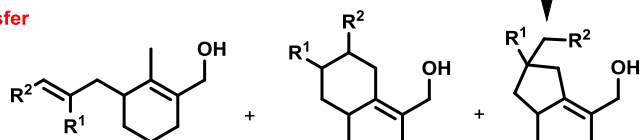
84%

58%

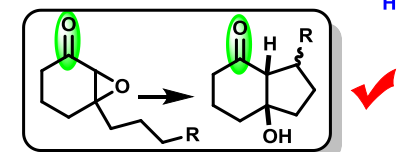
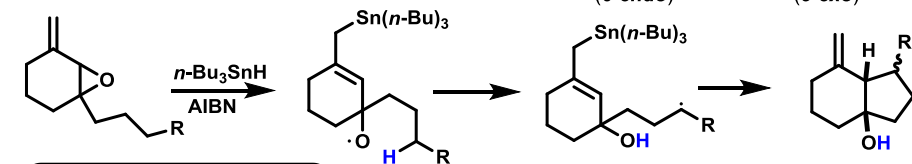


TL, 1989, 30, 6181

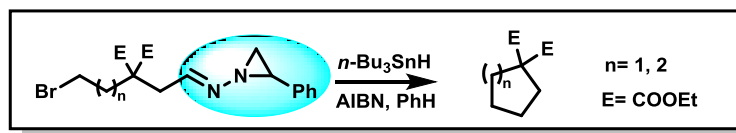
1991~2010

1,5-(*n*-Bu)₃Sn Group Transfer

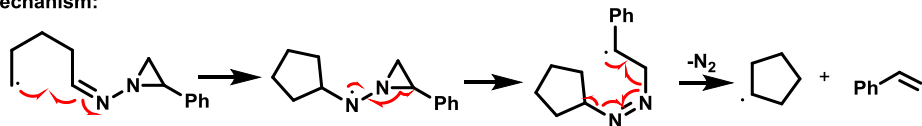
1,5-Hydrogen-Atom Transfer



JACS, 1991, 113, 5106.
J.C.S.Chem. Comm., 1992, 1377



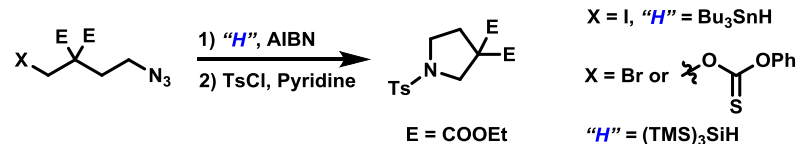
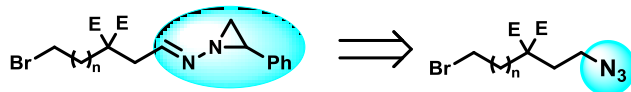
Mechanism:



Driving Force:

- The relief of ring strain of three-membered ring
- ejection of nitrogen and styrene

JACS, 1991, 113, 9882

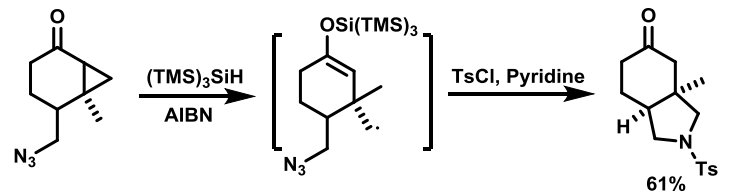
X = I, "H" = Bu₃SnH

X = Br or

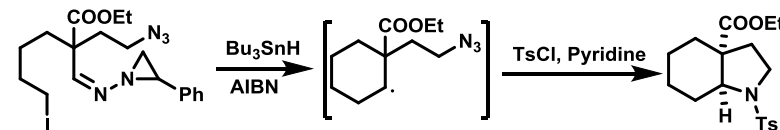
E = COOEt

"H" = (TMS)₃SiH

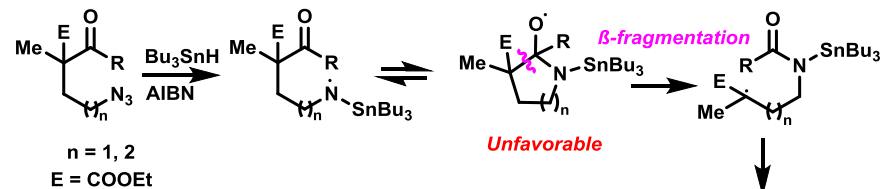
Selected Substrates:



61%

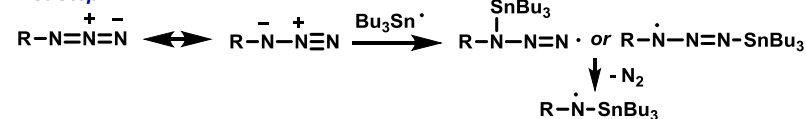


73%

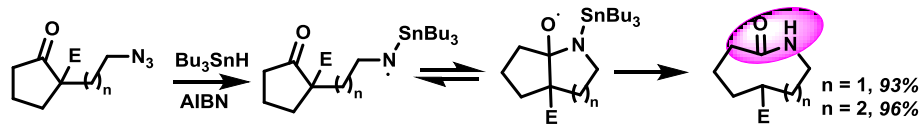


Unfavorable

The First Step:



The driving force of second step would be provided by resonance stabilization of the amide group formed by β -fragmentation.

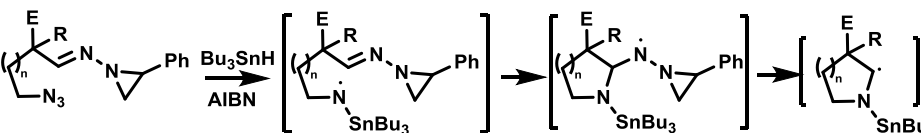
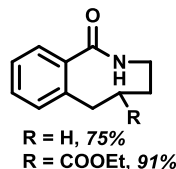
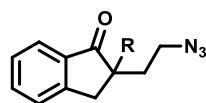
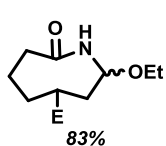
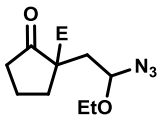
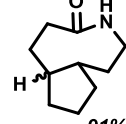
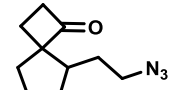
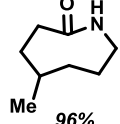
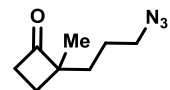


Substrates

Products

Substrates

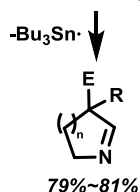
Products

**Highly Efficient Intramolecular Additions:**

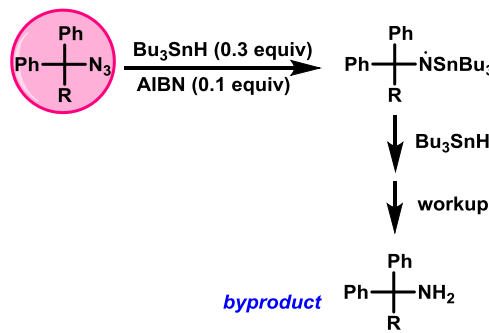
- (i) alkyl radicals to azido groups
- (ii) aminyl radicals to imino groups
- (iii) aminyl radicals to carbonyl groups

JACS, 1993, 115, 3328

JACS, 1994, 116, 5521



79%~81%



byproduct

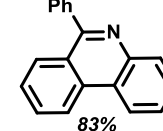
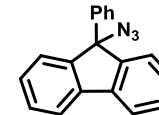
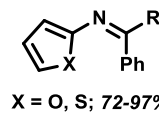
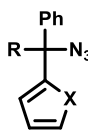
R = Me, sec-Bu, Ph
83%-95%

Substrates

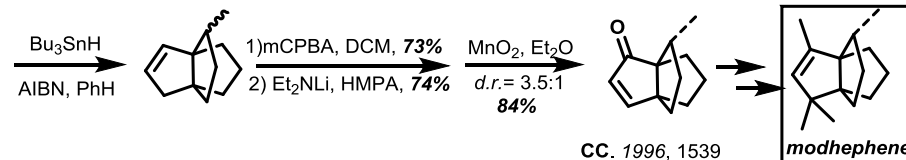
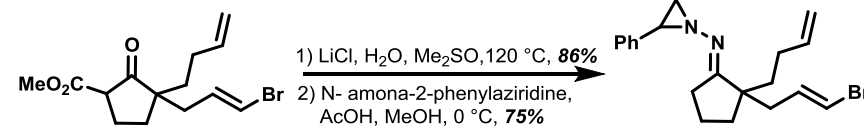
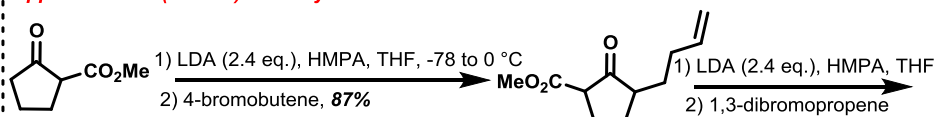
Products

Substrates

Products

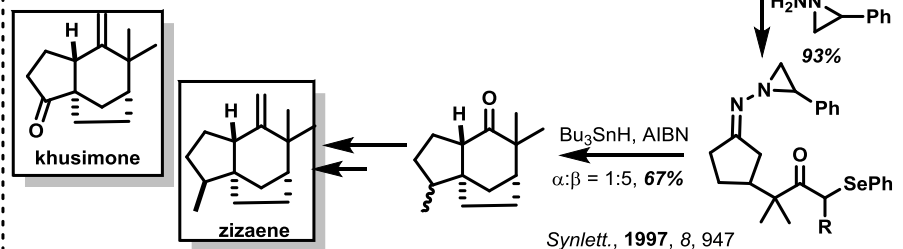
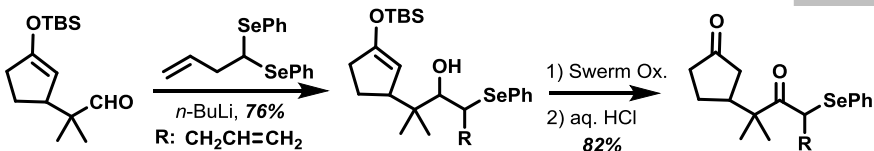


J.C.S. Chem. Comm., 1995, 1607

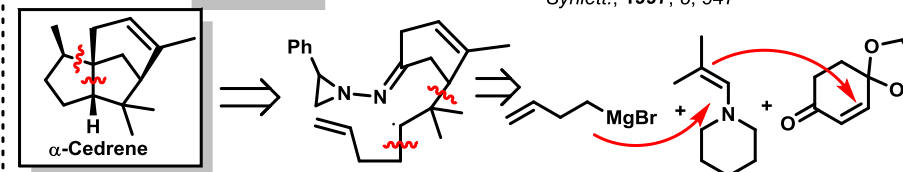
Applications In (Formal) Total Synthesis

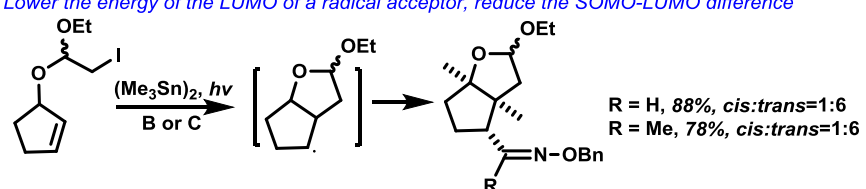
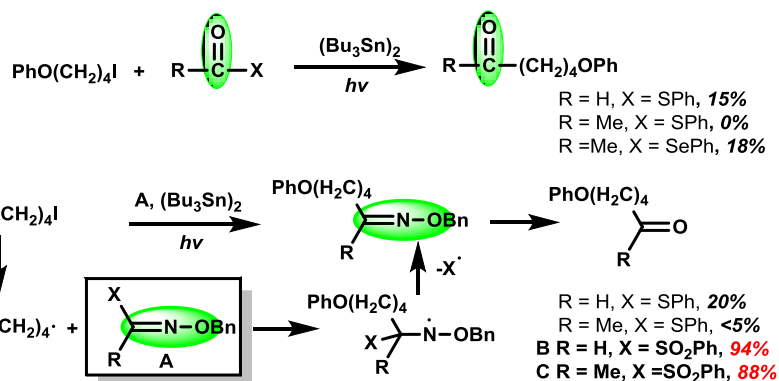
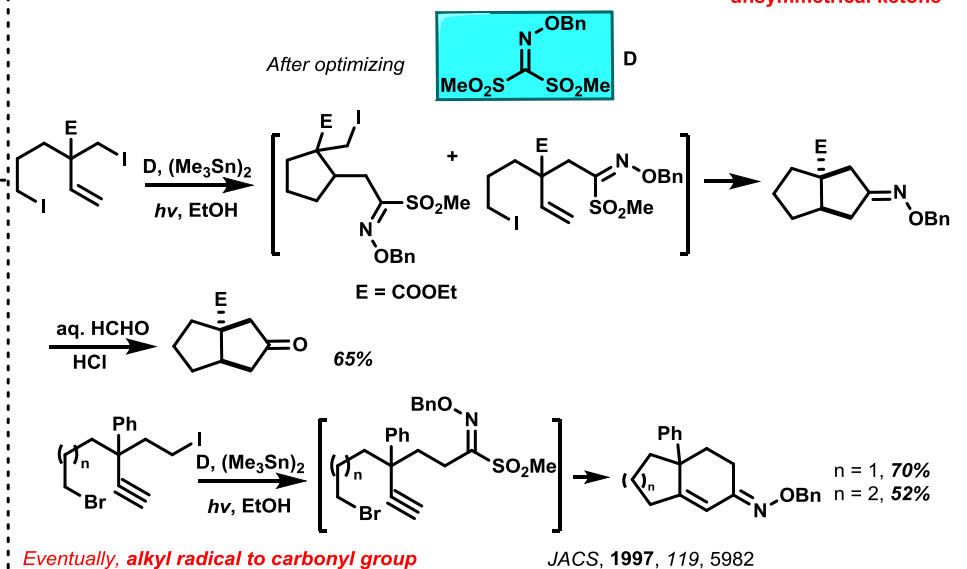
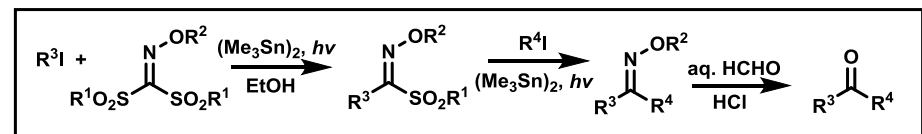
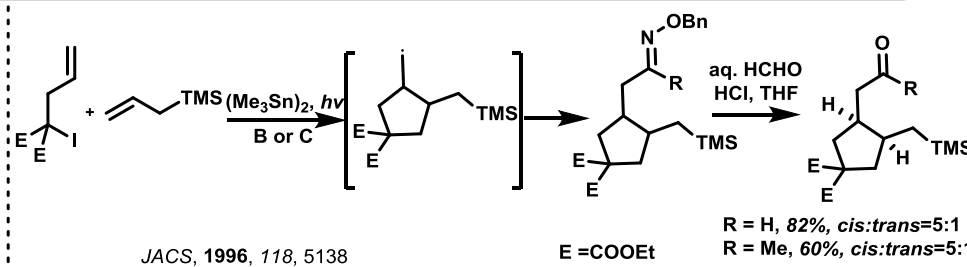
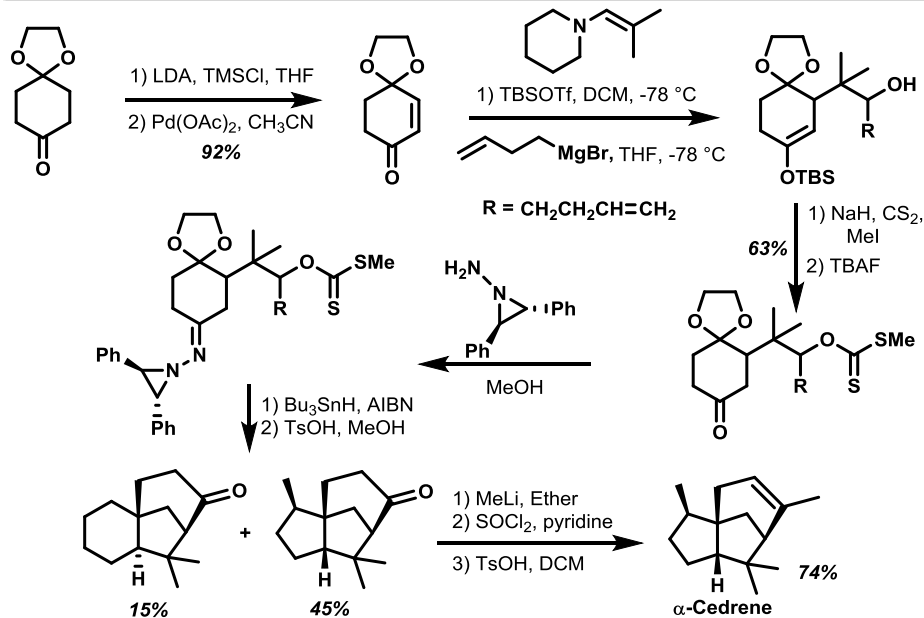
CC. 1996, 1539

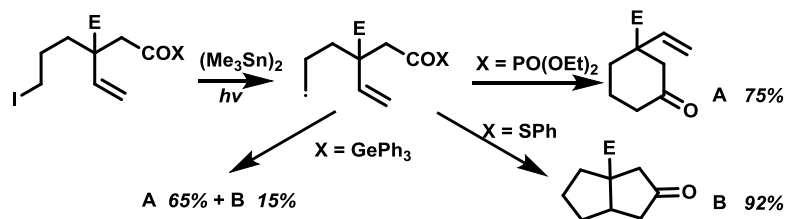
modhephene



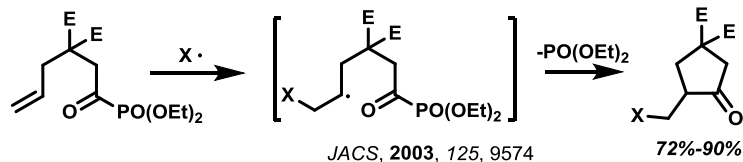
Synlett., 1997, 8, 947



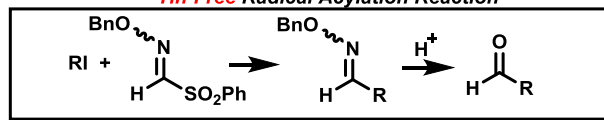




intermolecular radical addition



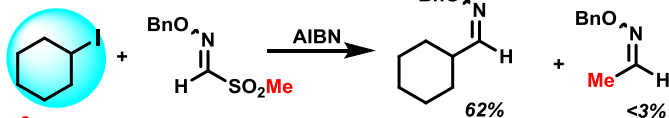
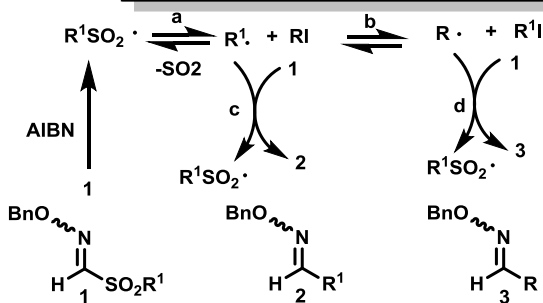
Tin-Free Radical Acylation Reaction



Problem 1:
radical acylation arises from the fast addition of an alkyl radical to sulfonyl oxime ether **1** to afford oxime ether **2**

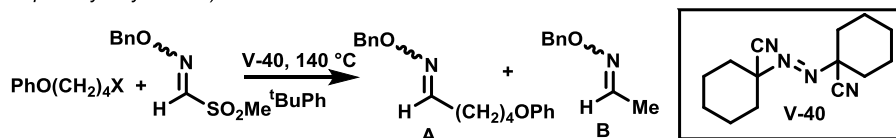
Solution:

Since the direct addition of the alkyl radical to sulfonyl oxime ether **1** (path c) would compete with transfer of an iodine atom (path b) in the radical acylation approach, efficient iodine transfer is a key factor for the success of this approach.

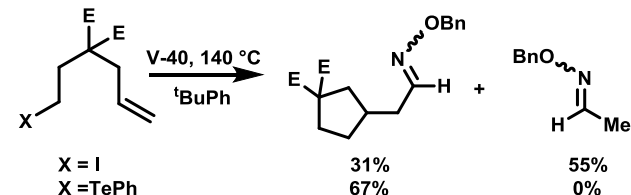


Problem 2:

Primary alkyl iodides did not work well. (Due to the small energy difference between the methyl radical and a primary alkyl radical)

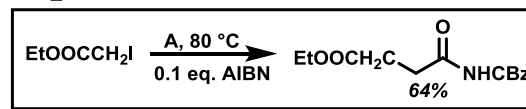
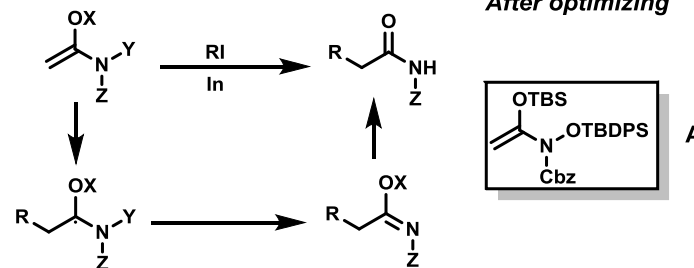


X = I, A 45%, B 25% X = TePh, A 78%, B 0%

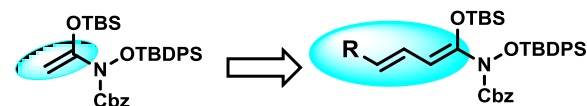
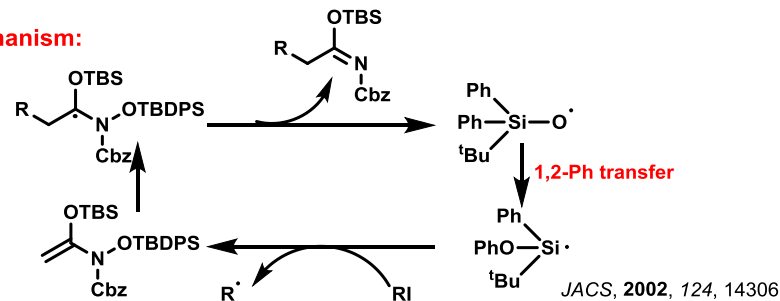


ACIE, 2001, 40, 2526

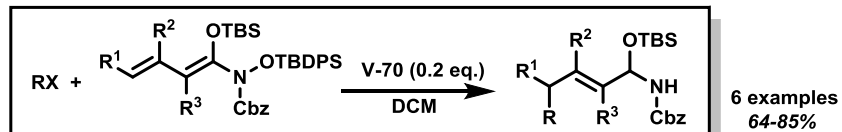
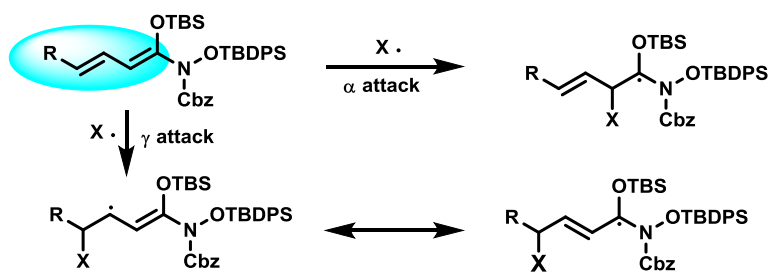
After optimizing



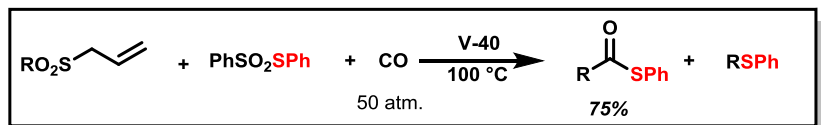
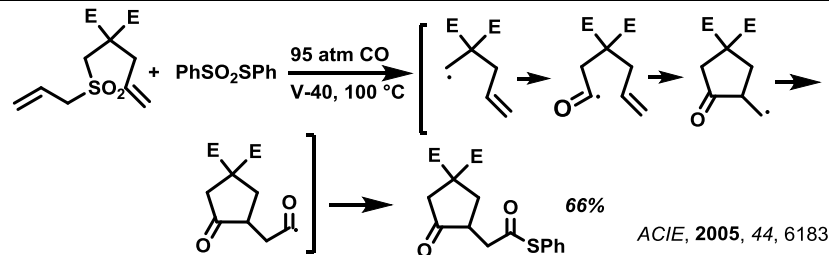
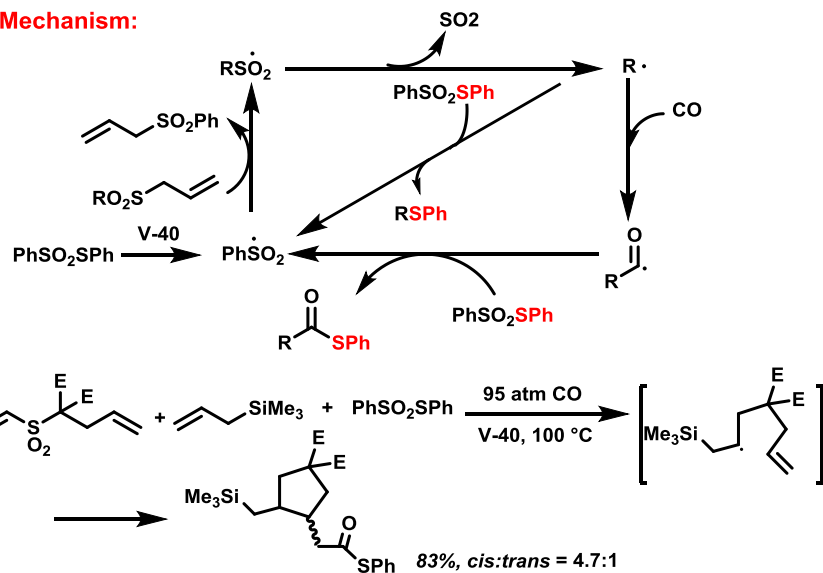
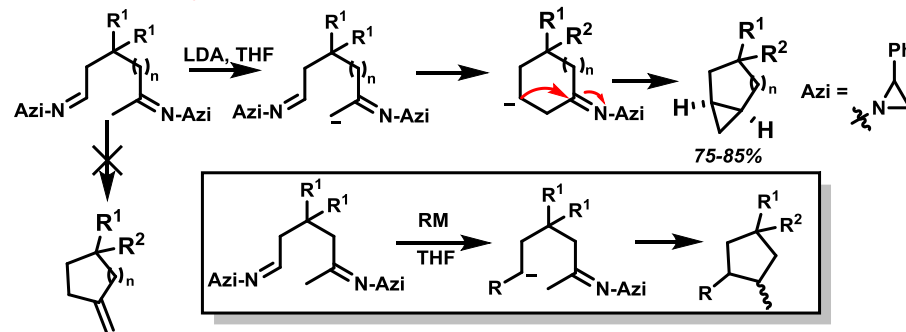
Mechanism:



γ-alkylation of α,β-unsaturated carbonyl compound



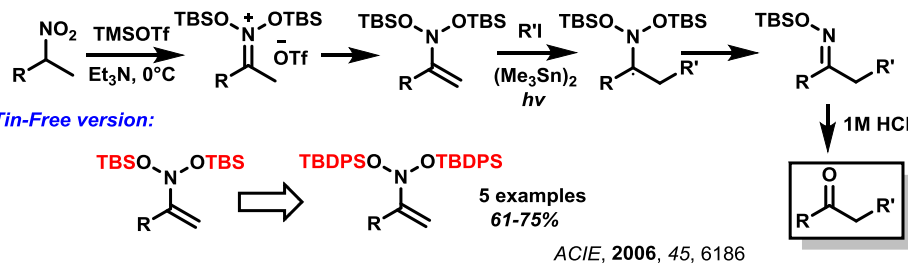
ACIE, 2004, 43, 5378

**Mechanism:****Anionic Tandem Cyclization****substrates scope**

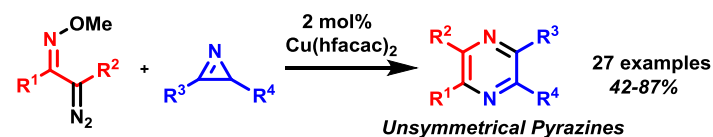
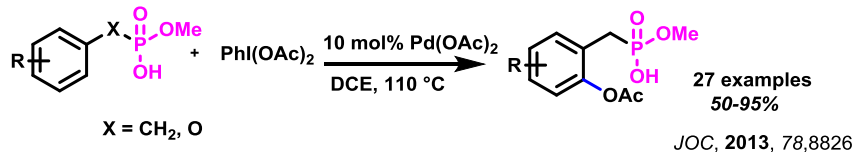
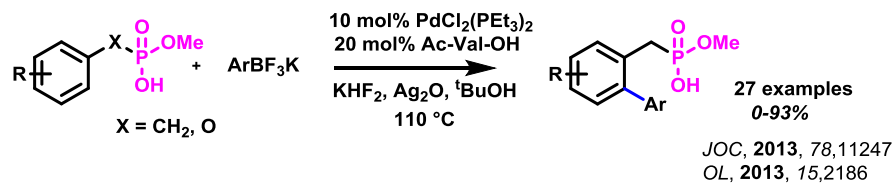
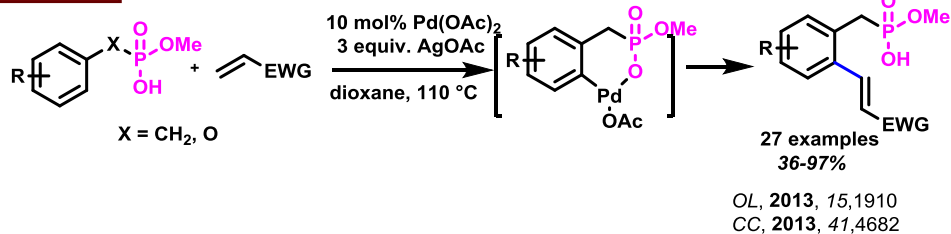
| substrate | RM ^a | product | yield, % |
|-----------|-----------------|---------|---------------------------|
| | A | | 15 (76%) |
| | C | | 16 (71%) |
| | D | | E=H 17 (76%) |
| | D | | =OH 18 (66%) ^b |
| | D | | =Br 19 (65%) ^b |
| | A | | 20 (72%) ^c |
| | C | | 21 (70%) ^c |
| | C | | 22 (63%) ^c |
| | C | | 23 (57%) ^d |
| | C | | 24 (69%) ^d |
| | B | | 25 (65%) ^e |

JACS, 1999, 121,5330

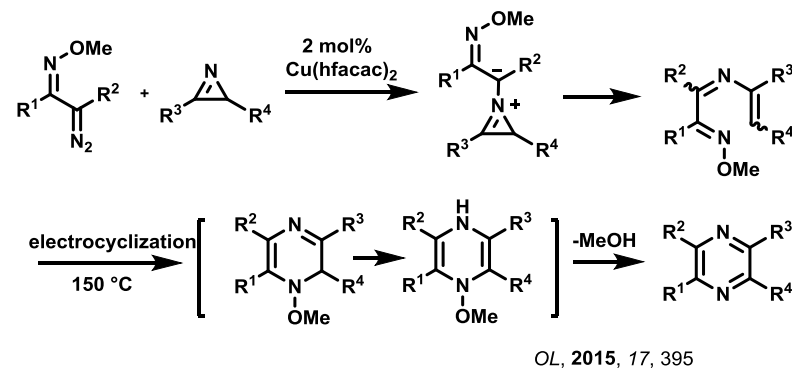
A:**H₂C=CHMgBr****B:****H₂C=CHLi****C:****H₂C=CHCH₂Li**



2010~2016



Mechanism:



From 2016, he retired.....