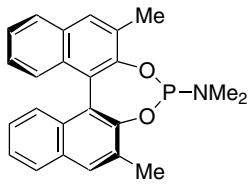
STREM
CATALOG
Part of Ascensus Specialties

DSM MonoPhos™ Ligand Kit: Catalog # 96-5650

For asymmetric hydrogenation and other catalytic applications

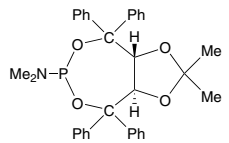
15-1255
(S)-(+)-(2,6-Dimethyl-3,5-dioxa-4-phospha-cyclohepta[2,1-a;3,4-a'] dinaphthalen-4-yl)dimethylamine, min. 98%

100mg



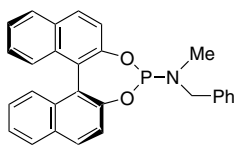
15-1505
(3aR,8aR)-(-)-(2,2-Dimethyl-4,4,8,8-tetraphe-nyl-tetrahydro-[1,3] dioxolo[4,5-e][1,3,2]dioxaphosphepin-6-yl) dimethylamine, min. 98%

100mg



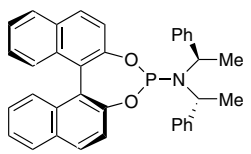
15-1510
(S)-(+)-(3,5-Dioxa-4-phospha-cyclohepta[2,1-a;3,4-a']dinaphthalen-4-yl)benzyl(methyl) amine, 99%

100mg



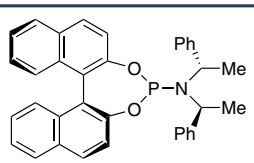
15-1520
(S)-(+)-(3,5-Dioxa-4-phospha-cyclohepta[2,1-a;3,4-a']dinaphthalen-4-yl)bis[(1R)-1-phenyl-ethyl]amine, dichloromethane adduct, min. 95%

100mg



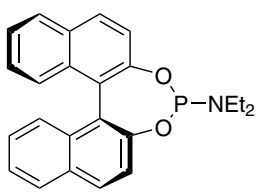
15-1521
(S)-(+)-(3,5-Dioxa-4-phospha-cyclohepta[2,1-a;3,4-a']dinaphthalen-4-yl)bis[(1S)-1-phenyle-thyl]amine, min. 95%

100mg



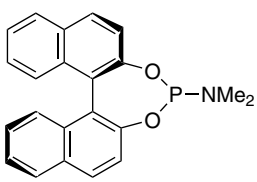
15-1231
(S)-(+)-(3,5-Dioxa-4-phospha-cyclohepta[2,1-a;3,4-a']dinaphthalen-4-yl)diethylamine, min. 97%

250mg



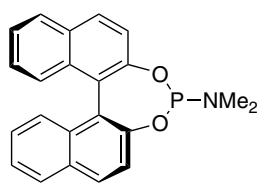
15-1232
(R)-(-)-(3,5-Dioxa-4-phospha-cyclohepta[2,1-a;3,4-a']dinaphthalen-4-yl)dimethylamine, min. 97% (R)-MONOPHOS

1g



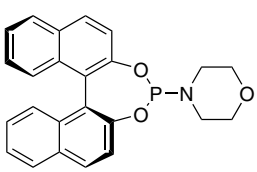
15-1233
(S)-(+)-(3,5-Dioxa-4-phospha-cyclohepta[2,1-a;3,4-a']dinaphthalen-4-yl)dimethylamine, min. 97% (S)-MONOPHOS

1g



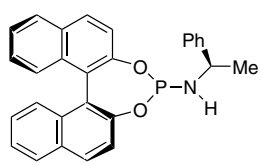
15-1235
(S)-(+)-(3,5-Dioxa-4-phospha-cyclohepta[2,1-a;3,4-a']dinaphthalen-4-yl)morpholine, min. 97% (S)-MorfPhos

100mg



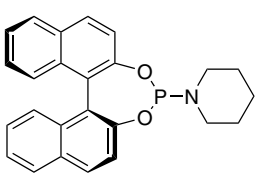
15-1525
(S)-(+)-(3,5-Dioxa-4-phospha-cyclohepta[2,1-a;3,4-a']dinaphthalen-4-yl)[(1R)-1-phenyle-thyl]amine, min. 95%

100mg



15-1234
(S)-(+)-(3,5-Dioxa-4-phospha-cyclohepta[2,1-a;3,4-a']dinaphthalen-4-yl)piperidine, min. 97% (S)-PipPhos

100mg



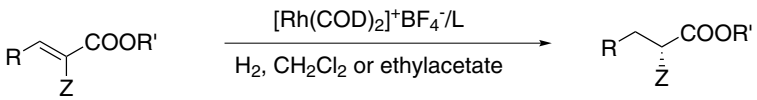
15-1255 **(S)-(+)-(2,6-Dimethyl-3,5-dioxa-4-phospha-cyclohepta[2,1-a;3,4-a']dinaphthalen-4-yl)dimethylamine, min. 98%** *(185449-86-9)* 100mg 500mg

$C_{24}H_{22}NO_2P$; FW: 387.41; off-white pwdr.; m.p. 228-229°

moisture sensitive

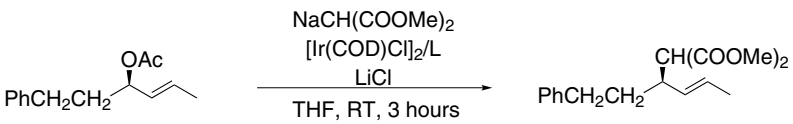
Technical Notes:

1. Ligand used in the enantioselective, rhodium-catalyzed hydrogenation of substituted olefins, such as N-acetyldihydroamino acids, enamides, and unsaturated acids.
2. Ligand used in the enantioselective, iridium-catalyzed allylic substitution of allyl acetates containing only a single substituent in the 1 or 3 position.
3. Ligand use in the rhodium-catalyzed, amide directed, asymmetric hydroboration reaction.
4. Ligand used in asymmetric conjugate addition of aryl boronic acids to dihydronitronaphthalenes.
5. Ligand used in the rhodium-catalyzed asymmetric intramolecular 1,4 addition.



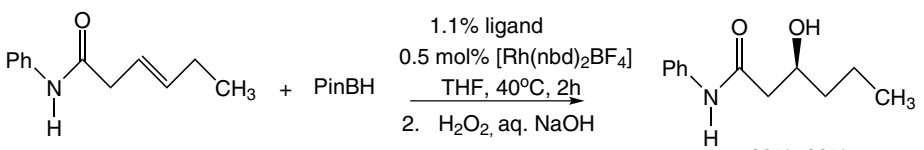
Tech. Note (1)
Ref. (1-3)

R = H, Ph R' = H, CH_3 Z = $NHCOCH_3$, CH_2COOH >97% ee



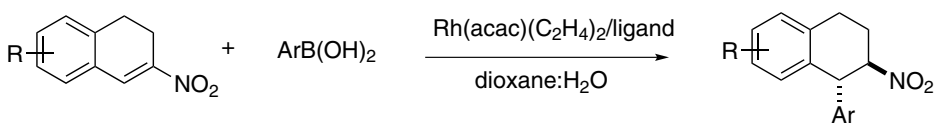
Tech. Note (2)
Ref. (4,5)

93% ee

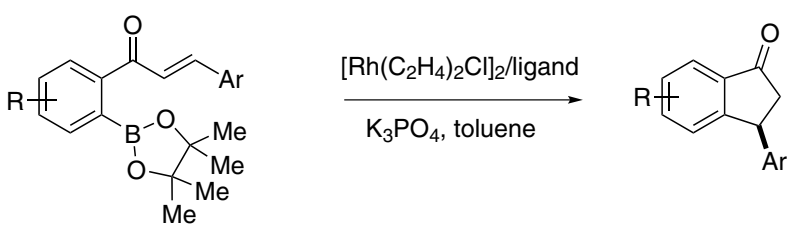


Tech. Note (3)
Ref. (6)

80%, 99% ee



Tech. Note (4)
Ref. (7)



Tech. Note (4)
Ref. (8)

References:

1. *J. Am. Chem. Soc.*, **2000**, *122*, 11539.
2. *Adv. Synth. Catal.*, **2003**, *345,* 308.
3. *Adv. Synth. Catal.*, **2002,** *344*, 1003.
4. *Chem. Comm,* **1999,** 741.
5. *Eur. J. Inorg. Chem.*, **2002**, 2569.
6. *J. Am. Chem. Soc.*, **2008**, *130,* 3734.
7. *Ad. Synth. Catal,* **2012**, *354,* 2433.
8. *J. Org. Chem.*, **2013**, *78*, 2736.

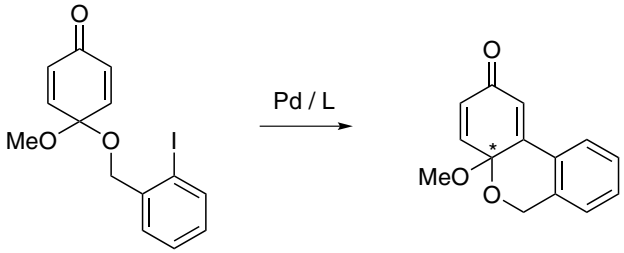
15-1505 **(3aR,8aR)-(-)-(2,2-Dimethyl-4,4,8,8-tetraphenyl-tetrahydro-[1,3]dioxolo[4,5-e][1,3,2]dioxaphosphepin-6-yl) dimethylamine, min. 98%** *(213843-90-4)* 100mg 500mg

$C_{33}H_{34}NO_4P$; FW: 539.60; white pwdr.; m.p. 218-221°

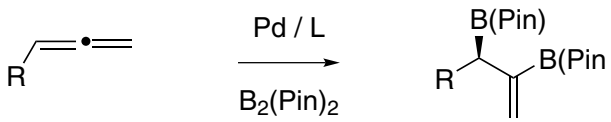
moisture sensitive

Technical Notes:

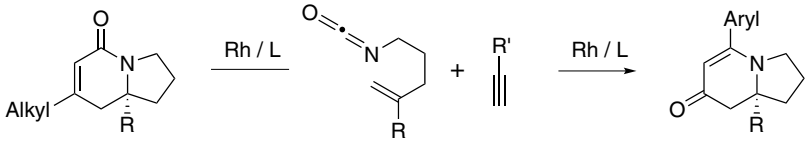
1. Monodendate ligand for the enantioselective intramolecular reaction of prochiral cyclohexadienones.
2. Ligand use in the palladium-catalyzed, enantioselective diboration of allenes.
3. Enantioselective Rh-catalyzed [2+2+2] cycloaddition of alkynes and isocyanates.
4. Palladium-catalyzed enantioselective C-H arylation.
5. Palladium-catalyzed dynamic kinetic cross-coupling.
6. Palladium-catalyzed enantioselective C-H arylation.



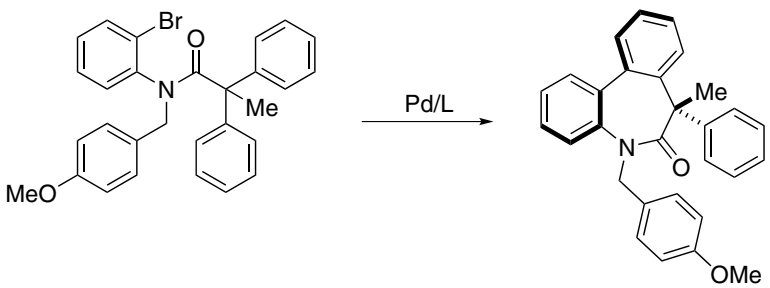
Tech. Note (1)
Ref. (1)



Tech. Note (2)
Ref. (2)



Tech. Note (3)
Ref. (3)



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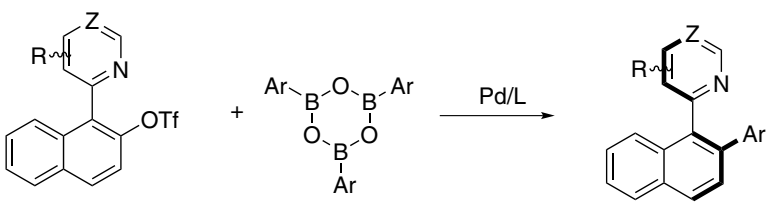
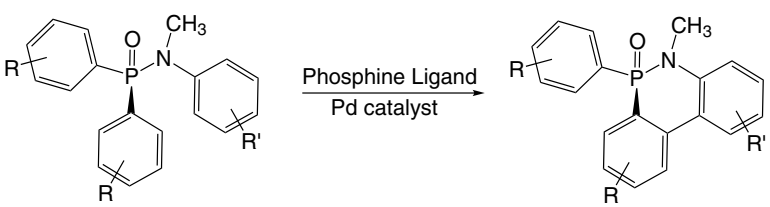
Ref. (4)



Tech. Note (5)
Ref. (5)



Tech. Note (6)
Ref. (6)

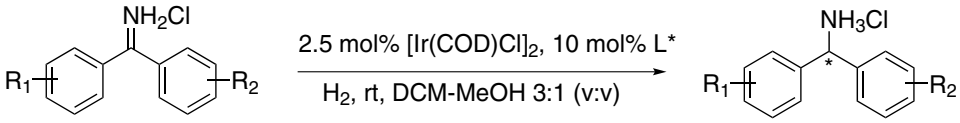
References:

1. *J. Am. Chem. Soc.*, **2002**, *124*, 184.
2. *J. Am. Chem. Soc.*, **2004,** *126*, 16328.
3. *Org. Lett.*, **2008**, *10*, 1231.
4. *Angew. Chem. Int. Ed.*, **2013**, *52*, 7865.
5. *J. Am. Chem. Soc.*, **2013**, *135,* 15730.
6. *Angew. Chem. Int. Ed.*, **2015**, *54*, 6265.

15-1510 **(S)-(+)-(3,5-Dioxa-4-phospha-cyclohepta[2,1-a;3,4-a']dinaphthalen-4-yl)benzyl(methyl)amine, 99%** 100mg
(490023-37-5) 500mg
$C_{28}H_{22}NO_2P$; FW: 435.45; white pwdr.; m.p. 155°
moisture sensitive

Technical Notes:

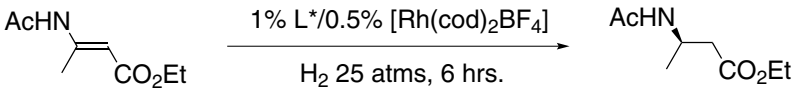
1. The ligand has been used in Ir-catalyzed asymmetric hydrogenation of substituted benzophenone N-H imines.
2. The ligand has been used in the rhodium-catalyzed enantioselective hydrogenation of (E)-N-acylated dehydro-β-aminoacid esters (For (Z) isomer, use 15-1525).



Tech. Note (1)
Ref. (1)

R^1, R^2 = Me, OMe, CF_3, F, Cl, Br

80 - 96 % yield
76 - 98 % *ee*



100% conv.
98% ee

Tech. Note (2)
Ref. (2)

References:

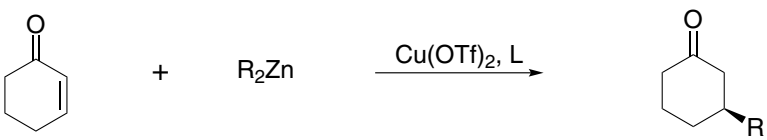
1. *J. Am. Chem. Soc.,* **2010**, *132*, 2124.
2. *J. Am. Chem. Soc.,* **2002**, *124*, 14552.

15-1520 **(S)-(+)-(3,5-Dioxa-4-phospha-cyclohepta[2,1-a;3,4-a']dinaphthalen-4-yl)bis[(1R)-1-phenylethyl]amine, dichloromethane adduct, min. 95%** *(415918-91-1)* 100mg 500mg

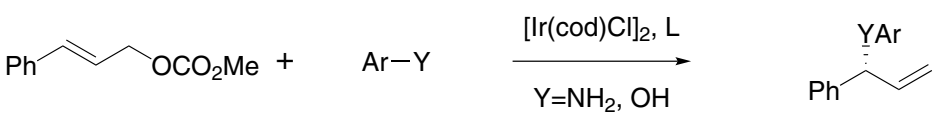
$C_{36}H_{30}NO_2P$; FW: 539.60; white pwdr.; m.p. 102-103°
moisture sensitive
Note: Sold in collaboration with DSM for research purposes only. Patent WO 0204466. DSM's MonoPhos™ Ligand Kit component.

Technical Notes:

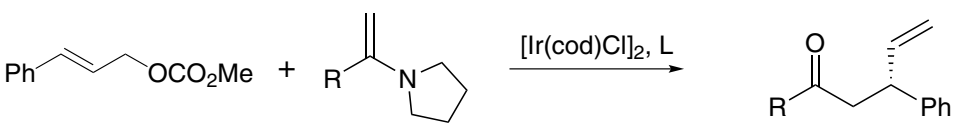
1. A ligand for asymmetric conjugate addition of dialkyl zinc reagents to activated olefins.
2. Ligand used in the iridium-catalyzed, enantioselective addition of nucleophiles to achiral allylic esters.
3. Asymmetric hydrogenation.
4. Ir-catalyzed regio- and enantioselective Friedel-Crafts allylic alkylation of indoles.
5. Asymmetric hydrovinylation.
6. Used in 1,3-dipolar cycloaddition reactions of azomethine ylides and alkenes,[9a] and Rh-catalyzed [5+2] cycloaddition of alkyne-vinyl-cyclopropanes.[9b]
7. Palladium-catalyzed enantioselective de-epimerization in catalytic asymmetric allylic alkylation.
8. Palladium-catalyzed enantioselective diamination of alkyl dienes.



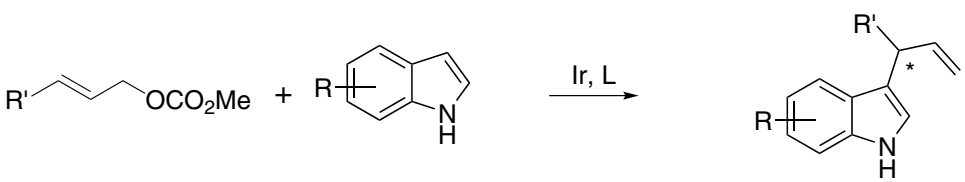
Tech. Note (1)
Ref. (1)



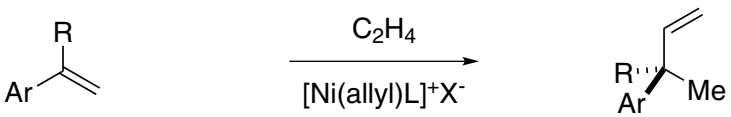
Tech. Note (2)
Ref. (2-4)



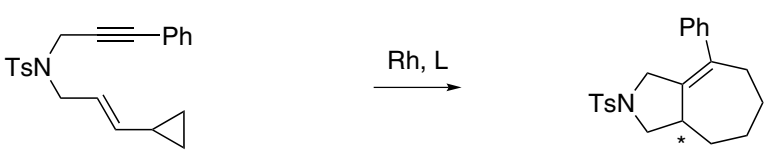
Tech. Note (2)
Ref. (5)



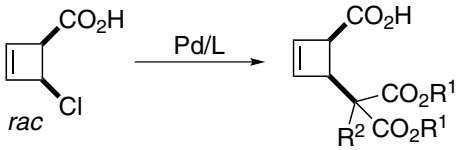
Tech. Note (4)
Ref. (7)



Tech. Note (5)
Ref. (8)



Tech. Note (6)
Ref. (9b)



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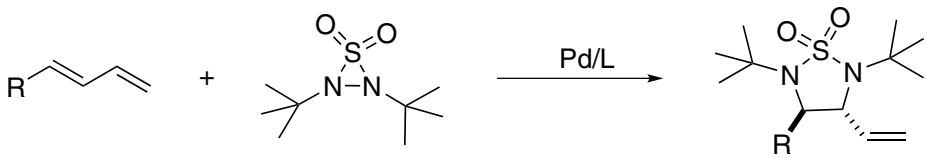
Ref. (10)



Tech. Note (8)
Ref. (11)

References:

1. *Angew. Chem. Int. Ed.*, **1997**, *36*, 2620.
2. *J. Am. Chem. Soc.*, **2002**, *124*, 15164.
3. *J. Am. Chem. Soc.*, **2003**, *125*, 3426.
4. *Org. Lett.***, 2005**, *7,* 1093.
5. *J. Am. Chem. Soc.*, **2007**, *129*, 7720.
6. *Acc. Chem. Res.*, **2007,** *40*, 1267.
7. *Org. Lett.*, **2008,** *10*, 1815.
8. *Synthesis*., **2009**, 2089.
9. (a) *Angew. Chem. Int. Ed.*, **2008,** *47*, 6055. (b) *Chem. Eur. J.*, **2009,** *15*, 8692.
10. *Angew. Chem. Int. Ed*., **2012**, *51*, 7314.
11. *Org. Lett.*, **2013,** *15*, 796.

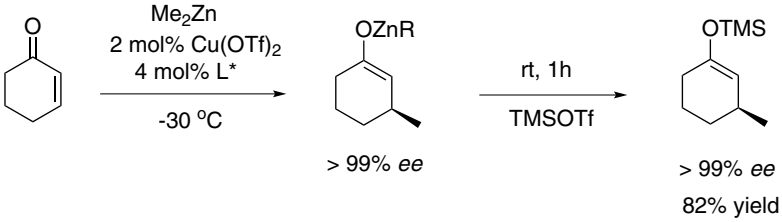
15-1521 **(S)-(+)-(3,5-Dioxa-4-phospha-cyclohepta[2,1-a;3,4-a']dinaphthalen-4-yl)bis[(1S)-1-phenylethyl]amine, min. 95%** *(380230-02-4)* 100mg 500mg

$C_{36}H_{30}NO_2P$; FW: 539.60; off-white pwdr.; m.p. 88-89°

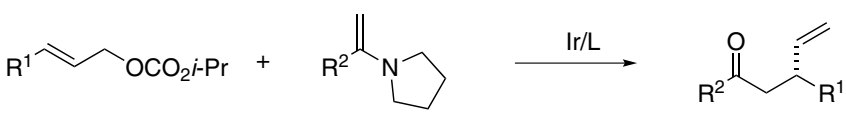
moisture sensitive

Technical Notes:

1. A ligand for asymmetric conjugate addition of dialkyl zinc reagents to activated olefins.
2. Iridium-catalyzed regioselective and enantioselective allylation of enamines.
3. Iridium-catalyzed asymmetric allylation of KSAc.



Tech. Note (1)
Ref. (1)



Tech. Note (2)
Ref. (2)

Tech. Note (3)
Ref. (3)

References:

1. *Org. Lett.*, **2002**, *4*, 3835.
2. *J. Am. Chem. Soc.,* **2007**, *129*, 7720.
3. *Eur. J. Org. Chem.,* **2013**, 2708.

15-1231 **(S)-(+)-(3,5-Dioxa-4-phospha-cyclohepta[2,1-a;3,4-a']dinaphthalen-4-yl)diethylamine, min. 97%** *(252288-04-3)* 250mg 1g

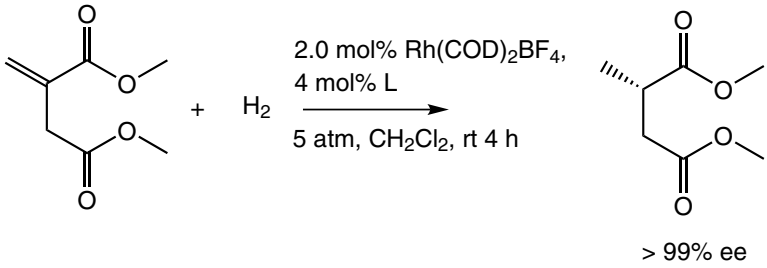
$C_{24}H_{22}NO_2P$; FW: 387.41; white pwdr.

moisture sensitive

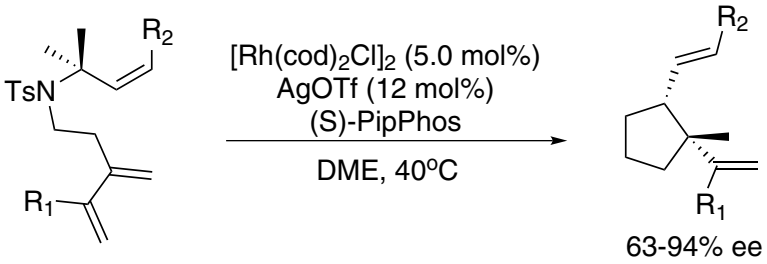
Note: Sold in collaboration with DSM for research purposes only. Patent WO 0204466. DSM's MonoPhos™ Ligand Kit component.

Technical Notes:

1. See 15-1232.
2. Ligand used in the enantioselective rhodium catalyzed low pressure high activity hydrogenation of α–dehydroaminoesters, enamides, and dimethylitaconate.
3. Ligand used in enantioselective rhodium-catalyzed allylic C–H activation for addition to conjugated dienes.



Tech. Note (2)
Ref. (1)



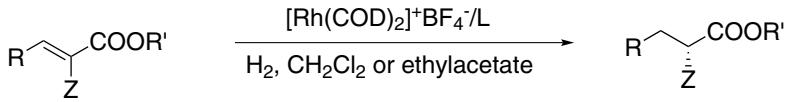
Tech. Note (3)
Ref. (2)

References:
1. *J. Org. Chem*., **2005**, *70*, 943.
2. *Angew. Chem. Int. Ed*., **2011**, *50*, 2144.

15-1232 **(R)-(-)-(3,5-Dioxa-4-phospha-cyclohepta[2,1-a;3,4-a']dinaphthalen-4-yl)dimethylamine, min. 97% (R)-MONOPHOS** *(157488-65-8)* 250mg 1g

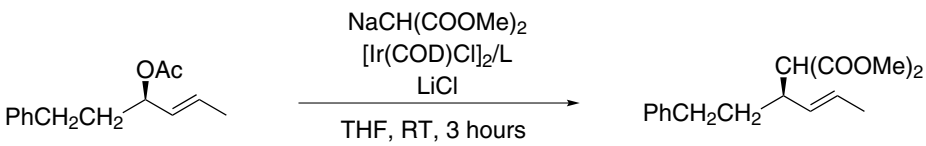
$C_{22}H_{18}NO_2P$; FW: 359.36; white xtl.; m.p. 190°
air sensitive
Note: Sold in collaboration with DSM for research purposes only. Patent no. WO02 04466. DSM's MonoPhos™ Ligand Kit component.

Technical Notes:
1. Ligand used in the enantioselective, rhodium-catalyzed hydrogenation of substituted olefins, such as N-acetyldihydroamino acids, enamides, and unsaturated acids.
2. Ligand used in the enantioselective, iridium-catalyzed allylic substitution of allyl acetates containing only a single substituent in the 1 or 3 position.
3. Ligand use in the rhodium-catalyzed, amide directed, asymmetric hydroboration reaction.
4. Ligand used in asymmetric conjugate addition of aryl boronic acids to dihydronitronaphthalenes.
5. Ligand used in the rhodium-catalyzed asymmetric intramolecular 1,4 addition.

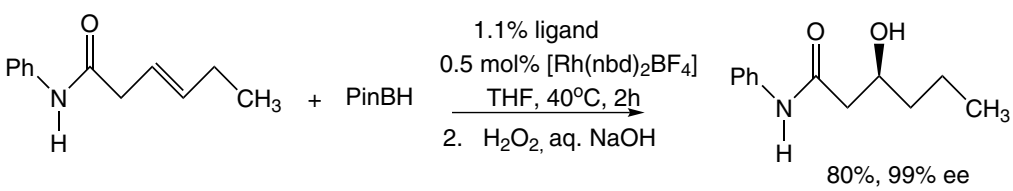


Tech. Note (1)
Ref. (1-3)

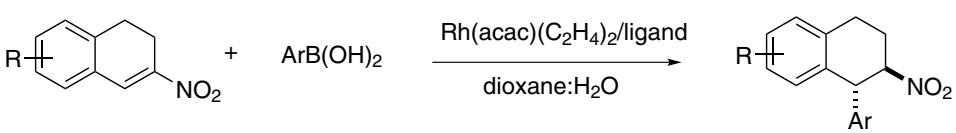
R = H, Ph R' = H, CH_3 Z = $NHCOCH_3$, CH_2COOH >97% ee



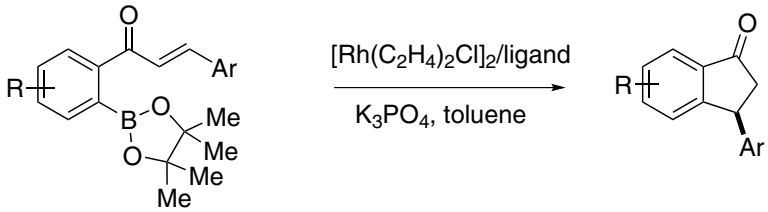
Tech. Note (2)
Ref. (4,5)



Tech. Note (3)
Ref. (6)



Tech. Note (4)
Ref. (7)



Tech. Note (4)
Ref. (8)

References:

1. *J. Am. Chem. Soc.*, **2000**, *122*, 11539.
2. *Adv. Synth. Catal.*, **2003**, *345*, 308.
3. *Adv. Synth. Catal.*, **2002**, *344*, 1003.
4. *Chem. Comm,* **1999**, 741.
5. *Eur. J. Inorg. Chem.*, **2002**, 2569.
6. *J. Am. Chem. Soc.*, **2008**, *130,* 3734.
7. *Ad. Synth. Catal,* **2012**, *354*, 2433.
8. *J. Org. Chem.*, **2013**, *78*, 2736.

15-1233 **(S)-(+)-(3,5-Dioxa-4-phospha-cyclohepta[2,1-a;3,4-a']dinaphthalen-4-yl)dimethylamine, min. 97% (S)-MONOPHOS** *(185449-80-3)* — 250mg, 1g

$C_{22}H_{18}NO_2P$; FW: 359.36; white xtl.; m.p. 190°
moisture sensitive
Note: Sold in collaboration with DSM for research purposes only. Patent no. WO02 04466. DSM's MonoPhos™ Ligand Kit component.

Technical Notes:

1. See 15-1232.
2. Asymmetric hydrogenation of ketones and β-keto esters.
3. Light-induced, enantioselective hydrogenation.

References:

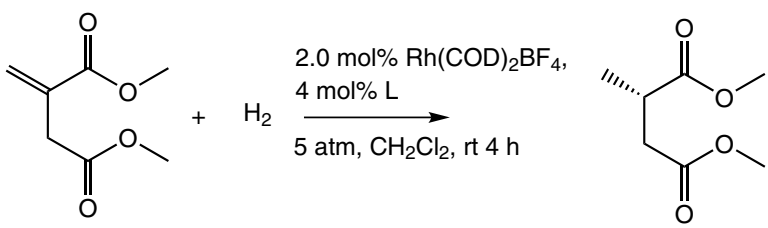
1. *Org. Lett.*, **2004**, *6*, 4105.
2. *Angew. Chem. Int. Ed.*, **2004**, *43*, 5066.
3. *J. Org. Chem.*, **2005**, *70*, 943.
4. *Organometallics*, **2011**, *30*, 3880.

15-1235 **(S)-(+)-(3,5-Dioxa-4-phospha-cyclohepta[2,1-a;3,4-a']dinaphthalen-4-yl)morpholine, min. 97% (S)-MorfPhos** *(185449-81-4)* — 100mg, 500mg

$C_{24}H_{20}NO_3P$; FW: 401.39; white pwdr.
moisture sensitive
Note: Sold in collaboration with DSM for research purposes only. Patent WO 0204466. DSM's MonoPhos™ Ligand Kit component.

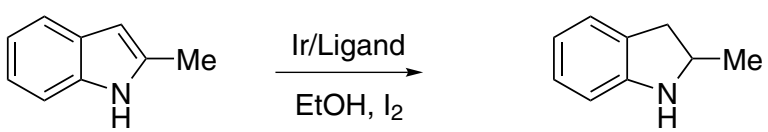
Technical Notes:

1. See 15-1232.
2. Ligand used in the enantioselective rhodium catalyzed low pressure high activity hydrogenation of α–dehydroaminoesters, enamides, and dimethylitaconate. See 15-1234.
3. Ligand used in iridinium-catalyzed asymmetric hydrogenation of 2-methylindole.



> 99% ee

Tech. Note (2)
Ref. (1)



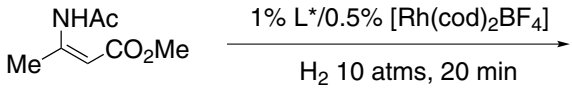
Tech. Note (3)
Ref. (2)

References:

1. *J. Org. Chem.*, **2005**, *70*, 943.
2. *Tetrahedron Lett.*, **2014**, *55*, 3613.

15-1525 **(S)-(+)-(3,5-Dioxa-4-phospha-cyclohepta[2,1-a;3,4-a']dinaphthalen-4-yl)[(1R)-1-phenylethyl]amine, min. 95%** 100mg
(422509-53-3) 500mg
$C_{28}H_{22}NO_2P$; FW: 435.45; white pwdr.; m.p. 212-213°
moisture sensitive
Note: Sold in collaboration with DSM for research purposes only. Patent WO 0204466. DSM's MonoPhos™ Ligand Kit component.

Technical Note:
1. The ligand for the rhodium-catalyzed enantioselective hydrogenation of (E)-N-acylated dehydro-β-aminoacid esters.



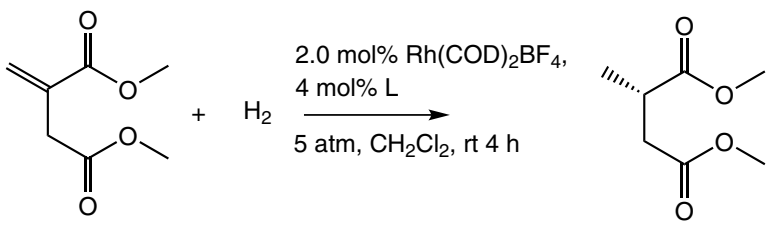
100% conv.
94% ee

Tech. Note (1)
Ref. (1)

References:
1. *J. Am. Chem. Soc.,* **2002**, *124*, 14552.

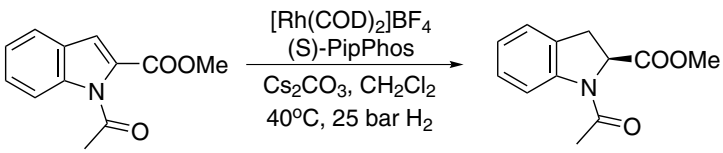
15-1234 **(S)-(+)-(3,5-Dioxa-4-phospha-cyclohepta[2,1-a;3,4-a']dinaphthalen-4-yl)piperidine, min. 97% (S)-PipPhos** 100mg
(284472-79-3) 500mg
$C_{25}H_{22}NO_2P$; FW: 399.42; white pwdr. 2g
moisture sensitive
Note: Sold in collaboration with DSM for research purposes only. Patent WO 0204466. DSM's MonoPhos™ Ligand Kit component.

Technical Notes:
1. See 15-1232.
2. Ligand used in the enantioselective rhodium catalyzed low pressure high activity hydrogenation of α–dehydroaminoesters, enamides, and dimethylitaconate.
3. Ligand used in asymmetric hydrogenation of 2-substituted N-protected indoles using Rhodium-based catalysts.



> 99% ee

Tech. Note (2)
Ref. (1)



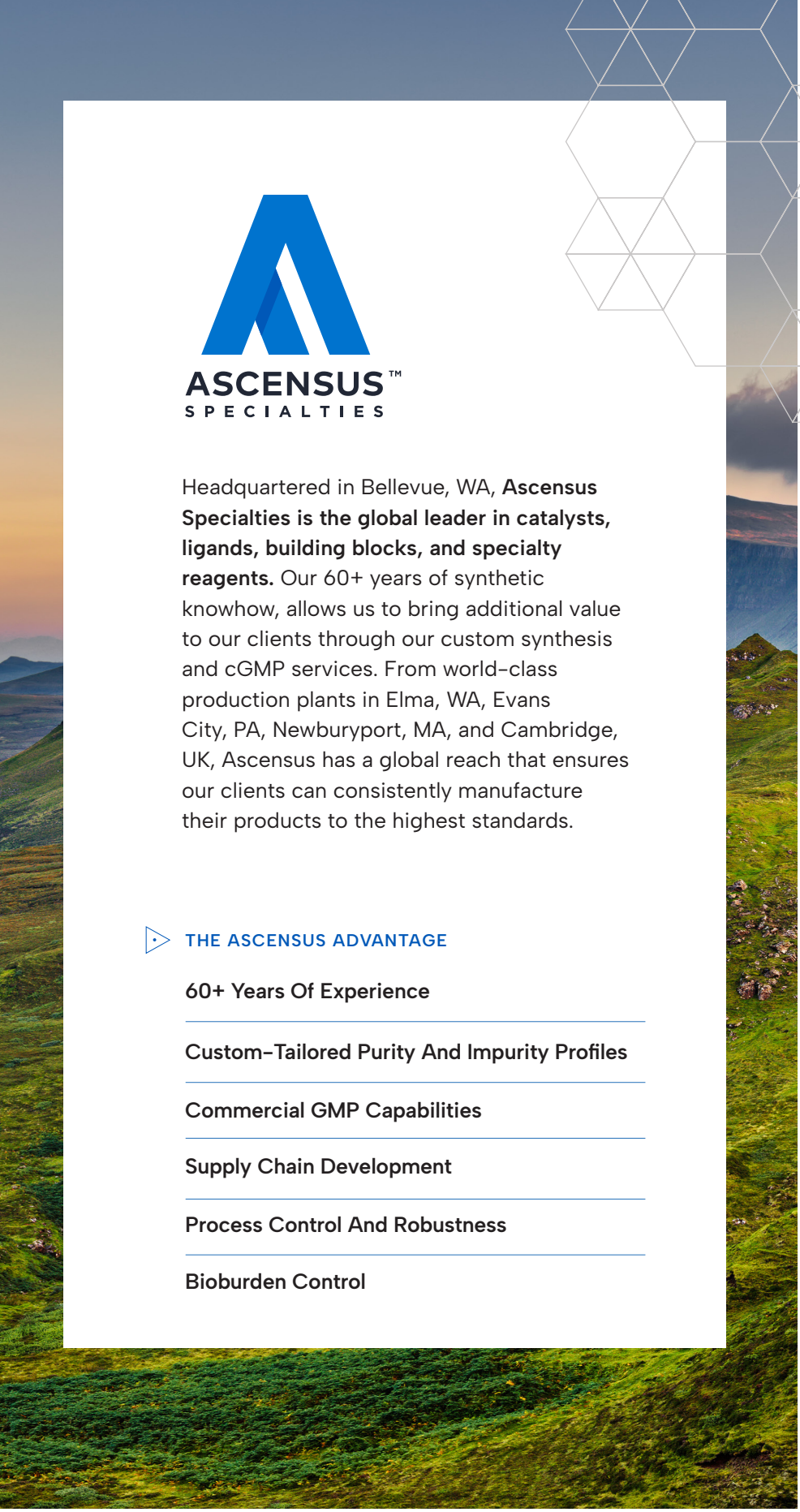
74% ee

Tech. Note (3)
Ref. (2)

References:
1. *J. Org. Chem.*, **2005**, *70*, 943.
2. *Tetrahedron*, **2010**, *21*, 7.
3. *Organometallics*, **2011**, *30*, 1942.
4. *Adv. Synth. Catal.*, **2011**, 353.

Collaboration

Sold in collaboration with DSM for research purposes only.
Patent WO 0204466.



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