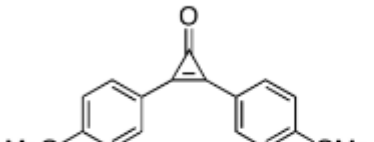
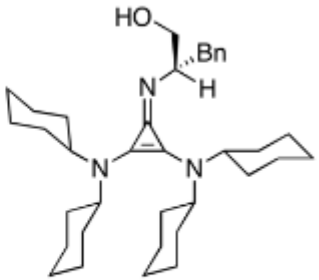
中国科学院上海有机化学研究所
Shanghai Institute of Organic Chemistry, CAS

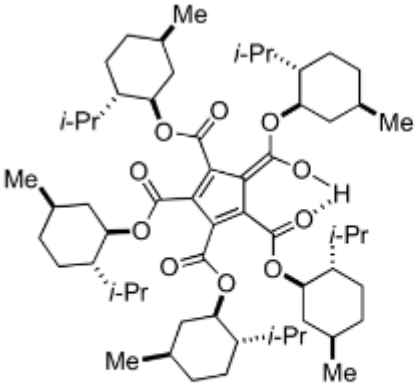
The Career of Tristan H. Lambert



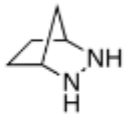
dehydrative catalysis



enantioselective Brønsted base catalysis



enantioselective Brønsted acid catalysis



catalytic carbonyl-olefin metathesis

Jian Rong（荣 健）

Hu Group Meeting

Apr 11 , 2016

Tristan H. Lambert: Biographical Notes

born in Madison, Wisconsin in 1976

Education

2004-2006: NIH Postdoctoral Fellow, Memorial Sloan-Kettering Cancer Center (Samuel J. Danishefsky, advisor)
2004: Ph.D. Chemistry, California Institute of Technology (David W. C. MacMillan, advisor)
2000: M.S. Chemistry, University of California at Berkeley (David W. C. MacMillan, advisor)
1998: B.S. Chemistry, University of Wisconsin at Platteville

Professional experience

2011-present: Associate Professor, Columbia University
2006-2011: Assistant Professor, Columbia University
2004-2006: NIH Postdoctoral Fellow, Memorial Sloan-Kettering Cancer Center
1998-2003: Graduate Research Assistant, UC-Berkeley and Caltech
1997-1998: Undergraduate Research, UW-Platteville
Summer 1997: NSF--Research Experience for Undergraduates, University of Kansas

Awards And Honors

2004-2006 NIH Postdoctoral Fellowship
2009 Abbott Young Investigator Award
2010 NSF CAREER award
2010 Thieme SynLett/Synthesis Journal Award
2010 Alfred P. Sloan Research Fellow
2010 Amgen Young Investigator Award
2010 ACS Young Investigators Symposium
2011 Eli Lilly Grantee Award
2014 Visiting Professorship, Phillips-University Marburg
2015 Swiss Chemical Society Lecturer

Lambert Group: Members and Publications

Current Members

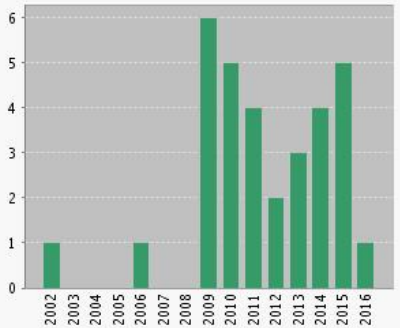
引文报告: 32

(来自 所有数据库)

您的检索: **作者:** (Lambert Tristan) **...更多内容**

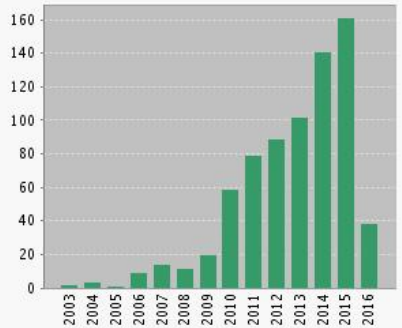
此报告反映对编入 "所有数据库" 索引的来源文献的引用情况。

每年出版的文献数



显示最近 20 年。

每年的引文数



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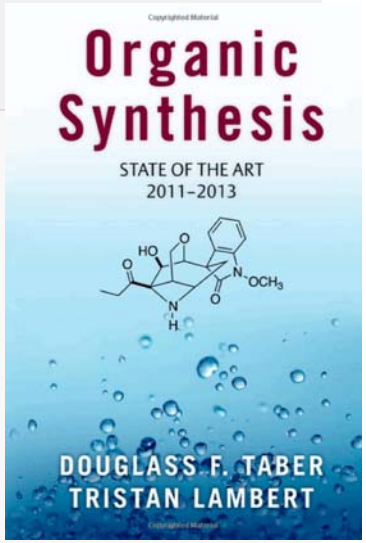
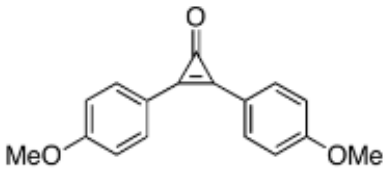


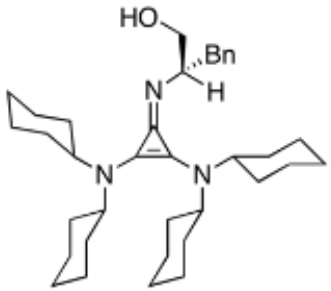
Significant Research Areas

Reaction Design | Synthesis

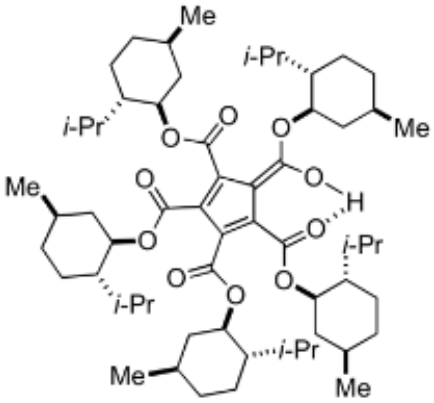
novel catalytic strategies for selective organic synthesis



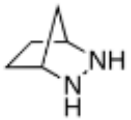
dehydrative catalysis



enantioselective Brønsted base catalysis

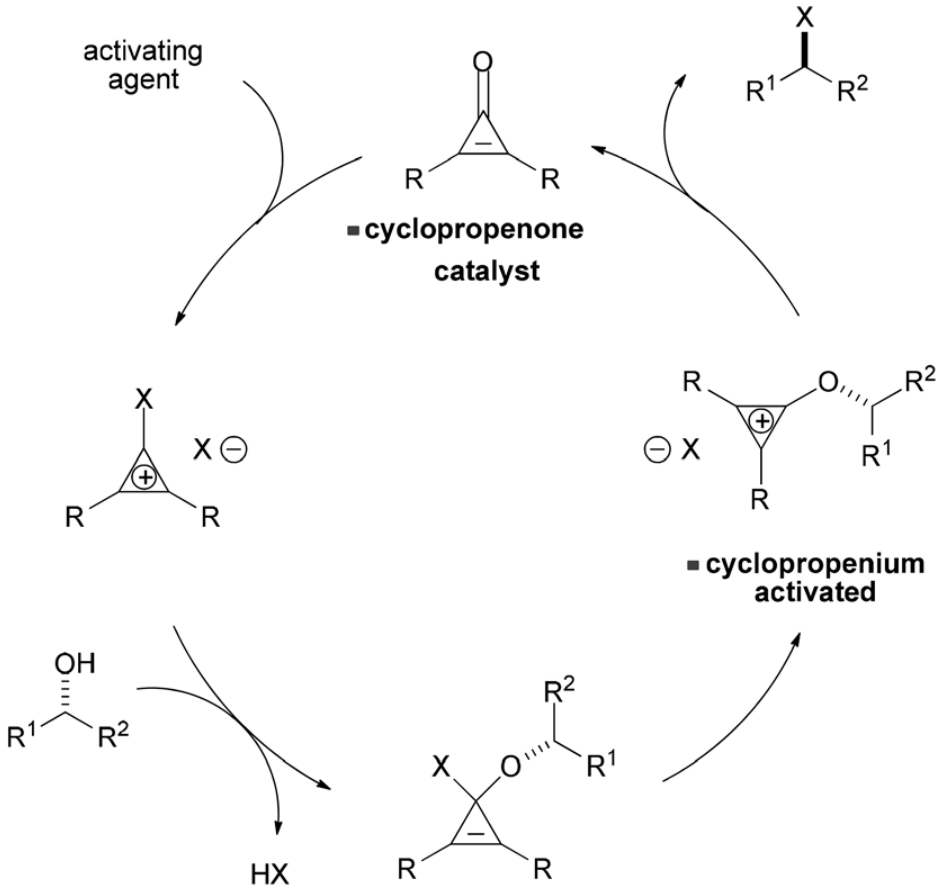


enantioselective Brønsted acid catalysis



catalytic carbonyl-olefin metathesis

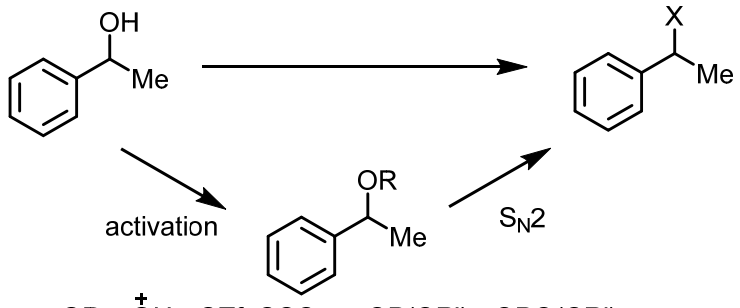
Dehydrative catalysis (Aromatic cation activation)

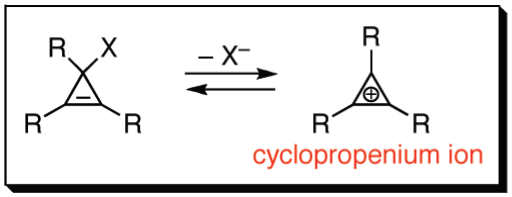


Org. Biomol. Chem. **2014**, *12*, 2993.

Dehydrative catalysis (Aromatic cation activation)

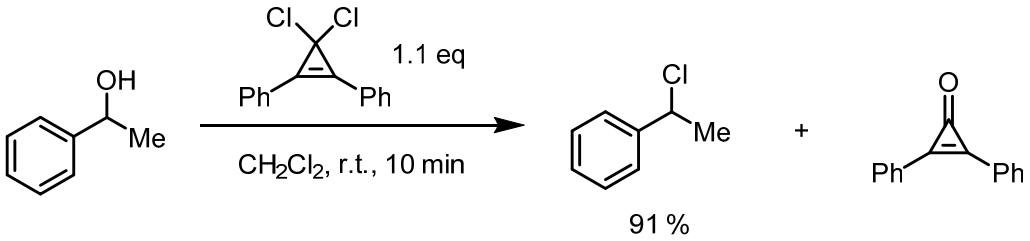
Aromatic Cation Activation of Alcohols

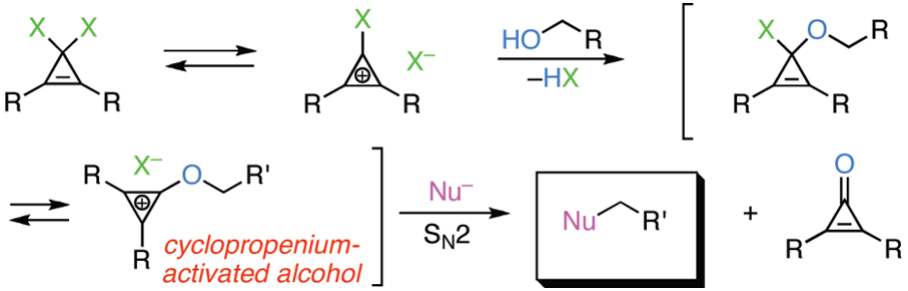




- 2π-electron aromatic system
- discovered by Breslow (1957)
- highly stabilized carbocations
- electronically, sterically tunable
- potential for new reaction design

Activation of Alcohols

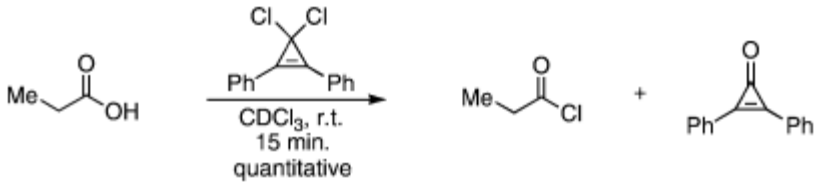


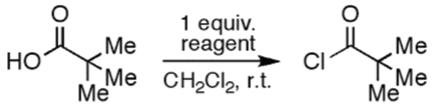


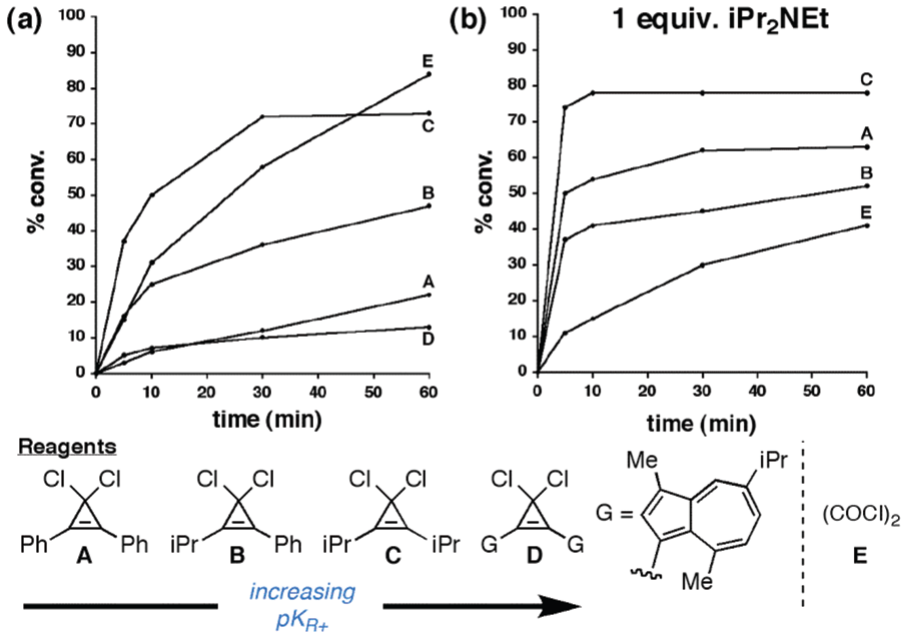
J. Am. Soc. Chem. **2009**, *131*, 13930.

Dehydrative catalysis (Aromatic cation activation)

Aromatic Cation Activation of Carboxylic Acids: Rapid Generation of Acid Chlorides



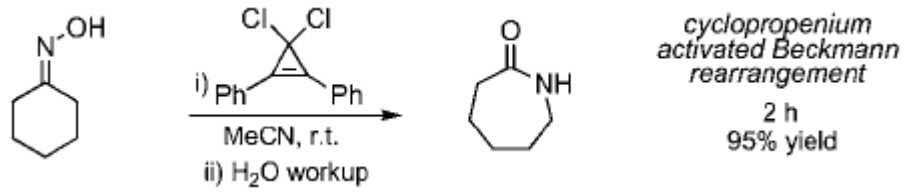




J. Am. Soc. Chem. **2010**, *132*, 5002.

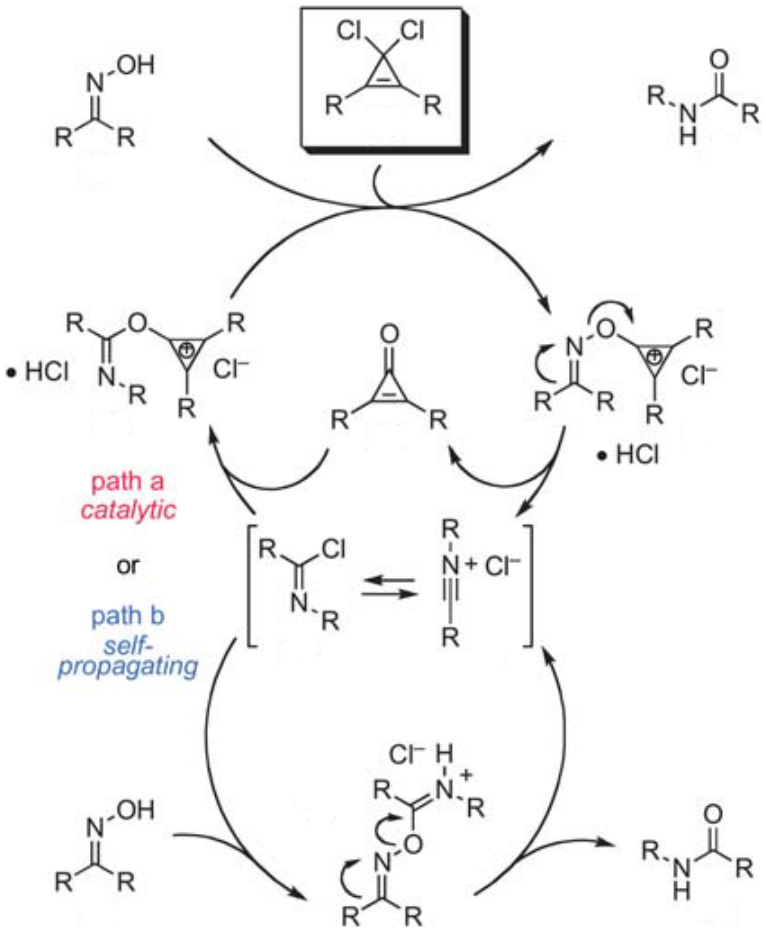
Dehydrative catalysis (Aromatic cation activation)

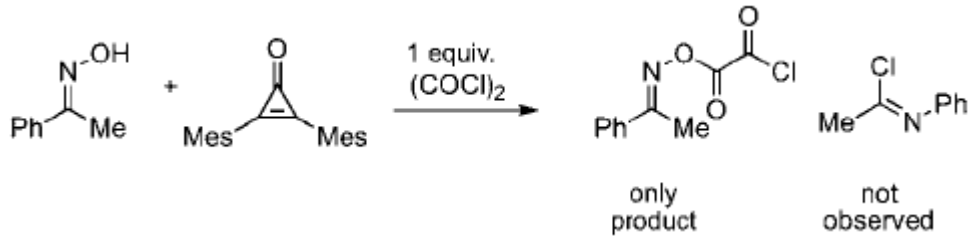
Cyclopropenium-activated Beckmann rearrangement

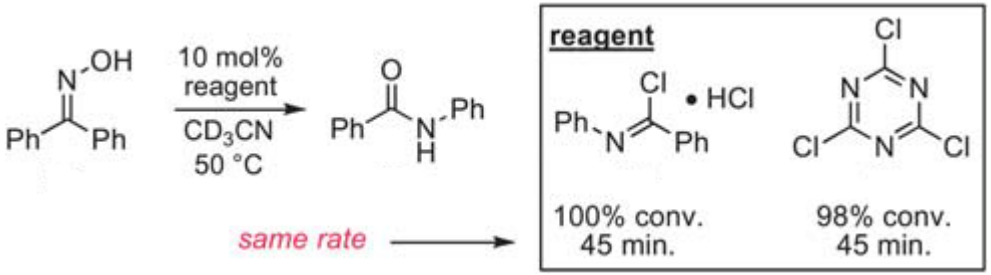


cyclopropenium activated Beckmann rearrangement

2 h
95% yield



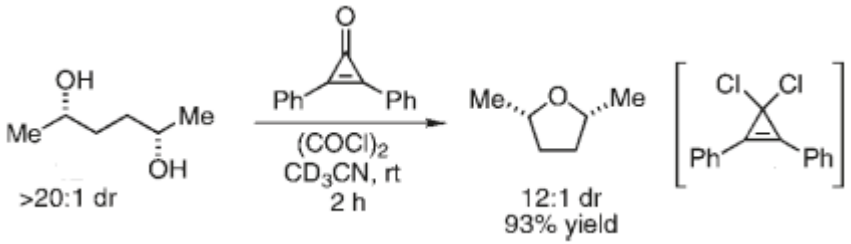


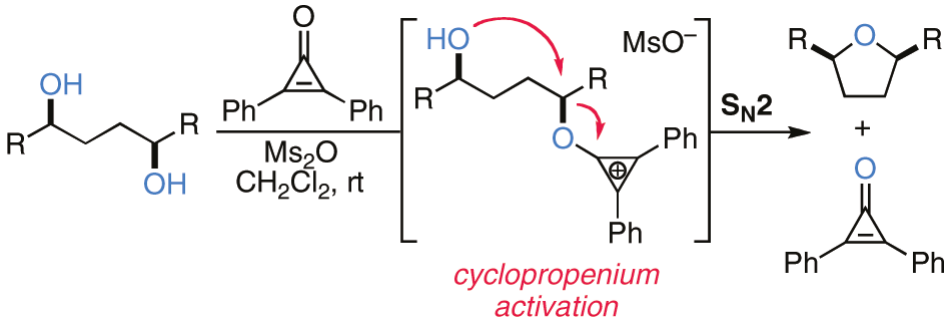


Chem. Sci. **2010**, *1*, 705.

Dehydrative catalysis (Aromatic cation activation)

Cyclopropenium-Activated Cyclodehydration of Diols

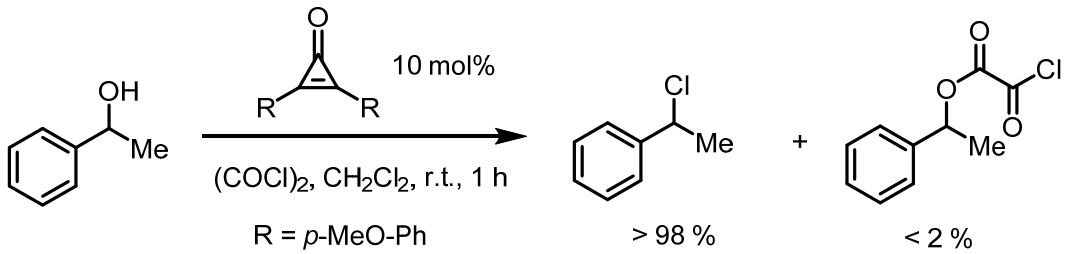


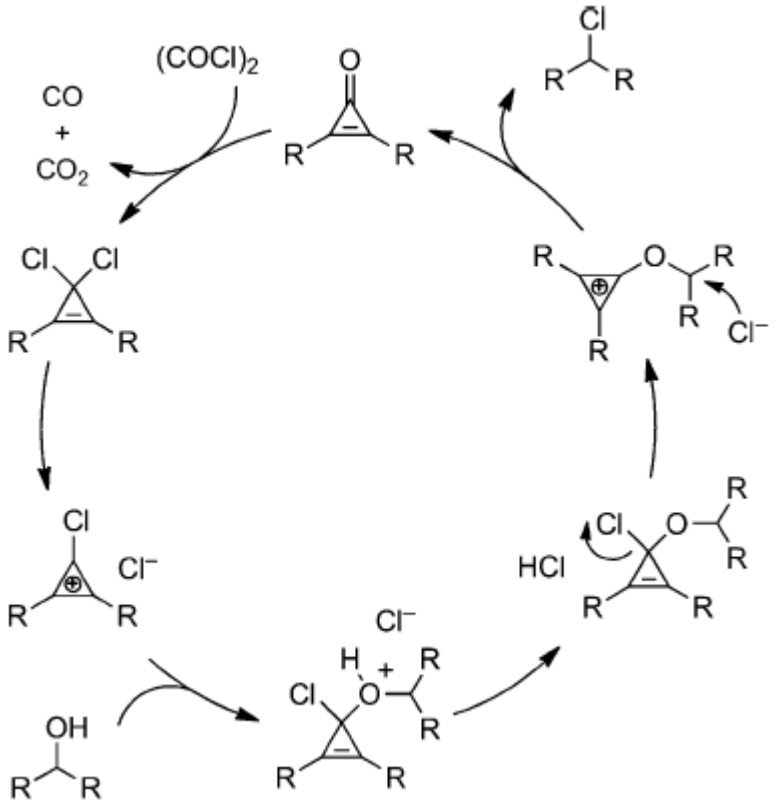


Org. Lett. **2011**, *13*, 740.

Dehydrative catalysis (Aromatic cation activation)

Cyclopropenone-Catalyzed Chlorodehydration of Alcohols



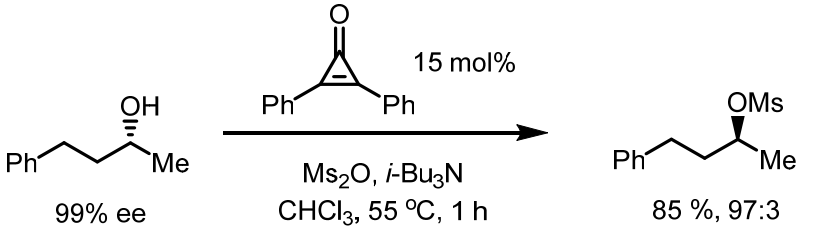


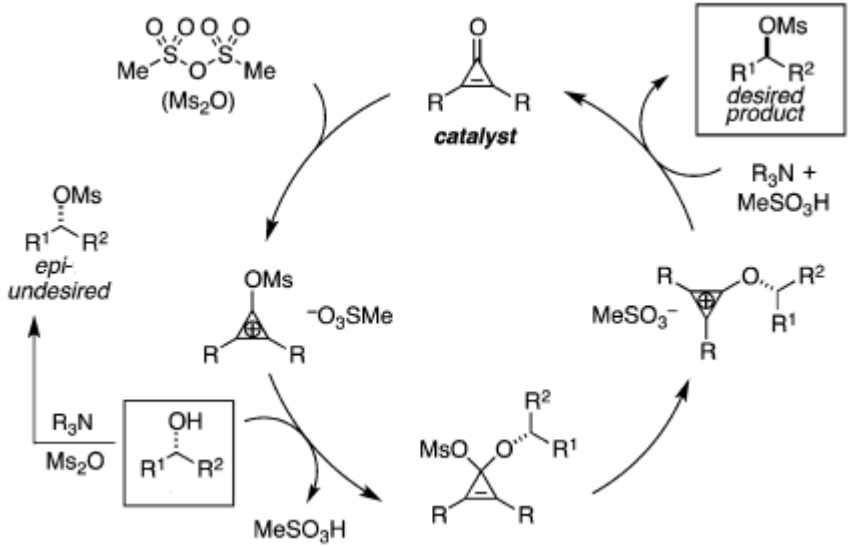
The more electron-rich catalysts improved this ratio.

Angew. Chem. Int. Ed. **2011**, *50*, 12222.

Dehydrative catalysis (Aromatic cation activation)

Cyclopropenone-Catalyzed Substitution of Alcohols with Mesylate Ion



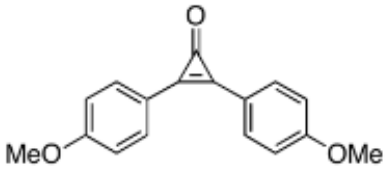


Org. Lett. **2013**, *15*, 38.

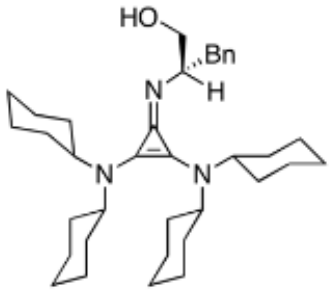
Significant Research Areas

catalysis

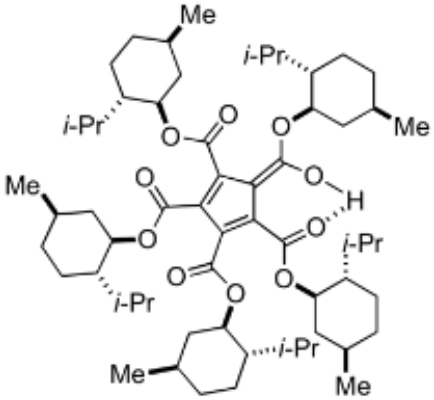
Reaction Design | Synthesis



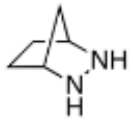
dehydrative catalysis



enantioselective Brønsted base catalysis



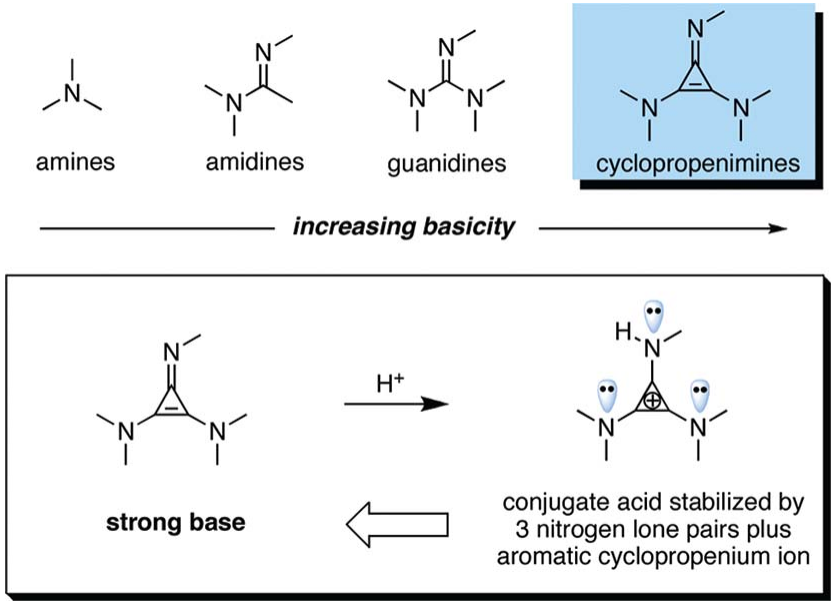
enantioselective Brønsted acid catalysis



catalytic carbonyl-olefin metathesis

Enantioselective Brønsted base catalysis

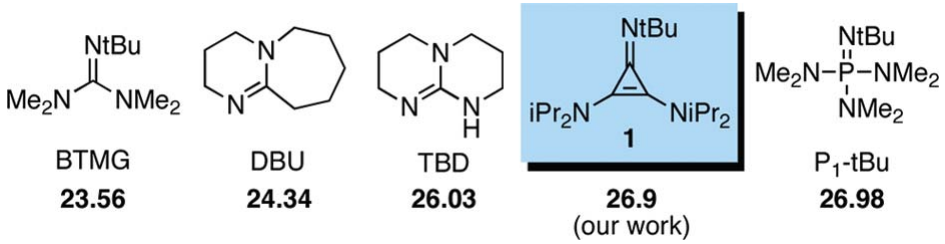
Enantioselective Brønsted Base Catalysis with Chiral Cyclopropenimines

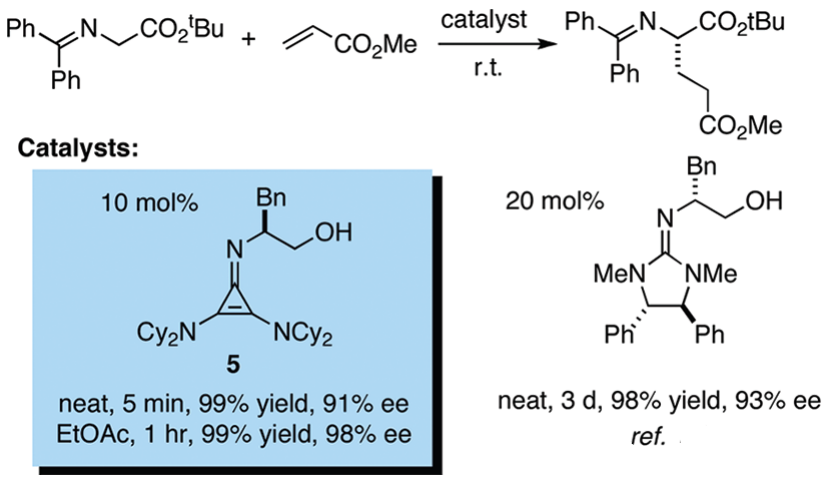


J. Am. Soc. Chem. **2012**, *134*, 5552.

Enantioselective Brønsted base catalysis

Enantioselective Brønsted Base Catalysis with Chiral Cyclopropenimines

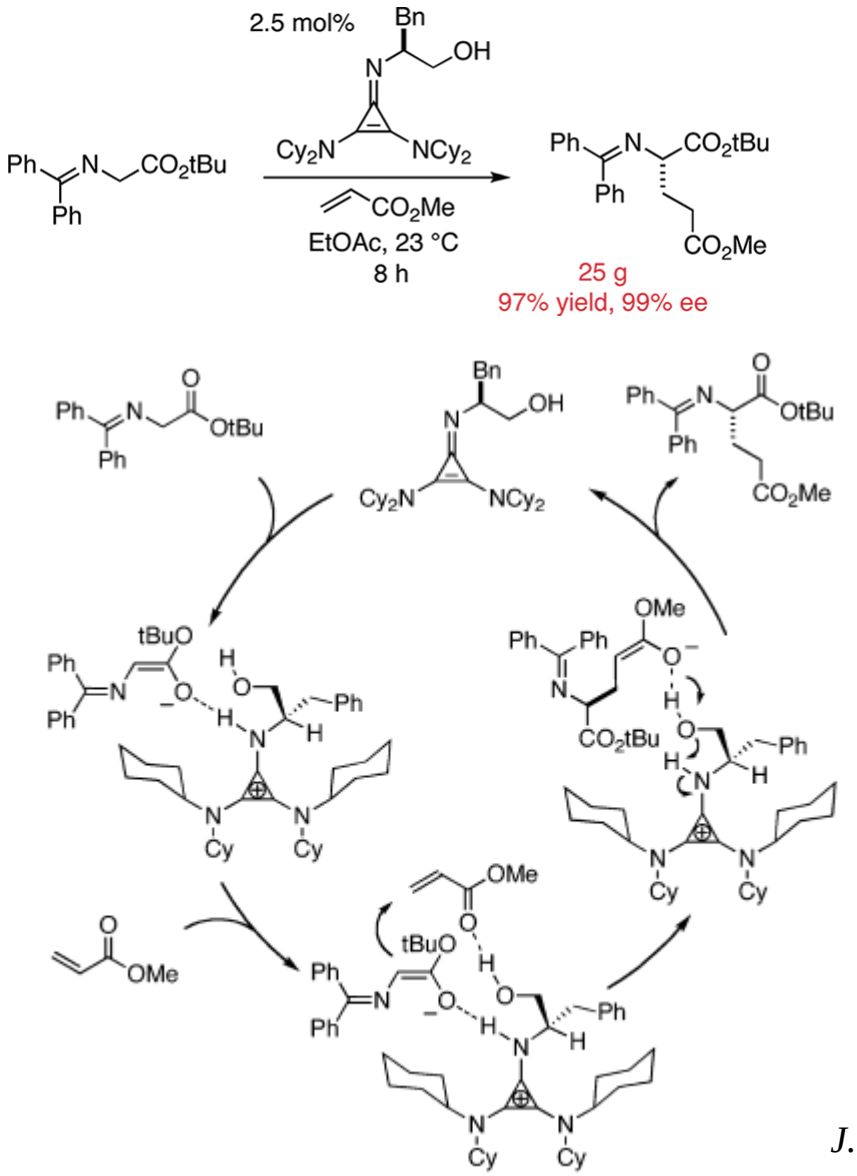




J. Am. Soc. Chem. **2012**, *134*, 5552.

Enantioselective Brønsted base catalysis

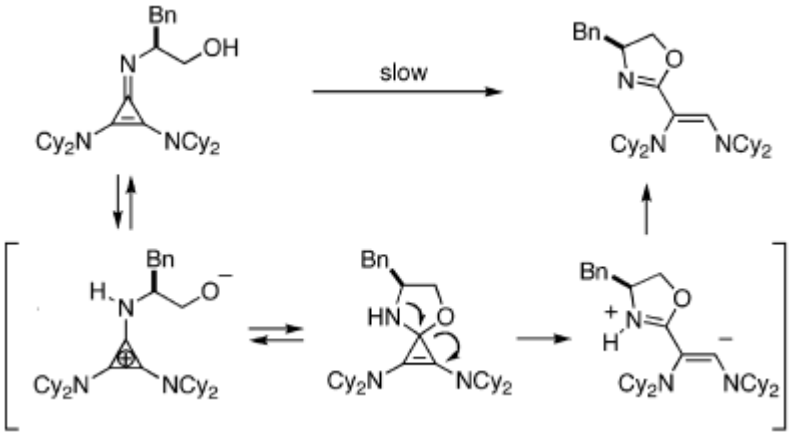
Enantioselective Brønsted Base Catalysis with Chiral Cyclopropenimines



J. Am. Soc. Chem. **2012**, *134*, 5552.

Enantioselective Brønsted base catalysis

Enantioselective Brønsted Base Catalysis with Chiral Cyclopropenimines



cyclopropenimine

$t_{1/2} \approx$ 12 days at r.t.

Storing should be at −20 °C, and 94% remained after 30 days.

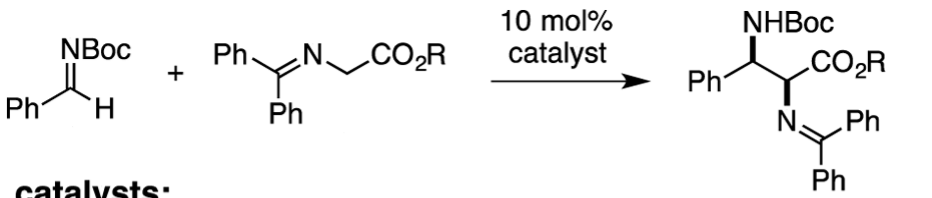
HCl salt is indefinitely stable at rt.

It's convenient to store the catalyst as its acid co-salt.

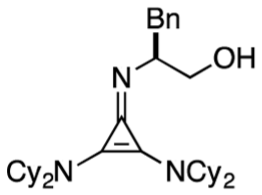
J. Am. Soc. Chem. **2012**, *134*, 5552.

Enantioselective Brønsted base catalysis

Cyclopropenimine-Catalyzed Enantioselective Mannich Reactions of *tert*-Butyl Glycinates with *N*–Boc-Imines

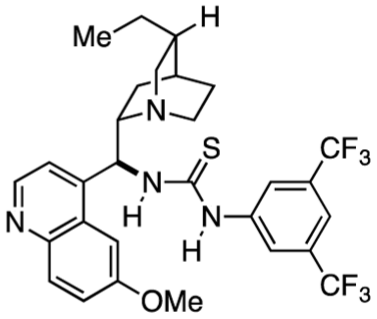


catalysts:



R = Me
PhMe, rt, 15 min
81% yield, 95:5 dr, 95% ee

R = tBu
PhMe, rt, 20 hr
97% yield, 99:1 dr, 95% ee



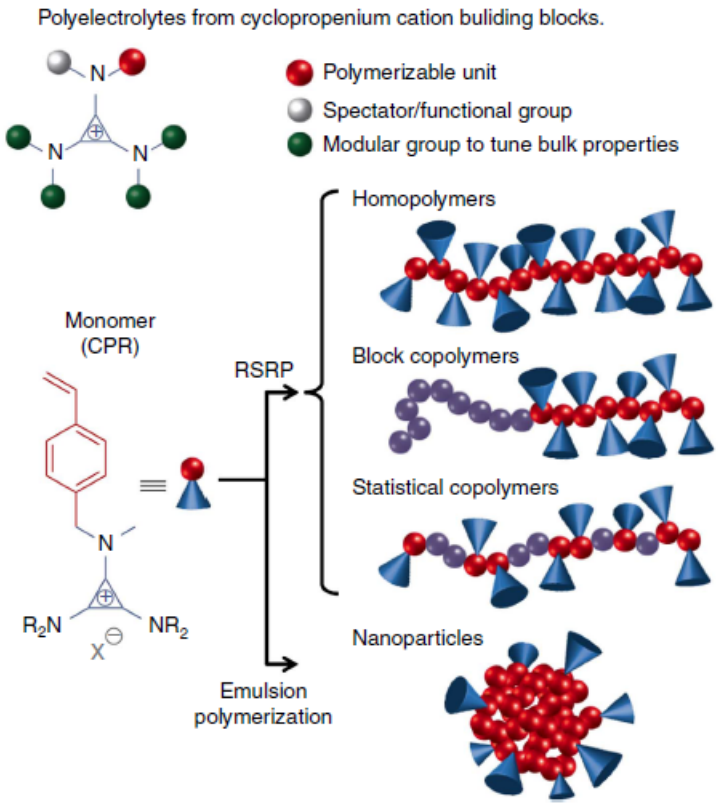
R = Me
$PhCF_3$, rt, 24-36 hr
76% yield, 99:1 dr, 99% ee

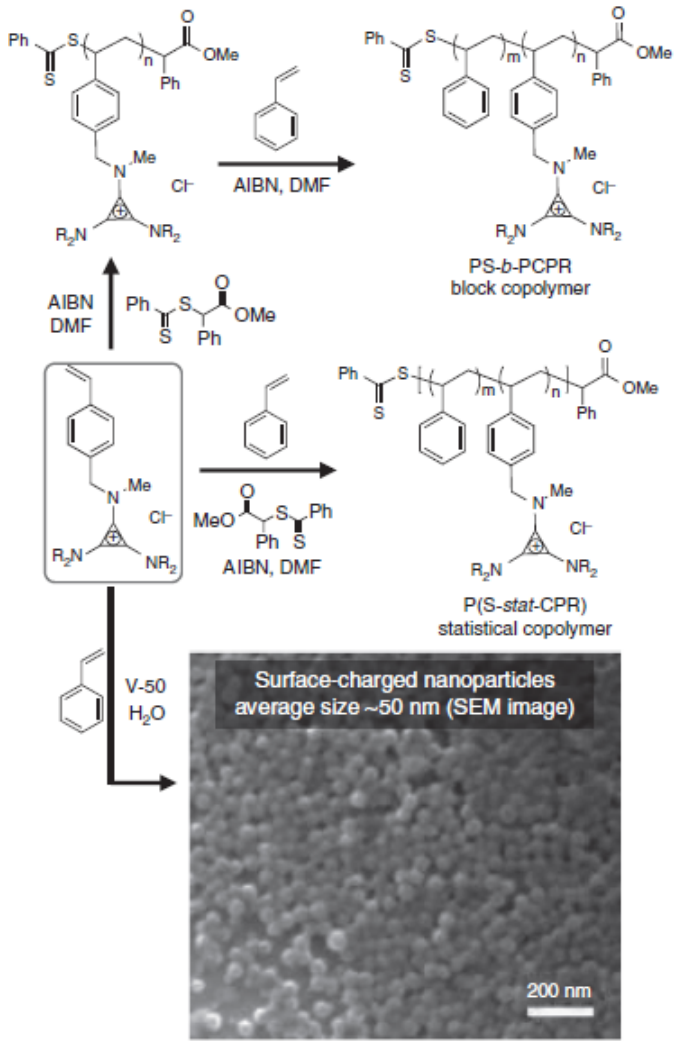
R = tBu
$CHCl_3$, rt, 26 hr
trace product

J. Am. Soc. Chem. **2013**, *135*, 11799.

Enantioselective Brønsted base catalysis

The evolution of cyclopropenium ions into functional polyelectrolytes

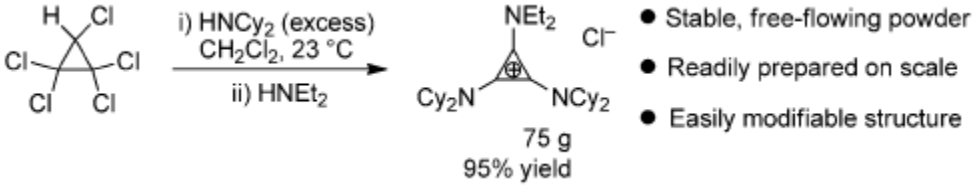


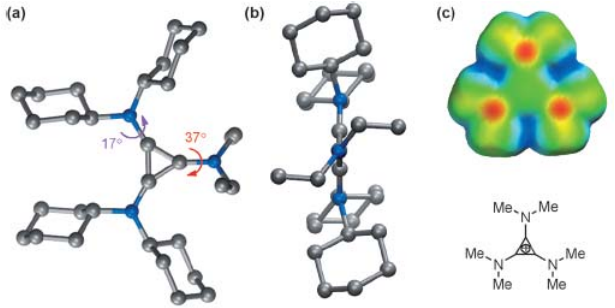


Nat. Commun. **2014**, *6*, 6950.

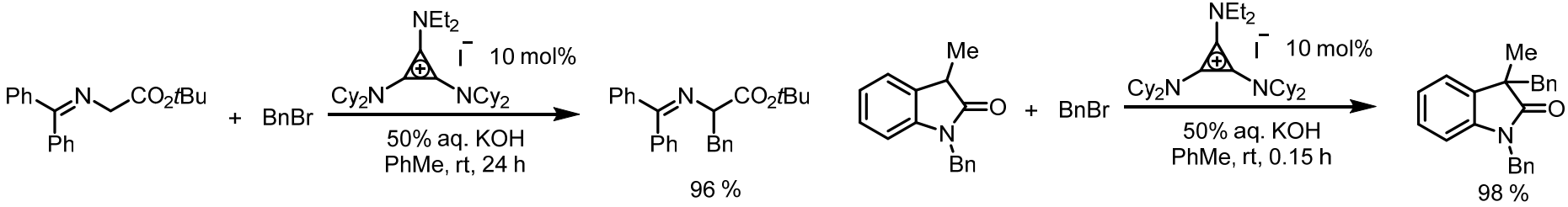
Enantioselective Brønsted base catalysis

Phase-Transfer and Other Types of Catalysis with Cyclopropenium Ions

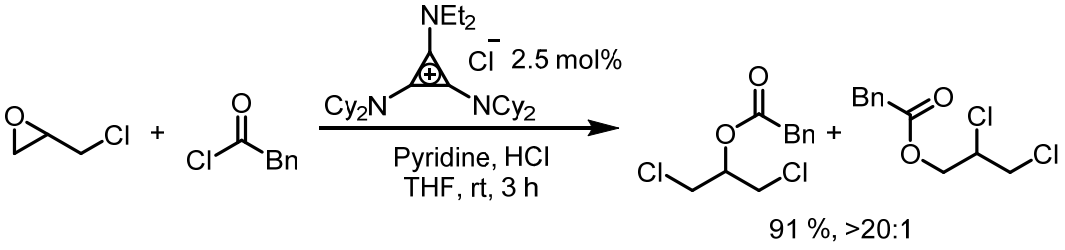




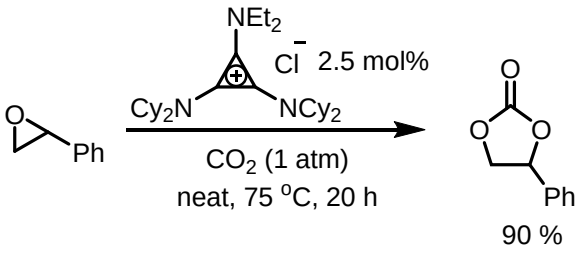
PTC of enolate alkylation



Addition of acid chlorides to epoxides



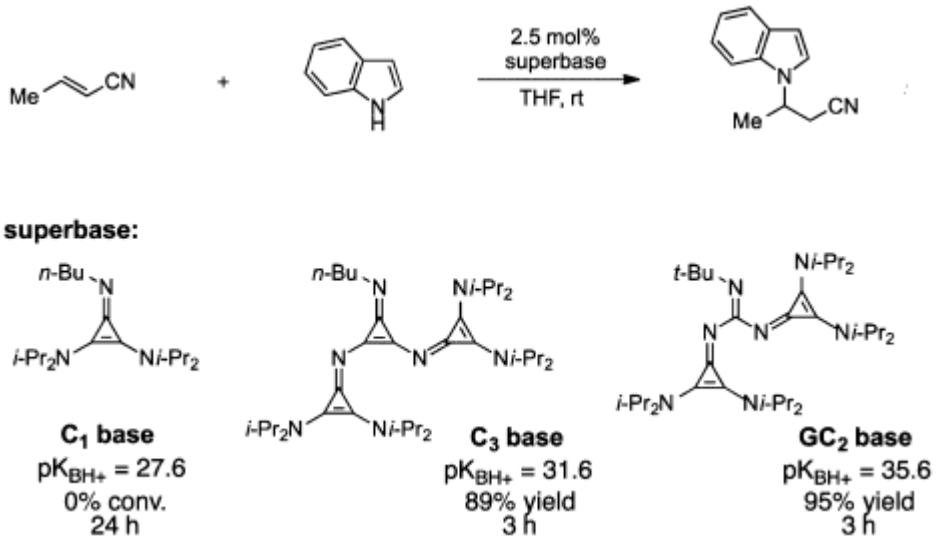
Addition of carbon dioxide to epoxides



Chem. Eur. J. **2015**, *21*, 7365.

Enantioselective Brønsted base catalysis

Higher-Order Cyclopropenimine Superbases: Direct Neutral Brønsted Base Catalyzed Michael Reactions with α−Aryl Esters

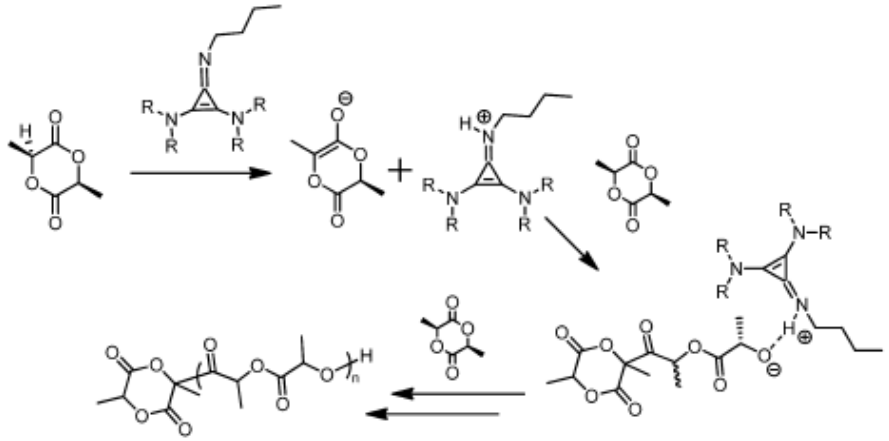


enable reactivity with a broader range of less acidic substrates

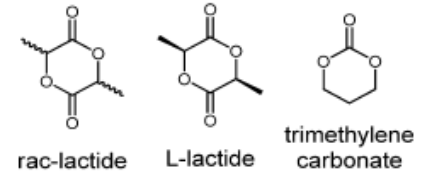
J. Am. Soc. Chem. **2015**, *137*, 10246.

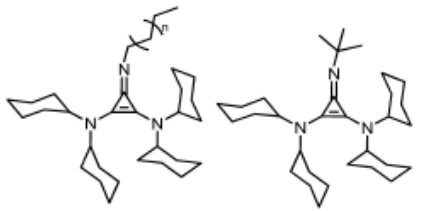
Enantioselective Brønsted base catalysis

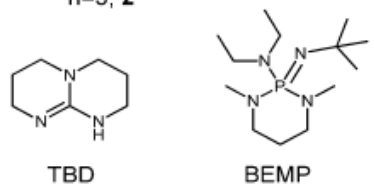
Cyclopropenimine Superbases-catalyzed ring-opening polymerization



entry	monomer	catalyst	cat. conc. (M)	solvent	time	conv. (%)	M_n[b]	M_w/M_n
1	rac-lactide	1	0.010	CH_2Cl_2	8 min	84	8390	1.42
2	rac-lactide	1	0.050	CH_2Cl_2	10 min	99	15300	1.57
3[c]	rac-lactide	1	0.007	C_6D_6	2 days	99	70700	1.46
4	L-lactide	1	0.010	CH_2Cl_2	8 min	93	11500	1.30
5	L-lactide	2	0.010	CH_2Cl_2	8 min	90	17300	1.46
6	rac-lactide	3	0.020	CD_2Cl_2	20 min	98	13100	1.38
7	rac-lactide	BEMP	0.010	CH_2Cl_2	8 min	65	8300	1.24
8	L-lactide[d]	TBD	0.0007	CH_2Cl_2	10 s	11	19000	1.39
9	carbonate[e]	1	0.010	CH_2Cl_2	22 hrs	3	-	-





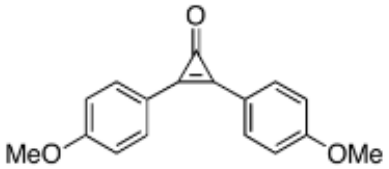


Acs Macro Lett. **2015**, *4*, 853.

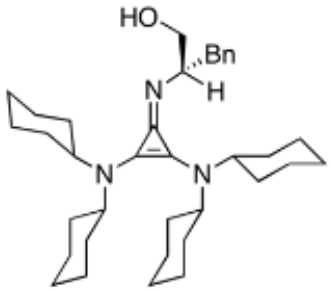
Significant Research Areas

catalysis

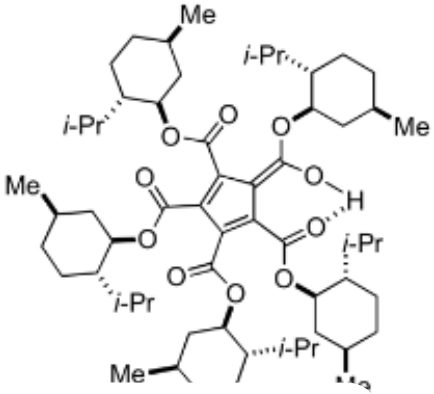
Reaction Design | Synthesis



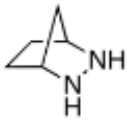
dehydrative catalysis



enantioselective Brønsted base catalysis



enantioselective Brønsted acid catalysis

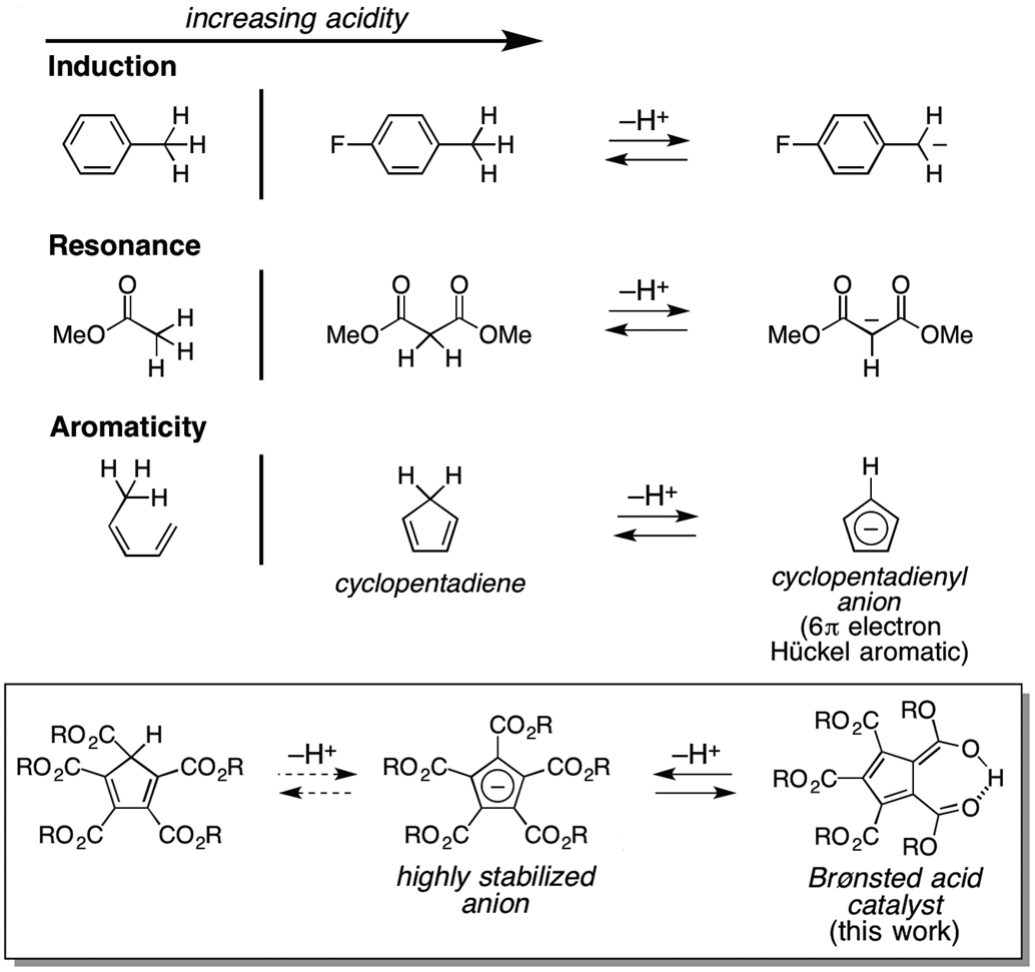


catalytic carbonyl-olefin metathesis

Enantioselective Brønsted acid catalysis

An aromatic ion platform for enantioselective Brønsted acid catalysis

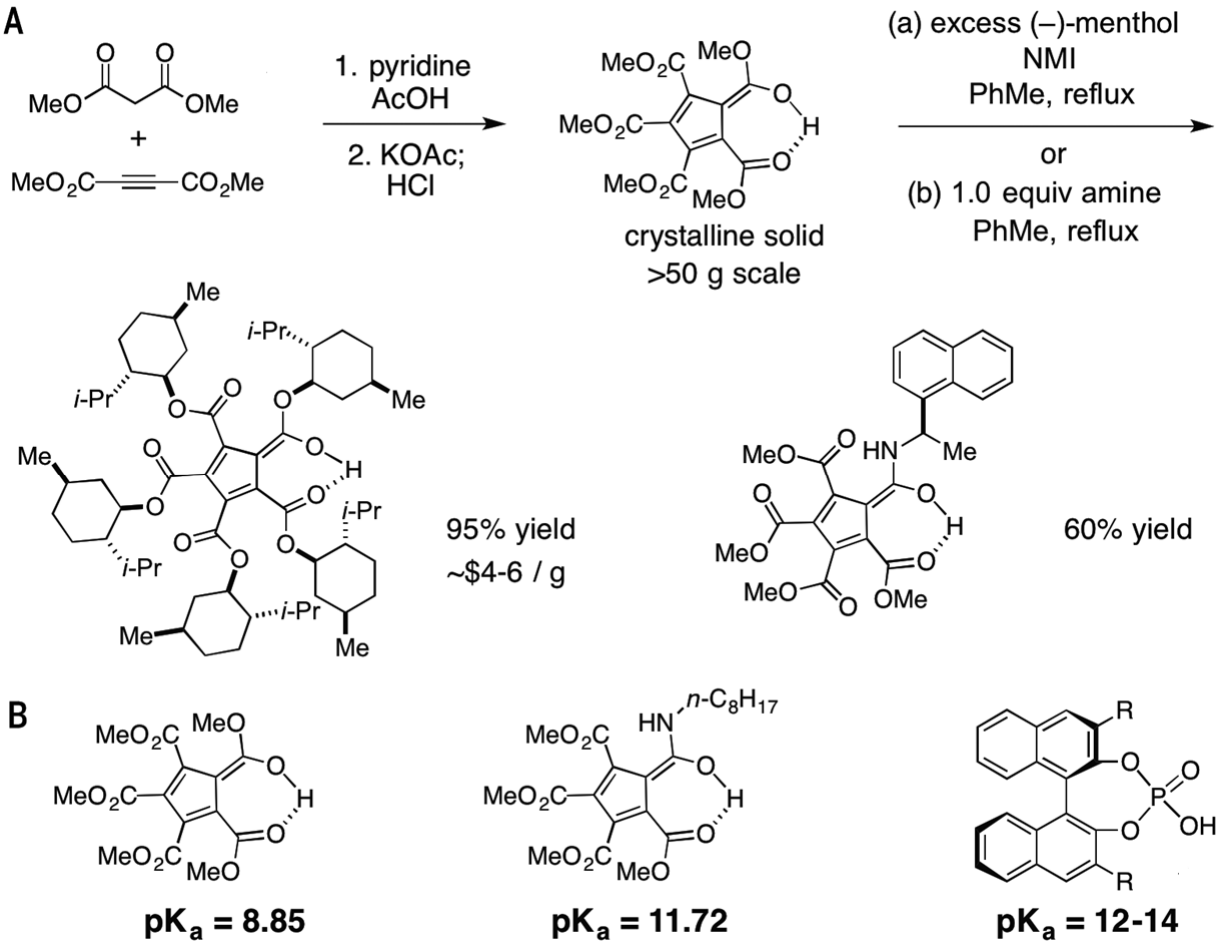
Tuning carbon acids for catalysis



Science **2016**, *352*, 961.

Enantioselective Brønsted acid catalysis

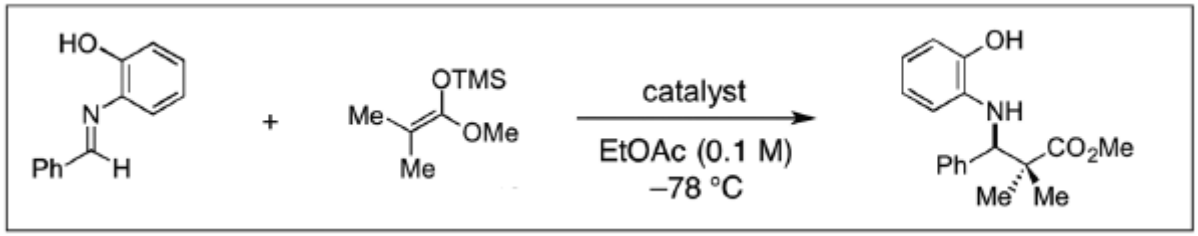
An aromatic ion platform for enantioselective Brønsted acid catalysis

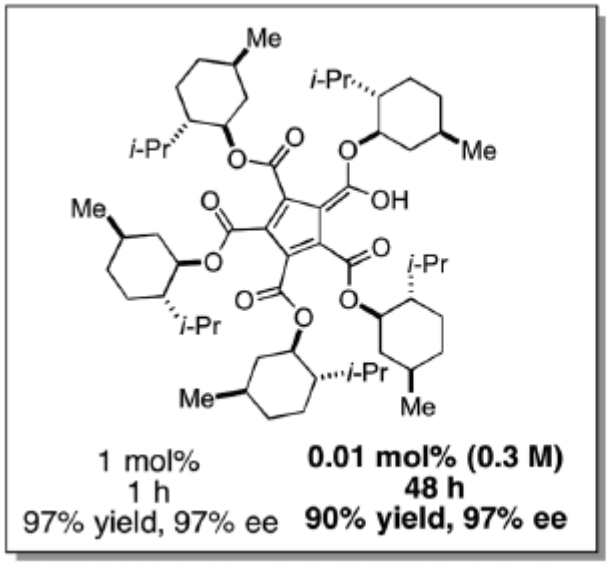


Science **2016**, *352*, 961.

Enantioselective Brønsted acid catalysis

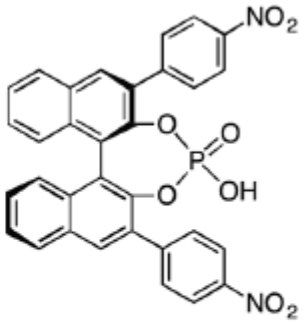
An aromatic ion platform for enantioselective Brønsted acid catalysis





1 mol%
1 h
97% yield, 97% ee

0.01 mol% (0.3 M)
48 h
90% yield, 97% ee



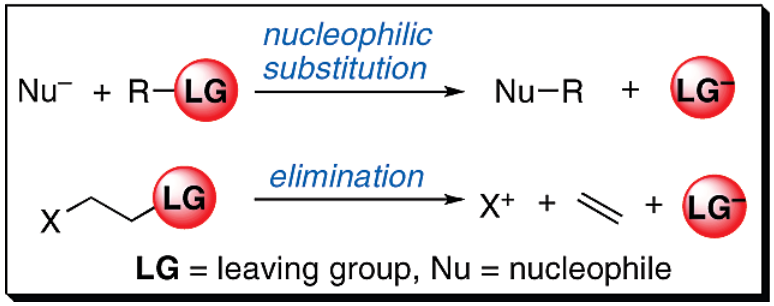
10 mol%, 24 h
98% yield, 89% ee
(toluene)

Science **2016**, *352*, 961.

Enantioselective Brønsted acid catalysis

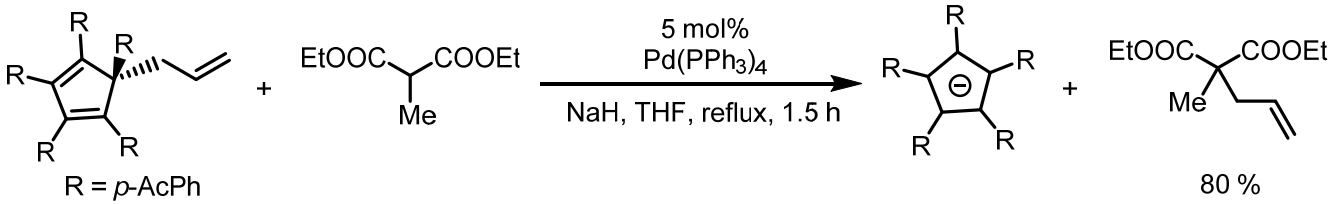
Leaving Group Potential of a Substituted Cyclopentadienyl Anion Toward Oxidative Addition

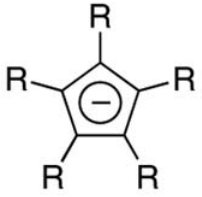
Leaving groups in organic chemistry



- Concept of leaving groups intrinsic to many reactions
- Typically **LG** = Cl^-, Br^-, I^-, RSO_3^-, H_2O, ROH, R_3N
- R_3C^- usually very poor **LG**

Carbon as a leaving group



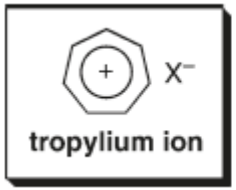


- Highly stabilized carbanions
- pKa of conjugate acids as low as –10
- Readily synthesized
- Electronically and sterically tunable
- General carbon leaving group?

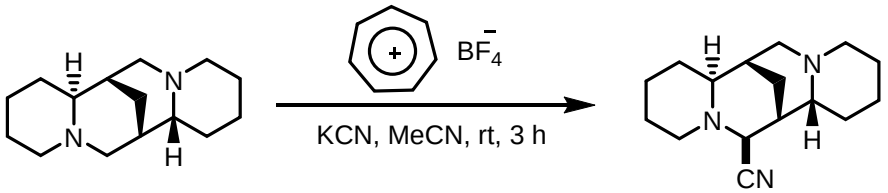
Org. Lett. **2009**, *11*, 4108.

Enantioselective Brønsted acid catalysis

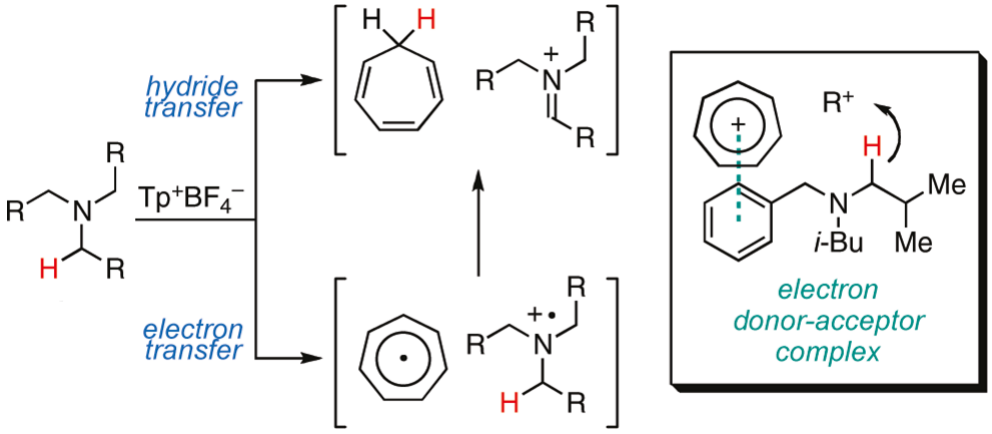
Tropylium Ion Mediated α -Cyanation of Amines



- 6π-electron aromatic system
- first prepared by Doering and Knox in 1954
- aromatic carbocation



90 %, 1g scale
R-cyanate (-)sparteine

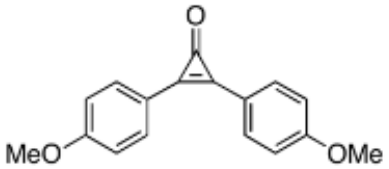


J. Am. Soc. Chem. **2011**, *133*, 1260.

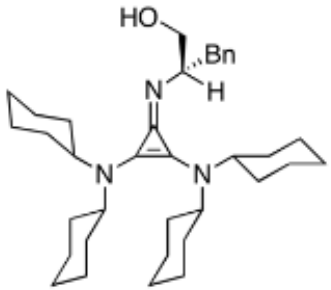
Significant Research Areas

catalysis

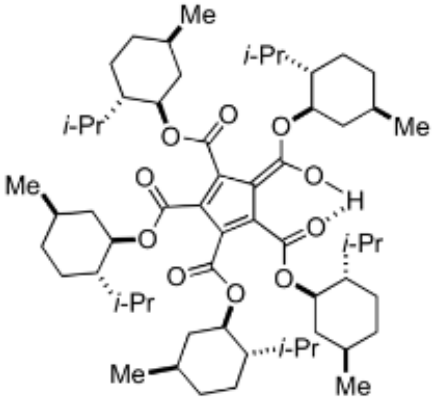
Reaction Design | Synthesis



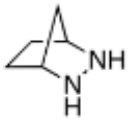
dehydrative catalysis



enantioselective Brønsted base catalysis



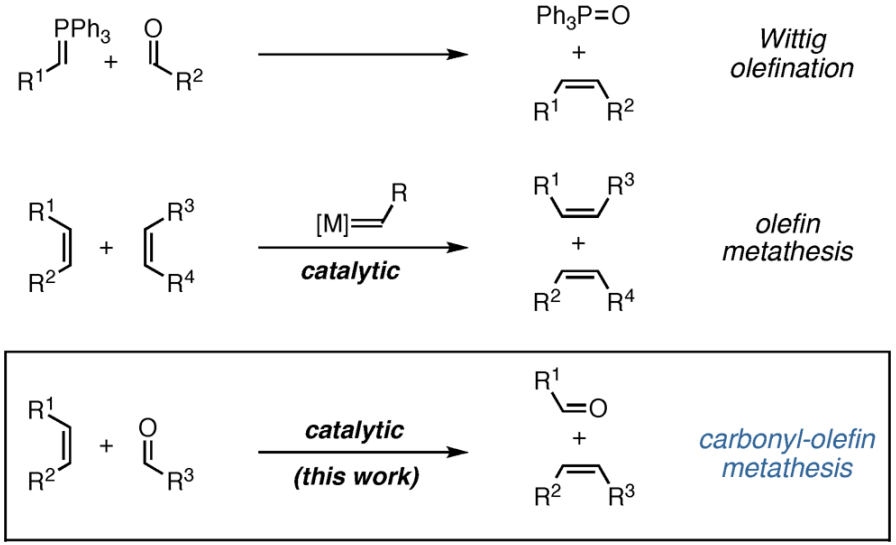
enantioselective Brønsted acid catalysis

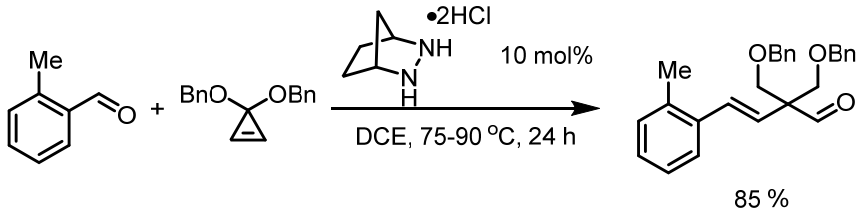


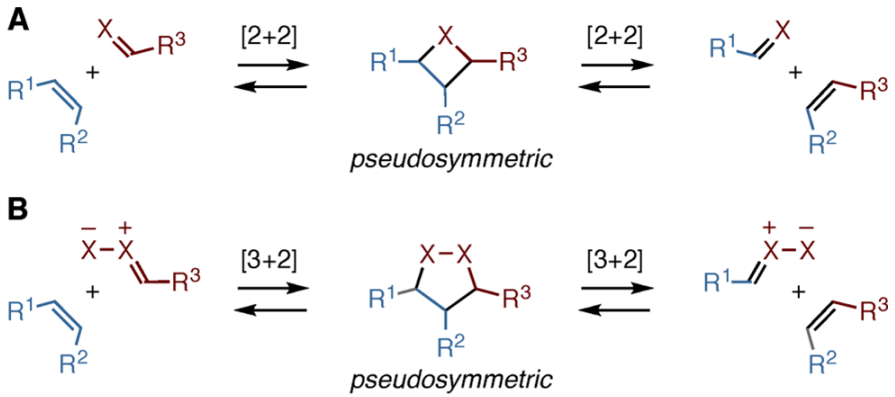
catalytic carbonyl-olefin metathesis

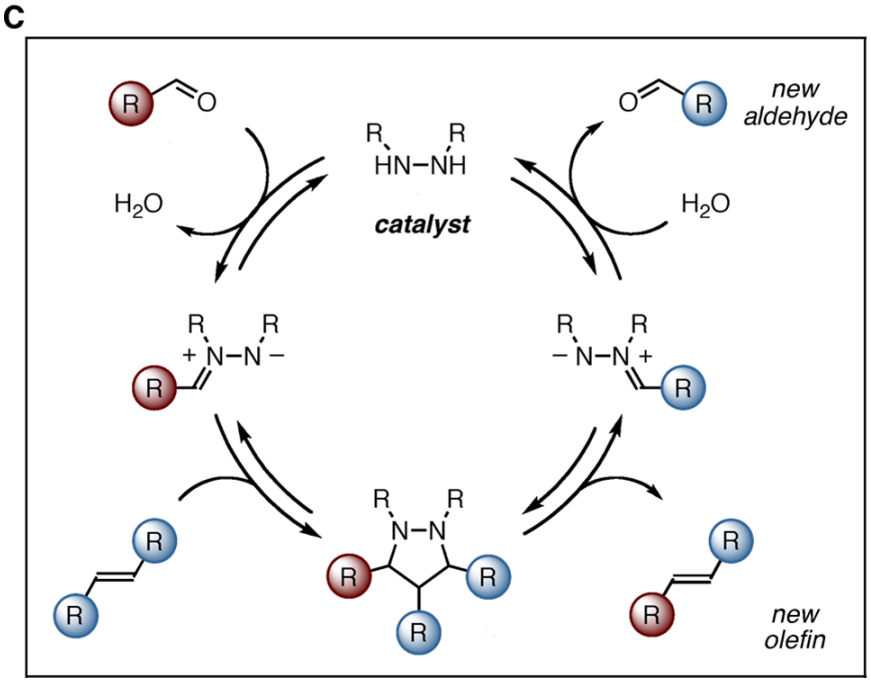
Catalytic carbonyl-olefin metathesis

Organocatalytic Carbonyl-Olefin Metathesis







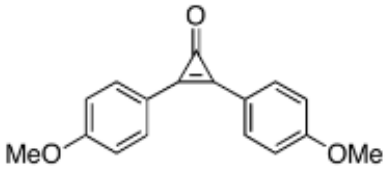


J. Am. Soc. Chem. **2012**, *134*, 18581.

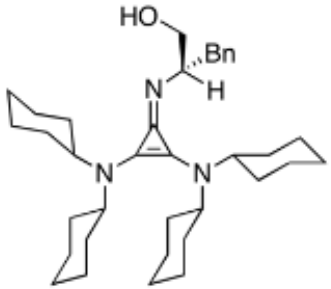
Summary

Reaction Design | Synthesis

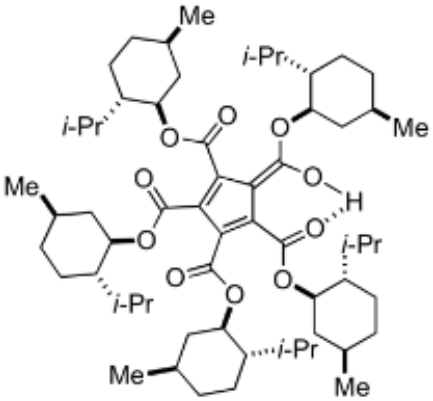
Aromatic ions activation



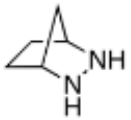
dehydrative catalysis



enantioselective Brønsted base catalysis

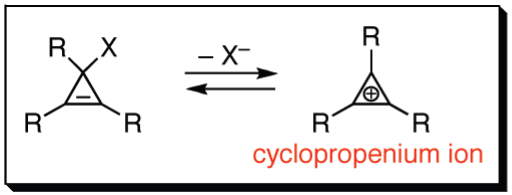


enantioselective Brønsted acid catalysis



catalytic carbonyl-olefin metathesis

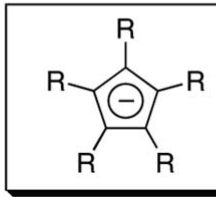
Aromatic Cation



Aromatic Cation

- 2π-electron aromatic system
- discovered by Breslow (1957)
- highly stabilized carbocations
- electronically, sterically tunable
- potential for new reaction design

Aromatic anion



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