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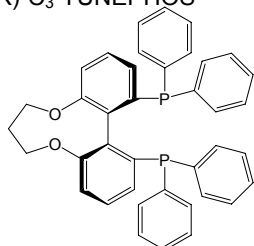
Cat. # 96-5900

1kit

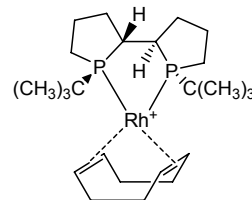
Chiral Quest Catalyst and Ligand Toolbox Kit for Asymmetric Hydrogenation

Contains 100mg of each of the items listed below.

Cat. # 15-0175 (R)-C₃-TUNEPHOS

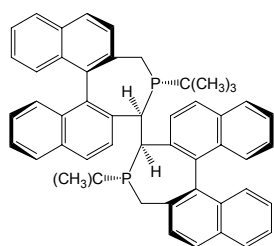


Cat. # 45-0653 (S,S,R,R)-TANGPHOS-Rh

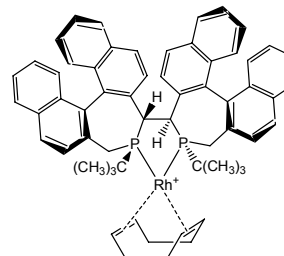


Cat. # 15-0176 (S)-C₃-TUNEPHOS

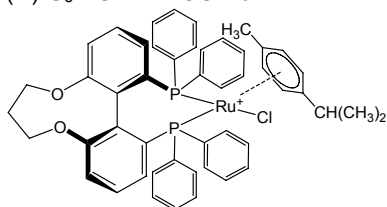
Cat. # 15-1053 (S)-BINAPINE



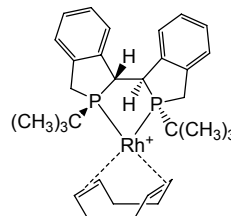
Cat. # 45-0657 (S)-BINAPINE-Rh



Cat. # 44-0109 (R)-C₃-TUNEPHOS-Ru



Cat. # 45-0663 (R,R,S,S)-DUANPHOS-Rh



Available in 100mg and 500mg standard sizes. Kit also available.

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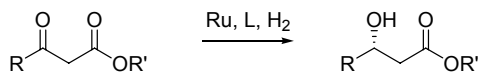
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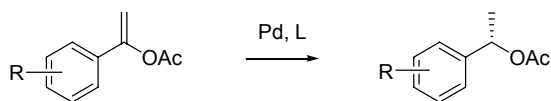
15-0175 R(-)-1,13-Bis(diphenylphosphino)-7,8-dihydro-6H-dibenzo[f,h][1,5]dioxonin, 97% (R)-C₃-TUNEPHOS 100mg
 [301847-89-2] 500mg
 C₃₉H₃₂O₂P₂; FW: 594.62; white powdr.
air sensitive
 Note: US Patent No. 6,521,769; additional patents pending.

Technical Notes:

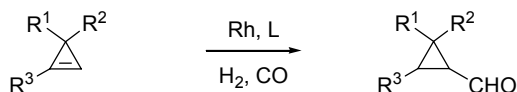
1. New generation of chiral biaryl phosphine ligands with tunable dihedral angles. The ability to modify the dihedral angle allows for the fine tuning of the catalyst system and optimization of enantioselectivity.
2. Ru-C₃-TUNEPHOS complexes are used for asymmetric hydrogenation of β-ketoesters¹, enol acetates², cyclic β-amino acids³, α-phthalimide ketones⁴, and α-keto esters⁵.
3. Rh-catalyzed hydroformylation of cyclopropenes.



Tech. Note (2)
Ref. (1)



Tech. Note (2)
Ref. (2)



Tech. Note (3)
Ref. (6)

References:

1. *J. Org. Chem.*, **2000**, 65, 6223.
2. *Org. Lett.*, **2002**, 4, 4495.
3. *J. Am. Chem. Soc.*, **2003**, 125, 9570.
4. *J. Am. Chem. Soc.*, **2004**, 126, 1626.
5. *Synlett*, **2006**, 126, 1169.
6. *J. Am. Chem. Soc.*, **2008**, 130, 13804.

15-0176 (S)(+)-1,13-Bis(diphenylphosphino)-7,8-dihydro-6H-dibenzo[f,h][1,5]dioxonin, 95% (S)-C₃-TUNEPHOS 100mg
 [486429-99-6] 500mg
 C₃₉H₃₂O₂P₂; FW: 594.62; white powdr.
air sensitive
 Note: US Patent No. 6,521,769; additional patents pending.

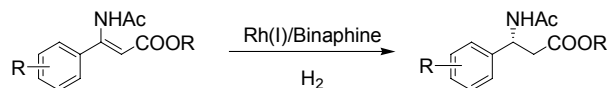
Technical Note:

1. See 15-0175.

15-1053 (3S,3'S,4S,4'S,11bS,11'bS)-(+)-4,4'-Di-*t*-butyl-4,4',5,5'-tetrahydro-3,3'-bi-3H-dinaphtho[2,1-c:1',2'-e]phosphepin, 97% (S)-BINAPINE [610304-81-9] 100mg
 C₅₂H₄₈P₂; FW: 734.89; white powdr. 500mg
air sensitive
 Note: Patents pending.

Technical Notes:

1. Phosphorus chirality restricts rotation of adjacent substituents leading to effective chiral induction, and the highly electron-donating bisphosphine leads to high activities.
2. Rh-BINAPINE complexes form excellent catalyst for asymmetric hydrogenation of aryl substituted β-amino acids.



up to >99% ee

Reference:

1. *Angew. Chem. Int. Ed.*, **2003**, 42, 3509.

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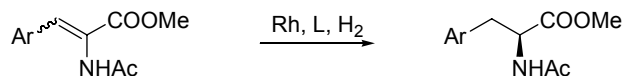
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45-0653 (1S,1'S,2R,2'R)-(+)-1,1'-Di-*t*-butyl-[2,2']-diphospholane(1,5-cyclooctadiene)rhodium(I) tetrafluoroborate, min. 98% (S,S,R,R)-TANGPHOS-Rh
 [Rh(C₈H₁₂)(C₁₆H₃₂P₂)]⁺BF₄⁻; FW: 608.29; orange xtl.
air sensitive
 Note: Patent pending, PCT/US02/35788.

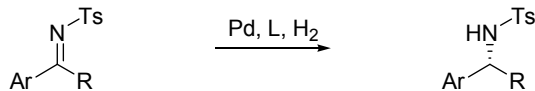
100mg
500mg

Technical Notes:

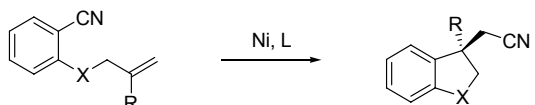
1. Phosphorus chirality restricts rotation of adjacent substituents leading to effective chiral induction, and the highly electron-donating bisphosphine leads to high activities.
2. Excellent catalysts for asymmetric hydrogenation of enamides¹, dehydroamino acids¹, itaconic acids² and α and β -amino acids³.
3. Effective catalyst for the asymmetric hydrogenation of *N*-tosylimines.
4. Asymmetric arylation of unactivated olefins.
5. Rh-catalyzed enantioselective cyclization of imidazoles via C-H bond activation.



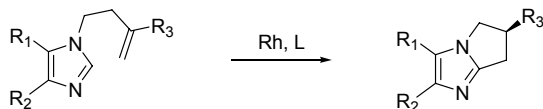
Tech. Note (3)
Ref. (1)



Tech. Note (3)
Ref. (4)



Tech. Note (4)
Ref. (5)



Tech. Note (5)
Ref. (6)

References:

1. *Angew. Chem. Int. Ed.*, **2002**, *41*, 1612.
2. *Org. Lett.*, **2003**, *5*, 205.
3. *Org. Lett.*, **2002**, *4*, 4159.
4. *Angew. Chem. Int. Ed.*, **2006**, *45*, 3832.
5. *J. Am. Chem. Soc.*, **2008**, *130*, 12594.
6. *Chem. Commun.*, **2009**, 3919.

45-0657 (3S,3'S,4S,4'S,11bS,11'bS)-(+)-4,4'-Di-*t*-butyl-4,4',5,5'-tetrahydro-3,3'-bi-3H-dinaphtho[2,1-c:1',2'-e]

phosphepin(1,5-cyclooctadiene)rhodium(I) tetrafluoroborate (S)-BINAPINE-Rh

[Rh(C₈H₁₂)(C₅₂H₄₈P₂)]⁺BF₄⁻; FW: 1032.78; orange to brown powdr.

air sensitive

Note: Patent pending, PCT/US02/35788.

100mg
500mg

Technical Note:

1. See 15-1053.

45-0663 (1R,1'R,2S,2'S)-(+)-2,2'-Di-*t*-butyl-2,3,2',3'-tetrahydro-1,1'-bi-1H-isophosphindole(1,5-cyclooctadiene)

rhodium(I) tetrafluoroborate, min. 98% (R,R,S,S)-DUANPHOS-Rh

[Rh(C₈H₁₂)(C₂₄H₃₂P₂)]⁺BF₄⁻; FW: 680.35; orange xtl.

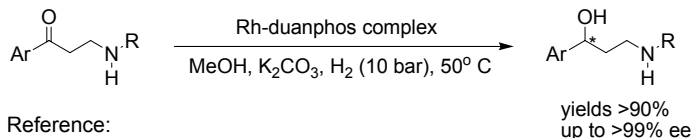
air sensitive

Note: Patent pending, PCT/US02/35788.

100mg
500mg

Technical Note:

1. As a highly electron-donating and conformationally rigid ligand, the rhodium complex of DuanPhos has exhibited remarkably high enantioselectivities and reactivities for the hydrogenation of a variety of functionalized olefins.



Reference:

1. *Angew. Chem. Int. Ed.*, **2005**, *44*, 1687.

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44-0109	Chloro{(R)-(-)-1,13-bis(diphenylphosphino)-7,8-dihydro-6H-dibenzo[f,h][1,5]dioxonin}(p-cymene) ruthenium(II) chloride (R)-C₃-TUNEPHOS-Ru	100mg 500mg
	[RuCl(C ₃₉ H ₃₂ O ₂ P ₂)(C ₁₀ H ₁₄)] ⁺ Cl ⁻ ; FW: 900.81; orange to brown powdr. <i>air sensitive</i> Note: Patent US 6,521,769.	

Technical Note:

1. See 15-0175.
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