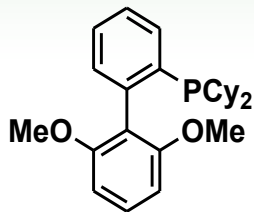
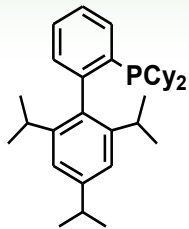


# ホスフィンリガンド

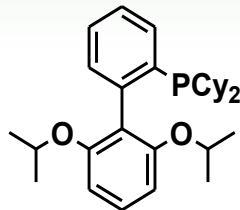
## Buchwaldリガンド



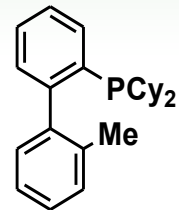
SPhos



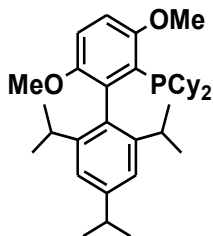
XPhos



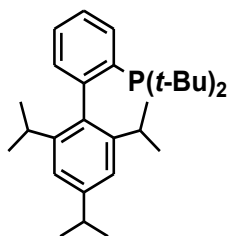
RuPhos



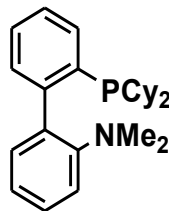
MePhos



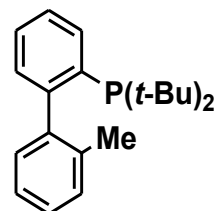
BrettPhos



t-Bu-XPhos



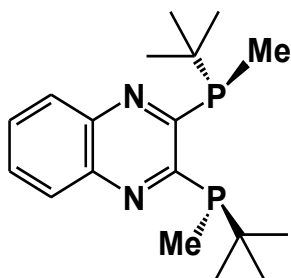
DavePhos



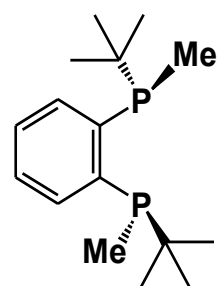
t-Bu-MePhos

100 kg 生産の工業化対応

## P-キラルリガンド QuinoxP\* & BenzP\*



(R,R)-QuinoxP\*



(R,R)-BenzP\*

- 大気雰囲気でも安定な結晶性固体
- 不斉水素化および C-C または C-N 結合形成における 99.9% ee を超える優れたエナンチオ選択性
- (S,S)-QuinoxP\* の対応も可能
- QuinoxP\*® は日本化学が特許取得

 日本化学工業株式会社

営業本部 機能品営業部

Tel. 03-3636-8081 / Fax. 03-3636-8140

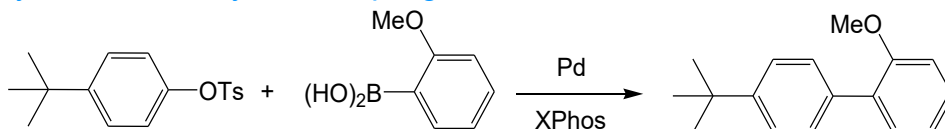
URL <https://www.nippon-chem.co.jp/>

# 使用例

## XPhos

*J. Am. Chem. Soc.*, 2003, 125, 6653.

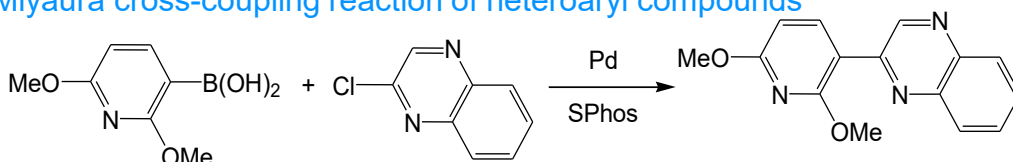
- Pd catalyzed Suzuki-Miyaura coupling reaction



## SPhos

*J. Am. Chem. Soc.*, 2005, 127, 4685.

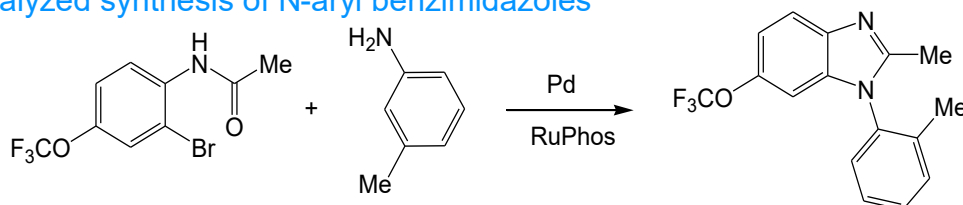
- Suzuki-Miyaura cross-coupling reaction of heteroaryl compounds



## RuPhos

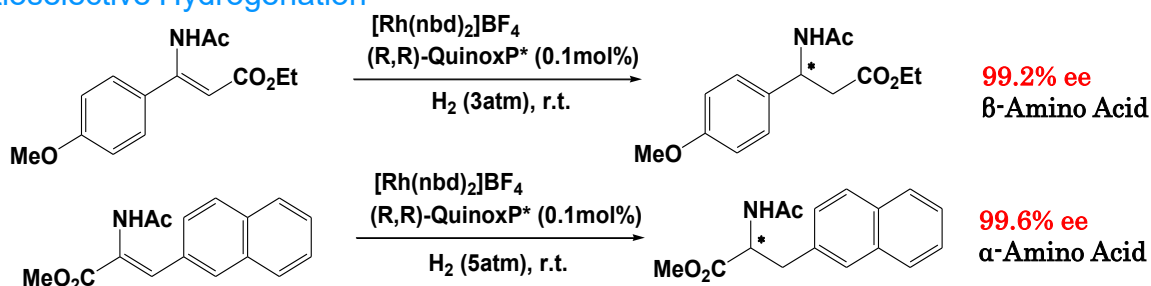
*J. Am. Chem. Soc.*, 2004, 126, 13028.

- Pd catalyzed synthesis of N-aryl benzimidazoles



## QuinoxP\*

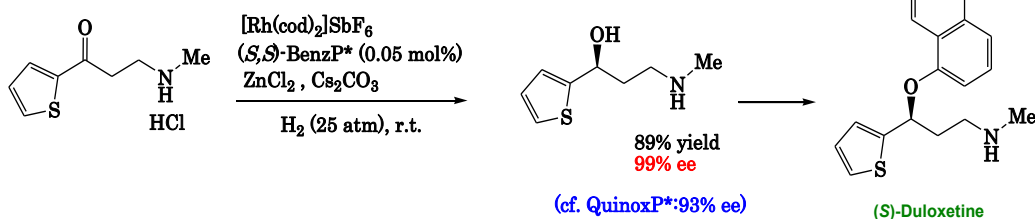
- Enantioselective Hydrogenation



## BenzP\*

*Angew. Chem. Int. Ed.* 2014, 53, 1.

- Enantioselective Hydrogenation



日本化学工業株式会社

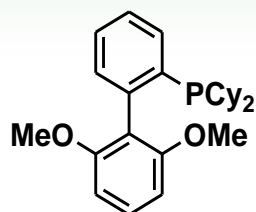
営業本部 機能品営業部

Tel. 03-3636-8081/ Fax. 03-3636-8140

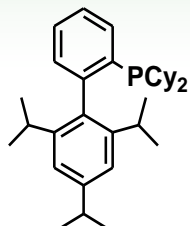
URL <https://www.nippon-chem.co.jp/>

# NCI's Phosphine Ligands

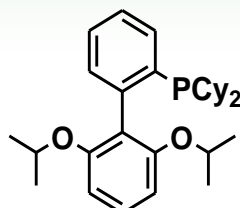
## Buchwald Ligands



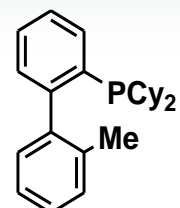
SPhos



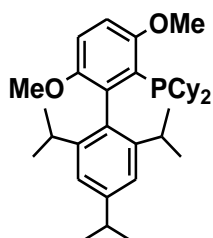
XPhos



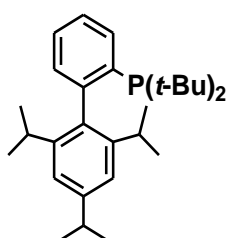
RuPhos



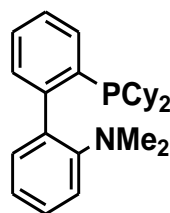
MePhos



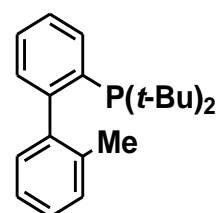
BrettPhos



t-Bu-XPhos



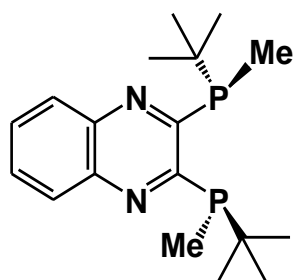
DavePhos



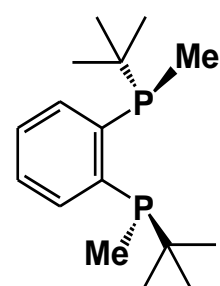
t-Bu-MePhos

100kg commercial production available

## P-Chiral Ligands QuinoxP\* & BenzP\*



(R,R)-QuinoxP\*



(R,R)-BenzP\*

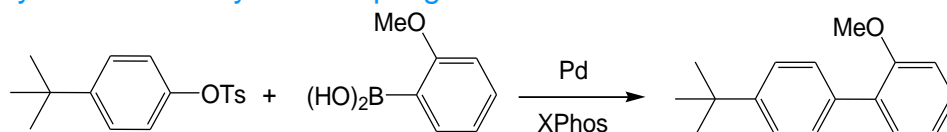
- Air-stable crystalline solid
- Excellent enantioselectivities of up to 99.9% ee in asymmetric hydrogenation and C-C or C-N bond formations
- (S,S)-QuinoxP\* is also available.
- QuinoxP\*® is patented by NCI.

# Example of use

## XPhos

*J. Am. Chem. Soc.*, 2003, 125, 6653.

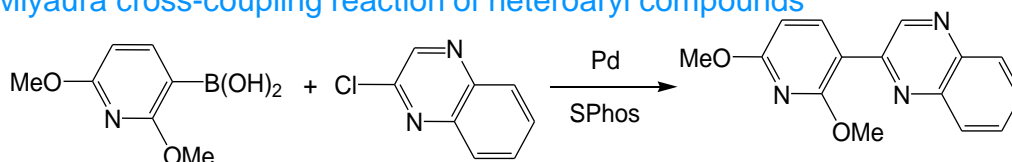
- Pd catalyzed Suzuki-Miyaura coupling reaction



## SPhos

*J. Am. Chem. Soc.*, 2005, 127, 4685.

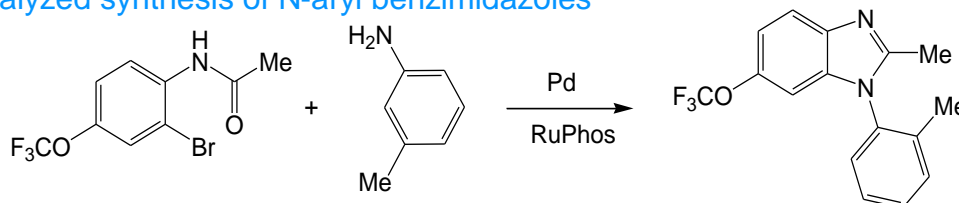
- Suzuki-Miyaura cross-coupling reaction of heteroaryl compounds



## RuPhos

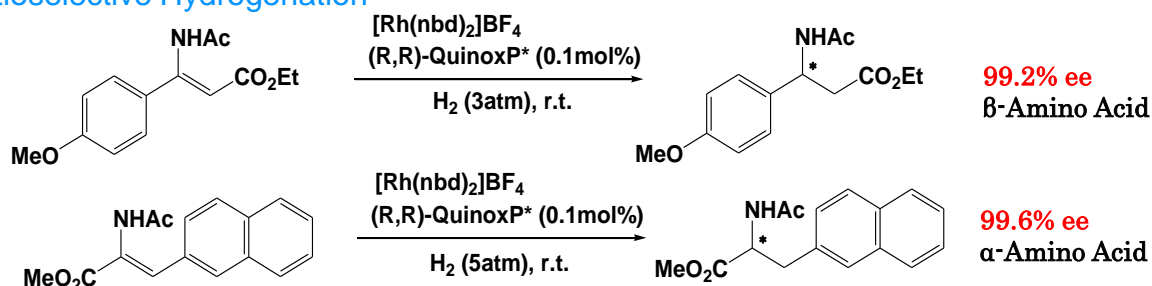
*J. Am. Chem. Soc.*, 2004, 126, 13028.

- Pd catalyzed synthesis of N-aryl benzimidazoles



## QuinoxP\*

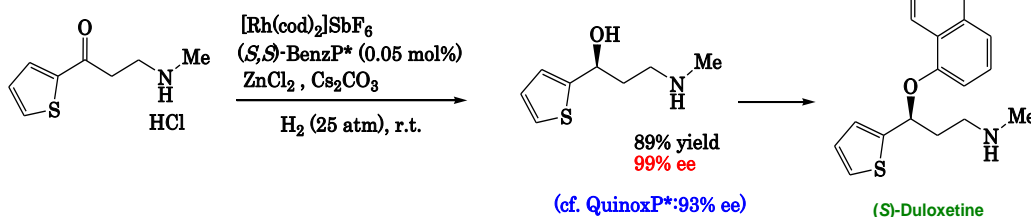
- Enantioselective Hydrogenation



## BenzP\*

*Angew. Chem. Int. Ed.* 2014, 53, 1.

- Enantioselective Hydrogenation



 **NIPPON CHEMICAL INDUSTRIAL**

Headquarter : 11-1, 9-Chome, Kameido, Koto-ku, Tokyo. 136-8515  
USA Office : 1311 Mamaroneck Avenue, Suite 145, White Plains, NY 10605  
Please visit : <https://www.nippon-chem.co.jp/>