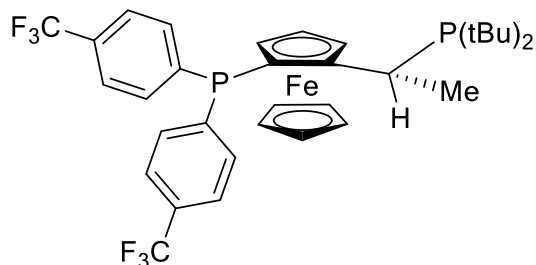
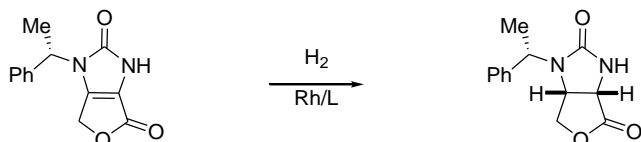


Catalog #26-0650 (R)-(-)-1-((S)-2-(Bis(4-trifluoromethylphenyl)phosphino)ferrocenyl)ethyl-di-*t*-butylphosphine, min. 97%

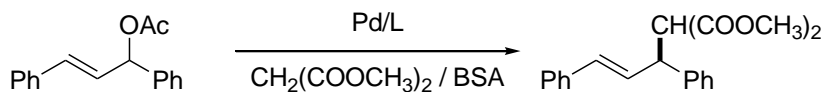


**Technical Notes:**

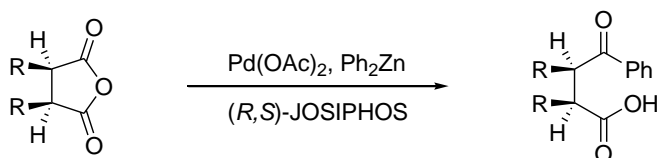
- Ligands of this type are currently used industrially in the stereoselective synthesis of commercial products<sup>1,2</sup>. These ferrocene based phosphine ligands have wide application in the stereoselective hydrogenation of substituted acetamidoacrylates, enol acetates,  $\beta$ -ketoesters and simple alkenes.<sup>4-8</sup>
- Useful as a ligand in Pd-catalyzed C-N bond-forming reactions.
- Pd-catalyzed enantioselective alkylative desymmetrization of *meso*-succinic anhydrides.
- Asymmetric hydrogenation of ketones and phosphinylketimines.
- Michael addition of Grignard reagents to  $\alpha,\alpha$ -unsaturated esters and thioesters.
- Boration of  $\alpha,\alpha$ -unsaturated esters and nitriles.
- Reaction of aryl halides with ammonia.
- Cu-catalyzed reduction of activated C=C bonds with PMHS.
- Regio- and enantioselective hydroboration of vinyl arenes.
- Rh-catalyzed asymmetric ring-opening reactions of oxabicyclic alkenes.
- 1,2-Migrations in Pd-catalyzed Negishi couplings with JosiPhos ligands.
- Catalyst for the homodimerization of ketoketenes.
- Ligand for the Rh catalyzed synthesis of lactones.
- Ligand for the Cu-catalyzed synthesis of syn and anti  $\gamma$ -amino alcohols.
- Ligand for Rh-catalyzed Asymmetric Hydrogenation of Nitroalkenes.
- Ligand for Rh-catalyzed Asymmetric Hydrogenation of Tetrasubstituted Enamides.



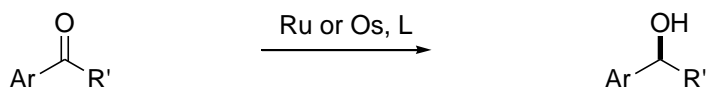
**Tech. Note (1)**  
**Ref. (2)**



**Tech. Note (1)**  
**Ref. (4)**



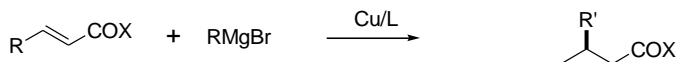
**Tech. Note (3)**  
**Ref. (11)**



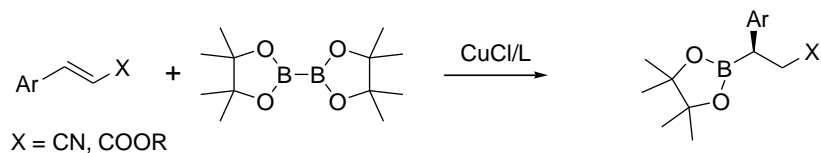
**Tech. Note (4)**  
**Ref. (12)**



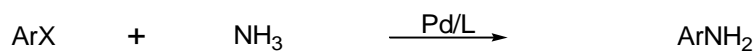
Tech. Note (4)  
Ref. (12)



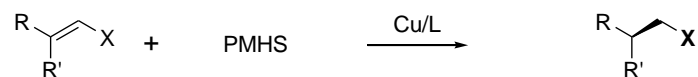
Tech. Note (5)  
Ref. (13)



Tech. Note (6)  
Ref. (14)

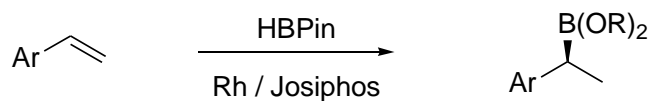


Tech. Note (7)  
Ref. (15)

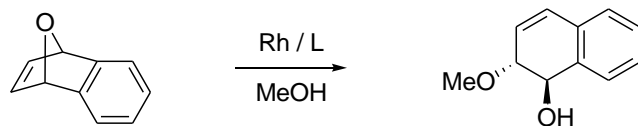


X = NO<sub>2</sub>, COMe, CN, Het

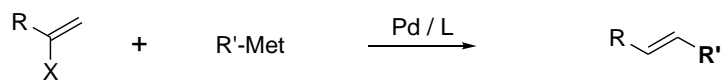
Tech. Note (8)  
Ref. (16)



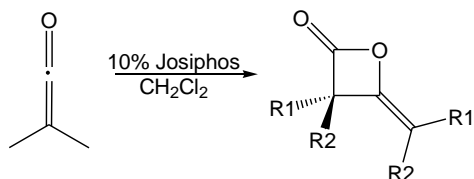
Tech. Note (9)  
Ref. (18)



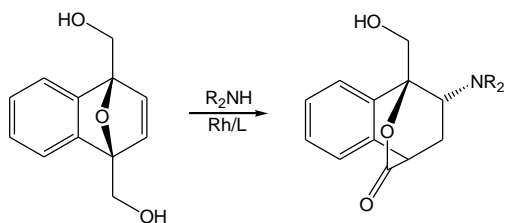
Tech. Note (10)  
Ref. (19)



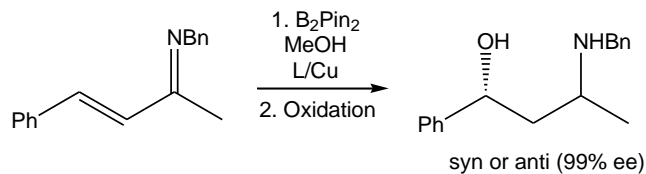
Tech. Note (11)  
Ref. (20)



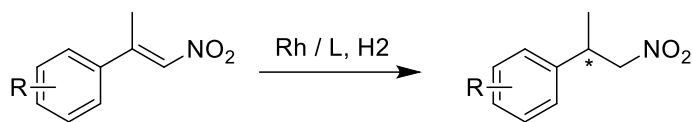
Tech. Note (12)  
Ref. (21)



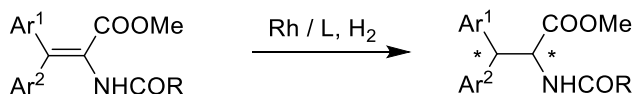
Tech. Note (13)  
Ref. (22)



Tech. Note (14)  
Ref. (24)



Tech. Note (15)  
Ref. (25)



Tech. Note (16)  
Ref. (26)

#### References:

1. *C&E News*, July 22, **1996**, 38.
2. *Angew. Chem. Int. Ed.*, **1996**, 35, 1475.
3. *J. Org. Chem.*, **1972**, 37, 3052.
4. *J. Am. Chem. Soc.*, **1994**, 116, 4062.
5. *Inorg. Chim. Acta.*, **1994**, 222, 213.
6. *Organometallics*, **1996**, 15, 860.
7. *Helv. Chim. Acta.*, **1995**, 78, 883.
8. European Patents; EP 624587 A2 941117, EP 612758 A1 940831, EP 564406 A1 931006.
9. *Comprehensive Asymmetric Catalysis*, **1999**, Chapter 6.1, pg. 199-207.
10. *Topics in Catalysis*, March **2002**, 19. (review)
11. *J. Am. Chem. Soc.*, **2004**, 126, 10248.
12. (a) *Angew. Chem. Int. Ed.*, **2007**, 46, 7651. (b) *Adv. Synth. Catal.*, **2002**, 343, 68.
13. *Angew. Chem. Int. Ed.*, **2005**, 44, 2752.
14. *Angew. Chem. Int. Ed.*, **2007**, 47, 145.
15. *J. Am. Chem. Soc.*, **2006**, 128, 10028.
16. (a) *Angew. Chem. Int. Ed.*, **2003**, 42, 4793. (b) *Angew. Chem. Int. Ed.*, **2006**, 45, 2785. (c) *J. Am. Chem. Soc.*, **2009**, 131, 10386.
17. *Angew. Chem. Int. Ed.*, **2006**, 45, 17674. (review)
18. *J. Am. Chem. Soc.*, **2004**, 126, 9200.
19. *Proc. Natl. Acad. Sci. U.S.A.*, **2004**, 101, 5455.
20. *J. Org. Chem.*, **2009**, 74, 135.
21. *J. Org. Chem.* **2011**, 76, 7901.
22. *Angew. Chem. Int. Ed.* **2011**, 50, 7346.
23. Review: *Privileged Ligands and Catalysts*, **2011**, 93.
24. *Angew. Chem. Int. Ed.* **2011**, 353, 376.
25. *Angew. Chem. Int. Ed.* **2012**, 51, 8573–8576.
26. *J. Am. Chem. Soc.* **2015**, 137, 999–1006.