

# STREM Metal Triflates

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• Aluminum	• Europium	• Lutetium	• Silver
• Barium	• Gadolinium	• Magnesium	• Terbium
• Bismuth	• Gallium	• Mercury	• Thallium
• Calcium	• Holmium	• Neodymium	• Thulium
• Cerium	• Indium	• Nickel	• Tin
• Copper	• Iron	• Praseodymium	• Ytterbium
• Dysprosium	• Lanthanum	• Samarium	• Yttrium
• Erbium	• Lithium	• Scandium	• Zinc

<b>13-1500</b>	<b>Aluminum trifluoromethanesulfonate, 99% (Aluminum triflate)</b> [74974-61-1] Al(CF <sub>3</sub> SO <sub>3</sub> ) <sub>3</sub> ; FW: 474.18; powdr.; m.p. dec.; <i>hygroscopic</i>	10g 50g
<b>56-8100</b>	<b>Barium trifluoromethanesulfonate, 99% (Barium triflate)</b> [2794-60-7] HAZ Ba(CF <sub>3</sub> SO <sub>3</sub> ) <sub>2</sub> ; FW: 435.47; powdr.; m.p. dec.; <i>hygroscopic</i>	5g 25g
<b>83-8000</b>	<b>Bismuth(III) trifluoromethanesulfonate, min. 98% (Bismuth triflate)</b> [88189-03-1] Bi(SO <sub>3</sub> CF <sub>3</sub> ) <sub>3</sub> ; FW: 656.19; white to off-white powdr. <i>hygroscopic</i>	1g 5g 25g

Technical Note:

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

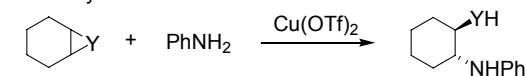
Reference:

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

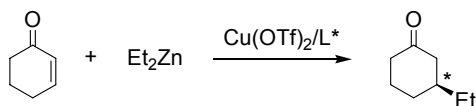
<b>20-5000</b>	<b>Calcium trifluoromethanesulfonate, min. 96% (Calcium triflate)</b> [55120-75-7] Ca(CF <sub>3</sub> SO <sub>3</sub> ) <sub>2</sub> ; FW: 338.21; powdr.; m.p. dec.; <i>hygroscopic</i>	10g 50g
<b>58-6000</b>	<b>Cerium(III) trifluoromethanesulfonate, min. 98% (Cerium triflate)</b> [76089-77-5] <b>NEW</b> Ce(CF <sub>3</sub> SO <sub>3</sub> ) <sub>3</sub> ; FW: 587.33; white powdr. <i>hygroscopic</i>	5g 25g
<b>29-5000</b>	<b>Copper(II) trifluoromethanesulfonate, 98% (Copper triflate)</b> [34946-82-2] HAZ Cu(CF <sub>3</sub> SO <sub>3</sub> ) <sub>2</sub> ; FW: 361.68; powdr.; <i>hygroscopic</i>	5g 25g

Technical Notes:

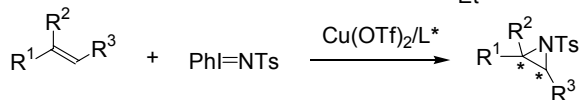
1. Ring-Opening of epoxides and aziridines.
2. Asymmetric conjugate addition of organozinc reagents to α,β-unsaturated ketones.
3. Electrophilic addition of olefins.
4. Asymmetric aziridination of olefins.
5. Asymmetric cycloadditions and aldol condensations.
6. Asymmetric Kharasch oxidation.
7. Asymmetric Michael addition of enamides.
8. Asymmetric O-H Insertion reactions.



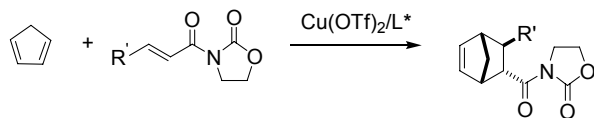
Tech. Note (1)  
Ref. (1,2)



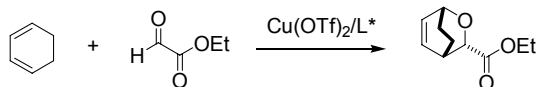
Tech. Note (2)  
Ref. (4)



Tech. Note (4)  
Ref. (6)



Tech. Note (5)  
Ref. (7)



Tech. Note (5)  
Ref. (8)

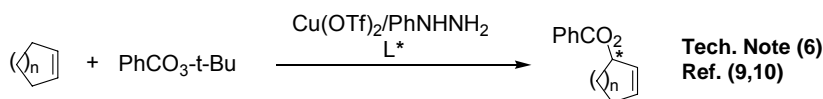
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U.S.A.  
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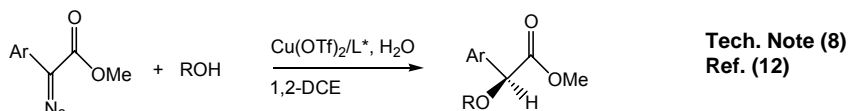
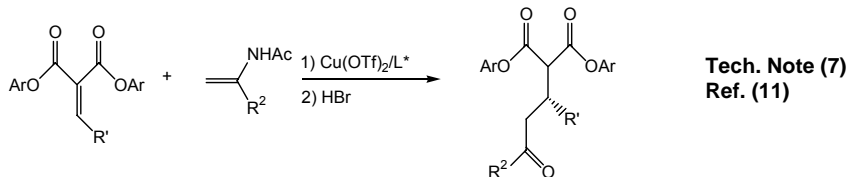
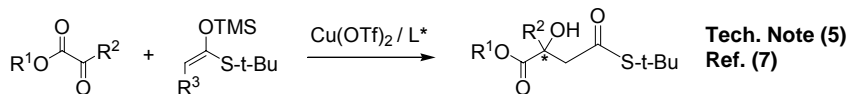
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15, rue de l'Atome  
Zone Industrielle  
67800 BISCHHEIM France  
Tel.: (33) 03 88 62 52 60  
Fax: (33) 03 88 62 26 81  
Email: [info.europe@strem.com](mailto:info.europe@strem.com)

**Strem Chemicals, Inc.**  
Postfach 1215  
77672 KEHL  
Germany  
Telefon: 0 78 51/ 7 58 79  
Email: [info.europe@strem.com](mailto:info.europe@strem.com)

**Strem Chemicals UK**  
48 High Street  
Orwell, Royston  
England SG8 5QN  
Tel.: 01223 207430  
Fax: 01223 208138  
Email: [stremchemicals.uk@btinternet.com](mailto:stremchemicals.uk@btinternet.com)

**29-5000 Copper(II) trifluoromethanesulfonate, 98% (Copper triflate) [34946-82-2]**HAZ  
(cont.)

n=1,2,3,4



## References:

1. *J. Org. Chem.*, **1999**, 64, 287.
2. *J. Org. Chem.*, **1999**, 64, 2537.
3. *J. Org. Chem.*, **1998**, 63, 4568.
4. *Eur. J. Org. Chem.*, **2002**, 3221.
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.

<b>66-4000</b> <b>NEW</b> →	<b>Dysprosium(III) trifluoromethanesulfonate, min. 98% (Dysprosium triflate) [139117-62-1]</b> Dy(CF <sub>3</sub> SO <sub>3</sub> ) <sub>3</sub> ; FW: 609.71; yellow powdr. <i>hygroscopic</i>	5g 25g
<b>68-6000</b> <b>NEW</b> →	<b>Erbium(III) trifluoromethanesulfonate, min. 98% (Erbium triflate) [139177-64-3]</b> Er(CF <sub>3</sub> SO <sub>3</sub> ) <sub>3</sub> ; FW: 614.47; pink powdr. <i>hygroscopic</i>	5g 25g
<b>63-1000</b> <b>NEW</b> →	<b>Europium(III) trifluoromethanesulfonate, min. 98% (Europium triflate) [52093-25-1]</b> Eu(CF <sub>3</sub> SO <sub>3</sub> ) <sub>3</sub> ; FW: 599.17; white to off-white powdr. <i>hygroscopic</i>	1g 5g
<b>64-3800</b> <b>NEW</b> →	<b>Gadolinium(III) trifluoromethanesulfonate, min. 98% (Gadolinium triflate) [52093-29-5]</b> Gd(CF <sub>3</sub> SO <sub>3</sub> ) <sub>3</sub> ; FW: 604.46; white powdr. <i>hygroscopic</i>	5g 25g
<b>31-1300</b> <b>NEW</b> → HAZ	<b>Gallium(III) trifluoromethanesulfonate, 98% (Gallium triflate) [74974-60-0]</b> Ga(CF <sub>3</sub> SO <sub>3</sub> ) <sub>3</sub> ; FW: 516.93; white powdr. <i>hygroscopic</i>	1g 5g
<b>49-1800</b>	<b>Indium(III) trifluoromethanesulfonate, 99% (Indium triflate) [128008-30-0]</b> In(CF <sub>3</sub> SO <sub>3</sub> ) <sub>3</sub> ; FW: 562.02; powdr.; m.p. dec.; <i>hygroscopic</i>	5g 25g
<b>26-2830</b> <b>NEW</b> → HAZ	<b>Iron(II) trifluoromethanesulfonate, 98% (Iron triflate) [59163-91-6]</b> Fe(CF <sub>3</sub> SO <sub>3</sub> ) <sub>2</sub> ; FW: 353.99; off-white to brown powdr. <i>hygroscopic</i>	25g 100g
<b>57-2800</b>	<b>Lanthanum(III) trifluoromethanesulfonate, min. 97% (Lanthanum triflate) [52093-26-2]</b> La(SO <sub>3</sub> CF <sub>3</sub> ) <sub>3</sub> ; FW: 586.11; white powdr. <i>hygroscopic</i>	2g 10g
<b>03-2000</b>	<b>Lithium trifluoromethanesulfonate, 99% (Lithium triflate) [33454-82-9]</b> LiCF <sub>3</sub> SO <sub>3</sub> ; FW: 156.01; white powdr.; <i>hygroscopic</i>	10g 50g
<b>71-1000</b> <b>NEW</b> →	<b>Lutetium(III) trifluoromethanesulfonate, min. 98% (Lutetium triflate) [126857-69-0]</b> Lu(CF <sub>3</sub> SO <sub>3</sub> ) <sub>3</sub> ; FW: 622.18; white powdr. <i>hygroscopic</i>	500mg 2g
<b>12-4000</b>	<b>Magnesium trifluoromethanesulfonate, min. 98% (Magnesium triflate) [60871-83-2]</b> Mg(SO <sub>3</sub> CF <sub>3</sub> ) <sub>2</sub> ; FW: 322.45; white powdr.; <i>hygroscopic</i>	5g 25g

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15, rue de l'Atome  
Zone Industrielle  
67800 BIRSCHHEIM France  
Tel.: (33) 03 88 62 52 60  
Fax: (33) 03 88 62 26 81  
Email: [info.europe@strem.com](mailto:info.europe@strem.com)

**Strem Chemicals, Inc.**  
Postfach 1215  
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Germany  
Telefon: 0 78 51/ 7 58 79  
Email: [info.europe@strem.com](mailto:info.europe@strem.com)

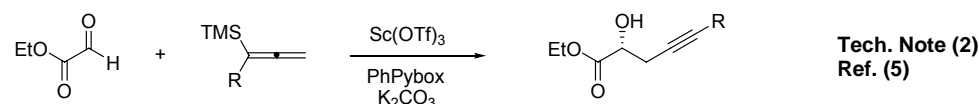
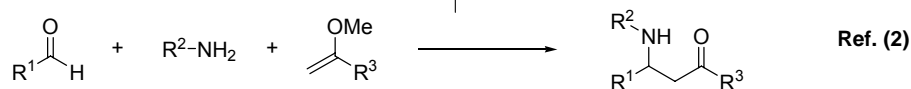
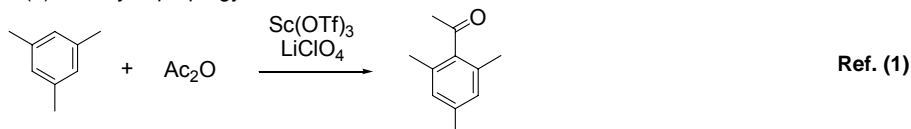
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England SG8 5QN  
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Fax: 01223 208138  
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<b>80-2200</b>	<b>Mercury(II) trifluoromethanesulfonate, 98% (Mercury triflate) [49540-00-3]</b>	5g
HAZ	Hg(CF <sub>3</sub> SO <sub>3</sub> ) <sub>2</sub> ; FW: 498.71; pwdr.; <i>hygroscopic</i>	25g
<b>60-5200</b>	<b>Neodymium(III) trifluoromethanesulfonate, min. 98% (Neodymium triflate) [34622-08-7]</b>	5g
<b>NEW→</b>	Nd(CF <sub>3</sub> SO <sub>3</sub> ) <sub>3</sub> ; FW: 591.45; purple pwdr.; <i>hygroscopic</i>	25g
<b>28-1700</b>	<b>Nickel(II) trifluoromethanesulfonate, min. 98% (Nickel triflate) [60871-84-3]</b>	1g
<b>NEW→</b>	Ni(CF <sub>3</sub> SO <sub>3</sub> ) <sub>2</sub> ; FW: 356.83; pale green pwdr.; <i>hygroscopic</i>	5g
<b>59-7000</b>	<b>Praseodymium(III) trifluoromethanesulfonate, min. 98% (Praseodymium triflate) [52093-27-3]</b>	5g
<b>NEW→</b>	Pr(CF <sub>3</sub> SO <sub>3</sub> ) <sub>3</sub> ; FW: 588.12; green pwdr. <i>heat sensitive</i>	25g
<b>62-3300</b>	<b>Samarium(III) trifluoromethanesulfonate, min. 98% (Samarium triflate) [52093-28-4]</b>	5g
<b>NEW→</b>	Sm(CF <sub>3</sub> SO <sub>3</sub> ) <sub>3</sub> ; FW: 597.57; white to off-white pwdr. <i>hygroscopic</i>	25g
<b>21-2000</b>	<b>Scandium(III) trifluoromethanesulfonate, min. 97% (Scandium triflate) [144026-79-9]</b>	1g
	Sc(SO <sub>3</sub> CF <sub>3</sub> ) <sub>3</sub> ; FW: 492.17; white pwdr.; <i>hygroscopic</i>	5g

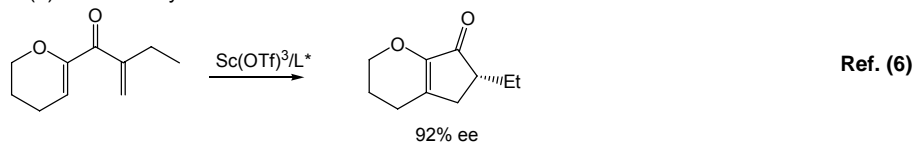
## Technical Notes:

- Water-tolerant Lewis acid catalyst.
- Commonly used as the metal source for Lewis acid catalyzed asymmetric reactions.
- Opening of aryl pyranosides.

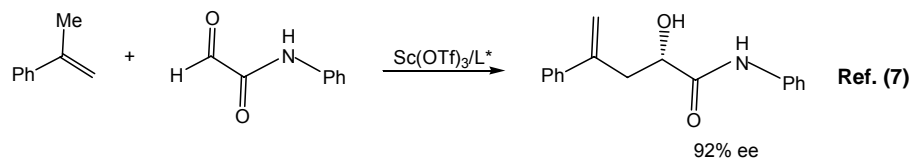
## (a) Aldehyde propargylation



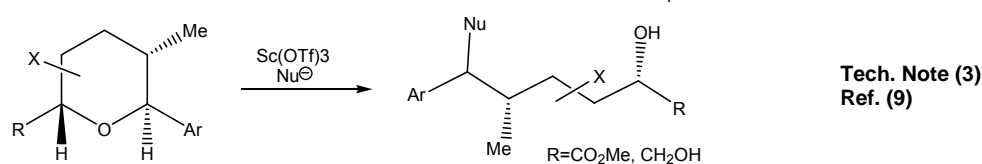
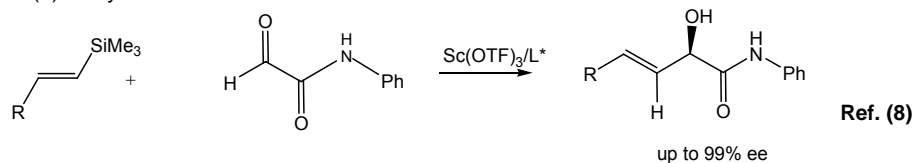
## (b) Nazarov cyclizations



## (c) Ene reaction



## (d) Vinylsilane additions



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Zone Industrielle  
67800 BIRSCHHEIM France  
Tel.: (33) 03 88 62 52 60  
Fax: (33) 03 88 62 26 81  
Email: [info.europe@strem.com](mailto:info.europe@strem.com)

**Strem Chemicals, Inc.**  
Postfach 1215  
77672 KEHL  
Germany  
Telefon: 0 78 51/ 7 58 79  
Email: [info.europe@strem.com](mailto:info.europe@strem.com)

**Strem Chemicals UK**  
48 High Street  
Orwell, Royston  
England SG8 5QN  
Tel.: 01223 207430  
Fax: 01223 208138  
Email: [stremchemicals.uk@btinternet.com](mailto:stremchemicals.uk@btinternet.com)

**21-2000 Scandium(III) trifluoromethanesulfonate, min. 97% (Scandium triflate) [144026-79-9]****(cont.)**

## References:

1. *Chem. Commun.*, **1996**, 183.
2. *Chem. Commun.*, **1995**, 1379.
3. *Synlett*, **1999**, 2023. (review)
4. *Eur. J. Org. Chem.*, **1999**, 15. (review)
5. *J. Am. Chem. Soc.*, **2001**, 123, 12095.
6. *J. Am. Chem. Soc.*, **2004**, 126, 9544.
7. *J. Am. Chem. Soc.*, **2005**, 127, 8006.
8. *J. Am. Chem. Soc.*, **2006**, 128, 11034.
9. *J. Am. Chem. Soc.*, **2007**, 129, 38.

**21-2004 Scandium(III) trifluoromethanesulfonate (Scandium triflate), Microencapsulated in a Styrene Polymer**

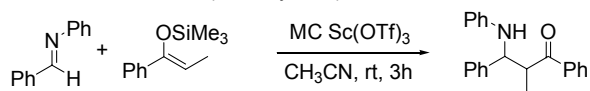
500mg

[~13% Sc(SO<sub>3</sub>CF<sub>3</sub>)<sub>3</sub>]Sc(SO<sub>3</sub>CF<sub>3</sub>)<sub>3</sub>; white solid

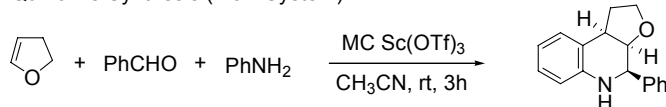
## Technical Note:

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(SO<sub>3</sub>CF<sub>3</sub>)<sub>3</sub> has a higher activity than the free monomer, can easily be separated from the reaction mixture, and is reusable.

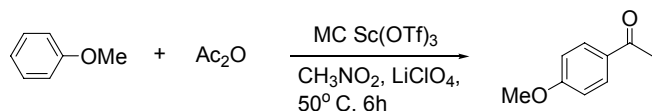
## Imino Aldol Reaction (Flow System)



## 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.

<b>47-2000</b>	<b>Silver trifluoromethanesulfonate, 99% (Silver triflate) [2923-28-6]</b>	5g
	AgSO <sub>3</sub> CF <sub>3</sub> ; FW: 256.94; off-white powdr.	25g
	<i>light sensitive, hygroscopic</i>	
<b>65-6000</b>	<b>Terbium(III) trifluoromethanesulfonate, min. 98% (Terbium triflate) [148980-31-8]</b>	1g
<b>NEW→</b>	Tb(CF <sub>3</sub> SO <sub>3</sub> ) <sub>3</sub> ; FW: 606.14; white powdr.	5g
	<i>hygroscopic</i>	
<b>81-8500</b>	<b>Thallium(I) trifluoromethanesulfonate, 99% (Thallium triflate) [73491-36-8]</b>	1g
HAZ	TlSO <sub>3</sub> CF <sub>3</sub> ; FW: 353.45; white powdr.	5g
	<i>hygroscopic</i>	25g
<b>69-5000</b>	<b>Thulium(III) trifluoromethanesulfonate, min. 98% (Thulium triflate) [141478-68-4]</b>	500mg
<b>NEW→</b>	Tm(CF <sub>3</sub> SO <sub>3</sub> ) <sub>3</sub> ; FW: 616.14; white powdr.	2g
	<i>hygroscopic</i>	
<b>50-2750</b>	<b>Tin(II) trifluoromethanesulfonate, 99% (Tin triflate) [62086-04-8]</b>	2g
	Sn(CF <sub>3</sub> SO <sub>3</sub> ) <sub>2</sub> ; FW: 416.82; powdr.; m.p. dec.	10g
	<i>hygroscopic</i>	
<b>70-6000</b>	<b>Ytterbium(III) trifluoromethanesulfonate hydrate (Ytterbium triflate) [54761-04-5]</b>	1g
	Yb(SO <sub>3</sub> CF <sub>3</sub> ) <sub>3</sub> ·XH <sub>2</sub> O; FW: 620.25; white powdr.	5g
	<i>hygroscopic</i>	25g
<b>39-4050</b>	<b>Yttrium(III) trifluoromethanesulfonate, min. 98% (Yttrium triflate) [52093-30-8]</b>	5g
<b>NEW→</b>	Y(CF <sub>3</sub> SO <sub>3</sub> ) <sub>3</sub> ; FW: 536.12; white powdr.	25g
	<i>hygroscopic</i>	

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U.S.A.  
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15, rue de l'Atome  
Zone Industrielle  
67800 BIRSCHHEIM France  
Tel.: (33) 03 88 62 52 60  
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Postfach 1215  
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Telefon: 0 78 51/ 7 58 79  
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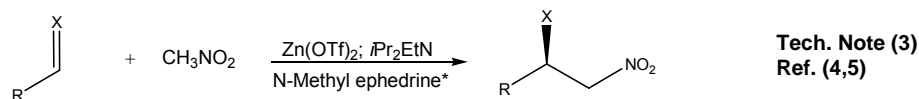
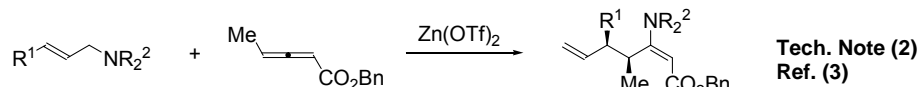
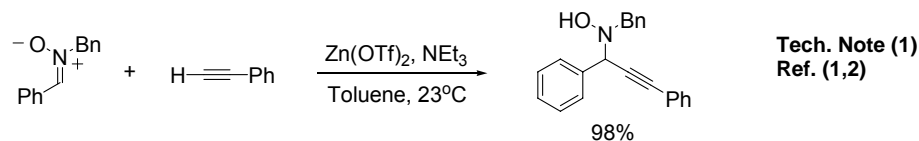
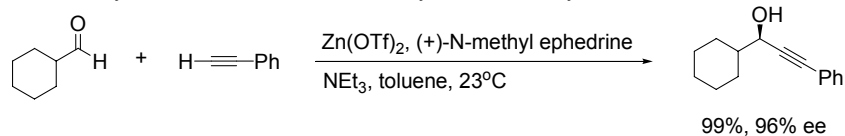
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Orwell, Royston  
England SG8 5QN  
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Fax: 01223 208138  
Email: [stremchemicals.uk@btinternet.com](mailto:stremchemicals.uk@btinternet.com)

**30-4000** Zinc trifluoromethanesulfonate, min. 98% (Zinc triflate) [54010-75-2]  
 HAZ Zn(SO<sub>3</sub>CF<sub>3</sub>)<sub>2</sub>; FW: 363.54; white powdr.  
*hygroscopic*

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.



References:

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4. *Angew. Chem. Int. Ed.*, **2005**, 44, 3881.
5. *Angew. Chem. Int. Ed.*, **2006**, 45, 117.

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**Strem Chemicals, Inc.**  
 7 Mulliken Way  
 Newburyport, MA 01950-4098  
 U.S.A.  
 Tel.: (978) 499-1600  
 Fax: (978) 465-3104  
 Email: [info@strem.com](mailto:info@strem.com)  
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**Strem Chemicals, Inc.**  
 15, rue de l'Atome  
 Zone Industrielle  
 67800 BISCHHEIM France  
 Tel.: (33) 03 88 62 52 60  
 Fax: (33) 03 88 62 26 81  
 Email: [info.europe@strem.com](mailto:info.europe@strem.com)

**Strem Chemicals, Inc.**  
 Postfach 1215  
 77672 KEHL  
 Germany  
 Telefon: 0 78 51/ 7 58 79  
 Email: [info.europe@strem.com](mailto:info.europe@strem.com)

**Strem Chemicals UK**  
 48 High Street  
 Orwell, Royston  
 England SG8 5QN  
 Tel.: 01223 207430  
 Fax: 01223 208138  
 Email: [stremchemicals.uk@btinternet.com](mailto:stremchemicals.uk@btinternet.com)