Pd-Catalyzed Asymmetric Allylic Alkylation of Indoles and Pyrroles by Chiral Alkene-Phosphine Ligands

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Supporting Information

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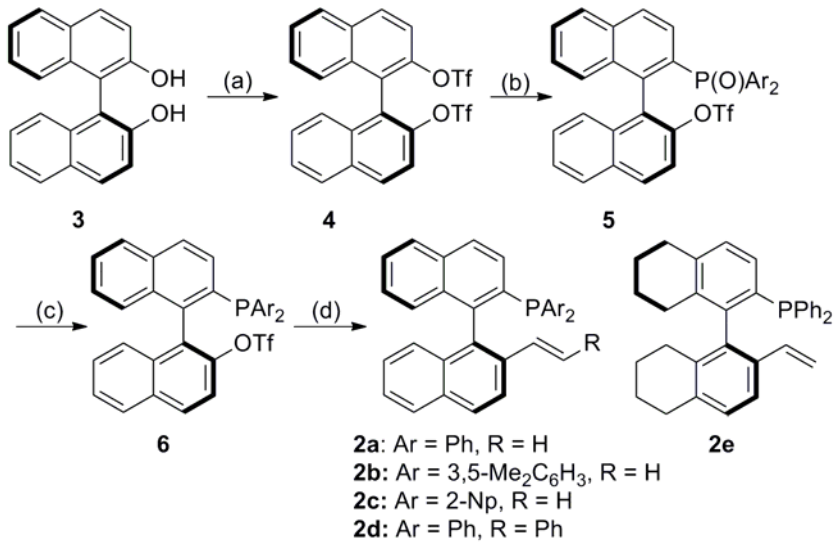
Representative procedure for the synthesis of terminal-alkene-phosphine hybrid ligand 2a (Scheme 1)



A single necked flask charged with a solution of (*S*)-BINOL (**3**) (14.3 g, 50 mmol) and Et_3N (15.2 g, 20.9 mL, 150 mmol) in CH_2Cl_2 (125 mL) was cooled to -78 °C, and Tf_2O (31.0 g, 18.5 mL, 110 mmol) was added dropwise. Then the resulting mixture was warmed to 0 °C for 2 h. After removal of the solvent under vacuum, the resulting thick residue was filtrated through a short silica gel column and flushed with petroleum ether/ethyl acetate (5:1, v/v). The filtrate was concentrated under reduce pressure, and the product **4** was obtained as a white solid (27.5 g, >99% yield) and used for the next step without further purification.

Ooi, T.; Kameda, M.; Maruoka, K. *J. Am. Chem. Soc.* **2003**, *125*, 5139.

To a schlenk flask charged with **4** (1.10 g, 2.0 mmol), diphenylphosphine oxide (0.808 g, 4 mmol), $Pd(OAc)_2$ (0.0224 g, 0.1 mmol) and dppb (0.0427 g, 0.1 mmol) in DMSO (8.8 mL) was added DIEA (1.03 g, 1.4 mL, 8.0 mmol) under argon. The resulting mixture was stirred at 100 °C for 12 h. Then the mixture was cooled to room temperature, diluted with EtOAc (50 mL), washed with water (20 mL x 3), brine (20 mL), successively. The organic phase was dried over anhydrous Na_2SO_4, filtered, concentrated, and the crude residue was further purified by flash chromatography on silica gel (petroleum ether/ethyl acetate = 1:1, v/v) to afford the desired product **5** as a white solid (1.08 g, 90% yield).

Uozumi, Y.; Tanahashi, A.; Lee, S.-Y.; Hayashi, T. *J. Org. Chem.* **1993**, *58*, 1945.

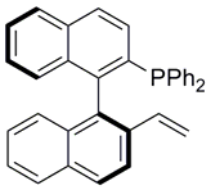
To a dried sealed tube charged with **5** (0.4876 g, 0.81 mmol) in dry toluene (20 mL), Et_3N (0.5727 g, 0.79 mL, 5.67 mmol) and $HSiCl_3$ (0.5488 g, 0.41 mL, 4.05 mmol) were added

successively under argon at 0 °C. The resulting mixture was stirring at 100 °C for 12 h. After cooled to 0 °C, diluted by Et_2O (10 mL), quenched with several drops of saturated Na_2CO_3 solution, the mixture was filtered by a short celite column, and washed with Et_2O (10 mL x 3). The filtrate was dried over anhydrous Na_2SO_4, filtered, concentrated, and the residue was purified by flash chromatography on silica gel (petroleum ether/ethyl acetate = 20:1, v/v) to afford the desired product **6** as a white solid (0.394 g, 83% yield).

Ref: Uozumi, Y.; Tanahashi, A.; Lee, S.-Y.; Hayashi, T. *J. Org. Chem.* **1993**, *58*, 1945.

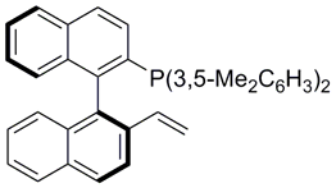
To a dried schlenk tube charged with **6** (0.0586 g, 0.1 mmol), potassium vinyltrifluoroborate (0.0161 g, 0.12 mmol), and $Pd(PPh_3)_4$ (0.0046 mg, 0.004 mmol), degassed Et_3N (0.0162 mg, 0.022 mL, 0.16 mmol) and dioxane (2 mL) was added sequentially. The mixture was heated to 104 °C for 3 h (detected by TLC). After cooling to ambient temperature, the mixture was concentrated and purified by flash chromatography on silica gel (petroleum ether/ethyl ether = 50:1, v/v) to afford the desired product **2a** as a white solid (0.0288 g, 62% yield).

Representative procedure for 2a/Pd-catalyzed asymmetric allylic alkylation of indoles. To a dried Schlenk flask charged with $[PdCl(C_3H_5)]_2$ (0.0011 g, 0.003 mmol, 3 mol % Pd), chiral phosphine-alkene ligand **2a** (0.0028 g, 0.006 mmol, 3 mol %), was added distilled CH_2Cl_2 (0.4 mL) under argon. Then the mixture was stirred for 30 minutes at room temperature before cooled to 0 °C. 1,3-Diphenyl-2-propenyl acetate **8** (0.0605 g, 0.24 mmol) in CH_2Cl_2 (0.40 mL), indole **7a** (0.0234 g, 0.2 mmol) and sodium carbonate (0.0424 g, 0.4 mmol), CH_2Cl_2 (0.2 mL) were added sequentially. After stirring at 0 °C for 24 h, the reaction mixture was quenched by water (1 mL) and extracted with CH_2Cl_2 (3 mL x 3). The solvent was removed under reduced pressure and crude residue was purified by flash chromatography on silica gel (petroleum ether/ethyl acetate = 20:1, v/v) to afford the desired product **9a** as a yellow solid (0.059 g, 95% yield).

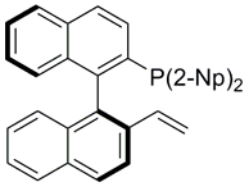


2a, white foam solid, m.p. 119-121 °C, $[\alpha]^{20}_D$ -90.0 (*c* 0.2, CH_2Cl_2). IR (film) 1478, 1434 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 7.95 (d, *J* = 8.8 Hz, 1H), 7.90 (d, *J* = 8.4 Hz, 2H), 7.85 (d, *J* = 8.4 Hz, 2H), 7.50-7.45 (m, 2H), 7.33 (t, *J* = 7.2 Hz, 1H), 7.27-7.12 (m, 10H), 7.06 (dd, *J* = 7.2, 6.8 Hz,

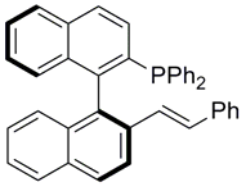
2H), 7.01 (dd, J = 8.4, 6.8 Hz, 1H), 6.88 (d, J = 8.4 Hz, 1H), 6.15 (dd, J = 17.6, 11.2 Hz, 1H), 5.64 (d, J = 17.6 Hz, 1H), 4.87 (d, J = 11.2 Hz, 1H); ^{31}P NMR (121 MHz, $CDCl_3$) δ -13.9; HRMS (EI): Calcd. for $C_{34}H_{25}P$ (M): 464.1694; Found: 464.1699.



2b, white foam solid, m.p. 53-55 °C, $[\alpha]^{20}_{D}$ -29.6 (c 0.25, CH_2Cl_2). IR (film) 1456 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.94 (d, J = 8.8 Hz, 1H), 7.91-7.82 (m, 4H), 7.54 (dd, J = 8.4, 2.8 Hz, 1H), 7.47 (dd, J = 7.6, 7.2 Hz, 1H), 7.35-7.29 (m, 1H), 7.26-7.20 (m, 1H), 7.15 (d, J = 8.4 Hz, 1H), 7.01 (dd, J = 8.0, 7.2 Hz, 1H), 6.89-6.82 (m, 4H), 6.80 (s, 1H), 6.68 (d, J = 8.0 Hz, 2H), 6.22 (dd, J = 17.6, 11.2 Hz, 1H), 5.68 (d, J = 17.6 Hz, 1H), 4.95 (d, J = 11.2 Hz, 1H), 2.21 (s, 6H), 2.13 (s, 6H); ^{31}P NMR (121 MHz, $CDCl_3$) δ -12.8; HRMS (EI): Calcd. for $C_{38}H_{33}P$ (M): 520.2320; Found: 520.2325.

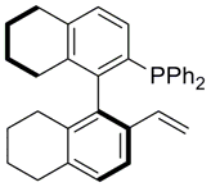


2c, white foam solid, m.p. 95-97 °C, $[\alpha]^{20}_{D}$ -82.7 (c 0.19, CH_2Cl_2). IR (film) 1499 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.99 (d, J = 8.8 Hz, 1H), 7.93-7.80 (m, 5H), 7.77 (d, J = 6.8 Hz, 2H), 7.70-7.65 (m, 3H), 7.61 (dd, J = 8.4, 2.4 Hz, 1H), 7.55 (d, J = 7.6 Hz, 1H), 7.53-7.37 (m, 6H), 7.37-7.19 (m, 5H), 6.91-6.83 (m, 2H), 6.23 (dd, J = 17.6, 10.8 Hz, 1H), 5.60 (d, J = 17.6 Hz, 1H), 4.82 (d, J = 10.8 Hz, 1H); ^{31}P NMR (121 MHz, $CDCl_3$) δ -12.4; HRMS (EI): Calcd. for $C_{42}H_{29}P$ (M): 564.2007; Found: 564.2014.



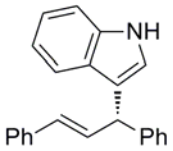
2d, white foam solid, m.p. 97-99 °C, $[\alpha]^{20}_{D}$ +40.9 (c 0.43, CH_2Cl_2). IR (film) 1479, 1434 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.01-7.86 (m, 5H), 7.52-7.46 (m, 2H), 7.37 (t, J = 7.2 Hz, 1H), 7.27-7.12 (m, 10H), 7.12-7.06 (m, 6H), 7.06-6.94 (m, 4H), 6.52 (d, J = 16.4 Hz, 1H); ^{31}P NMR

(121 MHz, $CDCl_3$) δ -14.0; HRMS (FT-ICRMS): Calcd. for $C_{40}H_{29}P$ (M): 540.2007; Found: 540.2001.



2e, white foam solid, m.p. 50-52 °C, $[\alpha]^{20}_{D}$ -46.0 (*c* 0.2, CH_2Cl_2). IR (film) 1477, 1456 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 7.37 (d, *J* = 8.0 Hz, 1H), 7.27-7.19 (m, 8H), 7.16-7.11 (m, 2H), 7.07 (d, *J* = 8.0 Hz, 1H), 7.04-6.99 (m, 2H), 6.00 (dd, *J* = 17.6, 10.8 Hz, 1H), 5.41 (d, *J* = 17.6 Hz, 1H), 4.78 (d, *J* = 10.8 Hz, 1H), 2.81 (dd, *J* = 6.4, 5.6 Hz, 2H), 2.75 (dd, *J* = 6.4, 6.0 Hz, 2H), 2.21-2.03 (m, 2H), 1.93 (dd, *J* = 6.4, 6.0 Hz, 2H), 1.73-1.50 (m, 6H), 1.50-1.19 (m, 2H); ^{31}P NMR (121 MHz, $CDCl_3$) δ -15.0; HRMS (FT-ICRMS): Calcd. for $C_{34}H_{33}P$ (M): 472.2320; Found: 472.2312.

Table 2, entry 1



9a, yellow solid, $[\alpha]^{20}_{D}$ +38.5 (*c* 1.90, CH_2Cl_2) (92% ee) [lit.: $[\alpha]^{20}_{D}$ -45.8 (*c* 0.98, CH_2Cl_2) (95% ee)]. ^1H NMR (400 MHz, $CDCl_3$) δ 7.96 (brs, 1H), 7.42 (d, *J* = 7.6 Hz, 1H), 7.38-7.14 (m, 12H), 7.02 (dd, *J* = 7.6, 7.2 Hz, 1H), 6.90 (s, 1H), 6.72 (dd, *J* = 16.0, 7.2 Hz, 1H), 6.44 (d, *J* = 16.0 Hz, 1H), 5.12 (d, *J* = 7.2 Hz, 1H) ; ^{13}C NMR (100 MHz, $CDCl_3$) δ 143.6, 137.7, 136.9, 132.8, 130.8, 128.7, 128.6, 127.4, 127.0, 126.6, 126.5, 122.8, 122.3, 120.1, 119.6, 118.9, 111.3, 46.4.

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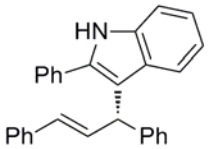
Table 2, entry 2



9b, yellow solid, $[\alpha]^{20}_{D}$ +75.3 (*c* 1.05, CH_2Cl_2) (82% ee) [lit.: $[\alpha]^{20}_{D}$ -71.9 (*c* 1.0, CH_2Cl_2) (92% ee)]. ^1H NMR (400 MHz, $CDCl_3$) δ 8.06 (brs, 1H), 7.59 (d, *J* = 7.2 Hz, 2H), 7.54-7.38 (m, 9H), 7.38-7.30 (m, 4H), 7.30-7.21 (m, 3H), 7.07 (dd, *J* = 7.6, 7.2 Hz, 1H), 6.97 (dd, *J* = 16.0, 7.2 Hz,

1H), 6.48 (d, J = 16.0 Hz, 1H), 5.36 (d, J = 7.2 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 143.7, 137.7, 136.4, 135.8, 133.1, 132.5, 131.3, 129.0, 128.8, 128.7, 128.5, 128.4, 128.2, 128.1, 127.3, 126.5, 126.3, 122.3, 121.4, 119.9, 114.0, 111.2, 45.3.

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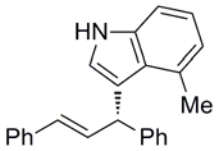
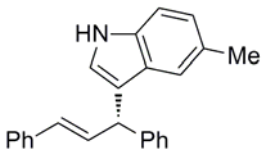
Table 2, entry 3



9c, white powder, m.p. 171-173 °C, $[\alpha]^{20}_{D}$ +68.4 (c 0.31, CH_2Cl_2) (94% ee). IR (film) 3419 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.96 (brs, 1H), 7.38 (d, J = 7.2 Hz, 2H), 7.37-7.27 (m, 6H), 7.27-7.16 (m, 3H), 7.11 (dd, J = 8.0, 7.2 Hz, 1H), 6.87-6.83 (m, 2H), 6.78 (dd, J = 16.0, 6.4 Hz, 1H), 6.28 (d, J = 16.0 Hz, 1H), 5.49 (d, J = 6.4 Hz, 1H), 2.57 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 144.3, 137.8, 137.2, 134.1, 131.3, 130.9, 129.1, 128.7, 128.6, 127.3, 126.5, 125.8, 123.7, 122.4, 121.5, 119.2, 109.2, 46.7, 20.6. HRMS (FT-ICRMS): Calcd. for $C_{24}H_{21}N$ (M): 323.1674; Found: 323.1663.

Table 2, entry 4



9d, yellow oil, $[\alpha]^{20}_{D}$ +38.1 (c 1.35, CH_2Cl_2) (92% ee) [lit.: $[\alpha]^{20}_{D}$ -48.3 (c 1.01, CH_2Cl_2) (96% ee)]. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.81 (brs, 1H), 7.37-7.16 (m, 12H), 6.99 (d, J = 8.4 Hz, 1H), 6.82 (d, J = 2.0 Hz, 1H), 6.71 (dd, J = 16.0, 7.2 Hz, 1H), 6.41 (d, J = 16.0 Hz, 1H), 5.09 (d, J = 7.2 Hz, 1H), 2.36 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 143.7, 137.8, 135.2, 132.9, 130.7, 128.9, 128.7, 128.6, 128.5, 127.3, 126.5, 124.0, 123.0, 119.6, 118.4, 111.0, 46.3, 21.7.

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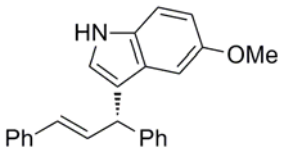
Table 2, entry 5



9e, yellow oil, $[\alpha]^{20}_{D}$ +32.1 (*c* 0.38, CH_2Cl_2) (90% ee) [lit.: $[\alpha]^{20}_{D}$ -38.5 (*c* 0.96, CH_2Cl_2) (94% ee)]. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.90 (brs, 1H), 7.44-7.17 (m, 11H), 6.89-6.82 (m, 3H), 6.72 (dd, *J* = 15.6, 7.6 Hz, 1H), 6.45 (d, *J* = 15.6 Hz, 1H), 5.08 (d, *J* = 7.6 Hz, 1H), 3.72 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 154.0, 143.5, 137.7, 132.7, 132.0, 130.7, 128.7, 128.6, 128.5, 127.4, 127.3, 126.6, 126.5, 123.7, 118.5, 112.3, 112.0, 102.0, 56.0, 46.4.

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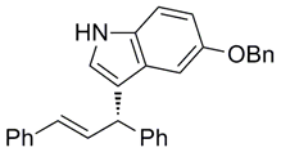
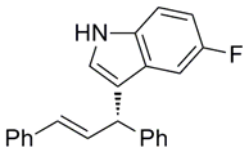
Table 2, entry 6



9f, yellow oil, $[\alpha]^{20}_{D}$ +30.5 (*c* 0.2, CH_2Cl_2) (90% ee) [lit.: $[\alpha]^{20}_{D}$ -30.2 (*c* 1.0, CH_2Cl_2) (94% ee)]. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.87 (brs, 1H), 7.40-7.16 (m, 16H), 6.93-6.86 (m, 3H), 6.69 (dd, *J* = 16.0, 7.2 Hz, 1H), 6.42 (d, *J* = 16.0 Hz, 1H), 5.04 (d, *J* = 7.2 Hz, 1H), 4.95 (s, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 153.2, 143.5, 137.8, 137.7, 132.7, 132.2, 130.8, 128.7, 128.6, 127.9, 127.8, 127.4, 127.3, 126.6, 126.5, 123.7, 118.6, 113.2, 112.0, 103.7, 71.1, 46.4.

Cheung, H. Y.; Yu, W.-Y.; Lam, F. L.; Au-Yeung, T. T.-L.; Zhou, Z.; Chan, T. H.; Chan, A. S. C. *Org. Lett*. **2007**, 9, 4295.

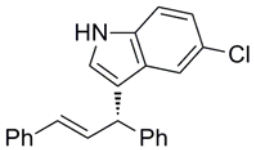
Table 2, entry 7



9g, light yellow oil, $[\alpha]^{20}_{D}$ +36.2 (*c* 1.41, CH_2Cl_2) (92% ee). IR (film) 3427 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.91 (brs, 1H), 7.43-7.23 (m, 11H), 7.11 (d, *J* = 8.8 Hz, 1H), 6.99-6.93 (m, 2H), 6.75 (dd, *J* = 16.0, 7.2 Hz, 1H), 6.49 (d, *J* = 16.0 Hz, 1H), 5.10 (d, *J* = 7.2 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 157.8 (d, $J_{C\text{-}F}$ = 233.0 Hz), 143.2, 137.6, 133.4, 132.3, 131.0, 128.7, 128.6, 127.5, 127.4, 127.3, 126.7, 126.5, 124.6, 119.0 (d, $J_{C\text{-}F}$ = 4.7 Hz), 111.9 (d, $J_{C\text{-}F}$ = 9.6 Hz), 110.7 (d, $J_{C\text{-}F}$ =

26.2 Hz), 104.9 (d, $J_{C\text{-}F}$ = 23.5 Hz), 46.3. HRMS (FT-ICRMS): Calcd. for $C_{23}H_{18}FN$ (M): 327.1423; Found: 327.1407.

Table 2, entry 8



9h, colorless oil, $[\alpha]^{20}_{D}$ +38.4 (*c* 0.23, CH_2Cl_2) (92% ee) [lit.: $[\alpha]^{20}_{D}$ -37.0 (*c* 0.94, CH_2Cl_2) (96% ee)]. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.98 (brs, 1H), 7.43-7.38 (m, 3H), 7.37-7.24 (m, 9H), 7.15 (dd, *J* = 8.4, 2.0 Hz, 1H), 6.93 (d, *J* = 2.0 Hz, 1H), 6.72 (dd, *J* = 16.0, 7.2 Hz, 1H), 6.45 (d, *J* = 16.0 Hz, 1H), 5.09 (d, *J* = 7.2 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 143.1, 137.5, 135.2, 132.3, 131.0, 128.7, 128.6, 128.1, 127.5, 126.8, 126.5, 125.4, 124.2, 122.7, 119.4, 118.7, 112.3, 46.1.

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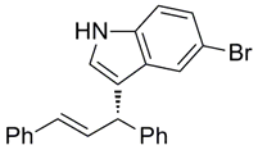
Table 2, entry 9



9i, light yellow oil, $[\alpha]^{20}_{D}$ +28.1 (*c* 1.80, CH_2Cl_2) (92% ee) [lit.: $[\alpha]^{20}_{D}$ -35.1 (*c* 1.0, CH_2Cl_2) (94% ee)]. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 (brs, 1H), 7.55 (d, *J* = 1.2 Hz, 1H), 7.38 (d, *J* = 7.2 Hz, 2H), 7.35-7.29 (m, 5H), 7.29-7.20 (m, 5H), 6.92 (d, *J* = 1.6 Hz, 1H), 6.69 (dd, *J* = 16.0, 7.2 Hz, 1H), 6.42 (d, *J* = 16.0 Hz, 1H), 5.07 (d, *J* = 7.2 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 143.1, 137.6, 135.5, 132.3, 131.1, 128.8, 128.7, 128.6, 128.5, 127.5, 126.8, 126.6, 125.3, 124.0, 122.5, 118.7, 113.0, 112.8, 46.1.

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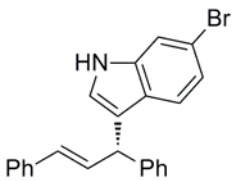
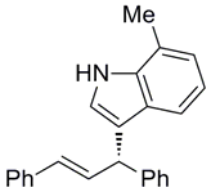
Table 2, entry 10



9j, white solid, m.p. 135-137 °C, $[\alpha]^{20}_{D}$ +33.4 (*c* 1.34, CH_2Cl_2) (94% ee). IR (film) 3424 cm^{-1}; ^{1}H

NMR (400 MHz, $CDCl_3$) δ 7.94 (brs, 1H), 7.50 (s, 1H), 7.39 (d, *J* = 8.0 Hz, 2H), 7.35-7.21 (m, 9H), 7.15 (dd, *J* = 8.4, 1.6 Hz, 1H), 6.88 (d, *J* = 2.0 Hz, 1H), 6.72 (dd, *J* = 16.0, 7.2 Hz, 1H), 6.45 (d, *J* = 16.0 Hz, 1H), 5.10 (d, *J* = 7.2 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 143.2, 137.7, 137.5, 132.3, 131.0, 128.8, 128.7, 128.6, 127.5, 126.8, 126.5, 125.9, 123.4, 123.0, 121.4, 119.2, 115.9, 114.2, 46.3. HRMS (FT-ICRMS): Calcd. for $C_{23}H_{18}BrN$ (M): 387.0623; Found: 387.0606.

Table 2, entry 11



9k, light yellow oil, $[\alpha]^{20}_D$ +37.3 (*c* 1.00, CH_2Cl_2) (75% ee) [lit.: $[\alpha]^{20}_D$ -40.7 (*c* 1.0, CH_2Cl_2) (96% ee)]. ^1H NMR (400 MHz, $CDCl_3$) δ 7.89 (brs, 1H), 7.42- 7.30 (m, 9H), 7.30 - 7.21 (m, 2H), 7.04-6.97 (m, 2H), 6.92 (d, *J* = 1.6 Hz, 1H), 6.78 (d, *J* = 15.6, 7.2 Hz, 1H), 6.49 (d, *J* = 15.6 Hz, 1H), 5.16 (d, *J* = 7.2 Hz, 1H), 2.51 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 143.7, 137.8, 136.5, 132.8, 130.8, 128.7, 128.6, 128.5, 127.3, 126.6, 126.5, 122.9., 122.5, 120.4, 119.9, 119.4, 117.9, 46.5, 16.8.

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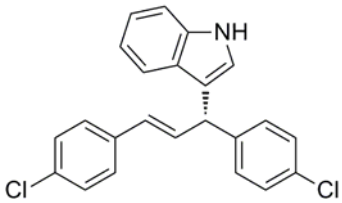
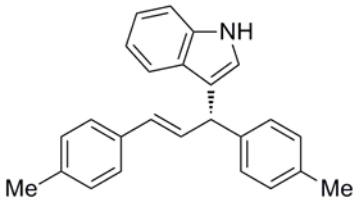
Table 2, entry 12



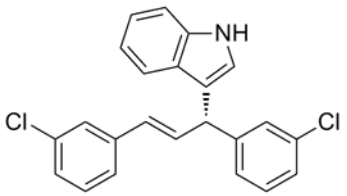
9l, yellow oil, $[\alpha]^{20}_D$ +21.1 (*c* 0.55, CH_2Cl_2) (80% ee). IR (film) 3449, 3416, 1489 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 7.97 (brs, 1H), 7.43 (d, *J* = 7.6 Hz, 1H), 7.38 (d, *J* = 8.0 Hz, 1H), 7.35-7.20 (m, 9H), 7.10 (dd, *J* = 7.6, 7.2 Hz, 1H), 6.90 (d, *J* = 1.6 Hz, 1H), 6.69 (dd, *J* = 16,0, 7.2 Hz, 1H), 6.39 (dd, *J* = 16.0, 0.8 Hz, 1H), 5.12 (d, *J* = 7.2 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 141.8, 136.8, 135.9, 133.1, 132.8, 132.4, 130.0, 129.9, 128.8, 128.7, 127.7, 126.7, 122.8, 122.5, 119.9, 119.8, 118.1, 111.4, 45.7. HRMS (TOF-EI): Calcd. for $C_{23}H_{17}Cl_2N$ (M): 377.0738; Found: 377.0742.

Table 2, entry 13



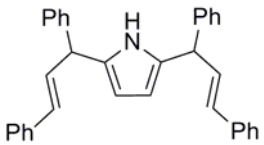
9m, light yellow form, m.p. 47-49 °C, $[\alpha]^{20}_{D}$ +32.8 (*c* 0.5, CH_2Cl_2) (86% ee). IR (film) 3419, 1510, 1456 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 7.91 (brs, 1H), 7.49 (d, *J* = 8.0 Hz, 1H), 7.36 (d, *J* = 8.0 Hz, 1H), 7.31 (d, *J* = 8.0 Hz, 2H), 7.27 (d, *J* = 8.4 Hz, 2H), 7.21 (t, *J* = 7.6 Hz, 1H), 7.18-7.10 (m, 4H), 7.07 (dd, *J* = 7.6, 7.2 Hz, 1H), 6.90 (d, *J* = 1.6 Hz, 1H), 6.71 (dd, *J* = 15.6, 7.2 Hz, 1H), 6.45 (d, *J* = 15.6 Hz, 1H), 5.12 (d, *J* = 7.2 Hz, 1H), 2.38 (s, 3H), 2.37 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 140.7, 137.0, 136.8, 136.0, 135.0, 131.9, 130.4, 129.4, 129.3, 128.5, 127.0, 126.4, 122.7, 122.2, 120.1, 119.6, 119.2, 111.3, 46.0, 21.4, 21.3. HRMS (TOF-EI): Calcd. for $C_{25}H_{23}N$ (M): 337.1830; Found: 337.1835.

Table 2, entry 14



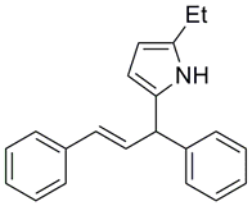
9n, light yellow oil, $[\alpha]^{20}_{D}$ +35.6 (*c* 1.74, CH_2Cl_2) (89% ee). IR (film) 3448, 3416, 1593, 1569, 1473 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 8.04 (brs, 1H), 7.41 (d, *J* = 8.4 Hz, 2H), 7.37 (d, *J* = 2.4 Hz, 1H), 7.32 (s, 1H), 7.27-7.17 (m, 7H), 7.06 (t, *J* = 7.6 Hz, 1H), 6.93 (d, *J* = 1.6 Hz, 1H), 6.72 (dd, *J* = 15.6, 7.2 Hz, 1H), 6.37 (d, *J* = 15.6 Hz, 1H), 5.10 (d, *J* = 7.2 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 145.4, 139.3, 136.9, 134.7, 134.5, 133.4, 130.1, 130.0, 128.7, 127.5, 127.0, 126.9, 126.7, 126.4, 124.8, 122.8, 122.6, 119.9, 119.8, 117.8, 111.5, 46.0. HRMS (TOF-EI): Calcd. for $C_{23}H_{17}Cl_2N$ (M): 377.0738; Found: 377.0743.

Scheme 3



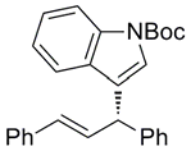
13a, pink oil, $[\alpha]^{20}_{D}$ +19.7 (*c* 0.89, CH_2Cl_2) (98% ee, dr = 8.5/1). IR (film) 3439, 3422, 1599, 1449

cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 7.56 (brs, 1H), 7.37-7.18 (m, 20H), 6.56 (d, *J* = 15.6, 7.6 Hz, 2H), 6.39 (d, *J* = 15.6 Hz, 2H), 5.89 (d, *J* = 2.4 Hz, 2H), 4.82 (d, *J* = 7.6 Hz, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 142.4, 137.3, 132.9, 131.4, 131.3, 128.8, 128.7, 128.6, 127.6, 127.0, 126.6, 107.1, 48.3. HRMS (TOF-EI): Calcd. for $C_{34}H_{29}N$ (M): 451.2300; Found: 451.2305.



13b, light yellow oil, $[\alpha]^{20}_D$ -11.5 (*c* 1.89, CH_2Cl_2) (86% ee). IR (film) 3423, 1598, 1492 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 7.60 (brs, 1H), 7.46-7.22 (m, 10H), 6.65 (dd, *J* = 15.6, 7.6 Hz, 1H), 6.49 (d, *J* = 15.6 Hz, 1H), 5.91-5.88 (m, 2H), 4.88 (d, *J* = 7.6 Hz, 1H), 2.61 (q, *J* = 7.6 Hz, 2H), 1.26 (t, *J* = 7.6 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 142.5, 137.3, 134.1, 131.6, 131.5, 131.2, 128.8, 128.7, 128.6, 127.6, 127.0, 126.6, 106.8, 104.3, 48.5, 21.1, 13.7. HRMS (TOF-EI): Calcd. for $C_{21}H_{21}N$ (M): 287.1674; Found: 287.1678.

BOC-derivatives



Light yellow oil, $[\alpha]^{20}_D$ +36.1 (*c* 1.65, CH_2Cl_2) (92% ee) [lit.: $[\alpha]^{20}_D$ -38.8 (*c* 1.01, CH_2Cl_2) (95% ee)]. ^1H NMR (400 MHz, $CDCl_3$) δ 8.14 (d, *J* = 7.6 Hz, 1H), 7.39 (d, *J* = 7.6 Hz, 4H), 7.37-7.20 (m, 9H), 7.15 (t, *J* = 7.6 Hz, 1H), 6.71 (dd, *J* = 16.0, 7.2 Hz, 1H), 6.46 (d, *J* = 16.0 Hz, 1H), 5.06 (d, *J* = 7.2 Hz, 1H), 1.69 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 150.1, 142.3, 137.4, 136.0, 131.5, 131.4, 130.1, 128.8, 128.7, 128.6, 127.6, 126.9, 126.6, 124.6, 124.0, 123.3, 122.6, 120.3, 115.5, 83.9, 46.2, 28.4.

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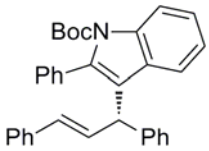

Colorless oil, $[\alpha]^{20}_{D}$ +33.6 (*c* 1.56, CH_2Cl_2) (82% ee) [lit.: $[\alpha]^{20}_{D}$ -39.6 (*c* 1.0, CH_2Cl_2) (92% ee)]. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.28 (d, *J* = 8.8 Hz, 1H), 7.45-7.35 (m, 5H), 7.33-7.14 (m, 12H), 7.09 (t, *J* = 7.6 Hz, 1H), 6.74 (dd, *J* = 15.6, 7.6 Hz, 1H), 6.30 (d, *J* = 15.6 Hz, 1H), 4.84 (d, *J* = 7.6 Hz, 1H), 1.22 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 150.4, 142.8, 137.6, 137.2, 136.8, 134.5, 131.8, 130.9, 130.3, 128.7, 128.5, 128.3, 128.2, 128.1, 128.0, 127.5, 126.5, 126.4, 124.5, 122.7, 121.5, 121.1, 115.6, 83.3, 45.1, 27.7.

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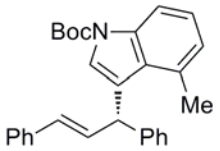
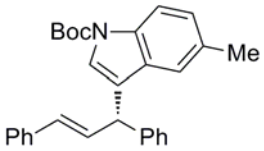


White powder, m.p. 138-140 °C, $[\alpha]^{20}_{D}$ +45.6 (*c* 0.31, CH_2Cl_2) (94% ee). IR (film) 1731 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 (d, *J* = 8.0 Hz, 1H), 7.36-7.14 (m, 12H), 6.90 (d, *J* = 7.2 Hz, 1H), 6.68 (dd, *J* = 16.0, 6.8 Hz, 1H), 6.26 (d, *J* = 16.0 Hz, 1H), 5.33 (d, *J* = 6.8 Hz, 1H), 2.46 (s, 3H), 1.64 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 150.0, 142.9, 137.5, 136.5, 132.8, 131.5, 131.4, 129.0, 128.8, 128.7, 127.5, 126.9, 126.6, 125.1, 125.0, 124.6, 123.6, 113.3, 83.9, 46.7, 28.4, 20.5. HRMS (FT-ICRMS): Calcd. for $C_{29}H_{29}NO_2$ (M): 423.2198; Found: 423.2191.



White powder, m.p. 139-141 °C, $[\alpha]^{20}_{D}$ +45.8 (*c* 0.26, CH_2Cl_2) (92% ee) [lit.: $[\alpha]^{20}_{D}$ -41.2 (*c* 1.05, CH_2Cl_2) (96% ee)]. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.00 (d, *J* = 7.2 Hz, 1H), 7.40-7.20 (m, 11H), 7.13 (dd, *J* = 8.8, 8.0 Hz, 2H), 6.70 (dd, *J* = 16.0, 7.2 Hz, 1H), 6.44 (d, *J* = 16.0 Hz, 1H), 5.03 (d, *J* = 7.2 Hz, 1H), 2.37 (s, 3H), 1.68 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 150.1, 142.4, 137.5, 134.2, 132.1, 131.6, 131.4, 130.3, 128.8, 128.7, 128.6, 127.5, 126.9, 126.6, 126.0, 124.1, 123.0, 120.1, 115.1, 83.7, 46.0, 28.5, 21.6.

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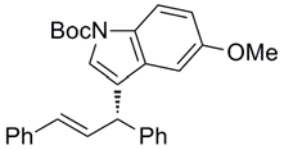

White solid, m.p. 109-111 °C, $[\alpha]^{20}_{D}$ +34.7 (*c* 2.25, CH_2Cl_2) (90% ee) [lit.: $[\alpha]^{20}_{D}$ -37.6 (*c* 0.95, CH_2Cl_2) (94% ee)]. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.04 (brs, 1H), 7.43-7.22 (m, 11H), 6.94 (dd, *J* = 8.8, 2.4 Hz, 1H), 6.82 (d, *J* = 2.0 Hz, 1H), 6.72 (dd, *J* = 16.0, 7.6 Hz, 1H), 6.49 (d, *J* = 16.0 Hz, 1H), 5.03 (d, *J* = 7.6 Hz, 1H), 3.75 (s, 3H), 1.69 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 155.8, 150.0, 142.2, 137.4, 131.5, 131.3, 130.9, 130.7, 128.8, 128.7, 128.6, 127.6, 126.9, 126.6, 124.6, 123.0, 116.1, 112.9, 103.3, 83.7, 55.8, 46.2, 28.4.

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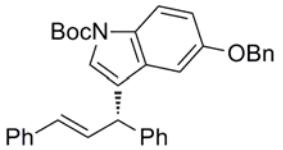

Light yellow powder, m.p. 50-51 °C, $[\alpha]^{20}_{D}$ +30.1 (*c* 1.05, CH_2Cl_2) (90% ee) [lit.: $[\alpha]^{20}_{D}$ -28.2 (*c* 0.97, CH_2Cl_2) (94% ee)]. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.98 (d, *J* = 6.8 Hz, 1H), 7.40-7.17 (m, 16H), 6.96 (dd, *J* = 8.8, 2.4 Hz, 1H), 6.85 (d, *J* = 2.4 Hz, 1H), 6.64 (dd, *J* = 15.6, 7.2 Hz, 1H), 6.41 (d, *J* = 15.6 Hz, 1H), 4.95 (d, *J* = 7.2 Hz, 1H), 4.94 (s, 2H), 1.64 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 154.9, 150.0, 142.2, 137.4, 131.6, 131.3, 130.9, 128.8, 128.7, 128.6, 128.5, 128.0, 127.7, 127.6, 126.9, 126.6, 124.7, 123.0, 116.2, 113.9, 104.8, 83.7, 70.8, 46.2, 28.4.

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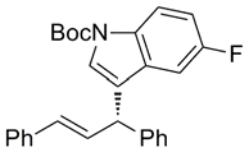
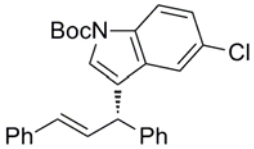
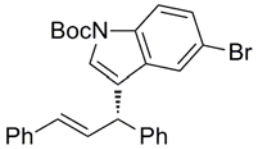


Light yellow powder, m.p. 49-51 °C, $[\alpha]^{20}_{D}$ +37.9 (*c* 1.56, CH_2Cl_2) (92% ee). IR (film) 1733 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.10 (brs, 1H), 7.45-7.42 (m, 11H), 7.06-6.99 (m, 2H), 6.69 (dd, *J* = 15.6, 7.2 Hz, 1H), 6.47 (d, *J* = 15.6 Hz, 1H), 5.00 (d, *J* = 7.2 Hz, 1H), 1.69 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 159.2 (d, $J_{C\text{-}F}$ = 238 Hz), 149.8, 141.9, 137.3, 132.4, 131.7, 131.1, 131.0, 128.9, 128.8, 128.5, 127.7, 127.1, 126.6, 125.5, 123.0 (d, $J_{C\text{-}F}$ = 4.7 Hz), 116.4 (d, $J_{C\text{-}F}$ = 9.6 Hz), 112.3 (d, $J_{C\text{-}F}$ = 26.2 Hz), 105.9 (d, $J_{C\text{-}F}$ = 23.5 Hz), 84.1, 46.1, 28.4. HRMS (FT-ICRMS): Calcd. for

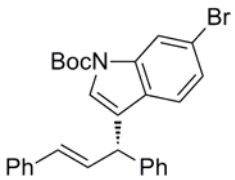
$C_{28}H_{26}FNO_2$ (M): 427.1948; Found: 427.1946.



White solid, m.p. 136-138 °C, $[\alpha]^{20}_{D}$ +36.2 (*c* 1.50, CH_2Cl_2) (92% ee) [lit.: $[\alpha]^{20}_{D}$ -36.1 (*c* 0.95, CH_2Cl_2) (96% ee)]. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.07 (d, *J* = 8.4 Hz, 1H), 7.42-7.23 (m, 13H), 6.68 (dd, *J* = 15.6, 7.6 Hz, 1H), 6.45 (d, *J* = 15.6 Hz, 1H), 5.01 (d, *J* = 7.6 Hz, 1H), 1.69 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 149.7, 141.9, 137.3, 134.4, 131.8, 131.3, 131.0, 128.9, 128.7, 128.5, 128.4, 127.7, 127.1, 126.6, 125.2, 124.8, 122.7, 119.8, 116.5, 84.3, 46.0, 28.4.
Cheung, H. Y.; Yu, W.-Y.; Lam, F. L.; Au-Yeung, T. T.-L.; Zhou, Z.; Chan, T. H.; Chan, A. S. C. *Org. Lett*. **2007**, 9, 4295.

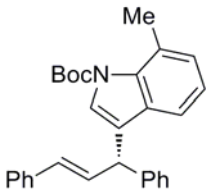


Light yellow solid, m.p. 128-130 °C, $[\alpha]^{20}_{D}$ +35.4 (*c* 0.26, CH_2Cl_2) (92% ee) [lit.: $[\alpha]^{20}_{D}$ -32.9 (*c* 1.0, CH_2Cl_2) (94% ee)]. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.00 (d, *J* = 8.4 Hz, 1H), 7.46 (s, 1H), 7.39-7.20 (m, 12H), 6.65 (dd, *J* = 15.6, 7.2 Hz, 1H), 6.42 (d, *J* = 15.6 Hz, 1H), 4.99 (d, *J* = 7.2 Hz, 1H), 1.66 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 149.7, 141.9, 137.3, 134.8, 131.8, 131.7, 131.0, 128.9, 128.8, 128.6, 127.7, 127.5, 127.1, 126.6, 125.1, 122.8, 122.6, 116.9, 116.1, 84.4, 45.9, 28.4.
Cheung, H. Y.; Yu, W.-Y.; Lam, F. L.; Au-Yeung, T. T.-L.; Zhou, Z.; Chan, T. H.; Chan, A. S. C. *Org. Lett*. **2007**, 9, 4295.



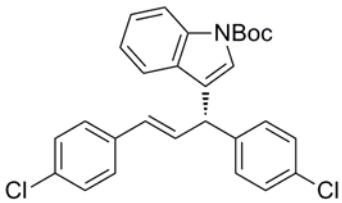
White powder, m.p. 138-140 °C, $[\alpha]^{20}_{D}$ +37.0 (*c* 1.49, CH_2Cl_2) (94% ee). IR (film) 1733 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.37 (brs, 1H), 7.41-7.24 (m, 12H), 7.19 (d, *J* = 8.4 Hz, 1H), 6.68 (dd, *J* = 15.6, 7.2 Hz, 1H), 6.46 (d, *J* = 15.6 Hz, 1H), 5.03 (d, *J* = 7.2 Hz, 1H), 1.70 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 149.6, 142.0, 137.3, 136.8, 131.7, 131.0, 128.9, 128.8, 128.6, 127.7, 127.1, 126.6, 125.9, 124.4, 123.1, 121.4, 118.7, 118.4, 84.5, 46.1, 28.4. HRMS (FT-ICRMS): Calcd. for

$C_{28}H_{26}BrNO_2$ (M): 487.1147; Found: 487.1151.

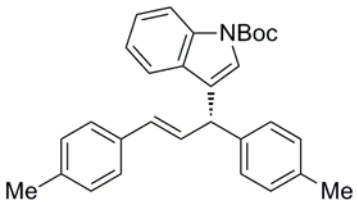


White powder, m.p. 102-104 °C, $[\alpha]^{20}_{D}$ +34.9 (*c* 0.90, CH_2Cl_2) (75% ee) [lit.: $[\alpha]^{20}_{D}$ -44.8 (*c* 1.05, CH_2Cl_2) (96% ee)]. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.38 (d, *J* = 7.2 Hz, 2H), 7.35-7.22 (m, 9H), 7.19 (d, *J* = 8.4 Hz, 1H), 7.11-7.04 (m, 2H), 6.70 (dd, *J* = 16.0, 7.2 Hz, 1H), 6.45 (d, *J* = 16.0 Hz, 1H), 5.03 (d, *J* = 7.2 Hz, 1H), 2.65 (s, 3H), 1.63 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 149.9, 142.4, 137.5, 135.7, 131.5, 131.4, 131.3, 128.7, 128.6, 128.0, 127.5, 126.9, 126.6, 126.2, 125.6, 123.1, 122.8, 117.9, 83.6, 46.1, 28.3, 22.4.

Cheung, H. Y.; Yu, W.-Y.; Lam, F. L.; Au-Yeung, T. T.-L.; Zhou, Z.; Chan, T. H.; Chan, A. S. C. *Org. Lett*. **2007**, 9, 4295.

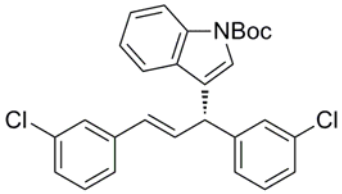


White solid, m.p. 65-67 °C, $[\alpha]^{20}_{D}$ +35.3 (*c* 1.9, CH_2Cl_2) (80% ee). IR (film) 1732, 1490, 1452 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.13 (d, *J* = 7.2 Hz, 1H), 7.38 (s, 1H), 7.36-7.21 (m, 10H), 7.15 (t, *J* = 7.6 Hz, 1H), 6.63(dd, *J* = 15.6, 7.2 Hz, 1H), 6.36 (d, *J* = 15.6 Hz, 1H), 5.01 (d, *J* = 7.2 Hz, 1H), 1.69 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 150.0, 140.5, 136.0, 135.6, 133.4, 132.8, 131.5, 130.7, 130.0, 129.7, 129.0, 128.9, 127.8, 124.8, 124.0, 122.8, 122.5, 120.1, 115.6, 84.1, 45.4, 28.4. HRMS (TOF-EI): Calcd. for $C_{28}H_{25}Cl_2NO_2$ (M): 477.1262; Found: 477.1267.

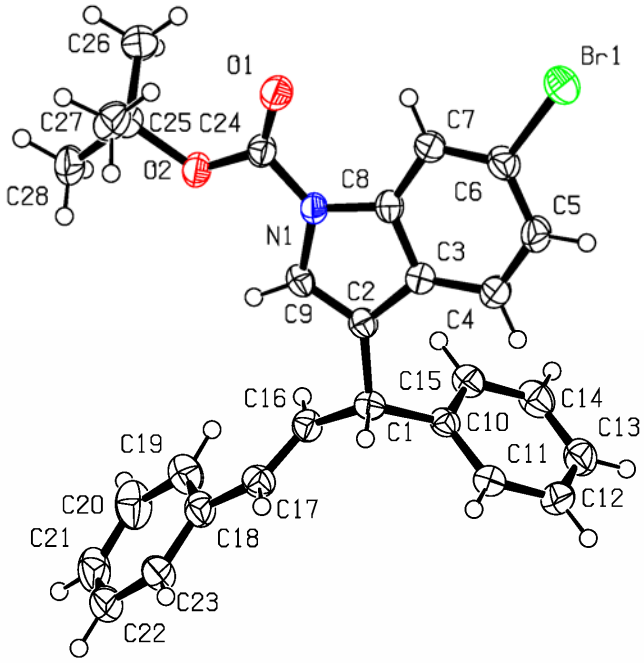


White solid, m.p. 54-56 °C, $[\alpha]^{20}_{D}$ +40.6 (*c* 0.51, CH_2Cl_2) (86% ee). IR (film) 1732, 1542, 1452 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.17 (d, *J* = 6.8 Hz, 1H), 7.44-7.37 (m, 2H), 7.36-7.28 (m,

3H), 7.28-7.23 (m, 2H), 7.21-7.11 (m, 5H), 6.67 (dd, J = 16.0, 7.2 Hz, 1H), 6.45 (d, J = 16.0 Hz, 1H), 5.03 (d, J = 7.2 Hz, 1H), 2.38 (s, 3H), 2.37 (s, 3H), 1.71 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 150.1, 139.4, 137.3, 136.3, 136.0, 134.7, 131.1, 130.6, 130.2, 129.4, 129.3, 128.5, 126.5, 124.5, 123.9, 123.6, 122.6, 120.4, 115.4, 83.8, 45.8, 28.4, 21.4, 21.3. HRMS (TOF-EI): Calcd. for $C_{30}H_{31}NO_2$ (M): 437.2355; Found: 437.2359.



White solid, m.p. 49-51 °C, $[\alpha]^{20}_{D}$ +41.6 (c 1.41, CH_2Cl_2) (89% ee). IR (film) 1732, 1593, 1569, 1474 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.13 (d, J = 7.2 Hz, 1H), 7.38 (d, J = 8.0 Hz, 2H), 7.34-7.27 (m, 3H), 7.27-7.19 (m, 6H), 7.16 (t, J = 7.6 Hz, 1H), 6.67 (dd, J = 16.0, 7.2 Hz, 1H), 6.37 (d, J = 16.0 Hz, 1H), 5.02 (d, J = 7.2 Hz, 1H), 1.69 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 150.0, 144.1, 139.0, 136.0, 134.8, 134.7, 132.1, 130.8, 130.1, 130.0, 129.7, 128.7, 127.7, 127.3, 126.8, 126.5, 124.8, 124.7, 124.1, 122.8, 122.1, 120.0, 115.6, 84.1, 45.7, 28.4. HRMS (TOF-EI): Calcd. for $C_{28}H_{25}Cl_2NO_2$ (M): 477.1262; Found: 477.1268.



X-ray structure of Boc-protected **9j**

Table 1. Crystal data and structure refinement for Boc-protected **9j**.

Identification code	sa1001
Empirical formula	C28 H26 Br N O2
Formula weight	488.41
Temperature	173(2) K
Wavelength	0.71073 A
Crystal system, space group	Monoclinic, C2
Unit cell dimensions	a = 23.306(7) A alpha = 90 deg.
	b = 5.8518(19) A beta = 91.215(5) deg.
	c = 17.515(6) A gamma = 90 deg.
Volume	2388.2(13) A^3
Z, Calculated density	4, 1.358 Mg/m^3
Absorption coefficient	1.746 mm^-1
F(000)	1008
Crystal size	0.43 x 0.13 x 0.12 mm
Theta range for data collection	2.88 to 27.45 deg.
Limiting indices	-30<=h<=30, -6<=k<=7, -22<=l<=22
Reflections collected / unique	14599 / 5303 [R(int) = 0.0399]
Completeness to theta = 27.45	99.6 %
Absorption correction	Numerical
Max. and min. transmission	0.8179 and 0.5206
Refinement method	Full-matrix least-squares on F^2
Data / restraints / parameters	5303 / 1 / 292
Goodness-of-fit on F^2	1.193
Final R indices [I>2sigma(I)]	R1 = 0.0411, wR2 = 0.0973
R indices (all data)	R1 = 0.0465, wR2 = 0.1078
Absolute structure parameter	-0.005(8)
Largest diff. peak and hole	0.618 and -0.631 e.A^-3

The chromatography for the determination of enantiomeric excess

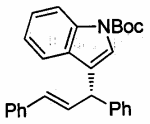
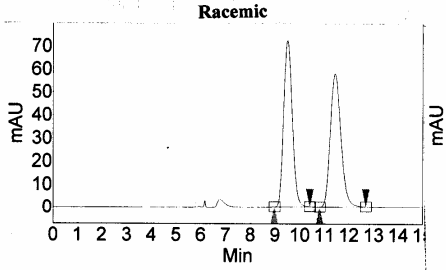


Table 2, Entry 1

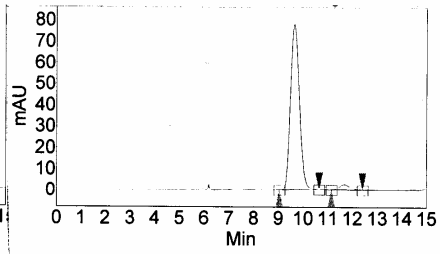
HPLC Conditions: Column: Chiralpak OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA (99/1); **Flow rate:** 0.7 mL/min; **Detection:** UV 254 nm

Racemic



Index	Time [Min]	Area % [%]
1	9.49	50.268
2	11.43	49.732
Total		100.000

Chiral



Index	Time [Min]	Area % [%]
1	9.64	95.857
2	11.67	4.143
Total		100.000

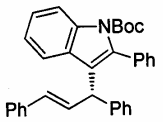
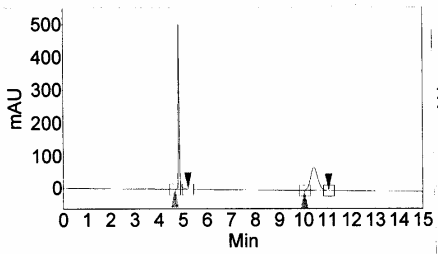


Table 2, Entry 2

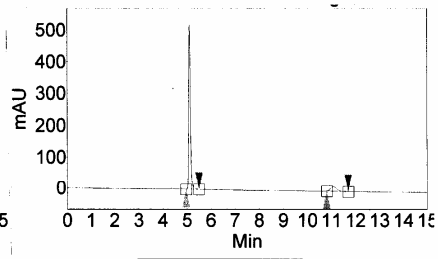
HPLC Conditions: Column: Chiralpak AD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA (99/1); **Flow rate:** 1.0 mL/min; **Detection:** UV 254 nm

Racemic



Index	Time [Min]	Area % [%]
1	4.83	48.221
2	10.44	51.779
Total		100.000

Chiral



Index	Time [Min]	Area % [%]
1	5.12	91.378
2	11.08	8.622
Total		100.000

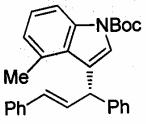
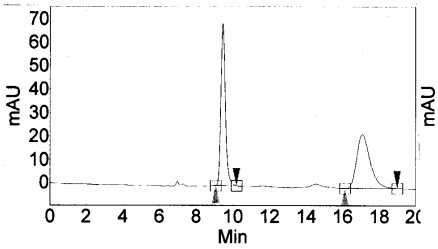


Table 2, Entry 3

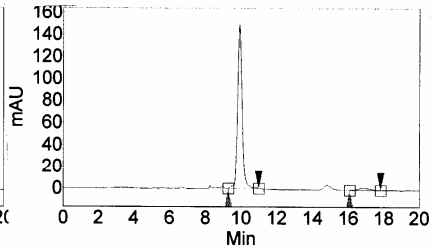
HPLC Conditions: Column: Chiralpak OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA (99/1); **Flow rate:** 0.7 mL/min; **Detection:** UV 254 nm

Racemic



Index	Time [Min]	Area % [%]
1	9.44	50.428
2	17.08	49.572
Total		100.000

Chiral



Index	Time [Min]	Area % [%]
1	9.91	96.730
2	16.84	3.270
Total		100.000

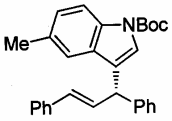
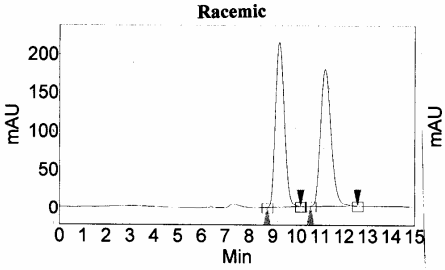


Table 2, Entry 4

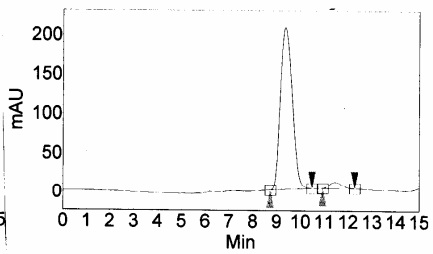
HPLC Conditions: Column: Chiralpak OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA (99/1); **Flow rate:** 0.7 mL/min; **Detection:** UV 254 nm

Racemic



Index	Time [Min]	Area % [%]
1	9.27	50.105
2	11.20	49.895
Total		100.000

Chiral



Index	Time [Min]	Area % [%]
1	9.35	95.897
2	11.45	4.103
Total		100.000

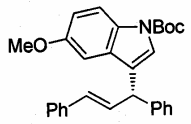
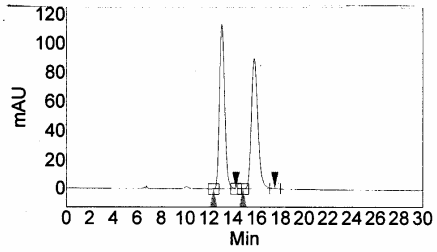


Table 2, Entry 5

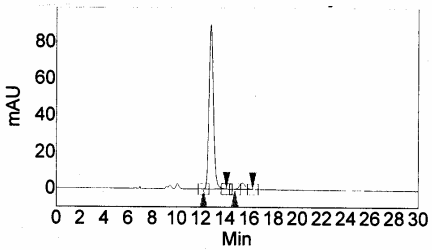
HPLC Conditions: Column: Chiralpak OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA (99/1); **Flow rate:** 0.7 mL/min; **Detection:** UV 254 nm

Racemic



Index	Time [Min]	Area % [%]
1	13.05	50.231
2	15.79	49.769
Total		100.000

Chiral



Index	Time [Min]	Area % [%]
1	12.81	95.191
2	15.43	4.809
Total		100.000

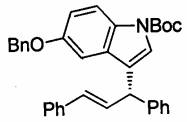
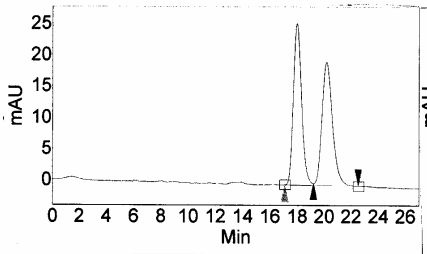


Table 2, Entry 6

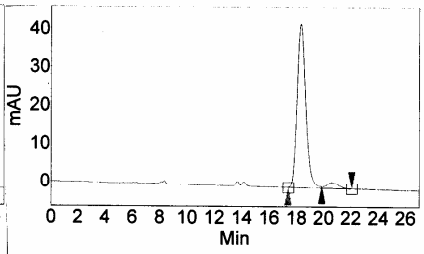
HPLC Conditions: Column: Chiralpak OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA (99/1); **Flow rate:** 0.7 mL/min; **Detection:** UV 254 nm

Racemic



Index	Time [Min]	Area % [%]
1	17.99	50.448
2	20.16	49.552
Total		100.000

Chiral



Index	Time [Min]	Area % [%]
1	18.32	95.224
2	20.61	4.776
Total		100.000

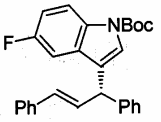
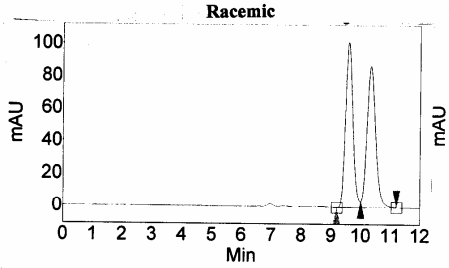


Table 2, Entry 7

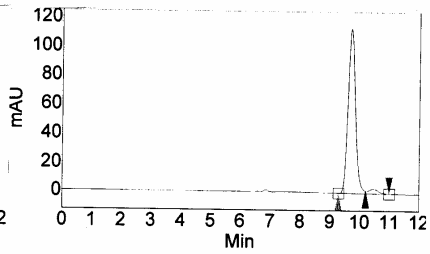
HPLC Conditions: Column: Chiralpak OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA (99/1); **Flow rate:** 0.7 mL/min; **Detection:** UV 254 nm

Racemic



Index	Time [Min]	Area % [%]
1	9.59	49.793
2	10.33	50.207
Total		100.000

Chiral



Index	Time [Min]	Area % [%]
1	9.71	96.304
2	10.47	3.696
Total		100.000

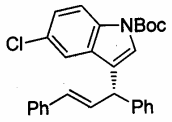
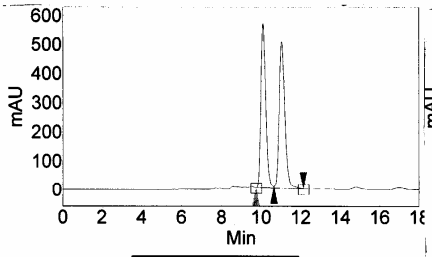


Table 2, Entry 8

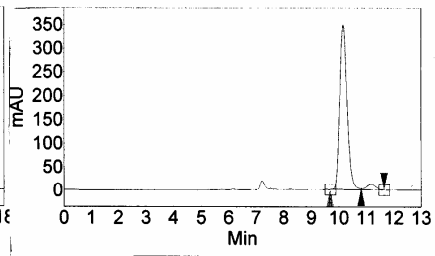
HPLC Conditions: Column: Chiralpak OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA (99/1); **Flow rate:** 0.7 mL/min; **Detection:** UV 254 nm

Racemic



Index	Time [Min]	Area % [%]
1	10.11	49.052
2	11.05	50.948
Total		100.000

Chiral



Index	Time [Min]	Area % [%]
1	10.16	96.043
2	11.17	3.957
Total		100.000

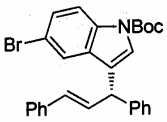
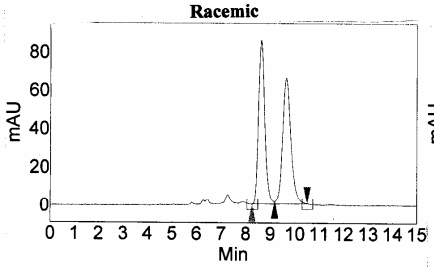


Table 2, Entry 9

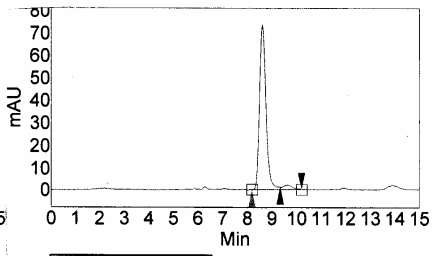
HPLC Conditions: Column: Chiralpak OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA (99/1); **Flow rate:** 0.7 mL/min; **Detection:** UV 254 nm

Racemic



Index	Time [Min]	Area % [%]
1	8.63	49.317
2	9.65	50.683
Total		100.000

Chiral



Index	Time [Min]	Area % [%]
1	8.61	95.990
2	9.64	4.010
Total		100.000

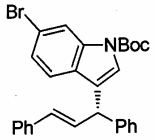
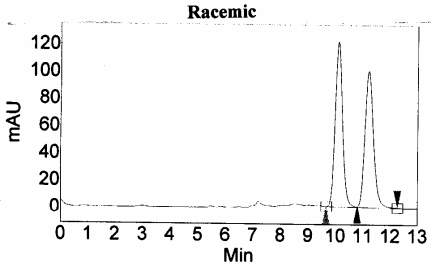


Table 2, Entry 10

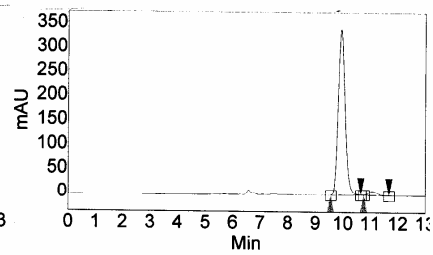
HPLC Conditions: Column: Chiralpak OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA (99/1); **Flow rate:** 0.7 mL/min; **Detection:** UV 254 nm

Racemic



Index	Time [Min]	Area % [%]
1	10.09	50.963
2	11.20	49.037
Total		100.000

Chiral



Index	Time [Min]	Area % [%]
1	9.93	97.254
2	11.07	2.746
Total		100.000

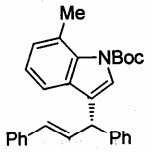
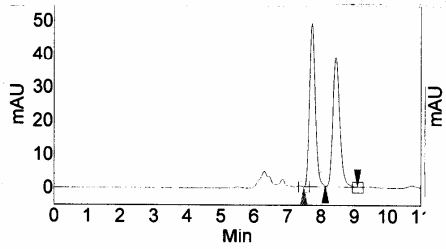


Table 2, Entry 11

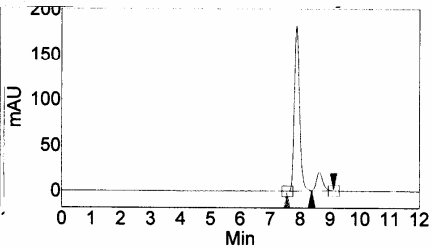
HPLC Conditions: Column: Chiralpak OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA (97/3); **Flow rate:** 0.7 mL/min; **Detection:** UV 254 nm

Racemic



Index	Time [Min]	Area % [%]
1	7.72	50.769
2	8.44	49.231
Total		100.000

Chiral



Index	Time [Min]	Area % [%]
1	7.88	87.550
2	8.64	12.450
Total		100.000

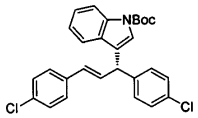
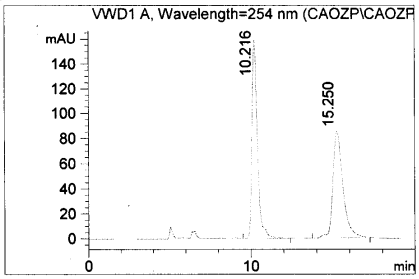


Table 2, Entry 12

HPLC Conditions: Column: Chiralpak OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA (99/1); **Flow rate:** 0.7 mL/min; **Detection:** UV 254 nm

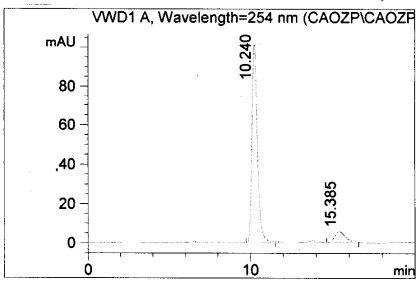
Racemic



Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RT [min]	Area %	Area
1	10.216	50.685	3.737e3
2	15.250	49.315	3.636e3

Chiral



Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RT [min]	Area %	Area
1	10.240	90.217	2.320e3
2	15.385	9.783	251.585

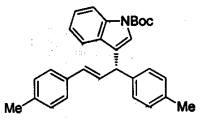
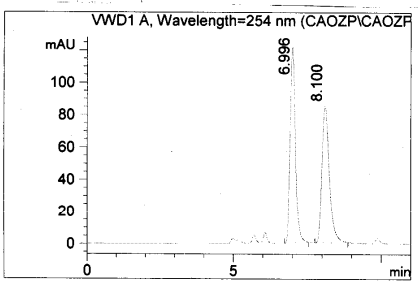


Table 2, Entry 13

HPLC Conditions: Column: Chiralpak OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA (99/1); **Flow rate:** 0.7 mL/min; **Detection:** UV 254 nm

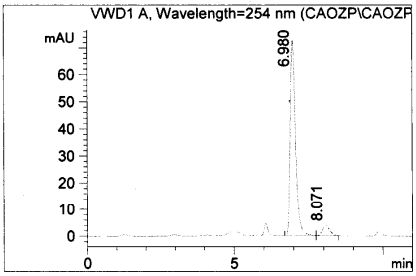
Racemic



Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RT [min]	Area %	Area
1	6.996	50.294	1.501e3
2	8.100	49.706	1.483e3

Chiral



Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RT [min]	Area %	Area
1	6.980	93.364	904.823
2	8.071	6.636	64.312

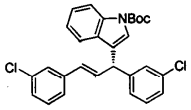
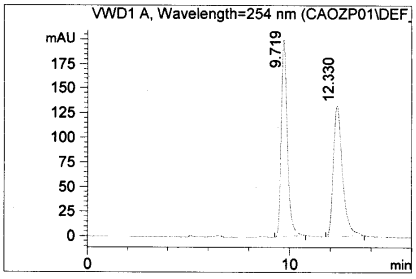


Table 2, Entry 14

HPLC Conditions: Column: Chiralpak OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA (99/1); **Flow rate:** 0.7 mL/min; **Detection:** UV 254 nm

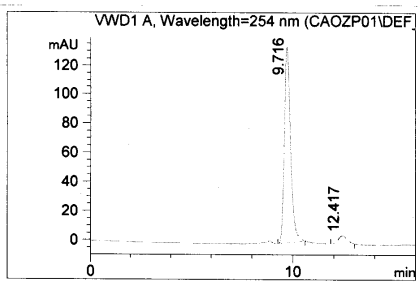
Racemic



Signal 1: VWD1 A, Wavelength=254 nm

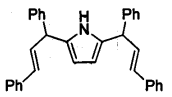
Peak #	RT [min]	Area %	Area
1	9.719	50.263	4.177e3
2	12.330	49.737	4.133e3

Chiral



Signal 1: VWD1 A, Wavelength=254 nm

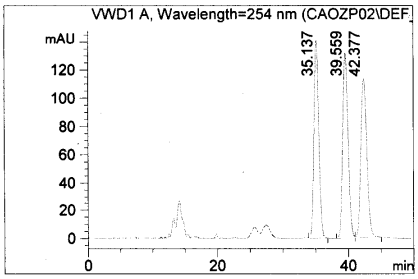
Peak #	RT [min]	Area %	Area
1	9.716	94.592	2.813e3
2	12.417	5.408	160.853



13a

HPLC Conditions: Column: Chiralpak AD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA (99/1); **Flow rate:** 0.8 mL/min; **Detection:** UV 254 nm

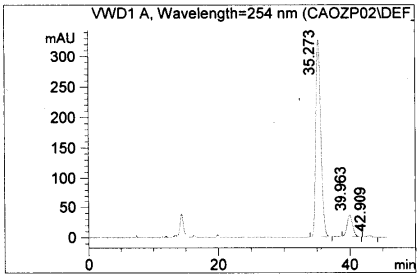
Racemic



Signal 1: VWD1 A, Wavelength=254 nm

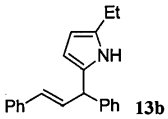
Peak #	RT [min]	Area %	Area
1	35.137	32.584	7.221e3
2	39.559	34.322	7.606e3
3	42.377	33.094	7.334e3

Chiral



Signal 1: VWD1 A, Wavelength=254 nm

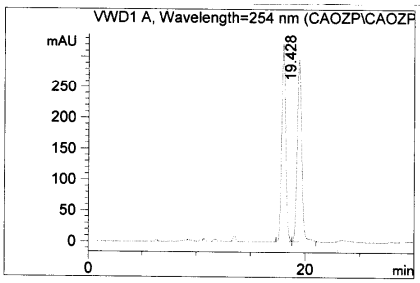
Peak #	RT [min]	Area %	Area
1	35.273	88.795	1.730e4
2	39.963	10.532	2.052e3
3	42.909	0.672	131.003



13b

HPLC Conditions: Column: Chiralpak OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA (99/1); **Flow rate:** 0.7 mL/min; **Detection:** UV 254 nm

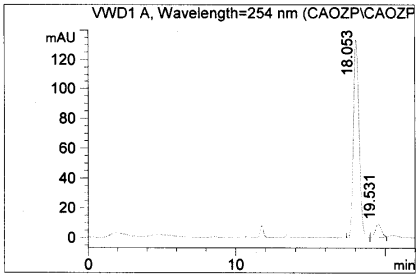
Racemic



Signal 1: VWD1 A, Wavelength=254 nm

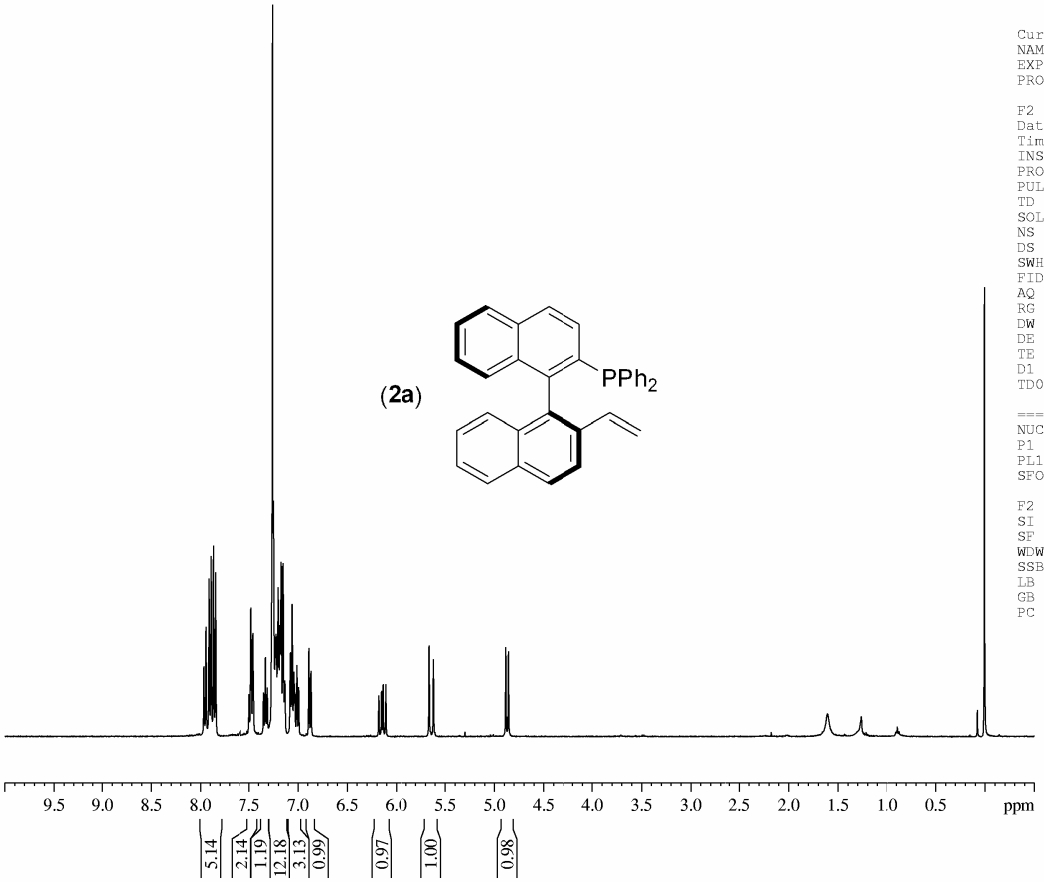
Peak #	RT [min]	Area %	Area
1	17.991	49.447	8.234e3
2	19.428	50.553	8.419e3

Chiral

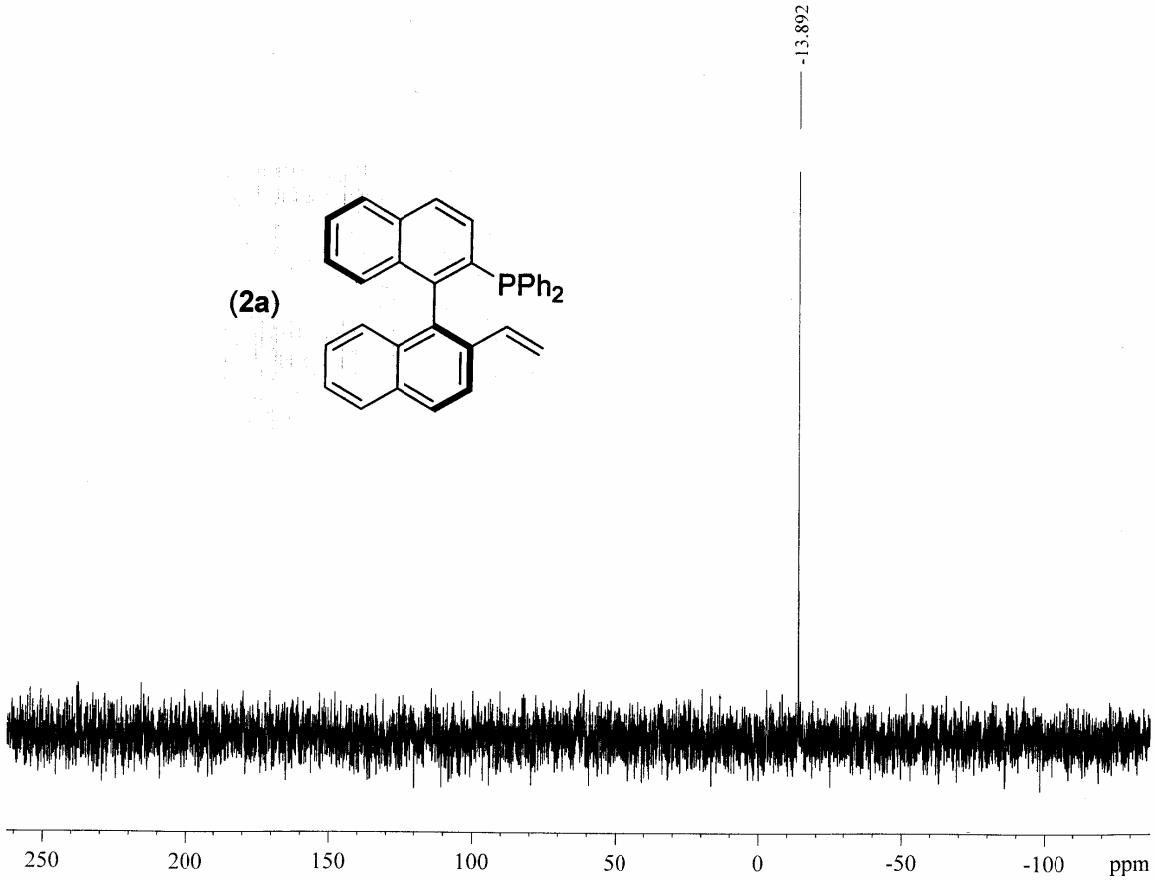


Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RT [min]	Area %	Area
1	18.053	93.286	3.465e3
2	19.531	6.714	249.382

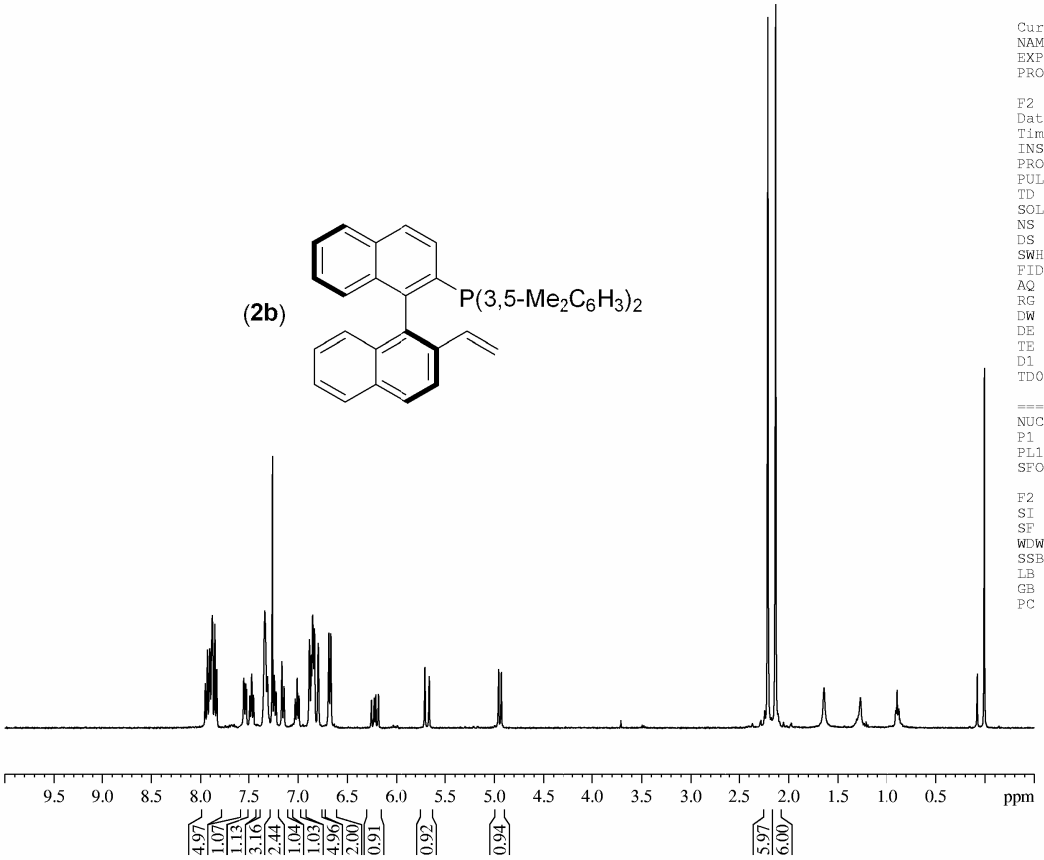



```
Current Data Parameters
NAME                 P=O
EXPNO                  9
PROCNO                 4

F2 - Acquisition Parameters
Date_           20110110
Time              16.41
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG            zg30
TD                65536
SOLVENT           CDCl3
NS                    8
DS                    0
SWH           12019.230 Hz
FIDRES         0.183399 Hz
AQ            2.7263477 sec
RG                  101
DW               41.600 usec
DE                6.00 usec
TE                299.8 K
D1           5.00000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 1H
P1                12.60 usec
PL1               -1.00 dB
SFO1        400.13320110 MHz

F2 - Processing parameters
SI                32768
SF          400.13001117 MHz
WDW                  EM
SSB                   0
LB                 0.30 Hz
GB                    0
PC                 1.00
```

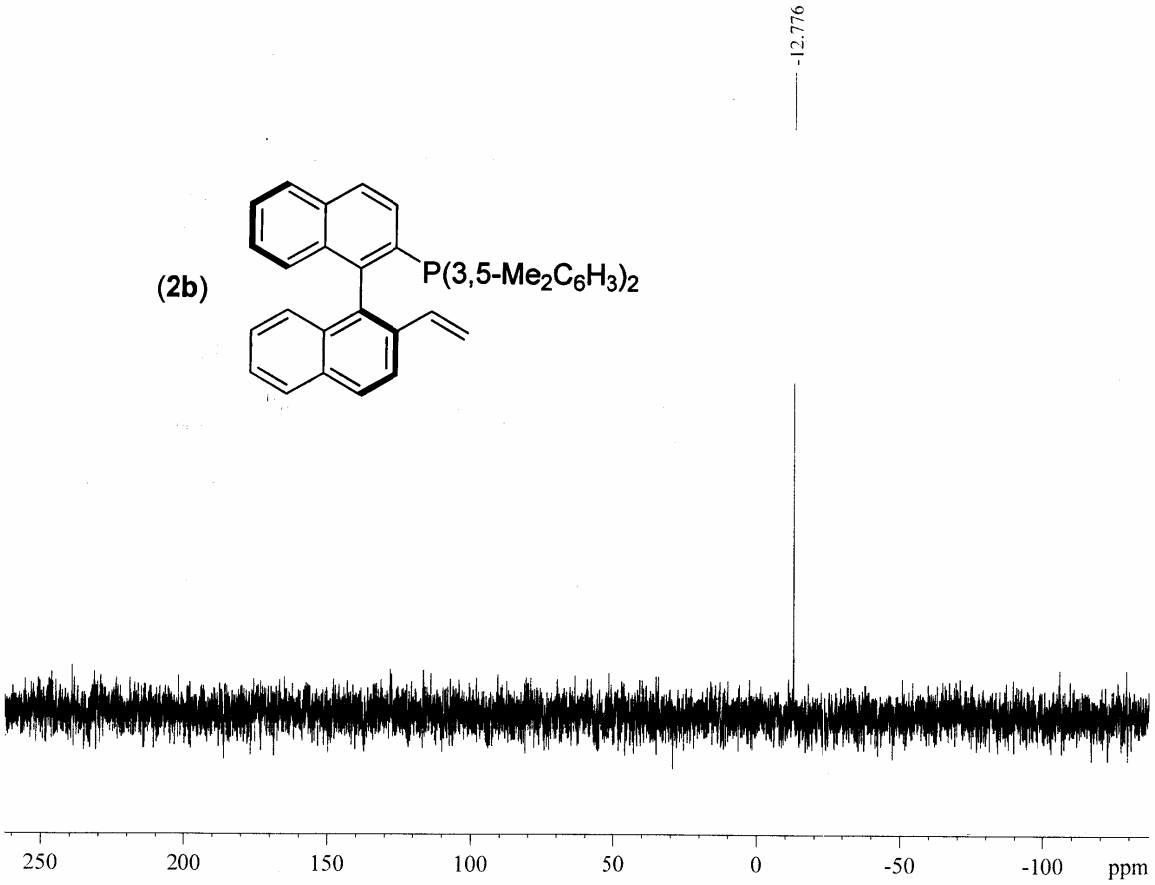



```
Current Data Parameters
NAME                  31p
EXPNO                  30
PROCNO                  1

F2 - Acquisition Parameters
Date_            20110107
Time                20.34
INSTRUM             spect
PROBHD   5 mm BBO BB-1H
PULPROG           zgig30
TD                 32768
SOLVENT         oC6D4Cl2
NS                    265
DS                      0
SWH             48543.688 Hz
FIDRES           1.481436 Hz
AQ              0.3375604 sec
RG                 32768
DW                 10.300 usec
DE                   6.00 usec
TE                    0.0 K
D1             1.00000000 sec
d11            0.03000000 sec
MCREST         0.00000000 sec
MCWRK          0.01500000 sec

======== CHANNEL f1 ========
NUC1                  31P
P1                  14.75 usec
PL1                 10.00 dB
SFO1          121.5023828 MHz

======== CHANNEL f2 ========
CPDPRG2           waltz16
NUC2                   1H
PCPD2               88.00 usec
PL2                  4.00 dB
PL12                19.08 dB
SFO2          300.1321998 MHz

F2 - Processing parameters
SI                 32768
SF          121.4947578 MHz
WDW                   EM
SSB                    0
LB                  5.00 Hz
GB                     0
PC                  1.40
```

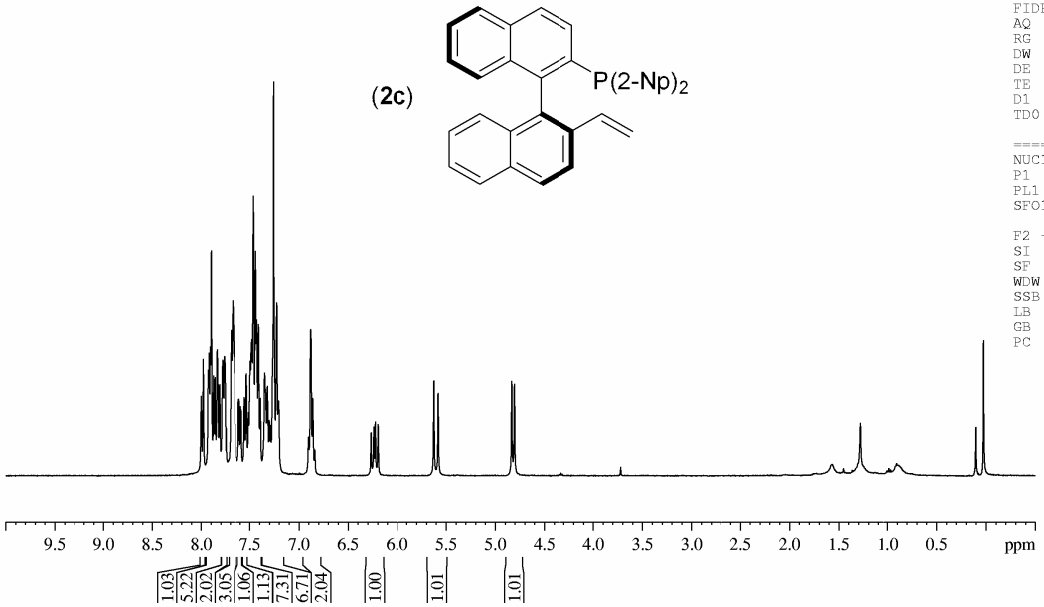
(**2b**)




```
Current Data Parameters
NAME                 P=O
EXPNO                  9
PROCNO                 1

F2 - Acquisition Parameters
Date_           20110110
Time               16.41
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     8
DS                     0
SWH            12019.230 Hz
FIDRES          0.183399 Hz
AQ             2.7263477 sec
RG                   101
DW                41.600 usec
DE                 6.00 usec
TE                299.8 K
D1            5.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                12.60 usec
PL1               -1.00 dB
SFO1        400.1332010 MHz

F2 - Processing parameters
SI                32768
SF          400.1300117 MHz
WDW                  EM
SSB                   0
LB                 0.30 Hz
GB                    0
PC                 1.00
```

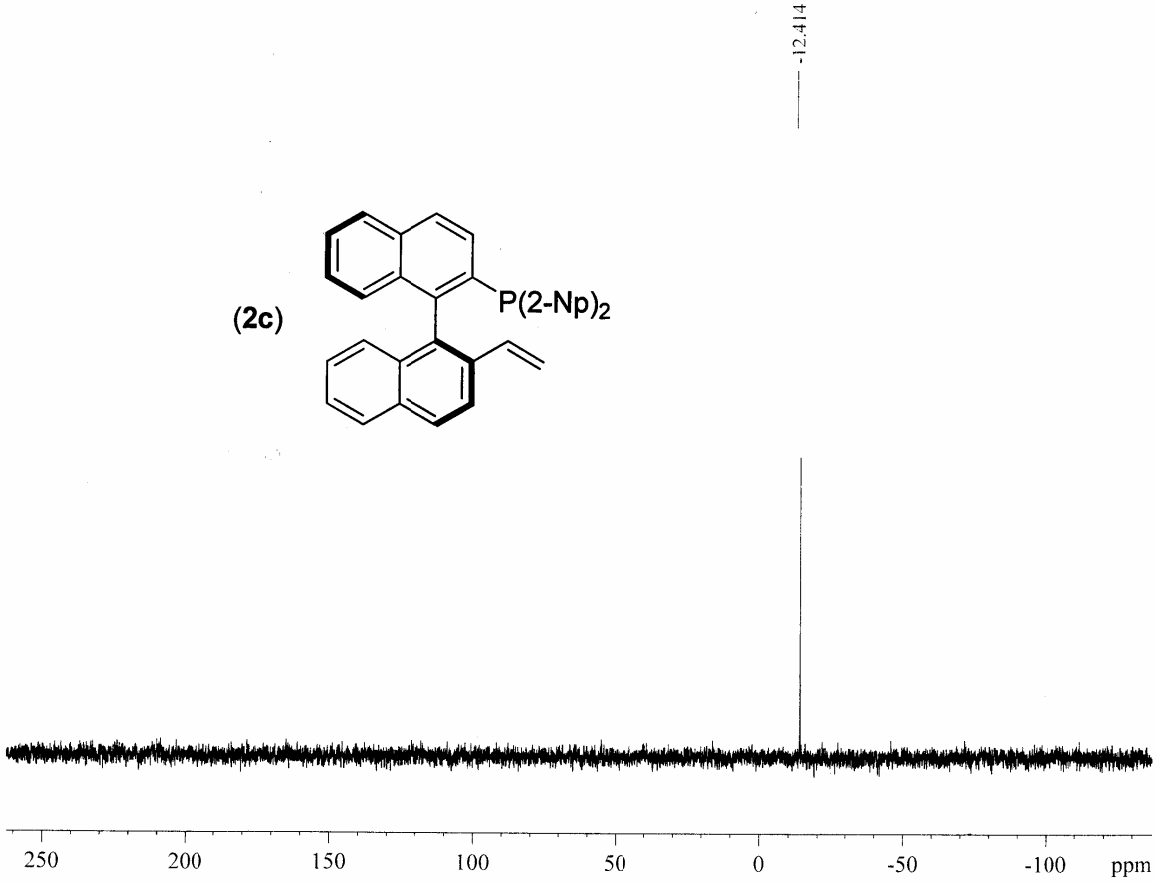



```
Current Data Parameters
NAME                 31p
EXPNO                 34
PROCNO                 1

F2 - Acquisition Parameters
Date_            20110107
Time               21.27
INSTRUM            spect
PROBHD   5 mm BBO BB-1H
PULPROG          zgig30
TD                32768
SOLVENT        oC6D4Cl2
NS                   706
DS                     0
SWH            48543.688 Hz
FIDRES          1.481436 Hz
AQ             0.3375604 sec
RG                32768
DW                10.300 usec
DE                  6.00 usec
TE                   0.0 K
D1           1.00000000 sec
d11          0.03000000 sec
MCREST       0.00000000 sec
MCWRK        0.01500000 sec

======== CHANNEL f1 ========
NUC1                 31P
P1                 14.75 usec
PL1                10.00 dB
SFO1        121.5023828 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                  1H
PCPD2              88.00 usec
PL2                 4.00 dB
PL12               19.08 dB
SFO2        300.1321998 MHz

F2 - Processing parameters
SI                32768
SF          121.4947578 MHz
WDW                  EM
SSB                   0
LB                 5.00 Hz
GB                    0
PC                 1.40
```



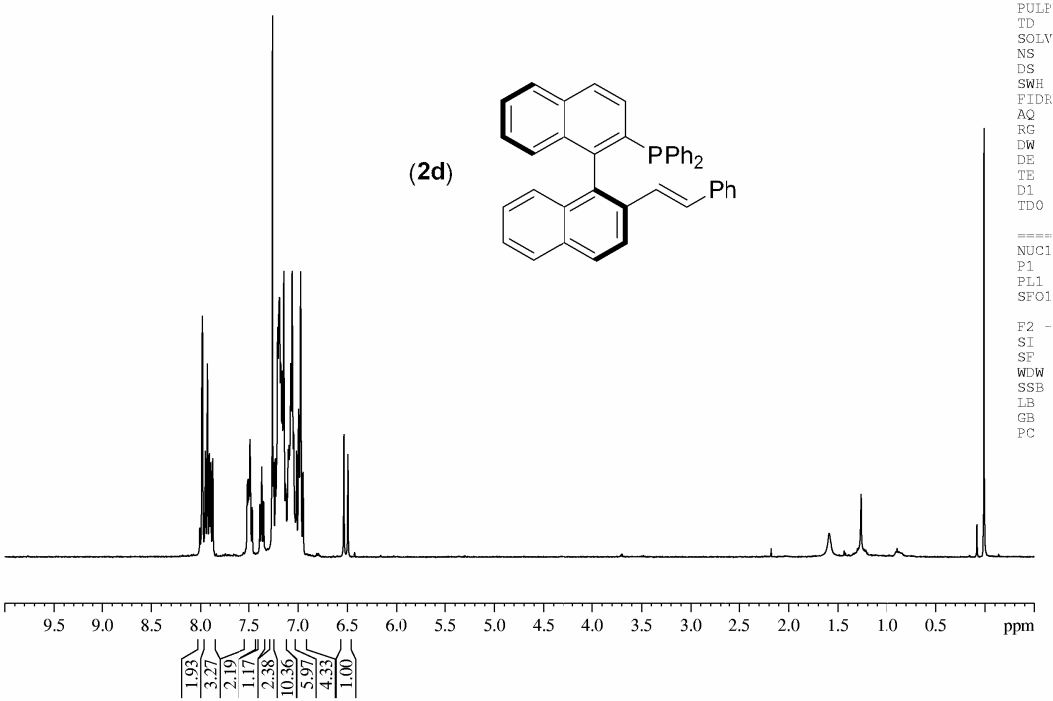

```
Current Data Parameters
NAME                 P=O
EXPNO                  9
PROCNO                 4

F2 - Acquisition Parameters
Date_           20110110
Time              16.41
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG            zg30
TD                65536
SOLVENT           CDCl3
NS                    8
DS                    0
SWH           12019.230 Hz
FIDRES         0.183399 Hz
AQ            2.7263477 sec
RG                  101
DW               41.600 usec
DE                6.00 usec
TE               299.8 K
D1           5.00000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 1H
P1                12.60 usec
PL1               -1.00 dB
SFO1        400.13320100 MHz

F2 - Processing parameters
SI               32768
SF          400.13001117 MHz
WDW                 EM
SSB                  0
LB                0.30 Hz
GB                   0
PC                1.00
```

(2c)

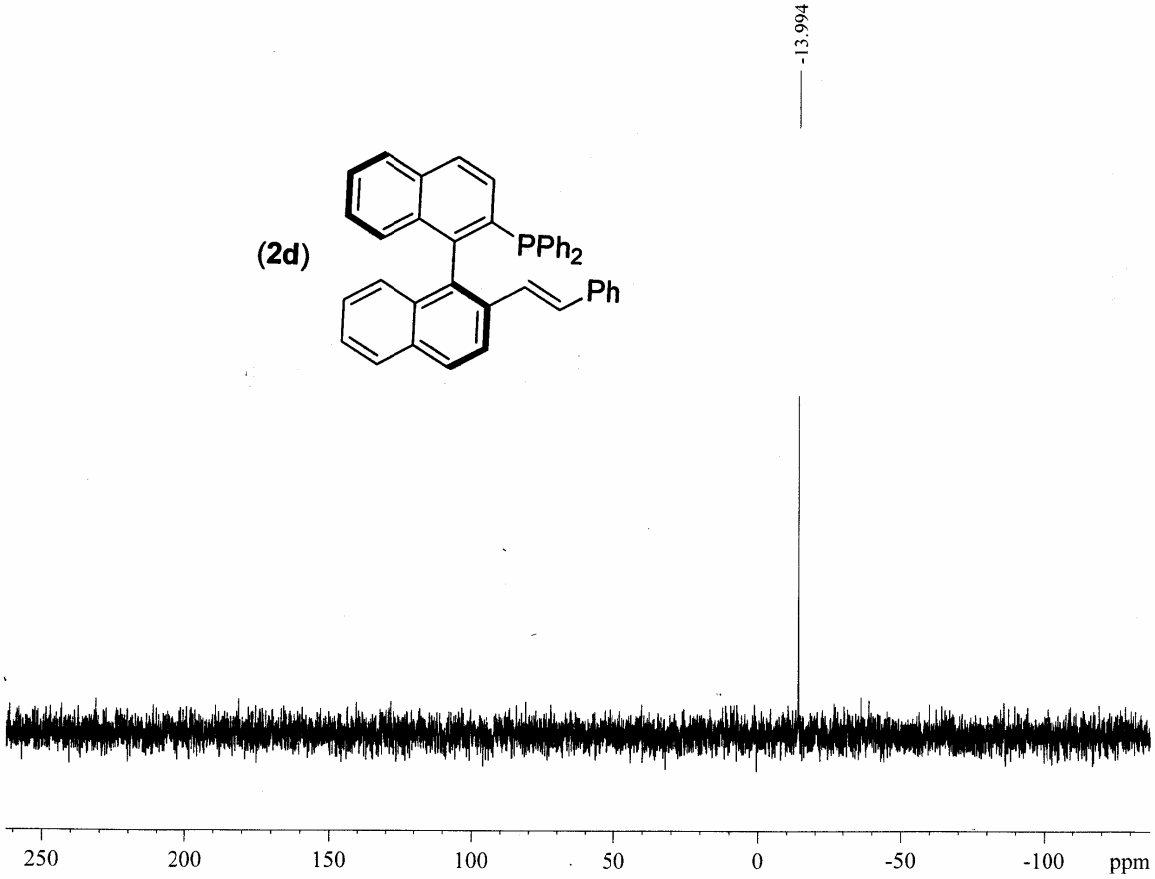



```
Current Data Parameters
NAME                 31p
EXPNO                 32
PROCNO                 1

F2 - Acquisition Parameters
Date_           20110107
Time               21.14
INSTRUM            spect
PROBHD   5 mm BBO BB-1H
PULPROG          zgig30
TD                32768
SOLVENT        oC6D4Cl2
NS                   260
DS                     0
SWH            48543.688 Hz
FIDRES          1.481436 Hz
AQ             0.3375604 sec
RG                32768
DW               10.300 usec
DE                 6.00 usec
TE                  0.0 K
D1            1.00000000 sec
d11           0.03000000 sec
MCREST        0.00000000 sec
MCWRK         0.01500000 sec

======== CHANNEL f1 ========
NUC1                 31P
P1                14.75 usec
PL1               10.00 dB
SFO1        121.5023828 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                  1H
PCPD2             88.00 usec
PL2                4.00 dB
PL12              19.08 dB
SFO2        300.1321998 MHz

F2 - Processing parameters
SI                32768
SF          121.4947578 MHz
WDW                  EM
SSB                   0
LB                 5.00 Hz
GB                    0
PC                 1.40
```

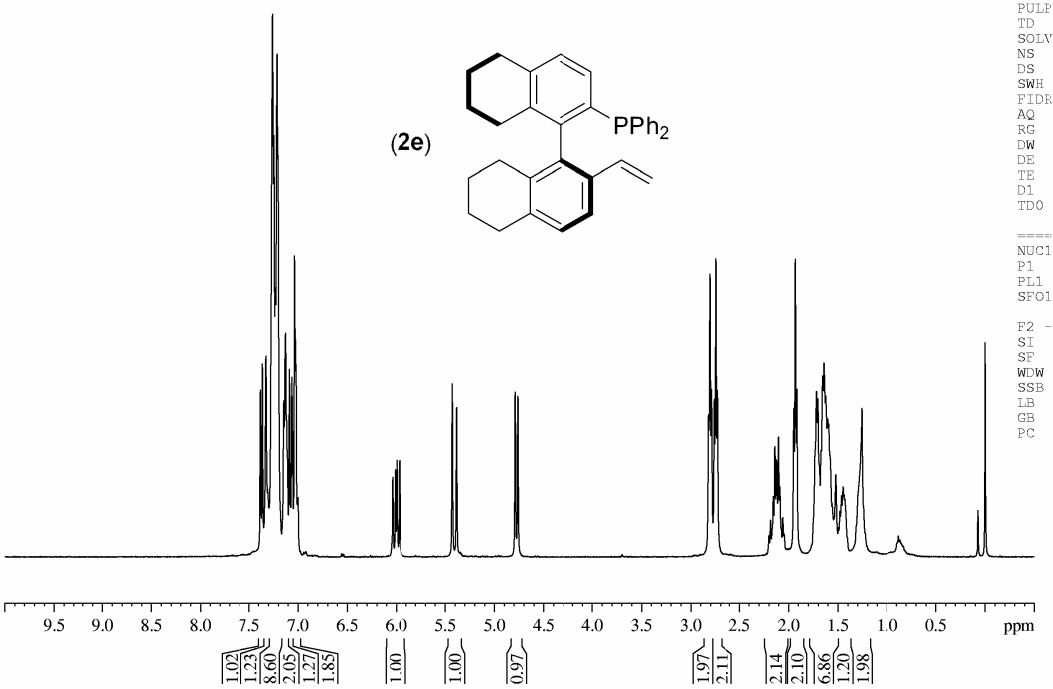
(**2d**)




```
Current Data Parameters
NAME                 P=O
EXPNO                  9
PROCNO                 5

F2 - Acquisition Parameters
Date_           20110110
Time              16.41
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG            zg30
TD                65536
SOLVENT           CDCl3
NS                    8
DS                    0
SWH           12019.230 Hz
FIDRES         0.183399 Hz
AQ            2.7263477 sec
RG                  101
DW               41.600 usec
DE                6.00 usec
TE                299.8 K
D1           5.00000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 1H
P1                12.60 usec
PL1               -1.00 dB
SFO1        400.13320110 MHz

F2 - Processing parameters
SI                32768
SF          400.13001117 MHz
WDW                  EM
SSB                   0
LB                 0.30 Hz
GB                    0
PC                 1.00
```

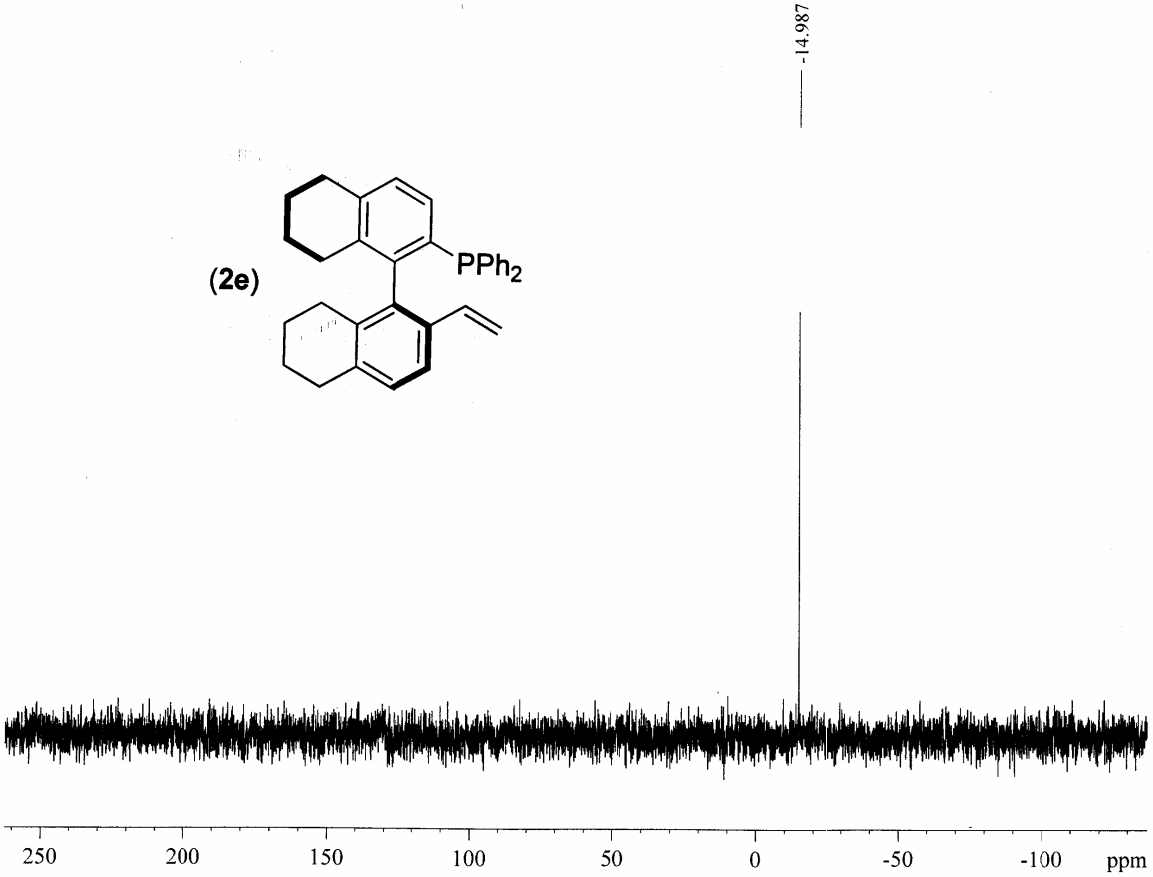



```
Current Data Parameters
NAME                  31p
EXPNO                  33
PROCNO                  1

F2 - Acquisition Parameters
Date_            20110107
Time                21.20
INSTRUM             spect
PROBHD   5 mm BBO BB-1H
PULPROG           zgig30
TD                 32768
SOLVENT         oC6D4Cl2
NS                    199
DS                      0
SWH             48543.688 Hz
FIDRES           1.481436 Hz
AQ              0.3375604 sec
RG                 32768
DW                 10.300 usec
DE                   6.00 usec
TE                    0.0 K
D1            1.00000000 sec
d11           0.03000000 sec
MCREST        0.00000000 sec
MCWRK         0.01500000 sec

======== CHANNEL f1 ========
NUC1                  31P
P1                  14.75 usec
PL1                 10.00 dB
SFO1        121.5023828 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                   1H
PCPD2               88.00 usec
PL2                  4.00 dB
PL12                19.08 dB
SFO2        300.1321998 MHz

F2 - Processing parameters
SI                 32768
SF          121.4947578 MHz
WDW                    EM
SSB                     0
LB                   5.00 Hz
GB                      0
PC                   1.40
```




```
Current Data Parameters
NAME                 P=O
EXPNO                  9
PROCNO                 9

F2 - Acquisition Parameters
Date_           20110110
Time               16.41
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     8
DS                     0
SWH            12019.230 Hz
FIDRES          0.183399 Hz
AQ             2.7263477 sec
RG                   101
DW                41.600 usec
DE                  6.00 usec
TE                 299.8 K
D1            5.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 12.60 usec
PL1                -1.00 dB
SFO1        400.1332010 MHz

F2 - Processing parameters
SI                 32768
SF          400.1300196 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  1.00
```

(2e)




```
Current Data Parameters
NAME                 31p
EXPNO                 35
PROCNO                 1

F2 - Acquisition Parameters
Date_           20110107
Time               21.44
INSTRUM            spect
PROBHD   5 mm BBO BB-1H
PULPROG          zgig30
TD                32768
SOLVENT         oC6D4Cl2
NS                  203
DS                    0
SWH            48543.688 Hz
FIDRES          1.481436 Hz
AQ             0.3375604 sec
RG                32768
DW                10.300 usec
DE                  6.00 usec
TE                   0.0 K
D1            1.00000000 sec
d11           0.03000000 sec
MCREST        0.00000000 sec
MCWRK         0.01500000 sec

======== CHANNEL f1 ========
NUC1                 31P
P1                 14.75 usec
PL1                10.00 dB
SFO1         121.5023828 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                  1H
PCPD2              88.00 usec
PL2                 4.00 dB
PL12               19.08 dB
SFO2         300.1321998 MHz

F2 - Processing parameters
SI                32768
SF          121.4947578 MHz
WDW                  EM
SSB                   0
LB                 5.00 Hz
GB                    0
PC                 1.40
```

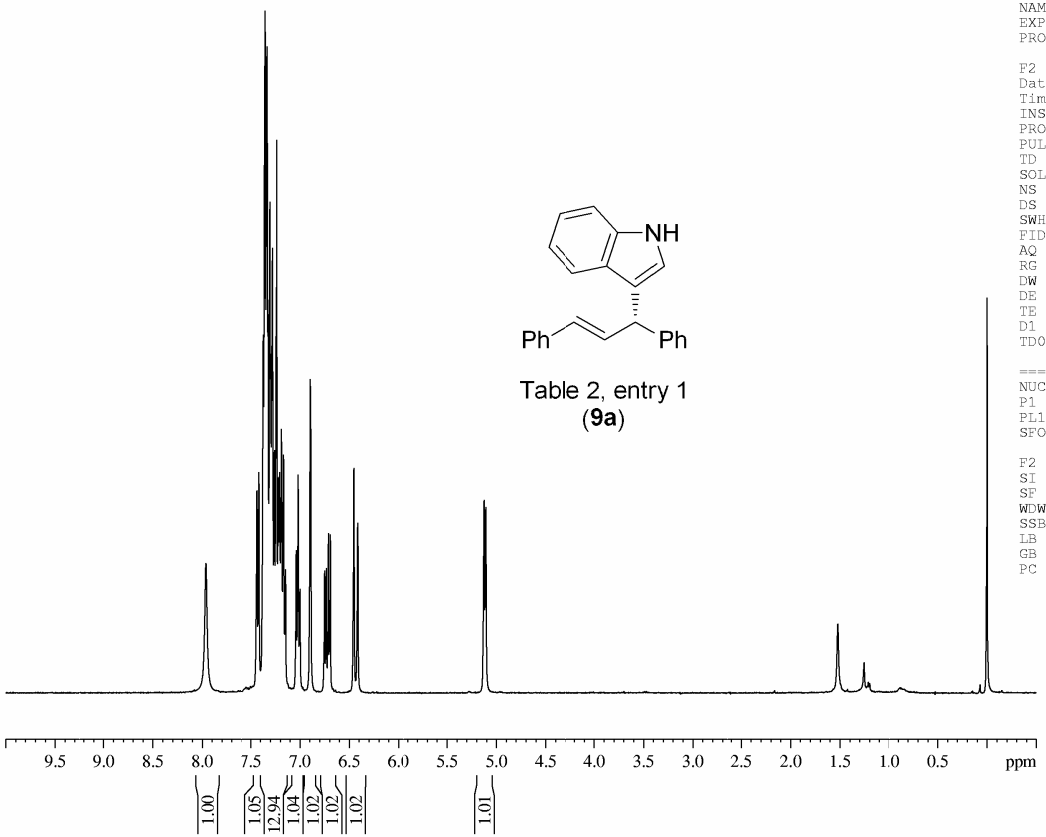


Table 2, entry 1
(**9a**)

```
Current Data Parameters
NAME          all-indol
EXPNO                 3
PROCNO                4

F2 - Acquisition Parameters
Date_          20110103
Time              22.20
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG            zg30
TD                65536
SOLVENT           CDCl3
NS                    8
DS                    0
SWH           12019.230 Hz
FIDRES         0.183399 Hz
AQ            2.7263477 sec
RG                 80.6
DW               41.600 usec
DE                 6.00 usec
TE                297.5 K
D1           5.00000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                  1H
P1                12.60 usec
PL1               -1.00 dB
SFO1        400.1332010 MHz

F2 - Processing parameters
SI                32768
SF          400.1300204 MHz
WDW                  EM
SSB                   0
LB                 0.30 Hz
GB                    0
PC                 1.00
```

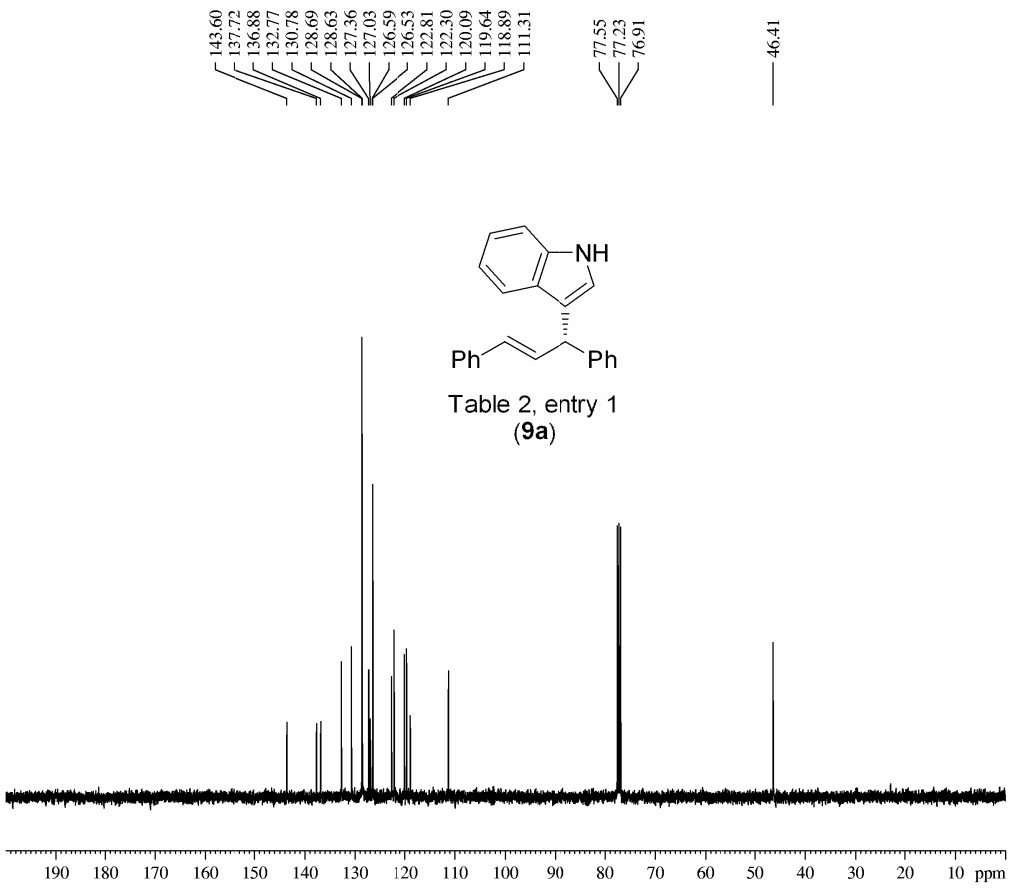


Table 2, entry 1
(**9a**)

```
Current Data Parameters
NAME      all-indol-C13
EXPNO                 1
PROCNO               17

F2 - Acquisition Parameters
Date_           20100904
Time              15.54
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                  206
DS                    0
SWH           25252.525 Hz
FIDRES         0.385323 Hz
AQ            1.2976629 sec
RG                  203
DW               19.800 usec
DE                8.00 usec
TE               302.0 K
D1           2.00000000 sec
d11          0.03000000 sec
DELTA        1.89999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.40 usec
PL1                -1.00 dB
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG2         waltz16
NUC2                 1H
PCPD2             80.00 usec
PL12              15.00 dB
PL13              15.00 dB
PL2               -1.00 dB
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                32768
SF          100.6127537 MHz
WDW                  EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```

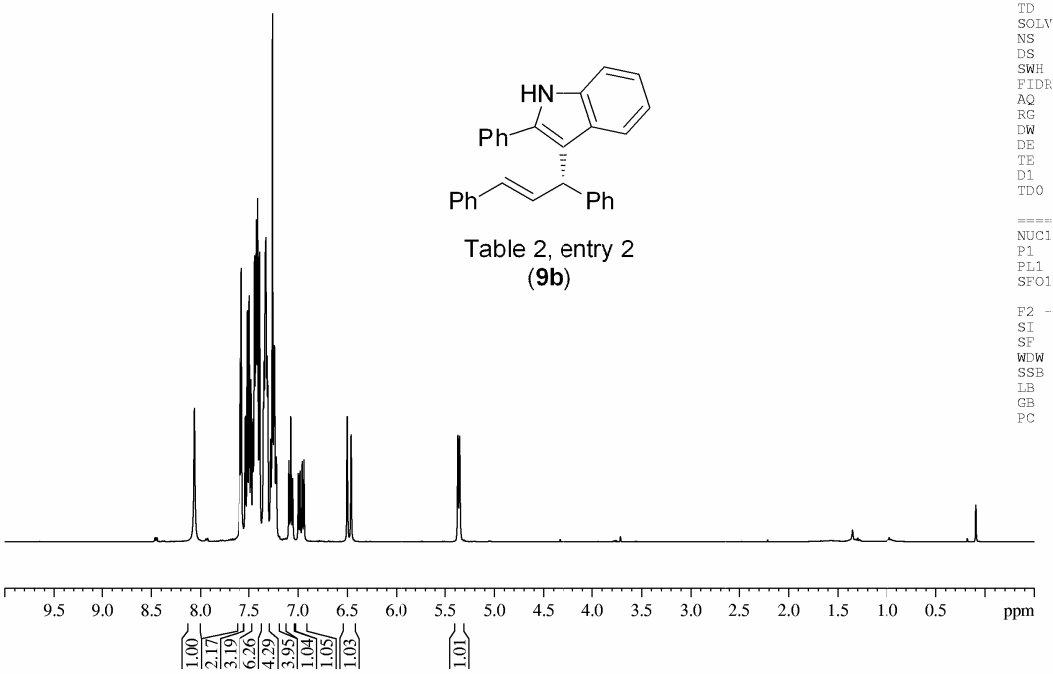


Table 2, entry 2
(**9b**)

```
Current Data Parameters
NAME          all-indol
EXPNO                 3
PROCNO                2

F2 - Acquisition Parameters
Date_          20110103
Time             22.20
INSTRUM          spect
PROBHD   5 mm PADUL 13C
PULPROG           zg30
TD               65536
SOLVENT          CDCl3
NS                   8
DS                   0
SWH          12019.230 Hz
FIDRES        0.183399 Hz
AQ           2.7263477 sec
RG                80.6
DW               41.600 usec
DE                6.00 usec
TE               297.5 K
D1           5.00000000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1                 1H
P1                12.60 usec
PL1               -1.00 dB
SFO1        400.1332010 MHz

F2 - Processing parameters
SI               32768
SF          400.1300117 MHz
WDW                 EM
SSB                  0
LB                0.30 Hz
GB                   0
PC                1.00
```

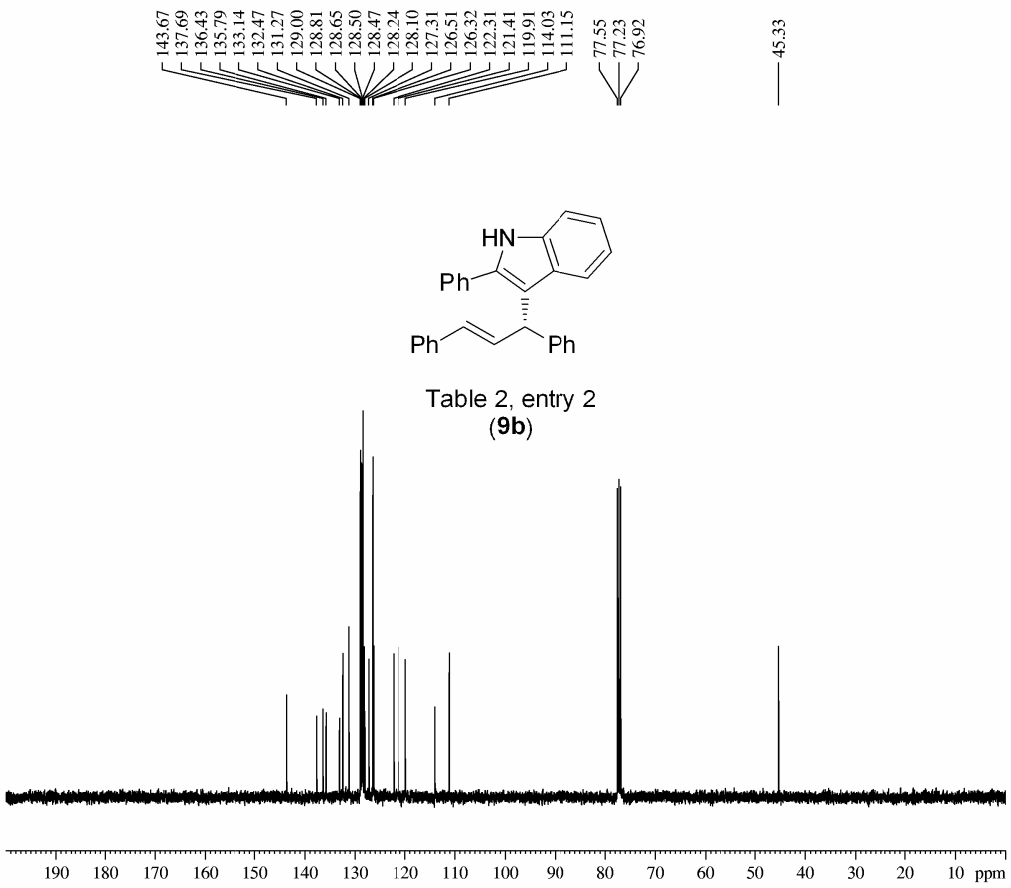
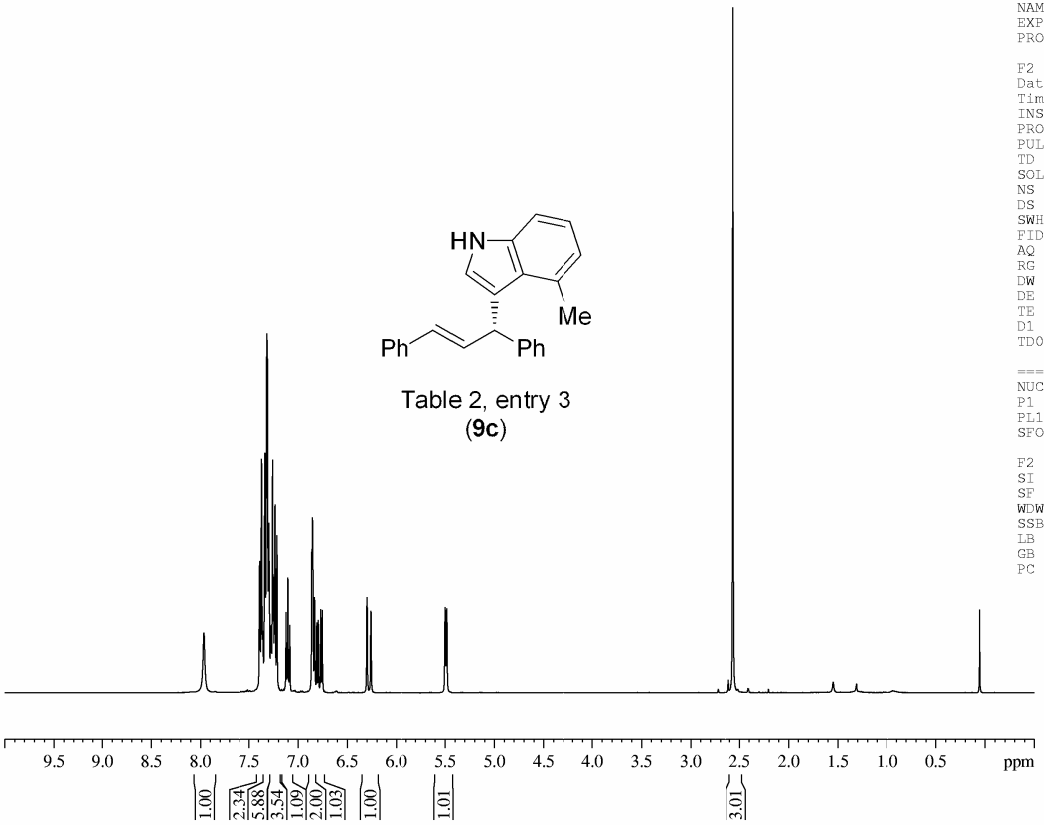
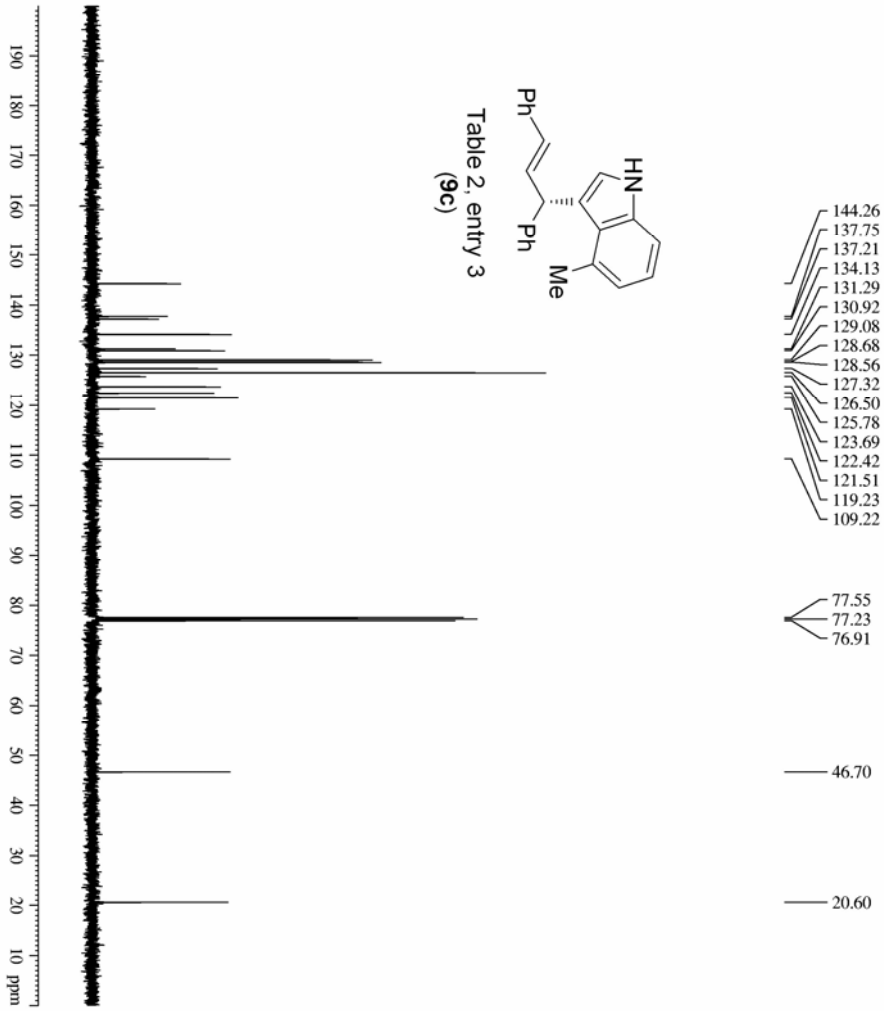


Table 2, entry 2
(**9b**)

```
Current Data Parameters
NAME      all-indol-C13
EXPNO                 2
PROCNO                3

F2 - Acquisition Parameters
Date_          20110103
Time             20.05
INSTRUM          spect
PROBHD   5 mm PADUL 13C
PULPROG        zgpg30
TD               65536
SOLVENT          CDCl3
NS                  51
DS                   0
SWH          25252.525 Hz
FIDRES        0.385323 Hz
AQ           1.2976629 sec
RG                 203
DW               19.800 usec
DE                8.00 usec
TE               298.2 K
D1          2.00000000 sec
d11         0.03000000 sec
DELTA       1.89999998 sec
TD0                  1

======== CHANNEL f1 ========
NUC1                13C
P1                 9.40 usec
PL1               -1.00 dB
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG2         waltz16
NUC2                 1H
PCPD2             80.00 usec
PL12              15.00 dB
PL13              15.00 dB
PL2               -1.00 dB
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                32768
SF          100.6127593 MHz
WDW                  EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```




```
Current Data Parameters
NAME          all-indol
EXPNO                 3
PROCNO                6

F2 - Acquisition Parameters
Date_          20110103
Time             22.20
INSTRUM          spect
PROBHD   5 mm PADUL 13C
PULPROG           zg30
TD               65536
SOLVENT          CDCl3
NS                   8
DS                   0
SWH          12019.230 Hz
FIDRES        0.183399 Hz
AQ           2.7263477 sec
RG                80.6
DW              41.600 usec
DE               6.00 usec
TE              297.5 K
D1          5.00000000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1                 1H
P1               12.60 usec
PL1              -1.00 dB
SFO1        400.1332010 MHz

F2 - Processing parameters
SI               32768
SF          400.1300117 MHz
WDW                 EM
SSB                  0
LB               0.30 Hz
GB                   0
PC               1.00
```




```
Current Data Parameters
NAME          all-indol-C13
EXPNO                     2
PROCNO                    4

F2 - Acquisition Parameters
Date_           20110103
Time              20.05
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                   51
DS                    0
SWH           25252.525 Hz
FIDRES        0.385523 Hz
AQ            1.2976629 sec
RG                  203
DW               19.800 usec
DE                8.00 usec
TE               298.2 K
D1            2.00000000 sec
d11           0.03000000 sec
DELTA         1.8999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                9.40 usec
PL1             -1.00 dB
SFO1       100.622829 8 MHz

======== CHANNEL f2 ========
CPDPRG2        waltz16
NUC2                 1H
PCPD2            80.00 usec
PL12             15.00 dB
PL13             15.00 dB
PL2              -1.00 dB
SFO2       400.1316005 MHz

F2 - Processing parameters
SI                32768
SF          100.6127546 MHz
WDW                    EM
SSB                     0
LB                   1.00 Hz
GB                      0
PC                   1.40
```

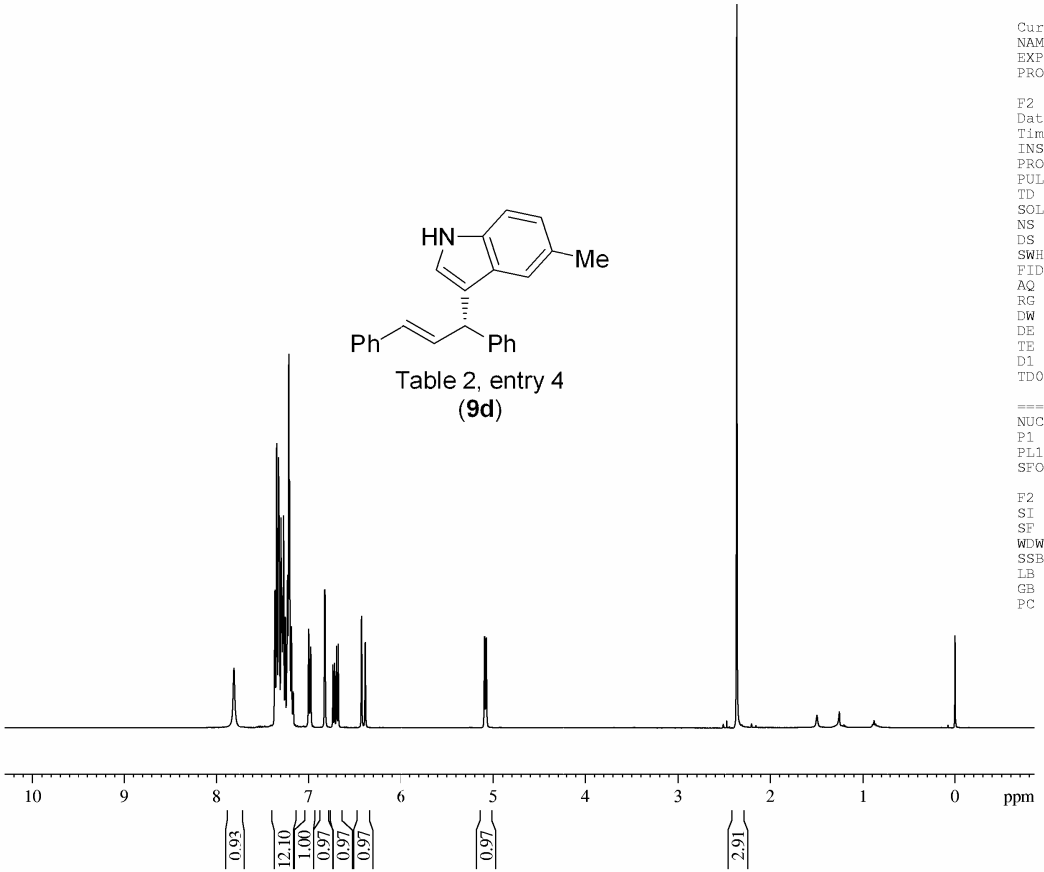


Table 2, entry 4
(**9d**)

```
Current Data Parameters
NAME          all-indol
EXPNO                 3
PROCNO                3

F2 - Acquisition Parameters
Date_          20110103
Time             22.20
INSTRUM          spect
PROBHD   5 mm PADUL 13C
PULPROG           zg30
TD               65536
SOLVENT          CDCl3
NS                   8
DS                   0
SWH          12019.230 Hz
FIDRES        0.183399 Hz
AQ           2.7263477 sec
RG                80.6
DW              41.600 usec
DE               6.00 usec
TE              297.5 K
D1          5.00000000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1                 1H
P1               12.60 usec
PL1              -1.00 dB
SFO1        400.1332010 MHz

F2 - Processing parameters
SI               32768
SF          400.1300010 MHz
WDW                 EM
SSB                  0
LB               0.30 Hz
GB                   0
PC               1.00
```

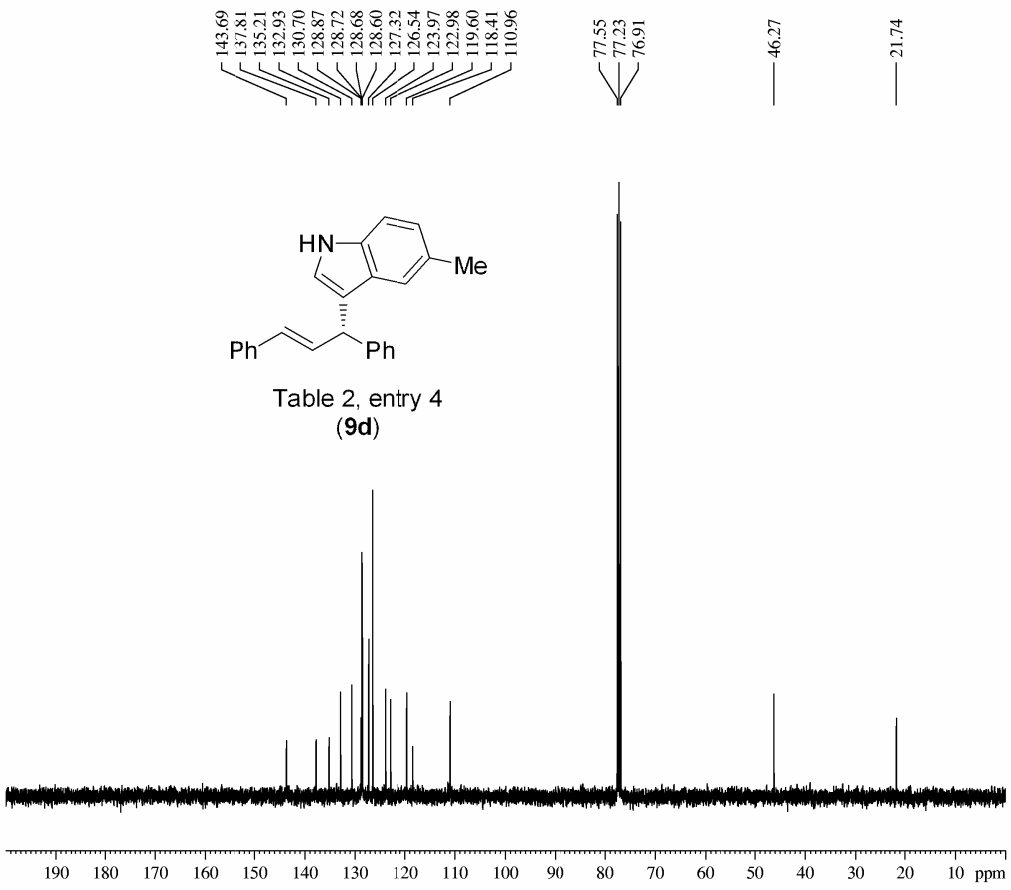


Table 2, entry 4
(**9d**)

```
Current Data Parameters
NAME      all-indol-C13
EXPNO                 1
PROCNO               12

F2 - Acquisition Parameters
Date_           20100904
Time               15.54
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                  206
DS                    0
SWH           25252.525 Hz
FIDRES         0.385323 Hz
AQ            1.2976629 sec
RG                  203
DW                19.800 usec
DE                 8.00 usec
TE                302.0 K
D1            2.00000000 sec
d11           0.03000000 sec
DELTA         1.89999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.40 usec
PL1                -1.00 dB
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                  1H
PCPD2              80.00 usec
PL12               15.00 dB
PL13               15.00 dB
PL2                -1.00 dB
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                 32768
SF          100.6127470 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.40
```

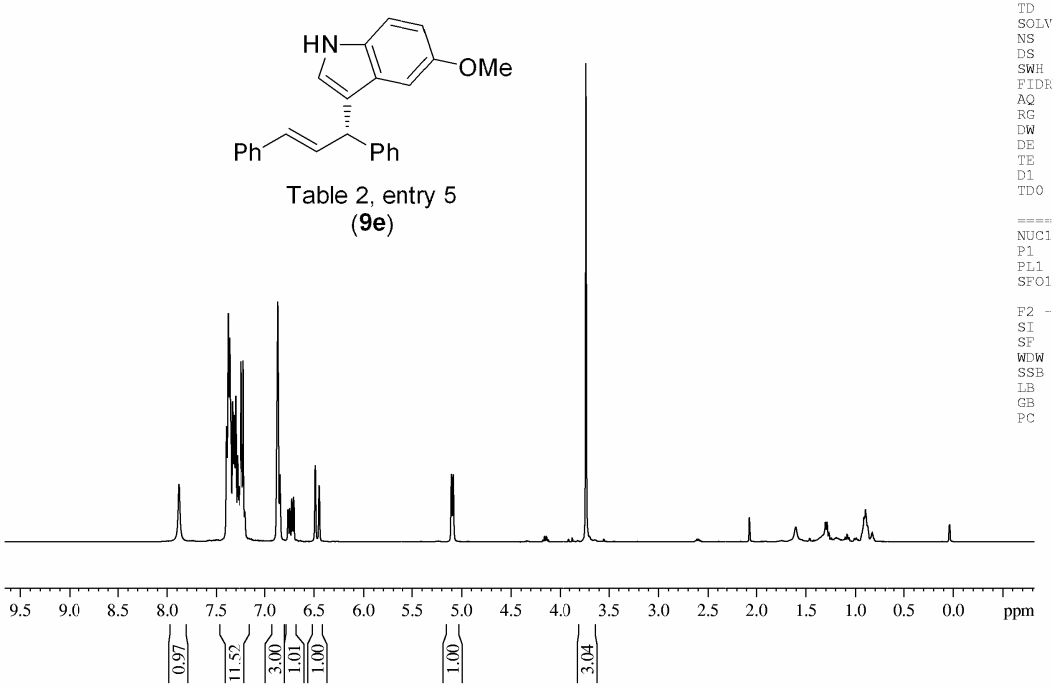


Table 2, entry 5
(**9e**)

```
Current Data Parameters
NAME          all-indol
EXPNO                 1
PROCNO               25

F2 - Acquisition Parameters
Date_           20100904
Time              15.48
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG            zg30
TD                65536
SOLVENT           CDCl3
NS                    7
DS                    0
SWH           12019.230 Hz
FIDRES         0.183399 Hz
AQ            2.7263477 sec
RG                  128
DW               41.600 usec
DE                6.00 usec
TE               301.0 K
D1           5.00000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 1H
P1                12.60 usec
PL1               -1.00 dB
SFO1        400.1332010 MHz

F2 - Processing parameters
SI                32768
SF          400.1300117 MHz
WDW                  EM
SSB                   0
LB                 0.30 Hz
GB                    0
PC                 1.00
```

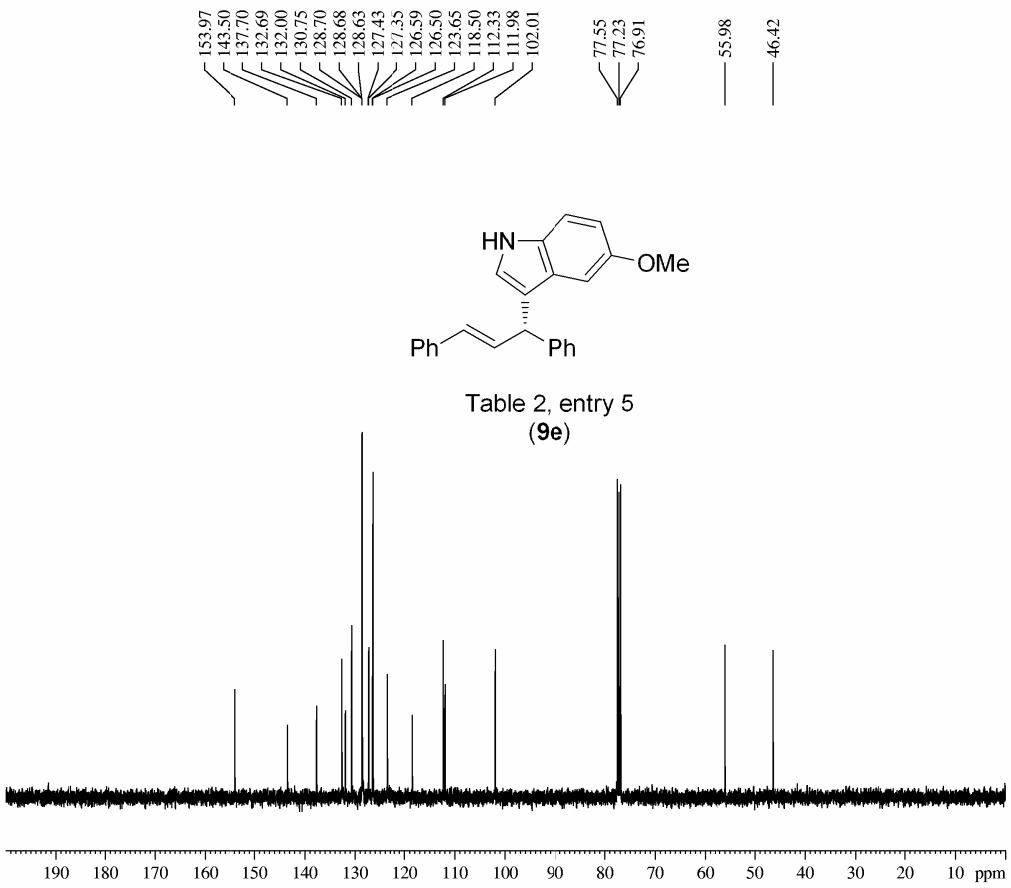


Table 2, entry 5
(**9e**)

```
Current Data Parameters
NAME      all-indol-C13
EXPNO                 1
PROCNO               25

F2 - Acquisition Parameters
Date_           20100904
Time              15.54
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                  206
DS                    0
SWH           25252.525 Hz
FIDRES         0.385323 Hz
AQ            1.2976629 sec
RG                  203
DW               19.800 usec
DE                8.00 usec
TE               302.0 K
D1           2.00000000 sec
d11          0.03000000 sec
DELTA        1.89999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.40 usec
PL1                -1.00 dB
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG2         waltz16
NUC2                 1H
PCPD2             80.00 usec
PL12              15.00 dB
PL13              15.00 dB
PL2               -1.00 dB
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                32768
SF          100.6127536 MHz
WDW                  EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```

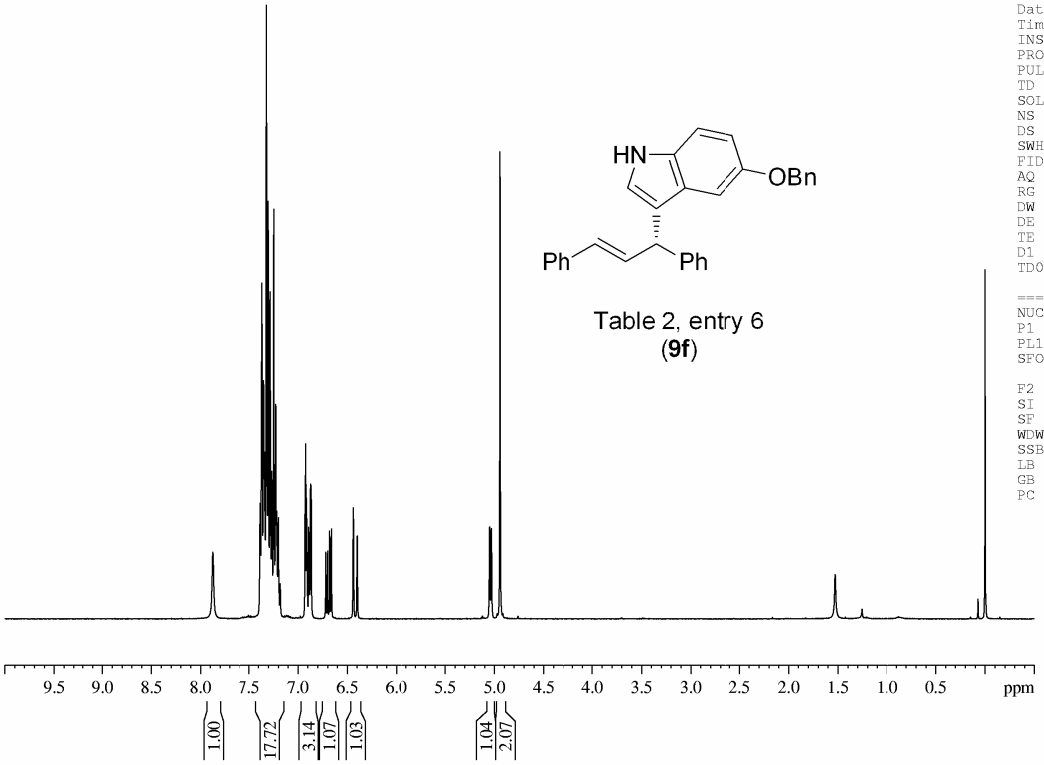


Table 2, entry 6
(**9f**)

```
Current Data Parameters
NAME          all-indol
EXPNO                 3
PROCNO                1

F2 - Acquisition Parameters
Date_          20110103
Time             22.20
INSTRUM          spect
PROBHD   5 mm PADUL 13C
PULPROG           zg30
TD               65536
SOLVENT          CDCl3
NS                   8
DS                   0
SWH          12019.230 Hz
FIDRES        0.183399 Hz
AQ           2.7263477 sec
RG                80.6
DW              41.600 usec
DE               6.00 usec
TE              297.5 K
D1          5.00000000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1                 1H
P1               12.60 usec
PL1              -1.00 dB
SFO1        400.1332010 MHz

F2 - Processing parameters
SI               32768
SF          400.1300188 MHz
WDW                 EM
SSB                  0
LB               0.30 Hz
GB                   0
PC               1.00
```

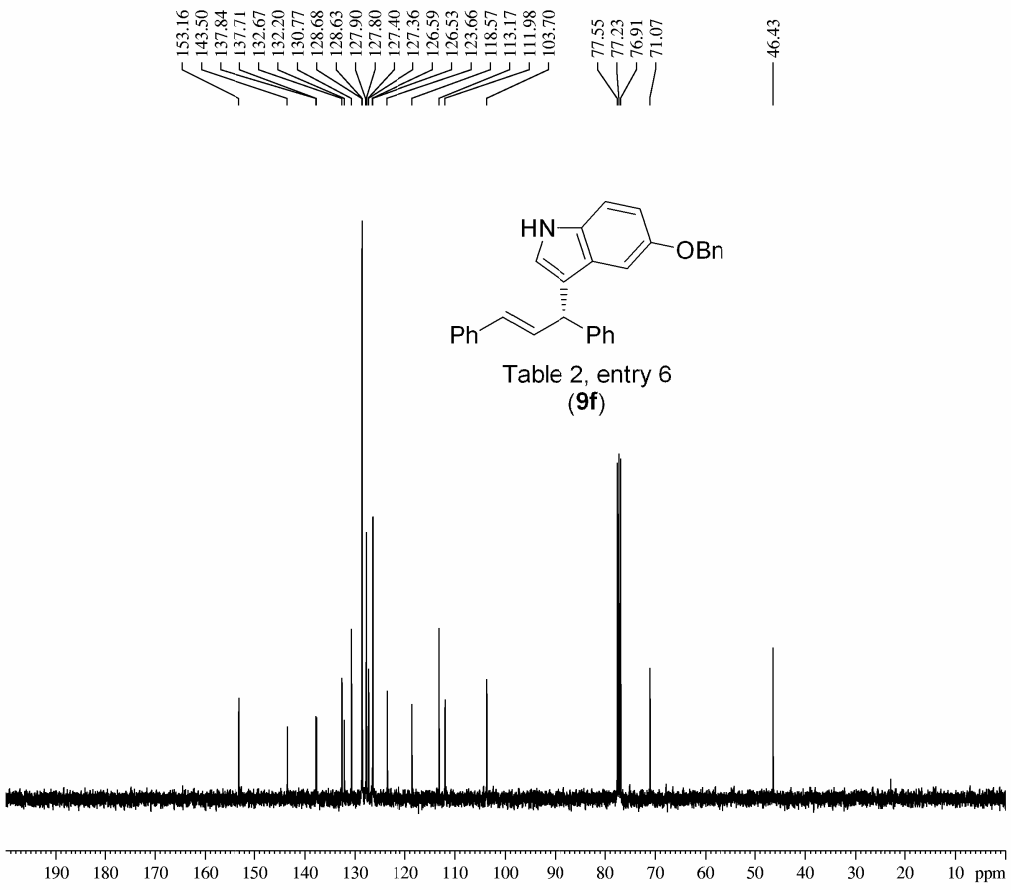


Table 2, entry 6
(**9f**)

```
Current Data Parameters
NAME      all-indol-C13
EXPNO                 1
PROCNO               37

F2 - Acquisition Parameters
Date_           20100904
Time               15.54
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                  206
DS                    0
SWH           25252.525 Hz
FIDRES         0.385323 Hz
AQ            1.2976629 sec
RG                  203
DW                19.800 usec
DE                 8.00 usec
TE                302.0 K
D1           2.00000000 sec
d11          0.03000000 sec
DELTA        1.89999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.40 usec
PL1                -1.00 dB
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG2         waltz16
NUC2                 1H
PCPD2             80.00 usec
PL12              15.00 dB
PL13              15.00 dB
PL2               -1.00 dB
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                32768
SF          100.6127550 MHz
WDW                  EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```

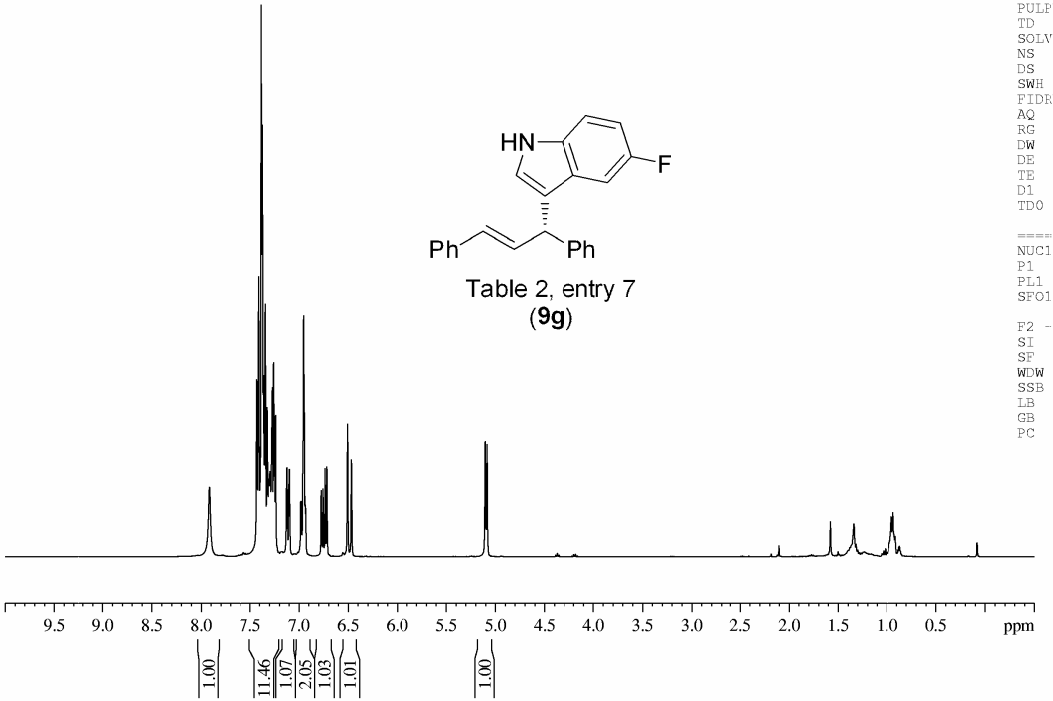


Table 2, entry 7
(**9g**)

```
Current Data Parameters
NAME          all-indol
EXPNO                 1
PROCNO               29

F2 - Acquisition Parameters
Date_           20100904
Time              15.48
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG            zg30
TD                65536
SOLVENT           CDCl3
NS                    7
DS                    0
SWH           12019.230 Hz
FIDRES         0.183399 Hz
AQ            2.7263477 sec
RG                  128
DW               41.600 usec
DE                6.00 usec
TE                301.0 K
D1           5.00000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 1H
P1                12.60 usec
PL1               -1.00 dB
SFO1        400.1332010 MHz

F2 - Processing parameters
SI                32768
SF          400.1300064 MHz
WDW                  EM
SSB                   0
LB                 0.30 Hz
GB                    0
PC                 1.00
```

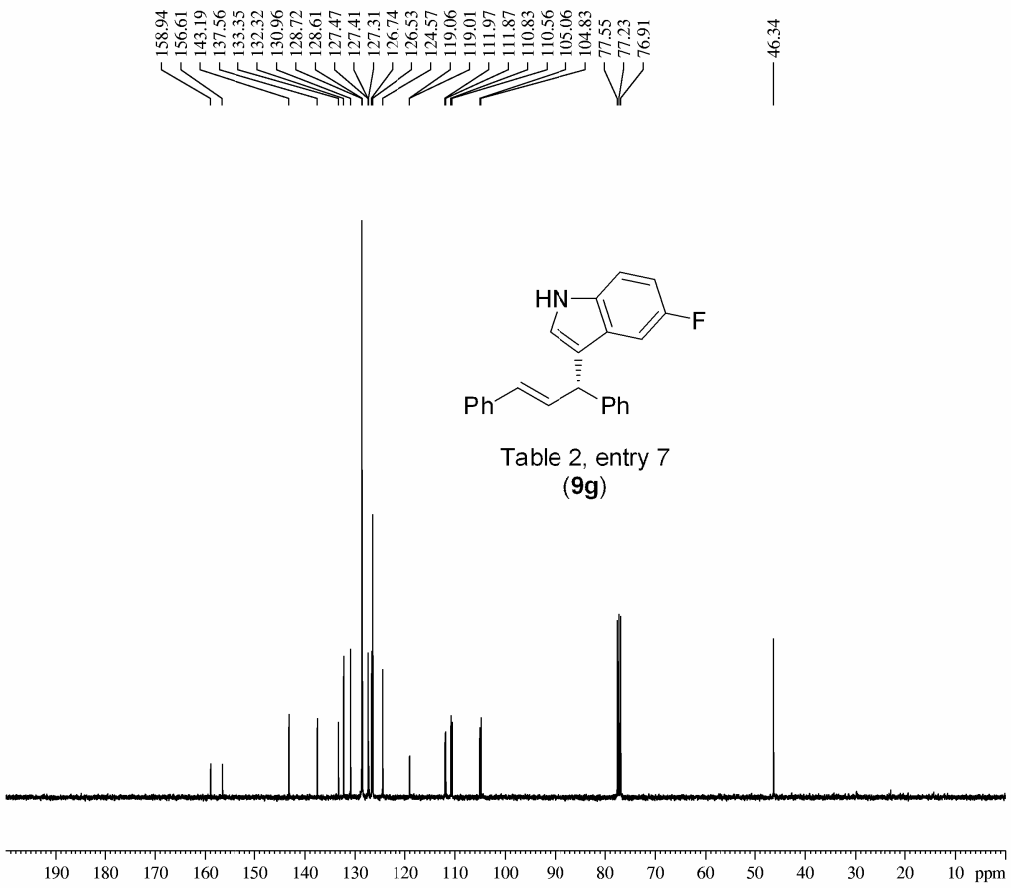


Table 2, entry 7
(**9g**)

```
Current Data Parameters
NAME      all-indol-C13
EXPNO                 1
PROCNO               27

F2 - Acquisition Parameters
Date_           20100904
Time               15.54
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                  206
DS                    0
SWH           25252.525 Hz
FIDRES         0.385323 Hz
AQ            1.2976629 sec
RG                  203
DW               19.800 usec
DE                8.00 usec
TE               302.0 K
D1           2.00000000 sec
d11          0.03000000 sec
DELTA        1.89999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.40 usec
PL1                -1.00 dB
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                  1H
PCPD2             80.00 usec
PL12              15.00 dB
PL13              15.00 dB
PL2               -1.00 dB
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                32768
SF          100.6127556 MHz
WDW                  EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```

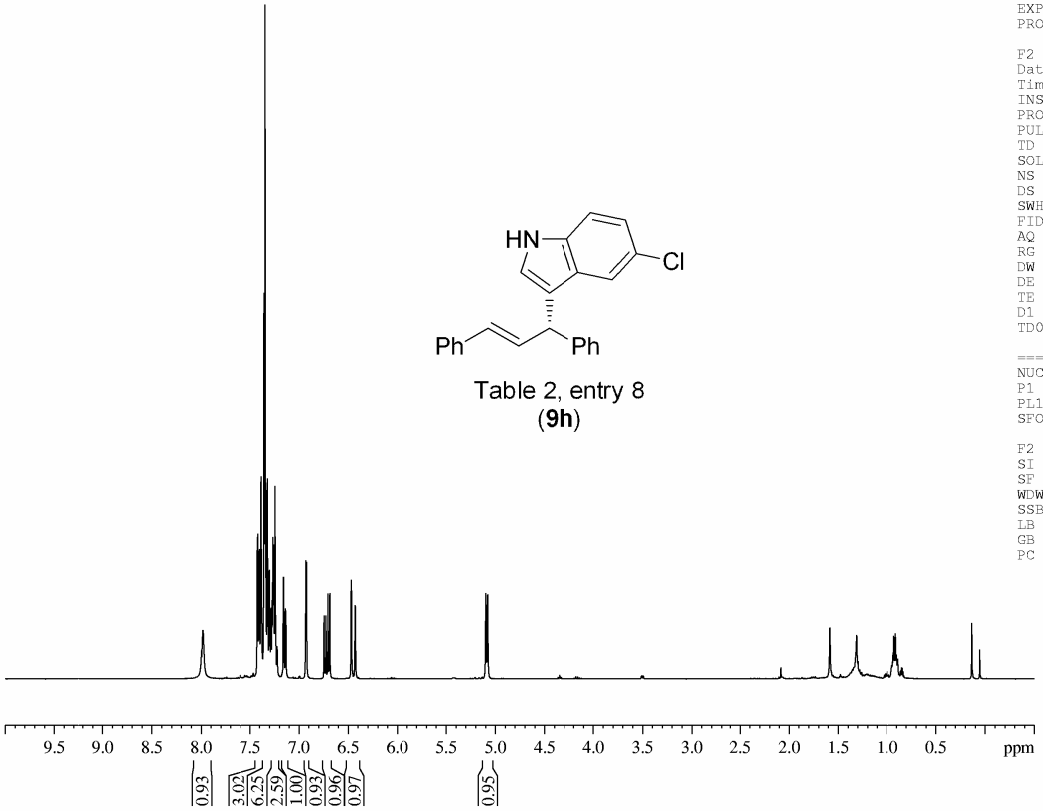


Table 2, entry 8
(**9h**)

```
Current Data Parameters
NAME          all-indol
EXPNO                 1
PROCNO               32

F2 - Acquisition Parameters
Date_           20100904
Time              15.48
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG            zg30
TD                65536
SOLVENT           CDCl3
NS                    7
DS                    0
SWH           12019.230 Hz
FIDRES         0.183399 Hz
AQ            2.7263477 sec
RG                  128
DW               41.600 usec
DE                6.00 usec
TE               301.0 K
D1           5.00000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 1H
P1                12.60 usec
PL1               -1.00 dB
SFO1        400.1332010 MHz

F2 - Processing parameters
SI                32768
SF          400.1300051 MHz
WDW                  EM
SSB                   0
LB                 0.30 Hz
GB                    0
PC                 1.00
```

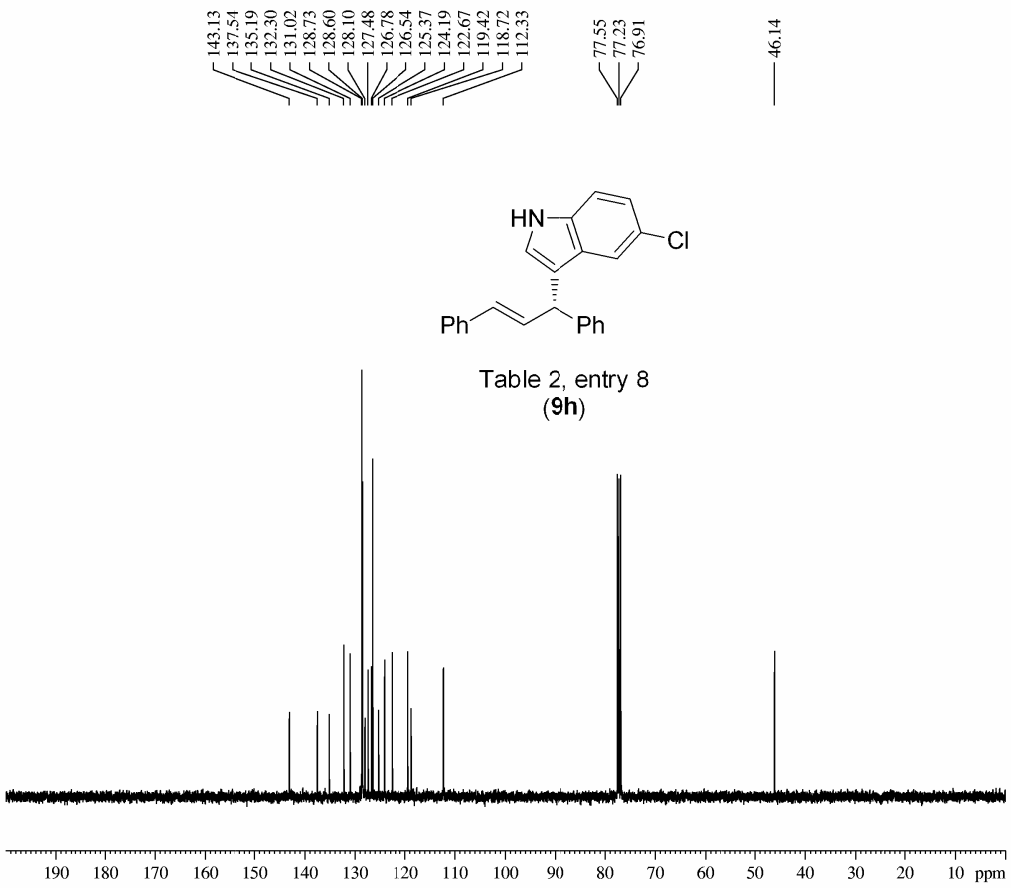


Table 2, entry 8
(**9h**)

```
Current Data Parameters
NAME      all-indol-C13
EXPNO                 1
PROCNO               29

F2 - Acquisition Parameters
Date_           20100904
Time               15.54
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                  206
DS                    0
SWH           25252.525 Hz
FIDRES         0.385323 Hz
AQ            1.2976629 sec
RG                  203
DW                19.800 usec
DE                 8.00 usec
TE                302.0 K
D1           2.00000000 sec
d11          0.03000000 sec
DELTA        1.89999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.40 usec
PL1                -1.00 dB
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                  1H
PCPD2              80.00 usec
PL12               15.00 dB
PL13               15.00 dB
PL2                -1.00 dB
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                 32768
SF          100.6127525 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.40
```

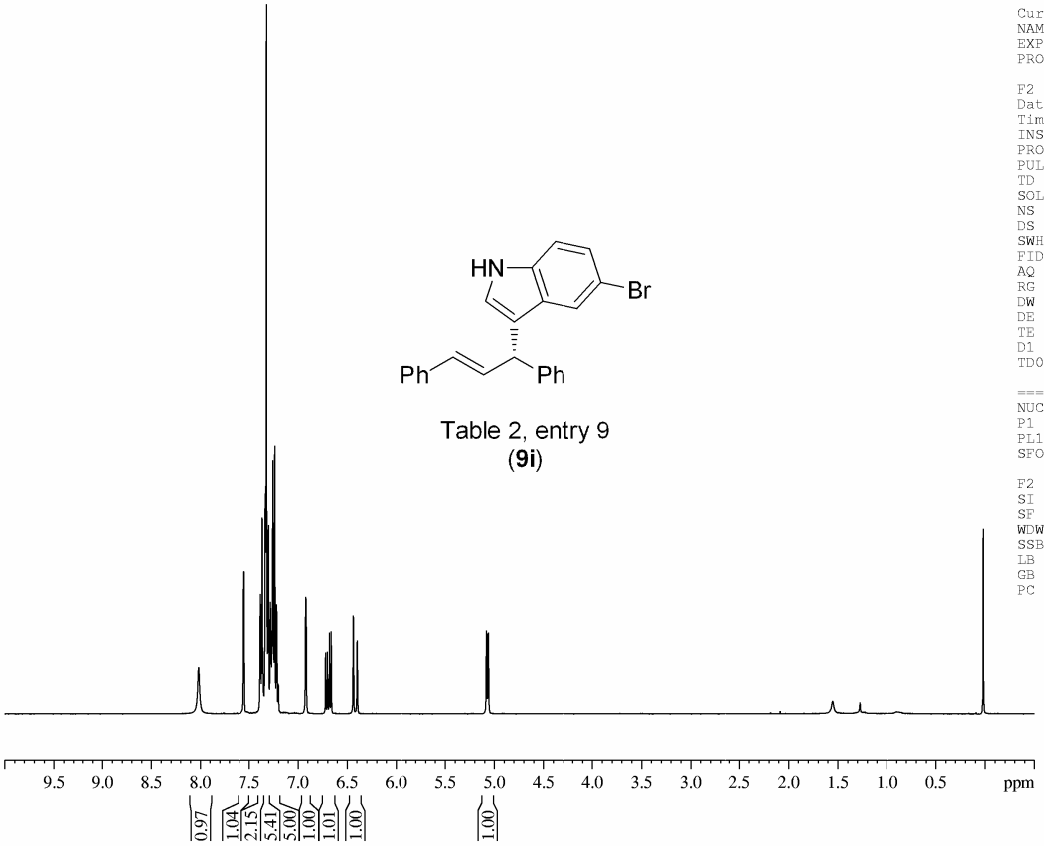


Table 2, entry 9
(**9i**)

```
Current Data Parameters
NAME          all-indol
EXPNO                 3
PROCNO                7

F2 - Acquisition Parameters
Date_          20110103
Time             22.20
INSTRUM          spect
PROBHD   5 mm PADUL 13C
PULPROG           zg30
TD               65536
SOLVENT          CDCl3
NS                   8
DS                   0
SWH          12019.230 Hz
FIDRES        0.183399 Hz
AQ           2.7263477 sec
RG                80.6
DW              41.600 usec
DE                6.00 usec
TE               297.5 K
D1          5.00000000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1                 1H
P1               12.60 usec
PL1              -1.00 dB
SFO1        400.1332010 MHz

F2 - Processing parameters
SI               32768
SF          400.1300117 MHz
WDW                 EM
SSB                  0
LB               0.30 Hz
GB                   0
PC               1.00
```

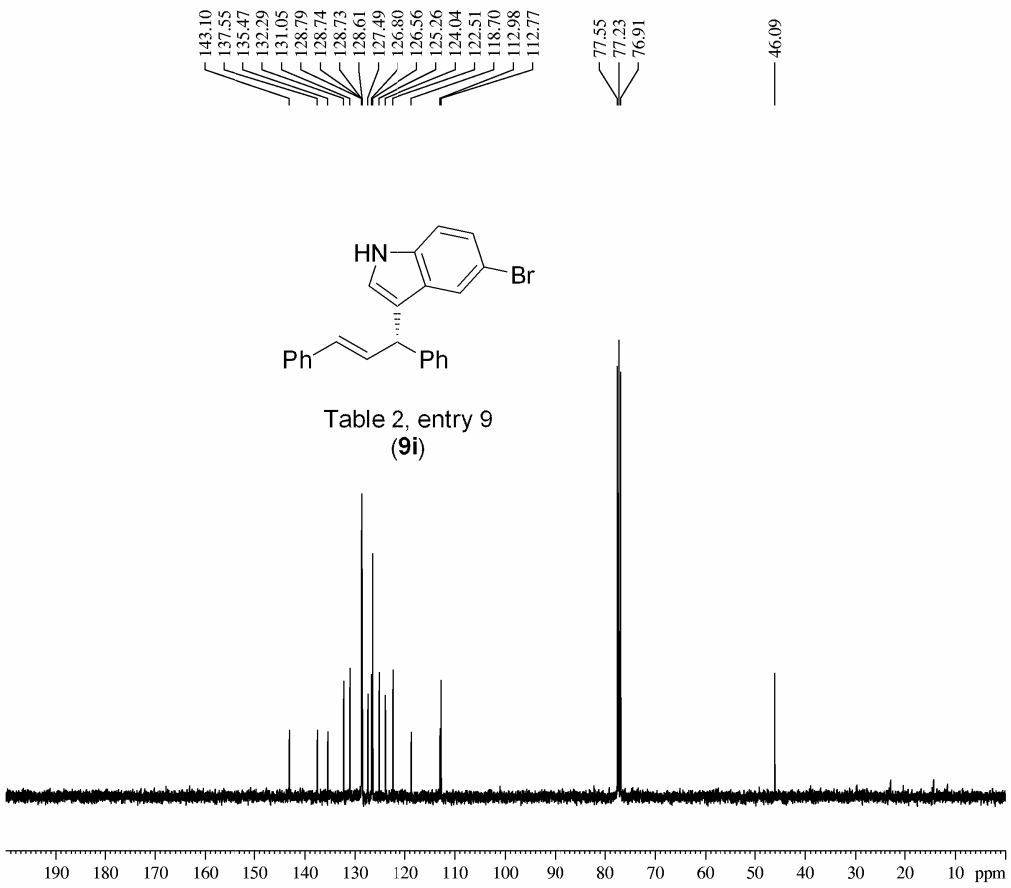


Table 2, entry 9
(**9i**)

```
Current Data Parameters
NAME      all-indol-C13
EXPNO                 1
PROCNO               13

F2 - Acquisition Parameters
Date_           20100904
Time              15.54
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                  206
DS                    0
SWH           25252.525 Hz
FIDRES         0.385323 Hz
AQ            1.2976629 sec
RG                  203
DW               19.800 usec
DE                8.00 usec
TE               302.0 K
D1           2.00000000 sec
d11          0.03000000 sec
DELTA        1.89999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.40 usec
PL1                -1.00 dB
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                  1H
PCPD2             80.00 usec
PL12              15.00 dB
PL13              15.00 dB
PL2               -1.00 dB
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                32768
SF          100.6127494 MHz
WDW                  EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```

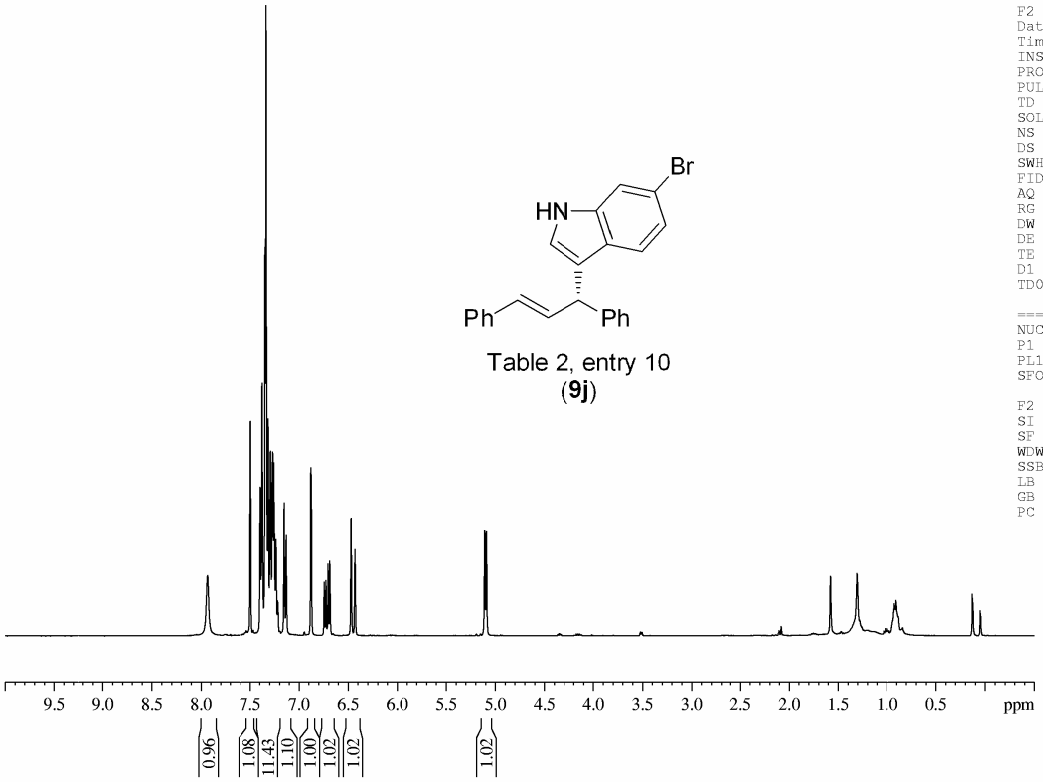


Table 2, entry 10
(**9j**)

```
Current Data Parameters
NAME          all-indol
EXPNO                 1
PROCNO               34

F2 - Acquisition Parameters
Date_           20100904
Time              15.48
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG            zg30
TD                65536
SOLVENT           CDCl3
NS                    7
DS                    0
SWH           12019.230 Hz
FIDRES         0.183399 Hz
AQ            2.7263477 sec
RG                  128
DW               41.600 usec
DE                6.00 usec
TE               301.0 K
D1           5.00000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 1H
P1                12.60 usec
PL1               -1.00 dB
SFO1        400.1332010 MHz

F2 - Processing parameters
SI                32768
SF          400.1300048 MHz
WDW                  EM
SSB                   0
LB                 0.30 Hz
GB                    0
PC                 1.00
```

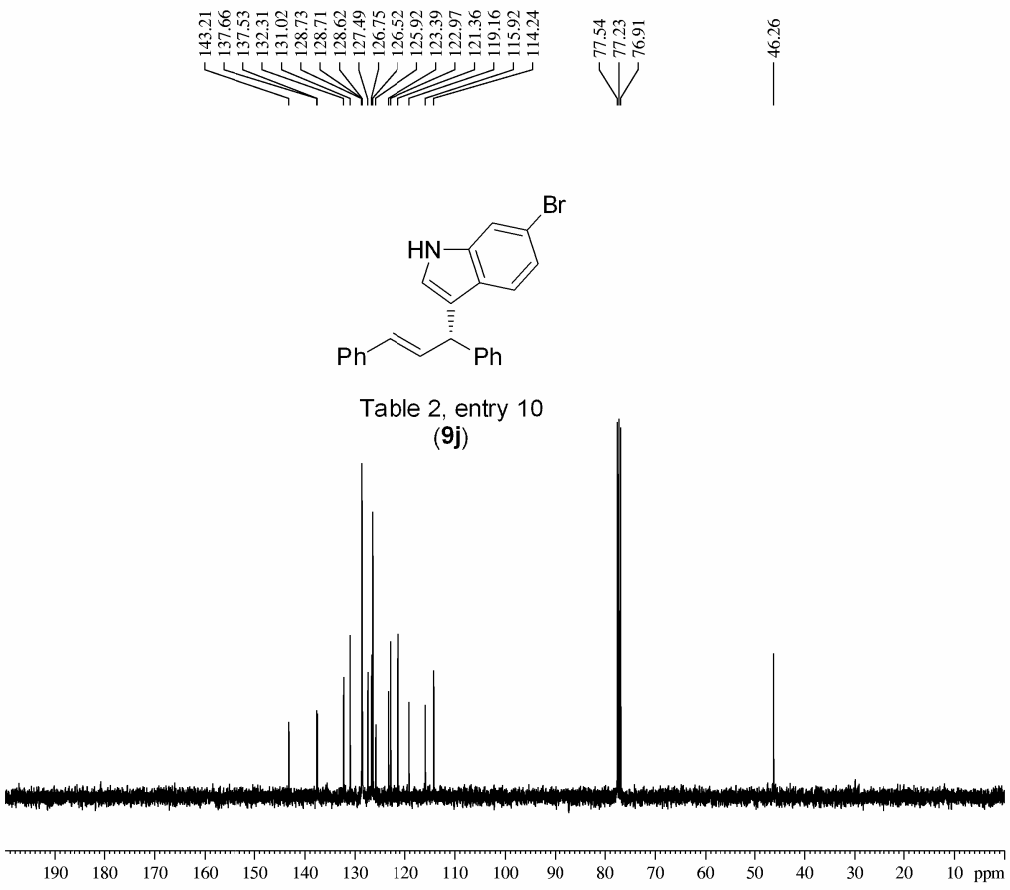
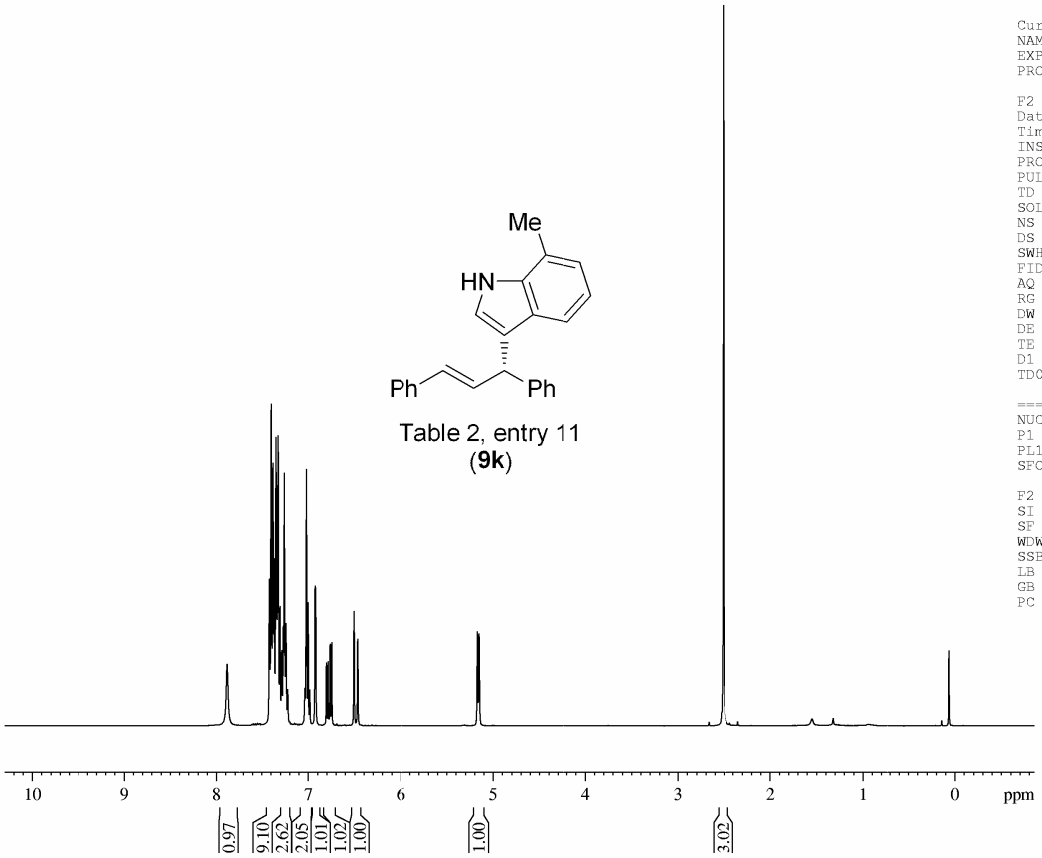


Table 2, entry 10
(**9j**)

```
Current Data Parameters
NAME      all-indol-C13
EXPNO                 1
PROCNO               30

F2 - Acquisition Parameters
Date_           20100904
Time               15.54
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                  206
DS                    0
SWH           25252.525 Hz
FIDRES         0.385323 Hz
AQ            1.2976629 sec
RG                  203
DW               19.800 usec
DE                8.00 usec
TE               302.0 K
D1           2.00000000 sec
d11          0.03000000 sec
DELTA        1.89999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.40 usec
PL1                -1.00 dB
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                  1H
PCPD2             80.00 usec
PL12              15.00 dB
PL13              15.00 dB
PL2               -1.00 dB
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                32768
SF          100.6127518 MHz
WDW                  EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```




```
Current Data Parameters
NAME          all-indol
EXPNO                 3
PROCNO                8

F2 - Acquisition Parameters
Date_          20110103
Time             22.20
INSTRUM          spect
PROBHD   5 mm PADUL 13C
PULPROG           zg30
TD               65536
SOLVENT          CDCl3
NS                   8
DS                   0
SWH          12019.230 Hz
FIDRES        0.183399 Hz
AQ           2.7263477 sec
RG                80.6
DW               41.600 usec
DE                6.00 usec
TE               297.5 K
D1          5.00000000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1                 1H
P1               12.60 usec
PL1              -1.00 dB
SFO1        400.1332010 MHz

F2 - Processing parameters
SI               32768
SF          400.1300117 MHz
WDW                 EM
SSB                  0
LB               0.30 Hz
GB                   0
PC               1.00
```

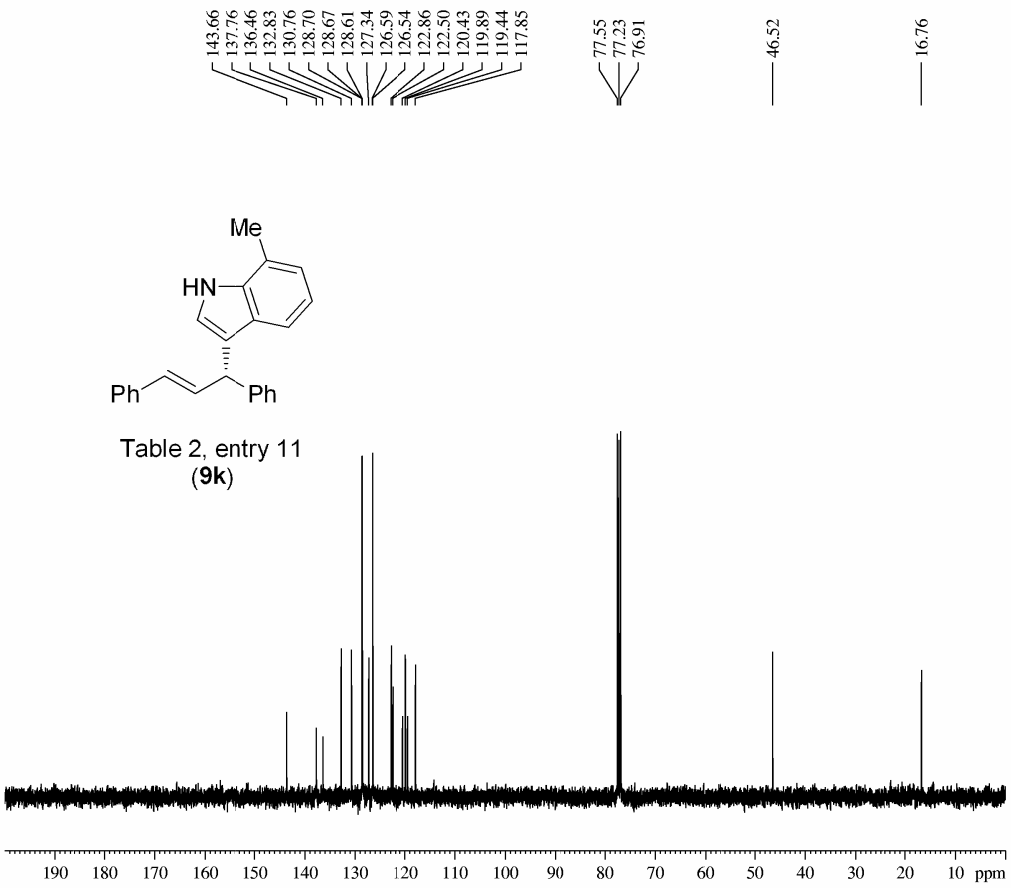
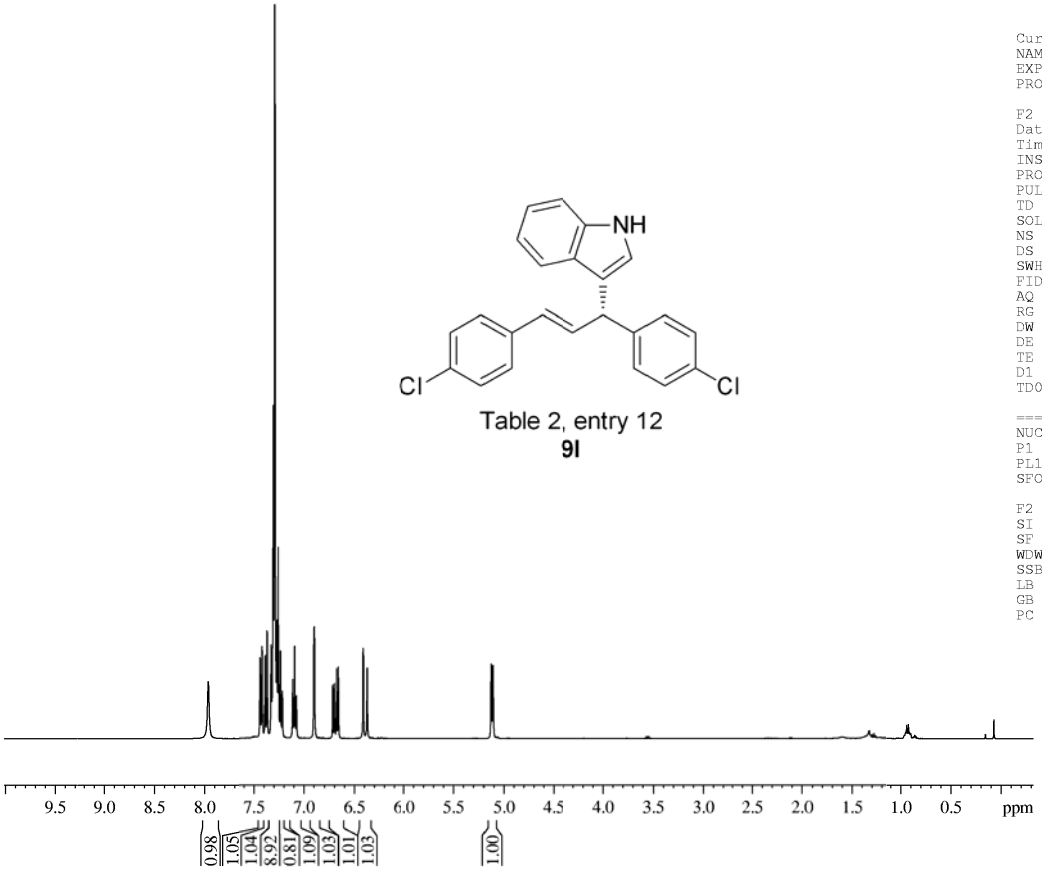


Table 2, entry 11
(**9k**)

```
Current Data Parameters
NAME      all-indol-C13
EXPNO                 1
PROCNO               22

F2 - Acquisition Parameters
Date_           20100904
Time              15.54
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                  206
DS                    0
SWH           25252.525 Hz
FIDRES         0.385323 Hz
AQ            1.2976629 sec
RG                  203
DW               19.800 usec
DE                8.00 usec
TE               302.0 K
D1           2.00000000 sec
d11          0.03000000 sec
DELTA        1.89999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.40 usec
PL1                -1.00 dB
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG2         waltz16
NUC2                 1H
PCPD2             80.00 usec
PL12              15.00 dB
PL13              15.00 dB
PL2               -1.00 dB
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                32768
SF          100.6127515 MHz
WDW                  EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```




```
Current Data Parameters
NAME          all-indol
EXPNO                 4
PROCNO                9

F2 - Acquisition Parameters
Date_          20110224
Time             21.42
INSTRUM          spect
PROBHD   5 mm PADUL 13C
PULPROG           zg30
TD               65536
SOLVENT          CDCl3
NS                   8
DS                   0
SWH           12019.230 Hz
FIDRES         0.183399 Hz
AQ            2.7263477 sec
RG                 203
DW               41.600 usec
DE                6.00 usec
TE               297.3 K
D1           5.00000000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1                 1H
P1                12.60 usec
PL1               -1.00 dB
SFO1        400.1332010 MHz

F2 - Processing parameters
SI               32768
SF          400.1300117 MHz
WDW                 EM
SSB                  0
LB                0.30 Hz
GB                   0
PC                1.00
```

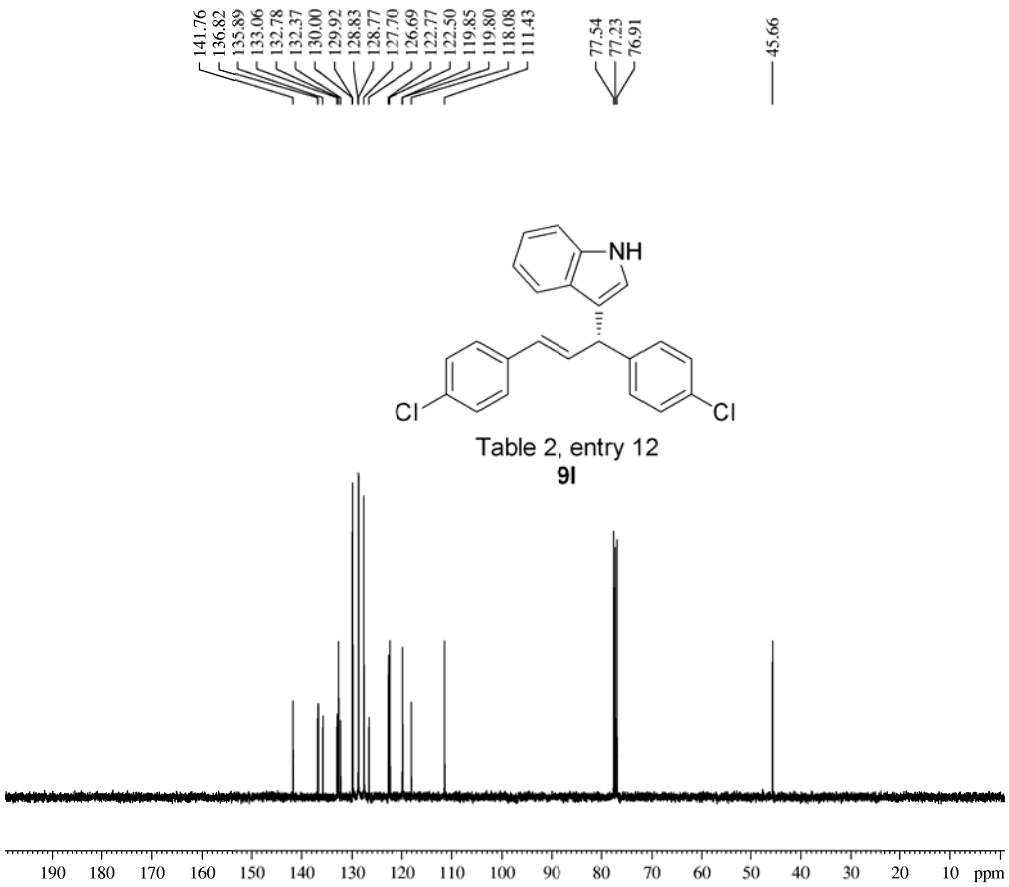
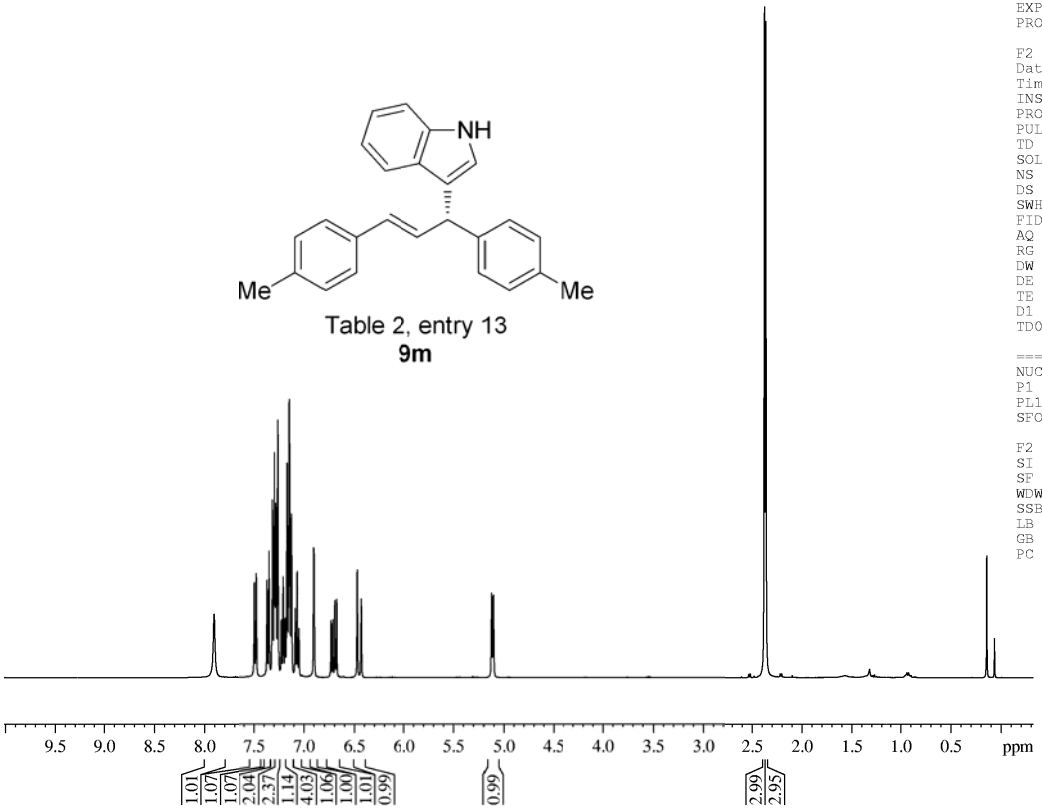


Table 2, entry 12

9l

```
Current Data Parameters
NAME      all-indol-C13
EXPNO                 3
PROCNO                5

F2 - Acquisition Parameters
Date_           20110224
Time              15.39
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                   50
DS                    0
SWH           25252.525 Hz
FIDRES         0.385323 Hz
AQ            1.2976629 sec
RG                  203
DW               19.800 usec
DE                8.00 usec
TE               298.4 K
D1           2.00000000 sec
d11          0.03000000 sec
DELTA        1.89999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.40 usec
PL1                -1.00 dB
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                  1H
PCPD2             80.00 usec
PL12              15.00 dB
PL13              15.00 dB
PL2               -1.00 dB
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                32768
SF          100.6127594 MHz
WDW                  EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```




```
Current Data Parameters
NAME          all-indol
EXPNO                 4
PROCNO                8

F2 - Acquisition Parameters
Date_          20110224
Time             21.42
INSTRUM          spect
PROBHD   5 mm PADUL 13C
PULPROG           zg30
TD               65536
SOLVENT          CDCl3
NS                   8
DS                   0
SWH          12019.230 Hz
FIDRES        0.183399 Hz
AQ           2.7263477 sec
RG                 203
DW              41.600 usec
DE               6.00 usec
TE              297.3 K
D1          5.00000000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1                1H
P1              12.60 usec
PL1             -1.00 dB
SFO1       400.1332010 MHz

F2 - Processing parameters
SI               32768
SF         400.1300117 MHz
WDW                 EM
SSB                  0
LB              0.30 Hz
GB                   0
PC               1.00
```

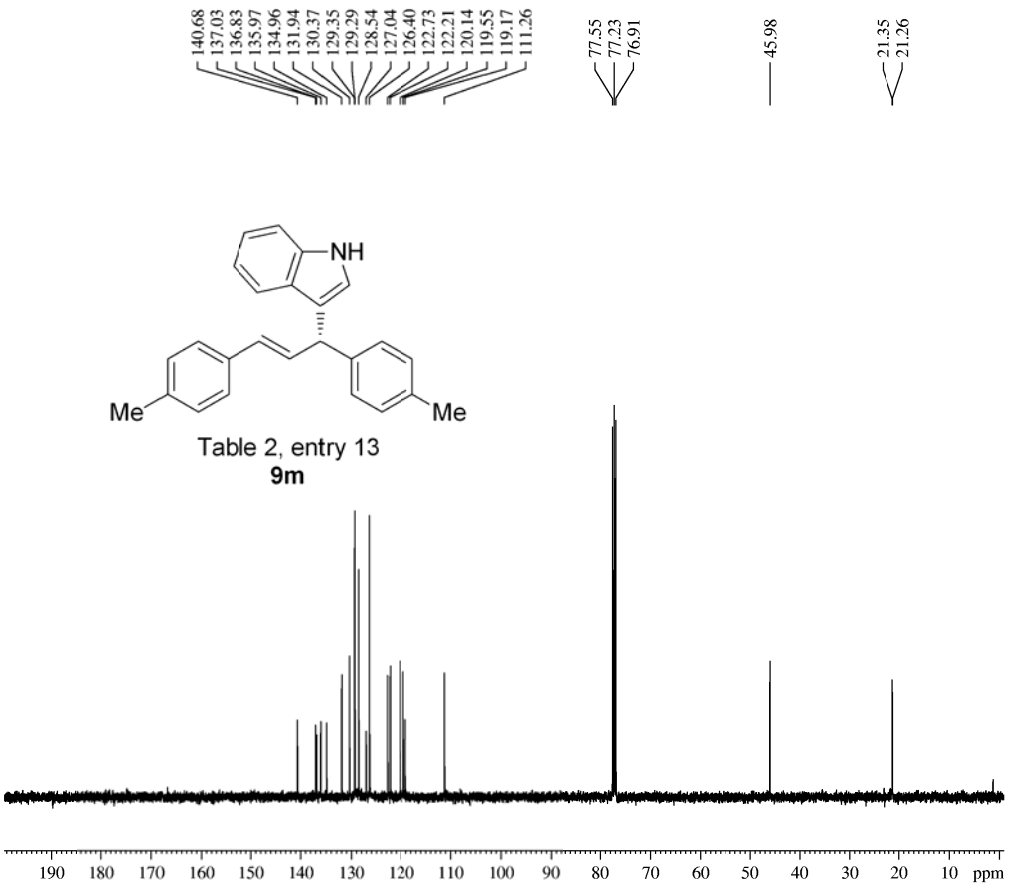


Table 2, entry 13

9m

```
Current Data Parameters
NAME      all-indol-C13
EXPNO                 3
PROCNO                4

F2 - Acquisition Parameters
Date_           20110224
Time              15.39
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                   50
DS                    0
SWH           25252.525 Hz
FIDRES         0.385323 Hz
AQ            1.2976629 sec
RG                  203
DW               19.800 usec
DE                8.00 usec
TE               298.4 K
D1           2.00000000 sec
d11          0.03000000 sec
DELTA        1.89999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.40 usec
PL1                -1.00 dB
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                  1H
PCPD2             80.00 usec
PL12              15.00 dB
PL13              15.00 dB
PL2               -1.00 dB
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                32768
SF          100.6127564 MHz
WDW                  EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```

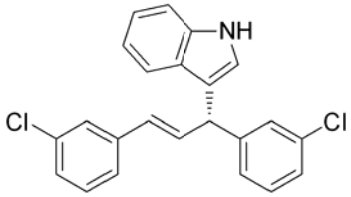
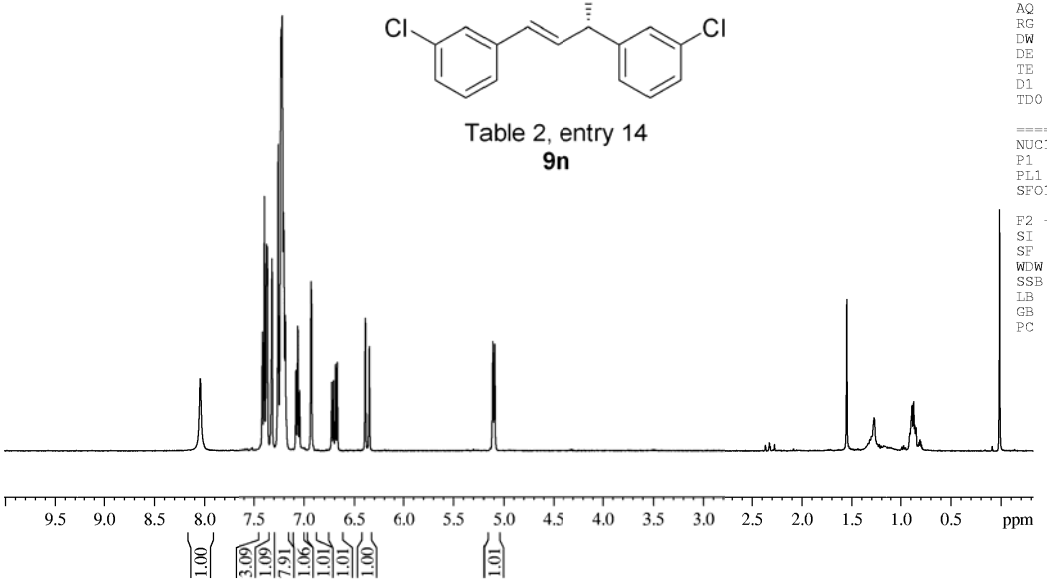


Table 2, entry 14
9n




```
Current Data Parameters
NAME          all-indol
EXPNO                 4
PROCNO               31

F2 - Acquisition Parameters
Date_           20110224
Time              21.42
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG            zg30
TD                65536
SOLVENT           CDCl3
NS                    8
DS                    0
SWH           12019.230 Hz
FIDRES         0.183399 Hz
AQ            2.7263477 sec
RG                  203
DW               41.600 usec
DE                6.00 usec
TE               297.3 K
D1           5.00000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 1H
P1                12.60 usec
PL1               -1.00 dB
SFO1        400.1332010 MHz

F2 - Processing parameters
SI                32768
SF          400.1300117 MHz
WDW                  EM
SSB                   0
LB                 0.30 Hz
GB                    0
PC                 1.00
```

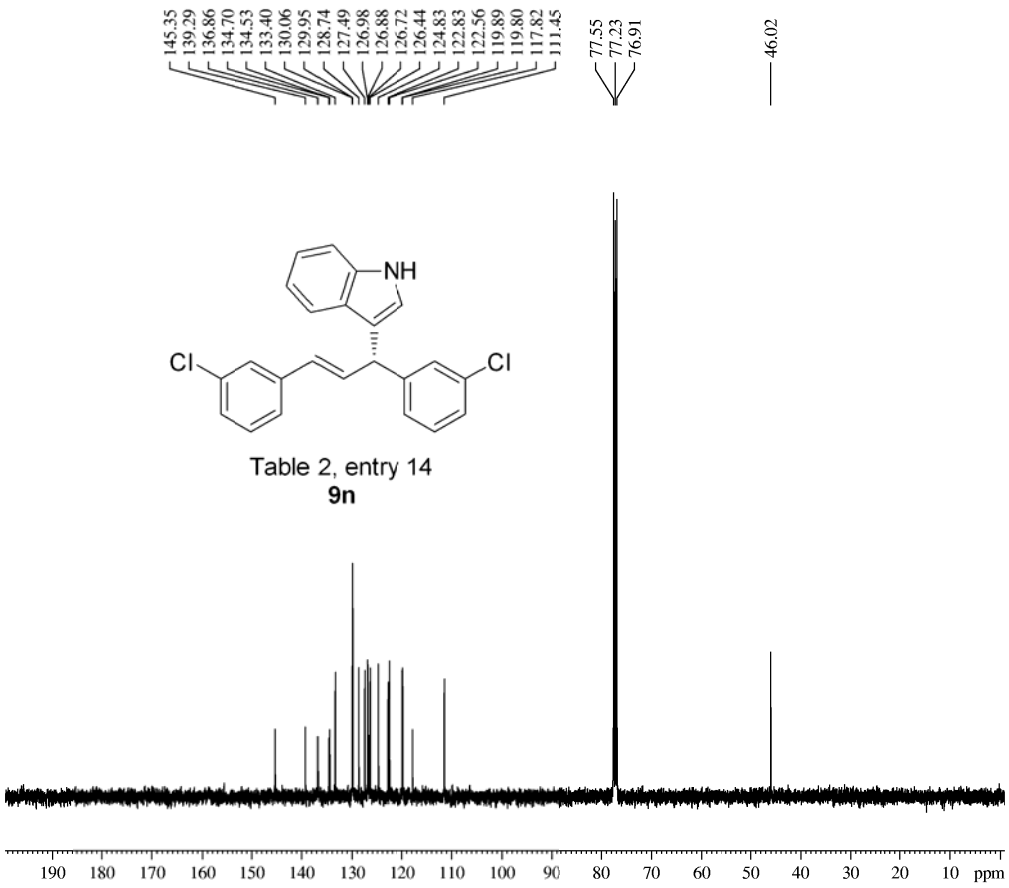
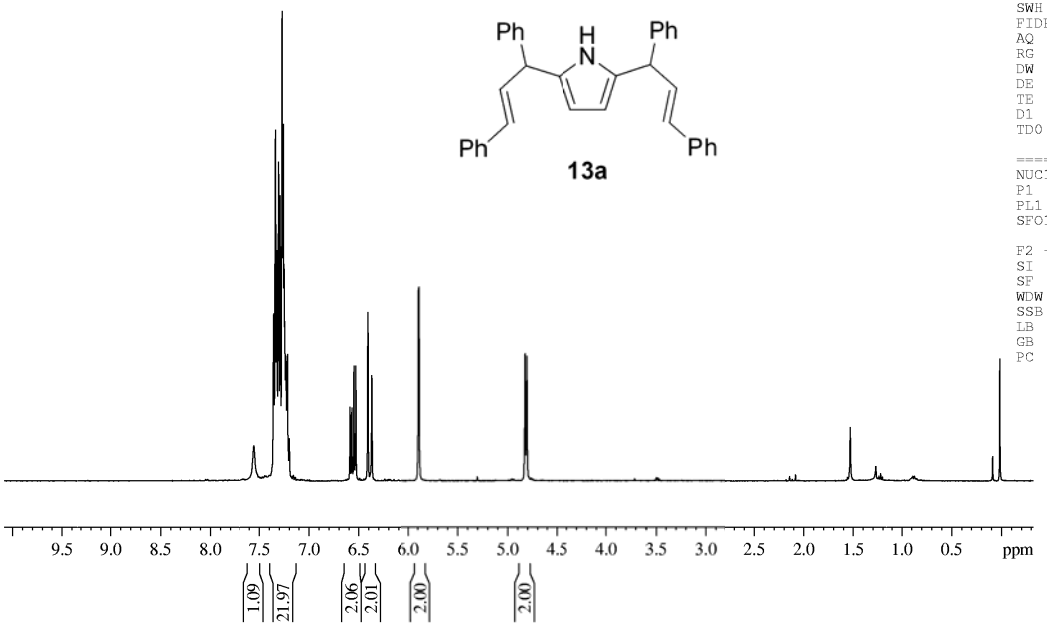
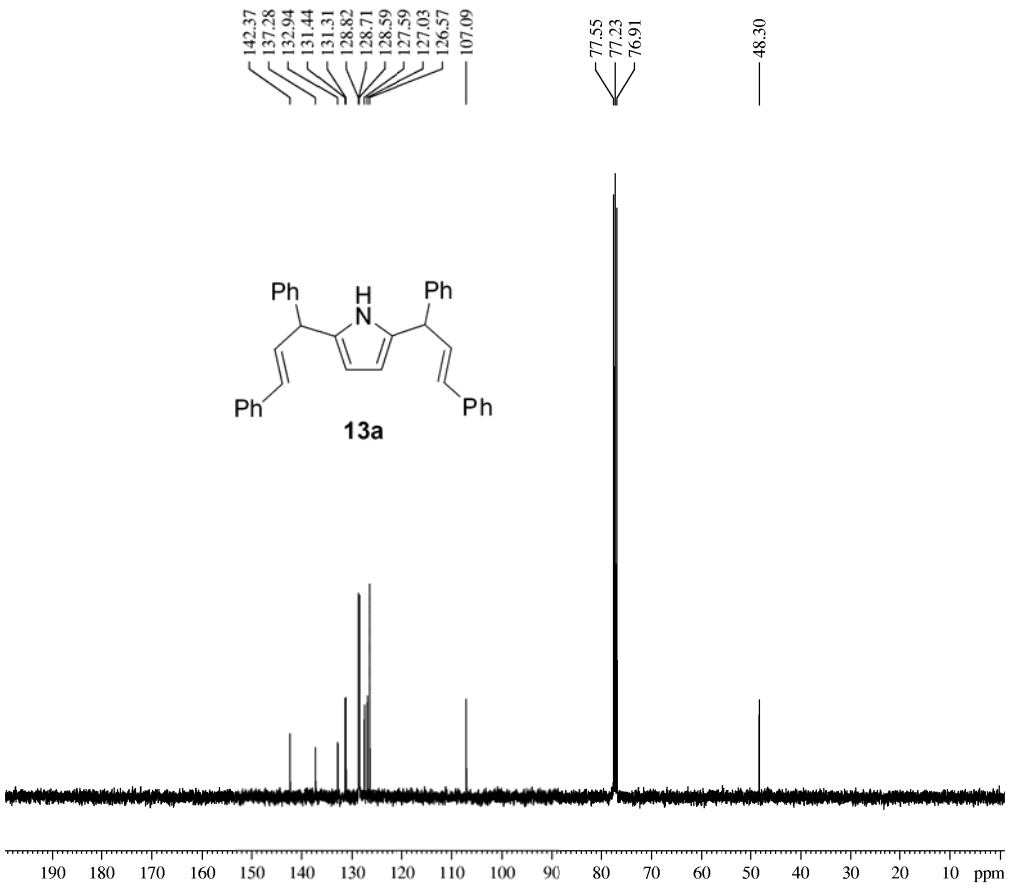


Table 2, entry 14
9n

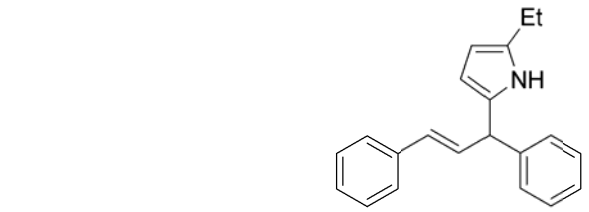
```
Current Data Parameters
NAME      all-indol-C13
EXPNO                 3
PROCNO               13

F2 - Acquisition Parameters
Date_           20110224
Time              15.39
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                   50
DS                    0
SWH           25252.525 Hz
FIDRES         0.385323 Hz
AQ            1.2976629 sec
RG                  203
DW               19.800 usec
DE                8.00 usec
TE               298.4 K
D1           2.00000000 sec
d11          0.03000000 sec
DELTA        1.89999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.40 usec
PL1                -1.00 dB
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                  1H
PCPD2             80.00 usec
PL12              15.00 dB
PL13              15.00 dB
PL2               -1.00 dB
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                32768
SF          100.6127507 MHz
WDW                  EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```



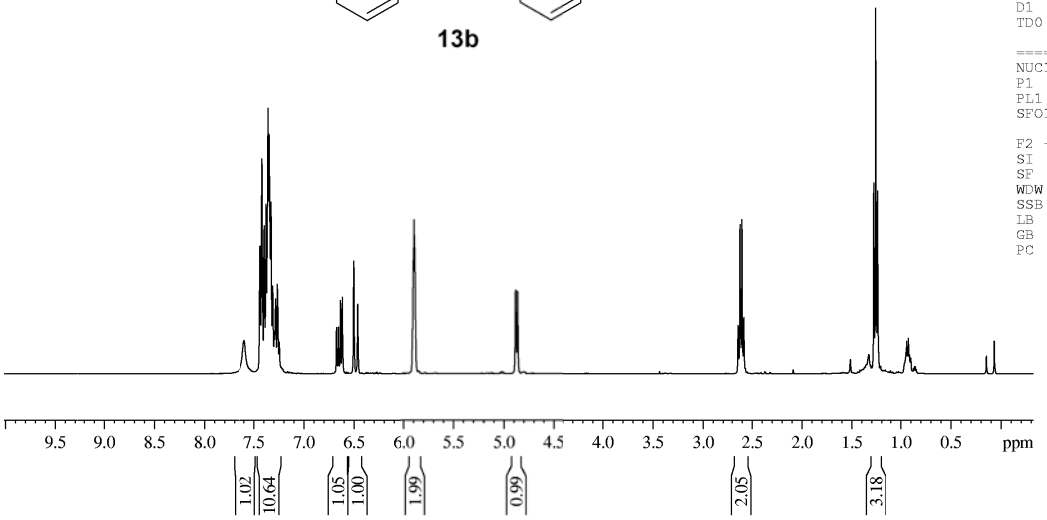

```
Current Data Parameters
NAME          all-indol
EXPNO                 4
PROCNO                6

F2 - Acquisition Parameters
Date_           20110224
Time              21.42
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG            zg30
TD                65536
SOLVENT           CDCl3
NS                    8
DS                    0
SWH           12019.230 Hz
FIDRES         0.183399 Hz
AQ            2.7263477 sec
RG                  203
DW               41.600 usec
DE                6.00 usec
TE               297.3 K
D1           5.00000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 1H
P1                12.60 usec
PL1               -1.00 dB
SFO1        400.1332010 MHz

F2 - Processing parameters
SI                32768
SF          400.1300117 MHz
WDW                  EM
SSB                   0
LB                 0.30 Hz
GB                    0
PC                 1.00
```



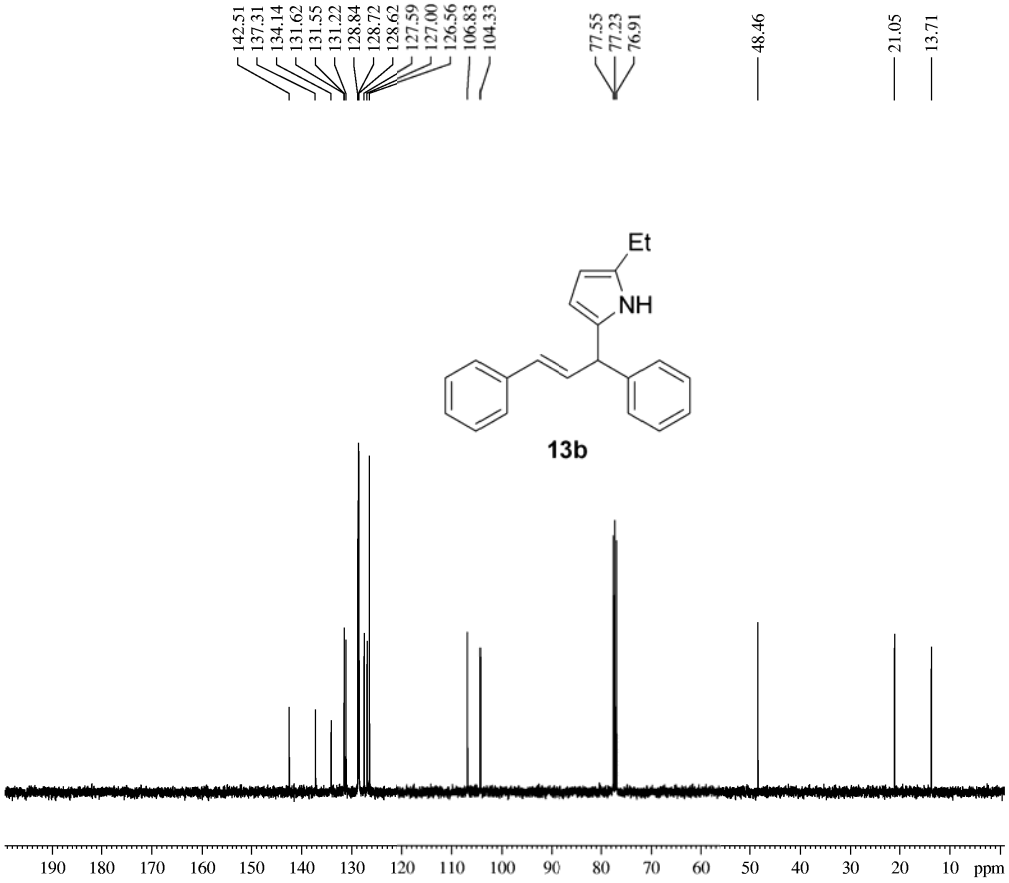

```
Current Data Parameters
NAME      all-indol-C13
EXPNO                 3
PROCNO                2

F2 - Acquisition Parameters
Date_           20110224
Time              15.39
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                   50
DS                    0
SWH           25252.525 Hz
FIDRES         0.385323 Hz
AQ            1.2976629 sec
RG                  203
DW               19.800 usec
DE                8.00 usec
TE               298.4 K
D1           2.00000000 sec
d11          0.03000000 sec
DELTA        1.89999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.40 usec
PL1                -1.00 dB
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                  1H
PCPD2             80.00 usec
PL12              15.00 dB
PL13              15.00 dB
PL2               -1.00 dB
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                32768
SF          100.6127503 MHz
WDW                  EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```



13b




```
Current Data Parameters
NAME          all-indol
EXPNO                 4
PROCNO               34

F2 - Acquisition Parameters
Date_           20110224
Time              21.42
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG            zg30
TD                65536
SOLVENT           CDCl3
NS                    8
DS                    0
SWH           12019.230 Hz
FIDRES         0.183399 Hz
AQ            2.7263477 sec
RG                  203
DW               41.600 usec
DE                6.00 usec
TE               297.3 K
D1           5.00000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 1H
P1                12.60 usec
PL1               -1.00 dB
SFO1        400.1332010 MHz

F2 - Processing parameters
SI                32768
SF          400.1300117 MHz
WDW                  EM
SSB                   0
LB                 0.30 Hz
GB                    0
PC                 1.00
```




```
Current Data Parameters
NAME      all-indol-C13
EXPNO                 3
PROCNO               16

F2 - Acquisition Parameters
Date_           20110224
Time              15.39
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                   50
DS                    0
SWH           25252.525 Hz
FIDRES         0.385323 Hz
AQ            1.2976629 sec
RG                  203
DW               19.800 usec
DE                8.00 usec
TE               298.4 K
D1           2.00000000 sec
d11          0.03000000 sec
DELTA        1.89999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.40 usec
PL1                -1.00 dB
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                  1H
PCPD2             80.00 usec
PL12              15.00 dB
PL13              15.00 dB
PL2               -1.00 dB
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                32768
SF          100.6127572 MHz
WDW                  EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```