Electronic Supplementary Material (ESI) for Dalton Transactions.

$B(C_6F_5)_3$-Catalyzed Metal–Free Hydrogenation of 3,6-Diarylpyridazines

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Supporting Information

General information: 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 $CDCl_3$ and DMSO-d_6 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. Column chromatography was performed on silica gel (200-300 mesh) or on basic alumina (200-300 mesh). All solvents were purified by conventional methods, distilled before use. Commercially available reagents were used without further purification.

Typical procedure for the synthesis of 3,6-disubstituted pyridazines: To an argon flushed glass pressure tube were added $Pd_2(dba)_3$ (0.25 mmol), 2-dicyclohexylphophino-2',6'-dimethoxy-1,1'-biphenyl (S-Phos) (1.0 mmol), 3,6-dichloropyridazine (10 mmol), arylboronic acid (20 mmol), and K_3PO_4 (30 mmol), followed by dry 1,4-dioxane (20 mL). The tube was closed by a teflon screw cap and the reaction mixture was stirred at 100 °C for 36 h. The mixture was then cooled to room temperature and diluted with water (10 mL) and dichloromethane (50 mL). The layers were separated and the aqueous layer was extracted with dichloromethane (50 mL x 2). The combined organic layers were dried with anhydrous sodium sulphate, filtered, and the solvent was evaporated. The residue was purified by column on silica gel using petroleum ether/ dichloromethane as the eluent to afford 3,6-disubstituted pyridazines.
P. Ehlers, A. Petrosyan, T. V. Ghochikyan, A. S. Saghyan, A. Neubauer, S. Lochbrunner and P. Langer, *Synlett*, 2013, **24**, 359.

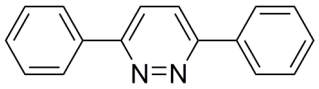
Procedure for the synthesis of pyridazines (1h, 1i, 1t): see the reference: J. Nakayama, T. Konishi, A. Ishii and M. Hoshino, *Bull. Chem. Soc. Jpn.,* 1989, **62**, 2608.

Procedure for the synthesis of pyridazines 1q: A mixture of 4-methoxyacetophenone (10.0 mmol), 1,3-diphenylpropane-1,3-dione (10.0 mmol), iodine (11.0 mmol), and copper oxide (11.0 mmol) in dimethyl sulfoxide (30 mL) was stirred at 70 °C for 12 h until nearly completed conversion of the substrates by TLC analysis and then extracted with ethyl acetate (40 mL x 2). The extract was washed with 10 %

sodium thiosulfate solution (w/w) (50 mL). After drying over anhydrous sodium sulphate and evaporation, hydrazine hydrate (150.0 mmol) was added and the mixture was stirred at reflux in *t*-BuOH (50 mL) for 3 h. After the reaction complete (as monitored by TLC), the solvent was removed under reduce pressure, and water (100 mL) was added to the residue, and then the mixture was extracted with ethyl acetate (50 mL x 3). The extract was dried over anhydrous sodium sulphate and concentrated in vacuo. The crude product was purified by column chromatography on silica gel using petroleum ether/ dichloromethane to afford the product **1q** (1.5739 g, 60% yield).

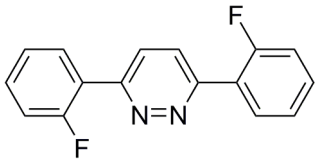
Q.-H. Gao, Y.-P. Zhu, M. Lian, M.-C. Liu, J.-J. Yuan, G.-D. Yin and A.-X. Wu, *J. Org. Chem*., 2012, **77**, 9865.

Representative procedure for hydrogenation of pyridazines (Table 2, entry 1): To a glass test tube (10 mL) was added $B(C_6F_5)_3$ (0.0128 g, 0.025 mmol), 3,6-diphenylpyridazine (**1a**) (0.0581 g, 0.25 mmol) and dry toluene (0.50 mL) in a nitrogen atmosphere glovebox. The tube was then 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 20 bar. The reaction mixture was stirred at 120 °C for 6 h. After cooling to ambient temperature, the solvent was removed under reduced pressure. The crude residue was purified by column chromatography on basic alumina using petroleum ether/dichloromethane as the eluent to afford 3,6-diphenyl-1,4,5,6-tetrahydropyridazine (**2a**) as a light yellow solid 0.0561 g (95% yield).

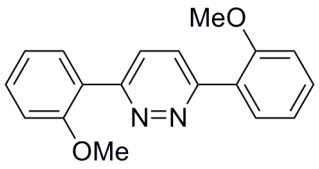


1a, 1.97 g (85 % yield), white solid; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 8.24-8.12 (m, 4H), 7.94 (s, 2H), 7.62-7.47 (m, 6H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 157.8, 136.3, 130.3, 129.3, 127.2, 124.4.

Q.-H. Gao, Y.-P. Zhu, M. Lian, M.-C. Liu, J.-J. Yuan, G.-D. Yin and A.-X. Wu, *J. Org. Chem*., 2012, **77**, 9865.

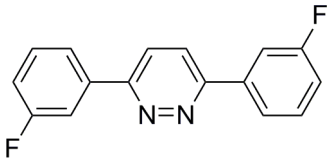


1b, 2.25 g (84 % yield), white solid, m.p. 157-158 ºC; IR (film): 1616, 1573, 1488, 1216 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 8.29 (ddd, J = 8.0, 8.0, 2.0 Hz, 2H), 8.04 (s, 2H), 7.53-7.44 (m, 2H), 7.36 (d, J = 7.6 Hz, 1H), 7.34 (d, J = 7.6 Hz, 1H), 7.24 (d, J = 8.4 Hz, 1H), 7.21 (d, J = 8.4 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 161.1 (d, $J_{C\text{-}F}$ = 249.0 Hz), 154.8 (d, $J_{C\text{-}F}$ = 2.0 Hz), 131.9 (d, $J_{C\text{-}F}$ = 8.0 Hz), 131.1 (d, $J_{C\text{-}F}$ = 2.0 Hz), 127.4 (d, $J_{C\text{-}F}$ = 10.0 Hz), 125.1 (d, $J_{C\text{-}F}$ = 3.0 Hz), 124.5 (d, $J_{C\text{-}F}$ = 11.0 Hz), 116.5 (d, $J_{C\text{-}F}$ = 23.0 Hz); ^{9}F NMR (564 MHz, $CDCl_3$, ppm) δ -117.1; HRMS (ESI) Calcd. for $C_{16}H_{11}N_2F_2$ (M+H): 269.0885, Found: 269.0881.

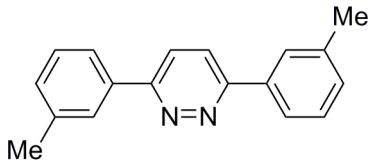


1c, 2.13 g (73 % yield), white solid; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 8.07 (dd, J = 7.6, 2.0 Hz, 2H), 8.03 (s, 2H), 7.49-7.42 (m, 2H), 7.15 (ddd, J = 7.6, 7.6, 2.0 Hz, 2H), 7.05 (d, J = 8.4 Hz, 2H), 3.90 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 157.5, 156.7, 131.5, 131.1, 127.5, 126.3, 121.5, 111.5, 55.8.

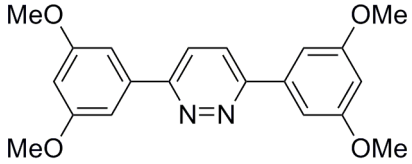
S.-J. Lin, Z.-D. Liu and , Y.-H. Hu, *J. Comb. Chem.,* 2007, **9**, 742.



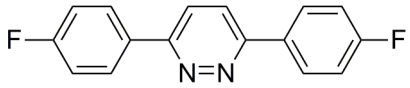
1d, 2.38 g (89 % yield), white solid, m.p. 195-196 ºC; IR (film): 1588, 1507, 1442 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 7.94 (s, 2H), 7.92 (d, J = 7.6 Hz, 4H), 7.56-7.47 (m, 2H), 7.25-7.17 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 163.6 (d, $J_{C\text{-}F}$ = 245.0 Hz), 157.1 (d, $J_{C\text{-}F}$ = 3.0 Hz), 138.4 (d, $J_{C\text{-}F}$ = 8.0 Hz), 130.9 (d, $J_{C\text{-}F}$ = 8.0 Hz), 124.5, 122.8 (d, $J_{C\text{-}F}$ = 2.0 Hz), 117.3 (d, $J_{C\text{-}F}$ = 21.0 Hz), 114.2 (d, $J_{C\text{-}F}$ = 23.0 Hz); ^{19}F NMR (564 MHz, $CDCl_3$, ppm) δ -111.9; HRMS (ESI) Calcd. for $C_{16}H_{11}N_2F_2$ (M+H): 269.0885, Found: 269.0882.



1e, 2.21 g (85 % yield), white solid, m.p. 134-136 ºC; IR (film): 1602, 1588, 1409 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 8.02 (s, 2H), 7.92 (d, *J* = 7.2 Hz, 2H), 7.91 (s, 2H), 7.43 (dd, *J* = 7.6, 7.6 Hz, 2H), 7.32 (d, *J* = 7.6 Hz, 2H), 2.48 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 157.9, 139.0, 136.3, 131.0, 129.1, 127.9, 124.4, 124.2, 21.8; HRMS (ESI) Calcd. for $C_{18}H_{17}N_2$ (M+H): 261.1386, Found: 261.1383.

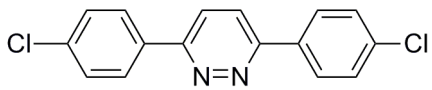


1f, 2.81 g (80 % yield), white solid, m.p. 158-160 ºC; IR (film): 1595, 1457, 1428 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 7.91 (s, 2H), 7.35 (d, *J* = 2.0 Hz, 4H), 6.63-6.59 (m, 2H), 3.90 (s, 12H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 161.5, 157.6, 138.1, 124.5, 105.2, 102.7, 55.8; HRMS (ESI) Calcd. for $C_{20}H_{21}O_4N_2$ (M+H): 353.1496, Found: 353.1491.



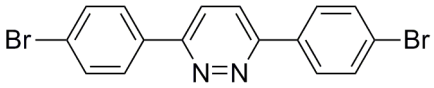
1g, 2.41 g (90 % yield), white solid; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 8.21-8.12 (m, 4H), 7.89 (s, 2H), 7.26-7.19 (m, 4H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 164.5 (d, $J_{C\text{-}F}$ = 249.0 Hz), 156.9, 132.4 (d, $J_{C\text{-}F}$ = 3.0 Hz), 129.1 (d, $J_{C\text{-}F}$ = 9.0 Hz), 124.2, 116.4 (d, $J_{C\text{-}F}$ = 21.0 Hz); ^{19}F NMR (564 MHz, $CDCl_3$, ppm) δ -111.0.

R. Singht and A. S. Hay, *Macromolecules*, 1992, **25**, 1025.



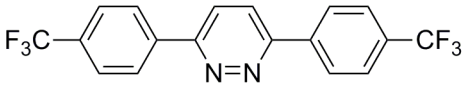
1h, 1.50 g (50 % yield), light yellow solid; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 8.11 (d, *J* = 8.0 Hz, 4H), 7.91 (s, 2H), 7.53 (d, *J* = 8.0 Hz, 4H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 157.0, 136.8, 134.6, 129.6, 128.4, 124.2.

J. Nakayama, T. Konishi, A.Ishii and M. Hoshino, *Bull. Chem. Soc. Jpn.,* 1989, **62**, 2608.

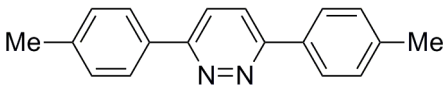


1i, 1.87 g (48 % yield), light yellow solid; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 8.04 (d, J = 8.8 Hz, 4H), 7.91 (s, 2H), 7.69 (d, J = 8.8 Hz, 4H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 157.1, 135.1, 132.6, 128.7, 125.2, 124.2.

J. Nakayama, T. Konishi, A.Ishii and M. Hoshino, *Bull. Chem. Soc. Jpn.,* 1989, **62**, 2608.

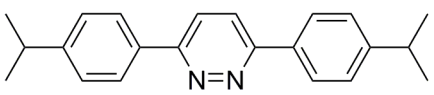


1j, 3.31 g (90 % yield), white solid, m.p. >250 ºC; IR (film): 1616, 1589, 1329 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 8.30 (d, J = 8.0 Hz, 4H), 8.03 (s, 2H), 7.83 (d, J = 8.0 Hz, 4H); ^{13}C NMR (100 MHz, DMSO-d_6, ppm): δ 156.5, 139.5, 130.2 (q, $J_{C\text{-}F}$ = 31.0 Hz), 127.7, 126.8 (q, $J_{C\text{-}F}$ = 271.0 Hz), 125.9 (q, $J_{C\text{-}F}$ = 3.7 Hz), 125.6; ^{19}F NMR (564 MHz, $CDCl_3$, ppm) δ -62.8; HRMS (ESI) Calcd. for $C_{18}H_{11}N_2F_6$ (M+H): 369.0821, Found: 369.0815.



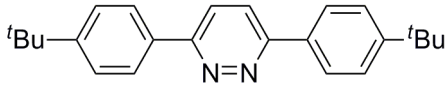
1k, 2.31 g (89 % yield), light yellow solid; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 8.05 (d, J = 8.0 Hz, 4H), 7.87 (s, 2H), 7.34 (d, J = 7.6 Hz, 4H), 2.44 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 157.5, 140.3, 133.6, 130.0, 126.9, 124.0, 21.6.

J. Nakayama, T. Konishi, A.Ishii and M. Hoshino, *Bull. Chem. Soc. Jpn.,* 1989, **62**, 2608.



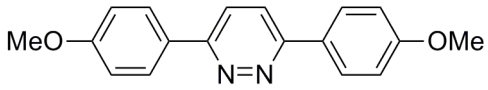
1l, 2.65 g (84 % yield), light yellow solid, m.p. 229-231 ºC; IR (film): 1609, 1585, 1428 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 8.09 (d, J = 8.0 Hz, 4H), 7.88 (s, 2H), 7.40 (d, J = 8.0 Hz, 4H), 3.00 (hept, J =

7.2 Hz, 2H), 1.31 (d, J = 7.2 Hz, 12H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 157.6, 151.3, 134.0, 127.4, 127.1, 124.1, 34.2, 24.1; HRMS (ESI) Calcd. for $C_{22}H_{25}N_2$ (M+H): 317.2012, Found: 317.2008.



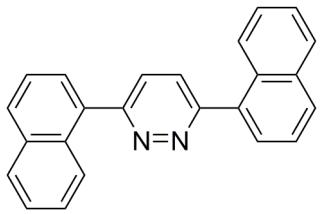
1m, 2.92 g (85 % yield), white solid; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 8.10 (d, J = 8.4 Hz, 4H), 7.89 (s, 2H), 7.56 (d, J = 8.4 Hz, 4H), 1.38 (s, 18H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 157.5, 153.5, 133.5, 126.8, 126.2, 124.1, 35.0, 31.5.

S.-J. Lin, Z.-D. Liu and , Y.-H. Hu, *J. Comb. Chem.*, 2007, **9**, 742.

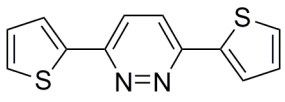


1n, 2.33 g (80 % yield), light yellow solid; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 8.12 (d, J = 8.8 Hz, 4H), 7.83 (s, 2H), 7.06 (d, J = 8.8 Hz, 4H), 3.89 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 161.4, 156.9, 129.0, 128.4, 123.6, 114.7, 55.6.

J. Nakayama, T. Konishi, A.Ishii and M. Hoshino, *Bull. Chem. Soc. Jpn.,*1989, **62**, 2608.

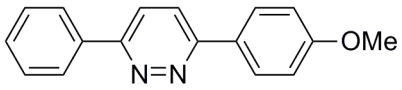


1o, 2.99 g (90 % yield), white solid, m.p. 199-201 ºC; IR (film): 1593, 1536, 1508 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 8.28-8.17 (m, 2H), 8.22 (d, J = 8.0 Hz, 2H), 8.01-7.96 (m, 2H), 7.91 (s, 2H), 7.82 (d, J = 6.8 Hz, 2H), 7.66 (dd, J = 7.6, 7.6 Hz, 2H), 7.62-7.50 (m, 4H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 160.0, 135.4, 134.2, 131.3, 130.2, 128.8, 128.6, 128.3, 127.2, 126.5, 125.6, 125.5; HRMS (ESI) Calcd. for $C_{24}H_{17}N_2$ (M+H): 333.1386, Found: 333.1381.



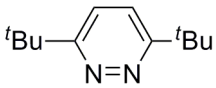
1p, 1.90 g (78 % yield), yellow solid; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 7.75 (s, 2H), 7.66 (d, *J* = 2.8 Hz, 2H), 7.49 (d, *J* = 4.8 Hz, 2H), 7.16 (dd, *J* = 4.8, 2.8 Hz, 2H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 153.6, 140.9, 129.4, 128.3, 126.2, 122.7.

J. Nakayama, T. Konishi, A.Ishii and M. Hoshino, *Bull. Chem. Soc. Jpn.* 1989, **62**, 2608.



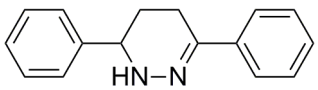
1q, 1.57 g (60 % yield), gray solid; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 8.22-8.09 (m, 4H), 7.95-7.84 (m, 2H), 7.61-7.46 (m, 3H), 7.06 (d, *J* = 8.8 Hz, 2H), 3.89 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 161.6, 157.4, 157.3, 136.5, 130.1, 129.2, 128.8, 128.5, 127.0, 124.3, 123.7, 114.7, 55.6.

Q.-H. Gao, Y.-P. Zhu, M. Lian, M.-C. Liu, J.-J. Yuan, G.-D. Yin and A.-X. Wu, *J. Org. Chem*., 2012, **77**, 9865.



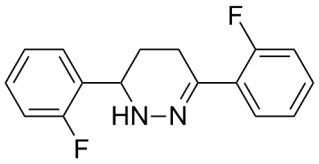
1t, 0.86 g, (45 % yield), white solid; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 7.44 (s, 2H), 1.55 (s, 18H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 167.8, 123.4, 36.7, 30.2.

J. Nakayama, T. Konishi, A.Ishii and M. Hoshino, *Bull. Chem. Soc. Jpn.* 1989, **62**, 2608.

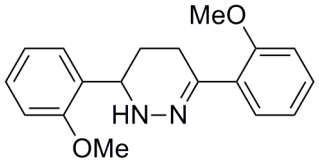


2a, 0.0561 g (95 % yield), white solid; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 7.69 (d, *J* = 7.2 Hz, 2H), 7.46-7.21 (m, 8H), 5.82 (s, 1H), 4.18 (d, *J* = 8.4 Hz, 1H), 2.86-2.74 (m, 1H), 2.74-2.59 (m, 1H), 2.29-2.08 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 143.4, 142.3, 138.8, 128.9, 128.5, 128.1, 128.0, 127.2, 124.7, 56.6, 28.8, 23.7.

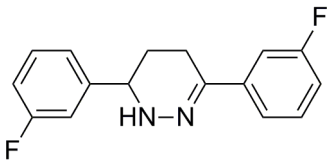
Z.-I. Yoshida, T. Harada and Y. Tamaru, *Tetrahedron Lett.*, 1976, **42**, 3823.



2b, 0.0613 g (90 % yield), yellow solid, m.p. 112-114 ºC; IR (film): 3287, 1491, 1457, 1234 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 7.62 (ddd, *J* = 8.0, 8.0, 1.6 Hz, 1H), 7.50 (ddd, *J* = 7.6, 7.6, 1.2 Hz, 1H), 7.34-7.22 (m, 2H), 7.21-7.11 (m, 2H), 7.11-7.00 (m, 2H), 5.86 (s, 1H), 4.61 (dd, *J* = 9.2, 2.4 Hz, 1H), 2.96-2.83 (m, 1H), 2.68-2.58 (m, 1H), 2.29-2.19 (m, 1H), 2.19-2.07 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 160.7 (d, J_{C-F} = 247.0 Hz), 160.6 (d, J_{C-F} = 244.0 Hz), 142.3 (d, J_{C-F} = 3.0 Hz), 129.5 (d, J_{C-F} = 8.0 Hz), 129.3 (d, J_{C-F} = 9.0 Hz), 129.1 (d, J_{C-F} = 4.0 Hz), 128.1 (d, J_{C-F} = 4.0 Hz), 127.3 (d, J_{C-F} = 12.0 Hz) , 124.7 (d, J_{C-F} = 3.0Hz), 124.3 (d, J_{C-F} = 3.0 Hz), 116.3 (d, J_{C-F} = 22.0 Hz), 115.7 (d, J_{C-F} = 21.0 Hz), 49.2 (d, J_{C-F} = 2.0 Hz), 26.8, 26.0 (d, J_{C-F} = 7.0 Hz); ^{19}F NMR (564 MHz, $CDCl_3$, ppm) δ -115.0, -119.8; HRMS (ESI) Calcd. for $C_{16}H_{15}N_2F_2$ (M+H): 273.1198, Found: 273.1195.

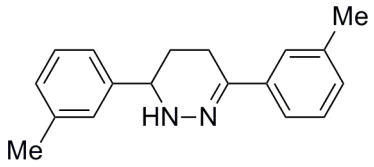


2c, 0.0629 g (85 % yield), light yellow solid, m.p. 172-174 ºC; IR (film): 3292, 1614, 1260 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 7.46 (d, *J* = 7.6 Hz, 1H), 7.40 (dd, *J* = 7.6, 1.6 Hz, 1H), 7.28-7.21 (m, 2H), 7.02-6.93 (m, 2H), 6.93-6.86 (m, 2H), 5.77 (s, 1H), 4.59 (d, *J* = 7.2 Hz, 1H), 3.84 (s, 3H), 3.83 (s, 3H), 2.96-2.82 (m, 1H), 2.62-2.53 (m, 1H), 2.21-2.12 (m, 1H), 2.12-2.02 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 157.5, 157.1, 146.9, 130.4, 129.7, 129.5, 129.2, 128.6, 127.2, 121.1, 121.0, 111.3, 110.5, 55.7, 55.6, 49.6, 26.8, 26.4; HRMS (ESI) Calcd. for $C_{18}H_{21}O_2N_2$ (M+H): 297.1595, Found: 297.1598.

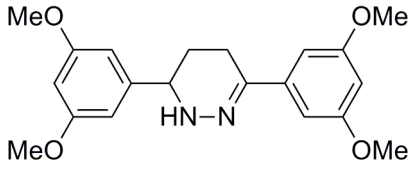


2d, 0.0593 g (87 % yield), white solid, m.p. 130-132 ºC; IR (film): 3300, 1614, 1582, 1448, 1272 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 7.47-7.37 (m, 2H), 7.37-7.27 (m, 2H), 7.17 (d, *J* = 7.6 Hz, 1H), 7.12

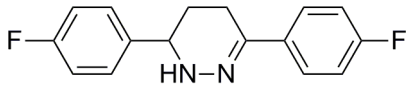
(d, J = 9.6 Hz, 1H), 7.07-6.94 (m, 2H), 5.88 (s, 1H), 4.18 (d, J = 8.0 Hz, 1H), 2.82-2.67 (m, 1H), 2.67-2.57 (m, 1H), 2.28-2.17 (m, 1H), 2.17-2.07 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 163.28 (d, J_{C-F} = 246.0 Hz), 163.26 (d, J_{C-F} = 242.0 Hz), 144.7 (d, J_{C-F} = 7.0 Hz), 141.8 (d, J_{C-F} = 1.3 Hz), 141.0 (d, J_{C-F} = 7.0 Hz), 130.5 (d, J_{C-F} = 9.0 Hz), 129.8 (d, J_{C-F} = 8.0 Hz), 122.7 (d, J_{C-F} = 1.6 Hz) , 120.2 (d, J_{C-F} = 1.5 Hz), 115.0 (d, J_{C-F} = 21.0 Hz), 114.8 (d, J_{C-F} = 22.0 Hz), 114.0 (d, J_{C-F} = 22.0 Hz), 111.5 (d, J_{C-F} = 23.0 Hz), 56.0, 28.5, 23.2; ^{19}F NMR (564 MHz, $CDCl_3$, ppm) δ -112.5, -113.5; HRMS (ESI) Calcd. for $C_{16}H_{15}N_2F_2$ (M+H): 273.1198, Found: 273.1193.



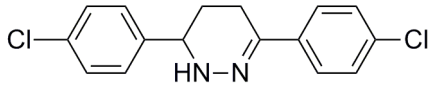
2e, 0.0627 g (95 % yield), white solid, m.p. 106-108 ºC; IR (film): 3350, 1682, 1254, cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 7.53 (s, 1H), 7.46 (d, J = 7.6 Hz, 1H), 7.32-7.17 (m, 4H), 7.17-7.07 (m, 2H), 5.78 (s, 1H), 4.59 (dd, J = 10.0, 3.2 Hz, 1H), 2.86-2.73 (m, 1H), 2.73-2.62 (m, 1H), 2.37 (s, 6H), 2.25-2.07 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 143.7, 142.3, 138.8, 138.6, 138.0, 128.81, 128.79, 128.4, 127.9, 125.4, 124.3, 121.9, 56.6, 28.8, 23.8, 21.7, 21.6; HRMS (ESI) Calcd. for $C_{18}H_{21}N_2$ (M+H): 265.1699, Found: 265.1696.



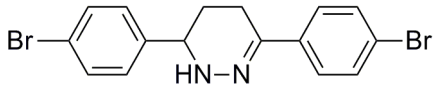
2f, 0.0837 g (94 % yield), white solid, m.p. 156-157 ºC; IR (film): 3355, 1596, 1457, 1205, 1153 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 6.86 (s, 2H), 6.57 (s, 2H), 6.42 (s, 2H), 5.82 (s, 1H), 4.09 (d, J = 8.8 Hz, 1H), 3.82 (s, 6H), 3.80 (s, 6H), 2.83-2.69 (m, 1H), 2.69-2.58 (m, 1H), 2.26-2.16 (m, 1H), 2.16-2.06 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 161.2, 160.9, 144.7, 142.9, 140.9, 105.0, 102.8, 100.4, 100.0, 56.7, 55.5, 28.7, 23.7; HRMS (ESI) Calcd. for $C_{20}H_{25}O_4N_2$ (M+H): 357.1809, Found: 357.1804.



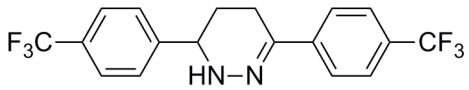
2g, 0.0646 g (95 % yield), white solid, m.p. 194-196 ºC; IR (film): 3293, 1730, 1508 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 7.64 (dd, *J* = 5.6, 5.6 Hz, 2H), 7.35 (dd, *J* = 5.6, 5.6 Hz, 2H), 7.06-6,95 (m, 4H), 5.72 (s, 1H), 4.10 (dd, *J* = 10.4, 2.4 Hz, 1H), 2.82-2.68 (m, 1H), 2.68-2.58 (m, 1H), 2.25-2.04 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 163.2 (d, J_{C-F} = 246.0 Hz), 162.6 (d, J_{C-F} = 244.0 Hz), 142.6, 137.9 (d, J_{C-F} = 3.0 Hz), 134.9 (d, J_{C-F} = 3.0 Hz), 128.8 (d, J_{C-F} = 8.0 Hz), 126.4 (d, J_{C-F} = 8.0 Hz), 115.8 (d, J_{C-F} = 21.0 Hz), 115.3 (d, J_{C-F} = 22.0 Hz), 55.9, 28.9, 23.7; ^{19}F NMR (564 MHz, $CDCl_3$, ppm) δ -114.39, -114.42; HRMS (ESI) Calcd. for $C_{16}H_{15}N_2F_2$ (M+H): 273.1198, Found: 273.1195.



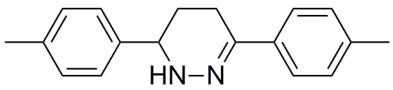
2h, 0.0710 g (93 % yield), light brown solid, m.p. 237-239 ºC; IR (film): 3302, 1682, 1591, 1265 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 7.61 (d, *J* = 8.4 Hz, 2H), 7.43-7.25 (m, 6H), 5.80 (s, 1H), 4.13 (d, *J* = 8.8 Hz, 1H), 2.83-2.64 (m, 1H), 2.64-2.48 (m, 1H), 2.21-2.18 (m, 1H), 2.18-2.02 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 142.2, 140.6, 137.1, 133.9, 129.2, 128.6, 128.5, 125.9, 55.9, 28.6, 23.3; HRMS (ESI) Calcd. for $C_{16}H_{15}N_2Cl_2$ (M+H): 305.0607, Found: 305.0602.



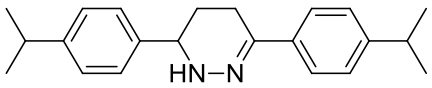
2i, 0.0886 g (90 % yield), light brown solid, m.p. >250 ºC; IR (film): 3288, 1615, 1486 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$, ppm): δ 7.58-7.43 (m, 6H), 7.27 (d, *J* = 7.2 Hz, 2H), 5.81 (s, 1H), 4.12 (dd, *J* = 10.4, 2.8 Hz, 1H), 2.79-2.68 (m, 1H), 2.67-2.57 (m, 1H), 2.25-2.18 (m, 1H), 2.18-2.07 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 142.2, 141.1, 137.5, 132.4, 131.6, 128.9, 126.2, 122.2, 122.0, 55.9, 28.5, 23.2; HRMS (ESI) Calcd. for $C_{16}H_{15}N_2Br_2$ (M+H): 392.9597, Found: 392.9597.



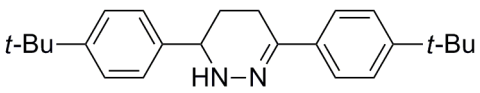
2j, 0.0865 g (93 % yield), yellow solid, m.p. 215-217 ºC; IR (film): 3297, 1602, 1327, 1115, 1070 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, ppm): δ 7.78 (d, *J* = 8.4 Hz, 2H), 7.65 (d, *J* = 8.4 Hz, 2H), 7.60 (d, *J* = 8.4 Hz, 2H), 7.52 (d, *J* = 8.0 Hz, 2H), 6.00 (s, 1H), 4.28 (dd, *J* = 10.0, 2.8 Hz, 1H), 2.85-2.74 (m, 1H), 2.71-2.61 (m, 1H), 2.32-2.22 (m, 1H), 2.22-2.10 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 146.0, 141.8, 141.5, 130.2 (q, J_{C-F} = 32.0 Hz), 127.5, 127.2 (q, J_{C-F} = 271.2 Hz), 127.0 (q, J_{C-F} = 271.5 Hz), 126.0 (q, J_{C-F} = 3.5 Hz), 125.5 (q, J_{C-F} = 3.5 Hz), 124.8, 56.0, 28.4, 23.0; ^{19}F NMR (564 MHz, $CDCl_3$, ppm) δ -62.5, -62.6; HRMS (ESI) Calcd. for $C_{18}H_{15}N_2F_6$ (M+H): 373.1134, Found: 373.1129.



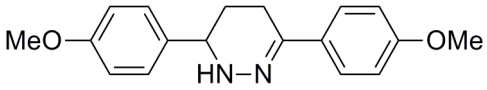
2k, 0.0627 g (95 % yield), white solid, m.p. 225-227 ºC; IR (film): 3289, 1514, 1106 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, ppm): δ 7.57 (d, *J* = 8.0 Hz, 2H), 7.29 (d, *J* = 8.0 Hz, 2H), 7.18 (d, *J* = 8.8 Hz, 2H), 7.16 (d, *J* = 8.4 Hz, 2H), 5.73 (s, 1H), 4.10 (dd, *J* = 10.0, 3.6 Hz, 1H), 2.83-2.72 (m, 1H), 2.71-2.61 (m, 1H), 2.36 (s, 6H), 2.22-2.08 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 143.7, 139.3, 137.8, 137.7, 136.1, 129.6, 129.2, 127.1, 124.6, 56.4, 28.8, 23.8, 21.4, 21.3; HRMS (ESI) Calcd. for $C_{18}H_{21}N_2$ (M+H): 265.1699, Found: 265.1698.



2l, 0.0753 g (94 % yield), light gray solid, m.p. 198-200 ºC; IR (film): 3293, 1506, 1361 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, ppm): δ 7.61 (d, *J* = 8.0 Hz, 2H), 7.33 (d, *J* = 7.6 Hz, 2H), 7.23 (d, *J* = 7.2 Hz, 2H), 7.21 (d, *J* = 8.0 Hz, 2H), 5.74 (s, 1H), 4.11 (dd, *J* = 10.0, 2.8 Hz, 1H), 2.92 (heptet, *J* = 6.8 Hz , 2H), 2.84-2.73 (m, 1H), 2.72-2.65 (m, 1H), 2.25-2.08 (m, 2H), 1.26 (d, *J* = 6.8 Hz, 6H), 1.25 (d, *J* = 6.8 Hz, 6H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 148.9, 148.7, 143.7, 139.7, 136.5, 127.2, 126.9, 126.5, 124.7, 56.4, 34.1, 28.8, 24.21, 24.20, 24.1, 23.8; HRMS (ESI) Calcd. for $C_{22}H_{29}N_2$ (M+H): 321.2325, Found: 321.2323.



2m, 0.0827 g (95 % yield), white solid, m.p. 187-189 ºC. IR (film): 3355, 1607, 1508 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, ppm): δ 7.61 (d, *J* = 8.4 Hz, 2H), 7.48-7.28 (m, 6H), 5.75 (s, 1H), 4.11 (dd, *J* = 10.0, 2.0 Hz, 1H), 2.85-2.72 (m, 1H), 2.72-2.61 (m, 1H), 2.25-2.10 (m, 2H), 1.33 (s, 18H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 151.1, 151.0, 143.6, 139.3, 136.1, 126.9, 125.8, 125.4, 124.4, 56.3, 34.8, 31.6, 31.5, 28.8, 23.7; HRMS (ESI) Calcd. for $C_{24}H_{33}N_2$ (M+H): 349.2638, Found: 349.2634.



2n, 0.0644 g (87 % yield), light brown solid; ^1H NMR (400 MHz, $CDCl_3$, ppm): δ 7.62 (d, *J* = 8.8 Hz, 2H), 7.32 (d, *J* = 8.4 Hz, 2H), 6.91 (d, *J* = 8.0 Hz, 2H), 6.89 (d, *J* = 8.4 Hz, 2H), 5.65 (s, 1H), 4.07 (dd, *J* = 10.0 Hz, 3.6 Hz, 1H), 3.83 (s, 3H), 3.82 (s, 3H), 2.83-2.72 (m, 1H), 2.72-2.65 (m, 1H), 2.22-2.07 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 159.7, 159.5, 143.7, 134.3, 131.6, 128.4, 126.0, 114.3, 113.8, 56.1, 55.52, 55.51, 28.9, 24.0.

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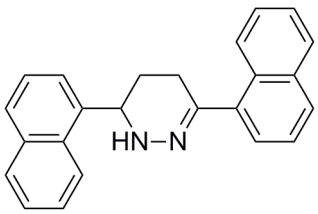
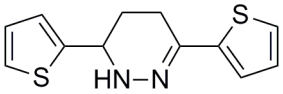
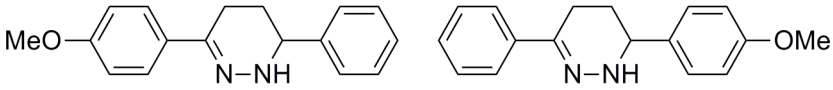


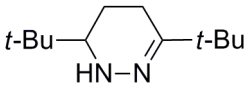
2o, 0.0799 g (95 % yield), white solid, m.p. 146-148 ºC; IR (film): 3352, 1596 1508 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, ppm): δ 8.41 (d, *J* = 8.4 Hz, 1H), 8.22 (d, *J* = 8.4 Hz, 1H), 7.93 (d, *J* = 7.6 Hz, 1H), 7.91-7.82 (m, 3H), 7.80 (d, *J* = 7.2 Hz, 1H), 7.62-7.46 (m, 7H), 6.04 (s, 1H), 5.13 (dd, *J* = 9.2 Hz, 3.6 Hz, 1H), 3.03-2.90 (m, 1H), 2.78-2.68 (m, 1H), 2.56-2.39 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 146.5, 137.9, 137.8, 134.3, 134.2, 131.3, 131.0, 129.4, 128.6, 128.5, 128.4, 126.6, 126.5, 126.01, 126.96, 126.95, 125.4, 125.3, 124.0, 122.9, 52.6, 28.1, 27.9; HRMS (ESI) Calcd. for $C_{24}H_{21}N_2$ (M+H): 337.1699, Found: 337.1695.



2p, 0.0528 g (85 % yield), yellow solid, m.p. 158-160 ºC; IR (film): 3287, 1646, 1466 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, ppm): δ 7.27-7.26 (m, 1H), 7.21 (d, *J* = 5.4 Hz, 1H), 7.07-7.04 (m, 2H), 7.01-6.97 (m, 2H), 5.77 (s, 1H), 4.48 (dd, *J* = 10.0, 2.8 Hz, 1H), 2.78-2.73 (m, 2H), 2.30-2.27 (m, 1H), 2.26-2.17 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 145.0, 144.3, 141.3, 127.2, 126.9, 125.5, 125.0, 124.8, 123.3, 52.3, 29.3, 23.8; HRMS (ESI) Calcd. for $C_{12}H_{13}N_2S_2$ (M+H): 249.0515, Found: 249.0512.



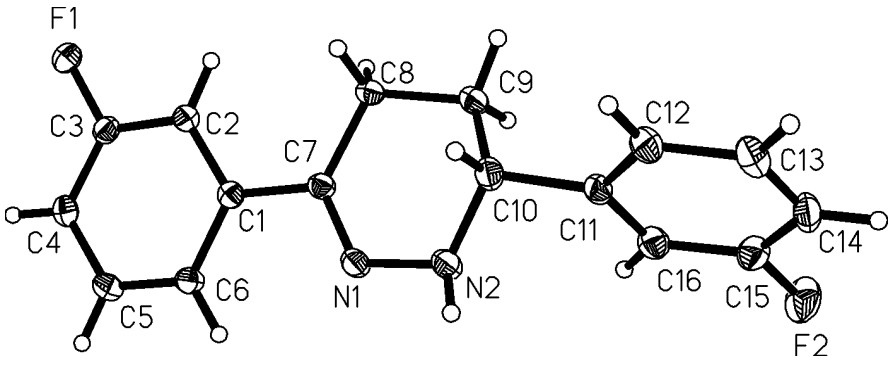
2q and **2q'** (ca.1:1), 0.0619 g (93 % yield), white solid, m.p. 160-162 ºC; IR (film): 3298, 1612, 1513, 1254 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, ppm): δ 7.68 (d, *J* = 8.8 Hz, 2H), 7.63 (d, *J* = 8.8 Hz, 2H), 7.44-7.28 (m, 10H), 6.97-6.93 (m, 4H), 5.75 (brs, 2H), 4.11 (ddd, *J* = 9.6, 3.2, 3.2 Hz, 2H), 3.83 (s, 3H), 3.82 (s, 3H), 2.85-2.73 (m, 2H), 2.73-2.60 (m, 2H), 2.26-2.08 (m, 4H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 159.8, 159.5, 143.8, 143.5, 142.3, 138.8, 134.2, 131.6, 128.9, 128.5, 128.3, 128.04, 128.02, 127.2, 126.0, 124.7, 114.3, 113.8, 55.7, 55.1, 55.52, 55.50, 28.9, 28.8, 23.9, 23.8.



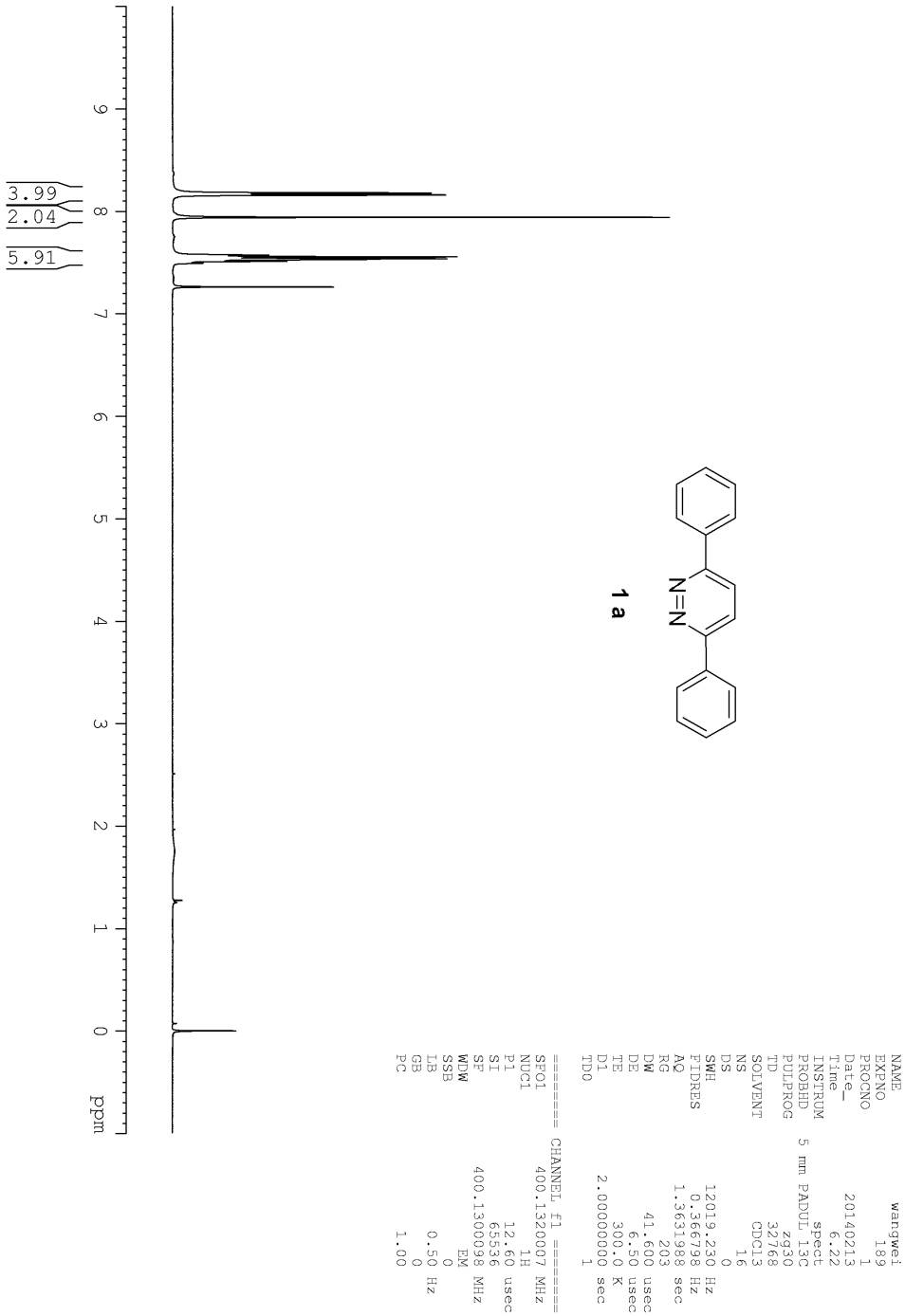
2t, 0.0378g (77 % yield), colourless oil; ^1H NMR (400 MHz, $CDCl_3$, ppm): δ 5.22 (s, 1H), 2.51 (dd, *J* = 11.2, 2.7 Hz, 1H), 2.34-2.17 (m, 2H), 1.89-1.80 (m, 1H), 1.66-1.52 (m, 1H), 1.09 (s, 9H), 0.93 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$, ppm): δ 156.2, 60.4, 37.3, 32.5, 28.4, 26.3, 21.9, 21.5. HRMS (ESI) Calcd. for $C_{12}H_{25}N_2$ (M+H): 197.2012, Found: 197.2012.

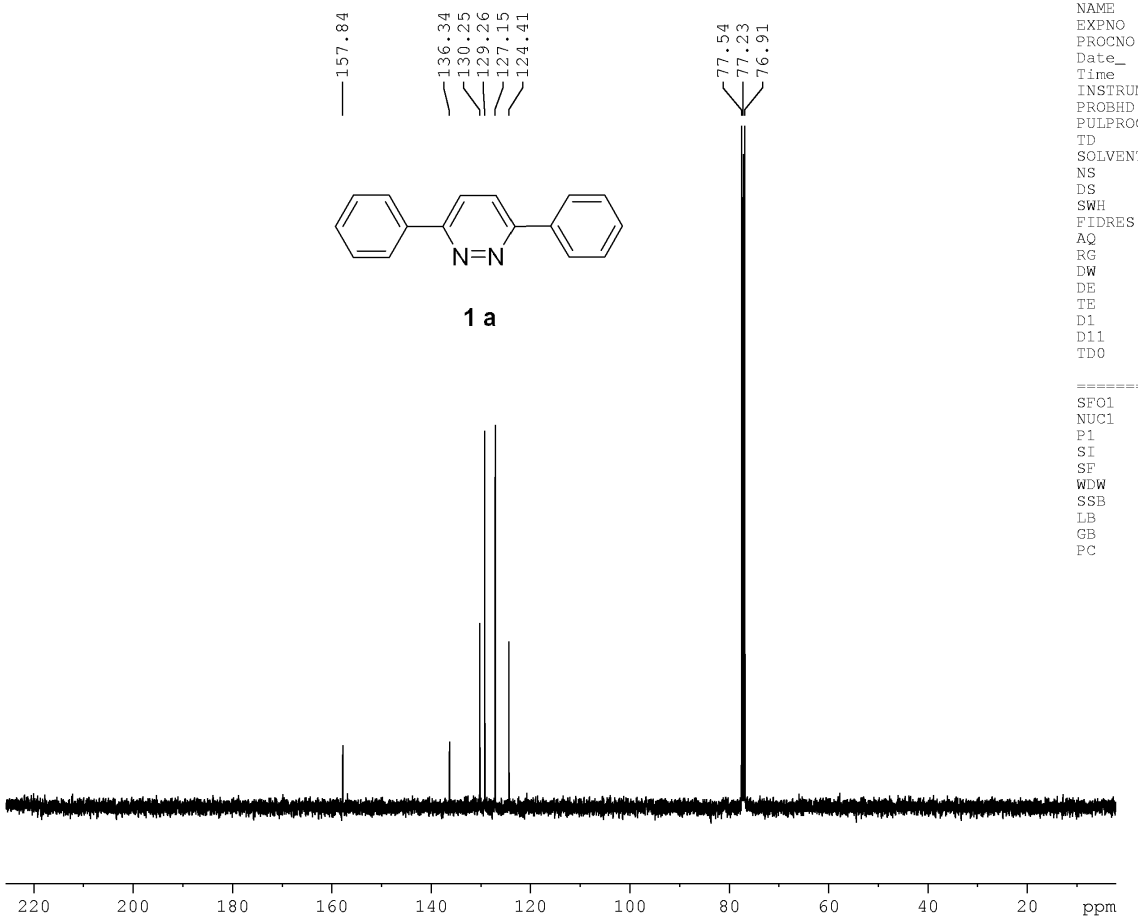
Table 1. Crystal data and structure refinement for compound **2d**.

Identification code	sa3599	
Empirical formula	C16 H14 F2 N2	
Formula weight	272.29	
Temperature	173.1500 K	
Wavelength	0.71073 Å	
Crystal system	Triclinic	
Space group	P -1	
Unit cell dimensions	a = 5.633(2) Å	a= 97.097(6)°.
	b = 10.581(4) Å	b= 103.762(8)°.
	c = 11.330(5) Å	g = 92.953(4)°.
Volume	648.6(5) $Å^3$	
Z	2	
Density (calculated)	1.394 Mg/m^3	
Absorption coefficient	0.103 mm^{-1}	
F(000)	284	
Crystal size	0.23 x 0.16 x 0.11 mm^3	
Theta range for data collection	1.869 to 27.483°.	
Index ranges	-7<=h<=7, -13<=k<=13, -14<=l<=13	
Reflections collected	8212	
Independent reflections	2970 [R(int) = 0.0345]	
Completeness to theta = 26.000°	99.5 %	
Absorption correction	Semi-empirical from equivalents	
Max. and min. transmission	1.0000 and 0.8049	
Refinement method	Full-matrix least-squares on F^2	
Data / restraints / parameters	2970 / 0 / 195	
Goodness-of-fit on F^2	1.148	
Final R indices [I>2sigma(I)]	R1 = 0.0603, wR2 = 0.1423	
R indices (all data)	R1 = 0.0678, wR2 = 0.1488	
Extinction coefficient	n/a	
Largest diff. peak and hole	0.317 and -0.206 $e.Å^{-3}$	

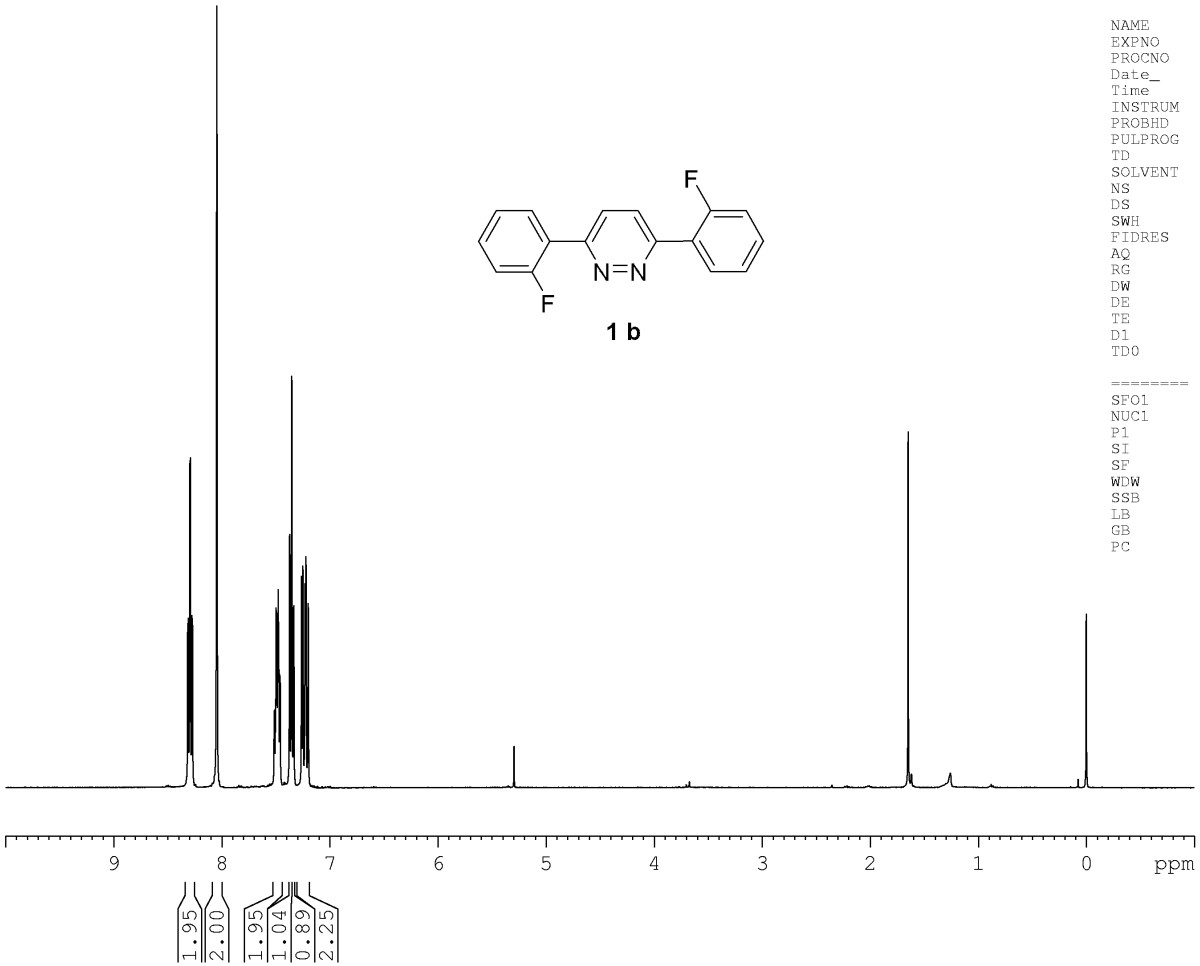


NMR spectra for the substrates and products.

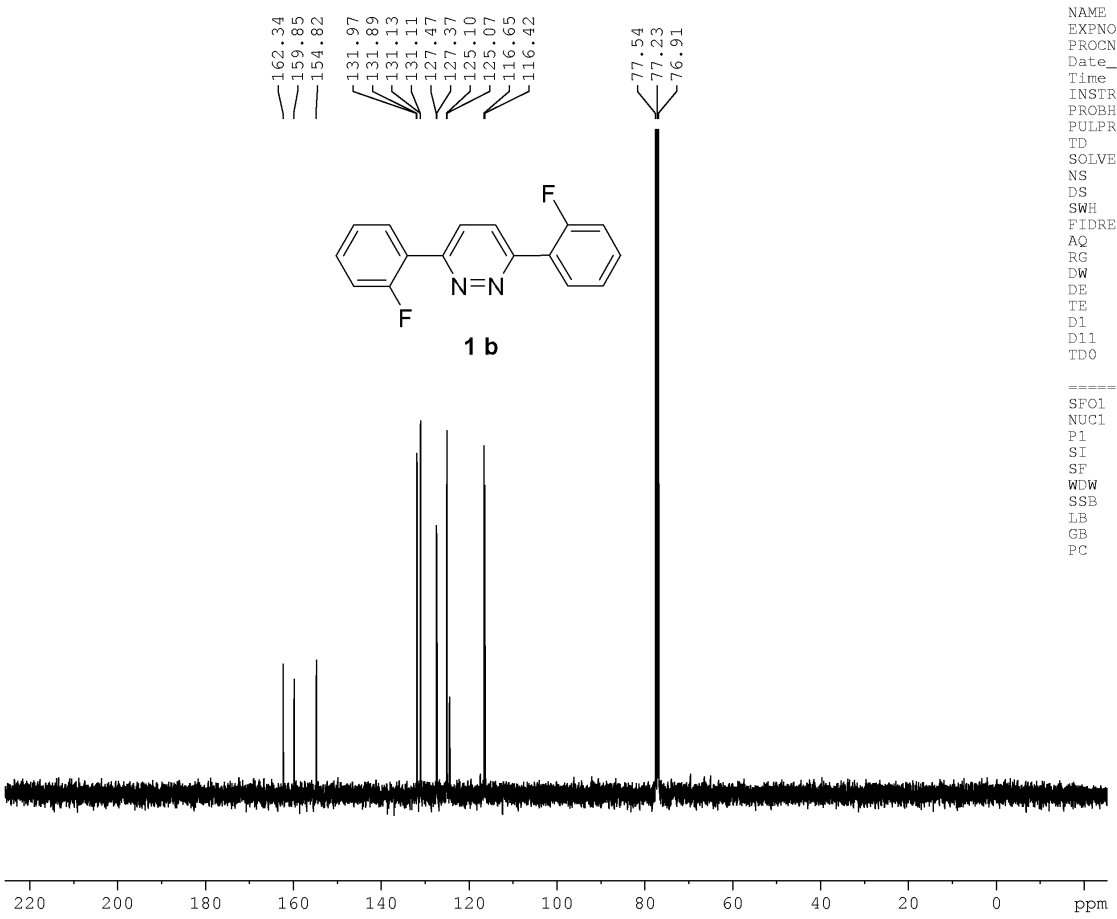




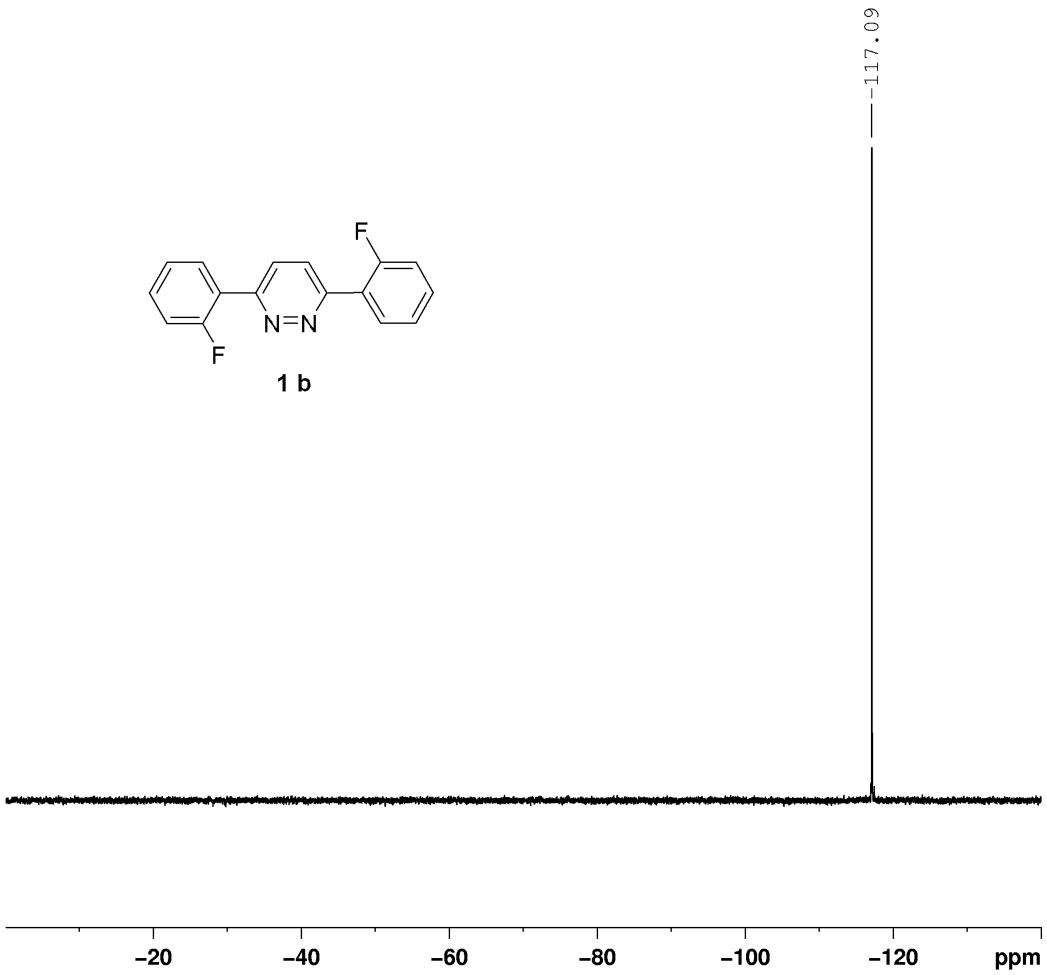
NAME	wangwei-C
EXPNO	11
PROCNO	1
Date_	20140213
Time	8.01
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	268
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL 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



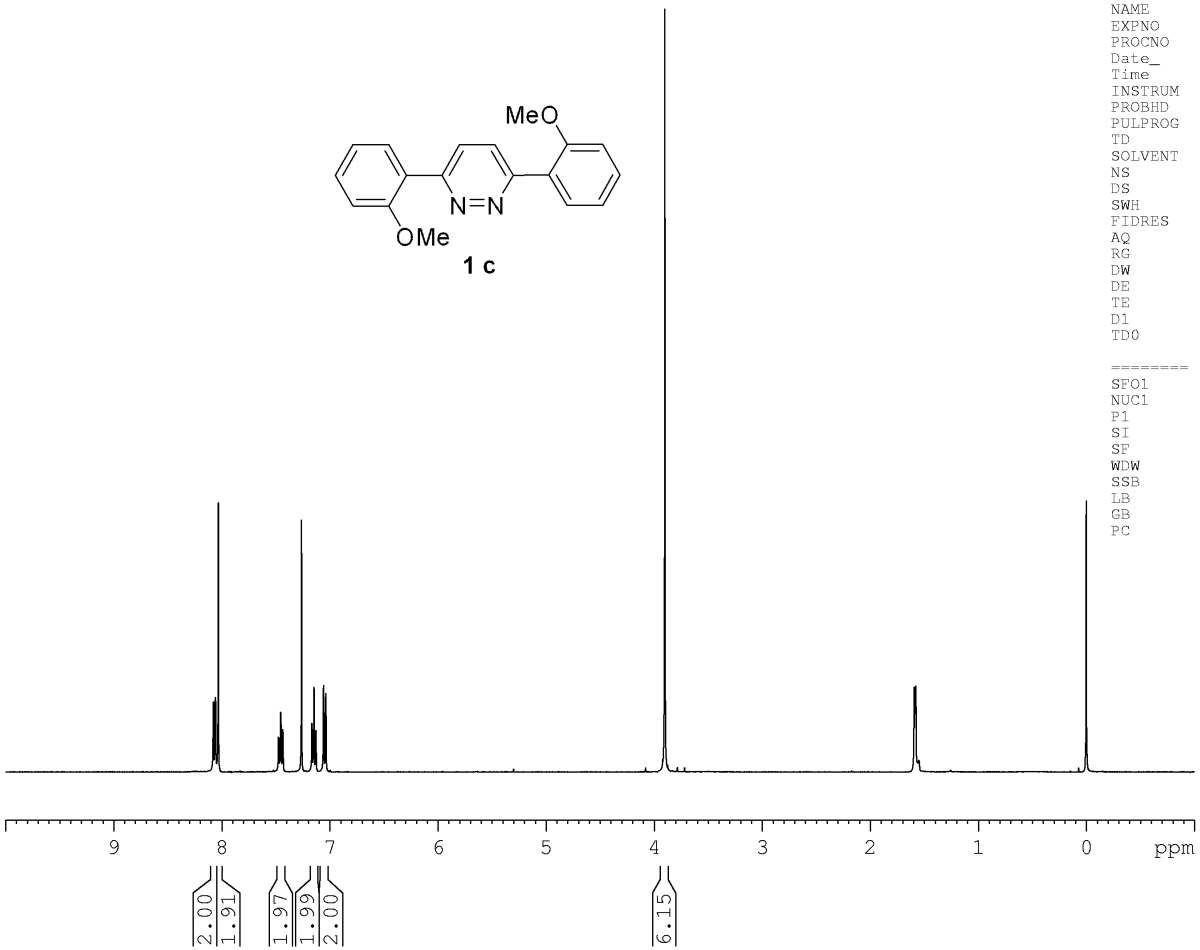
NAME	wangwei
EXPNO	532
PROCNO	1
Date_	20140822
Time	2.07
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300092 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



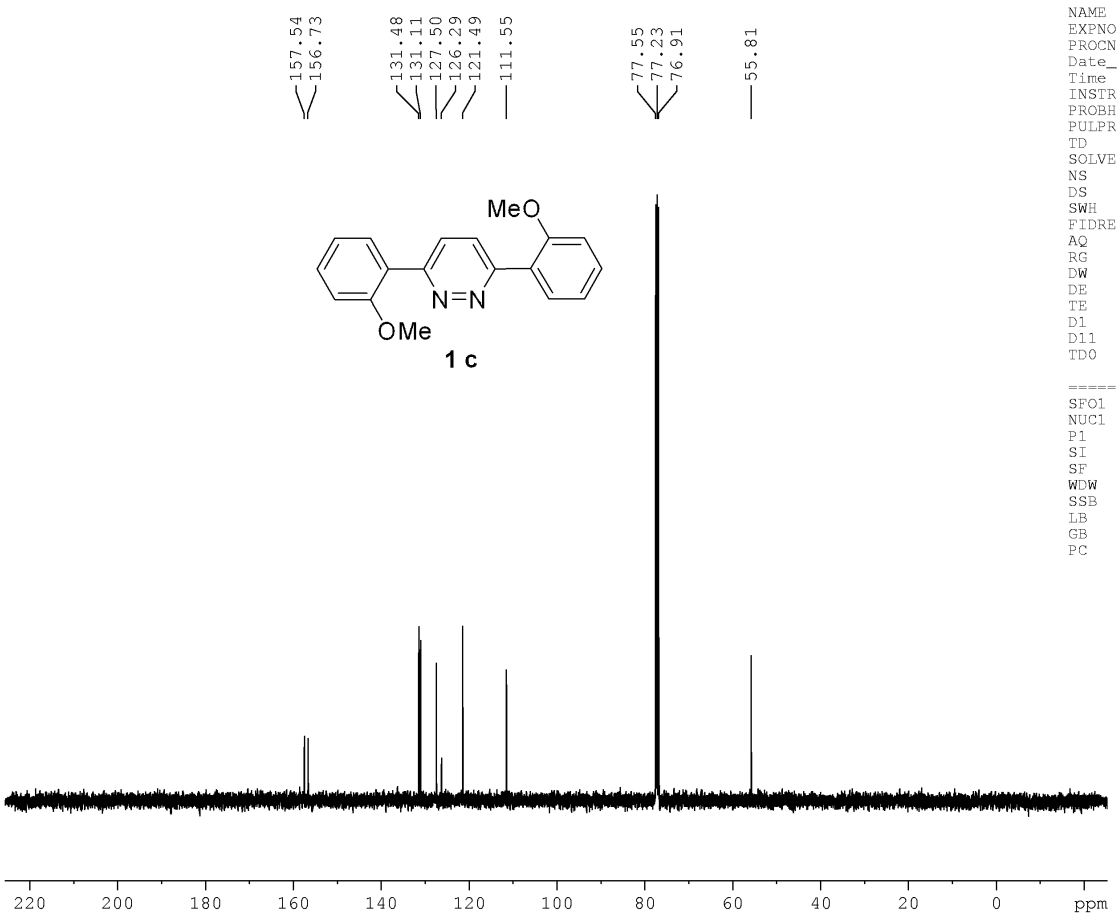
NAME	wangwei-C
EXPNO	114
PROCNO	1
Date_	20140822
Time	6.46
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	264
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
========	CHANNEL 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



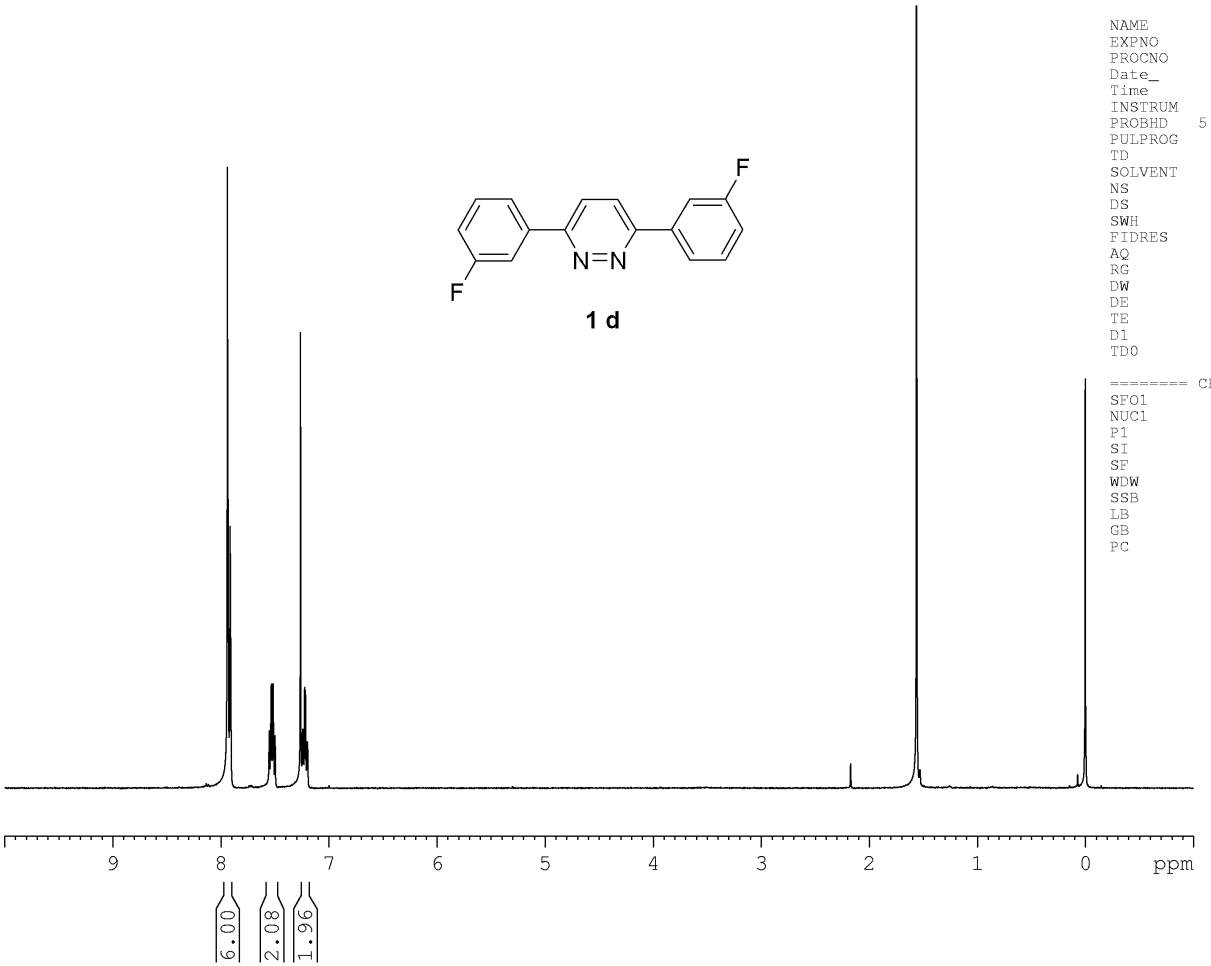
NAME	19F
EXPNO	69
PROCNO	1
Date_	20151008
Time	15.24
INSTRUM	spect
PROBHD	5 mm PATBO BB-
PULPROG	zgfhigqn
TD	65536
SOLVENT	CDCl3
NS	16
DS	0
SWH	112994.352 Hz
FIDRES	1.724157 Hz
AQ	0.2900512 sec
RG	362
DW	4.425 usec
DE	6.32 usec
TE	300.8 K
D1	2.00000000 sec
D11	0.03000000 sec
D12	0.00002000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	19F
P1	23.50 usec
PL1	0.00 dB
PL1W	25.11886406 W
SFO1	564.6299194 MHz
======== CHANNEL f2 ========	
CPDPRG2	waltz16
NUC2	1H
PCPD2	70.00 usec
PL2	-3.20 dB
PL12	10.18 dB
SFO2	600.1324005 MHz
SI	65536
SF	564.6863880 MHz
WDW	EM
SSB	0
LB	5.00 Hz
GB	0
PC	1.00



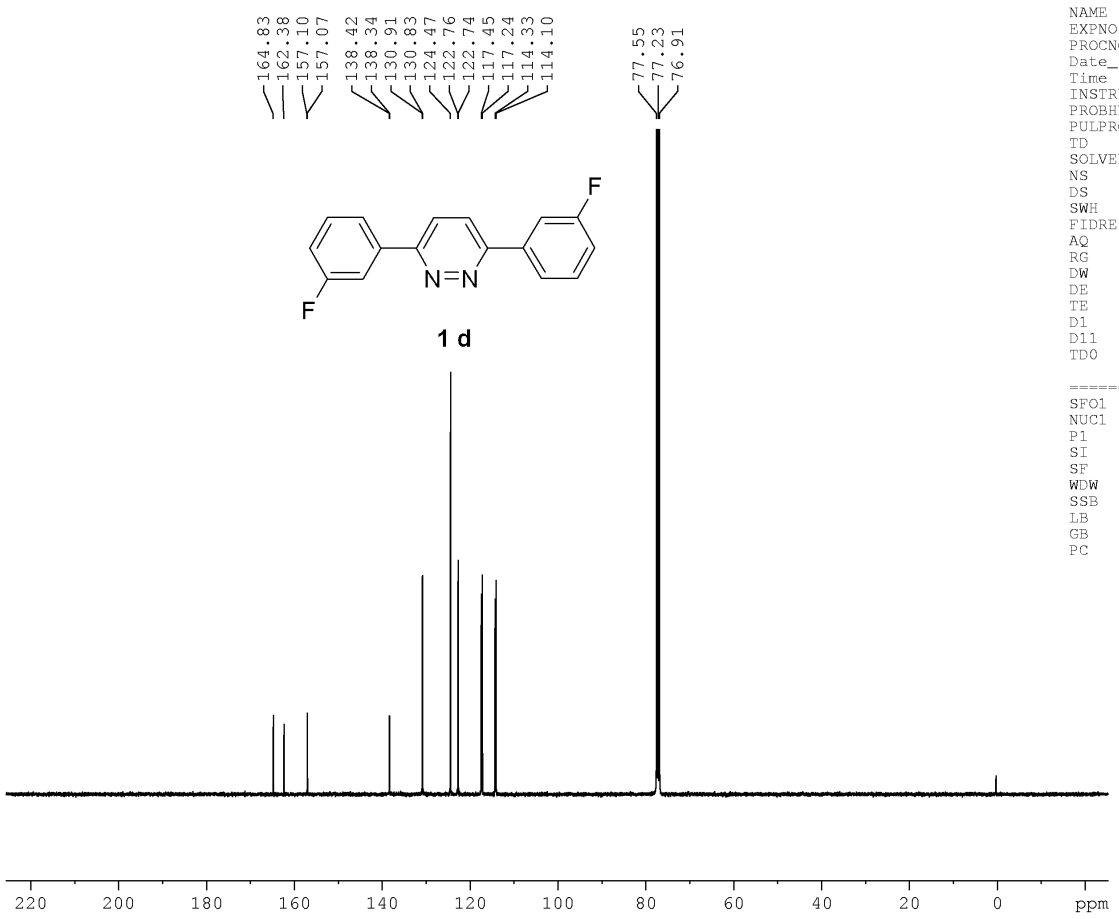
NAME	wangwei
EXPNO	460
PROCNO	1
Date_	20140704
Time	9.39
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 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



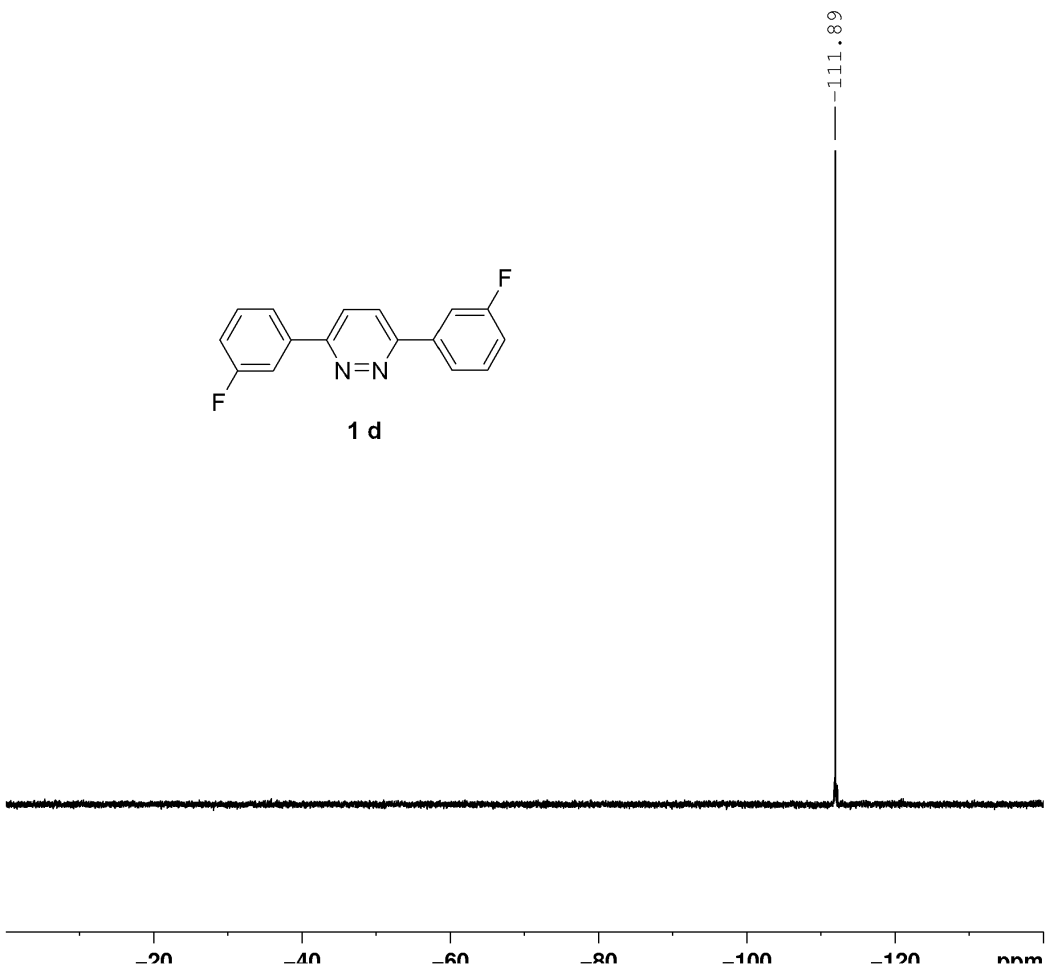
NAME	wangwei-C
EXPNO	98
PROCNO	1
Date_	20140704
Time	13.43
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	135
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
========	CHANNEL 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



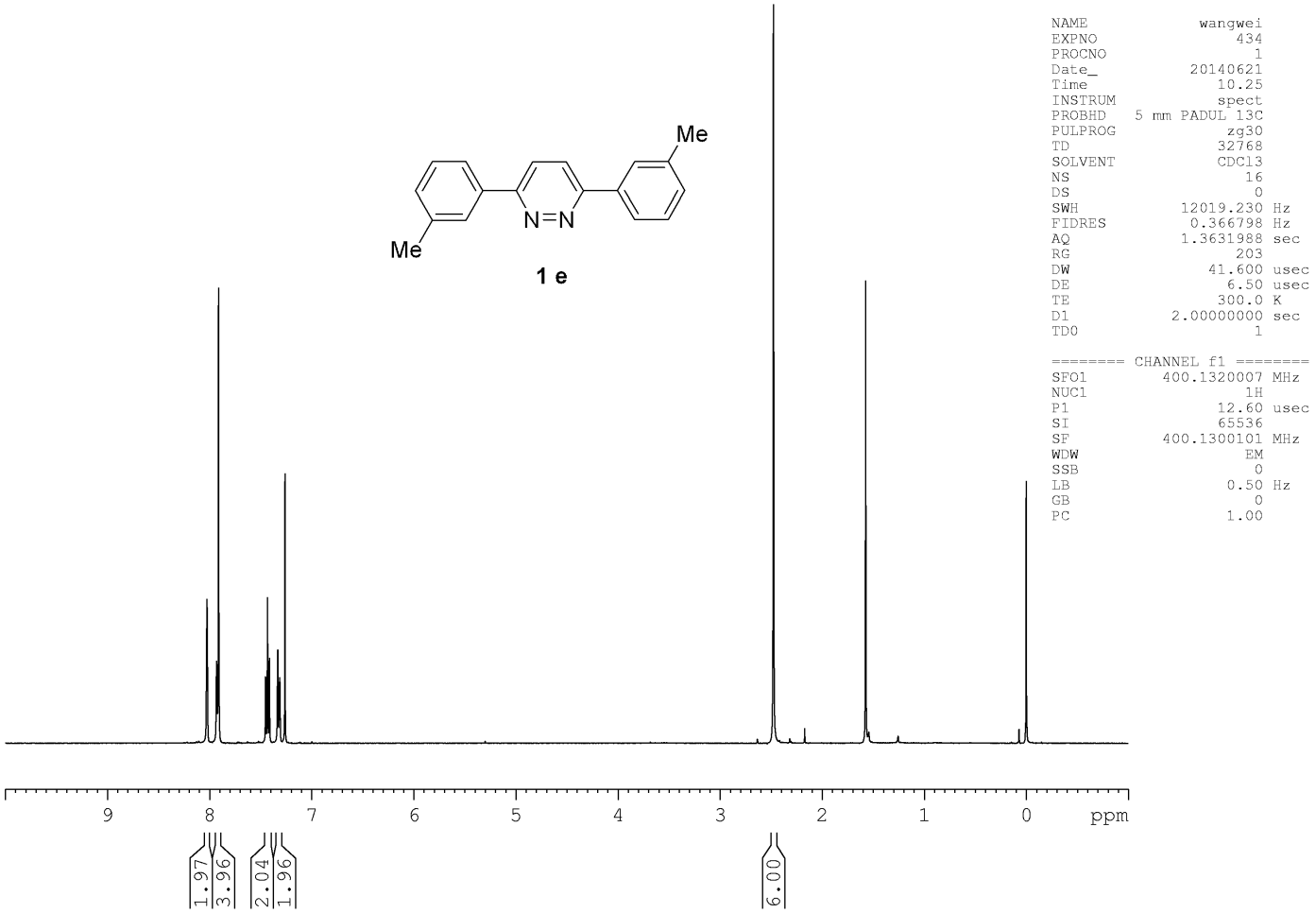
NAME	wangwei
EXPNO	442
PROCNO	1
Date_	20140625
Time	13.36
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300096 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



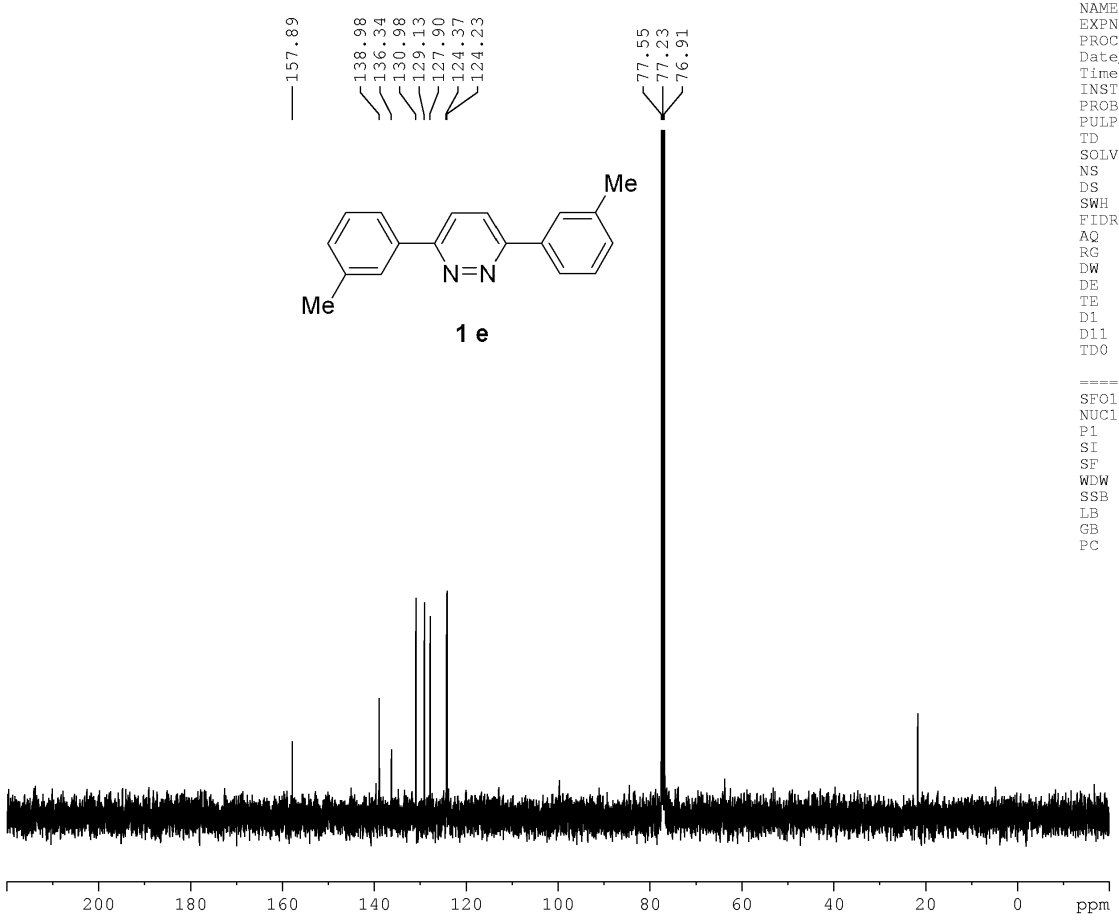
NAME	wangwei-C
EXPNO	97
PROCNO	1
Date_	20140702
Time	23.10
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	12924
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127471 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



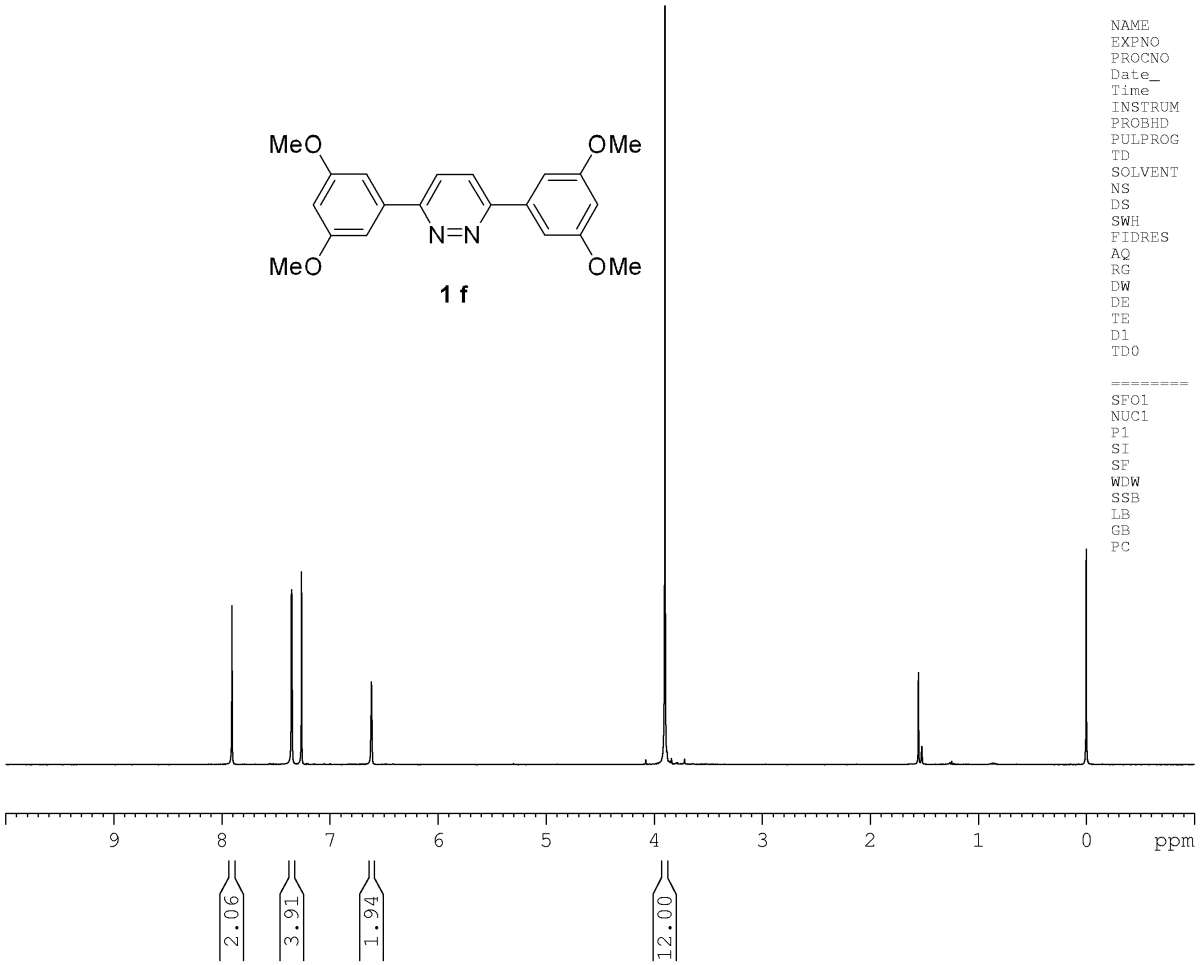
NAME	19F
EXPNO	70
PROCNO	1
Date_	20151008
Time	15.28
INSTRUM	spect
PROBHD	5 mm PATBO BB-
PULPROG	zgfhigqn
TD	65536
SOLVENT	CDCl3
NS	16
DS	0
SWH	112994.352 Hz
FIDRES	1.724157 Hz
AQ	0.2900512 sec
RG	362
DW	4.425 usec
DE	6.32 usec
TE	300.9 K
D1	2.00000000 sec
D11	0.03000000 sec
D12	0.00002000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	19F
P1	23.50 usec
PL1	0.00 dB
PL1W	25.11886406 W
SFO1	564.6299194 MHz
======== CHANNEL f2 ========	
CPDPRG2	waltz16
NUC2	1H
PCPD2	70.00 usec
PL2	-3.20 dB
PL12	10.18 dB
SFO2	600.1324005 MHz
SI	65536
SF	564.6863880 MHz
WDW	EM
SSB	0
LB	5.00 Hz
GB	0
PC	1.00



NAME	wangwei
EXPNO	434
PROCNO	1
Date_	20140621
Time	10.25
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	wangwei-C
EXPNO	91
PROCNO	1
Date_	20140621
Time	12.21
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	236
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            wangwei
EXPNO               455
PROCNO                1
Date_          20140701
Time              13.09
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
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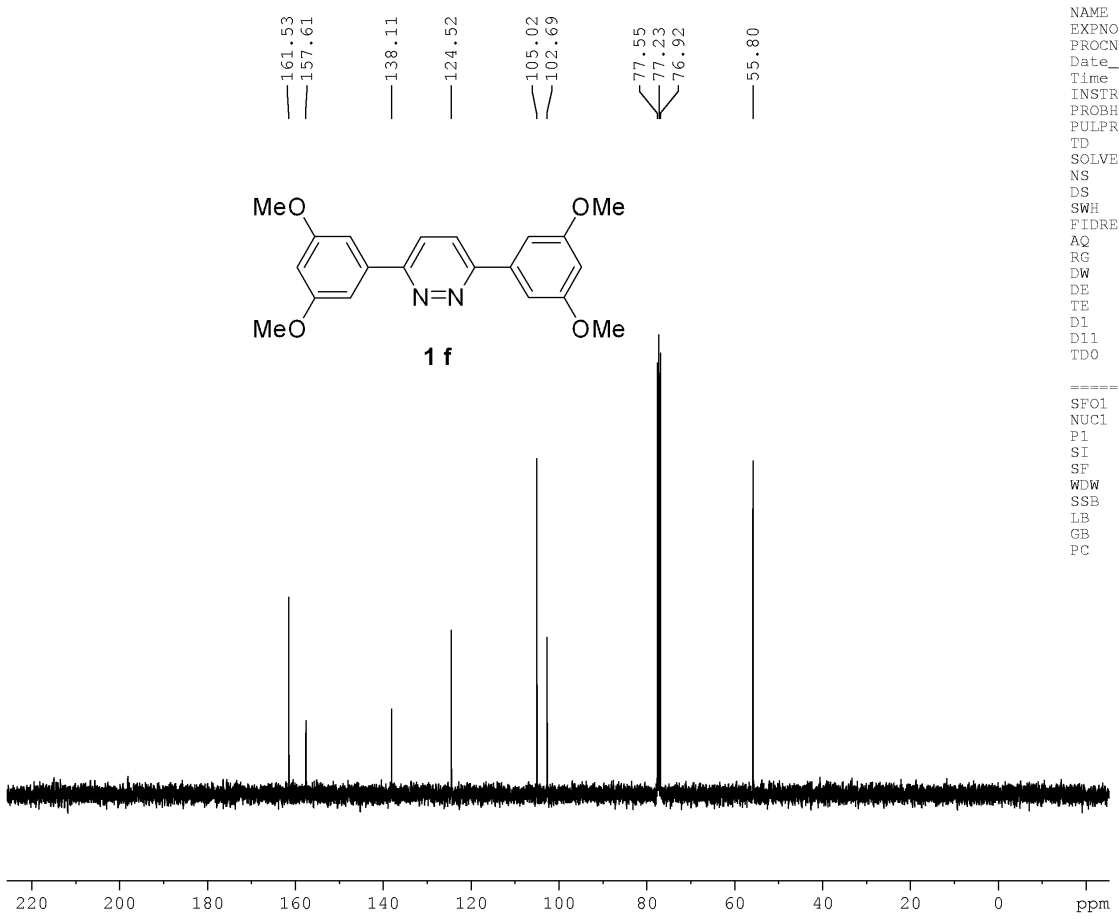
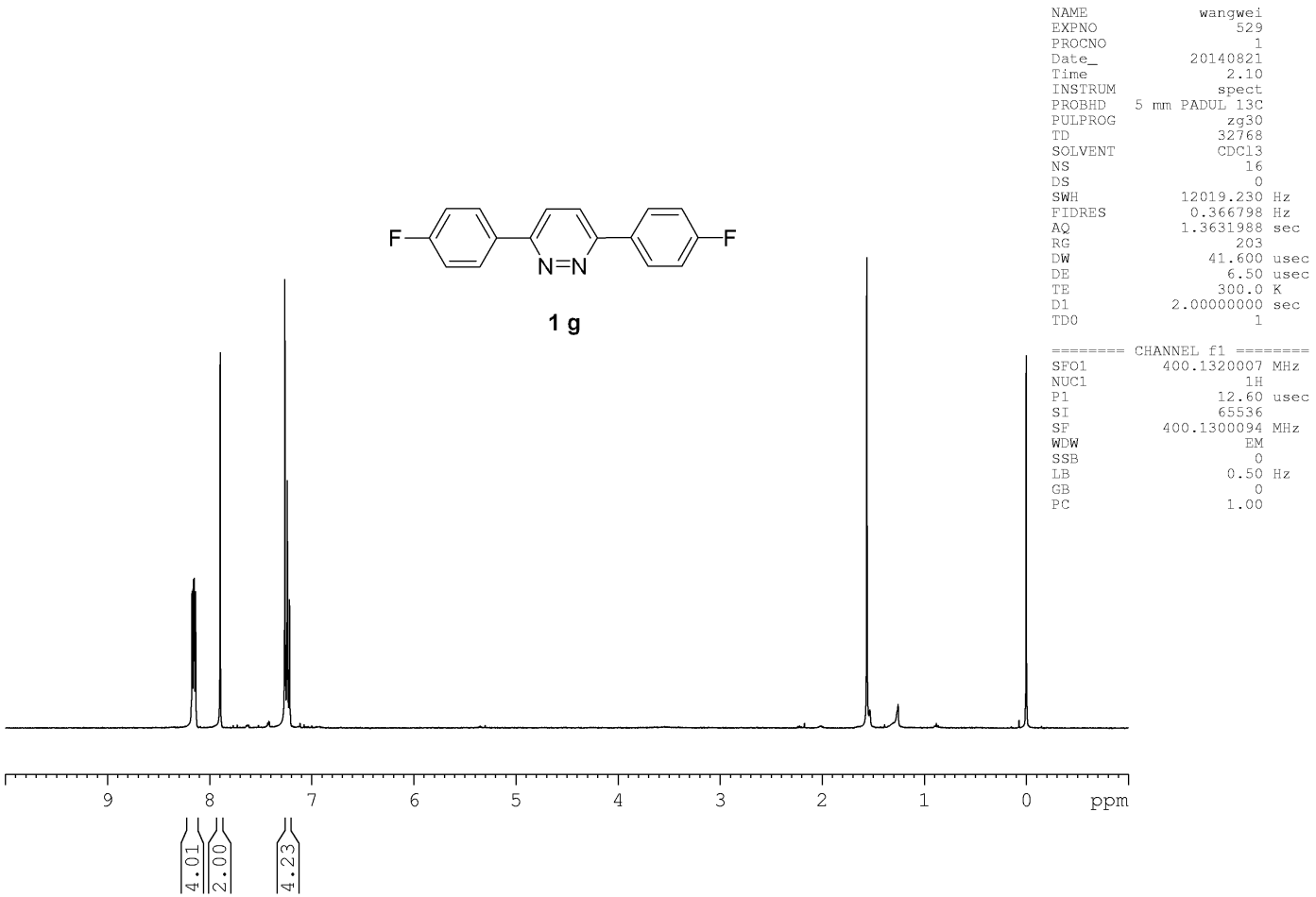
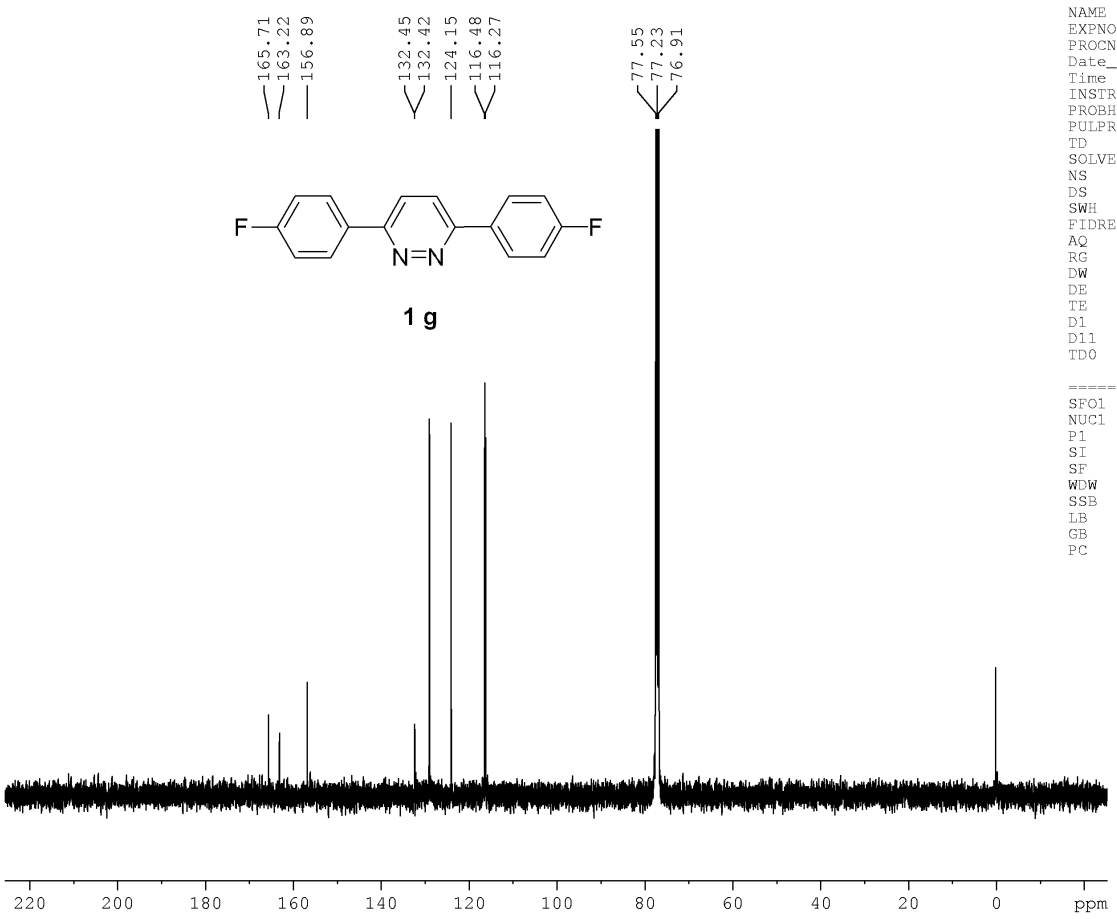


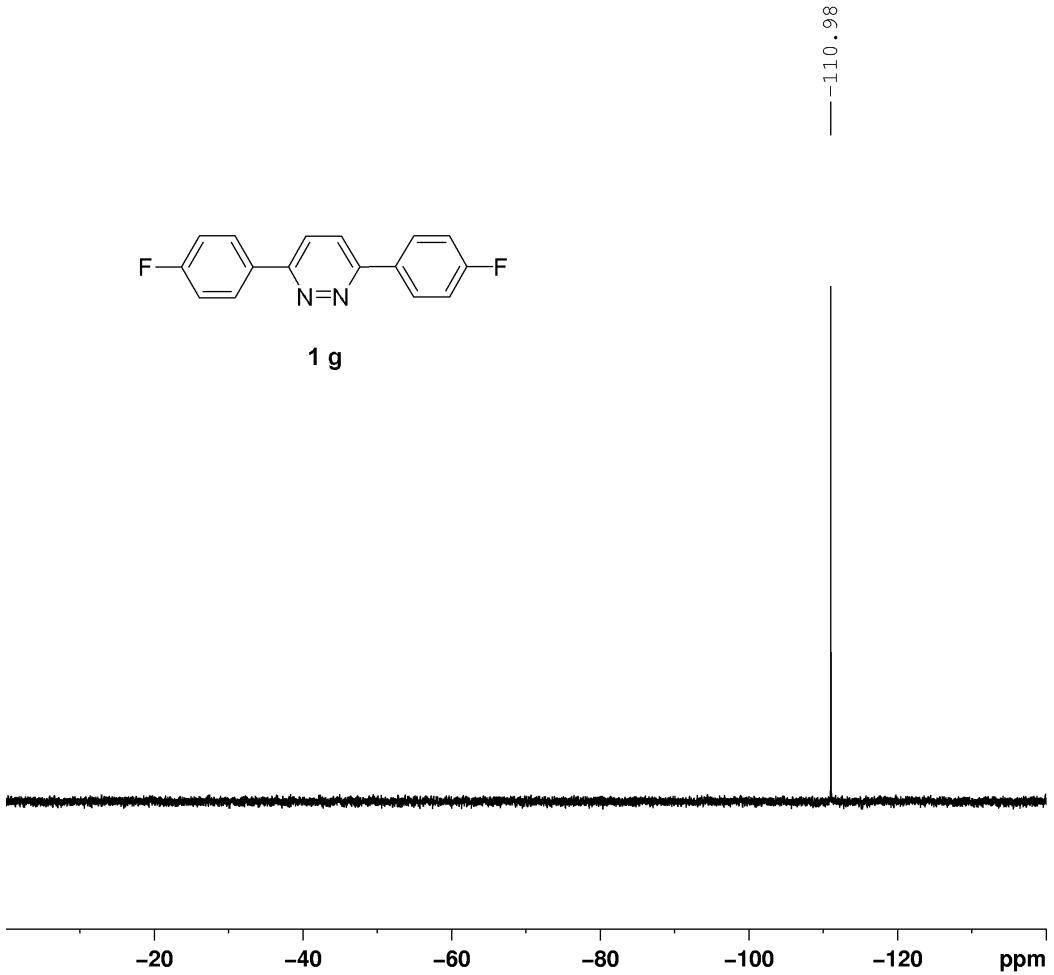
NAME	wangwei-C
EXPNO	95
PROCNO	1
Date_	20140701
Time	13.25
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	53
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL 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



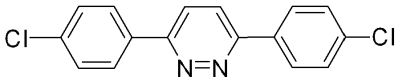
NAME	wangwei
EXPNO	529
PROCNO	1
Date_	20140821
Time	2.10
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300094 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



NAME	wangwei-C
EXPNO	115
PROCNO	1
Date_	20140822
Time	23.33
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	13577
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	100.6127456 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

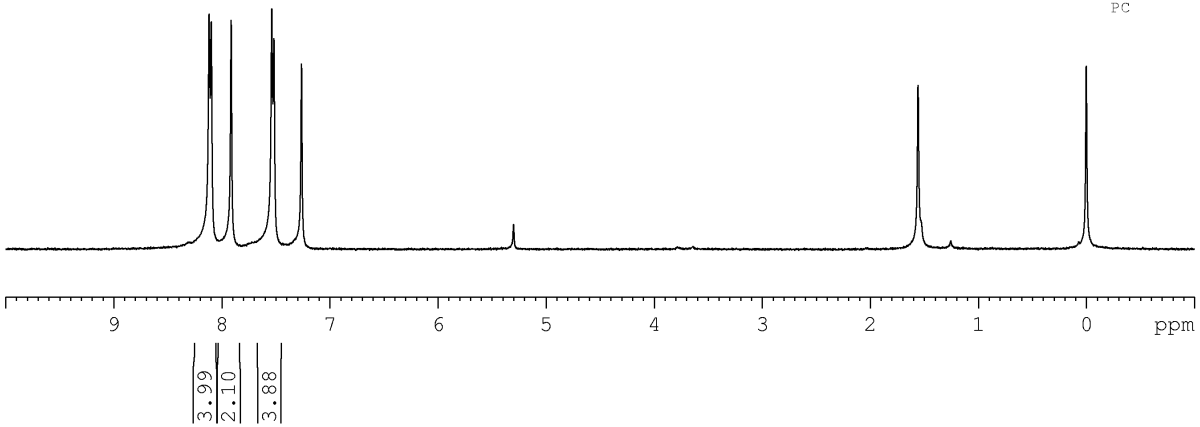


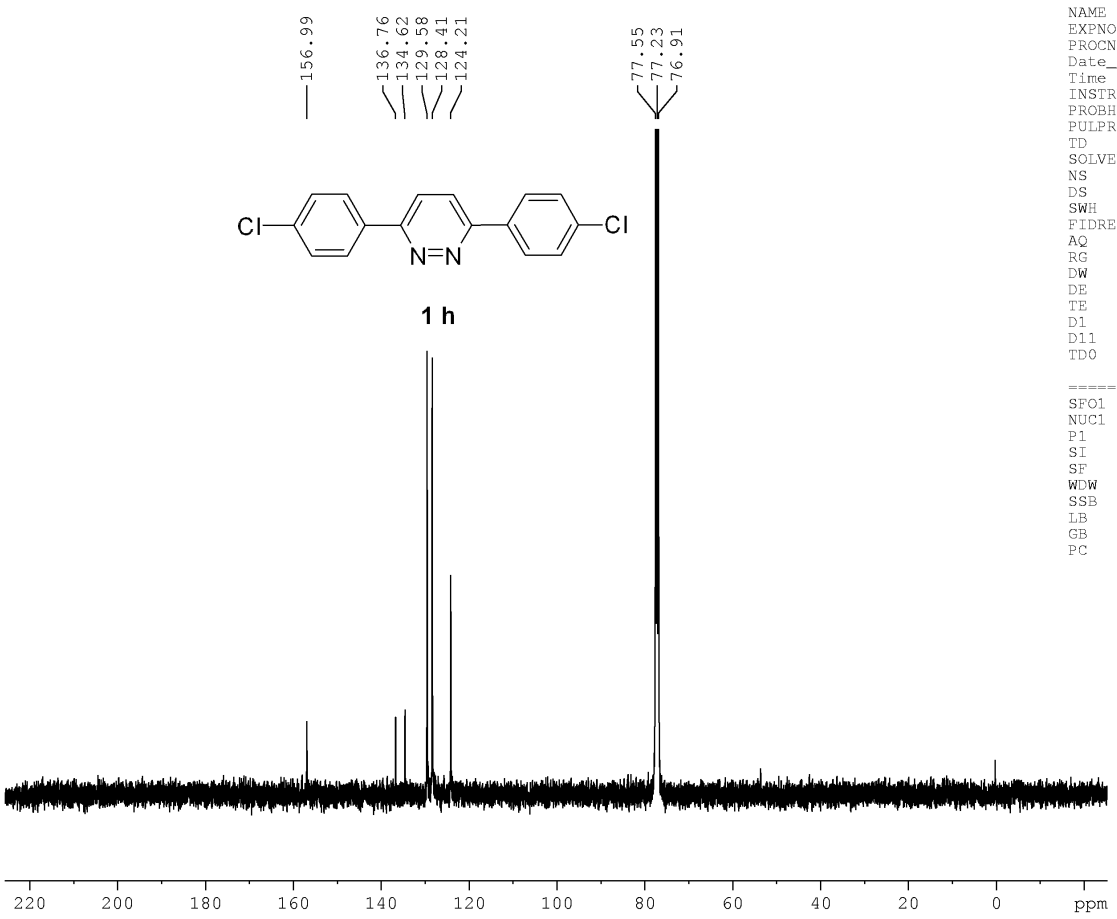
NAME	19F
EXPNO	76
PROCNO	1
Date_	20151008
Time	22.38
INSTRUM	spect
PROBHD	5 mm PATBO BB-
PULPROG	zgfhigqn
TD	65536
SOLVENT	CDCl3
NS	16
DS	0
SWH	112994.352 Hz
FIDRES	1.724157 Hz
AQ	0.2900512 sec
RG	362
DW	4.425 usec
DE	6.32 usec
TE	300.4 K
D1	2.00000000 sec
D11	0.03000000 sec
D12	0.00002000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	19F
P1	23.50 usec
PL1	0.00 dB
PL1W	25.11886406 W
SFO1	564.6299194 MHz
======== CHANNEL f2 ========	
CPDPRG2	waltz16
NUC2	1H
PCPD2	70.00 usec
PL2	-3.20 dB
PL12	10.18 dB
SFO2	600.1324005 MHz
SI	65536
SF	564.6863880 MHz
WDW	EM
SSB	0
LB	5.00 Hz
GB	0
PC	1.00



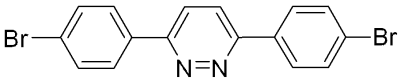
1 h

NAME	wangwei
EXPNO	388
PROCNO	1
Date_	20140529
Time	5.23
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	400.1300094 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00

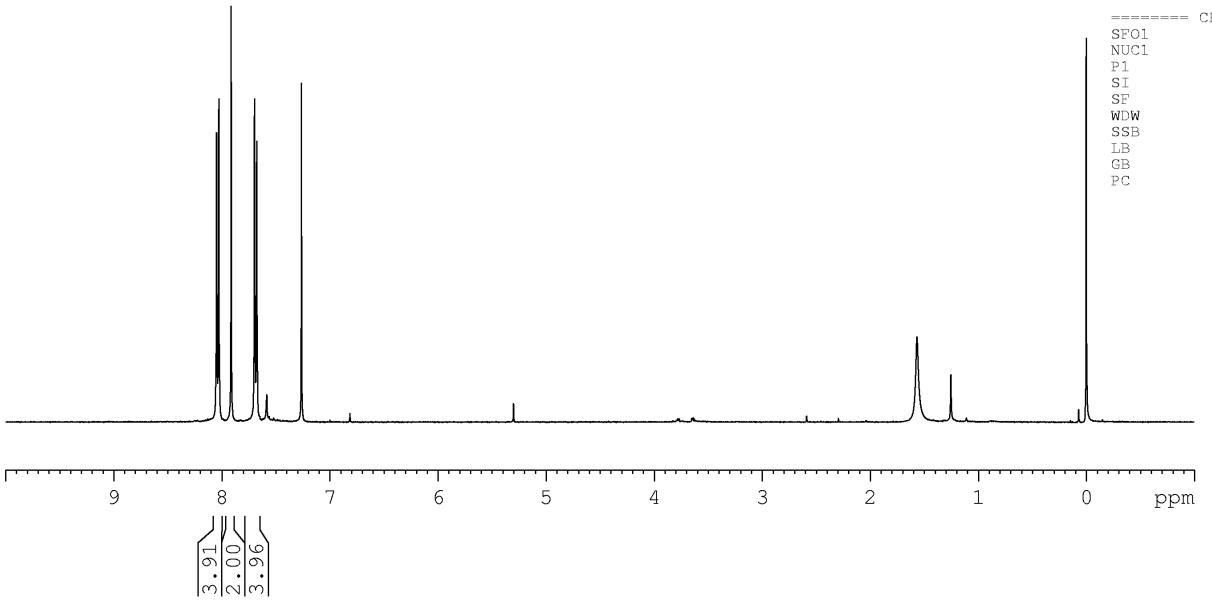




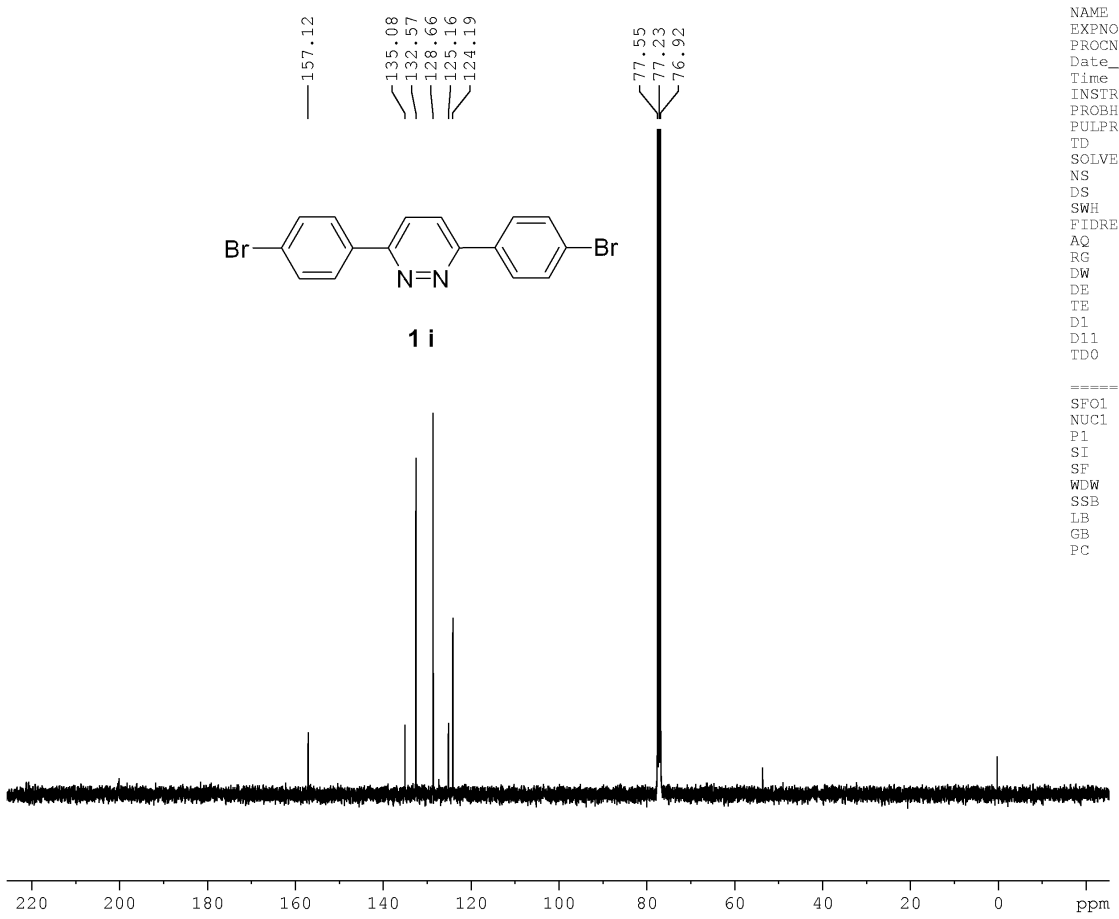
NAME	wangwei-C
EXPNO	81
PROCNO	1
Date_	20140529
Time	14.10
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	9127
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127464 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



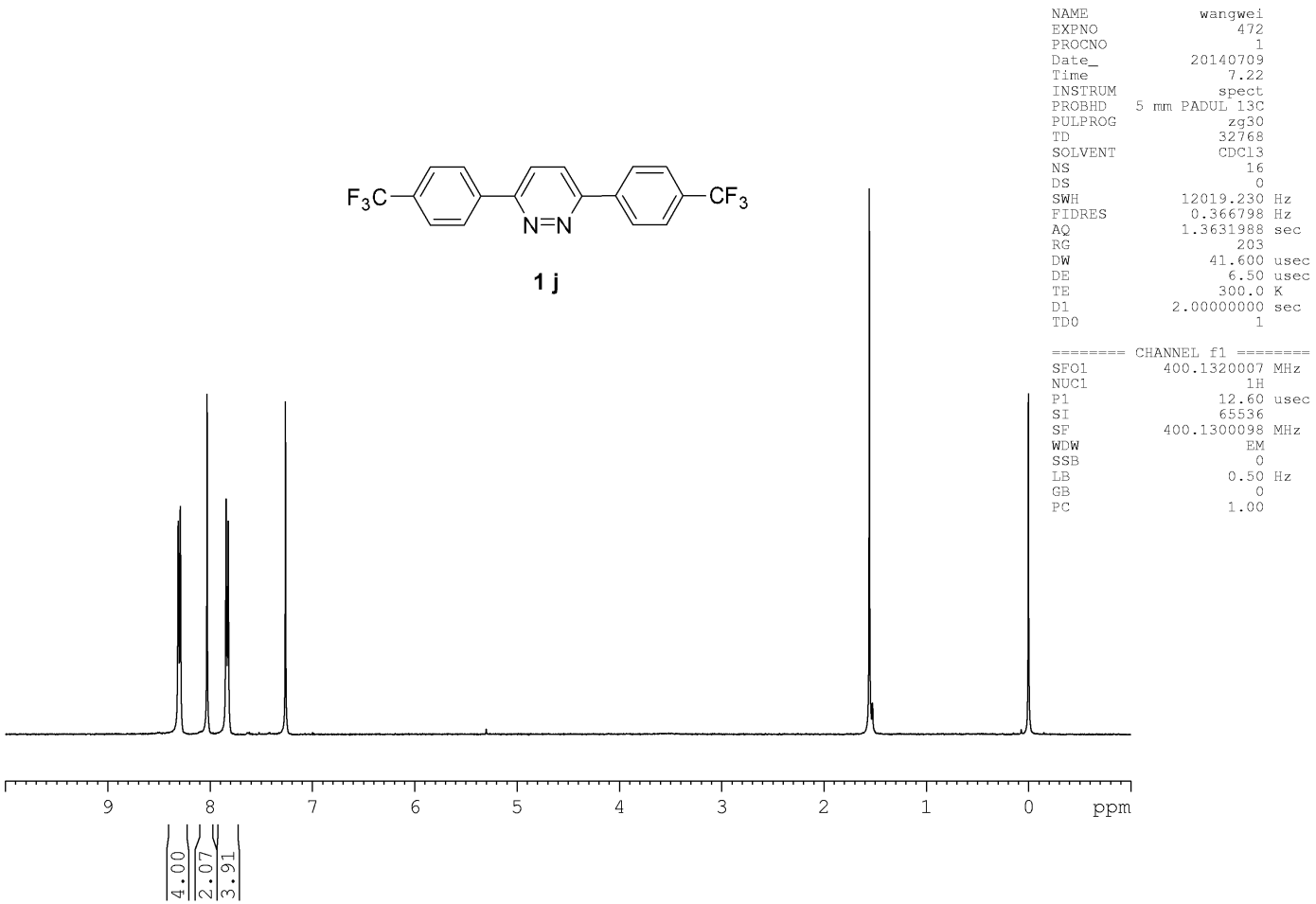
1 i



NAME	wangwei
EXPNO	431
PROCNO	1
Date_	20140619
Time	3.09
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	400.1300094 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00

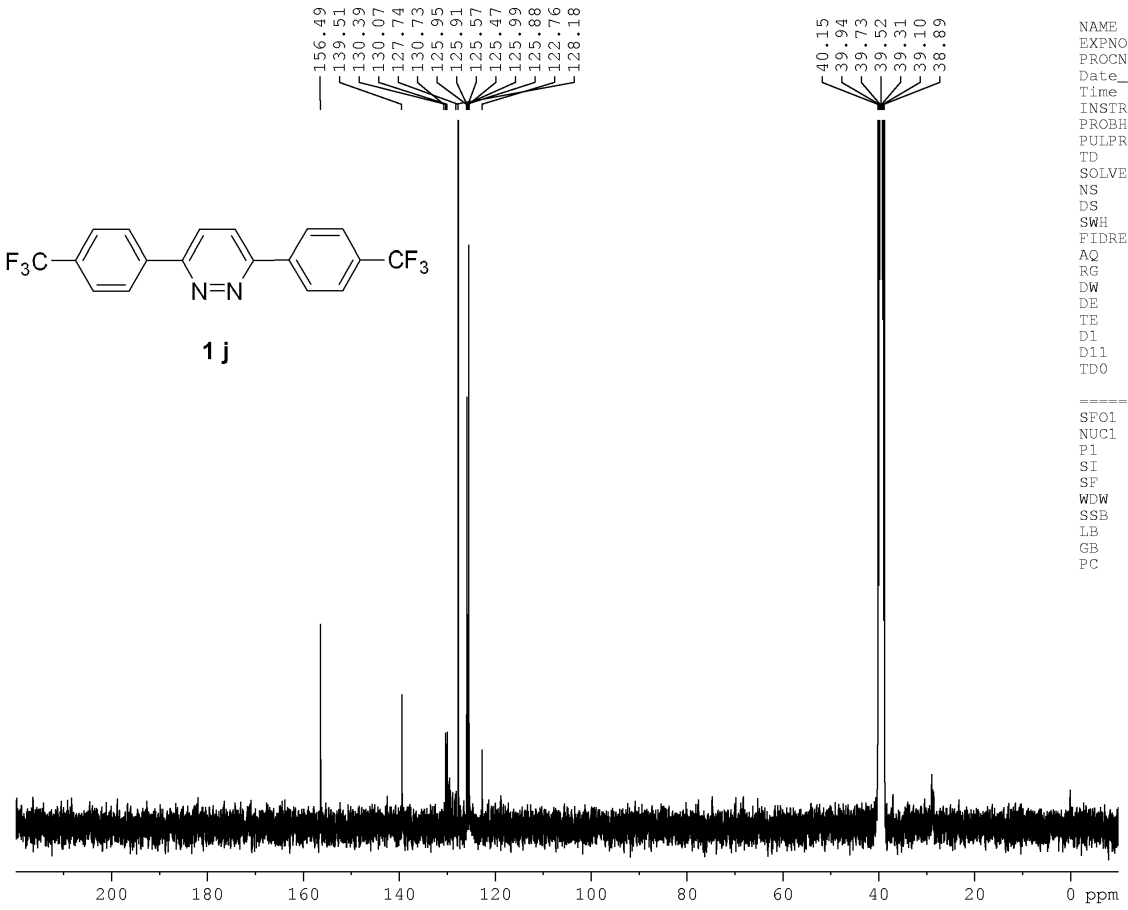


NAME	wangwei-C
EXPNO	90
PROCNO	1
Date_	20140619
Time	5.33
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	2813
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127456 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

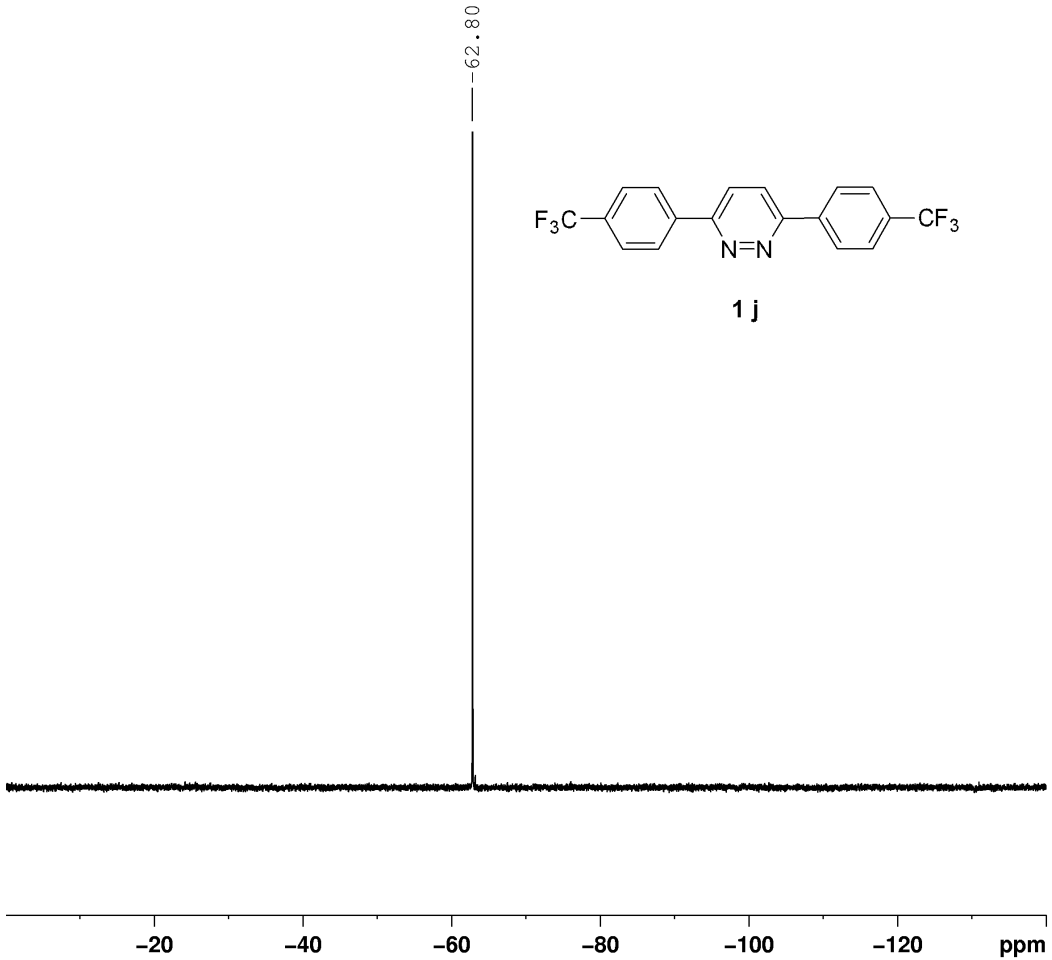



```
NAME            wangwei
EXPNO               472
PROCNO                1
Date_          20140709
Time               7.22
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG            zg30
TD                32768
SOLVENT           CDCl3
NS                   16
DS                    0
SWH           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
```



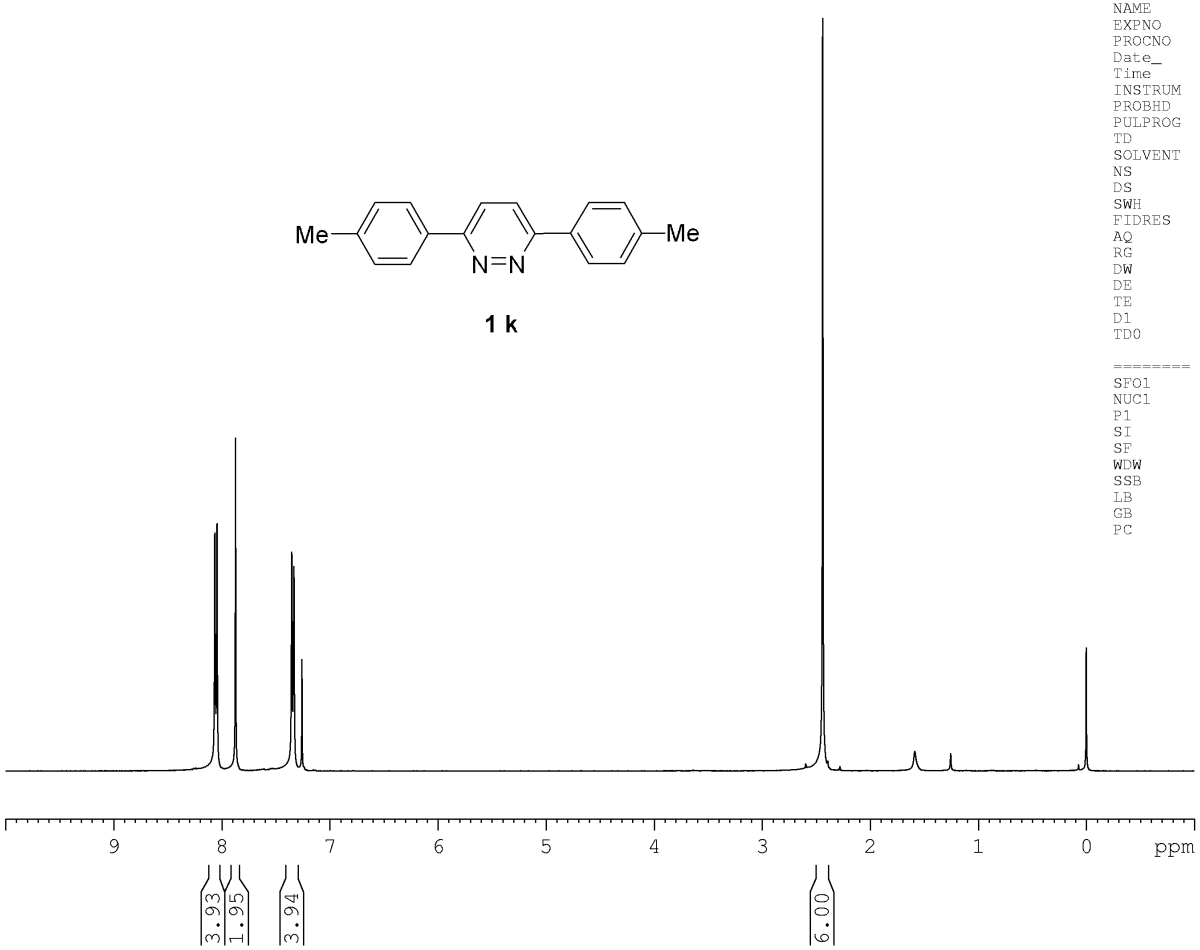
NAME	wangwei-C
EXPNO	119
PROCNO	1
Date_	20140828
Time	23.28
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	DMSO
NS	12437
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6128196 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



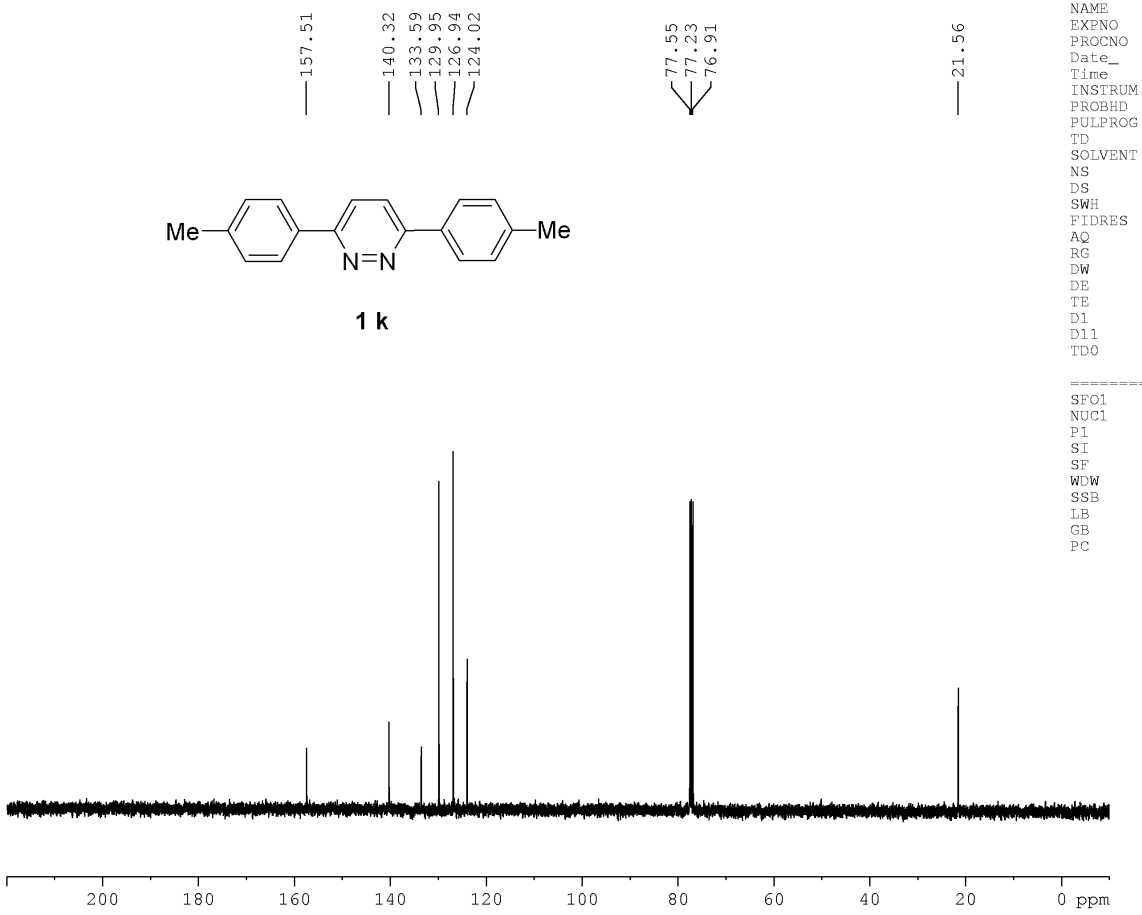

```
NAME                  19F
EXPNO                  71
PROCNO                  1
Date_            20151008
Time                15.43
INSTRUM             spect
PROBHD    5 mm PATBO BB-
PULPROG          zgfhigqn
TD                  65536
SOLVENT               CDC13
NS                     16
DS                      0
SWH           112994.352 H
FIDRES          1.724157 H
AQ              0.2900512 s
RG                    362
DW                  4.425 u
DE                  6.32 u
TE                 300.4 K
D1            2.00000000 s
D11           0.03000000 s
D12           0.00002000 s
TD0                     1

======== CHANNEL f1 =====
NUC1                  19F
P1                  23.50 u
PL1                  0.00 d
PL1W         25.11886406 W
SFO1         564.6299194 M

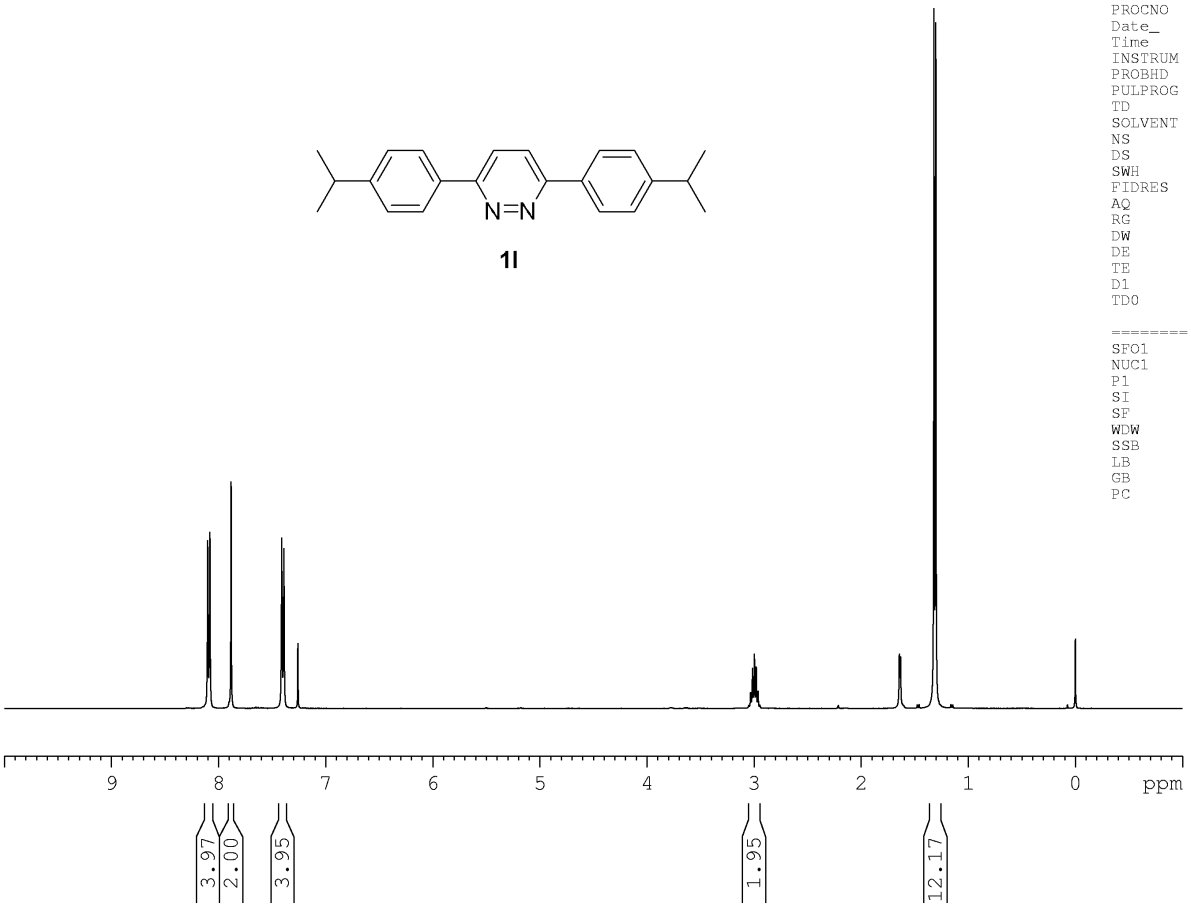
======== CHANNEL f2 =====
CPDPRG2           waltz16
NUC2                  1H
PCPD2               70.00 u
PL2                 -3.20 d
PL12                10.18 d
SFO2         600.1324005 M
SI                  65536
SF           564.6863880 M
WDW                   EM
SSB                    0
LB                  5.00 H
GB                     0
PC                  1.00
```



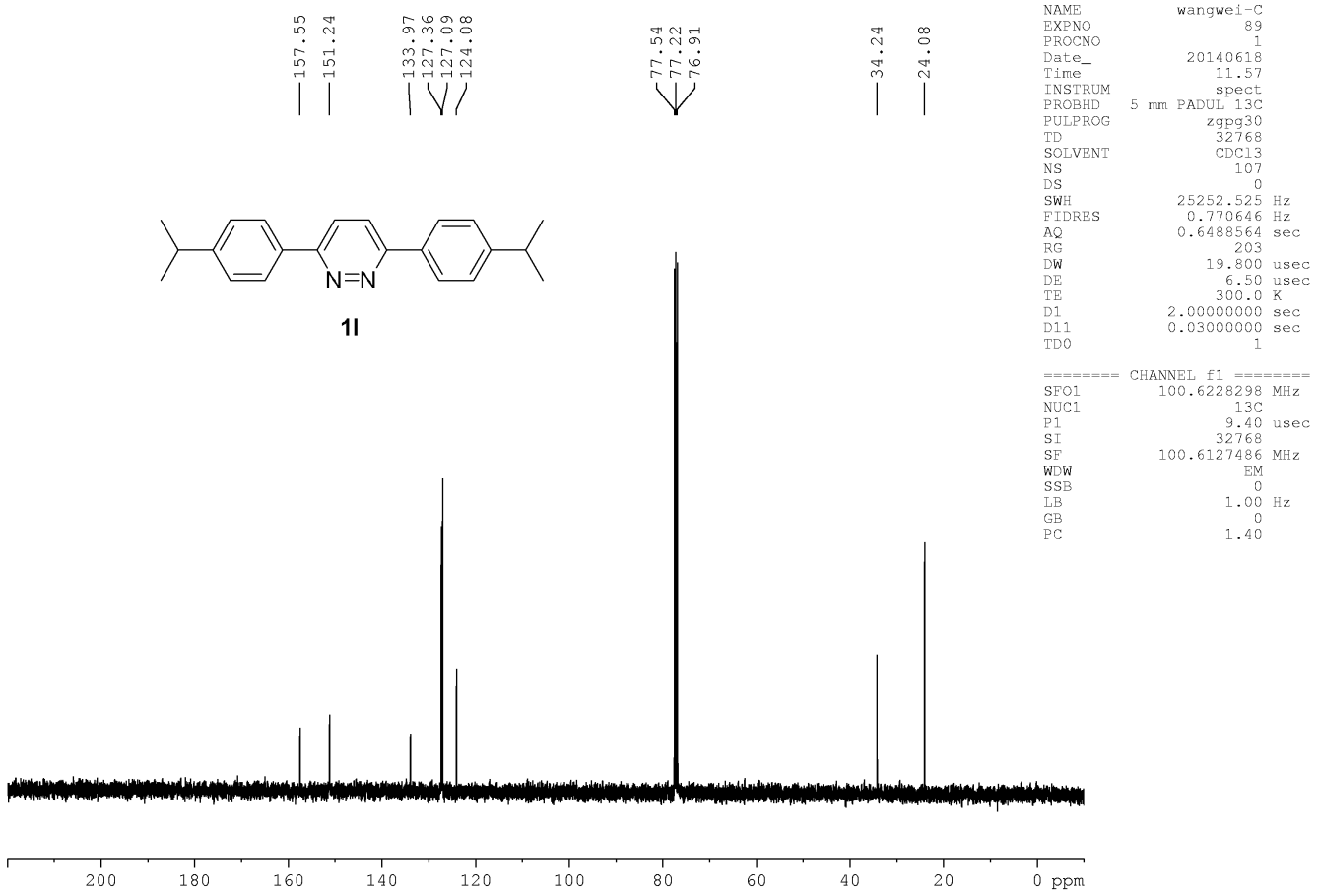
NAME	wangwei
EXPNO	415
PROCNO	1
Date_	20140611
Time	3.13
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300111 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



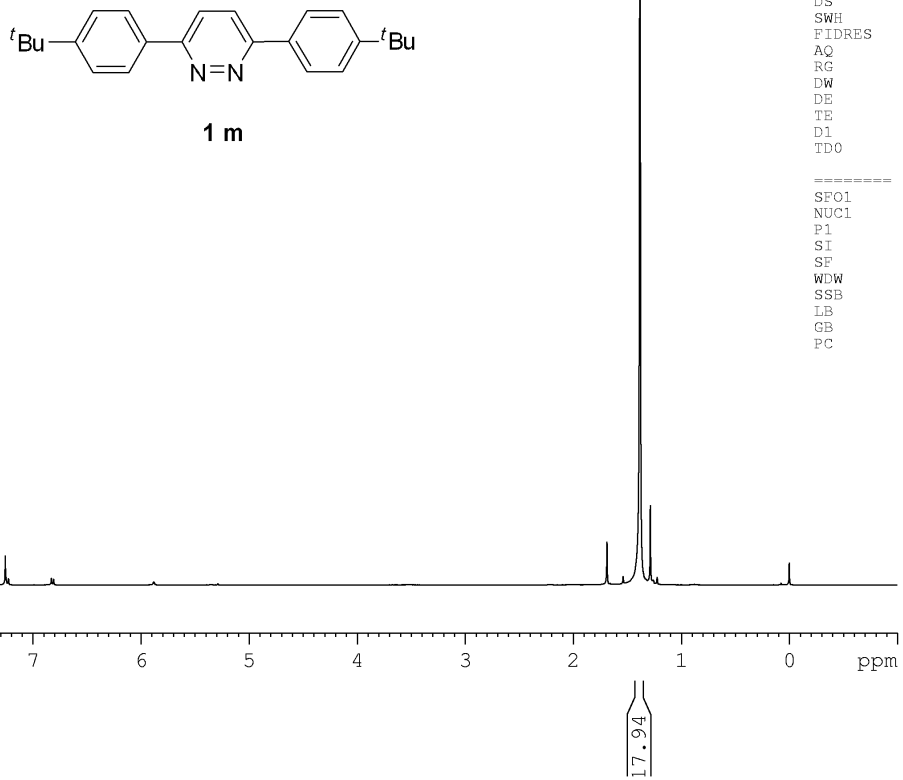
NAME	wangwei-C
EXPNO	86
PROCNO	1
Date_	20140611
Time	11.49
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	58
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL 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



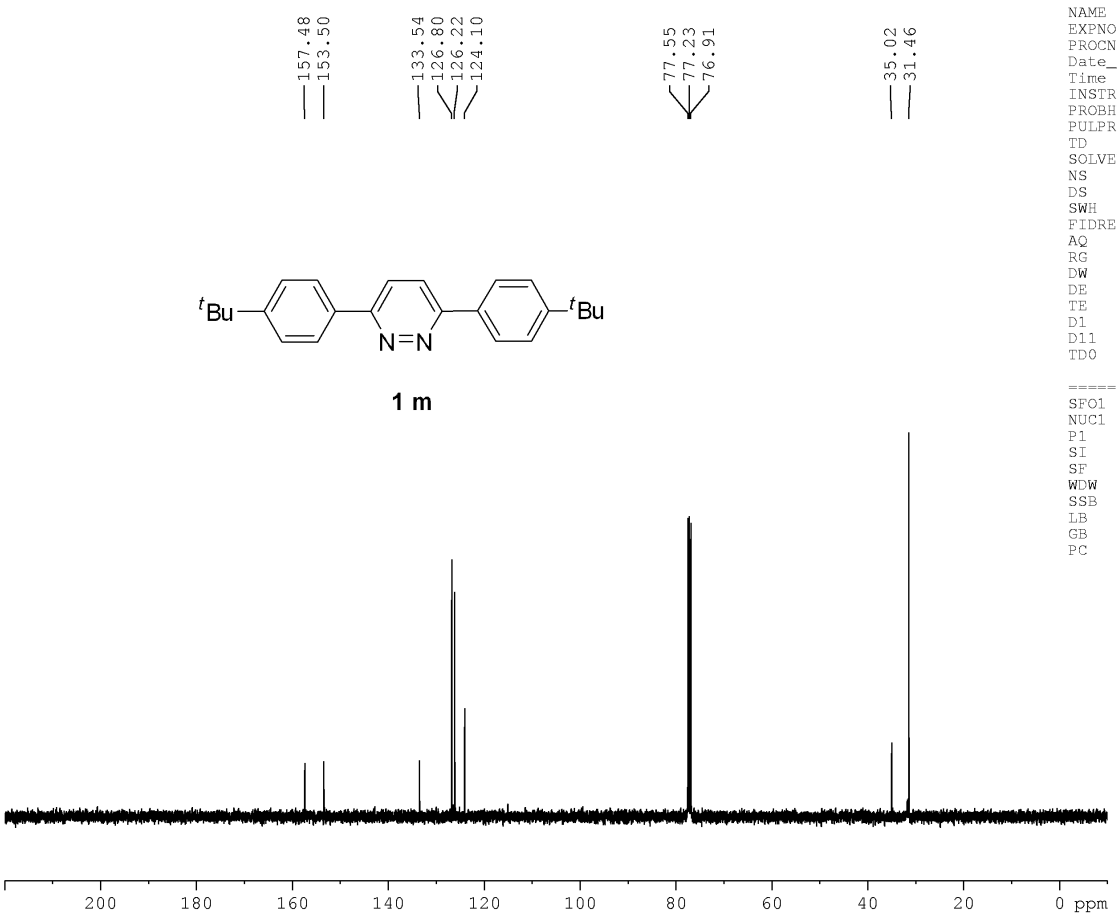
NAME	wangwei
EXPNO	429
PROCNO	1
Date_	20140618
Time	11.53
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 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



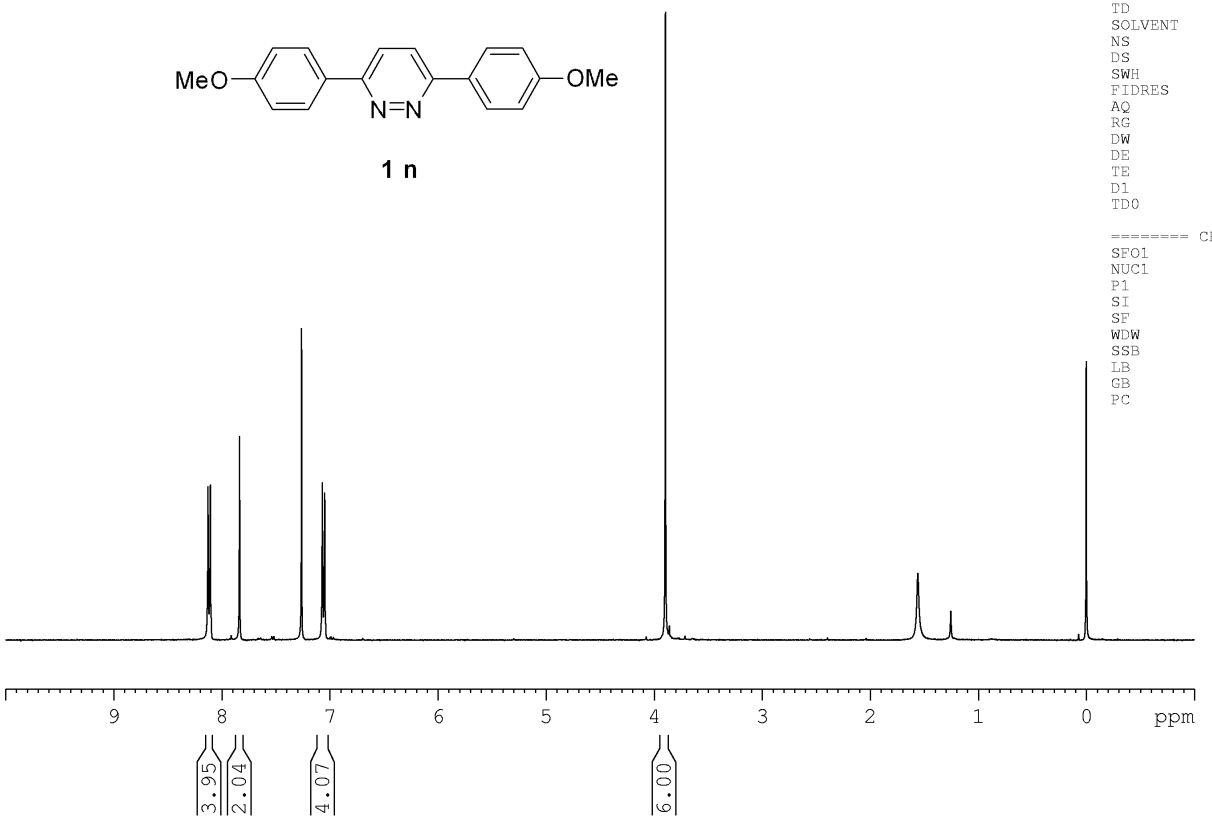
NAME	wangwei-C
EXPNO	89
PROCNO	1
Date_	20140618
Time	11.57
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	107
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127486 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



NAME	wangwei
EXPNO	514
PROCNO	1
Date_	20140813
Time	5.12
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	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	400.1300121 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00

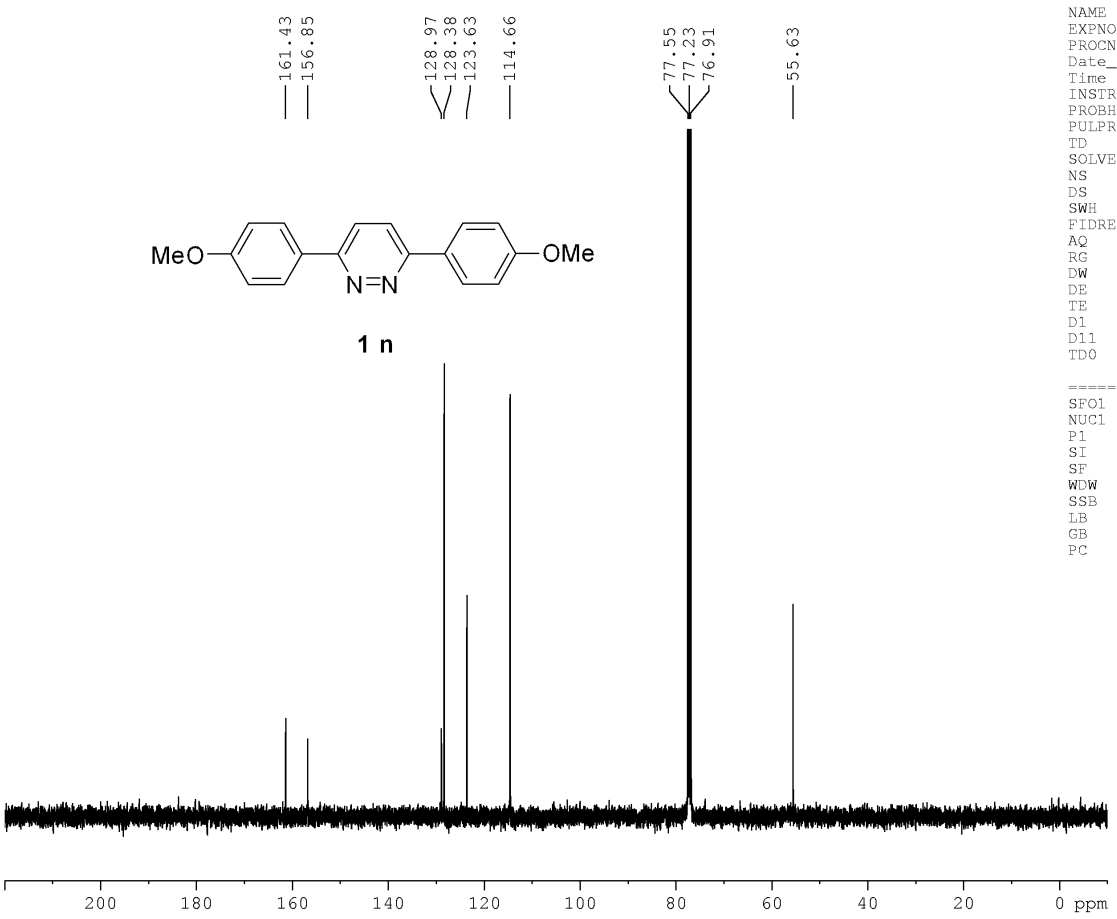


NAME	wangwei-C
EXPNO	108
PROCNO	1
Date_	20140813
Time	5.15
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	52
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL 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

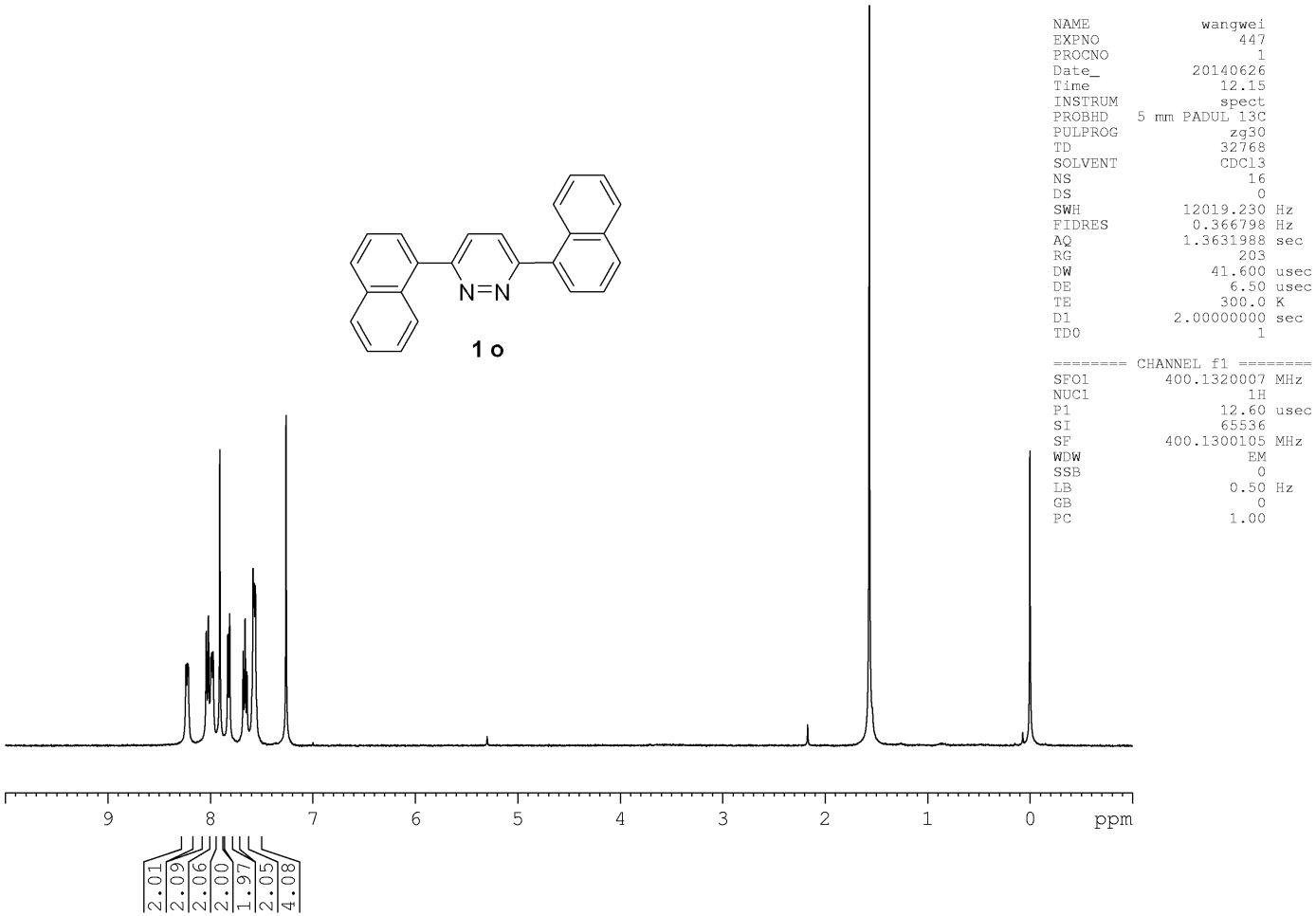



```
NAME            wangwei
EXPNO               389
PROCNO                1
Date_          20140530
Time               5.07
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG            zg30
TD                32768
SOLVENT           CDCl3
NS                   16
DS                    0
SWH           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

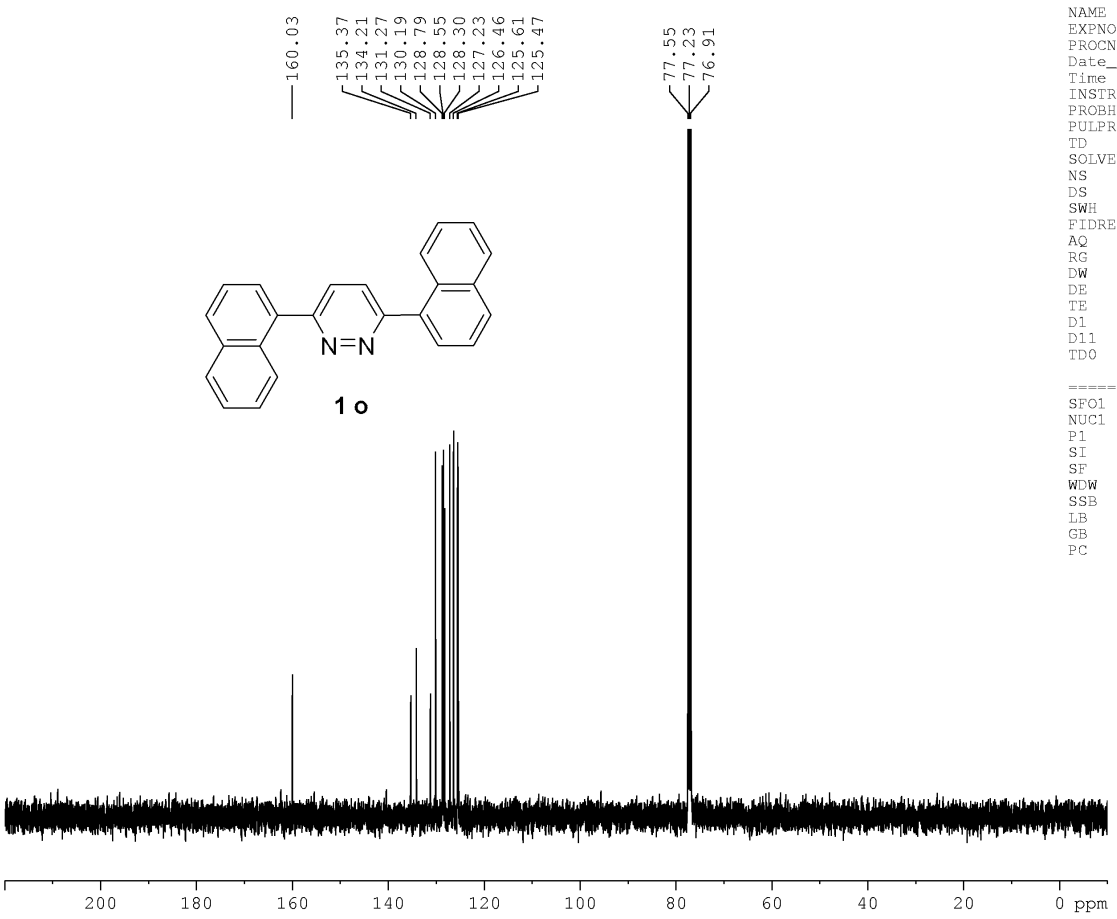
======== CHANNEL f1 ========
SFO1        400.1320007 MHz
NUC1                1H
P1                12.60 usec
SI                65536
SF          400.1300096 MHz
WDW                 EM
SSB                  0
LB                0.50 Hz
GB                   0
PC                1.00
```



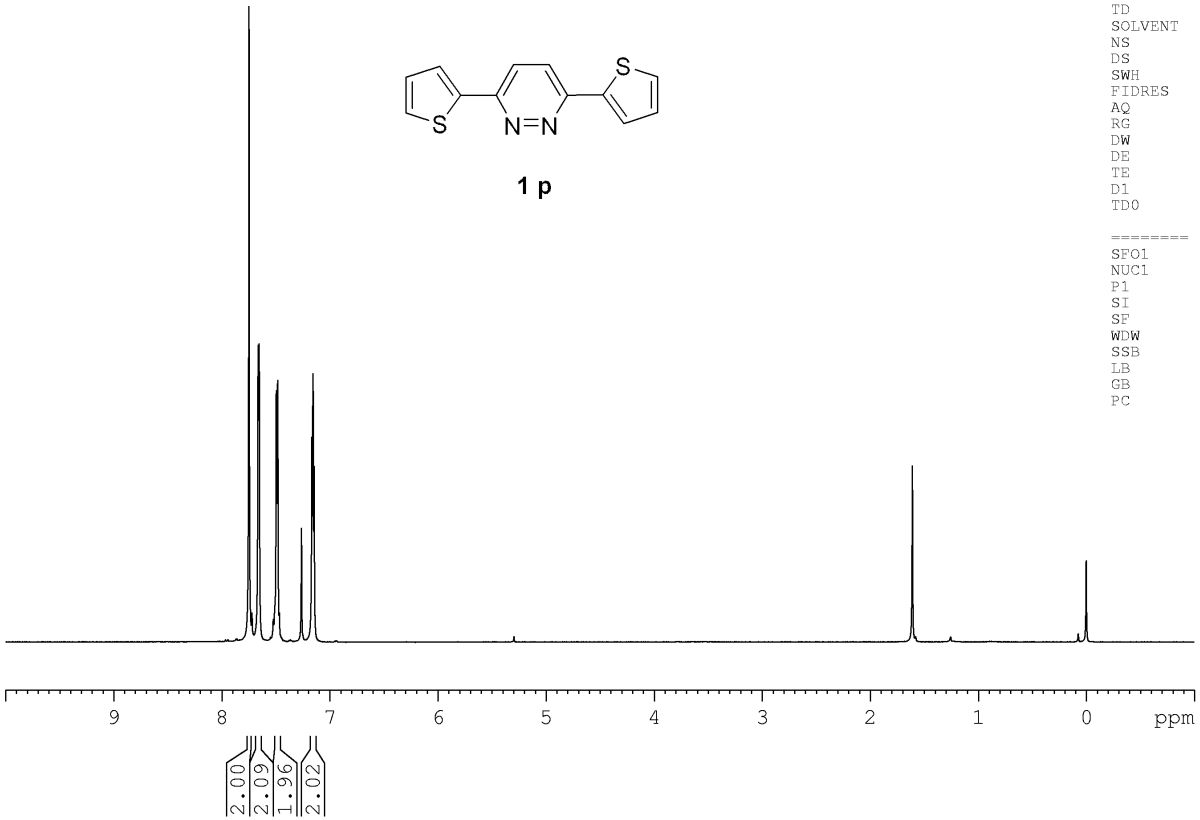
NAME	wangwei-C
EXPNO	82
PROCNO	1
Date_	20140530
Time	13.57
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	805
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127471 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



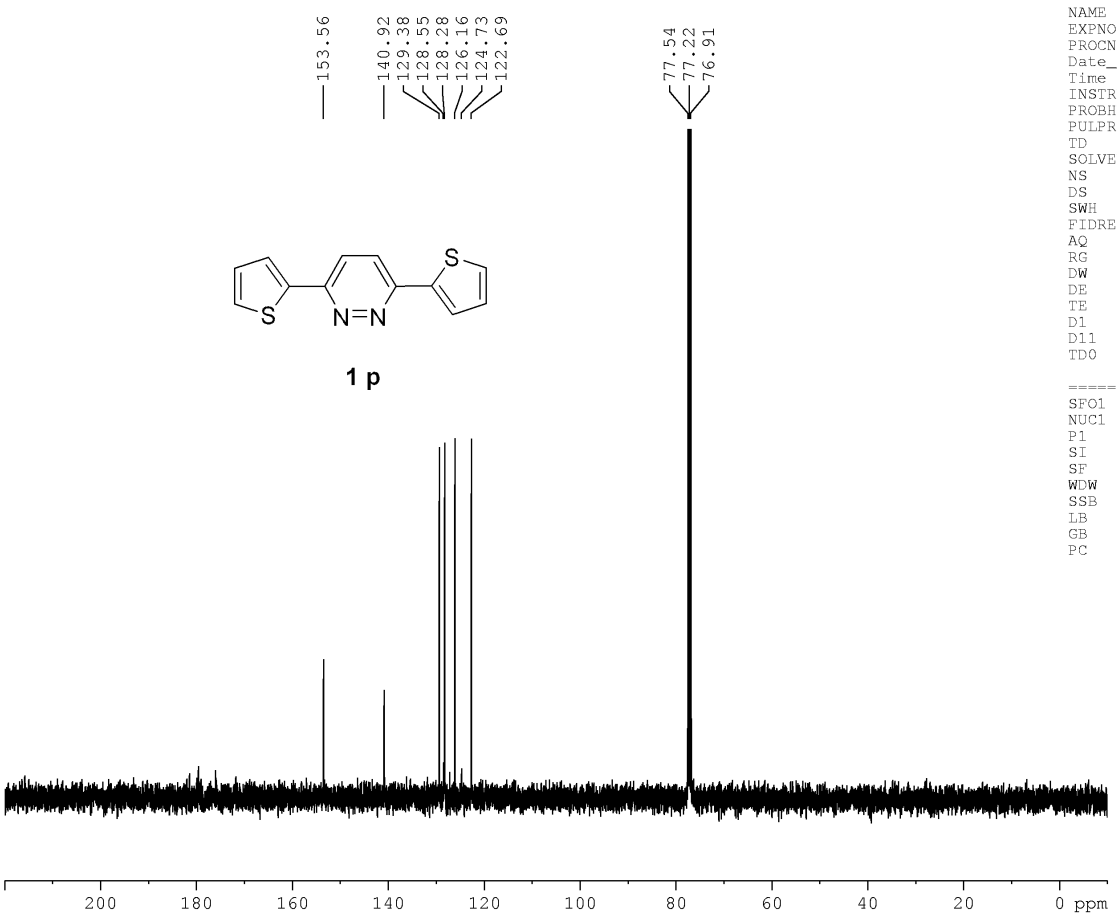
NAME	wangwei
EXPNO	447
PROCNO	1
Date_	20140626
Time	12.15
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 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



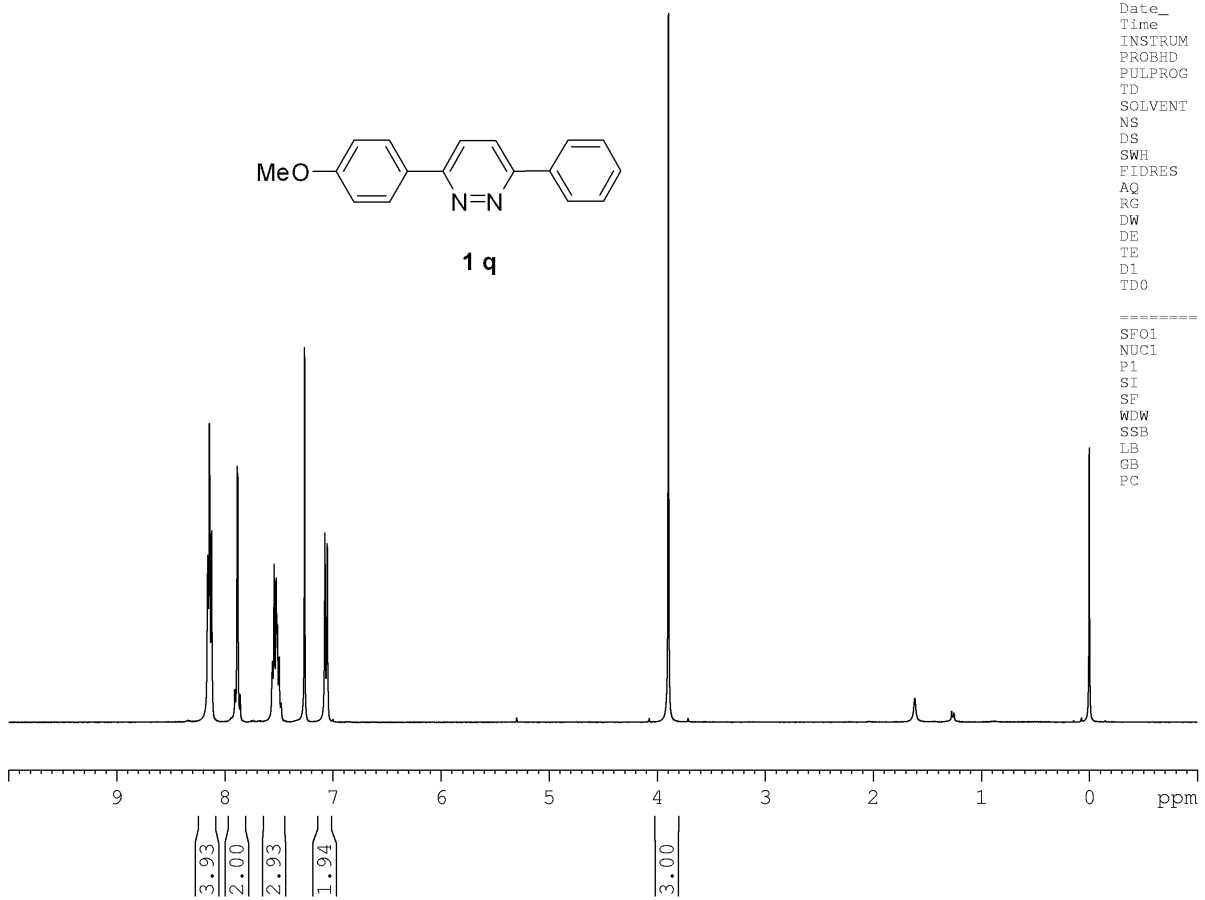
NAME	wangwei-C
EXPNO	93
PROCNO	1
Date_	20140626
Time	7.49
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	194
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
========	CHANNEL 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	wangwei
EXPNO	474
PROCNO	1
Date_	20140710
Time	6.33
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

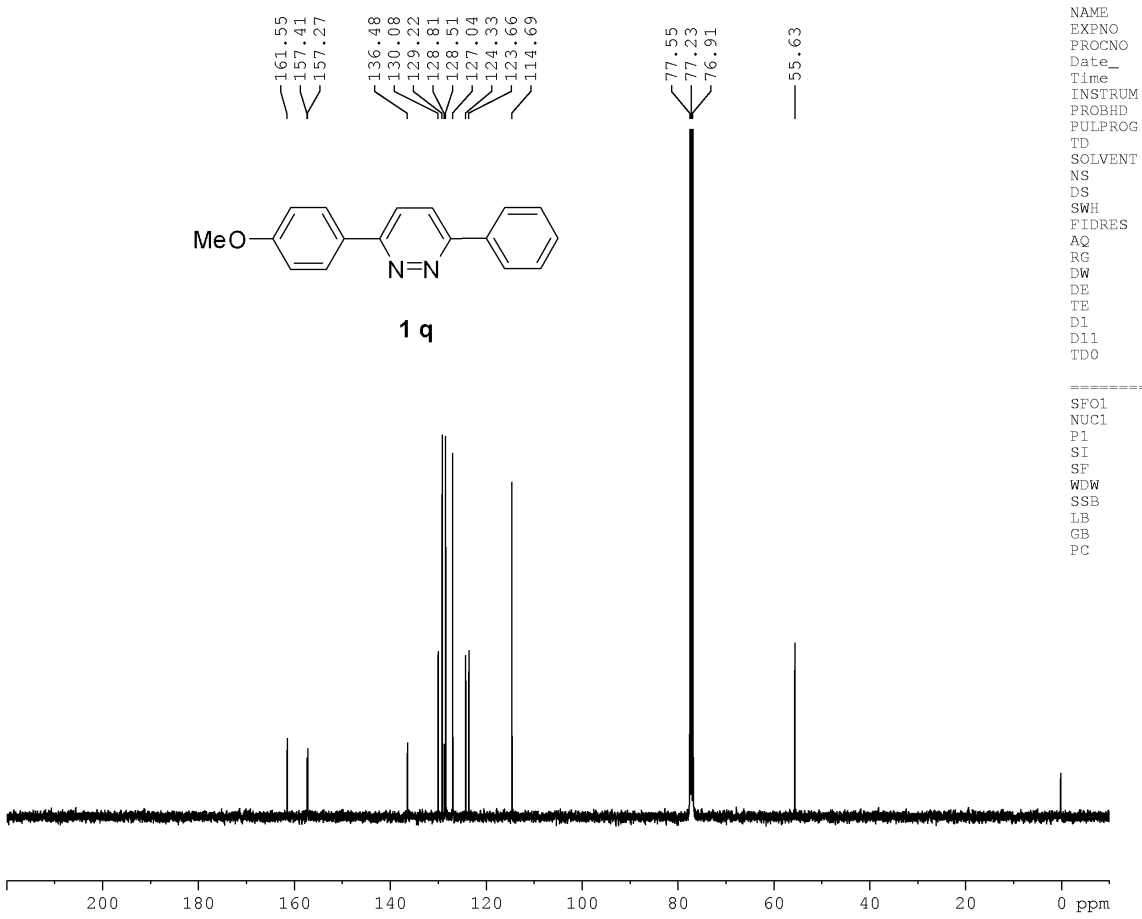


NAME	wangwei-C
EXPNO	101
PROCNO	1
Date_	20140710
Time	6.36
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	171
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127494 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

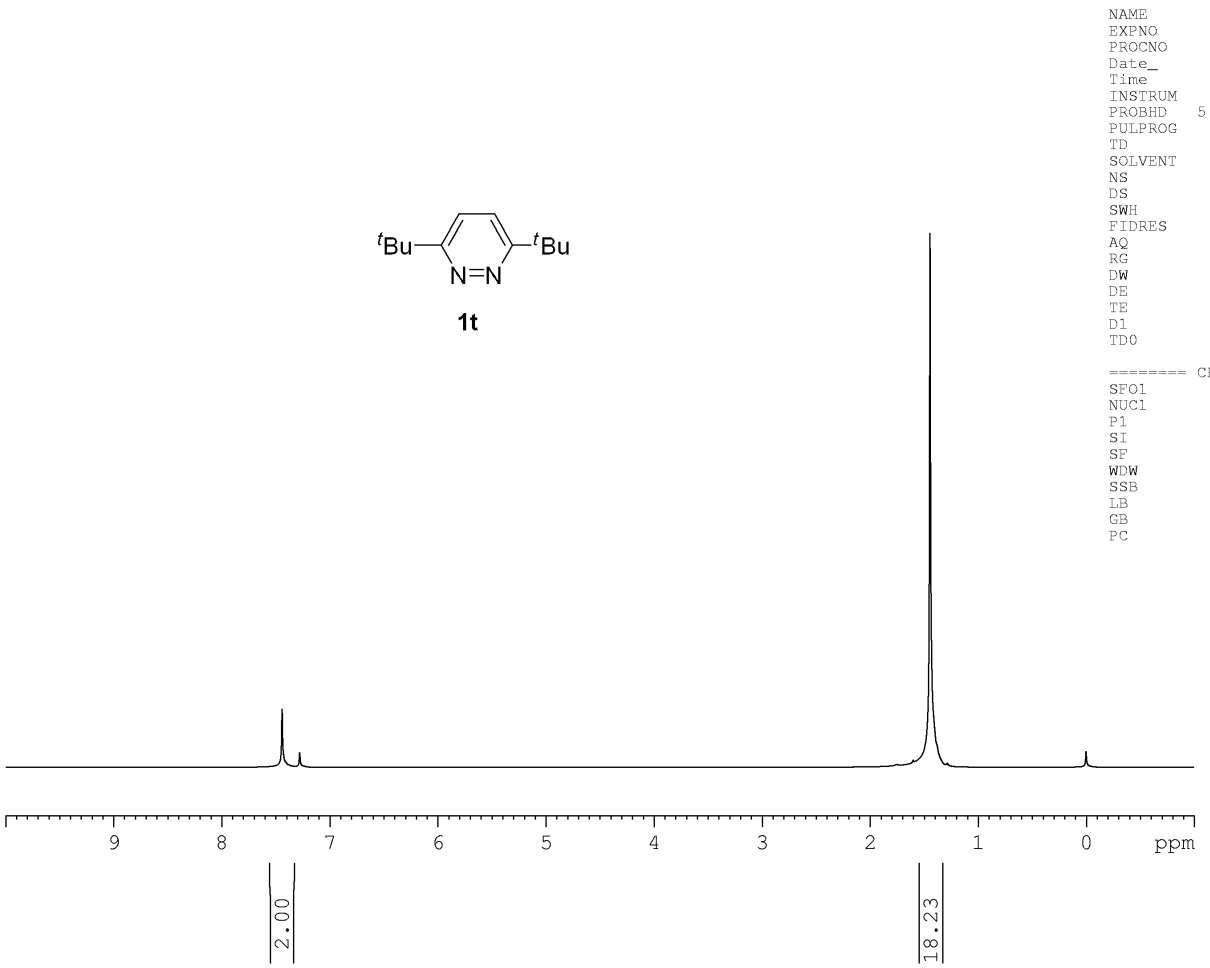



```
NAME          wangwei-2xin
EXPNO                  111
PROCNO                   1
Date_             20141208
Time                 11.23
INSTRUM              spect
PROBHD   5 mm PADUL 13C
PULPROG               zg30
TD                   32768
SOLVENT              CDCl3
NS                      16
DS                       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

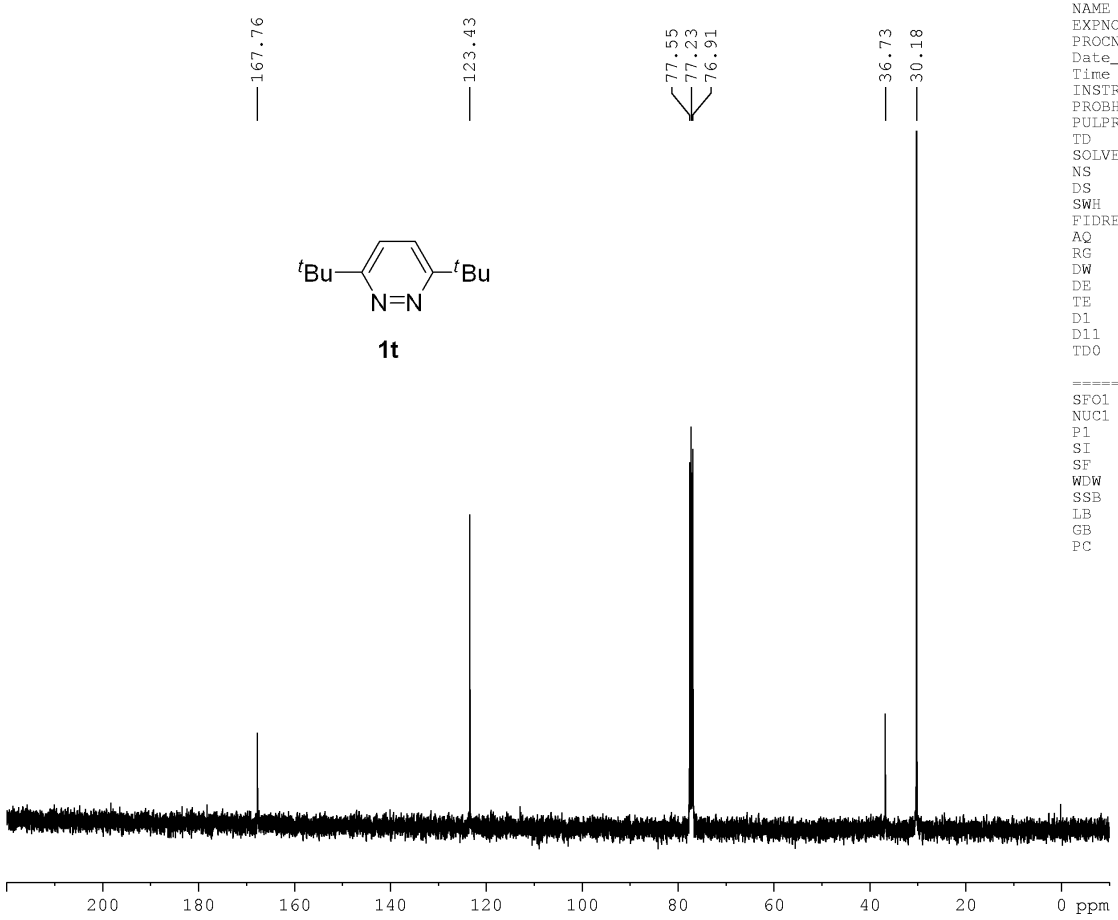
======== CHANNEL f1 ========
SFO1          400.1320007 MHz
NUC1                    1H
P1                   12.60 usec
SI                   65536
SF            400.1300096 MHz
WDW                     EM
SSB                      0
LB                    0.50 Hz
GB                       0
PC                    1.00
```



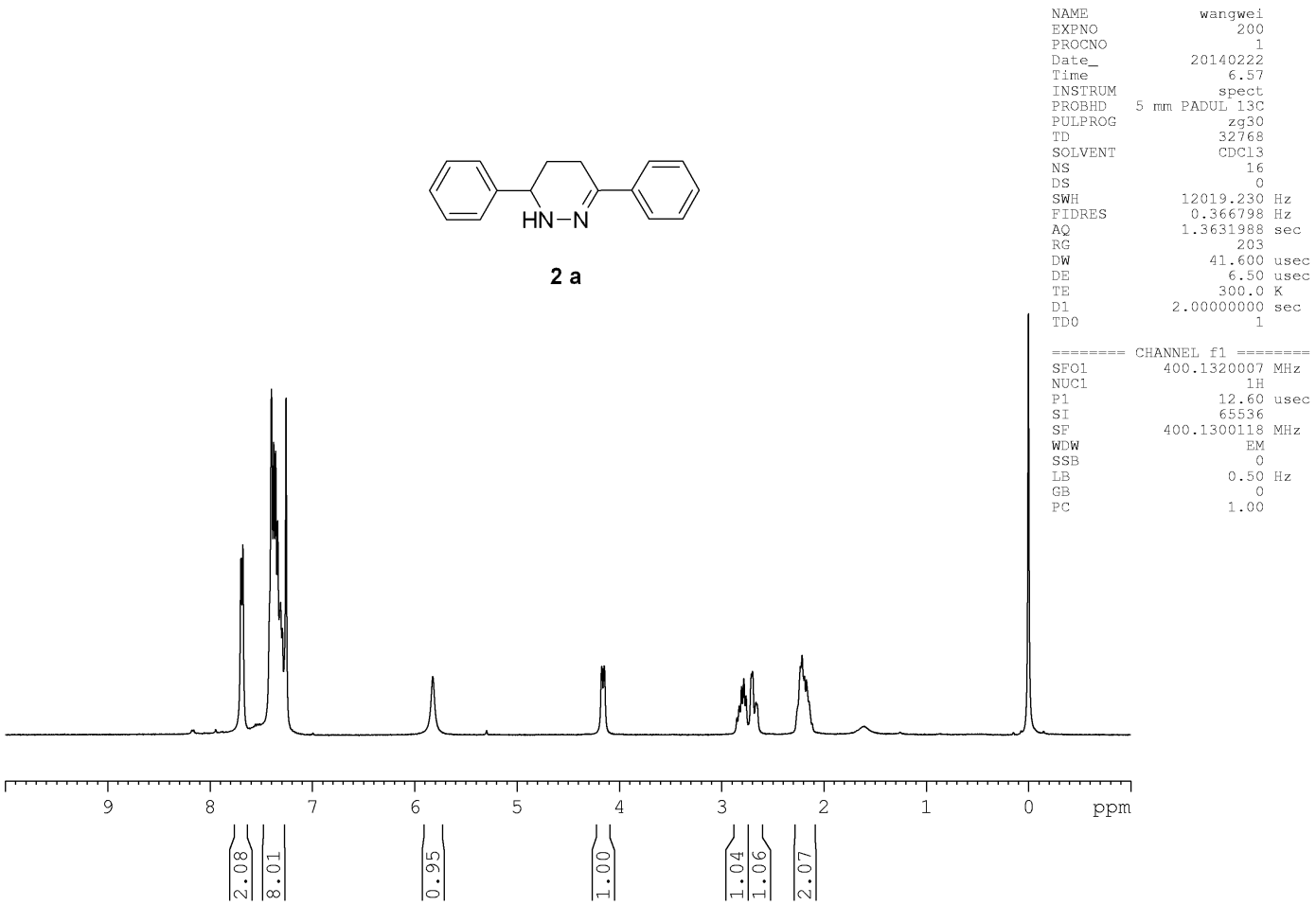
NAME	wangwei-C-1 HUIFU
EXPNO	19
PROCNO	1
Date_	20141208
Time	11.44
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	2182
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
========	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

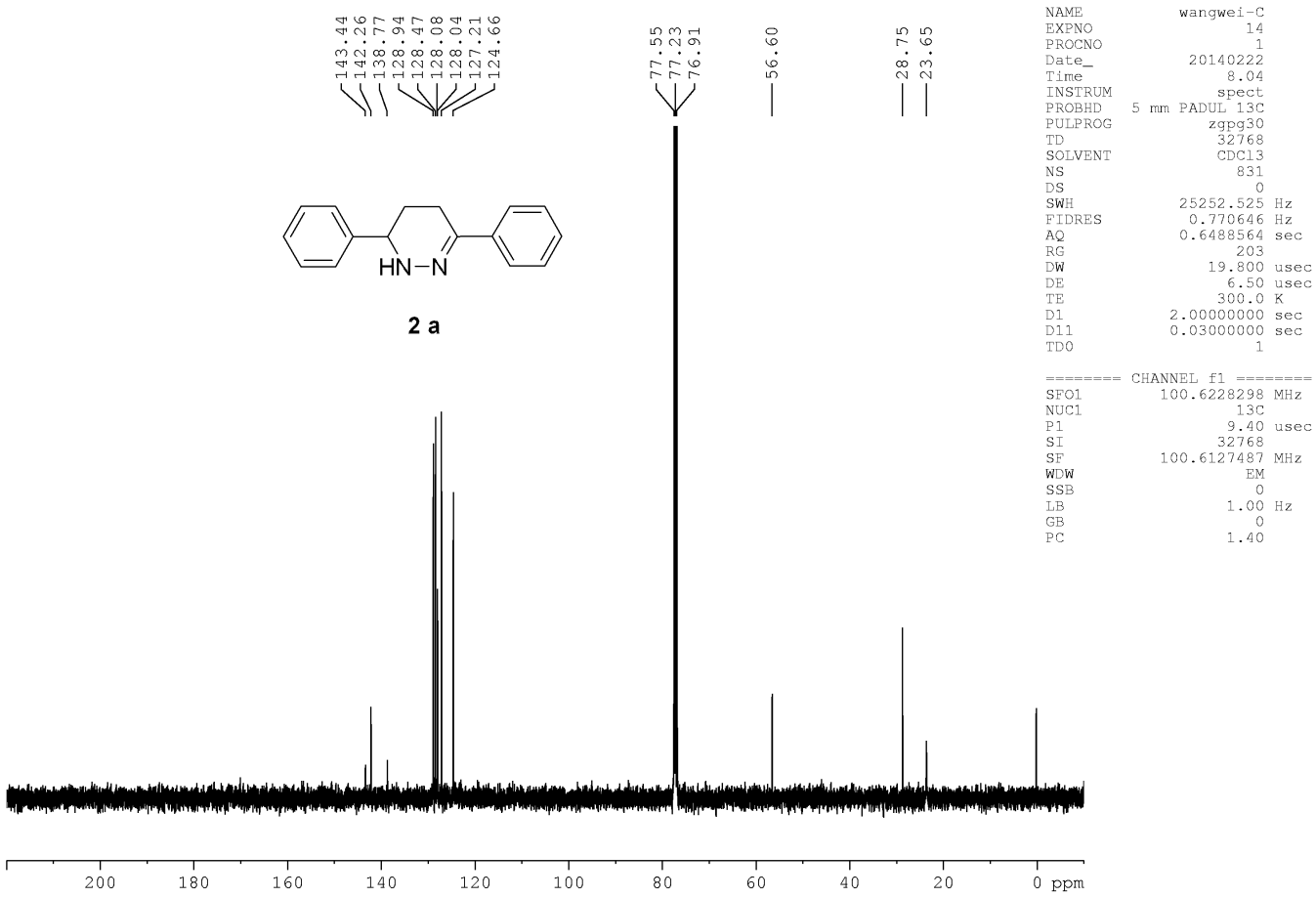


NAME	wangwei
EXPNO	232
PROCNO	1
Date_	20140306
Time	1.53
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	101
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300038 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00

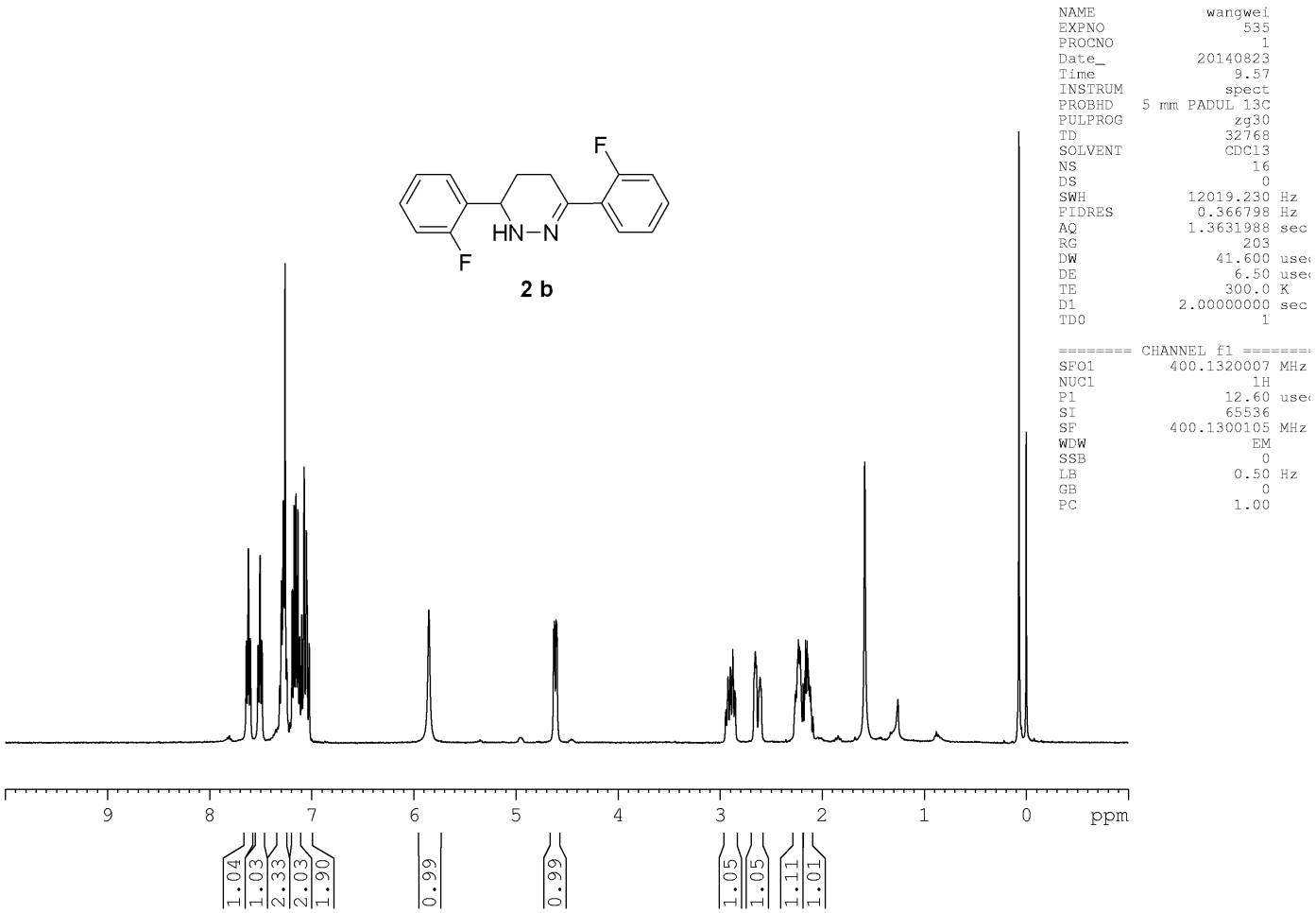


NAME	wangwei-C
EXPNO	24
PROCNO	1
Date_	20140306
Time	1.57
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	168
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127495 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

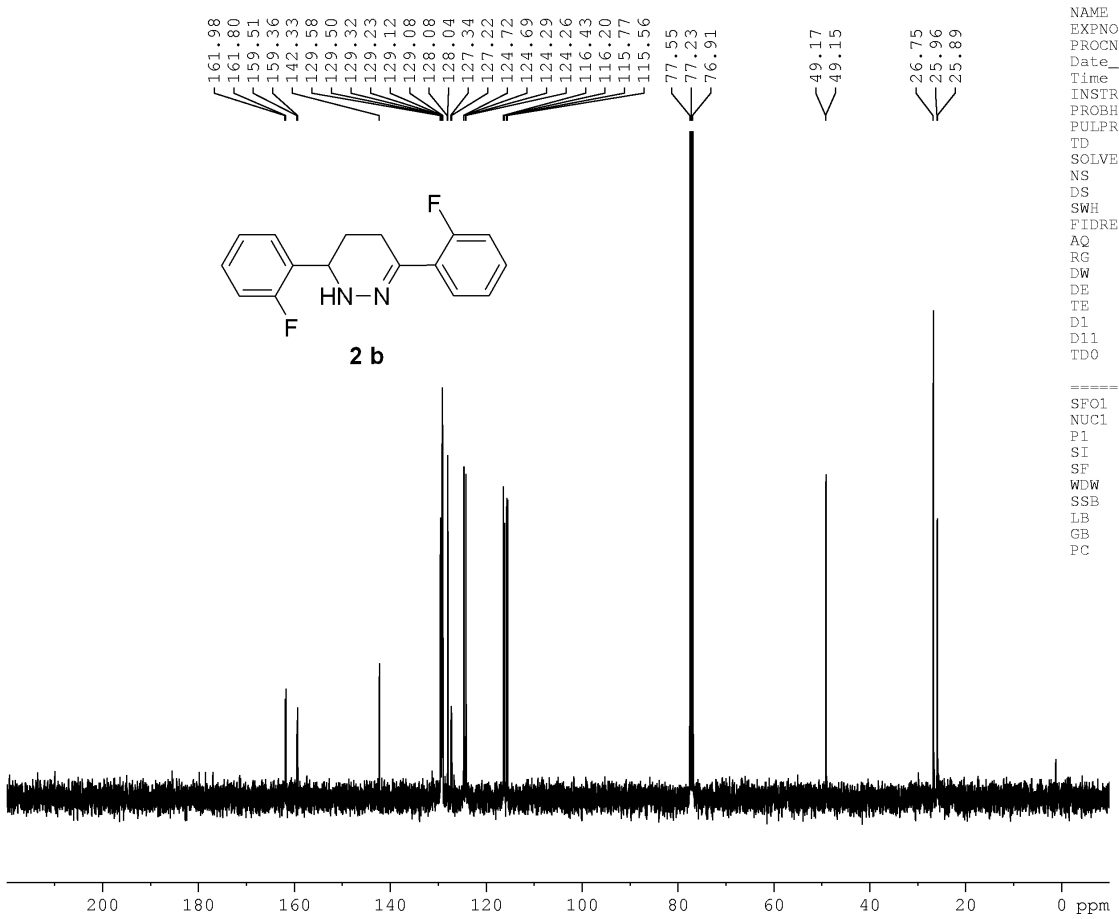

HN–N
2 a
NAME wangwei
EXPNO 200
PROCNO 1
Date_ 20140222
Time 6.57
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 0
SWH 12019.230 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 203
DW 41.600 usec
DE 6.50 usec
TE 300.0 K
D1 2.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1320007 MHz
NUC1 1H
P1 12.60 usec
SI 65536
SF 400.1300118 MHz
WDW EM
SSB 0
LB 0.50 Hz
GB 0
PC 1.00
9
8
7
6
5
4
3
2
1
0
ppm
2.08
8.01
0.95
1.00
1.04
1.06
2.07



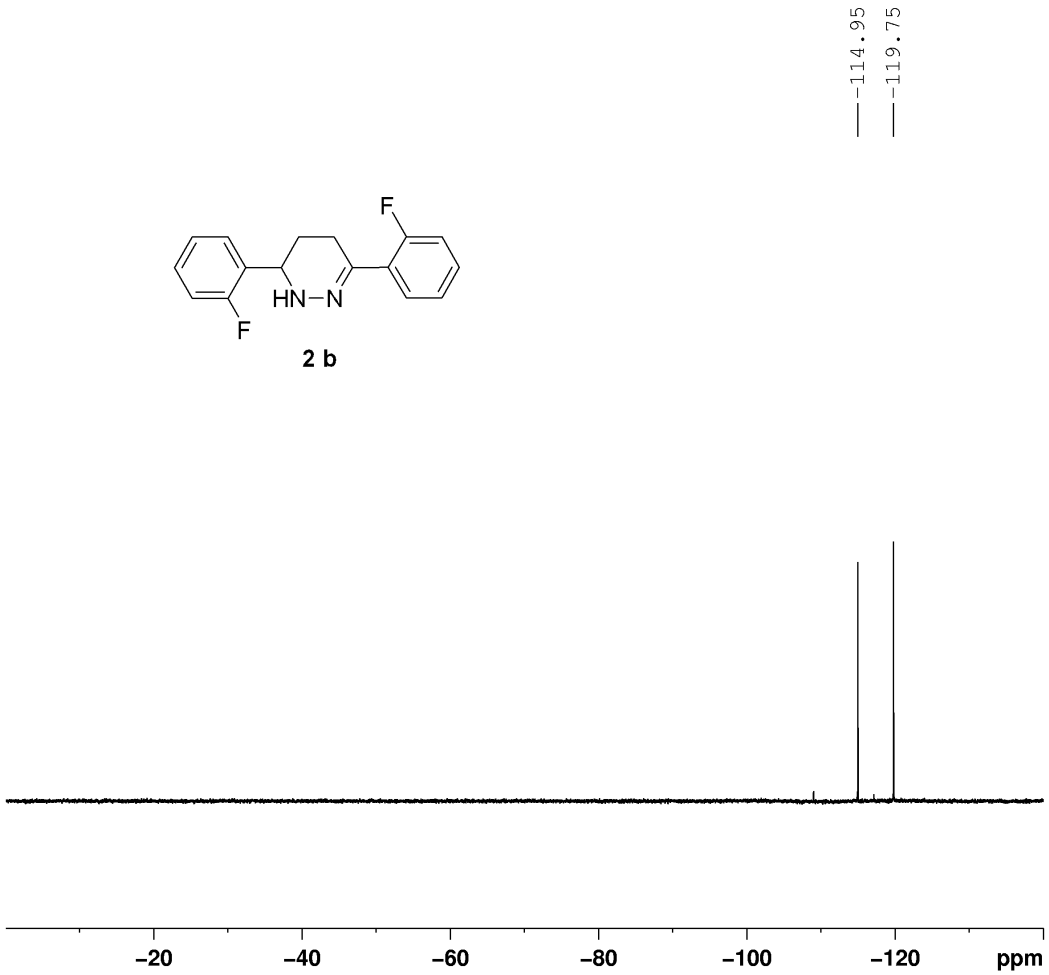
NAME	wangwei-C
EXPNO	14
PROCNO	1
Date_	20140222
Time	8.04
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	831
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL 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



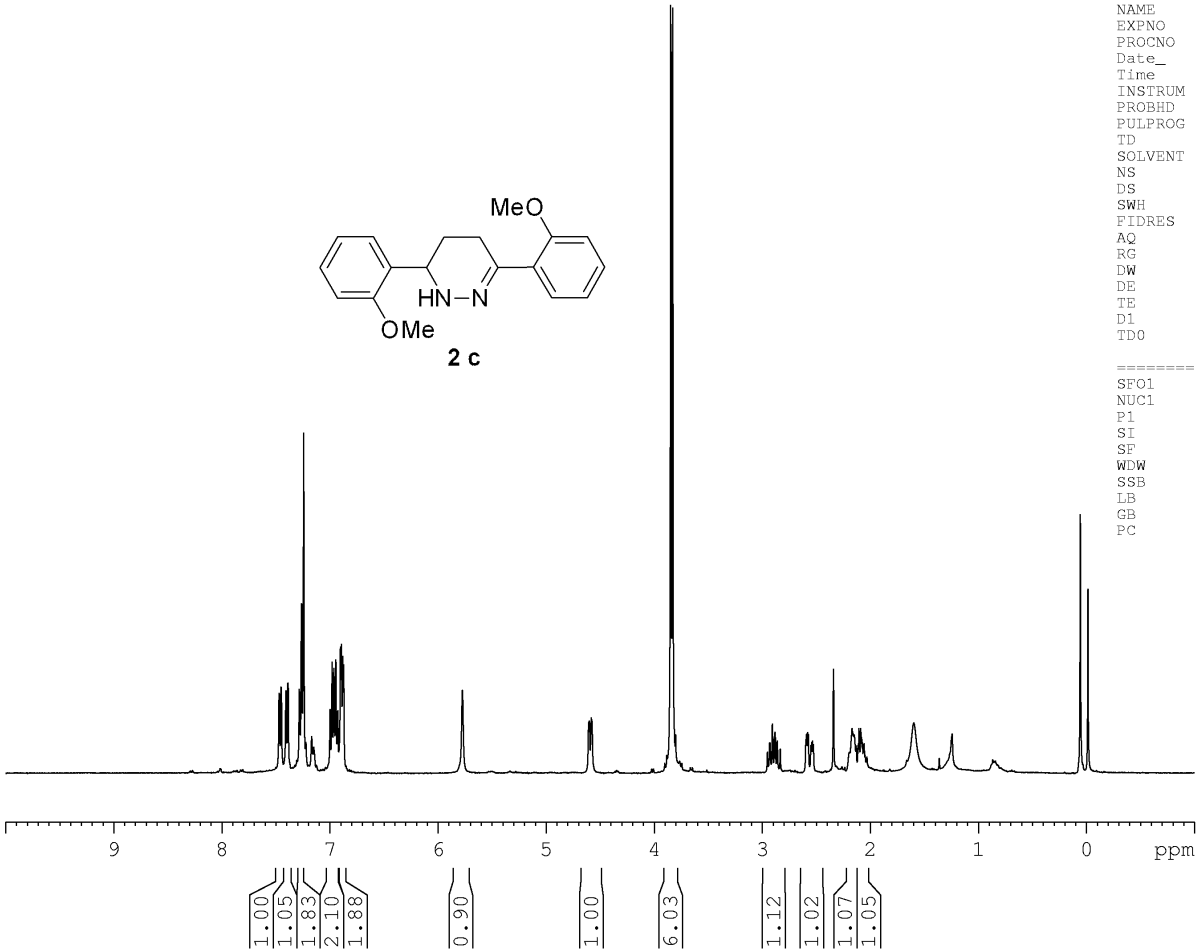
NAME	wangwei
EXPNO	535
PROCNO	1
Date_	20140823
Time	9.57
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 use
DE	6.50 use
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 use
SI	65536
SF	400.1300105 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



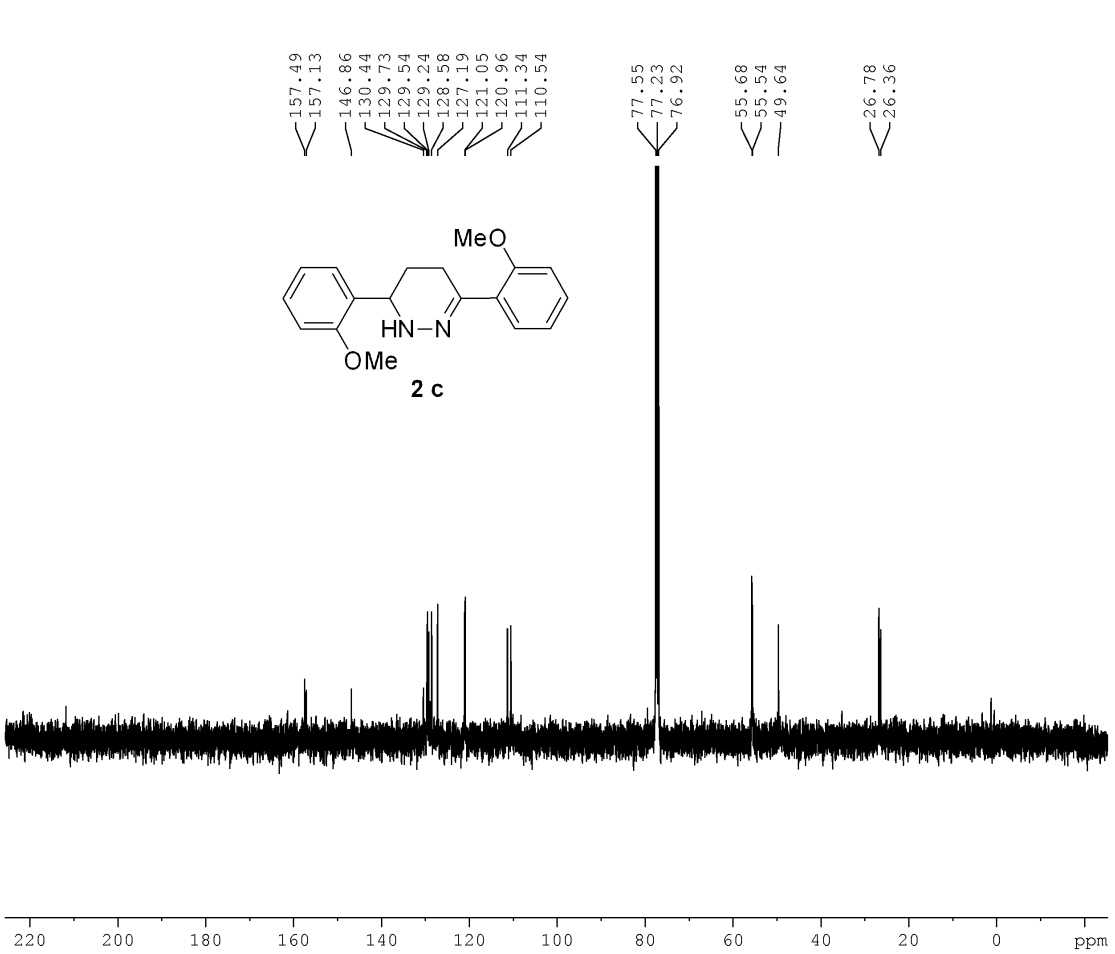
NAME	wangwei-C
EXPNO	117
PROCNO	1
Date_	20140826
Time	7.34
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	203
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL 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



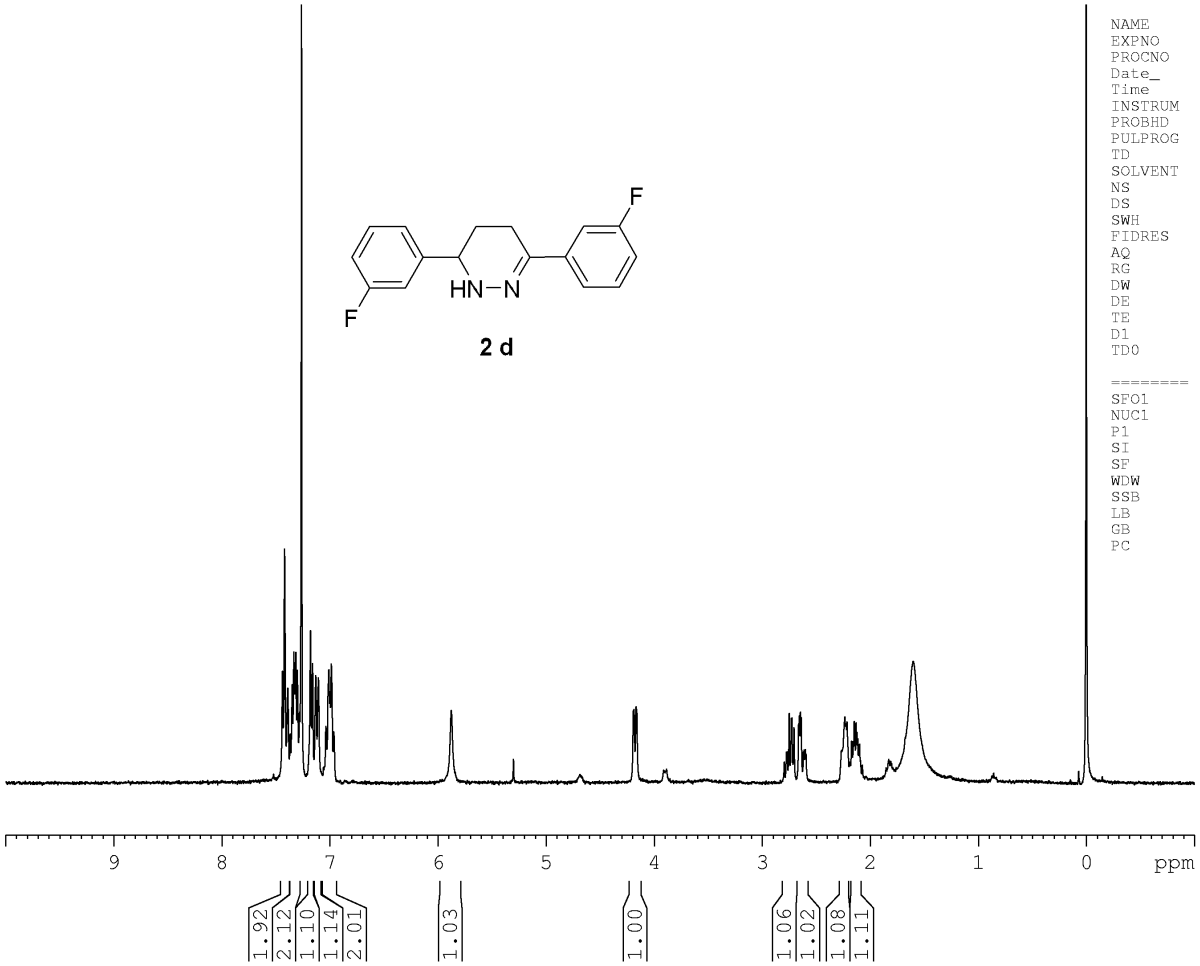
NAME	19F
EXPNO	77
PROCNO	1
Date_	20151008
Time	22.43
INSTRUM	spect
PROBHD	5 mm PATBO BB-
PULPROG	zgfhigqn
TD	65536
SOLVENT	CDCl3
NS	16
DS	0
SWH	112994.352 Hz
FIDRES	1.724157 Hz
AQ	0.2900512 sec
RG	362
DW	4.425 usec
DE	6.32 usec
TE	300.6 K
D1	2.00000000 sec
D11	0.03000000 sec
D12	0.00002000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	19F
P1	23.50 usec
PL1	0.00 dB
PL1W	25.11886406 W
SFO1	564.6299194 MHz
======== CHANNEL f2 ========	
CPDPRG2	waltz16
NUC2	1H
PCPD2	70.00 usec
PL2	-3.20 dB
PL12	10.18 dB
SFO2	600.1324005 MHz
SI	65536
SF	564.6863880 MHz
WDW	EM
SSB	0
LB	5.00 Hz
GB	0
PC	1.00



NAME	wangwei
EXPNO	480
PROCNO	1
Date_	20140711
Time	13.25
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	400.1300175 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00

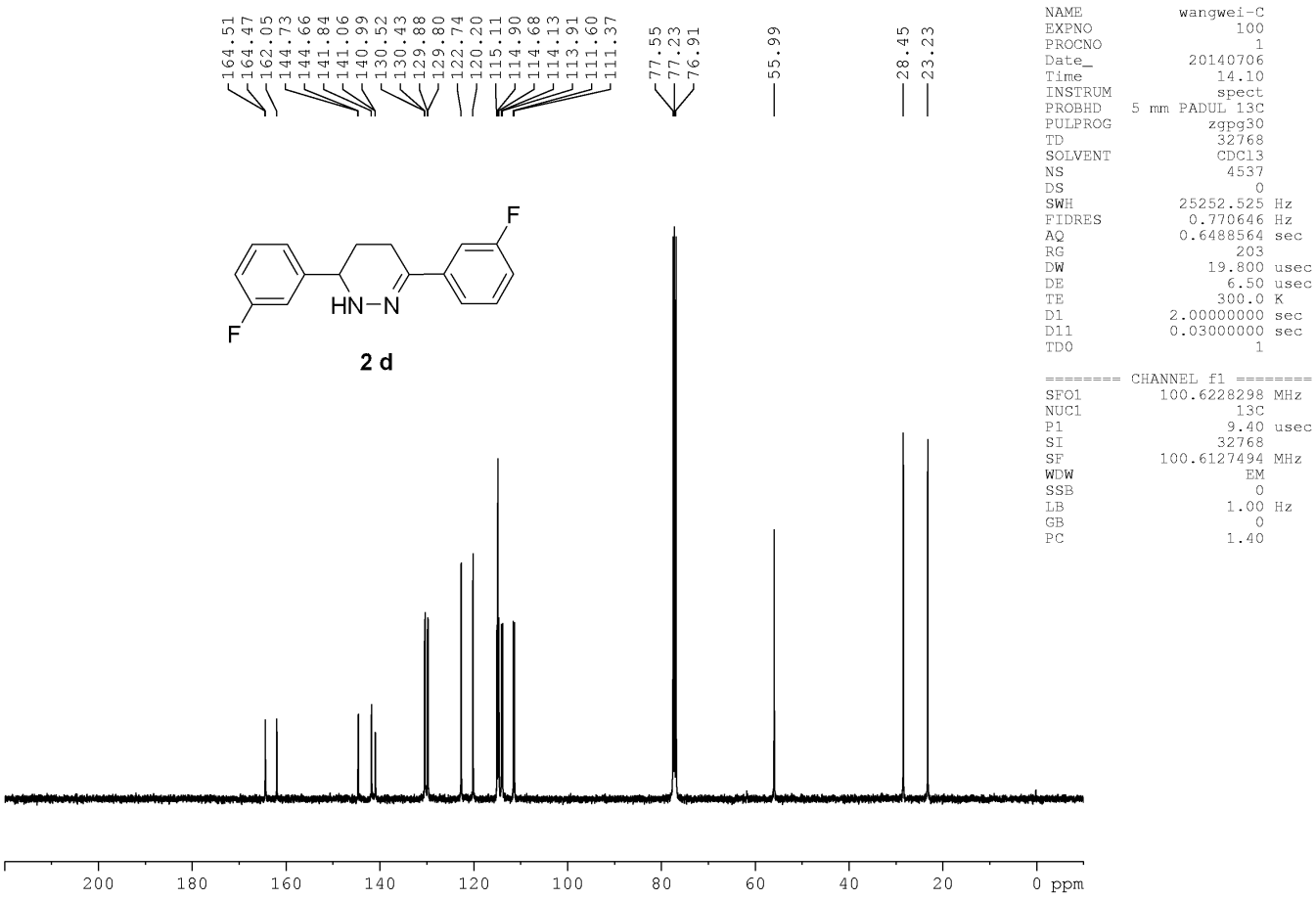


NAME	wangwei-C
EXPNO	106
PROCNO	1
Date_	20140719
Time	3.41
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	269
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 use
DE	6.50 use
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 use
SI	32768
SF	100.6127494 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

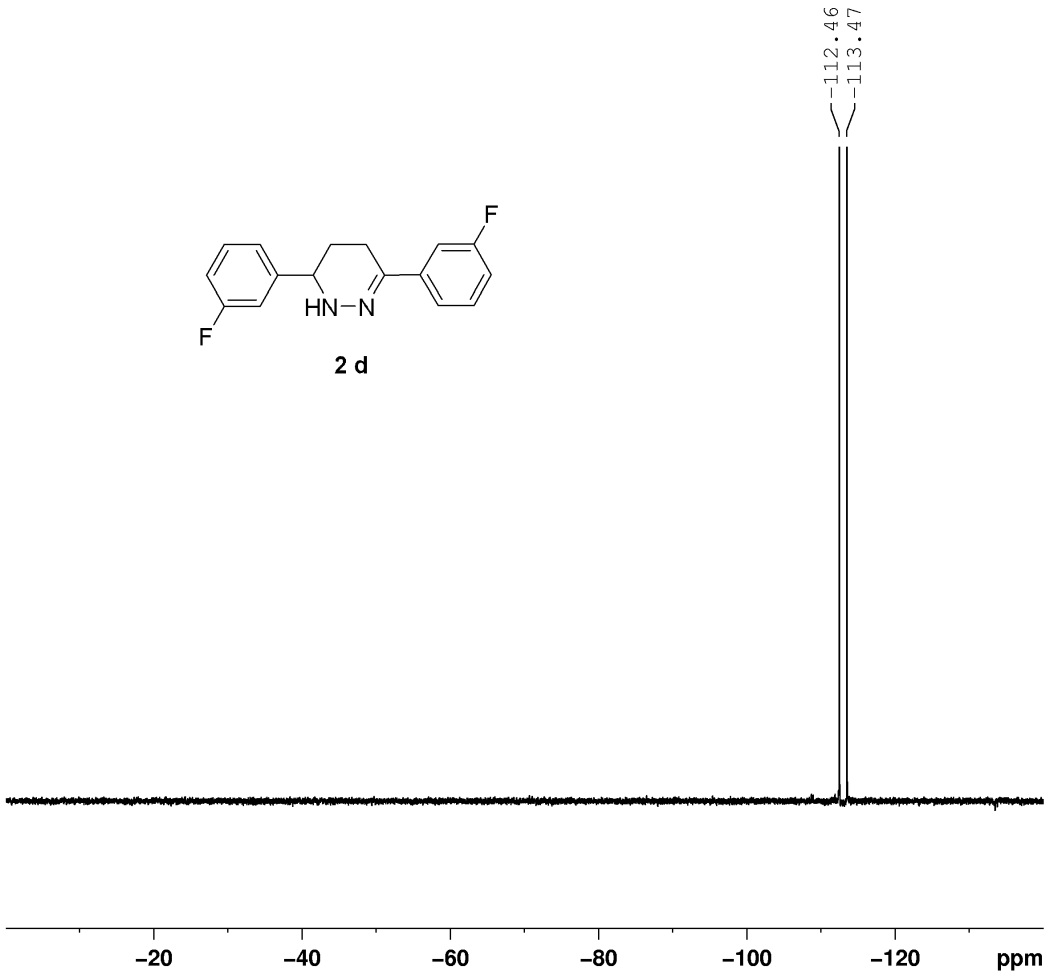



```
NAME              wangwei
EXPNO                 467
PROCNO                  1
Date_              20140706
Time                 12.57
INSTRUM              spect
PROBHD   5 mm PADUL 13C
PULPROG               zg30
TD                   32768
SOLVENT              CDCl3
NS                      16
DS                       0
SWH              12019.230 Hz
FIDRES           0.366798 Hz
AQ               1.3631988 sec
RG                     203
DW                  41.600 usec
DE                   6.50 usec
TE                  300.0 K
D1               2.00000000 sec
TD0                     1

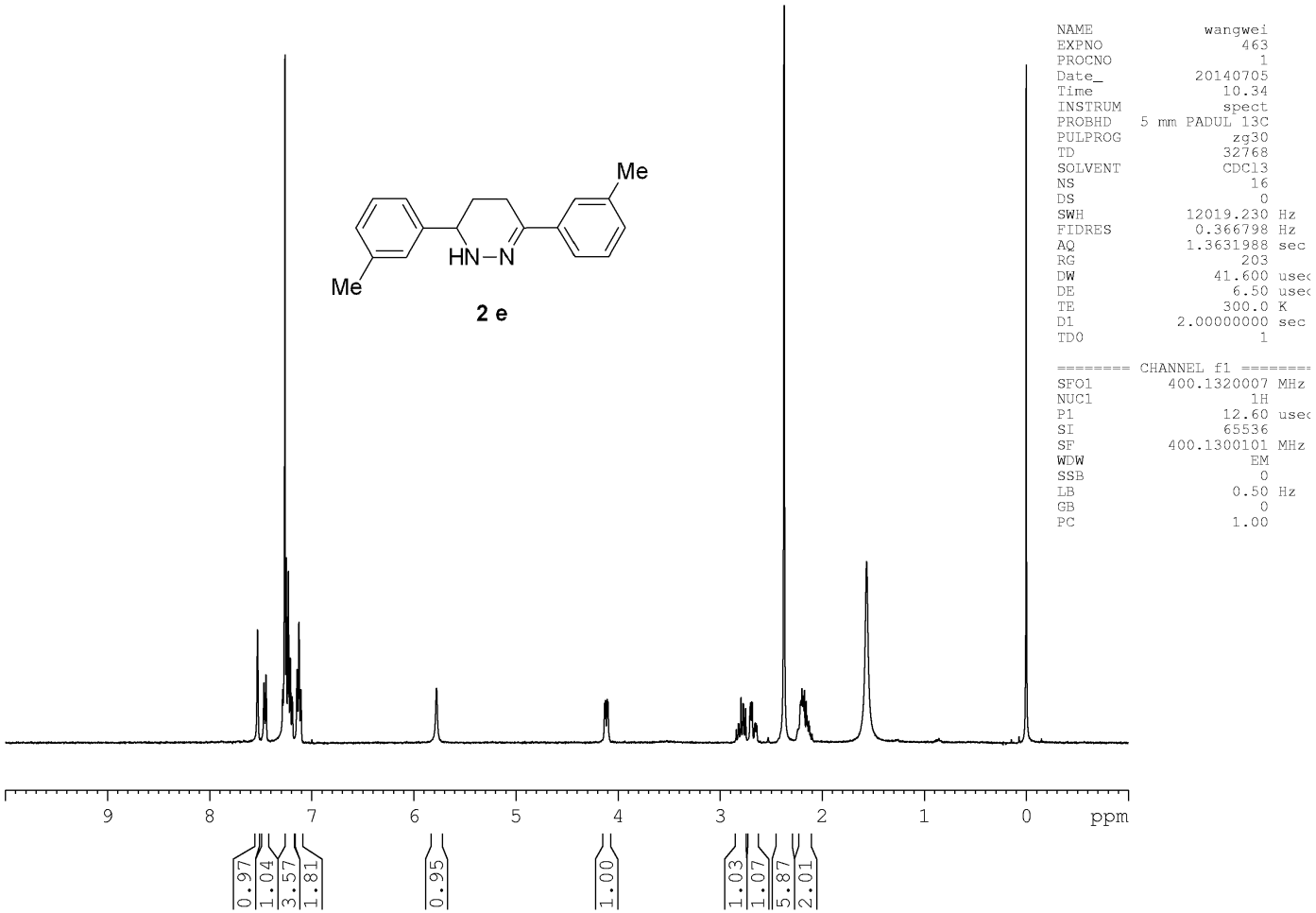
======== CHANNEL f1 ========
SFO1           400.1320007 MHz
NUC1                   1H
P1                  12.60 usec
SI                  65536
SF             400.1300097 MHz
WDW                    EM
SSB                     0
LB                   0.50 Hz
GB                      0
PC                   1.00
```



NAME	wangwei-C
EXPNO	100
PROCNO	1
Date_	20140706
Time	14.10
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	4537
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	100.6127494 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

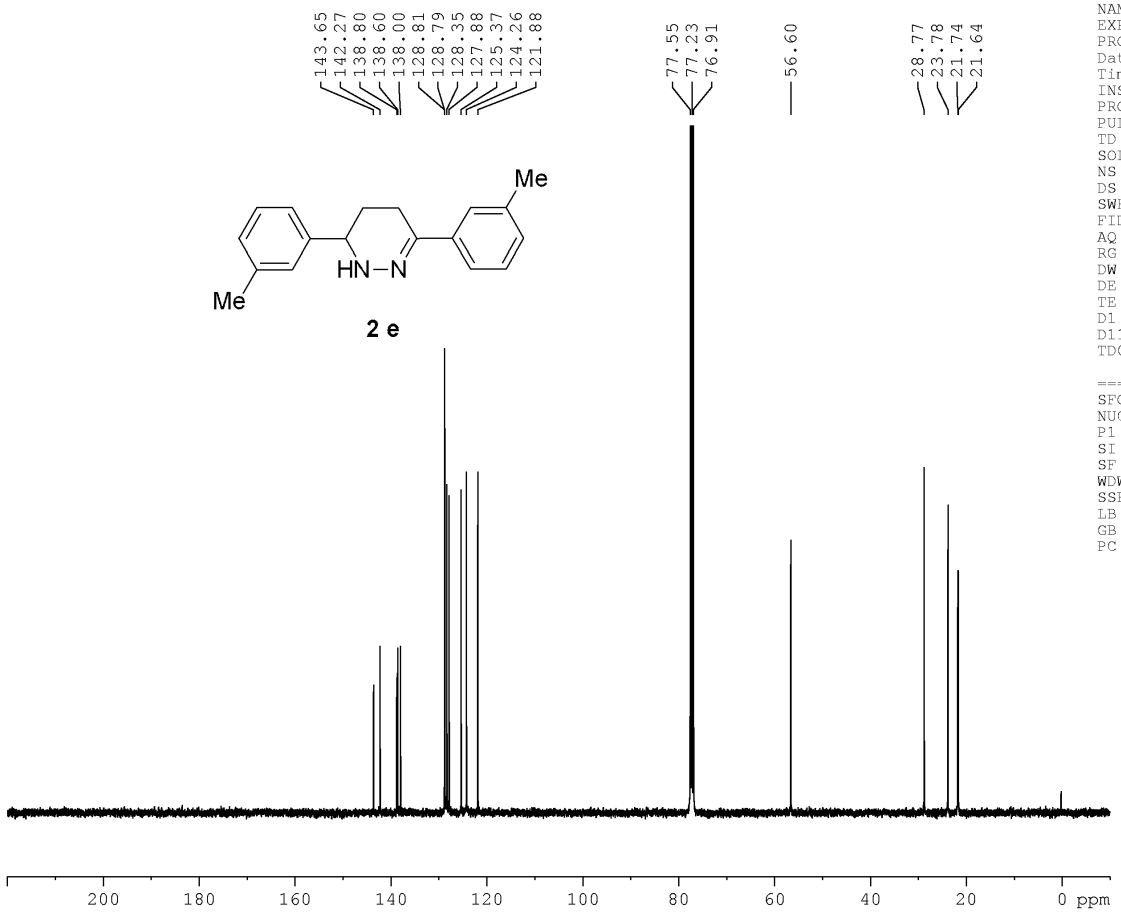


NAME	19F
EXPNO	68
PROCNO	1
Date_	20151008
Time	15.18
INSTRUM	spect
PROBHD	5 mm PATBO BB-
PULPROG	zgfhigqn
TD	65536
SOLVENT	CDCl3
NS	16
DS	0
SWH	112994.352 Hz
FIDRES	1.724157 Hz
AQ	0.2900512 sec
RG	362
DW	4.425 usec
DE	6.32 usec
TE	300.4 K
D1	2.00000000 sec
D11	0.03000000 sec
D12	0.00002000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	19F
P1	23.50 usec
PL1	0.00 dB
PL1W	25.11886406 W
SFO1	564.6299194 MHz
======== CHANNEL f2 ========	
CPDPRG2	waltz16
NUC2	1H
PCPD2	70.00 usec
PL2	-3.20 dB
PL12	10.18 dB
SFO2	600.1324005 MHz
SI	65536
SF	564.6863880 MHz
WDW	EM
SSB	0
LB	5.00 Hz
GB	0
PC	1.00

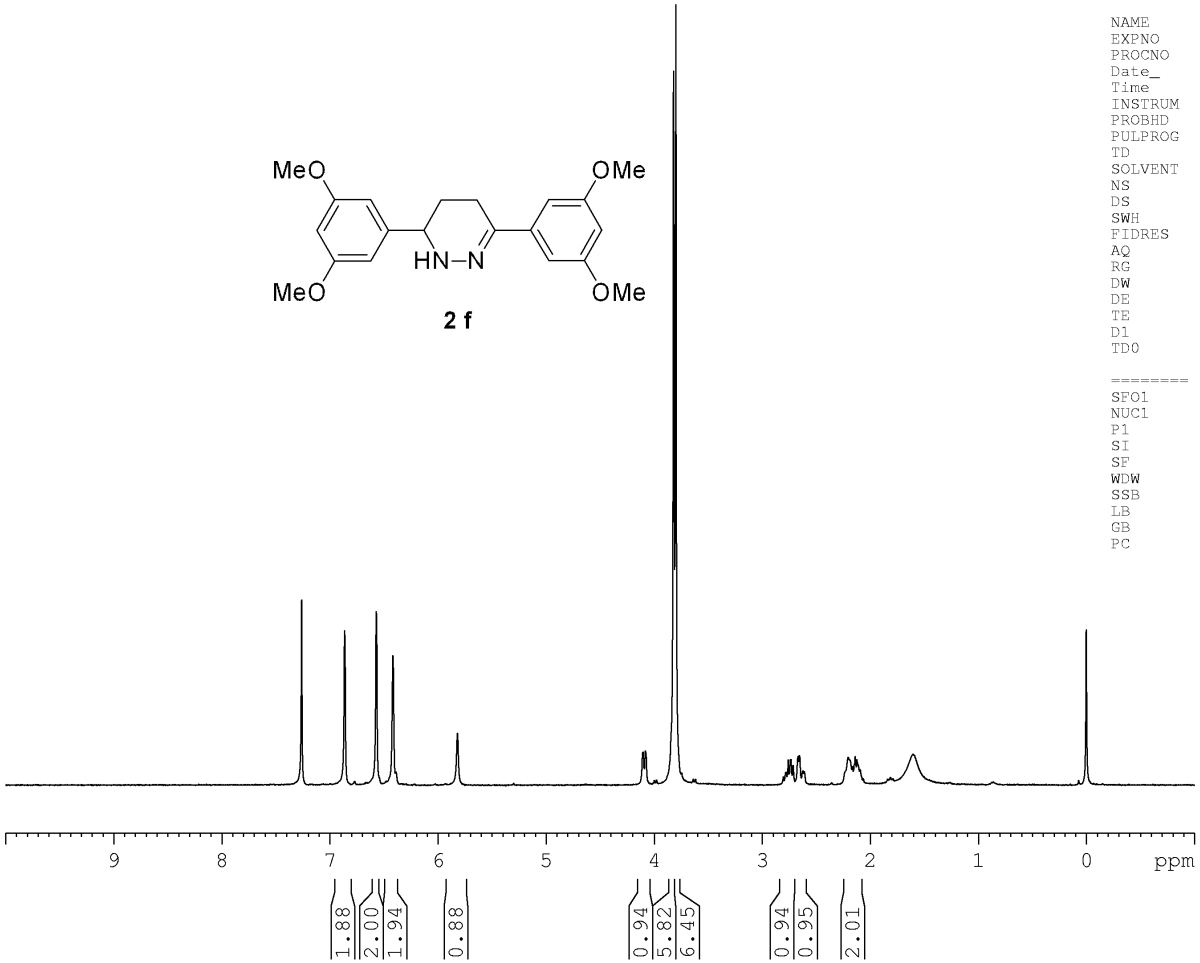



```
NAME            wangwei
EXPNO               463
PROCNO                1
Date_          20140705
Time              10.34
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 32768
SOLVENT            CDCl3
NS                    16
DS                     0
SWH           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

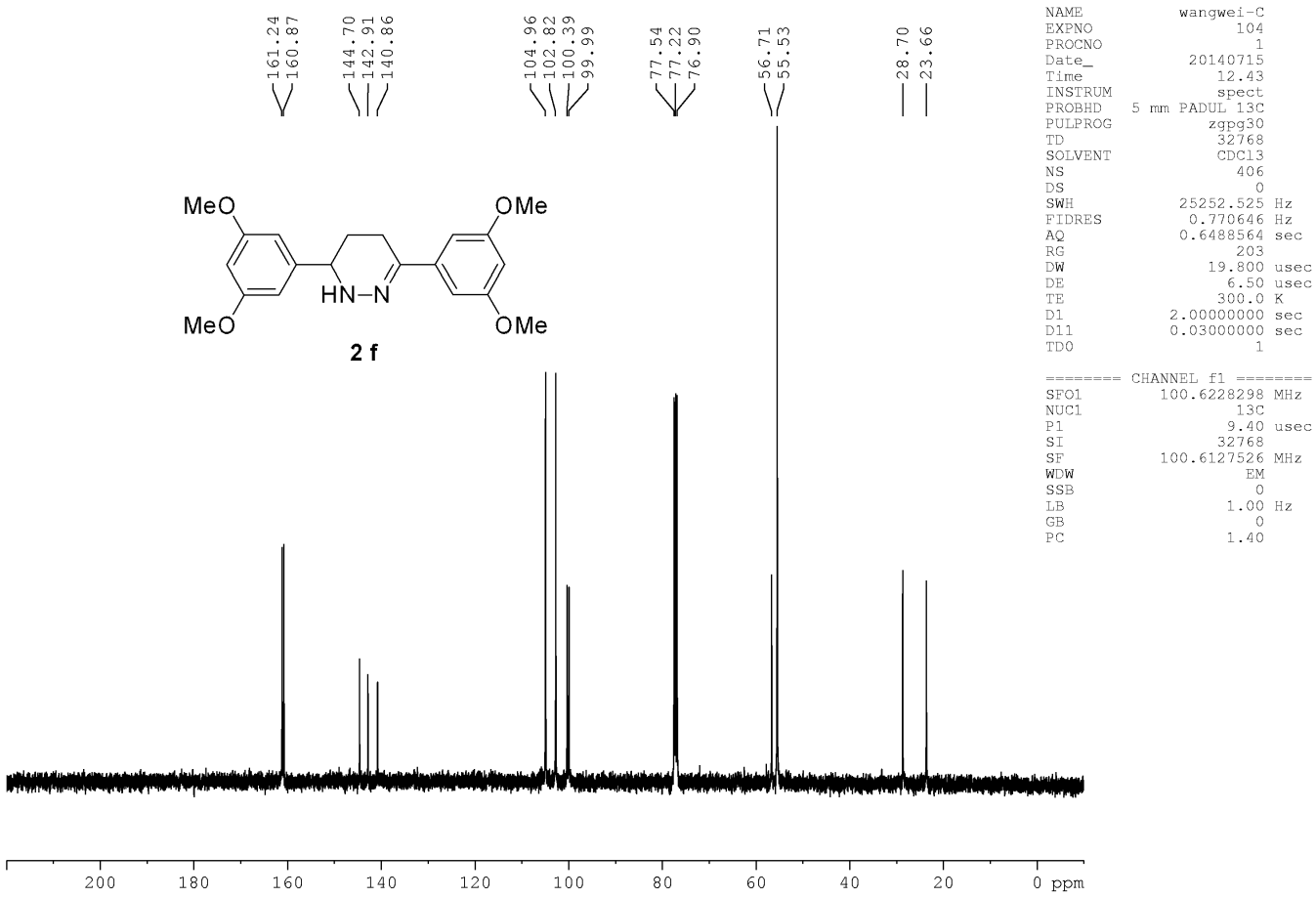
======== CHANNEL f1 ========
SFO1         400.1320007 MHz
NUC1                   1H
P1                 12.60 usec
SI                 65536
SF           400.1300101 MHz
WDW                   EM
SSB                    0
LB                  0.50 Hz
GB                     0
PC                  1.00
```



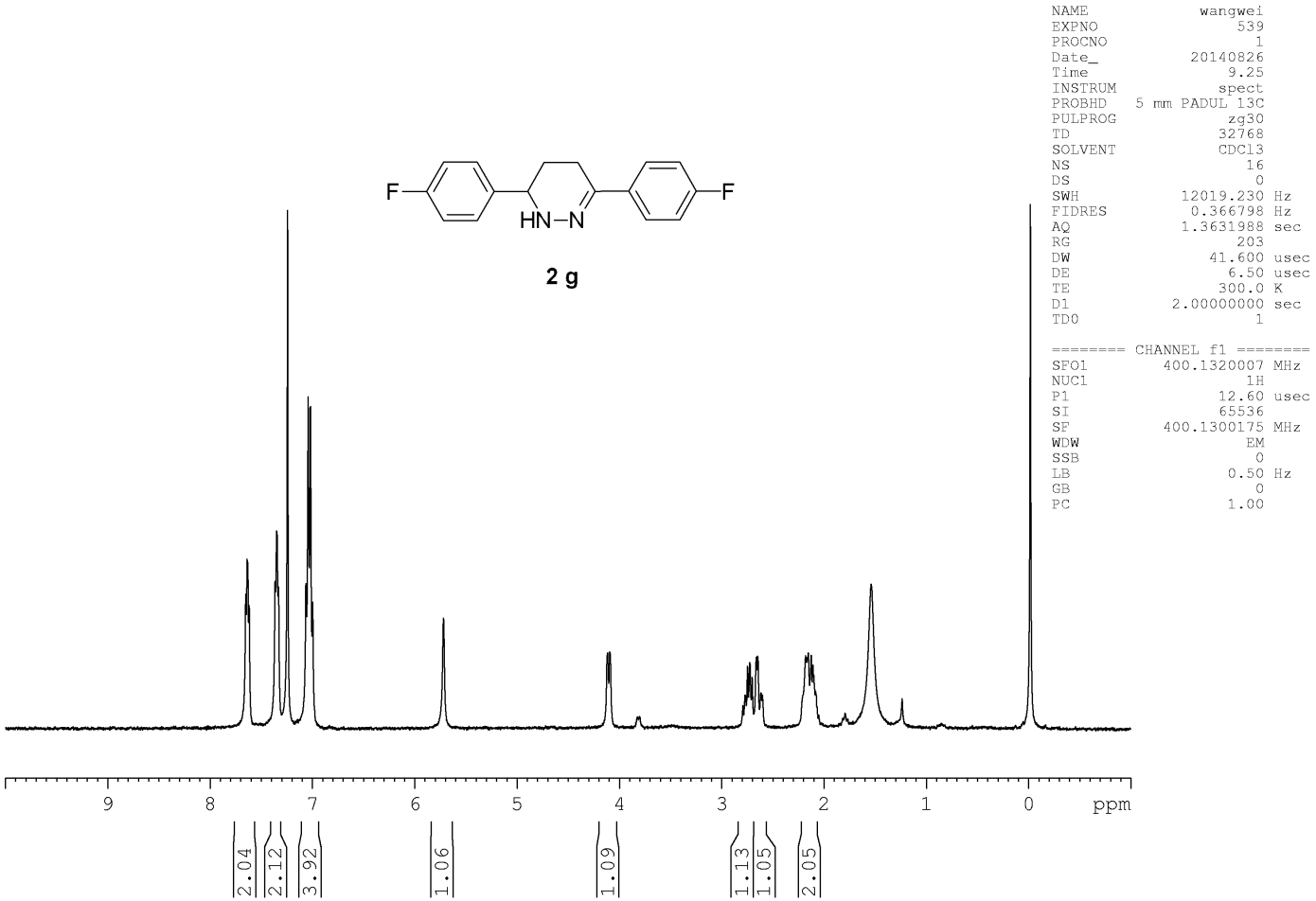
NAME	wangwei-C
EXPNO	99
PROCNO	1
Date_	20140705
Time	14.19
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	5353
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL 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

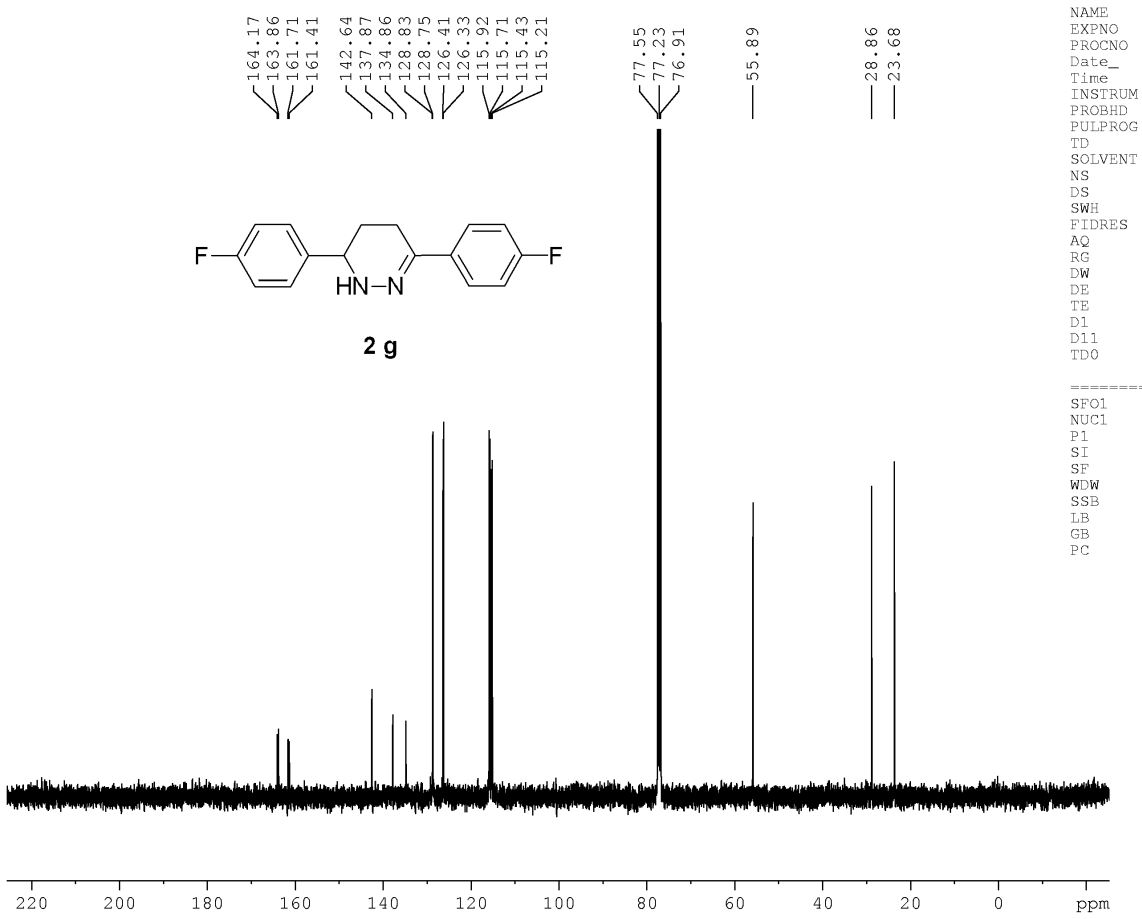


NAME	wangwei
EXPNO	488
PROCNO	1
Date_	20140715
Time	8.51
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	12019.230 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	203
DW	41.600 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1320007 MHz
NUC1	1H
P1	12.60 usec
SI	65536
SF	400.1300102 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00

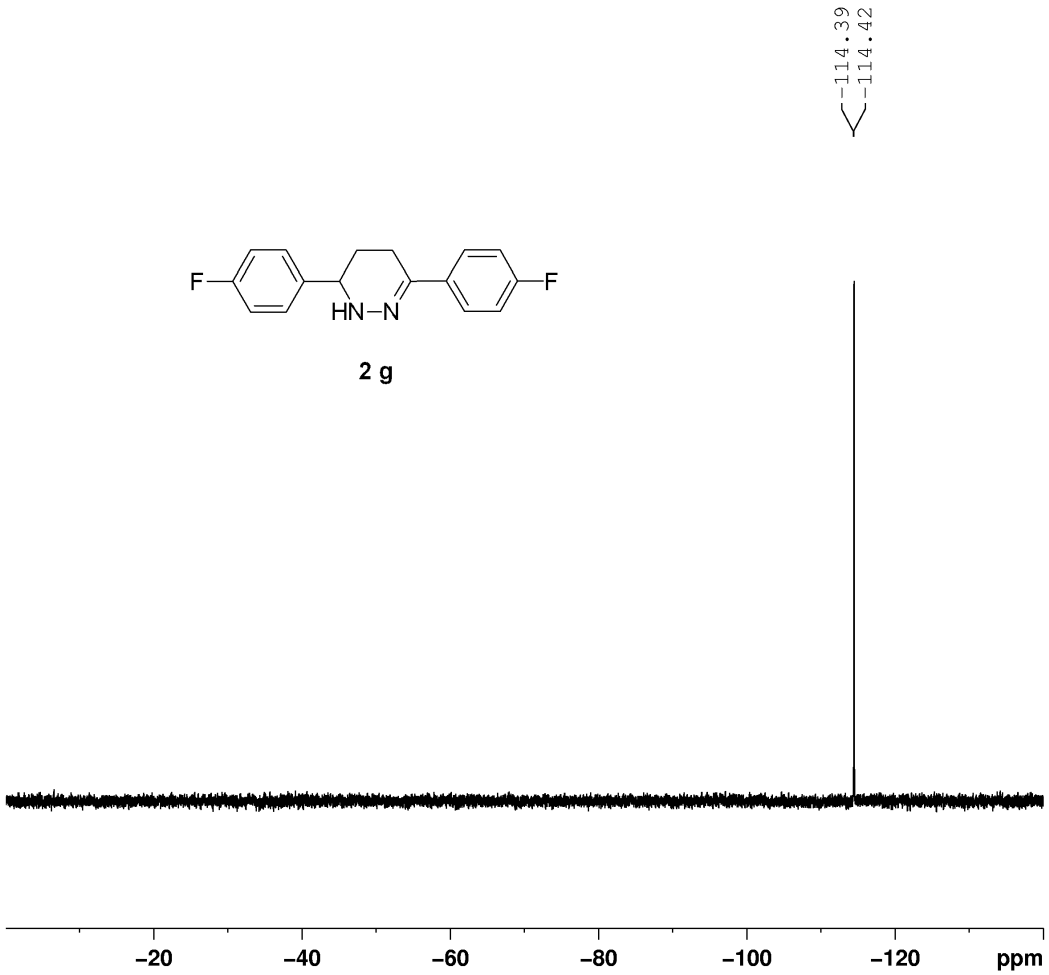


NAME	wangwei-C
EXPNO	104
PROCNO	1
Date_	20140715
Time	12.43
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	406
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127526 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

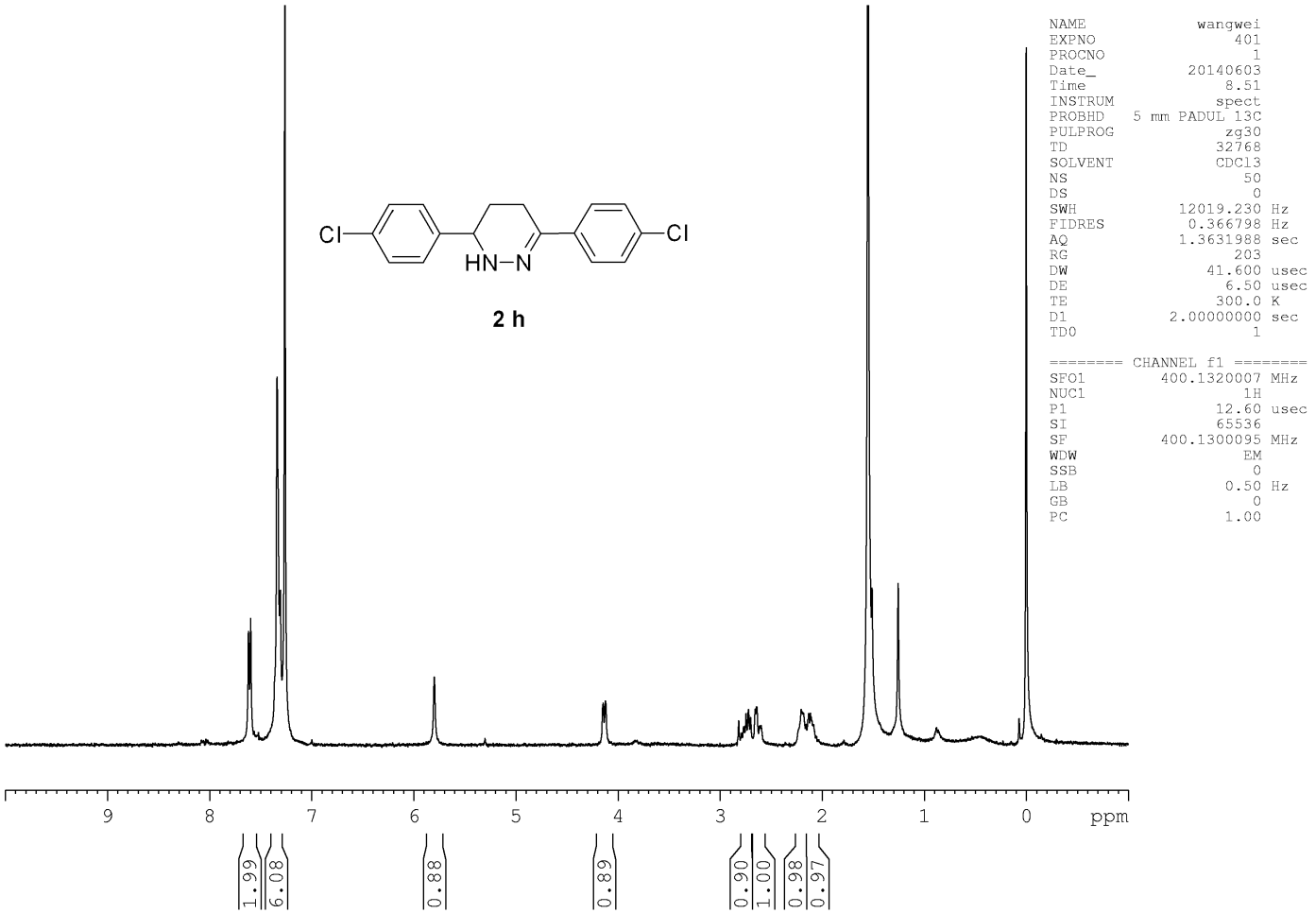

F
HN–N
F
2 g
NAME wangwei
EXPNO 539
PROCNO 1
Date_ 20140826
Time 9.25
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 0
SWH 12019.230 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 203
DW 41.600 usec
DE 6.50 usec
TE 300.0 K
D1 2.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1320007 MHz
NUC1 1H
P1 12.60 usec
SI 65536
SF 400.1300175 MHz
WDW EM
SSB 0
LB 0.50 Hz
GB 0
PC 1.00
9
8
7
6
5
4
3
2
1
0
ppm
2.04
2.12
3.92
1.06
1.09
1.13
1.05
2.05



NAME	wangwei-C
EXPNO	118
PROCNO	1
Date_	20140826
Time	14.06
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	13930
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	100.6127462 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



NAME	19F
EXPNO	78
PROCNO	1
Date_	20151008
Time	22.46
INSTRUM	spect
PROBHD	5 mm PATBO BB-
PULPROG	zgfhigqn
TD	65536
SOLVENT	CDCl3
NS	16
DS	0
SWH	112994.352 Hz
FIDRES	1.724157 Hz
AQ	0.2900512 sec
RG	362
DW	4.425 usec
DE	6.32 usec
TE	300.8 K
D1	2.00000000 sec
D11	0.03000000 sec
D12	0.00002000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	19F
P1	23.50 usec
PL1	0.00 dB
PL1W	25.11886406 W
SFO1	564.6299194 MHz
======== CHANNEL f2 ========	
CPDPRG2	waltz16
NUC2	1H
PCPD2	70.00 usec
PL2	-3.20 dB
PL12	10.18 dB
SFO2	600.1324005 MHz
SI	65536
SF	564.6863880 MHz
WDW	EM
SSB	0
LB	5.00 Hz
GB	0
PC	1.00


Cl
HN–N
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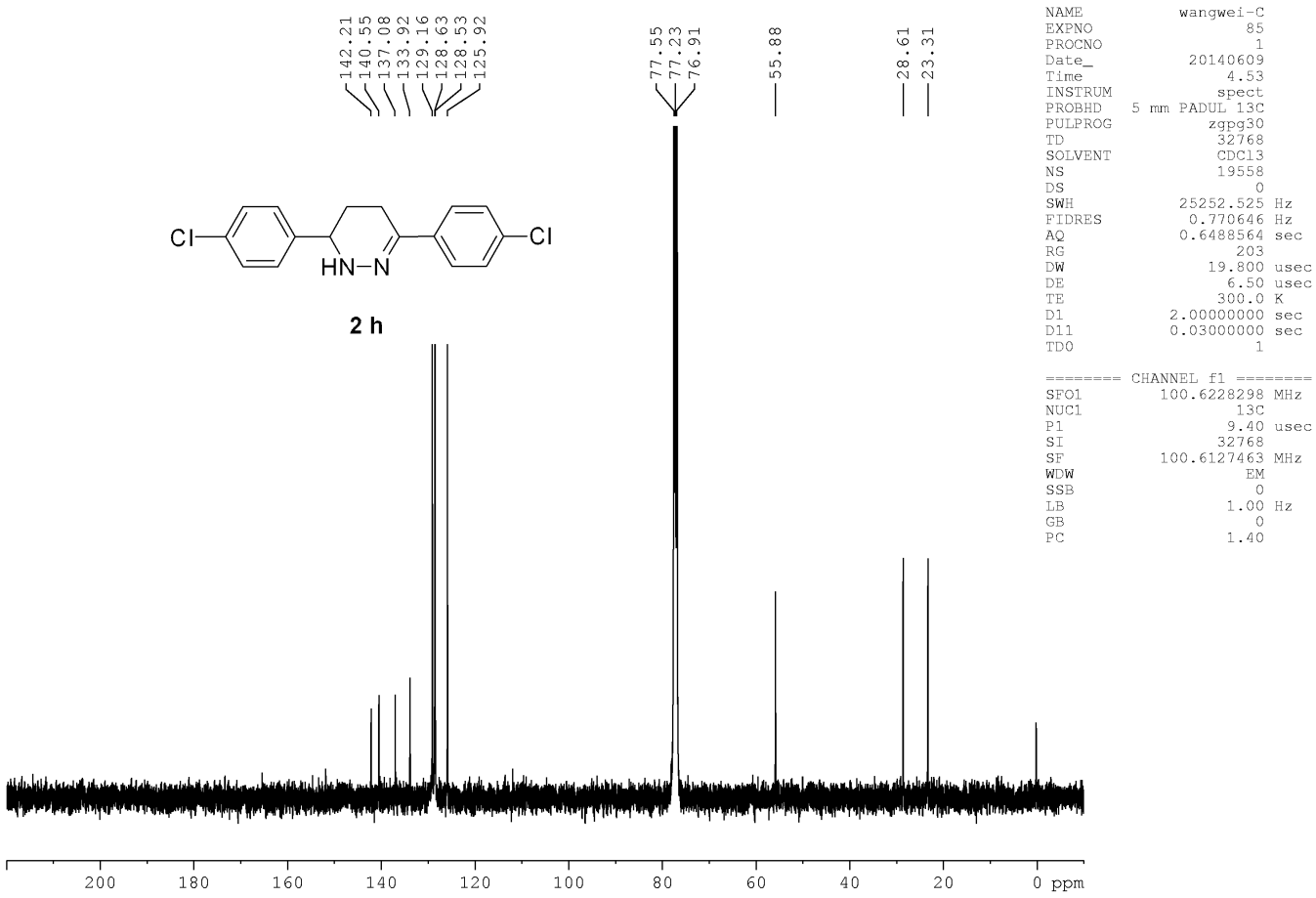
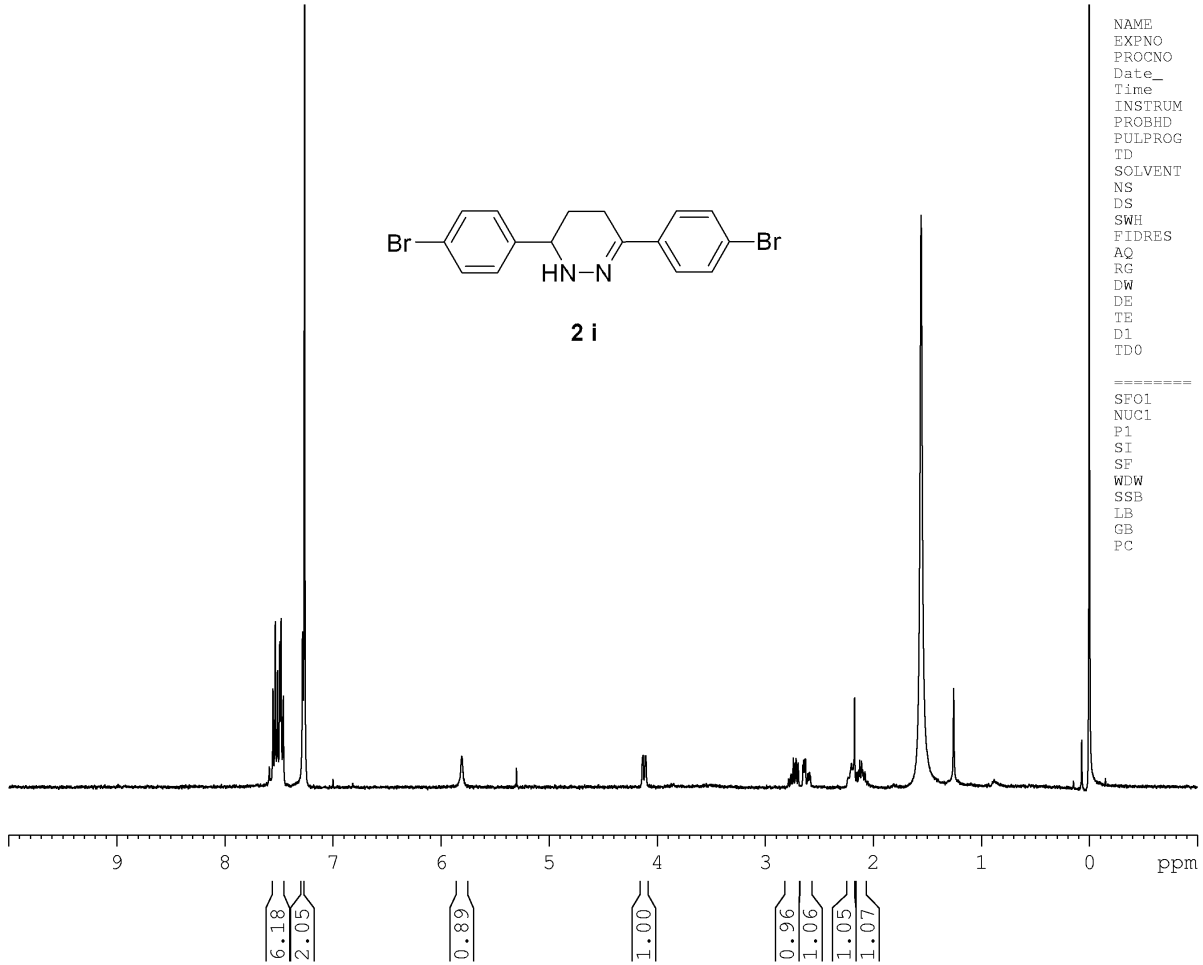
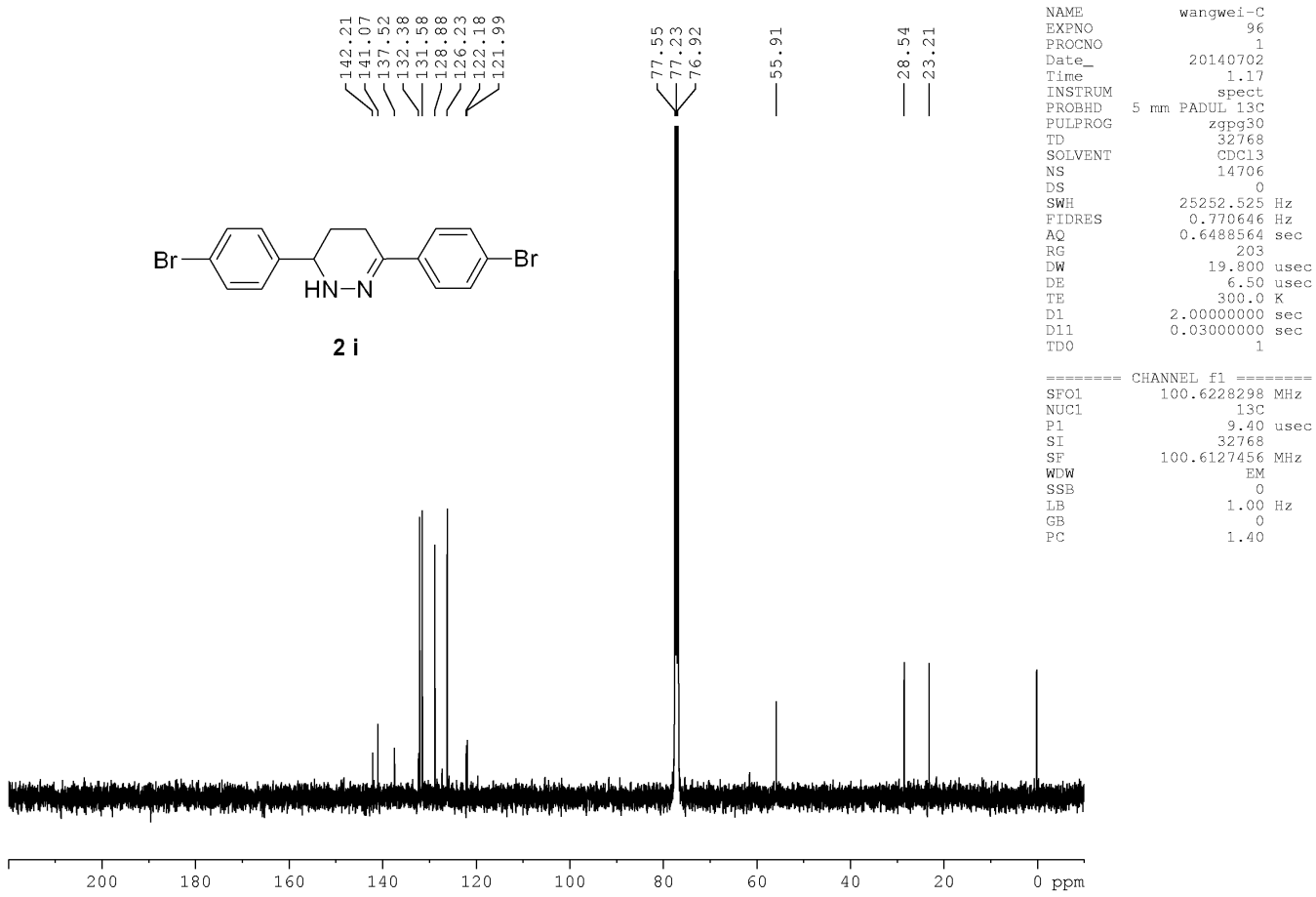
2 h
NAME wangwei
EXPNO 401
PROCNO 1
Date_ 20140603
Time 8.51
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 50
DS 0
SWH 12019.230 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 203
DW 41.600 usec
DE 6.50 usec
TE 300.0 K
D1 2.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1320007 MHz
NUC1 1H
P1 12.60 usec
SI 65536
SF 400.1300095 MHz
WDW EM
SSB 0
LB 0.50 Hz
GB 0
PC 1.00
9
8
7
6
5
4
3
2
1
0
ppm
1.99
6.08
0.88
0.89
0.90
1.00
0.98
0.97



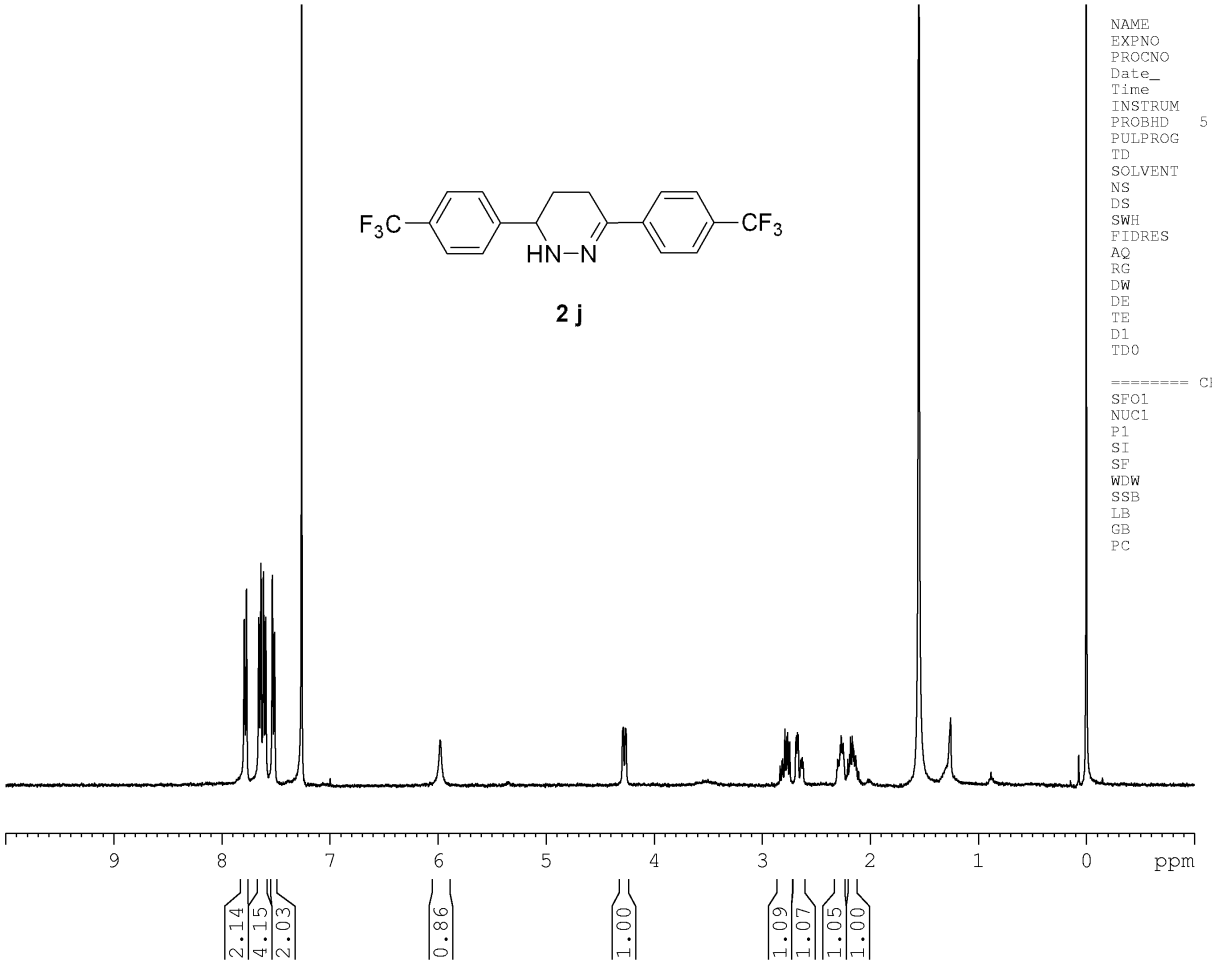
NAME	wangwei-C
EXPNO	85
PROCNO	1
Date_	20140609
Time	4.53
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	19558
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127463 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



NAME	wangwei
EXPNO	440
PROCNO	1
Date_	20140625
Time	7.17
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	400.1300096 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



NAME	wangwei-C
EXPNO	96
PROCNO	1
Date_	20140702
Time	1.17
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	14706
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	100.6127456 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40


F3C
CF3
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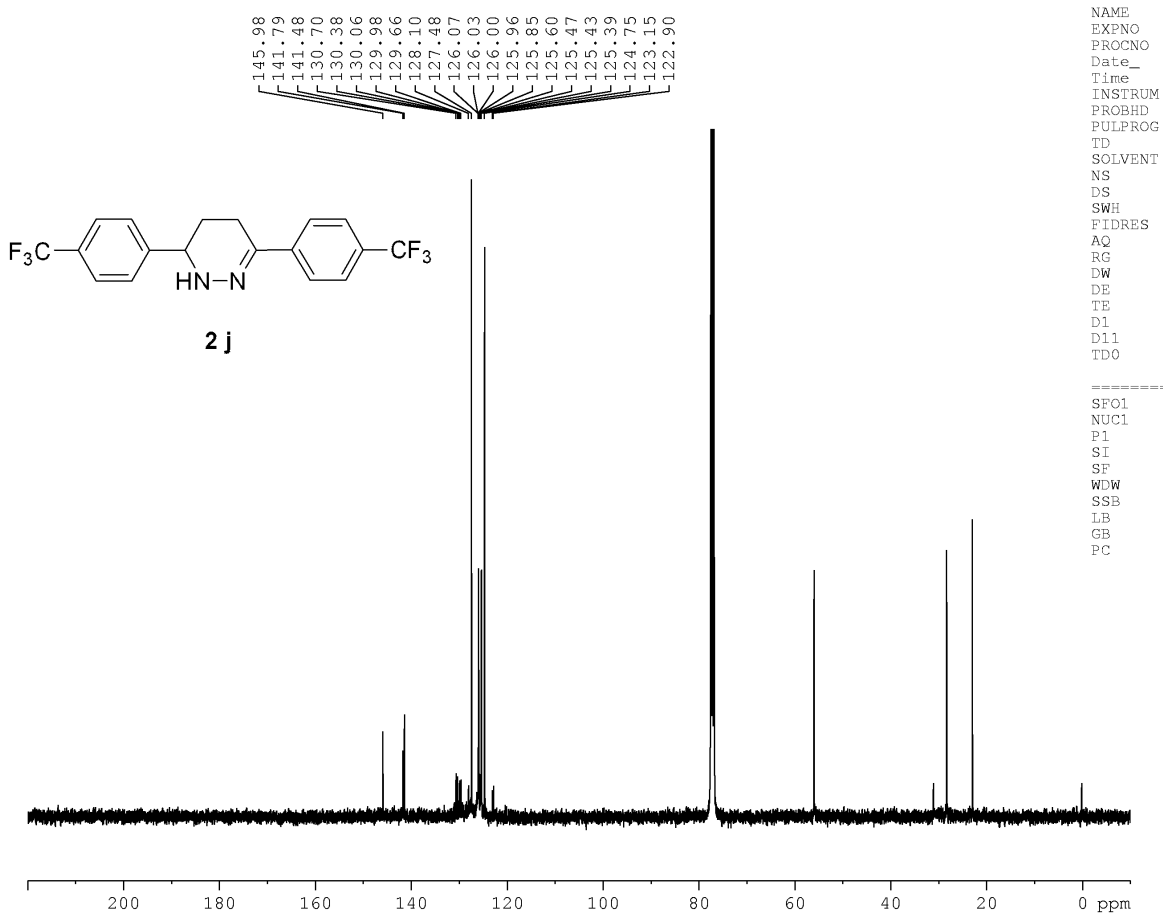
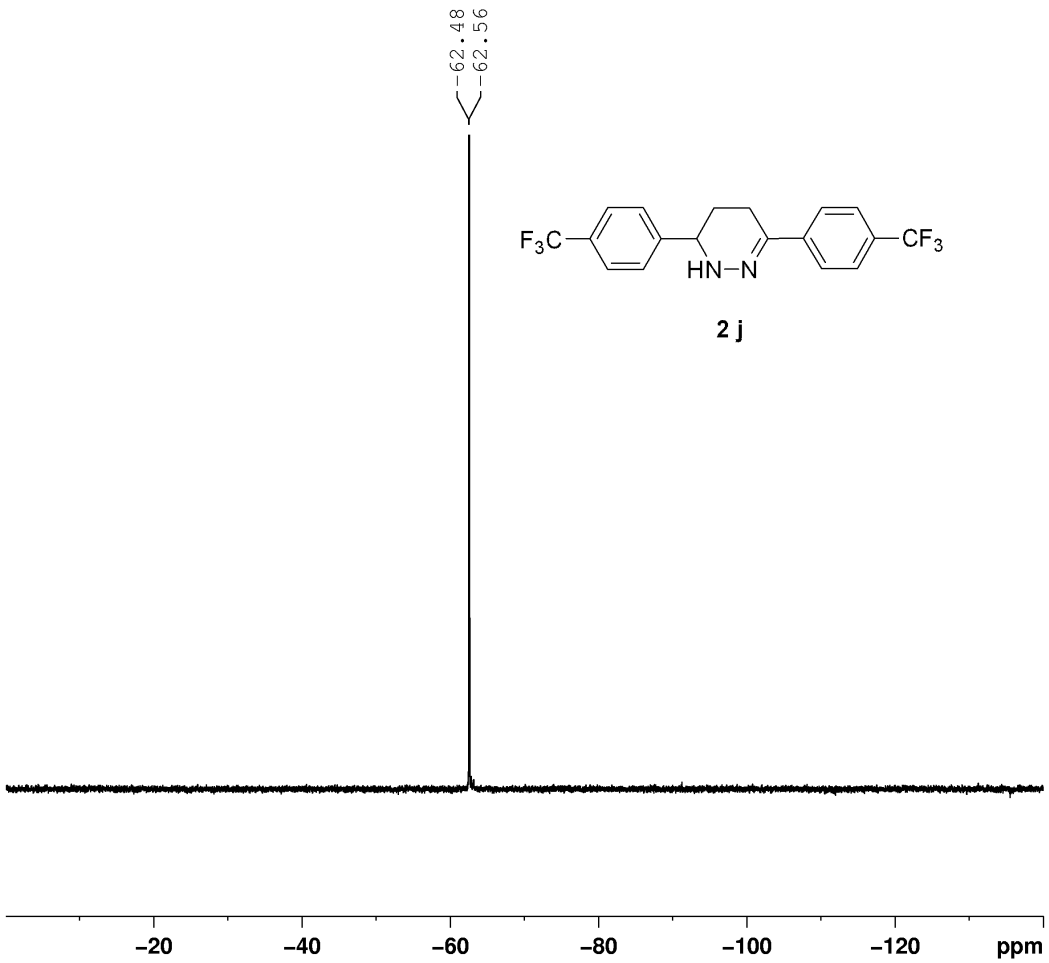
NAME wangwei
EXPNO 513
PROCNO 1
Date_ 20140812
Time 1.03
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 0
SWH 12019.230 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 203
DW 41.600 usec
DE 6.50 usec
TE 300.0 K
D1 2.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1320007 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
9
8
7
6
5
4
3
2
1
0
ppm
2.14
4.15
2.03
0.86
1.00
1.09
1.07
1.05
1.00



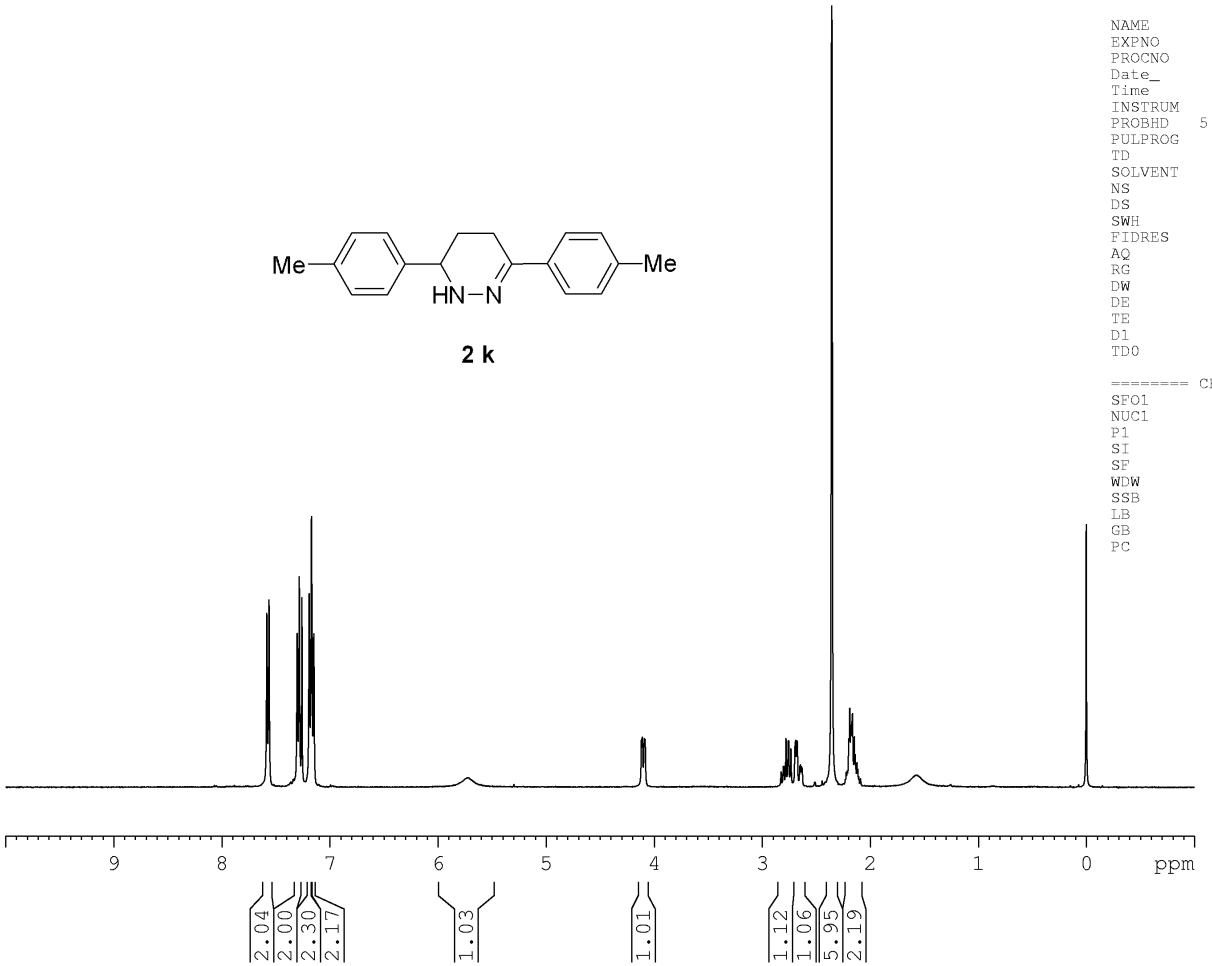
NAME	wangwei-C
EXPNO	107
PROCNO	1
Date_	20140726
Time	0.11
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	15743
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127463 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



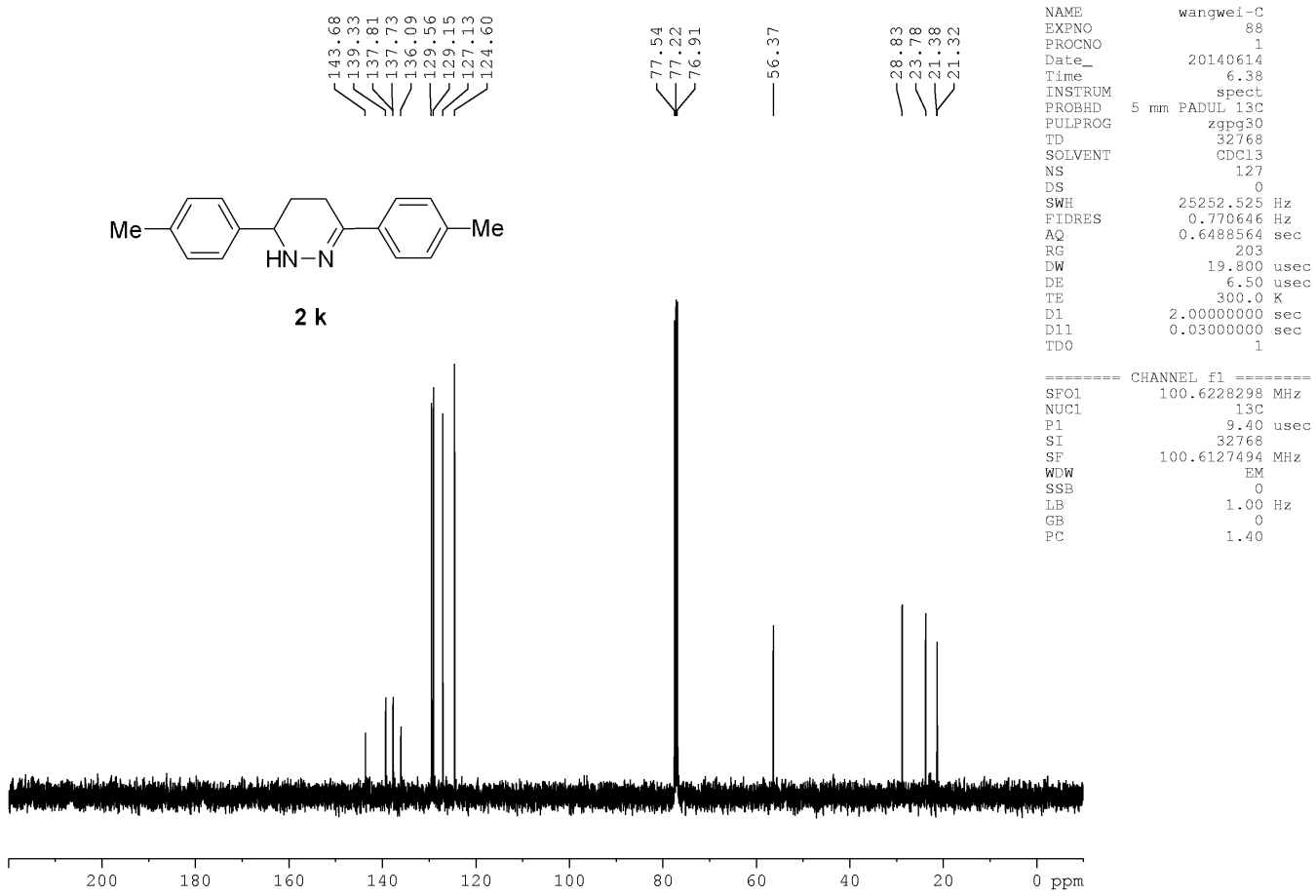

```
NAME                19F
EXPNO                74
PROCNO                1
Date_          20151008
Time              16.28
INSTRUM           spect
PROBHD   5 mm PATBO BB-
PULPROG         zgfhigqn
TD                65536
SOLVENT           CDCl3
NS                   16
DS                    0
SWH          112994.352 Hz
FIDRES         1.724157 Hz
AQ            0.2900512 sec
RG                  362
DW                4.425 usec
DE                 6.32 usec
TE                300.6 K
D1           2.00000000 sec
D11          0.03000000 sec
D12          0.00002000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 19F
P1                 23.50 usec
PL1                 0.00 dB
PL1W        25.11886406 W
SFO1       564.6299194 MHz

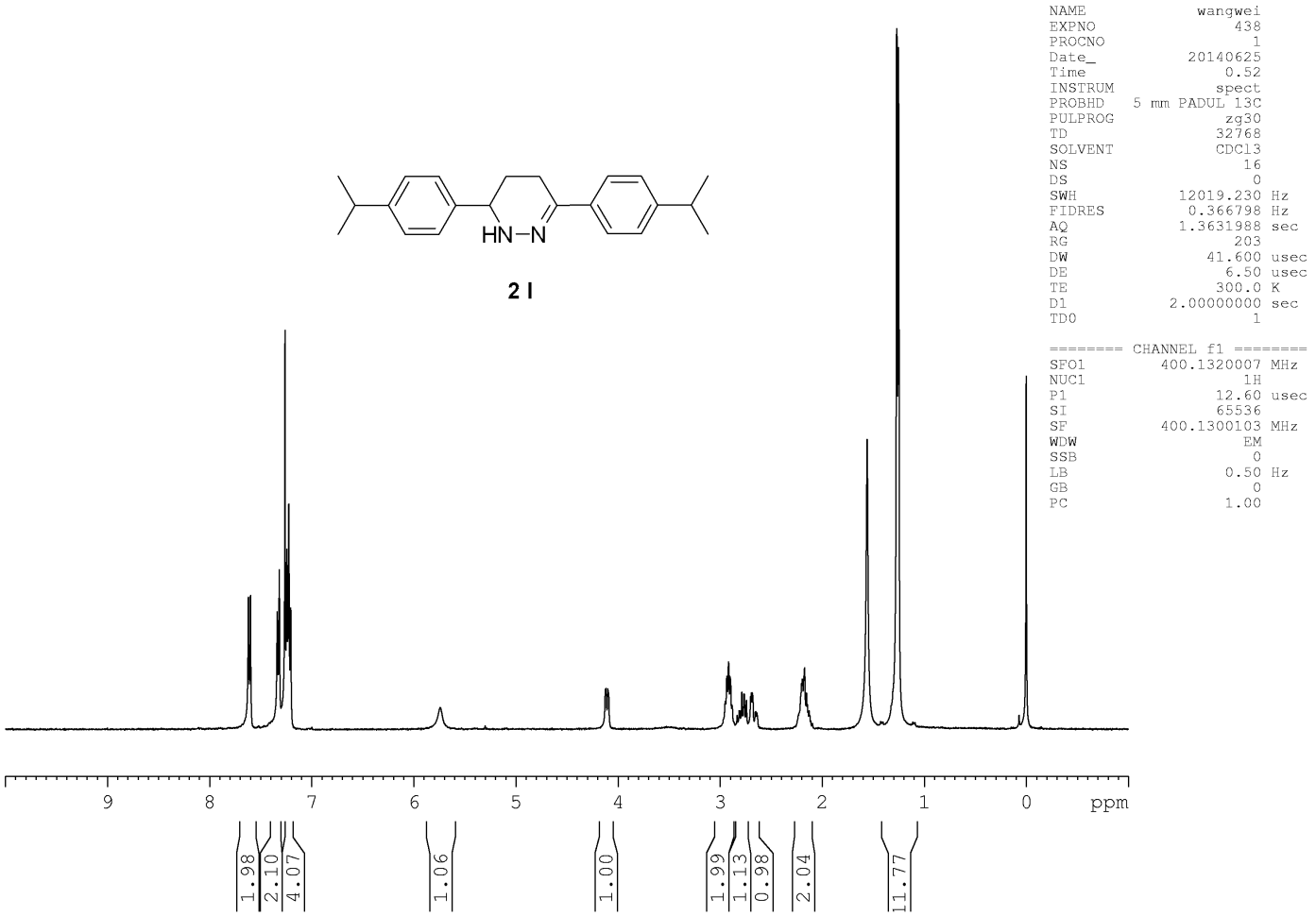
======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                 1H
PCPD2              70.00 usec
PL2                -3.20 dB
PL12               10.18 dB
SFO2       600.1324005 MHz
SI                65536
SF         564.6863880 MHz
WDW                  EM
SSB                   0
LB                 5.00 Hz
GB                    0
PC                 1.00
```



NAME	wangwei
EXPNO	424
PROCNO	1
Date_	20140614
Time	5.44
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	400.1300112 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00



NAME	wangwei-C
EXPNO	88
PROCNO	1
Date_	20140614
Time	6.38
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	127
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	100.6127494 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40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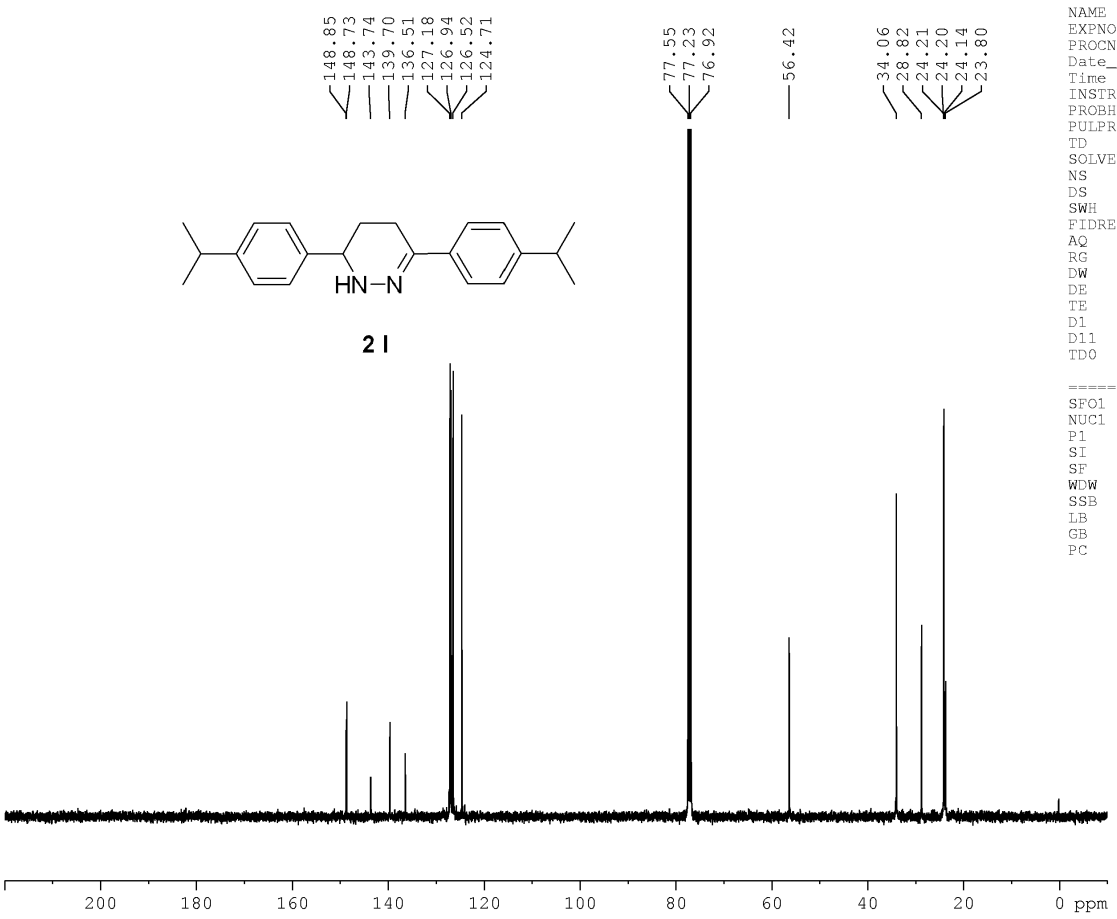
2 l
NAME wangwei
EXPNO 438
PROCNO 1
Date_ 20140625
Time 0.52
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 0
SWH 12019.230 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 203
DW 41.600 usec
DE 6.50 usec
TE 300.0 K
D1 2.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 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
9
8
7
6
5
4
3
2
1
0
ppm
1.98
2.10
4.07
1.06
1.00
1.99
1.13
0.98
2.04
11.77



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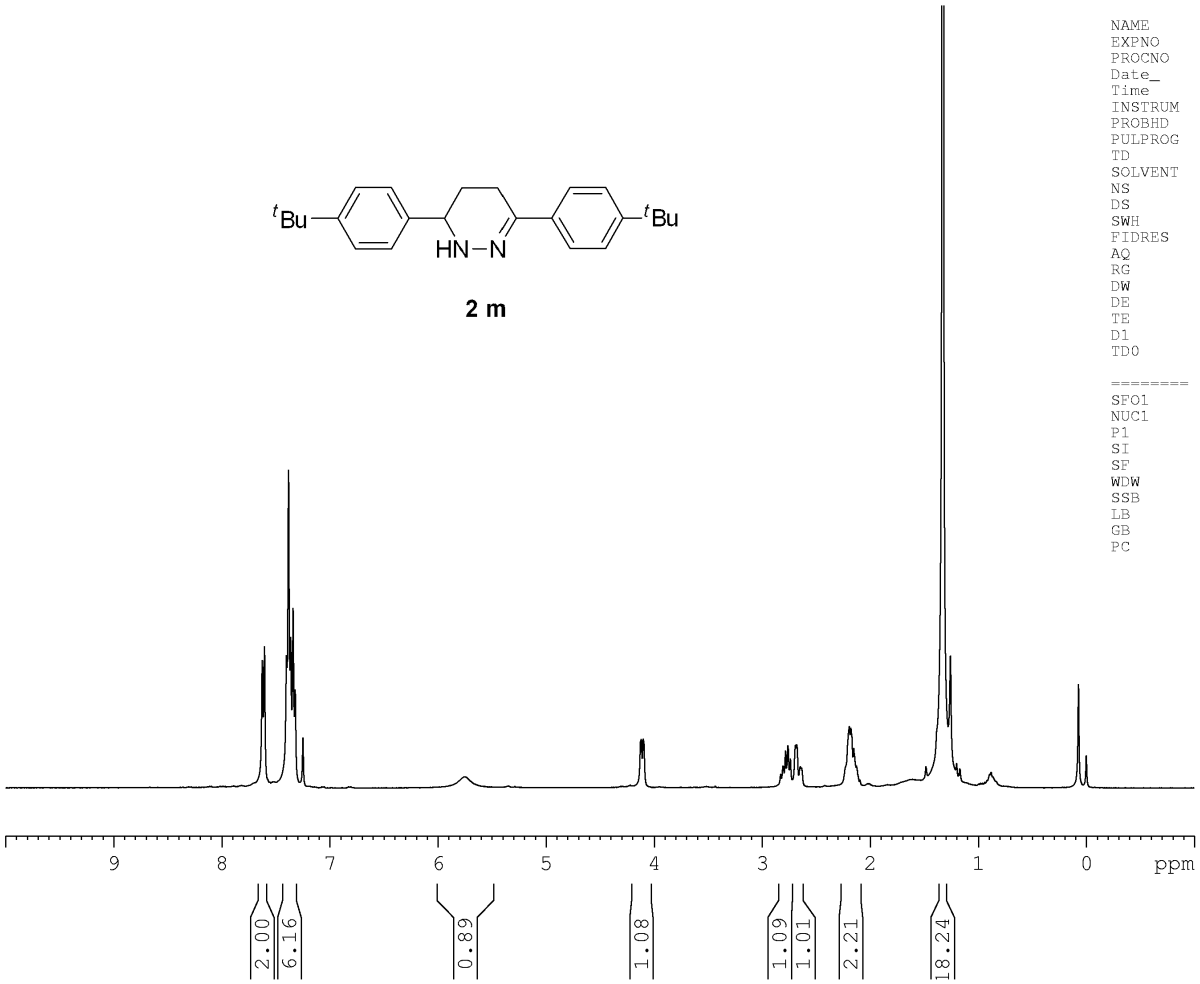
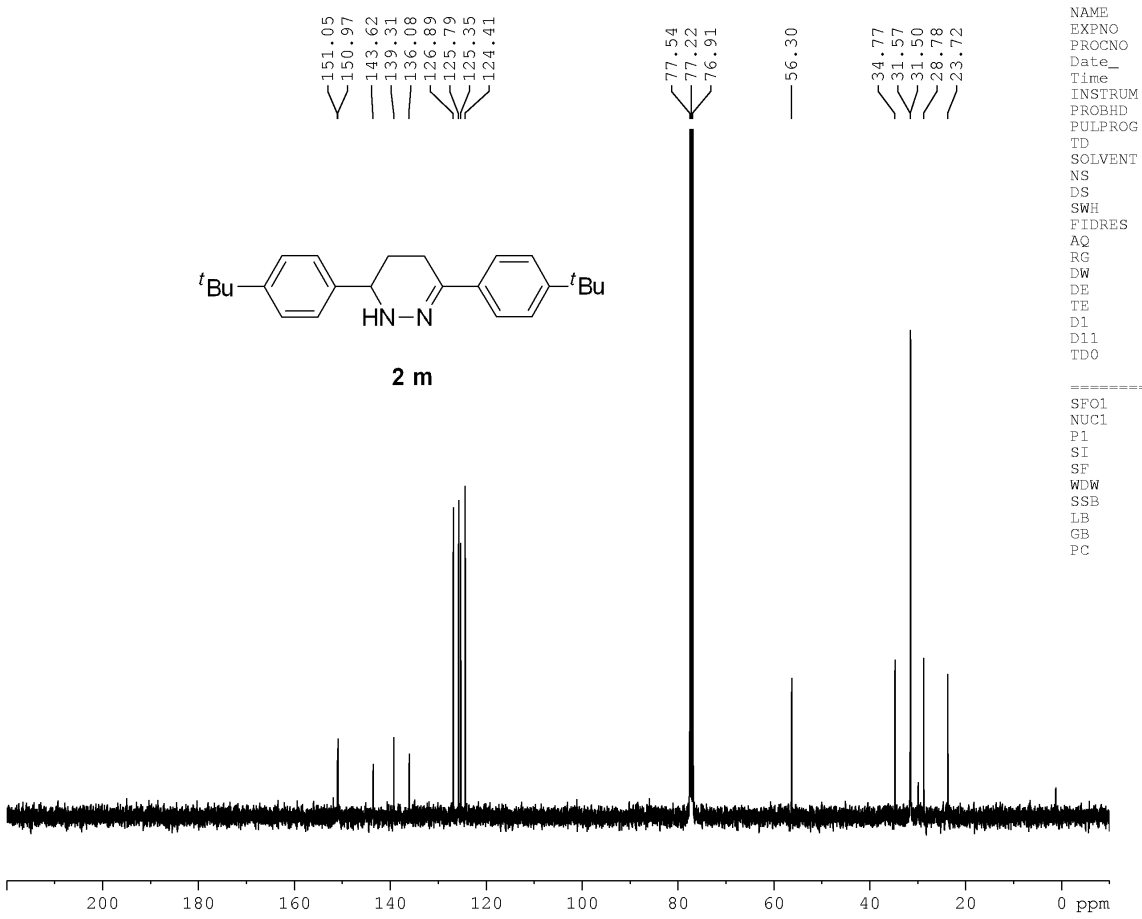
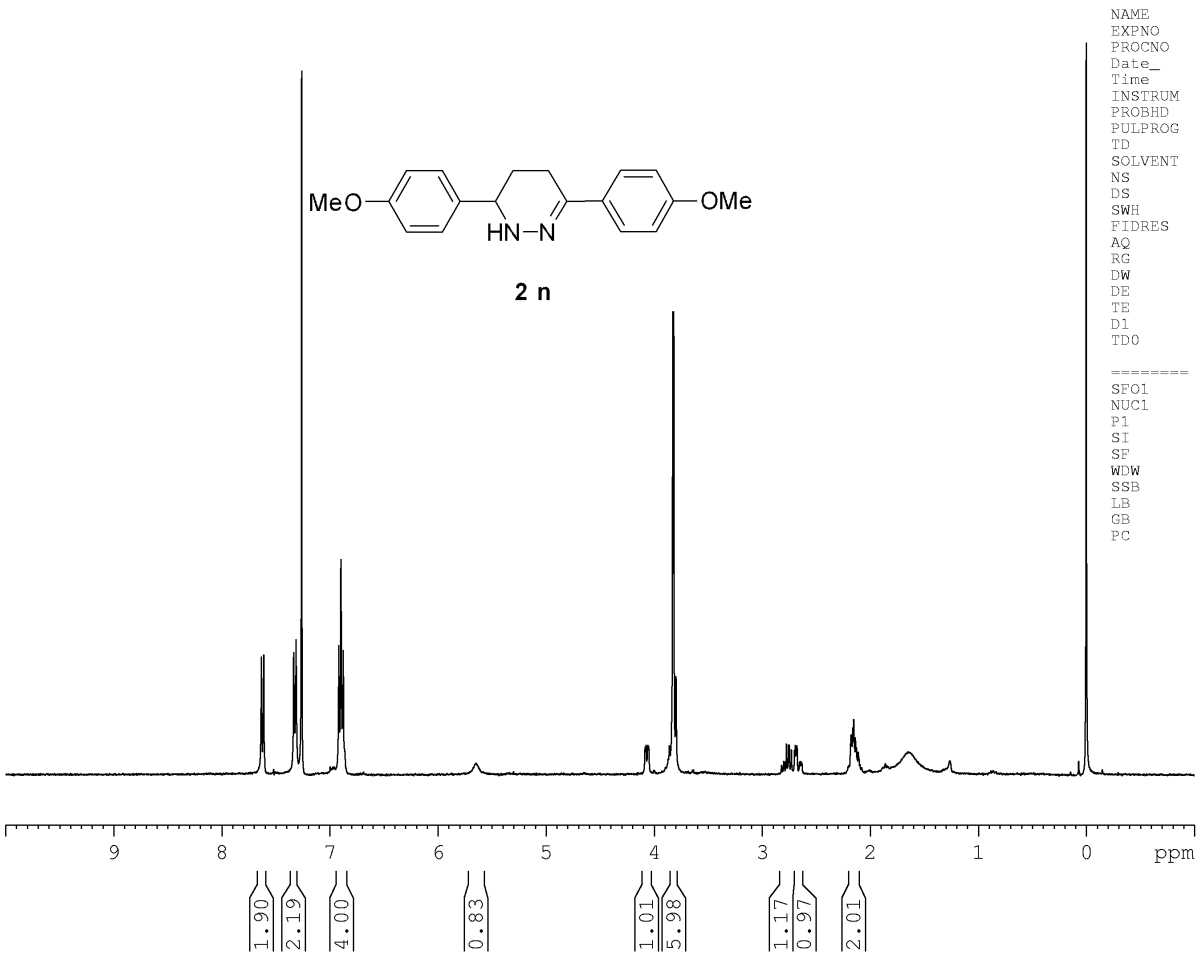
NAME	wangwei-C
EXPNO	92
PROCNO	1
Date_	20140625
Time	6.30
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	2855
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
========	CHANNEL f1 ========
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127464 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



NAME	wangwei
EXPNO	524
PROCNO	1
Date_	20140817
Time	4.53
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	400.1300144 MHz
WDW	EM
SSB	0
LB	0.50 Hz
GB	0
PC	1.00

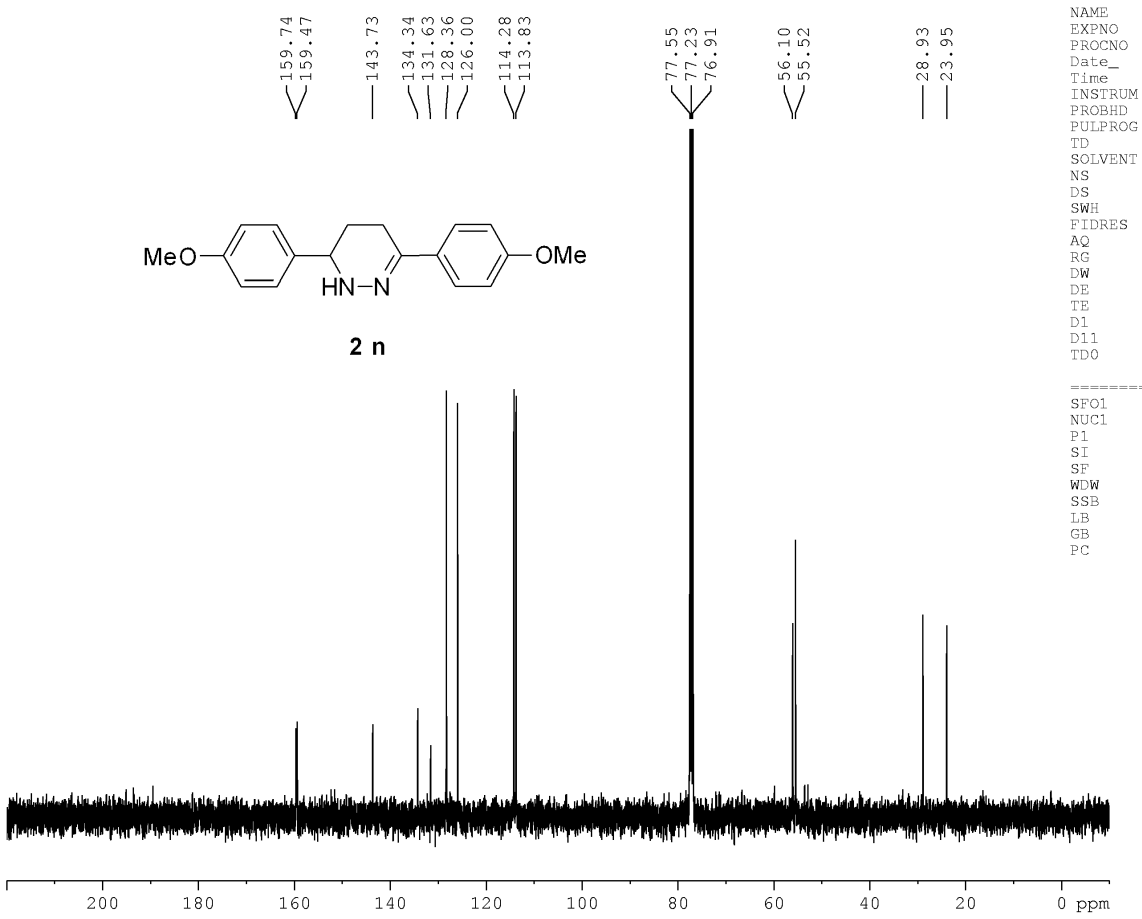


NAME	wangwei-C
EXPNO	111
PROCNO	1
Date_	20140817
Time	4.57
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	272
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
========	CHANNEL 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

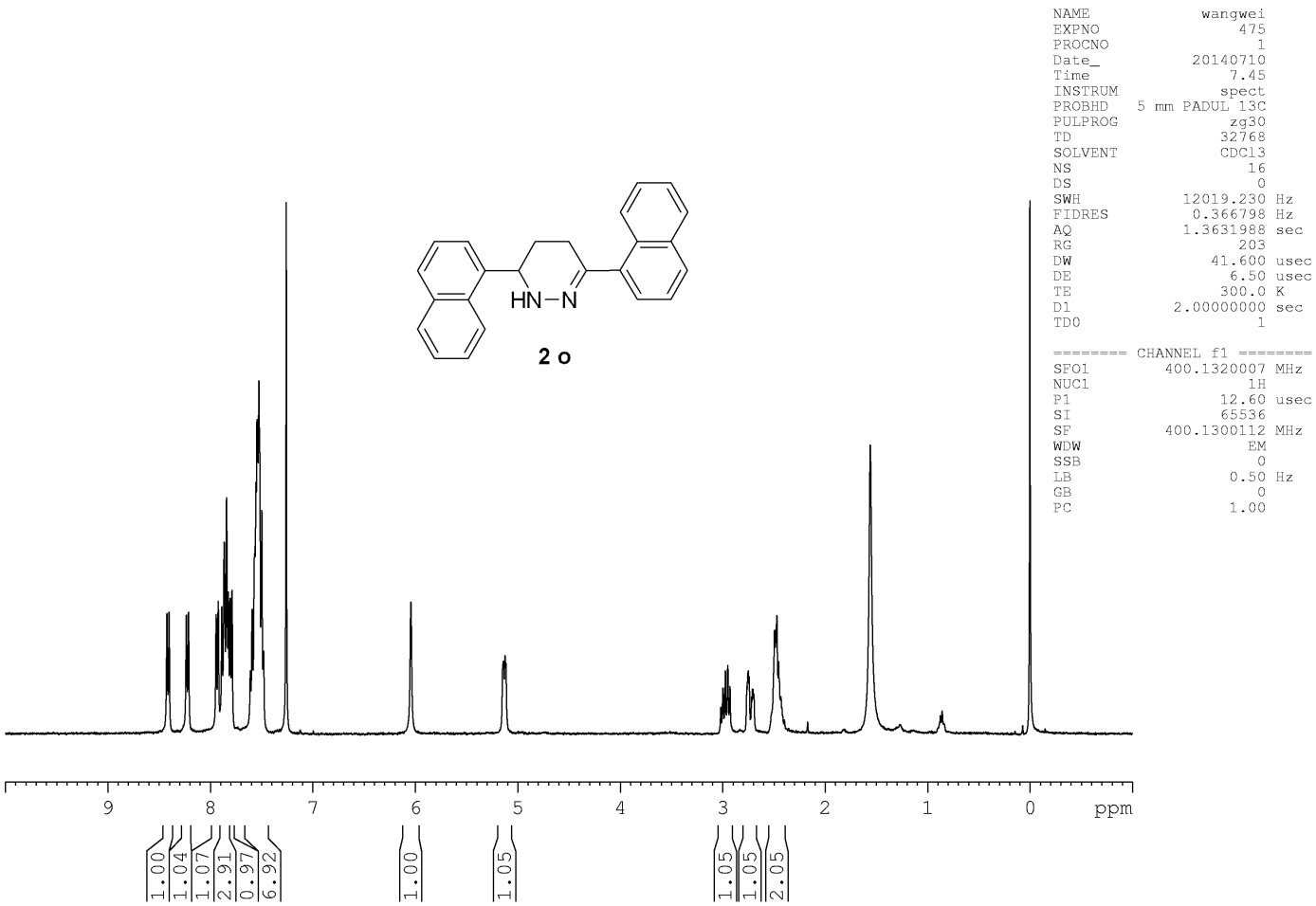


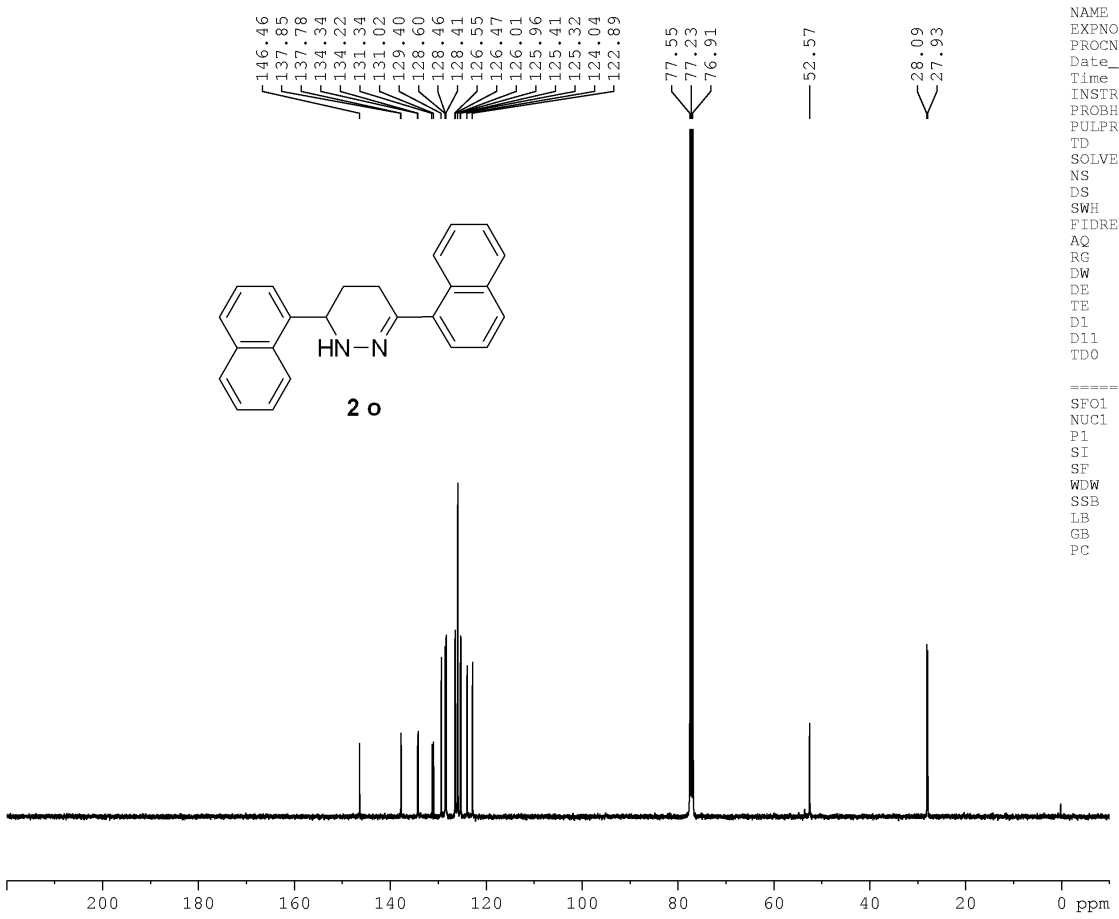

```
NAME            wangwei
EXPNO               414
PROCNO                1
Date_          20140608
Time               3.33
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG            zg30
TD                32768
SOLVENT           CDCl3
NS                   16
DS                    0
SWH           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
```

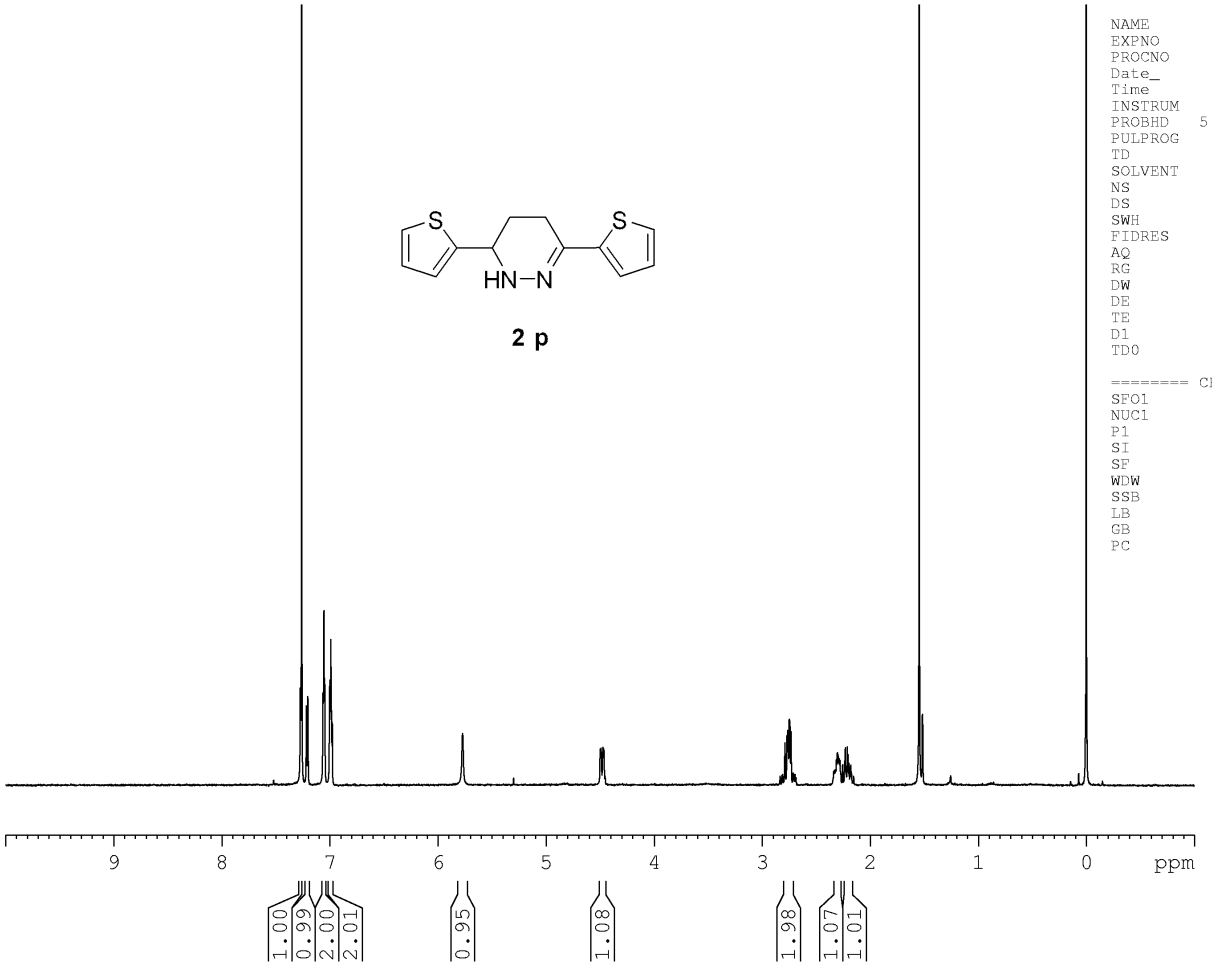


NAME	wangwei-C
EXPNO	84
PROCNO	1
Date_	20140608
Time	5.22
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	2064
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
========	CHANNEL 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

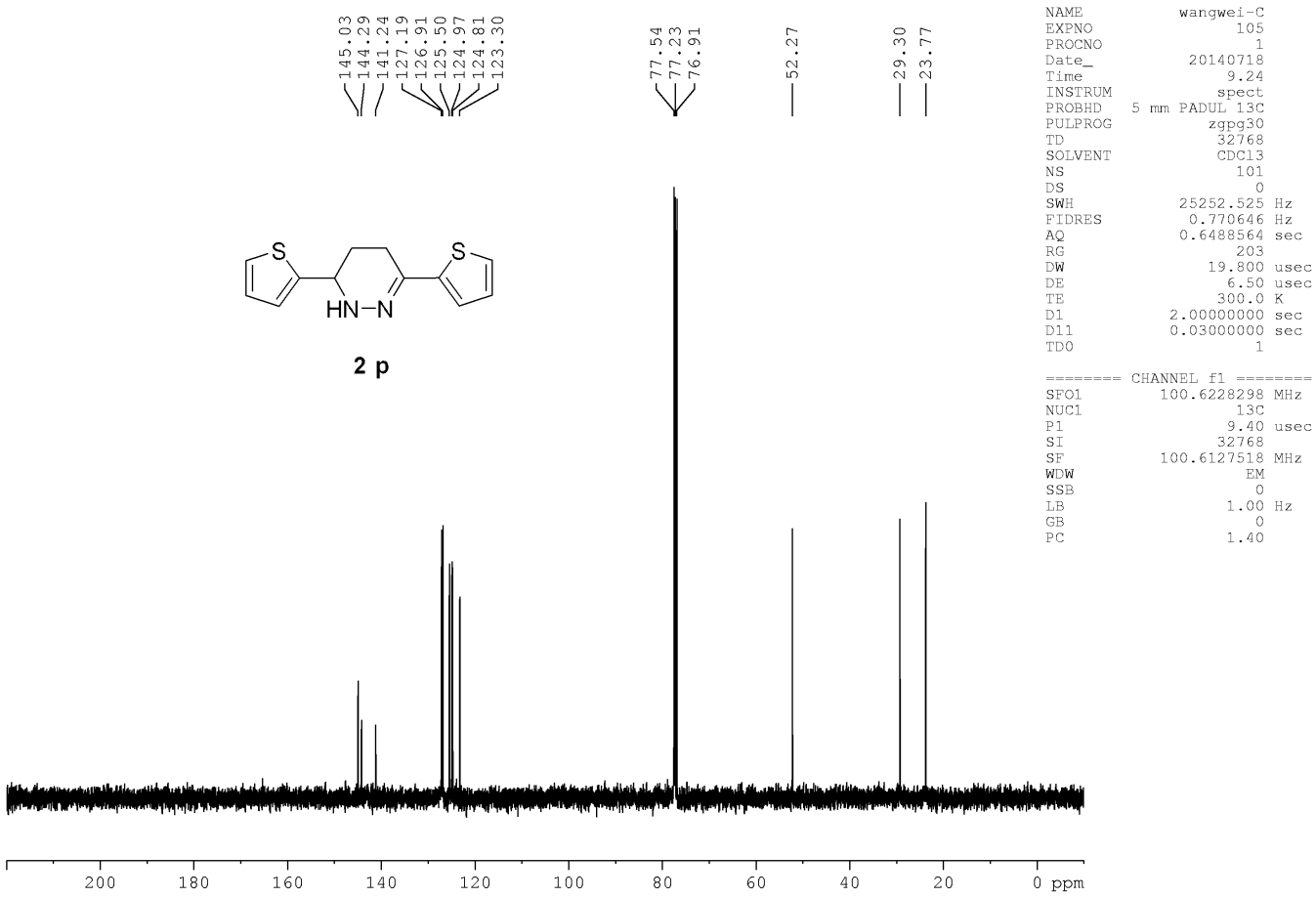

HN–N
2 o
NAME wangwei
EXPNO 475
PROCNO 1
Date_ 20140710
Time 7.45
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 0
SWH 12019.230 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 203
DW 41.600 usec
DE 6.50 usec
TE 300.0 K
D1 2.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1320007 MHz
NUC1 1H
P1 12.60 usec
SI 65536
SF 400.1300112 MHz
WDW EM
SSB 0
LB 0.50 Hz
GB 0
PC 1.00
9 8 7 6 5 4 3 2 1 0 ppm
1.00 1.04 1.07 2.91 0.97 6.92 1.00 1.05 1.05 1.05 2.05



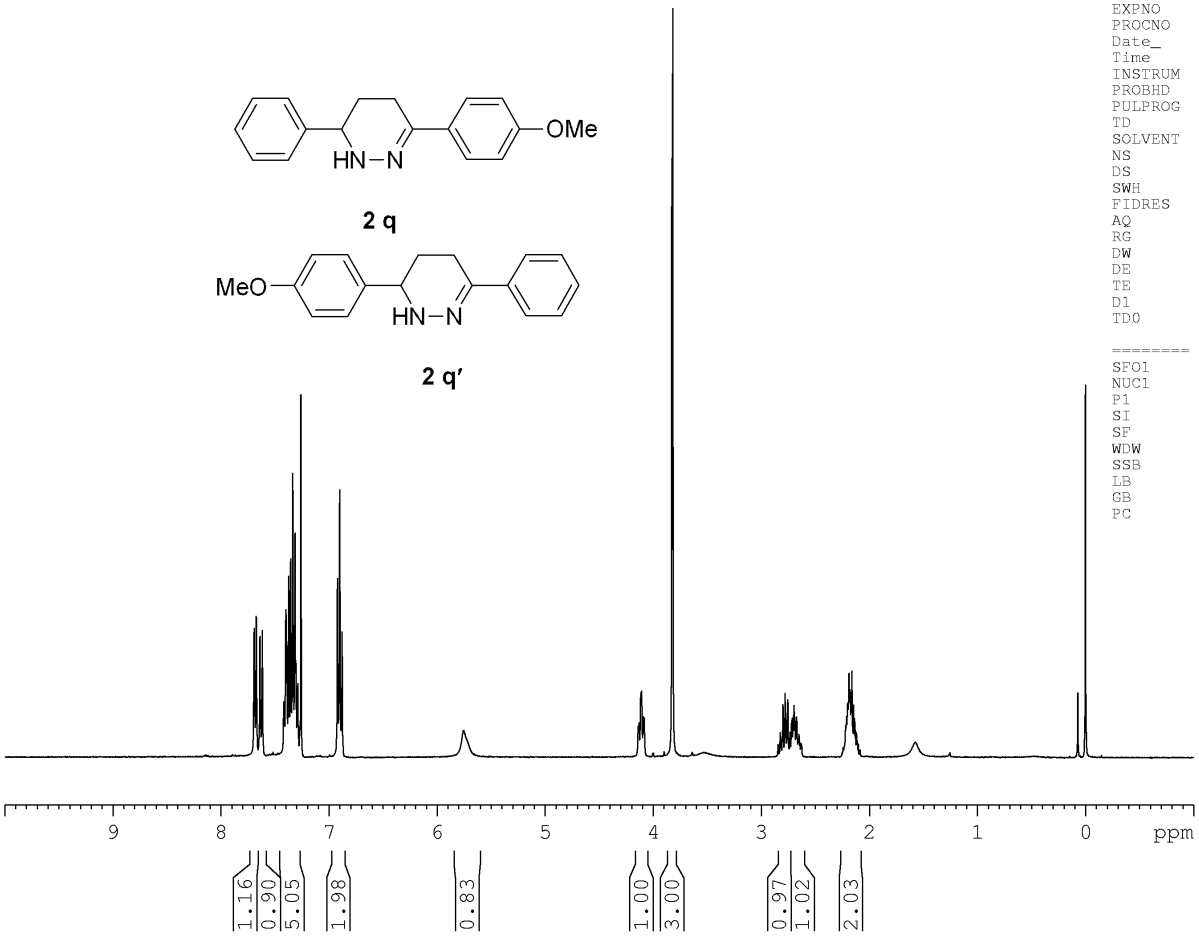
NAME	wangwei-C
EXPNO	102
PROCNO	1
Date_	20140710
Time	19.51
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	7527
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL 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	wangwei
EXPNO	504
PROCNO	1
Date_	20140718
Time	9.06
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

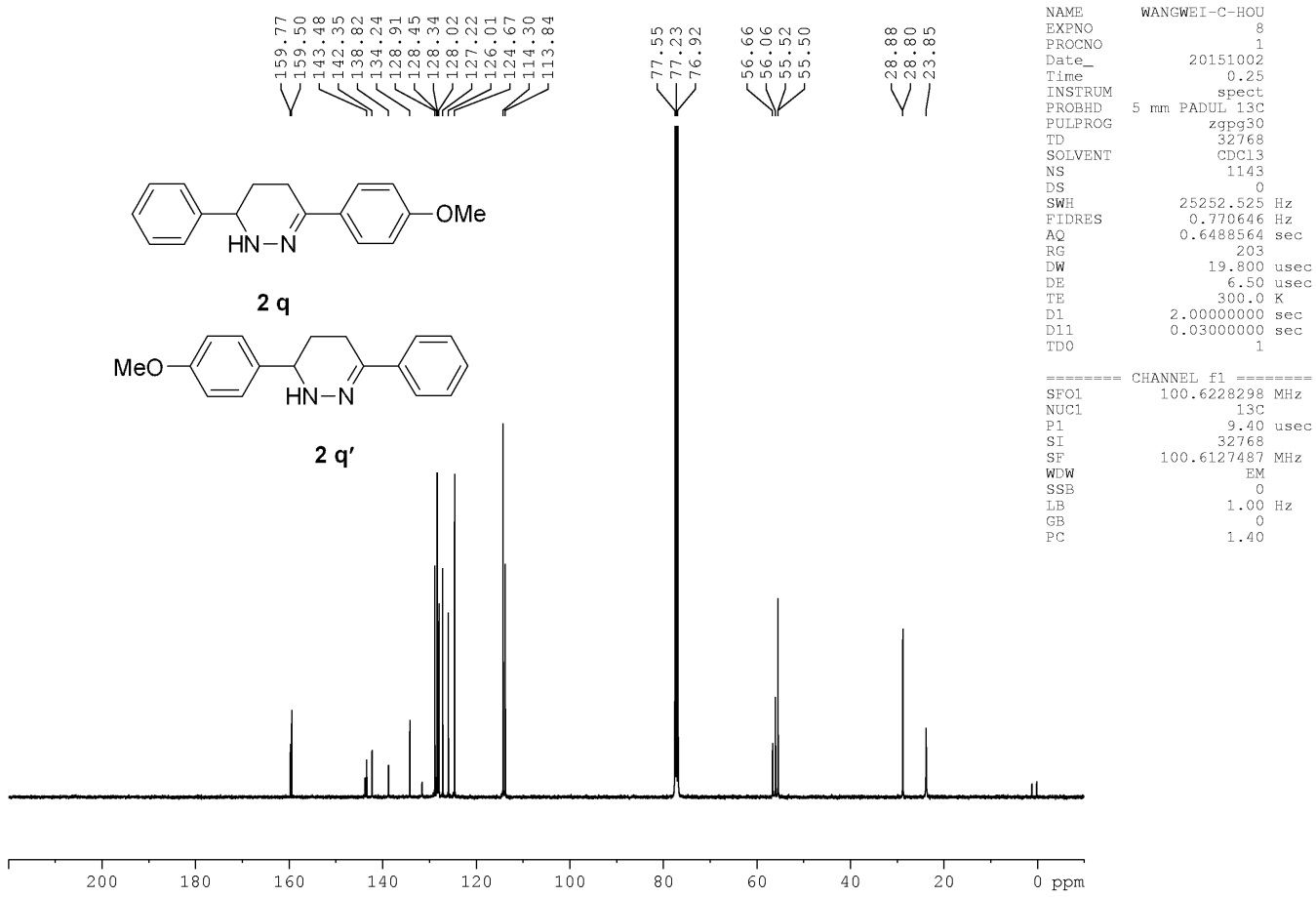


NAME	wangwei-C
EXPNO	105
PROCNO	1
Date_	20140718
Time	9.24
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	101
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	100.6228298 MHz
NUC1	13C
P1	9.40 usec
SI	32768
SF	100.6127518 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

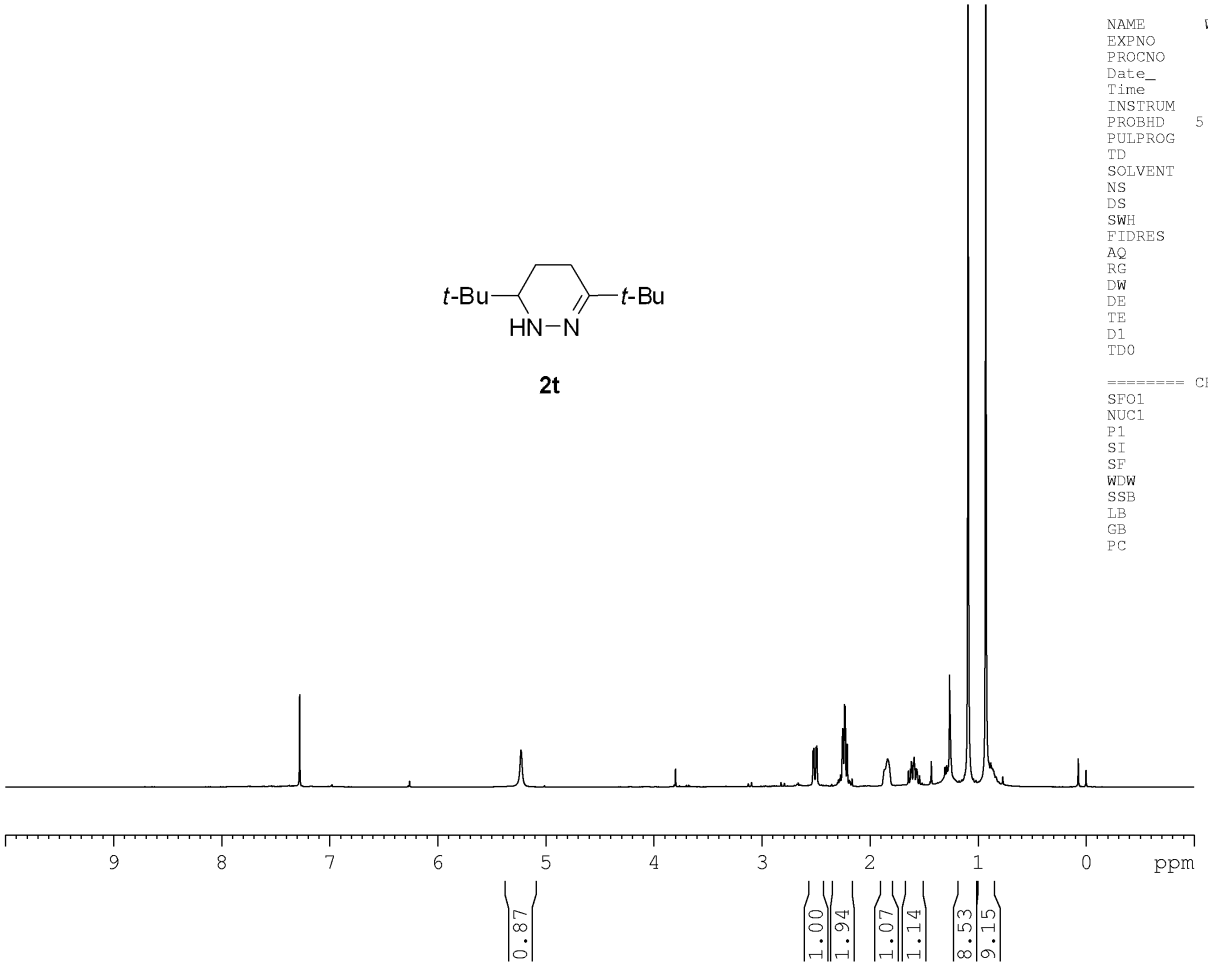



```
NAME       WANGWEI-H-HOU
EXPNO                 35
PROCNO                 1
Date_           20151002
Time                0.19
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 32768
SOLVENT            CDCl3
NS                    16
DS                     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           400.1300107 MHz
WDW                   EM
SSB                    0
LB                  0.50 Hz
GB                     0
PC                  1.00
```

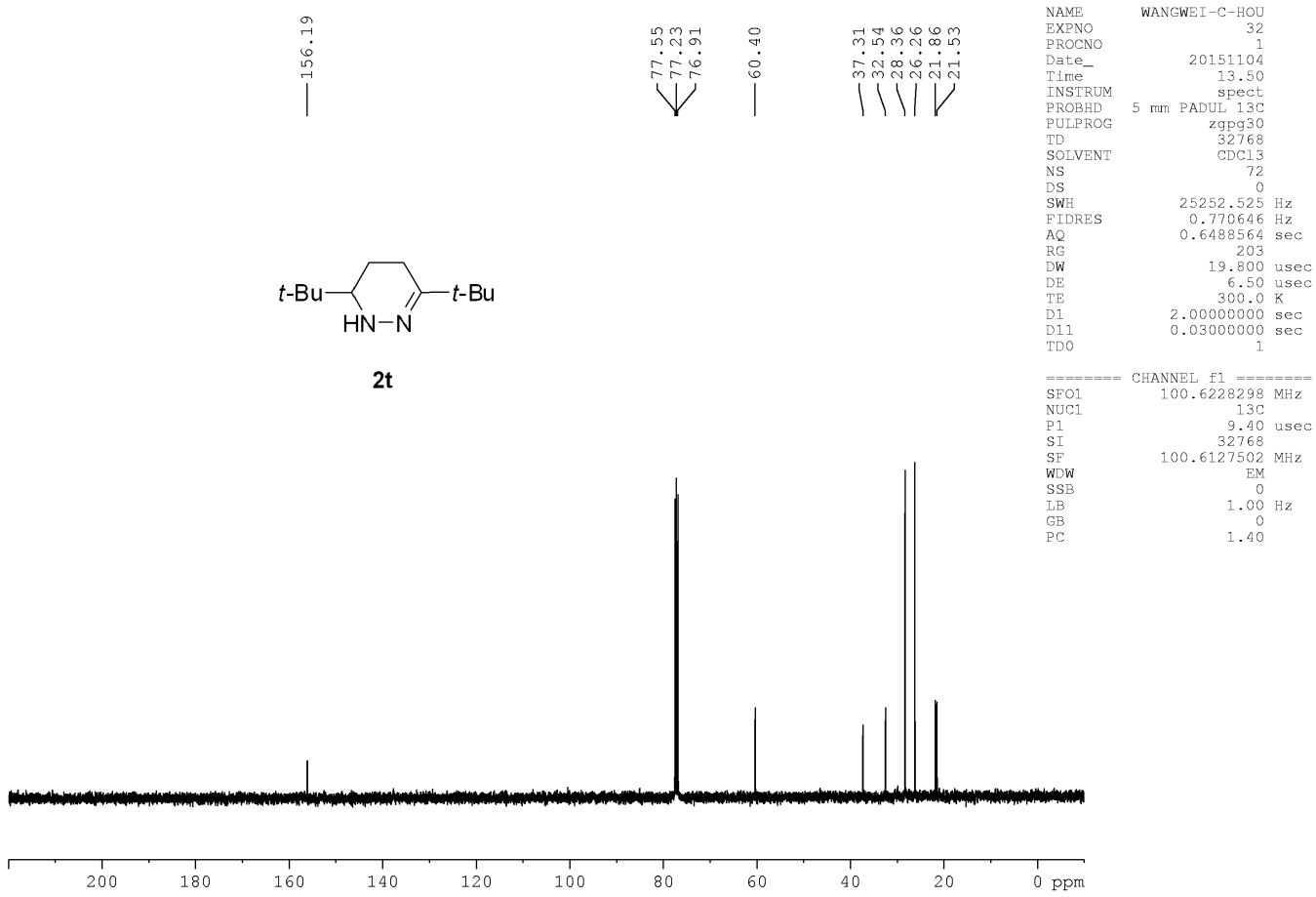


NAME	WANGWEI-C-HOU
EXPNO	8
PROCNO	1
Date_	20151002
Time	0.25
INSTRUM	spect
PROBHD	5 mm PADUL 13C
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	1143
DS	0
SWH	25252.525 Hz
FIDRES	0.770646 Hz
AQ	0.6488564 sec
RG	203
DW	19.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL 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          WANGWEI-H-HOU
EXPNO               122
PROCNO                1
Date_          20151104
Time              13.46
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                   57
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          400.1300035 MHz
WDW                 EM
SSB                  0
LB                0.50 Hz
GB                   0
PC                1.00
```



NAME	WANGWEI-C-HOU
EXPNO	32
PROCNO	1
Date_	20151104
Time	13.50
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	100.6127502 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40