Supporting Information for
Base-Catalyzed Stereoselective Isomerization of Electron-Deficient Propargylic Alcohols to
***E*-Enones**

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General Techniques All reactions were carried out with dry, freshly distilled solvents under anhydrous conditions, unless otherwise noted. Tetrahydrofuran (THF) was distilled from sodium-benzophenone, and methylene chloride (CH_2Cl_2) was distilled from calcium hydride. Dimethylsulfoxide (DMSO) was distilled from calcium hydride under reduced pressure and kept dry over 3 angstrom sieves. Yields refer to chromatographically and spectroscopically (^1H NMR) homogenous materials, unless otherwise stated.

All reactions were monitored by thin-layer chromatography (TLC) carried out on 0.25-mm silica gel plates (60F-254) using UV-light (254 nm) with anisaldehyde in ethanol and heat as developing agents. Silica gel (230–400 mesh) was used for flash column chromatography. Silica gel (60 PF₂₅₄) was used to make preparative TLC (prep-TLC) plates for further purification of select compounds in which the preparative TLC plates were prepared as specified by the silica gel manufacturer. NMR spectra were recorded on AM300 or AM500 instruments and calibrated using the solvent or tetramethylsilane as an internal reference. The following abbreviations are used to indicate the multiplicities; app, apparent; s, singlet; d, doublet; t, triplet; q, quartet; sex, sextet; m, multiplet; br, broad. High-resolution mass spectra were obtained by using EBE geometry.

Alkynes were synthesized by one of the two following methods.

Method A Using the procedure: Shahi, S. P., Koide, K. *Angew. Chem., Int. Ed.* **2004**, 43, 2525–2527.

Method B Using the procedure: Krause, N., *Liebigs Ann. Chem.* **1990**, 603–604.

Preparation of 1: See: Shahi, S. P.; Koide, K. *Angew. Chem., Int. Ed.* **2004**, 43, 2525–2527.

Preparation of 5: Method A. Spectral data were in agreement with the literature: Herrmann, J. L., Berger, M. H., Schlessinger, R. H., *J. Am. Chem. Soc.* **1979**, 101, 1544–1549.

Preparation of 7: Method A. Silica gel chromatography (5 → 20 % EtOAc in hexanes) afforded **7** (303.0 mg, 61 %) as a yellow oil; R_f = 0.33 (30 % EtOAc in hexanes); IR (film) 3420 (br, O-H), 3011, 2959, 2242 ($\text{C}\equiv\text{C}$), 1717 ($\text{C}=\text{O}$), 1438, 1329, 1260, 1167, 1128, 1017, 857 cm^{-1} ; ^1H NMR (300 MHz, 293K, CDCl_3) δ 7.65 (br s, 4H), 5.61 (br s, 1H), 3.80 (s 3H); ^{13}C NMR (125 MHz, 293 K, CDCl_3) δ 153.8, 142.4, 130.7 (q, J = 32.3 Hz), 126.8, 125.6 (q, J = 3.8 Hz), 123.8 (q, J = 270.4 Hz), 86.2, 77.5, 63.1, 52.9; HRMS (EI^+) calcd for $\text{C}_{12}\text{H}_9\text{F}_3\text{O}_3$ (M^+) 258.0503; found 258.0500.

Preparation of 9: See: Shahi, S. P.; Koide, K. *Angew. Chem., Int. Ed.* **2004**, 43, 2525–2527.

Preparation of 11: Method B. Silica gel chromatography (5 → 20 % EtOAc in hexanes) afforded **11** (459.0 mg, 46 %) as a yellow oil; R_f = 0.40 (30 % EtOAc in hexanes); IR (film) 3411 (br, O-H), 2954, 2923, 2238 ($\text{C}\equiv\text{C}$), 1716 ($\text{C}=\text{O}$), 1436, 1255, 1019, 942, 751 cm^{-1} ; ^1H NMR (500 MHz, 293 K, CDCl_3) δ 7.72 (dd, 1H, J = 7.8, 1.5 Hz), 7.57 (d, 1H, J = 8.0 Hz), 7.38 (t, 1H, J = 7.6 Hz), 7.22 (td, 1H, J = 7.8, 1.6 Hz), 5.87 (s, 1H), 3.79 (s, 3H); ^{13}C NMR (125 MHz, 293 K, CDCl_3) δ 153.8, 137.7, 132.9, 130.2, 128.4, 127.9, 122.4, 86.0, 76.9, 63.4, 52.9; HRMS (EI^+) calcd for $\text{C}_{11}\text{H}_9\text{BrO}_3$ (M^+); 267.9735; found 267.9742.

Preparation of 13: Method B. Silica gel chromatography (7.5 → 30 % EtOAc in hexanes) afforded **13** (632.3 mg, 63 %) as a pale yellow oil; R_f = 0.36 (30 % EtOAc in hexanes); IR (film) 3419 (br, O-H), 3070, 3048, 2956, 2241 ($\text{C}\equiv\text{C}$), 1716 ($\text{C}=\text{O}$), 1616, 1491, 1457, 1256, 1175, 1009, 758 cm^{-1} ; ^1H NMR (300 MHz, 293 K, CDCl_3) δ 7.62 (td, 1H, J = 7.5, 1.8 Hz), 7.39–7.31 (m, 1H), 7.19 (td, 1H, J = 7.5, 1.1 Hz), 7.08 (ddd, 1H, J = 10.2, 8.2, 1.2 Hz), 5.82 (br s, 1H), 3.79 (s, 3H); ^{13}C NMR (75 MHz, 293 K, CDCl_3) δ 159.4 (d, J = 247.2 Hz), 153.7, 130.3 (d, J = 8.2 Hz), 128.0 (d, J = 3.1 Hz), 125.7 (d, J = 13.3 Hz), 124.2 (d, J = 3.5 Hz), 115.3 (d, J = 20.9 Hz), 85.9, 76.4, 57.7 (d, J = 5.1 Hz), 52.7; HRMS (EI^+) calcd for $\text{C}_{11}\text{H}_9\text{FO}_3$ (M^+) 208.0535; found 208.0534.

Preparation of 15: Method A. Silica gel chromatography (5 → 20 % EtOAc in hexanes) afforded **15** (236.0 mg, 67 %) as a yellow oil; R_f = 0.30 (30 % EtOAc in hexanes); IR (film) 3408 (br, O-H), 2957, 2244 ($\text{C}\equiv\text{C}$), 1719 ($\text{C}=\text{O}$), 1500, 1438, 1263, 1144, 1073, 1023, 952, 918, 884, 750 cm^{-1} ; ^1H NMR (300 MHz, 293 K, CDCl_3) δ 7.44 (dd, 1H, J = 1.8, 0.6 Hz), 6.50 (dd, 1H, J = 3.3, 0.6 Hz), 6.38 (dd, 1H, J = 3.3, 1.8 Hz), 5.57 (br d, 1H, J = 6.8 Hz), 3.80 (s, 3H), 2.62 (br d, 1H, J = 6.8 Hz); ^{13}C NMR (75 MHz, 293 K, CDCl_3) δ 153.6, 150.7, 143.4, 110.5, 108.5, 84.2, 76.4, 57.7, 52.9; HRMS (EI^+) calcd for $\text{C}_9\text{H}_8\text{O}_4$ (M^+) 180.0423; found 180.0419.

Preparation of 17: See: Shahi, S. P.; Koide, K. *Angew. Chem., Int. Ed.* **2004**, *43*, 2525–2527.

Preparation of 19: Method B. Silica gel chromatography (5 → 20 % EtOAc in hexanes) afforded **9** (646.0 mg, 65 %) as a pale yellow oil; R_f = 0.42 (30 % EtOAc in hexanes); IR (film) 3407 (br, O-H), 3033, 2959, 2932, 2238 ($\text{C}\equiv\text{C}$), 1716 ($\text{C}=\text{O}$), 1436, 1256, 1066, 968, 752 cm^{-1} ; ^1H NMR (300 MHz, 293 K, CDCl_3) δ 5.91 (dtd, 1H, J = 15.3, 7.1, 1.1 Hz), 5.59 (ddt, 1H, J = 15.3, 6.2, 1.3 Hz), 4.92 (br d, J = 6.2 Hz), 3.79 (s, 1H), 2.05 (app br q, 2H, J = 7.1 Hz), 1.43 (app sex, 2H, J = 7.3), 0.91 (t, 3H, J = 7.3 Hz); ^{13}C NMR (75 MHz, 293 K, CDCl_3) δ 153.9, 134.8, 126.8, 87.0, 76.3, 62.0, 52.6, 33.8, 21.6, 13.3; HRMS (EI^+) calcd for $\text{C}_{10}\text{H}_{14}\text{O}_3$ (M^+) 182.0943; found 182.0948.

Preparation of 21: See: Shahi, S. P.; Koide, K. *Angew. Chem., Int. Ed.* **2004**, *43*, 2525–2527.

Preparation of S2: Para-toluene sulfonic acid monohydrate (pTsOH) (143.9 mg, 0.7567 mmol), was added in one portion to a solution 1-phenyl-2-propyn-1-ol (920 μL , 7.57 mmol) and dihydropyran (755 μL , 8.25 mmol) in CH_2Cl_2 (30 mL) at 23 $^\circ\text{C}$. The resulting mixture was then stirred for 1 h and then diluted with Et_2O (45 mL). The mixture was then washed with saturated NaHCO_3 solution (1 $\times$ 15 mL) and brine (1 $\times$ 30 mL). The aqueous layer was then extracted with Et_2O (2 $\times$ 15 mL). The organic layers were combined, dried over Na_2SO_4 , filtered, and concentrated under reduced pressure. The resulting residue was then purified by silica gel chromatography (2.5 $\rightarrow$ 10 % EtOAc in hexanes) to afford the THP ether **S2** as a mixture of diastereomers (1.551 g, 95 %), which was used in the subsequent step without further purification.

Preparation of S3: *n*-Butyllithium (1.6 M in hexanes) was added dropwise to a solution of **S2** (432.6 mg, 2.000 mmol) in THF (2 mL) at -78°C . Diethylchlorophosphate (320 μL , 2.20 mmol) in THF (2.2 mL) was then added dropwise to solution at -78°C and the resulting mixture was allowed to stir at the same temperature for 1.5 h. The reaction flask was then placed in an ice water bath and quenched with water (2.4 mL) at 0 $^\circ\text{C}$. The solvent was removed under pressure and the resulting residue was extracted with Et_2O (4 $\times$ 6 mL). The organic layers were then washed with brine (1 $\times$ 6 mL), dried over Na_2SO_4 , filtered, and concentrated under reduced pressure. The resulting residue was then subjected to silica gel chromatography (10 $\rightarrow$ 50 % EtOAc in hexanes) to remove unreacted starting materials and to afford the THP ether phosphonate **S3** as a mixture of diastereomers (298.6 mg, 42 %), which was used in the subsequent step without further purification.

Preparation of 23: Pyridinium *para*-toluenesulfonate (16.9 mg, 0.0673 mmol) was added in one portion to a solution of **S3** (236.6 mg, 0.6731 mmol) in EtOH (4.5 mL). The reaction mixture was heated to 55 $^\circ\text{C}$. After an additional 7.3 h at the same temperature, the solvent was removed under reduced pressure. The resulting residue was then purified by silica gel chromatography (15 $\rightarrow$ 60 % EtOAc in hexanes) to afford **23** (162.9 mg 90 %) as a pale yellow oil; R_f = 0.25 (80 % EtOAc in hexanes); IR (film) 3319 (br, O-H), 3032, 2986, 2909, 2203 ($\text{C}\equiv\text{C}$), 1455, 1252 ($\text{P}=\text{O}$), 1051, 781, 701 cm^{-1} ; ^1H NMR (300 MHz, 293 K, CDCl_3) δ 7.53–7.49 (m, 2H), 7.42–7.34 (m, 3H), 5.52 (d, 1H, J = 3.5 Hz), 4.20–4.09 (m, 4H), 1.73 (br s, 1H), 1.35 (td, 6H, J = 7.1, 3.2 Hz); ^{13}C NMR (75 MHz, 293 K, CDCl_3) δ 138.9, 128.4, 128.2, 126.4, 101.3 (d, J = 49.2 Hz), 74.3 (d, J = 295.4 Hz), 63.6 (br s), 63.3 (d, J = 5.6 Hz), 15.8 (d, J = 7.1 Hz); HRMS (EI^+) calcd for $\text{C}_{13}\text{H}_{17}\text{PO}_4(\text{M}^+)$ 268.0864; found 268.0874.

Preparation of 25: Method B. Silica gel chromatography (20 $\rightarrow$ 80 % EtOAc in hexanes) afforded **25** (58.0 mg, 26 %) as a yellow oil; R_f = 0.15 (80 % EtOAc in hexanes); IR (film) 3347 (br, O-H), 3032, 2965, 2858, 2237 ($\text{C}\equiv\text{C}$), 1613 ($\text{C}=\text{O}$), 1434, 1276, 1248, 1114, 996, 700 cm^{-1} ; ^1H NMR (300 MHz, 293

K, CDCl₃) δ 7.53–7.49 (m, 2H), 7.43–7.34 (m, 3H), 5.57 (s, 1H), 3.74–3.62 (m, 8H); ¹³C NMR (125 MHz, 293 K, CDCl₃) δ 152.8, 139.2, 128.7, 128.6, 126.5, 92.6, 66.7, 66.3, 64.0, 47.2, 41.9; HRMS (EI⁺) calcd for C₁₄H₁₅NO₃ (M⁺) 245.1052; found 245.1046.

General procedure for the formation of trans olefins: To a solution of **A** (0.2500 mmol) in DMSO (1.25 mL) at 23 °C, DABCO (5.6 mg, 0.050 mmol) was added in one portion, and the resulting solution was stirred at the same temperature for the indicated time. The reaction was then diluted with water (25 mL), and then acidified to pH 3 with pH 3 phosphate buffer. The resulting aqueous mixture was extracted with Et₂O (25 mL $\times$ 3 or 4). The combined organic layers were then washed with water (25 mL) then brine (25 mL), dried over Na₂SO₄, filtered, and concentrated under reduced pressure. The resulting residue was purified by silica gel chromatography (EtOAc in hexanes) to afford the corresponding trans olefin **B**.

Preparation of E2: General Procedure. Silica gel chromatography (5 $\rightarrow$ 20% EtOAc in hexanes) afforded **E2** (33.2 mg, 70%) as a pale yellow oil. Spectral data were in agreement with the literature: Bonete, P., Najera, C., *J. Org. Chem.*, **1994**, 59, 3202–3209.

Preparation of 6: General Procedure. Silica gel chromatography (5 $\rightarrow$ 20 % EtOAc in hexanes) afforded **6** (37.0 mg, 72 %) as a yellow oil; Spectral data were in agreement with the literature: Ronsheim, M. D., Zercher, C. K., *J. Org. Chem.* **2003**, 68, 4535–4538.

Preparation of 8: General Procedure. Silica gel chromatography (5 $\rightarrow$ 20 % EtOAc in hexanes) afforded **8** (40.0 mg, 62 %) as a pale yellow solid; R_f = 0.41 (20 % EtOAc in hexanes); mp = 73.5–74.0 °C; IR (film) 3079, 2927, 1731 (C=O), 1669 (C=O), 1628, 1410, 1319, 1306, 1164, 1126, 970, 773, 722 cm⁻¹; ¹H NMR (300 MHz, 293K, CDCl₃) δ 8.11 (br d, 2H, J = 8.8 Hz), 7.90 (d, 1H, J = 15.6 Hz), 7.79 (br d, 1H, J = 8.8 Hz), 6.93 (d, 1H, J = 15.6 Hz), 3.87 (s, 3H); ¹³C NMR (125 MHz, 293 K, CDCl₃) δ 188.6, 165.6, 139.1, 135.7, 135.0 (q, J = 32.5 Hz), 133.0, 129.0, 125.9, 123.4 (q, J = 273.8 Hz), 52.4; HRMS (ES⁺) calcd for C₁₂H₉F₃O₃ (M⁺) 258.0504; found 258.0538.

Preparation of 10: General Procedure. Silica gel chromatography (5 → 20 % EtOAc in hexanes) afforded **10** (42.4 mg, 77 %) as a yellow solid; R_f = 0.33 (30 % EtOAc in hexanes); mp = 65.5–66.0 °C; IR (film) 3014, 2956, 2924, 2848, 1737(C=O), 1727 (C=O), 1668, 1596, 1439, 1306, 1264, 1165, 1028, 975, 833, 766 cm^{-1} ; ^1H NMR (300 MHz, 293 K, CDCl_3) δ 8.02 (dt, 2H, J = 8.9, 2.1 Hz), 7.94 (d, 1H, J = 15.5 Hz), 6.99 (dt, 2H, J = 8.9, 2.1 Hz), 6.88 (d, 1H, J = 15.5 Hz), 3.90 (s, 3H), 3.85 (s, 3H); ^{13}C NMR (125 MHz, 293 K, CDCl_3) δ 187.5, 166.2, 164.2, 136.7, 131.2, 131.2, 129.6, 114.1, 55.5, 52.2; HRMS (EI^+) calcd for $\text{C}_{12}\text{H}_{12}\text{O}_4$ (M^+) 220.0736; found 220.0741.

Preparation of 12: General Procedure. Silica gel chromatography (5 → 20 % EtOAc in hexanes) afforded **12** (24.0 mg, 36 %) as a yellow oil; R_f = 0.46 (30 % EtOAc in hexanes); IR (film) 2952, 2923, 2851, 1728 (C=O), 1675 (C=O), 1434, 1309, 1275, 1256, 1169, 1025, 751 cm^{-1} ; ^1H NMR (300 MHz, 293 K, CDCl_3) δ 7.65 (d, 1H, J = 7.1 Hz), 7.50 (d, 1H, J = 15.8 Hz), 7.45–7.35 (m, 3H), 6.64 (d, 1H, J = 15.8 Hz), 3.83 (s, 3H); ^{13}C NMR (125 MHz, 293 K, CDCl_3) δ 193.1, 165.7, 139.4, 139.1, 133.6, 132.7, 132.4, 129.5, 127.5, 119.6, 52.3; HRMS (EI^+) calcd for $\text{C}_{11}\text{H}_9\text{BrO}_3$ (M^+) 267.9735; found 267.9745.

Preparation of 14: General Procedure. Alumina chromatography (15 % EtOAc in hexanes) afforded **14** (31.3 mg, 60 %) as an orange oil; R_f = 0.45 (30 % EtOAc in hexanes); IR (film) 2954, 2923, 2851, 1728 (C=O), 1673 (C=O), 1610, 1454, 1311, 1279, 977, 757 cm^{-1} ; ^1H NMR (300 MHz, 293 K, CDCl_3) δ 7.84 (dd, 1H, J = 7.4, 1.6 Hz), 7.77 (dd, 1H, J = 15.6, 3.4 Hz), 7.62–7.55 (m, 1H), 7.28 (td, 1H, J = 7.7, 1.1 Hz), 7.18 (ddd, 1H, J = 10.8, 8.3, 0.8 Hz), 6.83 (dd, 1H, J = 15.6, 1.3 Hz), 3.84 (s, 3H); ^{13}C NMR (125 MHz, 293 K, CDCl_3) δ 188.0 (d, J = 2.6 Hz), 165.9, 161.5 (d, J = 253.8 Hz), 139.3 (d, J = 6.9 Hz), 135.2 (d, J = 9.0 Hz), 131.7, 131.0 (d, J = 2.1 Hz), 125.4 (d, J = 12.2 Hz), 124.7 (d, J = 3.3 Hz), 116.7 (d, J = 22.8 Hz), 52.3; HRMS (EI^+) calcd for $\text{C}_{11}\text{H}_9\text{FO}_3$ (M^+) 208.0535; found 208.0542.

Preparation of 16: General Procedure. Silica gel chromatography (5 → 20 % EtOAc in hexanes) afforded **16** (36.0 mg, 78 %) as a pale yellow solid; R_f = 0.31 (30 % EtOAc in hexanes); mp = 87.5–88.5 °C; IR (film) 3154, 3133, 3096, 3005, 2959, 2853, 1720 (C=O), 1665 (C=O), 1622, 1463, 1337, 982, 767 cm^{-1} ; ^1H NMR (300 MHz, 293K, CDCl_3) δ 7.77 (d, 1H, J = 15.6 Hz), 7.70 (dd, 1H, J = 1.7, 0.7 Hz), 7.39 (dd 1H J = 3.6, 0.7 Hz), 6.98 (d, 1H, J = 15.6 Hz), 6.62 (dd, 1H, J = 3.6, 1.7 Hz), 3.84 (s, 3H); ^{13}C NMR (75 MHz, 293 K, CDCl_3) δ 176.4, 165.9, 152.7, 147.9, 135.6, 131.6, 119.6, 112.9, 52.3; HRMS (ES^+) calcd for $\text{C}_9\text{H}_8\text{O}_4\text{Na}$ ($\text{M} + \text{Na}^+$) 203.0320 ($\text{M} + \text{Na}^+$); found 203.0318.

Preparation of 18: General Procedure. Silica gel chromatography (5 → 20 % EtOAc in hexanes) afforded **18** (65.5 mg, quantitative yield) as a yellow solid; Spectral data were in agreement with the literature: Baraldi, P. G., Bazzanini, R., Bigoni, A., Manfredini, S., Simoni, D., *Synthesis*, **1993**, 1206–1208.

Preparation of 24: The general procedure was used to afford **24** with the modification of heating the reaction to 40 °C (oil bath) after DABCO addition. Silica gel chromatography (15 → 60 % EtOAc in hexanes) yielded **24** (25.4 mg,

95 %) as a yellow oil containing a 10:1 E/Z mixture. Stereochemically pure **24** was afforded under different conditions (50 mol % of CsHCO₃ in DMSO, 23 °C) in lower yield (31.0 mg, 50 %) which was used for characterization; *R_f* = 0.15 (80 % EtOAc in hexanes); IR (film) 3064, 2984, 2929, 1671, 1448, 1260 (P=O), 1051, 1024, 975, 692 cm⁻¹; ¹H NMR (300 MHz, 293 K, CDCl₃) δ 8.04–8.00 (m, 2H), 7.84 (dd, 1H, *J* = 21.2, 16.9, Hz), 7.64 (tt, 1H, *J* = 7.5, 1.3 Hz), 7.55–7.50 (m, 2H), 6.94 (dd, 1H, *J* = 19.4, 16.9 Hz), 4.18 (m, 4H), 1.38 (t, 3H, *J* = 7.1 Hz); ¹³C NMR (125 MHz, 293 K, CDCl₃) δ 188.5 (d, *J* = 22.5 Hz), 140.3, 136.3, 133.9, 131.4, 129.9, 128.9, 62.5, 16.3; HRMS (EI⁺) calcd for C₁₃H₁₇PO₄ (M⁺) 268.0864; found 268.0863.

Preparation of 26: The general procedure was used to generate **26** with the modification of an addition of NaOAc (1.6 mg, 0.020 mmol, 20 mol %) in one portion after the DABCO addition. Silica gel chromatography (20 → 80 % EtOAc in hexanes) yielded **26** (18.5 mg, 76 %) as a white solid; *R_f* = 0.19 (80 % EtOAc in hexanes); mp = 126.5–127.5 °C; IR (film) 2958, 2922, 2853, 1671 (C=O), 1636 (C=O), 1434, 1289, 1114, 1043, 891, 722 cm⁻¹; ¹H NMR (300 MHz, 293 K, CDCl₃) δ 8.04 (d, 2H, *J* = 7.2 Hz), 7.97 (d, 1H, *J* = 15.0 Hz), 7.65–7.60 (m, 1H), 7.54–7.49 (m, 2H), 7.47 (d, 1H, *J* = 15.0 Hz), 3.75–3.68 (m, 8H); ¹³C NMR (125 MHz, 293 K, CDCl₃) δ 189.5, 164.0, 136.8, 134.6, 133.8, 131.7, 128.8, 128.8, 66.7, 46.4, 42.6; HRMS (EI⁺) calcd for C₁₄H₁₅NO₃ (M⁺) 245.1052; found 245.1042.

^1H NMR spectrum of **7**: CDCl_3 , 293 K, 300 MHz

^{13}C NMR of **7**: CDCl_3 , 293 K, 75 MHz

¹H NMR spectrum of **11**: CDCl₃, 293 K, 500 MHz

JPS2120 in cdc13 1h 500mhz rt August 23 2005

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 PROCNO 1

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F2 - Processing parameters
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 PC 1.00

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 F2P -0.500 ppm
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 PPMCM 0.47500 ppm/cm
 HZCM 237.56177 Hz/cm

¹³C NMR spectrum of **11**: CDCl₃, 293 K, 125 MHz

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PPMCM 10.25000 ppm/cm
HZCM 1289.01758 Hz/cm

JPS2120 in cdcl3 13c 125mhz rt 500 December 12 2005

^1H NMR spectrum of **13**: CDCl_3 , 293 K, 300 MHz

JPS2135 in cdc13 1h 300mhz rt 301 October 21 2005

^{13}C NMR spectrum of **13**: CDCl_3 , 293 K, 75 MHz

^1H NMR spectrum of **15**: CDCl_3 , 293 K, 300 MHz

^{13}C NMR spectrum of **15**: CDCl_3 , 293 K, 75 MHz

^1H NMR spectrum of **19**: CDCl_3 , 293 K, 300 MHz

^{13}C NMR spectrum of **19**: CDCl_3 , 293 K, 75 MHz

^1H NMR spectrum of **23**: CDCl_3 , 293 K, 300 MHz

^{13}C NMR spectrum of **23**: CDCl_3 , 293 K, 125 MHz

^1H NMR spectrum of **25**: CDCl_3 , 293 K, 300 MHz

^{13}C NMR spectrum of **25**: CDCl_3 , 293 K, 75 MHz

^1H NMR spectrum of **8**: CDCl_3 , 293 K, 300 MHz

^{13}C NMR spectrum of **8**: CDCl_3 , 293 K, 75 MHz

^1H NMR spectrum of **10**: CDCl_3 , 293 K, 300 MHz

^{13}C NMR spectrum of **10**: CDCl_3 , 293 K, 125 MHz

JPS2087 in cdcl_3 13c 125mhz rt 500 August 5 2005

Current Data Parameters
 NAME JPS2087
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 500000
 Time 21.04
 INSTRUM spect
 PROBHD 5 mm TXI 13C
 PULPROG zgpg
 TD 32768
 SOLVENT CDCl_3
 NS 220
 DS 0
 SWH 32679.738 Hz
 FIDRES 0.997305 Hz
 AQ 0.5014004 sec
 RG 7298.2
 DW 15.300 usec
 DE 6.00 usec
 TE 290.0 K
 d11 0.0300000 sec
 d12 0.0000200 sec
 PL13 20.00 dB
 D1 6.00000000 sec
 CPDPRG2 waltz16
 PCPD2 65.00 usec
 SF02 500.1330008 MHz
 NUC2 ^1H
 PL2 120.00 dB
 PL12 18.00 dB
 P1 9.00 usec
 DE 6.00 usec
 SF01 125.7715724 MHz
 NUC1 ^{13}C
 PL1 -6.00 dB

F2 - Processing parameters
 SI 8192
 SF 125.7578047 MHz
 WDW EM
 SSB 0
 LB 4.00 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 FIP 220.000 ppm
 F1 27666.71 Hz
 F2P -5.000 ppm
 F2 -628.79 Hz
 PPMCM 11.25000 ppm/cm
 HZCM 1414.77527 Hz/cm

^1H NMR spectrum of **12**: CDCl_3 , 293 K, 300 MHz

^{13}C NMR spectrum of **12**: CDCl_3 , 293 K, 125 MHz

JPS2123 in cdcl_3 ^{13}C 125mhz rt 500 December 12 2005

Current Data Parameters
NAME JPS2123
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 500000
Time 16.36
INSTRUM spect
PROBHD 5 mm TXI 13C
PULPROG c13wznoe
TD 32768
SOLVENT CDCl_3
NS 284
DS 0
SMH 32679.738 Hz
FIDRES 0.997306 Hz
AQ 0.5014004 sec
RG 4096
DM 15.300 usec
DE 6.00 usec
TE 290.0 K
D3 0.00100000 sec
PL12 6.00 dB
D1 6.00000000 sec
CPDPRG2 waltz16
PCPD2 100.00 usec
SF02 500.1330008 MHz
NUC2 ^1H
PL2 120.00 dB
P1 21.60 usec
DE 6.00 usec
SF01 125.7715724 MHz
NUC1 ^{13}C
PL1 0.00 dB

F2 - Processing parameters
SI 8192
SF 125.7578040 MHz
WDW EM
SSB 0
LB 4.00 Hz
GB 0
PC 1.00

1D NMR plot parameters
CX 20.00 cm
F1P 200.000 ppm
F1 25151.56 Hz
F2P -5.000 ppm
F2 -628.79 Hz
PPMCH 10.25000 ppm/cm
HZCM 1289.01758 Hz/cm

^1H NMR spectrum of **14**: CDCl_3 , 293 K, 300 MHz

^{13}C NMR spectrum of **14**: CDCl_3 , 293 K, 75 MHz

^1H NMR spectrum of **16**: CDCl_3 , 293 K, 300 MHz

^{13}C NMR spectrum of **16**: CDCl_3 , 293 K, 75 MHz

^1H NMR spectrum of **24**: CDCl_3 , 293 K, 300 MHz

JPS2168 in cdcl_3 1h 300mhz rt 301 Ocotber 26 2005

¹³C NMR spectrum of **24**: CDCl₃, 293 K, 125 MHz

^1H NMR spectrum of **26**: CDCl_3 , 293 K, 300 MHz

JPS2193 in cdc13 1h 300mhz rt 301 December 3 2005

^{13}C NMR spectrum of **26**: CDCl_3 , 293 K, 125 MHz

JPS2193 after prep tlc 13c 125 mhz rt 500 December 12 2005