

96-7052 Paracyclophane Kit **1 kit**
Contains the smallest unit size of the following items listed below.
Components available for individual sale.

06-0104	racemic-4-Bromo[2.2]paracyclophane, min. 95% [1908-61-8] C ₁₆ H ₁₅ Br; FW: 287.19; white powdr.	500mg 2g
06-0460	racemic-4,12-Dibromo[2.2]paracyclophane, min. 95% [23927-40-4] C ₁₆ H ₁₄ Br ₂ ; FW: 366.09; white to off-white powdr.	250mg 1g
08-0700	racemic-4,12-Dihydroxy[2.2]paracyclophane, min. 97% [612492-27-0] C ₁₆ H ₁₆ O ₂ ; FW: 240.30; yellow to brown powdr.	100mg 500mg
08-2027	racemic-4-Hydroxy[2.2]paracyclophane, min. 97% [157018-15-0] C ₁₆ H ₁₆ O; FW: 224.30; yellow to tan powdr.	250mg 1g

Paracyclophane-based Ligands and Catalysts

15-0425 (R)-(-)-4,12-Bis(diphenylphosphino)-[2.2]-paracyclophane, min. 95% (R)-PHANEPHOS 100mg
500mg
C₄₀H₃₄P₂; FW: 576.65; white solid; [α]_D -62.6° (c 3.11, CH₂Cl₂); m.p. 222-225°
Note: Sold in collaboration with Chirotech for research purposes only. US Patent no. 5874629.

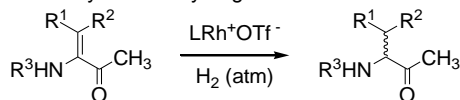
Technical Note:

- See 15-0426.

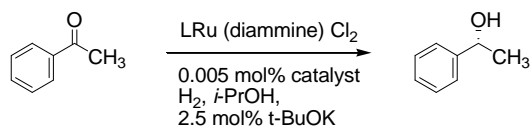
15-0426 (S)-(+)-4,12-Bis(diphenylphosphino)-[2.2]-paracyclophane, min. 95% (S)-PHANEPHOS 100mg
500mg
[192463-40-4]
C₄₀H₃₄P₂; FW: 576.65; white solid; [α]_D +63.2° (c 3.27, CH₂Cl₂); m.p. 222-225°
Note: Sold in collaboration with Chirotech for research purposes only. US Patent no. 5874629.

Technical Notes:

- Highly enantioselective catalyst for the hydrogenation of dehydroamino acids, methyl esters under mild conditions.
- Asymmetric hydrogenation of a wide variety of aromatic, heteroaromatic, and α-β unsaturated ketones.



Tech. Note (1)
Ref. (1)



Tech. Note (2)
Ref. (2)

References:

- J. Am. Chem. Soc.*, **1997**, *119*, 6207.
- Org. Lett.*, **2000**, *2*, 4173.

15-0730 (R)-(-)-4,12-Bis(di(3,5-xylyl)phosphino)-[2.2]-paracyclophane, min. 95% CTH-(R)-3,5-xylyl-PHANEPHOS 100mg
500mg
C₄₈H₅₀P₂; FW: 688.86; white powdr.
Note: Sold in collaboration with JM for research purposes only. US patent Application No 5874629 and patents arising therefrom.

Technical Notes:

- See 15-0426.
- See 15-0731.

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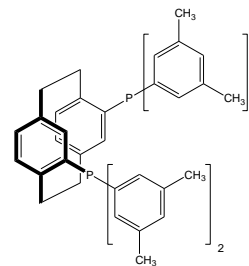
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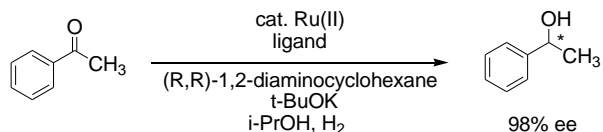
15-0731 (S)-(+)-4,12-Bis(di(3,5-xylyl)phosphino)-[2.2]-paracyclophane, min. 93% CTH-(S)-3,5-xylyl-PHANEPHOS
 $C_{48}H_{50}P_2$; FW: 688.86; white powdr.
 Note: Sold in collaboration with JM for research purposes only. US patent Application No 5874629 and patents arising therefrom.

100mg
500mg

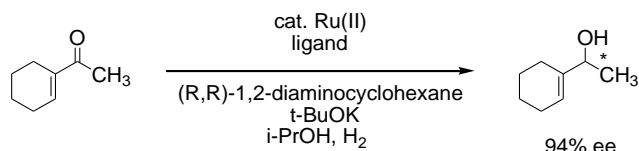


Technical Notes:

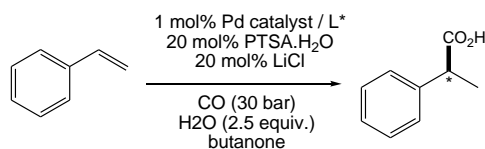
1. See 15-0426.
2. Chiral ligand employed in the enantioselective hydrogenation of various ketones.
3. Chiral ligand employed in the enantioselective hydroxycarbonylation and alkoxy-carbonylation of alkenes.
4. Chiral ligand employed in the enantioselective [2+2] cycloaddition of oxabicyclic alkenes with terminal alkynes.
5. Chiral ligand employed in the gold-catalyzed enantioselective Cope rearrangement of achiral 1,5-dienes.



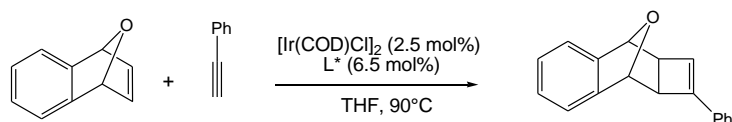
Tech Note (2)
Ref. (1)



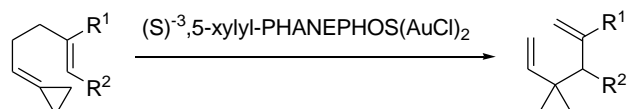
Tech Note (2)
Ref. (1)



Tech. Note (3)
Ref. (2)



Tech. Note (4)
Ref. (3)



Tech. Note (5)
Ref. (4)

Reference:

1. *Org. Lett.*, **2000**, 2, 4173.
2. *Angew. Chem. Int. Ed.*, **2010**, 49, 9197.
3. *Org. Lett.*, **2010**, 12, 304.
4. *Nature Chemistry*, **2012**, 4, 405.

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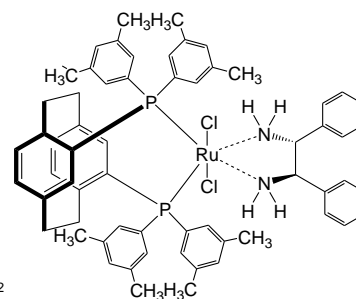
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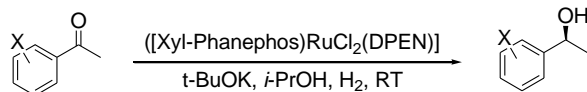
44-0380 Dichloro[(R)-(-)-4,12-bis(di(3,5-xylyl)phosphino)-[2.2]-paracyclophane] [(1S,2S)-(-)-1,2-diphenylethylenediamine]ruthenium (II), min. 95% [325150-57-0]
 $\text{RuCl}_2[\text{C}_{48}\text{H}_{50}\text{P}_2][\text{C}_{14}\text{H}_{16}\text{N}_2]$; FW: 1073.12; cream colored pwdr.
air sensitive
 Note: Sold in collaboration with Chirotech for research purposes only.
 US Patent nos. 5874629 and 6486337.

10mg
50mg

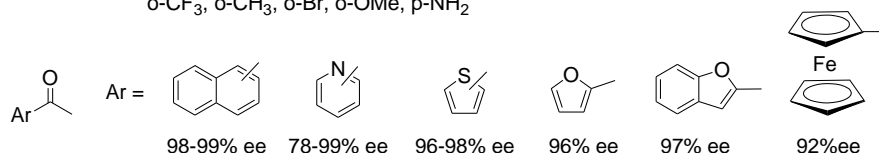


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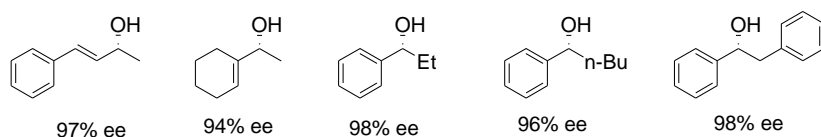
1. The Noyori [(diphosphine) RuCl_2 (diamine)] catalysts containing the chiral ligand Xylyl-Phanephos display exceptional activity and enantioselectivity in the asymmetric hydrogenation of a wide range of aromatic, heteroaromatic and α,β -unsaturated ketones.
2. Reactions are performed under mild conditions at room temperature and typically at low H_2 pressures of 2-10 bar. High substrate concentrations of up to 40% w/v are tolerated.
3. Molar substrate/catalyst ratios of up to 100,000/1 are achieved with excellent reactivity and enantioselectivity using commercial grade substrates and solvents.



X = p- CF_3 , p-Br, p-F, p-OMe, m- CF_3 , o- CF_3 , o- CH_3 , o-Br, o-OMe, p- NH_2



Other Examples



References:

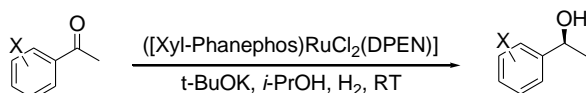
1. *Org. Lett.*, **2000**, 2, 4173.
2. Burk, M.J.; Hems, W.; Zanotti-Gerosa, A. PCT WO/0174829 A1, **2001**.
3. *Org. Proc. Res. Dev.*, **2003**, 7, 89.

44-0381 Dichloro[(S)-(+)-4,12-bis(di(3,5-xylyl)phosphino)-[2.2]-paracyclophane] [(1R,2R)-(+)-1,2-diphenylethylenediamine]ruthenium (II), min. 95%
 $\text{RuCl}_2[\text{C}_{48}\text{H}_{50}\text{P}_2][\text{C}_{14}\text{H}_{16}\text{N}_2]$; FW: 1073.12; cream colored pwdr.
air sensitive
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10mg
50mg

Technical Notes:

1. The Noyori [(diphosphine) RuCl_2 (diamine)] catalysts containing the chiral ligand Xylyl-Phanephos display exceptional activity and enantioselectivity in the asymmetric hydrogenation of a wide range of aromatic, heteroaromatic and α,β -unsaturated ketones.
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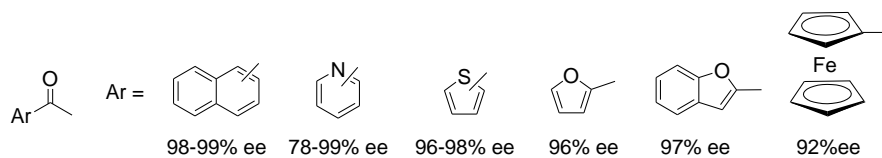
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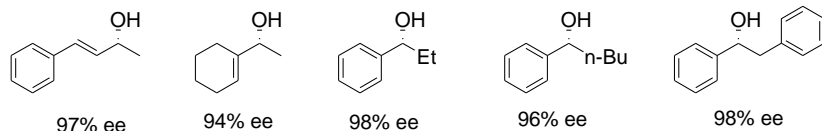
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Other Examples



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