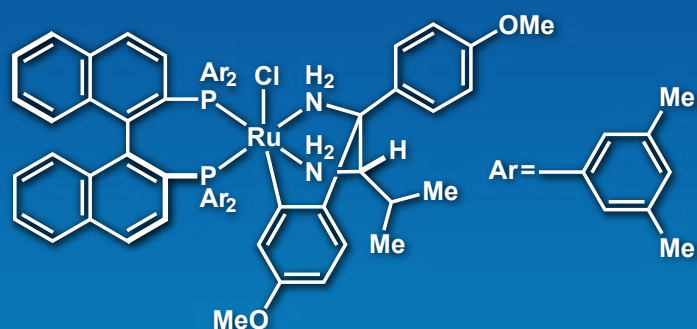
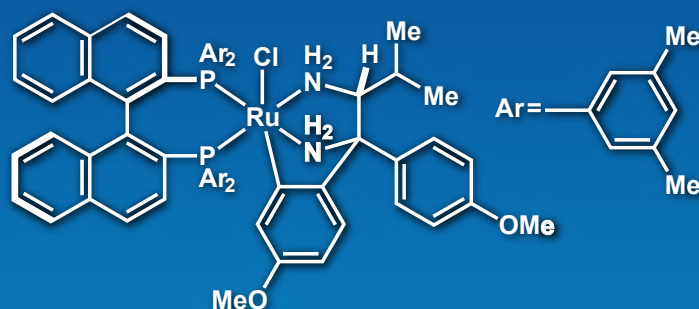


Ruthenium Complex Catalysts for Asymmetric Hydrogenation of Ketones



[R0138]

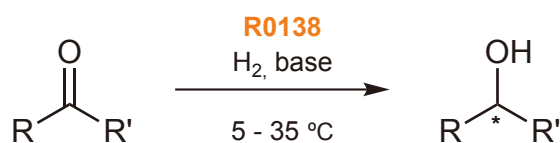


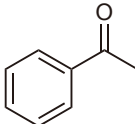
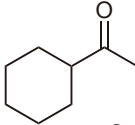
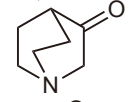
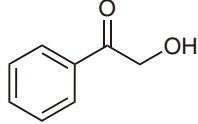
[R0139]

Advantages

- Reduce Carbonyl Groups Selectively
- The Reaction Proceeds under 1 atm of Hydrogen

Application



Substrate	Catalyst (mol%)	H ₂ (atm)	Base	Solvent	Time (h)	% Yield	% ee
	0.001	7	<i>t</i> BuOK	EtOH/ <i>i</i> PrOH	0.25	>99	>99 (<i>R</i>)
	0.01	1	<i>t</i> BuOK	EtOH/ <i>i</i> PrOH	24	>99	>99 (<i>R</i>)
	0.01	10	DBU	EtOH/ <i>i</i> PrOH	0.13	>99	>99 (<i>R</i>)
	0.025	10	<i>t</i> BuOK	<i>i</i> PrOH	5	96	90 (<i>R</i>)
	0.002	30	<i>t</i> BuOK	<i>i</i> PrOH	6	>99	95 (<i>S</i>)
	0.05	10	DBU	MeOH	5	>99	95 (<i>S</i>)

T. Ohkuma *et al.*, *J. Am. Chem. Soc.* **2011**, *133*, 10696.

(*S*)-RUCY®-XylBINAP

200mg / 1g [R0138]

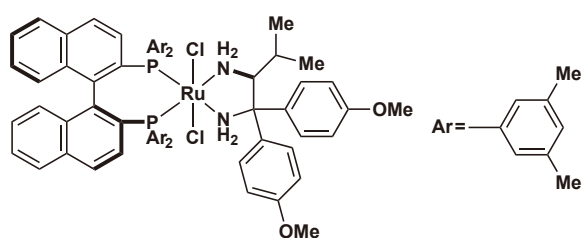
(*R*)-RUCY®-XylBINAP

200mg / 1g [R0139]

These products were merchandized under the technical tie-up with TAKASAGO INTERNATIONAL CORPORATION.
RUCY® is a registered trademark of TAKASAGO INTERNATIONAL CORPORATION.

Ruthenium Complex Catalysts for Asymmetric Hydrogenation of Ketones

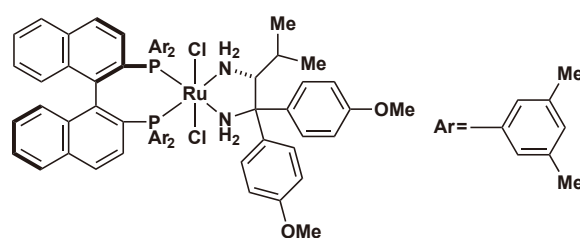
Perfluoroalkylating Reagents



RuCl₂[(S)-xylbinap][(S)-daipen]

200mg / 1g

[R0132]

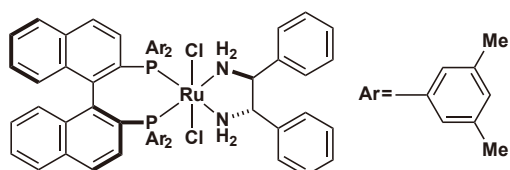


RuCl₂[(R)-xylbinap][(R)-daipen]

200mg / 1g

[R0133]

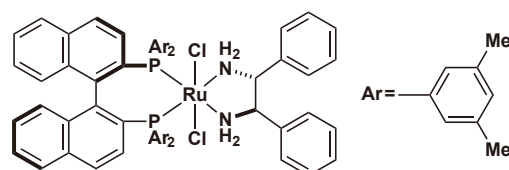
R. Noyori et al., *J. Am. Chem. Soc.* **1998**, 120, 13529; R. Noyori et al., *Org. Lett.* **2000**, 2, 659.



RuCl₂[(S)-xylbinap][(S,S)-dpen]

200mg / 1g

[R0134]

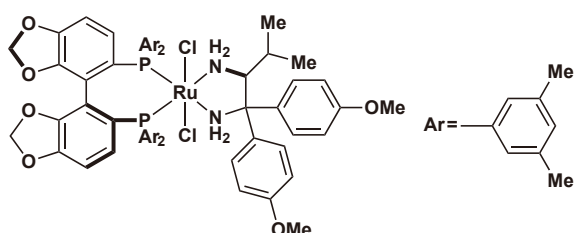


RuCl₂[(R)-xylbinap][(R,R)-dpen]

200mg / 1g

[R0135]

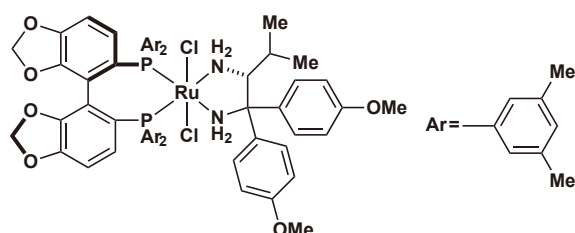
R. Noyori et al., *J. Am. Chem. Soc.* **1998**, 120, 13529; T. Matsumoto et al., *Tetrahedron Lett.* **1999**, 40, 5043.



RuCl₂[(S)-dm-segphos[®]][(S)-daipen]

200mg / 1g

[R0128]

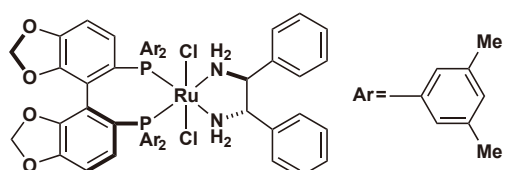


RuCl₂[(R)-dm-segphos[®]][(R)-daipen]

200mg / 1g

[R0129]

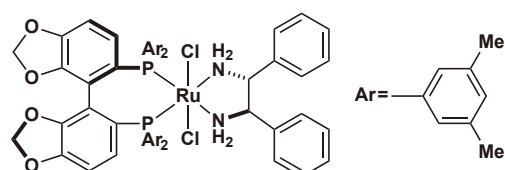
C. Chen, M. Weisel, *Synlett* **2013**, 24, 189.



RuCl₂[(S)-dm-segphos[®]][(S,S)-dpen]

200mg / 1g

[R0130]



RuCl₂[(R)-dm-segphos[®]][(R,R)-dpen]

200mg / 1g

[R0131]

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