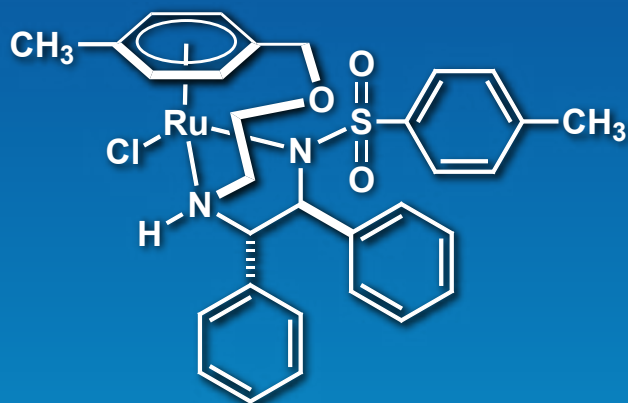
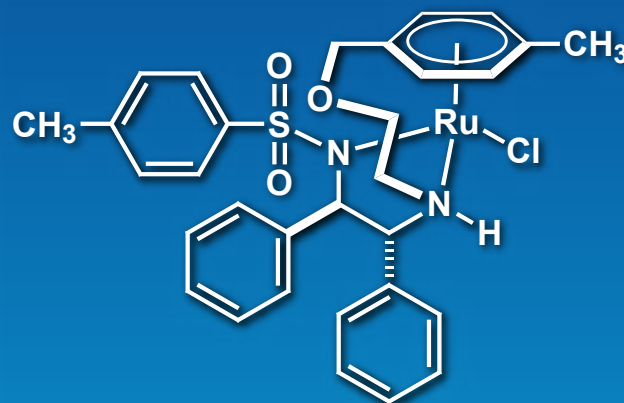


Ruthenium Complex Catalysts for Asymmetric Transfer Hydrogenation of Ketones



[T3077]

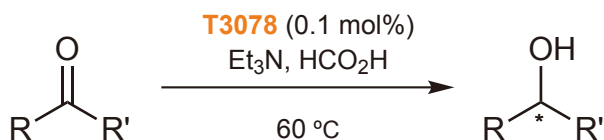


[T3078]

Advantages

- Reduce Carbonyl Groups Selectively
- High Pressure Equipment is Unnecessary by Using Formic Acid or IPA as a Hydrogen Source

Application



Substrate	Time (h)	% Yield	% ee
	3	>99	98 (R)
	5	>99	97 (S)
	5	98	96 (S)
	5	>99	>99 (R)
	5	>99	98 (R)

T. Ikariya et al., *J. Am. Chem. Soc.* **2011**, 133, 14960.

(*S,S*)-Ts-DENEB[®]

200mg / 1g [T3077]

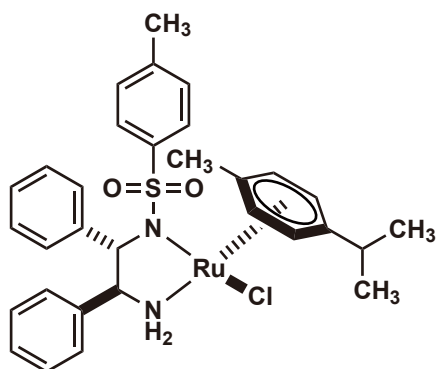
(*R,R*)-Ts-DENEB[®]

200mg / 1g [T3078]

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Ruthenium Complex Catalysts for Asymmetric Transfer Hydrogenation of Ketones

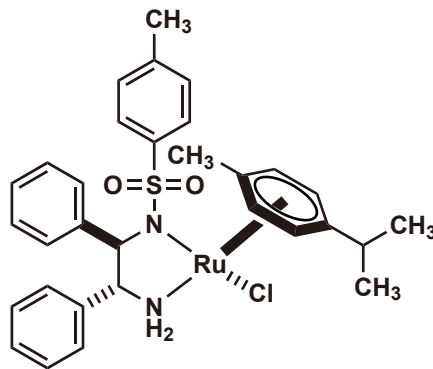
Other Ruthenium Complex Catalysts



RuCl[(S,S)-Tsdpen](p-cymene)

200mg / 1g

[R0124]

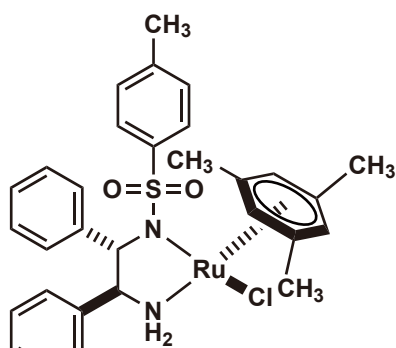


RuCl[(R,R)-Tsdpen](p-cymene)

200mg / 1g

[R0125]

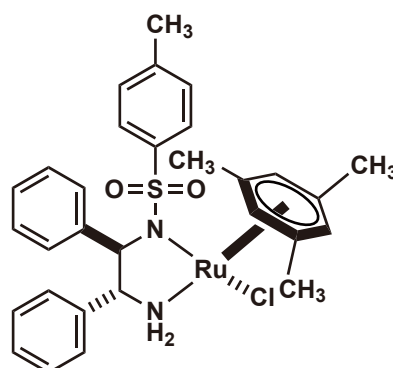
R. Noyori et al., *J. Am. Chem. Soc.* **1996**, 118, 2521; K. Matsumura et al., *J. Am. Chem. Soc.* **1997**, 119, 8738; R. Noyori et al., *J. Am. Chem. Soc.* **1996**, 118, 4916.



RuCl[(S,S)-Tsdpen](mesitylene)

200mg / 1g

[R0126]

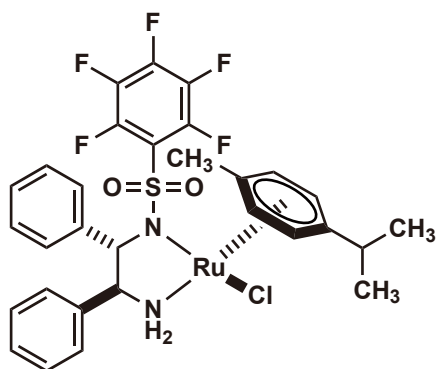


RuCl[(R,R)-Tsdpen](mesitylene)

200mg / 1g

[R0127]

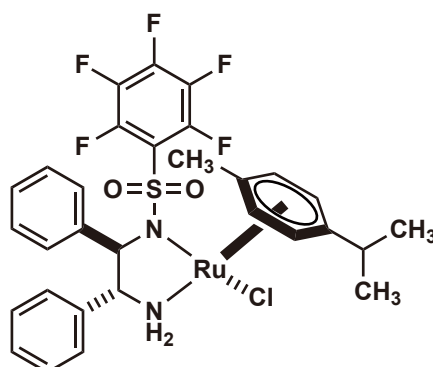
R. Noyori et al., *J. Am. Chem. Soc.* **1996**, 118, 2521; R. Noyori et al., *Org. Lett.* **2000**, 2, 3425.



RuCl[(S,S)-Fsdpen](p-cymene)

200mg / 1g

[R0122]



RuCl[(R,R)-Fsdpen](p-cymene)

200mg / 1g

[R0123]

J. Limanto et al., *Org. Lett.* **2010**, 12, 512.

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