

- | | | | |
|--------------|--------------|----------------|-------------|
| • Aluminum | • Europium | • Lutetium | • Silicon |
| • Barium | • Fluorine | • Magnesium | • Silver |
| • Bismuth | • Gadolinium | • Molybdenum | • Terbium |
| • Calcium | • Gallium | • Neodymium | • Thallium |
| • Cerium | • Holmium | • Nickel | • Thulium |
| • Cobalt | • Indium | • Praseodymium | • Tin |
| • Copper | • Iron | • Rhodium | • Ytterbium |
| • Dysprosium | • Lanthanum | • Ruthenium | • Yttrium |
| • Erbium | • Lead | • Samarium | • Zinc |
| | • Lithium | • Scandium | |

13-1500 Aluminum trifluoromethanesulfonate, 99% (Aluminum triflate) (74974-61-1) 10g
 $\text{Al}(\text{CF}_3\text{SO}_3)_3$; FW: 474.18; white powdr.; m.p. dec. 50g
hygroscopic

56-8100 Barium trifluoromethanesulfonate, 99% (Barium triflate) (2794-60-7) 5g
 HAZ $\text{Ba}(\text{CF}_3\text{SO}_3)_2$; FW: 435.47; white powdr.; m.p. dec. 25g
hygroscopic

83-8000 Bismuth(III) trifluoromethanesulfonate, min. 98% (Bismuth triflate) (88189-03-1) 1g
 $\text{Bi}(\text{SO}_3\text{CF}_3)_3$; FW: 656.19; white to off-white powdr. 5g
hygroscopic 25g

Technical Note:

1. Powerful Lewis acid useful in a number of catalytic reactions.

References:

1. *Synlett*, **2003**, *10*, 1566

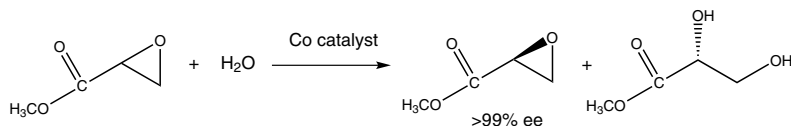
20-5000 Calcium trifluoromethanesulfonate, min. 96% (Calcium triflate) (55120-75-7) 10g
 $\text{Ca}(\text{CF}_3\text{SO}_3)_2$; FW: 338.21; white powdr.; m.p. dec. 50g
hygroscopic

58-6000 Cerium(III) trifluoromethanesulfonate, min. 98% (Cerium triflate) (76089-77-5) 5g
 $\text{Ce}(\text{CF}_3\text{SO}_3)_3$; FW: 587.33; white powdr. 25g
hygroscopic

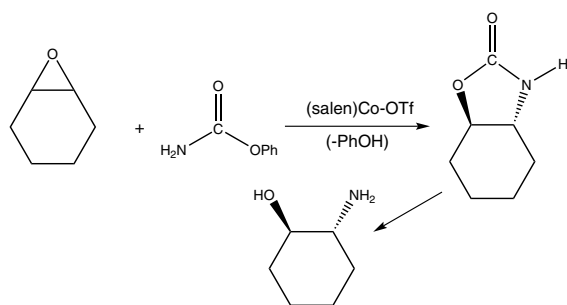
27-0495 Cyclic-Oligo Bis[(1R,2R)-(+)-1,2-cyclohexanediamino-N,N'-bis(3,3'-di-t-butylsalicylidene) cobalt(III)triflate]-5,5'-bis(2-carboxyethyl)ether (647036-07-5) 100mg
 $\text{C}_{70}\text{H}_{84}\text{Co}_2\text{F}_6\text{N}_4\text{O}_{20}\text{S}_2$; FW: 1597.42; black xtl. 500mg

Technical Notes:

1. Oligomeric catalyst used for the hydrolytic kinetic resolution of terminal epoxides under solvent-free conditions.
2. Oligomeric catalyst used for the synthesis of highly enantioenriched trans-1,2-amino alcohols.



Tech. Note (1)
 Ref. (1)



Tech. Note (2)
 Ref. (2)

References:

1. *Tetrahedron: Asymmetry*, **2003**, *14*, 3633
2. *Org. Lett.*, **2013**, *15*, 2895
3. *Tetrahedron* **2014**, *70*, 4165

27-0496 Cyclic-Oligo Bis[(1S,2S)-(-)-1,2-cyclohexanediamino-N,N'-bis(3,3'-di-t-butylsalicylidene) cobalt(III)triflate]-5,5'-bis(2-carboxyethyl)ether (1252661-94-1) 100mg
 $\text{C}_{70}\text{H}_{84}\text{Co}_2\text{F}_6\text{N}_4\text{O}_{20}\text{S}_2$; FW: 1597.42; black xtl. 500mg

Technical Notes:

1. Oligomeric catalyst used for the hydrolytic kinetic resolution of terminal epoxides under solvent-free conditions.
2. Catalyst used for the synthesis of enantioenriched tetrahydrofurans via the intramolecular openings of oxetanes.
3. Catalyst for the enantioselective addition of phenyl carbamate to meso-epoxides for the synthesis of trans-1,2-amino alcohols.

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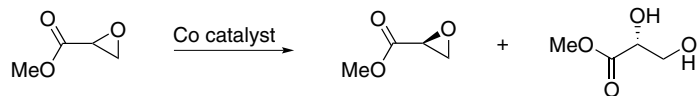
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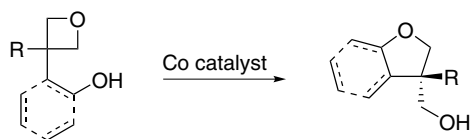
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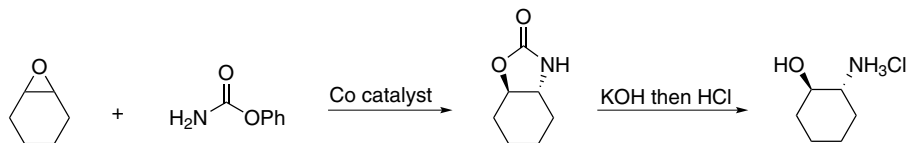
Metal Triflates



Tech. Note (1)
Ref. (1)



Tech. Note (2)
Ref. (2)

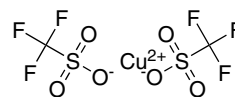


Tech. Note (3)
Ref. (3)

References:

1. *Tetrahedron: Asymmetry*, **2003**, *14*, 3633.
2. *J. Am. Chem. Soc.* **2009**, *131*, 2786.
3. *Org. Lett.*, **2013**, *15*, 2895.

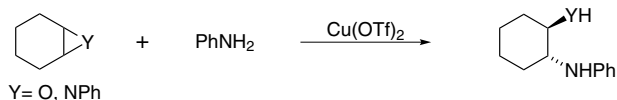
29-5000 **Copper(II) trifluoromethanesulfonate, 98% (Copper triflate) (34946-82-2)**
HAZ $\text{Cu}(\text{CF}_3\text{SO}_3)_2$; FW: 361.68; light green solid
hygroscopic



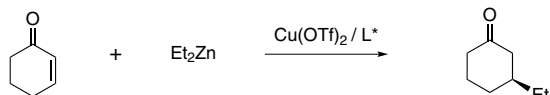
5g
25g
100g

Technical Notes:

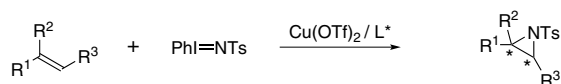
1. Ring-Opening of epoxides and aziridines.
2. Asymmetric conjugate addition of organozinc reagents to α,β -unsaturated ketones.
3. Electrophilic addition of olefins.
4. Asymmetric aziridination of olefins.
5. Asymmetric cycloadditions and aldol condensations.
6. Asymmetric Kharasch oxidation.
7. Asymmetric Michael addition of enamides.
8. Asymmetric O-H or O-R insertion reactions.
9. Enantioselective intramolecular aminooxygenation of alkenes.
10. Enantioselective addition of dialkylzinc reagents to N-acylpyridinium salts.
11. Pd-catalyzed C-H functionalizations of oximes with arylboronic acids.
12. Used as a Lewis acid in the Nazarov cyclization.
13. Catalyst in the diacetoxylation olefins
14. Catalyst in the meta-selective direct arylation of α -aryl carbonyl compounds
15. Catalyst in the three-component coupling of amines, aldehydes, and alkynes



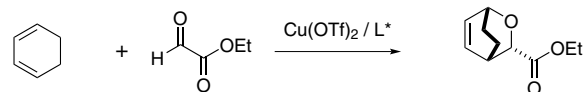
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Ref. (1,2)



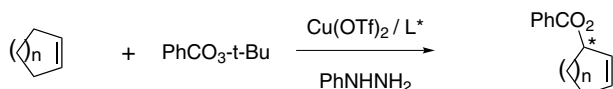
Tech. Note (2)
Ref. (4)



Tech. Note (4)
Ref. (6)



Tech. Note (5)
Ref. (8)



Tech. Note (6)
Ref. (7)

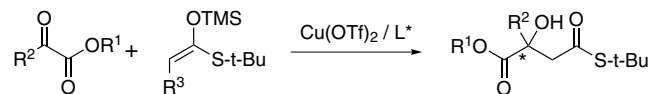
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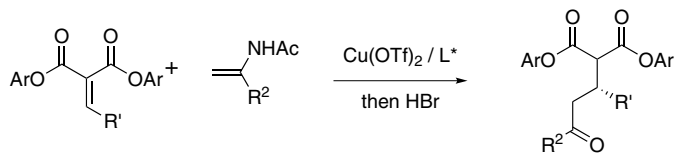
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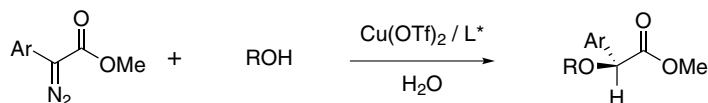
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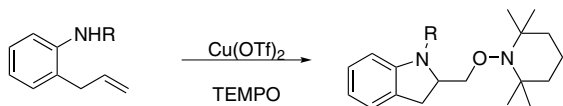
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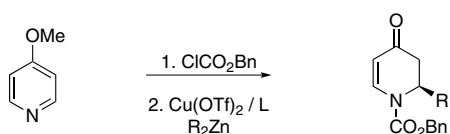
Tech. Note (8)
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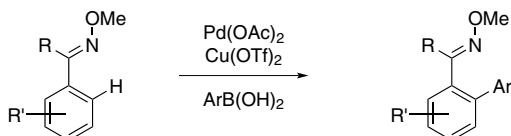
Tech. Note (9)
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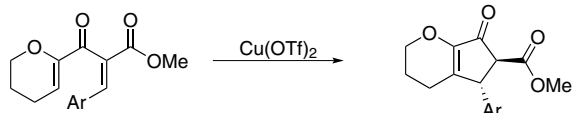
Tech. Note (10)
Ref. (14)



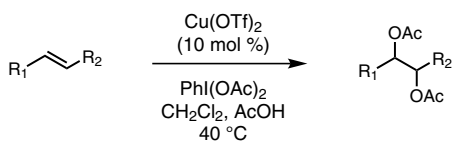
Tech. Note (11)
Ref. (15)



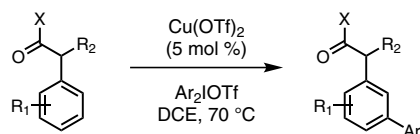
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Ref. (16)



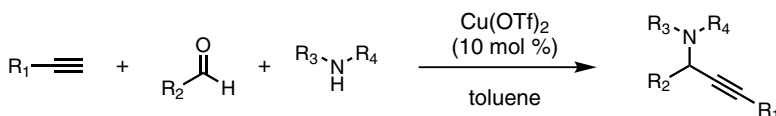
Tech. Note (13)
Ref. (17)



Tech. Note (14)
Ref. (18)



Tech. Note (15)
Ref. (19)



References:

1. *J. Org. Chem.*, **1999**, 64, 287
2. *J. Org. Chem.*, **1999**, 64, 2537
3. *J. Org. Chem.*, **1998**, 63, 4568
4. (a) *Eur. J. Org. Chem.*, **2002**, 3221, b, *J. Am. Chem. Soc.*, 2006, 128, 8416
5. *Heterocycles*, **1997**, 45, 847
6. *J. Am. Chem. Soc.*, **1993**, 115, 5328
7. *Acc. Chem. Res.*, **2000**, 33, 325
8. *J. Am. Chem. Soc.*, **2001**, 123, 3830
9. *Angew. Chem. Int. Ed.*, **2001**, 40, 3567
10. *Tetrahedron*, **2002**, 58, 845
11. *Angew. Chem. Int. Ed.*, **2007**, 46, 7803
12. *J. Am. Chem. Soc.*, **2006**, 128, 4594
13. *J. Am. Chem. Soc.*, **2008**, 130, 17638
14. *Angew. Chem. Int. Ed.*, **2009**, 48, 9339
15. *Org. Lett.*, **2010**, 12, 184
16. *J. Am. Chem. Soc.*, **2008**, 130, 1003
17. *Org. Lett.*, **2010**, 12, 1412
18. *Angew. Chem. Int. Ed.*, **2011**, 50, 463
19. *Org. Lett.*, **2012**, 14, 964

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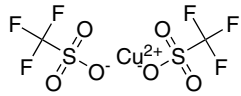
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Metal Triflates

29-5001 HAZ	Copper(II) trifluoromethanesulfonate, 99% (99.9%-Cu) (Copper triflate) (34946-82-2) Cu(CF ₃ SO ₃) ₂ ; FW: 361.68; light green solid <i>air sensitive</i>		5g 25g 100g
66-4000	Dysprosium(III) trifluoromethanesulfonate, min. 98% (Dysprosium triflate) (139177-62-1) Dy(CF ₃ SO ₃) ₃ ; FW: 609.71; white solid <i>hygroscopic</i>		5g 25g
68-6000	Erbium(III) trifluoromethanesulfonate, min. 98% (Erbium triflate) (139177-64-3) Er(CF ₃ SO ₃) ₃ ; FW: 614.47; pink powdr. <i>hygroscopic</i>		5g 25g
63-1000	Europium(III) trifluoromethanesulfonate, min. 98% (Europium triflate) (52093-25-1) Eu(CF ₃ SO ₃) ₃ ; FW: 599.17; white to off-white powdr. <i>hygroscopic</i>		1g 5g
64-3800	Gadolinium(III) trifluoromethanesulfonate, min. 98% (Gadolinium triflate) (52093-29-5) Gd(CF ₃ SO ₃) ₃ ; FW: 604.46; white powdr. <i>hygroscopic</i>		5g 25g
31-1300 HAZ	Gallium(III) trifluoromethanesulfonate, 98% (Gallium triflate) (74974-60-0) Ga(CF ₃ SO ₃) ₃ ; FW: 516.93; white powdr. <i>hygroscopic</i>		1g 5g
67-6000	Holmium(III) trifluoromethanesulfonate, min. 98% (Holmium triflate) (139177-63-2) Ho(CF ₃ SO ₃) ₃ ; FW: 612.14; white to off-white powdr. <i>hygroscopic</i>		5g 25g
49-1800	Indium(III) trifluoromethanesulfonate, 99% (Indium triflate) (128008-30-0) In(CF ₃ SO ₃) ₃ ; FW: 562.02; white powdr.; m.p. dec. <i>hygroscopic</i>		5g 25g
26-2830 HAZ	Iron(II) trifluoromethanesulfonate, 98% (Iron triflate) (59163-91-6) Fe(CF ₃ SO ₃) ₂ ; FW: 353.99; off-white to brown powdr. <i>hygroscopic</i>		25g 100g
57-2800	Lanthanum(III) trifluoromethanesulfonate, min. 97% (Lanthanum triflate) (52093-26-2) La(SO ₃ CF ₃) ₃ ; FW: 586.11; white powdr. <i>hygroscopic</i>		2g 10g 50g
03-2000	Lithium trifluoromethanesulfonate, 99% (Lithium triflate) (33454-82-9) LiCF ₃ SO ₃ ; FW: 156.01; white powdr. <i>hygroscopic</i>		10g 50g
71-1000	Lutetium(III) trifluoromethanesulfonate, min. 98% (Lutetium triflate) (126857-69-0) Lu(CF ₃ SO ₃) ₃ ; FW: 622.18; white powdr. <i>hygroscopic</i>		500mg 2g
12-4000	Magnesium trifluoromethanesulfonate, min. 98% (Magnesium triflate) (60871-83-2) Mg(SO ₃ CF ₃) ₂ ; FW: 322.45; white powdr. <i>hygroscopic</i>		5g 25g
80-2200 HAZ	Mercury(II) trifluoromethanesulfonate, 98% (Mercury triflate) (49540-00-3) Hg(CF ₃ SO ₃) ₂ ; FW: 498.71; white powdr. <i>hygroscopic</i>		5g 25g
60-5200	Neodymium(III) trifluoromethanesulfonate, min. 98% (Neodymium triflate) (34622-08-7) Nd(CF ₃ SO ₃) ₃ ; FW: 591.45; purple powdr. <i>hygroscopic</i>		5g 25g
28-1700	Nickel(II) trifluoromethanesulfonate, min. 98% (Nickel triflate) (60871-84-3) Ni(CF ₃ SO ₃) ₂ ; FW: 356.83; pale green powdr. <i>hygroscopic</i>		1g 5g
59-7000	Praseodymium(III) trifluoromethanesulfonate, min. 98% (Praseodymium triflate) (52093-27-3) Pr(CF ₃ SO ₃) ₃ ; FW: 588.12; green powdr. <i>heat sensitive, hygroscopic</i>		5g 25g
62-3300	Samarium(III) trifluoromethanesulfonate, min. 98% (Samarium triflate) (52093-28-4) Sm(CF ₃ SO ₃) ₃ ; FW: 597.57; white to off-white powdr. <i>hygroscopic</i>		5g 25g
21-2000	Scandium(III) trifluoromethanesulfonate, min. 98% (Scandium triflate) (144026-79-9) Sc(SO ₃ CF ₃) ₃ ; FW: 492.17; white powdr. <i>hygroscopic</i>		250mg 1g 5g

Technical Notes:

1. Water tolerant Lewis acid.
2. Commonly used in a range of Lewis acid catalyzed reactions.
3. Efficient metal source for Lewis acid catalyzed asymmetric reactions.
4. Catalyzes Friedel-Crafts alkylation, acylation and related reactions.

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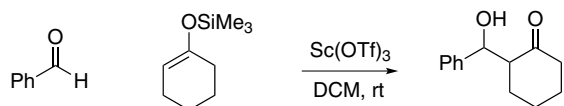
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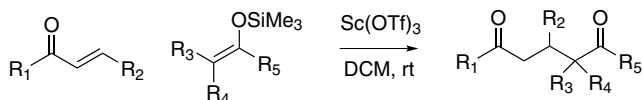
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- Catalyzes various domino- and multi-component processes.
- Catalyzes electrophilic additions of alpha-diazoesters with ketones.
- Catalyzes carbon insertion reactions.

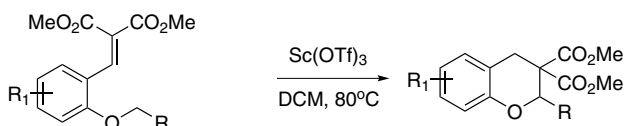
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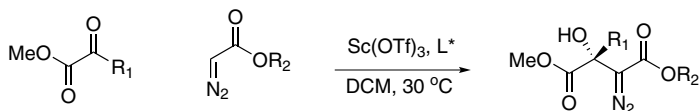
Michael Reactions



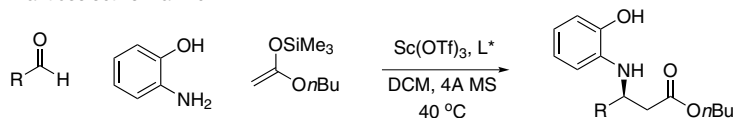
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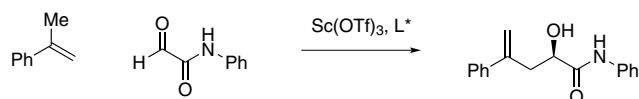
Enantioselective Aldol



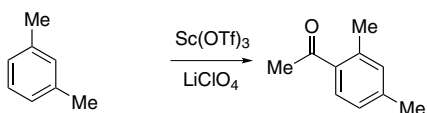
Enantioselective Mannich



Enantioselective Ene Reaction



Friedel-Crafts



Multi-component



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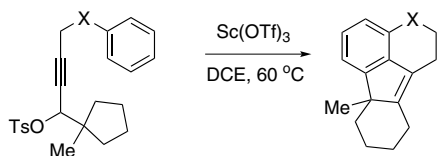
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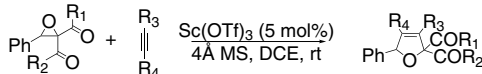
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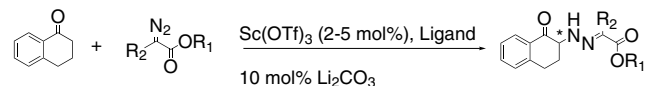
Domino reactions



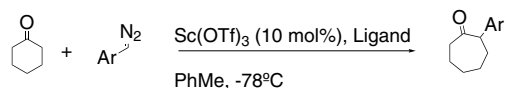
Cycloaddition Reactions



Enantioselective Electrophilic Diazoester Addition



Carbon Insertion



References:

1. *Synlett*, **1993**, 7, 472
2. *Synlett*, **1994**, 9, 689
3. *Org. Lett.*, **2009**, 11, 2972
4. *Chem. Comm.*, **2009**, 7297
5. *Chem. Eur. J.*, **2009**, 15, 5884
6. *J. Am. Chem. Soc.*, **2005**, 127, 8006
7. *Chem. Comm.*, **1996**, 183
8. *Tetrahedron Lett.*, **1997**, 38, 4819
9. *Angew. Chemie. Int. Ed.*, **2009**, 48, 7857
10. *Chem. Comm.*, **2011**, 47, 12870
11. *Org. Lett.*, **2011**, 13, 5940
12. *J. Am. Chem. Soc.*, **2011**, **133**, 15268
13. *Org. Lett.*, **2011**, 13, 2004

21-2004 Scandium(III) trifluoromethanesulfonate (Scandium triflate), Microencapsulated in a Styrene Polymer [~13%

500mg

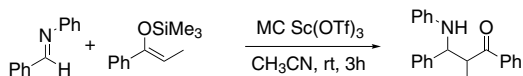
Sc(SO₃CF₃)₃]

Sc(SO₃CF₃)₃; white solid

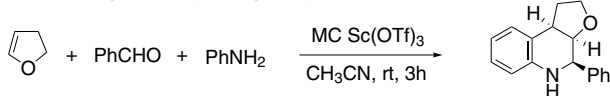
Technical Note:

1. Microencapsulated Scandium triflate is a useful Lewis acid catalyst which can be applied to various synthetic procedures such as the aldol, Michael, alkylation, Friedel-Crafts acylation, Mannich and Strecher type reactions. The encapsulated Sc(SO₃CF₃)₃ has a higher activity than the free monomer, can easily be separated from the reaction mixture, and is reusable.

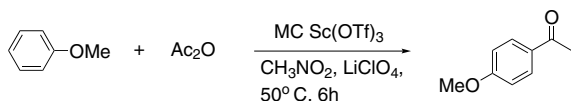
Imino Aldol Reaction (Flow System)



Quinoline Synthesis (Flow System)



Friedel-Crafts Acylation (Batch System)



References:

1. *J. Am. Chem. Soc.*, **1998**, 120, 2985
2. *Eur. J. Org. Chem.*, **1999**, 15

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47-2000 Silver trifluoromethanesulfonate, 99% (Silver triflate) (2923-28-6)

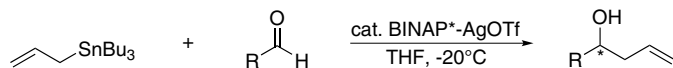
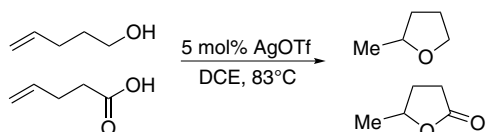
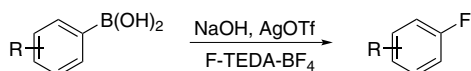
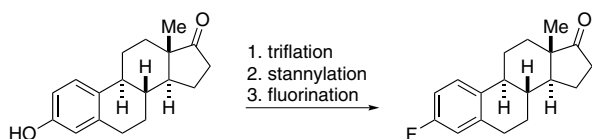
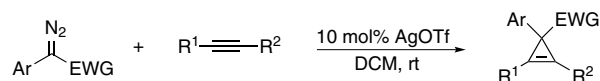
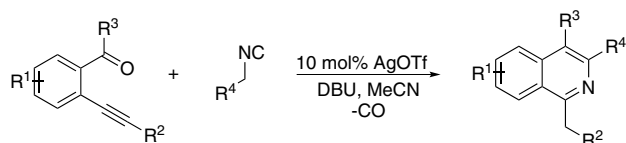
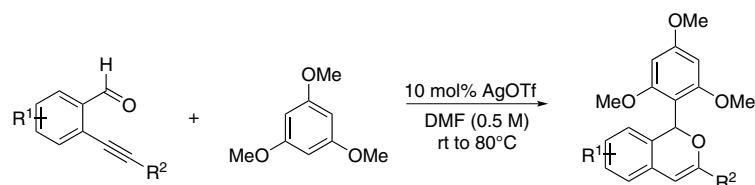
 AgSO₃CF₃; FW: 256.94; off-white powdr.

light sensitive, hygroscopic

 5g
25g
100g

Technical Notes:

1. Silver precatalyst for the asymmetric allylation of aldehydes
2. Silver catalyst for intramolecular additions of alcohols and carboxylic acids to inert olefins
3. Silver catalyst for the fluorination of boronic acids
4. Silver catalyst for the fluorination of functionalized aryl stannanes
5. Silver catalyst for cyclopropanation of internal alkynes with donor/acceptor substituted diazo compounds
6. Silver catalyst for the reaction of 2-alkynylbenzaldehyde with 2-isocyanoacetate
7. Silver catalyst for domino hydroarylation/cycloisomerizations of o-alkynylbenzaldehydes to functionalized isochromenes


Tech. Note (1)
Ref. (1)

Tech. Note (2)
Ref. (2)

Tech. Note (3)
Ref. (3)

Tech. Note (4)
Ref. (4)

Tech. Note (5)
Ref. (5)

Tech. Note (6)
Ref. (6)

Tech. Note (7)
Ref. (7)
References:

1. *J. Am. Chem. Soc.*, **1996**, *118*, 4723.
2. *Org. Lett.*, **2005**, *7*, 4553.
3. *Org. Lett.*, **2009**, *11*, 2860.
4. *J. Am. Chem. Soc.*, **2009**, *131*, 1662.
5. *Org. Lett.*, **2011**, *13*, 3984.
6. *Org. Lett.*, **2012**, *14*, 2655.
7. *Org. Lett.*, **2014**, *16*, 4570.

47-2012 Silver trifluoromethanesulfonate (99.95%-Ag) (Silver triflate) (2923-28-6)

 AgSO₃CF₃; FW: 256.94; off-white powdr.

light sensitive, hygroscopic

 1g
5g
25g

Technical Note:

1. See 47-2000.

65-6000 Terbium(III) trifluoromethanesulfonate, min. 98% (Terbium triflate) (148980-31-8)

 Tb(CF₃SO₃)₃; FW: 606.14; white powdr.

hygroscopic

 1g
5g

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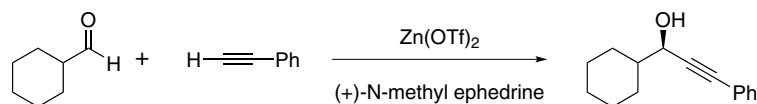
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Metal Triflates

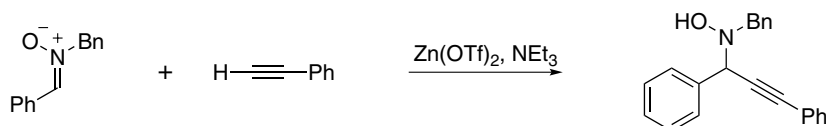
81-8500 HAZ	Thallium(I) trifluoromethanesulfonate, 99% (Thallium triflate) (73491-36-8) TlSO ₃ CF ₃ ; FW: 353.45; white powdr. <i>hygroscopic</i>	1g 5g 25g
69-5000	Thulium(III) trifluoromethanesulfonate, min. 98% (Thulium triflate) (141478-68-4) Tm(CF ₃ SO ₃) ₃ ; FW: 616.14; white powdr. <i>hygroscopic</i>	500mg 2g
50-2750	Tin(II) trifluoromethanesulfonate, 99% (Tin triflate) (62086-04-8) Sn(CF ₃ SO ₃) ₂ ; FW: 416.82; white powdr.; m.p. dec. <i>hygroscopic</i>	2g 10g
70-6000	Ytterbium(III) trifluoromethanesulfonate hydrate (Ytterbium triflate) (252976-51-5) Yb(SO ₃ CF ₃) ₃ ·XH ₂ O; FW: 620.25; white powdr. <i>hygroscopic</i>	1g 5g 25g
39-4050	Yttrium(III) trifluoromethanesulfonate, min. 98% (Yttrium triflate) (52093-30-8) Y(CF ₃ SO ₃) ₃ ; FW: 536.12; white powdr. <i>hygroscopic</i>	5g 25g
30-4000 HAZ	Zinc trifluoromethanesulfonate, min. 98% (Zinc triflate) (54010-75-2) Zn(SO ₃ CF ₃) ₂ ; FW: 363.54; white powdr. <i>hygroscopic</i>	5g 25g

Technical Notes:

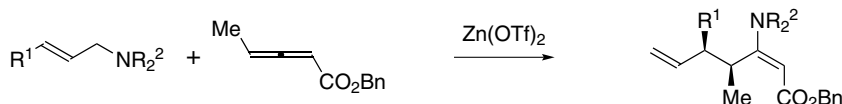
1. Catalyst for the addition of acetylenes to carbonyls and nitrones.
2. Claisen rearrangement.
3. Catalyst for the enantioselective Henry and Aza-Henry reactions.
4. Pd-catalyzed hydroalkylation of styrenes with zinc reagents.



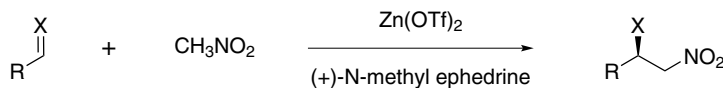
Tech. Note (1)
Ref. (1,2)



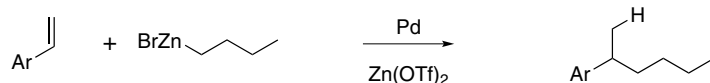
Tech. Note (2)
Ref. (3)



Tech. Note (3)
Ref. (4,5)



Tech. Note (4)
Ref. (6)



Tech. Note (4)
Ref. (6)

References:

1. *Acc. Chem. Res.*, **2000**, 33, 373
2. *J. Am. Chem. Soc.*, **2001**, 123, 9472
3. *J. Am. Chem. Soc.*, **2002**, 124, 13646
4. *Angew. Chem. Int. Ed.*, **2005**, 44, 3881
5. *Angew. Chem. Int. Ed.*, **2006**, 45, 117
6. *J. Am. Chem. Soc.*, **2009**, 131, 18042

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