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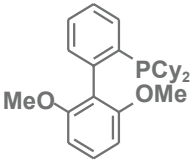
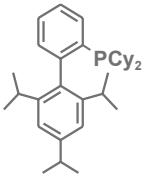
Summit Pharmaceuticals Europe

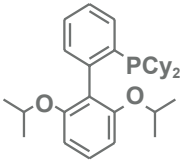
Buchwald Phosphine Ligands



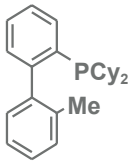
SPhos



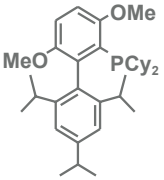
XPhos



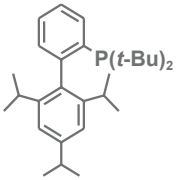
RuPhos



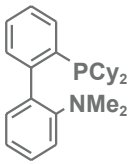
MePhos



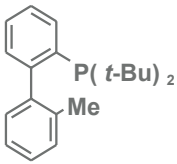
BrettPhos



t-Bu-XPhos

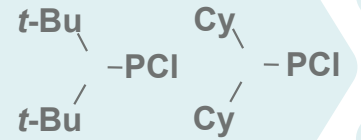


DavePhos



t-Bu-MePhos

Licensed by MIT

PH_3 →  → Buchwald Ligands

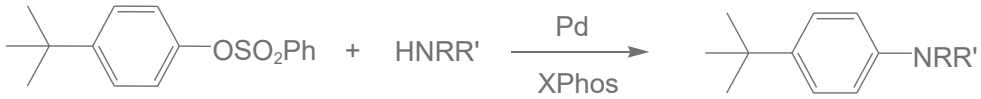
100 kg Production has been industrialized

NCI's advantages

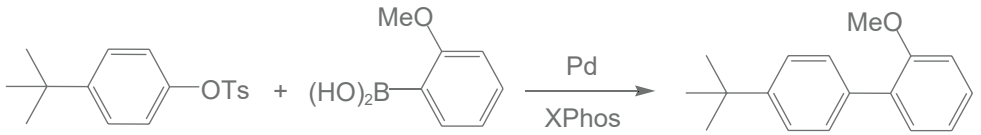
• Cost Effective	Integrated Production from PH_3
• High Purity	More than 98.0%
• Industrial Scale Supply	Flexible and Capable
• Contract Manufacturing Service	Ask us to find your solution

Application examples

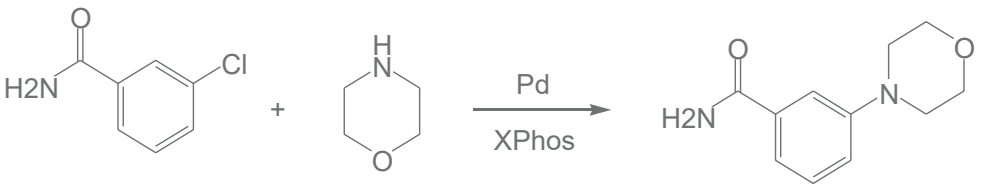
Amination and amidation of arylsulfonates



Pd catalyzed Suzuki-Miyaura coupling reaction



Chemoselective amination of aryl-chlorides



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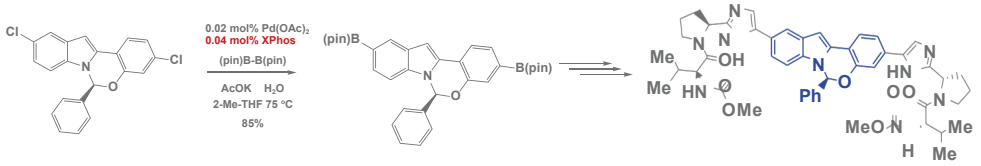
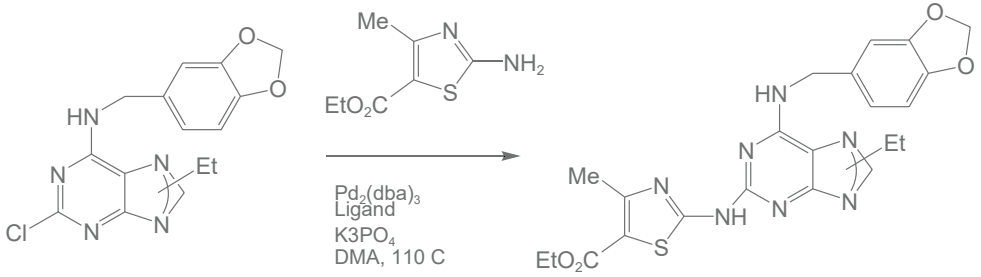
Applications in Pharmaceutical Synthesis

J. Am. Chem. Soc., 2015, 137, 13728.

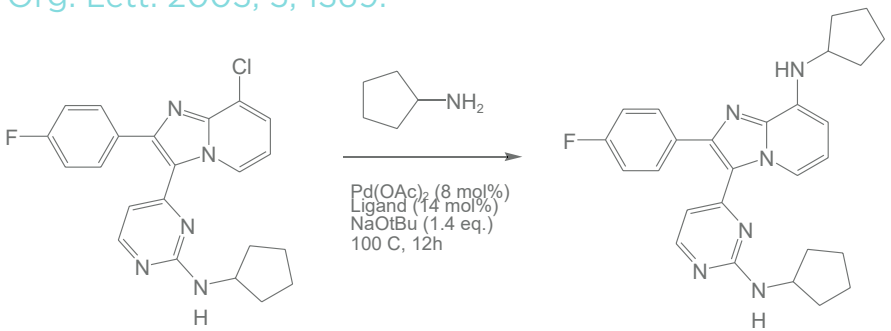


Elbasvir

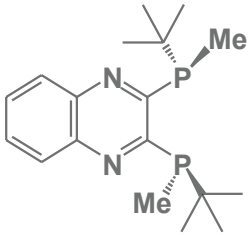
Bioorg. Med. Chem. Lett. 2004, 14, 2955.



Org. Lett. 2003, 5, 1369.

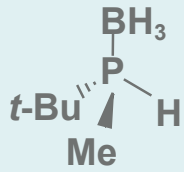


P-Chiral Phosphine Ligand QuinoxP*



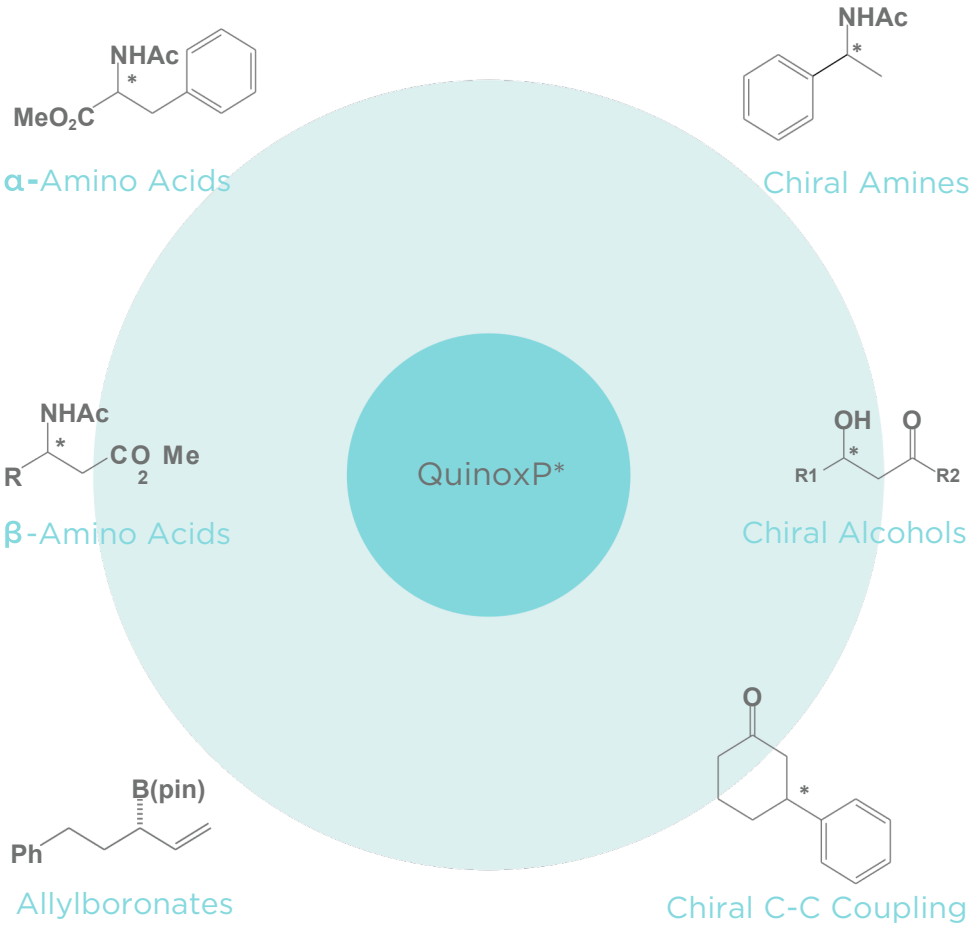
(R, **R**)-QuinoxP*
R,**R**)-2,3-Bis(tert-butylmethylphosphino) quinoxaline
CAS No.: 866081-62-1
Appearance: Orange crystalline solid
m.p.: 102-103 oC
[α]22D; -54.3 (c 1.00, CHCl3)

(R,*R*)-QuinoxP*

PH_3 →  → Chiral Ligands

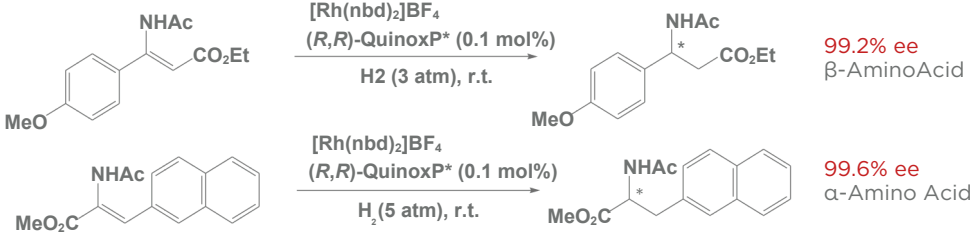
100 kg Production has been industrialized

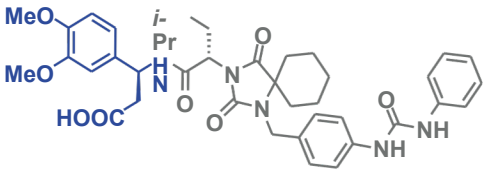
- Air-stable crystalline solid.
  Excellent enantioselectivities of up to 99.9% ee
- in asymmetric hydrogenation and C-C or C-N bond formations.
- **(*S*,*S*)-QuinoxP*** is also available.
- **QuinoxP* is patented by NCI**.



Application examples

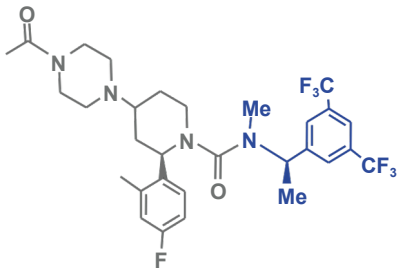
Enantioselective Hydrogenation





S/C 1,000 97.7% ee

VLA-4 antagonist S9059



S/C 10,000 99.9% ee

Casopitant

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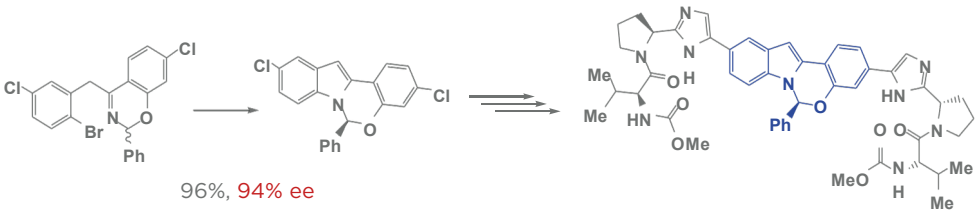
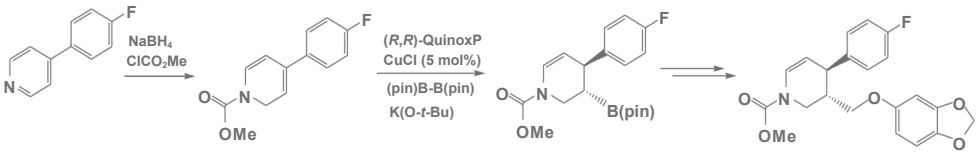
Application examples

Enantioselective C-C or C-N bond forming reaction



96%, 94% ee

Elbasvir
J. Am. Chem. Soc., 2015, 137, 13728.



91%, 96% ee

J. Am. Chem. Soc., 2016, 138, 4338.