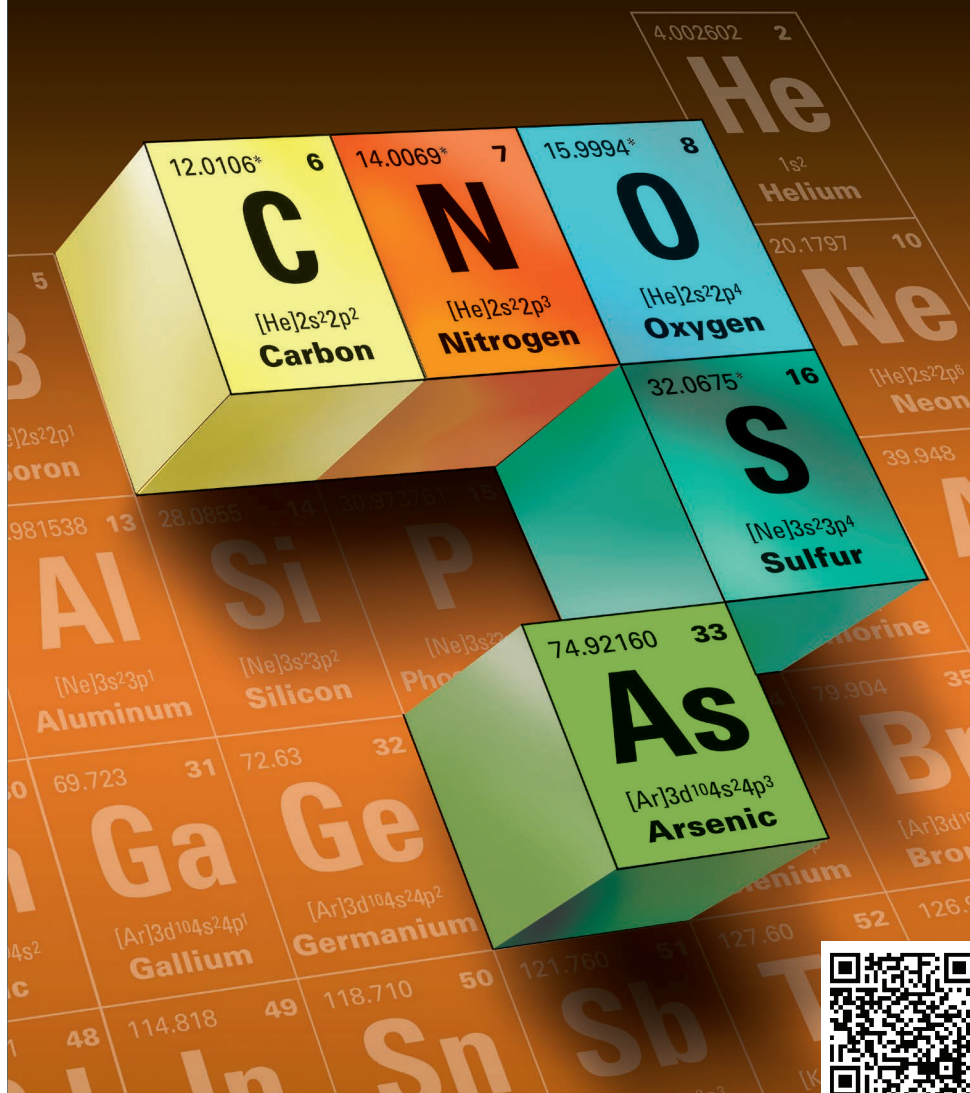


Other Ligands

Phosphorus Ligands Appear in their Own Booklet



Other Ligands



Strem Chemicals has been providing fine chemicals for research and commercial production for over fifty years. Throughout this time we have offered a wide range of ligands. This booklet focuses on all of our ligands that are not classified as phosphorus compounds. This includes carbon, nitrogen, oxygen and sulfur ligands as well as other elements. We offer monodentate, multidentate, achiral and chiral ligands, some which are only commercially available from Strem. There have also been recent additions of ligands for MOF synthesis and photocatalyst synthesis which can be found in this publication.

We have continued to expand our product line as new applications have been found for this focus area. As a note, any multidentate ligands containing a P-donor (e.g. aminophosphines) will not be found in this booklet but will appear only in our Phosphorus Ligands & Compounds booklet.

At Strem, we also offer a wide variety of catalysts, nanomaterials and CVD/ALD precursors. Most of our products are of high purity, typically at 99%, while some are as high as 99.9999% metals purity. We continually seek to provide new technologies from around the globe and add to our product line. We have licensing agreements with industry and academia, which allow easier access to these patent-protected products for our customers. We look forward to continued growth in order to best serve our customers' needs with the quality and service they can trust from Strem.

As part of our ongoing commitment to quality, we have achieved ISO 9001 certification for the Quality Management System (QMS) at our corporate headquarters in Newburyport, Massachusetts.

In addition, custom synthesis services are provided on a contract basis. For pharmaceutical applications, manufacturing is conducted under current Good Manufacturing Practices (cGMP) in FDA inspected kilo-lab suites. Complete documentation is available, including validation and stability studies. Active Drug Master Files (DMF's) are maintained in North America and Europe.

Our other booklets, which focus on applications and product classes, are available in print per request and also on our website. Below is a list of current booklet titles that are available. Please also check our Product Resources section online to find additional literature offerings, such as the Strem Chemiker, our technical publication, and product literature sheets.

- Biocatalysts
- Buchwald Ligands and Precatalysts
- Carbon-Base Nanomaterials & Elemental Forms
- Catalysts & Ligands Manufactured Under License of Takasago Patent
- Gold Elements & Compounds
- Heterogeneous Catalysts
- High Purity Chiral Reagents
- Kits
- Materials for Energy Applications
- Metal Catalysts for Organic Synthesis
- Metathesis Catalysts
- MOCVD, CVD & ALD Precursors
- MOFs and Ligands for MOF Synthesis
- Nanomaterials
- New Products
- Other Ligands
- Phosphorous Ligands and Compounds
- Photocatalysts
- PURATREM: High Purity Inorganics

Ephraim S. Honig, Ph.D., M.B.A.
Chief Executive Officer



OtherLigands 09/18
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Glossary of Terms

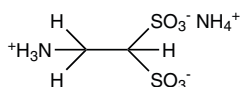
[α]_D		Specific rotation
AAS		Atomic Absorption Standard
ACS		Conforms to American Chemical Society specifications
air sensitive	.....	Product may chemically react with atmospheric oxygen or carbon dioxide at ambient conditions. Handle and store under an inert atmosphere of nitrogen or argon.
amp	.....	Ampouled
b.p.	.....	Boiling point in °C at 760mm, unless otherwise noted
d.	.....	Density
dec.	.....	Decomposes
elec. gr.	.....	Electronic Grade, suitable for electronic applications
f.p.	.....	Flash point in °F
gran.	.....	Granular
heat sensitive	.....	Product may chemically degrade if stored for prolonged periods of time at ambient temperatures or higher. Store at 5°C or lower.
hydrate	.....	Unspecified water content which may vary slightly from lot to lot
hygroscopic	.....	Product may absorb water if exposed to the atmosphere for prolonged periods of time (dependent on humidity and temperature). Handle and store under an inert atmosphere of nitrogen or argon.
light sensitive	.....	Product may chemically degrade if exposed to light
liq.	.....	Liquid
m.p.	.....	Melting point in °C
moisture sensitive	.....	Product may chemically react with water. Handle and store under an inert atmosphere of nitrogen or argon.
NMR grade	.....	Suitable as a Nuclear Magnetic Resonance reference standard
optical grade	.....	For optical applications
powdr.	.....	Powder
primary standard	.....	Used to prepare reference standards and standardize volumetric solutions
PURATREM	.....	Product has a minimum purity of 99.99% (metals basis)
purified	.....	A grade higher than technical, often used where there are no official standards
P. Vol.	.....	Pore volume
pyrophoric	.....	Product may spontaneously ignite if exposed to air at ambient conditions
reagent	.....	High purity material, generally used in the laboratory for detecting, measuring, examining or analyzing other substances
REO	.....	Rare Earth Oxides. Purity of a specific rare-earth metal expressed as a percentage of total rare-earths oxides.
SA	.....	Surface area
store cold	.....	Product should be stored at -18°C or 4°C, unless otherwise noted (see product details)
subl.	.....	Sublimes
superconductor grade	.....	A high purity, analyzed grade, suitable for preparing superconductors
tech. gr.	.....	Technical grade for general industrial use
TLC	.....	Suitable for Thin Layer Chromatography
v.p.	.....	Vapor pressure mm of Hg
xlt.	.....	Crystalline

About Purity

Chemical purity	.....	is reported after the chemical name, e.g. Ruthenium carbonyl, 99%
Metals purity	.....	is reported in parentheses with the respective element, e.g. Gallium (III) bromide, anhydrous, granular (99.999%-Ga) PURATREM where 100% minus the metal purity is equal to the maximum allowable percentage of trace metal impurity

AMMONIUM (Compounds)

02-0570 Ammonium 2-aminoethane-1,1-disulfonic acid hydrate, min. 95% (1235825-84-9)
 $C_2H_{10}N_2O_6S_2$; FW: 222.24; white powdr.; m.p. 57-60°



1g
5g

Technical Note:

- This di-sulfonated building block is recommended for post-synthetic water-solubilization of hydrophobic, molecules for applications in biological media, especially organic dyes, fluorophores, azo dyes^[1], bodipy^[2], coumarin^[3] and xanthene dyes^[4]. This includes organic supramolecular compounds such as cryptophanes^[5], through aminolysis reactions of activated esters, activated carbamates (or carbonates) and isothiocyanates. Such reactions can be performed either in aqueous media (Schotten-Baumann conditions), or in anhydrous organic media (by converting this di-sulfonated taurine analog into the corresponding tributylammonium or tetrabutylammonium salt^[2-4]). Such methodology is also applicable for sulfonation of biomolecules such as peptides and nucleic acids, for fine-tuning their net electric charge^[6]. A further derivatization of this unusual amine with 3-azidopropanoic acid, 3-mercaptopropanoic acid, or 4-pentynoic acid, provides a di-sulfonated linker that is reactive in either "click" reactions (1,3-dipolar cycloadditions), SNAr or Sonogashira cross-couplings^[1].

References:

- Chem.-Eur., J.*, **2013**, *19*, 1686
- New J. Chem.*, **2013**, *37*, 1016
- Dyes Pigm.*, **2014**, *110*, 270
- Tetrahedron Lett.*, **2010**, *51*, 3304
- Chem. Commun.*, **2011**, *47*, 9702
- Bioconjugate Chem.*, **2014**, *25*, 1000

ARSENIC (Compounds)

33-3400 Triethylarsine, 99% (617-75-4) 5g
 $(C_2H_5)_3As$; FW: 162.09; colorless to pale yellow liq.; m.p. -91°; b.p. 140°; d. 1.152 25g
 HAZ *air sensitive*

33-3750 Trimethylarsine, 99% (593-88-4) 5g
 $(CH_3)_3As$; FW: 120.03; colorless liq.; m.p. -87.3°; b.p. 51°; f.p. 100°F; d. 1.124 25g
 HAZ *air sensitive*

98-1975 Trimethylarsine, elec. gr. (99.995%-As) PURATREM (593-88-4) 25g
 $(CH_3)_3As$; FW: 120.03; colorless liq.; m.p. -87.3°; b.p. 51°; f.p. 100°F; d. 1.124
 HAZ *air sensitive*

33-4000 Triphenylarsine, min. 97% (603-32-7) 5g
 $(C_6H_5)_3As$; FW: 306.24; white powdr.; m.p. 59-60°; b.p. 233°/14 mm; d. 1.2225 25g
 HAZ

Technical Notes:

- Useful as a ligand in Stille coupling reactions.
- Synthesis of functionalized cyclopropanes from the reaction between acetylenic esters and C-H acids.



Tech. Note (2)
Ref. (2)

References:

- Pure Appl. Chem.*, **1996**, *68*, 73.
- Tetrahedron Lett.*, **2009**, *50*, 4439.

33-5000 Tris(dimethylamino)arsine, 99% (6596-96-9) 5g
 $((CH_3)_2N)_3As$; FW: 207.15; colorless liq.; b.p. 55°/10mm 25g
 HAZ *air sensitive, moisture sensitive*

Technical Notes:

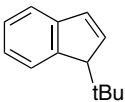
- Precursor for arsenic doping in MOCVD of HgCdTe films. Absence of As-H bonds prevents the formation of As-H complexes and its incorporation in the As-doped films^[1]
- ALD/CVD dopant for CdTe/CdS thin films for photovoltaics grown by MOCVD^[2-3]
- ALD/CVD dopant for GaAs_(1-x)N_x films deposited by N-ALD technique^[4]
- ALD/CVD precursor for p-type epitaxial grows of CdTe on p-type GaAs films^[5]
- CVD precursor for GaAs thin films deposition from As(NMe₂)₃ and GaMe₃ for solar cells^[6]

References:

- J. Electron. Mater.*, **1996**, *25*, 1328.
- J. Cryst. Growth.*, **1998**, *195*, 718.
- Semicond. Sci. Technol.*, **2008**, *23*, 015017.
- J. Cryst. Growth*, **2009**, *311*, 2821
- J. Electron. Mater.*, **2014**, *43*, 2895.
- RSC Adv.*, **2015**, *5*, 11812.

Other Ligands

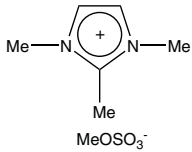
CARBON (Compounds)

06-0135	1-t-Butyl-1H-indene, min. 95% (40650-31-5) $C_{13}H_{16}$; FW: 172.27; colorless liq.		250mg 1g
06-0115 HAZ	n-Butylisocyanide, 97% (2769-64-4) $C_4H_9N\equiv C$; FW: 83.13; colorless to pale yellow liq.; d. 0.795 (store cold), STENCH		1g 5g
06-0120 amp HAZ	t-Butylisocyanide, min. 98% (7188-38-7) $(CH_3)_3CN\equiv C$; FW: 83.13; colorless liq.; b.p. 90-92°; f.p. 28°F; d. 0.735 (store cold), STENCH		1g 5g
06-0150 HAZ	t-Butylmethylacetylene, min. 98% (999-78-0) $C_4H_9C\equiv C(CH_3)$; FW: 96.17; colorless liq.; b.p. 83°; f.p. 14°F; d. 0.718		1g 5g
06-0350 HAZ	Cyclooctatetraene, 98% COT (629-20-9) C_8H_8 ; FW: 104.15; pale yellow liq.; m.p. -5°; b.p. 142-143°; f.p. 73°F; d. 0.943 air sensitive, (store cold) Note: Inhibited with 0.1% hydroquinone.		1g 5g
06-0550	Diphenylacetylene, 99% (501-65-5) $C_6H_5C\equiv CC_6H_5$; FW: 178.23; white powdr.; m.p. 59-61°; b.p. 170°/19 mm; d. 0.990		2g 10g
06-1040	(4S,5S)-(+)-O-Isopropylidene-2,3-dihydroxy-1,4-bis (p-tosyl)butane (37002-45-2) $C_{21}H_{26}O_6S_2$; FW: 470.56; white powdr.; m.p. 89-91° (store cold)		1g 5g
06-1290 amp HAZ	Pentamethylcyclopentadiene, min. 98% (4045-44-7) $C_{10}H_{16}$; FW: 136.24; pale yellow liq.; b.p. 58.3°/13.5 mm; f.p. 112°F; d. 0.870 (store cold)		1g 5g 25g
06-1296	1,2,3,4,5-Pentaphenyl-1,3-cyclopentadiene, 99% (2519-10-0) $C_{36}H_{26}$; FW: 446.60; white powdr.; m.p. 254-256°		1g 5g
08-2040	(S)-(+)-1,2-Propanediol, 99% (4254-15-3) See page 70		
06-1850 amp HAZ	i-Propylisocyanide, min. 97% (598-45-8) $i-C_3H_7N\equiv C$; FW: 69.11; colorless liq.; b.p. 82-83°; d. 0.7596 (store cold), STENCH		1g 5g
06-3050 amp HAZ	Tetramethyl(n-propyl)cyclopentadiene, min. 97% (64417-12-5) $C_{12}H_{20}$; FW: 164.30; yellow liq.		1g 5g 25g

FLUORINE (Compounds)

09-1070	5-Amino-2-chlorobenzotrifluoride, min. 97% (320-51-4) $(NH_2)CIC_6H_4CF_3$; FW: 195.56; brown waxy solid; m.p. 36-37°; f.p. >230°F		5g 25g
09-4396	2,2,3,3,4,4,4-Heptafluorobutylamine, min. 97% (374-99-2) $CF_3CF_2CF_2CH_2NH_2$; FW: 197.05; colorless liq.; b.p. 70-71°; d. 1.493		1g 5g
08-0750 HAZ	Hexafluoroacetylacetone, min. 98% HFAA (1522-22-1) $CF_3C(O)CH_2C(O)CF_3$; FW: 208.06; colorless liq.; b.p. 70°; d. 1.470 moisture sensitive		5g 25g 100g
09-6220 HAZ	Perfluorotri-n-butylamine, min. 85% (311-89-7) $(C_4F_9)_3N$; FW: 671.02; colorless liq.; b.p. 170-180°; d. 1.88		25g 100g

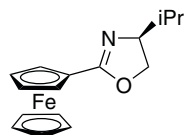
IONIC LIQUIDS (Compounds)

07-2660	1,2,3-Trimethylimidazolium methyl sulfate, 98% [TriMIM] [MeSO₄] (65086-12-6) $[C_6H_{11}N_2]^+[CH_3SO_3^-]$; FW: 222.27; tan powdr.; m.p. 115°		5g
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Other Ligands

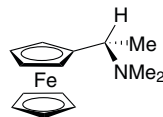
IRON (Compounds)

26-1490 (S)-(-)-[4,5-Dihydro-4-(1-methylethyl)-2-oxazolyl]ferrocene, min. 98% (162157-03-1)
C₁₆H₁₉FeNO; FW: 297.17; orange powdr.



1g
5g

26-1399 α-(N,N-Dimethylamino)ethylferrocene, 98% (31904-34-4)
(C₅H₅)Fe(C₅H₄CH(CH₃)N(CH₃)₂); FW: 257.16; orange liq.;
b.p. 110°C/0.45mm; d. 1.222



1g
5g
25g

26-1400 N,N-Dimethylaminomethylferrocene, min. 95% (1271-86-9)
(CH₃)₂NCH₂C₅H₄FeC₅H₅; FW: 243.13; amber liq.; b.p. 91-92°C/0.5mm;
f.p. >230°F; d. 1.228

5g
25g
100g

MOFS AND LIGANDS FOR MOF SYNTHESIS (Compounds)

08-1235 2,6-Naphthalenedicarboxylic acid, min. 98% (1141-38-4)
See page 69

07-1942 1,4,7,10-Tetraazacyclododecane-N,N',N'',N'''-tetraacetic acid, min. 98% DOTA (60239-18-1)
See page 57

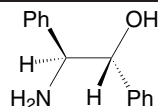
08-0195 1,3,5-Tricarboxybenzene, min. 95% (Trimesic acid) BTC (554-95-0)
See page 73

07-3235 2,4,6-(Tri-4-pyridinyl)-1,3,5-triazine, min. 97% TPT (42333-78-8)
See page 61

07-3110 Tris(isobutylaminoethyl)amine, min 97% (331465-73-7)
See page 61

NITROGEN (Compounds)

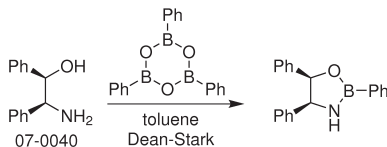
07-0040 (1R,2S)-2-Amino-1,2-diphenylethanol, min. 98%
(23190-16-1)
C₁₄H₁₅NO; FW: 213.28; white to light-yellow powdr.
Note: Sold in collaboration with Daicel for research purposes only.



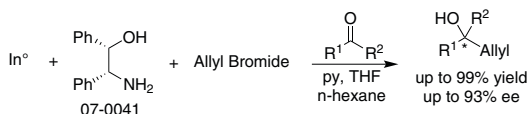
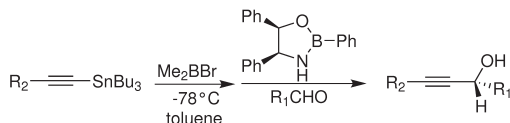
5g
25g

Technical Notes:

1. Ligand used to make chiral oxaborolidines for the enantioselective alkynylation of aldehydes
2. Ligand used in organoindium reagents for asymmetric Barbier-type allylations
3. Ligand used in organoindium reagents for asymmetric Barbier-type propargylations



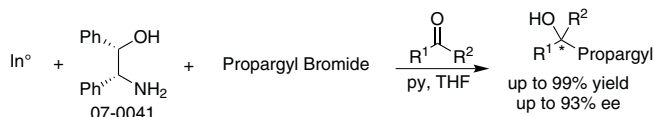
Tech. Note (1)
Ref. (1)



Tech. Note (2)
Ref. (2)

NITROGEN (Compounds)

07-0040 (1R,2S)-2-Amino-1,2-diphenylethanol, min. 98% (23190-16-1)
(continued)



Tech. Note (3)
Ref. (3)

References:

1. *J. Am. Chem. Soc.*, **1994**, 116, 3151
2. *J. Org. Chem.*, **2010**, 75, 642
3. *J. Org. Chem.*, **2012**, 77, 889

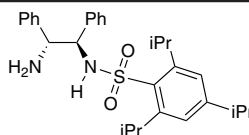
07-0041 (1S,2R)-2-Amino-1,2-diphenylethanol, min. 98% (23364-44-5)
C₁₆H₁₅NO; FW: 213.28; white to light-yellow powdr.
Note: Sold in collaboration with Daicel for research purposes only.

5g
25g

Technical Note:

1. See 07-0040 (page 3)

07-2345 N-[(1R,2R)-2-Amino-1,2-diphenylethyl]-2,4,6-tris(1-methylethyl)benzenesulfonamide, 98% (R,R)-TipsDPEN (852212-92-1)
C₂₉H₃₈N₂O₂S; FW: 478.69; white to tan powdr.
Note: Manufactured under license of Takasago patent.

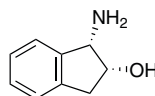


1g
5g

07-2346 N-[(1S,2S)-2-Amino-1,2-diphenylethyl]-2,4,6-tris(1-methylethyl)benzenesulfonamide, 98% (S,S)-TipsDPEN (247923-41-7)
C₂₉H₃₈N₂O₂S; FW: 478.69; white solid
Note: Manufactured under license of Takasago patent.

1g
5g

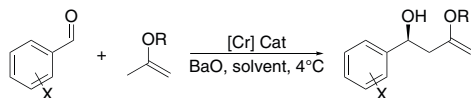
07-0200 (1S,2R)-(-)-cis-1-Aminoindan-2-ol, 98% (126456-43-7)
C₉H₁₁NO; FW: 149.19; white to off-white powdr.; m.p. 117-121°
Note: CATHy™ Catalyst Kit component.



1g
5g
25g

Technical Notes:

1. Ligand component used in the chromium-catalyzed highly selective asymmetric ene reactions between aryl aldehydes and alkoxy- and silyloxyalkenes.
2. Ligand component for the chromium-catalyzed highly enantioselective inverse electron demand hetero-Diels-Alder reactions of α,β -unsaturated aldehydes.
3. Building blocks for the magnesium-catalyzed conjugate addition reaction of 1,3-dicarbonyl compounds to nitroalkenes.
4. Component for stereoselective asymmetric 6π -azaelectrocyclization through the reaction between the (E)-3-carbonyl-2,4,6-trienal compounds and the (-)-7-alkyl-cis-1-amino-2-indanol derivatives.
5. Ligand component for palladium-catalyzed asymmetric azaelectrocyclization for the preparation of 2,4-disubstituted chiral 1,2,5,6-tetrahydropyridines.
6. Component for organocatalytic conjugate addition of formaldehyde N,N-dialkylhydrazones to β,γ -Unsaturated α -keto esters.
7. N-Sulfinyl urea organocatalyst component for enantioselective aza-henry reaction.
8. Component for organocatalytic enantioselective additions of indoles to nitroalkenes.
9. Organocatalytic component for enantioselective solvent-free inter- and intramolecular aldol reactions.
10. Indenyl-PYBOX (07-0280) ligand component for scandium-catalyzed asymmetric [3+2] annulation of allylsilanes with isatins in the synthesis of spirooxindoles.
11. Ligand component for Phos/Iridium catalyzed asymmetric hydrogenation of functionalized dialins.
12. Ligand for Ni-catalyzed negishi cross-coupling with 1,1-disubstituted styrenyl aziridines.
13. Ligand component for enantioselective iridium-catalyzed silylation of aromatic C-H bonds.

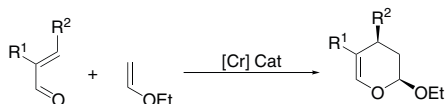


R = CH₃, TMS

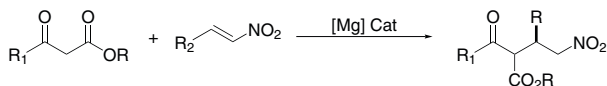
Tech. Note (1)
Ref. (1)

NITROGEN (Compounds)

07-0200 (1S,2R)-(-)-cis-1-Aminoindan-2-ol, 98% (126456-43-7)
(continued)

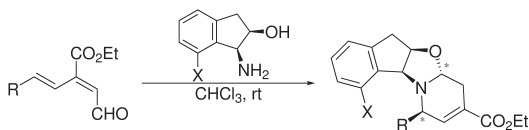


Tech. Note (2)
Ref. (2)



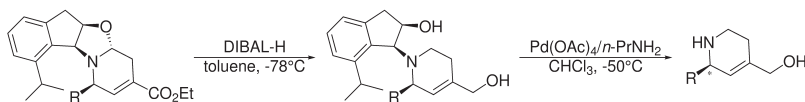
Tech. Note (3)
Ref. (3)

R₁ = alkyl, aryl, OR; R₂ = alkyl, aryl

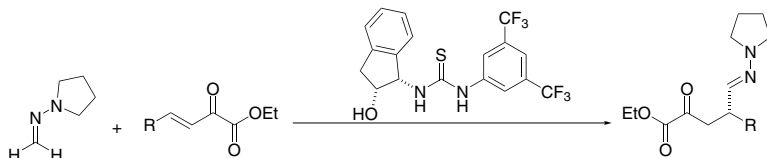


Tech. Note (4)
Ref. (4)

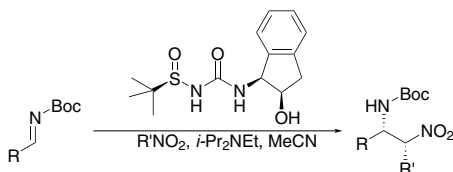
R₁ = alkenyl, ohenyl, indole



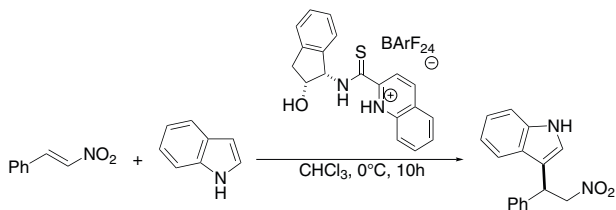
Tech. Note (5)
Ref. (5)



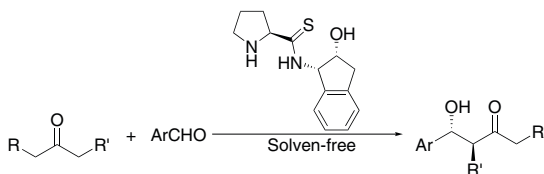
Tech. Note (6)
Ref. (6)



Tech. Note (7)
Ref. (7)



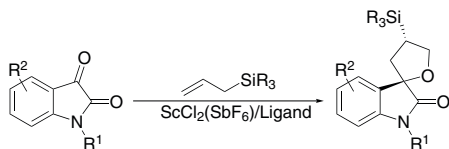
Tech. Note (8)
Ref. (8)



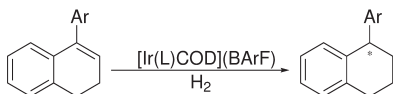
Tech. Note (9)
Ref. (9)

NITROGEN (Compounds)

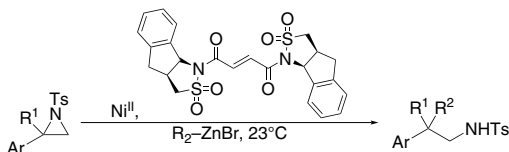
07-0200 (1S,2R)-(-)-cis-1-Aminoindan-2-ol, 98% (126456-43-7)
(continued)



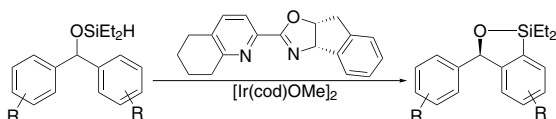
Tech. Note (10)
Ref. (10)



Tech. Note (11)
Ref. (11)



Tech. Note (12)
Ref. (12)



Tech. Note (13)
Ref. (13)

References:

1. *J. Am. Chem. Soc.*, **2002**, 124, 2882.
2. *Angew. Chem. Int. Ed.*, **2002**, 41, 3059.
3. *J. Am. Chem. Soc.*, **2002**, 124, 13097.
4. *J. Org. Chem.*, **2004**, 69, 5906.
5. *Org. Lett.*, **2006**, 8, 3809.
6. *Org. Lett.*, **2007**, 9, 3303.
7. *J. Am. Chem. Soc.*, **2007**, 129, 15110.
8. *J. Am. Chem. Soc.*, **2008**, 130, 16464.
9. *Adv. Synth. Catal.*, **2008**, 350, 2467.
10. *Angew. Chem. Int. Ed.*, **2012**, 51, 989.
11. *Angew. Chem. Int. Ed.*, **2014**, 53, 14428.
12. *J. Am. Chem. Soc.*, **2015**, 137, 5638.
13. *Angew. Chem. Int. Ed.*, **2017**, 56, 1092.

07-0201 (1R,2S)-(+)-cis-1-Aminoindan-2-ol, 98% (136030-00-7)
C₉H₁₁NO; FW: 149.19; white to off-white powd.; m.p. 117-121°
Note: CATHy™ Catalyst Kit component.

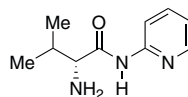
1g
5g
25g

Technical Note:

1. See 07-0200 (page 4)

NITROGEN (Compounds)

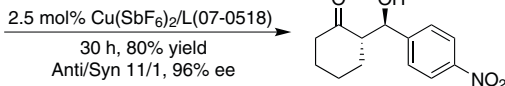
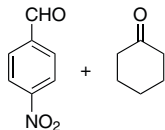
07-0519 (2R)-2-Amino-3-methyl-N-2-pyridinylbutanamide, min. 98% (1568043-19-5)
 $C_{10}H_{15}N_3O$; FW: 193.25; white to light-yellow powdr.
 Note: Sold in collaboration with Daicel for research purposes only.



100mg
500mg

Technical Note:

- Ligand for the copper-catalyzed asymmetric aldol reaction



Tech. Note (1)
Ref. (1)

References:

- Chem. Commun.*, **2011**, 47, 224

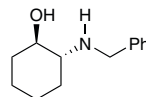
07-0518 (2S)-2-Amino-3-methyl-N-2-pyridinylbutanamide, min. 98% (167261-43-0)
 $C_{10}H_{15}N_3O$; FW: 193.25; white to light-yellow powdr.
 Note: Sold in collaboration with Daicel for research purposes only.

100mg
500mg

Technical Note:

- See 07-0519 (page 7)

07-0637 (1R,2R)-2-Benzylamino-1-cyclohexanol, min. 98% (141553-09-5)
 $C_{13}H_{19}NO$; FW: 205.30; white to light-yellow powdr.
 Note: Sold in collaboration with Daicel for research purposes only.

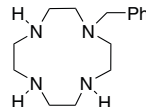


500mg
2g

07-0638 (1S,2S)-2-Benzylamino-1-cyclohexanol, min. 98% (322407-34-1)
 $C_{13}H_{19}NO$; FW: 205.30; white to light-yellow powdr.
 Note: Sold in collaboration with Daicel for research purposes only.

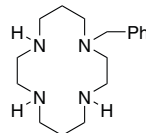
500mg
2g

07-1939 N-Benzyl-1,4,7,10-tetraazacyclododecane, min. 98% (112193-83-6)
 $C_{15}H_{26}N_4$; FW: 262.39; white to yellow powdr.



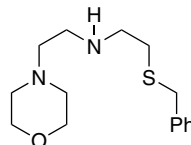
250mg
1g

07-1957 N-Benzyl-1,4,8,11-tetraazacyclotetradecane, min. 98% (132723-93-4)
 $C_{17}H_{30}N_4$; FW: 290.45; white to yellow powdr.



100mg
500mg

07-3530 2-(Benzylthio)-N-(2-morpholinoethyl)ethan-1-amine (1799787-08-8)
 $C_{15}H_{24}N_2OS$; FW: 280.43; Clear yellow liq.
air sensitive, moisture sensitive
 Note: U.S. Patent: PCT/US2015/034793.

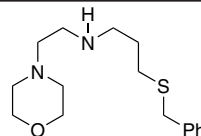


50mg

Technical Note:

- See 07-3500 (page 53)

07-3535 3-(Benzylthio)-N-(2-morpholinoethyl)propan-1-amine (1799787-09-9)
 $C_{16}H_{26}N_2OS$; FW: 294.46; Clear yellow liq.
air sensitive, moisture sensitive
 Note: U.S. Patent: PCT/US2015/034793.



50mg

Technical Note:

- See 07-3500 (page 53)

NITROGEN (Compounds)

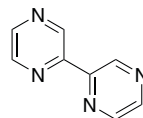
07-0750

2,2'-Bipyrazine, 95% (10199-00-5)

C₈H₆N₄; FW: 158.16; light-brown solid

air sensitive

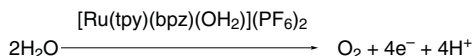
Note: Ligand for Photocatalyst Synthesis



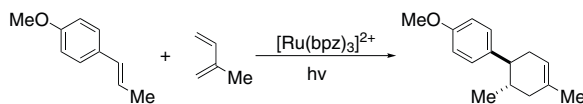
250mg
1g

Technical Notes:

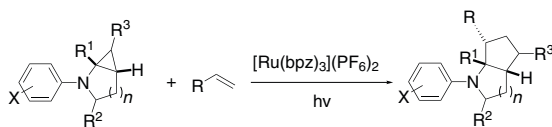
1. Ligand for the ruthenium-promoted catalytic water oxidation reaction.
2. Ligand for the ruthenium promoted photocatalytic Diels-Alder cycloaddition.
3. Ligand for the ruthenium photocatalyzed intermolecular [3+2] cycloaddition of cyclopropylamines with olefins.
4. Ligand for the ruthenium mediated photocatalytic reaction for the preparation of N-arylindoles.
5. Endoperoxide synthesis by photocatalytic aerobic [2+2+2] cycloadditions.
6. [Ru(bpz)₃](PF₆)₂ catalyzed anti-Markovnikov hydrothiolation of olefins with a variety of thiols.
7. [Ru(bpz)₃](PF₆)₂ catalyzed [3+2] photooxygenation of aryl cyclopropanes.
8. [Ru(bpz)₃](PF₆)₂ catalyzed intermolecular [3 + 2] annulation of cyclopropylanilines with alkynes.



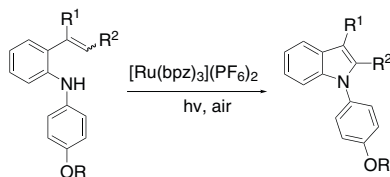
Tech. Note (1)
Ref. (1)



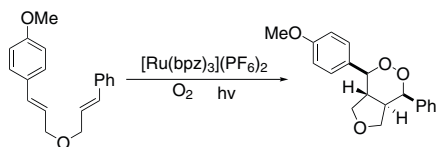
Tech. Note (2)
Ref. (2)



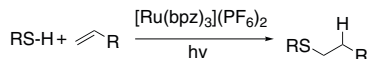
Tech. Note (3)
Ref. (3)



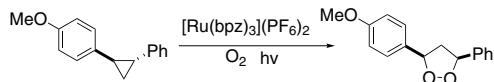
Tech. Note (4)
Ref. (4)



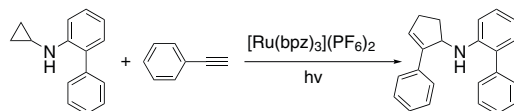
Tech. Note (5)
Ref. (5)



Tech. Note (6)
Ref. (6)



Tech. Note (7)
Ref. (7)



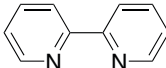
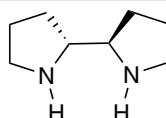
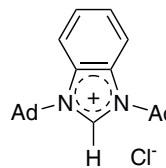
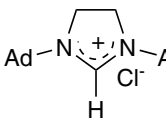
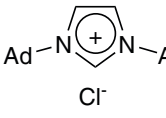
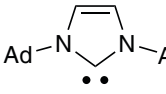
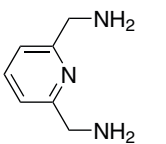
Tech. Note (8)
Ref. (8)

NITROGEN (Compounds)

07-0750 **2,2'-Bipyrazine, 95% (10199-00-5)**
(continued)

References:

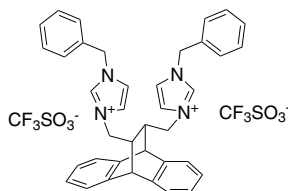
1. *J. Am. Chem. Soc.*, **2008**, *130*, 16462.
2. *J. Am. Chem. Soc.*, **2011**, *133*, 19350.
3. *Angew. Chem. Int. Ed.*, **2012**, *51*, 222.
4. *Angew. Chem. Int. Ed.*, **2012**, *51*, 9562.
5. *Org. Lett.*, **2012**, *14*, 1640.
6. *J. Org. Chem.*, **2013**, *78*, 2046.
7. *Tetrahedron*, **2014**, *70*, 4270.
8. *Beilstein J. Org. Chem.*, **2014**, *10*, 975.

07-0290 HAZ	2,2'-Bipyridine, 99+% BIPY (366-18-7) $C_{10}H_8N_2$; FW: 156.19; white to pale-pink powdr.; m.p. 69-70°; b.p. 273°		25g 100g
07-0092	(2R,2'R)-(-)-2,2'-Bipyrrolidine, 99% (137037-20-8) $C_8H_{16}N_2$; FW: 140.23; colorless liq. <i>air sensitive</i>		250mg 1g 5g
07-0093	(2S,2'S)-(+)-2,2'-Bipyrrolidine, 99% (124779-66-4) $C_8H_{16}N_2$; FW: 140.23; colorless liq. <i>air sensitive</i>		250mg 1g 5g
07-4005	1,3-Bis(1-adamantyl)benzimidazolium chloride, min. 97% (852634-41-4) $C_{27}H_{35}ClN_2$; FW: 423.03; yellow to orange solid <i>air sensitive</i>		500mg 2g
07-4007	1,3-Bis(1-adamantyl)-4,5-dihydroimidazolium chloride, min. 97% (871126-33-9) $C_{23}H_{35}ClN_2$; FW: 374.99; white to off-white solid <i>air sensitive</i> Note: NHC Ligand Kit 3: Variety of N-Heterocyclic Carbenes Kit component.		500mg 2g
07-0322	1,3-Bis(1-adamantyl)imidazolium chloride, min. 97% (131042-78-9) $[C_{23}H_{33}N_2]^+Cl^-$; FW: 372.97; white xtl.; m.p. 345-346° <i>hygroscopic</i> Note: NHC Ligand Kit 3: Variety of N-Heterocyclic Carbenes Kit component.		250mg 1g
07-0324 HAZ	1,3-Bis(1-adamantyl)imidazol-2-ylidene, min. 98% ARDUENGO'S CARBENE (131042-77-8) $C_{23}H_{32}N_2$; FW: 336.51; white xtl.; m.p. 240-241° <i>air sensitive, moisture sensitive, (store cold)</i> Note: NHC Ligand Kit 2: "Free" Carbenes Kit component.		250mg
07-0650	2,6-Bis(aminomethyl)pyridine, min. 85% (34984-16-2) $C_7H_{11}N_3$; FW: 137.18; low melting yellow solid <i>air sensitive</i>		1g 5g

NITROGEN (Compounds)

07-0076 **11,12-Bis[N-benzyl-1H-imidazolium-3-methylene]-9,10-dihydro-9,10-ethanoanthracene bis(trifluoromethanesulfonate)**
 $[C_{38}H_{36}N_4](CF_3SO_3)_2$; FW: 846.86;
 white to off-white powdr.

Note: Sold under license from URFI for research purposes only. Patent application PCT/US2008/054137. NHC Ligand Kit 4: Bis Carbenes Kit component.



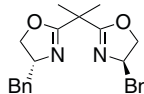
100mg
500mg

07-7043 **2,2-Bis[(4R)-4-benzyl-2-oxazolin-2-yl]propane, 98%, (99% ee)** (141362-77-8)

NEW

$C_{23}H_{26}N_2O_2$; FW: 362.50; white to yellow powdr.

Note: Sold in collaboration with Daicel for research purposes only.



100mg

07-7044 **2,2-Bis[(4S)-4-benzyl-2-oxazolin-2-yl]propane, 98%, (99% ee)** (176706-98-2)

NEW

$C_{23}H_{26}N_2O_2$; FW: 362.50; white to yellow powdr.

Note: Sold in collaboration with Daicel for research purposes only.

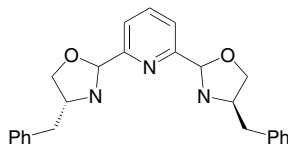
Technical Note:

1. See 07-7043 (page 10)

07-0390 **2,6-Bis[(4R)-benzyl-2-oxazolin-2-yl]pyridine, min. 98%** (365215-38-9)

$C_{25}H_{23}N_3O_2$; FW: 397.47; white to light-yellow powdr.

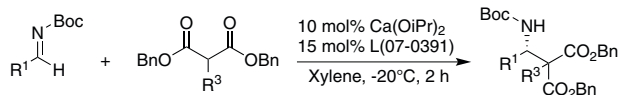
Note: Sold in collaboration with Daicel for research purposes only.



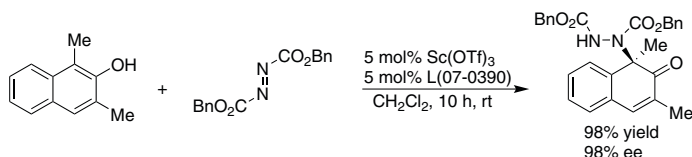
25mg
100mg

Technical Notes:

1. Ligand for the Calcium-catalyzed asymmetric Mannich reaction of malonates with imines
2. Ligand for the Scandium-catalyzed asymmetric dearomatization of 2-naphthols by electrophilic amination



Tech. Note (1)
Ref. (1)



Tech. Note (2)
Ref. (2)

References:

1. *J. Org. Chem.*, **2010**, 75, 963
2. *Angew. Chem. Int. Ed.*, **2015**, 54, 2356

07-0391 **2,6-Bis[(4S)-benzyl-2-oxazolin-2-yl]pyridine, min. 98%** (151670-69-8)

$C_{25}H_{23}N_3O_2$; FW: 397.47; white to light-yellow powdr.

Note: Sold in collaboration with Daicel for research purposes only.

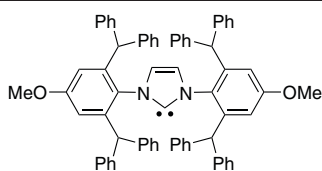
25mg
100mg

Technical Note:

1. See 07-0390 (page 10)

NITROGEN (Compounds)

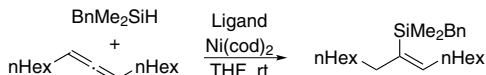
07-0216 **N,N'-Bis(2,6-bis(diphenylmethyl)-4-methoxyphenyl)imidazol-2-ylidene, min. 98% IPr[®]OMe** (1416368-06-3)
 $C_{69}H_{56}N_2O_2$; FW: 945.20; white powdr.
air sensitive, moisture sensitive



250mg
1g

Technical Note:

- Ligand for allene hydrosilylations with nickel.

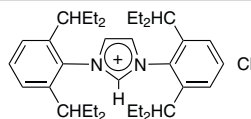


Tech. Note (1)
Ref. (1)

References:

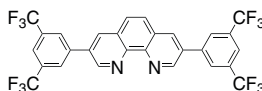
- Angew. Chem. Int. Ed.*, **2015**, 54, 9088

07-0358 **1,3-Bis[2,6-bis(1-ethylpropyl)phenyl]imidazolium chloride, 98% IPentHCl** (1440435-00-6)
 $C_{35}H_{53}ClN_2$; FW: 537.26; white powdr.



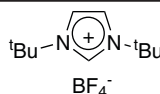
500mg
2g

07-0481 **3,8-Bis[3,5-bis(trifluoromethyl)phenyl]-1,10-phenanthroline** (1228032-35-6)
 $C_{28}H_{12}F_{12}N_2$; FW: 604.39; off-white powdr.



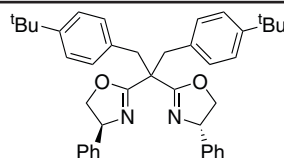
100mg
500mg

07-0598 **1,3-Bis(t-butyl)imidazolium tetrafluoroborate, min. 97% ItBuHBF₄** (263163-17-3)
 $[C_{11}H_{21}N_2]^+BF_4^-$; FW: 268.10;
 white to cream-colored solid
hygroscopic
 Note: NHC Ligand Kit 3: Variety of N-Heterocyclic Carbenes Kit component.



500mg
2g

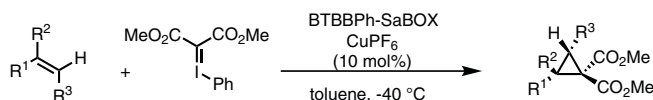
07-1235 **(4S,4'S)-2,2'-(1,3-Bis[4-(t-butyl)phenyl]propane-2,2-diyl)bis(4-phenyl-4,5-dihydrooxazole) (S)-BTBBPh-SaBOX** (1428328-51-1)
 $C_{41}H_{48}N_2O_2$; FW: 598.81; white powdr.



250mg
1g

Technical Note:

- Ligand used in the copper-catalyzed, highly enantioselective synthesis of 1,1-cyclopropane diesters.



R^1 = aryl, alkyl; R^2 = H, Me;
 R^3 = H, alkyl, alkenyl

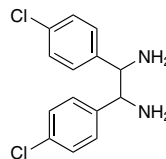
up to 99% yield
>99% ee

Tech. Note (1)
Ref. (1)

References:

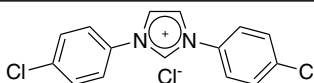
- Angew. Chem. Int. Ed.*, **2012**, 51, 11620

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

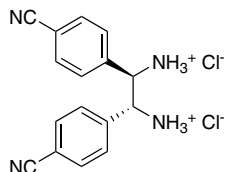
07-0490 **1,3-Bis(4-chlorophenyl)imidazolium chloride, min. 97%** (141556-46-9)
 $[C_{15}H_{11}Cl_2N_2]^+Cl^-$; FW: 325.62;
 cream-colored powdr.; m.p. 251-252°
hygroscopic



250mg

NITROGEN (Compounds)

07-0220 (1R,2R)-(+)-1,2-Bis(4-cyanophenyl)ethylenediamine dihydrochloride, min. 98% (117903-80-7)
C₁₆H₁₄N₄·2HCl; FW: 335.23;
white to off-white powdr.
hygroscopic



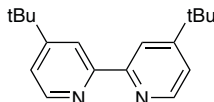
100mg
500mg

07-0597 1,3-Bis(cyclohexyl)imidazolium tetrafluoroborate, min. 97% ICyHBF₄ (286014-38-8)
[C₁₅H₂₅N₂]⁺BF₄⁻; FW: 320.18;
white to cream-colored solid
hygroscopic



500mg
2g

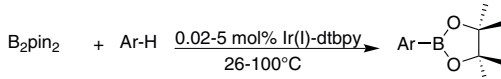
07-0273 4,4'-Bis(di-t-butyl)-2,2'-bipyridine, 97% DTBBPY (72914-19-3)
C₁₈H₂₄N₂; FW: 268.40; white xtl.
hygroscopic



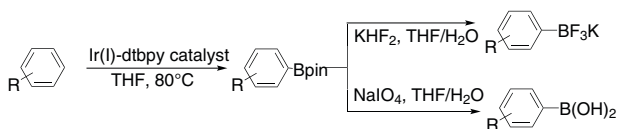
1g
5g

Technical Notes:

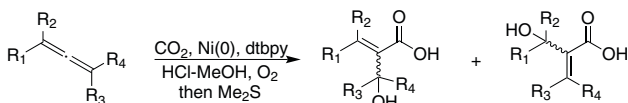
1. Ligand for the iridium-catalyzed borylation of arenes
2. Ligand for the iridium-catalyzed synthesis of arylboronic acids and aryl trifluoroborates
3. Ligand for the nickel-catalyzed hydroxycarboxylation of 1,2-dienes by reaction carbon dioxide and oxygen
4. Ligand for the iridium-catalyzed meta borylation followed by halogenation of 1,3-disubstituted arenes
5. Ligand for the iridium-catalyzed silyl-directed ortho-borylation of arenes
6. Ligand for the iridium-catalyzed preparation of silyl boranes.
7. Ligand for the iridium-catalyzed microwave-accelerated borylation of aromatic C-H bonds
8. Ligand for the iridium-catalyzed silyl-directed borylation of indoles
9. Ligand for the nickel-catalyzed synthesis of functionalized dialkyl ketones from carboxylic acids and alkyl halides
10. Ligand for the iron-catalyzed arylation of heterocycles



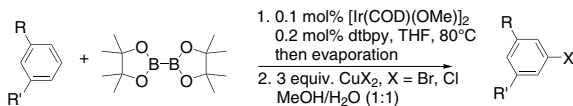
Tech. Note (1)
Ref. (1)



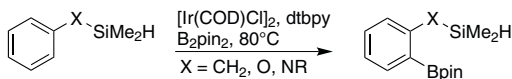
Tech. Note (2)
Ref. (2)



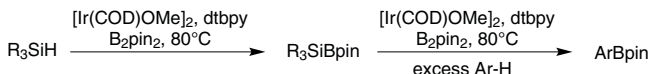
Tech. Note (3)
Ref. (3)



Tech. Note (4)
Ref. (4)



Tech. Note (5)
Ref. (5)

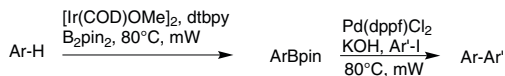


Tech. Note (6)
Ref. (6)

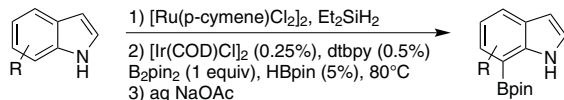
NITROGEN (Compounds)

07-0273 4,4'-Bis(di-t-butyl)-2,2'-bipyridine, 97% DTBBPY (72914-19-3)

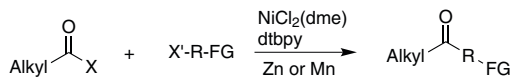
(continued)



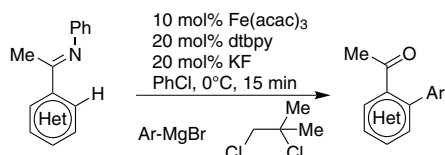
Tech. Note (7)
Ref. (7)



Tech. Note (8)
Ref. (8)



Tech. Note (9)
Ref. (9)



Tech. Note (10)
Ref. (10)

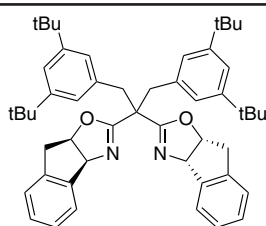
References:

1. *J. Am. Chem. Soc.*, **2002**, 124, 390
2. *Org. Lett.*, **2007**, 9, 757
3. *Org. Lett.*, **2007**, 9, 1251
4. *J. Am. Chem. Soc.*, **2007**, 129, 15434
5. *J. Am. Chem. Soc.*, **2008**, 130, 7534
6. *Organometallics*, **2008**, 27, 6013
7. *Org. Lett.*, **2009**, 11, 3586
8. *J. Am. Chem. Soc.*, **2010**, 132, 4068
9. *Org. Lett.*, **2012**, 14, 1476
10. *Org. Lett.*, **2014**, 16, 868

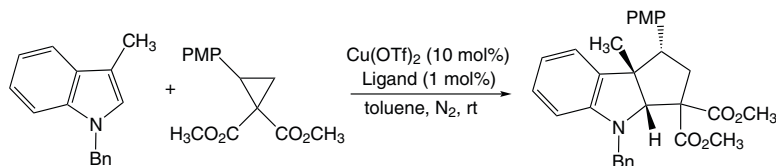
07-1228 (3aS,3a'S,8aR,8a'R)-2,2'-(1,3-Bis(3,5-di-t-butylphenyl)propane-2,2-diyl)bis(8,8a-dihydro-3aH-indeno[1,2-d]oxazole) (S,R)-BDTBIn-SaBOX (1435467-29-0)
C₅₁H₆₂N₂O₂; FW: 735.05; white solid

Technical Note:

1. Ligand used in the copper-catalyzed, highly enantioselective cyclopentannulation of indoles with donor-acceptor cyclopropanes.



100mg
500mg



Tech. Note (1)
Ref. (1)

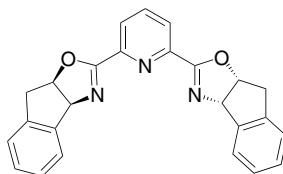
References:

1. *J. Am. Chem. Soc.*, **2013**, 135, 7851

NITROGEN (Compounds)

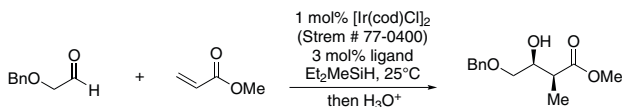
07-0280 (-)-2,6-Bis[(3aS,8aR)-3a,8a-dihydro-8H-indeno[1,2-d]oxazolin-2-yl]pyridine, min. 97% Indenyl-PYBOX (185346-09-2)
 $C_{25}H_{19}N_3O_2$; FW: 393.44;
 white to off-white powdr.; m.p. 265° dec.

250mg
1g

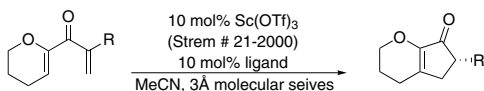


Technical Notes:

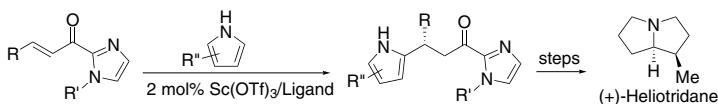
- Ligand for Iridium-catalyzed enantio- and diastereoselective reductive aldol reactions
- Ligand for Scandium-catalyzed asymmetric Nazarov reactions
- Ligand for Scandium-catalyzed enantioselective pyrrole alkylations of α,β -unsaturated 2-acyl imidazoles
- Ligand for Scandium-catalyzed enantioselective Friedel-Crafts Alkylations
- Ligand for Nickel-catalyzed asymmetric cross-couplings of racemic propargyl groups with arylzinc reagents
- Ligand for Scandium-catalyzed enantioselective intramolecular carbonyl-ene reaction.
- Ligand for Scandium-catalyzed asymmetric synthesis of substituted 3-hydroxy-2-oxindoles
- Ligand for Indium-catalyzed enantio- and regioselective addition of pyrroles to isatins
- Ligand for Scandium-catalyzed asymmetric [3+2] annulation of allylsilanes with isatins in the synthesis of spirooxindoles
- Ligand for Scandium-catalyzed enantioselective allylation of isatins using allylsilanes
- Ligand for Scandium-catalyzed enantioselective carboannulation with allylsilanes
- Ligand for Iron-catalyzed asymmetric olefin amino-oxygenation of indene
- Ligand for Scandium-catalyzed asymmetric dearomatization of 2-Naphthols by electrophilic amination
- Ligand for Lanthanum-catalyzed enantioselective intramolecular cyclization in the total synthesis of (+)-Muironolide A
- Ligand for Calcium-catalyzed asymmetric Michael reactions
- Ligand for Scandium-catalyzed synthesis of 3,4-dihydro-2H-1,2,4,-benzothiadiazine-1,1-dioxides



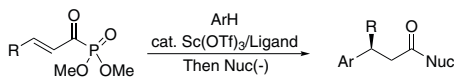
Tech. Note (1)
Ref. (1)



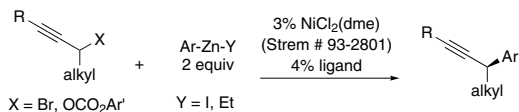
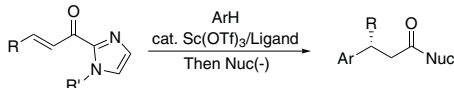
Tech. Note (2)
Ref. (2)



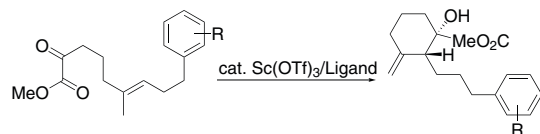
Tech. Note (3)
Ref. (3)



Tech. Note (4)
Ref. (4)



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

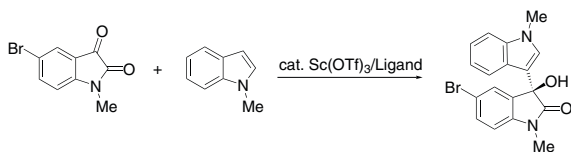


Tech. Note (6)
Ref. (6)

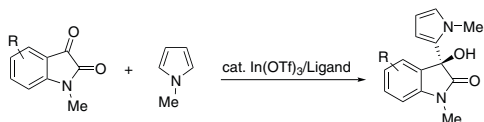
NITROGEN (Compounds)

07-0280
(continued)

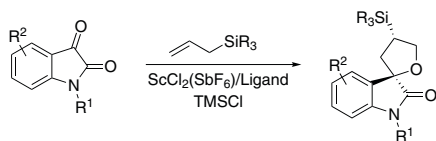
(-)-2,6-Bis[(3aS,8aR)-3a,8a-dihydro-8H-indeno[1,2-d]oxazolin-2-yl]pyridine, min. 97%
Indenyl-PYBOX (185346-09-2)



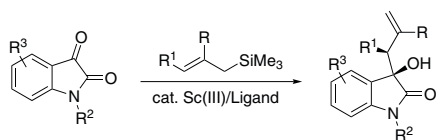
Tech. Note (7)
Ref. (7)



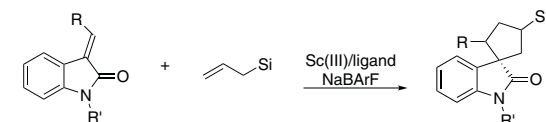
Tech. Note (8)
Ref. (8)



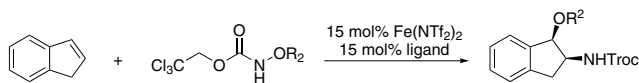
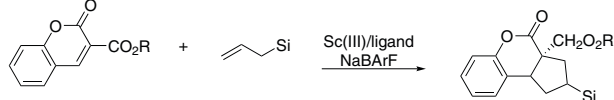
Tech. Note (9)
Ref. (10)



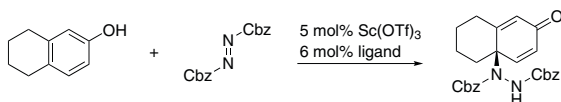
Tech. Note (10)
Ref. (11)



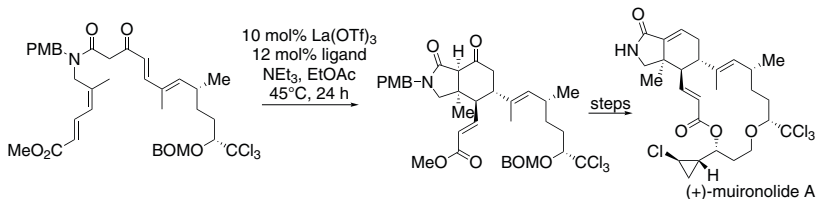
Tech. Note (11)
Ref. (12)



Tech. Note (12)
Ref. (13)



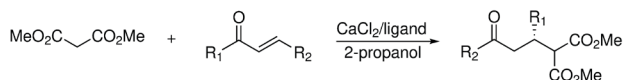
Tech. Note (13)
Ref. (14)



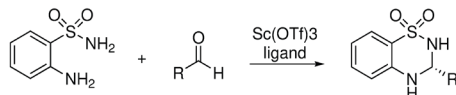
Tech. Note (14)
Ref. (15)

NITROGEN (Compounds)

07-0280 (-)-2,6-Bis[(3aS,8aR)-3a,8a-dihydro-8H-indeno[1,2-d]oxazolin-2-yl]pyridine, min. 97%
(continued) Indenyl-PYBOX (185346-09-2)



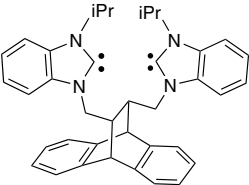
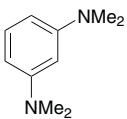
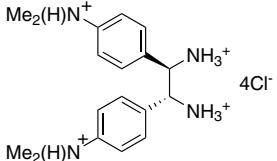
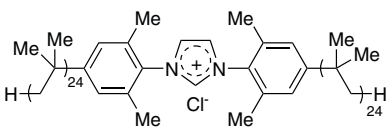
Tech. Note (15)
Ref. (16)



Tech. Note (16)
Ref. (17)

References:

1. *Org. Lett.*, **2001**, 3, 1829
2. *J. Am. Chem. Soc.*, **2004**, 126, 9544
3. *Org. Lett.*, **2006**, 8, 2249
4. *J. Am. Chem. Soc.*, **2007**, 129, 10029
5. *J. Am. Chem. Soc.*, **2008**, 130, 12645
6. *J. Am. Chem. Soc.*, **2010**, 132, 10242
7. *Angew. Chem. Int. Ed.*, **2010**, 49, 744
8. *Org. Lett.*, **2011**, 13, 5754
9. *J. Am. Chem. Soc.*, **2012**, 134, 2966
10. *Angew. Chem. Int. Ed.*, **2012**, 51, 989
11. *Org. Lett.*, **2012**, 14, 2218
12. *Angew. Chem. Int. Ed.*, **2014**, 53, 9462
13. *J. Am. Chem. Soc.*, **2014**, 136, 13186
14. *Angew. Chem. Int. Ed.*, **2015**, 54, 2356
15. *J. Am. Chem. Soc.*, **2015**, 137, 5907
16. *J. Org. Chem.*, **2015**, 80, 6336
17. *Tetrahedron*, **2016**, 72, 1573

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. <i>air sensitive, moisture sensitive</i> Note: Sold under license from UFRFI for research purposes only. Patent application PCT/US2008/054137. NHC Ligand Kit 4: Bis Carbenes Kit component.		100mg 500mg
07-0230	1,3-Bis(dimethylamino)benzene, 98% (22440-93-3) $C_{10}H_{16}N_2$; FW: 164.25; colorless liq. <i>air sensitive, light sensitive, (store cold)</i>		1g 5g
07-0226	(1R,2R)-(+)-1,2-Bis(4-dimethylaminophenyl)ethylenediamine tetrahydrochloride, min. 98% (866267-84-7) $C_{18}H_{28}N_4 \cdot 4HCl$; FW: 444.27; white to yellow powdr. <i>hygroscopic</i>		100mg 500mg
07-4042 amp HAZ	1,3-Bis(2,3-dimethyl-4-[polyisobutyl(24)]phenyl)-4,5-dihydroimidazolium tetrafluoroborate (50% in hexanes/polyisobutylene) $C_{211}H_{407}N_2BF_4$; FW: 3059; yellow liq.		500mg

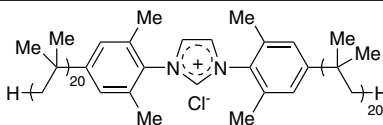
NITROGEN (Compounds)

07-4045

amp
HAZ

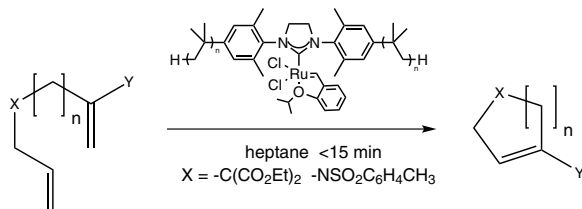
1,3-Bis{2,3-dimethyl-4-[polyisobutyl(20)]phenyl}imidazolium chloride (50% in hexanes/polyisobutylene)
C₁₇₉H₃₄₃N₂Cl; FW: 2557; orange liq.

500mg



Technical Note:

1. Ligand used in the preparation of a phase-separable NHC ruthenium complex, useful for ring-closing metathesis.



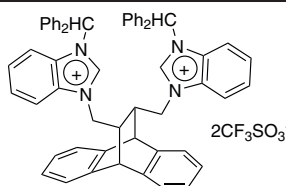
Tech. Note (1)
Ref. (1)

References:

1. *Org. Lett.*, **2009**, 11, 665

07-0078

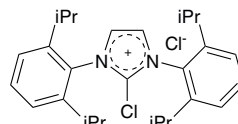
11,12-Bis[N-(2,2-diphenyl-1-ethyl)-1H-benzimidazolium-3-methylene]-9,10-dihydro-9,10-ethanoanthracene bis(trifluoromethanesulfonate), min. 95%
[C₆₀H₄₈N₄](CF₃SO₃)₂; FW: 1099.18; white to off-white pwr.
Note: Sold under license from UFRFI for research purposes only. Patent application PCT/US2008/054137. NHC Ligand Kit 4: Bis Carbenes Kit component.



100mg
500mg

07-0620

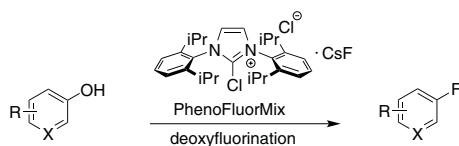
1,3-Bis(2,6-di-i-propylphenyl)-2-chloroimidazolium chloride, 98+%
(1228185-09-8)
C₂₇H₃₆Cl₂N₂; FW: 459.49; colorless solid
hygroscopic



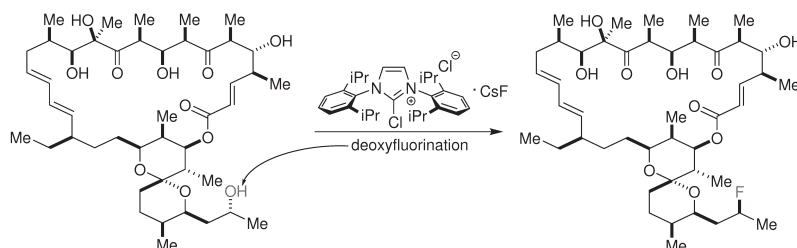
250mg
1g

Technical Notes:

1. Used with cesium fluoride for deoxyfluorination of phenols, heterocyclic alcohols and structurally complex alcohols
2. Component of PhenoFluorMix (07-4055)



Tech. Note (1)
Ref. (2)



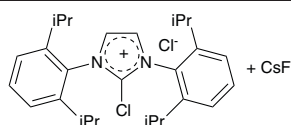
Tech. Note (1)
Ref. (2)

References:

1. *J. Am. Chem. Soc.*, **2011**, 133, 11482
2. *J. Am. Chem. Soc.*, **2013**, 135, 2470
3. *Org. Process Res. Dev.*, **2014**, 18, 1041
4. *Org. Lett.*, **2015**, 17, 544

NITROGEN (Compounds)

07-4055 **1,3-Bis(2,6-di-i-propylphenyl)-2-chloroimidazolium chloride/cesium fluoride admixture (1.0/6.7 molar ratio or 1/2.2 weight ratio) PhenoFluor®Mix (1228185-09-8)**
 $[C_{27}H_{36}Cl_2N_2][CsF]_{6.7}$; off-white solid
hygroscopic
 Note: Product sold under, use subject to, terms and conditions of label license at www.strem.com/harvard4

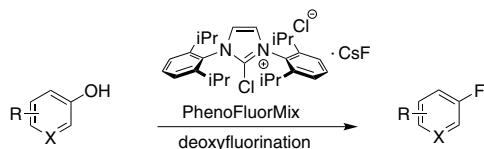


250mg
1g

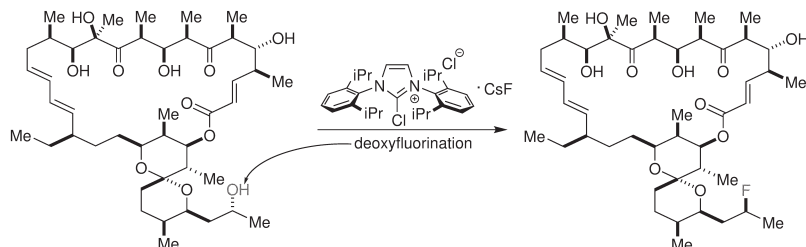
Note: 31.2 wt% ligand (07-0620), 8 wt% CsF (93-5519)

Technical Note:

1. PhenoFluorMix is a bench-stable mixture of 07-0620 and cesium fluoride used for the deoxyfluorination of phenols, heterocyclic alcohols and structurally complex alcohols



Tech. Note (1)
Ref. (1,3,4)

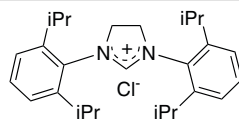


Tech. Note (1)
Ref. (2)

References:

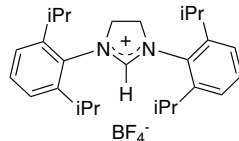
1. *J. Am. Chem. Soc.*, **2011**, 133, 11482
2. *J. Am. Chem. Soc.*, **2013**, 135, 2470
3. *Org. Process Res. Dev.*, **2014**, 18, 1041
4. *Org. Lett.*, **2015**, 17, 544

07-4009 **1,3-Bis(2,6-di-i-propylphenyl)-4,5-dihydroimidazolium chloride, min. 97%**
 (258278-25-0)
 $C_{27}H_{39}ClN_2$; FW: 427.06; white to off-white solid
air sensitive
 Note: NHC Ligand Kit 3: Variety of N-Heterocyclic Carbenes Kit component.



500mg
2g

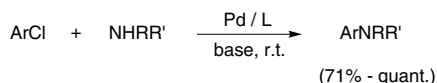
07-0587 **1,3-Bis(2,6-di-i-propylphenyl)-4,5-dihydroimidazolium tetrafluoroborate, min. 95%**
 (282109-83-5)
 $C_{27}H_{39}N_2^+BF_4^-$; FW: 478.43; white powder.
 Note: NHC Ligand Kit 3: Variety of N-Heterocyclic Carbenes Kit component.



1g
5g

Technical Notes:

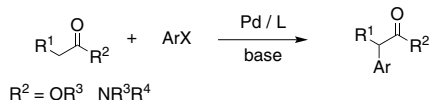
1. Ligand used in the nickel or palladium-catalyzed coupling of aryl chlorides and amines.
2. Ligand used for the palladium-catalyzed arylation of esters and amides.
3. Ligand used for the palladium-catalyzed intermolecular amination of Csp³-H Bonds.
4. Ligand used for the nickel-catalyzed hydrogenation of olefins.



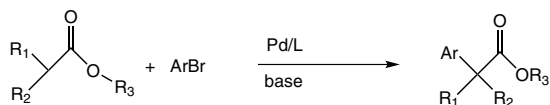
Tech. Note (1)
Ref. (1,2)

NITROGEN (Compounds)

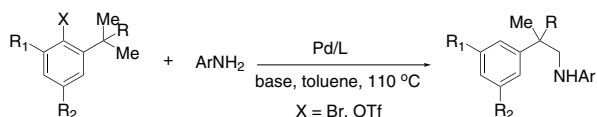
07-0587 1,3-Bis(2,6-di-i-propylphenyl)-4,5-dihydroimidazolium tetrafluoroborate, min. 95%
(continued) (282109-83-5)



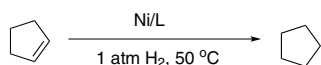
Tech. Note (2)
Ref. (3,4)



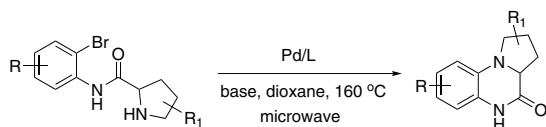
Tech. Note (2)
Ref. (4)



Tech. Note (3)
Ref. (5)



Tech. Note (4)
Ref. (6)

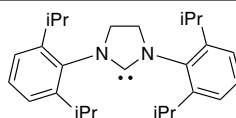


Tech. Note (1)
Ref. (7)

References:

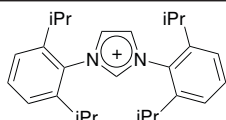
1. *Org. Lett.*, **2000**, 2, 1423
2. *Tetrahedron Lett.*, **2001**, 42, 5689
3. *J. Org. Chem.*, **2001**, 66, 3402
4. *J. Am. Chem. Soc.*, **2002**, 124, 12557
5. *Angew. Chem., Int. Ed.*, **2011**, 50, 8647
6. *Organometallics*, **2012**, 31, 806
7. *Org. Lett.*, **2010**, 12, 3574

07-0593 1,3-Bis(2,6-di-i-propylphenyl)-4,5-dihydroimidazol-2-ylidene, min. 98%
HAZ (258278-28-3)
 $\text{C}_{27}\text{H}_{38}\text{N}_2$; FW: 390.60; white to off-white powdr.
air sensitive, moisture sensitive, (store cold)
Note: NHC Ligand Kit 2: "Free" Carbenes Kit component.



500mg
2g

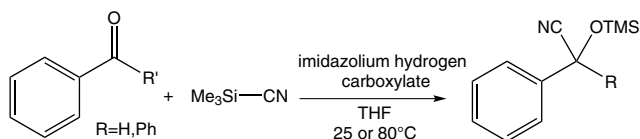
07-0484 1,3-Bis(2,6-di-i-propylphenyl)imidazolium bicarbonate, min. 97% IPrH.HCO₃ (1663476-15-0)
[C₂₇H₃₇N₂]⁺.HCO₃⁻; FW: 450.61;
white to off-white powdr.
hygroscopic



500mg
2g

Technical Notes:

1. Catalyst used for the cyanosilylation of benzaldehyde or benzophenone.
2. Catalyst used in the benzoin condensation reaction.
3. Catalyst used to effect the transesterification between benzyl alcohol and vinyl acetate.

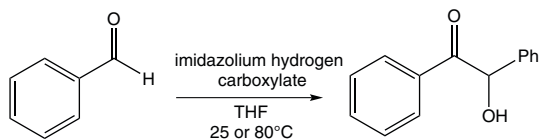


Tech. Note (1)
Ref. (1)

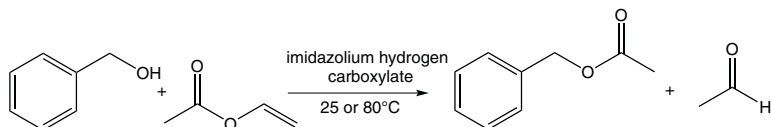
NITROGEN (Compounds)

07-0484
(continued)

1,3-Bis(2,6-di-i-propylphenyl)imidazolium bicarbonate, min. 97% IPrH.HCO₃ (1663476-15-0)



Tech. Note (2)
Ref. (1)



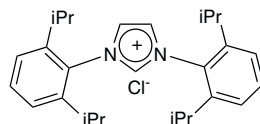
Tech. Note (3)
Ref. (1)

References:

1. *J. Org. Chem.*, **2012**, 77, 10135
2. *Catal. Sci. Technol.*, **2014**, 4, 2466

07-0590

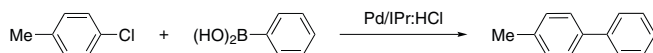
1,3-Bis(2,6-di-i-propylphenyl) imidazolium chloride, min. 97% (250285-32-6)
C₂₇H₃₇N₂⁺Cl⁻; FW: 425.06; white to off-white powdr.
Note: NHC Ligand Kit 3: Variety of N-Heterocyclic Carbenes Kit component.



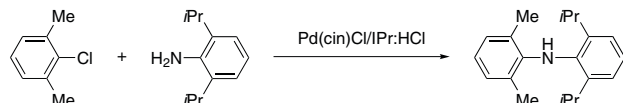
500mg
2g

Technical Notes:

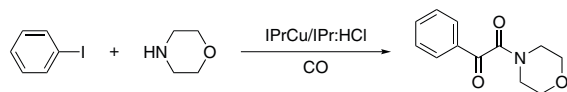
1. Precursor to Pd catalysts used in C-N and C-C coupling reactions.
2. Ligand used in double carbonylation reactions.
3. Precursor to Ni catalysts used in C-N coupling reactions.
4. Precursor to Cu catalysts used in copper hydride reactions.
5. Ligand used in Ru-catalyzed carbonylative C-H cyclization of 2-aryl phenols.



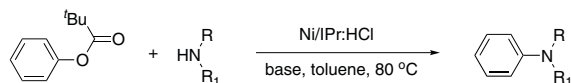
Tech. Note (1)
Ref. (1,2,4)



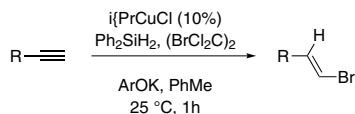
Tech. Note (1)
Ref. (2)



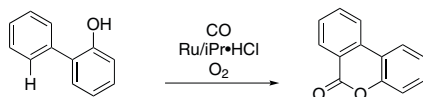
Tech. Note (2)
Ref. (3)



Tech. Note (3)
Ref. (5,6)



Tech. Note (4)
Ref. (7)



Tech. Note (5)
Ref. (8)

NITROGEN (Compounds)

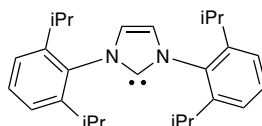
07-0590 1,3-Bis(2,6-di-i-propylphenyl) imidazolium chloride, min. 97% (250285-32-6)

(continued)

References:

1. *Organometallics*, **2002**, 21, 2866
2. *J. Am. Chem. Soc.*, **2006**, 128, 4101
3. *Org. Lett.*, **2009**, 11, 1321
4. *Angew. Chem., Int. Ed.*, **2012**, 51, 2
5. *Angew. Chem., Int. Ed.*, **2011**, 50, 2171
6. *Angew. Chem., Int. Ed.*, **2010**, 49, 2929
7. *J. Am. Chem. Soc.*, **2014**, 136, 8799
8. *Org. Lett.*, **2013**, 15, 3962

07-0595 1,3-Bis(2,6-di-i-propylphenyl)imidazol-2-ylidene, min. 98% (244187-81-3)
C₂₇H₃₈N₂; FW: 388.59; white to off-white powdr.
air sensitive, moisture sensitive
Note: NHC Ligand Kit 2: "Free" Carbenes Kit component.

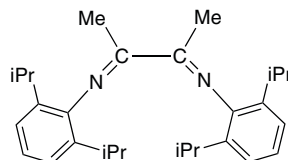


250mg
1g

Technical Note:

1. See 46-0040.

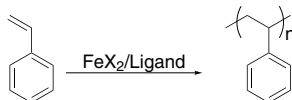
07-0285 2,3-Bis(2,6-di-i-propylphenylimino) butane, 98%
(74663-77-7)
[(C₃H₇)₂C₆H₃-N=C(CH₃)₂]₂; FW: 404.60;
yellow xtl.; m.p. 104-106°



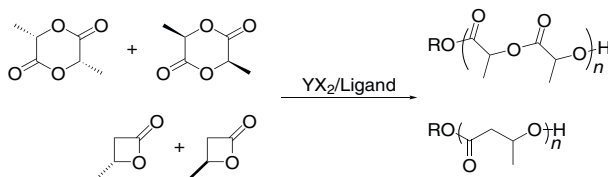
500mg
2g

Technical Notes:

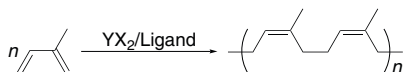
1. Ligand used in the preparation of highly active metal catalysts for the polymerization of ethylene (M=Ni, Pd) and olefins (ref 2, M=Pd; ref 3, M= Hf, Zr)
2. Ligand for the iron catalyzed polymerization of styrene acrylate monomers
3. Ligand for Yttrium complex that catalysis the ring-opening polymerization of cyclic esters
4. Ligand for rare-earth dichloro and bis(alkyl) complexes for isoprene polymerization
5. Ligand for cobalt catalyzed alkene hydroboration
6. Ligand for nickel catalyzed alkene hydrosilylation



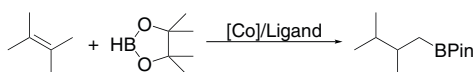
Tech. Note (2)
Ref. (1)



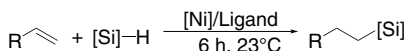
Tech. Note (3)
Ref. (2)



Tech. Note (4)
Ref. (3)



Tech. Note (5)
Ref. (4)



Tech. Note (6)
Ref. (5)

[Si] = Si(OEt)₃; SiMe(OEt)₂; SiMe₂(OEt); SiMe(OSiMe₃)₂; SiMe₂(OSiMe₃)

NITROGEN (Compounds)

07-0285 2,3-Bis(2,6-di-i-propylphenylimino) butane, 98% (74663-77-7)

(continued)

References:

1. *Macromolecules* **2007**, 40, 7441.
2. *Inorg. Chem.*, **2009**, 48, 4258.
3. *Dalton Trans.*, **2013**, 42, 9211.
4. *ACS Catal.*, **2015**, 5, 622.
5. *ACS Catal.*, **2016**, 6, 4105.

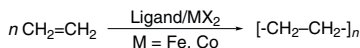
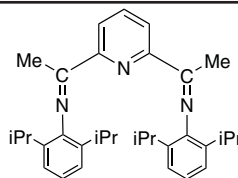
07-0289 2,6-Bis[1-(2,6-di-i-propylphenylimino)ethyl]pyridine, 98% (204203-14-5)

C₃₃H₄₃N₃; FW: 481.69; pale yellow powdr.

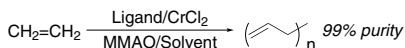
500mg
2g

Technical Notes:

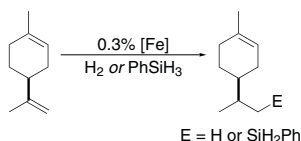
1. Ligand for iron and cobalt-catalyzed ethylene polymerization.
2. Ligand for chromium-catalyzed ethylene oligomerization.
3. Ligand for iron-catalyzed hydrogenation and hydrosilylation of olefins and alkynes.
4. Ligand for metal-catalyzed vinyl polymerization of norbornene.
5. Ligand for iron-catalyzed regioselective synthesis of α-aryl carboxylic acids from styrene derivatives and CO₂.
6. Ligand for low-valent iron-complex catalyzed tandem C–H activation/arylation.
7. Ligand for cobalt-catalyzed hydrosilylation of dienes (ref 8) and terminal alkenes. (ref 8, 9)



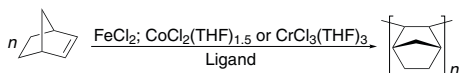
Tech. Note (1)
Ref. (1,2)



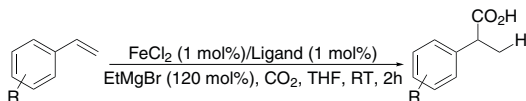
Tech. Note (2)
Ref. (3)



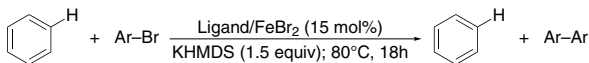
Tech. Note (3)
Ref. (4)



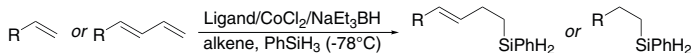
Tech. Note (4)
Ref. (5)



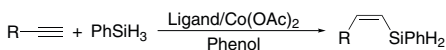
Tech. Note (5)
Ref. (6)



Tech. Note (6)
Ref. (7)



Tech. Note (7)
Ref. (8)



Tech. Note (7)
Ref. (9)

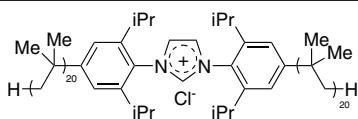
References:

1. *J. Am. Chem. Soc.*, **1998**, 120, 4049
2. *Eur. J. Inorg. Chem.*, **2003**, 1620.
3. *Macromolecules*, **2004**, 37, 4375.
4. *J. Am. Chem. Soc.*, **2004**, 126, 13794.
5. *J. Mol. Catal. A: Chem.*, **2006**, 259, 133.
6. *J. Am. Chem. Soc.*, **2012**, 134, 11900.
7. *Chem. Eur. J.*, **2014**, 20, 4754.
8. *ACS Catal.*, **2017**, 7, 2275.
9. *Angew. Chem. Int. Ed.*, **2017**, 56, 4328.

Other Ligands

NITROGEN (Compounds)

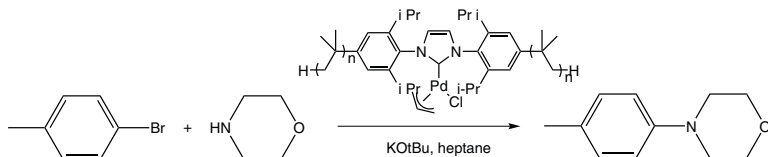
07-4050 **1,3-Bis[2,6-di-*i*-propyl-4-[polyisobutyl(20)]phenyl]imidazolium chloride (50% in hexanes/polyisobutylene)**
 amp
 HAZ
 $C_{187}H_{359}N_2Cl$; FW: 2669; orange liq.



500mg

Technical Note:

- Ligand used in the preparation of a phase-separable NHC palladium complex, useful for cross-coupling reactions.

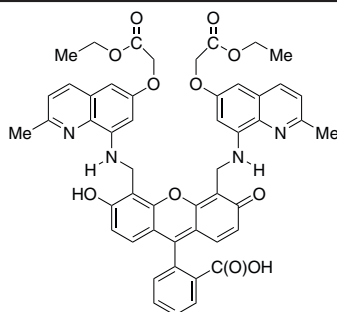


**Tech. Note (1)
Ref. (1)**

References:

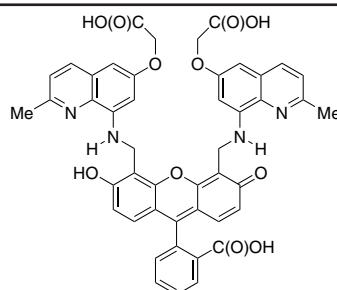
- J. Organomet. Chem.*, **2011**, 696, 1272

07-0291 **2-[4,5-Bis[(6-(2-ethoxy-2-oxoethoxy)-2-methylquinolin-8-ylamino)methyl]-6-hydroxy-3-oxo-3H-xanthen-9-yl]benzoic acid FL2E (1239877-06-5)**
 $C_{60}H_{44}N_4O_{11}$; FW: 876.30; dark-red solid (store cold)
 Note: Stability: store cold (-18 C); Nitric Oxide Sensor (Intracellular) Kit ("NO-ON") (FL2) component.



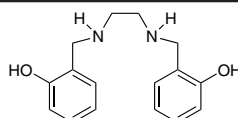
0.5mg

07-0287 **2-[4,5-Bis[(6-(2-ethoxy-2-oxohydroxy)-2-methylquinolin-8-ylamino)methyl]-6-hydroxy-3-oxo-3H-xanthen-9-yl]benzoic acid FL2A (1239877-07-6)**
 $C_{46}H_{36}N_4O_{11}$; FW: 848.85; dark-red solid
 Note: Nitric Oxide Sensor (Extracellular) Kit ("NO-ON") (FL2) component.



0.5mg

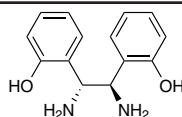
07-0295 **N,N'-Bis(2-hydroxybenzyl)ethylenediamine, min. 98% H₄ SALEN (18653-98-0)**
 $C_{16}H_{20}N_2O_2$; FW: 272.35; off-white xtl.; m.p. 118-120°



5g

25g

07-6008 **(1R,2R)-1,2-Bis(2-hydroxyphenyl)ethane-1,2-diamine, min. 97% (870991-70-1)**
 $C_{14}H_{16}N_2O_2$; FW: 244.29; white to off-white powdr. air sensitive



250mg

1g

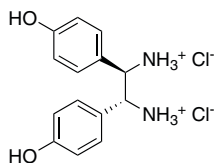
07-6009 **(1S,2S)-1,2-Bis(2-hydroxyphenyl)ethane-1,2-diamine, min. 97% (119386-71-9)**
 $C_{14}H_{16}N_2O_2$; FW: 244.29; white to off-white powdr. air sensitive

250mg

1g

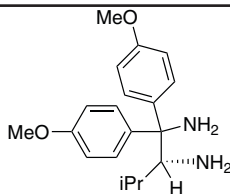
NITROGEN (Compounds)

07-0232 (1R,2R)-(-)-1,2-Bis(4-hydroxyphenyl)ethylenediamine dihydrochloride, min. 98% (1055301-14-8)
C₁₄H₁₆N₂O₂·2HCl; FW: 3107-12457.21;
white to off-white powdr.
hygroscopic



100mg
500mg

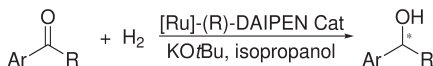
07-0210 (2R)-(+)-1,1-Bis(4-methoxyphenyl)-3-methyl-1,2-butanediamine, min. 97% (R)-DAIPEN (166764-19-8)
C₁₈H₂₆N₂O₂; FW: 314.43;
white to pale yellow powdr.; m.p. 78-98°



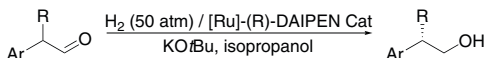
50mg
250mg

Technical Notes:

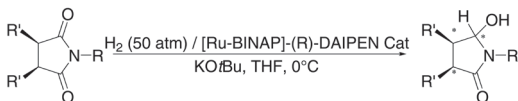
- Used in the ruthenium-catalyzed enantioselective hydrogenation of aromatic ketones.
- Used in ruthenium-catalyzed asymmetric hydrogenation of racemic aldehydes to optically active primary alcohols.
- Used in ruthenium-catalyzed enantioselective monohydrogenation of meso-cyclic imides.



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



Tech. Note (2)
Ref. (3)



Tech. Note (3)
Ref. (4)

References:

- J. Am. Chem. Soc.*, **1995**, 117, 2675.
- Org. Lett.*, **2004**, 6, 2937.
- J. Am. Chem. Soc.*, **2007**, 129, 1868.
- J. Am. Chem. Soc.*, **2010**, 132, 12832.

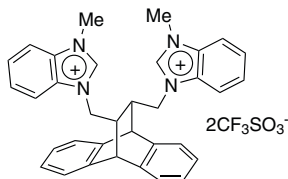
07-0211 (2S)-(-)-1,1-Bis(4-methoxyphenyl)-3-methyl-1,2-butanediamine, min. 97% (S)-DAIPEN (148369-91-9)
C₁₉H₂₆N₂O₂; FW: 314.43; white to pale yellow powdr.; m.p. 78-98°

50mg
250mg

Technical Note:

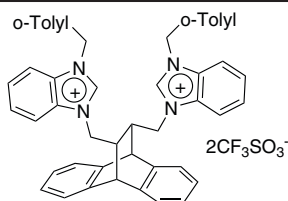
- See 07-0210 (page 24)

07-0080 11,12-Bis[N-methyl-1H-benzimidazolium-3-methylene]-9,10-dihydro-9,10-ethanoanthracene bis(trifluoromethanesulfonate) (958004-03-0)
[C₃₄H₃₂N₄](CF₃SO₃)₂; FW: 794.79;
white to off-white powdr.
Note: Sold under license from UFRFI for research purposes only. Patent application PCT/US2008/054137. NHC Ligand Kit 4: Bis Carbenes Kit component.



100mg
500mg

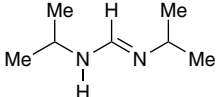
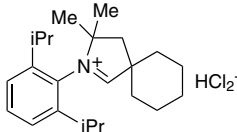
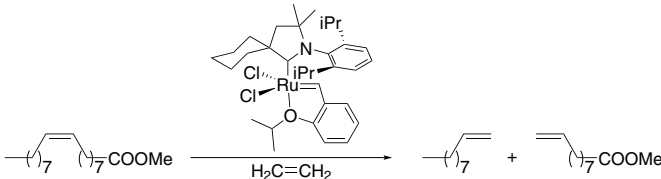
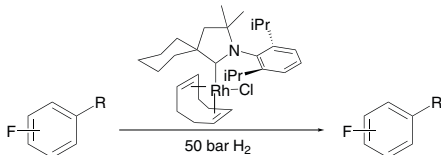
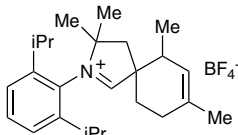
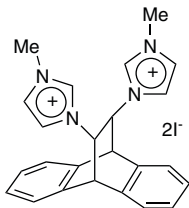
07-0082 11,12-Bis[N-(2-methylbenzyl)-1H-benzimidazolium-3-methylene]-9,10-dihydro-9,10-ethanoanthracene bis(trifluoromethanesulfonate), min. 95%
[C₄₈H₄₄N₄](CF₃SO₃)₂; FW: 951.01;
white to off-white powdr.
Note: Sold under license from UFRFI for research purposes only. Patent application PCT/US2008/054137. NHC Ligand Kit 4: Bis Carbenes Kit component.



100mg
500mg

Other Ligands

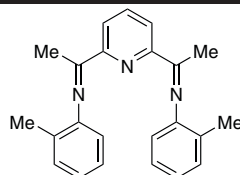
NITROGEN (Compounds)

07-0240	N,N'-Bis(1-methylethyl)methanimidamide , min. 98% (44843-38-1) $C_7H_{16}N_2$; FW: 128.22; off-white pwdr.		1g 5g 25g
07-0550	2-[2,6-Bis(1-methylethyl)phenyl]-3,3-dimethyl-2-azoniaspiro[4.5]dec-1-ene hydrogen dichloride , min. 97% Cyclohexyl-CAAC (1141464-90-5) $C_{23}H_{36}N^+ \cdot HCl_2^-$; FW: 398.45; white pwdr. <i>hygroscopic</i> Note: US Patent Application 11/449,568 and PCT Application US06/22477.		100mg 500mg
Technical Notes:			
1. Cyclic Alkyl Amino Carbene (CAAC) ligand for ruthenium-catalyzed ethenolysis to cleave carbon-carbon double bonds.			
2. Ligand for rhodium-catalyzed hydrogenation of readily available fluorinated arenes to form to all-cis-(multi) fluorinated cycloalkanes.			
		Tech. Note (1) Ref. (1)	
		Tech. Note (2) Ref. (2)	
References:			
1. <i>Angew. Chem. Int. Ed.</i> , 2015 , 54, 1919.			
2. <i>Science</i> , 2017 , 357, 908.			
07-0558	2-[2,6-Bis(1-methylethyl)phenyl]-3,3,6,8-tetramethyl-2-azoniaspiro[4.5]dec-1,7-diene tetrafluoroborate Trivertal-CAAC (1160555-04-3) $C_{28}H_{38}BF_4N^+$; FW: 439.38; white pwdr. <i>hygroscopic</i> Note: US Patent Application 11/449,568 and PCT Application US06/22477.		100mg 500mg
07-0083	11,12-Bis[3-methylimidazolium]-9,10-dihydro-9,10-ethanoanthracene bis(iodide) , min. 95% $[C_{24}H_{24}N_4I_2]$; FW: 622.28; white to off-white pwdr. Note: Sold under license from UFRFI for research purposes only. Patent application PCT/US2008/054137. NHC Ligand Kit 4: Bis Carbenes Kit component.		100mg 500mg

NITROGEN (Compounds)

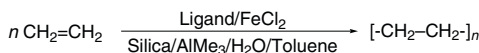
07-0296 **2,6-Bis[1-(2-methylphenylimino)ethyl]pyridine, 98%**
(210537-32-9)
 $C_{21}H_{21}N[(CH_3)_2C_6H_4N=C(CH_3)]_2$; FW: 341.46;
yellow powdr.

500mg
2g

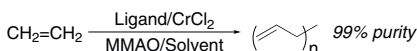


Technical Notes:

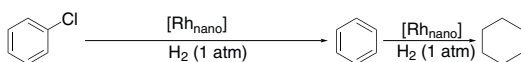
1. Ligand for iron catalyzed ethene polymerization, activated and heterogenized with a co-catalyst consisting of partially hydrolyzed trimethylaluminum on silica gel
2. Ligand for chromium catalyzed of ethylene oligomerization
3. Ligand for rhodium bis(imino)pyridine complex, that generates nanoparticles and effectively catalyses dehalogenation and hydrogenation of aromatic compounds



Tech. Note (1)
Ref. (1)



Tech. Note (2)
Ref. (2)



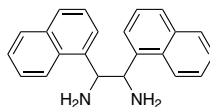
Tech. Note (3)
Ref. (3)

References:

1. *J. Mol. Catal. A., Chem.*, **2002**, 179, 155.
2. *Macromolecules*, **2004**, 37, 4375.
3. *Organometallics*, **2010**, 29, 4375.

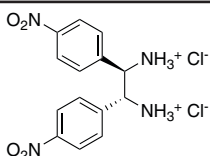
07-0492 **meso-1,2-Bis(naphthyl)ethylenediamine, min. 98%**
(117106-39-5)
 $C_{22}H_{20}N_2$; FW: 312.41; white to yellow powdr.
air sensitive

100mg
500mg



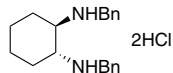
07-0243 **(1R,2R)-(+)-1,2-Bis(4-nitrophenyl)ethylenediamine dihydrochloride, min. 98% (117903-79-4)**
 $C_{14}H_{14}N_4O_4 \cdot 2\text{HCl}$; FW: 375.21; white to off-white powdr.
hygroscopic

100mg
500mg



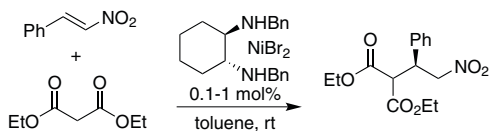
07-4073 **(1R,2R)-N,N'-Bis(phenylmethyl)-1,2-cyclohexanediamine dihydrochloride, min. 98%**
(212611-88-6)
 $C_{20}H_{28}N_2 \cdot 2\text{HCl}$; FW: 367.36; white to light-yellow powdr.
Note: Sold in collaboration with Daicel for research purposes only.

1g
5g

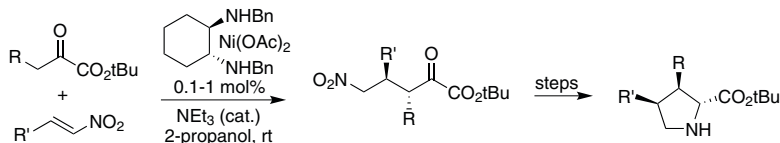


Technical Notes:

1. Ligand for Ni-catalyzed enantioselective Michael additions of 1,3-dicarbonyl compounds to nitroalkenes
2. Ligand for Ni-catalyzed enantioselective conjugate addition of α -Ketoesters to nitroalkenes



Tech. Note (1)
Ref. (1)



Tech. Note (2)
Ref. (2)

References:

1. *J. Am. Chem. Soc.*, **2007**, 129, 11583
2. *J. Am. Chem. Soc.*, **2010**, 132, 4036

NITROGEN (Compounds)

07-4074 (1S,2S)-N,N'-Bis(phenylmethyl)-1,2-cyclohexanediamine dihydrochloride, min. 98%

C₂₀H₂₈N₂·2HCl; FW: 367.36; white to light-yellow pwdr.

Note: Sold in collaboration with Daicel for research purposes only.

1g
5g

Technical Note:

1. See 07-4073 (page 26)

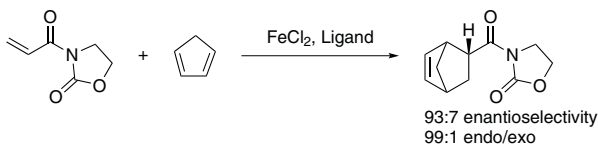
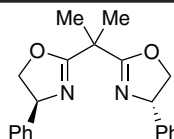
07-0275 (-)-2,2-Bis[(4S)-4-phenyl-2-oxazolin-2-yl]propane, 98% (131457-46-0)

C₂₁H₂₂N₂O₂; FW: 334.41; viscous liq.

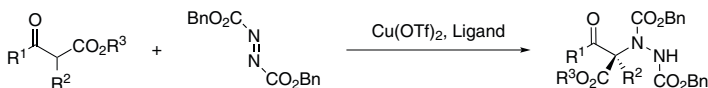
250mg
1g

Technical Notes:

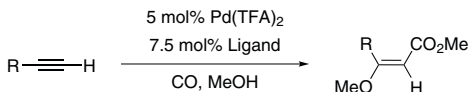
1. Commonly employed chiral ligand for Lewis acid catalyzed transformations, including cyclopropanation, carbonyl-ene, Michael, aldol, Henry, Diels-Alder and hetero Diels-Alder reactions.
2. Utilized in Methoxycarbonylation of terminal alkynes.
3. Ligand used in the asymmetric Kumada-cross coupling of secondary alkyl halides.
4. Ligand used for 5-endo-dig Carbocyclization.
5. Ligand use for reductive acyl cross-coupling.



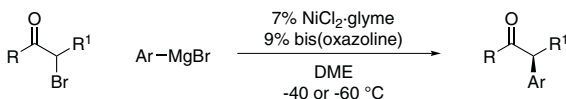
Tech. Note (1)
Ref. (1-4)



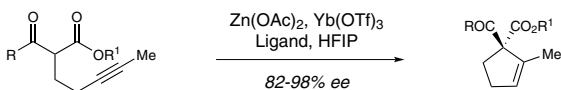
Tech. Note (1)
Ref. (5)



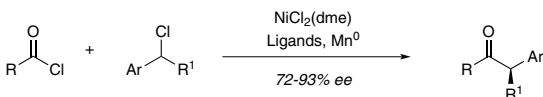
Tech. Note (2)
Ref. (4)



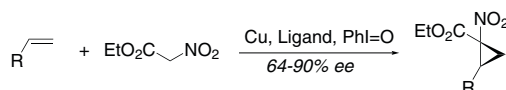
Tech. Note (3)
Ref. (8)



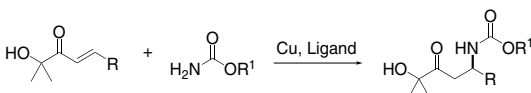
Tech. Note (4)
Ref. (9)



Tech. Note (5)
Ref. (10)



Tech. Note (1)
Ref. (6)



Tech. Note (1)
Ref. (7)

NITROGEN (Compounds)

07-0275 (-)-2,2-Bis[(4S)-4-phenyl-2-oxazolin-2-yl]propane, 98% (131457-46-0)

(continued)

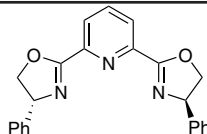
References:

1. *Tetrahedron: Asymmetry*, **1998**, 9, 1
2. *Acc. Chem. Res.*, **1999**, 32, 605
3. *Acc. Chem. Res.*, **2000**, 33, 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. *J. Am. Chem. Soc.*, **2010**, 132, 1264
9. *Angew. Chem. Int. Ed.* **2012**, 51, 4131
10. *J. Am. Chem. Soc.* **2013**, 135, 7442

07-0303 (+)-2,6-Bis[(4R)-4-phenyl-2-oxazolin-2-yl]pyridine, 98+%
(R,R)-Ph-pybox (128249-70-7)

C₂₃H₁₉N₃O₂; FW: 369.42; white xtl.; m.p. 171-175°

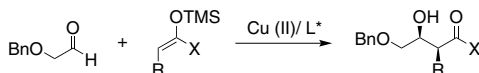
500mg
2g



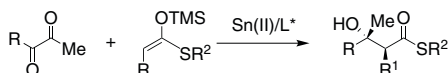
Note: This is for both enantiomers 07-0303 (R,R) and 07-0304 (S,S)

Technical Notes:

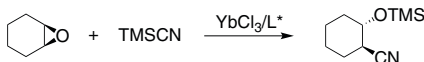
1. Ligand for Copper catalyzed syn-selective Mukaiyama aldol reaction.
2. Ligand for Tin catalyzed anti-selective aldol reaction.
3. Ligand for Ytterbium catalyzed desymmetrization of meso epoxides.
4. Ligand for Copper catalyzed enantioselective addition of terminal alkynes to imines.
5. Ligand for Scandium catalyzed enantioselective syn-selective ene reactions.
6. Ligand for Copper catalyzed asymmetric alkynylation of cyclic azomethine Imines.
7. Ligand for Europium catalyzed asymmetric alpha amination.
8. Ligand for Indium catalyzed enantioselective construction of spiro-fused 2-oxindole/alpha-methylene-gamma-butyrolactones.
9. Ligand for Copper catalyzed asymmetric azide-alkyne cycloaddition to quaternary oxindoles.
10. Ligand for Iron catalyzed enantioselective nitrene transfer to sulfides.
11. Ligand for Copper catalyzed enantioselective intramolecular propargylic amination.
12. Ligand for Copper catalyzed asymmetric hydroxylation.
13. Ligand for Scandium catalyzed dearomatization of 2-naphthols by electrophilic amination.
14. Ligand for Copper catalyzed asymmetric alkynylation of oxocarbenium ions to set diaryl tetrasubstituted stereocenters.



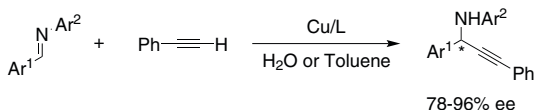
Tech. Note (1)
Ref. (1,4)



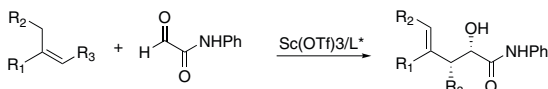
Tech. Note (2)
Ref. (2)



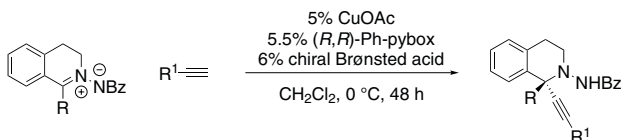
Tech. Note (3)
Ref. (3)



Tech. Note (4)
Ref. (5)



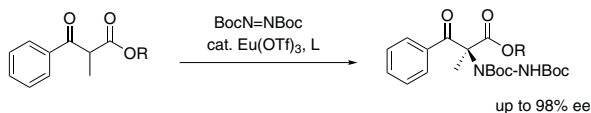
Tech. Note (5)
Ref. (6)



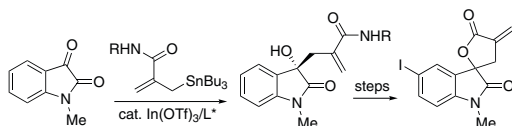
Tech. Note (6)
Ref. (7)

NITROGEN (Compounds)

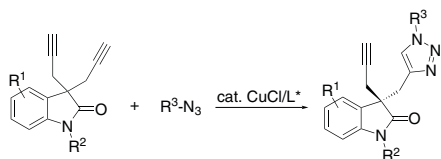
07-0303 (+)-2,6-Bis[(4R)-4-phenyl-2-oxazolin-2-yl]pyridine, 98+% (R,R)-Ph-pybox (128249-70-7)
(continued)



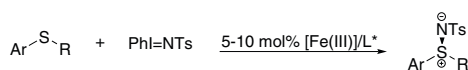
Tech. Note (7)
Ref. (8)



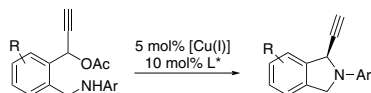
Tech. Note (8)
Ref. (9)



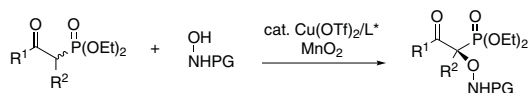
Tech. Note (9)
Ref. (10)



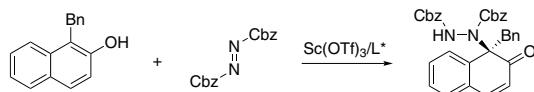
Tech. Note (10)
Ref. (11)



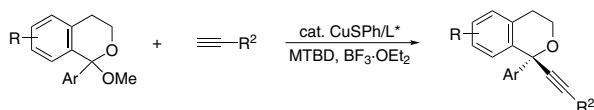
Tech. Note (11)
Ref. (12)



Tech. Note (12)
Ref. (13)



Tech. Note (13)
Ref. (14)



Tech. Note (14)
Ref. (15)

References:

1. *J. Am. Chem. Soc.*, **1999**, 121, 669
2. *J. Am. Chem. Soc.*, **1997**, 119, 10859
3. *Org. Lett.*, **2000**, 2, 1001
4. *Org. Lett.*, **2002**, 4, 3375
5. *J. Am. Chem. Soc.*, **2002**, 124, 5638
6. *J. Am. Chem. Soc.*, **2005**, 127, 8006
7. *Angew. Chem. Int. Ed.*, **2011**, 50, 8952
8. *Org. Lett.*, **2013**, 15, 1448
9. *Org. Lett.*, **2013**, 15, 6182
10. *J. Am. Chem. Soc.*, **2013**, 135, 10994
11. *Angew. Chem. Int. Ed.*, **2013**, 52, 8661
12. *Chem. Commun.*, **2014**, 50, 7874
13. *Angew. Chem. Int. Ed.*, **2014**, 53, 14472
14. *Angew. Chem. Int. Ed.*, **2015**, 54, 2356
15. *Angew. Chem. Int. Ed.*, **2015**, 54, 14154

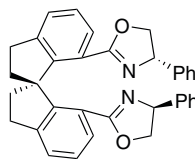
NITROGEN (Compounds)

07-0304	(-)-2,6-Bis[(4S)-4-phenyl-2-oxazolin-2-yl]pyridine, 98+% (S,S)-Ph-pybox (174500-20-0) $C_{23}H_{19}N_3O_2$; FW: 369.42; white xtl.; m.p. 171-175°	500mg 2g
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Technical Note:

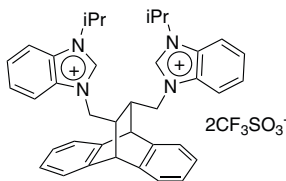
- See 07-0303 (page 28)

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) $C_{35}H_{30}N_2O_2$; FW: 510.62; white solid; m.p. 130-132° <i>moisture sensitive</i>	25mg 100mg
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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 (940880-69-3) $C_{35}H_{30}N_2O_2$; FW: 510.62; white solid; m.p. 167-169° <i>moisture sensitive</i>	25mg 100mg
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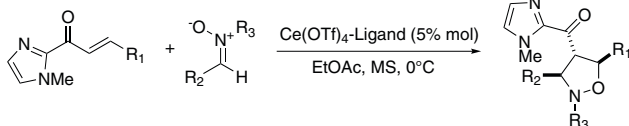
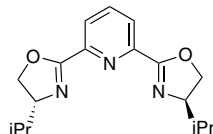
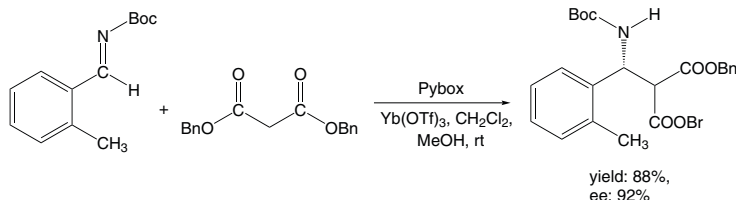
07-0084	11,12-Bis[N-(i-propyl)-1H-benzimidazolium-3-methylene]-9,10-dihydro-9,10-ethanoanthracene bis(trifluoromethanesulfonate) (958004-12-1) $[C_{38}H_{40}N_4](CF_3SO_3)_2$; FW: 826.87; white to off-white powdr. Note: Sold under license from UFRFI for research purposes only. Patent application PCT/US2008/054137. NHC Ligand Kit 4: Bis Carbenes Kit component.	100mg 500mg
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07-0306	(+)-2,6-Bis[(4R)-4-(i-propyl)-2-oxazolin-2-yl]pyridine, 98+% (R)-(i-Pr)-pybox (131864-67-0) $C_{17}H_{23}N_3O_2$; FW: 301.38; white xtl.; m.p. 152-153°	250mg 1g
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Technical Notes:

- Ligand for enantioselective nitron cycloaddition to α,β -unsaturated 2-acyl imidazoles.
- Highly efficient catalytic enantioselective Mannich reaction of malonates with N-tert-butoxycarbonyl imines.

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

References:

- Org.Lett., 2006, 8 (15), 3351-3354
- Chem-Eur.J., 2013, 19, 10142

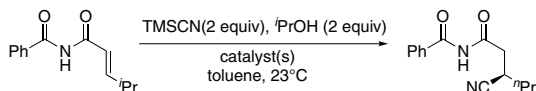
NITROGEN (Compounds)

07-0307 (-)-2,6-Bis[(4S)-4-(i-propyl)-2-oxazolin-2-yl]pyridine, 98+%
(S)-(i-Pr)-pybox (118949-61-4)
 $C_{17}H_{23}N_3O_2$; FW: 301.38; white xtl.; m.p. 152-153°

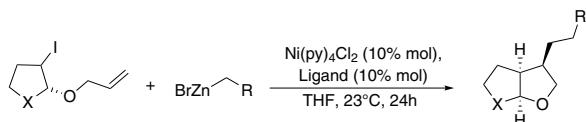
250mg
1g

Technical Notes:

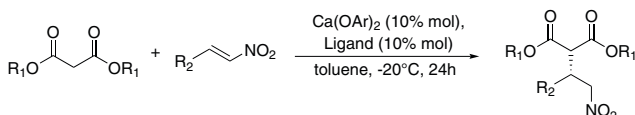
1. Ligand used in the dual-catalyst system for highly enantioselective conjugate cyanation of unsaturated imides.
2. Ligand for cross-coupling reactions of iodoalkanes with alkyl zinc halides.
3. Ligand for asymmetric 1,4-addition reactions of 1,3-dicarbonyl compounds to nitroalkenes.
4. Ligand for asymmetric allylation of aldehydes with β -carbonyl allylstannanes.
5. Ligand used in the enantioselective Negishi reaction of racemic secondary benzylic halides.
6. Ligand for osmium catalyzed enantioselective transfer hydrogenation.



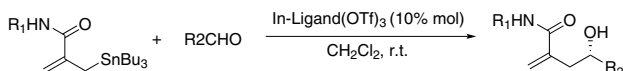
Tech. Note (1)
Ref. (1)



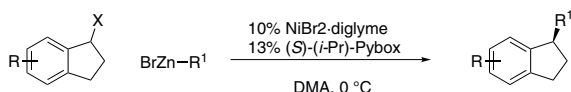
Tech. Note (2)
Ref. (2)



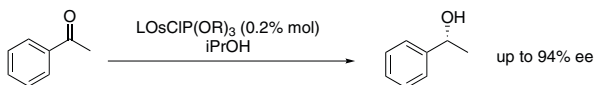
Tech. Note (3)
Ref. (3)



Tech. Note (4)
Ref. (4)



Tech. Note (5)
Ref. (5)

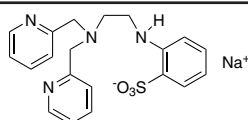


Tech. Note (6)
Ref. (6)

References:

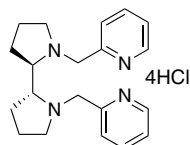
1. *J. Am. Chem. Soc.*, **2004**, 126, 9928
2. *Angew. Chem. Int. Ed.*, **2007**, 46, 8790
3. *Angew. Chem. Int. Ed.*, **2009**, 48, 9117
4. *J. Organomet. Chem.*, **2010**, 695, 128
5. *J. Am. Chem. Soc.* **2005**, 127, 10482
6. *Inorg. Chem.* **2013**, 52, 6193

07-0350 2-[[Bis(2-pyridinylmethyl)amino]ethylamino]benzenesulfonic acid hydrate sodium salt ZX1
 $C_{20}H_{21}N_4NaO_3S$; FW: 420.46; yellow solid
air sensitive



100mg
500mg

07-0097 (2R,2'R)-(+)-[N,N'-Bis(2-pyridylmethyl)]-2,2'-bipyrrolidine tetrahydrochloride, 98% (R,R)-PDP
(1228077-88-0)
 $C_{20}H_{26}N_4 \cdot 4HCl$; FW: 468.29; white pwdr.
air sensitive
Note: Patent pending.



100mg
500mg

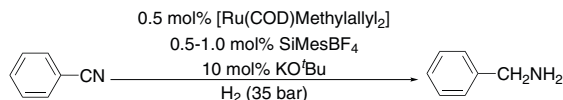
Other Ligands

NITROGEN (Compounds)

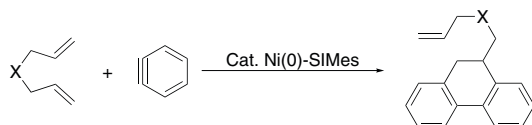
07-0094	(2S,2'S)-(-)-[N,N'-Bis(2-pyridylmethyl)-2,2'-bipyrrolidine tetrahydrochloride, 98% (S,S)-PDP (959395-07-4) C ₂₀ H ₂₆ N ₄ ·4HCl; FW: 468.29; white powdr. <i>air sensitive</i> Note: Patent pending.	100mg 500mg
07-7051	2,6-Bis[(4R)-4-tert-butyloxazolin-2-yl]pyridine, 98%, (99% ee) (185346-17-2) C ₁₉ H ₂₇ N ₃ O ₂ ; FW: 329.40; white to yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.	100mg
07-7050	2,6-Bis[(4S)-4-tert-butyloxazolin-2-yl]pyridine, 98%, (99% ee) (118949-63-6) C ₁₉ H ₂₇ N ₃ O ₂ ; FW: 329.40; white to yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.	100mg
07-1425	4,4'-Bis(trifluoromethyl)-2,2'-bipyridine, min. 95% (142946-79-0) C ₁₂ H ₆ F ₆ N ₂ ; FW: 292.17; off-white to light yellow powdr. <i>air sensitive</i> Note: Ligand for Photocatalyst Synthesis	1g 5g
07-1430	5,5'-Bis(trifluoromethyl)-2,2'-bipyridine, min 97% (142946-80-3) C ₁₂ H ₆ F ₆ N ₂ ; FW: 292.17; White powdr. <i>air sensitive</i> Note: Ligand for Photocatalyst Synthesis	1g 5g
07-4011	1,3-Bis(2,4,6-trimethylphenyl)-4,5-dihydroimidazolium chloride, min. 97% (173035-10-4) C ₂₁ H ₂₇ ClN ₂ ; FW: 342.91; white to off-white solid <i>air sensitive</i> Note: NHC Ligand Kit 3: Variety of N-Heterocyclic Carbenes Kit component.	500mg 2g
07-0302	1,3-Bis(2,4,6-trimethylphenyl)-4,5-dihydroimidazolium tetrafluoroborate, min. 95% SiMes-HBF₄ (245679-18-9) [C ₂₁ H ₂₇ N ₂] ⁺ BF ₄ ⁻ ; FW: 394.27; off-white powdr. Note: NHC Ligand Kit 3: Variety of N-Heterocyclic Carbenes Kit component.	1g 5g

Technical Notes:

- Ligand for ruthenium-catalyzed selective reduction of nitriles to primary amines.
- Ligand for nickel-catalyzed [2+2+2] cycloaddition of arynes and an unactivated alkene.
- Ligand for copper-catalyzed [3+2] cycloaddition of azides and alkynes under mild conditions.
- Ligand for copper-catalyzed direct aryl quaternization of N-substituted imidazoles to form imidazolium salts.
- Ligand for copper-catalyzed silylation of allenes.



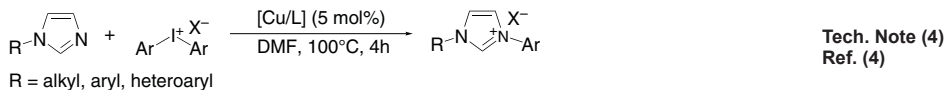
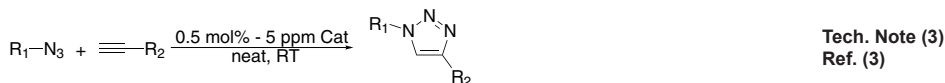
**Tech. Note (1)
Ref. (1)**



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

NITROGEN (Compounds)

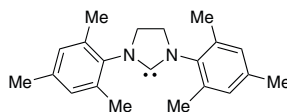
07-0302 1,3-Bis(2,4,6-trimethylphenyl)-4,5-dihydroimidazolium tetrafluoroborate, min. 95%
(continued) SiMes-HBF₄ (245679-18-9)



References:

1. *Tetrahedron Lett.*, **2009**, 50, 3654.
2. *Chem. Commun.*, **2009**, 4284.
3. *Organometallics*, **2012**, 31, 7969.
4. *J. Org. Chem.*, **2013**, 78, 5723.
5. *Chem. Eur. J.*, **2014**, 20, 13143.

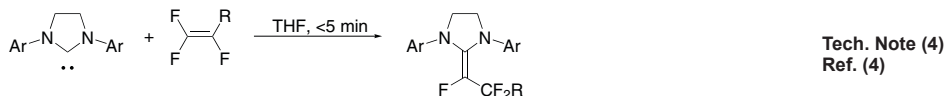
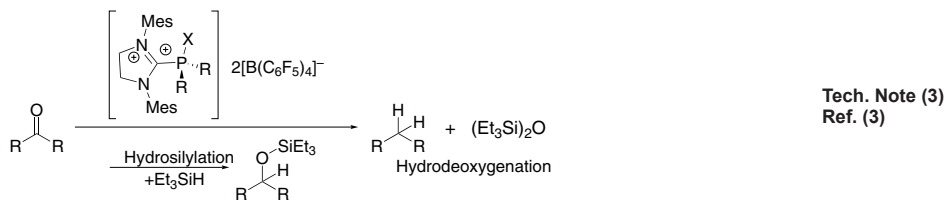
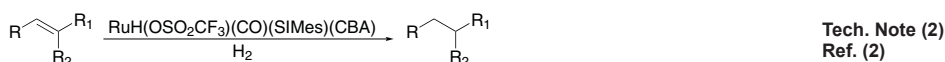
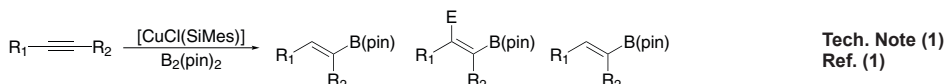
07-0605 1,3-Bis(2,4,6-trimethylphenyl)-4,5-dihydroimidazol-2-ylidene, min. 98%
HAZ (173035-11-5)
C₂₁H₂₆N₂; FW: 306.45; pale yellow powdr.
air sensitive, moisture sensitive
Note: NHC Ligand Kit 2: "Free" Carbenes Kit component.



500mg
2g

Technical Notes:

1. Ligand for copper-catalyzed regioselective formation of tri- and tetrasubstituted vinylboronates in air.
2. Ligand for highly active ruthenium catalyst for hydrogenation of olefins.
3. Electrophilic phosphonium cations component for ketone catalytic hydrodeoxygenation/hydrosilylation.
4. Used in selective activation of fluoroalkenes to produce N-heterocyclic fluoroalkenes and polyfluoroalkenyl imidazolium salts.



References:

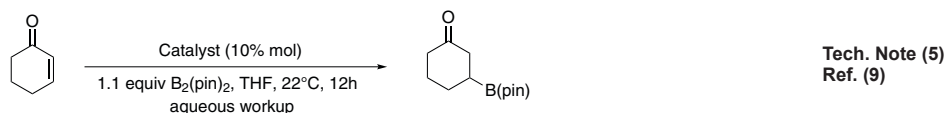
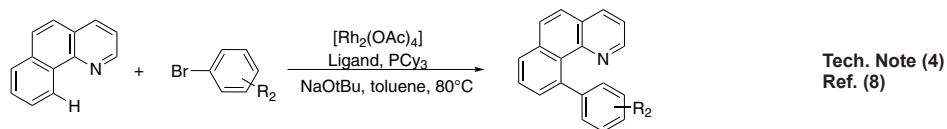
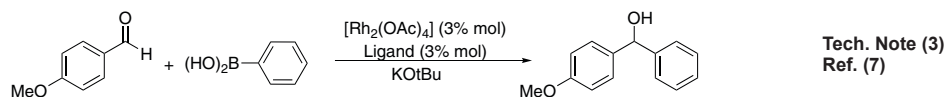
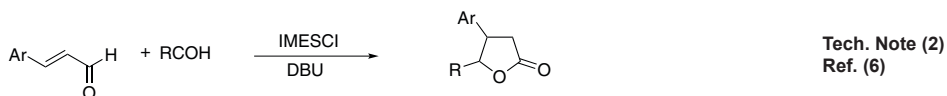
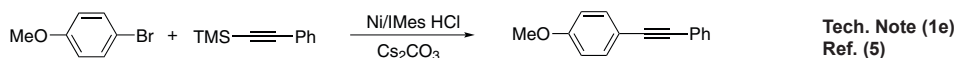
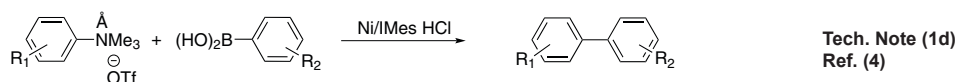
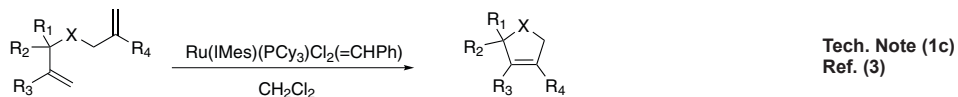
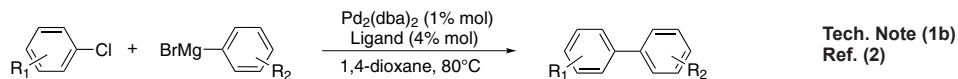
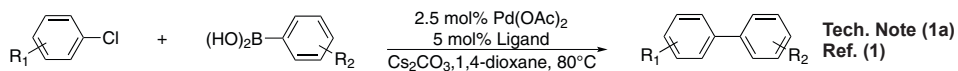
1. *ACS Catal.*, **2014**, 4, 1564.
2. *J. Am. Chem. Soc.*, **2015**, 137, 5582.
3. *Angew. Chem. Int. Ed.*, **2015**, 54, 8250
4. *Chem. Eur. J.*, **2016**, 22, 8063.

NITROGEN (Compounds)

07-0299 **1,3-Bis(2,4,6-trimethylphenyl)imidazolium chloride, min. 97% (141556-45-8)** 1g
 $C_{21}H_{25}N_2^+Cl^-$; FW: 340.90; off-white to yellow powdr. 5g
 Note: NHC Ligand Kit 3: Variety of N-Heterocyclic Carbenes Kit component.

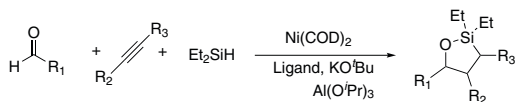
Technical Notes:

- 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 α,β -unsaturated carbonyls.
- Ligand for dehydrogenative cyclocondensation of aldehydes, alkynes, and dialkylsilanes.
- Precursor for carbene for conjugate silylation of alpha, beta-unsaturated carbonyls.

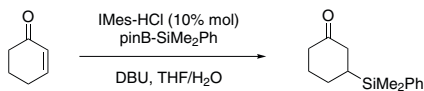


NITROGEN (Compounds)

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



Tech. Note (6)
Ref. (10)

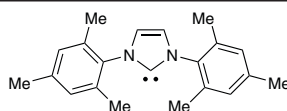


Tech. Note (7)
Ref. (11)

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.
11. *J. Am. Chem. Soc.*, **2011**, 133, 7712.

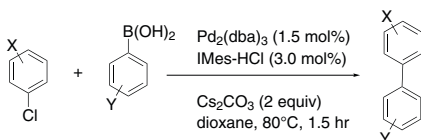
07-0600 1,3-Bis(2,4,6-trimethylphenyl)imidazol-2-ylidene, min. 98% (141556-42-5)
HAZ $C_{27}H_{24}N_2$; FW: 304.43; white to off-white powder.
air sensitive, moisture sensitive
Note: NHC Ligand Kit 2: "Free" Carbenes Kit component.



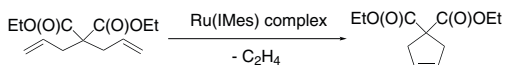
500mg
2g

Technical Note:

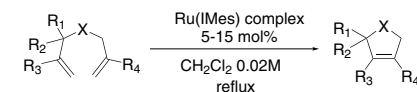
1. Palladium-imidazol-2-ylidene complex as catalysts for facile and efficient Suzuki cross-coupling reactions.
2. Ruthenium-imidazol-2-ylidene complex as a ring closing metathesis catalyst.
3. Improvement in olefin metathesis using a new generation of ruthenium catalyst bearing an imidazolylidene ligand – synthesis of heterocycles.
4. RCM catalysts of extended scope.
5. Metal-free catalyst for the chemoselective methylation of amines using carbon dioxide as a carbon source.
6. Enantioselective (4+2) annulation of donor-acceptor cyclobutanes by N-heterocyclic carbene catalysis.
7. Highly efficient synthesis of alkylboronate esters via Cu(II)-catalyzed borylation of unactivated alkyl bromides and chlorides in air.
8. N-Heterocyclic carbene catalyzed sulfenylation of α,β -unsaturated aldehydes.



Tech. Note (1)
Ref. (1)

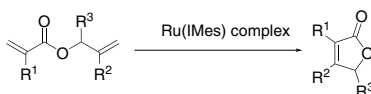


Tech. Note (2)
Ref. (2)



X = O, NBoc, P(O)OBn
P(O)OH, SiO₂(CH₃)₂

Tech. Note (3)
Ref. (3)

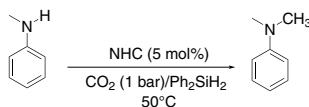
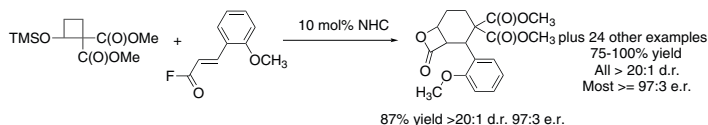
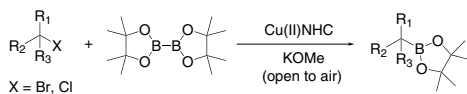
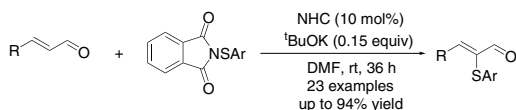


Tech. Note (4)
Ref. (4)

NITROGEN (Compounds)

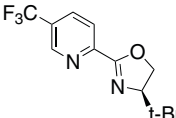
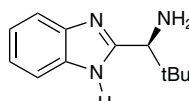
07-0600 1,3-Bis(2,4,6-trimethylphenyl)imidazol-2-ylidene, min. 98% (141556-42-5)

(continued)

Tech. Note (5)
Ref. (5)Tech. Note (6)
Ref. (6)Tech. Note (7)
Ref. (7)Tech. Note (8)
Ref. (8)

References:

1. *J. Org. Chem.*, **1999**, 64, 3804.
2. *Organometalics*, **1999**, 18, 3760.
3. *Org. Lett.*, **2000**, 2, 1517.
4. *J. Org. Chem.*, **2000**, 65, 2204.
5. *Angew. Chem. Int. Ed.*, **2014**, 53, 12876.
6. *Angew. Chem. Int. Ed.*, **2016**, 55, 16136.
7. *ACS Catal.*, **2016**, 6, 8332.
8. *Org. Lett.*, **2016**, 18, 5708.

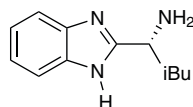
07-7173 NEW	2-[(4R)-4-tert-Butyl-4,5-dihydro-2-oxazolyl]-5-(trifluoromethyl)pyridine, 98%, (99% ee) (1428537-19-2) C ₁₃ H ₁₅ F ₃ N ₂ O; FW: 272.30; white to yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		50mg
07-7124 NEW	2-[(4S)-4-tert-Butyl-4,5-dihydro-2-oxazolyl]-5-(trifluoromethyl)pyridine, 98%, (99% ee) (1416819-91-4) C ₁₃ H ₁₅ F ₃ N ₂ O; FW: 272.30; white to yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		100mg
06-0115	n-Butylisocyanide, 97% (2769-64-4) See page 2		
06-0120	t-Butylisocyanide, min. 98% (7188-38-7) See page 2		
07-1245	(S)-(-)-2-(α-(t-butyl)methanamine)-1H-benzimidazole, min. 95% (S)-t-Bu-BIMAH (1118114-88-7) C ₁₂ H ₁₇ N ₃ ; FW: 203.28; white to off-white solid; 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.		100mg 500mg

Technical Note:

1. See 07-1242 (page 37)

NITROGEN (Compounds)

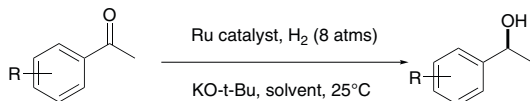
- 07-1242** (R)-(+)-2-(α -(i-butyl)methanamine)-1H-benzimidazole, min. 98% (R)-i-Bu-BIMAH (1235960-36-7)
 $C_{12}H_{17}N_3$; FW: 203.28; white to off-white solid; m.p. 92-94°
air sensitive
 Note: Sold under license from EnantioTech for research purposes only. PCT/CN2008/073648, CN 200810038929.
 EnantioTech BIMAH Ligand Kit component.



100mg
500mg

Technical Note:

- Efficient ruthenium catalyst for asymmetric hydrogenation of aryl ketones.



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

References:

- Adv. Synth. Catal.*, **2011**, 353, 495
- Org. Lett.*, **2009**, 11, 907

- 07-1240** (S)-(-)-2-(α -(i-butyl)methanamine)-1H-benzimidazole, min. 98% (S)-i-Bu-BIMAH (59592-31-3)
 $C_{12}H_{17}N_3$; FW: 203.28; white to off-white solid; m.p. 109-112°
air sensitive
 Note: Sold under license from EnantioTech for research purposes only.
 PCT/CN2008/073648, CN 200810038929. EnantioTech BIMAH Ligand Kit component.

250mg
1g

Technical Note:

- See 07-1242 (page 37)

- 07-0312** 9-(2-Carboxyphenyl)-2-chloro-5-[(2-(di(2-pyridyl)aminomethyl)phenyl)aminomethyl]-6-hydroxy-3-xanthanone Zinpyr-4 (502467-23-4)
 $C_{40}H_{31}ClN_4O_5$; FW: 683.15; orange powdr.

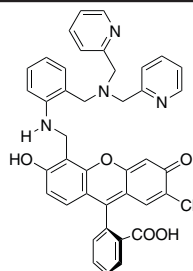
10mg

Technical Note:

- An intracellular and extracellular Zn^{+2} sensor of the Zinpyr family of ligands.

References:

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



- 07-0311** 9-(2-Carboxyphenyl)-2,7-dichloro-4,5-bis[(2-picolyl)(pyrazin-2-ylmethyl)aminomethyl]-6-hydroxy-3-xanthanone ZPP1 (1084898-23-6)
 $C_{44}H_{34}Cl_2N_6O_5$; FW: 825.70; pink powdr.

0.5mg

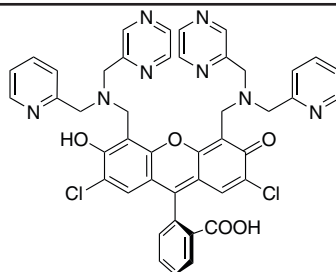
Ligand used for quantifying biological zinc via a modified Zinpyr fluorescence sensor.

Technical Notes:

- High concentration of zinc in sub-retinal epithelial deposits.
- New strategy for quantifying biological zinc by a modified Zinpyr fluorescence sensor.
- A novel imaging approach for early detection of prostate cancer based on endogenous zinc sensing.

References:

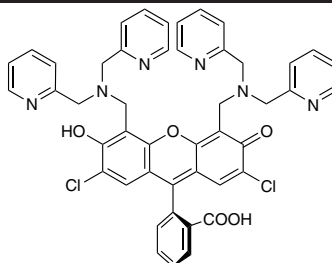
- Exp. Eye Res.*, **2008**, 87, 80
- J. Am. Chem. Soc.*, **2008**, 130, 15788
- Cancer Research*, **2010**, 70, 6119



NITROGEN (Compounds)

07-0314 **9-(2-Carboxyphenyl)-2,7-dichloro-4,5-bis[di(2-pyridyl)aminomethyl]-6-hydroxy-3-xanthone ZINPYR-1** (288574-78-7)
C₄₆H₃₆Cl₂N₆O₅; FW: 823.72; pink powd.

10mg



Technical Note:

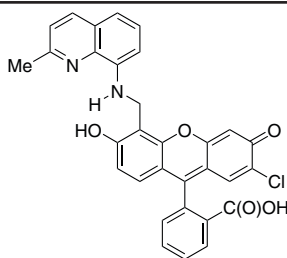
1. ZINPYR-1 is a new lipophilic, zinc-sensitive, fluorescent dye able to penetrate cell membranes. Excitation and emission wavelengths are in the visible range ($\lambda_{\text{max}} > 500\text{nm}$). This property is a clear advantage over other dyes requiring high energy, tissue damaging UV radiation.

References:

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

07-0293 **2-[2-Chloro-6-hydroxy-5-[2-methylquino- lin-8-ylaminomethyl]-3-oxo-3H-xanthen-9-yl]benzoic acid FL (905982-78-7)**
C₃₁H₂₁ClN₂O₅; FW: 536.96; magenta solid (store cold)
Note: Nitric Oxide Sensor (Intracellular) Kit ("NO-ON") (FL) component.

0.5mg



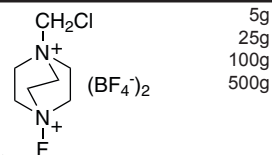
Technical Note:

1. Novel, cell-permeable copper (II)/ligand system allowing direct imaging of nitric oxide produced in living cells with fluorescence turn-on.

References:

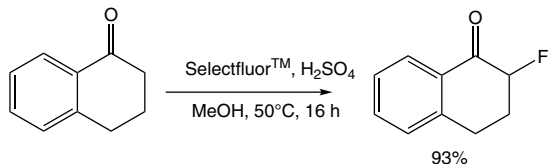
1. *Nature Chemical Biology*, **2006**, 2,349.
2. *Inorg. Chem.*, **2004**, 43, 2624

07-0332 **1-(Chloromethyl)-4-fluoro-1,4-diazoniabicyclo[2.2.2]octane bis(tetrafluoroborate), min. 97% SelectFluor® (140681-55-6)**
(C₈H₁₄ClFN₂)(BF₄)₂; FW: 354.26; white to off-white powd. moisture sensitive

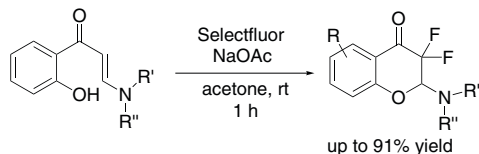


Technical Notes:

1. SelectFluor™ is one of the most efficient and popular reagents for electrophilic fluorination. The product is also useful as a reagent, or catalyst, for oxidative transformations, coupling reactions and halogenations.¹
2. Useful for the direct electrophilic fluorination of ketones, ketals and enamides.
3. Selectively-triggered tandem cyclization of o-hydroxyarylenaminones to access difluorinated 2-amino substituted chromanones.
4. Metal-free, three component regioselective amino fluorination of styrene derivatives.
5. Synthesis of pentafluoroethyl ethers by silver-mediated oxidative pentafluoroethylation of alcohols and phenols.
6. Decarboxylative fluorination of electron-rich heteroaromatic carboxylic acids with Selectfluor.
7. Catalyst free synthesis of α -fluoro- β -hydroxy ketones.



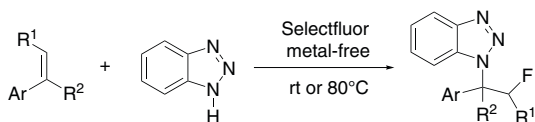
Tech. Note (2)
Ref. (2)



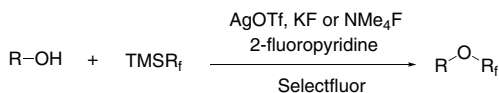
Tech. Note (3)
Ref. (3)

NITROGEN (Compounds)

07-0332 1-(Chloromethyl)-4-fluoro-1,4-diazoniabicyclo[2.2.2]octane bis(tetrafluoroborate), min. 97%
(continued) Selectfluor® (140681-55-6)

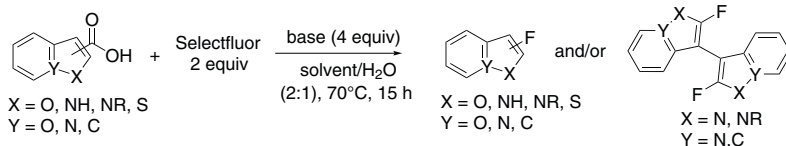


Tech. Note (4)
Ref. (4)



Tech. Note (5)
Ref. (5)

R = alkyl, aryl R_f = C₂F₅, CF₂CO₂Et, CF₂CF₂CF₃

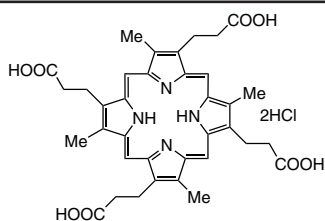


Tech. Note (6)
Ref. (6)

References:

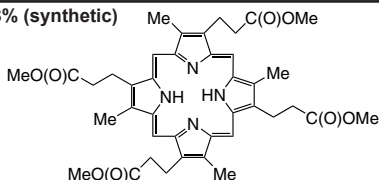
1. *Molecules*, **2011**, 16, 6432, (review)
2. *Tetrahedron Lett.*, **2012**, 53(12), 2971.
3. *J. Org. Chem. Soc.*, **2017**, 82, 9837.
4. *J. Org. Chem. Soc.*, **2017**, 82, 8258.
5. *J. Org. Chem. Soc.*, **2017**, 82, 3702.
6. *Org. Letts.*, **2017**, 19, 1410.
7. *Org. Biomol. Chem.*, **2017**, 15, 2063.

07-0300 Coproporphyrin I dihydrochloride
(synthetic) (69477-27-6)
C₃₆H₃₈N₄O₈·2HCl; FW: 727.64;
purple xtl.



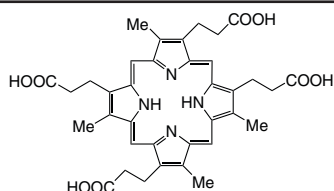
10mg
50mg

07-0310 Coproporphyrin I tetramethyl ester, 98% (synthetic)
(25767-20-8)
C₄₀H₄₆N₄O₈; FW: 710.83;
purple xtl.; m.p. 251-252°



10mg
50mg

07-0305 Coproporphyrin III dihydrochloride
(14643-66-4)
C₃₆H₃₈N₄O₈·2HCl; FW: 727.64;
purple xtl.



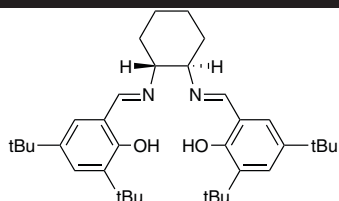
5mg
25mg

07-0318 trans-1,2-Cyclohexanediaminetetraacetic acid monohydrate, min. 98%
CyDTA (125572-95-4)
(HOOCCH₂)₂NC₆H₁₀N(CH₂COOH)₂·H₂O; FW: 346.32 (364.36); white powdr.

25g
100g

NITROGEN (Compounds)

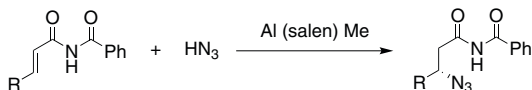
07-0316 (1*R*,2*R*)-(-)-1,2-Cyclohexanediamino-
N,N'-bis(3,5-di-*t*-butylsalicylidene), 98%
(*R,R*)-Jacobsen Ligand (135616-40-9)
C₃₆H₅₄N₂O₂; FW: 546.84; yellow powdr.;
m.p. 205-207°



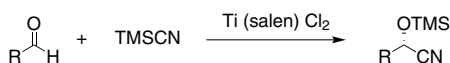
1g
5g

Technical Notes:

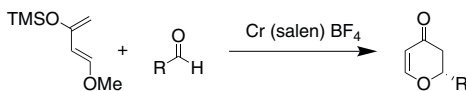
- See 27-0525, 25-0300, 13-5800.
- A versatile ligand for asymmetric catalysis.
 - Conjugate addition of hydrazoic acid to unsaturated imides.
 - Formation of cyanohydrins from aldehydes.
 - Desymmetrization of meso-epoxides with azide.
 - Hetero Diels-Alder reaction.
 - Nozaki-Hiyama reaction.
 - Reagent used for the Passerini, three-component reaction.
- Enantioselective conjugate cyanation of unsaturated imides.
- Cobalt catalyzed enantioselective alpha chlorination and fluorination of beta-ketoesters



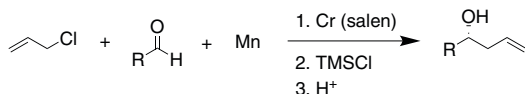
Tech. Note (2a)
Ref. (1)



Tech. Note (2b)
Ref. (2)



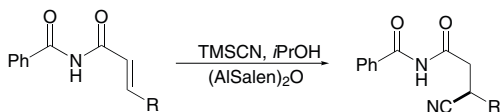
Tech. Note (2d)
Ref. (3)



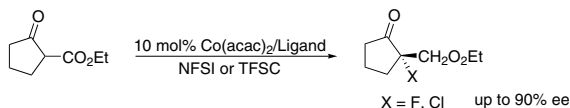
Tech. Note (2e)
Ref. (4)



Tech. Note (2f)
Ref. (7)



Tech. Note (3)
Ref. (5,6)



Tech. Note (4)
Ref. (8)

References:

- J. Am. Chem. Soc.*, **1999**, 121, 8959
- J. Am. Chem. Soc.*, **1999**, 121, 3968
- J. Org. Chem.*, **1998**, 63, 403
- Angew. Chem. Int. Ed.*, **1999**, 38, 3357
- J. Am. Chem. Soc.*, **2004**, 126, 9928
- J. Am. Chem. Soc.*, **2003**, 125, 4442
- Angew. Chem. Int. Ed.*, **2008**, 47, 388
- Chem. Lett.*, **2010**, 39, 466

Other Ligands

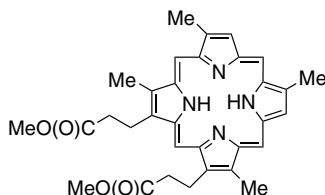
NITROGEN (Compounds)

07-0317	(1S,2S)-(+)-1,2-Cyclohexanediamino-N,N'-bis(3,5-di-<i>t</i>-butylsalicylidene), 98% (S,S)-Jacobsen Ligand (135616-36-3)	1g 5g
C ₃₆ H ₅₄ N ₂ O ₂ ; FW: 546.84; yellow powdr.; m.p. 205-207°		

Technical Note:

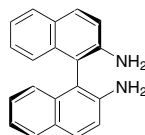
- See 07-0316 (page 40)

07-0325	Deuterioporphyrin IX, dimethyl ester, min. 97% (10589-94-3)	10mg 50mg
C ₃₂ H ₃₄ N ₄ O ₄ ; FW: 538.65; purple xtl.; m.p. 227°		



07-0326	racemic-2,2'-Diamino-1,1'-binaphthyl, min. 96% (4488-22-6)	1g 5g
C ₂₀ H ₁₆ N ₂ ; FW: 284.36; white to off-white xtl.; m.p. 242-244°		

07-0327	(R)-(+)-2,2'-Diamino-1,1'-binaphthyl, 99% (18741-85-0)	250mg 1g
C ₂₀ H ₁₆ N ₂ ; FW: 284.36; white to off-white xtl.; m.p. 242-244°		

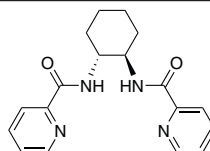


07-0328	(S)-(-)-2,2'-Diamino-1,1'-binaphthyl, 99% (18531-95-8)	250mg 1g
C ₂₀ H ₁₆ N ₂ ; FW: 284.36; white to off-white xtl.; m.p. 242-244°		

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

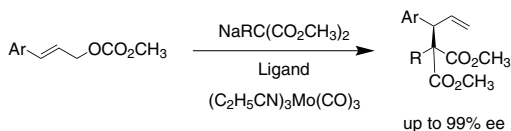
07-0335 HAZ	(1S,2S)-(+)-1,2-Diaminocyclohexane, 99% (S,S)-DACH (21436-03-3)	1g 5g
C ₆ H ₁₄ N ₂ ; FW: 114.19; white powdr.; m.p. 38-40°; b.p. 65°/5 mm; f.p. 169°F <i>air sensitive, light sensitive, (store cold)</i>		

07-0340	(-)-N,N'-(1R,2R)-1,2-Diaminocyclohexanediyl-bis(2-pyridinecarboxamide), min. 98% (R,R)-DACH-Pyridyl Trost Ligand (218290-24-5)	1g 5g
C ₁₈ H ₂₀ N ₄ O ₂ ; FW: 324.38; off-white powdr.; m.p. 170°		

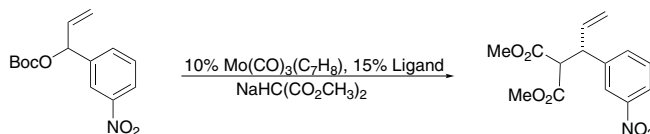


Technical Notes:

- 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.



Tech. Note (1)



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

References:

- J. Am. Chem. Soc.*, **1998**, *120*, 1104
- J. Am. Chem. Soc.*, **2002**, *124*, 14320
- J. Am. Chem. Soc.*, **2002**, *124*, 7256
- For a review, see *e-Encyclopedia or Reagents for Organic Synthesis*, "(+)-N,N'-(1S,2S)-1,2-Diaminocyclohexanediylbis(2-pyridinecarboxamide)", **2014**.

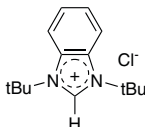
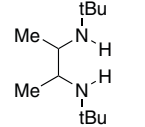
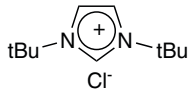
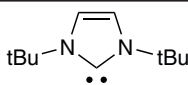
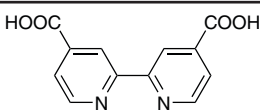
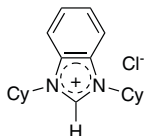
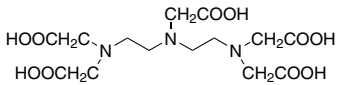
Other Ligands

NITROGEN (Compounds)

07-0341	(+)-N,N'-(1S,2S)-1,2-Diaminocyclohexanediylbis(2-pyridinecarboxamide), min. 98% (S,S)-DACH-Pyridyl Trost Ligand (172138-95-3) $C_{18}H_{20}N_4O_2$; FW: 324.38; off-white powdr.; m.p. 170°	1g 5g
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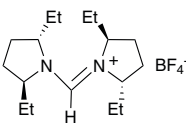
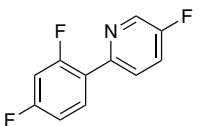
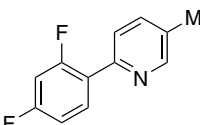
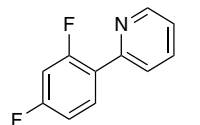
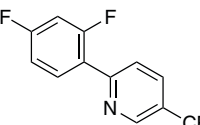
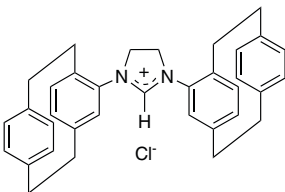
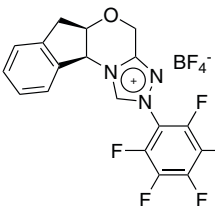
Technical Note:

- See 07-0340 (page 41)

07-4013	1,3-Di-t-butylbenzimidazolium chloride, min. 97% (946607-10-9) $C_{15}H_{23}ClN_2$; FW: 266.81; white to off-white solid <i>air sensitive</i>		500mg 2g
07-0385	N,N'-Di-t-butyl-2,3-diaminobutane, 98% (1167987-07-6) ($C_8H_{19}N_2$) $CH(CH_3)CH(CH_3)NH(C_4H_9)$; FW: 200.36; colorless, viscous liq.; b.p. 224-232°; f.p. 80-100°F; d. 0.82 <i>air sensitive</i>		500mg 2g
07-0368	1,3-Di-t-butylimidazolium chloride, min. 98% (157197-54-1) $[C_{11}H_{21}N_2]^+Cl^-$; FW: 216.75; white xtl. <i>air sensitive, hygroscopic</i> Note: NHC Ligand Kit 3: Variety of N-Heterocyclic Carbenes Kit component.		250mg
07-0333 HAZ	1,3-Di-t-butylimidazol-2-ylidene, min. 98% (157197-53-0) $C_{11}H_{20}N_2$; FW: 180.29; white xtl.; m.p. 71-72° <i>air sensitive, moisture sensitive, (store cold)</i> Note: NHC Ligand Kit 2: "Free" Carbenes Kit component.		250mg
07-0370	4,4'-Dicarboxy-2,2'-bipyridine, 98% (6813-38-3) $C_{12}H_8N_2O_4$; FW: 244.21; white powdr.		250mg 1g 5g
07-4015	1,3-Dicyclohexylbenzimidazolium chloride, min. 97% (1034449-15-4) $C_{19}H_{27}ClN_2$; FW: 318.88; white to off-white solid <i>air sensitive</i>		500mg 2g
07-0400 HAZ	Diethylenetriamine, min. 95% DIEN (111-40-0) $NH_2CH_2CH_2NHCH_2CH_2NH_2$; FW: 103.17; colorless liq.; m.p. -35°; b.p. 199-209°; f.p. 215°F; d. 0.955 <i>air sensitive</i>		100g 500g
07-0410	Diethylenetriaminepentaacetic acid, 97% DTPA (67-43-6) (HO_2CH_2) $_2N(CH_2)_2N(CH_2CO_2H)(CH_2)_2N(CH_2CO_2H)_2$; FW: 393.35; white xtl.; m.p. 220° dec.		250g 1kg
07-0398	Diethylenetriaminepentaacetic acid, 98.5% DTPA (USP) (67-43-6) (HO_2CCH_2) $_2N(CH_2)_2N(CH_2CO_2H)(CH_2)_2N(CH_2CO_2H)_2$; FW: 393.35; white xtl.; m.p. 220°		50g 250g
07-0412	Diethylenetriaminepentaacetic acid, 99% DTPA (67-43-6) (HO_2CCH_2) $_2N(CH_2)_2N(CH_2CO_2H)(CH_2)_2N(CH_2CO_2H)_2$; FW: 393.35; white xtl.; m.p. 220°		25g 100g

Other Ligands

NITROGEN (Compounds)

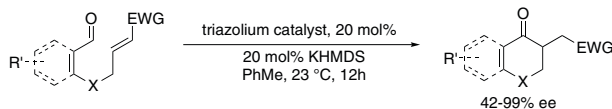
07-4024	(2R,5R)-1-[[[(2R,5R)-2,5-Diethylpyrrolidin-1-yl]methylene]-2,5-diethylpyrrolidinium tetrafluoroborate, min. 97% (1204324-20-8) $C_{17}H_{33}BF_4N_2$; FW: 352.26; yellow solid <i>air sensitive</i> Note: Sold under license from Kanata for research purposes only. WO2010/003226. NHC Ligand Kit 1: Chiral N-Heterocyclic Carbenes Kit component.		100mg 500mg
07-4025	(2S,5S)-1-[[[(2S,5S)-2,5-Diethylpyrrolidin-1-yl]methylene]-2,5-diethylpyrrolidinium tetrafluoroborate, min. 97% (1204324-18-4) $C_{17}H_{33}BF_4N_2$; FW: 352.26; yellow solid <i>air sensitive</i> Note: Sold under license from Kanata for research purposes only. WO2010/003226. NHC Ligand Kit 1: Chiral N-Heterocyclic Carbenes Kit component.		100mg 500mg
07-1415	2-(2,4-Difluorophenyl)-5-fluoropyridine, min 95% (1426047-01-9) $C_{11}H_6F_3N$; FW: 209.16; off-white solid <i>air sensitive</i> Note: Ligand for Photocatalyst Synthesis		1g 5g
07-1280	2-(2,4-Difluorophenyl)-5-methylpyridine, 95% (583052-21-5) $C_{12}H_9F_2N$; FW: 205.20; white solid <i>air sensitive</i> Note: Ligand for Photocatalyst Synthesis		500mg 2g
07-1420	2-(2,4-Difluorophenyl)pyridine, min. 97% (391604-55-0) $C_{11}H_7F_2N$; FW: 191.17; white solid <i>air sensitive</i> Note: Ligand for Photocatalyst Synthesis		1g 5g
07-4040	2-(2,4-Difluorophenyl)-5-(trifluoromethyl)pyridine, 98% dF(CF3)ppy (387827-64-7) $C_{12}H_6F_5N$; FW: 259.18; off-white microxtl.; m.p. 59.0-62.1°		250mg 1g
07-4018	(S)-4,5-Dihydro-1,3-bis-([2.2]paracyclophan-4-yl)imidazolinium chloride, min. 97% $C_{35}H_{35}ClN_2$; FW: 519.12; white to tan-colored solid <i>air sensitive</i>		100mg 500mg
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% (872143-57-2) $[C_{18}H_{11}F_9N_3O]^+BF_4^-$; FW: 467.10; light brown powdr.		250mg 1g

Technical Notes:

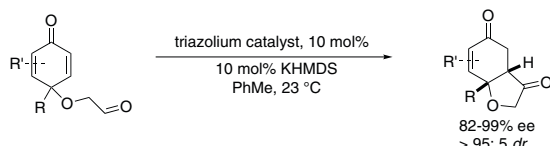
1. Reagent used in the highly enantio- and diastereoselective, catalytic intramolecular Stetter reaction.
2. Direct synthesis of α -protio and α -deuterio α -chloro and α -fluoro carboxylic acids via asymmetric hydration.
3. Chemoselective conversion of α -unbranched aldehydes to amides.

NITROGEN (Compounds)

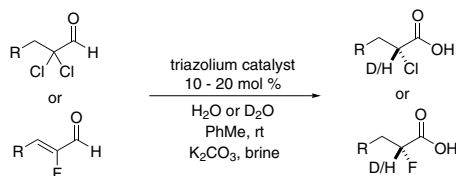
07-0415 (5aR,10bS)-(+)-5a,10b-Dihydro-2-(pentafluorophenyl)-4H,6H-indeno[2,1-b][1,2,4]triazolo[4,3-d][1,4]oxazinium tetrafluoroborate, min. 98% (872143-57-2)



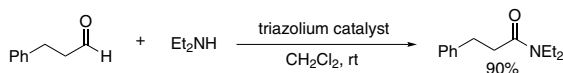
Tech. Note (1)
Ref. (1,3)



Tech. Note (1)
Ref. (2)



Tech. Note (2)
Ref. (4)



Tech. Note (3)
Ref. (5)

References:

1. *J. Org. Chem.*, **2008**, *73*, 2033
2. *J. Am. Chem. Soc.*, **2006**, *128*, 2552
3. *Org. Lett.*, **2008**, *10*, 3141
4. *J. Am. Chem. Soc.*, **2010**, *132*, 2860
5. *Chem. Commun.*, **2012**, *48*, 145
6. For a review, see *Acc. Chem. Res.*, **2011**, *44*, 1182

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% (740816-14-2)
[C₁₈H₁₁F₅N₃O]⁺BF₄⁻; FW: 467.10; light brown powdr.

100mg
500mg

Technical Note:

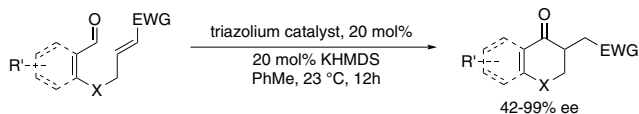
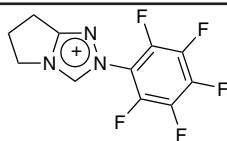
1. See 07-0415 (page 43)

07-0417 6,7-Dihydro-2-pentafluorophenyl-5H-pyrrolo[2,1-c]-1,2,4-triazolium tetrafluoroborate, min. 98% (862095-91-8)
[C₁₁H₇F₅N₃]⁺BF₄⁻; FW: 362.99; tan powdr.

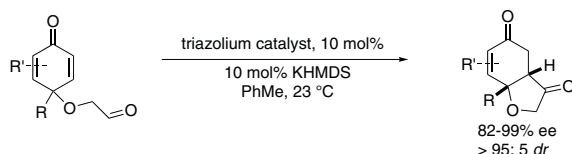
250mg
1g

Technical Notes:

1. Reagent used in the highly enantio- and diastereoselective, catalytic intramolecular Stetter reaction.
2. Enantioselective synthesis of β-hydroxy and β-amino esters.
3. Organocatalytic iminium ion/carbene reaction cascade for the formation of 2,4-disubstituted cyclopentenones.
4. Synthesis of allo- and epi-Inositol via the NHC-catalyzed carbocyclization of carbohydrate-derived dialdehydes.

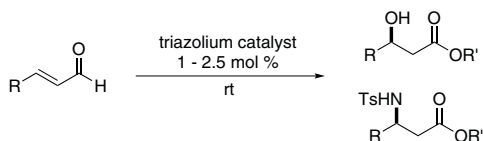
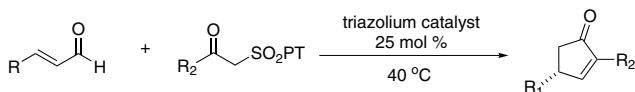
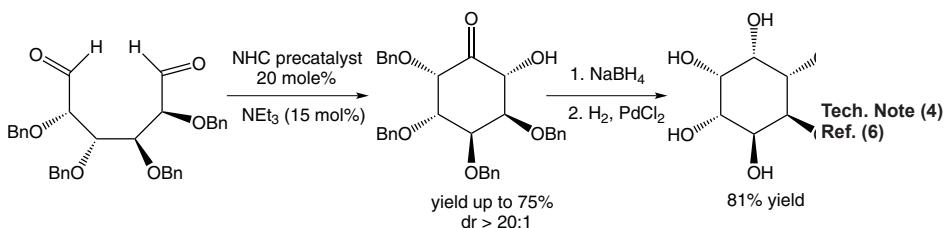


Tech. Note (1)
Ref. (1,3)



Tech. Note (1)
Ref. (2)

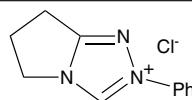
NITROGEN (Compounds)

07-0417
(continued)6,7-Dihydro-2-pentafluorophenyl-5H-pyrrolo[2,1-c]-1,2,4-triazolium tetrafluoroborate, min. 98%
(862095-91-8)Tech. Note (2)
Ref. (4)Tech. Note (3)
Ref. (5)Tech. Note (4)
Ref. (6)

References:

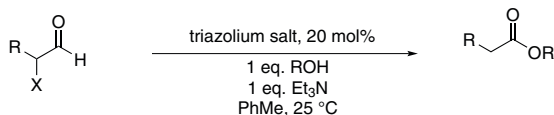
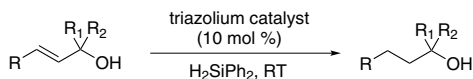
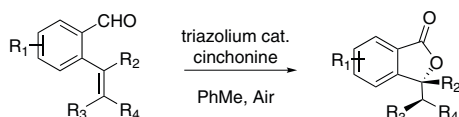
1. *J. Org. Chem.*, **2008**, *73*, 2033
2. *J. Am. Chem. Soc.*, **2006**, *128*, 2552
3. *Org. Lett.*, **2008**, *10*, 3141
4. *Org. Lett.*, **2010**, *12*, 5052
5. *Org. Lett.*, **2011**, *13*, 4790
6. *J. Org. Chem.*, **2014**, *79*, 5088

07-0421

6,7-Dihydro-2-phenyl-5H-pyrrolo[2,1-c]-1,2,4-triazolium chloride, min. 98% (828914-68-7)
[C₁₁H₁₂N₃⁺Cl⁻; FW: 221.69; off-white powd.250mg
1g

Technical Notes:

1. Reagent used for the conversion of α-haloaldehydes into acylating agents via a catalyzed internal redox reaction.
2. Reagent used for reduction of styryl and propargylic alcohols.
3. Catalyst for the synthesis of 3-substituted phthalides.

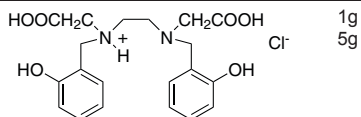
Tech. Note (1)
Ref. (1)Tech. Note (2)
Ref. (2)Tech. Note (3)
Ref. (3)

References:

1. *J. Am. Chem. Soc.*, **2004**, *126*, 9518.
2. *Chem. Eur. J.*, **2011**, *17*, 9911.
3. *Org. Lett.*, **2014**, *16*, 1028.

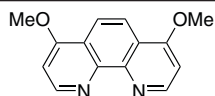
NITROGEN (Compounds)

07-0422 **N,N'-Di(2-hydroxybenzyl)ethylenediamine-N,N'-diacetic acid monohydrochloride hydrate HBED**
(35369-53-0)
 $C_{20}H_{24}N_2O_6 \cdot HCl \cdot xH_2O$; FW: 424.89;
off-white powdr.; m.p. 130-134°



1g
5g

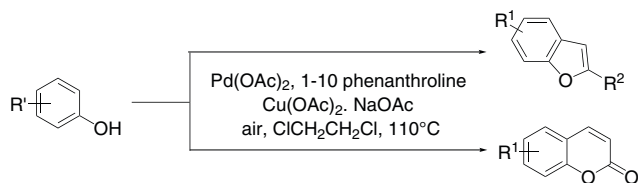
07-1923 **4,7-Dimethoxy-1,10-phenanthroline, 98%**
HAZ
(92149-07-0)
 $C_{14}H_{10}N_2O_2$; FW: 238.24; white to off-white powdr.;
m.p. 210-212°; d. 1.25
air sensitive
Note: Ligand for Photocatalyst Synthesis



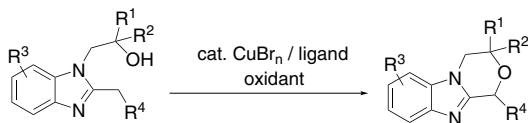
250mg
1g

Technical Notes:

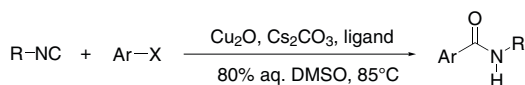
1. Palladium-catalyzed synthesis of benzofurans and coumarins from phenols and olefins.
2. Copper-catalyzed benzylic C(sp³)-H alkoxylation of heterocyclic compounds.
3. Synthesis of amides via copper-catalyzed amidation of aryl halides using isocyanides.
4. Iridium-catalyzed silylation of aryl C-H bonds.
5. Palladium-catalyzed intramolecular cyclization of nitroalkenes: synthesis of thienopyrroles.
6. A Copper-catalyzed N-alkynylation route to 2-substituted N-alkynyl pyrroles and their cyclization into pyrrolo[2,1-c]oxazin-1-ones



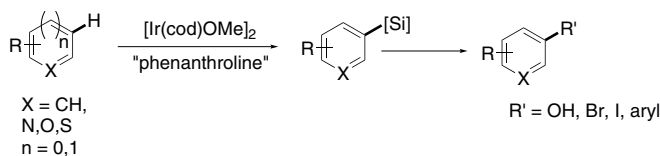
Tech. Note (1)
Ref. (1)



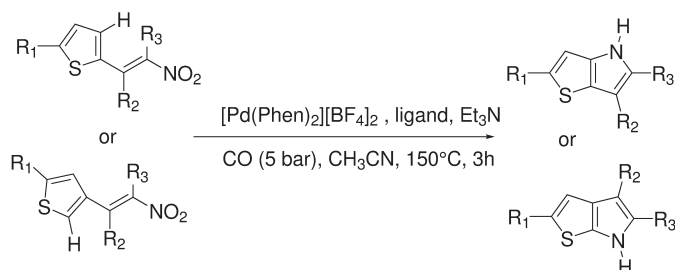
Tech. Note (2)
Ref. (2)



Tech. Note (3)
Ref. (3)



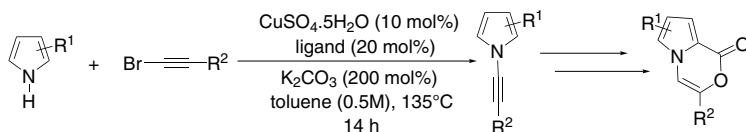
Tech. Note (4)
Ref. (4)



Tech. Note (5)
Ref. (5)

NITROGEN (Compounds)

07-1923 4,7-Dimethoxy-1,10-phenanthroline, 98% (92149-07-0)
(continued)

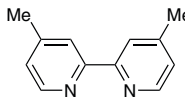


Tech. Note (6)
Ref. (6)

References:

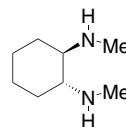
1. *Angew. Chem. Int. Ed.*, **2013**, 52, 12669.
2. *Organic & Biomolecular Chemistry*, **2014**, 12, 2528.
3. *Tetrahedron Letts.*, **2014**, 55, 4981.
4. *J. Am. Chem. Soc.*, **2015**, 137, 592.
5. *European Journal of Organic Chemistry*, **2017**, 2017(14), 1902.
6. *Synthesis*, **2017**, 49, 2544.

07-0458 4,4'-Dimethyl-2,2'-bipyridine, 99% DMBPY (1134-35-6)
C₁₂H₁₂N₂; FW: 184.24; white to off-white powd.



1g
5g
25g

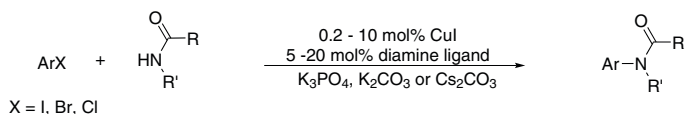
07-0270 trans-N,N'-Dimethyl-1,2-cyclohexanediamine, 98%
(67579-81-1)
C₈H₁₆(NHCH₃)₂; FW: 142.24; colorless to pale yellow liq.;
m.p. 4°
air sensitive



500mg
2g
10g

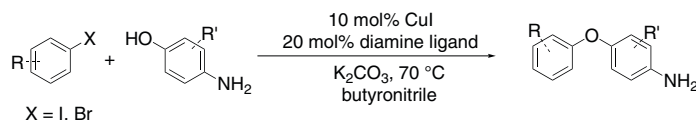
Technical Notes:

1. Ligand used with CuI to form a general and highly efficient catalyst for the N-arylation 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.
4. Ligand used for the N-arylation of primary sulfonamides.
5. Ligand used for the Cu-catalyzed chloride/iodide and bromide/iodide exchange of aryl halides.



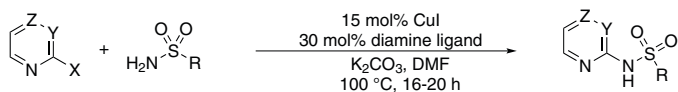
Tech. Note (1)
Ref. (1,2)

X = I, Br, Cl



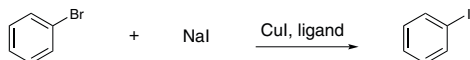
Tech. Note (3)
Ref. (3)

X = I, Br



Tech. Note (4)
Ref. (4)

X = I, Br



Tech. Note (5)
Ref. (6)

References:

1. *Org. Lett.*, **2007**, 9, 4749
2. *J. Am. Chem. Soc.*, **2008**, 130, 9613
3. *J. Am. Chem. Soc.*, **2009**, 131, 17423
4. *Org. Lett.*, **2010**, 12, 1532
5. *Organometallics*, **2011**, 30, 4067
6. *J. Am. Chem. Soc.*, **2002**, 124, 14844

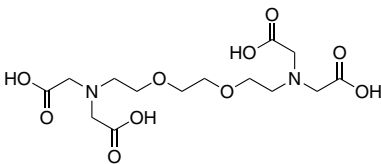
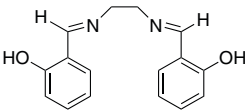
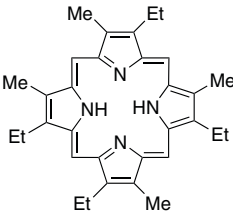
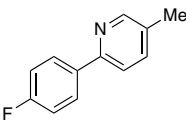
Other Ligands

NITROGEN (Compounds)

07-0445 HAZ	N,N'-Dimethylethylenediamine, min. 98% (110-70-3) <chem>CH3NHCH2CH2NHCH3</chem> ; FW: 88.15; colorless liq.; b.p. 119°; d. 0.819 <i>air sensitive</i>	5g 25g 100g
07-4035	1,3-Dimethylimidazol-2-ylidene borane, min. 97% (1211417-77-4) <chem>C9H11BN2</chem> ; FW: 109.97; white solid <i>moisture sensitive</i>	250mg 1g
07-0377	N-{3-[(2,6-Dimethylphenyl)amino]-1-methyl-2-buten-1-ylidene}-2,6-dimethylbenzenamine, 98% (267431-79-8) <chem>C21H26N2</chem> ; FW: 306.45; light-brown solid	250mg 1g
07-3515	N1,N1-Dimethyl-N2-[2-(phenylthio)ethyl]ethane-1,2-diamine (1179900-47-0) <chem>C12H20N2S</chem> ; FW: 224.37; Clear yellow liq. <i>air sensitive, moisture sensitive</i> Note: U.S. Patent: PCT/US2015/034793.	100mg
Technical Note: 1. See 07-3500 (page 53)		
07-0474	(1R,2R)-(+)-1,2-Diphenylethylenediamine, min. 97% (R,R)-DPEN (35132-20-8) <chem>(C6H5)(NH2)CHCH(NH2)(C6H5)</chem> ; FW: 212.29; white to pale yellow xtl.; m.p. 85-87°	500mg 2g 10g
07-0475	(1S,2S)-(-)-1,2-Diphenylethylenediamine, min. 97% (S,S)-DPEN (29841-69-8) <chem>(C6H5)(NH2)CHCH(NH2)(C6H5)</chem> ; FW: 212.29; white to pale yellow xtl.; m.p. 85-87°	500mg 2g 10g
07-0472	4,7-Diphenyl-1,10-phenanthroline, 99% (Bathophenanthroline) (1662-01-7) <chem>C24H16N2</chem> ; FW: 332.40; off-white powdr.; m.p. 218°	250mg 1g 5g 25g
Technical Notes: 1. Bidentate ligand and reagent for determination of iron. 2. Ligand used in the copper-catalyzed protodecarboxylation of aromatic carboxylic acids.		
References: 1. <i>Adv. Synth. Cata.</i> , 2007 , 349, 2338		
07-4020	Di-i-propylaminomethylene(di-i-propyl)aminium tetra-fluoroborate, min. 97% (369405-27-6) <chem>C13H29BF4N2</chem> ; FW: 300.19; white solid <i>air sensitive</i>	500mg 2g
07-0485	1,3-Di-i-propylimidazolium chloride, min. 97% (139143-09-2) <chem>[C9H17N2]+Cl-</chem> ; FW: 188.70; white to off-white xtl. <i>air sensitive, hygroscopic</i>	1g 5g
07-4017	1-(2,6-Di-i-propylphenyl)-3-(2,4,6-trimethylphenyl)-4,5-dihydroimidazolium chloride, min. 97% (866926-59-2) <chem>C24H33ClN2</chem> ; FW: 384.99; white to pink solid <i>air sensitive</i>	500mg 2g
07-0510	1,3-Di-(4-pyridyl)propane, min. 97% (17252-51-6) <chem>C13H14N2</chem> ; FW: 198.26; light yellow xtl.	5g 25g 100g
96-3700	Enantiotech BIMA H Ligand Kit for Asymmetric Hydrogenation See page 77	

Other Ligands

NITROGEN (Compounds)

07-0610	Ethylene glycol-bis(2-aminoethyl)-N,N,N',N'-tetraacetic acid, 99% EGTA (67-42-5) $(\text{HOOCCH}_2)_2\text{N}(\text{CH}_2\text{CH}_2\text{O})_2\text{CH}_2\text{CH}_2\text{N}(\text{CH}_2\text{COOH})_2$; FW: 380.35; white xtl.		25g 100g
07-0540	Ethylenebis(salicylimine), 98% SALEN (94-93-9) $\text{HOC}_6\text{H}_4\text{CH}=\text{NCH}_2\text{CH}_2\text{N}=\text{CHC}_6\text{H}_4\text{OH}$; FW: 268.32; yellow xtl.; m.p. 122-125°		25g 100g
07-0570 HAZ	Ethylenediamine, 99% (107-15-3) $\text{NH}_2\text{CH}_2\text{CH}_2\text{NH}_2$; FW: 60.10; colorless to pale yellow liq.; m.p. 8.5°; b.p. 118°; f.p. 93°F; d. 0.899 <i>air sensitive</i>		250g 1kg
07-0573	Ethylenediaminetetraacetic acid, 99+% (60-00-4) $(\text{HO}_2\text{CCH}_2)_2\text{NCH}_2\text{CH}_2\text{N}(\text{CH}_2\text{CO}_2\text{H})_2$; FW: 292.24; white xtl.; m.p. 245° dec.		500g 2kg
07-0580	Ethylenediaminetetraacetic acid dipotassium salt dihydrate, 99% (25102-12-9) $(\text{HOOCCH}_2)_2\text{NCH}_2\text{CH}_2\text{N}(\text{CH}_2\text{COOK})_2 \cdot 2\text{H}_2\text{O}$; FW: 368.44 (404.47); white xtl.; m.p. 272° dec.		50g 250g
93-1103	Ethylenediaminetetraacetic acid, disodium salt, dihydrate, 99+% (6381-92-6) $(\text{HOOCCH}_2)_2\text{NCH}_2\text{CH}_2\text{N}(\text{CH}_2\text{COONa})_2 \cdot 2\text{H}_2\text{O}$; FW: 336.22 (372.24); white xtl.; m.p. 255°		250g 1kg
93-1104	Ethylenediaminetetraacetic acid, tetrasodium salt tetrahydrate, 99+% (64-02-8) $(\text{NaOOCCH}_2)_2\text{NCH}_2\text{CH}_2\text{N}(\text{CH}_2\text{COONa})_2 \cdot 4\text{H}_2\text{O}$; FW: 380.18 (452.23); white xtl.		500g 2kg
07-0585	Etioporphyrin III (26608-34-4) $\text{C}_{32}\text{H}_{38}\text{N}_4$; FW: 478.68; purple xtl.		50mg 250mg
07-1410 NEW	2-(4-Fluorophenyl)-5-methylpyridine, min. 97% (85237-65-6) $\text{C}_{12}\text{H}_{10}\text{FN}$; FW: 187.07; Off white powdr. <i>air sensitive</i> Note: Ligand for Photocatalyst Synthesis		1g 5g

NITROGEN (Compounds)

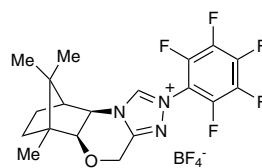
07-0970

(5a*S*,6*R*,9*S*,9a*R*)-5a,6,7,8,9,9a-Hexahydro-6,11,11-trimethyl-2-(2,3,4,5,6-pentafluorophenyl)-6,9-methano-4*H*-[1,2,4]triazolo[3,4-*c*][1,4]benzoxazinium tetrafluoroborate (1037287-81-2)

C₁₉H₁₉F₅N₃OBF₄; FW: 487.17; white powd.

hygroscopic

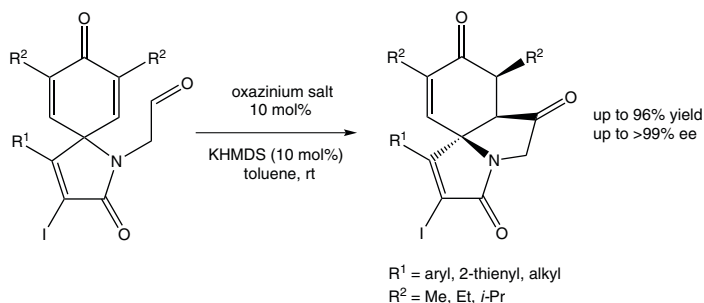
Note: Sold in collaboration with SIOC for research purposes only. Patent ZL200810033107.0.



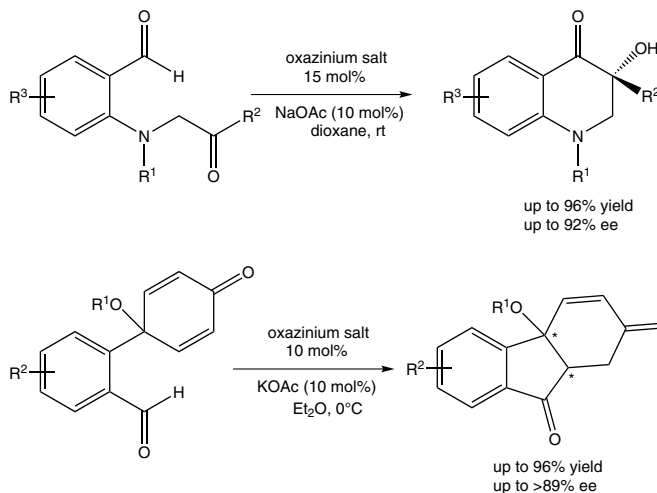
250mg
1g

Technical Notes:

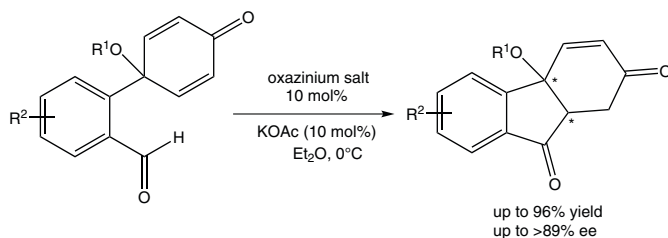
1. Chiral ligand used in the diastereoselective and enantioselective desymmetrization of α -substituted cyclohexadienones via an intramolecular Stetter reaction.
2. N-Heterocyclic, carbene-catalyzed, enantioselective intramolecular N-tethered aldehyde-ketone reactions.
3. Desymmetrization of cyclohexadienones via intramolecular Stetter reaction to construct tricyclic carbocycles.



Tech. Note (1)
Ref. (1)



Tech. Note (2)
Ref. (2)



Tech. Note (3)
Ref. (3)

References:

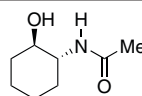
1. *J. Org. Chem.*, **2012**, 77, 10996
2. *ACS Catalysis*, **2013**, 3, 4, 622
3. *Synlett*, **2013**, 24(10), 1201.

07-0785

N-[(1*R*,2*R*)-2-Hydroxycyclohexyl]acetamide, min. 98% (214348-95-5)

C₈H₁₅NO₂; FW: 157.21; white to light-yellow powd.

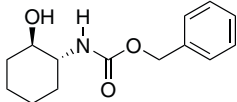
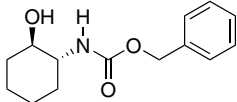
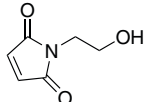
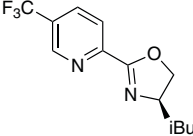
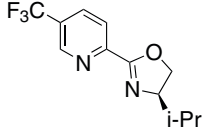
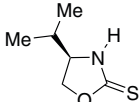
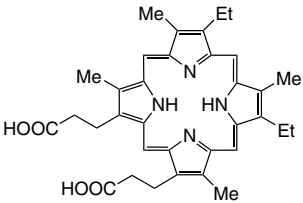
Note: Sold in collaboration with Daicel for research purposes only.



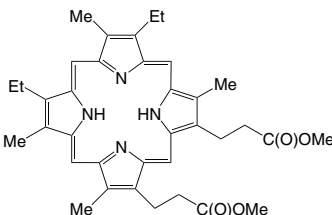
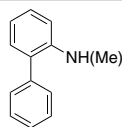
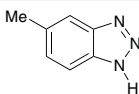
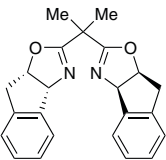
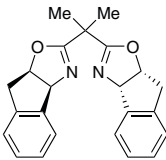
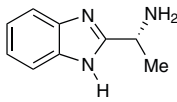
1g
5g

Other Ligands

NITROGEN (Compounds)

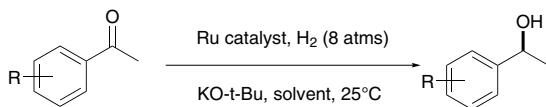
07-0786	N-[(1S,2S)-2-Hydroxycyclohexyl]acetamide, min. 98% (190848-36-3) C ₈ H ₁₅ NO ₂ ; FW: 157.21; white to light-yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		1g 5g
07-1005	[(1R,2R)-2-Hydroxycyclohexyl]carbamic Acid Phenylmethyl Ester, min. 98% (134108-76-2) C ₁₄ H ₁₉ NO ₃ ; FW: 249.31; white to light-yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		1g 5g
07-1006	[(1S,2S)-2-Hydroxycyclohexyl]carbamic Acid Phenylmethyl Ester, min. 98% (198422-64-9) C ₁₄ H ₁₉ NO ₃ ; FW: 249.31; white to light-yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		1g 5g
07-1010	N-(2-Hydroxyethyl)maleimide, 99% (1585-90-6) C ₆ H ₇ NO ₃ ; FW: 141.13; white powdr.		250mg 1g
07-1040 NEW	2-[(4R)-4-Isobutyl-4,5-dihydro-2-oxazolyl]-5-(trifluoromethyl)pyridine, 98%, (99% ee) C ₁₃ H ₁₅ F ₃ N ₂ O; FW: 272.30; white to yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		50mg
07-7058 NEW	2-[(4R)-4-Isopropyl-4,5-dihydro-2-oxazolyl]-5-(trifluoromethyl)pyridine, 98%, (99% ee) C ₁₂ H ₁₃ F ₃ N ₂ O; FW: 258.20; white to yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		100mg
07-0615	(R)-4-Isopropyl-2-oxazolidinethione, min. 98% (1217463-35-8) C ₆ H ₁₁ NOS; FW: 145.22; white to light-yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		500mg 2g
07-0616	(S)-4-Isopropyl-2-oxazolidinethione, min. 98% (104499-08-3) C ₆ H ₁₁ NOS; FW: 145.22; white to light-yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		500mg 2g
16-3025	1,3-(N-Mercaptoethylcarboxamide)benzene, 99% BDET (351994-94-0) See page 75		
07-1100	Mesoporphyrin IX dihydrochloride (68938-72-7) C ₃₄ H ₃₈ N ₄ O ₄ ·2HCl; FW: 639.62; purple xtl.		10mg 50mg

NITROGEN (Compounds)

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
07-1158	2-(N-Methylamino)-1,1'-biphenyl, min. 95% (14925-09-8) $C_{13}H_{13}N$; FW: 183.25; pale-yellow liq. <i>air sensitive</i>		250mg 1g 5g
07-1215	5-Methyl-1H-benzotriazole, 99% (136-85-6) $C_7H_7N_3$; FW: 133.15; white to off-white solid		25g 100g 500g
07-1035 NEW	(3aR,3'aR,8aS,8'aS)-2,2'-(1-Methylethylidene)bis[3a,8a-dihydro-8H-indeno[1,2-d]oxazole], 95%, (99% ee) (189623-45-8) $C_{23}H_{22}N_2O_2$; FW: 358.40; white to yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		100mg
07-1034 NEW	(3aS,3'aS,8aR,8'aR)-2,2'-(1-Methylethylidene)bis[3a,8a-dihydro-8H-indeno[1,2-d]oxazole], 98%, (99% ee) (175166-51-5) $C_{23}H_{22}N_2O_2$; FW: 358.40; white to yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		100mg
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; m.p. 188-190° <i>air sensitive</i> Note: Sold under license from EnantioTech for research purposes only. PCT/CN2008/073648, CN 200810038929. EnantioTech BIMAH Ligand Kit component.		250mg 1g

Technical Note:

- Efficient ruthenium catalyst for asymmetric hydrogenation of aryl ketones.



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

References:

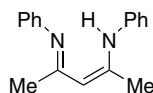
- Adv. Synth. Catal.*, **2011**, 353, 495
- Org. Lett.*, **2009**, 11, 907

Technical Note:

- See 07-1234 (page 52)

NITROGEN (Compounds)

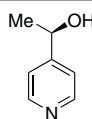
07-1655 **N-[1-Methyl-3-(phenylamino)-2-buten-1-ylidene]benzenamine, min. 98%** (19164-92-2)
C₁₇H₁₈N₂; FW: 250.34; pale yellow xtl.



1g
5g
25g

07-1160 **(R)-(+)-α-Methyl-4-pyridinemethanol, min. 98%** (27854-88-2)

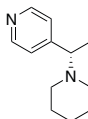
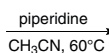
C₇H₉NO; FW: 123.15; white to light-yellow powdr.
Note: Sold in collaboration with Daicel for research purposes only.



50mg
100mg

Technical Notes:

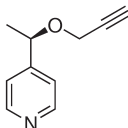
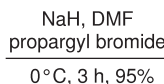
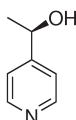
- Used for the synthesis of chiral 1-(4-pyridinyl)ethylamines
- Precursor for intermediates of highly stable chiral (A)6-B Supramolecular Copolymers



(S)-N-1-(4-pyridyl)ethylpiperidine

07-1160 (R)

Tech. Note (1)
Ref. (1)



Chiral Supramolecular Copolymer

Tech. Note (2)
Ref. (2)

References:

- J. Org. Chem.*, **2004**, 69, 6781
- J. Am. Chem. Soc.*, **2011**, 133, 11124

07-1161 **(S)-(-)-α-Methyl-4-pyridinemethanol, min. 98%** (54656-96-1)

C₇H₉NO; FW: 123.15; white to light-yellow powdr.
Note: Sold in collaboration with Daicel for research purposes only.

50mg
100mg

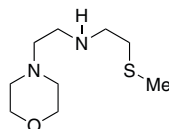
Technical Note:

- See 07-1160 (page 53)

07-3520 **2-(Methylthio)-N-(2-morpholinoethyl)ethan-1-amine**
(1342746-15-9)

C₉H₂₀N₂OS; FW: 204.33; clear colorless liq.
air sensitive, moisture sensitive
Note: U.S. Patent: PCT/US2015/034793.

100mg



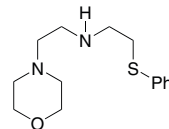
Technical Note:

- See 07-3500 (page 53)

07-3500 **2-Morpholino-N-[2-(phenylthio)ethyl]ethan-1-amine**
(1179894-18-8)

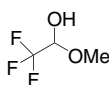
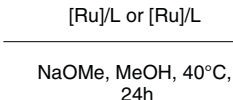
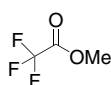
C₁₄H₂₂N₂OS; FW: 266.40; clear yellow liq.
air sensitive, moisture sensitive
Note: U.S. Patent: PCT/US2015/034793.

100mg

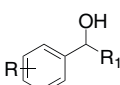
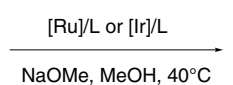
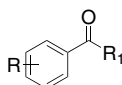


Technical Notes:

- Ligand for Ru or Ir-catalyzed hydrogenation of carbonyl functionalities.
- Ligand for Ru or Ir-catalyzed hydrogenation of select aromatic ketones.



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



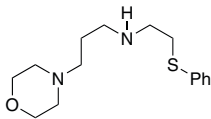
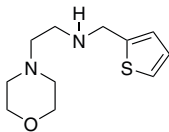
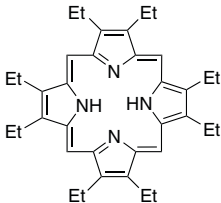
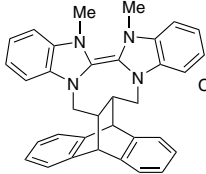
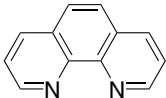
Tech. Note (2)
Ref. (1-3)

References:

- Organometallics* **2015**, 34, 4464.
- Patent No. WO 2015191505 A1 (2015).
- Patent No. US 20170088571 A1 (2017).

Other Ligands

NITROGEN (Compounds)

07-3505	3-Morpholino-N-(2-(phenylthio)ethyl)propan-1-amine (1500636-48-5) $C_{15}H_{24}N_2OS$; FW: 280.43; clear yellow liq. <i>air sensitive, moisture sensitive</i> Note: U.S. Patent: PCT/US2015/034793.		100mg
Technical Note: 1. See 07-3500 (page 53)			
07-3525	2-Morpholino-N-(thiophen-2-ylmethyl)ethan-1-amine (775293-39-5) $C_{11}H_{18}N_2OS$; FW: 226.34; Clear dark yellow liq. <i>air sensitive, moisture sensitive</i> Note: U.S. Patent: PCT/US2015/034793.		100mg
Technical Note: 1. See 07-3500 (page 53)			
96-3775	NHC Ligand Kit 4: Bis Carbenes See page 80		
96-3770	NHC Ligand Kit 3: Variety of N-Heterocyclic Carbenes See page 79		
96-3765	NHC Ligand Kit 2: "Free" Carbenes See page 78		
96-0397	Nitric Oxide Sensor (Extracellular) Kit ("NO-ON") (FL2A) (Cell-impermeable NO fluorescent probe) See page 81		
96-0293	Nitric Oxide Sensor (Intracellular) Kit ("NO-ON") (FL) (Cell-trappable NO fluorescent probe) See page 82		
96-0396	Nitric Oxide Sensor (Intracellular) Kit ("NO-ON") (FL2E) (Cell-trappable NO fluorescent probe) See page 83		
07-1550	Octaethylporphine, 97+% OEP (2683-82-1) $C_{36}H_{48}N_4$; FW: 534.78; purple xtl.		250mg 1g
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. <i>air sensitive</i> Note: Sold under license from UFRFI for research purposes only. Patent application PCT/US2008/054137. NHC Ligand Kit 4: Bis Carbenes Kit component.		100mg 500mg CF ₃ SO ₃ K adduct
07-1650 HAZ	1,10-Phenanthroline, anhydrous, 99% (66-71-7) $C_{12}H_8N_2$; FW: 180.21; white xtl.; m.p. 114-117°; b.p. >300° <i>hygroscopic</i>		5g 25g 100g

NITROGEN (Compounds)

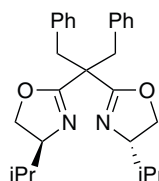
07-7105

NEW

(4*S*,4'*S*)-2,2'-[2-Phenyl-1-(phenylmethyl)ethylidene]bis[4-(1-methylethyl)-4,5-dihydrooxazole], 95%, (99% ee) (444575-98-8)

C₂₇H₃₄N₂O₂; FW: 418.60; white to yellow powdr.

Note: Sold in collaboration with Daicel for research purposes only.

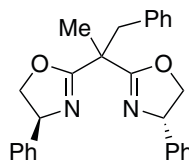


50mg

07-1219

(4*S*,4'*S*)-2,2'-[1-Phenylpropane-2,2-diyl]bis(4-phenyl-4,5-dihydrooxazole) (S)-BnPh-SaBOX (1404433-37-9)

C₂₇H₂₆N₂O₂; FW: 410.51; white solid

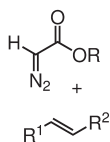


250mg

1g

Technical Note:

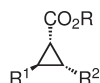
- Ligand used in the copper-catalyzed, highly diastereo- and enantioselective cyclopropanation of 1,2-disubstituted alkenes.



(*S*)-BnPh-SaBOX/CuOTf
(5 mol%)

CH₃CO₂/Bu, 30 °C, 4ÅMS

R = 2,6-Me₂C₆H₃



up to 99% yield
>99:1 trans/cis
98% ee

Tech. Note (1)
Ref. (1)

R¹ = aryl, R² = alkyl

catalyst loading can be lowered to 0.05 mol%

References:

- Angew. Chem. Int. Ed., 2012, 51, 8838

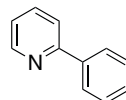
07-1780

2-Phenylpyridine, 95% (1008-89-5)

C₁₁H₉N; FW: 155.20; amber liquid; b.p. 268-270°; f.p. 230°; d. 1.086

air sensitive

Note: Ligand for Photocatalyst Synthesis



1g

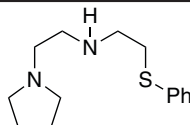
07-3510

2-(Phenylthio)-N-[2-(pyrrolidin-1-yl)ethyl]ethan-1-amine (1494801-76-1)

C₁₄H₂₂N₂S; FW: 250.40; clear yellow liq.

air sensitive, moisture sensitive

Note: U.S. Patent: PCT/US2015/034793.



100mg

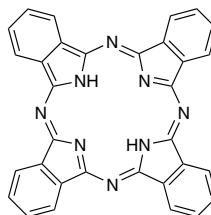
Technical Note:

- See 07-3500 (page 53)

07-1700

Phthalocyanine (574-93-6)

C₃₂H₁₈N₈; FW: 514.55; blue black powdr.



1g

5g

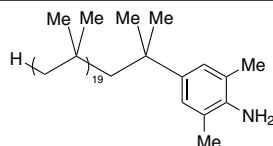
25g

07-6110

amp
HAZ

4-[Polyisobutyl(20)]-2,6-dimethylaniline (50% in heptane/polyisobutylene)

C₈₈H₁₇₁N; FW: 1243; pale yellow liq.

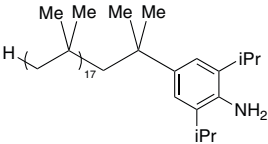
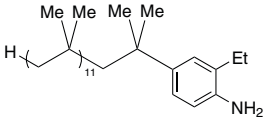
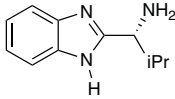
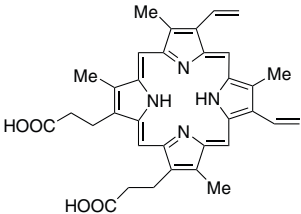
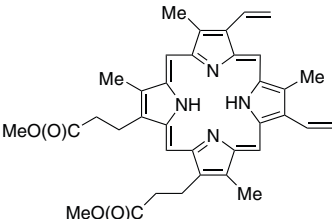
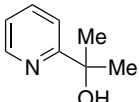


1g

5g

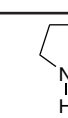
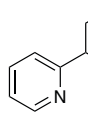
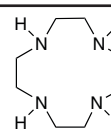
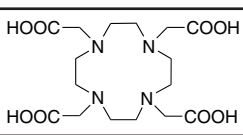
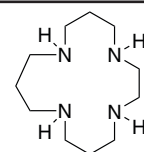
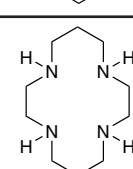
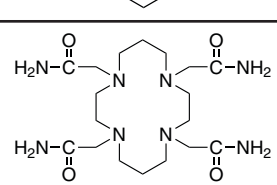
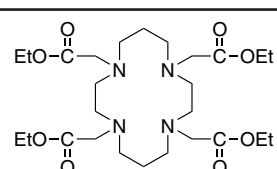
Other Ligands

NITROGEN (Compounds)

07-6120 amp HAZ	4-[Polyisobutyl(18)]-2,6-(di-<i>i</i>-propyl)aniline (50% in heptane/polyisobutylene) $C_{84}H_{163}N$; FW: 1187; yellow-orange liq.		1g 5g
07-6115 amp HAZ	4-[Polyisobutyl(12)]-2-ethylaniline (50% in heptane/polyisobutylene) $C_{96}H_{107}N$; FW: 794; red-orange liq.		1g 5g
06-1850	<i>i</i>-Propylisocyanide, min. 97% (598-45-8) See page 2		
07-1238	(R)-(+)-2-(α-(<i>i</i>-propyl)methanamine)-1H-benzimidazole, min. 98% (R)-<i>i</i>-Pr-BIMAH (1235024-08-4) $C_{11}H_{15}N_3$; FW: 189.26; white to off-white solid; m.p. 193-196° <i>air sensitive</i> Note: Sold under license from EnantioTech for research purposes only. PCT/CN2008/073648, CN 200810038929. EnantioTech BIMAH Ligand Kit component.		250mg 1g
Technical Note: 1. See 07-1234 (page 52)			
07-1236	(S)-(-)-2-(α-(<i>i</i>-propyl)methanamine)-1H-benzimidazole, min. 98% (S)-<i>i</i>-Pr-BIMAH (59653-66-6) $C_{11}H_{15}N_3$; FW: 189.26; white to off-white solid; m.p. 166-168° <i>air sensitive</i> Note: Sold under license from EnantioTech for research purposes only. PCT/CN2008/073648, CN 200810038929. EnantioTech BIMAH Ligand Kit component.		250mg 1g
Technical Note: 1. See 07-1234 (page 52)			
07-1820	Protoporphyrin IX (553-12-8) $C_{34}H_{34}N_4O_4$; FW: 562.67; purple powdr. <i>light sensitive</i>		250mg 1g
07-1850	Protoporphyrin IX, dimethyl ester (5522-66-7) $C_{36}H_{38}N_4O_4$; FW: 590.73; purple xtl.		100mg 500mg
07-3333	2-(Pyridine-2-yl)propan-2-ol, min. 95% pyalc (37988-38-8) $(C_5H_4N)C(CH_3)_2(OH)$; FW: 137.18; white xtl.		100mg 500mg 2g

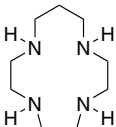
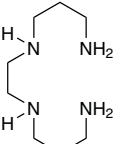
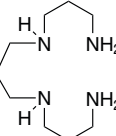
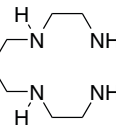
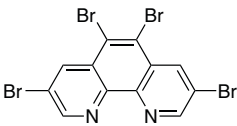
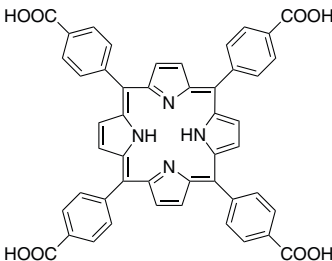
Other Ligands

NITROGEN (Compounds)

07-1885	Pyridinium trifluoromethanesulfonate, min. 97% (52193-54-1) [C ₅ H ₅ NH] ⁺ CF ₃ SO ₃ ⁻ ; FW: 229.18; white powdr.; m.p. 221-223°		5g 25g
Technical Note: 1. Catalytic amounts of pyridinium triflate in conjunction with silylbenzamide is a versatile reagent for the silylation of alcohols.			
07-1895	(R)-(-)-2-Pyrrolidinemethanol, 99% (D-Prolinol) (68832-13-3) C ₅ H ₁₁ NO; FW: 101.15; light-yellow, viscous liq.; b.p. 74-76° (2mm); d. 1.025 <i>air sensitive</i>		1g 5g 25g
07-1920	2,2':6',2''-Terpyridine, min. 98% TERPY (1148-79-4) C ₁₅ H ₄ NC ₅ H ₃ NC ₅ H ₄ N; FW: 233.27; off-white powdr.; m.p. 88-89°		1g 5g
07-1941	1,4,7,10-Tetraazacyclododecane, min. 98% CYCLEN (294-90-6) C ₈ H ₂₀ N ₄ ; FW: 172.28; white to off-white powdr. <i>hygroscopic</i>		1g 5g 25g
07-1942	1,4,7,10-Tetraazacyclododecane-N,N',N'',N'''-tetraacetic acid, min. 98% DOTA (60239-18-1) C ₁₆ H ₂₈ N ₄ O ₈ ; FW: 404.42; white powdr. Note: Ligand for MOF synthesis.		250mg 1g 5g
07-1955	1,4,8,12-Tetraazacyclopentadecane, min. 98% (15439-16-4) C ₁₁ H ₂₆ N ₄ ; FW: 214.35; white powdr.; m.p. 98-99° <i>hygroscopic</i>		250mg 1g
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 25g
07-1932	1,4,8,11-Tetraazacyclotetradecane-N,N',N'',N'''-tetraacetamide, min. 98% (345612-63-7) C ₁₈ H ₃₈ N ₈ O ₄ ; FW: 428.53; white to yellow powdr.		250mg 1g
07-1930	1,4,8,11-Tetraazacyclotetradecane-N,N',N'',N'''-tetraacetic acid, tetraethyl ester, min. 98% (126320-57-8) C ₂₆ H ₄₈ N ₄ O ₈ ; FW: 544.68; white to yellow powdr.		250mg 1g

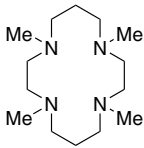
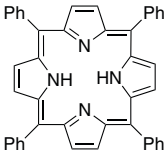
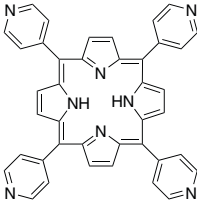
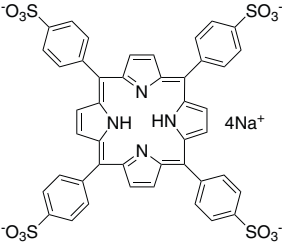
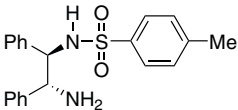
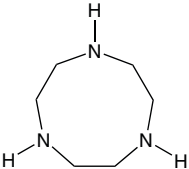
Other Ligands

NITROGEN (Compounds)

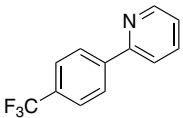
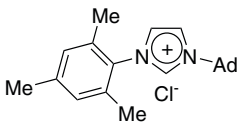
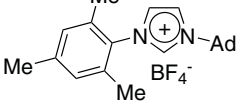
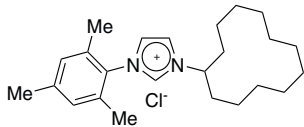
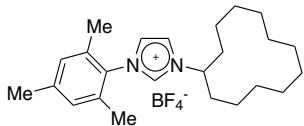
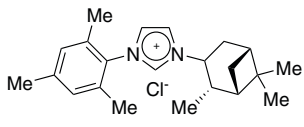
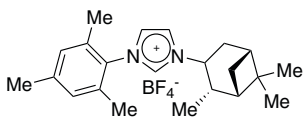
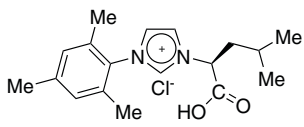
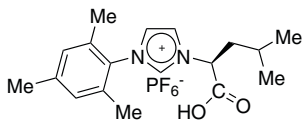
07-1934	1,4,7,10-Tetraazacyclotridecane, min. 98% (295-14-7) $C_9H_{22}N_4$; FW: 186.30; white to yellow powdr.		250mg 1g
07-1961 HAZ	1,5,8,12-Tetraazadodecane, min. 95% (10563-26-5) $C_8H_{22}N_4$; FW: 174.29; colorless to pale yellow liq.; b.p. 118°/0.2 mm; f.p. >230°F; d. 0.952 <i>air sensitive</i>		25g 100g 500g
07-1963 HAZ	1,5,9,13-Tetraazatridecane, min. 97% (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 <i>air sensitive</i>		1g 5g 25g
07-1965 HAZ	1,4,8,11-Tetraazaundecane, min. 97% (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 <i>air sensitive</i>		1g 5g 25g
07-1971	3,5,6,8-Tetrabromo-1,10-phenanthroline, 98% (66127-00-2) $C_{12}H_4Br_4N_2$; FW: 495.79; white powdr.		250mg 1g
Technical Note: 1. Ligand used in the nickel-catalyzed amination of aryl and heteroaryl chlorides.			
References:			
1. <i>J.Org.Chem.</i> , 2008 , 73, 1429			
07-1970	meso-Tetra(4-carboxyphenyl)porphine, 98% (14609-54-2) $C_{48}H_{30}N_4O_8$; FW: 790.79; purple powdr.		250mg 1g
07-1975 HAZ	Tetracyanoethylene, 98% (670-54-2) $(CN)_2C=C(CN)_2$; FW: 128.09; off-white xtl.; m.p. 197-199°		5g 25g
07-2000 HAZ	Tetraethylenepentamine, tech gr. (~50% linear, 41% branched, 5% triethylenetetramine, 4% polyethylene polyamines) TETRAEN (112-57-2) $HN(CH_2CH_2NHCH_2CH_2NH_2)_2$; FW: 189.31; colorless to yellow liq.; m.p. -40°; b.p. 340°; f.p. 365°F; d. 0.998 <i>air sensitive</i>		250g 1kg
07-2050 HAZ	N,N,N',N'-Tetramethylethylenediamine, 99% TMEDA (110-18-9) $(CH_3)_2NCH_2CH_2N(CH_3)_2$; FW: 116.21; colorless liq.; m.p. -55°; b.p. 120-122°; f.p. 68°F; d. 0.775		100g 500g

Other Ligands

NITROGEN (Compounds)

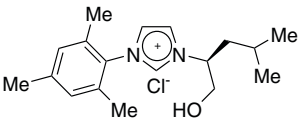
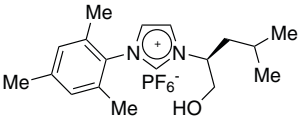
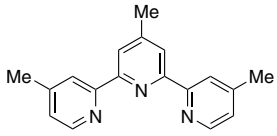
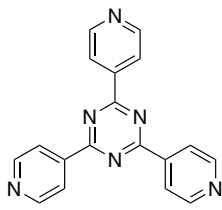
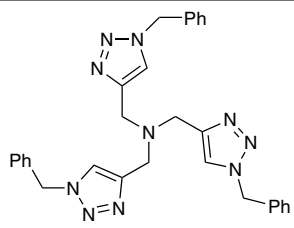
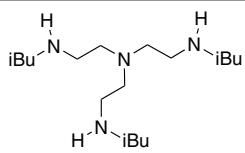
07-2112	1,4,8,11-Tetramethyl-1,4,8, 11-tetraazacyclotetradecane, 98% (41203-22-9) C ₁₄ H ₃₂ N ₄ ; FW: 256.43; white waxy xtl.; m.p. 34-36°; f.p. >230°F <i>moisture sensitive</i>		1g 5g
07-2160	meso-Tetraphenylporphine, min. 97% TPP (contains 1-3% chlorin) (917-23-7) C ₄₄ H ₃₀ N ₄ ; FW: 614.75; purple xtl.		2g 10g
07-2170	meso-Tetraphenylporphine TPP (chlorin free) (917-23-7) C ₄₄ H ₃₀ N ₄ ; FW: 614.75; violet xtl.		50mg 250mg
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 ₄ Na ₄ O ₁₂ S ₄ ·12H ₂ O; FW: 1022.87 (1239.11); purple powdr.		250mg 1g
07-2371	(1R,2R)-(-)-N-(4-toluenesulfonyl)-1,2-diphenylethylenediamine, 98% (R,R)-TsDPEN (144222-34-4) C ₂₁ H ₂₂ N ₂ O ₂ S; FW: 366.48; white xtl.; m.p. 127-129° Note: CATHy™ Catalyst Kit component.		500mg 2g 10g
07-2370	(1S,2S)-(+)-N-(4-toluenesulfonyl)-1,2-diphenylethylenediamine, 98% (S,S)-TsDPEN (167316-27-0) C ₂₁ H ₂₂ N ₂ O ₂ S; FW: 366.48; white xtl.; m.p. 127-129° Note: CATHy™ Catalyst Kit component.		500mg 2g 10g
07-2400	2,2',2''-Triaminotriethylamine, min. 98% TREN (4097-89-6) HAZ N(CH ₂ CH ₂ NH ₂) ₃ ; FW: 146.24; colorless to pale yellow liq.; b.p. 98-99°/1 mm; f.p. >230°F; d. 0.977 <i>air sensitive</i>		10g 50g 250g
07-2500	1,4,7-Triazacyclononane, 97% (4730-54-5) HAZ C ₆ H ₁₅ N ₃ ; FW: 129.20; white xtl.; f.p. 230°F		25mg 100mg

NITROGEN (Compounds)

07-2625	2-[4-(Trifluoromethyl)phenyl]pyridine, 95% (203065-88-7) $C_{12}H_8F_3N$; FW: 223.19; white to yellow solid <i>air sensitive</i> Note: Ligand for Photocatalyst Synthesis		1g
07-2660	1,2,3-Trimethylimidazolium methyl sulfate, 98% [TriMIM] [MeSO ₄] (65086-12-6) See page 2		
07-0542	1-(2,4,6-Trimethylphenyl)-3-(adamantyl)imidazolium chloride, min. 97% (1583244-07-8) $C_{22}H_{29}ClN_2$; FW: 356.94; white to off-white powdr. <i>hygroscopic</i>		250mg 1g
07-0545	1-(2,4,6-Trimethylphenyl)-3-(adamantyl)imidazolium tetrafluoroborate, min. 97% $C_{22}H_{29}BF_4N_2$; FW: 356.94; white to off-white powdr. <i>hygroscopic</i>		250mg 1g
07-0530	1-(2,4,6-Trimethylphenyl)-3-(cyclododecyl)imidazolium chloride, min. 97% $C_{24}H_{37}N_2Cl$; FW: 389.02; white to off-white powdr. <i>hygroscopic</i>		250mg 1g
07-0534	1-(2,4,6-Trimethylphenyl)-3-(cyclododecyl)imidazolium tetrafluoroborate, min. 97% (1583244-17-0) $C_{24}H_{37}BF_4N_2$; FW: 440.37; white to off-white powdr. <i>hygroscopic</i>		250mg 1g
07-0522	1-(2,4,6-Trimethylphenyl)-3-[(1R,2R,3R,5S)-(-)-isopinocampheyl]imidazolium chloride, min. 95% (1583244-12-5) $C_{27}H_{31}ClN_2$; FW: 358.95; white to off-white powdr. <i>hygroscopic</i>		100mg 500mg
07-0528	1-(2,4,6-Trimethylphenyl)-3-[(1R,2R,3R,5S)-(-)-isopinocampheyl]imidazolium tetrafluoroborate, min. 95% $C_{27}H_{31}BF_4N_2$; FW: 410.30; white to off-white powdr. <i>hygroscopic</i>		100mg 500mg
07-0640	1-(2,4,6-Trimethylphenyl)-3-[(2S)-4-methylpentanoic acid]imidazolium chloride, min. 95% $C_{18}H_{25}ClN_2O_2$; FW: 336.86; yellow solid <i>hygroscopic</i>		250mg 1g
07-0645	1-(2,4,6-Trimethylphenyl)-3-[(2S)-4-methylpentanoic acid]imidazolium hexafluorophosphate, min. 95% $C_{18}H_{25}F_6N_2PO_2$; FW: 446.37; yellow solid <i>hygroscopic</i>		250mg 1g

Other Ligands

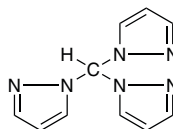
NITROGEN (Compounds)

07-0560	1-(2,4,6-Trimethylphenyl)-3-[(2S)-4-methyl-1-pentanol]imidazolium chloride, min. 97% C ₁₈ H ₂₇ ClN ₂ O; FW: 322.87; white to off-white powdr. <i>hygroscopic</i>		250mg 1g
07-0565	1-(2,4,6-Trimethylphenyl)-3-[(2S)-4-methyl-1-pentanol]imidazolium hexafluorophosphate, min. 97% C ₁₈ H ₂₇ F ₆ N ₂ OP; FW: 432.38; white to off-white powdr. <i>hygroscopic</i>		250mg 1g
07-2758	4,4',4''-Trimethyl-2,2':6'',2'''-terpyridine, 98% (33354-75-5) C ₁₈ H ₁₇ N ₃ ; FW: 275.35; white to off-white powdr.		500mg 2g
07-2750 amp	1,4,7-Trimethyl-1,4,7-triazacyclononane, min. 97% (96556-05-7) C ₉ H ₂₁ N ₃ ; FW: 171.28; pale yellow liq.; f.p. 155°F; d. 0.884 <i>moisture sensitive</i>		250mg 500mg 2g
07-3235	2,4,6-(Tri-4-pyridinyl)-1,3,5-triazine, min. 97% TPT (42333-78-8) C ₁₈ H ₁₂ N ₆ ; FW: 312.33; off-white powdr. Note: Ligand for MOF synthesis		250mg 1g 5g
07-3215	Tris[(1-benzyl-1H-1,2,3-triazol-4-yl)methyl]amine, 97% TBTA (510758-28-8) C ₃₀ H ₃₀ N ₁₀ ; FW: 530.63; white to off-white powdr. (store cold)		250mg 1g
07-3110	Tris(isobutylaminoethyl)amine, min 97% (331465-73-7) C ₁₈ H ₄₂ N ₄ ; FW: 314.55; colorless to pale yellow, viscous liq. <i>hygroscopic</i> Note: Ligand for MOF synthesis.		500mg 2g

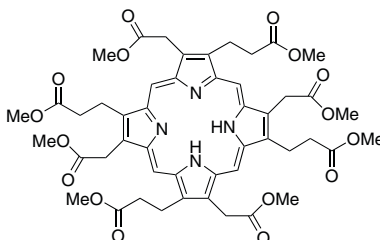
Other Ligands

NITROGEN (Compounds)

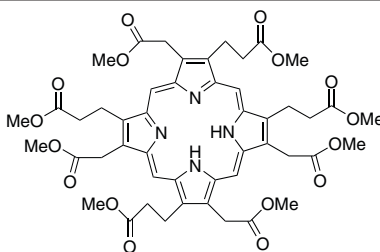
07-3200 **Tris(pyrazol-1-yl)methane, min. 98% (80510-03-8)** 250mg
 $C_{10}H_{10}N_6$; FW: 214.23; white powdr.; m.p. 103-104° 1g



07-3350 **Uroporphyrin I, octamethyl ester** 10mg
(10170-03-3)
 $C_{48}H_{54}N_4O_{16}$; FW: 942.98;
 rust colored powdr.; m.p. 291-292°

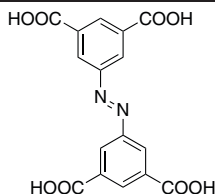


07-3410 **Uroporphyrin III, octamethyl ester** 5mg
(15435-60-6)
 $C_{48}H_{54}N_4O_{16}$; FW: 942.98;
 red to black powdr.

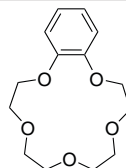


OXYGEN (Compounds)

08-0125 **3,3',5,5'-Azobenzene tetracarboxylic acid, TazbH₄, 97% (365549-33-3)** 1g
 $C_{16}H_{10}N_2O_8$; FW: 358.26; yellow-orange powdr. 5g
 Note: Ligand for MOF Synthesis



08-0150 **Benzo-15-crown-5, 97% (14098-44-3)** 1g
 $C_{14}H_{20}O_5$; FW: 268.31; white xtl.; m.p. 76-78° 5g
air sensitive



08-0999 **racemic-1,1'-Bi-2-naphthol, 99% rac-BINOL (602-09-5)** 5g
 $C_{20}H_{14}O_2$; FW: 286.32; white powdr.; m.p. 214-217° 25g

OXYGEN (Compounds)

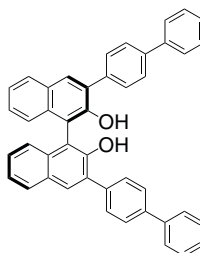
08-1090

NEW

(R)-3,3'-Bis([1,1'-biphenyl]-4-yl)-[1,1'-binaphthalene]-2,2'-diol, 98% (99% ee) (215433-52-6)

C₄₄H₃₀O₂; FW: 590.72; white to light yellow pwdr.

Note: Sold in collaboration with Daicel for research purposes only.



100mg

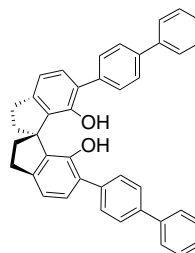
08-0460

NEW

(S)-6,6'-Bis([1,1'-biphenyl]-4-yl)-2,2',3,3'-tetrahydro-1,1'-spirobi[1H-indene]-7,7'-diol, 98% (99% ee) (1258327-00-2)

C₄₁H₃₂O₂; FW: 556.71; white to light yellow pwdr.

Note: Sold in collaboration with Daicel for research purposes only.



10mg

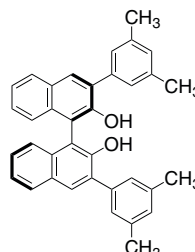
08-1040

NEW

(R)-3-3'-Bis[3,5-bis(methyl)phenyl]-1,1'-bi-2-naphthol, 98% (99% ee) (215433-51-5)

C₃₆H₃₀O₂; FW: 494.63; white to light yellow pwdr.

Note: Sold in collaboration with Daicel for research purposes only.



100mg

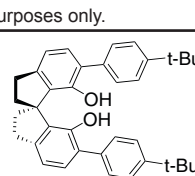
08-1041

NEW

(S)-3-3'-Bis[3,5-bis(methyl)phenyl]-1,1'-bi-2-naphthol, 98% (99% ee) (435327-17-6)

C₃₆H₃₀O₂; FW: 494.63; white to light yellow pwdr.

Note: Sold in collaboration with Daicel for research purposes only.



100mg

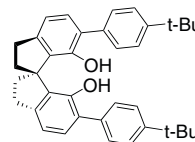
08-0441

NEW

(R)-6,6'-Bis4-(1,1-dimethylethyl)phenyl)-2,2',3,3'-tetrahydro-1,1'-spirobi[1H-indene]-7,7'-diol, 98% (99% ee)

C₃₇H₄₀O₂; FW: 516.73; white to light yellow pwdr.

Note: Sold in collaboration with Daicel for research purposes only.



50mg

08-0440

NEW

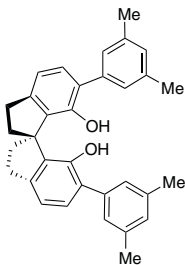
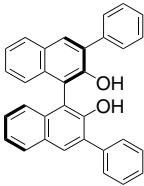
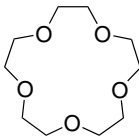
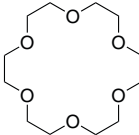
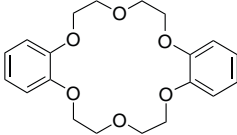
(S)-6,6'-Bis4-(1,1-dimethylethyl)phenyl)-2,2',3,3'-tetrahydro-1,1'-spirobi[1H-indene]-7,7'-diol, 98% (99% ee)

C₃₇H₄₀O₂; FW: 516.73; white to light yellow pwdr.

Note: Sold in collaboration with Daicel for research purposes only.

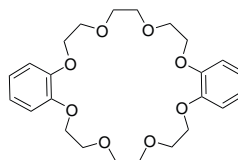
50mg

OXYGEN (Compounds)

08-0470	(R)-6,6'-Bis(3,5-dimethylphenyl)-2,2',3,3'-tetrahydro-1,1'-spirobi[1H-indene]-7,7'-diol, 98% (99% ee) (930784-56-8) C ₃₃ H ₃₂ O ₂ ; FW: 460.61; white to light-yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		50mg
08-0471	(S)-6,6'-Bis(3,5-dimethylphenyl)-2,2',3,3'-tetrahydro-1,1'-spirobi[1H-indene]-7,7'-diol, 98% (99% ee) C ₃₃ H ₃₂ O ₂ ; FW: 460.61; white to light-yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		50mg
08-1080	(S)-3,3'-Bis[4-(2-naphthalenyl)phenyl]-[1,1'-binaphthalene]-2,2'-diol, 95% (99% ee) (309934-87-0) C ₅₂ H ₃₄ O ₂ ; FW: 690.84; white to light yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		25mg
08-1030	(R)-3,3'-Bis(phenyl)-1,1'-bi-2-naphthol, 98% (99% ee) (75684-93-4) C ₃₂ H ₂₂ O ₂ ; FW: 438.53; white to light yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		100mg
08-1031	(S)-3,3'-Bis(phenyl)-1,1'-bi-2-naphthol, 98% (99% ee) (102490-05-1) C ₃₂ H ₂₂ O ₂ ; FW: 438.53; white to light yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		100mg
08-0201	(2S,3S)-(+)-2,3-Butanediol, min. 97% (19132-06-0) CH ₃ CH(OH)CH(OH)CH ₃ ; FW: 90.12; colorless liq.; b.p. 179-182°; f.p. 185°F; d. 0.987 hygroscopic		100mg 500mg
08-0198	(S)-(+)-1,3-Butanediol, 98+% (24621-61-2) CH ₃ CH(OH)CH ₂ CH ₂ OH; FW: 90.12; colorless liq.; f.p. 249°F; d. 1.005 hygroscopic		250mg 1g
08-0300	15-Crown-5, 98% (33100-27-5) C ₁₀ H ₂₀ O ₅ ; FW: 220.26; pale yellow liq.; b.p. 78°/0.05 mm; f.p. >230°F; d. 1.109 air sensitive		2g 10g
08-0320	18-Crown-6, 99% (17455-13-9) C ₁₂ H ₂₄ O ₆ ; FW: 264.32; white xtl.; m.p. 36-38°; f.p. >235°F air sensitive		10g 50g
08-0500	Dibenzo-18-crown-6, min. 98% (14187-32-7) C ₂₀ H ₂₄ O ₆ ; FW: 360.41; white powdr.; m.p. 162-164° air sensitive		10g 50g

OXYGEN (Compounds)

08-0510 **Dibenzo-24-crown-8, 98% (14174-09-5)**
 $C_{24}H_{32}O_8$; FW: 448.51; white xtl.; m.p. 103-104°
air sensitive



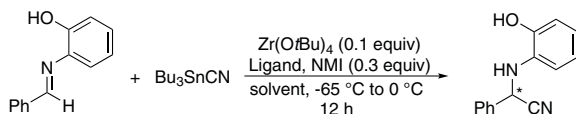
1g
5g

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

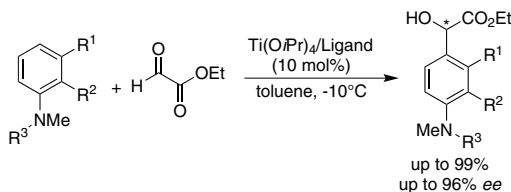
1g
5g

Technical Notes:

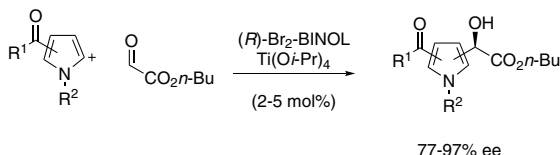
1. Ligand (enantiopure version) used to prepare a chiral zirconium catalyst useful in asymmetric Strecker and Mannich-type reactions.
2. Ligand (enantiopure version) used for titanium-catalyzed enantioselective Friedel-Crafts reactions.



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



Tech. Note (2)
Ref. (5-8)

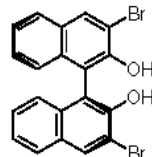


Tech. Note (2)
Ref. (9)

References:

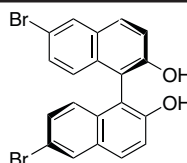
1. *J. Am. Chem. Soc.*, **2000**, 122, 762
2. *J. Am. Chem. Soc.*, **1997**, 119, 7153
3. *Angew. Chem. Int. Ed.*, **1998**, 37, 979
4. *J. Am. Chem. Soc.*, **1998**, 120, 431
5. *J. Org. Chem.*, **2004**, 69, 146
6. *Org. Lett.*, **2008**, 10, 2955
7. *Adv. Synth. Catal.*, **2009**, 351, 2433
8. *Org. Lett.*, **2009**, 11, 4636
9. *Org. Lett.*, **2011**, 13, 5944

08-0600 **(R)-(+)-3,3'-Dibromo-1,1'-bi-2-naphthol, min. 98%**
(111795-43-8)
 $C_{20}H_{12}Br_2O_2$; FW: 444.13; white powdr.; m.p. 254-258°



100mg
500mg

08-0605 **(R)-(-)-6,6'-Dibromo-1,1'-bi-2-naphthol, min. 98%**
(65283-60-5)
 $C_{20}H_{12}Br_2O_2$; FW: 444.13; white powdr.; m.p. 92-96°



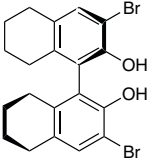
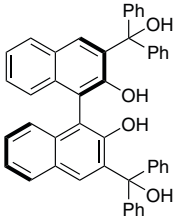
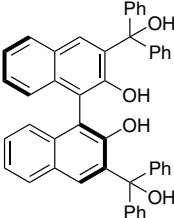
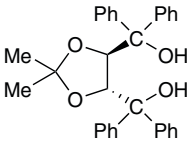
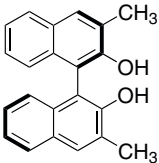
500mg
2g

Technical Notes:

1. See 08-0604 (page 65)

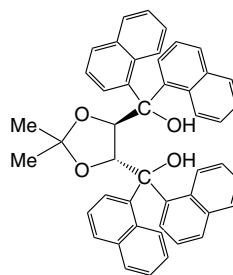
Other Ligands

OXYGEN (Compounds)

08-0601	(S)-(-)-3,3'-Dibromo-1,1'-bi-2-naphthol, min. 98% (119707-74-3) $C_{20}H_{12}Br_2O_2$; FW: 444.13; white powdr.; m.p. 257-262°	100mg 500mg
Technical Note: 1. See 08-0604 (page 65)		
08-0606	(S)-(-)-6,6'-Dibromo-1,1'-bi-2-naphthol, min. 98% (80655-81-8) $C_{20}H_{12}Br_2O_2$; FW: 444.13; white powdr.; m.p. 92-96°	500mg 2g
Technical Note: 1. See 08-0604 (page 65)		
08-0650	(R)-(+)-3,3'-Dibromo-5,5',6,6',7,7',8,8'-octahydro-1,1'-bi-2-naphthol, 99% (65355-08-0) $C_{20}H_{20}Br_2O_2$; FW: 452.20; off-white powdr.	250mg 1g
		
08-0651	(S)-(-)-3,3'-Dibromo-5,5',6,6',7,7',8,8'-octahydro-1,1'-bi-2-naphthol, 99% (765278-73-7) $C_{20}H_{20}Br_2O_2$; FW: 452.20; off-white powdr.	250mg 1g
08-2520 NEW	(R)-2,2'-Dihydroxy-$\alpha,\alpha,\alpha',\alpha'$-tetraphenyl-[1,1'-binaphthalene]-3,3'-dimethanol, 95% (99% ee) (336185-31-0) $C_{36}H_{34}O_4$; FW: 650.76; white to light-yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.	50mg
		
08-2521 NEW	(S)-2,2'-Dihydroxy-$\alpha,\alpha,\alpha',\alpha'$-tetraphenyl-[1,1'-binaphthalene]-3,3'-dimethanol, 98% (99% ee) (309269-73-6) $C_{36}H_{34}O_4$; FW: 650.76; white to light-yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.	50mg
		
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 powdr.; m.p. 193-195°	500mg 2g
		
08-1021 NEW	(1S)-3,3'-Dimethyl-[1,1'-binaphthalene]-2,2'-diol, 95% (99% ee) (55515-99-6) $C_{22}H_{18}O_2$; FW: 314.38; white to light yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.	100mg
08-1020 NEW	(1R)-3,3'-Dimethyl-[1,1'-binaphthalene]-2,2'-diol, 98% (99% ee) (55515-98-5) $C_{22}H_{18}O_2$; FW: 314.38; white to light yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.	100mg
		
08-2000	2,2-Dimethyl-3,5-hexanedione, min. 97% (7307-04-2) $(CH_3)_3CC(O)CH_2C(O)CH_3$; FW: 142.20; colorless liq.	1g 5g 25g

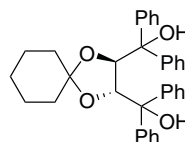
OXYGEN (Compounds)

08-2004 (4R,5R)-(-)-2,2-Dimethyl- $\alpha,\alpha,\alpha',\alpha'$ -tetra(1-naphthyl)-1,3-dioxolane-4,5-dimethanol, min. 97% (R,R)-1-Nph-TADDOL (137536-94-8)
C₄₇H₃₈O₄; FW: 666.82; white powdr.; m.p. 200° (dec.)



500mg
2g

08-0611 (2R,3R)-1,4-Dioxaspiro[4.5]decane-2,3-diylbis(diphenylmethanol), min. 98% (114026-76-5)
C₃₄H₃₄O₄; FW: 506.63; white to light-yellow powdr.
Note: Sold in collaboration with Daicel for research purposes only.

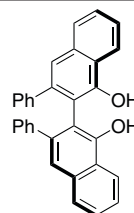


500mg
2g

08-0612 (2S,3S)-1,4-Dioxaspiro[4.5]decane-2,3-diylbis(diphenylmethanol), min. 98% (123287-35-4)
C₃₄H₃₄O₄; FW: 506.63; white to light-yellow powdr.
Note: Sold in collaboration with Daicel for research purposes only.

500mg
2g

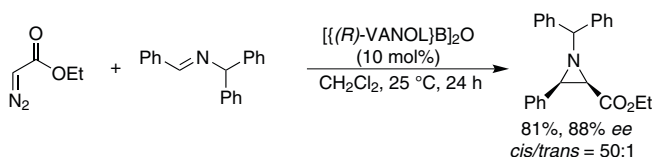
08-1700 (2R)-(+)-3,3'-Diphenyl-[2,2'-binaphthalene]-1,1'-diol, min. 98% (R)-VANOL (147702-13-4)
C₃₂H₂₂O₂; FW: 438.52; white to pale yellow powdr.



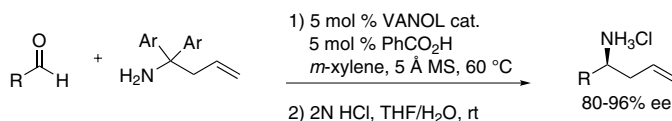
100mg
500mg

Technical Notes:

1. Chiral ligand used in catalytic asymmetric aziridination.
2. Chiral ligand used in catalytic asymmetric aminoallylation of aldehydes.



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



Tech. Note (2)
Ref. (5)

References:

1. *Chem. Eur. J.*, **2008**, *14*, 3785
2. *Org. Lett.*, **2010**, *12*, 4908
3. *J. Am. Chem. Soc.*, **2010**, *132*, 13100
4. *J. Am. Chem. Soc.*, **2011**, *133*, 8892
5. *J. Am. Chem. Soc.*, **2011**, *133*, 5656

08-1702 (2S)-(-)-3,3'-Diphenyl-[2,2'-binaphthalene]-1,1'-diol, min. 98% (S)-VANOL (147702-14-5)
C₃₂H₂₂O₂; FW: 438.52; white to pale yellow powdr.

100mg
500mg

Technical Note:

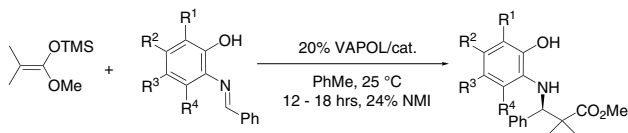
1. See 08-1700 (page 67)

OXYGEN (Compounds)

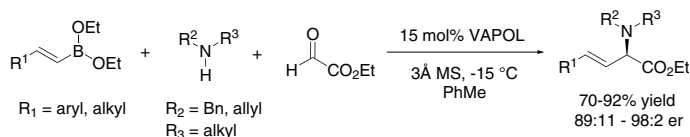
08-1704 (3R)-(-)-2,2'-Diphenyl-[3,3'-biphenanthrene]-4,4'-diol dichloromethane adduct, min. 98% (R)-VAPOL (147702-16-7) 100mg
500mg
 $C_{40}H_{26}O_2 \cdot \frac{1}{2}CH_2Cl_2$; FW: 538.63 (581.10); white to pale yellow powdr.

Technical Notes:

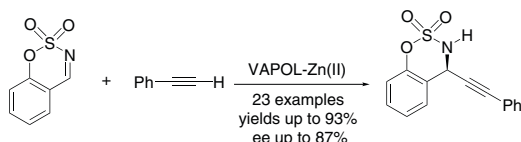
1. Development of a highly asymmetric and remarkably temperature-independent catalyst for the imino aldol reaction.
2. Asymmetric Petasis reactions catalyzed by chiral biphenols
3. Enantioselective alkynylation of benzo[e][1,2,3]-oxathiazine 2,2-dioxides catalysed by (R)-VAPOL-Zn complexes - synthesis of chiral propargylic cyclic sulfamides.
4. Chiral boron complex-promoted asymmetric Diels-Alder cycloaddition and its application in natural product synthesis.
5. Enantioselective addition of Et_2Zn to seven-membered cyclic imines catalyzed by a (R)-VAPOL-Zn(II) complex.
6. Catalyst-Controlled multicomponent - an aziridination of chiral aldehydes



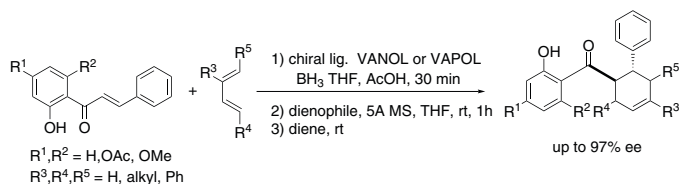
Tech. Note (1)
Ref. (1)



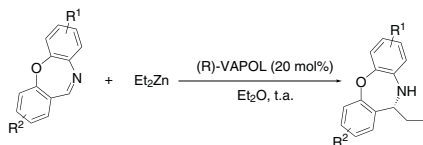
Tech. Note (2)
Ref. (2)



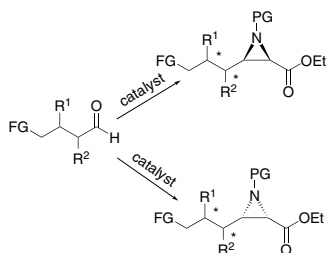
Tech. Note (3)
Ref. (3)



Tech. Note (4)
Ref. (4)



Tech. Note (5)
Ref. (5)



Tech. Note (6)
Ref. (6)

OXYGEN (Compounds)

08-1704 (3R)-(-)-2,2'-Diphenyl-[3,3'-biphenanthrene]-4,4'-diol dichloromethane adduct, min. 98%
(continued) (R)-VAPOL (147702-16-7)

References:

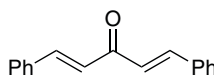
1. *Angew. Chem. Int. Ed.*, **2001**, 40, 2271
2. *J. Am. Chem. Soc.*, **2008**, 130, 6922
3. *Org. Biomol. Chem.*, **2015**, 13, 7393
4. *J. Org. Chem.*, **2016**, 13, 7393
5. *Tetrahedron Lett.*, **2017**, 58, 3358
6. *Chem. Eur. J.*, **2017**, 23, 2552.

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 · ½CH ₂ Cl ₂ ; FW: 538.63 (581.10); white to pale yellow powdr.	100mg 500mg
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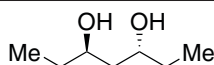
Technical Note:

1. See 08-1704 (page 68)

08-0625	1,5-Diphenyl-1,4-pentadien-3-one, min. 98% (Dibenzylideneacetone) (538-58-9) C ₁₇ H ₁₄ O; FW: 234.30; yellow solid	1g 5g
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08-2014	(3R,5R)-(-)-3,5-Heptanediol, 99% (77291-90-8) C ₇ H ₁₆ O ₂ ; FW: 132.20; colorless solid; m.p. 52°	250mg 1g
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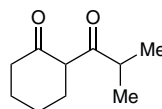
08-2015	(3S,5S)-(+)-3,5-Heptanediol, 99% (129212-21-1) C ₇ H ₁₆ O ₂ ; FW: 132.20; colorless solid; m.p. 52°	250mg 1g
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08-0750	Hexafluoroacetylacetone, min. 98% HFAA (1522-22-1) See page 2	
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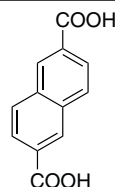
08-2024	(2R,5R)-(-)-2,5-Hexanediol, 99% (17299-07-9) CH ₃ CH(OH)CH ₂ CH ₂ CH(OH)CH ₃ ; FW: 118.18; colorless xtl.; m.p. 50-53°	500mg 2g
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08-2025	(2S,5S)-(+)-2,5-Hexanediol, 99% (34338-96-0) CH ₃ CH(OH)CH ₂ CH ₂ CH(OH)CH ₃ ; FW: 118.18; colorless xtl.; m.p. 50-53°	500mg 2g
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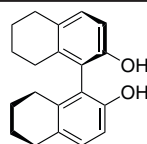
08-2029	2-Isobutyrylcyclohexanone, 96% (~96% enol form) (39207-65-3) C ₁₀ H ₁₆ O ₂ ; FW: 168.23; colorless liq.; m.p. 38°	1g 5g
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08-1235	2,6-Naphthalenedicarboxylic acid, min. 98% (1141-38-4) C ₁₀ H ₆ (COOH) ₂ ; FW: 216.19; white powdr.; m.p. >300° Note: Ligand for MOF synthesis.	5g 25g
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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 powdr.	250mg 1g
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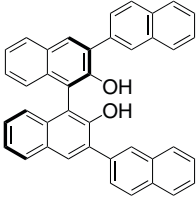
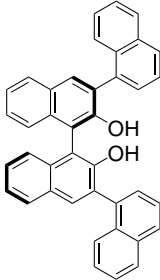
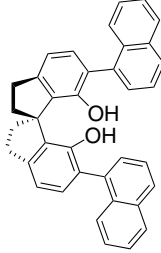
08-2036	(S)-(-)-5,5',6,6',7,7',8,8'-Octahydro-1,1'-bi-2-naphthol, 99% (65355-00-2) C ₂₀ H ₂₂ O ₂ ; FW: 294.40; off-white powdr.	250mg 1g
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19-1600	(R)-(-)-5,5',6,6',7,7',8,8'-Octahydro-3,3'-di-t-butyl-1,1'-bi-2-naphthol, dipotassium salt (350683-75-9) See page 73	
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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 page 74	
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Other Ligands

OXYGEN (Compounds)

08-2037	(3R,6R)-(-)-3,6-Octanediol, 99% (129619-37-0) $C_8H_{18}O_2$; FW: 146.23; colorless xtl.; m.p. 49-51°	250mg 1g
08-2038	(3S,6S)-(+)-3,6-Octanediol, 99% (136705-66-3) $C_8H_{18}O_2$; FW: 146.23; colorless xtl.; m.p. 49-51°	250mg 1g
08-2030	(2R,4R)-(-)-2,4-Pentanediol, 99% (42075-32-1) $C_5H_{12}O_2$; FW: 104.15; white xtl.; m.p. 48-50° <i>hygroscopic</i>	250mg 1g
08-2031	(2S,4S)-(+)-2,4-Pentanediol, 99% (72345-23-4) $C_5H_{12}O_2$; FW: 104.15; white xtl.; m.p. 48-50° <i>hygroscopic</i>	250mg 1g
08-2040	(S)-(+)-1,2-Propanediol, 99% (4254-15-3) $CH_3CH(OH)CH_2OH$; FW: 76.10; clear, viscous liq.; b.p. 77°/9mm; f.p. 225°F; d. 1.040	1g 5g
08-1060 NEW	(R)-[2,3':1',1'':3'',2'''-Quaternaphthalene]-2',2''-diol, 98% (99% ee) (215433-53-7) $C_{40}H_{26}O_2$; FW: 538.65; white to light yellow pwdr. Note: Sold in collaboration with Daicel for research purposes only.	100mg 
08-1070 NEW	(R)-[1,3':1',1'':3'',1''''-Quaternaphthalene]-2',2''-diol, 98% (99% ee) (851615-07-1) $C_{40}H_{26}O_2$; FW: 538.65; white to light yellow pwdr. Note: Sold in collaboration with Daicel for research purposes only.	100mg 
08-1061 NEW	(S)-[2,3':1',1'':3'',2''''-Quaternaphthalene]-2',2''-diol, 98% (99% ee) (863659-89-6) $C_{40}H_{26}O_2$; FW: 538.65; white to light yellow pwdr. Note: Sold in collaboration with Daicel for research purposes only.	100mg
08-1071 NEW	(S)-[1,3':1',1'':3'',1''''-Quaternaphthalene]-2',2''-diol, 98% (99% ee) (863659-88-5) $C_{40}H_{26}O_2$; FW: 538.65; white to light yellow pwdr. Note: Sold in collaboration with Daicel for research purposes only.	100mg
08-0450 NEW	(R)-2,2',3,3'-Tetrahydro-6,6'-di(1-naphthalenyl)-1,1'-spirobi[1H-indene]-7,7'-diol, 98% (99% ee) (1292849-40-1) $C_{38}H_{28}O_2$; FW: 504.63; white to light yellow pwdr. Note: Sold in collaboration with Daicel for research purposes only.	10mg 

OXYGEN (Compounds)

08-0451 NEW	(S)-2,2',3,3'-Tetrahydro-6,6'-di(1-naphthalenyl)-1,1'-spirobi[1H-indene]-7,7'-diol, 98% (99% ee) (1258327-02-4) C ₃₇ H ₂₈ O ₂ ; FW: 504.63; white to light yellow pwdr. Note: Sold in collaboration with Daicel for research purposes only.		10mg
08-8025 NEW	(R)-2,2',3,3'-Tetrahydro-6,6'-di-9-phenanthrenyl-1,1'-spirobi[1H-indene]-7,7'-diol, 98% (99% ee) (1372719-96-4) C ₄₅ H ₃₂ O ₂ ; FW: 604.73; white to light-yellow pwdr. Note: Sold in collaboration with Daicel for research purposes only.		10mg
08-8026 NEW	(S)-2,2',3,3'-Tetrahydro-6,6'-di-9-phenanthrenyl-1,1'-spirobi[1H-indene]-7,7'-diol, 98% (99% ee) C ₄₅ H ₃₂ O ₂ ; FW: 604.73; white to light-yellow pwdr. Note: Sold in collaboration with Daicel for research purposes only.		10mg
08-2066 NEW	(S)-2,2',3,3'-Tetrahydro-1,1'-spirobi[indene]-7,7'-diol, 98% (99% ee) (223259-63-0) C ₁₇ H ₁₆ O ₂ ; FW: 252.31; white to light yellow pwdr. Note: Sold in collaboration with Daicel for research purposes only.		250mg
08-2065	(R)-2,2',3,3'-Tetrahydro-1,1'-spirobi[indene]-7,7'-diol, 99% (223259-62-9) C ₁₇ H ₁₆ O ₂ ; FW: 252.31; white solid Note: Sold in collaboration with Daicel for research purposes only.		250mg 1g
08-2043	3,3',5,5'-Tetramethyl-2,2'-biphenol, 99% (26567-10-2) C ₁₆ H ₁₈ O ₂ ; FW: 242.31; white pwdr.; m.p. 134-136°		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 ₂ (101203-31-0) C ₂₄ H ₃₄ O ₂ ; FW: 354.54; white to off-white xtl.; m.p. 163-165°		5g 25g

Technical Notes:

1. Used as a ligand backbone for metathesis catalysts. (See 42-1212)
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.
5. Used as a ligand backbone for the ring-opening polymerization of cyclic esters.

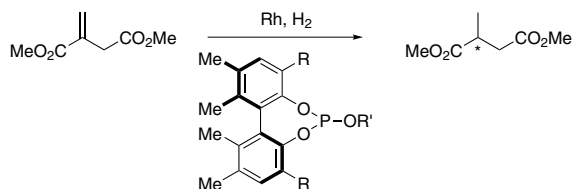
Technical Notes:

1. Used as a ligand backbone for metathesis catalysts. (See 42-1212)
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.
5. Used as a ligand backbone for the ring-opening polymerization of cyclic esters.

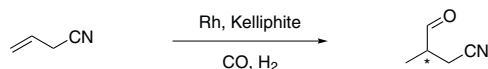
OXYGEN (Compounds)

08-2045
(continued)

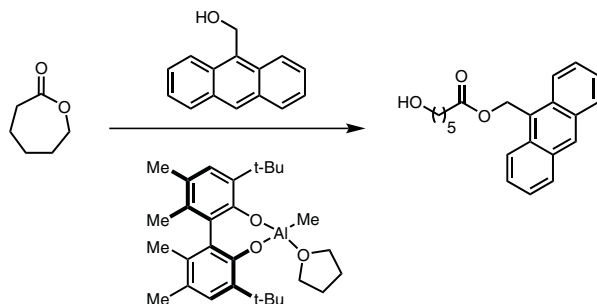
racemic-5,5',6,6'-Tetramethyl-3,3'-di- t-butyl-1,1'-biphenyl-2,2'-diol, 99% rac-BIPHEN H₂
(101203-31-0)



Tech. Note (2)
Ref. (1)



Tech. Note (3)
Ref. (2)



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

References:

1. *Org. Lett.*, **2003**, 5, 3831
2. *J. Org. Chem.*, **2004**, 69, 4031
3. *Angew. Chem. Int. Ed.*, **2009**, 48, 2379
4. *J. Polym. Sci. Pol. Chem.*, **2010**, 48, 3564
5. *J. Organomet. Chem.*, **2012**, 716, 175

08-2046 (R)-(+)-5,5',6,6'-Tetramethyl-3,3'-di-t-butyl-1,1'- biphenyl-2,2'-diol, 99%

(R)-BIPHEN H₂ (329735-68-4)

C₂₄H₃₄O₂; FW: 354.54; white pwdr.

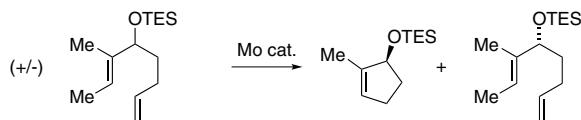
100mg

500mg

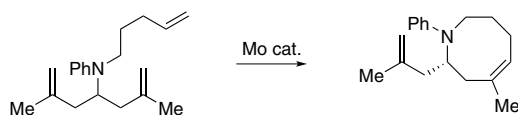
2g

Technical Note:

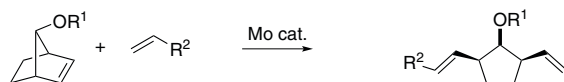
1. The new Schrock-Hoveyda, chiral molybdenum catalyst can effect various modes of enantioselective olefin metathesis with excellent selectivity.
 - (a) Kinetic resolution.
 - (b) Desymmetrization of tri- or tetraenes.
 - (c) Asymmetric Ring-Opening metathesis/Ring-Closing metathesis.



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



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



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

OXYGEN (Compounds)

08-2046 (R)-(-)-5,5',6,6'-Tetramethyl-3,3'-di-t-butyl-1,1'- biphenyl-2,2'-diol, 99% (R)-BIPHEN H₂
(continued) (329735-68-4)

References:

1. *J. Am. Chem. Soc.*, **1998**, 120, 4041
2. *J. Am. Chem. Soc.*, **2005**, 127, 8526
3. *Chem. Eur. J.*, **2001**, 7, 945, review
4. *Angew. Chem. Int. Ed.*, **2003**, 42, 4592, review
5. *J. Am. Chem. Soc.*, **1999**, 121, 11603
6. *J. Am. Chem. Soc.*, **2006**, 128, 5153
7. *Angew. Chem. Int. Ed.*, **2007**, 46, 4534

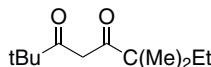
08-2047	(S)-(-)-5,5',6,6'-Tetramethyl-3,3'-di-t-butyl-1,1'- biphenyl-2,2'-diol, 99% (S)-BIPHEN H ₂ (205927-03-3) C ₂₄ H ₃₄ O ₂ ; FW: 354.54; white powdr.	100mg 500mg 2g
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Technical Note:

1. See 08-2046 (page 72)

08-2050	2,2,6,6-Tetramethylheptane-3,5-dione, 98% TMHD (1118-71-4) (CH ₃) ₃ CC(O)CH ₂ C(O)C(CH ₃) ₃ ; FW: 184.28; colorless to pale yellow liq. or low melting solid; b.p. 72-73°/6 mm; f.p. 153°; d. 0.883	5g 25g 100g
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08-2100	2,2,6,6-Tetramethyl-3,5-octanedione, 98% (TMOD) (78579-61-0) (CH ₃) ₃ CC(O)CH ₂ C(O)C(C ₂ H ₅)(CH ₃) ₂ ; FW: 198.31; colorless to pale yellow liq.	1g 5g
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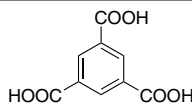
Technical Note:

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

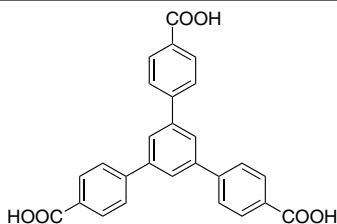
References:

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

08-0195	1,3,5-Tricarboxybenzene, min. 95% (Trimesic acid) BTC (554-95-0) C ₆ H ₃ (COOH) ₃ ; FW: 210.14; white powdr. Note: Ligand for MOF synthesis.	50g 250g
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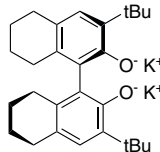


08-0635	1,3,5-Tris(4-carboxyphenyl)benzene, min. 98% BTB (50446-44-1) C ₂₇ H ₁₈ O ₆ ; FW: 438.43; white to yellow solid; m.p. 322-327° Note: Ligand for MOF synthesis.	1g 5g
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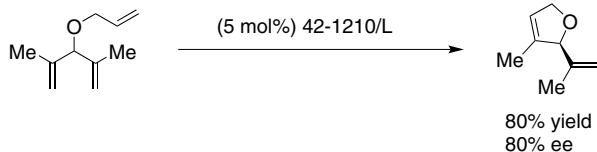
POTASSIUM (Compounds)

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 ₂ O ₂ ; FW: 482.80; cream-colored powdr. moisture sensitive	100mg 500mg
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Technical Note:

1. Ligand used in combination with for asymmetric ring closing and ring opening metathesis.

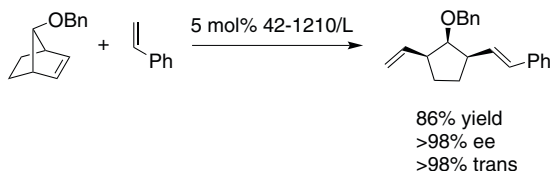


Tech. Note (1)
Ref. (1)

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
(continued) (350683-75-9)



Tech. Note (1)
Ref. (1)

References:

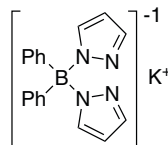
1. *Angew. Chem. Int. Ed.*, **2001**, 40, 8, 1452

19-1601	(S)-(+)-5,5',6,6',7,7',8,8'-Octahydro-3,3'-di- <i>t</i> -butyl-1,1'-bi-2-naphthol, dipotassium salt (821793-28-6) $C_{28}H_{38}K_2O_2$; FW: 482.80; cream-colored powdr. <i>moisture sensitive</i>	100mg 500mg
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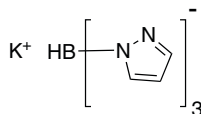
Technical Note:

1. See 19-1600 (page 73)

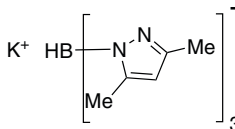
19-1700	Potassium diphenylbis(pyrazol-1-yl)borate, min. 98% (109088-11-1) $[C_{18}H_{16}BN_4]K$; FW: 338.26; white powdr.; m.p. 283-285°	250mg 1g
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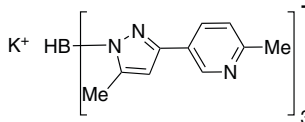
19-3600	Potassium hydrotris (pyrazol-1-yl)borate hydrate, 98% (18583-60-3) $[C_5H_4BN_3]K \cdot xH_2O$; FW: 252.13; white powdr.; m.p. 185-189°	1g 5g
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19-2900	Potassium hydrotris(3,5-dimethylpyrazol-1-yl)borate, 97% (184032-07-3) $[C_{15}H_{22}BN_3]K$; FW: 336.29; white powdr.; m.p. 298-300°	1g 5g
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19-3400	Potassium hydrotris (3-(6-methyl-3-pyridyl)-5-methylpyrazol-1-yl)borate, 97% (184032-07-3) $[C_{30}H_{31}BN_5]K$; FW: 567.54; white powdr.; m.p. 198°	250mg 1g
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SILICON (Compounds)

93-1402	3-Aminopropyltriethoxysilane, 98% (919-30-2) HAZ $H_2N(CH_2)_3Si(OC_2H_5)_3$; FW: 221.38; colorless liq.; b.p. 217°; f.p. 220°F; d. 0.943 <i>moisture sensitive</i>	100g 500g
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Note: Available prepacked in ALD cylinder- see 98-4036, 98-4037.

14-5023	(R)-3,3'-Bis(triphenylsilyl)-5,5',6,6',7,7',8,8'-octahydro-1,1'-bi-2,2'-naphthol, 98% (99% ee) (1041186-22-4) NEW $C_{96}H_{50}O_2Si_2$; FW: 811.17; white to light-yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.	50mg
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Other Ligands

SILICON (Compounds)

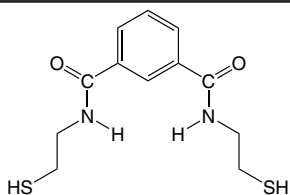
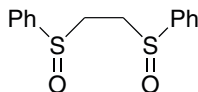
14-5024 NEW	(S)-3,3'-Bis(triphenylsilyl)-5,5',6,6',7,7',8,8'-octahydro-1,1'-bi-2,2'-naphthol, 98% (99% ee) $C_{56}H_{50}O_2Si_2$; FW: 811.17; white to light-yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.	50mg
14-1950	Dimethylbis(indenyl)silane, min. 98% (136946-83-3) $(CH_3)_2Si(C_9H_7)_2$; FW: 288.46; viscous yellow liq.	5g 25g
14-1445 HAZ	Silicon(IV) bromide, (99.99% Si) PURATREM (7789-66-4) $SiBr_4$; FW: 347.72; colorless liq.; m.p. 5.4°; b.p. 154°; d. 2.772 <i>moisture sensitive</i>	5g 25g
14-7950 HAZ	Trimethylsilylcyclopentadiene, 97% (mixture of isomers) (3559-74-8) $(C_5H_5)Si(CH_3)_3$; 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
14-8000 HAZ	Trimethylsilylpentamethylcyclopentadiene (87778-95-8) $[C_5(CH_3)_5]Si(CH_3)_3$; FW: 208.42; light yellow liq.; b.p. 100°/10 mm; d. 0.833 <i>moisture sensitive, (store cold)</i>	1g 5g

SODIUM (Compounds)

93-1075 HAZ	Sodium cyclopentadienide, 2-3M in THF (4984-82-1) C_5H_5Na ; FW: 88.09; yellow to red solution; f.p. 1°F (THF); d. 0.939 <i>air sensitive, moisture sensitive, (store cold)</i> Note: Free rubber septum included.	0.1mole 0.5mole
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SULFUR (Compounds)

07-3530	2-(Benzylthio)-N-(2-morpholinoethyl)ethan-1-amine (1799787-08-8) See page 7	
07-3535	3-(Benzylthio)-N-(2-morpholinoethyl)propan-1-amine (1799787-09-9) See page 7	
16-0350	1,2-Bis(phenylsulfinyl)ethane, 98% (6099-21-4) $C_{16}H_{14}O_2S_2$; FW: 278.39; white to off-white powdr. <i>(store cold)</i>	250mg 1g
07-3515	N1,N1-Dimethyl-N2-[2-(phenylthio)ethyl]ethane-1,2-diamine (1179900-47-0) See page 48	
16-3025	1,3-(N-Mercaptoethylcarboxamide)benzene, 99% BDET (351994-94-0) $C_{12}H_{16}N_2O_2S_2$; FW: 286.42; white solid; m.p. 132-135°	1g 5g



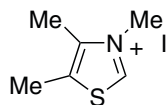
Technical Note:

- Ligand used in a variety of applications involving heavy-metal chelation and amelioration of acute heavy-metal toxicity.

07-3520	2-(Methylthio)-N-(2-morpholinoethyl)ethan-1-amine (1342746-15-9) See page 53	
07-3500	2-Morpholino-N-[2-(phenylthio)ethyl]ethan-1-amine (1179894-18-8) See page 53	
07-3505	3-Morpholino-N-(2-(phenylthio)ethyl)propan-1-amine (1500636-48-5) See page 54	
07-3525	2-Morpholino-N-(thiophen-2-ylmethyl)ethan-1-amine (775293-39-5) See page 54	
07-3510	2-(Phenylthio)-N-[2-(pyrrolidin-1-yl)ethyl]ethan-1-amine (1494801-76-1) See page 55	

SULFUR (Compounds)

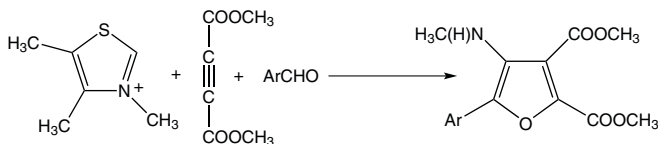
16-2230 **3,4,5-Trimethylthiazolium iodide, 99% (62993-85-5)**
 $C_6H_{10}INS$; FW: 255.12; white solid
moisture sensitive



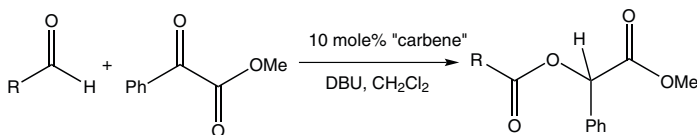
1g
5g

Technical Notes:

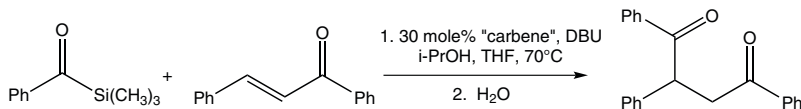
1. Reagent used for the synthesis of highly substituted 3-aminofurans.
2. N-Heterocyclic carbene precursor used for the catalytic hydroacylation of activated ketones.
3. N-Heterocyclic carbene precursor used for the catalytic addition of acylsilanes.



Tech. Note (1)
Ref. (1)



Tech. Note (2)
Ref. (2)



Tech. Note (3)
Ref. (3)

References:

1. *J. Org. Chem.*, **2005**, 70, 8919
2. *J. Am. Chem. Soc.*, **2006**, 128, 4558
3. *J. Org. Chem.*, **2006**, 71, 5715

Other Ligands

KITS - Enantiotech BIMA^H Ligand Kit for Asymmetric Hydrogenation

96-3700

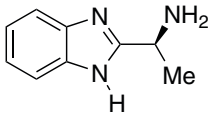
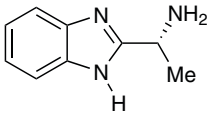
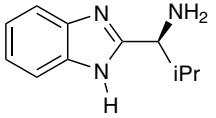
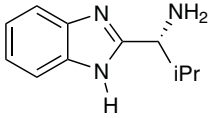
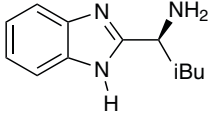
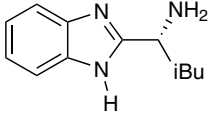
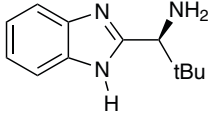
Enantiotech BIMA^H Ligand Kit for Asymmetric Hydrogenation

Sold under license from Enantiotech for research purposes only.

PCT/CN2008/073648, CN 200810038929.

Components also available for individual sale.

Contains the following:

 07-1232 250mg	 07-1234 250mg	 07-1236 250mg	 07-1238 250mg
 07-1240 250mg	 07-1242 100mg	 07-1245 100mg	

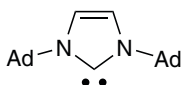
07-1232	(S)-(-)-2-(α-methylmethanamine)-1H-benzimidazole, min. 98% (S)-Me-BIMA ^H (925689-54-9)	250mg	See page 52
07-1234	(R)-(+)-2-(α-methylmethanamine)-1H-benzimidazole, min. 98% (R)-Me-BIMA ^H (163959-79-3)	250mg	See page 52
07-1236	(S)-(-)-2-(α-(i-propyl)methanamine)-1H-benzimidazole, min. 98% (S)-i-Pr-BIMA ^H (59653-66-6)	250mg	See page 56
07-1238	(R)-(+)-2-(α-(i-propyl)methanamine)-1H-benzimidazole, min. 98% (R)-i-Pr-BIMA ^H (1235024-08-4)	250mg	See page 56
07-1240	(S)-(-)-2-(α-(i-butyl)methanamine)-1H-benzimidazole, min. 98% (S)-i-Bu-BIMA ^H (59592-31-3)	250mg	See page 37
07-1242	(R)-(+)-2-(α-(i-butyl)methanamine)-1H-benzimidazole, min. 98% (R)-i-Bu-BIMA ^H (1235960-36-7)	100mg	See page 37
07-1245	(S)-(-)-2-(α-(t-butyl)methanamine)-1H-benzimidazole, min. 95% (S)-t-Bu-BIMA ^H (1118114-88-7)	100mg	See page 36

Other Ligands

KITS - NHC Ligand Kit 2: "Free" Carbenes

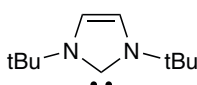
96-3765
HAZ

NHC Ligand Kit 2: "Free" Carbenes
Components also available for individual sale.
Contains the following:



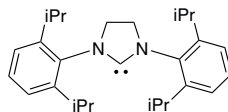
07-0324

250mg



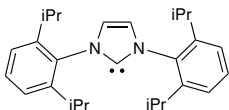
07-0333

250mg



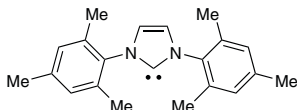
07-0593

500mg



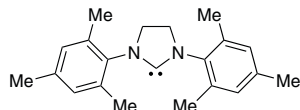
07-0595

250mg



07-0600

500mg



07-0605

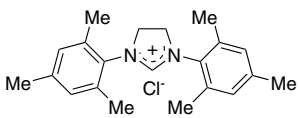
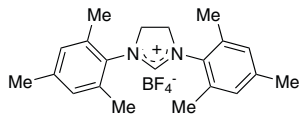
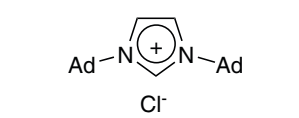
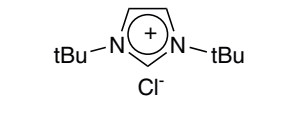
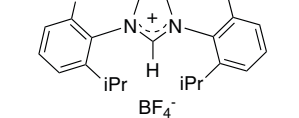
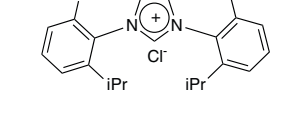
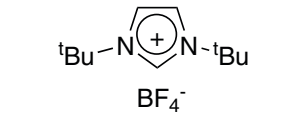
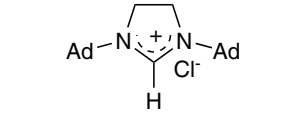
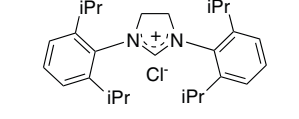
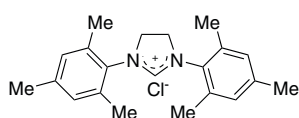
500mg

07-0324	1,3-Bis(1-adamantyl)imidazol-2-ylidene, min. 98% ARDUENGO'S CARBENE (131042-77-8)	250mg	See page 9
07-0333	1,3-Di-t-butylimidazol-2-ylidene, min. 98% (157197-53-0)	250mg	See page 42
07-0593	1,3-Bis(2,6-di-i-propylphenyl)-4,5-dihydroimidazol-2-ylidene, min. 98% (258278-28-3)	500mg	See page 19
07-0595	1,3-Bis(2,6-di-i-propylphenyl)imidazol-2-ylidene, min. 98% (244187-81-3)	250mg	See page 21
07-0600	1,3-Bis(2,4,6-trimethylphenyl)imidazol-2-ylidene, min. 98% (141556-42-5)	500mg	See page 35
07-0605	1,3-Bis(2,4,6-trimethylphenyl)-4,5-dihydroimidazol-2- ylidene, min. 98% (173035-11-5)	500mg	See page 33

Other Ligands

KITS - NHC Ligand Kit 3: Variety of N-Heterocyclic Carbenes

96-3770 NHC Ligand Kit 3: Variety of N-Heterocyclic Carbenes
Components also available for individual sale.
Contains the following:

 07-0299 1g	 07-0302 1g	 07-0322 250mg
 07-0368 250mg	 07-0587 1g	 07-0590 500mg
 07-0598 500mg	 07-4007 500mg	 07-4009 500mg
 07-4011 500mg		

07-0299	1,3-Bis(2,4,6-trimethylphenyl)imidazolium chloride, min. 97% (141556-45-8)	1g	See page 34
07-0302	1,3-Bis(2,4,6-trimethylphenyl)-4,5-dihydroimidazolium tetrafluoroborate, min. 95% SIMes-HBF ₄ (245679-18-9)	1g	See page 32
07-0322	1,3-Bis(1-adamantyl)imidazolium chloride, min. 97% (131042-78-9)	250mg	See page 9
07-0368	1,3-Di- <i>t</i> -butylimidazolium chloride, min. 98% (157197-54-1)	250mg	See page 42
07-0587	1,3-Bis(2,6-di- <i>i</i> -propylphenyl)-4,5-dihydroimidazolium tetrafluoroborate, min. 95% (282109-83-5)	1g	See page 18
07-0590	1,3-Bis(2,6-di- <i>i</i> -propylphenyl)imidazolium chloride, min. 97% (250285-32-6)	500mg	See page 20
07-0598	1,3-Bis(<i>t</i> -butyl)imidazolium tetrafluoroborate, min. 97% ItBuHBF ₄ (263163-17-3)	500mg	See page 11
07-4007	1,3-Bis(1-adamantyl)-4,5-dihydroimidazolium chloride, min. 97% (871126-33-9)	500mg	See page 9
07-4009	1,3-Bis(2,6-di- <i>i</i> -propylphenyl)-4,5-dihydroimidazolium chloride, min. 97% (258278-25-0)	500mg	See page 18
07-4011	1,3-Bis(2,4,6-trimethylphenyl)-4,5-dihydroimidazolium chloride, min. 97% (173035-10-4)	500mg	See page 32

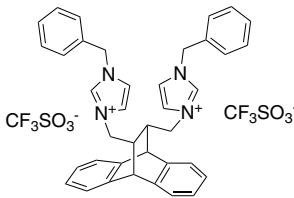
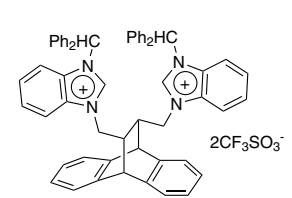
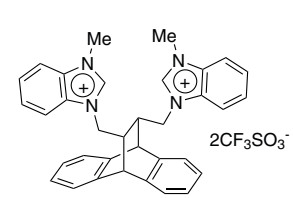
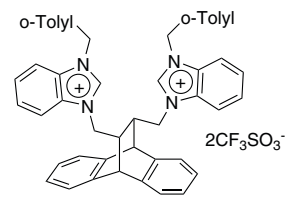
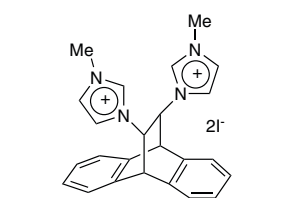
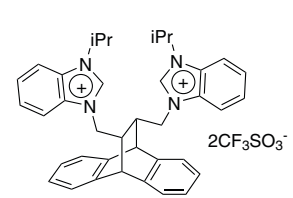
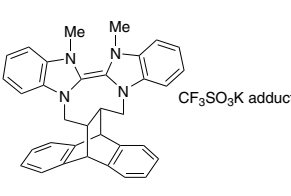
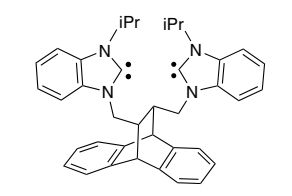
KITS - NHC Ligand Kit 4: Bis Carbenes

96-3775

NHC Ligand Kit 4: Bis Carbenes

Components also available for individual sale.

Contains the following:

 07-0076 100mg	 07-0078 100mg	 07-0080 100mg
 07-0082 100mg	 07-0083 100mg	 07-0084 100mg
 07-0086 100mg	 07-0088 100mg	

07-0076	11,12-Bis[N-benzyl-1H-imidazolium-3-methylene]-9,10-dihydro-9,10-ethanoanthracene bis(trifluoromethanesulfonate)	100mg	See page 10
07-0078	11,12-Bis[N-(2,2-diphenyl-1-ethyl)-1H-benzimidazolium-3-methylene]-9,10-dihydro-9,10-ethanoanthracene bis(trifluoromethanesulfonate), min. 95%	100mg	See page 17
07-0080	11,12-Bis[N-methyl-1H-benzimidazolium-3-methylene]-9,10-dihydro-9,10-ethanoanthracene bis(trifluoromethanesulfonate) (958004-03-0)	100mg	See page 24
07-0082	11,12-Bis[N-(2-methylbenzyl)-1H-benzimidazolium-3-methylene]-9,10-dihydro-9,10-ethanoanthracene bis(trifluoromethanesulfonate), min. 95%	100mg	See page 24
07-0083	11,12-Bis[3-methylimidazolium]-9,10-dihydro-9,10-ethanoanthracene bis(iodide), min. 95%	100mg	See page 25
07-0084	11,12-Bis[N-(i-propyl)-1H-benzimidazolium-3-methylene]-9,10-dihydro-9,10-ethanoanthracene bis(trifluoromethanesulfonate) (958004-12-1)	100mg	See page 30
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)	100mg	See page 54
07-0088	11,12-Bis[1,3-dihydro-3-(i-propyl)-2H-benzimidazol-2-ylidene-3-methylene]-9,10-dihydro-9,10-ethanoanthracene (958004-05-2)	100mg	See page 16

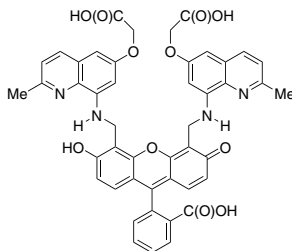
Other Ligands

KITS - Nitric Oxide Sensor (Extracellular) Kit ("NO-ON") (FL2A)

96-0397 Nitric Oxide Sensor (Extracellular) Kit ("NO-ON") (FL2A) (Cell-impermeable NO fluorescent probe)
Includes:
5 x 1ml Dimethylsulfoxide (ACS spectrophotometric grade): 97-4940
5 x 1ml Copper (II) chloride as a 1.0 mM solution in water: 97-3060
07-0287 packaged as 5 x 0.5mg
Components also available for individual sale. Contains the following:

07-0287	2-[4,5-Bis[(6-(2-ethoxy-2-oxohydroxy)-2-methylquinolin-8-ylamino)methyl]-6-hydroxy-3-oxo-3H-xanthen-9-yl]benzoic acid FL2A (1239877-07-6)	0.5mg	See page 23
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Active Ingredients: 2-[4,5-Bis[(6-(2-ethoxy-2-oxoethoxy)-2-methylquinolin-8-ylamino)methyl]-6-hydroxy-3-oxo-3H-xanthen-9-yl]benzoic acid FL2A



07-0287

Introduction:	The copper complex of FL2A is a novel, cell-trappable fluorescent NO probe, that allows direct imaging of nitric oxide produced in living cells through fluorescence turn on. The FL2A ligand is trapped in the cell. A solution of the copper (II) complex of FL2A can be readily prepared using this kit. For additional information, consult the following references: 1. <i>Inorg. Chem.</i> , 2010 , 49, 7464. 2. <i>PNAS</i> , 2010 , 107, 8525.
Contents:	Ligand FL2A : 5 x 0.5mg Dimethylsulfoxide (ACS spectrophotometric grade): 5 x 1.0ml Copper (II) chloride (1.0 mM solution in water): 5 x 1.0ml
SDS:	The Safety Data Sheets for the three products contained in this kit can be downloaded from the Strem Chemical website, www.strem.com . Locate the SDS using the following catalog numbers: 07-0287: FL2A 97-4940: Dimethylsulfoxide (ACS spectrophotometric grade) 97-3060: Copper (II) chloride (1.0 mM solution in water)

Storage Conditions:	This kit should be stored at -20°C and protected from light.
Preparation of the active copper complex of FL2A:	Step 1: Allow the kit to warm to room temperature. Add 589 microliters of DMSO to a 0.5mg vial of FL2A (resulting concentration ~1.0 mM). The FL2A is readily soluble in the DMSO. The solution can be partitioned into aliquots of 40-300 µL as required. These solutions must be stored in the freezer at <-20°C. The DMSO solution of FL2A is stable for three months at -80°C. It is advisable to check the extinction coefficient of the solution before preparing the copper complex. (log ε(499 nm) = 4.66) Step 2: A CuFL2A solution should be freshly prepared by adding 1:2 FL2A solution (1.0 mM) to the copper (II) solution (1.0 mM) at room temperature. Note: The prepared DMSO/water stock solution of CuFL2A solution [log ε(495 nm) = 4.19] can be kept at room temperature, but should be protected from light. The solution can be diluted with media to provide the concentration required for cell sensing experiments. When the extinction coefficient of the red solution of CuFL2A diminishes by 20% of the original value, the solution should be discarded. Do not use the solution after 1 hour and do not freeze the solution.

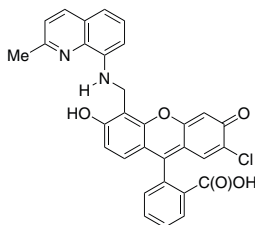
Other Ligands

KITS - Nitric Oxide Sensor (Intracellular) Kit ("NO-ON") (FL)

96-0293 Nitric Oxide Sensor (Intracellular) Kit ("NO-ON") (FL) (Cell-trappable NO fluorescent probe)
 Includes:
 5 x 1ml Dimethylsulfoxide (ACS spectrophotometric grade): 97-4940
 5 x 1ml Copper (II) chloride as a 1.0 mM solution in water: 97-3060
 07-0293 packaged as 5 x 0.5mg
 Components also available for individual sale. Contains the following:

07-0293	2-[2-Chloro-6-hydroxy-5-[2-methylquinolin-8-ylaminomethyl]-3-oxo-3H-xanthen-9-yl]benzoic acid FL (905982-78-7)	0.5mg	See page 38
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Active Ingredients: 2-[2-Chloro-6-hydroxy-5-[2-methylquinolin-8-ylamino)methyl]-3-oxo-3H-xanthen-9-yl]benzoic acid (FL)



07-0293

Introduction:	The copper complex of FL is a novel, cell-trappable fluorescent NO probe that allows direct imaging of nitric oxide produced in living cells through fluorescence turn on. A solution of the copper (II) complex of FL can be readily prepared using this kit. For additional information, consult the following references: 1. <i>Nature Chemical Biology</i>, 2006, 2, 375. 2. <i>Nature Protocols</i>, 2007, 2, 408. 3. <i>J. Am. Chem. Soc.</i>, 2006, 128, 14364
Contents:	Ligand FL: 5 x 0.5mg Dimethylsulfoxide (ACS spectrophotometric grade): 5 x 1.0ml Copper (II) chloride (1.0 mM solution in water): 5 x 1.0ml
SDS:	The Safety Data Sheets for the three products contained in this kit can be downloaded from the Strem Chemical website, www.strem.com. Locate the SDS using the following catalog numbers: 07-0293: FL 97-4940: Dimethylsulfoxide (ACS spectrophotometric grade) 97-3060: Copper (II) chloride as a 1.0 mM solution in water

Storage Conditions:	This kit should be stored at -20°C and protected from light.
Preparation of the active copper complex of FL:	Step 1: Allow the kit to warm to room temperature. Add 931 microliters of DMSO to a 0.5mg vial of FL (resulting concentration -1.0 mM). The FL is readily soluble in the DMSO. The solution can be partitioned into aliquots of 40-300 µL as required. These solutions must be stored in the freezer at <-20°C. The DMSO solution of FL is stable for three months at -80°C. It is advisable to check the extinction coefficient of the solution before preparing the copper complex. (log ε(504 nm) = 4.62) Step 2: A CuFL solution should be freshly prepared by adding 1:1 FL solution (1.0 mM) to the copper (II) solution (1.0 mM) at room temperature. Note: The prepared DMSO/water stock solution of CuFL solution [log ε(499 nm) = 4.60] can be kept at room temperature, but should be protected from light. The solution can be diluted with media to provide the concentration required for cell sensing experiments. When the extinction coefficient of the red solution of CuFL diminishes by 20% of the original value, the solution should be discarded. Do not use the solution after 1 hour, and do not freeze the solution.

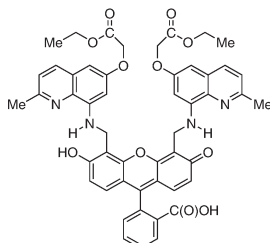
Other Ligands

KITS - Nitric Oxide Sensor (Intracellular) Kit ("NO-ON") (FL2E)

96-0396 Nitric Oxide Sensor (Intracellular) Kit ("NO-ON") (FL2E) (Cell-trappable NO fluorescent probe)
 Includes:
 5 x 1ml Dimethylsulfoxide (ACS spectrophotometric grade): 97-4940
 5 x 1ml Copper (II) chloride as a 1.0 mM solution in water: 97-3060
 07-0291 packaged as 5 x 0.5mg
 Components also available for individual sale. Contains the following:

07-0291	2-{4,5-Bis[(6-(2-ethoxy-2-oxoethoxy)-2-methylquinolin-8-ylamino)methyl]-6-hydroxy-3-oxo-3H-xanthen-9-yl}benzoic acid FL2E (1239877-06-5)	0.5mg	See page 23
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Active Ingredients: 2-{4,5-Bis[(6-(2-ethoxy-2-oxoethoxy)-2-methylquinolin-8-ylamino)methyl]-6-hydroxy-3-oxo-3H-xanthen-9-yl}benzoic acid FL2E

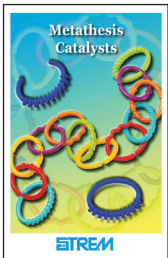
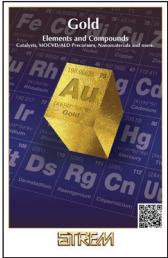
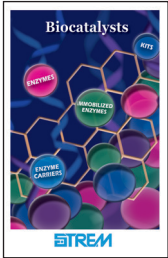
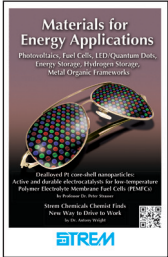
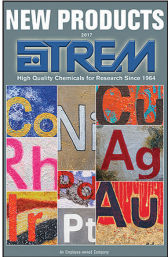
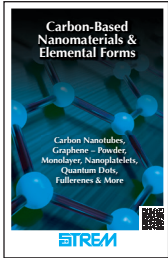
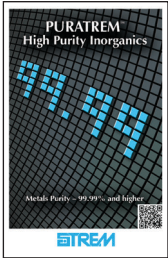
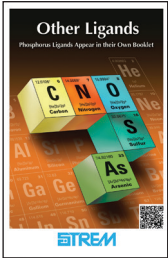
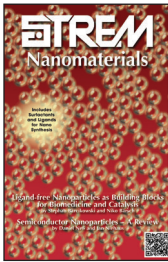
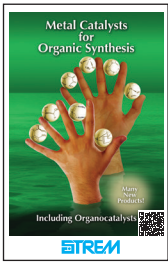


07-0291

Introduction:	The copper complex of FL2E is a novel, cell-trappable fluorescent NO probe, that allows direct imaging of nitric oxide produced in living cells through fluorescence turn on. The FL2E ligand is trapped in the cell. A solution of the copper (II) complex of FL2E can be readily prepared using this kit. For additional information, consult the following references: 1. <i>Inorg. Chem.</i> , 2010 , 49, 7464.
Contents:	Ligand FL2E : 5 x 0.5mg Dimethylsulfoxide (ACS spectrophotometric grade): 5 x 1.0ml Copper (II) chloride (1.0 mM solution in water): 5 x 1.0ml
SDS:	The Safety Data Sheets for the three products contained in this kit can be downloaded from the Strem Chemical website, www.strem.com . Locate the SDS using the following catalog numbers: 07-0291: FL2E 97-4940: Dimethylsulfoxide (ACS spectrophotometric grade) 97-3060: Copper (II) chloride as a 1.0 mM solution in water
Storage Conditions:	This kit should be stored at -20°C and protected from light.

Preparation of the active copper complex of FL2E:	Step 1: Allow the kit to warm to room temperature. Add 571 microliters of DMSO to a 0.5mg vial of FL2E (resulting concentration ~1.0 mM). The FL2E is readily soluble in the DMSO. The solution can be partitioned into aliquots of 40-300 µL as required. These solutions must be stored in the freezer at <-20°C. The DMSO solution of FL2E is stable for three months at -80°C. It is advisable to check the extinction coefficient of the solution before preparing the copper complex. (log ε(500 nm) = 4.25) Step 2: A CuFL2E solution should be freshly prepared by adding 1:1 FL2E solution (1.0 mM) to the copper (II) solution (1.0 mM) at room temperature. Note: The prepared DMSO/water stock solution of CuFL2E solution [log ε(496 nm) = 4.05] can be kept at room temperature, but should be protected from light. The solution can be diluted with media to provide the concentration required for cell sensing experiments. When the extinction coefficient of the red solution of CuFL2E diminishes by 20% of the original value, the solution should be discarded. Do not use the solution after 1 hour, and do not freeze the solution.
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Strem Chemicals, Inc.

7 Mulliken Way
Dexter Industrial Park
Newburyport, MA 01950-4098
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Office Tel: (978) 499-1600
Office Fax: (978) 465-3104

Toll-free (U.S. & Canada)
Tel: (800) 647-8736
Fax: (800) 517-8736

Email: info@strem.com
www.strem.com

Strem Chemicals, Inc.

15, rue de l'Atome
Zone Industrielle
F-67800 BISCHHEIM (France)
Tel.: +33 (0) 3 88 62 52 60
Fax: +33 (0) 3 88 62 26 81
Email: info.europe@strem.com

Strem Chemicals, Inc.

Postfach 1215
D-77672 KEHL, Germany
Tel.: +49 (0) 7851 75879
Fax: +33 (0) 3 88 62 26 81
Email: info.europe@strem.com

Strem Chemicals UK, Ltd.

An Independent Distributor
of Strem Chemicals Products
Newton Hall, Town Street
Newton, Cambridge, CB22 7ZE, UK
Tel.: +44 (0)1223 873 028
Fax: +44 (0)1223 870 207
Email: enquiries@strem.co.uk



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