

**96-0445 Chiral SpiroPAP Ligand Kit**

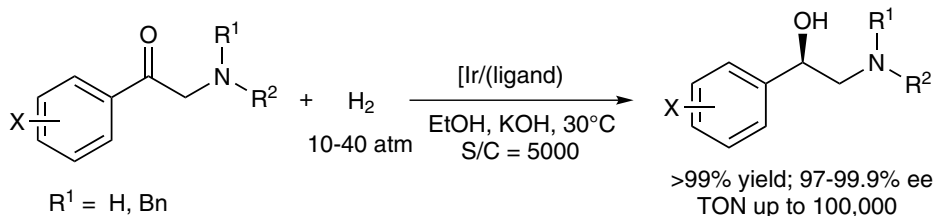
This kit contains 25mg of each of the products shown above.

1 kit

**15-5147 (R)-(+)-7-Bis(3,5-di-t-butylphenyl)phosphino-7'-[(4-t-butylpyridine-2-ylmethyl)amino]-2,2',3,3'-tetrahydro-1,1'-spirobiindane, min. 98% (>99% ee) (R)-DTB-SpiroPAP-4-t-Bu** [CAS# 1298133-38-6] 25mg  
C<sub>55</sub>H<sub>71</sub>N<sub>2</sub>P; FW: 791.14; white solid; m.p. 86-88°C; spec. rotation: +204°(c 1.0, CH<sub>2</sub>Cl<sub>2</sub>); air sensitive 100mg

Technical Notes:

1. Enantioselective synthesis of chiral 1,2-amino alcohols via asymmetric hydrogenation of α-amino ketones with chiral spiro iridium catalysts.



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

R<sup>1</sup> = H, Bn  
R<sup>2</sup> = Me, i-Pr, t-Bu

References:

1. *Synthesis*, **2014**, 46, 2910.

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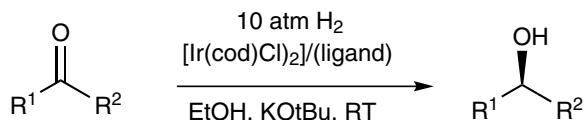
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**15-5148 (R)-(+)-7-Bis(3,5-di-*t*-butylphenyl)phosphino-7'-[(6-methylpyridine-2-ylmethyl)amino]-2,2',3,3'-tetrahydro-1,1'-spirobiindane, min. 98% (>99% ee) (R)-DTB-SpiroPAP-6-Me** [CAS# 1298133-26-2] 25mg  
 C<sub>52</sub>H<sub>65</sub>N<sub>2</sub>P; FW: 749.06; white solid; m.p. 153-155°C; spec. rotation: +191° (c 1.0, CH<sub>2</sub>Cl<sub>2</sub>); *air sensitive* 100mg

Technical Notes:

- Extremely efficient chiral iridium catalyst used for the asymmetric hydrogenation of ketones



R<sup>1</sup> = aryl, alkyl  
 R<sup>2</sup> = Me, Et, nBu

95-99% yields  
 88-99.9% ee  
 TON up to 4550000

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

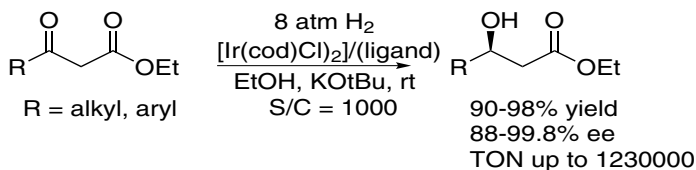
References:

- Angew. Chem. Int. Ed.*, **2011**, 50, 7329.

**15-5158 (R)-(+)-7-Bis(3,5-di-*t*-butylphenyl)phosphino-7'-[(3-methylpyridine-2-ylmethyl)amino]-2,2',3,3'-tetrahydro-1,1'-spirobiindane, min. 98% (>99% ee) (R)-DTB-SpiroPAP-3-Me** [CAS# 1298133-36-4] 25mg  
 C<sub>52</sub>H<sub>65</sub>N<sub>2</sub>P; FW: 749.06; white solid; m.p. 160-161°C; spec. rotation +213 (c 0.5, CH<sub>2</sub>Cl<sub>2</sub>); *air sensitive* 100mg

Technical Notes:

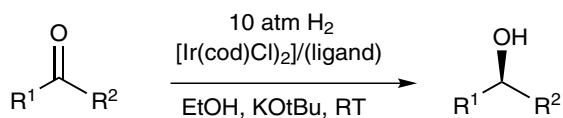
- Iridium/ligand catalyst for the highly efficient, asymmetric hydrogenation of β-aryl and β-ketoesters.
- Extremely efficient chiral iridium catalyst used for the asymmetric hydrogenation of ketones.
- Iridium/ligand catalyst for the highly efficient, asymmetric hydrogenation of β-aryl and β-ketoesters.



R = alkyl, aryl

90-98% yield  
 88-99.8% ee  
 TON up to 1230000

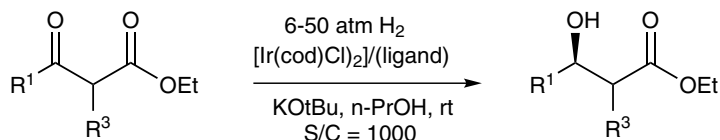
**Tech Note (1)**  
**Ref. (1)**



R<sup>1</sup> = aryl, alkyl  
 R<sup>2</sup> = Me, Et, nBu

95-99% yields  
 88-99.9% ee  
 TON up to 4550000

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



R = Me, Et, *i*-Pr: R<sup>1</sup> = H, C<sub>6</sub>H<sub>5</sub>  
 R<sup>2</sup>, R<sup>3</sup> = alkyl, aryl

90-98% yield  
 97-99.7% ee  
 TON up to 100000

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

References:

- Angew. Chem. Int. Ed.*, **2011**, 50, 7329.
- Angew. Chem. Int. Ed.*, **2012**, 51, 201.
- Org. Lett.*, **2012**, 14, 6158.

**15-5159 (S)-(-)-7-Bis(3,5-di-*t*-butylphenyl)phosphino-7'-[(3-methylpyridine-2-ylmethyl)amino]-2,2',3,3'-tetrahydro-1,1'-spirobiindane, min. 98% (>99% ee) (S)-DTB-SpiroPAP-3-Me** 25mg  
 C<sub>52</sub>H<sub>65</sub>N<sub>2</sub>P; FW: 749.06; off-white solid; m.p. 162-164°C; spec. rotation -216° (c 0.5, CH<sub>2</sub>Cl<sub>2</sub>); *air sensitive* 100mg

Technical Notes:

- See 15-5158.

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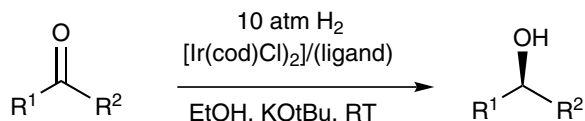
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**15-5166 (R)-(+)-7-Bis(3,5-di-*t*-butylphenyl)phosphino-7'-[(pyridine-2-ylmethyl)amino]-2,2',3,3'-tetrahydro-1,1'-spirobiindane, min. 98% (>99% ee) (R)-DTB-SpiroPAP [CAS# 1298133-21-7]** 25mg  
 C<sub>51</sub>H<sub>63</sub>N<sub>2</sub>P; FW: 735.03; white solid; m.p. 172-174°C; spec. rotation +172° (c 0.5, CH<sub>2</sub>Cl<sub>2</sub>); *air sensitive* 100mg

Technical Notes:

- Extremely efficient chiral iridium catalyst used for the asymmetric hydrogenation of ketones



R<sup>1</sup> = aryl, alkyl  
 R<sup>2</sup> = Me, Et, nBu

95-99% yields  
 88-99.9% ee  
 TON up to 4550000

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

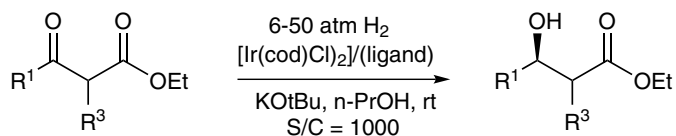
References:

- Angew. Chem. Int. Ed.*, **2011**, *50*, 7329.

**15-5167 (S)-(-)-7-Bis(3,5-di-*t*-butylphenyl)phosphino-7'-[(pyridine-2-ylmethyl)amino]-2,2',3,3'-tetrahydro-1,1'-spirobiindane, min. 98% (>99% ee) (S)-DTB-SpiroPAP [CAS# 1415636-82-6]** 25mg  
 C<sub>51</sub>H<sub>63</sub>N<sub>2</sub>P; FW: 735.03; white solid; m.p. 170-171°C, spec. rotation -175° (c 0.5, CH<sub>2</sub>Cl<sub>2</sub>); *air sensitive* 100mg

Technical Notes:

- Iridium/ligand catalyst for the highly efficient, asymmetric hydrogenation of β-aryl and β-ketoesters



R = Me, Et, *i*-Pr; R<sup>1</sup> = H, C<sub>6</sub>H<sub>5</sub>  
 R<sup>2</sup>, R<sup>3</sup> = alkyl, aryl

90-98% yield  
 97-99.7% ee  
 TON up to 100000

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

References:

- Org. Lett.*, **2012**, *14*, 6158.

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