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### Synthesis of Chiral 3-( o -Diphenylphosphinophenyl)-Butanoic Acid and Its Palladium Complex Catalyzed Asymmetric Allylic Alkylation

Yoshiharu Okada<sup>a</sup>; Yoshiyasu Murata<sup>a</sup>; Daisuke Une<sup>a</sup>; Isao Sasanuma<sup>a</sup>; Fumio Ogura<sup>a</sup>

<sup>a</sup> Kinki University, Japan

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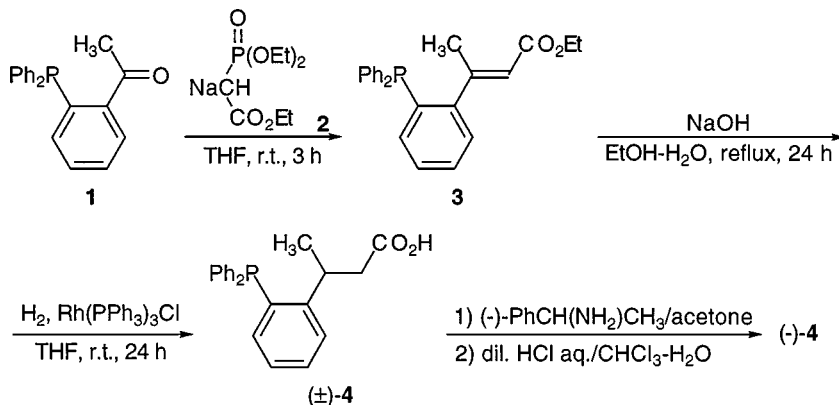
# SYNTHESIS OF CHIRAL 3-(*o*-DIPHENYLPHOSPHINOPHENYL)-BUTANOIC ACID AND ITS PALLADIUM COMPLEX CATALYZED ASYMMETRIC ALLYLIC ALKYLATION

Yoshiharu Okada, Yoshiyasu Murata, Daisuke Une,  
 Isao Sasanuma, and Fumio Ogura  
 Kinki University, Japan

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We report on the synthesis of a novel type of chiral phosphine ligands bearing carboxyl group and have shown that the carboxyl group plays an important role in the asymmetric induction.<sup>1</sup> We now report synthesis of chiral 3-(*o*-diphenylphosphinophenyl)butanoic acid and its palladium complex catalyzed asymmetric allylic alkylation.

Reaction of (*o*-diphenylphosphino)acetophenone **1** with triethyl sodiophosphonoacetate **2** gave ethyl 3-(*o*-diphenylphosphinophenyl)-but-2-enoate **3** in 89% yield. Alkaline hydrolysis of **3** and subsequent hydrogenation in the presence of Rh(PPh<sub>3</sub>)<sub>3</sub>Cl under H<sub>2</sub> atmosphere



SCHEME 1

Address correspondence to Yoshiharu Okada, Department of Chemistry and Environmental Technology, Faculty of Engineering, Kinki University, Umenobe 1, Takaya, Higashi-Hiroshima, 739-2116, Japan. E-mail: okadasan@hiro.kindai.ac.jp

gave racemic 3-(*o*-diphenylphosphinophenyl)butanoic acid ( $\pm$ )-**4** in 67% yield. Resolution of ( $\pm$ )-**4** with (–)- $\alpha$ -methylbenzylamine gave the optically active (–)-**4**,  $[\alpha]_{\text{D}}^{34} = -10.51$  (c 1.7,  $\text{CHCl}_3$ ).

Reaction of 3-acetoxy-1,3-diphenyl-1-propene with **2** in the presence of catalytic amount of  $\text{Pd}(\text{OAc})_2 \cdot (-)\text{-4}$  complex (1.5% mol) gave the allylic alkylation product in quantitative yield (38% ee).

## REFERENCE

- [1] T. Minami, Y. Okada, T. Otaguro, S. Tawaraya, T. Furuichi, and T. Okauchi, *Tetrahedron: Asymmetry*, **6**, 2469 (1995).