CuI/DMPAO-Catalyzed *N*-Arylation of Acyclic Secondary Amines

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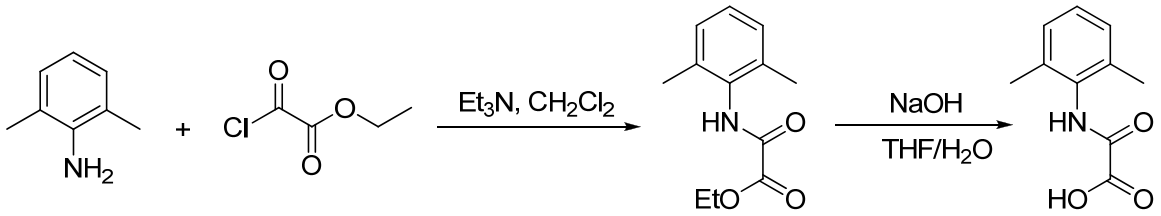
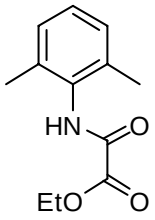
Experimental

Preparation of ligand DMPAO

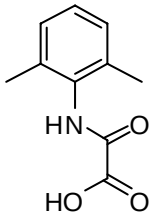


To a magnetically stirred solution of the 2,6-dimethylaniline (20 mmol) and 2 g of triethylamine (22 mmol) in 20 ml of CH_2Cl_2 was added, dropwise, a solution of 2.7 g of ethyl oxalyl chloride (22 mmol) in 10 mL of CH_2Cl_2. After it was stirred for 24 h, the mixture was washed with the same volume of water. The organic phase was dried over Na_2SO_4 and evaporated. The crude product was purified with silica gel chromatography to give the amide as white solid.

To a magnetically stirred solution of the above product (10 mmol) in 5 ml of THF and 5 mL of water was added 0.4 g of NaOH (10 mmol). After it was stirred for 2 h at room tempterature, the mixture was acidified by adding 20 ml of 1 M HCl, and then extracted with ethyl acetate. The organic layer was seperated, dried over Na_2SO_4 and evaporated to give DMPAO as white solid.

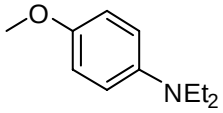


Ethyl 2-(2,6-dimethylanilino)-2-oxo-acetate.[1] ^{1}H NMR (300 MHz, $CDCl_3$) δ 8.51 (brs, 1H), 7.15-7.08 (m, 3H), 4.62 (q, *J* = 7.2 Hz, 2H), 2.20 (s, 3H), 1.39 (t, *J* = 7.2 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 160.8, 154.6, 135.0, 132.2, 128.3, 127.8, 63.4, 18.3, 13.9; ESI-MS *m/z* 222 $(M + H)^+$.

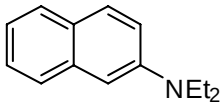


DMPAO. ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.20-7.10 (m, 3H), 5.12 (brs, 2H), 2.21 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 162.7, 158.9, 136.6, 134.3, 129.1, 128.8, 18.3; ESI-MS *m/z* 192 $(M - H)^+$; HRMS calcd for $C_{10}H_{10}NO_3$ $(M - H)^+$, 192.0666, found 192.0667.

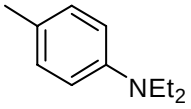
General procedure for N-arylation: An oven-dried Schlenk tube was charged with CuI (19 mg, 0.1 mmol), DMPAO (38 mg, 0.2 mmol), aryl halide (1 mmol), K_3PO_4 (2 mmol). The tube was evacuated and backfilled with argon, and then amine (1.5 mmol) and DMSO (1 mL) was added. The reaction mixture was stirred at 90 ^{o}C for 48 h. After aryl halide was consumed, water was added and the mixture was extracted with ethyl acetate. The organic layer was dried over Na_2SO_4 and evaporated. The residue was purified by chromatography to give the desired product.



***N*-(4-Methoxyphenyl)diethylamine (3a)**.[2] ^{1}H NMR (300 MHz, $CDCl_3$) δ 6.83 (d, *J* = 9.0 Hz, 2H), 6.71 (d, *J* = 9.0 Hz, 2H), 3.76 (s, 3H), 3.26 (q, *J* = 6.9 Hz, 4H), 1.10 (t, *J* = 6.9 Hz, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 151.6, 143.0, 115.4, 114.9, 55.9, 45.4, 12.6; EI-MS *m/z* 179 (M^+); HRMS calcd for $C_{11}H_{17}NO$ (M^+), 179.1310, found 179.1311.

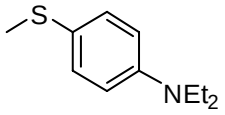


Diethyl naphthalen-2-yl-amine (3b).[3] ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.75-7.62 (m, 3H), 7.34 (t, *J* = 7.2 Hz, 1H), 7.20 (t, *J* = 7.2 Hz, 1H), 7.14 (dd, *J* = 9.0, 2.5 Hz, 1H), 6.92 (s, 1H), 3.49 (q, *J* = 6.9 Hz, 4H), 1.25 (t, *J* = 6.9 Hz, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 146.0, 135.4, 127.5, 126.4, 126.2, 126.0, 121.6, 116.2, 105.7, 44.7, 12.8; ESI-MS *m/z* 200 $(M + H)^+$.

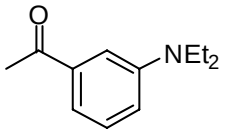


***N*-(4-Methylphenyl)diethylamine (3c)**.[2] ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.09 (d, *J* = 9.0 Hz, 2H), 6.69 (d, *J* = 9.0 Hz, 2H), 3.37 (q, *J* = 6.9 Hz, 4H), 2.31 (s, 3H), 1.19 (t, *J* = 6.9

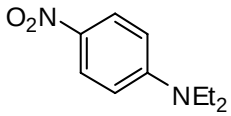
Hz, 6H), ^{13}C NMR (100 MHz, $CDCl_3$) δ 146.0, 129.9, 124.9, 112.7, 44.7, 20.3, 12.7; ESI-MS *m/z* 164 $(M + H)^+$.



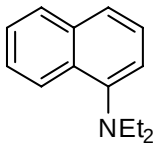
***N,N*-Diethyl-4-methylthioaniline (3f)**.[4] ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.26 (d, *J* = 6.6 Hz, 2H), 6.61 (d, *J* = 6.6 Hz, 2H), 3.32 (q, *J* = 5.4 Hz, 4H), 2.40 (s, 3H), 1.14 (t, *J* = 5.4 Hz, 6H), ^{13}C NMR (100 MHz, $CDCl_3$) δ 146.9, 132.2, 121.8, 112.4, 44.5, 19.7, 12.6; ESI-MS *m/z* 196 $(M + H)^+$.



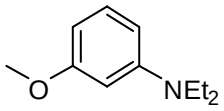
***N,N*-Diethyl-3-acetylaniline (3g)**. ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.30-7.24 (m, 2H), 7.18 (d, *J* = 5.7 Hz, 1H), 6.85 (dd, *J* = 6.0, 1.5 Hz, 1H), 3.37 (q, *J* = 5.7 Hz, 4H), 2.58 (s, 3H), 1.16 (t, *J* = 5.7 Hz, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 199.0, 147.9, 138.1, 129.3, 116.3, 115.8, 110.5, 44.4, 26.8, 12.5; EI-MS *m/z* 191 (M^+); HRMS calcd for $C_{12}H_{17}NO$ (M^+), 191.1310, found 191.1312.



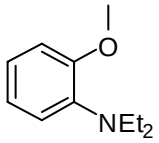
***N,N*-Diethyl-4-nitroaniline (3h)**.[5] ^{1}H NMR (300 MHz, $CDCl_3$) δ 8.05 (d, *J* = 9.6 Hz, 2H), 6.54 (d, *J* = 9.6 Hz, 2H), 3.42 (q, *J* = 7.2 Hz, 4H), 1.19 (t, *J* = 7.2 Hz, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 152.3, 136.1, 126.4, 109.8, 45.0, 12.4; ESI-MS *m/z* 196 $(M + H)^+$.



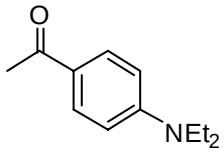
***N,N*-Diethyl naphthalen-1-yl-amine (3i)**. ^{1}H NMR (300 MHz, $CDCl_3$) δ 8.35-8.29 (m, 1H), 7.83-7.79 (m, 1H), 7.58-7.37 (m, 4H), 7.15 (d, *J* = 7.5 Hz, 1H), 3.21 (q, *J* = 7.2 Hz, 4H), 1.06 (t, *J* = 7.2 Hz, 6H) ^{13}C NMR (100 MHz, $CDCl_3$) δ 148.1, 135.0, 131.4, 128.2, 125.7, 125.6, 125.2, 124.4, 123.4, 118.0, 47.9, 12.4; EI-MS *m/z* 199 (M^+); HRMS calcd for $C_{12}H_{17}NO$ (M^+), 199.1361, found 199.1359.



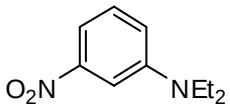
***N,N*-Diethyl-3-methoxyaniline (3j)**.[6] ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.11 (t, *J* = 5.4 Hz, 1H) 6.32-6.28 (m, 1H), 6.23-6.19 (m, 2H), 3.76 (s, 3H), 3.31 (q, *J* = 7.2 Hz, 4H), 1.14 (t, *J* = 7.2 Hz, 6H) ^{13}C NMR (100 MHz, $CDCl_3$) δ 161.1, 149.3, 130.0, 105.2, 100.1, 98.5, 55.2, 44.5, 12.7; ESI-MS *m/z* 180 $(M + H)^+$.



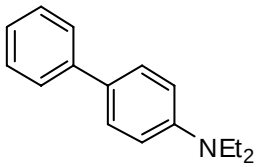
***N,N*-Diethyl-2-methoxyaniline (3k)**.[7] ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.03-6.95 (m, 2H), 6.93-6.85 (m, 2H), 3.86 (s, 3H), 3.16 (q, *J* = 7.2 Hz, 4H), 1.02 (t, *J* = 7.2 Hz, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 154.0, 139.1, 122.9, 121.9, 120.5, 111.5, 55.5, 46.3, 12.1; (ESI-MS *m/z* 180 $(M + H)^+$.



***N,N*-Diethyl-4-acetylaniline (3l)**.[8] ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.83 (d, *J* = 9.0 Hz, 2H), 6.60 (d, *J* = 9.0 Hz, 2H), 3.39 (q, *J* = 7.2 Hz, 4H), 2.48 (s, 3H), 1.18 (t, *J* = 7.2 Hz, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 196.0, 151.1, 130.8, 124.6, 110.0, 44.5, 25.9, 12.5; (ESI-MS *m/z* 192 $(M + H)^+$.

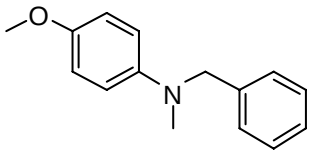


***N,N*-Diethyl-3-nitroaniline** (**3m**). ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.45-7.40 (m, 2H), 7.32-7.25 (m, 1H), 6.93-6.88 (m, 1H), 3.39 (q, *J* = 7.2 Hz, 4H), 1.18 (t, *J* = 7.2 Hz, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 149.7, 148.4, 129.8, 117.1, 109.7, 105.5, 44.6, 12.4; EI-MS *m/z* 194 (M^+); HRMS calcd for $C_{10}H_{14}N_2O_2$ (M^+), 194.1055, found 194.1053.

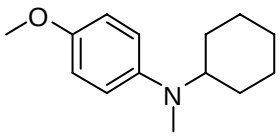


4-(*N,N*-Diethylamino)biphenyl (3n).[9] ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.57 (d, *J* = 7.8 Hz, 2H), 7.50 (d, *J* = 9.0 Hz, 2H), 7.40 (t, *J* = 7.8 Hz, 2H), 7.24 (dd, *J* = 7.2 Hz, 14.4 Hz, 1H),

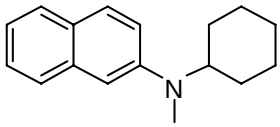
6.76 (d, *J* = 9.0 Hz, 2H), 3.39 (q, *J* = 7.2 Hz, 4H), 1.20 (t, *J* = 7.2 Hz, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 147.3, 141.4, 128.7, 128.1, 128.0, 126.2, 125.9, 112.0, 44.5, 12.8; ESI-MS *m/z* 226 $(M + H)^+$.



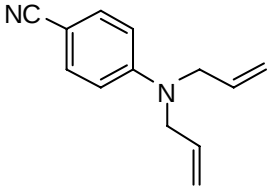
***N*-(4-Methoxyphenyl)-*N*-methylbenylamine (3o)**.[2] ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.50-7.30 (m, 5H), 6.95 (d, *J* = 9.0 Hz, 2H), 6.86 (d, *J* = 9.0 Hz, 2H), 4.55 (s, 2H), 3.87 (s, 3H), 3.04 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 151.9, 144.9, 139.3, 128.6, 127.2, 126.9, 114.9, 114.6, 58.1, 55.9, 39.2; ESI-MS *m/z* 228 $(M + H)^+$.



***N*-Methyl-*N*-cyclohexyl-4-methoxyaniline (3p)**. ^{1}H NMR (300 MHz, $CDCl_3$) δ 6.85-6.77 (m, 4H), 3.76 (s, 3H), 3.41-3.33 (m, 1H), 2.71 (s, 3H), 1.84-1.63 (m, 5H), 1.47-1.24 (m, 4H), 1.16-1.07 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 152.1, 145.3, 116.6, 60.3, 55.8, 32.5, 29.9, 26.3, 26.1; EI-MS *m/z* 219 (M^+); HRMS calcd for $C_{14}H_{21}NO$ (M^+), 219.1623, found 219.1622.

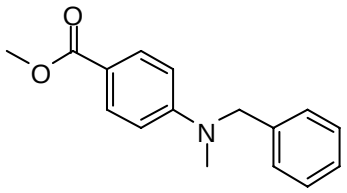


***N*-Methyl-*N*-(naphthalen-2-yl)-cyclohexylamine (3q)**. ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.68-7.61 (m, 3H), 7.37-7.31 (m, 1H), 7.22-7.15 (m, 2H), 6.94 (s, 1H), 3.73-3.63 (m, 1H), 2.84 (s, 3H), 1.86-1.05 (m, 10H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 148.3, 135.2, 128.7, 127.5, 127.0, 126.2, 126.2, 122.0, 117.3, 107.3, 58.9, 31.5, 30.2, 26.3, 26.0; EI-MS *m/z* 239 (M^+); HRMS calcd for $C_{17}H_{21}N$ (M^+), 239.1674, found 239.1677.

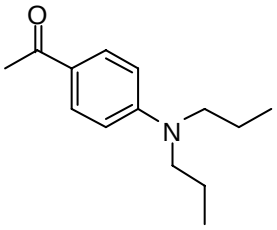


4-(*N*,*N*-Diallylamino)benzenenitrile (3r).[10] ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.41 (d, *J*

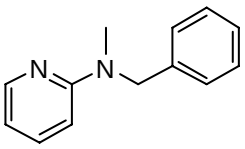
= 9.0 Hz, 2H), 6.62 (d, *J* = 9.0 Hz, 2H), 5.87-5.74 (m, 2H), 5.21-5.09 (m, 4H), 3.97-3.94 (m, 4H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 151.4, 133.5, 132.3, 120.7, 116.7, 111.9, 97.9, 52.7; EI-MS *m/z* 198 (M^+); HRMS calcd for $C_{13}H_{14}N_2$ (M^+), 198.1157, found 198.1153.



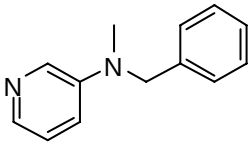
***N*-Methyl-*N*-benzyl-(4-carbomethoxy)aniline (3s)**.[11] ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.90 (d, *J* = 9,0 Hz, 2H), 7.36-7.23 (m, 3H), 7.18 (d, *J* = 6.6 Hz, 2H), 6.69 (d, *J* = 9,0 Hz, 2H), 4.62 (s, 2H), 3.85 (s, 3H), 3.11 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.4, 152.8, 137.8, 131.5, 128.8, 127.2, 126.5, 117.4, 111.0, 56.0, 51.5, 38.7; ESI-MS *m/z* 256 $(M + H)^+$.



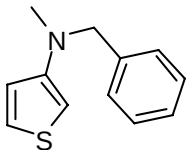
***N*,*N*-Dipropyl-4-acetylaniline (3t)**. ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.82 (d, *J* = 9 Hz, 2H), 6.57(d, *J* = 9 Hz, 2H), 3.28 (t, *J* = 7.8 Hz, 4H), 2.47 (s, 3H), 1.62 (q, *J* = 4.5 Hz, 4H), 0.93 (t, *J* = 4.5 Hz, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 196.1, 151.6, 130.8, 124.6, 110.3, 52.8, 25.9, 20.4, 11.4; ; EI-MS *m/z* 219 (M^+); HRMS calcd for $C_{14}H_{21}NO$ (M^+), 219.1623, found 219.1622.



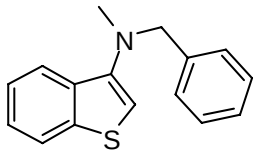
2-(*N*-Benzyl-*N*-methylamino)pyridine (3u). ^{1}H NMR (300 MHz, $CDCl_3$) δ 8.18 (d, *J* = 3.6 Hz, 1H), 7.43 (ddd, *J* = 1.8 Hz, 6.9 Hz, 8.7 Hz, 1H), 7.34-7.18 (m, 5H), 6.56 (dd, *J* = 5.1 Hz, 6.9 Hz, 1H), 6.51 (d, *J* = 8.7 Hz, 1H), 4.80 (s, 2H), 3.07 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 159.0, 148.1, 138.8, 137.4, 128.6, 127.1, 127.0, 111.9, 105.8, 53.3, 36.2; EI-MS *m/z* 198 (M^+), HRMS calcd for $C_{13}H_{14}N_2$ (M^+), 198.1157, found 198.1156.



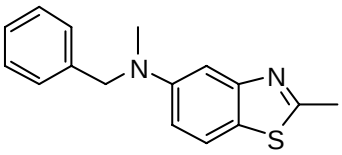
3-(*N*-Benzyl-*N*-methylamino)pyridine (3v). ^{1}H NMR (300 MHz, $CDCl_3$) δ 8.17 (d, *J* = 2.7 Hz, 1H), 7.96 (d, *J* = 4.5 Hz, 1H), 7.36-7.18 (m, 5H), 7.09 (dd, *J* = 4.5 Hz, 8.7 Hz, 1H), 7.01-6.95 (m, 1H), 4.55 (s, 2H), 3.06 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 145.4, 138.0, 137.9, 135.0, 128.8, 127.3, 126.7, 123.6, 118.7, 56.3, 38.5; EI-MS *m/z* 198 (M^+), HRMS calcd for $C_{13}H_{14}N_2$ (M^+), 198.1157, found 198.1160.



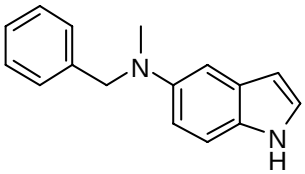
3-(*N*-Benzyl-*N*-methylamino)thiophen (3w) . ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.35-7.19 (m, 6H), 6.83 (dd, *J* = 5.2, 1.6 Hz, 1H), 5.96 (dd, *J* =2.8, 1.6 Hz, 1H), 4.36 (s, 2H), 2.84 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 152.0, 138.8, 128.5, 127.6, 127.1, 125.3, 119.3, 96.8, 58.7, 39.5; EI-MS *m/z* 203 (M^+), HRMS calcd for $C_{12}H_{13}NS$ (M^+), 203.0769, found 203.0766.



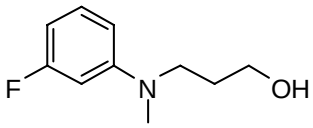
3-(*N*-Benzyl-*N*-methylamino)thianaphthene (3x). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.92-7.81(m, 2H), 7.44-7.30 (m, 7H), 6.58 (s, 1H), 4.28 (s, 2H), 2.74 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 147.3, 139.5, 138.4, 134.9, 128.6, 128.3, 127.4, 124.6, 123.8, 123.5, 122.1, 106.6, 60.3, 40.7; ESI-MS *m/z* 253 (M^+), HRMS calcd for $C_{16}H_{15}NS$ (M^+), 253.0925, found 253.0924.



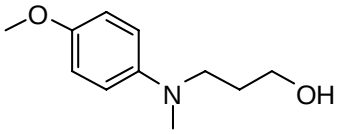
5-(*N*-Benzyl-*N*-methylamino)-2-methylbenzothiazole (3y). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.55 (d, *J* = 8.8 Hz, 1H), 7.32-7.26 (m, 3H), 7.25-7.20 (m, 3H), 6.85 (dd, *J* = 8.8, 2.4 Hz, 1H), 4.56(s, 2H), 3.07(s, 3H), 2.76(s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.6, 155.2, 149.1, 138.8, 128.7, 127.0, 126.8, 123.6, 121.5, 122.3, 105.2, 57.2, 39.2, 20.2; ESI-MS *m/z* 268 (M^+), HRMS calcd for $C_{16}H_{16}N_2S$ (M^+), 268.1034, found 268.1038.



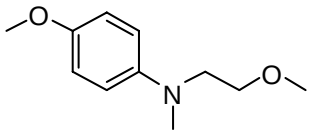
5-(*N*-Benzyl-*N*-methylamino)indole (3z). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.9 (br s, 1H), 7.30 (m, 4H), 7.28-7.20 (m, 2H), 7.12 (t, *J* = 2.8 Hz, 1H), 7.03 (d, *J* = 2.4 Hz, 1H), 6.89 (dd, *J* = 4.8, 1.8 Hz, 1H), 6.43-6.40 (m, 1H), 4.47 (s, 2H), 2.93 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 145.4, 139.8, 130.2, 128.9, 128.5, 127.6, 126.9, 124.6, 112.9, 111.5, 104.7, 102.2, 59.2, 39.5; ESI-MS *m/z* 237 $(M + H)^+$.



***N*-Methyl-*N*-(3-hydroxyl-1-propyl)-3-fluoroaniline (3aa)**. ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.14 (q, *J* = 8.1 Hz, 1H), 6.50-6.34 (m, 3 H), 3.68 (m, 2H), 3.42 (t, *J* = 6.9 Hz, 2H), 2.91 (s, 3H), 2.26 (s, 1H), 1.81 (q, *J* = 6.9 Hz, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.5, 163.1, 151.2, 151.1, 130.3, 130.2, 107.9, 107.9, 102.7, 102.5, 99.3, 99.1, 60.5, 49.6, 38.4, 29.6; EI-MS *m/z* 183 (M^+); HRMS calcd for $C_{10}H_{14}NOF$ (M^+), 183.1059, found 183.1061.

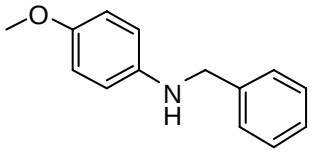


***N*-Methyl-*N*-(3-hydroxyl-1-propyl)-4-methoxyaniline (3ab)**. ^{1}H NMR (300 MHz, $CDCl_3$) δ 6.86-6.78 (m, 4H), 3.75 (s, 3H), 3.73 (t, *J* = 6.0 Hz, 2H), 3.30 (t, *J* = 6.8 Hz, 2H), 3.10 (s, 1H), 2.81 (s, 3H), 1.78 (q, *J* = 6.0 Hz, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 152.6, 144.9, 116.4, 114.7, 61.8, 55.8, 52.8, 39.8, 29.3; EI-MS *m/z* 195 (M^+); HRMS calcd for $C_{11}H_{17}NO_2$ (M^+), 195.1259, found 195.1256.

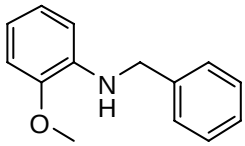


***N*-Methyl-*N*-(2-methoxy-1-ethyl)-4-methoxyaniline (3ac)**. ^{1}H NMR (300 MHz, $CDCl_3$) δ 6.84 (d, *J* = 9.0 Hz, 2H), 6.74 (d, *J* = 9.0 Hz, 2H), 3.76 (s, 3H), 3.54 (t, *J* = 6.0 Hz, 2H), 3.43 (t, *J* = 6.0 Hz, 2H), 3.37 (s, 3H), 2.91 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 151.8,

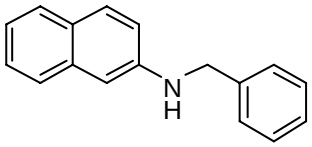
144.5, 114.8, 114.5, 70.4, 59.0, 55.8, 53.8, 39.6; EI-MS *m/z* 195 (M^+); HRMS calcd for $C_{10}H_{14}N_2O_2$ (M^+), 195.1259, found 195.1255.



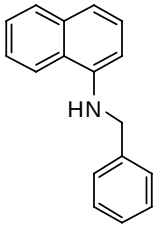
***N*-Benzyl-4-methoxyaniline (3ad)**.[12] ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.60-7.46 (m, 5H), 7.00 (d, *J* = 6.9 Hz, 2H), 6.79 (d, *J* = 6.9 Hz, 2H), 4.46 (s, 2H), 3.98 (s, 1H), 3.92 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 152.1, 142.4, 139.7, 128.6, 127.5, 127.1, 114.8, 114.0, 55.7, 49.1; ESI-MS *m/z* 214 $(M + H)^+$.



***N*-Benzyl-2-methoxyaniline (3ae)**.[13] ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.35-7.20 (m, 5H), 6.80 (td, *J* = 0.9, 5.7 Hz, 1H), 6.74 (d, *J* = 5.7 Hz, 1H), 6.65 (td, *J* = 0.9, 5.7 Hz, 1H), 6.56 (d, *J* = 5.7 Hz, 1H), 4.60 (s, 1H), 4.29 (s, 2H), 3.77 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 146.8, 139.6, 138.1, 128.6, 127.5, 127.1, 121.3, 111.6, 110.1, 109.4, 55.4, 48.0; ESI-MS *m/z* 214 $(M + H)^+$.

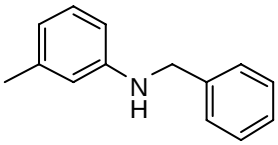


***N*-Benzyl (2-naphthyl)amine (3af)**.[14] ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.84 (d, *J* = 7.8 Hz, 1H), 7.77-7.74 (m, 2H), 7.55-7.41 (m, 6H), 7.40-7.36 (td, *J* = 7.2, 1.2 Hz, 1H), 6.97-6.90 (m, 2H), 4.45 (s, 2H), 4.15 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 145.7, 139.2, 135.2, 128.9, 128.9, 128.6, 127.7, 127.5, 127.3, 126.3, 126.0, 122.0, 117.9, 104.6, 48.1; ESI-MS *m/z* 234 $(M + H)^+$.

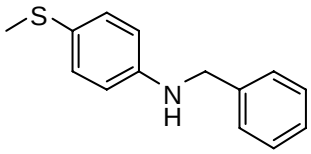


***N*-Benzyl (1-naphthyl)amine (3ag)**.[15] ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.87 (d, *J* = 6.0 Hz, 1H), 7.70 (d, *J* = 6.0 Hz, 1H), 7.54-7.31 (m, 9H), 6.67 (d, *J* = 5.4 Hz, 2H), 4.68 (s, 1H),

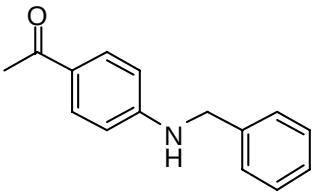
4.47 (s, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 143.2, 139.1, 134.3, 128.7, 127.7, 127.4, 126.7, 125.8, 124.8, 123.4, 120.0, 117.6, 104.8, 48.5; ESI-MS *m/z* 234 $(M + H)^+$.



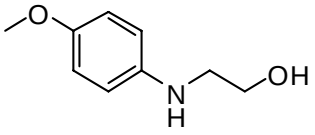
***N*-Benzyl-3-methylaniline (3ah)**.[16] ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.41-7.27 (m, 5H), 7.11 (t, *J* = 6.0 Hz, 1H), 6.60 (d, *J* = 6.0 Hz, 1H), 6.50-6.44 (m, 2H), 4.30 (s, 2H), 3.92 (s, 1H), 2.32 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 148.2, 139.6, 139.0, 129.2, 128.6, 127.5, 127.2, 118.5, 113.6, 110.0, 48.3, 21.7; ESI-MS *m/z* 198 $(M + H)^+$.



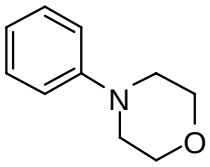
4-(*N*-Benzyl)aminothioanisole (3ai).[17] ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.38-7.20 (m, 5H), 7.16 (d, *J* = 8.4 Hz, 2H), 6.52 (d, *J* = 8.4 Hz, 2H), 4.24 (s, 2H), 4.03 (brs, 1H), 2.35 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 147.0, 139.2, 131.4, 128.7, 127.4, 127.3, 124.4, 113.5, 48.2, 19.1; ESI-MS *m/z* 230 $(M + H)^+$.



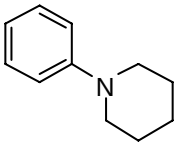
4-(*N*-Benzyl)aminoacetophenone (3aj).[18] ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.83 (d, *J* = 6.6 Hz, 2H), 7.40-7.27 (m, 5H), 6.61 (d, *J* = 6.6 Hz, 2H), 5.04 (m, 1H), 4.40 (d, *J* = 4.2 Hz, 2H), 2.48 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 196.4, 152.1, 138.3, 130.7, 128.7, 127.4, 127.2, 126.5, 111.5, 47.3, 25.9; ESI-MS *m/z* 226 $(M + H)^+$.



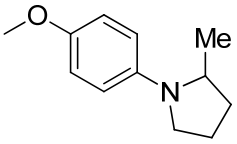
2-(4-Methoxy-phenylamino)-ethanol (3ak).[19] ^{1}H NMR (300 MHz, $CDCl_3$) δ 6.83 (d, *J* = 9.0 Hz, 2H), 6.60 (d, *J* = 9.0 Hz, 2H), 3.83 (t, *J* = 8.4 Hz, 2H), 3.79 (s, 3H), 3.24 (t, *J* = 8.4 Hz, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 152.6, 142.3, 115.0, 114.9, 61.3, 55.9, 47.3; ESI-MS *m/z* 168 $(M + H)^+$.



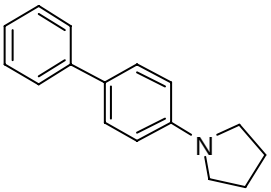
***N*-Phenylmorpholine (3al)**.[20] ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.32 (dd, *J* = 7.2 Hz, 8.7 Hz, 2H), 6.97-6.88 (m, 3H), 3.90-3.84 (m, 4H), 3.20-3.13 (m, 4H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 151.3, 129.2, 120.0, 115.6, 66.9, 49.3; ESI-MS *m/z* 164 $(M + H)^+$.



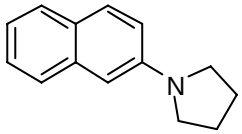
***N*-Phenylpiperidine (3am)**.[21] ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.26 (dd, *J* = 7.8, 7.5 Hz, 2H), 6.95 (d, *J* = 7.8 Hz, 2H), 6.84 (t, *J* = 7.5 Hz, 1H), 3.15 (m, 4H), 1.70 (m, 4H), 1.58 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 152.2, 129.0, 119.2, 116.5, 50.6, 25.9, 24.3; ESI-MS *m/z* 162 $(M + H)^+$.



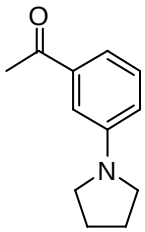
1-(4-Methoxyphenyl)-2-methylpyrrolidine (3an).[22] ^{1}H NMR (300 MHz, $CDCl_3$) δ 6.85 (d, *J* = 7.4 Hz, 2H); 6.55 (d, *J* = 7.5 Hz, 2H), 3.76 (s, 3H), 3.74-3.82 (m, 1H), 3.35-3.49 (m, 1H), 3.07-3.15 (m, 1H), 1.92-2.11 (m, 3H), 1.63-1.73 (m, 1H), 1.16 (d, *J* = 6.0 Hz, 3H); ^{13}C NMR (75 MHz, $CDCl_3$) δ 150.7, 142.5, 132.3, 115.8, 115.2, 112.8, 56.1, 54.2, 49.0, 33.3, 23.5, 19.7. ESI-MS *m/z* 192 $(M + H)^+$.



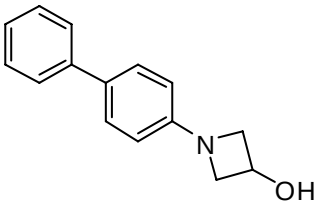
1-Biphenyl-4-yl-pyrrolidine (3ao).[23] ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.60 (dd, *J* = 0.9, 6.0 Hz, 2H), 7.53 (d, *J* = 6.6 Hz, 2H), 7.42 (t, *J* = 6.0 Hz, 2H), 7.27 (t, *J* = 5.7 Hz, 1H), 6.65 (d, *J* = 6.0 Hz, 2H), 3.36-3.29 (m, 4H), 2.05-1.97 (m, 4H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 147.4, 141.5, 128.7, 128.1, 127.8, 126.2, 125.8, 112.0, 47.7, 25.6; ESI-MS *m/z* 224 $(M + H)^+$.



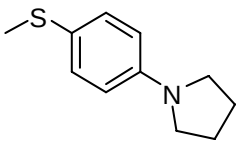
1-Naphthalen-2-yl-pyrrolidine (3ap).[3] ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.64 (d, *J* = 6.3 Hz, 2H), 7.59 (d, *J* = 6.3 Hz, 1H), 7.31 (td, *J* = 0.9, 5.7 Hz, 1H), 7.13 (td, *J* = 0.6 Hz, 5.7 Hz, 1H), 6.92 (dd, *J* = 1.8, 6.9 Hz, 1H), 6.70 (d, *J* = 1.2 Hz, 1H), 3.35-3.27 (m, 4H), 2.00-1.92 (m, 4H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 145.9, 135.3, 128.8, 127.7, 126.3, 126.2, 125.8, 121.2, 115.8, 104.7, 47.8, 25.5; ESI-MS *m/z* 198 $(M + H)^+$.



1-(3-Acetylphenyl)pyrrolidine (3aq). ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.23 (d, *J* = 6.0 Hz, 1H), 7.17 (d, *J* = 5.4 Hz, 1H), 7.07 (m, 1H), 6.67 (dd, *J* = 1.2, 6.0 Hz, 1H), 3.26-3.19 (m, 4H), 2.52 (s, 3H), 1.97-1.92 (m, 4H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 198.6, 147.6, 137.6, 128.9, 116.0, 115.5, 110.2, 47.4, 26.5, 25.2; ESI-MS *m/z* 190 $(M + H)^+$.

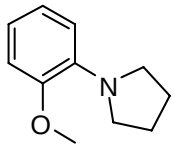


1-Biphenyl-4-yl-3-hydroxylcyclobutylamine (3ar). ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.53 (d, *J* = 7.8 Hz, 2H), 7.46 (d, *J* = 8.7 Hz, 2H), 7.39 (t, *J* = 7.8 Hz, 2H), 7.27 (t, *J* = 7.8 Hz, 1H), 6.53 (d, *J* = 8.7 Hz, 2H), 4.77-4.65 (m, 1H), 4.18 (dd, *J* = 8.1, 6.6 Hz, 2H), 3.67 (dd, *J* = 8.1, 4.8 Hz, 2H), 2.51 (d, *J* = 5.4 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 151.0, 141.3, 131.0, 128.8, 127.8, 126.5, 126.3, 112.4, 63.0, 62.1; EI-MS *m/z* 225 (M^+); HRMS calcd for $C_{15}H_{15}NO$ (M^+), 225.1154, found 225.1157.

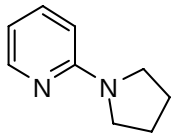


1-(4-Methylthiophenyl)pyrrolidine (3as). ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.32 (d, *J* = 6.6 Hz, 2H), 6.53 (d, *J* = 6.6 Hz, 2H), 3.32-3.24 (m, 4H), 2.44 (s, 3H), 2.05-1.98 (m, 4H);

^{13}C NMR (100 MHz, $CDCl_3$) δ 146.9, 132.1, 121.6, 112.2, 47.6, 25.5, 19.8; EI-MS *m/z* 193 (M^+); HRMS calcd for $C_{11}H_{15}NS$ (M^+), 193.0925, found 193.0928.



***N*-(2-Methoxyphenyl)pyrrolidine (3at)**[20,24] ^{1}H NMR (300 MHz, $CDCl_3$) δ 6.88-6.72 (m, 4H), 3.77 (s, 3H), 3.26-3.19 (m, 4H), 1.90-1.84 (m, 4H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 150.3, 139.7, 121.0, 119.5, 115.3, 111.5, 55.4, 50.3, 24.6; ESI-MS *m/z* 178 $(M + H)^+$.



2-Pyrrolidinopyridine (3au)[25] ^{1}H NMR (300 MHz, $CDCl_3$) δ 8.15 (d, *J* = 3.0 Hz, 1H), 7.39 (td, *J* = 1.5, 6.0 Hz, 1H), 6.48 (dd, *J* = 4.8, 4.2 Hz, 1H), 6.31 (d, *J* = 6.0 Hz, 1H), 3.46-3.38 (m, 4H), 2.01-1.93 (m, 4H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 157.2, 148.0, 136.7, 110.9, 106.4, 46.5, 25.4; ESI-MS *m/z* 149 $(M + H)^+$.

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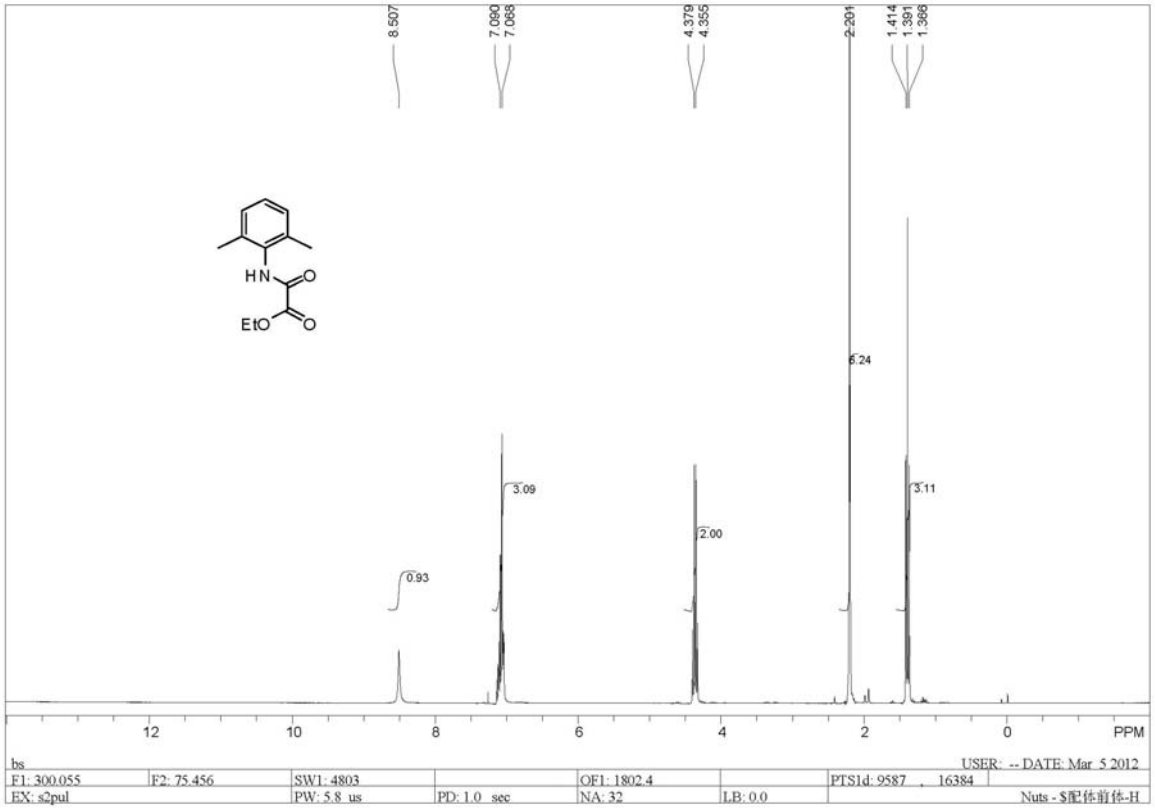
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7.090
7.068
4.379
4.355
2.291
1.414
1.391
1.366
HN
O
EtO
O
6.24
3.09
3.11
2.00
0.93
12
10
8
6
4
2
0
PPM
bs
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F2: 75.456
SW1: 4803
OF1: 1802.4
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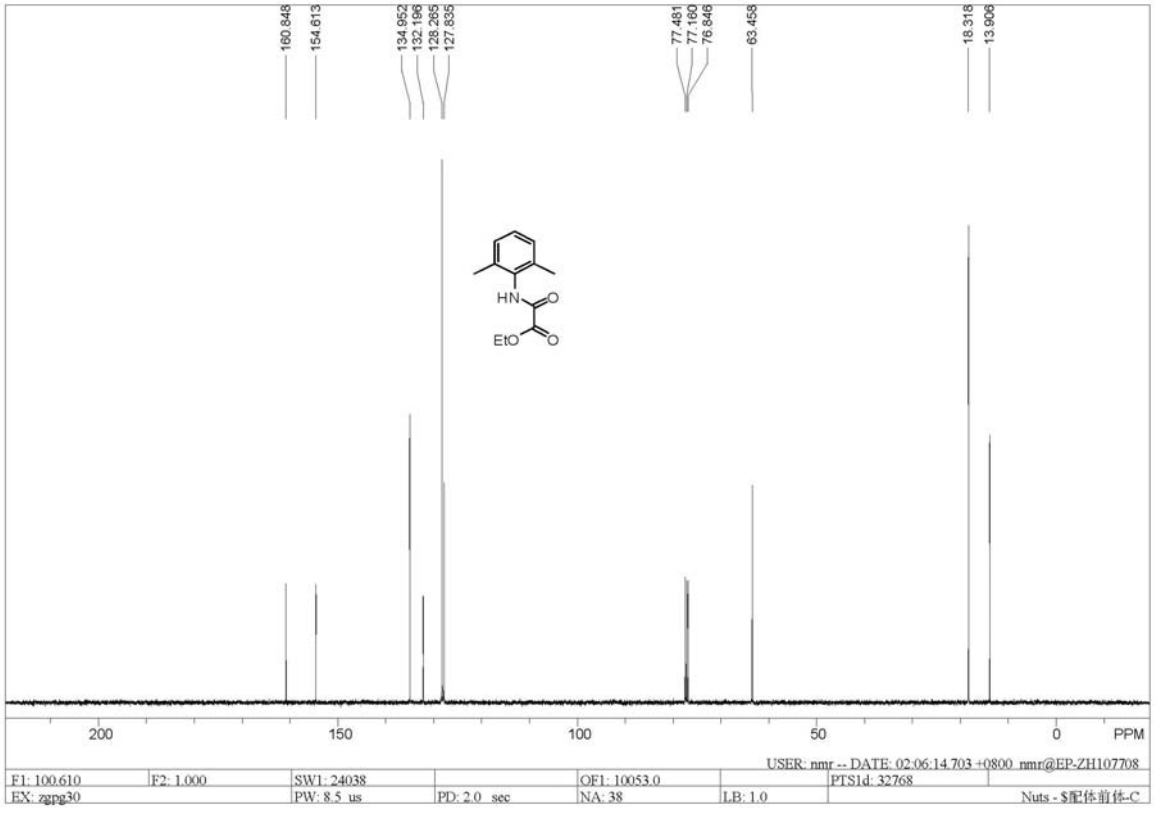
PD: 1.0 sec
NA: 32
LB: 0.0
Nuts - $配体前体-H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154.613
134.952
132.196
128.265
127.835
77.481
77.160
76.846
63.458
18.318
13.906
HN
O
EtO
O
200
150
100
50
0
PPM
USER: nmr -- DATE: 02:06:14.703 +0800 nmr@EP-ZH107708
F1: 100.610
F2: 1.000
SW1: 24038
OF1: 10053.0
PTS1d: 32768
EX: zgpg30
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PD: 2.0 sec
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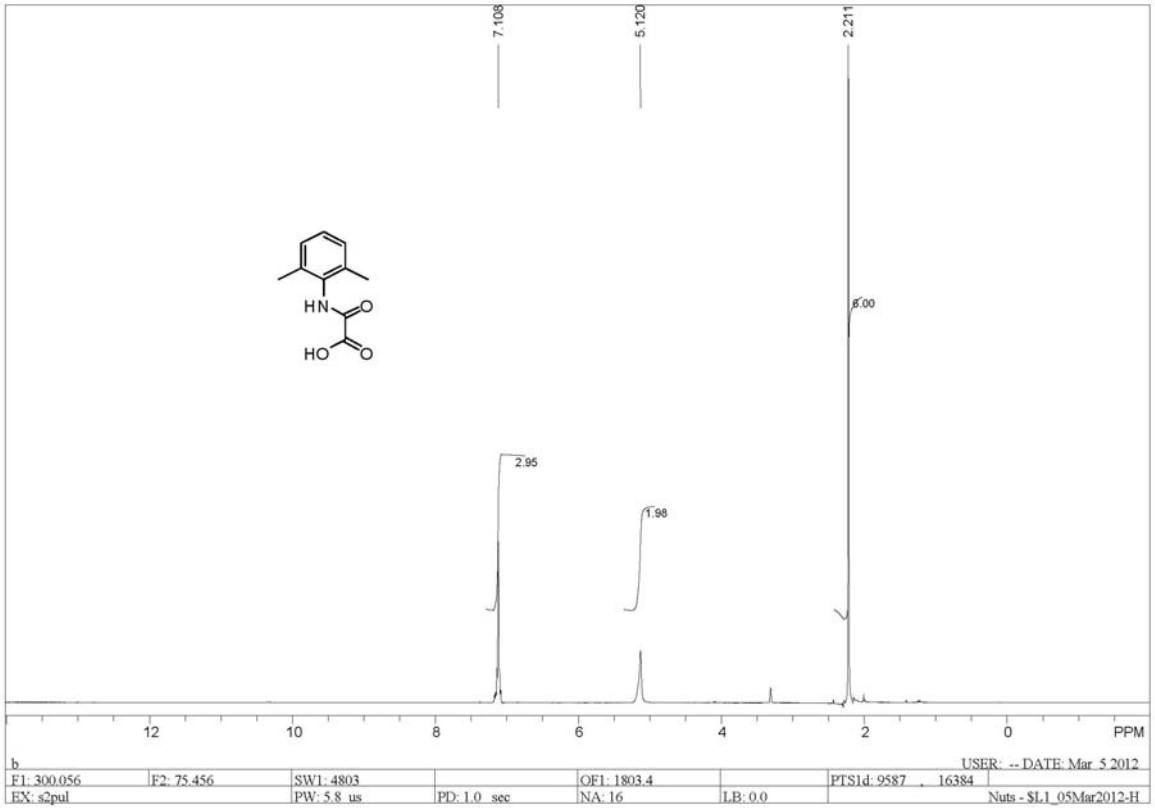
LB: 1.0
Nuts - $配体前体-C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1.98
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O
HO
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12
10
8
6
4
2
0
PPM
b
USER: -- DATE: Mar 5 2012
F1: 300.056
F2: 75.456
SW1: 4803
OF1: 1803.4
PTS1d: 9587 , 16384
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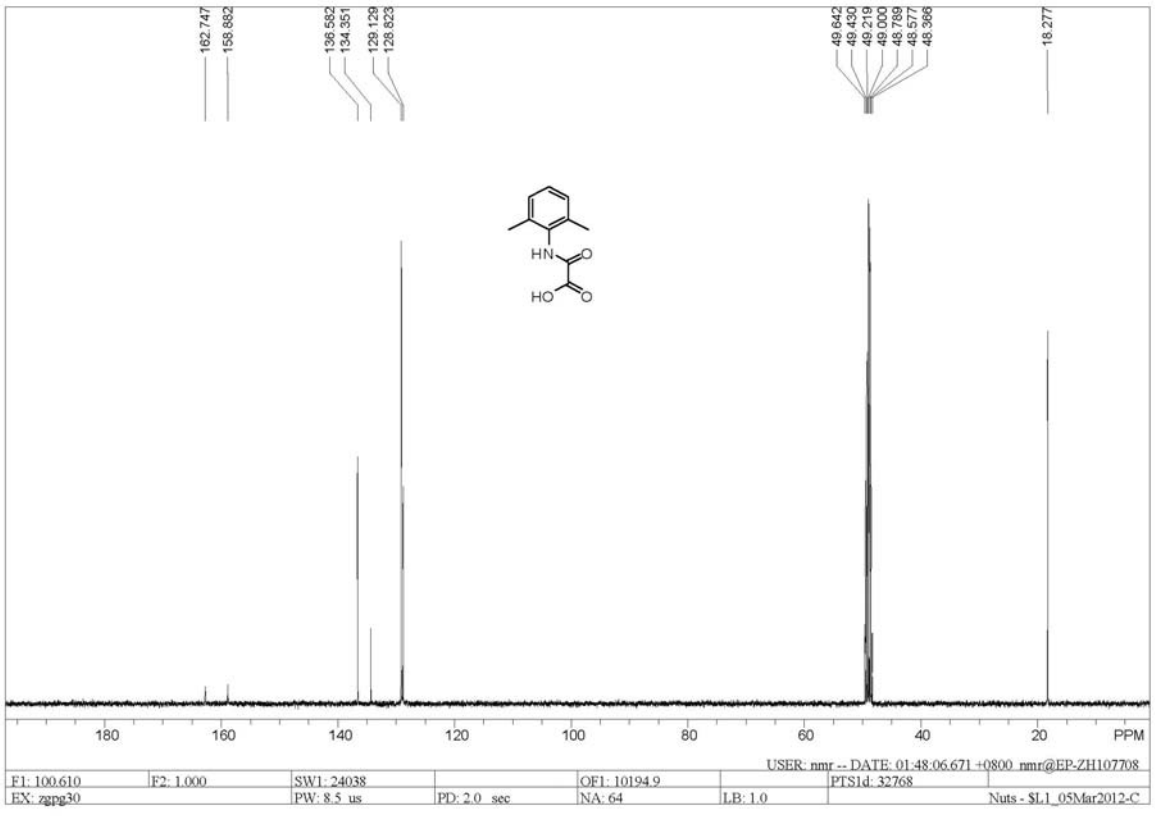
LB: 0.0
Nuts - $L1_05Mar2012-H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128.823
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49.219
49.000
48.789
48.577
48.366
18.277
HN
O
HO
O
180
160
140
120
100
80
60
40
20
PPM
USER: nmr -- DATE: 01:48:06.671 +0800 nmr@EP-ZH107708
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F2: 1.000
SW1: 24038
OF1: 10194.9
PTS1d: 32768
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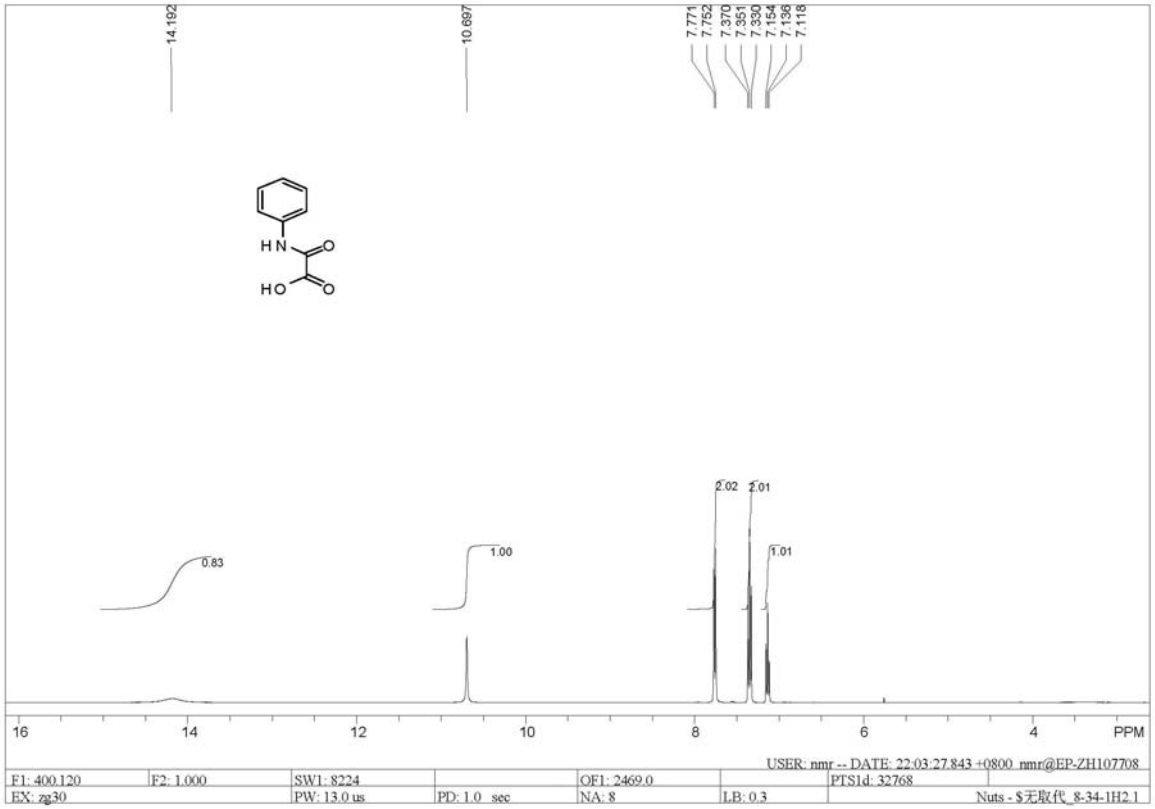
Nuts - $L1_05Mar2012-C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7.351
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7.154
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7.118
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O
HO
O
0.83
1.00
2.02
2.01
1.01
16
14
12
10
8
6
4
PPM
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F1: 400.120 F2: 1.000 SW1: 8224 OF1: 2469.0 PTS1d: 32768
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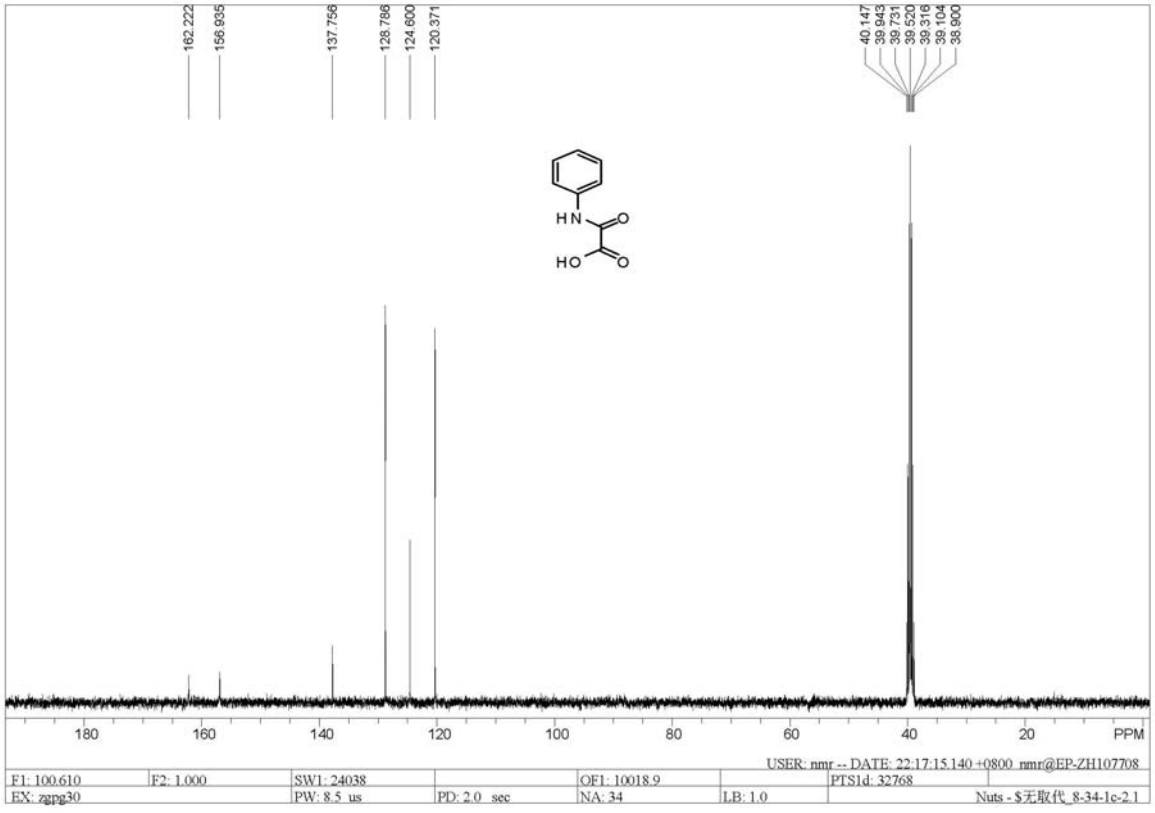
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39.731
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39.104
38.900
HN
O
HO
O
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160
140
120
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80
60
40
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PPM
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F1: 100.610 F2: 1.000 SW1: 24038 OF1: 10018.9 PTS1d: 32768
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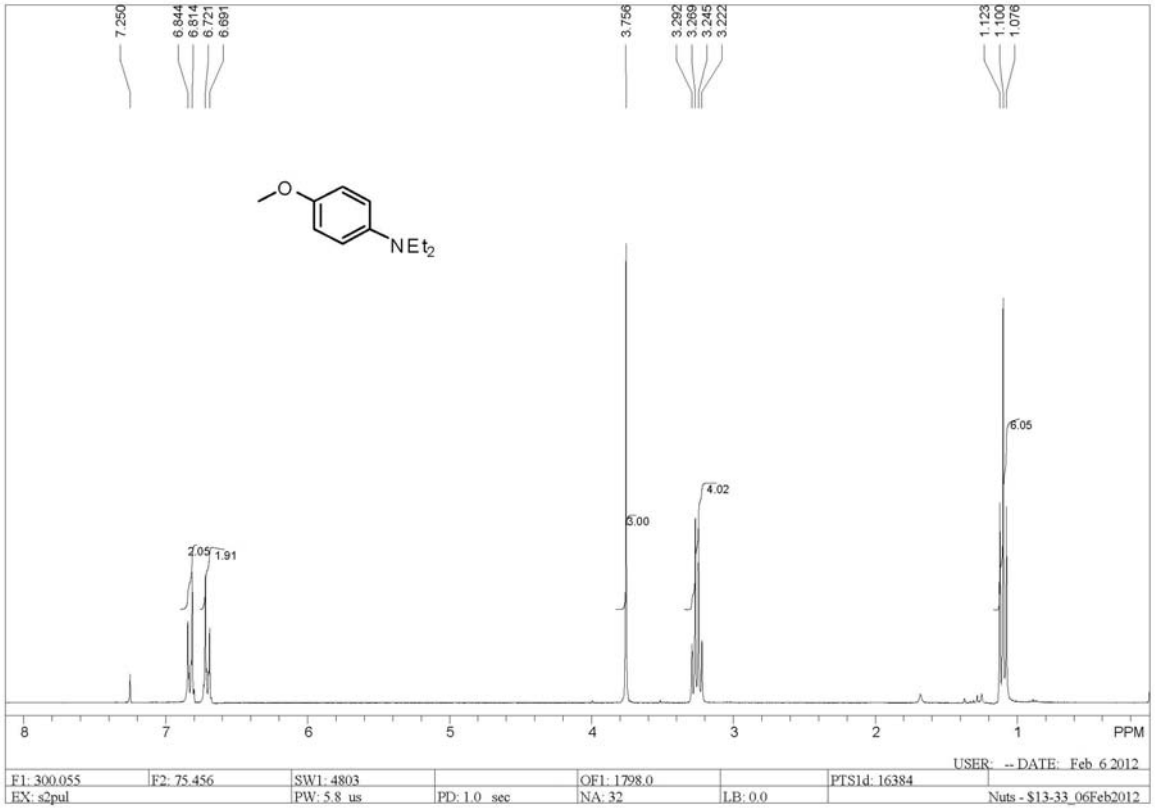
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3.245
3.222
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1.100
1.076
NEt2
2.05
1.91
3.00
4.02
6.05
8
7
6
5
4
3
2
1
PPM
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PTS1d: 16384
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LB: 0.0
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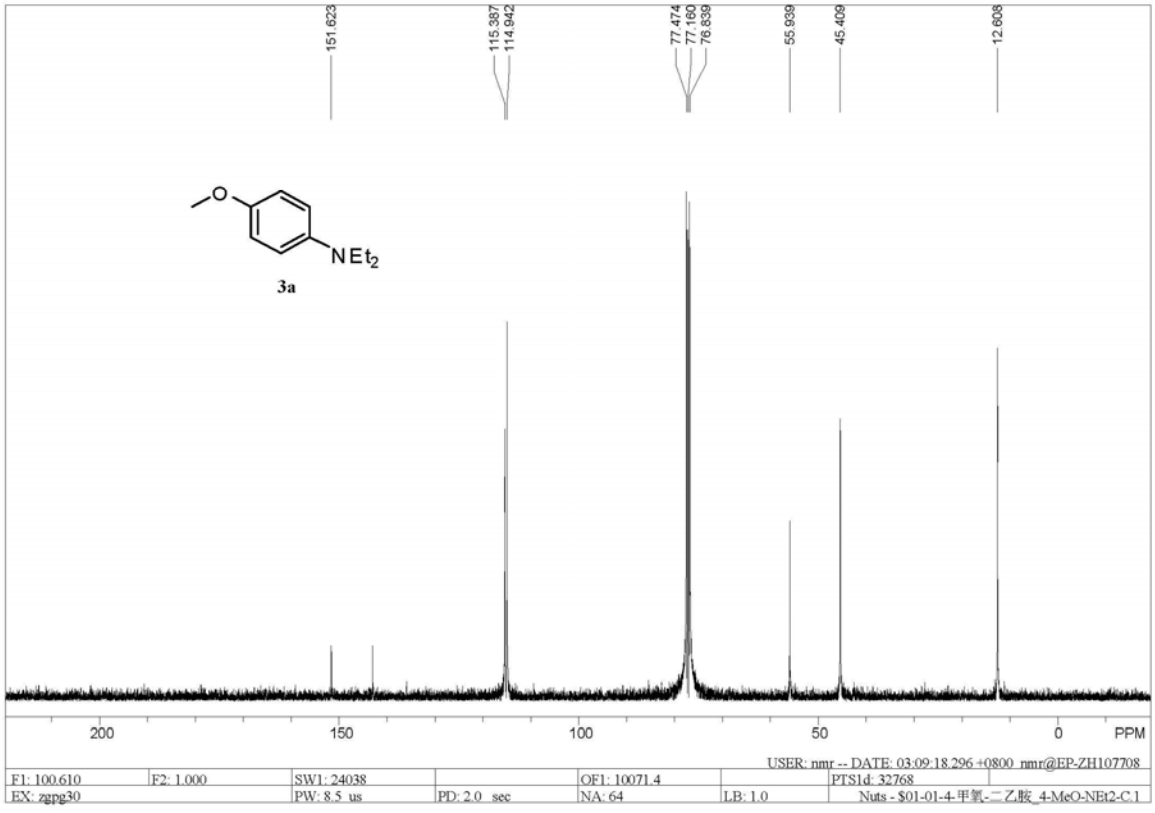
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12.608
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PPM
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PTS1d: 32768
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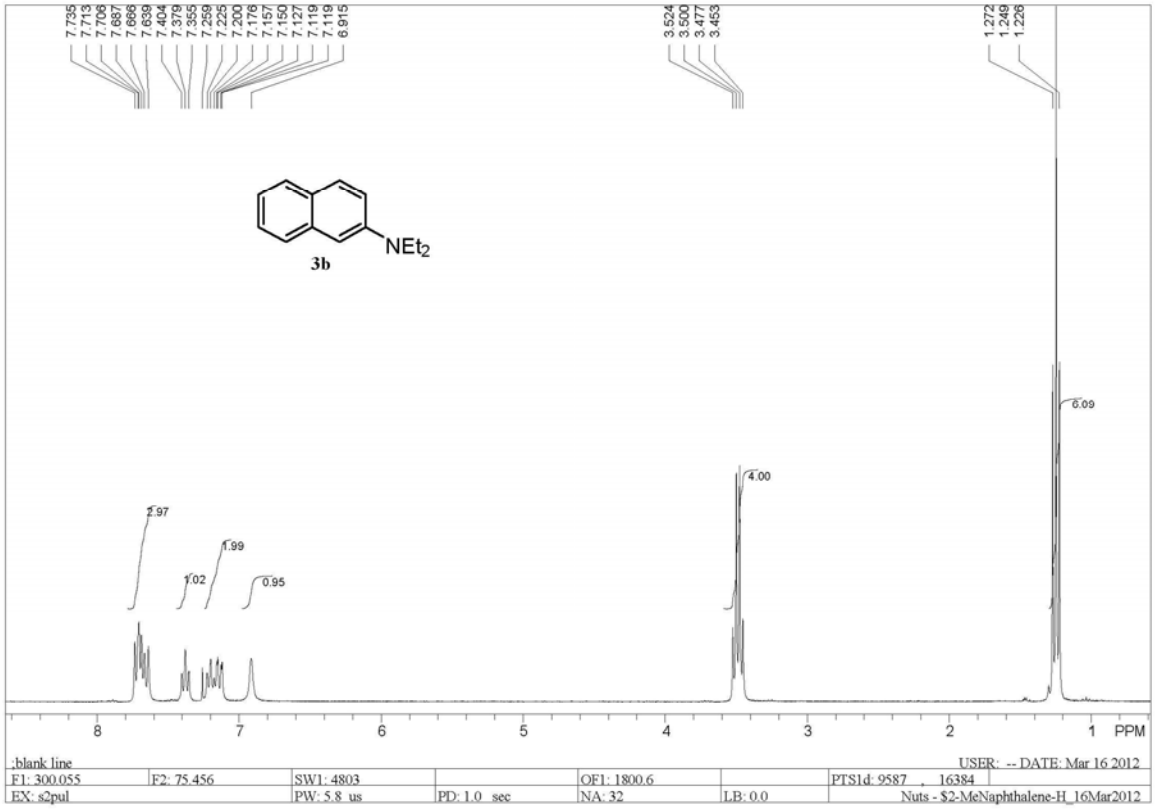
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6.915
3.524
3.500
3.477
3.453
1.272
1.249
1.226
NEt2
3b
6.09
4.00
2.97
1.99
1.02
0.95
8
7
6
5
4
3
2
1
PPM
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F2: 75.456
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PD: 1.0 sec
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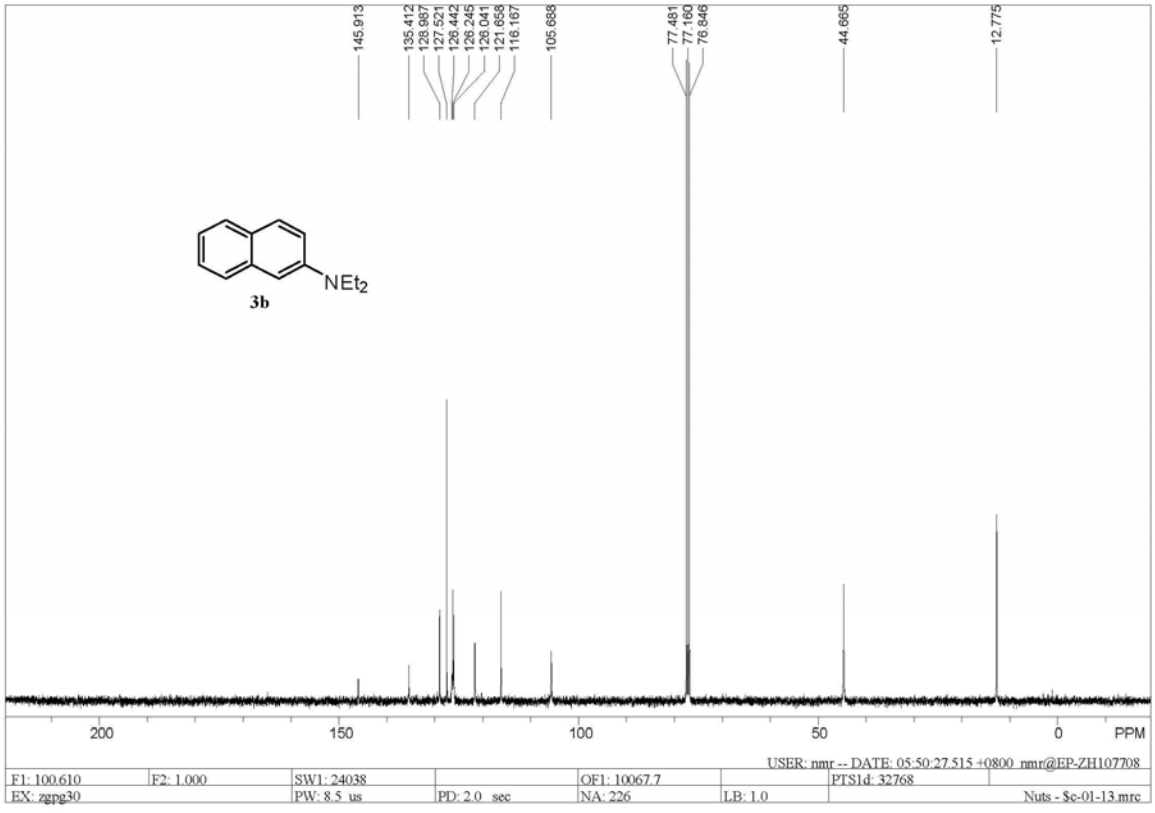
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126.245
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121.658
116.167
105.688
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77.160
76.846
44.665
12.775
NEt2
3b
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150
100
50
0
PPM
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F2: 1.000
SW1: 24038
OF1: 10067.7
PTS1d: 32768
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PD: 2.0 sec
NA: 226
LB: 1.0
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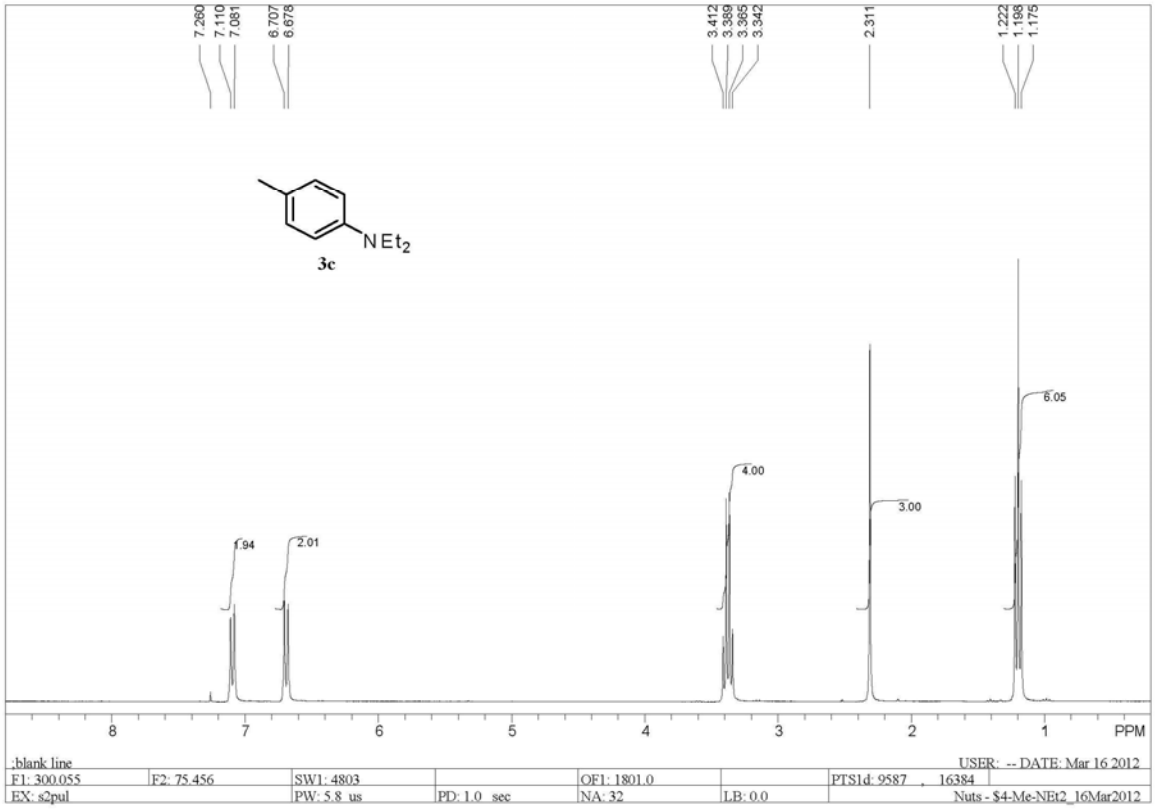
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3c
1.94
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4.00
3.00
6.05
8
7
6
5
4
3
2
1
PPM
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OF1: 1801.0
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PW: 5.8 us
PD: 1.0 sec
NA: 32
LB: 0.0
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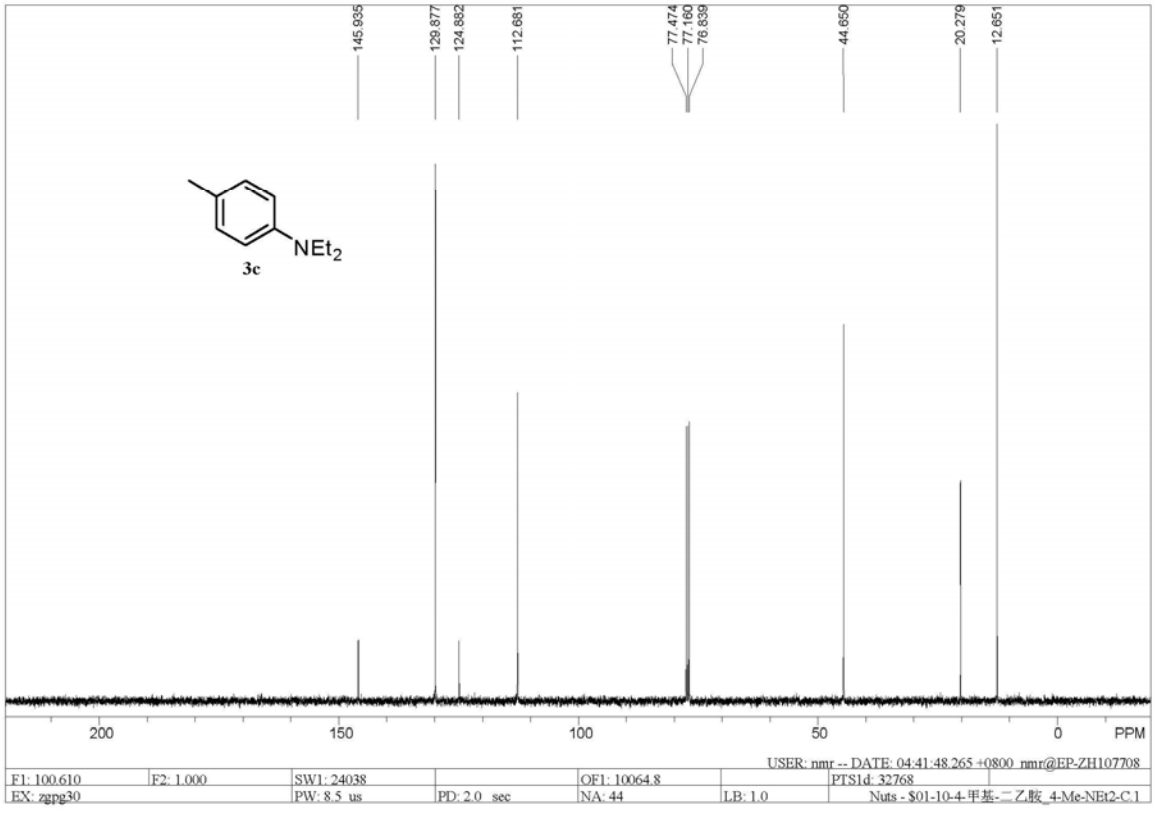
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12.651
NEt2
3c
200
150
100
50
0
PPM
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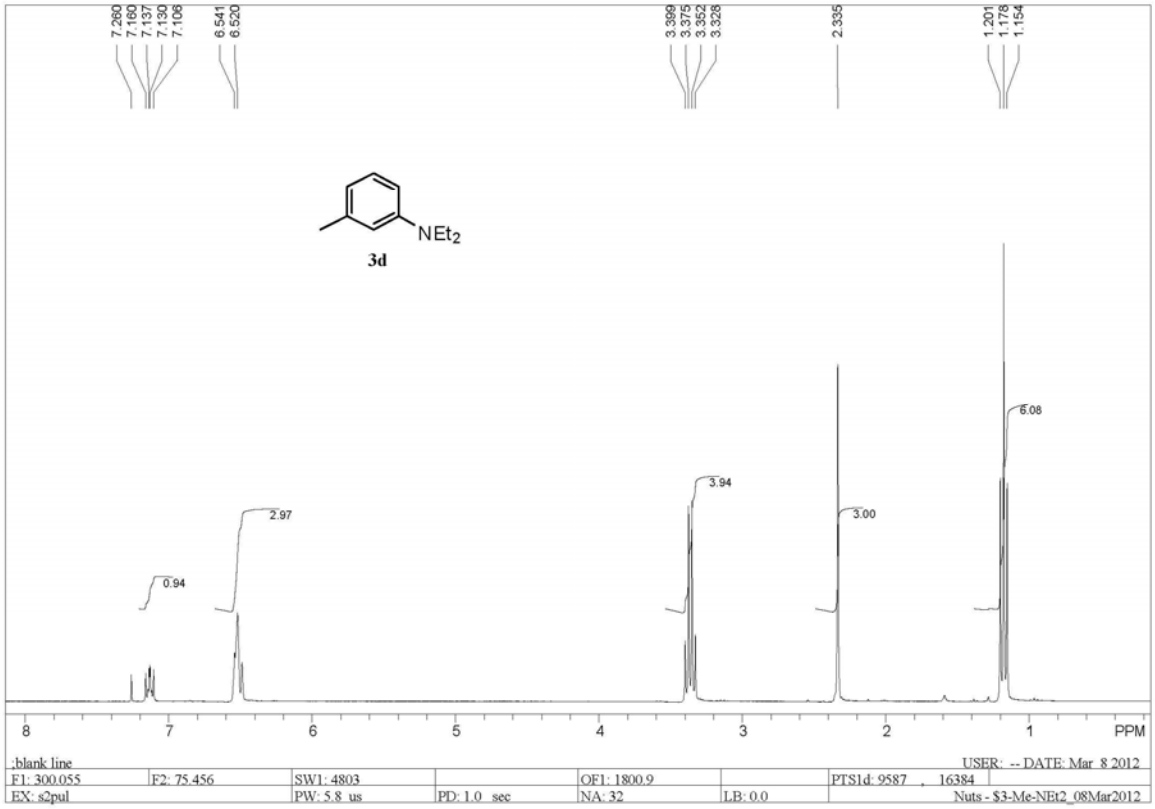
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3.328
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1.201
1.178
1.154
NEt2
3d
6.08
3.94
3.00
2.97
0.94
8
7
6
5
4
3
2
1
PPM
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PTS1d: 9587 , 16384
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LB: 0.0
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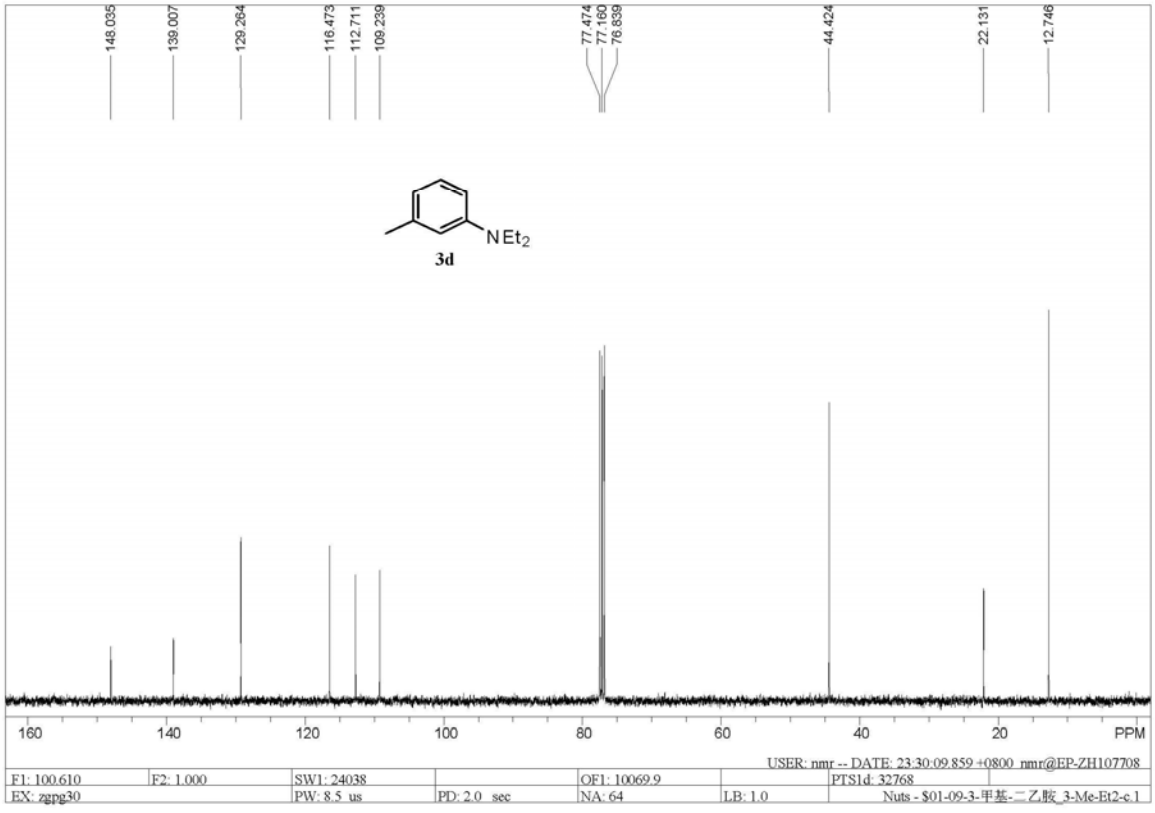
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12.746
NEt2
3d
160
140
120
100
80
60
40
20
PPM
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PTS1d: 32768
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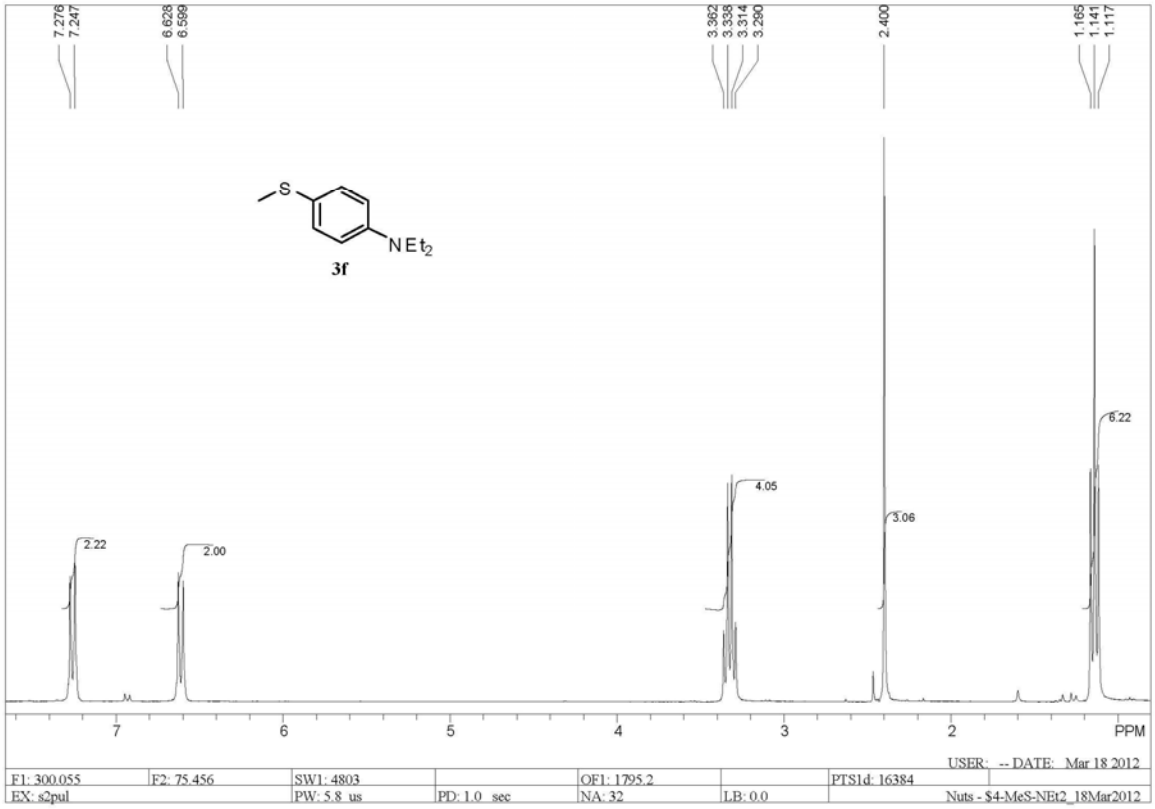
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3.290
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1.165
1.141
1.117
S
NEt2
3f
2.22
2.00
4.05
3.06
6.22
7
6
5
4
3
2
PPM
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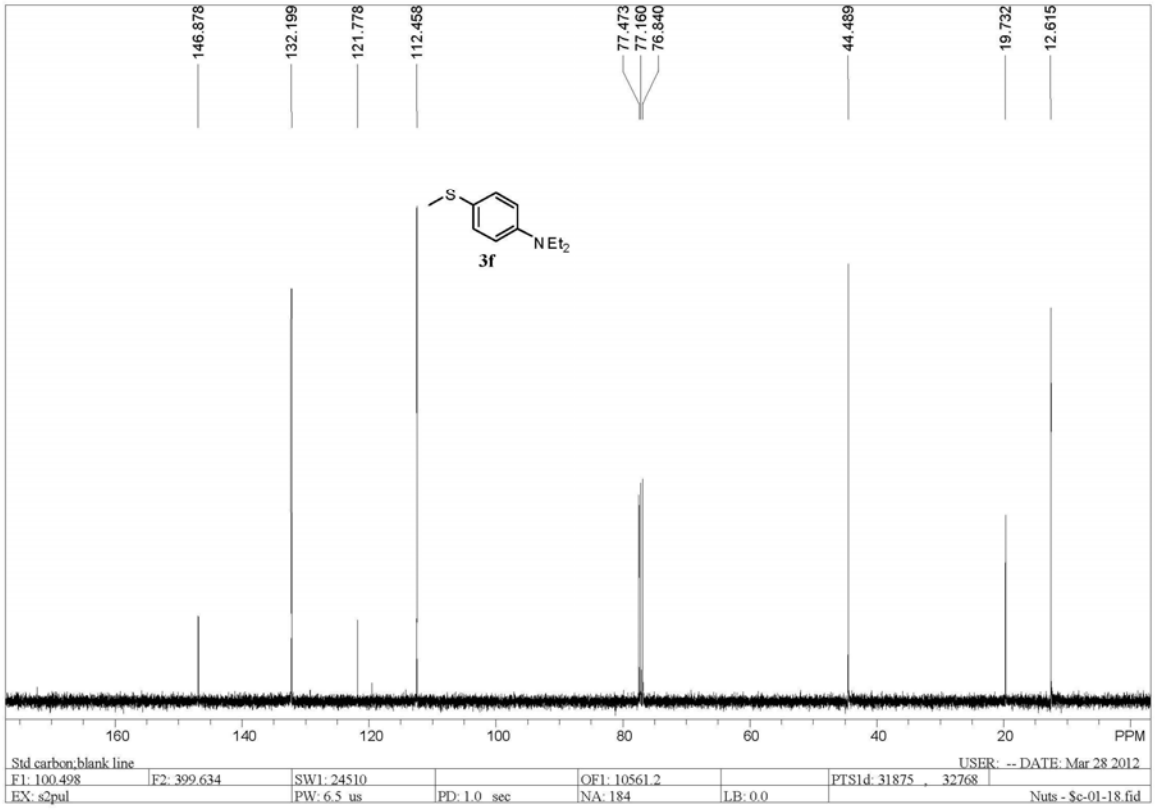
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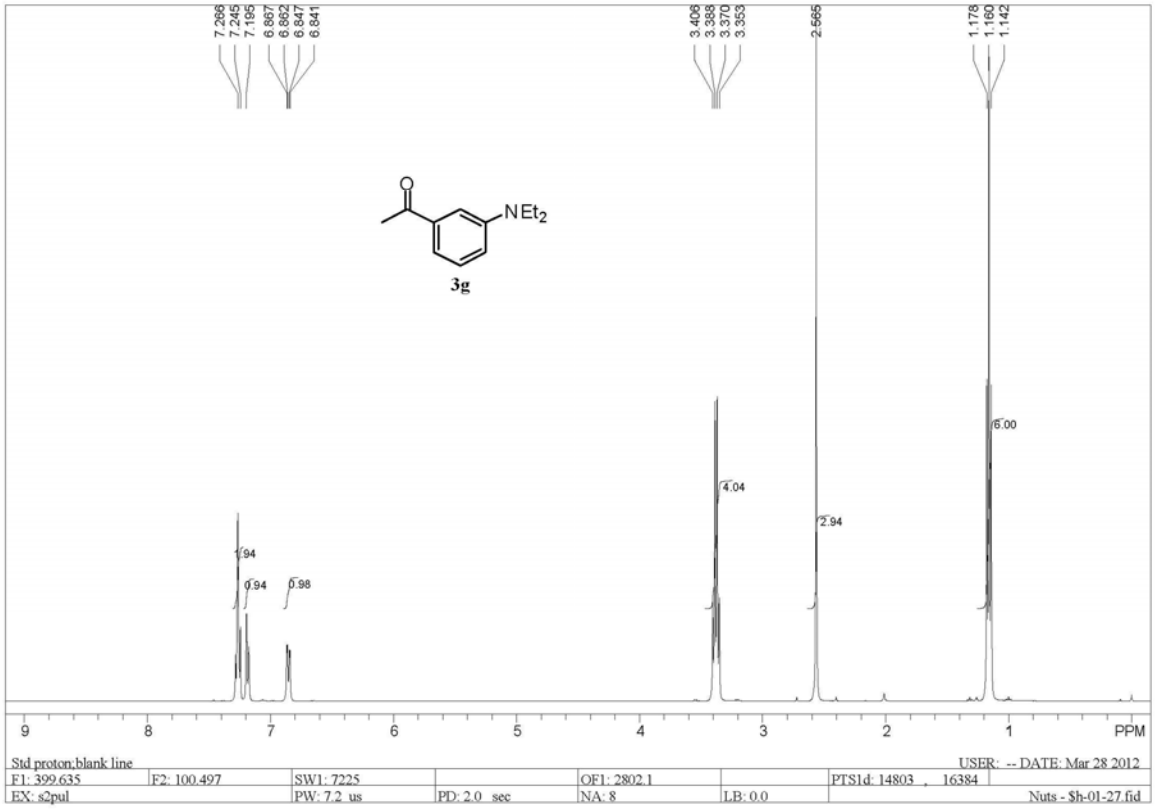
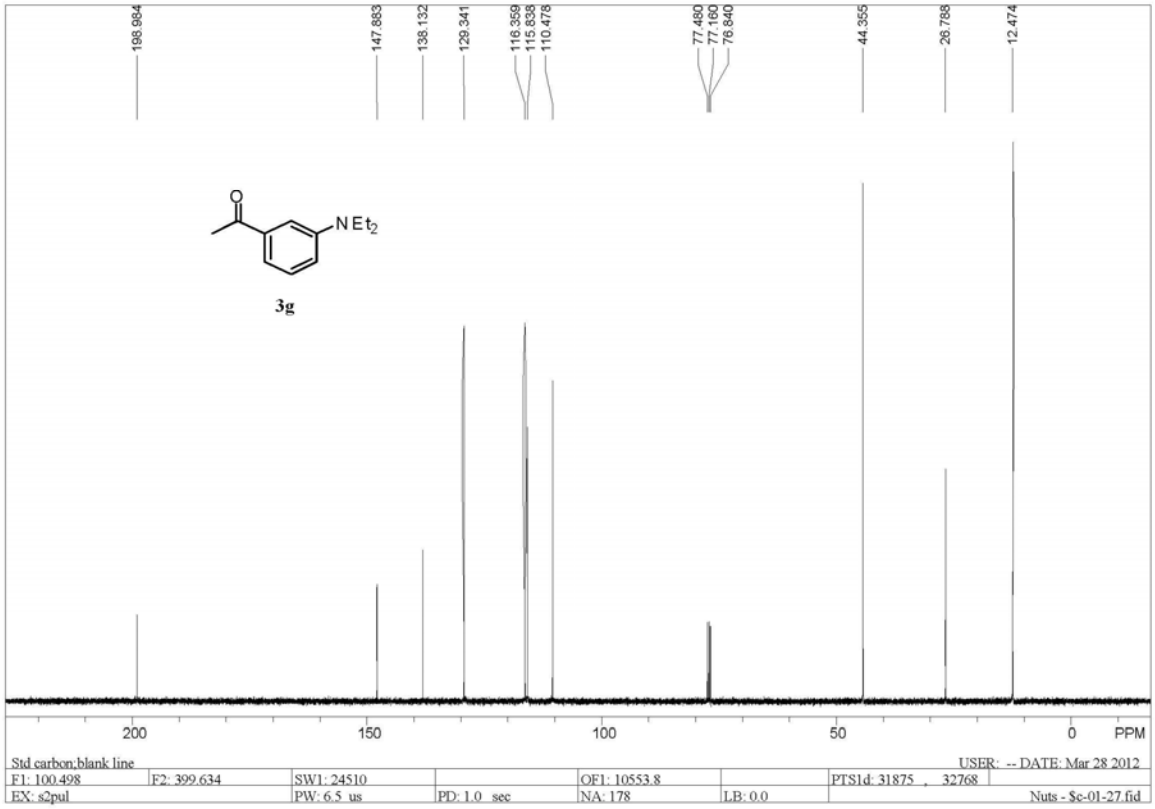
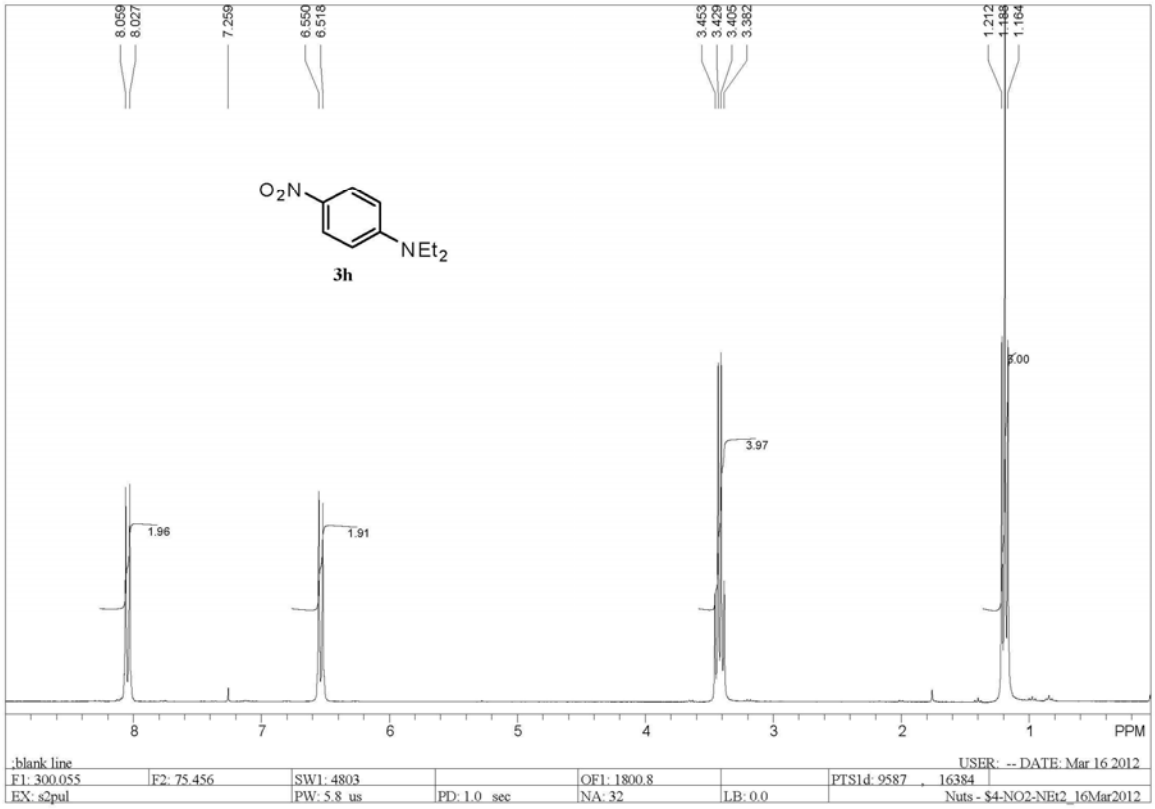
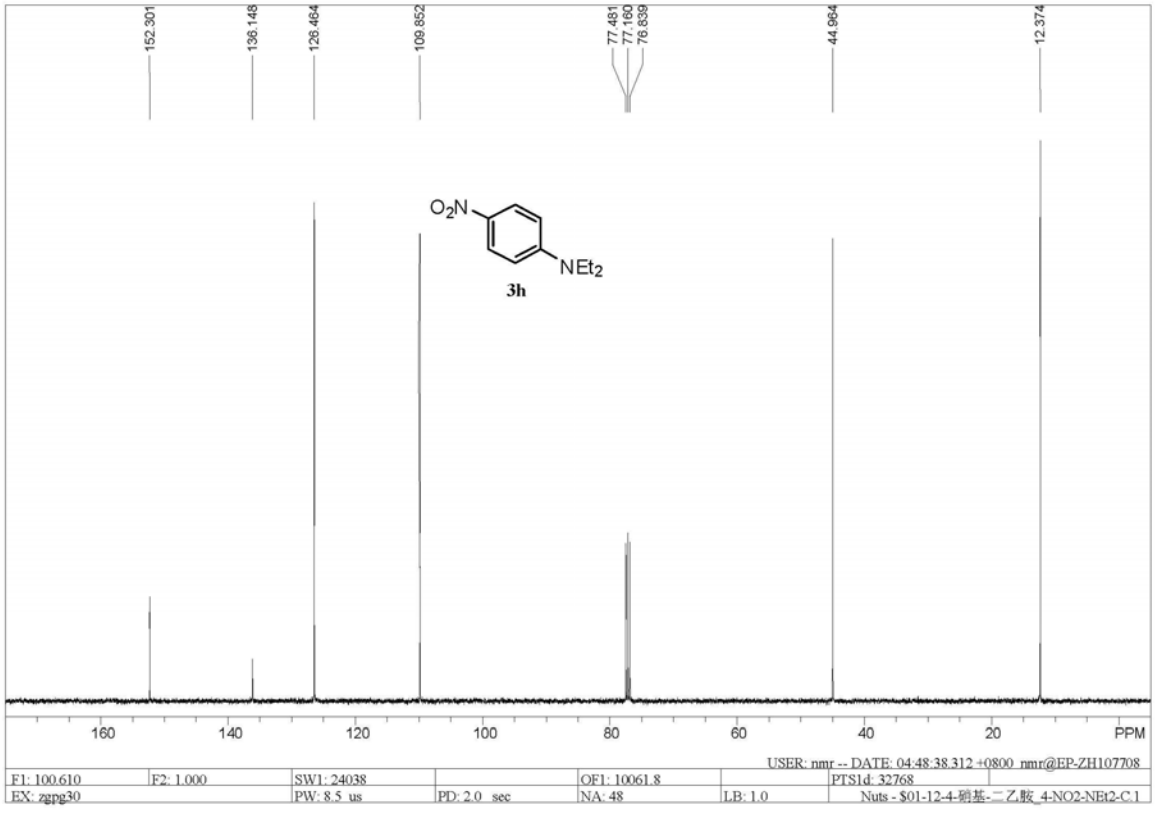
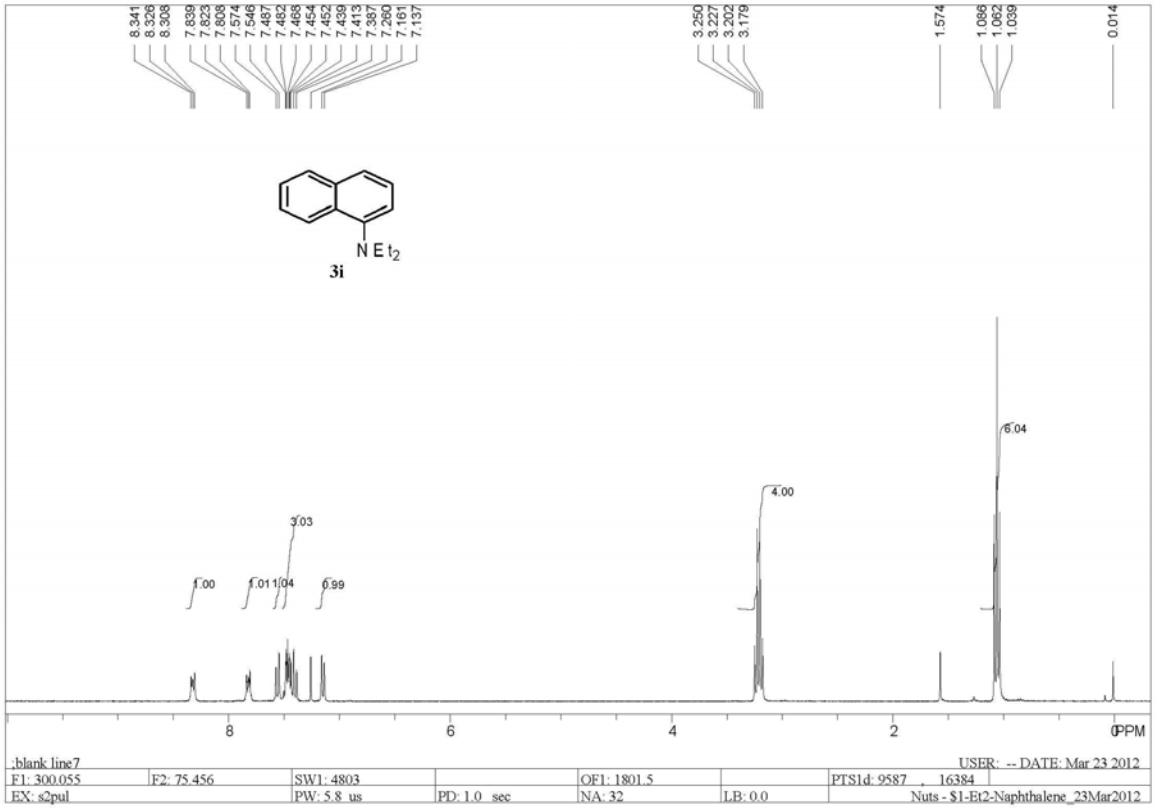
19.732
12.615
S
NEt2
3f
160
140
120
100
80
60
40
20
PPM
Std carbon;blank line
USER: -- DATE: Mar 28 2012
F1: 100.498 F2: 399.634 SW1: 24510 OF1: 10561.2 PTS1d: 31875 , 32768
EX: s2pul PW: 6.5 us PD: 1.0 sec NA: 184 LB: 0.0 Nuts - $c-01-18.fid

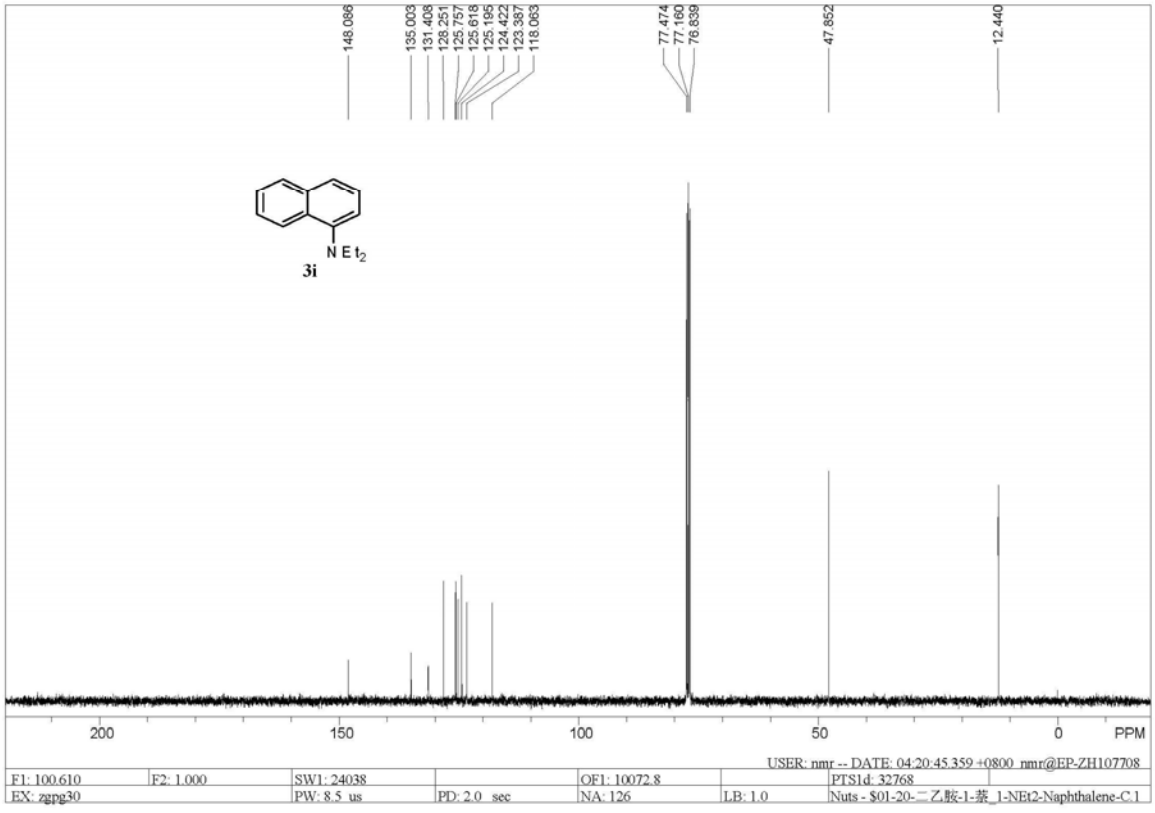

7.266
7.245
7.195
6.867
6.862
6.847
6.841
3.406
3.388
3.370
3.353
2.565
1.178
1.160
1.142
NEt2
3g
6.00
4.04
2.94
1.94
0.94
0.98
9
8
7
6
5
4
3
2
1
PPM
Std proton;blank line
USER: -- DATE: Mar 28 2012
F1: 399.635
F2: 100.497
SW1: 7225
OF1: 2802.1
PTS1d: 14803 , 16384
EX: s2pul
PW: 7.2 us
PD: 2.0 sec
NA: 8
LB: 0.0
Nuts - $h-01-27.fid

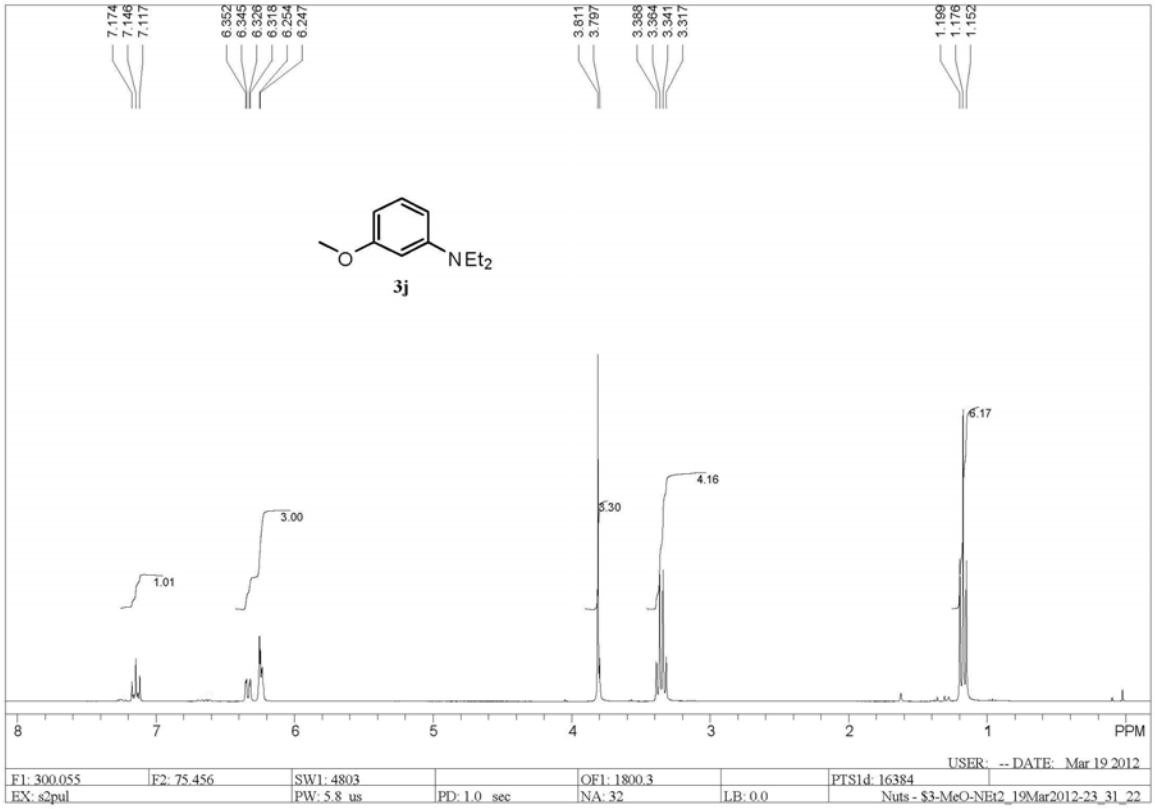

198.984
147.883
138.132
129.341
116.359
115.838
110.478
77.480
77.160
76.840
44.355
28.788
12.474
NEt2
3g
200
150
100
50
0
PPM
Std carbon;blank line
USER: -- DATE: Mar 28 2012
F1: 100.498
F2: 399.634
SW1: 24510
OF1: 10553.8
PTS1d: 31875 , 32768
EX: s2pul
PW: 6.5 us
PD: 1.0 sec
NA: 178
LB: 0.0
Nuts - $c-01-27.fid

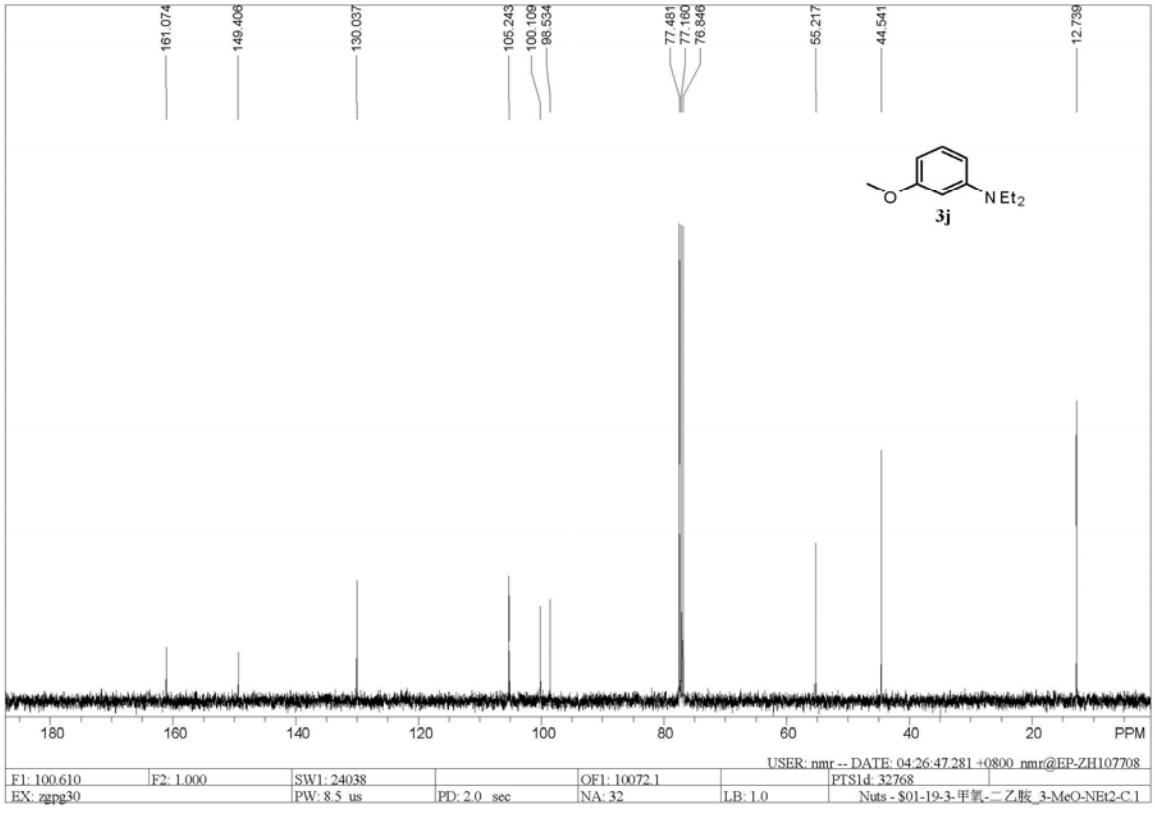

8.059
8.027
7.259
6.550
6.518
3.453
3.429
3.405
3.382
1.212
1.188
1.164
O2N
NEt2
3h
6.00
3.97
1.96
1.91
8
7
6
5
4
3
2
1
PPM
;blank line
USER: -- DATE: Mar 16 2012
F1: 300.055
F2: 75.456
SW1: 4803
OF1: 1800.8
PTS1d: 9587 , 16384
EX: s2pul
PW: 5.8 us
PD: 1.0 sec
NA: 32
LB: 0.0
Nuts - $4-NO2-NEt2_16Mar2012

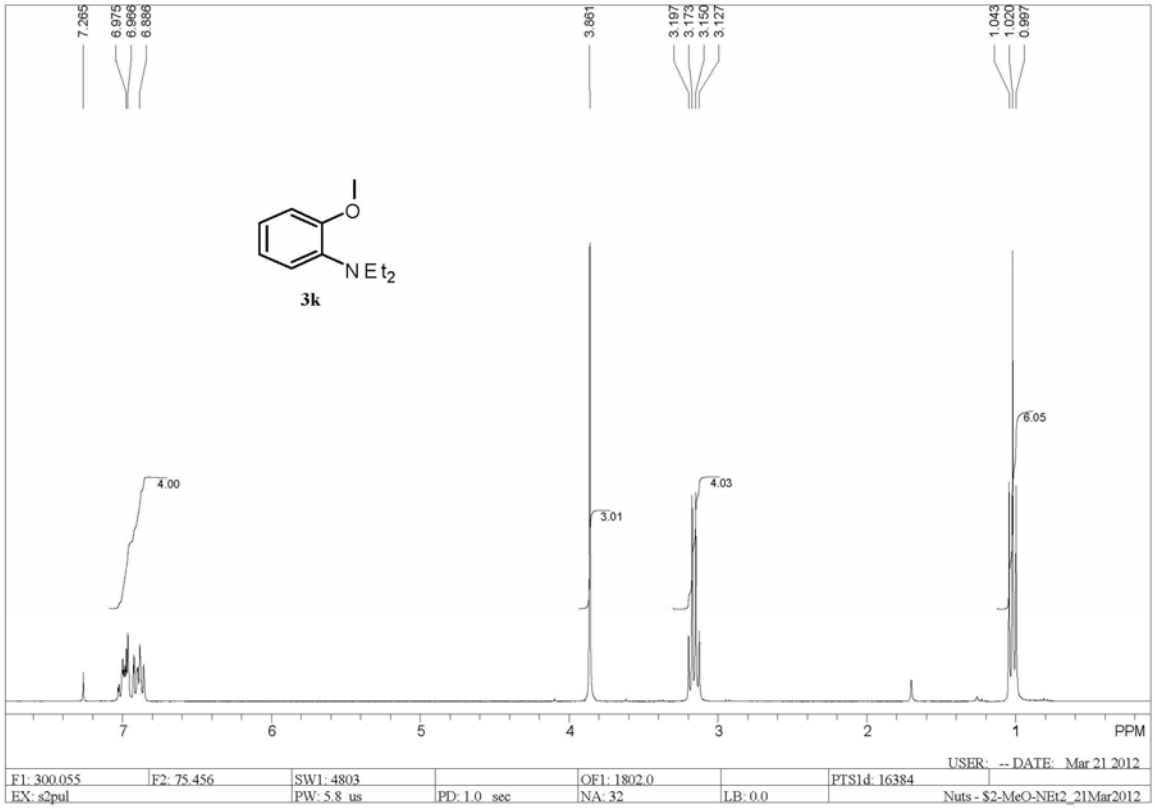

152.301
136.148
128.464
109.852
77.481
77.160
76.839
44.964
12.374
O2N
NEt2
3h
160
140
120
100
80
60
40
20
PPM
USER: nmr -- DATE: 04:48:38.312 +0800 nmr@EP-ZH107708
F1: 100.610
F2: 1.000
SW1: 24038
OF1: 10061.8
PTS1d: 32768
EX: zgpg30
PW: 8.5 us
PD: 2.0 sec
NA: 48
LB: 1.0
Nuts - $01-12-4-硝基-二乙胺_4-NO2-NEt2-C.1

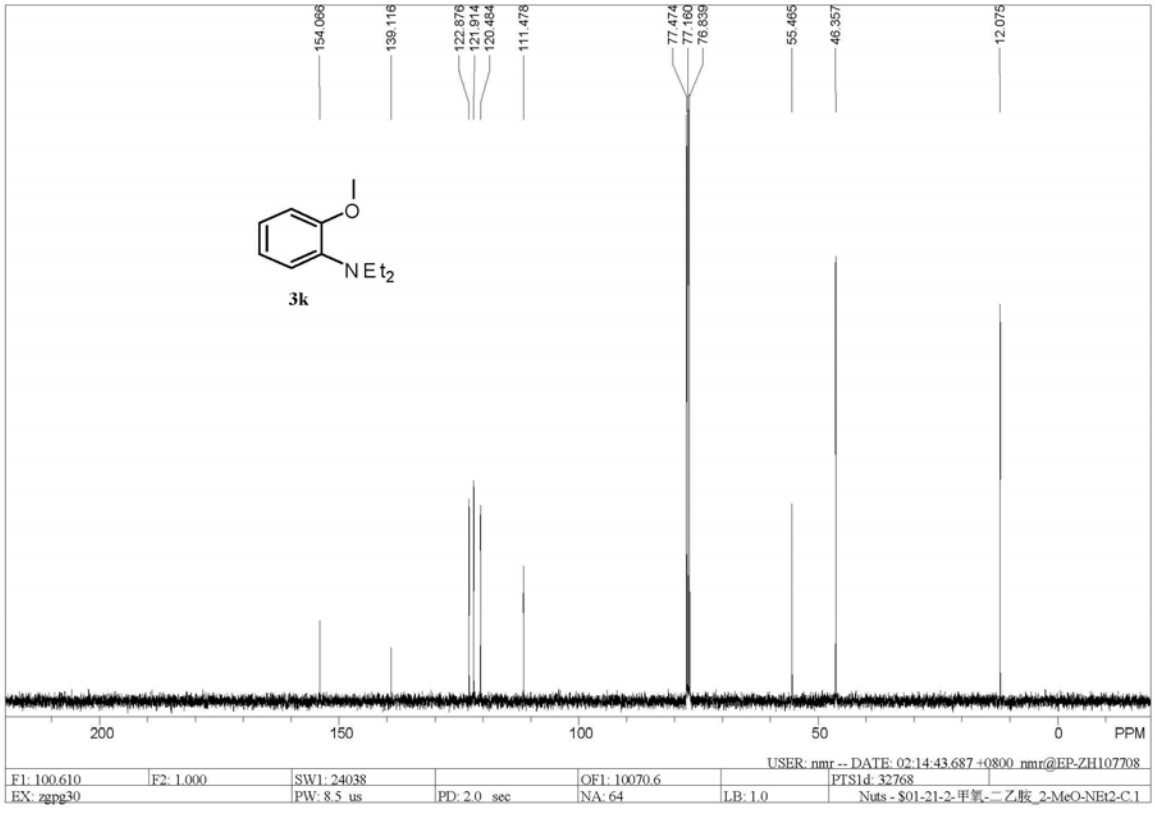

8.341
8.326
8.308
7.839
7.823
7.808
7.574
7.546
7.487
7.482
7.468
7.454
7.452
7.439
7.413
7.387
7.260
7.161
7.137
3.250
3.227
3.202
3.179
1.574
1.086
1.062
1.039
0.014
NEt2
3i
6.04
4.00
3.03
1.00
1.01
1.04
0.99
8
6
4
2
0
PPM
;blank line7
USER: -- DATE: Mar 23 2012
F1: 300.055
F2: 75.456
SW1: 4803
OF1: 1801.5
PTS1d: 9587 , 16384
EX: s2pul
PW: 5.8 us
PD: 1.0 sec
NA: 32
LB: 0.0
Nuts - $1-Et2-Naphthalene_23Mar2012

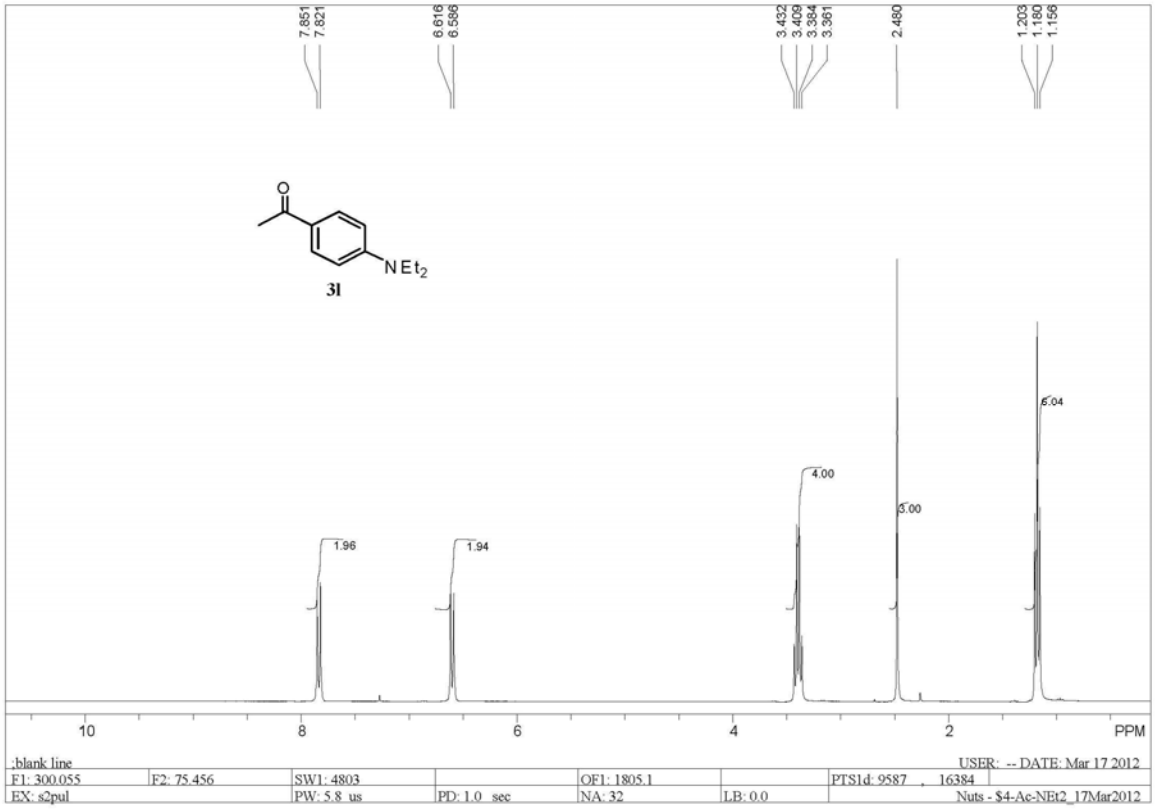

148.086
135.003
131.408
128.251
125.757
125.618
125.195
124.422
123.387
118.063
77.474
77.160
76.839
47.852
12.440
NEt2
3i
200
150
100
50
0
PPM
USER: nmr -- DATE: 04:20:45.359 +0800 nmr@EP-ZH107708
F1: 100.610
F2: 1.000
SW1: 24038
OF1: 10072.8
PTS1d: 32768
EX: zgpg30
PW: 8.5 us
PD: 2.0 sec
NA: 126
LB: 1.0
Nuts - $01-20-二乙胺-1-萘_1-NEt2-Naphthalene-C.1

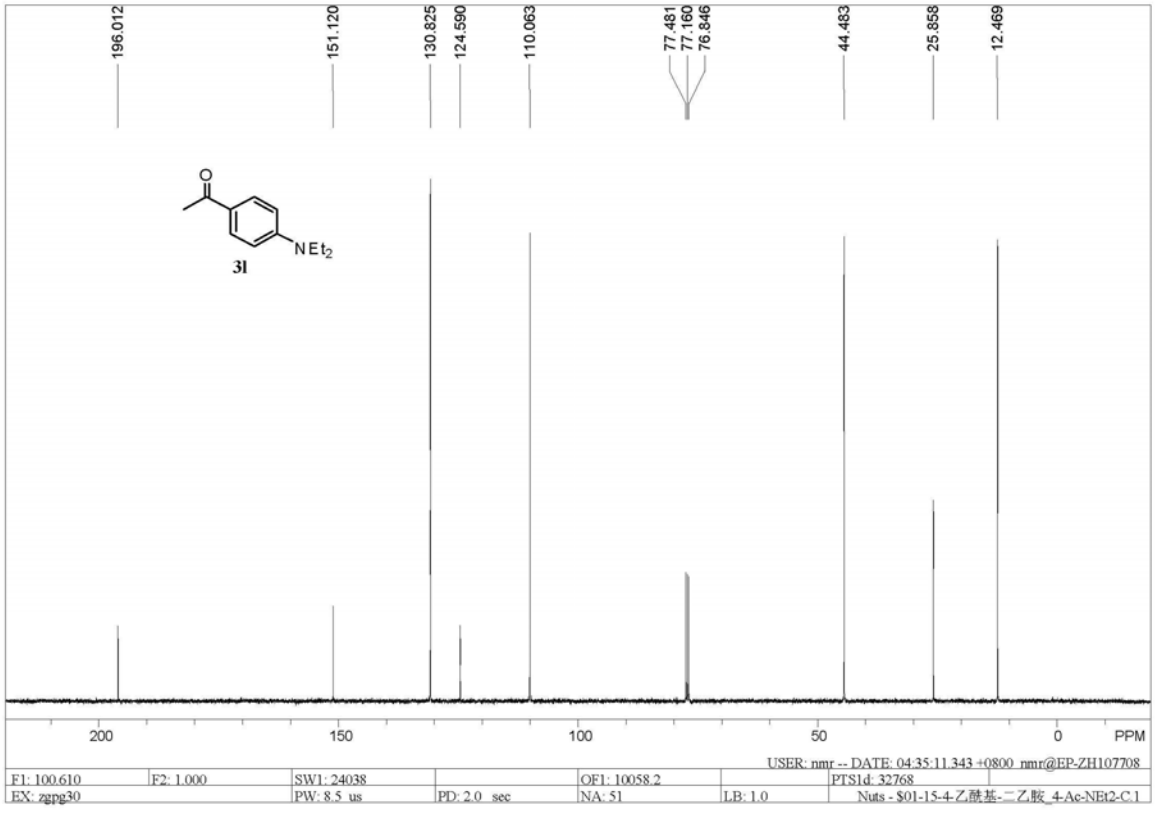

7.174
7.146
7.117
6.352
6.345
6.328
6.318
6.254
6.247
3.811
3.797
3.388
3.364
3.341
3.317
1.199
1.176
1.152
NEt2
O
3j
1.01
3.00
5.30
4.16
6.17
8
7
6
5
4
3
2
1
PPM
USER: -- DATE: Mar 19 2012
F1: 300.055 F2: 75.456 SW1: 4803 OF1: 1800.3 PTS1d: 16384
EX: s2pul PW: 5.8 us PD: 1.0 sec NA: 32 LB: 0.0 Nuts - $3-MeO-NEt2_19Mar2012-23_31_22

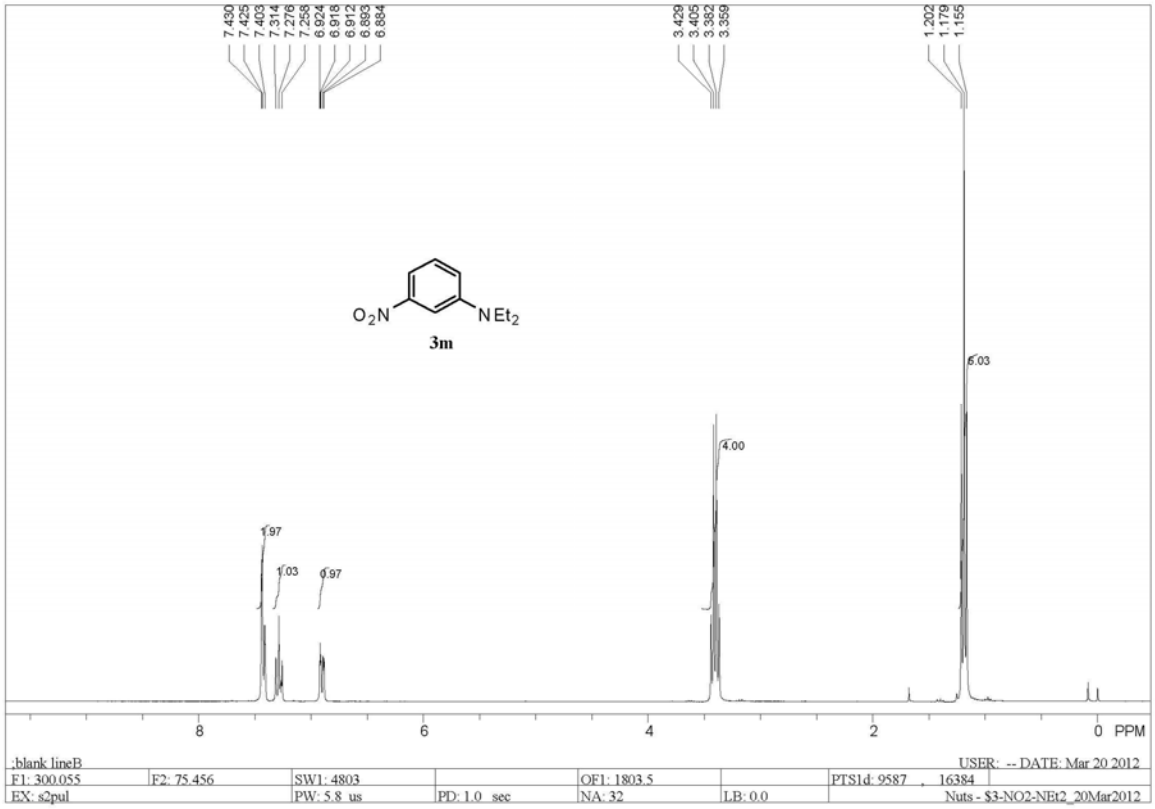

161.074
149.406
130.037
105.243
100.109
98.534
77.481
77.160
76.846
55.217
44.541
12.739
NEt2
O
3j
180
160
140
120
100
80
60
40
20
PPM
USER: nmr -- DATE: 04:26:47.281 +0800 nmr@EP-ZH107708
F1: 100.610 F2: 1.000 SW1: 24038 OF1: 10072.1 PTS1d: 32768
EX: zgpg30 PW: 8.5 us PD: 2.0 sec NA: 32 LB: 1.0 Nuts - $01-19-3-甲氧-二乙胺_3-MeO-NEt2-C.1

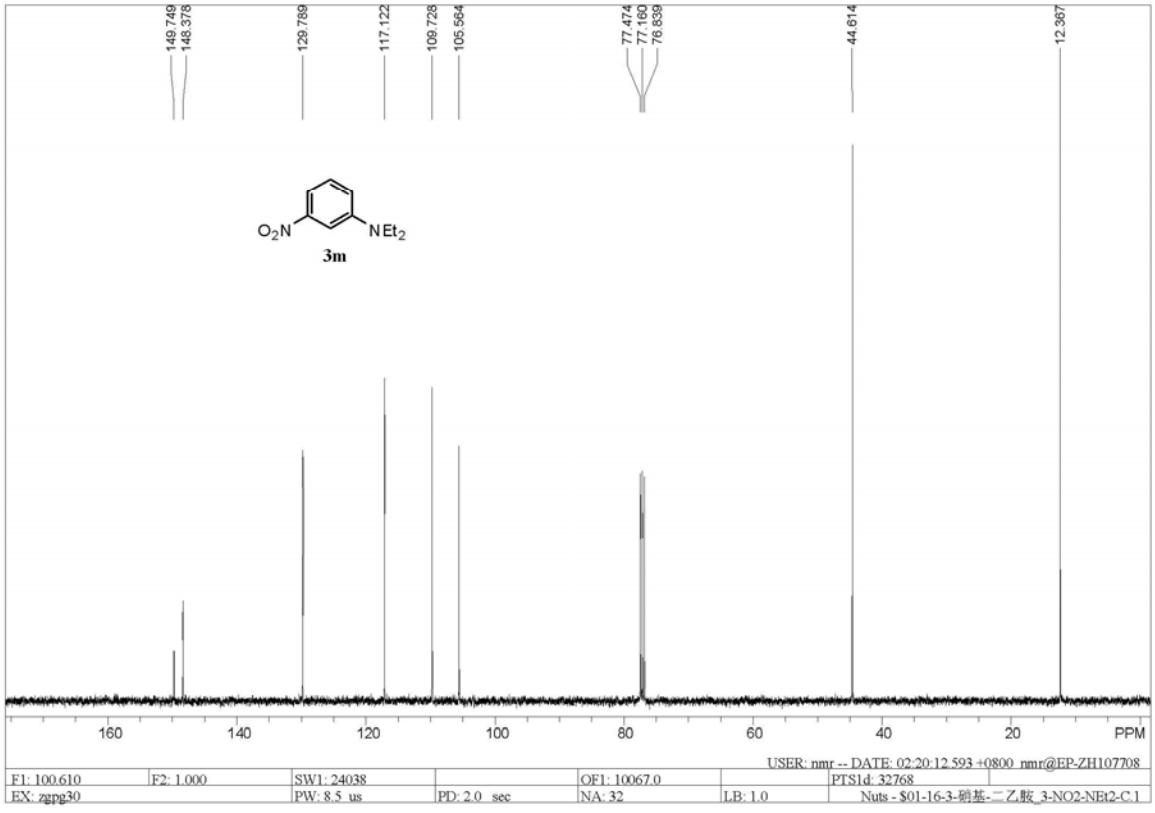

7.265
6.975
6.966
6.886
3.861
3.197
3.173
3.150
3.127
1.043
1.020
0.997
NEt2
3k
4.00
3.01
4.03
6.05
7
6
5
4
3
2
1
PPM
USER: -- DATE: Mar 21 2012
F1: 300.055 F2: 75.456 SW1: 4803 OF1: 1802.0 PTS1d: 16384
EX: s2pul PW: 5.8 us PD: 1.0 sec NA: 32 LB: 0.0 Nuts - $2-MeO-NEt2_21Mar2012

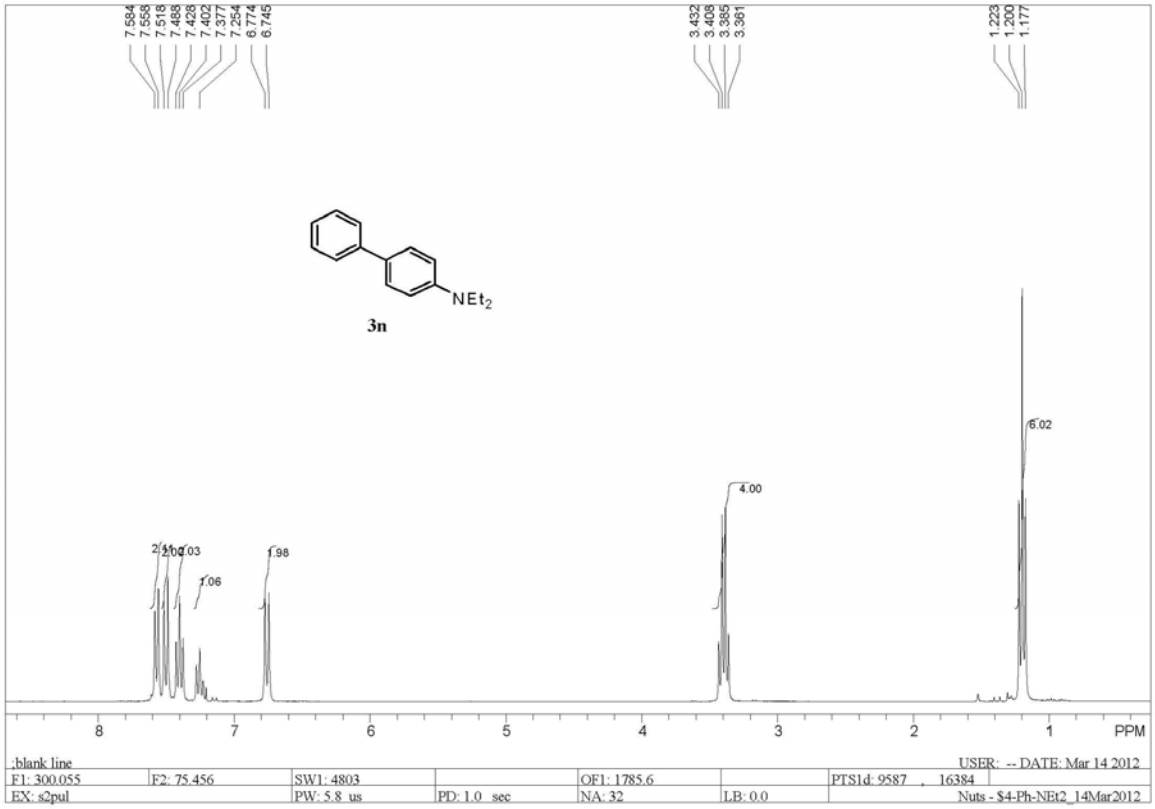

154.066
139.116
122.676
121.914
120.484
111.478
77.474
77.160
76.839
55.465
46.357
12.075
NEt2
3k
200
150
100
50
0
PPM
USER: nmr -- DATE: 02:14:43.687 +0800 nmr@EP-ZH107708
F1: 100.610 F2: 1.000 SW1: 24038 OF1: 10070.6 PTS1d: 32768
EX: zgpg30 PW: 8.5 us PD: 2.0 sec NA: 64 LB: 1.0 Nuts - $01-21-2-甲氧-二乙胺_2-MeO-NEt2-C.1

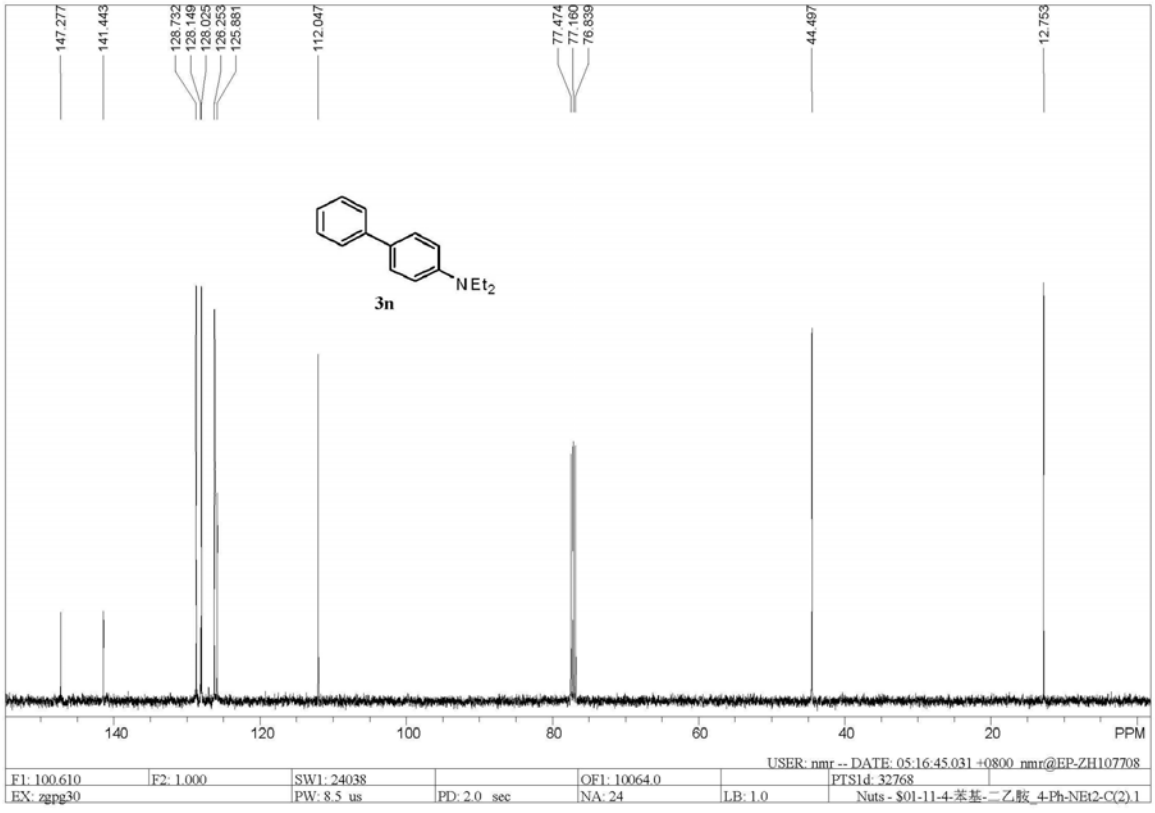

7.851
7.821
6.616
6.588
3.432
3.409
3.384
3.361
2.480
1.203
1.180
1.156
NEt2
3l
1.96
1.94
4.00
3.00
6.04
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Mar 17 2012
F1: 300.055
F2: 75.456
SW1: 4803
OF1: 1805.1
PTS1d: 9587 , 16384
EX: s2pul
PW: 5.8 us
PD: 1.0 sec
NA: 32
LB: 0.0
Nuts - $4-Ac-NEt2_17Mar2012

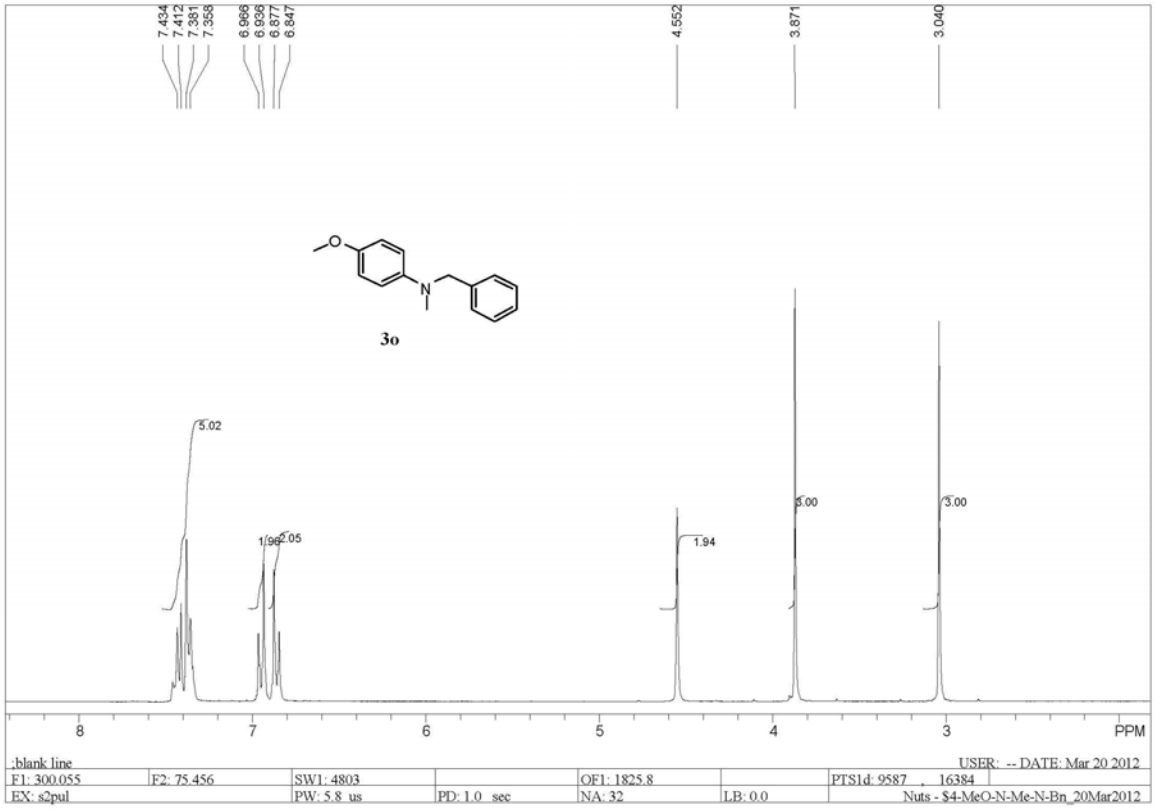

196.012
151.120
130.825
124.590
110.063
77.481
77.160
76.846
44.483
25.858
12.469
NEt2
3l
200
150
100
50
0
PPM
USER: nmr -- DATE: 04:35:11.343 +0800 nmr@EP-ZH107708
F1: 100.610
F2: 1.000
SW1: 24038
OF1: 10058.2
PTS1d: 32768
EX: zgpg30
PW: 8.5 us
PD: 2.0 sec
NA: 51
LB: 1.0
Nuts - $01-15-4-乙酰基-二乙胺_4-Ac-NEt2-C.1

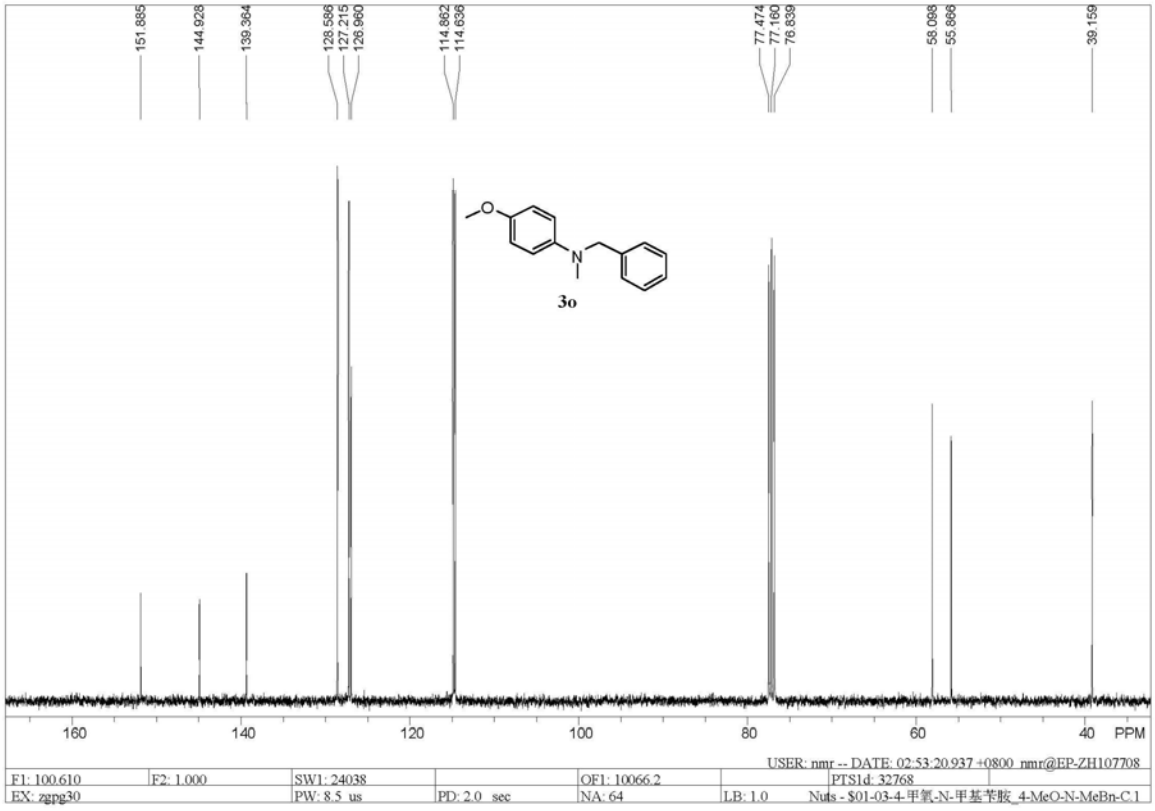

7.430
7.425
7.403
7.314
7.276
7.258
6.924
6.918
6.912
6.893
6.884
3.429
3.405
3.382
3.359
1.202
1.179
1.155
O2N
NEt2
3m
6.03
4.00
1.97
1.03
0.97
8
6
4
2
0 PPM
;blank lineB
USER: -- DATE: Mar 20 2012
F1: 300.055
F2: 75.456
SW1: 4803
OF1: 1803.5
PTS1d: 9587 , 16384
EX: s2pul
PW: 5.8 us
PD: 1.0 sec
NA: 32
LB: 0.0
Nuts - $3-NO2-NEt2_20Mar2012

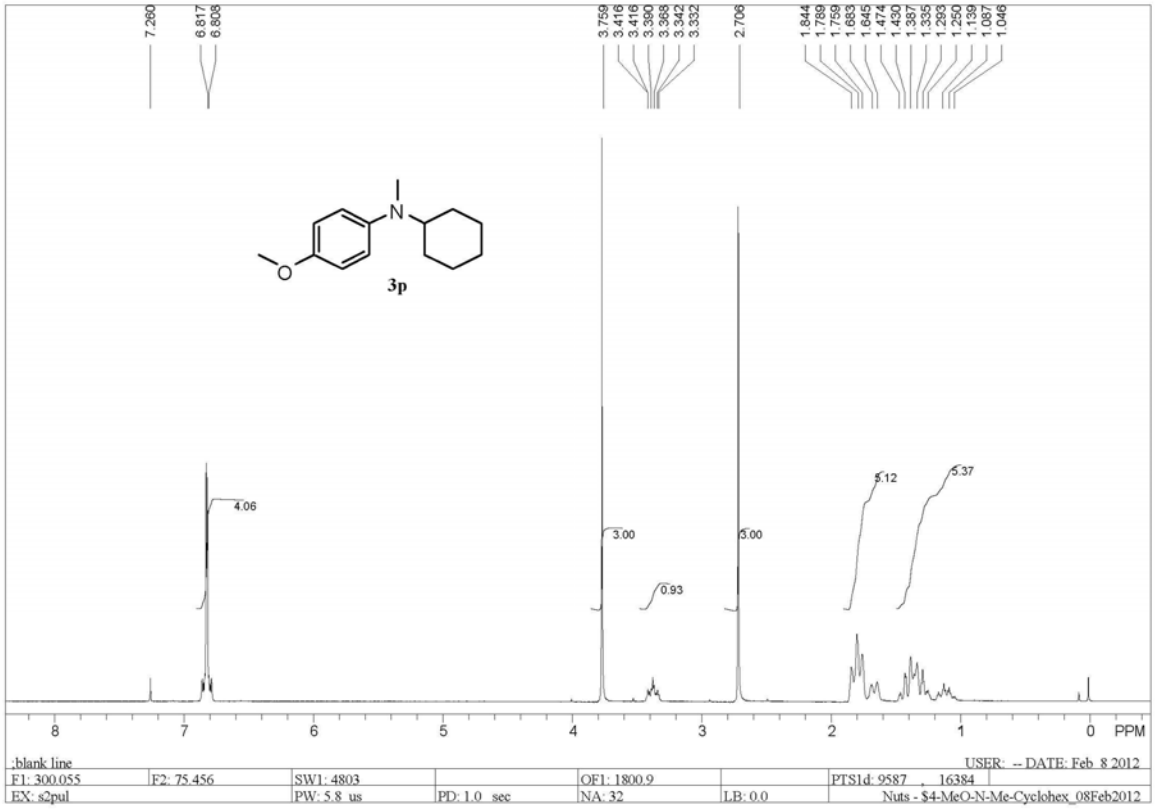

149.749
148.378
129.789
117.122
109.728
105.564
77.474
77.160
76.839
44.614
12.367
O2N
NEt2
3m
160
140
120
100
80
60
40
20
PPM
USER: nmr -- DATE: 02:20:12.593 +0800 nmr@EP-ZH107708
F1: 100.610
F2: 1.000
SW1: 24038
OF1: 10067.0
PTS1d: 32768
EX: zgpg30
PW: 8.5 us
PD: 2.0 sec
NA: 32
LB: 1.0
Nuts - $01-16-3-硝基-二乙胺_3-NO2-NEt2-C.1

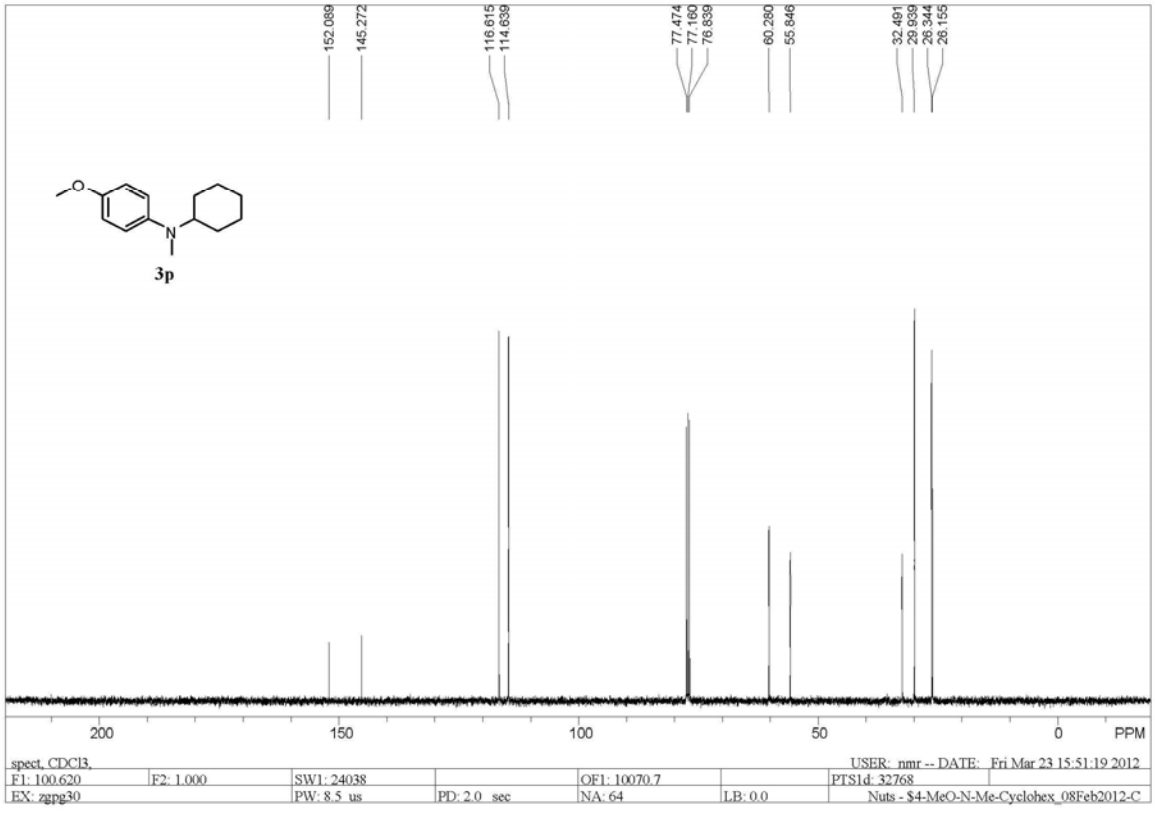

7.584
7.558
7.518
7.488
7.428
7.402
7.377
7.254
6.774
6.745
3.432
3.408
3.385
3.361
1.223
1.200
1.177
NEt2
3n
6.02
4.00
2.03
1.98
1.06
8
7
6
5
4
3
2
1
PPM
;blank line
USER: -- DATE: Mar 14 2012
F1: 300.055
F2: 75.456
SW1: 4803
OF1: 1785.6
PTS1d: 9587 , 16384
EX: s2pul
PW: 5.8 us
PD: 1.0 sec
NA: 32
LB: 0.0
Nuts - $4-Ph-NEt2_14Mar2012

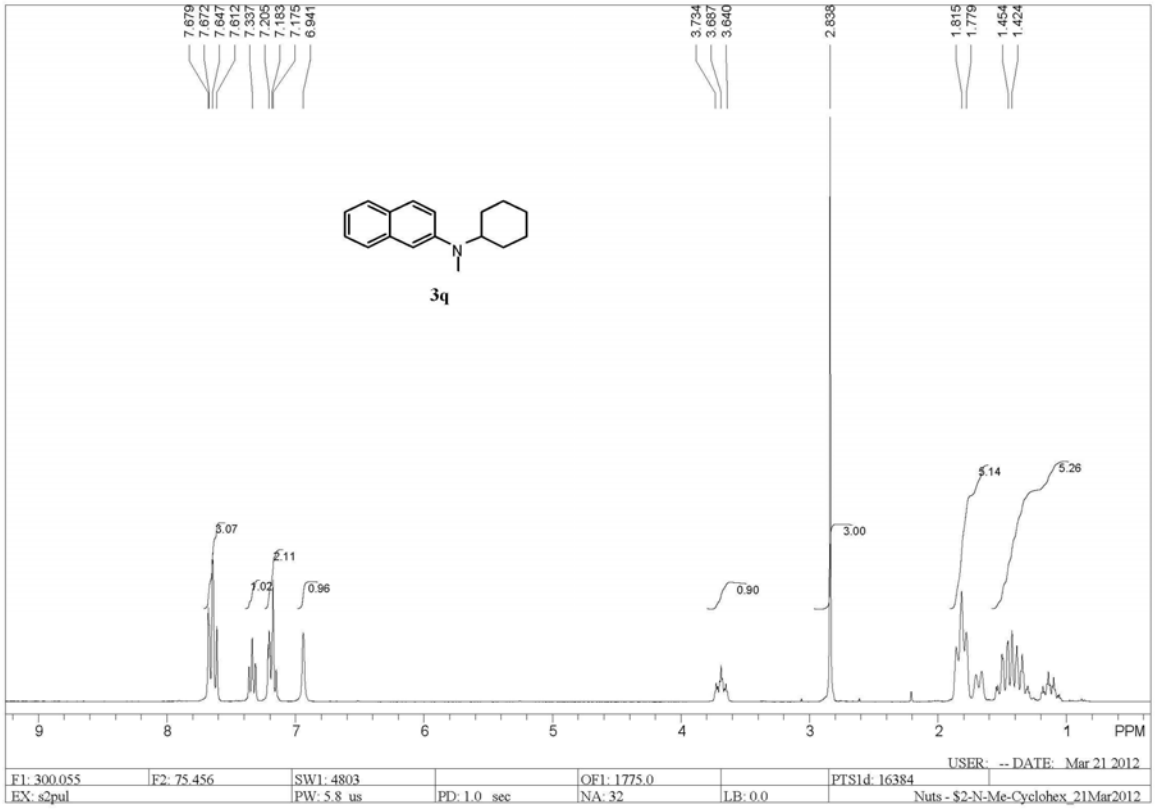

147.277
141.443
128.732
128.149
128.025
126.253
125.881
112.047
77.474
77.160
76.839
44.497
12.753
NEt2
3n
140
120
100
80
60
40
20
PPM
USER: nmr -- DATE: 05:16:45.031 +0800 nmr@EP-ZH107708
F1: 100.610
F2: 1.000
SW1: 24038
OF1: 10064.0
PTS1d: 32768
EX: zgpg30
PW: 8.5 us
PD: 2.0 sec
NA: 24
LB: 1.0
Nuts - $01-11-4-苯基-二乙胺_4-Ph-NEt2-C(2).1

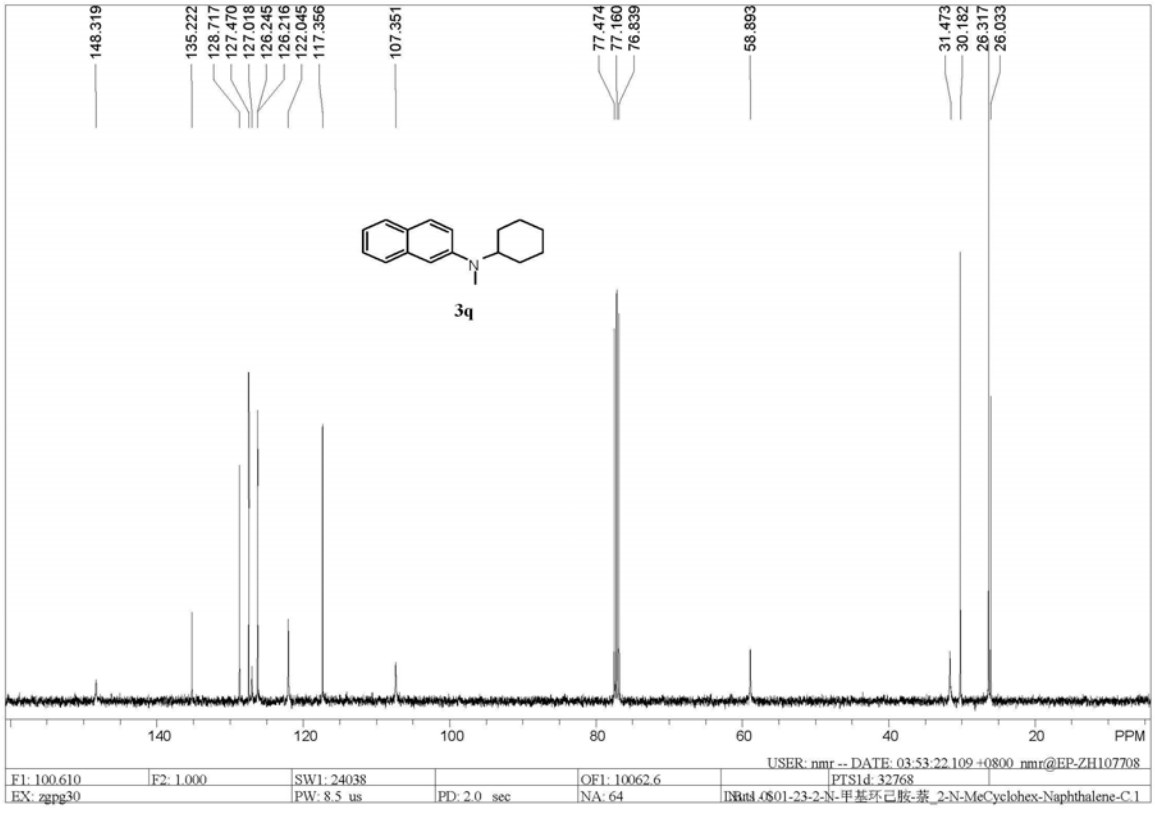

7.434
7.412
7.381
7.358
6.966
6.936
6.877
6.847
4.552
3.871
3.040
3o
5.02
1.96
2.05
1.94
5.00
3.00
8
7
6
5
4
3
PPM
;blank line
USER: -- DATE: Mar 20 2012
F1: 300.055
F2: 75.456
SW1: 4803
OF1: 1825.8
PTS1d: 9587 , 16384
EX: s2pul
PW: 5.8 us
PD: 1.0 sec
NA: 32
LB: 0.0
Nuts - $4-MeO-N-Me-N-Bn_20Mar2012

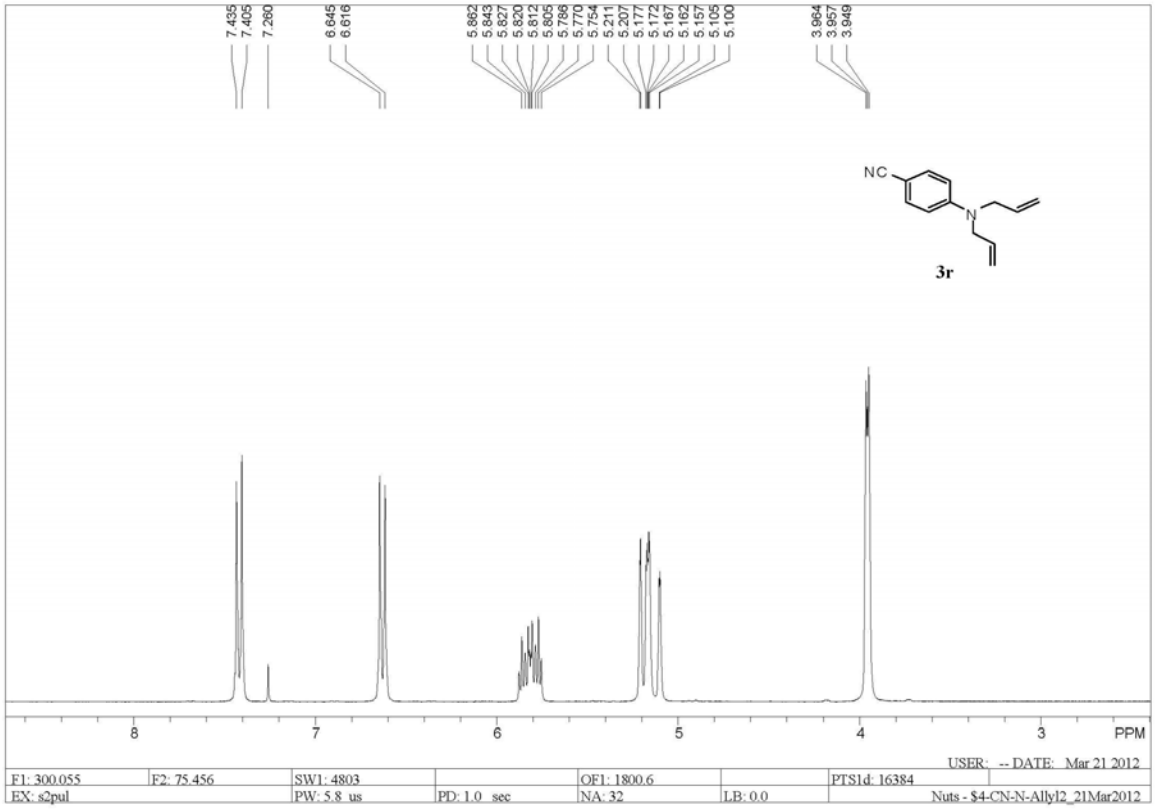

151.885
144.928
139.364
128.586
127.215
126.960
114.862
114.636
77.474
77.160
76.839
58.098
55.866
39.159
3o
160
140
120
100
80
60
40
PPM
USER: nmr -- DATE: 02:53:20.937 +0800 nmr@EP-ZH107708
F1: 100.610
F2: 1.000
SW1: 24038
OF1: 10066.2
PTS1d: 32768
EX: zgpg30
PW: 8.5 us
PD: 2.0 sec
NA: 64
LB: 1.0
Nuts - $01-03-4-甲氧-N-甲基苄胺_4-MeO-N-MeBn-C.1

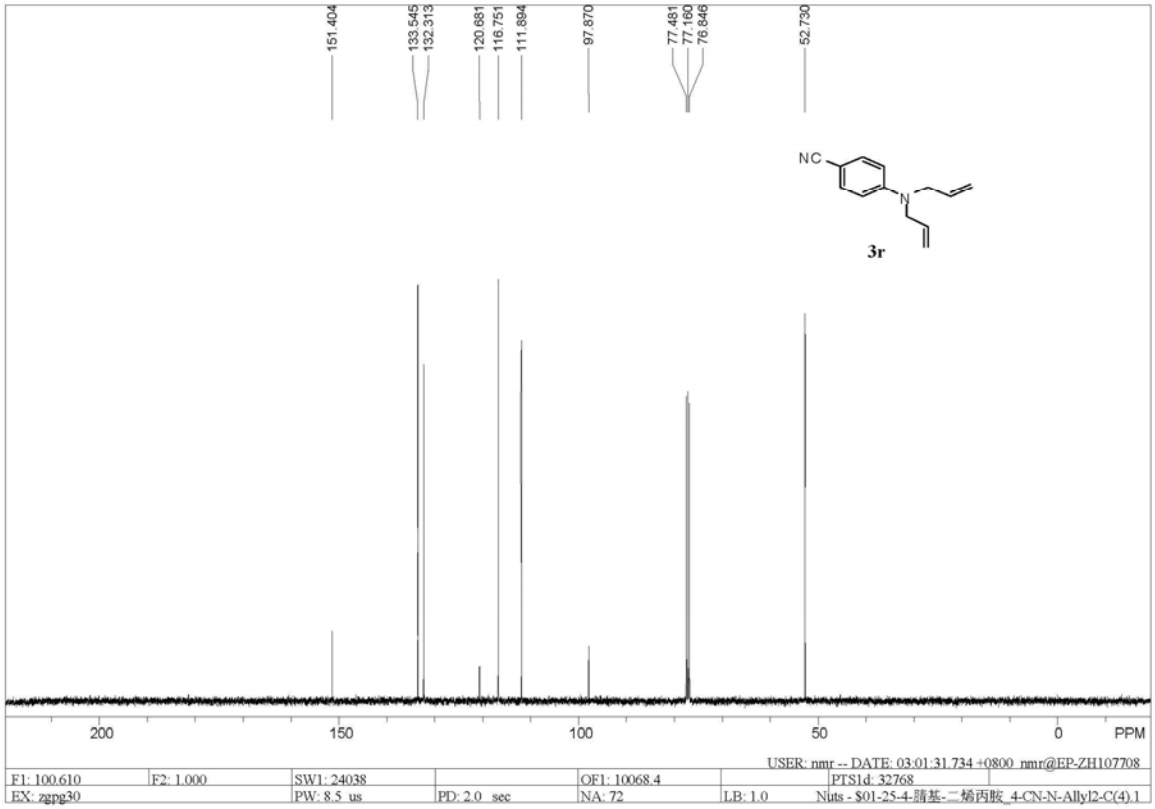

7.260
6.817
6.808
3.759
3.416
3.380
3.368
3.342
3.332
2.706
1.844
1.789
1.759
1.683
1.645
1.474
1.430
1.387
1.335
1.293
1.250
1.139
1.087
1.046
3p
4.06
3.00
0.93
3.00
5.12
5.37
8
7
6
5
4
3
2
1
0
PPM
;blank line
USER: -- DATE: Feb 8 2012
F1: 300.055
F2: 75.456
SW1: 4803
OF1: 1800.9
PTS1d: 9587 , 16384
EX: s2pul
PW: 5.8 us
PD: 1.0 sec
NA: 32
LB: 0.0
Nuts - $4-MeO-N-Me-Cyclohex_08Feb2012

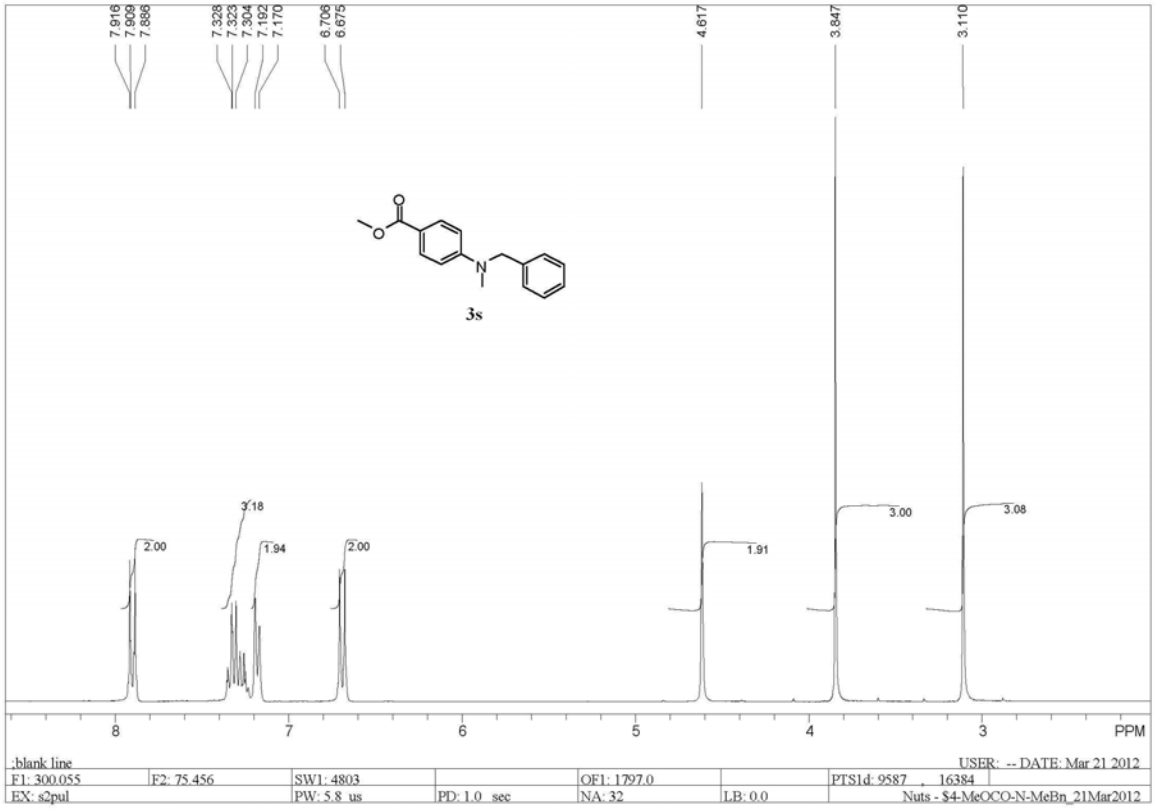

152.089
145.272
116.615
114.639
77.474
77.160
78.839
60.280
55.846
32.491
29.939
26.344
26.155
3p
200
150
100
50
0
PPM
spect, CDCl3,
USER: nmr -- DATE: Fri Mar 23 15:51:19 2012
F1: 100.620
F2: 1.000
SW1: 24038
OF1: 10070.7
PTS1d: 32768
EX: zgpg30
PW: 8.5 us
PD: 2.0 sec
NA: 64
LB: 0.0
Nuts - $4-MeO-N-Me-Cyclohex_08Feb2012-C

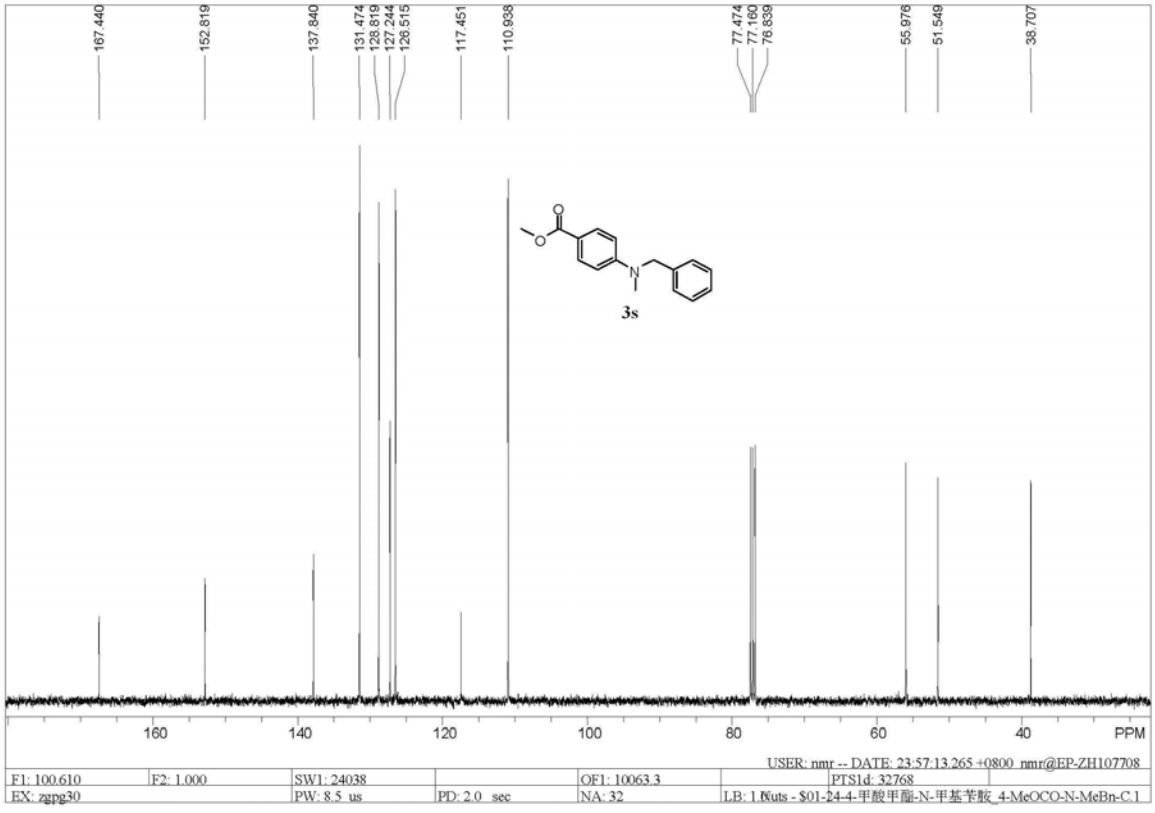

7.679
7.672
7.647
7.612
7.337
7.205
7.183
7.175
6.941
3.734
3.687
3.640
2.838
1.815
1.779
1.454
1.424
3q
5.07
2.11
1.02
0.96
0.90
3.00
5.14
5.26
9
8
7
6
5
4
3
2
1
PPM
USER: -- DATE: Mar 21 2012
F1: 300.055
F2: 75.456
SW1: 4803
OF1: 1775.0
PTS1d: 16384
EX: s2pul
PW: 5.8 us
PD: 1.0 sec
NA: 32
LB: 0.0
Nuts - $2-N-Me-Cyclohex_21Mar2012

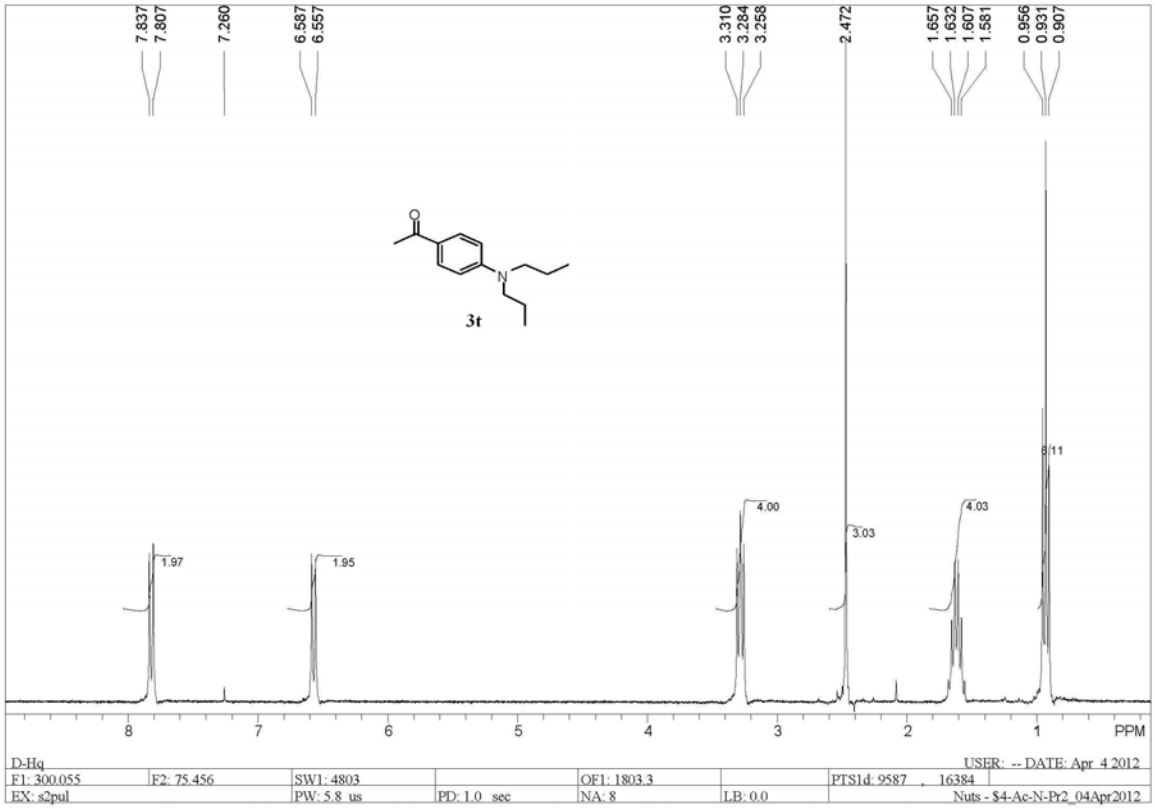

148.319
135.222
128.717
127.470
127.018
126.245
126.216
122.045
117.356
107.351
77.474
77.160
76.839
58.893
31.473
30.182
26.317
26.033
3q
140
120
100
80
60
40
20
PPM
USER: nmr -- DATE: 03:53:22 109 +0800 nmr@EP-ZH107708
F1: 100.610
F2: 1.000
SW1: 24038
OF1: 10062.6
PTS1d: 32768
EX: zgpg30
PW: 8.5 us
PD: 2.0 sec
NA: 64
Nuts - 501-23-2-N-甲基环己胺-萘_2-N-MeCyclohex-Naphthalene-C.1

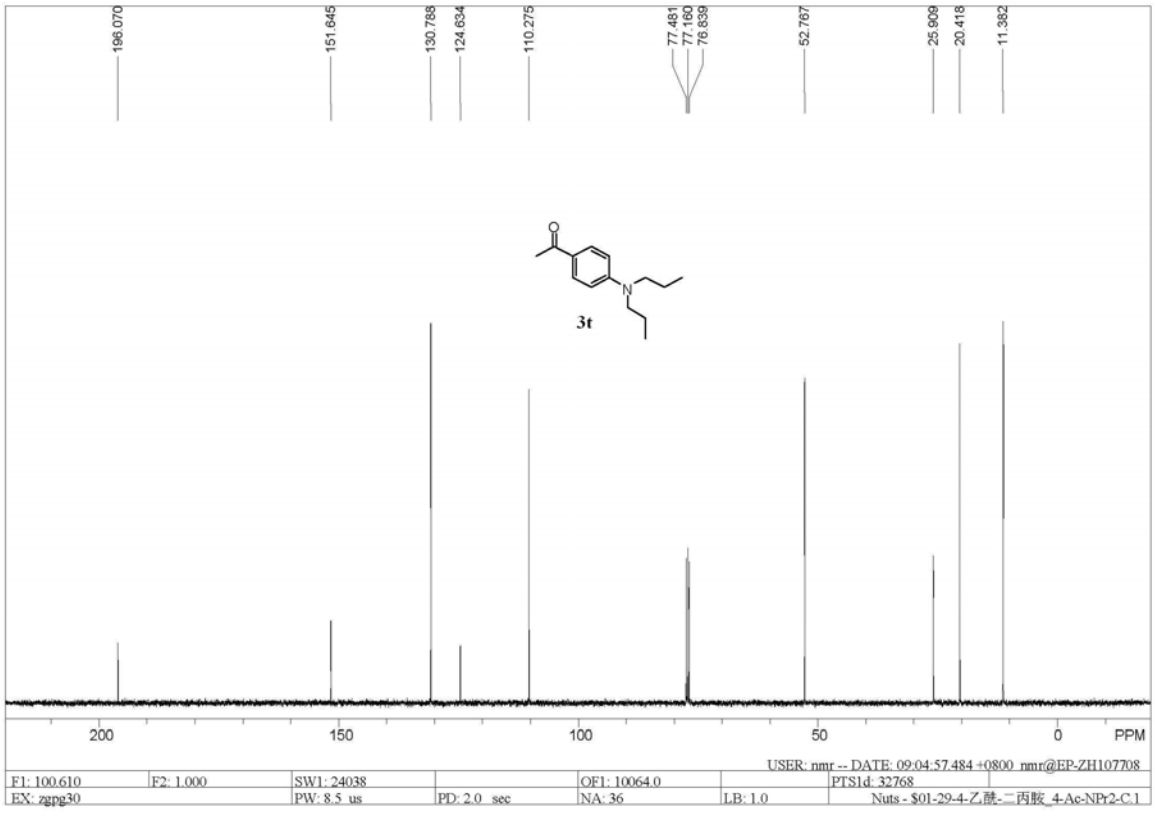

7.435
7.405
7.280
6.645
6.616
5.862
5.843
5.827
5.820
5.812
5.805
5.798
5.770
5.754
5.211
5.207
5.177
5.172
5.167
5.162
5.157
5.105
5.100
3.964
3.957
3.949
NC
N
3r
8
7
6
5
4
3
PPM
USER: -- DATE: Mar 21 2012
F1: 300.055 F2: 75.456 SW1: 4803 OF1: 1800.6 PTS1d: 16384
EX: s2pul PW: 5.8 us PD: 1.0 sec NA: 32 LB: 0.0 Nuts - $4-CN-N-Allyl2_21Mar2012

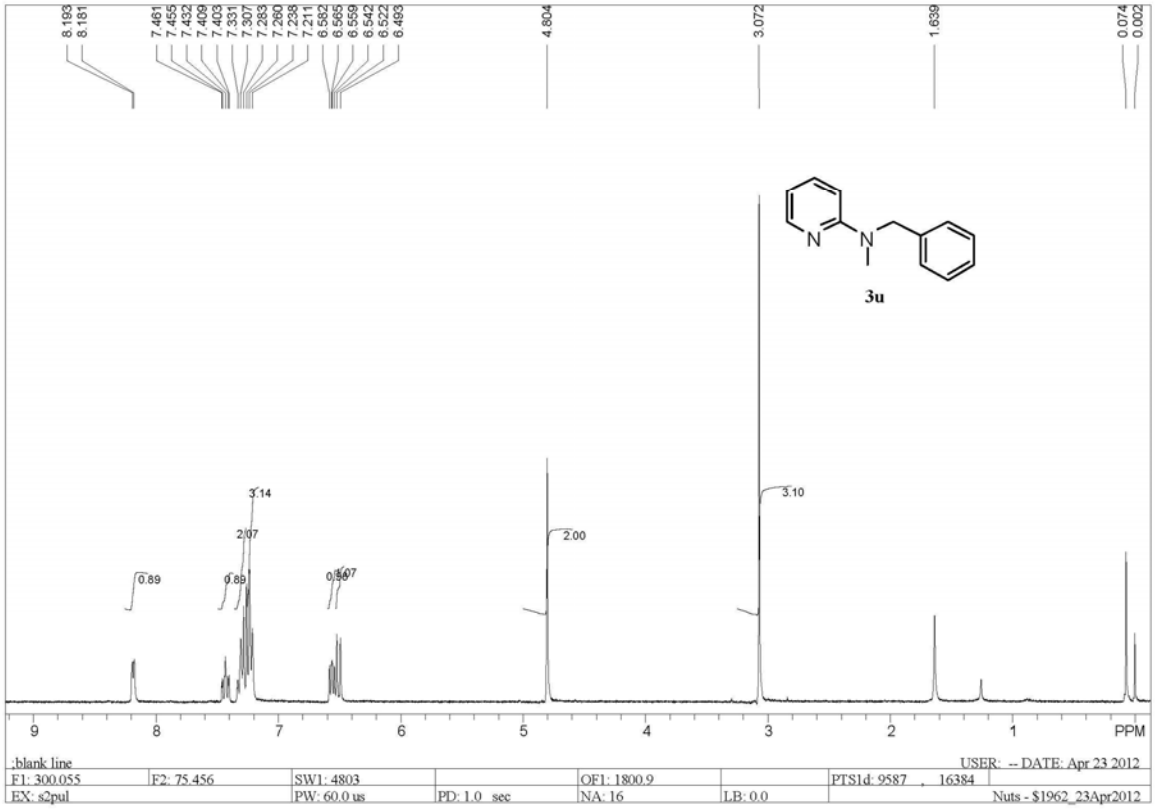

151.404
133.545
132.313
120.681
116.751
111.894
97.870
77.481
77.160
76.846
52.730
NC
N
3r
200
150
100
50
0
PPM
USER: nmr -- DATE: 03:01:31.734 +0800 nmr@EP-ZH107708
F1: 100.610 F2: 1.000 SW1: 24038 OF1: 10068.4 PTS1d: 32768
EX: zgpg30 PW: 8.5 us PD: 2.0 sec NA: 72 LB: 1.0 Nuts - $01-25-4-腈基-二烯丙胺_4-CN-N-Allyl2-C(4).1

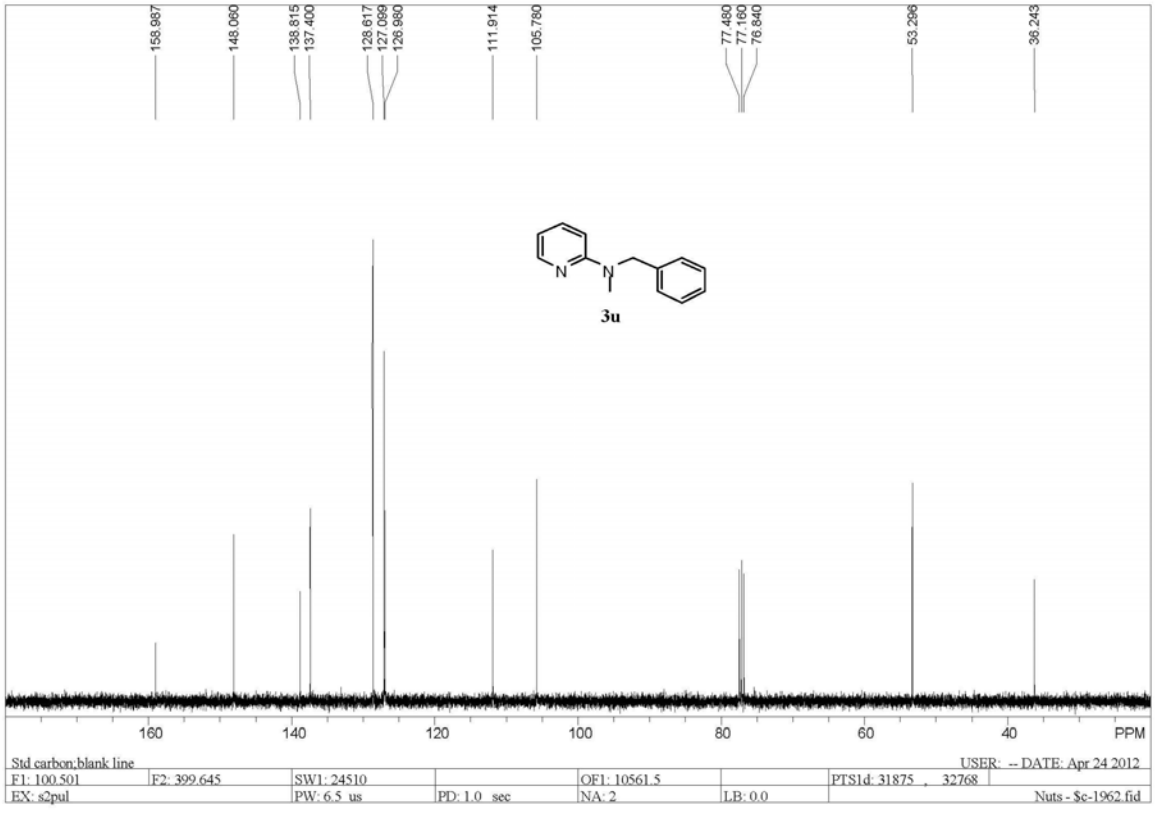

7.916
7.909
7.888
7.328
7.323
7.304
7.192
7.170
6.706
6.675
4.617
3.847
3.110
3s
2.00
3.18
1.94
2.00
1.91
3.00
3.08
8
7
6
5
4
3
PPM
;blank line
USER: -- DATE: Mar 21 2012
F1: 300.055
F2: 75.456
SW1: 4803
OF1: 1797.0
PTS1d: 9587 , 16384
EX: s2pul
PW: 5.8 us
PD: 1.0 sec
NA: 32
LB: 0.0
Nuts - $4-MeOCO-N-MeBn_21Mar2012

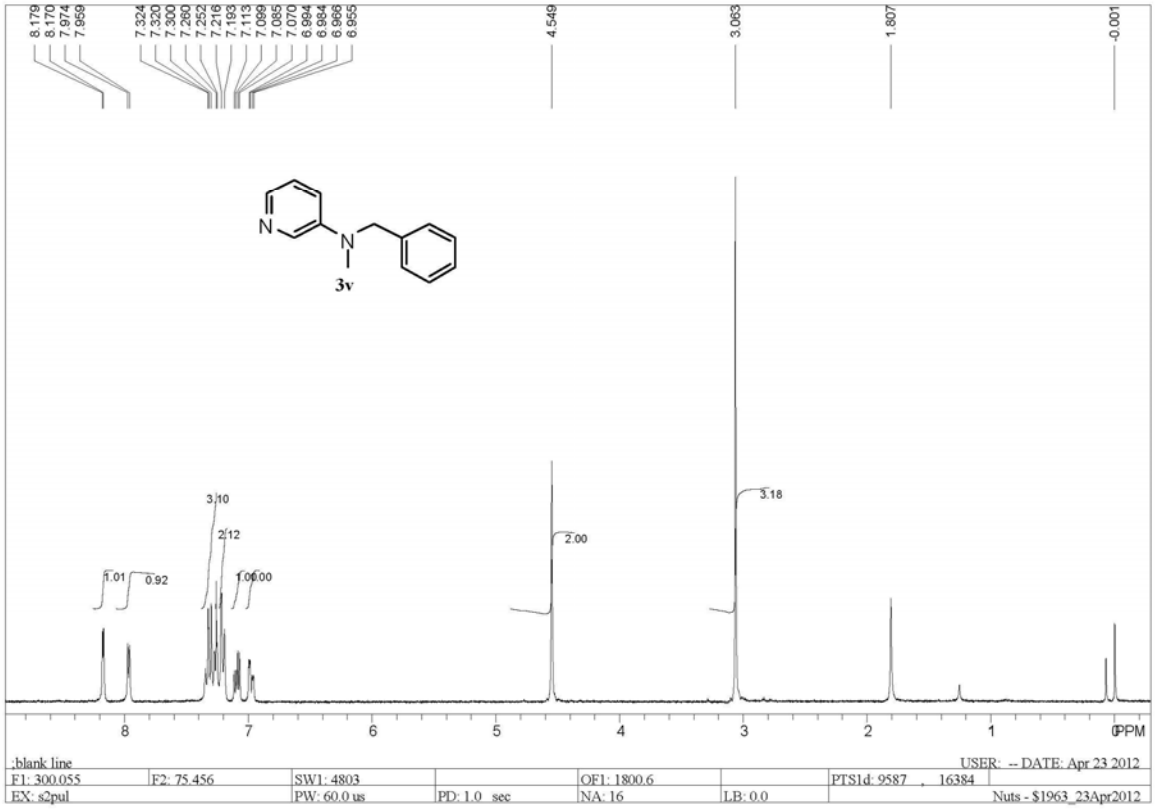

167.440
152.819
137.840
131.474
128.819
127.244
126.515
117.451
110.938
77.474
77.160
76.839
55.976
51.549
38.707
3s
160
140
120
100
80
60
40
PPM
USER: nmr -- DATE: 23:57:13.265 +0800 nmr@EP-ZH107708
F1: 100.610
F2: 1.000
SW1: 24038
OF1: 10063.3
PTS1d: 32768
EX: zgpg30
PW: 8.5 us
PD: 2.0 sec
NA: 32
Nuts - $01-24-4-甲酸甲酯-N-甲基苄胺_4-MeOCO-N-MeBn-C.1

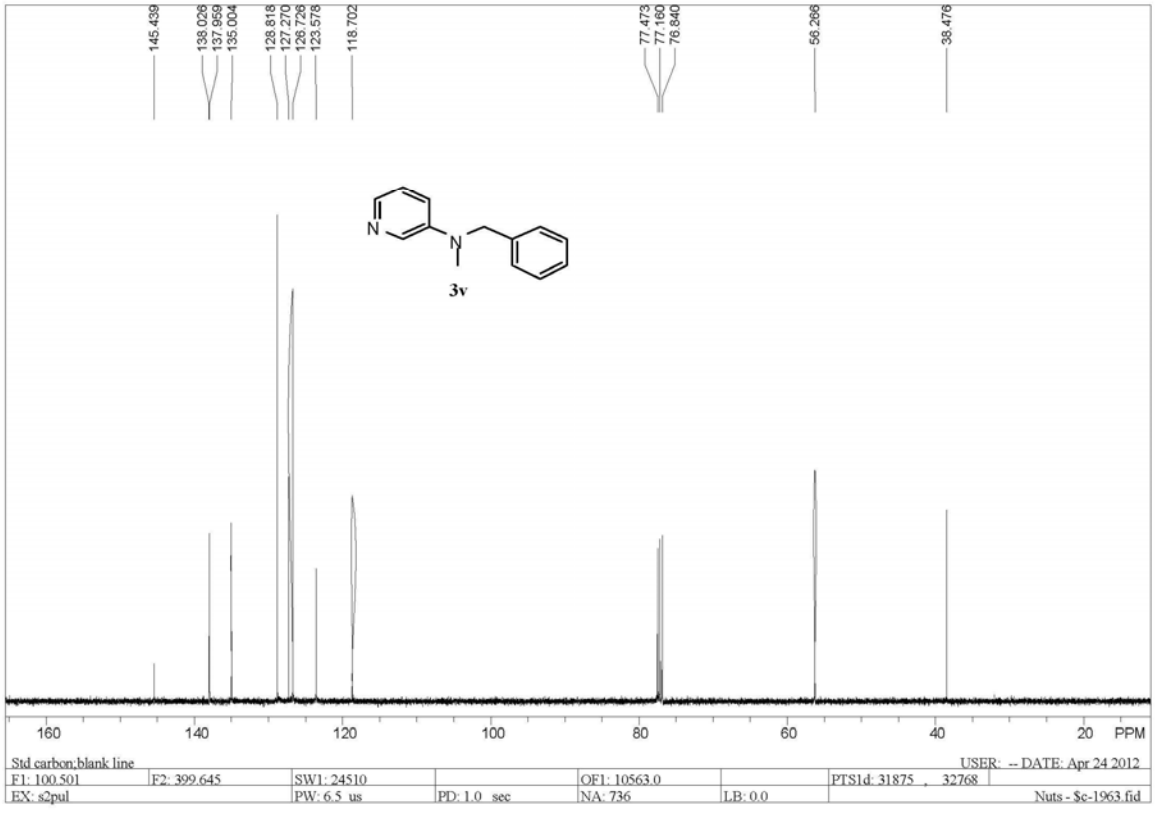

7.837
7.807
7.260
6.587
6.557
3.310
3.284
3.258
2.472
1.657
1.632
1.607
1.581
0.956
0.931
0.907
3t
1.97
1.95
4.00
3.03
4.03
9.11
8
7
6
5
4
3
2
1
PPM
D-Hq
USER: -- DATE: Apr 4 2012
F1: 300.055
F2: 75.456
SW1: 4803
OF1: 1803.3
PTS1d: 9587 , 16384
EX: s2pul
PW: 5.8 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $4-Ac-N-Pr2_04Apr2012

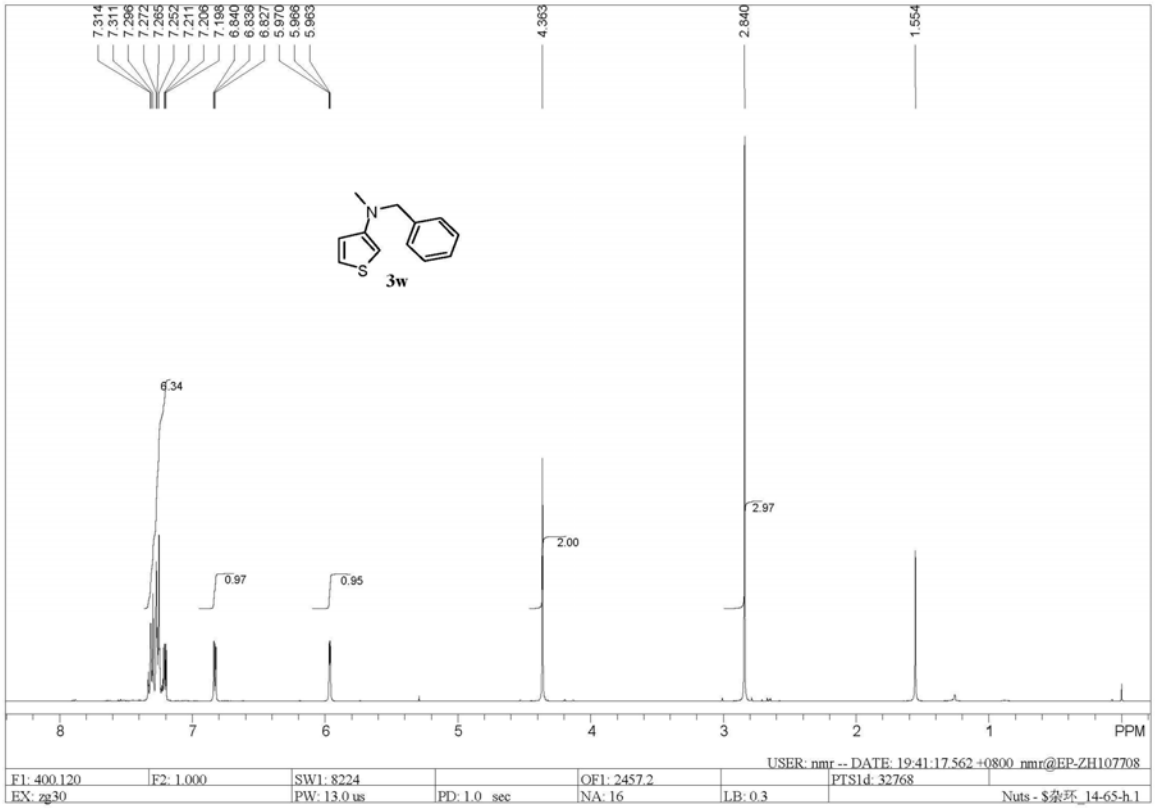

196.070
151.645
130.788
124.634
110.275
77.481
77.160
76.839
52.767
25.909
20.418
11.382
3t
200
150
100
50
0
PPM
USER: nmr -- DATE: 09:04:57.484 +0800 nmr@EP-ZH107708
F1: 100.610
F2: 1.000
SW1: 24038
OF1: 10064.0
PTS1d: 32768
EX: zgpg30
PW: 8.5 us
PD: 2.0 sec
NA: 36
LB: 1.0
Nuts - $01-29-4-乙酰-二丙胺_4-Ac-NPr2-C.1

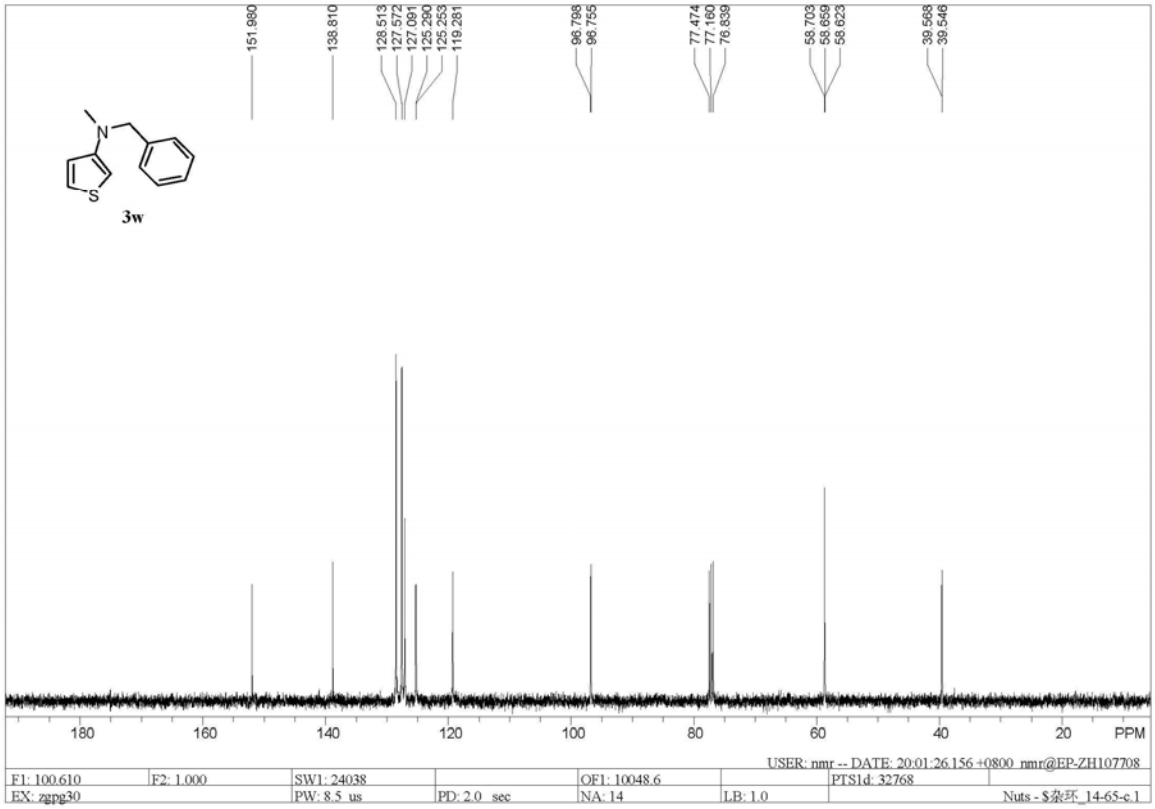

8.193
8.181
7.461
7.455
7.432
7.409
7.403
7.331
7.307
7.283
7.260
7.238
7.211
6.582
6.565
6.559
6.542
6.522
6.493
4.804
3.072
1.639
0.074
0.002
3u
3.14
2.07
0.89
0.89
0.90
1.07
2.00
3.10
9
8
7
6
5
4
3
2
1
PPM
;blank line
USER: -- DATE: Apr 23 2012
F1: 300.055
F2: 75.456
SW1: 4803
OF1: 1800.9
PTS1d: 9587 , 16384
EX: s2pul
PW: 60.0 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $1962_23Apr2012

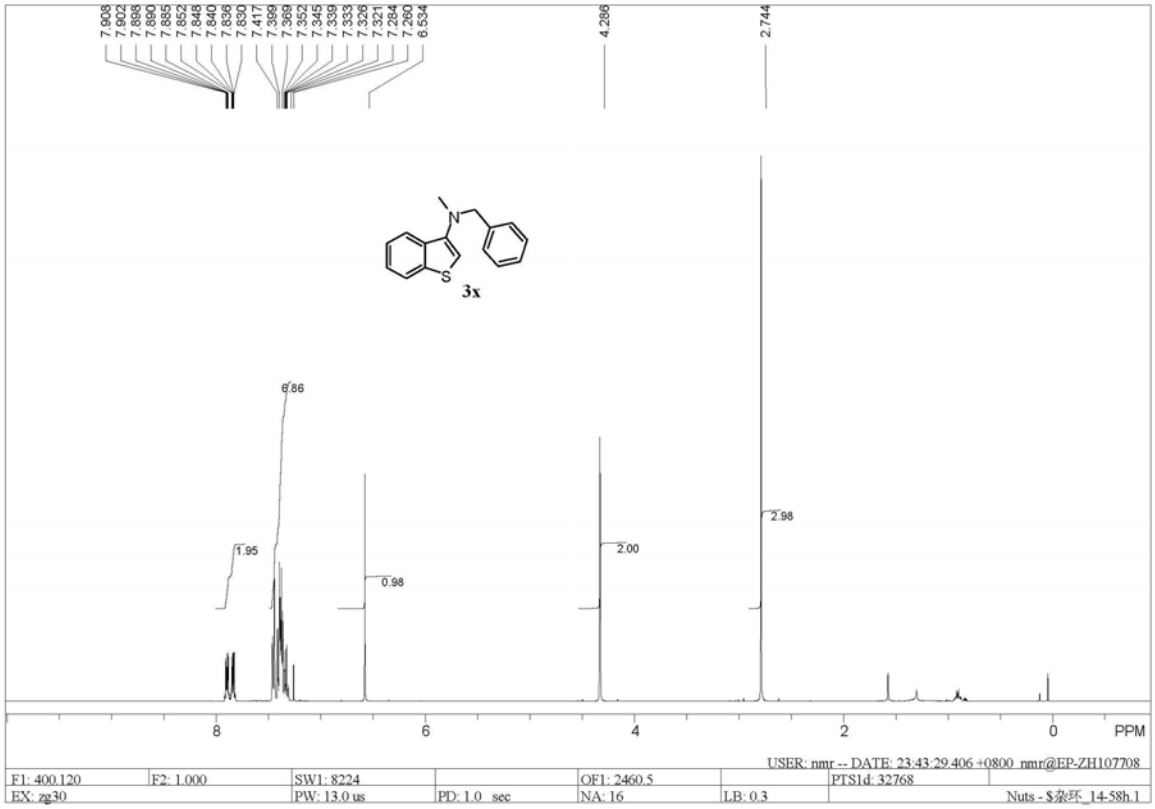

158.987
148.060
138.815
137.400
128.617
127.069
126.980
111.914
105.780
77.480
77.160
76.840
53.296
36.243
3u
160
140
120
100
80
60
40
PPM
Std carbon;blank line
USER: -- DATE: Apr 24 2012
F1: 100.501
F2: 399.645
SW1: 24510
OF1: 10561.5
PTS1d: 31875 , 32768
EX: s2pul
PW: 6.5 us
PD: 1.0 sec
NA: 2
LB: 0.0
Nuts - $c-1962.fid

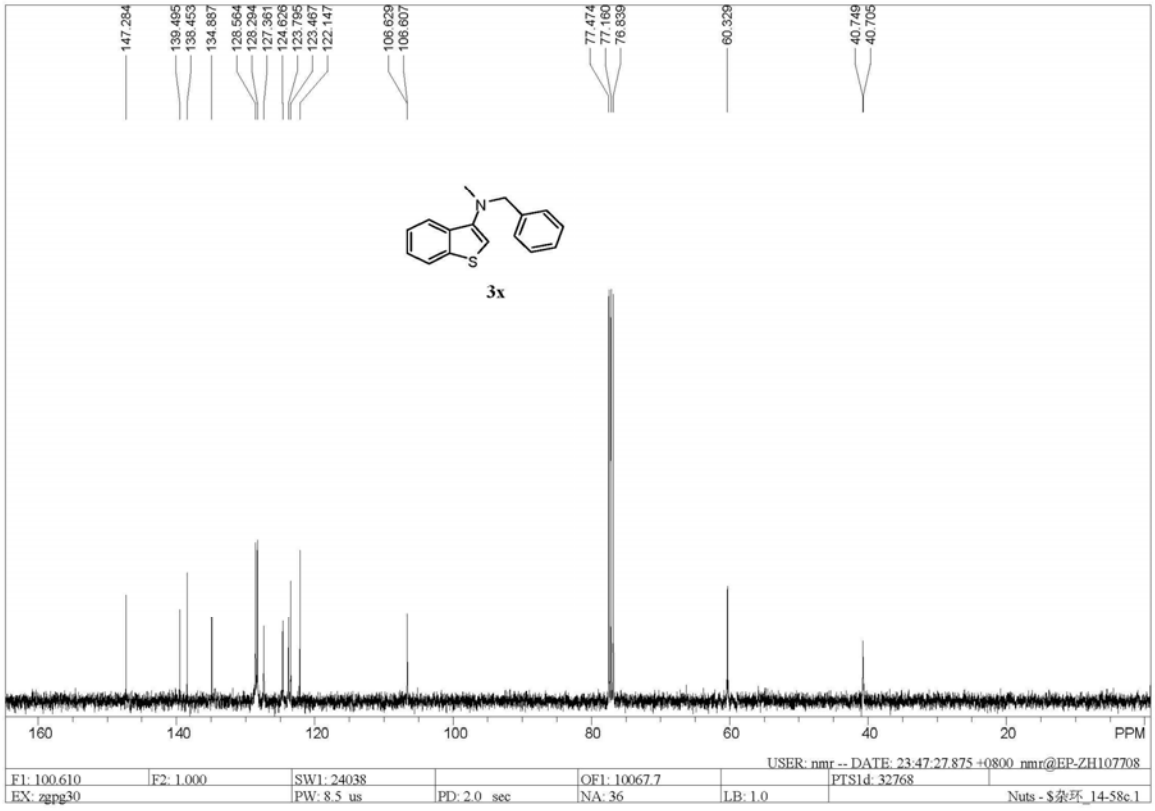

8.179
8.170
7.974
7.959
7.324
7.320
7.300
7.260
7.252
7.216
7.193
7.113
7.089
7.085
7.070
6.994
6.984
6.966
6.955
4.549
3.063
1.807
-0.001
3v
3.10
2.12
1.01
0.92
1.00
0.00
2.00
3.18
8
7
6
5
4
3
2
1
0
PPM
;blank line
USER: -- DATE: Apr 23 2012
F1: 300.055
F2: 75.456
SW1: 4803
OF1: 1800.6
PTS1d: 9587 , 16384
EX: s2pul
PW: 60.0 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $1963_23Apr2012

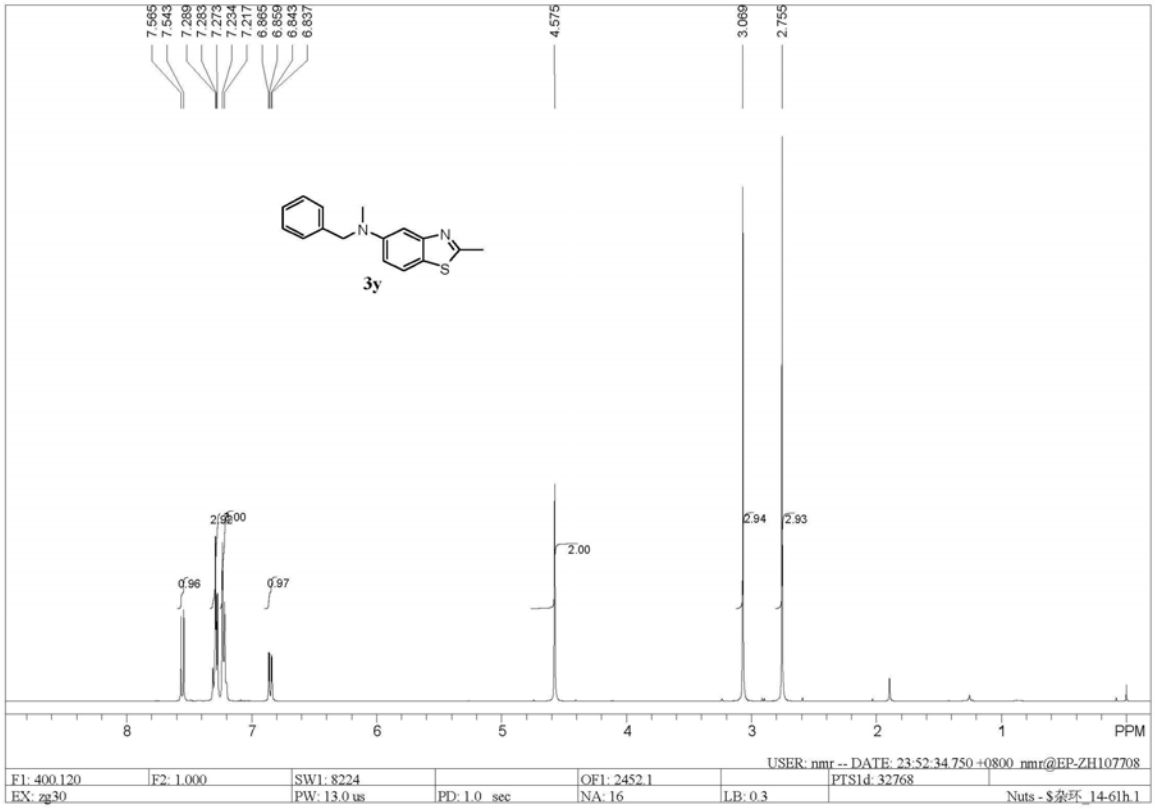

145.439
138.026
137.959
135.004
128.818
127.270
126.726
123.578
118.702
77.473
77.160
76.840
56.266
38.476
3v
160
140
120
100
80
60
40
20
PPM
Std carbon;blank line
USER: -- DATE: Apr 24 2012
F1: 100.501
F2: 399.645
SW1: 24510
OF1: 10563.0
PTS1d: 31875 , 32768
EX: s2pul
PW: 6.5 us
PD: 1.0 sec
NA: 736
LB: 0.0
Nuts - $c-1963.fid

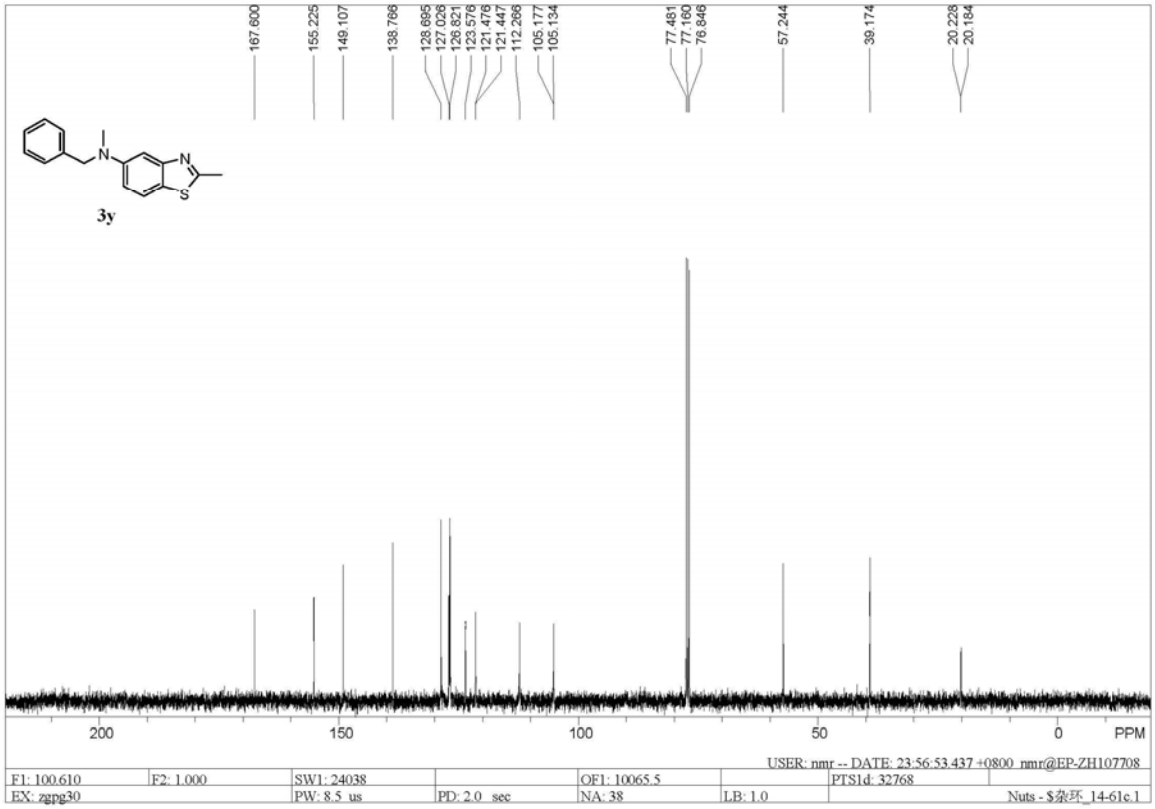

7.314
7.311
7.296
7.272
7.265
7.252
7.211
7.206
7.198
6.840
6.836
6.827
5.970
5.966
5.963
4.363
2.840
1.554
3w
6.34
0.97
0.95
2.00
2.97
8
7
6
5
4
3
2
1
PPM
USER: nmr -- DATE: 19:41:17.562 +0800 nmr@EP-ZH107708
F1: 400.120 F2: 1.000 SW1: 8224 OF1: 2457.2 PTS1d: 32768
EX: zg30 PW: 13.0 us PD: 1.0 sec NA: 16 LB: 0.3 Nuts - $杂环_14-65-h.1

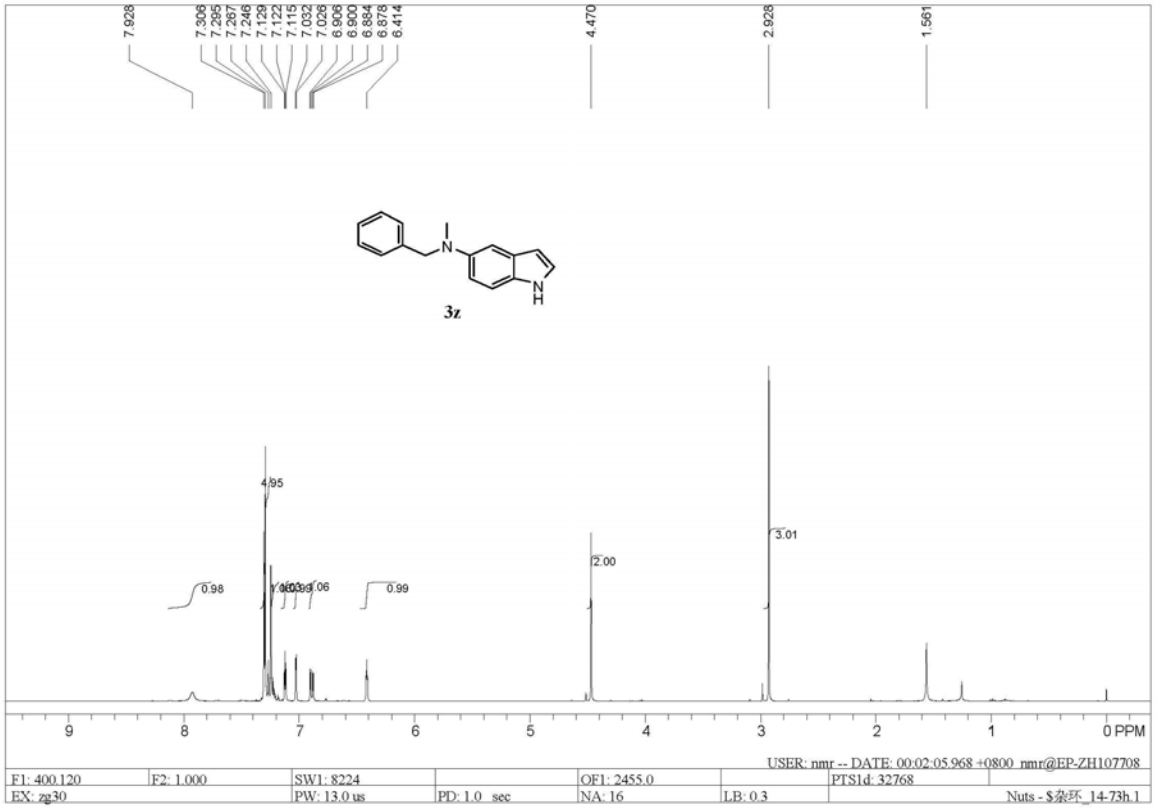

151.980
138.810
128.513
127.572
127.091
125.290
125.253
119.281
96.798
96.755
77.474
77.160
76.839
58.703
58.659
58.623
39.568
39.546
3w
180
160
140
120
100
80
60
40
20
PPM
USER: nmr -- DATE: 20:01:26.156 +0800 nmr@EP-ZH107708
F1: 100.610 F2: 1.000 SW1: 24038 OF1: 10048.6 PTS1d: 32768
EX: zgpg30 PW: 8.5 us PD: 2.0 sec NA: 14 LB: 1.0 Nuts - $杂环_14-65-c.1

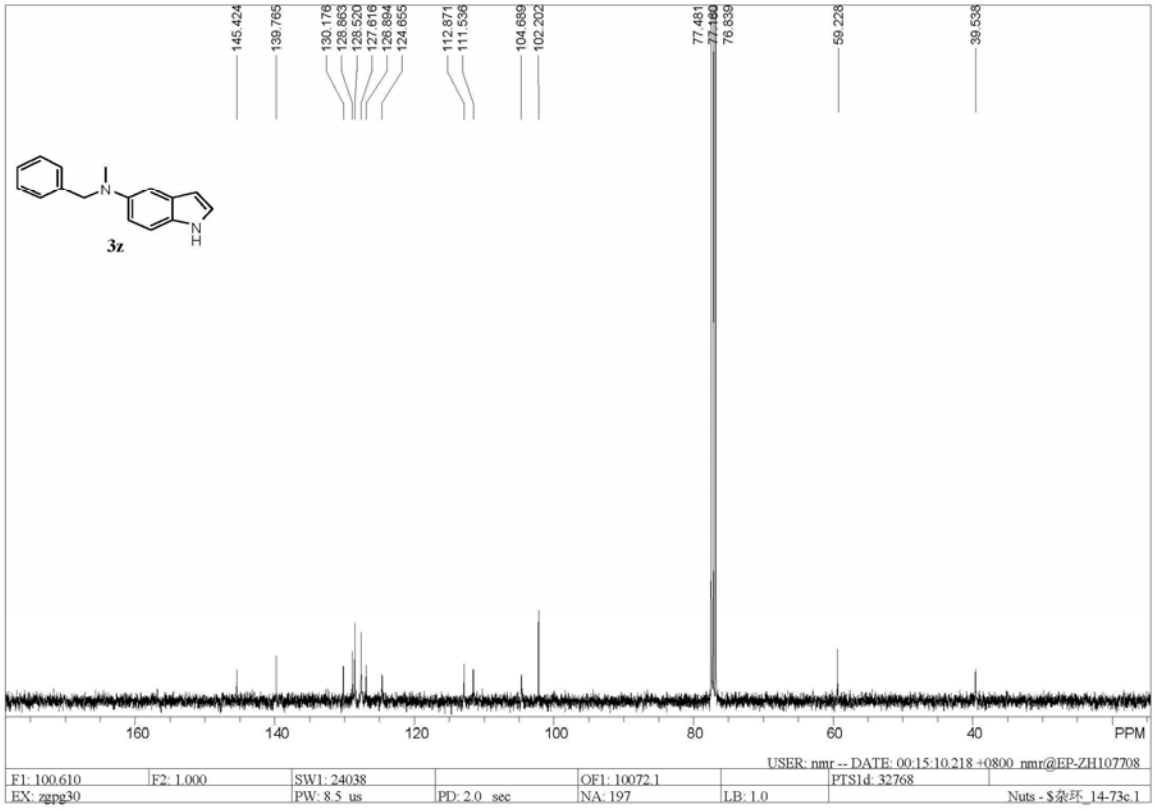

7.908
7.902
7.898
7.890
7.885
7.852
7.848
7.840
7.836
7.830
7.417
7.389
7.369
7.352
7.345
7.339
7.333
7.326
7.321
7.294
7.260
6.534
4.286
2.744
3x
6.86
1.95
0.98
2.00
2.98
8
6
4
2
0
PPM
USER: nmr -- DATE: 23:43:29.406 +0800 nmr@EP-ZH107708
F1: 400.120
F2: 1.000
SW1: 8224
OF1: 2460.5
PTS1d: 32768
EX: zg30
PW: 13.0 us
PD: 1.0 sec
NA: 16
LB: 0.3
Nuts - $杂环_14-58h.1

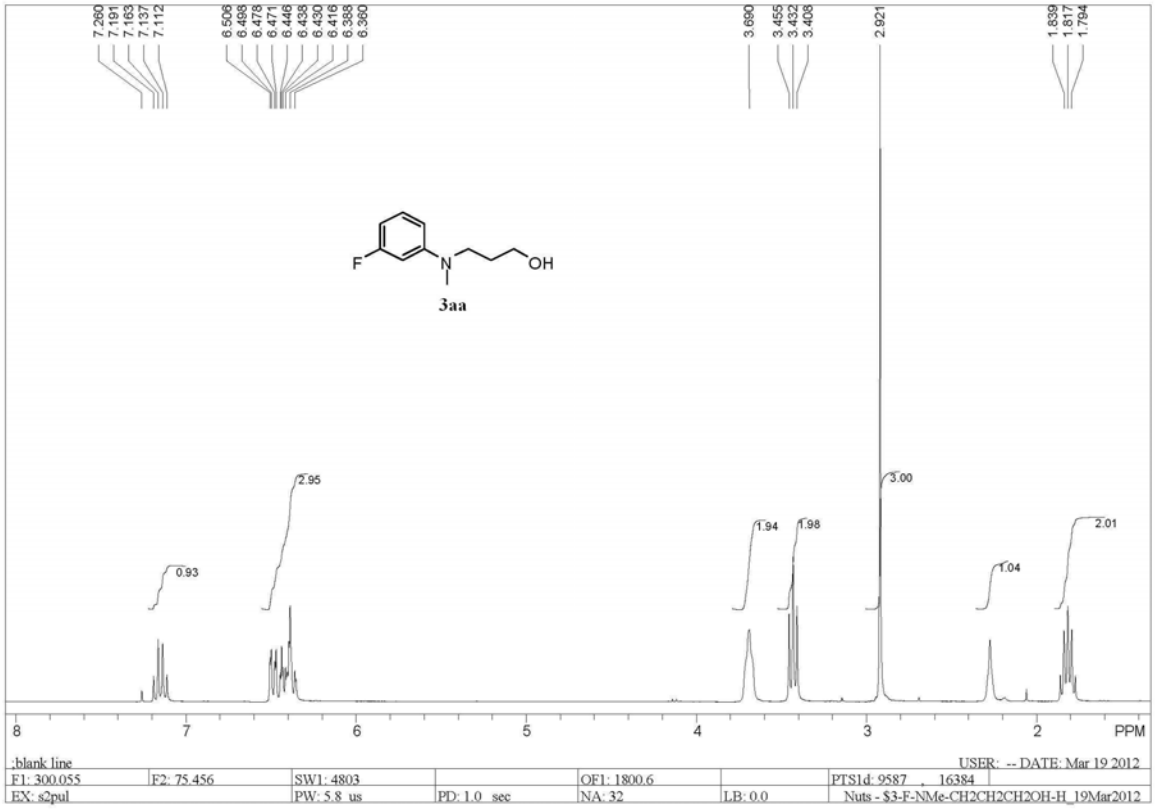

147.284
139.495
138.453
134.887
128.564
128.294
127.361
124.626
123.795
123.467
122.147
106.629
106.607
77.474
77.160
76.839
60.329
40.749
40.705
3x
160
140
120
100
80
60
40
20
PPM
USER: nmr -- DATE: 23:47:27.875 +0800 nmr@EP-ZH107708
F1: 100.610
F2: 1.000
SW1: 24038
OF1: 10067.7
PTS1d: 32768
EX: zgpg30
PW: 8.5 us
PD: 2.0 sec
NA: 36
LB: 1.0
Nuts - $杂环_14-58c.1

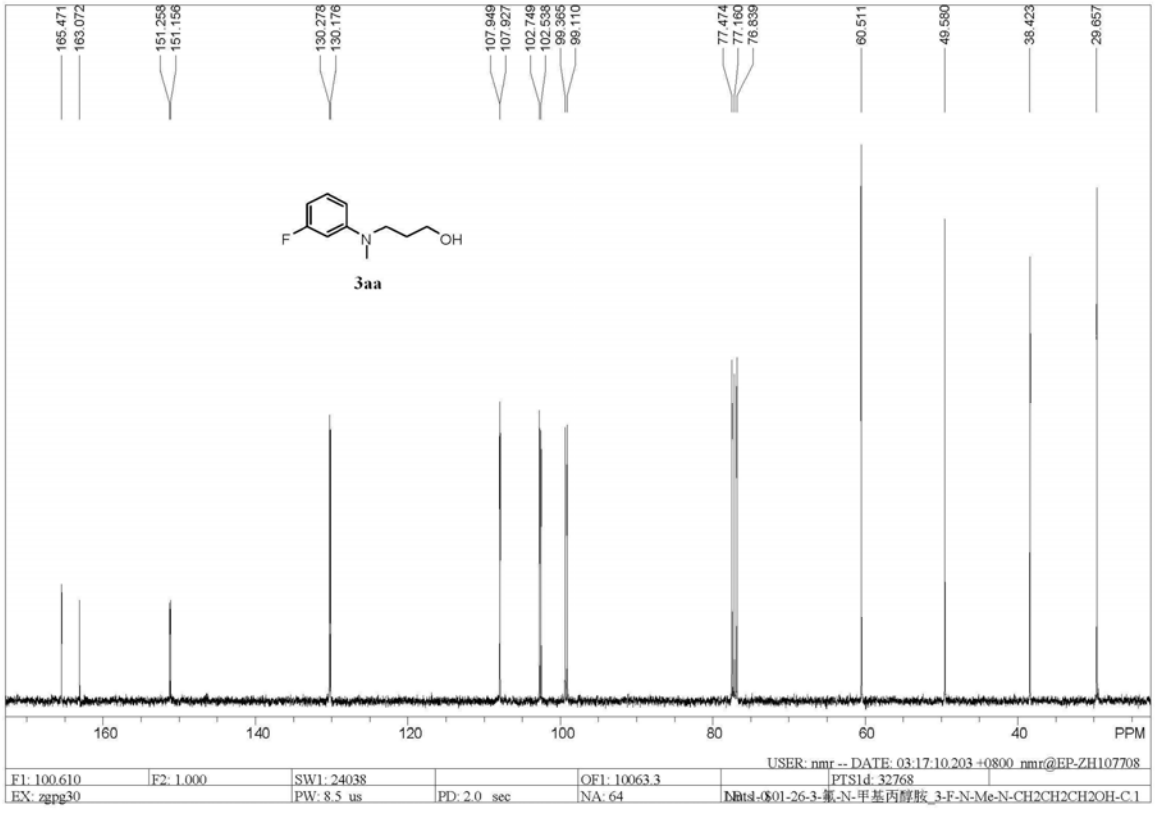

7.565
7.543
7.289
7.283
7.273
7.234
7.217
6.865
6.859
6.843
6.837
4.575
3.069
2.755
3y
2.00
0.96
0.97
2.00
2.94
2.93
8
7
6
5
4
3
2
1
PPM
USER: nmr -- DATE: 23:52:34.750 +0800 nmr@EP-ZH107708
F1: 400.120
F2: 1.000
SW1: 8224
OF1: 2452.1
PTS1d: 32768
EX: zg30
PW: 13.0 us
PD: 1.0 sec
NA: 16
LB: 0.3
Nuts - $杂环_14-61h.1

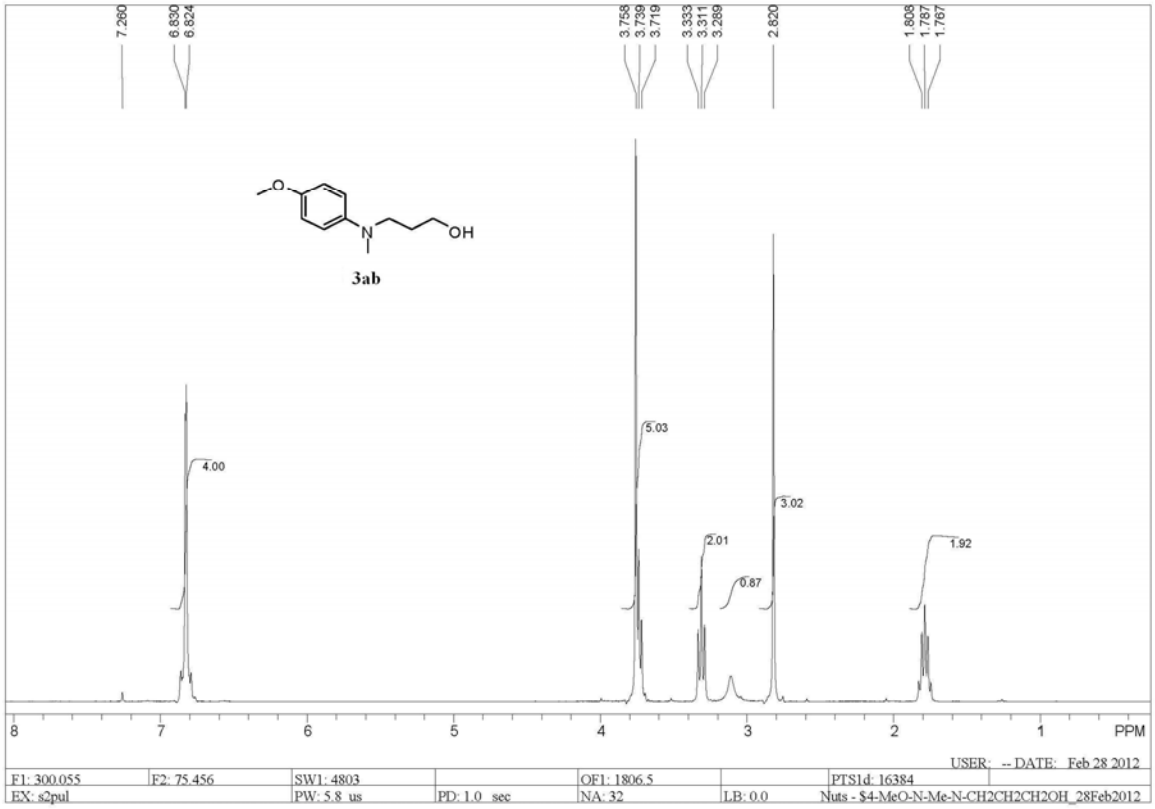

167.600
155.225
149.107
138.766
128.695
127.026
126.821
123.576
121.476
121.447
112.266
105.177
105.134
77.481
77.160
76.846
57.244
39.174
20.228
20.184
3y
200
150
100
50
0
PPM
USER: nmr -- DATE: 23:56:53.437 +0800 nmr@EP-ZH107708
F1: 100.610
F2: 1.000
SW1: 24038
OF1: 10065.5
PTS1d: 32768
EX: zgpg30
PW: 8.5 us
PD: 2.0 sec
NA: 38
LB: 1.0
Nuts - $杂环_14-61c.1

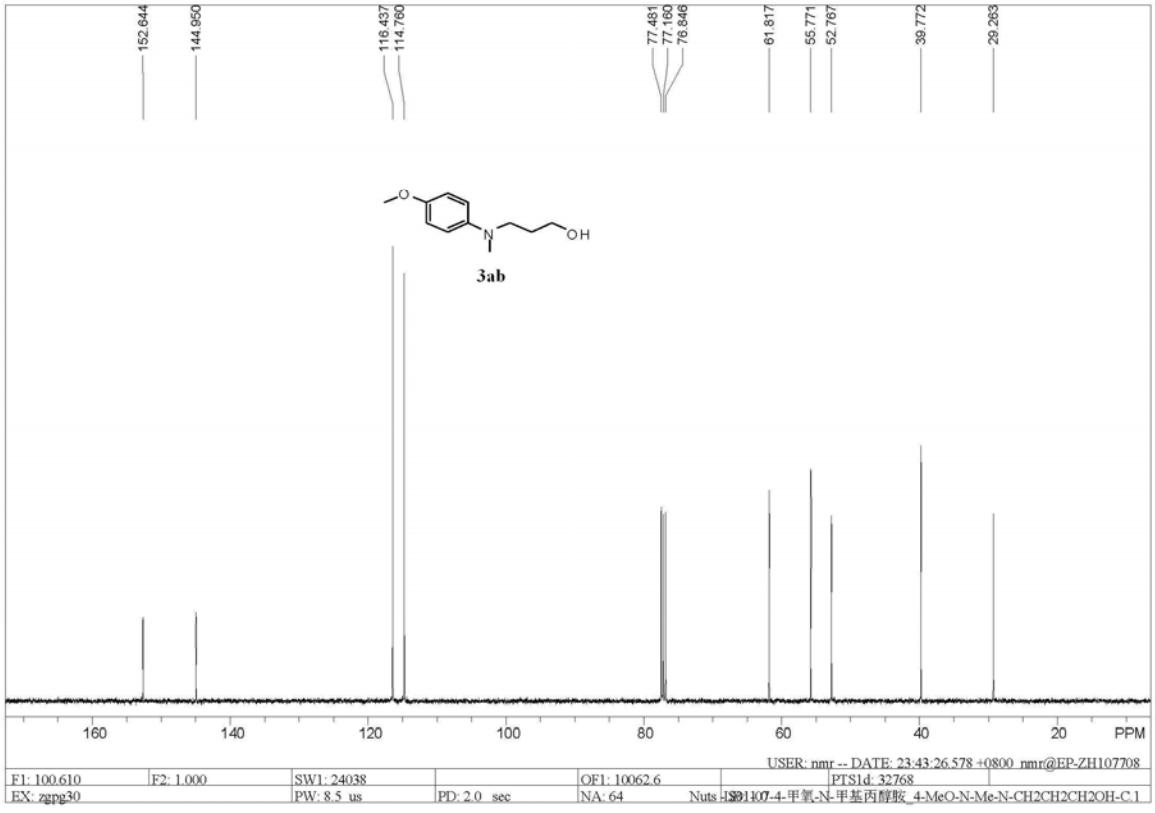

7.928
7.306
7.295
7.267
7.246
7.129
7.122
7.115
7.032
7.026
6.906
6.900
6.884
6.878
6.414
4.470
2.928
1.581
3z
4.95
3.01
2.00
0.98
1.06
0.99
9
8
7
6
5
4
3
2
1
0 PPM
USER: nmr -- DATE: 00:02:05.968 +0800 nmr@EP-ZH107708
F1: 400.120
F2: 1.000
SW1: 8224
OF1: 2455.0
PTS1d: 32768
EX: zg30
PW: 13.0 us
PD: 1.0 sec
NA: 16
LB: 0.3
Nuts - $杂环_14-73h.1

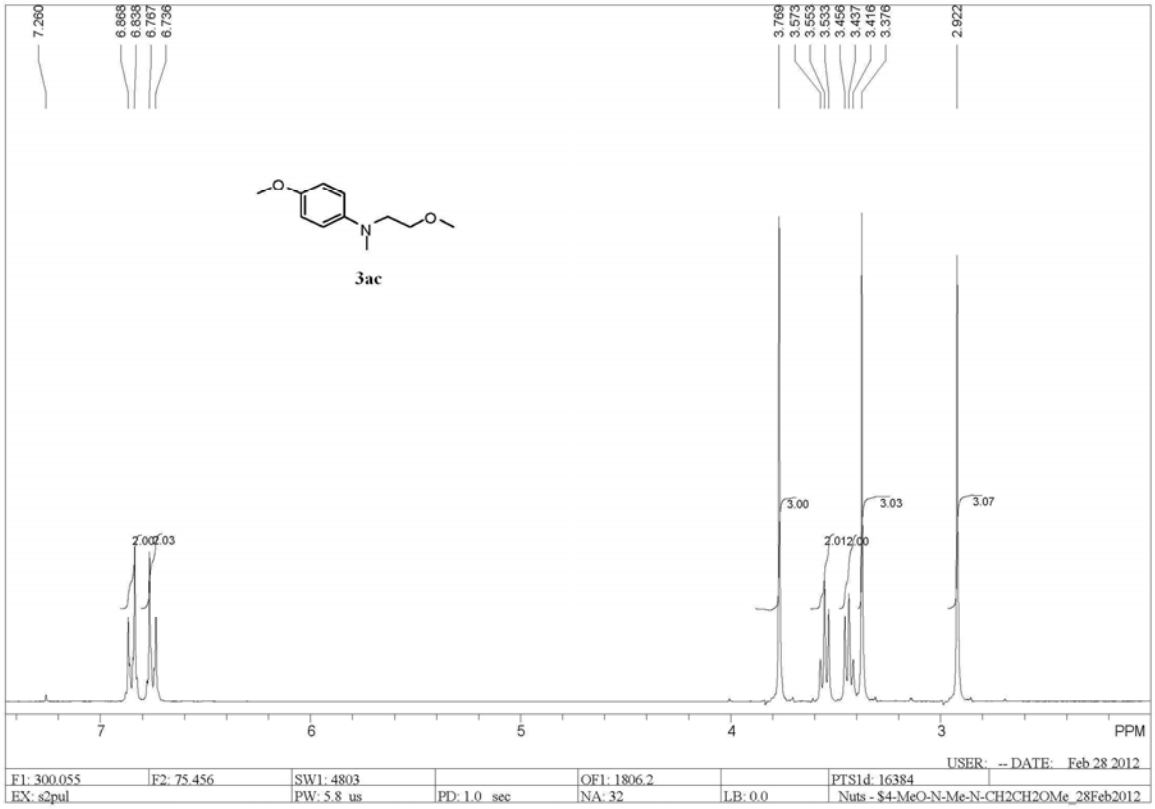

145.424
139.765
130.176
128.863
128.520
127.616
126.894
124.655
112.871
111.536
104.689
102.202
77.481
77.160
76.839
59.228
39.538
3z
160
140
120
100
80
60
40
PPM
USER: nmr -- DATE: 00:15:10.218 +0800 nmr@EP-ZH107708
F1: 100.610
F2: 1.000
SW1: 24038
OF1: 10072.1
PTS1d: 32768
EX: zgpg30
PW: 8.5 us
PD: 2.0 sec
NA: 197
LB: 1.0
Nuts - $杂环_14-73c.1

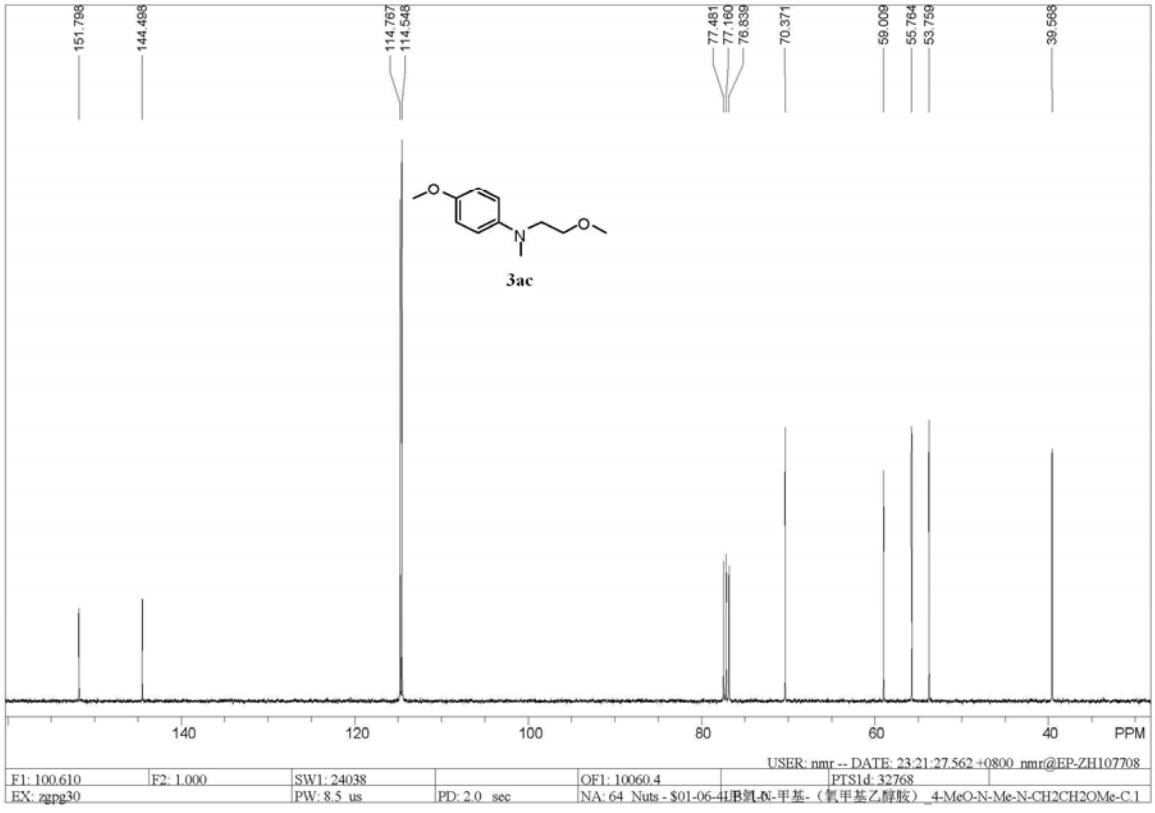

7.260
7.191
7.163
7.137
7.112
6.506
6.498
6.478
6.471
6.446
6.438
6.430
6.416
6.388
6.360
3.690
3.455
3.432
3.408
2.921
1.839
1.817
1.794
F
N
OH
3aa
0.93
2.95
1.94
1.98
3.00
1.04
2.01
8
7
6
5
4
3
2
PPM
;blank line
USER: -- DATE: Mar 19 2012
F1: 300.055
F2: 75.456
SW1: 4803
OF1: 1800.6
PTS1d: 9587 , 16384
EX: s2pul
PW: 5.8 us
PD: 1.0 sec
NA: 32
LB: 0.0
Nuts - $3-F-NMe-CH2CH2CH2OH-H_19Mar2012

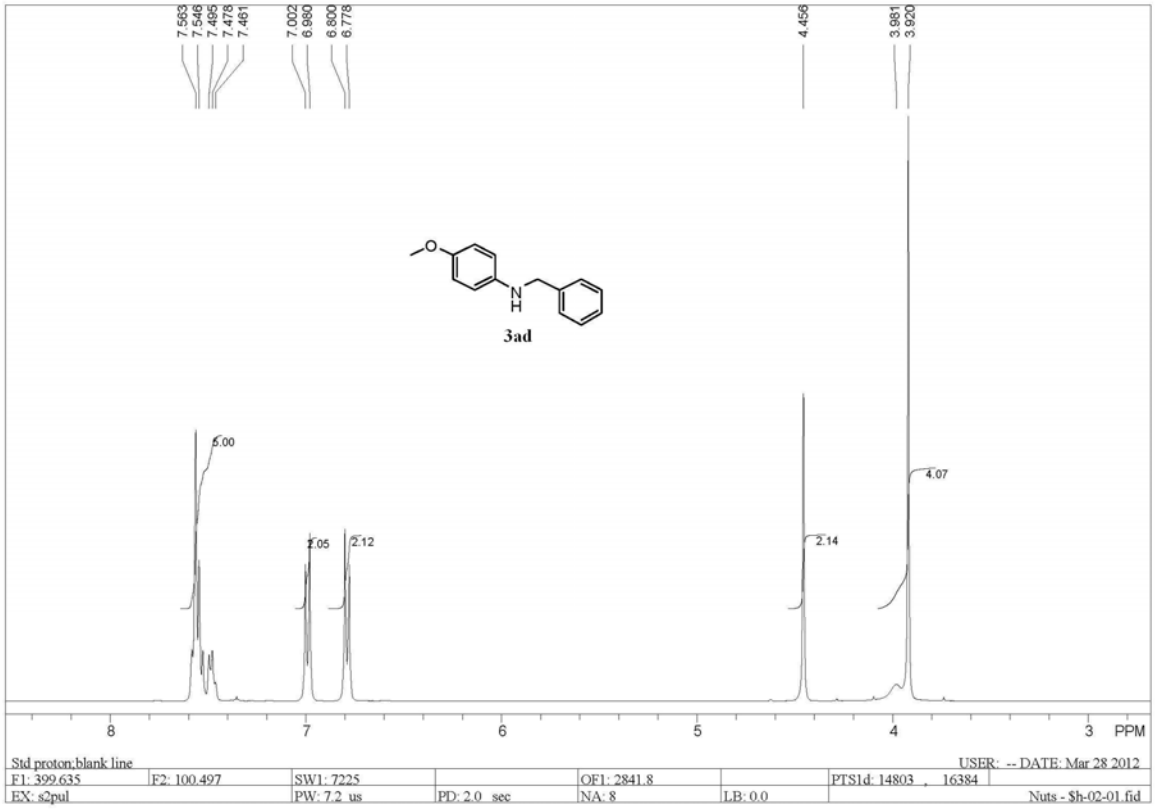

165.471
163.072
151.258
151.156
130.278
130.176
107.949
107.927
102.749
102.538
99.365
99.110
77.474
77.160
76.839
60.511
49.580
38.423
29.657
F
N
OH
3aa
160
140
120
100
80
60
40
PPM
USER: nmr -- DATE: 03:17:10.203 +0800 nmr@EP-ZH107708
F1: 100.610
F2: 1.000
SW1: 24038
OF1: 10063.3
PTS1d: 32768
EX: zgpg30
PW: 8.5 us
PD: 2.0 sec
NA: 64
Nuts - $01-26-3-氟-N-甲基丙醇胺_3-F-N-Me-N-CH2CH2CH2OH-C.1

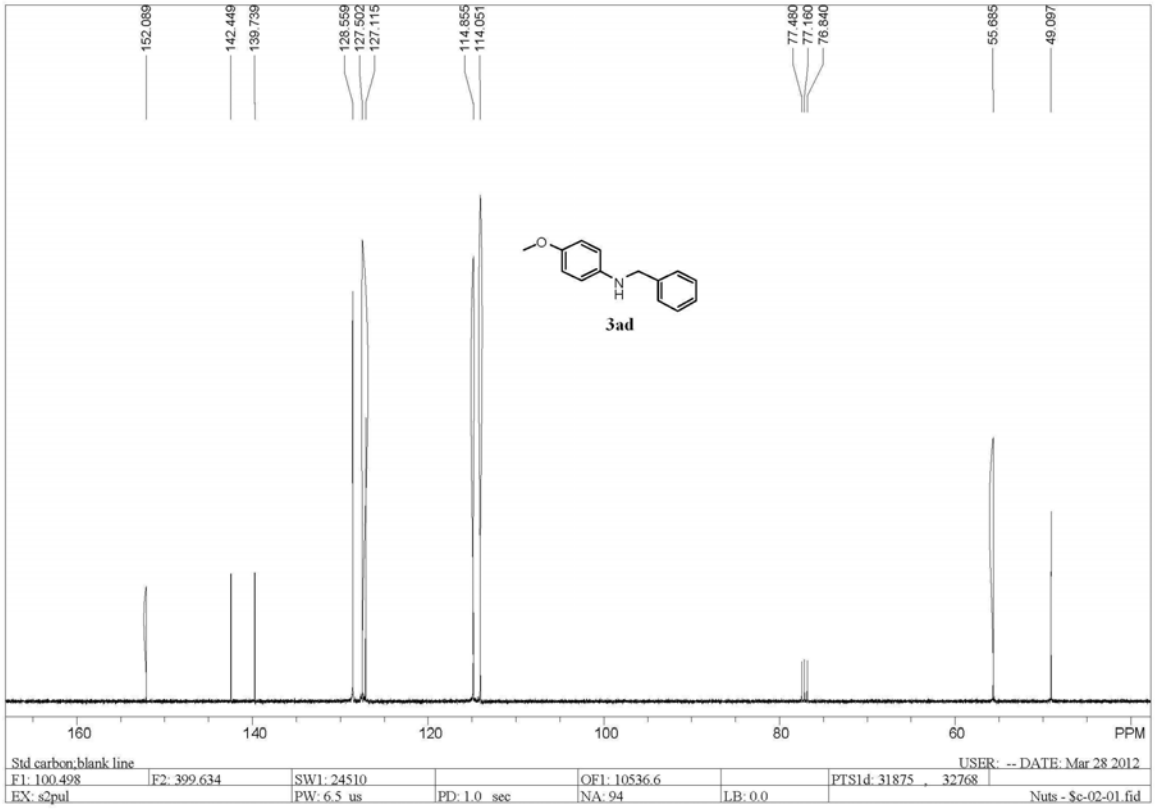

7.260
6.830
6.824
3.758
3.739
3.719
3.333
3.311
3.289
2.820
1.808
1.787
1.767
3ab
4.00
5.03
2.01
0.87
3.02
1.92
8
7
6
5
4
3
2
1
PPM
USER: -- DATE: Feb 28 2012
F1: 300.055 F2: 75.456 SW1: 4803 OF1: 1806.5 PTS1d: 16384
EX: s2pul PW: 5.8 us PD: 1.0 sec NA: 32 LB: 0.0 Nuts - $4-MeO-N-Me-N-CH2CH2CH2OH_28Feb2012

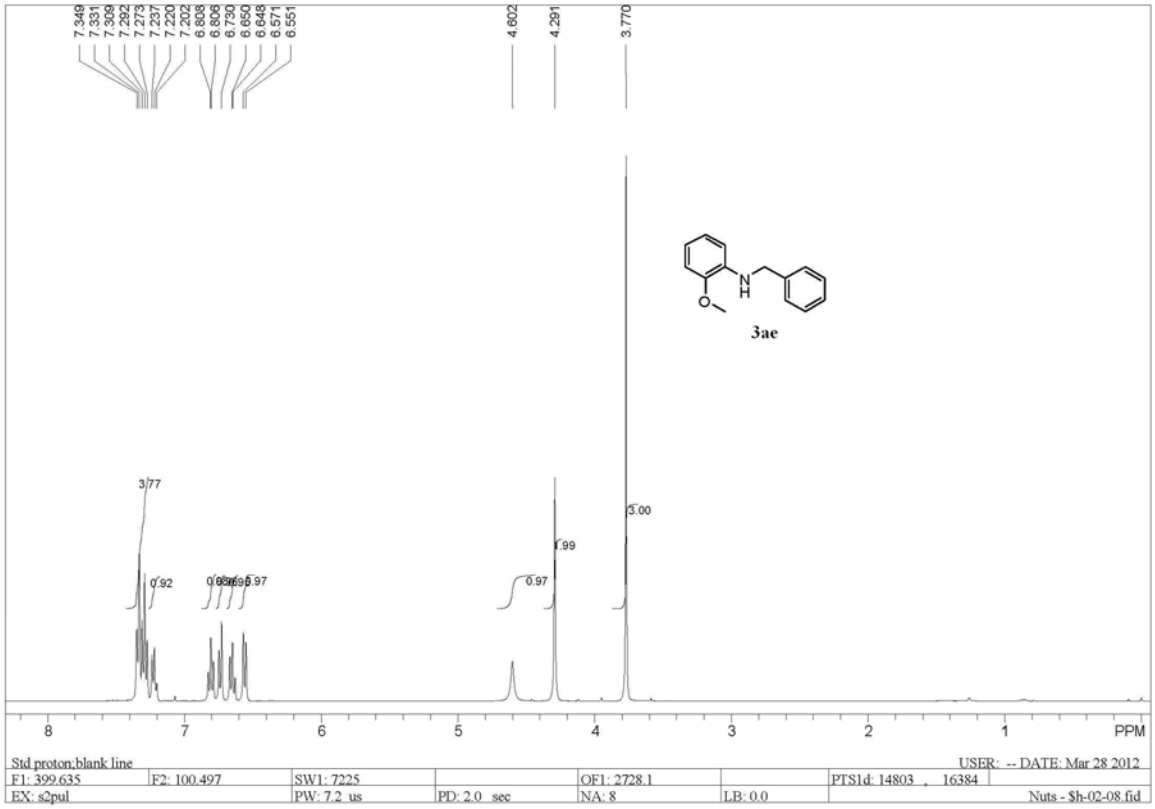

152.644
144.950
116.437
114.760
77.481
77.160
76.846
61.817
55.771
52.767
39.772
29.263
3ab
160
140
120
100
80
60
40
20
PPM
USER: nmr -- DATE: 23:43:26.578 +0800 nmr@EP-ZH107708
F1: 100.610 F2: 1.000 SW1: 24038 OF1: 10062.6 PTS1d: 32768
EX: zgpg30 PW: 8.5 us PD: 2.0 sec NA: 64 Nuts - $9107-4-甲氧-N-甲基丙醇胺_4-MeO-N-Me-N-CH2CH2CH2OH-C.1

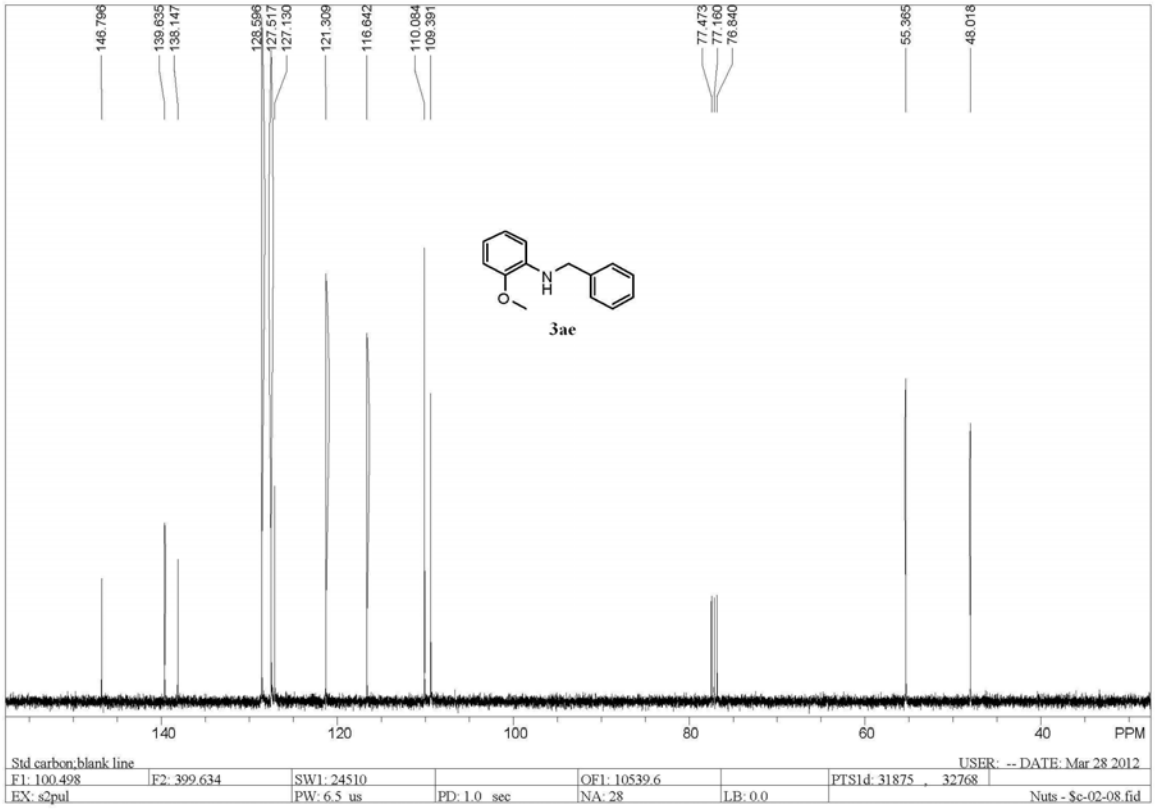

7.260
6.868
6.838
6.797
6.736
3.769
3.573
3.553
3.533
3.456
3.437
3.416
3.378
2.922
3ac
2.00
2.03
3.00
3.03
2.01
2.00
3.07
7
6
5
4
3
PPM
USER: -- DATE: Feb 28 2012
F1: 300.055 F2: 75.456 SW1: 4803 OF1: 1806.2 PTS1d: 16384
EX: s2pul PW: 5.8 us PD: 1.0 sec NA: 32 LB: 0.0 Nuts - $4-MeO-N-Me-N-CH2CH2OMe_28Feb2012

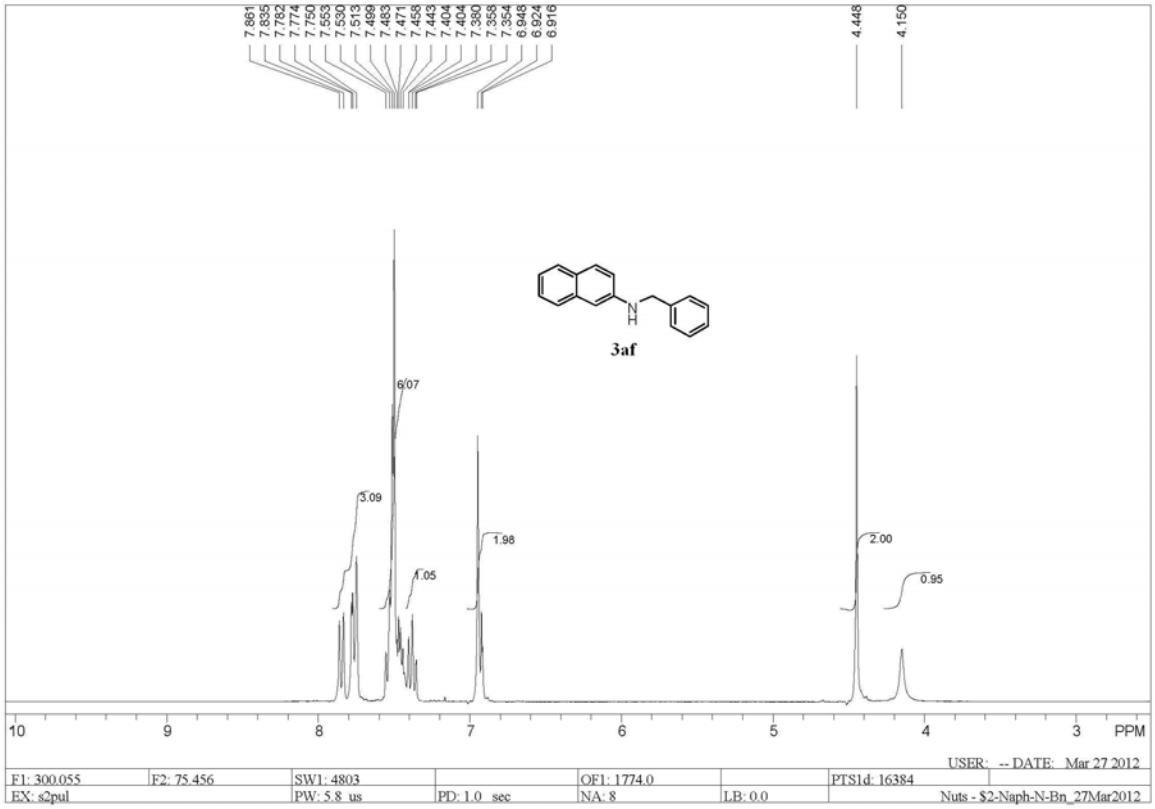

151.798
144.498
114.767
114.548
77.481
77.160
76.839
70.371
59.009
55.764
53.759
39.568
3ac
140
120
100
80
60
40
PPM
USER: nmr -- DATE: 23:21:27.562 +0800 nmr@EP-ZH107708
F1: 100.610 F2: 1.000 SW1: 24038 OF1: 10060.4 PTS1d: 32768
EX: zgpg30 PW: 8.5 us PD: 2.0 sec NA: 64 Nuts - $01-06-4 4-甲氧-N-甲基-（氧甲基乙醇胺） 4-MeO-N-Me-N-CH2CH2OMe-C.1

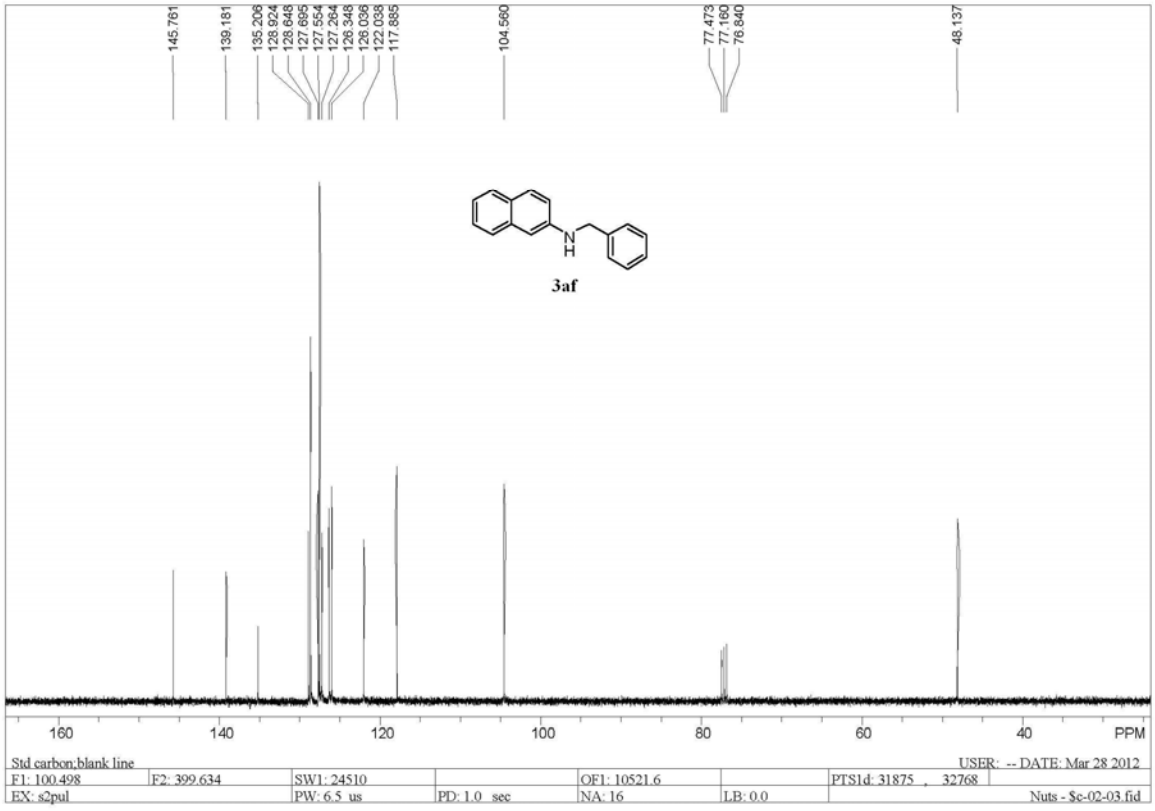

7.583
7.546
7.495
7.478
7.461
7.002
6.980
6.800
6.778
4.456
3.981
3.920
3ad
5.00
2.05
2.12
2.14
4.07
8
7
6
5
4
3
PPM
Std proton;blank line
USER: -- DATE: Mar 28 2012
F1: 399.635
F2: 100.497
SW1: 7225
OF1: 2841.8
PTS1d: 14803 , 16384
EX: s2pul
PW: 7.2 us
PD: 2.0 sec
NA: 8
LB: 0.0
Nuts - $h-02-01.fid

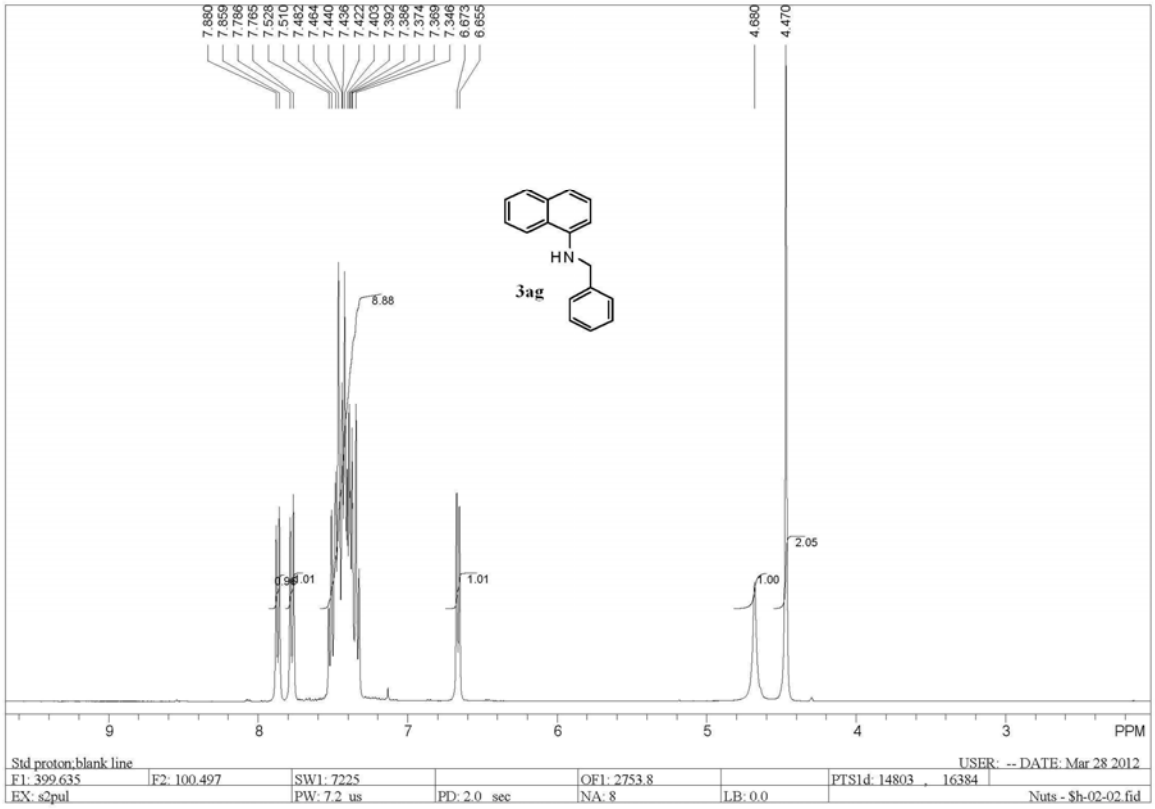

152.089
142.449
139.739
128.559
127.502
127.115
114.855
114.051
77.480
77.160
76.840
55.685
49.097
3ad
160
140
120
100
80
60
PPM
Std carbon;blank line
USER: -- DATE: Mar 28 2012
F1: 100.498
F2: 399.634
SW1: 24510
OF1: 10536.6
PTS1d: 31875 , 32768
EX: s2pul
PW: 6.5 us
PD: 1.0 sec
NA: 94
LB: 0.0
Nuts - $c-02-01.fid

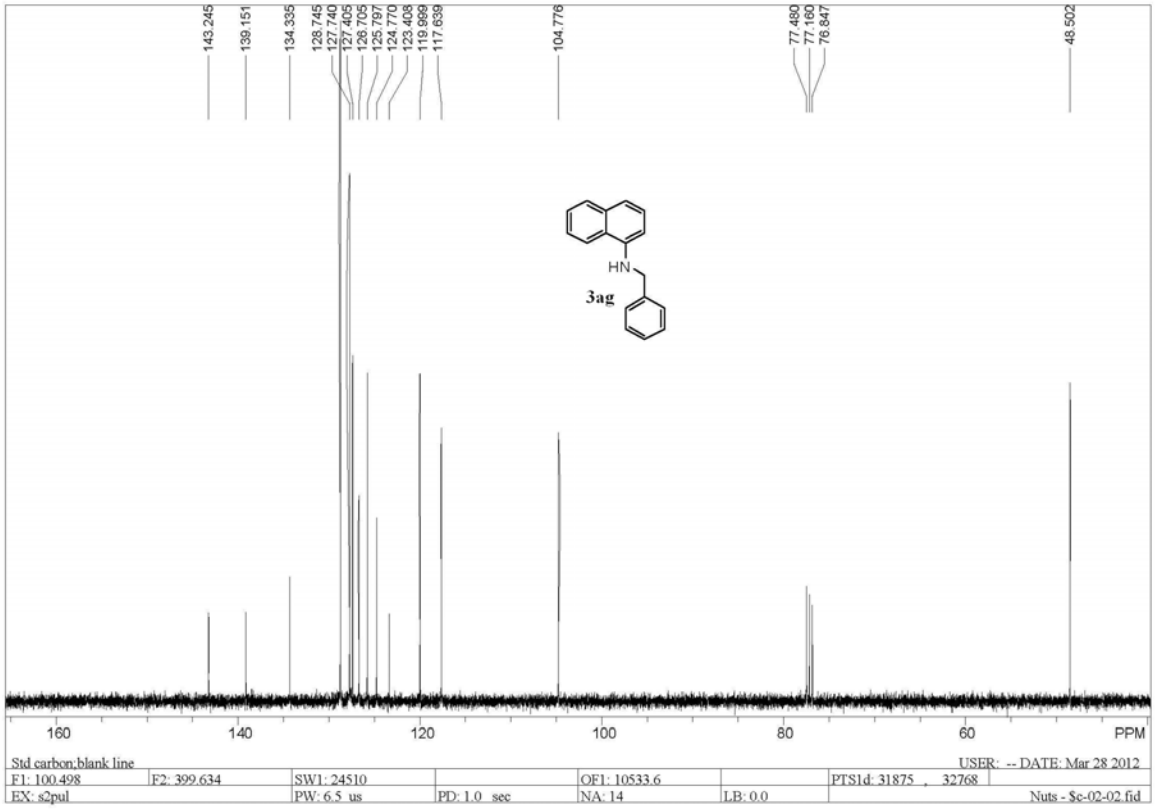

7.349
7.331
7.309
7.292
7.273
7.237
7.220
7.202
6.808
6.806
6.730
6.650
6.648
6.571
6.551
4.602
4.291
3.770
3.77
0.92
0.97
5.97
0.97
1.99
3.00
3ae
8
7
6
5
4
3
2
1
PPM
Std proton;blank line
USER: -- DATE: Mar 28 2012
F1: 399.635
F2: 100.497
SW1: 7225
OF1: 2728.1
PTS1d: 14803 , 16384
EX: s2pul
PW: 7.2 us
PD: 2.0 sec
NA: 8
LB: 0.0
Nuts - $h-02-08.fid

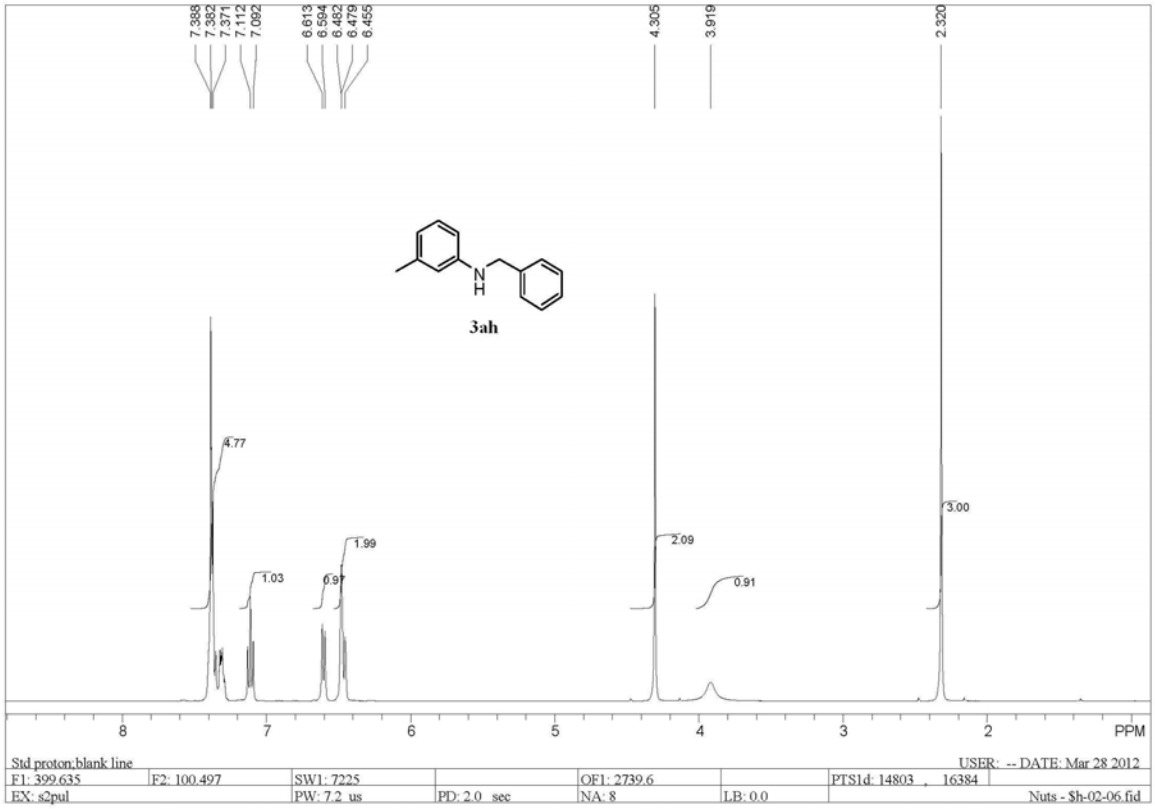

146.796
139.635
138.147
128.596
127.517
127.130
121.309
116.642
110.084
109.391
77.473
77.160
76.840
55.365
48.018
3ae
140
120
100
80
60
40
PPM
Std carbon;blank line
USER: -- DATE: Mar 28 2012
F1: 100.498
F2: 399.634
SW1: 24510
OF1: 10539.6
PTS1d: 31875 , 32768
EX: s2pul
PW: 6.5 us
PD: 1.0 sec
NA: 28
LB: 0.0
Nuts - $c-02-08.fid

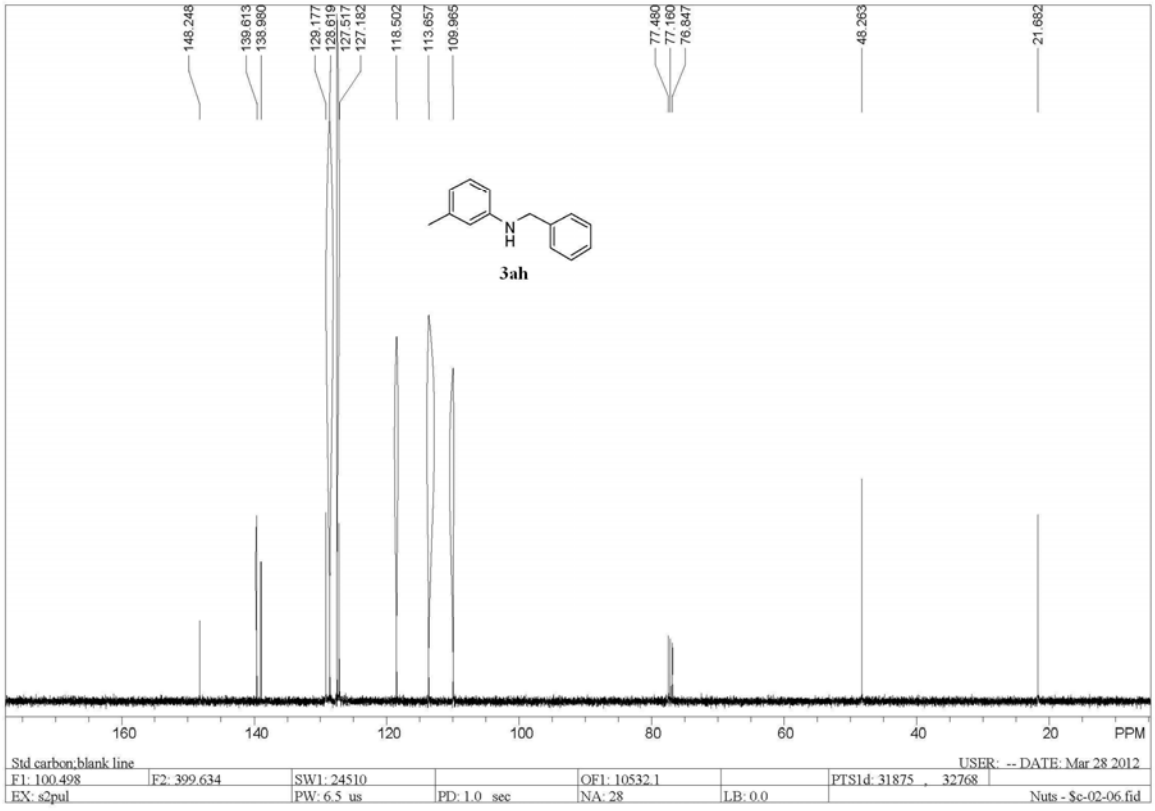

7.861
7.835
7.782
7.774
7.750
7.553
7.530
7.513
7.489
7.483
7.471
7.458
7.443
7.404
7.404
7.380
7.358
7.354
6.948
6.924
6.916
4.448
4.150
3af
6.07
3.09
1.98
1.05
2.00
0.95
10
9
8
7
6
5
4
3
PPM
USER: -- DATE: Mar 27 2012
F1: 300.055
F2: 75.456
SW1: 4803
OF1: 1774.0
PTS1d: 16384
EX: s2pul
PW: 5.8 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $2-Naph-N-Bn_27Mar2012

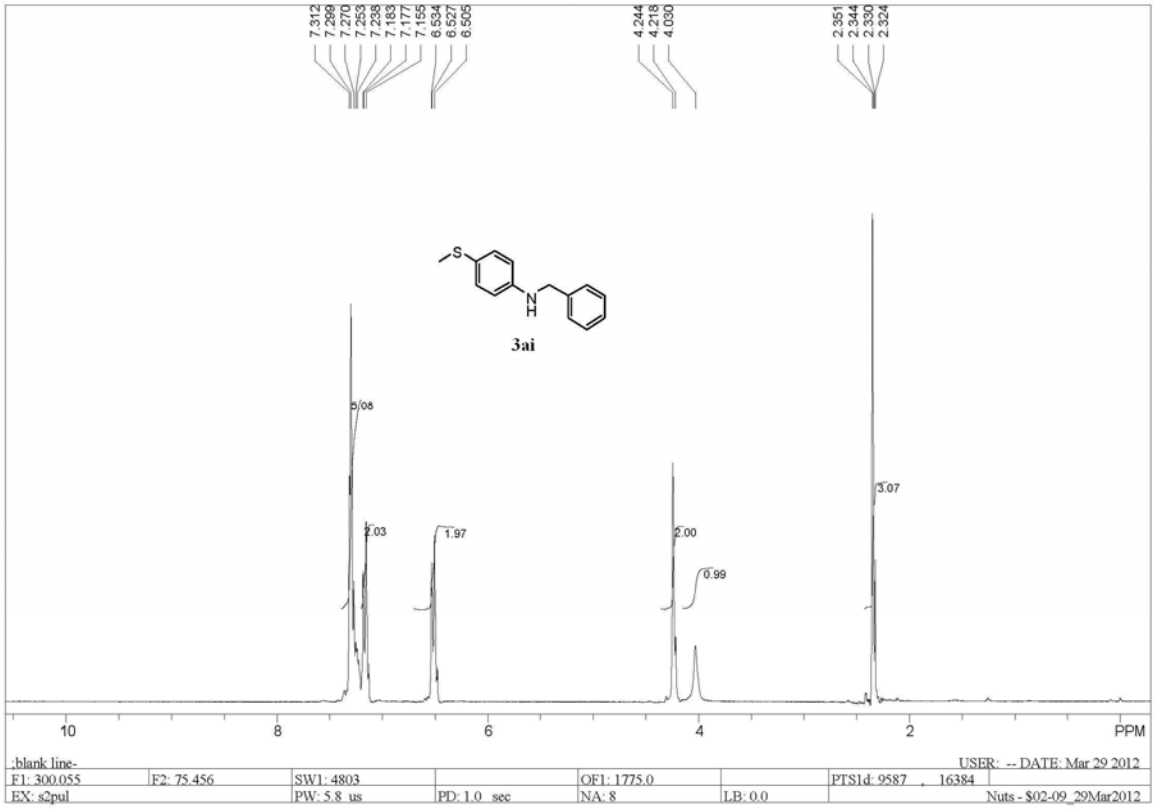

145.761
139.181
135.206
128.924
128.848
127.695
127.554
127.264
126.348
126.036
122.038
117.885
104.560
77.473
77.160
76.840
48.137
3af
160
140
120
100
80
60
40
PPM
Std carbon;blank line
USER: -- DATE: Mar 28 2012
F1: 100.498
F2: 399.634
SW1: 24510
OF1: 10521.6
PTS1d: 31875 , 32768
EX: s2pul
PW: 6.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $c-02-03.fid

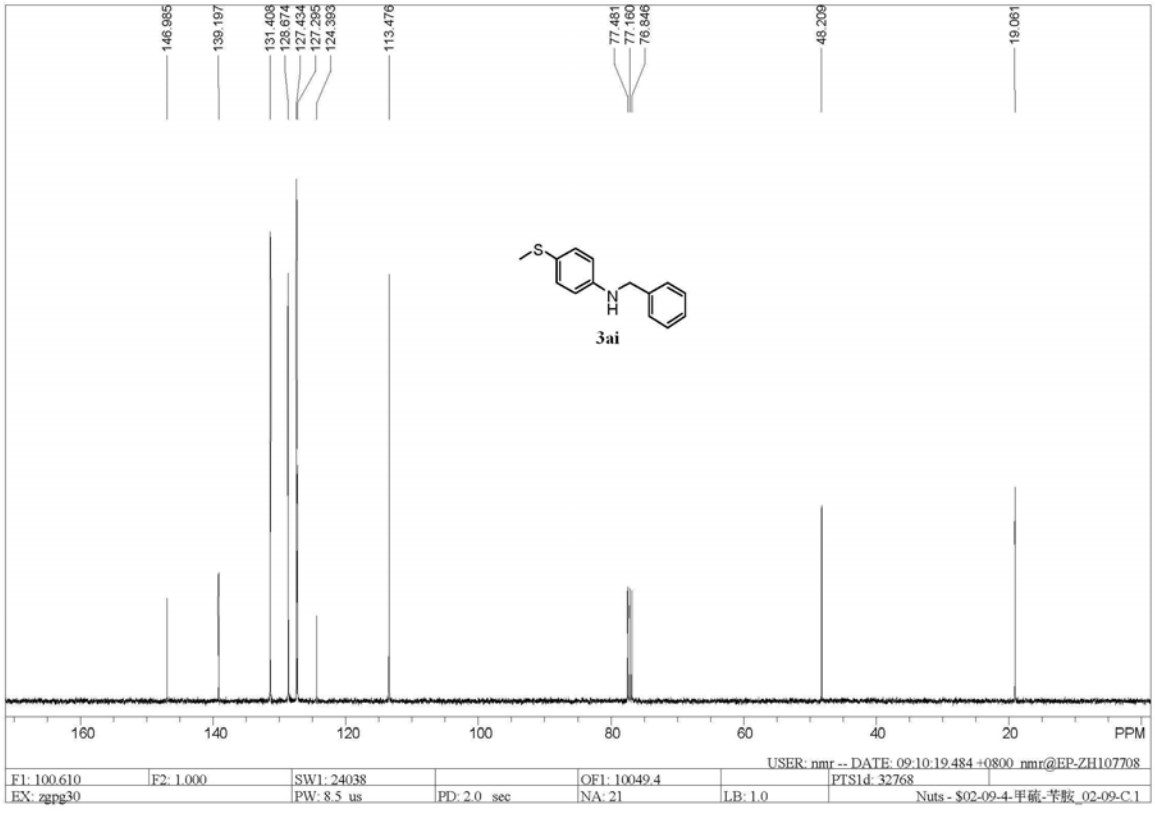

7.880
7.859
7.796
7.765
7.528
7.510
7.482
7.464
7.440
7.436
7.422
7.403
7.392
7.386
7.374
7.369
7.346
6.673
6.655
4.680
4.470
HN
3ag
8.88
0.96
1.01
1.01
1.00
2.05
9
8
7
6
5
4
3
PPM
Std proton;blank line
USER: -- DATE: Mar 28 2012
F1: 399.635
F2: 100.497
SW1: 7225
OF1: 2753.8
PTS1d: 14803 , 16384
EX: s2pul
PW: 7.2 us
PD: 2.0 sec
NA: 8
LB: 0.0
Nuts - $h-02-02.fid

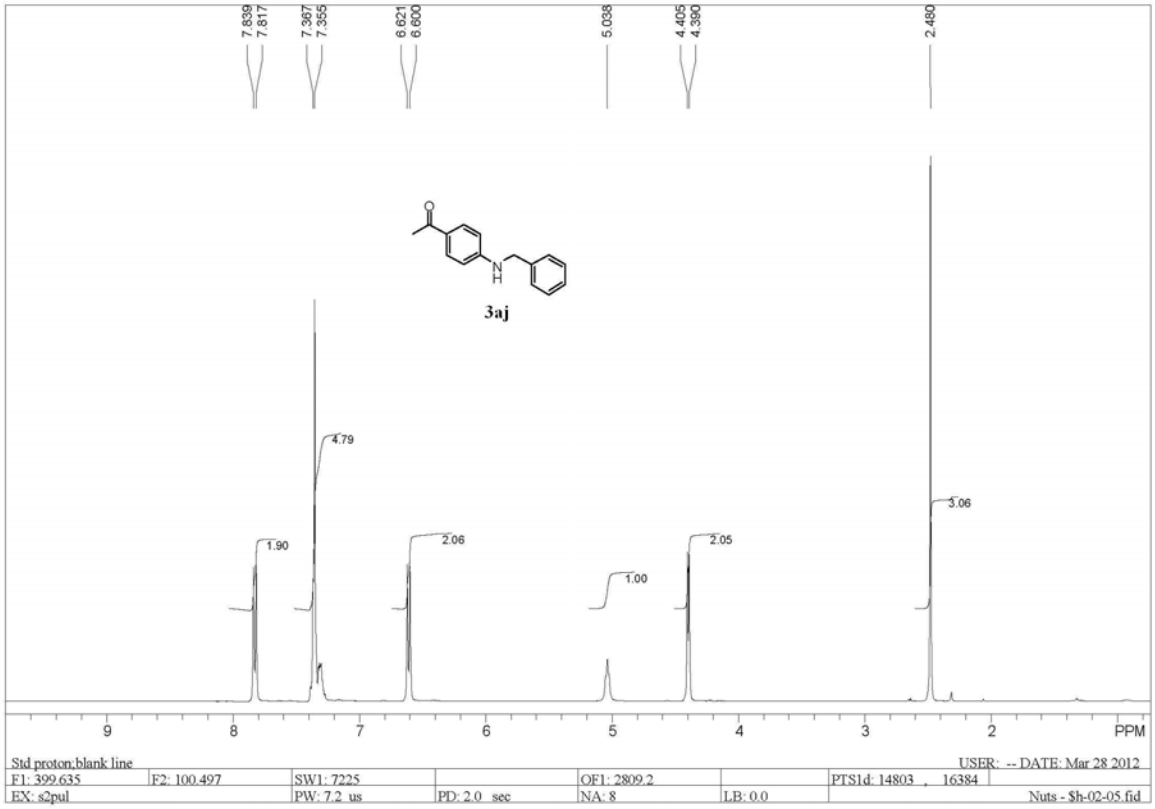

143.245
139.151
134.335
128.745
127.740
127.405
126.705
125.797
124.770
123.408
119.969
117.639
104.776
77.480
77.160
76.847
48.502
HN
3ag
160
140
120
100
80
60
PPM
Std carbon;blank line
USER: -- DATE: Mar 28 2012
F1: 100.498
F2: 399.634
SW1: 24510
OF1: 10533.6
PTS1d: 31875 , 32768
EX: s2pul
PW: 6.5 us
PD: 1.0 sec
NA: 14
LB: 0.0
Nuts - $c-02-02.fid

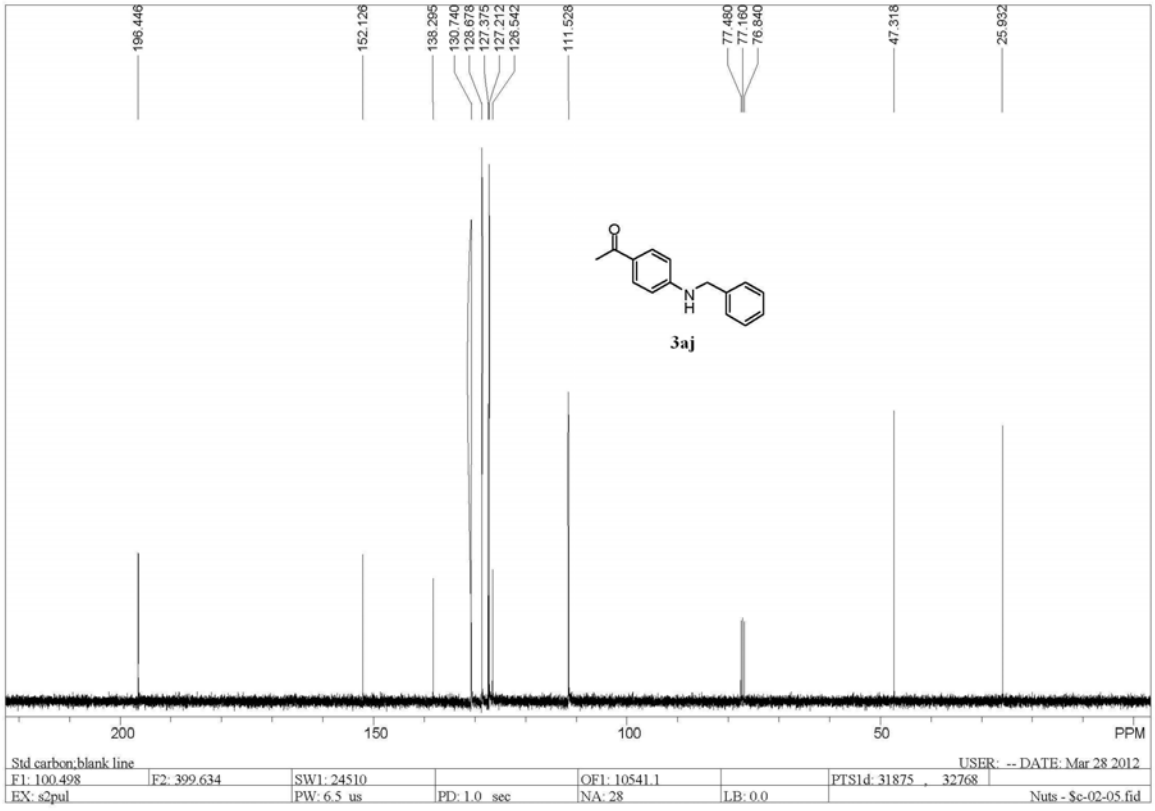

7.388
7.382
7.371
7.112
7.092
6.613
6.594
6.482
6.479
6.455
4.305
3.919
2.320
3ah
4.77
1.03
0.97
1.99
2.09
0.91
3.00
8
7
6
5
4
3
2
PPM
Std proton;blank line
USER: -- DATE: Mar 28 2012
F1: 399.635
F2: 100.497
SW1: 7225
OF1: 2739.6
PTS1d: 14803 , 16384
EX: s2pul
PW: 7.2 us
PD: 2.0 sec
NA: 8
LB: 0.0
Nuts - $h-02-06.fid

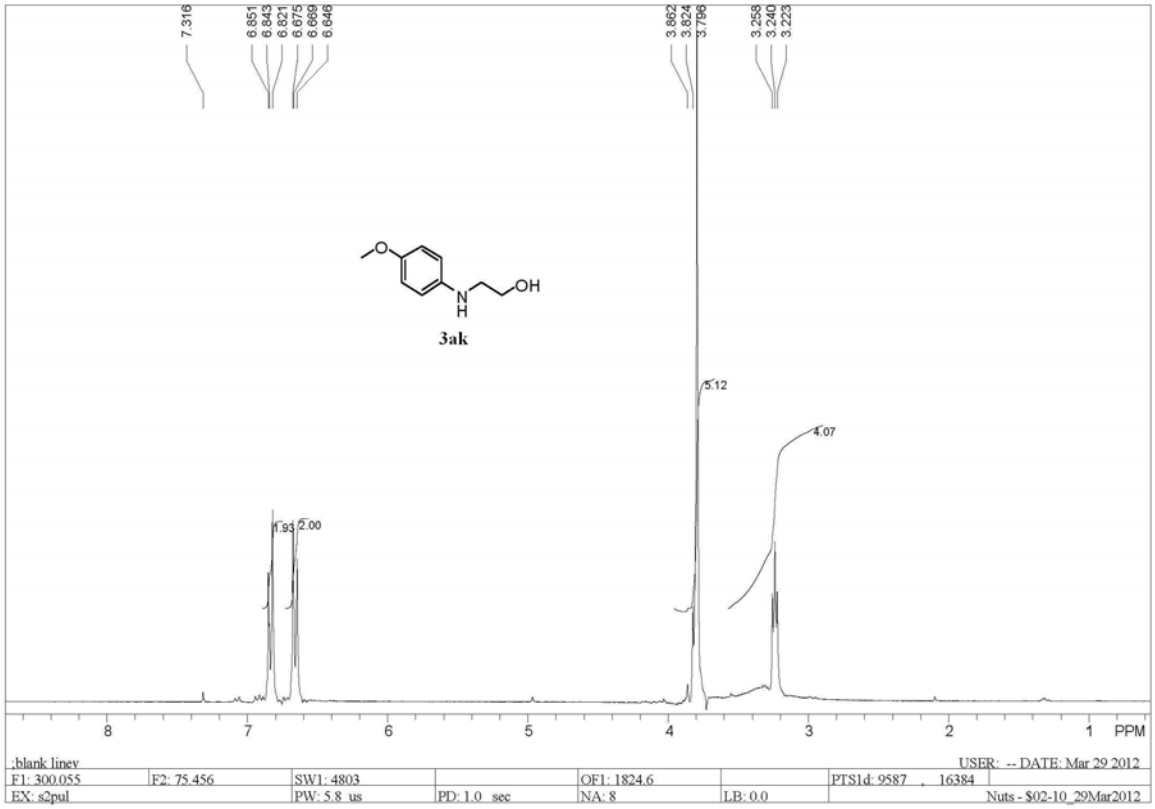

148.248
139.613
138.980
129.177
128.819
127.517
127.182
118.502
113.857
109.965
77.480
77.160
76.847
48.263
21.682
3ah
160
140
120
100
80
60
40
20
PPM
Std carbon;blank line
USER: -- DATE: Mar 28 2012
F1: 100.498
F2: 399.634
SW1: 24510
OF1: 10532.1
PTS1d: 31875 , 32768
EX: s2pul
PW: 6.5 us
PD: 1.0 sec
NA: 28
LB: 0.0
Nuts - $c-02-06.fid

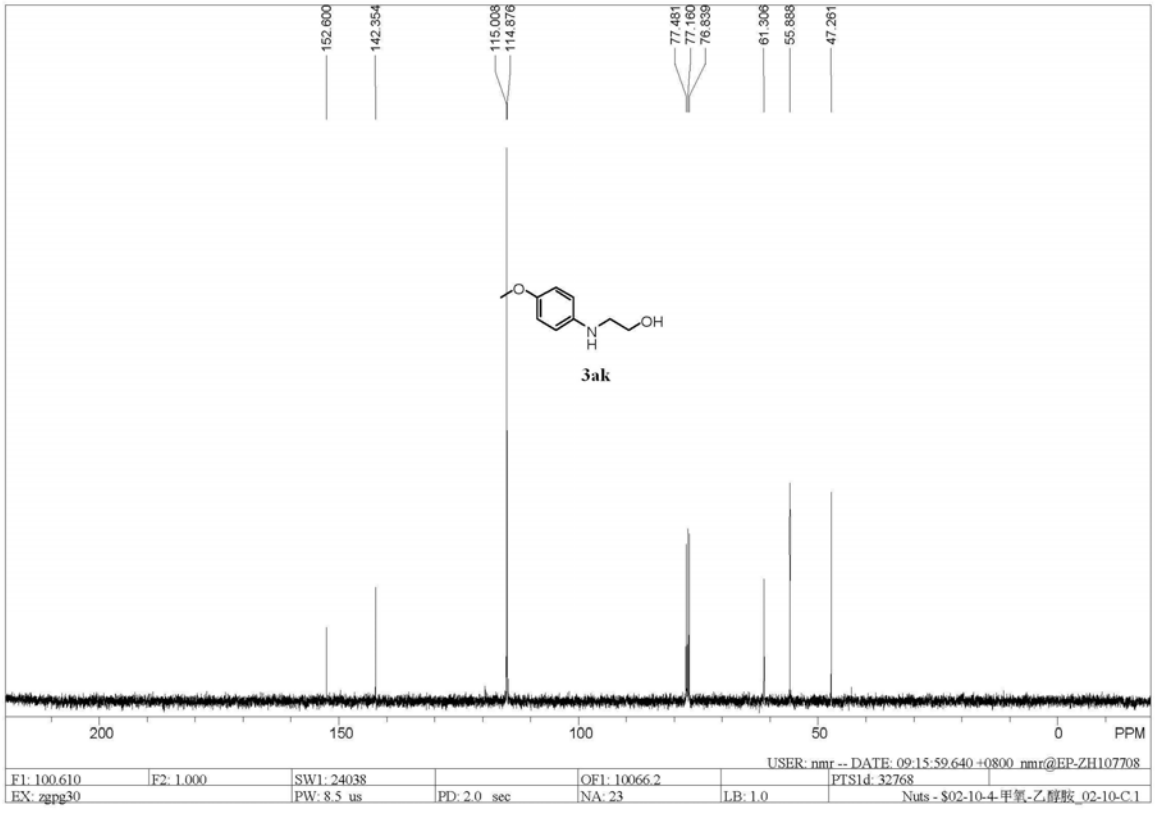

7.312
7.299
7.270
7.253
7.238
7.183
7.177
7.155
6.534
6.527
6.505
4.244
4.218
4.030
2.351
2.344
2.330
2.324
3ai
5.08
2.03
1.97
2.00
0.99
3.07
10
8
6
4
2
PPM
;blank line-
USER: -- DATE: Mar 29 2012
F1: 300.055
F2: 75.456
SW1: 4803
OF1: 1775.0
PTS1d: 9587 , 16384
EX: s2pul
PW: 5.8 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $02-09_29Mar2012

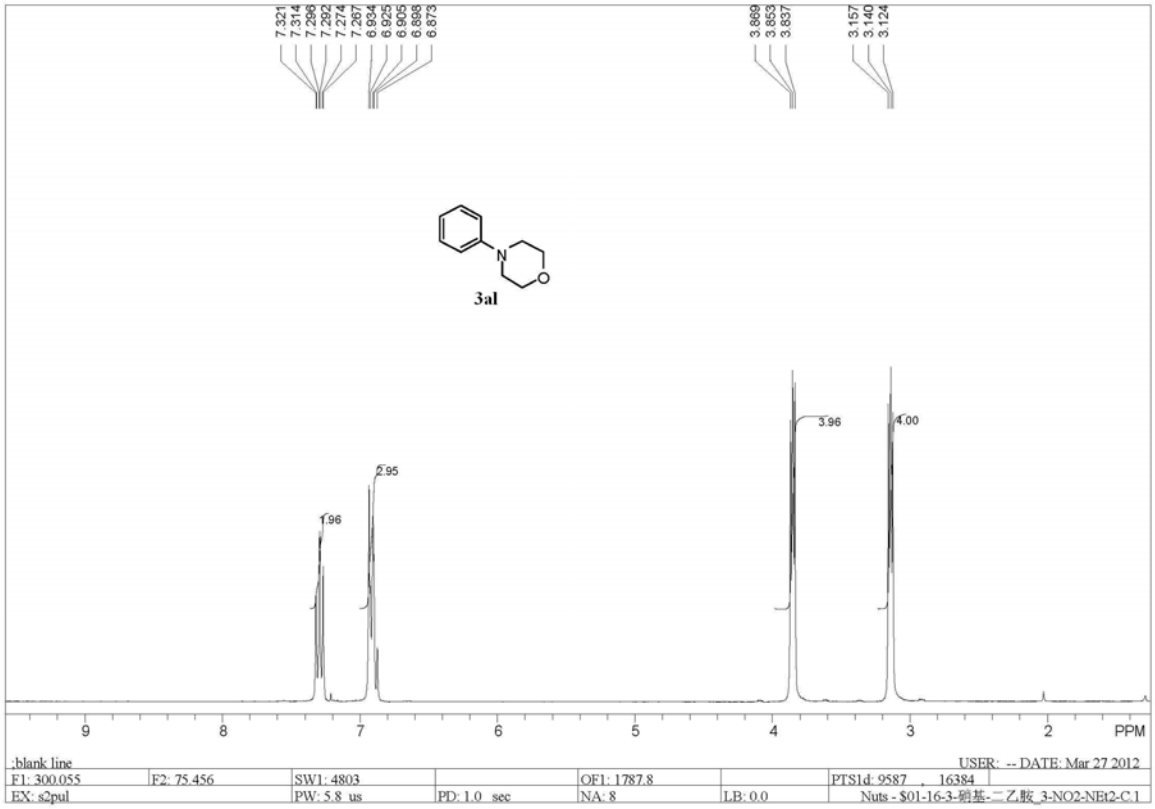

146.985
139.197
131.408
128.674
127.434
127.295
124.393
113.476
77.481
77.160
76.846
48.209
19.061
3ai
160
140
120
100
80
60
40
20
PPM
USER: nmr -- DATE: 09:10:19.484 +0800 nmr@EP-ZH107708
F1: 100.610
F2: 1.000
SW1: 24038
OF1: 10049.4
PTS1d: 32768
EX: zgpg30
PW: 8.5 us
PD: 2.0 sec
NA: 21
LB: 1.0
Nuts - $02-09-4-甲硫-苄胺_02-09-C.1


7.839
7.817
7.367
7.355
6.621
6.600
5.038
4.405
4.390
2.480
3aj
4.79
1.90
2.06
1.00
2.05
3.06
9
8
7
6
5
4
3
2
PPM
Std proton;blank line
USER: -- DATE: Mar 28 2012
F1: 399.635
F2: 100.497
SW1: 7225
OF1: 2809.2
PTS1d: 14803 , 16384
EX: s2pul
PW: 7.2 us
PD: 2.0 sec
NA: 8
LB: 0.0
Nuts - $h-02-05.fid


196.446
152.126
138.295
130.740
128.678
127.375
127.212
126.542
111.528
77.480
77.160
76.840
47.318
25.932
3aj
200
150
100
50
PPM
Std carbon;blank line
USER: -- DATE: Mar 28 2012
F1: 100.498
F2: 399.634
SW1: 24510
OF1: 10541.1
PTS1d: 31875 , 32768
EX: s2pul
PW: 6.5 us
PD: 1.0 sec
NA: 28
LB: 0.0
Nuts - $c-02-05.fid


7.316
6.851
6.843
6.821
6.675
6.669
6.646
3.862
3.824
3.796
3.258
3.240
3.223
3ak
5.12
4.07
1.93
2.00
8
7
6
5
4
3
2
1
PPM
;blank linev
USER: -- DATE: Mar 29 2012
F1: 300.055
F2: 75.456
SW1: 4803
OF1: 1824.6
PTS1d: 9587 , 16384
EX: s2pul
PW: 5.8 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $02-10_29Mar2012


152.600
142.354
115.008
114.876
77.481
77.160
76.839
61.306
55.888
47.261
3ak
200
150
100
50
0
PPM
USER: nmr -- DATE: 09:15:59.640 +0800 nmr@EP-ZH107708
F1: 100.610
F2: 1.000
SW1: 24038
OF1: 10066.2
PTS1d: 32768
EX: zgpg30
PW: 8.5 us
PD: 2.0 sec
NA: 23
LB: 1.0
Nuts - $02-10-4-甲氧-乙醇胺_02-10-C.1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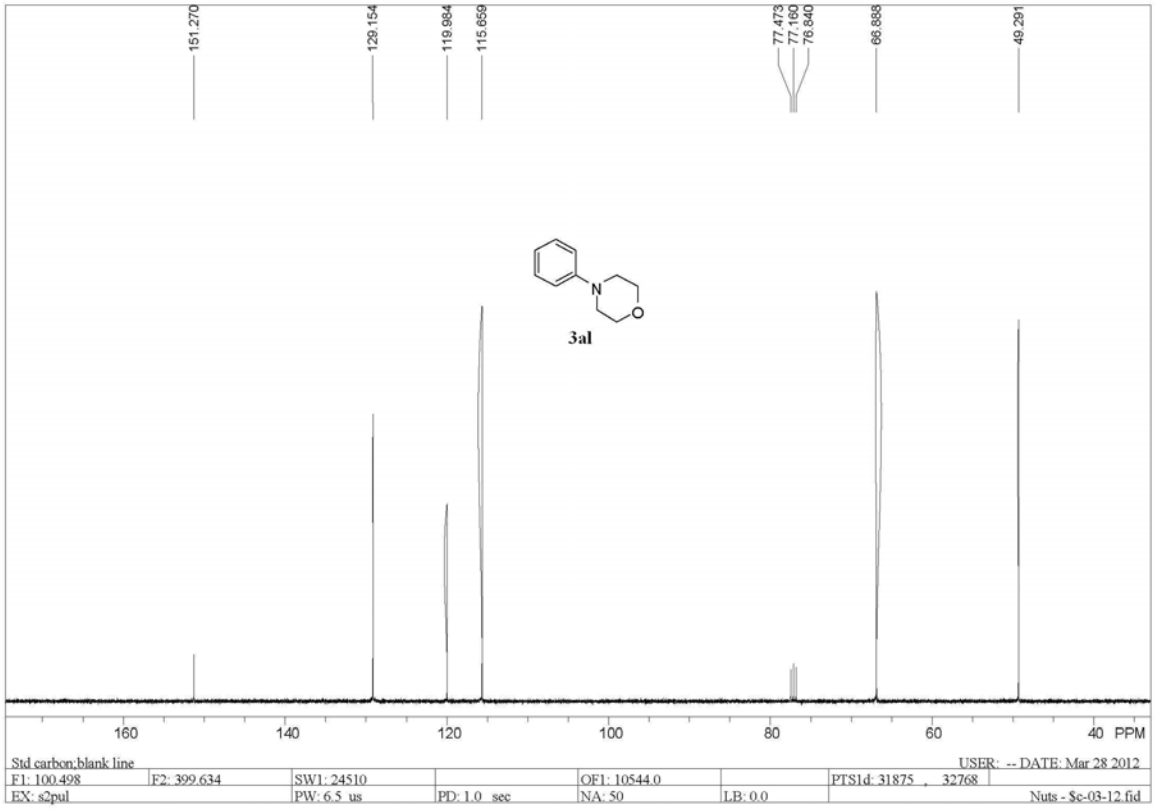
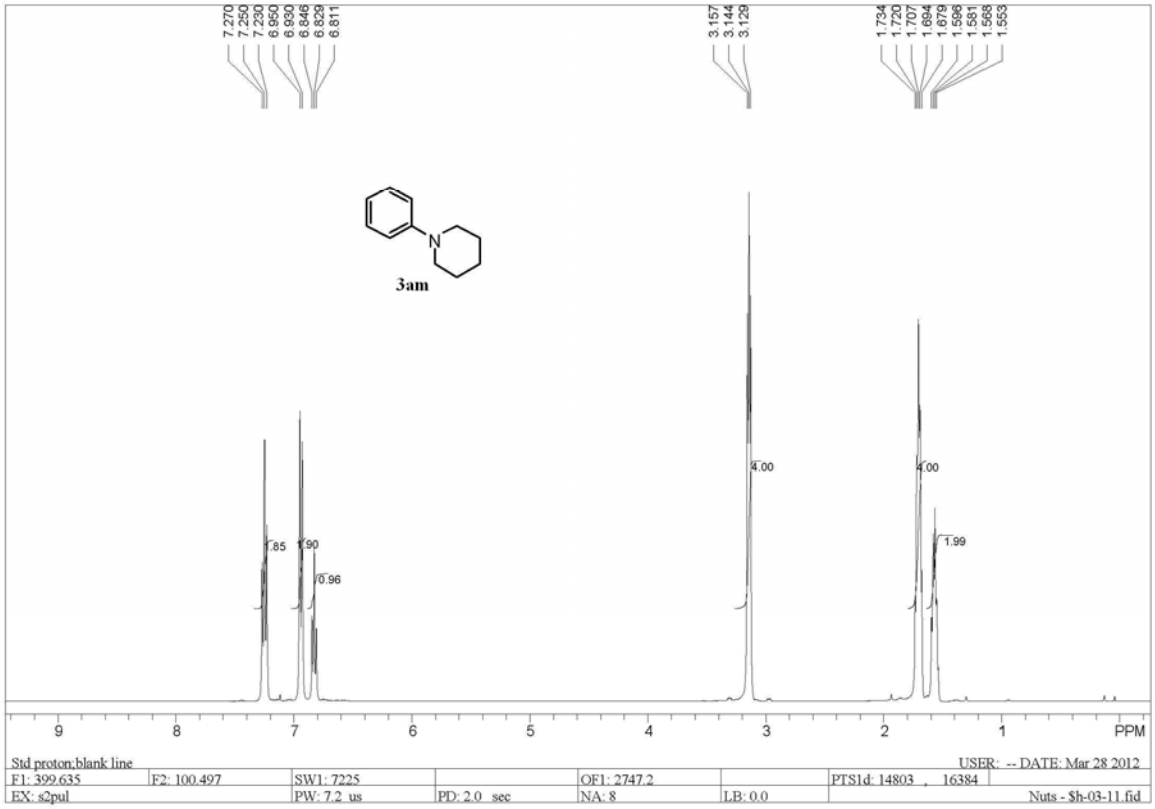
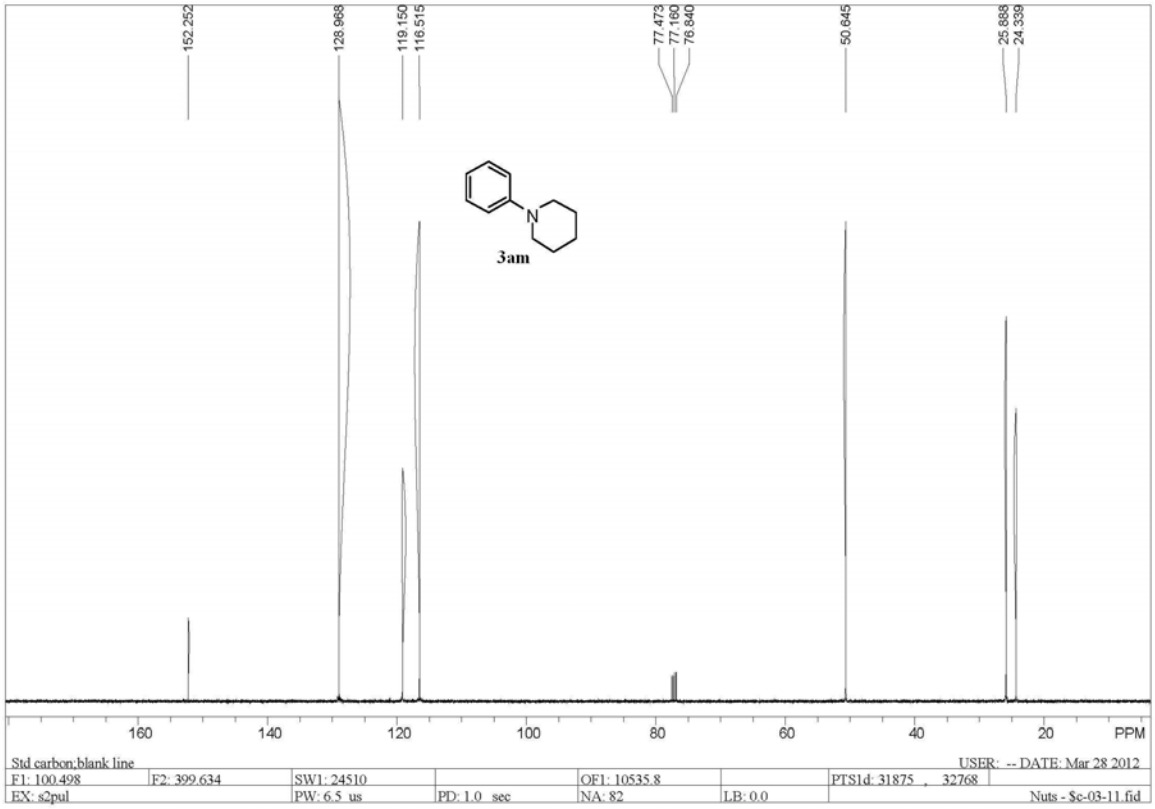
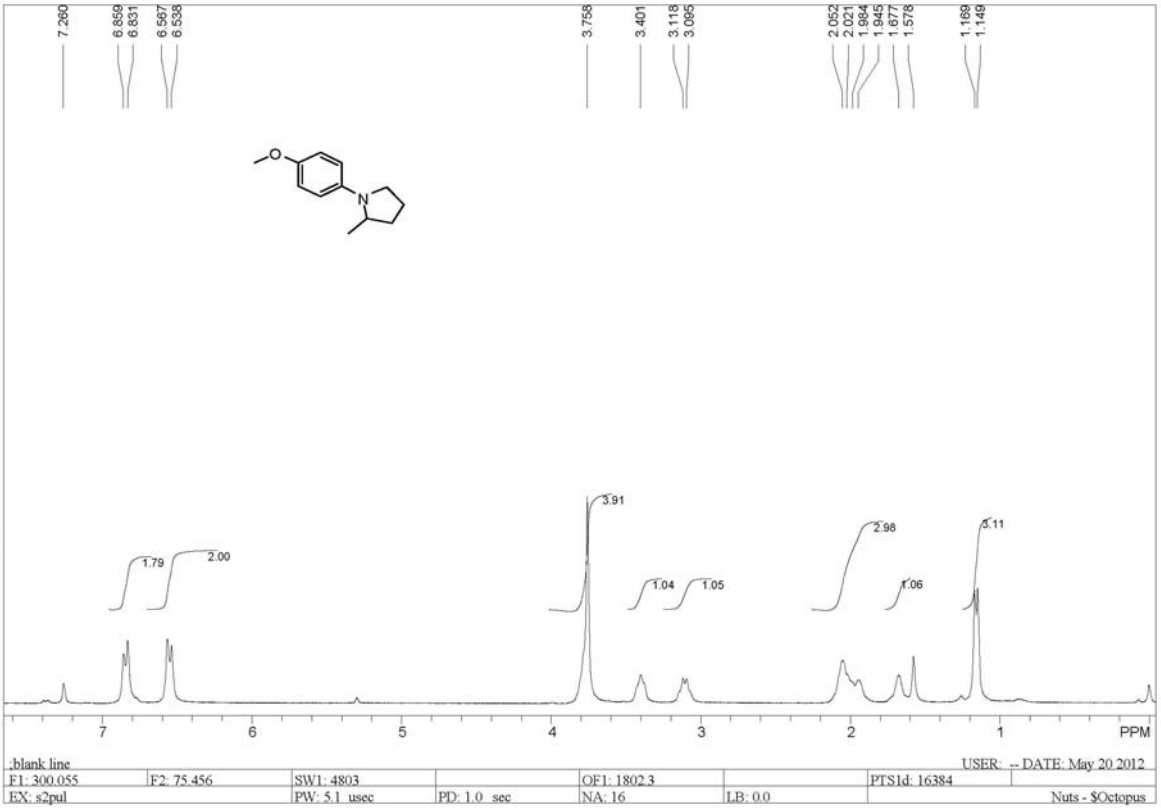
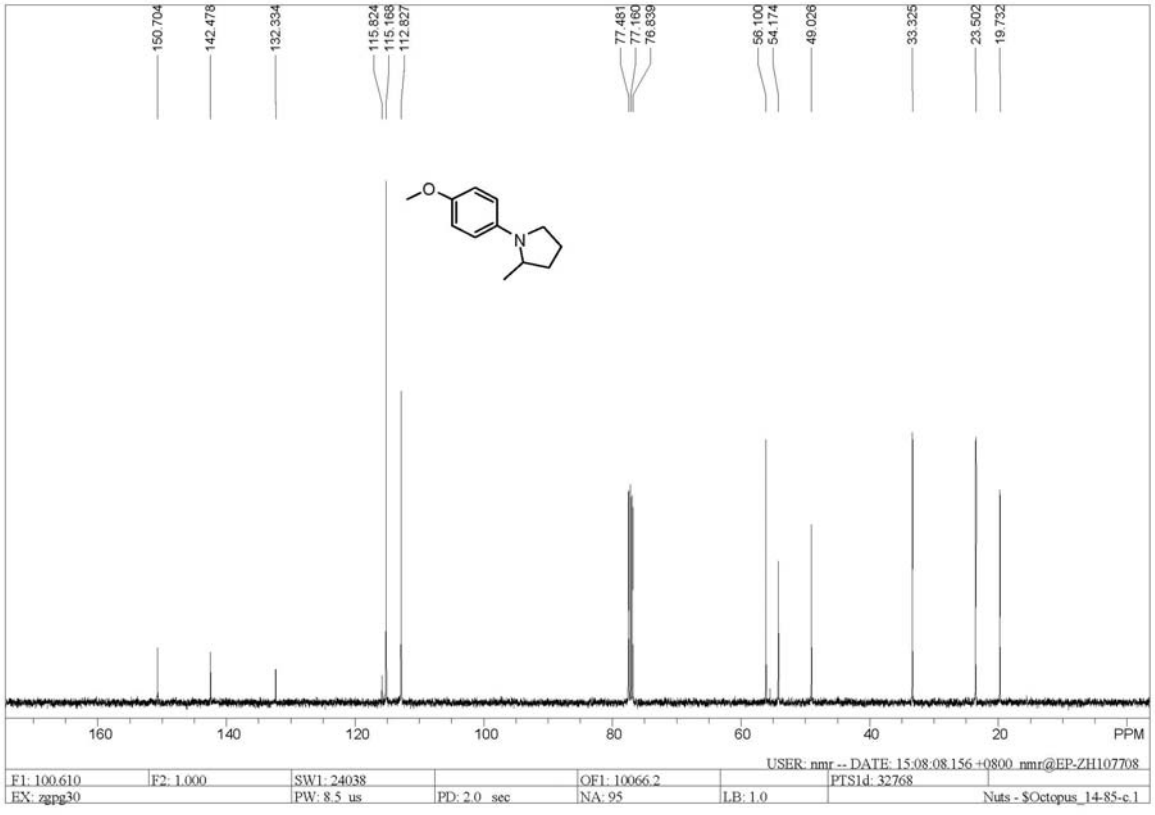
7.314
7.298
7.292
7.274
7.267
6.934
6.925
6.905
6.898
6.873
3.869
3.853
3.837
3.157
3.140
3.124
3al
1.96
2.95
3.96
4.00
9
8
7
6
5
4
3
2
PPM
;blank line
USER: -- DATE: Mar 27 2012
F1: 300.055
F2: 75.456
SW1: 4803
OF1: 1787.8
PTS1d: 9587 , 16384
EX: s2pul
PW: 5.8 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $01-16-3-硝基-二乙胺_3-NO2-NEt2-C.1

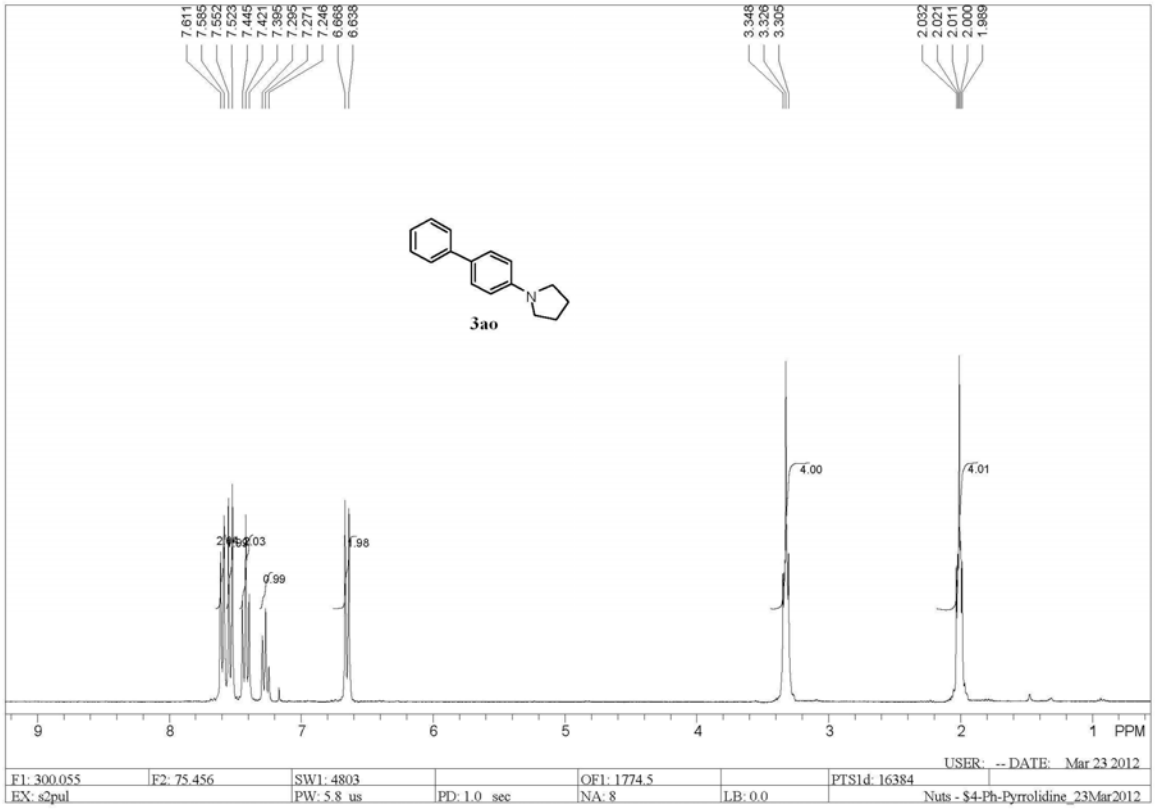

151.270
129.154
119.984
115.659
77.473
77.160
76.840
66.888
49.291
3al
160
140
120
100
80
60
40
PPM
Std carbon;blank line
USER: -- DATE: Mar 28 2012
F1: 100.498
F2: 399.634
SW1: 24510
OF1: 10544.0
PTS1d: 31875 , 32768
EX: s2pul
PW: 6.5 us
PD: 1.0 sec
NA: 50
LB: 0.0
Nuts - $c-03-12.fid

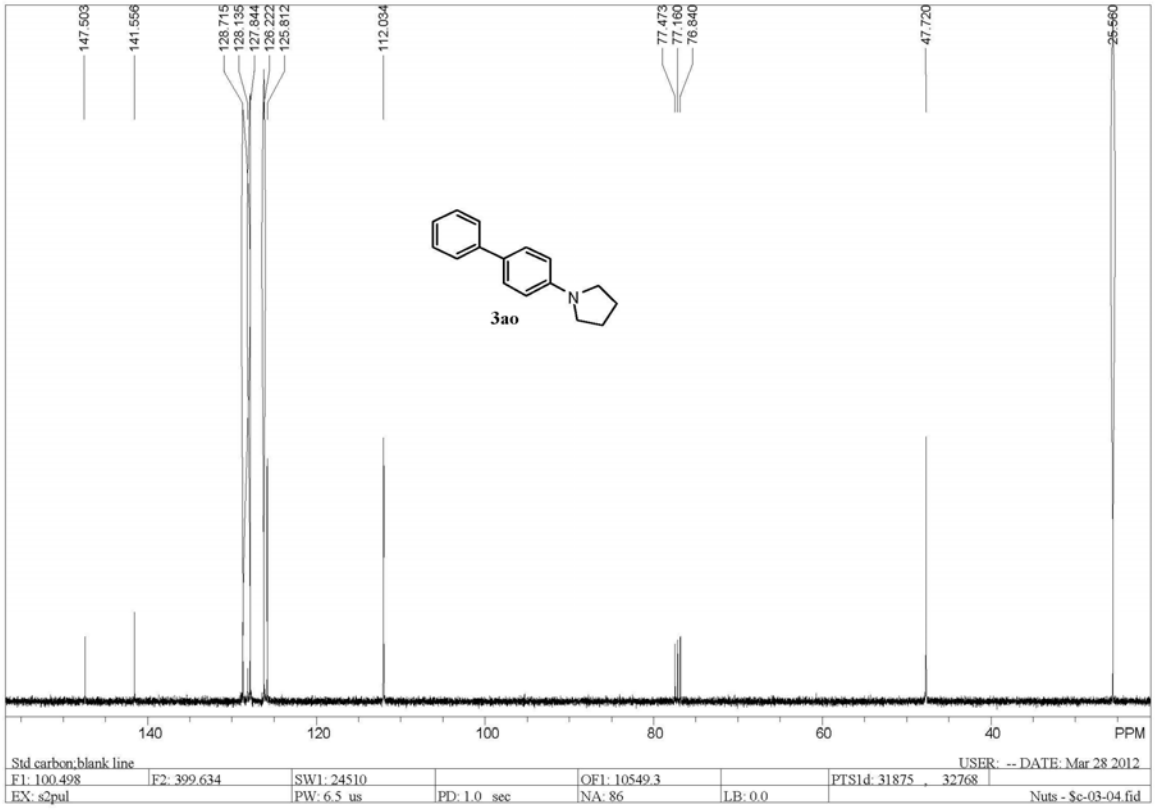

7.270
7.250
7.230
6.950
6.930
6.846
6.829
6.811
3.157
3.144
3.129
1.734
1.720
1.707
1.694
1.679
1.596
1.581
1.568
1.553
3am
1.85
1.90
0.96
4.00
4.00
1.99
9
8
7
6
5
4
3
2
1
PPM
Std proton;blank line
USER: -- DATE: Mar 28 2012
F1: 399.635
F2: 100.497
SW1: 7225
OF1: 2747.2
PTS1d: 14803 , 16384
EX: s2pul
PW: 7.2 us
PD: 2.0 sec
NA: 8
LB: 0.0
Nuts - $h-03-11.fid

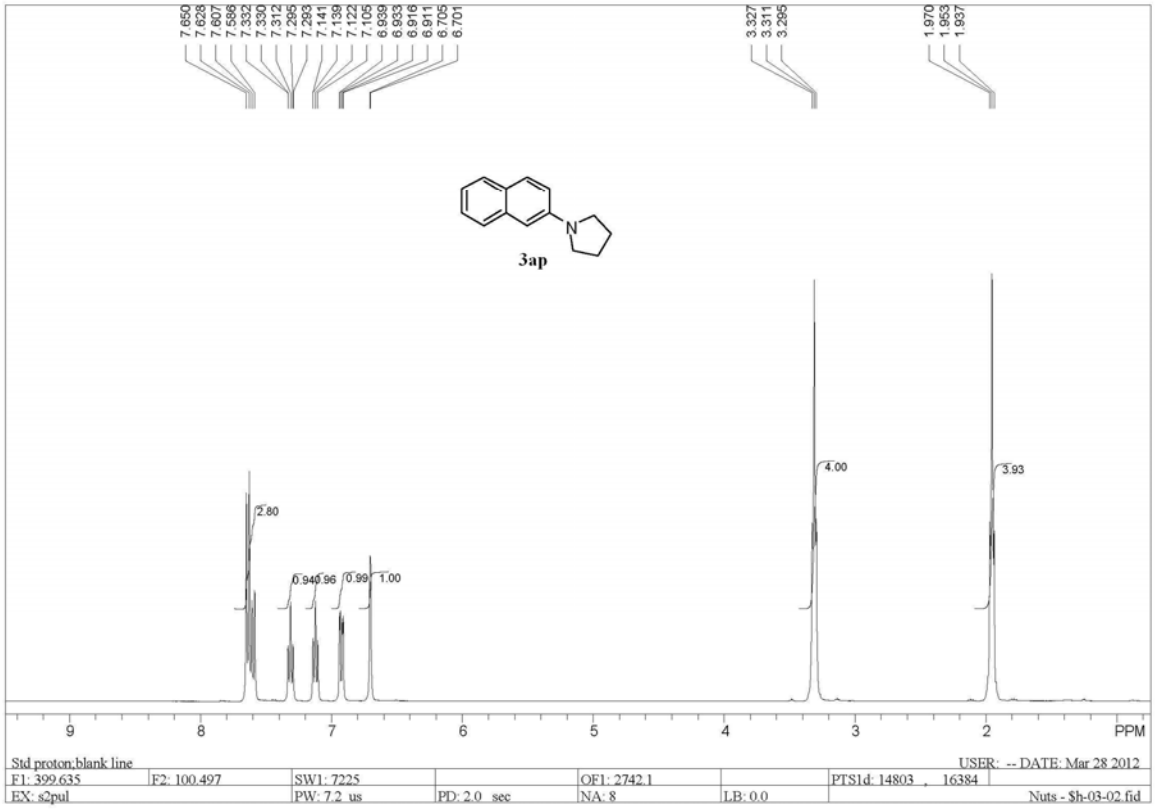

152.252
128.968
119.150
116.515
77.473
77.160
76.840
50.645
25.888
24.339
3am
160
140
120
100
80
60
40
20
PPM
Std carbon;blank line
USER: -- DATE: Mar 28 2012
F1: 100.498
F2: 399.634
SW1: 24510
OF1: 10535.8
PTS1d: 31875 , 32768
EX: s2pul
PW: 6.5 us
PD: 1.0 sec
NA: 82
LB: 0.0
Nuts - $c-03-11.fid

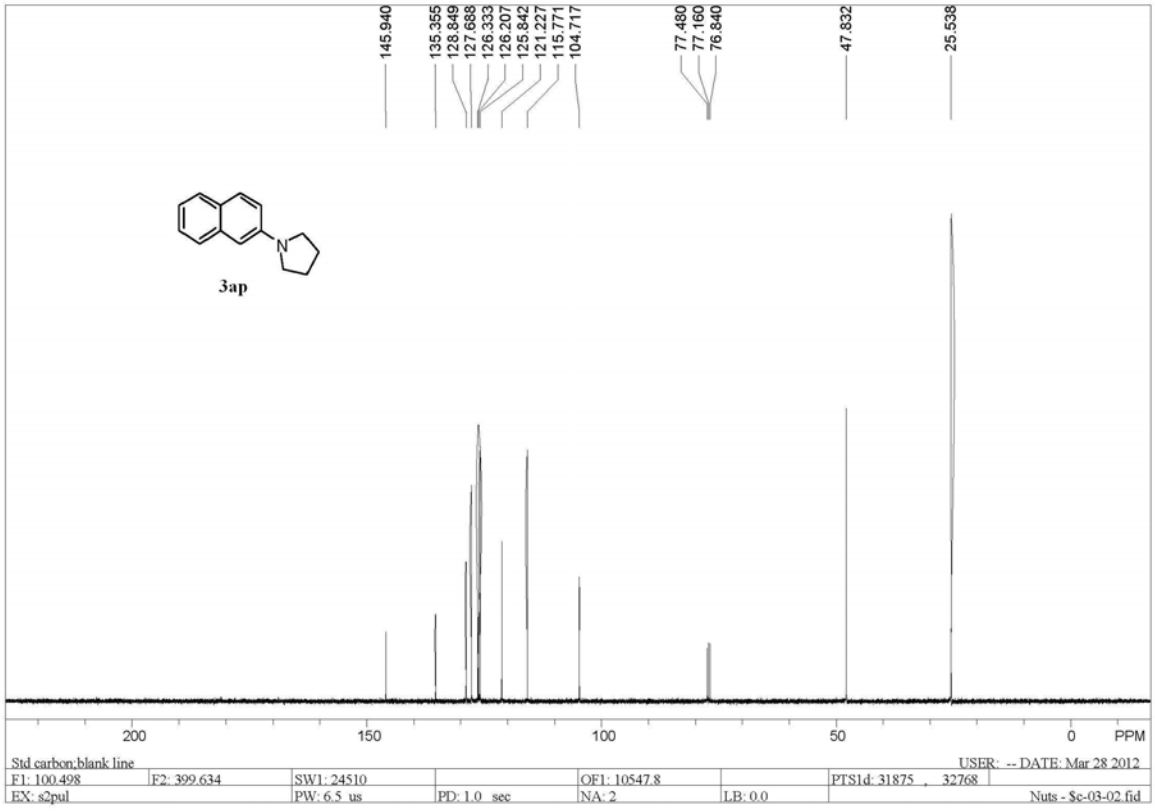

7.260
6.859
6.831
6.567
6.538
3.758
3.401
3.118
3.095
2.052
2.021
1.984
1.945
1.677
1.578
1.169
1.149
O
N
3.91
2.98
3.11
1.79
2.00
1.04
1.05
1.06
7
6
5
4
3
2
1
PPM
.blank line
USER: -- DATE: May 20 2012
F1: 300.055
F2: 75.456
SW1: 4803
OF1: 1802.3
PTS1d: 16384
EX: s2pul
PW: 5.1 usec
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $Octopus

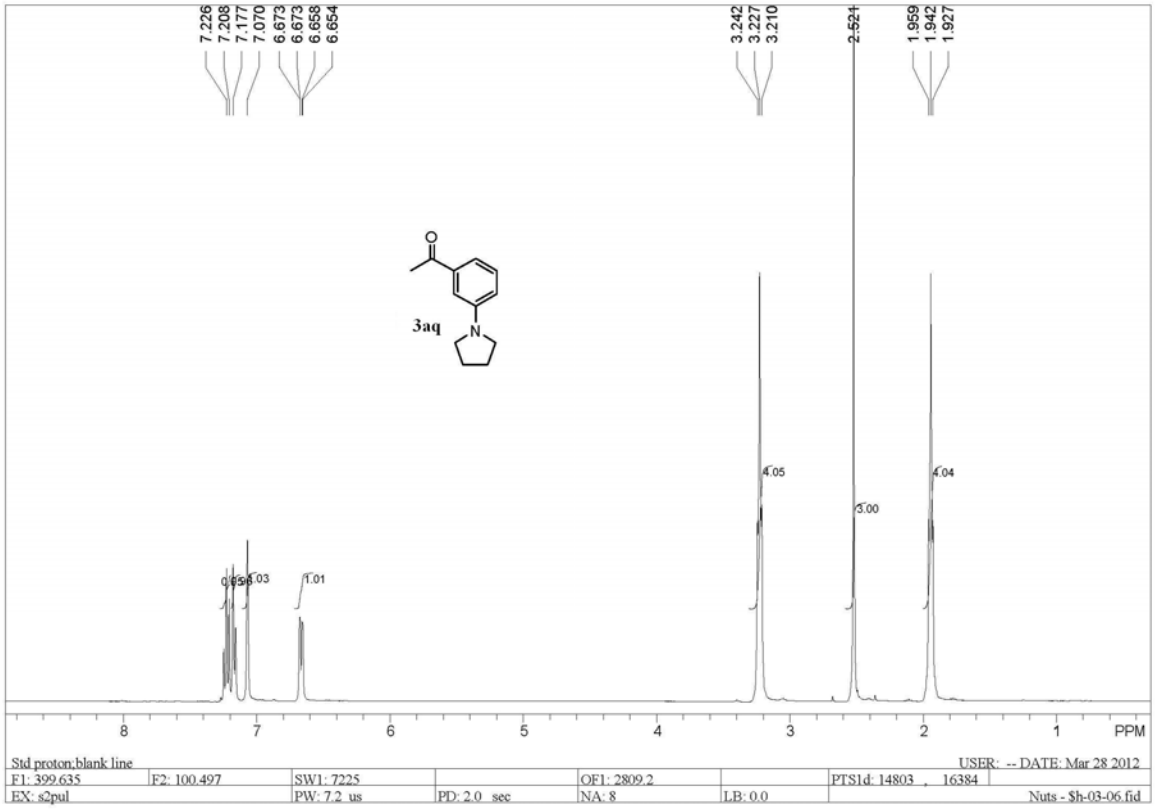

150.704
142.478
132.334
115.824
115.168
112.827
77.481
77.160
76.839
56.100
54.174
49.026
33.325
23.502
19.732
O
N
160
140
120
100
80
60
40
20
PPM
USER: nmr -- DATE: 15:08:08.156 +0800 nmr@EP-ZH107708
F1: 100.610
F2: 1.000
SW1: 24038
OF1: 10066.2
PTS1d: 32768
EX: zgpg30
PW: 8.5 us
PD: 2.0 sec
NA: 95
LB: 1.0
Nuts - $Octopus_14-85-c.1

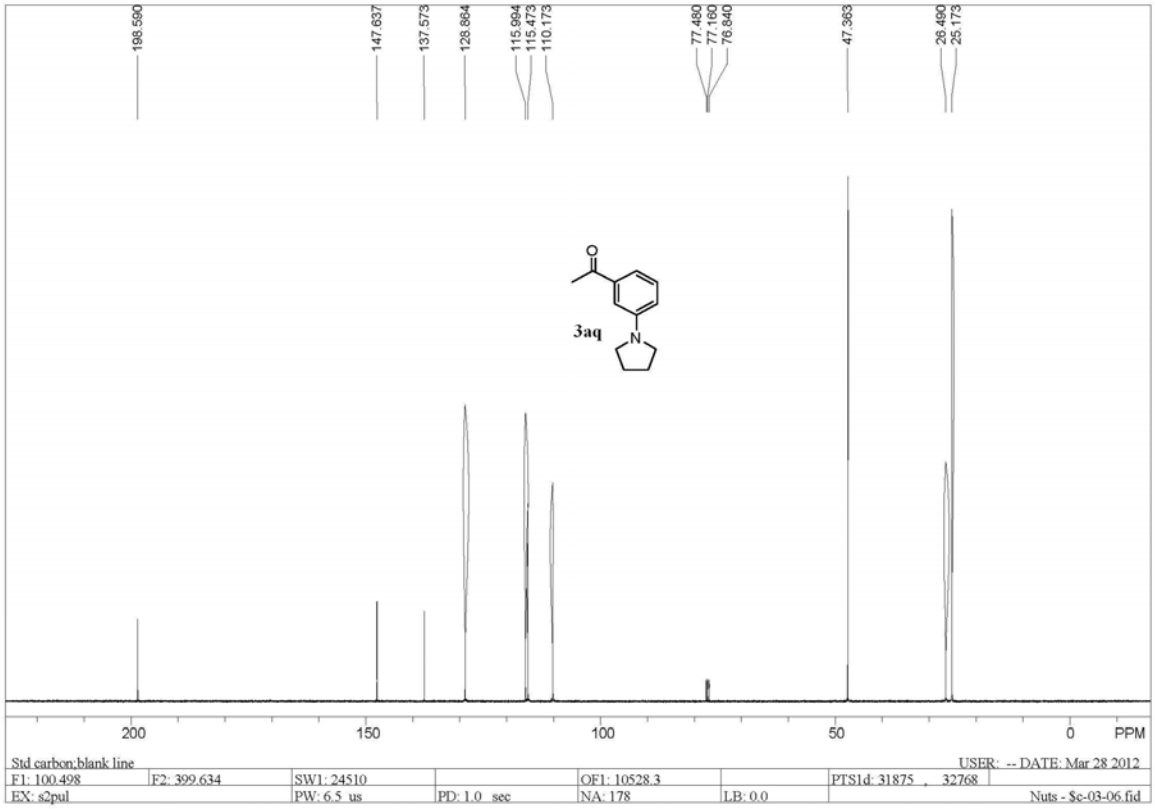

7.611
7.585
7.552
7.523
7.445
7.421
7.395
7.295
7.271
7.246
6.668
6.638
3.348
3.326
3.305
2.032
2.021
2.011
2.000
1.989
3ao
4.00
4.01
2.03
0.99
1.98
9
8
7
6
5
4
3
2
1
PPM
USER: -- DATE: Mar 23 2012
F1: 300.055
F2: 75.456
SW1: 4803
OF1: 1774.5
PTS1d: 16384
EX: s2pul
PW: 5.8 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $4-Ph-Pyrrolidine_23Mar2012

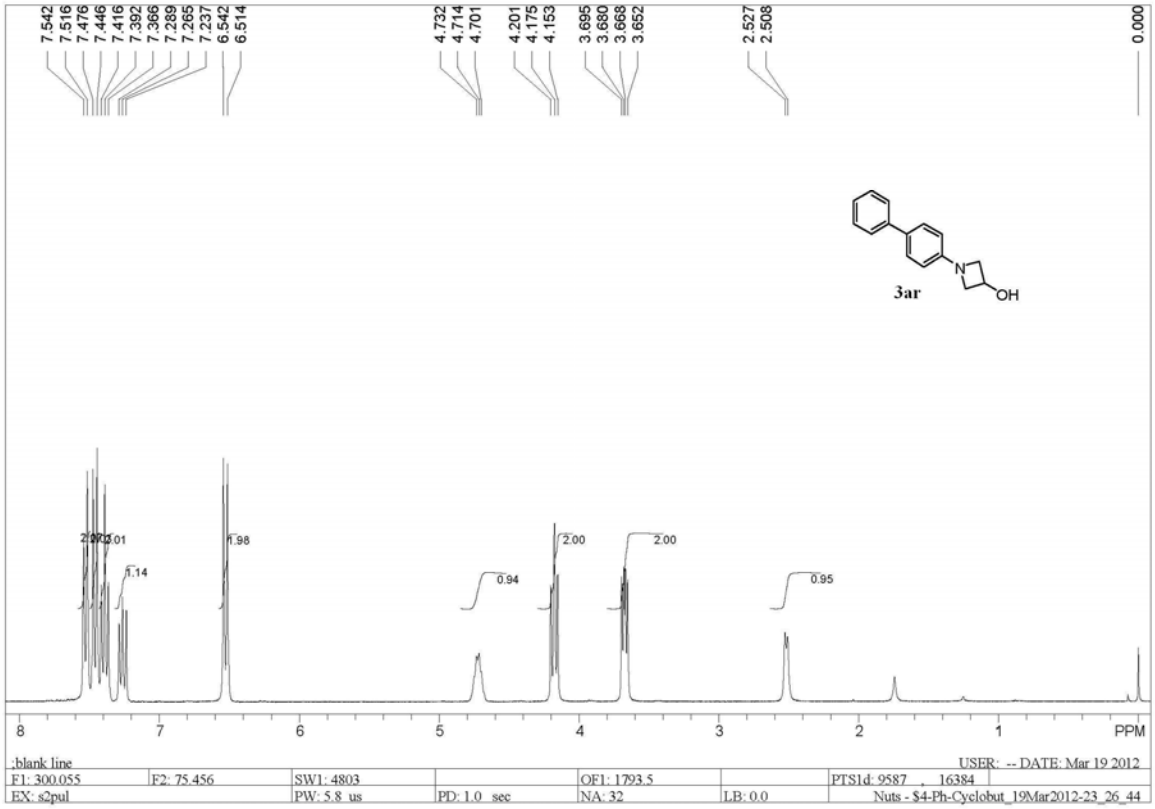

147.503
141.556
128.715
128.135
127.844
126.222
125.612
112.034
77.473
77.160
76.840
47.720
25.560
3ao
140
120
100
80
60
40
PPM
Std carbon;blank line
USER: -- DATE: Mar 28 2012
F1: 100.498
F2: 399.634
SW1: 24510
OF1: 10549.3
PTS1d: 31875 , 32768
EX: s2pul
PW: 6.5 us
PD: 1.0 sec
NA: 86
LB: 0.0
Nuts - $c-03-04.fid

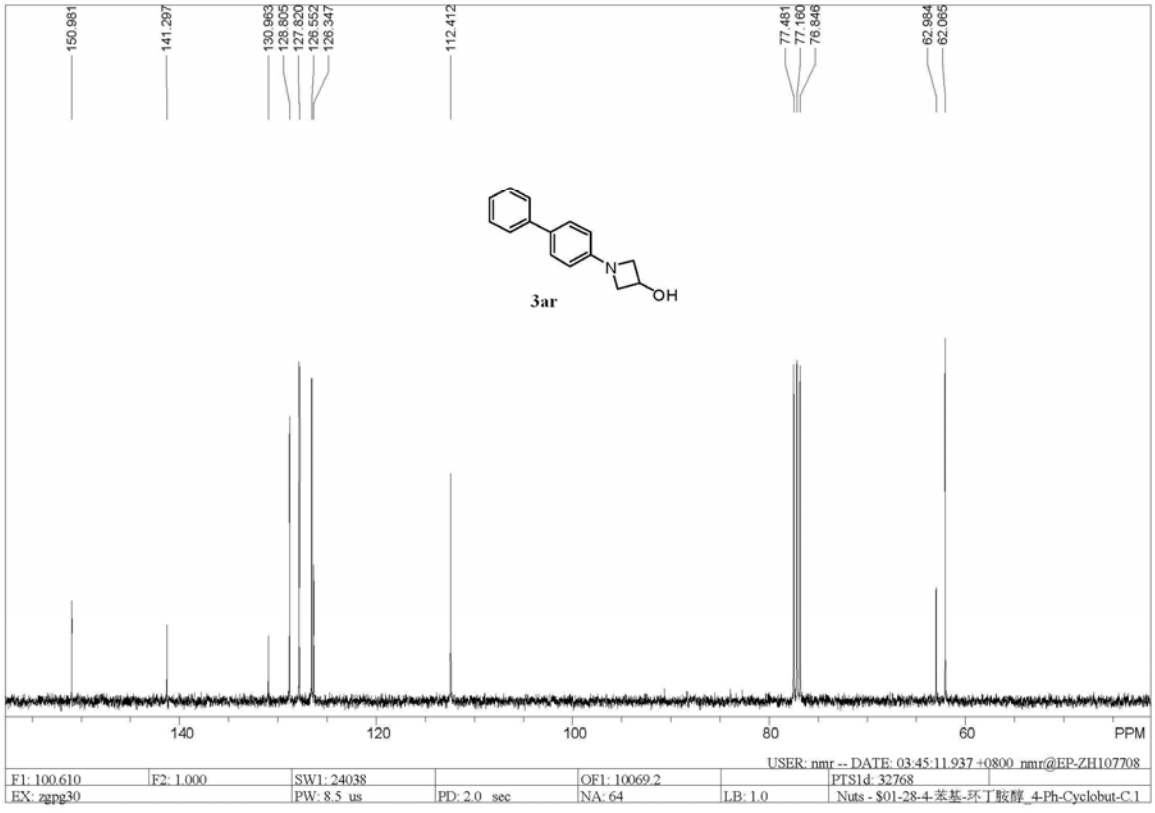

7.650
7.628
7.607
7.586
7.332
7.330
7.312
7.295
7.293
7.141
7.139
7.122
7.105
6.939
6.933
6.916
6.911
6.705
6.701
3.327
3.311
3.295
1.970
1.953
1.937
3ap
2.80
0.94
0.96
0.99
1.00
4.00
3.93
9
8
7
6
5
4
3
2
PPM
Std proton;blank line
USER: -- DATE: Mar 28 2012
F1: 399.635
F2: 100.497
SW1: 7225
OF1: 2742.1
PTS1d: 14803 , 16384
EX: s2pul
PW: 7.2 us
PD: 2.0 sec
NA: 8
LB: 0.0
Nuts - $h-03-02.fid

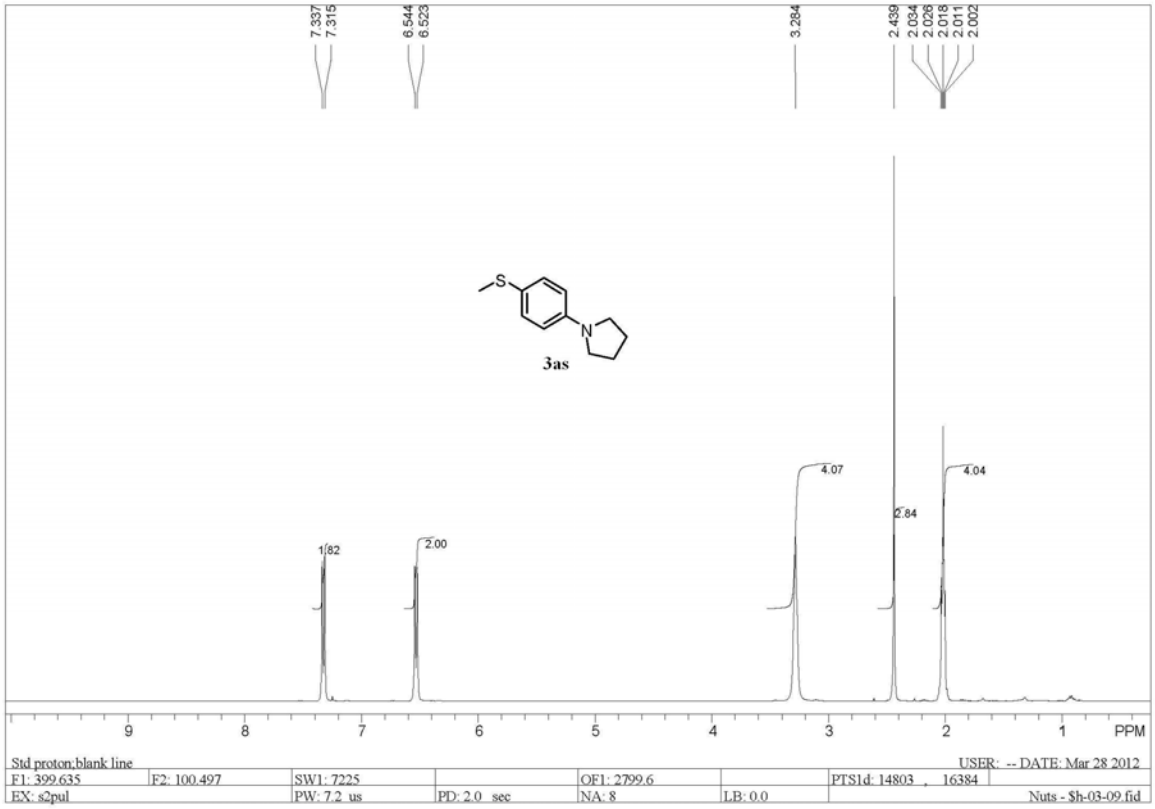

145.940
135.355
128.849
127.688
126.333
126.207
125.842
121.227
115.771
104.717
77.480
77.160
76.840
47.832
25.538
3ap
200
150
100
50
0
PPM
Std carbon;blank line
USER: -- DATE: Mar 28 2012
F1: 100.498
F2: 399.634
SW1: 24510
OF1: 10547.8
PTS1d: 31875 , 32768
EX: s2pul
PW: 6.5 us
PD: 1.0 sec
NA: 2
LB: 0.0
Nuts - $c-03-02.fid

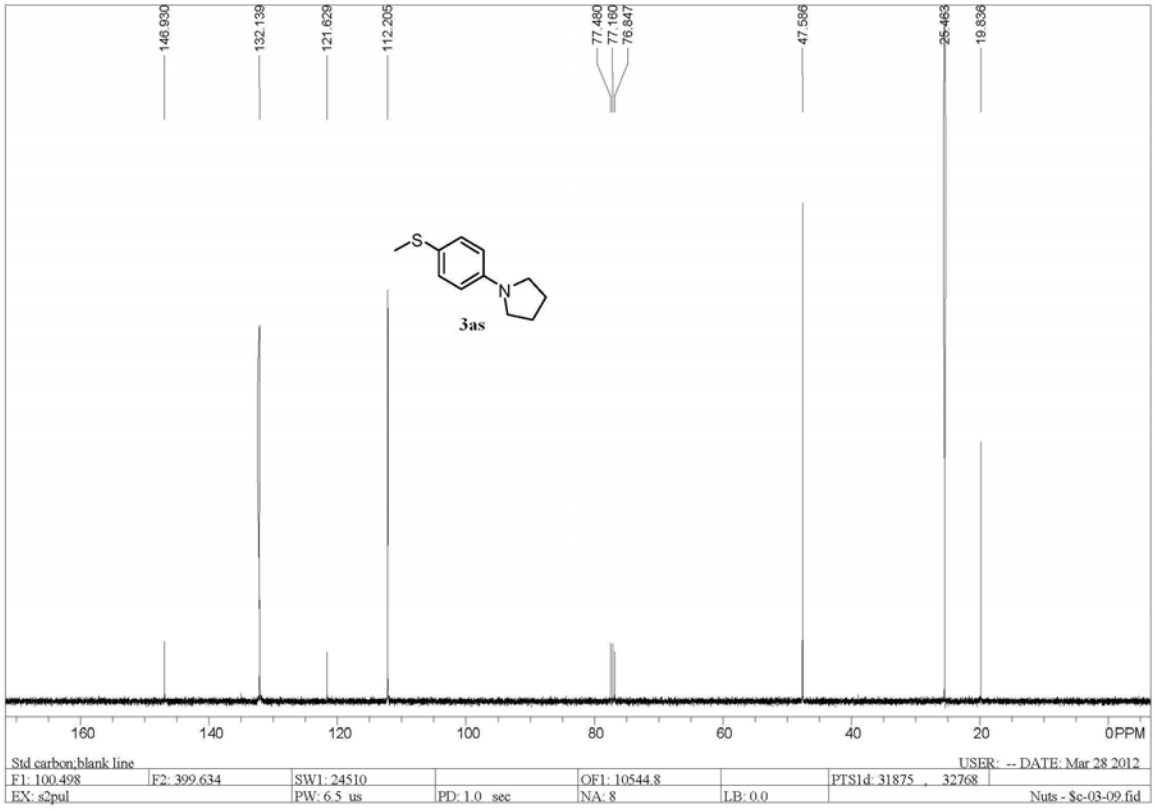

7.226
7.208
7.177
7.070
6.673
6.673
6.658
6.654
3.242
3.227
3.210
2.524
1.959
1.942
1.927
3aq
4.05
3.00
4.04
0.95
1.03
1.01
8
7
6
5
4
3
2
1
PPM
Std proton;blank line
USER: -- DATE: Mar 28 2012
F1: 399.635
F2: 100.497
SW1: 7225
OF1: 2809.2
PTS1d: 14803 , 16384
EX: s2pul
PW: 7.2 us
PD: 2.0 sec
NA: 8
LB: 0.0
Nuts - $h-03-06.fid

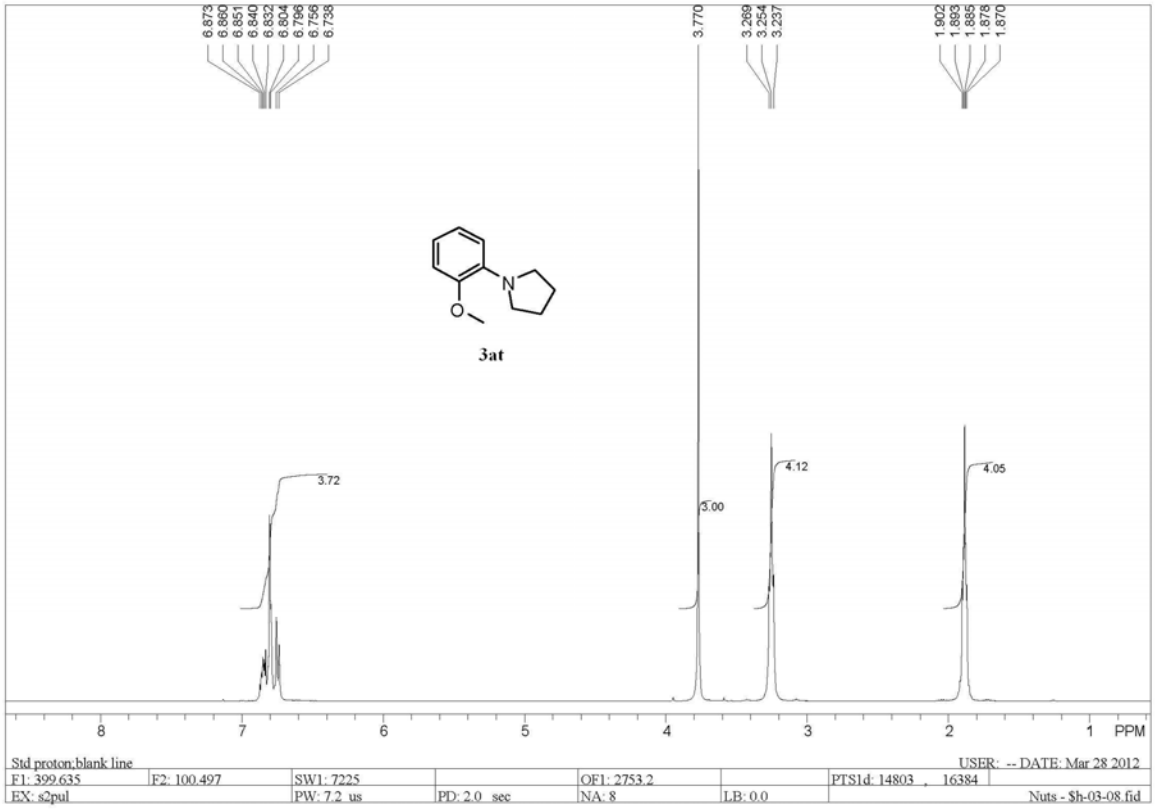

198.590
147.637
137.573
128.864
115.994
115.473
110.173
77.480
77.160
76.840
47.363
26.490
25.173
3aq
200
150
100
50
0
PPM
Std carbon;blank line
USER: -- DATE: Mar 28 2012
F1: 100.498
F2: 399.634
SW1: 24510
OF1: 10528.3
PTS1d: 31875 , 32768
EX: s2pul
PW: 6.5 us
PD: 1.0 sec
NA: 178
LB: 0.0
Nuts - $c-03-06.fid

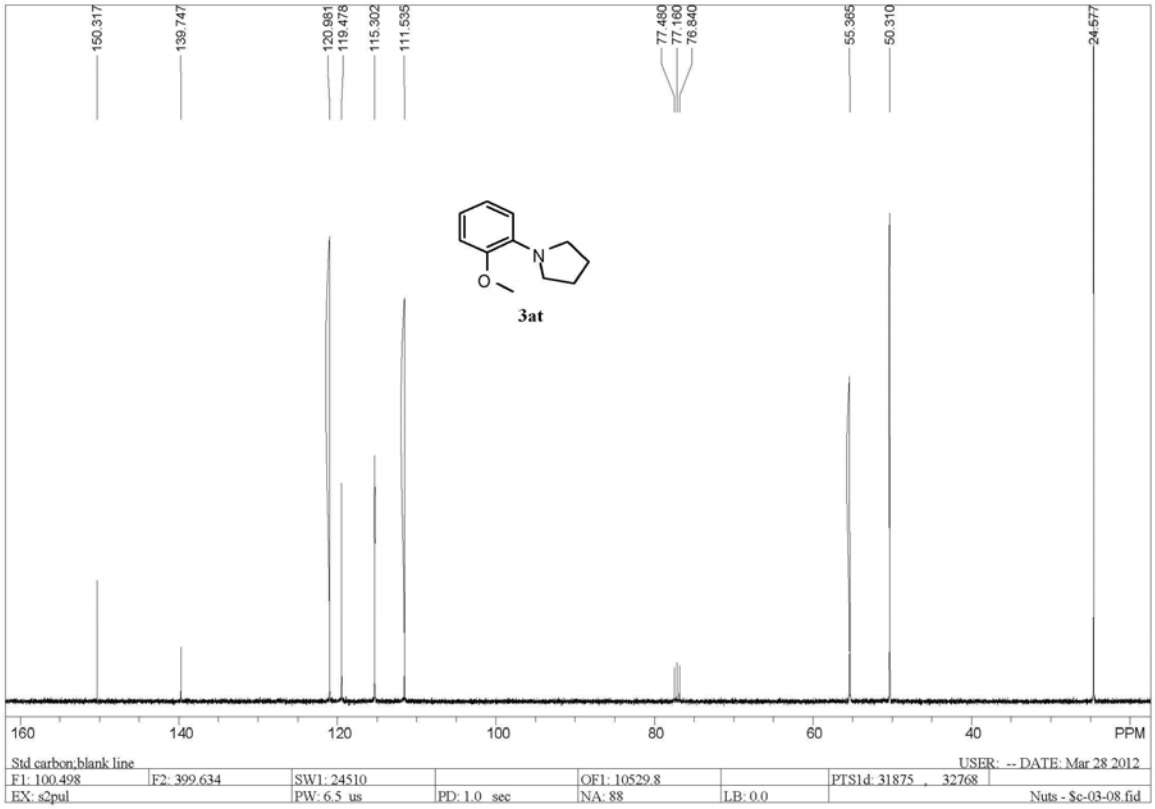

7.542
7.516
7.476
7.446
7.416
7.392
7.366
7.289
7.265
7.237
6.542
6.514
4.732
4.714
4.701
4.201
4.175
4.153
3.695
3.680
3.668
3.652
2.527
2.508
0.000
3ar
N
OH
3.01
1.14
1.98
0.94
2.00
2.00
0.95
8
7
6
5
4
3
2
1
PPM
;blank line
USER: -- DATE: Mar 19 2012
F1: 300.055
F2: 75.456
SW1: 4803
OF1: 1793.5
PTS1d: 9587 , 16384
EX: s2pul
PW: 5.8 us
PD: 1.0 sec
NA: 32
LB: 0.0
Nuts - $4-Ph-Cyclobut_19Mar2012-23_26_44

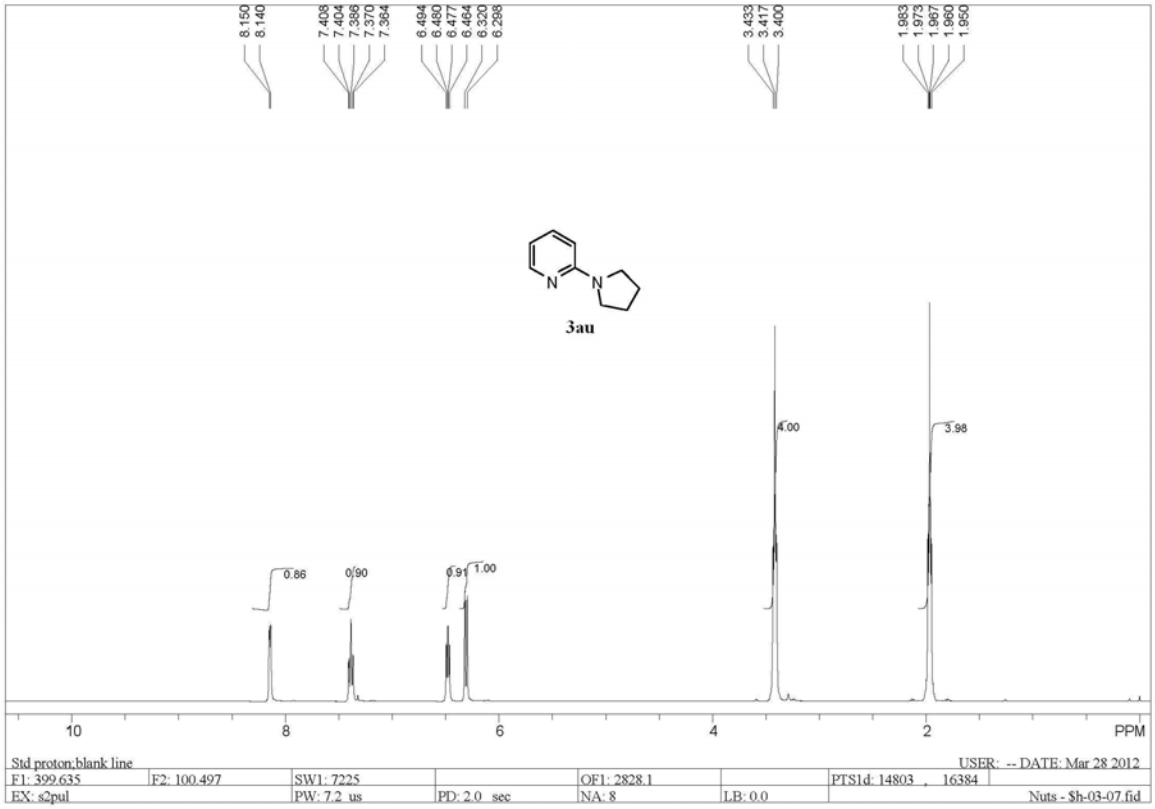

150.981
141.297
130.963
128.805
127.620
126.552
126.347
112.412
77.481
77.160
76.846
62.984
62.065
3ar
N
OH
140
120
100
80
60
PPM
USER: nmr -- DATE: 03:45:11.937 +0800 nmr@EP-ZH107708
F1: 100.610
F2: 1.000
SW1: 24038
OF1: 10069.2
PTS1d: 32768
EX: zgpg30
PW: 8.5 us
PD: 2.0 sec
NA: 64
LB: 1.0
Nuts - $01-28-4-苯基-环丁胺醇_4-Ph-Cyclobut-C.1

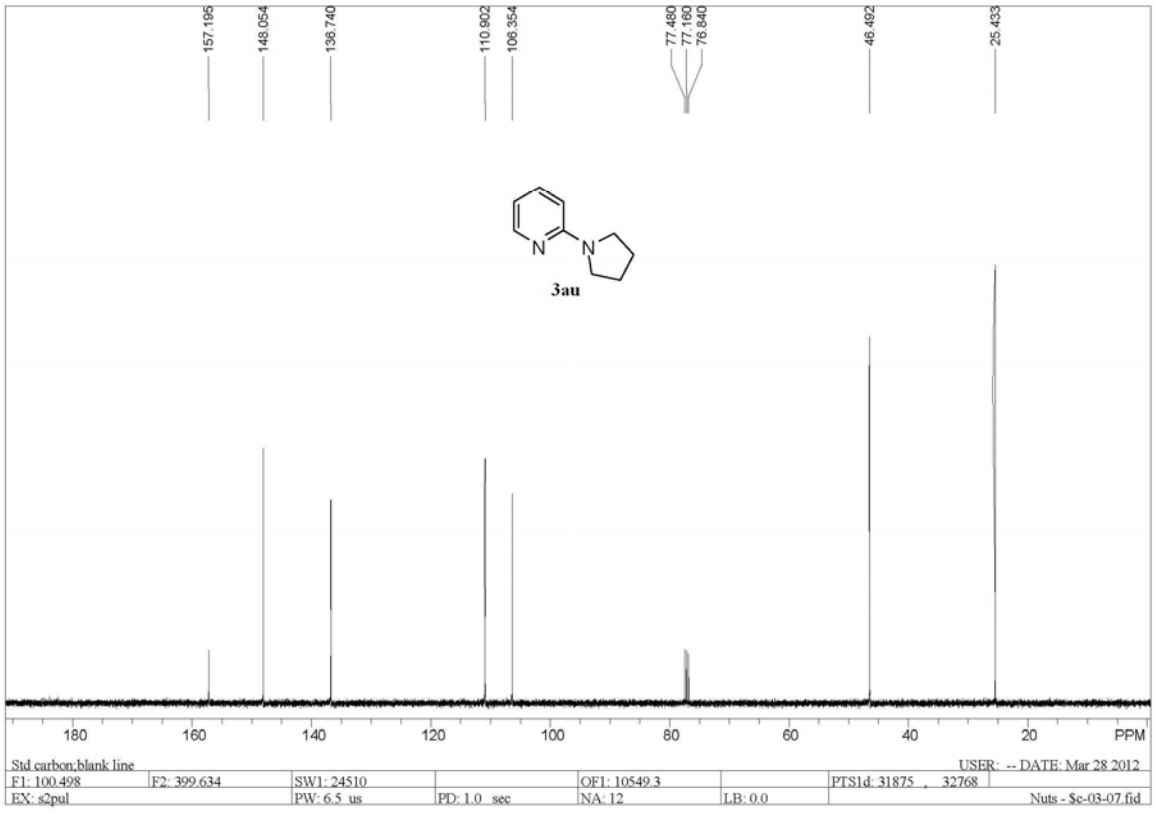

7.337
7.315
6.544
6.523
3.284
2.439
2.034
2.028
2.018
2.011
2.002
3as
4.07
4.04
2.84
1.82
2.00
9
8
7
6
5
4
3
2
1
PPM
Std proton;blank line
USER: -- DATE: Mar 28 2012
F1: 399.635
F2: 100.497
SW1: 7225
OF1: 2799.6
PTS1d: 14803 , 16384
EX: s2pul
PW: 7.2 us
PD: 2.0 sec
NA: 8
LB: 0.0
Nuts - $h-03-09.fid


146.930
132.139
121.629
112.205
77.480
77.160
76.847
47.586
25.463
19.836
3as
160
140
120
100
80
60
40
20
0PPM
Std carbon;blank line
USER: -- DATE: Mar 28 2012
F1: 100.498
F2: 399.634
SW1: 24510
OF1: 10544.8
PTS1d: 31875 , 32768
EX: s2pul
PW: 6.5 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $c-03-09.fid


6.873
6.860
6.851
6.840
6.832
6.804
6.796
6.756
6.738
3.770
3.269
3.254
3.237
1.902
1.893
1.885
1.878
1.870
3at
3.72
3.00
4.12
4.05
8
7
6
5
4
3
2
1
PPM
Std proton;blank line
USER: -- DATE: Mar 28 2012
F1: 399.635
F2: 100.497
SW1: 7225
OF1: 2753.2
PTS1d: 14803 , 16384
EX: s2pul
PW: 7.2 us
PD: 2.0 sec
NA: 8
LB: 0.0
Nuts - $h-03-08.fid


150.317
139.747
120.961
119.478
115.302
111.535
77.480
77.160
76.840
55.365
50.310
24.577
3at
160
140
120
100
80
60
40
PPM
Std carbon;blank line
USER: -- DATE: Mar 28 2012
F1: 100.498
F2: 399.634
SW1: 24510
OF1: 10529.8
PTS1d: 31875 , 32768
EX: s2pul
PW: 6.5 us
PD: 1.0 sec
NA: 88
LB: 0.0
Nuts - $c-03-08.fid


8.150
8.140
7.408
7.404
7.388
7.370
7.364
6.494
6.480
6.477
6.464
6.320
6.298
3.433
3.417
3.400
1.983
1.973
1.967
1.960
1.950
3au
4.00
3.98
0.86
0.90
0.91
1.00
10
8
6
4
2
PPM
Std proton;blank line
USER: -- DATE: Mar 28 2012
F1: 399.635
F2: 100.497
SW1: 7225
OF1: 2828.1
PTS1d: 14803 , 16384
EX: s2pul
PW: 7.2 us
PD: 2.0 sec
NA: 8
LB: 0.0
Nuts - $h-03-07.fid


157.195
148.054
136.740
110.902
106.354
77.480
77.160
76.840
46.492
25.433
3au
180
160
140
120
100
80
60
40
20
PPM
Std carbon;blank line
USER: -- DATE: Mar 28 2012
F1: 100.498
F2: 399.634
SW1: 24510
OF1: 10549.3
PTS1d: 31875 , 32768
EX: s2pul
PW: 6.5 us
PD: 1.0 sec
NA: 12
LB: 0.0
Nuts - $c-03-07.fid