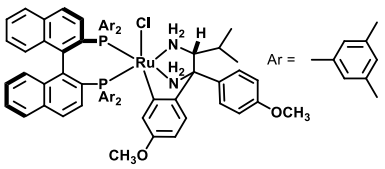
RUCY®

RUCY® is a novel ruthenabicyclic complex. This complex with base shows excellent catalytic activity in the asymmetric hydrogenation of ketones. In the case of hydrogenation of acetophenone, the turnover frequency reaches about 35000min^{-1}, affording 1-phenylethanol in >99% ee. Several base-labile and bicyclic ketones, which are difficult substrates to hydrogenate with reported catalyst system ($RuCl_2$(diphosphine)(diamine)/t-BuOK), are smoothly converted to the corresponding alcohols in high enantioselectivity.

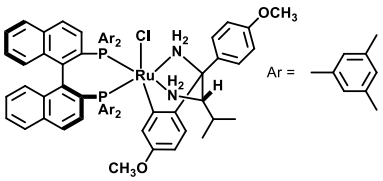
(R)-RUCY®-XylBINAP
RuCl[(R)-daipena][(R)-xylbinap]

CAS No.	1384974-38-2
Formula	$C_{71}H_{73}ClN_2O_2P_2Ru$
M.W.	1184.91



(S)-RUCY®-XylBINAP
RuCl[(S)-daipena][(S)-xylbinap]

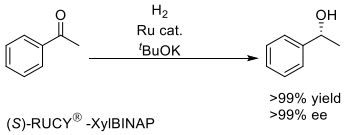
CAS No.	1312713-89-5
Formula	$C_{71}H_{73}ClN_2O_2P_2Ru$
M.W.	1184.91



JP5685071B, CN102858788B, EP2563799B, US9079931B, WO2011135753A (Takasago)
US9255049B, CN103443111B, WO2012137460A (Takasago)

Tech Note

1 Asymmetric Hydrogenation of Acetophenone



(*S*)-RUCY® -XylBINAP
H_2 5 MPa, 0.001 mol%; 6 min
H_2 0.7 MPa, 0.001 mol%; 15 min
H_2 0.1 MPa, 0.01 mol%; 24 h
trans-$RuCl_2$((xylbinap)(daipen) 0.001 mol%; 240 min

Matsumura, K.; Arai, N.; Hori, K.; Saito, T.; Sayo, N.; Ohkuma, T. *J. Am. Chem. Soc.* **2011**, *133*, 10696.
doi: 10.1021/ja202296w

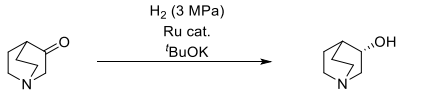
2 Asymmetric Hydrogenation of Base-labile Substrate

(*S*)-RUCY® -XylBINAP 0.05 mol%; >99% yield, 95% ee

Matsumura, K.; Arai, N.; Hori, K.; Saito, T.; Sayo, N.; Ohkuma, T. *J. Am. Chem. Soc.* **2011**, *133*, 10696.
doi: 10.1021/ja202296w

finechemicals@takasago.com

3 Asymmetric Hydrogenation of Bicyclic Ketone

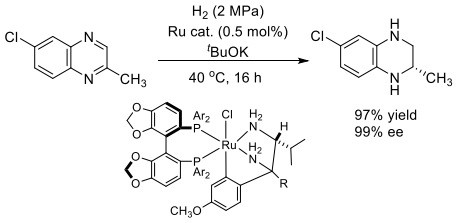


(*S*)-RUCY® -XylBINAP 0.002 mol%; >99% yield, 95% ee

trans-$RuCl_2$((xylbinap)(daipen) 0.005 mol%; 50% yield, 86% ee

Matsumura, K.; Arai, N.; Hori, K.; Saito, T.; Sayo, N.; Ohkuma, T. *J. Am. Chem. Soc.* **2011**, *133,* 10696.
doi: 10.1021/ja202296w

4 Asymmetric Hydrogenation of 2-methylquinoxaline



Ar = 3,5-$(CH_3)_2C_6H_3$
R = 4-$CH_3OC_6H_4$
RuCl[(*R*)-daipena][(*R*)-dm-segphos]

Ohkuma, T. *Adv. Synth. Catal*. **2013**, *355*, 2769-2774.
doi.10.1002/adsc.201300604
JP6065259B, US9328079B, WO2014038666A (Takasago)