Supplementary Information

Copper-Mediated C(sp^2)−H Amination Using $TMSN_3$ as a Nitrogen Source: Redox-neutral Access to Primary Anilines

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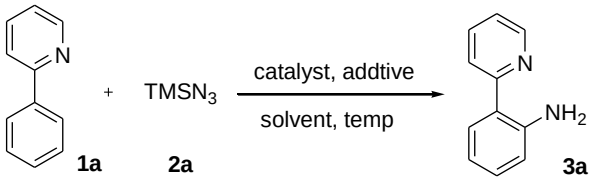
I. General information

All reagents were purchased without further purification unless otherwise noted. DCE was distilled under reduced pressure before use. Reactions were monitored using thin-layer chromatography (TLC) on commercial silica gel plates (GF254). Visualization of the developed plates was performed under UV light (254 nm). Flash column chromatography was performed on silica gel (200-300 mesh). ^{1}H and ^{13}C NMR spectra were recorded on a 400 or 500 MHz spectrometer. ^{1}H and ^{13}C NMR spectra are recorded on a 400 or 500 MHz spectrometer. Chemical shifts (δ) are reported in ppm referenced to an internal tetramethylsilane standard or the DMSO-d_6 residual peak (δ 2.50) for ^{1}H NMR. Chemical shifts of ^{13}C NMR are reported relative to $CDCl_3$ (δ 77.0) or DMSO-d_6 (δ 39.5). The following abbreviations were used to describe peak splitting patterns when appropriate: br = broad, s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet. Coupling constants, *J*, were reported in Hertz unit (Hz). High resolution mass spectra (HRMS) were obtained on an ESI-LC-MS/MS Spectrometer.

II.Screening of reaction conditions for the synthesis of 3a



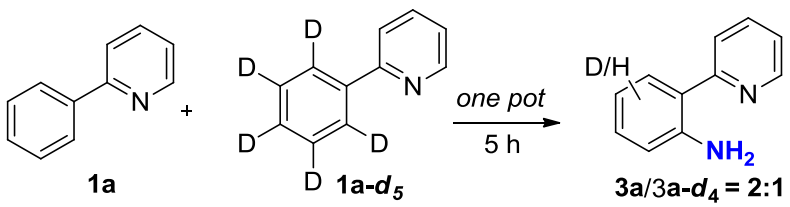
1a **2a** **3a**

entry	catalyst (equiv)	additive (equiv)	solvent	time (h)	tem. (^{o}C)	yield (%)
1	CuTc (0.3)	CF_3SO_3H (1.0)	DCB	24	120	24
2	CuCl (0.3)	CF_3SO_3H (1.0)	DCB	24	120	nr
3	CuBr (0.3)	CF_3SO_3H (1.0)	DCB	24	120	nr
4	CuI (0.3)	CF_3SO_3H (1.0)	DCB	24	120	nr
5	CuOAc (0.3)	CF_3SO_3H (1.0)	DCB	24	120	nr
6	$Cu(TFA)_2$ (0.3)	CF_3SO_3H (1.0)	DCB	24	115	26
7	$Cu(OTf)_2$ (0.3)	CF_3SO_3H (1.0)	DCB	24	115	nr

8	CuOTf (0.3)	CF_3SO_3H (1.0)	DCB	24	115	nr
9	CuTc (0.3)	TFA (1.0)	DCB	24	115	34
10	CuTc (0.3)	HBF_4 (1.0)	DCB	24	115	nr
11[e]	CuTc (0.3)	HFIP (1.0)	DCB	24	115	trace
12	CuTc (0.3)	*p*-TsOH (1.0)	DCB	24	115	16
13	CuTc (0.3)	3,4,5-trifluorobenzoic acid (1.0)	DCB	24	115	24
14	$Cu(TFA)_2$ (1.0)	TFA (1.0)	DCB	12	115	88
15	$Cu(OAc)_2$ (1.0)	TFA (1.0)	DCB	12	115	nd
16	$CuSO_4$ (1.0)	TFA (1.0)	DCB	12	115	nr
17	$CuCl_2$ (1.0)	TFA (1.0)	DCB	12	115	nd
18	$Cu(acac)_2$ (1.0)	TFA (1.0)	DCB	12	115	nr
19	$Cu(hfacac)_2$ (1.0)	TFA (1.0)	DCB	12	115	48
20	$Cu(OTf)_2$ (1.0)	TFA (1.0)	DCB	12	115	nr
21	$Cu(ClO_4)_2$ (1.0)	TFA (1.0)	DCB	12	115	nr
22	$Cu(TFA)_2$ (1.0)	TFA (1.0)	DCE	12	115	nd
23	$Cu(TFA)_2$ (1.0)	TFA (1.0)	mesitylene	12	115	messy
24	$Cu(TFA)_2$ (1.0)	TFA (1.0)	toluene	12	115	52%
25	$Cu(TFA)_2$ (1.0)	TFA (1.0)	DMSO	12	115	nd
26	$Cu(TFA)_2$ (1.0)	TFA (1.0)	DMF	12	115	nd
27	$Cu(TFA)_2$ (1.0)	TFA (1.0)	GDE	12	115	trace
28	$Cu(TFA)_2$ (1.0)	TFA (0.5)	DCB	12	115	68
29	$Cu(TFA)_2$ (1.0)	TFA (1.2)	DCB	12	115	86
30	$Cu(TFA)_2$ (1.0)	TFA (1.5)	DCB	24	115	75
31	$Cu(TFA)_2$ (1.0)	TFA (2.0)	DCB	24	115	nd

Reaction conditions: **1a** (0.20 mmol), **2** (0.40 mol), solvent (1.0 mL), sealed tube, Ar, T/℃, isolated yields, nd = not detected, nr = no reaction. DCB = 1, 2-dichlorobenzene.

III. Mechanistic studies



A mixture of substrate **1a** (0.1 mmol), **1a-*d*$_5$** (0.1 mmol), $TMSN_3$ (0.4 mmol, 2.0 equiv), $Cu(TFA)_2$ (57.8 mg, 0.2 mmol, 1.0 equiv), TFA (0.2 mmol, 1.0 equiv) in 1, 2-dichlorobenzene (1.0 mL) was stirred at 115 ^oC in sealed tube under Ar atomosphere. The reaction was cooled down to room temperature after 10h. Saturated aqueous NaCl (10 mL), NH_4OH (1 mL)and EtOAc were added to the reaction mixture successively. The organic phase was further extracted with EtOAc(2 × 10 mL). The combined organic layers were dried over anhydrous Na_2SO_4 and concentrated. The residue was purified by flash chromatography to provide the mixtrue of **3a** and **3a-*d*$_4$**.

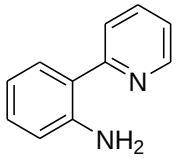
IV. General procedures and characterization of the products

(1) General procedure for the synthesis of 3

A mixture of substrate **1** (0.2 mmol), $TMSN_3$ (0.4 mmol, 2.0 equiv), $Cu(TFA)_2$ (57.8 mg, 0.2 mmol, 1.0 equiv), TFA (0.2 mmol, 1.0 equiv) in 1, 2-dichlorobenzene (1.0 mL) was stirred at 115 ^oC in sealed tube under Ar atomosphere. The reaction was cooled down to room temperature after complete consumption of the starting material as being monitored by TLC. Saturated aqueous NaCl (10 mL), NH_4OH (1 mL) and EtOAc (10 mL) were added to the reaction mixture successively. The organic phase was separated, and the aqueous phase was further extracted with EtOAc (2 × 10 mL). The combined organic layers were dried over anhydrous Na_2SO_4 and concentrated. The residue was purified by flash chromatography to provide the desired product **3**.

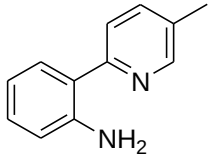
(2) Characterization of the products

2-(pyridin-2-yl)benzenamine (**3a**)



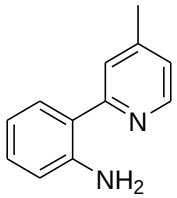
^1H NMR (400 MHz, $CDCl_3$) δ 8.61 (d, *J* = 4.0 Hz, 1H), 7.74-7.78 (m, 1H), 7.65 (d, *J* = 8.0 Hz, 1H), 7.51 (d, *J* = 8.0 Hz, 1H), 7.16-7.19 (m, 2H), 6.75-6.80 (m, 2H), 5.71 (br s, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 159.4, 147.8, 146.5, 136.9, 129.9, 129.4, 122.2, 122.2, 120.9, 117.6, 117.2; HRMS (ESI): Exact mass calcd for $C_{11}H_{11}N_2$ $[M+H]^+$ 171.0922, Found 171.0917.

2-(5-methylpyridin-2-yl)benzenamine (**3b**)



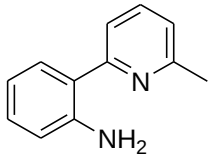
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.44 (s, 1H), 7.54-7.56 (m, 2H), 7.48 (d, *J* = 8.0 Hz, 1H), 7.13-7.17 (m, 1H), 6.74-6.79 (m, 2H), 5.65 (br s, 2H), 2.36 (s, 3H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 156.6, 148.1, 146.3, 137.5, 130.3, 129.5, 129.2, 122.4, 121.7, 117.6, 117.1, 18.1; HRMS (ESI): Exact mass calcd for $C_{12}H_{13}N_2$ $[M+H]^+$ 185.1079, Found 185.1072.

2-(4-methylpyridin-2-yl)benzenamine (**3c**)



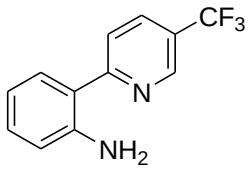
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.46 (d, *J* = 4.0 Hz, 1H), 7.49 (d, *J* = 8.0 Hz, 1H), 7.46 (s, 1H), 7.14-7.18 (m, 1H), 7.01 (d, *J* = 5.0 Hz, 1H), 6.74-6.80 (m, 2H), 5.65 (br s, 2H), 2.40 (s, 3H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 159.4, 147.7, 147.7, 146.7, 129.7, 129.3, 123.0, 122.6, 121.9, 117.5, 117.1, 21.1; HRMS (ESI): Exact mass calcd for $C_{12}H_{13}N_2$ $[M+H]^+$ 185.1079, Found 185.1075.

2-(6-methylpyridin-2-yl)benzenamine (**3d**)



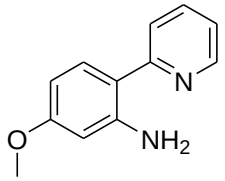
^{1}H NMR (400 MHz, $CDCl_3$) δ7.63-7.67 (m, 1H), 7.50 (d, *J* = 8.0 Hz, 1H), 7.45 (d, *J* = 8.0 Hz, 1H), 7.14-7.18 (m, 1H), 7.04 (d, *J* = 7.6 Hz, 1H), 6.74-6.79 (m, 2H), 5.66 (br s, 2H), 2.59 (s, 3H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 158.8, 156.5, 146.4, 137.2, 129.7, 129.4, 122.5, 120.4, 119.2, 117.6, 117.2, 24.5; HRMS (ESI): Exact mass calcd for $C_{12}H_{13}N_2$ $[M+H]^+$ 185.1079, Found 185.1074.

2-(5-(trifluoromethyl)pyridin-2-yl)benzenamine (**3e**)



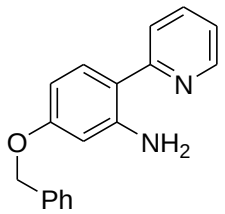
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.87 (s, 1H), 7.97 (d, *J* = 8.5 Hz, 1H), 7.79 (d, *J* = 8.5 Hz, 1H), 7.56 (d, *J* = 7.8 Hz,, 1H), 7.20-7.24 (m, 1H), 6.76-6.82 (m, 2H), 5.83 (br s, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 162.7, 147.2, 144.8 (q, *J* = 4.1 Hz), 133.7 (q, *J* = 3.5 Hz), 131.0, 129.5, 123.7 (q, *J* = 271.9 Hz), 123.4 (q, *J* = 33.0 Hz), 121.4, 120.2, 117.6, 117.5; HRMS (ESI): Exact mass calcd for $C_{12}H_{10}F_3N_2$ $[M+H]^+$ 239.0796, Found 239.0791.

5-methoxy-2-(pyridin-2-yl)benzenamine (**3f**)



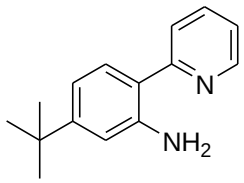
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.55 (d, *J* = 4.0 Hz, 1H), 7.69-7.73 (m, 1H), 7.59 (d, *J* = 8.0 Hz, 1H), 7.47 (d, *J* = 8.0 Hz, 1H), 7.09-7.12 (m, 1H), 6.37 (d, *J* = 8.0 Hz, 1H), 6.27 (s, 1H),5.93 (br s, 2H), 3.80 (s, 3H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 161.1, 159.3, 148.3, 147.6, 136.7, 130.5, 121.3, 120.1, 115.4, 104.2, 101.4, 55.1; HRMS (ESI): Exact mass calcd for $C_{12}H_{13}N_2O$ $[M+H]^+$ 201.1028, Found 201.1023.

5-(benzyloxy)-2-(pyridin-2-yl)benzenamine (**3g**)



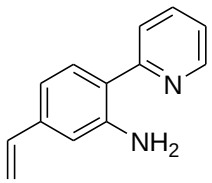
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.55 (d, *J* = 4.0 Hz, 1H), 7.69-7.73 (m, 1H), 7.59 (d, *J* = 8.0 Hz, 1H), 7.33-7.48 (m, 6H), 7.10-7.12 (m, 1H)6.44 (d, *J* = 8.0 Hz, 1H), 6.35 (s, 1H),5.92 (br s, 2H), 5.08 (s, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 160.3, 159.2, 148.3, 147.6, 137.0, 136.7, 130.5, 128.5, 127.9, 127.4, 121.4, 120.2, 115.6, 104.9, 102.4, 69.8; HRMS (ESI): Exact mass calcd for $C_{18}H_{17}N_2O$ $[M+H]^+$ 277.1341, Found 277.1341.

5-tert-butyl-2-(pyridin-2-yl)benzenamine (**3h**)



^{1}H NMR (400 MHz, $CDCl_3$) δ 8.58 (d, *J* = 4.0 Hz, 1H), 7.71-7.73 (m, 1H), 7.65 (d, *J* = 8.0 Hz, 1H), 7.47 (d, *J* = 8.0 Hz, 1H), 7.14-7.15 (m, 1H), 6.83 (d, *J* = 8.0 Hz, 1H), 6.78 (s, 1H),5.77 (br s, 2H), 1.32 (s, 9H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 159.4, 153.2, 147.8, 146.3, 136.7, 129.0, 121.8, 120.5, 119.5, 115.1, 114.3, 34.5, 31.1; HRMS (ESI): Exact mass calcd for $C_{15}H_{19}N_2$ $[M+H]^+$ 227.1548, Found 227.1545.

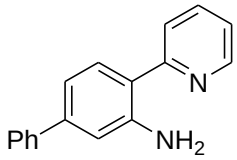
2-(pyridin-2-yl)-5-vinylbenzenamine (**3i**)



^{1}H NMR (400 MHz, $CDCl_3$) δ 8.60 (d, *J* = 4.0 Hz, 1H), 7.73-7.77 (m, 1H), 7.66 (d, *J*

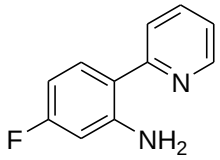
= 8.0 Hz, 1H), 7.50 (d, *J* = 8.0 Hz, 1H), 7.15-7.18 (m, 1H), 6.87 (d, *J* = 8.0 Hz, 1H), 6.79 (s, 1H), 6.65 (dd, *J* = 17.6, 10.8 Hz, 1H), 5.79 (br s, 2H), 5.76 (d, *J* = 17.6 Hz, 1H), 5.26 (d, *J* = 10.8 Hz, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 159.1, 147.8, 146.7, 139.0, 136.8, 136.6, 129.5, 121.9, 121.5, 120.8, 115.6, 115.0, 114.2; HRMS (ESI): Exact mass calcd for $C_{13}H_{13}N_2$ $[M+H]^+$ 197.1079, Found 197.1075.

4-(pyridin-2-yl)-[1,1'-biphenyl]-3-amine (**3j**)



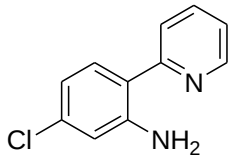
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.62 (d, *J* = 4.0 Hz, 1H), 7.70-7.79 (m, 2H), 7.60-7.64 (m, 3H), 7.42-7.46 (m, 2H), 7.34-7.37 (m, 1H), 7.17-7.20 (m, 1H), 7.03 (d, *J* = 8.0 Hz, 1H), 7.00 (s, 1H), 5.89 (br s, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 159.4, 147.8, 147.1, 142.9, 141.0, 136.6, 129.6, 128.6, 127.3, 127.0, 121.8, 121.2, 120.6, 116.6, 115.7; HRMS (ESI): Exact mass calcd for $C_{17}H_{15}N_2$ $[M+H]^+$ 247.1235, Found 247.1230.

5-fluoro-2-(pyridin-2-yl)benzenamine (**3k**)



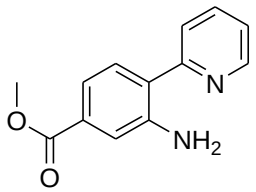
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.58 (d, *J* = 4.0 Hz, 1H), 7.73-7.77 (m, 1H), 7.59 (d, *J* = 8.0 Hz, 1H), 7.46-7.50 (m, 1H), 7.15-7.18 (m, 1H), 6.43-6.49 (m, 2H), 5.94 (br s, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 164.0 (d, *J* = 246.2 Hz), 158.7, 148.5 (d, *J* = 11.3 Hz), 147.8, 136.9, 130.9 (d, *J* = 10.5 Hz), 121.8, 120.8, 118.2 (d, *J* = 2.3 Hz), 104.5 (d, *J* = 21.9 Hz), 103.0 (d, *J* = 24 Hz); HRMS (ESI): Exact mass calcd for $C_{11}H_{10}FN_2$ $[M+H]^+$ 189.0828, Found 189.0825.

5-chloro-2-(pyridin-2-yl)benzenamine (**3l**)



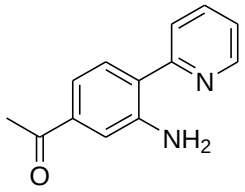
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.59 (d, *J* = 4.0 Hz, 1H), 7.73-7.77 (m, 1H), 7.61 (d, *J* = 8.0 Hz, 1H), 7.44 (d, *J* = 8.0 Hz, 1H), 7.17-7.20 (m, 1H), 6.72-6.74 (m, 2H), 5.91 (br s, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 158.5, 147.8, 147.7, 137.0, 135.4, 130.4, 121.9, 121.1, 120.3, 117.5, 116.5; HRMS (ESI): Exact mass calcd for $C_{11}H_{10}ClN_2$ $[M+H]^+$ 205.0533, Found 205.0530.

Methyl 3-amino-4-(pyridin-2-yl)benzoate (**3m**)



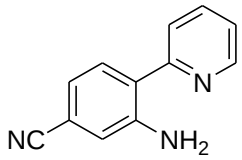
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.63 (d, *J* = 4.0 Hz, 1H), 7.77-7.81 (m, 1H), 7.69 (d, *J* = 8.0 Hz, 1H), 7.57 (d, *J* = 8.0 Hz, 1H), 7.40-7.44 (m, 2H), 7.21-7.24 (m, 1H),5.85 (br s, 2H), 3.91 (s, 3H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 167.0, 158.4, 148.0, 146.5, 137.0, 131.0, 129.3, 125.7, 122.6, 121.6, 118.3, 118.2, 52.0; HRMS (ESI): Exact mass calcd for $C_{13}H_{13}N_2O_2$ $[M+H]^+$ 229.0977, Found 229.0970.

1-(3-amino-4-(pyridin-2-yl)phenyl)ethanone (**3n**)



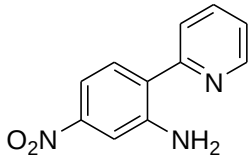
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.64 (d, *J* = 4.0 Hz, 1H), 7.78-7.82 (m, 1H), 7.70 (d, *J* = 8.0 Hz, 1H), 7.60 (d, *J* = 8.0 Hz, 1H), 7.33-7.34 (m, 2H), 7.22-7.24 (m, 1H), 5.98 (br s, 2H), 2.60 (s, 3H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 198.1, 158.3, 148.0, 146.7, 138.0, 137.0, 129.5, 125.9, 122.6, 121.7, 117.4, 116.6, 26.7; HRMS (ESI): Exact mass calcd for $C_{13}H_{13}N_2O$ $[M+H]^+$ 213.1028, Found 213.1028.

3-amino-4-(pyridin-2-yl)benzonitrile (**3o**)



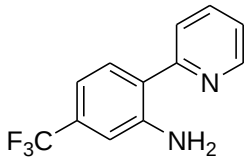
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.64 (d, *J* = 4.0 Hz, 1H), 7.80-7.84 (m, 1H), 7.67 (d, *J* = 8.0 Hz, 1H), 7.57 (d, *J* = 8.0 Hz, 1H), 7.26-7.28 (m, 1H), 7.00-7.03 (m, 2H), 6.01 (br s, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 157.9, 148.0, 147.1, 137.0, 129.8, 125.5, 122.3, 121.9, 120.3, 120.0, 118.7, 113.3; HRMS (ESI): Exact mass calcd for $C_{12}H_{10}N_3$ $[M+H]^+$ 196.0875, Found 196.0871.

5-nitro-2-(pyridin-2-yl)benzenamine (**3p**)



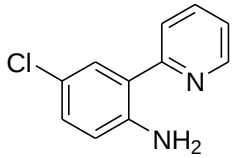
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.66 (d, *J* = 4.0 Hz, 1H), 7.82-7.86 (m, 1H), 7.71 (d, *J* = 8.0 Hz, 1H), 7.64 (d, *J* = 8.0 Hz, 1H), 7.56-7.58 (m, 2H), 7.27-7.30 (m, 1H), 6.14 (br s, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 157.4, 148.7, 148.1, 147.4, 137.3, 130.0, 126.8, 122.8, 122.3, 111.7, 111.3; HRMS (ESI): Exact mass calcd for $C_{11}H_{10}N_3O_2$ $[M+H]^+$ 216.0773, Found 216.0768.

5-(trifluoromethyl)-2-(pyridin-2-yl)benzenamine (**3q**)



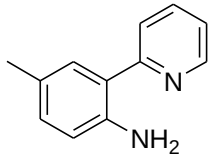
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.64 (d, *J* = 4.0 Hz, 1H), 7.79-7.82 (m, 1H), 7.68 (d, *J* = 8.0 Hz, 1H), 7.60 (d, *J* = 8.0 Hz, 1H), 7.23-7.26 (m, 1H), 6.98-7.00 (m, 2H), 5.95 (br s, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 158.2, 148.0, 146.7, 137.1, 131.6 (q, *J* = 32 Hz), 129.7, 124.5, 124.0 (q, *J* = 270 Hz), 122.4, 121.7, 113.7 (q, *J* = 3.8 Hz), 113.6 (q, *J* = 3.8 Hz); HRMS (ESI): Exact mass calcd for $C_{12}H_{10}F_3N_2$ $[M+H]^+$ 239.0796, Found 239.0791.

4-chloro-2-(pyridin-2-yl)benzenamine (**3r**)



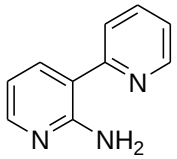
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.59 (d, *J* = 4.0 Hz, 1H), 7.73-7.77 (m, 1H), 7.61 (d, *J* = 8.0 Hz, 1H), 7.44 (d, *J* = 8.0 Hz, 1H), 7.17-7.20 (m, 1H), 6.72-6.74 (m, 2H), 5.91 (br s, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 158.5, 147.8, 147.7, 137.0, 135.4, 130.4, 121.9, 121.1, 120.3, 117.5, 116.5; HRMS (ESI): Exact mass calcd for $C_{11}H_{10}ClN_2$ $[M+H]^+$ 205.0533, Found 205.0529.

4-methyl-2-(pyridin-2-yl)benzenamine (**3s**)



^{1}H NMR (400 MHz, $CDCl_3$) δ 8.60 (d, *J* = 4.0 Hz, 1H), 7.73-7.77 (m, 1H), 7.64 (d, *J* = 8.0 Hz, 1H), 7.34 (s, 1H), 7.15-7.18 (m, 1H), 7.00 (d, *J* = 8.0 Hz, 1H), 6.69 (d, *J* = 8.0 Hz, 1H), 5.47 (br s, 2H), 2.30 (s, 3H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 159.7, 147.9, 144.2, 136.5, 130.6, 129.7, 126.6, 122.6, 122.1, 120.7, 117.3, 20.3; HRMS (ESI): Exact mass calcd for $C_{12}H_{13}N_2$ $[M+H]^+$ 185.1079, Found 185.1075.

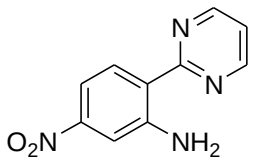
3-(pyridin-2-yl)pyridin-2-amine (**3t**)



^{1}H NMR (400 MHz, $CDCl_3$) δ 8.62 (d, *J* = 4.0 Hz, 1H), 8.11 (d, *J* = 4.0 Hz, 1H), 7.84 (d, *J* = 8.0 Hz, 1H), 7.75-7.77 (m, 1H), 7.69 (d, *J* = 8.0 Hz, 1H), 7.20-7.23 (m, 1H), 6.75 (br s, 2H), 6.69-6.72 (m, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 157.7, 157.5, 149.1, 147.9, 136.7, 136.3, 121.4, 121.2, 116.3, 113.2; HRMS (ESI): Exact mass

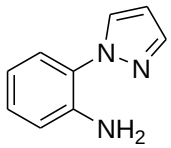
calcd for $C_{10}H_{10}N_3$ $[M+H]^+$ 172.0875, Found 172.0870.

5-nitro-2-(pyrimidin-2-yl)benzenamine (**3u**)



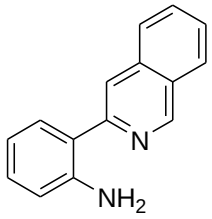
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.84 (d, *J* = 4.0 Hz, 2H), 8.64 (d, *J* = 8.8 Hz, 1H), 7.58 (s, 1H), 7.54 (d, *J* = 8.8 Hz, 1H), 7.21-7.24 (m, 1H), 6.63 (br s, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 164.5, 156.4, 149.9, 149.0, 132.2, 123.1, 118.5, 111.5, 110.7; HRMS (ESI): Exact mass calcd for $C_{10}H_9N_4O_2$ $[M+H]^+$ 217.0726, Found 217.0721.

2-(1H-pyrazol-1-yl)benzenamine (**3v**)



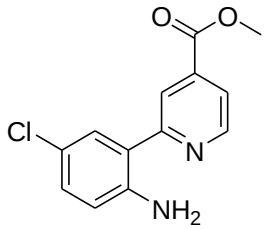
^{1}H NMR (400 MHz, $CDCl_3$) δ 7.73 (d, *J* = 12.0 Hz, 2H), 7.13-7.19 (m, 2H), 6.76-6.84(m, 2H), 6.44 (s, 1H), 4.67 (br s, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 141.2, 140.3, 129.6, 128.4, 126.7, 124.1, 117.9, 117.3, 106.2; HRMS (ESI): Exact mass calcd for $C_9H_{10}N_3$ $[M+H]^+$ 160.0875, Found 160.0870.

2-(isoquinolin-3-yl)benzenamine (**3w**)



^{1}H NMR (400 MHz, $CDCl_3$) δ 9.28 (s, 1H), 7.98 (d, *J* = 8.0 Hz, 1H), 7.95 (s, 1H), 7.86 (d, *J* = 8.0 Hz, 1H), 7.67-7.71 (m, 1H), 7.57-7.60 (m, 2H), 7.18-7.22(m, 1H), 6.79-6.87 (m, 2H), 5.22 (br s, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 153.3, 150.9, 146.2, 136.9, 130.5, 129.9, 129.6, 127.5, 127.0, 126.9, 126.8, 123.6, 118.6, 118.1, 117.1; HRMS (ESI): Exact mass calcd for $C_{15}H_{13}N_2$ $[M+H]^+$ 221.1079, Found 221.1074.

Methyl 2-(2-amino-5-chlorophenyl)pyridine-4-carboxylate (**3x**)

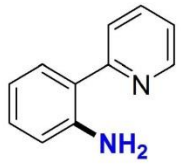


^{1}H NMR (400 MHz, $CDCl_3$) δ 8.75 (d, *J* = 4.0 Hz, 1H), 8.21 (s, 1H), 7.75 (d, *J* = 4.0

Hz, 1H), 7.58 (s, 1H), 7.14 (d, *J* = 8.0 Hz, 1H), 6.70 (d, *J* = 8.0 Hz, 1H), 5.81 (br s, 2H), 4.00 (s, 3H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.5, 159.1, 148.7, 145.4, 138.4, 130.2, 128.8, 122.1, 122.0, 121.3, 120.3, 118.5, 52.8; HRMS (ESI): Exact mass calcd for $C_{13}H_{12}N_2O_2$ $[M+H]^+$ 263.0587, Found 263.0584.

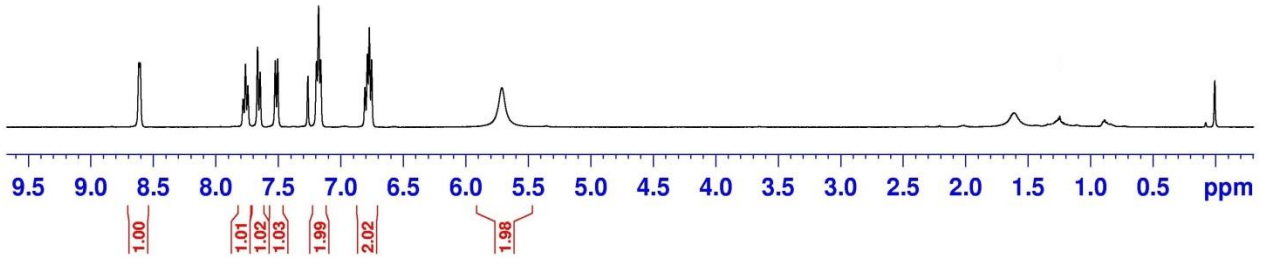
V. Copies of ^{1}H NMR and ^{13}C NMR Spectra

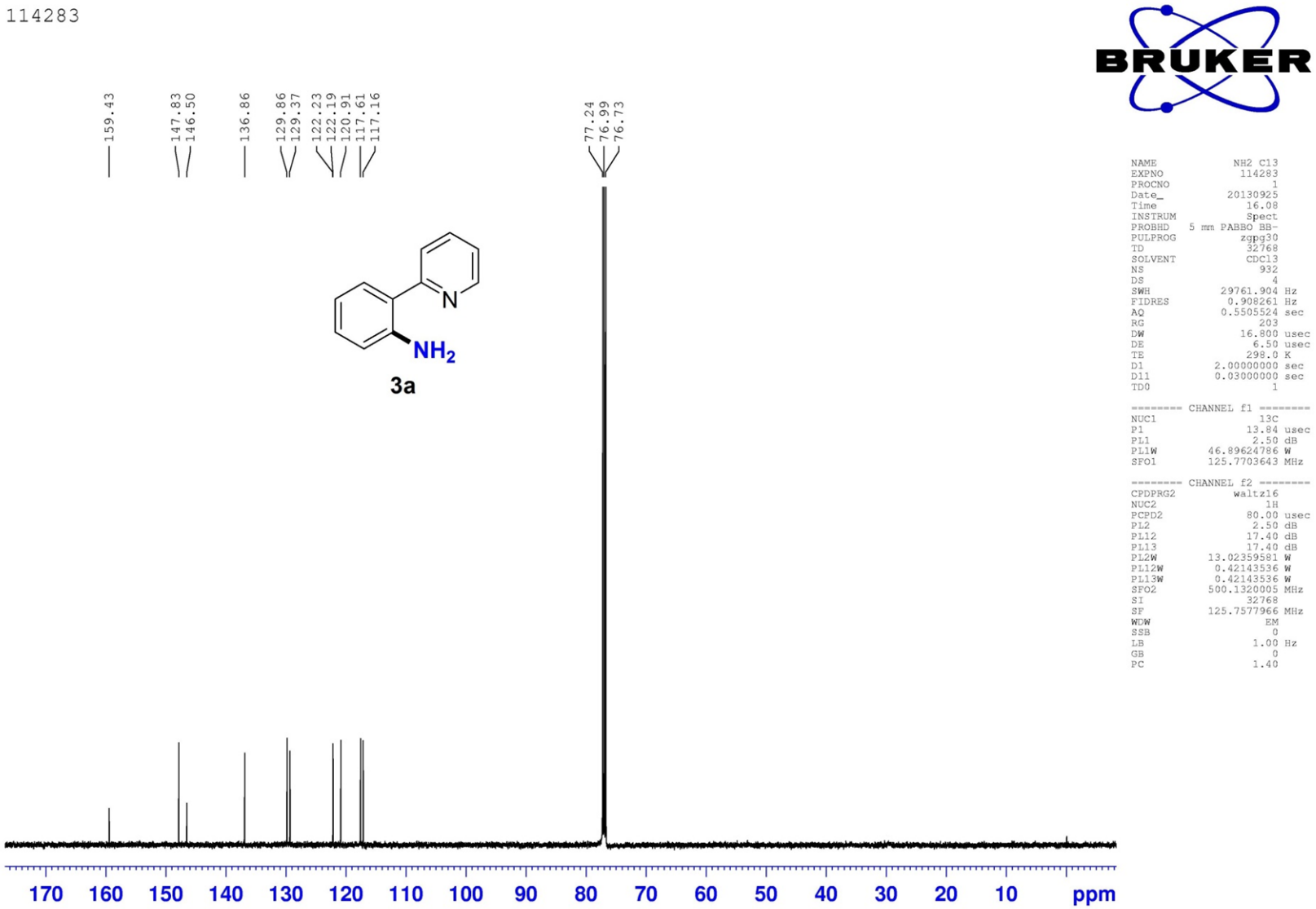
114233



3a

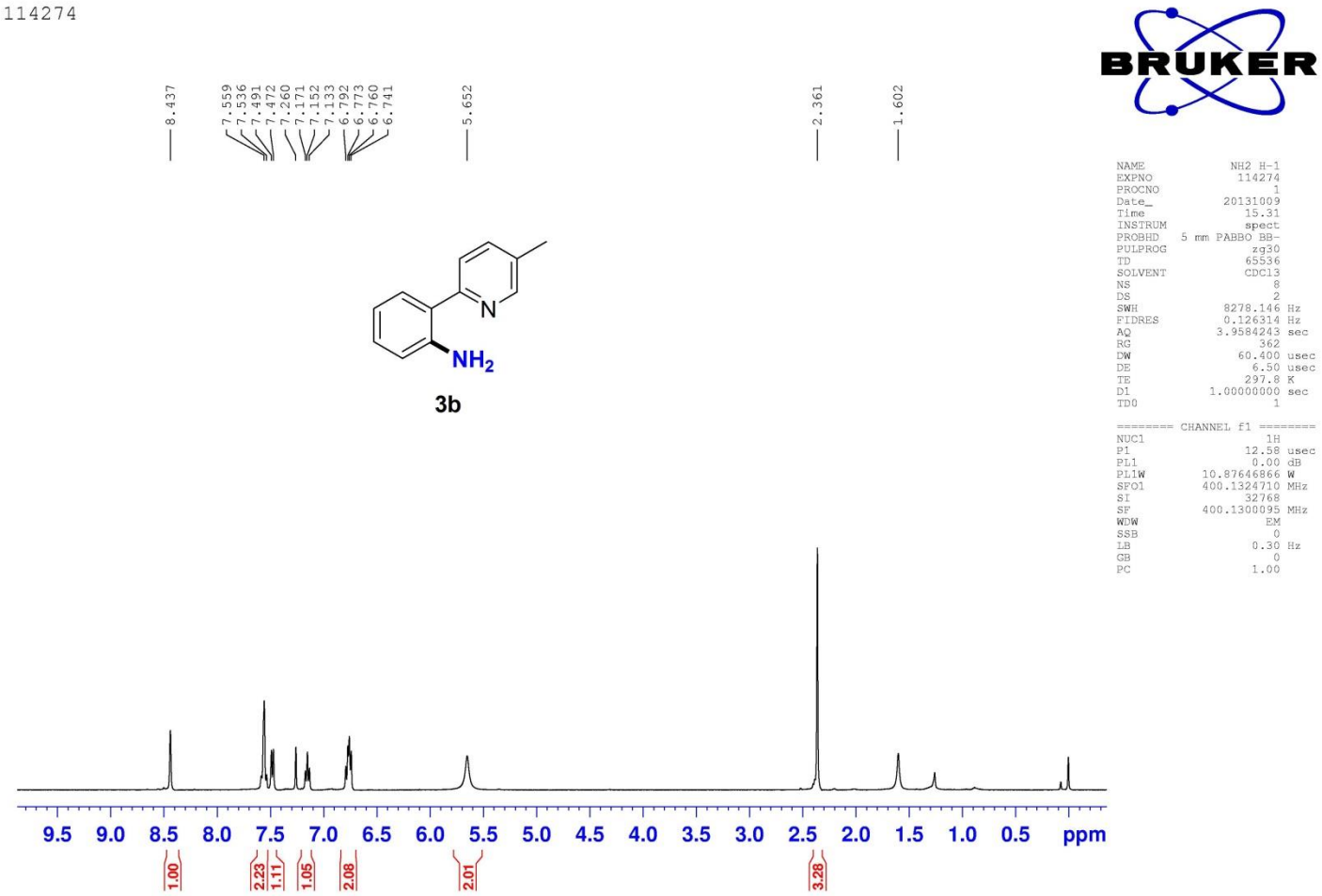
NAME	NH2 H-1
EXPNO	114233
PROCNO	1
Date_	20130923
Time	21.05
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	16
DS	2
SWH	8278.146 Hz
FIDRES	0.126314 Hz
AQ	3.9584243 sec
RG	322.5
DW	60.400 usec
DE	6.50 usec
TE	298.2 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	1H
P1	12.58 usec
PL1	0.00 dB
PL1W	10.87646866 W
SFO1	400.1324710 MHz
SI	32768
SF	400.1300094 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00





BRUKER

NAME	NH2 C13
EXPNO	114283
PROCNO	1
Date_	20130925
Time	16.08
INSTRUM	Spect
PROBHD	5 mm PABBO BB-
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	932
DS	4
SWH	29761.904 Hz
FIDRES	0.908261 Hz
AQ	0.5505524 sec
RG	203
DW	16.800 usec
DE	6.50 usec
TE	298.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	13C
P1	13.84 usec
PL1	2.50 dB
PL1W	46.89624786 W
SFO1	125.7703643 MHz
======== CHANNEL f2 ========	
CPDPRG2	waltz16
NUC2	1H
PCPD2	80.00 usec
PL2	2.50 dB
PL12	17.40 dB
PL13	17.40 dB
PL2W	13.02359581 W
PL12W	0.42143536 W
PL13W	0.42143536 W
SFO2	500.1320005 MHz
SI	32768
SF	125.7577966 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40


114274
8.437
7.559
7.536
7.491
7.472
7.260
7.171
7.152
7.133
6.792
6.773
6.760
6.741
5.652
2.361
1.602
NH2
3b
NAME NH2 H-1
EXPNO 114274
PROCNO 1
Date_ 20131009
Time 15.31
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 362
DW 60.400 usec
DE 6.50 usec
TE 297.8 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 12.58 usec
PL1 0.00 dB
PL1W 10.87646866 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300095 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
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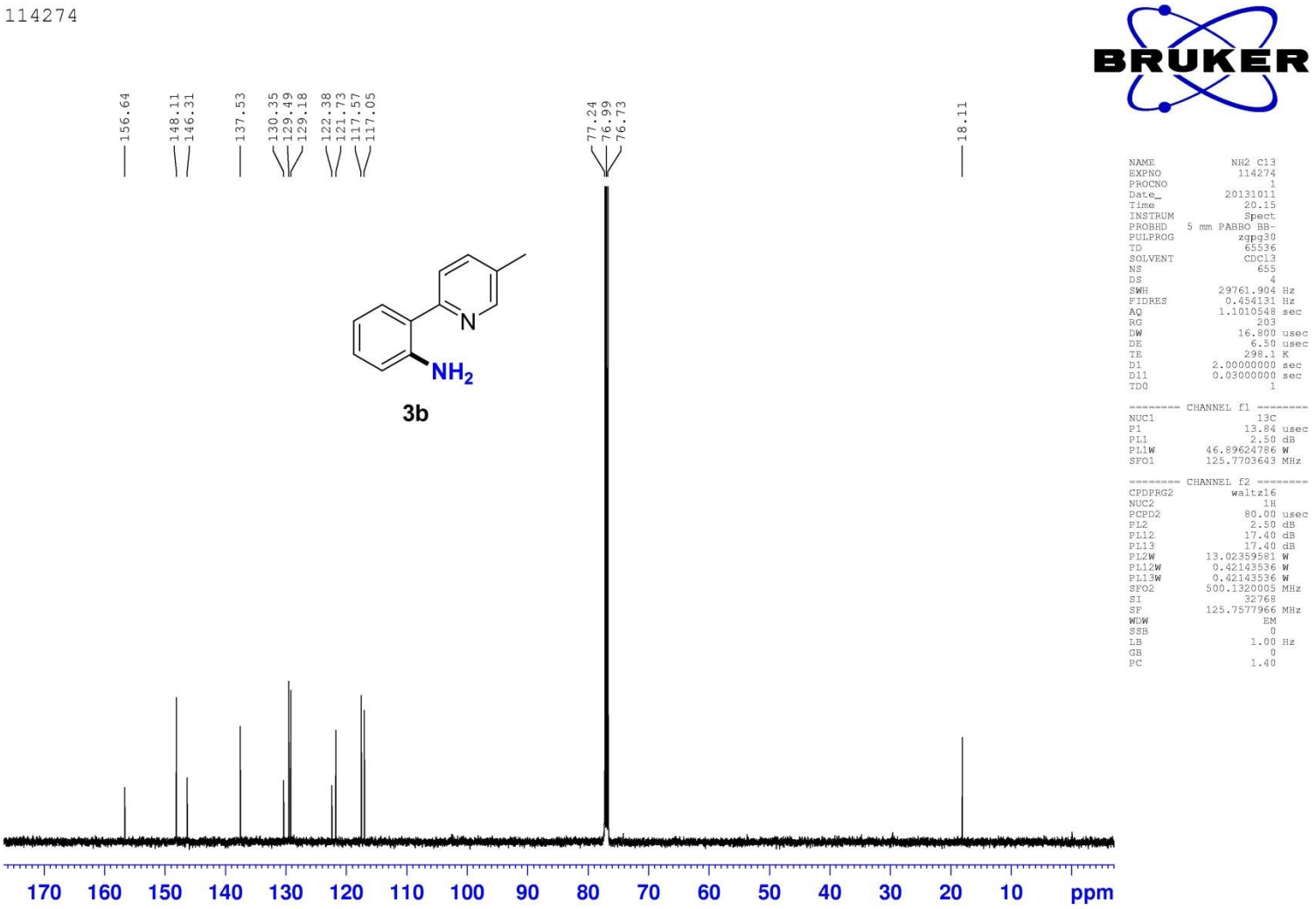
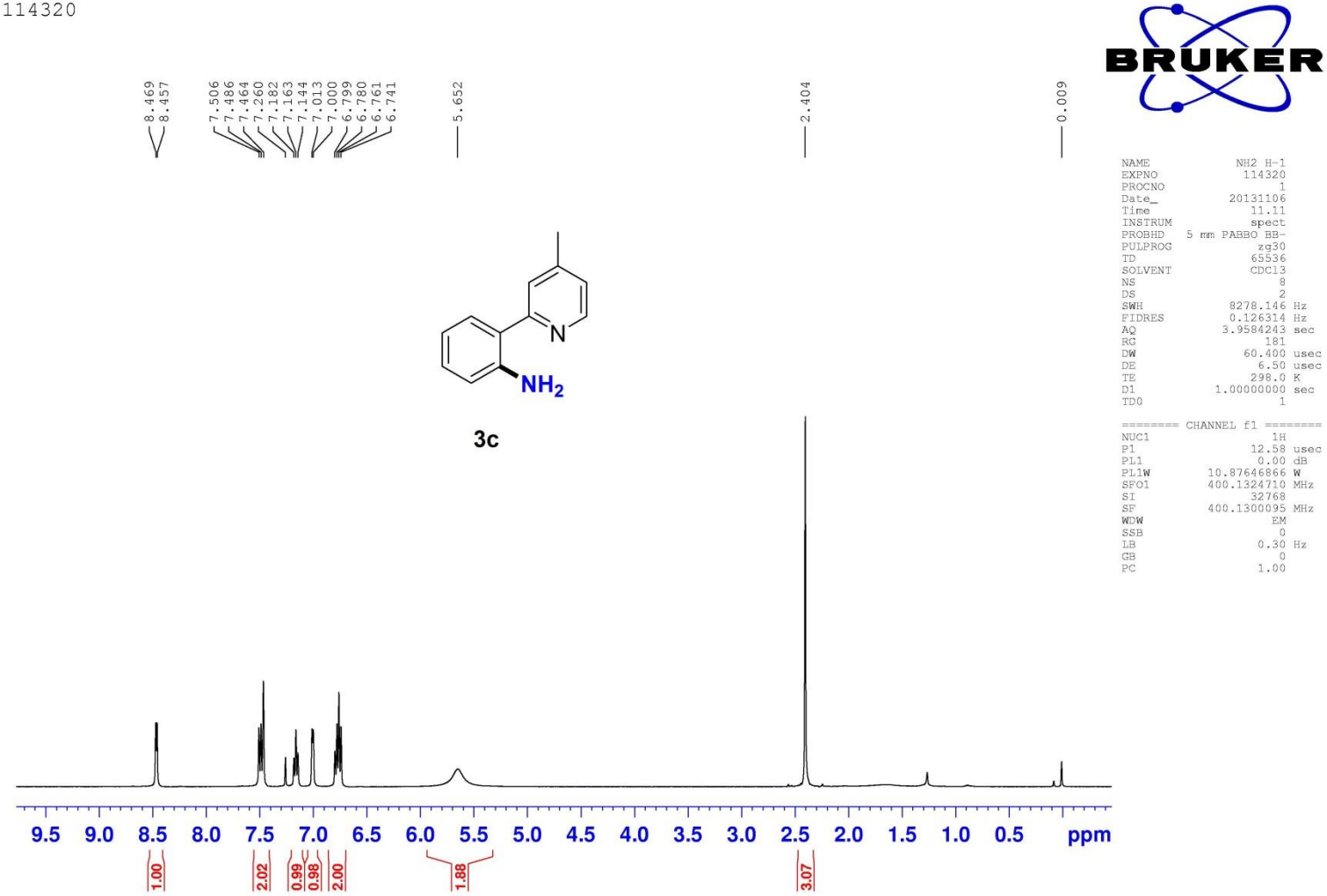
2.23
1.11
1.05
2.08
2.01
3.28



BRUKER

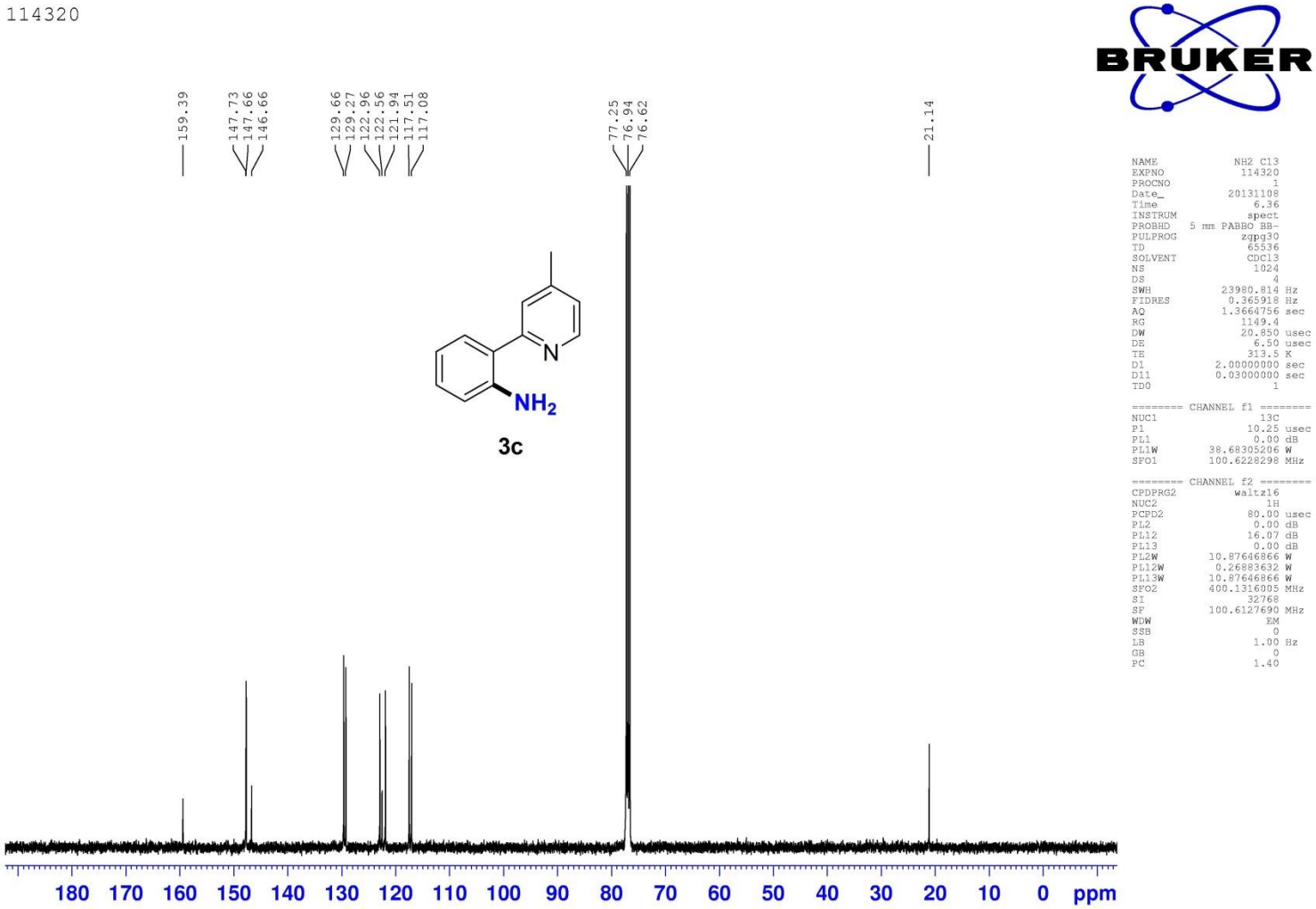
NAME	NH2 C13
EXPNO	114274
PROCNO	1
Date_	20131011
Time	20.15
INSTRUM	Spect
PROBHD	5 mm PABBO BB-
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	655
DS	4
SWH	29761.904 Hz
FIDRES	0.454131 Hz
AQ	1.1010548 sec
RG	203
DW	16.800 usec
DE	6.50 usec
TE	298.1 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	13C
P1	13.84 usec
PL1	2.50 dB
PL1W	46.89624786 W
SFO1	125.7703643 MHz
======== CHANNEL f2 ========	
CPDPRG2	waltz16
NUC2	1H
PCPD2	80.00 usec
PL2	2.50 dB
PL12	17.40 dB
PL13	17.40 dB
PL2W	13.02359581 W
PL12W	0.42143536 W
PL13W	0.42143536 W
SFO2	500.1320005 MHz
SI	32768
SF	125.7577966 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

114320



BRUKER

NAME	NH2 H-1
EXPNO	114320
PROCNO	1
Date_	20131106
Time	11.11
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	8
DS	2
SWH	8278.146 Hz
FIDRES	0.126314 Hz
AQ	3.9584243 sec
RG	181
DW	60.400 usec
DE	6.50 usec
TE	298.0 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	1H
P1	12.58 usec
PL1	0.00 dB
PL1W	10.87646866 W
SFO1	400.1324710 MHz
SI	32768
SF	400.1300095 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

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NAME              NH2 C13
EXPNO              114320
PROCNO                  1
Date_            20131108
Time                6.36
INSTRUM             spect
PROBHD   5 mm PABBO BB-
PULPROG          zgpg30
TD                 65536
SOLVENT            CDCl3
NS                  1024
DS                     4
SWH           23980.814 Hz
FIDRES         0.365918 Hz
AQ             1.3664756 sec
RG                1149.4
DW                20.850 usec
DE                 6.50 usec
TE                313.5 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                13C
P1                10.25 usec
PL1                0.00 dB
PL1W         38.68305206 W
SFO1         100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                1H
PCPD2             80.00 usec
PL2                0.00 dB
PL12              16.07 dB
PL13               0.00 dB
PL2W         10.87646866 W
PL12W         0.26883632 W
PL13W        10.87646866 W
SFO2         400.1316005 MHz
SI                 32768
SF           100.6127690 MHz
WDW                   EM
SSB                    0
LB                 1.00 Hz
GB                     0
PC                 1.40
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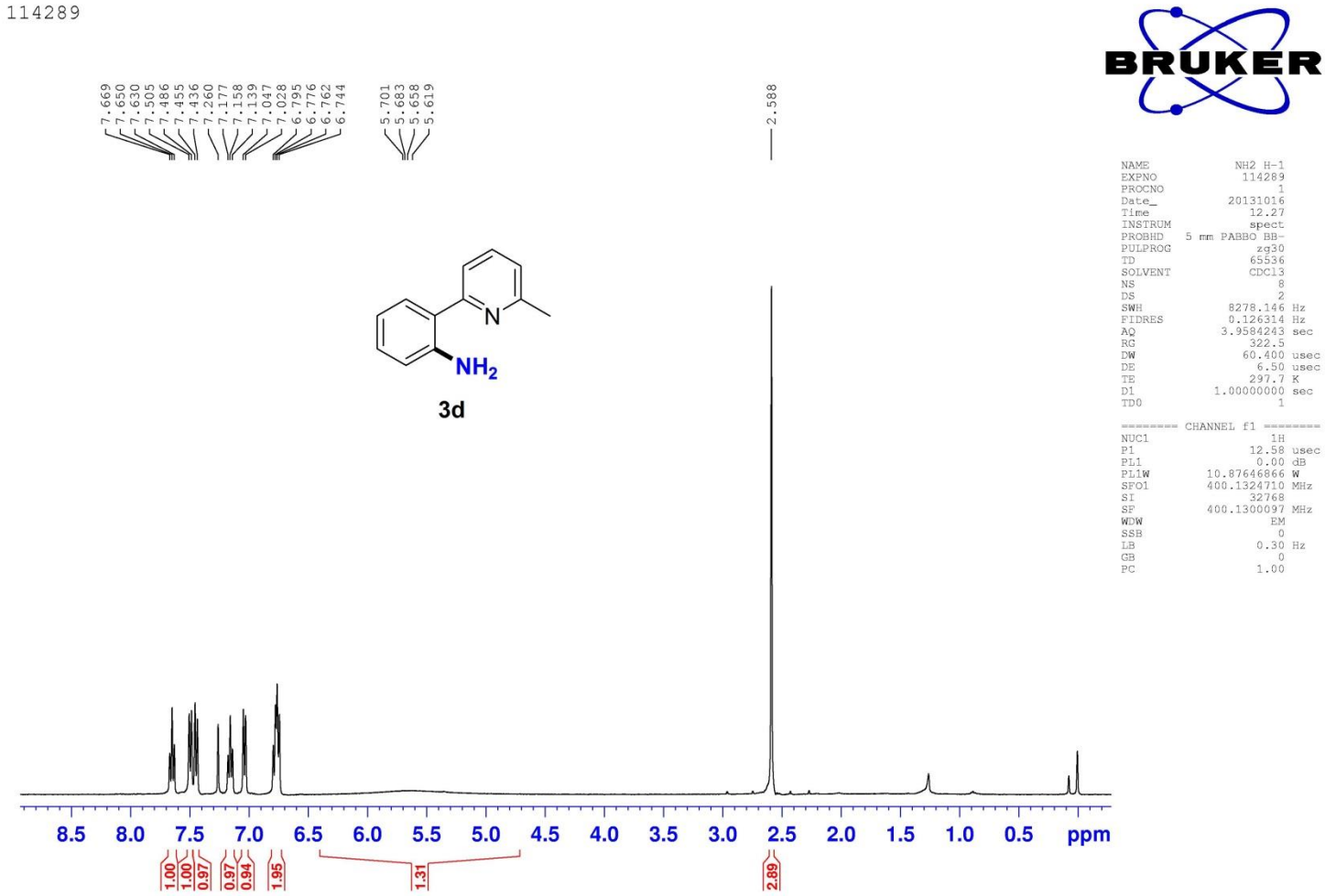
114289
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7.650
7.630
7.505
7.486
7.455
7.436
7.260
7.177
7.158
7.139
7.047
7.028
6.795
6.776
6.762
6.744
5.701
5.683
5.658
5.619
2.588
NAME NH2 H-1
EXPNO 114289
PROCNO 1
Date_ 20131016
Time 12.27
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 322.5
DW 60.400 usec
DE 6.50 usec
TE 297.7 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 12.58 usec
PL1 0.00 dB
PL1W 10.87646866 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300097 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
N
NH2
3d
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
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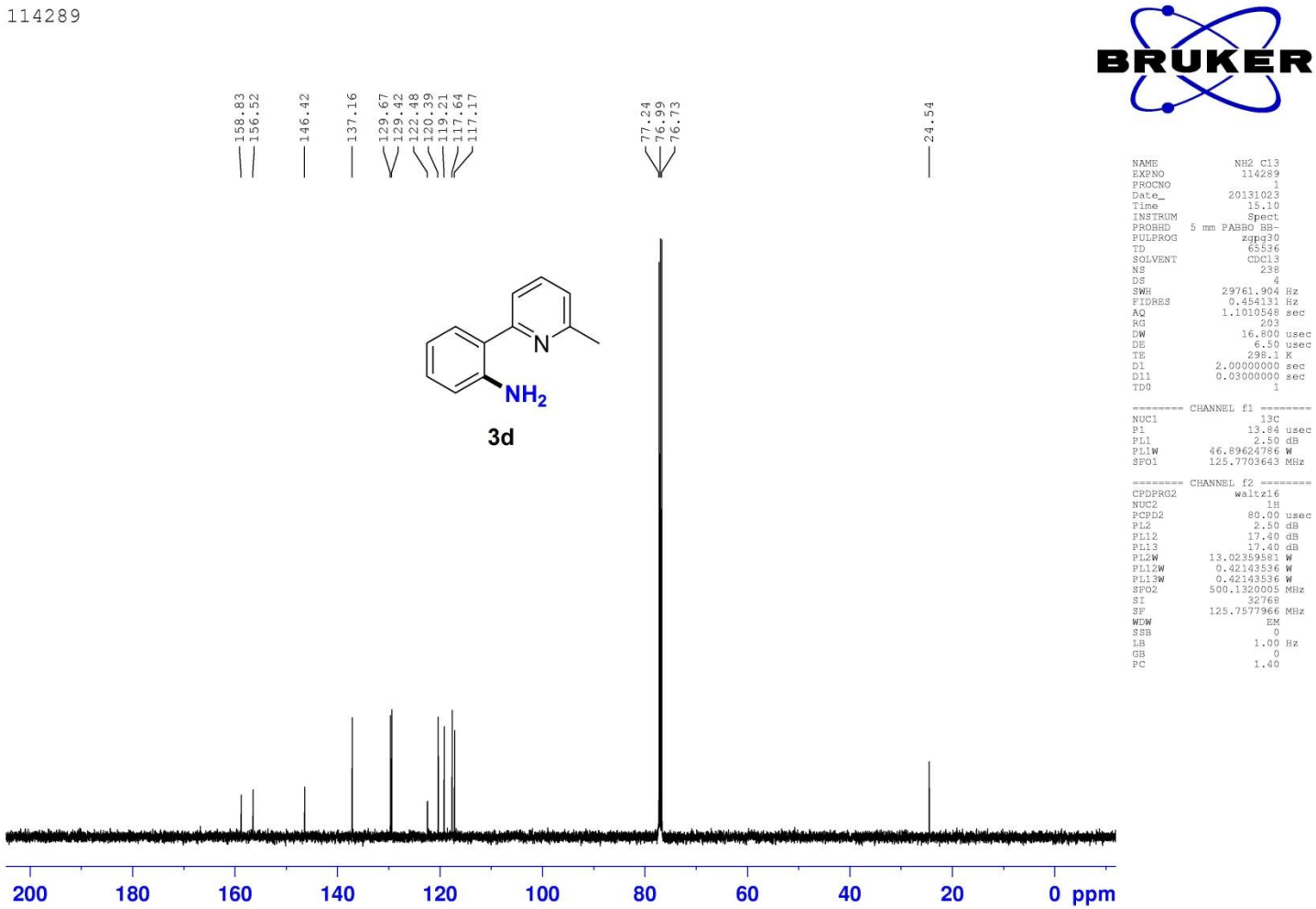
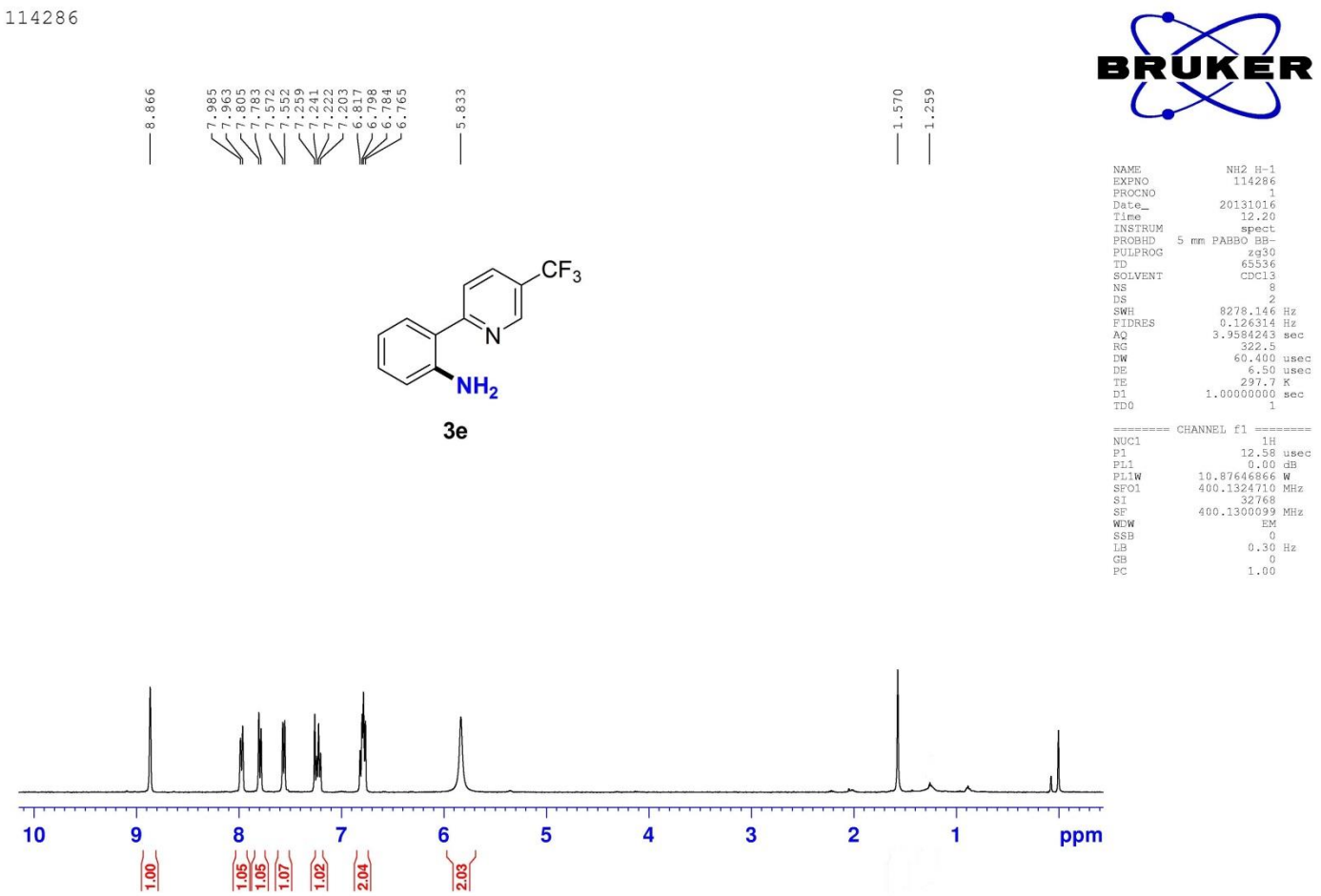
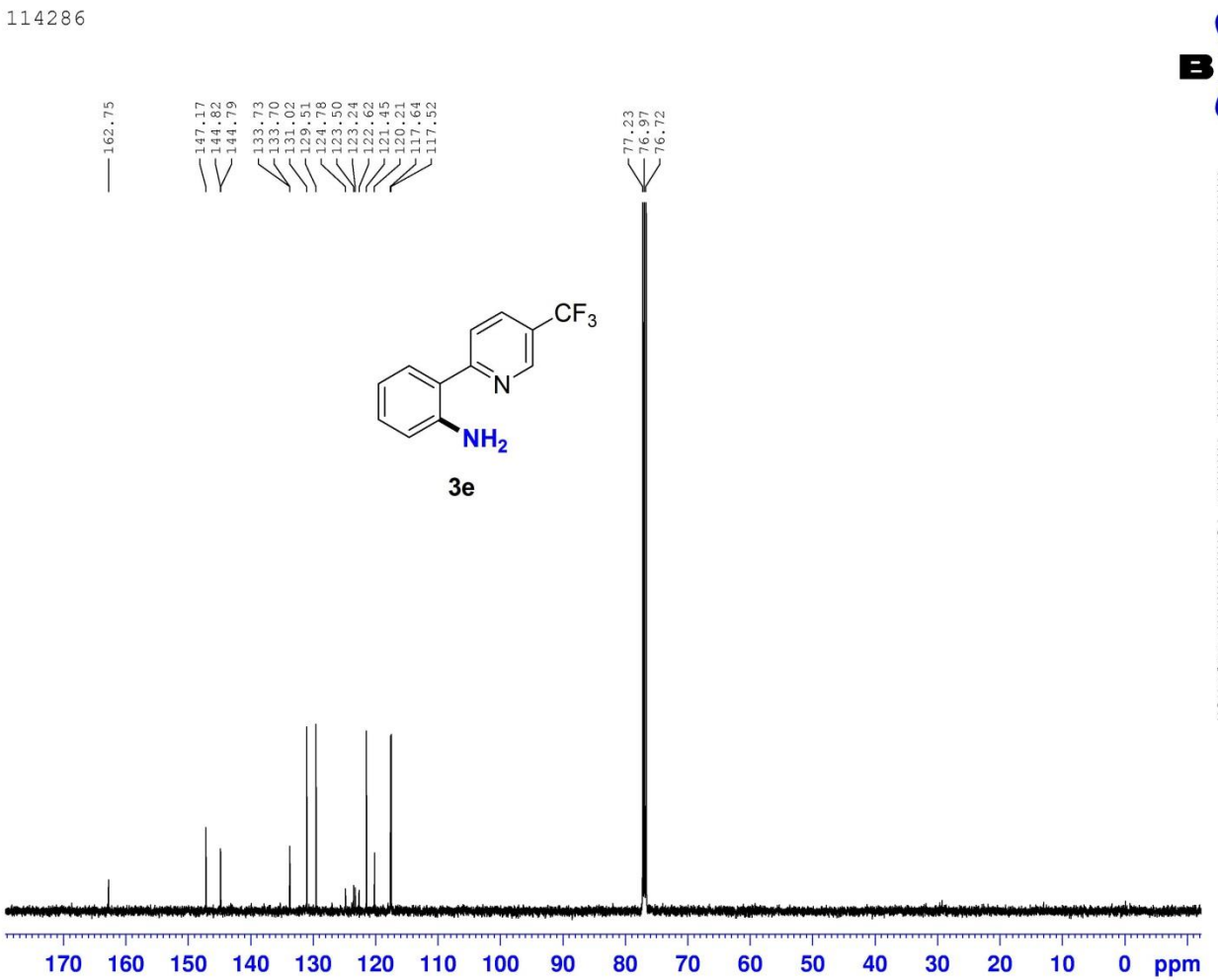
1.00
0.97
0.97
0.94
1.95
1.31
2.89



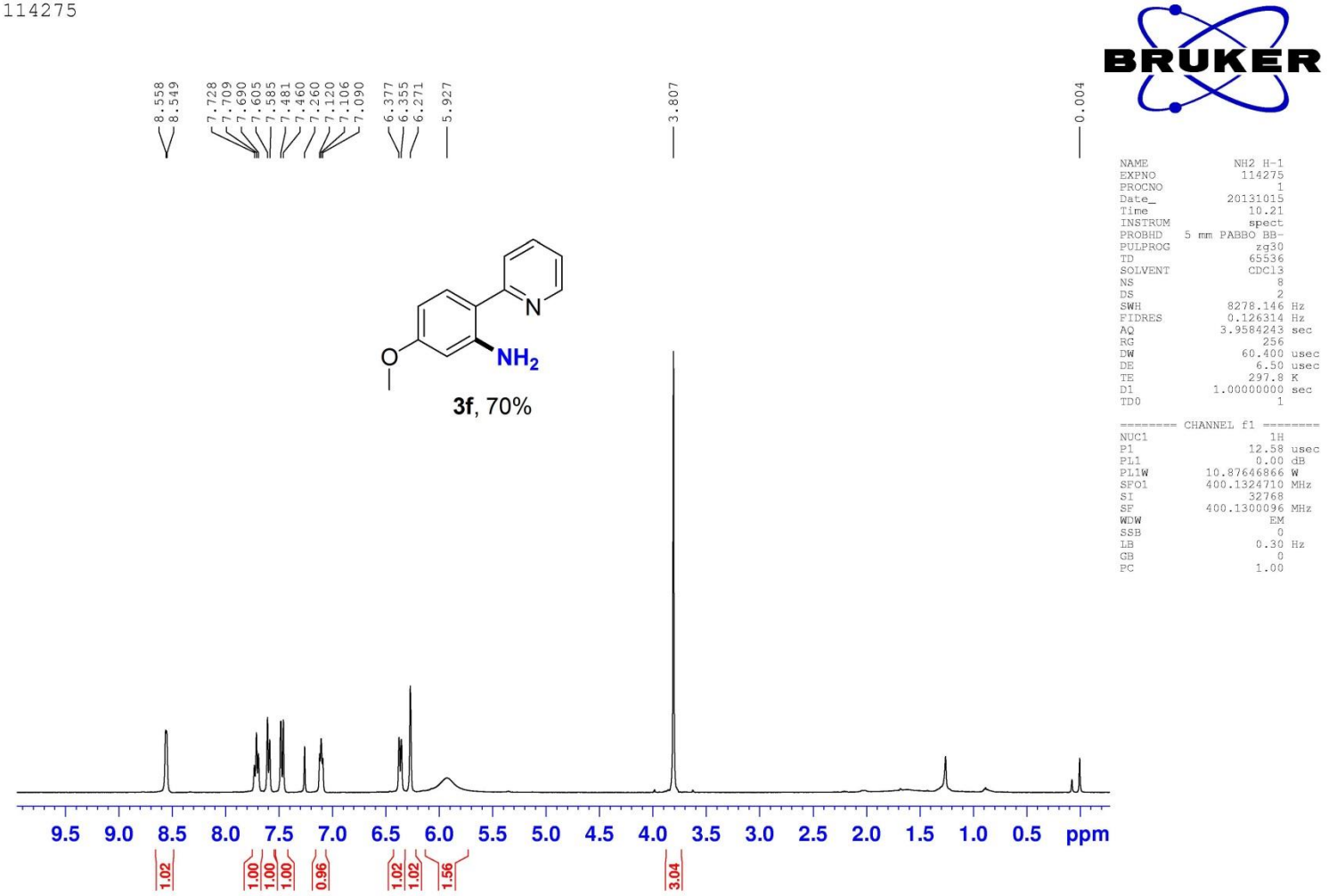

```
NAME                NH2 C13
EXPNO                114289
PROCNO                    1
Date_              20131023
Time                  15.10
INSTRUM               Spect
PROBHD  5 mm PABBO BB-
PULPROG             zgpg30
TD                   65536
SOLVENT              CDCl3
NS                     238
DS                       4
SWH              29761.904 Hz
FIDRES           0.454131 Hz
AQ               1.1010548 sec
RG                     203
DW                16.800 usec
DE                 6.50 usec
TE                298.1 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                      1

======== CHANNEL f1 ========
NUC1                   13C
P1                   13.84 usec
PL1                   2.50 dB
PL1W         46.89624786 W
SFO1         125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2            waltz16
NUC2                   1H
PCPD2                80.00 usec
PL2                   2.50 dB
PL12                 17.40 dB
PL13                 17.40 dB
PL2W         13.02359581 W
PL12W         0.42143536 W
PL13W         0.42143536 W
SFO2         500.1320005 MHz
SI                   32768
SF           125.7577966 MHz
WDW                     EM
SSB                      0
LB                    1.00 Hz
GB                       0
PC                    1.40
```

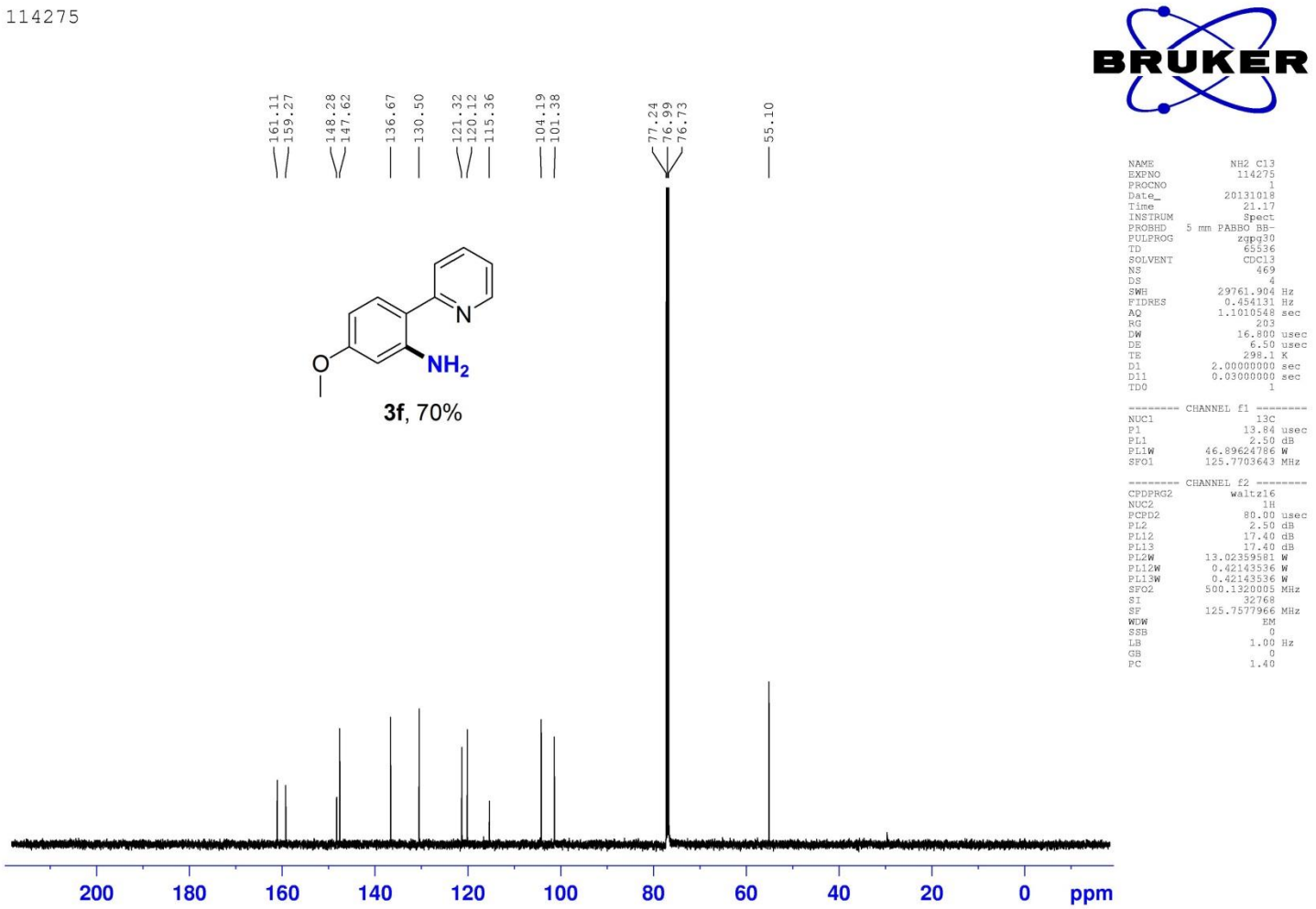

114286
8.866
7.985
7.963
7.805
7.783
7.572
7.552
7.259
7.241
7.222
7.203
6.817
6.798
6.784
6.765
5.833
1.570
1.259
CF3
N
NH2
3e
NAME NH2 H-1
EXPNO 114286
PROCNO 1
Date_ 20131016
Time 12.20
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 322.5
DW 60.400 usec
DE 6.50 usec
TE 297.7 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 12.58 usec
PL1 0.00 dB
PL1W 10.87646866 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
10
9
8
7
6
5
4
3
2
1
ppm
1.00
1.05
1.05
1.07
1.02
2.04
2.03



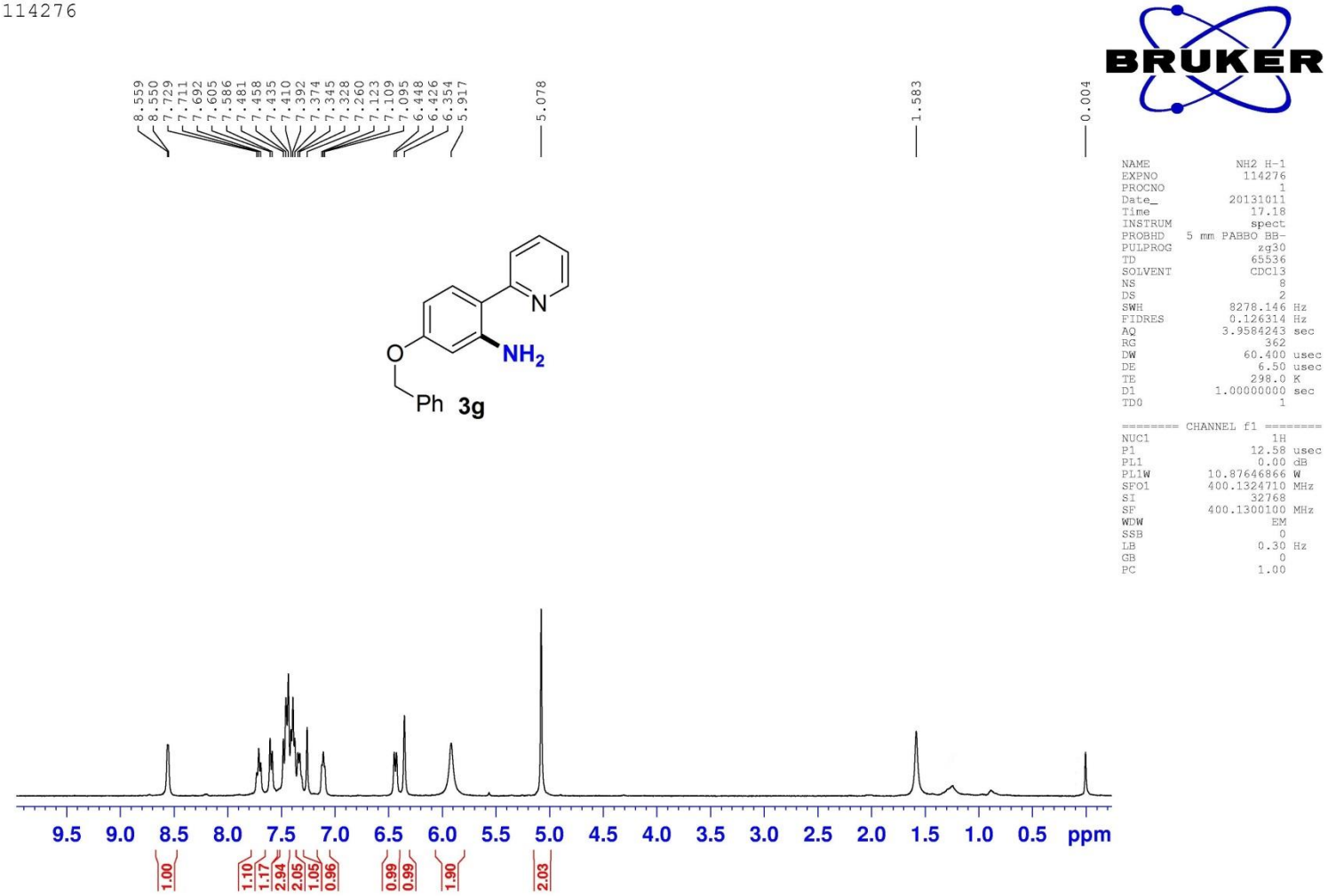
BRUKER

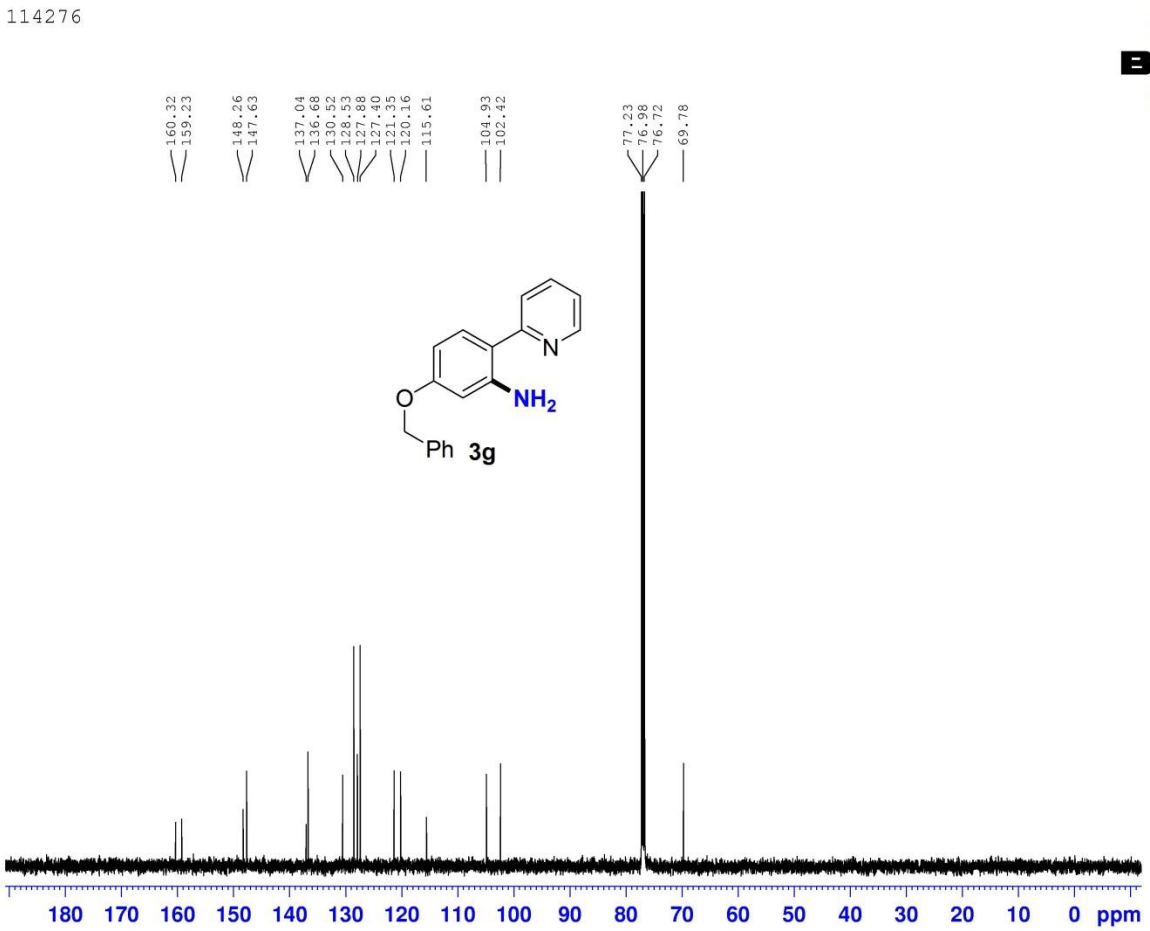
NAME	NH2 C13
EXPNO	114286
PROCNO	1
Date_	20131023
Time	15.32
INSTRUM	Spect
PROBHD	5 mm PABBO BB-
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	951
DS	4
SWH	29761.904 Hz
FIDRES	0.454131 Hz
AQ	1.1010548 sec
RG	203
DW	16.800 usec
DE	6.50 usec
TE	298.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	13C
P1	13.84 usec
PL1	2.50 dB
PL1W	46.89624786 W
SFO1	125.7703643 MHz
======== CHANNEL f2 ========	
CPDPRG2	waltz16
NUC2	1H
PCPD2	80.00 usec
PL2	2.50 dB
PL12	17.40 dB
PL13	17.40 dB
PL2W	13.02359581 W
PL12W	0.42143536 W
PL13W	0.42143536 W
SFO2	500.1320005 MHz
SI	32768
SF	125.7577966 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40


114275
8.558
8.549
7.728
7.709
7.690
7.605
7.585
7.481
7.460
7.260
7.120
7.106
7.090
6.377
6.355
6.271
5.927
3.807
0.004
BRUKER
NAME NH2 H-1
EXPNO 114275
PROCNO 1
Date_ 20131015
Time 10.21
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 256
DW 60.400 usec
DE 6.50 usec
TE 297.8 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 12.58 usec
PL1 0.00 dB
PL1W 10.87646866 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300096 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
N
O
NH2
3f, 70%
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.02
1.00
1.00
1.00
0.96
1.02
1.02
1.56
3.04


114275
161.11
159.27
148.28
147.62
136.67
130.50
121.32
120.12
115.36
104.19
101.38
77.24
76.99
76.73
55.10
N
O
NH2
3f, 70%
200
180
160
140
120
100
80
60
40
20
0
ppm
BRUKER
NAME NH2 C13
EXPNO 114275
PROCNO 1
Date_ 20131018
Time 21.17
INSTRUM Spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 469
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 203
DW 16.800 usec
DE 6.50 usec
TE 298.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 13.84 usec
PL1 2.50 dB
PL1W 46.89624786 W
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 2.50 dB
PL12 17.40 dB
PL13 17.40 dB
PL2W 13.02359581 W
PL12W 0.42143536 W
PL13W 0.42143536 W
SFO2 500.1320005 MHz
SI 32768
SF 125.7577966 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

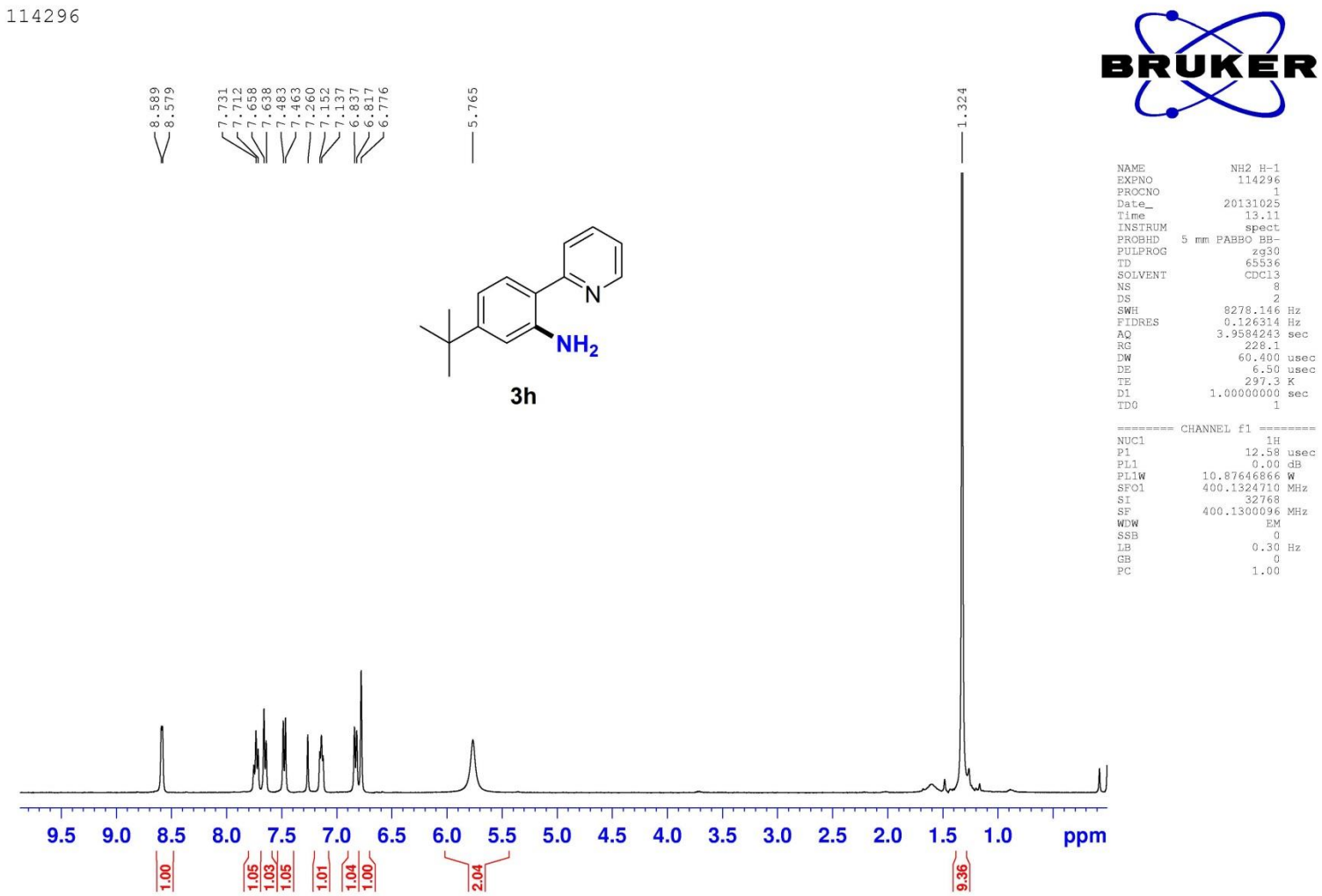
114276

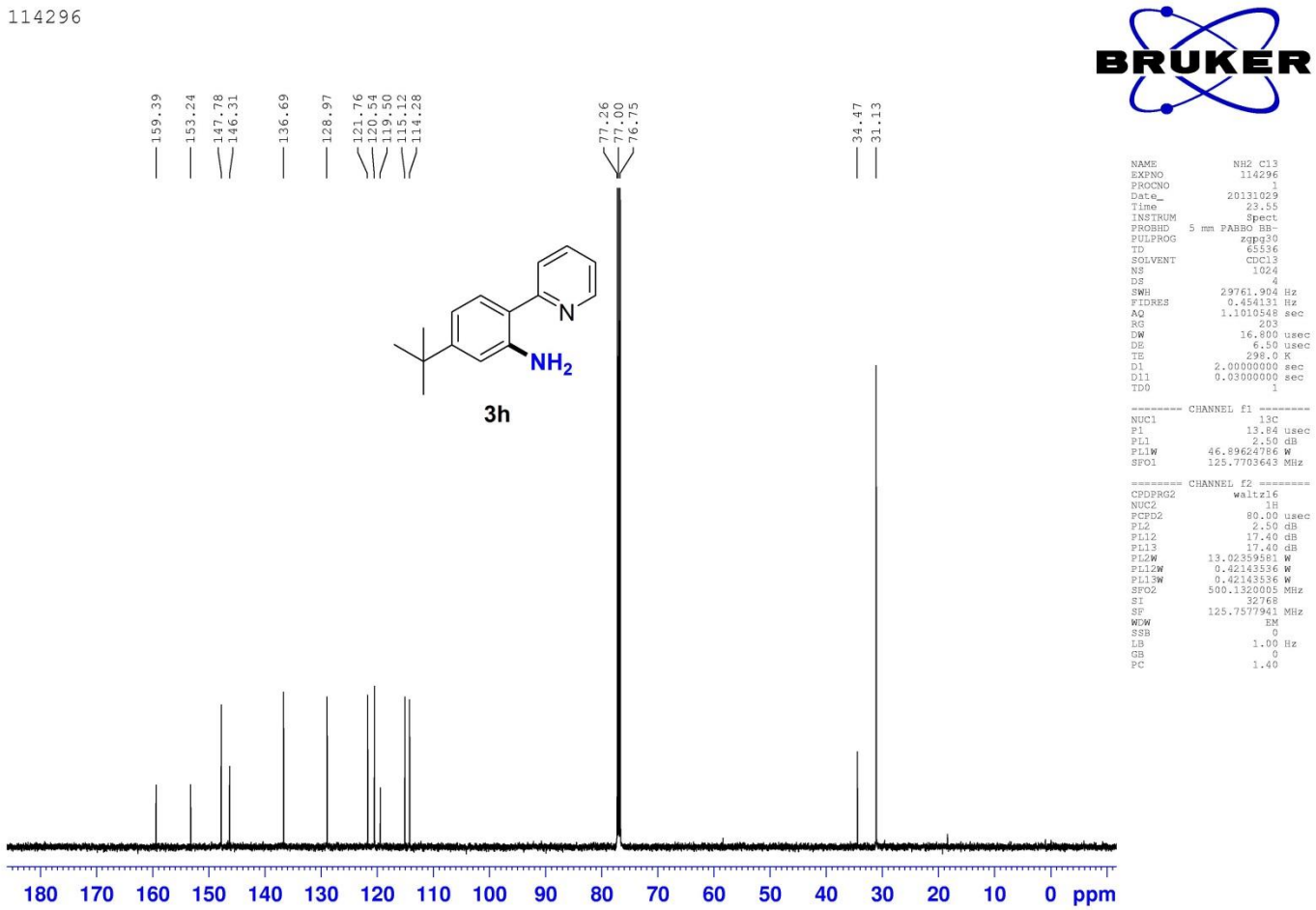

8.559
8.550
7.729
7.711
7.692
7.605
7.586
7.481
7.458
7.435
7.410
7.392
7.374
7.345
7.328
7.260
7.123
7.109
7.095
6.448
6.426
6.354
5.917
5.078
1.583
0.004
BRUKER
NAME NH2 H-1
EXPNO 114276
PROCNO 1
Date_ 20131011
Time 17.18
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 362
DW 60.400 usec
DE 6.50 usec
TE 298.0 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 12.58 usec
PL1 0.00 dB
PL1W 10.87646866 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300100 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
N
O
NH2
Ph
3g
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.00
1.10
1.17
2.94
2.05
1.05
0.96
0.99
0.99
1.90
2.03

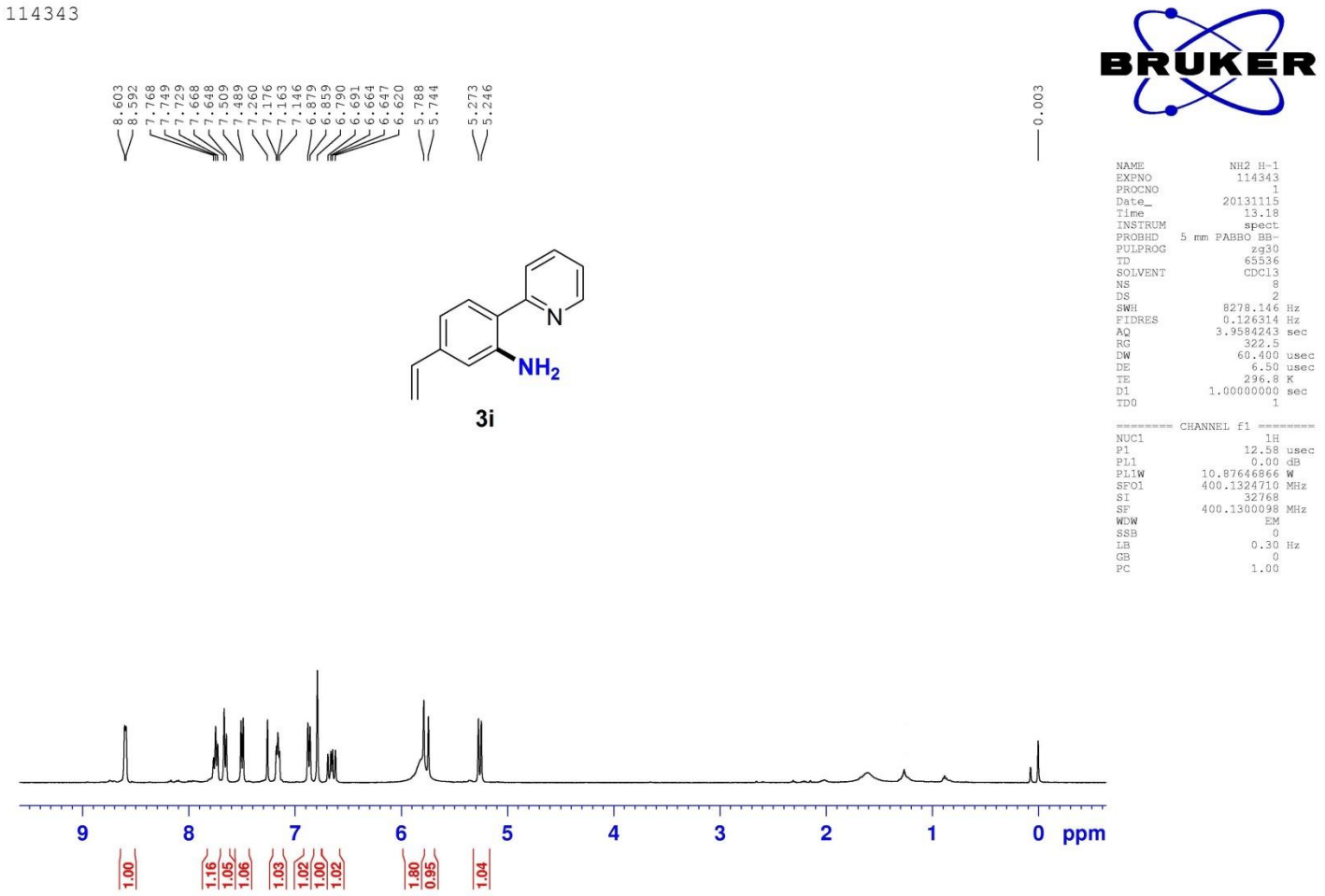


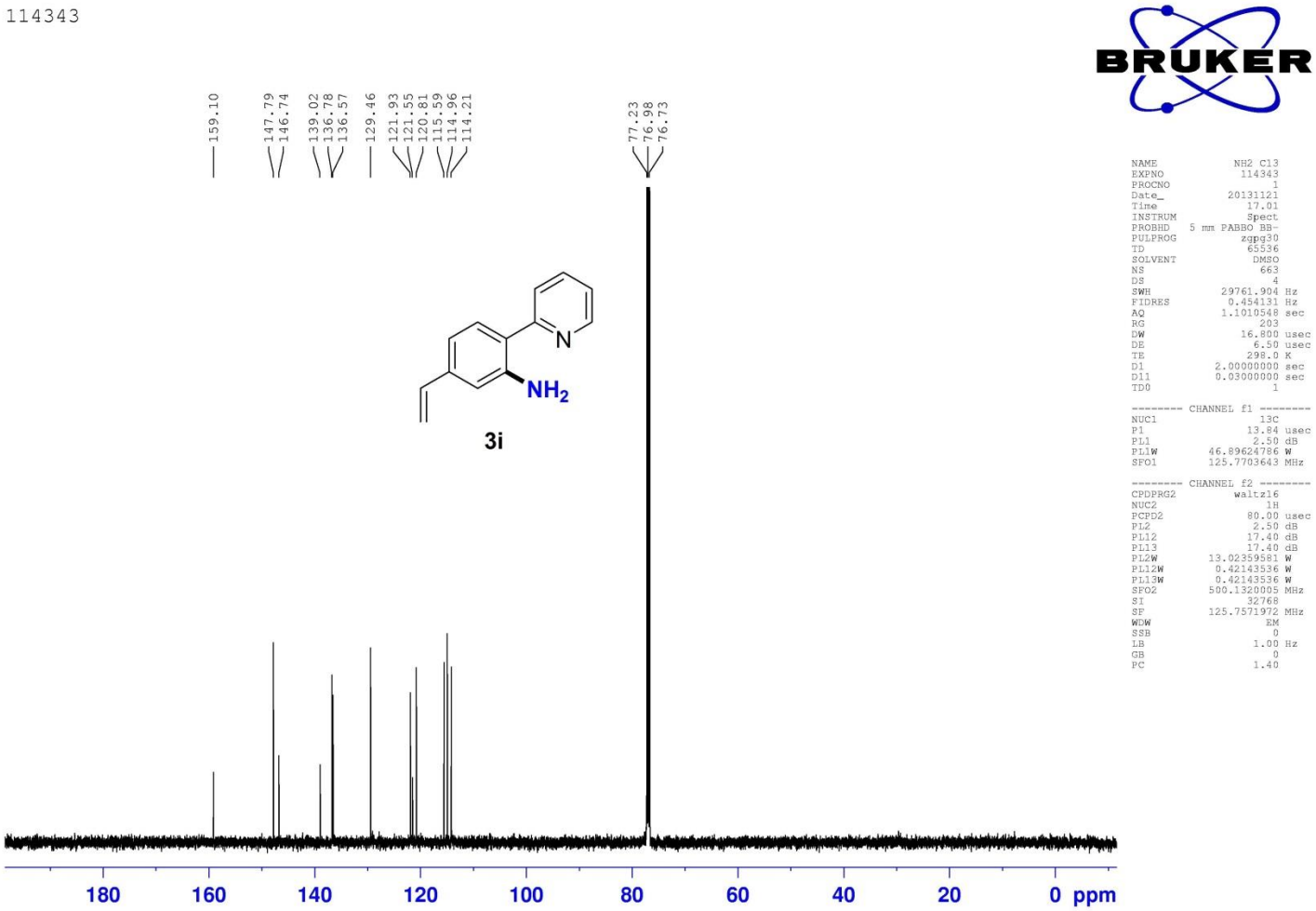
BRUKER

NAME	NH2 C13
EXPNO	114276
PROCNO	1
Date_	20131012
Time	20.44
INSTRUM	Spect
PROBHD	5 mm PABBO BB-
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	463
DS	4
SWH	29761.904 Hz
FIDRES	0.908261 Hz
AQ	0.5505524 sec
RG	203
DW	16.800 usec
DE	6.50 usec
TE	297.9 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	13C
P1	13.84 usec
PL1	2.50 dB
PL1W	46.89624786 W
SFO1	125.7703643 MHz
======== CHANNEL f2 ========	
CPDPRG2	waltz16
NUC2	1H
PCPD2	80.00 usec
PL2	2.50 dB
PL12	17.40 dB
PL13	17.40 dB
PL2W	13.02359581 W
PL12W	0.42143536 W
PL13W	0.42143536 W
SFO2	500.1320005 MHz
SI	32768
SF	125.7577966 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

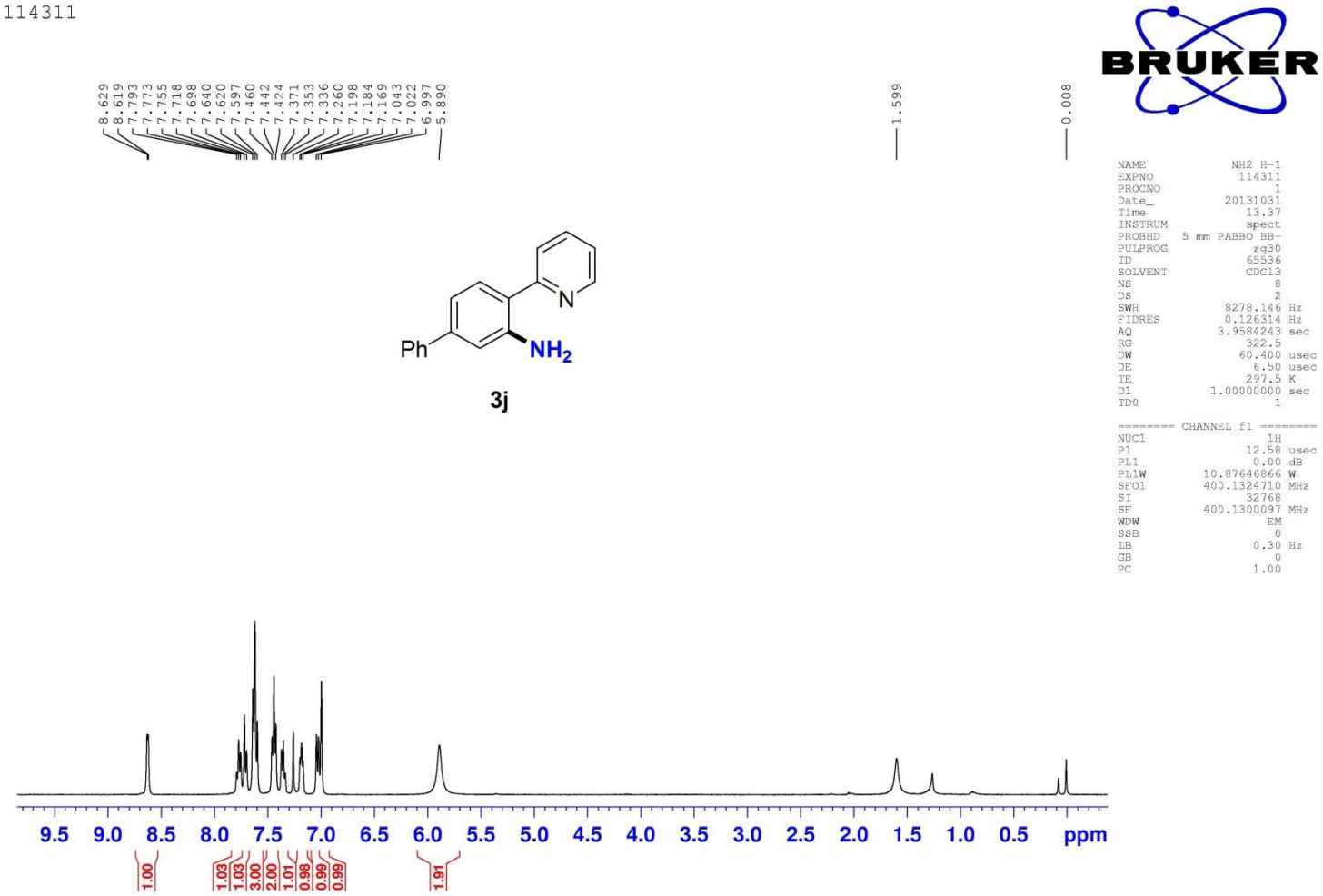

114296
8.589
8.579
7.731
7.712
7.658
7.638
7.483
7.463
7.260
7.152
7.137
6.837
6.817
6.776
5.765
1.324
NH2
3h
NAME NH2 H-1
EXPNO 114296
PROCNO 1
Date_ 20131025
Time 13.11
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 228.1
DW 60.400 usec
DE 6.50 usec
TE 297.3 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 12.58 usec
PL1 0.00 dB
PL1W 10.87646866 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300096 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
1.05
1.03
1.05
1.01
1.04
1.00
2.04
9.36

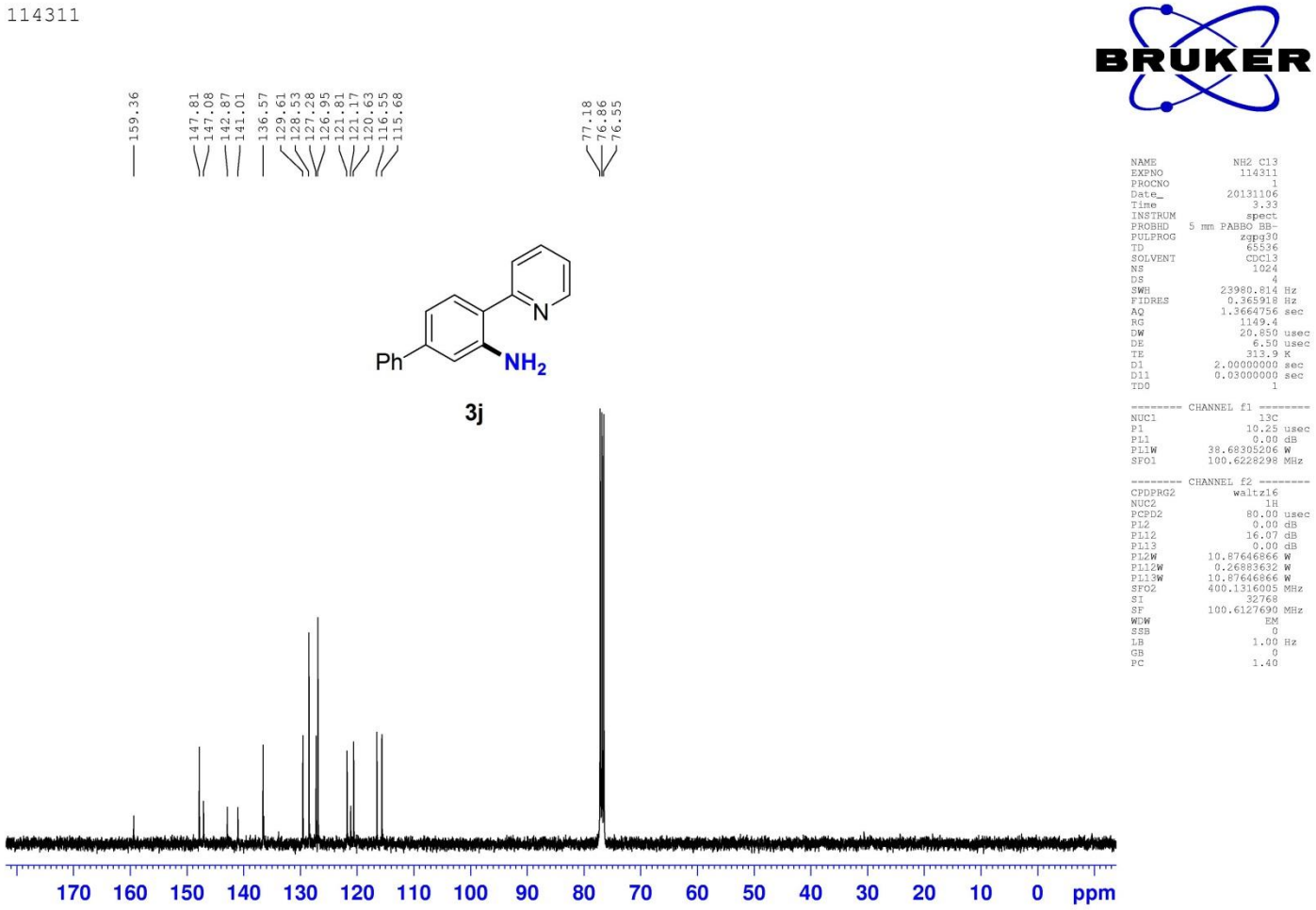

114296
159.39
153.24
147.78
146.31
136.69
128.97
121.76
120.54
119.50
115.12
114.28
77.26
77.00
76.75
34.47
31.13
NH2 C13
114296
1
20131029
23.55
Spect
5 mm PABBO BB-
zgpg30
65536
CDCl3
1024
4
29761.904 Hz
0.454131 Hz
1.1010548 sec
203
16.800 usec
6.50 usec
298.0 K
2.00000000 sec
0.03000000 sec
1
CHANNEL f1
13C
13.84 usec
2.50 dB
46.89624786 W
125.7703643 MHz
CHANNEL f2
waltz16
1H
80.00 usec
2.50 dB
17.40 dB
17.40 dB
13.02359581 W
0.42143536 W
0.42143536 W
500.1320005 MHz
32768
125.7577941 MHz
EM
0
1.00 Hz
0
1.40
N
NH2
3h
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm


114343
8.603
8.592
7.768
7.749
7.729
7.668
7.648
7.509
7.489
7.260
7.176
7.163
7.146
6.879
6.859
6.790
6.691
6.664
6.647
6.620
5.788
5.744
5.273
5.246
0.003
N
NH2
3i
BRUKER
NAME NH2 H-1
EXPNO 114343
PROCNO 1
Date_ 20131115
Time 13.18
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 322.5
DW 60.400 usec
DE 6.50 usec
TE 296.8 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 12.58 usec
PL1 0.00 dB
PL1W 10.87646866 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300098 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9
8
7
6
5
4
3
2
1
0 ppm
1.00
1.16
1.05
1.06
1.03
1.02
1.00
1.02
1.80
0.95
1.04



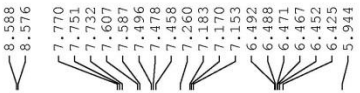

```
NAME                NH2 C13
EXPNO                114343
PROCNO                    1
Date_              20131121
Time                  17.01
INSTRUM                Spect
PROBHD   5 mm PABBO BB-
PULPROG              zgpg30
TD                    65536
SOLVENT                DMSO
NS                      663
DS                        4
SWH               29761.904 Hz
FIDRES             0.454131 Hz
AQ                 1.1010548 sec
RG                      203
DW                 16.800 usec
DE                  6.50 usec
TE                  298.0 K
D1                2.00000000 sec
D11               0.03000000 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                    13C
P1                 13.84 usec
PL1                 2.50 dB
PL1W           46.89624786 W
SFO1          125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2             waltz16
NUC2                    1H
PCPD2              80.00 usec
PL2                 2.50 dB
PL12               17.40 dB
PL13               17.40 dB
PL2W           13.02359581 W
PL12W           0.42143536 W
PL13W           0.42143536 W
SFO2          500.1320005 MHz
SI                    32768
SF            125.7571972 MHz
WDW                      EM
SSB                       0
LB                 1.00 Hz
GB                        0
PC                 1.40
```

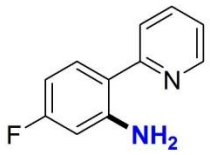

114311
8.629
8.619
7.793
7.773
7.755
7.718
7.698
7.640
7.620
7.597
7.460
7.442
7.424
7.371
7.353
7.336
7.260
7.198
7.184
7.169
7.043
7.022
6.997
5.890
1.599
0.008
Ph
NH2
N
3j
NAME NH2 H-1
EXPNO 114311
PROCNO 1
Date_ 20131031
Time 13.37
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 8
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 322.5
DW 60.400 usec
DE 6.50 usec
TE 297.5 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 12.58 usec
PL1 0.00 dB
PL1W 10.87646866 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300097 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.00
1.03
1.03
3.00
2.00
1.01
0.98
0.99
0.99
1.91



NAME	NH2_C13
EXPNO	114311
PROCNO	1
Date_	20131106
Time	3.33
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	1024
DS	4
SWH	23980.814 Hz
FIDRES	0.365918 Hz
AQ	1.3664756 sec
RG	1149.4
DW	20.850 usec
DE	6.50 usec
TE	313.9 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	13C
P1	10.25 usec
PL1	0.00 dB
PL1W	38.68305206 W
SFO1	100.6228298 MHz
======== CHANNEL f2 ========	
CPDPRG2	waltz16
NUC2	1H
PCPD2	80.00 usec
PL2	0.00 dB
PL12	16.07 dB
PL13	0.00 dB
PL2W	10.87646866 W
PL12W	0.26983632 W
PL13W	10.87646866 W
SFO2	400.1316005 MHz
SI	32768
SF	100.6127690 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

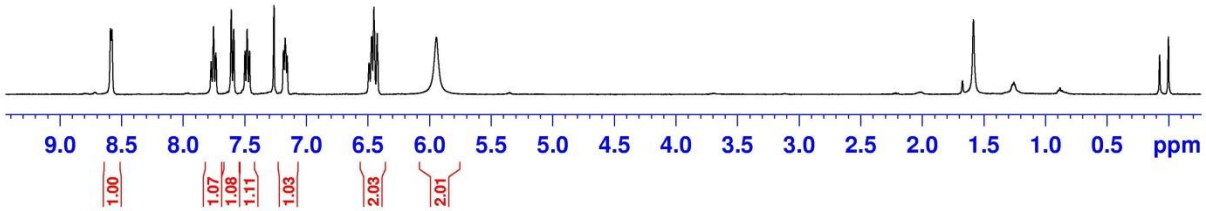
114293

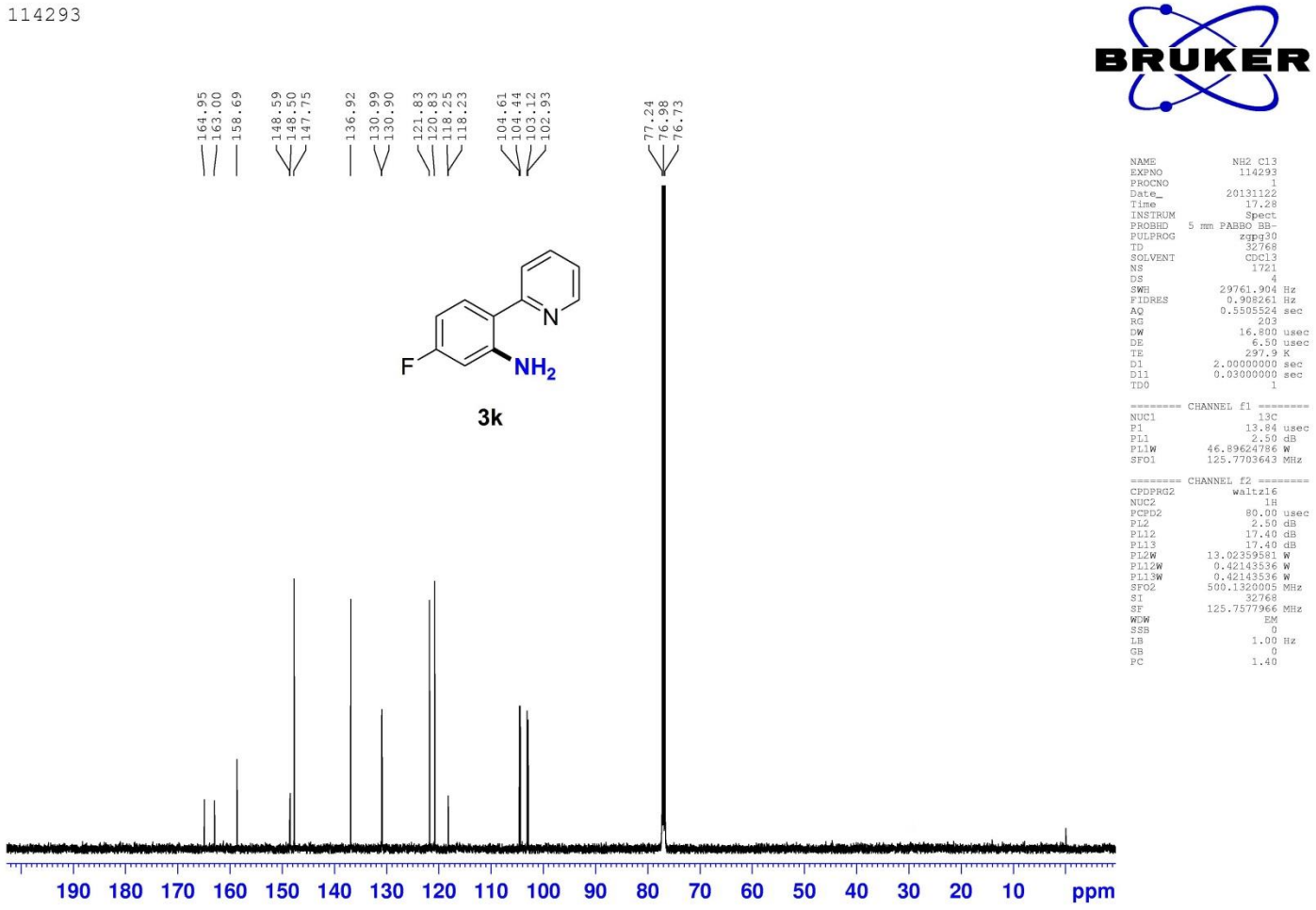




3k

NAME	NH2 H-1
EXPNO	114293
PROCNO	1
Date_	20131029
Time	16.05
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	8
DS	2
SWH	8278.146 Hz
FIDRES	0.126314 Hz
AQ	3.9584243 sec
RG	362
DW	60.400 usec
DE	6.50 usec
TE	297.4 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	1H
P1	12.58 usec
PL1	0.00 dB
PL1W	10.87646866 W
SFO1	400.1324710 MHz
SI	32768
SF	400.1300095 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

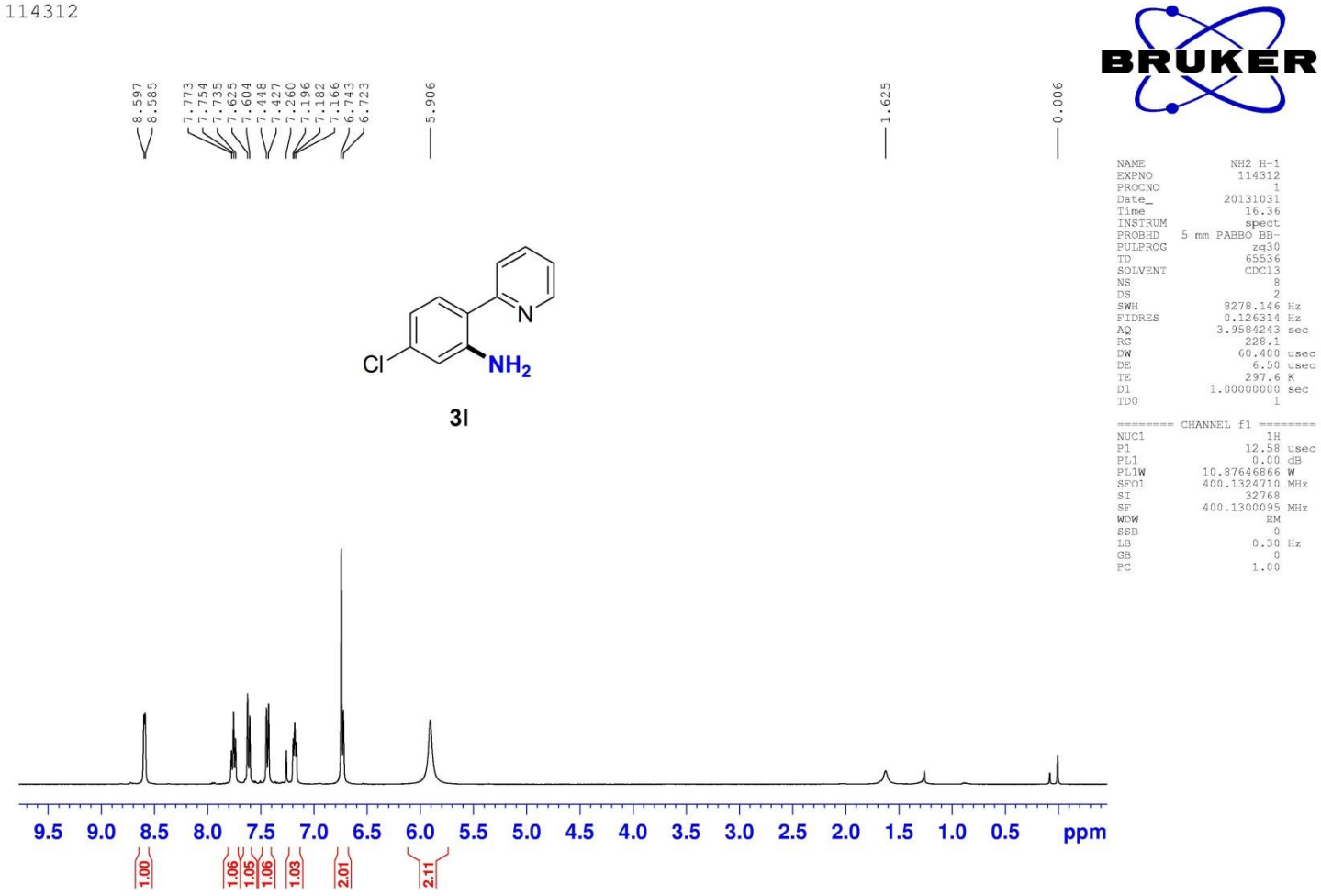




BRUKER

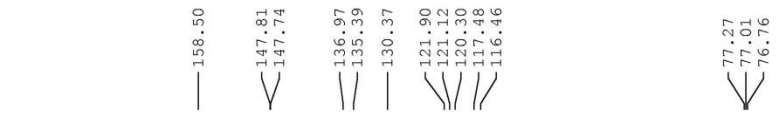
NAME	NH2_C13
EXPNO	114293
PROCNO	1
Date_	20131122
Time	17.28
INSTRUM	Spect
PROBHD	5 mm PABBO BB-
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	1721
DS	4
SWH	29761.904 Hz
FIDRES	0.908261 Hz
AQ	0.5505524 sec
RG	203
DW	16.800 usec
DE	6.50 usec
TE	297.9 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	13C
P1	13.84 usec
PL1	2.50 dB
PL1W	46.89624786 W
SFO1	125.7703643 MHz
======== CHANNEL f2 ========	
CPDPRG2	waltz16
NUC2	1H
PCPD2	80.00 usec
PL2	2.50 dB
PL12	17.40 dB
PL13	17.40 dB
PL2W	13.02359581 W
PL12W	0.42143536 W
PL13W	0.42143536 W
SFO2	500.1320005 MHz
SI	32768
SF	125.7577966 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

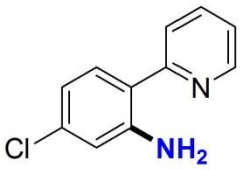
114312



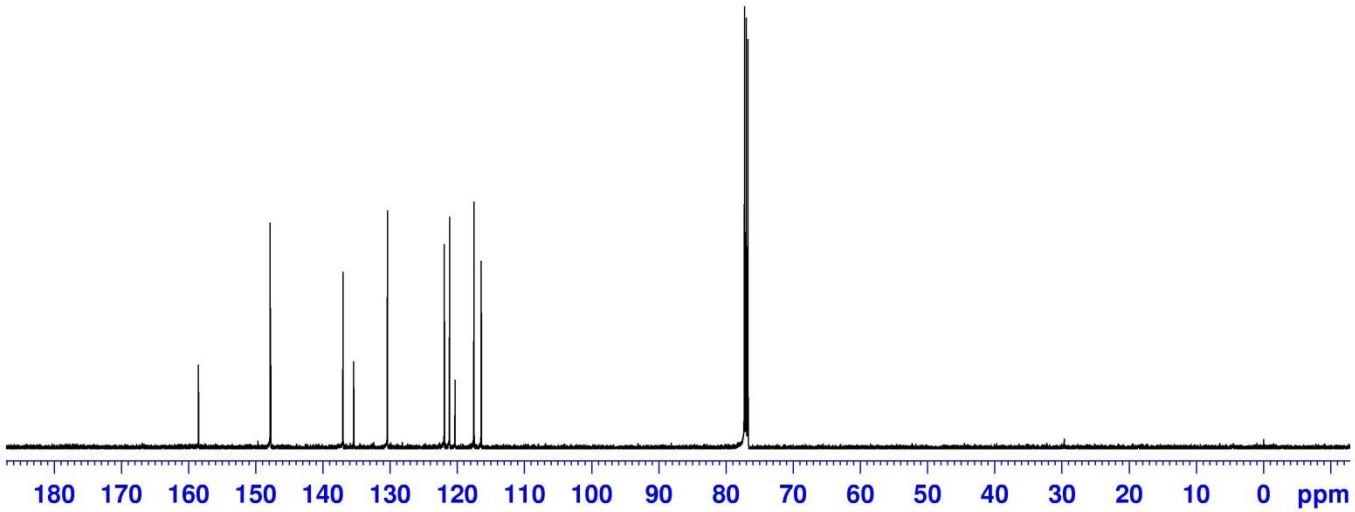
NAME	NH2 H-1
EXPNO	114312
PROCNO	1
Date_	20131031
Time	16.36
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	8
DS	2
SWH	8278.146 Hz
FIDRES	0.126314 Hz
AQ	3.9584243 sec
RG	228.1
DW	60.400 usec
DE	6.50 usec
TE	297.6 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	1H
P1	12.58 usec
PL1	0.00 dB
PL1W	10.87646866 W
SFO1	400.1324710 MHz
SI	32768
SF	400.1300095 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

114312

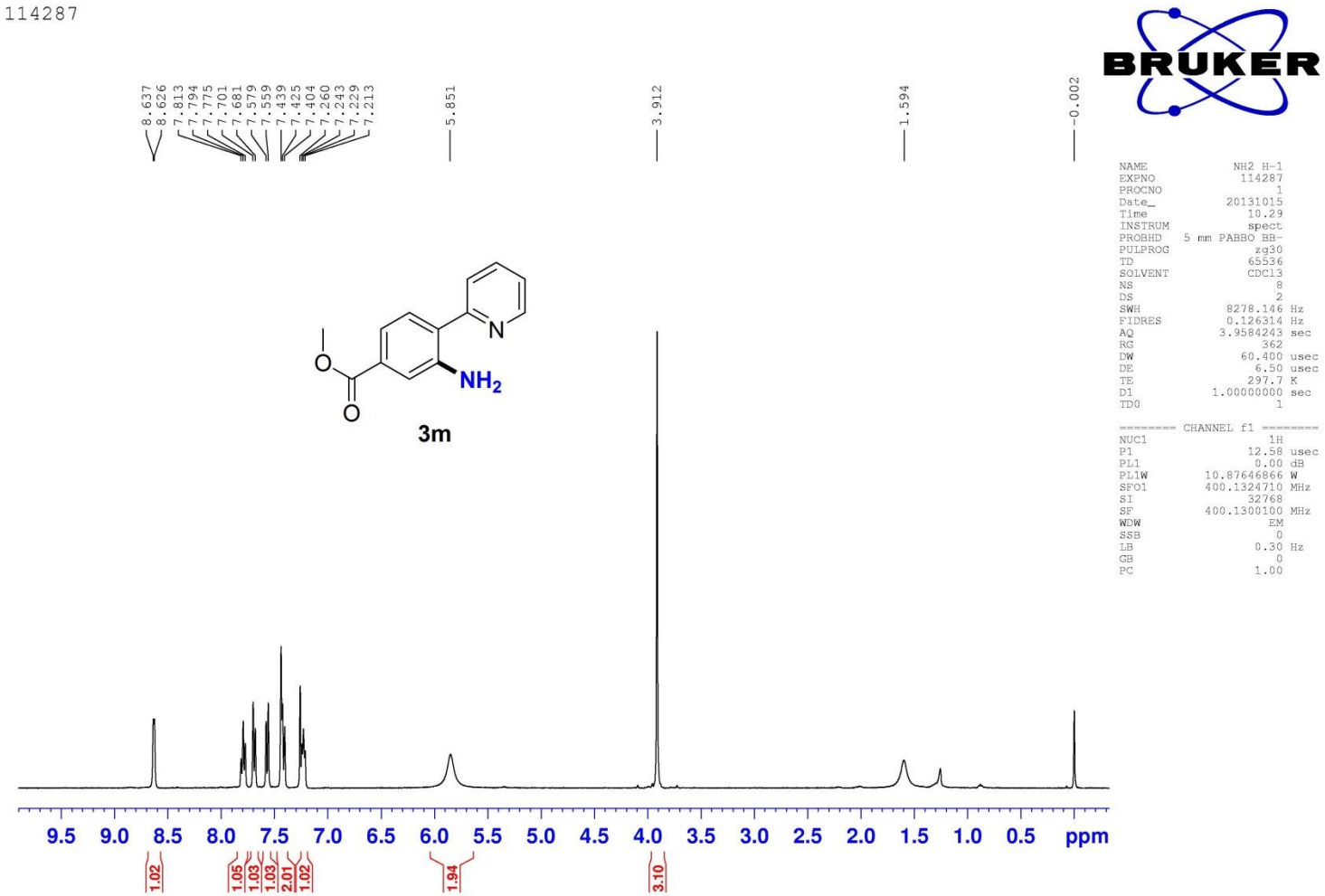


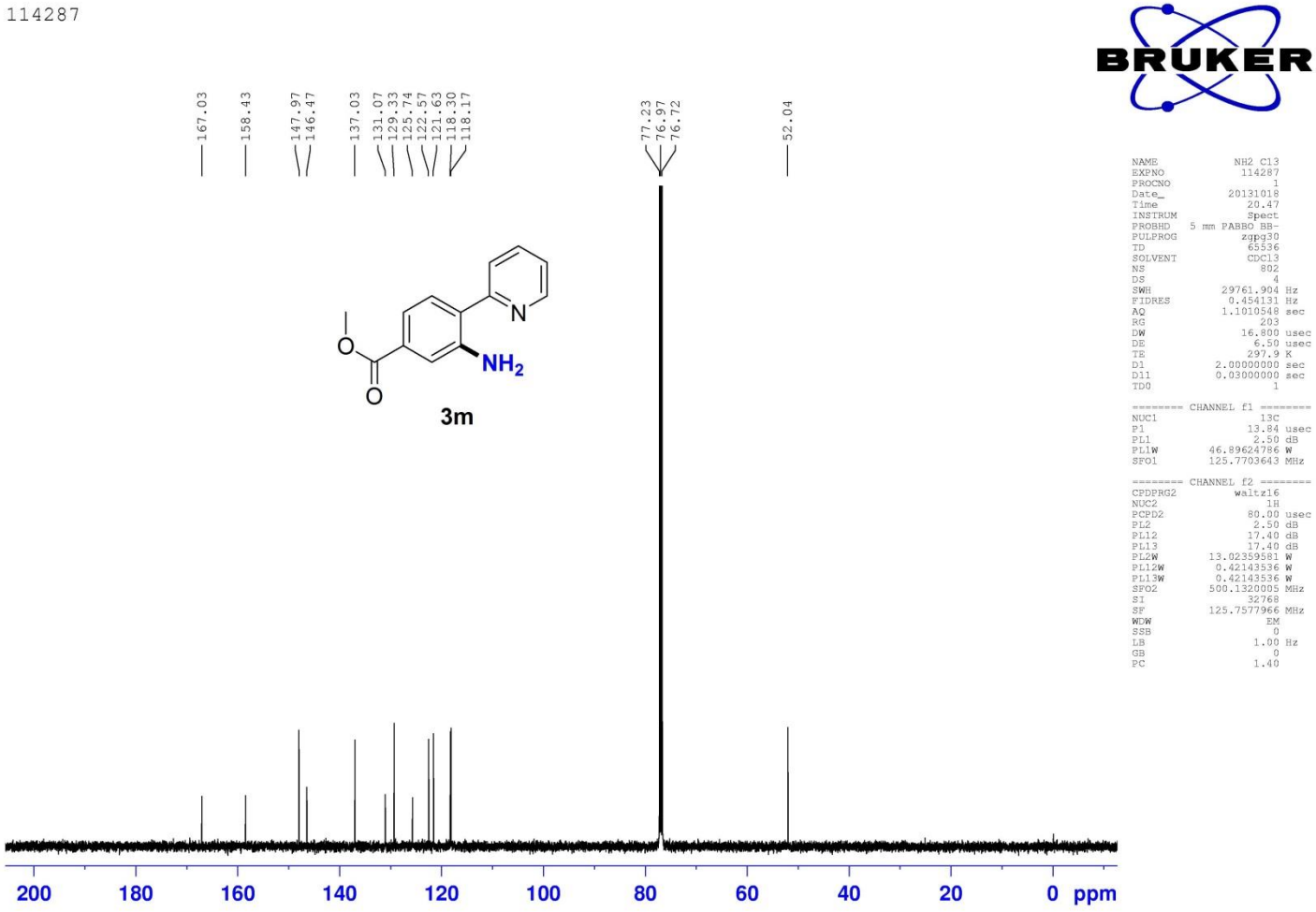


3l



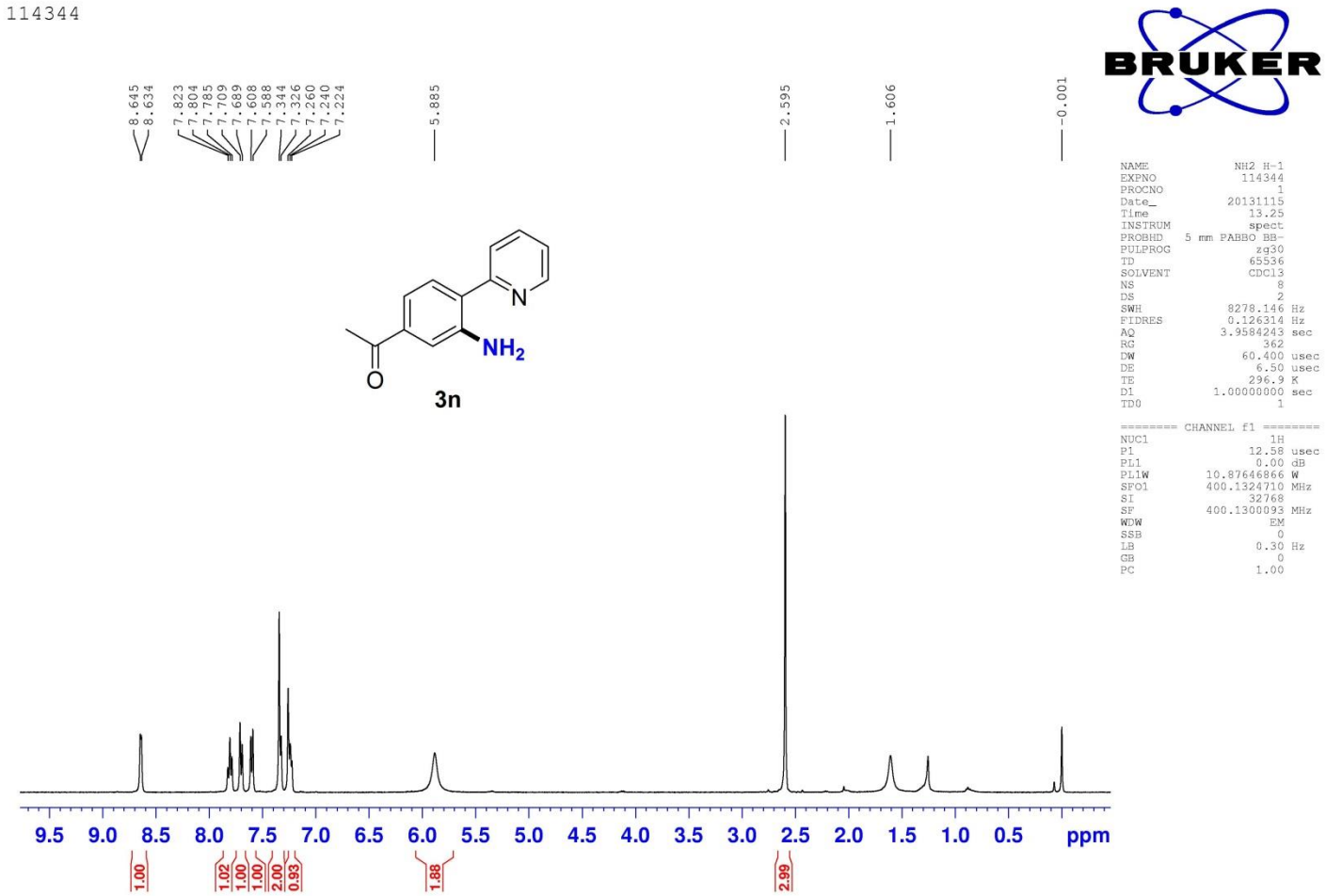

```
NAME                NH2 C13
EXPNO                114312
PROCNO                    1
Date_              20131115
Time                  18.33
INSTRUM               spect
PROBHD   5 mm PABBO BB-
PULPROG             zgpg30
TD                   65536
SOLVENT              CDCl3
NS                     845
DS                       4
SWH              29761.904 Hz
FIDRES           0.454131 Hz
AQ               1.1010548 sec
RG                     203
DW                16.800 usec
DE                 6.50 usec
TE                298.0 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                      1

======== CHANNEL f1 ========
NUC1                   13C
P1                 13.84 usec
PL1                 2.50 dB
PL1W         46.89624786 W
SFO1        125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2            waltz16
NUC2                   1H
PCPD2              80.00 usec
PL2                 2.50 dB
PL12               17.40 dB
PL13               17.40 dB
PL2W         13.02359581 W
PL12W         0.42143536 W
PL13W         0.42143536 W
SFO2        500.1320005 MHz
SI                 32768
SF          125.7577966 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.40
```

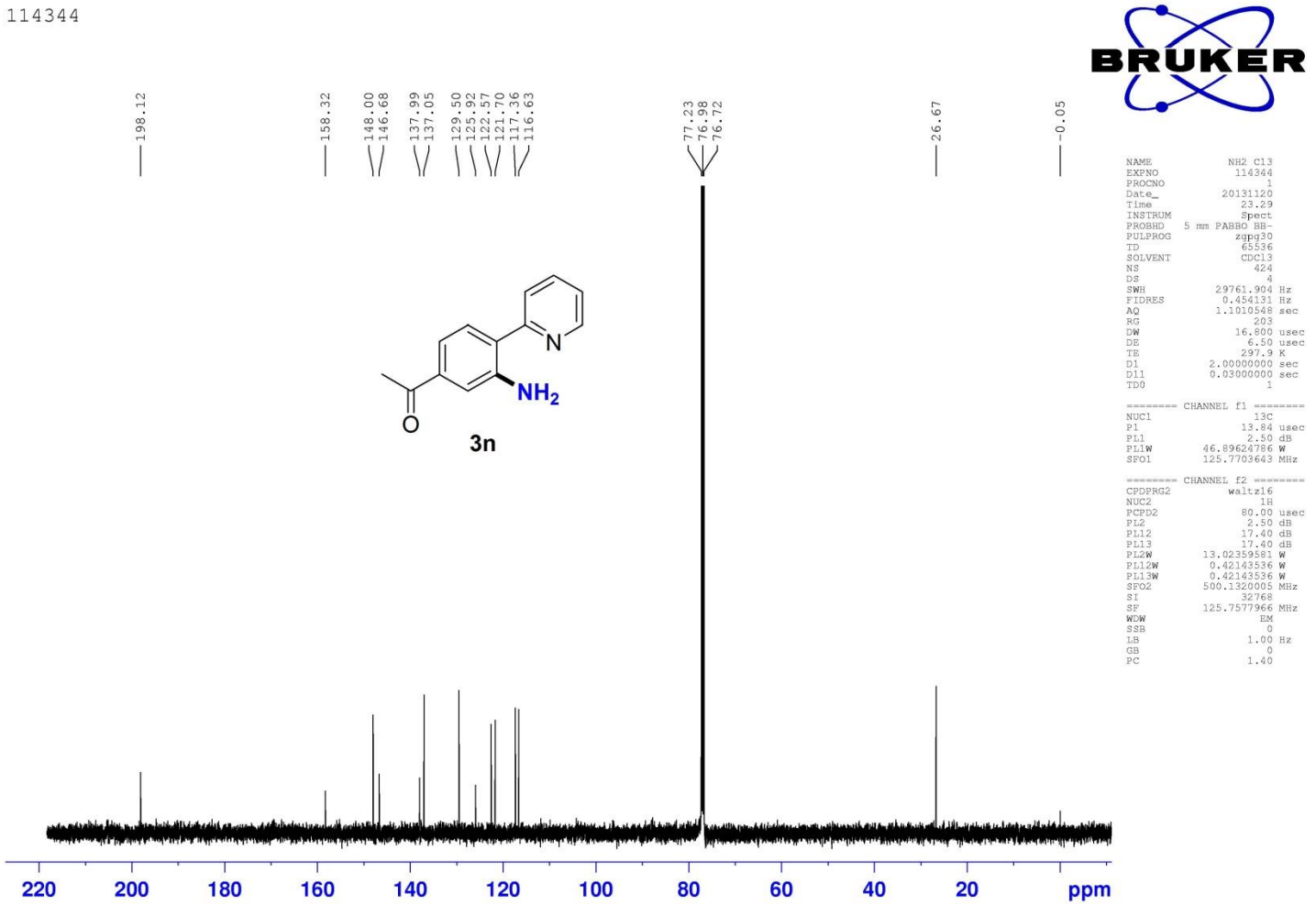

114287
8.637
8.626
7.813
7.794
7.775
7.701
7.681
7.579
7.559
7.439
7.425
7.404
7.260
7.243
7.229
7.213
5.851
3.912
1.594
0.002
BRUKER
NAME NH2 H-1
EXPNO 114287
PROCNO 1
Date_ 20131015
Time 10.29
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 362
DW 60.400 usec
DE 6.50 usec
TE 297.7 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 12.58 usec
PL1 0.00 dB
PL1W 10.87646866 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300100 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
O
O
N
NH2
3m
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.02
1.05
1.03
1.03
2.01
1.02
1.94
3.10

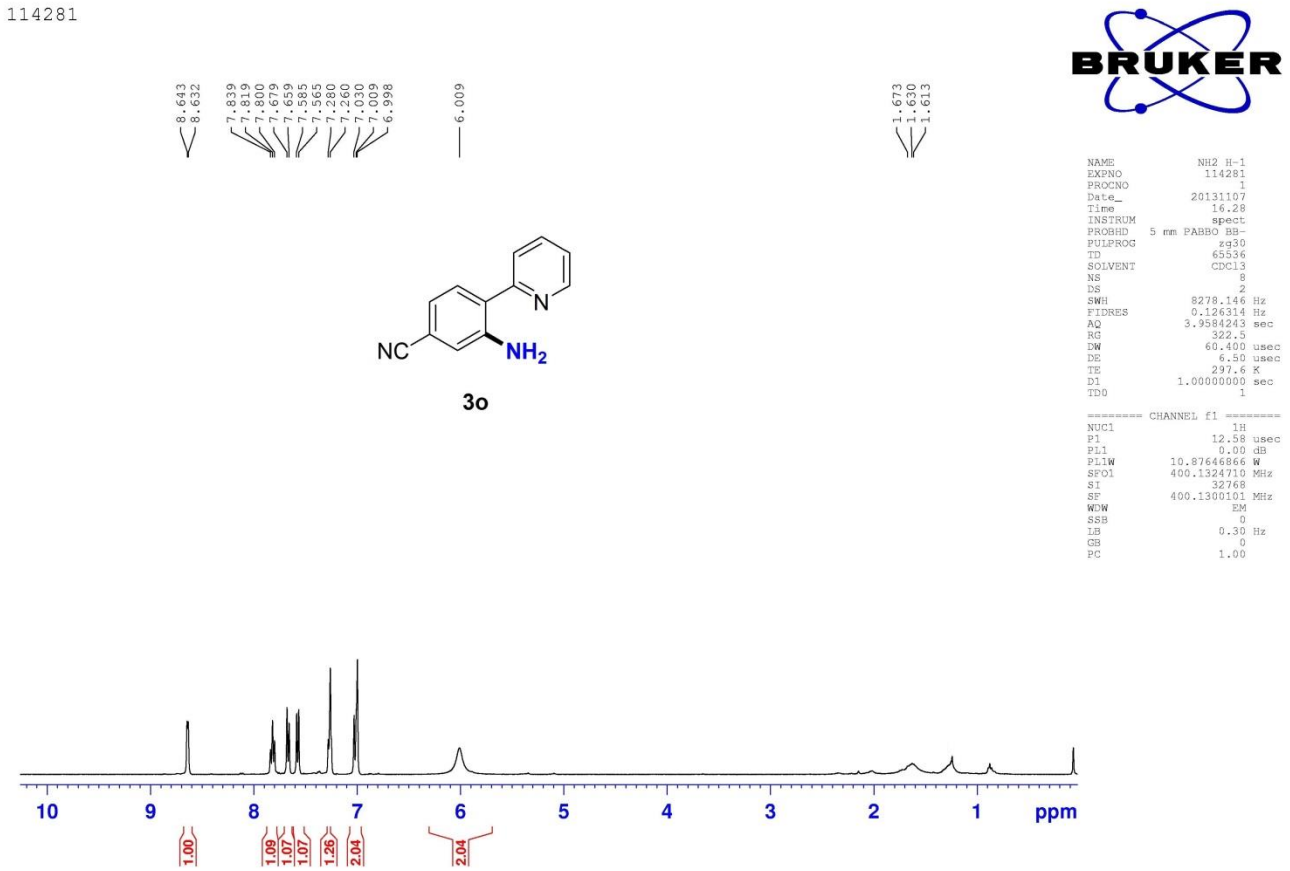


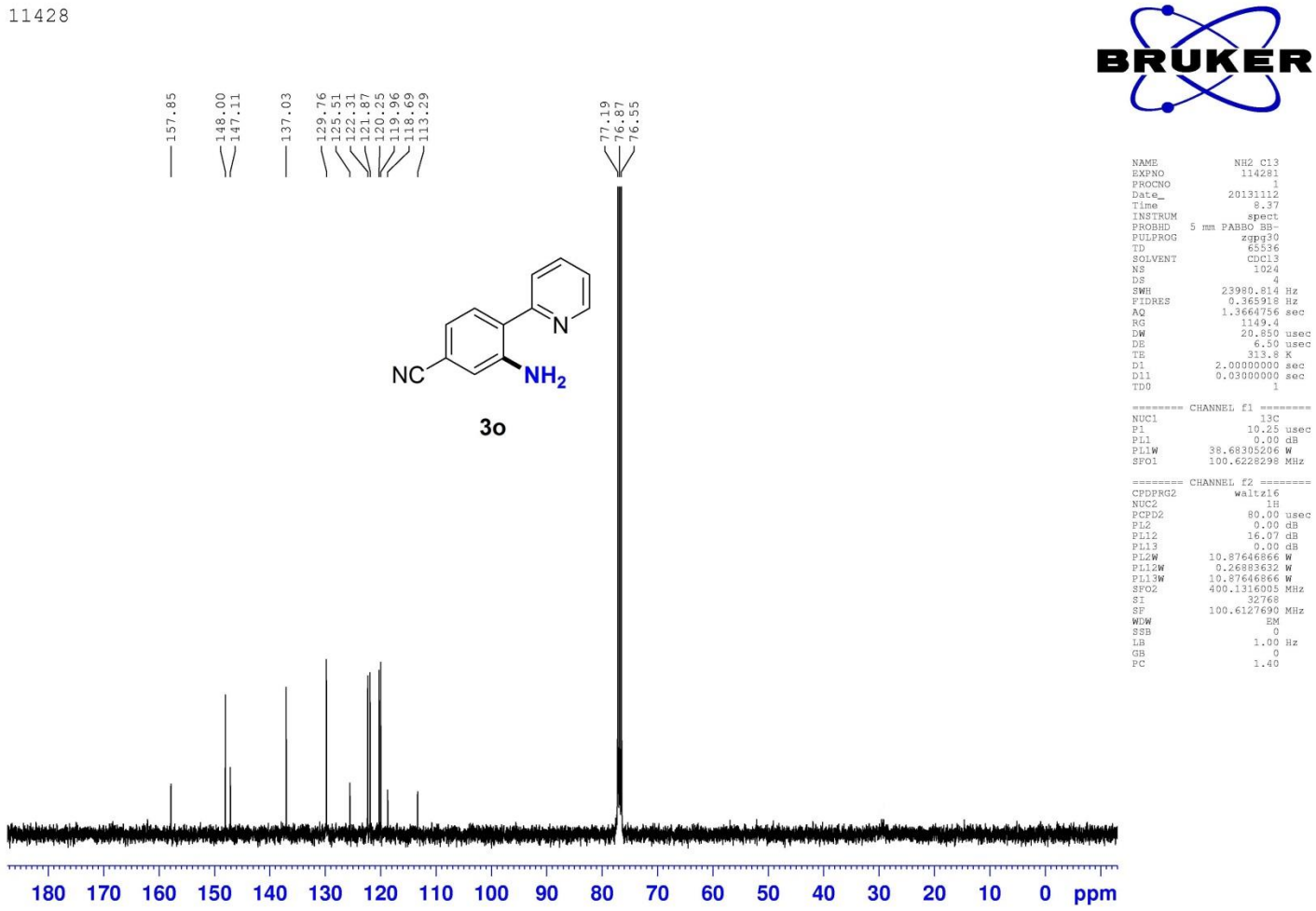
BRUKER

NAME	NH2 C13
EXPNO	114287
PROCNO	1
Date_	20131018
Time	20.47
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	802
DS	4
SWH	29761.904 Hz
FIDRES	0.454131 Hz
AQ	1.1010548 sec
RG	203
DW	16.800 usec
DE	6.50 usec
TE	297.9 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	13C
P1	13.84 usec
PL1	2.50 dB
PL1W	46.89624786 W
SFO1	125.7703643 MHz
======== CHANNEL f2 ========	
CPDPRG2	waltz16
NUC2	1H
PCPD2	80.00 usec
PL2	2.50 dB
PL12	17.40 dB
PL13	17.40 dB
PL2W	13.02359581 W
PL12W	0.42143536 W
PL13W	0.42143536 W
SFO2	500.1320005 MHz
SI	32768
SF	125.7577966 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

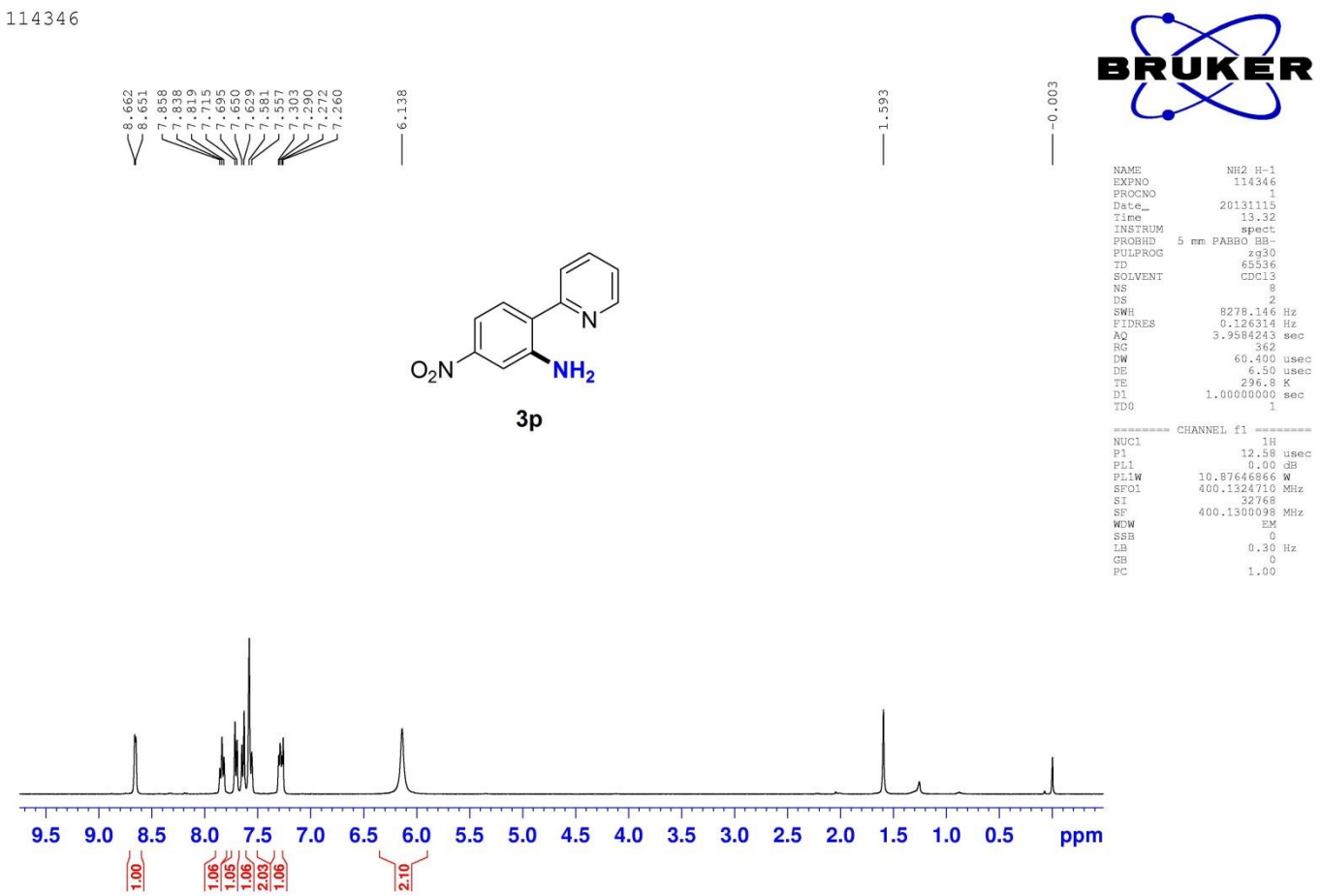

114344
8.645
8.634
7.823
7.804
7.785
7.709
7.689
7.608
7.588
7.344
7.326
7.260
7.240
7.224
5.885
2.595
1.606
-0.001
NH2
O
3n
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.00
1.02
1.00
1.00
2.00
0.93
1.88
2.99
BRUKER
NAME NH2 H-1
EXPNO 114344
PROCNO 1
Date_ 20131115
Time 13.25
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 362
DW 60.400 usec
DE 6.50 usec
TE 296.9 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 12.58 usec
PL1 0.00 dB
PL1W 10.87646866 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300093 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

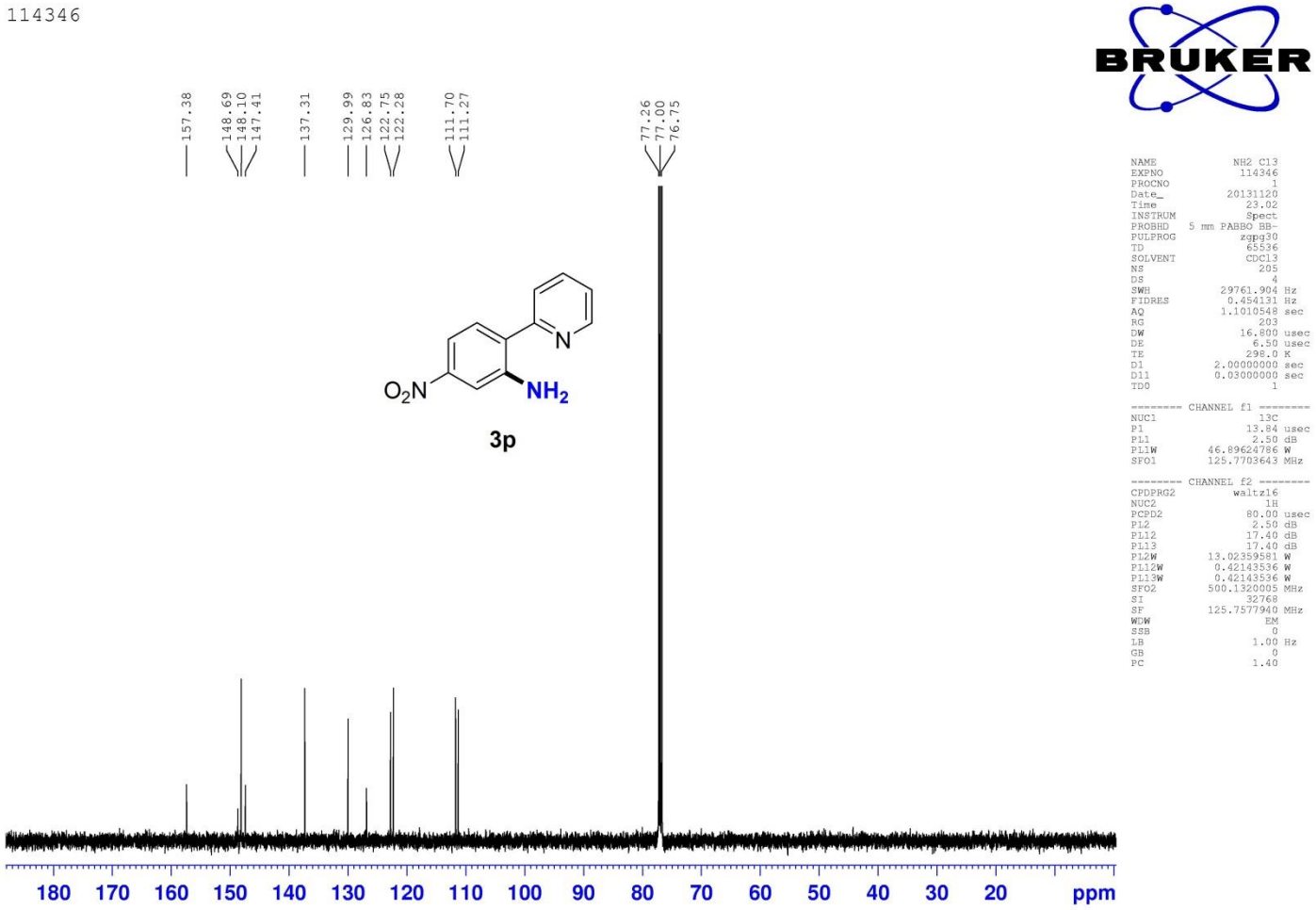

114344
198.12
158.32
148.00
146.68
137.99
137.05
129.50
125.92
122.57
121.70
117.36
116.63
77.23
76.98
76.72
26.67
-0.05
N
NH2
O
3n
220
200
180
160
140
120
100
80
60
40
20
ppm
NAME NH2 C13
EXPNO 114344
PROCNO 1
Date_ 20131120
Time 23.29
INSTRUM Spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 424
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 203
DW 16.800 usec
DE 6.50 usec
TE 297.9 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 13.84 usec
PL1 2.50 dB
PL1W 46.89624786 W
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 2.50 dB
PL12 17.40 dB
PL13 17.40 dB
PL2W 13.02359581 W
PL12W 0.42143536 W
PL13W 0.42143536 W
SFO2 500.1320005 MHz
SI 32768
SF 125.7577966 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

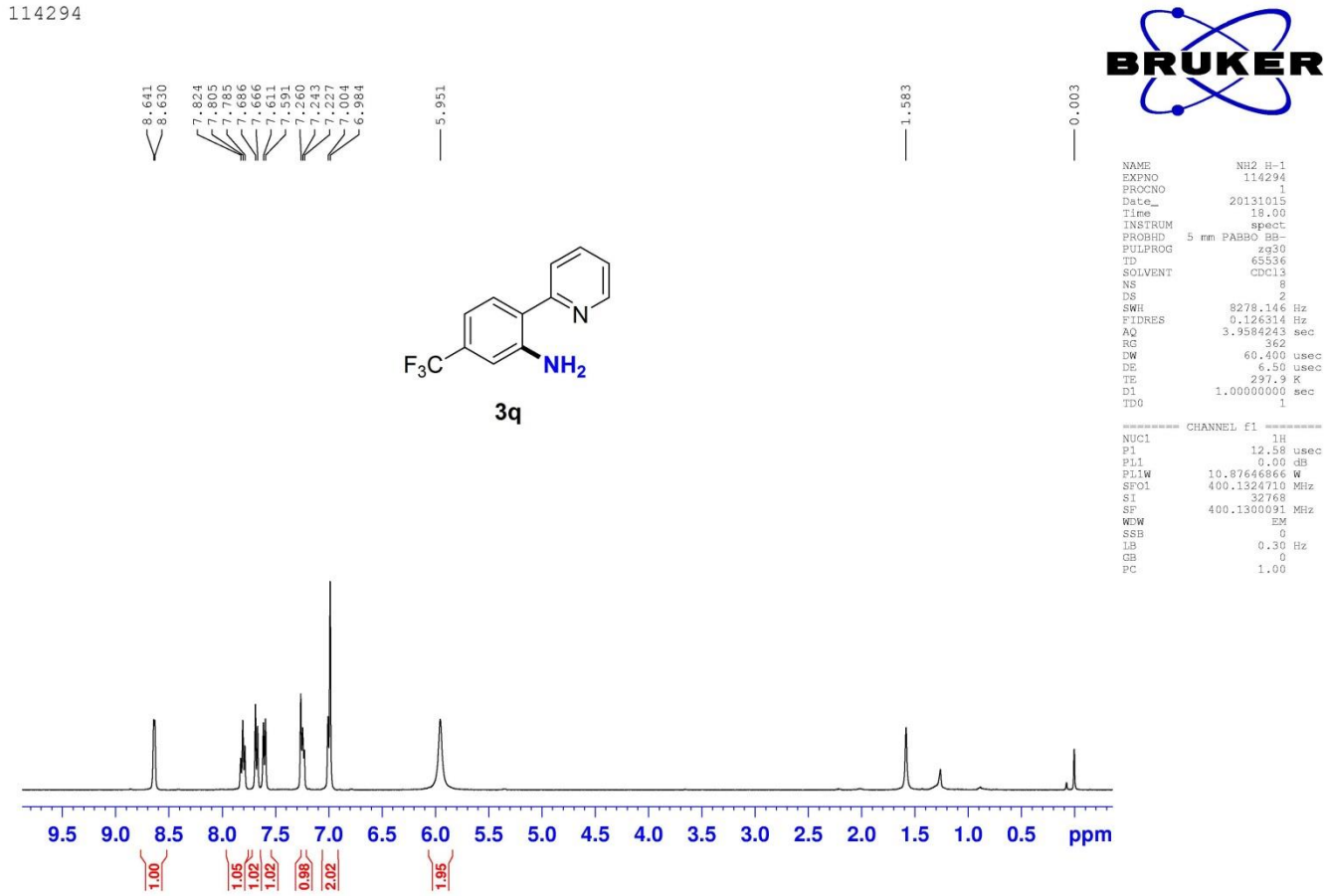

114281
8.643
8.632
7.839
7.819
7.800
7.679
7.659
7.585
7.565
7.280
7.260
7.030
7.009
6.998
6.009
1.673
1.630
1.613
BRUKER
NAME NH2 H-1
EXPNO 114281
PROCNO 1
Date_ 20131107
Time 16.28
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 322.5
DW 60.400 usec
DE 6.50 usec
TE 297.6 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 12.58 usec
PL1 0.00 dB
PL1W 10.87646866 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300101 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
NC
NH2
N
3o
10
9
8
7
6
5
4
3
2
1
ppm
1.00
1.09
1.07
1.07
1.26
2.04
2.04

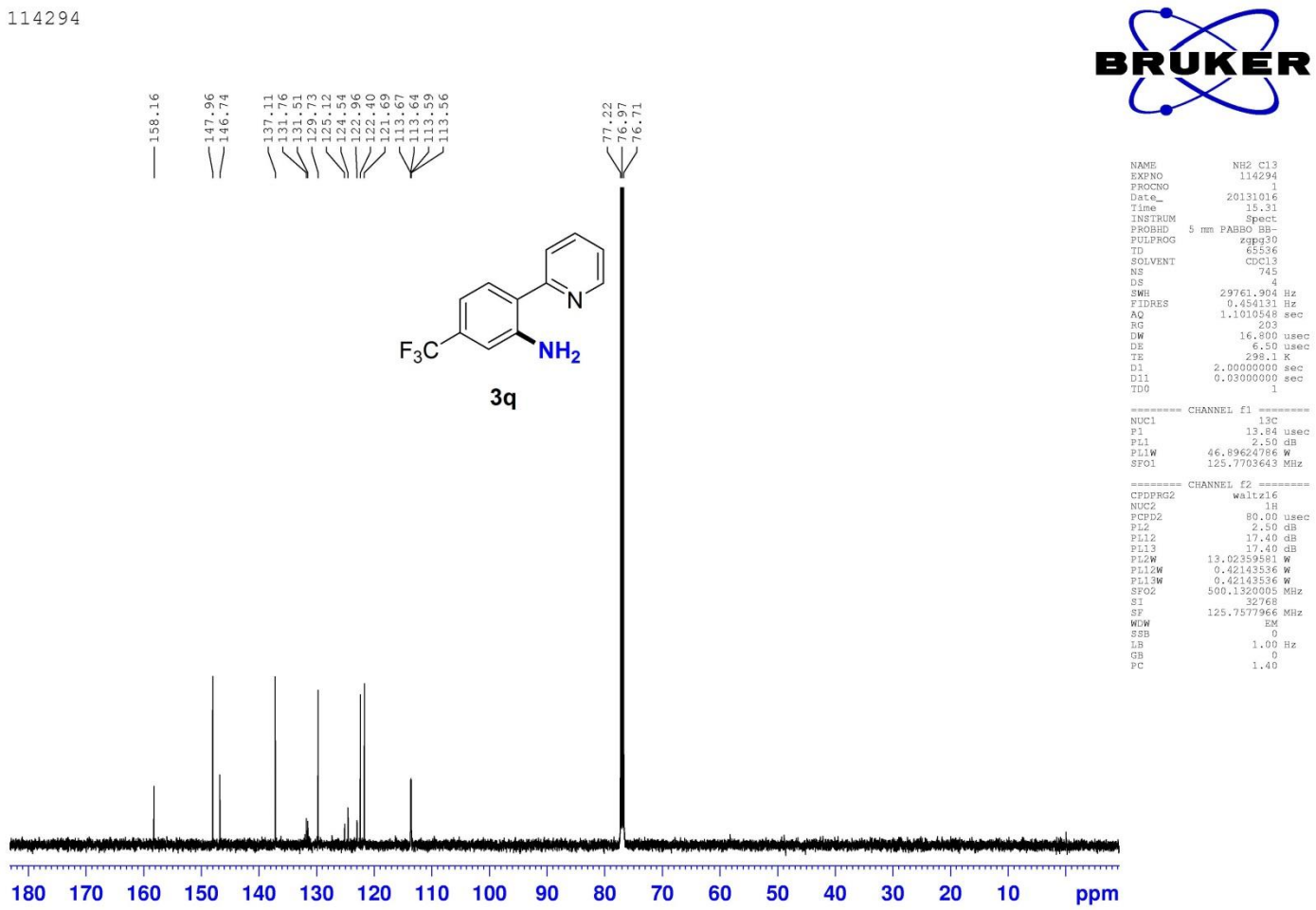



```
NAME                NH2 C13
EXPNO                114281
PROCNO                    1
Date_              20131112
Time                   8.37
INSTRUM               spect
PROBHD   5 mm PABBO BB-
PULPROG              zgpg30
TD                    65536
SOLVENT               CDCl3
NS                     1024
DS                        4
SWH              23980.814 Hz
FIDRES           0.365918 Hz
AQ               1.3664756 sec
RG                  1149.4
DW                  20.850 usec
DE                   6.50 usec
TE                  313.8 K
D1               2.00000000 sec
D11              0.03000000 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                   13C
P1                   10.25 usec
PL1                   0.00 dB
PL1W          38.68305206 W
SFO1         100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG2            waltz16
NUC2                   1H
PCPD2                80.00 usec
PL2                   0.00 dB
PL12                 16.07 dB
PL13                  0.00 dB
PL2W          10.87646866 W
PL12W          0.26883632 W
PL13W         10.87646866 W
SFO2         400.1316005 MHz
SI                    32768
SF           100.6127690 MHz
WDW                      EM
SSB                       0
LB                     1.00 Hz
GB                        0
PC                     1.40
```


114346
8.662
8.651
7.858
7.838
7.819
7.715
7.695
7.650
7.629
7.581
7.557
7.303
7.290
7.272
7.260
6.138
1.593
0.003
BRUKER
NAME NH2 H-1
EXPNO 114346
PROCNO 1
Date_ 20131115
Time 13.32
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 362
DW 60.400 usec
DE 6.50 usec
TE 296.8 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 12.58 usec
PL1 0.00 dB
PL1W 10.87646866 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300098 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
N
O2N
NH2
3p
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.00
1.06
1.05
1.06
2.03
1.06
2.10


114346
157.38
148.69
148.10
147.41
137.31
129.99
126.83
122.75
122.28
111.70
111.27
77.26
77.00
76.75
O_2N
NH_2
N
3p
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 ppm
BRUKER
NAME NH2 C13
EXPNO 114346
PROCNO 1
Date_ 20131120
Time 23.02
INSTRUM Spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 205
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 203
DW 16.800 usec
DE 6.50 usec
TE 298.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 13.84 usec
PL1 2.50 dB
PL1W 46.89624786 W
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 2.50 dB
PL12 17.40 dB
PL13 17.40 dB
PL2W 13.02359581 W
PL12W 0.42143536 W
PL13W 0.42143536 W
SFO2 500.1320005 MHz
SI 32768
SF 125.7577940 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

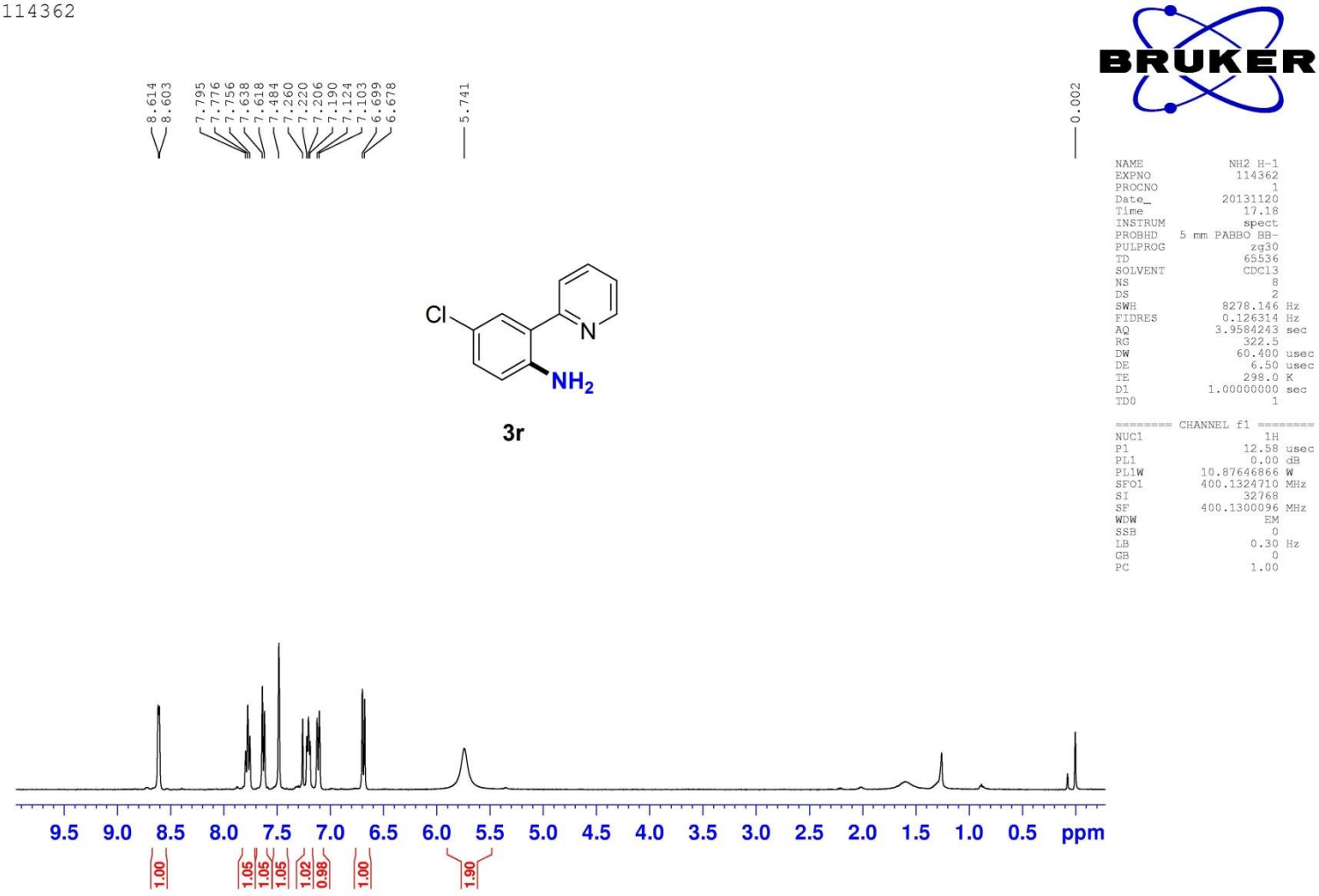

114294
8.641
8.630
7.824
7.805
7.785
7.686
7.666
7.611
7.591
7.260
7.243
7.227
7.004
6.984
5.951
1.583
0.003
BRUKER
NAME NH2 H-1
EXPNO 114294
PROCNO 1
Date_ 20131015
Time 18.00
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 362
DW 60.400 usec
DE 6.50 usec
TE 297.9 K
D1 1.00000000 sec
TD0 1
CHANNEL f1
NUC1 1H
P1 12.58 usec
PL1 0.00 dB
PL1W 10.87646866 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300091 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
F3C
NH2
N
3q
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.00
1.05
1.02
1.02
0.98
2.02
1.95

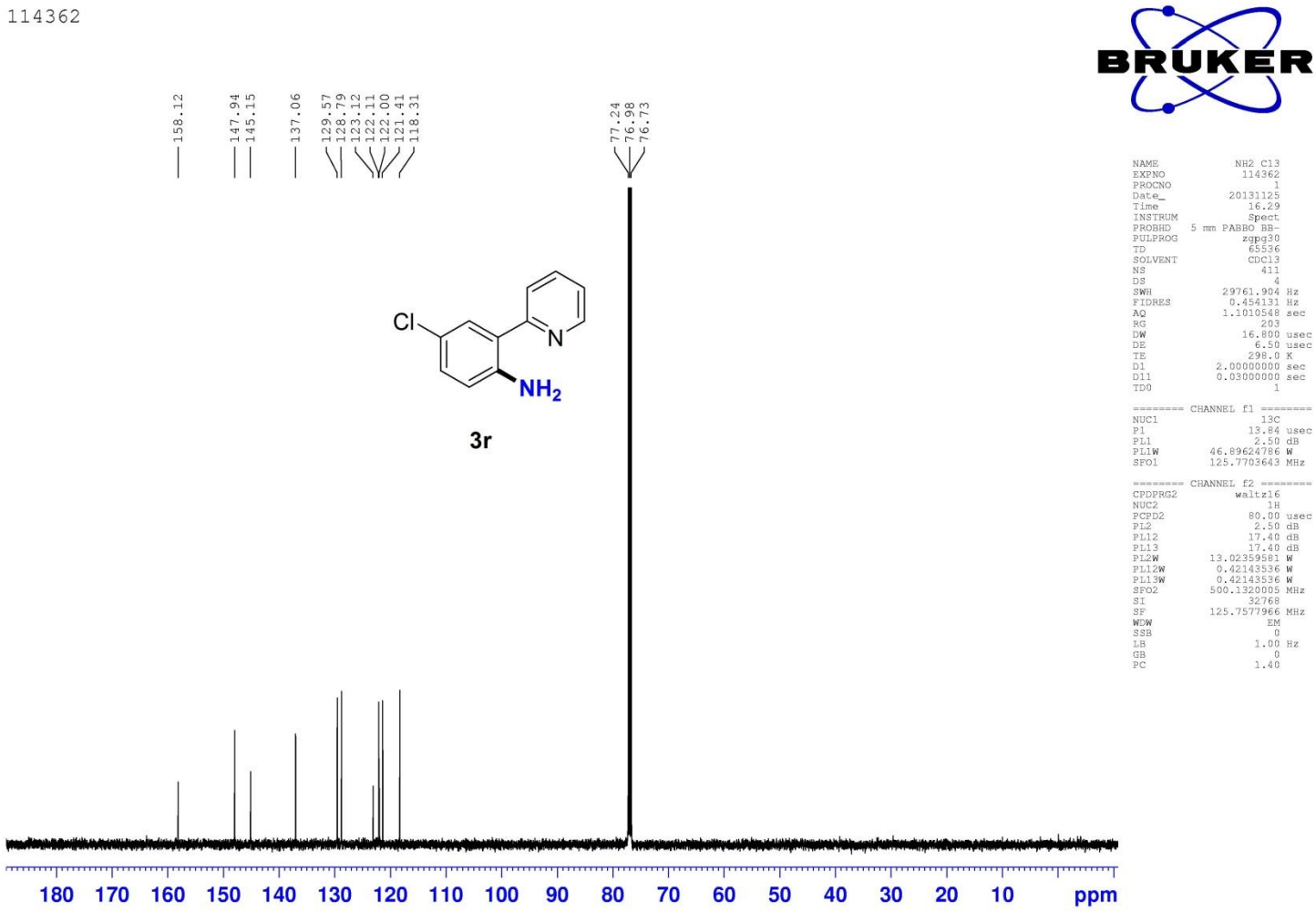


BRUKER

NAME	NH2 C13
EXPNO	114294
PROCNO	1
Date_	20131016
Time	15.31
INSTRUM	Spect
PROBHD	5 mm PABBO BB-
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	745
DS	4
SWH	29761.904 Hz
FIDRES	0.454131 Hz
AQ	1.1010548 sec
RG	203
DW	16.800 usec
DE	6.50 usec
TE	298.1 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	13C
P1	13.84 usec
PL1	2.50 dB
PL1W	46.89624786 W
SFO1	125.7703643 MHz
======== CHANNEL f2 ========	
CPDPRG2	waltz16
NUC2	1H
PCPD2	80.00 usec
PL2	2.50 dB
PL12	17.40 dB
PL13	17.40 dB
PL2W	13.02359581 W
PL12W	0.42143536 W
PL13W	0.42143536 W
SFO2	500.1320005 MHz
SI	32768
SF	125.7577966 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

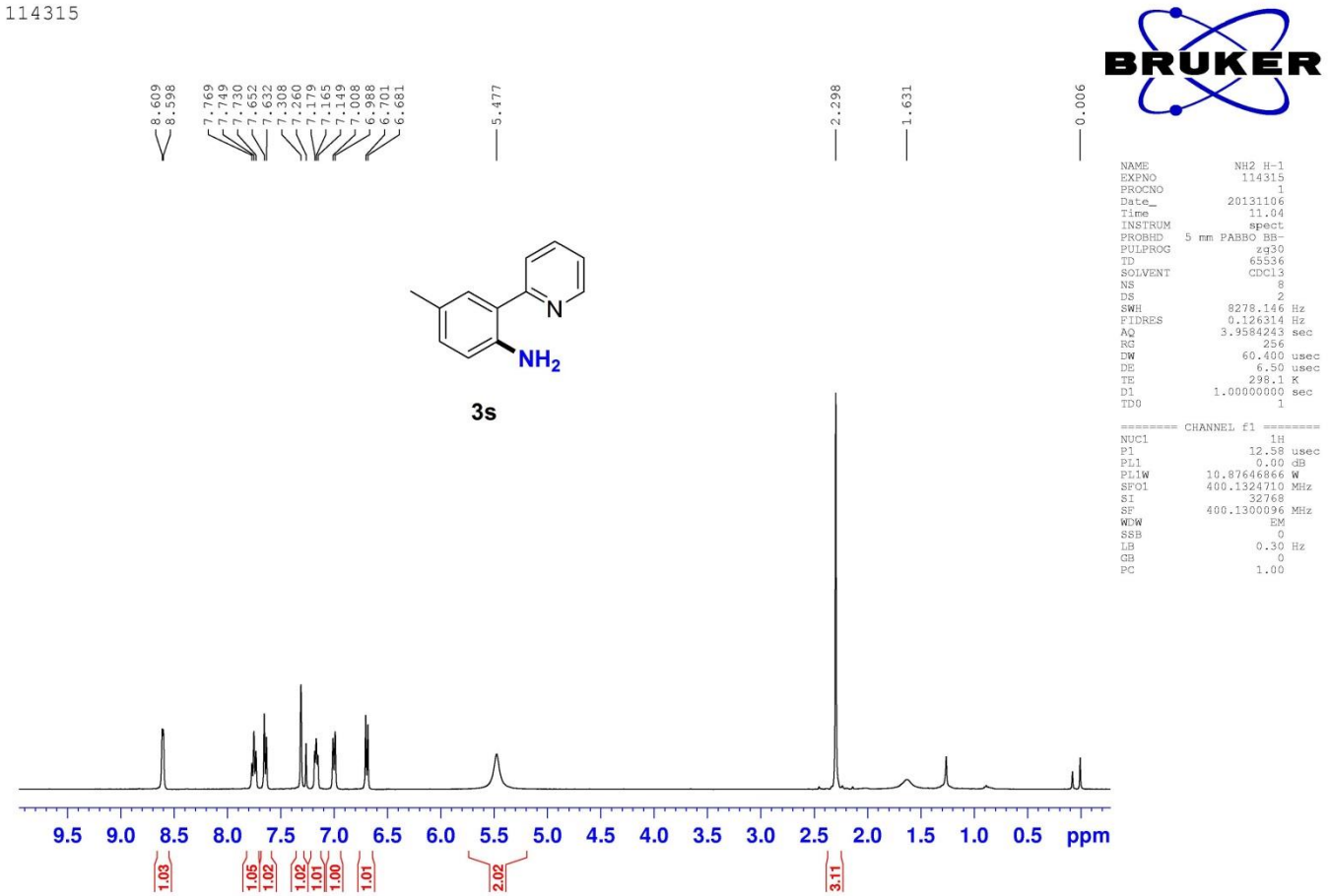
114362

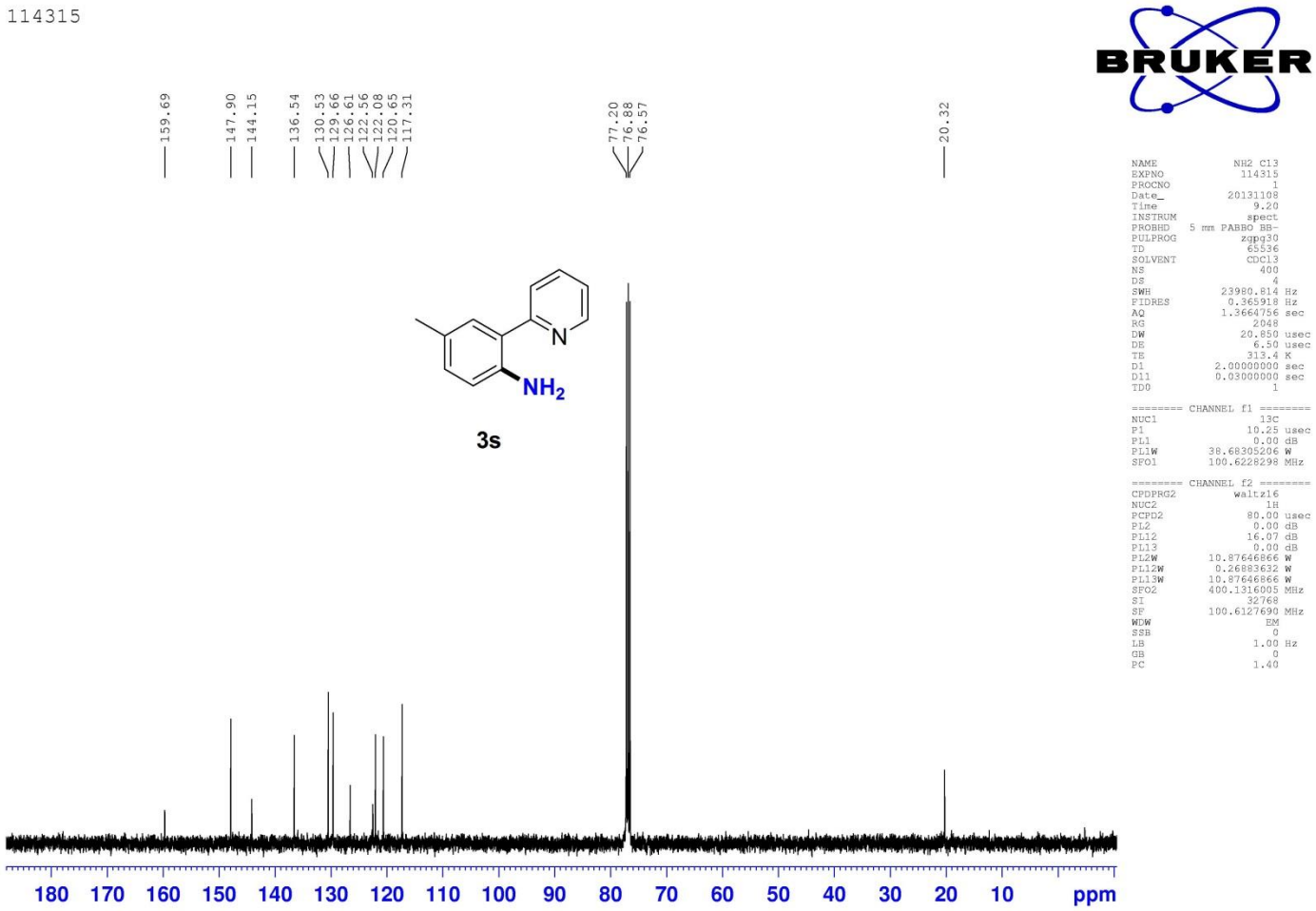

8.614
8.603
7.795
7.776
7.756
7.638
7.618
7.484
7.260
7.220
7.206
7.190
7.124
7.103
6.699
6.678
5.741
0.002
Cl
N
NH2
3r
NAME NH2 H-1
EXPNO 114362
PROCNO 1
Date_ 20131120
Time 17.18
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 322.5
DW 60.400 usec
DE 6.50 usec
TE 298.0 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 12.58 usec
PL1 0.00 dB
PL1W 10.87646866 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300096 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.00
1.05
1.05
1.05
1.02
0.98
1.00
1.90



BRUKER

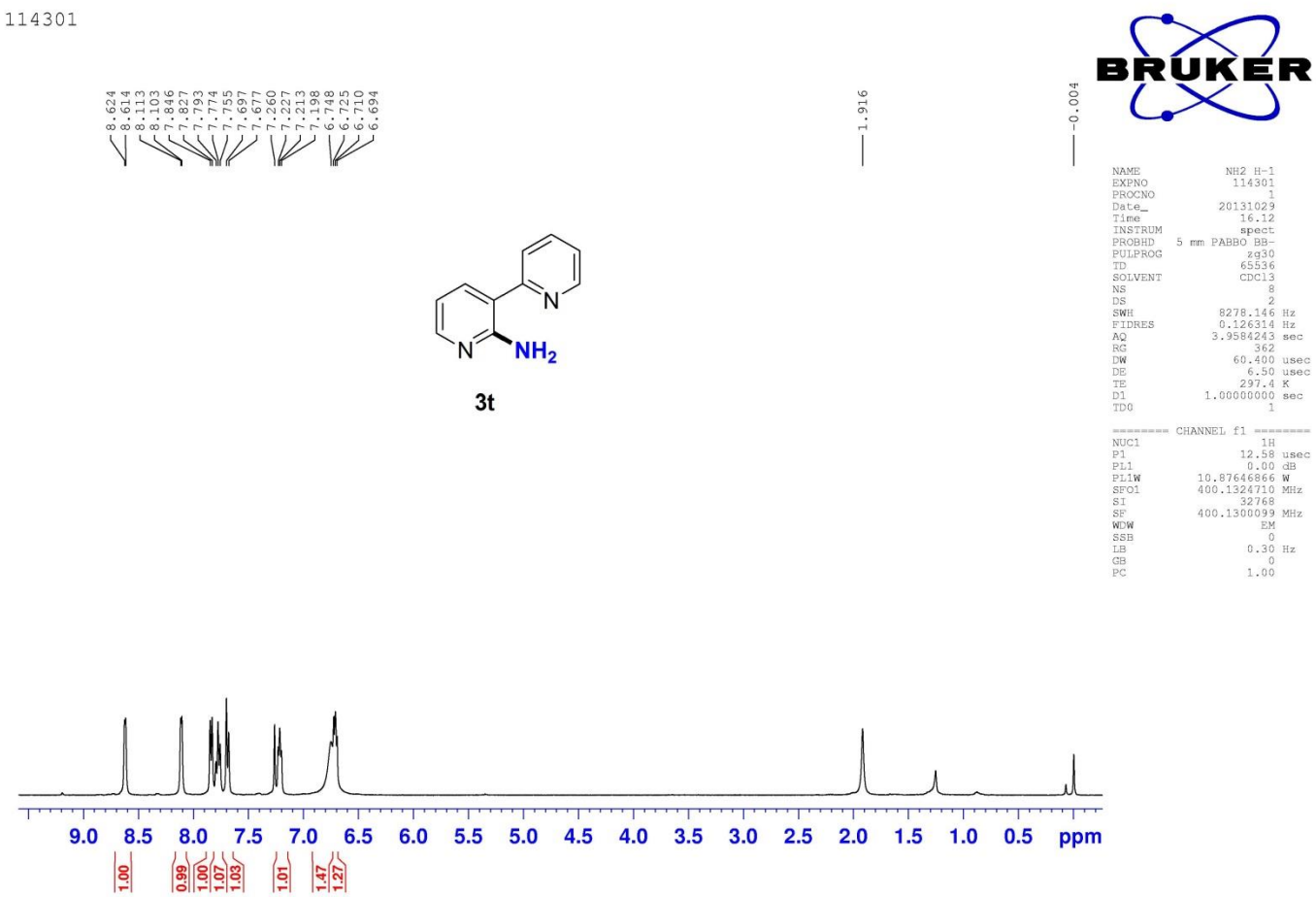
NAME	NH2 C13
EXPNO	114362
PROCNO	1
Date_	20131125
Time	16.29
INSTRUM	Spect
PROBHD	5 mm PABBO BB-
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	411
DS	4
SWH	29761.904 Hz
FIDRES	0.454131 Hz
AQ	1.1010548 sec
RG	203
DW	16.800 usec
DE	6.50 usec
TE	298.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	13C
P1	13.84 usec
PL1	2.50 dB
PL1W	46.89624786 W
SFO1	125.7703643 MHz
======== CHANNEL f2 ========	
CPDPRG2	waltz16
NUC2	1H
PCPD2	80.00 usec
PL2	2.50 dB
PL12	17.40 dB
PL13	17.40 dB
PL2W	13.02359581 W
PL12W	0.42143536 W
PL13W	0.42143536 W
SFO2	500.1320005 MHz
SI	32768
SF	125.7577966 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

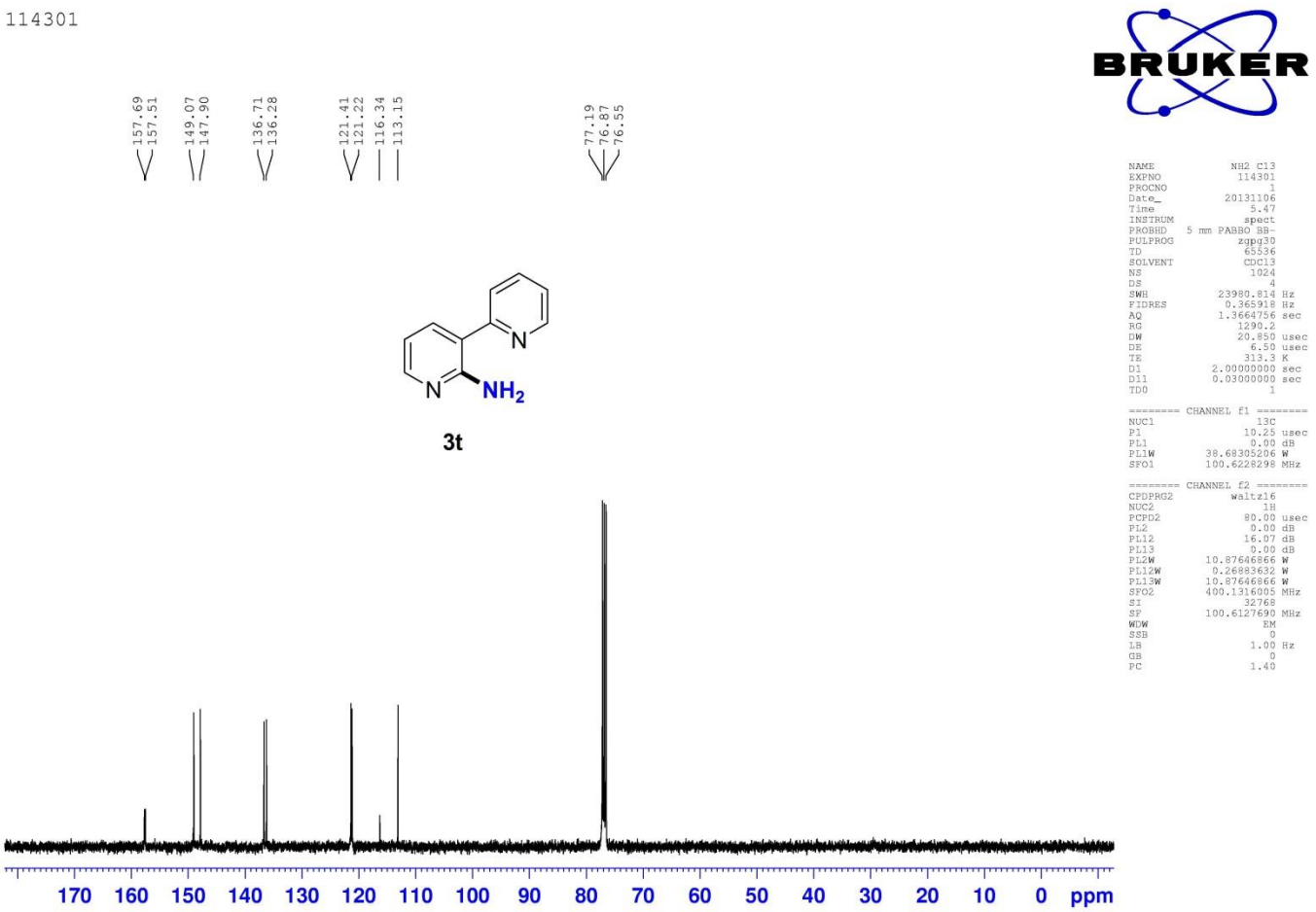

114315
8.609
8.598
7.769
7.749
7.730
7.652
7.632
7.308
7.260
7.179
7.165
7.149
7.008
6.988
6.701
6.681
5.477
2.298
1.631
0.006
BRUKER
NAME NH2 H-1
EXPNO 114315
PROCNO 1
Date_ 20131106
Time 11.04
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 256
DW 60.400 usec
DE 6.50 usec
TE 298.1 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 12.58 usec
PL1 0.00 dB
PL1W 10.87646866 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300096 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
N
NH2
3s
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.03
1.05
1.02
1.02
1.01
1.00
1.01
2.02
3.11



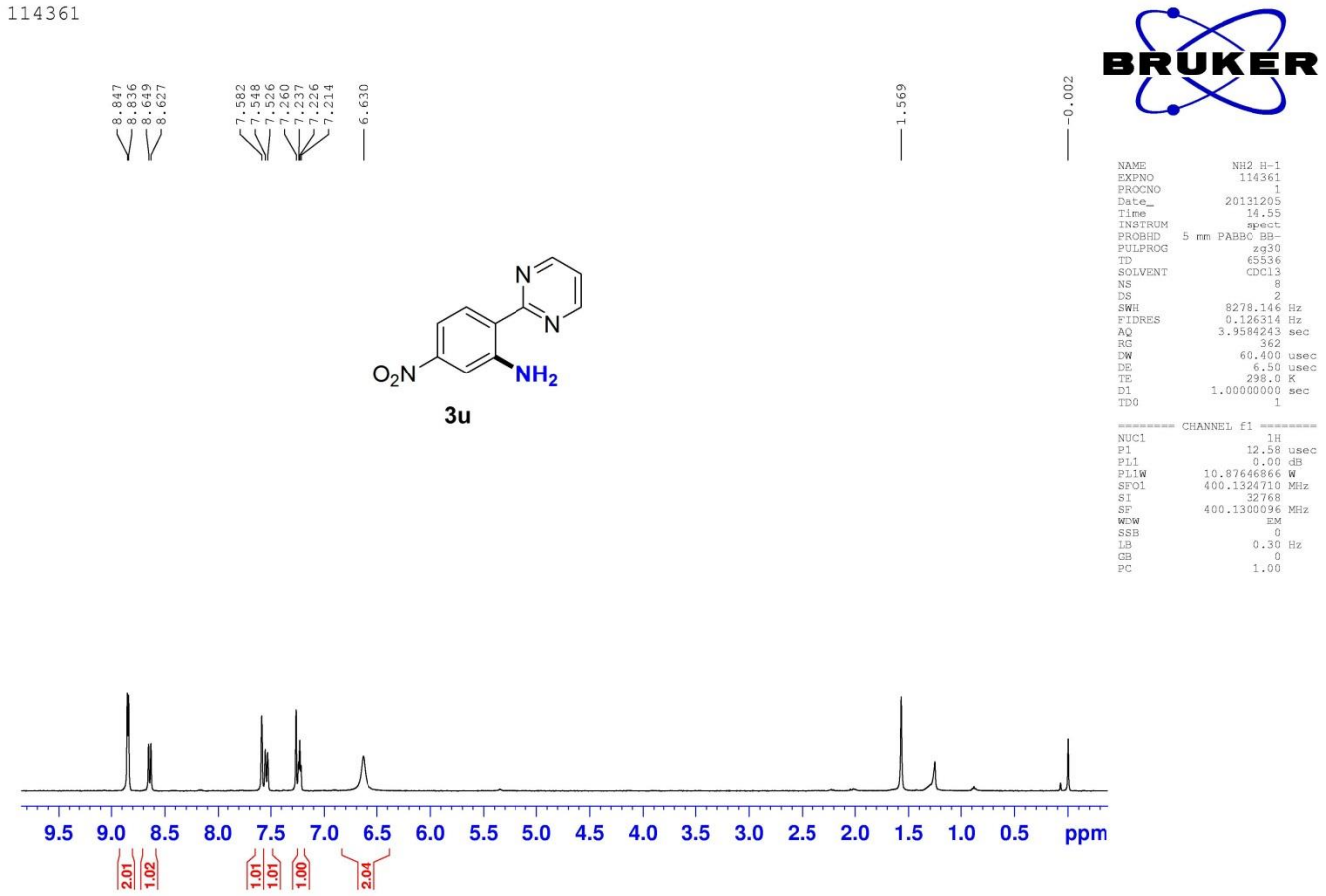
BRUKER

NAME	NH2 C13
EXPNO	114315
PROCNO	1
Date_	20131108
Time	9.20
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	400
DS	4
SWH	23980.814 Hz
FIDRES	0.365918 Hz
AQ	1.3664756 sec
RG	2048
DW	20.850 usec
DE	6.50 usec
TE	313.4 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	13C
P1	10.25 usec
PL1	0.00 dB
PL1W	38.68305206 W
SFO1	100.6228298 MHz
======== CHANNEL f2 ========	
CPDPRG2	waltz16
NUC2	1H
PCPD2	80.00 usec
PL2	0.00 dB
PL12	16.07 dB
PL13	0.00 dB
PL2W	10.87646866 W
PL12W	0.26883632 W
PL13W	10.87646866 W
SFO2	400.1316005 MHz
SI	32768
SF	100.6127690 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

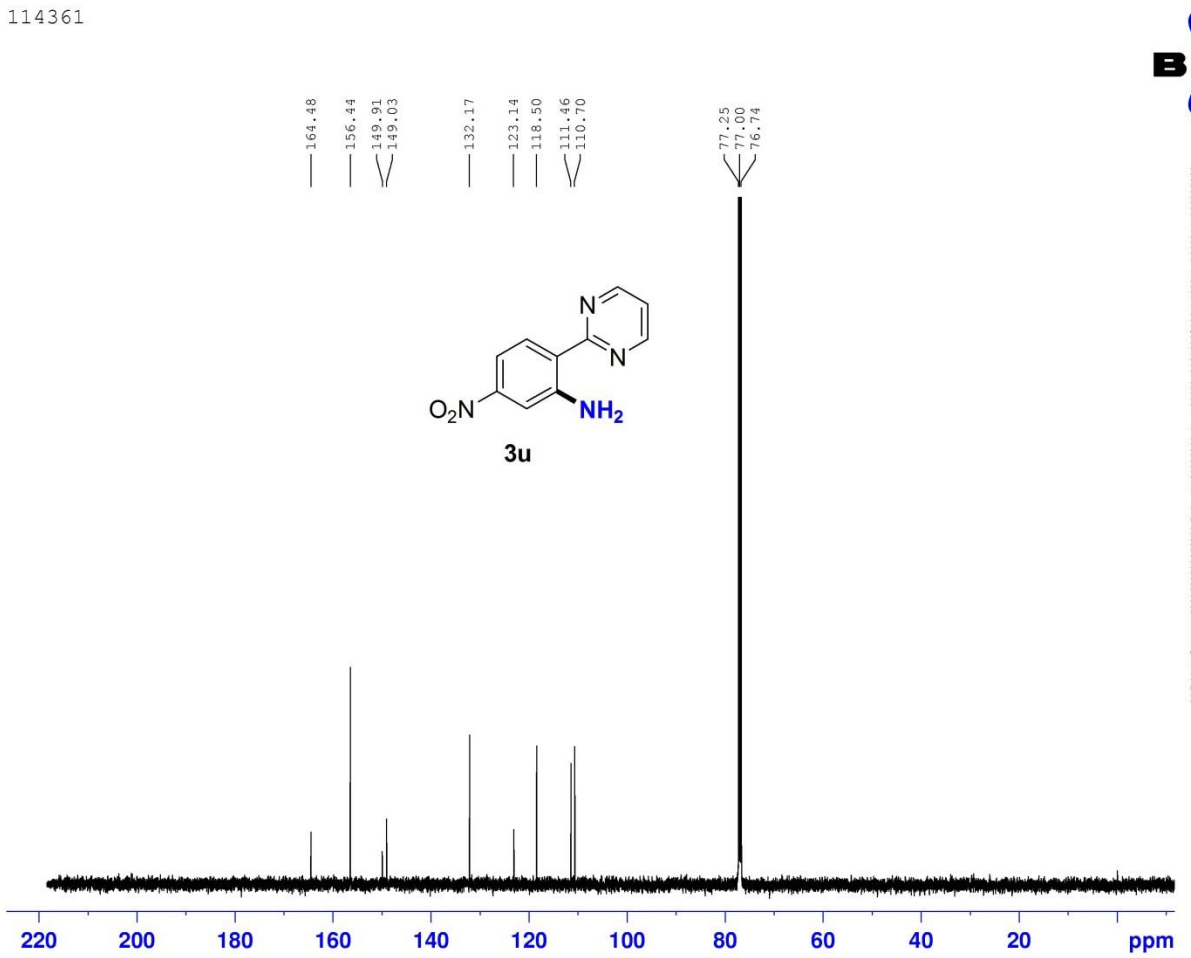

114301
8.624
8.614
8.113
8.103
7.846
7.827
7.793
7.774
7.755
7.697
7.677
7.260
7.227
7.213
7.198
6.748
6.725
6.710
6.694
1.916
0.004
BRUKER
NAME NH2 H-1
EXPNO 114301
PROCNO 1
Date_ 20131029
Time 16.12
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 362
DW 60.400 usec
DE 6.50 usec
TE 297.4 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 12.58 usec
PL1 0.00 dB
PL1W 10.87646866 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
N
N
NH2
3t
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.00
0.99
1.00
1.07
1.03
1.01
1.47
1.27



NAME	NH2 C13
EXPNO	114301
PROCNO	1
Date_	20131106
Time	5.47
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	1024
DS	4
SWH	23980.814 Hz
FIDRES	0.365918 Hz
AQ	1.3664756 sec
RG	1290.2
DW	20.850 usec
DE	6.50 usec
TE	313.3 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	13C
P1	10.25 usec
PL1	0.00 dB
PL1W	38.68305206 W
SFO1	100.6228298 MHz
======== CHANNEL f2 ========	
CPDPRG2	waltz16
NUC2	1H
PCPD2	80.00 usec
PL2	0.00 dB
PL12	16.07 dB
PL13	0.00 dB
PL2W	10.87646866 W
PL12W	0.26883632 W
PL13W	10.87646866 W
SFO2	400.1316005 MHz
SI	32768
SF	100.6127690 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40


114361
8.847
8.836
8.649
8.627
7.582
7.548
7.526
7.260
7.237
7.226
7.214
6.630
1.569
-0.002
BRUKER
NAME NH2 H-1
EXPNO 114361
PROCNO 1
Date_ 20131205
Time 14.55
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 362
DW 60.400 usec
DE 6.50 usec
TE 298.0 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 12.58 usec
PL1 0.00 dB
PL1W 10.87646866 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300096 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
N
N
O2N
NH2
3u
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
2.01
1.02
1.01
1.01
1.00
2.04

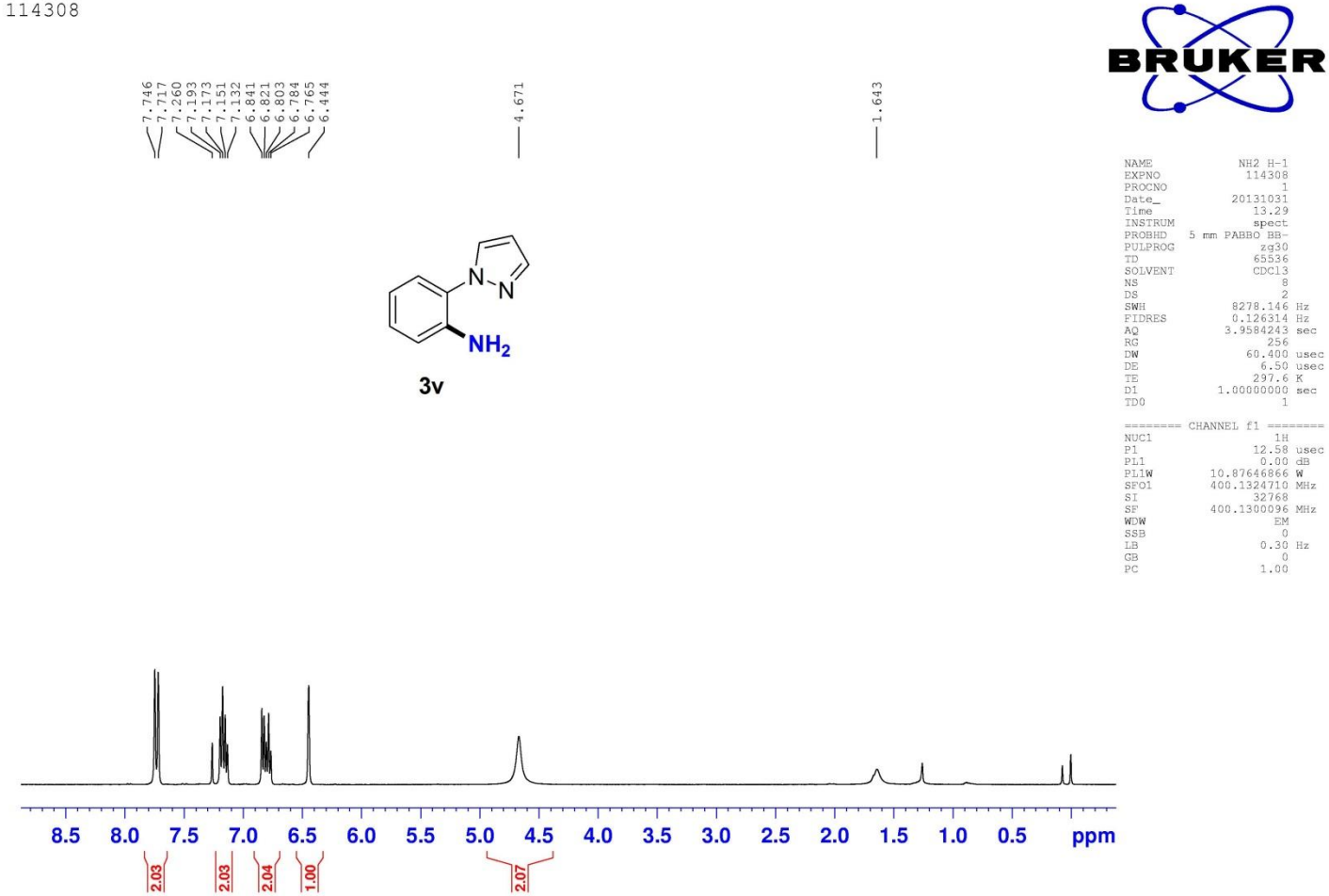
114361



BRUKER

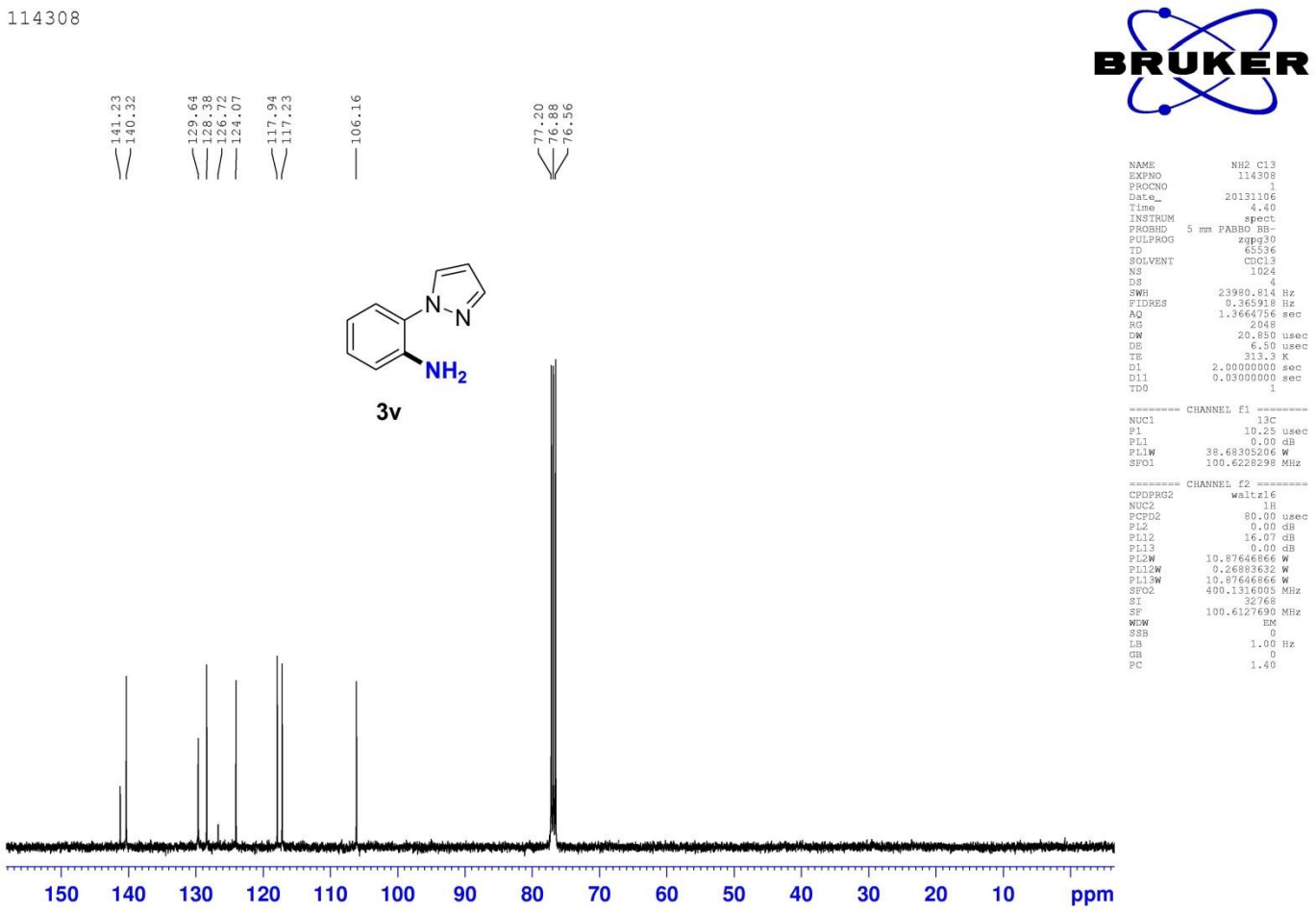
NAME	NH2 C13
EXPNO	114361
PROCNO	1
Date_	20131211
Time	23.53
INSTRUM	Spect
PROBHD	5 mm PABBO BB-
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	980
DS	4
SWH	29761.904 Hz
FIDRES	0.454131 Hz
AQ	1.1010548 sec
RG	203
DW	16.800 usec
DE	6.50 usec
TE	298.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	13C
P1	13.84 usec
PL1	2.50 dB
PL1W	46.89624786 W
SFO1	125.7703643 MHz
======== CHANNEL f2 ========	
CPDPRG2	waltz16
NUC2	1H
PCPD2	80.00 usec
PL2	2.50 dB
PL12	17.40 dB
PL13	17.40 dB
PL2W	13.02359581 W
PL12W	0.42143536 W
PL13W	0.42143536 W
SFO2	500.1320005 MHz
SI	32768
SF	125.7577931 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

114308



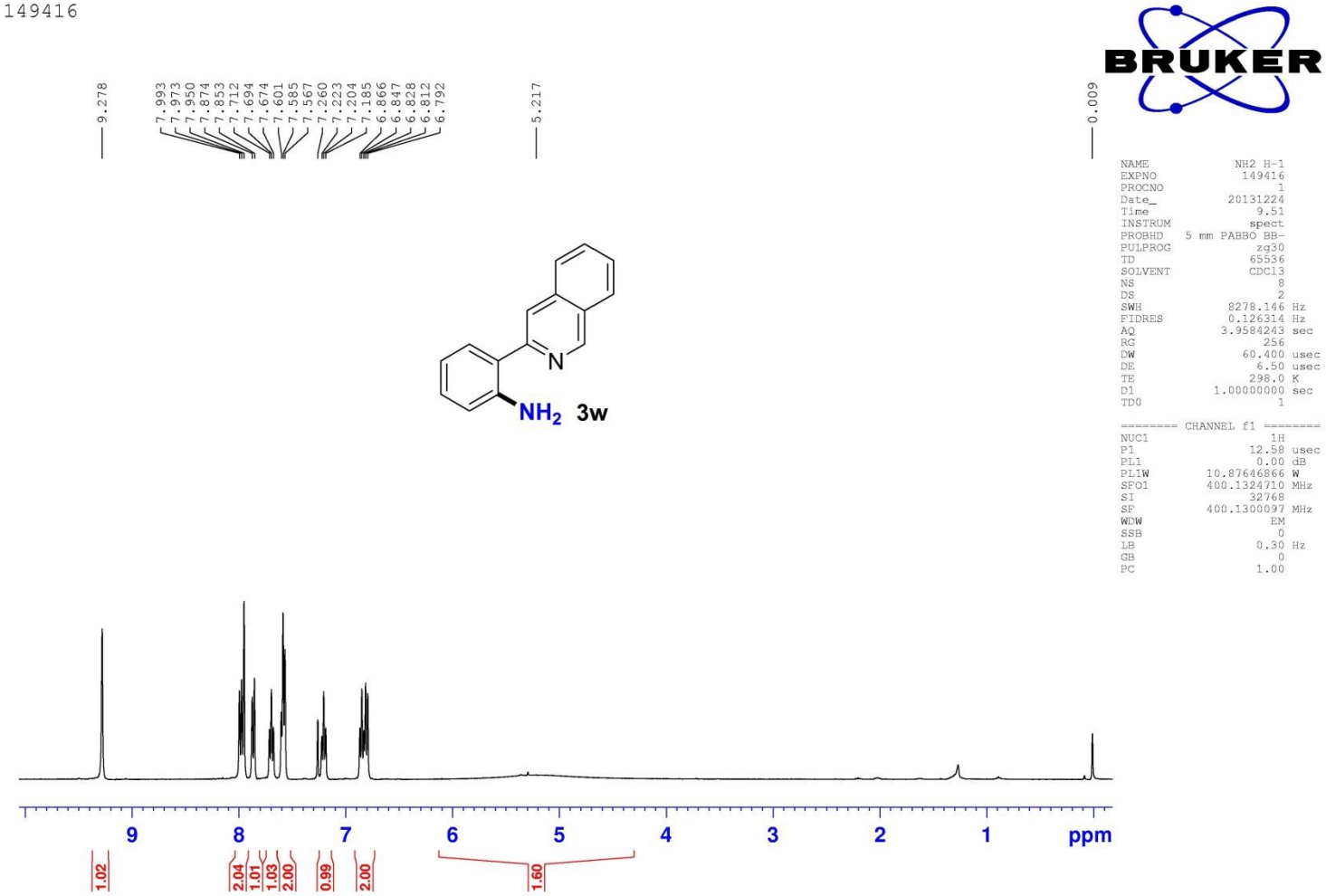
BRUKER

NAME	NH2 H-1
EXPNO	114308
PROCNO	1
Date_	20131031
Time	13.29
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	8
DS	2
SWH	8278.146 Hz
FIDRES	0.126314 Hz
AQ	3.9584243 sec
RG	256
DW	60.400 usec
DE	6.50 usec
TE	297.6 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	1H
P1	12.58 usec
PL1	0.00 dB
PL1W	10.87646866 W
SFO1	400.1324710 MHz
SI	32768
SF	400.1300096 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

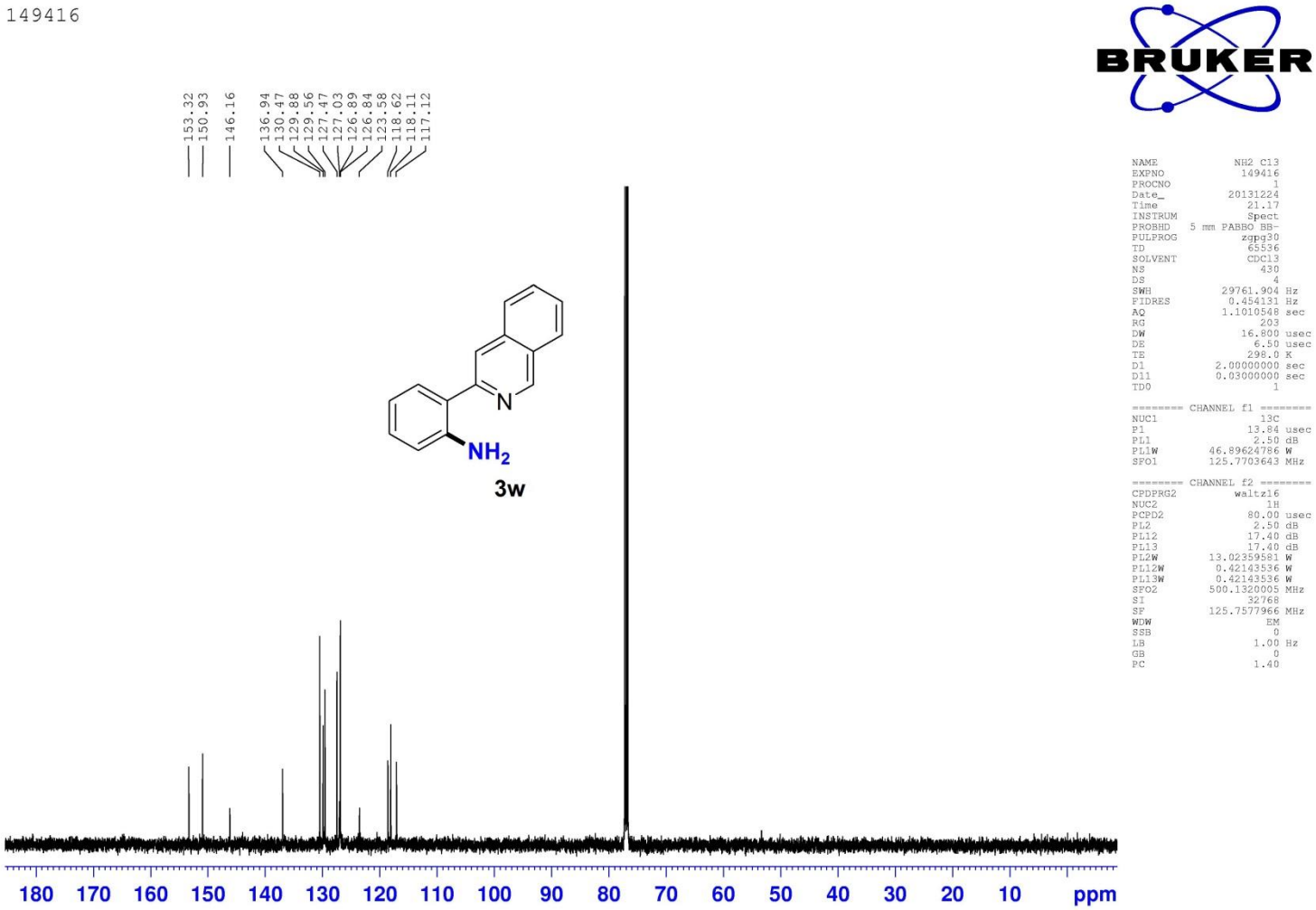



```
NAME                NH2_C13
EXPNO                114308
PROCNO                    1
Date_              20131106
Time                   4.40
INSTRUM               spect
PROBHD   5 mm PABBO BB-
PULPROG            zgpg30
TD                  65536
SOLVENT              CDCl3
NS                    1024
DS                       4
SWH             23980.814 Hz
FIDRES          0.365918 Hz
AQ              1.3664756 sec
RG                    2048
DW                20.850 usec
DE                 6.50 usec
TE                 313.3 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                      1

======== CHANNEL f1 ========
NUC1                   13C
P1                 10.25 usec
PL1                 0.00 dB
PL1W        38.68305206 W
SFO1       100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                   1H
PCPD2              80.00 usec
PL2                 0.00 dB
PL12               16.07 dB
PL13                0.00 dB
PL2W        10.87646866 W
PL12W        0.26883632 W
PL13W       10.87646866 W
SFO2       400.1316005 MHz
SI                   32768
SF         100.6127690 MHz
WDW                    EM
SSB                     0
LB                 1.00 Hz
GB                      0
PC                 1.40
```

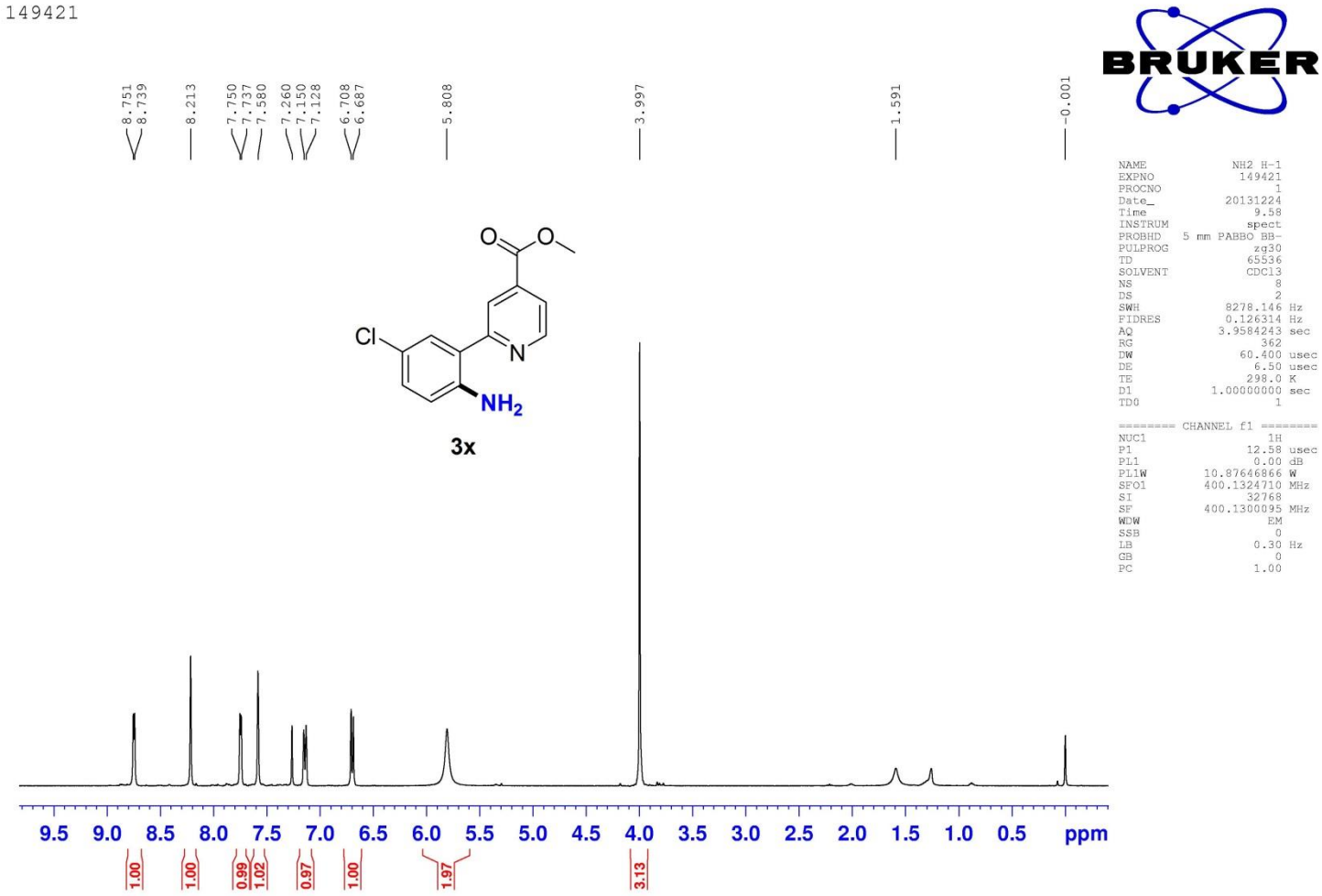
149416



NAME	NH2 H-1
EXPNO	149416
PROCNO	1
Date_	20131224
Time	9.51
INSTRUM	spect
PROBHD	5 mm PABBO BB-
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	8
DS	2
SWH	8278.146 Hz
FIDRES	0.126314 Hz
AQ	3.9584243 sec
RG	256
DW	60.400 usec
DE	6.50 usec
TE	298.0 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	1H
P1	12.58 usec
PL1	0.00 dB
PL1W	10.87646866 W
SFO1	400.1324710 MHz
SI	32768
SF	400.1300097 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00




```
NAME              NH2 C13
EXPNO              149416
PROCNO                  1
Date_            20131224
Time                21.17
INSTRUM              Spect
PROBHD   5 mm PABBO BB-
PULPROG            zgpg30
TD                  65536
SOLVENT             CDCl3
NS                    430
DS                      4
SWH             29761.904 Hz
FIDRES              0.454131 Hz
AQ                1.1010548 sec
RG                      203
DW                 16.800 usec
DE                  6.50 usec
TE                 298.0 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                   13C
P1                   13.84 usec
PL1                   2.50 dB
PL1W          46.89624786 W
SFO1         125.7703643 MHz

======== CHANNEL f2 ========
CPDPRG2             waltz16
NUC2                   1H
PCPD2                80.00 usec
PL2                   2.50 dB
PL12                 17.40 dB
PL13                 17.40 dB
PL2W          13.02359581 W
PL12W          0.42143536 W
PL13W          0.42143536 W
SFO2         500.1320005 MHz
SI                    32768
SF           125.7577966 MHz
WDW                      EM
SSB                       0
LB                     1.00 Hz
GB                        0
PC                     1.40
```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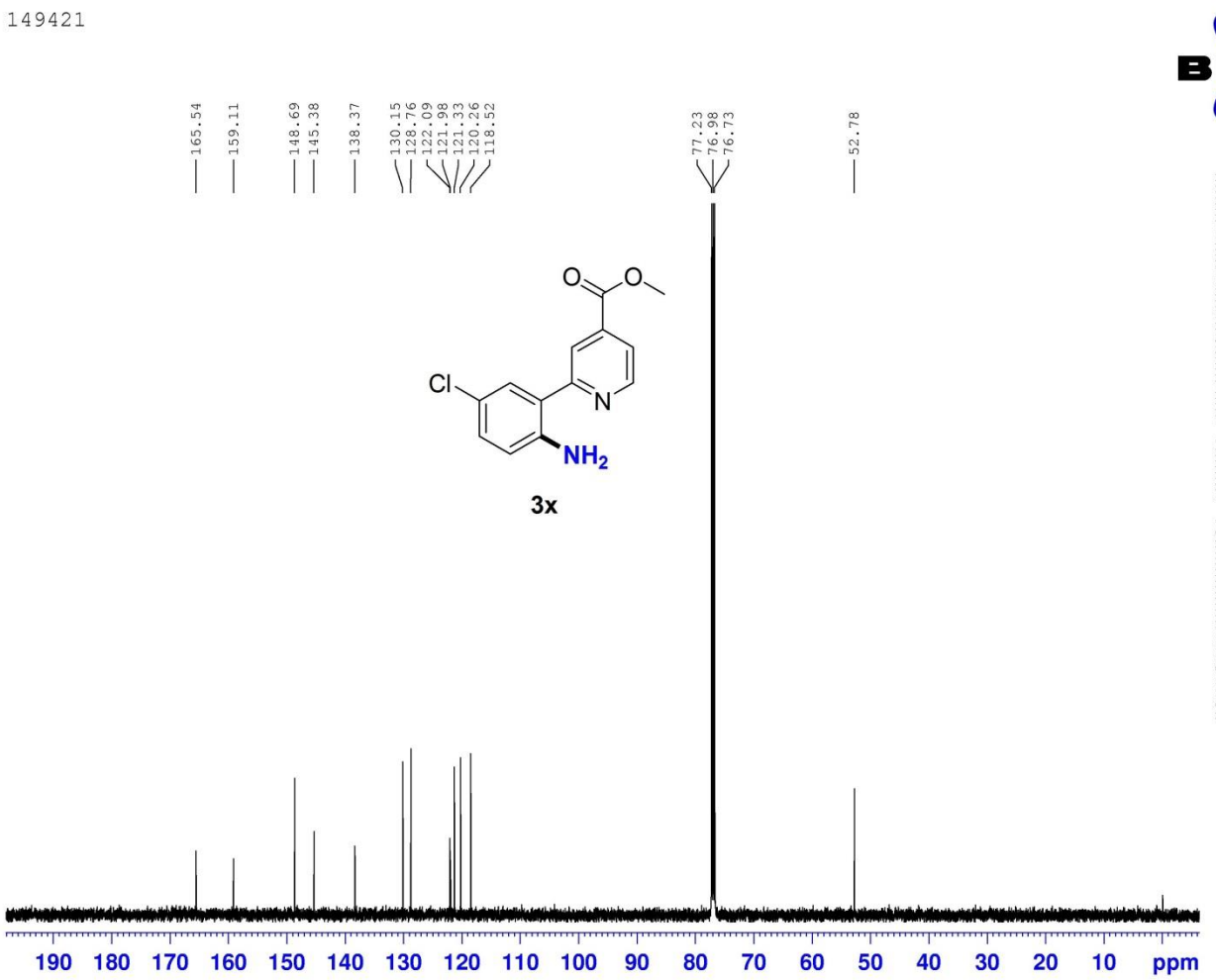
8.739
8.213
7.750
7.737
7.580
7.260
7.150
7.128
6.708
6.687
5.808
3.997
1.591
-0.001
O
O
Cl
N
NH2
3x
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
ppm
1.00
1.00
0.99
1.02
0.97
1.00
1.97
3.13
BRUKER
NAME NH2 H-1
EXPNO 149421
PROCNO 1
Date_ 20131224
Time 9.58
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 362
DW 60.400 usec
DE 6.50 usec
TE 298.0 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 12.58 usec
PL1 0.00 dB
PL1W 10.87646866 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300095 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



BRUKER

NAME	NH2 C13
EXPNO	149421
PROCNO	1
Date_	20131224
Time	18.11
INSTRUM	Spect
PROBHD	5 mm PABBO BB-
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	514
DS	4
SWH	29761.904 Hz
FIDRES	0.454131 Hz
AQ	1.1010548 sec
RG	203
DW	16.800 usec
DE	6.50 usec
TE	298.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	13C
P1	13.84 usec
PL1	2.50 dB
PL1W	46.89624786 W
SFO1	125.7703643 MHz
======== CHANNEL f2 ========	
CPDPRG2	waltz16
NUC2	1H
PCPD2	80.00 usec
PL2	2.50 dB
PL12	17.40 dB
PL13	17.40 dB
PL2W	13.02359581 W
PL12W	0.42143536 W
PL13W	0.42143536 W
SFO2	500.1320005 MHz
SI	32768
SF	125.7577966 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40