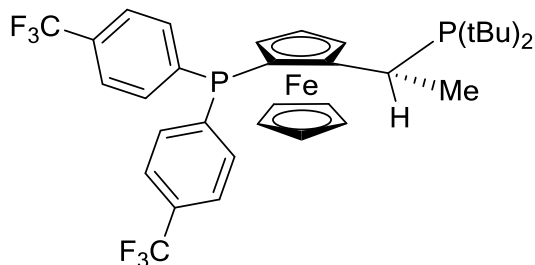


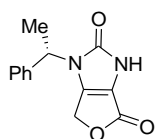
Catalog #26-0650 (R)-(-)-1-((S)-2-(Bis(4-trifluoromethylphenyl)phosphino)ferrocenyl)ethyl-di-t-butylphosphine, min. 97%



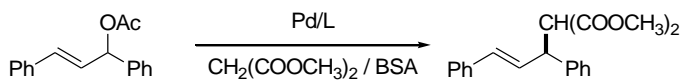
Note: Sold in collaboration with Solvias for research purposes only. Solvias Josiphos Ligand Kit component.

Technical Notes:

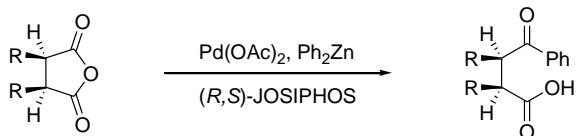
1. Ferrocenylphosphine ligands of the type $\text{cpFcpc}(\text{PR}_2)(^*\text{CH}(\text{CH}_3)\text{PR}'_2)$ are a class of asymmetric ligands developed at Solvias in Basel, Switzerland¹. Ligands of this type are currently used industrially in the stereoselective synthesis of commercial products^{2,3}. A unique feature of these bidentate ligands is the presence of a fixed phosphine moiety and a stereogenic, functionalized side chain, which can be easily modified to accommodate electronic and steric requirements. Based on a versatile synthetic procedure starting with optically active ferrocenes of the type $\text{cpFcpc}(\text{PR}_2)(^*\text{CH}(\text{CH}_3)\text{X})$ [$\text{X} = \text{OAc}$ or NR_2], a variety of donor atoms can be introduced into the side chain.⁴ These ferrocene based phosphine ligands have wide application in the stereoselective hydrogenation of substituted acetamidoacrylates, enol acetates, β -ketoesters and simple alkenes⁵⁻⁹.
2. Useful as a ligand in Pd-catalyzed C-N bond-forming reactions.
3. Pd-catalyzed enantioselective alkylative desymmetrization of *meso*-succinic anhydrides.
4. Asymmetric hydrogenation of ketones and phosphinylketimines.
5. Michael addition of Grignard reagents to α,α -unsaturated esters and thioesters.
6. Boration of α,α -unsaturated esters and nitriles.
7. Reaction of aryl halides with ammonia.
8. Cu-catalyzed reduction of activated C=C bonds with PMHS.
9. Regio- and enantioselective hydroboration of vinyl arenes.
10. Rh-catalyzed asymmetric ring-opening reactions of oxabicyclic alkenes.
11. 1,2-Migrations in Pd-catalyzed Negishi couplings with JosiPhos ligands.
12. Catalyst for the homodimerization of ketoketenes.
13. Ligand for the Rh catalyzed synthesis of lactones.
14. Ligand for the Cu-catalyzed synthesis of syn and anti γ -amino alcohols.



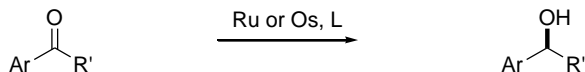
**Tech. Note (1)
Ref. (3)**



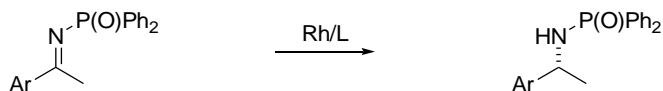
**Tech. Note (1)
Ref. (5)**



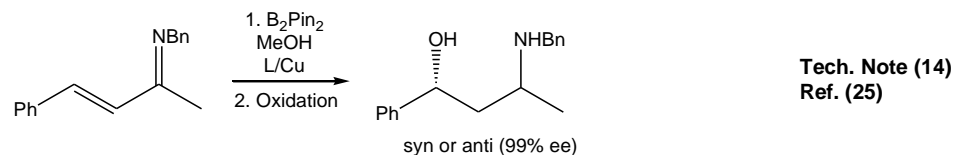
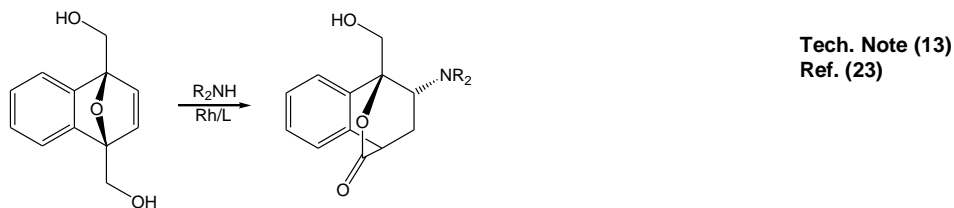
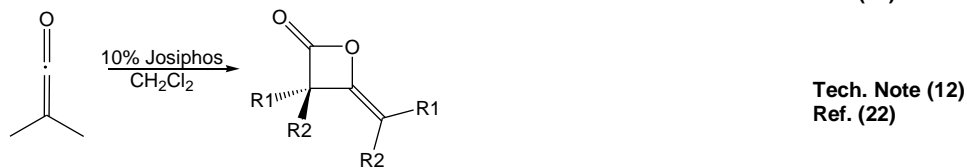
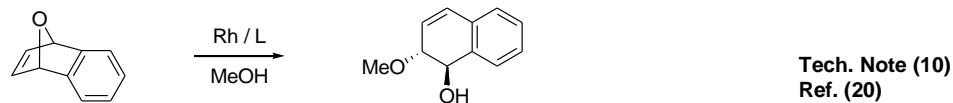
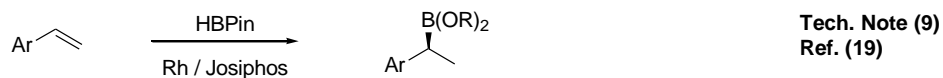
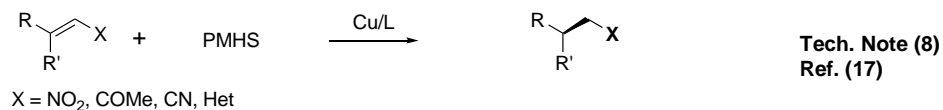
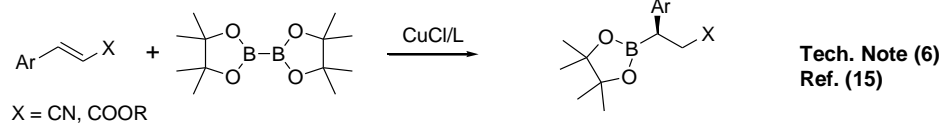
**Tech. Note (3)
Ref. (12)**



**Tech. Note (4)
Ref. (13)**



**Tech. Note (4)
Ref. (13)**



References:

1. Solvias owns the patent rights for Strem products 26-1000, 26-1001, 26-1200, 26-1201, 26-1230, 26-1101, and for the Ir and Rh complexes of the aforementioned products, including the complexes of 26-1210 and 26-1211.
2. *C&E News*, July 22, 1996, 38.
3. *Angew. Chem. Int. Ed.*, 1996, 35, 1475.
4. *J. Org. Chem.*, 1972, 37, 3052.
5. *J. Am. Chem. Soc.*, 1994, 116, 4062.
6. *Inorg. Chim. Acta.*, 1994, 222, 213.

7. *Organometallics*, **1996**, 15, 860.
8. *Helv. Chim. Acta.*, **1995**, 78, 883.
9. European Patents; EP 624587 A2 941117, EP 612758 A1 940831, EP 564406 A1 931006.
10. *Comprehensive Asymmetric Catalysis*, **1999**, Chapter 6.1, pg. 199-207.
11. *Topics in Catalysis*, March **2002**, 19. (review)
12. *J. Am. Chem. Soc.*, **2004**, 126, 10248.
13. (a) *Angew. Chem. Int. Ed.*, **2007**, 46, 7651. (b) *Adv. Synth. Catal.*, **2002**, 343, 68.
14. *Angew. Chem. Int. Ed.*, **2005**, 44, 2752.
15. *Angew. Chem. Int. Ed.*, **2007**, 47, 145.
16. *J. Am. Chem. Soc.*, **2006**, 128, 10028.
17. (a) *Angew. Chem. Int. Ed.*, **2003**, 42, 4793. (b) *Angew. Chem. Int. Ed.*, **2006**, 45, 2785.
(c) *J. Am. Chem. Soc.*, **2009**, 131, 10386.
18. *Angew. Chem. Int. Ed.*, **2006**, 45, 17674. (review)
19. *J. Am. Chem. Soc.*, **2004**, 126, 9200.
20. *Proc. Natl. Acad. Sci. U.S.A.*, **2004**, 101, 5455.
21. *J. Org. Chem.*, **2009**, 74, 135.
22. *J. Org. Chem.* **2011**, 76, 7901.
23. *Angew. Chem. Int. Ed.* **2011**, 50, 7346.
24. Review: *Privileged Ligands and Catalysts*, **2011**, 93.
25. *Angew. Chem. Int. Ed.* **2011**, 353, 376.