

metals • inorganics • organometallics • catalysts • ligands • custom synthesis • cGMP facilities • nanomaterials

**Catalog # 96-3655 Solvias (R)-MeO-BIPHEP Ligand Kit**

Components include 100mg of the nine items listed below:

Cat. #15-0178  100mg	Cat. #15-0042  100mg	Cat. #15-0112  100mg
Cat. #15-0488  100mg	Cat. #15-0654  100mg	Cat. #15-0156  100mg
Cat. #15-0044  100mg	Cat. #15-0158  100mg	Cat. #15-0652  100mg

**96-3656 Solvias (S)-MeO-BIPHEP Ligand Kit - components include 100mg of the nine S-enantiomers of the ligands contained in the (R)-Kit (#96-3655) above.**

1 kit

15-0178	(R)-(+)-2,2'-Bis(diphenylphosphino)-6,6'-dimethoxy-1,1'-biphenyl, min. 97% (R)-MeO-BIPHEP [133545-16-1] C <sub>38</sub> H <sub>32</sub> O <sub>2</sub> P <sub>2</sub> ; FW: 582.53; off-white xtl.	100mg 500mg 2g 10g
---------	---	-----------------------------

**Technical Notes:**

In many respects the catalytic profile of the MeOBIPHEP ligands is similar to that of other atropisomeric diphosphines such as binap and its many analogs. The nature of the PR<sub>2</sub> group strongly influences the catalytic performance of the metal complexes. The rhodium and ruthenium MeO-BIPHEP catalysts are highly effective for the hydrogenation of various C=O, C=C and C=N bonds and several synthetically useful CC coupling reactions.

1. Ru catalyzed asymmetric hydrogenation of β-keto esters, β-keto sulfones and α-keto amides.
2. Ru and Ir catalyzed dynamic kinetic resolution for the synthesis of β-hydroxy-α-amino acid derivatives.
3. Ru catalyzed hydrogenation of C=C bonds, especially α,β-unsaturated acids, allylic alcohols and with other activated groups.
4. Ir catalyzed enantioselective hydrogenation of heteroaromatic compounds.
5. Various asymmetric C-C coupling reactions such as Rh catalyzed reductive coupling of acetylene to aldehydes and α-ketoesters, Pt catalyzed intramolecular hydroarylation of unactivated alkenes with indoles and glyoxylate-ene reaction or the Pd catalyzed enantioselective Heck reaction of p-XC<sub>6</sub>H<sub>4</sub>OTf (X = OMe, H, CO<sub>2</sub>Me) with dihydrofuran.

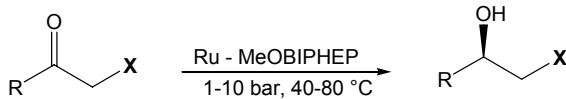
 Visit [www.strem.com](http://www.strem.com) for new product information and searchable catalog.

**Strem Chemicals, Inc.**  
 7 Mulliken Way  
 Newburyport, MA 01950-4098  
 U.S.A.  
 Tel.: (978) 499-1600  
 Fax: (978) 465-3104  
 Email: [info@strem.com](mailto:info@strem.com)

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

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

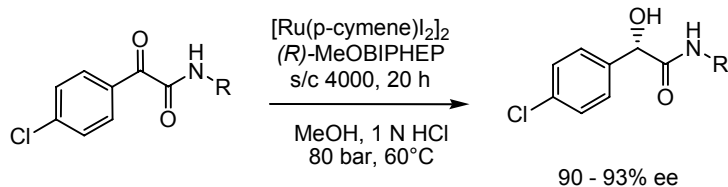
**Strem Chemicals UK, Ltd.**  
 41 Hills Road  
 Cambridge  
 England CB2 1NT  
 Tel.: 0845 643 7263  
 Fax: 01223 368021  
 Email: [enquiries@strem.co.uk](mailto:enquiries@strem.co.uk)



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

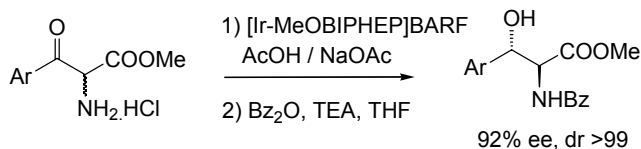
R = alkyl, (subst) Ph, Np  
X = COOR', SO<sub>2</sub>Ph

88-97% ee



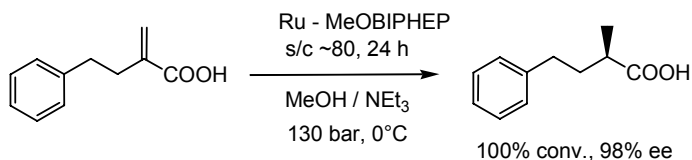
Tech. Note (1)  
Ref. (4)

90 - 93% ee



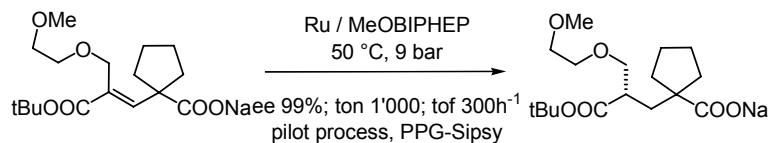
Tech. Note (2)  
Ref. (5)

92% ee, dr >99



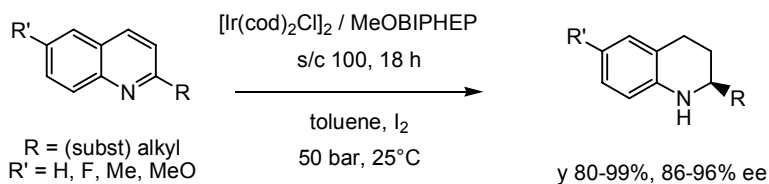
Tech. Note (3)  
Ref. (6-9)

100% conv., 98% ee



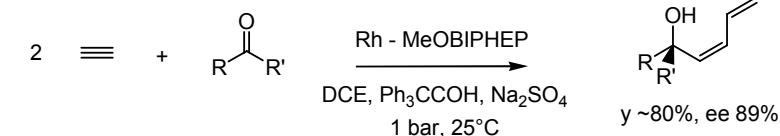
Tech. Note (3)  
Ref. (10)

99%; ton 1'000; tof 300h<sup>-1</sup>  
pilot process, PPG-Sipsy



Tech. Note 4)  
Ref. (11)

y 80-99%, 86-96% ee



Tech. Note (5)  
Ref. (12)

y ~80%, ee 89%

#### References:

1. *Adv. Synth. Catal.* **2003**, 345, 261.
2. *J. Organomet. Chem.* **2000**, 603, 128.
3. *Tetrahedron: Asymmetry* **1999**, 10, 1369.
4. *Adv. Synth. Catal.* **2004**, 346, 842.
5. *Org. Lett.* **2006**, 8, 4573.
6. *Tetrahedron Lett.* **2006**, 47, 9261.
7. *Comprehensive Asymmetric Catalysis*, **1999**, 1439.
8. *Chimia* **1997**, 51, 303.
9. *J. Am. Chem. Soc.* **2003**, 125, 8779.
10. *Org. Process Res. Devel.* **2001**, 5, 438.
11. *J. Am. Chem. Soc.* **2003**, 125, 10536.
12. *J. Am. Chem. Soc.* **2006**, 128, 16040.

Visit [www.strem.com](http://www.strem.com) for new product information and searchable catalog.

**Strem Chemicals, Inc.**  
7 Mulliken Way  
Newburyport, MA 01950-4098  
U.S.A.  
Tel.: (978) 499-1600  
Fax: (978) 465-3104  
Email: [info@strem.com](mailto:info@strem.com)

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

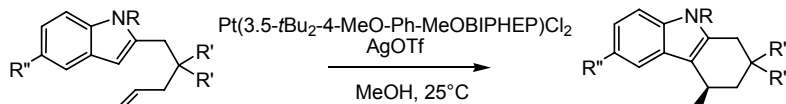
**Strem Chemicals, Inc.**  
Postfach 1215  
77672 KEHL  
Germany  
Telefon: 0 78 51/ 7 58 79  
Email: [info.europe@strem.com](mailto:info.europe@strem.com)

**Strem Chemicals UK, Ltd.**  
41 Hills Road  
Cambridge  
England CB2 1NT  
Tel.: 0845 643 7263  
Fax: 01223 368021  
Email: [enquiries@strem.co.uk](mailto:enquiries@strem.co.uk)

15-0042	(R)-(-)-2,2'-Bis[di(3,5-di- <i>t</i> -butyl-4-methoxyphenyl)phosphino]-6,6'-dimethoxy-1,1'-biphenyl, min. 97% [352655-61-9] C <sub>74</sub> H <sub>104</sub> O <sub>6</sub> P <sub>2</sub> ; FW: 1151.60; white xtl.	100mg 500mg 2g 10g
---------	---	-----------------------------

## Technical Note:

- Various asymmetric C-C coupling reactions such as Rh catalyzed reductive coupling of acetylene to aldehydes and  $\alpha$ -ketoesters, Pt catalyzed intramolecular hydroarylation of unactivated alkenes with indoles and glyoxylate-ene reaction or the Pd catalyzed enantioselective Heck reaction of *p*-XC<sub>6</sub>H<sub>4</sub>OTf (X = OMe, H, CO<sub>2</sub>Me) with dihydrofuran.
- See 15-0178.



## Reference:

- Org. Lett.* **2006**, *8*, 3801.

15-0112	(R)-(+)-2,2'-Bis(di-2-furanylphosphino)-6,6'-dimethoxy-1,1'-biphenyl, min. 97% [145214-57-9] C <sub>30</sub> H <sub>24</sub> O <sub>6</sub> P <sub>2</sub> ; FW: 542.47; off-white powdr.	100mg 500mg 2g 10g
---------	--	-----------------------------

## Technical Note:

- See 15-0178.

15-0488	(R)-(+)-2,2'-Bis(di(3,5-xylyl)phosphino)-6,6'-dimethoxy-1,1'-biphenyl, min. 97% [394248-45-4] C <sub>46</sub> H <sub>48</sub> O <sub>2</sub> P <sub>2</sub> ; FW: 694.84; white powdr.	100mg 500mg 2g 10g
---------	---	-----------------------------

## Technical Note:

- See 15-0178.

15-0654	(R)-(+)-2,2'-Bis(di- <i>i</i> -propylphosphino)-6,6'-dimethoxy-1,1'-biphenyl, min. 97% [150971-45-2] C <sub>26</sub> H <sub>40</sub> O <sub>2</sub> P <sub>2</sub> ; FW: 446.56; white powdr.	100mg 500mg 2g 10g
---------	--	-----------------------------

## Technical Note:

- See 15-0178.

15-0156	(R)-(+)-2,2'-Bis(di- <i>p</i> -tolylphosphino)-6,6'-dimethoxy-1,1'-biphenyl, min. 97% [133545-24-1] C <sub>42</sub> H <sub>40</sub> O <sub>2</sub> P <sub>2</sub> ; FW: 638.73; white powdr.	100mg 500mg 2g 10g
---------	---	-----------------------------

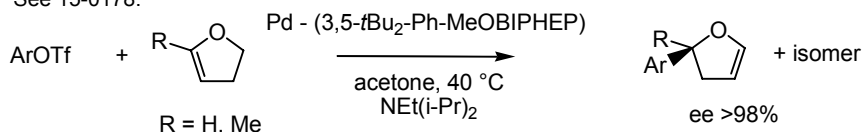
## Technical Note:

- See 15-0178.

15-0044	(R)-(+)-2,2'-Bis[di(3,5-di- <i>t</i> -butylphenyl)phosphino]-6,6'-dimethoxy-1,1'-biphenyl, min. 97% [192138-05-9] C <sub>70</sub> H <sub>96</sub> O <sub>2</sub> P <sub>2</sub> ; FW: 1031.49; white powdr.	100mg 500mg 2g 10g
---------	--	-----------------------------

## Technical Notes:

- Various asymmetric C-C coupling reactions such as Rh catalyzed reductive coupling of acetylene to aldehydes and  $\alpha$ -ketoesters, Pt catalyzed intramolecular hydroarylation of unactivated alkenes with indoles and glyoxylate-ene reaction or the Pd catalyzed enantioselective Heck reaction of *p*-XC<sub>6</sub>H<sub>4</sub>OTf (X = OMe, H, CO<sub>2</sub>Me) with dihydrofuran.
- See 15-0178.



## Reference:

- Organometallics* **1999**, *18*, 670.

Visit [www.strem.com](http://www.strem.com) for new product information and searchable catalog.

**Strem Chemicals, Inc.**  
7 Mulliken Way  
Newburyport, MA 01950-4098  
U.S.A.  
Tel.: (978) 499-1600  
Fax: (978) 465-3104  
Email: [info@strem.com](mailto:info@strem.com)

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

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

**Strem Chemicals UK, Ltd.**  
41 Hills Road  
Cambridge  
England CB2 1NT  
Tel.: 0845 643 7263  
Fax: 01223 368021  
Email: [enquiries@strem.co.uk](mailto:enquiries@strem.co.uk)

15-0158	(R)-(+)-2,2'-Bis[di(3,4,5-trimethoxyphenyl)phosphino]-6,6'-dimethoxy-1,1'-biphenyl, min. 97% [256390-47-3] C <sub>50</sub> H <sub>56</sub> O <sub>14</sub> P <sub>2</sub> ; FW: 942.94; off-white powdr.	100mg 500mg 2g 10g
Technical Note: 1. See 15-0178.		
15-0652	(R)-(-)-2,2'-Bis[di(3,5-di-i-propyl-4-dimethylaminophenyl)phosphino]-6,6'-dimethoxy-1,1'-biphenyl, min. 97% [352655-40-4] C <sub>70</sub> H <sub>100</sub> N <sub>4</sub> O <sub>2</sub> P <sub>2</sub> ; FW: 1091.55; white powdr.	100mg 500mg 2g 10g
Technical Note: 1. See 15-0178.		
<b>(S)-enantiomers listed below</b>		
15-0179	(S)-(-)-2,2'-Bis(diphenylphosphino)-6,6'-dimethoxy-1,1'-biphenORyyl, min. 97% (S)-MeO-BIPHEP [133545-17-2] C <sub>38</sub> H <sub>32</sub> O <sub>2</sub> P <sub>2</sub> ; FW: 582.53; white xtl.	100mg 500mg 2g 10g
Technical Note: 1. See 15-0178.		
15-0043	S-(+)-2,2'-Bis[di(3,5-di-t-butyl-4-methoxyphenyl)phosphino]-6,6'-dimethoxy-1,1'-biphenyl, min. 97% [910134-30-4] C <sub>74</sub> H <sub>104</sub> O <sub>6</sub> P <sub>2</sub> ; FW: 1151.60; white xtl.	100mg 500mg 2g 10g
Technical Note: 1. See 15-0042.		
15-0113	(S)-(-)-2,2'-Bis(di-2-furanylphosphino)-6,6'-dimethoxy-1,1'-biphenyl, min. 97% [145214-59-1] C <sub>30</sub> H <sub>24</sub> O <sub>6</sub> P <sub>2</sub> ; FW: 542.47; off-white powdr.	100mg 500mg 2g 10g
Technical Note: 1. See 15-0178.		
15-0489	(S)-(-)-2,2'-Bis[di(3,5-xylyl)phosphino]-6,6'-dimethoxy-1,1'-biphenyl, min. 97% [362634-22-8] C <sub>46</sub> H <sub>46</sub> O <sub>2</sub> P <sub>2</sub> ; FW: 694.84; white powdr.	100mg 500mg 2g 10g
Technical Note: 1. See 15-0178.		
15-0655	(S)-(-)-2,2'-Bis(di-i-propylphosphino)-6,6'-dimethoxy-1,1'-biphenyl, min. 97% [150971-43-0] C <sub>26</sub> H <sub>40</sub> O <sub>2</sub> P <sub>2</sub> ; FW: 446.56; white powdr.	100mg 500mg 2g 10g
Technical Note: 1. See 15-0178.		
15-0157	(S)-(-)-2,2'-Bis(di-p-tolylphosphino)-6,6'-dimethoxy-1,1'-biphenyl, min. 97% [133545-25-2] C <sub>42</sub> H <sub>40</sub> O <sub>2</sub> P <sub>2</sub> ; FW: 638.73; white powdr.	100mg 500mg 2g 10g
Technical Note: 1. See 15-0178.		
15-0045	(S)-(-)-2,2'-Bis[di(3,5-di-t-butylphenyl)phosphino]-6,6'-dimethoxy-1,1'-biphenyl, min. 97% [167709-31-1] C <sub>70</sub> H <sub>96</sub> O <sub>2</sub> P <sub>2</sub> ; FW: 1031.49; white powdr.	100mg 500mg 2g 10g
Technical Note: 1. See 15-0044.		

**Visit [www.strem.com](http://www.strem.com) for new product information and searchable catalog.**

**Strem Chemicals, Inc.**  
7 Mulliken Way  
Newburyport, MA 01950-4098  
U.S.A.  
Tel.: (978) 499-1600  
Fax: (978) 465-3104  
Email: [info@strem.com](mailto:info@strem.com)

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

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

**Strem Chemicals UK, Ltd.**  
41 Hills Road  
Cambridge  
England CB2 1NT  
Tel.: 0845 643 7263  
Fax: 01223 368021  
Email: [enquiries@strem.co.uk](mailto:enquiries@strem.co.uk)

---

15-0159	(S)-(-)-2,2'-Bis[di(3,4,5-trimethoxyphenyl)phosphino]-6,6'-dimethoxy-1,1'-biphenyl, min. 97% [256235-61-7] $C_{50}H_{56}O_{14}P_2$ ; FW: 942.94; off-white powdr.	100mg 500mg 2g 10g
---------	--	-----------------------------

Technical Note:  
1. See 15-0178.

---

15-0653	(S)-(+)-2,2'-Bis[di(3,5-di-i-propyl-4-dimethylaminophenyl)phosphino]-6,6'-dimethoxy-1,1'-biphenyl, min. 97% [919338-66-2] $C_{70}H_{100}N_4O_2P_2$ ; FW: 1091.55; white powdr.	100mg 500mg 2g 10g
---------	--	-----------------------------

Technical Note:  
1. See 15-0178.

---

Visit [www.strem.com](http://www.strem.com) for new product information and searchable catalog.

**Strem Chemicals, Inc.**  
7 Mulliken Way  
Newburyport, MA 01950-4098  
U.S.A.  
Tel.: (978) 499-1600  
Fax: (978) 465-3104  
Email: [info@strem.com](mailto:info@strem.com)

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

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

**Strem Chemicals UK, Ltd.**  
41 Hills Road  
Cambridge  
England CB2 1NT  
Tel.: 0845 643 7263  
Fax: 01223 368021  
Email: [enquiries@strem.co.uk](mailto:enquiries@strem.co.uk)