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Air-Stable P-Chiral Phosphorus Ligands for Asymmetric Catalysis and Synthesis

by Prof. Wenjun Tang and Kaidi Li

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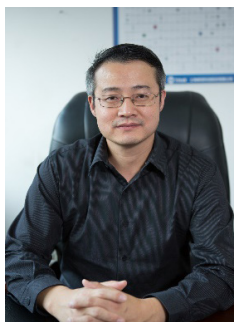
Glossary of Terms

[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
pwdr.	.....	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
xtl.	.....	Crystalline

About Purity

Chemical purity		is reported after the chemical name, e.g. Ruthenium carbonyl, 99%
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Biographical Sketches



Prof. Wenjun Tang

Wenjun Tang was born in Zhejiang Province, China. He received his B. Eng. degree in 1995 from East China University of Sciences and Technology, his M.S. in 1998 from Shanghai Institute of Organic Chemistry, Chinese Academy of Sciences (CAS), and his Ph.D. in 2003 from Pennsylvania State University. After two-years of postdoctoral research at the Scripps Research Institute, he worked six years as a process chemist at Boehringer Ingelheim Pharmaceuticals Inc. In 2011, he took his current position as a research professor at Shanghai Institute of Organic Chemistry, CAS. His research interests are in the areas of asymmetric catalysis, total synthesis of natural products, and development of efficient chemical processes. He was an awardee of the President's Award for individual excellence at Boehringer Ingelheim Pharmaceuticals (2009), the National "Thousand Talents" Youth program (2012), the National Homogeneous Catalysis Youth Award (2015), the National Science Fund for Distinguished Young Scholars (2017), and the National "Ten-thousand Talents" Program (2019).



Kaidi Li

Kaidi Li was born and raised in Dongying, an oil city in China. He received his B.S. in Pharmacy from Fudan University, where he developed great interest in synthetic chemistry. For his undergraduate studies, he received extensive experimental and theoretical training. Since 2017, he has been a graduate student in Wenjun Tang's group at Shanghai Institute of Organic Chemistry, Chinese Academy of Sciences. His current research interests are in the area of chiral boron chemistry, synthesis and application of P-chiral phosphorus ligands.

Air-stable P-chiral Phosphorus Ligands for Asymmetric Catalysis and Synthesis

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1. Introduction

P-chiral phosphorus ligands are not only historically important, but also synthetically versatile in the field of asymmetric catalysis and synthesis.¹ In the early 1970s, Knowles developed the landmark P-chiral phosphorus ligand DIPAMP and applied it successfully in the production of L-DOPA, signifying the beginning and the power of asymmetric catalysis for industrial application. Since then, great progress has been achieved in the field of asymmetric catalysis with the development of numerous chiral ligands. Nonetheless, the development of P-chiral phosphorus ligands was overlooked and underdeveloped for a long period of time mostly because of their synthetic difficulties. It was not until the late 1990s that the development of P-chiral phosphorus ligands regained the attention thanks to the development of bisP*², TangPhos³, DuanPhos⁴, QuinoxP*⁵, etc. Moreover, most existing P-chiral phosphorus ligands are air-sensitive liquids and difficult to handle. Hence, we hoped to make our contributions in this area and develop a series of versatile and air-stable P-chiral phosphorus ligands for asymmetric catalysis and synthesis.⁶

Over the past ten years, we have designed and developed a series of P-chiral bis- and monophosphorus ligands based on the 2,3-dihydrobenzo[d][1,3]oxaphosphole motif. Their applications toward the efficient synthesis of chiral natural products and drugs are explored. These P-chiral ligands have unique structural and physical properties including conformational unambiguousness, high tunability of their electronic and steric properties, and operational simplicity as air-stable solids.

2. P-Chiral Biphosphorus Ligands

Our research was initiated on structural modification of TangPhos⁴, which proved to be an excellent P-chiral phosphorus ligand in asymmetric hydrogenation. However, the use of costly sparteine in synthesis and its high air-sensitivity limited the availability and applicability of TangPhos. We proposed that the addition of aryl rings on both sides of TangPhos would lead to a ligand with improved air stability and ease of preparation (Figure 1).⁷ Besides, the installation of substituents on the aryl rings provides options to modify the shape, depth, and electronic properties of the chiral pockets. Thus, a 2,3-dihydrobenzo[d][1,3]oxaphosphole core was designed and synthesized. Reaction of *tert*-butyldichlorophosphine with lithiated 1,3-dimethoxybenzene followed by treatment with water and

formaldehyde, consecutively, led to the formation of phosphine oxide **2**. Methoxy de-protection with HI followed by mesylation and ring closure under basic conditions yielded phenol **3**. Resolution by treatment with chiral menthyl chloroformate gave rise to the key chiral scaffold (*S*)-**3**, setting the foundation for developing a library of chiral ligands on the basis of 2,3-dihydrobenzo[*d*][1,3]oxaphosphole motif.

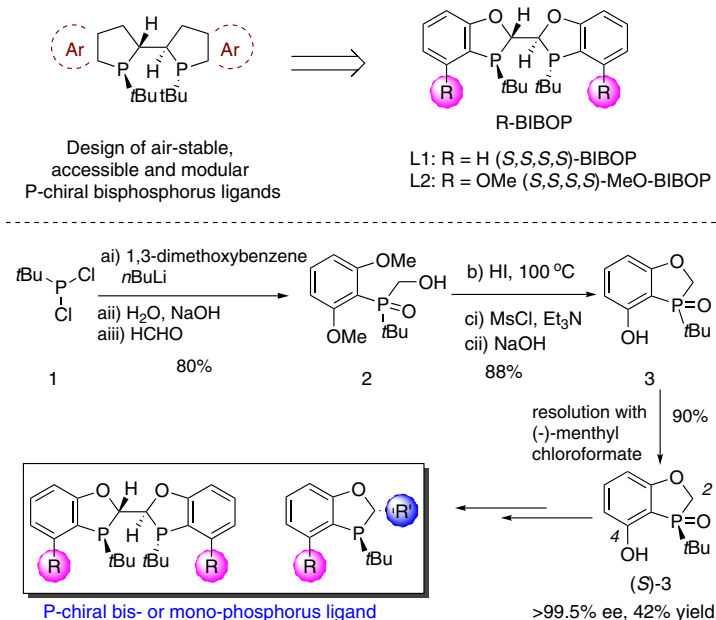
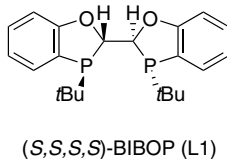


Figure 1. Design and synthesis of air-stable and modular P-chiral bisphosphorus ligands

2.1 BIBOP



1. A bench-stable chiral bisphosphorus ligand
2. An efficient ligand for Rh-catalyzed asymmetric hydrogenation of functionalized olefins.

BIBOP is an excellent ligand for rhodium-catalyzed asymmetric hydrogenation of various functionalized olefins in both academic research and industrial practice. Its rhodium complex can be applied for asymmetric hydrogenation of α -(acylamino)acrylic acid derivatives, α -arylenamides, β -(acylamino) acrylic acid derivatives, and itaconates (Figure 2.).⁷ Excellent enantioselectivities (up to 99% ee) and high TONs (up to 2000) have been achieved in the synthesis of chiral α - and β -amino acids, chiral amines, and chiral carboxylic acid derivatives.

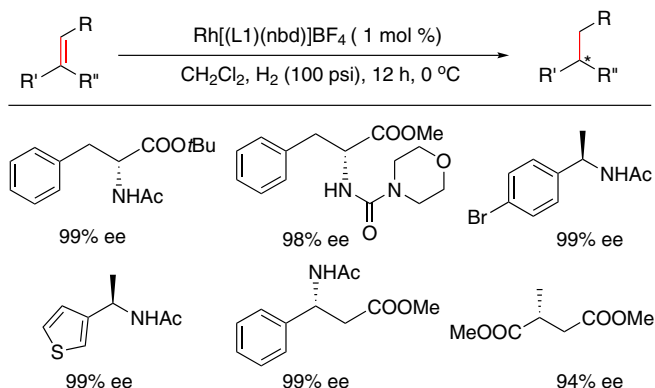
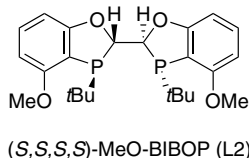


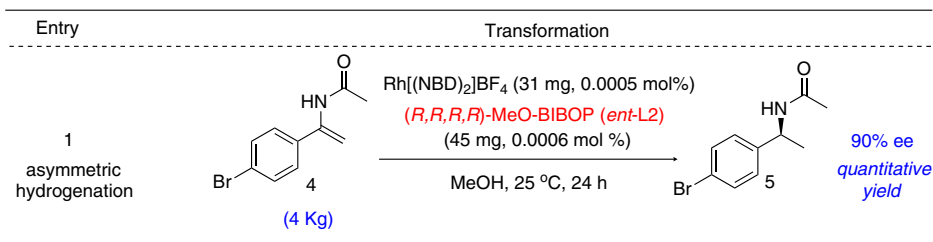
Figure 2. Enantioselective hydrogenation of functionalized olefins by Rh-BIBOP catalyst

2.2 MeO-BIBOP



1. Enantioselective for asymmetric hydrogenation/asymmetric propargylation/asymmetric reduction/asymmetric hydroformylation
2. Extremely low catalyst loading (TON > 200,000) in Rh-catalyzed asymmetric hydrogenation of *N*-(1-(4-bromophenyl)-vinyl)acetamide

MeO-BIBOP is the more electron-rich version of BIBOP. The presence of two methoxy groups *ortho* to the phosphorus center on the two aryl rings in the structure of MeO-BIBOP has enabled the asymmetric hydrogenation of *N*-(1-(4-bromophenyl)-vinyl)acetamide with the highest TONs to date (Figure 3).⁸ Besides applications in asymmetric hydrogenation⁹, MeO-BIBOP has proven to be an efficient ligand for various other transformations including asymmetric propargylation of benzaldehyde with a propargyl borolane reagent using Cu-catalyst¹⁰, asymmetric reduction of aryl ketone with a Ru-MeO-BIBOP-diamine catalyst at extremely low catalyst loading (0.001 mol%)¹¹, and hydroformylation of vinyl acetate into α -acetyl aldehyde with an excellent branch/linear ratio and 90% ee.¹²



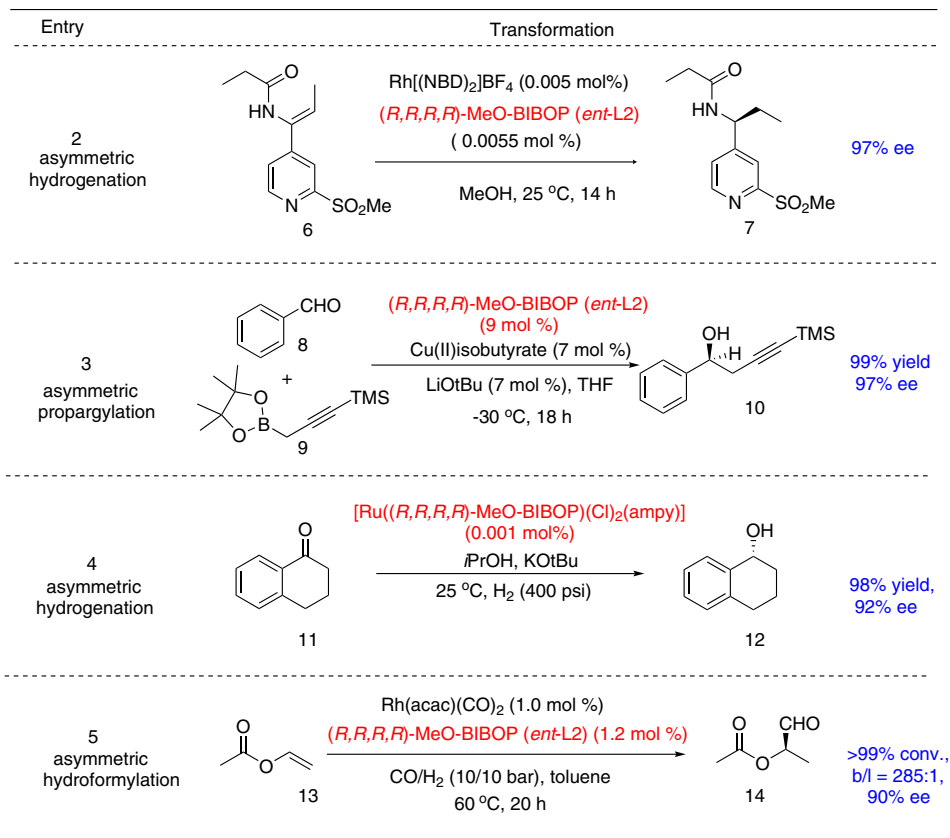
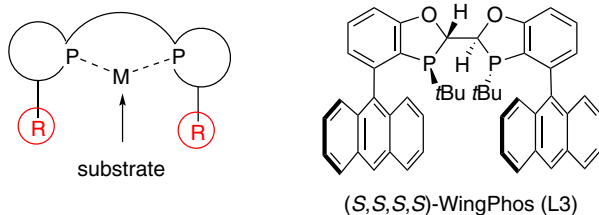


Figure 3. Asymmetric catalytic reactions employed with MeO-BIBOP

2.3 WingPhos



1. Possessing deep chiral pockets capable of long-range stereochemical control
2. The *tert*-butyl groups control the orientations of the anthryl groups, which interact with the substrates during catalysis.

Rh-WingPhos is a highly efficient catalyst for rhodium-catalyzed hydrogenation of (*E*)- β -arylenamides, forming a variety of chiral cyclic and acyclic β -arylamine derivatives with various functionalities and excellent enantioselectivities at low catalyst loadings (TONs up to 10,000) (Figure 4). Because of the ready accessibility of (*E*)- β -arylenamine substrates, this method offers practical preparation for a series of chiral β -arylamines.²⁹

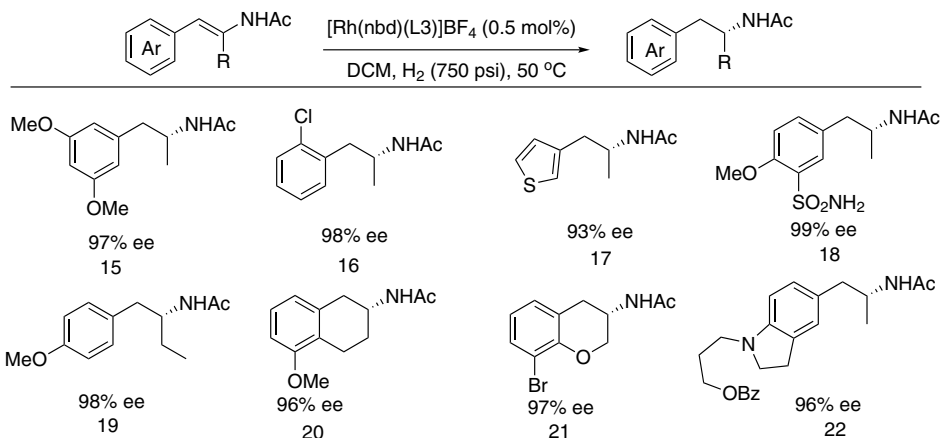


Figure 4. Asymmetric hydrogenation employed with WingPhos

WingPhos is also a capable ligand for catalytic asymmetric addition reactions. With the rhodium–WingPhos as the catalyst, CsF as the base, and MgBr₂ as an additive, a variety of aryl ketones with different electronic properties and substitution patterns reacted with aryl boroxines (Figure 5), forming a series of chiral diaryl alkyl carbinols in excellent yields and ee's. Calculations suggested that the interaction between the aryl group of the ketone and the anthryl moieties of WingPhos may have directed the stereochemical outcome.¹³

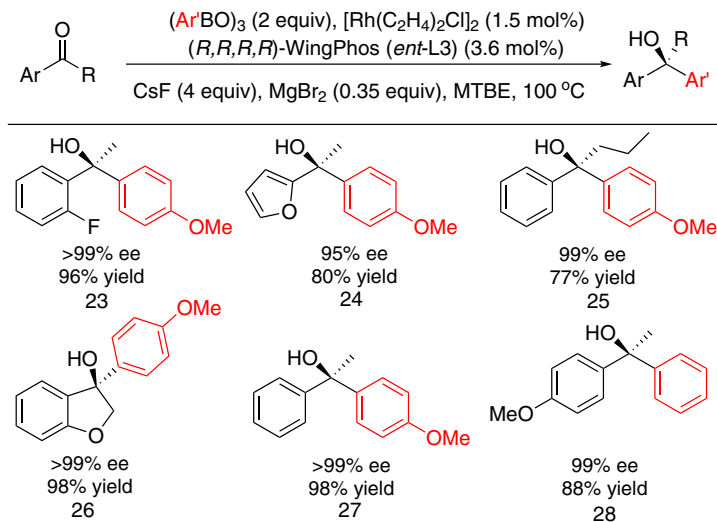
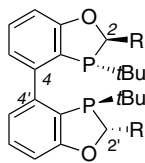


Figure 5. Asymmetric addition employed with WingPhos

2.4 R-BABIBOP



R-BABIBOP

L4: R = H ((*R,R*)-BABIBOP)

L5: R = *i*Pr ((*R,R,R,R*)-*i*Pr-BABIBOP)

1. P-chiral biaryl bisphosphorus ligand
2. Highly modular through variation of the R-substituents.

The P-chiral bisphosphorus ligands R-BABIBOP possess several structural features: a) the chiral elements of the ligands are originated from the central P-chirality instead of the biaryl axial chirality; b) The biaryl ligands adopt the coordination modes similar to BINAP- or BIPHEP-type ligands; c) The steric and electronic properties are highly modular through the variations of the R groups at 2,2' positions. By using Pd-*i*Pr-BABIBOP catalyst (**Pd-L5**), the hydrogenation of ethyl 3-oxo-3-phenylpropanoate proceeded in pentafluoropropanol/TFA under 35 atm H₂ to form the chiral alcohol product with 93% ee in 99% yield with a TON of 10 000 (Figure 6).¹⁴ Besides the applications in palladium-catalyzed asymmetric hydrogenation, BABIBOP is also efficient for rhodium-catalyzed asymmetric hydrogenation of di- and trisubstituted enamides¹⁵ and copper-catalyzed hydrogenation of 2-substituted 1-tetralones via dynamic kinetic resolution.¹⁶

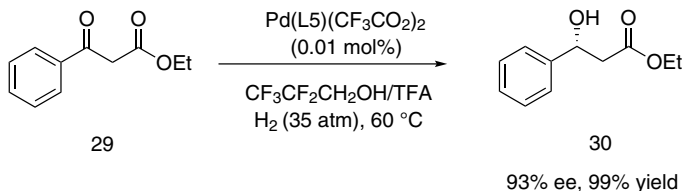
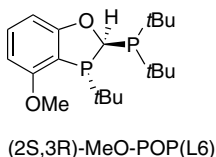


Figure 6. Asymmetric hydrogenation employed with R-BABIBOP ligands

2.5 MeO-POP



(2*S*,3*R*)-MeO-POP(L6)

Unlike most chiral C₂-symmetric ligands, MeO-POP is an effective C₁-symmetric bisphosphorus ligand. MeO-POP is an air-stable and operationally convenient solid, which can be applied to Rh-catalyzed asymmetric hydrogenation of α-(acylamino)acrylates or β-(acylamino)acrylates to prepare chiral α- or β-amino acid derivatives (Figure 7).¹⁷

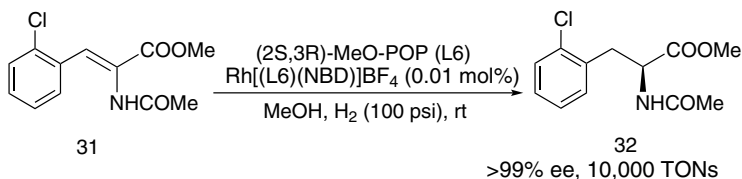


Figure 7. Asymmetric hydrogenation of α-(acylamino)acrylates catalyzed by MeO-POP ligand

3. P-chiral monophosphorus ligands

Compared to a number of efficient chiral bisphosphorus ligands, a smaller number of effective monophosphorus ligands are available due to lack of conformationally defined and systematically tunable framework.¹⁸ Although monophosphoramidite ligands have demonstrated to be among the most versatile in academic research, their relatively electron-deficient and unstable nature has hampered broad applications in industrial settings. The 2,3-dihydrobenzo[d][1,3]oxaphosphole motif developed by us has shown excellent properties including good air-stability, resistance to harsh reaction conditions (aqueous, basic or high temperature), and high tunability. More importantly, the electron-rich nature of these monophosphorus ligands enables the activation of inert bonds where monophosphoramidite ligands are incapable. We therefore developed a library of P-chiral biaryl monophosphorus ligands (Figure 8), which have shown high efficiency in Suzuki-Miyaura coupling, asymmetric palladium-catalyzed dearomative cyclization, asymmetric hydroboration and diboration, asymmetric nickel-catalyzed reductive coupling, etc.

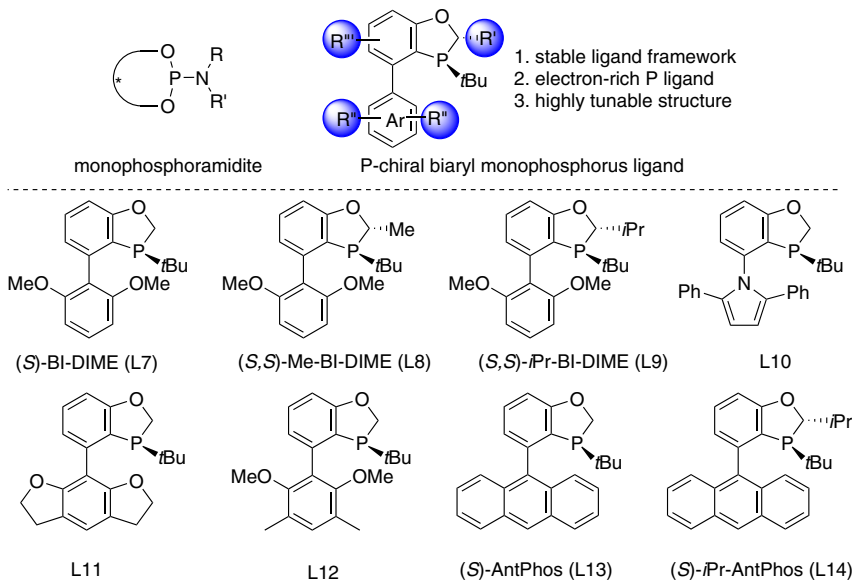


Figure 8. P-chiral biaryl monophosphorus ligands

3.1 Suzuki-Miyaura coupling reaction

Dialkylbiaryl phosphorus ligands such as SPhos are effective ligands for the Suzuki-Miyaura cross-coupling reaction. However, SPhos possesses two major conformers by rotation of its P-aryl bond, resulting in two conformers of its palladium complex. The more sterically hindered conformer is considered the more effective for cross-coupling and the less sterically hindered is considered to be inferior. By contrast, the monophosphorus ligands derived from 2,3-dihydrobenzo[d][1,3]oxaphosphole structure have the effective and sterically hindered conformer, facilitating the transmetalation and reductive elimination process of sterically hindered cross-couplings. Thus, BI-DIME and AntPhos are effective ligands for sterically hindered cross-coupling reactions, particularly for the syntheses of tetra-*ortho*-substituted biaryls and sterically hindered alkyl arenes (Figure 9). Moreover, AntPhos enables the Suzuki-Miyaura coupling reaction at extremely low catalyst loading. At 0.005 mol% Pd loading, the coupling of 1-chloro-2-nitrobenzene and (3,4,5-trifluorophenyl)boronic acid proceeded smoothly to form the coupling product in 96% yield at a metric ton scale.¹⁹ Me-BI-DIME and iPr-BI-DIME are excellent ligands for asymmetric Suzuki-Miyaura coupling reactions, and high enantioselectivities have been achieved on various tri-*ortho*-substituted biaryls.²⁰ More challenging asymmetric tetra-*ortho*-substituted biaryls have been achieved with NitinPhos.²¹

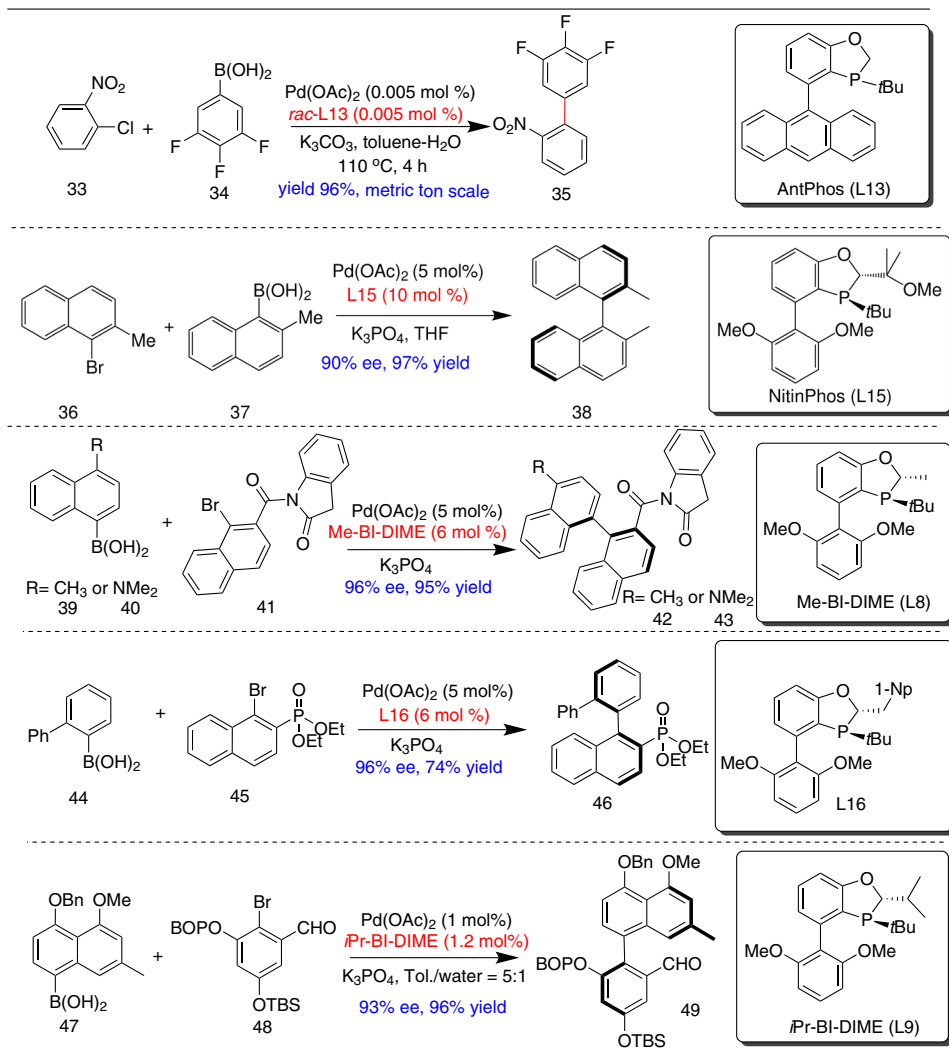
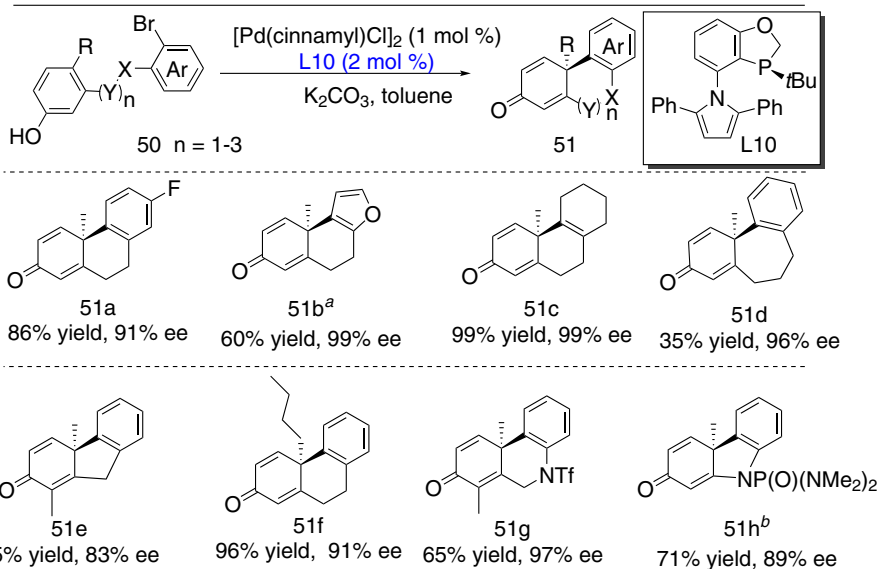


Figure 9. Asymmetric Suzuki–Miyaura coupling of tetra-ortho-substituted biaryls

3.2 Asymmetric palladium-catalyzed dearomative cyclization

Asymmetric palladium-catalyzed dearomative cyclization offers advantages in the synthesis of chiral polycyclic natural products bearing all-carbon quaternary centers. With **Pd-L10** as the catalyst, the cyclization of aryl bromide **50** containing a phenol moiety formed the cyclization product **51** with excellent ee's in satisfactory yields (Figure 10).²² The substrate scope was broad and compatible with various heterocycles such as furyl and quinoline, forming five-, six-, or seven-membered rings in good to excellent yields. These cyclization skeletons are synthetically useful intermediates for the synthesis of terpenes, steroids, polyketides, and alkaloids.



^avinyl triflate was employed as the starting materials; ^bAntPhos (L14) was employed as the chiral ligand.

Figure 10. Asymmetric palladium-catalyzed dearomative cyclization

3.3 Asymmetric hydroboration and diboration

The use of BI-DIME has proven to be crucial for the regioselectivity and enantioselectivity of sterically hindered asymmetric hydroboration and diboration reactions. Although formation of chiral tertiary boronic esters as Markovnikov products are rare and challenging in hydroboration, the Rh-BI-DIME catalyst allowed, for the first time, the formation of a series of α -amino tertiary boronic acid esters with excellent ee's and satisfactory yields (Figure 11).²³ Mechanistic studies have shown that the transformation is likely to proceed through hydroboration over the diboration of the acyl imine pathway. Chiral BI-DIME has also enabled the conversion of allene to a series of tertiary boronic esters,²⁴ which are useful building blocks for natural products, agrochemicals, and therapeutic reagents.

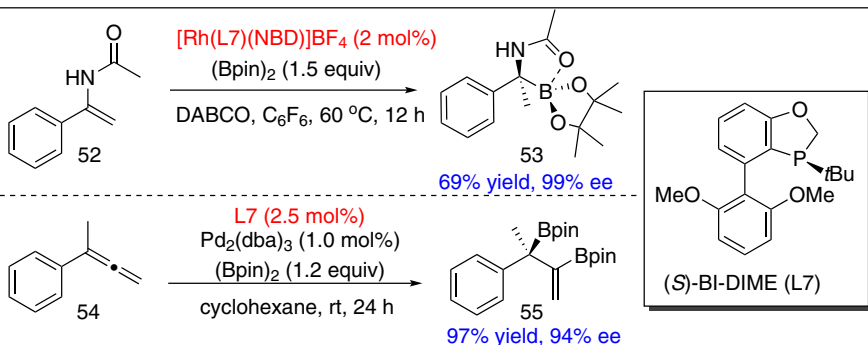


Figure 11. Asymmetric hydroboration and diboration catalyzed by BI-DIME

3.4 Asymmetric nickel-catalyzed reductive coupling

With chiral AntPhos as the key ligand and Et_3SiH as the reducing reagent, the Ni-catalyzed cyclization of alkynone **56** proceeds to form chiral tertiary alcohol **57** in excellent yield and with high ee (Figure 12).²⁵ With DI-BIDIME (L17) as the chiral ligand, the lowest catalyst loading in Ni-catalyzed reductive

coupling reported to date has been realized. Alkynes with an N-linker such as **58** are transformed to chiral pyrrolidine **59**.²⁶ In addition, the intermolecular coupling catalyzed by Ni-BI-DIME (Ni-L7) between alkyne **60** and aldehyde **61** proceeds smoothly to form chiral allylic alcohol **62**.²⁷

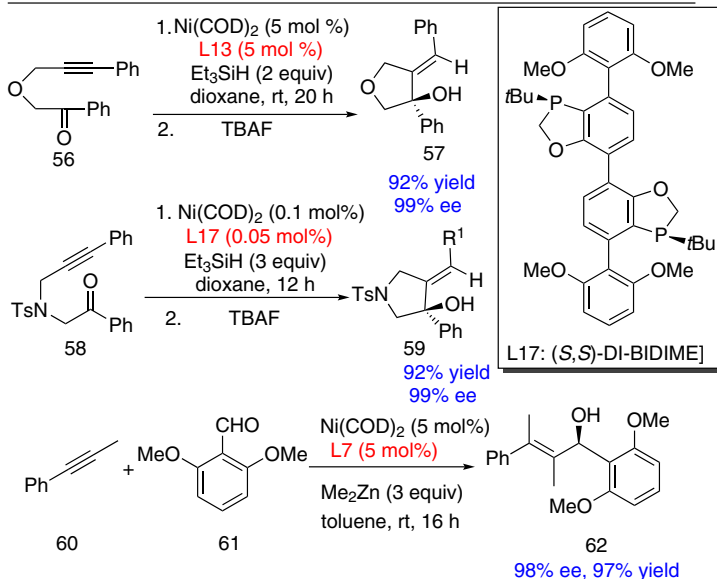


Figure 12. Ni-catalyzed cyclization of alkynone or alkyne with aldehyde

3.5 Asymmetric palladium-catalyzed intramolecular arylation

Palladium-catalyzed intramolecular arylation has become an important method to forge a chiral scaffold. Chiral monophosphorus ligands are also suitable for such transformations. For example, cyclization of aryl bromide **63** containing an *o*-carborane moiety gives a carbon-boron coupling chiral-at-cage product **64** (Figure 13).²⁸ Likewise, the cyclization of *o*-bromo-phenylphosphonate **65** using catalyst Pd-*ent*-L11 forms the P-chiral phosphonate **66** with 88% ee and in 83% yield, which is an important intermediate for the synthesis of P-chiral phosphorus ligands.²⁹

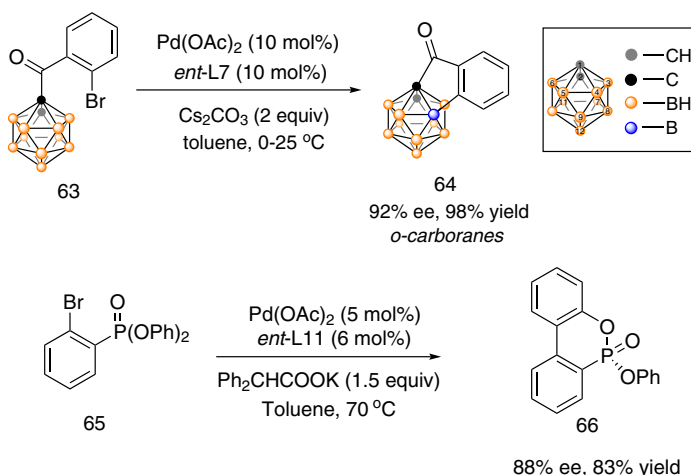
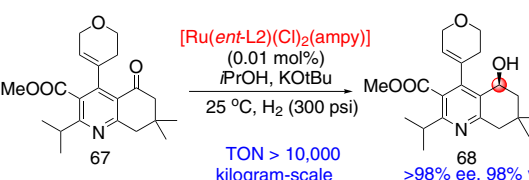
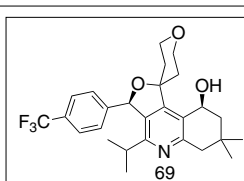
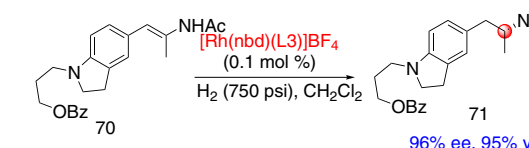
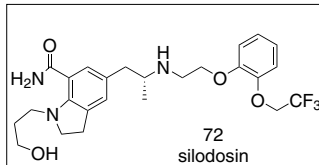
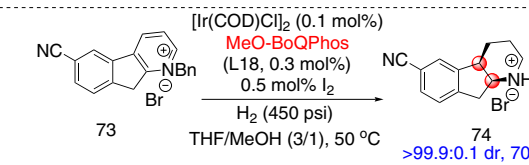
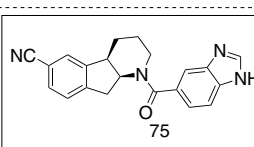
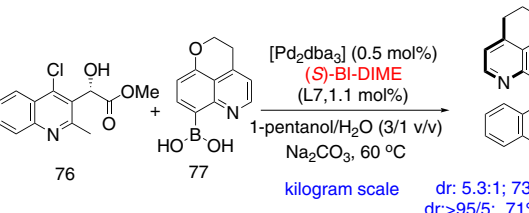
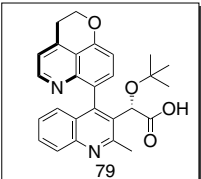
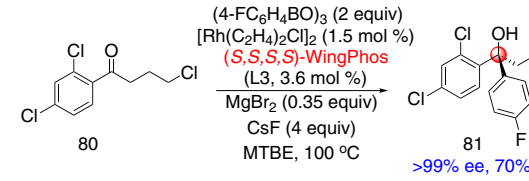
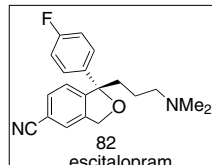
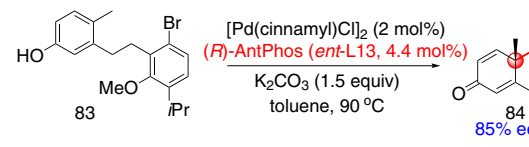
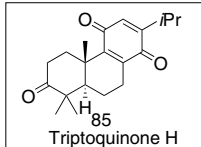


Figure 13. Asymmetric palladium-catalyzed intramolecular arylation

3.6 Applications in synthesis of chiral natural products and therapeutic agents

Chiral ligands based on the 2,3-dihydrobenzo[d][1,3]-oxaphosphole motif have proven to be applicable in efficient syntheses of a number of chiral natural products and therapeutic agents. With these chiral ligands, significant improvements in synthetic efficiency have been achieved by implementing asymmetric hydrogenation and carbon-carbon coupling reactions. In many cases, these transformations can't be realized by other commercially available ligands (Figure 14).^{30,31,32,33,34,35,36}

Entry	Transformation	Target product
1 ³⁰	 [Ru(<i>ent</i>-L2)(Cl)₂(ampy)] (0.01 mol %) iPrOH, KOtBu 25 °C, H₂ (300 psi) TON > 10,000 kilogram-scale >98% ee, 98% yield	
2 ³¹	 [Rh(<i>nbd</i>)(L3)]BF₄ (0.1 mol %) H₂ (750 psi), CH₂Cl₂ 96% ee, 95% yield	 72 silodosin
3 ³²	 [Ir(COD)Cl]₂ (0.1 mol %) MeO-BQPhos (L18, 0.3 mol %) 0.5 mol % I₂ H₂ (450 psi) THF/MeOH (3/1), 50 °C >99.9:0.1 dr, 70% ee	 75
4 ³³	 [Pd(dba)₃] (0.5 mol %) (<i>S,S</i>)-BI-DIME (L7, 1.1 mol %) 1-pentanol/H₂O (3/1 v/v) Na₂CO₃, 60 °C kilogram scale dr: 5.3:1; 73% assay yield dr:>95/5; 71% isolated yield	 79
5 ¹³	 (4-FC₆H₄BO)₃ (2 equiv) [Rh(C₂H₄)₂Cl]₂ (1.5 mol %) (<i>S,S,S,S</i>)-WingPhos (L3, 3.6 mol %) MgBr₂ (0.35 equiv) CsF (4 equiv) MTBE, 100 °C >99% ee, 70% yield	 82 escitalopram
6 ³⁴	 [Pd(cinnamyl)Cl]₂ (2 mol %) (<i>R</i>)-AntPhos (<i>ent</i>-L13, 4.4 mol %) K₂CO₃ (1.5 equiv) toluene, 90 °C 85% ee, 87% yield	 85 Triptokinone H

5. Conclusion and outlook

A series of monophosphorus and bisphosphorus ligands based on the 2,3-dihydrobenzo[d][1,3]oxaphosphole motif have been developed, which are efficient for a number of asymmetric transformations including cross-coupling reaction, asymmetric hydrogenation, and et al. Their unique structural properties including conformational unambiguity and modularity have allowed us to develop a series of efficient ligands including MeO-BIBOP, WingPhos, MeO-POP, BABIBOP, BI-DIME, AntPhos, MeO-BoQPhos, etc. Syntheses of an array of biologically important chiral natural products and therapeutic agents with much improved efficiency are realized with employment of these ligands in catalysis. As the design and synthesis of chiral ligands and catalysts are ongoing in our laboratory, it is without any doubt that such continuing efforts will facilitate advances in asymmetric catalysis as well as synthetic organic chemistry.

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Reference of Ligands Mentioned in the Article

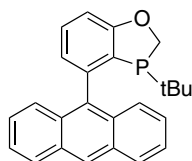
Ligand #	Strem #	Description
L1	15-6270	(2S,2'S,3S,3'S)-3,3'-Di-tert-butyl-2,2',3,3'-tetrahydro-2,2'-bibenzo[d][1,3]oxaphosphole, 97% (>99% ee) (2S,2'S,3S,3'S)-BIBOP
L2	15-6255	(2S,2'S,3S,3'S)-3,3'-Di-tert-butyl-4,4'-dimethoxy-2,2',3,3'-tetrahydro-2,2'-bibenzo[d][1,3]oxaphosphole, 97% (>99% ee) (2S,2'S,3S,3'S)-MeO-BIBOP
ent-L2	15-6250	(2R,2'R,3R,3'R)-3,3'-Di-tert-butyl-4,4'-dimethoxy-2,2',3,3'-tetrahydro-2,2'-bibenzo[d][1,3]oxaphosphole, 97% (>99% ee) (2R,2'R,3R,3'R)-MeO-BIBOP
L3	15-1975	(2S,2'S,3S,3'S)-4,4'-Di(anthracen-9-yl)-3,3'-di-t-butyl-2,2',3,3'-tetrahydro-2,2'-bibenzo[d][1,3]oxaphosphole, min 98%, (>99% ee), [(2S,2'S,3S,3'S)-WingPhos]
ent-L3	15-1970	(2R,2'R,3R,3'R)-4,4'-Di(anthracen-9-yl)-3,3'-di-t-butyl-2,2',3,3'-tetrahydro-2,2'-bibenzo[d][1,3]oxaphosphole, min 98% (>90% ee), [(2R,2'R,3R,3'R)-WingPhos]
L4	15-6415	(3R,3'R)-3,3'-Di-tert-butyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (3R,3'R)-BABIBOP
L5	15-6445	(2R,2'R,3R,3'R)-3,3'-Di-tert-butyl-2,2'-diisopropyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (2R,2'R,3R,3'R)-DI-iPr-BABIBOP
L6	15-6280	(2S,3R)-3-(tert-Butyl)-2-(di-tert-butylphosphino)-4-methoxy-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (2S,3R)-MeO-POP
L7	15-6210	(S)-3-(t-Butyl)-4-(2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, min. 97% (S)-BI-DIME
L8	15-6220	(2S,3S)-3-(t-Butyl)-4-(2,6-dimethoxyphenyl)-2-methyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, min. 97% (S,S)-Me-BI-DIME
L9	15-6230	(2S,3S)-3-(t-Butyl)-4-(2,6-dimethoxyphenyl)-2-i-propyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, min. 97% (S,S)-iPr-BI-DIME
L10	15-6320	(S)-1-(3-(tert-Butyl)-2,3-dihydrobenzo[d][1,3]oxaphosphol-4-yl)-2,5-diphenyl-1H-pyrrole, 97% (>99% ee)
L11	15-6295	(S)-3-(tert-Butyl)-4-(2,3,5,6-tetrahydrobenzo[1,2-b:5,4-b']difuran-8-yl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)
L12	15-6840	(S)-3-(tert-Butyl)-4-(2,6-dimethoxy-3,5-dimethylphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)
L13	15-1967	(S)-4-(Anthracen-9-yl)-3-(t-butyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 99+% (>99% ee) [(S)-AntPhos]
L14	15-6820	(2S,3S)-4-(Anthracen-9-yl)-3-(tert-butyl)-2-isopropyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)
L15	Please inquire.	
L16	Please inquire.	
L17	Please inquire.	
L18	15-6854	2-((2S,3S)-3-(tert-Butyl)-4-methoxy-2,3-dihydrobenzo[d][1,3]oxaphosphol-2-yl)-6-methoxypyridine, 97% (>99% ee) (2S,3S)-MeO-BoQPhos
L19	Please inquire.	
L20	Please inquire.	

PHOSPHORUS (Compounds)

15-1960

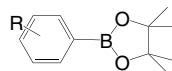
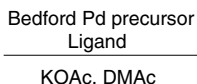
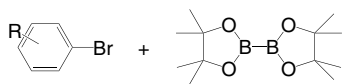
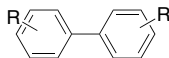
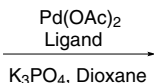
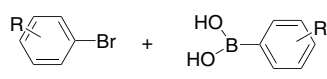
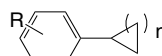
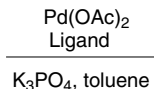
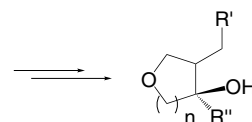
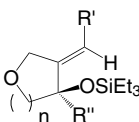
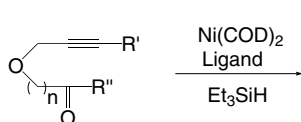
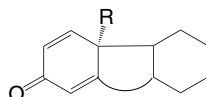
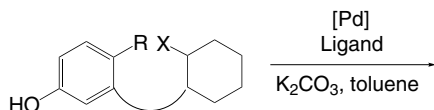
4-(Anthracen-9-yl)-3-(t-butyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 98+% rac-AntPhos (1268693-24-8) $C_{25}H_{23}O_3P$; FW: 370.42; pale yellow powdr.*air sensitive, (store cold)*

Note: Sold in collaboration with Zejun for research purposes only. Patents ZL201310020371.1, CN 201610056390.

25mg
100mg
500mg

Technical Notes:

1. Ligand/palladium catalyst for general Miyaura borylation reactions.
2. Ligand/palladium catalyst for general and sterically demanding Suzuki-Miyaura cross-coupling reactions.
3. Ligand/palladium catalyst for aryl-alkyl Suzuki-Miyaura cross-coupling reactions.
4. Ligand/nickel catalyst for intramolecular reductive cyclization.
5. Ligand/palladium catalyst for Dearomative cyclization.

Tech. Note (1)
Ref. (1)Tech. Note (2)
Ref. (2)Tech. Note (3)
Ref. (3)Tech. Note (4)
Ref. (4)Tech. Note (5)
Ref. (5,6)

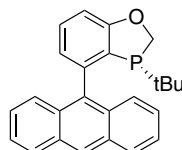
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5. *Angew. Chem. Int. Ed.*, **2015**, 54, 3033.
6. *Tetrahedron*, **2016**, 72, 1782.

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(R)-4-(Anthracen-9-yl)-3-(t-butyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 98+% (>99% ee) [(R)-AntPhos]
(1456816-37-7) $C_{25}H_{23}O_3P$; FW: 370.42; light-yellow xtl.*air sensitive, (store cold)*

Note: Sold in collaboration with Zejun for research purposes only. Patents ZL201310020371.1, CN 201610056390.

25mg
100mg
500mg

Technical Note:

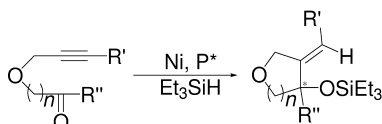
1. See 15-1960 (page 17)

PHOSPHORUS (Compounds)

15-1967	(S)-4-(Anthracen-9-yl)-3-(<i>t</i>-butyl-2,3-dihydrobenzo[d][1,3]oxaphosphole,99+% (>99% ee) [(S)-AntPhos] (1807740-34-6)	25mg 100mg 500mg
	C ₂₆ H ₂₃ O ₃ P; FW: 370.42; light yellow xtl. air sensitive, (store cold)	
	Note: Sold in collaboration with Zejun for research purposes only. Patents ZL201310020371.1, CN 201610056390.	

Technical Note:

- Ligand for the enantioselective nickel-catalyzed intramolecular reductive cyclization of alkynes.

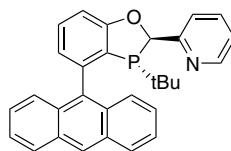


Tech. Note (1)
Ref. (1)

References:

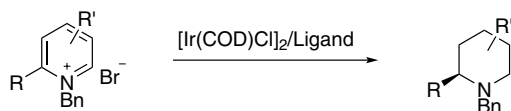
- Angew. Chem. Int. Ed., **2015**, 54, 2520.

15-6892	2-((2R,3R)-4-(Anthracen-9-yl)-3-(<i>tert</i>-butyl)-2,3-dihydrobenzo[d][1,3]oxaphosphol-2-yl)pyridine, 97% (>99% ee) (1542796-14-4)	25mg 100mg 500mg
NEW	C ₃₆ H ₂₆ NOP; FW: 447.51; white to off-white solid Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	

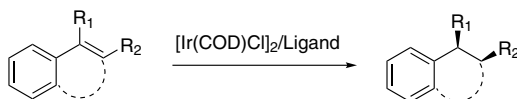


Technical Notes:

- Ligand used with iridium catalyst for asymmetric hydrogenation of pyridinium salts.
- Ligand used with iridium catalyst for asymmetric hydrogenation of unfunctionalized alkenes.



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



Tech. Note (2)
Ref. (4-5)

References:

- Org. Lett. **2018**, 20, 1333-1337.
- Org. Lett. **2016**, 18, 4920-4923.
- J. Am. Chem. Soc. **2016**, 138, 15473-15481.
- J. Org. Chem. **2014**, 79, 993-1000.
- Angew. Chem. Int. Ed. **2014**, 53, 14428-14432.

15-6894	2-((2S,3S)-4-(Anthracen-9-yl)-3-(<i>tert</i>-butyl)-2,3-dihydrobenzo[d][1,3]oxaphosphol-2-yl)pyridine, 97% (>99% ee)	25mg 100mg 500mg
NEW	C ₃₆ H ₂₆ NOP; FW: 447.51; white to off-white solid Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	

Technical Note:

- See 15-6892 (page 18)

PHOSPHORUS (Compounds)

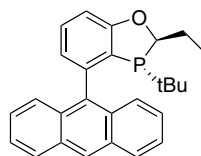
15-6888

NEW

(2R,3R)-4-(Anthracen-9-yl)-3-(tert-butyl)-2-ethyl-
2,3-dihydrobenzo[d][1,3]oxaphosphole, 97%
(>99% ee)

C₂₇H₂₇OP; FW: 398.48; white to off-white solid

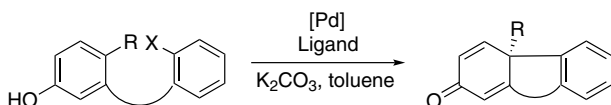
Note: Sold under license from Zejun for research
purposes only. Patents: CN 107827929 A
20180323; US 20180155375 A1 20180607.



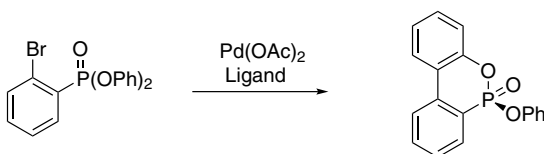
100mg
500mg

Technical Notes:

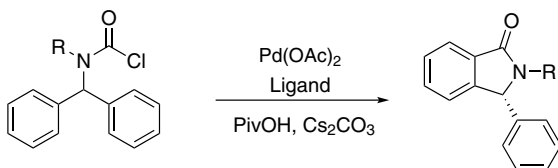
1. Ligand used with palladium catalyst for asymmetric intramolecular cyclization.
2. Ligand used with palladium catalyst for C-H functionalization.
3. Ligand used with palladium catalyst for Suzuki-Miyaura cross-coupling reactions.
4. Ligand used with nickel catalyst for asymmetric intramolecular/intermolecular reductive cyclization.
5. Ligand used with palladium catalyst for asymmetric cyclization.
6. Ligand used with palladium catalyzed Heck-type reactions.



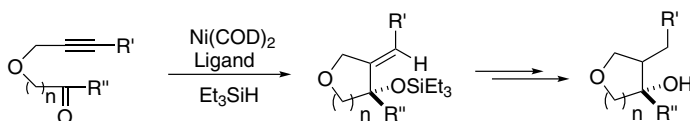
Tech. Note (1)
Ref. (1-4)



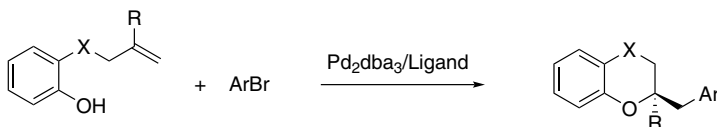
Tech. Note (2)
Ref. (5)



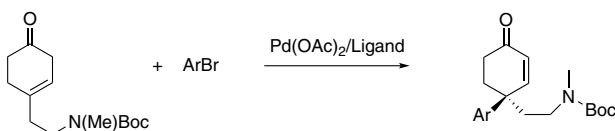
Tech. Note (3)
Ref. (6)



Tech. Note (4)
Ref. (7)



Tech. Note (5)
Ref. (8)



Tech. Note (6)
Ref. (9)

PHOSPHORUS (Compounds)

15-6888 (2R,3R)-4-(Anthracen-9-yl)-3-(tert-butyl)-2-ethyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)

References:

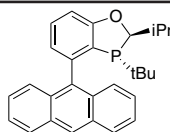
1. *Angew. Chem., Int. Ed.* **2015**, 54, 3033-3037.
2. *Tetrahedron*, **2016**, 72, 1782-1786.
3. *Chem. Sci.* **2017**, 8, 6247-6256.
4. *J. Am. Chem. Soc.* **2017**, 139, 6630.
5. *Org. Chem. Front.* **2015**, 2, 1342-1345.
6. *Tetrahedron*, **2019**, 75, 3239-3247.
7. *Angew. Chem., Int. Ed.* **2015**, 54, 2520-2524.
8. *Angew. Chem., Int. Ed.* **2016**, 55, 5044-5048.
9. *J. Org. Chem.* **2016**, 81, 10165-10171.

15-6890 (2S,3S)-4-(Anthracen-9-yl)-3-(tert-butyl)-2-ethyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (1884594-03-9) 100mg
NEW C₂₇H₂₇OP; FW: 398.48; white to off-white solid 500mg
 Note: Sold under license from Zejun for research purposes only.
 Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

Technical Note:

1. See 15-6888 (page 19)

15-6818 (2R,3R)-4-(Anthracen-9-yl)-3-(tert-butyl)-2-isopropyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) 25mg
NEW C₂₆H₂₉OP; FW: 412.51; light yellow solid 100mg
 Note: Sold under license from Zejun for research purposes only. 500mg
 Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



Technical Note:

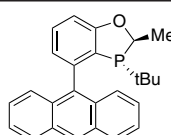
1. See 15-6888 (page 19)

15-6820 (2S,3S)-4-(Anthracen-9-yl)-3-(tert-butyl)-2-isopropyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (1891002-61-1) 25mg
NEW C₂₆H₂₉OP; FW: 412.51; light yellow solid 100mg
 Note: Sold under license from Zejun for research purposes only. 500mg
 Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

Technical Note:

1. See 15-6888 (page 19)

15-6822 (2R,3R)-4-(Anthracen-9-yl)-3-(tert-butyl)-2-methyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (1477517-20-6) 25mg
NEW C₂₆H₂₅OP; FW: 384.46; light yellow solid 100mg
 Note: Sold under license from Zejun for research purposes only. 500mg
 Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



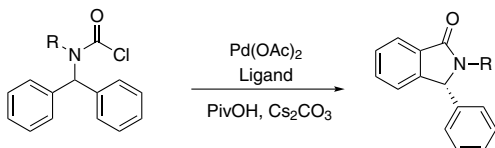
Technical Note:

1. See 15-6888 (page 19)

15-6824 (2S,3S)-4-(Anthracen-9-yl)-3-(tert-butyl)-2-methyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) 25mg
NEW C₂₆H₂₅OP; FW: 384.46; light yellow solid 100mg
 Note: Sold under license from Zejun for research purposes only. 500mg
 Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

Technical Note:

1. Ligand used with palladium catalyst for Suzuki-Miyaura cross-coupling reactions.



Tech. Note (1)
Ref. (1)

References:

1. *Tetrahedron*, **2019**, 75, 3239-3247

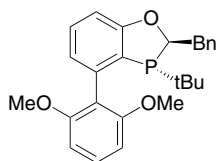
96-0660 BABIBOP Ligand Kit
See page 43

PHOSPHORUS (Compounds)

15-6848

NEW

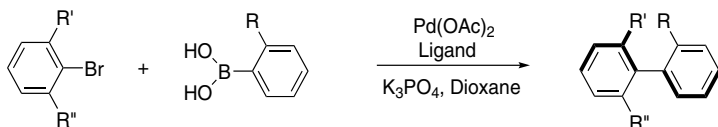
(2R,3R)-2-Benzyl-3-(tert-butyl)-4-(2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (1884457-36-6)
 $C_{26}H_{29}O_3P$; FW: 420.18; white to off-white solid
 Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



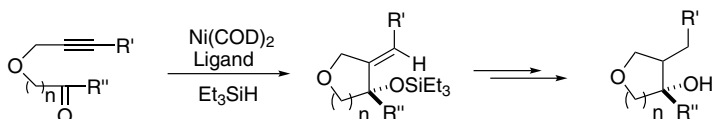
100mg
500mg
1g

Technical Notes:

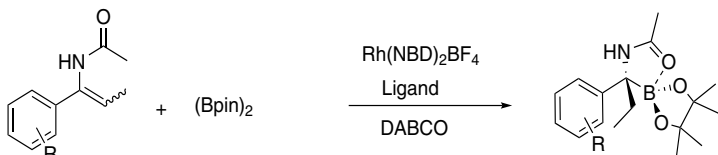
1. Ligand used with palladium catalyst for asymmetric Suzuki-Miyaura cross-coupling reactions.
2. Ligand used with nickel catalyst for asymmetric intramolecular/intermolecular reductive addition.
3. Ligand used with rhodium or palladium catalyzed asymmetric boration.
4. Ligand used with palladium catalyzed asymmetric C-H functionalization.



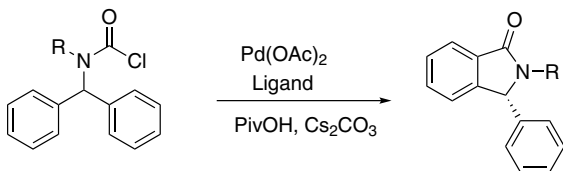
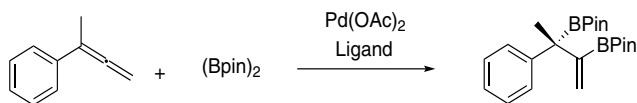
Tech. Note (1)
Ref. (1-5)



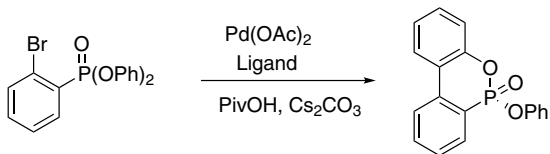
Tech. Note (2)
Ref. (6,7)



Tech. Note (3)
Ref. (8,9)



Tech. Note (4)
Ref. (10,11)



PHOSPHORUS (Compounds)

15-6848 (2R,3R)-2-Benzyl-3-(tert-butyl)-4-(2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]
(continued) oxaphosphole, 97% (>99% ee) (1884457-36-6)

References:

1. *Org. Lett.* **2012**, 14, 2258–2261.
2. *J. Am. Chem. Soc.*, **2014**, 136, 570–573.
3. *Angew. Chem., Int. Ed.* **2015**, 54, 7144–7148.
4. *Adv. Synth. Catal.* **2016**, 358, 3522–3527.
5. *ACS Catal.* **2018**, 8, 10190–10209.
6. *Angew. Chem., Int. Ed.* **2015**, 54, 2520–2524.
7. *Org. Chem. Front.* **2015**, 2, 1322–1325.
8. *J. Am. Chem. Soc.* **2015**, 137, 6746–6749.
9. *Chem. Sci.* **2017**, 8, 5161–5165.
10. *Tetrahedron*, **2019**, 75(24), 3239–3247.
11. *Org. Chem. Front.* **2015**, 2, 1342–1345.

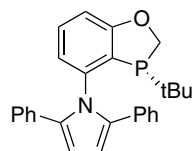
15-6846 (2S,3S)-2-Benzyl-3-(tert-butyl)-4-(2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d]
NEW [1,3]oxaphosphole, 97% (>99% ee) (1373432-13-3) 100mg
C₂₆H₂₈O₃P; FW: 420.18; white to off-white solid 500mg
Note: Sold under license from Zejun for research purposes only. 1g
Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

Technical Note:

1. See 15-6848 (page 21)

96-0650 BI-DIME Ligand Kit
See page 44

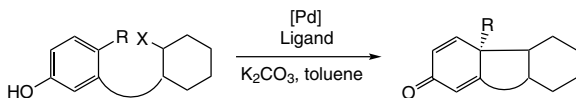
15-6315 (R)-1-(3-(tert-Butyl)-2,3-dihydrobenzo[d][1,3]
NEW oxaphosphol-4-yl)-2,5-diphenyl-1H-pyrrole, 97%
(>99% ee) (1884457-40-2)
C₂₇H₂₈NOP; FW: 411.48; light yellow xtl.
air sensitive
Note: Sold in collaboration with Zejun for research purposes only. Patents: ZL2013105048267, CN104558038.



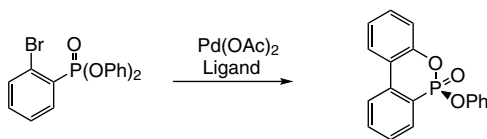
50mg
250mg

Technical Notes:

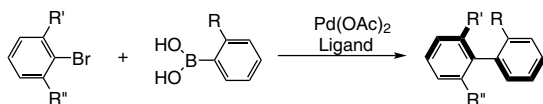
1. Ligand/palladium catalyst for dearomatic cyclization.
2. Ligand/palladium catalyst for cyclization.
3. Ligand/palladium catalyst for Suzuki-Miyaura cross-coupling reactions.
4. Ligand/nickel catalyst for asymmetric intramolecular/intremolecular reductive cyclization.
5. Ligand/palladium catalyst for asymmetric cyclization.



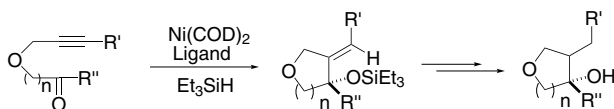
Tech. Note (1)
Ref. (1-4)



Tech. Note (2)
Ref. (5)



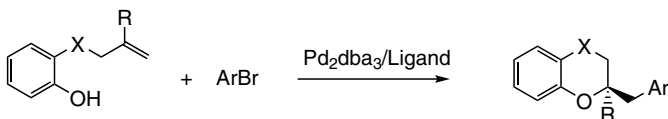
Tech. Note (3)
Ref. (6-7)



Tech. Note (4)
Ref. (8)

PHOSPHORUS (Compounds)

15-6315 (continued) **(R)-1-(3-(tert-Butyl)-2,3-dihydrobenzo[d][1,3]oxaphosphol-4-yl)-2,5-diphenyl-1H-pyrrole, 97% (>99% ee) (1884457-40-2)**



Tech. Note (5)
Ref. (9)

References:

1. *Angew. Chem., Int. Ed.* **2015**, 54, 3033.
2. *Tetrahedron.* **2016**, 72, 1782.
3. *Chem. Sci.*, **2017**, 8, 6247.
4. *J. Am. Chem. Soc.* **2017**, 139, 6630.
5. *Org. Chem. Front.* **2015**, 2, 1342.
6. *Org. Lett.* **2012**, 14, 2258.
7. *J. Am. Chem. Soc.*, **2014**, 136, 570.
8. *Angew. Chem., Int. Ed.* **2015**, 54, 2520.
9. *Angew. Chem., Int. Ed.* **2016**, 55, 5044.

15-6320**NEW**

(S)-1-(3-(tert-Butyl)-2,3-dihydrobenzo[d][1,3]oxaphosphol-4-yl)-2,5-diphenyl-1H-pyrrole, 97% (>99% ee) (1683581-58-9)

C₂₇H₂₆NOP; FW: 411.48; light yellow xtl.

air sensitive

Note: Sold in collaboration with Zejun for research purposes only. Patents: ZL2013105048267, CN104558038.

50mg
250mg

Technical Note:

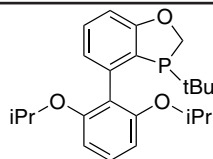
1. See 15-6315 (page 22)

15-6868**NEW**

3-(tert-Butyl)-4-(2,6-diisopropoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97%

C₂₃H₃₁O₃P; FW: 386.20; white to off-white solid

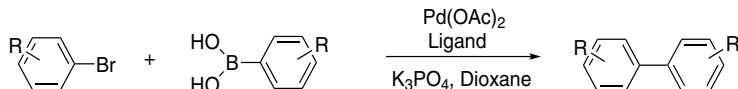
Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607



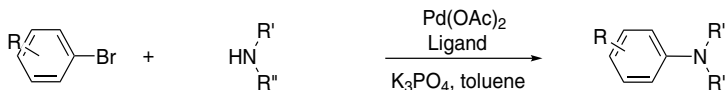
100mg
500mg

Technical Notes:

1. Ligand used with palladium catalyst for general and/or sterically demanding Suzuki-Miyaura cross-coupling reactions.
2. Ligand used with palladium catalyst for sterically demanding Buchwald-Hartwig amination.



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



Tech. Note (2)
Ref. (3)

References:

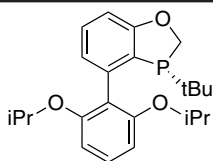
1. *Angew. Chem., Int. Ed.* **2010**, 49, 5879-5883.
2. *Chem. Eur. J.* **2013**, 19, 2261-2265.
3. *Adv. Syn. Cat.* **2011**, 353, 533-537.

15-6810**NEW**

(R)-3-(tert-Butyl)-4-(2,6-diisopropoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)

C₂₃H₃₁O₃P; FW: 386.20; white to off-white solid

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



25mg
100mg
500mg

Technical Notes:

1. See 15-6848 (page 21)

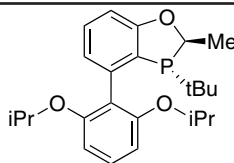
PHOSPHORUS (Compounds)

15-6812	(S)-3-(tert-Butyl)-4-(2,6-diisopropoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)	25mg 100mg 500mg
NEW	$C_{25}H_{31}O_3P$; FW: 386.20; white to off-white solid Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	

Technical Note:

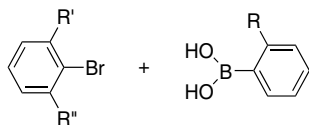
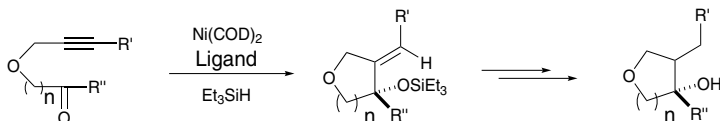
1. See 15-6848 (page 21)

15-6826	(2R,3R)-3-(tert-Butyl)-4-(2,6-diisopropoxyphenyl)-2-methyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)	25mg 100mg 500mg
NEW	$C_{24}H_{33}O_3P$; FW: 400.21; white to off-white solid Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	



Technical Notes:

1. Ligand used with palladium catalyst for asymmetric Suzuki-Miyaura cross-coupling reactions.
2. Ligand used with nickel catalyst for asymmetric intramolecular/intermolecular reductive addition.

Tech. Note (1)
Ref. (1-5)Tech. Note (2)
Ref. (6,7)

References:

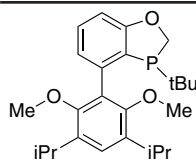
1. *Org. Lett.* **2012**, 14, 2258–2261.
2. *J. Am. Chem. Soc.*, **2014**, 136, 570–573.
3. *Angew. Chem., Int. Ed.* **2015**, 54, 7144–7148.
4. *Adv. Synth. Catal.* **2016**, 358, 3522–3527.
5. *ACS Catal.* **2018**, 8, 10190–10209.
6. *Angew. Chem., Int. Ed.* **2015**, 54, 2520–2524.
7. *Org. Chem. Front.* **2015**, 2, 1322–1325.

15-6828	(2S,3S)-3-(tert-butyl)-4-(2,6-diisopropoxyphenyl)-2-methyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)	25mg 100mg 500mg
NEW	$C_{24}H_{33}O_3P$; FW: 400.21; white to off-white solid Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	

Technical Note:

1. See 15-6826 (page 24)

15-6866	3-(tert-Butyl)-4-(3,5-diisopropyl-2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97%	100mg 500mg
NEW	$C_{26}H_{35}O_3P$; FW: 414.23; white to off-white solid Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	



Technical Note:

1. See 15-6868 (page 23)

PHOSPHORUS (Compounds)

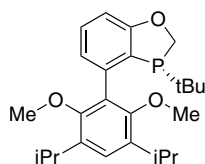
15-6838

NEW

(R)-3-(tert-Butyl)-4-(3,5-diisopropyl-2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)

C₂₅H₃₅O₃P; FW: 414.23; white to off-white solid

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



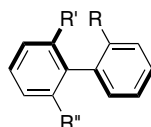
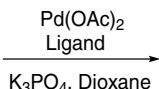
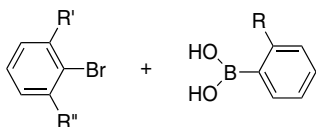
25mg

100mg

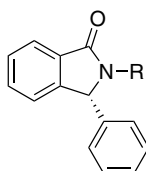
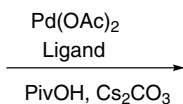
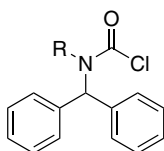
500mg

Technical Notes:

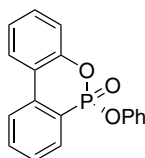
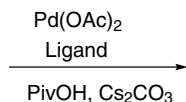
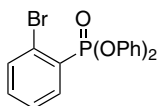
1. Ligand used with palladium catalyst for asymmetric Suzuki-Miyaura cross-coupling reactions.
2. Ligand used with palladium catalyzed asymmetric C-H functionalization.



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



Tech. Note (2)
Ref. (6,7)



References:

1. *Org. Lett.* **2012**, *14*, 2258–2261.
2. *J. Am. Chem. Soc.*, **2014**, *136*, 570–573.
3. *Angew. Chem., Int. Ed.* **2015**, *54*, 7144–7148.
4. *Adv. Synth. Catal.* **2016**, *358*, 3522–3527.
5. *ACS Catal.* **2018**, *8*, 10190–10209.
6. *Tetrahedron*, 2019, *75*(24), 3239–3247.
7. *Org. Chem. Front.* **2015**, *2*, 1342–1345.

15-6844

NEW

(S)-3-(tert-Butyl)-4-(3,5-diisopropyl-2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)

C₂₅H₃₅O₃P; FW: 414.23; white to off-white solid

Note: Sold under license from Zejun for research purposes only.

Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

Technical Note:

1. See 15-6838 (page 25)

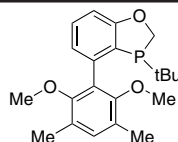
15-6864

NEW

3-(tert-Butyl)-4-(2,6-dimethoxy-3,5-dimethylphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97%

C₂₁H₂₇O₃P; FW: 358.16; white to off-white solid

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



100mg

500mg

Technical Note:

1. See 15-6868 (page 23)

PHOSPHORUS (Compounds)

15-6834 NEW	(R)-3-(tert-Butyl)-4-(2,6-dimethoxy-3,5-dimethylphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)	25mg
	$C_{21}H_{27}O_3P$; FW: 358.16; white to off-white solid	100mg
	Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	500mg

Technical Note:

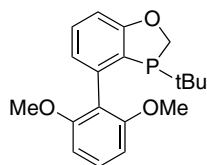
1. See 15-6838 (page 25)

15-6840 NEW	(S)-3-(tert-Butyl)-4-(2,6-dimethoxy-3,5-dimethylphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (201202-03-7)	25mg
	$C_{21}H_{27}O_3P$; FW: 358.16; white to off-white solid	100mg
	Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	500mg

Technical Note:

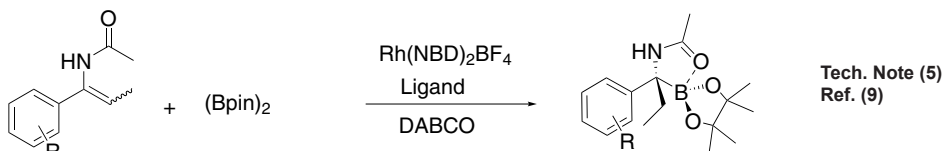
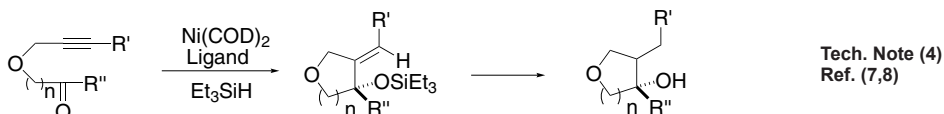
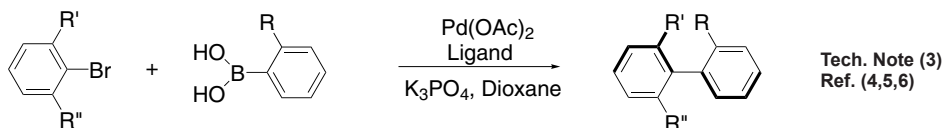
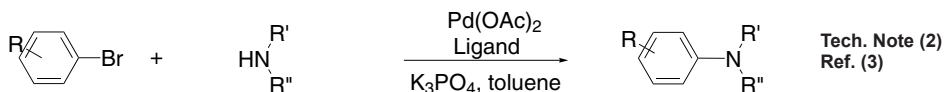
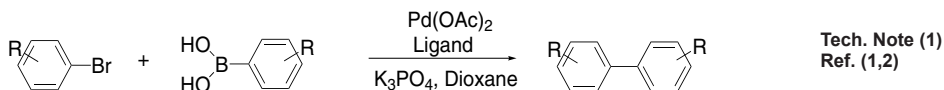
1. See 15-6838 (page 25)

15-6205 NEW	3-(t-Butyl)-4-(2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, min. 97% rac-BI-DIME (1246888-90-3)	25mg
	$C_{19}H_{23}O_3P$; FW: 330.36; white xtl.	100mg
	Note: Sold in collaboration with Zejun for research purposes only. Patents: ZL2013105048267, CN104558038	500mg



Technical Notes:

1. Ligand/palladium catalyst for general and sterically demanding Suzuki-Miyaura cross-coupling reactions.
2. Ligand/palladium catalyst for sterically demanding Buchwald-Hartwig amination.
3. Ligand/palladium catalyst for asymmetric Suzuki-Miyaura cross-coupling reactions.
4. Ligand/nickel catalyst for asymmetric intramolecular reductive cyclization.
5. Ligand/rhodium catalyst for asymmetric hydroboration.



PHOSPHORUS (Compounds)

15-6205 **3-(t-Butyl)-4-(2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, min. 97%**
(continued) **rac-BI-DIME (1246888-90-3)**

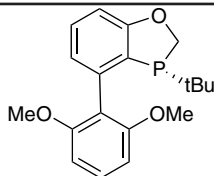
References:

1. *Angew. Chem., Int. Ed.* **2010**, 49, 5879-5883.
2. *Chem. Eur. J.* **2013**, 19, 2261-2265.
3. *Adv. Syn. Cat.* **2011**, 353, 533-537.
4. *Org. Lett.* **2012**, 14, 2258-2261.
5. *J. Am. Chem. Soc.*, **2014**, 136, 570-573.
6. *Angew. Chem., Int. Ed.* **2015**, 54, 7144-7148.
7. *Angew. Chem., Int. Ed.* **2015**, 54, 2520-2524.
8. *Org. Chem. Front.* **2015**, 2, 1322-1325.
9. *J. Am. Chem. Soc.* **2015**, 137, 6746-6749.

15-6211**NEW**

(R)-3-(t-Butyl)-4-(2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, min. 97%
(R)-BI-DIME (1373432-03-7)

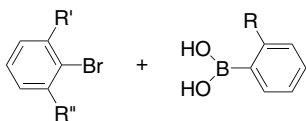
C₁₉H₂₃O₃P; FW: 330.36; light-yellow xtl.
 Note: Sold in collaboration with Zejun for research purposes only. Patents: ZL2013105048267, CN104558038.



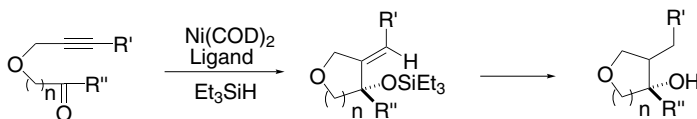
25mg
 100mg
 500mg

Technical Notes:

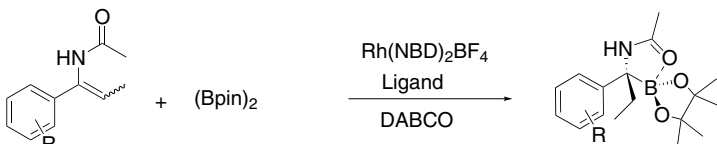
1. Ligand/palladium catalyst for asymmetric Suzuki-Miyaura cross-coupling reactions.
2. Ligand/nickel catalyst for asymmetric intramolecular reductive cyclization.
3. Ligand/rhodium catalyst for asymmetric hydroboration.



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



Tech. Note (2)
Ref. (4,5)



Tech. Note (3)
Ref. (6)

References:

1. *Org. Lett.* **2012**, 14, 2258-2261.
2. *J. Am. Chem. Soc.*, **2014**, 136, 570-573.
3. *Angew. Chem., Int. Ed.* **2015**, 54, 7144-7148.
4. *Angew. Chem., Int. Ed.* **2015**, 54, 2520-2524.
5. *Org. Chem. Front.* **2015**, 2, 1322-1325.
6. *J. Am. Chem. Soc.* **2015**, 137, 6746-6749.

15-6210**NEW**

(S)-3-(t-Butyl)-4-(2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, min. 97%
(S)-BI-DIME (1373432-09-7)

C₁₉H₂₃O₃P; FW: 330.36; light-yellow xtl.
 Note: Sold in collaboration with Zejun for research purposes only.
 Patents: ZL2013105048267, CN104558038.

25mg
 100mg
 500mg

Technical Note:

1. See 15-6211 (page 27)

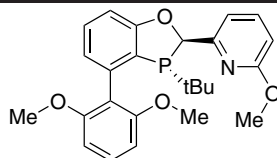
PHOSPHORUS (Compounds)

15-6862

NEW

2-((2R,3R)-3-(tert-Butyl)-4-(2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphol-2-yl)-6-methoxypyridine, 97% (>99% ee)

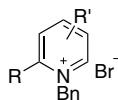
C₂₅H₂₈NO₄P; FW: 437.47; white to off-white solid
 Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



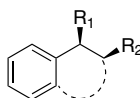
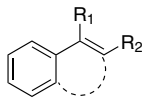
25mg
 100mg
 500mg

Technical Notes:

- Ligand used with iridium catalyst for asymmetric hydrogenation of pyridinium salts.
- Ligand used with iridium catalyst for asymmetric hydrogenation of unfunctionalized alkenes.



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



Tech. Note (2)
 Ref. (4-5)

References:

- Org. Lett.* **2018**, *20*, 1333–1337.
- Org. Lett.* **2016**, *18*, 4920–4923.
- J. Am. Chem. Soc.* **2016**, *138*, 15473–15481.
- J. Org. Chem.* **2014**, *79*, 993–1000.
- Angew. Chem. Int. Ed.* **2014**, *53*, 14428–14432.

15-6856

NEW

2-((2S,3S)-3-(tert-Butyl)-4-(2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphol-2-yl)-6-methoxypyridine, 97% (>99% ee) (2003230-67-7)

C₂₅H₂₈NO₄P; FW: 437.47; white to off-white solid
 Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

25mg
 100mg
 500mg

Technical Note:

- See 15-6862 (page 28)

15-6882

NEW

(R)-3-(tert-Butyl)-4-(2,6-dimethoxyphenyl)-2,2-dimethyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)

C₂₄H₂₇O₃P; FW: 358.16; white to off-white solid
 Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

25mg
 100mg
 500mg

Technical Note:

- See 15-6826 (page 24)

15-6880

NEW

(S)-3-(tert-Butyl)-4-(2,6-dimethoxyphenyl)-2,2-dimethyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (2227217-19-6)

C₂₄H₂₇O₃P; FW: 358.16; white to off-white solid
 Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

25mg
 100mg
 500mg

Technical Note:

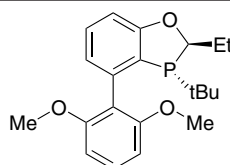
- See 15-6826 (page 24)

15-6886

NEW

(2R,3R)-3-(tert-Butyl)-4-(2,6-dimethoxyphenyl)-2-ethyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)

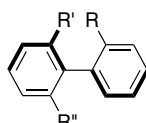
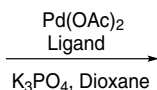
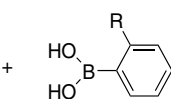
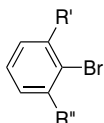
C₂₄H₂₇O₃P; FW: 358.16; white to off-white solid
 Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



100mg
 500mg

Technical Note:

- Ligand used with palladium catalyst for asymmetric Suzuki-Miyaura cross-coupling reactions.



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

PHOSPHORUS (Compounds)

15-6886 (2R,3R)-3-(tert-Butyl)-4-(2,6-dimethoxyphenyl)-2-ethyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)

References:

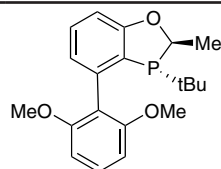
1. *Org. Lett.* **2012**, 14, 2258–2261.
2. *J. Am. Chem. Soc.*, **2014**, 136, 570–573.
3. *Angew. Chem., Int. Ed.* **2015**, 54, 7144–7148.
4. *Adv. Synth. Catal.* **2016**, 358, 3522–3527.
5. *ACS Catal.* **2018**, 8, 10190–10209.

15-6884 (2S,3S)-3-(tert-Butyl)-4-(2,6-dimethoxyphenyl)-2-ethyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (2247162-97-4) 100mg
NEW 500mg
 $C_{21}H_{27}O_3P$; FW: 358.16; white to off-white solid
 Note: Sold under license from Zejun for research purposes only.
 Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

Technical Note:

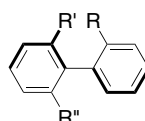
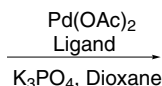
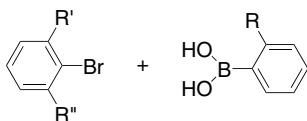
1. See 15-6886 (page 28)

15-6225 (2R,3R)-3-(t-Butyl)-4-(2,6-dimethoxyphenyl)-2-methyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, min. 97% (R,R)-Me-BI-DIME (1477517-18-2) 25mg
NEW 100mg
 $C_{20}H_{25}O_3P$; FW: 344.38; light-yellow xtl.
 Note: Sold in collaboration with Zejun for research purposes only. Patents: ZL2013105048267, CN104558038.



Technical Note:

1. Ligand/palladium catalyst for asymmetric Suzuki-Miyaura cross-coupling reactions.



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

References:

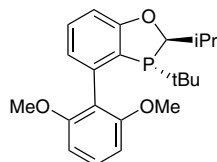
1. *Org. Lett.* **2012**, 14, 2258–2261.
2. *J. Am. Chem. Soc.* **2014**, 136, 570–573.
3. *Angew. Chem., Int. Ed.* **2015**, 54, 7144–7148.

15-6220 (2S,3S)-3-(t-Butyl)-4-(2,6-dimethoxyphenyl)-2-methyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, min. 97% (S,S)-Me-BI-DIME (1373432-11-1) 25mg
NEW 100mg
 $C_{20}H_{25}O_3P$; FW: 344.38; light-yellow xtl.
 Note: Sold in collaboration with Zejun for research purposes only.
 Patents: ZL2013105048267, CN104558038.

Technical Note:

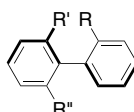
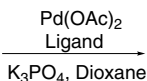
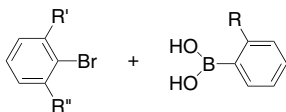
1. See 15-6225 (page 29)

15-6235 (2R,3R)-3-(t-Butyl)-4-(2,6-dimethoxyphenyl)-2-isopropyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, min. 97% (>99% ee), (R,R)-iPr-BI-DIME (1477517-19-3) 25mg
NEW 100mg
 $C_{22}H_{29}O_3P$; FW: 372.44; light-yellow xtl.
 Note: Sold in collaboration with Zejun for research purposes only. Patents: ZL2013105048267, CN104558038.



Technical Note:

1. Ligand/palladium catalyst for asymmetric Suzuki-Miyaura cross-coupling reactions.



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

References:

1. *Org. Lett.* **2012**, 14, 2258–2261.
2. *J. Am. Chem. Soc.* **2014**, 136, 570–573.
3. *Angew. Chem., Int. Ed.* **2015**, 54, 7144–7148.

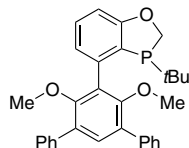
PHOSPHORUS (Compounds)

15-6230	(2S,3S)-3-(<i>t</i>-Butyl)-4-(2,6-dimethoxyphenyl)-2-<i>i</i>-propyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, min. 97% (>99% ee), (S,S)-iPr-BI-DIME (1477517-21-7)	25mg 100mg 500mg
NEW	$C_{22}H_{29}O_3P$; FW: 372.44; light-yellow xtl. Note: Sold in collaboration with Zejun for research purposes only. Patents: ZL2013105048267, CN104558038.	

Technical Note:

- See 15-6235 (page 29)

15-6896	3-(<i>tert</i>-Butyl)-4-(4',6'-dimethoxy-[1,1':3',1''-terphenyl]-5'-yl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97%	100mg 500mg
NEW	$C_{31}H_{31}O_3P$; FW: 482.20; white to off-white solid Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	



Technical Note:

- See 15-6868 (page 23)

15-6836	(R)-3-(<i>tert</i>-Butyl)-4-(4',6'-dimethoxy-[1,1':3',1''-terphenyl]-5'-yl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)	25mg 100mg 500mg
NEW	$C_{31}H_{31}O_3P$; FW: 482.20; white to off-white solid Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	

Technical Note:

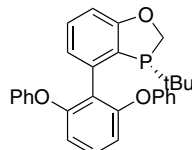
- See 15-6838 (page 25)

15-6842	(S)-3-(<i>tert</i>-Butyl)-4-(4',6'-dimethoxy-[1,1':3',1''-terphenyl]-5'-yl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (2021201-99-8)	25mg 100mg 500mg
NEW	$C_{31}H_{31}O_3P$; FW: 482.20; white to off-white solid Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	

Technical Note:

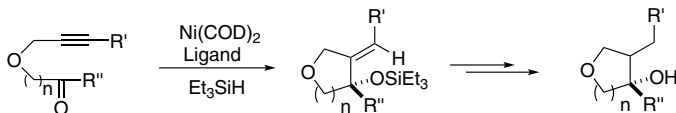
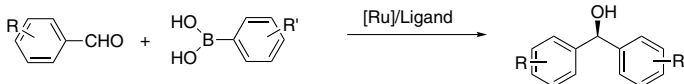
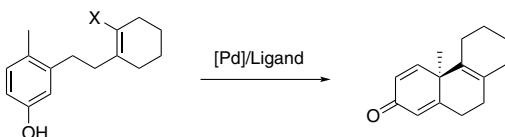
- See 15-6838 (page 25)

15-6814	(R)-3-(<i>tert</i>-Butyl)-4-(2,6-diphenoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (1441830-74-5)	25mg 100mg 500mg
NEW	$C_{28}H_{27}O_3P$; FW: 454.17; white to off-white solid Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607	



Technical Notes:

- Ligand used with nickel catalyst for asymmetric intramolecular/intermolecular reductive addition.
- Ligand used with ruthenium catalyzed asymmetric addition.
- Ligand used with palladium catalyst for asymmetric intramolecular cyclization.

Tech. Note (1)
Ref. (1,2)Tech. Note (2)
Ref. (3)Tech. Note (3)
Ref. (4,5)

PHOSPHORUS (Compounds)

15-6814 (R)-3-(tert-Butyl)-4-(2,6-diphenoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97%
(continued) (>99% ee) (1441830-74-5)

References:

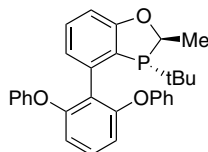
1. *Angew. Chem., Int. Ed.* **2015**, 54, 2520-2524.
2. *Org. Chem. Front.* **2015**, 2, 1322-1325.
3. *J. Org. Chem.* **2013**, 78, 6350-6355.
4. *Angew. Chem., Int. Ed.* **2015**, 54, 3033-3037.
5. *Tetrahedron.* **2016**, 72, 1782-1786.

15-6816 (S)-3-(tert-Butyl)-4-(2,6-diphenoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) 25mg
NEW C₂₅H₂₇O₃P; FW: 454.16; light yellow solid 100mg
Note: Sold under license from Zejun for research purposes only. 500mg
Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

Technical Note:

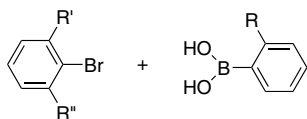
1. See 15-6814 (page 30)

15-6830 (2R,3R)-3-(tert-butyl)-4-(2,6-diphenoxyphenyl)-2-methyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) 25mg
NEW C₃₀H₂₉O₃P; FW: 468.18; white to off-white solid 100mg
Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; 500mg
US 20180155375 A1 20180607.

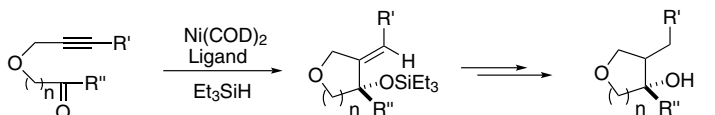


Technical Notes:

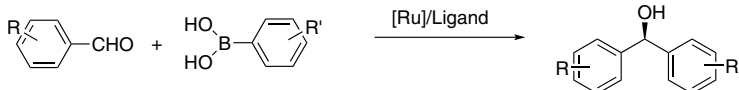
1. Ligand used with palladium catalyst for asymmetric Suzuki-Miyaura cross-coupling reactions.
2. Ligand used with nickel catalyst for asymmetric intramolecular/intermolecular reductive addition.
3. Ligand used with ruthenium catalyzed asymmetric addition.
4. Ligand used with palladium catalyst for asymmetric intramolecular cyclization.



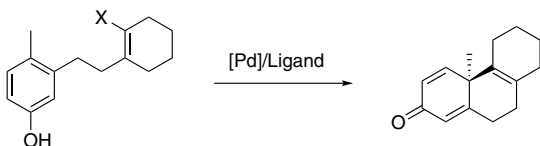
Tech. Note (1)
Ref. (1-5)



Tech. Note (2)
Ref. (6,7)



Tech. Note (3)
Ref. (8)



Tech. Note (4)
Ref. (9,10)

References:

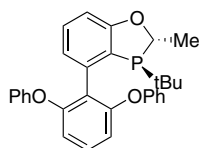
1. *Org. Lett.* **2012**, 14, 2258-2261.
2. *J. Am. Chem. Soc.*, **2014**, 136, 570-573.
3. *Angew. Chem., Int. Ed.* **2015**, 54, 7144-7148.
4. *Adv. Synth. Catal.* **2016**, 358, 3522-3527.
5. *ACS Catal.* **2018**, 8, 10190-10209.
6. *Angew. Chem., Int. Ed.* **2015**, 54, 2520-2524.
7. *Org. Chem. Front.* **2015**, 2, 1322-1325.
8. *J. Org. Chem.* **2013**, 78, 6350-6355.
9. *Angew. Chem., Int. Ed.* **2015**, 54, 3033-3037.
10. *Tetrahedron.* **2016**, 72, 1782-1786.

PHOSPHORUS (Compounds)

15-6832

NEW

(2S,3S)-3-(tert-Butyl)-4-(2,6-diphenoxypheyl)-2-methyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)
 $C_{30}H_{29}O_3P$; FW: 468.18; white to off-white solid
 Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



25mg
100mg
500mg

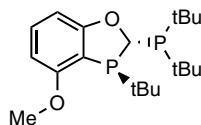
Technical Notes:

- See 15-6830 (page 31)

15-6285

NEW

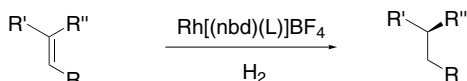
(2R,3S)-3-(tert-Butyl)-2-(di-tert-butylphosphino)-4-methoxy-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (2R,3S)-MeO-POP
 $C_{20}H_{34}O_3P_2$; FW: 368.44; light yellow powdr.
air sensitive
 Note: Sold in collaboration with Zejun for research purposes only. Patents: ZL2013105048267, CN104558038.



25mg
100mg

Technical Note:

- Ligand/Rhodium catalyst for asymmetric hydrogenation.



Tech. Note (1)
Ref. (1)

References:

- Org. Lett.* **2010**, 12, 176.

15-6280

NEW

(2S,3R)-3-(tert-Butyl)-2-(di-tert-butylphosphino)-4-methoxy-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (2S,3R)-MeO-POP (1215081-28-9)
 $C_{20}H_{34}O_3P_2$; FW: 368.44; light yellow powdr.
air sensitive
 Note: Sold in collaboration with Zejun for research purposes only. Patents: ZL2013105048267, CN104558038.

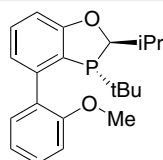
25mg
100mg

Technical Note:

- See 15-6285 (page 32)

15-6878

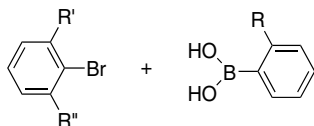
(2R,3R)-3-(tert-Butyl)-2-isopropyl-4-(2-methoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)
 $C_{21}H_{27}O_3P$; FW: 342.17; white to off-white solid
 Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



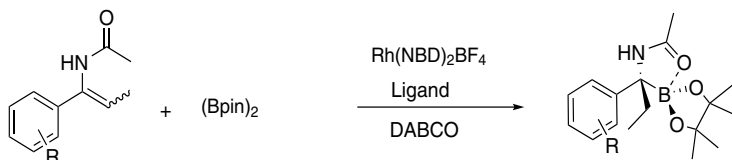
100mg
500mg

Technical Notes:

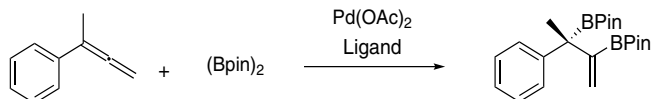
- Ligand used with palladium catalyst for asymmetric Suzuki-Miyaura cross-coupling reactions.
- Ligand used with rhodium or palladium catalyzed asymmetric boron.



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



Tech. Note (2)
Ref. (6,7)



PHOSPHORUS (Compounds)

15-6878 (2R,3R)-3-(tert-Butyl)-2-isopropyl-4-(2-methoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)
(continued)

References:

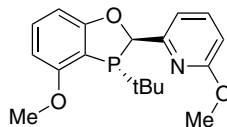
1. *Org. Lett.* **2012**, 14, 2258–2261.
2. *J. Am. Chem. Soc.*, **2014**, 136, 570–573.
3. *Angew. Chem., Int. Ed.* **2015**, 54, 7144–7148.
4. *Adv. Synth. Catal.* **2016**, 358, 3522–3527.
5. *ACS Catal.* **2018**, 8, 10190–10209.
6. *J. Am. Chem. Soc.* **2015**, 137, 6746–6749.
7. *Chem. Sci.* **2017**, 8, 5161–5165.

15-6876 (2S,3S)-3-(tert-Butyl)-2-isopropyl-4-(2-methoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) 100mg
NEW 500mg
C₂₁H₂₇O₂P; FW: 342.17; white to off-white solid
Note: Sold under license from Zejun for research purposes only.
Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

Technical Note:

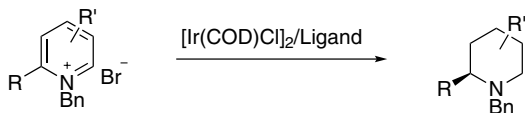
1. See 15-6878 (page 32)

15-6860 2-((2R,3R)-3-(tert-Butyl)-4-methoxy-2,3-dihydrobenzo[d][1,3]oxaphosphol-2-yl)-6-methoxypyridine, 97% (>99% ee), (2R,3R)-MeO-BoQPhos (1542796-16-6) 25mg
NEW 100mg
C₁₈H₂₂NO₃P; FW: 331.35; white to off-white solid
air sensitive
Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

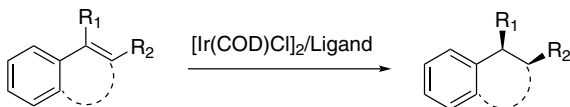


Technical Notes:

1. Ligand used with iridium catalyst for asymmetric hydrogenation of pyridinium salts.
2. Ligand used with iridium catalyst for asymmetric hydrogenation of unfunctionalized alkenes.



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



Tech. Note (2)
Ref. (4-5)

References:

1. *Org. Lett.* **2018**, 20, 1333–1337.
2. *Org. Lett.* **2016**, 18, 4920–4923.
3. *J. Am. Chem. Soc.* **2016**, 138, 15473–15481.
4. *J. Org. Chem.* **2014**, 79, 993–1000.
5. *Angew. Chem. Int. Ed.* **2014**, 53, 14428–14432.

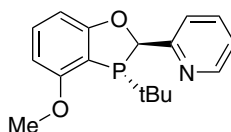
15-6854 2-((2S,3S)-3-(tert-Butyl)-4-methoxy-2,3-dihydrobenzo[d][1,3]oxaphosphol-2-yl)-6-methoxypyridine, 97% (>99% ee), (2S,3S)-MeO-BoQPhos (1777796-37-8) 25mg
NEW 100mg
C₁₈H₂₂NO₃P; FW: 331.35; white to off-white solid
air sensitive
Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

Technical Note:

1. See 15-6860 (page 33)

PHOSPHORUS (Compounds)

15-6858
NEW
2-((2R,3R)-3-(tert-Butyl)-4-methoxy-2,3-dihydrobenzo[d][1,3]oxaphosphol-2-yl)pyridine, 97% (>99% ee) (1542796-07-5)
 $C_{17}H_{20}NO_2P$; FW: 301.32; white to off-white solid
air sensitive
 Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



25mg
 100mg
 500mg

Technical Note:

1. See 15-6860 (page 33)

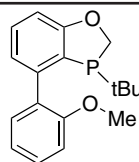
15-6852
NEW
2-((2S,3S)-3-(tert-Butyl)-4-methoxy-2,3-dihydrobenzo[d][1,3]oxaphosphol-2-yl)pyridine, 97% (>99% ee)
 $C_{17}H_{20}NO_2P$; FW: 301.32; white to off-white solid
air sensitive
 Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

25mg
 100mg
 500mg

Technical Note:

1. See 15-6860 (page 33)

15-6870
NEW
3-(tert-Butyl)-4-(2-methoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (1246888-88-9)
 $C_{18}H_{21}O_2P$; FW: 300.12; white to off-white solid
air sensitive
 Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

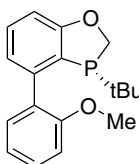


1g
 5g

Technical Note:

1. See 15-6868 (page 23)

15-6872
NEW
(R)-3-(tert-Butyl)-4-(2-methoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (1338454-28-6)
 $C_{18}H_{21}O_2P$; FW: 300.12; white to off-white solid
air sensitive
 Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



100mg
 500mg

Technical Notes:

1. See 15-6878 (page 32)

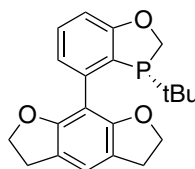
15-6874
NEW
(S)-3-(tert-Butyl)-4-(2-methoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)
 $C_{18}H_{21}O_2P$; FW: 300.12; White to off-white solid
air sensitive
 Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

100mg
 500mg

Technical Note:

1. See 15-6878 (page 32)

15-6290
NEW
(R)-3-(tert-Butyl)-4-(2,3,5,6-tetrahydrobenzo[1,2-b:5,4-b']difuran-8-yl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (1835717-07-1)
 $C_{21}H_{23}O_3P$; FW: 354.39; white powd.
air sensitive
 Note: Sold in collaboration with Zejun for research purposes only. Patents: ZL2013105048267, CN104558038.



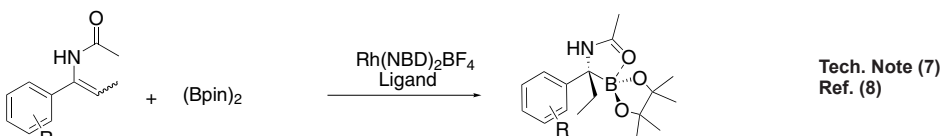
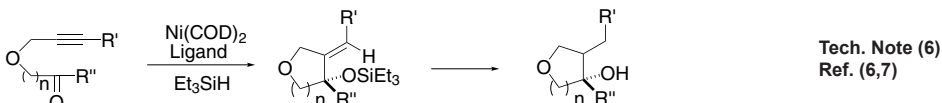
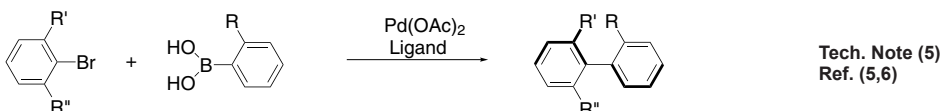
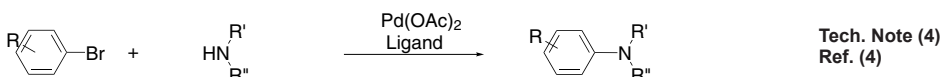
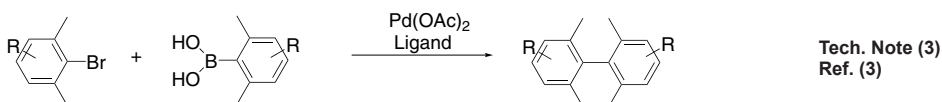
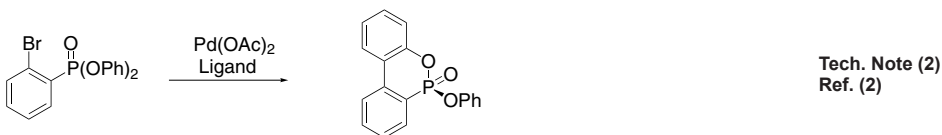
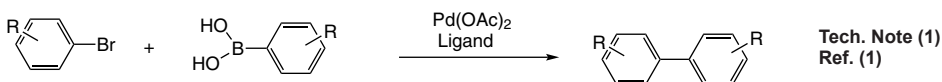
50mg
 250mg

Technical Notes:

1. Ligand/palladium catalyst for general Suzuki-Miyaura borylation reactions.
2. Ligand/palladium catalyst for Cyclization.
3. Ligand/palladium catalyst for general and sterically demanding Suzuki-Miyaura cross-coupling reactions.
4. Ligand/palladium catalyst for sterically demanding Buchwald-Hartwig amination.
5. Ligand/palladium catalyst for asymmetric Suzuki-Miyaura cross-coupling reactions.
6. Ligand/nickel catalyst for asymmetric intramolecular/intremolecular reductive cyclization.
7. Ligand/rhodium catalyst for asymmetric hydroboration.

PHOSPHORUS (Compounds)

15-6290 (R)-3-(tert-Butyl)-4-(2,3,5,6-tetrahydrobenzo[1,2-b:5,4-b']difuran-8-yl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (1835717-07-1)



References:

1. *Angew. Chem., Int. Ed.* **2010**, 49, 5879-5883.
2. *Org. Chem. Front.* **2015**, 2, 1342-1345.
3. *Chem. Eur. J.* **2013**, 19, 2261-2265.
4. *Adv. Syn. Cat.* **2011**, 353, 533-537.
5. *Org. Lett.* **2012**, 14, 2258-2261.
6. *J. Am. Chem. Soc.*, **2014**, 136, 570-573.
7. *Angew. Chem., Int. Ed.* **2015**, 54, 7144-7148.
8. *Angew. Chem., Int. Ed.* **2015**, 54, 2520-2524.
9. *J. Am. Chem. Soc.* **2015**, 137, 6746-6749.

15-6295**NEW**

(S)-3-(tert-Butyl)-4-(2,3,5,6-tetrahydrobenzo[1,2-b:5,4-b']difuran-8-yl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)

C₂₁H₂₃O₃P; FW: 354.39; white powdr.

air sensitive

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

Patents: ZL2013105048267, CN104558038.

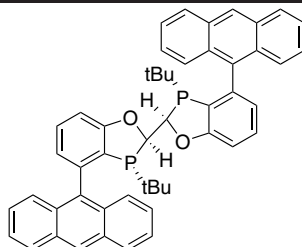
50mg
250mg

Technical Note:

1. See 15-6290 (page 34)

PHOSPHORUS (Compounds)

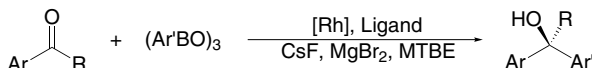
15-1970 (2R,2'R,3R,3'R)-4,4'-Di(anthracen-9-yl)-3,3'-di-*t*-butyl-2,2',3,3'-tetrahydro-2,2'-bibenzo[d][1,3]oxaphosphole, min 98% (>90% ee), [(2R,2'R,3R,3'R)-WingPhos] (1884680-45-8)
C₅₀H₄₄O₂P₂; FW: 738.83; light yellow powdr.
air sensitive, (store cold)
Note: Sold in collaboration with Zejun for research purposes only. Patents ZL201310020371.1, CN 201610056390.



25mg
100mg
500mg

Technical Note:

- Ligand for rhodium-catalyzed enantioselective addition of arylboroxines to simple aryl ketones.



Tech. Note (1)
Ref. (1)

References:

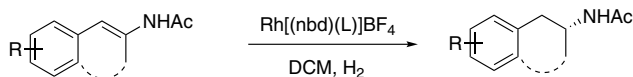
- Angew. Chem.Int Ed., **2016**, 55, 4527.

15-1975 (2S,2'S,3S,3'S)-4,4'-Di(anthracen-9-yl)-3,3'-di-*t*-butyl-2,2',3,3'-tetrahydro-2,2'-bibenzo[d][1,3]oxaphosphole, min 98%, (>99% ee), [(2S,2'S,3S,3'S)-WingPhos] (1435940-19-4)
C₅₀H₄₄O₂P₂; FW: 738.83; light yellow powdr.
air sensitive, (store cold)
Note: Sold in collaboration with Zejun for research purposes only. Patents ZL201310020371.1, CN 201610056390.

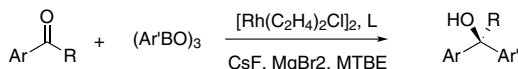
25mg
100mg
500mg

Technical Notes:

- Ligand/Rhodium catalyst for asymmetric hydrogenation.
- Ligand/Rhodium catalyst for asymmetric arylboronic reagents addition to aryl ketones.



Tech. Note (1)
Ref. (1)

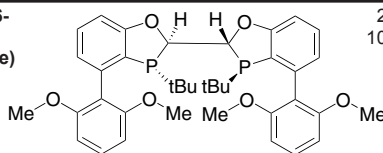


Tech. Note (2)
Ref. (2)

References:

- Angew. Chem.Int.Ed., **2013**, 52, 4235.
- Angew. Chem.Int Ed., **2016**, 55, 4527.

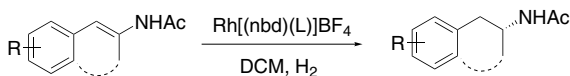
15-6240 **NEW** (2R,2'R,3R,3'R)-3,3'-Di-*tert*-butyl-4,4'-bis(2,6-dimethoxyphenyl)-2,2',3,3'-tetrahydro-2,2'-bibenzo[d][1,3]oxaphosphole, 97% (>99% ee) (2R,2'R,3R,3'R)-Bis-BIDIME (1884680-48-1)
C₃₈H₄₄O₆P₂; FW: 658.70; White xtl.
Note: Sold in collaboration with Zejun for research purposes only. Patents: ZL2013105048267, CN104558038.



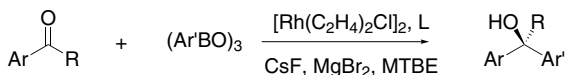
25mg
100mg

Technical Notes:

- Ligand/Rhodium catalyst for asymmetric hydrogenation of enamides.
- Ligand/Rhodium catalyst for asymmetric arylboronic reagents addition to aryl ketones.



Tech. Note (1)
Ref. (1)



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

References:

- Angew. Chem., Int. Ed **2013**, 52, 4235.
- Angew. Chem., Int. Ed **2016**, 55, 4527.
- Adv. Syn. Cat. **2013**, 355, 1297.

PHOSPHORUS (Compounds)

15-6245	(2S,2'S,3S,3'S)-3,3'-Di-tert-butyl-4,4'-bis(2,6-dimethoxyphenyl)-2,2',3,3'-tetrahydro-2,2'-bibenzo[d][1,3]oxaphosphole, 97% (>99% ee) (2S,2'S,3S,3'S)-Bis-BIDIME (1435940-21-8) C ₃₈ H ₄₄ O ₆ P ₂ ; FW: 658.70; white xtl. Note: Sold in collaboration with Zejun for research purposes only. Patents: ZL2013105048267, CN104558038.	25mg 100mg
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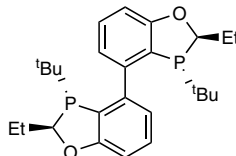
NEW

Technical Note:

- See 15-6240 (page 36)

15-6440	(2R,2'R,3R,3'R)-3,3'-Di-tert-butyl-2,2'-diethyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (2R,2'R,3R,3'R)-DI-ET-BABIBOP C ₂₈ H ₃₆ O ₂ P ₂ ; FW: 442.51; white to off-white solid <i>air sensitive, (store cold)</i> Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	25mg 100mg
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NEW

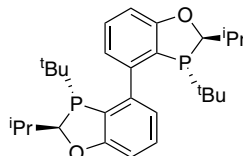


15-6425	(2S,2'S,3S,3'S)-3,3'-Di-tert-butyl-2,2'-diethyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (2S,2'S,3S,3'S)-DI-ET-BABIBOP C ₂₈ H ₃₆ O ₂ P ₂ ; FW: 442.51; white to off-white solid <i>air sensitive, (store cold)</i> Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	25mg 100mg
----------------	--	---------------

NEW

15-6445	(2R,2'R,3R,3'R)-3,3'-Di-tert-butyl-2,2'-diisopropyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (2R,2'R,3R,3'R)-DI-iPr-BABIBOP (2214207-75-5) C ₂₈ H ₄₀ O ₂ P ₂ ; FW: 470.57; white to off-white solid <i>air sensitive, (store cold)</i> Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	25mg 100mg
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NEW



Technical Note:

- Ligand used in palladium-catalyzed asymmetric hydrogenation.

Tech. Note (1)
Ref. (1)

References:

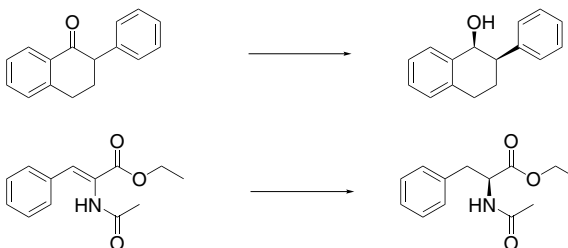
- Chi. J. Chem., 2018, 36, 153-156.

15-6430	(2S,2'S,3S,3'S)-3,3'-Di-tert-butyl-2,2'-diisopropyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (2S,2'S,3S,3'S)-DI-iPr-BABIBOP (2207601-12-3) C ₂₈ H ₄₀ O ₂ P ₂ ; FW: 470.57; white to off-white solid <i>air sensitive, (store cold)</i> Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	25mg 100mg
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NEW

Technical Notes:

- Ligand used for copper-catalyzed asymmetric hydrogenation of 2-substituted ketones.
- Ligand used for rhodium catalyst for asymmetric hydrogenation enamides.

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

References:

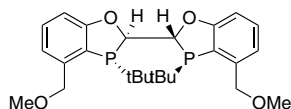
- Chem. Sci., 2018, 9, 4505-4510.
- Org. Lett., 2018, 20, 1725-1729.

PHOSPHORUS (Compounds)

15-6250

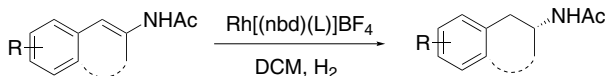
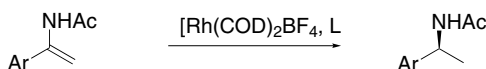
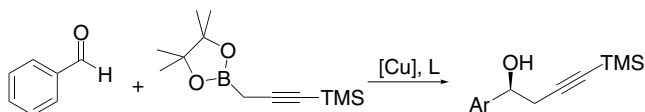
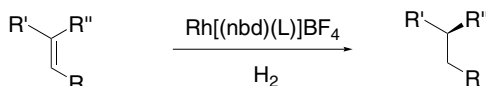
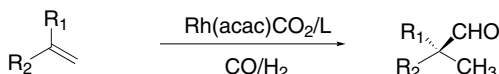
NEW

(2R,2'R,3R,3'R)-3,3'-Di-tert-butyl-4,4'-dimethoxy-2,2',3,3'-tetrahydro-2,2'-bibenzo[d][1,3]oxaphosphole, 97% (>99% ee)
(2R,2'R,3R,3'R)-MeO-BIBOP (1228758-57-3)
 $C_{24}H_{32}O_4P_2$; FW: 446.46; white powdr.
Note: Sold in collaboration with Zejun for research purposes only. Patents: ZL2013105048267, CN104558038.

25mg
100mg

Technical Notes:

1. Ligand/Rhodium catalyst for asymmetric hydrogenation of enamides.
2. Ligand/Rhodium catalyst for asymmetric arylboronic reagents addition to aryl ketones.
3. Ligand/Copper catalyst for asymmetric addition.
4. Ligand/Rhodium catalyst for asymmetric hydrogenation.
5. Ligand/Rhodium catalyst for asymmetric hydroformylation.

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)

References:

1. *Angew. Chem., Int. Ed.* **2013**, 52, 4235.
2. *Org. Process Res. Dev.*, **2013**, 17, 1061.
3. *J. Am. Chem. Soc.* **2010**, 132, 7600.
4. *Org. Lett.* **2010**, 12, 176.
5. *Org. Lett.* **2016**, 18, 3346.

15-6255

NEW

(2S,2'S,3S,3'S)-3,3'-Di-tert-butyl-4,4'-dimethoxy-2,2',3,3'-tetrahydro-2,2'-bibenzo[d][1,3]oxaphosphole, 97% (>99% ee) (2S,2'S,3S,3'S)-MeO-BIBOP (1202033-19-9)
 $C_{24}H_{32}O_4P_2$; FW: 446.46; white powdr.
Note: Sold in collaboration with Zejun for research purposes only. Patents: ZL2013105048267, CN104558038.

25mg
100mg

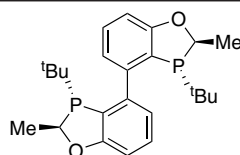
Technical Note:

1. See 15-6250 (page 38)

15-6435

NEW

(2R,2'R,3R,3'R)-3,3'-Di-tert-butyl-2,2'-dimethyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (2R,2'R,3R,3'R)-DI-Me-BABIBOP (2214207-74-4)
 $C_{24}H_{32}O_4P_2$; FW: 414.46; white to off-white solid
air sensitive, (store cold)
Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

25mg
100mg

Technical Note:

1. See 15-6445 (page 37)

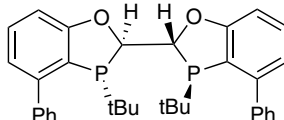
PHOSPHORUS (Compounds)

15-6420	(2S,2'S,3S,3'S)-3,3'-Di-tert-butyl-2,2'-dimethyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee)	25mg 100mg
NEW	(2S,2'S,3S,3'S)-DI-Me-BABIBOP (2207601-10-1) C ₂₄ H ₃₂ O ₂ P ₂ ; FW: 414.46; white to off-white solid <i>air sensitive, (store cold)</i> Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	

Technical Note:

- See 15-6430 (page 37)

15-6260	(2R,2'R,3R,3'R)-3,3'-Di-tert-butyl-4,4'-diphenyl-2,2',3,3'-tetrahydro-2,2'-bibenzo[d][1,3]oxaphosphole, 97% (>99% ee) (2R,2'R,3R,3'R)-Ph-BIBOP	25mg 100mg
NEW	C ₃₄ H ₃₆ O ₂ P ₂ ; FW: 538.60; light yellow xtl. <i>air sensitive, light sensitive, moisture sensitive</i> Note: Sold in collaboration with Zejun for research purposes only. Patents: ZL2013105048267, CN104558038.	



Technical Notes:

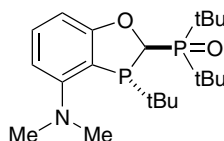
- See 15-6240 (page 36)

15-6265	(2S,2'S,3S,3'S)-3,3'-Di-tert-butyl-4,4'-diphenyl-2,2',3,3'-tetrahydro-2,2'-bibenzo[d][1,3]oxaphosphole, 97% (>99% ee) (2S,2'S,3S,3'S)-Ph-BIBOP (1202033-21-3)	25mg 100mg
NEW	C ₃₄ H ₃₆ O ₂ P ₂ ; FW: 538.60; light yellow xtl. <i>air sensitive</i> Note: Sold in collaboration with Zejun for research purposes only. Patents: ZL2013105048267, CN104558038.	

Technical Note:

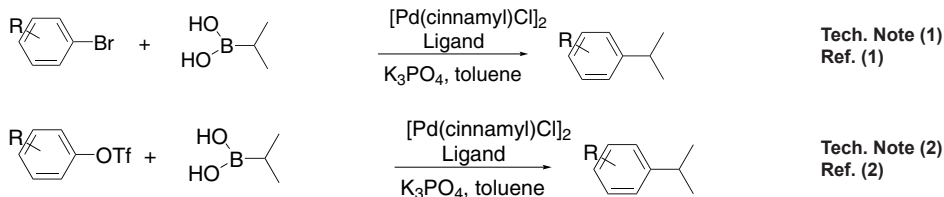
- See 15-6240 (page 36)

15-6330	racemic-Di-tert-butyl(3-(tert-butyl)-4-(dimethylamino)-2,3-dihydrobenzo[d][1,3]oxaphosphol-2-yl)phosphine oxide, 97% (1788085-47-1)	100mg 500mg
NEW	C ₂₁ H ₃₇ NO ₂ P ₂ ; FW: 397.48; white powdr. <i>air sensitive</i> Note: Sold in collaboration with Zejun for research purposes only. Patents: ZL2013105048267, CN104558038.	



Technical Notes:

- Ligand/palladium catalyst for aryl-alkyl Suzuki-Miyaura cross-coupling reactions with ArBr.
- Ligand/palladium catalyst for aryl-alkyl Suzuki-Miyaura cross-coupling reactions with ArOTf.



References:

- Angew. Chem., Int. Ed. **2015**, 54, 3792-3796.
- Org. Biomol. Chem., **2017**, 15, 9903-9909.

PHOSPHORUS (Compounds)

15-6325

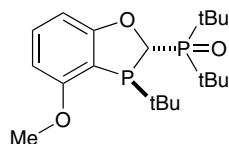
NEW

racemic-Di-tert-butyl(3-(tert-butyl)-4-methoxy-2,3-dihydrobenzo[d][1,3]oxaphosphol-2-yl)phosphine oxide, 97% (1788085-46-0)

$C_{20}H_{34}O_3P_2$; FW: 384.43; white xtl.

air sensitive

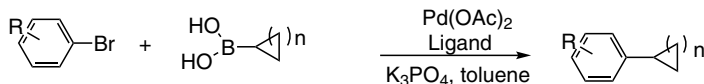
Note: Sold in collaboration with Zejun for research purposes only. Patents: ZL2013105048267, CN104558038.



100mg
500mg

Technical Notes:

1. Ligand/palladium catalyst for aryl-alkyl Suzuki-Miyaura cross-coupling reactions with ArBr.
2. Ligand/palladium catalyst for aryl-alkyl Suzuki-Miyaura cross-coupling reactions with ArOTf.



Tech. Note (1)
Ref. (1)



Tech. Note (1)
Ref. (2)



Tech. Note (2)
Ref. (3)

References:

1. *Org. Chem. Front.* **2014**, 1, 225-229.
2. *Angew. Chem., Int. Ed.* **2015**, 54, 3792-3796.
3. *Org. Biomol. Chem.* DOI: 10.1039/c7ob00253.

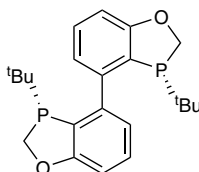
15-6415

NEW

(3R,3'R)-3,3'-Di-tert-butyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (3R,3'R)-BABIBOP (2214207-73-3)

$C_{22}H_{28}O_2P_2$; FW: 386.41; white to off-white solid
air sensitive, (store cold)

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



25mg
100mg

Technical Note:

1. See 15-6445 (page 37)

15-6410

NEW

(3S,3'S)-3,3'-Di-tert-butyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (3S,3'S)-BABIBOP (2207601-04-3)

$C_{22}H_{28}O_2P_2$; FW: 386.41; white to off-white solid
air sensitive, (store cold)

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

25mg
100mg

Technical Notes:

1. Ligand used in copper-catalyzed asymmetric hydrogenation of 2-substituted ketones.
2. Ligand used in rhodium catalyst for asymmetric hydrogenation enamides.
3. Ligand used in palladium-catalyzed asymmetric hydrogenation.



Tech. Note (1)
Ref. (1)



Tech. Note (2)
Ref. (2)

PHOSPHORUS (Compounds)

15-6410 (3*S*,3'*S*)-3,3'-Di-*tert*-butyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97%
(continued) (99% ee) (3*S*,3'*S*)-BABIBOP (2207601-04-3)



Tech. Note (3)
Ref. (3)

References:

1. *Chem. Sci.*, **2018**, 9, 4505-4510.
2. *Org. Lett.*, **2018**, 20, 1725-1729.
3. *Chi. J. Chem.*, **2018**, 36, 153-156.

15-6275

NEW

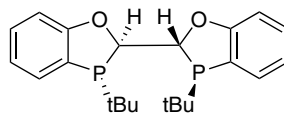
(2*R*,2'*R*,3*R*,3'*R*)-3,3'-Di-*tert*-butyl-2,2',3,3'-tetrahydro-2,2'-bibenzo[d][1,3]oxaphosphole, 97% (>99% ee) (2*R*,2'*R*,3*R*,3'*R*)-BIBOP (1610785-35-7)

$C_{22}H_{28}O_2P_2$; FW: 386.40; white powdr.

air sensitive

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

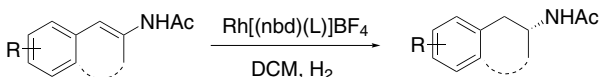
Patents: ZL2013105048267, CN104558038.



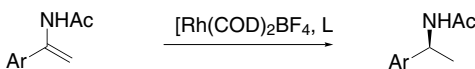
25mg
100mg

Technical Notes:

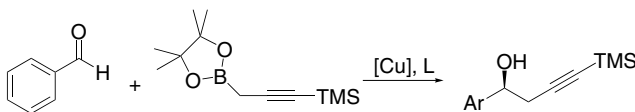
1. Ligand/Rhodium catalyst for asymmetric hydrogenation of enamides.
2. Ligand/Rhodium catalyst for asymmetric arylboronic reagents addition to aryl ketones.
3. Ligand/Copper catalyst for asymmetric addition.
4. Ligand/Rhodium catalyst for asymmetric hydrogenation.
5. Ligand/Rhodium catalyst for asymmetric hydroformylation.



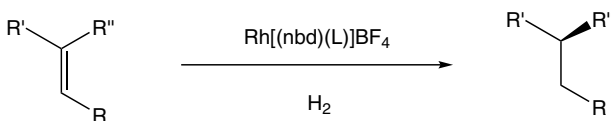
Tech. Note (1)
Ref. (1)



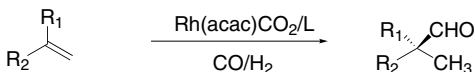
Tech. Note (2)
Ref. (2)



Tech. Note (3)
Ref. (3)



Tech. Note (4)
Ref. (4)



Tech. Note (5)
Ref. (5)

References:

1. *Angew. Chem., Int. Ed.* **2013**, 52, 4235.
2. *Org. Process Res. Dev.*, **2013**, 17, 1061.
3. *J. Am. Chem. Soc.* **2010**, 132, 7600.
4. *Org. Lett.* **2010**, 12, 176.
5. *Org. Lett.* **2016**, 18, 3346.

15-6270

NEW

(2*S*,2'*S*,3*S*,3'*S*)-3,3'-Di-*tert*-butyl-2,2',3,3'-tetrahydro-2,2'-bibenzo[d][1,3]oxaphosphole, 97% (>99% ee) (2*S*,2'*S*,3*S*,3'*S*)-BIBOP (1202033-17-7)

$C_{22}H_{28}O_2P_2$; FW: 386.40; white powdr.

air sensitive

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

Patents: ZL2013105048267, CN104558038.

25mg
100mg

Technical Note:

1. See 15-6275 (page 41)

KITS - AntPhos and WingPhos Kit

96-3810

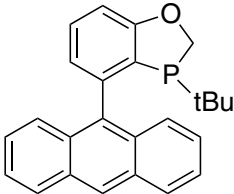
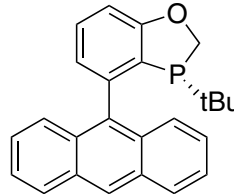
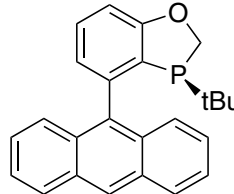
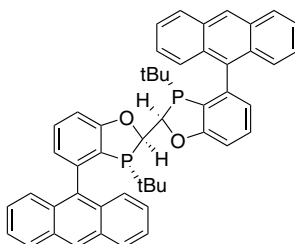
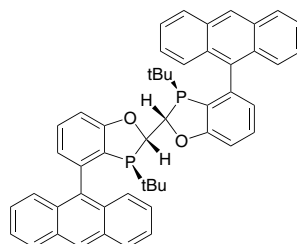
AntPhos and WingPhos Kit

Sold in collaboration with Zejun for research purposes only.

Patents ZL201310020371.1, CN 201610056390.

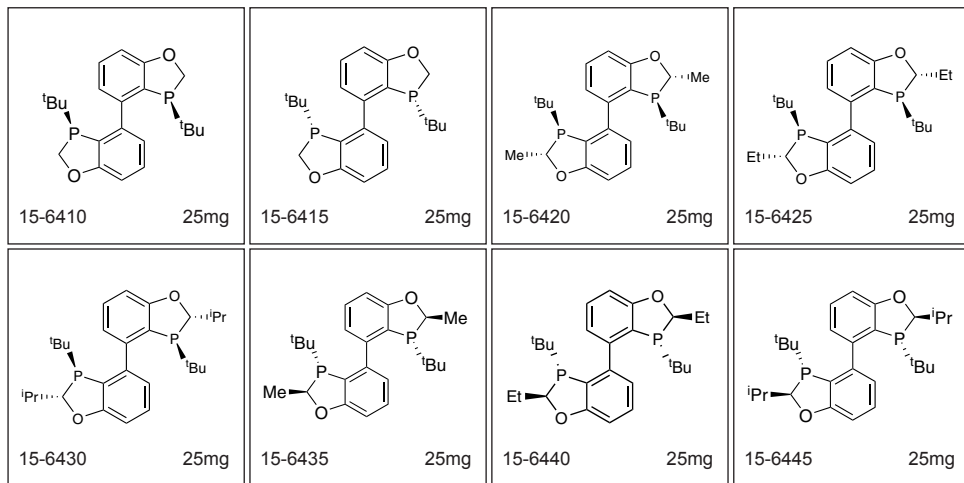
Components also available for individual sale.

Contains the following:

	15-1960	25mg	
	15-1963	25mg	
	15-1967	25mg	
	15-1970	25mg	
	15-1975	25mg	
15-1960	4-(Anthracen-9-yl)-3-(t-butyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 98+% rac-AntPhos (1268693-24-8)	25mg	See page 17
15-1963	(R)-4-(Anthracen-9-yl)-3-(t-butyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 98+% (>99% ee) [(R)-AntPhos] (1456816-37-7)	25mg	See page 17
15-1967	(S)-4-(Anthracen-9-yl)-3-(t-butyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 99+% (>99% ee) [(S)-AntPhos] (1807740-34-6)	25mg	See page 18
15-1970	(2R,2'R,3R,3'R)-4,4'-Di(anthracen-9-yl)-3,3'-di-t-butyl-2,2',3,3'-tetrahydro-2,2'-bibenzo[d][1,3]oxaphosphole, min 98% (>90% ee), [(2R,2'R,3R,3'R)-WingPhos] (1884680-45-8)	25mg	See page 36
15-1975	(2S,2'S,3S,3'S)-4,4'-Di(anthracen-9-yl)-3,3'-di-t-butyl-2,2',3,3'-tetrahydro-2,2'-bibenzo[d][1,3]oxaphosphole, min 98%, (>99% ee), [(2S,2'S,3S,3'S)-WingPhos] (1435940-19-4)	25mg	See page 36

NEW

Contains the following:



15-6410	(3S,3'S)-3,3'-Di-tert-butyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (3S,3'S)-BABIBOP (2207601-04-3)	25mg	See page 40
15-6415	(3R,3'R)-3,3'-Di-tert-butyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (3R,3'R)-BABIBOP (2214207-73-3)	25mg	See page 40
15-6420	(2S,2'S,3S,3'S)-3,3'-Di-tert-butyl-2,2'-dimethyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (2S,2'S,3S,3'S)-DI-Me-BABIBOP (2207601-10-1)	25mg	See page 39
15-6425	(2S,2'S,3S,3'S)-3,3'-Di-tert-butyl-2,2'-diethyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (2S,2'S,3S,3'S)-DI-Et-BABIBOP	25mg	See page 37
15-6430	(2S,2'S,3S,3'S)-3,3'-Di-tert-butyl-2,2'-diisopropyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (2S,2'S,3S,3'S)-DI-iPr-BABIBOP (2207601-12-3)	25mg	See page 37
15-6435	(2R,2'R,3R,3'R)-3,3'-Di-tert-butyl-2,2'-dimethyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (2R,2'R,3R,3'R)-DI-Me-BABIBOP (2214207-74-4)	25mg	See page 38
15-6440	(2R,2'R,3R,3'R)-3,3'-Di-tert-butyl-2,2'-diethyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (2R,2'R,3R,3'R)-DI-Et-BABIBOP	25mg	See page 37
15-6445	(2R,2'R,3R,3'R)-3,3'-Di-tert-butyl-2,2'-diisopropyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (2R,2'R,3R,3'R)-DI-iPr-BABIBOP (2214207-75-5)	25mg	See page 37

KITS - BI-DIME Ligand Kit

96-0650

BI-DIME Ligand Kit

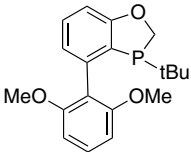
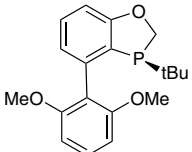
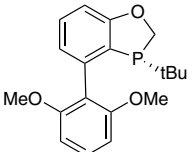
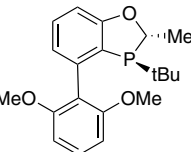
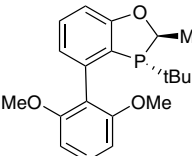
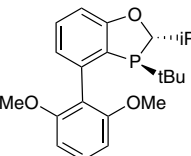
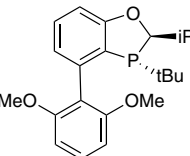
NEW

Sold in collaboration with Zejun for research purposes only.

Patents: ZL2013105048267, CN104558038.

Components also available for individual sale.

Contains the following:

	15-6205	25mg		15-6210	25mg		15-6211	25mg		15-6220	25mg
	15-6225	25mg		15-6230	25mg		15-6235	25mg			
15-6205	3-(t-Butyl)-4-(2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, min. 97% rac-BI-DIME (1246888-90-3)							25mg	See page 26		
15-6210	(S)-3-(t-Butyl)-4-(2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, min. 97% (S)-BI-DIME (1373432-09-7)							25mg	See page 27		
15-6211	(R)-3-(t-Butyl)-4-(2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, min. 97% (R)-BI-DIME (1373432-03-7)							25mg	See page 27		
15-6220	(2S,3S)-3-(t-Butyl)-4-(2,6-dimethoxyphenyl)-2-methyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, min. 97% (S,S)-Me-BI-DIME (1373432-11-1)							25mg	See page 29		
15-6225	(2R,3R)-3-(t-Butyl)-4-(2,6-dimethoxyphenyl)-2-methyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, min. 97% (R,R)-Me-BI-DIME (1477517-18-2)							25mg	See page 29		
15-6230	(2S,3S)-3-(t-Butyl)-4-(2,6-dimethoxyphenyl)-2-i-propyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, min. 97% (S,S)-iPr-BI-DIME (1477517-21-7)							25mg	See page 30		

ALUMINUM (Compounds)

13-1905

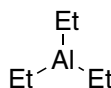
NEW

Triethylaluminum paraffin pellet (97-93-8)

 $C_6H_{15}Al$; FW: 114.16; paraffin pellet

air sensitive, moisture sensitive, (store cold)

Note: Developed by XiMo. Sold under license from XiMo for research purposes only.

2pcs
10pcs

Technical Note:

1. Safe, non-pyrophoric formulated triethyl aluminum pellet for use in treating solvent and substrate materials for metathesis reactions in order to scavenge catalyst poisoning impurities before introduction of sensitive metathesis catalysts.

AMMONIUM (Compounds)

26-2900

Iron(III) ammonium sulfate dodecahydrate, min 98.5% (ACS) (7783-83-7)

See page 48

BORON (Compounds)

05-0150

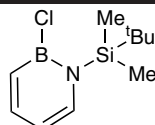
NEW

1-(tert-Butyldimethylsilyl)-2-chloro-1,2-dihydro-1,2-azaborine, 98% (1138164-75-6)

 $C_{10}H_{19}BClNSi$; FW: 227.61; pale yellow to purple liq.;

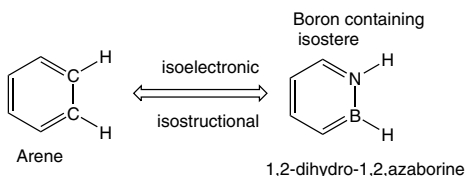
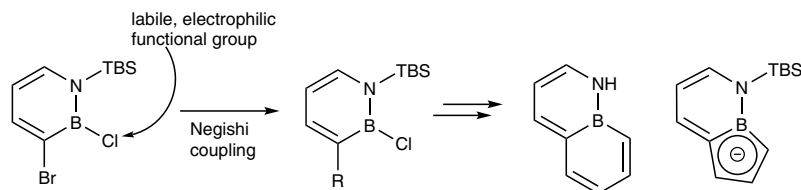
m.p. < -45°C; b.p. 75°C @200 mTorr

air sensitive, moisture sensitive

250mg
1g

Technical Notes:

1. Functionalized azaborine compounds are potential candidates for use as therapeutic pharmaceutical agents.
2. Precursor for the synthesis of new BN-naphthalene and BN-indenyl compounds.
3. Precursor and intermediate for many other azaborines which are studied for varied applications such as organic synthesis, catalysis, hydrogen storage, optoelectronic materials, and drug discovery. Azaborines are isoelectronic analogues of benzenoid compounds/arenes.



References:

1. PCT Int. Appl. **2015**, WO 2015160688 A1 20151022.
2. J. Am. Chem. Soc., **2015**, 137 (28), 8932–8935.
3. J. Am. Chem. Soc., **2018**, 140, 1184–1194.

CARBON (Compounds)

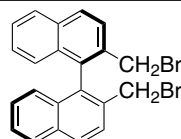
06-0486

NEW

(R)-2,2'-Bis(bromomethyl)-1,1'-binaphthalene, 95% (99% ee) (86631-56-3)

 $C_{22}H_{16}Br_2$; FW: 440.2; white to light yellow powdr.

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



250mg

06-0487

NEW

(S)-2,2'-Bis(bromomethyl)-1,1'-binaphthalene, 95% (99% ee) (37803-02-4)

 $C_{22}H_{16}Br_2$; FW: 440.2; white to light yellow powdr.

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

250mg

CERIUM (Compounds)

58-5820

Cerium(III) iodide, anhydrous (99.99%-Ce) (REO) PURATREM
(7790-87-6)

NEW

amp

CeI₃; FW: 520.82; yellow beads; m.p. 750
light sensitive, moisture sensitive, hygroscopic1g
5g
25g

COPPER (Compounds)

29-2907

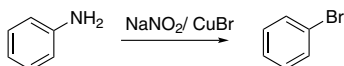
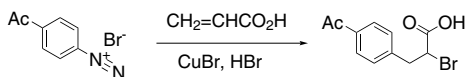
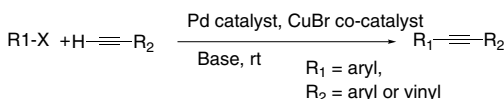
Copper(I) bromide (99.99%-Cu) PURATREM (7787-70-4)

NEW

BrCu; FW: 143.45; off-white to pale-green powdr.; m.p. 492;
b.p. 1345; d. 4.98
moisture sensitive, hygroscopic25g
100g

Technical Notes:

- Used for the synthesis of organic compounds e.g. the Sandmeyer reaction.
- Also used as a raw material to make organocopper reagents.
- Catalyst for the Meerwein reaction, the arylation of alkenes by diazonium salts.
- Cocatalyst in the Sonogashira coupling reaction.

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

References:

- Chem. Rev.*, **1947**, 40(2), 251-277.
- Posner, G. H. *An Introduction to Synthesis Using Organocopper Reagents*; Wiley: New York, **1980**.
- J. Org. Chem.*, **1961**, 26, 3362.
- J. Organomet. Chem.*, **2002**, 653 (1-2), 46-49.

ELECTROPOLISHED STAINLESS STEEL BUBBLERS (Vertical)

97-7000

Stainless steel low volume bubbler, 7ml, vertical, electropolished with fill-port, PCTFE valve stem tip

NEW

1cyl



GOLD (Compounds)

79-0290

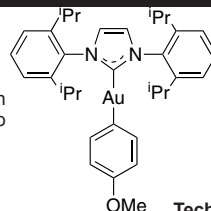
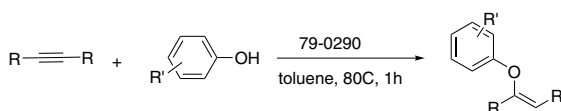
[1,3-Bis(2,6-di-isopropylphenyl)imidazol-2-ylidene]methoxyphenylgold(I), 98+%
C₃₄H₄₃N₂OAu; FW: 692.68

NEW

100mg
500mg

Technical Note:

- The gold complex has been used to generate active catalytic species in the hydrophenoxylation of alkynes (see equation) and can be used to enable related transformations.

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

References:

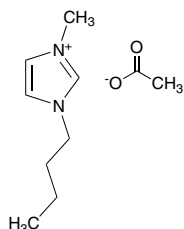
- Beil. J. Org. Chem.* **2013**, 9, 2002-2008.
- Angew. Chem. Int. Ed.* **2013**, 52, 9767-9770.
- ACS Catal.* **2015**, 5, 6918-6921.
- Adv. Synth. Cat.* **2016**, 358, 3857-3862.

IONIC LIQUIDS (Compounds)

07-0720

NEW

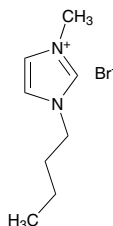
1-Butyl-3-methylimidazolium acetate, 95%, [BMIM]acetate
(284049-75-8)
 $C_{10}H_{18}N_2O_2$; FW: 198.26; yellow to dark yellow viscous liq.
air sensitive, hygroscopic

10g
50g

07-0710

NEW

3-Butyl-1-methylimidazolium bromide, 98% [BMIM]Br
(85100-77-2)
 $C_8H_{15}BrN_2$; FW: 219.12; white solid ; m.p. 75°C
air sensitive, hygroscopic

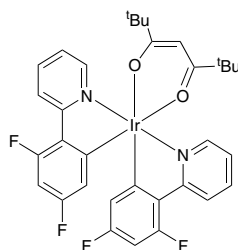
10g
50g

IRIDIUM (Compounds)

77-8030

NEW

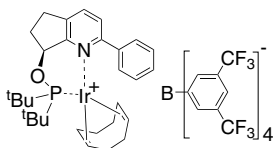
Bis[3,5-difluoro-2-(2-pyridinyl-κN)phenyl-κC](2,2,6,6-tetramethyl-3,5-heptanedionato-κO,κO') iridium(III), min. 98% (562099-10-9)
 $C_{33}H_{31}F_4IrN_2O_2$; FW: 755.83;
yellow to green yellow powd.
air sensitive, moisture sensitive
Note: Precursor for Photocatalyst Synthesis

100mg
500mg

77-5025

NEW

(S)-(-)-[(1,5-Cyclooctadien-7-(2-phenyl-6,7-dihydro-5H-[1]pyridin)-di-(tert-butyl) phosphiniteiridium(I))tetrakis[3,5-bis(trifluoromethyl)phenyl]borate, min. 97% (881310-39-0)
 $C_{62}H_{54}BF_{24}IrNOP$; FW: 1519.16;
orange to red solid
air sensitive, moisture sensitive, (store cold)
Note: Sold in collaboration with Solvias for research purposes only.

100mg
500mg

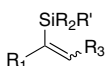
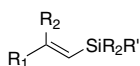
Technical Notes:

1. Iridium-Catalyzed Enantioselective Hydrogenation of Vinylsilanes.
2. Study of chemoselective asymmetric hydrogenation of (1-bromo-1-alkenyl)boronic esters with iridium-P⁺N complexes.

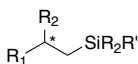
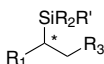
IRIDIUM (Compounds)

77-5025
(continued)

(S)-(-)-[(1,5-Cyclooctadien-7-(2-phenyl-6,7-dihydro-5H-[1]pyridin)-di-(tert-butyl) phosphinitetiridium(I)]tetrakis[3,5-bis(trifluoromethyl)phenyl]borate, min. 97% (881310-39-0)



Z or E

77-5025
catalyst,
H₂, CH₂Cl₂R₁ = aryl, alkyl, CH₂OHR₂ = Me, EtR₃ = Me, CO₂EtSiR₂R' = SiMe₃, SiMe₂Ph, Si(OR)₃, Si-Tech. Note (1)
Ref. (1)6 examples
up to 98% ee3 examples
up to > 99% ee8 examples
up to 97% ee

77-5025

H₂ (30 bar), S/C - 10/1
CH₂Cl₂, 50°C
95% to 99% conversionee up to 73%
86-94% (GC yield)
50-70% isolated yield

5-9%

Tech. Note (2)
Ref. (2)

References:

1. *Advanced synthesis and catalysis*, **2017**, 359 (15), 2523-2529.
2. *Tetrahedron*, **2014**, 70 (16), 2654-2660.

77-0355

NEW

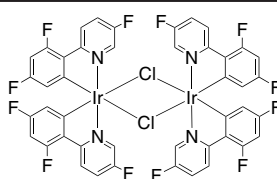
Di-μ-chlorotetrakis[3,5-difluoro-2-(5-fluoro-2-pyridinyl-κN)phenyl-κC]diiridium, min. 98% (mixture of isomers) (849723-04-2)

C₄₄H₂₀Cl₂F₁₂Ir₂N₄; FW: 1288.01;

yellow to green-yellow solid

air sensitive

Note: Precursor for Photocatalyst Synthesis

250mg
1g

IRON (Compounds)

26-2900

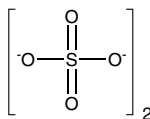
NEW

Iron(III) ammonium sulfate dodecahydrate, min 98.5% (ACS) (7783-83-7)

NH₄Fe(SO₄)₂(H₂O)₁₂; FW: 266.00 (482.19);

pale purple xtl.; m.p. 39-41

air sensitive, light sensitive, hygroscopic, (store cold)

Fe³⁺ NH₄⁺ 12H₂O25g
100g

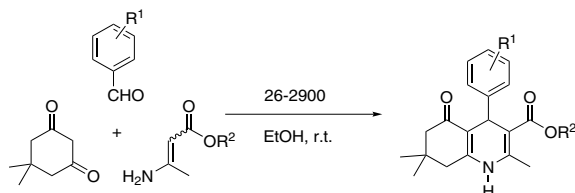
Technical Notes:

1. Catalyst for the preparation of 1,4-dihydropyridines. Improved conditions for the Hantzsch reaction.
2. Use of Ferric Ammonium Sulfate in Serum Cholesterol Determination
3. Used as an indicator (argentimetric titrations) and as a mordant in dyeing and printing textiles.

IRON (Compounds)

26-2900
(continued)

Iron(III) ammonium sulfate dodecahydrate, min 98.5% (ACS) (7783-83-7)

Tech. Note (1)
Ref. (1)

References:

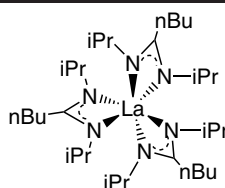
1. *Monatsh Chem.*, **2012**, 143, 931.
2. *Clinical chemistry*, **1973**, 19 (1), 121.
3. The Merck Index, 12th Ed., Entry # 549.

LANTHANUM (Compounds)

57-1500

NEW

amp

Tris(N,N'-di-i-propylpentylamidinato)lanthanum(III),
98% (99.999%-La) PURATREMC₃₃H₆₉N₆La; FW: 688.84; off white to beige solid*air sensitive, moisture sensitive*Note: Product sold under, use subject to, terms and
conditions of label license at www.strem.com/harvard21g
5g

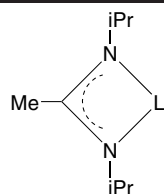
LITHIUM (Compounds)

03-8000

NEW

(N,N'-Di-i-propylacetamidinato)lithium, min. 97%
(99.99%-Li) PURATREMC₈H₁₇N₂Li; FW: 148.17; off white to beige solid*air sensitive, moisture sensitive*

Note: Sold in collaboration with HepatoChem.

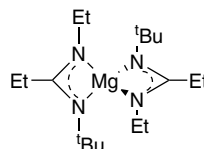
1g
5g

MAGNESIUM (Compounds)

12-0865

NEW

amp

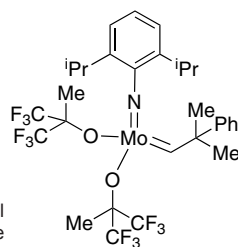
Bis(N-t-butyl-N'-ethylpropanimidamido)magnesium,
min. 98% (99.99%-Mg) PURATREMC₁₈H₃₈MgN₄; FW: 334.82; off-white to tan solid*air sensitive, moisture sensitive*Note: Product sold under, use subject to, terms and
conditions of label license at www.strem.com/harvard21g
5g

MOLYBDENUM (Compounds)

42-0575

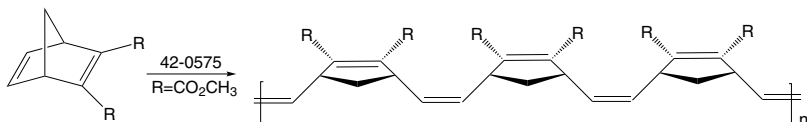
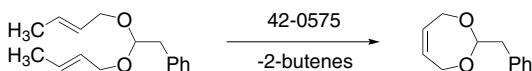
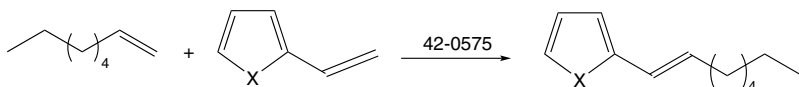
NEW

[2,6-Bis(1-methylethyl)benzenaminato(2-)]bis(1,1,1,3,3,3-hexafluoro-2-methyl-2-propanolato-κO)(2-methyl-2-phenylpropylidene)-, (T-4) molybdenum, paraffin pellet (139220-25-0)
 $C_{30}H_{35}F_{12}MoNO_2$; FW: 763.53; paraffin pellet
 air sensitive, moisture sensitive
 Note: Developed by XiMo. Sold under license from XiMo for research purposes only.

2pcs
10pcs

Technical Notes:

- General metathesis of many ordinary olefins, especially terminal olefins, and will ROMP many norbornene or substituted norbornadiene monomers to give all cis, and often isotactic, polymers.
- Useful for the "ring-closing" of dienes or the coupling of terminal olefins.
- Highly active and most commonly used in cross metathesis of aliphatic alkenes with 2-vinyl aromatics.

Tech. Note (1)
Ref. (1,2)Tech. Note (2)
Ref. (3,4)Tech. Note (3)
Ref. (6)

X = S, O

References:

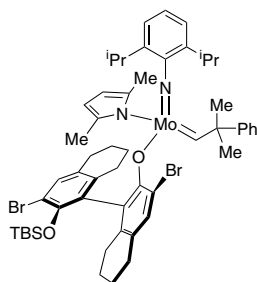
- J. Am. Chem. Soc.*, **1994**, 116, 3414.
- J. Am. Chem. Soc.*, **1993**, 115, 4413.
- J. Am. Chem. Soc.*, **1992**, 114, 5426.
- J. Am. Chem. Soc.*, **1992**, 114, 7324.
- Tetrahedron*, **1998**, 54, 4413. (review article)
- J. Mol. Catal. Chem.*, **2002**, 190, 45.

42-0530

NEW

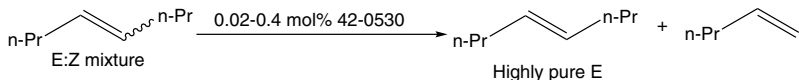
amp

[2,6-Bis(1-methylethyl)benzenaminato(2-)][(1R)-3,3'-dibromo-2'-[[[(1,1-dimethylethyl)dimethylsilyl]oxy]-5,5',6,6',7,7',8,8'-octahydro[1,1'-binaphthalen]-2-olato-κO](2,5-dimethyl-1H-pyrrol-1-yl)(2-methyl-2-phenylpropylidene) molybdenum (VI) (1103220-99-0)
 $C_{54}H_{70}Br_2MoN_2O_2Si$; FW: 1063; orange powder.
 air sensitive, moisture sensitive
 Note: Developed by XiMo. Sold under license from XiMo for research purposes only.
 Patents: U.S. 9,687,834, EP2242578.

100mg
500mg

Technical Notes:

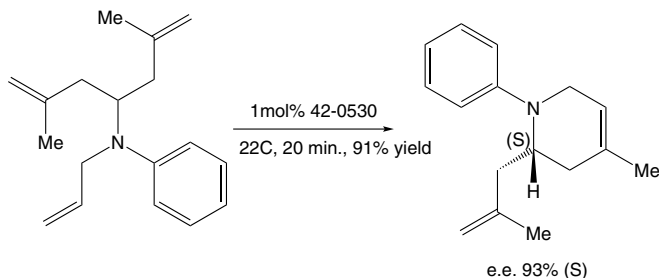
- Catalyst used in Z-selective cross metathesis.
- Catalyst used in enantio- or diastereo-selective ene-yne ring closing metathesis.

Tech. Note (1)
Ref. (2)

MOLYBDENUM (Compounds)

42-0530
(continued)

[2,6-Bis(1-methylethyl)benzenaminato(2-)][(1R)-3,3'-dibromo-2'-[[[1,1-dimethylethyl)dimethylsilyl]oxy]-5,5',6,6',7,7',8,8'-octahydro[1,1'-binaphthalen]-2-olato-kO](2,5-dimethyl-1H-pyrrol-1-yl)(2-methyl-2-phenylpropylidene) molybdenum (VI) (1103220-99-0)

Tech. Note (2)
Ref. (1)

References:

1. *Nature*, **2008**, 456, 933-937.
2. *J. Am. Chem. Soc.*, **2011**, 133, 11512.
3. *J. Am. Chem. Soc.*, **2009**, 131, 10652.
4. *Org. Process Res. & Dev.*, **2016**, 20, 1709.

42-0535

NEW

[2,6-Bis(1-methylethyl)benzenaminato(2-)][(1R)-3,3'-dibromo-2'-[[[1,1-dimethylethyl)dimethylsilyl]oxy]-5,5',6,6',7,7',8,8'-octahydro[1,1'-binaphthalen]-2-olato-kO](2,5-dimethyl-1H-pyrrol-1-yl)(2-methyl-2-phenylpropylidene) molybdenum (VI), paraffin pellets (75980-60-8)

 $C_{54}H_{70}Br_2MoN_2O_2Si$; FW: 1063; paraffin pellet

air sensitive, moisture sensitive, (store cold)

Note: Developed by XiMo. Sold under license from XiMo for research purposes only.

Patents: U.S. 9,687,834, EP2242578.

2pcs

10pcs

Technical Note:

1. See 42-0530 (page 50)

42-0510

NEW

amp

[2,6-Bis(1-methylethyl)benzenaminato(2-)]
(2,5-dimethyl-1H-pyrrol-1-yl)
(4',6'-diphenyl[1,1':3',1''-terphenyl]-2'-olato)
(2-methyl-2-phenylpropylidene) molybdenum(VI)
(1572180-69-8) $C_{58}H_{58}MoN_2O$; FW: 895.05; orange powder.

air sensitive, moisture sensitive, (store cold)

Note: Developed by XiMo. Sold under license from XiMo for research purposes only.

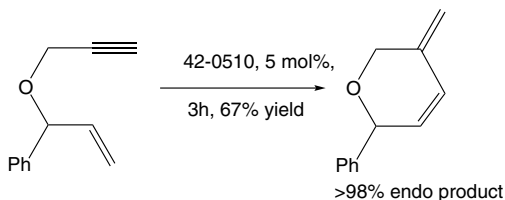
Patents: US20140309466, WO14139679.

100mg

500mg

Technical Note:

1. Catalyst for general metathesis reactions including cross metathesis and ring closing metathesis.

Tech. Note (1)
Ref. (1)

References:

1. *J. Am. Chem. Soc.*, **2009**, 131, 10652.
2. *Org. Process Res. & Dev.*, **2016**, 20, 1709.

MOLYBDENUM (Compounds)

42-0515

NEW

[2,6-Bis(1-methylethyl)benzenaminato(2-)](2,5-dimethyl-1H-pyrrol-1-yl)(4',6'-diphenyl[1,1':3',1''-terphenyl]-2'-olato)(2-methyl-2-phenylpropylidene)molybdenum(VI) in paraffin formulated pellet

C₅₈H₅₈MoN₂O; FW: 895.05; paraffin pellet
air sensitive, moisture sensitive, (store cold)

Note: Developed by XiMo. Sold under license from XiMo for research purposes only.

Patents: US20140309466, WO14139679.

2pcs

10pcs

Technical Note:

1. See 42-0510 (page 51)

42-0520

NEW

amp

[2,6-Bis(1-methylethyl)benzenaminato(2-)](2,5-dimethyl-1H-pyrrol-1-yl)(2-methyl-2-phenylpropylidene)([1,1':3',1''-terphenyl]-2'-olato)molybdenum(VI) (1703808-70-1)

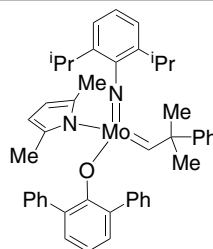
C₄₆H₅₀MoN₂O; FW: 742.86; yellow pwd.
air sensitive, moisture sensitive, (store cold)

Note: Developed by XiMo. Sold under license from XiMo for research purposes only.

Patents: US20140309466, WO14139679.

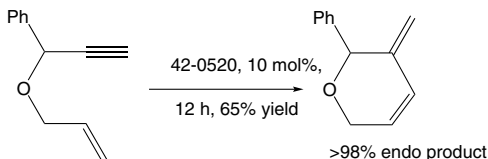
100mg

500mg



Technical Note:

1. Catalyst for general metathesis reactions including cross metathesis and endo-selective ene-yne ring closing metathesis.



Tech. Note (1)
Ref. (1)

References:

1. J. Am. Chem. Soc., 2009, 131, 10652.

42-0525

NEW

[2,6-Bis(1-methylethyl)benzenaminato(2-)](2,5-dimethyl-1H-pyrrol-1-yl)(2-methyl-2-phenylpropylidene)([1,1':3',1''-terphenyl]-2'-olato)molybdenum(VI), paraffin formulated pellet (1703808-70-1)

C₄₆H₅₀MoN₂O; FW: 742.86; paraffin pellet
air sensitive, moisture sensitive, (store cold)

Note: Developed by XiMo. Sold under license from XiMo for research purposes only.

Patents: US20140309466, WO14139679.

2pcs

10pcs

Technical Note:

1. See 42-0520 (page 52)

42-0560

NEW

amp

(S)-1-((3,3'-Dibromo-2'-(tert-butyldimethylsilyl)oxy)-5,5',6,6',7,7',8,8'-octahydro-[1,1'-binaphthalen]-2-yl)oxy)-N-(2,6-diisopropylphenyl)-1-(2,5-dimethyl-1H-pyrrol-1-yl)-1-(2-methyl-2-phenylpropylidene)molybdenum (VI) (1196674-83-5)

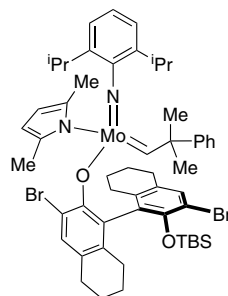
C₅₄H₇₀Br₂MoN₂O₂Si; FW: 1063; red pwd.
air sensitive, moisture sensitive, (store cold)

Note: Developed by XiMo. Sold under license from XiMo for research purposes only.

Patents: U.S. 9,687,834, EP2242578.

100mg

500mg



Technical Notes:

1. Z-selective cross metathesis.
2. Enantio- or diastereoselective ene-yne ring closing metathesis.

References:

1. Nature, 2008, 456, 933-937.
2. J. Am. Chem. Soc., 2011, 133, 11512.
3. J. Am. Chem. Soc., 2009, 131, 10652.

MOLYBDENUM (Compounds)

42-0565

NEW

(S)-1-((3,3'-Dibromo-2'-((tert-butyldimethylsilyl)oxy)-5,5',6,6',7,7',8,8'-octahydro-[1,1'-binaphthalen]-2-yl)oxy)-N-(2,6-diisopropylphenyl)-1-(2,5-dimethyl-1H-pyrrol-1-yl)-1-(2-methyl-2-phenylpropylidene)molybdenum (VI) paraffin pellets (1196674-83-5)

$C_{54}H_{70}Br_2MoN_2O_2Si$; FW: 1063; paraffin pellet

air sensitive, moisture sensitive, (store cold)

Note: Developed by XiMo. Sold under license from XiMo for research purposes only.

Patents: U.S. 9,687,834, EP2242578.

2pcs

10pcs

Technical Note:

- See 42-0560 (page 52)

42-0540

NEW

amp

(R)-1-((3,3'-Dibromo-2'-((tert-butyldimethylsilyl)oxy)-5,5',6,6',7,7',8,8'-octahydro-[1,1'-binaphthalen]-2-yl)oxy)-N-(2,5-dimethyl-1H-pyrrol-1-yl)-N-(2,6-dimethylphenyl)-1-(2-methyl-2-phenylpropylidene)molybdenum (VI) (1300026-28-1)

$C_{50}H_{62}Br_2MoN_2O_2Si$; FW: 1006.89; orange powdr.

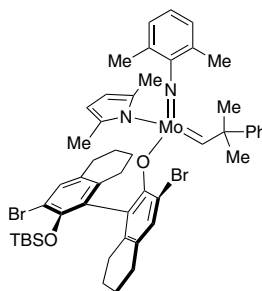
air sensitive, moisture sensitive, (store cold)

Note: Developed by XiMo. Sold under license from XiMo for research purposes only.

Patents: U.S. 9,687,834, EP2242578.

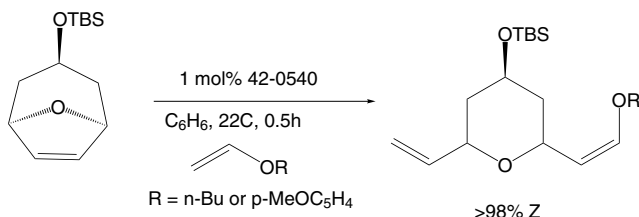
100mg

500mg



Technical Note:

- Catalyst used for:
 - Enantio-selective ring opening/cross metathesis.
 - Ring closing metathesis.
 - Enantio- and endo-selective ene-yne ring closing metathesis.



Tech. Note (1)
Ref. (2)

References:

- Nature, **2011**, 471, 461-466.
- J. Am. Chem. Soc., **2012**, 134, 2788-2799.

42-0545

NEW

(R)-1-((3,3'-Dibromo-2'-((tert-butyldimethylsilyl)oxy)-5,5',6,6',7,7',8,8'-octahydro-[1,1'-binaphthalen]-2-yl)oxy)-1-(2,5-dimethyl-1H-pyrrol-1-yl)-N-(2,6-dimethylphenyl)-1-(2-methyl-2-phenylpropylidene)molybdenum (VI) paraffin pellets (1300026-28-1)

$C_{50}H_{62}Br_2MoN_2O_2Si$; FW: 1006.89; paraffin pellet

air sensitive, moisture sensitive, (store cold)

Note: Developed by XiMo. Sold under license from XiMo for research purposes only.

Patents: U.S. 9,687,834, EP2242578.

2pcs

10pcs

Technical Note:

- See 42-0540 (page 53)

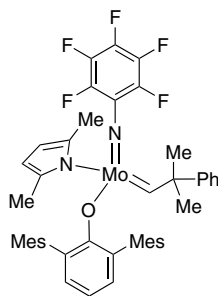
MOLYBDENUM (Compounds)

42-0550

NEW

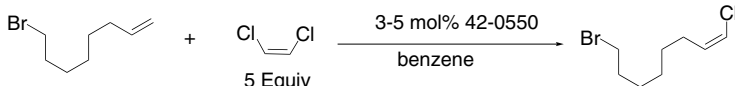
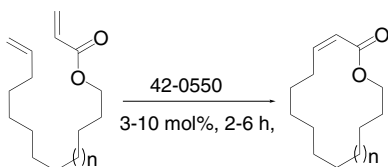
amp

(2,5-Dimethyl-1H-pyrrol-1-yl)(2,2'',4,4'',6,6''-hexamethyl[1,1':3',1''-terphenyl]-2'-olato)(2-methyl-2-phenylpropylidene)[2,3,4,5,6-pentafluorobenzenaminato(2-)-κN], (T-4) molybdenum(VI) (1433803-79-2)
 $C_{46}H_{45}F_5MoN_2O$; FW: 832.81; orange powdr.
air sensitive, moisture sensitive, (store cold)
 Note: Developed by XiMo. Sold under license from XiMo for research purposes only.
 Patent: U.S. 9,441,059.

100mg
500mg

Technical Notes:

1. Z-selective alkenyl halide synthesis by cross metathesis.
2. Stereoselective macrocyclic ring closing metathesis.

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

Macrocyclic Z-enolates

References:

1. *Nature*, **2016**, 531, 459.
2. *J. Am. Chem. Soc.*, **2014**, 136, 16493.

42-0555

NEW

(2,5-Dimethyl-1H-pyrrol-1-yl)(2,2'',4,4'',6,6''-hexamethyl[1,1':3',1''-terphenyl]-2'-olato)(2-methyl-2-phenylpropylidene)[2,3,4,5,6-pentafluorobenzenaminato(2-)-κN], (T-4) molybdenum(VI), paraffin pellets (1433803-79-2)
 $C_{46}H_{45}F_5MoN_2O$; FW: 832.81; paraffin pellet
air sensitive, moisture sensitive, (store cold)
 Note: Developed by XiMo. Sold under license from XiMo for research purposes only.
 Patent: U.S. 9,441,059.

2pcs
10pcs

Technical Note:

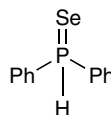
1. See 42-0550 (page 54)

NANOMATERIALS (Compounds)

15-1772

NEW

Diphenylphosphine selenide, 98% (5853-64-5)
 $C_{12}H_{11}PSe$; FW: 265.15; white to off-white powdr.; m.p. 111-112
moisture sensitive
 Note: Precursor for quantum dot synthesis

1g
5g

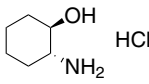
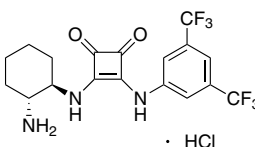
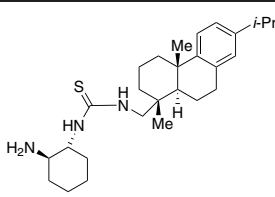
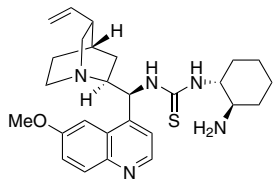
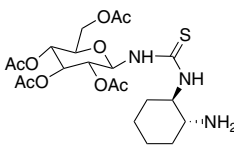
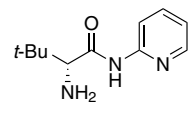
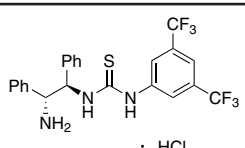
Technical Note:

1. Reagent used for the preparation of highly emissive Se-based quantum dots: PbSe [1, 2] ZnSe [3] and CdSe [4-6] quantum dots.

References:

1. *J. Am. Chem. Soc.* **2010**, 132, 10973.
2. *Nanoscale*, **2015**, 7, 5299.
3. *ACS Appl. Mater. Interfaces*, **2012**, 4, 4302.
4. *Chem. Phys.*, **2016**, 471, 24.
5. *J. Phys. Chem. A*, **2016**, 120, 918.
6. *J. Am. Chem. Soc.*, **2016**, 138, 3382.

NITROGEN (Compounds)

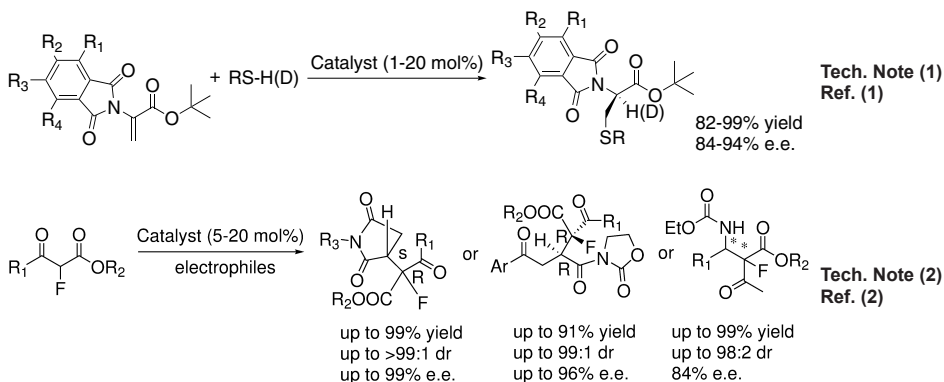
07-7222	(1R,2R)-2-Aminocyclohexanol hydrochloride, 95% (99% ee) (13374-31-7) C ₆ H ₁₄ ClNO; FW: 151.6; white to light yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		1g
07-1360	3-[(1R,2R)-2-Aminocyclohexylamino]-4-[3,5-bis(trifluoromethyl)phenylamino]cyclobut-3-ene-1,2-dione Hydrochloride, 98%, (99% ee) C ₁₈ H ₁₇ F ₆ N ₃ O ₂ ; FW: 457.8; white-light yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		50mg
07-1359	3-[(1S,2S)-2-Aminocyclohexylamino]-4-[3,5-bis(trifluoromethyl)phenylamino]cyclobut-3-ene-1,2-dione Hydrochloride, 95%, (99% ee) C ₁₈ H ₁₇ F ₆ N ₃ O ₂ ; FW: 457.8; white-light yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		50mg
07-6329	N-[(1R,2R)-2-Aminocyclohexyl]-N'-[[[(1R,4aS,10aR)-1,2,3,4,4a,9,10,10a-octahydro-1,4a-dimethyl-7-isopropyl-1-phenanthrenyl]methyl]thiourea, 95% (1094496-54-4) C ₂₇ H ₄₃ N ₃ S; FW: 441.7; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		50mg
07-6369	N-[(1R,2R)-2-Aminocyclohexyl]-N'-[(8α,9S)-6'-methoxycinchonan-9-yl]thiourea, 98% (1052184-48-1) C ₂₇ H ₃₇ N ₃ OS; FW: 479.7; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		50mg
07-6363	N-[(1R,2R)-2-Aminocyclohexyl]-N'-(2,3,4,6-tetra-O-acetyl-β-D-glucopyranosyl)thiourea, 95% (933456-75-8) C ₂₁ H ₃₃ N ₃ O ₉ S; FW: 503.6; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		100mg
07-6356	(2R)-2-Amino-3,3-dimethyl-N-2-pyridinylbutanamide, 98%, (99% ee) (1568087-94-4) C ₁₁ H ₁₇ N ₃ O; FW: 207.3; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		100mg
07-6355	(2S)-2-Amino-3,3-dimethyl-N-2-pyridinylbutanamide, 98%, (99% ee) (171764-07-1) C ₁₁ H ₁₇ N ₃ O; FW: 207.3; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		100mg
07-6370	N-[(1R,2R)-2-Amino-1,2-diphenylethyl]-N'-[3,5-bis(trifluoromethyl)phenyl]thiourea Hydrochloride, 98%, (99% ee) C ₂₃ H ₁₉ F ₆ N ₃ S; FW: 519.9; white-light yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		100mg

NITROGEN (Compounds)

07-6371 NEW	N-[(1S,2S)-2-Amino-1,2-diphenylethyl]-N'-[3,5-bis(trifluoromethyl)phenyl]thiourea 100mg Hydrochloride, 98%, (99% ee) $C_{23}H_{19}F_6N_3S$; FW: 519.9; white-light yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.	
07-6351 NEW	N-[(1R,2R)-2-Amino-1,2-diphenylethyl]-N'-1-(1-naphthalenyl)ethyl]thiourea, 95%, (99% ee) 50mg $C_{27}H_{27}N_3S$; FW: 425.6; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.	
07-6350 NEW	N-[(1S,2S)-2-Amino-1,2-diphenylethyl]-N'-[(R)-1-(1-naphthalenyl)ethyl]thiourea, 98%, (99% ee) 50mg $C_{27}H_{27}N_3S$; FW: 425.6; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.	
07-1373 NEW	1-[(4R)-4-Benzyl-4,5-dihydro-2-oxazolyl]isoquinoline, 98%, (99% ee) 50mg $C_{19}H_{18}N_2O$; FW: 288.3; white-brown powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.	
07-1374 NEW	1-[(4S)-4-Benzyl-4,5-dihydro-2-oxazolyl]isoquinoline, 98%, (99% ee) 50mg $C_{19}H_{18}N_2O$; FW: 288.3; white-light brown powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.	
07-6372 NEW	(2S,6S)-2,6-Bis(1,1-dimethylethyl)-2,3,5,6-tetrahydro-1H-imidazo[1,2-a]imidazole, 98% (877773-38-1) 50mg $C_{13}H_{25}N_3$; FW: 223.4; white-brown powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.	

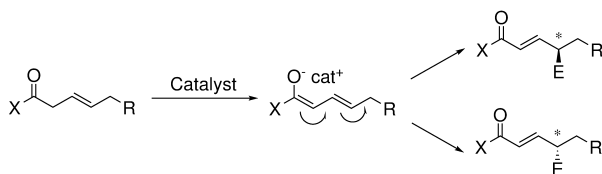
Technical Notes:

1. Protonation- The guanidine derivative catalyzes a tandem conjugate addition-enantioselective protonation reaction of phthalimidoacrylates with thiols and itaconimides with phosphine oxides.
2. Addition of Fluorocarbon Nucleophiles- Synthesis of a chiral quaternary carbon center bearing a fluorine atom: enantio- and diastereoselective guanidine-catalyzed addition of fluorocarbon nucleophiles. The title reaction provides adducts having quaternary carbon centers bearing a fluorine atom with high ee and d.r. values.
3. Allylic Amination- The title reaction-enantiodivergent and γ -selective asymmetric allylic amination using the guanidine catalyst can deliver both enantiomers of the product with excellent enantioselectivity by judicious choice of the double bond geometry of the β,γ -unsaturated carbonyl compound.
4. Isomerization- We report that chiral bicyclic guanidine is found to catalyze the isomerization of alkynes to chiral allenes with high enantioselectivities. This Bronsted base catalyzed 1,3-proton shift reaction, an efficient and atom economical reaction, proceeds through deprotonation and protonation sequences.

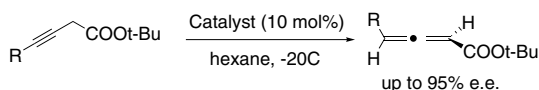


NITROGEN (Compounds)

07-6372 (continued) (2S,6S)-2,6-Bis(1,1-dimethylethyl)-2,3,5,6-tetrahydro-1H-imidazo[1,2-a]imidazole, 98% (877773-38-1)



Tech. Note (3)
Ref. (3)



Tech. Note (4)
Ref. (4)

References:

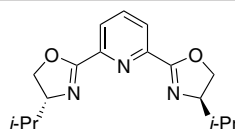
1. *Angew. Chem. Int. Ed.*, **2008**, 47, 5641-5645.
2. *Angew. Chem. Int. Ed.*, **2009**, 48, 3627-3631.
3. *Angew. Chem. Int. Ed.*, **2012**, 51, 2382-2386.
4. *J. Am. Chem. Soc.*, **2009**, 131, 7212-7213.

07-1365 2,6-Bis[(4R)-isopropyl-2-oxazolin-2-yl]pyridine, 98%, (99% ee) (131864-67-0)

NEW

C₁₇H₂₃N₃O₂; FW: 301.4; white-light yellow pwdr.
(store cold)

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



1g

07-1366 2,6-Bis[(4S)-isopropyl-2-oxazolin-2-yl]pyridine, 98%, (99% ee) (118949-61-4)

NEW

C₁₇H₂₃N₃O₂; FW: 301.4; white-light yellow pwdr.
(store cold)

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

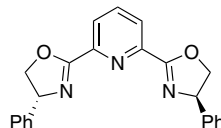
1g

07-1363 2,6-Bis[(4R)-phenyl-2-oxazolin-2-yl]pyridine, 98%, (99% ee) (128249-70-7)

NEW

C₂₃H₁₉N₃O₂; FW: 369.4; white-light yellow pwdr.
(store cold)

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

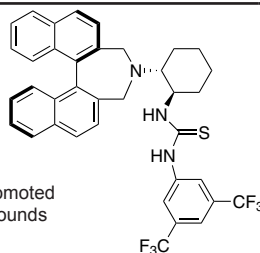


1g

07-6339 N-[3,5-Bis(trifluoromethyl)phenyl]-N'-[(1R,2R)-2-[(11bR)-3,5-dihydro-4H-dinaphth[2,1-c:1',2'-e]azepin-4-yl]cyclohexyl]thiourea, 98%, (99% ee) (1040235-96-8)

NEW

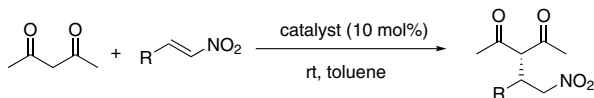
C₃₇H₃₁F₆N₃S; FW: 663.7; white-light yellow pwdr.
Note: Sold in collaboration with Daicel for research purposes only.



50mg

Technical Note:

1. Michael Addition- Bifunctional amine-thiourea organocatalyst promoted enantioselective Michael reaction between 1,3-dicarbonyl compounds and nitro olefins.



Tech. Note (1)
Ref. (1)

References:

1. *J. Org. Chem.*, **2008**, 73, 5202-5205.

NITROGEN (Compounds)

07-6335

N-[3,5-Bis(trifluoromethyl)phenyl]-N'-[(1S,2S)-2-[(11bR)-3,5-dihydro-4H-dinaphth[2,1-c:1',2'-e]azepin-4-yl]cyclohexyl]thiourea, 98%, (99% ee)
(1040245-49-5)

50mg

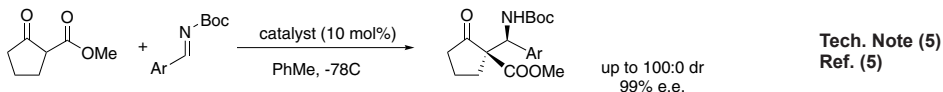
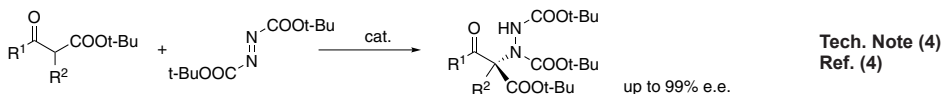
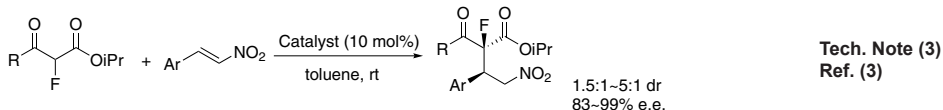
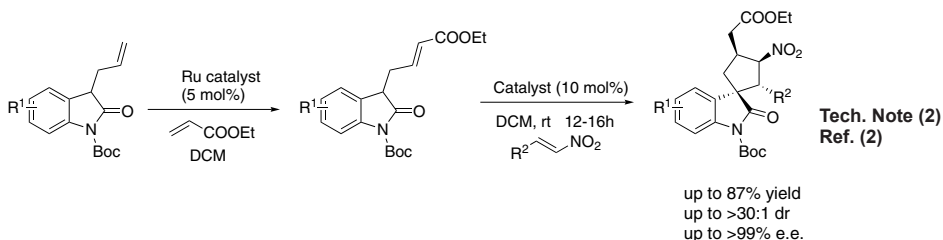
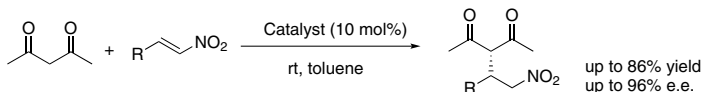
NEW

C₃₇H₃₁F₆N₂S; FW: 663.7; white-light yellow pwdr.

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

Technical Notes:

1. Michael Addition to promote enantioselective Michael reaction between 1,3-dicarbonyl compounds and nitro olefins.
2. Spirocyclopentaneoxindoles with four contiguous stereocenters including one spiroquaternary stereocenter are synthesized by a combined Ru-catalyzed cross-metathesis/organocatalyzed asymmetric double-Michael addition.
3. Catalytic enantioselective conjugate addition reaction of α -fluoro- β -ketoesters to nitroalkenes.
4. Catalytic enantioselective electrophilic α -hydrazination promoted by chiral bifunctional organocatalysts.
5. Catalytic enantioselective Mannich reaction promoted by chiral bifunctional organocatalysts..



References:

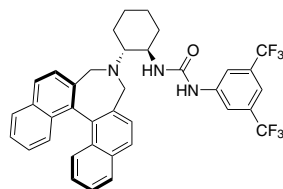
1. *J. Org. Chem.*, **2008**, 73, 5202-5205.
2. *Org. Lett.*, **2011**, 13, 6200-6203.
3. *Tetrahedron Lett.*, **2009**, 50, 4674-4676.
4. *Tetrahedron Lett.*, **2008**, 49, 5527-5530.
5. *J. Org. Chem.*, **2009**, 74, 5734-5737.

NITROGEN (Compounds)

07-6353

NEW

N-[3,5-Bis(trifluoromethyl)phenyl]-N'-[[(1R,2R)-2-[(11bR)-3,5-dihydro-4H-dinaphth[2,1-c:1',2'-e]azepin-4-yl]cyclohexyl]urea, 98%, (99% ee)
(1069115-56-5)
 $C_{37}H_{31}F_6N_3O$; FW: 647.7; white-light red powdr.
Note: Sold in collaboration with Daicel for research purposes only.



50mg

07-6352

NEW

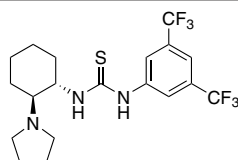
N-[3,5-Bis(trifluoromethyl)phenyl]-N'-[(1S,2S)-2-[(11bR)-3,5-dihydro-4H-dinaphth[2,1-c:1',2'-e]azepin-4-yl]cyclohexyl]urea, 98%, (99% ee) (1069114-13-1)
 $C_{37}H_{31}F_6N_3O$; FW: 647.7; white-yellow powdr.
Note: Sold in collaboration with Daicel for research purposes only.

50mg

07-6354

NEW

1-[3,5-Bis(trifluoromethyl)phenyl]-3-[(1S,2S)-2-(pyrrolidin-1-yl)cyclohexyl]thiourea, 98%, (99% ee)
(1248348-67-5)
 $C_{19}H_{23}F_6N_3S$; FW: 439.5; white-light yellow powdr.
Note: Sold in collaboration with Daicel for research purposes only.

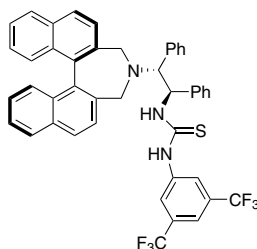


50mg

07-6340

NEW

N-[3,5-Bis(trifluoromethyl)phenyl]-N'-[(1R,2R)-2-[(11bR)-3,5-dihydro-4H-dinaphth[2,1-c:1',2'-e]azepin-4-yl]-1,2-diphenylethyl]thiourea, 95%, (99% ee)
 $C_{46}H_{33}F_6N_3S$; FW: 761.8; white-light yellow powdr.
Note: Sold in collaboration with Daicel for research purposes only.



50mg

Technical Note:

- See 07-6342 (page 59)

07-6342

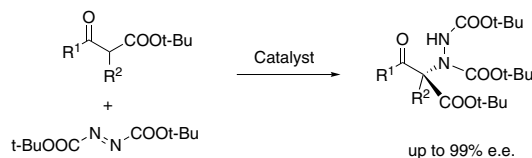
NEW

N-[3,5-Bis(trifluoromethyl)phenyl]-N'-[(1S,2S)-2-[(11bR)-3,5-dihydro-4H-dinaphth[2,1-c:1',2'-e]azepin-4-yl]-1,2-diphenylethyl]thiourea, 95%, (99% ee)
(1069114-12-0)
 $C_{46}H_{33}F_6N_3S$; FW: 761.8; white-light yellow powdr.
Note: Sold in collaboration with Daicel for research purposes only.

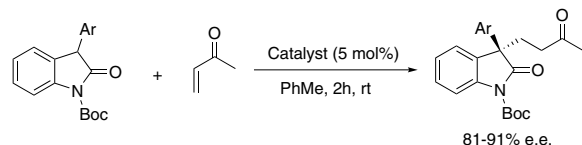
50mg

Technical Notes:

- Electrophilic α -Hydrazination- Treatment of β -ketoesters with azodicarboxylates as electrophilic amination reagents.
- Conjugate Addition- The enantioselective conjugate addition reaction of 3-aryl-substituted oxindoles with methyl vinyl ketone.



Tech. Note (1)
Ref. (1)



Tech. Note (2)
Ref. (2)

References:

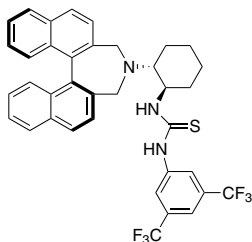
- Tetrahedron Lett.*, **2008**, 49, 5527-5530.
- Molecules*, **2012**, 17, 7523-7532.

NITROGEN (Compounds)

07-6336

NEW

N-[3,5-Bis(trifluoromethyl)phenyl]-N'-[(1R,2R)-2-[(11bS)-3,5-dihydro-4H-dinaphth[2,1-c:1',2'-e]azepin-4-yl]cyclohexyl]thiourea, 98%, (99% ee)
 $C_{37}H_{31}F_6N_2S$; FW: 663.7; white-yellow powd.
 Note: Sold in collaboration with Daicel for research purposes only.



50mg

07-6338

NEW

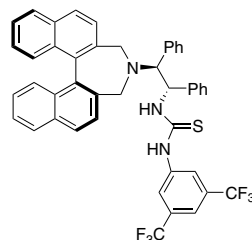
N-[3,5-Bis(trifluoromethyl)phenyl]-N'-[(1S,2S)-2-[(11bS)-3,5-dihydro-4H-dinaphth[2,1-c:1',2'-e]azepin-4-yl]cyclohexyl]thiourea, 98%, (99% ee)
 $C_{37}H_{31}F_6N_2S$; FW: 663.7; white-light yellow powd.
 Note: Sold in collaboration with Daicel for research purposes only.

50mg

07-6341

NEW

N-[3,5-Bis(trifluoromethyl)phenyl]-N'-[(1S,2S)-2-[(11bS)-3,5-dihydro-4H-dinaphth[2,1-c:1',2'-e]azepin-4-yl]-1,2-diphenylethyl]thiourea, 98%, (99% ee)
 $C_{45}H_{33}F_6N_2S$; FW: 761.8; white-light yellow powd.
 Note: Sold in collaboration with Daicel for research purposes only.

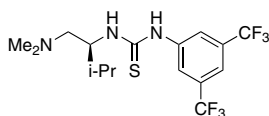


50mg

07-6334

NEW

(S)-1-[3,5-Bis(trifluoromethyl)phenyl]-3-[1-(dimethylamino)-3-methylbutan-2-yl]thiourea, 98%, (99% ee) (1048692-50-7)
 $C_{16}H_{21}F_6N_2S$; FW: 401.4; white-light yellow powd.
 Note: Sold in collaboration with Daicel for research purposes only.

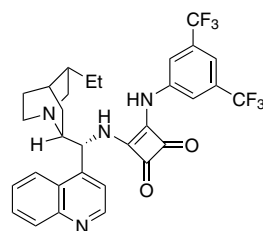


50mg

07-1362

NEW

3-[[3,5-Bis(trifluoromethyl)phenyl]amino]-4-[[[(9R)-10,11-dihydrocinchonan-9-yl]amino]-3-cyclobutene-1,2-dione, 98% (1407166-64-6)
 $C_{31}H_{28}F_6N_2O_2$; FW: 602.6; white-yellow powd.
 Note: Sold in collaboration with Daicel for research purposes only.

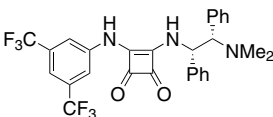


50mg

07-1354

NEW

3-[[3,5-Bis(trifluoromethyl)phenyl]amino]-4-[[[(1S,2S)-2-(dimethylamino)-1,2-diphenylethyl]amino]-3-cyclobutene-1,2-dione, 98%, (99% ee) (1263205-97-5)
 $C_{28}H_{23}F_6N_2O_2$; FW: 547.5; white-light yellow powd.
 Note: Sold in collaboration with Daicel for research purposes only.

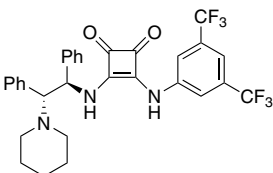


50mg

07-1352

NEW

3-[[3,5-Bis(trifluoromethyl)phenyl]amino]-4-[[[(1R,2R)-1,2-diphenyl-2-(1-piperidinyl)ethyl]amino]-3-cyclobutene-1,2-dione, 98%, (99% ee) (1454257-32-9)
 $C_{31}H_{27}F_6N_2O_2$; FW: 587.6; white-light brown powd. (store cold)
 Note: Sold in collaboration with Daicel for research purposes only.



50mg

NITROGEN (Compounds)

07-1353

NEW

3-[[3,5-Bis(trifluoromethyl)phenyl]amino]-4-[[[(1S,2S)-1,2-diphenyl-2-(1-piperidinylethyl)amino]-3-cyclobutene-1,2-dione, 98%, (99% ee)

C₃₁H₂₇F₆N₃O₂; FW: 587.6; white-light brown powdr.

(store cold)

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

50mg

07-1355

NEW

3-[[3,5-Bis(trifluoromethyl)phenyl]amino]-4-[[[(1R,2R)-2-(1-pyrrolidinyl)cyclohexyl]amino]-3-cyclobutene-1,2-dione, 98%, (99% ee)

(1211565-10-4)

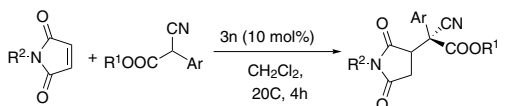
C₂₃H₂₃F₆N₃O₂; FW: 475.4; white-brown powdr.

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

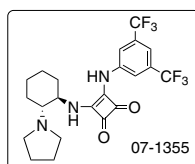
50mg

Technical Note:

1. Michael Addition- An efficient diastereo- and enantioselective addition of α -substituted isocyanoacetates to N-aryl maleimides.



up to 99% yield
up to >20:1 dr
up to >91% e.e.



Tech. Note (1)
Ref. (1)

References:

1. *Tetrahedron*, **2013**, 69, 10763-10771.

07-6333

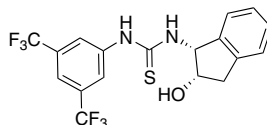
NEW

N-[3,5-Bis(trifluoromethyl)phenyl]-N'-[[(1R,2S)-2,3-dihydro-2-hydroxy-1H-inden-1-yl]thiourea, 95%, (99% ee) (871828-95-4)

C₁₈H₁₄F₆N₂OS; FW: 420.4; white-light yellow powdr.

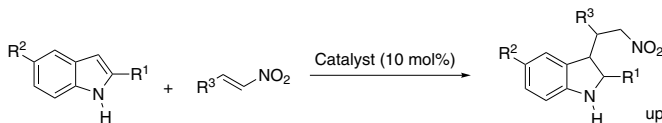
Note: Sold in collaboration with Daicel for research purposes only.

50mg



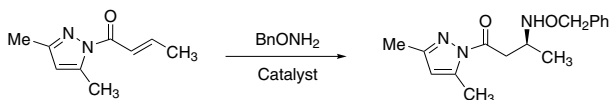
Technical Notes:

1. Friedel-Crafts Alkylation- access to optically active 2-indolyl-1-nitro derivatives by enantioselective Friedel-Crafts alkylation of indoles with nitroalkenes (R₁= R₂= H, R₃= Ph).
2. Conjugate Addition- Conjugate addition of O-protected hydroxylamines to pyrazole-derived enoates proceeds with high efficiency and enantioselectivity.



up to 88% yield
up to 89% e.e.

Tech. Note (1)
Ref. (1)



Tech. Note (2)
Ref. (2)

References:

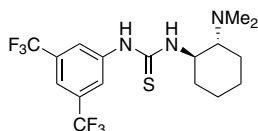
1. *Angew. Chem. Int. Ed.*, **2005**, 44, 6576-6579.
2. *J. Am. Chem. Soc.*, **2007**, 129, 8064-8065.

NITROGEN (Compounds)

07-6331

NEW

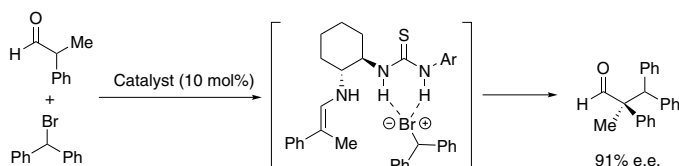
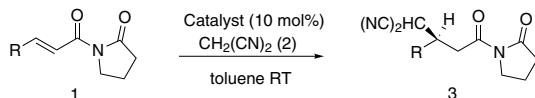
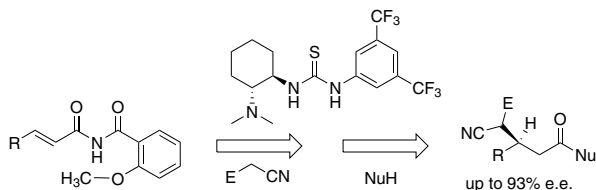
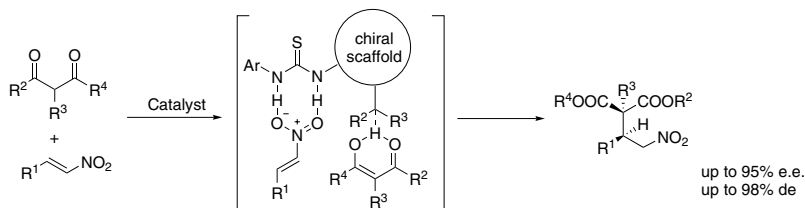
1-[3,5-Bis(trifluoromethyl)phenyl]-3-[(1R,2R)-2-(dimethylamino)cyclohexyl]thiourea, 98%, (99% ee) (620960-26-1)
 $C_{17}H_{21}F_6N_2S$; FW: 413.4; white-light yellow powdr.
 Note: Sold in collaboration with Daicel for research purposes only.



1g

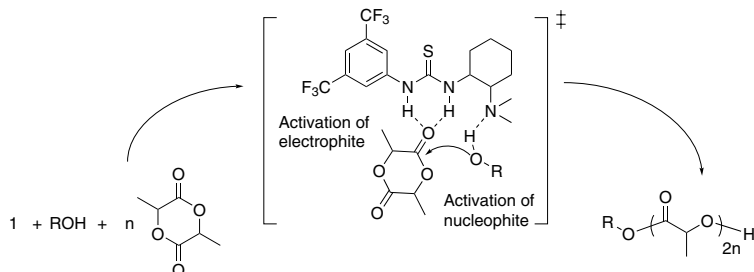
Technical Notes:

1. Michael Addition- Michael reaction of malonates to afforded Michael adducts with high yields and enantioselectivities (up to 95%, up to 93% ee).
2. Synthesized a new class of bifunctional catalysts bearing a thiourea moiety and an amino group on a chiral scaffold.
3. A thiourea-catalyzed asymmetric Michael addition of activated methylene compounds to α,β -unsaturated imides derived from 2-pyrrolidinone and 2-methoxybenzamide.
4. High enantioselectivities (up to 94 % ee) were attained in the Michael addition of a variety of α,β -unsaturated imides (1) and malononitrile.
5. Alkylation- Primary aminothiurea derivatives catalyze enantioselective alkylation of α -arylpropionaldehydes with diarylbromomethane.
6. Living Ring-Opening Polymerization- A versatile, metal-free, organocatalytic approach to the living ring-opening polymerization of lactide.
7. Neber Reaction- The first enantioselective Neber reaction of β -ketoxime sulfonates catalyzed by a bifunctional thiourea.

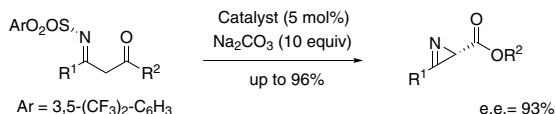


NITROGEN (Compounds)

07-6331 **1-[3,5-Bis(trifluoromethyl)phenyl]-3-[(1R,2R)-2-(dimethylamino)cyclohexyl]thiourea, 98%, (continued) (99% ee) (620960-26-1)**



Tech. Note (6)
Ref. (6)



Tech. Note (7)
Ref. (7)

References:

1. *J. Am. Chem. Soc.*, **2003**, 125, 12672-12673.
2. *J. Am. Chem. Soc.*, **2005**, 127, 119-125.
3. *J. Am. Chem. Soc.*, **2006**, 128, 9413-9419.
4. *Angew. Chem. Int. Ed.*, **2005**, 44, 4032-4035.
5. *J. Am. Chem. Soc.*, **2010**, 132, 9286-9288.
6. *J. Am. Chem. Soc.*, **2005**, 127, 13798-13799
7. *Org. Lett.*, **2011**, 13, 6374-6377.

07-6332 **1-[3,5-Bis(trifluoromethyl)phenyl]-3-[(1S,2S)-2-(dimethylamino)cyclohexyl]thiourea, 98%, (99% ee) (851477-20-8)**

19

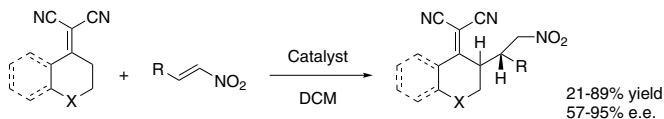
NEW

C₁₇H₂₁F₆N₃S; FW: 413.4; white-light yellow powdr.

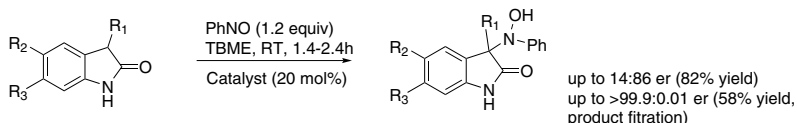
Note: Sold in collaboration with Daicel for research purposes only.

Technical Notes:

1. Michael Addition- The bifunctional chiral thiourea-tertiary amine organocatalysts have been applied to a direct asymmetric vinylogous Michael addition of α,α -dicyanoolefins to nitroolefins with 2-10 mol % catalyst loadings.
2. Oxyamination- An enantioselective α -oxyamination of unprotected 3-substituted oxindoles with nitrosobenzene catalyzed by tertiary amine-thiourea bifunctional organocatalysts has been developed and affords the corresponding 3-amino-2-oxindole derivatives in good yields and with moderate to excellent enantioselectivities.
3. Michael-Michael Cascade Reaction- A novel chiral amine thiourea catalyzed, highly enantioselective Michael-Michael cascade process serves as a "one-pot" approach to synthetically and biologically significant chiral tetrahydrothiophenes.
4. The first highly diastereo- and enantioselective organocatalytic synthesis of 2,2-disubstituted-2H-oxazol-5-ones is described.



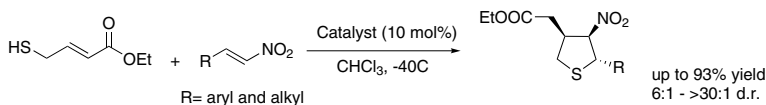
Tech. Note (1)
Ref. (1)



Tech. Note (2)
Ref. (2)

NITROGEN (Compounds)

07-6332 1-[3,5-Bis(trifluoromethyl)phenyl]-3-[(1S,2S)-2-(dimethylamino)cyclohexyl]thiourea, 98%,
(continued) (99% ee) (851477-20-8)



Tech. Note (3)
Ref. (3)

References:

1. *Tetrahedron*, **2007**, 63, 5123-5128.
2. *Org. Biomol. Chem.*, **2012**, 10, 431-439.
3. *Chem. Eur. J.*, **2011**, 17, 770-774.
4. *Chem. Eur. J.*, **2010**, 16, 9884-9889.

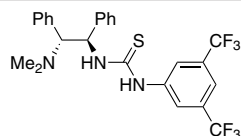
07-6344

NEW

N-[3,5-Bis(trifluoromethyl)phenyl]-N'-[(1R,2R)-2-(dimethylamino)-1,2-diphenylethyl]thiourea, 98%, (99% ee) (834917-24-7)

C₂₅H₂₃F₆N₂S; FW: 511.5; white-light yellow powdr.

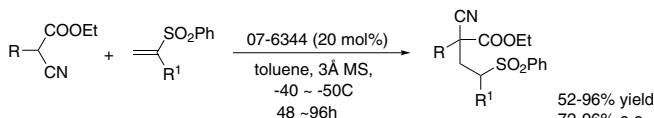
Note: Sold in collaboration with Daicel for research purposes only.



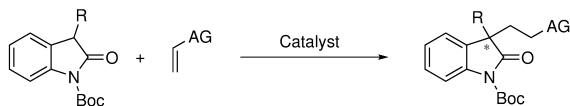
50mg

Technical Notes:

1. Michael Addition- highly enantioselective catalysts for the Michael addition of α -substituted cyanoacetates to vinyl sulfones, giving an efficient protocol for the construction of an all-carbon substituted quaternary stereocentre.
2. Asymmetric catalysis of chiral oxindoles bearing 3-position all-carbon quaternary stereocenters.
3. The enantioselective Michael addition of dialkyl phosphites to N-protected isatylidene malononitriles.
4. Aldol Reaction- The first example of a direct catalytic asymmetric intermolecular aldol reaction of 3-isothiocyanato oxindoles to simple ketones.
5. Cascade Aldol-Cyclization- A highly efficient method for the construction of a family of spiro[oxazolidine-2-thione-oxindoles] with 3-isothiocyanato oxindoles and aldehydes via a cascade aldol-cyclization.

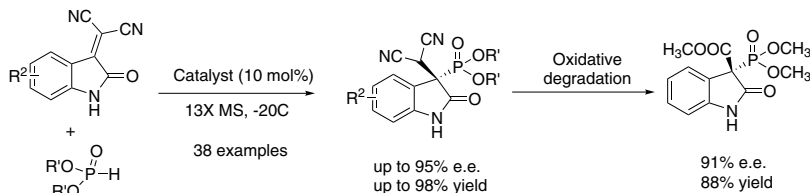


Tech. Note (1)
Ref. (1)



R = Ar or CH₃ AG = COOR' or SOOR''

Tech. Note (2)
Ref. (2)

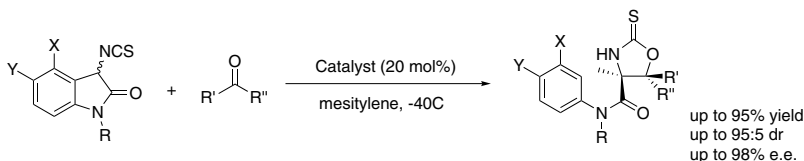
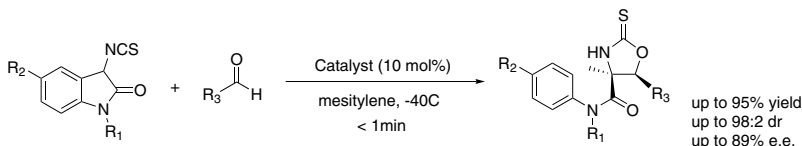


Tech. Note (3)
Ref. (3)

NITROGEN (Compounds)

07-6344
(continued)

N-[3,5-Bis(trifluoromethyl)phenyl]-N'-[1(R,2R)-2-(dimethylamino)-1,2-diphenylethyl]thiourea, 98%, (99% ee) (834917-24-7)

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

References:

1. *Org. Biomol. Chem.*, **2006**, 4, 2097-2099.
2. *Org. Biomol. Chem.*, **2010**, 8, 77-82.
3. *Tetrahedron*, **2014**, 70, 2406-2415.
4. *Org. Lett.*, **2011**, 13, 2472-2475.
5. *Tetrahedron*, **2013**, 69, 5281-5286.

07-6345

N-[3,5-Bis(trifluoromethyl)phenyl]-N'-[(1S,2S)-2-(dimethylamino)-1,2-diphenylethyl]thiourea, 98%, (99% ee) (1233369-41-9)

100mg

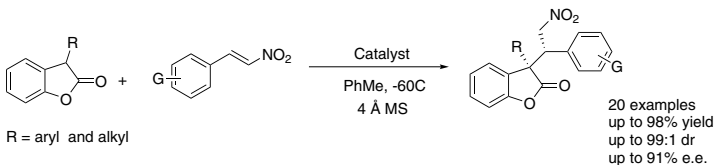
NEW

C₂₈H₂₃F₆N₃S; FW: 511.5; white-light yellow powdr.

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

Technical Note:

1. Michael Addition- an organocatalytic strategy for the asymmetric catalysis of chiral benzofuran-2(3H)-ones bearing 3-position all-carbon quaternary stereocenters.

Tech. Note (1)
Ref. (1)

References:

1. *Org. Biomol. Chem.*, **2012**, 10, 413-420.

07-6349

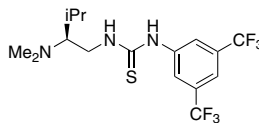
N-[3,5-Bis(trifluoromethyl)phenyl]-N'-[(2S)-2-(dimethylamino)-3-methylbutyl]thiourea, 95%, (99% ee) (1048692-60-9)

50mg

NEW

C₁₆H₂₁F₆N₃S; FW: 401.4; white-light yellow powdr. (store cold)

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



07-6348

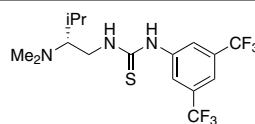
N-[3,5-Bis(trifluoromethyl)phenyl]-N'-[(2R)-2-(dimethylamino)-3-methylbutyl]thiourea, 98%, (99% ee)

50mg

NEW

C₁₆H₂₁F₆N₃S; FW: 401.4; white-light yellow powdr.

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



07-1376

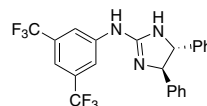
(4R,5R)-N-(3,5-Bis(trifluoromethyl)phenyl)-4,5-diphenyl-4,5-dihydro-1H-imidazol-2-amine, 98%, (99% ee)

50mg

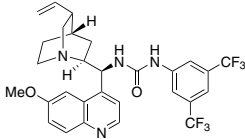
NEW

C₂₃H₁₇N₃F₆; FW: 449.4; white-light yellow powdr.

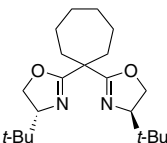
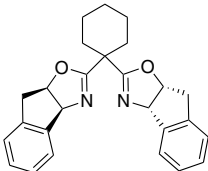
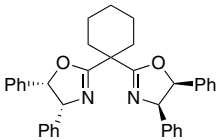
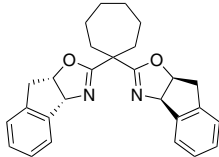
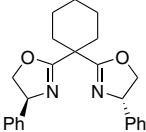
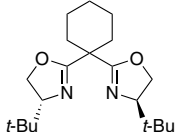
Note: Sold in collaboration with Daicel for research purposes only.



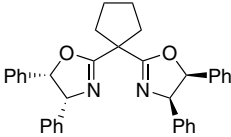
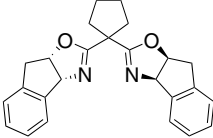
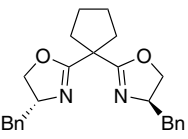
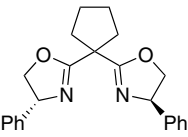
NITROGEN (Compounds)

07-1375	(4S,5S)-N-(3,5-Bis(trifluoromethyl)phenyl)-4,5-diphenyl-4,5-dihydro-1H-imidazol-2-amine, 98%, (99% ee) C ₂₃ H ₁₇ N ₃ F ₆ ; FW: 449.4; white-light yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.	50mg
NEW		
07-6328	N-[3,5-Bis(trifluoromethyl)phenyl]-N'-[(8α,9S)-6'-methoxycinchonan-9-yl]urea, 98%, (99% ee) (957770-66-0) C ₂₉ H ₂₈ F ₆ N ₂ O ₂ ; FW: 578.5; white-light yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.	50mg
		
07-1361	3-[[[3,5-Bis(trifluoromethyl)phenyl]methyl]amino]-4-[[[(9R)-10,11-dihydro-6'-methoxycinchonan-9-yl]amino]-3-cyclobutene-1,2-dione, 95% (1363811-07-7) C ₃₃ H ₃₂ F ₆ N ₂ O ₃ ; FW: 646.6; white-light yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.	50mg
NEW		
07-1357	3-[[[3,5-Bis(trifluoromethyl)phenyl]methyl]amino]-4-[[[(8α,9S)-6'-methoxycinchonan-9-yl]amino]-3-cyclobutene-1,2-dione, 98% (1210360-60-3) C ₃₃ H ₃₀ F ₆ N ₂ O ₃ ; FW: 644.6; white-light yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.	50mg
NEW		
07-1370	1-[(4S)-4-tert-Butyl-4,5-dihydro-2-oxazolyl]isoquinoline, 98% (1402851-52-8) C ₁₆ H ₁₈ N ₂ O; FW: 254.3; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.	50mg
NEW		
07-1398	(4R,4'R,5S,5'S)-2,2'-(Cycloheptane-1,1-diyl)bis(4,5-diphenyl-4,5-dihydrooxazole), 98%, (99% ee) C ₃₇ H ₃₆ N ₂ O ₂ ; FW: 540.7; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.	50mg
NEW		
07-1399	(4S,4'S,5R,5'R)-2,2'-(Cycloheptane-1,1-diyl)bis(4,5-diphenyl-4,5-dihydrooxazole), 95%, (99% ee) C ₃₇ H ₃₆ N ₂ O ₂ ; FW: 540.7; white-yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.	50mg
NEW		
07-1396	(4R,4'R)-2,2'-(Cycloheptane-1,1-diyl)bis(4-phenyl-4,5-dihydrooxazole), 98%, (99% ee) C ₂₆ H ₂₈ N ₂ O ₂ ; FW: 388.5; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.	50mg
NEW		
07-1397	(4S,4'S)-2,2'-(Cycloheptane-1,1-diyl)bis(4-phenyl-4,5-dihydrooxazole), 98%, (99% ee) C ₂₆ H ₂₈ N ₂ O ₂ ; FW: 388.5; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.	50mg
NEW		

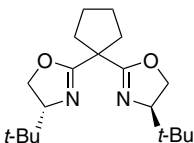
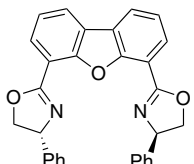
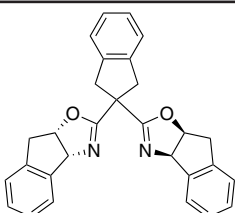
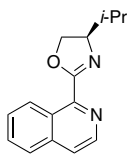
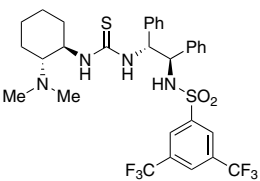
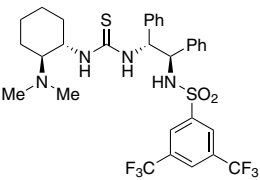
NITROGEN (Compounds)

07-1400	(4R,4'R)-2,2'-(Cycloheptane-1,1-diyl)bis(4-tert-butyl-4,5-dihydrooxazole), 98%, (99% ee) C ₂₁ H ₃₆ N ₂ O ₂ ; FW: 348.5; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		50mg
07-1401	(4S,4'S)-2,2'-(Cycloheptane-1,1-diyl)bis(4-tert-butyl-4,5-dihydrooxazole), 98%, (99% ee) C ₂₁ H ₃₆ N ₂ O ₂ ; FW: 348.5; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		50mg
07-1387	(3aS,3a'S,8aR,8a'R)-2,2'-Cyclohexylidenebis[8,8a-dihydro-3aH-indeno[1,2-d]oxazole], 98%, (99% ee) (182122-13-0) C ₂₆ H ₂₆ N ₂ O ₂ ; FW: 398.5; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		50mg
07-1390	(4R,4'R,5S,5'S)-2,2'-Cyclohexylidenebis[4,5-dihydro-4,5-diphenyloxazole], 98%, (99% ee) C ₃₆ H ₃₄ N ₂ O ₂ ; FW: 526.7; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		50mg
07-1391	(4S,4'S,5R,5'R)-2,2'-Cyclohexylidenebis[4,5-dihydro-4,5-diphenyloxazole], 98%, (99% ee) C ₃₆ H ₃₄ N ₂ O ₂ ; FW: 526.7; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		50mg
07-1394	(3aR,3'aR,8aS,8'aS)-2,2'-Cyclohexylidenebis[3a,8a-dihydro-8H-indeno[1,2-d]oxazole, 98%, (99% ee) (2085239-89-8) C ₂₇ H ₂₈ N ₂ O ₂ ; FW: 412.5; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		50mg
07-1395	(3aS,3'aS,8aR,8'aR)-2,2'-Cyclohexylidenebis[3a,8a-dihydro-8H-indeno[1,2-d]oxazole, 98%, (99% ee) C ₂₇ H ₂₈ N ₂ O ₂ ; FW: 412.5; white-light brown powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		50mg
07-1389	(4S,4'S)-2,2'-Cyclohexylidenebis[4,5-dihydro-4-phenyloxazole], 98%, (99% ee) C ₂₄ H ₂₆ N ₂ O ₂ ; FW: 374.5; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		50mg
07-1392	(4R,4'R)-2,2'-Cyclohexylidenebis[4-tert-butyl-4,5-dihydrooxazole], 98%, (99% ee) C ₂₀ H ₃₄ N ₂ O ₂ ; FW: 334.5; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		50mg

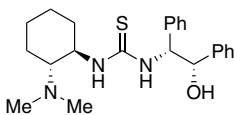
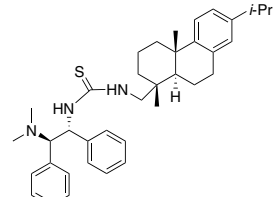
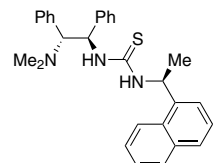
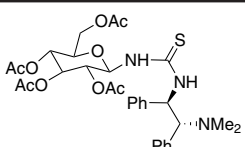
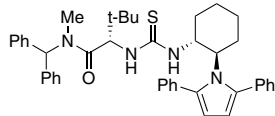
NITROGEN (Compounds)

07-1393	(4S,4'S)-2,2'-Cyclohexylidenebis[4-tert-butyl-4,5-dihydrooxazole], 98%, (99% ee) (298693-04-6) C ₂₀ H ₃₄ N ₂ O ₂ ; FW: 334.5; white-light yellow pwdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.	50mg
NEW		
07-1382	(4R,4'R,5S,5'S)-2,2'-Cyclopentylidenebis[4,5-dihydro-4,5-diphenyloxazole], 98%, (99% ee) C ₃₅ H ₃₂ N ₂ O ₂ ; FW: 512.6; white-light yellow pwdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.	50mg
NEW		
07-1383	(4S,4'S,5R,5'R)-2,2'-Cyclopentylidenebis[4,5-dihydro-4,5-diphenyloxazole], 98%, (99% ee) C ₃₅ H ₃₂ N ₂ O ₂ ; FW: 512.6; white-light yellow pwdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.	50mg
NEW		
07-7220	(3aR,3'aR,8aS,8'aS)-2,2'-Cyclopentylidenebis[3a,8a-dihydro-8H-indeno[1,2-d]oxazole] 98%, (99% ee) (2005443-90-1) C ₂₅ H ₂₄ N ₂ O ₂ ; FW: 384.5; white to light yellow pwdr. Note: Sold in collaboration with Daicel for research purposes only.	100mg
NEW		
07-1381	(3aS,3'aS,8aR,8'aR)-2,2'-Cyclopentylidenebis[3a,8a-dihydro-8H-indeno[1,2-d]oxazole], 98%, (99% ee) (182122-12-9) C ₂₅ H ₂₄ N ₂ O ₂ ; FW: 384.5; white-light yellow pwdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.	50mg
NEW		
07-1380	(4S,4'S)-2,2'-Cyclopentylidenebis[4,5-dihydro-4-(phenylmethyl)oxazole], 95%, (99% ee) (1003886-05-2) C ₂₅ H ₂₈ N ₂ O ₂ ; FW: 388.5; white-light yellow pwdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.	50mg
NEW		
07-1379	(4R,4'R)-2,2'-Cyclopentylidenebis[4,5-dihydro-4-(phenylmethyl)oxazole], 98%, (99% ee) (2005443-99-0) C ₂₅ H ₂₈ N ₂ O ₂ ; FW: 388.5; white-light yellow pwdr. Note: Sold in collaboration with Daicel for research purposes only.	50mg
NEW		
07-7210	(4R,4'R)-2,2'-Cyclopentylidenebis[4,5-dihydro-4-phenyloxazole], 95% (99% ee) (1246401-49-9) C ₂₃ H ₂₄ N ₂ O ₂ ; FW: 360.4; white to light yellow pwdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.	100mg
NEW		
07-7218	(4S,4'S)-2,2'-Cyclopentylidenebis[4,5-dihydro-4-phenyloxazole], 98%, (99% ee) (1639791-77-7) C ₂₃ H ₂₄ N ₂ O ₂ ; FW: 360.4; white to light yellow pwdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.	100mg
NEW		
07-1385	(4S,4'S)-2,2'-Cyclopentylidenebis[4-tert-butyl-4,5-dihydrooxazole], 95%, (99% ee) (298693-03-5) C ₁₉ H ₃₂ N ₂ O ₂ ; FW: 320.5; white-light yellow pwdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.	50mg
NEW		

NITROGEN (Compounds)

07-1384	(4R,4'R)-2,2'-Cyclopentylidenebis[4-tert-butyl-4,5-dihydrooxazole], 98%, (99% ee) $C_{19}H_{32}N_2O_2$; FW: 320.5; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		50mg
07-1402	(4R,4'R)-2,2'-(4,6-Dibenzofurandiyl)bis[4,5-dihydro-4-phenyloxazole], 95% (195433-00-2) $C_{30}H_{22}N_2O_3$; FW: 458.5; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		50mg
07-1403	(3aR,3a'R,8aS,8a'S)-2,2'-(1,3-Dihydro-2H-inden-2-ylidene)bis[3a,8a-dihydro-8H-indeno[1,2-d]oxazole], 98%, (99% ee) $C_{26}H_{24}N_2O_2$; FW: 432.5; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		50mg
07-1404	(3aS,3a'S,8aR,8a'R)-2,2'-(1,3-Dihydro-2H-inden-2-ylidene)bis[3a,8a-dihydro-8H-indeno[1,2-d]oxazole], 98%, (99% ee) (188780-28-1) $C_{26}H_{24}N_2O_2$; FW: 432.5; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		50mg
07-1368	1-[(4R)-4,5-Dihydro-4-isopropyl-2-oxazolyl]isoquinoline, 98%, (99% ee) (280755-83-1) $C_{16}H_{16}N_2O$; FW: 240.3; white-yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		100mg
07-6357	N-[(1R,2R)-2-[[[(1R,2R)-2-(Dimethylamino)cyclohexyl]amino]thiomethyl]amino]-1,2-diphenylethyl]-3,5-bis(trifluoromethyl)benzenesulfonamide, 95%, (99% ee) (1020665-73-9) $C_{31}H_{34}F_6N_4O_2S_2$; FW: 672.7; white-light yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		50mg
07-6359	N-[(1S,2S)-2-[[[(1R,2R)-2-(Dimethylamino)cyclohexyl]amino]thiomethyl]amino]-1,2-diphenylethyl]-3,5-bis(trifluoromethyl)benzenesulfonamide, 95%, (99% ee) (1448608-06-7) $C_{31}H_{34}F_6N_4O_2S_2$; FW: 672.7; white-yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		50mg
07-6360	N-[(1R,2R)-2-[[[(1S,2S)-2-(Dimethylamino)cyclohexyl]amino]thiomethyl]amino]-1,2-diphenylethyl]-3,5-bis(trifluoromethyl)benzenesulfonamide, 98%, (99% ee) (1448608-07-8) $C_{31}H_{34}F_6N_4O_2S_2$; FW: 672.7; white-light yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		50mg

NITROGEN (Compounds)

07-6358	N-[(1S,2S)-2-[[[(1S,2S)-2-(Dimethylamino)cyclohexyl]amino]thioxomethyl]amino]-1,2-diphenylethyl]-3,5-bis(trifluoromethyl)benzenesulfonamide, 98%, (99% ee) (1449480-55-0) $C_{31}H_{34}F_6N_4O_2S_2$; FW: 672.7; white-light yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.	50mg
NEW		
07-6361	N-[(1R,2R)-2-(Dimethylamino)cyclohexyl]-N'-[(1R,2S)-2-hydroxy-1,2-diphenylethyl]thiourea, 98%, (99% ee) (1046493-36-0) $C_{23}H_{31}N_3OS$; FW: 397.6; white-light yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.	50mg
		
07-6373	N-[(1R,2R)-2-(Dimethylamino)-1,2-diphenylethyl]-N'-[[[(1R,4aS,10aR)-1,2,3,4,4a,9,10,10a-octahydro-1,4a-dimethyl-7-isopropyl-1-phenanthrenyl]methyl]thiourea, 98%, (99% ee) $C_{37}H_{49}N_3S$; FW: 567.9; white-light yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.	50mg
NEW		
		
07-6330	N-[(1S,2S)-2-(Dimethylamino)-1,2-diphenylethyl]-N'-[[[(1R,4aS,10aR)-1,2,3,4,4a,9,10,10a-octahydro-1,4a-dimethyl-7-isopropyl-1-phenanthrenyl]methyl]thiourea, 98%, (99% ee) $C_{37}H_{49}N_3S$; FW: 567.9; white-light yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.	50mg
NEW		
07-6347	1-[(1S,2S)-2-(Dimethylamino)-1,2-diphenylethyl]-3-[(R)-1-(naphthalen-1-yl)ethyl]thiourea, 95%, (99% ee) $C_{26}H_{31}N_3S$; FW: 453.6; white-yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.	50mg
NEW		
07-6346	1-[(1R,2R)-2-(Dimethylamino)-1,2-diphenylethyl]-3-[(S)-1-(naphthalen-1-yl)ethyl]thiourea, 98%, (99% ee) $C_{26}H_{31}N_3S$; FW: 453.6; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.	50mg
NEW		
		
07-6364	N-[(1R,2R)-2-(Dimethylamino)-1,2-diphenylethyl]-N'-(2,3,4,6-tetra-O-acetyl-β-D-glucopyranosyl)thiourea, 98%, (99% ee) (1440198-44-6) $C_{31}H_{39}N_3O_9S$; FW: 629.7; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.	100mg
NEW		
		
07-6365	N-[(1S,2S)-2-(Dimethylamino)-1,2-diphenylethyl]-N'-(2,3,4,6-tetra-O-acetyl-β-D-glucopyranosyl)thiourea, 98%, (99% ee) (1414889-04-5) $C_{31}H_{39}N_3O_9S$; FW: 629.7; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.	100mg
NEW		
07-6362	(2S)-N-(Diphenylmethyl)-N,3,3-trimethyl-2-[[[(1R,2R)-2,2,5-diphenyl-1H-pyrrol-1-yl]cyclohexyl]amino]thioxomethyl]amino]butanamide, 98% $C_{43}H_{48}N_4OS$; FW: 668.9; white-light yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.	50mg
NEW		
		

NITROGEN (Compounds)

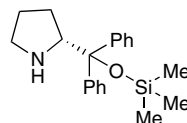
07-7234

NEW

(R)-Diphenylprolinol trimethyl silyl ether, 95% (99% ee)
(943757-71-9) $C_{20}H_{27}NOSi$; FW: 325.5; white to light brown viscous liq.

(store cold)

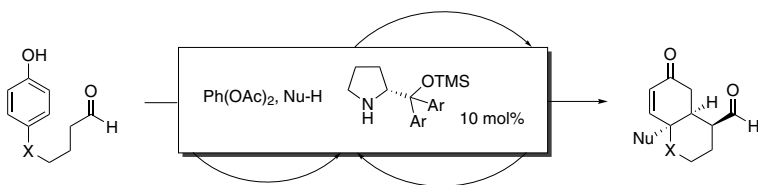
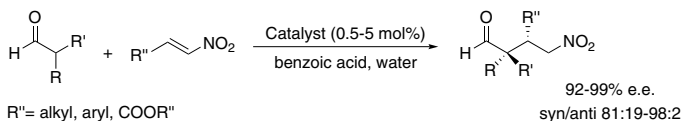
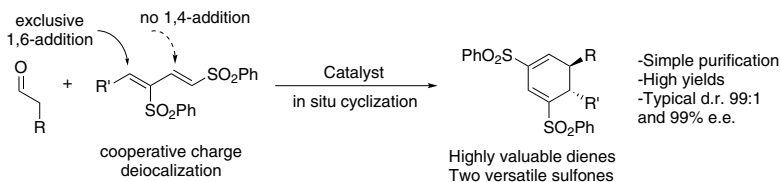
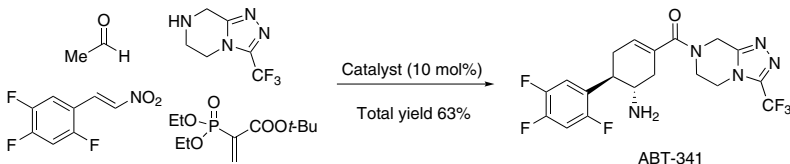
Note: Sold in collaboration with Daicel for research purposes only.



1g

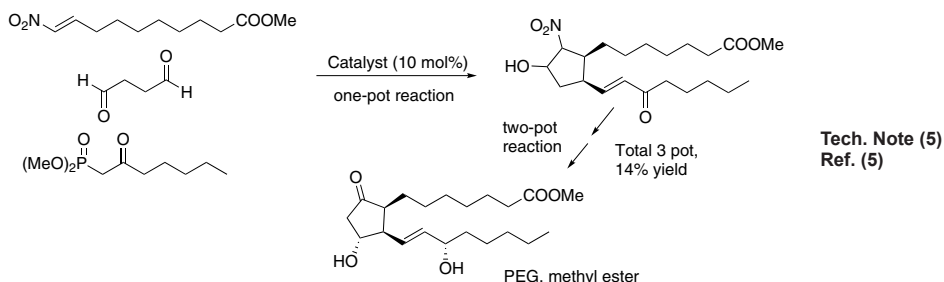
Technical Notes:

1. Michael Addition- oxidative dearomatization of substituted phenols followed by a desymmetrizing secondary amine-catalyzed asymmetric intramolecular Michael addition controls three new stereogenic centers and an array of exploitable orthogonal functionality.
2. A highly effective catalytic procedure for the Michael addition of aldehydes to nitroalkenes is achieved.
3. Conjugate Addition- An unprecedented 1,6-enamine conjugate from 1,3-bis(sulfonyl) butadienes.
4. ABT-341 was synthesized in a one-pot process. An asymmetric Michael reaction, a domino Michael/Horner-Wadsworth-Emmons reaction combined with a retro-aldol reaction, base-catalyzed isomerization, amide-bond formation, and reduction of the nitro group all took place in a single flask.
5. Efficient synthesis in a small number of synthetic steps using one-pot operations involving several successive reactions.

Tech. Note (1)
Ref. (1)Tech. Note (2)
Ref. (2)Tech. Note (3)
Ref. (3)Tech. Note (4)
Ref. (4)

NITROGEN (Compounds)

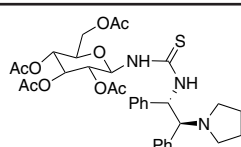
07-7234 (R)-Diphenylprolinol trimethyl silyl ether, 95% (99% ee) (943757-71-9)
(continued)



References:

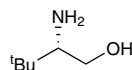
1. *J. Am. Chem. Soc.*, **2008**, 130, 404-405.
2. *Angew. Chem. Int. Ed.*, **2008**, 47, 545-548.
3. *Angew. Chem. Int. Ed.*, **2011**, 50, 5095-5098.
4. *Angew. Chem. Int. Ed.*, **2011**, 50, 2824-2827.
5. *Angew. Chem. Int. Ed.*, **2013**, 52, 3450-3452.

07-6366 **NEW** N-[(1S,2S)-1,2-Diphenyl-2-(1-pyrrolidinyl)ethyl]-N'-(2,3,4,6-tetra-O-acetyl-β-D-glucopyranosyl)thiourea, 95% (1414889-06-7)
C₃₃H₄₁N₃O₉S; FW: 655.8; white-light yellow powdr.
(store cold)
Note: Sold in collaboration with Daicel for research purposes only.



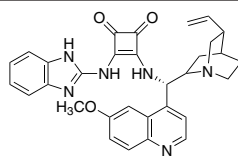
50mg

07-7224 **NEW** L-tert-Leucinol, 98% (99% ee) (13374-31-7)
C₆H₁₅NO; FW: 117.2; white to light yellow solid
Note: Sold in collaboration with Daicel for research purposes only.



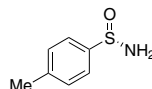
1g

07-1358 **NEW** 3-[[[(8α,9S)-6'-Methoxycinchonan-9-yl]amino]-4-[(1H-benzimidazol-2-yl)amino]-3-cyclobutene-1,2-dione, 98%
C₃₁H₃₀N₆O₃; FW: 534.6; white-yellow powdr.
Note: Sold in collaboration with Daicel for research purposes only.



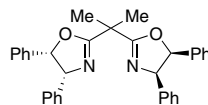
50mg

07-7228 **NEW** (S)-4-Methylbenzenesulfonamide, 95% (99% ee) (188447-91-8)
C₇H₉NOS; FW: 155.2; white to light yellow powdr.
Note: Sold in collaboration with Daicel for research purposes only.



1g

07-1378 **NEW** (4R,4'R,5S,5'S)-2,2'-(1-Methylethylidene)bis[4,5-dihydro-4,5-diphenyloxazole], 98%, (99% ee) (157904-67-1)
C₃₃H₃₀N₂O₂; FW: 486.6; white-light yellow powdr.
(store cold)
Note: Sold in collaboration with Daicel for research purposes only.

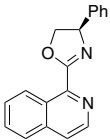
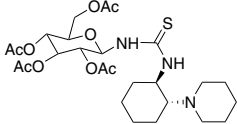
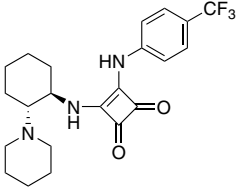


50mg

07-1377 **NEW** (4S,4'S,5R,5'R)-2,2'-(1-Methylethylidene)bis[4,5-dihydro-4,5-diphenyloxazole], 98%, (99% ee) (157825-96-2)
C₃₃H₃₀N₂O₂; FW: 486.6; white-light yellow powdr.
(store cold)
Note: Sold in collaboration with Daicel for research purposes only.

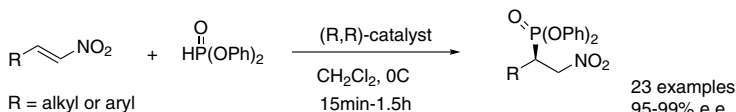
50mg

NITROGEN (Compounds)

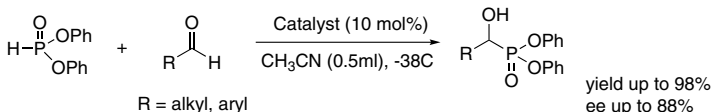
07-1371 NEW	1-[(4R)-4-Phenyl-4,5-dihydro-2-oxazolyl]isoquinoline, 95%, (99% ee) $C_{18}H_{14}N_2O$; FW: 274.3; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		100mg
07-1372 NEW	1-[(4S)-4-Phenyl-4,5-dihydro-2-oxazolyl]isoquinoline, 95%, (99% ee) $C_{18}H_{14}N_2O$; FW: 274.3; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		100mg
07-6368 NEW	N-[(1R,2R)-2-(1-Piperidinylamino)cyclohexyl]-N'-(2,3,4,6-tetra-O-acetyl-β-D-glucopyranosyl)thiourea, 98% $C_{28}H_{41}N_3O_9S$; FW: 571.7; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		50mg
07-1356 NEW	3-[[[(1R,2R)-2-(1-Piperidinyl)cyclohexyl]amino]-4-[[4-(trifluoromethyl)phenyl]amino]-3-cyclobutene-1,2-dione, 98%, (99% ee) (1211565-08-0) $C_{22}H_{26}F_3N_3O_2$; FW: 421.5; white-light yellow powdr. Note: Sold in collaboration with Daicel for research purposes only.		50mg

Technical Notes:

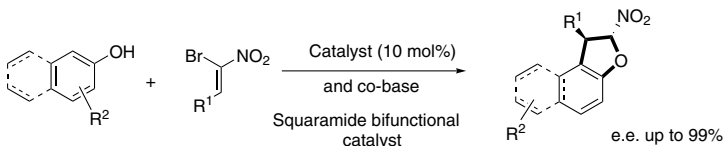
1. Michael Addition- highly enantioselective Michael addition reaction of diphenyl phosphite to a range of nitroalkenes.
2. Hydrophosphonylation- diphenylphosphite has been successfully employed in a chiral Pudovik reaction with aldehydes, extending the generality of this asymmetric methodology.
3. Friedel-Crafts/Substitution Domino Reaction- Dihydroarylfuran skeletons are efficiently synthesized from (Z)-bromonitroalkenes and naphthol derivatives in good yields and excellent enantioselectivities



Tech. Note (1)
Ref. (1)



Tech. Note (2)
Ref. (2)



Tech. Note (3)
Ref. (3)

References:

1. *Angew. Chem. Int. Ed.*, **2010**, 49, 153-156.
2. *Org. Biomol. Chem.*, **2014**, 12, 1258-1264.
3. *Angew. Chem. Commun.*, **2013**, 49, 2001-2003.

07-1367 NEW	(3aS,3'aS,8aR,8'aR)-2,2'-(2,6-Pyridinediyl)bis[3a,8a-dihydro-8H-indeno[1,2-d]oxazole], 95%, (99% ee) (185346-09-2) $C_{28}H_{19}N_3O_2$; FW: 393.4; white-light yellow powdr. (store cold) Note: Sold in collaboration with Daicel for research purposes only.		250mg
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NITROGEN (Compounds)

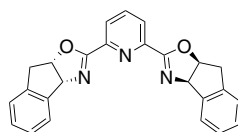
07-7212

NEW

(3aR,3'aR,8aS,8'aS)-2,2'-(2,6-Pyridinediyl)bis[3a,8a-dihydro-8H-indeno[1,2-d]oxazole], 98% (99% ee) (357209-32-6)

C₂₅H₁₉N₃O₂; FW: 393.4; white to light yellow powdr. (store cold)

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



500mg

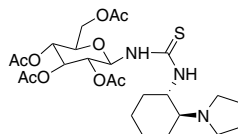
07-6367

NEW

N-[(1S,2S)-2-(1-Pyrrolidinyl)cyclohexyl]-N'-(2,3,4,6-tetra-O-acetyl-β-D-glucopyranosyl)thiourea, 98% (1471290-67-1)

C₂₆H₃₉N₃O₉S; FW: 557.7; white-light yellow powdr. (store cold)

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



50mg

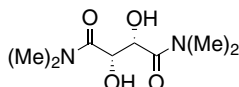
07-7226

NEW

N,N,N',N'-Tetramethyl-D-tartaramide, 98% (99% ee) (63126-52-3)

C₈H₁₆N₂O₄; FW: 204.2; white to light yellow powdr.

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



5g

OXYGEN (Compounds)

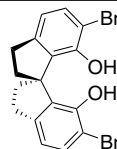
08-1252

NEW

(R)-6,6'-Dibromo-2,2',3,3'-tetrahydro-1,1'-spirobi[1H-indene]-7,7'-diol, 95% (99 ee) (1286189-15-8)

C₁₇H₁₄Br₂O₂; FW: 410.1; white to light yellow powdr.

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



250mg

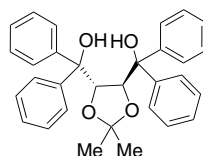
08-1250

NEW

(S)-6,6'-Dibromo-2,2',3,3'-tetrahydro-1,1'-spirobi[1H-indene]-7,7'-diol, 98% (99% ee) (1621066-74-7)

C₁₇H₁₄Br₂O₂; FW: 410.10; white to light yellow powdr.

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



250mg

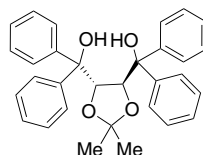
08-1258

NEW

(4S,5S)-2,2-Dimethyl-α,α,α',α'-tetraphenyl-1,3-dioxolane-4,5-dimethanol, 98% (99% ee) (93379-49-8)

C₃₁H₃₀O₄; FW: 466.6; white to light yellow powdr.

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



1g

08-1262

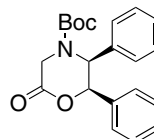
NEW

(2R,3S)-6-Oxo-2,3-diphenyl-4-morpholinecarboxylic acid t-butyl ester, 98% (99% ee) (112741-49-8)

C₂₁H₂₃NO₄; FW: 353.4; white to light yellow powdr.

(store cold)

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



1g

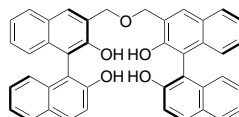
08-1256

NEW

(1R,1''R)-3,3''-[Oxybis(methylene)]bis-[1,1'-binaphthalene]-2,2'-diol, 95% (99% ee) (265116-85-6)

C₄₂H₃₀O₅; FW: 614.7; white to light yellow powdr.

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



100mg

OXYGEN (Compounds)

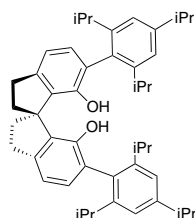
08-1254

NEW

(R)-2,2',3,3'-Tetrahydro-6,6'-bis(2,4,6-tri-isopropylphenyl)-1,1'-spirobi[1H-indene]-7,7'-diol, 95% (99% ee) (1372719-98-6)

C₄₇H₆₀O₂; FW: 657; white to light yellow powd.

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



50mg

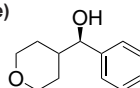
08-1260

NEW

(αR)-Tetrahydro-α-phenyl-2H-pyran-4-methanol, 98% (99% ee) (1800345-36-1)

C₁₂H₁₆O₂; FW: 192.3; white to Light yellow powd.

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



500mg

PHOSPHORUS (Compounds)

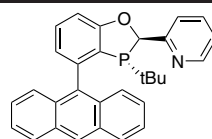
15-6892

NEW

2-((2R,3R)-4-(Anthracen-9-yl)-3-(tert-butyl)-2,3-dihydrobenzo[d][1,3]oxaphosphol-2-yl)pyridine, 97% (>99% ee) (1542796-14-4)

C₃₀H₂₆NOP; FW: 447.51; white to off-white solid

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



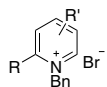
25mg

100mg

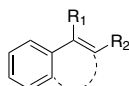
500mg

Technical Notes:

1. Ligand used with iridium catalyst for asymmetric hydrogenation of pyridinium salts.
2. Ligand used with iridium catalyst for asymmetric hydrogenation of unfunctionalized alkenes.



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



Tech. Note (2)
Ref. (4-5)

References:

1. *Org. Lett.* **2018**, 20, 1333–1337.
2. *Org. Lett.* **2016**, 18, 4920–4923.
3. *J. Am. Chem. Soc.* **2016**, 138, 15473–15481.
4. *J. Org. Chem.* **2014**, 79, 993–1000.
5. *Angew. Chem. Int. Ed.* **2014**, 53, 14428–14432.

15-6894

NEW

2-((2S,3S)-4-(Anthracen-9-yl)-3-(tert-butyl)-2,3-dihydrobenzo[d][1,3]oxaphosphol-2-yl)pyridine, 97% (>99% ee)

C₃₀H₂₆NOP; FW: 447.51; white to off-white solid

Note: Sold under license from Zejun for research purposes only.

Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

25mg

100mg

500mg

Technical Note:

1. See 15-6892 (page 75)

15-6888

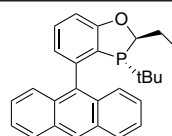
NEW

(2R,3R)-4-(Anthracen-9-yl)-3-(tert-butyl)-2-ethyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)

C₂₇H₂₇OP; FW: 398.48; white to off-white solid

Note: Sold under license from Zejun for research purposes only.

Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



100mg

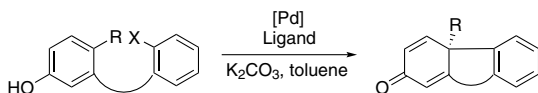
500mg

Technical Notes:

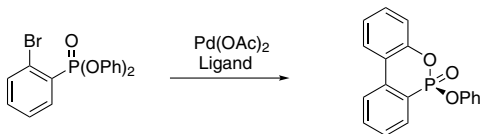
1. Ligand used with palladium catalyst for asymmetric intramolecular cyclization.
2. Ligand used with palladium catalyst for C-H functionalization.
3. Ligand used with palladium catalyst for Suzuki-Miyaura cross-coupling reactions.
4. Ligand used with nickel catalyst for asymmetric intramolecular/intermolecular reductive cyclization.
5. Ligand used with palladium catalyst for asymmetric cyclization.
6. Ligand used with palladium catalyzed Heck-type reactions.

OXYGEN (Compounds)

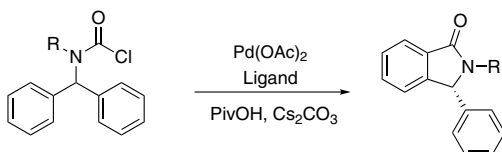
15-6888 (continued) (2R,3R)-4-(Anthracen-9-yl)-3-(tert-butyl)-2-ethyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)



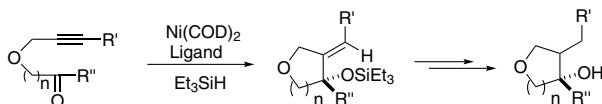
Tech. Note (1)
Ref. (1-4)



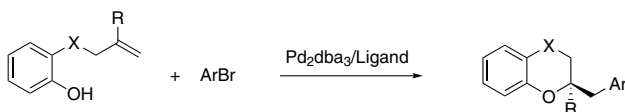
Tech. Note (2)
Ref. (5)



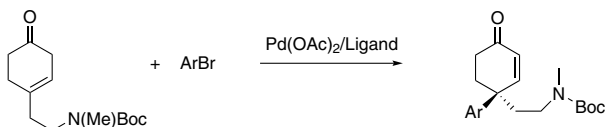
Tech. Note (3)
Ref. (6)



Tech. Note (4)
Ref. (7)



Tech. Note (5)
Ref. (8)



Tech. Note (6)
Ref. (9)

References:

1. *Angew. Chem., Int. Ed.* **2015**, 54, 3033-3037.
2. *Tetrahedron*. **2016**, 72, 1782-1786.
3. *Chem. Sci.* **2017**, 8, 6247-6256.
4. *J. Am. Chem. Soc.* **2017**, 139, 6630.
5. *Org. Chem. Front.* **2015**, 2, 1342-1345.
6. *Tetrahedron*. **2019**, 75, 3239-3247.
7. *Angew. Chem., Int. Ed.* **2015**, 54, 2520-2524.
8. *Angew. Chem., Int. Ed.* **2016**, 55, 5044-5048.
9. *J. Org. Chem.* **2016**, 81, 10165-10171.

15-6890

NEW

(2S,3S)-4-(Anthracen-9-yl)-3-(tert-butyl)-2-ethyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (1884594-03-9)
C₂₇H₂₇OP; FW: 398.48; white to off-white solid
Note: Sold under license from Zejun for research purposes only.
Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

100mg
500mg

Technical Note:

1. See 15-6888 (page 75)

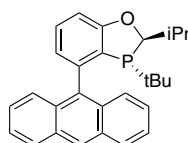
PHOSPHORUS (Compounds)

15-6818

NEW

(2R,3R)-4-(Anthracen-9-yl)-3-(tert-butyl)-2-isopropyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) $C_{28}H_{29}OP$; FW: 412.51; light yellow solid

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

25mg
100mg
500mg

Technical Notes:

1. See 15-6888 (page 75)

15-6820

NEW

(2S,3S)-4-(Anthracen-9-yl)-3-(tert-butyl)-2-isopropyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (1891002-61-1) $C_{28}H_{29}OP$; FW: 412.51; light yellow solid

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

Technical Note:

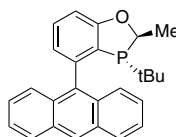
1. See 15-6888 (page 75)

15-6822

NEW

(2R,3R)-4-(Anthracen-9-yl)-3-(tert-butyl)-2-methyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (1477517-20-6) $C_{26}H_{25}OP$; FW: 384.46; light yellow solid

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

25mg
100mg
500mg

Technical Notes:

1. See 15-6888 (page 75)

15-6824

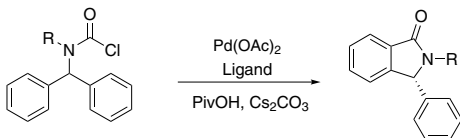
NEW

(2S,3S)-4-(Anthracen-9-yl)-3-(tert-butyl)-2-methyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) $C_{26}H_{25}OP$; FW: 384.46; light yellow solid

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

Technical Note:

1. Ligand used with palladium catalyst for Suzuki-Miyaura cross-coupling reactions.

Tech. Note (1)
Ref. (1)

References:

1. *Tetrahedron*, 2019, 75, 3239-3247

96-0660

BABIBOP Ligand Kit

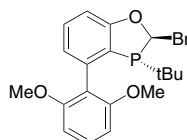
See page 91

15-6848

NEW

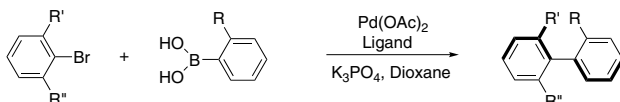
(2R,3R)-2-Benzyl-3-(tert-butyl)-4-(2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (1884457-36-6) $C_{28}H_{29}O_3P$; FW: 420.18; white to off-white solid

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

100mg
500mg
1g

Technical Notes:

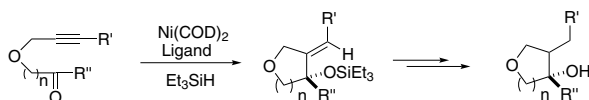
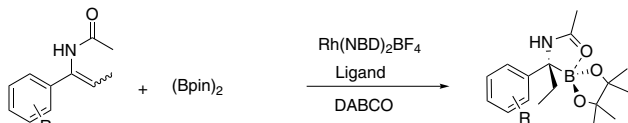
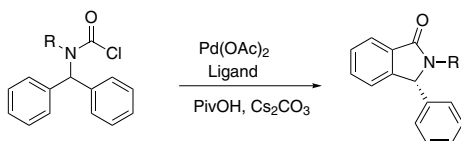
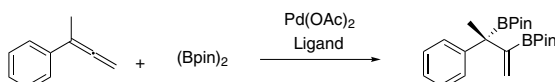
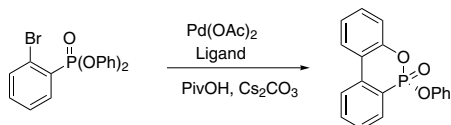
1. Ligand used with palladium catalyst for asymmetric Suzuki-Miyaura cross-coupling reactions.
2. Ligand used with nickel catalyst for asymmetric intramolecular/intermolecular reductive addition.
3. Ligand used with rhodium or palladium catalyzed asymmetric boration.
4. Ligand used with palladium catalyzed asymmetric C-H functionalization.

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

PHOSPHORUS (Compounds)

15-6848
(continued)

(2R,3R)-2-Benzyl-3-(tert-butyl)-4-(2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (1884457-36-6)

Tech. Note (2)
Ref. (6,7)Tech. Note (3)
Ref. (8,9)Tech. Note (4)
Ref. (10,11)

References:

1. *Org. Lett.* **2012**, 14, 2258–2261.
2. *J. Am. Chem. Soc.*, **2014**, 136, 570–573.
3. *Angew. Chem., Int. Ed.* **2015**, 54, 7144–7148.
4. *Adv. Synth. Catal.* **2016**, 358, 3522–3527.
5. *ACS Catal.* **2018**, 8, 10190–10209.
6. *Angew. Chem., Int. Ed.* **2015**, 54, 2520–2524.
7. *Org. Chem. Front.* **2015**, 2, 1322–1325.
8. *J. Am. Chem. Soc.* **2015**, 137, 6746–6749.
9. *Chem. Sci.* **2017**, 8, 5161–5165.
10. *Tetrahedron*, **2019**, 75(24), 3239–3247.
11. *Org. Chem. Front.* **2015**, 2, 1342–1345.

15-6846

NEW

(2S,3S)-2-Benzyl-3-(tert-butyl)-4-(2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (1373432-13-3)

C₂₆H₂₈O₄P; FW: 420.18; white to off-white solid

Note: Sold under license from Zejun for research purposes only.

Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

100mg

500mg

1g

Technical Note:

1. See 15-6848 (page 77)

15-6868

NEW

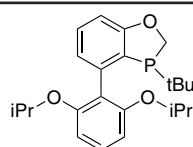
3-(tert-Butyl)-4-(2,6-diisopropoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97%

C₂₆H₃₁O₃P; FW: 386.20; white to off-white solid

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607

100mg

500mg



Technical Notes:

1. Ligand used with palladium catalyst for general and/or sterically demanding Suzuki-Miyaura cross-coupling reactions.
2. Ligand used with palladium catalyst for sterically demanding Buchwald-Hartwig amination.

PHOSPHORUS (Compounds)

15-6868 (continued)	3-(tert-Butyl)-4-(2,6-diisopropoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97%	Tech. Note (1) Ref. (1,2)
		Tech. Note (2) Ref. (3)
References:	1. <i>Angew. Chem., Int. Ed.</i> 2010, 49, 5879-5883. 2. <i>Chem. Eur. J.</i> 2013, 19, 2261-2265. 3. <i>Adv. Syn. Cat.</i> 2011, 353, 533-537.	
15-6810 NEW	(R)-3-(tert-Butyl)-4-(2,6-diisopropoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) C ₂₃ H ₃₁ O ₃ P; FW: 386.20; white to off-white solid Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	 25mg 100mg 500mg
Technical Notes:	1. See 15-6848 (page 77).	
15-6812 NEW	(S)-3-(tert-Butyl)-4-(2,6-diisopropoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) C ₂₃ H ₃₁ O ₃ P; FW: 386.20; white to off-white solid Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	25mg 100mg 500mg
Technical Note:	1. See 15-6848 (page 77)	
15-6826 NEW	(2R,3R)-3-(tert-Butyl)-4-(2,6-diisopropoxyphenyl)-2-methyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) C ₂₄ H ₃₃ O ₃ P; FW: 400.21; white to off-white solid Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	 25mg 100mg 500mg
Technical Notes:	1. Ligand used with palladium catalyst for asymmetric Suzuki-Miyaura cross-coupling reactions. 2. Ligand used with nickel catalyst for asymmetric intramolecular/intermolecular reductive addition.	
		Tech. Note (1) Ref. (1-5)
		Tech. Note (2) Ref. (6,7)
References:	1. <i>Org. Lett.</i> 2012, 14, 2258-2261. 2. <i>J. Am. Chem. Soc.</i>, 2014, 136, 570-573. 3. <i>Angew. Chem., Int. Ed.</i> 2015, 54, 7144-7148. 4. <i>Adv. Synth. Catal.</i> 2016, 358, 3522-3527. 5. <i>ACS Catal.</i> 2018, 8, 10190-10209. 6. <i>Angew. Chem., Int. Ed.</i> 2015, 54, 2520-2524. 7. <i>Org. Chem. Front.</i> 2015, 2, 1322-1325.	

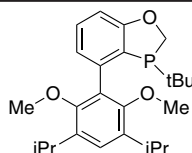
PHOSPHORUS (Compounds)

15-6828	(2S,3S)-3-(tert-butyl)-4-(2,6-diisopropoxyphenyl)-2-methyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)	25mg 100mg 500mg
NEW	$C_{24}H_{33}O_3P$; FW: 400.21; white to off-white solid Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	

Technical Notes:

- See 15-6826 (page 79)

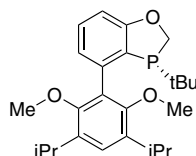
15-6866	3-(tert-Butyl)-4-(3,5-diisopropyl-2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97%	100mg 500mg
NEW	$C_{25}H_{35}O_3P$; FW: 414.23; white to off-white solid Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	



Technical Notes:

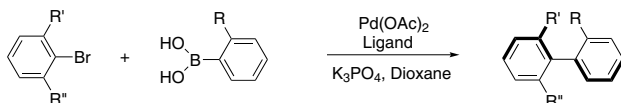
- See 15-6868 (page 78)

15-6838	(R)-3-(tert-Butyl)-4-(3,5-diisopropyl-2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)	25mg 100mg 500mg
NEW	$C_{25}H_{35}O_3P$; FW: 414.23; white to off-white solid Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	

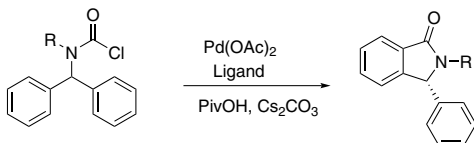


Technical Notes:

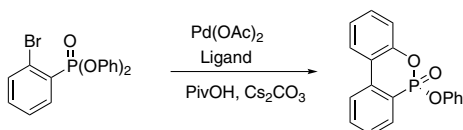
- Ligand used with palladium catalyst for asymmetric Suzuki-Miyaura cross-coupling reactions.
- Ligand used with palladium catalyzed asymmetric C-H functionalization.



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



Tech. Note (2)
Ref. (6,7)



References:

- Org. Lett.* **2012**, 14, 2258–2261.
- J. Am. Chem. Soc.*, **2014**, 136, 570–573.
- Angew. Chem., Int. Ed.* **2015**, 54, 7144–7148.
- Adv. Synth. Catal.* **2016**, 358, 3522–3527.
- ACS Catal.* **2018**, 8, 10190–10209.
- Tetrahedron*, **2019**, 75(24), 3239–3247.
- Org. Chem. Front.* **2015**, 2, 1342–1345.

15-6844	(S)-3-(tert-Butyl)-4-(3,5-diisopropyl-2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)	25mg 100mg 500mg
NEW	$C_{25}H_{35}O_3P$; FW: 414.23; white to off-white solid Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.	

Technical Note:

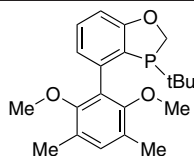
- See 15-6838 (page 80)

PHOSPHORUS (Compounds)

15-6864

NEW

3-(tert-Butyl)-4-(2,6-dimethoxy-3,5-dimethylphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97%
 $C_{21}H_{27}O_3P$; FW: 358.16; white to off-white solid
 Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

100mg
500mg

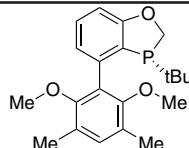
Technical Notes:

1. See 15-6868 (page 78)

15-6834

NEW

(R)-3-(tert-Butyl)-4-(2,6-dimethoxy-3,5-dimethylphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)
 $C_{21}H_{27}O_3P$; FW: 358.16; white to off-white solid
 Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

25mg
100mg
500mg

Technical Notes:

1. See 15-6838 (page 80)

15-6840

NEW

(S)-3-(tert-Butyl)-4-(2,6-dimethoxy-3,5-dimethylphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (2021202-03-7)
 $C_{21}H_{27}O_3P$; FW: 358.16; white to off-white solid
 Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

25mg
100mg
500mg

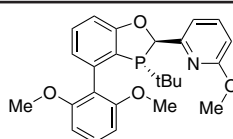
Technical Note:

1. See 15-6838 (page 80)

15-6862

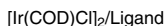
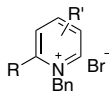
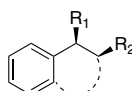
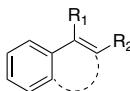
NEW

2-((2R,3R)-3-(tert-Butyl)-4-(2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphol-2-yl)-6-methoxypyridine, 97% (>99% ee)
 $C_{28}H_{28}NO_4P$; FW: 437.47; white to off-white solid
 Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

25mg
100mg
500mg

Technical Notes:

1. Ligand used with iridium catalyst for asymmetric hydrogenation of pyridinium salts.
2. Ligand used with iridium catalyst for asymmetric hydrogenation of unfunctionalized alkenes.

Tech. Note (1)
Ref. (1-3)Tech. Note (2)
Ref. (4-5)

References:

1. *Org. Lett.* **2018**, 20, 1333–1337.
2. *Org. Lett.* **2016**, 18, 4920–4923.
3. *J. Am. Chem. Soc.* **2016**, 138, 15473–15481.
4. *J. Org. Chem.* **2014**, 79, 993–1000.
5. *Angew. Chem. Int. Ed.* **2014**, 53, 14428–14432.

15-6856

NEW

2-((2S,3S)-3-(tert-Butyl)-4-(2,6-dimethoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphol-2-yl)-6-methoxypyridine, 97% (>99% ee) (2003230-67-7)
 $C_{28}H_{28}NO_4P$; FW: 437.47; white to off-white solid
 Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

25mg
100mg
500mg

Technical Notes:

1. See 15-6862 (page 81)

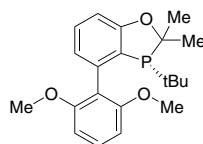
PHOSPHORUS (Compounds)

15-6882

NEW

(R)-3-(tert-Butyl)-4-(2,6-dimethoxyphenyl)-2,2-dimethyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)C₂₁H₂₇O₃P; FW: 358.16; white to off-white solid

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

25mg
100mg
500mg

Technical Notes:

- See 15-6826 (page 79)

15-6880

NEW

(S)-3-(tert-Butyl)-4-(2,6-dimethoxyphenyl)-2,2-dimethyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (2227217-19-6)C₂₁H₂₇O₃P; FW: 358.16; white to off-white solid

Note: Sold under license from Zejun for research purposes only.

Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

Technical Notes:

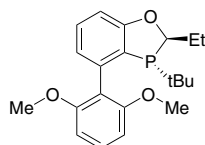
- See 15-6826 (page 79)

15-6886

NEW

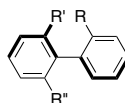
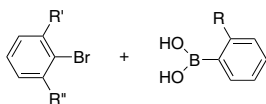
(2R,3R)-3-(tert-Butyl)-4-(2,6-dimethoxyphenyl)-2-ethyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)C₂₁H₂₇O₃P; FW: 358.16; white to off-white solid

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

100mg
500mg

Technical Note:

- Ligand used with palladium catalyst for asymmetric Suzuki-Miyaura cross-coupling reactions.

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

References:

- Org. Lett. **2012**, 14, 2258–2261.
- J. Am. Chem. Soc., **2014**, 136, 570–573.
- Angew. Chem., Int. Ed. **2015**, 54, 7144–7148.
- Adv. Synth. Catal. **2016**, 358, 3522–3527.
- ACS Catal. **2018**, 8, 10190–10209.

15-6884

NEW

(2S,3S)-3-(tert-Butyl)-4-(2,6-dimethoxyphenyl)-2-ethyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (2247162-97-4)C₂₁H₂₇O₃P; FW: 358.16; white to off-white solid

Note: Sold under license from Zejun for research purposes only.

Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

Technical Note:

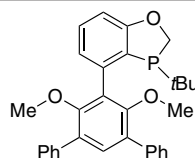
- See 15-6886 (page 82)

15-6896

NEW

3-(tert-Butyl)-4-(4',6'-dimethoxy-[1,1':3',1''-terphenyl]-5'-yl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97%C₃₁H₃₁O₃P; FW: 482.20; white to off-white solid

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

100mg
500mg

Technical Notes:

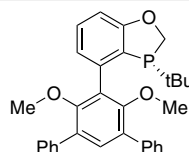
- See 15-6868 (page 78)

15-6836

NEW

(R)-3-(tert-Butyl)-4-(4',6'-dimethoxy-[1,1':3',1''-terphenyl]-5'-yl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)C₃₁H₃₁O₃P; FW: 482.20; white to off-white solid

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

25mg
100mg
500mg

Technical Notes:

- See 15-6838 (page 80)

PHOSPHORUS (Compounds)

15-6842

NEW

(S)-3-(tert-Butyl)-4-(4',6'-dimethoxy-[1,1':3',1''-terphenyl]-5'-yl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (2021201-99-8)
C₃₁H₃₁O₃P; FW: 482.20; white to off-white solid

Note: Sold under license from Zejun for research purposes only.

Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

25mg

100mg

500mg

Technical Notes:

1. See 15-6838 (page 80)

15-6814

NEW

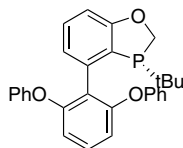
(R)-3-(tert-Butyl)-4-(2,6-diphenoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)
(1441830-74-5)

C₂₉H₂₇O₃P; FW: 454.17; white to off-white solid

Note: Sold under license from Zejun for research purposes only.

Patents: CN 107827929 A 20180323; US 20180155375

A1 20180607



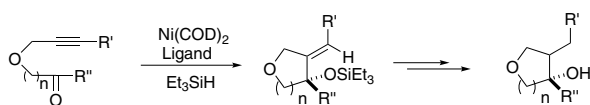
25mg

100mg

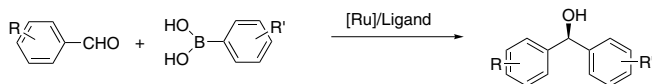
500mg

Technical Notes:

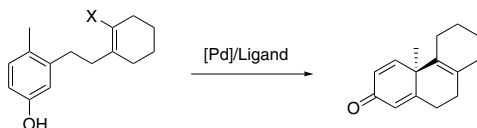
1. Ligand used with nickel catalyst for asymmetric intramolecular/intermolecular reductive addition.
2. Ligand used with ruthenium catalyzed asymmetric addition.
3. Ligand used with palladium catalyst for asymmetric intramolecular cyclization.



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



Tech. Note (2)
Ref. (3)



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

References:

1. *Angew. Chem., Int. Ed.* **2015**, 54, 2520-2524.
2. *Org. Chem. Front.* **2015**, 2, 1322-1325.
3. *J. Org. Chem.* **2013**, 78, 6350-6355.
4. *Angew. Chem., Int. Ed.* **2015**, 54, 3033-3037.
5. *Tetrahedron.* **2016**, 72, 1782-1786.

15-6816

NEW

(S)-3-(tert-Butyl)-4-(2,6-diphenoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)

C₂₉H₂₇O₃P; FW: 454.16; light yellow solid

Note: Sold under license from Zejun for research purposes only.

Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

25mg

100mg

500mg

Technical Notes:

1. See 15-6814 (page 83)

PHOSPHORUS (Compounds)

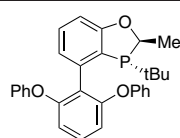
15-6830

NEW

(2R,3R)-3-(tert-Butyl)-4-(2,6-diphenoxyphenyl)-2-methyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)C₃₀H₂₉O₃P; FW: 468.18; white to off-white solid

Note: Sold under license from Zejun for research purposes only.

Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



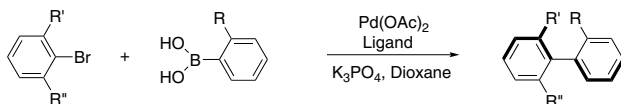
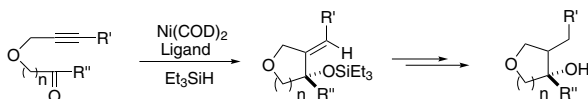
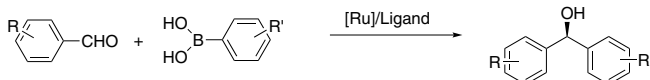
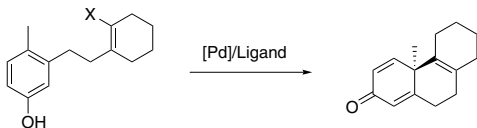
25mg

100mg

500mg

Technical Notes:

1. Ligand used with palladium catalyst for asymmetric Suzuki-Miyaura cross-coupling reactions.
2. Ligand used with nickel catalyst for asymmetric intramolecular/intermolecular reductive addition.
3. Ligand used with ruthenium catalyzed asymmetric addition.
4. Ligand used with palladium catalyst for asymmetric intramolecular cyclization.

Tech. Note (1)
Ref. (1-5)Tech. Note (2)
Ref. (6,7)Tech. Note (3)
Ref. (8)Tech. Note (4)
Ref. (9,10)

References:

1. *Org. Lett.* **2012**, 14, 2258–2261.
2. *J. Am. Chem. Soc.*, **2014**, 136, 570–573.
3. *Angew. Chem., Int. Ed.* **2015**, 54, 7144–7148.
4. *Adv. Synth. Catal.* **2016**, 358, 3522–3527.
5. *ACS Catal.* **2018**, 8, 10190–10209.
6. *Angew. Chem., Int. Ed.* **2015**, 54, 2520–2524.
7. *Org. Chem. Front.* **2015**, 2, 1322–1325.
8. *J. Org. Chem.* **2013**, 78, 6350–6355.
9. *Angew. Chem., Int. Ed.* **2015**, 54, 3033–3037.
10. *Tetrahedron.* **2016**, 72, 1782–1786.

15-6832

NEW

(2S,3S)-3-(tert-Butyl)-4-(2,6-diphenoxyphenyl)-2-methyl-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)C₃₀H₂₉O₃P; FW: 468.18; white to off-white solid

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

25mg

100mg

500mg

Technical Notes:

1. See 15-6830 (page 84)

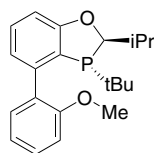
PHOSPHORUS (Compounds)

15-6878

NEW

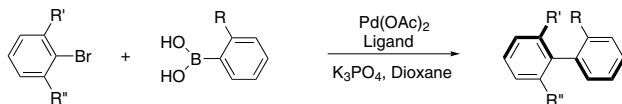
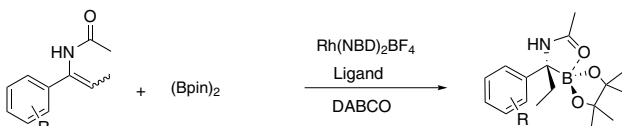
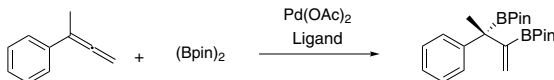
(2R,3R)-3-(tert-Butyl)-2-isopropyl-4-(2-methoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)C₂₁H₂₇O₂P; FW: 342.17; white to off-white solid

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

100mg
500mg

Technical Notes:

1. Palladium catalyst for asymmetric Suzuki-Miyaura cross-coupling reactions.
2. Rhodium or palladium catalyzed asymmetric boration.

Tech. Note (1)
Ref. (1-5)Tech. Note (2)
Ref. (6,7)

References:

1. *Org. Lett.* **2012**, 14, 2258–2261.
2. *J. Am. Chem. Soc.*, **2014**, 136, 570–573.
3. *Angew. Chem., Int. Ed.* **2015**, 54, 7144–7148.
4. *Adv. Synth. Catal.* **2016**, 358, 3522–3527.
5. *ACS Catal.* **2018**, 8, 10190–10209.
6. *J. Am. Chem. Soc.* **2015**, 137, 6746–6749.
7. *Chem. Sci.* **2017**, 8, 5161–5165.

15-6876

NEW

(2S,3S)-3-(tert-Butyl)-2-isopropyl-4-(2-methoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)C₂₁H₂₇O₂P; FW: 342.17; white to off-white solid

Note: Sold under license from Zejun for research purposes only.

Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

Technical Notes:

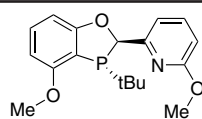
1. See 15-6878 (page 85)

15-6860

NEW

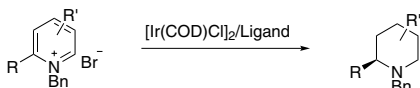
2-((2R,3R)-3-(tert-Butyl)-4-methoxy-2,3-dihydrobenzo[d][1,3]oxaphosphol-2-yl)-6-methoxypyridine, 97% (>99% ee)**(2R,3R)-MeO-BoQPhos (1542796-16-6)**C₁₈H₂₂NO₃P; FW: 331.35; white to off-white solid
air sensitive

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

25mg
100mg
500mg

Technical Notes:

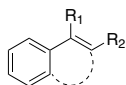
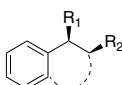
1. Ligand used with iridium catalyst for asymmetric hydrogenation of pyridinium salts.
2. Ligand used with iridium catalyst for asymmetric unfunctionalized alkenes.

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

PHOSPHORUS (Compounds)

15-6860
(continued)

2-((2R,3R)-3-(tert-Butyl)-4-methoxy-2,3-dihydrobenzo[d][1,3]oxaphosphol-2-yl)-6-methoxypyridine, 97% (>99% ee) (2R,3R)-MeO-BoQPhos (1542796-16-6)

[Ir(COD)Cl]₂/LigandTech. Note (2)
Ref. (4-5)

References:

1. *Org. Lett.* **2018**, 20, 1333–1337.
2. *Org. Lett.* **2016**, 18, 4920–4923.
3. *J. Am. Chem. Soc.* **2016**, 138, 15473–15481.
4. *J. Org. Chem.* **2014**, 79, 993–1000.
5. *Angew. Chem. Int. Ed.* **2014**, 53, 14428–14432.

15-6854

NEW

2-((2S,3S)-3-(tert-Butyl)-4-methoxy-2,3-dihydrobenzo[d][1,3]oxaphosphol-2-yl)-6-methoxypyridine, 97% (>99% ee) (2S,3S)-MeO-BoQPhos (1777796-37-8)

C₁₈H₂₂NO₃P; FW: 331.35; white to off-white solid

air sensitive

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

25mg

100mg

500mg

Technical Notes:

1. See 15-6860 (page 85)

15-6858

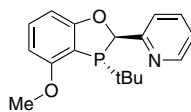
NEW

2-((2R,3R)-3-(tert-Butyl)-4-methoxy-2,3-dihydrobenzo[d][1,3]oxaphosphol-2-yl)pyridine, 97% (>99% ee) (1542796-07-5)

C₁₇H₂₀NO₃P; FW: 301.32; white to off-white solid

air sensitive

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



25mg

100mg

500mg

Technical Notes:

1. See 15-6860 (page 85)

15-6852

NEW

2-((2S,3S)-3-(tert-Butyl)-4-methoxy-2,3-dihydrobenzo[d][1,3]oxaphosphol-2-yl)pyridine, 97% (>99% ee)

C₁₇H₂₀NO₃P; FW: 301.32; white to off-white solid

air sensitive

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

25mg

100mg

500mg

Technical Notes:

1. See 15-6860 (page 85)

15-6870

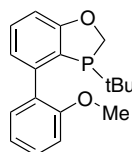
NEW

3-(tert-Butyl)-4-(2-methoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (1246888-88-9)

C₁₈H₂₁O₃P; FW: 300.12; white to off-white solid

air sensitive

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



1g

5g

Technical Notes:

1. See 15-6868 (page 78)

15-6872

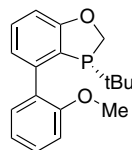
NEW

(R)-3-(tert-Butyl)-4-(2-methoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee) (1338454-28-6)

C₁₈H₂₁O₃P; FW: 300.12; white to off-white solid

air sensitive

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



100mg

500mg

Technical Notes:

1. See 15-6878 (page 85)

PHOSPHORUS (Compounds)

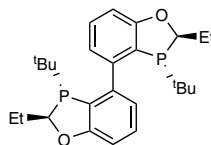
- 15-6874** (S)-3-(tert-Butyl)-4-(2-methoxyphenyl)-2,3-dihydrobenzo[d][1,3]oxaphosphole, 97% (>99% ee)
NEW $C_{18}H_{21}O_2P$; FW: 300.12; white to off-white solid
air sensitive
 Note: Sold under license from Zejun for research purposes only.
 Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

Technical Notes:

- See 15-6878 (page 85)

- 15-1772** Diphenylphosphine selenide, 98% (5853-64-5)
 See page 54

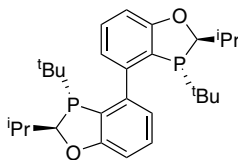
- 15-6440** (2R,2'R,3R,3'R)-3,3'-Di-tert-butyl-2,2'-diethyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (2R,2'R,3R,3'R)-DI-Et-BABIBOP
NEW $C_{26}H_{36}O_2P_2$; FW: 442.51; white to off-white solid
air sensitive, (store cold)
 Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



25mg
100mg

- 15-6425** (2S,2'S,3S,3'S)-3,3'-Di-tert-butyl-2,2'-diethyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (2S,2'S,3S,3'S)-DI-Et-BABIBOP
NEW $C_{26}H_{36}O_2P_2$; FW: 442.51; white to off-white solid
air sensitive, (store cold)
 Note: Sold under license from Zejun for research purposes only.
 Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

- 15-6445** (2R,2'R,3R,3'R)-3,3'-Di-tert-butyl-2,2'-diisopropyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (2R,2'R,3R,3'R)-DI-iPr-BABIBOP (2214207-75-5)
NEW $C_{28}H_{40}O_2P_2$; FW: 470.57; white to off-white solid
air sensitive, (store cold)
 Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



25mg
100mg

Technical Note:

- Ligand used in palladium-catalyzed asymmetric hydrogenation.



Tech. Note (1)
Ref. (1)

References:

- Chi. J. Chem., 2018, 36, 153-156.

- 15-6430** (2S,2'S,3S,3'S)-3,3'-Di-tert-butyl-2,2'-diisopropyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (2S,2'S,3S,3'S)-DI-iPr-BABIBOP (2207601-12-3)
NEW $C_{28}H_{40}O_2P_2$; FW: 470.57; white to off-white solid
air sensitive, (store cold)
 Note: Sold under license from Zejun for research purposes only.
 Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

Technical Notes:

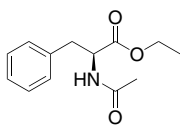
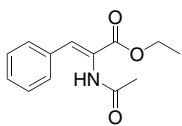
- Ligand used for copper-catalyzed asymmetric hydrogenation of 2-substituted ketones.
- Ligand used for rhodium catalyst for asymmetric hydrogenation enamides.



Tech. Note (1)
Ref. (1)

PHOSPHORUS (Compounds)

15-6430 (2S,2'S,3S,3'S)-3,3'-Di-tert-butyl-2,2'-diisopropyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (2S,2'S,3S,3'S)-DI-iPr-BABIBOP (2207601-12-3)



Tech. Note (2)
Ref. (2)

References:

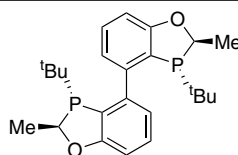
1. *Chem. Sci.*, **2018**, 9, 4505-4510.
2. *Org. Lett.*, **2018**, 20, 1725-1729.

15-6435**NEW**

(2R,2'R,3R,3'R)-3,3'-Di-tert-butyl-2,2'-dimethyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (2R,2'R,3R,3'R)-DI-Me-BABIBOP (2214207-74-4)

C₂₆H₃₂O₂P₂; FW: 414.46; white to off-white solid
air sensitive, (store cold)

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



25mg
100mg

Technical Note:

1. See 15-6445 (page 87)

15-6420**NEW**

(2S,2'S,3S,3'S)-3,3'-Di-tert-butyl-2,2'-dimethyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (2S,2'S,3S,3'S)-DI-Me-BABIBOP (2207601-10-1)

C₂₆H₃₂O₂P₂; FW: 414.46; white to off-white solid
air sensitive, (store cold)

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

Technical Note:

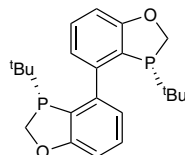
1. See 15-6430 (page 87)

15-6415**NEW**

(3R,3'R)-3,3'-Di-tert-butyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (3R,3'R)-BABIBOP (2214207-73-3)

C₂₂H₂₈O₂P₂; FW: 386.41; white to off-white solid
air sensitive, (store cold)

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.



25mg
100mg

Technical Note:

1. See 15-6445 (page 87)

15-6410**NEW**

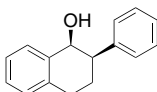
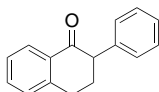
(3S,3'S)-3,3'-Di-tert-butyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (99% ee) (3S,3'S)-BABIBOP (2207601-04-3)

C₂₂H₂₈O₂P₂; FW: 386.41; white to off-white solid
air sensitive, (store cold)

Note: Sold under license from Zejun for research purposes only. Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.

Technical Notes:

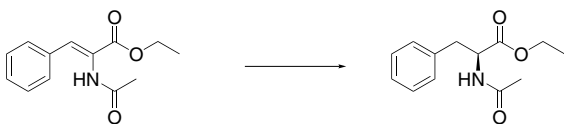
1. Ligand used in copper-catalyzed asymmetric hydrogenation of 2-substituted ketones.
2. Ligand used in rhodium catalyst for asymmetric hydrogenation enamides.
3. Ligand used in palladium-catalyzed asymmetric hydrogenation.



Tech. Note (1)
Ref. (1)

PHOSPHORUS (Compounds)

15-6410 (3S,3'S)-3,3'-Di-tert-butyl-2,2',3,3'-tetrahydro-4,4'-bibenzo[d][1,3]oxaphosphole, min. 97% (continued) (99% ee) (3S,3'S)-BABIBOP (2207601-04-3)



Tech. Note (2)
Ref. (2)



Tech. Note (3)
Ref. (3)

References:

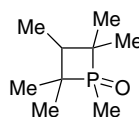
1. *Chem. Sci.*, **2018**, 9, 4505-4510.
2. *Org. Lett.*, **2018**, 20, 1725-1729.
3. *Chi. J. Chem.*, **2018**, 36, 153-156.

15-8150 **1,2,2,3,4,4 Hexamethylphosphetane 1-oxide** (16083-94-6)

NEW

C₉H₁₉OP; FW: 174.22; white solid

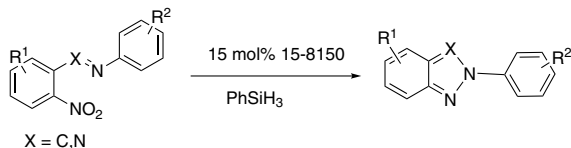
Note: Product sold under, use subject to, terms and conditions of label license at www.strem.com/mit



100mg
500mg

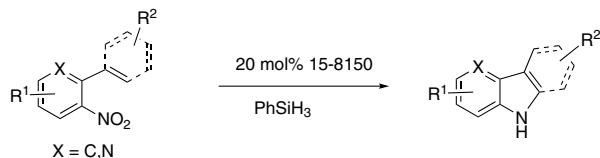
Technical Notes:

1. Catalyst used for the reductive cyclization of o-nitrobenzalmines, o-nitrobenzenes and related substrates.
2. Catalyst used for the reductive cyclization of o-nitrobiaryl and -styrenyl derivatives.



X = C,N

Tech. Note (1)
Ref. (1)



X = C,N

Tech. Note (2)
Ref. (2)

References:

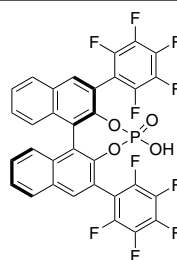
1. *J. Am. Chem. Soc.*, **2017**, 139, 6839.
2. *J. Am. Chem. Soc.*, **2018**, 140, 3103.

15-1398 **(11bR)-4-Hydroxy-2,6-bis(2,3,4,5,6-pentafluorophenyl)-4-oxide-dinaphtho[2,1-d:1',2'-f][1,3,2]dioxaphosphepin**, 98%, (99% ee) (1284293-45-3)

NEW

C₃₂H₁₁F₁₀O₄P; FW: 680.4; white-light yellow powdr. (store cold)

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



50mg

15-1399 **(11bS)-4-Hydroxy-2,6-bis(2,3,4,5,6-pentafluorophenyl)-4-oxide-dinaphtho[2,1-d:1',2'-f][1,3,2]dioxaphosphepin**, 98%, (99% ee) (1882075-20-8)

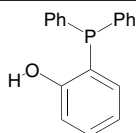
NEW

C₃₂H₁₁F₁₀O₄P; FW: 680.4; white-light yellow powdr. (store cold)

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

50mg

PHOSPHORUS (Compounds)

15-9120 (2-Hydroxyphenyl)diphenylphosphine, 97% (60254-10-6) $C_{18}H_{15}OP$; white to off-white solid ; m.p. 142-150
air sensitive

1g

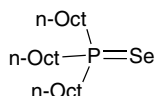
NEW

Technical Notes:

- Synthesis, properties, handling and applications of (2-hydroxyphenyl)diphenylphosphine in esterification, condensation and etherification reactions are reviewed.
- Rhenium(I) Tricarbonyl Complexes with (2-Hydroxyphenyl)diphenylphosphine as PO Bidentate Ligand and ^{99m}Tc complexes with potential for radiopharmaceutical applications
- Ligand used to make a nickel catalyst used in the copolymerization of ethylene with linear olefins.

References:

- e-EROS Encyclopedia of Reagents for Organic Synthesis*, **2012**, 1-4.
- Inorg. Chem.*, **2017**, 56 (14), 8175–8186.
- J. Polym. Sci. A Polym. Chem.*, **2009**, 47, 258-266.

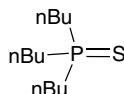
15-6657 Trioctylphosphine selenide min. 99%, (15% Se, dissolved in TOP) (20612-73-1) $(C_8H_{17})_3PSe$; FW: 449.59; light yellow liq.
Note: Precursor for quantum dot synthesis

25g

100g

500g

NEW

15-6658 Tributylphosphine sulfide min. 99%, (7% S, dissolved in TBP) (3084-50-2) $(C_4H_9)_3PS$; FW: 402.71; light yellow liq.
Note: Precursor for quantum dot synthesis

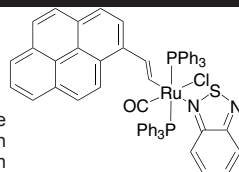
25g

100g

500g

NEW

RUTHENIUM (Compounds)

44-0548 (2,1,3-Benzothiadiazole-κN1)carbonylchloro[(1E)-2-(1-pyrenyl)ethenyl]bis(triphenylphosphine) ruthenium(II), 97% (1621871-86-0) $C_{61}H_{45}ClN_2OP_2RuS$; FW: 1052.55; red orange solid

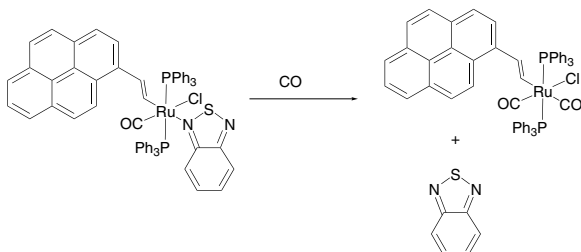
250mg

1g

NEW

Technical Note:

- A Chromo-Fluorogenic Synthetic "Canary" for CO Detection. The chromo-fluorogenic detection of carbon monoxide in air has been achieved. This probe shows exceptional sensitivity and selectivity in its sensing behavior in the solid state. A color response visible to the naked eye is observed at 5 ppb of CO, and a remarkably clear color change occurs from orange to yellow at the onset of toxic CO concentrations (100 ppm) in air.

Tech. Note (1)
Ref. (1)

References:

- J. Am. Chem. Soc.*, **2014**, 136, 11930–11933.

SELENIUM (Compounds)

15-1772 Diphenylphosphine selenide, 98% (5853-64-5)

See page 54

15-6657 Trioctylphosphine selenide min. 99%, (15% Se, dissolved in TOP) (20612-73-1)

See page 90

SILICON (Compounds)

07-7234 (R)-Diphenylprolinol trimethyl silyl ether, 95% (99% ee) (943757-71-9)

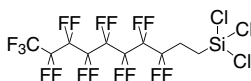
See page 71

SILICON (Compounds)

14-5450

NEW

Perfluorodecyl-1H,1H,2H,2H-trichlorosilane, 97% FTDS (78560-44-8)
 $C_{10}H_4Cl_3F_{17}Si$; FW: 581.56; colorless liq.
air sensitive, moisture sensitive

5g
25g

SULFUR (Compounds)

15-6658

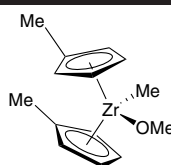
Tributylphosphine sulfide min. 99%, (7% S, dissolved in TBP) (3084-50-2)
 See page 90

ZIRCONIUM (Compounds)

40-1028

NEW

Bis(methylcyclopentadienyl)(methyl)(methoxy)zirconium(IV), 98+% (916597-01-8)
 $C_{14}H_{20}OZr$; FW: 295.53; colorless to light yellow liq.
air sensitive, moisture sensitive

500mg
2g

Technical Note:

1. Precursor for the atomic layer deposition of zirconium oxide using water or ozone as co-reactants.

References:

1. *J. Electrochem. Soc.*, **2010**, 157 (10), G202-G210.
2. *Thin Solid Films*, **2010**, 519 (2), 666-673.
3. *Journal of Vacuum Science & Technology B: Microelectronics and Nanometer Structures Processing, Measurement, and Phenomena*, **2009**, 27, 389.
4. *Chem. Mater.*, **2008**, 20 (17), 5698-5705.
5. *Chemical vapor deposition*, **2008**, 14, 358-365.
6. *Journal of Materials Chemistry*, **2008**, 28, 3385-3390.

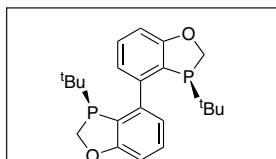
KITS - BABIBOP Ligand Kit

96-0660

BABIBOP Ligand Kit

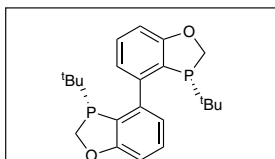
NEW

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 Patents: CN 107827929 A 20180323; US 20180155375 A1 20180607.
 Components also available for individual sale. Contains the following:



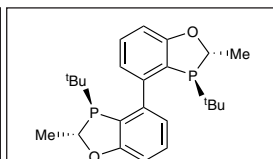
15-6410
(3S,3'S)-BABIBOP

25mg



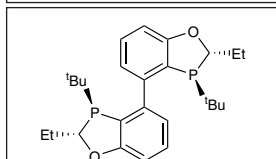
15-6415
(3R,3'R)-BABIBOP

25mg



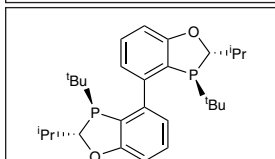
15-6420
(2S,2'S,3S,3'S)-DI-Me-BABIBOP

25mg



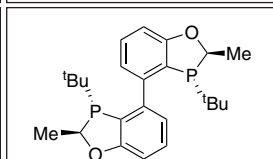
15-6425
(2S,2'S,3S,3'S)-DI-Et-BABIBOP

25mg



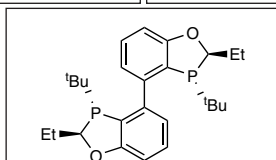
15-6430
(2S,2'S,3S,3'S)-DI-iPr-BABIBOP

25mg



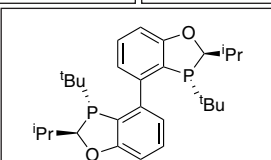
15-6435
(2R,2'R,3R,3'R)-DI-Me-BABIBOP

25mg



15-6440
(2R,2'R,3R,3'R)-DI-Et-BABIBOP

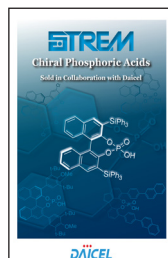
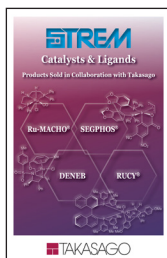
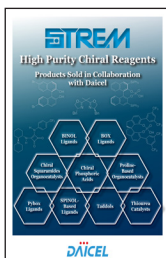
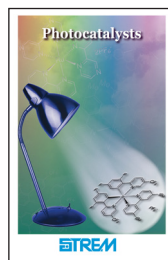
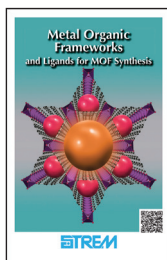
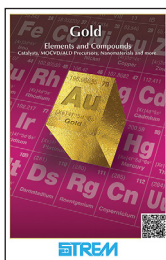
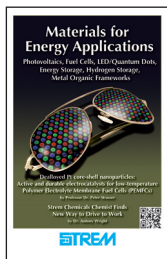
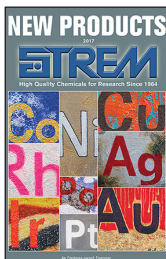
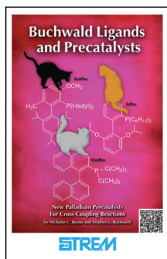
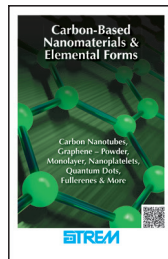
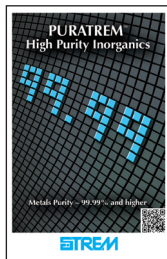
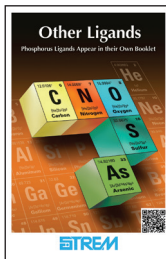
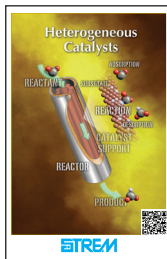
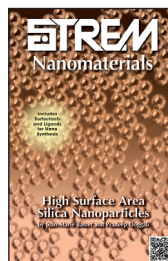
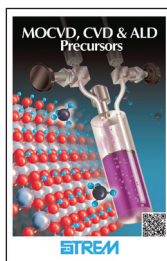
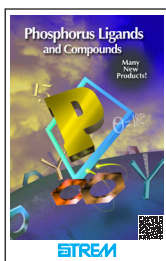
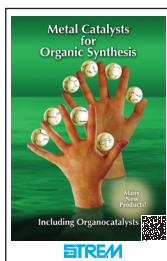
25mg



15-6445
(2R,2'R,3R,3'R)-DI-iPr-BABIBOP

25mg

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