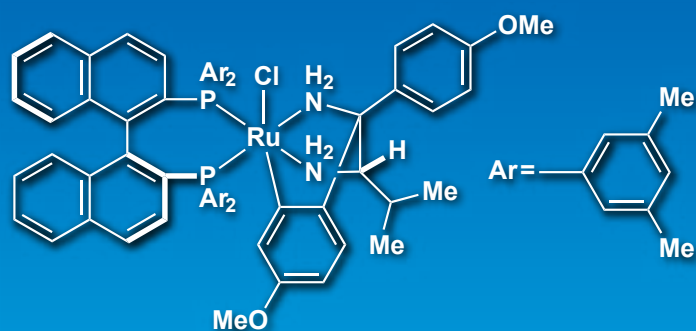
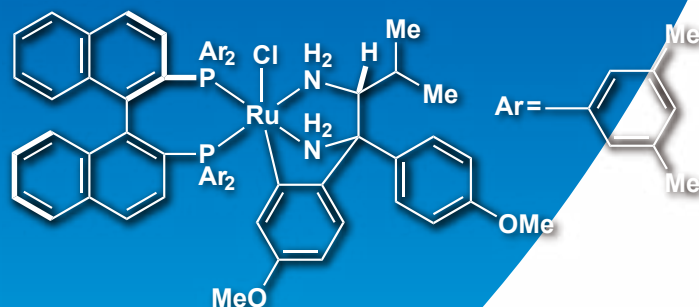


**New****TGI**

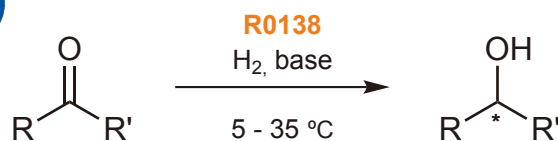
# Ruthenium Complex Catalysts for Asymmetric Hydrogenation of Ketones

**[R0138]****[R0139]**

## Advantages

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

## Reaction Examples



Substrate	Catalyst (mol%)	H <sub>2</sub> (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.**R0138 (S)-RUCY®-XylBINAP**

200mg / 1g

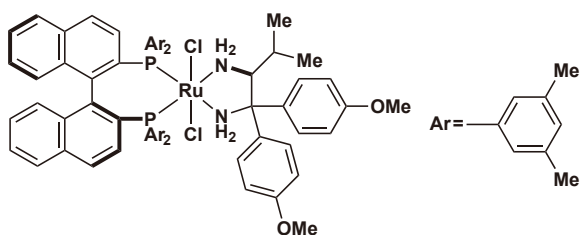
**R0139 (R)-RUCY®-XylBINAP**

200mg / 1g

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

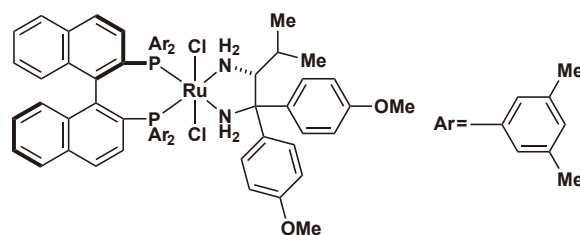
## Perfluoroalkylating Reagents



**RuCl<sub>2</sub>[(S)-xylbinap][(S)-daipen]**

200mg / 1g

[R0132]

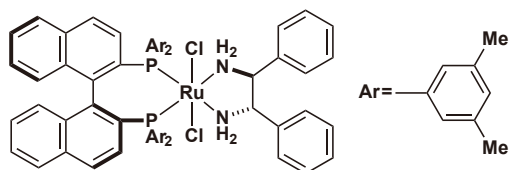


**RuCl<sub>2</sub>[(R)-xylbinap][(R)-daipen]**

200mg / 1g

[R0133]

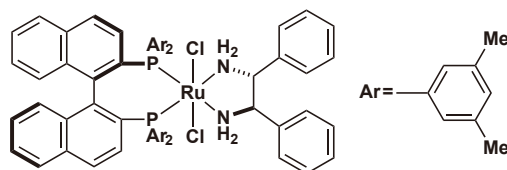
R. Noyori et al., *J. Am. Chem. Soc.* **1998**, 120, 13529; R. Noyori et al., *Org. Lett.* **2000**, 2, 659.



**RuCl<sub>2</sub>[(S)-xylbinap][(S,S)-dpen]**

200mg / 1g

[R0134]

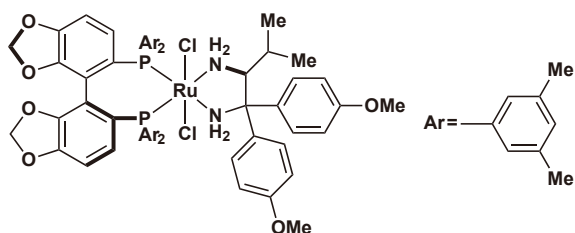


**RuCl<sub>2</sub>[(R)-xylbinap][(R,R)-dpen]**

200mg / 1g

[R0135]

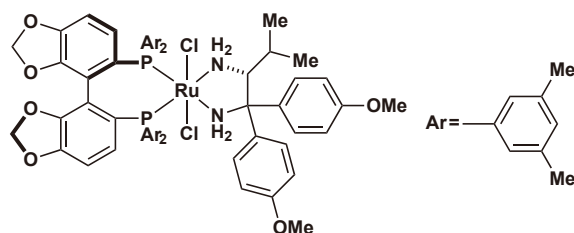
R. Noyori et al., *J. Am. Chem. Soc.* **1998**, 120, 13529; T. Matsumoto et al., *Tetrahedron Lett.* **1999**, 40, 5043.



**RuCl<sub>2</sub>[(S)-dm-segphos<sup>®</sup>][(S)-daipen]**

200mg / 1g

[R0128]

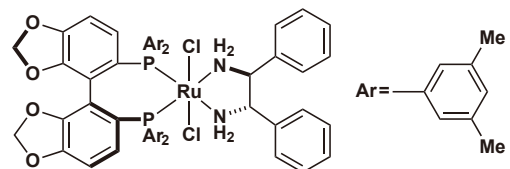


**RuCl<sub>2</sub>[(R)-dm-segphos<sup>®</sup>][(R)-daipen]**

200mg / 1g

[R0129]

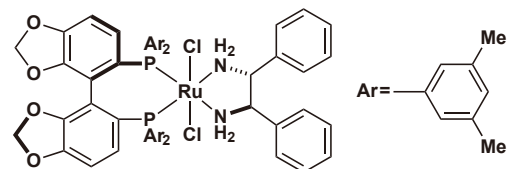
C. Chen, M. Weisel, *Synlett* **2013**, 24, 189.



**RuCl<sub>2</sub>[(S)-dm-segphos<sup>®</sup>][(S,S)-dpen]**

200mg / 1g

[R0130]



**RuCl<sub>2</sub>[(R)-dm-segphos<sup>®</sup>][(R,R)-dpen]**

200mg / 1g

[R0131]

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