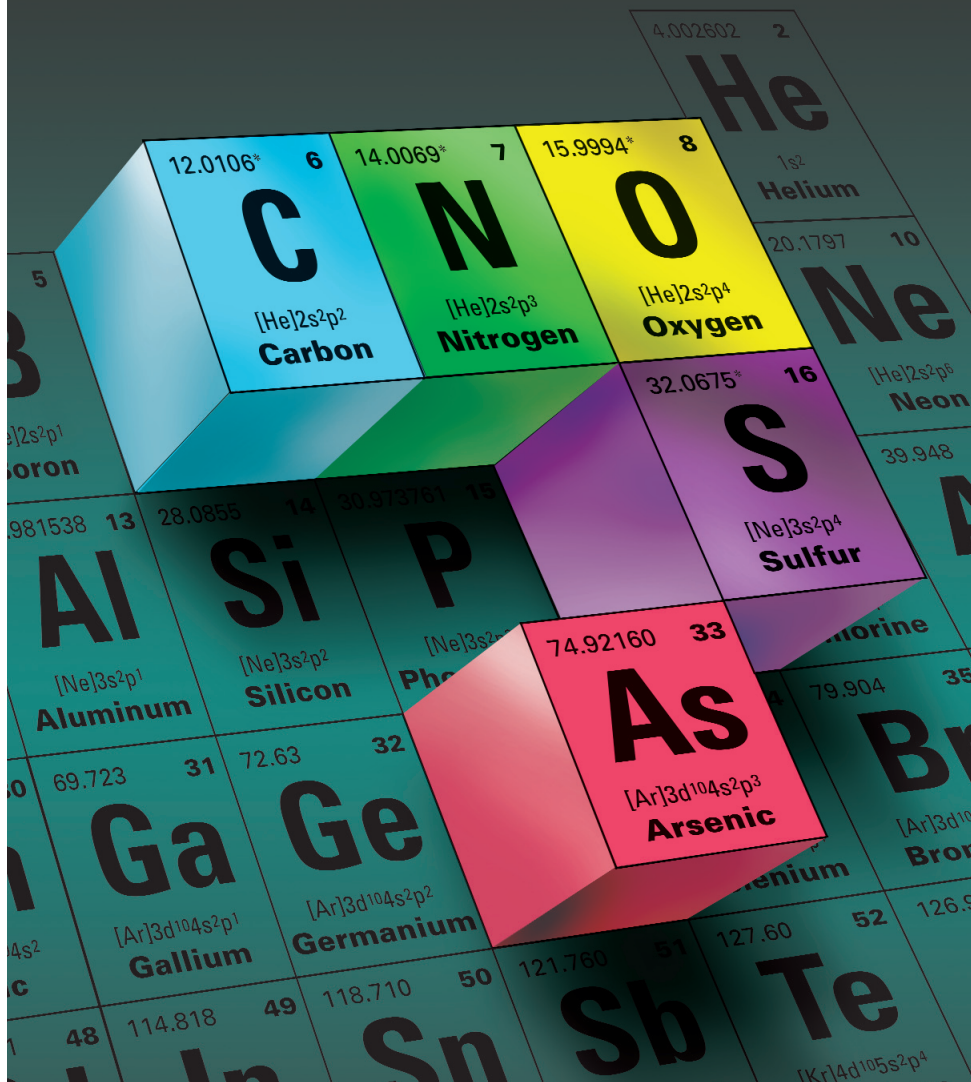


# Other Ligands

Phosphorus Ligands Appear in their Own Booklet



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Ephraim S. Honig, Ph.D., M.B.A.  
COO

# LIGANDS FOR ORGANIC SYNTHESIS

## INDEX OF REACTION TYPES

### Sorted by Key Element

#### Amination

07-0590	1,3-Bis(2,6-di- <i>i</i> -propylphenyl)imidazolium chloride, min. 97% .....	10
07-0270	trans- <i>N,N'</i> -Dimethyl-1,2-cyclohexanediamine, 98% .....	29
08-1700	(2 <i>R</i> )-(+)-3,3'-Diphenyl-[2,2'-binaphthalene]-1,1'-diol, min. 98% (R)-VANOL .....	42
08-1702	(2 <i>S</i> )-(-)-3,3'-Diphenyl-[2,2'-binaphthalene]-1,1'-diol, min. 98% (S)-VANOL .....	42
08-1704	(3 <i>R</i> )-(-)-2,2'-Diphenyl-[3,3'-biphenanthrene]-4,4'-diol dichloromethane adduct, min. 98% (R)-VAPOL .....	42
08-1706	(3 <i>S</i> )-(+)-2,2'-Diphenyl-[3,3'-biphenanthrene]-4,4'-diol dichloromethane adduct, min. 98% (S)-VAPOL .....	42

#### Aziridination

08-1700	(2 <i>R</i> )-(+)-3,3'-Diphenyl-[2,2'-binaphthalene]-1,1'-diol, min. 98% (R)-VANOL .....	42
08-1702	(2 <i>S</i> )-(-)-3,3'-Diphenyl-[2,2'-binaphthalene]-1,1'-diol, min. 98% (S)-VANOL .....	42
08-1704	(3 <i>R</i> )-(-)-2,2'-Diphenyl-[3,3'-biphenanthrene]-4,4'-diol dichloromethane adduct, min. 98% (R)-VAPOL .....	42
08-1706	(3 <i>S</i> )-(+)-2,2'-Diphenyl-[3,3'-biphenanthrene]-4,4'-diol dichloromethane adduct, min. 98% (S)-VAPOL .....	42

#### Carbon-carbon bond formation-Cross coupling

33-4000	Triphenylarsine, min. 97% .....	3
07-0590	1,3-Bis(2,6-di- <i>i</i> -propylphenyl)imidazolium chloride, min. 97% .....	10
07-0299	1,3-Bis(2,4,6-trimethylphenyl)imidazolium chloride, min. 97% .....	20
07-0600	1,3-Bis(2,4,6-trimethylphenyl)imidazol-2-ylidene, min. 98% .....	21

#### Carbon-carbon bond formation-General

33-4000	Triphenylarsine, min. 97% .....	3
07-0587	1,3-Bis(2,6-di- <i>i</i> -propylphenyl)-4,5-dihydroimidazolium tetrafluoroborate, min. 95% .....	9
07-0275	(-)-2,2-Bis[(4 <i>S</i> )-4-phenyl-2-oxazolin-2-yl]propane, 98% .....	14
07-0303	(+)-2,6-Bis[(4 <i>R</i> )-4-phenyl-2-oxazolin-2-yl]pyridine, 98+% .....	14
07-0304	(-)-2,6-Bis[(4 <i>S</i> )-4-phenyl-2-oxazolin-2-yl]pyridine, 98+% .....	15
07-0306	(+)-2,6-Bis[(4 <i>R</i> )-4-( <i>i</i> -propyl)-2-oxazolin-2-yl]pyridine, 98+% .....	17
07-0307	(-)-2,6-Bis[(4 <i>S</i> )-4-( <i>i</i> -propyl)-2-oxazolin-2-yl]pyridine, 98+% .....	18
07-0600	1,3-Bis(2,4,6-trimethylphenyl)imidazol-2-ylidene, min. 98% .....	21
07-0316	(1 <i>R</i> ,2 <i>R</i> )-(-)-1,2-Cyclohexanediamino- <i>N,N'</i> -bis(3,5-di- <i>t</i> -butylsalicylidene), 98% (R,R)-Jacobsen Ligand ..	24
07-0317	(1 <i>S</i> ,2 <i>S</i> )-(+)-1,2-Cyclohexanediamino- <i>N,N'</i> -bis(3,5-di- <i>t</i> -butylsalicylidene), 98% (S,S)-Jacobsen Ligand ..	25
07-0340	(-)- <i>N,N'</i> -(1 <i>R</i> ,2 <i>R</i> )-1,2-Diaminocyclohexanediylbis(2-pyridinecarboxamide), min. 98% .....	26
07-0341	(+)- <i>N,N'</i> -(1 <i>S</i> ,2 <i>S</i> )-1,2-Diaminocyclohexanediylbis(2-pyridinecarboxamide), min. 98% .....	26
07-0421	6,7-Dihydro-2-phenyl-5 <i>H</i> -pyrrolo[2,1- <i>c</i> ]-1,2,4-triazolium chloride, min. 98% .....	29
08-0600	( <i>R</i> )-(+)-3,3'-Dibromo-1,1'-bi-2-naphthol, min. 98% .....	40
08-0601	( <i>S</i> )-(-)-3,3'-Dibromo-1,1'-bi-2-naphthol, min. 98% .....	41
08-0604	racemic-6,6'-Dibromo-1,1'-bi-2-naphthol, min. 98% .....	41
08-0605	( <i>R</i> )-(-)-6,6'-Dibromo-1,1'-bi-2-naphthol, min. 98% .....	41
08-0606	( <i>S</i> )-(+)-6,6'-Dibromo-1,1'-bi-2-naphthol, min. 98% .....	41

#### Carbon-heteroatom bond formation

07-0587	1,3-Bis(2,6-di- <i>i</i> -propylphenyl)-4,5-dihydroimidazolium tetrafluoroborate, min. 95% .....	9
07-0590	1,3-Bis(2,6-di- <i>i</i> -propylphenyl)imidazolium chloride, min. 97% .....	10
07-5194	( <i>R</i> )-7,7'-Bis[(4 <i>S</i> )-(phenyl)oxazol-2-yl]-2,2',3,3'-tetrahydro-1,1'-spiroindane, min. 97% ( <i>Ra,S,S</i> )-SpiroBOX .....	16
07-5195	( <i>S</i> )-7,7'-Bis[(4 <i>S</i> )-(phenyl)oxazol-2-yl]-2,2',3,3'-tetrahydro-1,1'-spiroindane, min. 97% ( <i>Sa,S,S</i> )-SpiroBOX .....	17
07-0299	1,3-Bis(2,4,6-trimethylphenyl)imidazolium chloride, min. 97% .....	20
07-0316	(1 <i>R</i> ,2 <i>R</i> )-(-)-1,2-Cyclohexanediamino- <i>N,N'</i> -bis(3,5-di- <i>t</i> -butylsalicylidene), 98% (R,R)-Jacobsen Ligand ..	24
07-0270	trans- <i>N,N'</i> -Dimethyl-1,2-cyclohexanediamine, 98% .....	29

#### Cyclization

07-0275	(-)-2,2-Bis[(4 <i>S</i> )-4-phenyl-2-oxazolin-2-yl]propane, 98% .....	14
07-5194	( <i>R</i> )-7,7'-Bis[(4 <i>S</i> )-(phenyl)oxazol-2-yl]-2,2',3,3'-tetrahydro-1,1'-spiroindane, min. 97% ( <i>Ra,S,S</i> )-SpiroBOX .....	16
07-5195	( <i>S</i> )-7,7'-Bis[(4 <i>S</i> )-(phenyl)oxazol-2-yl]-2,2',3,3'-tetrahydro-1,1'-spiroindane, min. 97% ( <i>Sa,S,S</i> )-SpiroBOX .....	17
07-0306	(+)-2,6-Bis[(4 <i>R</i> )-4-( <i>i</i> -propyl)-2-oxazolin-2-yl]pyridine, 98+% .....	17

## Cyclization

07-0307	(-)-2,6-Bis[(4S)-4-(i-propyl)-2-oxazolin-2-yl]pyridine, 98+% .....	18
07-0600	1,3-Bis(2,4,6-trimethylphenyl)imidazol-2-ylidene, min. 98% .....	21
07-0415	(5aR,10bS)-(+)-5a,10b-Dihydro-2-(pentafluorophenyl)-4H,6H-indeno[2,1-b][1,2,4]triazolo[4,3-d] [1,4]oxazinium tetrafluoroborate, min. 98% .....	28
07-0414	(5aS, 10bR)-(-)-5a,10b-Dihydro-2-(pentafluorophenyl)-4H,6H-indeno[2,1-b][1,2,4]triazolo[4,3-d] [1,4]oxazinium tetrafluoroborate, min. 98% .....	29
07-0417	6,7-Dihydro-2-pentafluorophenyl-5H-pyrrolo[2,1-c]-1,2,4-triazolium tetrafluoroborate, min. 98% .....	29
08-2046	(R)-(+)-5,5',6,6'-Tetramethyl-3,3'-di-t-butyl-1,1'-biphenyl-2,2'-diol, 99% (R)-BIPHEN H <sub>2</sub> .....	45
08-2047	(S)-(-)-5,5',6,6'-Tetramethyl-3,3'-di-t-butyl-1,1'-biphenyl-2,2'-diol, 99% (S)-BIPHEN H <sub>2</sub> .....	45

## Cyclopropanation

33-4000	Triphenylarsine, min. 97% .....	3
07-0275	(-)-2,2-Bis[(4S)-4-phenyl-2-oxazolin-2-yl]propane, 98% .....	14

## Hydroformylation

08-2045	racemic-5,5',6,6'-Tetramethyl-3,3'-di-t-butyl-1,1'-biphenyl-2,2'-diol, 99% rac-BIPHEN H <sub>2</sub> .....	44
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## Hydrogenation

96-7650	CATHY™ Catalyst Kit for Asymmetric Transfer Hydrogenation of Ketones and Imines ..... Visit <a href="http://www.strem.com">www.strem.com</a>	
07-0605	1,3-Bis(2,4,6-trimethylphenyl)-4,5-dihydroimidazol-2-ylidene, min. 98% .....	19
08-2045	racemic-5,5',6,6'-Tetramethyl-3,3'-di-t-butyl-1,1'-biphenyl-2,2'-diol, 99% rac-BIPHEN H <sub>2</sub> .....	44

## Hydrosilylation

07-0605	1,3-Bis(2,4,6-trimethylphenyl)-4,5-dihydroimidazol-2-ylidene, min. 98% .....	19
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## Kinetic Resolution

08-2046	(R)-(+)-5,5',6,6'-Tetramethyl-3,3'-di-t-butyl-1,1'-biphenyl-2,2'-diol, 99% (R)-BIPHEN H <sub>2</sub> .....	45
08-2047	(S)-(-)-5,5',6,6'-Tetramethyl-3,3'-di-t-butyl-1,1'-biphenyl-2,2'-diol, 99% (S)-BIPHEN H <sub>2</sub> .....	45

## Metathesis

07-0605	1,3-Bis(2,4,6-trimethylphenyl)-4,5-dihydroimidazol-2-ylidene, min. 98% .....	19
08-2045	racemic-5,5',6,6'-Tetramethyl-3,3'-di-t-butyl-1,1'-biphenyl-2,2'-diol, 99% rac-BIPHEN H <sub>2</sub> .....	44
08-2046	(R)-(+)-5,5',6,6'-Tetramethyl-3,3'-di-t-butyl-1,1'-biphenyl-2,2'-diol, 99% (R)-BIPHEN H <sub>2</sub> .....	45
08-2047	(S)-(-)-5,5',6,6'-Tetramethyl-3,3'-di-t-butyl-1,1'-biphenyl-2,2'-diol, 99% (S)-BIPHEN H <sub>2</sub> .....	45
19-1600	(R)-(-)-5,5',6,6',7,7',8,8'-Octahydro-3,3'-di-t-butyl-1,1'-bi-2-naphthol, dipotassium salt .....	46
19-1601	(S)-(+)-5,5',6,6',7,7',8,8'-Octahydro-3,3'-di-t-butyl-1,1'-bi-2-naphthol, dipotassium salt .....	46

## Ring Opening

07-5194	(R)-7,7'-Bis[(4S)-(phenyl)oxazol-2-yl]-2,2',3,3'-tetrahydro-1,1'-spirobiindane, min. 97% (Ra,S,S)-SpiroBOX .....	16
07-5195	(S)-7,7'-Bis[(4S)-(phenyl)oxazol-2-yl]-2,2',3,3'-tetrahydro-1,1'-spirobiindane, min. 97% (Sa,S,S)-SpiroBOX .....	17

**OTHER LIGANDS - ARSENIC (Compounds)**

**33-3400 Triethylarsine, 99% [617-75-4]** 5g  
 amp (C<sub>2</sub>H<sub>5</sub>)<sub>3</sub>As; FW: 162.09; colorless liq.; m.p. -91°; b.p. 140°; 25g  
 HAZ d. 1.152  
*air sensitive*

**98-1857 Triethylarsine, elec. gr. (99.999%-As) PURATREM** 25g  
 amp [617-75-4] 100g  
 HAZ (C<sub>2</sub>H<sub>5</sub>)<sub>3</sub>As; FW: 162.09; colorless liq.; m.p. -91°; b.p. 140°;  
 d. 1.152  
*air sensitive*  
 S. Steel bubbler extra

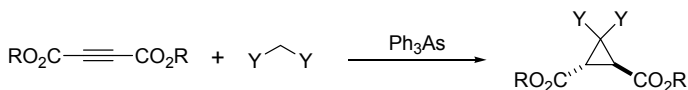
**33-3750 Trimethylarsine, 99% [593-88-4]** 5g  
 amp (CH<sub>3</sub>)<sub>3</sub>As; FW: 120.03; colorless liq.; m.p. -87.3°; b.p. 51°; 25g  
 HAZ f.p. 100°F; d. 1.124  
*air sensitive*

**98-1975 Trimethylarsine, elec. gr. (99.995%-As) PURATREM** 25g  
 amp [593-88-4] 100g  
 HAZ (CH<sub>3</sub>)<sub>3</sub>As; FW: 120.03; colorless liq.; m.p. -87.3°; b.p. 51°;  
 f.p. 100°F; d. 1.124  
*air sensitive*  
 S. Steel bubbler extra

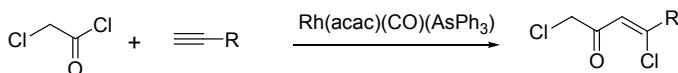
**33-4000 Triphenylarsine, min. 97% [603-32-7]** 5g  
 HAZ (C<sub>6</sub>H<sub>5</sub>)<sub>3</sub>As; FW: 306.24; white powdr.; m.p. 59-60°; 25g  
 b.p. 233°/14 mm; d. 1.2225

## Technical Notes:

- Useful as a ligand in Stille coupling reactions.
- Synthesis of functionalized cyclopropanes from the reaction between acetylenic esters and C-H acids.
- Rh-complex catalyzed addition reactions of chloroacetyl chlorides to alkynes.



**Tech. Note (2)  
Ref. (2)**



**Tech. Note (3)  
Ref. (3)**

## References:

- Pure Appl. Chem.*, **1996**, 68, 73.
- Tetrahedron Lett.*, **2009**, 50, 4439.
- Org. Lett.*, **2008**, 10, 5469.

**33-5000 Tris(dimethylamino)arsine, 99% [6596-96-9]** 5g  
 HAZ ((CH<sub>3</sub>)<sub>2</sub>N)<sub>3</sub>As; FW: 207.15; colorless liq.; b.p. 55°/10mm 25g  
*air sensitive, moisture sensitive*

**OTHER LIGANDS - CARBON (Compounds)**

**06-0115 n-Butylisocyanide, 97% [2769-64-4]** 1g  
 HAZ C<sub>4</sub>H<sub>9</sub>N≡C; FW: 83.13; colorless to pale yellow liq.; d. 0.795; 5g  
 STENCH  
*(store cold)*

**OTHER LIGANDS - CARBON (Compounds)**

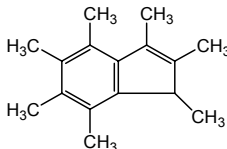
**06-0120 t-Butylisocyanide, min. 98% [7188-38-7]** 1g  
amp (CH<sub>3</sub>)<sub>3</sub>CN≡C; FW: 83.13; colorless liq.; b.p. 90-92°; f.p. 28°F; 5g  
HAZ d. 0.735; STENCH  
(store cold)

**06-0150 t-Butylmethylacetylene, min. 98% [999-78-0]** 1g  
HAZ C<sub>4</sub>H<sub>9</sub>C≡C(CH<sub>3</sub>); FW: 96.17; colorless liq.; b.p. 83°; f.p. 14°F; 5g  
d. 0.718

**06-0350 Cyclooctatetraene, 98% COT [629-20-9]** 1g  
HAZ C<sub>8</sub>H<sub>8</sub>; FW: 104.15; pale yellow liq.; b.p. 142-143°; f.p. 73°F; 5g  
d. 0.943  
air sensitive, (store cold)  
Note: Inhibited with 0.1% hydroquinone.

**06-0550 Diphenylacetylene, 99% [501-65-5]** 2g  
C<sub>6</sub>H<sub>5</sub>C≡CC<sub>6</sub>H<sub>5</sub>; FW: 178.23; white powdr.; m.p. 59-61°; 10g  
b.p. 170°/19 mm; d. 0.990

**06-0800 1,2,3,4,5,6,7-Heptamethylindene, min. 98% [86901-30-6]** 250mg  
C<sub>16</sub>H<sub>22</sub>; FW: 214.35; yellow powdr.; 1g  
m.p. 54-56°



Technical Note:

1. Strong, bulky donor ligand capable of stabilizing metals in relatively high and low oxidation states.

**03-4750 Lithium tetramethylcyclopentadienide, min. 95%**  
SEE LITHIUM SECTION (page 6)

**06-1290 Pentamethylcyclopentadiene, min. 98% [4045-44-7]** 1g  
amp C<sub>10</sub>H<sub>16</sub>; FW: 136.24; pale yellow liq.; b.p. 58.3°/13.5 mm; 5g  
HAZ f.p. 112°F; d. 0.870 25g  
(store cold)

**06-1296 1,2,3,4,5-Pentaphenyl-1,3-cyclopentadiene, 99%** 1g  
[2519-10-0] 5g  
C<sub>35</sub>H<sub>26</sub>; FW: 446.60; white powdr.; m.p. 254-256°

**08-2040 (S)-(+)-1,2-Propanediol, 99%**  
SEE OXYGEN SECTION (page 44)

**06-1850 i-Propylisocyanide, 99% [598-45-8]** 1g  
amp i-C<sub>3</sub>H<sub>7</sub>N≡C; FW: 69.11; colorless liq.; b.p. 82-83°; d. 0.7596; 5g  
HAZ STENCH  
(store cold)

**06-3050 Tetramethyl(n-propyl)cyclopentadiene, min. 97%** 1g  
amp [64417-12-5] 5g  
HAZ C<sub>12</sub>H<sub>20</sub>; FW: 164.30; yellow liq. 25g

**OTHER LIGANDS - FLUORINE (Compounds)**

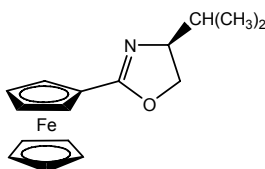
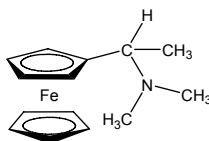
**09-1070 5-Amino-2-chlorobenzotrifluoride, min. 97% [320-51-4]** 5g  
(NH<sub>2</sub>)ClC<sub>6</sub>H<sub>3</sub>CF<sub>3</sub>; FW: 195.56; brown waxy solid; m.p. 36-37°; 25g  
f.p. >230°F

**OTHER LIGANDS - FLUORINE (Compounds)**

<b>09-4396</b>	<b>2,2,3,3,4,4,4-Heptafluorobutylamine, min. 97%</b> [374-99-2] CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CH <sub>2</sub> NH <sub>2</sub> ; FW: 197.05; colorless liq.; b.p. 70-71°; d. 1.493	1g 5g
<b>08-0750</b> HAZ	<b>Hexafluoroacetylacetone, min. 98% HFAA</b> [1522-22-1] CF <sub>3</sub> C(O)CH <sub>2</sub> C(O)CF <sub>3</sub> ; FW: 208.06; colorless liq.; b.p. 70°; d. 1.470 <i>moisture sensitive</i>	5g 25g 100g
<b>09-6220</b> HAZ	<b>Perfluorotri-n-butylamine, min. 85%</b> [311-89-7] (C <sub>4</sub> F <sub>9</sub> ) <sub>3</sub> N; FW: 671.02; colorless liq.; b.p. 170-180°; d. 1.88	25g 100g

**OTHER LIGANDS - IRIIDIUM (Compounds)**

<b>96-7650</b>	<b>CATHy™ Catalyst Kit for Asymmetric Transfer Hydrogenation of Ketones and Imines</b> Visit <a href="http://www.strem.com">www.strem.com</a>
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**OTHER LIGANDS - IRON (Compounds)****96-3730 1,1'-Bis(dialkyl/diarylphosphino)ferrocene Ligand Kit****NEW→** Visit [www.strem.com](http://www.strem.com)**96-3650 Solvias Josiphos Ligand Kit**Visit [www.strem.com](http://www.strem.com)**96-3652 Solvias MandyPhos™ Ligand Kit**Visit [www.strem.com](http://www.strem.com)**96-3651 Solvias Walphos Ligand Kit**Visit [www.strem.com](http://www.strem.com)**26-1490 (S)-(-)-[4,5-Dihydro-4-(1-methylethyl)-2-oxazoly] ferrocene, min. 98%****NEW→**[162157-03-1]  
C<sub>16</sub>H<sub>19</sub>FeNO; FW: 297.17; orange powdr.;  
[α]<sub>D</sub> -135° (c 1.0, Ethanol)1g  
5g**26-1399 α-(N,N-Dimethylamino)ethylferrocene, 98%** [31904-34-4](C<sub>5</sub>H<sub>5</sub>)<sub>2</sub>Fe(C<sub>5</sub>H<sub>4</sub>CH(CH<sub>3</sub>)N(CH<sub>3</sub>)<sub>2</sub>);  
FW: 257.16; orange liq.;  
b.p. 110°/0.45mm; d. 1.2221g  
5g  
25g**26-1400 N,N-Dimethylaminomethylferrocene, min. 95%**[1271-86-9]  
(CH<sub>3</sub>)<sub>2</sub>NCH<sub>2</sub>C<sub>5</sub>H<sub>4</sub>FeC<sub>5</sub>H<sub>5</sub>; FW: 243.13; amber liq.;  
b.p. 91-92°/0.5mm; f.p. >230°F; d. 1.2285g  
25g  
100g**OTHER LIGANDS - LITHIUM (Compounds)****03-1000 Lithium cyclopentadienide, 97%** [16733-97-4]HAZ  
C<sub>5</sub>H<sub>5</sub>Li; FW: 72.04; off-white powdr.  
*air sensitive, moisture sensitive*5g  
25g

**OTHER LIGANDS - LITHIUM (Compounds)**

<b>03-4750</b>	<b>Lithium tetramethylcyclopentadienide, min. 95%</b>	1g
HAZ	[82061-21-0]	5g
	LiC <sub>9</sub> H <sub>13</sub> ; FW: 128.15; off-white to yellow powdr.	25g
	<i>moisture sensitive</i>	

**OTHER LIGANDS - NITROGEN (Compounds)****96-3700 Enantiotech BIMAH Ligand Kit for Asymmetric Hydrogenation**

NEW→

Visit [www.strem.com](http://www.strem.com)**96-3760 NHC Ligand Kit 1: Chiral N-Heterocyclic Carbenes**

NEW→

Visit [www.strem.com](http://www.strem.com)**96-3765 NHC Ligand Kit 2: "Free" Carbenes**

NEW→

Visit [www.strem.com](http://www.strem.com)**96-3770 NHC Ligand Kit 3: Variety of N-Heterocyclic Carbenes**

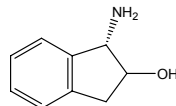
NEW→

Visit [www.strem.com](http://www.strem.com)**96-3775 NHC Ligand Kit 4: Bis Carbenes**

NEW→

Visit [www.strem.com](http://www.strem.com)**07-0200 (1S,2R)-(-)-cis-1-Aminoindan-2-ol, 98% [126456-43-7]**C<sub>9</sub>H<sub>11</sub>NO; FW: 149.19; white to off-white powdr.;[α]<sub>D</sub> -42.5° (c 1, CH<sub>3</sub>OH); m.p. 117-121°

Note: CATHY™ Catalyst Kit component.

Visit [www.strem.com](http://www.strem.com).

1g

5g

## Technical Note:

1. Class of catalytic ligands which when used with a reducing agent, exhibit enantioselectivity in the reduction of a wide range of substrates.

## References:

1. "Asymmetric Hydrogenation" in *Catalytic Asymmetric Synthesis*, I. Ojima(ed); VCH Publishers, New York, **1993**, 1-39.
2. *Tetrahedron Lett.*, **1994**, 35, 6631-34.
3. *Tetrahedron Lett.*, **1994**, V35, 5551-54.
4. *Synthesis*, **1998**, 937.

**07-0201 (1R,2S)-(+)-cis-1-Aminoindan-2-ol, 98% [136030-00-7]**C<sub>9</sub>H<sub>11</sub>NO; FW: 149.19; white to off-white powdr.;[α]<sub>D</sub> +42.5° (c 1, CH<sub>3</sub>OH); m.p. 117-121°

Note: CATHY™ Catalyst Kit component. Visit

[www.strem.com](http://www.strem.com). Technical Note: See 07-0200 (page 6)

1g

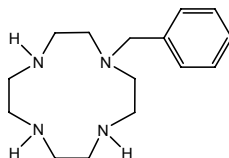
5g

**07-1939 N-Benzyl-1,4,7,10-tetraaza-****cyclododecane, min. 98%**

[112193-83-6]

C<sub>15</sub>H<sub>26</sub>N<sub>4</sub>; FW: 262.39;

white to yellow powdr.



250mg

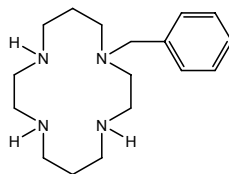
1g

**07-1957 N-Benzyl-1,4,8,11-tetraaza-****cyclotetradecane, min. 98%**

[132723-93-4]

C<sub>17</sub>H<sub>30</sub>N<sub>4</sub>; FW: 290.45;

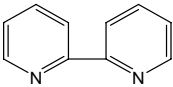
white to yellow powdr.

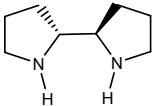


100mg

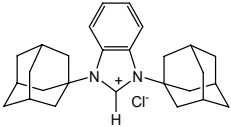
500mg

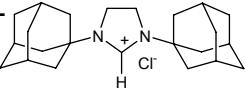
**OTHER LIGANDS - NITROGEN (Compounds)**

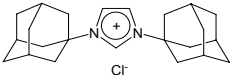
**07-0290** **2,2'-Bipyridine, 99+% BIPY** [366-18-7]  25g  
HAZ  $C_{10}H_8N_2$ ; FW: 156.19; white to off-white xtl.; m.p. 69-70°; b.p. 273° 100g

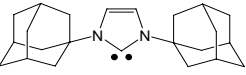
**07-0092** **(2R,2'R)-(-)-2,2'-Bipyrrolidine, 99%**  250mg  
**NEW→** [107886-22-6] 1g  
 $C_8H_{16}N_2$ ; FW: 140.23; colorless liq.; 5g  
[ $\alpha$ ]<sub>D</sub> -14.91 (c 1.03, methanol)  
*air sensitive*

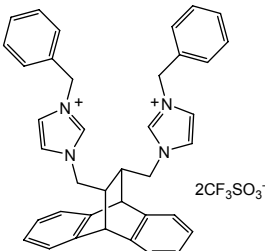
**07-0093** **(2S,2'S)-(+)-2,2'-Bipyrrolidine, 99%** [124779-66-4] 250mg  
**NEW→**  $C_8H_{16}N_2$ ; FW: 140.23; colorless liq.; 1g  
[ $\alpha$ ]<sub>D</sub> +14.82 (c 1.01, methanol) 5g  
*air sensitive*

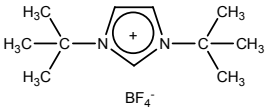
**07-4005** **1,3-Bis(1-adamantyl)benzimidazolium chloride, min. 97%**  500mg  
**NEW→** [852634-41-4] 2g  
 $C_{27}H_{35}ClN_2$ ; FW: 423.03; yellow to orange solid  
*air sensitive*

**07-4007** **1,3-Bis(1-adamantyl)-4,5-dihydroimidazolium chloride, min. 97%**  500mg  
**NEW→** [871126-33-9] 2g  
 $C_{23}H_{35}ClN_2$ ; FW: 374.99  
*air sensitive*

**07-0322** **1,3-Bis(1-adamantyl)imidazolium chloride, min. 97%**  250mg  
[131042-78-9]  $Cl^-$   
 $C_{23}H_{33}N_2^+Cl^-$ ; FW: 372.97; white xtl.; m.p. 345-346°  
*hygroscopic*

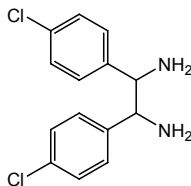
**07-0324** **1,3-Bis(1-adamantyl)imidazol-2-ylidene, min. 98%**  250mg  
HAZ **ARDUENGO'S CARBENE**  
[131042-77-8]  
 $C_{23}H_{32}N_2$ ; FW: 336.51; white xtl.; m.p. 240-241°  
*air sensitive, moisture sensitive, (store cold)*

**07-0076** **11,12-Bis[N-benzyl-1H-imidazolium-3-methylene]-9,10-dihydro-9,10-ethanoanthracene bis(trifluoromethanesulfonate)**  100mg  
2CF<sub>3</sub>SO<sub>3</sub><sup>-</sup> 500mg  
[C<sub>38</sub>H<sub>36</sub>N<sub>4</sub>](CF<sub>3</sub>SO<sub>3</sub>)<sub>2</sub>; FW: 846.86; white to off-white powdr.  
Note: Sold under license from UFRFI for research purposes only. Patent application PCT/US2008/054137.

**07-0598** **1,3-Bis(t-butyl)imidazolium tetrafluoroborate, min. 97%**  500mg  
**NEW→** **ItBuHBF<sub>4</sub>** [263163-17-3] 2g  
[C<sub>11</sub>H<sub>21</sub>N<sub>2</sub>]<sup>+</sup>BF<sub>4</sub><sup>-</sup>; FW: 268.10; white to cream-colored solid  
*hygroscopic*

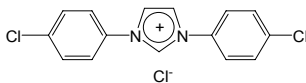
**OTHER LIGANDS - NITROGEN (Compounds)**

**07-0487 meso-1,2-Bis(4-chlorophenyl) ethylenediamine, min. 98%**  
 [74641-30-8]  
 $C_{14}H_{14}Cl_2N_2$ ; FW: 281.18;  
 white to yellow powdr.  
*air sensitive*



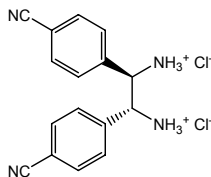
100mg  
500mg

**07-0490 1,3-Bis(4-chlorophenyl) imidazolium chloride, min. 97%** [141556-46-9]  
 $[C_{15}H_{11}Cl_2N_2]^+ Cl^-$ ;  
 FW: 325.62; cream-colored powdr.; m.p. 251-252°  
*hygroscopic*



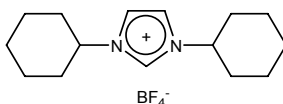
250mg

**07-0220 (1R,2R)-(+)-1,2-Bis(4-cyanophenyl) ethylenediamine dihydrochloride, min. 98%** [117903-80-7]  
 $C_{16}H_{14}N_4 \cdot 2HCl$ ; FW: 335.23;  
 white to off-white powdr.;  
 $[\alpha]_D^{25} +78^\circ$  (c 1.0, methanol)  
*hygroscopic*



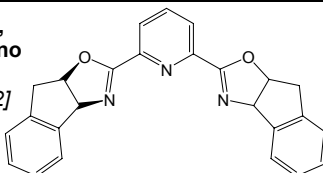
100mg  
500mg

**07-0597 1,3-Bis(cyclohexyl)imidazolium tetrafluoroborate, min. 97%**  
**NEW →** ICyHBF<sub>4</sub> [286014-38-8]  
 $[C_{15}H_{25}N_2]^+ BF_4^-$ ; FW: 320.18;  
 white to cream-colored solid  
*hygroscopic*



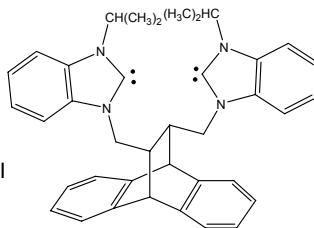
500mg  
2g

**07-0280 (-)-2,6-Bis[2-{3aS-(2(3'aR\*,8'aS\*), 3aα,8aα)-3a,8a-dihydro-8H-indeno [1,2-d]oxazole}] pyridine, min. 97%** [185346-09-2]  
 $C_{25}H_{19}N_3O_2$ ; FW: 393.44;  
 white to off-white powdr.;  
 $[\alpha]_D^{25} -364.0^\circ$  (c 1.04, CH<sub>2</sub>Cl<sub>2</sub>);  
 m.p. 265° dec.



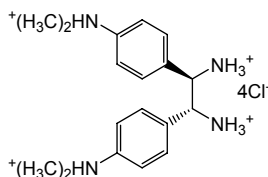
250mg  
1g

**07-0088 HAZ 11,12-Bis[1,3-dihydro-3-(i-propyl)-2H-benzimidazol-2-ylidene-3-methylene]-9,10-dihydro-9,10-ethanoanthracene** [958004-05-2]  
 $C_{38}H_{38}N_4$ ; FW: 550.74;  
 white to off-white powdr.  
 Note: Sold under license from UFRFI for research purposes only. Patent application PCT/US2008/054137.

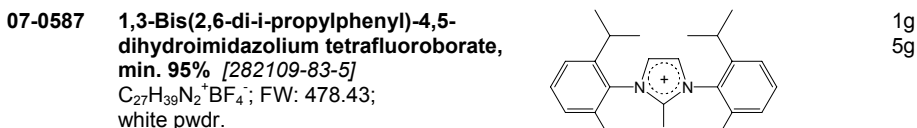
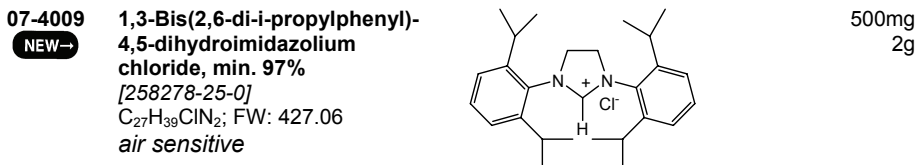
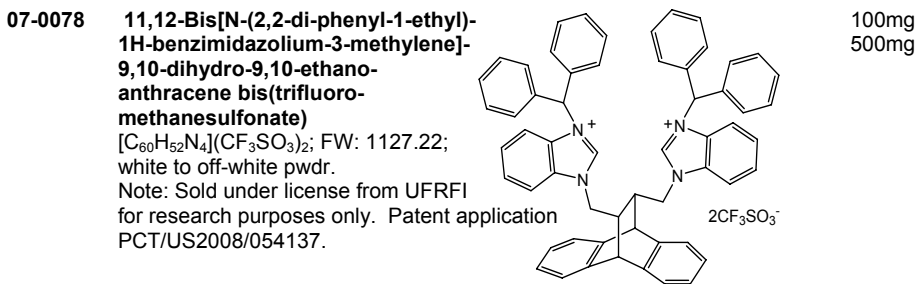


100mg  
500mg

**07-0226 (1R,2R)-(+)-1,2-Bis(4-dimethylaminophenyl)ethylenediamine tetrahydrochloride, min. 98%**  
 $C_{18}H_{26}N_4 \cdot 4HCl$ ; FW: 444.27;  
 white to yellow powdr.;  
 $[\alpha]_D^{25} +35^\circ$  (c 1.0, water)  
*hygroscopic*

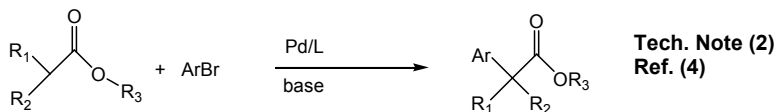
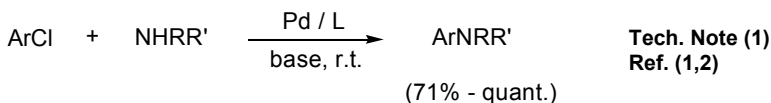


100mg  
500mg

**OTHER LIGANDS - NITROGEN (Compounds)**

**Technical Notes:**

In-situ deprotonation leads to metal carbene species which acts as a catalyst in a variety of C-C and C-N bond forming reactions.

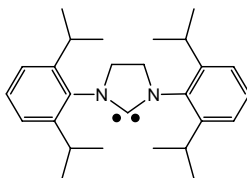
1. Ligand used in the nickel or palladium-catalyzed coupling of aryl chlorides and amines.
2. Ligand for the palladium-catalyzed arylation of esters and amides.


**References:**

1. *Org. Lett.*, **2000**, 2, 1423.
2. *Tetrahedron Lett.*, **2001**, 42, 5689.
3. *J. Org. Chem.*, **2001**, 66, 3402.
4. *J. Am. Chem. Soc.*, **2002**, 124, 12557.

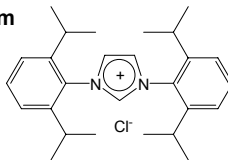
**OTHER LIGANDS - NITROGEN (Compounds)**

**07-0593** **1,3-Bis(2,6-di-*i*-propylphenyl)-4,5-dihydroimidazol-2-ylidene**, min. 98% [258278-28-3]  
 HAZ  $C_{27}H_{38}N_2$ ; FW: 390.60; white to off-white powdr.  
*air sensitive, moisture sensitive, (store cold)*



500mg  
2g

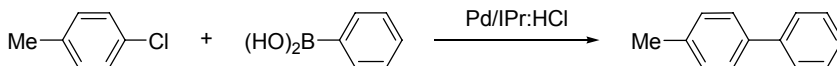
**07-0590** **1,3-Bis(2,6-di-*i*-propylphenyl)imidazolium chloride**, min. 97% [250285-32-6]  
 HAZ  $C_{27}H_{37}N_2^+ Cl^-$ ; FW: 425.06; white to off-white powdr.



500mg  
2g

**Technical Notes:**

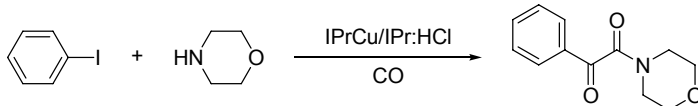
1. Precursor to Pd catalysts used in C-N and C-C coupling reactions.
2. Ligand used in double carbonylation reactions.



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



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

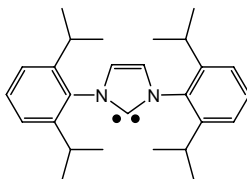


**Tech. Note (2)**  
**Ref. (3)**

**References:**

1. *Organometallics*, **2002**, 21, 2866.
2. *J. Am. Chem. Soc.*, **2006**, 128, 4101.
3. *Org. Lett.*, **2009**, 11, 1321.
4. See 07-0299 (page 20).

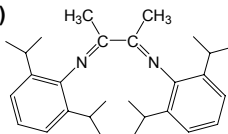
**07-0595** **1,3-Bis(2,6-di-*i*-propylphenyl)imidazol-2-ylidene**, min. 98% [244187-81-3]  
 HAZ  $C_{27}H_{36}N_2$ ; FW: 388.59; white to off-white powdr.  
*air sensitive, moisture sensitive*



250mg  
1g

**OTHER LIGANDS - NITROGEN (Compounds)**

**07-0285** **2,3-Bis(2,6-di-*i*-propylphenylimino)butane, 98%** [74663-77-7] 500mg  
 butane, 98% [74663-77-7] 2g  
 $[(C_3H_7)_2C_6H_3-N=C(CH_3)-]_2$ ;  
 FW: 404.60; yellow xtl.;  
 m.p. 104-106°

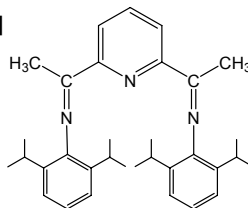

**Technical Note:**

- Ligand used in the preparation of highly active nickel and palladium catalysts for the polymerization of ethylene and  $\alpha$ -olefins.

**References:**

- J. Am. Chem. Soc.*, **1995**, 117, 6414.
- Angew. Chem. Int. Ed.*, **2001**, 40, 534.
- Organometallics*, **2003**, 22(24), 5033.

**07-0289** **2,6-Bis[1-(2,6-di-*i*-propylphenylimino)ethyl]pyridine, 98%** [204203-14-5] 500mg  
 pyridine, 98% [204203-14-5] 2g  
 $C_{33}H_{43}N_3$ ; FW: 481.69;  
 pale yellow powdr.

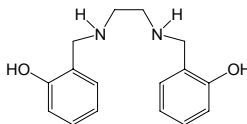

**Technical Note:**

- Active ethylene polymerization catalyst with iron and cobalt.

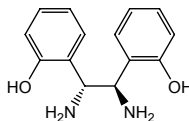
**References:**

- J. Am. Chem. Soc.*, **1998**, 120, 4049.
- Angew. Chem. Int. Ed.*, **2001**, 40, 534.

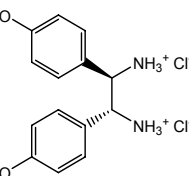
**07-0295** **N,N'-Bis(2-hydroxybenzyl)ethylenediamine, min. 98%** 5g  
**H<sub>4</sub> SALEN** [18653-98-0] 25g  
 $C_{16}H_{20}N_2O_2$ ; FW: 272.35;  
 off-white xtl.; m.p. 118-120°



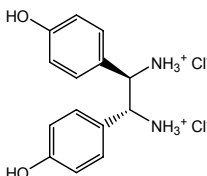
**07-6008** **(1R,2R)-1,2-Bis(2-hydroxyphenyl)ethane-1,2-diamine, min. 97%** 500mg  
**NEW** → [870991-70-1] 2g  
 $C_{14}H_{16}N_2O_2$ ; FW: 244.29  
*air sensitive*



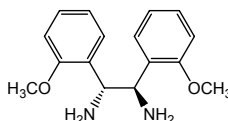
**07-6009** **(1S,2S)-1,2-Bis(2-hydroxyphenyl)ethane-1,2-diamine, min. 97%** 500mg  
**NEW** → [119386-71-9] 2g  
 $C_{14}H_{16}N_2O_2$ ; FW: 244.29  
*air sensitive*



**07-0232** **(1R,2R)-(-)-1,2-Bis(4-hydroxyphenyl)ethylenediamine dihydrochloride, min. 98%** 100mg  
 dihydrochloride, min. 98% 500mg  
 $C_{14}H_{16}N_2O_2 \cdot 2HCl$ ; FW: 317.21;  
 white to off-white powdr.  
*hygroscopic*



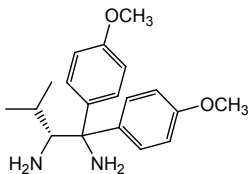
**07-6020** **(1R,2R)-1,2-Bis(2-methoxyphenyl)ethane-1,2-diamine, min. 97%** 500mg  
**NEW** → [758691-50-8] 2g  
 $C_{16}H_{20}N_2O_2$ ; FW: 272.34;  
 white to off-white solid  
*air sensitive*



**OTHER LIGANDS - NITROGEN (Compounds)**

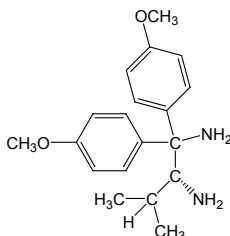
**07-6021** (1S,2S)-1,2-Bis(2-methoxyphenyl)ethane-1,2-diamine, 500mg  
**NEW→** min. 97% [148240-65-7] 2g  
 $C_{16}H_{20}N_2O_2$ ; FW: 272.34; white to off-white solid  
*air sensitive*

**07-6011** (R)-1,1-Bis(4-methoxyphenyl)-3- 250mg  
**NEW→** methylbutane-1,2-diamine, 1g  
 min. 97% [166764-19-8]  
 $C_{19}H_{26}N_2O_2$ ; FW: 314.42;  
 white to off-white solid  
*air sensitive*



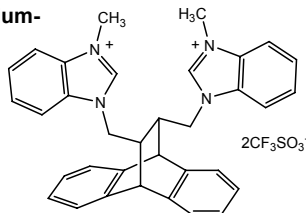
**07-6012** (S)-1,1-Bis(4-methoxyphenyl)-3-methylbutane-1,2- 250mg  
**NEW→** diamine, min. 97% [148369-91-9] 1g  
 $C_{19}H_{26}N_2O_2$ ; FW: 314.42; white to off-white solid  
*air sensitive*

**07-0210** (2R)-(+)-1,1-Bis(4-methoxy- 50mg  
 phenyl)-3-methyl-1,2- 250mg  
 butanediamine, min. 97%  
 (R)-DAIPEN [166764-19-8]  
 $C_{19}H_{26}N_2O_2$ ; FW: 314.43;  
 white to pale yellow powdr.;  
 $[\alpha]_D^{25} +13^\circ$  to  $+17^\circ$  (c 1,  $CH_2Cl_2$ );  
 m.p. 78-98°

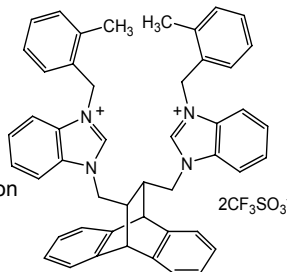


**07-0211** (2S)-(-)-1,1-Bis(4-methoxyphenyl)-3-methyl-1,2-butane- 50mg  
 diamine, min. 97% (S)-DAIPEN [148369-91-9] 250mg  
 $C_{19}H_{26}N_2O_2$ ; FW: 314.43; white to pale yellow powdr.;  
 $[\alpha]_D^{25} -13^\circ$  to  $-17^\circ$  (c 1,  $CH_2Cl_2$ ); m.p. 78-98°

**07-0080** 11,12-Bis[N-methyl-1H-benzimidazolium- 100mg  
 3-methylene]-9,10-dihydro-9,10- 500mg  
 ethanoanthracene bis(trifluoro-  
 methanesulfonate) [958004-03-0]  
 $[C_{34}H_{32}N_4](CF_3SO_3)_2$ ; FW: 794.79;  
 white to off-white powdr.  
 Note: Sold under license from UFRFI  
 for research purposes only. Patent  
 application PCT/US2008/054137.

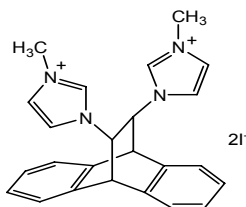


**07-0082** 11,12-Bis[N-(2-methylbenzyl)-1H- 100mg  
 benzimidazolium-3-methylene]-9,10- 500mg  
 dihydro-9,10-ethanoanthracene  
 bis(trifluoromethanesulfonate)  
 $[C_{48}H_{44}N_4](CF_3SO_3)_2$ ; FW: 951.01;  
 white to off-white powdr.  
 Note: Sold under license from UFRFI for  
 research purposes only. Patent application  
 PCT/US2008/054137.



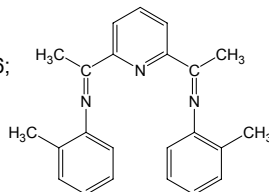
**OTHER LIGANDS - NITROGEN (Compounds)**

**07-0083** **11,12-Bis[3-methylimidazolium]-9,10-dihydro-9,10-ethanoanthracene bis(iodide)**  
 $[C_{24}H_{24}N_4]I_2$ ; FW: 622.28;  
 white to off-white powdr.  
 Note: Sold under license from UFRFI for research purposes only. Patent application PCT/US2008/054137.



100mg  
500mg

**07-0296** **2,6-Bis[1-(2-methylphenylimino)ethyl]pyridine, 98%** [210537-32-9]  
 $C_5H_3N[(CH_3)_2C_6H_4N=C(CH_3)]_2$ ; FW: 341.46;  
 yellow powdr.



500mg  
2g

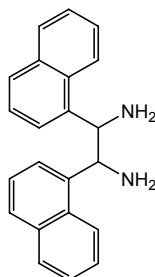
Technical Note:

1. Active ethylene oligomerization catalyst with iron to give  $\alpha$ -olefins.

References:

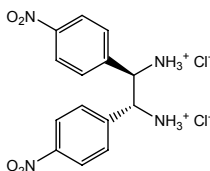
1. *J. Am. Chem. Soc.*, **1998**, *120*, 7143.
2. *Angew. Chem. Int. Ed.*, **2001**, *40*, 534.

**07-0492** **meso-1,2-Bis(naphthyl)ethylene-diamine, min. 98%** [117106-39-5]  
 $C_{22}H_{20}N_2$ ; FW: 312.41;  
 white to yellow powdr.  
*air sensitive*



100mg  
500mg

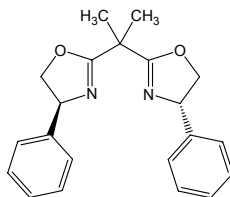
**07-0243** **(1R,2R)-(+)-1,2-Bis(4-nitrophenyl)ethylenediamine dihydrochloride, min. 98%**  
 [117903-79-4]  
 $C_{14}H_{14}N_4O_4 \cdot 2HCl$ ; FW: 375.21;  
 white to off-white powdr.;  
 $[\alpha]_D^{25} +85^\circ$  (c 1.0, methanol)  
*hygroscopic*



100mg  
500mg

**OTHER LIGANDS - NITROGEN (Compounds)**

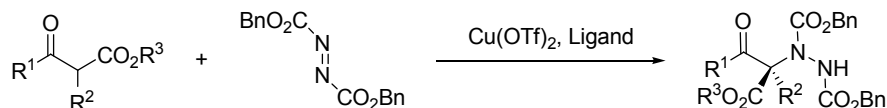
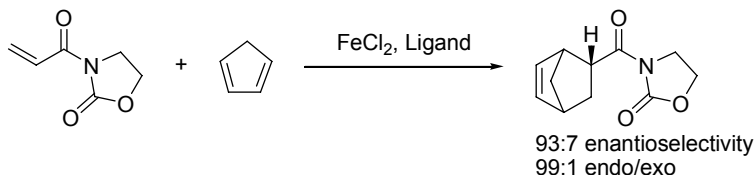
**07-0275 (-)-2,2-Bis[(4S)-4-phenyl-2-oxazolin-2-yl]propane, 98%**  
 [131457-46-0]  
 $C_{21}H_{22}N_2O_2$ ; FW: 334.41;  
 viscous liq.;  
 $[\alpha]_D -171^\circ$  (c 1.0, ethanol)



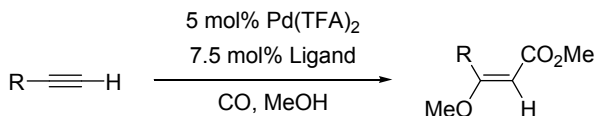
250mg  
1g

**Technical Notes:**

1. Commonly employed chiral ligand for Lewis acid catalyzed transformations, including cyclopropanation, carbonyl-ene, Michael, aldol, Henry, Diels-Alder and hetero Diels-Alder reactions.
2. Utilized in Methoxycarbonylation of terminal alkynes.



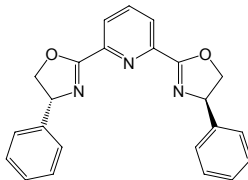
**Tech. Note (1)**  
**Ref. (5)**



**References:**

1. *Tetrahedron: Asymmetry*, **1998**, 9, 1.
2. *Acc. Chem. Res.*, **1999**, 33, 605.
3. *Acc. Chem. Res.*, **2000**, 34, 325.
4. *Angew. Chem. Int. Ed.*, **2000**, 39, 3558.
5. *Angew. Chem. Int. Ed.*, **2003**, 42, 1367.
6. *J. Am. Chem. Soc.*, **2005**, 127, 18014.
7. *J. Am. Chem. Soc.*, **2004**, 126, 9188.
8. *Angew. Chem. Int. Ed.*, **2000**, 39, 3558.

**07-0303 (+)-2,6-Bis[(4R)-4-phenyl-2-oxazolin-2-yl]pyridine, 98+%**  
 [128249-70-7]  
 $C_{23}H_{19}N_3O_2$ ; FW: 369.42;  
 white xtl.;  
 $[\alpha]_D +228^\circ$  (c 1,  $CHCl_3$ );  
 m.p. 171-175°



500mg  
2g

**Technical Note:**

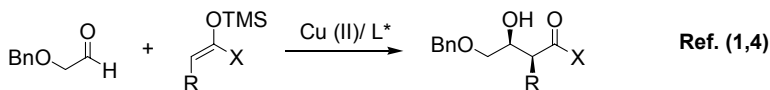
1. See 07-0304 (page 15).

**07-0304** (-)-2,6-Bis[(4S)-4-phenyl-2-oxazolin-2-yl]pyridine, 98+%  
 [174500-20-0]  
 $C_{23}H_{19}N_3O_2$ ; FW: 369.42; white xtl.;  $[\alpha]_D -224^\circ$  (c 1,  $CHCl_3$ );  
 m.p. 171-175°

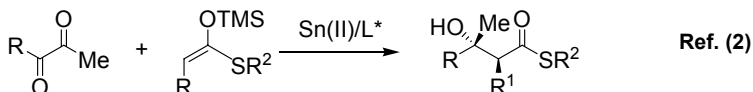
500mg  
2g

Technical Note:

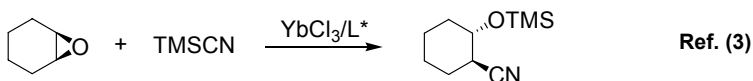
- Useful as a ligand in asymmetric catalysis.
  - Syn-selective Cu(II) or Sc(III) Mukaiyama aldol reaction.



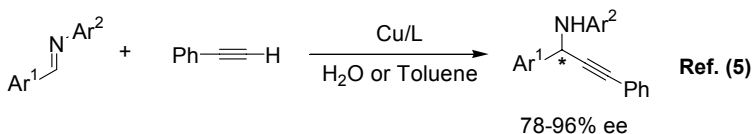
- Anti-selective Sn(II)-catalyzed aldol reaction.



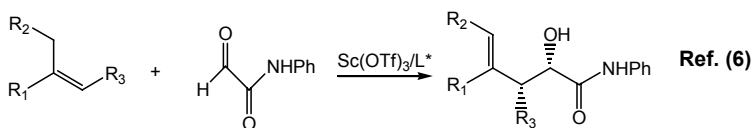
- Desymmetrization of meso epoxides.



- Enantioselective addition of terminal alkynes to imines.



- Enantioselective syn-selective scandium catalyzed ene reactions.



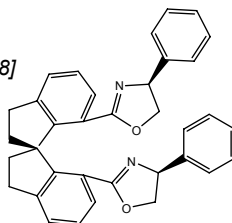
References:

- J. Am. Chem. Soc.*, **1999**, 121, 669.
- J. Am. Chem. Soc.*, **1997**, 119, 10859.
- Org. Lett.*, **2000**, 2, 1001.
- Org. Lett.*, **2002**, 4, 3375.
- J. Am. Chem. Soc.*, **2002**, 124, 5638.
- J. Am. Chem. Soc.*, **2005**, 127, 8006.

07-5194

(R)-7,7'-Bis[(4S)-(phenyl)oxazol-2-yl]-  
2,2',3,3'-tetrahydro-1,1'-spirobiindane,  
min. 97% (R<sub>a</sub>,S,S)-SpiroBOX [890090-21-8]

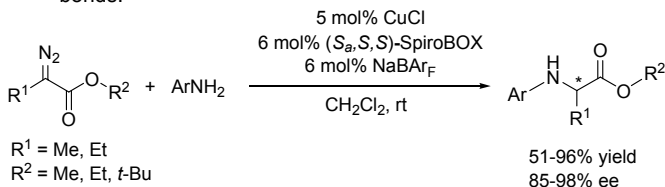
C<sub>35</sub>H<sub>30</sub>N<sub>2</sub>O<sub>2</sub>; FW: 510.62;  
white solid;  
[α]<sub>D</sub> +93.0° (c 0.5, CH<sub>2</sub>Cl<sub>2</sub>); m.p. 130-132°  
*moisture sensitive*



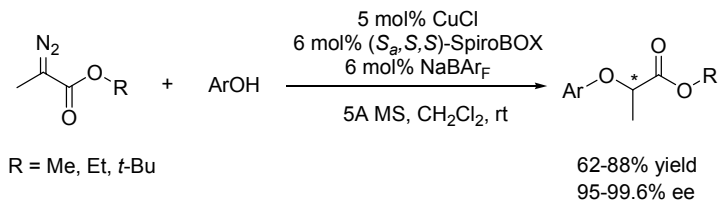
25mg  
100mg

## Technical Notes:

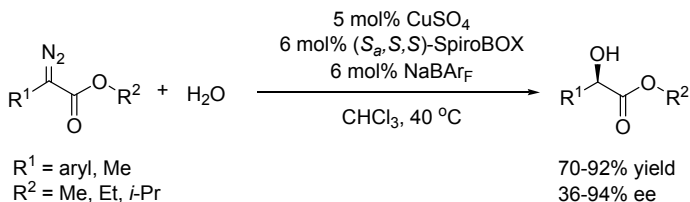
- Chiral ligands for copper-catalyzed asymmetric insertions of carbenoids into N–H bond of anilines.
- Chiral ligands for copper-catalyzed asymmetric insertions of carbenoids into O–H bond of phenols.
- Chiral ligands for copper-catalyzed asymmetric insertions of carbenoids into O–H bond of water.
- Chiral ligands for copper-catalyzed asymmetric insertions of carbenoids into S–H bonds.
- Chiral ligands for copper-catalyzed asymmetric insertions of carbenoids into Si–H bonds.



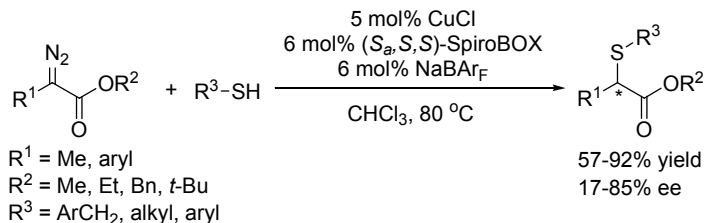
**Tech. Note (1)**  
**Ref. (1)**



**Tech. Note (2)**  
**Ref. (2)**



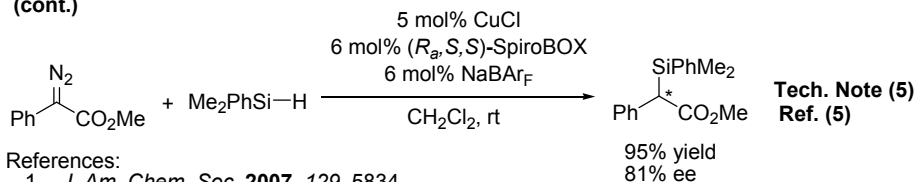
**Tech. Note (3)**  
**Ref. (3)**



**Tech. Note (4)**  
**Ref. (4)**

## OTHER LIGANDS - NITROGEN (Compounds)

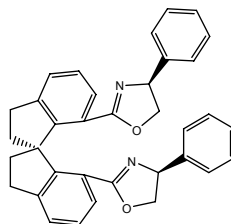
**07-5194** (R)-7,7'-Bis[(4S)-(phenyl)oxazol-2-yl]-2,2',3,3'-tetrahydro-1,1'-spirobiindane, min. 97% (Ra,S,S)-SpiroBOX [890090-21-8]  
**NEW→**  
 (cont.)



References:

1. *J. Am. Chem. Soc.* **2007**, 129, 5834.
2. *J. Am. Chem. Soc.* **2007**, 129, 12616.
3. *Angew. Chem. Int. Ed.* **2008**, 47, 932.
4. *Chem. Commun.* **2009**, 5362.
5. *Angew. Chem. Int. Ed.* **2008**, 47, 8496.

**07-5195** (S)-7,7'-Bis[(4S)-(phenyl)oxazol-2-yl]-2,2',3,3'-tetrahydro-1,1'-spirobiindane, min. 97%  
**NEW→**  
 (Sa,S,S)-SpiroBOX [940880-69-3]  
 $\text{C}_{35}\text{H}_{30}\text{N}_2\text{O}_2$ ; FW: 510.62;  
 white solid;  $[\alpha]_D^{20}$  -322.0° (c 0.5,  $\text{CH}_2\text{Cl}_2$ );  
 m.p. 167-169°  
*moisture sensitive*

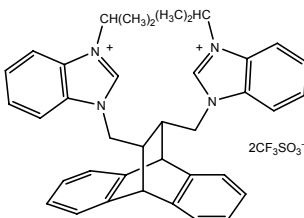


25mg  
100mg

Technical Note:

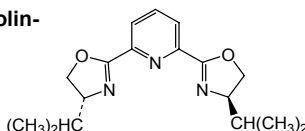
1. See 07-5194 (page 16).

**07-0084** 11,12-Bis[N-(i-propyl)-1H-benzimidazolium-3-methylene]-9,10-dihydro-9,10-ethanoanthracene bis(trifluoromethanesulfonate) [958004-12-1]  
 $[\text{C}_{38}\text{H}_{40}\text{N}_4](\text{CF}_3\text{SO}_3)_2$ ;  
 FW: 826.87;  
 white to off-white powdr.  
 Note: Sold under license from UFRFI for research purposes only. Patent application PCT/US2008/054137.



100mg  
500mg

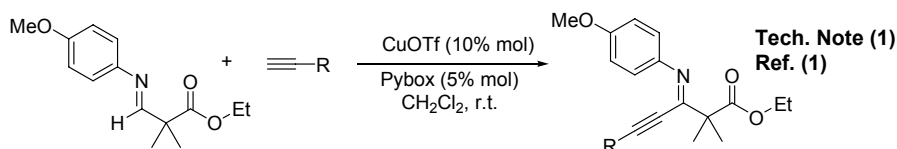
**07-0306** (+)-2,6-Bis[(4R)-4-(i-propyl)-2-oxazolin-2-yl]pyridine, 98+% [131864-67-0]  
 $\text{C}_{17}\text{H}_{23}\text{N}_3\text{O}_2$ ; FW: 301.38; white xtl.;  
 $[\alpha]_D^{20}$  +118° (c 1.0,  $\text{CH}_2\text{Cl}_2$ );  
 m.p. 152-153°



250mg  
1g

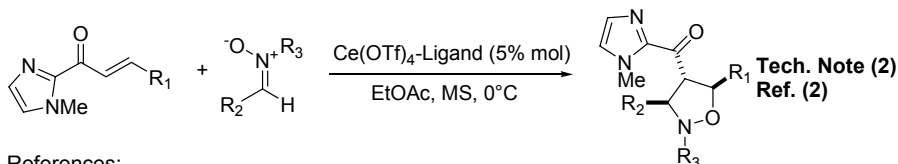
Technical Notes:

1. Ligand for enantioselective nitron cycloaddition to  $\alpha,\beta$ -unsaturated 2-acyl imidazoles.
2. Ligand for asymmetric addition of terminal alkynes to  $\beta$ -imino esters.



## OTHER LIGANDS - NITROGEN (Compounds)

**07-0306 (+)-2,6-Bis[(4R)-4-(i-propyl)-2-oxazolin-2-yl]pyridine, 98+% [131864-67-0]**  
(cont.)



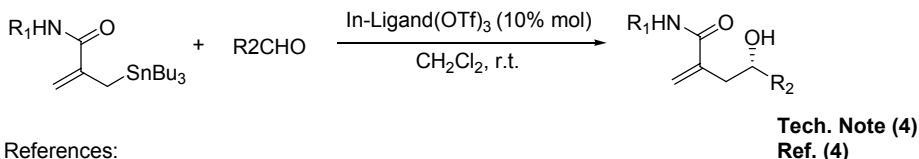
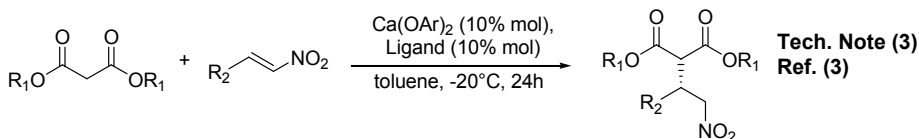
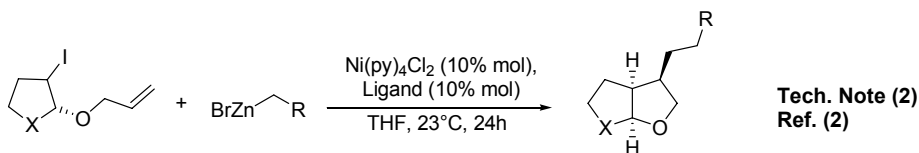
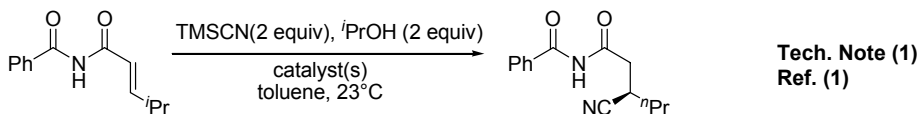
References:

1. *Org. Lett.*, **2006**, 8, 3351.
2. *Adv. Synth. Catal.*, **2009**, 351, 1250.

**07-0307 (-)-2,6-Bis[(4S)-4-(i-propyl)-2-oxazolin-2-yl]pyridine, 98+% 250mg**  
[173829-03-3] 1g  
C<sub>17</sub>H<sub>23</sub>N<sub>3</sub>O<sub>2</sub>; FW: 301.38; white xtl.;  
[α]<sub>D</sub> -120° (c 1.0, CH<sub>2</sub>Cl<sub>2</sub>); m.p. 152-153°

Technical Notes:

1. Ligand used in the dual-catalyst system for highly enantioselective conjugate cyanation of unsaturated imides.
2. Ligand for cross-coupling reactions of iodoalkanes with alkyl zinc halides.
3. Ligand for asymmetric 1,4-addition reactions of 1,3-dicarbonyl compounds to nitroalkenes.
4. Ligand for asymmetric allylation of aldehydes with β-carbonyl allylstannanes.

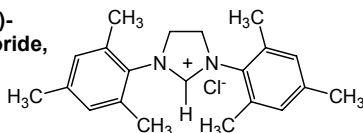


References:

1. *J. Am. Chem. Soc.*, **2004**, 126, 9928.
2. *Angew. Chem. Int. Ed.*, **2007**, 46, 8790.
3. *Angew. Chem. Int. Ed.*, **2009**, 48, 9117.
4. *J. Organomet. Chem.*, **2010**, 695, 128.

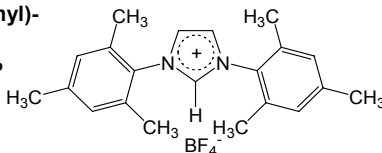
**OTHER LIGANDS - NITROGEN (Compounds)**

**07-4011** **1,3-Bis(2,4,6-trimethylphenyl)-4,5-dihydroimida-zolium chloride, min. 97%** [173035-10-4]  
 $C_{21}H_{27}ClN_2$ ; FW: 342.91  
*air sensitive*



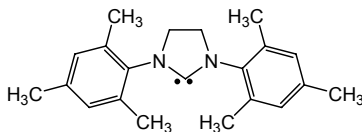
500mg  
2g

**07-0302** **1,3-Bis(2,4,6-tri-methylphenyl)-4,5-dihydroimidazolium tetrafluoroborate, min. 95%**  
 [245679-18-9]  
 $[C_{21}H_{27}N_2]^+BF_4^-$ ;  
 FW: 394.27; off-white powdr.



1g  
5g

**07-0605** **1,3-Bis(2,4,6-tri-methylphenyl)-4,5-dihydroimidazol-2-ylidene, min. 98%**  
 [173035-11-5]  
 $C_{21}H_{26}N_2$ ;  
 FW: 306.45; white to off-white powdr.  
*air sensitive, moisture sensitive*

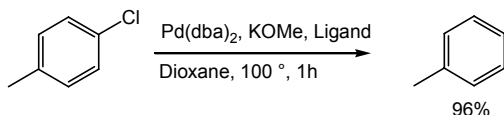


500mg  
2g

**Technical Notes:**

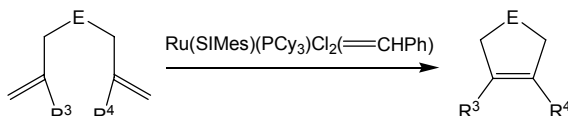
1. Nucleophilic carbene that serves as a bulky, electron-rich "phosphine mimic" for metal-catalyzed reactions.

(a) Palladium- Catalyzed dehalogenation of aryl halides using carbene precursor SIMes.HCl.



Ref. (1)

(b) Ruthenium- SIMes is part of the Grubbs II Ruthenium catalyst for ring-closing metathesis Ref. (2,3). The catalyst  $RuHCl(CO)SIMes(PPh_3)$  has been used for hydrogenation of unactivated internal olefins (Ref 4).



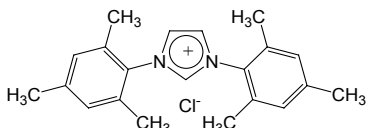
Ref. (2,3)

(c) Copper- The presence of SIMes greatly accelerates the catalyzed conjugate addition of diethylzinc to enones (Ref 5). Cu-SIMes complexes are good hydrosilylation catalysts for hindered and functionalized ketones (Ref. 6).

**References:**

1. *Organometallics*, **2001**, 20, 3607.
2. *Org. Lett.*, **1999**, 1, 953.
3. *Angew. Chem. Int. Ed.*, **2006**, 45, 3760.
4. *Organometallics*, **2005**, 24, 1056.
5. *Tetrahedron Lett.*, **2001**, 42, 2747.
6. *J. Org. Chem.*, **2005**, 70, 4784.

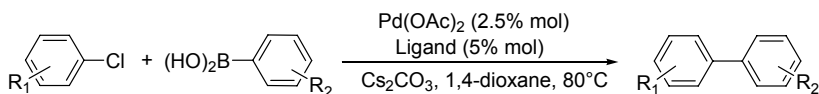
**07-0299** 1,3-Bis(2,4,6-trimethylphenyl)imidazolium chloride, min. 97%  
 [141556-45-8]  
 $C_{21}H_{25}N_2^+Cl^-$ ; FW: 340.90;  
 off-white to yellow powdr.



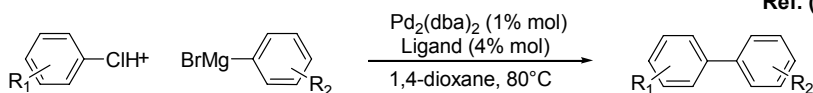
1g  
5g

#### Technical Notes:

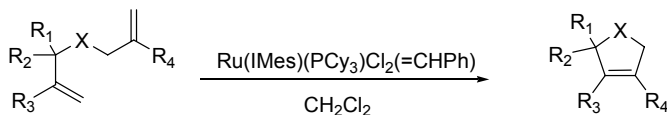
- Precursor to the nucleophilic carbene that serves as a bulky, electron-rich "phosphine mimic" for metal-catalyzed reactions.
  - Palladium-catalyzed Suzuki cross-coupling of aryl chlorides.
  - Palladium-catalyzed Kumada cross-coupling of aryl chlorides.
  - Ruthenium-carbene catalysts for ring-closing metathesis.
  - Suzuki coupling of aryltrimethylammonium salts.
  - Sonogashira coupling of aryl bromides.
- Precursor to a nucleophilic carbene that serves as catalyst.
- Ligand for arylation of aldehydes.
- Ligand for carbene catalyzed intermolecular arylation of C-H bonds.
- Catalyst for boron conjugate additions to cyclic and acyclic  $\alpha,\beta$ -unsaturated carbonyls.
- Ligand for dehydrogenative cyclocondensation of aldehydes, alkynes, and dialkylsilanes.



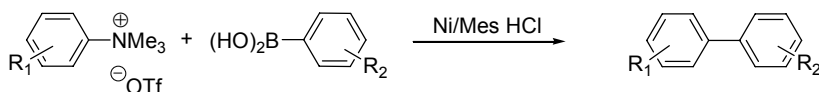
**Tech. Note (1-a)**  
**Ref. (1)**



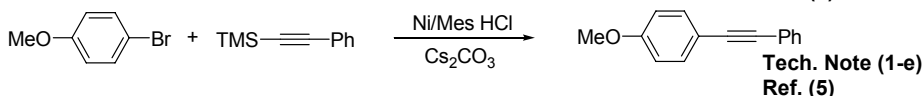
**Tech. Note (1-b)**  
**Ref. (2)**



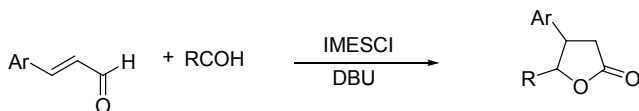
**Tech. Note (1-c)**  
**Ref. (3)**



**Tech. Note (1-d)**  
**Ref. (4)**



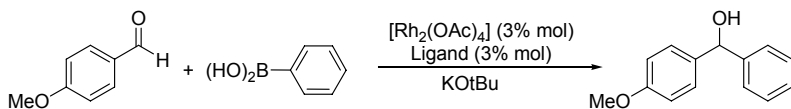
**Tech. Note (1-e)**  
**Ref. (5)**



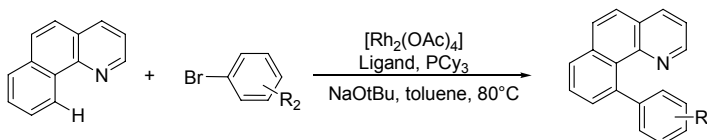
**Tech. Note (2)**  
**Ref. (6)**

**OTHER LIGANDS - NITROGEN (Compounds)**

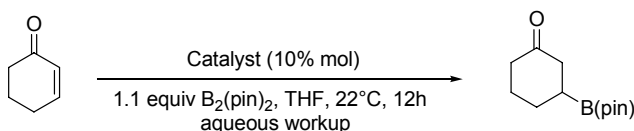
**07-0299** 1,3-Bis(2,4,6-trimethylphenyl) imidazolium chloride, min. 97% [141556-45-8]  
(cont.)



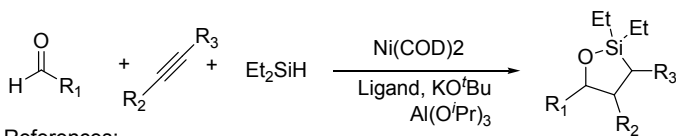
**Tech. Note (3)**  
**Ref. (7)**



**Tech. Note (4)**  
**Ref. (8)**



**Tech. Note (5)**  
**Ref. (9)**



**Tech. Note (6)**  
**Ref. (10)**

**References:**

1. *Organometallics*, **2002**, 21, 2866.
2. *J. Am. Chem. Soc.*, **1999**, 121, 9889.
3. *Org. Lett.*, **2000**, 2, 1517.
4. *J. Am. Chem. Soc.*, **2003**, 125, 6046.
5. *Organometallics*, **2002**, 21, 1020.
6. *J. Am. Chem. Soc.*, **2004**, 126, 14370.
7. *Angew. Chem. Int. Ed.*, **2007**, 46, 5750.
8. *Angew. Chem. Int. Ed.*, **2009**, 48, 8935.
9. *J. Am. Chem. Soc.*, **2009**, 131, 7253.
10. *J. Am. Chem. Soc.*, **2008**, 130, 9662.

**07-0600** 1,3-Bis(2,4,6-trimethylphenyl) imidazol-2-ylidene, min. 98%

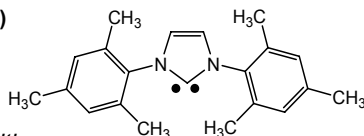
HAZ

[141556-42-5]

C<sub>21</sub>H<sub>24</sub>N<sub>2</sub>; FW: 304.43;

white to off-white powdr.

*air sensitive, moisture sensitive*

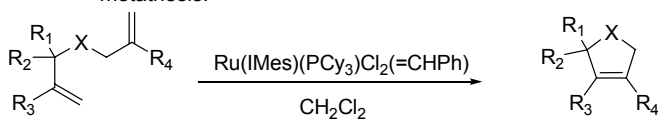


500mg  
2g

**Technical Notes:**

1. Precursor to the nucleophilic carbene that serves as a bulky, electron-rich "phosphine mimic" for metal-catalyzed reactions.

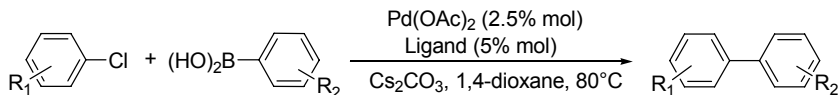
- (a) Palladium-catalyzed Suzuki cross-coupling of aryl chlorides.
- (b) Ruthenium-carbene complexes serve as more reactive catalyst for ring-closing metathesis.



**Tech. Note (1-a)**  
**Ref. (1)**

**OTHER LIGANDS - NITROGEN (Compounds)**

**07-0600** 1,3-Bis(2,4,6-trimethylphenyl)imidazol-2-ylidene, min. 98% [141556-42-5]  
HAZ  
(cont.)

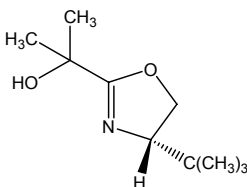


**Tech. Note (1-b)  
Ref. (2-8)**

References:

1. *J. Org. Chem.*, **1999**, 64, 3804.
2. *Angew. Chem. Int. Ed.*, **2002**, 41, 1290.
3. *Organometalics*, **1999**, 18, 2674.
4. *Org. Lett.*, **2000**, 2, 1517.
5. *J. Org. Chem.*, **2000**, 65, 2204.
6. *Organometalics*, **1999**, 18, 3760.
7. *J. Am. Chem. Soc.*, **1999**, 121, 2674.
8. *J. Am. Chem. Soc.*, **2009**, 131, 14176.

**07-0282** (4S)-(-)-2-(4-*t*-Butyl-4,5-dihydro-oxazol-2-yl)propan-2-ol, 98%  
C<sub>10</sub>H<sub>19</sub>NO<sub>2</sub>; FW: 185.26;  
pale yellow powdr.;  
[α]<sub>D</sub> -64.9° (c 1.82, CHCl<sub>3</sub>);  
m.p. 53-55°

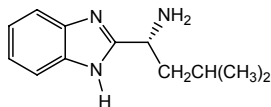


250mg  
1g

**06-0115** *n*-Butylisocyanide, 97%  
SEE CARBON SECTION (page 3)

**06-0120** *t*-Butylisocyanide, min. 98%  
SEE CARBON SECTION (page 4)

**07-1242** (R)-(+)-2-(α-(*i*-butyl) methanamine)-1H-benzimidazole, min. 98% (R)-*i*-Bu-BIMAH  
C<sub>12</sub>H<sub>17</sub>N<sub>3</sub>; FW: 203.28;



100mg  
500mg

white to off-white solid; [α]<sub>D</sub> +0.8° (c 1.0, CHCl<sub>3</sub>); m.p. 92-94°  
*air sensitive*

Note: Sold under license from EnantioTech for research purposes only. PCT/CN2008/073648, CN 200810038929.  
EnantioTech BIMAH Ligand Kit component.  
Visit [www.strem.com](http://www.strem.com).

Technical Note:

1. See 44-0910 (visit [www.strem.com](http://www.strem.com)).

**07-1240** (S)-(-)-2-(α-(*i*-butyl) methanamine)-1H-benzimidazole, min. 98% (S)-*i*-Bu-BIMAH [59592-31-3]  
C<sub>12</sub>H<sub>17</sub>N<sub>3</sub>; FW: 203.28; white to off-white solid;  
[α]<sub>D</sub> -0.9° (c 1.0 CHCl<sub>3</sub>); m.p. 109-112°  
*air sensitive*

250mg  
1g

Note: Sold under license from EnantioTech for research purposes only. PCT/CN2008/073648, CN 200810038929.  
EnantioTech BIMAH Ligand Kit component.  
Visit [www.strem.com](http://www.strem.com).

Technical Note:

1. See 44-0910 (page visit [www.strem.com](http://www.strem.com)).

**OTHER LIGANDS - NITROGEN (Compounds)**

07-1245

NEW →

**(S)-(-)-2-( $\alpha$ -(*t*-butyl) methanamine)-1H-benzimidazole, min. 95% (S)-*t*-Bu-BIMAH [1118114-88-7]**

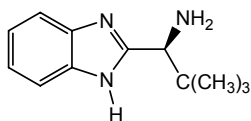
C<sub>12</sub>H<sub>17</sub>N<sub>3</sub>; FW: 203.28; white to off-white solid;  $[\alpha]_D$  -31.1° (c 1.0, CHCl<sub>3</sub>); m.p. 220-222°

*air sensitive*

Note: Sold under license from Enantiochem for research purposes only. PCT/CN2008/073648, CN 200810038929.

Enantiochem BIMAH Ligand Kit component.

Visit [www.strem.com](http://www.strem.com).



100mg  
500mg

Technical Note:

1. See 44-0910 (visit [www.strem.com](http://www.strem.com)).

07-0312

**9-(2-Carboxyphenyl)-2-chloro-5-[(2-(di(2-pyridyl)aminomethyl)phenyl)aminomethyl]-6-hydroxy-3-xanthanone**

**Zinpyr-4 [502467-23-4]**

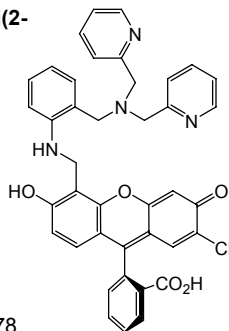
C<sub>40</sub>H<sub>31</sub>ClN<sub>4</sub>O<sub>5</sub>; FW: 683.15; orange pwr.

Technical Note:

1. An intracellular and extracellular Zn<sup>+2</sup> sensor of the Zinpyr family of ligands.

Reference:

1. *J. Am. Chem. Soc.*, **2003**, *125*, 1778.



10mg

07-0314

**9-(2-Carboxyphenyl)-2,7-dichloro-4,5-bis[di(2-pyridyl)aminomethyl]-6-hydroxy-3-xanthanone**

**ZINPYR-1 [288574-78-7]**

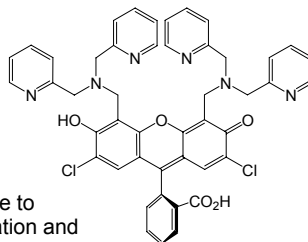
C<sub>46</sub>H<sub>36</sub>Cl<sub>2</sub>N<sub>6</sub>O<sub>5</sub>; FW: 823.72; pink pwr.

Technical Note:

1. ZINPYR-1 is a new lipophilic, zinc-sensitive, fluorescent dye able to penetrate cell membranes. Excitation and emission wavelengths are in the visible range ( $\lambda$ >500nm). This property is a clear advantage over other dyes requiring high energy, tissue damaging UV radiation.

References:

1. *J. Am. Chem. Soc.*, **2003**, *125*(7), 1778.
2. *J. Am. Chem. Soc.*, **2001**, *123*(32), 7831.



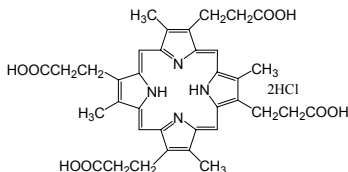
10mg

07-0300

**Coproporphyrin I dihydrochloride (synthetic)**

[69477-27-6]

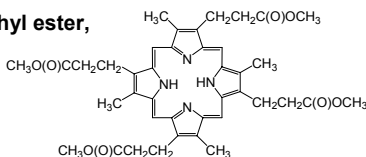
C<sub>36</sub>H<sub>38</sub>N<sub>4</sub>O<sub>8</sub>·2HCl; FW: 727.64; purple xtl.



10mg  
50mg

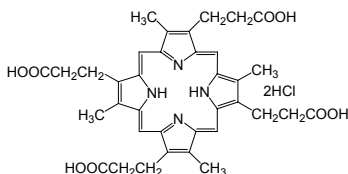
**OTHER LIGANDS - NITROGEN (Compounds)**

**07-0310 Coproporphyrin I tetramethyl ester, 98% (synthetic)**  
**[14643-66-8]**  
 $C_{40}H_{46}N_4O_8$ ; FW: 710.83;  
 purple xtl.;  
 m.p. 251-252°



10mg  
50mg

**07-0305 Coproporphyrin III dihydrochloride**  
**[14643-66-4]**  
 $C_{36}H_{38}N_4O_8 \cdot 2HCl$ ;  
 FW: 727.64; purple xtl.

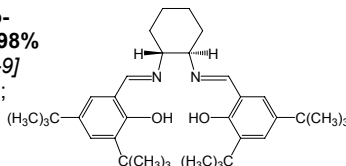


5mg  
25mg

**07-0318 trans-1,2-Cyclohexanediaminetetraacetic acid monohydrate, min. 98%**  
**[13291-61-7]**  
 $(HOOCCH_2)_2NC_6H_{10}N(CH_2COOH)_2 \cdot H_2O$ ; FW: 346.32  
 (364.36); white powder.

25g  
100g

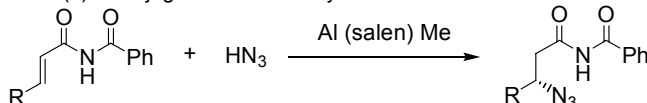
**07-0316 (1R,2R)-(-)-1,2-Cyclohexanediamino-N,N'-bis(3,5-di-*t*-butylsalicylidene), 98% (R,R)-Jacobsen Ligand**  
**[135616-40-9]**  
 $C_{36}H_{54}N_2O_2$ ; FW: 546.84; yellow powder;  
 $[\alpha]_D^{25} -315^\circ$  (c 1,  $CH_2Cl_2$ );  
 m.p. 205-207°



1g  
5g

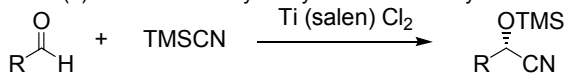
**Technical Notes:**

- See 27-0525 (visit [www.strem.com](http://www.strem.com)), 25-0300 (visit [www.strem.com](http://www.strem.com)), 13-5800 (visit [www.strem.com](http://www.strem.com)).
- A versatile ligand for asymmetric catalysis.
  - Conjugate addition of hydrazoic acid to unsaturated imides.



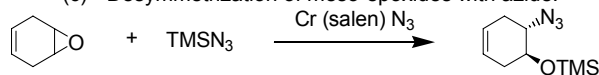
**Tech. Note (2)**  
**Ref. (1)**

- Formation of cyanohydrins from aldehydes.



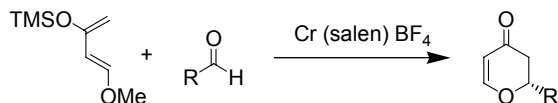
**Tech. Note (2)**  
**Ref. (2)**

- Desymmetrization of meso-epoxides with azide.



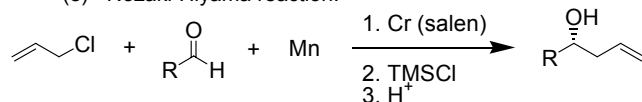
**Tech. Note (2)**  
**Ref. (3)**

- Hetero Diels-Alder reaction.



**Tech. Note (2)**  
**Ref. (4)**

- Nozaki-Hiyama reaction.

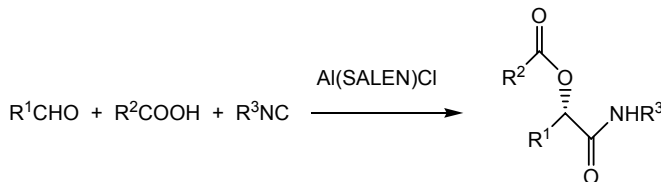


**Tech. Note (2)**  
**Ref. (5)**

**OTHER LIGANDS - NITROGEN (Compounds)**

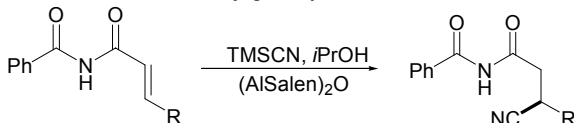
**07-0316 (1R,2R)-(-)-1,2-Cyclohexanediamino-N,N'-bis(3,5-di-*t*-butylsalicylidene), 98% (cont.) (R,R)-Jacobsen Ligand [135616-40-9]**

(f) Reagent used for the Passerini, three-component reaction.



**Tech. Note (2)  
Ref. (8)**

3. Enantioselective conjugate cyanation of unsaturated imides.



**Tech. Note (3)  
Ref. (6,7)**

References:

1. *J. Am. Chem. Soc.*, **1999**, 121, 8959.
2. *J. Am. Chem. Soc.*, **1999**, 121, 3968.
3. *Tetrahedron Lett.*, **1997**, 38, 1693.
4. *J. Org. Chem.*, **1998**, 63, 403.
5. *Angew. Chem. Int. Ed.*, **1999**, 38, 3357.
6. *J. Am. Chem. Soc.*, **2004**, 126, 9928.
7. *J. Am. Chem. Soc.*, **2003**, 125, 4442.
8. *Angew. Chem. Int. Ed.*, **2008**, 47, 388.

**07-0317 (1S,2S)-(+)-1,2-Cyclohexanediamino-N,N'-bis(3,5-di-*t*-butylsalicylidene), 98% (S,S)-Jacobsen Ligand [135616-36-3]**

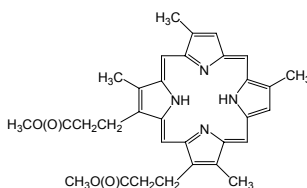
$\text{C}_{36}\text{H}_{54}\text{N}_2\text{O}_2$ ; FW: 546.84; yellow powder;  
[ $\alpha$ ]<sub>D</sub> +305° (c 1, CH<sub>2</sub>Cl<sub>2</sub>); m.p. 205-207°

Technical Note:

1. See 07-0316 (page 24).

**07-0325 Deuteroporphyrin IX, dimethyl ester, min. 97% [10589-94-3]**

$\text{C}_{32}\text{H}_{34}\text{N}_4\text{O}_4$ ; FW: 538.65;  
purple xtl.; m.p. 227°



10mg  
50mg

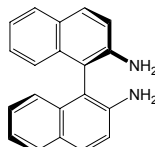
**07-0326 racemic-2,2'-Diamino-1,1'-binaphthyl, min. 96% [4488-22-6]**

$\text{C}_{20}\text{H}_{16}\text{N}_2$ ; FW: 284.36; white to off-white xtl.

1g  
5g

**07-0327 (R)-(+)-2,2'-Diamino-1,1'-binaphthyl, 99% [18741-85-0]**

$\text{C}_{20}\text{H}_{16}\text{N}_2$ ; FW: 284.36;  
white to off-white xtl.;  
[ $\alpha$ ]<sub>D</sub> +157° (c 1, pyridine); m.p. 242-244°



250mg  
1g

**07-0328 (S)-(-)-2,2'-Diamino-1,1'-binaphthyl, 99% [18531-95-8]**

$\text{C}_{20}\text{H}_{16}\text{N}_2$ ; FW: 284.36; white to off-white xtl.;  
[ $\alpha$ ]<sub>D</sub> -157° (c 1, pyridine); m.p. 242-244°

250mg  
1g

**OTHER LIGANDS - NITROGEN (Compounds)**

**07-0330 (1R,2R)-(-)-1,2-Diaminocyclohexane, 99% (R,R)-DACH** 1g  
 HAZ [20439-47-8] 5g  
 C<sub>6</sub>H<sub>14</sub>N<sub>2</sub>; FW: 114.19; white powder; [α]<sub>D</sub> -40.4° (c 7.13, C<sub>6</sub>H<sub>6</sub>);  
 m.p. 38-40°; b.p. 65°/5 mm; f.p. 169°F  
*air sensitive, light sensitive, (store cold)*

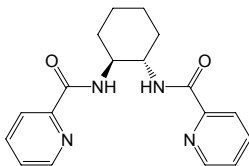
**07-0335 (1S,2S)-(+)-1,2-Diaminocyclohexane, 99% (S,S)-DACH** 1g  
 HAZ [21436-03-3] 5g  
 C<sub>6</sub>H<sub>14</sub>N<sub>2</sub>; FW: 114.19; white powder;  
 [α]<sub>D</sub> +40.4° (c 7.13, C<sub>6</sub>H<sub>6</sub>); m.p. 38-40°; b.p. 65°/5 mm;  
 f.p. 169°F  
*air sensitive, light sensitive, (store cold)*

**07-0340 (-)-N,N'-(1R,2R)-1,2-Diaminocyclohexanediybis(2-pyridinecarboxamide), min. 98%** [218290-24-5] 1g  
 C<sub>18</sub>H<sub>20</sub>N<sub>4</sub>O<sub>2</sub>; FW: 324.38; off-white powder;  
 [α]<sub>D</sub> -95° (c 1, CH<sub>3</sub>OH); m.p. 170°  
 Note: Sold in collaboration with Chirotech for research purposes only. 5g

Technical Note:

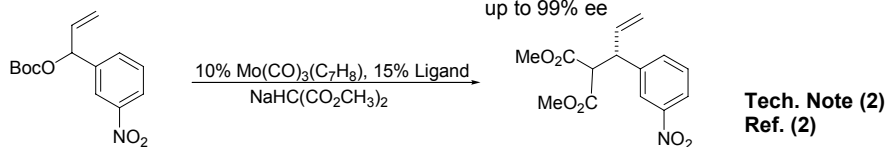
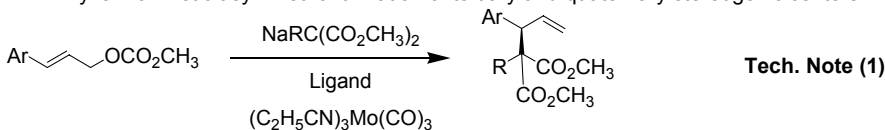
- See 07-0341 (page 26).

**07-0341 (+)-N,N'-(1S,2S)-1,2-Diaminocyclohexanediybis(2-pyridinecarboxamide), min. 98%** 1g  
 [172138-95-3] 5g  
 C<sub>18</sub>H<sub>20</sub>N<sub>4</sub>O<sub>2</sub>; FW: 324.38;  
 off-white powder;  
 [α]<sub>D</sub> +95° (c 1, CH<sub>3</sub>OH); .p. 170°  
 Note: Sold in collaboration with Chirotech for research purposes only.



Technical Notes:

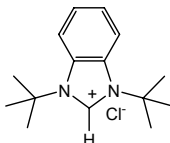
- Ligands for Mo catalyzed asymmetric allylic substitutions. Especially useful for the synthesis of tertiary and quaternary stereocenters. Exclusive license for this technology acquired by ChiroTech and is protected by pending Stanford University patents.
- Dynamic kinetic asymmetric formation of tertiary and quaternary stereogenic centers.



References:

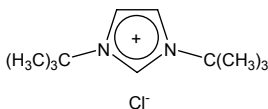
- J. Am. Chem. Soc., **1998**, *120*, 1104.
- J. Am. Chem. Soc., **2002**, *124*, 14320.
- J. Am. Chem. Soc., **2002**, *124*, 7256.

**07-4013** **1,3-Di-t-butylbenzimidazolium chloride, min. 97%** [946607-10-9] 500mg  
 C<sub>15</sub>H<sub>23</sub>ClN<sub>2</sub>; FW: 266.81;  
 white to off-white solid 2g  
*air sensitive*

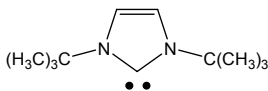


**OTHER LIGANDS - NITROGEN (Compounds)**

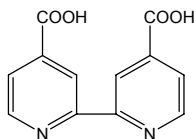
**07-0368** **1,3-Di-t-butylimidazolium chloride, min. 98%** 250mg  
 [157197-54-1]  
 $C_{11}H_{21}N_2^+Cl^-$ ; FW: 216.75  
*air sensitive, hygroscopic*



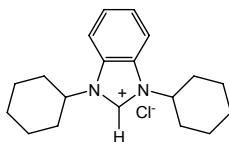
**07-0333** **1,3-Di-t-butylimidazol-2-ylidene, min. 98%** 250mg  
 HAZ  
 [157197-53-0]  
 $C_{11}H_{21}N_2$ ; FW: 181.30;  
 white xtl.; m.p. 71-72°  
*air sensitive, moisture sensitive, (store cold)*



**07-0370** **4,4'-Dicarboxy-2,2'-bipyridine, 98%** 250mg  
 [6813-38-3]  
 $C_{12}H_8N_2O_4$ ; FW: 244.21; white powdr.  
 1g  
 5g



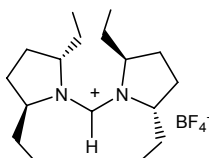
**07-4015** **1,3-Dicyclohexylbenzimidazolium chloride, min. 97%** 500mg  
 NEW→ [1034449-15-4]  
 $C_{19}H_{27}N_2$ ; FW: 318.88;  
 white to off-white solid  
*air sensitive* 2g



**07-0400** **Diethylenetriamine, min. 95% DIEN** [111-40-0] 100g  
 HAZ  $NH_2CH_2CH_2NHCH_2CH_2NH_2$ ; FW: 103.17; colorless liq.;; 500g  
 m.p. -35°; b.p. 199-209°; f.p. 202°F; d. 0.955  
*air sensitive*

**07-0410** **Diethylenetriaminepentaacetic acid, 97% DTPA** [67-43-6] 250g  
 $(HO_2CCH_2)_2N(CH_2)_2N(CH_2CO_2H)(CH_2)_2N(CH_2CO_2H)$ ;  
 1kg  
 FW: 393.35; white xtl.; m.p. 220° dec.

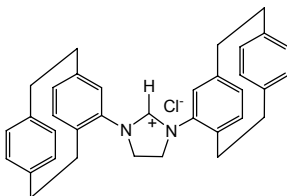
**07-4024** **(2R,5R)-1-[[[(2R,5R)-2,5-diethylpyrrolidin-1-yl]methylene]-2,5-diethylpyrrolidinium tetrafluoroborate, min. 97%** 100mg  
 NEW→ [1204324-20-8] 500mg  
 $C_{17}H_{33}BF_4N_2$ ; FW: 352.26;  
 yellow solid  
*air sensitive*  
 Note: Sold under license from Kanata for research purposes only. WO2010/003226.



**OTHER LIGANDS - NITROGEN (Compounds)**

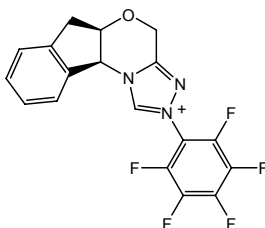
**07-4025** (2S,5S)-1-[[[(2S,5S)-2,5-Diethylpyrrolidin-1-yl]methylene]-2,5-diethylpyrrolidinium tetrafluoroborate, min. 97% 100mg  
**NEW→** [1204324-18-4] 500mg  
 $C_{17}H_{33}BF_4N_2$ ; FW: 352.26; yellow solid  
*air sensitive*  
 Note: Sold under license from Kanata for research purposes only. WO2010/003226.

**07-4019** (R)-4,5-Dihydro-1,3-bis-([2.2]paracyclophan-4-yl)imidazolium chloride, min. 97% 100mg  
**NEW→** 500mg  
 $C_{35}H_{35}ClN_2$ ; FW: 519.12; white to tan-colored solid  
*air sensitive*



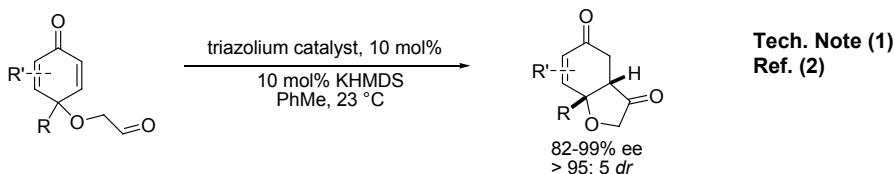
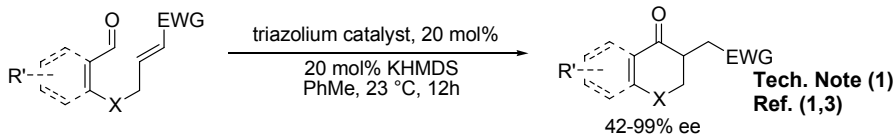
**07-4018** (S)-4,5-Dihydro-1,3-bis-([2.2]paracyclophan-4-yl)imidazolium chloride, min. 97% 100mg  
**NEW→** 500mg  
 $C_{35}H_{35}ClN_2$ ; FW: 519.12; white to tan-colored solid  
*air sensitive*

**07-0415** (5aR,10bS)-(+)-5a,10b-Dihydro-2-(pentafluorophenyl)-4H,6H-indeno[2,1-b][1,2,4]triazolo[4,3-d][1,4]oxazinium tetrafluoroborate, min. 98% 250mg  
 [872143-57-2] 1g  
 $[C_{18}H_{11}F_5N_3O]^+BF_4^-$ ; FW: 467.10; light brown powdr.



**Technical Note:**

1. Reagent used in the highly enantio- and diastereoselective, catalytic intramolecular Stetter reaction.

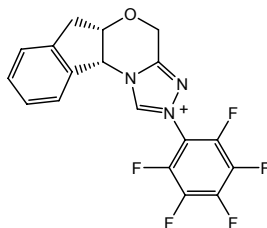


**References:**

1. *J. Org. Chem.*, **2008**, *73*, 2033.
2. *J. Am. Chem. Soc.*, **2006**, *128*, 2552.
3. *Org. Lett.*, **2008**, *10*, 3141.

**OTHER LIGANDS - NITROGEN (Compounds)**

**07-0414** (5aS, 10bR)-(-)-5a,10b-Dihydro-2-(pentafluoro-phenyl)-4H,6H-indeno[2,1-b][1,2,4]triazolo[4,3-d][1,4]oxazinium tetrafluoroborate, min. 98% [740816-14-2]  
[C<sub>18</sub>H<sub>11</sub>F<sub>5</sub>N<sub>3</sub>O]<sup>+</sup>BF<sub>4</sub><sup>-</sup>; FW: 467.10; light brown powdr.

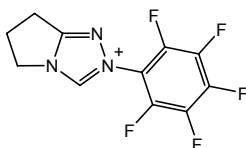


100mg  
500mg

Technical Note:

1. See 07-0415 (page 28).

**07-0417** 6,7-Dihydro-2-pentafluorophenyl-5H-pyrrolo[2,1-c]-1,2,4-triazolium tetrafluoroborate, min. 98%  
[C<sub>11</sub>H<sub>7</sub>F<sub>5</sub>N<sub>3</sub>]<sup>+</sup>BF<sub>4</sub><sup>-</sup>; FW: 362.99; white to off-white powdr.

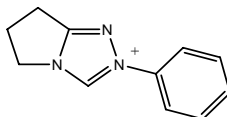


250mg  
1g

Technical Note:

1. See 07-0415 (page 28).

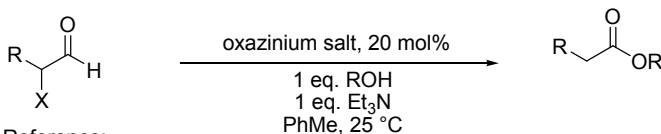
**07-0421** 6,7-Dihydro-2-phenyl-5H-pyrrolo[2,1-c]-1,2,4-triazolium chloride, min. 98%  
[828914-68-7]  
[C<sub>11</sub>H<sub>12</sub>N<sub>3</sub>]<sup>+</sup>Cl<sup>-</sup>; FW: 221.69; off-white powdr.



250mg  
1g

Technical Note:

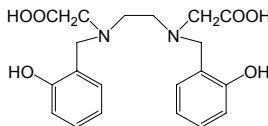
1. Reagent used for the conversion of α-haloaldehydes into acylating agents via a catalyzed internal redox reaction.



Reference:

1. *J. Am. Chem. Soc.*, **2004**, *126*, 9518.

**07-0422** N,N'-Di(2-hydroxybenzyl)ethylene-diamine-N,N'-diacetic acid mono-hydrochloride hydrate HBED  
[35369-53-0]  
C<sub>20</sub>H<sub>24</sub>N<sub>2</sub>O<sub>6</sub>·HCl·XH<sub>2</sub>O; FW: 424.89; off-white powdr.; m.p. 130-134°



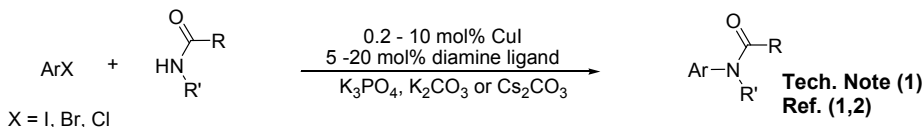
1g  
5g

**07-0270** trans-N,N'-Dimethyl-1,2-cyclohexanediamine, 98%  
[67579-81-1]  
C<sub>6</sub>H<sub>10</sub>(NHCH<sub>3</sub>)<sub>2</sub>; FW: 142.24; colorless to pale yellow liq.; m.p. 4°  
*air sensitive*

500mg  
2g

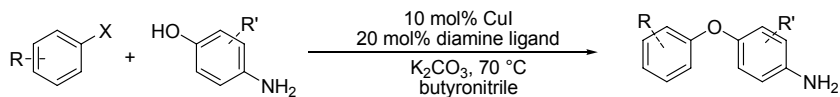
Technical Notes:

1. Ligand used with CuI to form a general and highly efficient catalyst for the N-acylation of aryl and heteroaryl iodides, bromides and in some cases, unactivated aryl chlorides. The catalyst system is also used for the N-arylation of indoles.
2. Ligand used for the N-Arylation of pyrroles, pyrazoles, indazoles, imidazoles and triazoles.
3. Ligand used for the O-arylation of 4-aminophenols.



## OTHER LIGANDS - NITROGEN (Compounds)

**07-0270** trans-N,N'-Dimethyl-1,2-cyclohexanediamine, 98% [67579-81-1]  
(cont.)



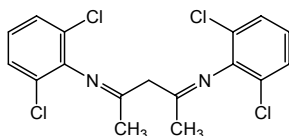
X = I, Br

**Tech. Note (3)**  
**Ref. (3)**

References:

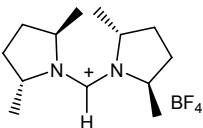
1. *Org. Lett.*, **2007**, 9, 4749.
2. *J. Am. Chem. Soc.*, **2008**, 130, 9613.
3. *J. Am. Chem. Soc.*, **2009**, 131, 17423.

**07-0375** **NEW**→ N,N'-(1,3-Dimethyl-1,3-propanediylidene)bis(2,6-dichlorobenzamide), 99% [445460-78-6]  
C<sub>17</sub>H<sub>14</sub>Cl<sub>4</sub>N<sub>2</sub>; FW: 388.12;  
white powder.



1g  
5g

**07-4022** **NEW**→ (2R,5R)-1-([(2R,5R)-2,5-Dimethylpyrrolidin-1-yl]methylene)-2,5-dimethyl-pyrrolidinium tetrafluoroborate, min. 97% [1204324-14-0]  
C<sub>13</sub>H<sub>25</sub>BF<sub>4</sub>N<sub>2</sub>; FW: 296.16;  
yellow solid  
*air sensitive*



100mg  
500mg

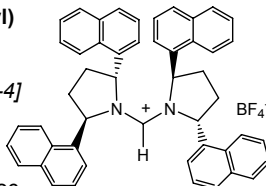
Note: Sold under license from Kanata for research purposes only. WO2010/003226.

**07-4021** **NEW**→ (2S,5S)-1-([(2S,5S)-2,5-Dimethylpyrrolidin-1-yl]methylene)-2,5-dimethylpyrrolidinium tetrafluoroborate, min. 97% [1204324-12-8]  
C<sub>13</sub>H<sub>25</sub>BF<sub>4</sub>N<sub>2</sub>; FW: 296.16; yellow solid  
*air sensitive*

Note: Sold under license from Kanata for research purposes only. WO2010/003226.

100mg  
500mg

**07-4030** **NEW**→ (2R,5R)-1-([(2R,5S)-2,5-Di(naphthalen-1-yl)pyrrolidin-1-yl]methylene)-2,5-di(naphthalen-1-yl)pyrrolidinium tetrafluoroborate, min. 97% [1204324-26-4]  
C<sub>49</sub>H<sub>41</sub>BF<sub>4</sub>N<sub>2</sub>; FW: 744.67  
*air sensitive*



100mg  
500mg

Note: Sold under license from Kanata for research purposes only. WO2010/003226.

**07-4029** **NEW**→ (2S,5S)-1-([(2S,5S)-2,5-Di(naphthalen-1-yl)pyrrolidin-1-yl]methylene)-2,5-di(naphthalen-1-yl)pyrrolidinium tetrafluoroborate, min. 97% [1204324-24-2]  
C<sub>49</sub>H<sub>41</sub>BF<sub>4</sub>N<sub>2</sub>; FW: 744.67  
*air sensitive*

Note: Sold under license from Kanata for research purposes only. WO2010/003226.

100mg  
500mg

**OTHER LIGANDS - NITROGEN (Compounds)**

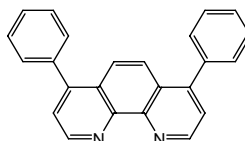
**07-0474** (1R,2R)-(+)-1,2-Diphenylethylenediamine, min. 97%  
**(R,R)-DPEN** [35132-20-8]  
 (C<sub>6</sub>H<sub>5</sub>)(NH<sub>2</sub>)CHCH(NH<sub>2</sub>)(C<sub>6</sub>H<sub>5</sub>); FW: 212.29;  
 white to pale yellow xtl.; [α]<sub>D</sub> +104° (c 1.1, methanol);  
 m.p. 81-82°

100mg  
 500mg  
 2g

**07-0475** (1S,2S)-(-)-1,2-Diphenylethylenediamine, min. 97%  
**(S,S)-DPEN** [29841-69-8]  
 (C<sub>6</sub>H<sub>5</sub>)(NH<sub>2</sub>)CHCH(NH<sub>2</sub>)(C<sub>6</sub>H<sub>5</sub>); FW: 212.29;  
 white to pale yellow xtl.; [α]<sub>D</sub> -104° (c 1.1, methanol);  
 m.p. 81-82°

100mg  
 500mg  
 2g

**07-0472** 4,7-Diphenyl-1,10-phenanthroline,  
 min. 97% (Bathophenanthroline)  
 [1662-01-7]  
 C<sub>24</sub>H<sub>16</sub>N<sub>2</sub>; FW: 332.40;  
 off-white powder; m.p. 218°



250mg  
 1g

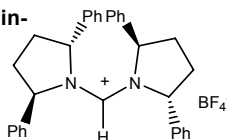
Technical Notes:

1. Bidentate ligand and reagent for determination of iron.
2. Ligand used in the copper-catalyzed protodecarboxylation of aromatic carboxylic acids.

Reference:

1. *Adv. Synth. Cata.*, **2007**, 349(14+15), 2338.

**07-4026** (2R,5R)-1-[[[(2R,5R)-2,5-Diphenylpyrrolidin-1-yl] methylene]-2,5-diphenylpyrrolidinium tetrafluoroborate, min. 97% [1204324-08-2]  
 C<sub>33</sub>H<sub>33</sub>BF<sub>4</sub>N<sub>2</sub>; FW: 544.43; yellow solid  
*air sensitive*



100mg  
 500mg

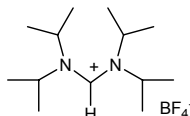
Note: Sold under license from Kanata for research purposes only. WO2010/003226.

**07-4027** (2S,5S)-1-[[[(2S,5S)-2,5-Diphenylpyrrolidin-1-yl] methylene]-2,5-diphenylpyrrolidinium tetrafluoroborate, min. 97% [1204324-10-6]  
 C<sub>33</sub>H<sub>33</sub>BF<sub>4</sub>N<sub>2</sub>; FW: 544.43; yellow solid  
*air sensitive*

100mg  
 500mg

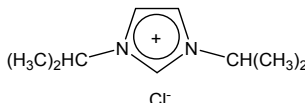
Note: Sold under license from Kanata for research purposes only. WO2010/003226.

**07-4020** Di-*i*-propylaminomethylene(di-*i*-propyl)aminium tetrafluoroborate, min. 97%  
 [369405-27-6]  
 C<sub>13</sub>H<sub>29</sub>BF<sub>4</sub>N<sub>2</sub>; FW: 300.19; white solid  
*air sensitive*



500mg  
 2g

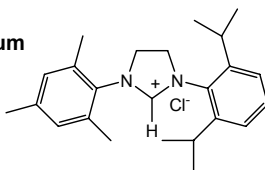
**07-0485** 1,3-Di-*i*-propylimidazolium chloride, min. 97% [139143-09-2]  
 [C<sub>9</sub>H<sub>17</sub>N<sub>2</sub>]<sup>+</sup>Cl<sup>-</sup>; FW: 188.70;  
 white to off-white xtl.  
*air sensitive, hygroscopic*



1g  
 5g

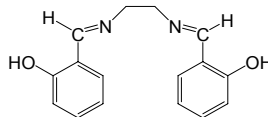
**OTHER LIGANDS - NITROGEN (Compounds)**

**07-4017** **1-(2,6-Di-*i*-propylphenyl)-3-(2,4,6-trimethylphenyl)-4,5-dihydroimidazolium chloride, min. 97%** [866926-59-2]  
**NEW→**  $C_{24}H_{33}ClN_2$ ; FW: 384.99;  
 white to pink solid  
*air sensitive*



500mg  
2g

**07-0540** **Ethylenebis(salicylimine), 98%**  
**SALEN** [94-93-9]  
 $HOC_6H_4CH=NCH_2CH_2N=CHC_6H_4OH$ ;  
 FW: 268.32; yellow xtl.;  
 m.p. 122-125°



25g  
100g

**07-0570** **Ethylenediamine, 99%** [107-15-3]  
 HAZ  $NH_2CH_2CH_2NH_2$ ; FW: 60.10; colorless to pale yellow liq.;  
 m.p. 8.5°; b.p. 118°; f.p. 93°F; d. 0.899  
*air sensitive*

250g  
1kg

**07-0573** **Ethylenediaminetetraacetic acid, 99+%** [60-00-4]  
 $(HO_2CCH_2)_2NCH_2CH_2N(CH_2CO_2H)_2$ ; FW: 292.24; white xtl.;  
 m.p. 245° dec.

500g  
2kg

**07-0580** **Ethylenediaminetetraacetic acid dipotassium salt dihydrate, 99%** [25102-12-9]  
 $(HOOCCH_2)_2NCH_2CH_2N(CH_2COOK)_2 \cdot 2H_2O$ ; FW: 368.44  
 (404.47); white xtl.; m.p. 272° dec.

50g  
250g

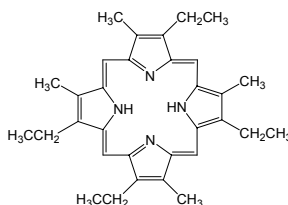
**93-1103** **Ethylenediaminetetraacetic acid, disodium salt, dihydrate, 99+%** [6381-92-6]  
 $(HOOCCH_2)_2NCH_2CH_2N(CH_2COONa)_2 \cdot 2H_2O$ ; FW: 336.22  
 (372.24); white xtl.

250g  
1kg

**93-1104** **Ethylenediaminetetraacetic acid, tetrasodium salt tetrahydrate, 99+%** [64-02-8]  
 $(NaOOCCH_2)_2NCH_2CH_2N(CH_2COONa)_2 \cdot 4H_2O$ ; FW: 380.18  
 (452.23); white xtl.

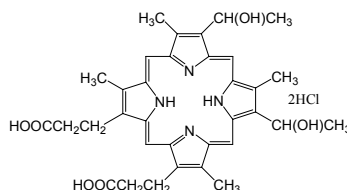
500g  
2kg

**07-0585** **Etioporphyrin III**  
 [26608-34-4]  
 $C_{32}H_{38}N_4$ ; FW: 478.68;  
 purple xtl.



50mg  
250mg

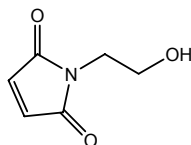
**07-0790** **Hematoporphyrin IX dihydrochloride**  
 [17696-69-4]  
 $C_{34}H_{38}N_4O_6 \cdot 2HCl$ ;  
 FW: 671.62; purple xtl.



1g  
5g

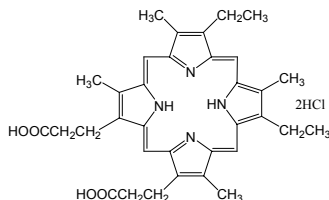
**OTHER LIGANDS - NITROGEN (Compounds)**

**07-1010 N-(2-Hydroxyethyl)maleimide, 99%**  
 [1585-90-6]  
 $C_6H_7NO_3$ ; FW: 141.13; white powdr.



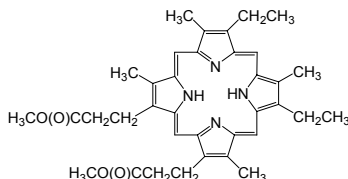
250mg  
1g

**07-1100 Mesoporphyrin IX dihydrochloride**  
 [68938-72-7]  
 $C_{34}H_{38}N_4O_4 \cdot 2HCl$ ;  
 FW: 639.62; purple xtl.



10mg  
50mg

**07-1150 Mesoporphyrin IX, dimethyl ester, 97%**  
 [1263-63-4]  
 $C_{36}H_{42}N_4O_4$ ;  
 FW: 594.76;  
 purple xtl.; m.p. 215°



10mg  
50mg

**07-1234 (R)-(+)-2-(α-methylmethanamine)-1H-benzimidazole, min. 98% (R)-Me-BIMAH**  
 [163959-79-3]

$C_9H_{11}N_3$ ; FW: 161.2; white to off-white solid;  
 $[\alpha]_D^{25} +8.9^\circ$  (c 1.0,  $CHCl_3$ ); m.p. 188-190°

*air sensitive*

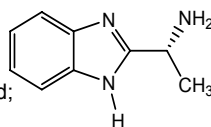
Note: Sold under license from Enantitech for research purposes only. PCT/CN2008/073648, CN 200810038929.

Enantitech BIMAH Ligand Kit component.

Visit [www.strem.com](http://www.strem.com).

Technical Note:

1. See 44-0910 (visit [www.strem.com](http://www.strem.com)).



250mg  
1g

**07-1232 (S)-(-)-2-(α-methylmethanamine)-1H-benzimidazole, min. 98% (S)-Me-BIMAH** [925689-54-9]

$C_9H_{11}N_3$ ; FW: 161.2; white to off-white solid;  
 $[\alpha]_D^{25} -9.2^\circ$  (c 0.95,  $CHCl_3$ ); m.p. 170-172°

*air sensitive*

Note: Sold under license from Enantitech for research purposes only. PCT/CN2008/073648, CN 200810038929.

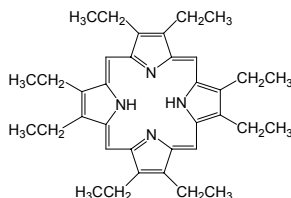
Enantitech BIMAH Ligand Kit component.

Visit [www.strem.com](http://www.strem.com).

Technical Note:

1. See 44-0910 (visit [www.strem.com](http://www.strem.com)).

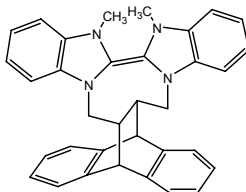
**07-1550 Octaethylporphine, 97+% OEP** [2683-82-1]  
 $C_{36}H_{46}N_4$ ; FW: 534.78;  
 purple xtl.



250mg  
1g

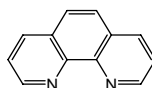
**OTHER LIGANDS - NITROGEN (Compounds)**

**07-0086** (12a,18a)-5,6,12,12a,13,18,18a,19-Octahydro-5,6-dimethyl-13,18[1',2']-benzenobisbenzimidazo [1,2-b:2',1'-d] benzo[i][2.5]benzodiazocine potassium triflate adduct [958004-04-1]  
 $C_{34}H_{30}N_4 \cdot CF_3SO_3K$ ; FW: 494.63 (682.80); white powdr.  
 Note: Sold under license from UFRFI for research purposes only. Patent application PCT/US2008/054137.



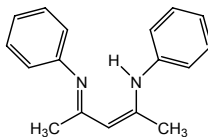
100mg  
500mg

**07-1650** 1,10-Phenanthroline, anhydrous, 99%  
 HAZ [66-71-7]  
 $C_{12}H_8N_2$ ; FW: 180.21; white xtl.  
*hygroscopic*



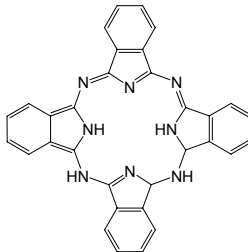
5g  
25g  
100g

**07-1655** 4-(Phenylamino)-2-(phenylimino)-3-pentene, min. 98% *NacNac* [19164-92-2]  
**NEW→**  $C_{17}H_{18}N_2$ ; FW: 250.34; white solid



1g  
5g  
25g

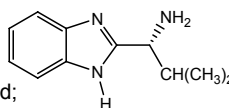
**07-1700** Phthalocyanine [574-93-6]  
 $C_{32}H_{18}N_8$ ; FW: 514.55;  
 blue black powdr.



1g  
5g  
25g

**06-1850** i-Propylisocyanide, 99%  
 SEE CARBON SECTION (page 4)

**07-1238** (R)-(+)-2-(α-(i-propyl)methanamine)-1H-benzimidazole, min. 98%  
**NEW→** (R)-i-Pr-BIMAH



250mg  
1g

$C_{11}H_{15}N_3$ ; FW: 189.26; white to off-white solid;  
 $[\alpha]_D^{25} +32.7^\circ$  (c 1.0,  $CHCl_3$ ); m.p. 193-196°

*air sensitive*

Note: Sold under license from Enantiochem for research purposes only. PCT/CN2008/073648, CN 200810038929.  
 Enantiochem BIMAH Ligand Kit component.  
 Visit [www.strem.com](http://www.strem.com).

Technical Note:

1. See 44-0910 (visit [www.strem.com](http://www.strem.com)).

**07-1236** (S)-(-)-2-(α-(i-propyl)methanamine)-1H-benzimidazole, min. 98% (S)-i-Pr-BIMAH [184685-11-8]  
**NEW→**

$C_{11}H_{15}N_3$ ; FW: 189.26; white to off-white solid;  
 $[\alpha]_D^{25} -29.9^\circ$  (c 1.0  $CHCl_3$ ); m.p. 166-168°

*air sensitive*

Note: Sold under license from Enantiochem for research purposes only. PCT/CN2008/073648, CN 200810038929.  
 Enantiochem BIMAH Ligand Kit component.  
 Visit [www.strem.com](http://www.strem.com).

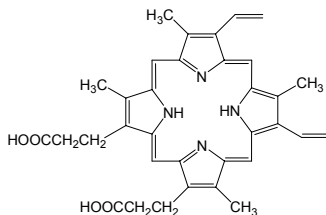
Technical Note:

1. See 44-0910 (visit [www.strem.com](http://www.strem.com)).

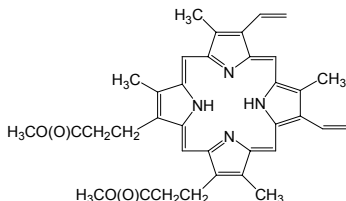
250mg  
1g

**OTHER LIGANDS - NITROGEN (Compounds)**

**07-1820 Protoporphyrin IX** 1g  
 [553-12-8]  
 $C_{34}H_{34}N_4O_4$ ;  
 FW: 562.67;  
 purple powdr.  
*light sensitive*



**07-1850 Protoporphyrin IX, dimethyl ester** 100mg  
 500mg  
 [522-66-7]  
 $C_{36}H_{38}N_4O_4$ ;  
 FW: 590.73; purple xtl.



**07-1885 Pyridinium trifluoromethanesulfonate, min. 97%** 5g  
 25g  
 [52193-54-1]  
 $[C_5H_5NH]^+CF_3SO_3^-$ ; FW: 229.18; white powdr.; m.p. 221-223°

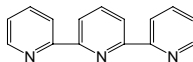
Technical Note:

- Catalytic amounts of pyridinium triflate in conjunction with silylbenzamide is a versatile reagent for the silylation of alcohols.

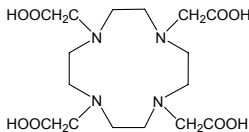
Reference:

- J. Chem. Soc., Chem. Comm.*, **2001**, 2478.

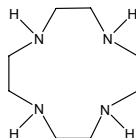
**07-1920 2,2':6',2''-Terpyridine, min. 98%** 1g  
**TERPY** [1148-79-4] 5g  
 $C_5H_4NC_5H_3NC_5H_4N$ ; FW: 233.27;  
 off-white powdr.; m.p. 88-89°



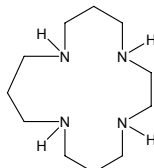
**07-1942 1,4,7,10-Tetraazacyclododecane-N,N',N'',N'''-tetraacetic acid, min. 98%** 250mg  
**DOTA** [60239-18-1] 1g  
 $C_{16}H_{28}N_4O_8$ ; FW: 404.42;  
 white powdr. 5g



**07-1941 1,4,7,10-Tetraazacyclododecane, min. 98% CYCLEN** [294-90-6] 1g  
 $C_8H_{20}N_4$ ; FW: 172.28;  
 white to off-white powdr. 5g  
*hygroscopic* 25g

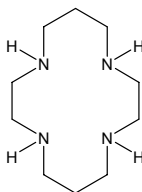


**07-1955 1,4,8,12-Tetraazacyclopentadecane, min. 98%** [15439-16-4] 250mg  
 $C_{11}H_{26}N_4$ ; FW: 214.35; white powdr.; 1g  
 m.p. 98-99°  
*hygroscopic*



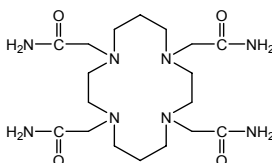
**OTHER LIGANDS - NITROGEN (Compounds)**

**07-1959** **1,4,8,11-Tetraazacyclotetradecane, min. 98% CYCLAM** [295-37-4]  
 $C_{10}H_{24}N_4$ ; FW: 200.33; off-white powdr.; m.p. 185-186°



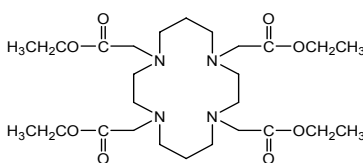
250mg  
1g  
5g

**07-1932** **1,4,8,11-Tetraazacyclo-tetradecane-N,N',N'',N'''-tetraacetamide, min. 98%**  
 [345612-63-7]  
 $C_{18}H_{36}N_8O_4$ ; FW: 428.53; white to yellow powdr.



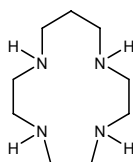
250mg  
1g

**07-1930** **1,4,8,11-Tetraaza-cyclotetradecane-N,N',N'',N'''-tetraacetic acid, tetraethyl ester, min. 98%**  
 [126320-57-8]  
 $C_{26}H_{48}N_4O_8$ ; FW: 544.68; white to yellow powdr.



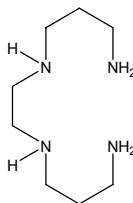
250mg  
1g

**07-1934** **1,4,7,10-Tetraazacyclotridecane, min. 98%**  
 [295-14-7]  
 $C_9H_{22}N_4$ ; FW: 186.30; white to yellow powdr.



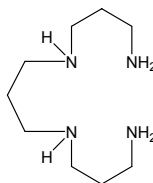
250mg  
1g

**07-1961** **1,5,8,12-Tetraazadodecane, min. 95%**  
 HAZ [10563-26-5]  
 $C_8H_{22}N_4$ ; FW: 174.29; colorless to pale yellow liq.; b.p. 118°/0.2 mm; f.p. >230°F; d. 0.952  
*air sensitive*



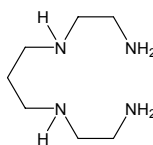
25g  
100g  
500g

**07-1963** **1,5,9,13-Tetraazatridecane, min. 97%**  
 HAZ [4605-14-5]  
 $C_9H_{24}N_4$ ; FW: 188.32; colorless to pale yellow liq.; b.p. 98-103°/1 mm; f.p. 230°F; d. 0.92  
*air sensitive*



1g  
5g  
25g

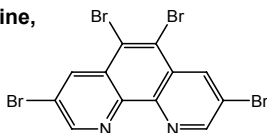
**07-1965** **1,4,8,11-Tetrazaundecane, min. 97%**  
 HAZ [4741-99-5]  
 $C_7H_{20}N_4$ ; FW: 160.26; colorless to pale yellow liq.; b.p. 142-145°/8 mm; f.p. 230°F; d. 0.96  
*air sensitive*



1g  
5g  
25g

**OTHER LIGANDS - NITROGEN (Compounds)**

**07-1971** **3,5,6,8-Tetrabromo-1,10-phenanthroline, 98%** [66127-00-2] 250mg  
**NEW→** **98%** [66127-00-2] 1g  
 $C_{12}H_4Br_4N_2$ ; FW: 495.79;  
white powder.



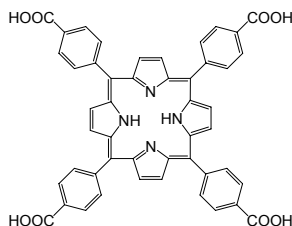
Technical Note:

- Ligand used in the nickel-catalyzed amination of aryl and heteroaryl chlorides.

Reference:

- J. Org. Chem.*, **2008**, *73*, 1429.

**07-1970** **meso-Tetra(4-carboxyphenyl)porphine, 98%** 250mg  
**[14609-54-2]** 1g  
 $C_{48}H_{30}N_4O_8$ ; FW: 790.79;  
purple powder.

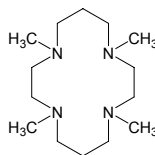


**07-1975** **Tetracyanoethylene, 98%** [670-54-2] 5g  
HAZ  $(CN)_2C=C(CN)_2$ ; FW: 128.09; off-white xtl.; m.p. 197-199° 25g

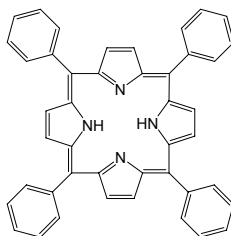
**07-2000** **Tetraethylenepentamine, tech gr. (~50% linear, 41% branched, 5% triethylenetetramine, 4% polyethylene polyamines) TETRAEN** [112-57-2] 250g  
HAZ  $HN(CH_2CH_2NHCH_2CH_2NH_2)_2$ ; FW: 189.31; colorless to yellow liq.; m.p. -40°; b.p. 340°; f.p. 365°F; d. 0.998 1kg  
*air sensitive*

**07-2050** **N,N,N',N'-Tetramethylethylenediamine, 99% TMEDA** 100g  
HAZ [110-18-9] 500g  
 $(CH_3)_2NCH_2CH_2N(CH_3)_2$ ; FW: 116.21; colorless liq.; m.p. -55°; b.p. 120-122°; f.p. 50°F; d. 0.775

**07-2112** **1,4,8,11-Tetramethyl-1,4,8,11-tetraazacyclotetradecane, 98%** 1g  
**[41203-22-9]** 5g  
 $C_{14}H_{32}N_4$ ; FW: 256.43; white waxy xtl.; m.p. 34-36°; f.p. >230°F  
*moisture sensitive*



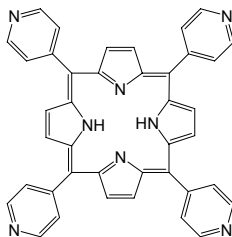
**07-2160** **meso-Tetraphenylporphine, min. 97% TPP (contains 1-3% chlorin)** [917-23-7] 2g  
**[917-23-7]** 10g  
 $C_{44}H_{30}N_4$ ; FW: 614.75; purple xtl.



**07-2170** **meso-Tetraphenylporphine TPP (chlorin free)** [917-23-7] 50mg  
 $C_{44}H_{30}N_4$ ; FW: 614.75; violet xtl. 250mg

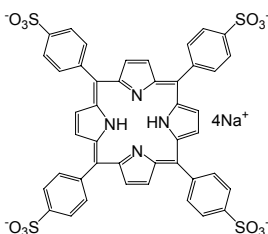
**OTHER LIGANDS - NITROGEN (Compounds)**

**07-2300 meso-Tetra(4-pyridyl)porphine, 97%** [16834-13-2]  
 $C_{40}H_{26}N_8$ ; FW: 618.70; purple powdr.



1g  
5g

**07-2340 Tetrasodium-meso-tetra (4-sulfonatophenyl)porphine dodecahydrate, min. 95%** [39050-26-5]  
 $C_{44}H_{26}N_4Na_4O_{12}S_4 \cdot 12H_2O$ ;  
 FW: 1022.87 (1239.11); purple powdr.

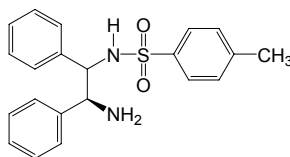


250mg  
1g

**07-2371 (1R,2R)-(-)-N-(4-toluenesulfonyl)-1,2-diphenylethylene-diamine, 98% (R,R)-TsDPEN** [144222-34-4]  
 $C_{21}H_{22}N_2O_2S$ ; FW: 366.48; white xtl.;  
 $[\alpha]_D$  -60° to -63° (c 1,  $CH_2Cl_2$ ); m.p. 127-129°  
 Note: CATHy™ Catalyst Kit component.  
 Visit [www.strem.com](http://www.strem.com).

500mg  
2g  
10g

**07-2370 (1S,2S)-(+)-N-(4-toluenesulfonyl)-1,2-diphenylethylenediamine, 98% (S,S)-TsDPEN** [167316-27-0]



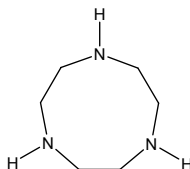
500mg  
2g  
10g

$C_{21}H_{22}N_2O_2S$ ; FW: 366.48; white xtl.;  
 $[\alpha]_D$  +60° to +63° (c 1,  $CH_2Cl_2$ );  
 m.p. 127-129°  
 Note: CATHy™ Catalyst Kit component.  
 Visit [www.strem.com](http://www.strem.com).

**07-2400 2,2',2''-Triaminotriethylamine, 97% TREN** [4097-89-6]  
 HAZ  $N(CH_2CH_2NH_2)_3$ ; FW: 146.24; colorless to pale yellow liq.;  
 b.p. 98-99°/1 mm; f.p. >230°F; d. 0.977  
*air sensitive*

10g  
50g

**07-2500 1,4,7-Triazacyclononane, 97%**  
 HAZ [4730-54-5]  
 $C_6H_{15}N_3$ ; FW: 129.20; white xtl.;  
 f.p. 230°F

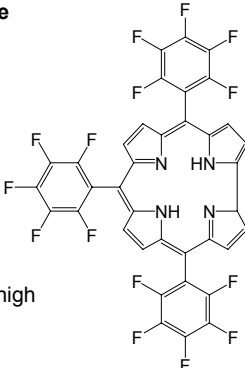


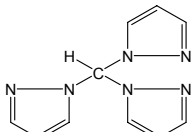
25mg  
100mg

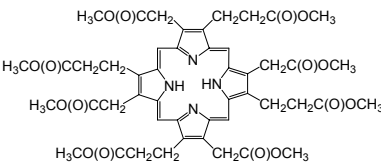
**07-2750 1,4,7-Trimethyl-1,4,7-triazacyclononane, min. 97%**  
 amp [96556-05-7]  
 $C_9H_{21}N_3$ ; FW: 171.28; pale yellow liq.; f.p. 155°F; d. 0.884  
*moisture sensitive*

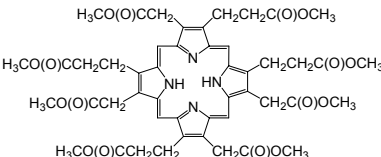
250mg  
500mg  
2g

**OTHER LIGANDS - NITROGEN (Compounds)**

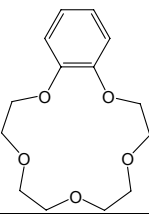
<b>07-3100</b> <b>5,10,15-Tri(pentafluorophenyl)corrole</b> <i>[238402-21-6]</i> $C_{37}H_{11}F_{15}N_4$ ; FW: 796.52; purple powdr. Note: US Patent 6,541,628 B1.		25mg
Technical Note: 1. Corroles are a class of tetradentate nitrogen ligands analogous to porphyrins. The corroles can act as trianionic ligands toward metal ions, and in particular, stabilize metal ions in high oxidation states such as Fe(IV), Co(IV) and Co(V).		

<b>07-3200</b> <b>Tris(pyrazol-1-yl)methane, min. 98%</b> <i>[80510-03-8]</i> $C_{10}H_{10}N_6$ ; FW: 214.23; white powdr.; m.p. 103-104°		250mg 1g
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<b>07-3350</b> <b>Uroporphyrin I, octamethyl ester</b> <i>[10170-03-3]</i> $C_{48}H_{54}N_4O_{16}$ ; FW: 942.98; rust colored powdr.; m.p. 291-292°		10mg
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<b>07-3410</b> <b>Uroporphyrin III, octamethyl ester</b> <i>[15435-60-6]</i> $C_{48}H_{54}N_4O_{16}$ ; FW: 942.98; red to black powdr.		5mg
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**OTHER LIGANDS - OXYGEN (Compounds)**

<b>08-0150</b> <b>Benzo-15-crown-5, 97%</b> <i>[14098-44-3]</i> $C_{14}H_{20}O_5$ ; FW: 268.31; white xtl.; m.p. 76-78° <i>air sensitive</i>		1g 5g
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<b>08-0999</b> <b>racemic-1,1'-Bi-2-naphthol, 99% rac-BINOL</b> <i>[602-09-5]</i> $C_{20}H_{14}O_2$ ; FW: 286.32; white powdr.; m.p. 214-217°	5g 25g
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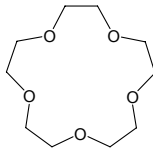
<b>08-0198</b> <b>(S)-(+)-1,3-Butanediol, 98+%</b> <i>[24621-61-2]</i> $CH_3CH(OH)CH_2CH_2OH$ ; FW: 90.12; colorless liq.; $[\alpha]_D +30.0^\circ$ (c 1, ethanol); f.p. 185°F; d. 1.005 <i>hygroscopic</i>	250mg 1g
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**OTHER LIGANDS - OXYGEN (Compounds)**

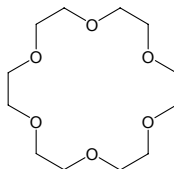
**08-0201 (2S,3S)-(+)-2,3-Butanediol, 99%** [19132-06-0] 100mg  
 500mg  
 $\text{CH}_3\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}_3$ ; FW: 90.12; colorless liq.;  
 $[\alpha]_D^{20} +13^\circ$  (neat); b.p. 179-182°; f.p. 185°F; d. 0.987  
*hygroscopic*

**07-0282 (4S)-(-)-2-(4-t-Butyl-4,5-dihydro-oxazol-2-yl)propan-2-ol, 98%**  
 SEE NITROGEN SECTION (page 22)

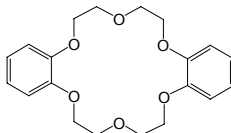
**08-0300 15-Crown-5, 98%** [33100-27-5] 2g  
 10g  
 $\text{C}_{10}\text{H}_{20}\text{O}_5$ ; FW: 220.26; pale yellow liq.;  
 b.p. 78°/0.05 mm; f.p. >230°F; d. 1.109  
*air sensitive*



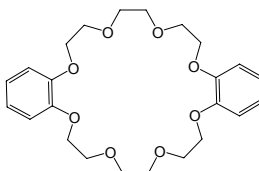
**08-0320 18-Crown-6, 99%** [17455-13-9] 10g  
 50g  
 $\text{C}_{12}\text{H}_{24}\text{O}_6$ ; FW: 264.32; white xtl.;  
 m.p. 36-38°; f.p. >235°F  
*air sensitive*



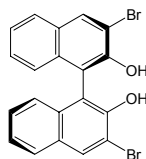
**08-0500 Dibenzo-18-crown-6, min. 98%** 10g  
 50g  
 [14187-32-7]  
 $\text{C}_{20}\text{H}_{24}\text{O}_6$ ; FW: 360.41;  
 white powdr.; m.p. 162-164°  
*air sensitive*



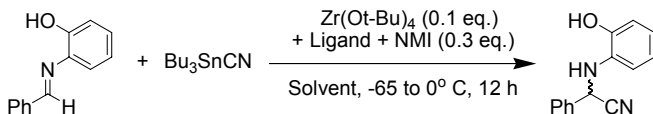
**08-0510 Dibenzo-24-crown-8, 98%** 1g  
 5g  
 [14174-09-5]  
 $\text{C}_{24}\text{H}_{32}\text{O}_8$ ; FW: 448.51;  
 white xtl.; m.p. 103-104°  
*air sensitive*



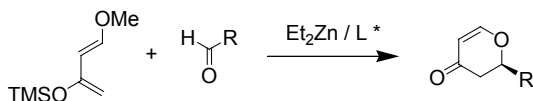
**08-0600 (R)-(+)-3,3'-Dibromo-1,1'-bi-2-naphthol, min. 98%** [111795-43-8] 100mg  
 500mg  
 $\text{C}_{20}\text{H}_{12}\text{Br}_2\text{O}_2$ ; FW: 444.13; white powdr.;  
 $[\alpha]_D^{20} +43^\circ$  (c 0.22,  $\text{CHCl}_3$ ); m.p. 254-258°


**Technical Notes:**

- Ligand used to prepare a chiral zirconium catalyst useful in an asymmetric Strecker synthesis.
- Ligand used in the zinc catalyzed enantioselective Hetero Diels-Alder reaction.



**Tech. Note (1)  
 Ref. (1)**



**Tech. Note (2)  
 Ref. (3,4)**

**References:**

- J. Am. Chem. Soc.*, **2000**, 122, 762.
- Org. Lett.*, **2002**, 4, 4349.
- Org. Lett.*, **2003**, 5, 1091.

**OTHER LIGANDS - OXYGEN (Compounds)**

**08-0601 (S)-(-)-3,3'-Dibromo-1,1'-bi-2-naphthol, min. 98%** 100mg  
 [119707-74-3] 500mg  
 $C_{20}H_{12}Br_2O_2$ ; FW: 444.13; white powdr.;  
 $[\alpha]_D -40^\circ$  (c 0.15,  $CHCl_3$ ); m.p. 257-262°

Technical Note:

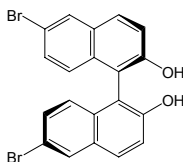
1. See 08-0600 (page 40).

**08-0604 racemic-6,6'-Dibromo-1,1'-bi-2-naphthol, min. 98%** 1g  
 [13185-00-7] 5g  
 $C_{20}H_{12}Br_2O_2$ ; FW: 444.13; white powdr.; m.p. 202-205°

Technical Note:

1. See 08-0600 (page 40).

**08-0605 (R)-(-)-6,6'-Dibromo-1,1'-bi-2-naphthol, min. 98%** 500mg  
 [65283-60-5] 2g  
 $C_{20}H_{12}Br_2O_2$ ; FW: 444.13; white powdr.



Technical Note:

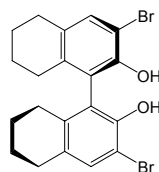
1. See 08-0600 (page 40).

**08-0606 (S)(+)-6,6'-Dibromo-1,1'-bi-2-naphthol, min. 98%** 500mg  
 [80655-81-8] 2g  
 $C_{20}H_{12}Br_2O_2$ ; FW: 444.13; white powdr..

Technical Note:

1. See 08-0600 (page 40).

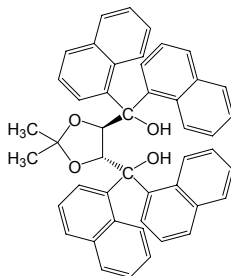
**08-0650 (R)(+)-3,3'-Dibromo-5,5',6,6',7,7',8,8'-octahydro-1,1'-bi-2-naphthol, 99%** 250mg  
 [65355-08-0] 1g  
 $C_{20}H_{20}Br_2O_2$ ; FW: 452.20; off-white powdr.;  
 $[\alpha]_D +27^\circ$  to  $+29^\circ$  (c 1.0,  $CHCl_3$ )



**08-0651 (S)-(-)-3,3'-Dibromo-5,5',6,6',7,7',8,8'-octahydro-1,1'-bi-2-naphthol, 99%** 250mg  
 $C_{20}H_{20}Br_2O_2$ ; FW: 452.20; off-white powdr.;  
 $[\alpha]_D -27^\circ$  to  $-29^\circ$  (c 1.0,  $CHCl_3$ ) 1g

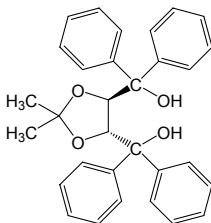
**08-2000 2,2-Dimethyl-3,5-hexanedione, min. 97%** [7307-04-2] 1g  
 $(CH_3)_3CC(O)CH_2C(O)CH_3$ ; FW: 142.20; colorless liq. 5g  
 25g

**08-2004 (4R,5R)-(-)-2,2-Dimethyl- $\alpha,\alpha,\alpha'$ -tetra(1-naphthyl)-1,3-dioxolane-4,5-dimethanol, min. 97% (R,R)-1-Nph-TADDOL** 500mg  
 [137536-94-8] 2g  
 $C_{47}H_{38}O_4$ ; FW: 666.82;  
 white powdr.;  
 $[\alpha]_D -290^\circ$  (c 1,  $CH_3COOC_2H_5$ );  
 m.p. 200° (dec.)



**OTHER LIGANDS - OXYGEN (Compounds)**

**08-2008** (4R,5R)-(-)-2,2-Dimethyl- $\alpha,\alpha,\alpha',\alpha'$ -tetraphenyl-1,3-dioxolane-4,5-dimethanol (R,R)-TADDOL [93379-48-7]  
 $C_{31}H_{30}O_4$ ; FW: 466.57; white powder.;  
 $[\alpha]_D$  -62.6° (c 1,  $CHCl_3$ );  
 m.p. 193-195°



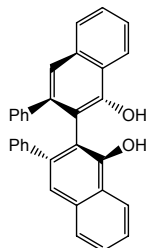
500mg  
2g

**08-1700** (2R)-(+)-3,3'-Diphenyl-[2,2'-binaphthalene]-1,1'-diol, min. 98% (R)-VANOL [147702-13-4]  
 $C_{32}H_{22}O_2$ ; FW: 438.52; white to pale yellow powder.;  
 $[\alpha]_D$  +362° (c 1.0, THF)

Technical Note:

1. See 08-1706 (page 42).

**08-1702** (2S)-(-)-3,3'-Diphenyl-[2,2'-binaphthalene]-1,1'-diol, min. 98% (S)-VANOL [147702-14-5]  
 $C_{32}H_{22}O_2$ ; FW: 438.52;  
 white to pale yellow powder.;  
 $[\alpha]_D$  -372.3° (c 1.0, THF)



100mg  
500mg

Technical Note:

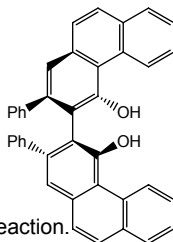
1. See 08-1706 (page 42).

**08-1704** (3R)-(-)-2,2'-Diphenyl-[3,3'-biphenanthrene]-4,4'-diol dichloromethane adduct, min. 98% (R)-VAPOL [147702-16-7]  
 $C_{40}H_{26}O_2 \cdot \frac{1}{2}CH_2Cl_2$ ; FW: 538.63 (581.10);  
 white to pale yellow powder.;  $[\alpha]_D$  -123.4° (c 1.0, THF)

Technical Note:

1. See 08-1706 (page 42).

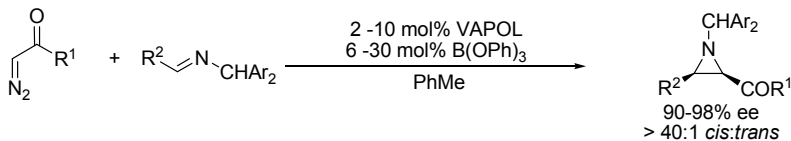
**08-1706** (3S)-(+)-2,2'-Diphenyl-[3,3'-biphenanthrene]-4,4'-diol dichloromethane adduct, min. 98% (S)-VAPOL [147702-15-6]  
 $C_{40}H_{26}O_2 \cdot \frac{1}{2}CH_2Cl_2$ ; FW: 538.63 (581.10);  
 white to pale yellow powder.;  $[\alpha]_D$  +125.0° (c 1.0, THF)



100mg  
500mg

Technical Notes:

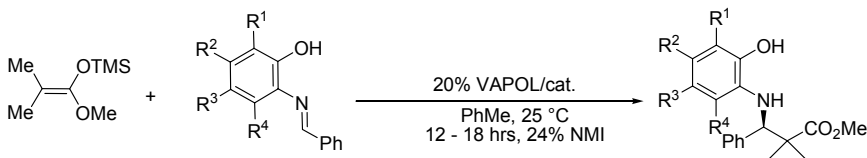
1. Chiral ligand used in catalytic asymmetric aziridination.
2. Chiral ligand used in catalytic asymmetric imino aldol reaction.
3. Chiral ligand used in catalytic asymmetric Petasis reaction.



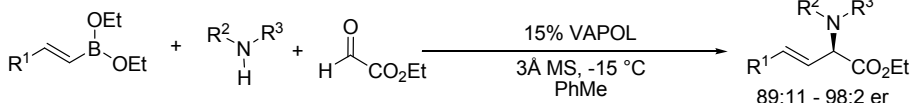
**Tech. Note (1)**  
**Ref. (1,2)**

**OTHER LIGANDS - OXYGEN (Compounds)**

**08-1706 (3S)-(+)-2,2'-Diphenyl-[3,3'-biphenanthrene]-4,4'-diol dichloromethane adduct, (cont.) min. 98% (S)-VAPOL [147702-15-6]**



**Tech. Note (2)  
Ref. (3)**



**Tech. Note (3)  
Ref. (4)**

**References:**

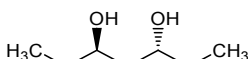
1. *Eur. J. Org. Chem.*, **2007**, 2068.
2. *J. Am. Chem. Soc.*, **2007**, 129, 7185.
3. *Angew. Chem. Int. Ed.*, **2001**, 40, 2271.
4. *J. Am. Chem. Soc.*, **2008**, 130, 6922.

**08-2012 H-BREW** 5g  
25g  
**(mixed propyl and butyl substituted beta-diketones)**  
 $\text{Hy}_x\text{C}(\text{O})\text{CH}_2\text{C}(\text{O})\text{C}_y\text{Hy}$  ( $x=3-4$ ) ( $y=2x+1$ );  
 colorless to pale-yellow liq.

**Technical Note:**

1. H-BREW is a mixture of propyl and butyl substituted beta-diketones capable of forming a wide variety of metal complexes suitable for MOCVD. In most cases, the metal complexes are liquids, are completely miscible with polar and non-polar organic solvents and are miscible with other metal complexes in essentially all proportions.

**08-2014 (3R,5R)-(-)-3,5-Heptanediol, 99%** 250mg  
1g  
*[77291-90-8]*  
 $\text{C}_7\text{H}_{16}\text{O}_2$ ; FW: 132.20;  
 colorless solid;  $[\alpha]_D^{25} -40^\circ$  (c 10, ethanol)



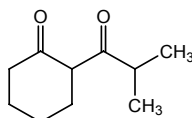
**08-2015 (3S,5S)-(+)-3,5-Heptanediol, 99%** 250mg  
1g  
*[129212-21-1]*  
 $\text{C}_7\text{H}_{16}\text{O}_2$ ; FW: 132.20; colorless solid;  
 $[\alpha]_D^{25} +40^\circ$  (c 10, ethanol)

**08-0750 Hexafluoroacetylacetone, min. 98% HFAA**  
**SEE FLUORINE SECTION (page 5)**

**08-2024 (2R,5R)-(-)-2,5-Hexanediol, 99%** 500mg  
2g  
*[17299-07-9]*  
 $\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$ ; FW: 118.18; colorless xtl.;  
 $[\alpha]_D^{25} -39.6^\circ$  (c 1,  $\text{CHCl}_3$ ); m.p. 50-53°

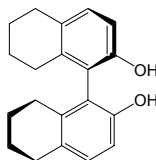
**08-2025 (2S,5S)-(+)-2,5-Hexanediol, 99%** 500mg  
2g  
*[34338-96-0]*  
 $\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$ ; FW: 118.18; colorless xtl.;  
 $[\alpha]_D^{25} +39.4^\circ$  (c 1,  $\text{CHCl}_3$ ); m.p. 50-53°

**08-2029 2-Isobutyrylcyclohexanone, 96%** 1g  
5g  
**(~96% enol form)** *[39207-65-3]*  
 $\text{C}_{10}\text{H}_{16}\text{O}_2$ ; FW: 168.23; colorless liq.



**OTHER LIGANDS - OXYGEN (Compounds)**

**08-2035 (R)-(+)-5,5',6,6',7,7',8,8'-Octahydro-1,1'-bi-2-naphthol, 99%** [65355-14-8]  
 $C_{20}H_{22}O_2$ ; FW: 294.40; off-white powder;  
 $[\alpha]_D^{25} +48^\circ$  to  $53^\circ$  (c 1.1,  $CHCl_3$ )



250mg  
1g

**08-2036 (S)-(-)-5,5',6,6',7,7',8,8'-Octahydro-1,1'-bi-2-naphthol, 99%**  
 [65355-00-2]  
 $C_{20}H_{22}O_2$ ; FW: 294.40; off-white powder;  
 $[\alpha]_D^{25} -48^\circ$  to  $-53^\circ$  (c 1.1,  $CHCl_3$ )

**19-1600 (R)-(-)-5,5',6,6',7,7',8,8'-Octahydro-3,3'-di-*t*-butyl-1,1'-bi-2-naphthol, dipotassium salt**  
 SEE POTASSIUM SECTION (page 46)

**19-1601 (S)-(+)-5,5',6,6',7,7',8,8'-Octahydro-3,3'-di-*t*-butyl-1,1'-bi-2-naphthol, dipotassium salt**  
 SEE POTASSIUM SECTION (page 46)

**08-2037 (3R,6R)-(-)-3,6-Octanediol, 99%** [129619-37-0]  
 $C_2H_5C(OH)CH_2CH_2C(OH)C_2H_5$ ; FW: 146.23; colorless xtl.;  
 $[\alpha]_D^{25} -15^\circ$  (c 10, ethanol)

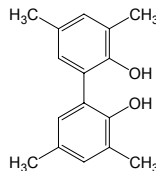
**08-2038 (3S,6S)-(+)-3,6-Octanediol, 99%** [136705-66-3]  
 $C_2H_5C(OH)CH_2CH_2C(OH)C_2H_5$ ; FW: 146.23; colorless xtl.;  
 $[\alpha]_D^{25} +15^\circ$  (c 10, ethanol)

**08-2030 (2R,4R)-(-)-2,4-Pentanediol, 99%** [42075-32-1]  
 $C_5H_{12}O_2$ ; FW: 104.15; white xtl.;  $[\alpha]_D^{25} -41.2^\circ$  (c 10,  $CHCl_3$ );  
 m.p.  $48-50^\circ$   
*hygroscopic*

**08-2031 (2S,4S)-(+)-2,4-Pentanediol, 99%** [72345-23-4]  
 $C_5H_{12}O_2$ ; FW: 104.15; white xtl.;  $[\alpha]_D^{25} +41.2^\circ$  (c 10,  $CHCl_3$ );  
 m.p.  $48-50^\circ$   
*hygroscopic*

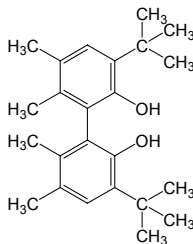
**08-2040 (S)-(+)-1,2-Propanediol, 99%** [4254-15-3]  
 $CH_3CH(OH)CH_2OH$ ; FW: 76.10; clear, viscous liq.;  
 $[\alpha]_D^{25} +16.7^\circ$  (neat); b.p.  $77^\circ/9mm$ ; f.p.  $225^\circ F$ ; d. 1.040

**08-2043 3,3',5,5'-Tetramethyl-2,2'-biphenol, 99%**  
 $C_{16}H_{18}O_2$ ; FW: 242.31; white powder;  
 m.p.  $134-136^\circ$



100mg  
500mg

**08-2045 racemic-5,5',6,6'-Tetramethyl-3,3'-di-*t*-butyl-1,1'-biphenyl-2,2'-diol, 99%**  
**rac-BIPHEN H<sub>2</sub>** [101203-31-0]  
 $C_{24}H_{34}O_2$ ; FW: 354.54;  
 white to off-white xtl.; m.p.  $163-165^\circ$



5g  
25g

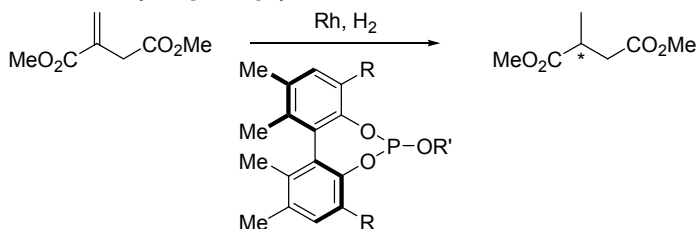
## OTHER LIGANDS - OXYGEN (Compounds)

**08-2045 racemic-5,5',6,6'-Tetramethyl-3,3'-di-t-butyl-1,1'-biphenyl-2,2'-diol, 99% (cont.) rac-BIPHEN H<sub>2</sub> [101203-31-0]**

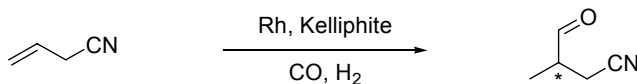
BIPHEN = 5,5',6,6'-Tetramethyl-3,3'-di-t-butyl-1,1'-biphenyl-2,2'-diol

Technical Notes:

1. Used as a ligand backbone for metathesis' catalysts.
2. Used as a ligand backbone in catalytic asymmetric hydrogenation.
3. Used as a ligand backbone for asymmetric hydroformylation of allyl cyanide.
4. Used as a ligand backbone for phosphoramidite ligands in the asymmetric Rh-catalyzed [2+2+2] cycloaddition.



Tech. Note (2)  
Ref. (2)



Tech. Note (3)  
Ref. (3)

References:

1. See 42-1212 (visit [www.strem.com](http://www.strem.com)).
2. *Org. Lett.*, **2003**, 5, 3831.
3. *J. Org. Chem.*, **2004**, 69, 4031.
4. *Angew. Chem. Int. Ed.*, **2009**, 48, 2379.

**08-2046 (R)-(+)-5,5',6,6'-Tetramethyl-3,3'-di-t-butyl-1,1'-biphenyl-2,2'-diol, 99% (R)-BIPHEN H<sub>2</sub> [329735-68-4]** 100mg  
500mg  
 $\text{C}_{24}\text{H}_{34}\text{O}_2$ ; FW: 354.54; white powdr.;  $[\alpha]_D^{25} +78^\circ$  (c 0.352, THF) 2g

Technical Note:

1. See 42-1214 (visit [www.strem.com](http://www.strem.com)).

**08-2047 (S)-(-)-5,5',6,6'-Tetramethyl-3,3'-di-t-butyl-1,1'-biphenyl-2,2'-diol, 99% (S)-BIPHEN H<sub>2</sub> [205927-03-3]** 100mg  
500mg  
 $\text{C}_{24}\text{H}_{34}\text{O}_2$ ; FW: 354.54; white powdr.;  $[\alpha]_D^{25} -78^\circ$  (c 0.352, THF) 2g

Technical Note:

1. See 42-1214 (page visit [www.strem.com](http://www.strem.com)).

**08-2050 2,2,6,6-Tetramethylheptane-3,5-dione, 98% TMHD** 5g  
[1118-71-4] 25g  
 $(\text{CH}_3)_3\text{CC}(\text{O})\text{CH}_2\text{C}(\text{O})\text{C}(\text{CH}_3)_3$ ; FW: 184.28; 100g  
colorless to pale yellow liq. or low melting solid; b.p. 72-73°/6 mm; f.p. 153°F; d. 0.883

**08-2100 2,2,6,6-Tetramethyl-3,5-octanedione, 98% (TMOD)** 1g  
[78579-61-0] 5g  
 $(\text{CH}_3)_3\text{C}(\text{O})\text{CH}_2\text{C}(\text{O})\text{C}(\text{C}_2\text{H}_5)(\text{CH}_3)_2$ ; FW: 198.31;  
colorless to pale yellow liq.

Technical Note:

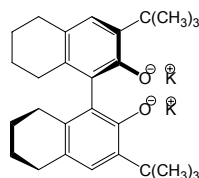
1. Ligand of choice for the preparation of low melting, volatile beta-diketonate complexes.

References:

1. *Jpn. J. Appl. Phys.*, **1997**, 36 (11), 6871.
2. *Advanced Materials for Optics and Electronics*, **2000**, 10(3-5), 201.

**OTHER LIGANDS - POTASSIUM (Compounds)**

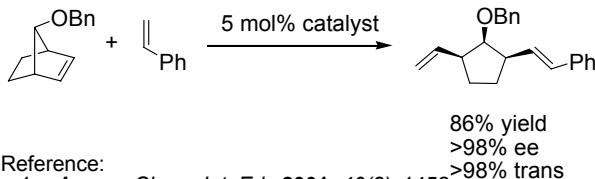
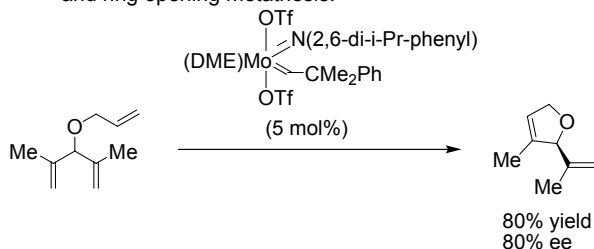
**19-1600 (R)-(-)-5,5',6,6',7,7',8,8'-Octahydro-3,3'-di-t-butyl-1,1'-bi-2-naphthol, dipotassium salt**  
 [350683-75-9]  
 $C_{28}H_{36}K_2O_2$ ; FW: 482.80; cream-colored powdr.;  
 $[\alpha]_D -35^\circ$  (c 1, THF)  
*moisture sensitive*



100mg  
500mg

Technical Note:

- Ligand used in combination with 42-1210 (visit [www.strem.com](http://www.strem.com)) for asymmetric ring closing and ring opening metathesis.



Reference:

- Angew. Chem. Int. Ed.*, **2001**, 40(8), 1452.

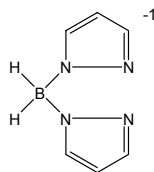
**19-1601 (S)-(+)-5,5',6,6',7,7',8,8'-Octahydro-3,3'-di-t-butyl-1,1'-bi-2-naphthol, dipotassium salt**  
 $C_{28}H_{36}K_2O_2$ ; FW: 482.80; cream-colored powdr.;  
 $[\alpha]_D +35^\circ$  (c 1, THF)  
*moisture sensitive*

100mg  
500mg

Technical Note:

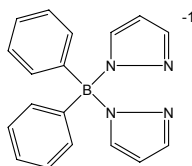
- See 19-1600 (page 46).

**07-1750 Potassium dihydrobis(pyrazol-1-yl) borate, min. 95%** [18583-59-0]  
 $[C_6H_8BN_4]K$ ; FW: 186.06; white xtl.;  
 m.p. 171-172°



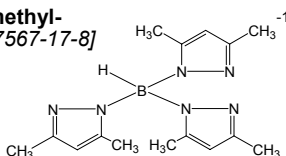
1g  
5g

**19-1700 Potassium diphenylbis(pyrazol-1-yl) borate, min. 98%** [17567-17-1]  
 $[C_{18}H_{16}BN_4]K$ ; FW: 338.26;  
 white powdr.; m.p. 283-285°



250mg  
1g

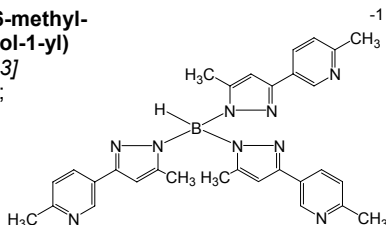
**19-2900 Potassium hydrotris(3,5-dimethyl-pyrazol-1-yl)borate, 97%** [17567-17-8]  
 $[C_{15}H_{22}BN_6]K$ ; FW: 336.29;  
 white powdr.; m.p. 298-300°



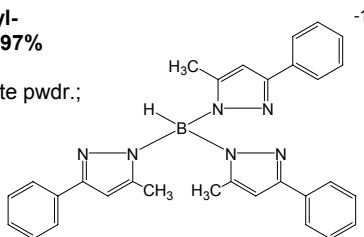
1g  
5g

**OTHER LIGANDS - POTASSIUM (Compounds)**

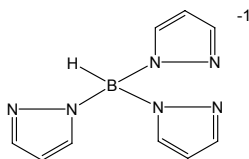
**19-3400 Potassium hydrotris(3-(6-methyl-3-pyridyl)-5-methylpyrazol-1-yl)borate, 97%** [184032-07-3]  
[C<sub>30</sub>H<sub>31</sub>BN<sub>9</sub>]K; FW: 567.54; white powdr.; m.p. 198°



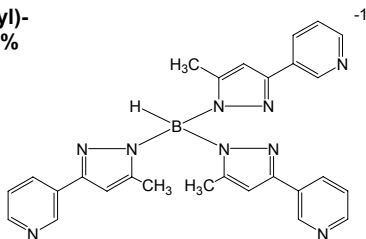
**19-3500 Potassium hydrotris(3-phenyl-5-methylpyrazol-1-yl)borate, 97%** [185034-21-3]  
[C<sub>30</sub>H<sub>28</sub>BN<sub>6</sub>]K; FW: 522.50; white powdr.; m.p. 157°  
*moisture sensitive*



**19-3600 Potassium hydrotris(pyrazol-1-yl)borate hydrate, 98%** [18583-60-3]  
[C<sub>9</sub>H<sub>10</sub>BN<sub>6</sub>]K·XH<sub>2</sub>O; FW: 252.13; white powdr.; m.p. 185-189°



**19-3700 Potassium hydrotris(3-(3-pyridyl)-5-methylpyrazol-1-yl)borate, 97%** [184032-06-2]  
[C<sub>27</sub>H<sub>25</sub>BN<sub>9</sub>]K; FW: 525.46; white powdr.; m.p. 263°

**OTHER LIGANDS - RHODIUM (Compounds)**

**96-7650 CATHy™ Catalyst Kit for Asymmetric Transfer Hydrogenation of Ketones and Imines**  
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**OTHER LIGANDS - RUTHENIUM (Compounds)**

**96-5900 Chiral Quest Catalyst and Ligand Toolbox Kit for Asymmetric Hydrogenation**  
Visit [www.strem.com](http://www.strem.com)

**OTHER LIGANDS - SILICON (Compounds)**

**93-1402 3-Aminopropyltriethoxysilane, 98%** [919-30-2]  
HAZ H<sub>2</sub>N(CH<sub>2</sub>)<sub>3</sub>Si(OC<sub>2</sub>H<sub>5</sub>)<sub>3</sub>; FW: 221.38; colorless liq.; b.p. 217°; f.p. 220°F; d. 0.943  
*moisture sensitive*

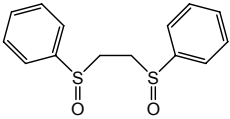
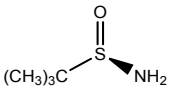
**OTHER LIGANDS - SILICON (Compounds)**

<b>14-1950</b>	<b>Dimethylbis(indenyl)silane, min. 98%</b> [136946-83-3] (CH <sub>3</sub> ) <sub>2</sub> Si(C <sub>9</sub> H <sub>7</sub> ) <sub>2</sub> ; FW: 288.46; viscous yellow liq.	5g 25g 100g
<b>14-7950</b> HAZ	<b>Trimethylsilylcyclopentadiene, 97% (mixture of isomers)</b> [3559-74-8] (C <sub>5</sub> H <sub>5</sub> )Si(CH <sub>3</sub> ) <sub>3</sub> ; FW: 138.29; colorless liq.; b.p. 138-140°; f.p. 85°F; d. 0.833 <i>moisture sensitive, (store cold)</i>	1g 5g 25g
<b>14-8000</b> HAZ	<b>Trimethylsilylpentamethylcyclopentadiene</b> [87778-95-8] [C <sub>5</sub> (CH <sub>3</sub> ) <sub>5</sub> ]Si(CH <sub>3</sub> ) <sub>3</sub> ; FW: 208.42; light yellow liq.; b.p. 100°/10 mm; d. 0.833 <i>moisture sensitive, (store cold)</i>	1g 5g

**OTHER LIGANDS - SODIUM (Compounds)**

<b>93-1075</b> HAZ	<b>Sodium cyclopentadienide, 2-3M in THF</b> [4984-82-1] C <sub>5</sub> H <sub>5</sub> Na; FW: 88.09; yellow to red solution; f.p. 1°F (THF) <i>air sensitive, moisture sensitive, (store cold)</i> Note: Free rubber septum included.	0.1mole 0.5mole
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**OTHER LIGANDS - SULFUR (Compounds)**

<b>16-0350</b> <b>NEW→</b>	<b>1,2-Bis(phenylsulfinyl)ethane, 98%</b> [6099-21-4] C <sub>14</sub> H <sub>14</sub> O <sub>2</sub> S <sub>2</sub> ; FW: 278.39; white to off-white powdr. <i>(store cold)</i>		250mg 1g
<b>16-0380</b>	<b>(R)-(+)-t-Butylmethylsulfinamide, min. 97%</b> [196929-78-9] (C <sub>4</sub> H <sub>9</sub> )(CH <sub>3</sub> )S(O)NH <sub>2</sub> ; FW: 121.20; white powdr.; [α] <sub>D</sub> +4° (c 1.2, CHCl <sub>3</sub> ); m.p. 103-107° <i>(store cold)</i>  Technical Note: 1. Useful reagent for synthesizing chiral amines. References: 1. <i>Acc. Chem. Res.</i> , <b>2002</b> , 35, 984. 2. <i>Chem. Soc. Rev.</i> , <b>1998</b> , 27, 13.		1g 5g 25g
<b>16-0381</b>	<b>(S)-(-)-t-Butylmethylsulfinamide, min. 97%</b> [343338-28-3] (C <sub>4</sub> H <sub>9</sub> )(CH <sub>3</sub> )S(O)NH <sub>2</sub> ; FW: 121.20; white powdr.; [α] <sub>D</sub> -4.5° (c 1.0, CHCl <sub>3</sub> ); m.p. 97-101° <i>(store cold)</i>  Technical Note: 1. See 16-0380 (page 48).		1g 5g 25g

**OTHER LIGANDS - THALLIUM (Compounds)**

<b>81-0305</b> HAZ	<b>Cyclopentadienylthallium, 99% (99.9%-Tl) sublimed</b> [34822-90-7] C <sub>5</sub> H <sub>5</sub> Tl; FW: 269.47; yellow xtl.; m.p. subl. 75°/0.1mm <i>air sensitive, (store cold)</i>	1g 5g 25g
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