A Facile Development of Chiral Alkenylboranes from Chiral Diynes for Asymmetric Hydrogenation of Silyl Enol Ethers

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Supporting Information

General consideration: All air-sensitive compounds were handled under an atmosphere of argon or in a nitrogen-filled glovebox. ^{1}H NMR and ^{13}C NMR spectra were recorded on Bruker AV 400 at ambient temperature with $CDCl_3$ as solvent and TMS as internal standard. Chemical shifts (δ) were given in ppm, referenced to the residual proton resonance of TMS (0), to the carbon resonance of the $CDCl_3$ (77.23). Coupling constants (*J*) were given in Hertz (Hz). IR spectrums were recorded on Perkin-Elmer-983 spectrometer. Optical rotations were measured with PerkinElmer 341 polarimeter. Flash column chromatography was performed on silica gel (200-300 mesh). All solvents were purified by conventional methods, distilled before use. Commercially available reagents were used without further purification. $H(C_6F_5)_2$ was prepared according to the reported method (D. J. Parks, W. E. Piers, G. P. A. Yap, *Organometallics* **1998**, *17*, 5492-5503).

Representative procedure for the synthesis of chiral diyne 5a:

Synthesis of compound 8a: A solution of PPh_3 (2.6229 g, 10 mmol) in CH_2Cl_2 (5 mL) was added dropwise to a solution of CBr_4 (1.6581 g, 5 mmol) in CH_2Cl_2 (3 mL) at 0 ºC, stirred for 1 h under argon atmosphere. A solution of **7a** (0.6870 g, 1.0 mmol) in CH_2Cl_2 (2 mL) was added dropwise and the mixture was stirred for an additional 1 h. The solution was filtered through a short of silica gel column and washed with CH_2Cl_2. Then the solution of filtration was evaporated and petroleum ether was added. The resulting solution was filtered again through a short of silica gel column and washed with petroleum ether to remove triphenylphosphine oxide. The solvent was then removed under reduced pressure to yield compound **8a** (0.9587 g, 96% yield). Compound **8a** was used for the next step directly without isolation.

Synthesis of compound 5a: Compound **8a** (0.9587 g, 0.96 mmol) was dissolved in THF (10 mL) and cooled to -78 ºC under argon atmosphere. *n*-BuLi (2.5 M in pentane, 3.8 mL, 9.6 mmol) was added dropwise over 15 min and the solution was stirred at -78 ºC for 1 h, then the addition of saturated NH_4Cl solution (10 mL) and warm to room temperature for 30 min. The solution was extracted with Et_2O (3 × 10 mL). The combined organic phase was washed with brine, dried over Na_2SO_4, filtered. After removal of

solvents, the residue was purified by column chromatography on silica gel (petroleum ether) to afford compound **5a** as a light yellow foam (0.3520 g, 54% yield).

O. Vechorkin, A. Godinat, R. Scopelliti, and X. Hu, *Angew. Chem.* **2011**, *123*, 11981–11985; *Angew. Chem. Int. Ed.* **2011**, *50,* 11777–11781.

Procedure for the synthesis of chiral diyne 5f: A solution of compound **5a** (0.2765 g, 0.4 mmol), in THF (4 mL) was cooled to -40 ºC under argon atmosphere. *n*-BuLi (2.5 M in pentane, 1.0 mL, 2.5 mmol) was added dropwise over 10 min. After stirring at -40 ºC for 2 h, a solution of iodomethane (0.3548 g, 2.5 mmol) in THF (1 mL) was added and the mixture was stirred for 2 h at room temperature. Saturated NH_4Cl solution (5 mL) and water (10 mL) was added, and the mixture was extracted with Et_2O (3 × 10 mL). The combined organic layers was dried over Na_2SO_4, filtered, and concentrated. The resulting residue was purified by column chromatography on silica gel (petroleum ether) to afford compound **5f** as a light yellow foam (0.1158 g, 74% yield).

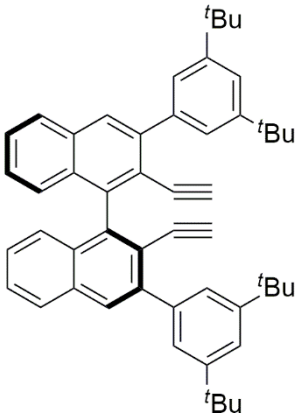
Q. Zhou, H. D. Srinivas, S. Dasgupta, and M. P. Watson, *J. Am. Chem. Soc.* **2013**, *135*, 3307 −3310.

Representative procedure for the metal-free catalytic asymmetric hydrogenation of asymmetric hydrogenation of silyl enol ethers (Table 2, entry 1): To a glass test tube (10 mL), $HB(C_6F_5)_2$ (0.0138 g, 0.04 mmol), chiral diyne **5a** (0.0136 g, 0.02 mmol), and dry mesitylene (0.2 mL) were added in a nitrogen atmosphere glovebox. The resulting mixture was stirred for 5 min at room temperature followed by addition of P^tBu_3 (10% w in *n*-pentane, 0.0810 g, 0.04 mmol), enol silyl ether **9a** (0.0769 g, 0.4 mmol). Then the tube was moved to a stainless-steel autoclave. After being sealed, the autoclave was purged three times with H_2 and the final pressure of hydrogen was adjusted to 40 bar. The reaction mixture was stirred at 50 °C for 24 h. The reaction mixture was cooled to room temperature and TBAF (0.4 mmol, 0.4 mL, 1.0 M in THF) was added and stirred at room temperature for 1 h. The resulting solution was added water (15 mL) and extracted with CH_2Cl_2 (3 × 10 mL). The combined organic layers was dried over Na_2SO_4, filtered, and concentrated. The resulting residue was purified by column chromatography on

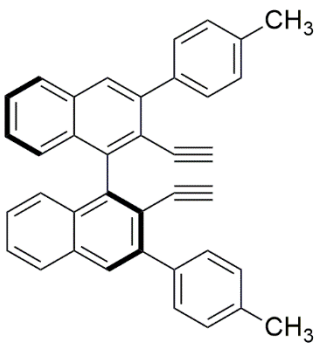
silica gel (petroleum ether/ethyl acetate = 20/1) to afford the desired (*R*)-**10a** as a colorless oil (0.0440 g, 90% yield, 95% ee).

Procedure for NMR study on chiral alkenylborane 6a: To a glass test tube (10 mL) equipped with a magnetic stir bar was added $HB(C_6F_5)_2$ (0.0276 g, 0.04 mmol), chiral diyne **5a** (0.0272 g, 0.02 mmol) and C_6D_6 (0.5 mL) in a nitrogen atmosphere glovebox. After stirred at room temperature for 5 min, the resulting mixture was transferred to an NMR tube for NMR studies.

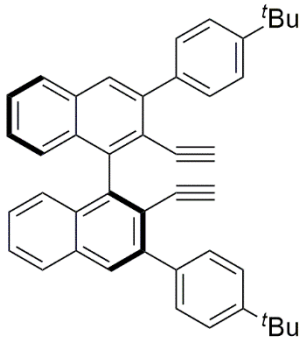
Characterization of chiral diynes:



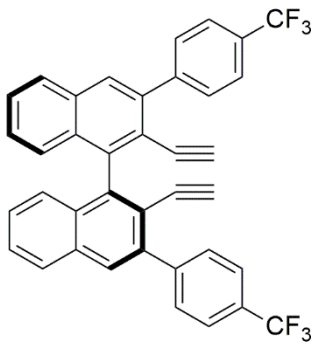
5a: Light yellow foam; m.p. 156-160 ºC; $[\alpha]_D^{25}$ = +103.6 (*c* 0.50, $CHCl_3$); IR (film): 3301, 2103, 1594, 1362 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, ppm) δ 8.00 (s, 2H), 7.95 (d, *J* = 8.4 Hz, 2H), 7.64 (s, 2H), 7.63 (s, 2H), 7.50 (dd, *J* = 7.2, 7.2 Hz, 2H), 7.44 (dd, *J* = 1.6, 1.6 Hz, 2H), 7.30 (dd, *J* = 7.2, 7.2 Hz, 2H), 7.26-7.22 (m, 2H), 2.75 (s, 2H), 1.38 (s, 36H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 150.2, 143.0, 142.2, 139.5, 133.3, 131.6, 128.6, 128.3, 127.2, 126.8, 126.6, 124.5, 121.5, 120.2, 84.6, 82.5, 35.2, 31.8; HRMS (ESI) calcd for $C_{52}H_{55}$ (M+H): 679.4298; Found: 679.4288.



5b: Light yellow foam; m.p. 108-112 ºC; $[\alpha]_D^{25}$ = +122.8 (*c* 0.50, $CHCl_3$); IR (film): 3289, 2102, 1514, 1264 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, ppm) δ 7.93 (s, 2H), 7.91 (d, *J* = 8.0 Hz, 2H), 7.66 (d, *J* = 8.0 Hz, 4H), 7.50 (dd, *J* = 8.0, 8.0 Hz, 2H), 7.34-7.21 (m, 6H), 7.20 (d, *J* = 8.0 Hz, 2H), 2.75 (s, 2H), 2.43 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 142.8, 141.2, 137.9, 137.4, 133.3, 131.6, 129.8, 128.8, 128.5, 128.2, 127.2, 126.8, 126.5, 120.1, 84.6, 82.1, 21.5; HRMS (ESI) calcd. for $C_{38}H_{27}$ (M+H): 483.2107; Found: 483.2104.

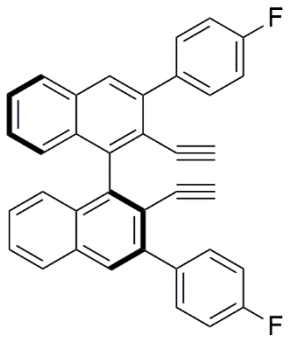


5c: Light yellow foam; m.p. 140-144 ºC; $[\alpha]_D^{25}$ = +114.6 (*c* 0.50, $CHCl_3$); IR (film): 3292, 2100, 1516, 1363, 1266 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, ppm) δ 7.96 (s, 2H), 7.91 (d, *J* = 8.4 Hz, 2H), 7.72 (d, *J* = 8.4 Hz, 4H), 7.51-7.45 (m, 6H), 7.31-7.24 (m, 2H), 7.22-7.18 (m, 2H), 2.74 (s, 2H), 1.38 (s, 18H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 150.6, 142.9, 141.0, 137.7, 133.3, 131.6, 129.6, 128.6, 128.3, 127.2, 126.9, 126.6, 125.0, 120.0, 84.8, 82.1, 34.8, 31.6; HRMS (ESI) calcd. for $C_{44}H_{39}$ (M+H): 567.3046; Found: 567.3040.

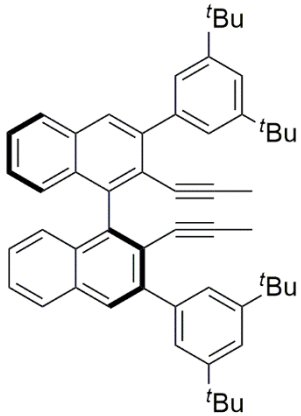


5d: Light yellow foam; m.p. 180-185 ºC; $[\alpha]_D^{25}$ = +77.8 (*c* 0.50, $CHCl_3$); IR (film): 3291, 2102, 1616, 1324 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, ppm) δ 7.97 (s, 2H), 7.96 (d, *J* = 8.0 Hz, 2H), 7.87 (d, *J* = 8.0 Hz, 4H), 7.72 (d, *J* = 8.4 Hz, 4H), 7.55 (dd, *J* = 8.0, 8.0 Hz, 2H), 7.36 (dd, *J* = 8.0, 8.0 Hz, 2H), 7.23 (d, *J* =

8.4 Hz, 2H), 2.77 (s, 2H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 144.2, 142.7, 139.8, 133.1, 131.9, 130.3, 129.8 (q, J_{C-F} = 32.2 Hz), 129.0, 128.5, 127.7, 127.6, 126.5, 125.1, 124.5 (q, J_{C-F} = 270.0 Hz), 119.6, 85.3, 81.4; ^{19}F NMR (470 MHz, $CDCl_3$, ppm) δ -62.4 (s, 6F); HRMS (ESI) calcd. for $C_{38}H_{21}F_6$ (M+H): 591.1542; Found: 591.1537.



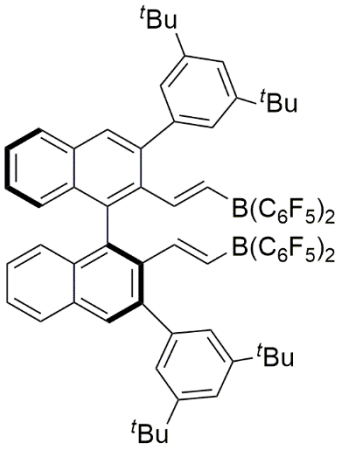
5e: Light yellow foam; m.p. 107-112 ºC; $[\alpha]_D^{25}$ = +87.2 (*c* 0.50, $CHCl_3$); IR (film): 3292, 2102, 1605, 1510, 1265 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.94 (s, 2H), 7.93 (d, *J* = 8.0 Hz, 2H), 7.71 (m, 4H), 7.52 (dd, *J* = 7.2, 7.2 Hz, 2H), 7.34 (dd, *J* = 7.2, 7.2 Hz, 2H), 7.21 (d, *J* = 8.0 Hz, 2H), 7.14 (dd, *J* = 8.4, 8.4 Hz, 4H), 2.75 (s, 2H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 162.7 (d, J_{C-F} = 245.0 Hz), 142.7, 140.2, 136.7 (d, J_{C-F} = 3.0 Hz), 133.2, 131.6, 131.59 (d, J_{C-F} = 8.3 Hz), 128.7, 128.3, 127.5, 127.1, 126.5, 120.0, 115.0 (d, J_{C-F} = 21.3 Hz), 84.9, 81.8; ^{19}F NMR (470 MHz, $CDCl_3$, ppm) δ -115.0 (s, 2F); HRMS (ESI) calcd. for $C_{36}H_{21}F_2$ (M+H): 491.1606; Found: 491.1603.



5f: Light yellow foam; m.p. 140-143 ºC; $[\alpha]_D^{22}$ = +159.4 (*c* 0.62, $CHCl_3$); IR (film): 2220, 1594, 1362, 1246, 1218 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.96 (s, 2H), 7.93 (d, *J* = 8.0 Hz, 2H), 7.67 (s, 2H), 7.66 (s, 2H), 7.58-7.40 (m, 4H), 7.31-7.20 (m, 4H), 1.48 (s, 6H), 1.40 (s, 36H); ^{13}C NMR (100 MHz,

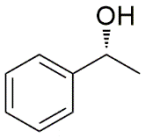
$CDCl_3$, ppm) δ 150.1, 142.4, 141.6, 140.2, 132.8, 131.8, 128.13, 128.07, 126.7, 126.4, 126.3, 124.4, 122.0, 121.3, 93.3, 79.1, 35.2, 31.8, 4.7; HRMS (ESI) calcd. for $C_{54}H_{59}$ (M+H): 707.4611; Found: 707.4601.

Characterization of chiral alkenylborane 6a:



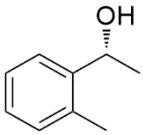
^{1}H NMR (400 MHz, C_6D_6, ppm) δ 7.96 (s, 2H), 7.64 (m, 8H), 7.29 (d, *J* = 8.4 Hz, 2H), 7.23-7.18 (m, 4H), 6.88 (dd, *J* = 7.6, 7.6 Hz, 2H), 6.80 (d, *J* = 18.0 Hz, 2H), 1.43 (s, 36H); ^{13}C NMR (100 MHz, C_6D_6, ppm) δ 163.6, 151.6, 141.7, 141.0, 139.8, 139.6, 134.4, 134.1, 131.5, 131.0, 128.6, 126.4, 124.7, 121.9, 35.2, 31.6 (Quaternary carbons of C_6F_5 ring were not located); ^{19}F NMR (470 MHz, C_6D_6, ppm): δ -129.5 (d, *J* = 18.8 Hz, 8F), -148,6 (m, 4F), -161.7 (m, 8F); ^{11}B NMR (160 MHz, C_6D_6, ppm): δ -3.48 (s, 2B); HRMS (ESI) calcd. for $C_{76}H_{57}B_2F_{20}O$ (M+H_2O-H): 1387.4282; Found: 1387.4289.

Characterization of products:



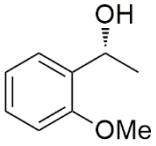
(*R*)-1-phenylethanol (**10a**): Colorless oil, 0.0440 g, 90% yield, 95% ee, $[\alpha]_D^{26}$ = +96.7 (*c* 0.28, $CHCl_3$), [lit.: $[\alpha]_D^{20}$ = +42.92 (*c* 1.04, $CHCl_3$) (96% ee for *R*-isomer)]; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.39-7.32 (m, 4H), 7.30-7.24 (m, 1H), 4.88 (q, *J* = 6.4 Hz, 1H), 1.93 (s, 1H), 1.49 (d, *J* = 6.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 146.0, 128.7, 127.7, 125.6, 70.6, 25.3.

Y. S. Sokeirik, H. Mori, M. Omote, K. Sato, A. Tarui, I. Kumadaki, A. Ando, *Org. Lett.* **2007**, *9*, 1927-1929.



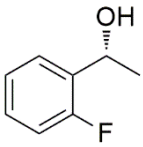
(*R*)-1-(o-tolyl)ethanol (**10b**): Colorless oil, 0.0507 g, 93% yield, 98% ee, $[\alpha]_D^{27}$ = +56.1 (*c* 0.96, $CHCl_3$), [lit.: $[\alpha]_D^{20}$ = -73.8 (*c* 0.90, $CHCl_3$) (99% ee for *S*-isomer)]; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.52 (d, *J* = 7.6 Hz, 1H), 7.28-7.21 (m, 1H), 7.20-7.10 (m, 2H), 5.18-5.10 (m, 1H), 2.35 (s, 3H), 1.69 (s, 1H), 1.47 (d, *J* = 6.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 144.0, 134.4, 130.6, 127.4, 126.6, 124.7, 67.0, 24.1, 19.1.

Y. Li, S. Yu, X. Wu, J. Xiao, W. Shen, Z. Dong, J. Gao, *J. Am. Chem. Soc*. **2014**, *136*, 4031-4039.



(*R*)-1-(2-methoxyphenyl)ethanol (**10c**): Colorless oil, 0.0560 g, 92% yield, 99% ee, $[\alpha]_D^{26}$ = +23.8 (*c* 0.98, $CHCl_3$), [lit.: $[\alpha]_D^{24}$ = +20.535 (*c* 1.14, $CHCl_3$) (83% ee for *R*-isomer)]; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.34 (dd, *J* = 8.0 Hz, *J* = 1.6 Hz, 1H), 7.27-7.21 (m, 1H), 6.96 (dd, *J* = 8.0, 8.0 Hz, 1H), 6.88 (d, *J* = 8.4 Hz, 1H), 5.09 (q, *J* = 6.4 Hz, 1H), 3.86 (s, 3H), 2.64 (s, 1H), 1.51 (d, *J* = 6.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 156.6, 133.7, 128.4, 126.2, 120.9, 110.5, 66.5, 55.4, 23.1.

Z. Zhang, P. Jain, J. C. Antilla, *Angew. Chem.* **2011**, *123*, 11153-11156; *Angew. Chem. Int. Ed*. **2011**, *50*, 10961-10964.



(*R*)-1-(2-fluorophenyl)ethanol (**10d**): Colorless oil, 0.0477 g, 85% yield, 99% ee, $[\alpha]_D^{26}$ = +41.6 (*c* 0.51, $CHCl_3$), [lit.: $[\alpha]_D^{20}$ = +36.61 (*c* 1.23, $CHCl_3$) (89% ee for *R*-isomer)]; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.49 (ddd, *J* = 7.6, 7.6, 1.6 Hz, 1H), 7.29-7.20 (m, 1H), 7.18-7.12 (m, 1H), 7.06-6.97 (m, 1H), 5.20 (q, *J* = 6.4 Hz, 1H), 1.94 (s, 1H), 1.52 (d, *J* = 6.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 160.0 (d, $J_{C\text{-}F}$ =

244.0 Hz), 132.8(d, J_{C-F} = 14.0 Hz), 129.0 (d, J_{C-F} = 8.0 Hz), 126.8 (d, J_{C-F} = 5.0 Hz), 124.5 (d, J_{C-F} = 3.0 Hz), 115.5 (d, J_{C-F} = 2.0 Hz), 64.7 (d, J_{C-F} = 3.0 Hz), 24.2.

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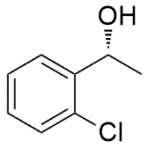
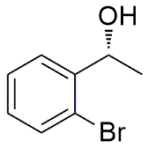


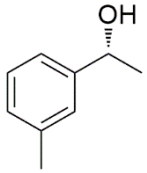
(*R*)-1-(2-chlorophenyl)ethanol (**10e**): Colorless oil, 0.0564 g, 90% yield, 99% ee, $[\alpha]_D^{26}$ = +55.3 (*c* 1.91, $CHCl_3$), [lit.: $[\alpha]_D^{20}$ = +47.19 (*c* 1.53, $CHCl_3$) (91% ee for *R*-isomer)]; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.60 (dd, *J* = 7.6 Hz, *J* = 1.6 Hz, 1H), 7.34-7.27 (m, 2H), 7.20 (ddd, *J* = 7.6, 7.6, 1.6 Hz, 1H), 5.30 (qd, *J* = 6.4 Hz, *J* = 3.6 Hz, 1H), 1.98 (d, *J* = 3.6 Hz, 1H), 1.50 (d, *J* = 6.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 143.3, 131.9, 129.6, 128.6, 127.4, 126.6, 67.2, 23.7.

Y. S. Sokeirik, H. Mori, M. Omote, K. Sato, A. Tarui, I. Kumadaki, A. Ando, *Org. Lett.* **2007**, *9*, 1927-1929.



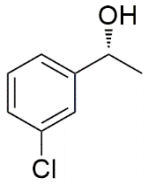
(*R*)-1-(2-bromophenyl)ethanol (**10f**): Colorless oil, 0.0708 g, 88% yield, 99% ee, $[\alpha]_D^{26}$ = +45.2 (*c* 1.72, $CHCl_3$), [lit.: $[\alpha]_D^{20}$ = -54.5 (*c* 1.65, $CHCl_3$) (99% ee for *S*-isomer)]; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.59 (dd, *J* = 7.6, *J* = 1.6 Hz, 1H), 7.51 (dd, *J* = 8.0, *J* = 0.8 Hz, 1H),7.34 (dd, *J* = 8.0 , 8.0 Hz, 1H), 7.12 (ddd, *J* = 8.0, 8.0, 1.6 Hz, 1H), 5.24 (q, *J* = 6.4 Hz, 1H), 2.02 (s, 1H), 1.49 (d, *J* = 6.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 144.8, 132.9, 129.0, 128.1, 126.9, 122.0, 69.4, 23.8.

Y. Li, S. Yu, X. Wu, J. Xiao, W. Shen, Z. Dong, J. Gao, *J. Am. Chem. Soc*. **2014**, *136*, 4031-4039.



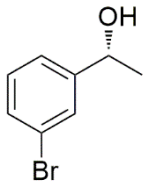
(*R*)-1-(m-tolyl)ethanol (**10g**): Colorless oil, 0.0507 g, 93% yield, 89% ee, $[\alpha]_D^{26}$ = +12.3 (*c* 0.65, $CHCl_3$), [lit.: $[\alpha]_D^{20}$ = -47.2 (*c* 1.09, $CHCl_3$) (95% ee for *S*-isomer)]; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.26-7.20 (m, 1H), 7.19-7.13 (m, 2H), 7.08 (d, *J* = 7.2 Hz, 1H), 4.85 (q, *J* = 6.4 Hz, 1H), 2.36 (s, 3H), 1.91 (s, 1H), 1.48 (d, *J* = 6.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 146.0, 138.4, 128.6, 128.4, 126.3, 122.6, 70.6, 25.3, 21.6.

Y. Li, S. Yu, X. Wu, J. Xiao, W. Shen, Z. Dong, J. Gao, *J. Am. Chem. Soc*. **2014**, *136*, 4031-4039.



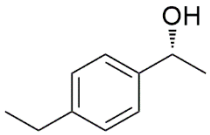
(*R*)-1-(3-chlorophenyl)ethanol (**10h**): Colorless oil, 0.0570 g, 91% yield, 97% ee, $[\alpha]_D^{26}$ = +33.5 (*c* 1.14, $CHCl_3$), [lit.: $[\alpha]_D^{20}$ = +42.4 (*c* 1.0, $CHCl_3$) (97% ee for *R*-isomer)]; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.38 (s, 1H), 7.32-7.20 (m, 3H), 4.88 (q, *J* = 6.4 Hz, 1H), 1.89 (s, 1H), 1.48 (d, *J* = 6.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 148.1, 134.6, 123.0, 127.8, 125.8, 123.7, 70.0, 25.4.

M. N. Cheemala, M. Gayral, J. M. Brown, K. Rossen, P. Knochel, *Synthesis* **2007**, 3877-3885.



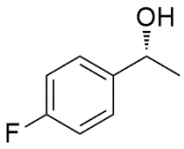
(*R*)-1-(3-bromophenyl)ethanol (**10i**): Colorless oil, 0.0740 g, 92% yield, 98% ee, $[\alpha]_D^{26}$ = +25.8 (*c* 1.41, $CHCl_3$), [lit.: $[\alpha]_D^{20}$ = -32.6 (*c* 1.57, $CHCl_3$) (93% ee for *S*-isomer)]; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.55-7.52 (m, 1H), 7.39 (d, *J* = 7.6 Hz, 1H), 7.28 (d, *J* = 7.6 Hz, 1H), 7.22 (dd, *J* = 7.6, 7.6 Hz, 1H), 4.88 (qd, *J* = 6.4 Hz, *J* = 3.2 Hz, 1H), 1.81 (d, *J* = 3.2 Hz, 1H), 1.49 (d, *J* = 6.4Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 148.3, 130.7, 130.3, 128.8, 124.2, 122.8, 69.9, 25.5.

Y. Li, S. Yu, X. Wu, J. Xiao, W. Shen, Z. Dong, J. Gao, *J. Am. Chem. Soc*. **2014**, *136*, 4031-4039.



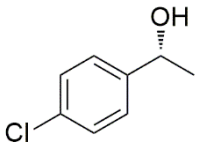
(*R*)-1-(4-ethylphenyl)ethanol (**10j**): Colorless oil, 0.0505 g, 84% yield, 92% ee, $[\alpha]_D^{25}$ = +40.3 (*c* 0.78, $CHCl_3$), [lit.: $[\alpha]_D^{20}$ = -45.3 (*c* 1.13, $CHCl_3$) (97% ee for *S*-isomer)]; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.29 (d, *J* = 8.0 Hz, 2H), 7.18 (d, *J* = 8.0 Hz, 2H), 4.87 (q, *J* = 6.4 Hz, 1H),2.64 (q, *J* = 7.6 Hz, 2H), 1.77(s, 1H), 1.49 (d, *J* = 6.4 Hz, 3H), 1.23 (t, *J* = 7.6 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 143.8, 143.3, 128.2, 125.6, 70.5, 28.7, 25.2, 15.8.

Y. Li, S. Yu, X. Wu, J. Xiao, W. Shen, Z. Dong, J. Gao, *J. Am. Chem. Soc*. **2014**, *136*, 4031-4039.



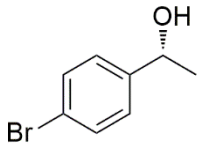
(*R*)-1-(4-fluorophenyl)ethanol (**10k**): Colorless oil, 0.0448 g, 80% yield, 98% ee, $[\alpha]_D^{26}$ = +29.2 (*c* 0.32, $CHCl_3$), [lit.: $[\alpha]_D^{20}$ = -81.5 (*c* 1.58, $CHCl_3$) (96% ee for *S*-isomer)]; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.38-7.31 (m, 2H), 7.03 (dd, *J* = 8.8 Hz, *J* = 8.4 Hz, 2H), 4.90 (q, *J* = 6.4 Hz, 1H), 1.77 (s, 1H), 1.49 (d, *J* = 6.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 162.3 (d, $J_{C\text{-}F}$ = 243.6 Hz), 141.7 (d, $J_{C\text{-}F}$ = 3.1 Hz), 127.2 (d, $J_{C\text{-}F}$ = 8.0 Hz), 115.4 (d, $J_{C\text{-}F}$ = 21.3 Hz), 69.9, 25.4.

Y. Li, S. Yu, X. Wu, J. Xiao, W. Shen, Z. Dong, J. Gao, *J. Am. Chem. Soc*. **2014**, *136*, 4031-4039.



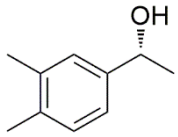
(*R*)-1-(4-chlorophenyl)ethanol (**10l**): Colorless oil, 0.0558 g, 89% yield, 93% ee, $[\alpha]_D^{26}$ = +38.7 (*c* 1.12, $CHCl_3$), [lit.: $[\alpha]_D^{20}$ = +26.8 (*c* 1.0, $CHCl_3$) (96% ee for *R*-isomer)]; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.33-7.27 (m, 4H), 4.89 (q, *J* = 6.4 Hz, 1H), 1.81 (s, 1H), 1.48 (d, *J* = 6.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 144.4, 133.3, 128.8, 70.0, 25.5.

M. N. Cheemala, M. Gayral, J. M. Brown, K. Rossen, P. Knochel, *Synthesis* **2007**, 3877-3885.



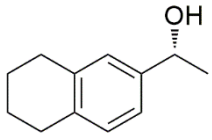
(*R*)-1-(4-bromophenyl)ethanol (**10m**): Colorless oil, 0.0740 g, 92% yield, 94% ee, $[\alpha]_D^{27}$ = +34.6 (*c* 1.27, $CHCl_3$), [lit.: $[\alpha]_D^{24}$ = +30.856 (*c* 0.915, $CHCl_3$) (95% ee for *R*-isomer)]; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.47 (d, *J* = 8.4 Hz, 2H), 7.25 (d, *J* = 8.0 Hz, 2H), 4.87 (q, *J* = 6.4 Hz, 1H), 1.84 (s, 1H), 1.47 (d, *J* = 6.4Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 145.0, 131.8, 127.4, 121.4, 70.0, 25.5.

Z. Zhang, P. Jain, J. C. Antilla, *Angew. Chem.* **2011**, *123*, 11153-11156; *Angew. Chem. Int. Ed*. **2011**, *50*, 10961-10964.



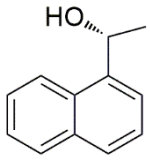
(*R*)-1-(3,4-dimethylphenyl)ethanol (**10n**): Colorless oil, 0.0535 g, 89% yield, 91% ee, $[\alpha]_D^{26}$ = +37.6 (*c* 1.05, $CHCl_3$), [lit.: $[\alpha]_D^{20}$ = +50.0 (*c* 1.0, $CHCl_3$) (96% ee for *R*-isomer)]; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.15 (s, 1H), 7.13-7.07 (m, 2H), 4.84 (q, *J* = 6.4, 1H), 2.27 (s, 3H), 2.25 (s, 3H), 1.74 (s, 1H), 1.48 (d, *J* = 6.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 143.6, 136.9, 136.0, 123.0, 126.9, 123.0, 70.5, 25.2, 20.0, 19.6.

M. N. Cheemala, M. Gayral, J. M. Brown, K. Rossen, P. Knochel, *Synthesis* **2007**, 3877-3885.



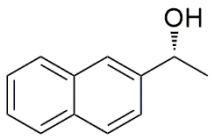
(*R*)-1-(5,6,7,8-tetrahydronaphthalen-2-yl)ethanol (**10o**): Colorless oil, 0.0684 g, 97% yield, 96% ee, $[\alpha]_D^{25}$ = +33.3 (*c* 2.92, $CHCl_3$), [lit.: $[\alpha]_D^{20}$ = -48.3 (*c* 1.8, $CHCl_3$) (>99% ee for *S*-isomer)]; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.11-7.03 (m, 3H), 4.83 (qd, *J* = 6.4 Hz, *J* = 2.8 Hz, 1H), 2.78-2.74 (m, 4H), 1.83-1.76 (m, 4H), 1.70 (d, *J* = 2.8 Hz, 1H), 1.48 (d, *J* = 6.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 143.2, 137.5, 136.7, 129.5, 126.3, 122.8, 70.5, 29.7, 29.3, 25.2, 23.4.

A. Świzdor, T. Janeczko, J. D. Gładysz, *J. Ind. Microbiol. Biotechnol.* **2010**, *37*, 1121-1130.



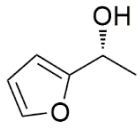
(*R*)-1-(naphthalen-1-yl)ethanol (**10p**): Colorless oil, 0.0675 g, 98% yield, 98% ee, $[\alpha]_D^{27}$ = +53.3 (*c* 1.16, $CHCl_3$), [lit.: $[\alpha]_D^{20}$ = +68.8 (*c* 1.0, $CHCl_3$) (96% ee for *R*-isomer)]; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 8.12 (d, *J* = 8.0 Hz, 1H), 7.87 (d, *J* = 7.2 Hz, 1H), 7.78 (d, *J* = 8.0 Hz, 1H), 7.68 (d, *J* = 7.2 Hz, 1H), 7.55-7.45 (m, 3H), 5.69 (q, *J* = 6.4 Hz, 1H), 1.93 (s, 1H), 1.67 (d, *J* = 6.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 141.5, 134.0, 130.4, 129.1, 128.1, 126.2, 125.7, 123.3, 122.2, 67.3, 24.5.

M. N. Cheemala, M. Gayral, J. M. Brown, K. Rossen, P. Knochel, *Synthesis* **2007**, 3877-3885.



(*R*)-1-(naphthalen-2-yl)ethanol (**10q**): White solid, 0.0668 g, 97% yield, 87% ee, $[\alpha]_D^{28}$ = +30.4 (*c* 0.97, $CHCl_3$), [lit.: $[\alpha]_D^{20}$ = +37.77 (*c* 1.04, $CHCl_3$) (95% ee for *R*-isomer)]; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.87-7.80 (m, 4H), 7.53-7.43 (m, 3H), 5.08 (qd, *J* = 6.4 Hz, *J* = 3.2 Hz, 1H), 1.85 (d, *J* = 3.2 Hz, 1H), 1.59 (d, *J* = 6.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 143.4, 133.6, 133.1, 128.5, 128.1, 127.9, 126.4, 126.0, 124.0, 70.7, 25.3.

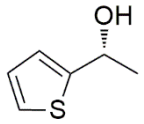
Y. S. Sokeirik, H. Mori, M. Omote, K. Sato, A. Tarui, I. Kumadaki, A. Ando, *Org. Lett.* **2007**, *9*, 1927-1929.



(*R*)-1-(furan-2-yl)ethanol (**10r**): Colorless oil, 0.0381 g, 85% yield, 94% ee, $[\alpha]_D^{25}$ = +14.5 (*c* 0.47, $CHCl_3$), [lit.: $[\alpha]_D^{20}$ = +7.86 (*c* 0.9, $CHCl_3$) (97% ee for *R*-isomer)]; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ

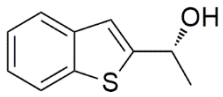
7.37 (s, 1H), 6.32 (s, 1H), 6.22 (d, J = 2.8 Hz, 1H), 4.95-4.85 (m, 1H), 1.95 (d, J = 4.0 Hz, 1H), 1.54 (d, J = 6.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 157.8, 142.1, 110.3, 105.3, 63.8, 21.4.

Y. S. Sokeirik, H. Mori, M. Omote, K. Sato, A. Tarui, I. Kumadaki, A. Ando, *Org. Lett.* **2007**, *9*, 1927-1929.



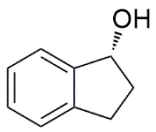
(*R*)-1-(thiophen-2-yl)ethanol (**10s**): Colorless oil, 0.0487 g, 95% yield, 96% ee, $[\alpha]_D^{25}$ = +19.9 (*c* 1.04, $CHCl_3$), [lit.: $[\alpha]_D^{20}$ = +16.4 (*c* 1.0, $CHCl_3$) (92% ee for *R*-isomer)]; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.26-7.22 (m, 1H), 6.98-6.94 (m, 2H), 5.18-5.09 (m, 1H), 2.00 (s, 1H), 1.60 (d, J = 6.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 150.1, 126.8, 124.6, 123.4, 66.4, 25.4.

M. N. Cheemala, M. Gayral, J. M. Brown, K. Rossen, P. Knochel, *Synthesis* **2007**, 3877-3885.



(*R*)-1-(benzo[b]thiophen-2-yl)ethanol (**10t**): White solid, 0.0706 g, 99% yield, 93% ee, $[\alpha]_D^{24}$ = +22.9 (*c* 2.89, $CHCl_3$), [lit.: $[\alpha]_D^{24}$ = -21.2 (*c* 1.00, $CHCl_3$) (>99% ee for *S*-isomer)]; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.81 (d, J = 8.0 Hz, 1H), 7.72 (d, J = 8.0 Hz, 1H), 7.40-7.24 (m, 2H), 7.19 (s, 1H), 5.24-5.17 (m, 1H), 2.07 (d, J = 4.0 Hz, 1H), 1,66 (d, J = 6.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 150.7, 139.7, 139.5, 124.5, 124.3, 123.6, 122.7, 119.7, 67.0, 25.3.

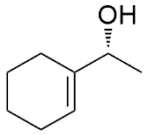
M. I. Tosa, P. V. Podea, C. Paizs, F. D. Irimie, *Tetrahedron: Asymmetry* **2008**, *19*, 2068-2071.



(*R*)-2,3-dihydro-1H-inden-1-ol (**10u**): Colorless oil, 0.0494 g, 92% yield, 98% ee, $[\alpha]_D^{25}$ = -24.6 (*c* 0.88, $CHCl_3$), [lit.: $[\alpha]_D^{23}$ = -23.88 (*c* 2.68, $CHCl_3$) (86% ee for *R*-isomer)]; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.43-7.40 (m, 1H), 7.26-7.20 (m, 3H), 5.25 (q, J = 6.4 Hz, 1H), 3.11-3.01 (m, 1H), 2.87-2.77 (m, 1H),

2.54-2.44 (m, 1H), 2.02-1.90 (m, 1H), 1.70 (d, J = 6.4 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 145.2, 143.5, 128.5, 126.9, 125.1, 124.4, 76.7, 36.1, 30.0.

P. He, X. Liu, H. Zheng, W. Li, L. Lin, X. Feng, *Org. Lett*. **2012**, *14*, 5134-5137.

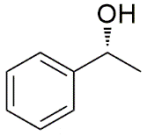


(*R*)-1-(cyclohex-1-en-1-yl)ethanol (**10v**): Colorless oil, 0.0414 g, 82% yield, 97% ee, $[\alpha]_D^{23}$ = +6.9 (*c* 0.17, $CHCl_3$), [lit.: $[\alpha]_D^{20}$ = -9.5 (*c* 1.2, $CHCl_3$) (97% ee for *S*-isomer)]; ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 5.67 (m, 2H), 4.16 (q, J = 6.4 Hz, 1H), 2.10-1.90 (m, 4H), 1.66-1.57 (m, 5H), 1.25 (d, J = 6.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ 141.5, 121.7, 72.4, 25.1, 23.9, 22.9, 22.8, 21.7.

D. R. Li, A. He, J. R. Falck, *Org. Lett*. **2010**, *12*, 1756-1759.

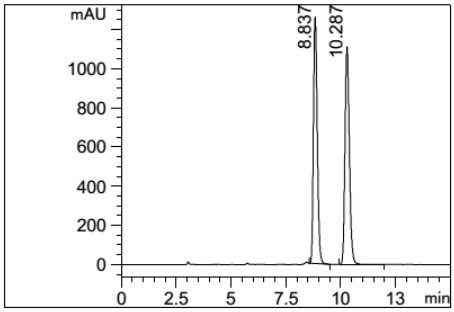
The chromatography for the determination of the enantiomeric excess

Table 2, entry 1



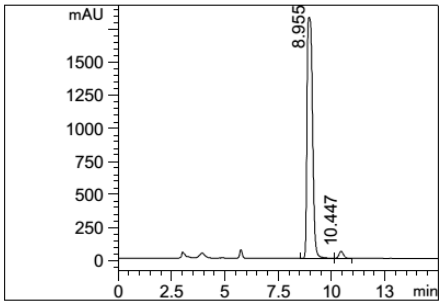
HPLC Conditions: Column: Chiralcel OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA(95/5); **Flow rate:** 1.0 mL/min; **Detection:** UV 210 nm

Racemic



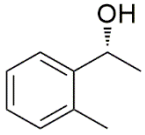
Peak #	RT [min]	Area %	Area
1	8.837	49.387	1.518e4
2	10.287	50.613	1.555e4

Chiral



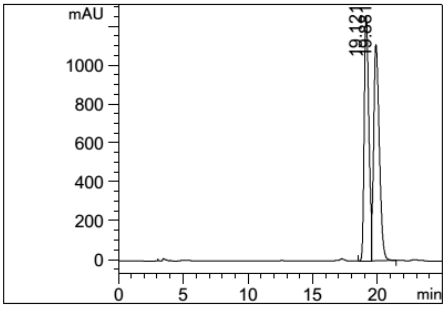
Peak #	RT [min]	Area %	Area
1	8.955	97.715	3.262e4
2	10.447	2.285	763.011

Table 2, entry 2



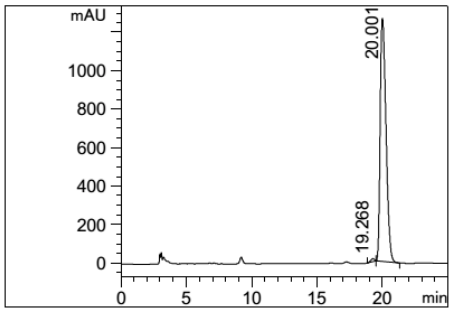
HPLC Conditions: Column: Chiralcel OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA(99/1); **Flow rate:** 1.0 mL/min; **Detection:** UV 210 nm

Racemic



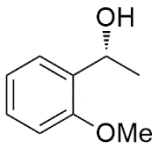
Peak #	RT [min]	Area %	Area
1	19.121	48.310	3.144e4
2	19.881	51.690	3.364e4

Chiral



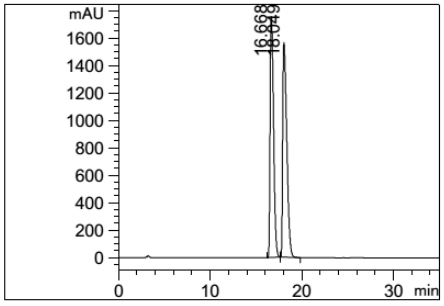
Peak #	RT [min]	Area %	Area
1	19.268	0.768	302.331
2	20.001	99.232	3.908e4

Table 2, entry 3



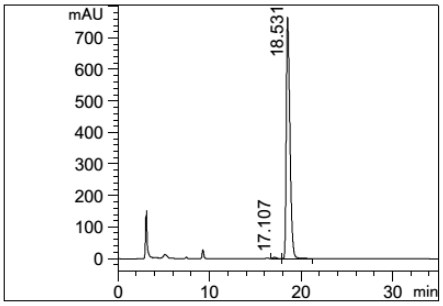
HPLC Conditions: Column: Chiralcel OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA(98/2); **Flow rate:** 1.0 mL/min; **Detection:** UV 210 nm

Racemic



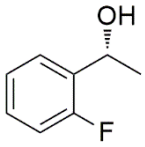
Peak #	RT [min]	Area %	Area
1	16.668	48.990	4.651e4
2	18.049	51.010	4.842e4

Chiral



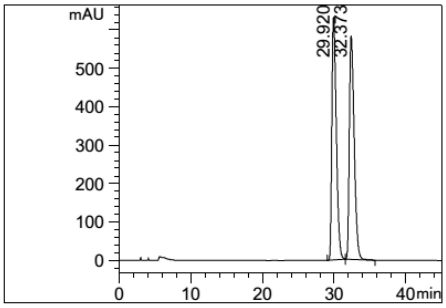
Peak #	RT [min]	Area %	Area
1	17.107	0.399	84.807
2	18.531	99.601	2.116e4

Table 2, entry 4



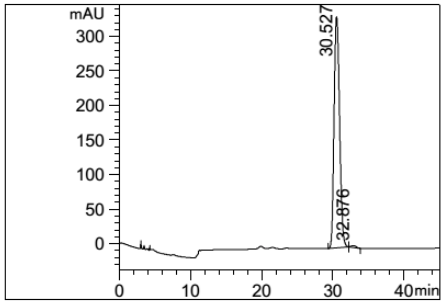
HPLC Conditions: Column: Chiralcel OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA(200/1); **Flow rate:** 1.0 mL/min; **Detection:** UV 210 nm

Racemic



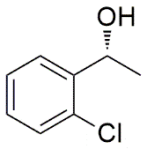
Peak #	RT [min]	Area %	Area
1	29.920	49.832	2.719e4
2	32.373	50.168	2.737e4

Chiral



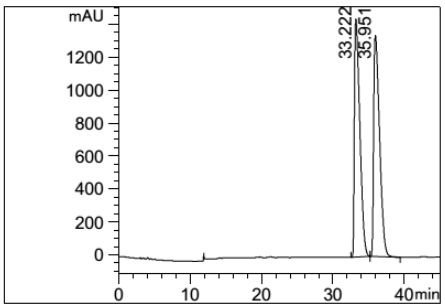
Peak #	RT [min]	Area %	Area
1	30.527	99.351	1.795e4
2	32.876	0.649	117.210

Table 2, entry 5



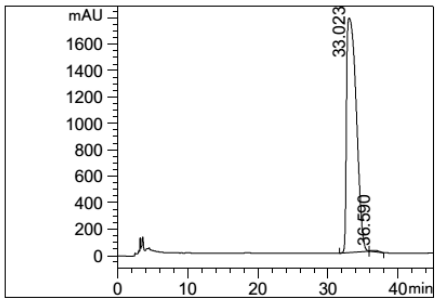
HPLC Conditions: Column: Chiralcel OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA(200/1); **Flow rate:** 1.0 mL/min; **Detection:** UV 210 nm

Racemic



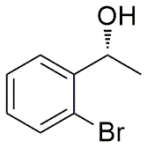
Peak #	RT [min]	Area %	Area
1	33.222	49.747	7.611e4
2	35.951	50.253	7.688e4

Chiral



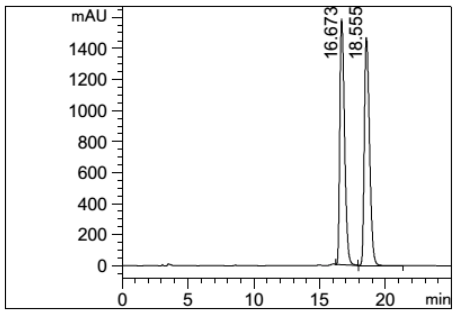
Peak #	RT [min]	Area %	Area
1	33.023	99.662	1.712e5
2	36.590	0.338	580.909

Table 2, entry 6



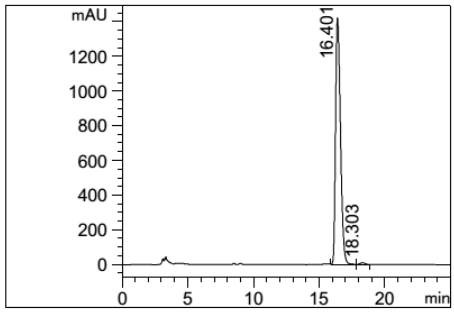
HPLC Conditions: Column: Chiralcel OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA(99/1); **Flow rate:** 1.0 mL/min; **Detection:** UV 210 nm

Racemic



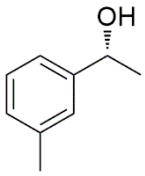
Peak #	RT [min]	Area %	Area
1	16.673	49.500	3.957e4
2	18.555	50.500	4.037e4

Chiral



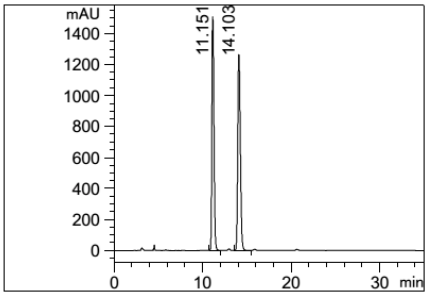
Peak #	RT [min]	Area %	Area
1	16.401	99.352	3.697e4
2	18.303	0.648	241.116

Table 2, entry 7



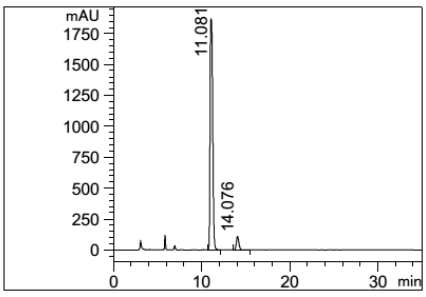
HPLC Conditions: Column: Chiralcel OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA(97/3); **Flow rate:** 1.0 mL/min; **Detection:** UV 210 nm

Racemic



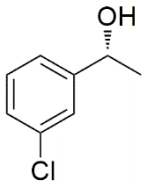
Peak #	RT [min]	Area %	Area
1	11.151	49.146	2.475e4
2	14.103	50.854	2.561e4

Chiral



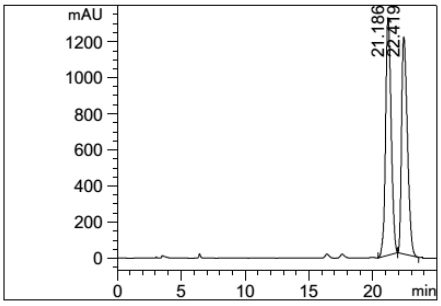
Peak #	RT [min]	Area %	Area
1	11.081	94.690	3.890e4
2	14.076	5.310	2.181e3

Table 2, entry 8



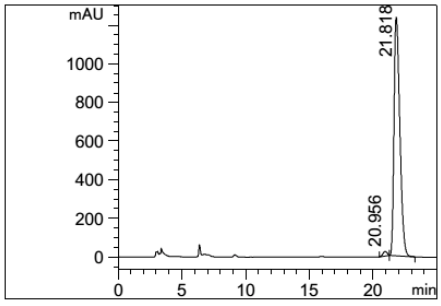
HPLC Conditions: Column: Chiralcel OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA(99/1); **Flow rate:** 1.0 mL/min; **Detection:** UV 210 nm

Racemic



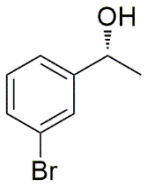
Peak #	RT [min]	Area %	Area
1	21.186	51.119	4.000e4
2	22.419	48.881	3.824e4

Chiral



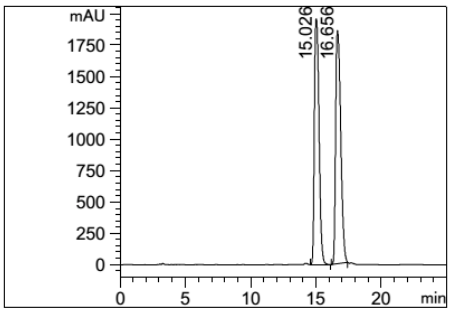
Peak #	RT [min]	Area %	Area
1	20.956	1.297	514.337
2	21.818	98.703	3.913e4

Table 2, entry 9



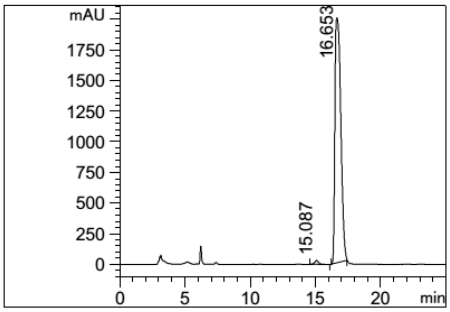
HPLC Conditions: Column: Chiralcel OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA(98/2); **Flow rate:** 1.0 mL/min; **Detection:** UV 210 nm

Racemic



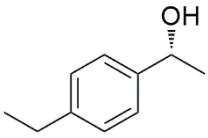
Peak #	RT [min]	Area %	Area
1	15.026	49.102	4.868e4
2	16.656	50.898	5.046e4

Chiral



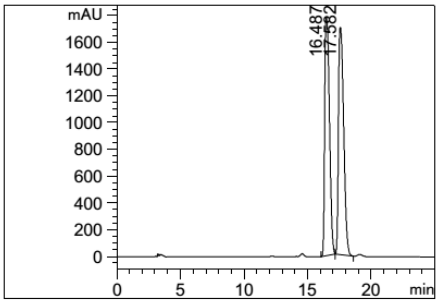
Peak #	RT [min]	Area %	Area
1	15.087	1.112	700.879
2	16.653	98.888	6.230e4

Table 2, entry 10



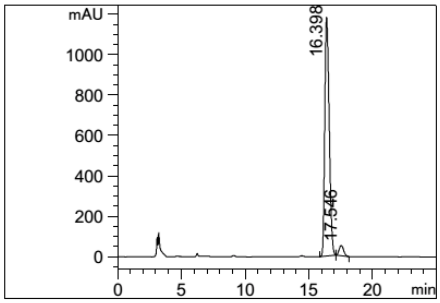
HPLC Conditions: Column: Chiralcel OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA(99/1); **Flow rate:** 1.0 mL/min; **Detection:** UV 210 nm

Racemic



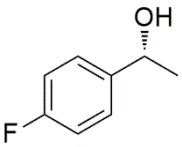
Peak #	RT [min]	Area %	Area
1	16.487	49.047	4.657e4
2	17.582	50.953	4.838e4

Chiral



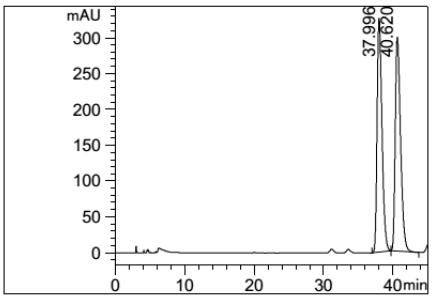
Peak #	RT [min]	Area %	Area
1	16.398	95.835	2.880e4
2	17.546	4.165	1.252e3

Table 2, entry 11



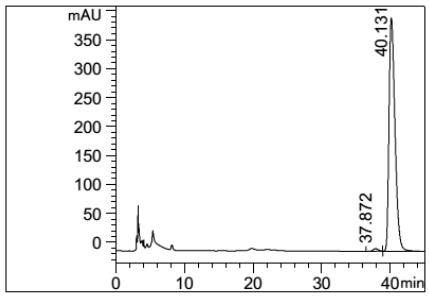
HPLC Conditions: Column: Chiralcel OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA(200/1); **Flow rate:** 1.0 mL/min; **Detection:** UV 210 nm

Racemic



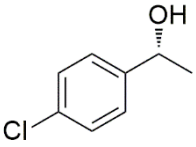
Peak #	RT [min]	Area %	Area
1	37.996	49.906	1.593e4
2	40.620	50.094	1.599e4

Chiral



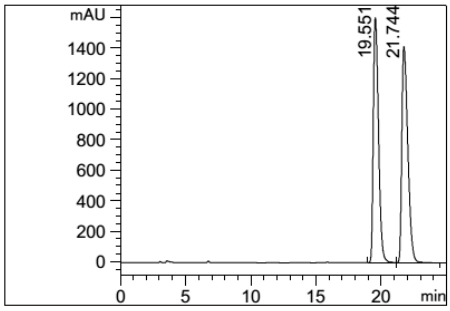
Peak #	RT [min]	Area %	Area
1	37.872	0.971	239.454
2	40.131	99.029	2.441e4

Table 2, entry 12



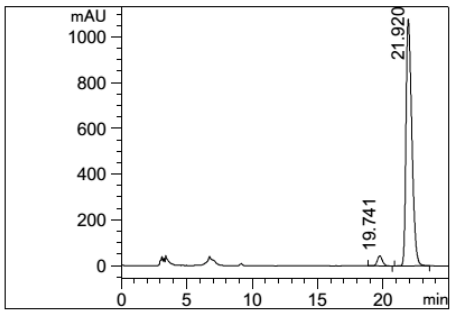
HPLC Conditions: Column: Chiralpak IC, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA(99/1); **Flow rate:** 1.0 mL/min; **Detection:** UV 210 nm

Racemic



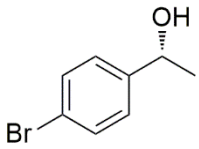
Peak #	RT [min]	Area %	Area
1	19.551	49.575	4.454e4
2	21.744	50.425	4.531e4

Chiral



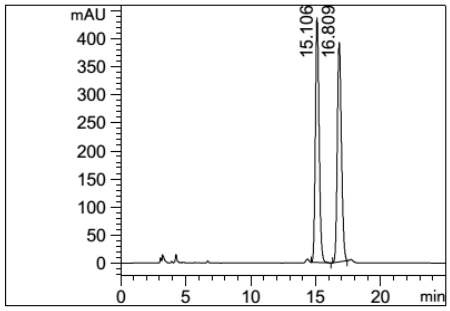
Peak #	RT [min]	Area %	Area
1	19.741	3.486	1.202e3
2	21.920	96.514	3.328e4

Table 2, entry 13



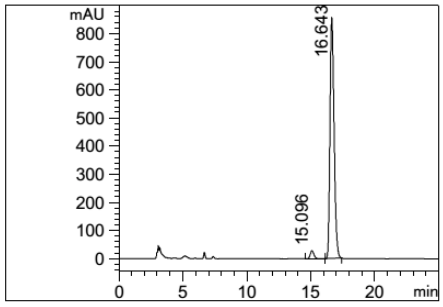
HPLC Conditions: Column: Chiralcel OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA(98/2); **Flow rate:** 1.0 mL/min; **Detection:** UV 210 nm

Racemic



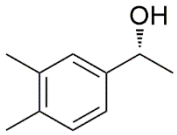
Peak #	RT [min]	Area %	Area
1	15.106	50.345	8.748e3
2	16.809	49.655	8.628e3

Chiral



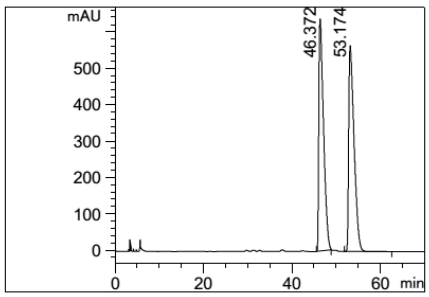
Peak #	RT [min]	Area %	Area
1	15.096	2.981	586.181
2	16.643	97.019	1.908e4

Table 2, entry 14



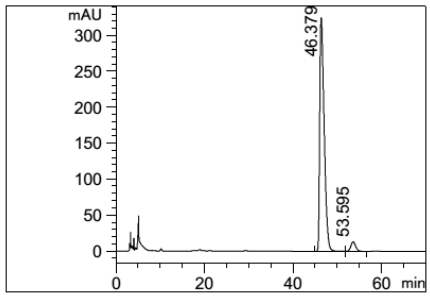
HPLC Conditions: Column: Chiralcel OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA(200/1); **Flow rate:** 1.0 mL/min; **Detection:** UV 210 nm

Racemic



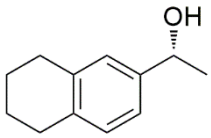
Peak #	RT [min]	Area %	Area
1	46.372	49.583	4.681e4
2	53.174	50.417	4.760e4

Chiral



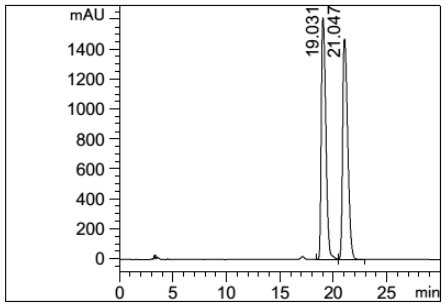
Peak #	RT [min]	Area %	Area
1	46.379	95.699	2.257e4
2	53.595	4.301	1.014e3

Table 2, entry 15



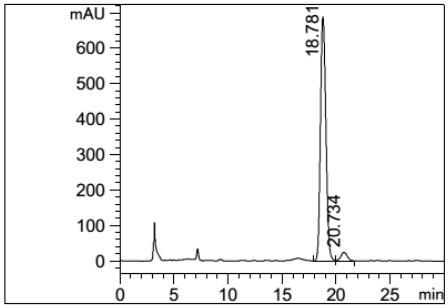
HPLC Conditions: Column: Chiralcel OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA(99/1); **Flow rate:** 1.0 mL/min; **Detection:** UV 210 nm

Racemic



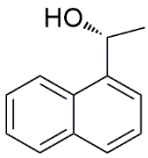
Peak #	RT [min]	Area %	Area
1	19.031	49.571	4.775e4
2	21.047	50.429	4.858e4

Chiral



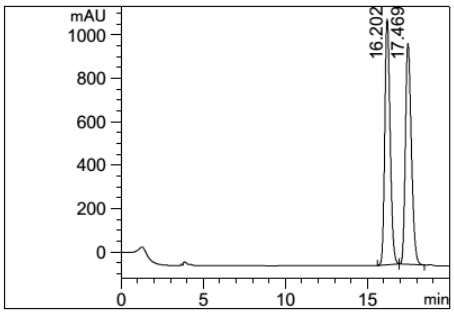
Peak #	RT [min]	Area %	Area
1	18.781	96.112	2.413e4
2	20.734	3.888	975.952

Table 2, entry 16



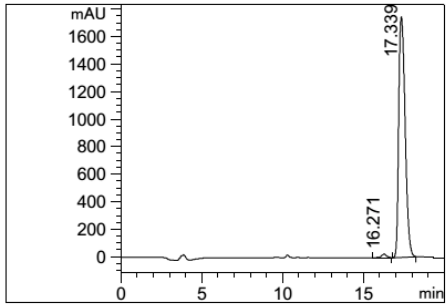
HPLC Conditions: Column: Chiralcel AS-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA(97/3); **Flow rate:** 1.0 mL/min; **Detection:** UV 210 nm

Racemic



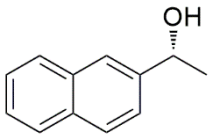
Peak #	RT [min]	Area %	Area
1	16.202	49.841	2.565e4
2	17.469	50.159	2.581e4

Chiral



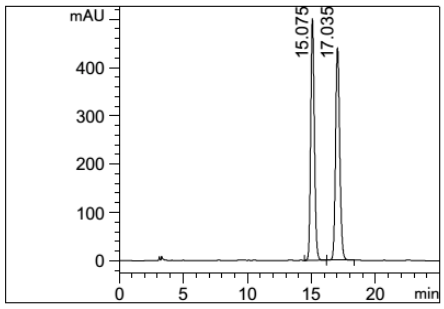
Peak #	RT [min]	Area %	Area
1	16.271	1.101	534.679
2	17.339	98.899	4.801e4

Table 2, entry 17



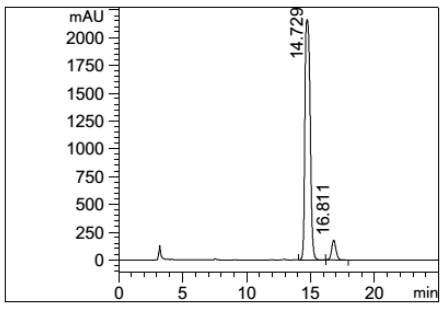
HPLC Conditions: Column: Chiralcel AS-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA(97/3); **Flow rate:** 1.0 mL/min; **Detection:** UV 210 nm

Racemic



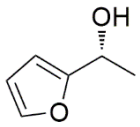
Peak #	RT [min]	Area %	Area
1	15.075	49.866	9.960e3
2	17.035	50.134	1.001e4

Chiral



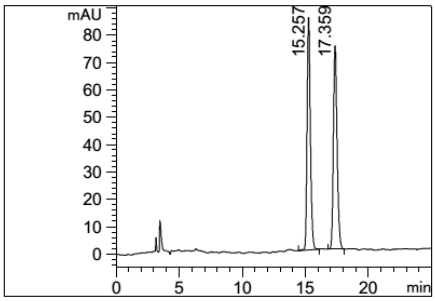
Peak #	RT [min]	Area %	Area
1	14.729	93.608	6.130e4
2	16.811	6.392	4.185e3

Table 2, entry 18



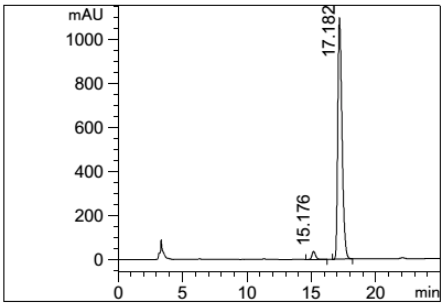
HPLC Conditions: Column: Chiralcel OJ-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA(97/3); **Flow rate:** 1.0 mL/min; **Detection:** UV 210 nm

Racemic



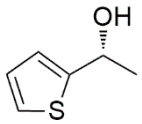
Peak #	RT [min]	Area %	Area
1	15.257	50.159	1.536e3
2	17.359	49.841	1.526e3

Chiral



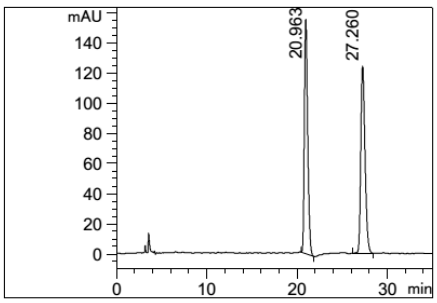
Peak #	RT [min]	Area %	Area
1	15.176	2.800	724.512
2	17.182	97.200	2.515e4

Table 2, entry 19



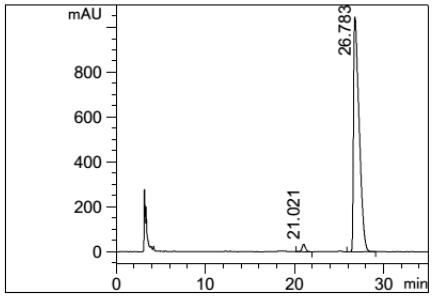
HPLC Conditions: Column: Chiralcel OJ-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA(98/2); **Flow rate:** 1.0 mL/min; **Detection:** UV 210 nm

Racemic



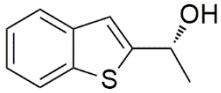
Peak #	RT [min]	Area %	Area
1	20.963	49.606	3.998e3
2	27.260	50.394	4.061e3

Chiral



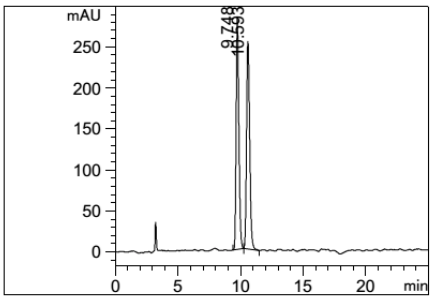
Peak #	RT [min]	Area %	Area
1	21.021	1.879	882.038
2	26.783	98.121	4.607e4

Table 2, entry 20



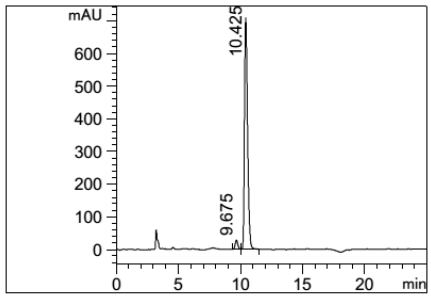
HPLC Conditions: Column: Chiralcel OB-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA(90/10); **Flow rate:** 1.0 mL/min; **Detection:** UV 210 nm

Racemic



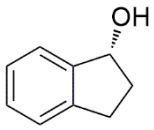
Peak #	RT [min]	Area %	Area
1	9.748	49.567	4.308e3
2	10.593	50.433	4.383e3

Chiral



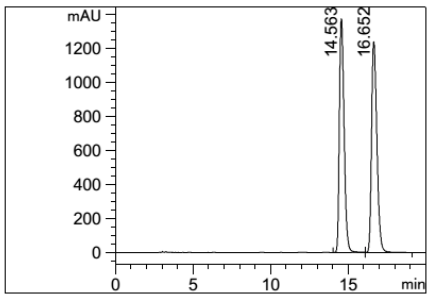
Peak #	RT [min]	Area %	Area
1	9.675	3.320	419.652
2	10.425	96.680	1.222e4

Table 2, entry 21



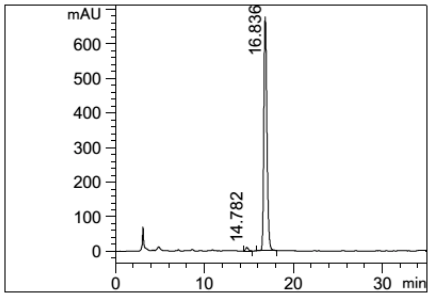
HPLC Conditions: Column: Chiralcel OD-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA(97/3); **Flow rate:** 1.0 mL/min; **Detection:** UV 210 nm

Racemic



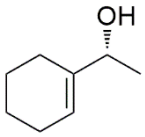
Peak #	RT [min]	Area %	Area
1	14.563	49.553	2.911e4
2	16.652	50.447	2.964e4

Chiral



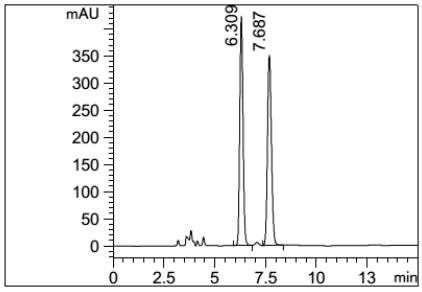
Peak #	RT [min]	Area %	Area
1	14.782	1.231	202.998
2	16.836	98.769	1.629e4

Table 2, entry 22



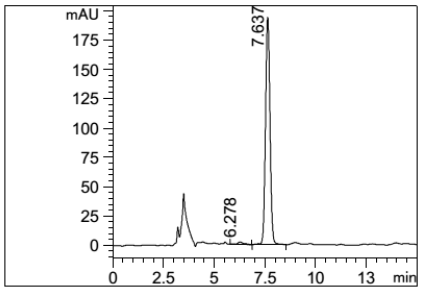
HPLC Conditions: Column: Chiralcel OB-H, Daicel Chemical Industries, Ltd., **Eluent:** Hexanes/IPA(99/1); **Flow rate:** 1.0 mL/min; **Detection:** UV 210 nm

Racemic

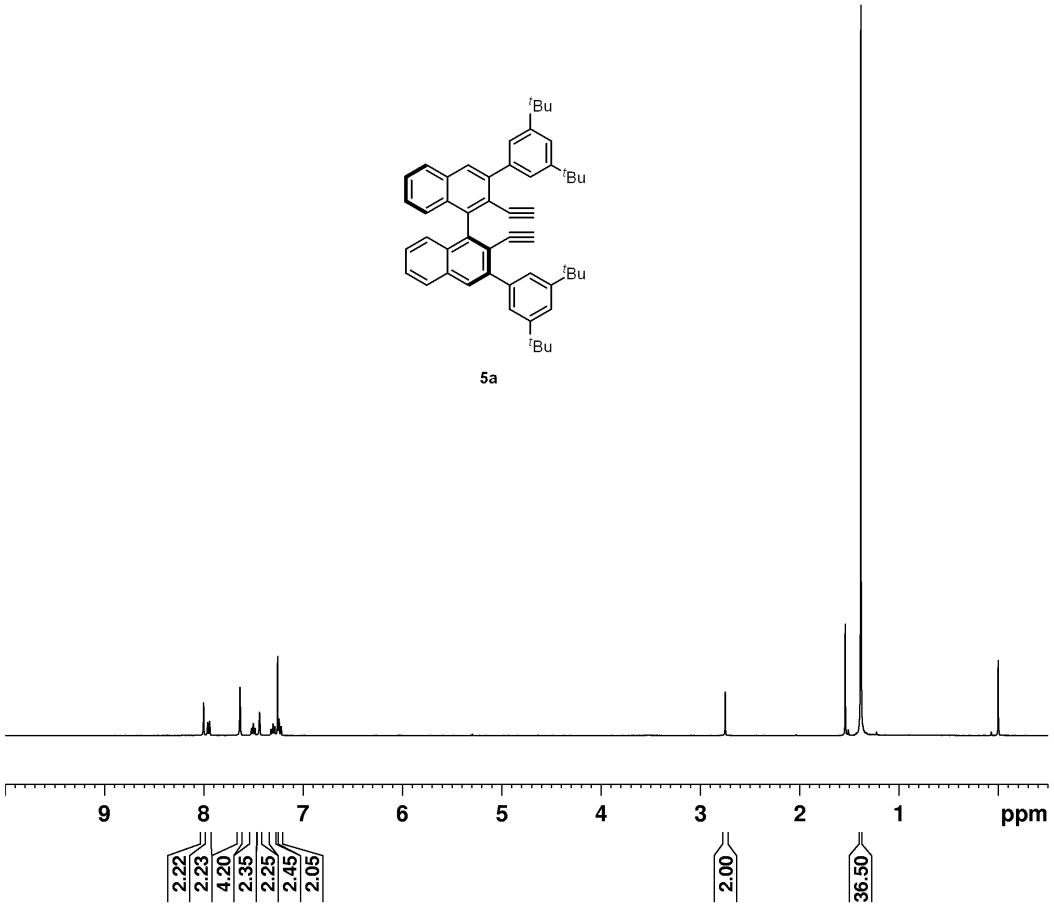


Peak #	RT [min]	Area %	Area
1	6.309	49.717	4.707e3
2	7.687	50.283	4.761e3

Chiral

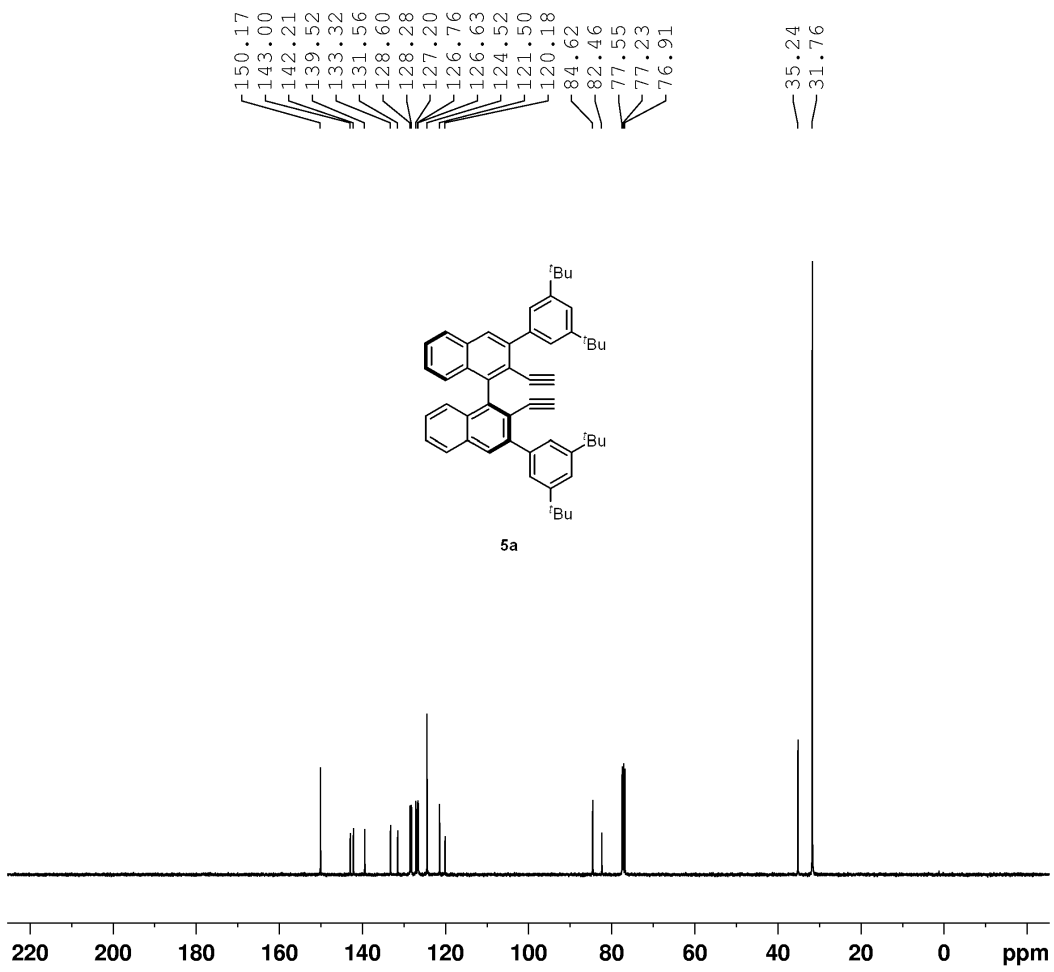


Peak #	RT [min]	Area %	Area
1	6.278	1.339	40.818
2	7.637	98.661	3.008e3

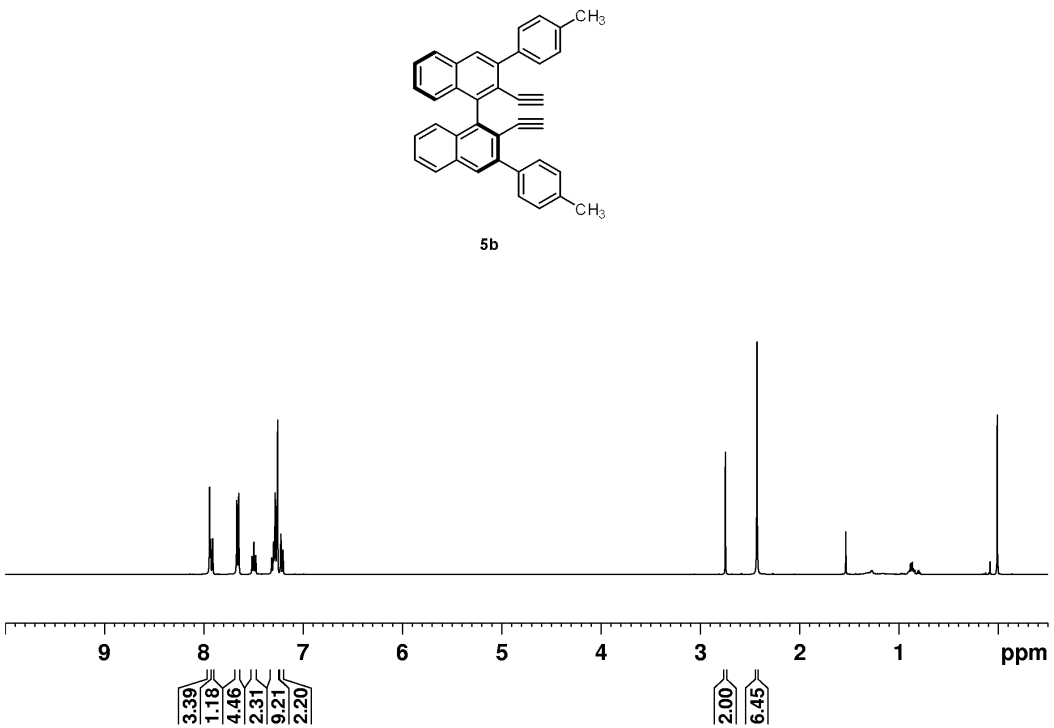


5a

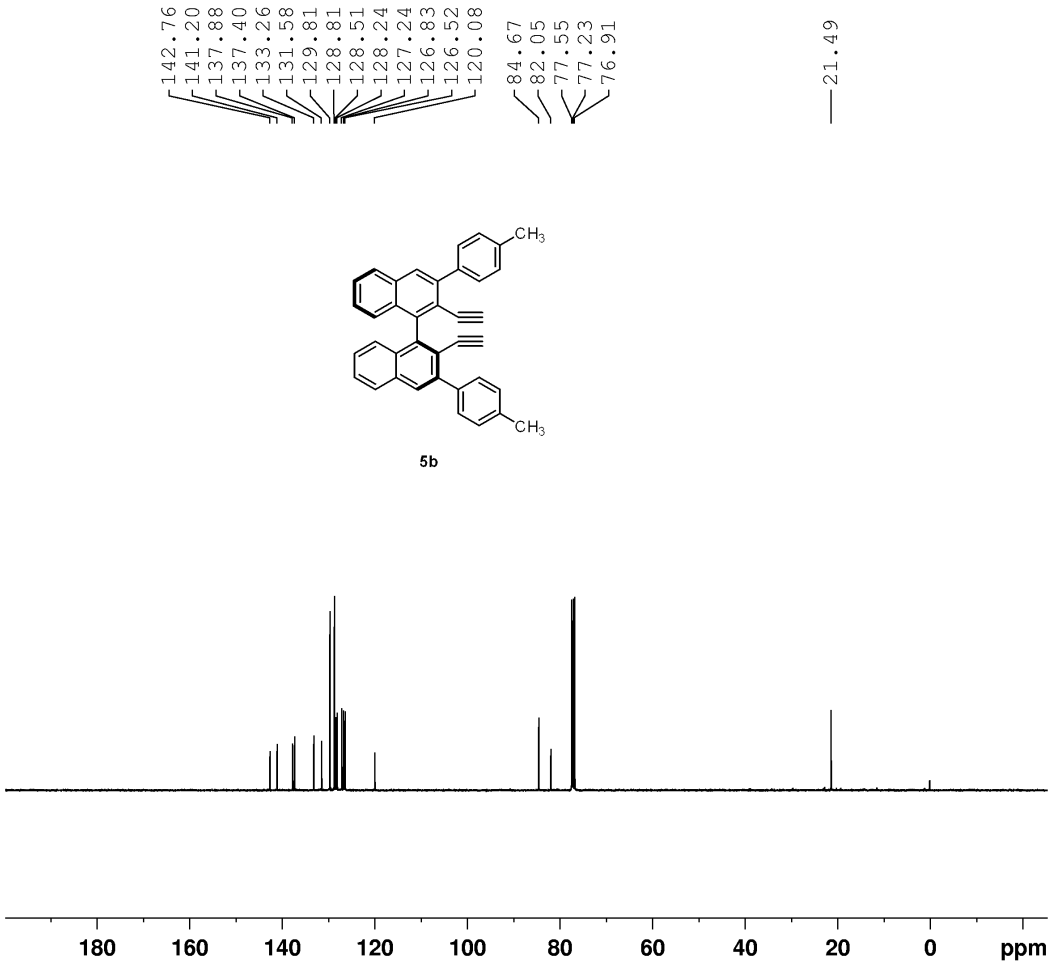
NAME	RXY
EXPNO	573
PROCNO	1
Date_	20140618
Time	5.07
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300099 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



NAME	RXY-C
EXPNO	13
PROCNO	1
Date_	20140511
Time	2.35
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	697
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127549 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

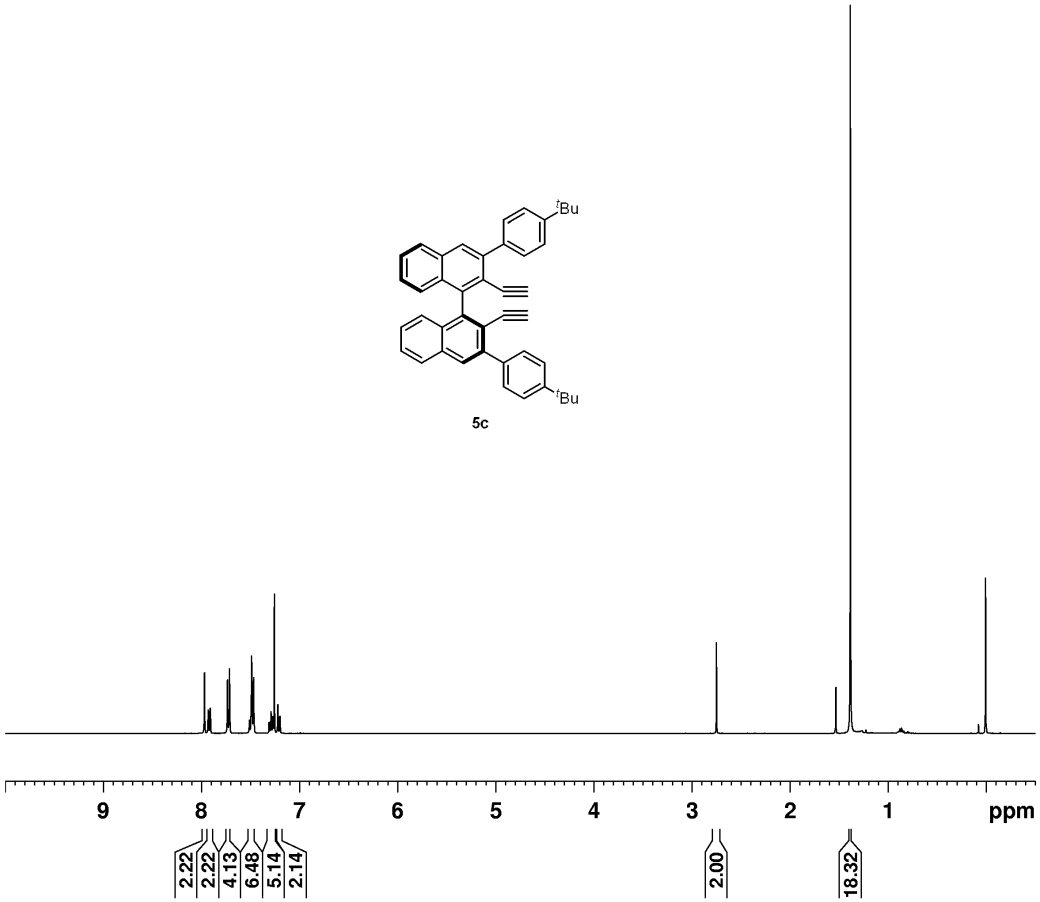


NAME	RXY
EXPNO	365
PROCNO	1
Date_	20140427
Time	0.08
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	181
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300098 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00

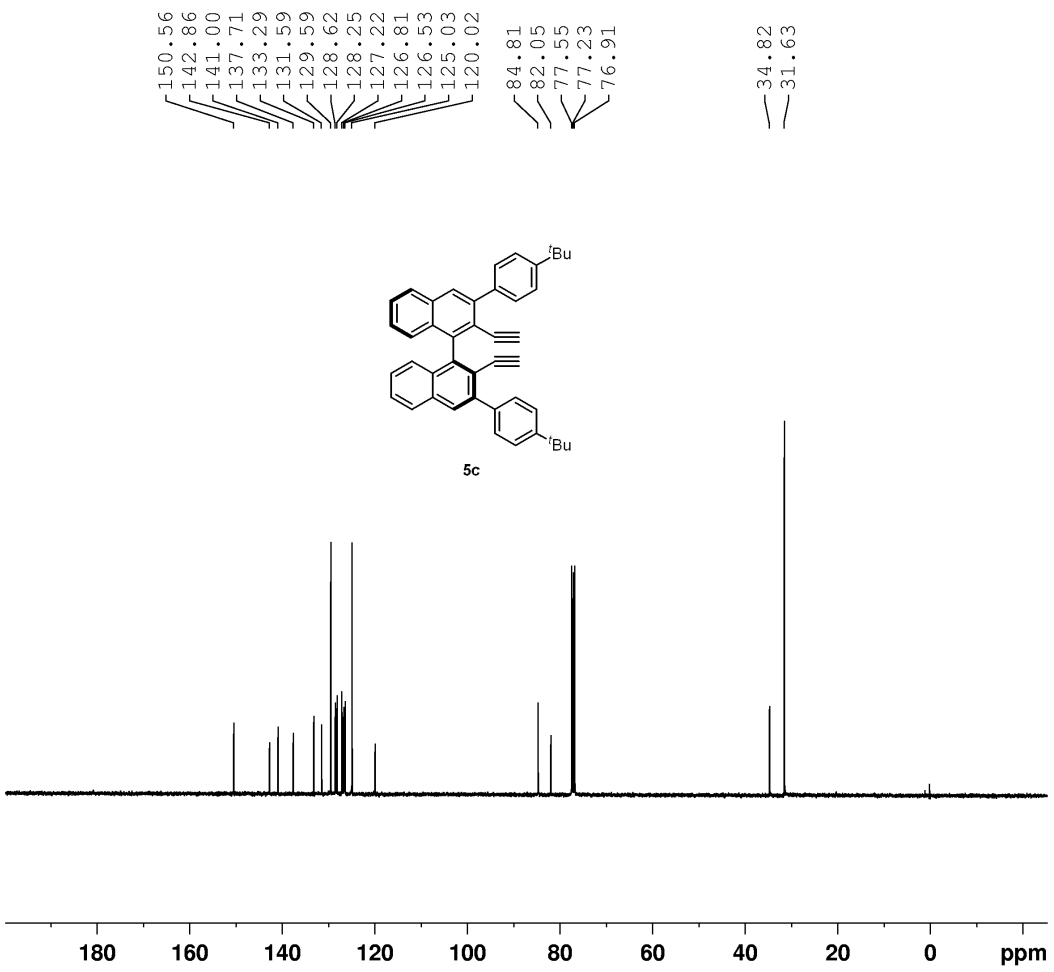


5b

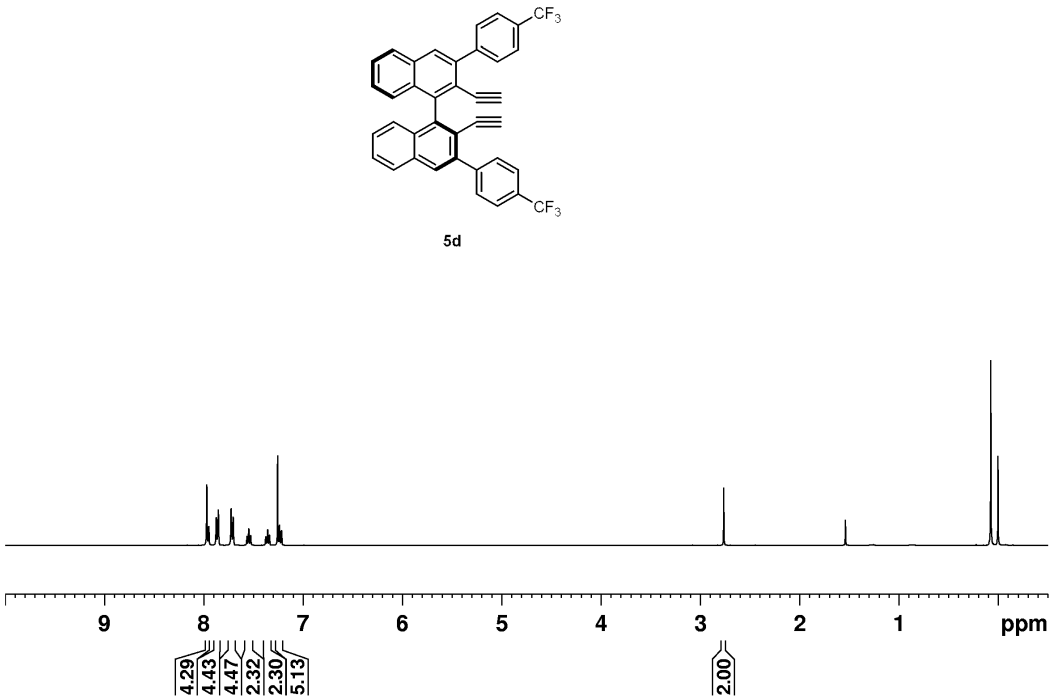
NAME	RXY-C
EXPNO	5
PROCNO	1
Date_	20140427
Time	7.06
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	3203
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127514 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



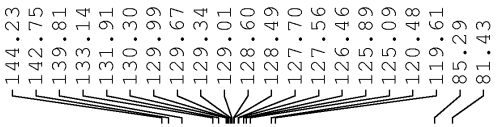
NAME	RXY
EXPNO	364
PROCNO	1
Date_	20140426
Time	8.57
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	181
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300098 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00

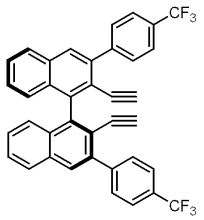


NAME	RXY-C
EXPNO	4
PROCNO	1
Date_	20140427
Time	2.52
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	1683
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127514 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

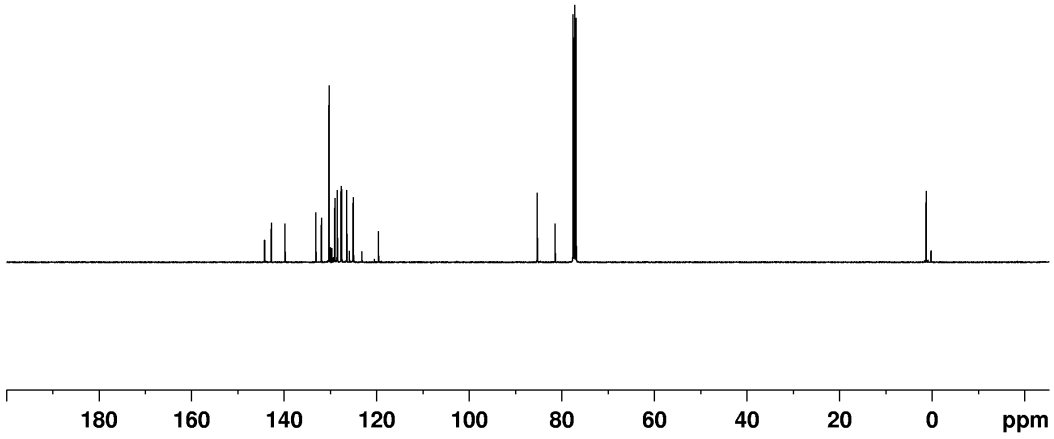


NAME	RXY
EXPNO	376
PROCNO	1
Date_	20140429
Time	5.11
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300099 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00

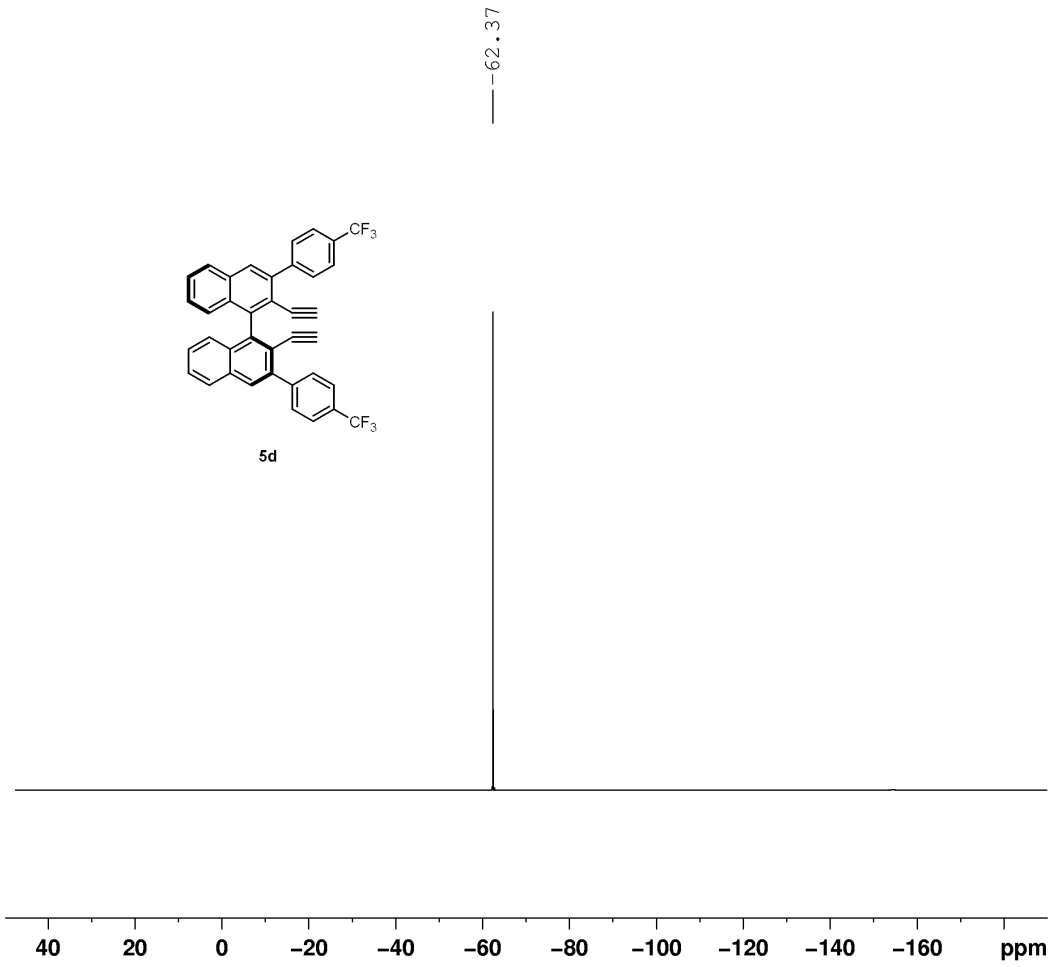




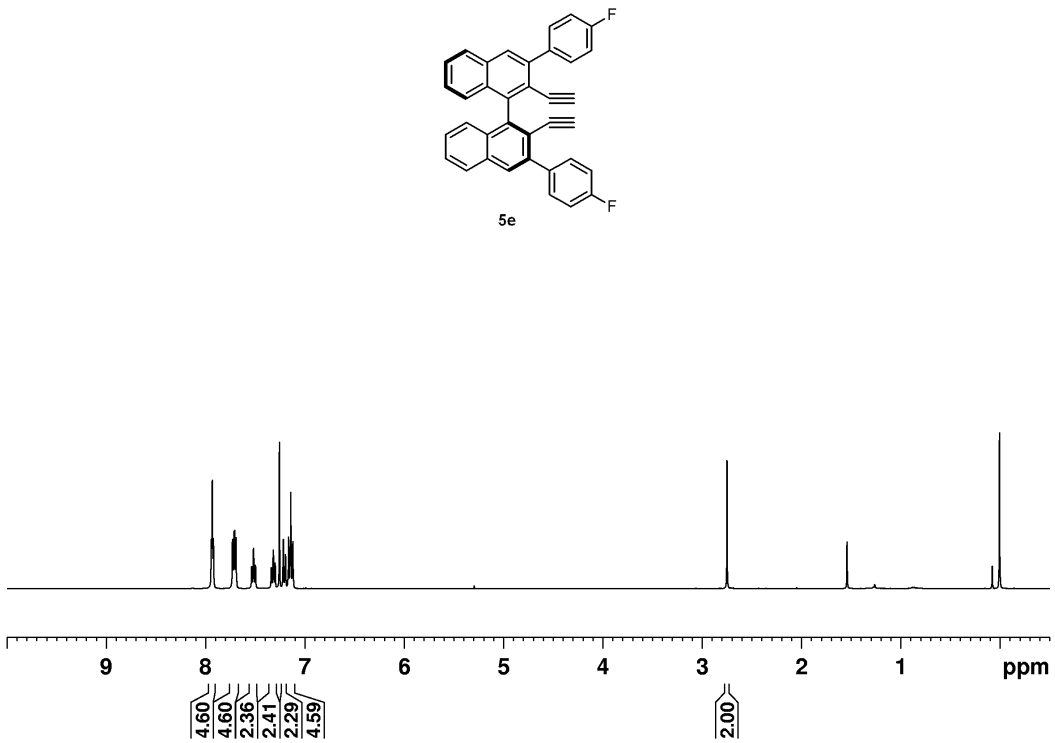
5d



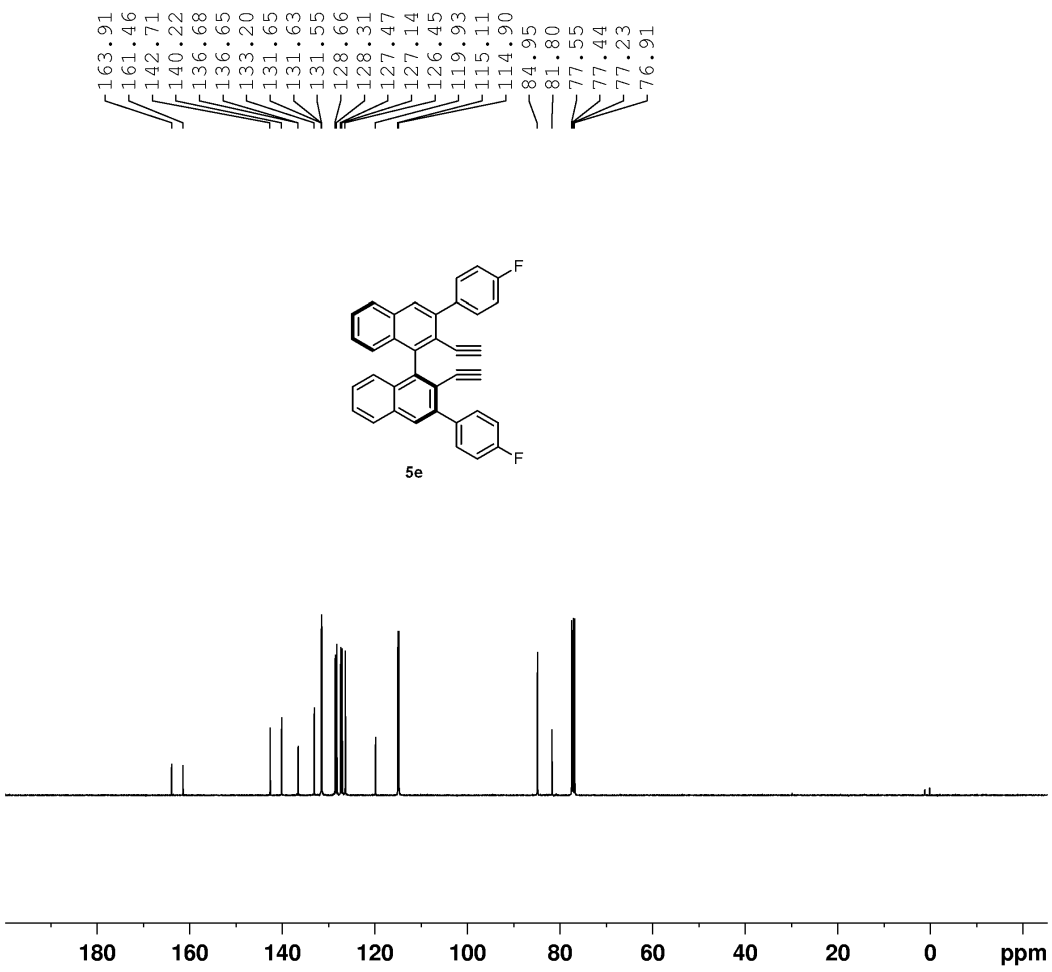
NAME	RXY-C
EXPNO	7
PROCNO	1
Date_	20140430
Time	0.39
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	15565
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127487 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



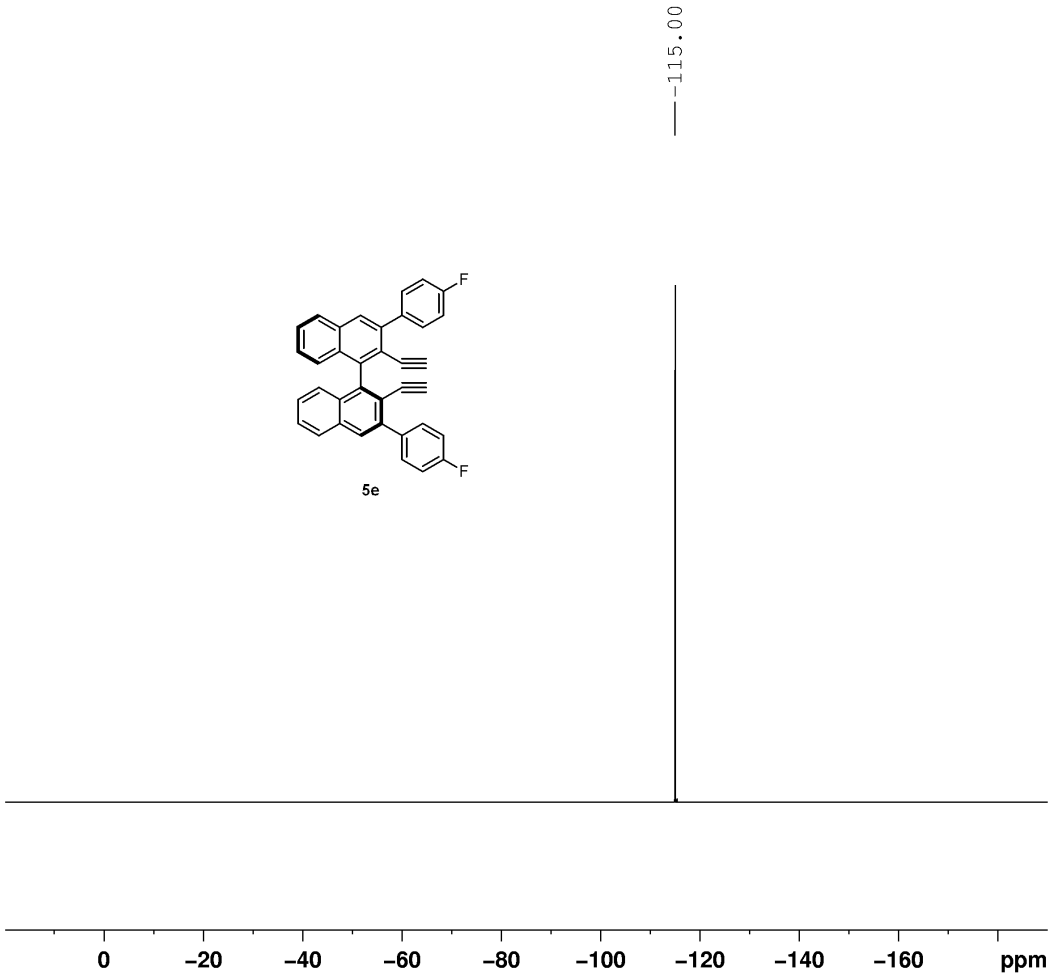

```
NAME                RXY-F
EXPNO                 130
PROCNO                  1
Date_            20141205
Time                 8.21
INSTRUM             spect
PROBHD    5 mm PABBO BB/
PULPROG       zgfhigqn.2
TD                 131072
SOLVENT              CDCl3
NS                      16
DS                       0
SWH            138888.891 Hz
FIDRES           1.059638 Hz
AQ               0.4719092 sec
RG                   71.67
DW                   3.600 usec
DE                    6.50 usec
TE                   298.1 K
D1             1.00000000 sec
D11            0.03000000 sec
D12            0.00002000 sec
TD0                      1

======== CHANNEL f1 ========
SFO1           470.6111772 MHz
NUC1                   19F
P1                   12.50 usec
SI                   65536
SF             470.6582430 MHz
WDW                     EM
SSB                      0
LB                    1.00 Hz
GB                       0
PC                    1.00
```



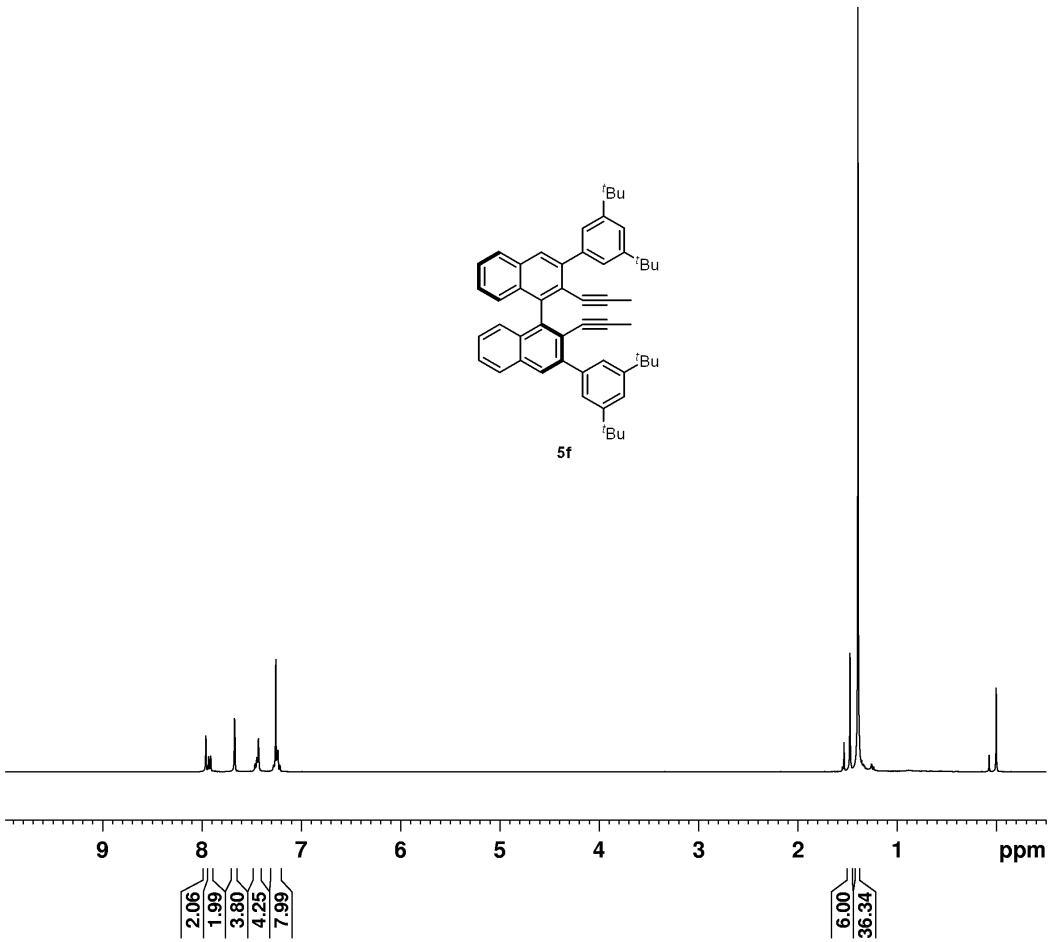
NAME	RXY
EXPNO	377
PROCNO	1
Date_	20140430
Time	0.28
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300098 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



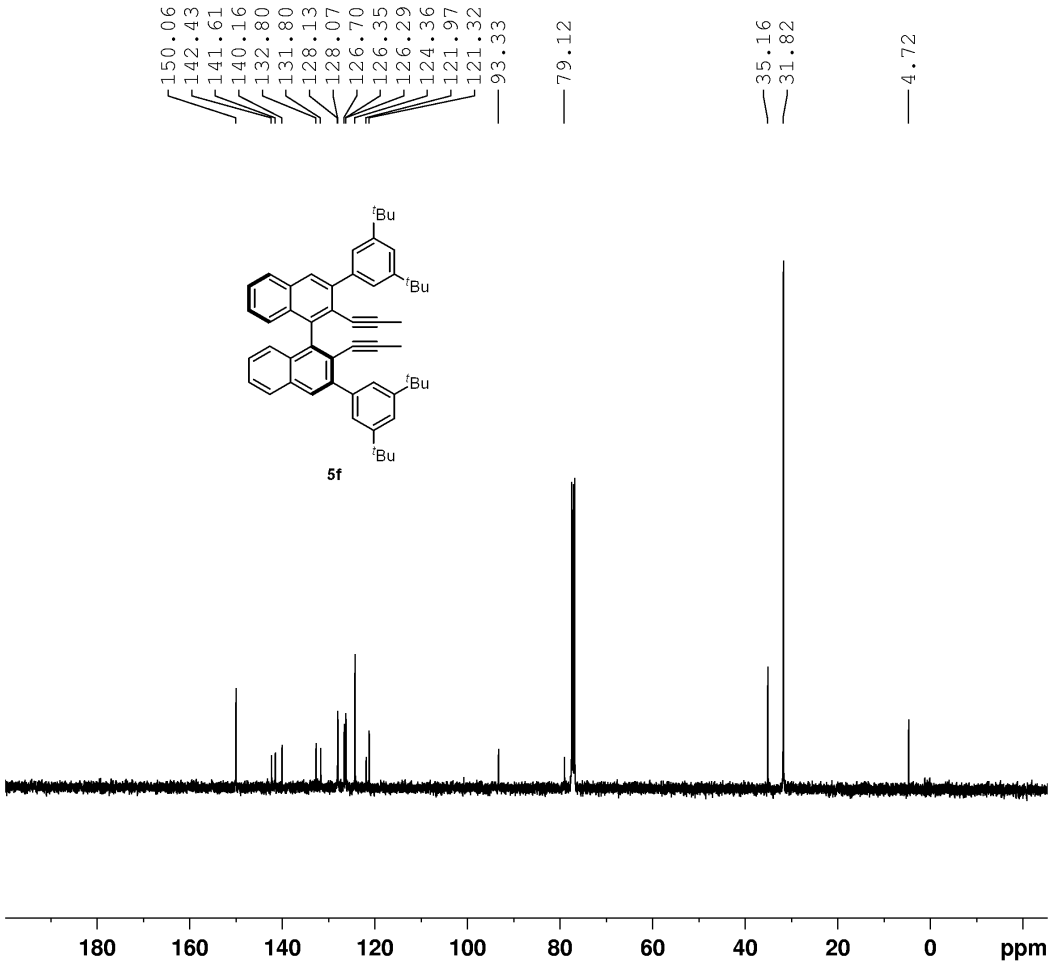
NAME	RXY-C
EXPNO	9
PROCNO	1
Date_	20140501
Time	0.17
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	14761
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127528 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



NAME	RXY-F
EXPNO	131
PROCNO	1
Date_	20141205
Time	8.25
INSTRUM	spect
PROBHD	5 mm PABBO BB/
PULPROG	zgfhigqn.2
TD	131072
SOLVENT	CDCl3
NS	16
DS	0
SWH	138888.891 Hz
FIDRES	1.059638 Hz
AQ	0.4719092 sec
RG	71.67
DW	3.600 usec
DE	6.50 usec
TE	298.1 K
D1	1.00000000 sec
D11	0.03000000 sec
D12	0.00002000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	470.6111772 MHz
NUC1	19F
P1	12.50 usec
SI	65536
SF	470.6582430 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.00

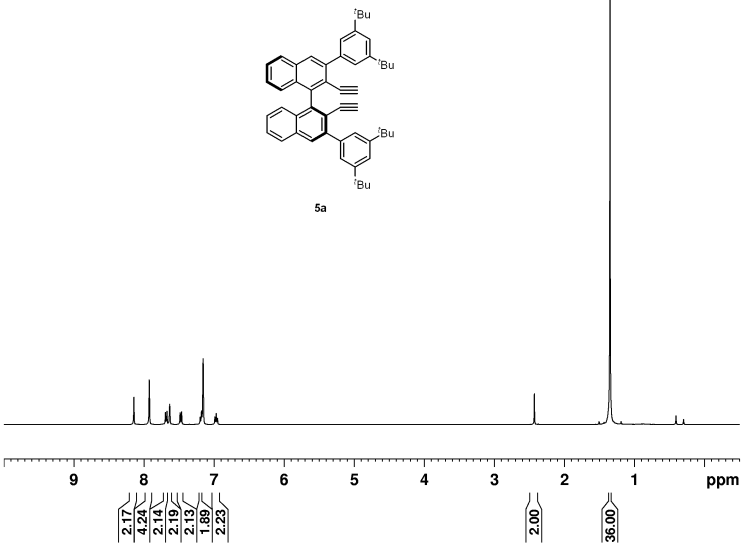


NAME	RXY
EXPNO	1076
PROCNO	1
Date_	20141203
Time	11.19
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300106 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00

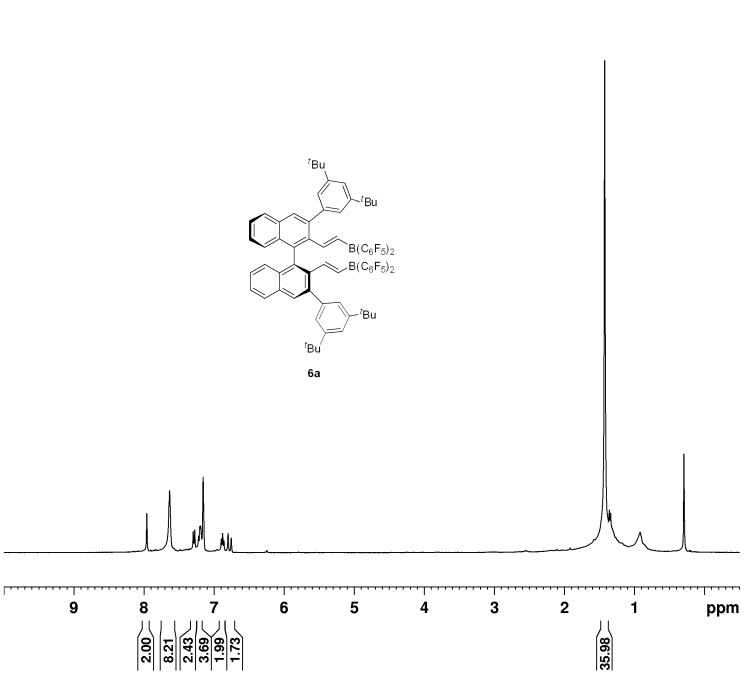


NAME	RXY-C
EXPNO	134
PROCNO	1
Date_	20141203
Time	10.45
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	351
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127499 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

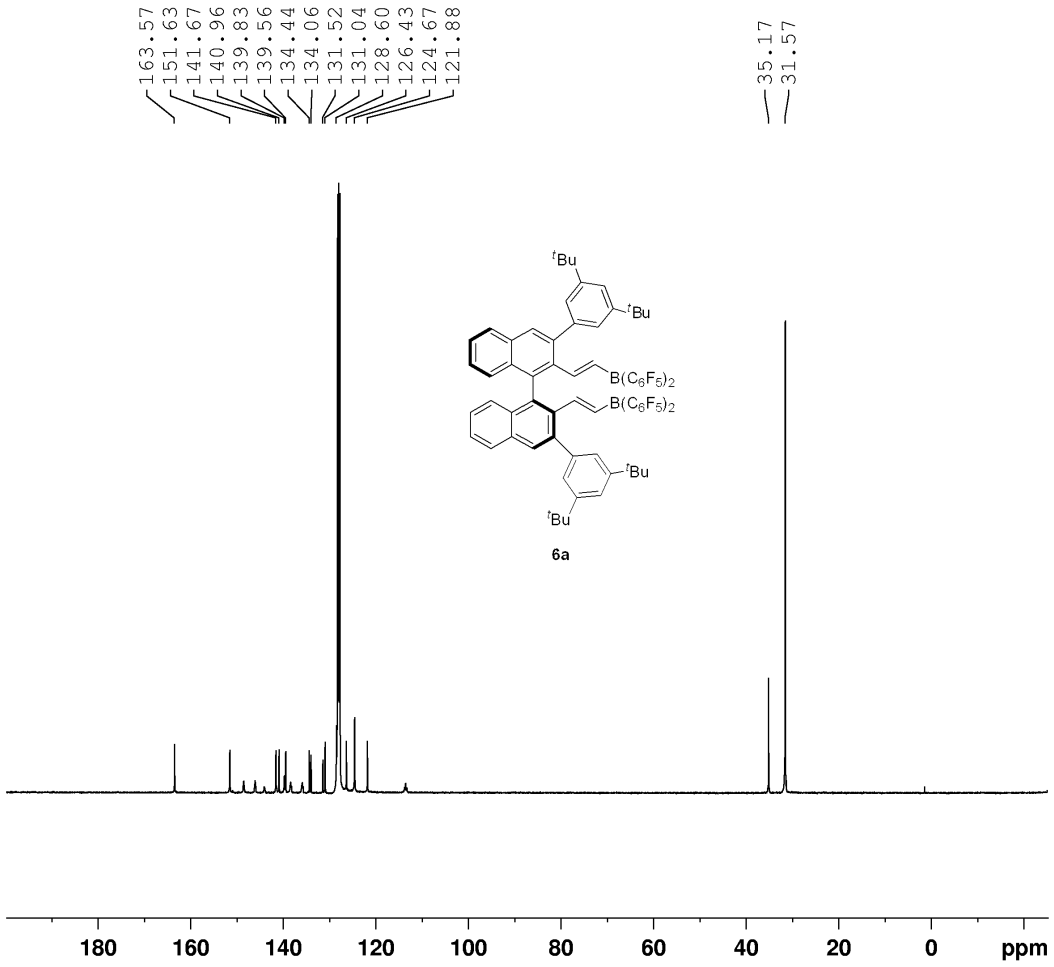
NMR study for chiral alkenylborane 6a



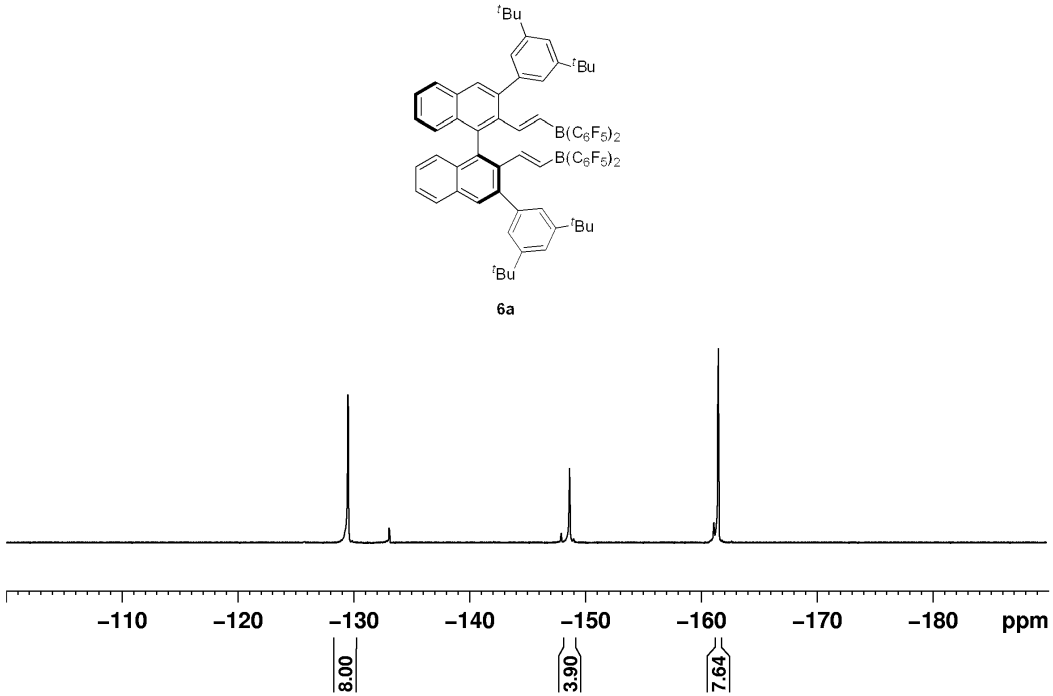

```
NAME                RXY
EXPNO               880
PROCNO                1
Date_          20140918
Time               2.40
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 32768
SOLVENT             C6D6
NS                    16
DS                     0
SWH            12019.230 Hz
FIDRES         0.366798 Hz
AQ             1.3631988 sec
RG                   101
DW                41.600 usec
DE                 6.50 usec
TE                300.0 K
D1           2.00000000 sec
TD0                    1

======== CHANNEL f1 ========
SFO1         400.1320007 MHz
NUC1                   1H
P1                 12.60 usec
SI                 65536
SF           400.1299969 MHz
WDW                   EM
SSB                    0
LB                  0.50 Hz
GB                     0
PC                  1.00
```



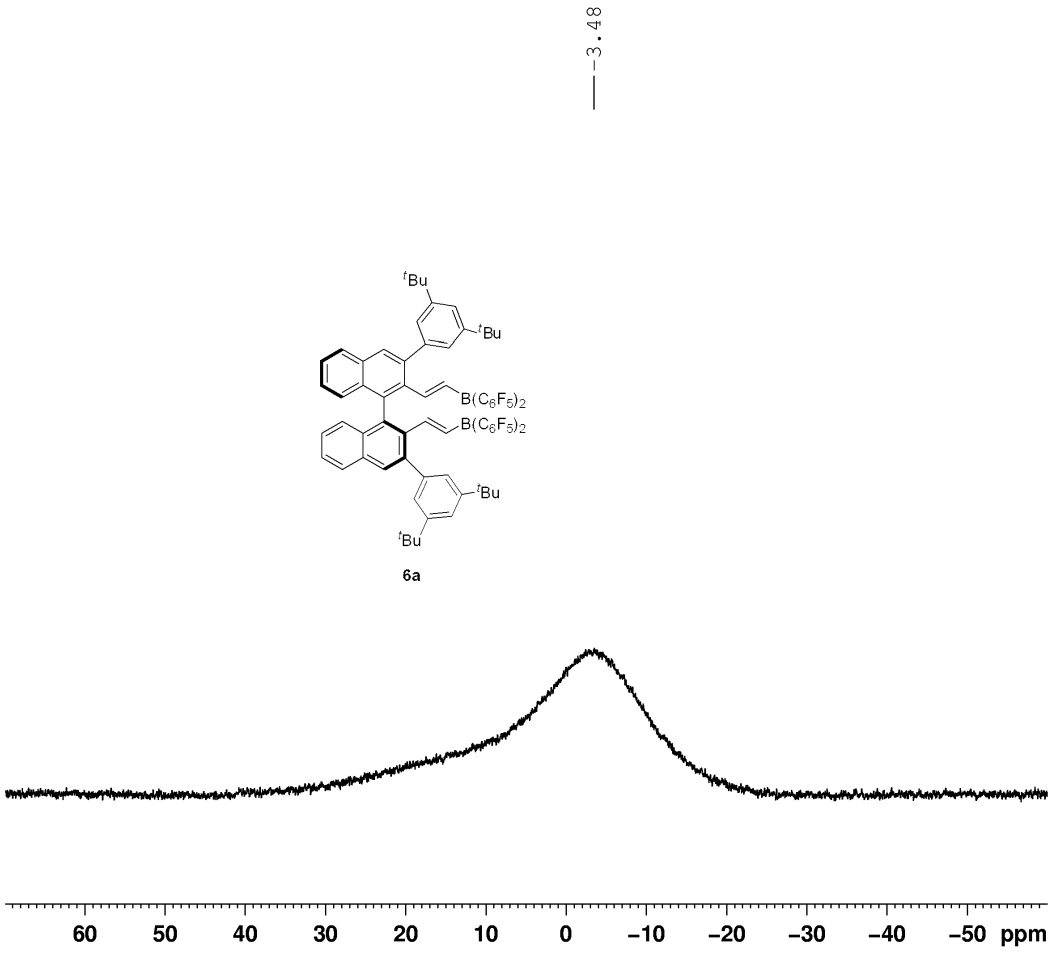

```
NAME                RXY
EXPNO               888
PROCNO                1
Date_          20140918
Time               9.40
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 32768
SOLVENT             C6D6
NS                    16
DS                     0
SWH            12019.230 Hz
FIDRES         0.366798 Hz
AQ             1.3631988 sec
RG                   203
DW                41.600 usec
DE                 6.50 usec
TE                300.0 K
D1           2.00000000 sec
TD0                    1

======== CHANNEL f1 ========
SFO1         400.1320007 MHz
NUC1                   1H
P1                 12.60 usec
SI                 65536
SF           400.1299966 MHz
WDW                   EM
SSB                    0
LB                  0.50 Hz
GB                     0
PC                  1.00
```



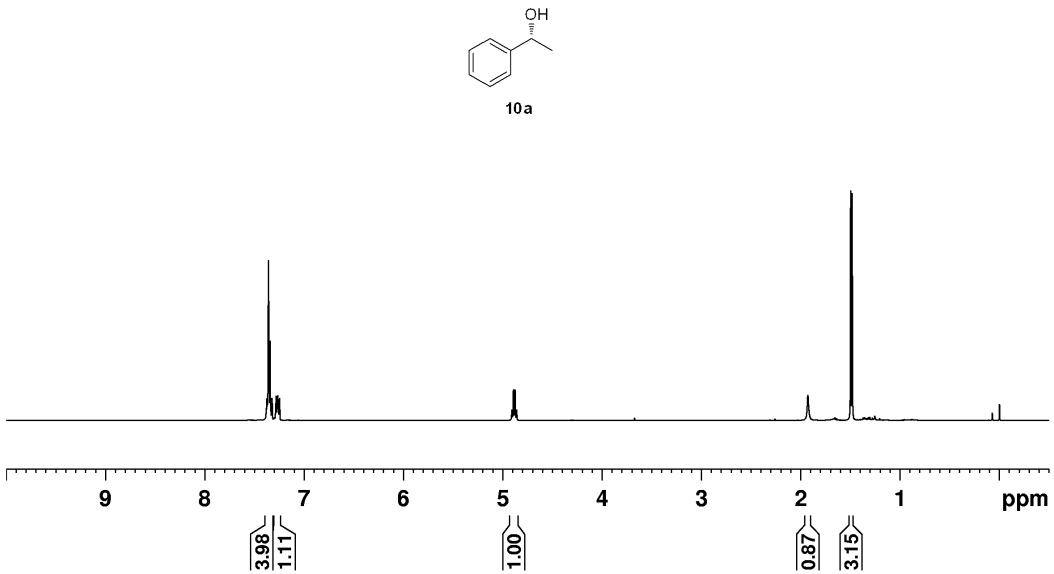
NAME	RXY-C
EXPNO	137
PROCNO	1
Date_	20141206
Time	12.47
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	C6D6
NS	10064
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127257 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



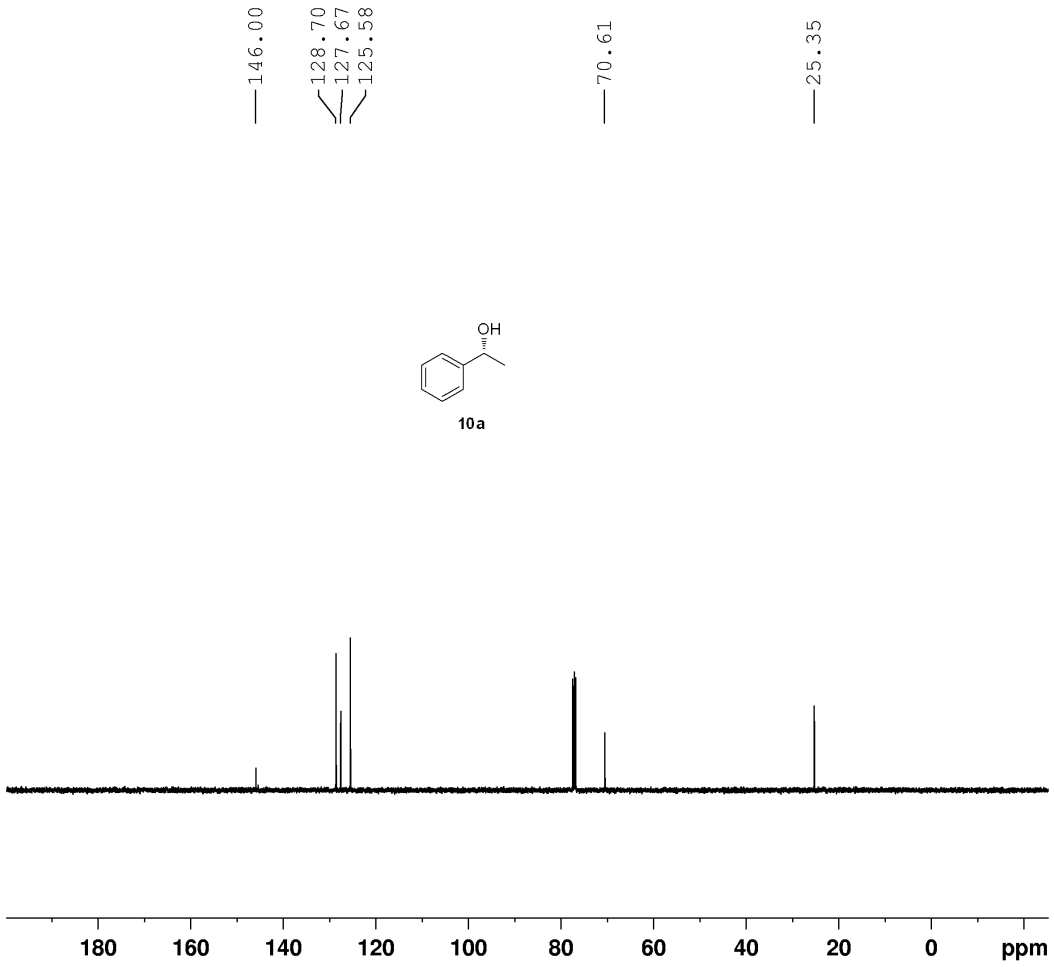
NAME	RXY-F
EXPNO	96
PROCNO	1
Date_	20140923
Time	14.47
INSTRUM	spect
PROBHD	5 mm PABBO BB/
PULPROG	zgfhigqn.2
TD	131072
SOLVENT	C6D6
NS	32
DS	0
SWH	46875.000 Hz
FIDRES	0.357628 Hz
AQ	1.3981513 sec
RG	71.67
DW	10.667 usec
DE	6.50 usec
TE	299.5 K
D1	1.00000000 sec
D11	0.03000000 sec
D12	0.00002000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	470.5923508 MHz
NUC1	19F
P1	12.50 usec
SI	65536
SF	470.6582430 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00



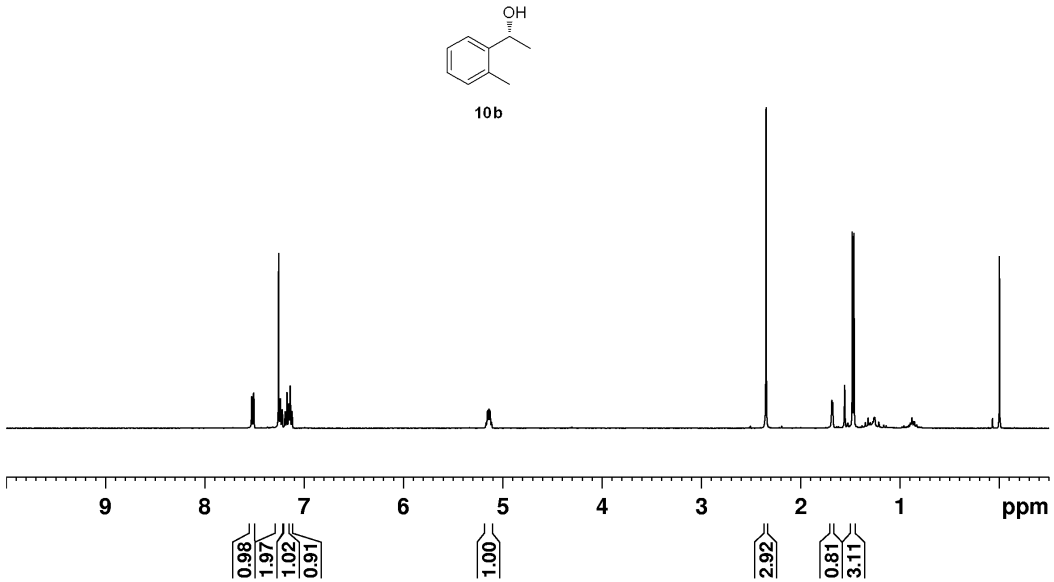
NAME	RXY-B
EXPNO	23
PROCNO	999
Date_	20141013
Time	14.57
INSTRUM	spect
PROBHD	5 mm PABBO BB/
PULPROG	zg30
TD	32768
SOLVENT	C6D6
NS	256
DS	0
SWH	32051.281 Hz
FIDRES	0.978127 Hz
AQ	0.5112308 sec
RG	813.28
DW	15.600 usec
DE	6.50 usec
TE	298.2 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	160.4840379 MHz
NUC1	11B
P1	7.50 usec
SI	32768
SF	160.4840380 MHz
WDW	EM
SSB	0
LB	5.00 Hz
GB	0
PC	1.40



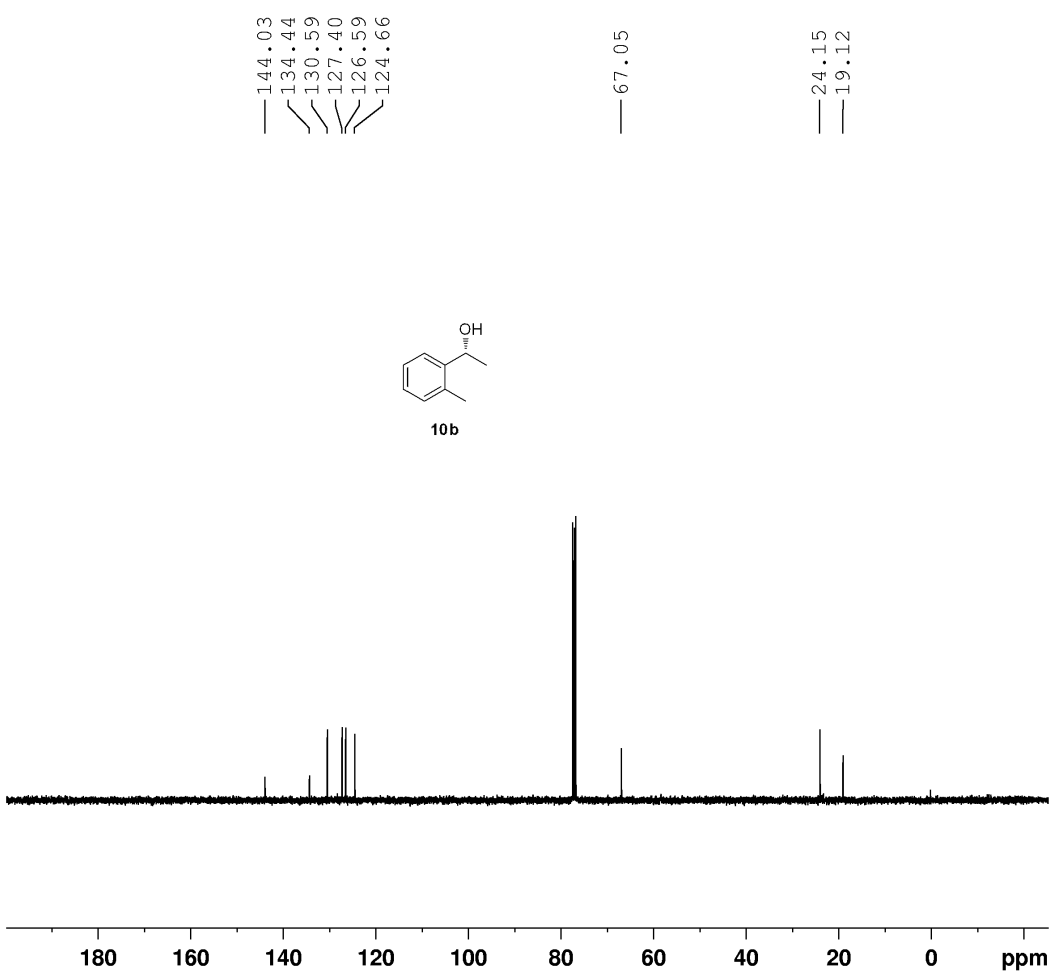
NAME	RXY
EXPNO	425
PROCNO	1
Date_	20140514
Time	10.20
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	13
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	128
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300139 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



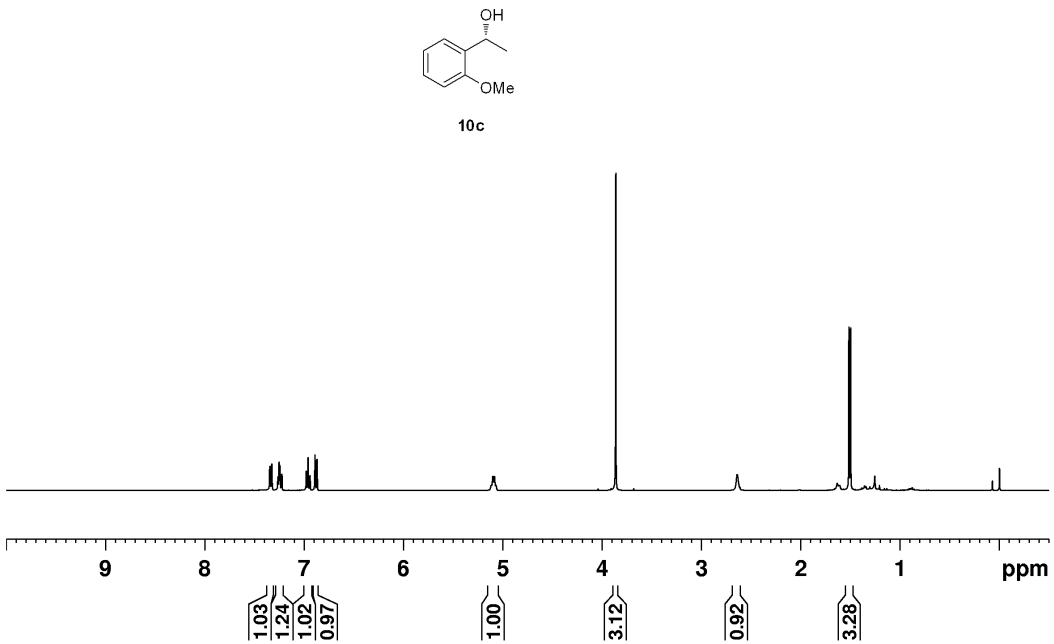
NAME	RXY-C
EXPNO	14
PROCNO	1
Date_	20140514
Time	10.30
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	123
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127510 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



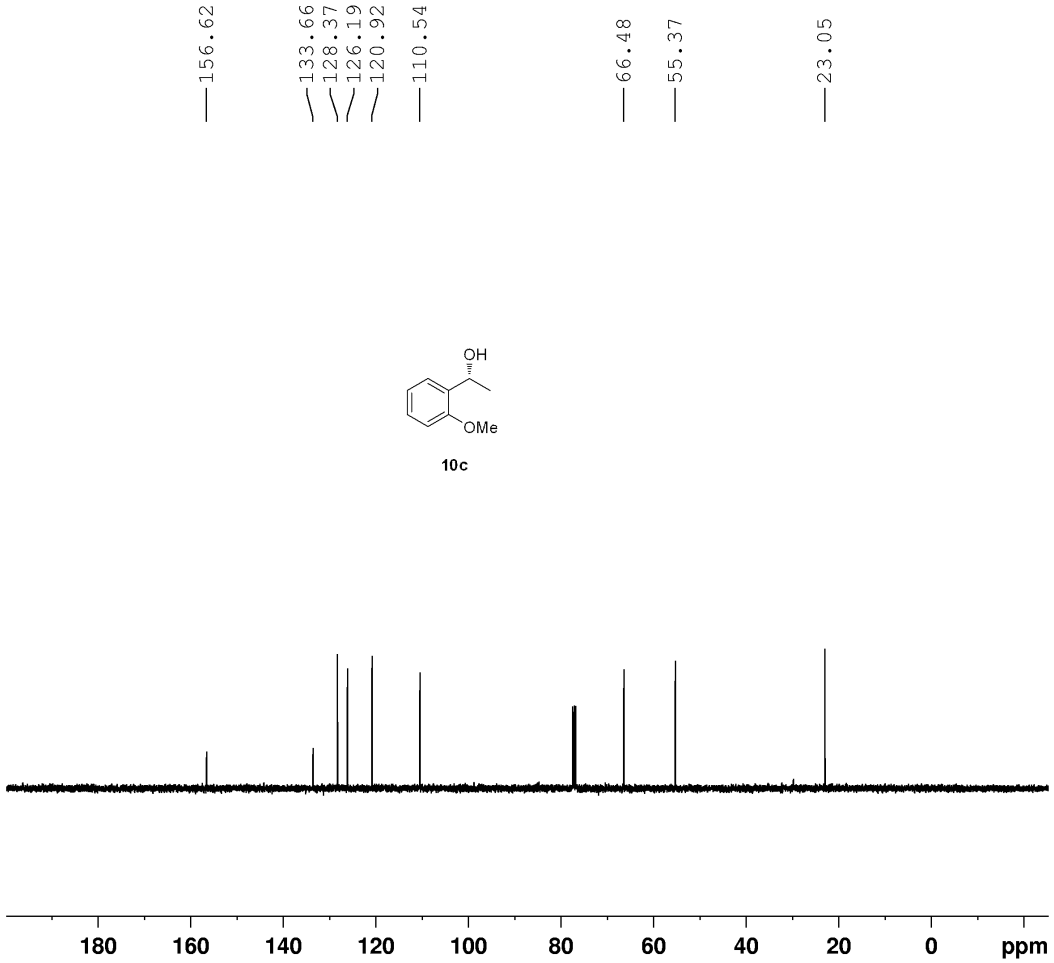
NAME	RXY
EXPNO	433
PROCNO	1
Date_	20140515
Time	8.45
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300098 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



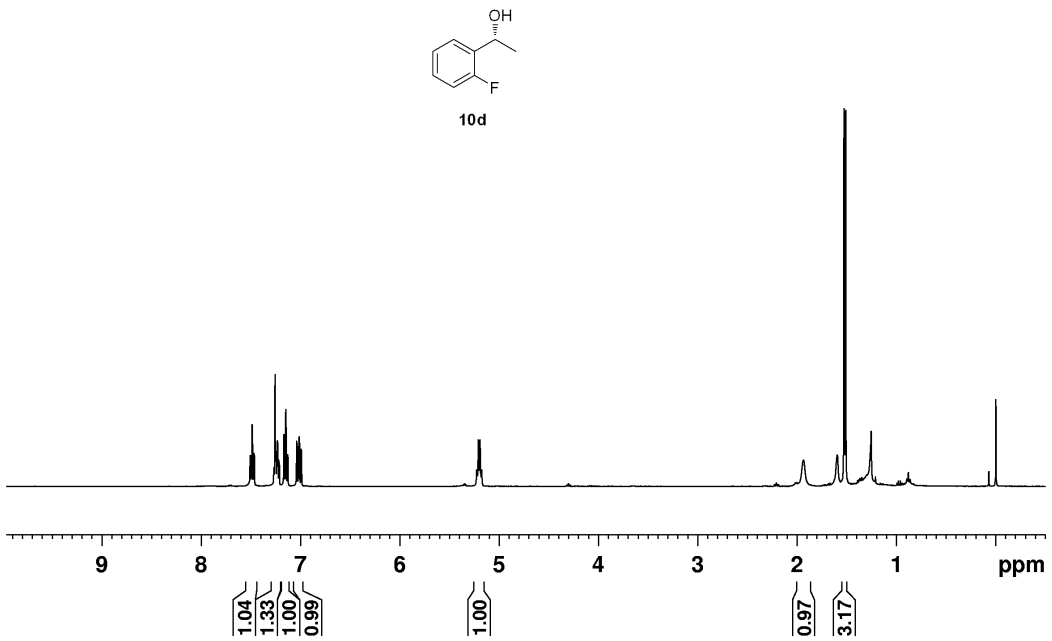
NAME	RXY-C
EXPNO	16
PROCNO	1
Date_	20140516
Time	1.37
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	251
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127490 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



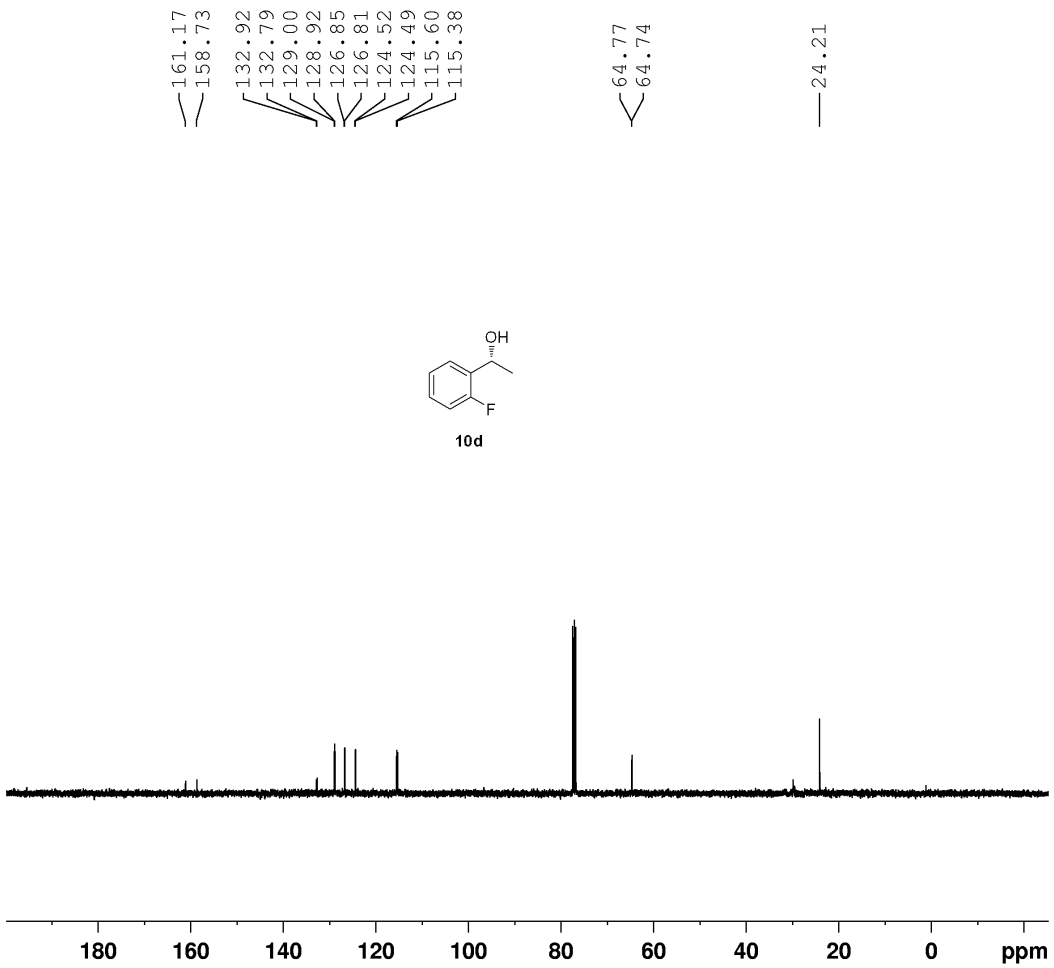
NAME	RXY
EXPNO	685
PROCNO	1
Date_	20140711
Time	7.36
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300114 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



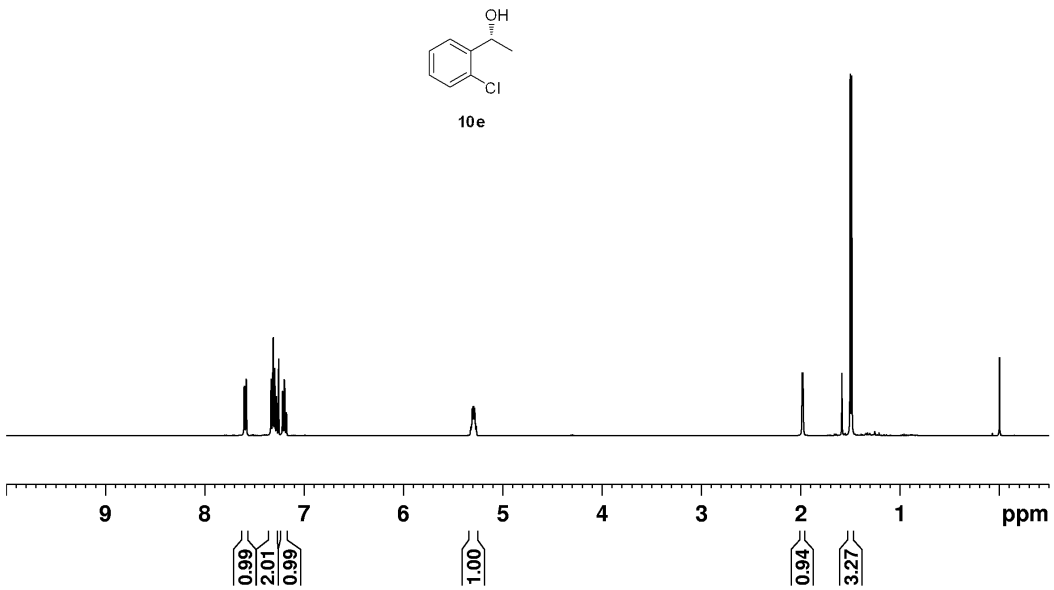
NAME	RXY-C
EXPNO	66
PROCNO	1
Date_	20140711
Time	7.47
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	13
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127579 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



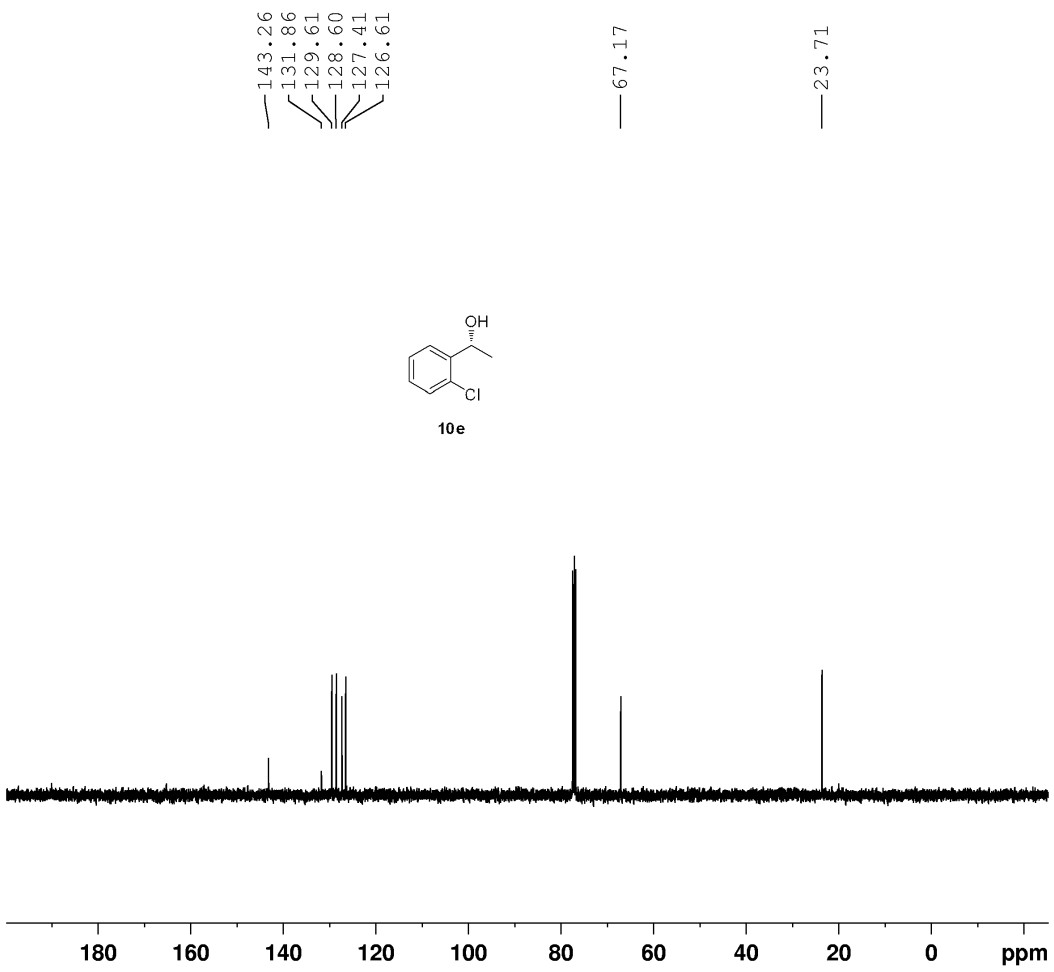
NAME	RXY
EXPNO	677
PROCNO	1
Date_	20140710
Time	11.11
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	12
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300101 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



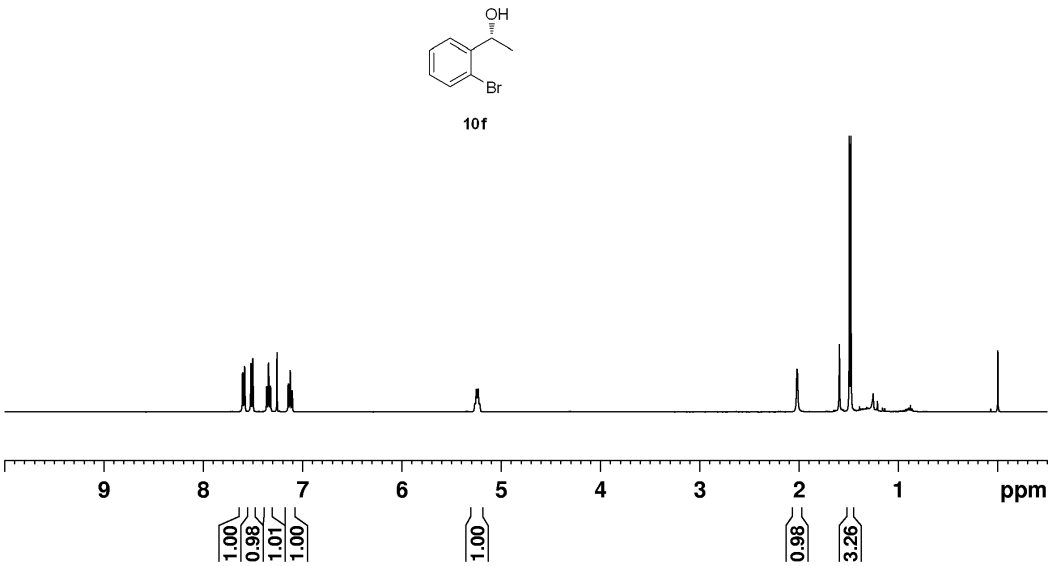
NAME	RXY-C
EXPNO	61
PROCNO	1
Date_	20140710
Time	11.33
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	72
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127486 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



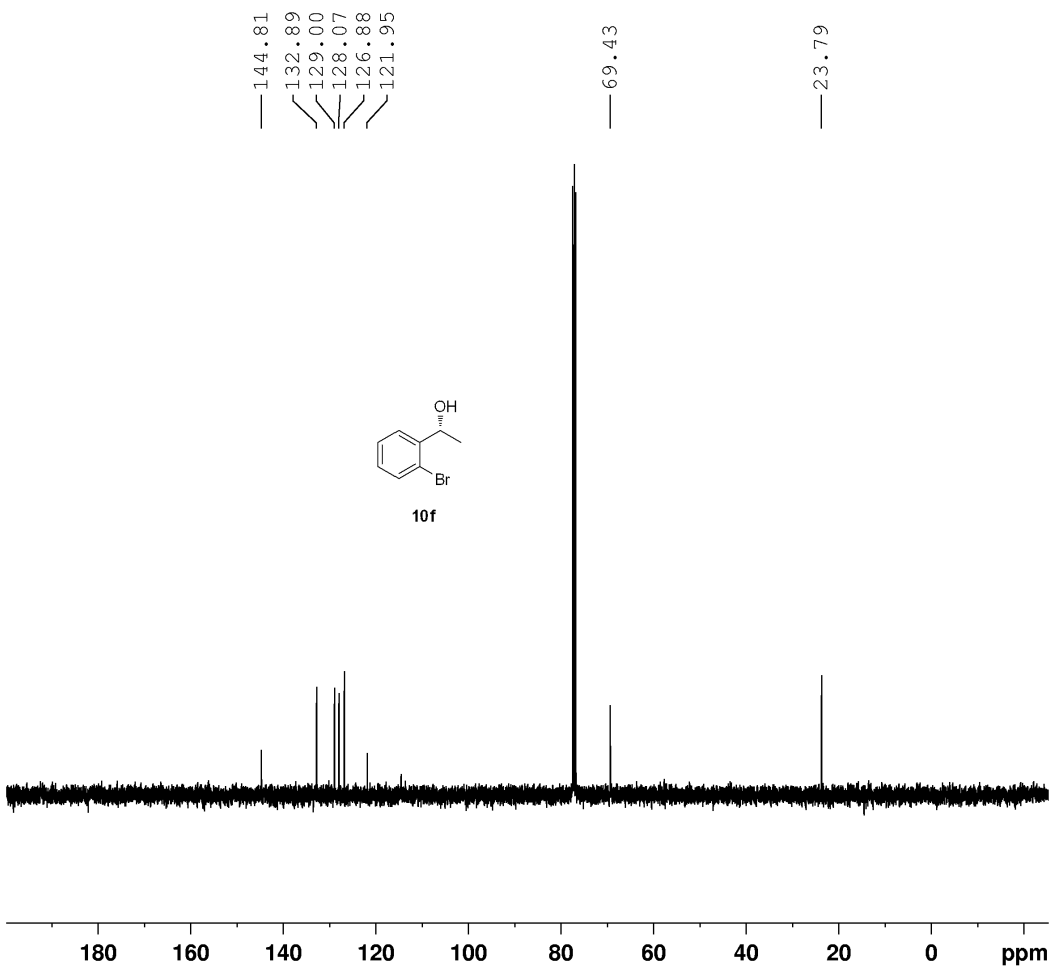
NAME	RXY
EXPNO	450
PROCNO	1
Date_	20140519
Time	1.58
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300100 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



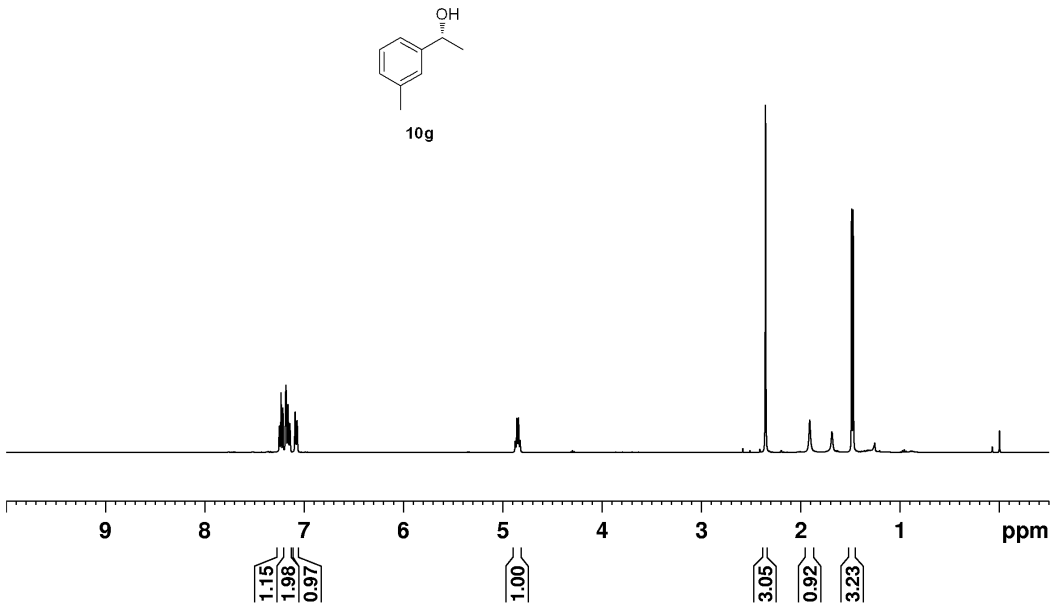
NAME	RXY-C
EXPNO	45
PROCNO	1
Date_	20140627
Time	1.25
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	42
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127487 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



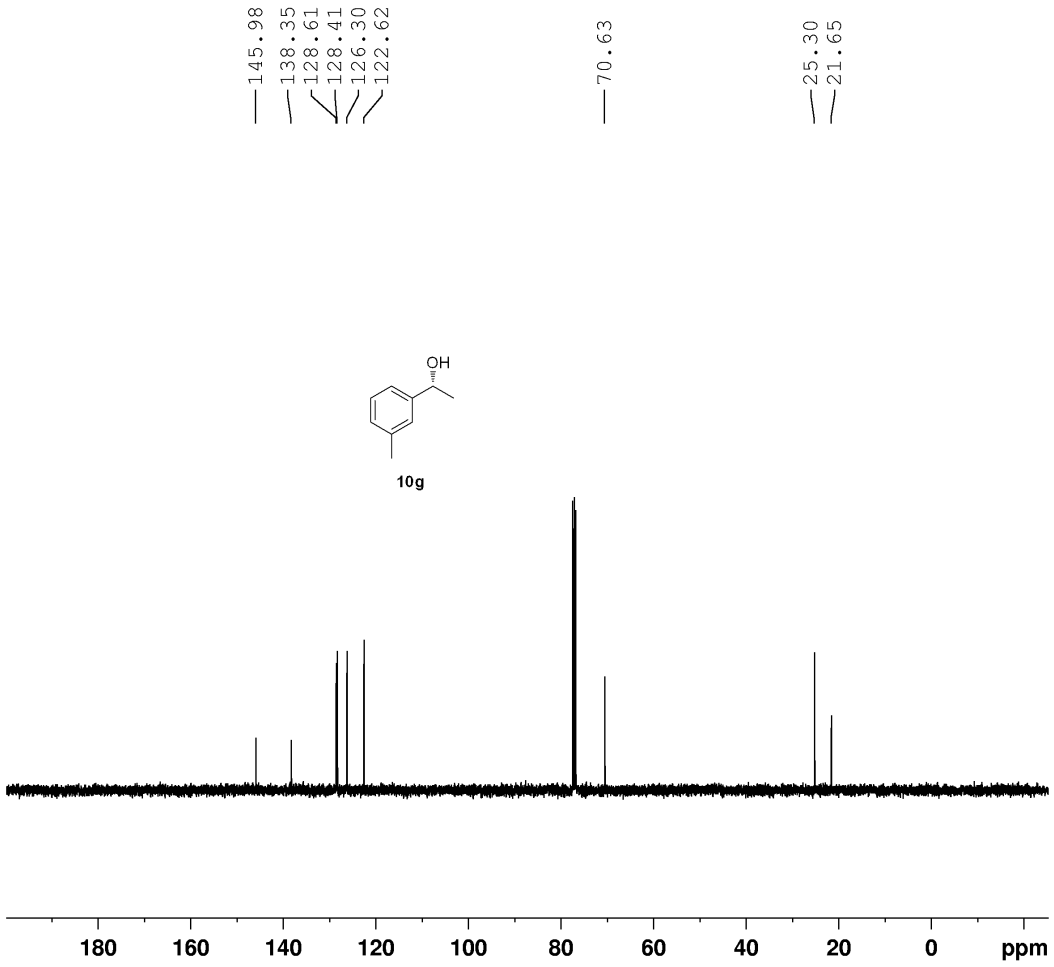
NAME	RXY
EXPNO	652
PROCNO	1
Date_	20140705
Time	0.45
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	10
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300101 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



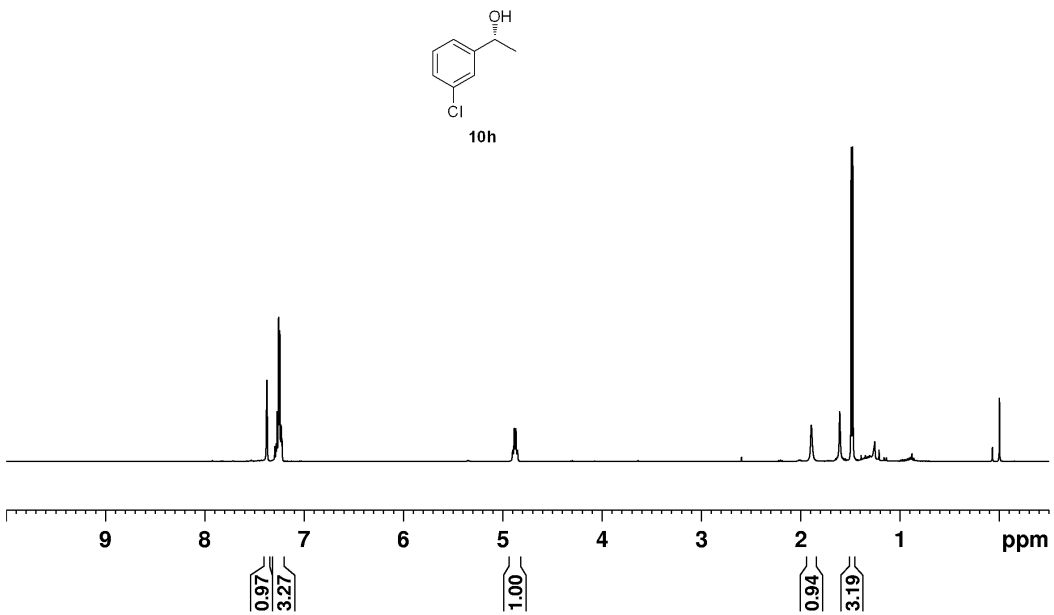
NAME	RXY-C
EXPNO	54
PROCNO	1
Date_	20140705
Time	0.48
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	87
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127479 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



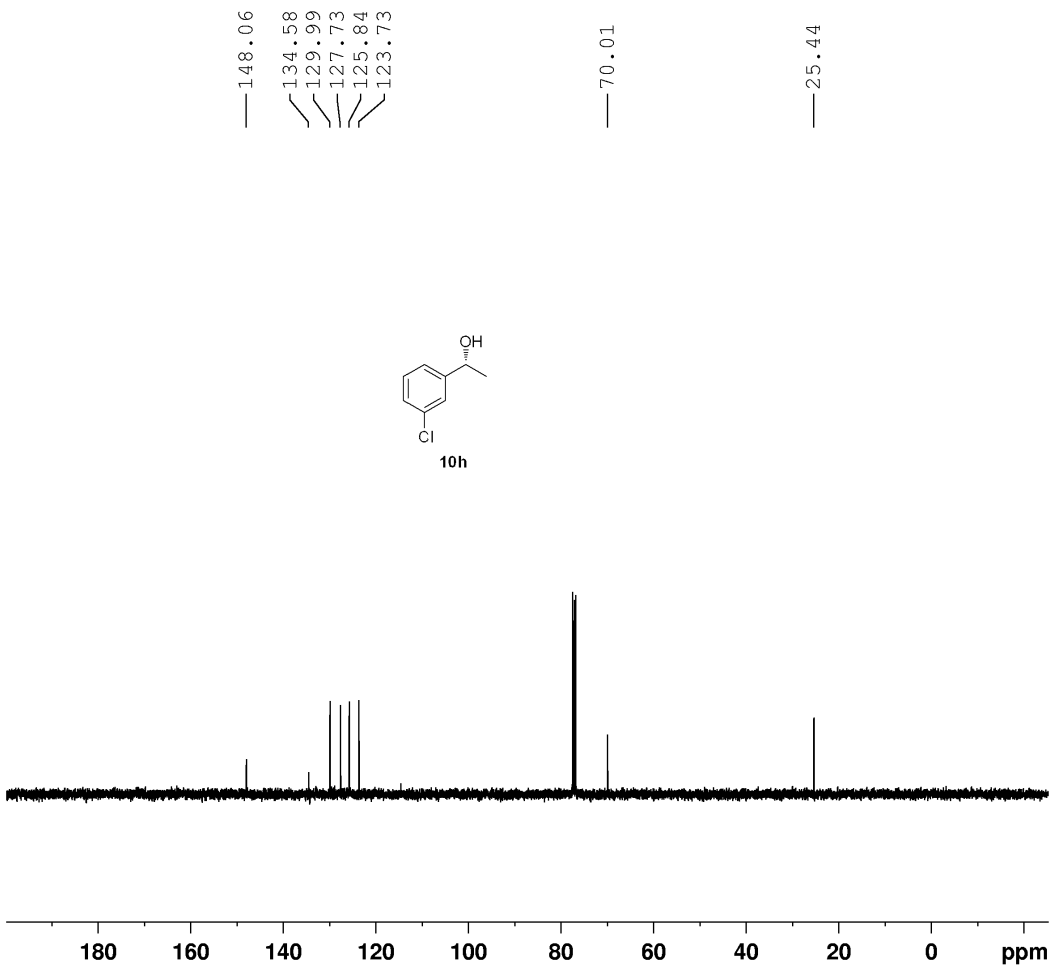
NAME	RXY
EXPNO	646
PROCNO	1
Date_	20140703
Time	5.42
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	101
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300139 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



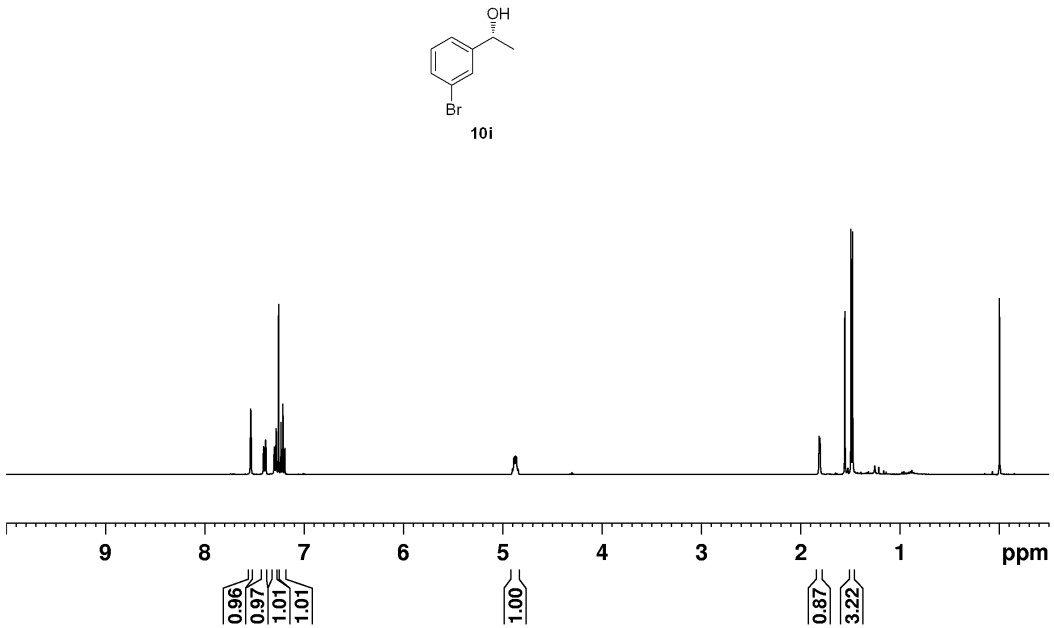
NAME	RXY-C
EXPNO	53
PROCNO	1
Date_	20140703
Time	5.49
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	69
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127502 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



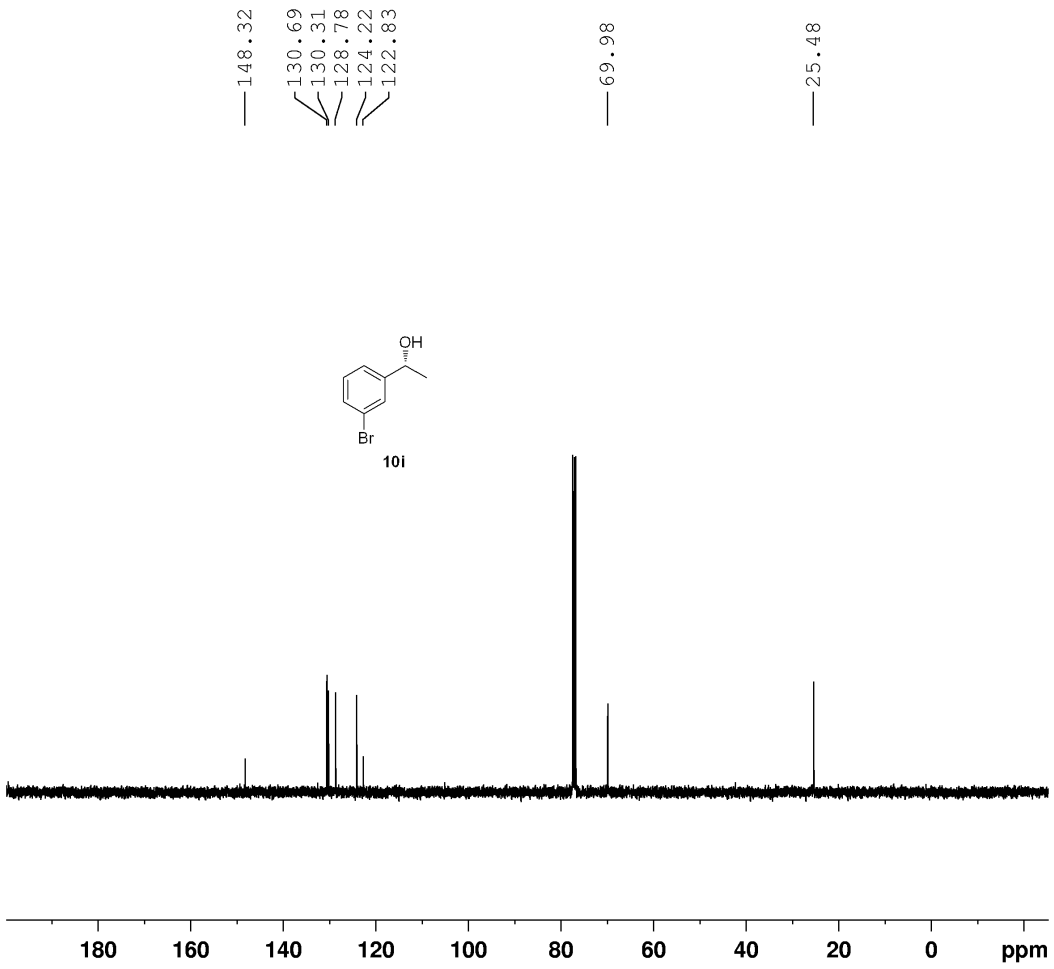
NAME	RXY
EXPNO	648
PROCNO	1
Date_	20140704
Time	0.35
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	11
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300096 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



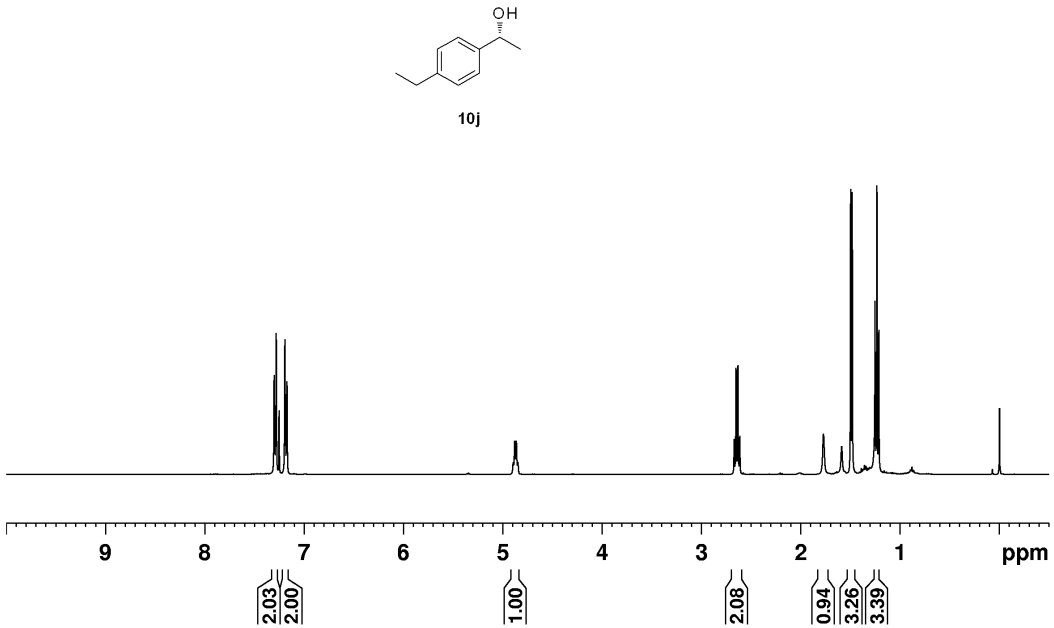
NAME	RXY-C
EXPNO	35
PROCNO	1
Date_	20140612
Time	4.24
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	42
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127491 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



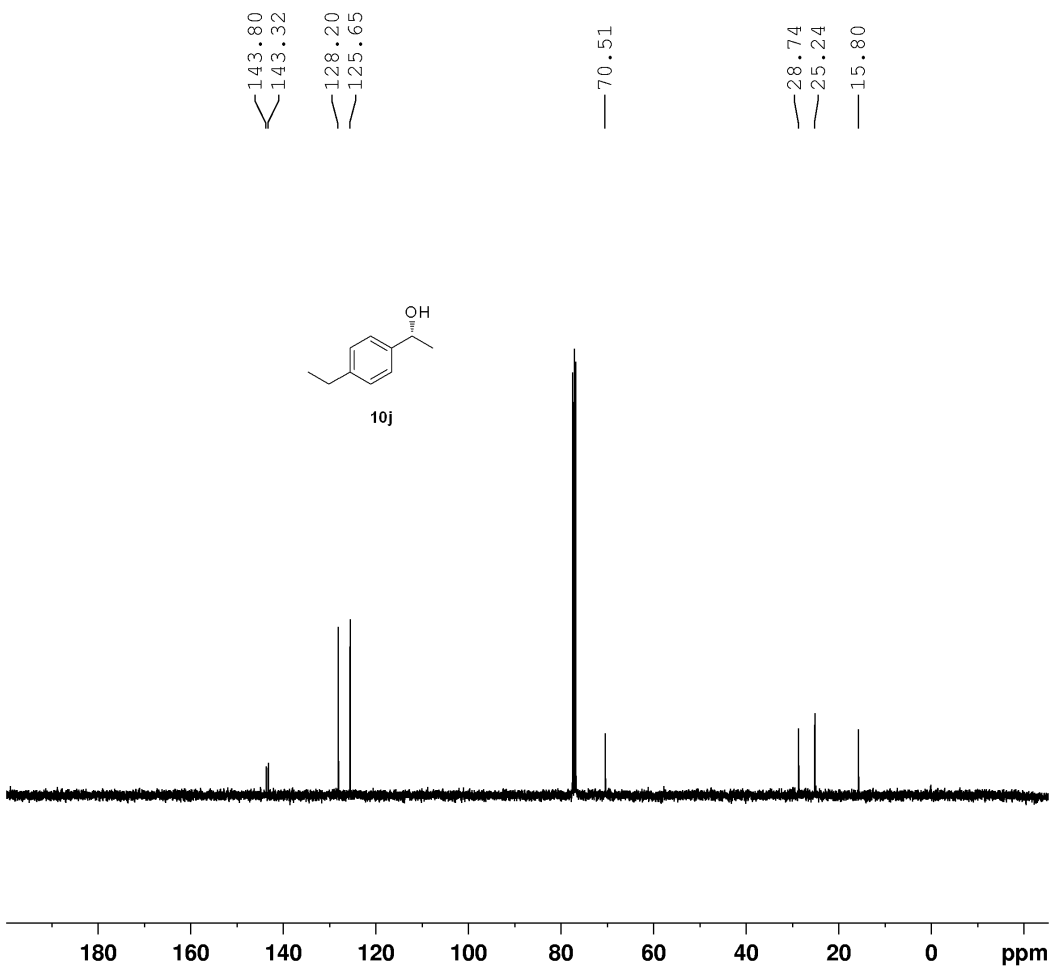
NAME	RXY
EXPNO	468
PROCNO	1
Date_	20140523
Time	0.31
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300096 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



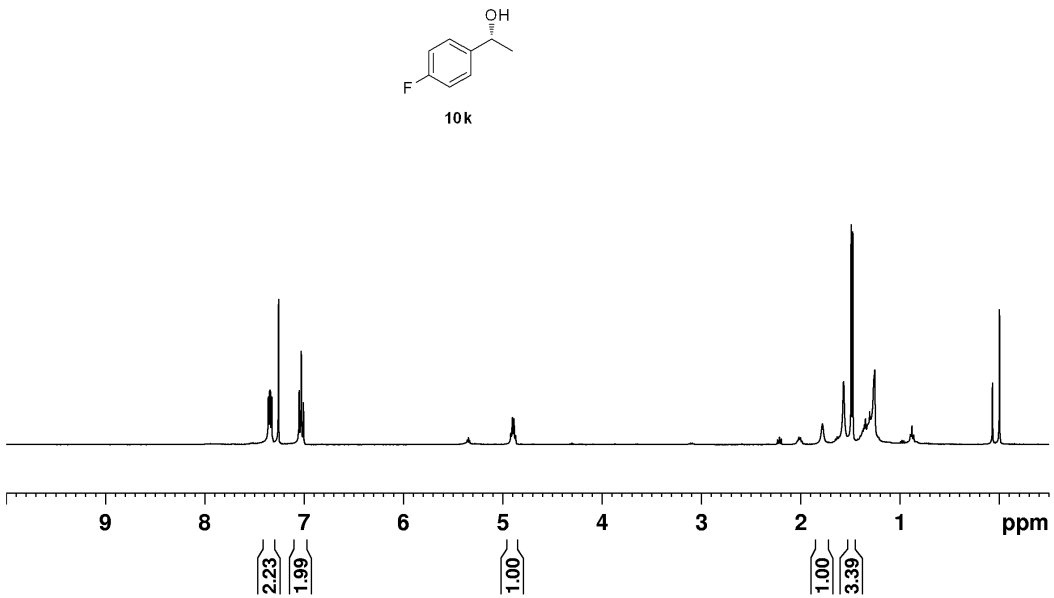
NAME	RXY-C
EXPNO	24
PROCNO	1
Date_	20140523
Time	1.57
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	167
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127483 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



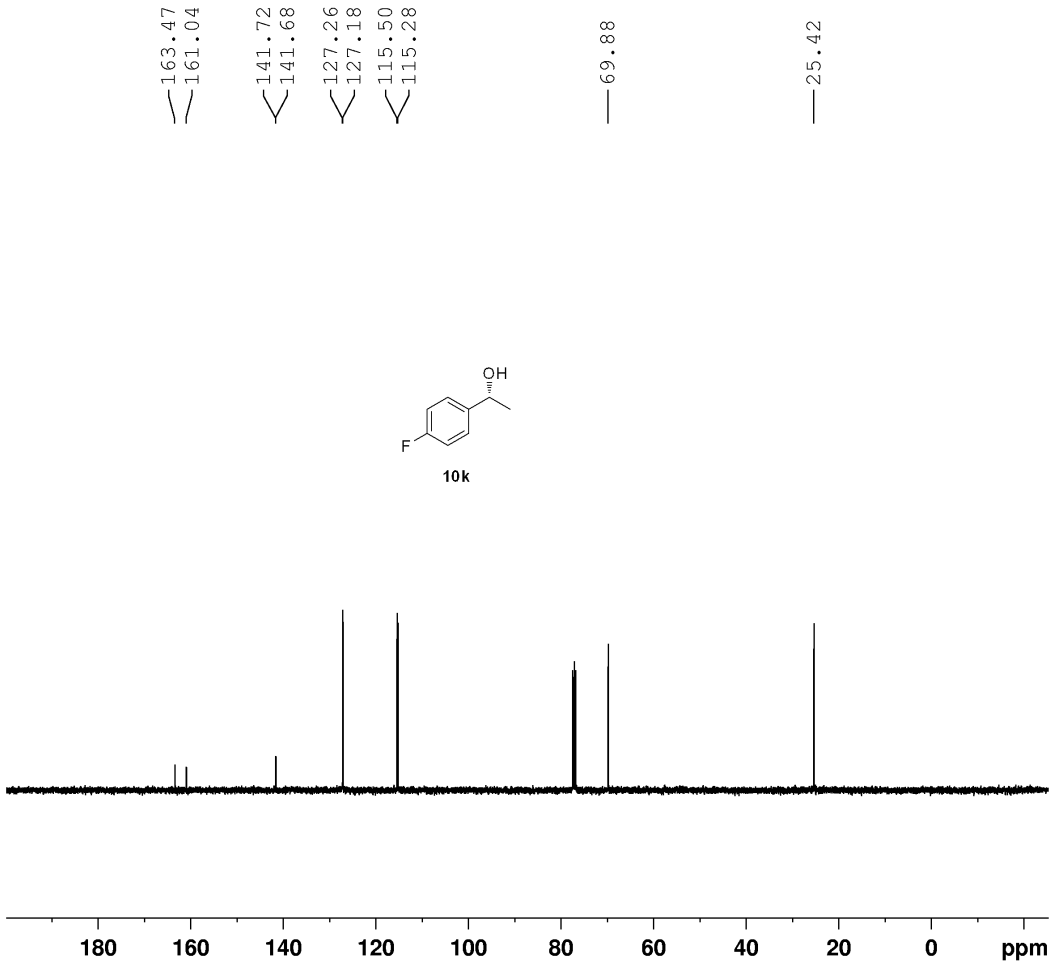
NAME	RXY
EXPNO	709
PROCNO	1
Date_	20140717
Time	11.26
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300119 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



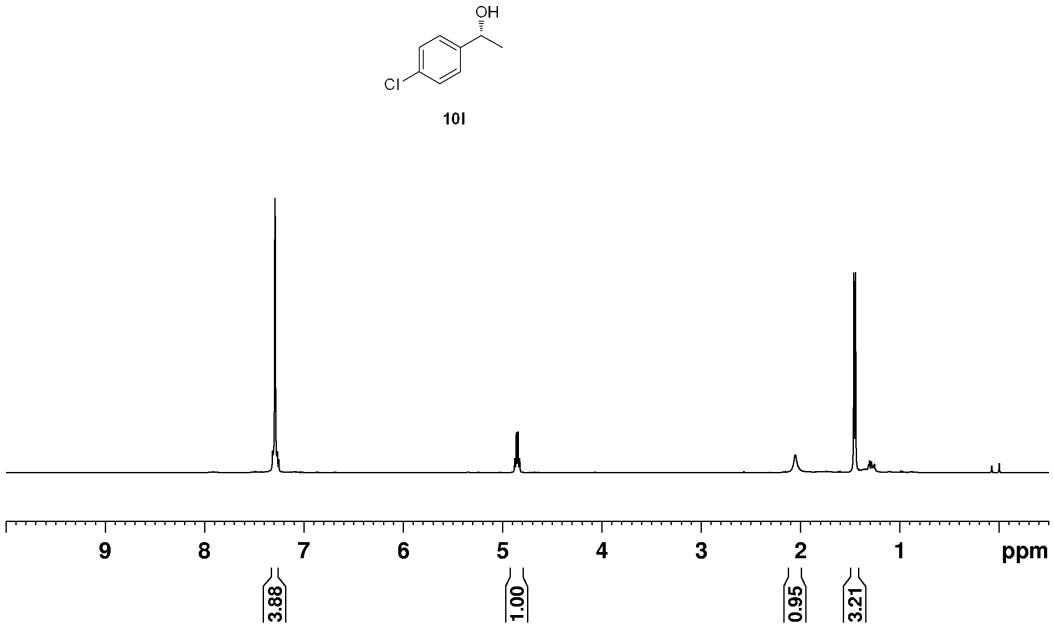
NAME	RXY-C
EXPNO	73
PROCNO	1
Date_	20140717
Time	11.35
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	195
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127472 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



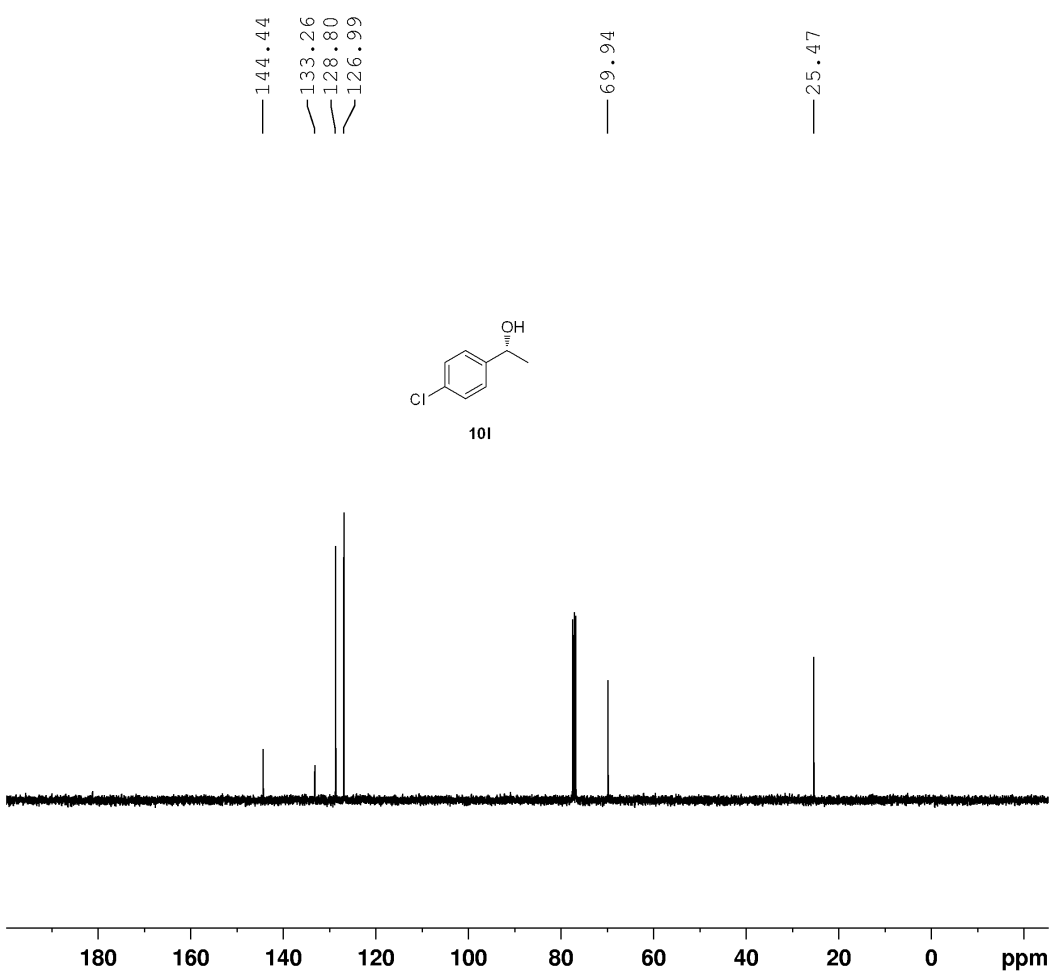
NAME	RXY
EXPNO	684
PROCNO	1
Date_	20140711
Time	7.32
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300096 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



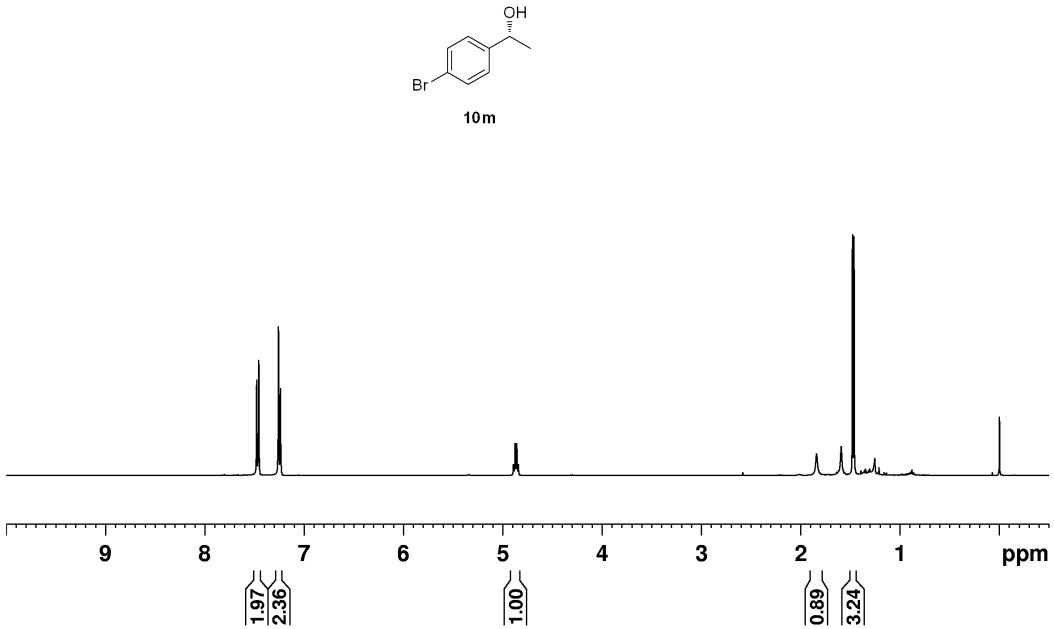

```
Current Data Parameters
NAME         renxiaoyu-C
EXPNO                139
PROCNO                 1

F2 - Acquisition Parameters
Date_           20141205
Time               20.58
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                 32768
SOLVENT            CDCl3
NS                    52
DS                     0
SWH            25252.525 Hz
FIDRES          0.770646 Hz
AQ              0.6488064 sec
RG                   203
DW                19.800 usec
DE                 6.50 usec
TE                300.0 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
SFO1         100.6228298 MHz
NUC1                 13C
P1                  9.40 usec
PLW1         43.63899994 W

======== CHANNEL f2 ========
SFO2         400.1316005 MHz
NUC2                 1H
CPDPRG[2          waltz16
PCPD2               90.00 usec
PLW2         13.06000042 W
PLW12         0.25598001 W
PLW13         0.20734000 W

F2 - Processing parameters
SI                 32768
SF           100.6127526 MHz
WDW                  EM
SSB       0
LB                  1.00 Hz
GB        0
PC                  1.40
```



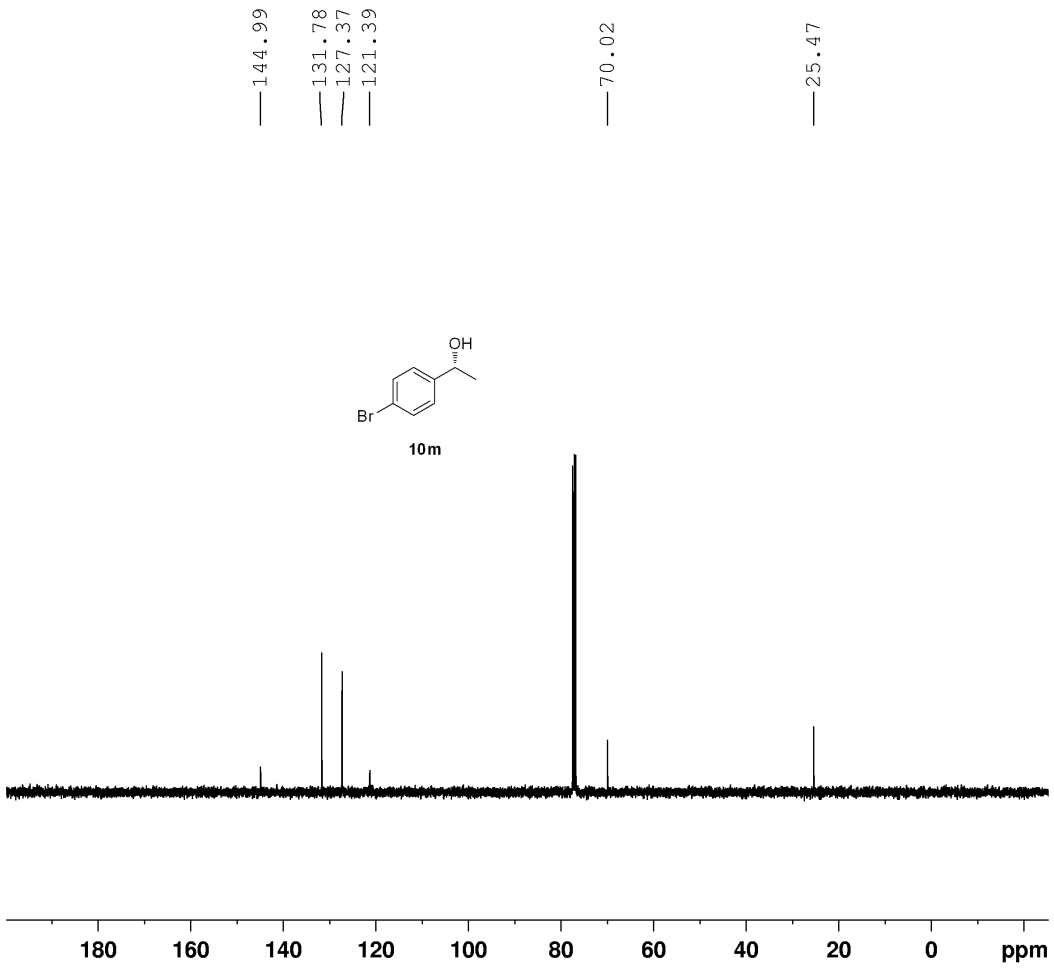
NAME	RXY
EXPNO	592
PROCNO	1
Date_	20140621
Time	9.49
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	114
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300114 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



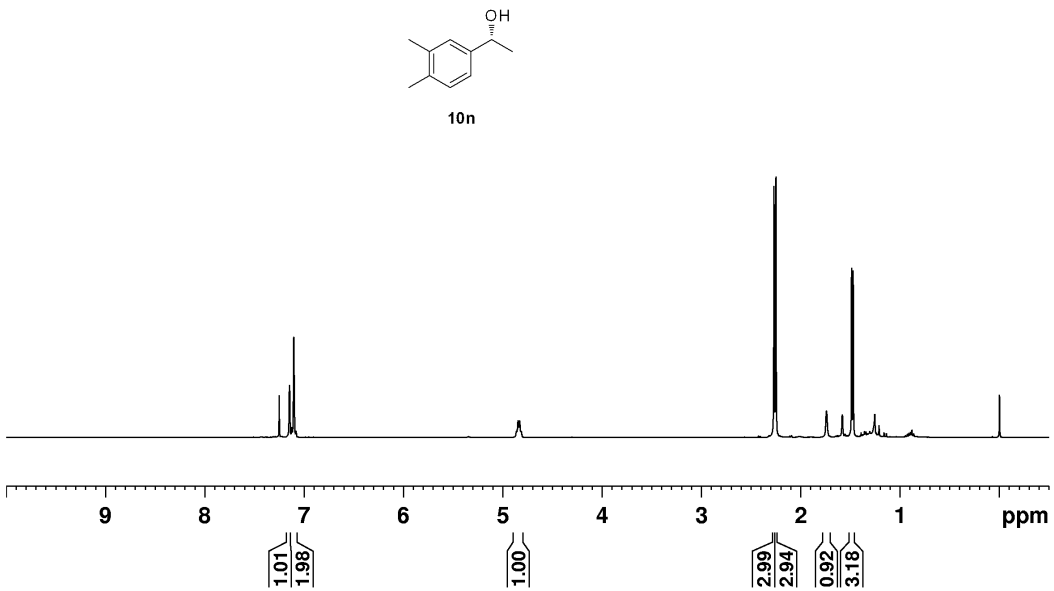
NAME	RXY-C
EXPNO	23
PROCNO	1
Date_	20140520
Time	1.06
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	104
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127495 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



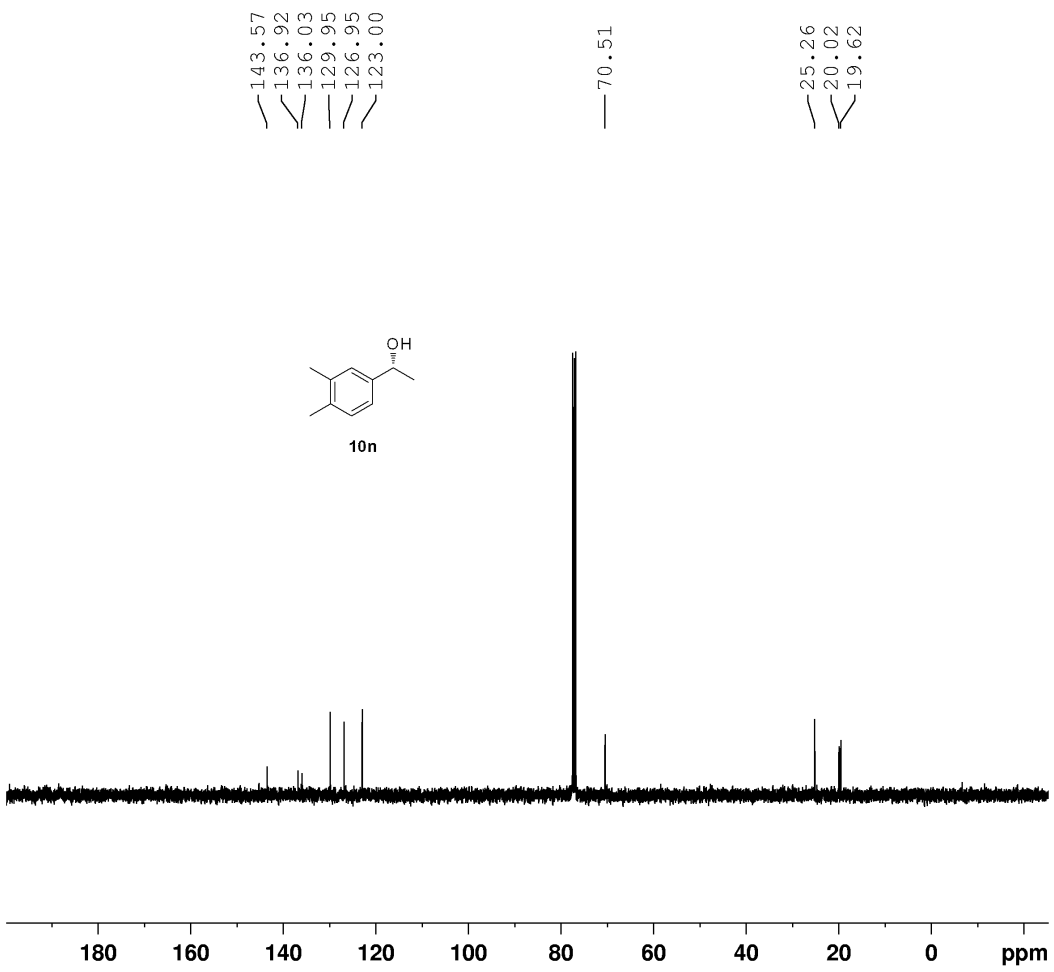
NAME	RXY
EXPNO	664
PROCNO	1
Date_	20140705
Time	23.51
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	13
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300096 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



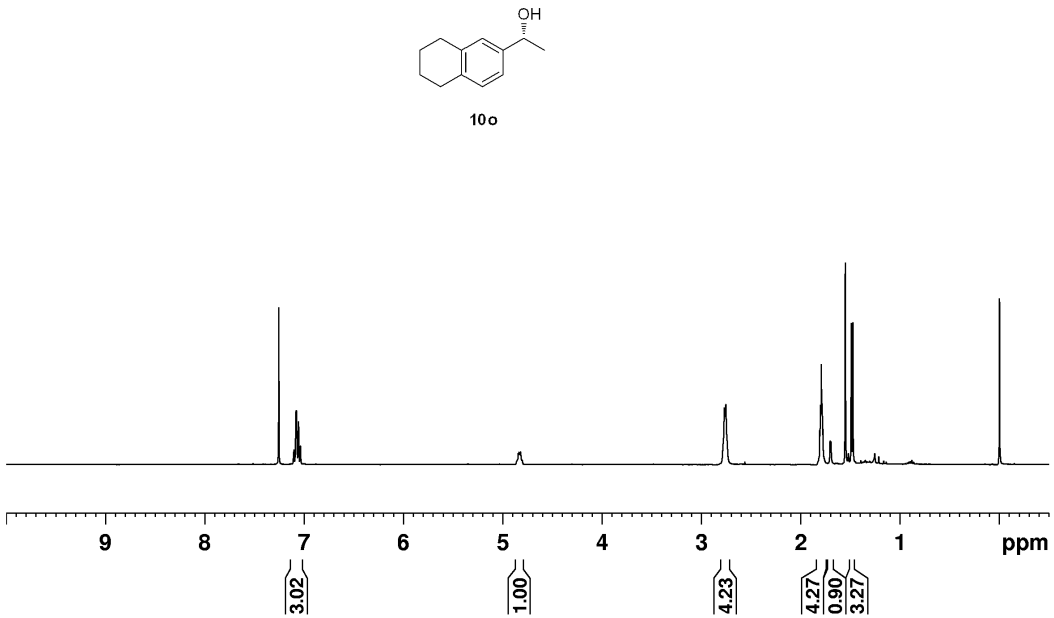
NAME	RXY-C
EXPNO	57
PROCNO	1
Date_	20140706
Time	0.06
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	168
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127472 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



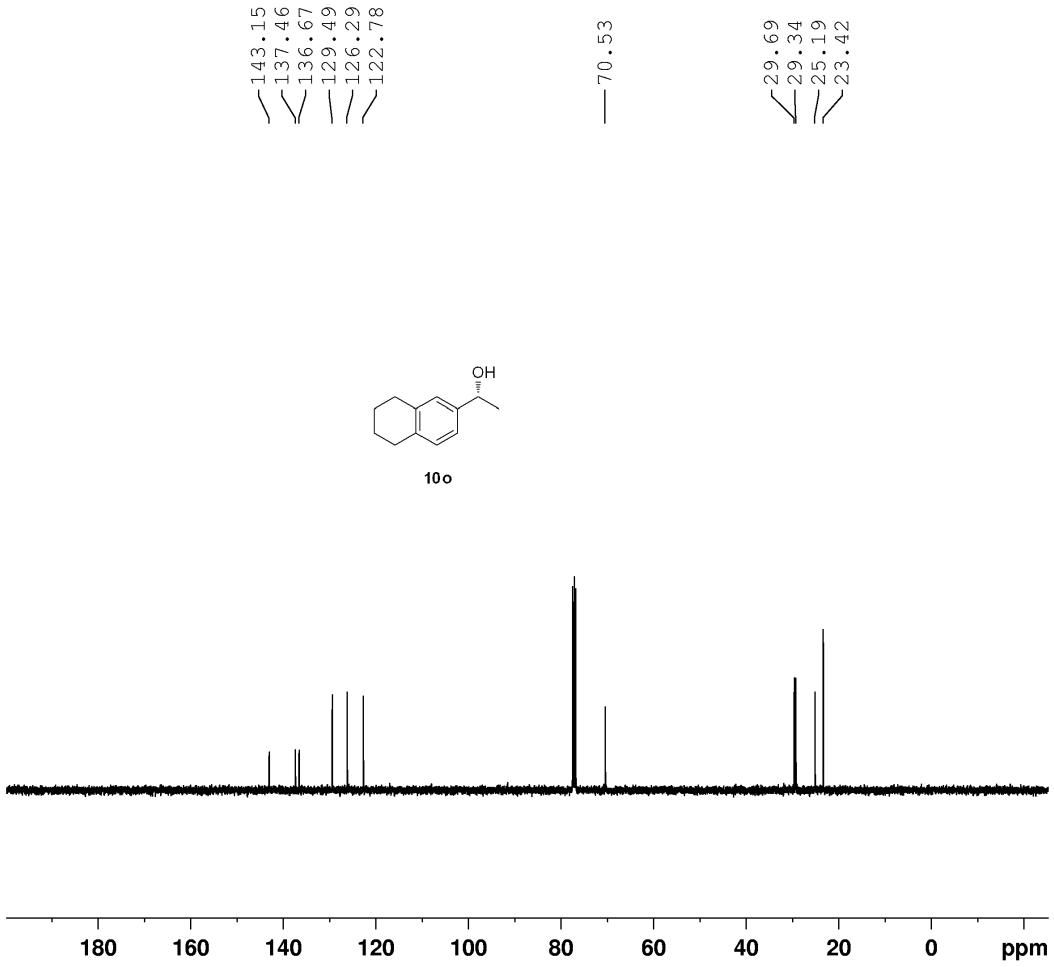
NAME	RXY
EXPNO	710
PROCNO	1
Date_	20140717
Time	11.29
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300121 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



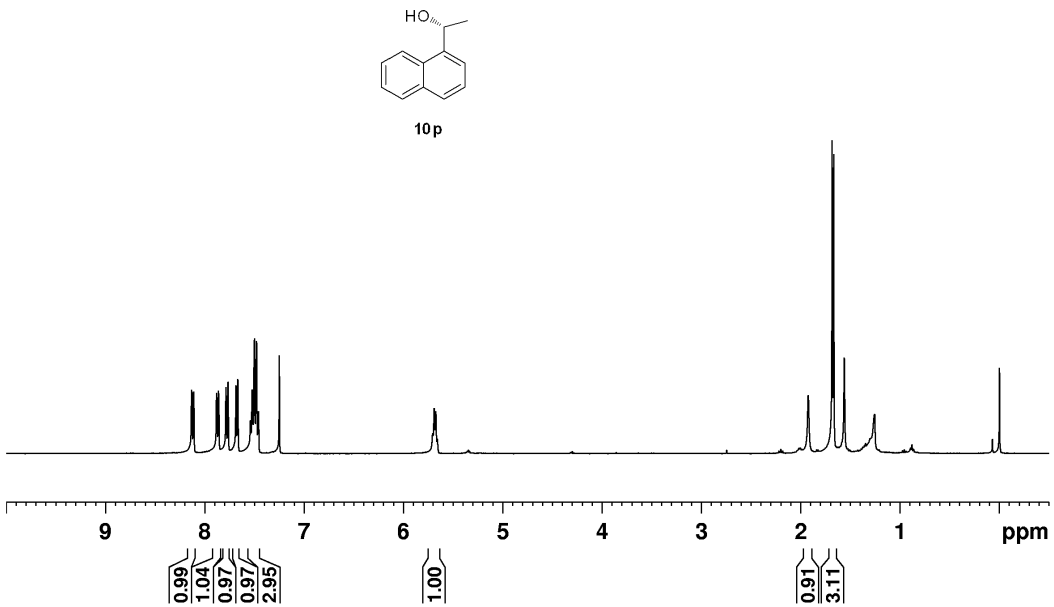
NAME	RXY-C
EXPNO	74
PROCNO	1
Date_	20140717
Time	11.46
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	110
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127475 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



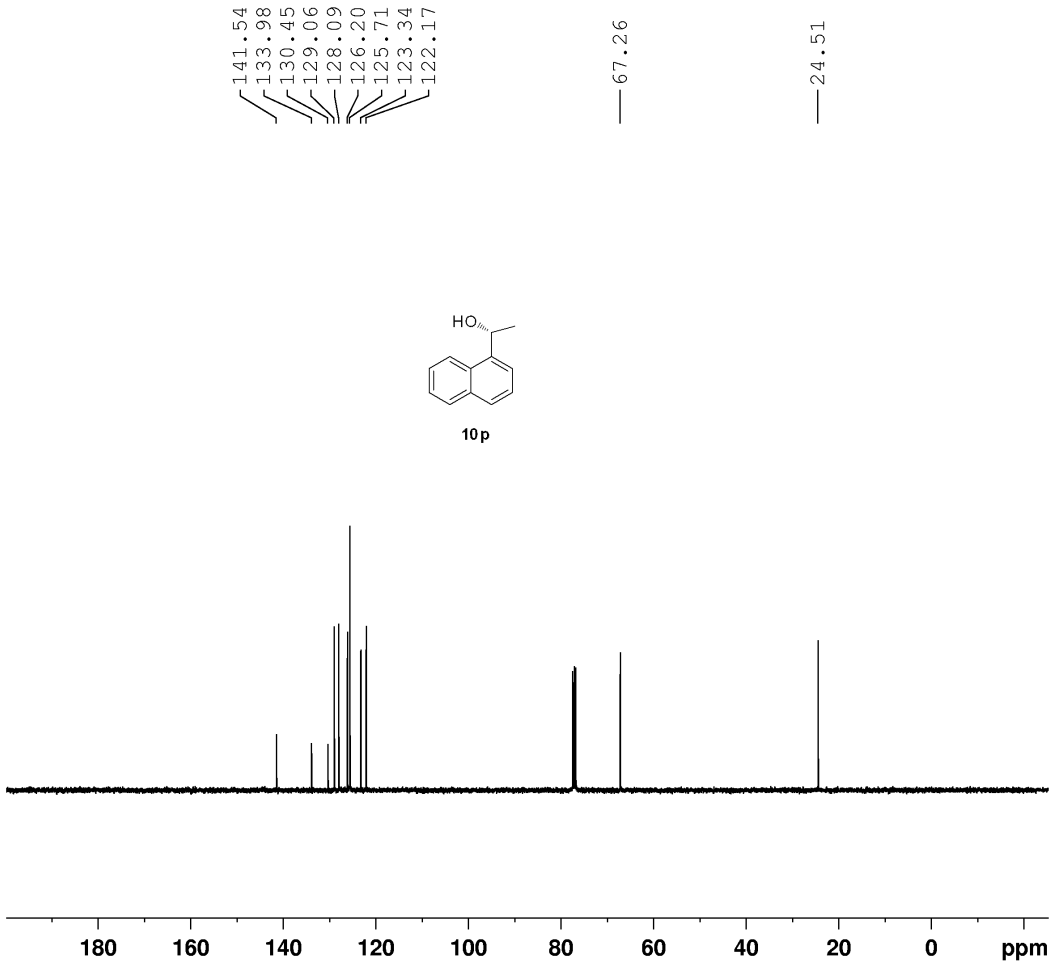
NAME	RXY
EXPNO	717
PROCNO	1
Date_	20140720
Time	4.42
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300105 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



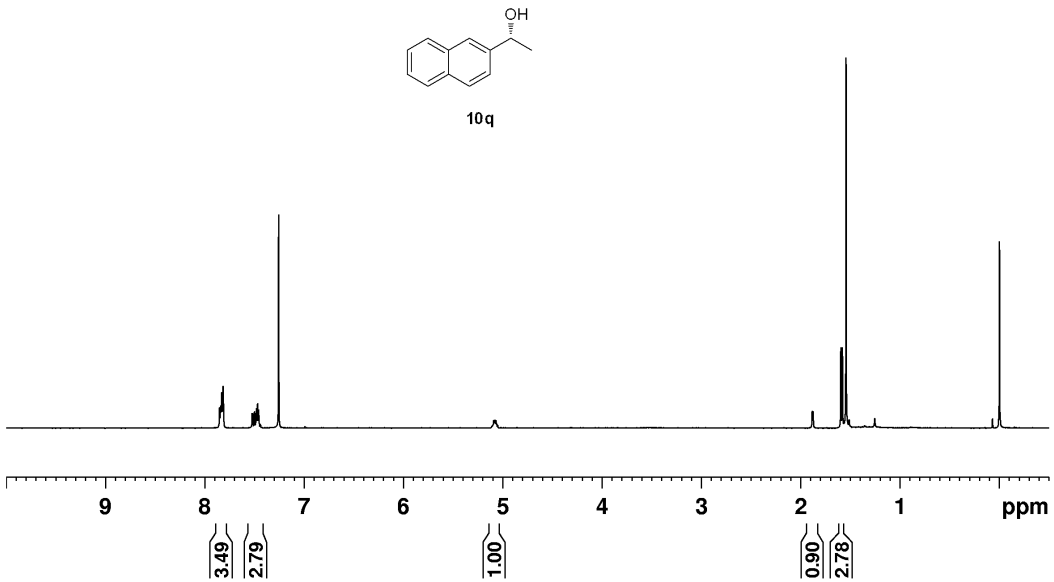
NAME	RXY-C
EXPNO	78
PROCNO	1
Date_	20140719
Time	9.21
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	107
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127495 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



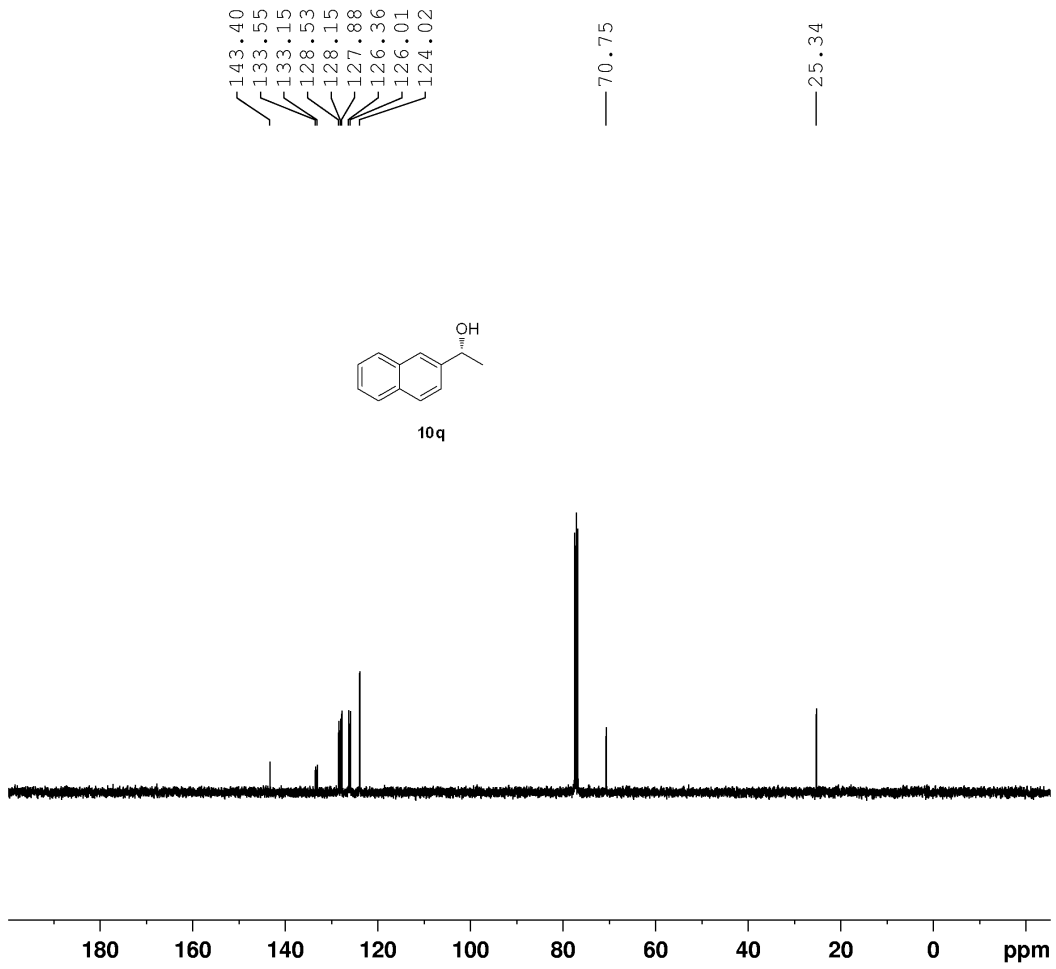
NAME	RXY
EXPNO	698
PROCNO	1
Date_	20140715
Time	4.09
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300123 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



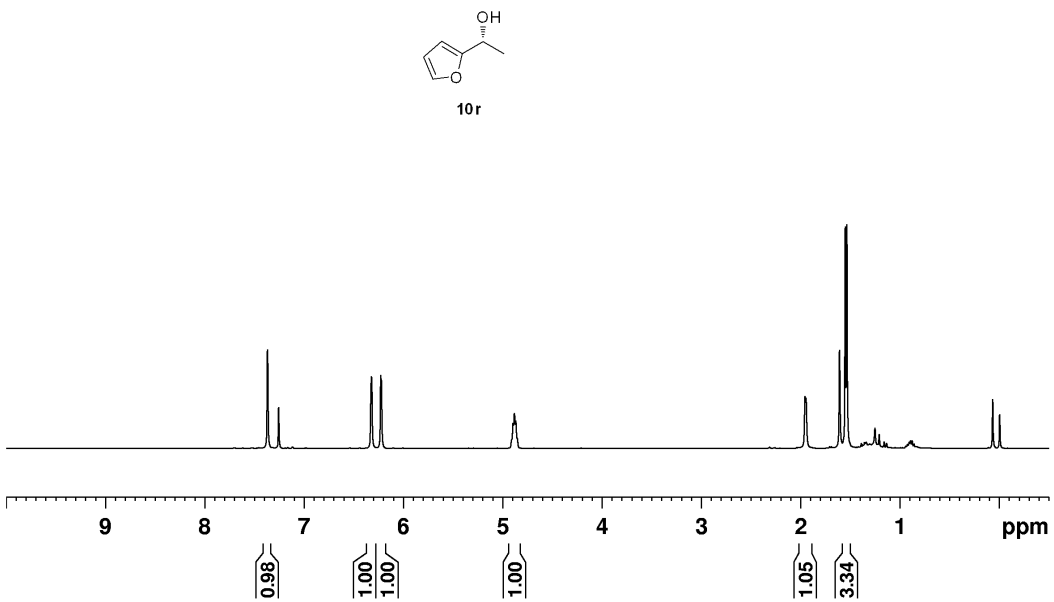
NAME	RXY-C
EXPNO	25
PROCNO	1
Date_	20140523
Time	2.02
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	169
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127541 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



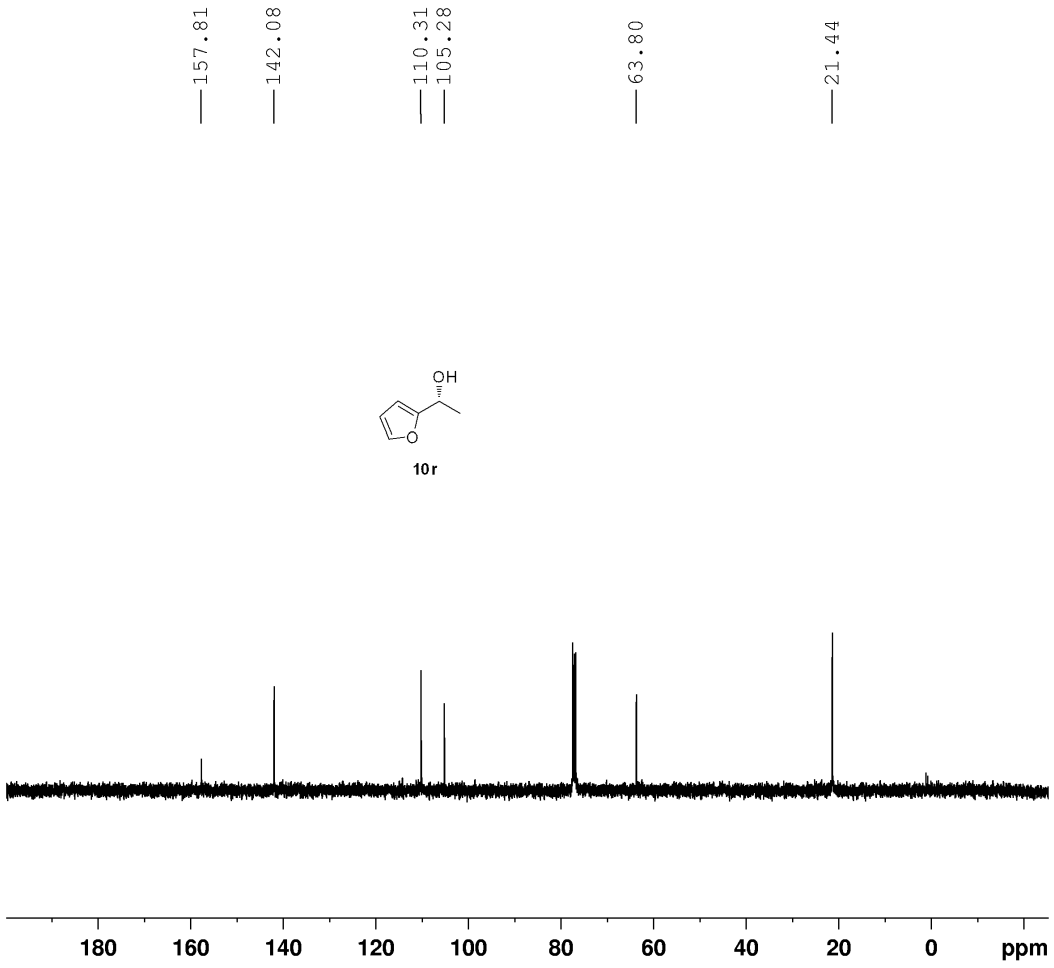
NAME	RXY
EXPNO	699
PROCNO	1
Date_	20140715
Time	4.12
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300101 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



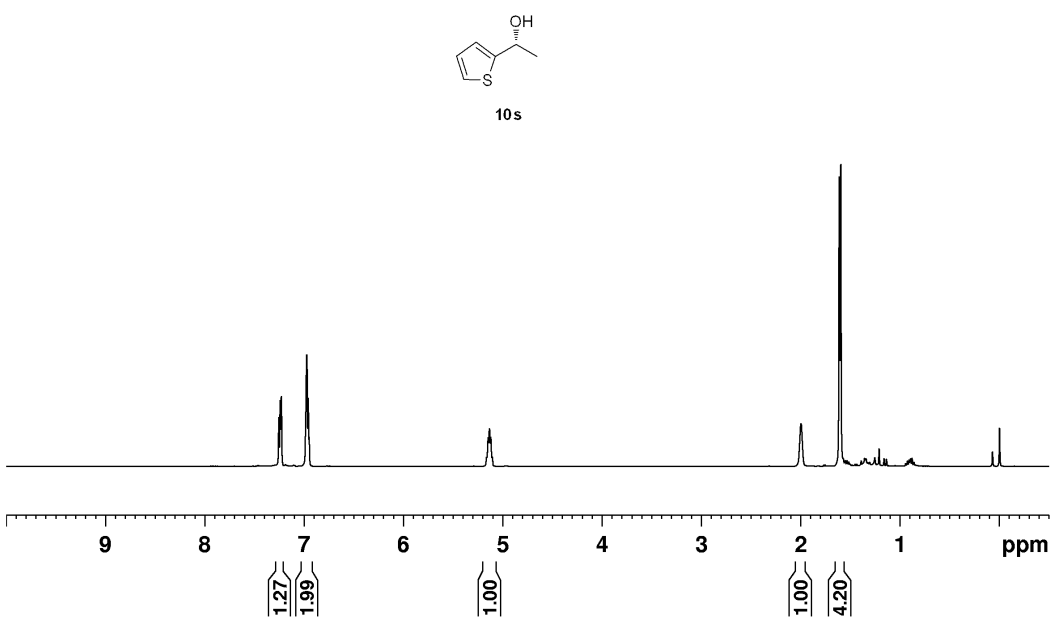
NAME	RXY-C
EXPNO	71
PROCNO	1
Date_	20140715
Time	4.21
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	99
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127487 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



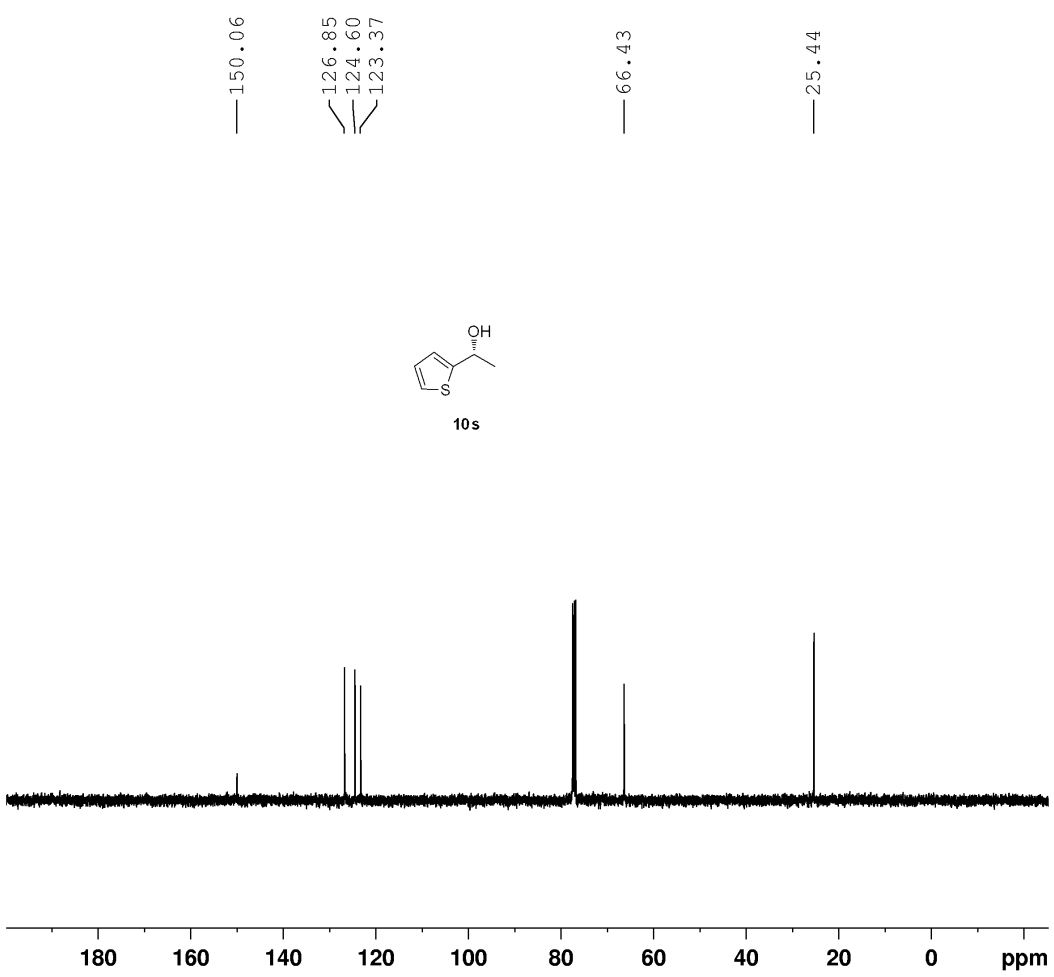
NAME	RXY
EXPNO	920
PROCNO	1
Date_	20140922
Time	8.17
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300097 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



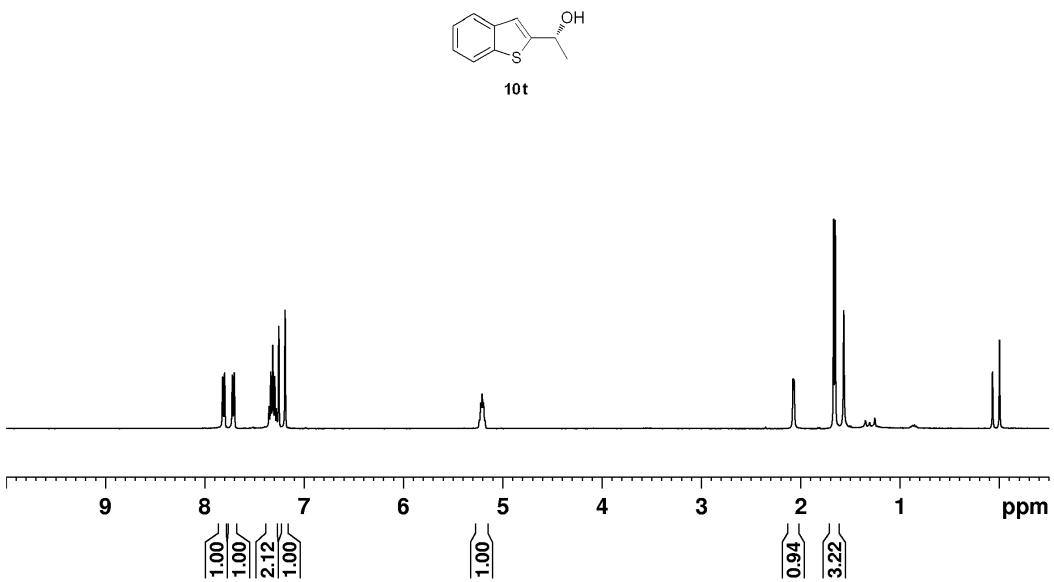
NAME	RXY-C
EXPNO	100
PROCNO	1
Date_	20140922
Time	7.54
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	87
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127498 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



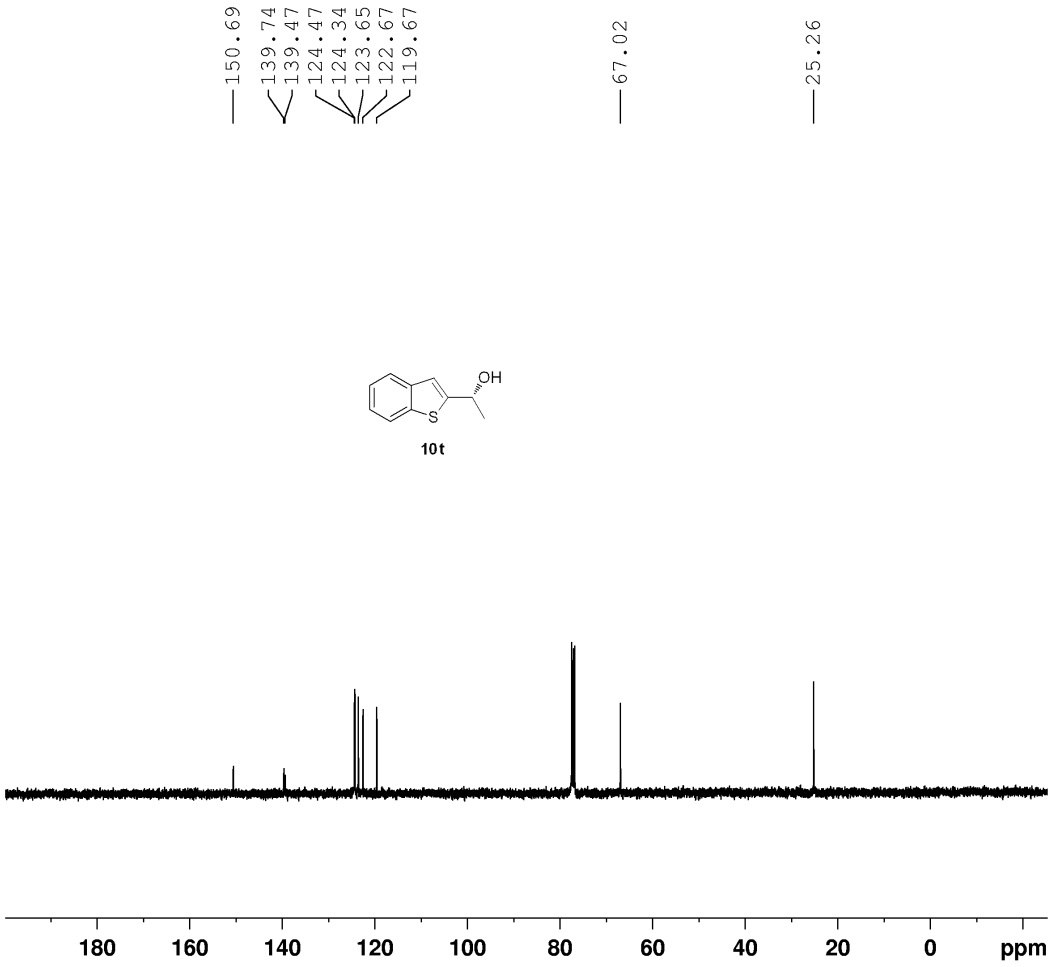
NAME	RXY
EXPNO	919
PROCNO	1
Date_	20140922
Time	8.13
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300103 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



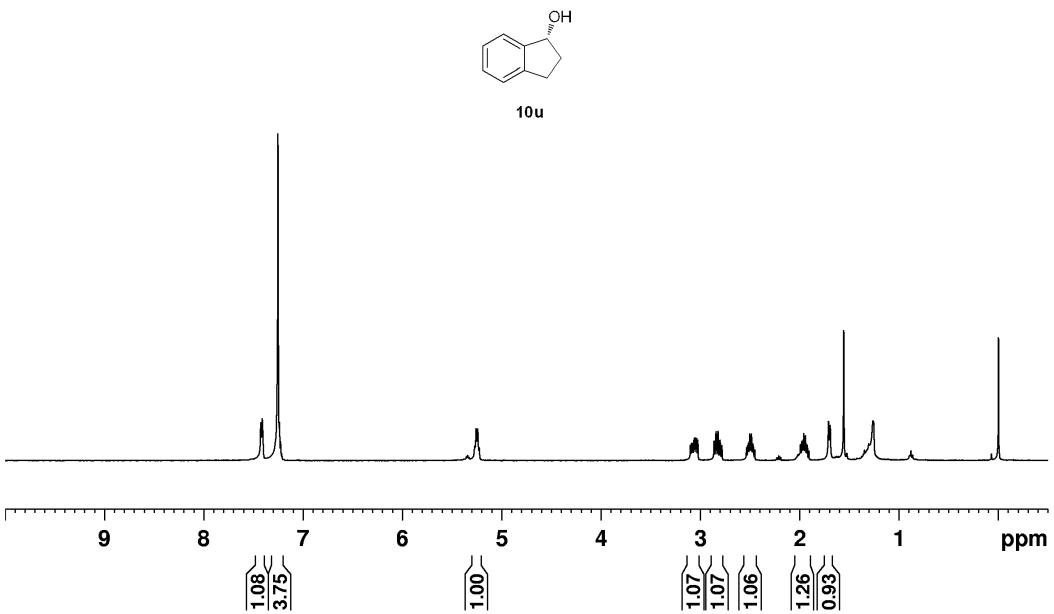
NAME	RXY-C
EXPNO	101
PROCNO	1
Date_	20140922
Time	8.02
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	149
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127505 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



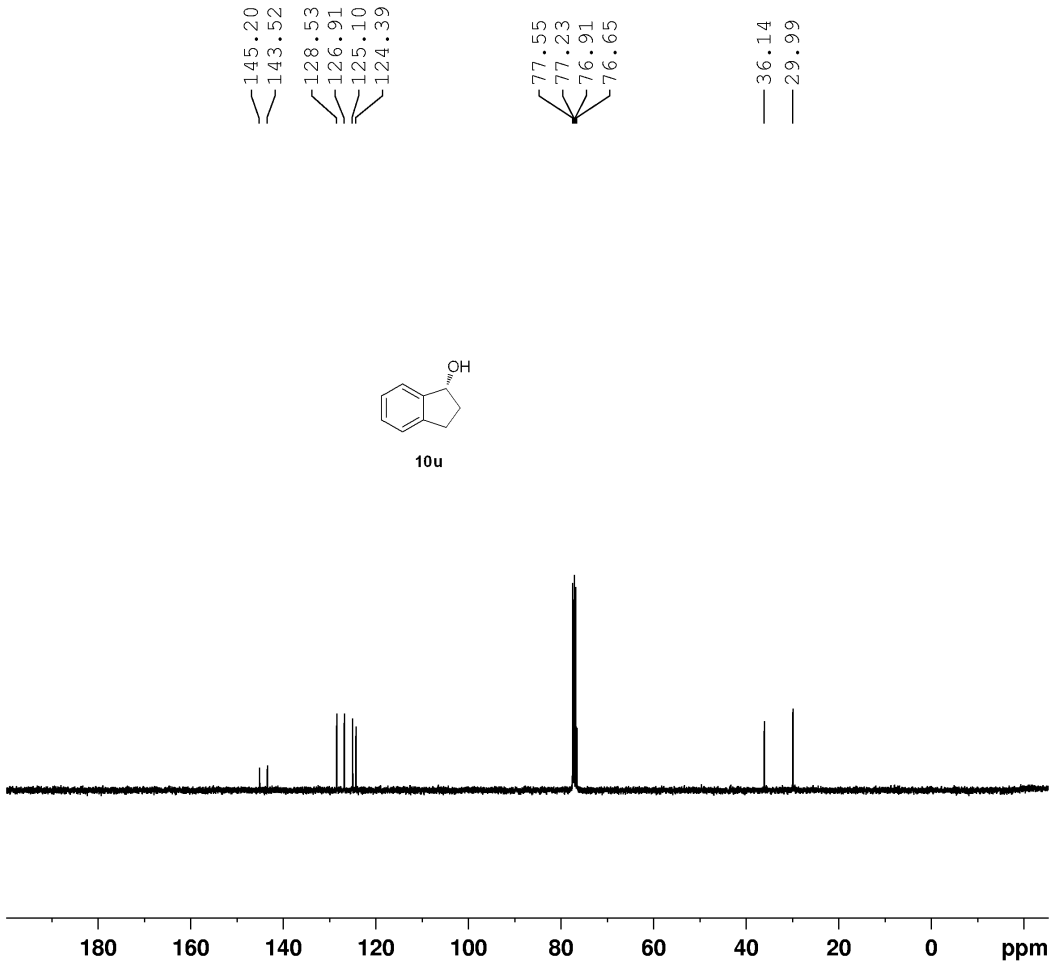
NAME	RXY
EXPNO	992
PROCNO	1
Date_	20141014
Time	1.01
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300103 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



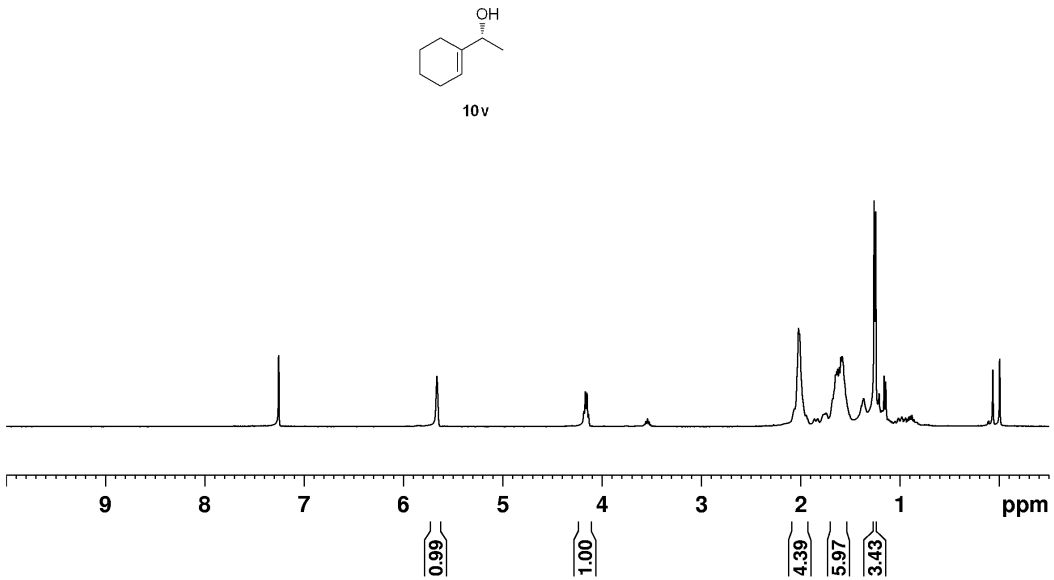
NAME	RXY-C
EXPNO	113
PROCNO	1
Date_	20141014
Time	1.09
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	118
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127522 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



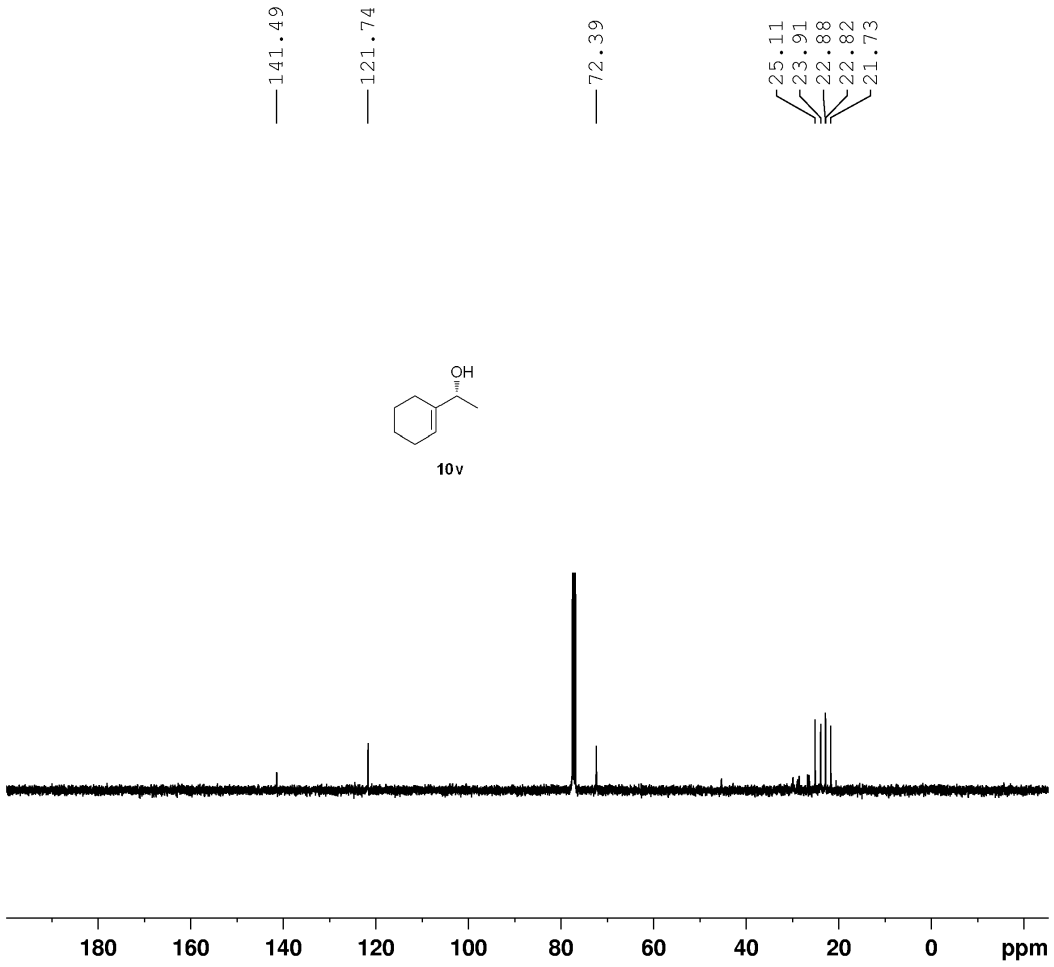
NAME	RXY
EXPNO	705
PROCNO	1
Date_	20140717
Time	0.51
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	9
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300108 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



NAME	RXY-C
EXPNO	72
PROCNO	1
Date_	20140717
Time	3.51
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	341
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127495 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



NAME	RXY
EXPNO	978
PROCNO	1
Date_	20141009
Time	1.09
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300098 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



NAME	RXY-C
EXPNO	110
PROCNO	1
Date_	20141009
Time	1.20
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	277
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127466 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40