Supporting Information

Syntheses of Novel Chiral Sulfinamido Ligands and Their Applications in Diethylzinc Additions to Aldehydes

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Table of Contents:

Page S-1: Title of the paper, author’s name and address along with the contents.
Page S-2: Contents of Supporting Information. General methods and Er determination.
Page S-4: ¹H NMR, ¹³C NMR Spectra and HPLC Analysis of 1a.
Page S-6: ¹H NMR, ¹³C NMR Spectra and HPLC Analysis of 1b.
Page S-8: ¹H NMR, ¹³C NMR Spectra and HPLC Analysis of 1c.
Page S-10: ¹H NMR, ¹³C NMR Spectra and HPLC Analysis of 1d.
Page S-12: ¹H NMR, ¹³C NMR Spectra and HPLC Analysis of 1e.
Page S-14: ¹H NMR, ¹³C NMR Spectra and HPLC Analysis of 1f.
Page S-16: ¹H NMR, ¹³C NMR Spectra and HPLC Analysis of 1g.
Page S-18: ¹H NMR, ¹³C NMR Spectra and HPLC Analysis of 2.
Page S-20: ¹H NMR, ¹³C NMR Spectra of 3.
Page S-23: ¹H NMR, ¹³C NMR Spectra and HPLC Analysis of 5.
General methods.

Unless otherwise stated, all commercially available reagents were used without further purification. All solvents were distilled under nitrogen from the following drying agents immediately before use: Toluene and hexane were dried and distilled from sodium; THF was distilled from sodium/benzophenone ketyl; dichloromethane was distilled from calcium hydride; acetone were distilled from P₂O₅. All reactions were carried out in flame- or oven-dried glassware in anhydrous solvent and under nitrogen atmosphere. Chromatography was conducted using 200-300 mesh silica gel. IR spectra were recorded as KBr pellets. Chemical shifts in NMR spectra are expressed in ppm. All NMR spectra were obtained at room temperature in CDCl₃ with TMS as an internal standard. Chiral analyses of adducts were performed using Diacel chiralecel OD at 254 nm UV detection. Chiral analyses of ligands were performed using Diacel chiralecel column (OD or AS) at 227 nm UV detection. HRMS spectra were obtained by the ESI method. Optical rotations were measured on a polarimeter.

Enantiomeric Excess Analysis of Secondary Alcohols:

The er values of adducts in Table 2 were determined by chiral stationary phase HPLC (Diacel Chiralcel OD column). The retention time and conditions are listed as below: 1-p-chlorophenyl-1-propanol, 1.0 mL/min, 2.5% IPA in hexanes, \( t_R = 11.3 \text{ min}, t_S = 10.7 \text{ min}; 1-p\)-methoxyphenyl-1-propanol: 1.0 mL/min, 2.5% IPA in hexanes, \( t_R = 16.3 \text{ min}, t_S = 18.5 \text{ min}; 1-p\)-dimethylaminophenyl-1-propanol: 1.0 mL/min, 5% IPA in hexanes, \( t_R = 12.2 \text{ min}, t_S = 14.1 \text{ min}; 1-(3'-furyl)-1-propanol: 0.5 mL/min, 2% IPA in hexanes, \( t_R = 20.7 \text{ min}, t_S = 21.9 \text{ min}; 1-(2'-Thienyl)-1-propanol: 0.4 mL/min, 1.5% IPA in hexanes, \( t_R = 34.7 \text{ min}, t_S = 40.0 \text{ min}; 1-Phenyl-3-pentanol: 1.0 mL/min, 2% IPA in hexanes, \( t_R = 15.4 \text{ min}, t_S = 24.2 \text{ min}; (E)-1-phenyl-1-penten-3-ol: 1.0 mL/min, 5% IPA in hexanes, \( t_R = 11.5 \text{ min}, t_S = 18.6 \text{ min}.}
The X-ray crystallographic data for 3 are available as a CIF file in the second supporting information file.

Figure 1. ORTEP drawing and relative stereochemistry of 3.