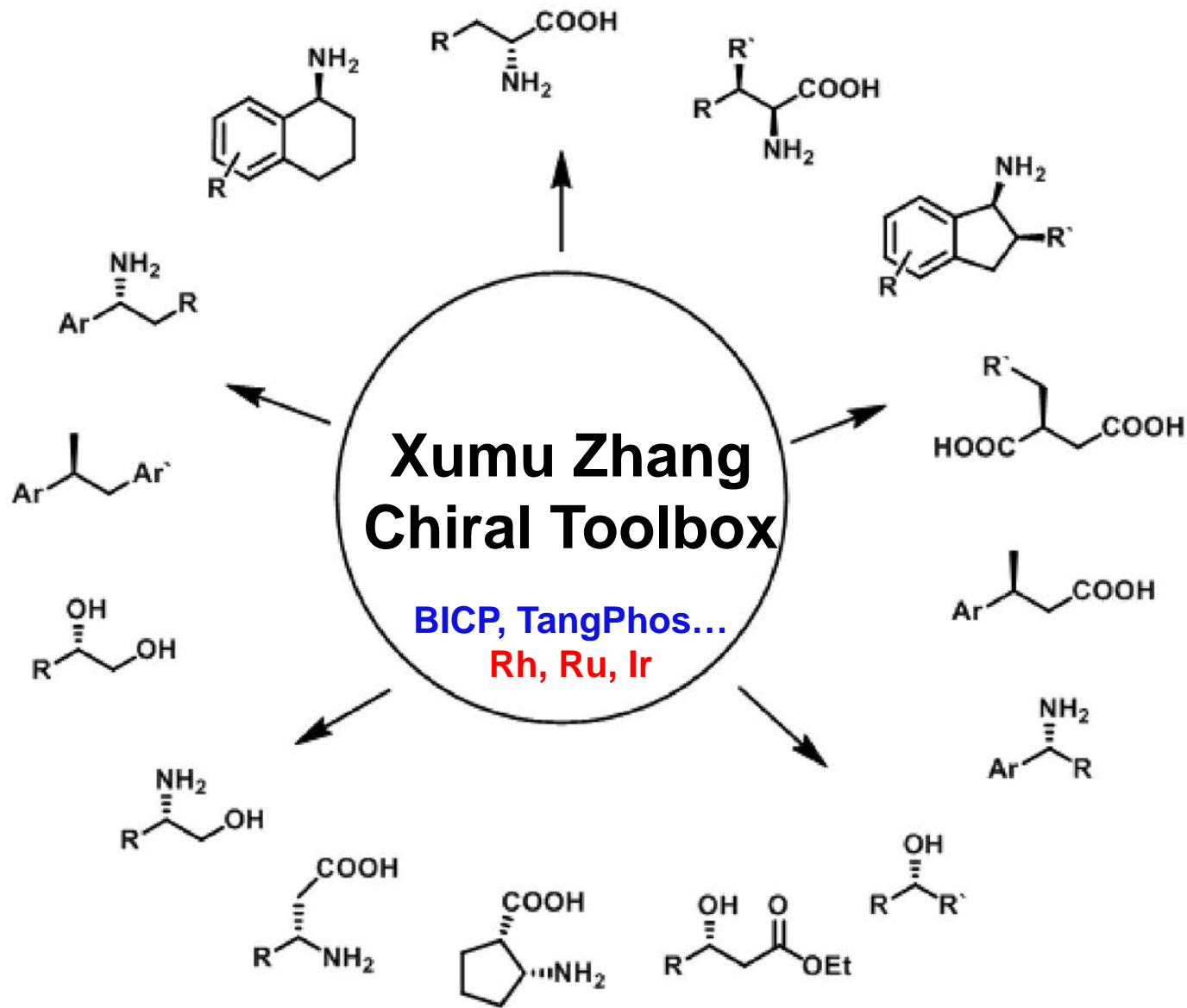


Xumu Zhang Chiral Toolbox

BICP, TangPhos...
Rh, Ru, Ir

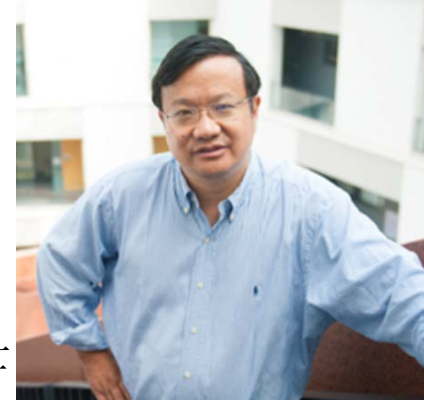


Up to 99.9% ee, up to 50,000TONs

R=Alkyl or aryl

个人简介

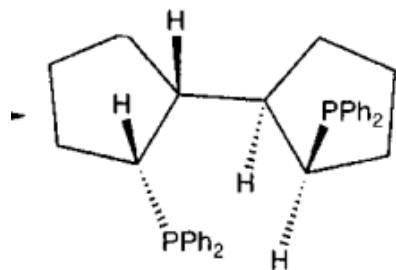
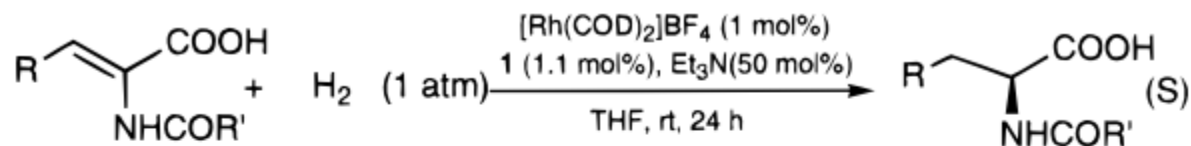
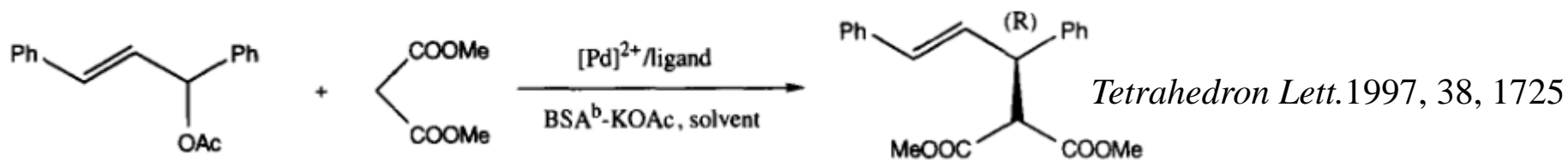
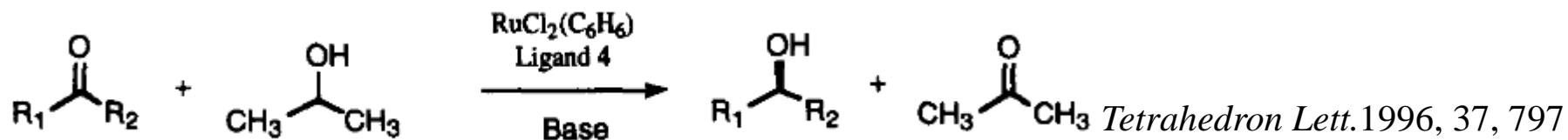
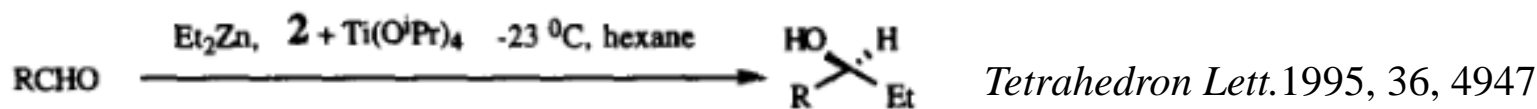
- 现任南方科技大学理学院副院长、化学系讲席教授
- 1982年在武汉大学获得学士学位；
- 1985年在中国科学院福建物质结构研究所获得硕士学位，师从卢嘉锡院士（诺贝尔获奖者[Linus Carl Pauling](#)的博士后，时任中国科学院院长）；
- 1987年在加州大学圣地亚哥分校（University of California, San Diego）获得硕士学位，师从Gerhard N. Schauzer教授
- 1992年在斯坦福大学(Stanford University)获得博士学位，师从美国国家科学院院士James P. Collman教授(两位诺贝尔获奖者[Karl Barry Sharpless](#)和[Robert H. Grubbs](#)的导师)
- 1992—1994年在斯坦福大学做博士后研究
- 1994—2006年任教于美国宾夕法尼亚州州立大学并获终身教授职位
- 2000年创立凯瑞斯德生化有限公司（Chiral Quest）
- 2007—2015年任新泽西州立大学化学学院杰出讲席教授
- 2000年创立凯特立斯（深圳）科技有限公司
- 2015—2018年，任南方科技大学化学系讲座教授及系主任
- 2018年，任南方科技大学理学院副院长



获奖与成就

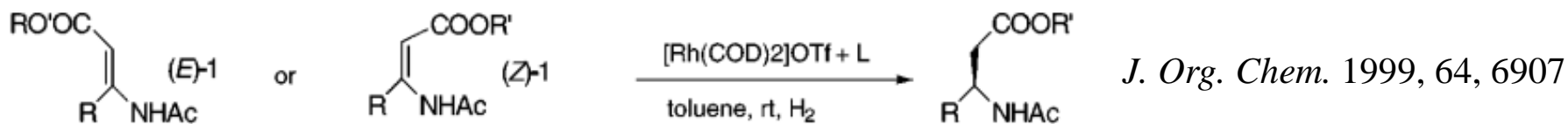
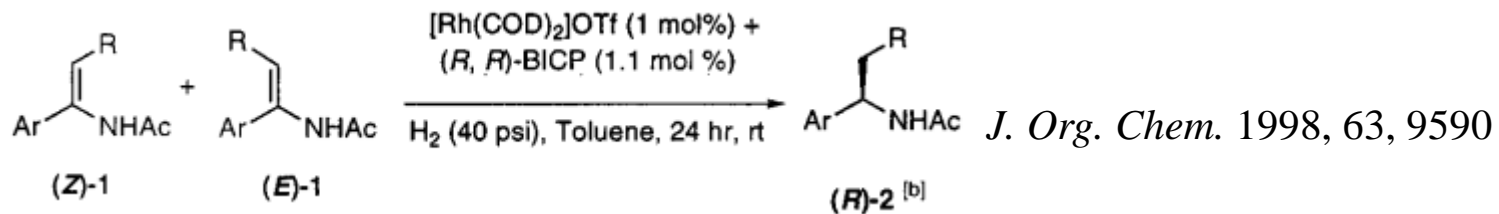
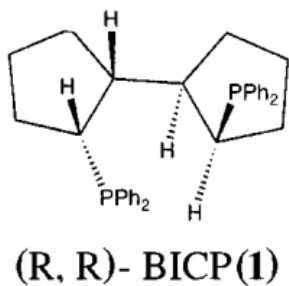
- Franklin Veatch Graduate Fellowship, Stanford University, 1991
- The Camille and Henry Dreyfus Foundation New Faculty Award, 1994
- DuPont Young Faculty Award, 1996
- Office of Naval Research Young Investigator Award, 1996
- The Camille and Henry Dreyfus Foundation Teacher-Scholar Award, 1998
- The John Simon Guggenheim Foundation Fellow, 2000
- The Outstanding Oversea Chinese Young Scientist B, Chinese Academy of Sciences, 2000
- The Penn State Faculty Scholar Medal, 2001
- The American Chemical Society Arthur C. Cope Scholar Award, 2002
- The SDCA (San Diego Chinese Association) Achievement Award, 2002



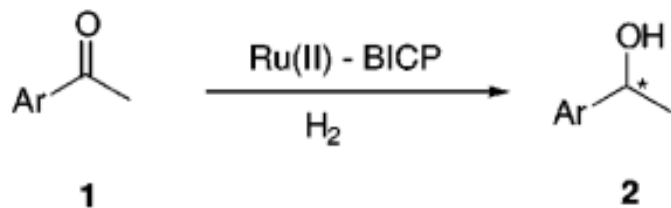


(R, R)- BICP(**1**)

entry	substrate	ee (%) ^a
1	R = H, R' = CH ₃	97.5 ^b
2	R = Ph, R' = CH ₃	96.8 ^b
3	R = Ph, R' = Ph	99.0 ^b
4	R = <i>p</i> -OAc- <i>m</i> -OMePh, R' = CH ₃	98.2 ^c
5	R = <i>m</i> -BrPh, R' = CH ₃	97.0 ^b
6	R = <i>p</i> -OMePh, R' = CH ₃	99.0 ^c
7	R = <i>i</i> -Pr, R' = CH ₃	92.6 ^b

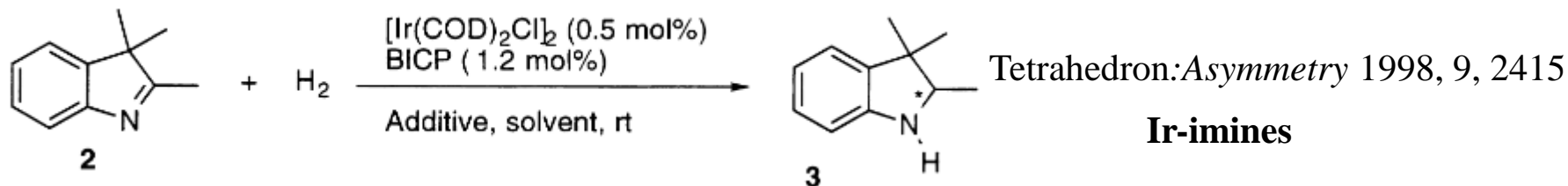


Rh-dehydroamino acids / esters, enamides



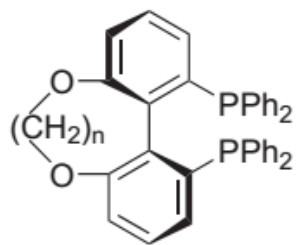
J. Org. Chem. 1999, 64, 2127.

Ru-simple ketones

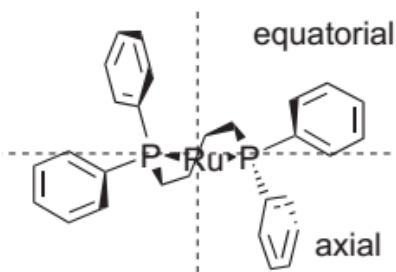


Ir-imines

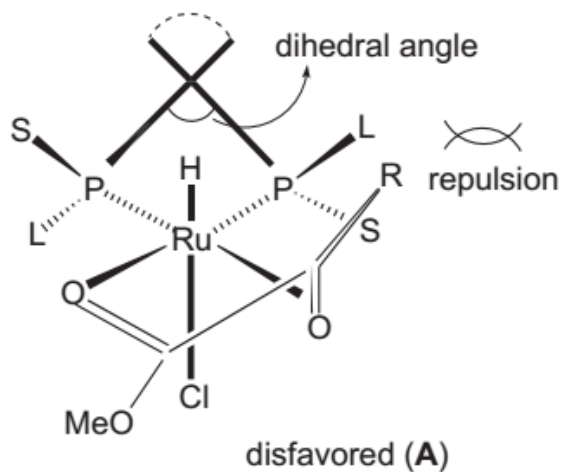
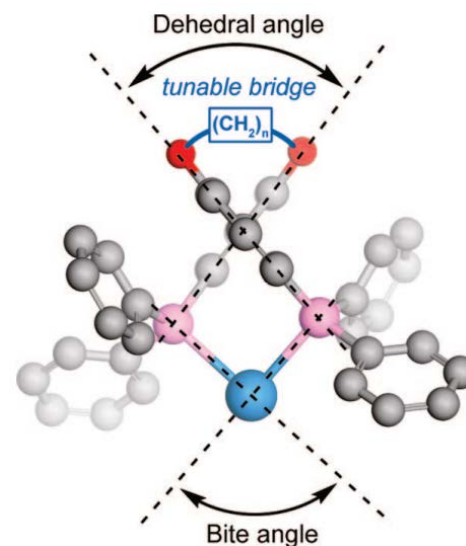
C_n -TunePhos –Enantioselective Hydrogenation of ketones and olefins



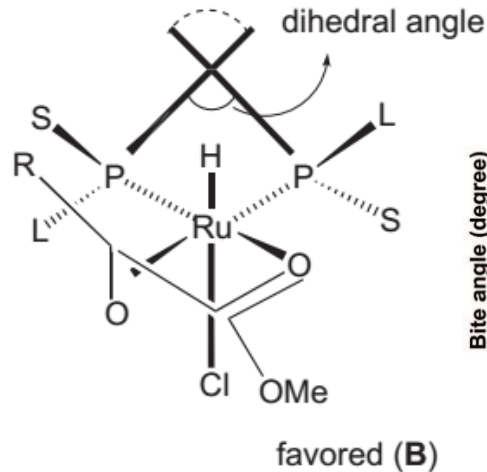
(S)- C_n -TunePhos
n = 1–6



quadrant diagram of
Ru-(S)- C_n -TunePhos

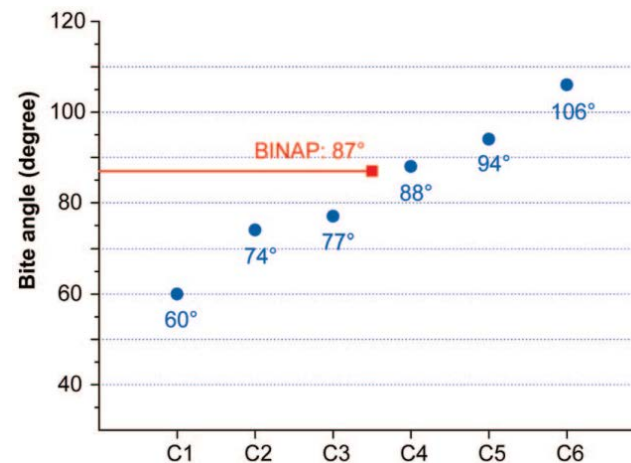


disfavored (A)

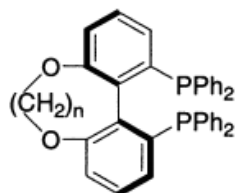
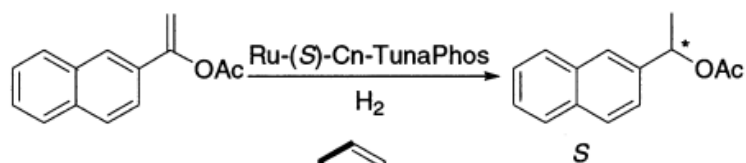


favored (B)

L = equatorial phenyl group, large group
S = axial phenyl group, small group

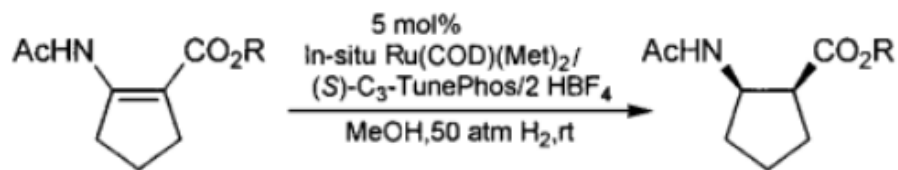


C_n-TunePhos –Ru



n = 1 - 6

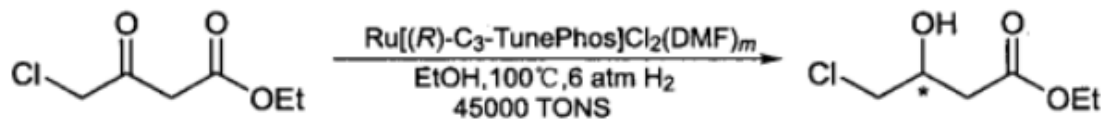
Enamides, Enol Acetates



up to 99% ee

Org. Lett. 2002, 4, 4495

J. Am. Chem. Soc. 2003, 125, 9570

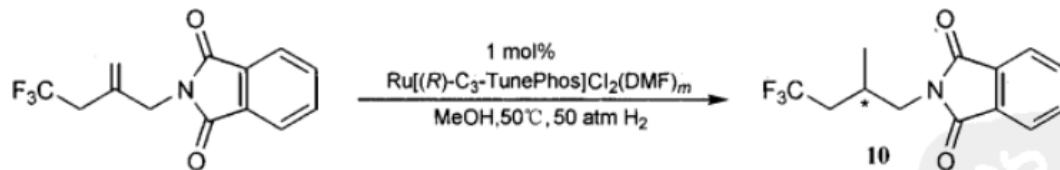


97% ee

Liptor Side Chain

J. Org. Chem. 2000, 65, 6223

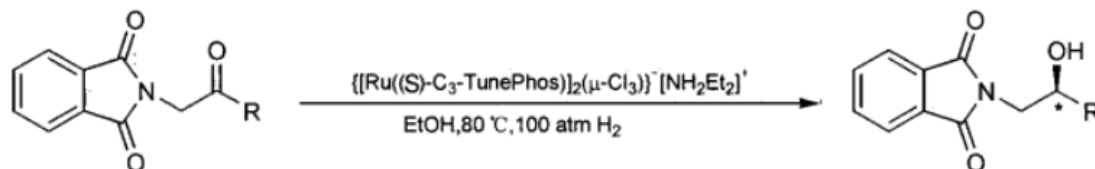
keto esters



10

98%, 93.4% ee

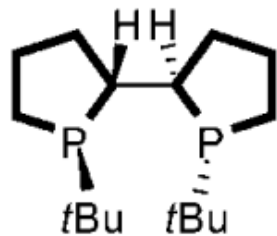
Angew. Chem., Int. Ed. 2005, 44, 4933



up to 99% ee

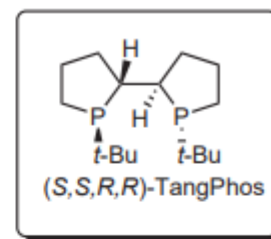
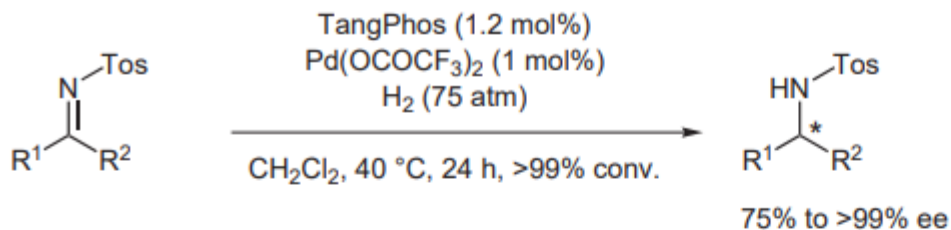
J. Am. Chem. Soc. 2004, 126, 1626

phthalimide / amino ketones
dehydroamino acids / esters
unsaturated esters / acids

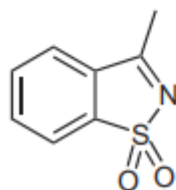
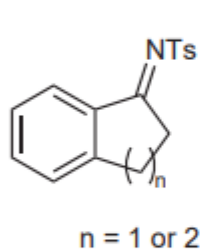


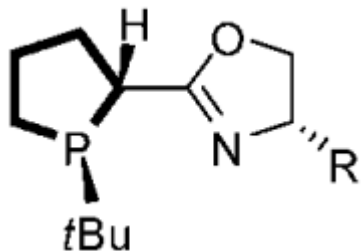
Rh-dehydroamino acids / esters
unsaturated esters / acids
Enamides, Enol Acetates, imines
Ru-keto esters
Pd-imines

TangPhos **9**¹⁰

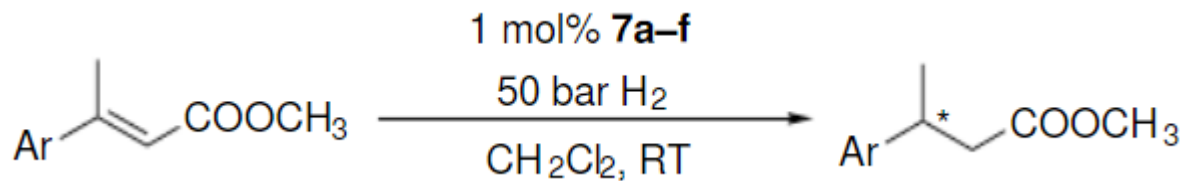
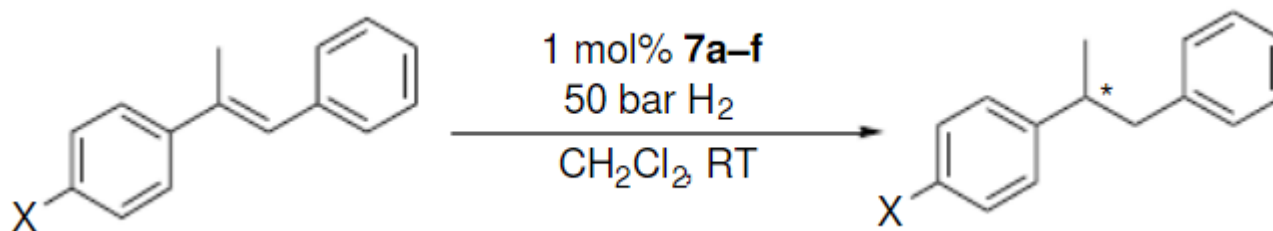
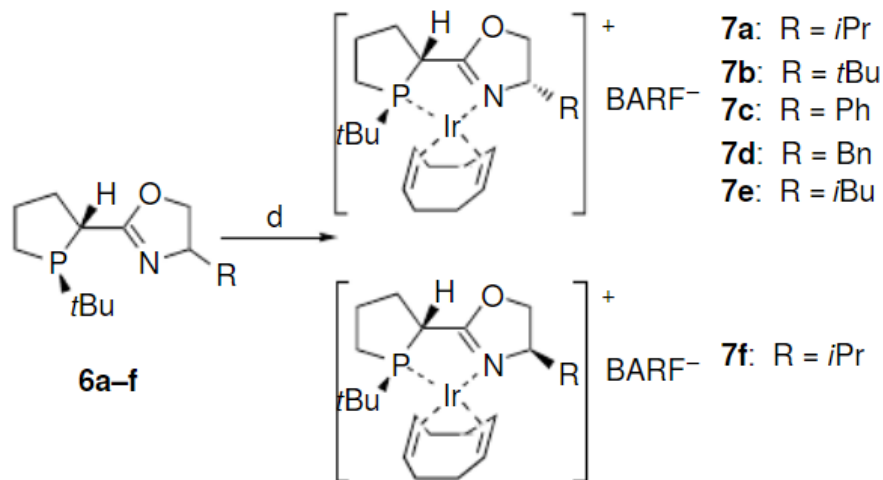


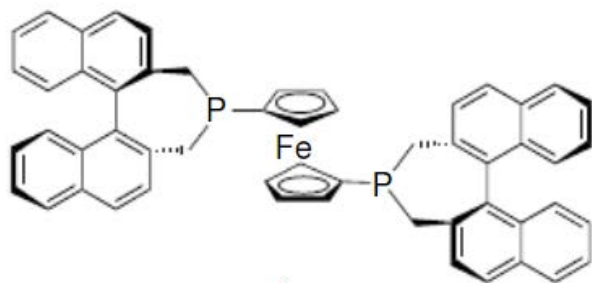
Pd(OCOCF₃)₂
[Pd(MeCN)₄](BF₄)₂



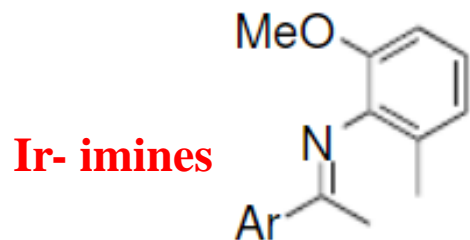


Ir- unsaturated esters / acids, **unfunctionalized olefins**

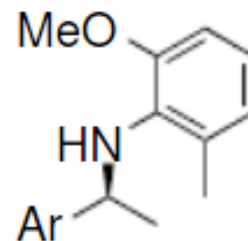




f-Binaphane

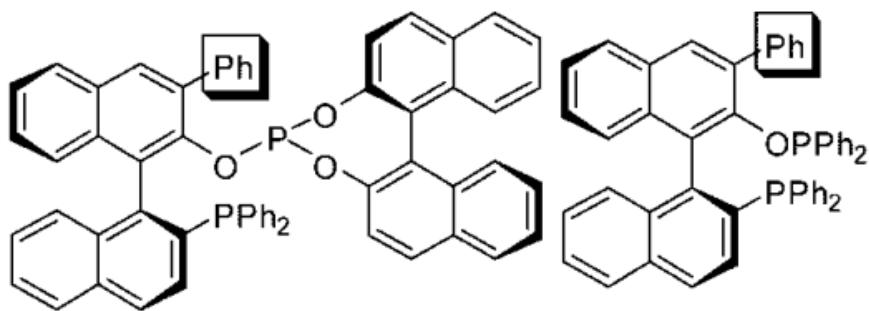


Ir-f-Binaphane (1 mol%),
DCM, RT, H₂(1000 psi)



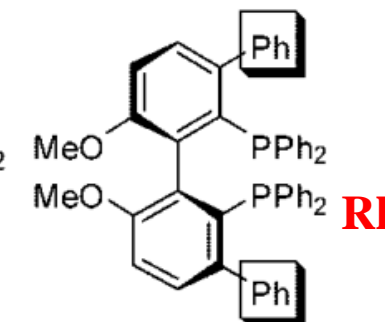
72% 98% ee

Angew. Chem., Int. Ed. 2001, 40, 3425



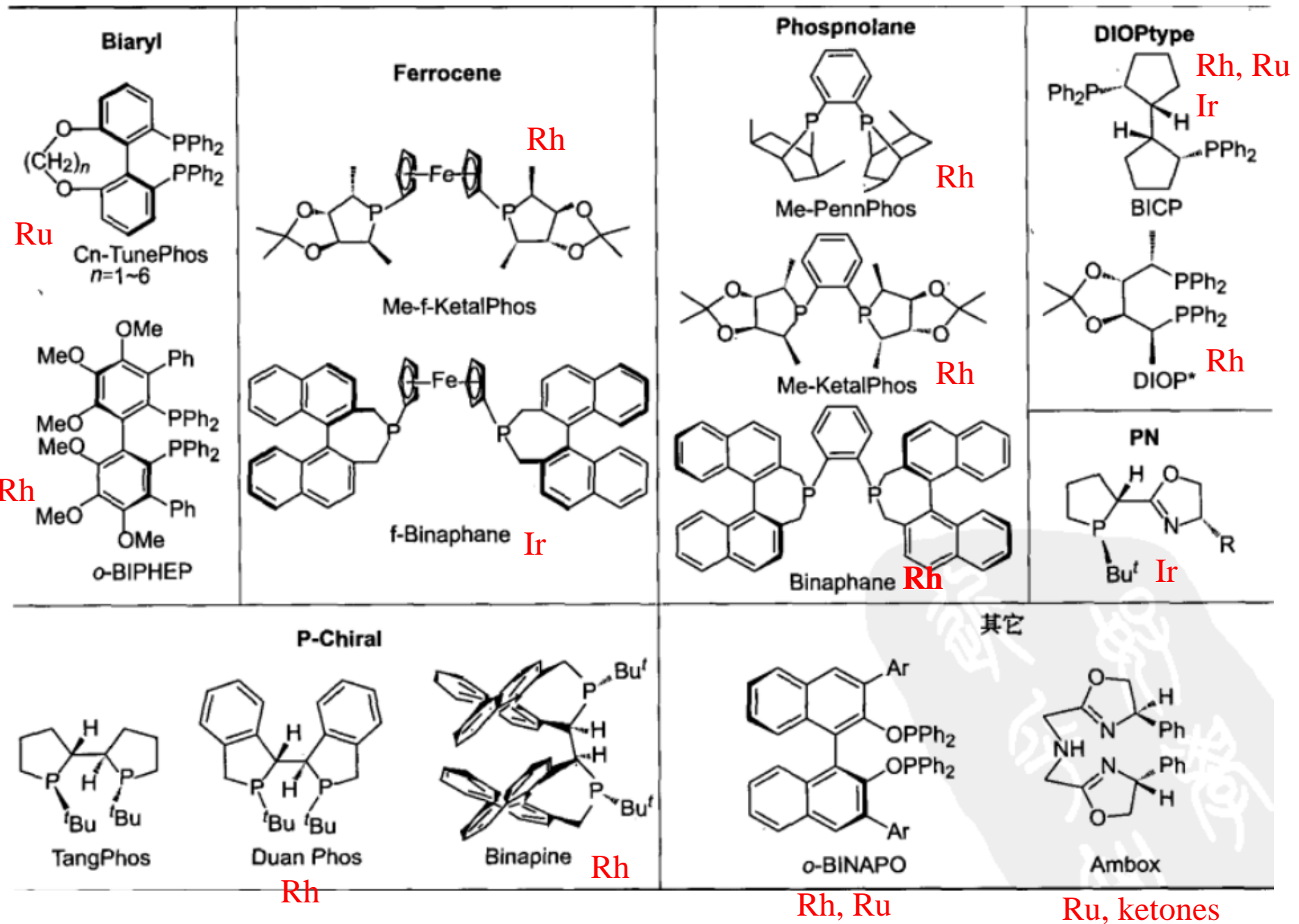
o-BINAPHOS 27²⁹

o-BIPNITE 28²⁹



o-Ph-MeO-BIPHEP 29³⁰

Rh-dehydroamino acids / esters



Noyori asymmetric hydrogenation

