

Asymmetric Hydrogenation of α -Alkyl-Substituted β -Keto Esters through Dynamic Kinetic Resolution

(¹Graduate School of Chemical Sciences and Engineering, Hokkaido University, ² Faculty of Engineering, Hokkaido University, ³ Frontier Chemistry Center, Hokkaido University) ○

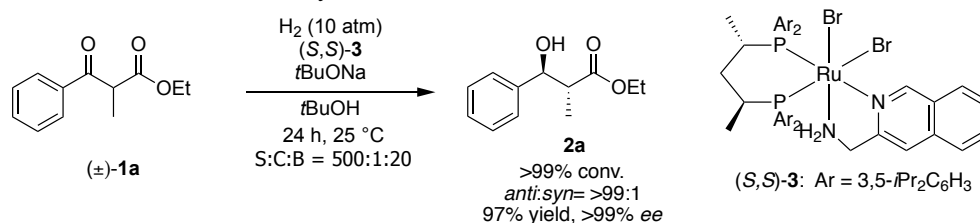
Shuangli Yang¹, Noriyoshi Arai², Takeshi Ohkuma^{2,3}

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The synthesis of optically active compounds plays an important role in the preparation of pharmaceuticals, pesticides, electronics, fragrances, etc. Even today, it is still a difficult task to completely convert a racemic mixture into a single enantiomer, even a variety of asymmetric synthesis reactions have been developed. As an approach to solve this problem, dynamic kinetic resolution using an asymmetric catalyst has attracted attention as an efficient and useful method.

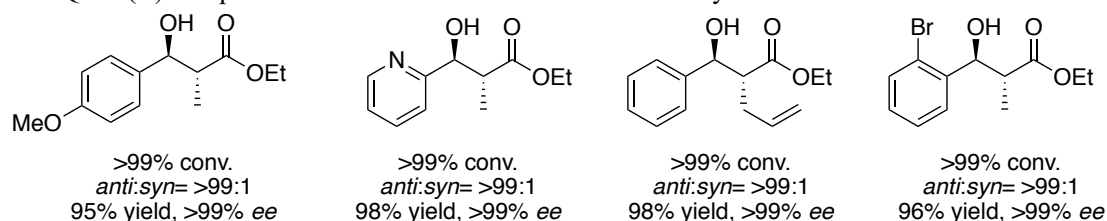
In our laboratory, poly-substituted aromatic ketones and β - to δ -keto esters were successfully hydrogenated using an optically active ruthenium complex RuBr₂[(*S,S*)-xylskewphos](3-amiq) ((*S,S*)-**3** in Scheme 1) with base, and the corresponding aromatic alcohols and hydroxy esters were obtained with high enantiomeric purity.^{1), 2)}

Based on this research, it was considered that the use of the XylSkewphos/3-AMIQ–Ru(II) complex **3** could achieve an asymmetric hydrogenation reaction through dynamic kinetic resolution of α -alkyl-substituted β -keto esters, which was difficult in the past. Rate of stereoinversion at the α position connected with an alkyl group was expected sufficiently fast under the basic conditions. As a result, both the yield and *ee* of the corresponding hydrogenated product were achieved excellently shown in Scheme 1.



Scheme 1

Then a range of α -substituted β -keto esters were applied to the catalyst system of XylSkewphos/3-AMIQ–Ru(II) complex **3** and most of them achieved excellent yields and enantioselectivities.



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2) Utsumi, N.; Arai, N.; Kawaguchi, K.; Katayama, T.; Yasuda, T.; Murata, T.; Ohkuma, T. *ChemCatChem.* **2018**, 10, 3955–3959.