SUPPLEMENTARY INFORMATION

Rapid heteroatom-transfer to arylmetals utilizing multifunctional reagent scaffolds

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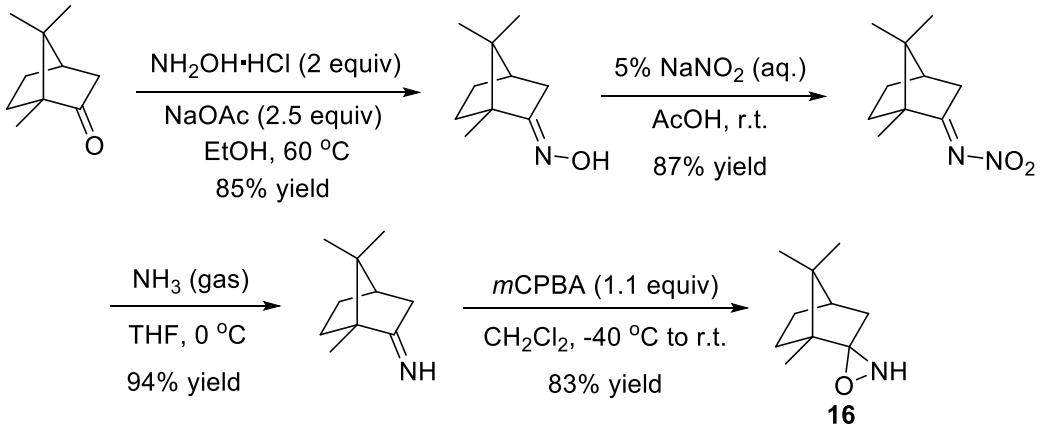
General Remarks

Solvents were dried by passage through an activated alumina column under argon. Liquids and solutions were transferred via syringe. All halogen-substituted arene reagents were purchased from Sigma-Aldrich Co. and used without further purification. All reactions were carried out in flame-dried glassware under an atmosphere of argon with magnetic stirring. All Grignard reagents were freshly prepared and the concentration of the Grignard reagents was titrated by literature reported method.[1] All reactions were monitored by thin-layer chromatography (TLC) with E. Merck silica gel 60 F254 pre-coated plates (0.25 mm). Silica gel (particle size 0.032 - 0.063 mm) purchased from SiliCycle was used for flash chromatography.

Proton (^{1}H) and carbon (^{13}C) NMR spectra were recorded on a Bruker AV-400 or a Bruker DRX-600 spectrometer operating at 400 MHz (or 600 MHz) for proton and 100 MHz (or 151 MHz) for carbon nuclei using $CDCl_3$ as solvent, respectively. Chemical shifts are expressed as parts per million (δ, ppm) and are referenced to 7.26 ($CDCl_3$) for ^{1}H NMR and 77.00 ($CDCl_3$) for ^{13}C NMR. Proton signal data uses the following abbreviations: s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet, br = broad and *J* = coupling constant. High Resolution Mass Spectrometry was performed on a Shimadzu LCMS-IT-TOF under the conditions of electrospray ionization (ESI) in both positive and negative mode.

Synthesis of oxaziridines

Synthesis of Camphoryl N–H Oxaziridine 16 [Adapted from literature procedure [2]]



Supplementary Figure 1. Synthesis of Camphoryl N–H Oxaziridine **16**

(±)-Camphor oxime

To a 1 L round flask charged with a stirring bar, hydroxylamine hydrochloride (79 g, 1.0 mol), (±)-camphor (79.2 g, 0.5 mol) and ethanol (0.6 L) were added. Sodium acetate (103 g, 1.25 mol) was added into the reaction mixture and stirred at 60 ºC for 24 hours. After cooling, most of the ethanol in the reaction mixture was removed *in vacuo*. Water was then added, causing the crude oxime to precipitate from the solution as colorless crystals, which were isolated by filtration and washed with distilled water. The crystalline material was collected, dried under vacuum and recrystallized from absolute ethanol to afford (±)-camphor oxime (71.2 g, 85%); R_f = 0.30 (Hexanes:EtOAc = 5:1); ^{1}H NMR (400 MHz, $CDCl_3$): δ 9.41 (br s, 1 H), 2.53 (dt, *J* = 18.0, 4.0 Hz, 1H), 2.03 (d, *J* = 18.0 Hz, 1H), 1.89 (t, *J* = 4.8 Hz, 1H), 1.87-1.75 (m, 1H), 1.74-1.63 (m, 1H), 1.48-1.38 (m, 1H), 1.26-1.16 (m, 1H), 0.98 (s, 3H), 0.89 (s, 3H), 0.77 (s, 3H); ^{13}C NMR (100 MHz, $CDC1_3$): δ 169.8, 51.8, 48.3, 43.6, 33.1, 32.5, 27.2, 19.4, 18.5, 11.0.

(±)-Camphor nitrimine

(±)-Camphor oxime (33 g, 0.2 mol) in glacial acetic acid (900 mL) was treated with 5% aqueous sodium nitrite (500 mL). A bright yellow color developed and dispersed over 30 minutes. After a further 1.5 hours, the crude product was precipitated as a colorless solid by the addition of water and isolated by filtration. After drying under high vacuum, the crude product (34.2 g, 87%) was directly used for the next step reaction without further purification. R_f = 0.40 (Hexanes:EtOAc = 10:1); ^{1}H NMR (400 MHz, $CDCl_3$): δ 2.74-2.64 (m, 1H), 2.13 (d, *J* = 18.4, 1H), 2.03 (t, *J* = 4.4 Hz, 1H), 1.97-1.79 (m, 2H), 1.65-1.50 (m, 1H), 1.38-1.28 (m, 1 H), 1.04 (s, 3H), 0.98 (s, 3H), 0.88 (s, 3H).

(±)-Camphor N–H imine

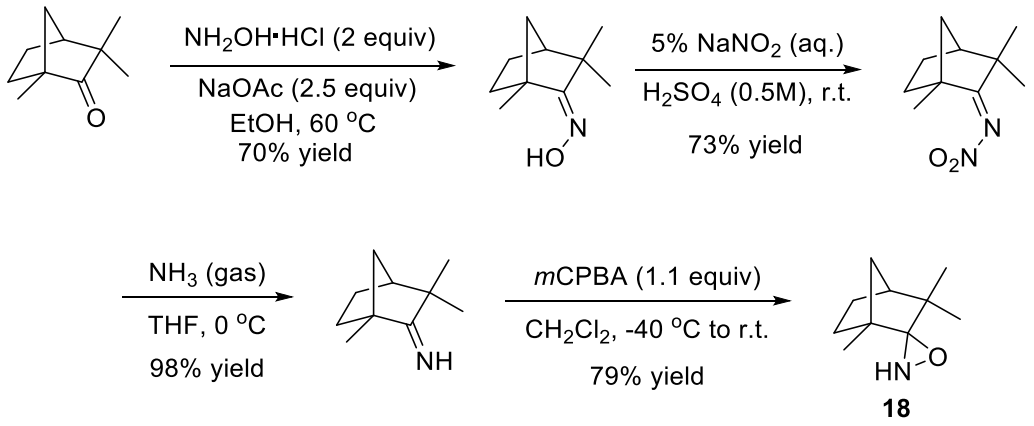
A solution of (±)-camphor nitrimine **(**11.8 g, 60 mmol) in dry tetrahydrofuran (100 mL) was treated at 0 °C with a slow stream of ammonia gas for 6 hours. The solvent was removed *in vacuo* (keeping the water bath below 30 °C) to give the (±)-camphor imine **as** a pale yellow solid (8.6 g, 94%). R_f = 0.30 (Hexanes:EtOAc = 3:1); ^{1}H NMR (400 MHz, $CDC1_3$): δ 8.18 (br s, 1H), 2.46-2.35 (m, 1H), 1.93 (d, *J* = 17.2 Hz, 1H), 1.89-1.75 (m, 2H**),** 1.66-1.56 (m, 1H), 1.36-1.18 (m, 2H), 0.89 (s, 3H), 0.88 (s, 3H), 0.75 (s, 3H); ^{13}C NMR (100.6 MHz, $CDC1_3$): δ 193.8, 54.6, 47.2, 43.6, 40.3, 32.0, 27.3, 19.5, 18.9, 10.3. The unpurified imine is homogeneous by spectroscopic analysis and is identical to that previously described. It was used immediately for the next step reaction without further purification.

(±)-Camphoryl N–H oxaziridine 16

A solution of purified *m*-CPBA (10.4 g, 60 mmol) in dry dichloromethane (250 mL) was cooled to -40 °C, causing some of the peracid to crystallize from the solution. On addition of a solution of the (±)-camphor imine (8.32 g, 55 mmol) in dry dichloromethane (50 mL) to this solution over a period of 10 minutes, this solution became homogeneous. This reaction mixture was then stirred overnight at between -30 °C and -40 °C and allowed to reach room temperature. The reaction mixture was stirred at room temperature for a further 2 hours until all of the peracid had reacted (TLC), by which time much of the *m*-chlorobenzoic acid by-product had crystallized from the solution. The solution was concentrated in vacuo until approximately 25% of the original volume remained. Hexanes (200 mL) was added and the solution again concentrated in vacuo until approximately 25% of the original volume remained. This process was repeated once more and finally hexanes (300 mL) was added to the mixture. The precipitated m-chlorobenzoic acid was removed by filtration, and the rest of this by-product washed out of the resulting solution with aqueous sodium hydroxide (1.0 M, 3 x 100 mL). The organic solution was dried (Na_2SO_4) and the solvent was removed in vacuo to give the crude oxaziridine, which can be further purified by column chromatography (Hexanes:EtOAc = 20:1) over silica gel to give (±)-camphoryl N–H oxaziridine **16** as a colorless solid (7.63 g, 83%).

(±)-Camphoryl N–H oxaziridine **16** was found by NMR spectroscopy to exist as a pair of diastereoisomers (A and B) at N–H in a 60:40 ratio (the major isomer is represented by A); ^{1}H NMR (400 MHz, $CDC1_3$): δ 4.21 (br s, $1H_A$), 3.74 (br s, $1H_B$), 2.33-2.21 (m, $1H_{A+B}$), 1.87-1.26 (m, $6H_{A+B}$), 0.93 (s, $3H_B$), 0.91 (s, $3H_A$), 0.88 (s, $6H_{A+B}$), 0.63 (s, $3H_B$), 0.62 (s, $3H_A$); ^{13}C NMR (100 MHz, $CDC1_3$): δ 89.7, 89.4, 48.1, 47.8, 47.7, 47.5, 44.3, 44.2, 37.7, 36.5, 30.4, 29.5, 27.2, 27.0, 19.6, 19.5, 19.4, 19.3, 8.7, 8.4.

Synthesis of Fenchyl N–H Oxaziridine 18 [Adapted from literature procedure [2]]



Supplementary Figure 2. Synthesis of Fenchyl N–H Oxaziridine **18**

(-)-Fenchone oxime

To a 1 L round flask charged with a stirring bar, hydroxylamine hydrochloride (79 g, 1.0 mol), (-)-fenchone (77.7 g, 0.5 mol) and ethanol (0.6 L) were added. Sodium acetate (103 g, 1.25 mol) was added into the reaction mixture and stirred at 60 °C for 24 hours. After cooling, most of the ethanol in the reaction mixture was removed *in vacuo.* Water was then added, causing the crude oxime to precipitate from the solution as colorless crystals, which were isolated by filtration and washed with distilled water. The crystalline material was collected, dried under vacuum and recrystallized from absolute ethanol to afford (-)-fenchone oxime **(**58.2 g, 70%); R_f = 0.30 (Hexanes:EtOAc = 5:1); ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.82 (br s, 1H), 1.86-1.69 (m, 3H), 1.64-1.40 (m, 3H), 1.36-1.33 (m, 1H), 1.32 (s, 3H), 1.29 (s, 3H), 1.22 (s, 3H); ^{13}C NMR (100 MHz, $CDC1_3$): δ 172.5, 50.1, 48.5, 44.2, 43.2, 34.1, 25.2, 22.8, 22.1, 17.1.

(-)-Fenchone nitrimine

A solution of sodium nitrite (23.5 g, 0.34 mol, 1.7 equiv) in water (150 mL) was added to a solution of (-)-fenchone oxime (33.5 g, 0.2 mol) in diethyl ether (300 mL) in a 1 L flask. A solution of 0.5 M sulfuric acid (330 mL) was added with occasional vigorous swirling over 2 hours at r.t. The mixture was allowed to stand for a further 3 hours, and the ether layer was separated, washed with saturated aqueous sodium hydrogen carbonate (2x100 mL), dried (Na_2SO_4) and the solvent removed in *vacuo*. After drying under high vacuum, the crude product (28.5 g, 73%) was directly used for the next step reaction without further purification. R_f = 0.30 (Hexanes:EtOAc = 10:1); The (-)-fenchone nitrimine was shown by NMR spectroscopy to be a mixture of *syn* and *anti* diastereoisomers (A and B) present in an approximately 2:1 ratio (the major isomer is represented by A): ^{1}H NMR (400 MHz, $CDC1_3$): δ 2.03-1.52 (m, $6H_{A+B}$), 1.47 (d, J = 10.4 Hz, $1H_A$), 1.36 (d, J = 10.4 Hz, $1H_B$), 1.28 (s, $3H_{A+B}$), 1.24 (s, $3H_A$), 1.21 (s, $3H_B$), 1.18 (s, $3H_A$), 1.16 (s, $3H_B$); ^{13}C NMR (100 MHz, $CDC1_3$): δ 189.9, 189.8, 53.6, 52.3, 49.7, 47.3, 46.7, 45.5, 45.0, 42.1, 34.0, 33.6, 26.0, 25.1, 24.6, 24.4, 23.7, 22.6, 16.1, 15.1.

(-)-Fenchone N–H imine

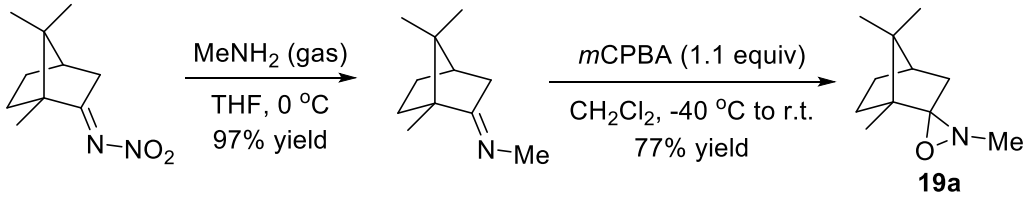
A solution of (-)-fenchone nitrimine (10.2 g, 52 mmol) in dry tetrahydrofuran (100 mL) was treated at 0 °C with a slow stream of ammonia gas for 6 hours. The solvent was removed in *vacuo* (keeping the water bath below 30 °C) to give the (-)-fenchone imine as an unstable pale yellow liquid (7.7 g, 98%). R_f = 0.30 (Hexanes:EtOAc = 3:1); ^{1}H NMR (400 MHz, $CDC1_3$): δ 8.20 (br s, 1H), 2.01-1.95 (m, 1H), 1.75-1.69 (m, 1H), 1.68-1.55 (m, 2H), 1.49 (td, *J* = 12.0, 3.6 Hz, 1H), 1.38 (dd, *J* = 10.4, 1.6 Hz, 1H), 1.34-1.23 (m, 1H), 1.18 (s, 3H), 1.08 (s, 3H), 1.05 (s, 3H); ^{13}C NMR (100 MHz, $CDC1_3$): δ 199.9, 51.9, 46.1, 44.8, 42.6, 33.3, 26.0, 25.0, 23.6, 16.0. The unpurified imine is homogeneous by spectroscopic analysis and is identical to that previously described. It was used immediately for the next step reaction without further purification.

(-)-Fenchyl N–H oxaziridine 18

A solution of purified *m*-CPBA (9.7 g, 56 mmol) in dry dichloromethane (250 mL) was cooled to -40 °C, causing some of the peracid to crystallize from the solution. On addition of a solution of the (-)-fenchone imine (7.7 g, 51 mmol) in dry dichloromethane (50 mL) to this solution over a period of 10 minutes, this solution became homogeneous. This reaction mixture was then stirred overnight at between -30 °C and -40 °C and allowed to reach room temperature. The reaction mixture was stirred at room temperature for a further 2 hours until all of the peracid had reacted (TLC), by which time much of the *m*-chlorobenzoic acid by-product had crystallized from the solution. The solution was concentrated in *vacuo* until approximately 25% of the original volume remained. Hexanes (200 mL) was added and the solution again concentrated in *vacuo* until approximately 25% of the original volume remained. This process was repeated once more and finally hexanes (300 mL) was added to the mixture. The precipitated *m*-chlorobenzoic acid was removed by filtration, and the rest of this by-product washed out of the resulting solution with aqueous sodium hydroxide (1.0 M, 3 x 100 mL). The organic solution was dried (Na_2SO_4) and the solvent was removed in *vacuo* to give the crude oxaziridine, which can be further purified by column chromatography (Hexanes:EtOAc = 20:1) over silica gel to give (-)-fenchyl N–H oxaziridine **18** as a colorless oil (6.9 g, 79%).

(-)-Fenchyl N–H oxaziridine was found by NMR spectroscopy to exist as a pair of diastereoisomers (A and B) at N–H in a 60:40 ratio (the major isomer is represented by A); ^{1}H NMR (600 MHz, $CDC1_3$): δ 3.82 (br s, $1H_B$), 3.70 (br s, $1H_A$), 1.98-1.90 (m, $1H_{A+B}$), 1.88-1.68 (m, $2H_{A/B}$), 1.62-1.26 (m, $4H_{A+B}$), 0.96 (s, $3H_{A/B}$), 0.94 (s, $3H_{A+B}$), 0.88 (s, $3H_{A/B}$), 0.87 (s, 3 H_{A+B}); ^{13}C NMR (151 MHz, $CDC1_3$): δ 93.4, 92.9, 47.3, 47.2, 46.60, 41.8, 41.1, 39.8, 31.7, 31.1, 25.2, 23.3, 23.2, 22.6, 22.4, 14.0, 13.0.

Synthesis of Camphoryl N–Me Oxaziridine 19a [Adapted from literature procedure [2]]



Supplementary Figure 3. Synthesis of Camphoryl N–Me Oxaziridine **19a**

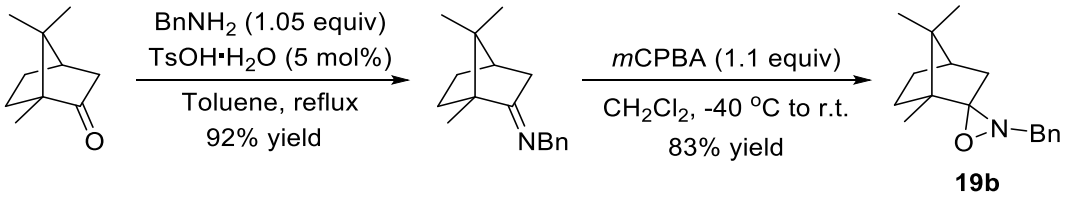
(±)-Camphor N–Me imine

A solution of (±)-camphor nitrimine **(**9.5 g, 48 mmol) in dry tetrahydrofuran (100 mL) was treated at 0 °C with a slow stream of methanamine gas for 5 hours. The solvent was removed *in vacuo* (keeping the water bath below 30 °C) to give the (±)-camphor N–Me imine **as** a pale yellow liquid (7.7 g, 97%). R_f = 0.30 (Hexanes:EtOAc = 3:1); ^{1}H NMR (400 MHz, $CDC1_3$): δ 3.00 (s, 3H), 2.35-2.25 (m, 1H), 1.92 (t, *J* = 4.0 Hz, 1H), 1.89-1.75 (m, 2H**),** 1.62 (td, *J* = 12.4, 4.4 Hz, 1H), 1.36-1.24 (m, 1H), 1.20-1.10 (m, 1H), 0.93 (s, 3H), 0.88 (s, 3H), 0.70 (s, 3H); ^{13}C NMR (100 MHz, $CDC1_3$): δ 184.7, 53.7, 47.2, 43.7, 38.9, 35.2, 31.9, 27.3, 19.4, 18.8, 11.2.

(±)-Camphoryl N–Me Oxaziridine 19a

A solution of purified *m*-CPBA (5.7 g, 33 mmol) in dry dichloromethane (120 mL) was cooled to -40 °C, causing some of the peracid to crystallize from the solution. On addition of a solution of the (±)-camphor N–Me imine (4.96 g, 30 mmol) in dry dichloromethane (30 mL) to this solution over a period of 10 minutes, this solution became homogeneous. This reaction mixture was then stirred overnight at between -30 °C and -40 °C and allowed to reach room temperature. The reaction mixture was stirred at room temperature for a further 2 hours until all of the peracid had reacted (TLC), by which time much of the *m*-chlorobenzoic acid by-product had crystallized from the solution. The solution was concentrated in *vacuo* until approximately 25% of the original volume remained. Hexanes (100 mL) was added and the solution again concentrated in *vacuo* until approximately 25% of the original volume remained. This process was repeated once more and finally hexanes (150 mL) was added to the mixture. The precipitated *m*-chlorobenzoic acid was removed by filtration, and the rest of this by-product washed out of the resulting solution with aqueous sodium hydroxide (1.0 M, 3 x 50 mL). The organic solution was dried (Na_2SO_4) and the solvent was removed in *vacuo* to give the crude oxaziridine, which can be further purified by column chromatography (Hexanes:EtOAc = 20:1) over silica gel to give (±)-camphoryl N–Me oxaziridine **19a** as a colorless solid (4.2 g, 77%). ^{1}H NMR (400 MHz, $CDC1_3$): δ 2.58 (s, 3H), 2.28-2.20 (m, 1H), 1.90-1.75 (m, 2H), 1.63-1.50 (m, 1H), 1.48-1.25 (m, 3H), 0.89 (s, 3H), 0.81 (s, 3H), 0.61 (s, 3H); ^{13}C NMR (100 MHz, $CDC1_3$): δ 94.1, 49.2, 46.7, 44.3, 42.1, 32.3, 29.3, 27.2, 19.4, 19.3, 9.2.

Synthesis of Camphoryl N–Bn Oxaziridine 19b [Adapted from literature procedure [2]]



Supplementary Figure 4. Synthesis of Camphoryl N–Bn Oxaziridine **19b**

(±)-Camphor N–Bn imine

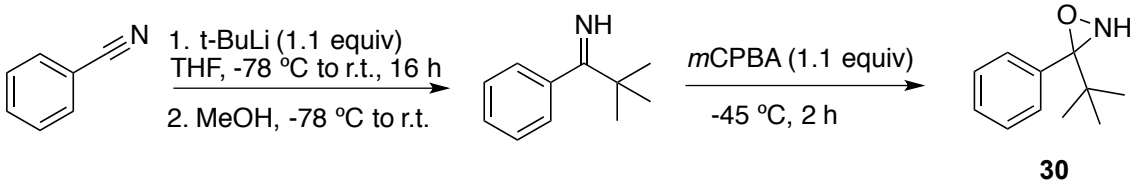
A solution of (±)-camphor (7.6 g, 50 mmol), benzylamine (5.6g, 52.5 mmol, 1.05 equiv) and *p*-toluenesulfonic acid monohydrate (0.48g, 2.5 mmol, 0.05 equiv) in toluene (100 mL) was treated at 130 °C with a Dean-Stark for 12 hours. After cooling, most of the toluene in the reaction mixture was removed *in vacuo.* The precipitates from the solution were removed by filtration. The organic solution was washed by saturated $NaHCO_3$ solution (2 x 100 mL) and brine (100 mL), dried over Na_2SO_4. The solvent was removed *in vacuo* to give the (±)-camphor N–Bn imine as a colorless liquid (11.1 g, 92%). R_f = 0.30 (Hexanes:EtOAc = 5:1); ^{1}H NMR (400 MHz, $CDC1_3$): δ 7.38-7.26 (m, 4H), 7.25-7.18 (m, 1H), 4.51 (d, *J* = 14.8 Hz, 1H), 4.44 (d, *J* = 14.8 Hz, 1H), 2.48-2.35 (m, 1H), 2.00-1.80 (m, 3H), 1.71 (td, *J* = 12.4, 4.0 Hz, 1H), 1.48-1.35 (m, 1H), 1.30-1.15 (m, 1H), 1.05 (s, 3H), 0.95 (s, 3H), 0.78 (s, 3H); ^{13}C NMR (100 MHz, $CDC1_3$): δ 183.6, 140.4, 128.2, 127.4, 126.3, 55.5, 53.9, 47.1, 43.8, 35.8, 32.2, 27.4, 19.6, 19.0, 11.4.

(±)-Camphoryl N–Bn Oxaziridine 19b

A solution of purified *m*-CPBA (7.9 g, 46 mmol) in dry dichloromethane (150 mL) was cooled to -40 °C, causing some of the peracid to crystallize from the solution. On addition of a solution of the (±)-camphor N–Bn imine (10.5 g, 44 mmol) in dry dichloromethane (50 mL) to this solution over a period of 15 minutes, this solution became homogeneous. This reaction mixture was then stirred overnight at between -30 °C and -40 °C and allowed to reach room temperature. The reaction mixture was stirred at room temperature for a further 2 hours until all of the peracid had reacted (TLC), by which time much of the *m*-chlorobenzoic acid by-product had crystallized from the solution. The solution was concentrated in *vacuo* until approximately 25% of the original volume remained. Hexanes (150 mL) was added and the solution again concentrated in *vacuo* until approximately 25% of the original volume remained. This process was repeated once more and finally hexanes (200 mL) was added to the mixture. The precipitated *m*-chlorobenzoic acid was removed by filtration, and the rest of this by-product washed out of the resulting solution with aqueous sodium hydroxide (1.0 M, 3 x 100 mL). The organic solution was dried (Na_2SO_4) and the solvent was removed in *vacuo* to give the crude oxaziridine, which can be further purified by column chromatography (Hexanes:EtOAc = 20:1) over silica gel to give (±)-camphoryl N–Bn oxaziridine **19b** as a colorless solid (9.4 g, 83%). ^{1}H NMR (400 MHz, $CDC1_3$): δ 7.43 (d, *J* = 7.6 Hz, 2H), 7.35 (t, *J* = 7.2 Hz, 2H), 7.28 (d, *J* = 7.2 Hz, 1H), 3.86 (d, *J* = 14.8 Hz, 1H), 3.64 (d, *J* = 14.0 Hz, 1H), 2.48-2.37 (m, 1H), 1.91 (t, *J* = 4.8 Hz, 1H), 1.88-1.78 (m, 1H),

1.68-1.54 (m, 2H), 1.52-1.32 (m, 2H), 0.91 (s, 3H), 0.76 (s, 3H), 0.67 (s, 3H); ^{13}C NMR (100 MHz, $CDC1_3$): δ 136.6, 128.52, 128.45, 127.4, 94.2, 59.4, 49.3, 46.9, 44.4, 33.2, 29.4, 27.1, 19.4, 19.3, 9.3.

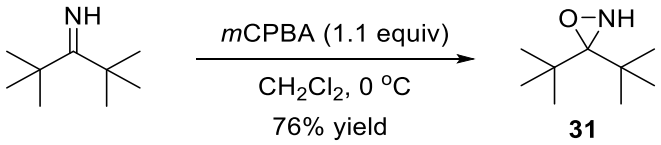
Synthesis of oxaziridine 30 [Adapted from literature procedure[3]]



Supplementary Figure 5. Synthesis of oxaziridine **30**

tert-Butyllithium (1.7 M, 16.4 mL, 28 mmol, 1.1 eq.) was slowly added to a solution of benzonitrile (2.58 g, 25 mmol, 1.0 eq.) in 50 mL THF at -78 ºC. The reaction was allowed to reach room temperature. After 16 h, the reaction mixture was cooled back to -78 ºC and 5 mL of anhydrous MeOH was added. After reaching room temperature, the reaction mixture was diluted with 50 mL hexanes and filtered through a pad of celite. The filtrate was concentrated under reduced pressure. The crude imine was re-dissolved in 25 mL of anhydrous DCM and slowly added to a suspension of *m*-CPBA (4.75 g, 27.5 mmol, 1.1 eq.) in 125 mL anhydrous DCM at -45 ºC. After 2 h at -45 ºC, the reaction mixture was allowed to reach room temperature. The solvent was carefully evaporated under reduced temperature, and 50 mL hexanes was added to the residue. The suspension was filtered and the solid was washed with additional hexanes (2 x 50 mL) before being discarded. The combined filtrate was washed once with 100 mL saturated aqueous$NaHCO_3$ and dried over anhydrous Na_2SO_4. The solvent was removed under reduced pressure and the residue was purified by silica gel chromatography (Hexanes:EtOAc = 25:1) to give 31 as a colorless oil (2.6 g, 58% over 2 steps). The product exists as a single pair of diastereomers (A and B). ^{1}H NMR (600 MHz, $CDCl_3$) δ 7.41 – 7.30 (m, 5H, A & B), 4.40 (s, 1H, A), 3.85 (s, 1H, B), 1.07 (s, 9H, A), 1.03 (s, 9H, B); ^{13}C NMR (151 MHz, $CDCl_3$) δ 138.0, 132.7, 132.1, 129.1, 128.5, 128.0, 127.6, 127.6, 127.4, 86.2, 35.0, 25.5, 25.5.

Synthesis of Di-*t*-Butyl Oxaziridine 31 [Adapted from literature procedure[4]]



Supplementary Figure 6. Synthesis of Di-*t*-Butyl Oxaziridine **31**

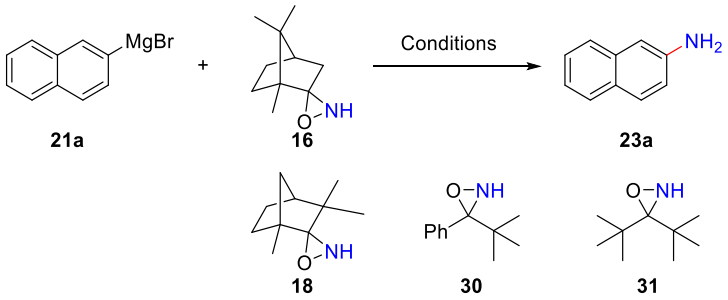
To a solution of 2,2,4,4-tetramethylpentan-3-imine (5 g, 35 mmol) in 20 mL of CH_2Cl_2 was added dropwise a solution of *m*-CPBA (7.1 g, 39 mmol, 1.1 equiv) in 80 mL of CH_2Cl_2 at 0 °C. The reaction mixture was stirred at 0 °C for 3 hours, and then concentrated in *vacuo* to remove

half of the solvent and filtered the *m*-chlorobenzoic acid by-product from the mixture. Hexanes (50 mL) was added and the solution again concentrated in *vacuo* until approximately 25% of the original volume remained. This process was repeated once more and finally hexanes (50 mL) was added to the mixture. The precipitated *m*-chlorobenzoic acid was removed by filtration, and the rest of this by-product washed out of the resulting solution with aqueous sodium hydroxide (1.0 M, 3 x 50 mL). The organic solution was dried (Na_2SO_4) and the solvent was removed in *vacuo* to give the crude oxaziridine, which can be further purified by column chromatography (Hexanes:EtOAc = 40:1) over silica gel to give di-*t*-butyl oxaziridine **31** as a colorless oil (4.2 g, 76%). ^{1}H NMR (600 MHz, $CDC1_3$): δ 3.78 (br s, 1H), 1.13 (s, 9H), 1.09 (s, 9H); ^{13}C NMR (151 MHz, $CDC1_3$): δ 85.2, 37.5, 28.1, 27.9.

Safety Warning:

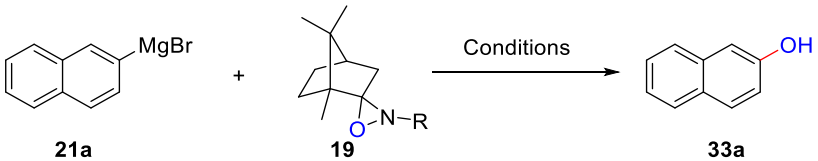
While we have experienced no ill effects of using these above mentioned oxaziridine reagents, this does not excuse carelessness in their handling.

Optimization of the reaction conditions



Entry	Equiv of **21a**	Equiv of **NH**	Additives 1.2 equiv	Solvent	Temperature	Time	Yield of **23a**
1	2.0	**16**, 1.0	-	THF	-45 °C	1 h	59%
2	2.0	**16**, 1.0	-	THF	-78 °C	5 h	58%
3	2.0	**16**, 1.0	-	THF	-78 °C	1 h	43%
4	2.0	**16**, 1.0	-	THF	0 °C	1 h	25%
5	1.5	**16**, 1.0	-	THF	-45 °C	1 h	54%
6	1.0	**16**, 1.5	-	THF	-45 °C	1 h	65%
7	1.0	**16**, 1.5	-	THF	-45 °C	2 h	57%
8	1.0	**16**, 1.2	-	THF	-78 °C	2 h	50%
9	1.0	**16**, 1.2	-	THF	-45 °C	2 h	63%
10	1.0	**16**, 1.2	TMEDA	THF	-45 °C	2 h	42%
11	1.0	**16**, 1.2	DMPU	THF	-45 °C	2 h	45%
12	1.0	**16**, 1.2	HMPA	THF	-45 °C	2 h	46%
13	1.0	**16**, 1.5	-	Et_2O	-45 °C	2 h	43%
14	1.0	**16**, 1.5	-	Toluene	-45 °C	2 h	41%
15	1.0	**16**, 1.5	-	CH_2Cl_2	-45 °C	2 h	33%
16	1.0	**18**, 1.2	-	THF	-45 °C	2 h	77%
17	1.0	**18**, 1.2	-	THF	-78 °C	2 h	81%
18	1.0	**18**, 1.2	-	THF	-0 °C	2 h	68%
19	1.0	**18**, 1.5	-	THF	-45 °C	2 h	69%
20	1.0	**18**, 1.5	-	THF	-78 °C	2 h	68%
21	1.0	**18**, 1.2	-	Et_2O	-78 °C	2 h	76%
22	**1.0**	**18, 1.2**	**-**	**Toluene**	**-78 °C**	**2 h**	**89%**
23	1.0	**18**, 1.2	-	CH_2Cl_2	-78 °C	2 h	83%
24	1.0	**30**, 1.2	-	Toluene	-78 °C	2 h	83%
25	1.0	**31**, 1.2	-	Toluene	-78 °C	2 h	46%

Supplementary Table 1. Optimization of the amination conditions



21a **19** **33a**

19a, R = Me
19b, R = Bn

Entry	Equiv of **21a**	Equiv of **19**	Solvent	Temperature	Time	Yield of **3a**
1	1.5	**19a**, 1.0	THF	-78 °C	4 h	N.R.
2	1.5	**19a**, 1.0	THF	0 °C	7 h	56%
3	1.5	**19a**, 1.0	THF	r.t.	7 h	78%
4	1.0	-	THF	r.t.	7 h	< 5%
5	1.0	-	THF	r.t. (Air)	7 h	32%
6	1.5	**19a**, 1.0	THF	r.t.	2 h	64%
7	1.0	**19a**, 1.5	THF	r.t.	2 h	83%
8	1.0	**19a**, 1.5	THF	r.t. (Air)	2 h	84%
9	1.0	**19a**, 1.2	THF	r.t.	2 h	71%
10	**1.0**	**19b, 1.5**	**THF**	**r.t.**	**2 h**	**86%**
11	1.0	**19b**, 1.2	THF	r.t.	2 h	77%
12	1.0	**19b**, 1.5	DCM	r.t.	2 h	75%
13	1.0	**19b**, 1.5	Et_2O	r.t.	2 h	79%
14	1.0	**19b**, 1.5	Toluene	r.t.	2 h	85%

Supplementary Table 2. Optimization of the oxidation conditions

Experimental procedures

Amination of arylmetals:

Method A: To a flame-dried 25 mL round bottom flask was charged activated Mg (7.5 mmol, 1.5 eq.) and 5 mL anhydrous THF. To this suspension was added 2 drops of 1,2-dibromoethane. After 5 min, a solution of Aryl bromide (5 mmol, 1.0 eq.) in 5 mL anhydrous THF was slowly added to the suspension of Mg at room temperature. The reaction was mildly exothermic. The Grignard reagent was titrated and 1 mmol of this reagent was added to a flame-dried reaction vial. The solution was diluted with 3 mL anhydrous toluene and after cooling to the target temperature ***T***, a solution of oxaziridine (1.2 mmol, 1.2 eq.) in 1 mL anhydrous toluene was added. The reaction was maintained at the targeted temperature ***T*** for time ***t*** before being quenched with saturated aqueous NH_4Cl. (The actual temperature/reaction time is listed for each substrate.)

Method B: To a flame-dried reaction vial was added iPrMgCl·LiCl (1.1 mmol, 1.1 eq., commercially-available THF solution from Aldrich). A solution of aryl iodide (1.0 mmol, 1.0 eq.) in 2 mL THF was added at -45 ºC. After 2 h, 3 mL of anhydrous toluene was added at -45 ºC, followed by a solution of oxaziridine (1.2 mmol, 1.2 eq.) in 1 mL anhydrous toluene. The reaction temperature was maintained at -45 ºC for 2 h before being quenched with saturated aqueous NH_4Cl.

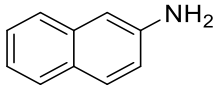
Method C: To a flame-dried reaction vial was added TMPMgCl·LiCl (1.1 mmol, 1.1 eq., commercially-available THF solution from Aldrich). A solution of aromatic or hetero-aromatic substrate (1.0 mmol, 1.0 eq.) in 2 mL THF was added at the temperature T_1. After target time t_1, the solution was cooled to temperature ***T2*** and 3 mL anhydrous toluene was added, followed by a solution of oxaziridine (1.2 mmol, 1.2 eq.) in 1 mL anhydrous toluene. The reaction was maintained at the targeted temperature T_2 for t_2 before being quenched with saturated aqueous NH_4Cl. (The actual temperature/reaction time is listed for each substrate.)

Method D: To a flame-dried reaction vial was added a solution of aryl bromide (1.0 mmol, 1.0 eq.) in 2 mL anhydrous THF. A solution of n-BuLi in hexanes (1.1 mmol, 1.1 eq.) was slowly added at -78 ºC and the temperature was maintained. After 30 min, a solution of oxaziridine (1.2 mmol, 1.2 eq.) in 4 mL anhydrous toluene was added at -78 ºC. The reaction was allowed to proceed at -78 ºC for 2 h before being quenched with saturated aqueous NH_4Cl.

Method E: To a flame-dried reaction vial was added a solution of aryl bromide (1.0 mmol, 1.0 eq.) in 2 mL anhydrous THF. A solution of n-BuLi in hexanes (1.1 mmol, 1.1 eq.) was slowly added at -78 ºC and the temperature was maintained at -78 ºC. After 30 min, this aryl lithium solution was transferred to a suspension of $MgBr_2$ (1.0 mmol, 1.0 eq., freshly prepared from Mg and $BrCH_2CH_2Br$) at -78 ºC. The reaction mixture was allowed to reach room temperature over 30 min before being cooled to the target temperature ***T***. A solution of oxaziridine (1.2 mmol, 1.2 eq.) in 4 mL anhydrous toluene was added to the reaction mixture at ***T***. The reaction was maintained at the targeted temperature ***T*** for 2 h before being quenched with saturated aqueous NH_4Cl. (The actual temperature/reaction time is listed for each substrate.)

Workup and Purification: After quenching, the reaction was diluted with 20 mL saturated aqueousNaCl and 20 mL EtOAc. The organic layer was separated and the aqueous layer was extracted with EtOAc (2 x 20mL). The combined organic layer was dried over anhydrous Na_2SO_4, filtered and concentrated under reduced pressure. The residue was purified with flash chromatography.

1. **Naphthalen-2-amine (23a)**



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

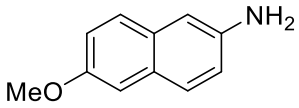
Yield = 89%; $\mathbf{R_f}$ = 0.25 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.75 (d, *J* = 8.0 Hz, 1H), 7.70 (d, *J* = 8.4 Hz, 1H), 7.64 (d, *J* = 8.4 Hz, 1H), 7.43 (t, *J* = 7.2 Hz, 1H), 7.29 (t, *J* = 7.2 Hz, 1H), 7.02-6.94 (m, 2H), 3.82 (br s, 2 H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 144.0, 134.8, 129.1, 127.9, 127.6, 126.3, 125.7, 122.4, 118.2, 108.5.

Spectral data is in accordance with the literature report.[5]

2. **6-Methoxynaphthalen-2-amine (23b)**



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

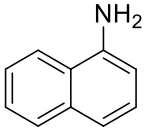
Yield = 78%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 3:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.58 (d, J = 8.8 Hz, 1H), 7.52 (d, J = 8.8 Hz, 1H), 7.11-7.03 (m, 2H), 6.98-6.90 (m, 2H), 3.89 (s, 3H), 3.73 (br s, 2 H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 155.3, 142.3, 130.2, 128.6, 127.9, 127.3, 118.9, 118.7, 109.2, 106.0, 55.2.

Spectral data is in accordance with the literature report.[5]

3. **Naphthalen-1-amine (23c)**



Method A, ***T*** = -45 ºC, ***t*** = 2 h;

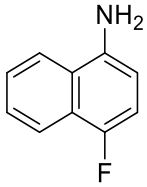
Yield = 63%; $\mathbf{R_f}$ = 0.25 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.89-7.80 (m, 2H), 7.55-7.46 (m, 2H), 7.41-7.31 (m, 2H), 6.81 (dd, *J* = 6.8, 1.2 Hz, 1H), 4.12 (br s, 2 H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 142.0, 134.3, 128.5, 126.3, 125.8, 124.8, 123.5, 120.7, 118.8, 109.6.

Spectral data is in accordance with the literature report.[6]

4. **4-Fluoronaphthalen-1-amine (23d)**



Method A, ***T*** = -45 ºC, ***t*** = 2 h;

Yield = 31%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 4:1);

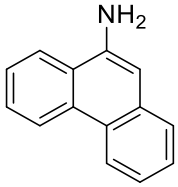
^{1}H NMR (400 MHz, $CDCl_3$): δ 8.09 (dd, *J* = 7.2, 2.4 Hz, 1H), 7.85-7.80 (m, 1H), 7.58-7.50 (m, 2H), 6.98 (dd, *J* = 10.4, 8.0 Hz, 1H), 6.66 (dd, *J* = 8.4, 4.4 Hz, 1H), 3.99 (br s, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 152.6 (d, *J* = 240.9 Hz), 138.1 (d, *J* = 2.9 Hz), 126.1 (d, *J* = 2.2 Hz), 125.8, 124.5 (d, *J* = 16.8 Hz), 124.1 (d, *J* = 16.8 Hz), 121.1, 121.0, 109.4 (d, *J* = 20.5 Hz), 108.6 (d, *J* = 8.0 Hz);

^{19}F NMR (376 MHz, $CDCl_3$): δ -134.6 (m).

Spectral data is in accordance with the literature report.[7]

5. Phenanthren-9-amine (23e)



Method A, ***T*** = -45 ºC, ***t*** = 3 h;

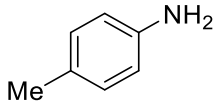
Yield = 52%; R_f = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 8.73 (dd, *J* = 8.4, 1.2 Hz, 1H), 8.59 (d, *J* = 8.0 Hz, 1H), 7.93 (dd, *J* = 8.0, 1.2 Hz, 1H), 7.73-7.61 (m, 3H), 7.56-7.50 (m, 1H), 7.49-7.42 (m, 1H), 6.99 (s, 1H), 4.14 (br s, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 139.8, 133.2, 131.1, 126.8, 126.6, 126.3, 126.2, 126.1, 125.4, 123.4, 123.3, 122.4, 121.2, 107.4.

Spectral data is in accordance with the literature report.[6]

6. *p*-Toluidine (23f)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

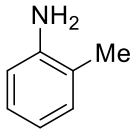
Yield = 61%; **R_f** = 0.35 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 6.97 (d, *J* = 8.0 Hz, 2H), 6.62 (d, *J* = 8.8 Hz, 2H), 3.53 (br s, 2 H), 2.25 (s, 3H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 143.8, 129.7, 127.8, 115.2, 20.4.

Spectral data is in accordance with the literature report.[5]

7. *o*-Toluidine (23g)



Method A, ***T*** = -45 ºC, ***t*** = 2 h;

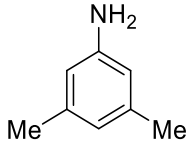
Yield = 47%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.11-7.04 (m, 2H), 6.79-6.68 (m, 2H), 3.61 (br s, 2H), 2.20 (s, 3H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 144.5, 130.4, 126.9, 122.2, 118.5, 114.9, 17.3.

Spectral data is in accordance with the literature report.[8]

8. 3,5-Dimethylaniline (23h)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

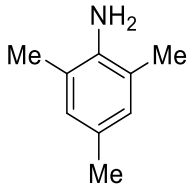
Yield = 74%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 6.50 (s, 1H), 6.39 (s, 2H), 3.63 (br s, 2H), 2.31 (s, 6H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 146.1, 138.8, 120.4, 113.0, 21.2.

Spectral data is in accordance with the literature report.[8]

9. 2,4,6-Trimethylaniline (23i)



Method A, ***T*** = -45 ºC, ***t*** = 3 h;

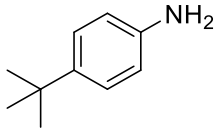
Yield = 26%; R_f = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 6.81 (s, 2H), 3.48 (br s, 2H), 2.25 (s, 3H), 2.19 (s, 6H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 140.1, 128.8, 127.1, 121.8, 20.3, 17.5.

Spectral data is in accordance with the literature report.[6]

10. 4-(Tert-butyl)aniline (23j)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

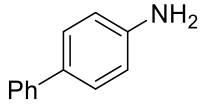
Yield = 70%; **R_f** = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.21 (d, *J* = 8.4 Hz, 2H), 6.67 (d, *J* = 8.4 Hz, 2H), 3.52 (br s, 2H), 1.31 (s, 9H);

^{13}C NMR (150 MHz, $CDCl_3$): δ 143.7, 141.4, 126.0, 114.9, 33.9, 31.5.

Spectral data is in accordance with the literature report.[5]

11. [1,1'-Biphenyl]-4-amine (23k)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

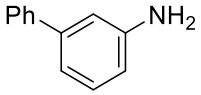
Yield = 92%; **R_f** = 0.25 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.57 (d, *J* = 7.6 Hz, 2H), 7.48-7.40 (m, 4H), 7.30 (t, *J* = 7.6 Hz, 1H), 6.78 (d, *J* = 8.4 Hz, 2H), 3.73 (br s, 2 H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 145.8, 141.1, 131.5, 128.6, 128.0, 126.3, 126.2, 115.3.

Spectral data is in accordance with the literature report.[5]

12. [1,1'-Biphenyl]-3-amine (23l)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

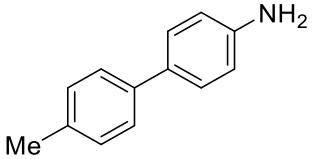
Yield = 82%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.60-7.55 (m, 2H), 7.43 (t, *J* = 7.2 Hz, 2H), 7.37-7.33 (m, 1H), 7.24 (t, *J* = 8.4 Hz, 1H), 7.03-6.98 (m, 1H), 6.92 (t, *J* = 2.0 Hz, 1H), 6.72-6.66 (m, 1H), 3.74 (br s, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 146.7, 142.4, 141.4, 129.6, 128.6, 127.2, 127.1, 117.7, 114.1, 113.9.

Spectral data is in accordance with the literature report.[9]

13. 4'-Methyl-[1,1'-biphenyl]-4-amine (23m)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

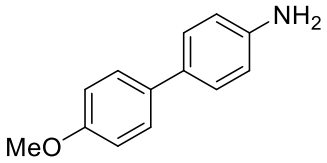
Yield = 85%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.55 (d, *J* = 8.4 Hz, 2H), 7.50 (d, *J* = 8.4 Hz, 2H), 7.32 (d, *J* = 8.0 Hz, 2H), 6.81(d, *J* = 8.8 Hz, 2H), 3.71 (br s, 2H), 2.48 (s, 3H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 145.5, 138.2, 135.7, 131.3, 129.3, 127.7, 126.1, 115.3, 20.9.

Spectral data is in accordance with the literature report.[10]

14. 4'-Methoxy-[1,1'-biphenyl]-4-amine (23n)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

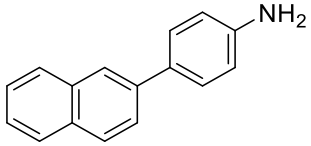
Yield = 83%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 3:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.58 (d, *J* = 7.2 Hz, 2H), 7.48 (d, *J* = 7.2 Hz, 2H), 7.06 (d, *J* = 7.8 Hz, 2H), 6.86 (d, *J* = 7.2 Hz, 2H), 3.96 (s, 3H), 3.81 (br s, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 158.4, 145.3, 133.9, 131.3, 127.6, 127.4, 115.4, 114.1, 55.3.

Spectral data is in accordance with the literature report.[10]

15. 4-(Naphthalen-2-yl)aniline (23o)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

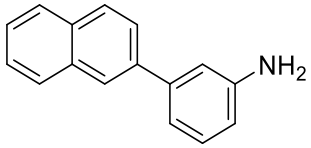
Yield = 62%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.98 (s, 1H), 7.91-7.83 (m, 3H), 7.73 (dd, *J* = 8.8, 2.0 Hz, 1H), 7.57 (dd, *J* = 6.4, 2.0 Hz, 2H), 7.51-7.44 (m, 2H), 6.81 (dd, *J* = 6.8, 2.4 Hz, 2H), 3.76 (br s, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 145.9, 138.5, 133.8, 132.1, 131.3, 128.3, 128.2, 127.9, 127.6, 126.1, 125.4, 125.3, 124.4, 115.4.

Spectral data is in accordance with the literature report.[11]

16. 3-(Naphthalen-2-yl)aniline (23p)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

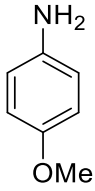
Yield = 79%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 8.05 (s, 1H), 7.94-7.86 (m, 3H), 7.75 (dd, *J* = 8.4, 1.6 Hz, 1H), 7.54-7.48 (m, 2H), 7.30 (t, *J* = 8.0 Hz, 1H), 7.15 (d, *J* = 8.0 Hz, 1H), 7.05 (t, *J* = 2.0 Hz, 1H), 6.76-6.70 (m, 1H), 3.73 (br s, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 146.8, 142.3, 138.7, 133.6, 132.6, 129.7, 128.2, 128.1, 127.6, 126.2, 125.8, 125.64, 125.60, 117.9, 114.2, 114.1.

Spectral data is in accordance with the literature report.[12]

17. 4-Methoxyaniline (23q)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

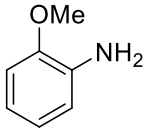
Yield = 63%; $\mathbf{R_f}$ = 0.32 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 6.79-6.72 (m, 2H), 6.68-6.61 (m, 2H), 3.75 (s, 3 H), 3.43 (br s, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 152.6, 139.8, 116.3, 114.6, 55.6.

Spectral data is in accordance with the literature report.[5]

18. 2-Methoxyaniline (23r)



Method A, ***T*** = -45 ºC, ***t*** = 2 h;

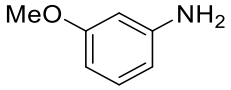
Yield = 61%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 6.87-6.81 (m, 2H), 6.80-6.73 (m, 1H), 3.88 (s, 3H), 3.82 (br s, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 147.2, 136.1, 120.0, 118.3, 114.9, 110.3, 55.3.

Spectral data is in accordance with the literature report.[13]

19. 3-Methoxyaniline (23s)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

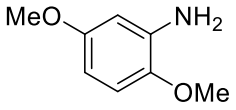
Yield = 67%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.09 (t, *J* = 8.4 Hz, 1H), 6.39-6.29 (m, 2H), 6.27 (t, *J* = 2.4 Hz, 1H), 3.78 (s, 3H), 3.71 (br s, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 160.6, 147.6, 129.9, 107.8, 103.8, 100.9, 54.9.

Spectral data is in accordance with the literature report.[5]

20. 2,5-Dimethoxyaniline (23t)



Method A, ***T*** = -45 ºC, ***t*** = 2 h;

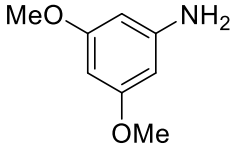
Yield = 58%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 3:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 6.70 (d, *J* = 8.8 Hz, 1H), 6.34 (d, *J* = 2.8 Hz, 1H), 6.25 (dd, *J* = 8.4, 2.8 Hz, 1H), 3.84 (br s, 2H), 3.81 (s, 3H), 3.73 (s, 3H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 154.3, 141.8, 137.2, 111.2, 101.9, 101.8, 56.0, 55.4.

Spectral data is in accordance with the literature report.[14]

21. 3,5-Dimethoxyaniline (23u)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

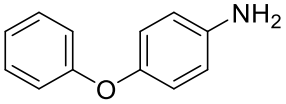
Yield = 78%; $\mathbf{R_f}$ = 0.25 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 5.93 (t, *J* = 2.0 Hz, 1H), 5.87 (d, *J* = 2.4 Hz, 2H), 3.73 (s, 6H), 3.67 (s, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 161.5, 148.4, 93.6, 90.7, 55.0.

Spectral data is in accordance with the literature report.[15]

22. 4-Phenoxyaniline (23v)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

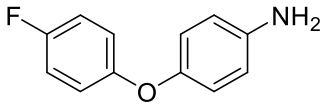
Yield = 81%; $\mathbf{R_f}$ = 0.50 (Hexanes:EtOAc = 3:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.35-7.28 (m, 2H), 7.04 (t, *J* = 7.4 Hz, 1H), 6.96 (d, *J* = 8.0 Hz, 2H), 6.90 (d, *J* = 8.7 Hz, 2H), 6.69 (d, *J* = 8.7 Hz, 2H), 3.59 (br s, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 158.8, 148.5, 142.6, 129.5, 122.0, 121.0, 117.2, 116.2.

Spectral data is in accordance with the literature report.[5]

23. 3-(4-Fluorophenoxy)aniline (23w)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

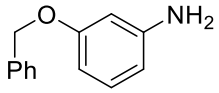
Yield = 70%; $\mathbf{R_f}$ = 0.6 (Hexanes:EtOAc = 3:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.09 (t, *J* = 8.4 Hz, 1H), 7.07-6.95 (m, 4H), 6.43 (dd, *J* = 8.0, 1.8 Hz, 1H), 6.36 (dd, *J* = 8.4, 1.8 Hz, 1H), 6.31 (d, *J* = 2.4 Hz, 1H), 3.76 (br s, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 158.4 (d, *J* = 133.2 Hz), 152.7, 147.6, 130.4, 120.7, 120.6, 116.1 (d, *J* = 24.3 Hz), 110.1, 108.4, 105.0.

Spectral data is in accordance with the literature report.[16]

24. 3-(Benzyloxy)aniline (23x)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

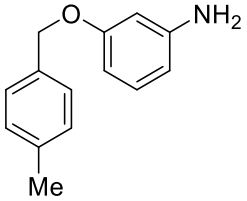
Yield = 86%; $\mathbf{R_f}$ = 0.40 (Hexanes:EtOAc = 3:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.45 (d, *J* = 6.6 Hz, 2H), 7.40 (t, *J* = 7.8 Hz, 2H), 7.34 (t, *J* = 7.2 Hz, 1H), 7.09 (t, *J* = 7.8 Hz, 1H), 6.43 (dd, *J* = 7.8, 2.4 Hz, 1H), 6.38-6.30 (m, 2H), 5.04 (s, 2H), 3.72 (br s, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 160.0, 147.6, 137.2, 130.1, 128.5, 127.8, 127.4, 108.2, 104.9, 102.0, 69.8.

Spectral data is in accordance with the literature report.[17]

25. 3-((4-Methylbenzyl)oxy)aniline (23y)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

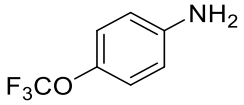
Yield = 65%; $\mathbf{R_f}$ = 0.55 (Hexanes:EtOAc = 3:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.33 (d, *J* = 6.6 Hz, 2H), 7.20 (d, *J* = 7.8 Hz, 2H), 7.08 (t, *J* = 8.4 Hz, 1H), 6.45-6.40 (m, 1H), 6.37-6.29 (m, 2H), 4.99 (s, 2H), 3.73 (br s, 2H), 2.38 (s, 3H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 160.0, 147.5, 137.6, 134.1, 130.1, 129.2, 127.5, 108.2, 105.0, 102.1, 69.7, 21.2.

Spectral data is in accordance with the literature report.[18]

26. 4-(Trifluoromethoxy)aniline (23z)



Method A, ***T*** = -20 ºC, ***t*** = 2 h;

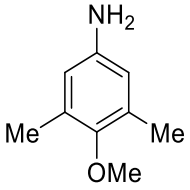
Yield = 62%; $\mathbf{R_f}$ = 0.70 (Hexanes:EtOAc = 3:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.01 (d, *J* = 8.4 Hz, 2H), 6.67-6.60 (m, 2H), 3.68 (br s, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 145.2, 141.3, 122.4, 120.64 (q, *J* = 255.3 Hz), 115.4.

Spectral data is in accordance with the literature report.[19]

27. 4-Methoxy-3,5-dimethylaniline (24a)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

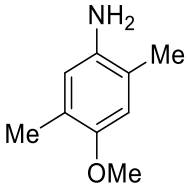
Yield = 77%; $\mathbf{R_f}$ = 0.25 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 6.37 (s, 2H), 3.68 (s, 3H), 3.51 (br s, 2H), 2.23 (s, 6H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 149.5, 141.9, 131.3, 115.2, 59.8, 15.9.

Spectral data is in accordance with the literature report.[20]

28. 4-Methoxy-2,5-dimethylaniline (24b)



Method A, ***T*** = -45 ºC, ***t*** = 2 h;

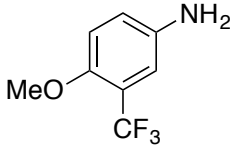
Yield = 46%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 6.61 (s, 1H), 6.52 (s, 1H), 3.78 (s, 3H), 3.29 (br s, 2H), 2.17 (s, 6H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 150.7, 137.6, 124.9, 120.3, 118.1, 113.3, 56.0, 17.3, 15.7.

Spectral data is in accordance with the literature report.[21]

29. 4-methoxy-3-(trifluoromethyl)aniline (24c)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

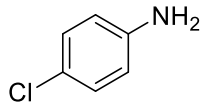
Yield = 65%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 2:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 6.89 (d, *J* = 3.0 Hz, 1H), 6.84 (d, *J* = 9.0 Hz, 1H), 6.81-6.76 (m, 1H), 3.81 (s, 3H), 3.50 (br s, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 150.2, 139.6, 123.6 (q, *J* = 270.2 Hz), 119.3, 119.2 (q, *J* = 30.6 Hz), 114.0, 113.8 (q, *J* = 4.4 Hz), 56.5.

Spectral data is in accordance with the literature report.[22]

30. 4-Chloroaniline (24d)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

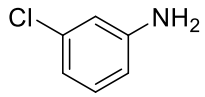
Yield = 43%; $\mathbf{R_f}$ = 0.40 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.10 (d, *J* = 8.8 Hz, 2H), 6.60 (d, *J* = 8.8 Hz, 2H), 3.58 (br s, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 144.9, 129.0, 123.0, 116.2.

Spectral data is in accordance with the literature report.[14]

31. 3-Chloroaniline (24e)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

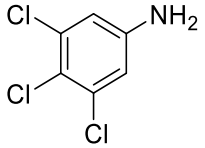
Yield = 63%; $\mathbf{R_f}$ = 0.40 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.07 (t, *J* = 8.0 Hz, 1H), 6.77-6.71 (m, 1H), 6.67 (t, *J* = 2.0 Hz, 1H), 6.57-6.51 (m, 1H), 3.72 (br s, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 147.6, 134.7, 130.2, 118.3, 114.8, 113.1.

Spectral data is in accordance with the literature report.[8]

32. 3,4,5-Trichloroaniline (24f)



Method A, ***T*** = -45 ºC, ***t*** = 2 h;

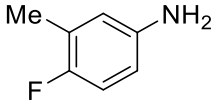
Yield = 47%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 6.67 (s, 2H), 3.78 (br s, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 145.6, 134.1, 119.7, 115.0.

Spectral data is in accordance with the literature report. [23]

33. 4-Fluoro-3-methylaniline (24g)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

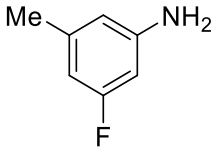
Yield = 48%; $\mathbf{R_f}$ = 0.40 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 6.80 (t, *J* = 8.8 Hz, 1H), 6.52-6.40 (m, 2H), 3.44 (br s, 2H), 2.20 (d, *J* = 1.6 Hz, 3H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 155.0 (d, *J* = 233.6 Hz), 142.0 (d, *J* = 1.5 Hz), 125.2 (d, *J* = 18.2 Hz), 117.7, 115.2 (d, *J* = 23.3 Hz), 113.3 (d, *J* = 7.3 Hz), 14.6 (d, *J* = 2.9 Hz).

Spectral data is in accordance with the literature report.[24]

34. 3-Fluoro-5-methylaniline (24h)



Method A, ***T*** = -45 ºC, ***t*** = 2 h;

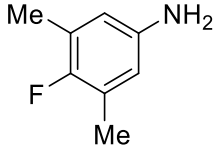
Yield = 62%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 3:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 6.32 – 6.25 (m, 2H), 6.20 (d, *J* = 10.2 Hz, 1H), 3.68 (br s, 2H), 2.25 (s, 3H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 163.8 (d, *J* = 242.2 Hz), 147.8 (d, *J* = 11.0 Hz), 141.0 (d, *J* = 10.0 Hz), 111.3, 105.9 (d, *J* = 19.8 Hz), 99.2 (d, *J* = 24.3 Hz), 21.4.

HRMS (ESI) m/z calcd for $[C_7H_9FN]^+$ $[M+H]^+$: 126.0714, found 126.0716.

35. 4-Fluoro-3,5-dimethylaniline (24i)



Method A, ***T*** = -45 ºC, ***t*** = 2 h;

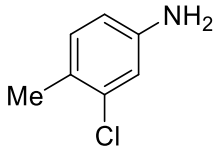
Yield = 69%; $\mathbf{R_f}$ = 0.25 (Hexanes:EtOAc = 4:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 6.33 (s, 1H), 6.32 (s, 1H), 3.34 (br s, 2H), 2.19 (s, 3H), 2.18 (s, 3H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 153.6 (d, *J* = 233.3 Hz), 141.5 (d, *J* = 3.3 Hz), 124.8 (d, *J* = 18.7 Hz), 115.1 (d, *J* = 3.3 Hz), 14.62, 14.59.

HRMS (ESI) m/z calcd for $[C_8H_{11}FN]^+$ $[M+H]^+$: 140.0870, found 140.0874.

36. 3-Chloro-4-methylaniline (24j)



Method A, ***T*** = -45 ºC, ***t*** = 2 h;

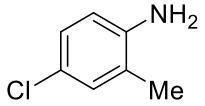
Yield = 67%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 6.99 (d, *J* = 7.8 Hz, 1H), 6.71 (d, *J* = 2.4 Hz, 1H), 6.49 (dd, *J* = 7.8, 2.4 Hz, 1H), 3.59 (br s, 2H), 2.26 (s, 3H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 145.3, 134.6, 131.3, 125.4, 115.5, 113.6, 18.9.

Spectral data is in accordance with the literature report.[25]

37. 4-Chloro-2-methylaniline (24k)



Method A, ***T*** = -45 ºC, ***t*** = 2 h;

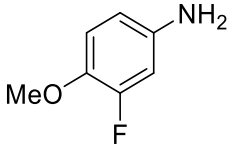
Yield = 46%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.03 (d, *J* = 2.4 Hz, 1H), 6.99 (dd, *J* = 8.4, 2.4 Hz, 1H), 6.58 (d, *J* = 8.4 Hz, 1H), 3.56 (br s, 2H), 2.13 (s, 3H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 143.1, 129.9, 126.5, 123.9, 122.7, 115.8, 17.2.

Spectral data is in accordance with the literature report.[6]

38. 3-Fluoro-4-methoxyaniline (24l)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

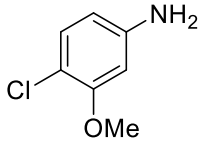
Yield = 68%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 2:1);

^{1}H NMR (600 MHz, CDCl3): δ 6.78 (t, *J* = 9.0 Hz, 1H), 6.45 (dd, *J* = 13.2, 3.0 Hz, 1H), 6.39-6.34 (m, 1H), 3.79 (s, 3H), 3.49 (br s, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 153.1 (d, *J* = 244.5 Hz), 141.0 (d, *J* = 8.9 Hz), 140.1 (d, *J* = 12.1 Hz), 115.7 (d, *J* = 3.3 Hz), 110.2 (d, *J* = 3.3 Hz), 104.1 (d, *J* = 20.8 Hz), 57.3.

Spectral data is in accordance with the literature report.[26]

39. 4-Chloro-3-methoxyaniline (24m)



Method A, ***T*** = -78 ºC, ***t*** = 3 h;

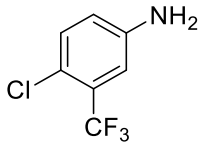
Yield = 62%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.08 (d, *J* = 8.4 Hz, 1H), 6.25 (d, *J* = 2.4 Hz, 1H), 6.23-6.17 (m, 1H), 3.81 (s, 3H), 3.69 (br s, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 155.4, 146.4, 130.3, 111.2, 107.7, 99.6, 55.8.

Spectral data is in accordance with the literature report. [27]

40. 4-Chloro-3-(trifluoromethyl)aniline (24n)



Method A, ***T*** = -45 ºC, ***t*** = 2 h;

Yield = 61%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.22 (d, *J* = 8.8 Hz, 1H), 6.95 (d, *J* = 2.8 Hz, 1H), 6.74-6.69 (m, 1H), 3.84 (br s, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 145.1, 132.0, 128.6 (q, *J* = 30.6 Hz), 122.8 (q, *J* = 271.6 Hz), 120.1, 118.6, 113.6 (q, *J* = 5.1 Hz);

^{19}F NMR (376 MHz, $CDCl_3$): δ -62.8.

Spectral data is in accordance with the literature report.[15]

41. 3,5-Difluoro-4-methoxyaniline (24o)

Method A, ***T*** = -45 ºC, ***t*** = 2 h;

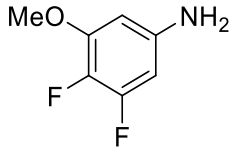
Yield = 61%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 6.24-6.14 (m, 2H), 3.85 (s, 3H), 3.68 (br s, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 155.6 (dd, *J* = 245.5, 8.8 Hz), 142.6 (t, *J* = 12.1 Hz), 128.3 (t, *J* = 15.4 Hz), (98.79, 98.77, 98.74, 98.64, 98.61, 98.59), 62.2 (t, *J* = 3.3 Hz).

Spectral data is in accordance with the literature report.[28]

42. 3,4-Difluoro-5-methoxyaniline (24p)



Method A, ***T*** = -45 ºC, ***t*** = 2 h;

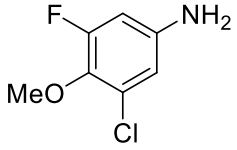
Yield = 77%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 6.10-6.01 (m, 2H), 3.83 (s, 3H), 3.60 (br s, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 151.6 (dd, *J* = 243.4, 11.0 Hz), 149.5 (dd, *J* = 8.9, 5.6 Hz), 142.3 (dd, *J* = 11.0, 3.3 Hz), 134.7 (dd, *J* = 236.8, 14.3 Hz), 95.8 (d, *J* = 2.3 Hz), 95.4 (d, *J* = 22.0 Hz), 56.5.

Spectral data is in accordance with the literature report.[29]

43. 3-Chloro-5-fluoro-4-methoxyaniline (24q)



Method A, ***T*** = -45 ºC, ***t*** = 2 h;

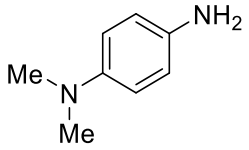
Yield = 60%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 6.45 (t, *J* = 2.3 Hz, 1H), 6.33 (dd, *J* = 12.0, 2.7 Hz, 1H), 3.83 (s, 3H), 3.64 (br s, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 156.8 (d, *J* = 247.8 Hz), 143.0 (d, *J* = 11.0 Hz), 136.4 (d, *J* = 14.2 Hz), 129.0 (d, *J* = 5.4 Hz), 111.3 (d, *J* = 3.3 Hz), 102.3 (d, *J* = 22.0 Hz), 61.7 (d, *J* = 3.3 Hz).

HRMS (ESI) m/z calcd for $[C_7H_8ClFNO]^+$ $[M+H]^+$: 176.0273, found 176.0279.

44. *N*',*N*'-dimethylbenzene-1,4-diamine (24r)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

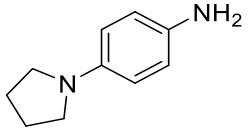
Yield = 79%; $\mathbf{R_f}$ = 0.20 (Hexanes:EtOAc = 1:1);

^{1}H NMR (600 MHz, Acetone-d_6): δ 6.68-6.62 (m, 2H), 6.61-6.55 (m, 2H), 4.02 (br s, 2H), 2.76 (s, 6H);

^{13}C NMR (151 MHz, Acetone-d_6): δ 143.9, 140.0, 115.6, 115.5, 41.5.

Spectral data is in accordance with the literature report.[13]

45. 4-(Pyrrolidin-1-yl)aniline (24s)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

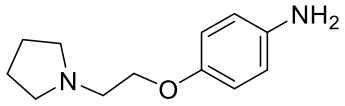
Yield = 57%; $\mathbf{R_f}$ = 0.25 (Hexanes:EtOAc = 1:1);

^{1}H NMR (600 MHz, Acetone-d_6): δ 6.64-6.53 (m, 2H), 6.45-6.38 (m, 2H), 3.87 (br s, 2H), 3.26-3.11 (m, 4H), 2.03-1.90 (m, 4H);

^{13}C NMR (151 MHz, Acetone-d_6): δ 141.6, 138.3, 116.1, 113.0, 48.1, 24.9.

Spectral data is in accordance with the literature report.[30]

46. 4-(2-(Pyrrolidin-1-yl)ethoxy)aniline (24t)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

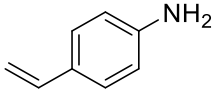
Yield = 83%; $\mathbf{R_f}$ = 0.2 (5% MeOH in DCM);

^{1}H NMR (600 MHz, $CDCl_3$): δ 6.78-6.68 (m, 2H), 6.67-6.55 (m, 2H), 4.18-3.92 (m, 2H), 3.43 (br s, 2H), 2.98-2.77 (m, 2H), 2.75-2.53 (m, 4H), 1.88-1.71 (m, 4H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 152.0, 140.0, 116.3, 115.8, 67.6, 55.2, 54.7, 23.5.

Spectral data is in accordance with the literature report.[31]

47. 4-Vinylaniline (28a)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

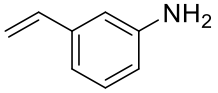
Yield = 75%; $\mathbf{R_f}$ = 0.20 (Hexanes:EtOAc = 5:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.30-7.26 (m, 2H), 6.72-6.63 (m, 3H), 5.61 (dd, *J* = 17.6, 1.2 Hz, 1H), 5.10 (dd, *J* = 10.8, 1.2 Hz, 1H), 3.70 (br s, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 146.1, 136.5, 128.2, 127.2, 114.9, 109.9.

Spectral data is in accordance with the literature report.[32]

48. 3-Vinylaniline (28b)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

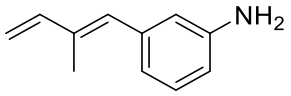
Yield = 72%; $\mathbf{R_f}$ = 0.20 (Hexanes:EtOAc = 5:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.16 (t, *J* = 8.0 Hz, 1H), 6.87 (d, *J* = 7.6 Hz, 1H), 6.76 (t, *J* = 2.0 Hz, 1H), 6.73-6.59 (m, 2H), 5.74 (dd, *J* = 17.6, 1.2 Hz, 1H), 5.25 (dd, *J* = 11.2, 0.8 Hz, 1H), 3.63 (br s, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 146.5, 138.5, 136.9, 129.3, 116.8, 114.7, 113.5, 112.6.

Spectral data is in accordance with the literature report.[33]

49. (*E*)-3-(2-Methylbuta-1,3-dien-1-yl)aniline (28c)



Method A, ***T*** = -45 ºC, ***t*** = 2 h;

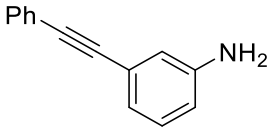
Yield = 75%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 4:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.16 (t, *J* = 7.8 Hz, 1H), 6.75 (d, *J* = 7.4 Hz, 1H), 6.65 (t, *J* = 2.0 Hz, 1H), 6.62 – 6.51 (m, 2H), 6.47 (s, 1H), 5.32 (d, *J* = 17.3 Hz, 1H), 5.15 (d, *J* = 10.6 Hz, 1H), 3.65 (br s, 2H), 2.02 (d, *J* = 1.3 Hz, 3H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 146.0, 141.9, 138.7, 135.8, 131.8, 128.9, 119.8, 115.8, 113.6, 112.7, 13.2.

HRMS (ESI) m/z calcd for $[C_{11}H_{14}N]^+$ $[M+H]^+$: 160.1121, found 160.1120.

50. 3-(Phenylethynyl)aniline (28d)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

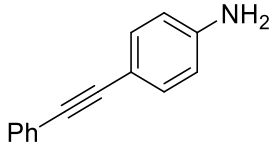
Yield = 60%; $\mathbf{R_f}$ = 0.20 (Hexanes:EtOAc = 5:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.59-7.54 (m, 2H), 7.41-7.32 (m, 3H), 7.16 (t, *J* = 8.0 Hz, 1H), 6.99 (d, *J* = 8.0 Hz, 1H), 6.88 (s, 1H), 6.67 (dd, *J* = 8.0, 1.6 Hz, 1H), 3.63 (br s, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 146.2, 131.5, 129.2, 128.3, 128.1, 123.8, 123.3, 122.0, 117.7, 115.3, 89.6, 88.7.

Spectral data is in accordance with the literature report.[34]

51. 4-(Phenylethynyl)aniline (28e)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

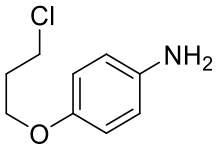
Yield = 74%; $\mathbf{R_f}$ = 0.20 (Hexanes:EtOAc = 5:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.51 (d, *J* = 6.8 Hz, 2H), 7.38-7.27 (m, 5H), 6.64 (d, *J* = 8.0 Hz, 2H), 3.81 (br s, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 146.6, 132.9, 131.3, 128.2, 127.6, 123.9, 114.7, 112.6, 90.1, 87.3.

Spectral data is in accordance with the literature report.[35]

52. 4-(3-Chloropropoxy)aniline (28f)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

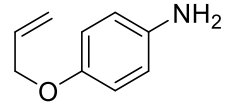
Yield = 51%; $\mathbf{R_f}$ = 0.20 (Hexanes:EtOAc = 2:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 6.80-6.71 (m, 2H), 6.69-6.62 (m, 2H), 4.04 (t, *J* = 6.0 Hz, 2H), 3.74 (t, *J* = 6.0 Hz, 2H), 3.47 (br s, 2H), 2.19 (p, *J* = 6.0 Hz, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 152.0, 139.9, 116.5, 115.7, 65.0, 41.6, 32.4.

Spectral data is in accordance with the literature report.[36]

53. 4-(Allyloxy)aniline (28g)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

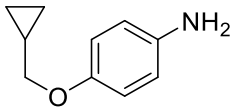
Yield = 50%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 2:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 6.80-6.70 (m, 2H), 6.66-6.60 (m, 2H), 6.12-5.98 (m, 1H), 5.44-5.35 (m, 1H), 5.30-5.20 (m, 1H), 4.50-4.40 (m, 2H), 3.32 (br s, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 151.7, 140.1, 133.8, 117.3, 116.3, 115.9, 69.6.

Spectral data is in accordance with the literature report.[25]

54. 4-(Cyclopropylmethoxy)aniline (28h)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

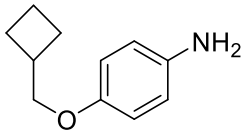
Yield = 51%; $\mathbf{R_f}$ = 0.20 (Hexanes:EtOAc = 2:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 6.75 (dd, *J* = 6.6, 1.8 Hz, 2H), 6.63 (dd, *J* = 6.6, 2.4 Hz, 2H), 3.72 (d, *J* = 6.6 Hz, 2H), 3.38 (br s, 2H), 1.27-1.17 (m, 1H), 0.67-0.56 (m, 2H), 0.40-0.24 (m, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 152.2, 139.8, 116.4, 115.8, 73.5, 10.4, 3.1.

Spectral data is in accordance with the literature report.[37]

55. 4-(Cyclobutylmethoxy)aniline (28i)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

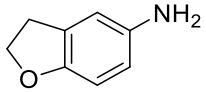
Yield = 58%; $\mathbf{R_f}$ = 0.25 (Hexanes:EtOAc = 2:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 6.75 (d, *J* = 8.4 Hz, 2H), 6.64 (d, *J* = 8.4 Hz, 2H), 3.86 (d, *J* = 6.6 Hz, 2H), 3.37 (br s, 2H), 2.73 (p, *J* = 7.2 Hz, 1H), 2.13 (dtd, *J* = 12.6, 8.4, 4.2 Hz, 2H), 2.04-1.76 (m, 4H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 152.5, 139.6, 116.4, 116.4, 115.8, 73.0, 34.8, 24.9, 18.6.

Spectral data is in accordance with the literature report.[38]

56. 2,3-Dihydrobenzofuran-5-amine (28j)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

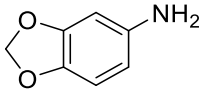
Yield = 45%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 3:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 6.65-6.56 (m, 2H), 6.46 (dd, *J* = 8.4, 2.4 Hz, 1H), 4.49 (t, *J* = 8.4 Hz, 2H), 3.37 (br s, 2H), 3.12 (t, *J* = 8.4 Hz, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 153.1, 139.8, 127.7, 114.6, 112.6, 109.2, 70.8, 30.2.

Spectral data is in accordance with the literature report.[39]

57. Benzo[d][1,3]dioxol-5-amine (28k)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

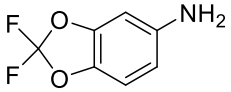
Yield = 66%; $\mathbf{R_f}$ = 0.35(Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 6.62 (d, *J* = 8.4 Hz, 1H), 6.28 (d, *J* = 2.4 Hz, 1H), 6.11 (dd, *J* = 8.0, 2.0 Hz, 1H), 5.84 (s, 2H), 3.46 (br s, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 148.0, 141.3, 140.1, 108.4, 106.7, 100.5, 97.9.

Spectral data is in accordance with the literature report.[15]

58. 2,2-Difluorobenzo[*d*][1,3]dioxol-5-amine (28l)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

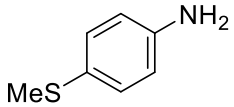
Yield = 27%; $\mathbf{R_f}$ = 0.40 (Hexanes:EtOAc = 3:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 6.81 (d, *J* = 8.4 Hz, 1H), 6.43 (d, *J* = 2.4 Hz, 1H), 6.32 (dd, *J* = 8.4, 2.4 Hz, 1H), 3.58 (br s, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 144.5, 143.0, 133.4 (t, *J* = 487.8 Hz), 131.7, 109.7, 108.8, 97.7.

Spectral data is in accordance with the literature report.[40]

59. 4-(Methylthio)aniline (28m)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

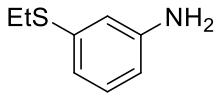
Yield = 54%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.21-7.15 (m, 2H), 6.66-6.60 (m, 2H), 3.67 (br s, 2H), 2.41 (s, 3H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 145.0, 130.9, 125.6, 115.6, 18.7.

Spectral data is in accordance with the literature report.[15]

60. 3-(Ethylthio)aniline (28n)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

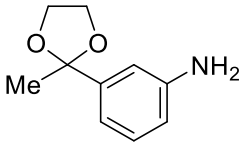
Yield = 61%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.06 (t, *J* = 7.8 Hz, 1H), 6.82-6.68 (m, 1H), 6.66 (t, *J* = 2.4 Hz, 1H), 6.49 (ddd, *J* = 7.8, 2.4, 0.6 Hz, 1H), 3.56 (br s, 2H), 2.92 (q, *J* = 7.8 Hz, 2H), 1.31 (t, *J* = 7.4 Hz, 3H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 146.7, 137.5, 129.6, 118.9, 115.2, 112.7, 27.3, 14.4.

Spectral data is in accordance with the literature report.[41]

61. 3-(2-Methyl-1,3-dioxolan-2-yl)aniline (28o)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

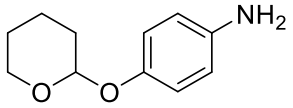
Yield = 80%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 3:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.12 (t, *J* = 7.8 Hz, 1H), 6.92-6.85 (m, 1H), 6.82 (t, *J* = 2.4 Hz, 1H), 6.61 (dd, *J* = 7.8, 2.4 Hz, 1H), 4.06-3.96 (m, 2H), 3.83-3.74 (m, 2H), 3.69 (br s, 2H), 1.64 (s, 3H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 146.2, 144.5, 129.1, 115.5, 114.4, 112.0, 108.7, 64.3, 27.5.

Spectral data is in accordance with the literature report.[42]

62. 4-((Tetrahydro-2H-pyran-2-yl)oxy)aniline (28p)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

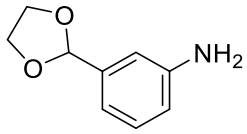
Yield = 67%; $\mathbf{R_f}$ = 0.25 (Hexanes:EtOAc = 3:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 6.89 (d, *J* = 9.0 Hz, 2H), 6.62 (d, *J* = 9.0 Hz, 2H), 5.24 (t, *J* = 3.0 Hz, 1H), 4.00-3.90 (m, 1H), 3.62-3.55 (m, 1H), 3.54 (br s, 2H), 2.02-1.95 (m, 1H), 1.91-1.80 (m, 2H), 1.70-1.50 (m, 3H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 150.0, 140.6, 117.9, 116.2, 97.4, 62.0, 30.4, 25.2, 18.9.

Spectral data is in accordance with the literature report.[43]

63. 3-(1,3-Dioxolan-2-yl)aniline (28q)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

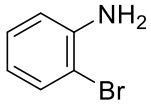
Yield = 79%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 1:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.16 (t, *J* = 7.8 Hz, 1H), 6.87 (d, *J* = 7.2 Hz, 1H), 6.81 (t, *J* = 1.8 Hz, 1H), 6.70-6.60 (m, 1H), 5.74 (s, 1H), 4.18-4.06 (m, 2H), 4.05-3.95 (m, 2H), 3.57 (br s, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 146.4, 139.0, 129.3, 116.6, 115.9, 112.8, 103.6, 65.2.

Spectral data is in accordance with the literature report.[5]

64. 2-Bromoaniline (28r)



Method B.

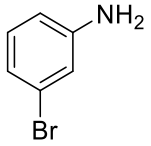
Yield = 29%; $\mathbf{R_f}$ = 0.40 (Hexanes:EtOAc = 5:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.41 (dd, *J* = 7.8, 1.2 Hz, 1H), 7.20-7.04 (m, 1H), 6.77 (d, *J* = 8.4 Hz, 1H), 6.63 (td, *J* = 7.2, 1.2 Hz, 1H), 4.01 (br s, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 144.0, 132.5, 128.3, 119.4, 115.7, 109.3.

Spectral data is in accordance with the literature report.[6]

65. 3-Bromoaniline (28s)



Method B.

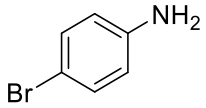
Yield = 76%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 3:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.00 (t, *J* = 7.8 Hz, 1H), 6.87 (d, *J* = 7.8 Hz, 1H), 6.83 (s, 1H), 6.59 (dd, *J* = 7.8, 1.2 Hz, 1H), 3.69 (br s, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 147.8, 130.6, 123.0, 121.3, 117.8, 113.6.

Spectral data is in accordance with the literature report.[5]

66. 4-Bromoaniline (28t)



Method B.

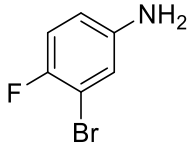
Yield = 77%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 3:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.23 (d, *J* = 8.4 Hz, 2H), 6.55 (d, *J* = 9.0 Hz, 2H), 3.59 (br s, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 145.4, 131.9, 116.6, 110.1.

Spectral data is in accordance with the literature report.[5]

67. 3-Bromo-4-fluoroaniline (28u)



Method B.

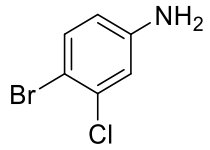
Yield = 63%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 6.89 (t, *J* = 8.4 Hz, 1H), 6.86-6.81 (m, 1H), 6.59-6.50 (m, 1H), 3.58 (br s, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 152.5 (d, *J* = 236.6 Hz), 143.4, 119.1, 116.6 (d, *J* = 23.1 Hz), 115.0 (d, *J* = 6.6 Hz), 108.9 (d, *J* = 22.0 Hz).

Spectral data is in accordance with the literature report.[44]

68. 4-Bromo-3-chloroaniline (28v)



Method B

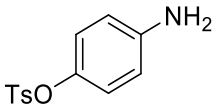
Yield = 77%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.30 (d, *J* = 8.4 Hz, 1H), 6.76 (d, *J* = 3.0 Hz, 1H), 6.43 (dd, *J* = 8.4, 2.4 Hz, 1H), 3.74 (br s, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 146.6, 134.5, 133.8, 116.3, 114.9, 109.6.

Spectral data is in accordance with the literature report.[45]

69. 4-Aminophenyl 4-methylbenzenesulfonate (28w)



Method A, ***T*** = -30 ºC, ***t*** = 2 h;

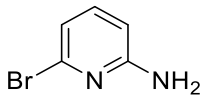
Yield = 48%; $\mathbf{R_f}$ = 0.25 (Hexanes:EtOAc = 2:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.67 (d, *J* = 8.4 Hz, 2H), 7.28 (d, *J* = 7.8 Hz, 2H), 6.71 (dd, *J* = 6.6, 1.8 Hz, 2H), 6.54-6.47 (m, 2H), 3.68 (br s, 2H), 2.43 (s, 3H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 145.4, 145.0, 141.5, 132.4, 129.6, 128.5, 123.1, 115.3, 21.6.

Spectral data is in accordance with the literature report.[46]

70. 6-Bromopyridin-2-amine (28x)



Method D.

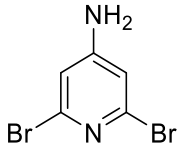
Yield = 32%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 2:1);

^{1}H NMR (600 MHz, DMSO-d_6) δ 7.26 (d, *J* = 7.7 Hz, 1H), 6.62 (d, *J* = 7.4 Hz, 1H), 6.40 (d, *J* = 8.1 Hz, 1H), 6.37 (s, 2H);

^{13}C NMR (151 MHz, DMSO-d_6) δ 160.7, 140.3, 139.9, 114.5, 107.1.

Spectral data is in accordance with the literature report.[47]

71. 2,6-Dibromopyridin-4-amine (28y)



Method C, T_1 = 25 ºC, t_1 = 6 min., T_2 = -25 ºC, t_2 = 2 h;

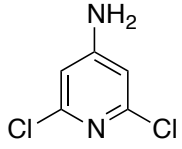
Yield = 58%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 2:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 6.67 (s, 2H), 4.33 (br s, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 155.4, 140.9, 112.0.

Spectral data is in accordance with the literature report.[48]

72. 2,6-Dichloropyridin-4-amine (28z)



Method C, T_1 = 25 ºC, t_1 = 6 min., T_2 = -25 ºC, t_2 = 2 h;

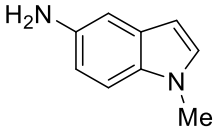
Yield = 64%; $\mathbf{R_f}$ = 0.2 (Hexanes:EtOAc = 3:1);

^{1}H NMR (600 MHz, DMSO-d_6) δ 6.76 (br s, 2H), 6.50 (s, 2H);

^{13}C NMR (151 MHz, DMSO-d_6) δ 159.1, 149.7, 107.0.

Spectral data is in accordance with the literature report.[49]

73. 1-Methyl-1H-indol-5-amine (29a)



Method B.

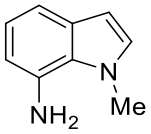
Yield = 55%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 2:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.18 (d, *J* = 8.8 Hz, 1H), 7.03-6.96 (m, 2H), 6.74 (dd, *J* = 8.8, 2.4 Hz, 1H), 6.37 (d, *J* = 3.2 Hz, 1H), 3.74 (s, 3H), 3.47 (s, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 139.1, 131.7, 129.2, 129.0, 112.3, 109.6, 105.5, 99.3, 32.6.

Spectral data is in accordance with the literature report.[50]

74. 1-Methyl-1H-indol-7-amine (29b)



Method B.

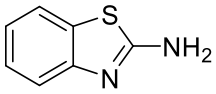
Yield = 22%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 2:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.18-7.14 (m, 1H), 6.95-6.88 (m, 2H), 6.49 (dd, *J* = 7.2, 0.8 Hz, 1H), 6.42 (d, *J* = 3.2 Hz, 1H), 4.10 (s, 3H), 3.66 (s, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 132.6, 130.9, 130.2, 127.3, 120.2, 113.1, 109.7, 101.1, 36.2.

HRMS (ESI) m/z calcd for $[C_9H_{11}N_2]^+$ $[M+H]^+$: 147.0917, found 147.0919.

75. Benzo[*d*]thiazol-2-amine (29c)



Method C, T_1 = 0º C, t_1 = 6 min., T_2 = -30 ºC, t_2 = 2 h;

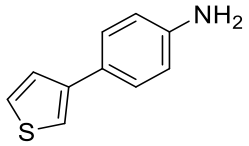
Yield = 26%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 1:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.59 (d, *J* = 7.8 Hz, 1H), 7.54 (d, *J* = 7.8 Hz, 1H), 7.31 (t, *J* = 8.4 Hz, 1H), 7.13 (t, *J* = 7.8 Hz, 1H), 5.55 (br s, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 166.0, 151.8, 131.5, 126.0, 122.3, 120.9, 119.1.

Spectral data is in accordance with the literature report.[32]

76. 4-(Thiophen-3-yl)aniline (29d)



Method A, ***T*** = -78 ºC, ***t*** = 2 h;

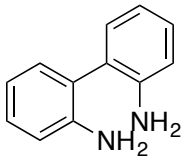
Yield = 42%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 3:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.46-7.41 (m, 2H), 7.38-7.34 (m, 2H), 7.33-7.30 (m, 1H), 6.72 (dd, *J* = 6.4, 2.4 Hz, 2H), 3.70 (s, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 145.5, 142.3, 127.4, 126.6, 126.1, 125.8, 118.0, 115.3.

Spectral data is in accordance with the literature report.[51]

77. [1,1'-biphenyl]-2,2'-diamine (29e)



Method A, ***T*** = -78 ºC, ***t*** = 3 h;

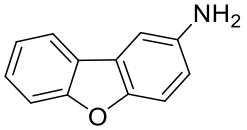
Yield = 56%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 3:1);

^{1}H NMR (600 MHz, $CDCl_3$) δ 7.21 (t, *J* = 7.7 Hz, 2H), 7.15 (d, *J* = 7.5 Hz, 2H), 6.87 (t, *J* = 7.4 Hz, 2H), 6.80 (d, *J* = 7.9 Hz, 2H), 3.80 (s, 4H).

^{13}C NMR (151 MHz, $CDCl_3$) δ 143.9, 130.9, 128.7, 124.6, 118.8, 115.6.

Spectral data is in accordance with the literature report.[52]

78. Dibenzo[b,d]furan-2-amine (29f)



Method E, ***T*** = -45 ºC;

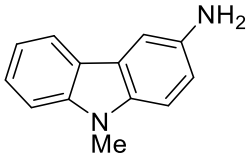
Yield = 36%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 2:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.86 (d, *J* = 7.2 Hz, 1H), 7.53 (d, *J* = 8.4 Hz, 1H), 7.43 (td, *J* = 7.2, 1.2 Hz, 1H), 7.37 (d, *J* = 8.4 Hz, 1H), 7.30 (td, *J* = 7.2, 0.6 Hz, 1H), 7.22 (d, *J* = 2.4 Hz, 1H), 6.82 (dd, *J* = 8.4, 2.4 Hz, 1H), 3.57 (br s, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 156.7, 150.3, 142.0, 126.9, 124.8, 124.2, 122.2, 120.5, 115.7, 111.8, 111.6, 105.9.

HRMS (ESI) m/z calcd for $[C_{12}H_{10}NO]^+$ $[M+H]^+$: 184.0757, found 184.0762.

79. 9-Methyl-9*H*-carbazol-3-amine (29g)



Method D.

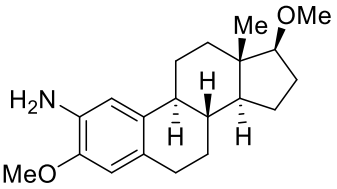
Yield = 18%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 2:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 8.00 (d, *J* = 7.8 Hz, 1H), 7.49-7.49 (m, 2H), 7.34 (d, *J* = 8.4 Hz, 1H), 7.22 (d, *J* = 8.4 Hz, 1H), 7.17 (t, *J* = 7.2 Hz, 1H), 6.93 (dd, *J* = 8.4, 1.8 Hz, 1H), 3.79 (s, 3H), 3.31 (br s, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 141.4, 138.9, 135.7, 125.5, 123.5, 122.3, 120.2, 118.1, 115.6, 108.9, 108.3, 106.2, 29.1.

Spectral data is in accordance with the literature report.[53]

80. (8*R*,9*S*,13*S*,14*S*,17*S*)-3,17-Dimethoxy-13-methyl-7,8,9,11,12,13,14,15,16,17-decahydro-6H-cyclopenta[a]phenanthren-2-amine (29h)



Method E, ***T*** = -45 ºC;

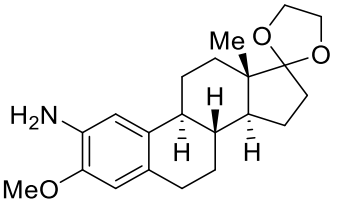
Yield = 25%; $\mathbf{R_f}$ = 0.25 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 6.69 (s, 1H), 6.51 (s, 1H), 3.82 (s, 3H), 3.54 (br s, 2H), 3.38 (s, 3H), 3.31 (t, *J* = 8.4 Hz, 1H), 2.85-2.70 (m, 2H), 2.27-2.16 (m, 1H), 2.15-2.11 (m, 1H), 2.10-2.00 (m, 2H), 1.93-1.82 (m, 1H), 1.74-1.65 (m, 1H), 1.60-1.25 (m, 6H), 1.24-1.15 (m, 1H), 0.79 (s, 3H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 145.6, 133.6, 132.5, 126.5, 112.4, 111.0, 90.8, 57.9, 55.5, 50.3, 44.0, 43.2, 38.7, 38.1, 29.2, 27.8, 27.5, 26.5, 23.0, 11.5.

Spectral data is in accordance with the literature report.[54]

81. (8*R*,9*S*,13*S*,14*S*)-3-Methoxy-13-methyl-6,7,8,9,11,12,13,14,15,16-decahydrospiro [cyclopenta[a]phenanthrene-17,2'-[1,3]dioxolan]-2-amine (29i)



Method E, ***T*** = -45 ºC;

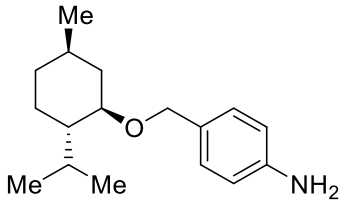
Yield = 32%; $\mathbf{R_f}$ = 0.50 (Hexanes:EtOAc = 3:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 6.69 (s, 1H), 6.51 (s, 1H), 4.01-3.86 (m, 4H), 3.82 (s, 3H), 3.42 (br s, 2H), 2.85-2.72 (m, 2H), 2.29-2.16 (m, 2H), 2.08-1.98 (m, 1H), 1.92-1.81 (m, 2H), 1.80-1.71 (m, 2H), 1.68-1.59 (m, 1H), 1.57-1.50 (m, 1H), 1.50-1.29 (m, 4H), 0.89 (s, 3H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 145.6, 133.6, 132.5, 126.6, 119.4, 112.4, 111.0, 65.2, 64.5, 55.5, 49.3, 46.1, 43.7, 39.1, 34.2, 30.8, 29.2, 27.2, 26.2, 22.3, 14.3;

HRMS (ESI) m/z calcd for $[C_{21}H_{30}NO_3]^+$ $[M+H]^+$: 344.2220, found 344.2217.

82. 4-((((1R,2S,5R)-2-isopropyl-5-methylcyclohexyl)oxy)methyl)aniline (29j)



Method A, ***T*** = -78 ºC;

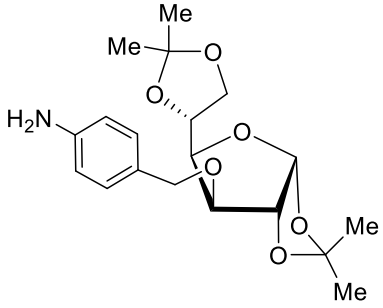
Yield = 73%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.15 (d, *J* = 7.8 Hz, 2H), 6.65 (d, *J* = 7.8 Hz, 2H), 4.55 (d, *J* = 10.8 Hz, 1H), 4.30 (d, *J* = 10.2 Hz, 1H), 3.65 (br s, 2H), 3.17-3.14 (m, 1H), 2.35-2.25 (m, 1H), 2.24-2.16 (m, 1H), 1.72-1.60 (m, 2H), 1.45-1.33 (m, 1H), 1.32-1.25 (m, 1H), 0.95 (d, *J* = 6.6 Hz, 3H), 0.91 (d, *J* = 7.2 Hz, 3H), 1.05-0.85 (m, 3H), 0.72 (d, *J* = 7.2 Hz, 3H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 145.6, 129.3, 129.0, 114.9, 78.0, 70.2, 48.2, 40.2, 34.5, 31.4, 25.3, 23.2, 22.3, 20.9, 15.9;

HRMS (ESI) m/z calcd for $[C_{17}H_{28}NO]^+$ $[M+H]^+$: 262.2165, found 262.2160.

83. 4-((((3aR,5R,6aR)-5-((R)-2,2-dimethyl-1,3-dioxolan-4-yl)-2,2-dimethyltetrahydrofuro [2,3-d][1,3]dioxol-6-yl)oxy)methyl)aniline (29k)



Method A, ***T*** = -78 ºC;

Yield = 54%; $\mathbf{R_f}$ = 0.25 (Hexanes:EtOAc = 3:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.12 (d, *J* = 8.1 Hz, 2H), 6.65 (d, *J* = 8.2 Hz, 2H), 5.87 (d, *J* = 3.7 Hz, 1H), 4.55-4.48 (m, 3H), 4.33 (q, *J* = 6.4 Hz, 1H), 4.18-4.12 (m, 1H), 4.12-4.06 (m, 1H), 4.00-3.96 (m, 2H), 3.68 (br s, 2H), 1.48 (s, 3H), 1.42 (s, 3H), 1.37 (s, 3H), 1.30 (s, 3H);

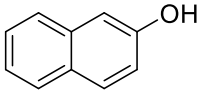
^{13}C NMR (151 MHz, $CDCl_3$): δ 146.2, 129.4, 127.4, 114.9, 111.7, 108.8, 105.3, 82.8, 81.3, 81.1, 72.6, 72.4, 67.3, 26.8, 26.7, 26.2, 25.4;

HRMS (ESI) m/z calcd for $[C_{19}H_{27}NO_6Na]^+$ $[M+Na]^+$: 388.1736, found 388.1726.

Hydroxylation of arylmetals:

To a flame-dried 25 mL round bottom flask was charged Activated Mg (7.5 mmol, 1.5 eq.) and 5 mL anhydrous THF. To this suspension was added 2 drops of 1,2-dibromoethane. After 5 min, a solution of Aryl bromide (5 mmol, 1.0 eq.) in 5 mL anhydrous THF was slowly added to the suspension of Mg at room temperature. The reaction was mildly exothermic. The Grignard reagent was titrated and 1 mmol of this reagent was added to a flame-dried reaction vial. The solution was diluted with 3 mL anhydrous THF and after cooling to 0 ºC in an ice bath, a solution of oxaziridine (1.5 mmol, 1.5 eq.) in 1 mL anhydrous THF was added. The ice bath was removed and the reaction was allowed to reach room temperature. After time ***t***, the reaction was quenched with saturated aqueousNH_4Cl. The reaction mixture was diluted with 20 mL saturated aqueousNaCl and 20 mL EtOAc. The organic layer was separated and the aqueous layer was extracted with EtOAc (2 x 20mL). The combined organic layer was dried over anhydrous Na_2SO_4, filtered and concentrated under reduced pressure. The residue was purified with flash chromatography.

84. Naphthalen-2-ol (33a)



t = 2 h.

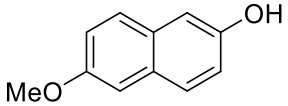
Yield = 86%; $\mathbf{R_f}$ = 0.40 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.85-7.72 (m, 2H), 7.68 (d, *J* = 8.4, 1H), 7.45 (td, *J* = 8.4, 1.2 Hz, 1H), 7.35 (td, *J* = 8.4, 1.2 Hz, 1H), 7.20-7.10 (m, 2H), 5.74(br s, 1H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 153.3, 134.5, 129.8, 128.9, 127.7, 126.5, 126.3, 123.6, 117.7, 109.5.

Spectral data is in accordance with the literature report.[55]

85. 6-Methoxynaphthalen-2-ol (33b)



t = 4 h.

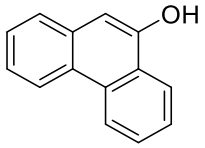
Yield = 75%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.65 (d, *J* = 8.4 Hz, 1H), 7.59 (d, *J* = 8.8 Hz, 1H), 7.15-7.05 (m, 4H), 3.90 (s, 3H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 156.1, 151.7, 129.8, 129.7, 128.5, 127.8, 119.3, 118.0, 109.7, 106.0, 55.3.

Spectral data is in accordance with the literature report.[56]

86. Phenanthren-9-ol (33c)



t = 4 h.

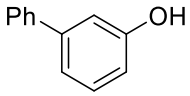
Yield = 57%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 8.71-8.67 (m, 1H), 8.63-8.59 (m, 1H), 8.35-8.30 (m, 1H), 7.74-7.63 (m, 3H), 7.57-7.49 (m, 2H), 7.01 (s, 1H), 5.33 (br s, 1H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 149.4, 132.6, 131.5, 127.2, 126.9, 126.7, 126.4, 125.5, 124.3, 122.7, 122.6, 122.3, 106.11, 106.08.

Spectral data is in accordance with the literature report.[57]

87. [1,1'-Biphenyl]-3-ol (33d)



t = 2 h.

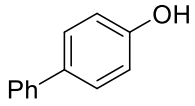
Yield = 78%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.62-7.58 (m, 2H), 7.49-7.43 (m, 2H), 7.42-7.31 (m, 2H), 7.25-7.20 (m, 1H), 7.13 (t, *J* = 2.0 Hz, 1H), 6.91-6.86 (m, 1H), 5.41 (br s, 1H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 155.8, 143.0, 140.7, 130.1, 128.8, 127.5, 127.2, 119.8, 114.4, 114.2.

Spectral data is in accordance with the literature report.[58]

88. [1,1'-Biphenyl]-4-ol (33e)



t = 2 h.

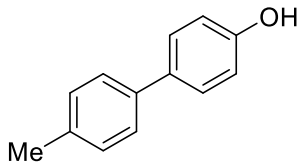
Yield = 79%; $\mathbf{R_f}$ = 0.40 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.57-7.53 (m, 2H), 7.49 (dd, *J* = 6.8, 2.4 Hz, 2H), 7.45-7.40 (m, 2H), 7.35-7.28 (m, 1H), 6.92 (dd, *J* = 6.4, 2.0 Hz, 2H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 155.0, 140.7, 134.0, 128.7, 128.4, 126.7 (2C), 115.6.

Spectral data is in accordance with the literature report.[55]

89. 4'-Methyl-[1,1'-biphenyl]-4-ol (33f)



t = 2 h.

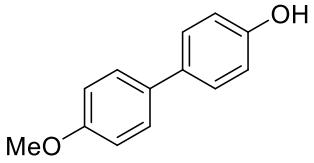
Yield = 61%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.49-7.43 (m, 4H), 7.23 (d, *J* = 8.8 Hz, 2H), 6.89 (dd, *J* = 6.8, 2.0 Hz, 2H), 2.39 (s, 3H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 154.8, 137.9, 136.4, 134.0, 129.4, 128.2, 126.5, 115.6, 21.0.

Spectral data is in accordance with the literature report.[59]

90. 4'-Methoxy-[1,1'-biphenyl]-4-ol (33g)



t = 2 h.

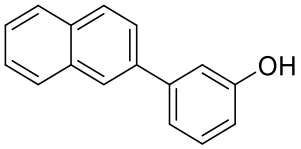
Yield = 66%; $\mathbf{R_f}$ = 0.40 (Hexanes:EtOAc = 3:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.47 (d, *J* = 8.4 Hz, 2H), 7.43 (d, *J* = 8.4 Hz, 2H), 6.96 (d, *J* = 8.4 Hz, 2H), 6.88 (d, *J* = 8.4 Hz, 2H), 3.85 (s, 3H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 158.7, 154.6, 133.8, 133.4, 128.0, 127.7, 115.6, 114.2, 55.3.

Spectral data is in accordance with the literature report.[58]

91. 3-(Naphthalen-2-yl)phenol (33h)



t = 2 h.

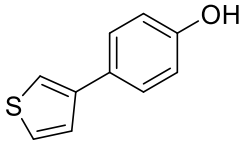
Yield = 64%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 8.03 (d, *J* = 1.2 Hz, 1H), 7.93-7.85 (m, 3H), 7.72 (dd, *J* = 8.8, 2.0 Hz, 1H), 7.56-7.48 (m, 2H), 7.41-7.30 (m, 2H), 7.21 (t, *J* = 2.0 Hz, 1H), 6.91-6.85 (m, 1H), 5.24 (br s, 1H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 155.8, 142.9, 138.0, 133.6, 132.7, 130.1, 128.4, 128.2, 127.6, 126.3, 126.0, 125.8, 125.4, 120.0, 114.32, 114.30.

Spectral data is in accordance with the literature report.[60]

92. 4-(Thiophen-3-yl)phenol (33i)



t = 2 h.

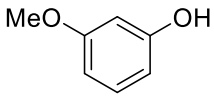
Yield = 31%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.48 (dd, *J* = 6.8, 2.0 Hz, 2H), 7.39-7.31 (m, 3H), 6.86 (dd, *J* = 6.4, 2.0 Hz, 2H), 4.87 (br s, 1H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 154.8, 141.9, 129.0, 127.8, 126.2, 126.1, 119.0, 115.6.

Spectral data is in accordance with the literature report.[61]

93. 3-Methoxyphenol (33j)



t = 3 h.

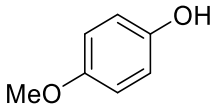
Yield = 75%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.14 (t, *J* = 8.0 Hz, 1H), 6.54-6.43 (m, 3H), 5.84 (br s, 1H), 3.78 (s, 3H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 160.7, 156.7, 130.2, 107.9, 106.4, 101.5, 55.3.

Spectral data is in accordance with the literature report.[55]

94. 4-Methoxyphenol (33k)



t = 2 h.

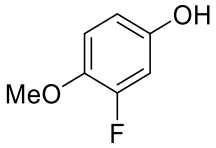
Yield = 65%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 6.82-6.75 (m, 4H), 5.46 (br s, 1H), 3.77 (s, 3H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 153.5, 149.5, 116.1, 114.9, 55.9.

Spectral data is in accordance with the literature report.[55]

95. 3-Fluoro-4-methoxyphenol (33l)



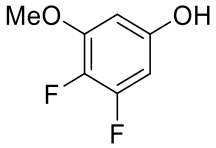
Yield = 46%; $\mathbf{R_f}$ = 0.40 (Hexanes:EtOAc = 2:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 6.83 (t, *J* = 9.0 Hz, 1H), 6.64 (dd, *J* = 12.6, 3.0 Hz, 1H), 6.58-6.50 (m, 1H), 5.68 (br s, 1H), 3.83 (s, 3H).

^{13}C NMR (151 MHz, $CDCl_3$): δ 152.8 (d, *J* = 245.7 Hz), 149.9 (d, *J* = 10.0 Hz), 141.5 (d, *J* = 11.0 Hz), 115.2 (d, *J* = 3.3 Hz), 110.4 (d, *J* = 3.3 Hz), 104.7 (d, *J* = 20.8 Hz), 57.3.

Spectral data is in accordance with the literature report.[62]

96. 3,4-Difluoro-5-methoxyphenol (33m)



t = 2 h.

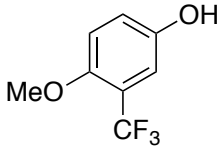
Yield = 35%; $\mathbf{R_f}$ = 0.25 (Hexanes:EtOAc = 1:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 6.30-6.18 (m, 2H), 5.23 (br s, 1H), 3.85 (s, 3H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 151.2 (dd, *J* = 244.5, 11.0 Hz), 151.1 (dd, *J* = 12.2, 3.3 Hz), 149.4 (dd, *J* = 8.9, 5.6 Hz), 136.2 (dd, *J* = 238.9, 14.2 Hz), 96.7 (d, *J* = 2.1 Hz), 96.3 (d, *J* = 21.0 Hz), 56.6.

HRMS (ESI) m/z calcd for $[C_7H_5F_2O_2]^-$ $[M-H]^-$: 159.0263, found 159.0267.

97. 4-methoxy-3-(trifluoromethyl)phenol (33n)



t = 2 h.

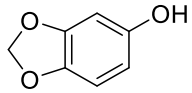
Yield = 37%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 3:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.06 (d, *J* = 3.0 Hz, 1H), 6.96 (dd, *J* = 9.0, 3.0 Hz, 1H), 6.89 (d, *J* = 8.4 Hz, 1H), 3.84 (s, 3H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 151.6 (q, *J* = 2.3 Hz), 148.7, 123.2 (q, *J* = 272.0 Hz), 119.6, 119.5 (q, *J* = 28.5 Hz), 114.3 (q, *J* = 5.4 Hz), 113.9, 56.6.

HRMS (ESI) m/z calcd for $[C_8H_6F_3O_2]^-$ $[M-H]^-$: 191.0325, found 191.0333.

98. Benzo[d][1,3]dioxol-5-ol (33o)



t = 2 h.

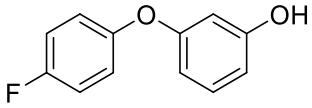
Yield = 63%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 6.65 (d, *J* = 8.4 Hz, 1H), 6.43 (d, *J* = 2.8 Hz, 1H), 6.26 (dd, *J* = 8.0, 2.8 Hz, 1H), 5.90 (s, 2H), 5.56 (br s, 1H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 150.4, 148.1, 141.5, 108.2, 106.7, 101.1, 98.3.

Spectral data is in accordance with the literature report.[63]

99. 3-(4-Fluorophenoxy)phenol (33p)



t = 2 h.

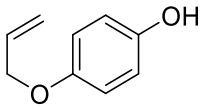
Yield = 65%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 5:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.16 (t, *J* = 8.4 Hz, 1H), 7.08-6.94 (m, 4H), 6.56 (dd, *J* = 8.4, 2.4 Hz, 1H), 6.53 (dd, *J* = 8.4, 2.4 Hz, 1H), 6.46 (t, *J* = 2.4 Hz, 1H), 5.19 (br s, 1H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 159.4 (d, *J* = 101.9 Hz), 158.2, 156.9, 152.4 (d, *J* = 3.2 Hz), 130.4, 120.9 (d, *J* = 7.7 Hz), 116.3 (d, *J* = 23.1 Hz), 110.3, 110.1, 105.4.

Spectral data is in accordance with the literature report.[64]

100. 4-(Allyloxy)phenol (33q)



t = 2 h.

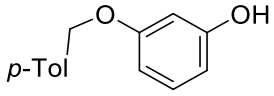
Yield = 63%; $\mathbf{R_f}$ = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 6.86-6.78 (m, 2H), 6.77-6.71 (m, 2H), 6.10-6.00 (m, 1H), 5.40 (dq, *J* = 17.4, 1.8 Hz, 1H), 5.27 (dq, *J* = 10.2, 1.8 Hz, 1H), 4.48 (dt, *J* = 6.0, 1.8 Hz, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 152.6, 149.7, 133.4, 117.6, 116.0, 116.0, 69.7.

Spectral data is in accordance with the literature report.[65]

101. 3-((4-Methylbenzyl)oxy)phenol (33r)



t = 2 h.

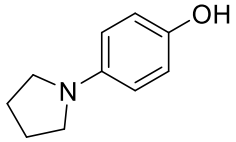
Yield = 51%; $\mathbf{R_f}$ = 0.40 (Hexanes:EtOAc = 4:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.32 (d, *J* = 7.8 Hz, 2H), 7.21 (d, *J* = 7.8 Hz, 2H), 7.14 (t, *J* = 8.4 Hz, 1H), 6.61-6.56 (m, 1H), 6.49 (t, *J* = 2.4 Hz, 1H), 6.46-6.41 (m, 1H), 5.04 (br s, 1H), 4.99 (s, 2H), 2.38 (s, 3H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 160.1, 156.6, 137.7, 133.8, 130.1, 129.2, 127.6, 108.0, 107.4, 102.5, 70.0, 21.2.

Spectral data is in accordance with the literature report.[66]

102. 4-(Pyrrolidin-1-yl)phenol (33s)



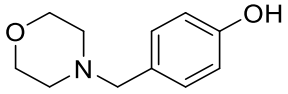
t = 2 h.
Yield = 54%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 3:1);

^{1}H NMR (600 MHz, Acetone-d_6) δ 7.41 (s, 1H), 6.73 (d, *J* = 6.6 Hz, 2H), 6.46 (d, *J* = 8.4 Hz, 2H), 3.39-3.09 (m, 4H), 2.02-1.86 (m, 4H);

^{13}C NMR (151 MHz, Acetone-d_6) δ 148.1, 142.6, 115.8, 112.8, 48.0, 25.0.

Spectral data is in accordance with the literature report.[67]

103. 4-(Morpholinomethyl)phenol (33t)



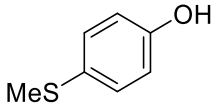
t = 2 h.
Yield = 76%; $\mathbf{R_f}$ = 0.20 (100% EtOAc);

^{1}H NMR (600 MHz, Acetone-d_6) δ 8.28 (s, 1H), 7.15 (d, *J* = 8.4 Hz, 2H), 6.79 (d, *J* = 8.4 Hz, 2H), 3.61 (t, *J* = 4.8 Hz, 4H), 3.38 (s, 2H), 2.51-2.23 (m, 4H);

^{13}C NMR (151 MHz, Acetone-d_6) δ 156.5, 130.3, 128.8, 115.0, 66.6, 62.6, 53.5.

Spectral data is in accordance with the literature report.[68]

104. 4-(Methylthio)phenol (33u)



t = 2 h.

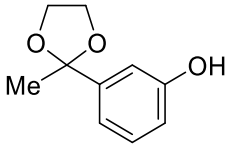
Yield = 63%; $\mathbf{R_f}$ = 0.35 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.21 (d, *J* = 8.8 Hz, 2H), 6.78 (d, *J* = 8.8 Hz, 2H), 5.42 (s, 1H), 2.44 (s, 3H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 153.9, 130.3, 128.7, 116.1, 17.9.

Spectral data is in accordance with the literature report.[69]

105. 3-(2-Methyl-1,3-dioxolan-2-yl)phenol (33v)



t = 2 h.

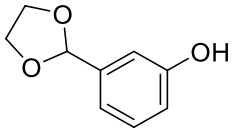
Yield = 64%; $\mathbf{R_f}$ = 0.45 (Hexanes:EtOAc = 3:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.22 (t, *J* = 7.8 Hz, 1H), 7.08-7.00 (m, 2H), 6.83-6.75 (m, 1H), 6.21 (s, 1H), 4.11-3.99 (m, 2H), 3.85-3.75 (m, 2H), 1.67 (s, 3H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 155.8, 144.8, 129.7, 117.4, 114.9, 112.3, 108.9, 64.4, 27.4.

Spectral data is in accordance with the literature report.[70]

106. 3-(1,3-Dioxolan-2-yl)phenol (33w)



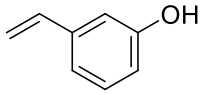
t = 2 h.
Yield = 73%; $\mathbf{R_f}$ = 0.45 (Hexanes:EtOAc = 3:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.20 (t, *J* = 7.8 Hz, 1H), 7.02 (d, *J* = 7.8 Hz, 1H), 6.91 (s, 1H), 6.77 (dd, *J* = 8.4, 1.8 Hz, 1H), 6.40 (br s, 1H), 5.77 (s, 1H), 4.17-4.06 (m, 2H), 4.05-3.92 (m, 2H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 155.8, 139.2, 129.7, 118.7, 116.4, 113.2, 103.4, 65.2.

Spectral data is in accordance with the literature report.[71]

107. 3-Vinylphenol (33x)



t = 2 h.

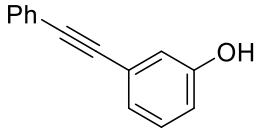
Yield = 39%; $\mathbf{R_f}$ = 0.25 (Hexanes:EtOAc = 4:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.22 (t, *J* = 8.0 Hz, 1H), 7.01 (t, *J* = 7.6 Hz, 1H), 6.92 (d, *J* = 1.2 Hz, 1H), 6.78 (dd, *J* = 8.0, 0.8 Hz, 1H), 6.67 (dd, *J* = 17.6, 11.2 Hz, 1H), 5.73 (d, *J* = 17.6 Hz, 1H), 5.32 (br s, 1H), 5.27 (d, *J* = 11.2 Hz, 1H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 155.5, 139.3, 136.4, 129.7, 119.1, 114.9, 114.3, 112.8.

Spectral data is in accordance with the literature report.[72]

108. 3-(Phenylethynyl)phenol (33y)



t = 2 h.

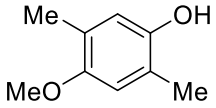
Yield = 39%; $\mathbf{R_f}$ = 0.25 (Hexanes:EtOAc = 5:1);

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.60-7.52 (m, 2H), 7.41-7.34 (m, 3H), 7.24 (t, *J* = 8.0 Hz, 1H), 7.15 (d, *J* = 7.2 Hz, 1H), 7.08-7.00 (m, 1H), 6.85 (dd, *J* = 8.0, 2.0 Hz, 1H), 5.28 (br s, 1H);

^{13}C NMR (100 MHz, $CDCl_3$): δ 155.2, 131.6, 129.7, 128.3(2C), 124.43, 124.37, 123.0, 118.2, 115.8, 89.4, 88.9.

Spectral data is in accordance with the literature report.[73]

109. 4-Methoxy-2,5-dimethylphenol (33z)



t = 2 h.

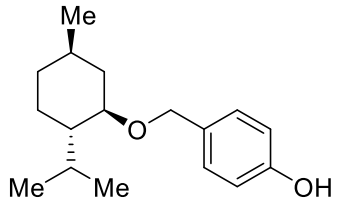
Yield = 40%; R_f = 0.30 (Hexanes:EtOAc = 4:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 6.61 (s, 1H), 6.59 (s, 1H), 4.41 (br s, 1H), 3.78 (s, 3H), 2.23 (s, 3H), 2.16 (s, 3H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 151.7, 147.1, 125.1, 121.1, 117.6, 113.4, 56.1, 15.8, 15.7.

Spectral data is in accordance with the literature report.[21]

110. 4-((((1R,2S,5R)-2-isopropyl-5-methylcyclohexyl)oxy)methyl)phenol (34a)



t = 2 h;

Yield = 79%; $\mathbf{R_f}$ = 0.40 (Hexanes:EtOAc = 4:1);

^{1}H NMR (600 MHz, $CDCl_3$): δ 7.17 (d, *J* = 9.0 Hz, 2H), 6.71 (d, *J* = 8.4 Hz, 2H), 4.59 (d, *J* = 11.4 Hz, 1H), 4.35 (d, *J* = 11.4 Hz, 1H), 3.25-3.15 (m, 1H), 2.35-2.25 (m, 1H), 2.24-2.16 (m, 1H), 1.72-1.58 (m, 2H), 1.45-1.33 (m, 1H), 1.32-1.25 (m, 1H), 0.94 (d, *J* = 6.6 Hz, 3H), 0.89 (d, *J* = 7.2 Hz, 3H), 1.02-0.80 (m, 3H), 0.70 (d, *J* = 6.6 Hz, 3H);

^{13}C NMR (151 MHz, $CDCl_3$): δ 155.6, 130.1, 129.8, 115.4, 78.6, 70.3, 48.0, 40.2, 34.4, 31.5, 25.4, 23.1, 22.3, 20.9, 15.9;

HRMS (ESI) m/z calcd for $[C_{17}H_{25}O_2]^-$ $[M-H]^-$: 261.1860, found 261.1868.

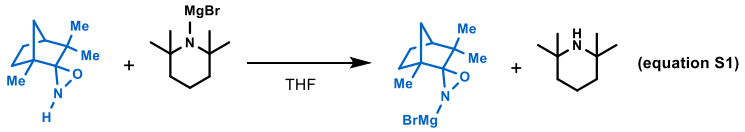
Computational Details

All ground-state and transition-state geometries were optimized in Gaussian 09 using the M06-2X density functional with an ultrafine integration grid. Stationary points were confirmed to be either minima or transition-state structures by calculation and visualization of vibrational frequencies. Intrinsic reaction coordinate (IRC) calculations were used to verify transition states. For geometries, the 6-31+G(d,p) basis set was used for all atoms, including Mg, expect for Br that used the LANL2DZ pseudopential and basis set. All optimizations were carried out in the SMD continuum model for THF. M06-2X/def2-TZVP and ωB97X-D/def2-TZVP electronic energies were calculated in THF solvent using the M06-2X/6-31+G(d,p)[LANL2DZ] geometries.[74] Free energies and enthalpies reported refer to M06-2X/def2-TZVP//M06-2X/6-31+G(d,p)[LANL2DZ] or ωB97X-D/def2-TZVP//M06-2X/6-31+G(d,p)[LANL2DZ] where zero-point energy, thermal, and entropy corrections are used from the M06-2X/6-31+G(d,p)[LANL2DZ] geometries. 3D structures were generated using CYLview.[75]

The exact solution structure of phenylmagnesium bromide is dictated by solvent, temperature, and reaction conditions. It is generally assumed at low temperatures in THF there is an equilibrium between solvent-coordinated mononuclear species (**a**), solvent-coordinated Schlenk species (**b**), and several potential dinuclear bridging species (**c**).[76–82] Under the assumption of fast equilibrium (CurtiN–Hammett) the lowest energy transition states identified for amination results from bridging species where phenyl groups bridge between two Mg centers – a dinuclear phenylmagnesium bromide model was adopted in all reported calculations. Calculation of amination, proton transfer, and hydroxylation transition states with a monomeric phenylmagnesium bromide model (xyz coordinates also given below) does not reproduce experiment. With PhMgBr the proton transfer is significantly favored over amination. This is likely due to the inability of a monomeric model to replicate coordination stabilization of the N and O atoms simultaneously.

$$\underset{\mathbf{a}}{2RMgX} \rightleftharpoons \underset{\mathbf{b}}{R_2Mg + MgX_2} \rightleftharpoons \underset{\mathbf{c}}{R_2MgMgX_2}$$

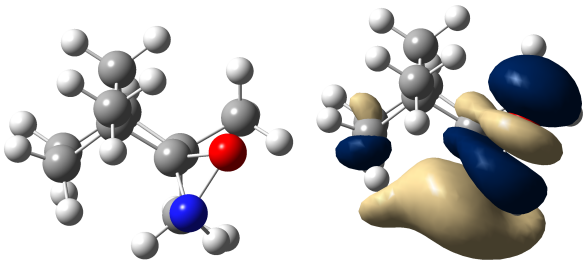
To estimate the pK_a of **18**, we used the known pK_a value for 2,2,6,6-tetramethylpiperidine (TMP) in THF as a reference.[83] Equation S1 was used to calculate the pK_a of **18** with relative stabilities of MgBr-coordinated anions. Without the use of MgBr, the pK_a estimate of **18** drops to ~26.



Supplementary Figure 7. Estimate the pK_a of **18**

To estimate the N–O bond energy in **18**, the N–O bond was constrained at increasing increments until intramolecular rearrangement to the amide occurred. The bond energy was taken at the point prior to this rearrangement where the N–O bond has a length of 2.21 Å. The S^2 value for this structure is 0.85, indicating a nearly complete open-shell singlet and broken bond. Spin-projection lowers the bond energy by 3.9 kcal/mol.[84]

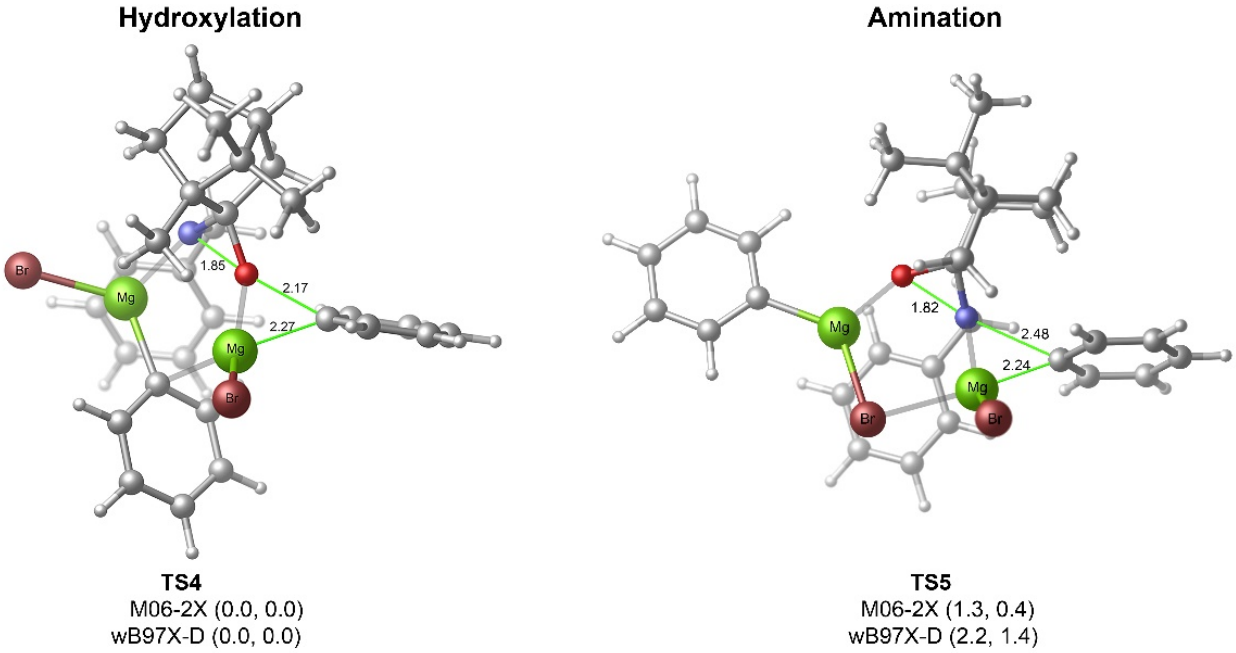
Below is a picture of the LUMO of **18** showing the σ* orbital for M06-2X/3-21G//M06-2X//6-31+G(d,p). The 3-21G basis set is used to eliminate diffuse functions.



Supplementary Figure 8. LUMO of **18**

Previous studies have shown that transition states of nucleophilic addition to oxaziridines can exhibit radical character,[85–87] therefore we tested the wavefunction stability (stable=opt in Gaussian) of reported transition-state structures. ***TS1*** and ***TS2*** have stable wavefunctions and have no radical character. ***TS3*** showed a UHF instability with S^2 = ~0.2 and has a minor amount of radical character. However, re-calculation of the UM06-2X ***TS3*** wavefunction as an open-shell singlet by mixing the HOMO and LUMO in the initial guess did not lead to a lower energy wavefunction.

The figure below shows the hydroxylation and amination transition states for oxaziridine **19b**. Without the NBn group amination is favored by > 10 kcal/mol. But for **19b**, the M06-2X/def2-TZVP free energy barrier for hydroxylation is favored by 1.3 kcal/mol over the amination transition state. With wB97X-D/def2-TZVP the hydroxylation transition state is predicted to be favored by 2.2 kcal/mol.



Supplementary Figure 9. 3-D illustration of **TS4** (hydroxylation) and **TS5** (amination).

XYZ coordinates and thermochemistry (in Hartree and Å)

18

M06-2X/6-31+G(d,p)[LANL2DZ]

Electronic Energy = -521.09950107

Electronic and Zero-Point Energy = -520.844542

Enthalpy = -520.831948

Free Energy = -520.88063700

M06-2X/def2-TZVP

Electronic Energy = -521.1745433

C	-1.33133700	1.10302600	-0.95981400
C	-1.26491600	0.00748000	0.13518500
C	0.45545500	1.41002800	0.63340200
C	-0.23829700	2.12490500	-0.54042900
H	-1.15946600	0.67594700	-1.95466300
H	-2.32748500	1.55680600	-0.96573500
H	0.44117900	2.39147600	-1.35294600
H	-0.69455100	3.05231200	-0.18073200
C	-0.76973300	0.81279200	1.35279700
H	-0.52631200	0.17595000	2.20970600
H	-1.48984200	1.57524000	1.66900000
C	-0.00054100	-0.79166000	-0.15875300
C	1.20387200	0.13795700	0.13073900
H	1.10429200	2.05725000	1.23080300
C	-2.51992900	-0.82543100	0.28644900
H	-3.37735100	-0.17876100	0.50041600
H	-2.73228300	-1.37914500	-0.63476700
H	-2.42110700	-1.54979000	1.10010900
C	2.08942000	-0.44238600	1.23740500
H	2.49695000	-1.41341500	0.94045300
H	2.92766100	0.23701300	1.42740300
H	1.54373800	-0.58192500	2.17511800
C	2.06154700	0.37897100	-1.11525600
H	2.74086200	1.22254800	-0.94797000
H	2.67977100	-0.49816700	-1.33725400
H	1.46074500	0.59717600	-2.00354400
N	-0.02207700	-1.78286900	-1.18924700
O	0.05472200	-2.12958100	0.24565300
H	0.93672700	-1.91787300	-1.52624000

$(PhMgBr)_2$

M06-2X/6-31+G(d,p)[LANL2DZ]

Electronic Energy = -889.66743563

Electronic and Zero-Point Energy = -889.484122

Enthalpy = -889.465265

Free Energy = -889.536643
M06-2X/def2-TZVP
Electronic Energy = -6011.99159

Mg	1.80327900	-0.01194500	-0.35822200
C	3.89456000	-0.00080700	-0.35622300
C	4.63984300	-0.01064700	-1.55189100
C	4.63888900	0.01881900	0.83990900
C	6.03770000	-0.00082900	-1.55979400
H	4.12831900	-0.02653900	-2.51320300
C	6.03673700	0.02821300	0.84869600
H	4.12657500	0.02778500	1.80088700
C	6.74133900	0.01852100	-0.35532600
H	6.57680400	-0.00861400	-2.50383100
H	6.57507500	0.04340400	1.79308300
H	7.82785800	0.02596900	-0.35497800
Br	0.00726600	-1.90029800	-0.43860400
Br	-0.00744500	1.86290200	-0.29172900
Mg	-1.80345500	-0.02545000	-0.37211200
C	-3.89473700	-0.03658700	-0.37411100
C	-4.63906300	-0.05625500	-1.57024400
C	-4.64002200	-0.02669800	0.82155500
C	-6.03691100	-0.06564300	-1.57903400
H	-4.12674600	-0.06526100	-2.53122100
C	-6.03787900	-0.03651000	0.82945600
H	-4.12849900	-0.01077100	1.78286800
C	-6.74151600	-0.05590200	-0.37501300
H	-6.57524800	-0.08086800	-2.52342100
H	-6.57698500	-0.02868700	1.77349100
H	-7.82803400	-0.06334500	-0.37536200

TS1
M06-2X/6-31+G(d,p)[LANL2DZ]
Electronic Energy = -1410.704861
Electronic and Zero-Point Energy = -1410.259729
Enthalpy = -1410.229557
Free Energy = -1410.321653
M06-2X/def2-TZVP
Electronic Energy = -6533.189692

C	-3.60640700	-0.87393200	-1.28979600
C	-2.19538000	-1.25777800	-1.80772600
C	-2.78294800	-2.95978800	-0.42475400
C	-4.06621900	-2.11536000	-0.48076300
H	-3.57858300	0.04077600	-0.68599100
H	-4.26132100	-0.67974600	-2.14498300
H	-4.47440100	-1.86612000	0.50068000
H	-4.83847900	-2.66805800	-1.02455200

C	-2.28471800	-2.79555900	-1.87263000
C	-1.21955800	-1.15225000	-0.62699800
C	-1.67706400	-2.22845500	0.40268700
C	-0.54100200	-3.20441000	0.72421500
C	-2.20188900	-1.61975300	1.70180300
H	-2.93457900	-3.98544600	-0.07710000
H	-3.01398600	-3.13533000	-2.61514800
H	-1.31788900	-3.26616700	-2.07894500
O	0.12303700	-1.16070400	-1.00614800
N	-0.75359000	0.17076700	-0.20823400
H	-0.82473900	0.75839700	-1.04782800
C	-1.76745600	-0.52050400	-3.06185400
H	-0.74611800	-0.77942600	-3.35437000
H	-2.43935700	-0.78062800	-3.88575900
H	-1.83304400	0.56859900	-2.93571300
C	-4.52606500	3.17445000	0.25799900
C	-4.26579500	2.41582200	1.40169200
H	-3.73380800	3.91470600	-1.60630000
C	-3.53801300	3.32332000	-0.71596000
C	-3.02662000	1.79102600	1.55851200
C	-2.01282300	1.92272300	0.59281700
C	-2.30054800	2.69838300	-0.54417100
H	-2.85598600	1.19909900	2.45616600
H	-1.54705400	2.82499000	-1.32435500
Mg	0.09267000	1.57854500	1.15093400
Mg	1.71956900	-0.47785800	-0.00272700
H	-0.13991400	-3.68802500	-0.17087800
H	0.28593900	-2.70762700	1.24180100
H	-0.92155000	-3.98200300	1.39470800
H	-2.93366400	-0.83109800	1.52032000
H	-2.68110300	-2.39904800	2.30533500
H	-1.38207500	-1.19736100	2.28978600
H	-5.03034600	2.30730500	2.16647100
H	-5.49495900	3.64789500	0.12779400
Br	3.69907700	-1.81687200	-0.55095800
Br	1.28176200	-0.22356300	2.62143500
C	3.99385500	2.94499200	-0.41593700
C	3.76426200	3.18855300	-1.77062100
C	2.58676100	2.73691600	-2.36614400
C	1.64391700	2.05117500	-1.59665300
C	1.82747100	1.78433800	-0.22016700
C	3.04280200	2.24981200	0.33284200
H	4.91450600	3.28619400	0.04922100
H	4.50477100	3.71975600	-2.36195200
H	2.40800700	2.91320200	-3.42319300
H	0.74220400	1.70656800	-2.10667200

H	3.26277900	2.05352500	1.38272700

TS2

M06-2X/6-31+G(d,p)[LANL2DZ]

Electronic Energy = -1410.692132

Electronic and Zero-Point Energy = -1410.252156

Enthalpy = -1410.221358

Free Energy = -1410.316087

M06-2X/def2-TZVP

Electronic Energy = -6533.176585

C	3.32574100	2.59745300	0.15621500
C	2.13777800	2.31366100	-0.79971800
C	1.40740700	4.00426500	0.53793300
C	2.88147000	3.85369800	0.95339300
H	3.53338800	1.73268300	0.79830200
H	4.22770800	2.78688800	-0.43357600
H	3.02695700	3.75855700	2.03145500
H	3.44054600	4.73508200	0.62505200
C	1.52065600	3.71756200	-0.97220400
C	1.03756600	1.70024300	0.06001500
C	0.57608000	2.78763300	1.05544500
C	-0.92558500	3.05222600	0.93640600
C	0.90489000	2.39046400	2.49701000
H	0.95604900	4.95948400	0.81992100
H	2.19662100	4.40847600	-1.48618800
H	0.56275700	3.69401100	-1.50326500
O	0.06321000	0.97366800	-0.68572400
N	0.96732500	0.31578800	0.33208500
H	1.80213200	-0.57739100	-0.06967300
C	2.49536000	1.52111900	-2.03916200
H	1.62036400	1.34760600	-2.67150100
H	3.24493400	2.06473200	-2.62307800
H	2.92191800	0.54614800	-1.77387500
C	4.96241200	-3.27128600	0.42369400
C	4.53623500	-2.42938400	1.45173500
H	4.53066600	-4.04623100	-1.54020100
C	4.19516800	-3.39573600	-0.73695300
C	3.34235000	-1.71934900	1.30725100
C	2.53780200	-1.82439800	0.15388200
C	3.00114000	-2.68332400	-0.86245700
H	3.03722500	-1.04940800	2.11302500
H	2.41958500	-2.79345200	-1.77645700
Mg	0.31456200	-1.76270700	0.59580800
Mg	-1.69349800	-0.05587900	-0.58771500
Br	-0.53738800	-1.96946800	-1.95502900
H	-1.21998300	3.36368400	-0.07008000

H	-1.50566800	2.15903100	1.20144400
H	-1.21373100	3.84210400	1.63814900
H	1.90882100	1.96659200	2.59680100
H	0.83609900	3.26565300	3.15234000
H	0.19304300	1.64514900	2.86022100
H	5.13271000	-2.32575000	2.35416000
H	5.89154000	-3.82546800	0.52378000
C	-1.75894200	-1.34319300	1.25032000
C	-2.76311300	-2.29923600	0.96972900
C	-1.89680400	-0.65153200	2.47559600
C	-3.82803800	-2.54748600	1.83870700
H	-2.71892800	-2.86605600	0.03923400
C	-2.95259900	-0.88619300	3.35761800
H	-1.15523700	0.09637400	2.75097700
C	-3.92238400	-1.83714900	3.03518800
H	-4.58165000	-3.28714300	1.58345700
H	-3.02380800	-0.33067200	4.28864200
H	-4.75026500	-2.02171300	3.71402400
Br	-3.66064200	1.12014900	-1.42716700

TS3

M06-2X/6-31+G(d,p)[LANL2DZ]

Electronic Energy = -1410.687124

Electronic and Zero-Point Energy = -1410.243017

Enthalpy = -1410.212713

Free Energy = -1410.305154

M06-2X/def2-TZVP

Electronic Energy = -6533.171957

C	1.85367600	-2.82130500	-2.30211900
C	2.19725000	-1.42566700	-1.71382700
C	2.85423000	-2.89049200	-0.11356700
C	2.38854200	-3.82241300	-1.24381400
H	0.78069500	-2.93333700	-2.49266800
H	2.36985900	-2.93560800	-3.26049800
H	1.64127500	-4.55121100	-0.92277400
H	3.24337800	-4.38197700	-1.63530100
C	3.47783800	-1.73965700	-0.92413400
C	1.20034900	-1.20347100	-0.56051100
C	1.64022700	-2.18758900	0.56966500
C	2.15228400	-1.49030800	1.83278400
C	0.50547700	-3.14027900	0.95331600
H	3.50177800	-3.37260700	0.62452400
H	4.29151800	-2.07030500	-1.57834400
H	3.82380700	-0.89009900	-0.32583500
O	0.95696800	0.19988700	-0.22737500
N	-0.16511400	-1.09771300	-0.89890200

H	-0.23997800	-0.83616800	-1.88774000
C	2.26064200	-0.31829400	-2.74580400
H	2.58009400	0.62421900	-2.29691900
H	2.97738900	-0.58986800	-3.52748700
H	1.29291500	-0.15673800	-3.23840100
C	4.64612100	3.25524800	0.25339900
C	3.68604300	3.32233800	-0.75743300
H	5.16183800	2.41324800	2.17005800
C	4.41967100	2.45797500	1.37726200
C	2.51095100	2.57493800	-0.64581800
C	2.26486400	1.77182200	0.47721600
C	3.23941000	1.71682700	1.48490100
H	1.77995900	2.62019900	-1.45274800
H	3.08347700	1.11222100	2.37516500
Mg	0.09890500	1.58363200	0.93548200
Mg	-1.84449500	-0.38470600	0.12860100
H	3.07898900	-0.94487400	1.64917600
H	1.41599400	-0.79999100	2.24862500
H	2.35499900	-2.25382900	2.59193600
H	-0.00959900	-3.55504600	0.08270100
H	0.90518800	-3.96892600	1.54835500
H	-0.24071800	-2.62434500	1.56787200
H	3.85757400	3.94283500	-1.63297000
H	5.56907500	3.82124200	0.16580100
Br	-3.91357000	-1.61806700	-0.32625000
C	-1.66576200	1.84458800	-0.34415300
C	-2.86866000	2.43098600	0.11060500
C	-1.41180500	1.96432700	-1.73067600
C	-3.75415700	3.09014100	-0.74497700
H	-3.13188300	2.36347200	1.16687000
C	-2.28318200	2.62098200	-2.60249200
H	-0.50087800	1.52870200	-2.14534000
C	-3.45944200	3.18406000	-2.10551400
H	-4.67259400	3.52158500	-0.35666100
H	-2.05212100	2.69056400	-3.66205100
H	-4.14717200	3.68938500	-2.77781100
Br	-1.21200500	0.04853900	2.64621900

TS4

M06-2X/6-31+G(d,p)[LANL2DZ]
Electronic Energy = -1680.949186
Electronic and Zero-Point Energy = -1680.395721
Enthalpy = -1680.359321
Free Energy = -1680.4657
M06-2X/def2-TZVP
Electronic Energy = -6803.516027

C	0.22487700	3.76407700	-0.44939300
C	-0.69725500	2.52720600	-0.62373200
C	-1.78184800	3.80581200	0.90554400
C	-0.52021700	4.64009500	0.59844900
H	1.22920100	3.47090700	-0.13091800
H	0.33054200	4.27862900	-1.40813000
H	0.07552200	4.80793600	1.50115400
H	-0.77638300	5.62071800	0.18902900
C	-2.11208800	3.16907100	-0.46815000
C	-0.51834400	1.77137400	0.71660000
C	-1.32214100	2.59525200	1.73956100
H	-2.59921000	4.36737400	1.36648700
C	-0.45307600	1.73303700	-1.88795200
H	-1.19373300	0.93812900	-2.03487600
H	-0.53068400	2.38909300	-2.76143000
H	0.55372700	1.29848300	-1.93619800
C	-4.45371300	-1.82337700	2.95285400
C	-4.79861800	-1.50578400	1.63819300
H	-2.86012700	-1.90940400	4.40445100
C	-3.13261300	-1.67457000	3.37871600
C	-3.82470000	-1.04367800	0.74623700
C	-2.49182200	-0.90825900	1.16019200
C	-2.16736300	-1.20389700	2.48473900
H	-4.11667200	-0.81050000	-0.27585800
H	-1.14543900	-1.05124300	2.83620500
Mg	-1.01644000	-1.16670200	-0.54561000
Br	-2.22773200	-1.78227200	-2.61211900
Mg	2.06355600	0.12252200	-0.19087700
H	-5.82649600	-1.61786400	1.30271600
H	-5.21298000	-2.17664400	3.64464100
O	-0.74576200	0.32135500	0.77158100
N	0.78966400	1.32312600	0.99269700
H	-2.15598400	1.99512600	2.11291400
H	-0.71558600	2.89718500	2.59686900
C	-3.25670500	2.15779900	-0.42682200
H	-3.36013700	1.65153500	-1.39452700
H	-3.12499000	1.39008200	0.33373400
H	-4.20357800	2.67180300	-0.22410700
C	-2.44802000	4.19128300	-1.55831500
H	-2.62246600	3.68486500	-2.51423700
H	-3.37393500	4.71461100	-1.29345100
H	-1.67523500	4.94581600	-1.71718300
C	1.15166500	1.16807500	2.40336100
H	1.45950100	2.15141500	2.78892100
H	0.29374700	0.82444000	2.99430200
C	2.28760800	0.17683700	2.49224600

C	2.09696500	-1.10401100	3.01860500
C	3.53005100	0.50563000	1.92575500
C	3.12414000	-2.04548800	2.96841500
H	1.13683600	-1.36404900	3.45750200
C	4.55266600	-0.44561800	1.85789800
H	3.70256900	1.51560200	1.55496900
C	4.34668500	-1.72331400	2.37726700
H	2.96354700	-3.03964400	3.37449100
H	5.50295800	-0.18278400	1.40362200
H	5.13728900	-2.46511500	2.32455600
C	1.24869500	-1.82200800	-0.65612400
C	0.66964300	-2.72101300	0.27664700
C	1.52575200	-2.37383000	-1.92939900
C	0.37222300	-4.05648000	-0.03476300
H	0.44404400	-2.37744200	1.28906200
C	1.26486100	-3.70623700	-2.24601000
H	1.95782900	-1.73962400	-2.70272300
C	0.67847900	-4.54999500	-1.29963300
H	-0.08847100	-4.70005500	0.70966200
H	1.49790700	-4.08531600	-3.23725400
H	0.45437100	-5.58215400	-1.55228500
Br	3.60318500	1.24506000	-1.77793000

TS5

M06-2X/6-31+G(d,p)[LANL2DZ]

Electronic Energy = -1680.947235

Electronic and Zero-Point Energy = -1680.391789

Enthalpy = -1680.355885

Free Energy = -1680.46083

M06-2X/def2-TZVP

Electronic Energy = -6803.516806

C	-2.33554800	2.92308500	0.85058400
C	-0.78999900	2.86031000	0.74684800
C	-1.50466800	3.08960100	-1.40957200
C	-2.81721500	3.15754900	-0.60827800
H	-2.73813700	2.00224000	1.28611100
H	-2.62520100	3.74477900	1.51164000
H	-3.53481700	2.40377900	-0.93989900
H	-3.29473100	4.13494900	-0.71727700
C	-0.50625300	3.81160600	-0.47379000
C	-0.46911800	1.49912000	0.08506000
C	-1.01451300	1.63037200	-1.35231000
H	-1.56639800	3.48964400	-2.42499400
O	0.84226000	1.05885300	0.20140400
N	-0.67156200	0.17455300	0.68829600
C	-0.05688500	3.23191900	2.02568300

H	0.99690400	2.93646100	1.99461200
H	-0.09756700	4.31810700	2.15896600
H	-0.52124100	2.78990500	2.91208300
C	-5.69610400	-0.38713500	1.67311300
C	-5.33983100	0.02447400	0.38991500
H	-4.98973000	-1.28369900	3.50315100
C	-4.72488500	-0.94195100	2.50610100
C	-4.01928300	-0.11126800	-0.04780600
C	-3.01398400	-0.64357400	0.77855300
C	-3.40499200	-1.05533100	2.06008600
H	-3.79753800	0.19051800	-1.06850300
H	-2.68855600	-1.48507900	2.75930700
Mg	-1.37620600	-1.42861900	-0.53751200
Br	-2.41438500	-1.90230700	-2.75083700
Mg	2.21238100	-0.28785100	-0.16662200
Br	1.04481000	-2.31123200	-1.17515700
C	6.95709400	1.08698900	-0.55685200
C	5.99812700	1.96379500	-0.04843100
H	7.30535900	-0.88041100	-1.36513100
C	6.56707200	-0.18904500	-0.96588300
C	4.66319400	1.55733600	0.04642100
C	4.22641300	0.27826900	-0.35653300
C	5.22708800	-0.57565700	-0.86365600
H	3.94437000	2.27285400	0.44801400
H	4.96337700	-1.58020000	-1.19572200
H	-6.08666200	0.44909000	-0.27600400
H	-6.72032300	-0.28211400	2.01922600
H	6.28977000	2.96127500	0.27183700
H	7.99627500	1.39486100	-0.63504200
H	-0.21017600	1.41462000	-2.06184400
H	-1.83482900	0.93385200	-1.55358200
C	0.94235100	3.81071500	-0.97639500
H	1.61916300	4.15179300	-0.18459600
H	1.29977800	2.83761700	-1.31906800
H	1.03657800	4.51197400	-1.81324200
C	-0.88256700	5.27165100	-0.19668100
H	-0.09306500	5.77133000	0.37424500
H	-0.98517900	5.80650200	-1.14796500
H	-1.81707200	5.39061700	0.35566800
C	-0.37575300	0.02201400	2.13669600
H	-1.31849400	-0.08751100	2.66922600
H	0.11619700	0.91942300	2.49827800
C	0.52936000	-1.17148900	2.32397500
C	1.91399400	-0.96569800	2.40849600
C	0.03538200	-2.47888400	2.33160000
C	2.79203500	-2.05125900	2.47506300

H	2.30454200	0.05156500	2.46457300
C	0.91137500	-3.56168600	2.40898200
H	-1.03577500	-2.65877300	2.27074700
C	2.28838300	-3.35181700	2.47111700
H	3.86208700	-1.87506600	2.53387000
H	0.51628200	-4.57285000	2.40911000
H	2.96706500	-4.19730000	2.51965000

[($MgPh_2$)($MgBr_2$)]

M06-2X/6-31+G(d,p)[LANL2DZ]

Electronic Energy = -889.678901

Electronic and Zero-Point Energy = -889.494880

Enthalpy = -889.477362

Free Energy = -889.543089

M06-2X/def2-TZVP

Electronic Energy = -6012.000342

Mg	1.86228700	0.06717100	-0.11591500
Br	0.11792600	-1.76679300	-0.84069200
Mg	-1.33655400	0.34350700	-0.32385900
C	-3.43633900	0.39880600	-0.32671500
C	-4.20114300	-0.68300900	-0.80814100
C	-4.17000200	1.52179100	0.10840600
C	-5.59845200	-0.65220200	-0.85932700
H	-3.70362600	-1.58655800	-1.16064800
C	-5.56650800	1.57035500	0.06574700
H	-3.64613800	2.39545800	0.49544200
C	-6.28694400	0.47936600	-0.42168000
H	-6.14856200	-1.50901300	-1.24061600
H	-6.09163500	2.45758400	0.41131700
H	-7.37242900	0.51064700	-0.45906400
Br	4.04790100	-0.84407400	0.48629500
C	0.49003700	1.72380900	-0.14945400
C	0.06563800	2.21193300	-1.41420400
C	0.01288500	2.44214200	0.97482400
C	-0.75398800	3.33925900	-1.55060600
H	0.38546300	1.70457300	-2.32522600
C	-0.80629600	3.56825000	0.85107200
H	0.28731800	2.11533300	1.97590800
C	-1.19002800	4.01751400	-0.41358900
H	-1.05221400	3.67943800	-2.53796200
H	-1.15060400	4.08934000	1.73992700
H	-1.83474000	4.88583300	-0.51061100

[($PhMgBr)_2$]$^{\bullet+}$

M06-2X/6-31+G(d,p)[LANL2DZ]

Electronic Energy = -889.44246866

Electronic and Zero-Point Energy = -889.258479
Enthalpy = -889.240210
Free Energy = -889.308364
M06-2X/def2-TZVP
Electronic Energy = -6011.767231

Mg	2.17811000	-1.09368900	-0.16046700
C	4.39506300	-1.56217400	-0.41094900
C	4.44938100	-0.84261600	-1.59734200
C	4.65053900	-1.05656400	0.85798200
C	4.79234100	0.51594800	-1.48744200
H	4.25964700	-1.30446300	-2.56279900
C	4.98773100	0.30674700	0.92966500
H	4.61654700	-1.67933300	1.74740000
C	5.06610300	1.07362500	-0.23545800
H	4.84924200	1.12301700	-2.38526200
H	5.19465500	0.75235300	1.89755500
H	5.34102900	2.12086400	-0.16645200
Br	0.51758200	-1.43072600	-2.06066000
Br	0.64441300	0.50850600	1.14602900
Mg	-1.23925100	-0.07141400	-0.60787200
C	-3.31238400	0.07617800	-0.48240800
C	-4.14289400	-0.40858100	-1.51175800
C	-3.95867000	0.66605600	0.62098300
C	-5.53567400	-0.31048400	-1.45010100
H	-3.70194100	-0.87700000	-2.39115100
C	-5.35057900	0.76985500	0.69642200
H	-3.37325200	1.05899600	1.45152800
C	-6.14342200	0.28117700	-0.34236800
H	-6.14542200	-0.69427700	-2.26407300
H	-5.81560600	1.23148300	1.56375300
H	-7.22558500	0.36047300	-0.28913000

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M06-2X/6-31+G(d,p)[LANL2DZ]
Electronic Energy = -521.09950107
Electronic and Zero-Point Energy = -520.844542
Enthalpy = -520.831948
Free Energy = -520.880637
M06-2X/def2-TZVP
Electronic Energy = -521.2647118

C	1.29461100	1.18964400	0.85735500
C	1.25505400	-0.00862400	-0.11931000
C	-0.49928900	1.28775800	-0.74158400
C	0.18271000	2.14163700	0.34075500
H	1.12128300	0.85406900	1.88551500
H	2.27884300	1.67436400	0.83044600

H	-0.50001800	2.48144300	1.12432500
H	0.61815200	3.03697200	-0.11841200
C	0.73725200	0.65387300	-1.40604000
H	0.50178500	-0.08630000	-2.17772900
H	1.42709600	1.40292700	-1.81778300
C	0.02558700	-0.92234900	0.22850600
C	-1.20884500	0.05715100	-0.10980100
H	-1.16342400	1.86224100	-1.40030500
C	2.56096900	-0.76890400	-0.21027300
H	3.36692000	-0.12894700	-0.59322500
H	2.86383700	-1.13724900	0.77748800
H	2.44717200	-1.63427600	-0.86900200
C	-2.13774600	-0.58257500	-1.14225600
H	-2.53112400	-1.53476200	-0.77363800
H	-2.98380700	0.08625800	-1.35338000
H	-1.61938200	-0.79474800	-2.08135100
C	-2.04824300	0.41476800	1.12025700
H	-2.74962200	1.22996700	0.89395600
H	-2.64533200	-0.44789800	1.44092800
H	-1.43682600	0.71953400	1.97497400
N	0.10467700	-1.40022700	1.60258400
O	0.01296900	-2.08872400	-0.45454800
H	-0.80440300	-1.84649000	1.76983600

TS1 (Monomeric Grignard)

M06-2X/6-31+G(d,p)[LANL2DZ]

Electronic Energy = -965.8101842

Electronic and Zero-Point Energy = -965.458353

Enthalpy = -965.437604

Free Energy = -965.506598

M06-2X/def2-TZVP

Electronic Energy = -3527.137326

C	0.91979200	-1.08881300	1.64906300
C	1.39068100	-1.76375000	0.34656200
C	3.19924100	-0.56652300	1.03062500
C	2.16589600	-0.30315900	2.14396500
H	0.04964200	-0.44664100	1.49014400
H	0.62107700	-1.85913600	2.36818200
H	1.96726800	0.75839400	2.31113300
H	2.52994300	-0.71640900	3.08970000
C	2.87049400	-2.03040100	0.68334900
C	2.80968600	0.17343500	-0.27967400
H	4.23141600	-0.35903400	1.32980000
C	0.57127700	-2.96221100	-0.08524800
H	0.58138100	-3.72802600	0.69771700
H	-0.48504000	-2.71060400	-0.25912600

H	0.96267200	-3.39275800	-1.01009600
C	1.57036500	-0.68092000	-0.74748600
Mg	-1.64752500	-0.33530700	-0.80832500
Br	-3.53845300	-1.61543800	0.06102300
C	-1.13526300	4.33378700	0.52603600
C	-0.94026700	1.99842300	1.13265800
C	-0.81104700	1.63208400	-0.21668100
C	-0.85625700	2.64951700	-1.18060100
C	-1.01734200	3.98960200	-0.82084700
H	-0.75022500	2.40983900	-2.24005800
H	-1.04259200	4.76080800	-1.58595300
C	-1.10480500	3.33598400	1.50152700
H	-0.91774000	1.25018500	1.92223800
H	3.43363200	-2.43601600	-0.16212900
H	2.97607200	-2.70697300	1.53898000
C	3.94077400	0.04704500	-1.30885800
H	3.63585200	0.46493800	-2.27229500
H	4.81665000	0.60162400	-0.95322100
H	4.24041200	-0.98921700	-1.48348100
C	2.52521900	1.66379500	-0.08986300
H	3.41380300	2.15718400	0.32217600
H	2.30381500	2.14165800	-1.05243900
H	1.68469600	1.86385000	0.57536700
O	1.55789500	-1.10881000	-2.01957900
N	0.31123800	0.00971400	-1.16876200
H	0.58560000	0.76244000	-1.79770800
H	-1.24880700	5.37466200	0.81474100
H	-1.20585700	3.59837300	2.55122000

TS2 (Monomeric Grignard)

M06-2X/6-31+G(d,p)[LANL2DZ]

Electronic Energy = -965.8157966

Electronic and Zero-Point Energy = -965.468876

Enthalpy = -965.447457

Free Energy = -965.520094

M06-2X/def2-TZVP

Electronic Energy = -3527.143669

C	2.90382300	-2.08369100	0.84144100
C	2.19409800	-1.58668800	-0.44674800
C	3.92805100	-0.13989500	-0.15521300
C	4.15848600	-1.17550300	0.96028200
H	2.24009700	-2.01386200	1.71130000
H	3.17551000	-3.13694100	0.72128800
H	4.27880700	-0.73046800	1.95021800
H	5.06789600	-1.74521200	0.74634800
C	3.38270900	-1.05437400	-1.27048900

C	1.54946000	-0.26486000	-0.04769100
C	2.69432700	0.75178000	0.17919000
H	4.81125100	0.45558500	-0.40329700
O	0.41632400	0.15716400	-0.80148200
N	0.35169100	-0.22710600	0.69720500
H	-0.64651100	-1.00536000	0.57427600
C	1.25825200	-2.58878000	-1.08730400
H	0.81004300	-2.18883400	-2.00150800
H	1.80669000	-3.50097600	-1.34342100
H	0.44819700	-2.86548500	-0.40227900
C	-4.36560000	-2.89278800	-0.00029100
C	-3.59429200	-2.56722600	-1.11749200
H	-4.60869600	-2.65708600	2.12844300
C	-4.01025900	-2.40291900	1.25774800
C	-2.47046600	-1.75211500	-0.96914700
C	-2.07847500	-1.24028600	0.28591700
C	-2.88463400	-1.58760200	1.38900900
H	-1.87661900	-1.52015000	-1.85280800
H	-2.62077200	-1.22425000	2.38200400
Mg	-1.32672200	0.89047900	0.18017900
Br	-1.83134300	3.24996200	-0.15441400
H	4.08205900	-1.85075700	-1.54609300
H	3.06754000	-0.52854500	-2.17742900
C	2.59010300	1.92257900	-0.80395100
H	1.65826700	2.47672500	-0.65333500
H	3.42532200	2.61051500	-0.63419700
H	2.62165100	1.59823000	-1.84802100
C	2.67556800	1.30249000	1.60598600
H	3.60536500	1.84393000	1.81328900
H	1.84159000	2.00104800	1.73046500
H	2.56044100	0.51602700	2.35760000
H	-5.24029300	-3.52785100	-0.10965700
H	-3.86951000	-2.94900600	-2.09694100

TS3 (Monomeric Grignard)

M06-2X/6-31+G(d,p)[LANL2DZ]

Electronic Energy = -965.7905112

Electronic and Zero-Point Energy = -965.440158

Enthalpy = -965.419276

Free Energy = -965.488625

M06-2X/def2-TZVP

Electronic Energy = -3527.118129

C	-2.03896800	-2.71519700	0.91664300
C	-1.16112300	-1.43500000	0.95443000
C	-3.24112100	-0.66681200	0.47620600
C	-3.47645600	-2.17473300	0.67798200

H	-1.70850000	-3.40971000	0.13697500
H	-1.96251400	-3.23548500	1.87680700
H	-3.98259000	-2.65264100	-0.16321900
H	-4.09852200	-2.33237300	1.56449100
C	-2.15230500	-0.40913000	1.53102700
C	-1.06332400	-0.96007000	-0.50955200
C	-2.47920400	-0.39580300	-0.85578500
H	-4.14792000	-0.05980000	0.55864400
C	0.16350700	-1.61369400	1.66907900
H	0.64971700	-0.64818700	1.86721400
H	0.01240400	-2.07940100	2.64810700
H	0.85323800	-2.26447900	1.11458800
C	-0.17448200	4.56991000	0.48212000
C	-0.15047700	3.66911500	1.54803400
H	0.12259000	4.83620600	-1.63796300
C	0.14728400	4.13661800	-0.80682700
C	0.19170300	2.33200100	1.32496600
C	0.52463400	1.89012900	0.03788900
C	0.48087400	2.79986600	-1.02644900
H	0.19634100	1.64421000	2.16872000
H	0.69058200	2.46270300	-2.03995500
Mg	1.90503800	0.18411500	-0.14272800
Br	3.84861700	-1.28190100	-0.14012300
H	-1.76105400	0.61100600	1.52386800
H	-2.47087900	-0.66650600	2.54757700
C	-2.47379400	1.10636400	-1.15720000
H	-2.15545500	1.70863000	-0.30211200
H	-1.80312100	1.33074500	-1.99131800
H	-3.48748400	1.41556800	-1.43676100
C	-3.08495200	-1.11579800	-2.06333400
H	-4.14910100	-0.86562000	-2.14805800
H	-2.58541400	-0.79921400	-2.98399800
H	-2.98755400	-2.20230400	-1.99920800
N	-0.41392700	-1.69176300	-1.47473900
O	0.07484300	0.03401900	-0.71800600
H	0.29094100	-2.28416800	-1.02006900
H	-0.44957300	5.60650900	0.65369500
H	-0.40023000	4.00505200	2.55088200

PhMgBr
M06-2X/6-31+G(d,p)[LANL2DZ]
Electronic Energy = -444.8188564
Electronic and Zero-Point Energy = -444.727594
Enthalpy = -444.718739
Free Energy = -444.762486
M06-2X/def2-TZVP

Electronic Energy = -3005.979748

C	2.13940800	-1.19527300	-0.00000600
C	3.53746200	-1.20408900	0.00000300
C	4.24192000	0.00001000	0.00000700
C	3.53744700	1.20410100	0.00000300
C	2.13939300	1.19526800	-0.00000600
C	1.39316100	-0.00000800	-0.00001000
H	1.62797200	-2.15685700	-0.00000900
H	4.07597400	-2.14854100	0.00000700
H	5.32847600	0.00001700	0.00001500
H	4.07594700	2.14856000	0.00000600
H	1.62794500	2.15684500	-0.00000800
Mg	-0.70382600	-0.00001400	-0.00000300
Br	-3.14923300	0.00000300	0.00000200

[18]-MgBr

M06-2X/6-31+G(d,p)[LANL2DZ]

Electronic Energy = -733.6939559

Electronic and Zero-Point Energy =

Enthalpy = -733.429585

Free Energy = -733.486234

M06-2X/def2-TZVP

Electronic Energy = -3294.949949

C	2.81844500	0.21715000	-1.47882500
C	2.53102200	0.80426600	-0.07177800
C	2.47203800	-1.44902600	0.23129200
C	2.88734500	-1.31684200	-1.24410700
H	2.04012400	0.50542900	-2.19350000
H	3.77038000	0.60875800	-1.85262700
H	2.25560800	-1.89004300	-1.92655000
H	3.91143100	-1.68286200	-1.36661400
C	3.20793100	-0.23799700	0.83654700
C	1.05707200	0.49149600	0.22335800
C	0.97797700	-1.05394100	0.41838000
H	2.69654300	-2.42520000	0.67169900
O	0.13170000	1.13763700	-0.64491600
N	0.24541200	1.41133000	0.92397400
C	2.91843500	2.25653300	0.10024100
H	2.78224100	2.58581200	1.13440900
H	3.96877700	2.40283400	-0.17441900
H	2.30362500	2.89986500	-0.53939500
H	3.00865900	-0.06923500	1.89990500
H	4.29169900	-0.28069300	0.68110200
C	0.52085200	-1.41128400	1.83758600
H	-0.52214200	-1.12164400	2.01354600
H	0.58300200	-2.49573800	1.98157200

H	1.13120200	-0.92944400	2.60717500
C	0.03030600	-1.71047600	-0.58581800
H	0.15533700	-2.79922300	-0.56773800
H	-1.02058600	-1.51891300	-0.33048700
H	0.18591700	-1.35922200	-1.60914700
Mg	-1.64141100	0.97681900	0.39237200
Br	-3.74699700	-0.07634300	-0.22991800

2,2,6,6-tetramethylpiperidine (TMP)

M06-2X/6-31+G(d,p)[LANL2DZ]

Electronic Energy = -408.994149

Electronic and Zero-Point Energy = -408.722750

Enthalpy = -408.710873

Free Energy = -408.757270

M06-2X/def2-TZVP

Electronic Energy = -409.1198062

C	-1.25247400	1.23979800	-0.41748300
C	-1.28007700	-0.25426800	-0.06328200
C	1.28005500	-0.25427700	-0.06330700
C	1.25249000	1.23979700	-0.41746300
C	0.00000300	1.94334200	0.10549100
H	-0.00001100	-1.84247700	-0.25328900
H	-1.27925800	1.33403400	-1.51173900
H	-2.16033100	1.71467500	-0.02586400
H	2.16033500	1.71463000	-0.02575800
H	1.27934800	1.33410700	-1.51171000
H	-0.00000500	1.95700600	1.20262100
H	0.00000800	2.99049200	-0.21675200
C	1.61409200	-0.45287100	1.42861500
H	1.45375400	-1.49817500	1.71829800
H	2.66679800	-0.21014100	1.61313700
H	1.01230500	0.17623900	2.08737700
C	2.36983000	-0.95347700	-0.88090200
H	3.35217000	-0.51500800	-0.67449000
H	2.41690000	-2.02052500	-0.62952000
H	2.16205300	-0.86257000	-1.95143500
C	-1.61404100	-0.45287900	1.42863100
H	-2.66667300	-0.20990600	1.61327900
H	-1.45398100	-1.49826100	1.71819800
H	-1.01202500	0.17600800	2.08738200
C	-2.36987600	-0.95344200	-0.88085700
H	-2.41691000	-2.02050700	-0.62954900
H	-3.35221400	-0.51500300	-0.67436600
H	-2.16217000	-0.86246100	-1.95139900
N	-0.00001400	-0.85035600	-0.48872700

[TMP]-MgBr

M06-2X/6-31+G(d,p)[LANL2DZ]

Electronic Energy = -408.4313431

Electronic and Zero-Point Energy = -408.176426

Enthalpy = -408.164359

Free Energy = -408.211583

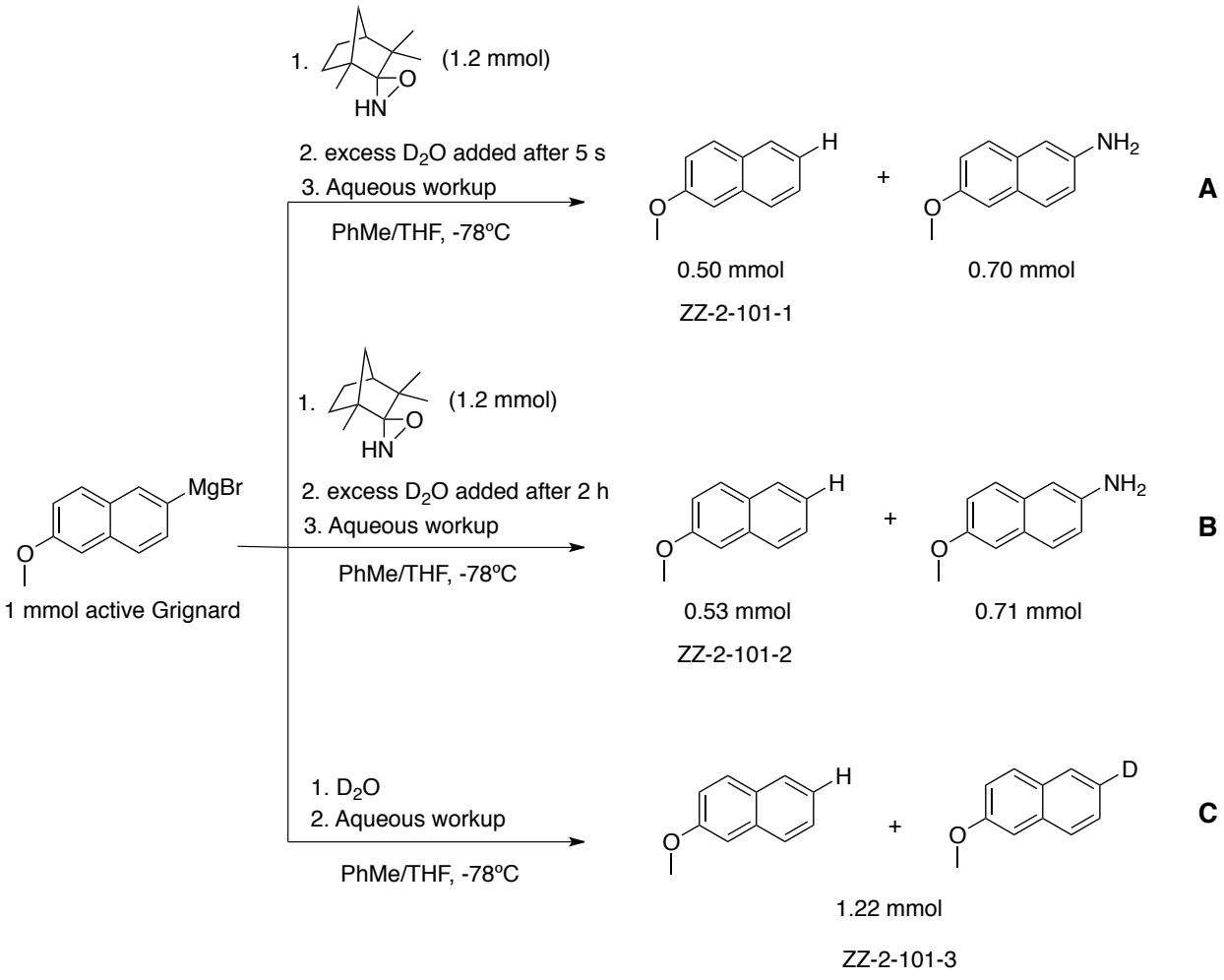
M06-2X/def2-TZVP

Electronic Energy = -408.5542895

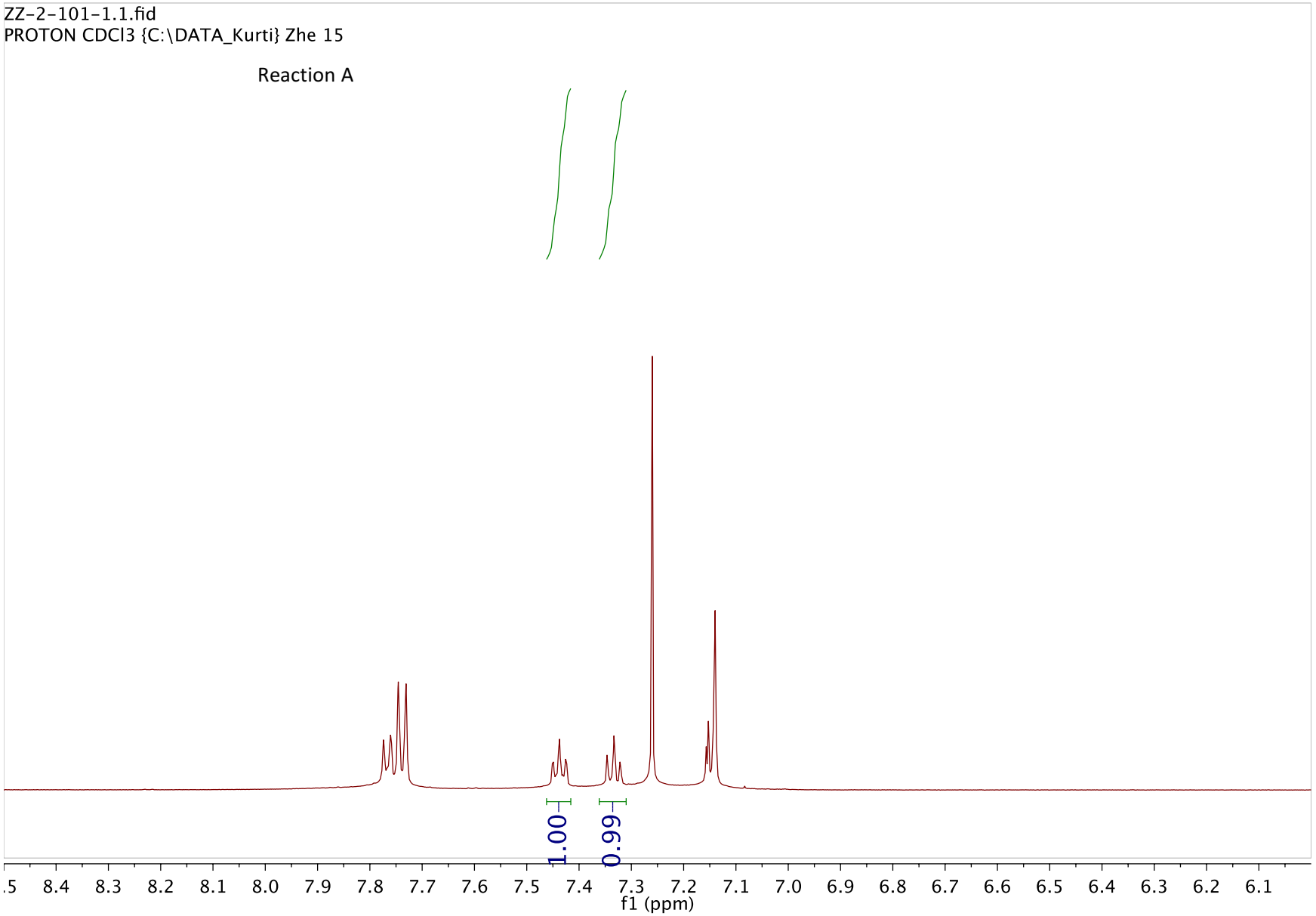
C	2.40777200	1.40642700	-0.96904000
C	1.33138700	1.27917100	0.12919100
C	1.64164800	-1.23304100	0.10300200
C	2.71132200	-1.07634200	-0.99630200
C	3.42725300	0.27045900	-0.91162200
H	1.90572700	1.37864500	-1.94700400
H	2.90656200	2.38063800	-0.88559700
H	3.43033600	-1.90352000	-0.93286300
H	2.21332600	-1.15002200	-1.97391400
H	4.01063000	0.33089000	0.01614500
H	4.14470000	0.36710900	-1.73444300
C	2.32541600	-1.54123200	1.45358800
H	1.57955900	-1.55040500	2.25640000
H	2.81216000	-2.52360800	1.42311800
H	3.09108600	-0.80700200	1.71287500
C	0.76869600	-2.44586600	-0.24022900
H	1.35400000	-3.36890500	-0.30447300
H	0.00882500	-2.60989500	0.54046400
H	0.26739400	-2.30212500	-1.20714200
C	1.92225400	1.71418300	1.48887000
H	2.14587100	2.78786700	1.48494600
H	1.20033100	1.51755000	2.28967800
H	2.84908300	1.19089200	1.73423800
C	0.19433400	2.25659500	-0.19100900
H	-0.57594100	2.23503000	0.59602800
H	0.55312900	3.28963300	-0.24826200
H	-0.26931000	2.01415000	-1.15728500
N	0.75337700	-0.06773500	0.14063400
Mg	-1.16008100	-0.32317500	0.05404800
Br	-3.58173200	-0.02019400	-0.07127500

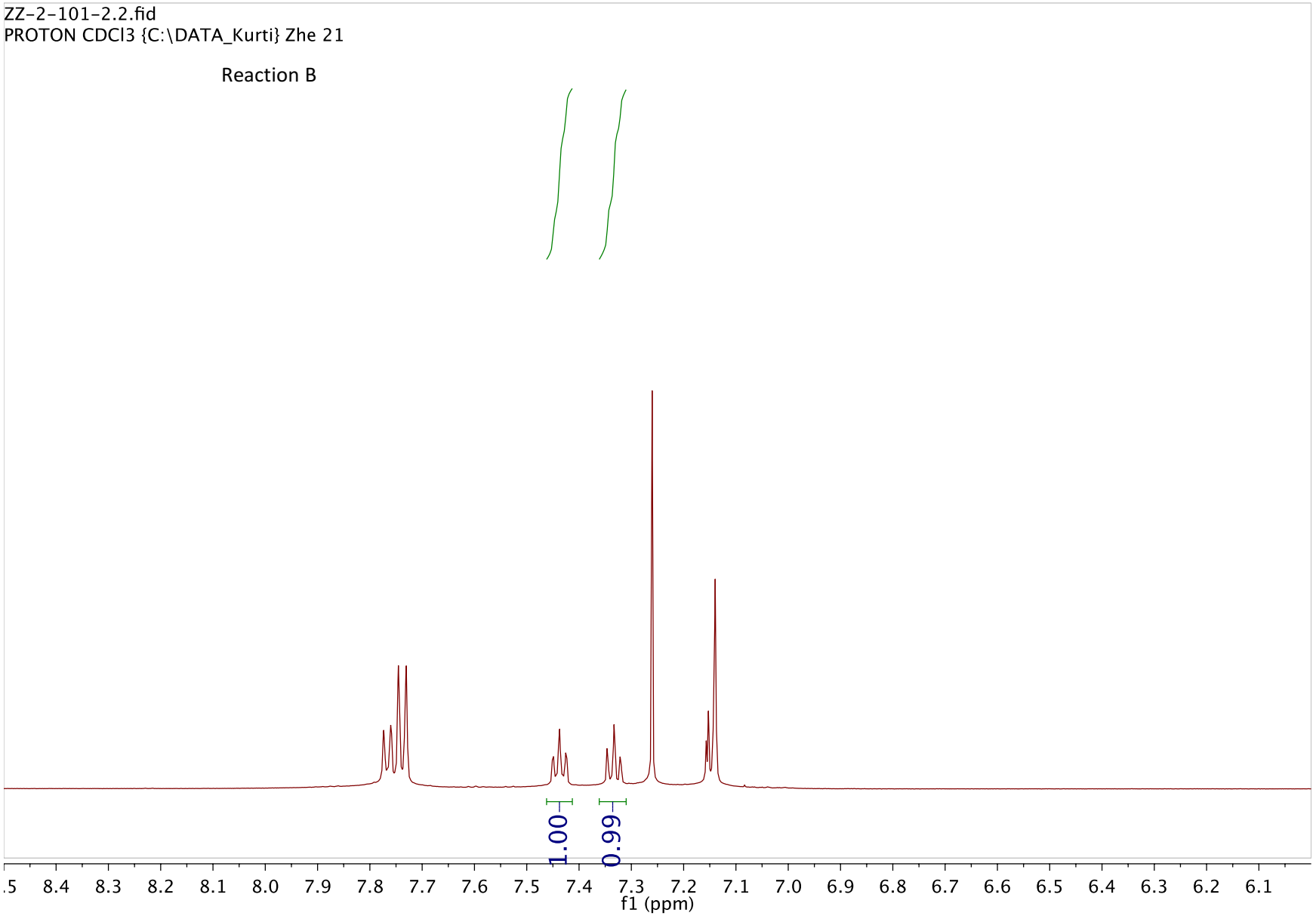
D_2O trapping experiments

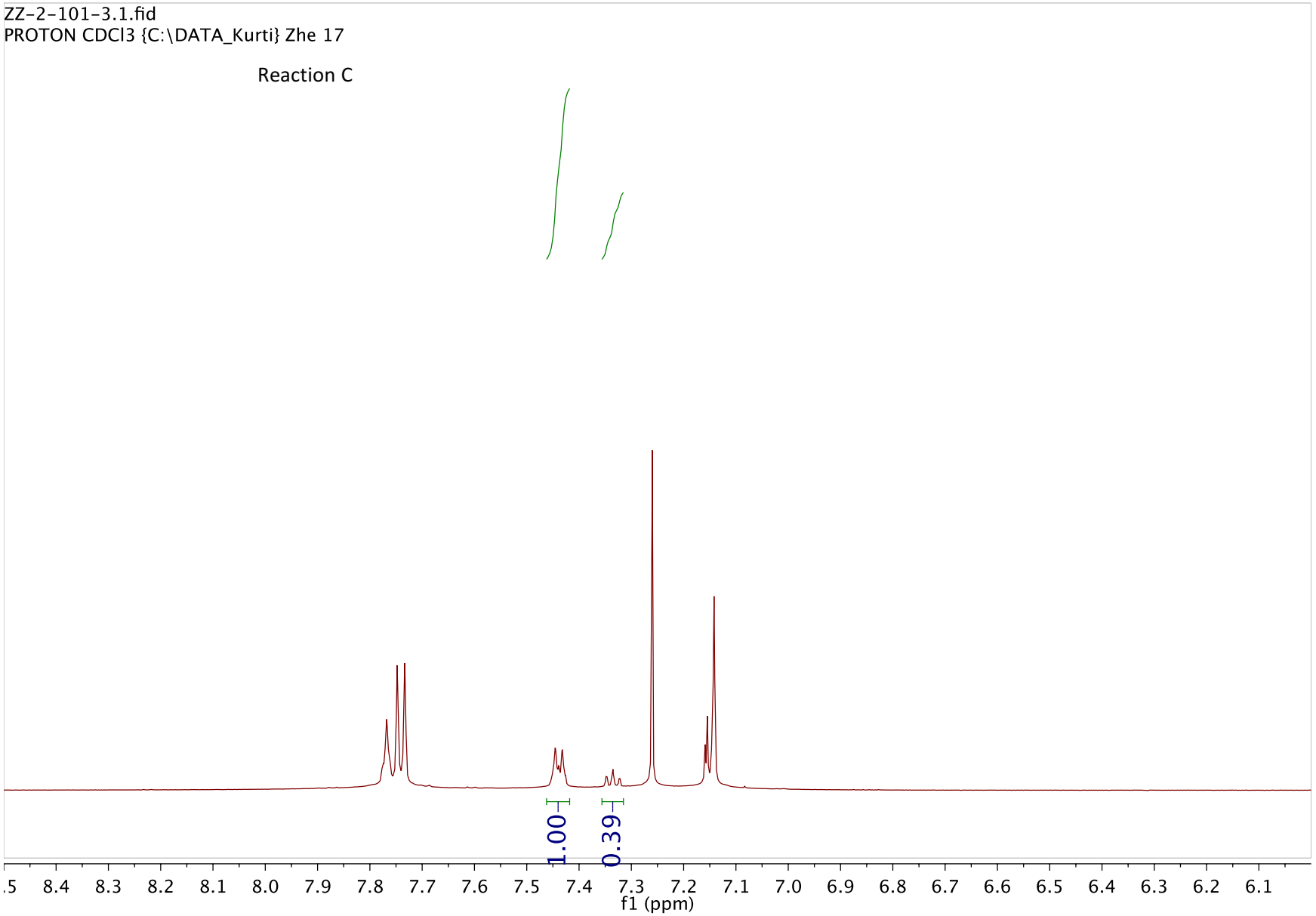
D_2O trapping experiments are conducted as illustrated below. The 2-methoxynaphthalene product from each reaction was isolated and NMR was obtained, along with a standard NMR taken with commercially available 2-methoxynaphthalene. It is clear from the spectral data that in reactions A and B, deuterium was not incorporated.

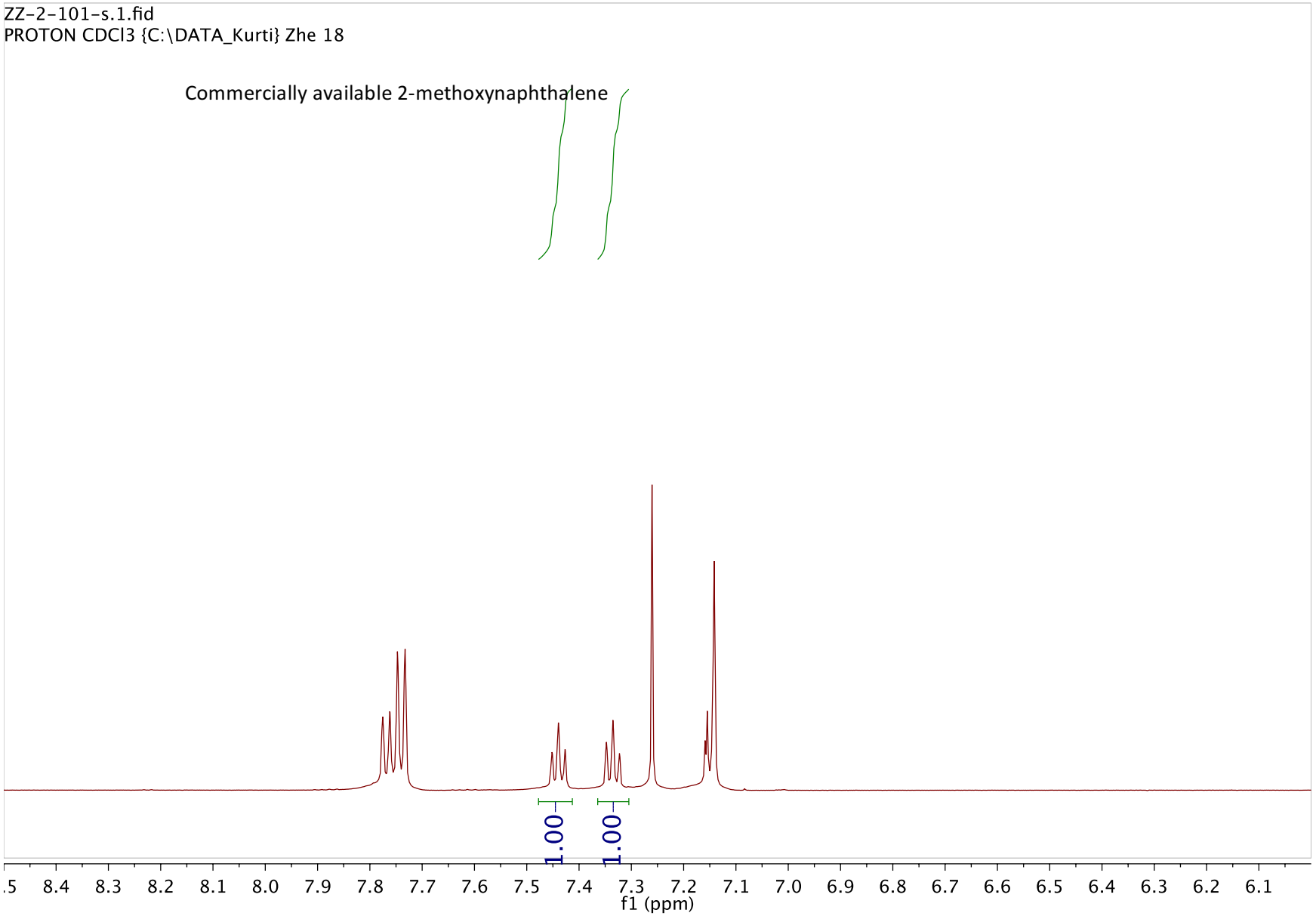


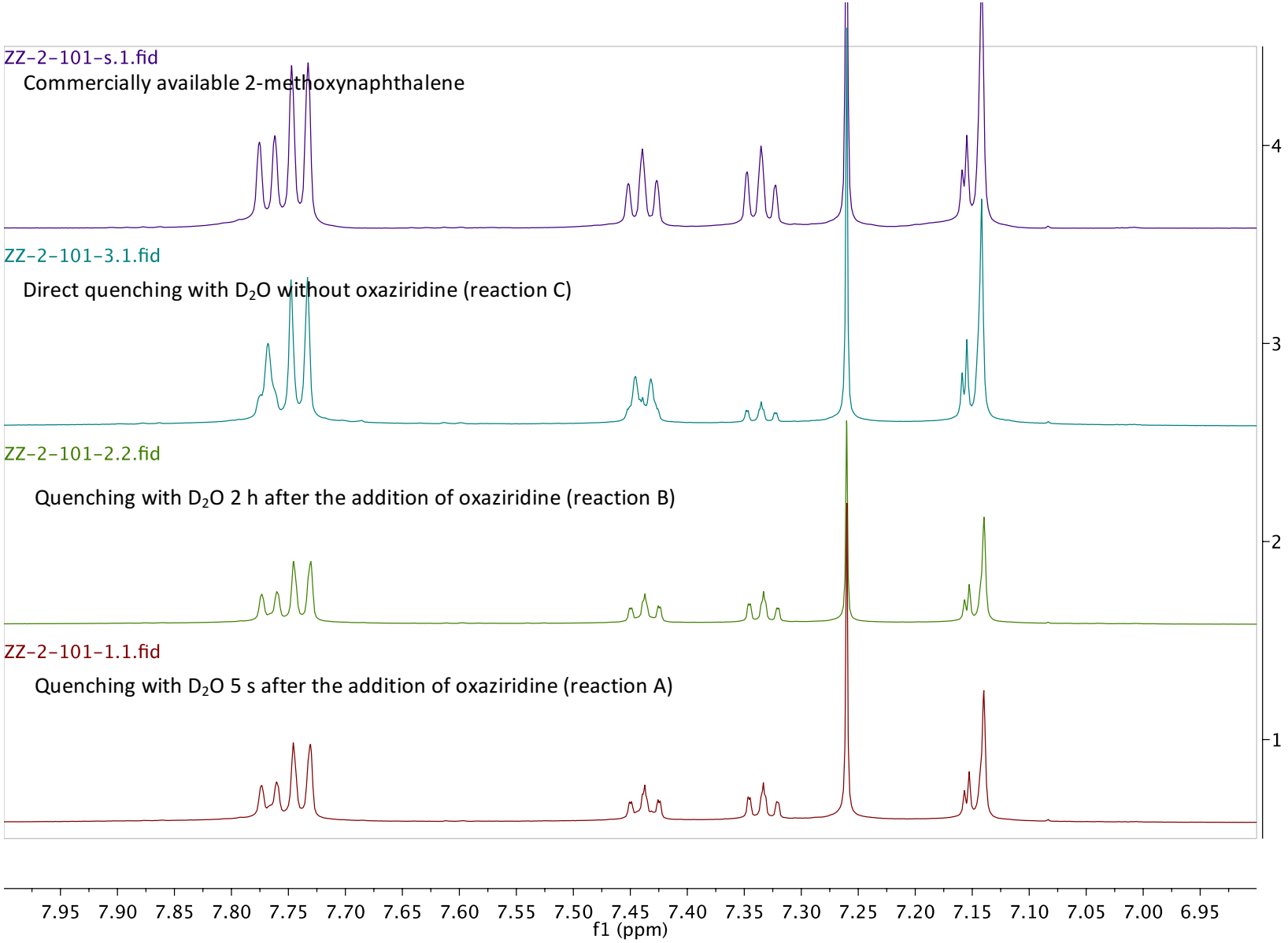
Supplementary Figure 10. Trapping experiments


ZZ-2-101-1.1.fid
PROTON CDCl3 {C:\DATA_Kurti} Zhe 15
Reaction A
1.00
0.99
.5 8.4 8.3 8.2 8.1 8.0 7.9 7.8 7.7 7.6 7.5 7.4 7.3 7.2 7.1 7.0 6.9 6.8 6.7 6.6 6.5 6.4 6.3 6.2 6.1
f1 (ppm)


ZZ-2-101-2.2.fid
PROTON CDCl3 {C:\DATA_Kurti} Zhe 21
Reaction B
1.00
0.99
.5 8.4 8.3 8.2 8.1 8.0 7.9 7.8 7.7 7.6 7.5 7.4 7.3 7.2 7.1 7.0 6.9 6.8 6.7 6.6 6.5 6.4 6.3 6.2 6.1
f1 (ppm)


ZZ-2-101-3.1.fid
PROTON CDCl3 {C:\DATA_Kurti} Zhe 17
Reaction C
1.00
0.39
.5 8.4 8.3 8.2 8.1 8.0 7.9 7.8 7.7 7.6 7.5 7.4 7.3 7.2 7.1 7.0 6.9 6.8 6.7 6.6 6.5 6.4 6.3 6.2 6.1
f1 (ppm)


ZZ-2-101-s.1.fid
PROTON CDCl3 {C:\DATA_Kurti} Zhe 18
Commercially available 2-methoxynaphthalene
1.00
1.00
.5 8.4 8.3 8.2 8.1 8.0 7.9 7.8 7.7 7.6 7.5 7.4 7.3 7.2 7.1 7.0 6.9 6.8 6.7 6.6 6.5 6.4 6.3 6.2 6.1
f1 (ppm)


ZZ-2-101-s.1.fid
Commercially available 2-methoxynaphthalene
ZZ-2-101-3.1.fid
Direct quenching with D2O without oxaziridine (reaction C)
ZZ-2-101-2.2.fid
Quenching with D2O 2 h after the addition of oxaziridine (reaction B)
ZZ-2-101-1.1.fid
Quenching with D2O 5 s after the addition of oxaziridine (reaction A)
4
3
2
1
7.95 7.90 7.85 7.80 7.75 7.70 7.65 7.60 7.55 7.50 7.45 7.40 7.35 7.30 7.25 7.20 7.15 7.10 7.05 7.00 6.95
f1 (ppm)

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DSC (Differential Scanning Calorimetry) Analysis Data for Oxaziridines

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Size: 6.5030 mg
Method: Ramp

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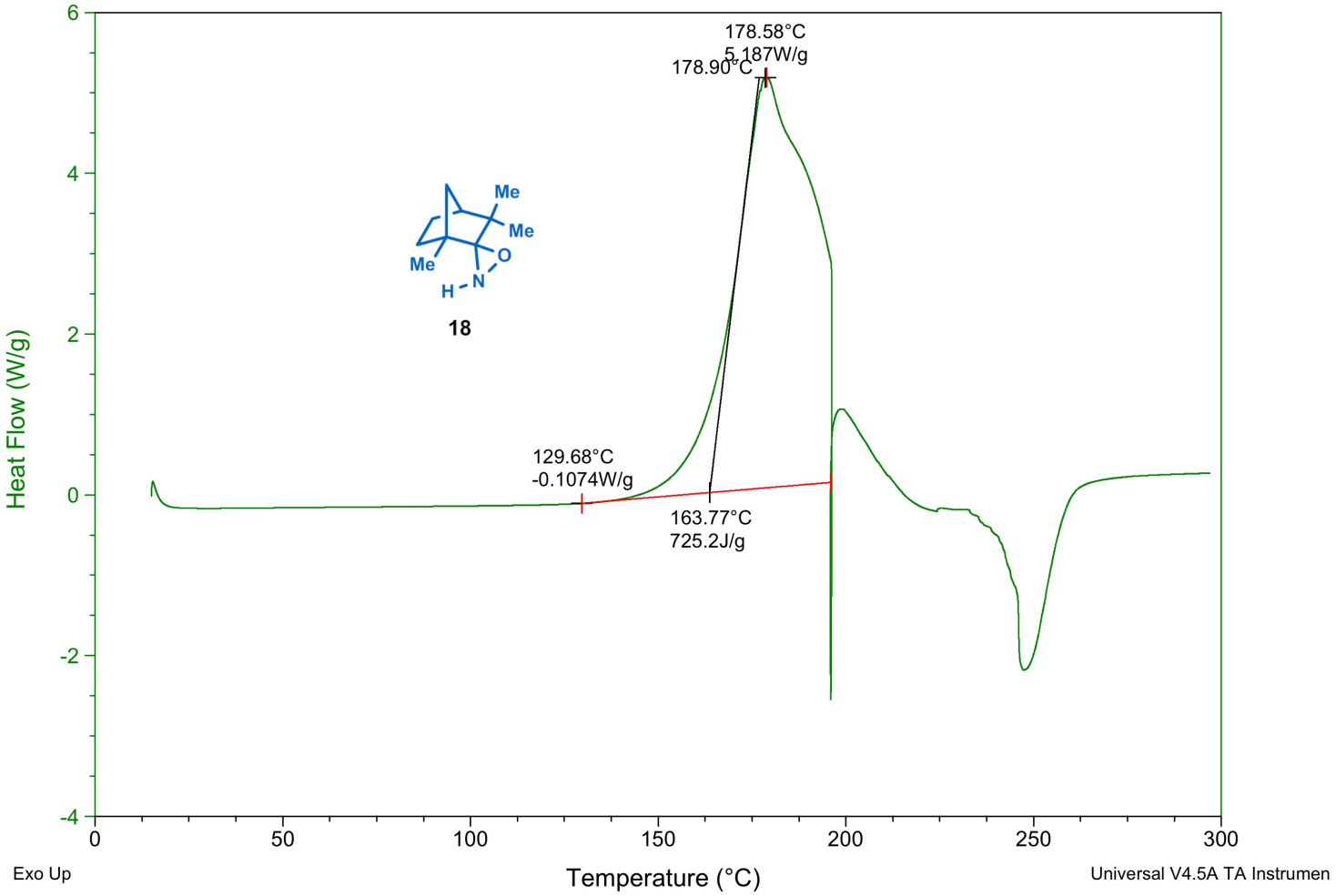

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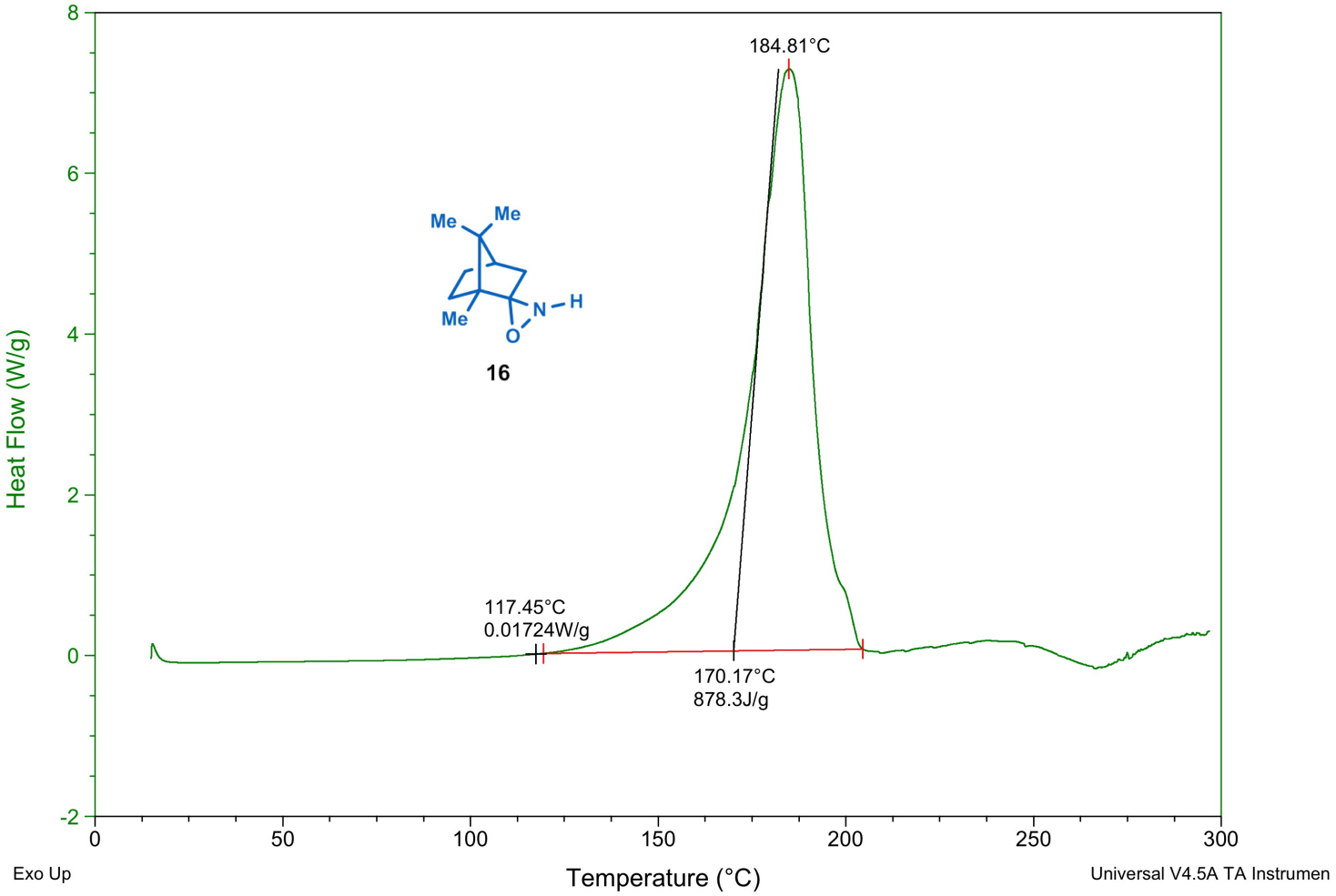

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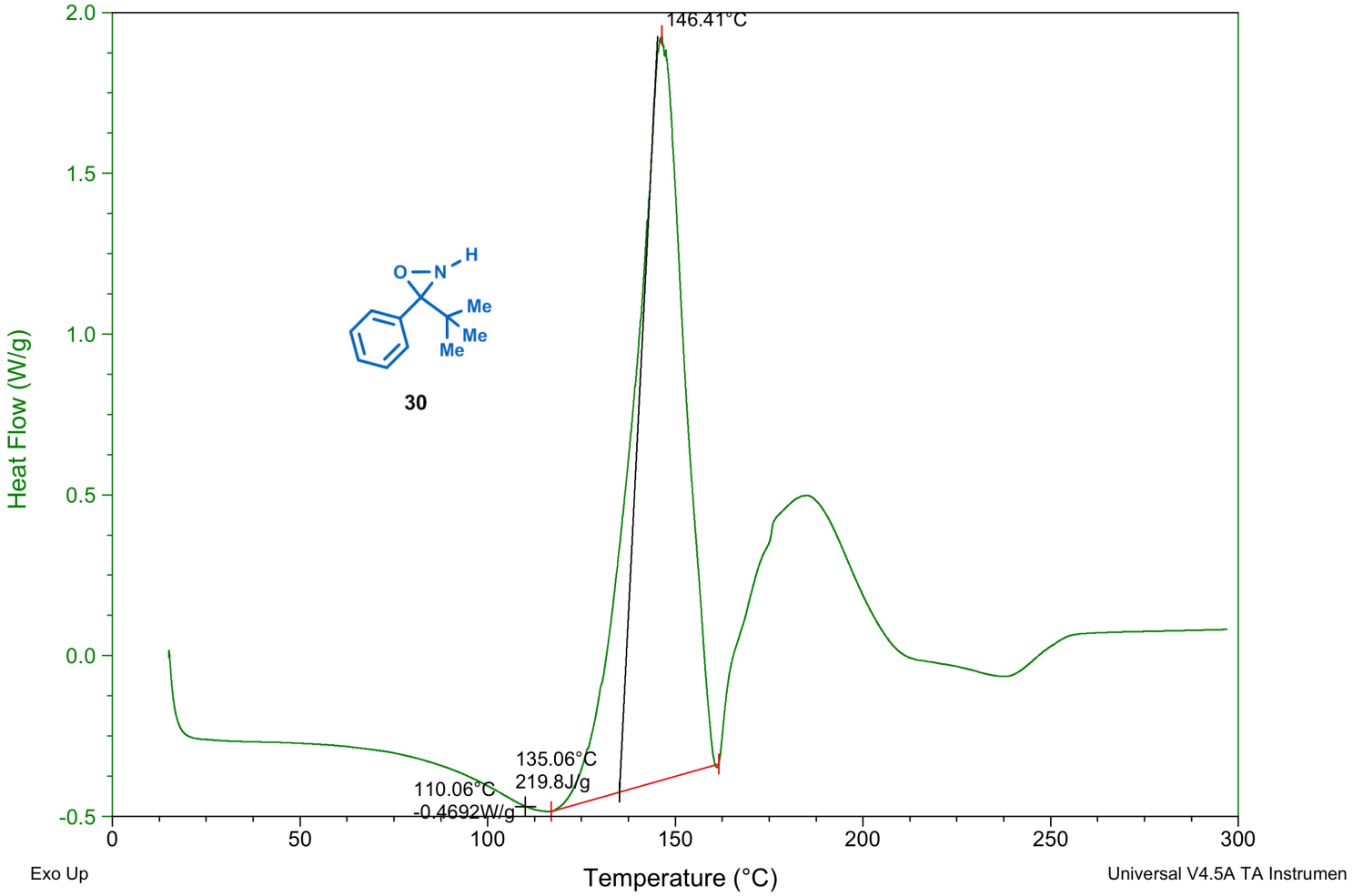

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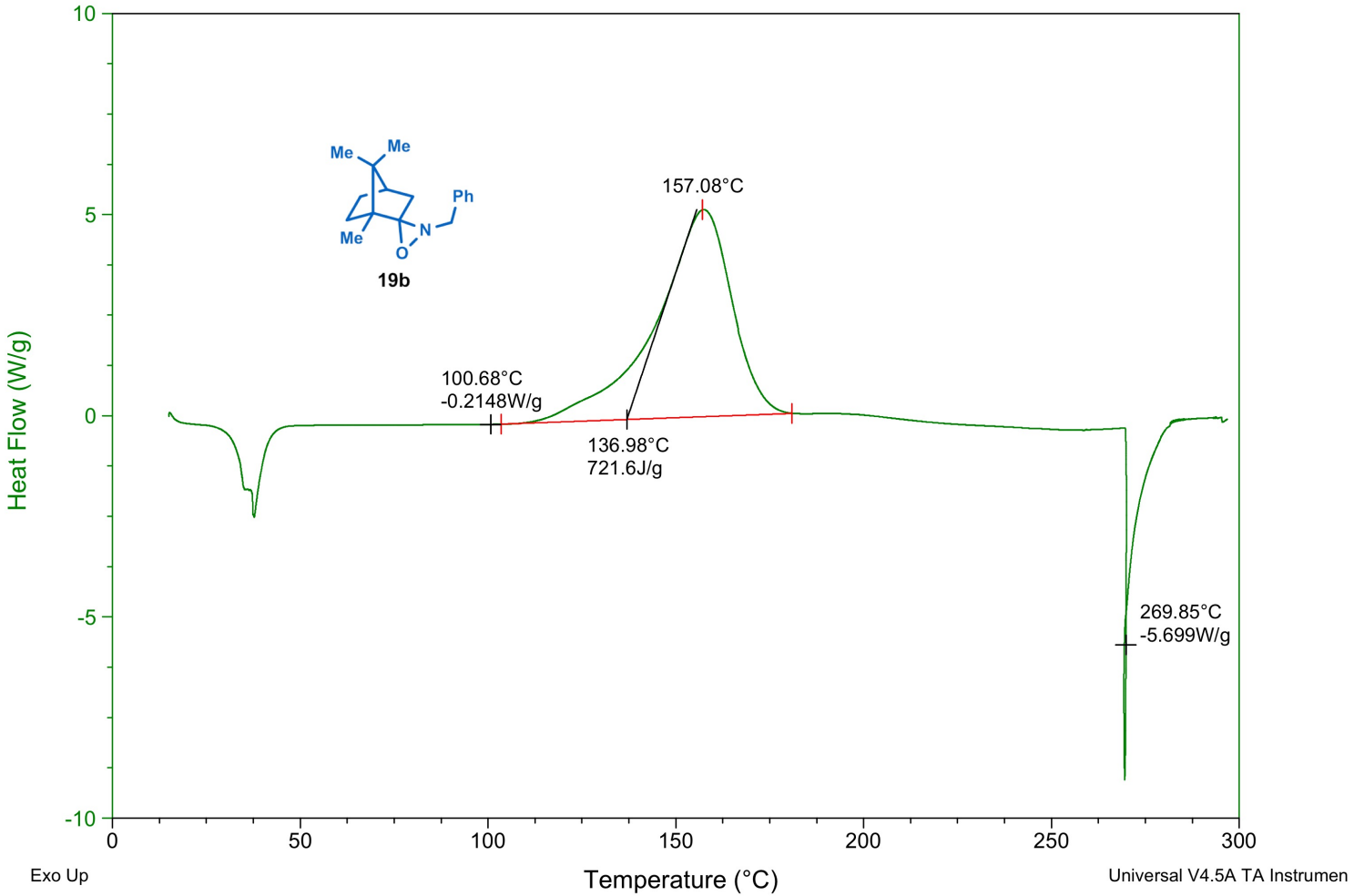
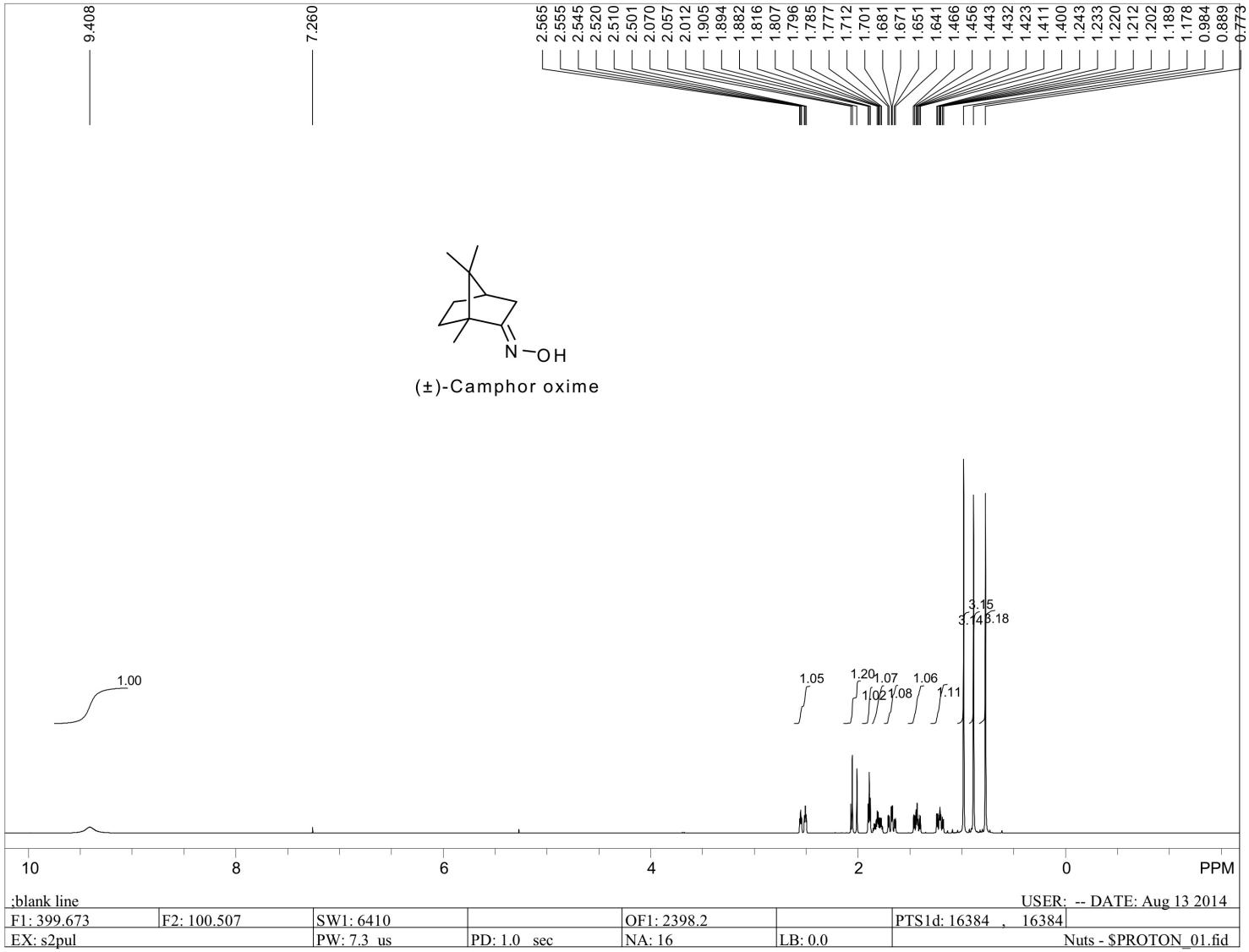


NMR Spectra of Oxaziridines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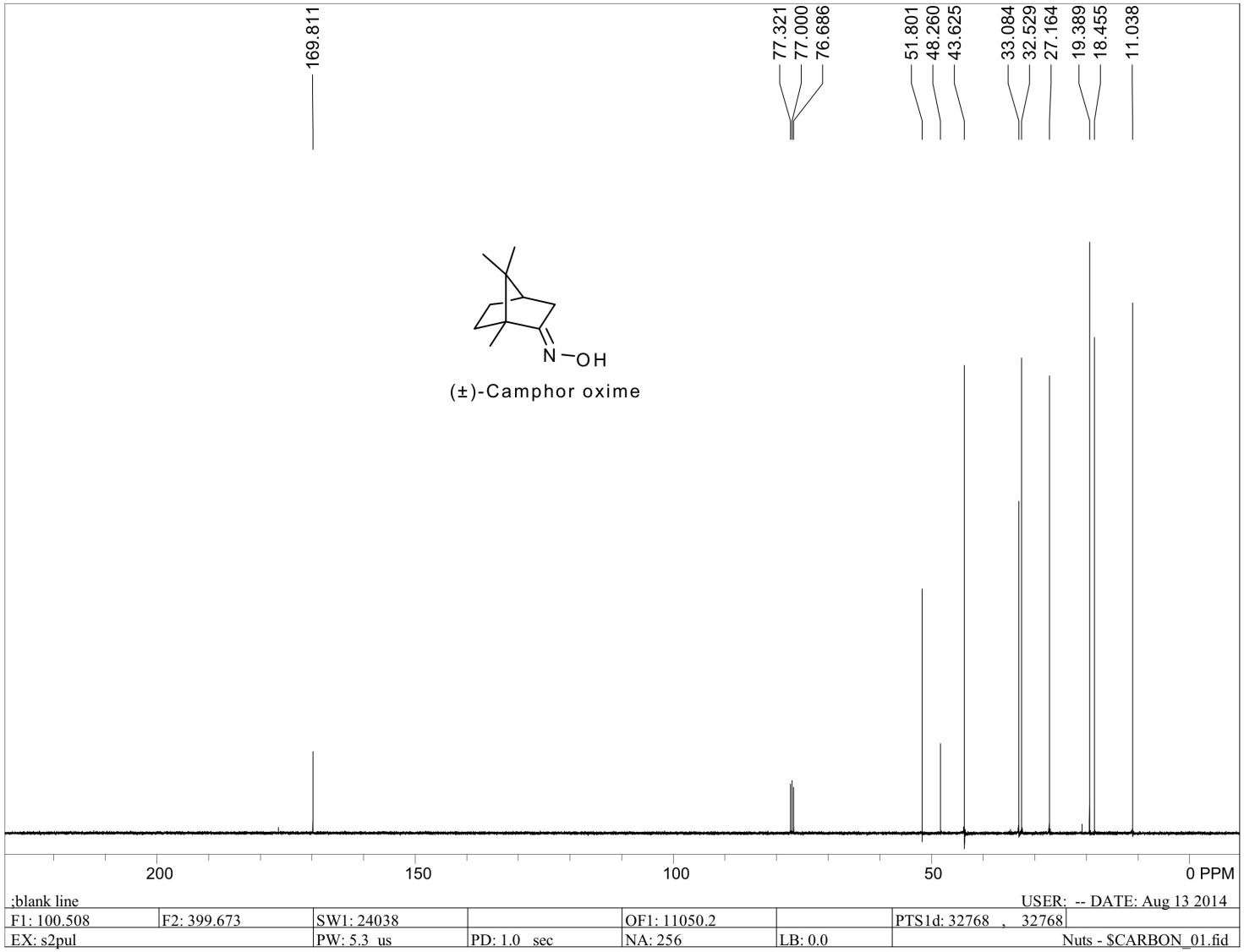
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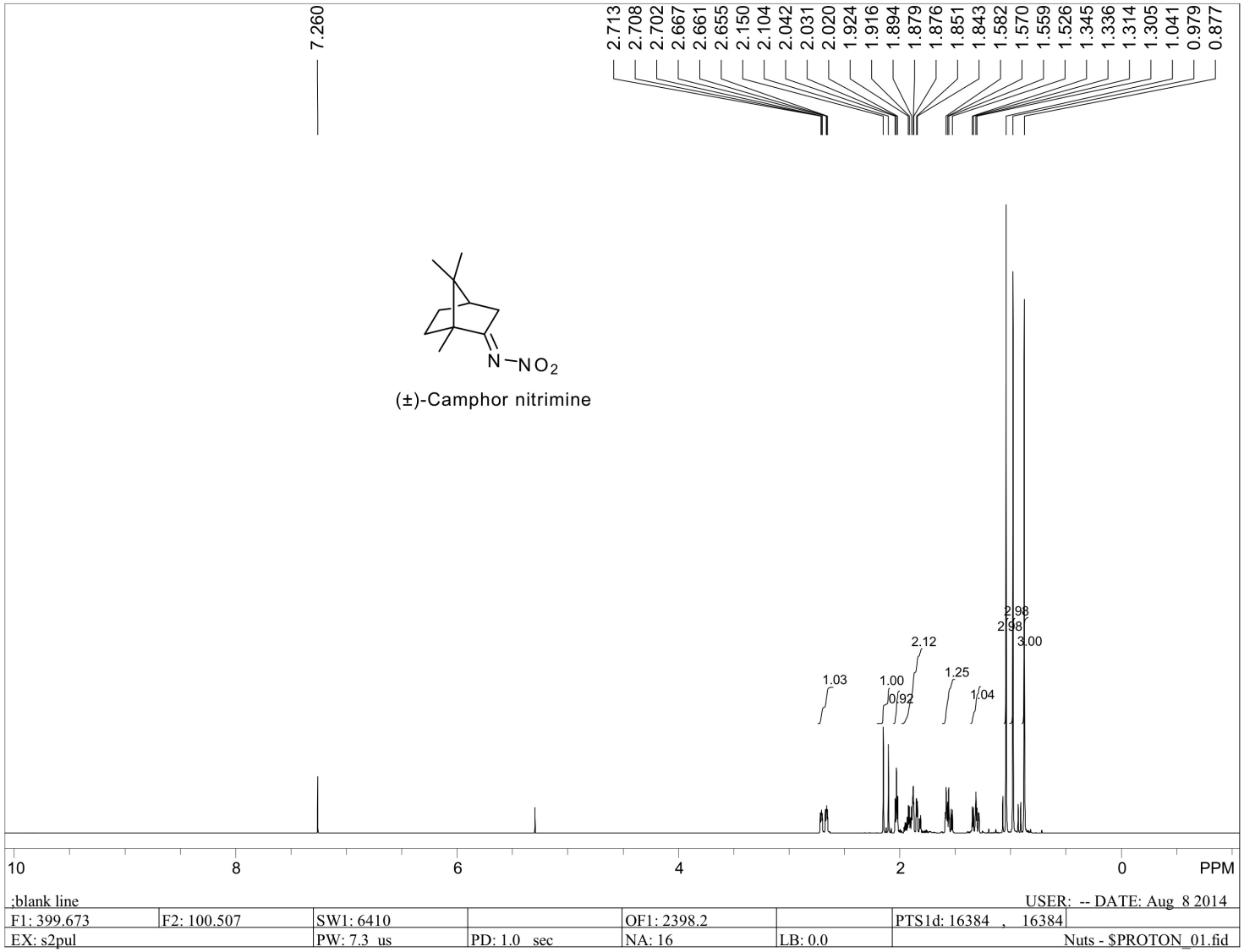
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1.851
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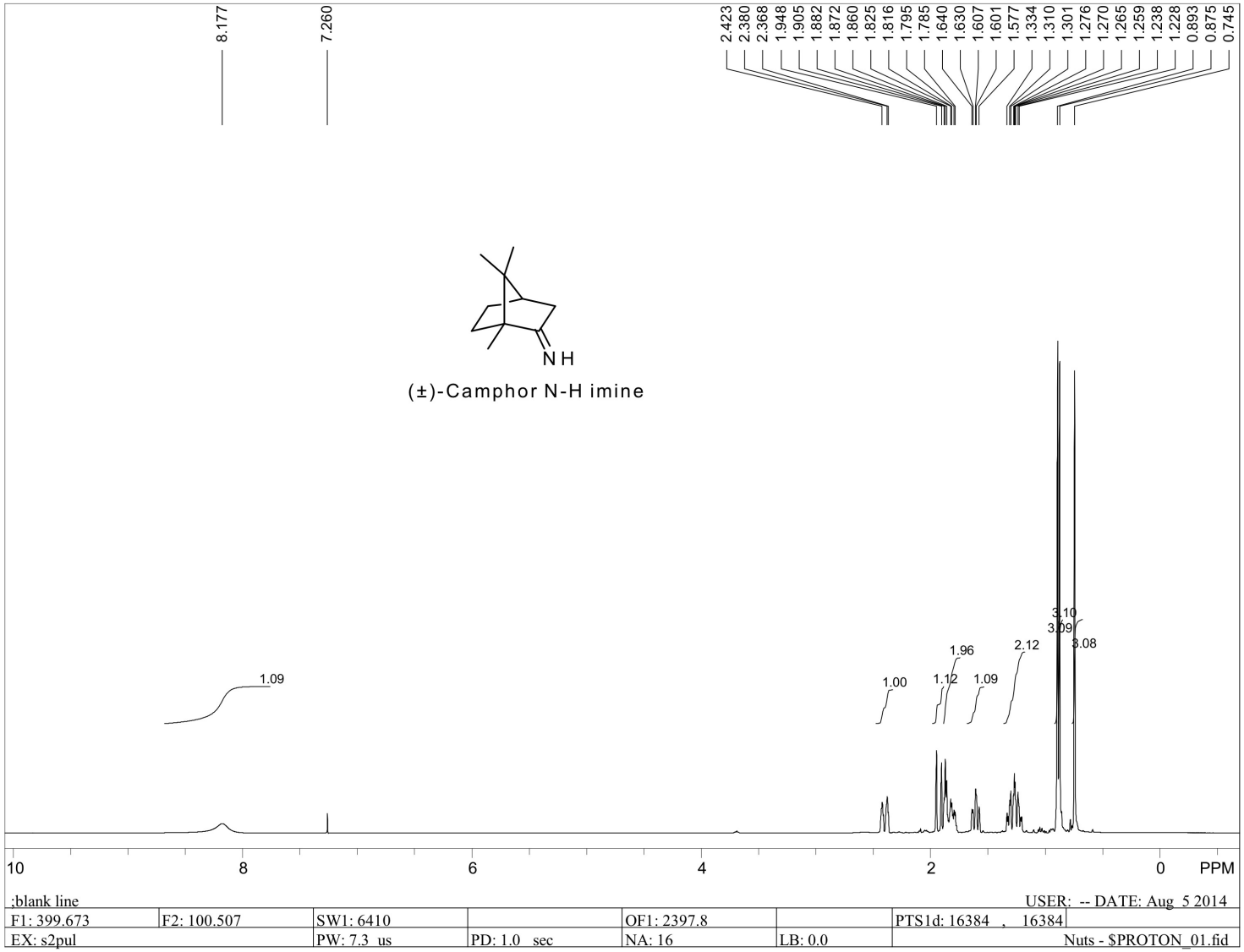
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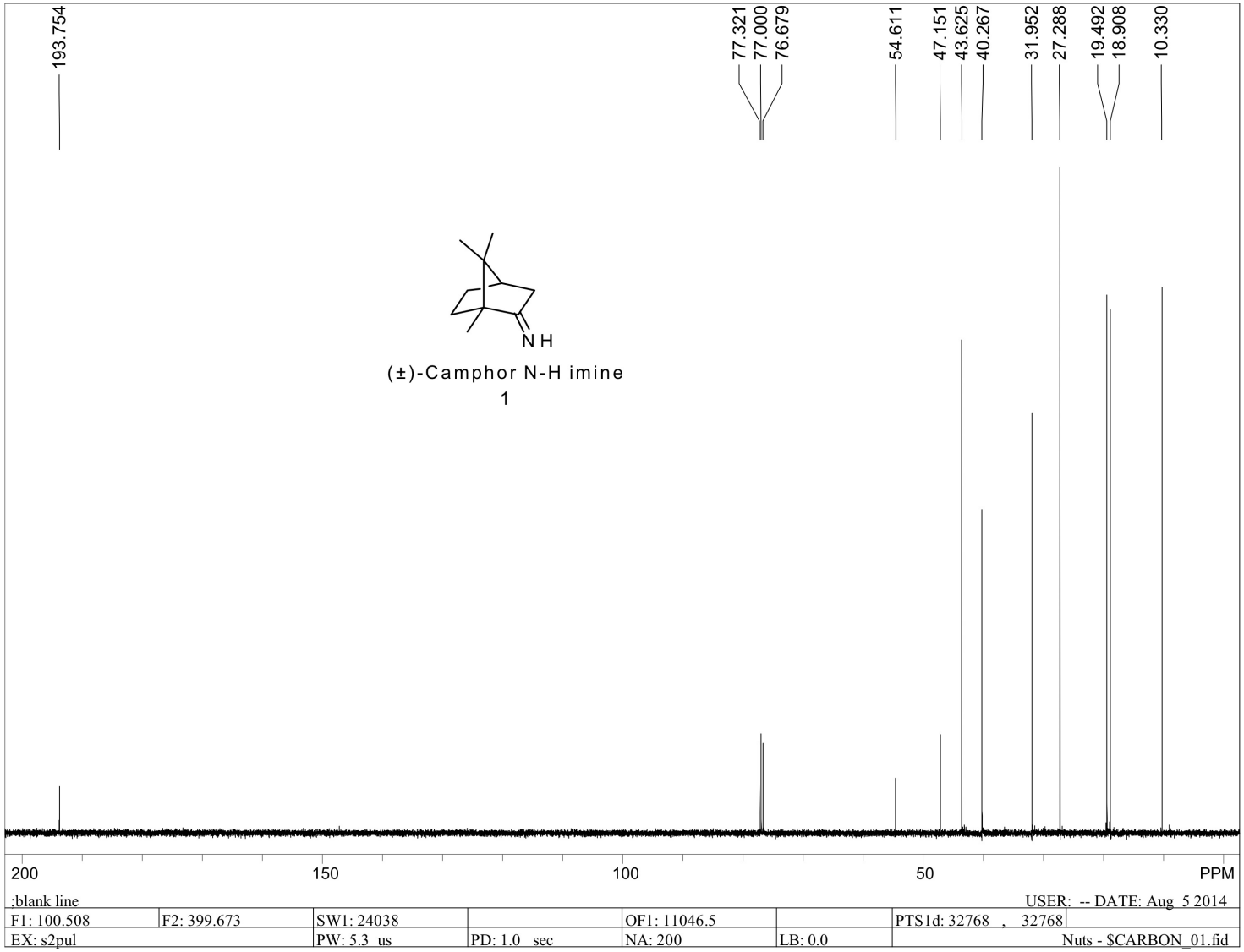
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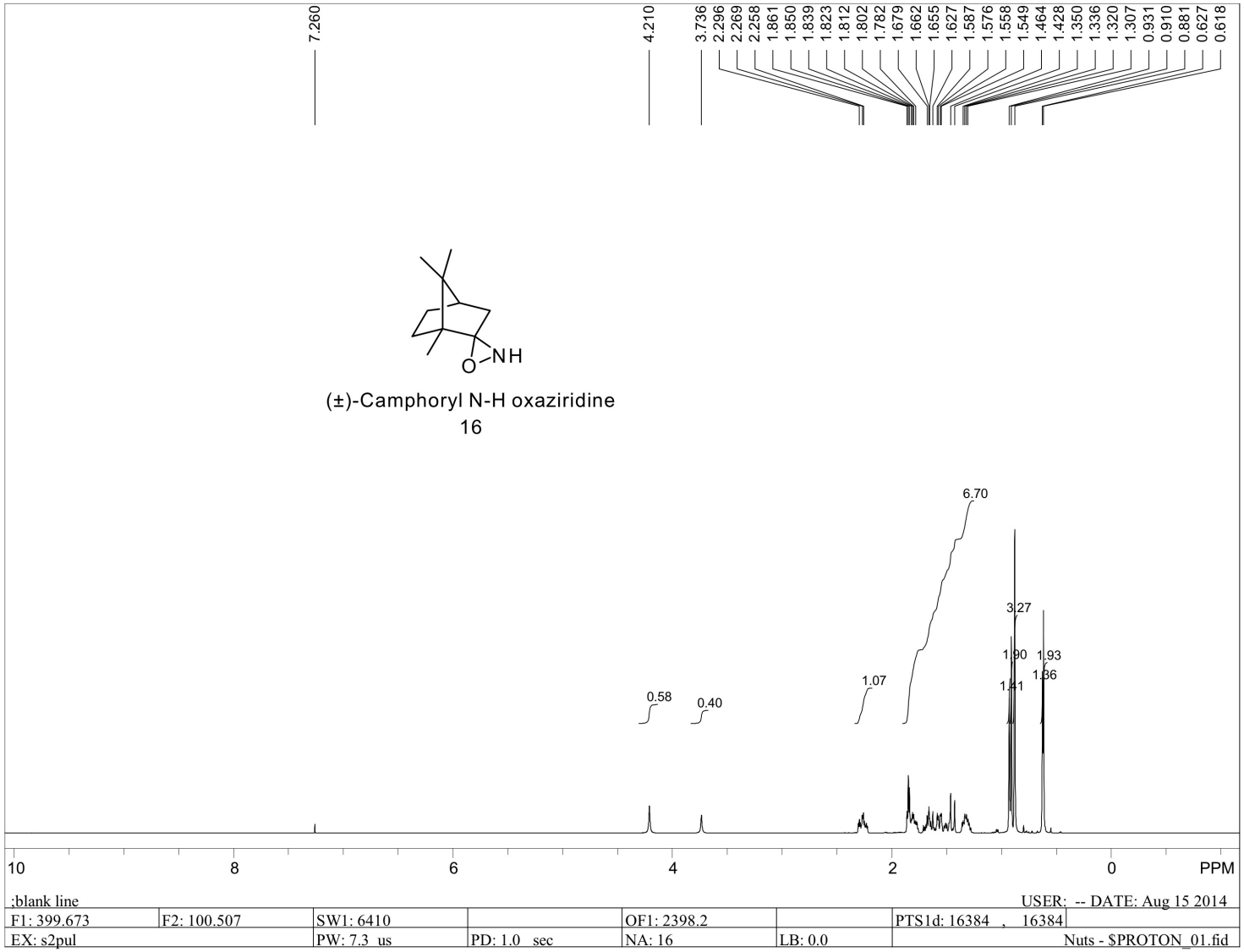
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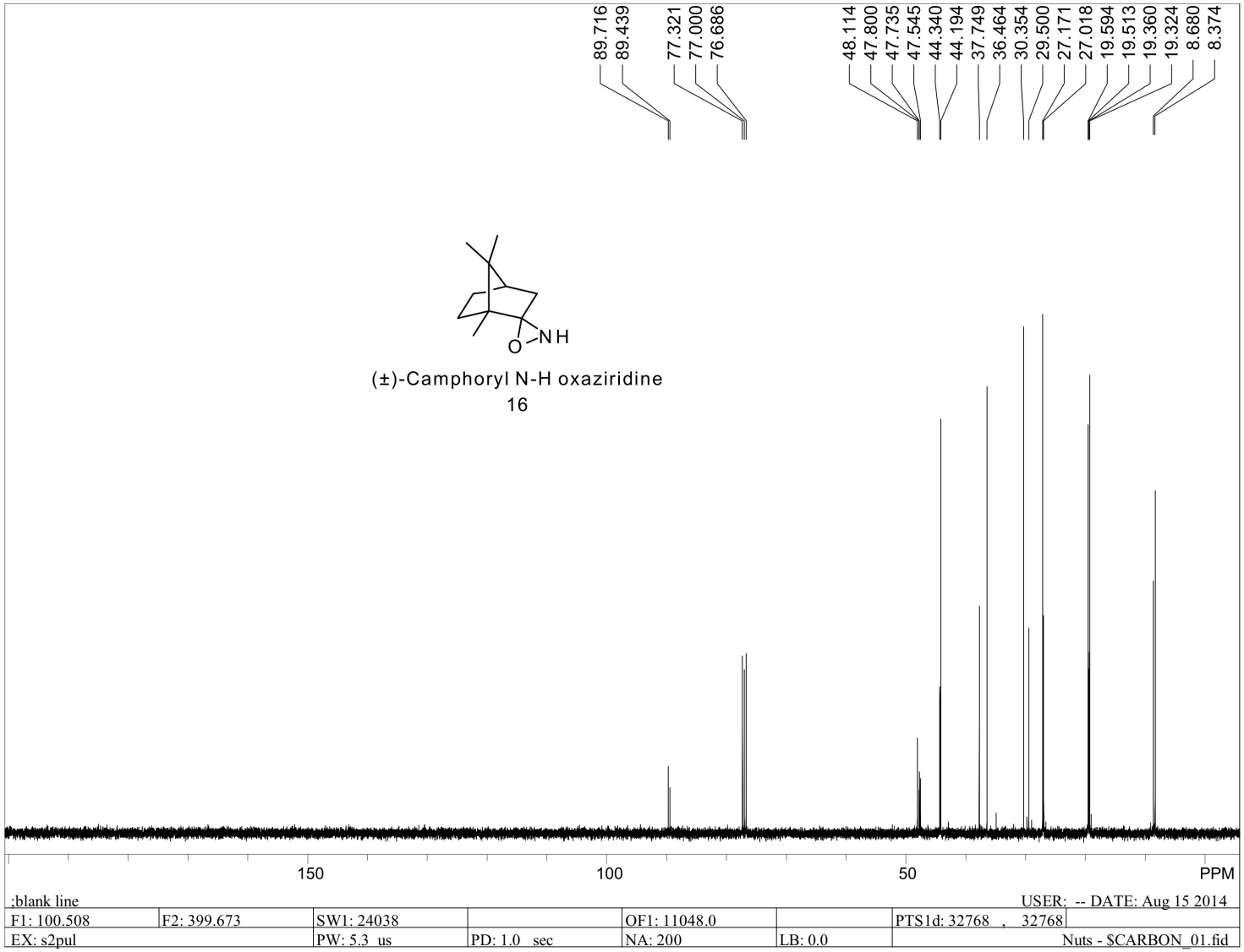
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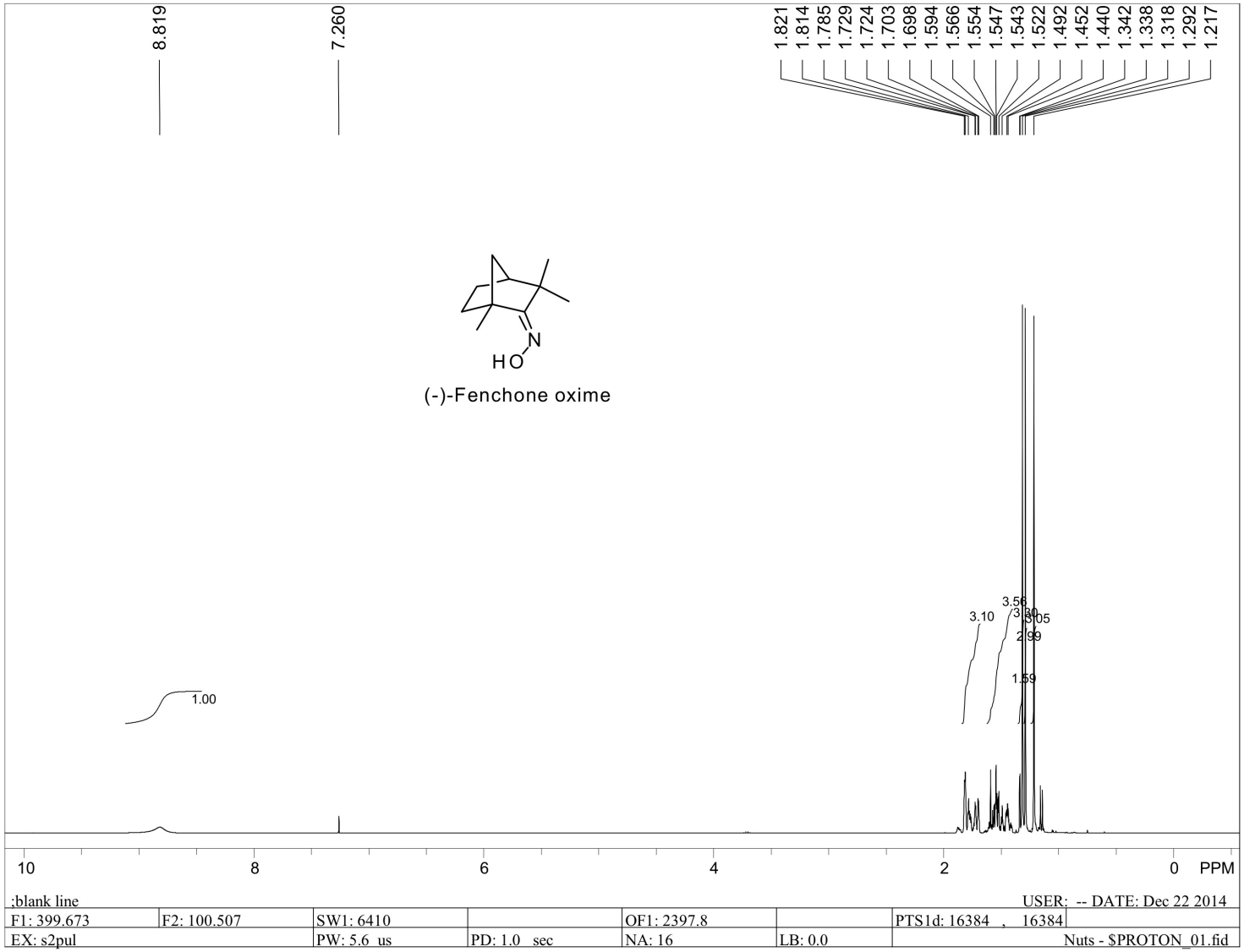
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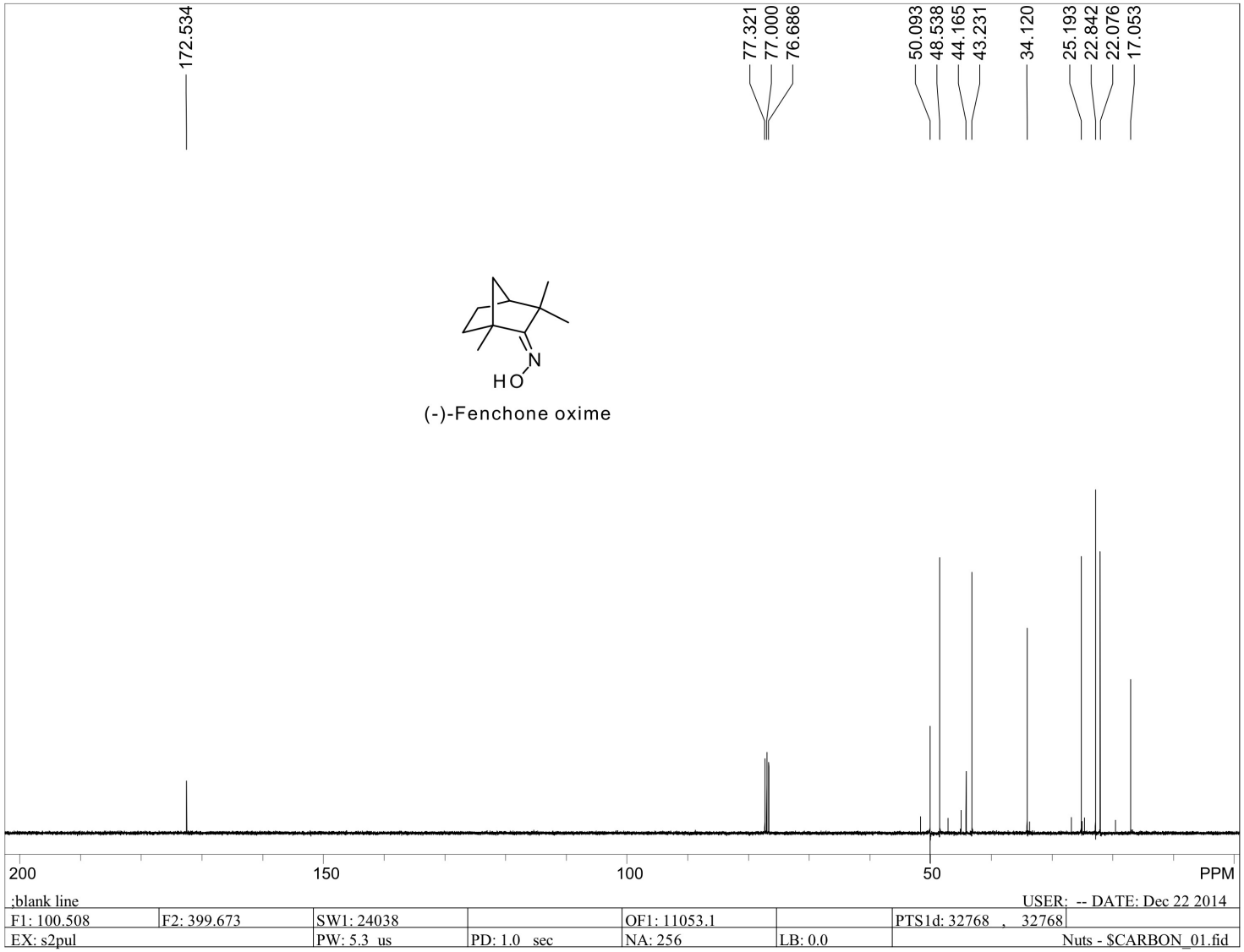
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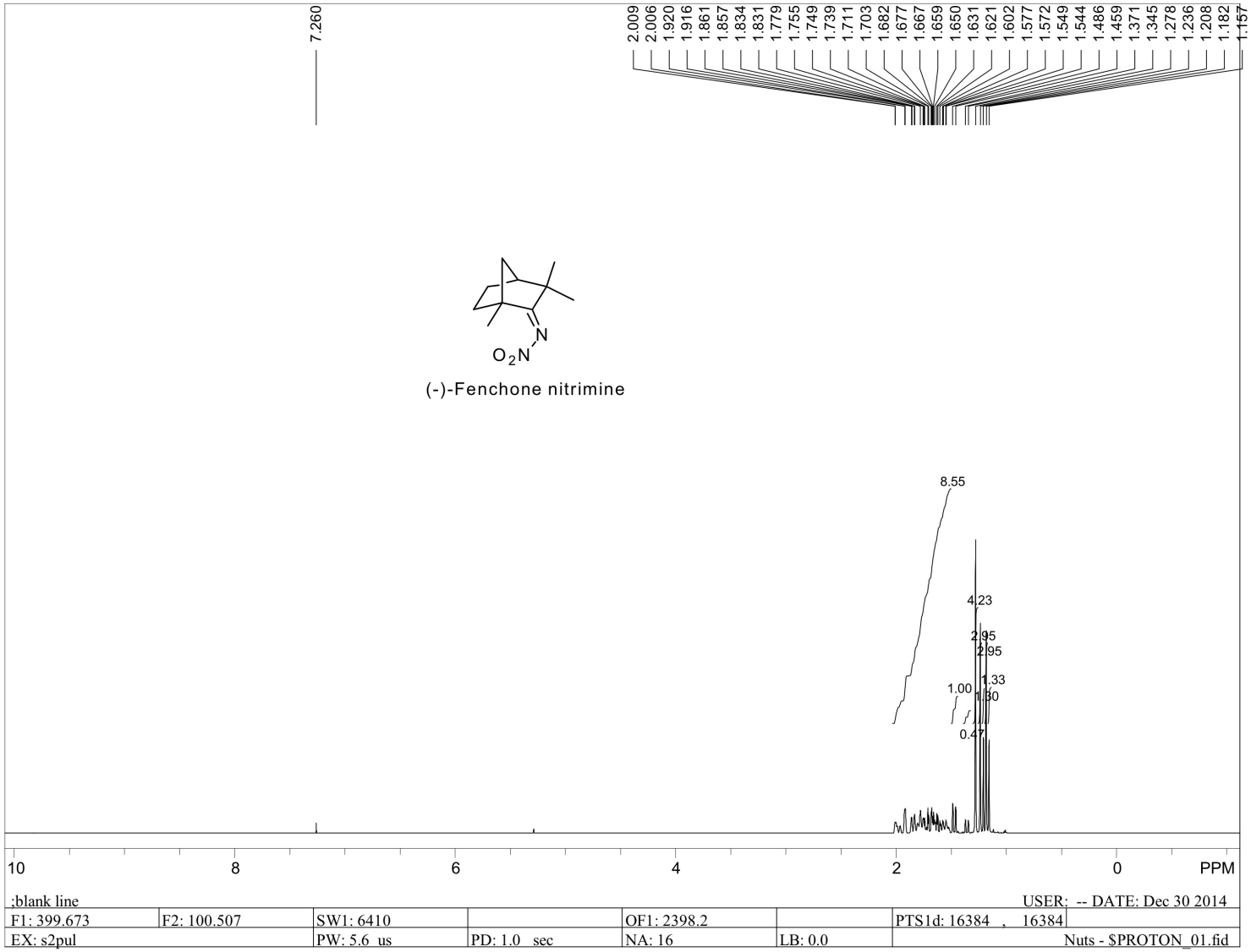
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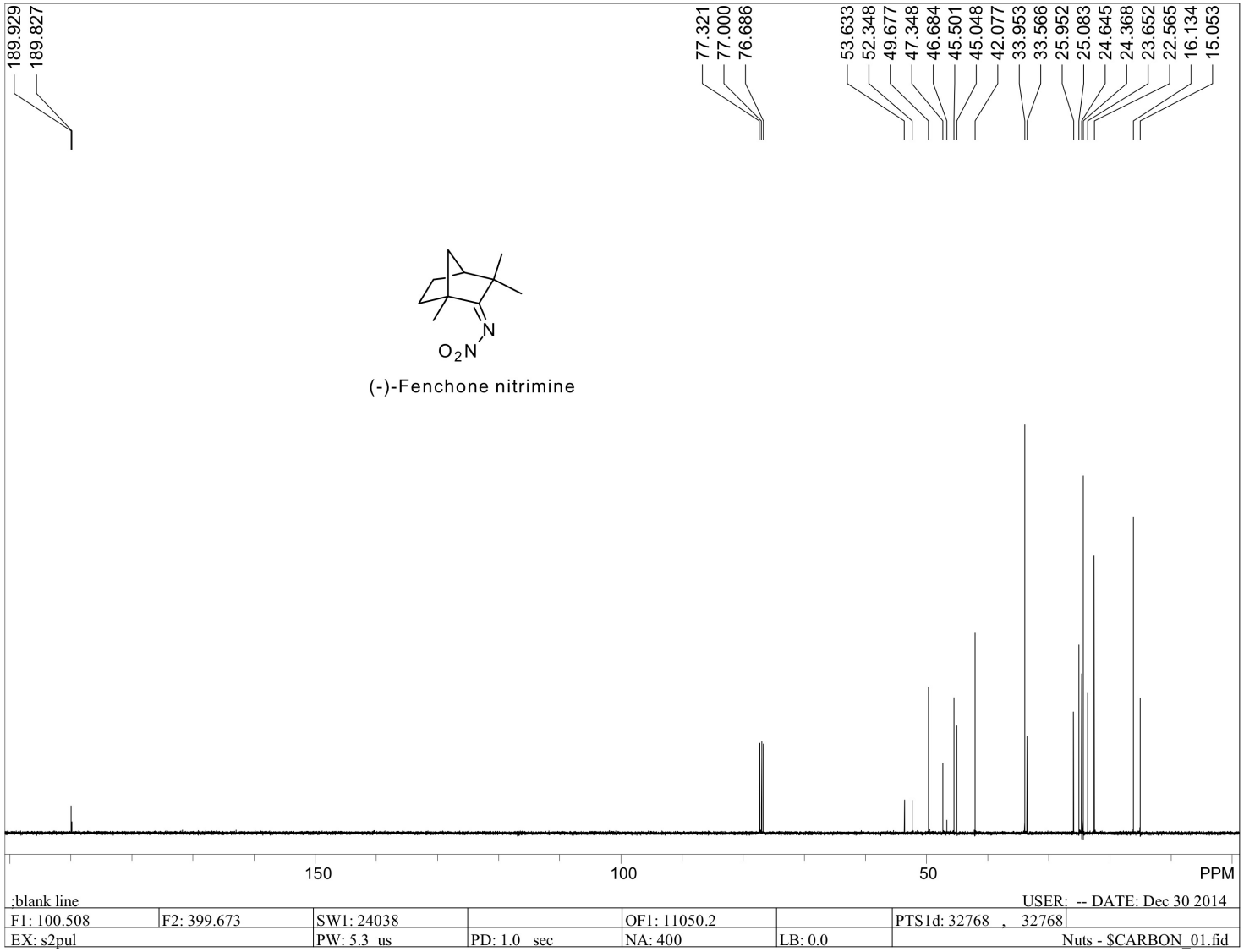
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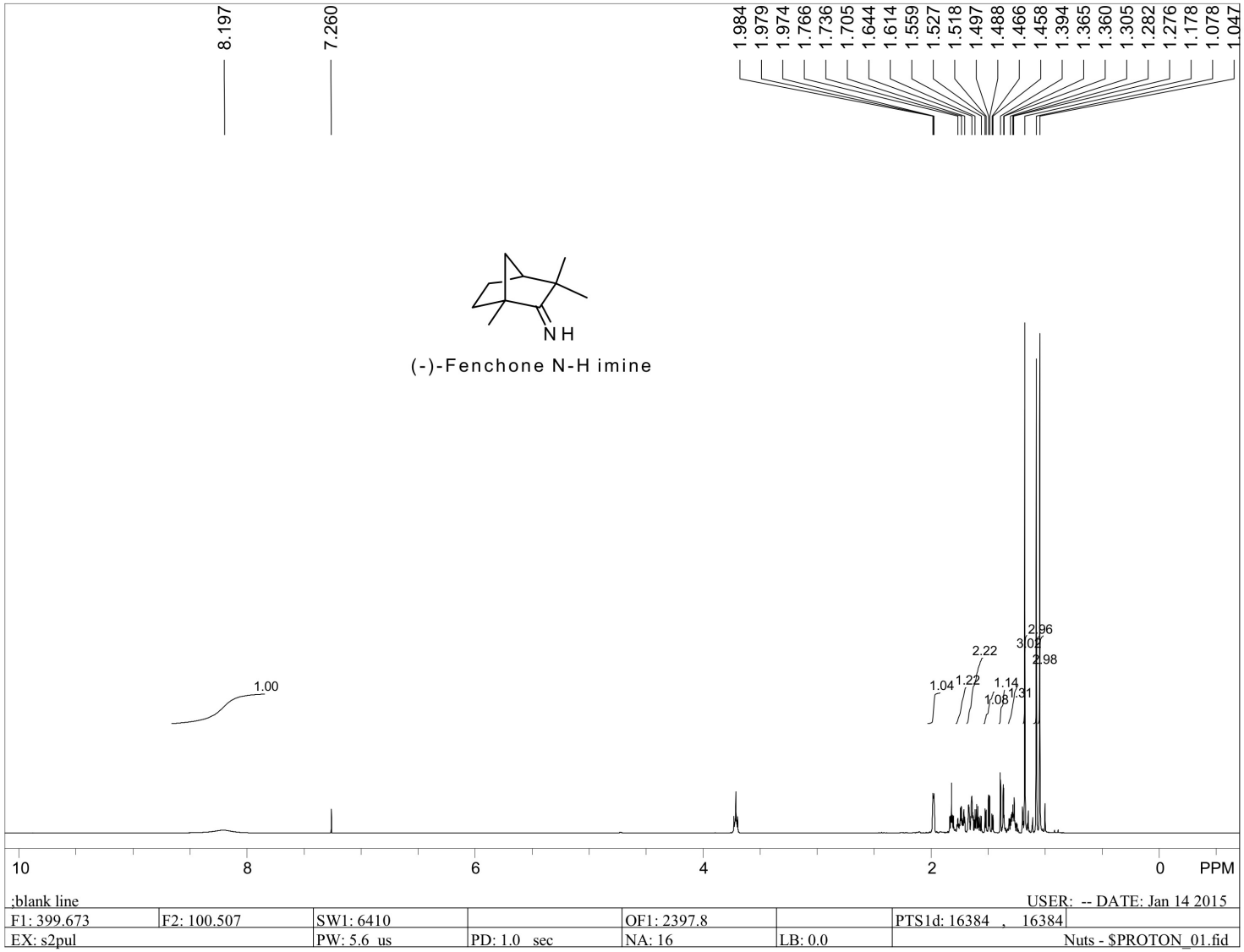
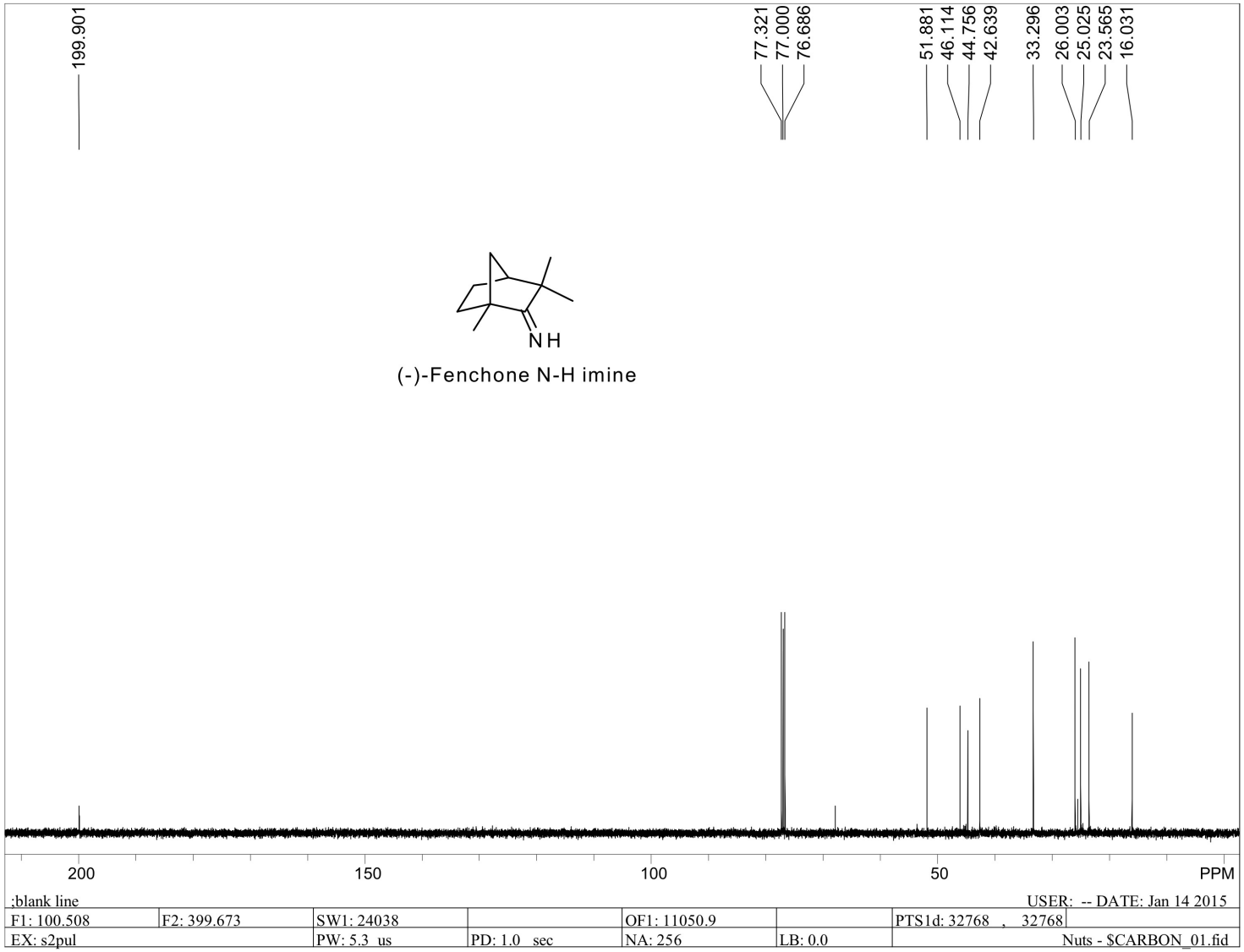
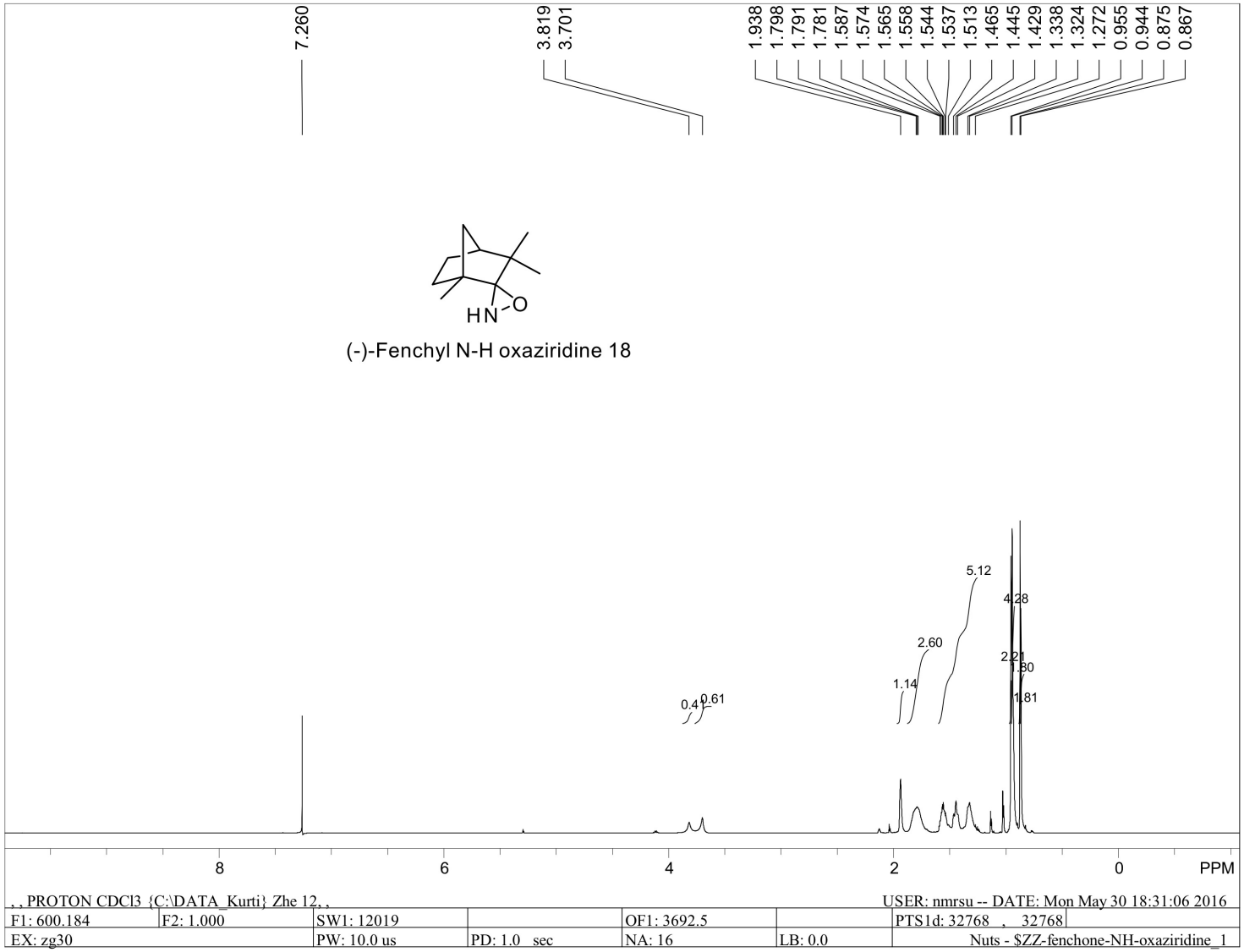
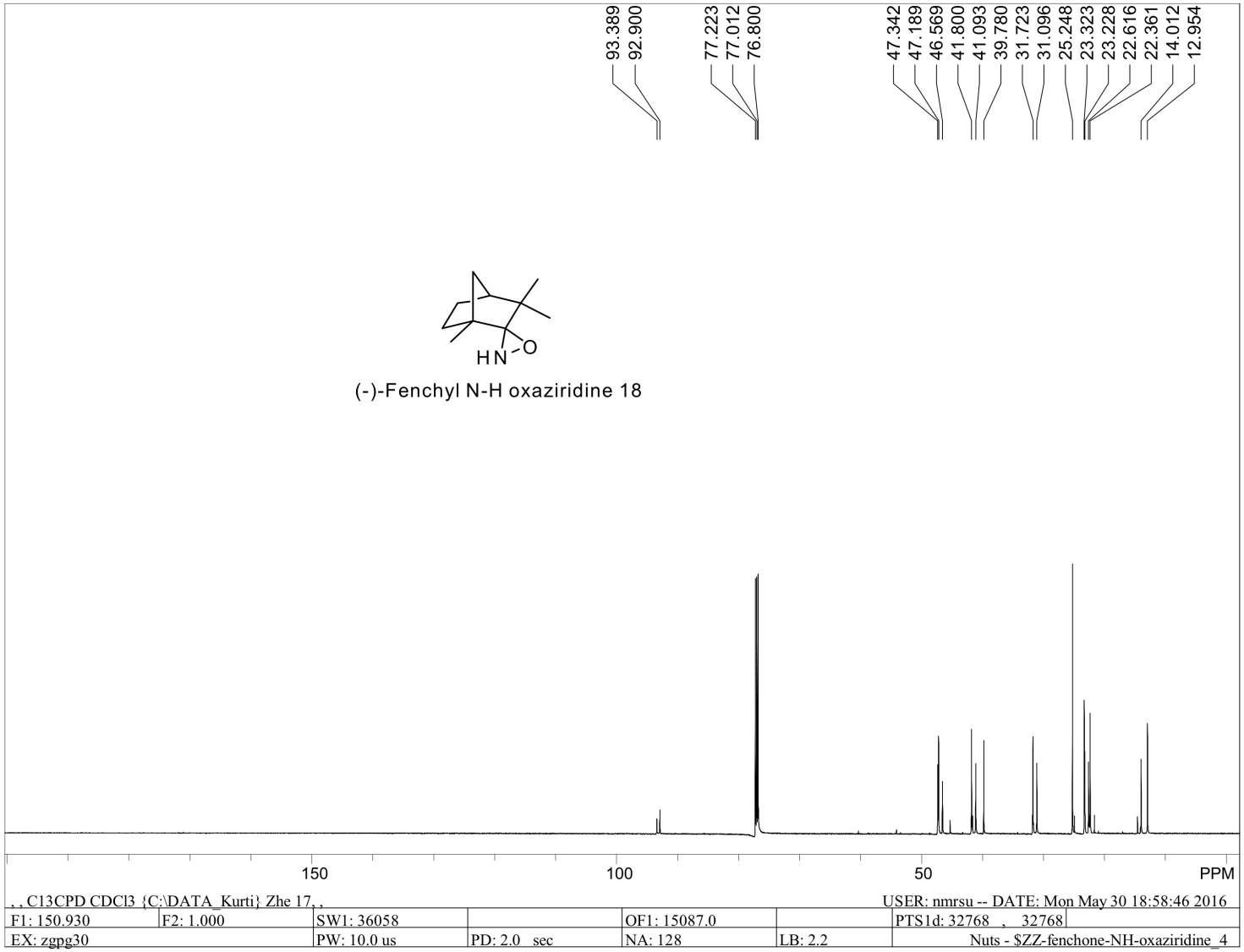
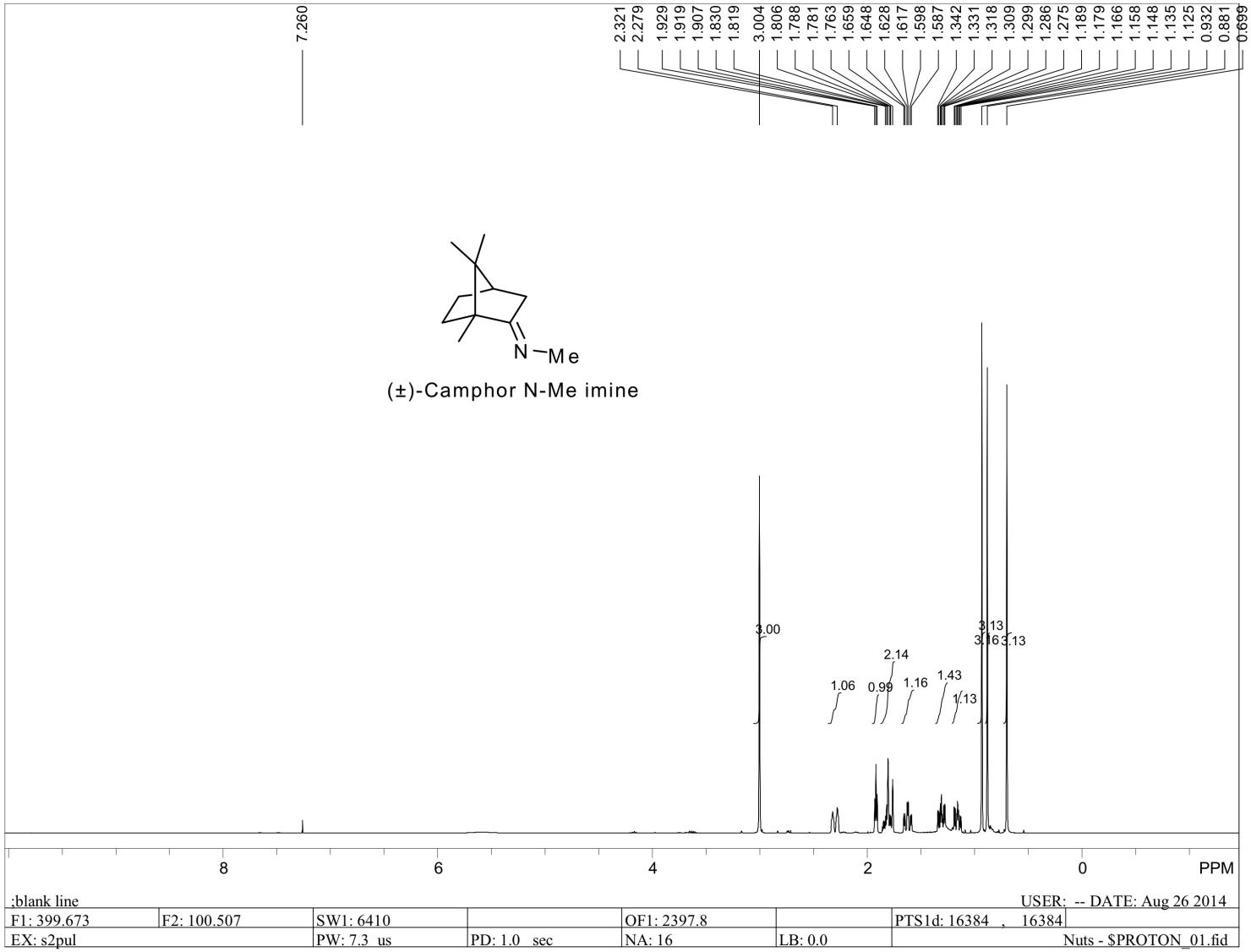
42.077
33.953
33.566
25.952
25.083
24.645
24.368
23.652
22.565
16.134
15.053
O2N
N
(-)-Fenchone nitrimine
150
100
50
PPM
;blank line
USER: -- DATE: Dec 30 2014
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11050.2
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 400
LB: 0.0
Nuts - $CARBON_01.fid

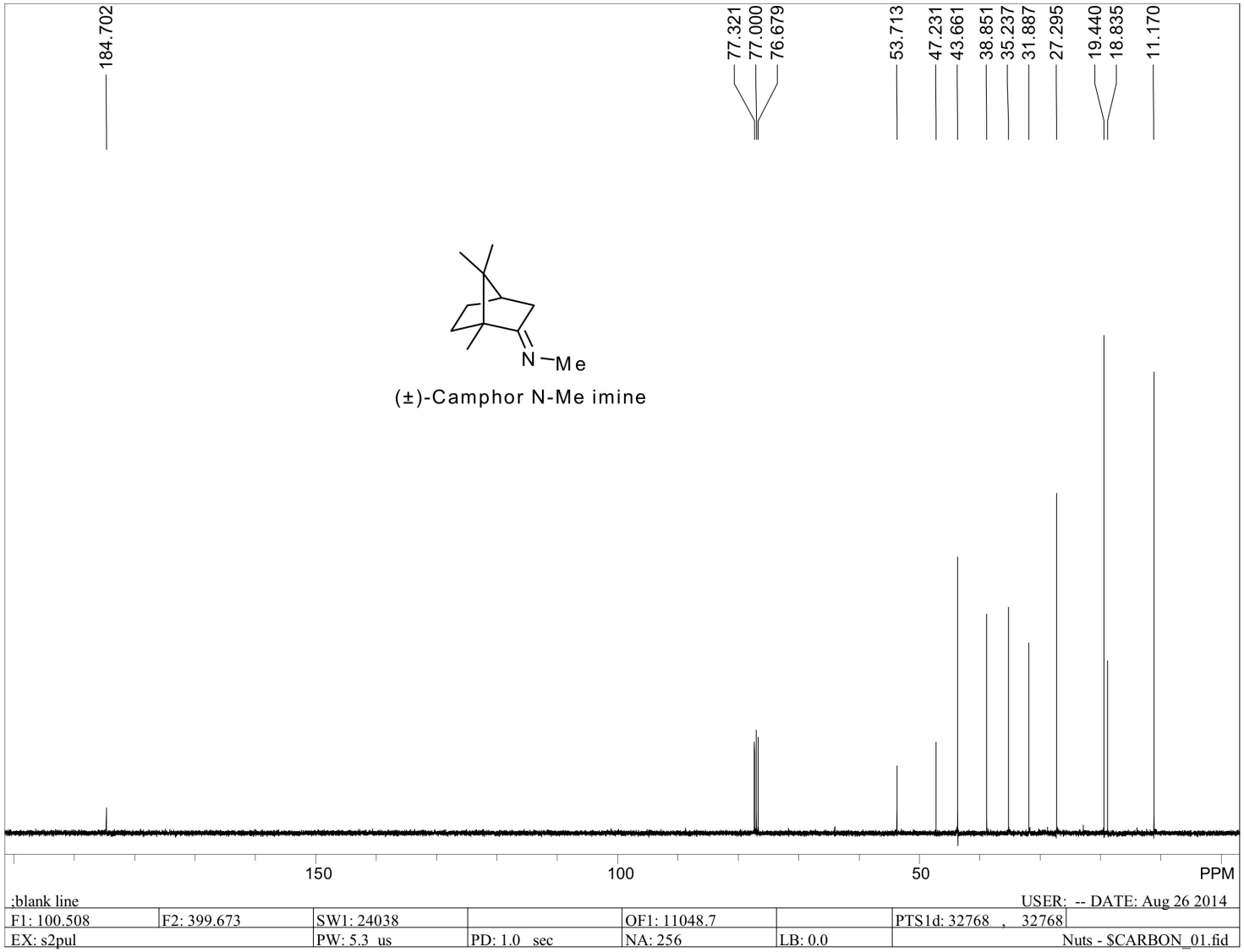

8.197
7.260
1.984
1.979
1.974
1.766
1.736
1.705
1.644
1.614
1.559
1.527
1.518
1.497
1.488
1.466
1.458
1.394
1.365
1.360
1.305
1.282
1.276
1.178
1.078
1.047
NH
(-)-Fenchone N-H imine
1.00
1.04
1.22
2.22
3.02
2.96
2.98
1.14
1.08
1.31
10
8
6
4
2
0
PPM
;blank line
USER: -- DATE: Jan 14 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2397.8
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.6 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

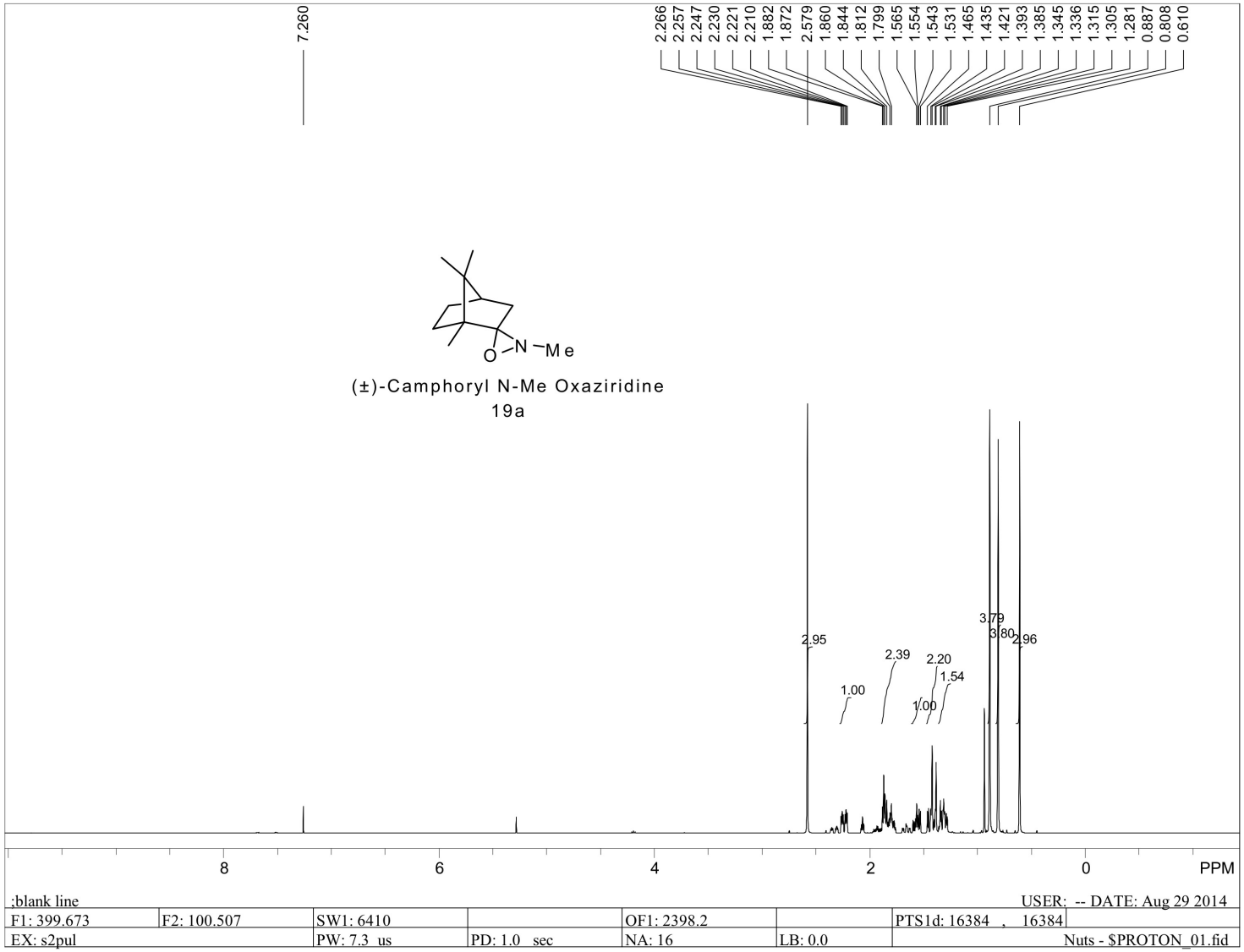

199.901
77.321
77.000
76.686
51.881
46.114
44.756
42.639
33.296
26.003
25.025
23.565
16.031
NH
(-)-Fenchone N-H imine
200
150
100
50
PPM
;blank line
USER: -- DATE: Jan 14 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11050.9
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 0.0
Nuts - $CARBON_01.fid

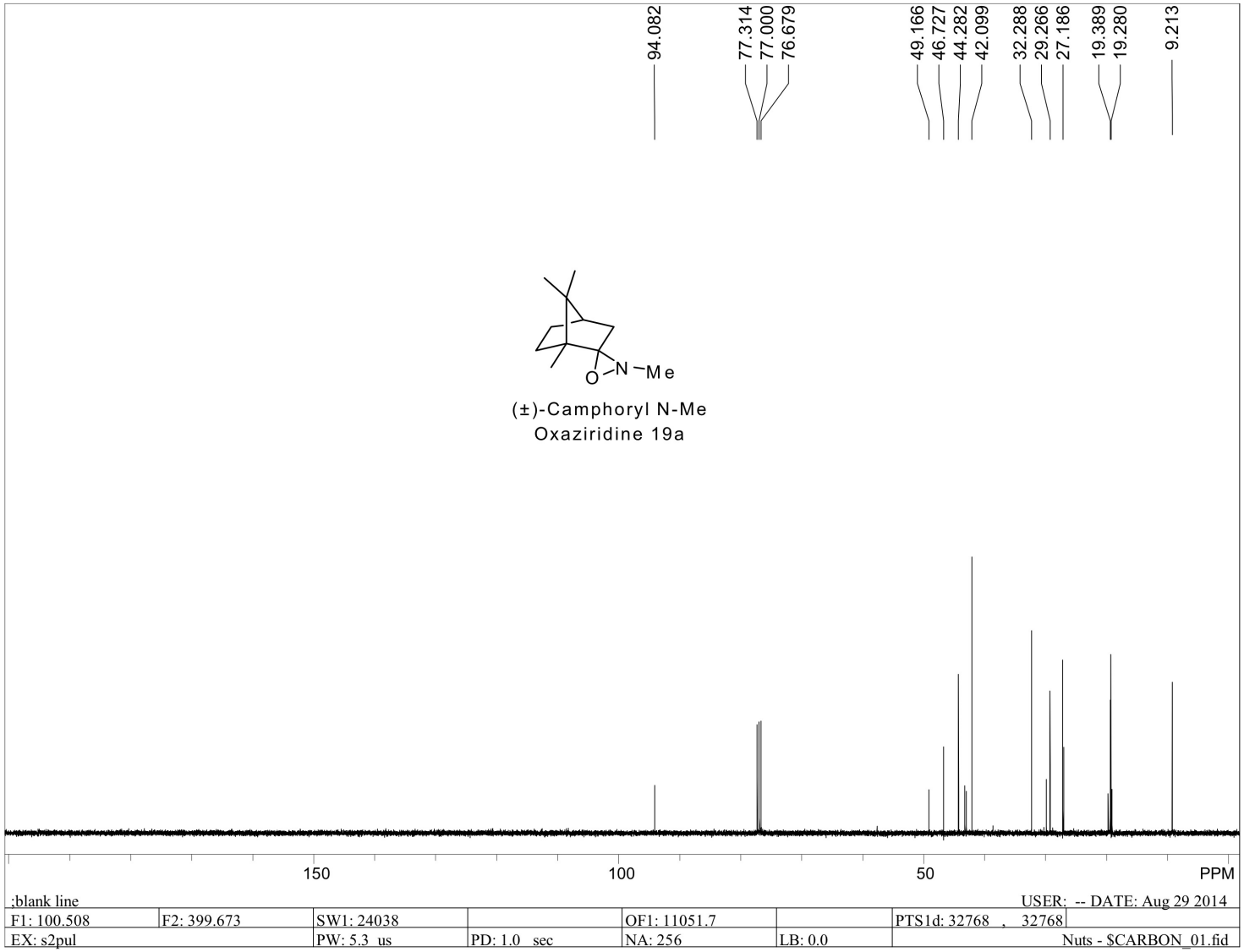

7.260
3.819
3.701
1.938
1.798
1.791
1.781
1.587
1.574
1.565
1.558
1.544
1.537
1.513
1.465
1.445
1.429
1.338
1.324
1.272
0.955
0.944
0.875
0.867
HN
O
(-)-Fenchyl N-H oxaziridine 18
5.12
4.28
2.60
2.21
1.80
1.14
1.81
0.61
8
6
4
2
0
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 12, ,
USER: nmrsu -- DATE: Mon May 30 18:31:06 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.5
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $ZZ-fenchone-NH-oxaziridine_1

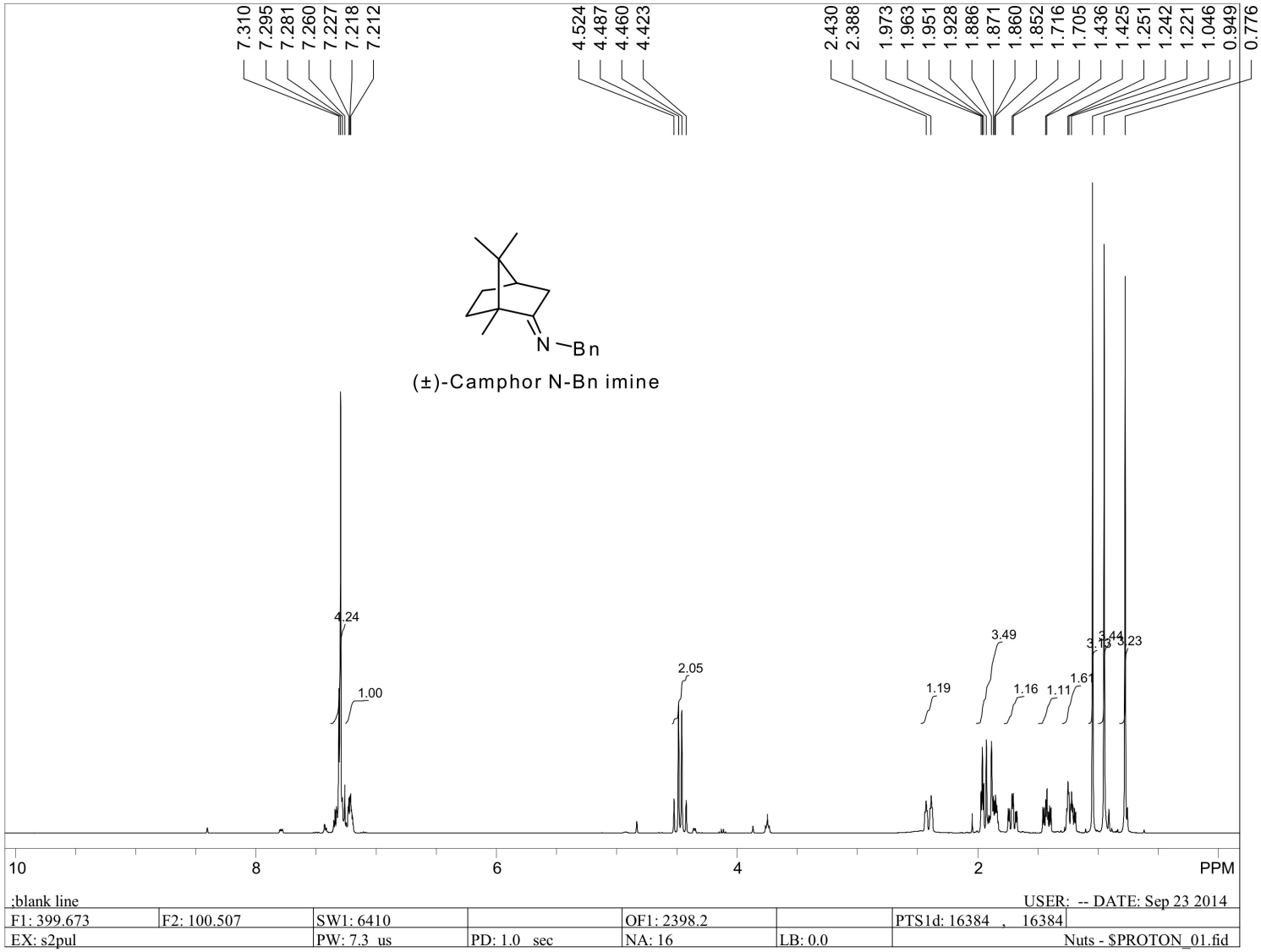

93.389
92.900
77.223
77.012
76.800
47.342
47.189
46.569
41.800
41.093
39.780
31.723
31.096
25.248
23.323
23.228
22.616
22.361
14.012
12.954
HN
O
(-)-Fenchyl N-H oxaziridine 18
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Zhe 17, ,
USER: nmrsu -- DATE: Mon May 30 18:58:46 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15087.0
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 128
LB: 2.2
Nuts - $ZZ-fenchone-NH-oxaziridine_4

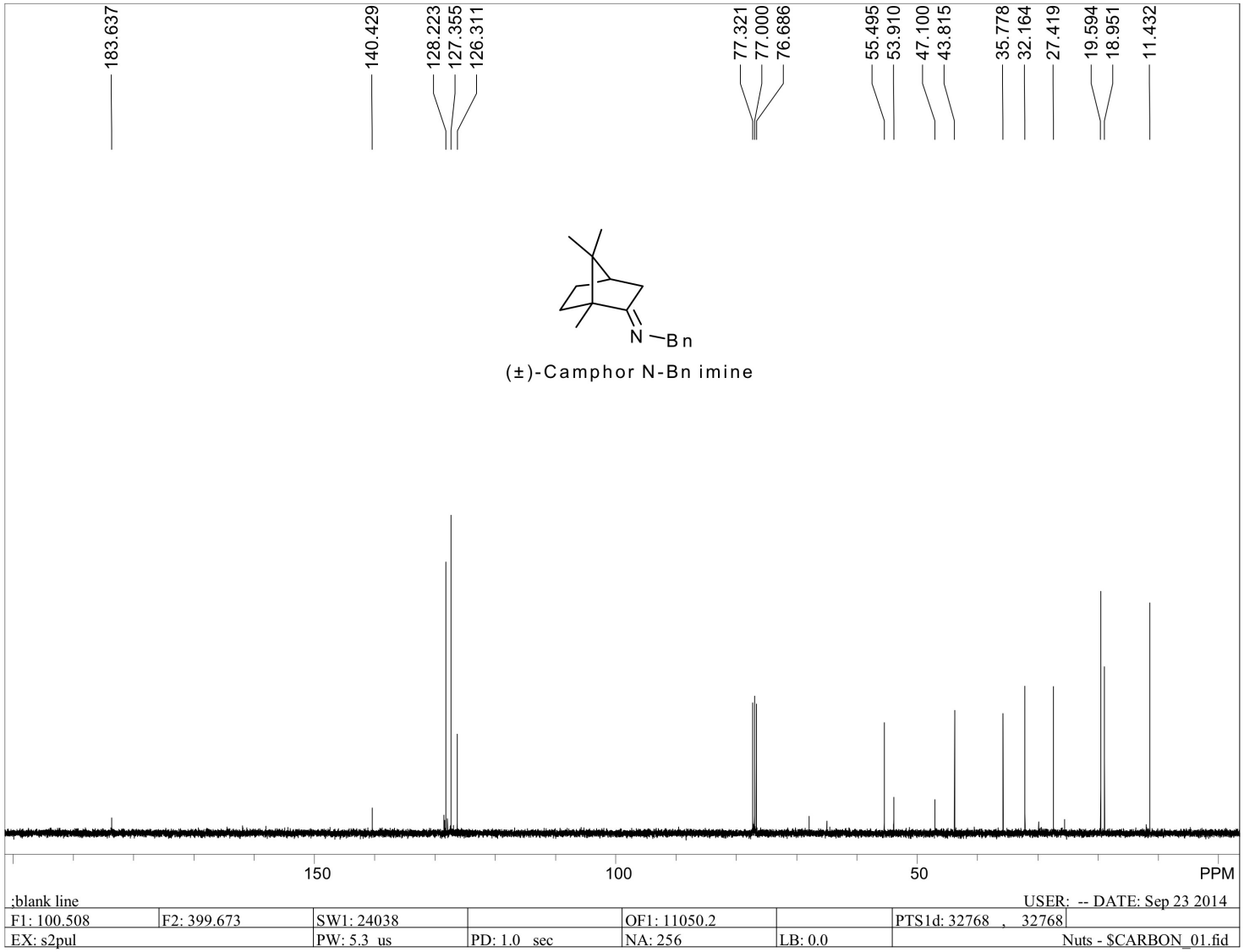

7.260
2.321
2.279
1.929
1.919
1.907
1.830
1.819
3.004
1.806
1.788
1.781
1.763
1.659
1.648
1.628
1.617
1.598
1.587
1.342
1.331
1.318
1.309
1.299
1.286
1.275
1.189
1.179
1.166
1.158
1.148
1.135
1.125
0.932
0.881
0.699
N—Me
(±)-Camphor N-Me imine
3.00
2.14
1.06
0.99
1.16
1.43
1.13
3.13
3.16
3.13
8
6
4
2
0
PPM
;blank line
USER: -- DATE: Aug 26 2014
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2397.8
PTS1d: 16384 , 16384
EX: s2pul
PW: 7.3 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

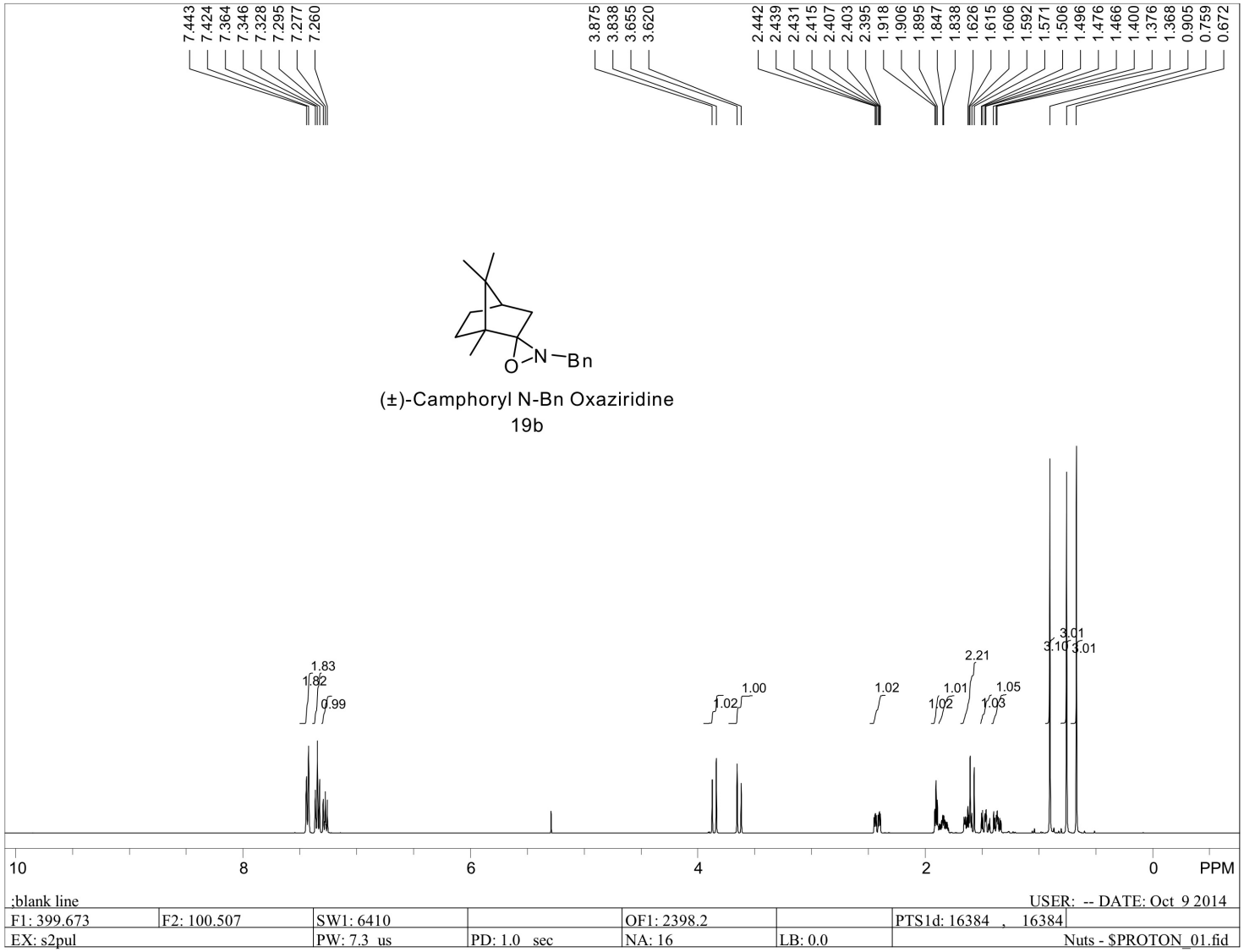

184.702
77.321
77.000
76.679
53.713
47.231
43.661
38.851
35.237
31.887
27.295
19.440
18.835
11.170
N–Me
(±)-Camphor N-Me imine
150
100
50
PPM
;blank line
USER: -- DATE: Aug 26 2014
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11048.7
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 0.0
Nuts - $CARBON_01.fid

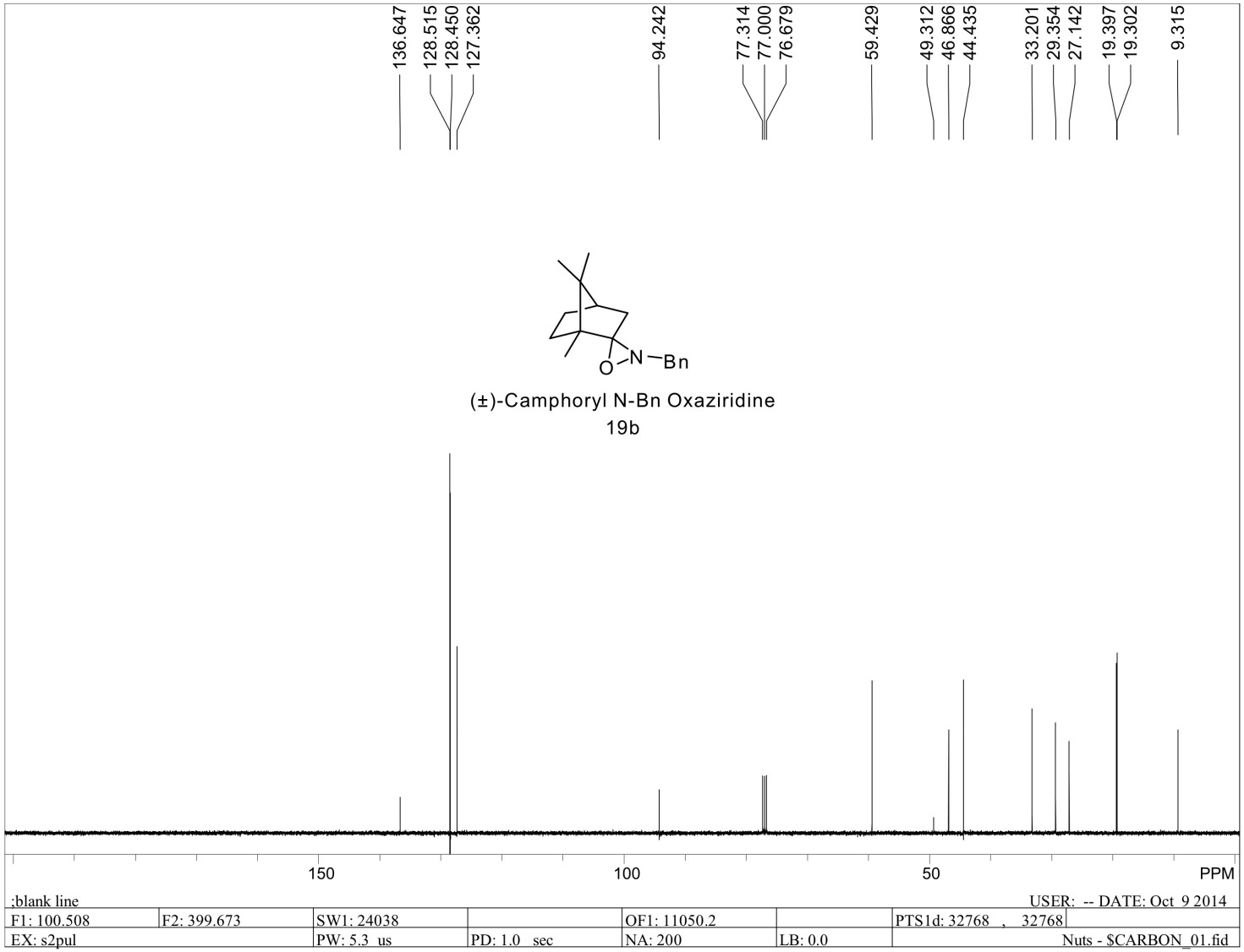

7.260
2.266
2.257
2.247
2.230
2.221
2.210
1.882
1.872
2.579
1.860
1.844
1.812
1.799
1.565
1.554
1.543
1.531
1.465
1.435
1.421
1.393
1.385
1.345
1.336
1.315
1.305
1.281
0.887
0.808
0.610
N
Me
O
(±)-Camphoryl N-Me Oxaziridine
19a
2.95
1.00
2.39
2.20
1.54
1.00
3.79
3.80
2.96
8
6
4
2
0
PPM
;blank line
USER: -- DATE: Aug 29 2014
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.2
PTS1d: 16384 , 16384
EX: s2pul
PW: 7.3 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

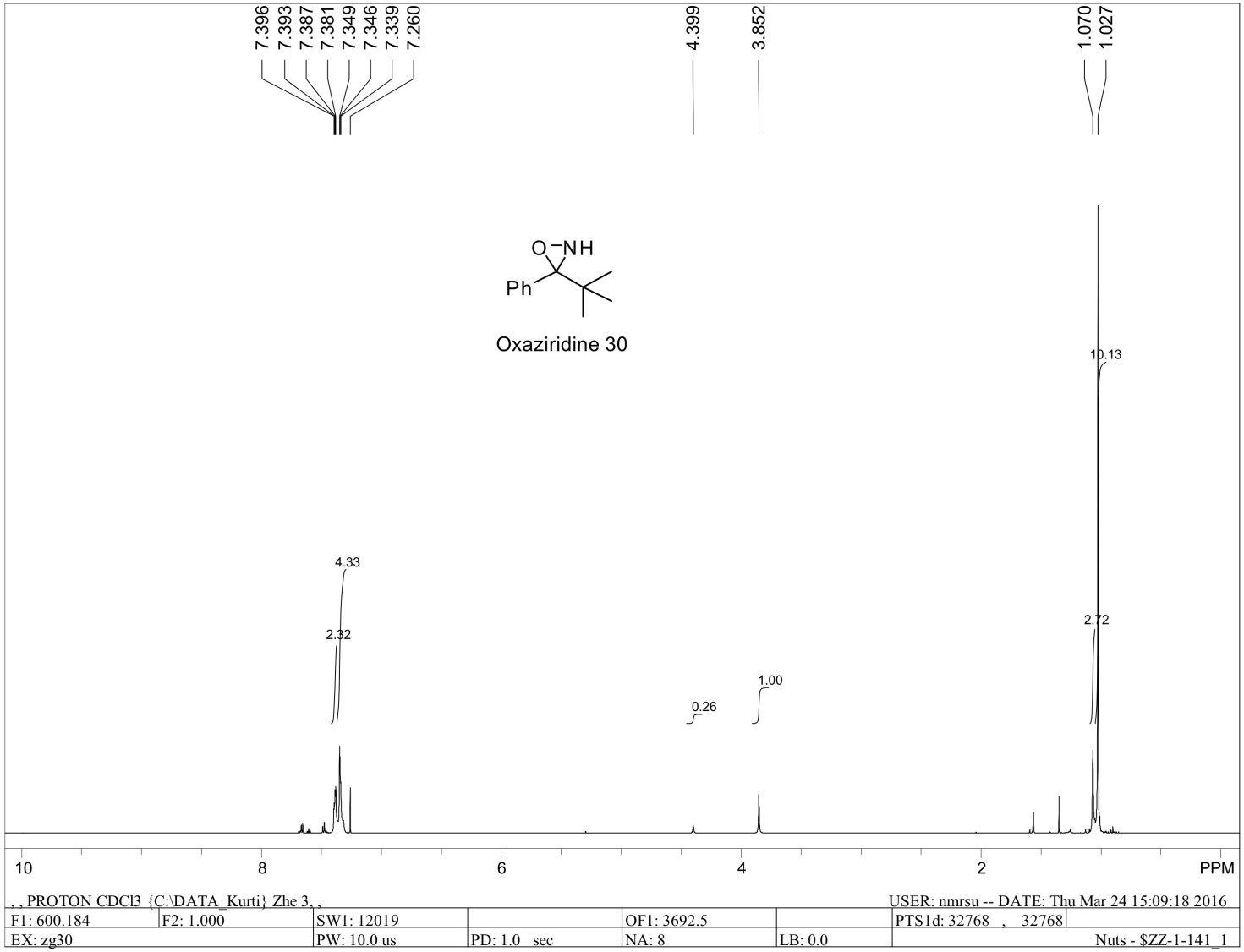

94.082
77.314
77.000
76.679
49.166
46.727
44.282
42.099
32.288
29.266
27.186
19.389
19.280
9.213
N
Me
O
(±)-Camphoryl N-Me
Oxaziridine 19a
150
100
50
PPM
;blank line
USER: -- DATE: Aug 29 2014
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11051.7
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 0.0
Nuts - $CARBON_01.fid

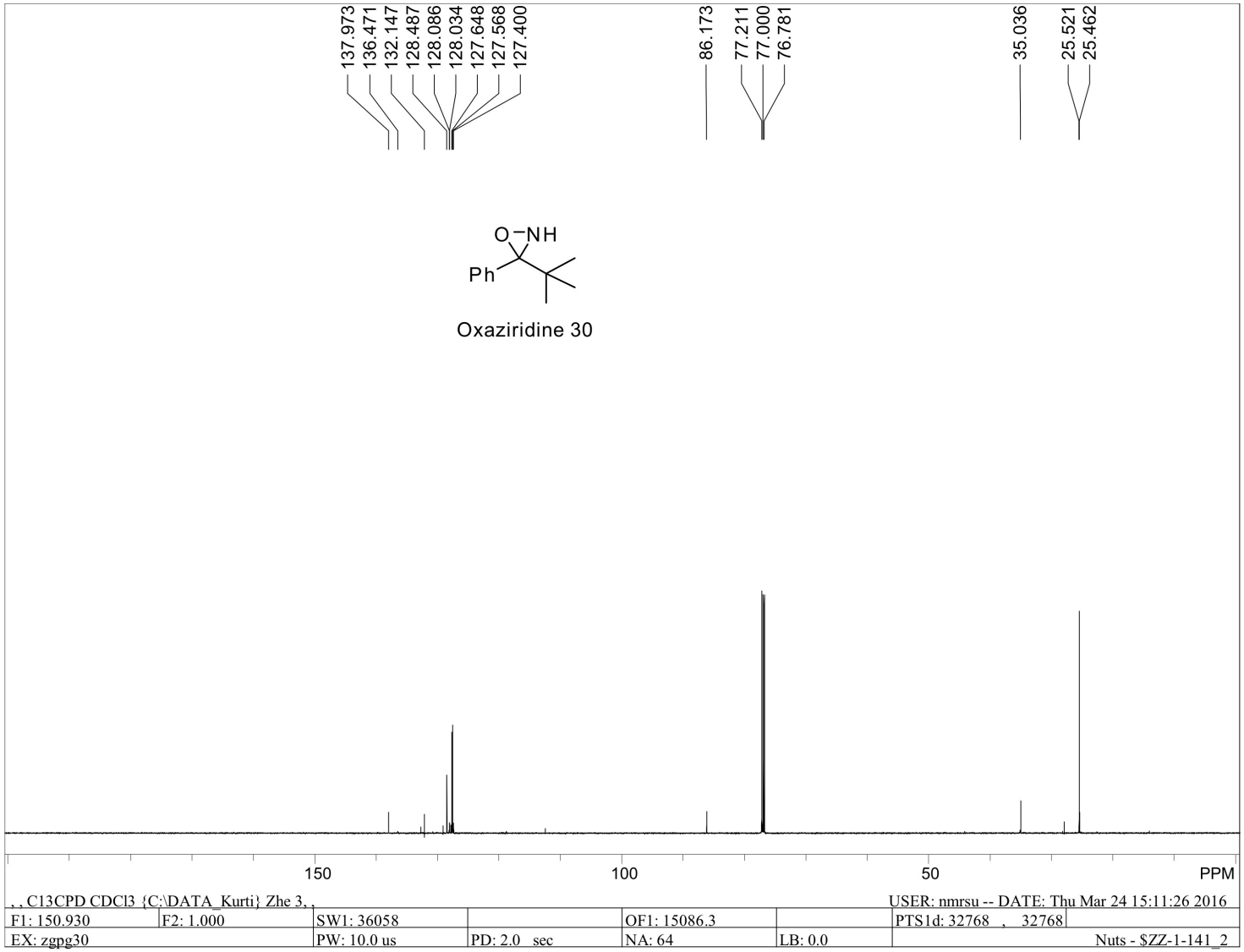

7.310
7.295
7.281
7.260
7.227
7.218
7.212
4.524
4.487
4.460
4.423
2.430
2.388
1.973
1.963
1.951
1.928
1.886
1.871
1.860
1.852
1.716
1.705
1.436
1.425
1.251
1.242
1.221
1.046
0.949
0.776
N
Bn
(±)-Camphor N-Bn imine
4.24
1.00
2.05
1.19
3.49
1.16
1.11
1.61
3.44
3.23
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Sep 23 2014
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.2
PTS1d: 16384 , 16384
EX: s2pul
PW: 7.3 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid


183.637
140.429
128.223
127.355
126.311
77.321
77.000
76.686
55.495
53.910
47.100
43.815
35.778
32.164
27.419
19.594
18.951
11.432
N
Bn
(±)-Camphor N-Bn imine
150
100
50
PPM
;blank line
USER: -- DATE: Sep 23 2014
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11050.2
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 0.0
Nuts - $CARBON_01.fid

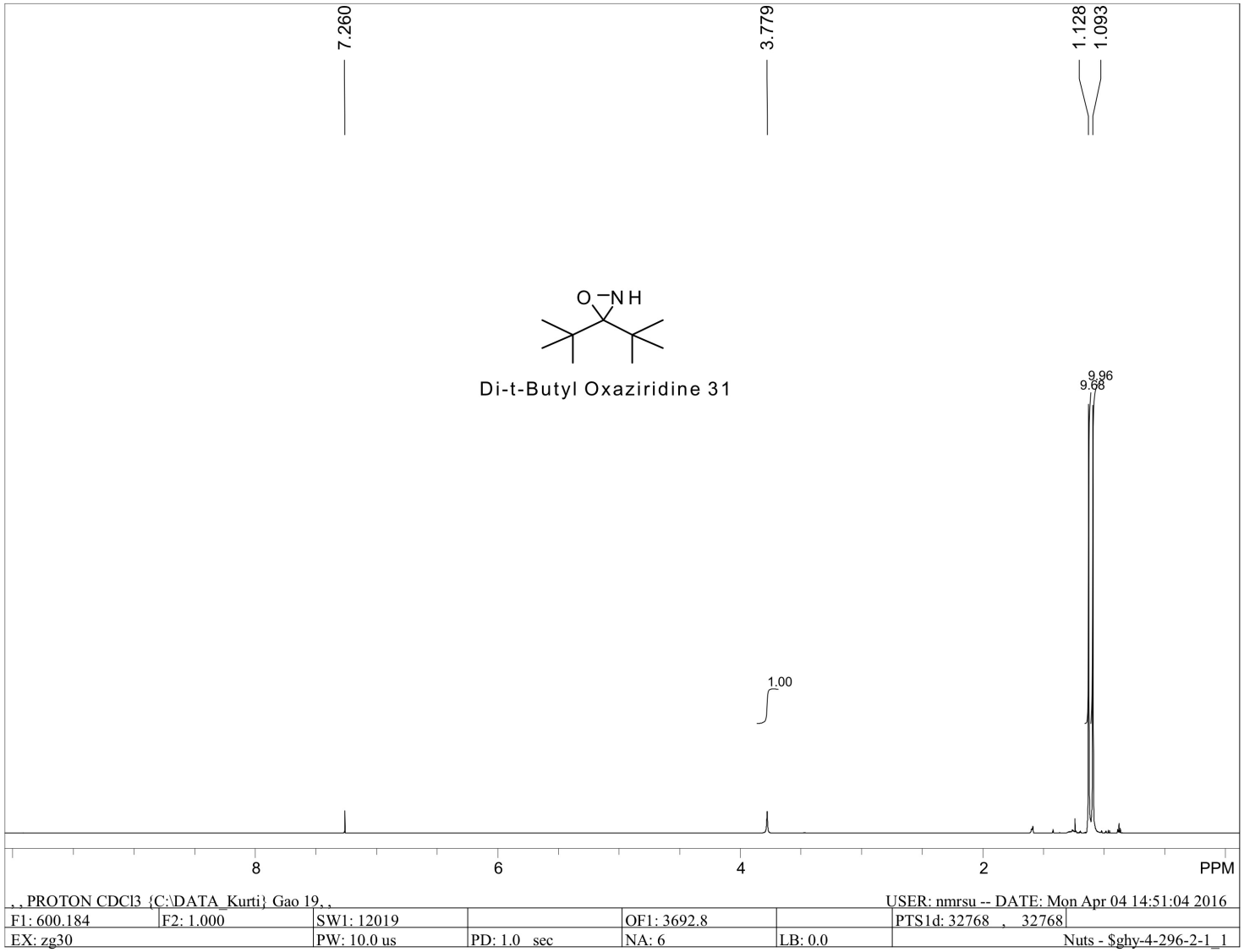

7.443
7.424
7.364
7.346
7.328
7.295
7.277
7.260
3.875
3.838
3.655
3.620
2.442
2.439
2.431
2.415
2.407
2.403
2.395
1.918
1.906
1.895
1.847
1.838
1.626
1.615
1.606
1.592
1.571
1.506
1.496
1.476
1.466
1.400
1.376
1.368
0.905
0.759
0.672
N
Bn
O
(±)-Camphoryl N-Bn Oxaziridine
19b
1.83
1.82
0.99
1.02
1.00
1.02
1.02
1.01
1.02
2.21
1.05
1.03
3.10
3.01
3.01
10
8
6
4
2
0
PPM
;blank line
USER: -- DATE: Oct 9 2014
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.2
PTS1d: 16384 , 16384
EX: s2pul
PW: 7.3 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

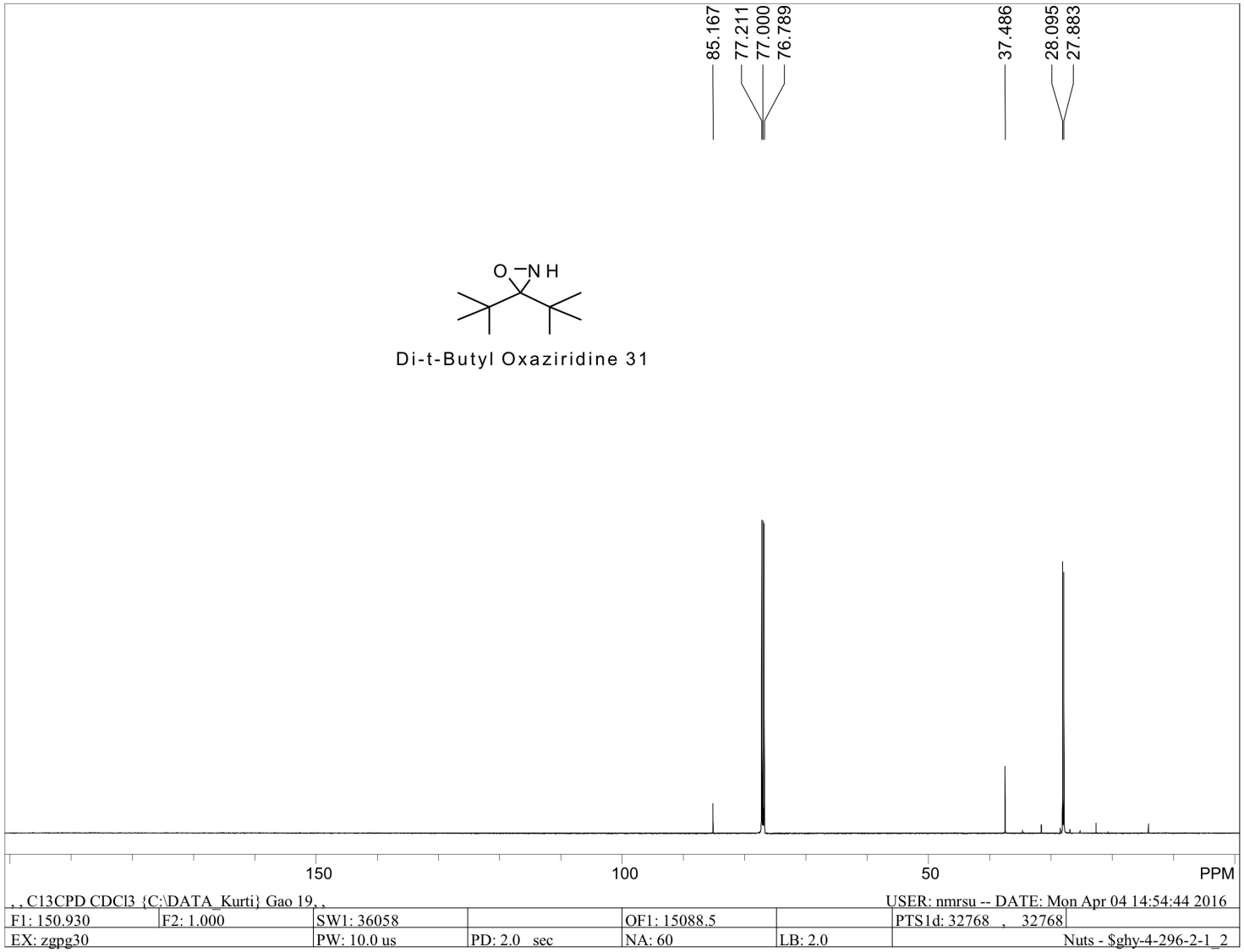

136.647
128.515
128.450
127.362
94.242
77.314
77.000
76.679
59.429
49.312
46.866
44.435
33.201
29.354
27.142
19.397
19.302
9.315
N
Bn
O
(±)-Camphoryl N-Bn Oxaziridine
19b
150
100
50
PPM
;blank line
USER: -- DATE: Oct 9 2014
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11050.2
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 200
LB: 0.0
Nuts - $CARBON_01.fid


7.396
7.393
7.387
7.381
7.349
7.346
7.339
7.260
4.399
3.852
1.070
1.027
O
NH
Ph
Oxaziridine 30
10.13
4.33
2.32
2.72
1.00
0.26
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 3, ,
USER: nmrsu -- DATE: Thu Mar 24 15:09:18 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.5
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ZZ-1-141_1

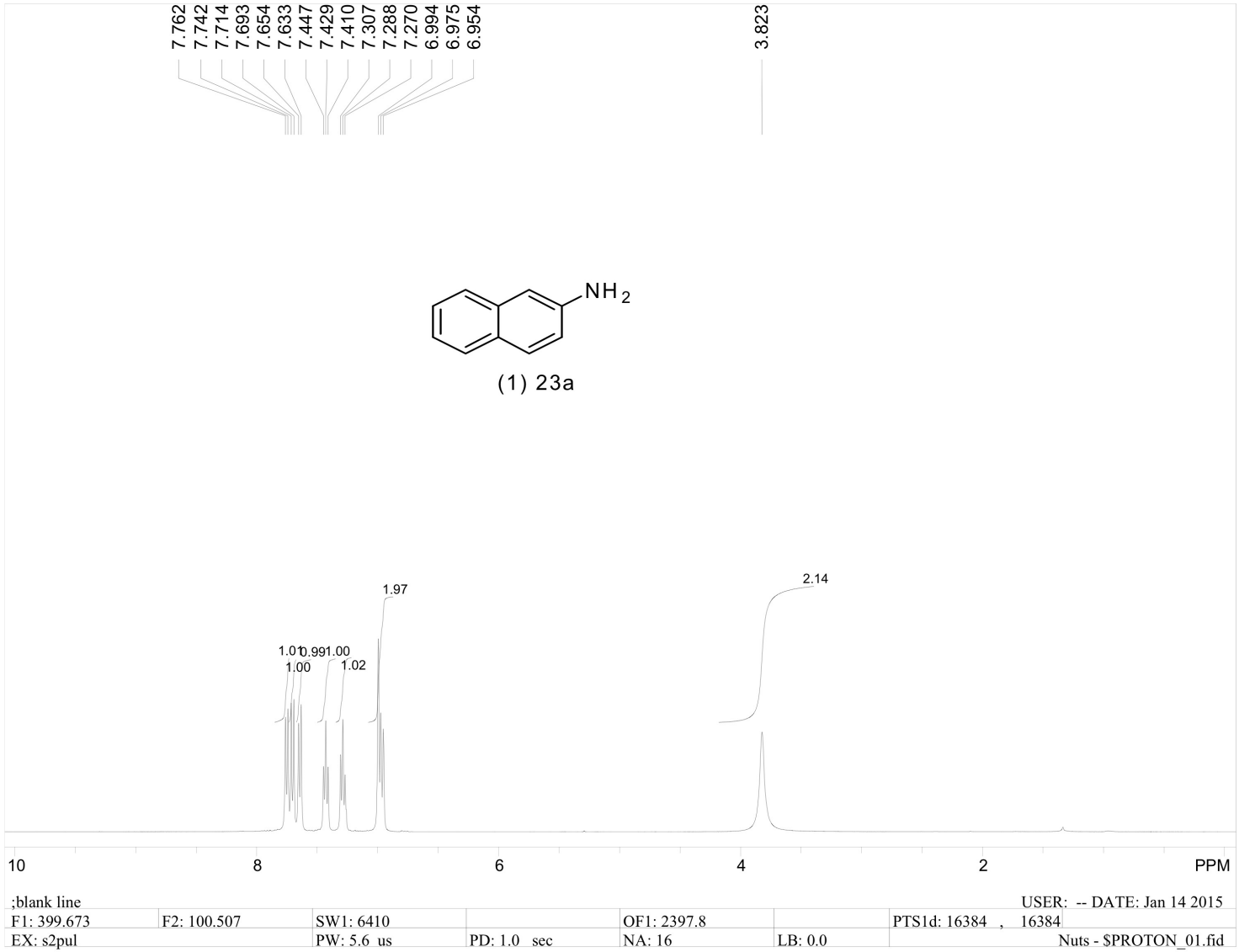


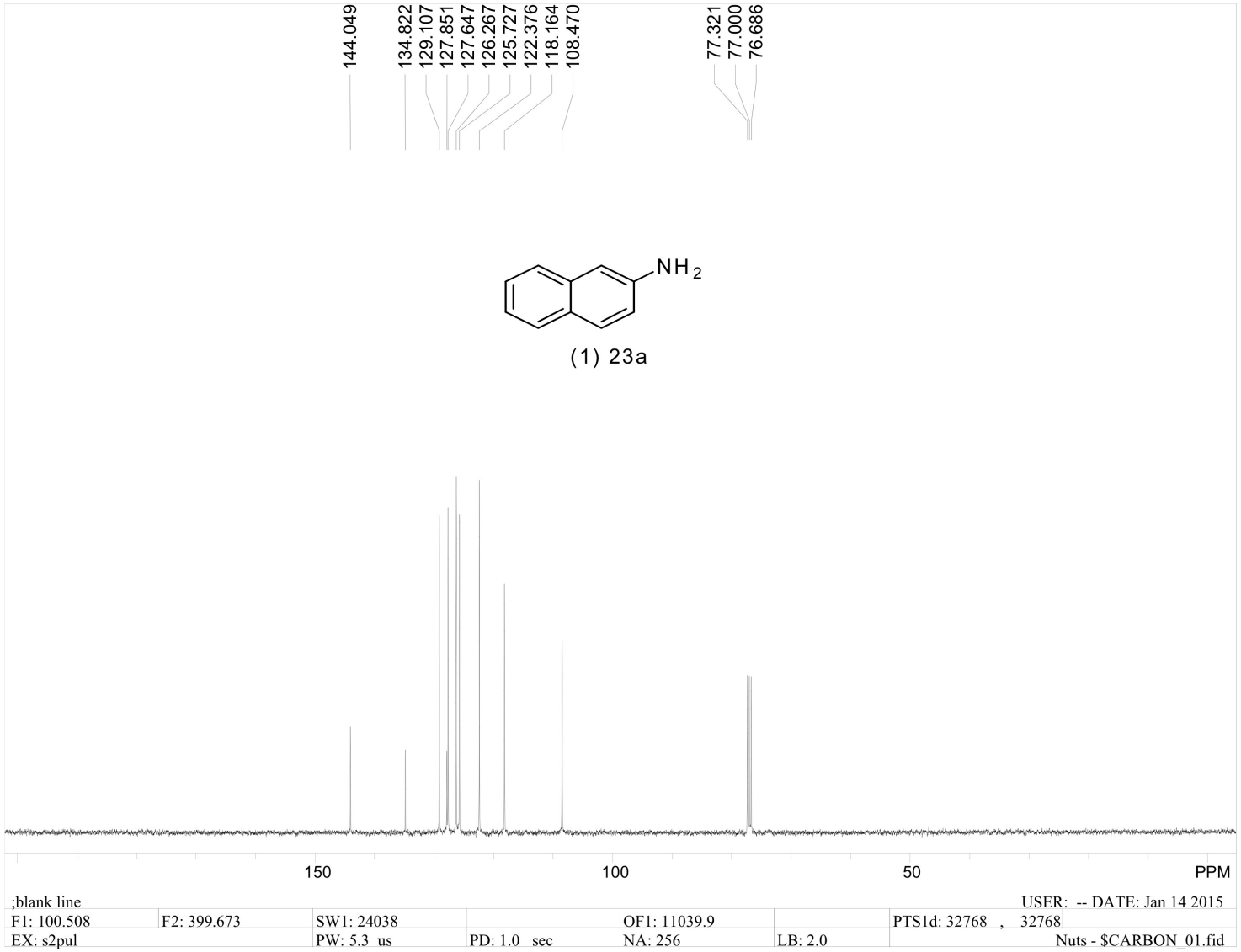
Oxaziridine 30

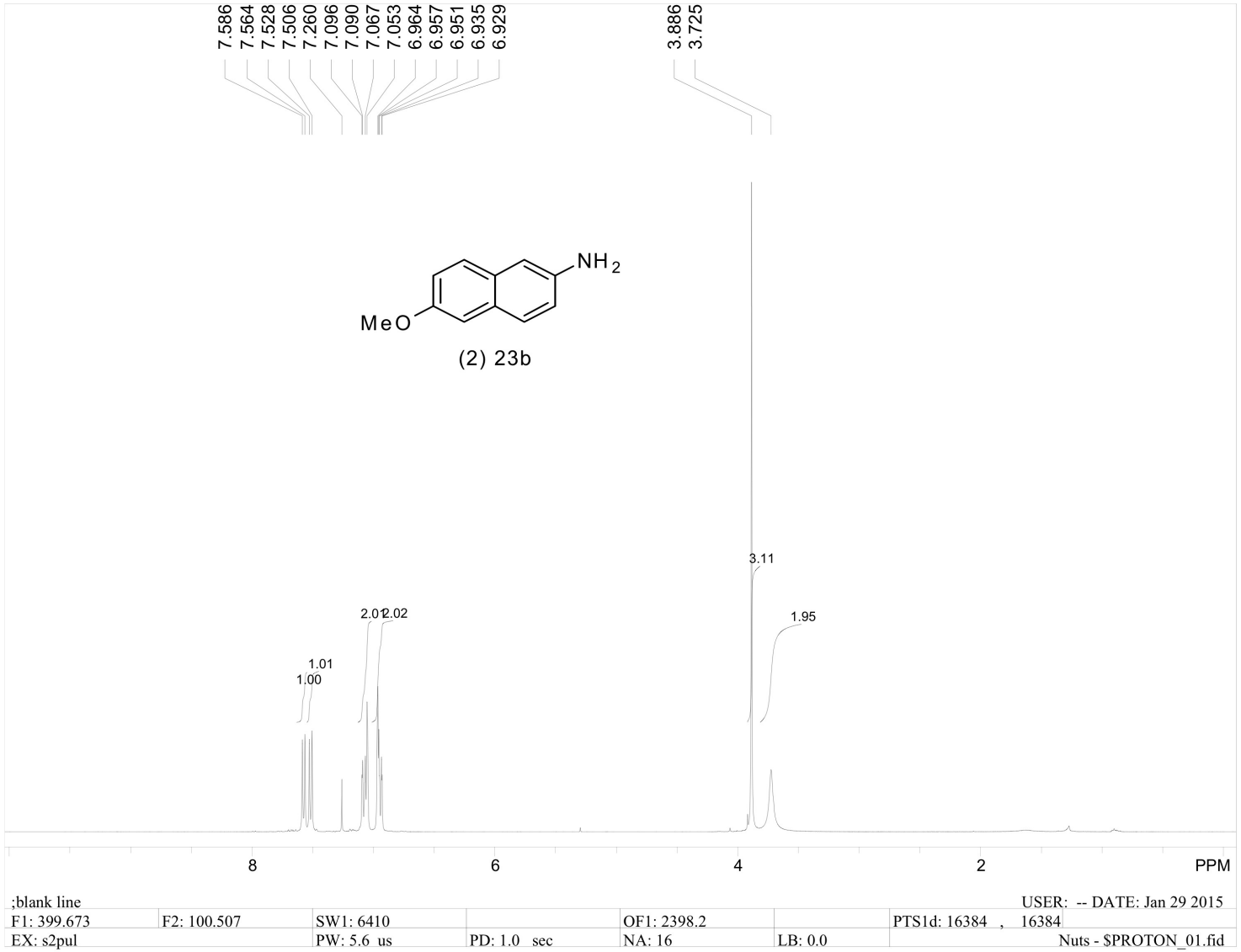

7.260
3.779
1.128
1.093
O
NH
Di-t-Butyl Oxaziridine 31
9.96
9.68
1.00
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 19, ,
USER: nmrsu -- DATE: Mon Apr 04 14:51:04 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 6
LB: 0.0
Nuts - $ghy-4-296-2-1_1

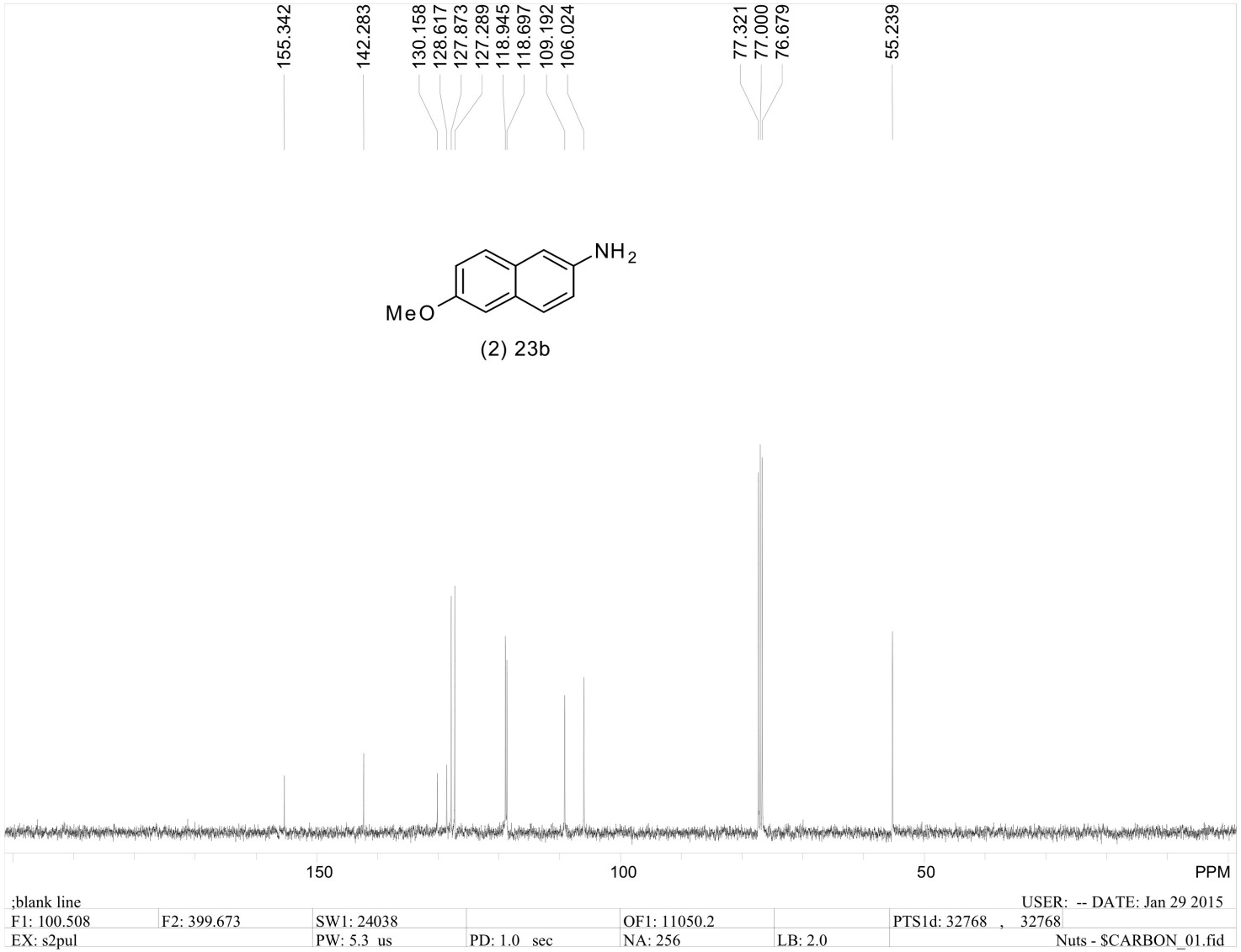

85.167
77.211
77.000
76.789
37.486
28.095
27.883
O
N H
Di-t-Butyl Oxaziridine 31
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 19, ,
USER: nmrsu -- DATE: Mon Apr 04 14:54:44 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15088.5
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 60
LB: 2.0
Nuts - $ghy-4-296-2-1_2

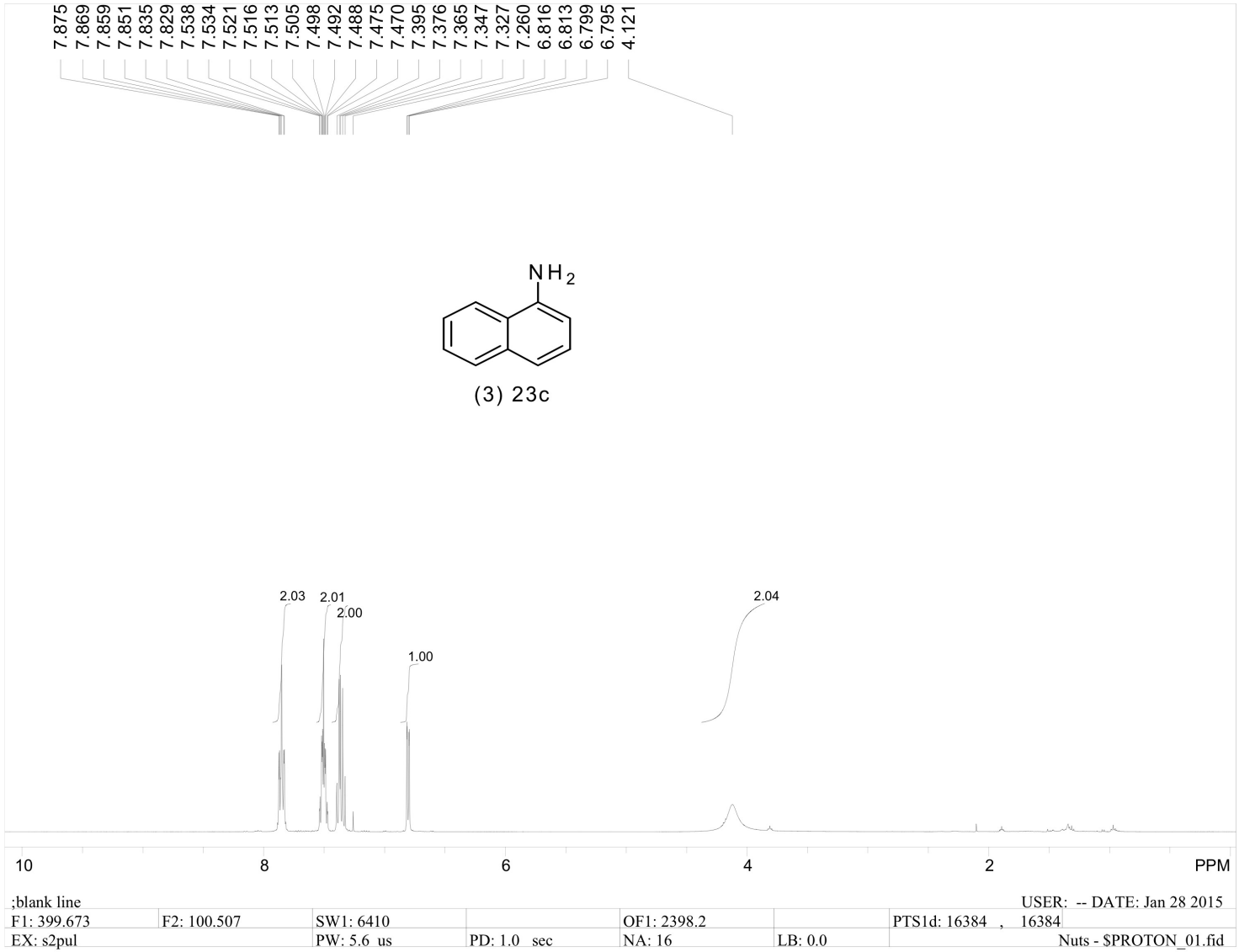
NMR Spectra of Arylamines

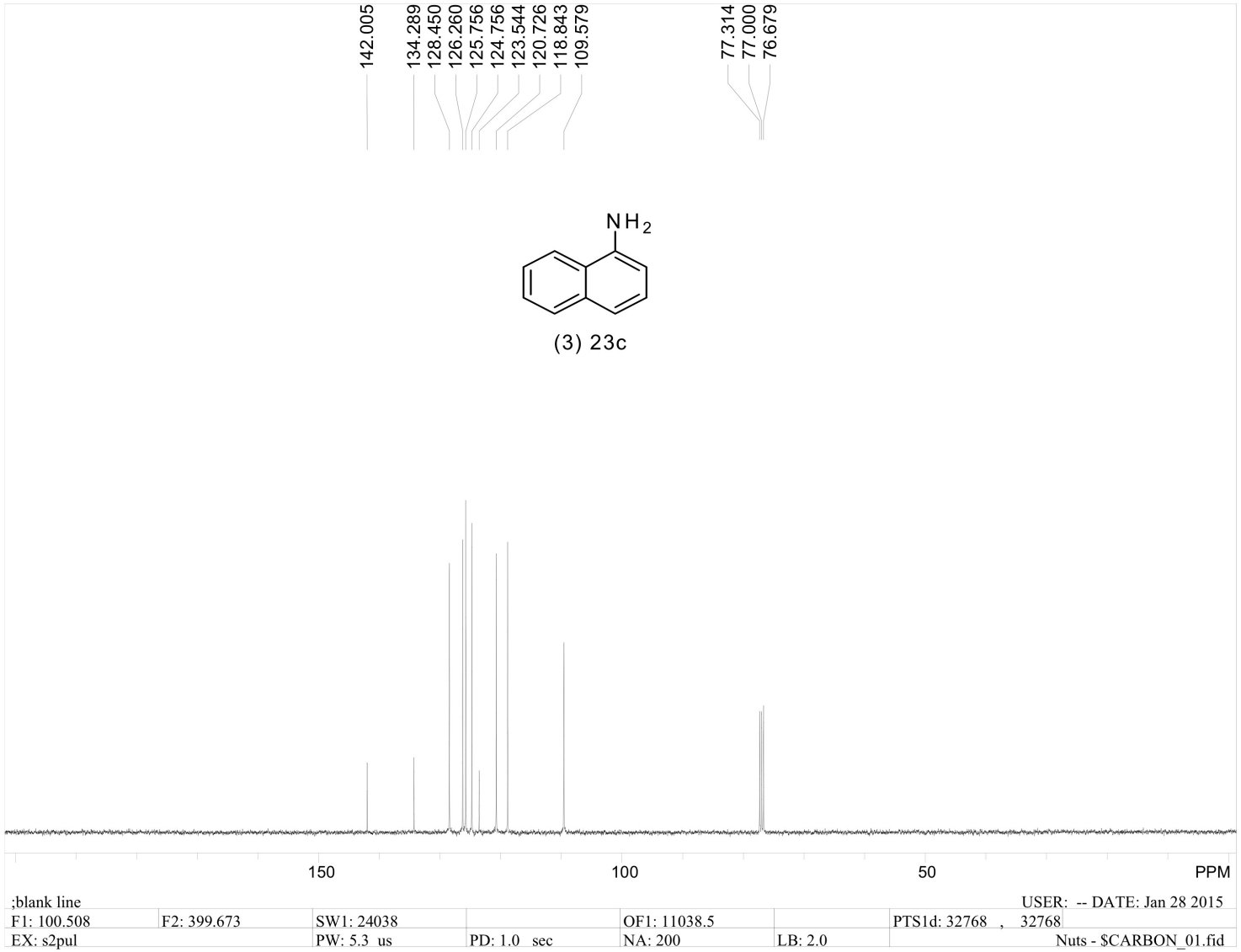

7.762
7.742
7.714
7.693
7.654
7.633
7.447
7.429
7.410
7.307
7.288
7.270
6.994
6.975
6.954
3.823
NH2
(1) 23a
1.97
2.14
1.01
1.00
0.99
1.00
1.02
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Jan 14 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2397.8
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.6 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

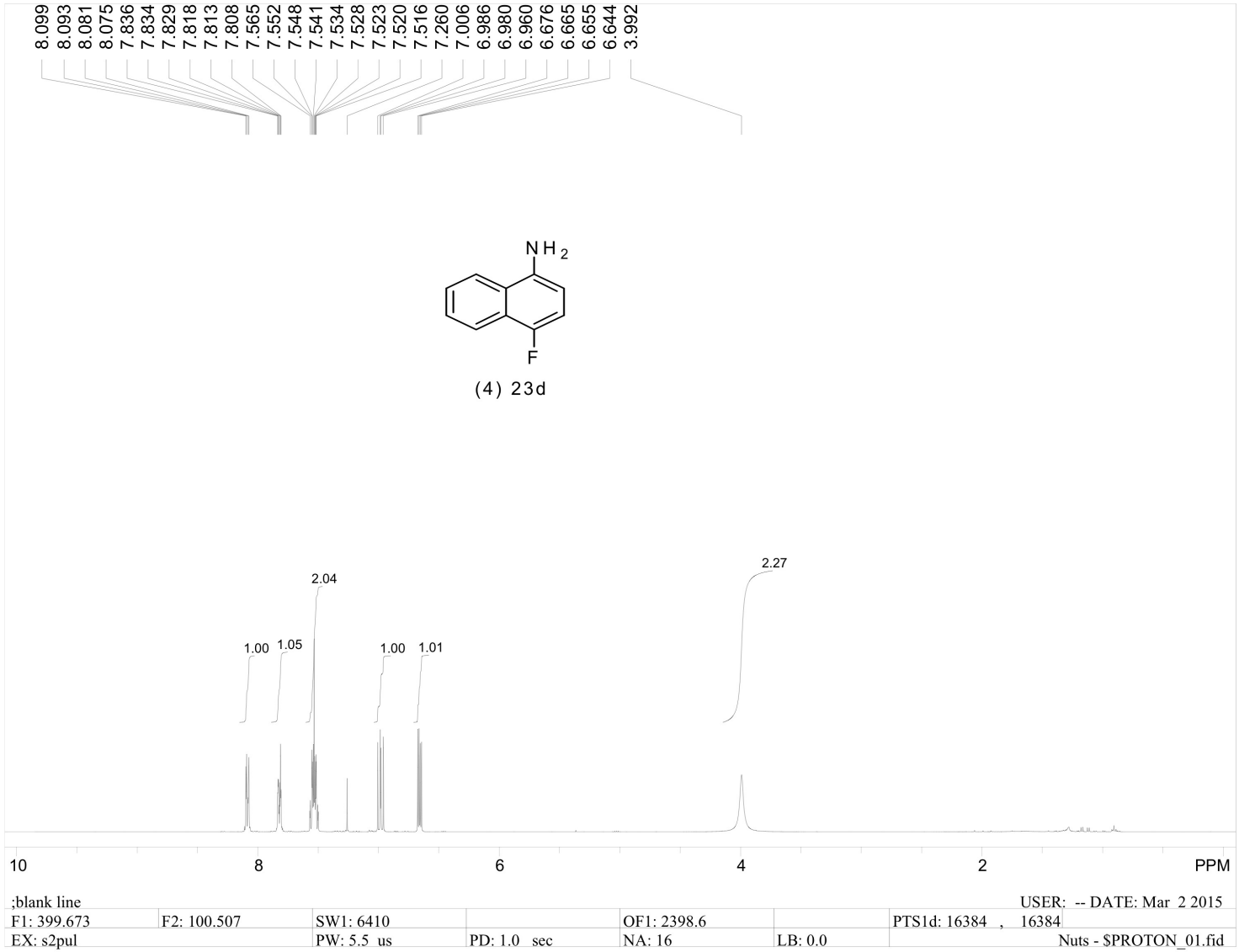

144.049
134.822
129.107
127.851
127.647
126.267
125.727
122.376
118.164
108.470
77.321
77.000
76.686
NH2
(1) 23a
150
100
50
PPM
;blank line
USER: -- DATE: Jan 14 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11039.9
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 2.0
Nuts - $CARBON_01.fid

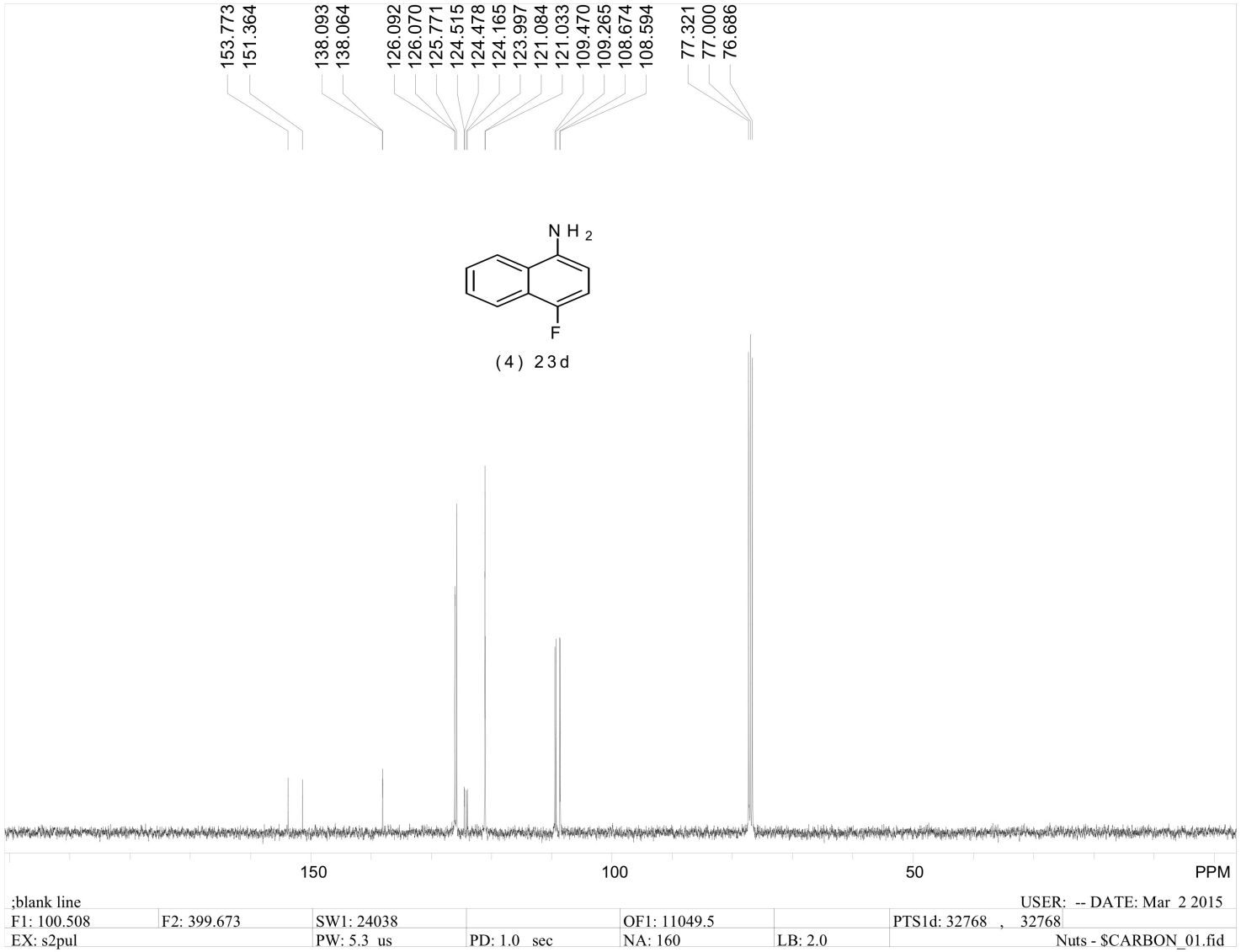

7.586
7.564
7.528
7.506
7.260
7.096
7.090
7.067
7.053
6.964
6.957
6.951
6.935
6.929
3.886
3.725
NH2
MeO
(2) 23b
3.11
2.01
2.02
1.95
1.01
1.00
8
6
4
2
PPM
;blank line
USER: -- DATE: Jan 29 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.2
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.6 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

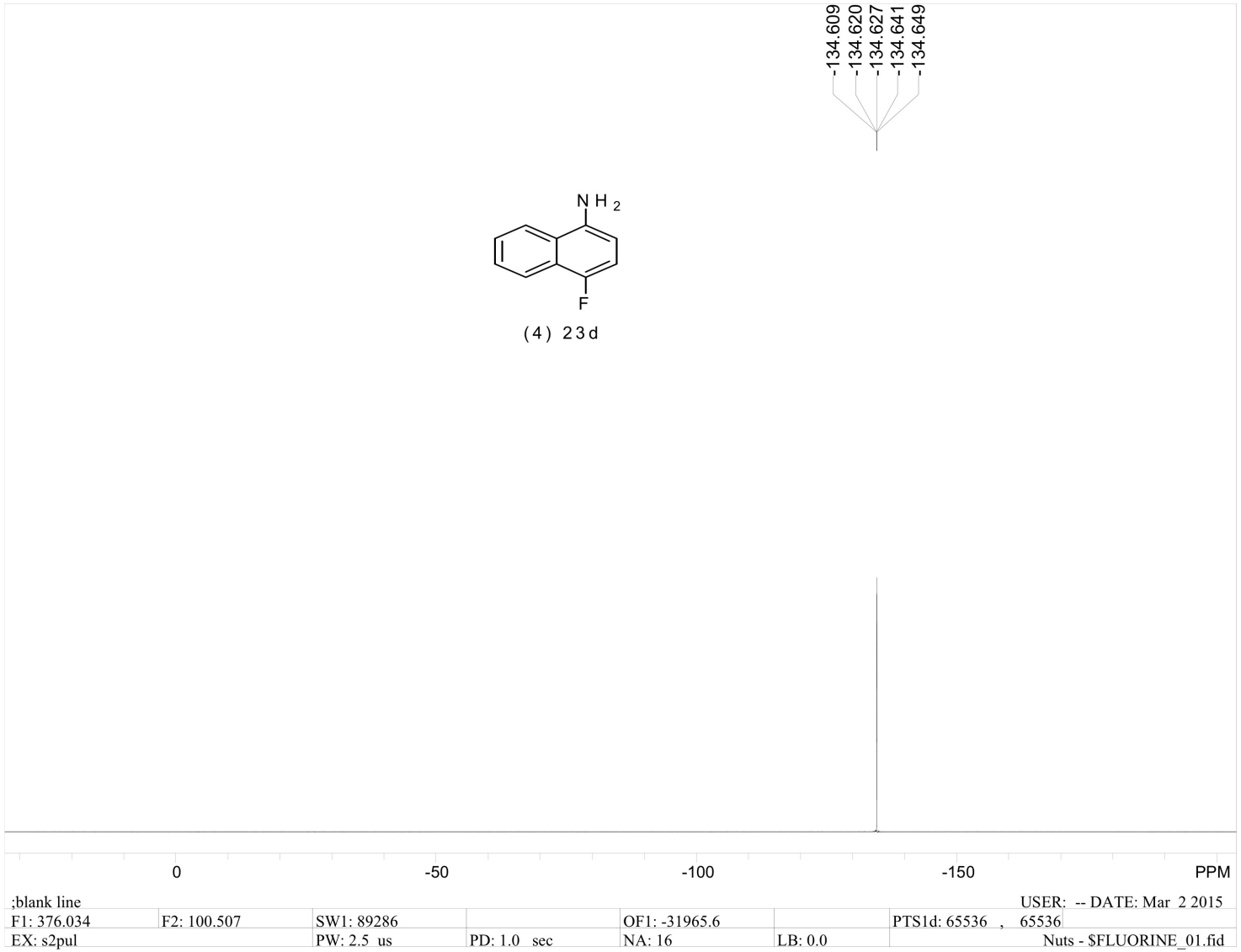

155.342
142.283
130.158
128.617
127.873
127.289
118.945
118.697
109.192
106.024
77.321
77.000
76.679
55.239
NH2
MeO
(2) 23b
150
100
50
PPM
;blank line
USER: -- DATE: Jan 29 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11050.2
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 2.0
Nuts - $CARBON_01.fid

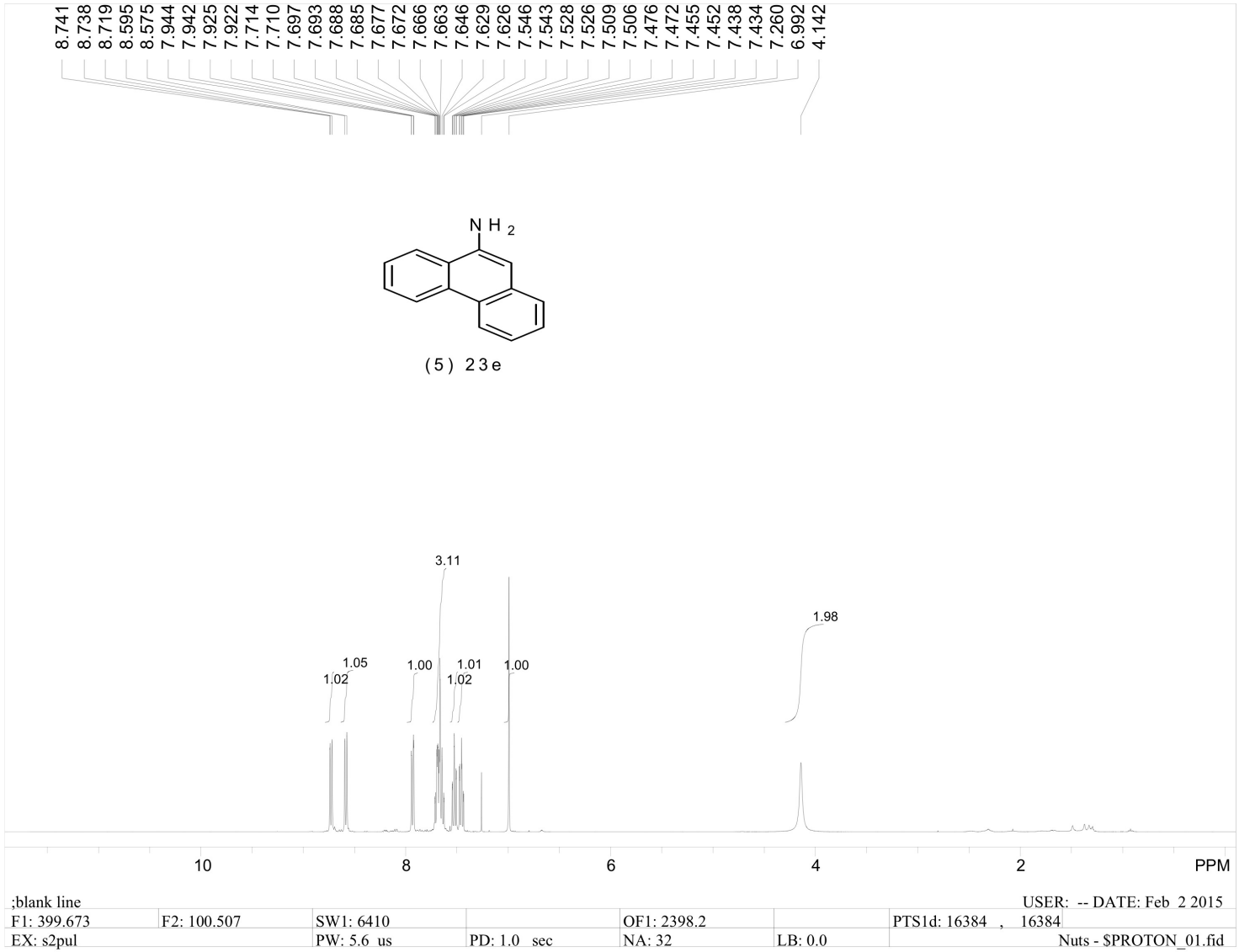

7.875
7.869
7.859
7.851
7.835
7.829
7.538
7.534
7.521
7.516
7.513
7.505
7.498
7.492
7.488
7.475
7.470
7.395
7.376
7.365
7.347
7.327
7.260
6.816
6.813
6.799
6.795
4.121
NH2
(3) 23c
2.03
2.01
2.00
1.00
2.04
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Jan 28 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.2
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.6 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

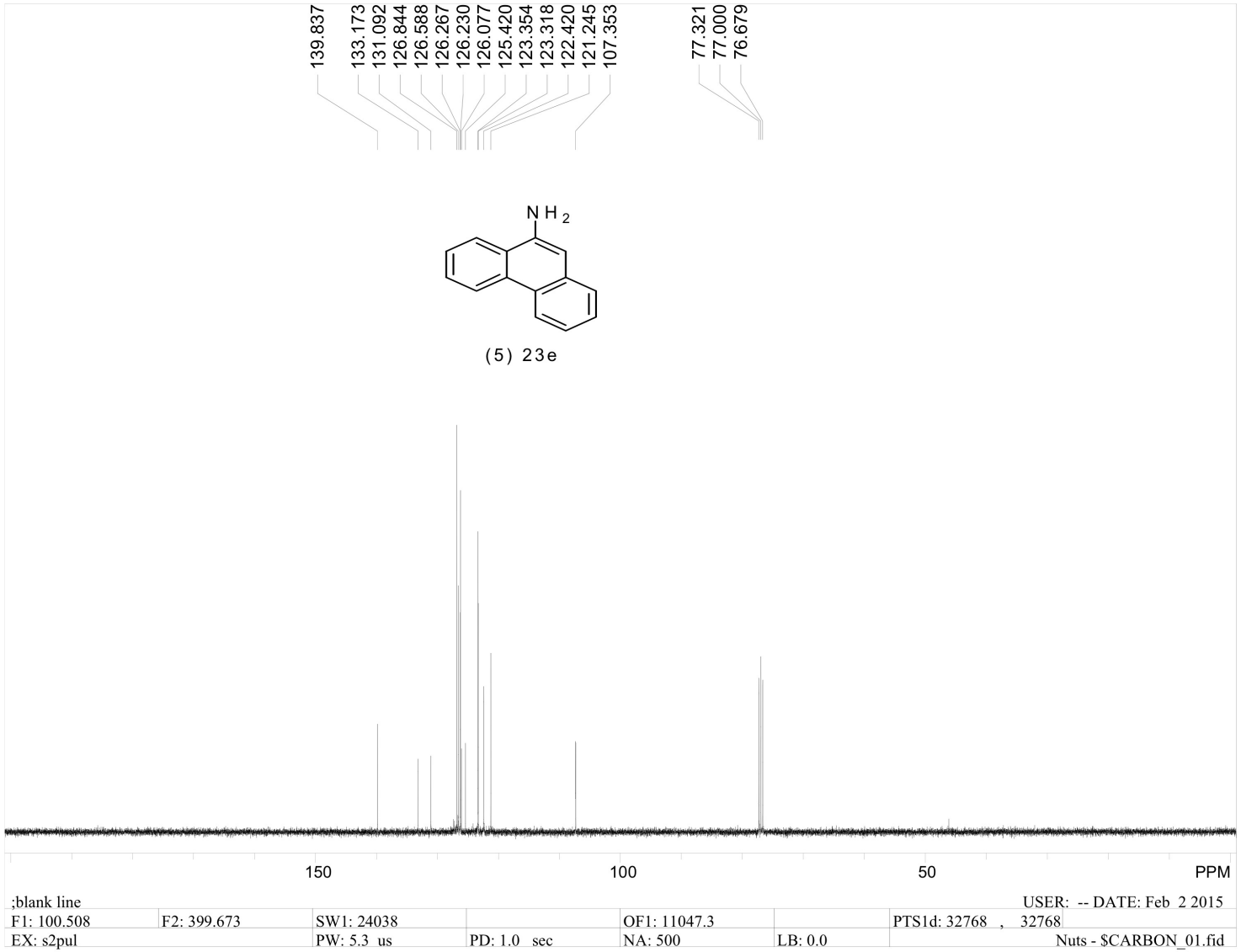

142.005
134.289
128.450
126.260
125.756
124.756
123.544
120.726
118.843
109.579
77.314
77.000
76.679
NH2
(3) 23c
150
100
50
PPM
;blank line
USER: -- DATE: Jan 28 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11038.5
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 200
LB: 2.0
Nuts - $CARBON_01.fid

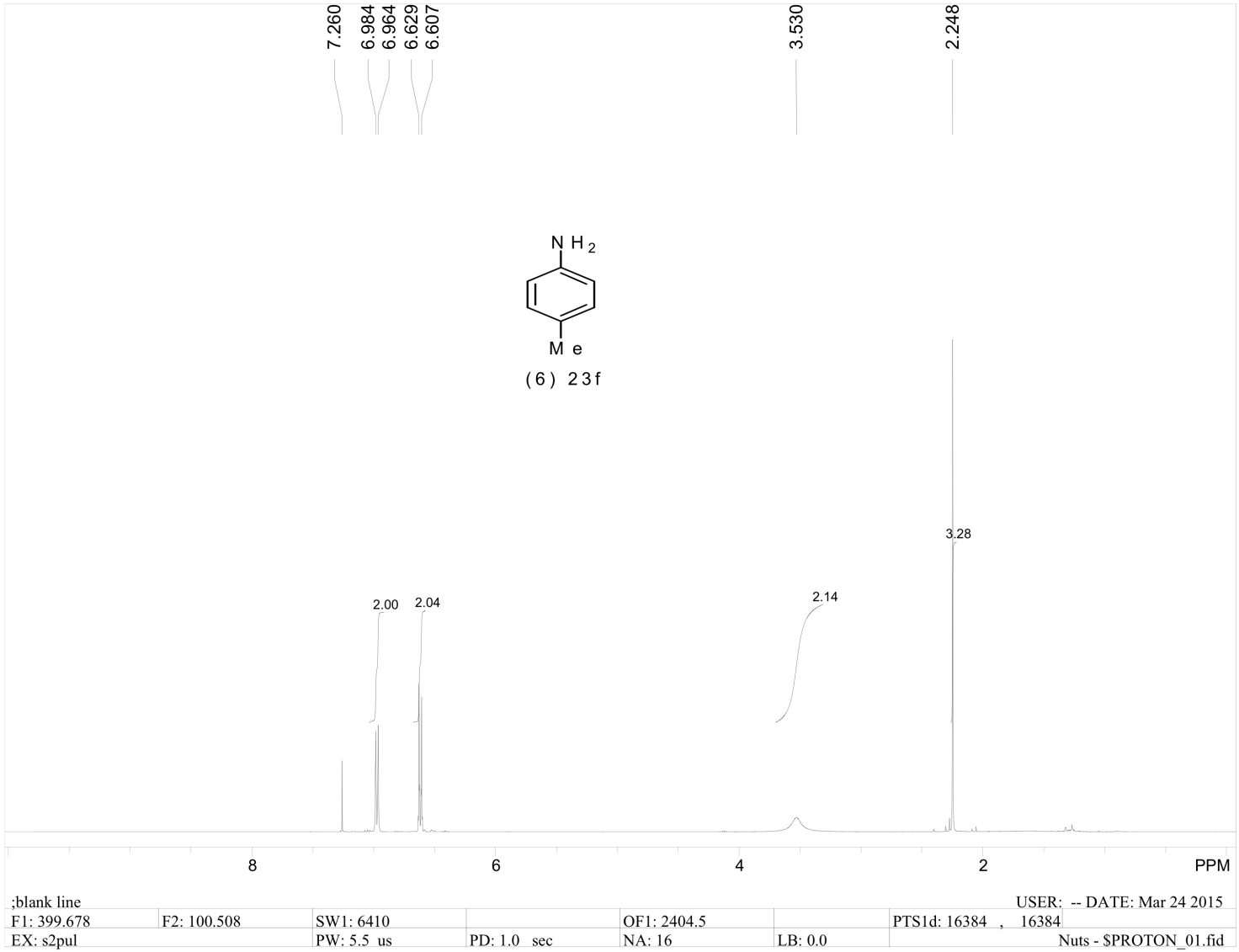

8.099
8.093
8.081
8.075
7.836
7.834
7.829
7.818
7.813
7.808
7.565
7.552
7.548
7.541
7.534
7.528
7.523
7.520
7.516
7.260
7.006
6.986
6.980
6.960
6.676
6.665
6.655
6.644
3.992
NH2
F
(4) 23d
2.27
2.04
1.00
1.05
1.00
1.01
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Mar 2 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.6
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

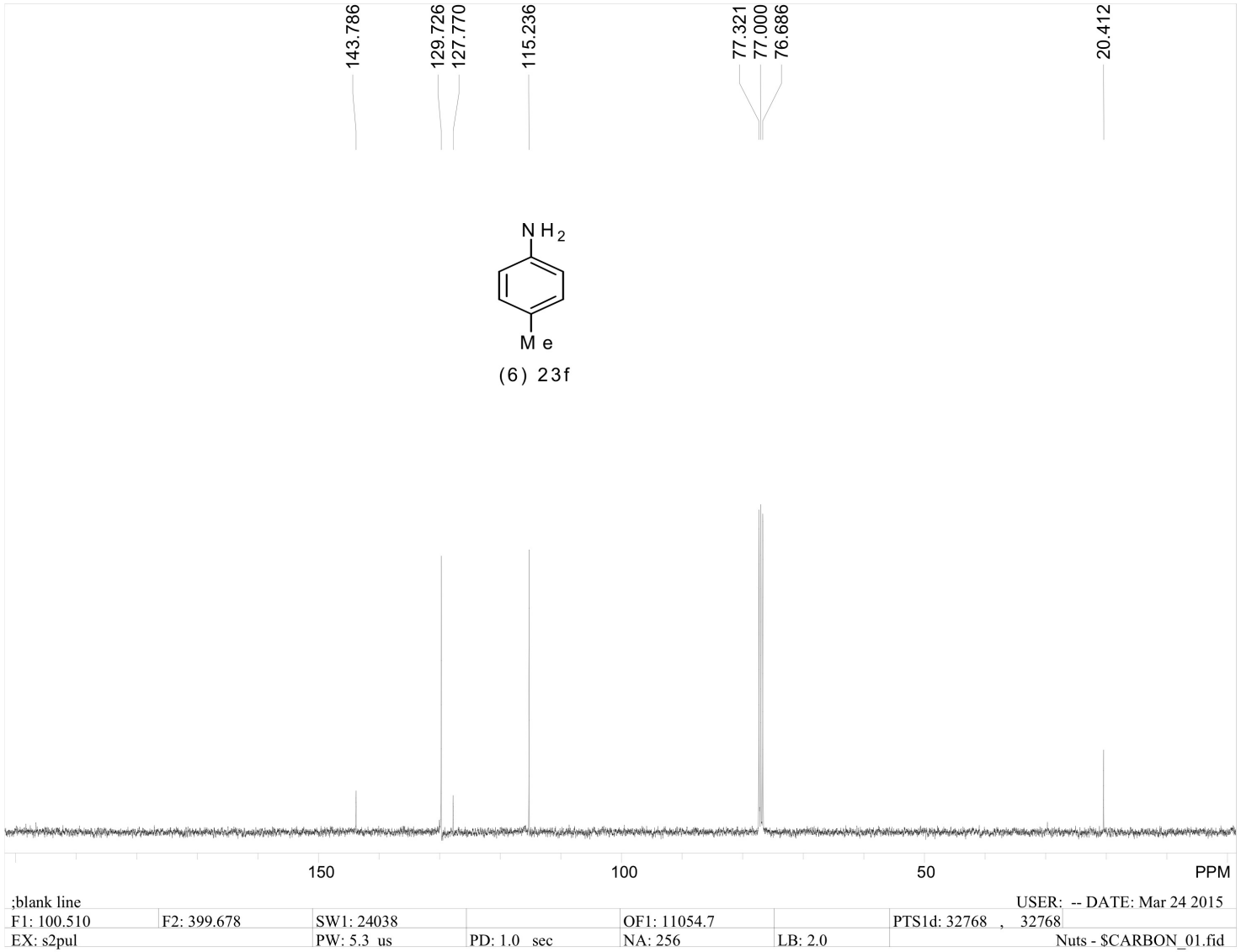

153.773
151.364
138.093
138.064
126.092
126.070
125.771
124.515
124.478
124.165
123.997
121.084
121.033
109.470
109.265
108.674
108.594
77.321
77.000
76.686
NH2
F
(4) 23d
150
100
50
PPM
;blank line
USER: -- DATE: Mar 2 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11049.5
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 160
LB: 2.0
Nuts - $CARBON_01.fid

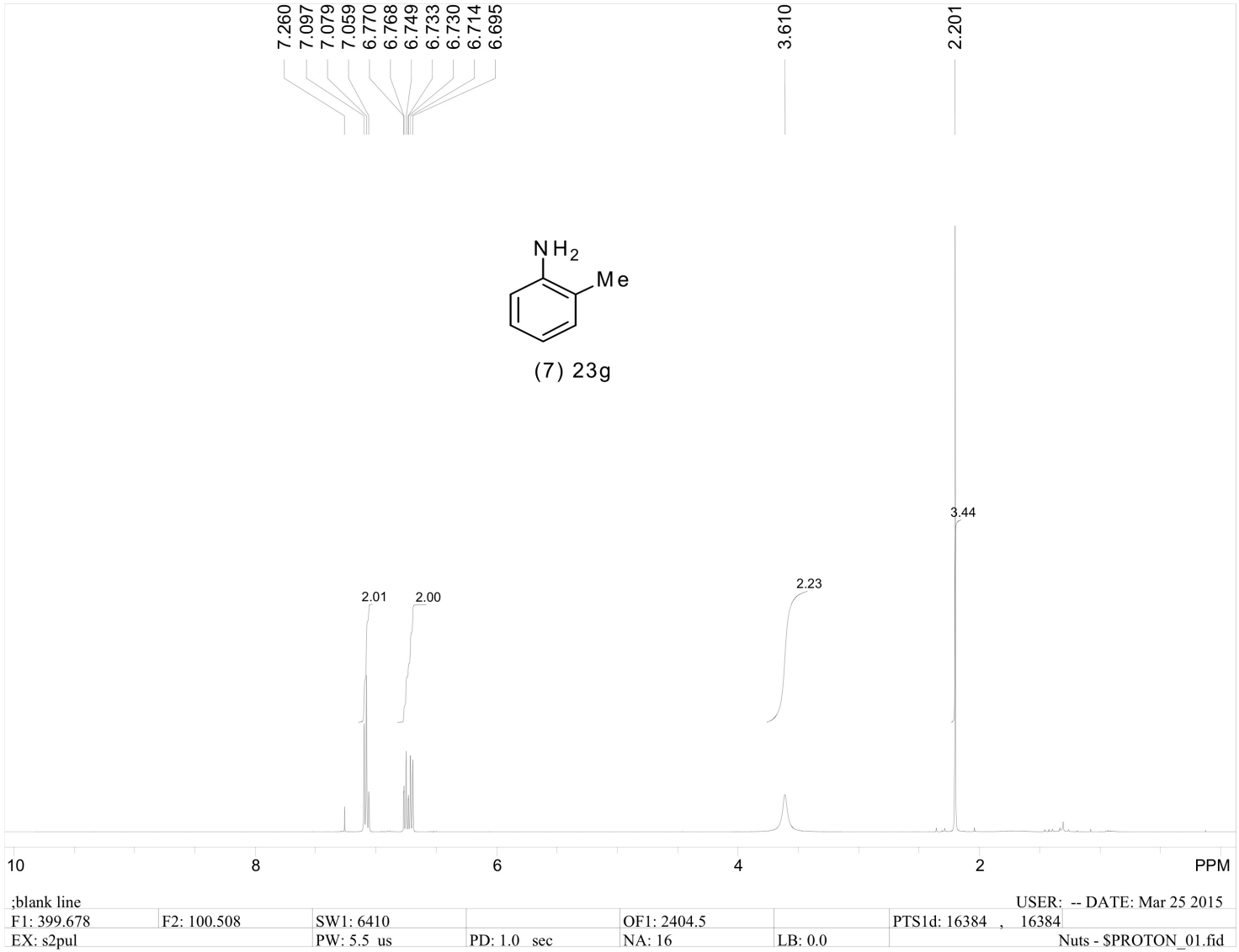

-134.609
-134.620
-134.627
-134.641
-134.649
NH2
F
(4) 23d
0
-50
-100
-150
PPM
;blank line
USER: -- DATE: Mar 2 2015
F1: 376.034
F2: 100.507
SW1: 89286
OF1: -31965.6
PTS1d: 65536 , 65536
EX: s2pul
PW: 2.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $FLUORINE_01.fid

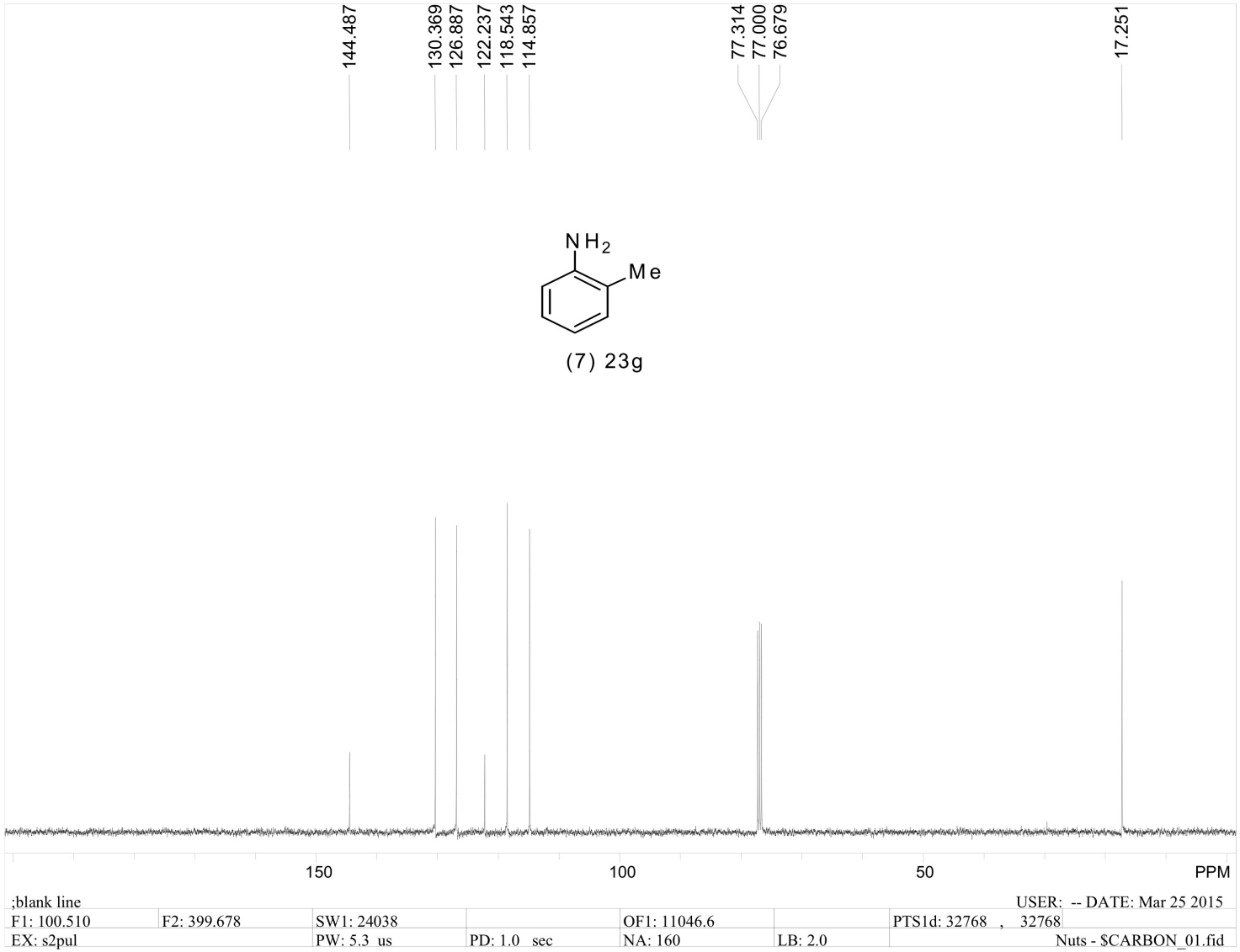

8.741
8.738
8.719
8.595
8.575
7.944
7.942
7.925
7.922
7.714
7.710
7.697
7.693
7.688
7.685
7.677
7.672
7.666
7.663
7.646
7.629
7.626
7.546
7.543
7.528
7.526
7.509
7.506
7.476
7.472
7.455
7.452
7.438
7.434
7.260
6.992
4.142
NH2
(5) 23e
3.11
1.98
1.05
1.02
1.00
1.01
1.02
1.00
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Feb 2 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.2
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.6 us
PD: 1.0 sec
NA: 32
LB: 0.0
Nuts - $PROTON_01.fid

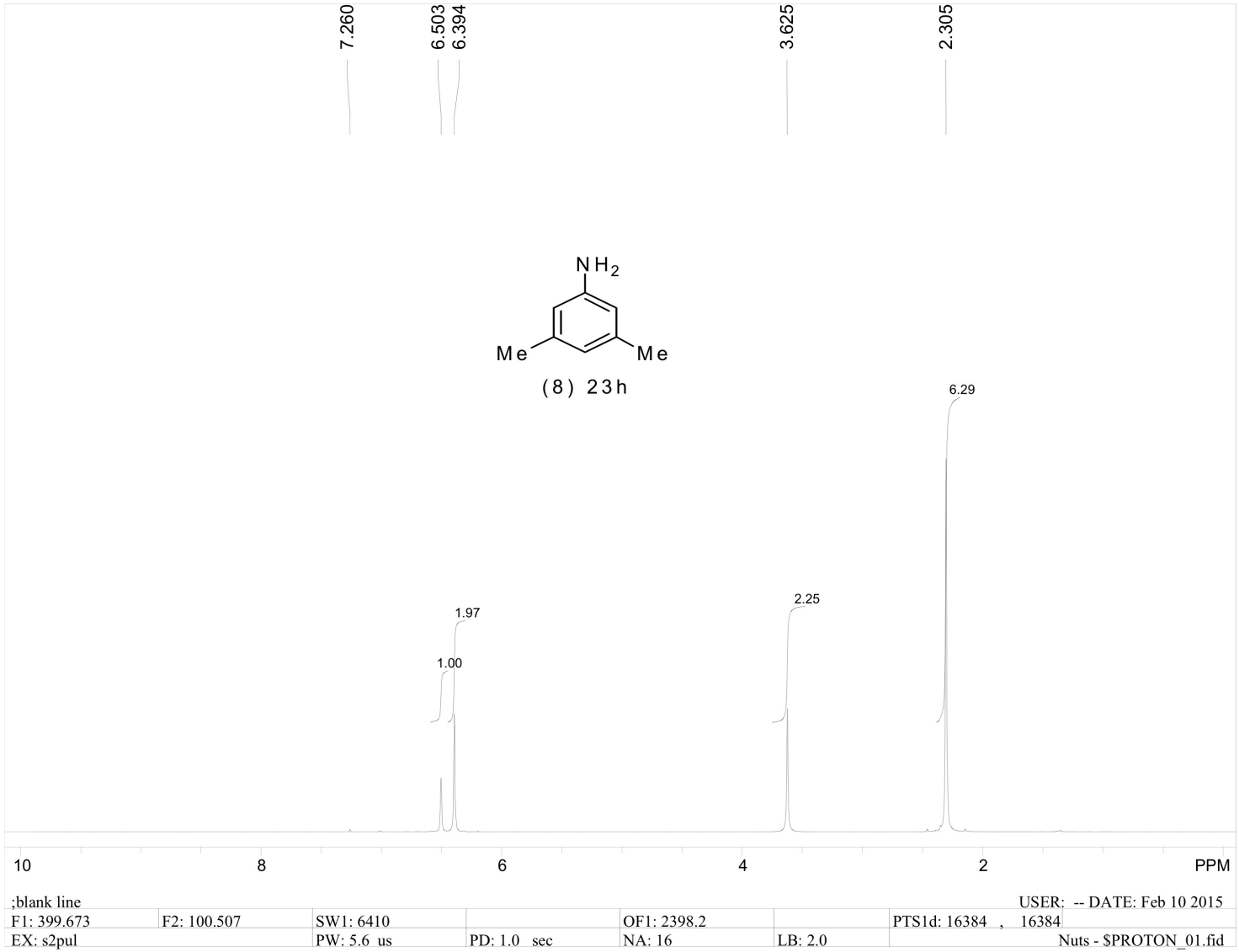

139.837
133.173
131.092
126.844
126.588
126.267
126.230
126.077
125.420
123.354
123.318
122.420
121.245
107.353
77.321
77.000
76.679
NH2
(5) 23e
150
100
50
PPM
;blank line
USER: -- DATE: Feb 2 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11047.3
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 500
LB: 0.0
Nuts - $CARBON_01.fid

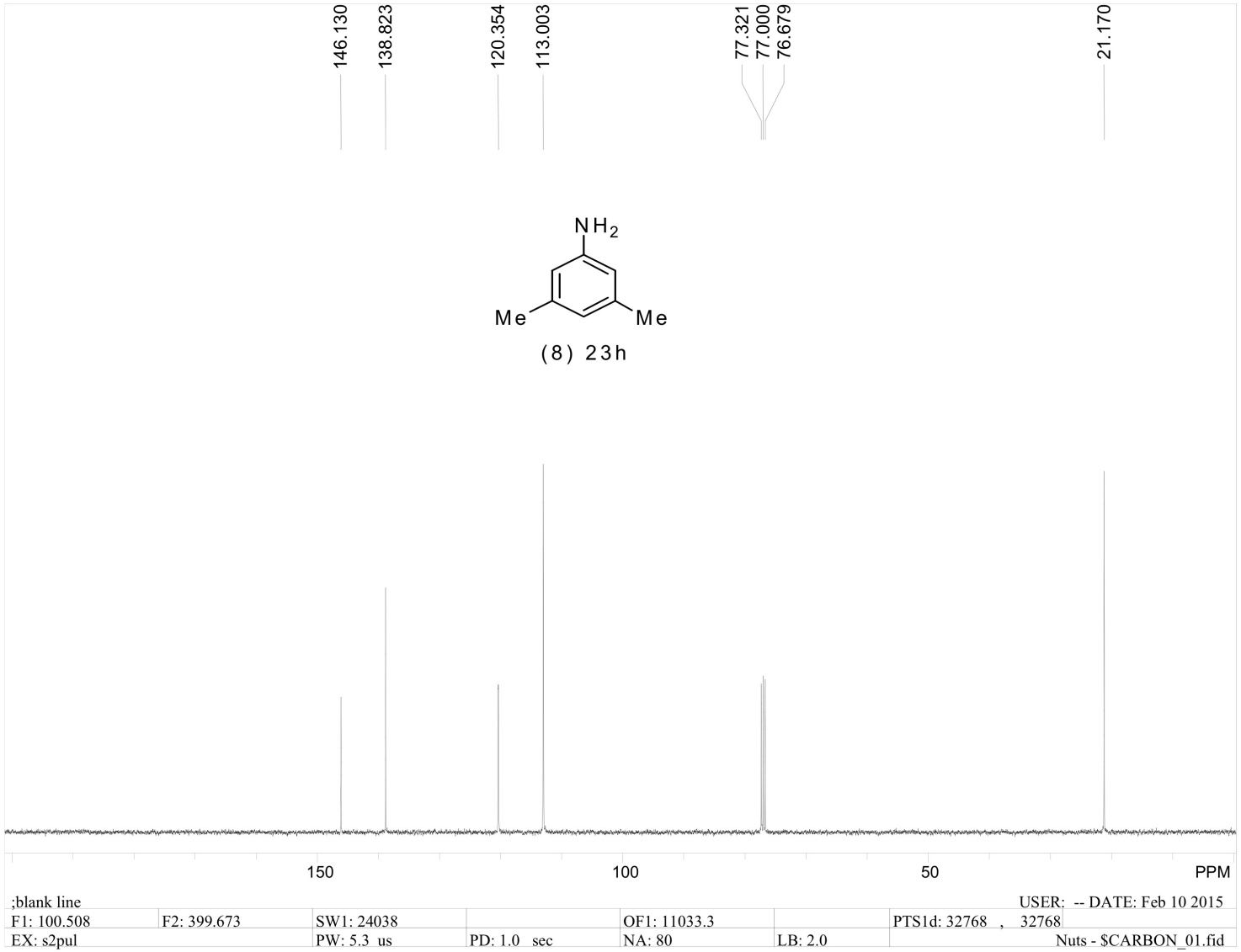

7.260
6.984
6.964
6.629
6.607
3.530
2.248
NH2
Me
(6) 23f
3.28
2.14
2.00
2.04
8
6
4
2
PPM
;blank line
USER: -- DATE: Mar 24 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2404.5
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

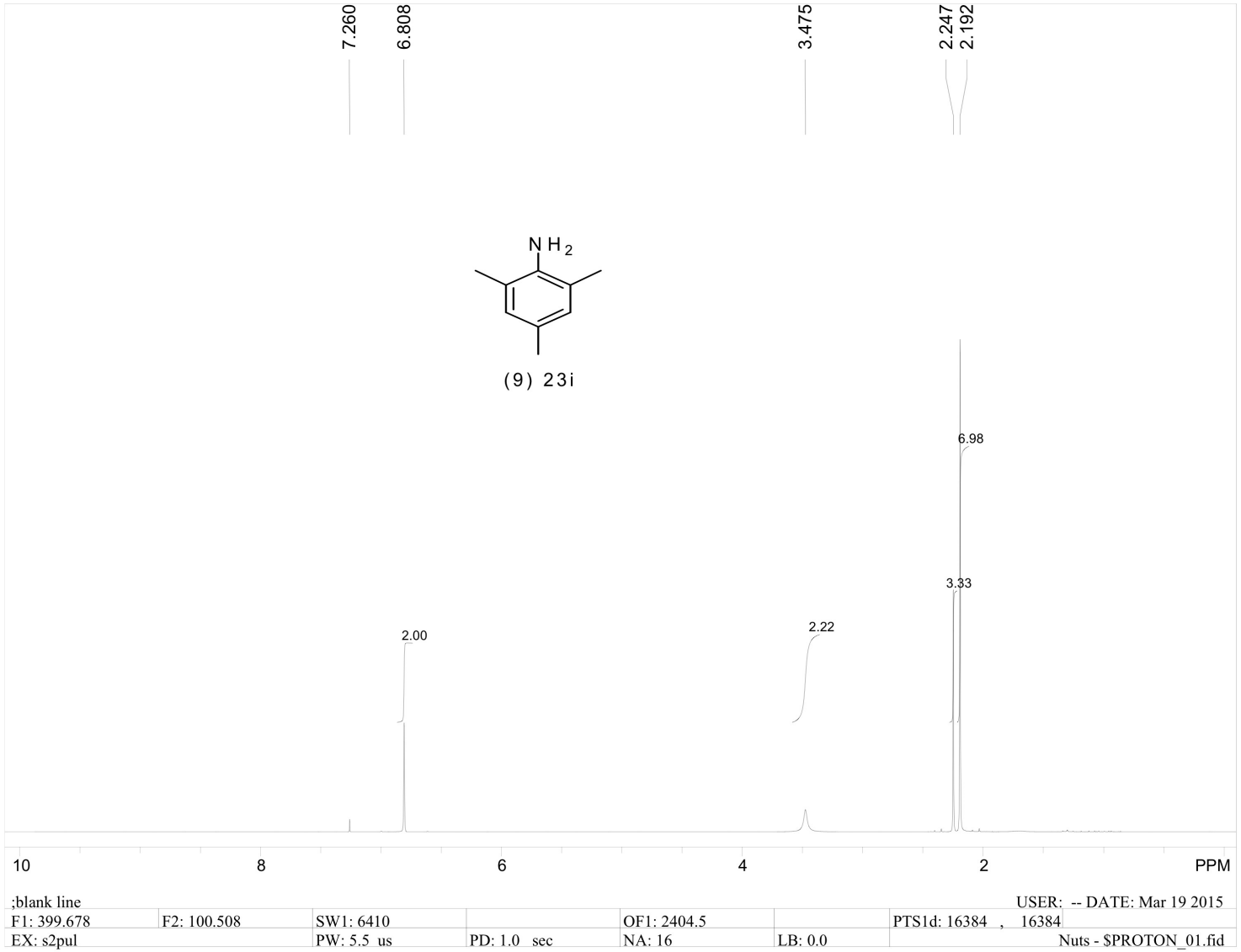

143.786
129.726
127.770
115.236
77.321
77.000
76.686
20.412
NH2
Me
(6) 23f
150
100
50
PPM
;blank line
USER: -- DATE: Mar 24 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11054.7
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 2.0
Nuts - $CARBON_01.fid

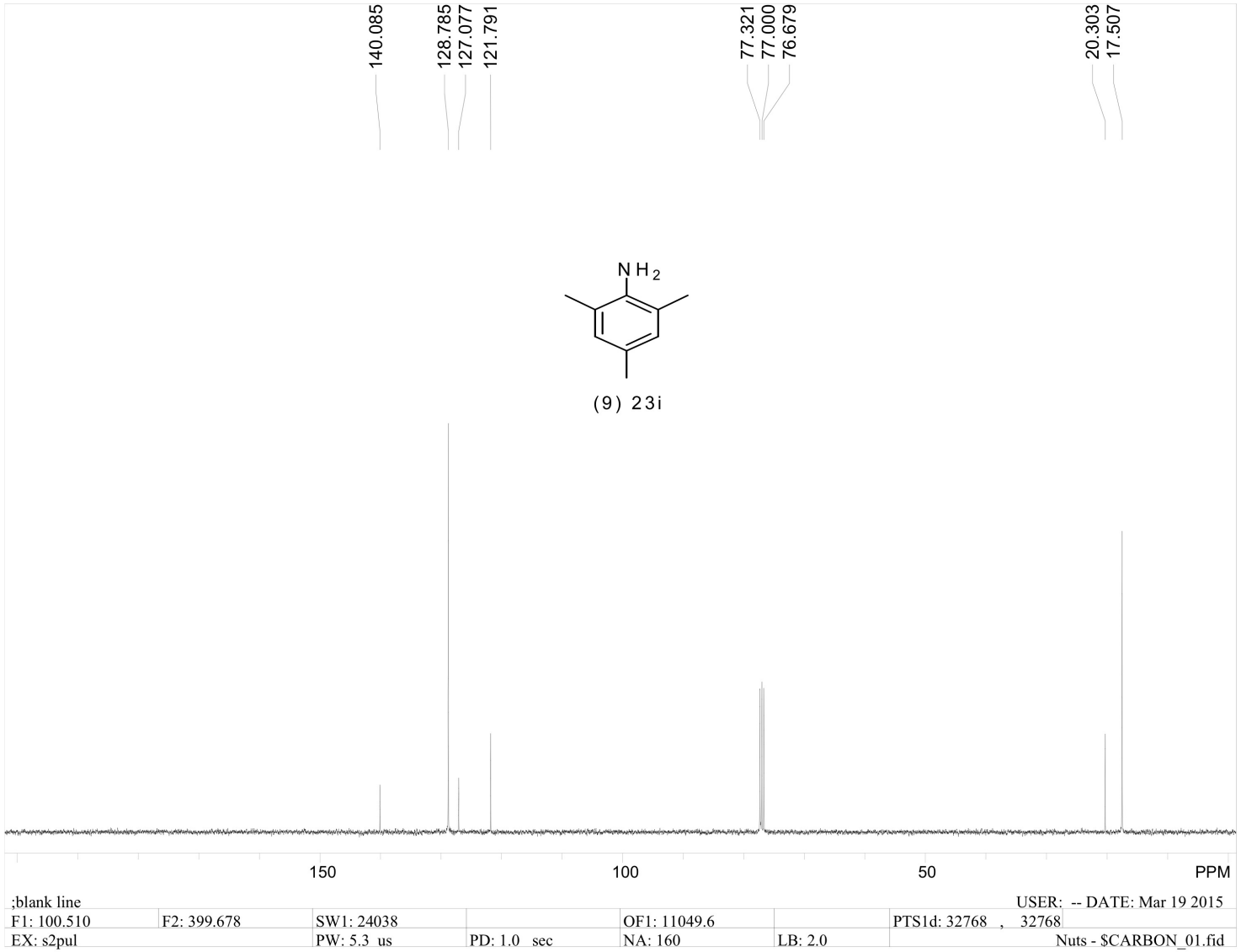

7.260
7.097
7.079
7.059
6.770
6.768
6.749
6.733
6.730
6.714
6.695
3.610
2.201
NH2
Me
(7) 23g
3.44
2.23
2.01
2.00
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Mar 25 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2404.5
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

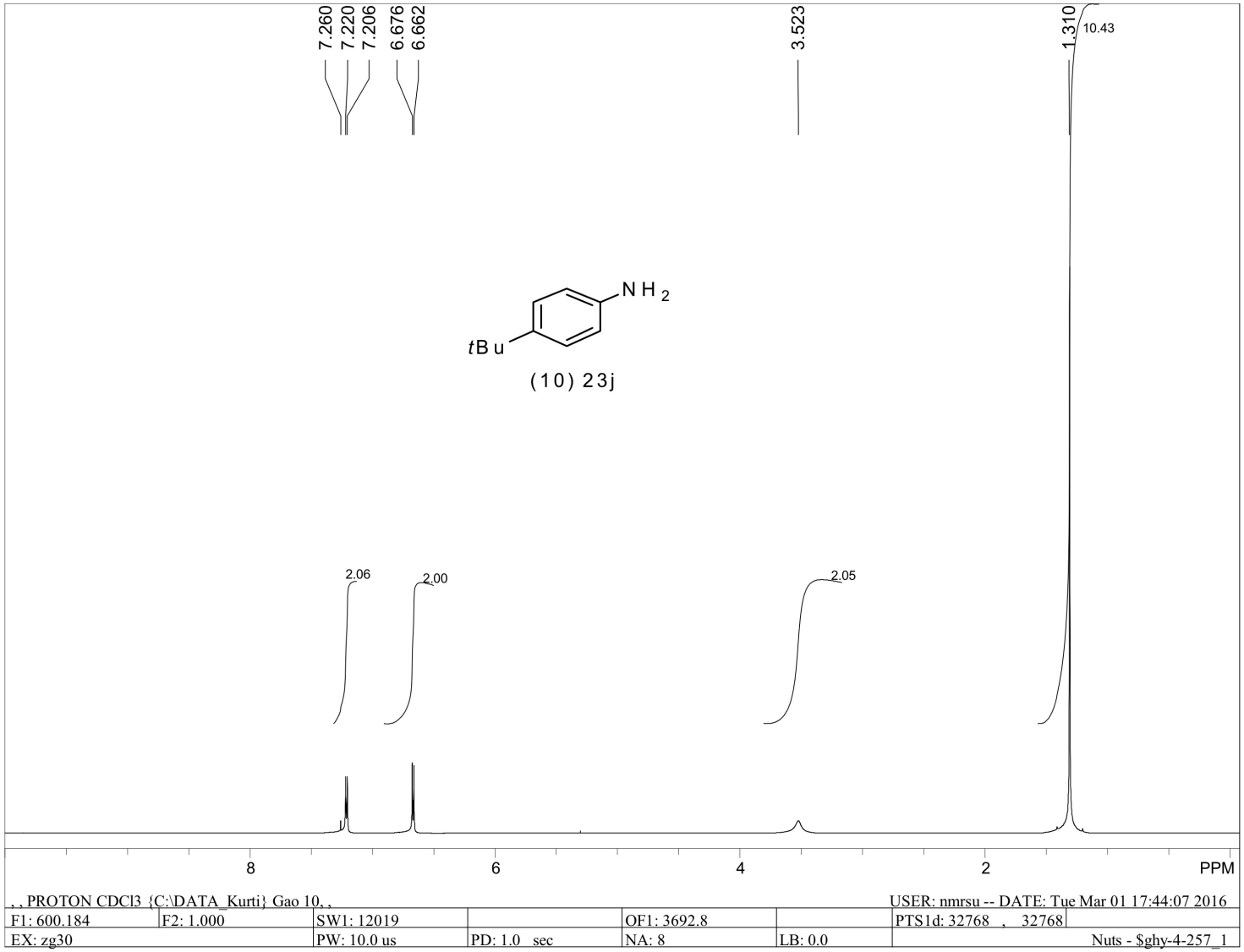

144.487
130.369
126.887
122.237
118.543
114.857
77.314
77.000
76.679
17.251
NH2
Me
(7) 23g
150
100
50
PPM
;blank line
USER: -- DATE: Mar 25 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11046.6
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 160
LB: 2.0
Nuts - $CARBON_01.fid

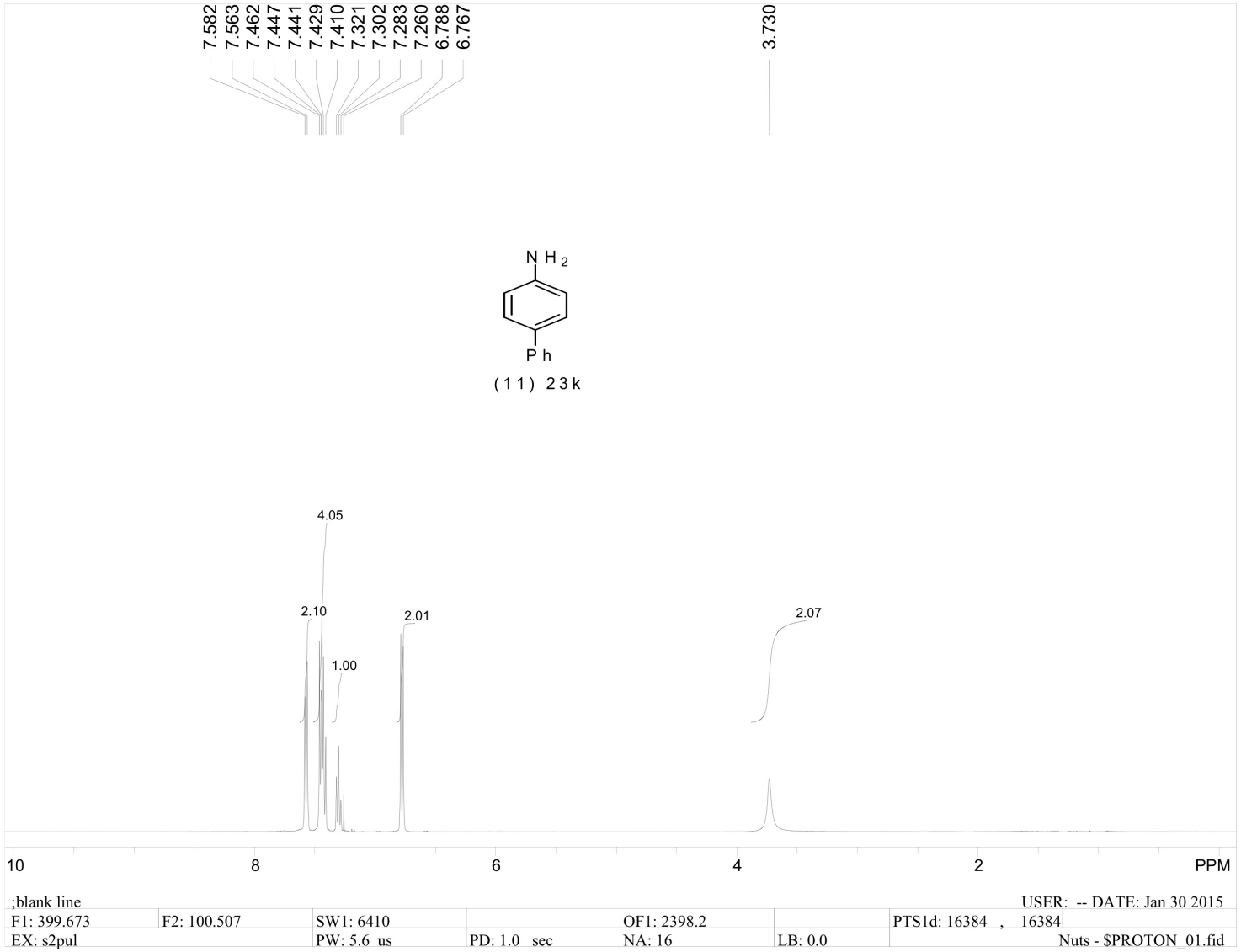

7.260
6.503
6.394
3.625
2.305
NH2
Me
Me
(8) 23h
6.29
2.25
1.97
1.00
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Feb 10 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.2
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.6 us
PD: 1.0 sec
NA: 16
LB: 2.0
Nuts - $PROTON_01.fid

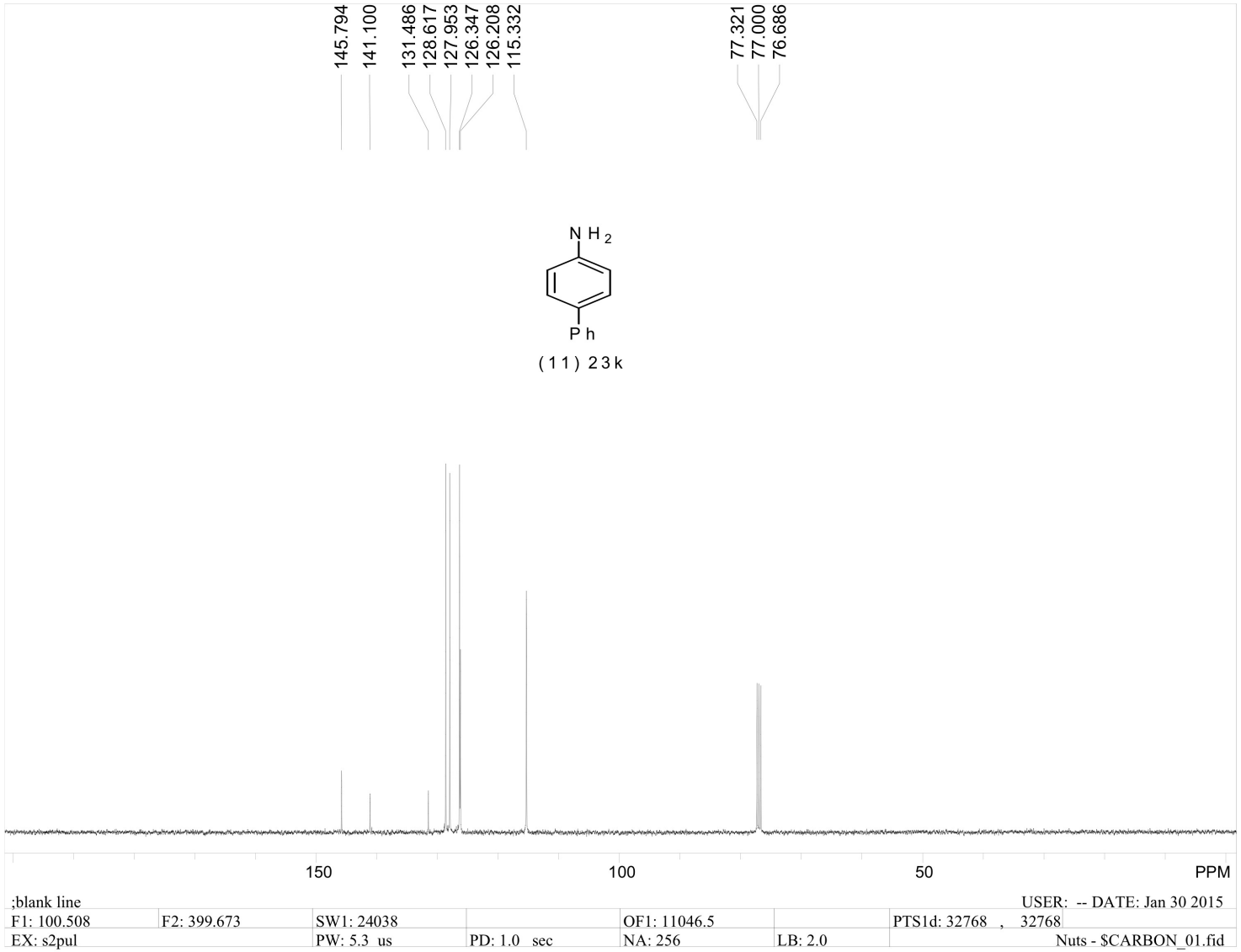

146.130
138.823
120.354
113.003
77.321
77.000
76.679
21.170
NH2
Me
Me
(8) 23h
150
100
50
PPM
;blank line
USER: -- DATE: Feb 10 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11033.3
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 80
LB: 2.0
Nuts - $CARBON_01.fid

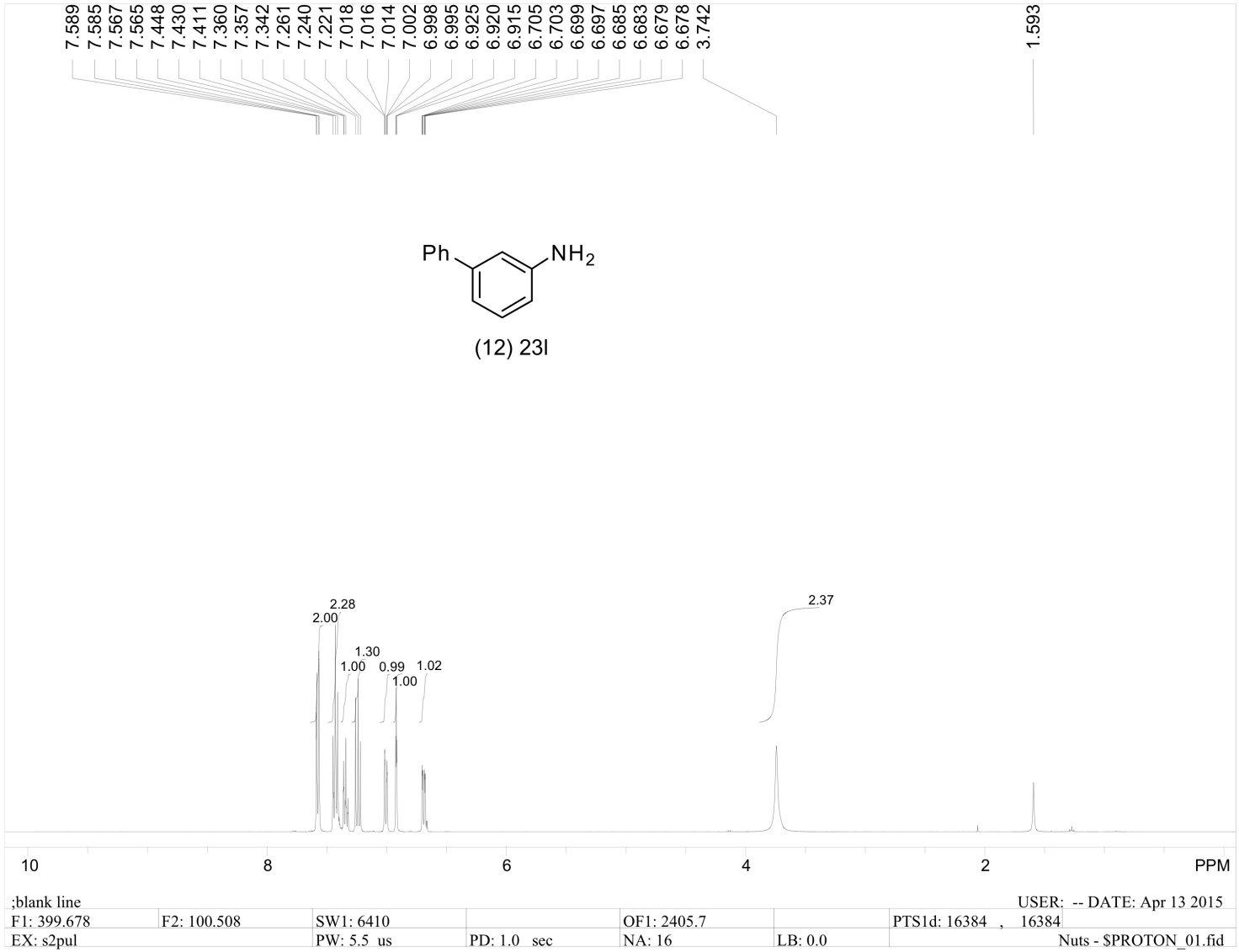

7.260
6.808
3.475
2.247
2.192
NH2
(9) 23i
6.98
3.33
2.22
2.00
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Mar 19 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2404.5
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

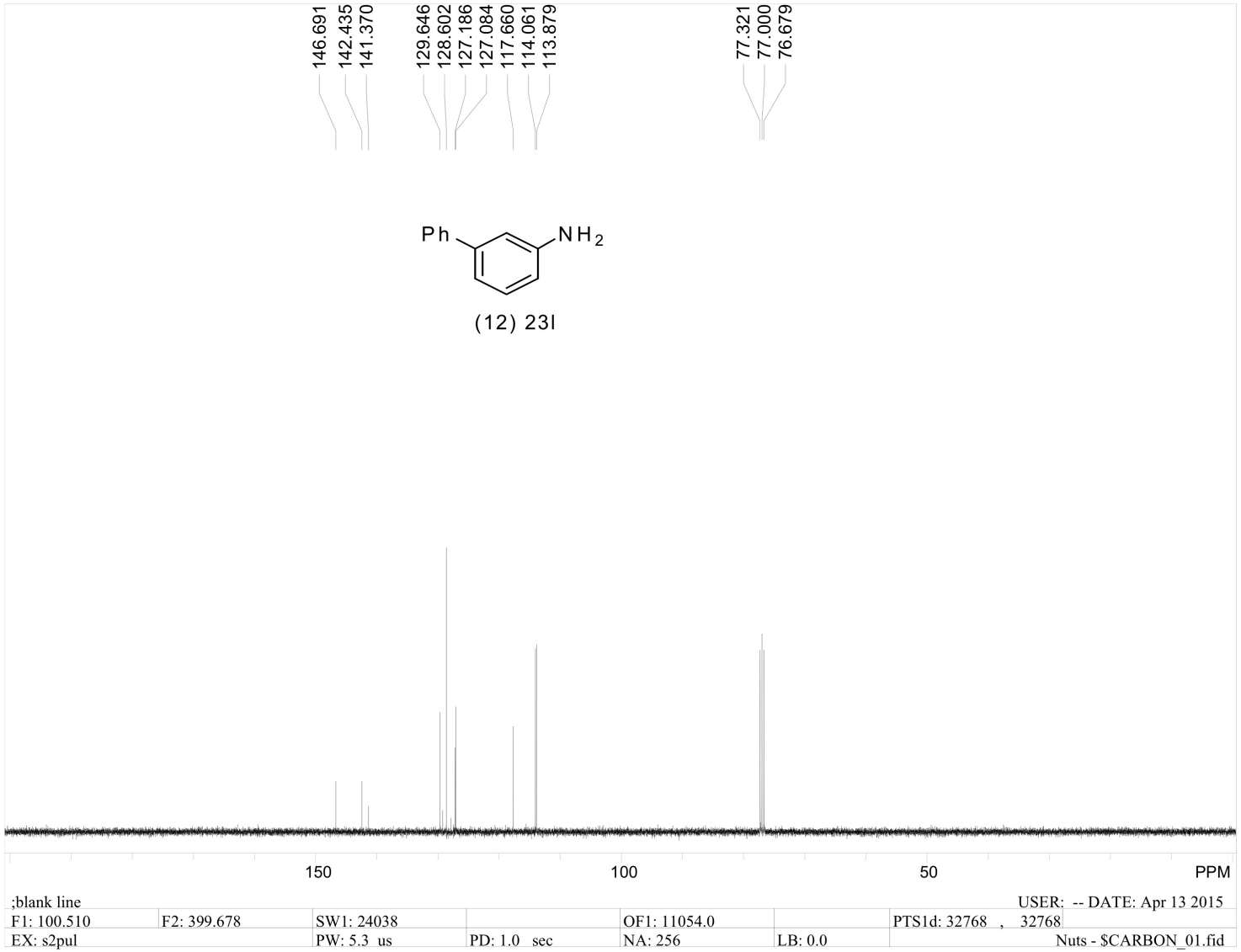

140.085
128.785
127.077
121.791
77.321
77.000
76.679
20.303
17.507
NH2
(9) 23i
150
100
50
PPM
;blank line
USER: -- DATE: Mar 19 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11049.6
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 160
LB: 2.0
Nuts - $CARBON_01.fid

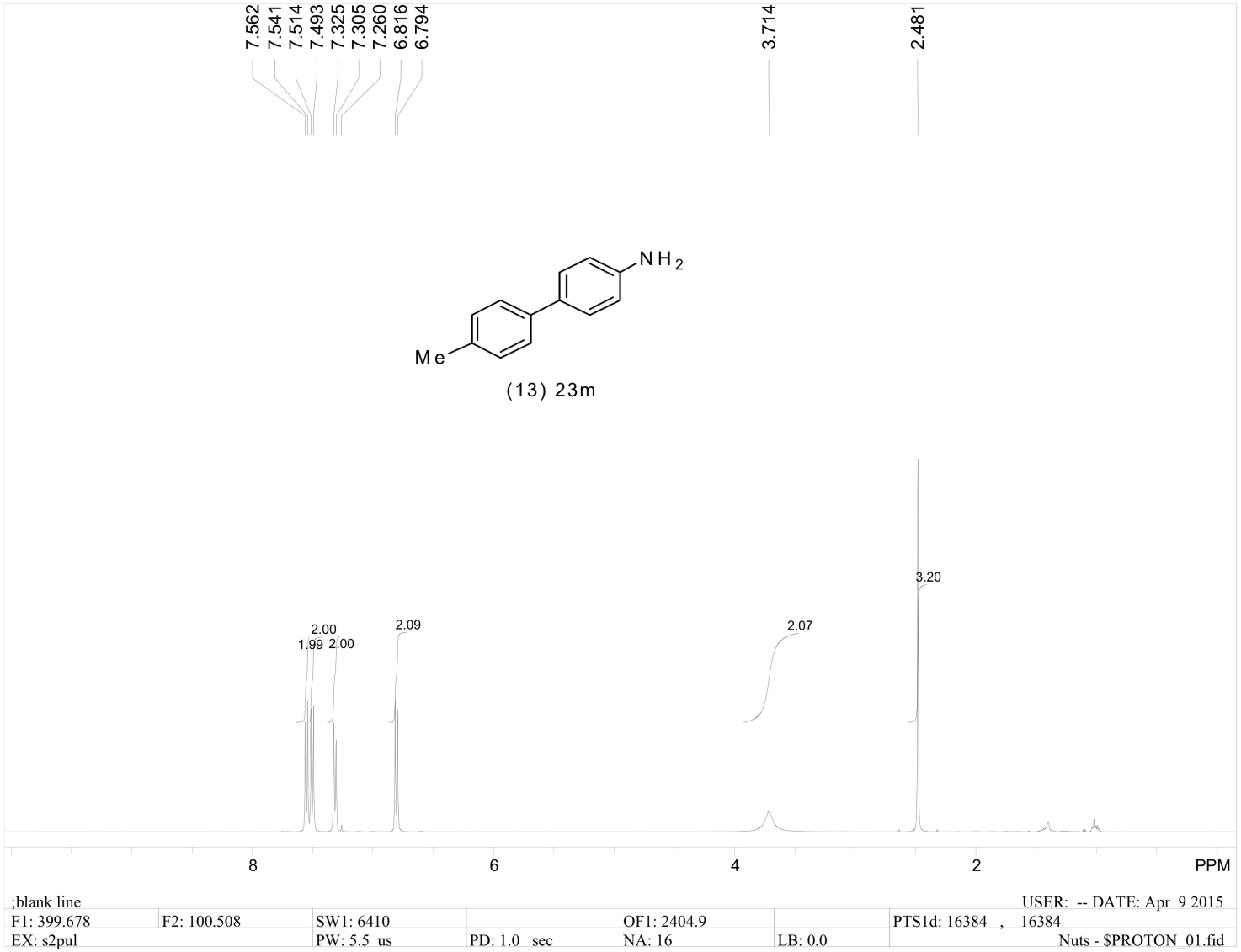

7.260
7.220
7.206
6.676
6.662
3.523
1.310
10.43
NH2
tBu
(10) 23j
2.06
2.00
2.05
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 10, ,
USER: nmrsu -- DATE: Tue Mar 01 17:44:07 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-257_1

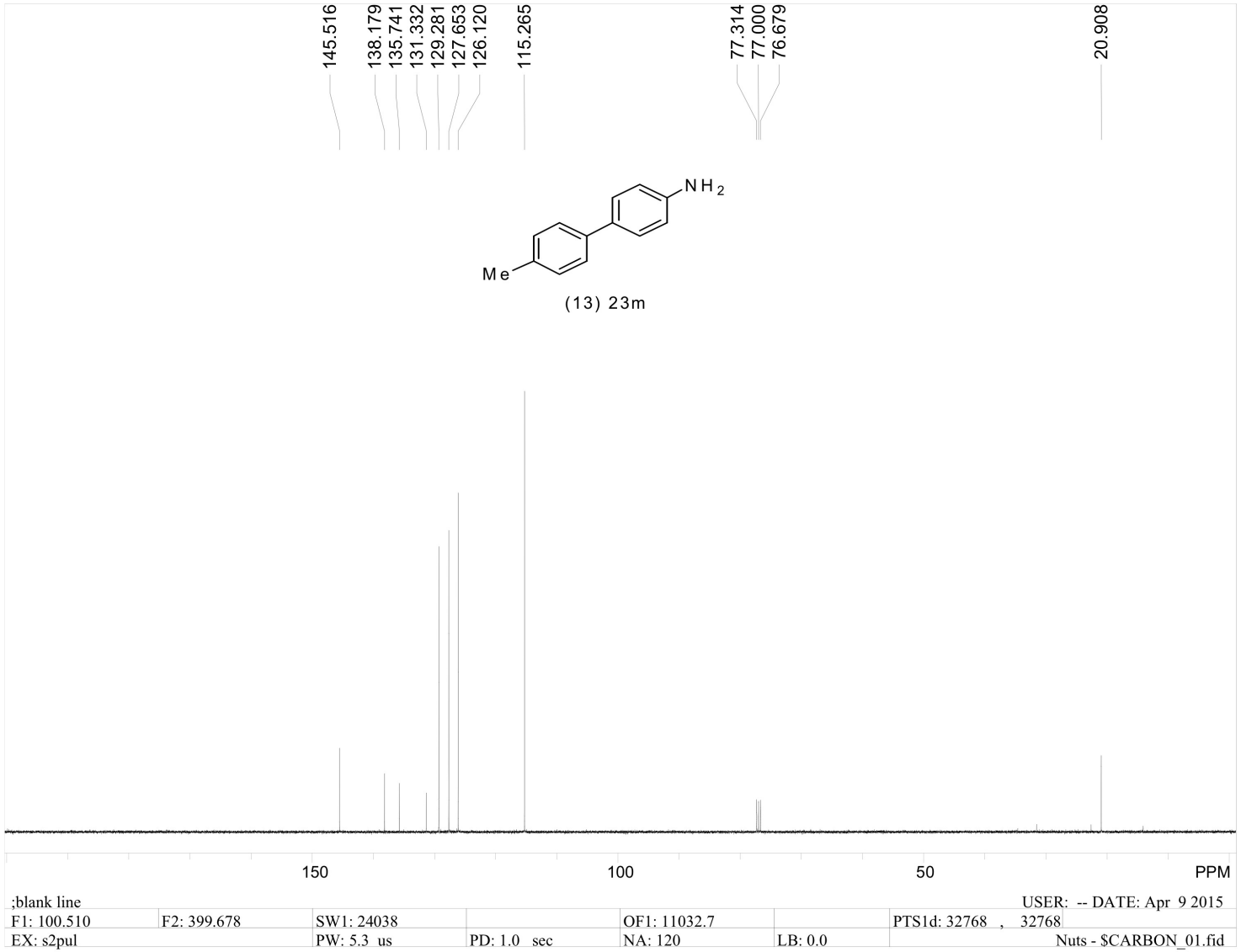

7.582
7.563
7.462
7.447
7.441
7.429
7.410
7.321
7.302
7.283
7.260
6.788
6.767
3.730
NH2
Ph
(11) 23k
4.05
2.10
2.01
1.00
2.07
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Jan 30 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.2
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.6 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

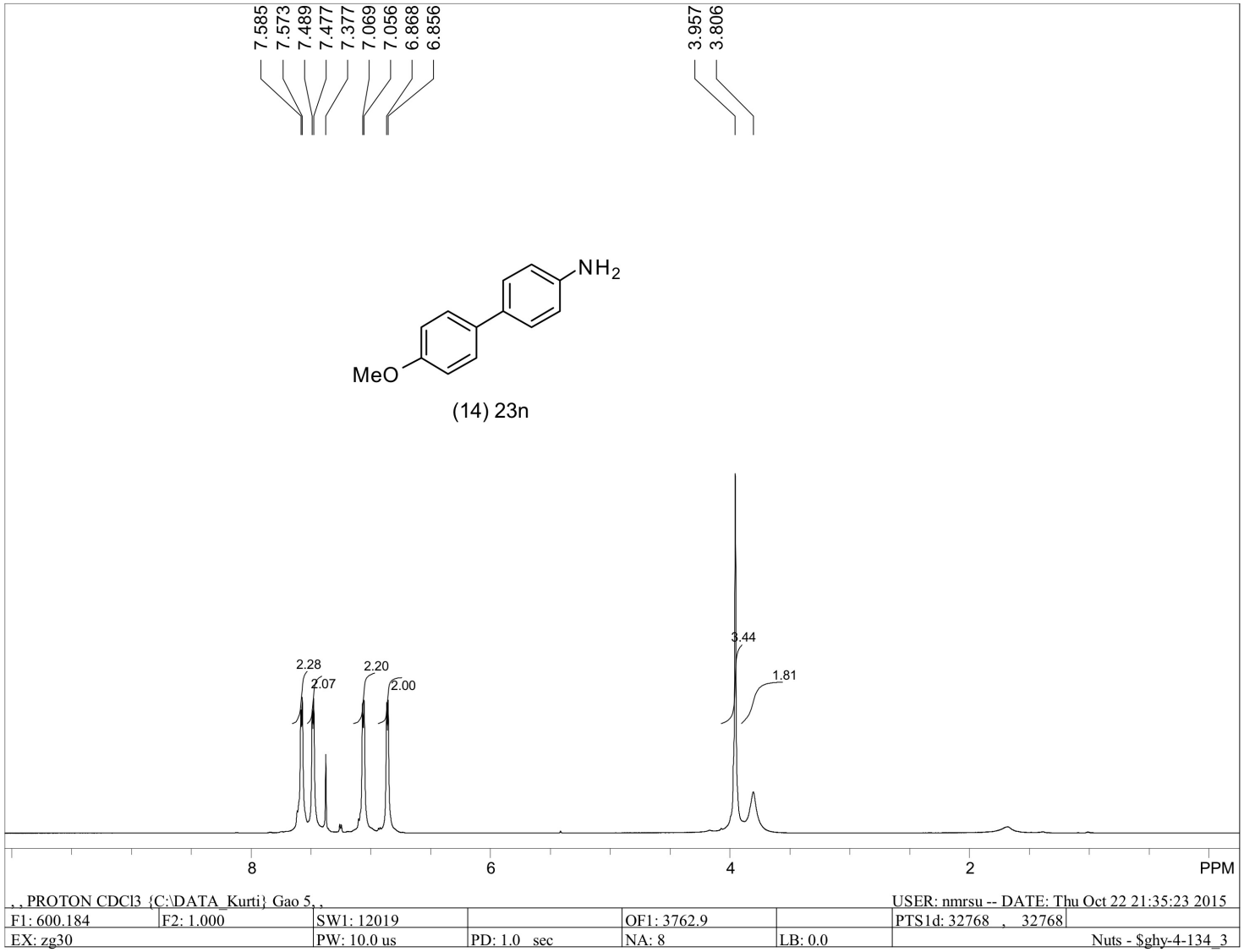

145.794
141.100
131.486
128.617
127.953
126.347
126.208
115.332
77.321
77.000
76.686
NH2
Ph
(11) 23k
150
100
50
PPM
;blank line
USER: -- DATE: Jan 30 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11046.5
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 2.0
Nuts - $CARBON_01.fid

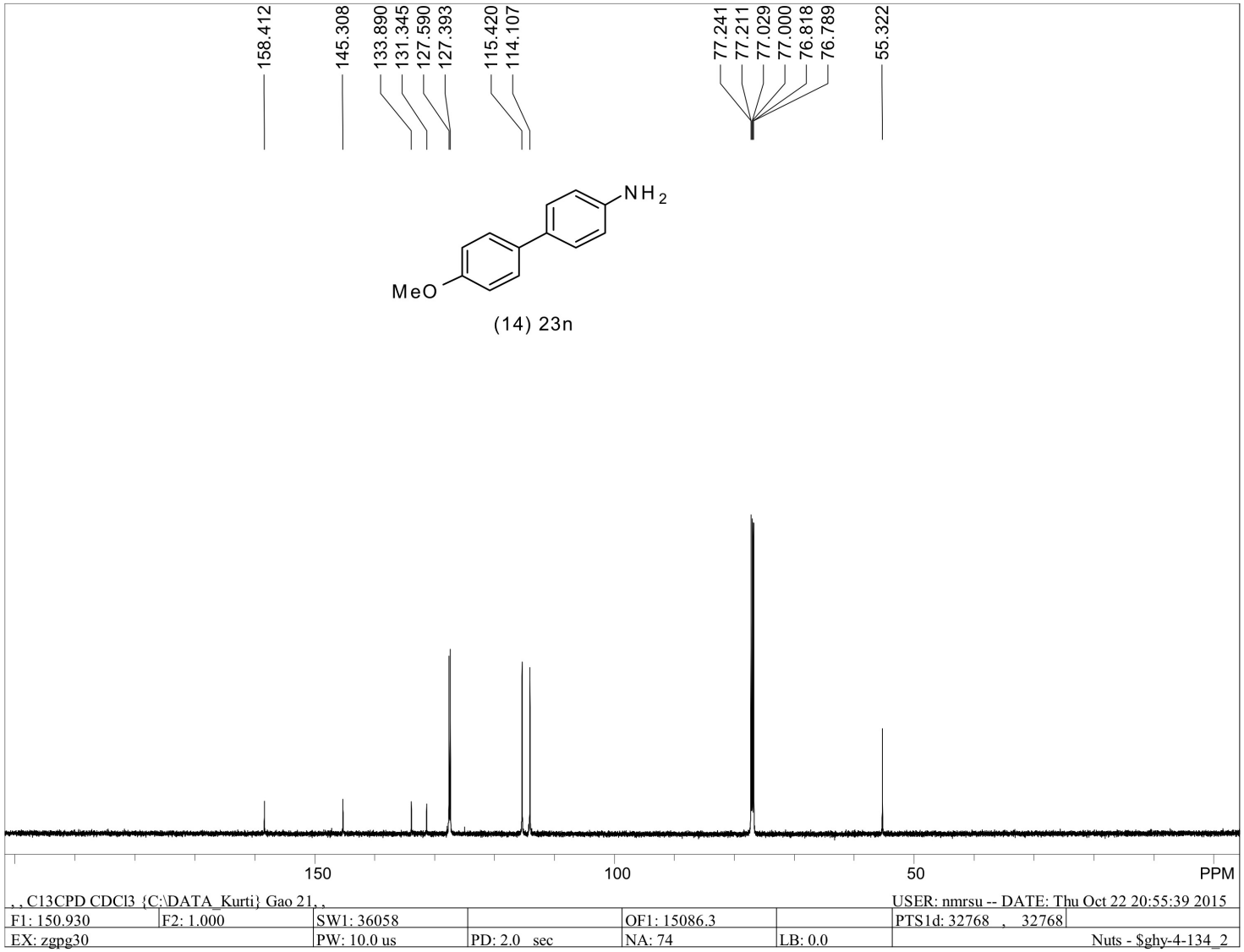

7.589
7.585
7.567
7.565
7.448
7.430
7.411
7.360
7.357
7.342
7.261
7.240
7.221
7.018
7.016
7.014
7.002
6.998
6.995
6.925
6.920
6.915
6.705
6.703
6.699
6.697
6.685
6.683
6.679
6.678
3.742
1.593
Ph
NH2
(12) 23l
2.28
2.00
1.30
1.00
0.99
1.00
1.02
2.37
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Apr 13 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2405.7
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

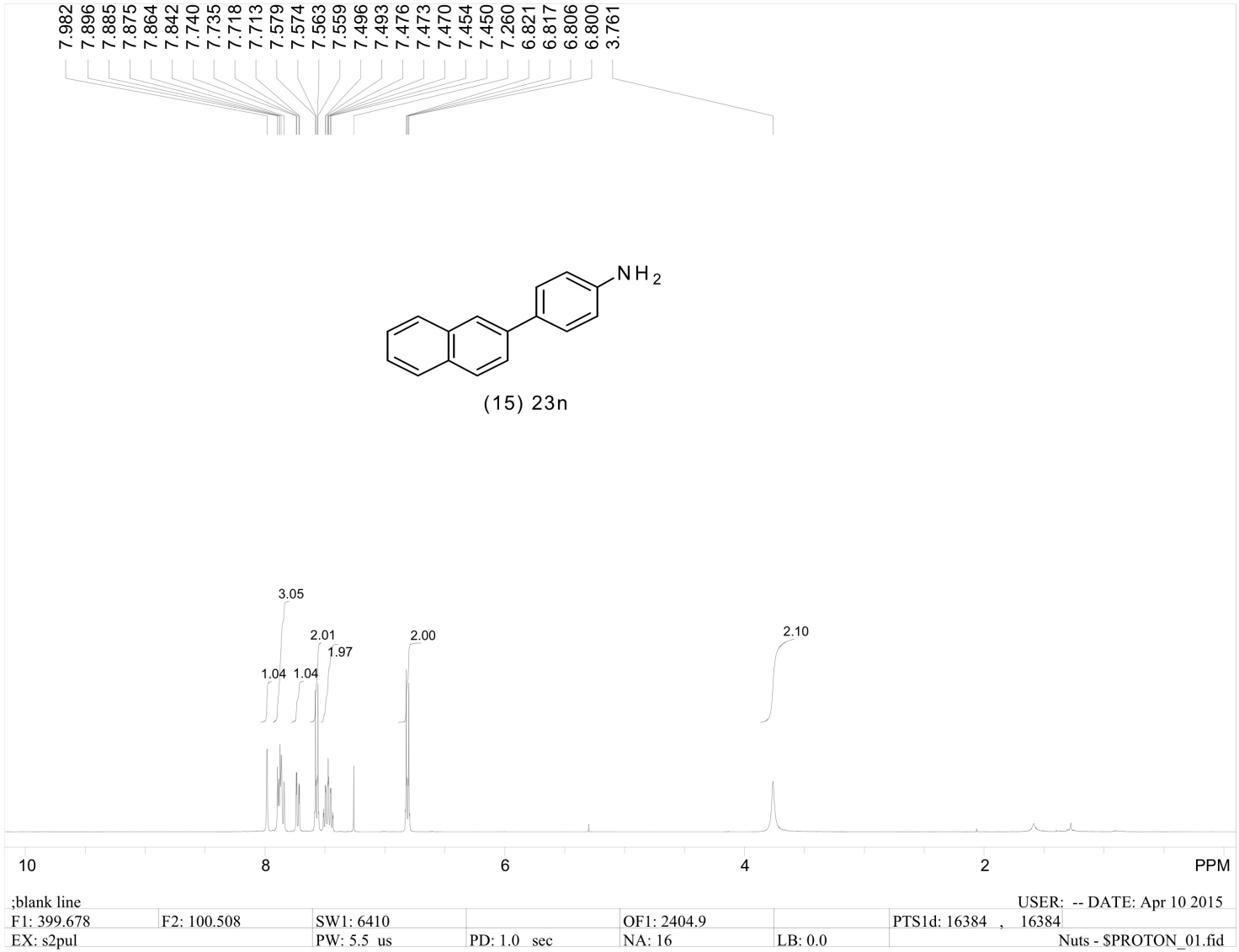

146.691
142.435
141.370
129.646
128.602
127.186
127.084
117.660
114.061
113.879
77.321
77.000
76.679
Ph
NH2
(12) 23l
150
100
50
PPM
;blank line
USER: -- DATE: Apr 13 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11054.0
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 0.0
Nuts - $CARBON_01.fid

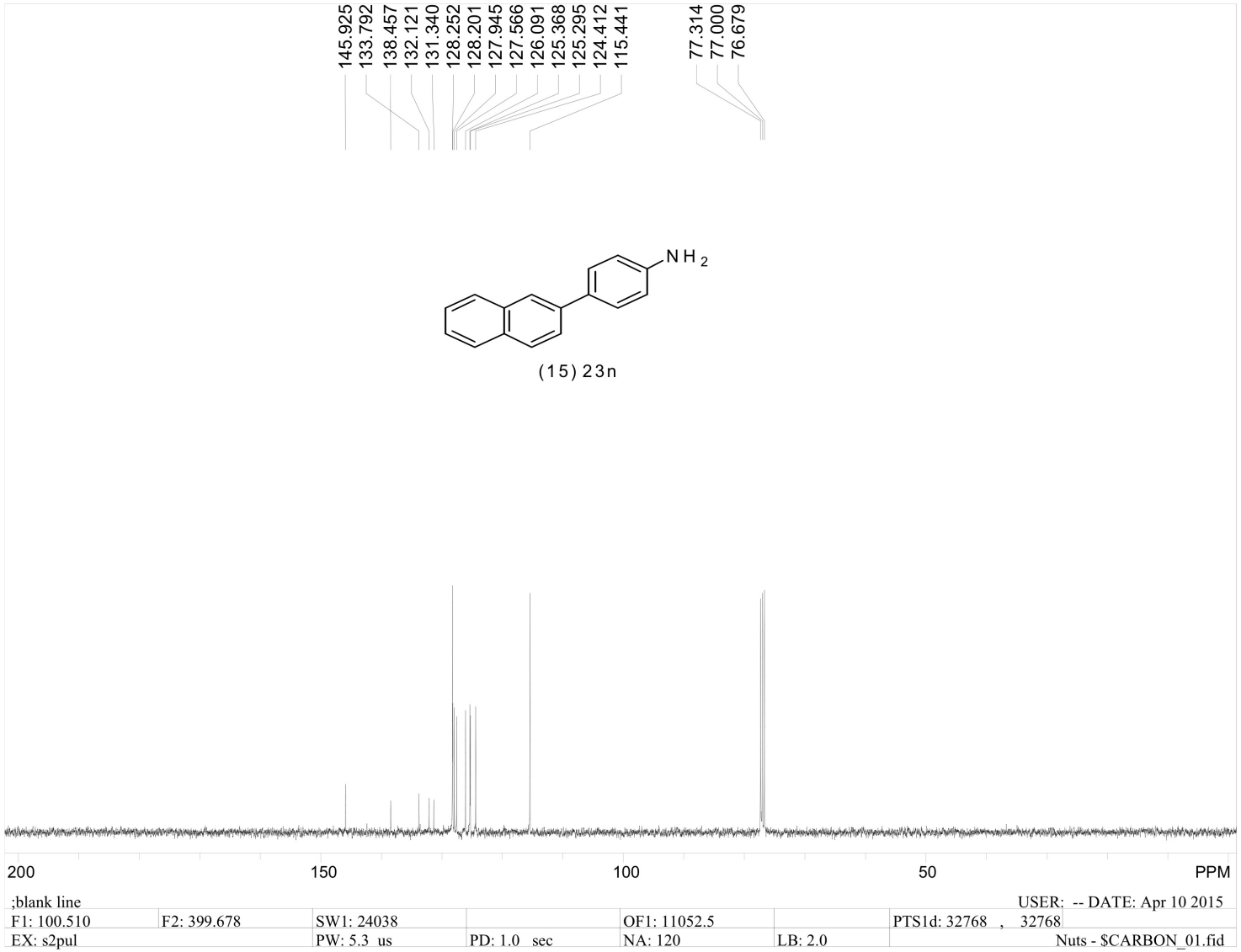

7.562
7.541
7.514
7.493
7.325
7.305
7.260
6.816
6.794
3.714
2.481
NH2
Me
(13) 23m
3.20
2.09
2.07
2.00
1.99
2.00
8
6
4
2
PPM
;blank line
USER: -- DATE: Apr 9 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2404.9
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

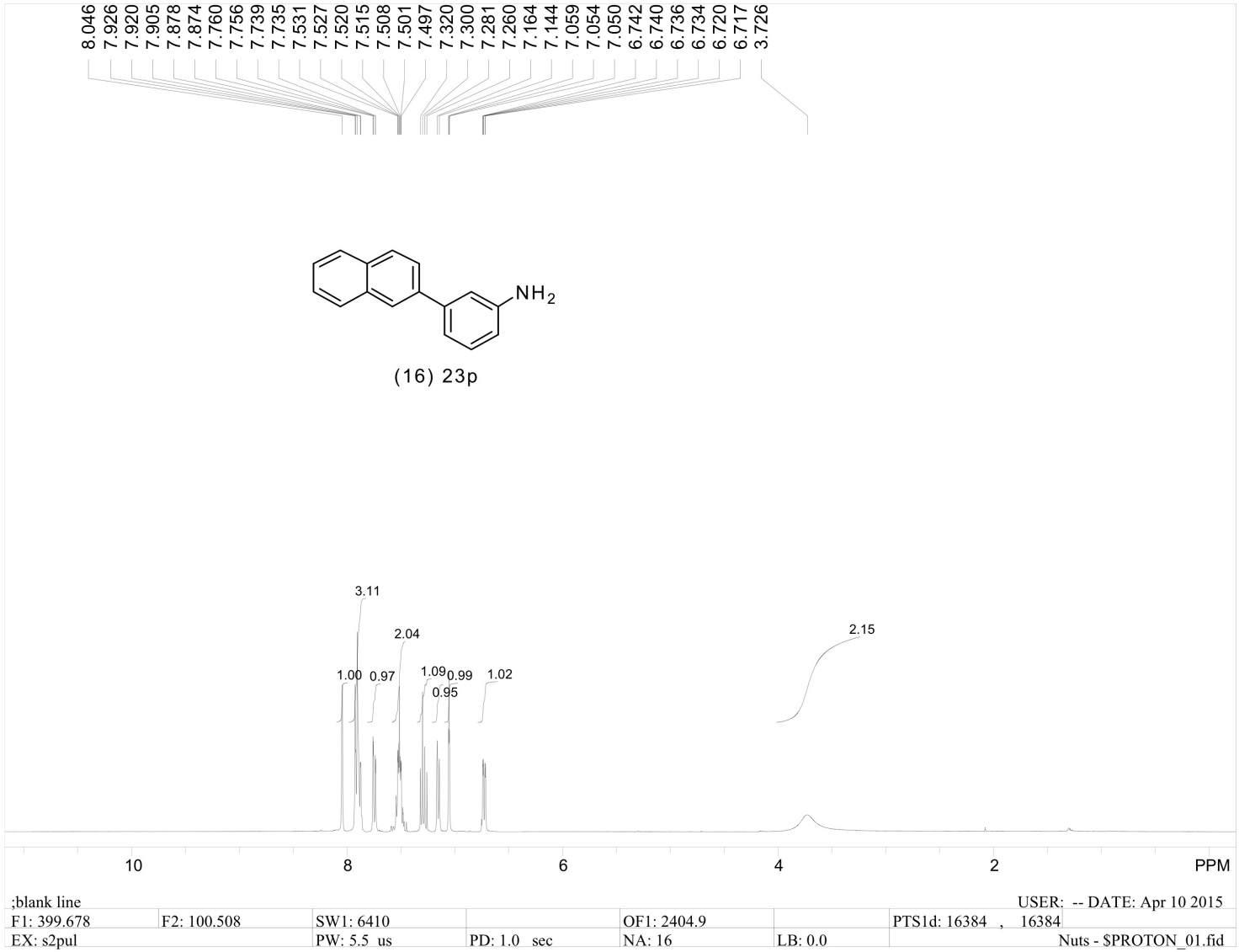

145.516
138.179
135.741
131.332
129.281
127.653
126.120
115.265
77.314
77.000
76.679
20.908
NH2
Me
(13) 23m
150
100
50
PPM
;blank line
USER: -- DATE: Apr 9 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11032.7
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 120
LB: 0.0
Nuts - $CARBON_01.fid

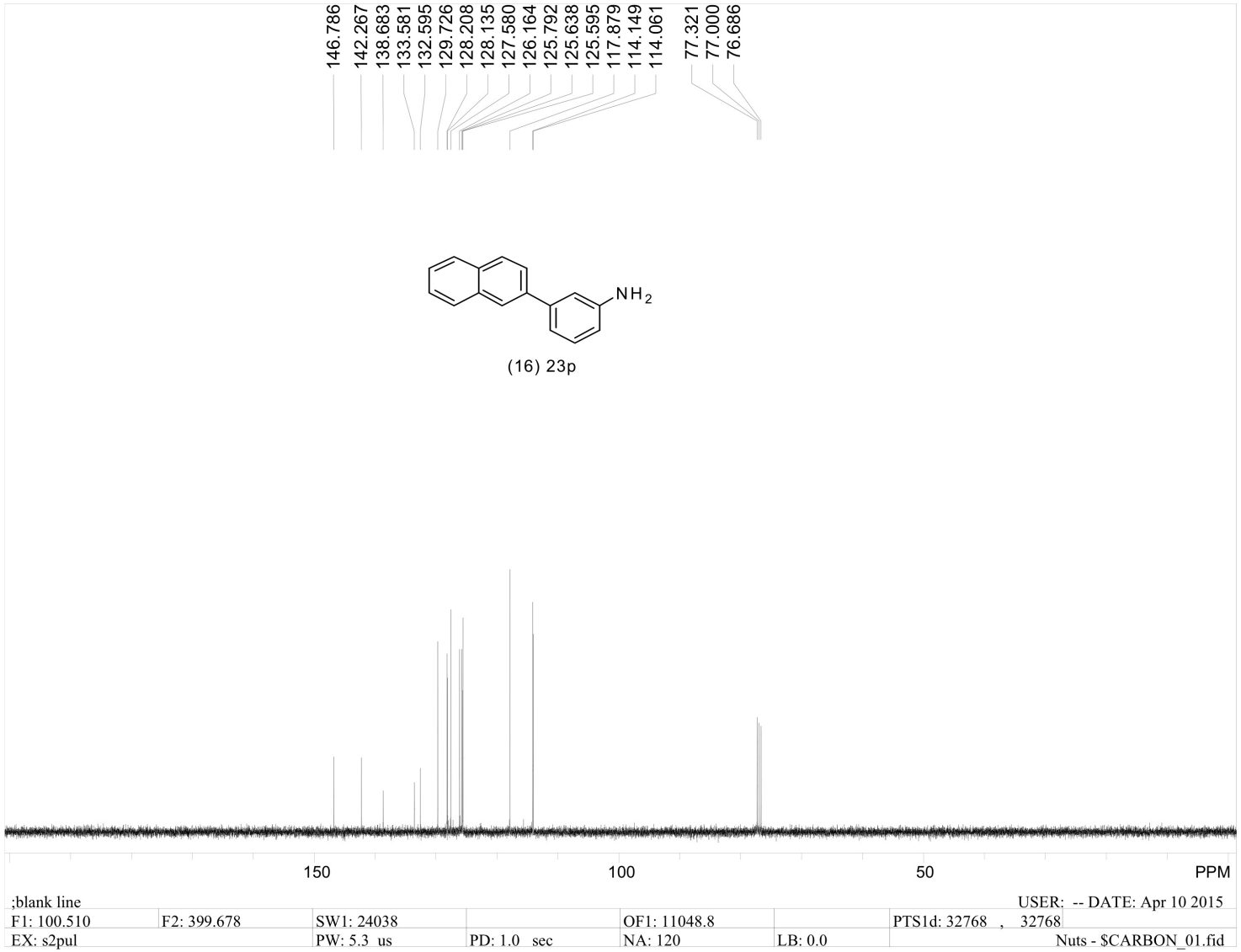

7.585
7.573
7.489
7.477
7.377
7.069
7.056
6.868
6.856
3.957
3.806
NH2
MeO
(14) 23n
2.28
2.07
2.20
2.00
3.44
1.81
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 5, ,
USER: nmrsu -- DATE: Thu Oct 22 21:35:23 2015
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3762.9
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-134_3

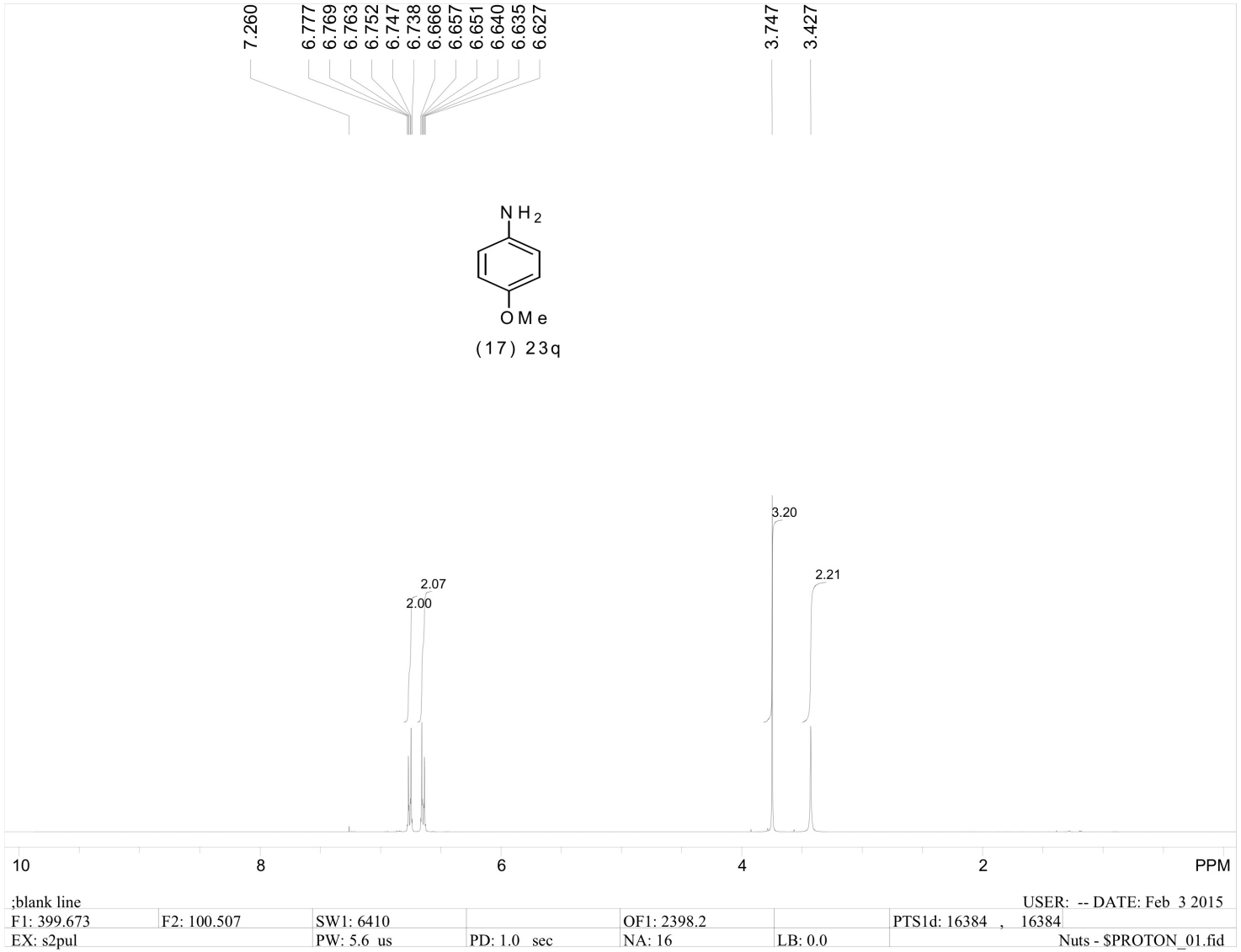

158.412
145.308
133.890
131.345
127.590
127.393
115.420
114.107
77.241
77.211
77.029
77.000
76.818
76.789
55.322
NH2
MeO
(14) 23n
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 21, ,
USER: nmrsu -- DATE: Thu Oct 22 20:55:39 2015
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15086.3
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 74
LB: 0.0
Nuts - $ghy-4-134_2

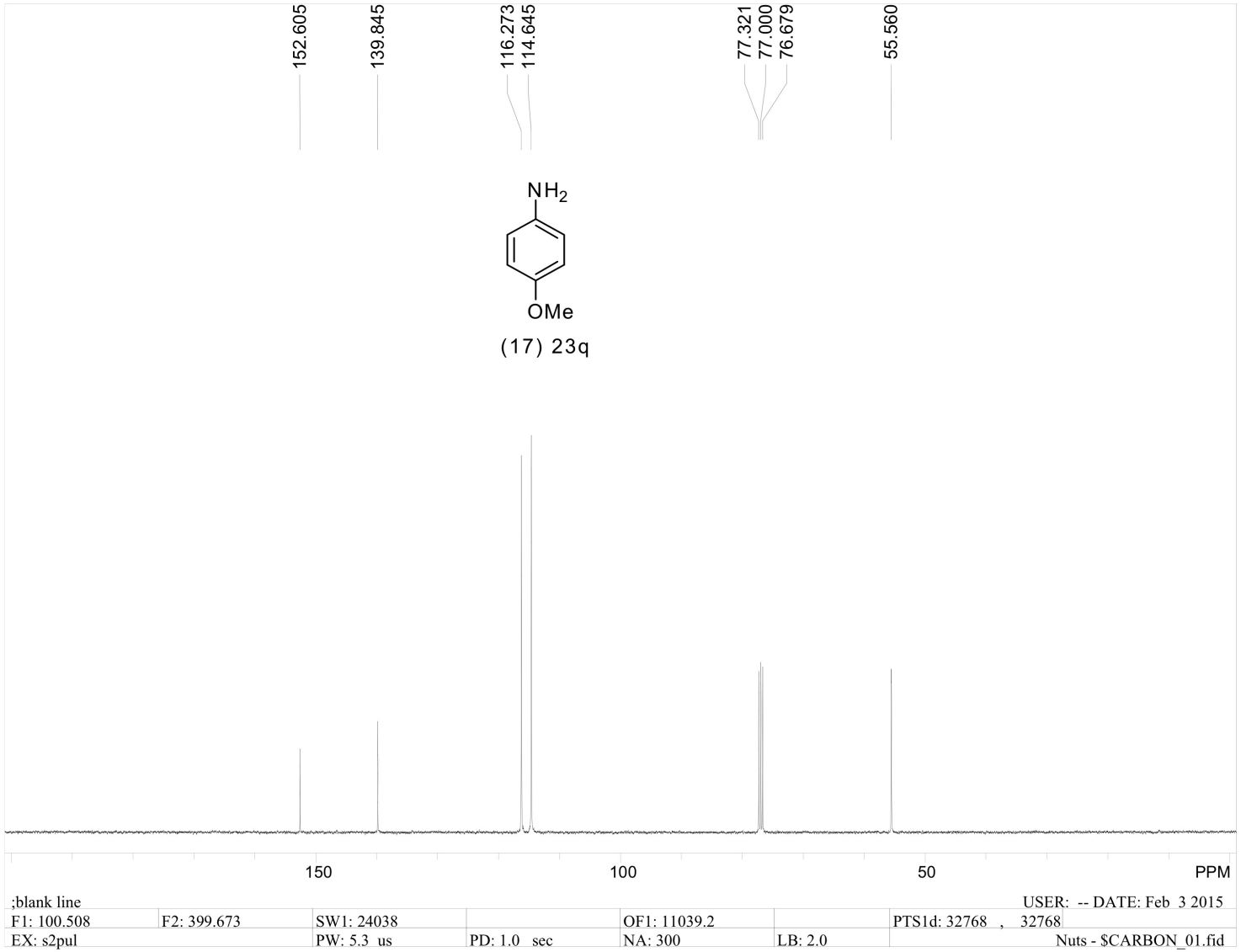

7.982
7.896
7.885
7.875
7.864
7.842
7.740
7.735
7.718
7.713
7.579
7.574
7.563
7.559
7.496
7.493
7.476
7.473
7.470
7.454
7.450
7.260
6.821
6.817
6.806
6.800
3.761
NH2
(15) 23n
3.05
2.01
1.97
2.00
2.10
1.04
1.04
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Apr 10 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2404.9
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

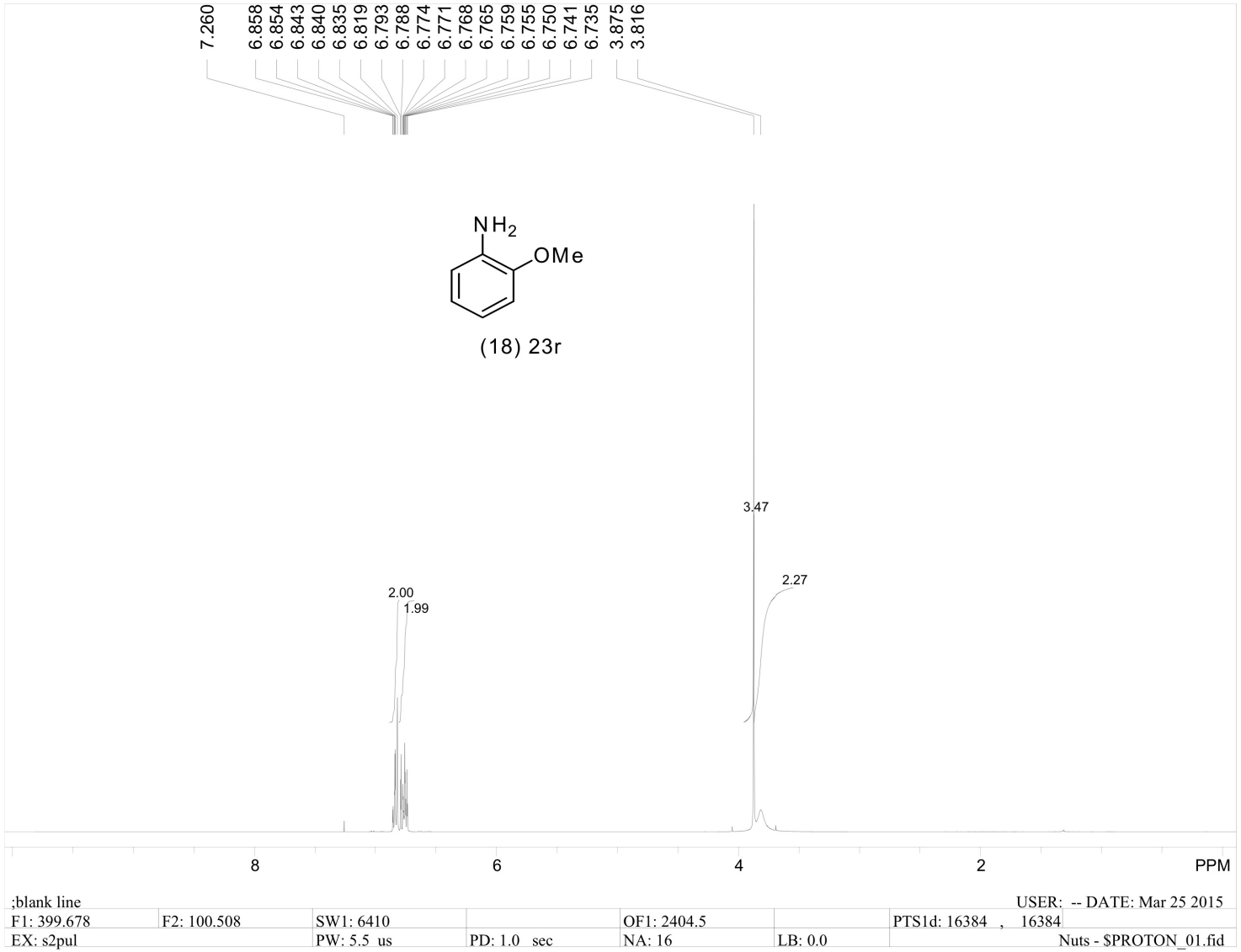

145.925
133.792
138.457
132.121
131.340
128.252
128.201
127.945
127.566
126.091
125.368
125.295
124.412
115.441
77.314
77.000
76.679
NH2
(15) 23n
200
150
100
50
PPM
;blank line
USER: -- DATE: Apr 10 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11052.5
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 120
LB: 2.0
Nuts - $CARBON_01.fid

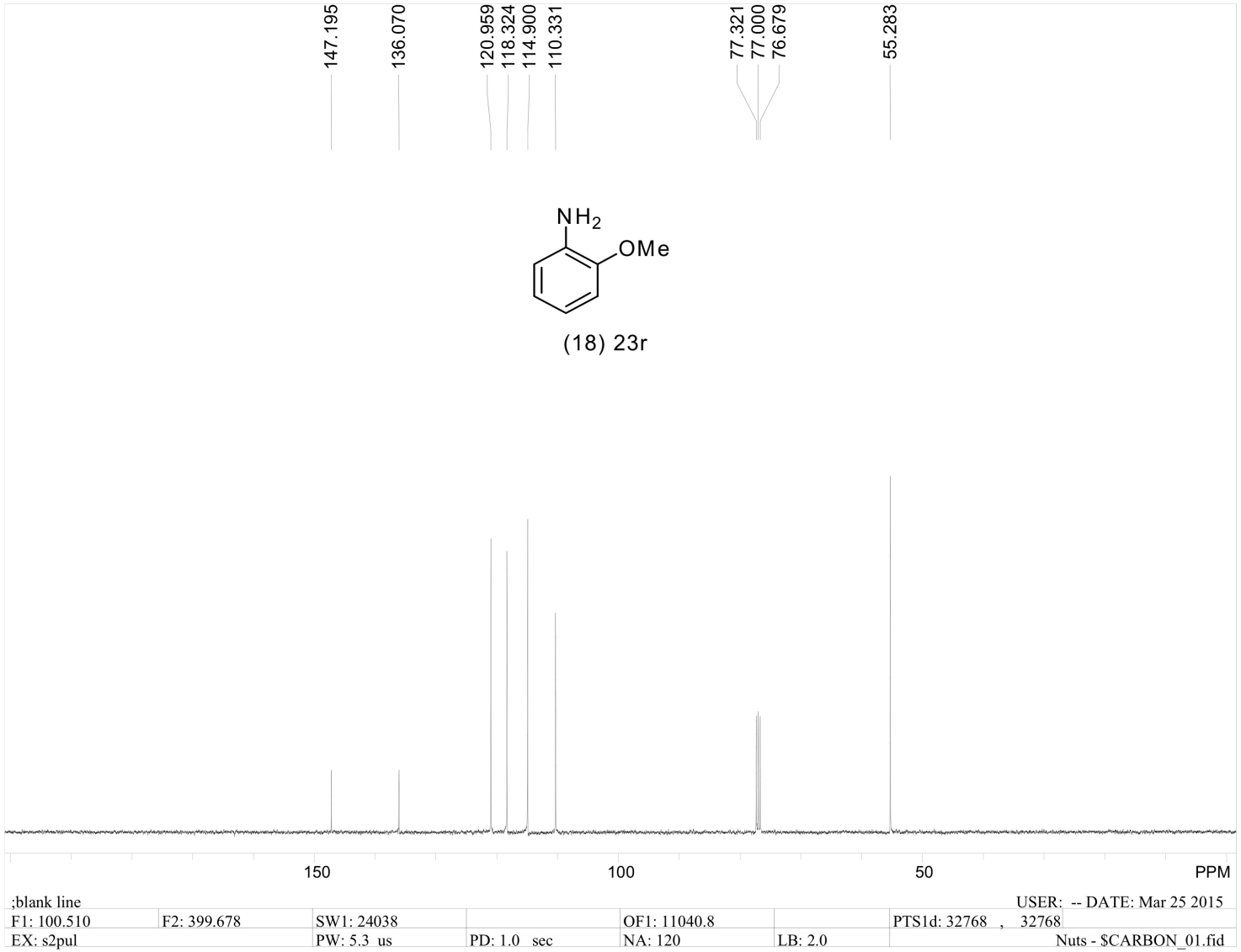

8.046
7.926
7.920
7.905
7.878
7.874
7.760
7.756
7.739
7.735
7.531
7.527
7.520
7.515
7.508
7.501
7.497
7.320
7.300
7.281
7.260
7.164
7.144
7.059
7.054
7.050
6.742
6.740
6.736
6.734
6.720
6.717
3.726
NH2
(16) 23p
3.11
2.04
2.15
1.00
0.97
1.09
0.99
0.95
1.02
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Apr 10 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2404.9
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

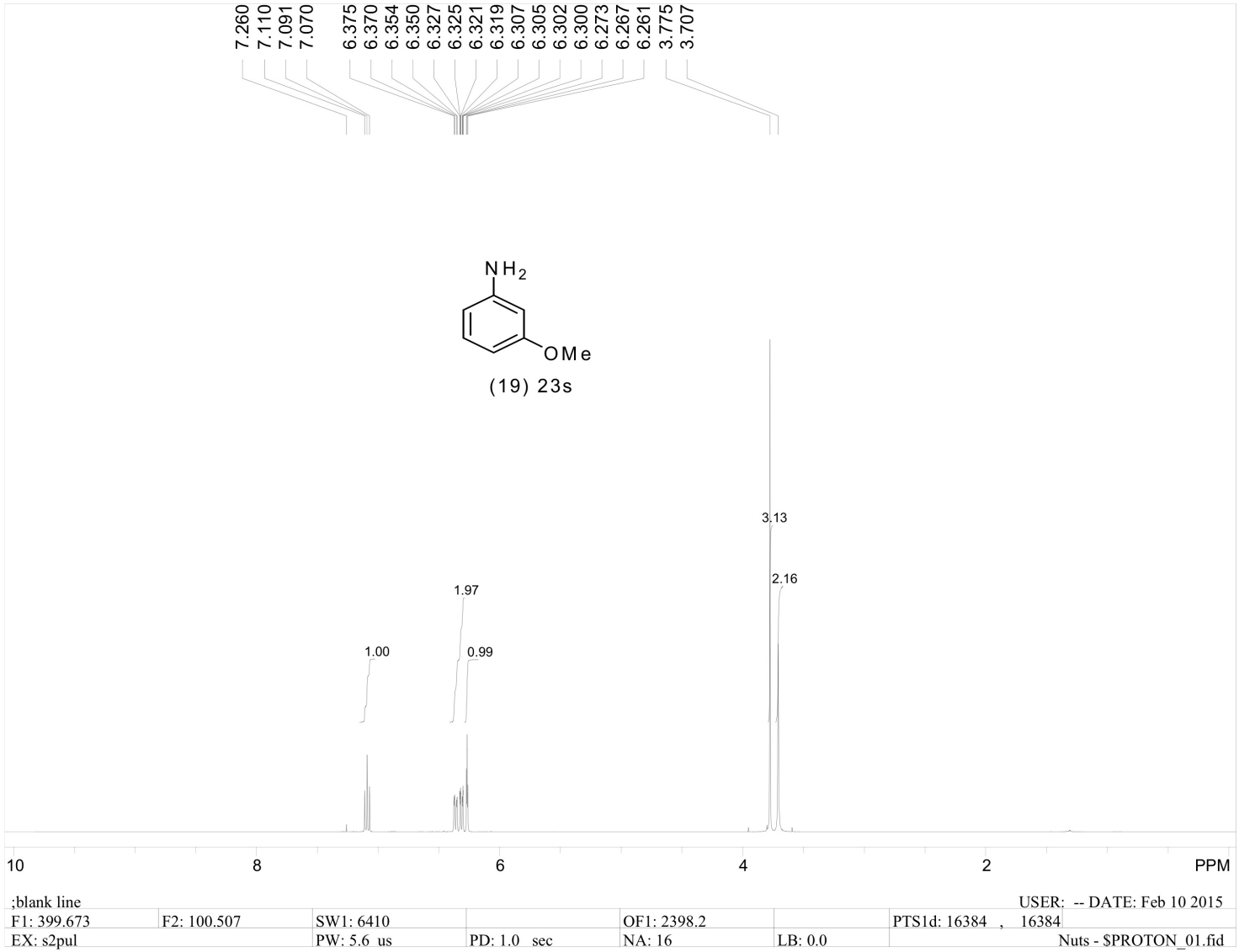

146.786
142.267
138.683
133.581
132.595
129.726
128.208
128.135
127.580
126.164
125.792
125.638
125.595
117.879
114.149
114.061
77.321
77.000
76.686
NH2
(16) 23p
150
100
50
PPM
;blank line
USER: -- DATE: Apr 10 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11048.8
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 120
LB: 0.0
Nuts - $CARBON_01.fid

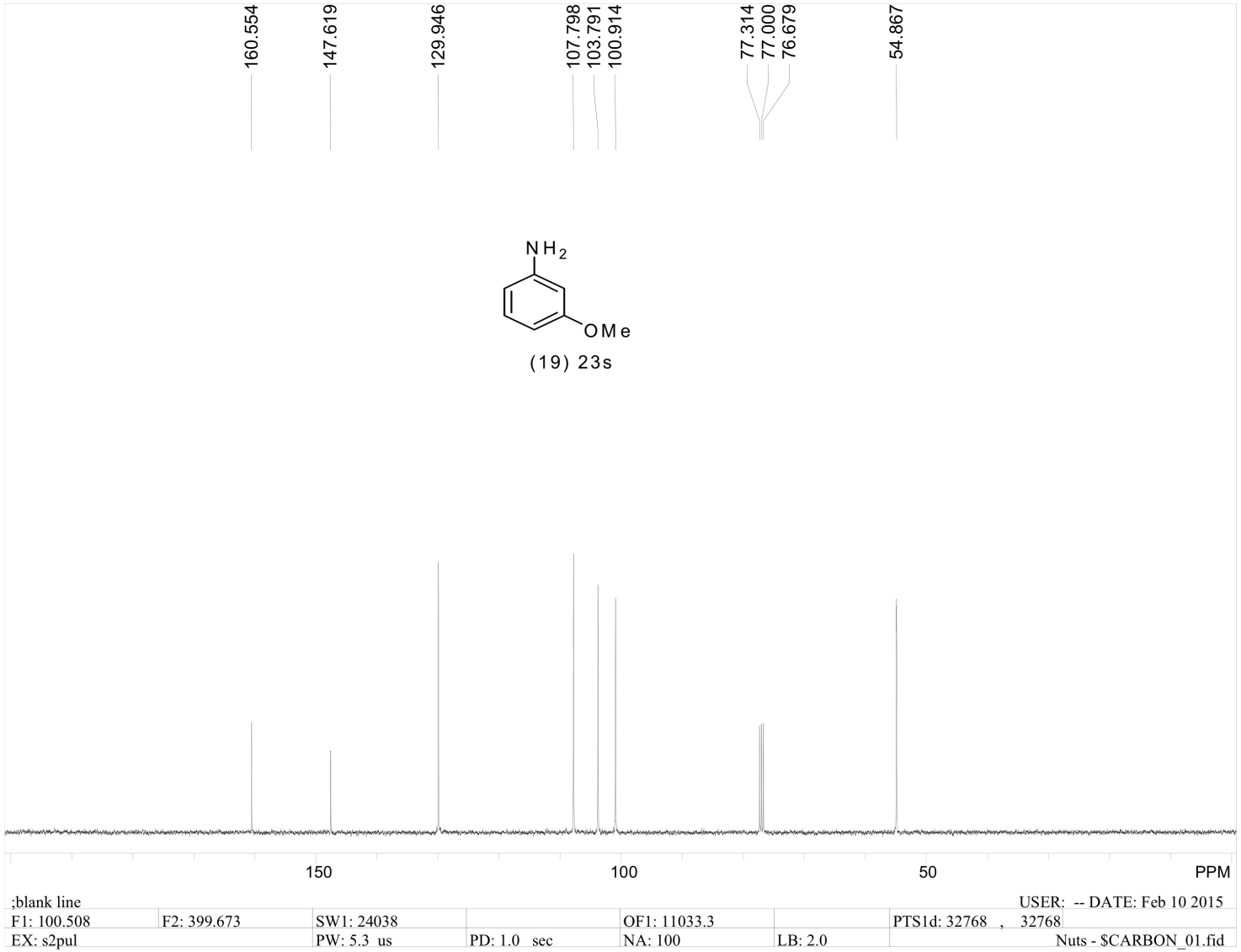

7.260
6.777
6.769
6.763
6.752
6.747
6.738
6.666
6.657
6.651
6.640
6.635
6.627
3.747
3.427
NH2
OMe
(17) 23q
3.20
2.21
2.07
2.00
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Feb 3 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.2
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.6 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

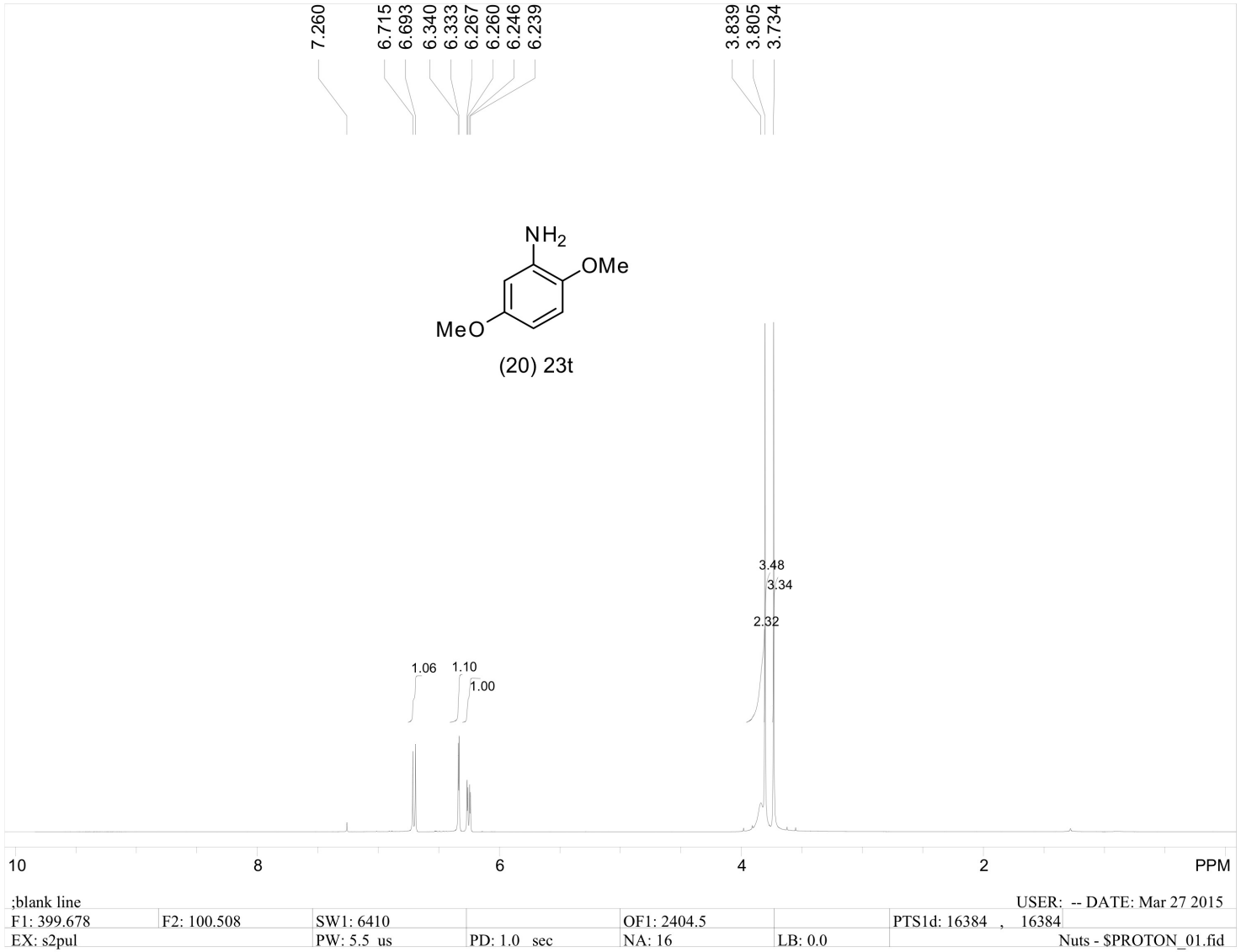

152.605
139.845
116.273
114.645
77.321
77.000
76.679
55.560
NH2
OMe
(17) 23q
150
100
50
PPM
;blank line
USER: -- DATE: Feb 3 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11039.2
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 300
LB: 2.0
Nuts - $CARBON_01.fid

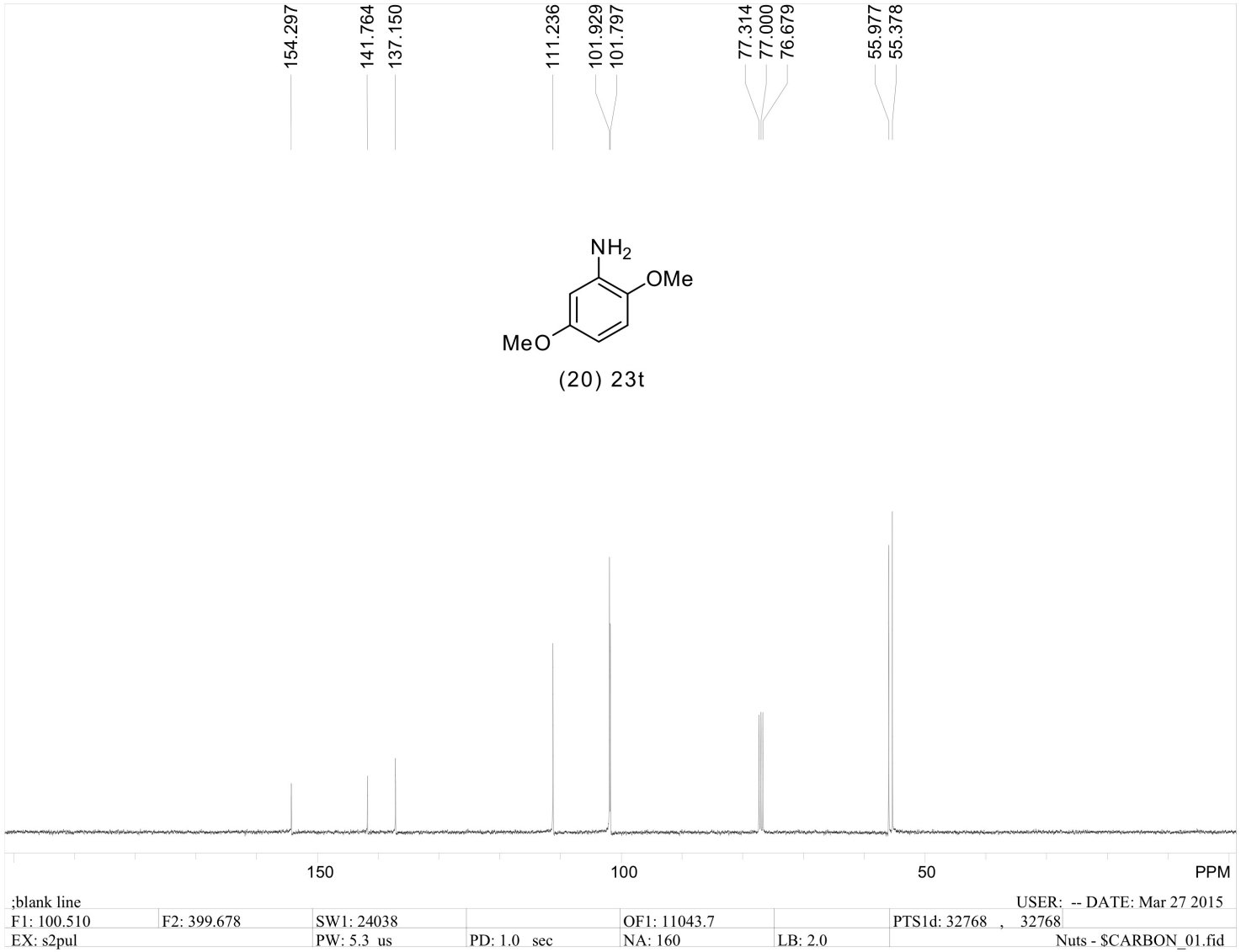

7.260
6.858
6.854
6.843
6.840
6.835
6.819
6.793
6.788
6.774
6.771
6.768
6.765
6.759
6.755
6.750
6.741
6.735
3.875
3.816
NH2
OMe
(18) 23r
3.47
2.27
2.00
1.99
8
6
4
2
PPM
;blank line
USER: -- DATE: Mar 25 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2404.5
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

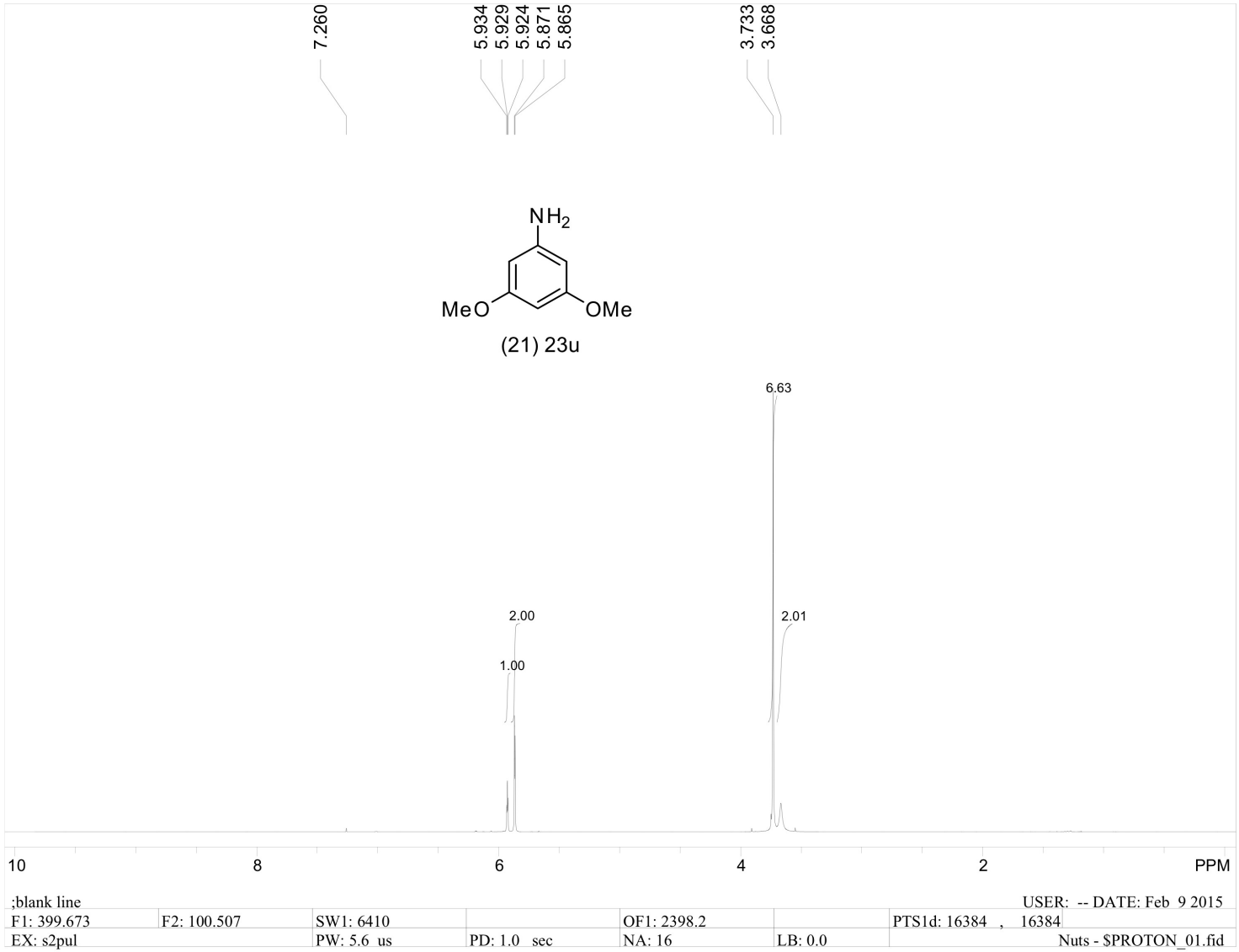

147.195
136.070
120.959
118.324
114.900
110.331
77.321
77.000
76.679
55.283
NH2
OMe
(18) 23r
150
100
50
PPM
;blank line
USER: -- DATE: Mar 25 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11040.8
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 120
LB: 2.0
Nuts - $CARBON_01.fid

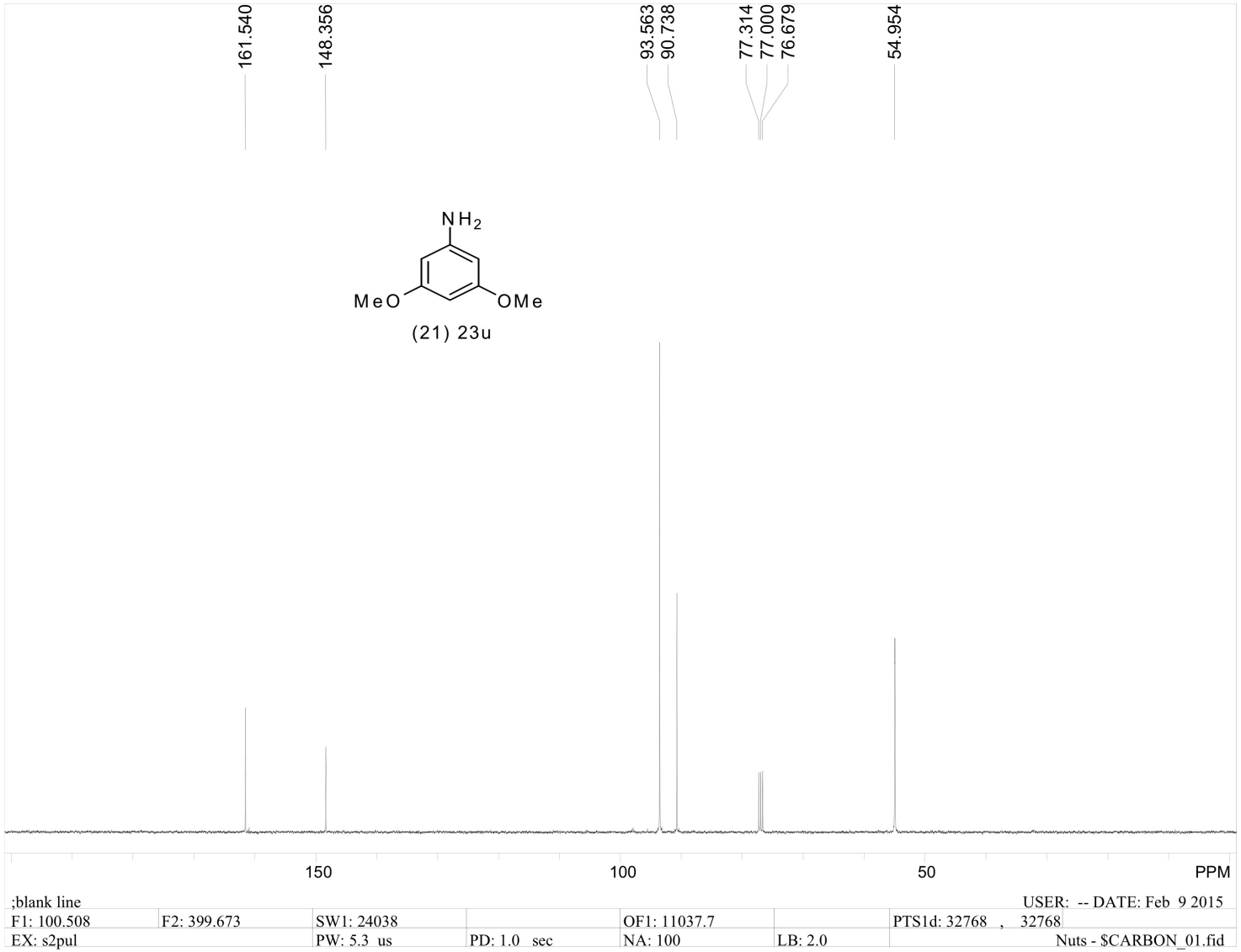

7.260
7.110
7.091
7.070
6.375
6.370
6.354
6.350
6.327
6.325
6.321
6.319
6.307
6.305
6.302
6.300
6.273
6.267
6.261
3.775
3.707
NH2
OMe
(19) 23s
3.13
2.16
1.97
1.00
0.99
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Feb 10 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.2
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.6 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

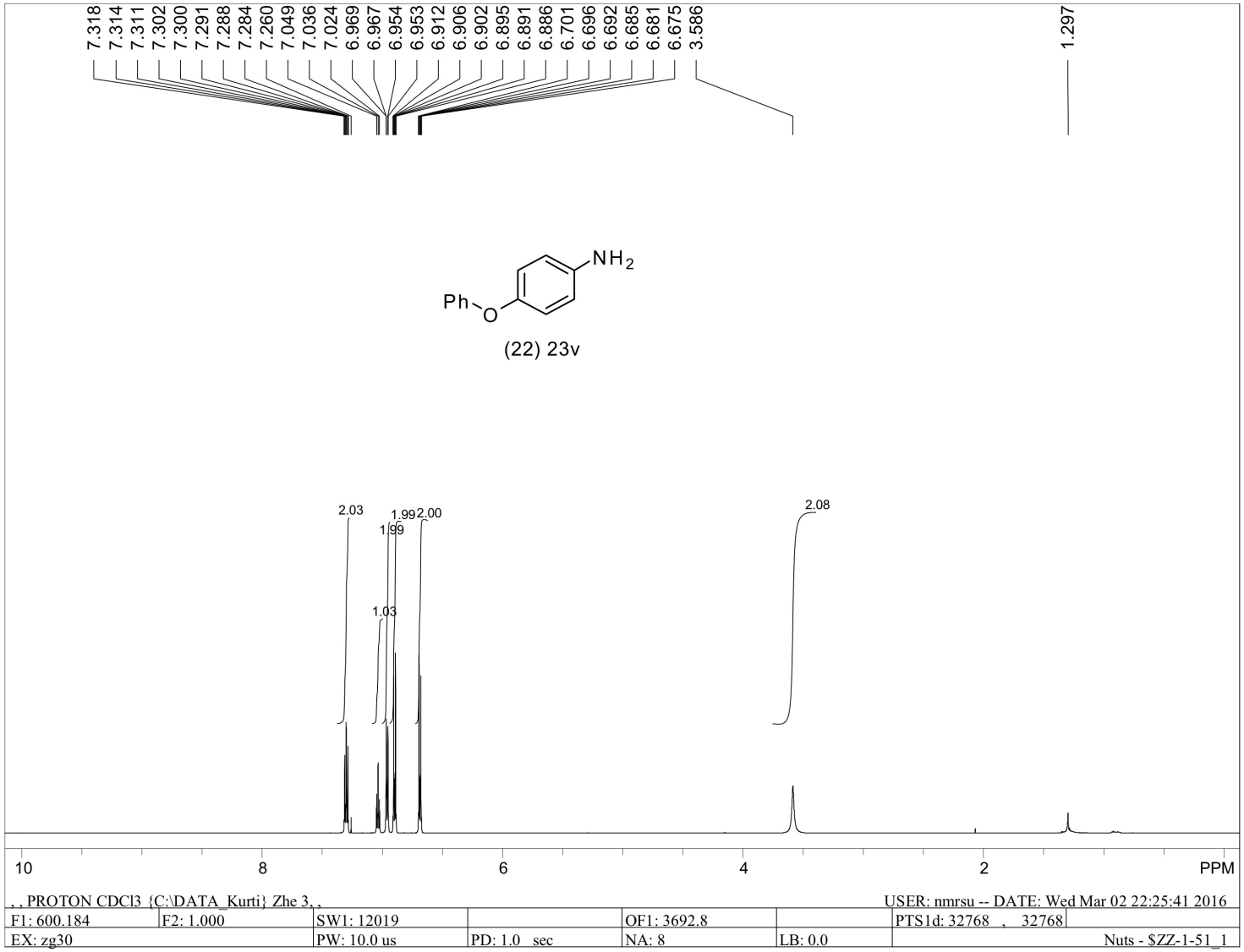

160.554
147.619
129.946
107.798
103.791
100.914
77.314
77.000
76.679
54.867
NH2
OMe
(19) 23s
150
100
50
PPM
;blank line
USER: -- DATE: Feb 10 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11033.3
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 100
LB: 2.0
Nuts - $CARBON_01.fid

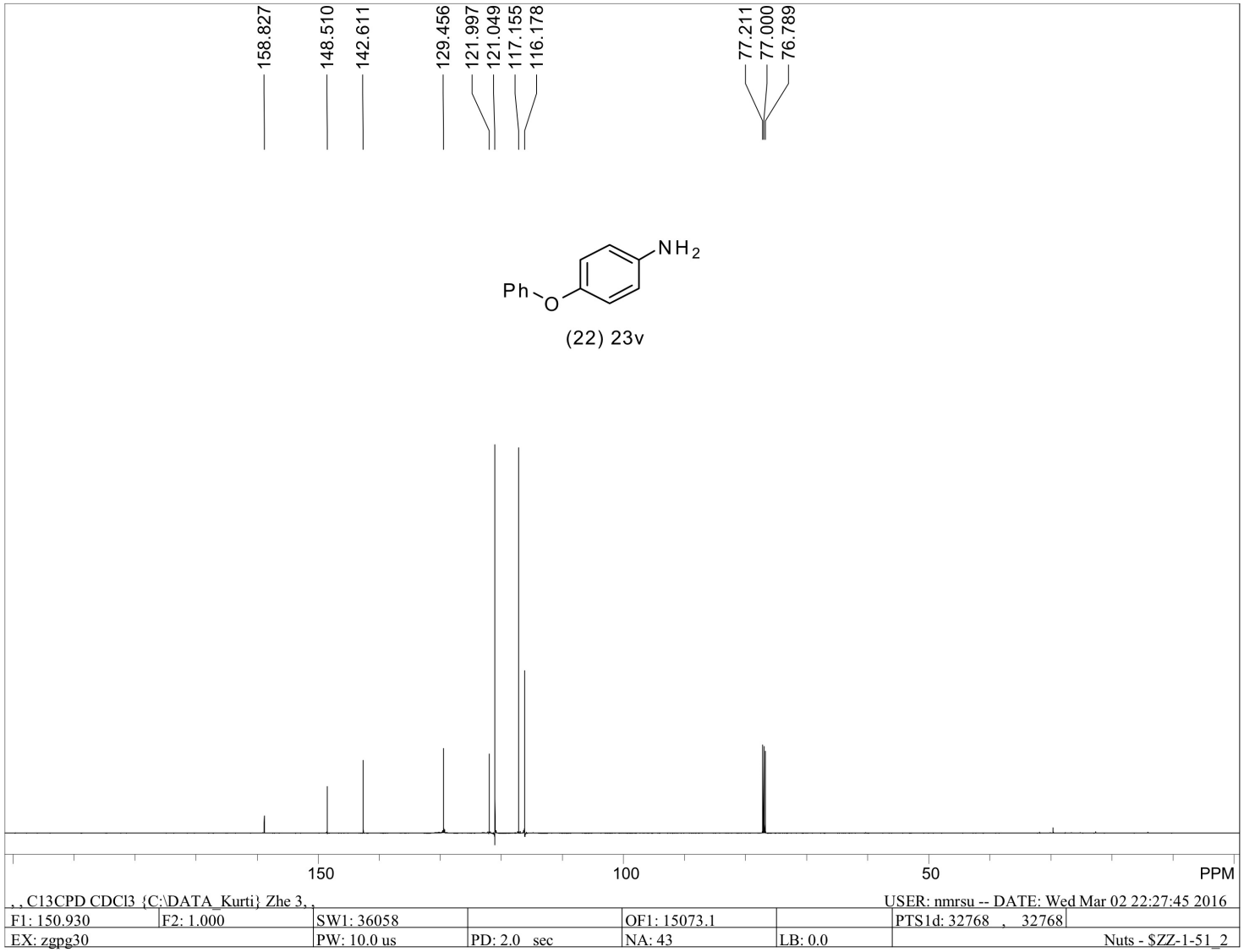

7.260
6.715
6.693
6.340
6.333
6.267
6.260
6.246
6.239
3.839
3.805
3.734
NH2
OMe
MeO
(20) 23t
3.48
3.34
2.32
1.06
1.10
1.00
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Mar 27 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2404.5
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

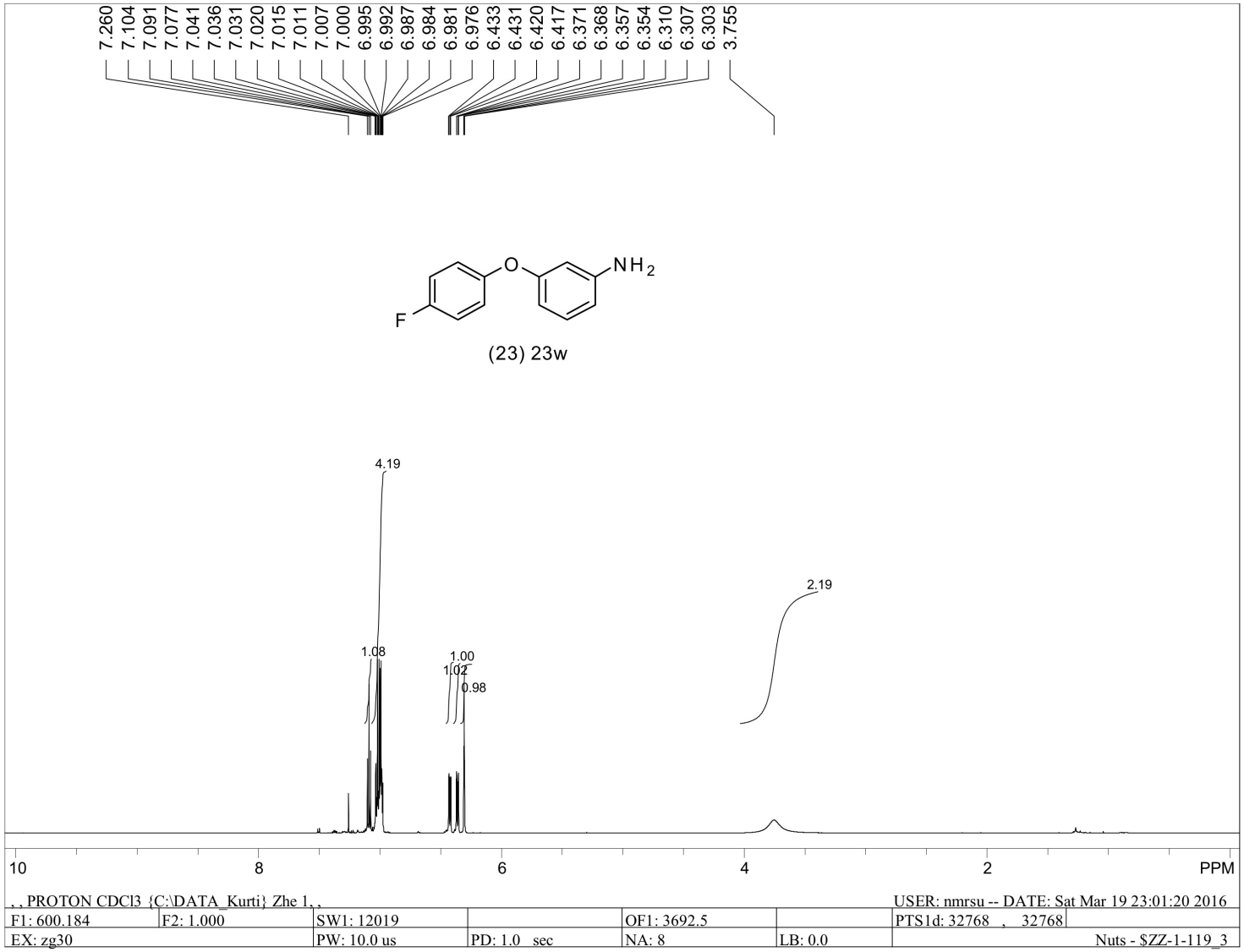

154.297
141.764
137.150
111.236
101.929
101.797
77.314
77.000
76.679
55.977
55.378
NH2
OMe
MeO
(20) 23t
150
100
50
PPM
;blank line
USER: -- DATE: Mar 27 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11043.7
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 160
LB: 2.0
Nuts - $CARBON_01.fid

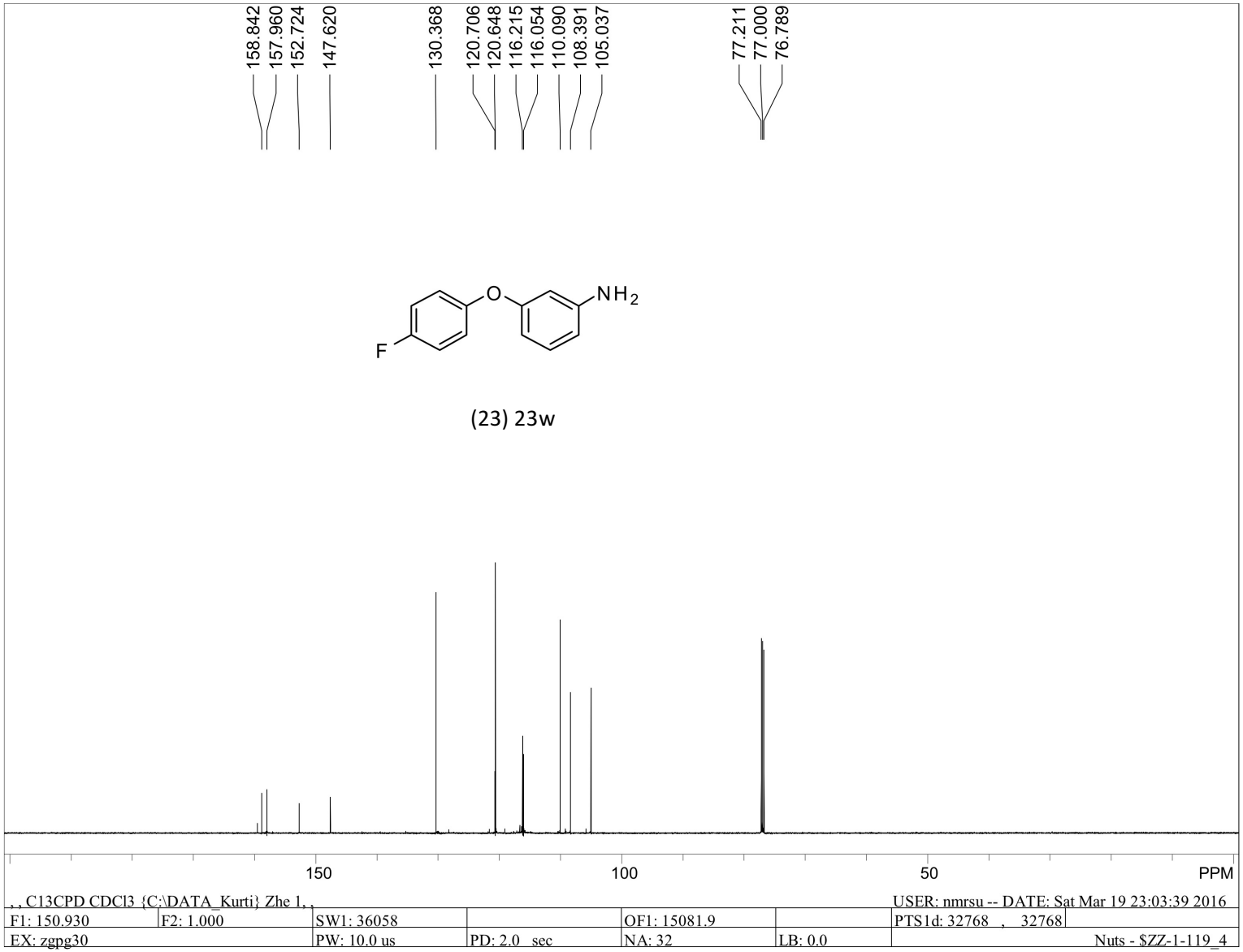

7.260
5.934
5.929
5.924
5.871
5.865
3.733
3.668
NH2
MeO
OMe
(21) 23u
6.63
2.00
2.01
1.00
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Feb 9 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.2
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.6 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid


161.540
148.356
93.563
90.738
77.314
77.000
76.679
54.954
NH2
MeO
OMe
(21) 23u
150
100
50
PPM
;blank line
USER: -- DATE: Feb 9 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11037.7
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 100
LB: 2.0
Nuts - $CARBON_01.fid

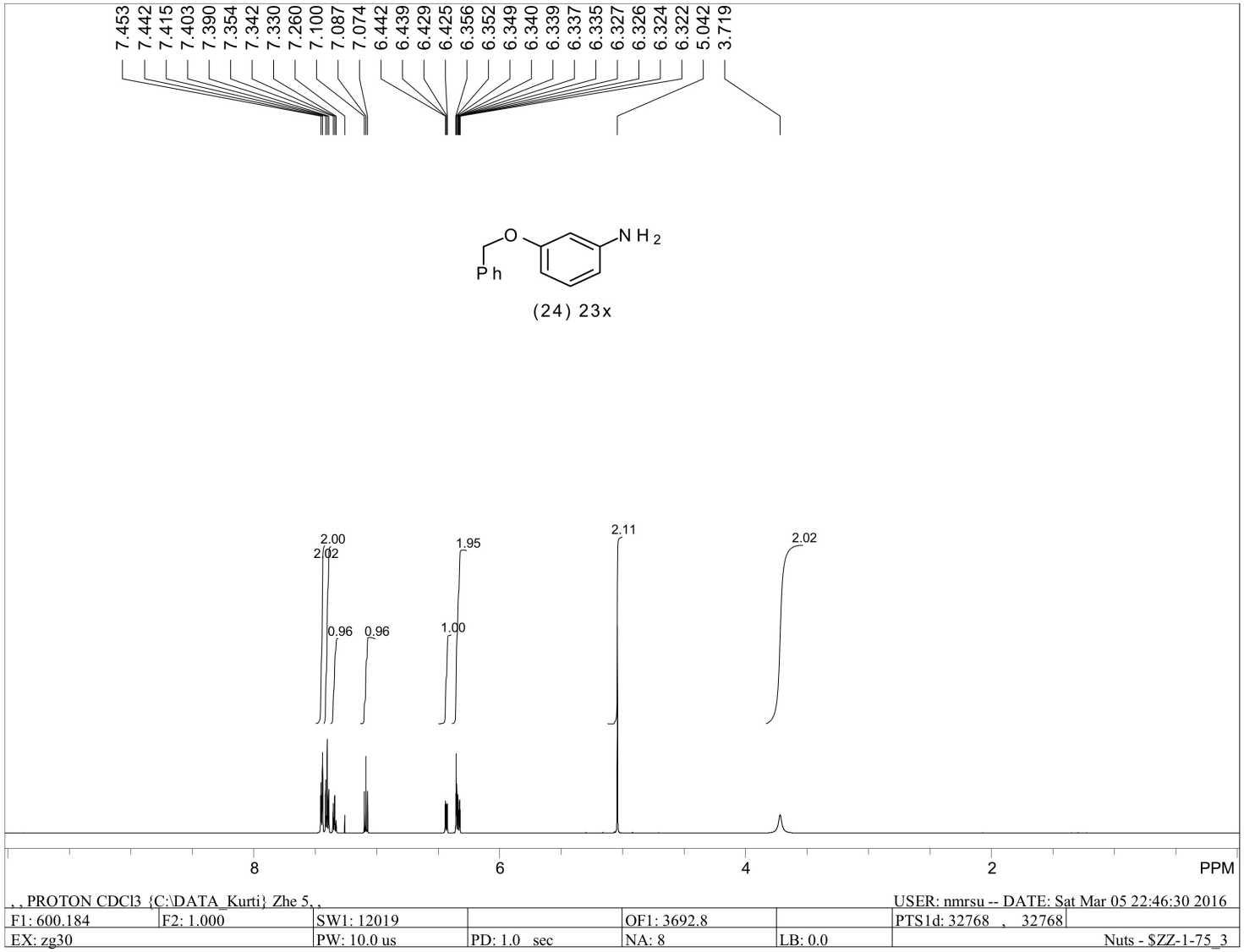

7.318
7.314
7.311
7.302
7.300
7.291
7.288
7.284
7.260
7.049
7.036
7.024
6.969
6.967
6.954
6.953
6.912
6.906
6.902
6.895
6.891
6.886
6.701
6.696
6.692
6.685
6.681
6.675
3.586
1.297
NH2
Ph
O
(22) 23v
2.03
1.99
2.00
1.99
1.03
2.08
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 3, ,
USER: nmrsu -- DATE: Wed Mar 02 22:25:41 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ZZ-1-51_1

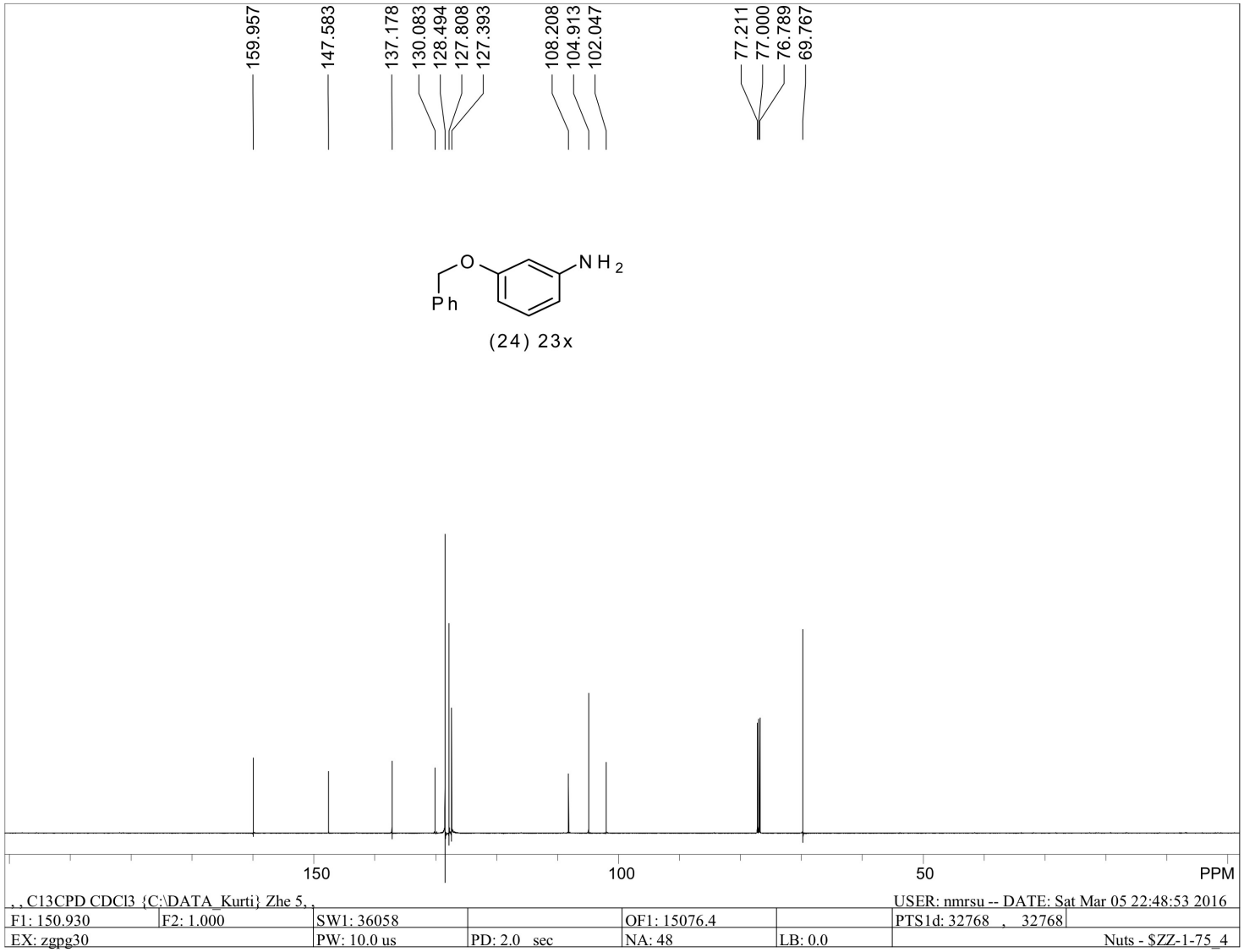

158.827
148.510
142.611
129.456
121.997
121.049
117.155
116.178
77.211
77.000
76.789
NH2
Ph
O
(22) 23v
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Zhe 3, ,
USER: nmrsu -- DATE: Wed Mar 02 22:27:45 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15073.1
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 43
LB: 0.0
Nuts - $ZZ-1-51_2

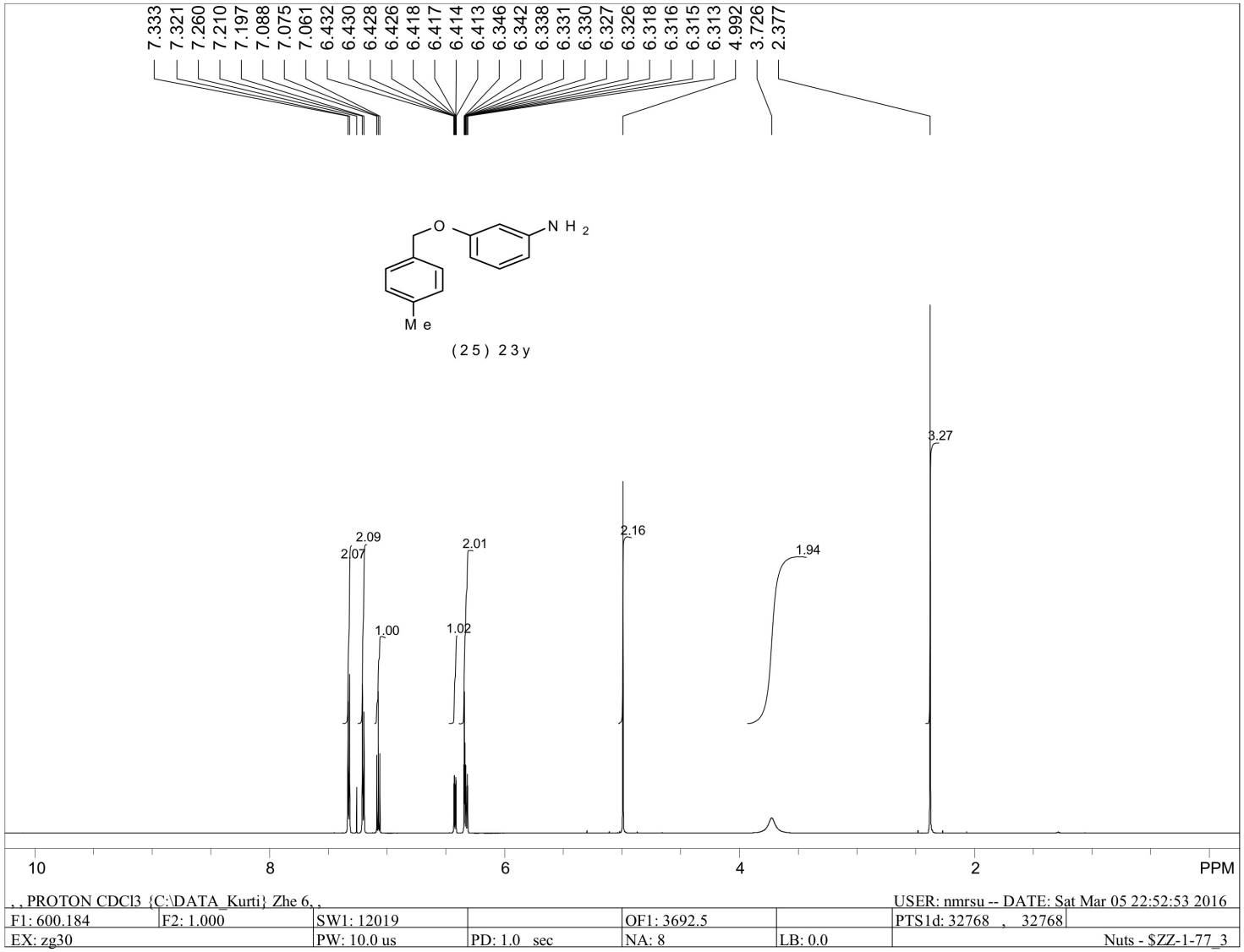

7.260
7.104
7.091
7.077
7.041
7.036
7.031
7.020
7.015
7.011
7.007
7.000
6.995
6.992
6.987
6.984
6.981
6.976
6.433
6.431
6.420
6.417
6.371
6.368
6.357
6.354
6.310
6.307
6.303
3.755
O
NH2
F
(23) 23w
4.19
2.19
1.08
1.00
1.02
0.98
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 1, ,
USER: nmrsu -- DATE: Sat Mar 19 23:01:20 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.5
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ZZ-1-119_3

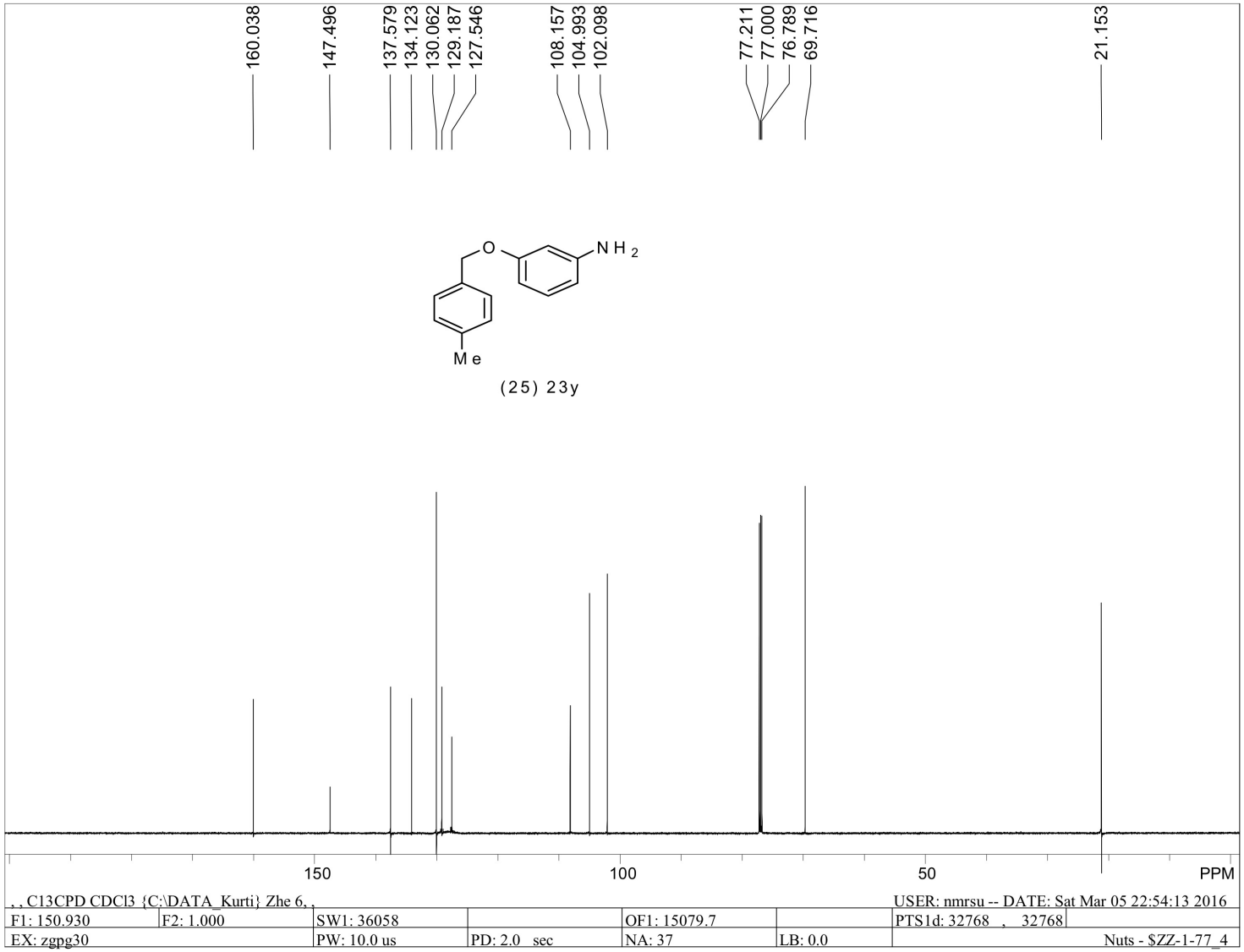

158.842
157.960
152.724
147.620
130.368
120.706
120.648
116.215
116.054
110.090
108.391
105.037
77.211
77.000
76.789
O
NH2
F
150
100
50
PPM
. , C13CPD CDCl3 {C:\DATA_Kurti} Zhe 1, .
USER: nmrsu -- DATE: Sat Mar 19 23:03:39 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15081.9
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 32
LB: 0.0
Nuts - $ZZ-1-119_4

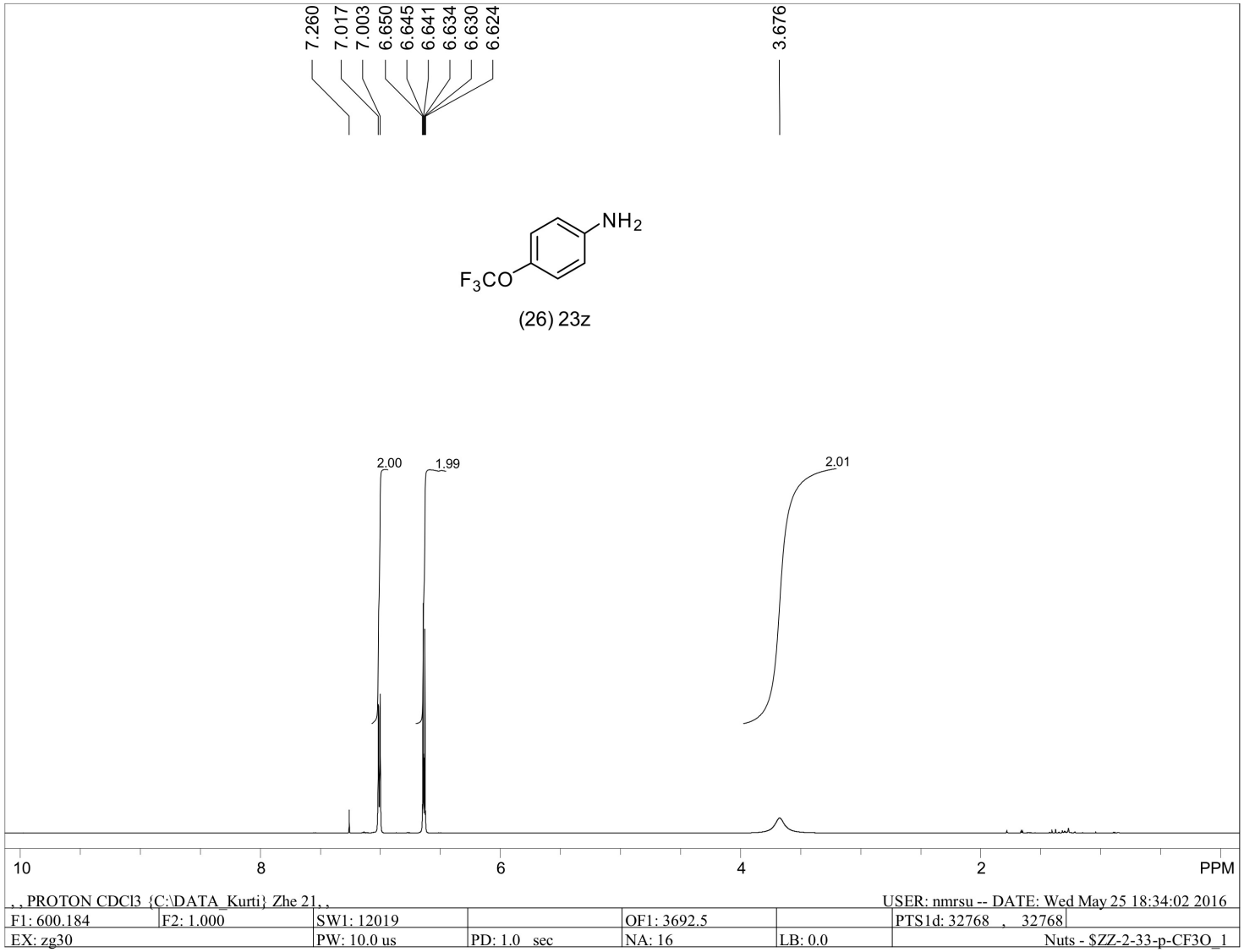
(23) 23w

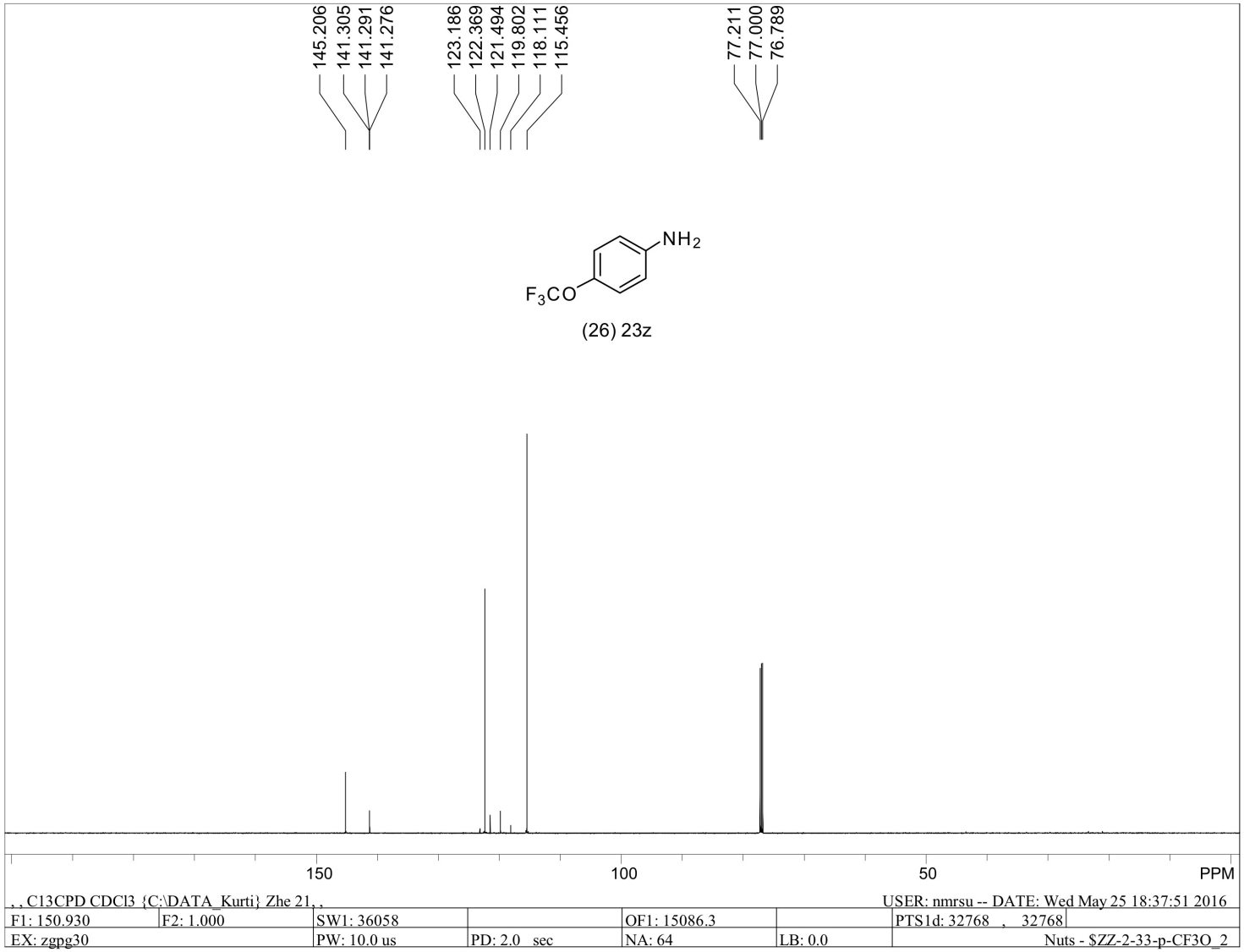

7.453
7.442
7.415
7.403
7.390
7.354
7.342
7.330
7.260
7.100
7.087
7.074
6.442
6.439
6.429
6.425
6.356
6.352
6.349
6.340
6.339
6.337
6.335
6.327
6.326
6.324
6.322
5.042
3.719
O
NH2
Ph
(24) 23x
2.00
2.02
0.96
0.96
1.95
1.00
2.11
2.02
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 5, ,
USER: nmrsu -- DATE: Sat Mar 05 22:46:30 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ZZ-1-75_3

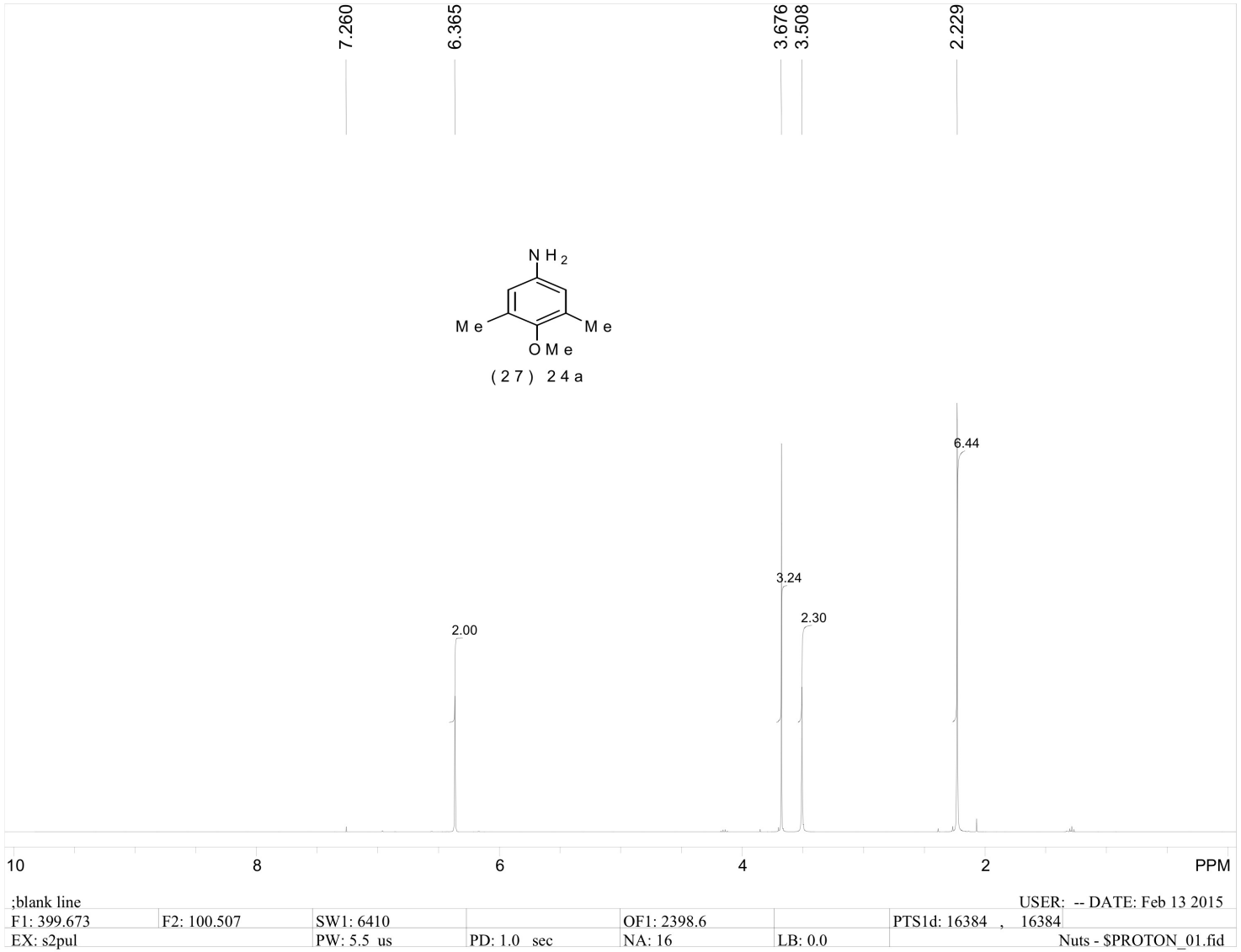

159.957
147.583
137.178
130.083
128.494
127.808
127.393
108.208
104.913
102.047
77.211
77.000
76.789
69.767
O
NH2
Ph
(24) 23x
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Zhe 5, ,
USER: nmrsu -- DATE: Sat Mar 05 22:48:53 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15076.4
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 48
LB: 0.0
Nuts - $ZZ-1-75_4

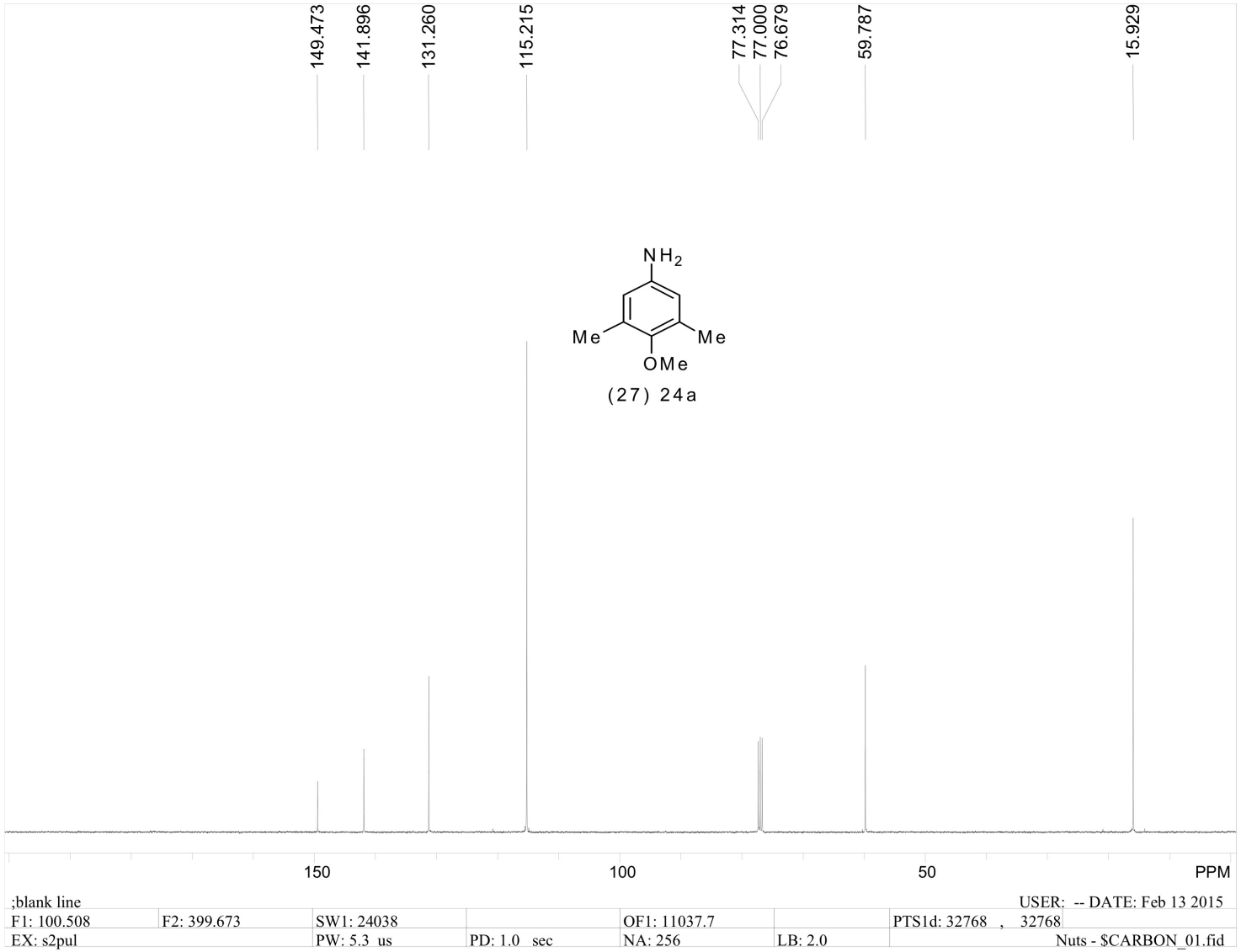

7.333
7.321
7.260
7.210
7.197
7.088
7.075
7.061
6.432
6.430
6.428
6.426
6.418
6.417
6.414
6.413
6.346
6.342
6.338
6.331
6.330
6.327
6.326
6.318
6.316
6.315
6.313
4.992
3.726
2.377
O
N H 2
M e
(25) 23y
3.27
2.16
2.09
2.07
2.01
1.94
1.00
1.02
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 6, ,
USER: nmrsu -- DATE: Sat Mar 05 22:52:53 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.5
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ZZ-1-77_3

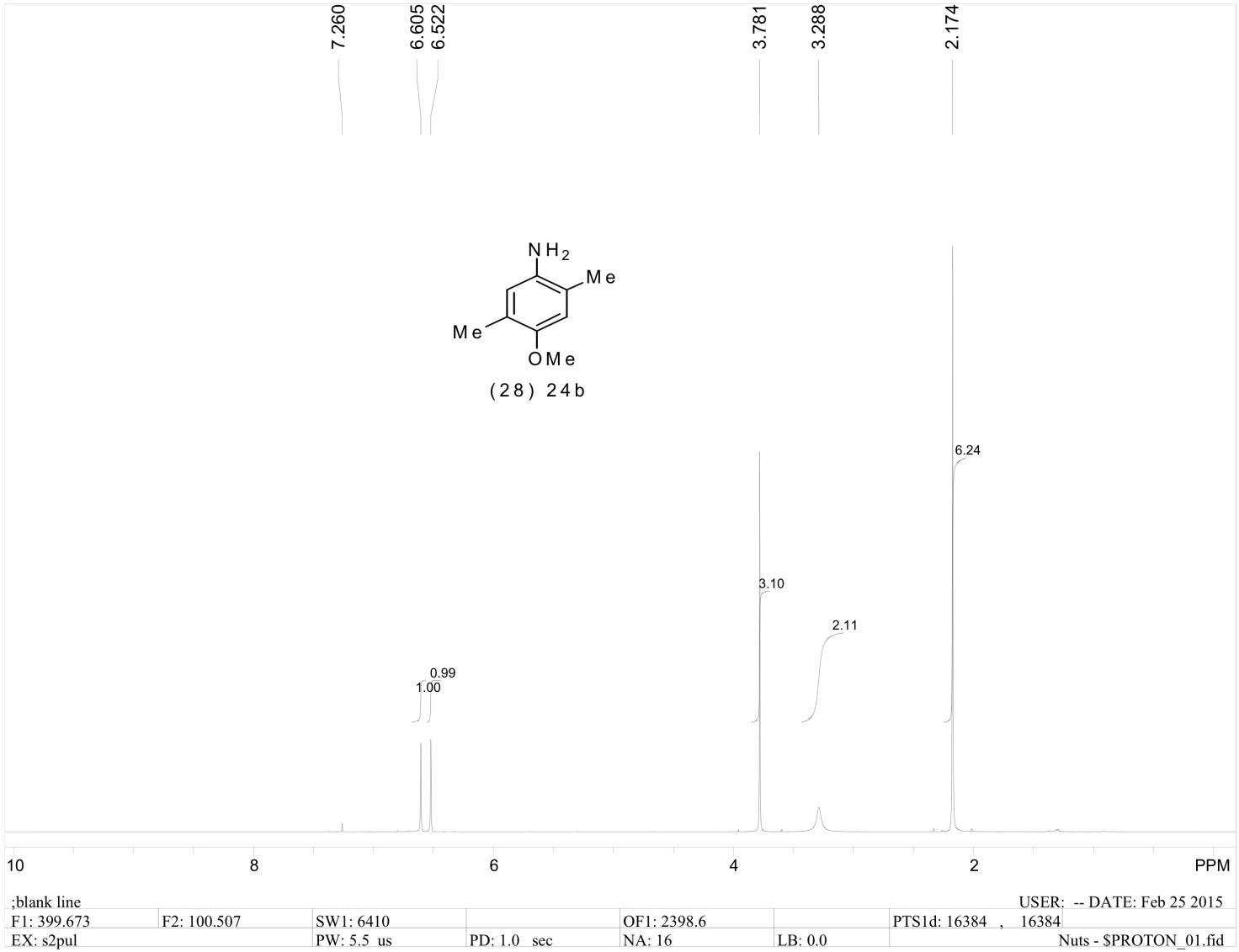

160.038
147.496
137.579
134.123
130.062
129.187
127.546
108.157
104.993
102.098
77.211
77.000
76.789
69.716
21.153
O
NH2
Me
(25) 23y
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Zhe 6, ,
USER: nmrsu -- DATE: Sat Mar 05 22:54:13 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15079.7
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 37
LB: 0.0
Nuts - $ZZ-1-77_4

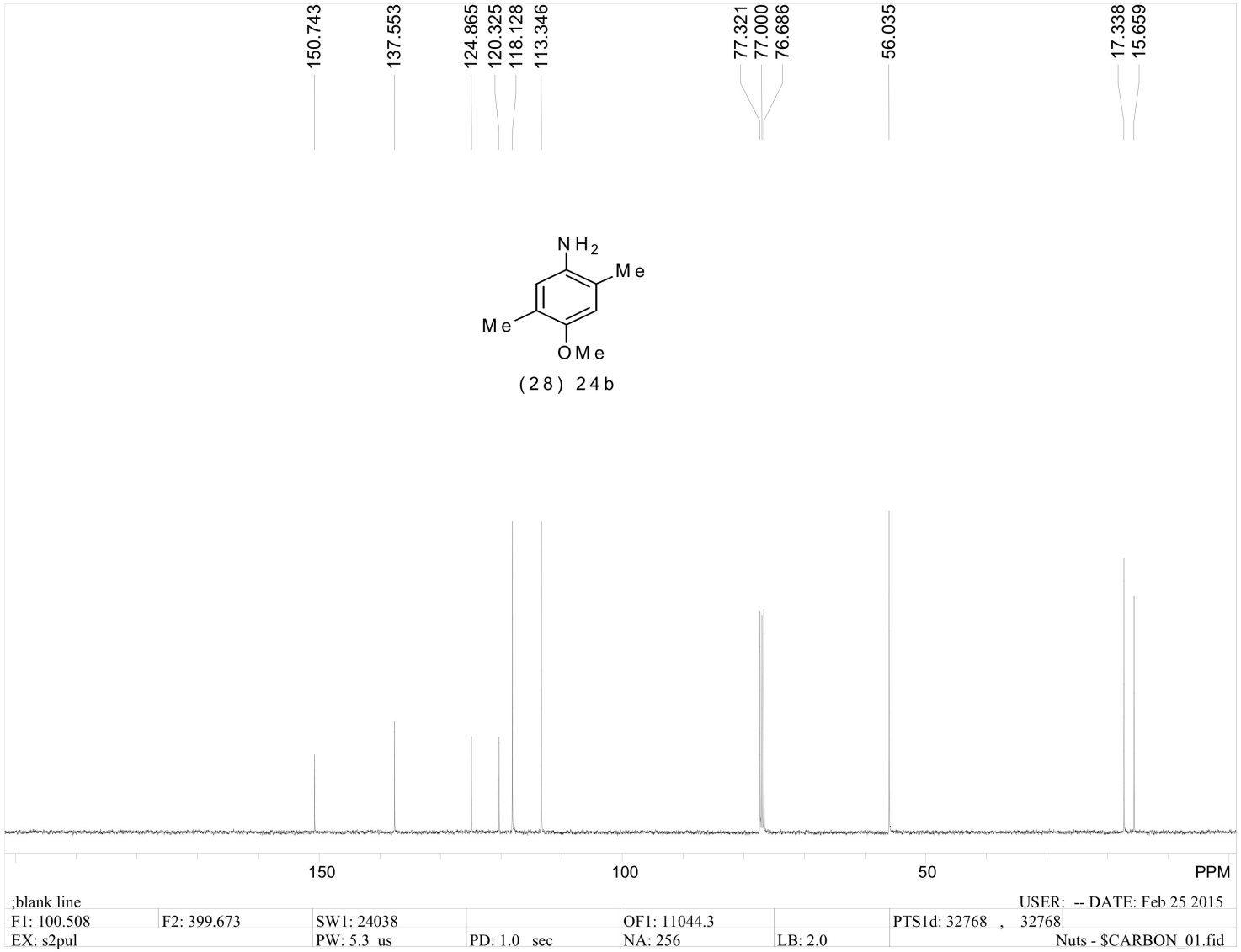

7.260
7.017
7.003
6.650
6.645
6.641
6.634
6.630
6.624
3.676
NH2
F3CO
(26) 23z
2.00
1.99
2.01
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 21, ,
USER: nmrsu -- DATE: Wed May 25 18:34:02 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.5
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $ZZ-2-33-p-CF3O_1

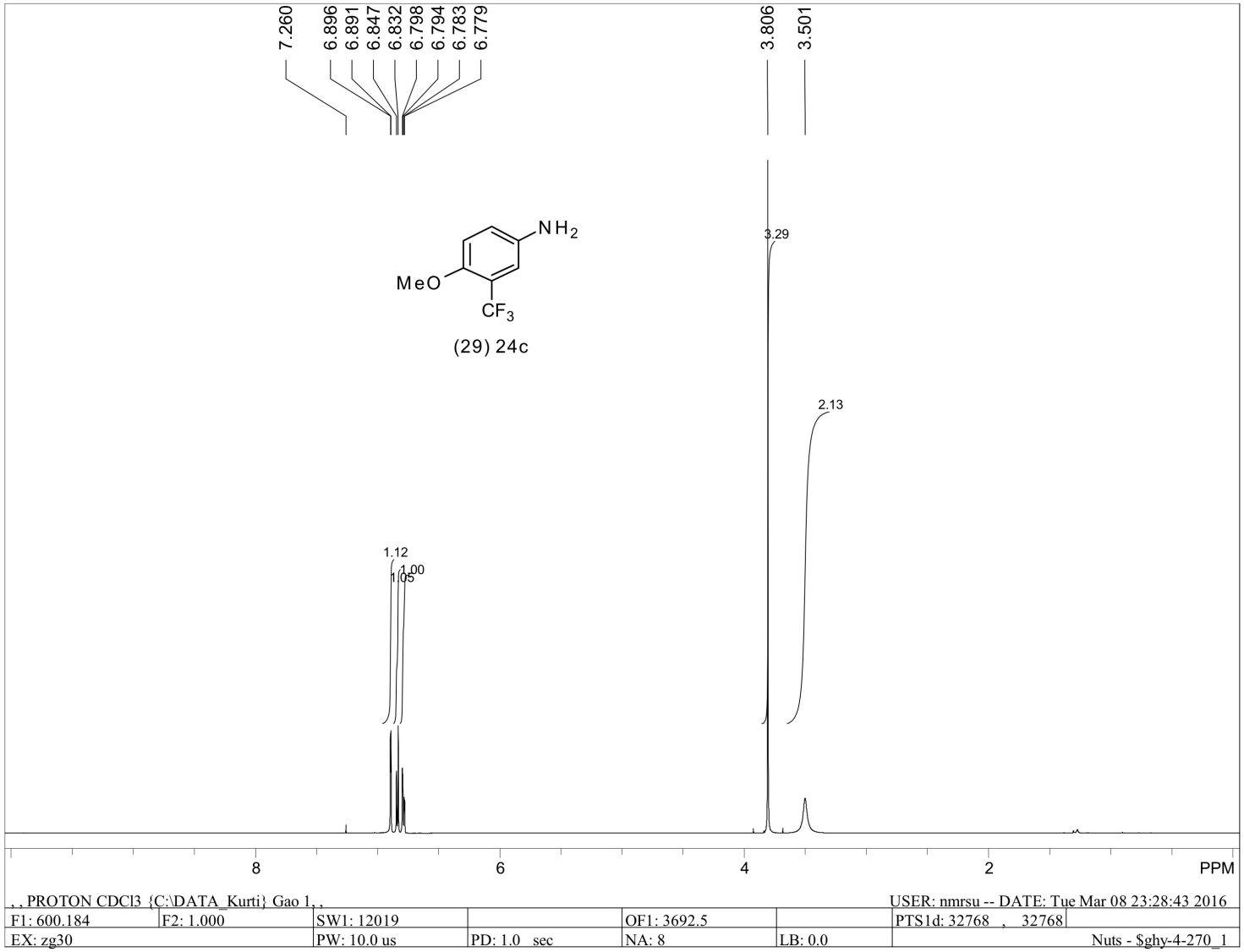

145.206
141.305
141.291
141.276
123.186
122.369
121.494
119.802
118.111
115.456
77.211
77.000
76.789
NH2
F3CO
(26) 23z
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Zhe 21, ,
USER: nmrsu -- DATE: Wed May 25 18:37:51 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15086.3
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 64
LB: 0.0
Nuts - $ZZ-2-33-p-CF3O_2

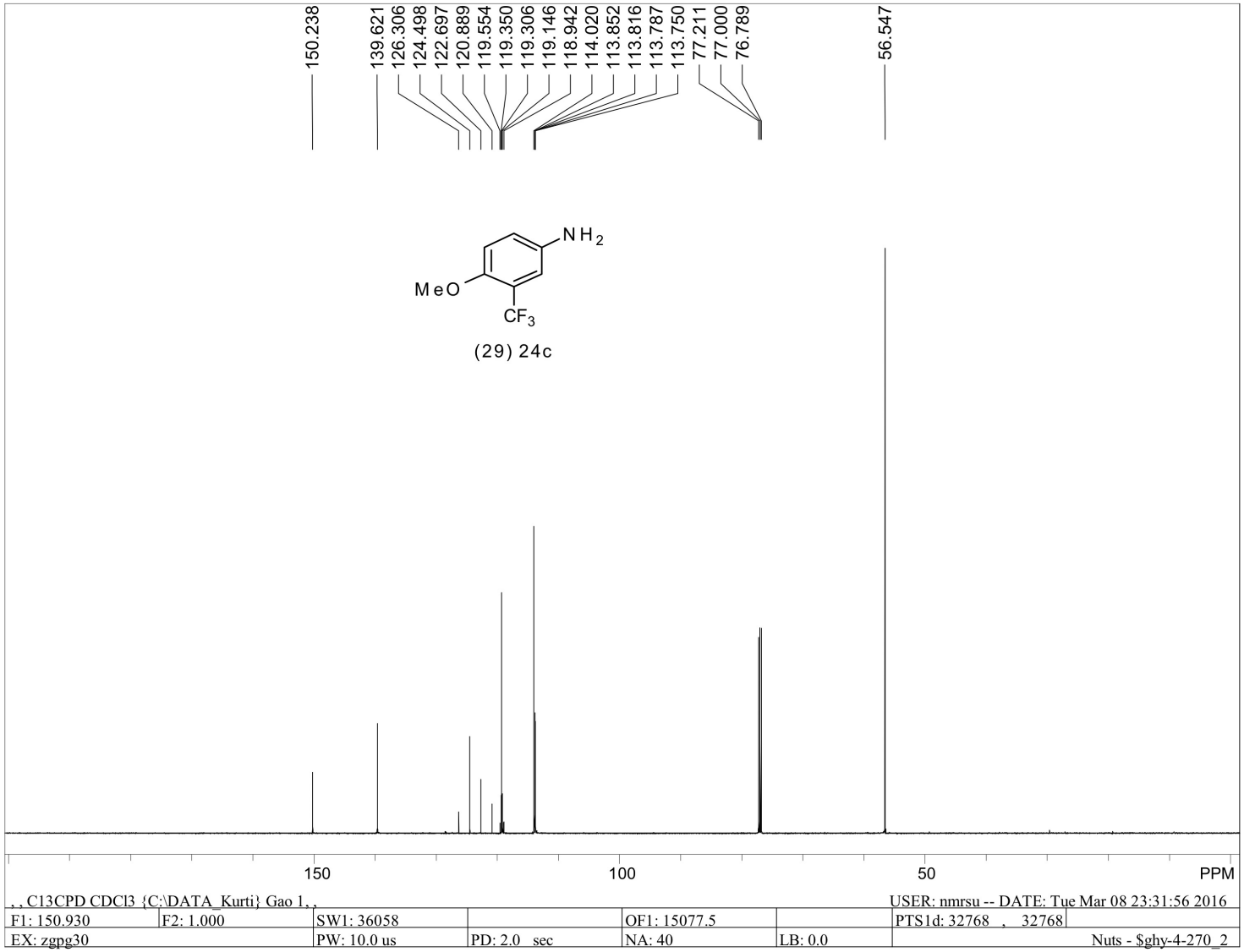

7.260
6.365
3.676
3.508
2.229
NH2
Me
Me
OMe
(27) 24a
6.44
3.24
2.30
2.00
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Feb 13 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.6
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

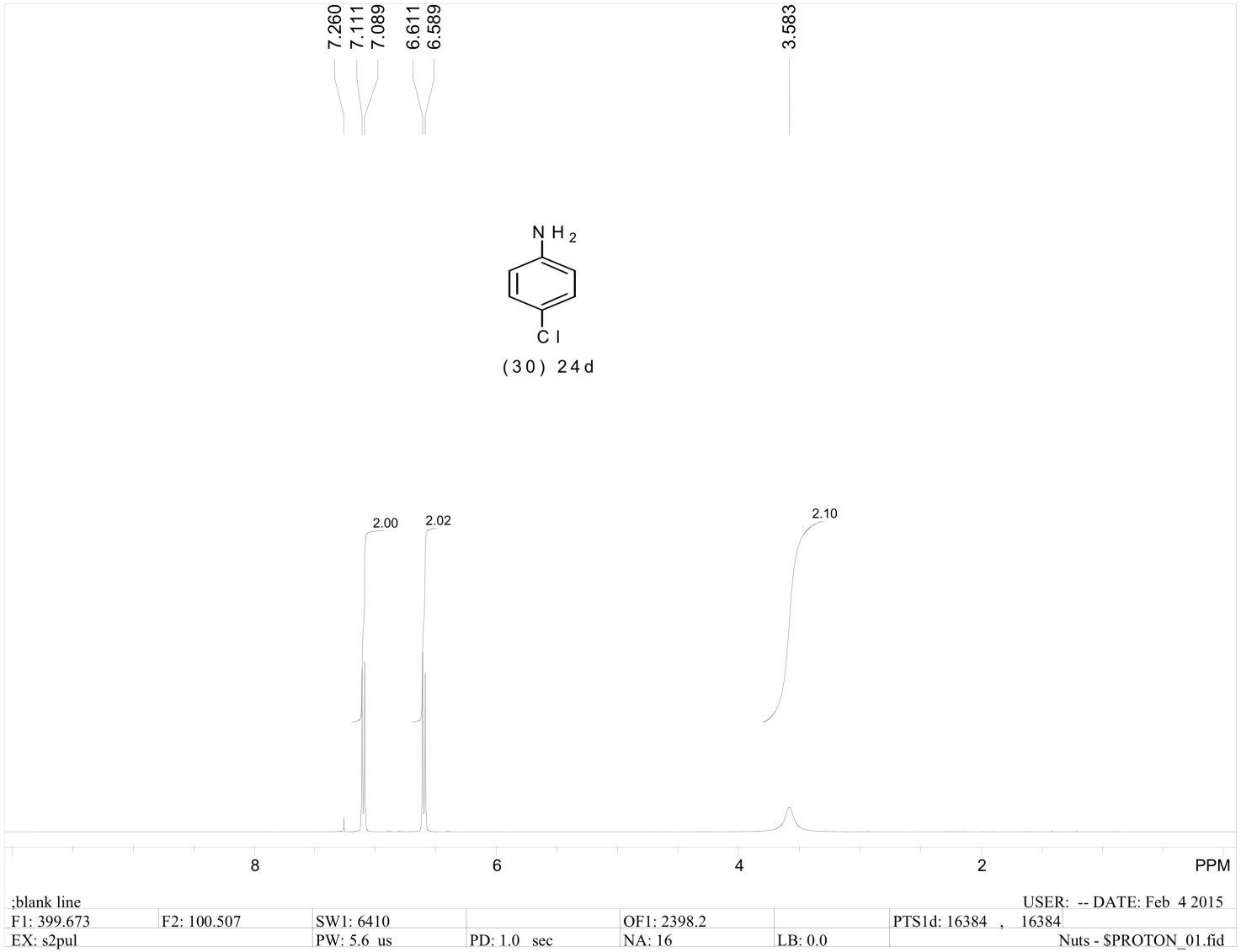

149.473
141.896
131.260
115.215
77.314
77.000
76.679
59.787
15.929
NH2
Me
Me
OMe
(27) 24a
150
100
50
PPM
;blank line
USER: -- DATE: Feb 13 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11037.7
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 2.0
Nuts - $CARBON_01.fid

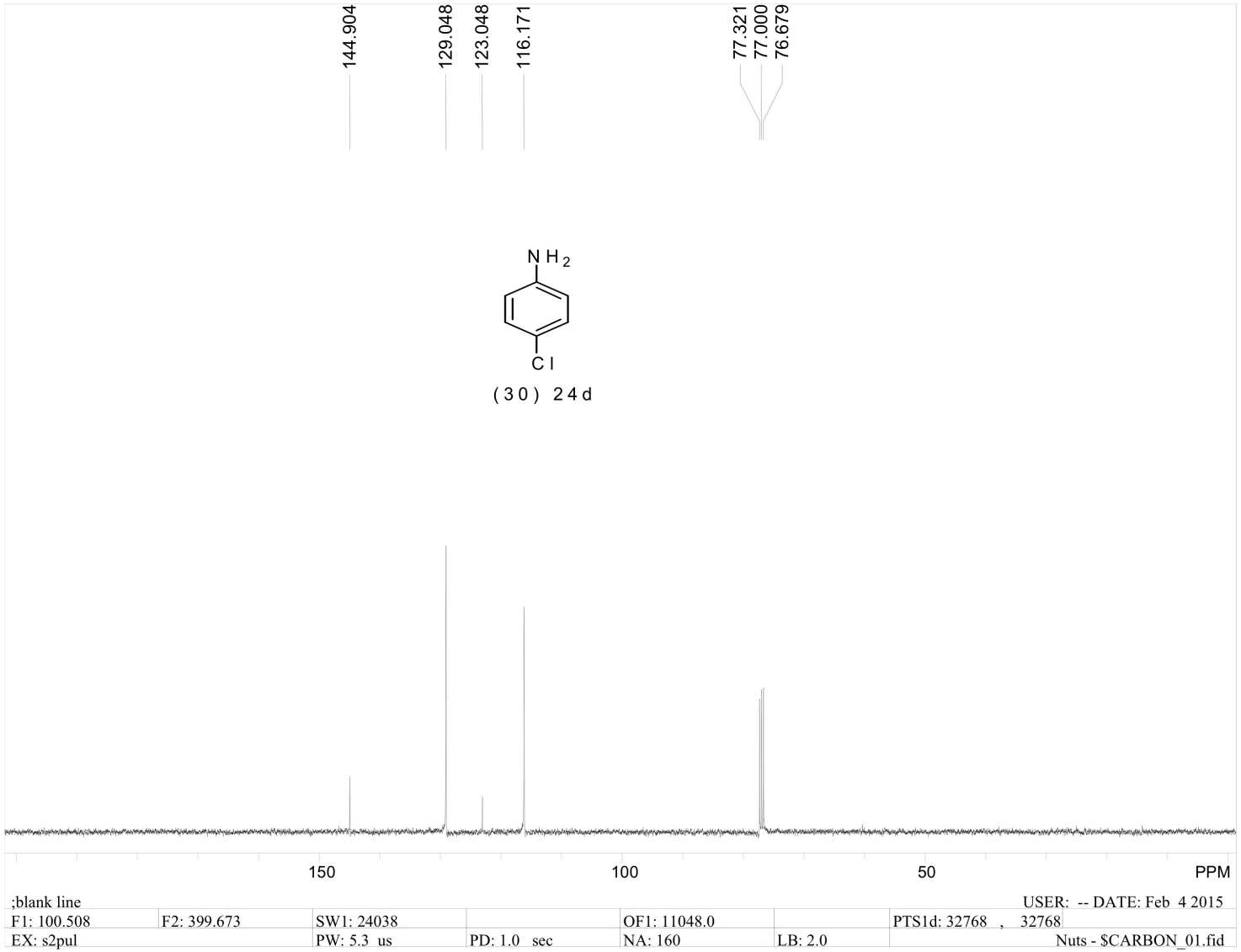

7.260
6.605
6.522
3.781
3.288
2.174
NH2
Me
Me
OMe
(28) 24b
6.24
3.10
2.11
0.99
1.00
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Feb 25 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.6
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

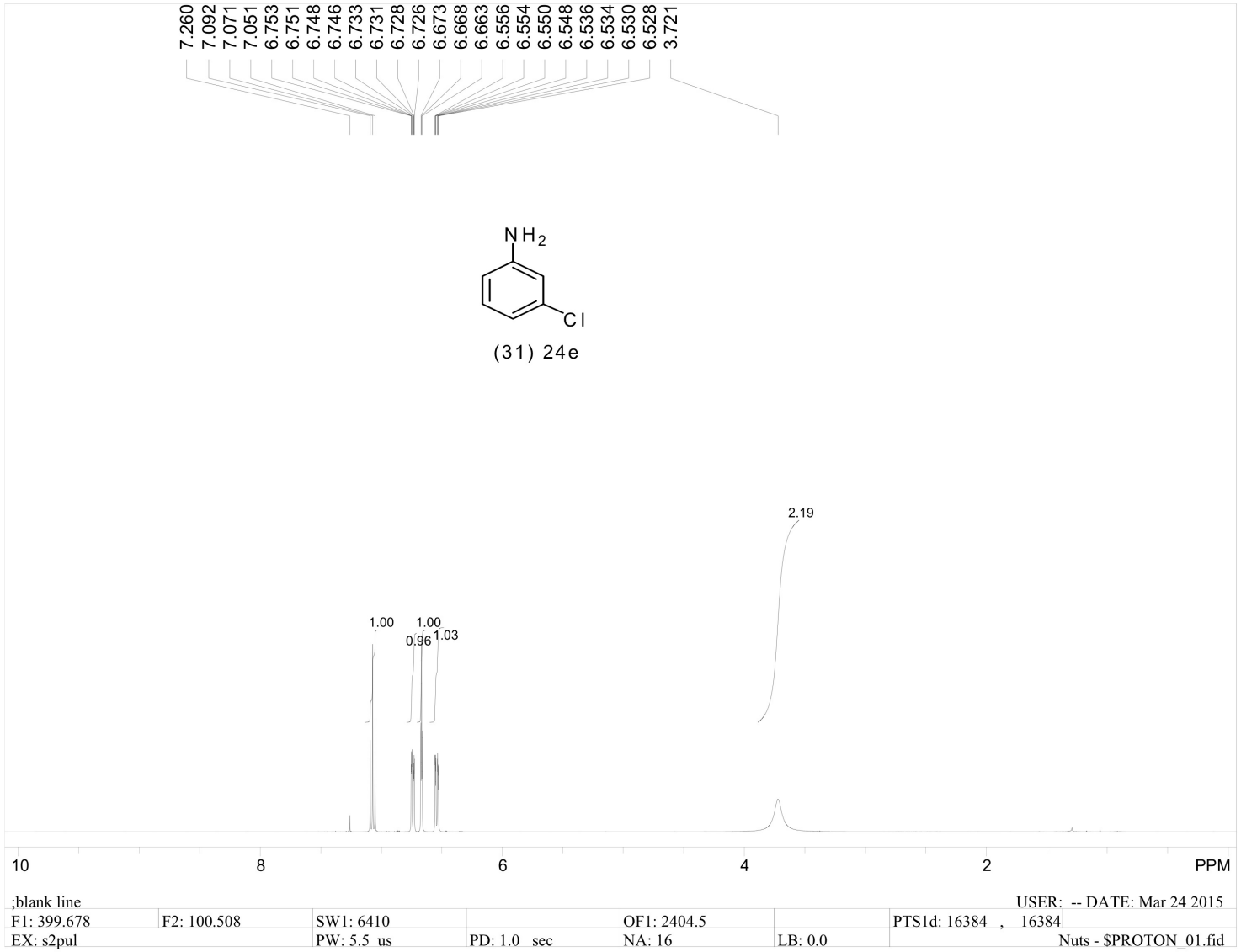

150.743
137.553
124.865
120.325
118.128
113.346
77.321
77.000
76.686
56.035
17.338
15.659
NH2
Me
Me
OMe
(28) 24b
150
100
50
PPM
;blank line
USER: -- DATE: Feb 25 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11044.3
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 2.0
Nuts - $CARBON_01.fid

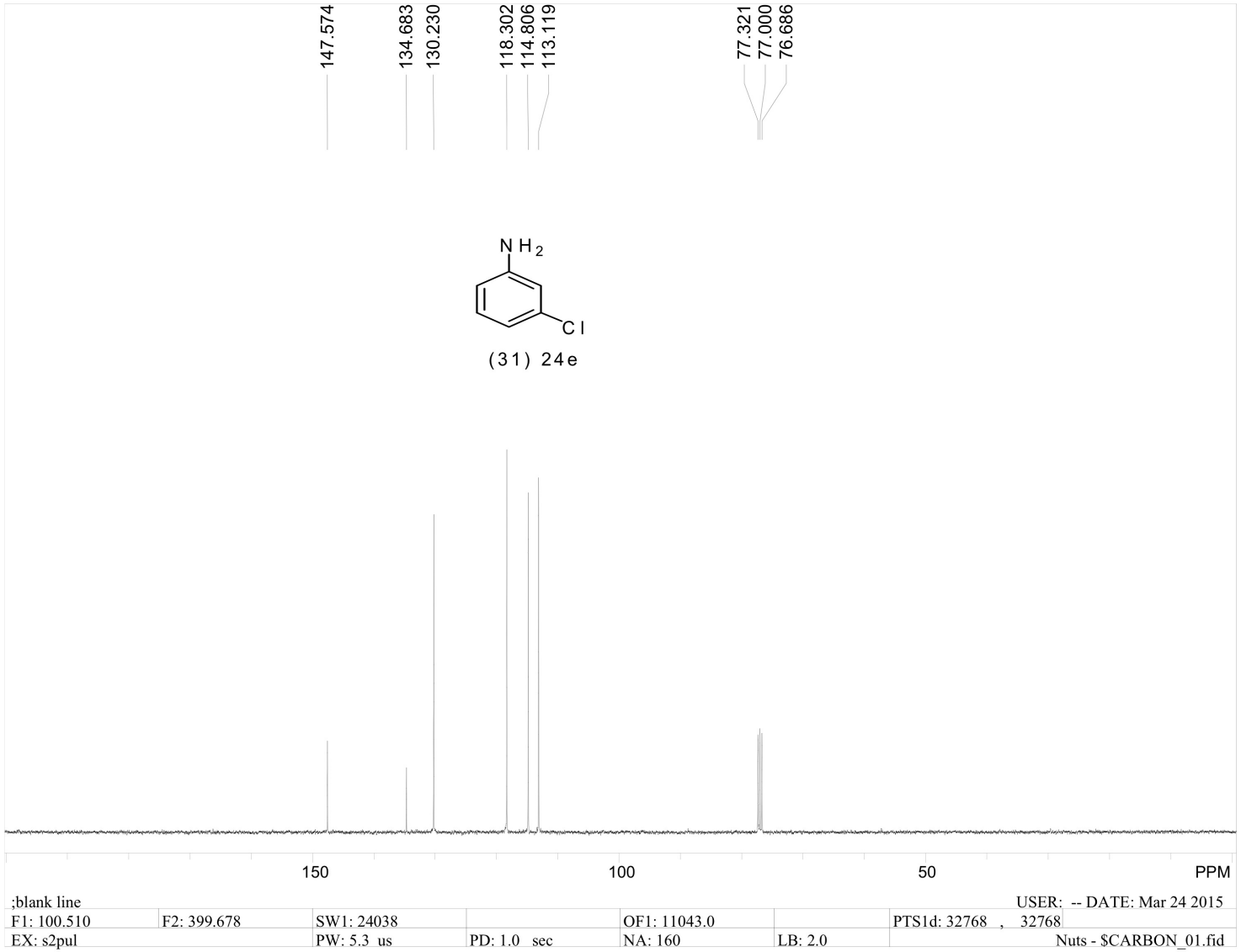

7.260
6.896
6.891
6.847
6.832
6.798
6.794
6.783
6.779
3.806
3.501
NH2
MeO
CF3
(29) 24c
3.29
2.13
1.12
1.00
1.05
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 1, ,
USER: nmrsu -- DATE: Tue Mar 08 23:28:43 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.5
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-270_1

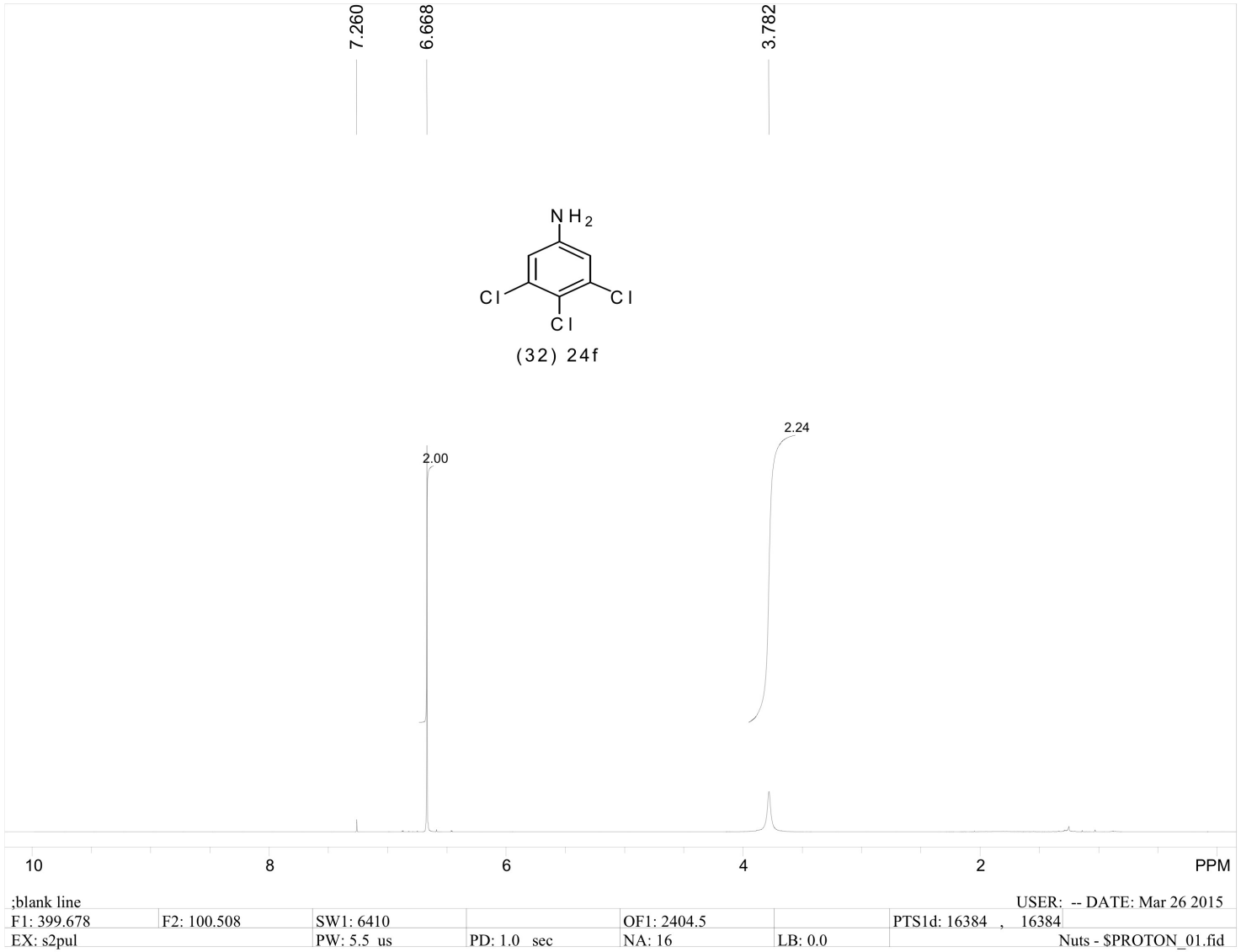

150.238
139.621
126.306
124.498
122.697
120.889
119.554
119.350
119.306
119.146
118.942
114.020
113.852
113.816
113.787
113.750
77.211
77.000
76.789
56.547
NH2
MeO
CF3
(29) 24c
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 1, ,
USER: nmrsu -- DATE: Tue Mar 08 23:31:56 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15077.5
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 40
LB: 0.0
Nuts - $ghy-4-270_2

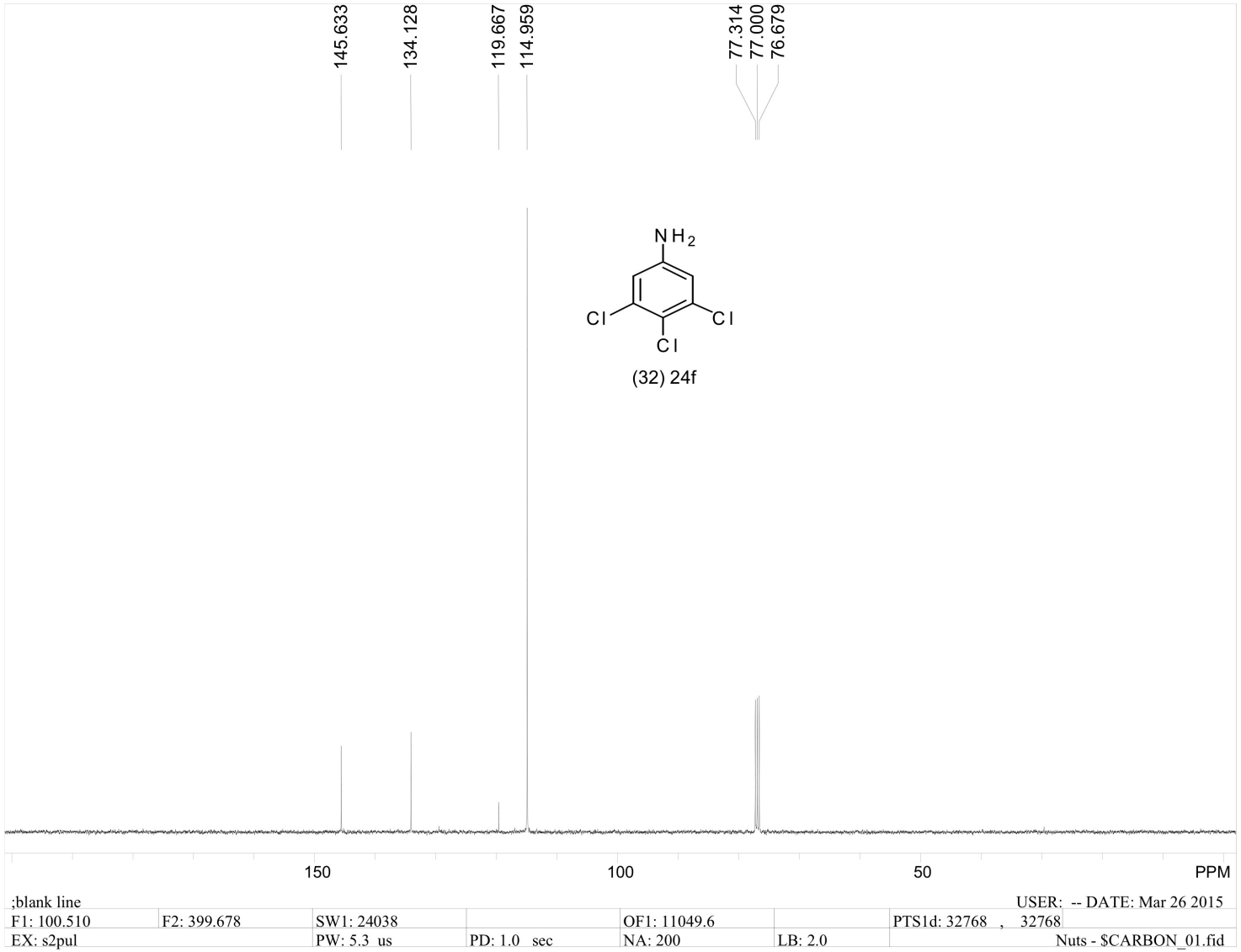

7.260
7.111
7.089
6.611
6.589
3.583
NH2
Cl
(30) 24d
2.00
2.02
2.10
8
6
4
2
PPM
;blank line
USER: -- DATE: Feb 4 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.2
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.6 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

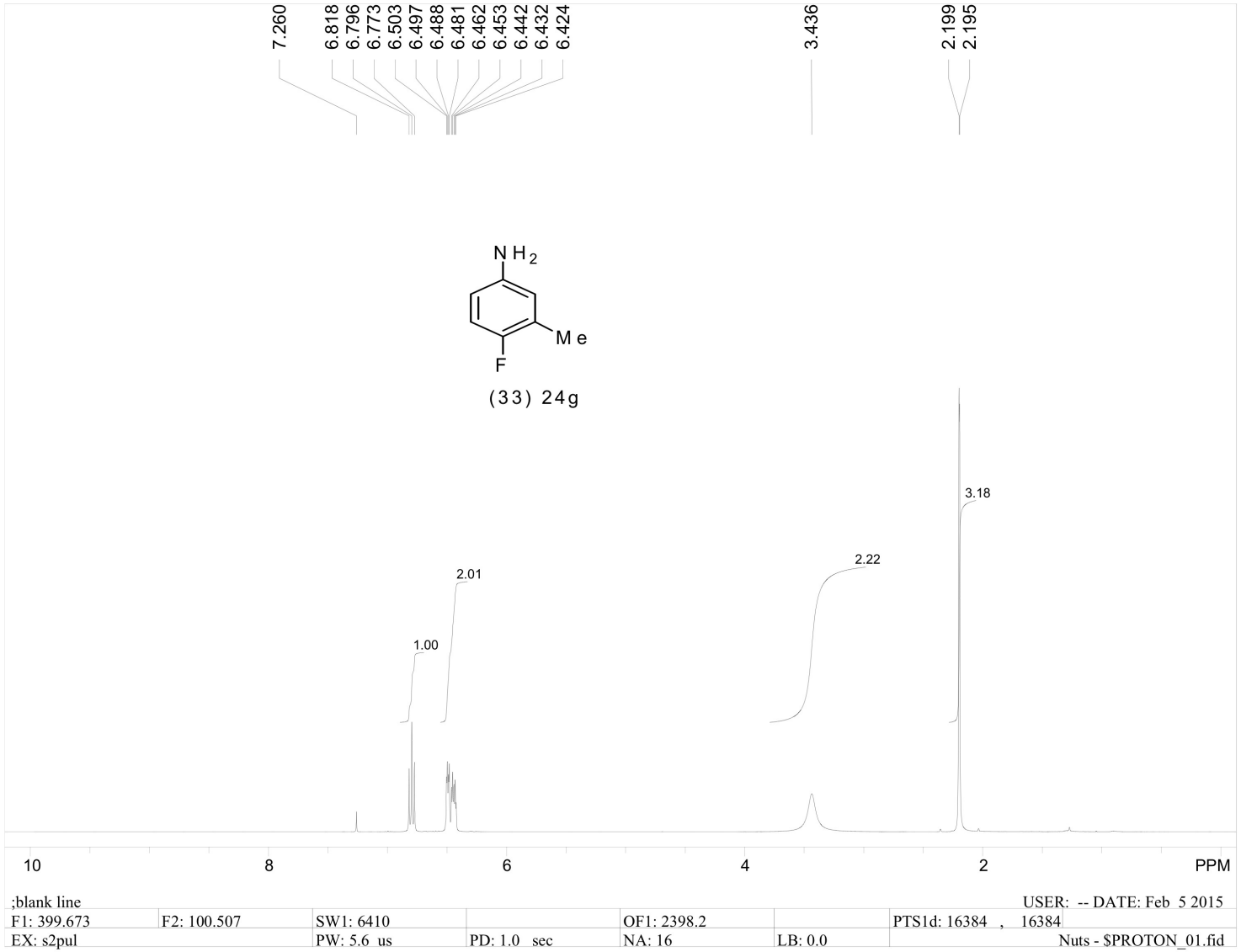

144.904
129.048
123.048
116.171
77.321
77.000
76.679
NH2
Cl
(30) 24d
150
100
50
PPM
;blank line
USER: -- DATE: Feb 4 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11048.0
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 160
LB: 2.0
Nuts - $CARBON_01.fid

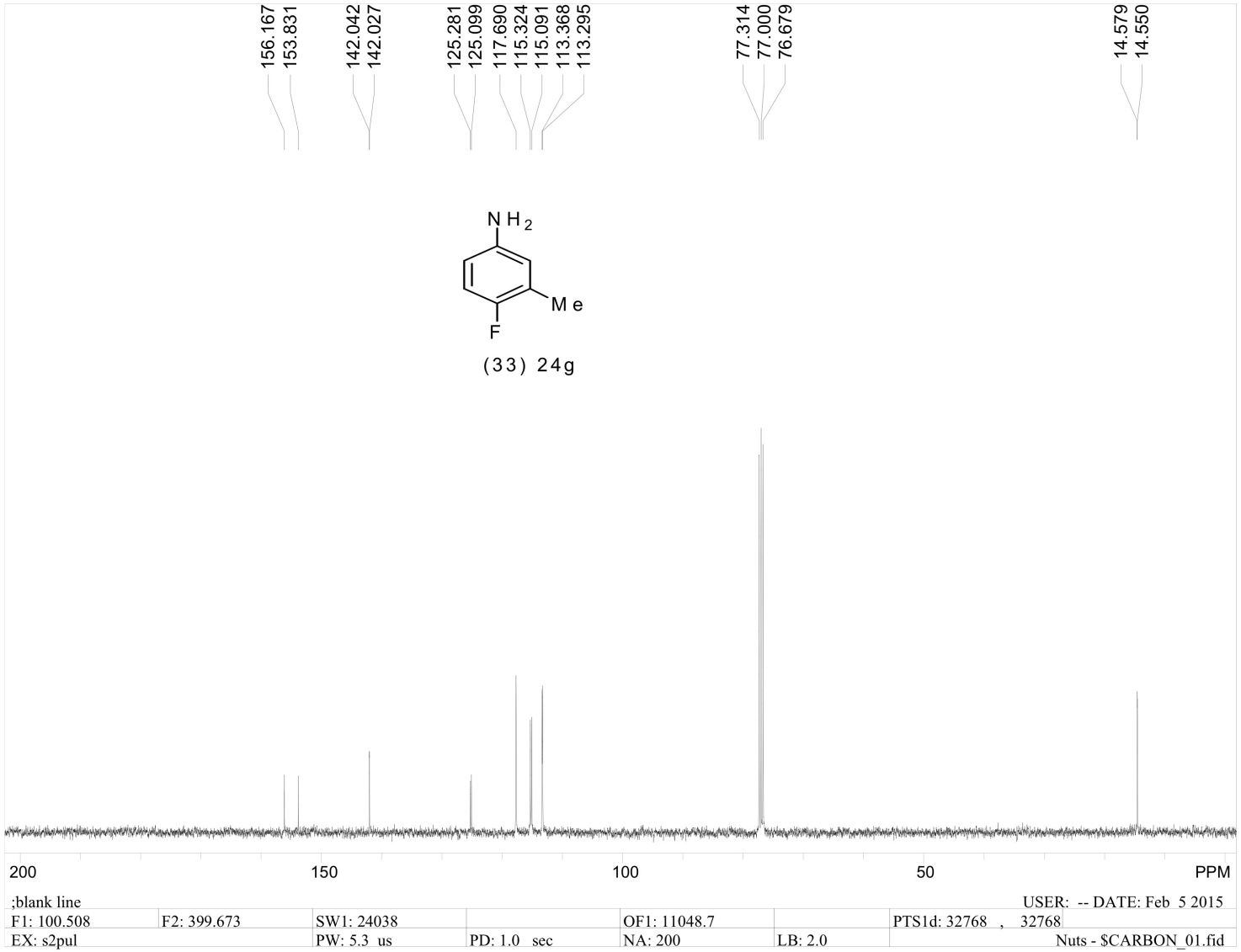

7.260
7.092
7.071
7.051
6.753
6.751
6.748
6.746
6.733
6.731
6.728
6.726
6.673
6.668
6.663
6.556
6.554
6.550
6.548
6.536
6.534
6.530
6.528
3.721
NH2
Cl
(31) 24e
2.19
1.00
1.00
0.96
1.03
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Mar 24 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2404.5
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

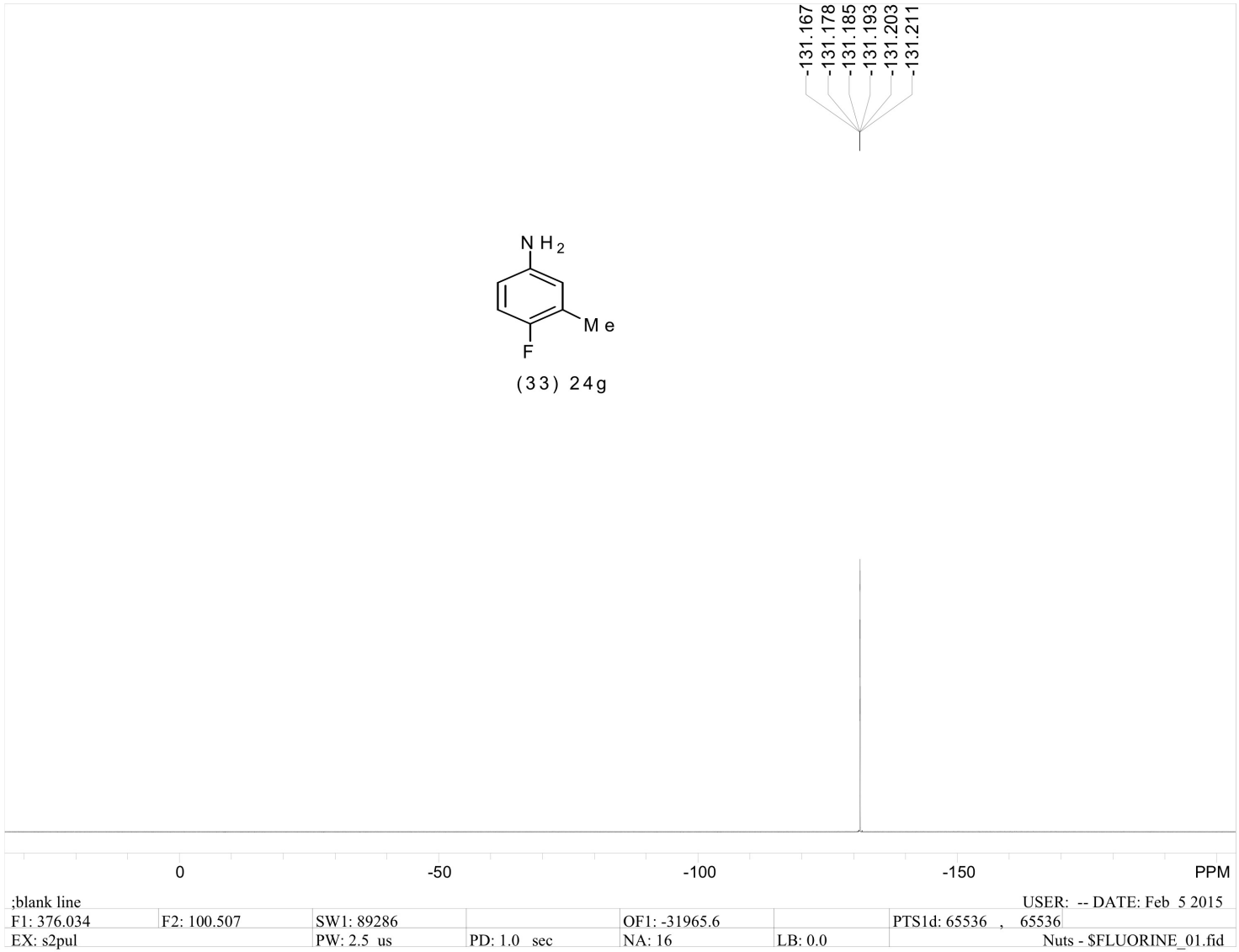

147.574
134.683
130.230
118.302
114.806
113.119
77.321
77.000
76.686
NH2
Cl
(31) 24e
150
100
50
PPM
;blank line
USER: -- DATE: Mar 24 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11043.0
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 160
LB: 2.0
Nuts - $CARBON_01.fid

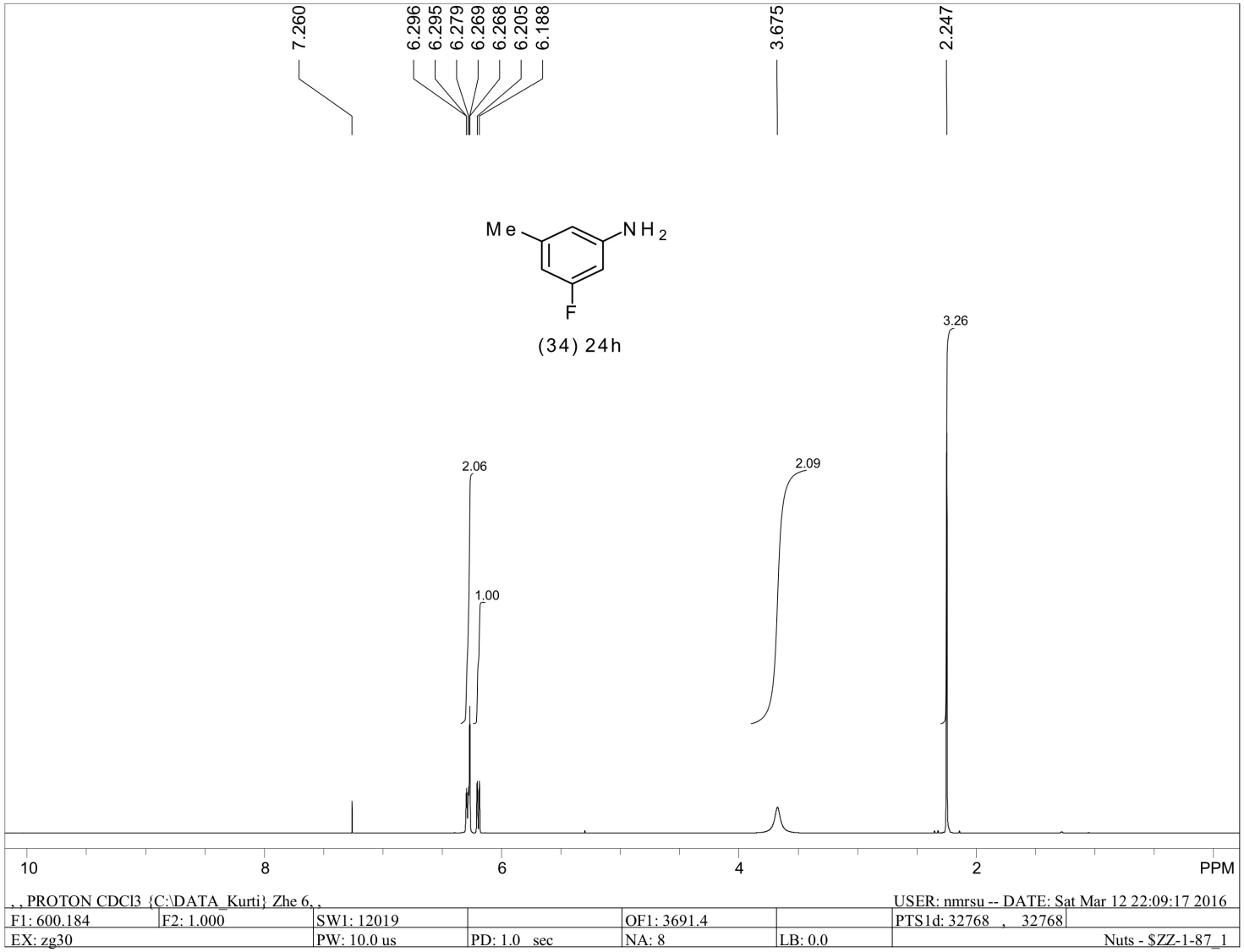

7.260
6.668
3.782
NH2
Cl
Cl
Cl
(32) 24f
2.24
2.00
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Mar 26 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2404.5
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

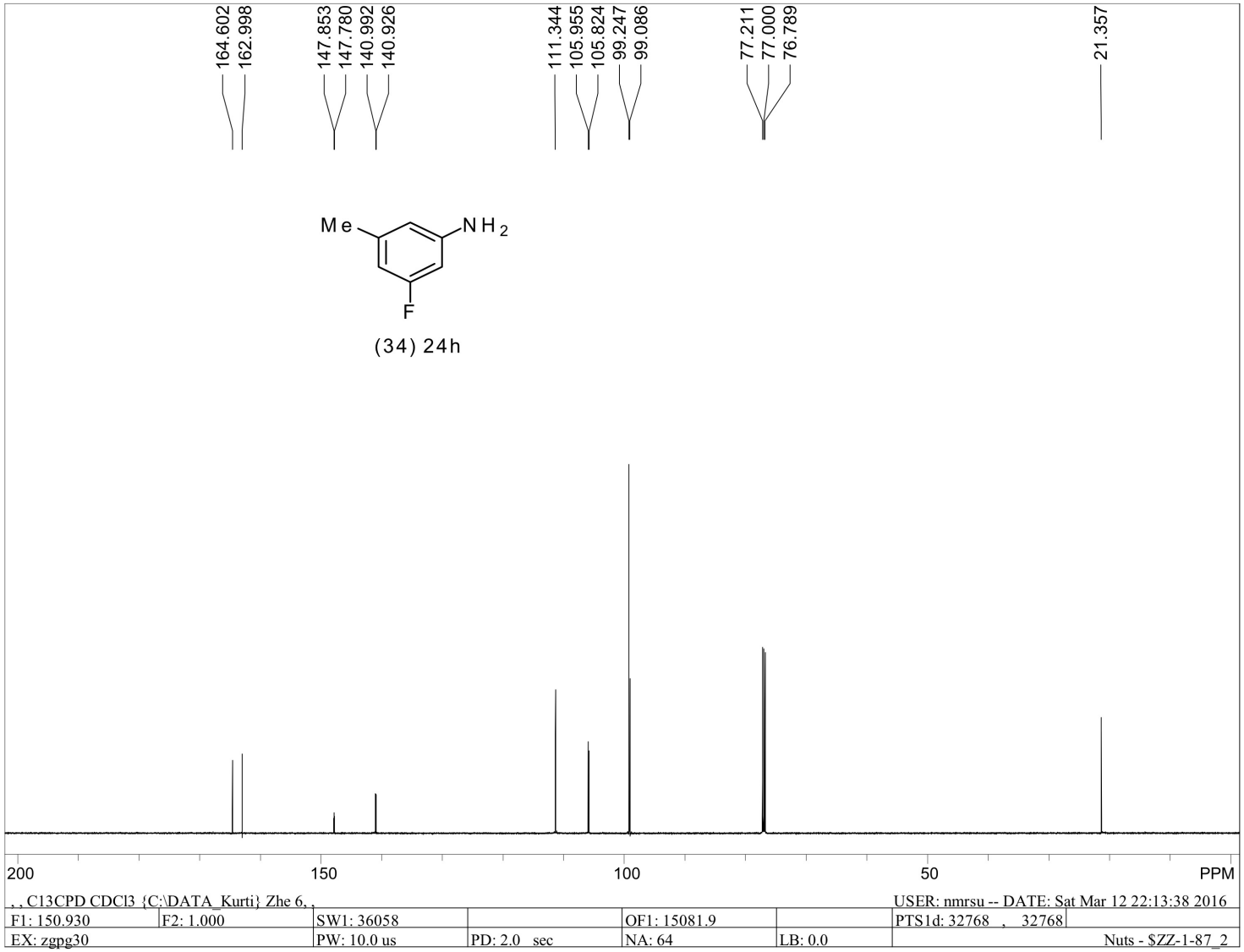

145.633
134.128
119.667
114.959
77.314
77.000
76.679
NH2
Cl
Cl
Cl
(32) 24f
150
100
50
PPM
;blank line
USER: -- DATE: Mar 26 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11049.6
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 200
LB: 2.0
Nuts - $CARBON_01.fid

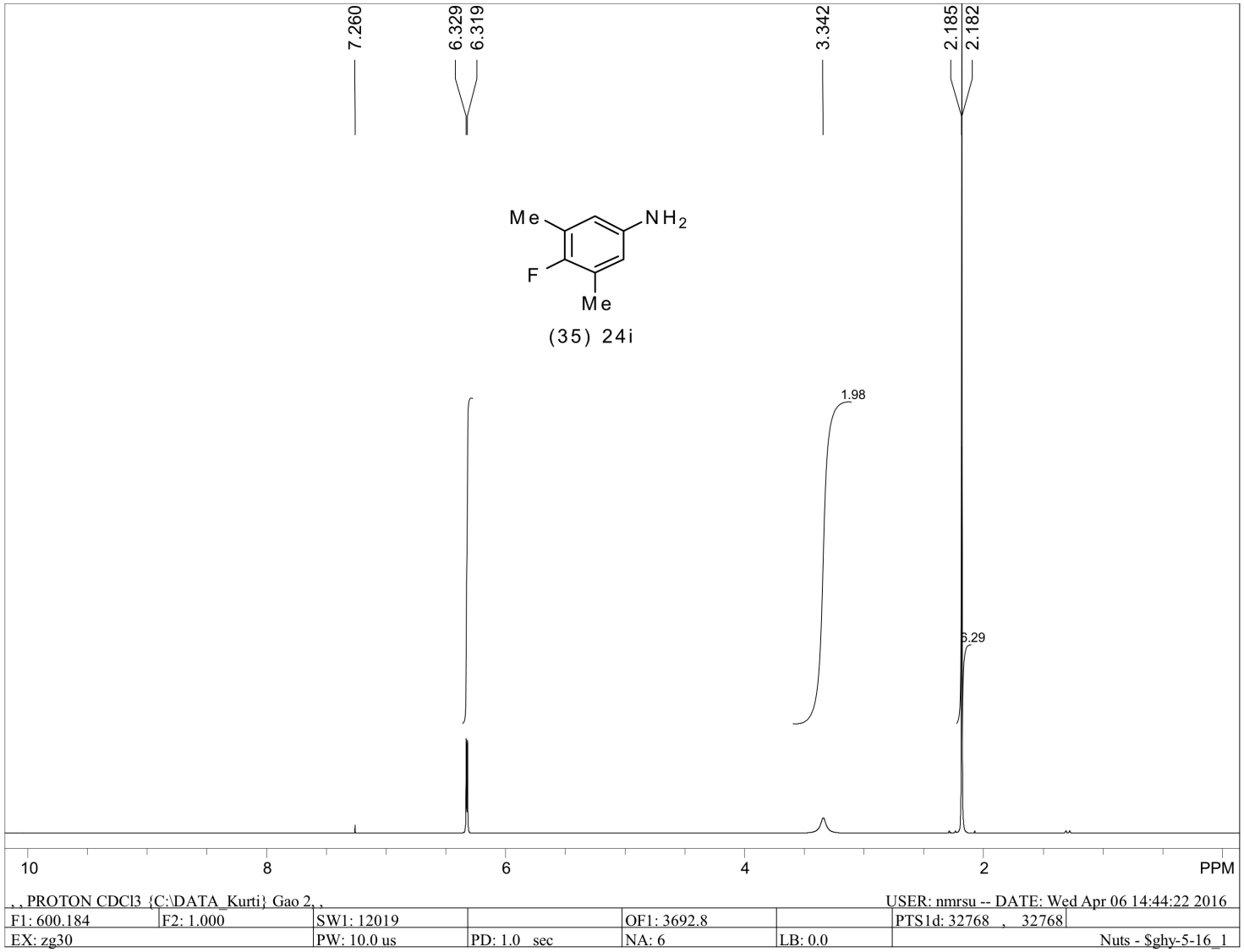

7.260
6.818
6.796
6.773
6.503
6.497
6.488
6.481
6.462
6.453
6.442
6.432
6.424
3.436
2.199
2.195
NH2
Me
F
(33) 24g
3.18
2.22
2.01
1.00
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Feb 5 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.2
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.6 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

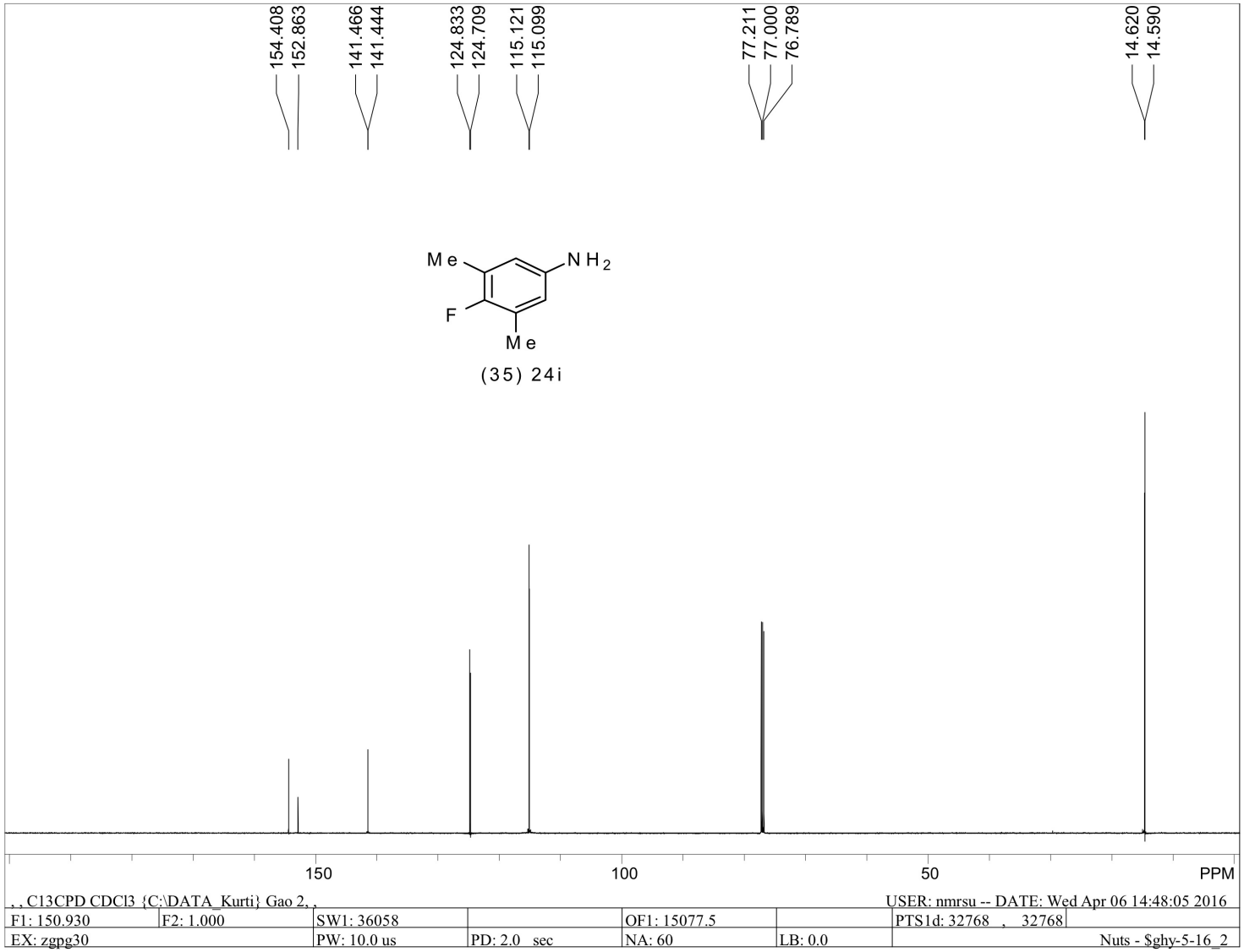

156.167
153.831
142.042
142.027
125.281
125.099
117.690
115.324
115.091
113.368
113.295
77.314
77.000
76.679
14.579
14.550
NH2
Me
F
(33) 24g
200
150
100
50
PPM
;blank line
USER: -- DATE: Feb 5 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11048.7
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 200
LB: 2.0
Nuts - $CARBON_01.fid

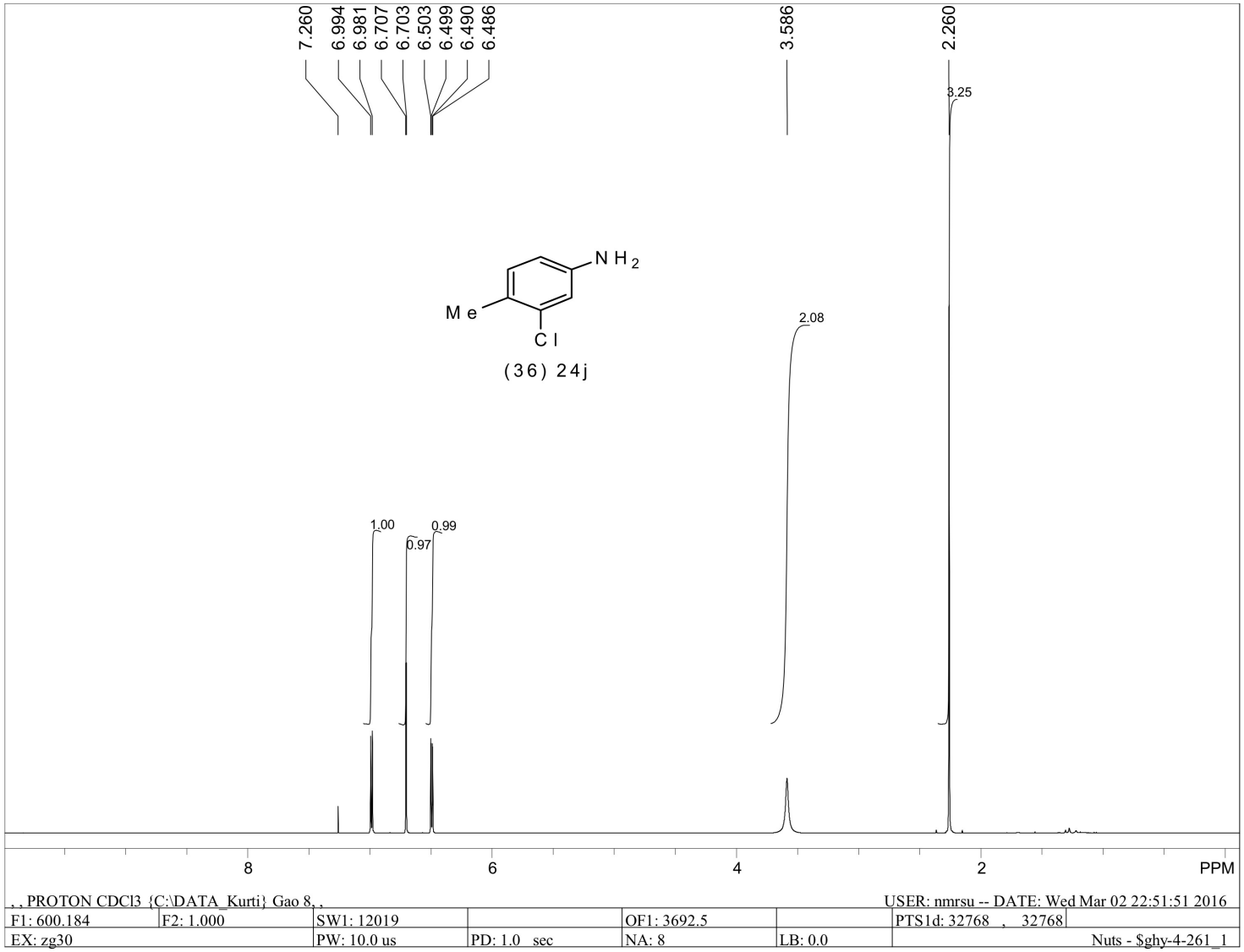

-131.167
-131.178
-131.185
-131.193
-131.203
-131.211
NH2
Me
F
(33) 24g
0
-50
-100
-150
PPM
;blank line
USER: -- DATE: Feb 5 2015
F1: 376.034
F2: 100.507
SW1: 89286
OF1: -31965.6
PTS1d: 65536 , 65536
EX: s2pul
PW: 2.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $FLUORINE_01.fid

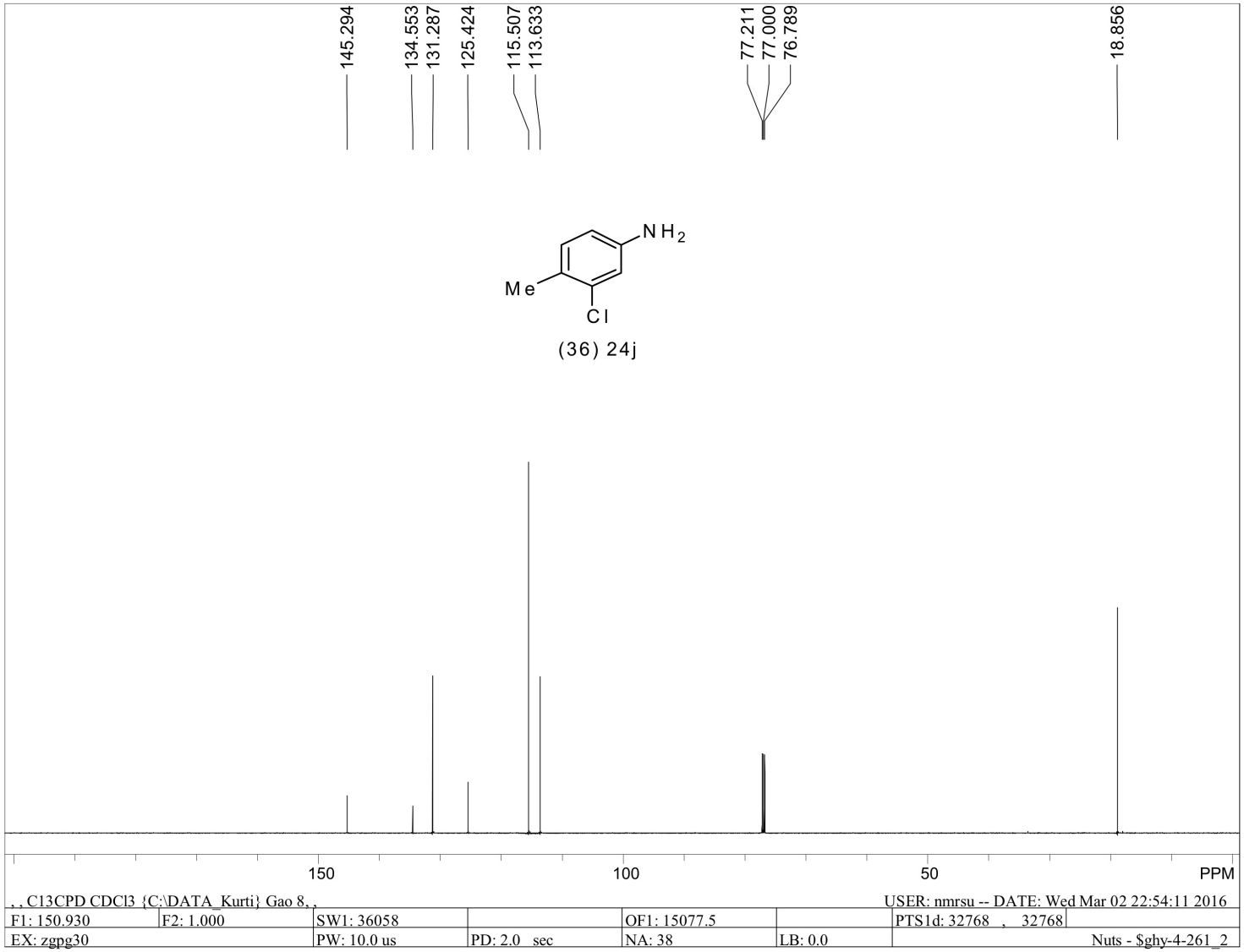

7.260
6.296
6.295
6.279
6.269
6.268
6.205
6.188
3.675
2.247
Me
NH2
F
(34) 24h
3.26
2.06
2.09
1.00
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 6, ,
USER: nmrsu -- DATE: Sat Mar 12 22:09:17 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3691.4
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ZZ-1-87_1

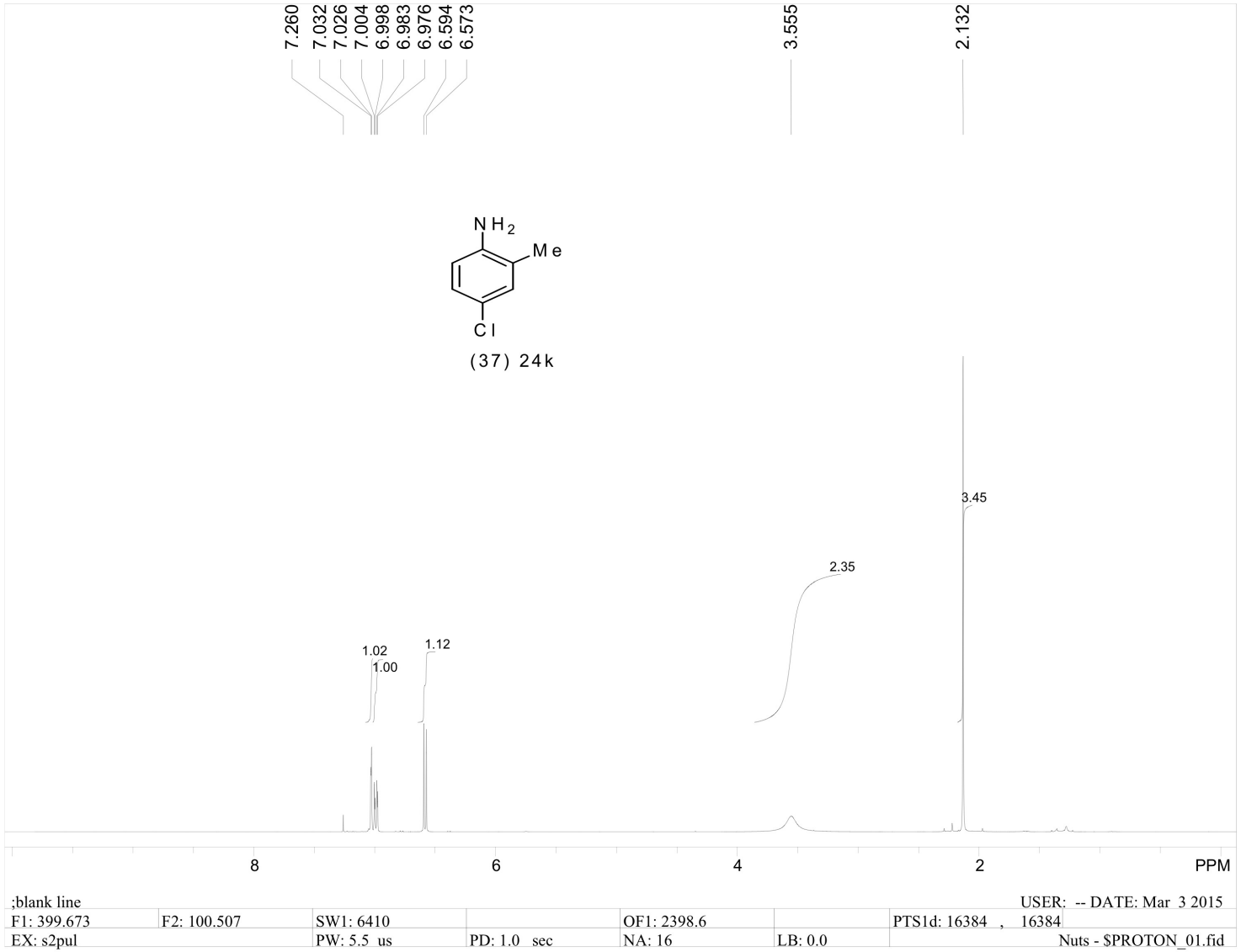

164.602
162.998
147.853
147.780
140.992
140.926
111.344
105.955
105.824
99.247
99.086
77.211
77.000
76.789
21.357
Me
NH2
F
(34) 24h
200
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Zhe 6, ,
USER: nmrsu -- DATE: Sat Mar 12 22:13:38 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15081.9
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 64
LB: 0.0
Nuts - $ZZ-1-87_2

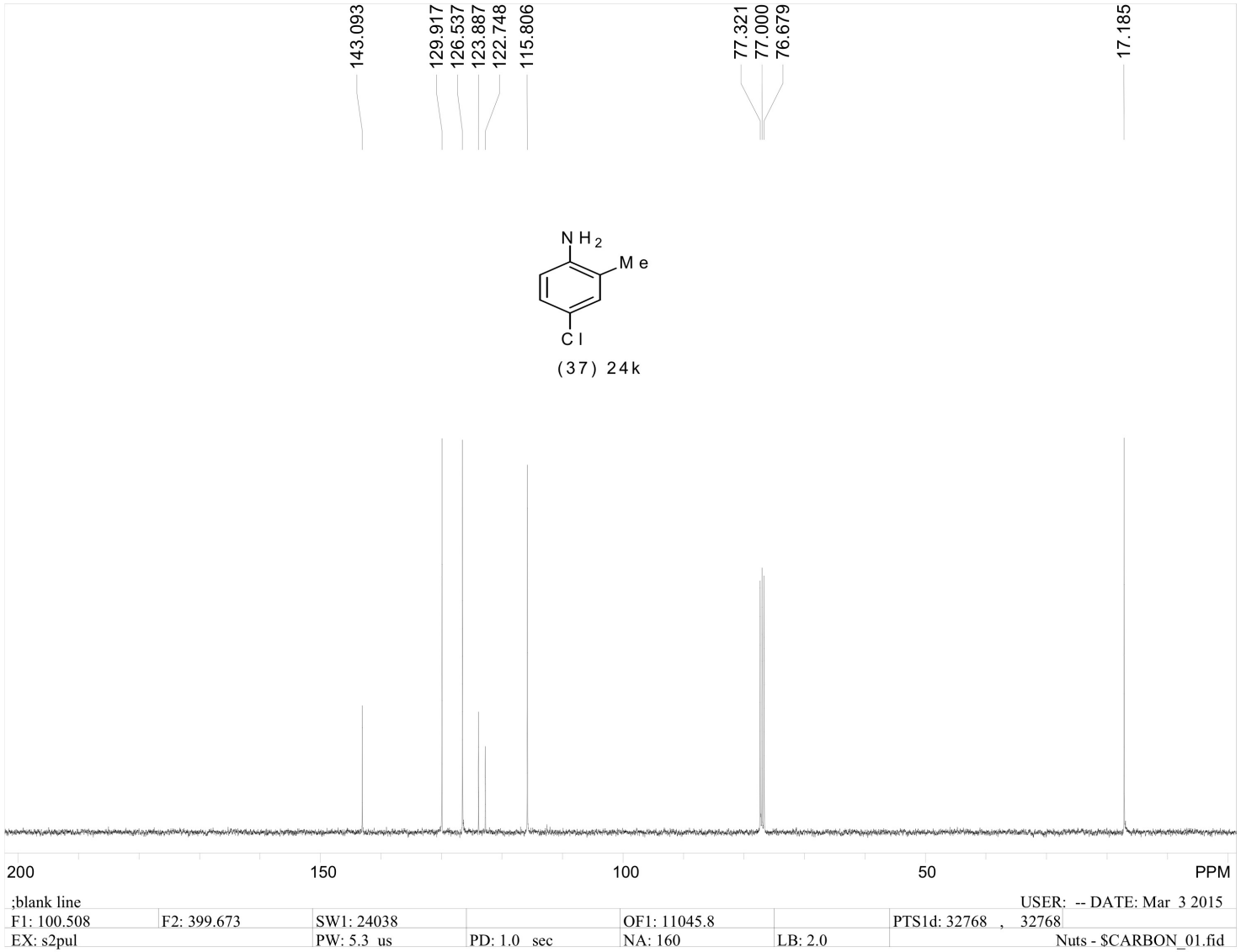

7.260
6.329
6.319
3.342
2.185
2.182
Me
NH2
F
Me
(35) 24i
1.98
6.29
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 2, ,
USER: nmrsu -- DATE: Wed Apr 06 14:44:22 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 6
LB: 0.0
Nuts - $ghy-5-16_1

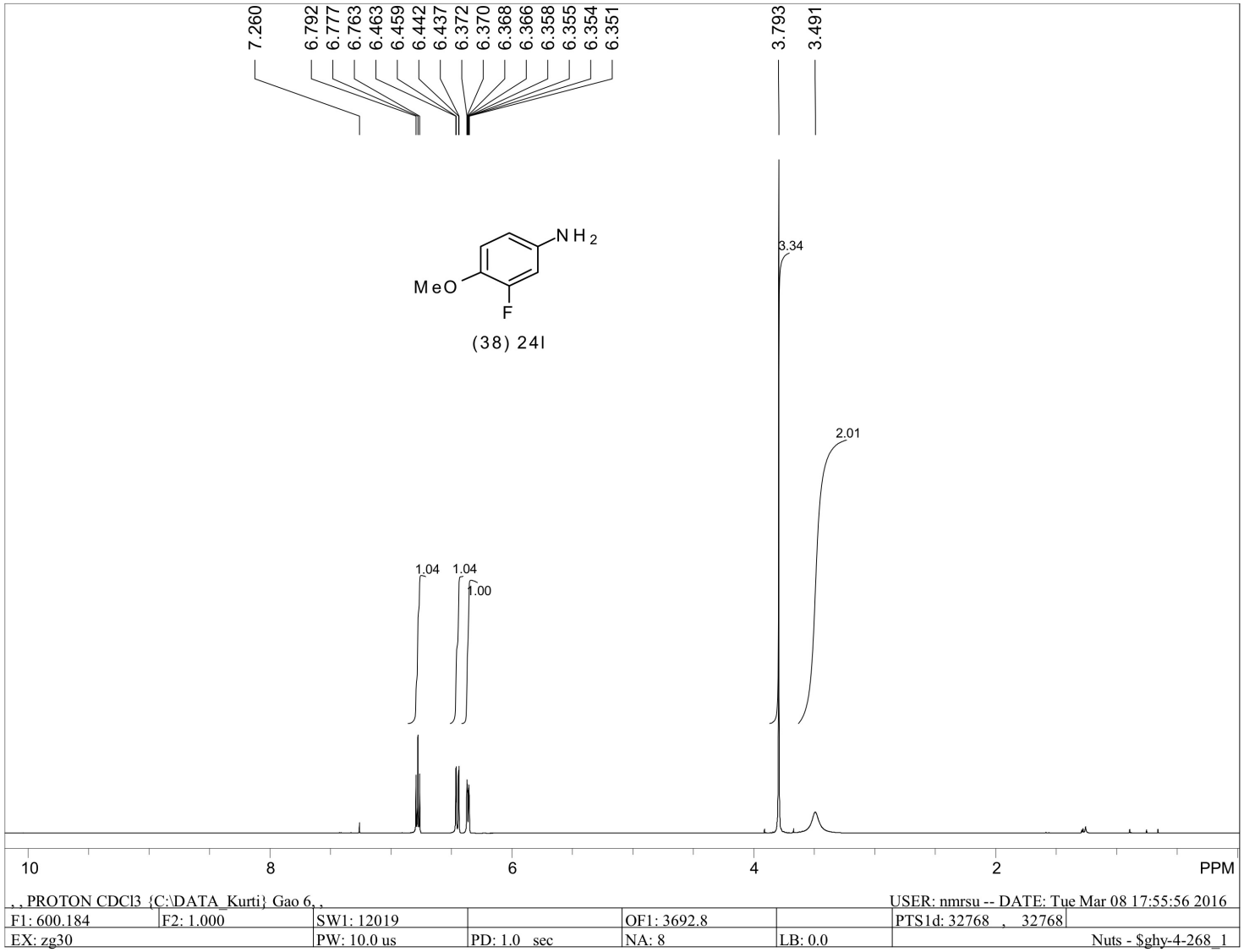

154.408
152.863
141.466
141.444
124.833
124.709
115.121
115.099
77.211
77.000
76.789
14.620
14.590
Me
NH2
F
Me
(35) 24i
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 2, ,
USER: nmrsu -- DATE: Wed Apr 06 14:48:05 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15077.5
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 60
LB: 0.0
Nuts - $ghy-5-16_2

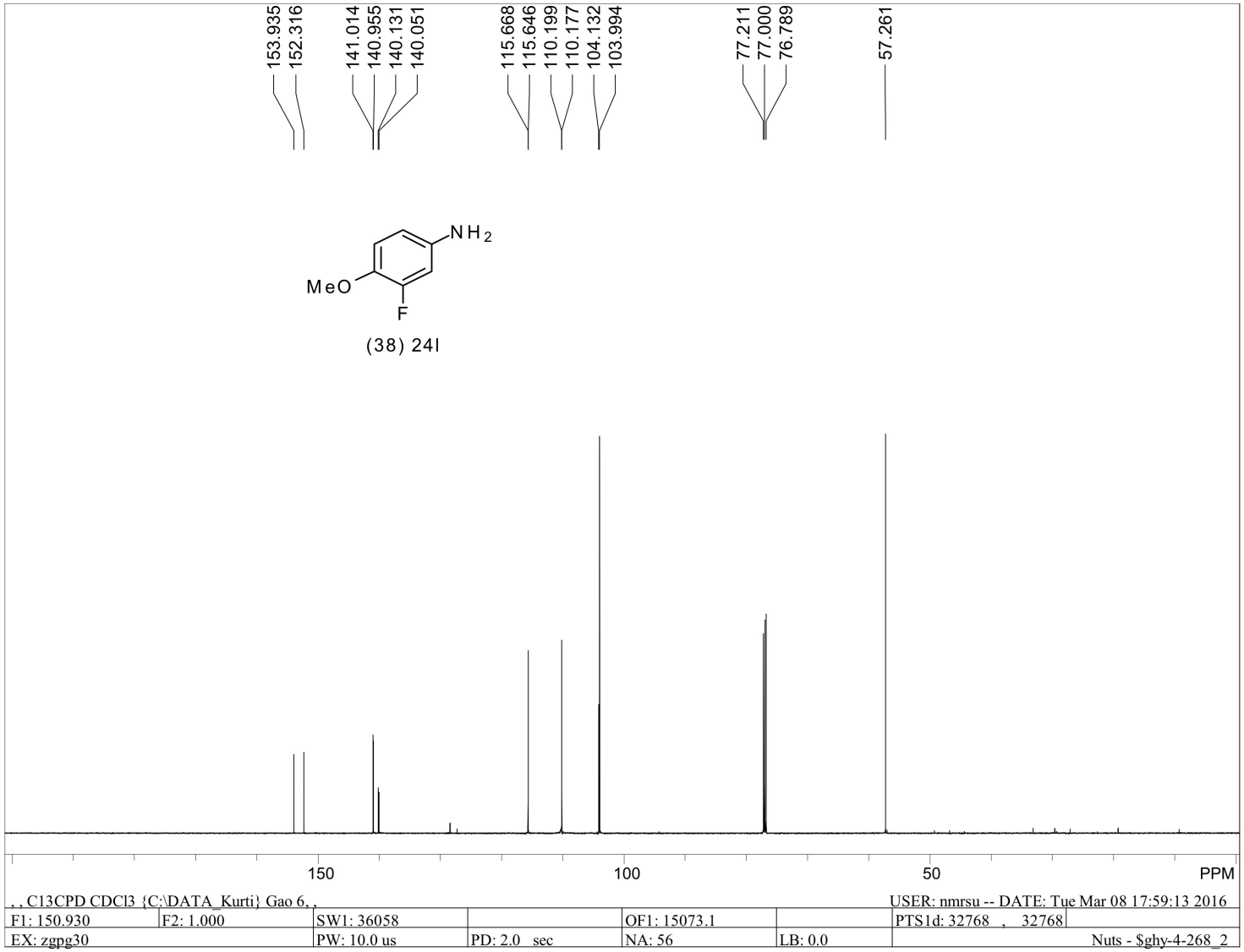

7.260
6.994
6.981
6.707
6.703
6.503
6.499
6.490
6.486
3.586
2.260
3.25
NH2
Me
Cl
(36) 24j
2.08
1.00
0.99
0.97
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 8, ,
USER: nmrsu -- DATE: Wed Mar 02 22:51:51 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.5
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-261_1

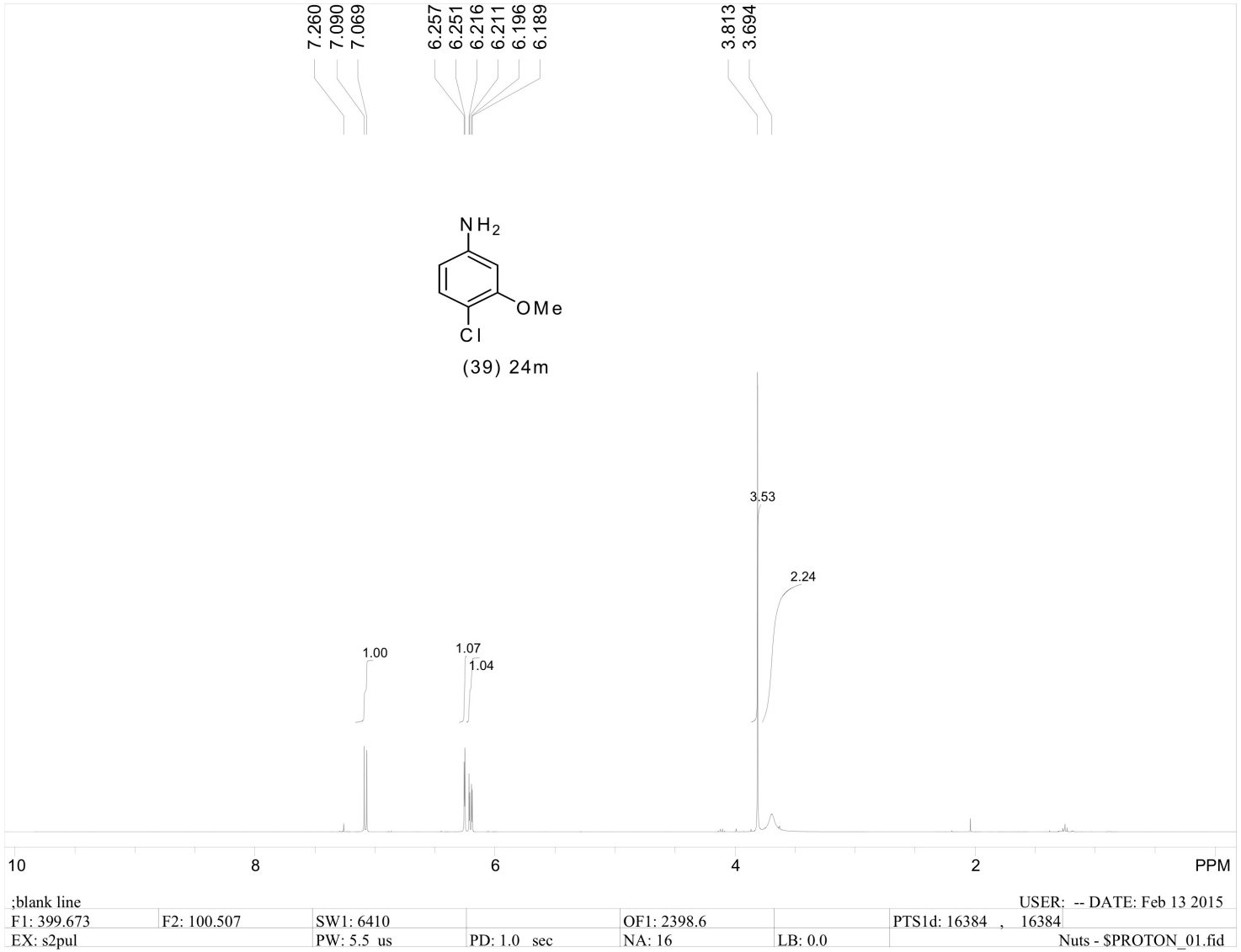

145.294
134.553
131.287
125.424
115.507
113.633
77.211
77.000
76.789
18.856
NH2
Me
Cl
(36) 24j
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 8, ,
USER: nmrsu -- DATE: Wed Mar 02 22:54:11 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15077.5
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 38
LB: 0.0
Nuts - $ghy-4-261_2

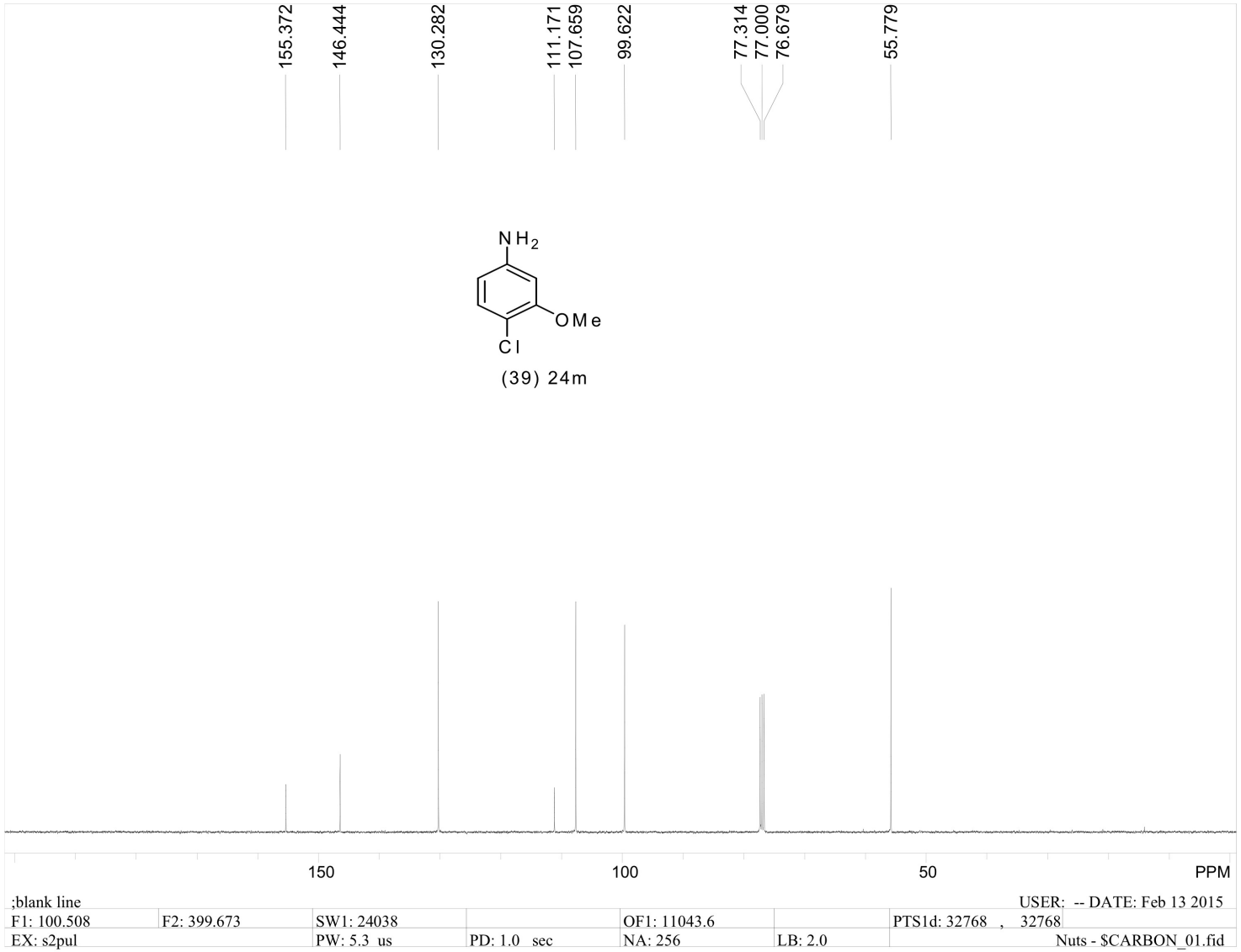

7.260
7.032
7.026
7.004
6.998
6.983
6.976
6.594
6.573
3.555
2.132
NH2
Me
Cl
(37) 24k
3.45
2.35
1.02
1.00
1.12
8
6
4
2
PPM
;blank line
USER: -- DATE: Mar 3 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.6
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

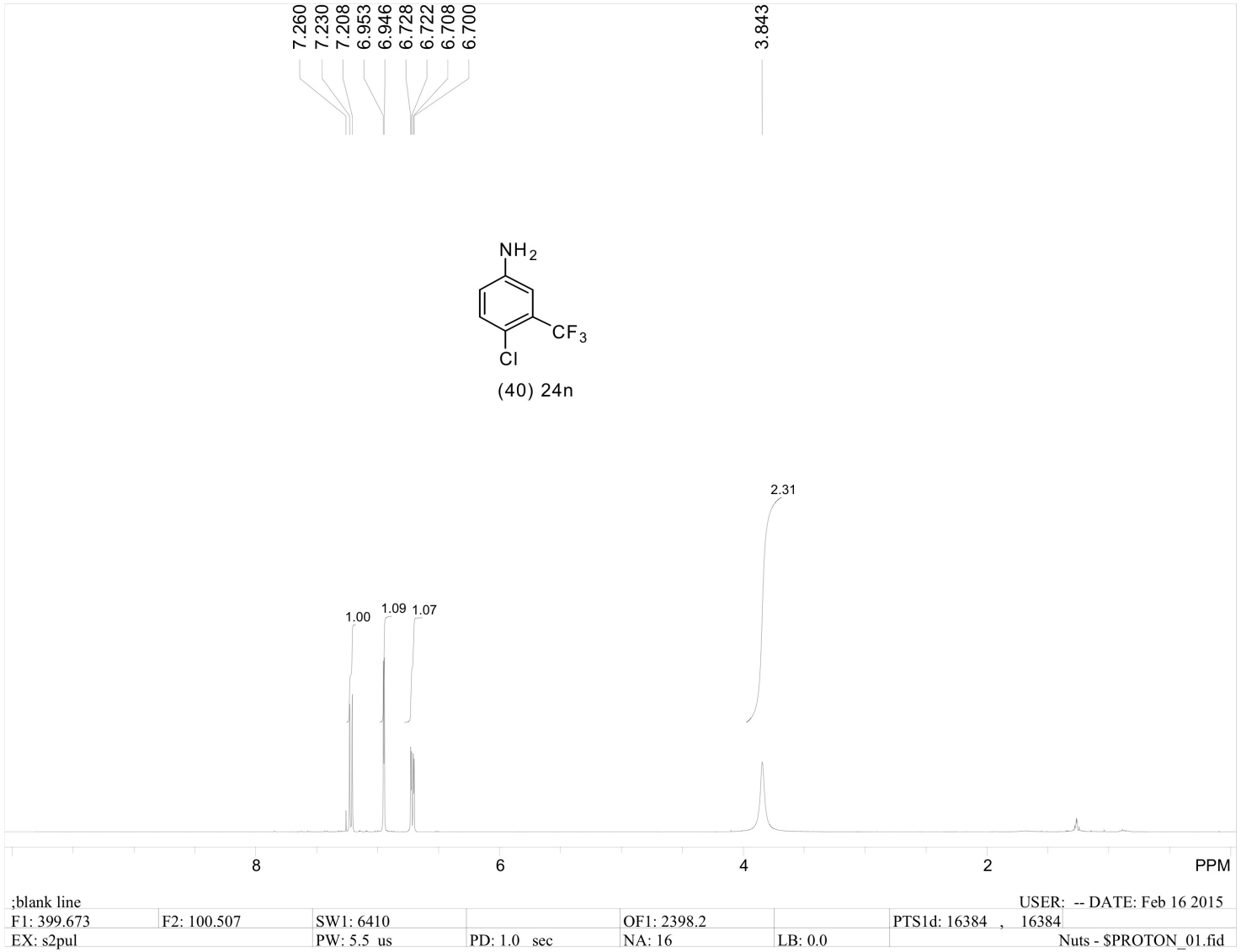

143.093
129.917
126.537
123.887
122.748
115.806
77.321
77.000
76.679
17.185
NH2
Me
Cl
(37) 24k
200
150
100
50
PPM
;blank line
USER: -- DATE: Mar 3 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11045.8
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 160
LB: 2.0
Nuts - $CARBON_01.fid

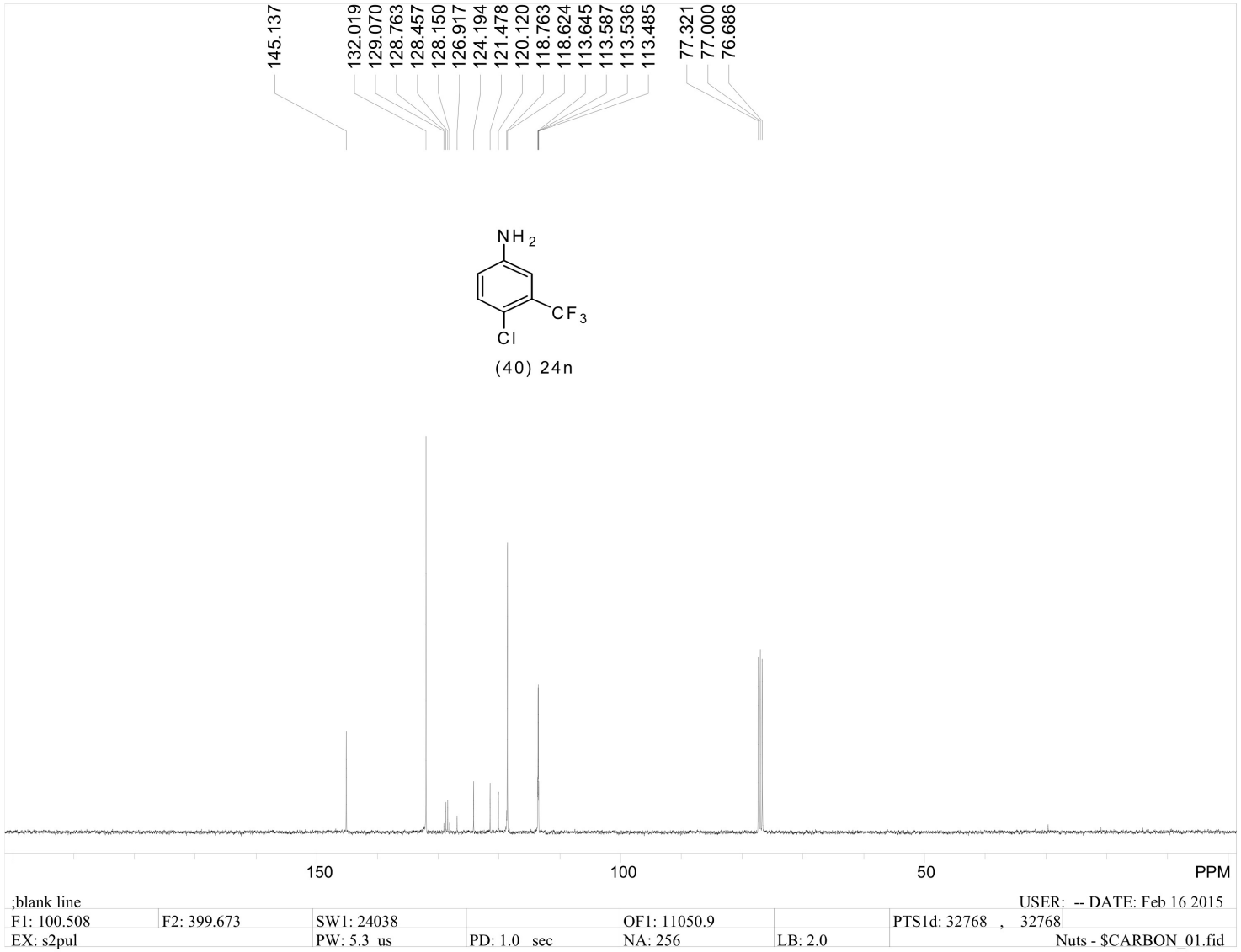

7.260
6.792
6.777
6.763
6.463
6.459
6.442
6.437
6.372
6.370
6.368
6.366
6.358
6.355
6.354
6.351
3.793
3.491
NH2
MeO
F
(38) 24l
3.34
2.01
1.04
1.04
1.00
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 6, ,
USER: nmrsu -- DATE: Tue Mar 08 17:55:56 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-268_1

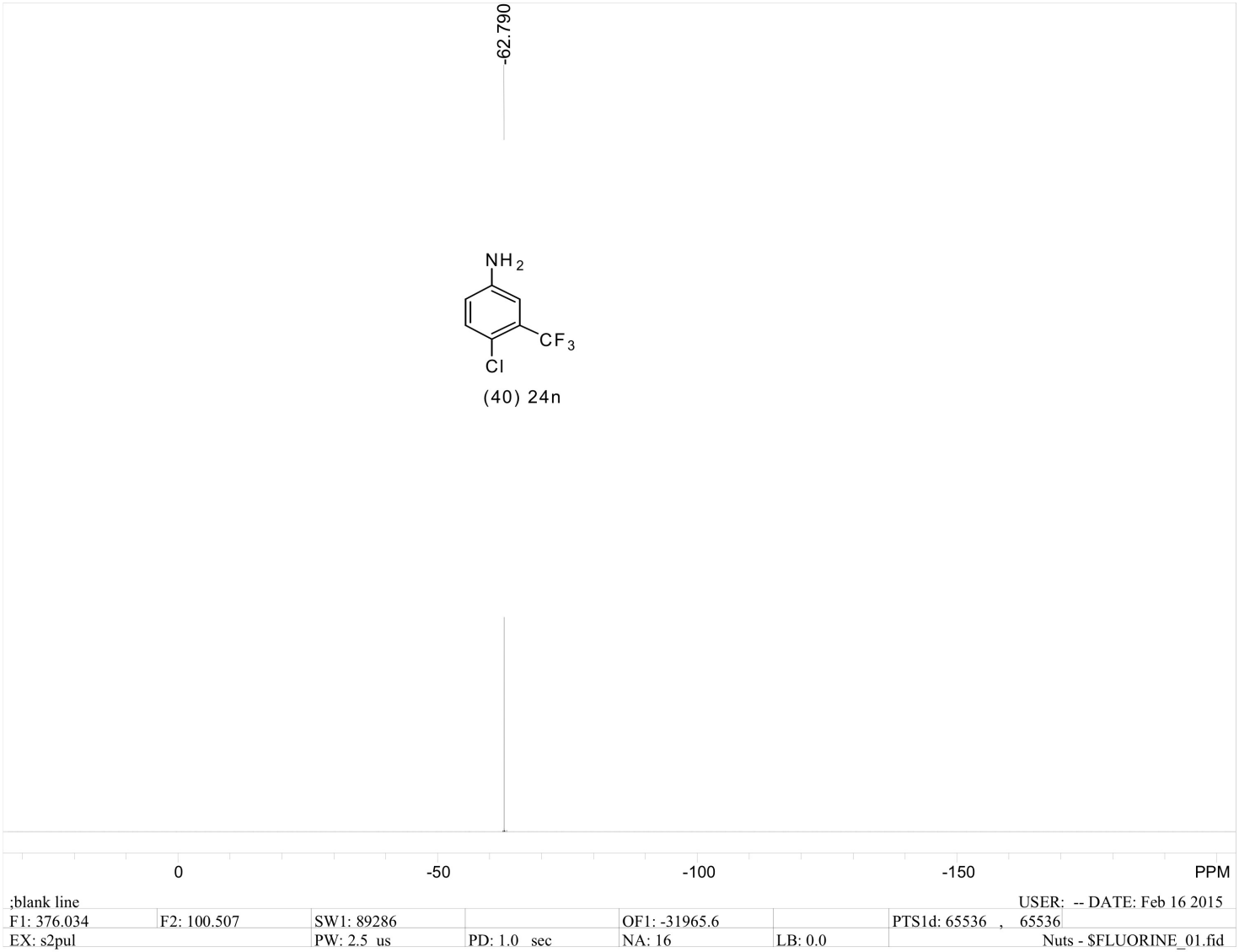

153.935
152.316
141.014
140.955
140.131
140.051
115.668
115.646
110.199
110.177
104.132
103.994
77.211
77.000
76.789
57.261
NH2
MeO
F
(38) 24l
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 6, ,
USER: nmrsu -- DATE: Tue Mar 08 17:59:13 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15073.1
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 56
LB: 0.0
Nuts - $ghy-4-268_2

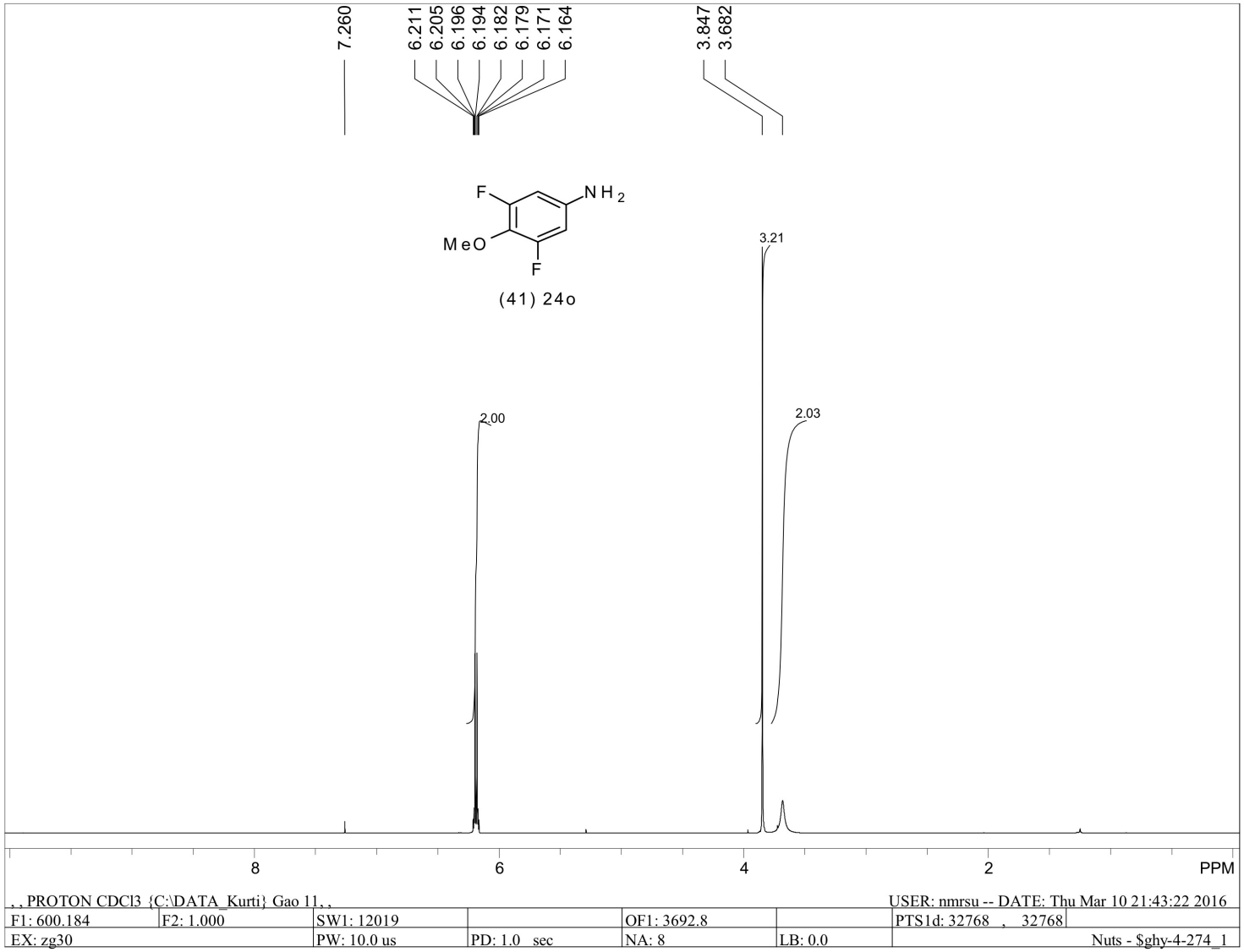

7.260
7.090
7.069
6.257
6.251
6.216
6.211
6.196
6.189
3.813
3.694
NH2
OMe
Cl
(39) 24m
3.53
2.24
1.00
1.07
1.04
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Feb 13 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.6
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

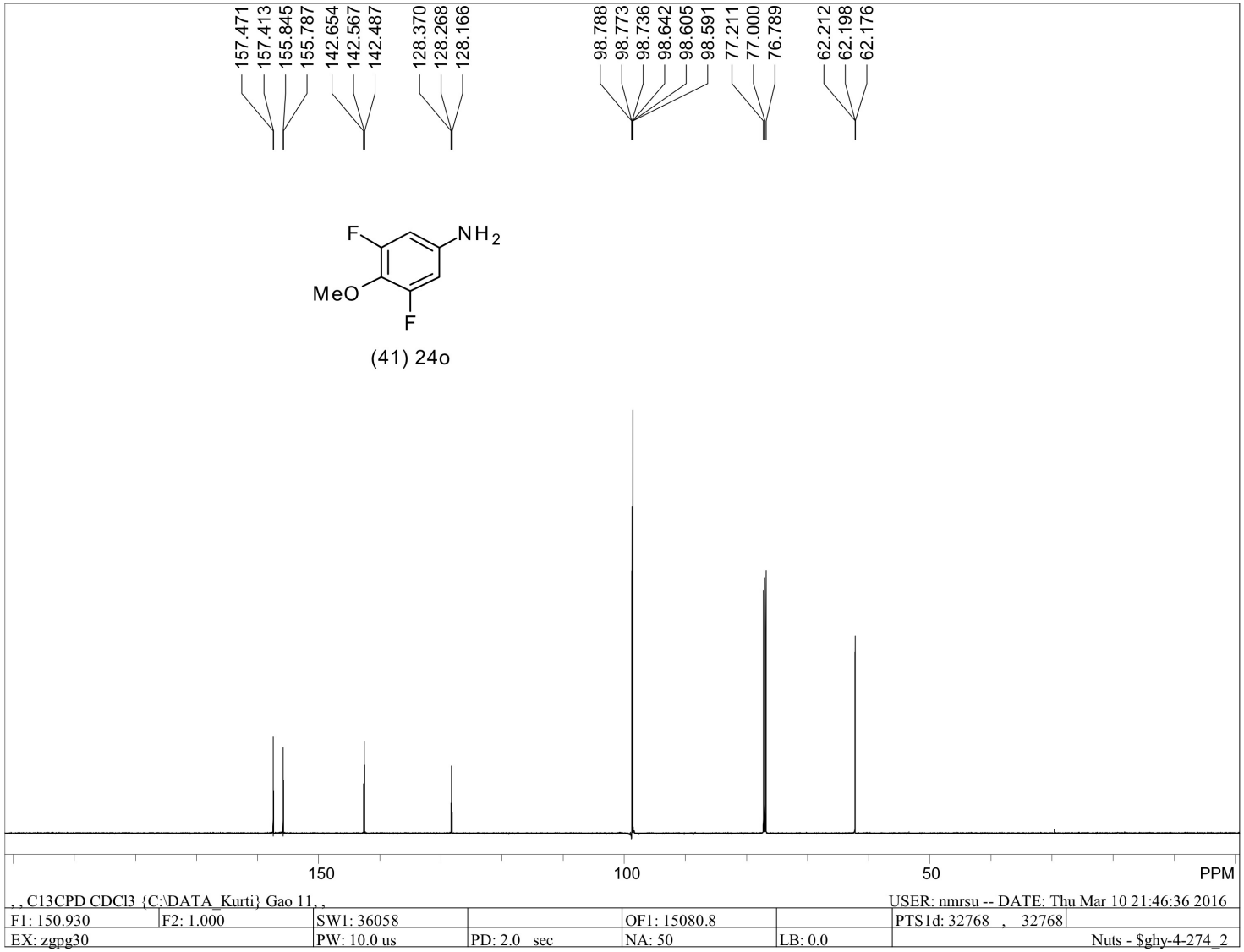

155.372
146.444
130.282
111.171
107.659
99.622
77.314
77.000
76.679
55.779
NH2
OMe
Cl
(39) 24m
150
100
50
PPM
;blank line
USER: -- DATE: Feb 13 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11043.6
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 2.0
Nuts - $CARBON_01.fid

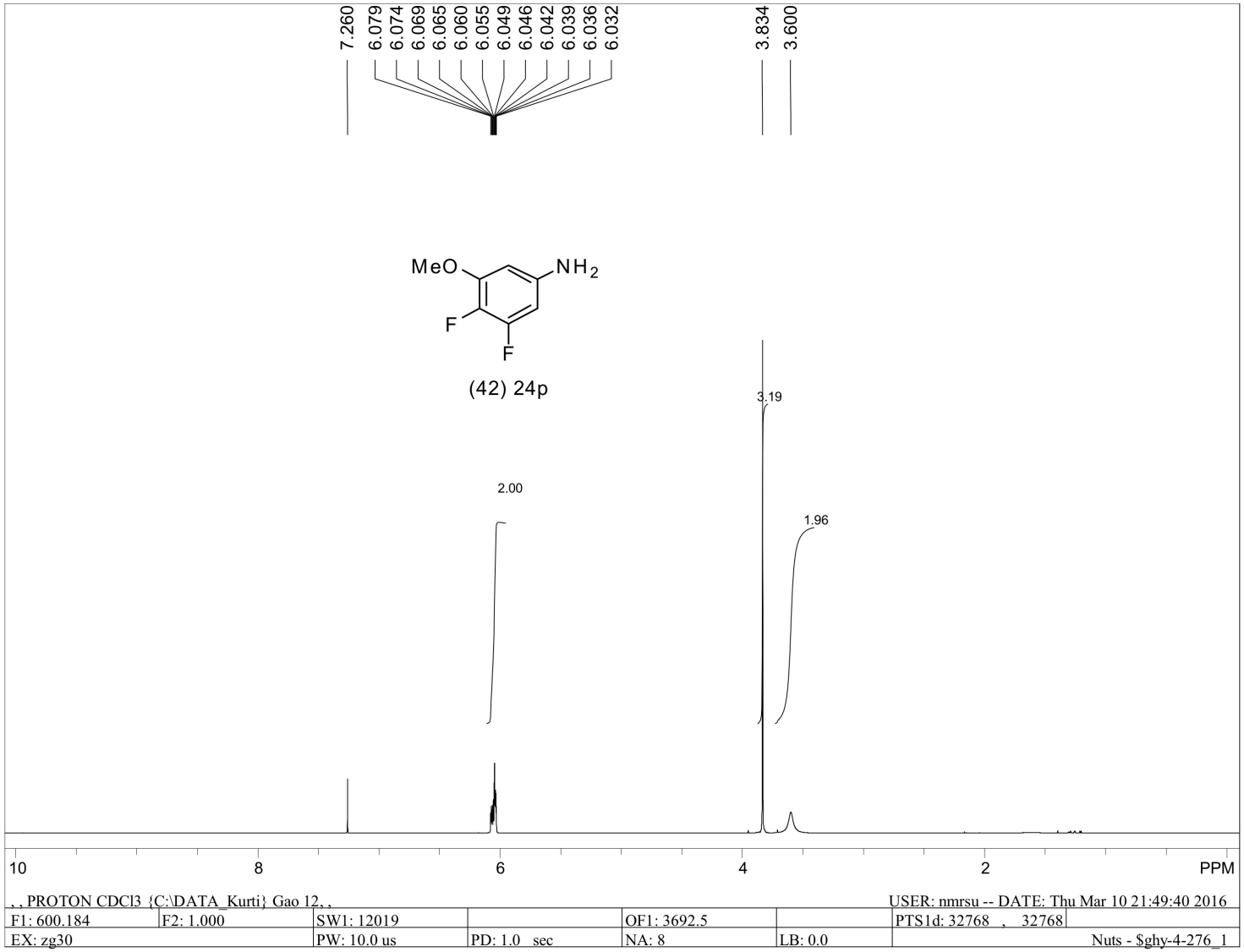

7.260
7.230
7.208
6.953
6.946
6.728
6.722
6.708
6.700
3.843
NH2
CF3
Cl
(40) 24n
2.31
1.00
1.09
1.07
8
6
4
2
PPM
;blank line
USER: -- DATE: Feb 16 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.2
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

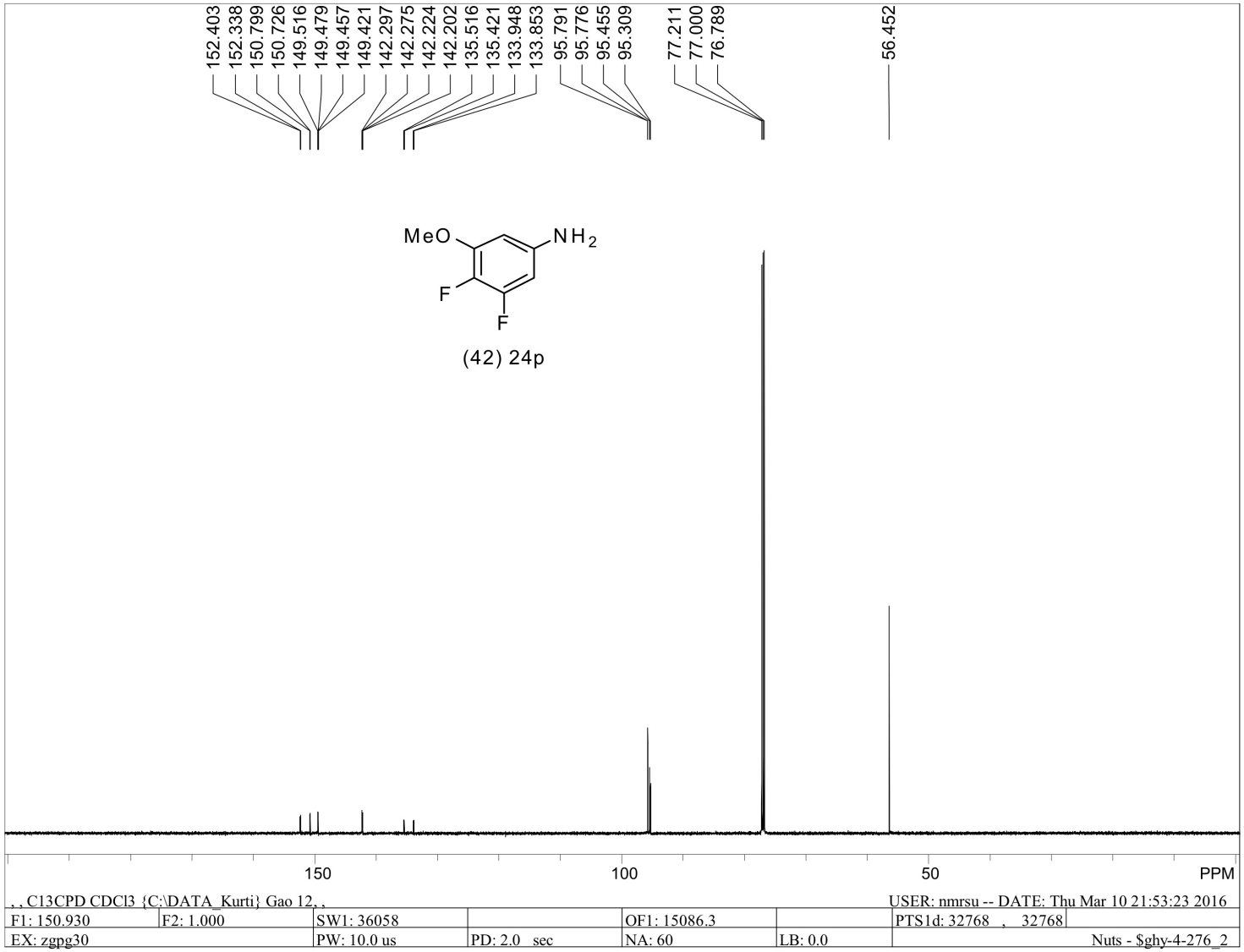

145.137
132.019
129.070
128.763
128.457
128.150
126.917
124.194
121.478
120.120
118.763
118.624
113.645
113.587
113.536
113.485
77.321
77.000
76.686
NH2
CF3
Cl
(40) 24n
150
100
50
PPM
;blank line
USER: -- DATE: Feb 16 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11050.9
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 2.0
Nuts - $CARBON_01.fid

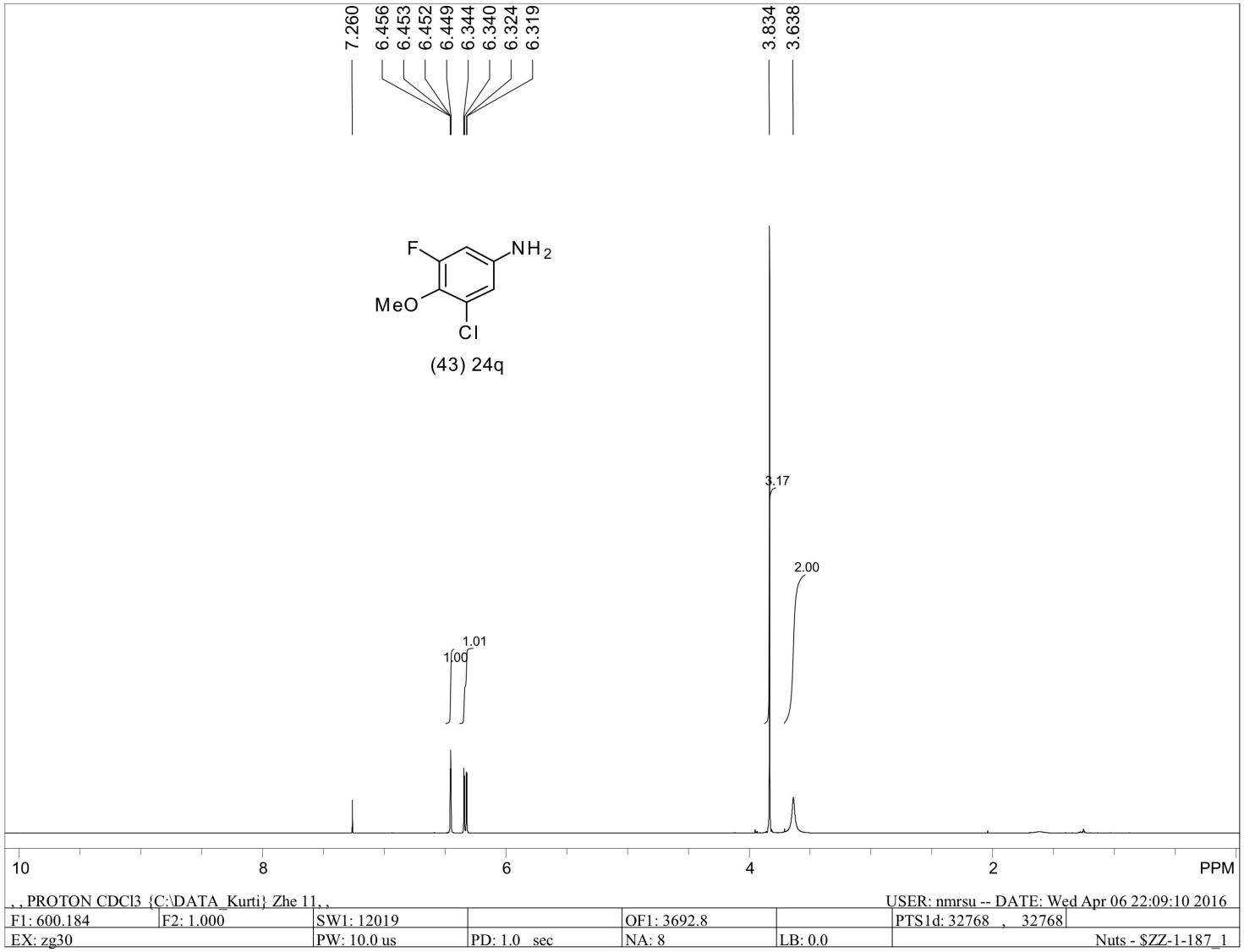

-62.790
NH2
CF3
Cl
(40) 24n
0
-50
-100
-150
PPM
;blank line
USER: -- DATE: Feb 16 2015
F1: 376.034
F2: 100.507
SW1: 89286
OF1: -31965.6
PTS1d: 65536 , 65536
EX: s2pul
PW: 2.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $FLUORINE_01.fid

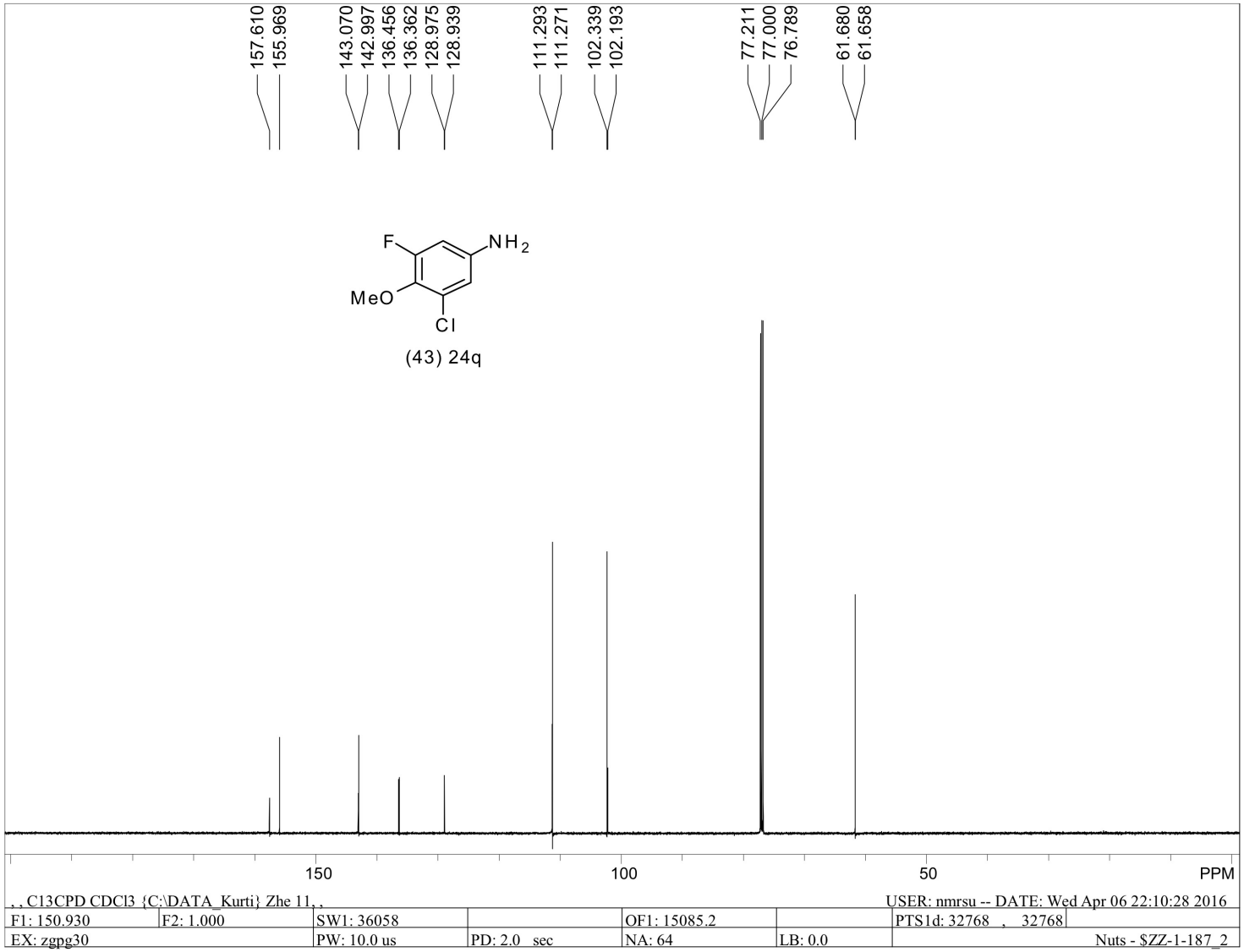

7.260
6.211
6.205
6.196
6.194
6.182
6.179
6.171
6.164
3.847
3.682
F
NH2
MeO
F
(41) 24o
3.21
2.00
2.03
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 11, ,
USER: nmrsu -- DATE: Thu Mar 10 21:43:22 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-274_1

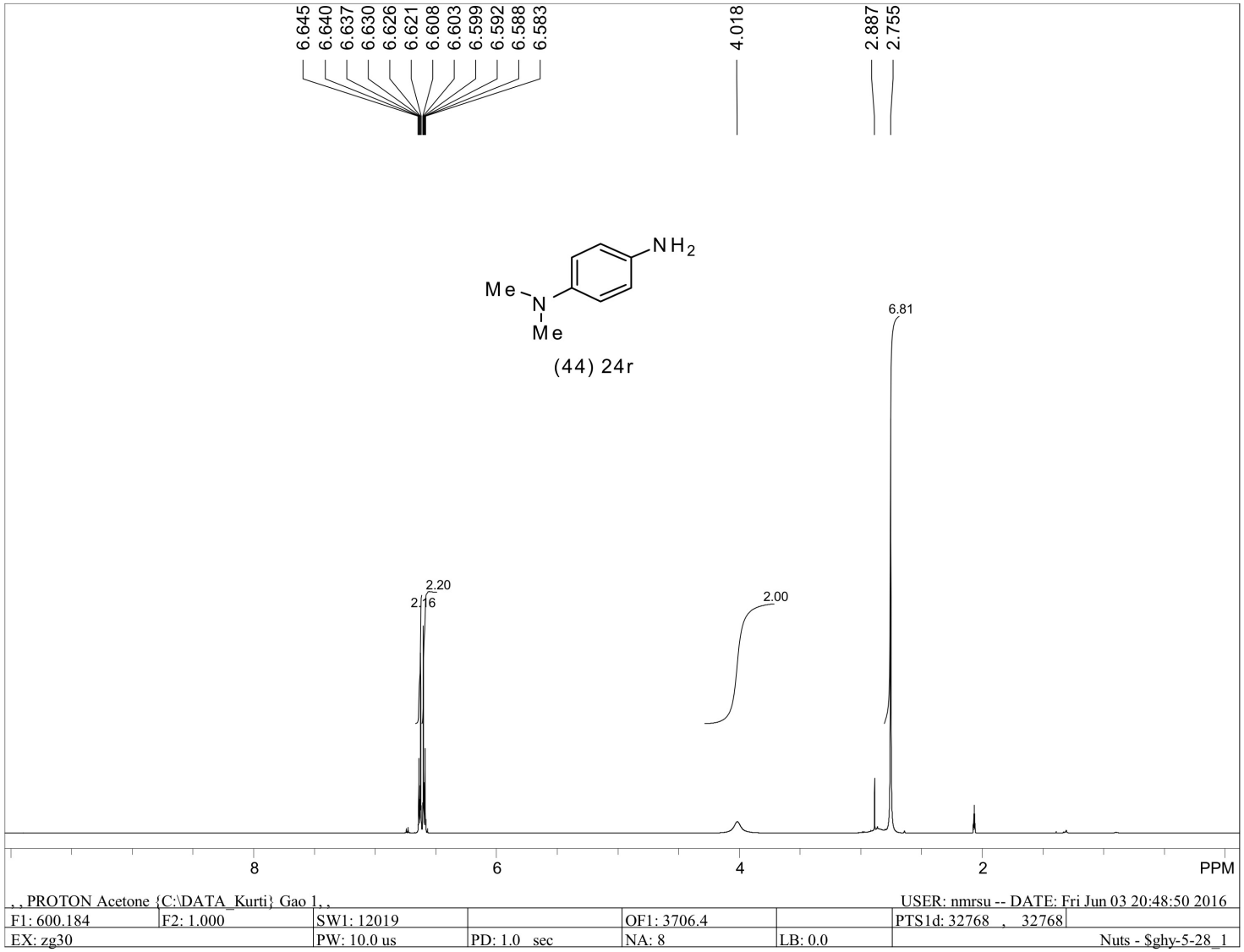

157.471
157.413
155.845
155.787
142.654
142.567
142.487
128.370
128.268
128.166
98.788
98.773
98.736
98.642
98.605
98.591
77.211
77.000
76.789
62.212
62.198
62.176
F
NH2
MeO
F
(41) 24o
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 11, ,
USER: nmrsu -- DATE: Thu Mar 10 21:46:36 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15080.8
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 50
LB: 0.0
Nuts - $ghy-4-274_2

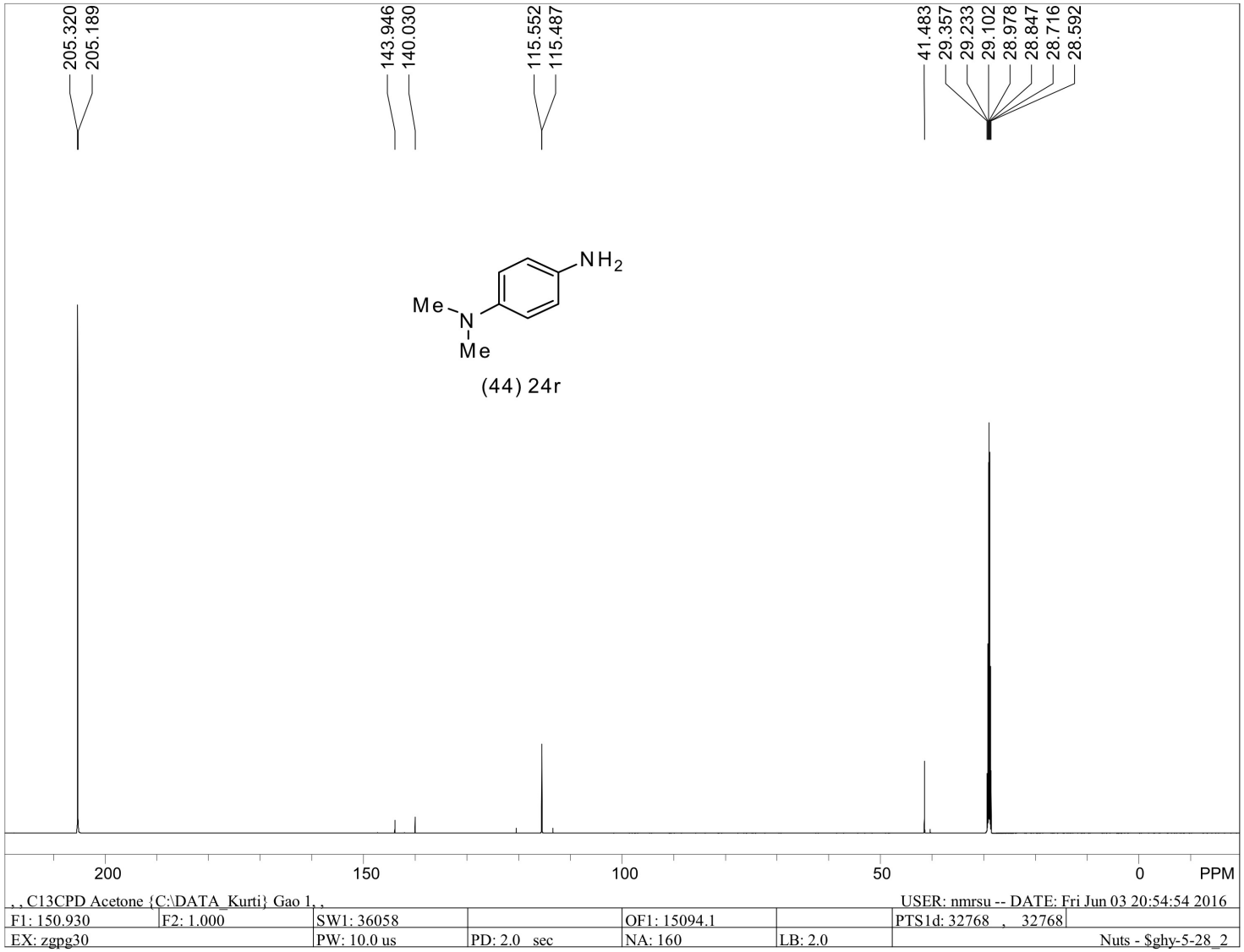

7.260
6.079
6.074
6.069
6.065
6.060
6.055
6.049
6.046
6.042
6.039
6.036
6.032
3.834
3.600
MeO
NH2
F
F
(42) 24p
3.19
2.00
1.96
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 12, ,
USER: nmrsu -- DATE: Thu Mar 10 21:49:40 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.5
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-276_1

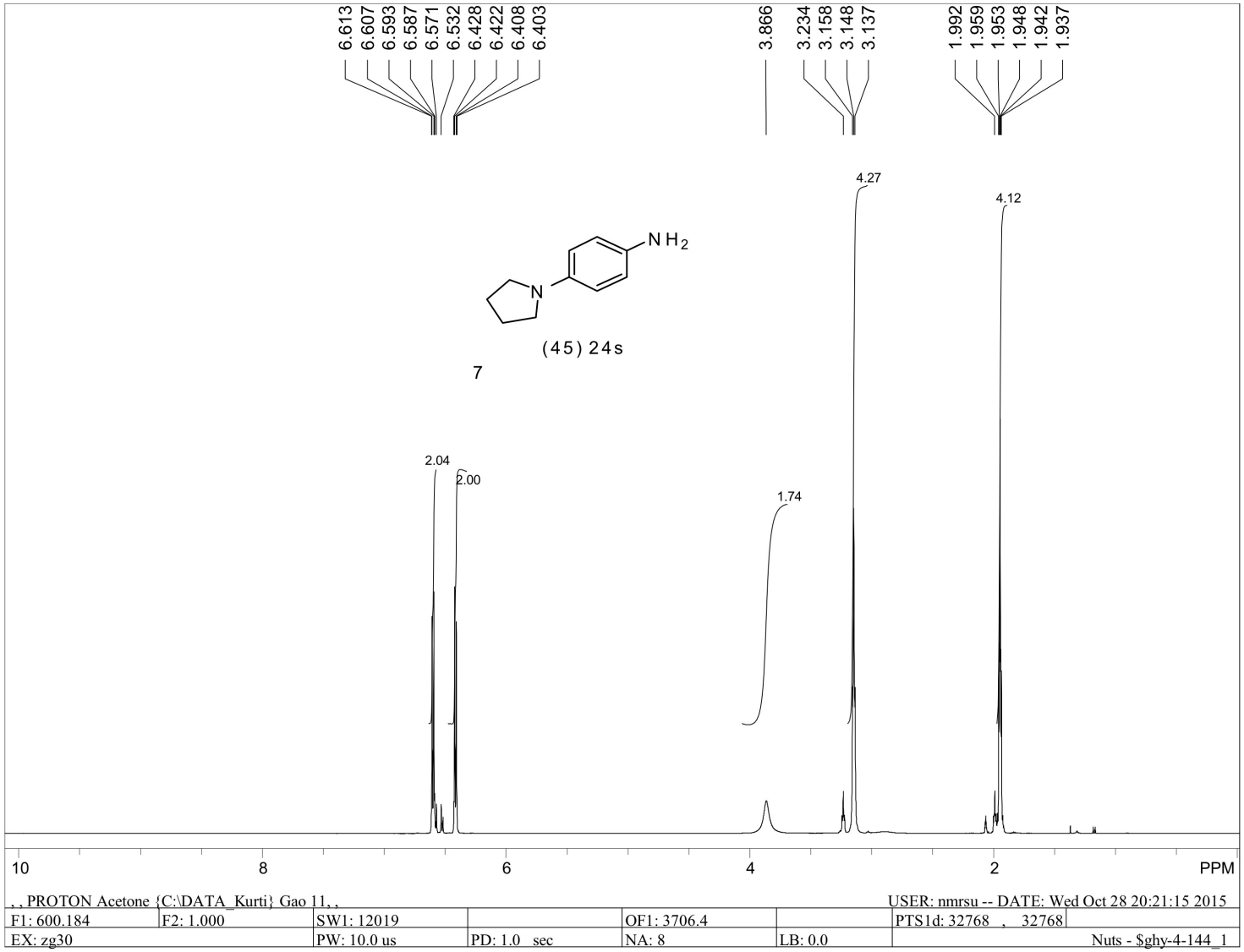

152.403
152.338
150.799
150.726
149.516
149.479
149.457
149.421
142.297
142.275
142.224
142.202
135.516
135.421
133.948
133.853
95.791
95.776
95.455
95.309
77.211
77.000
76.789
56.452
MeO
NH2
F
F
(42) 24p
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 12, ,
USER: nmrsu -- DATE: Thu Mar 10 21:53:23 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15086.3
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 60
LB: 0.0
Nuts - $ghy-4-276_2

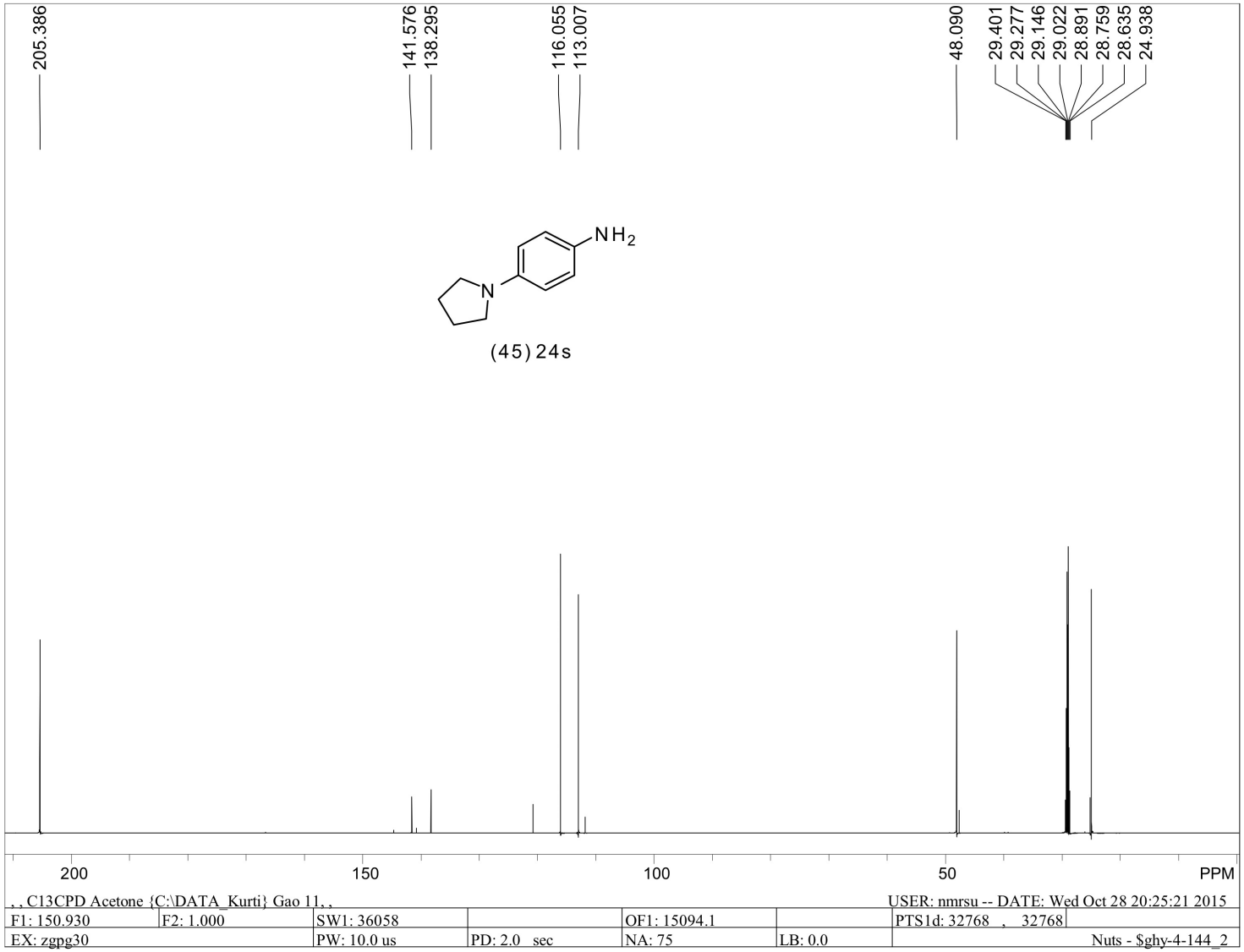

7.260
6.456
6.453
6.452
6.449
6.344
6.340
6.324
6.319
3.834
3.638
F
NH2
MeO
Cl
(43) 24q
3.17
2.00
1.01
1.00
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 11, ,
USER: nmrsu -- DATE: Wed Apr 06 22:09:10 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ZZ-1-187_1

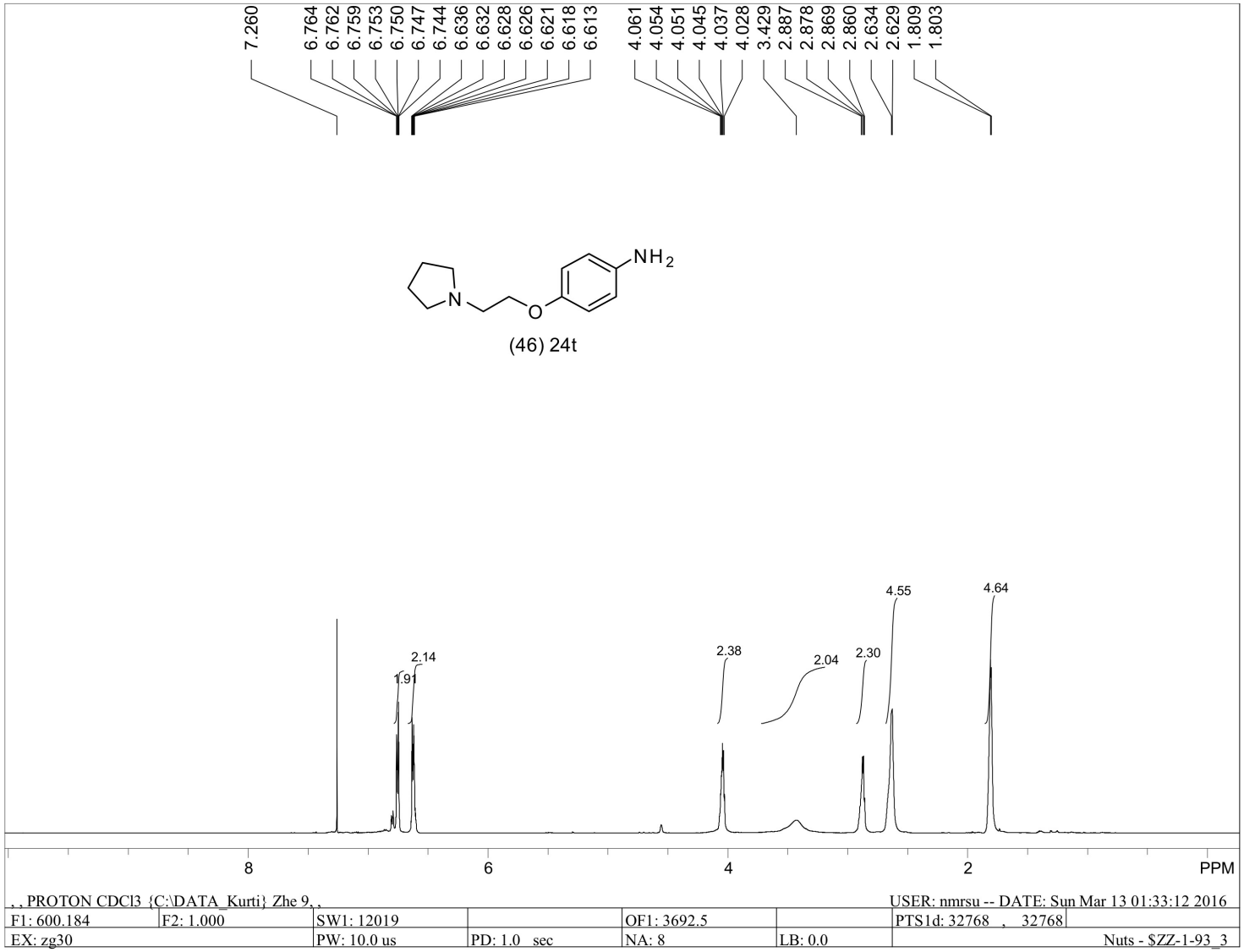

157.610
155.969
143.070
142.997
136.456
136.362
128.975
128.939
111.293
111.271
102.339
102.193
77.211
77.000
76.789
61.680
61.658
F
NH2
MeO
Cl
(43) 24q
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Zhe 11, ,
USER: nmrsu -- DATE: Wed Apr 06 22:10:28 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15085.2
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 64
LB: 0.0
Nuts - $ZZ-1-187_2

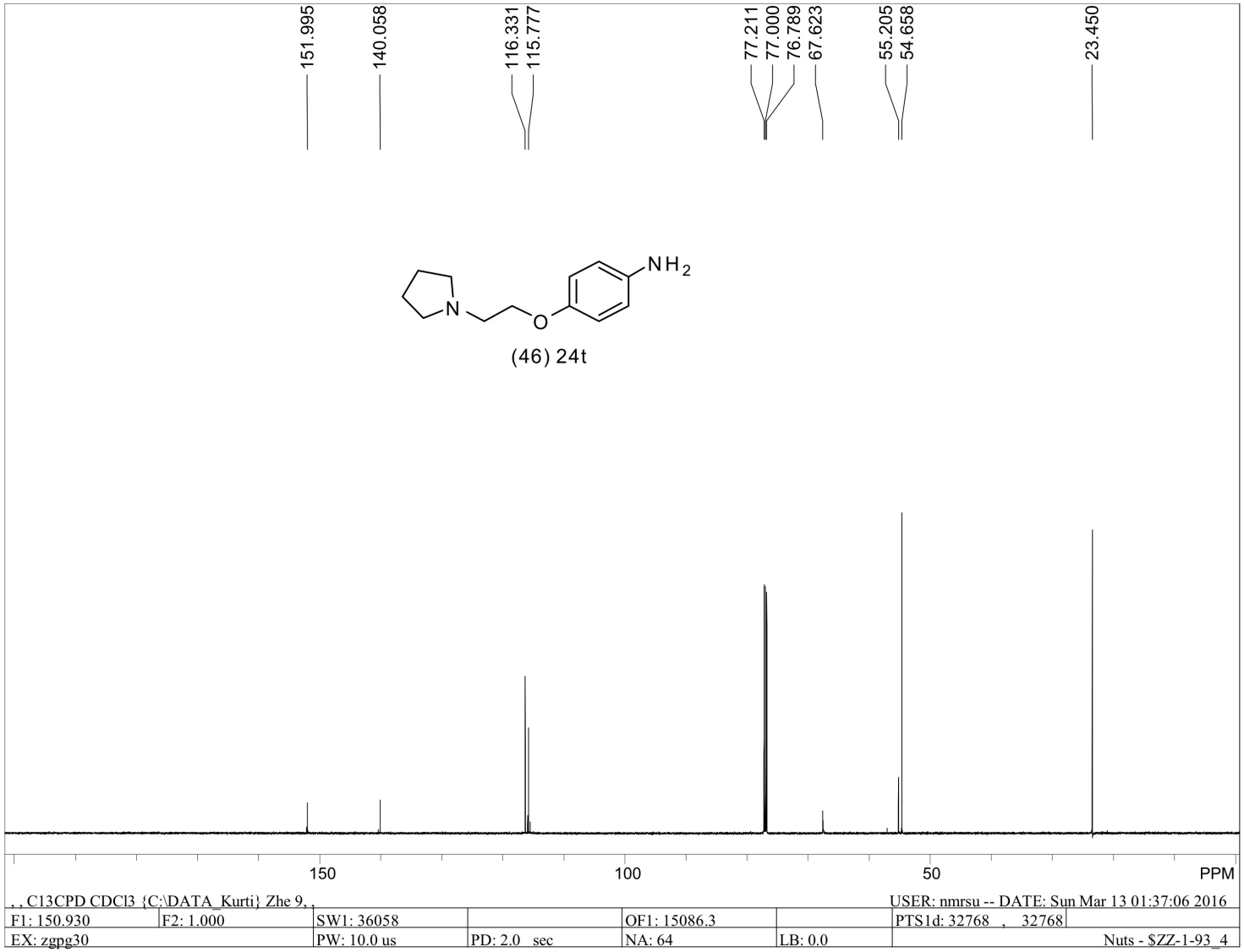

6.645
6.640
6.637
6.630
6.626
6.621
6.608
6.603
6.599
6.592
6.588
6.583
4.018
2.887
2.755
NH2
Me
N
Me
(44) 24r
6.81
2.20
2.16
2.00
8
6
4
2
PPM
, , PROTON Acetone {C:\DATA_Kurti} Gao 1, ,
USER: nmrsu -- DATE: Fri Jun 03 20:48:50 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3706.4
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-5-28_1

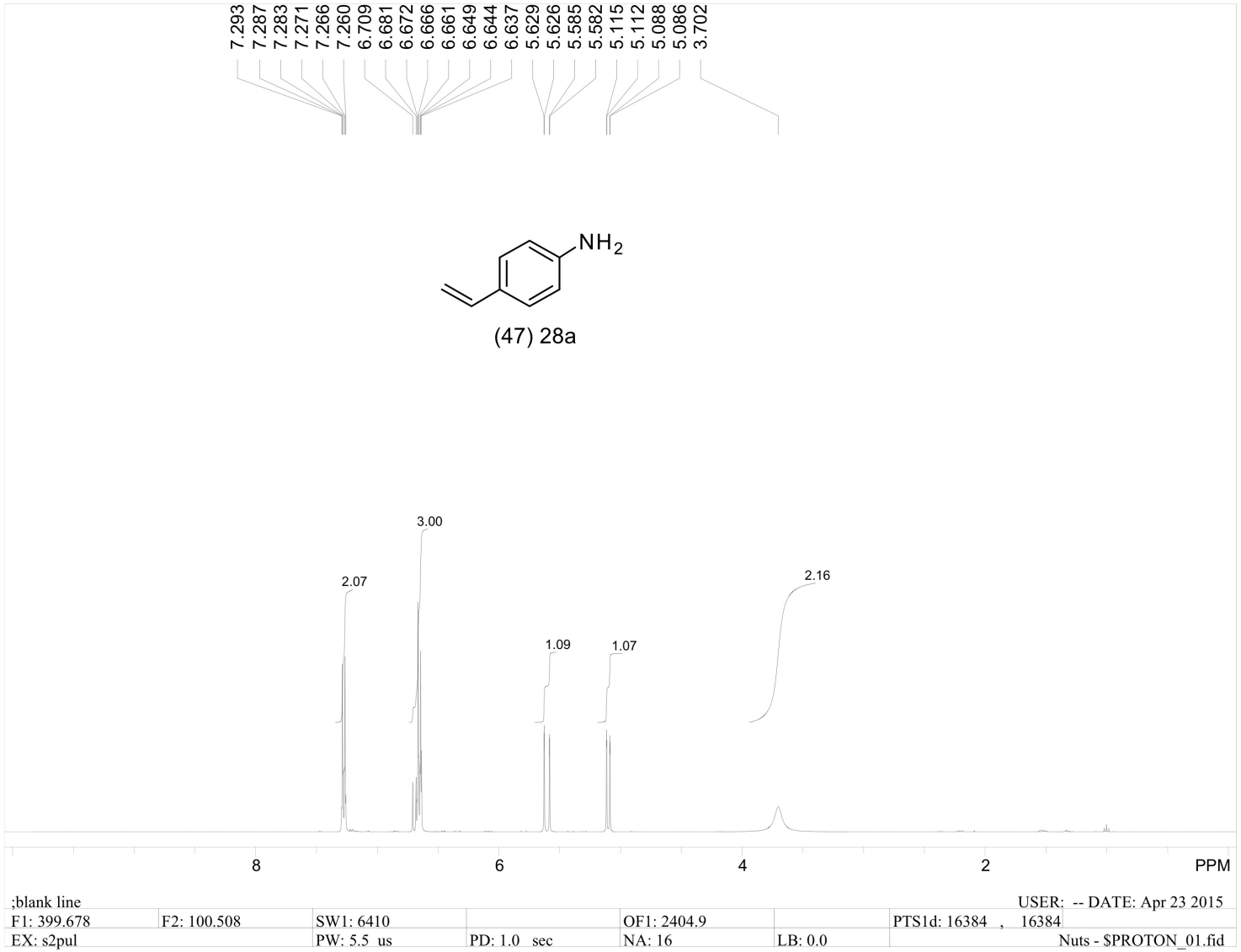

205.320
205.189
143.946
140.030
115.552
115.487
41.483
29.357
29.233
29.102
28.978
28.847
28.716
28.592
NH2
Me
N
Me
(44) 24r
200
150
100
50
0
PPM
, , C13CPD Acetone {C:\DATA_Kurti} Gao 1, ,
USER: nmrsu -- DATE: Fri Jun 03 20:54:54 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15094.1
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 160
LB: 2.0
Nuts - $ghy-5-28_2

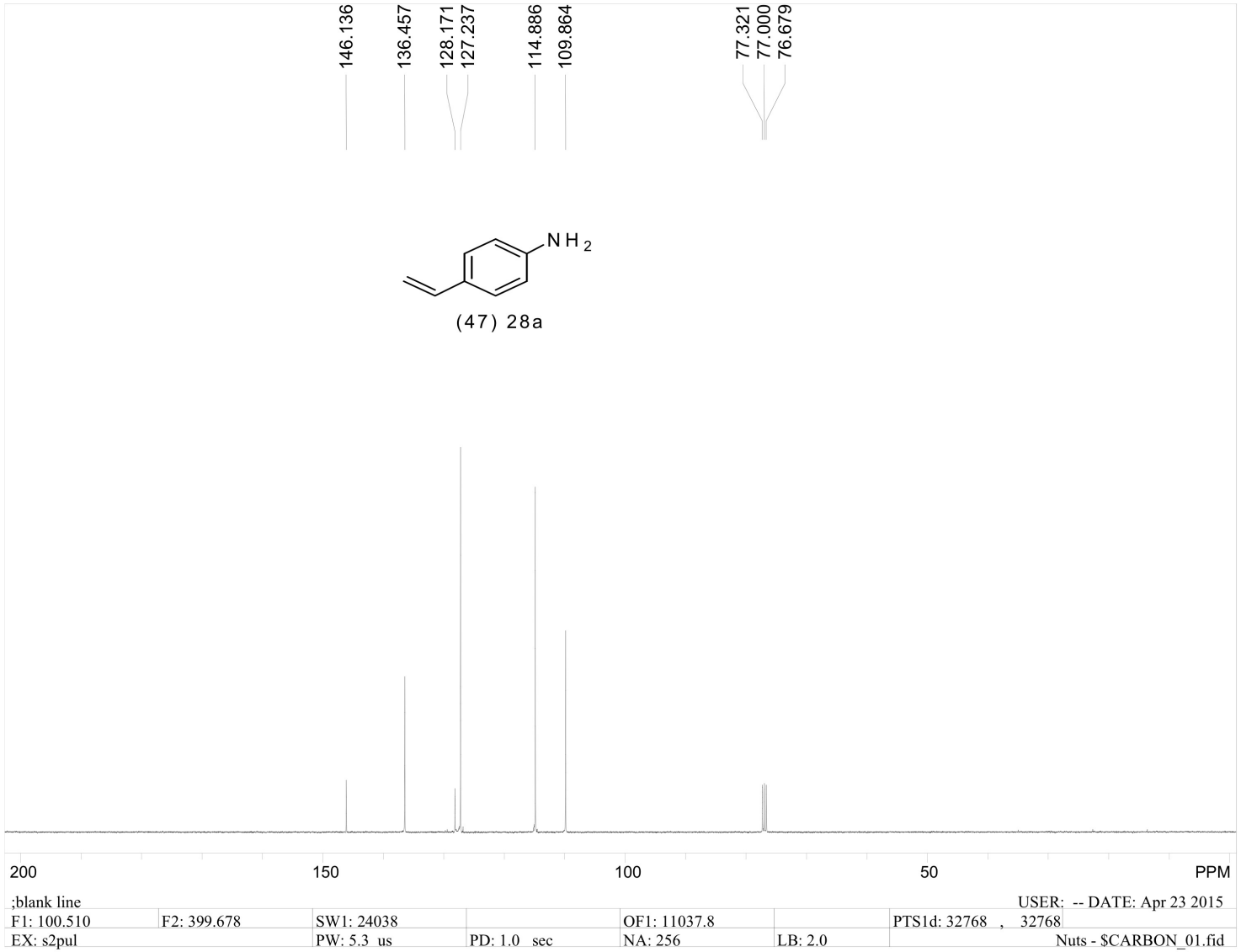

6.613
6.607
6.593
6.587
6.571
6.532
6.428
6.422
6.408
6.403
3.866
3.234
3.158
3.148
3.137
1.992
1.959
1.953
1.948
1.942
1.937
4.27
4.12
NH2
N
(45) 24s
7
2.04
2.00
1.74
10
8
6
4
2
PPM
, , PROTON Acetone {C:\DATA_Kurti} Gao 11, ,
USER: nmrsu -- DATE: Wed Oct 28 20:21:15 2015
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3706.4
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-144_1

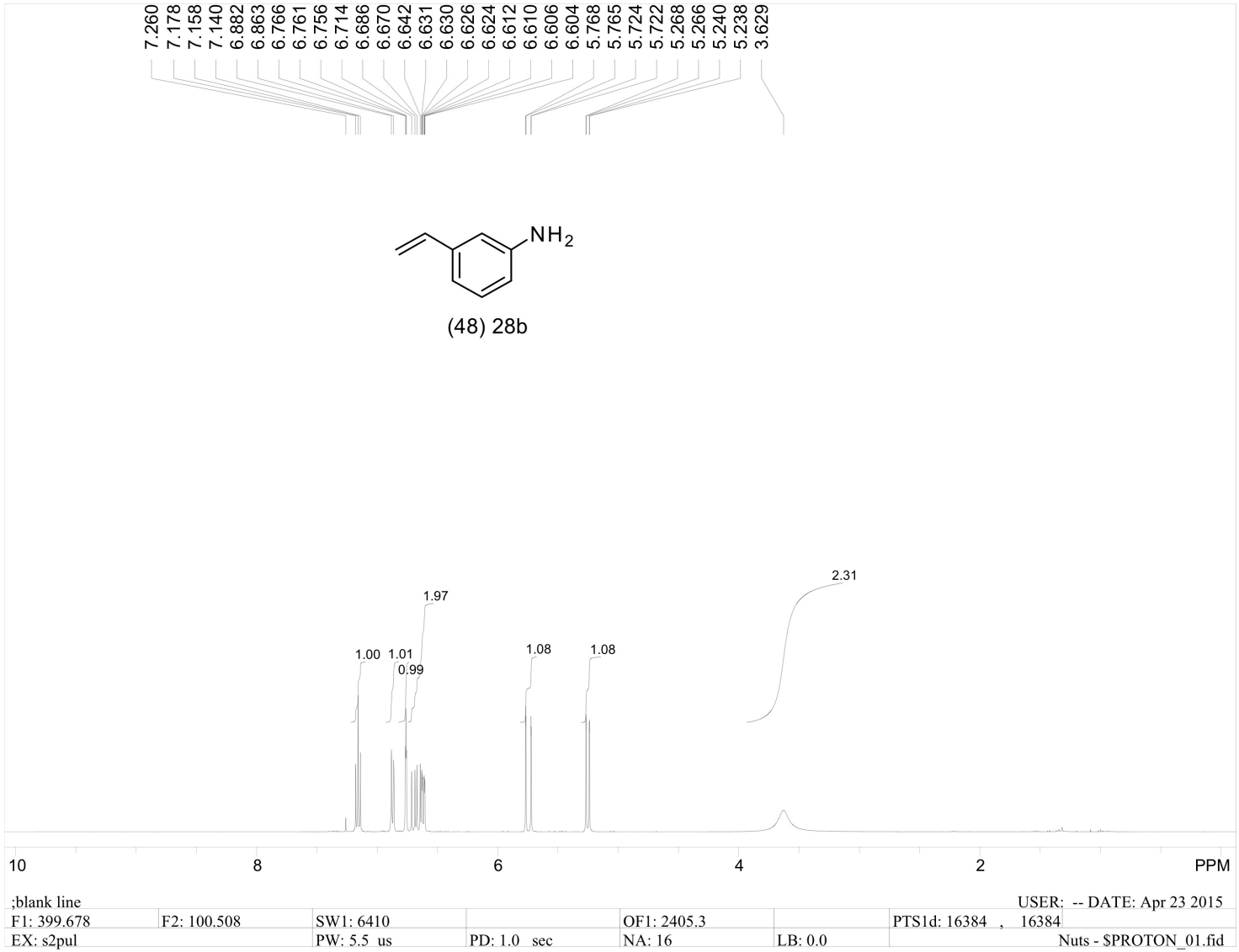

205.386
141.576
138.295
116.055
113.007
48.090
29.401
29.277
29.146
29.022
28.891
28.759
28.635
24.938
NH2
N
(45) 24s
200
150
100
50
PPM
, , C13CPD Acetone {C:\DATA_Kurti} Gao 11, ,
USER: nmrsu -- DATE: Wed Oct 28 20:25:21 2015
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15094.1
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 75
LB: 0.0
Nuts - $ghy-4-144_2

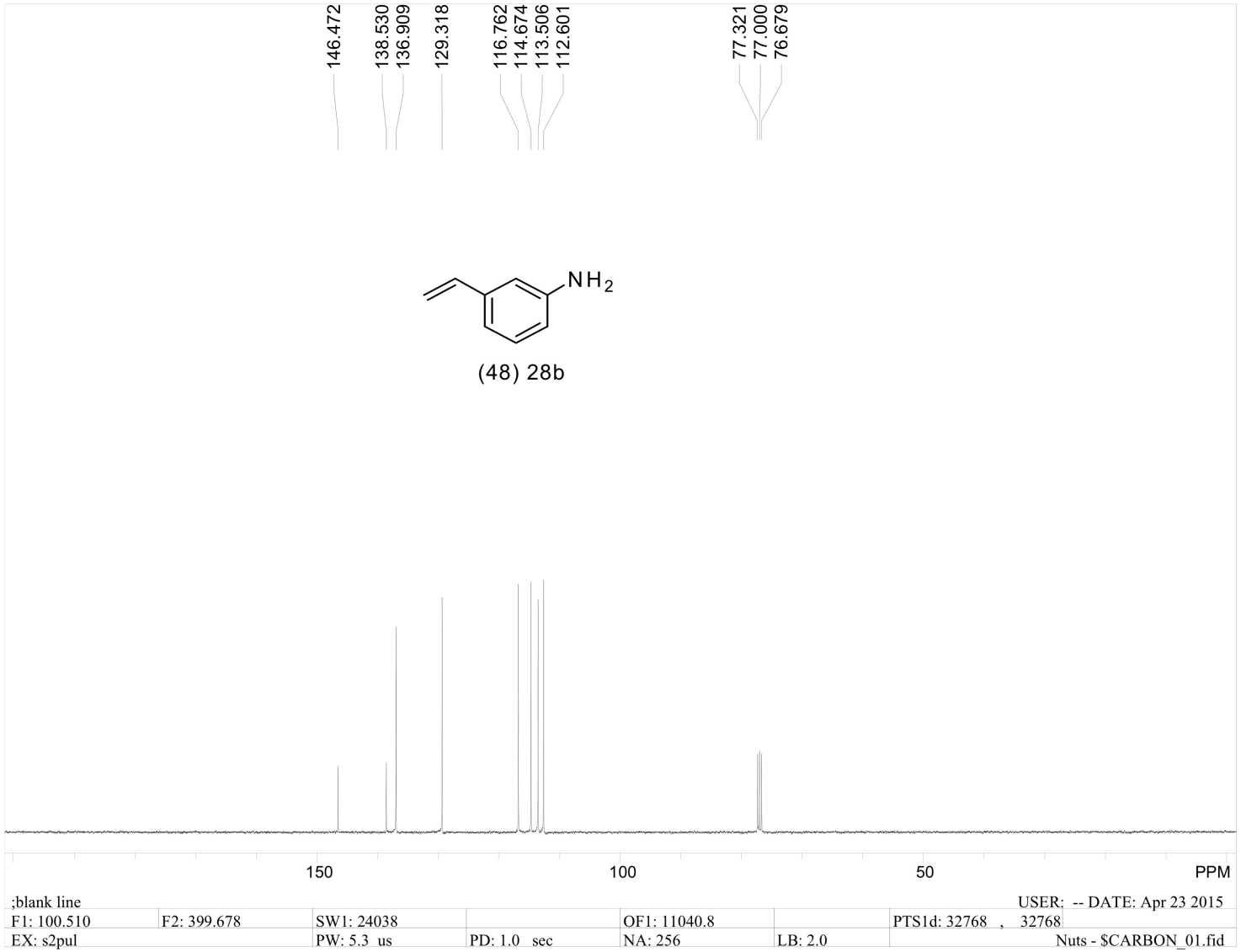

7.260
6.764
6.762
6.759
6.753
6.750
6.747
6.744
6.636
6.632
6.628
6.626
6.621
6.618
6.613
4.061
4.054
4.051
4.045
4.037
4.028
3.429
2.887
2.878
2.869
2.860
2.634
2.629
1.809
1.803
NH2
N
O
(46) 24t
4.64
4.55
2.38
2.30
2.14
2.04
1.91
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 9, ,
USER: nmrsu -- DATE: Sun Mar 13 01:33:12 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.5
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ZZ-1-93_3

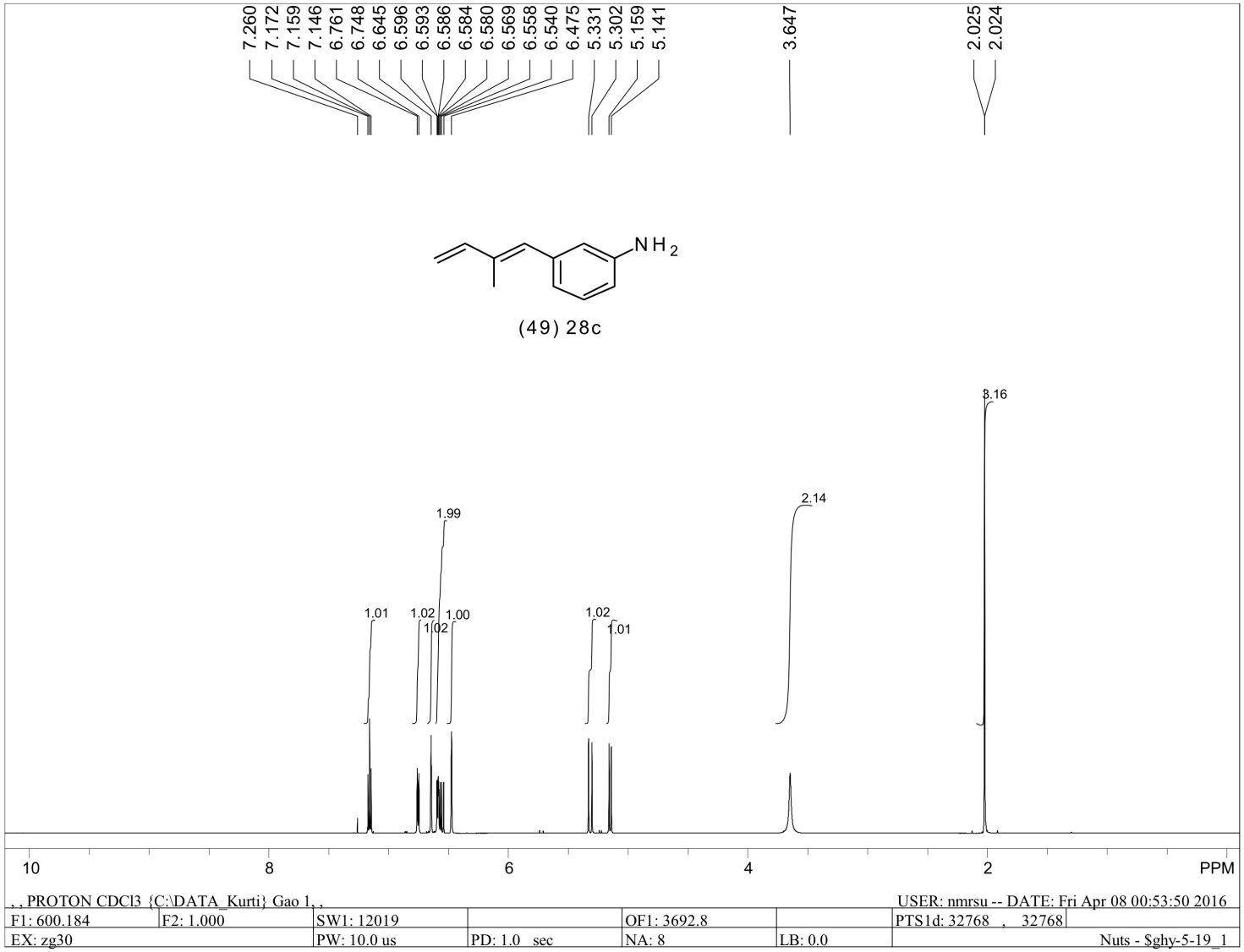

151.995
140.058
116.331
115.777
77.211
77.000
76.789
67.623
55.205
54.658
23.450
NH2
N
O
(46) 24t
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Zhe 9, ,
USER: nmrsu -- DATE: Sun Mar 13 01:37:06 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15086.3
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 64
LB: 0.0
Nuts - $ZZ-1-93_4

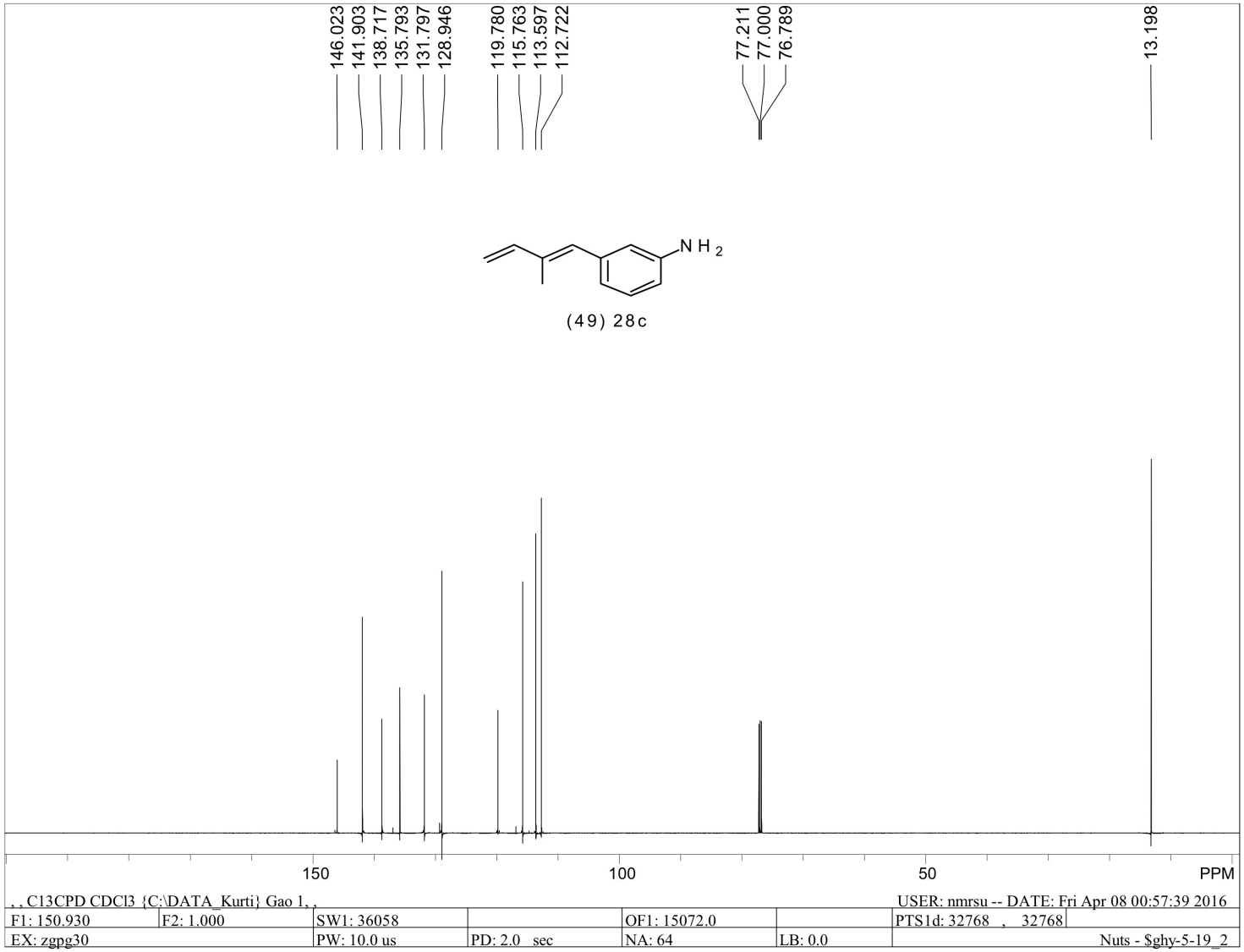

7.293
7.287
7.283
7.271
7.266
7.260
6.709
6.681
6.672
6.666
6.661
6.649
6.644
6.637
5.629
5.626
5.585
5.582
5.115
5.112
5.088
5.086
3.702
NH2
(47) 28a
3.00
2.07
2.16
1.09
1.07
8
6
4
2
PPM
;blank line
USER: -- DATE: Apr 23 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2404.9
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

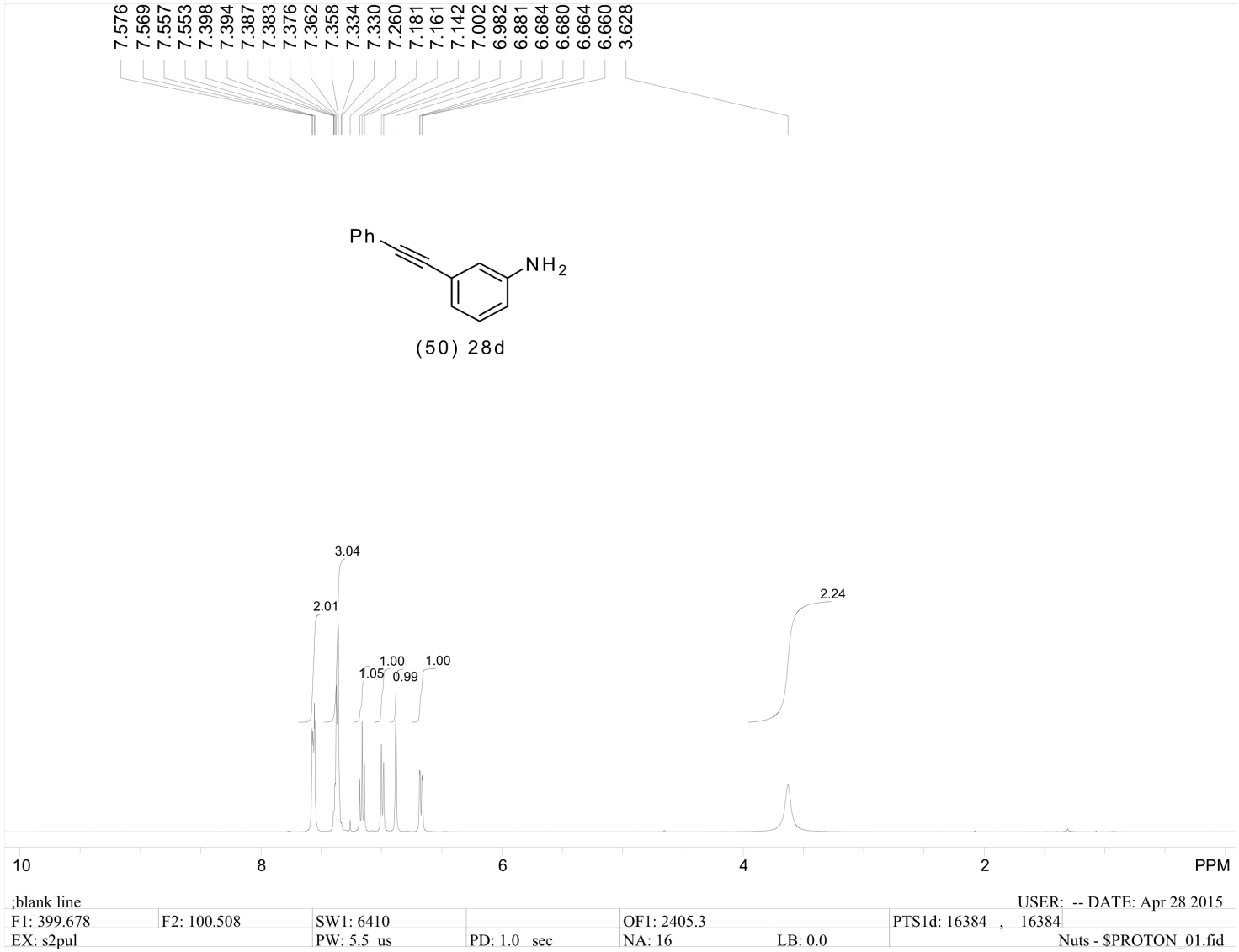

146.136
136.457
128.171
127.237
114.886
109.864
77.321
77.000
76.679
NH2
(47) 28a
200
150
100
50
PPM
;blank line
USER: -- DATE: Apr 23 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11037.8
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 2.0
Nuts - $CARBON_01.fid

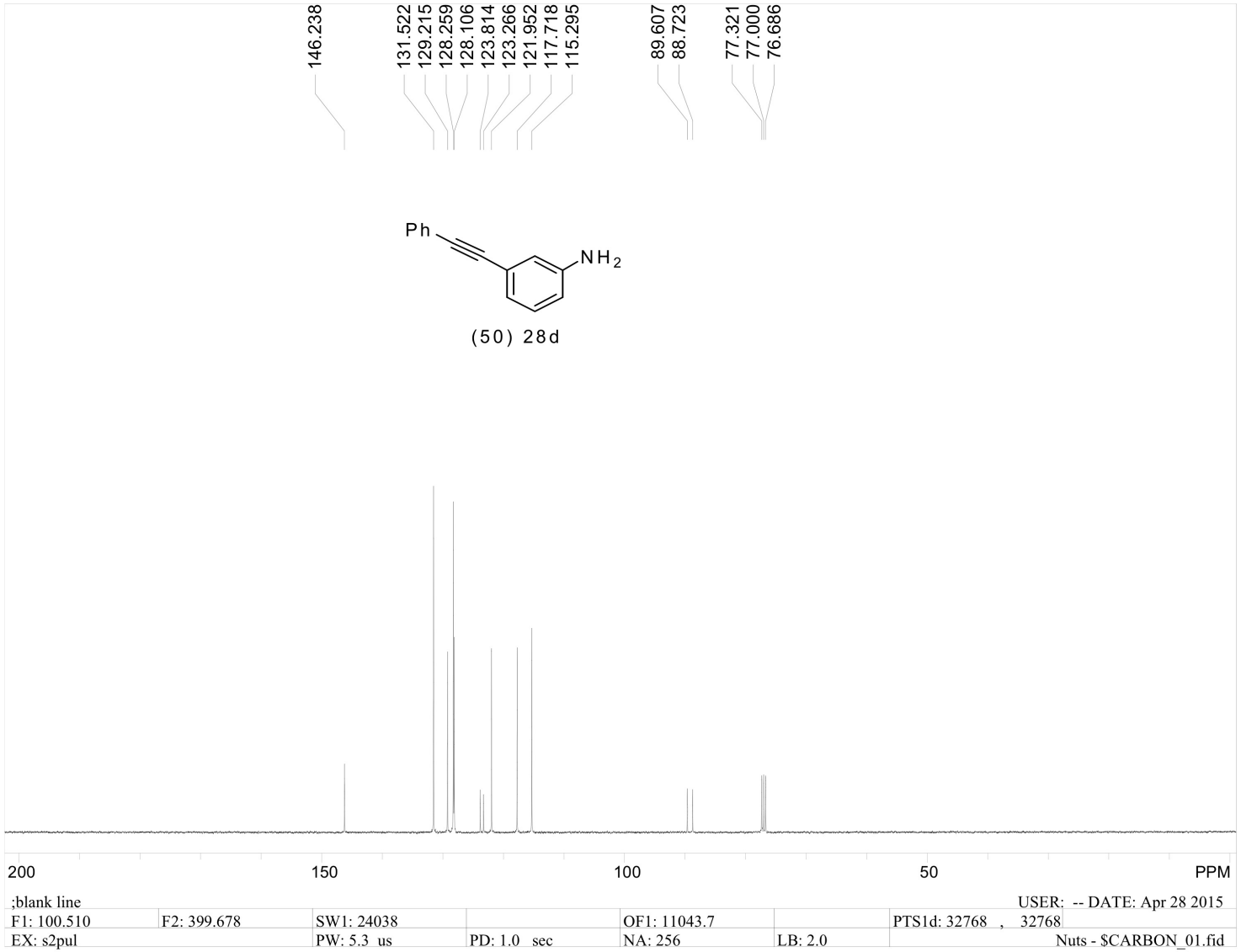

7.260
7.178
7.158
7.140
6.882
6.863
6.766
6.761
6.756
6.714
6.686
6.670
6.642
6.631
6.630
6.626
6.624
6.612
6.610
6.606
6.604
5.768
5.765
5.724
5.722
5.268
5.266
5.240
5.238
3.629
NH2
(48) 28b
2.31
1.97
1.00
1.01
0.99
1.08
1.08
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Apr 23 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2405.3
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

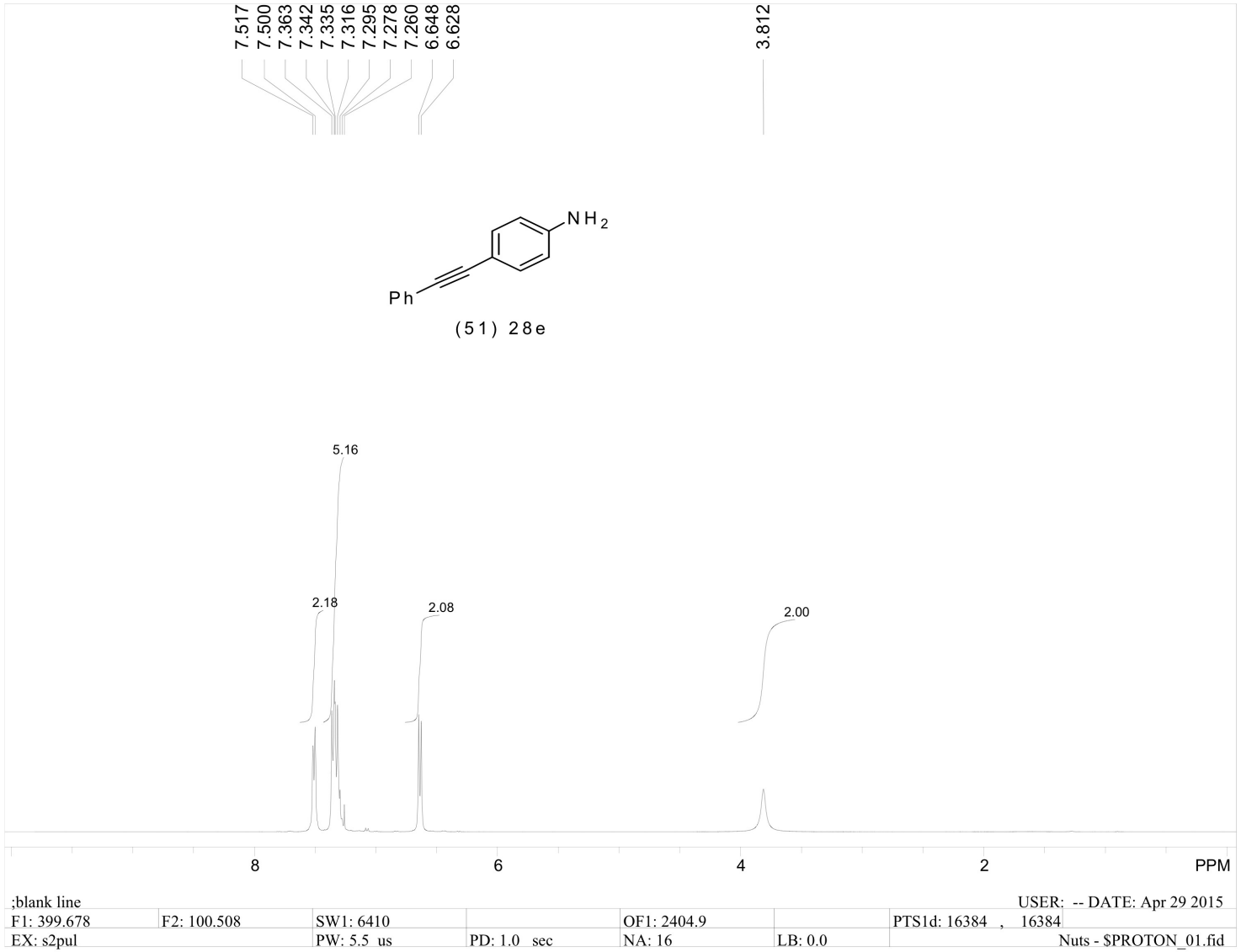

146.472
138.530
136.909
129.318
116.762
114.674
113.506
112.601
77.321
77.000
76.679
NH2
(48) 28b
150
100
50
PPM
;blank line
USER: -- DATE: Apr 23 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11040.8
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 2.0
Nuts - $CARBON_01.fid

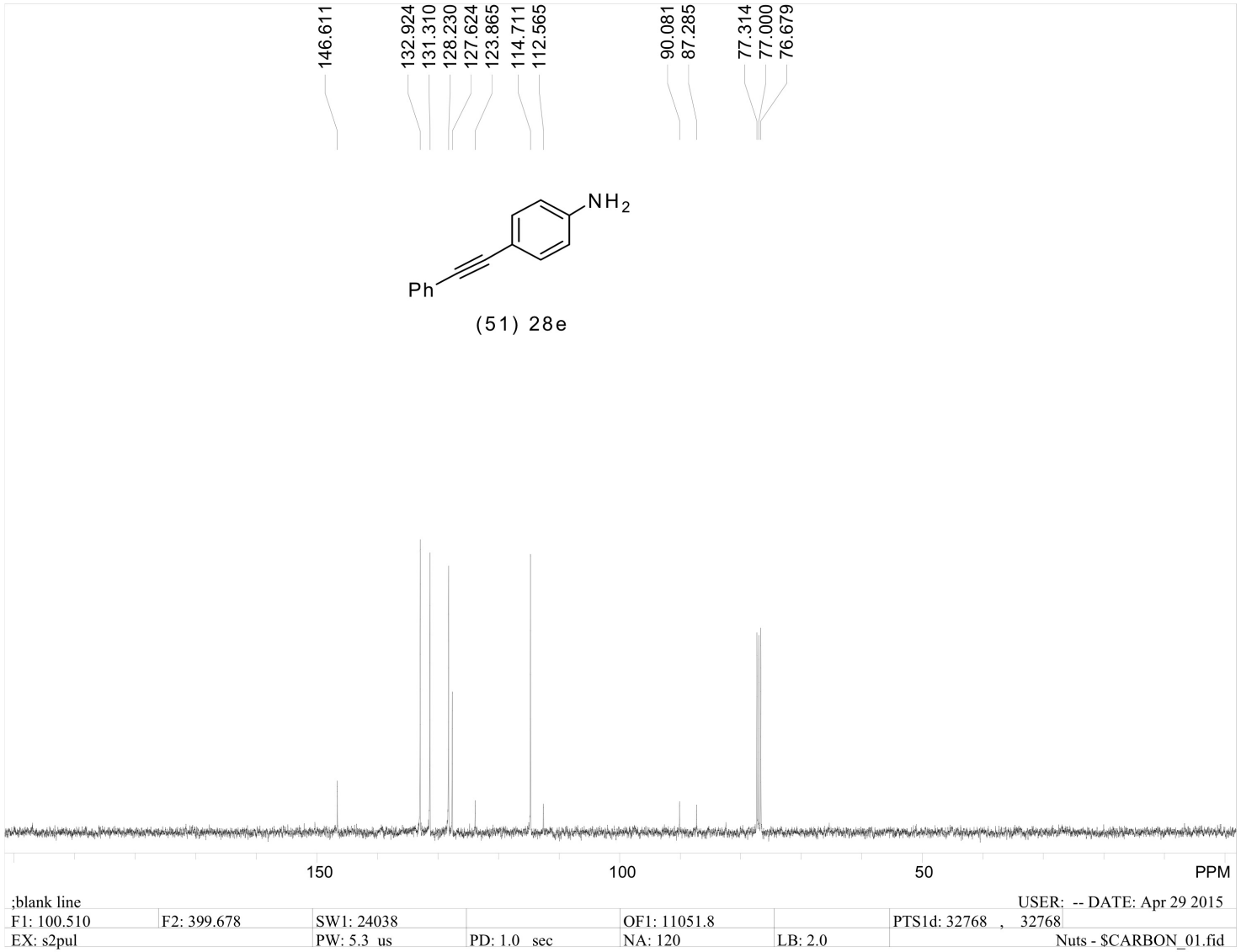

7.260
7.172
7.159
7.146
6.761
6.748
6.645
6.596
6.593
6.586
6.584
6.580
6.569
6.558
6.540
6.475
5.331
5.302
5.159
5.141
3.647
2.025
2.024
NH2
(49) 28c
3.16
2.14
1.99
1.01
1.02
1.02
1.00
1.02
1.01
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 1, ,
USER: nmrsu -- DATE: Fri Apr 08 00:53:50 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-5-19_1

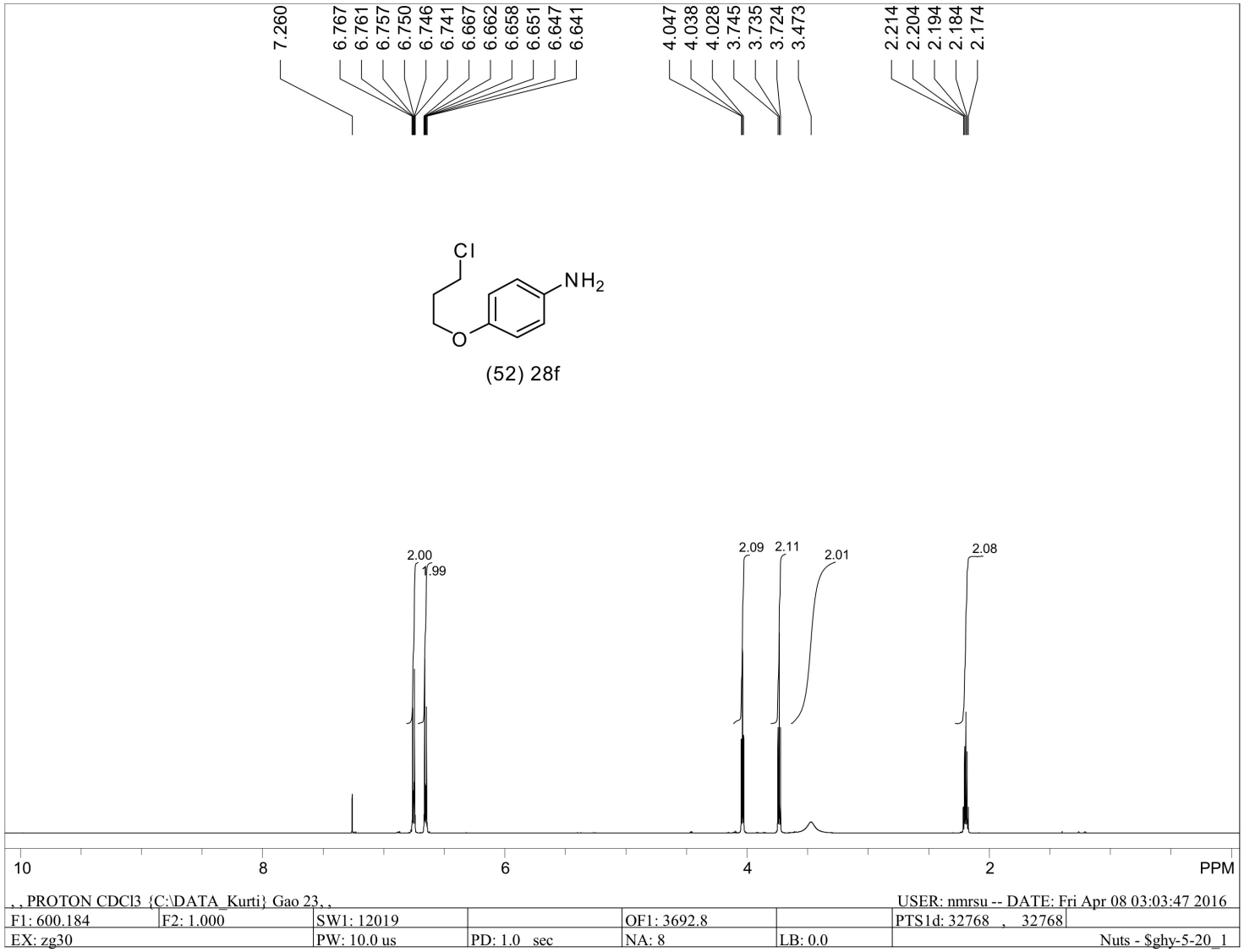

146.023
141.903
138.717
135.793
131.797
128.946
119.780
115.763
113.597
112.722
77.211
77.000
76.789
13.198
NH2
(49) 28c
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 1, ,
USER: nmrsu -- DATE: Fri Apr 08 00:57:39 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15072.0
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 64
LB: 0.0
Nuts - $ghy-5-19_2

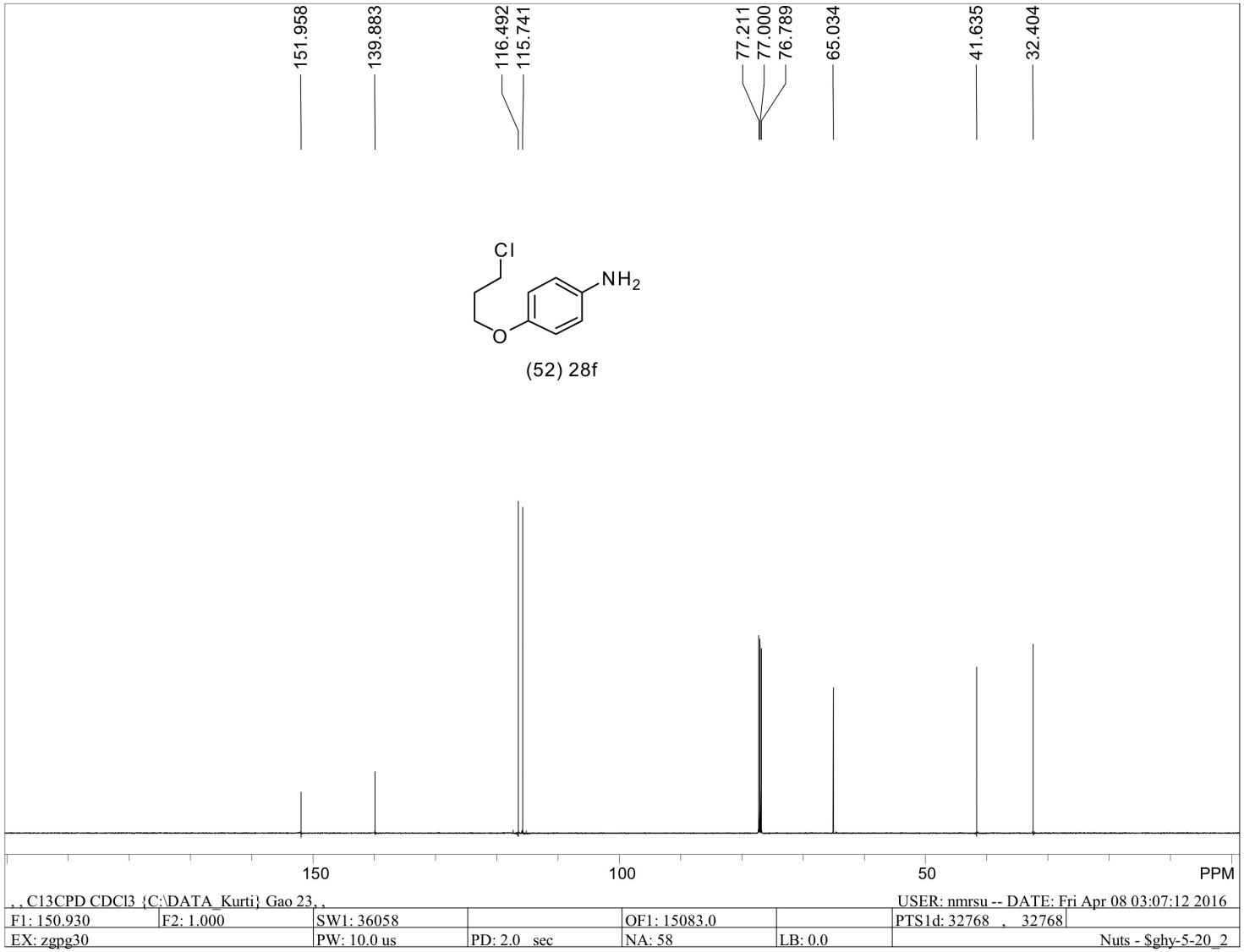

7.576
7.569
7.557
7.553
7.398
7.394
7.387
7.383
7.376
7.362
7.358
7.334
7.330
7.260
7.181
7.161
7.142
7.002
6.982
6.881
6.684
6.680
6.664
6.660
3.628
Ph
NH2
(50) 28d
3.04
2.01
1.05
1.00
0.99
1.00
2.24
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Apr 28 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2405.3
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

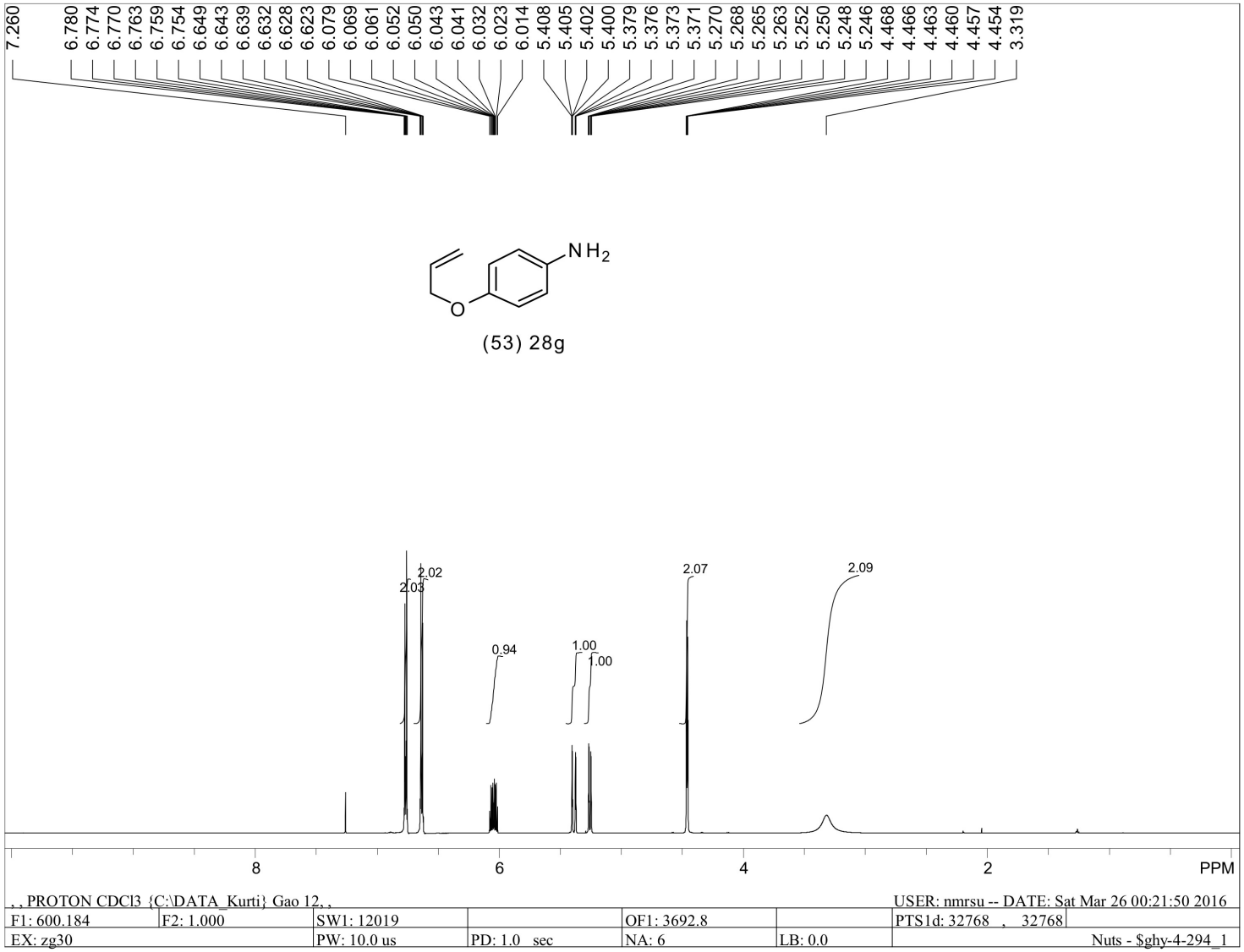

146.238
131.522
129.215
128.259
128.106
123.814
123.266
121.952
117.718
115.295
89.607
88.723
77.321
77.000
76.686
Ph
NH2
(50) 28d
200
150
100
50
PPM
;blank line
USER: -- DATE: Apr 28 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11043.7
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 2.0
Nuts - $CARBON_01.fid

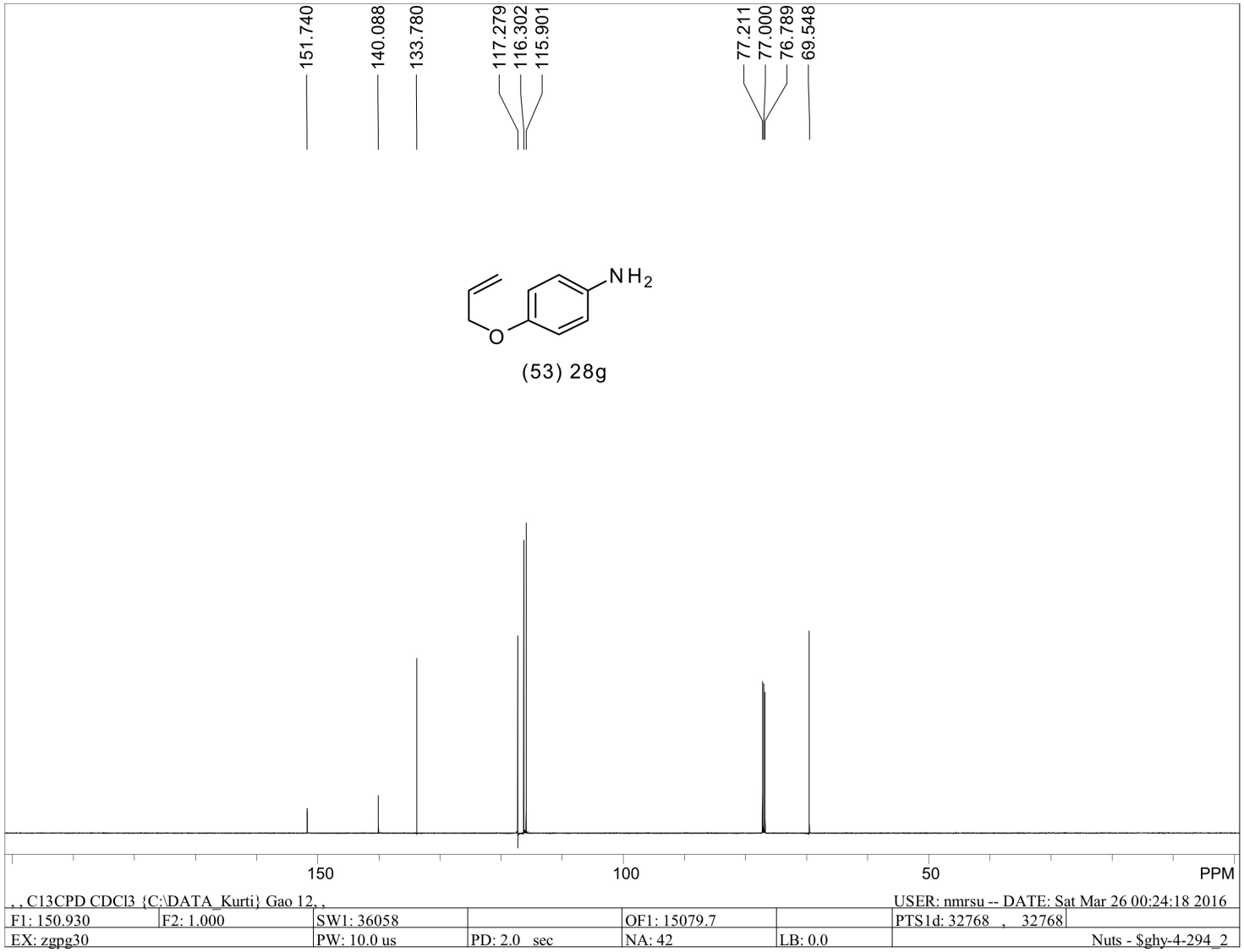

7.517
7.500
7.363
7.342
7.335
7.316
7.295
7.278
7.260
6.648
6.628
3.812
NH2
Ph
(51) 28e
5.16
2.18
2.08
2.00
8
6
4
2
PPM
;blank line
USER: -- DATE: Apr 29 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2404.9
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

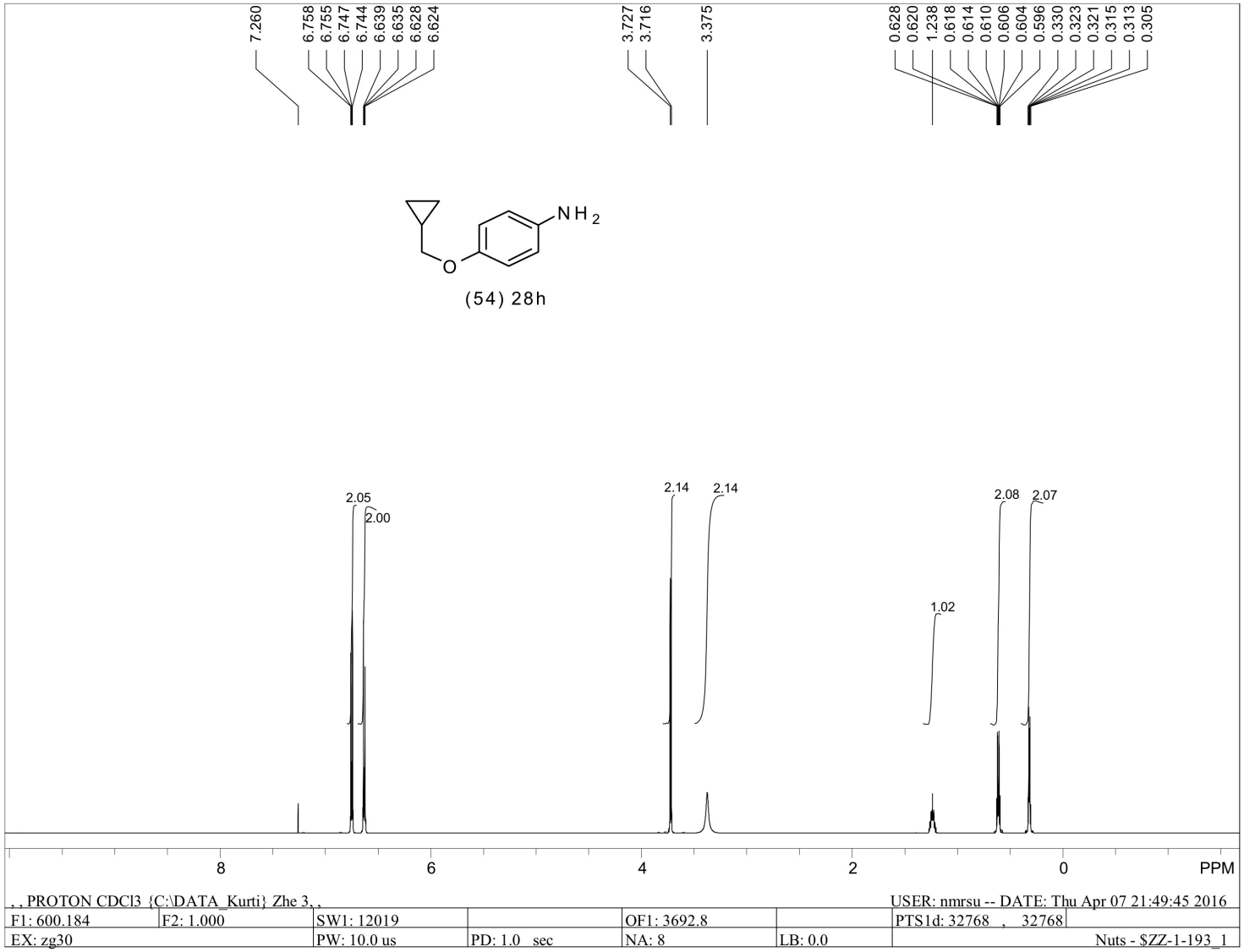

146.611
132.924
131.310
128.230
127.624
123.865
114.711
112.565
90.081
87.285
77.314
77.000
76.679
NH2
Ph
(51) 28e
150
100
50
PPM
;blank line
USER: -- DATE: Apr 29 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11051.8
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 120
LB: 2.0
Nuts - $CARBON_01.fid

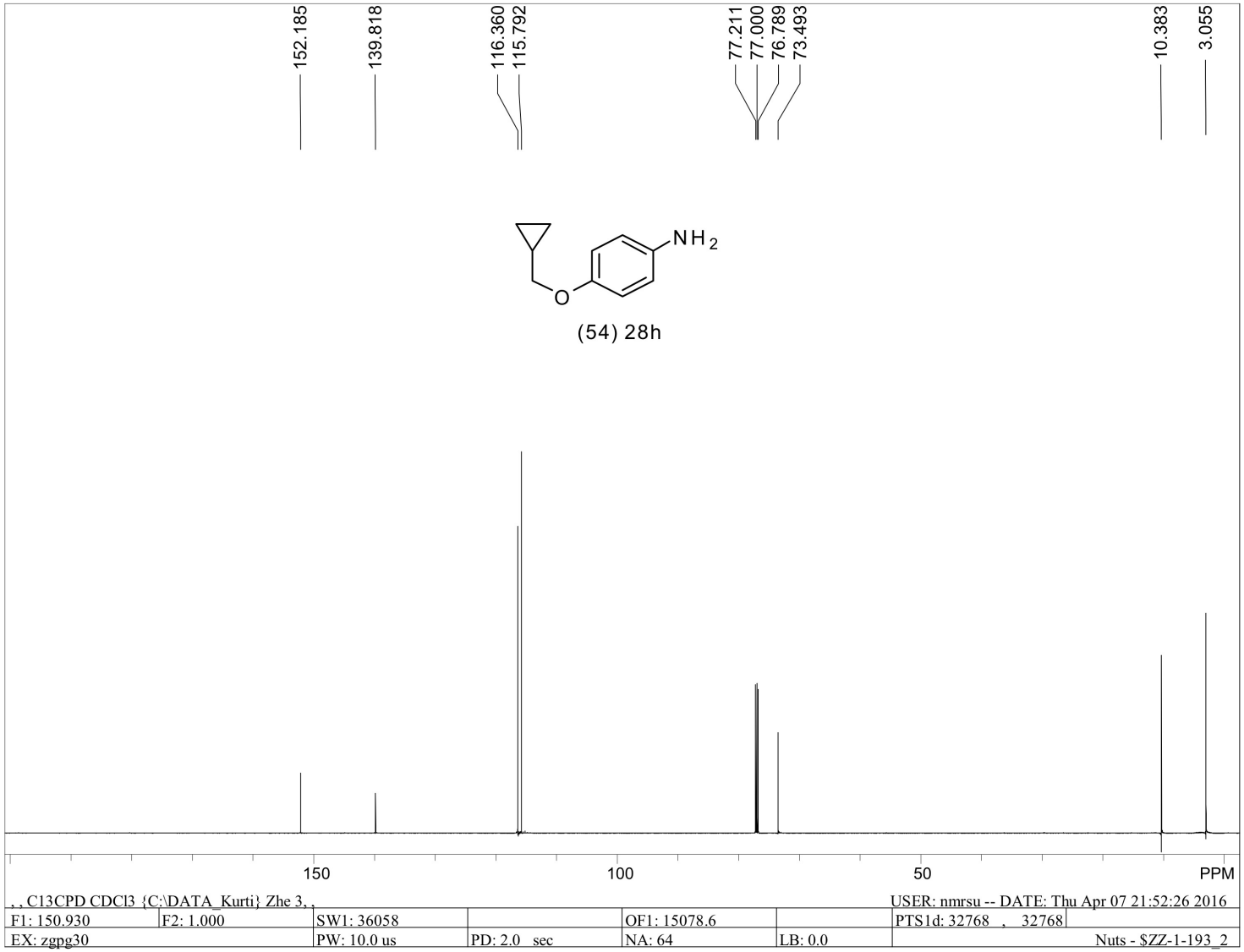

7.260
6.767
6.761
6.757
6.750
6.746
6.741
6.667
6.662
6.658
6.651
6.647
6.641
4.047
4.038
4.028
3.745
3.735
3.724
3.473
2.214
2.204
2.194
2.184
2.174
Cl
NH2
O
(52) 28f
2.00
1.99
2.09
2.11
2.01
2.08
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 23, ,
USER: nmrsu -- DATE: Fri Apr 08 03:03:47 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-5-20_1

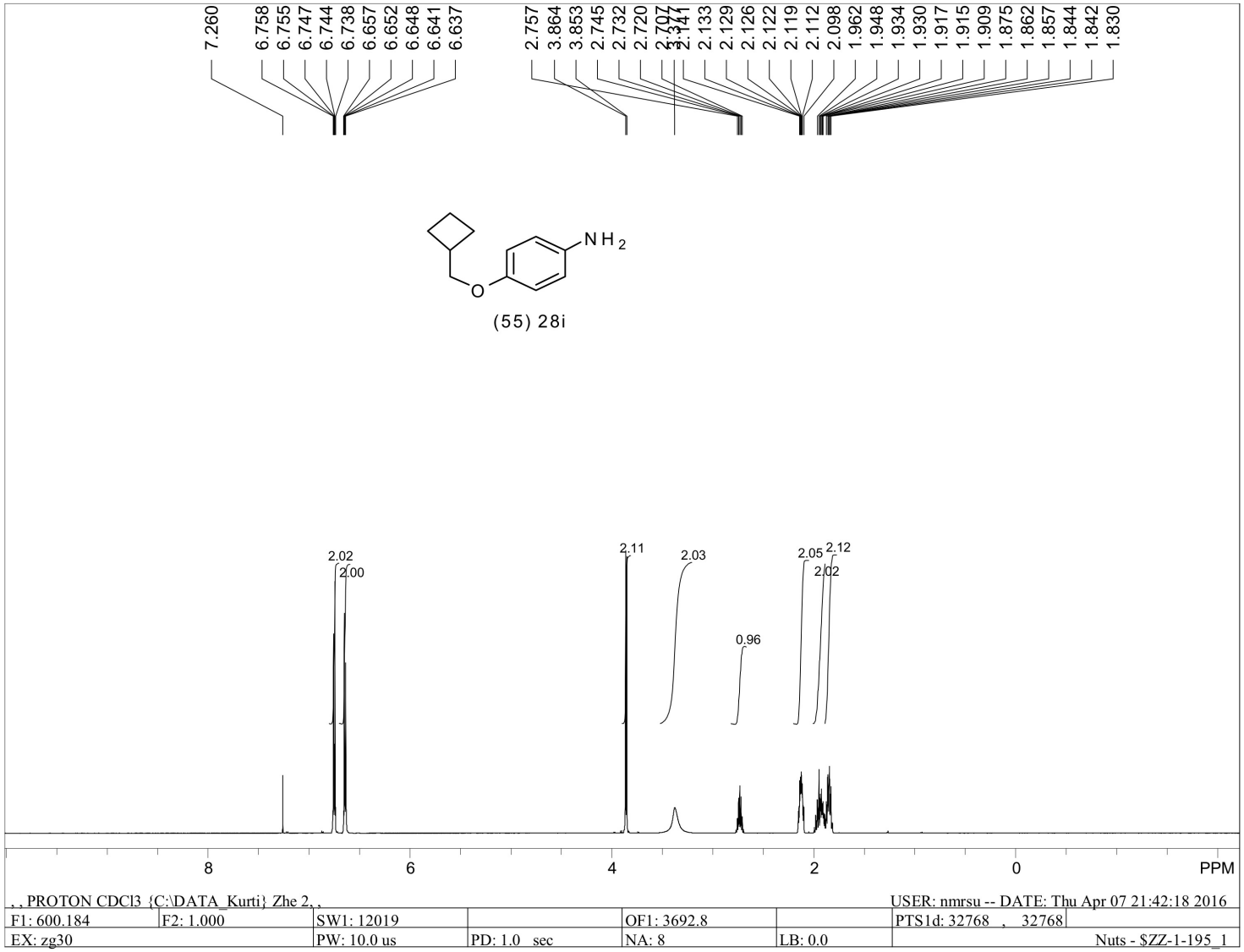

151.958
139.883
116.492
115.741
77.211
77.000
76.789
65.034
41.635
32.404
Cl
NH2
O
(52) 28f
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 23, ,
USER: nmrsu -- DATE: Fri Apr 08 03:07:12 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15083.0
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 58
LB: 0.0
Nuts - $ghy-5-20_2

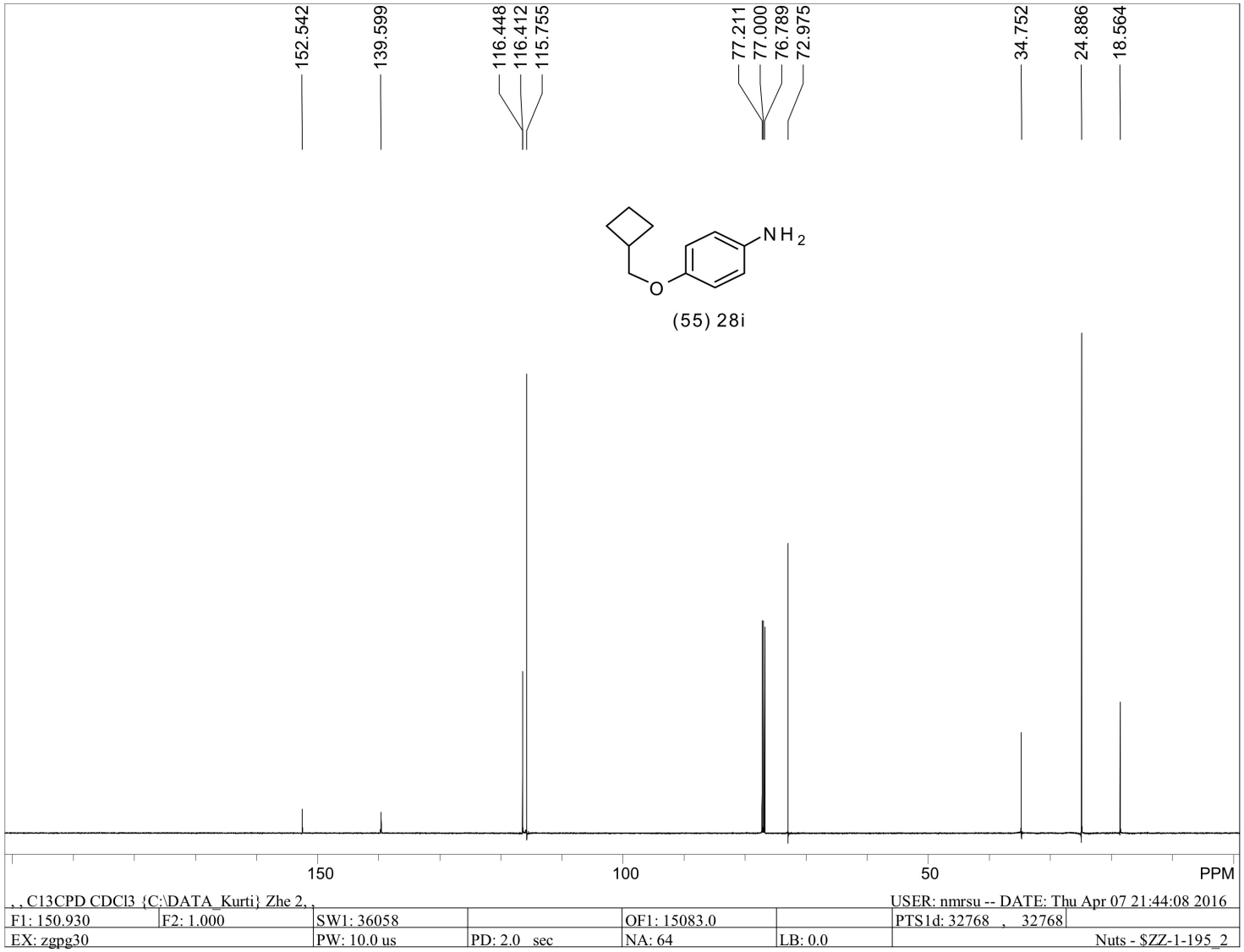

7.260
6.780
6.774
6.770
6.763
6.759
6.754
6.649
6.643
6.639
6.632
6.628
6.623
6.079
6.069
6.061
6.052
6.050
6.043
6.041
6.032
6.023
6.014
5.408
5.405
5.402
5.400
5.379
5.376
5.373
5.371
5.270
5.268
5.265
5.263
5.252
5.250
5.248
5.246
4.468
4.466
4.463
4.460
4.457
4.454
3.319
NH2
O
(53) 28g
2.03
2.02
0.94
1.00
1.00
2.07
2.09
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 12, ,
USER: nmrsu -- DATE: Sat Mar 26 00:21:50 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 6
LB: 0.0
Nuts - $ghy-4-294_1

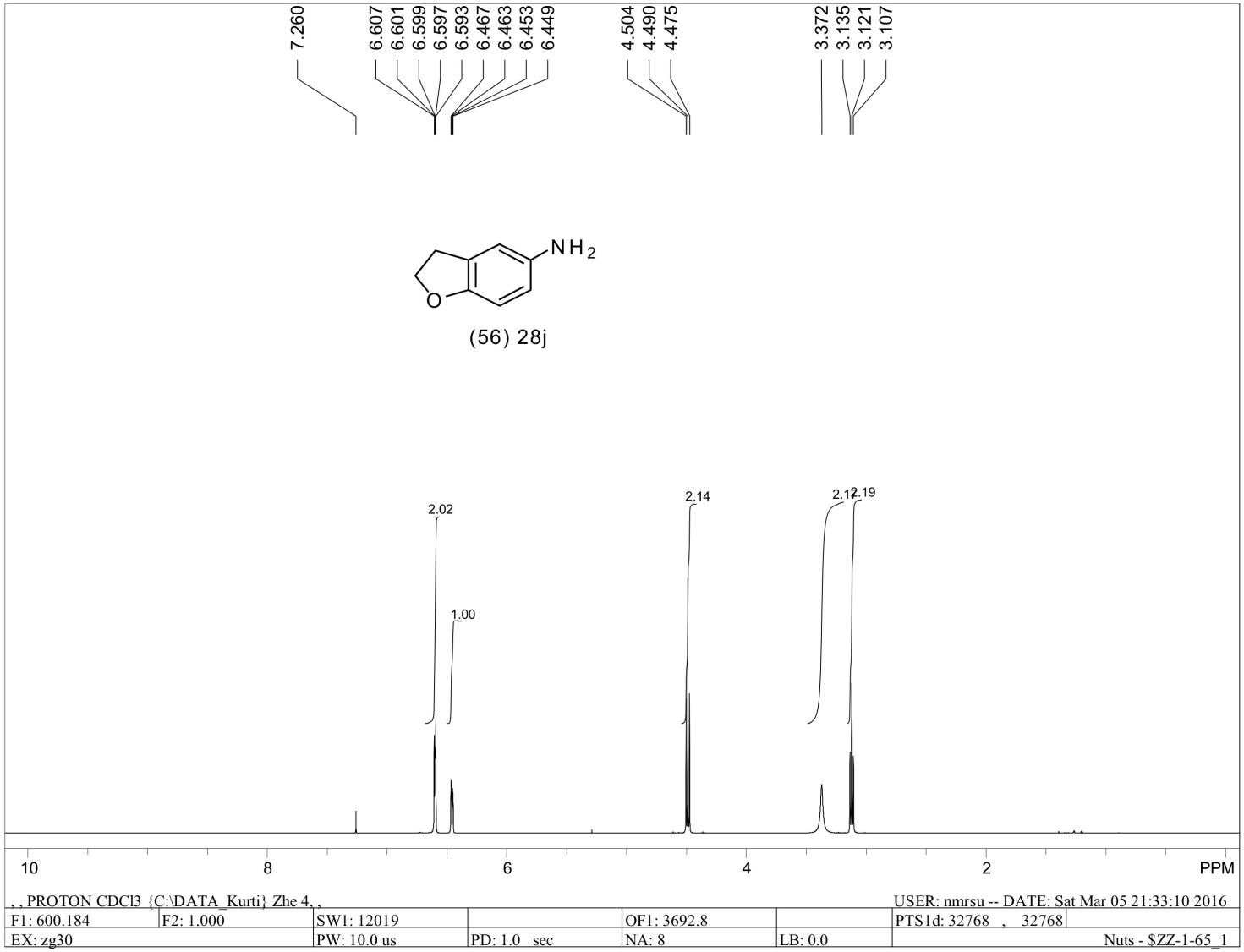

151.740
140.088
133.780
117.279
116.302
115.901
77.211
77.000
76.789
69.548
NH2
O
(53) 28g
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 12, ,
USER: nmrsu -- DATE: Sat Mar 26 00:24:18 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15079.7
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 42
LB: 0.0
Nuts - $ghy-4-294_2

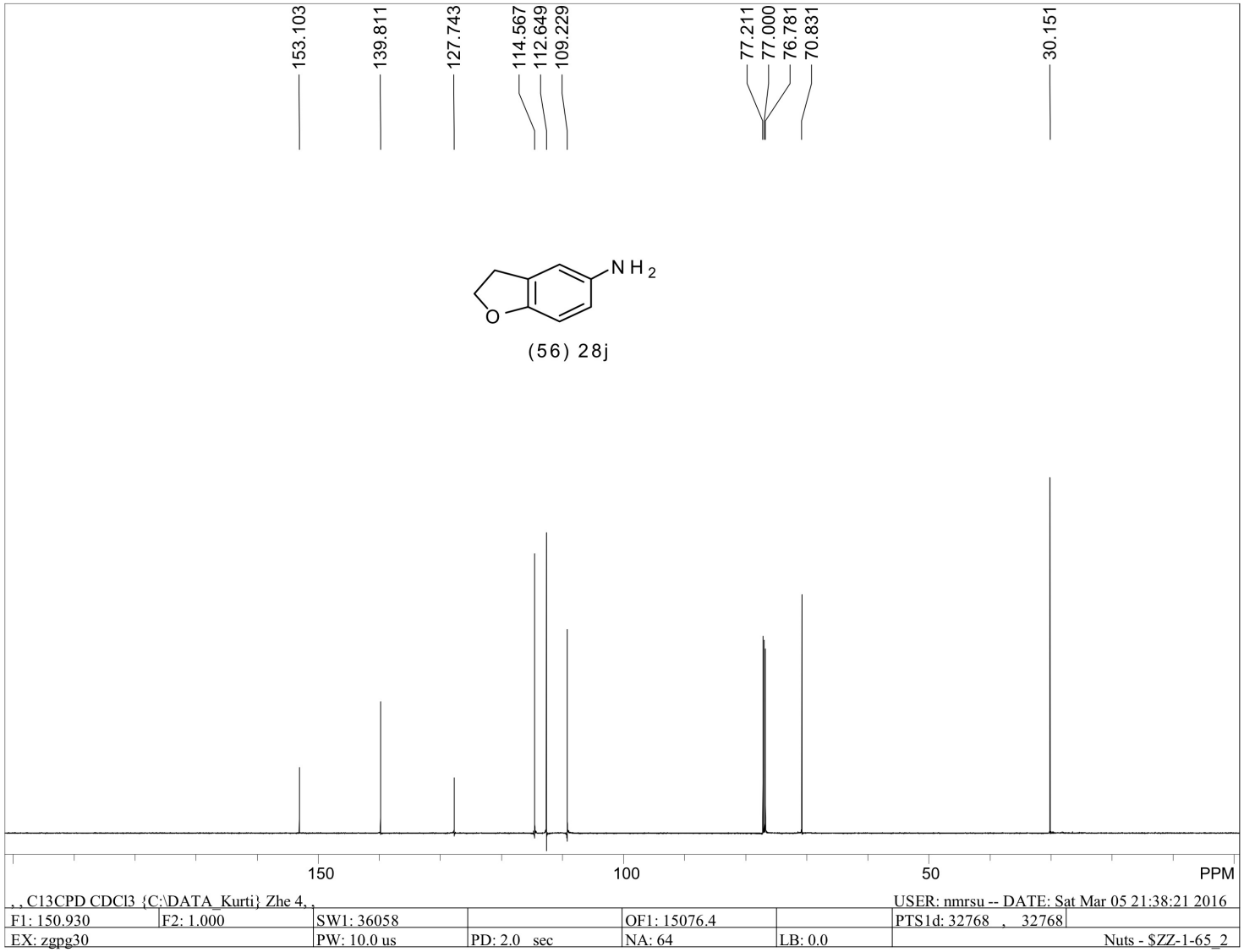

7.260
6.758
6.755
6.747
6.744
6.639
6.635
6.628
6.624
3.727
3.716
3.375
0.628
0.620
1.238
0.618
0.614
0.610
0.606
0.604
0.596
0.330
0.323
0.321
0.315
0.313
0.305
NH2
O
(54) 28h
2.05
2.00
2.14
2.14
1.02
2.08
2.07
8
6
4
2
0
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 3, ,
USER: nmrsu -- DATE: Thu Apr 07 21:49:45 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ZZ-1-193_1

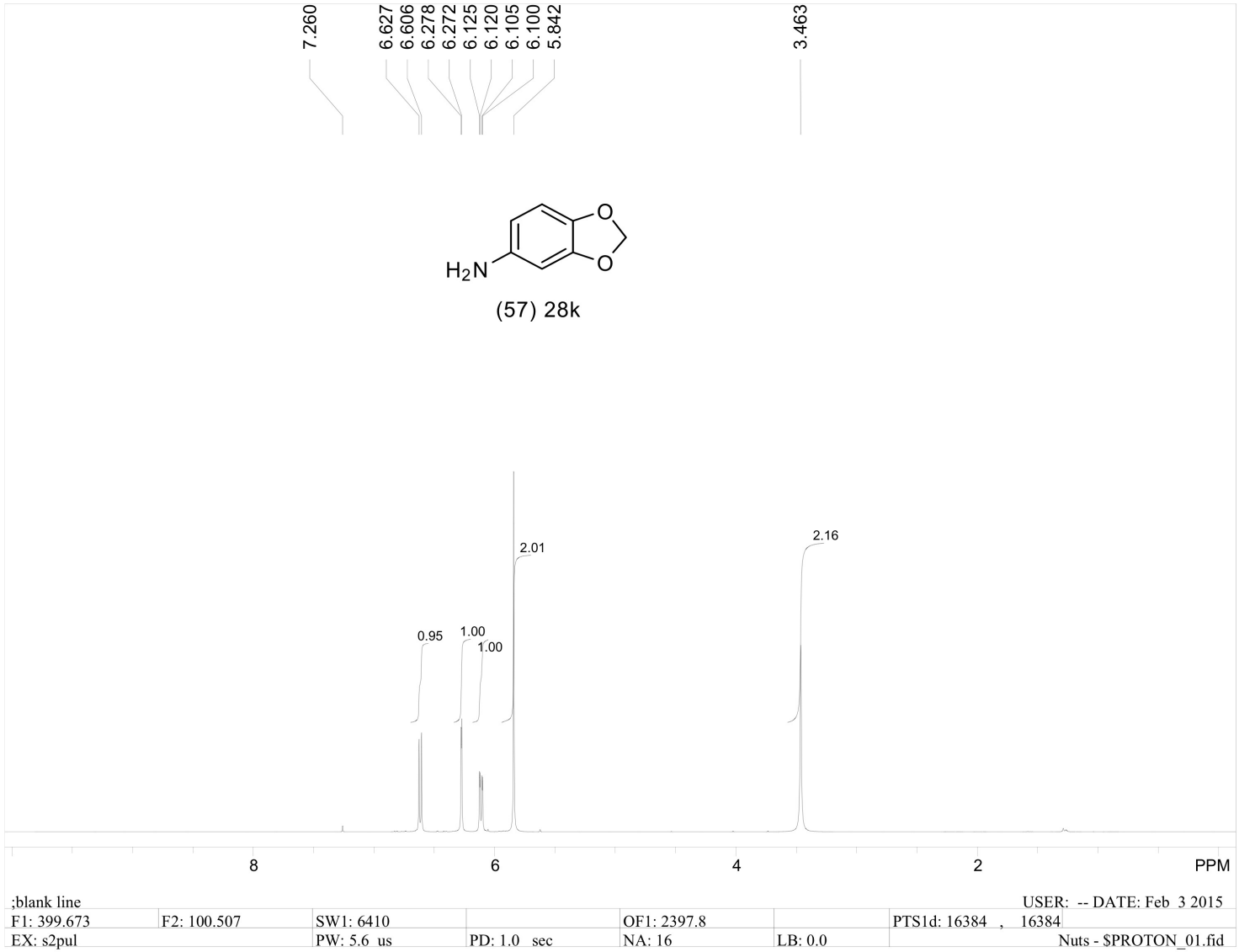

152.185
139.818
116.360
115.792
77.211
77.000
76.789
73.493
10.383
3.055
NH2
O
(54) 28h
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Zhe 3, ,
USER: nmrsu -- DATE: Thu Apr 07 21:52:26 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15078.6
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 64
LB: 0.0
Nuts - $ZZ-1-193_2

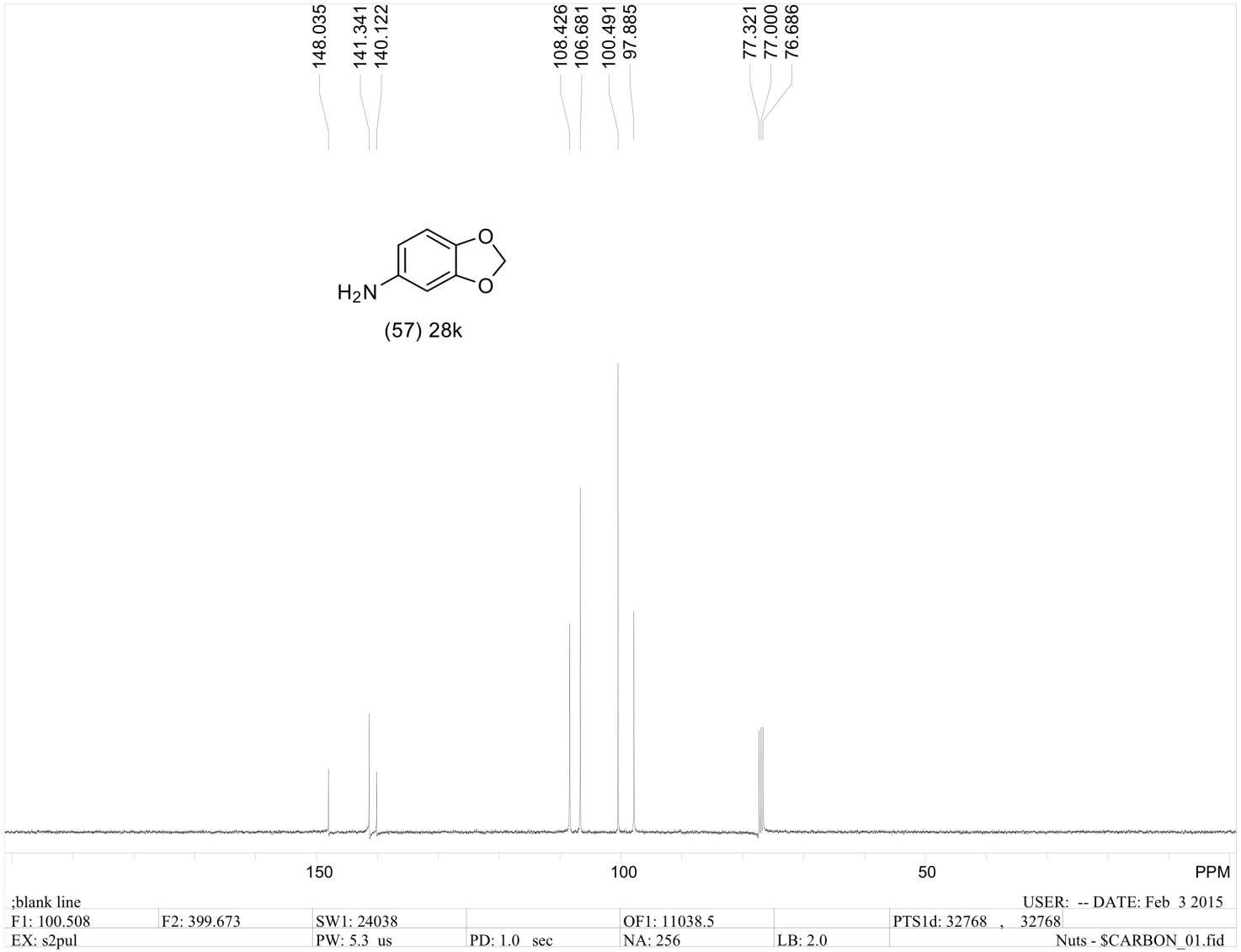

7.260
6.758
6.755
6.747
6.744
6.738
6.657
6.652
6.648
6.641
6.637
2.757
3.864
3.853
2.745
2.732
2.720
2.707
2.141
2.133
2.129
2.126
2.122
2.119
2.112
2.098
1.962
1.948
1.934
1.930
1.917
1.915
1.909
1.875
1.862
1.857
1.844
1.842
1.830
NH2
O
(55) 28i
2.02
2.00
2.11
2.03
0.96
2.05
2.12
2.02
8
6
4
2
0
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 2, ,
USER: nmrsu -- DATE: Thu Apr 07 21:42:18 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ZZ-1-195_1

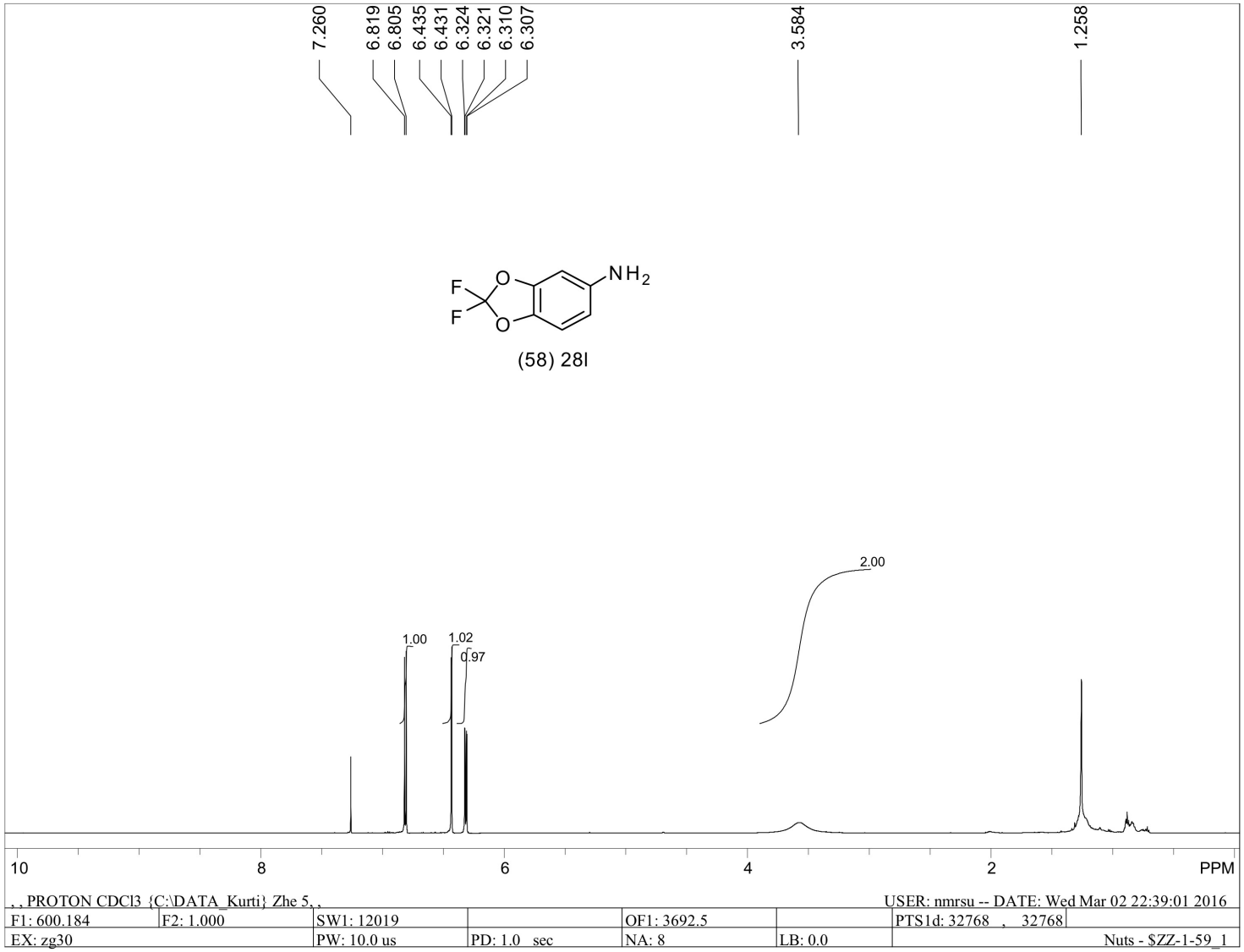

152.542
139.599
116.448
116.412
115.755
77.211
77.000
76.789
72.975
34.752
24.886
18.564
NH2
O
(55) 28i
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Zhe 2, ,
USER: nmrsu -- DATE: Thu Apr 07 21:44:08 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15083.0
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 64
LB: 0.0
Nuts - $ZZ-1-195_2

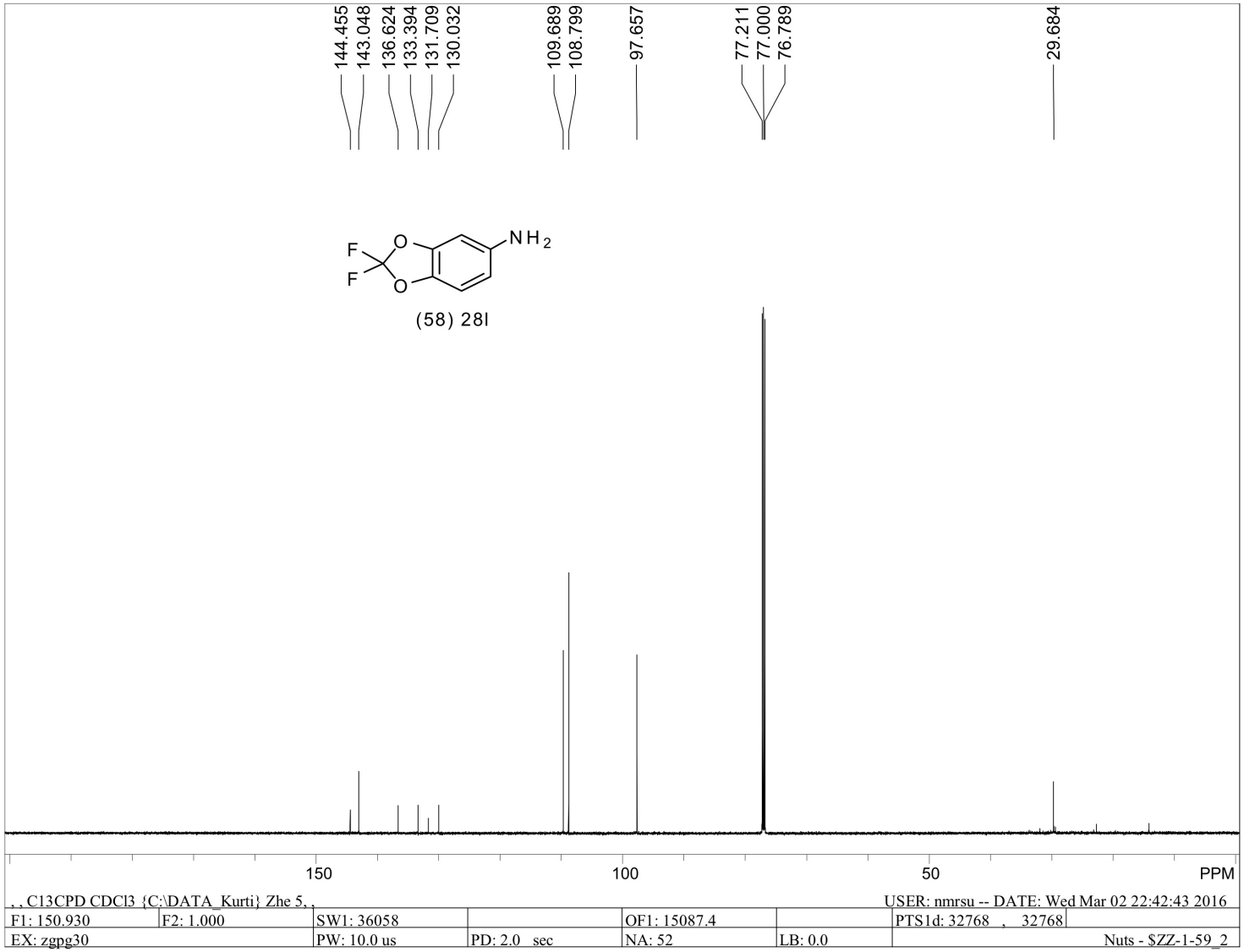

7.260
6.607
6.601
6.599
6.597
6.593
6.467
6.463
6.453
6.449
4.504
4.490
4.475
3.372
3.135
3.121
3.107
NH2
O
(56) 28j
2.02
1.00
2.14
2.12
2.19
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 4, ,
USER: nmrsu -- DATE: Sat Mar 05 21:33:10 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ZZ-1-65_1

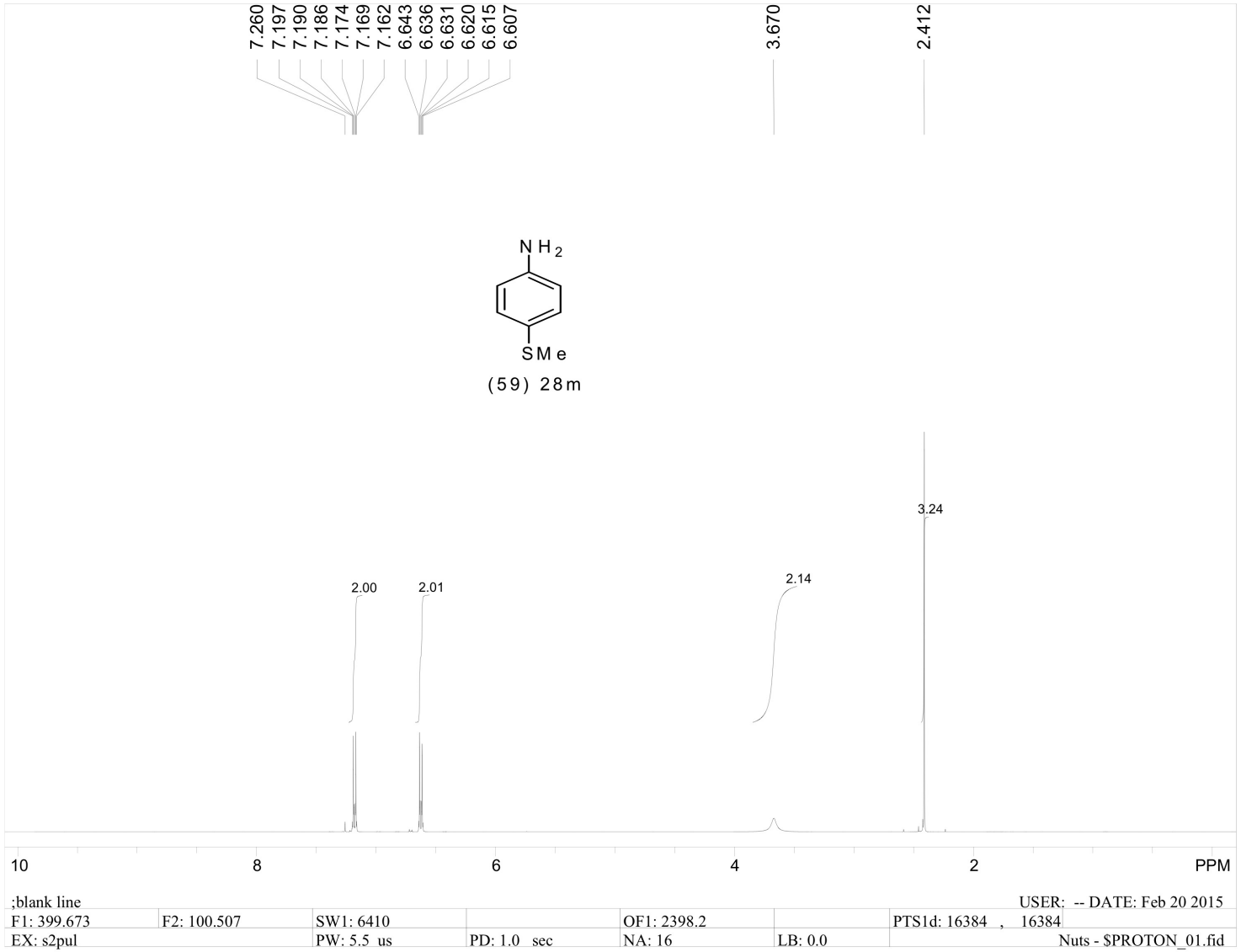

153.103
139.811
127.743
114.567
112.649
109.229
77.211
77.000
76.781
70.831
30.151
NH2
O
(56) 28j
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Zhe 4, ,
USER: nmrsu -- DATE: Sat Mar 05 21:38:21 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15076.4
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 64
LB: 0.0
Nuts - $ZZ-1-65_2

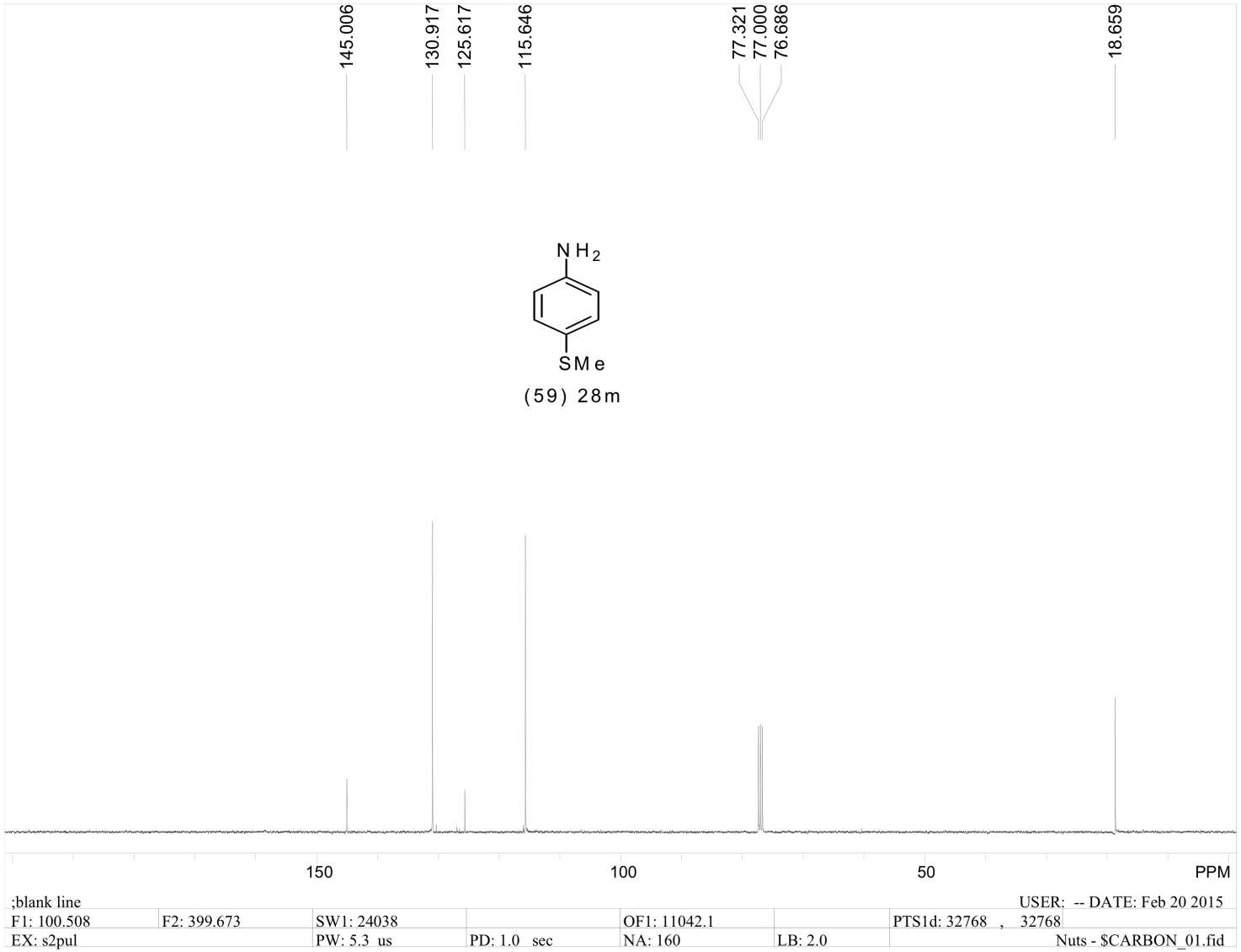

7.260
6.627
6.606
6.278
6.272
6.125
6.120
6.105
6.100
5.842
3.463
O
O
H2N
(57) 28k
2.16
2.01
0.95
1.00
1.00
8
6
4
2
PPM
;blank line
USER: -- DATE: Feb 3 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2397.8
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.6 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

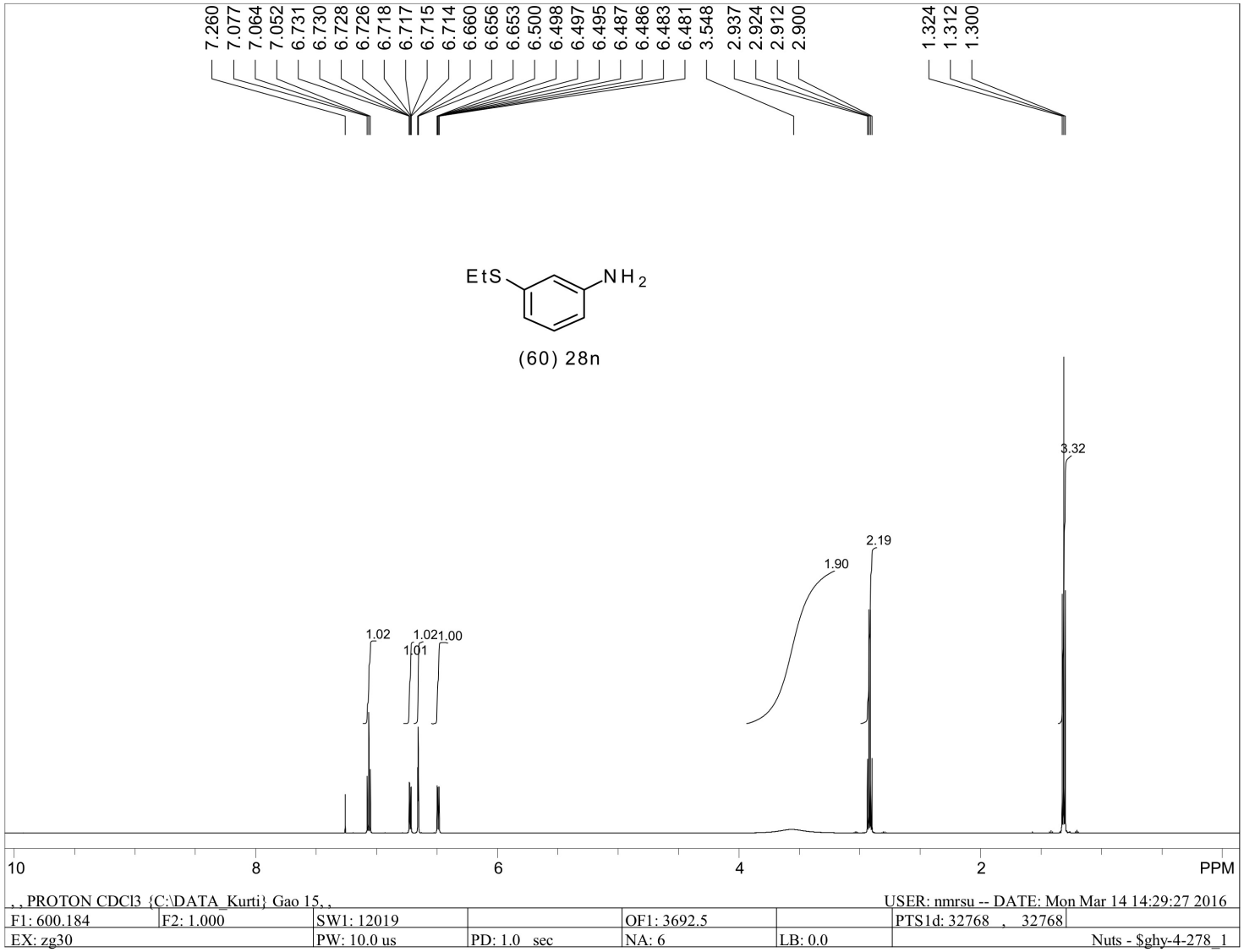

148.035
141.341
140.122
108.426
106.681
100.491
97.885
77.321
77.000
76.686
O
O
H2N
(57) 28k
150
100
50
PPM
;blank line
USER: -- DATE: Feb 3 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11038.5
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 2.0
Nuts - $CARBON_01.fid

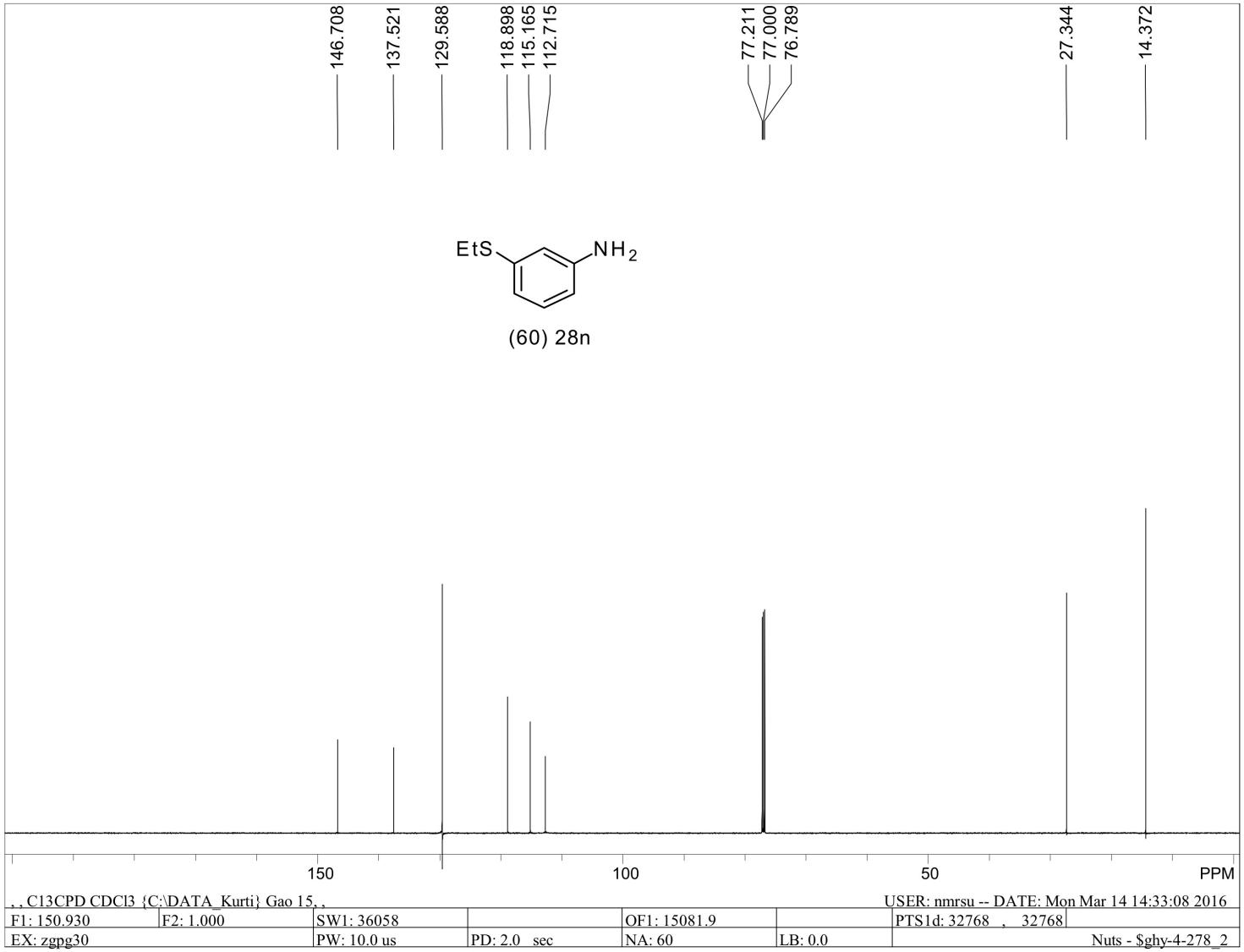

7.260
6.819
6.805
6.435
6.431
6.324
6.321
6.310
6.307
3.584
1.258
F
F
O
O
O
NH2
(58) 28l
2.00
1.00
1.02
0.97
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 5, ,
USER: nmrsu -- DATE: Wed Mar 02 22:39:01 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.5
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ZZ-1-59_1

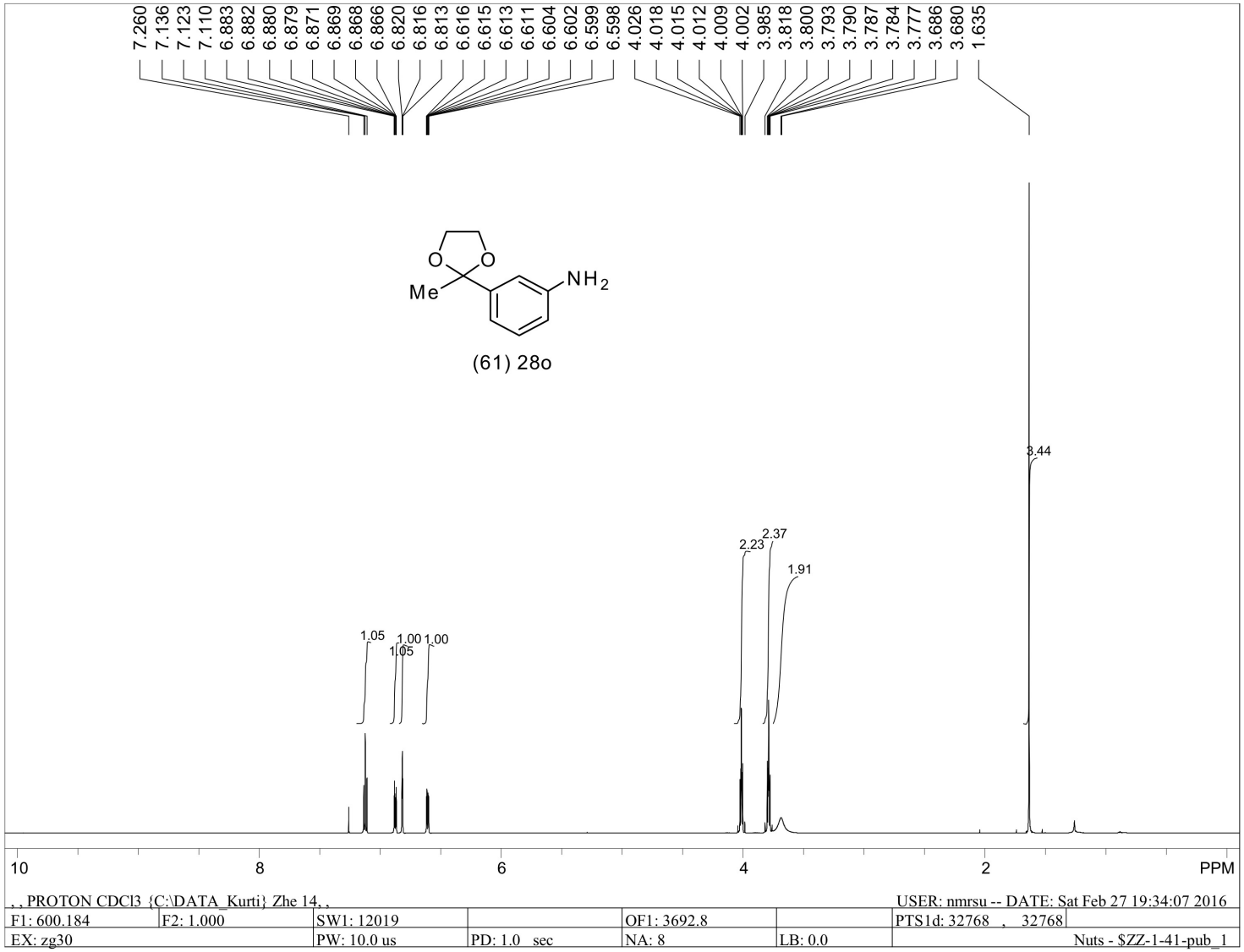

144.455
143.048
136.624
133.394
131.709
130.032
109.689
108.799
97.657
77.211
77.000
76.789
29.684
F
F
O
O
NH2
(58) 28l
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Zhe 5, ,
USER: nmrsu -- DATE: Wed Mar 02 22:42:43 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15087.4
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 52
LB: 0.0
Nuts - $ZZ-1-59_2

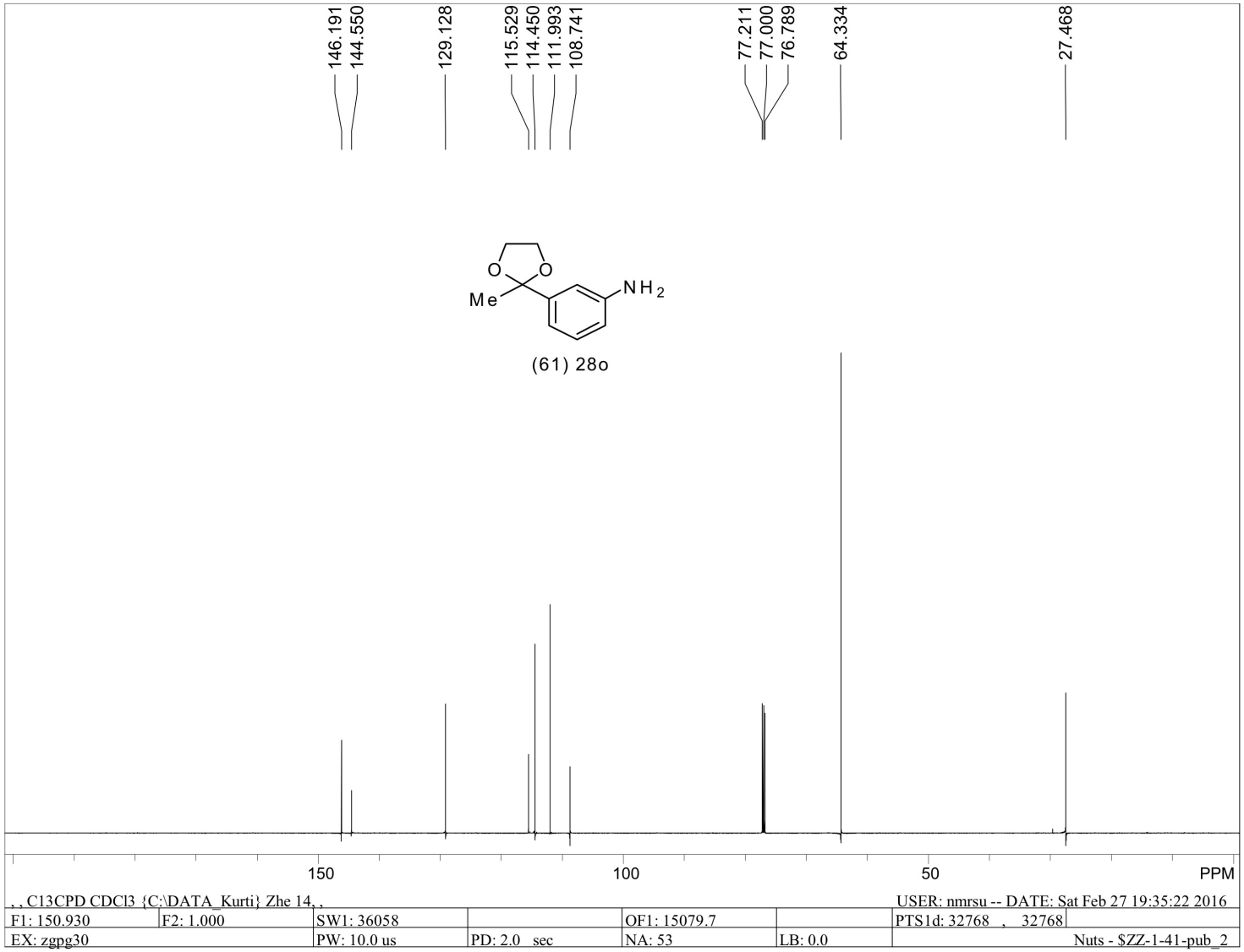

7.260
7.197
7.190
7.186
7.174
7.169
7.162
6.643
6.636
6.631
6.620
6.615
6.607
3.670
2.412
NH2
SMe
(59) 28m
3.24
2.14
2.00
2.01
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Feb 20 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.2
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

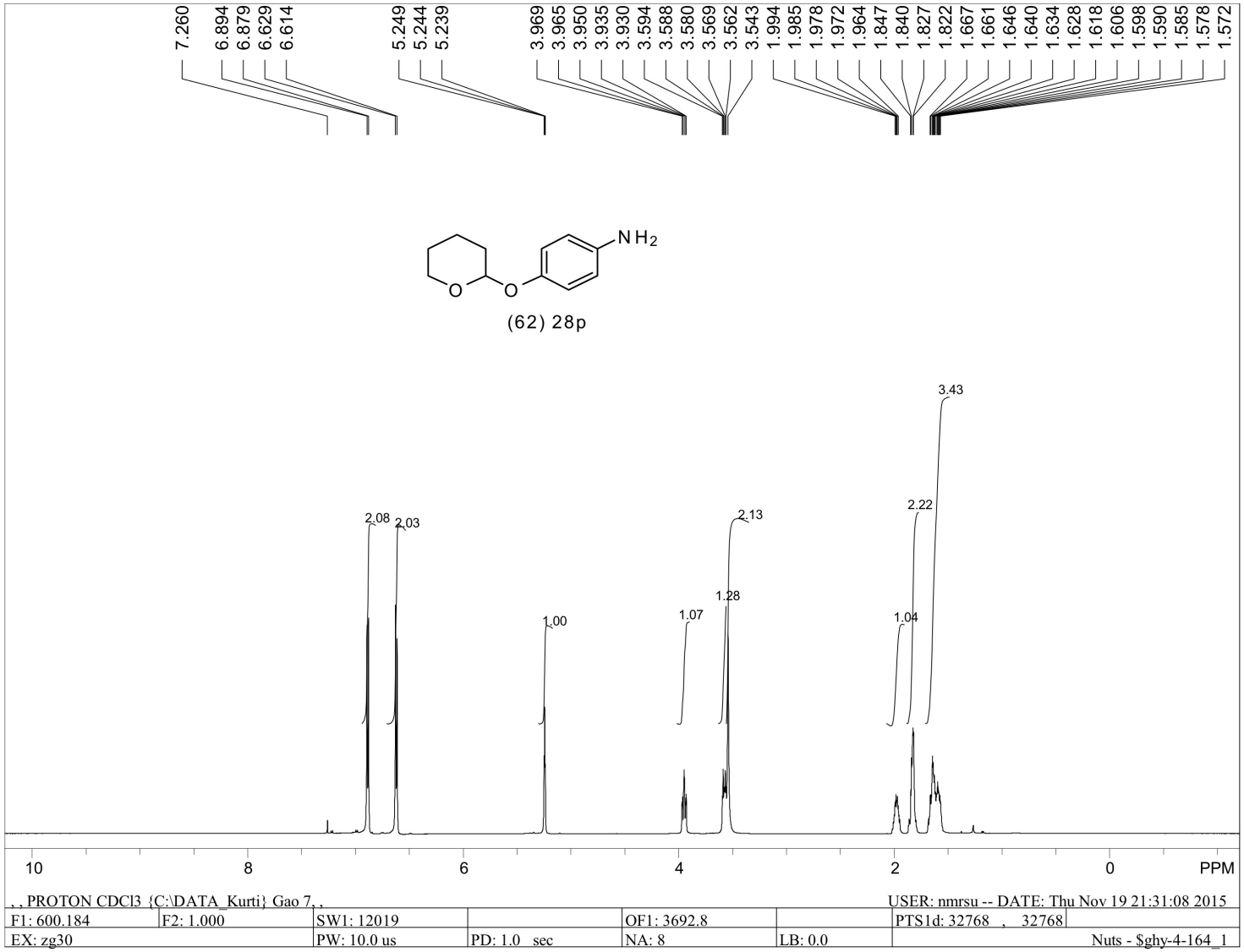

145.006
130.917
125.617
115.646
77.321
77.000
76.686
18.659
NH2
SMe
(59) 28m
150
100
50
PPM
;blank line
USER: -- DATE: Feb 20 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11042.1
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 160
LB: 2.0
Nuts - $CARBON_01.fid

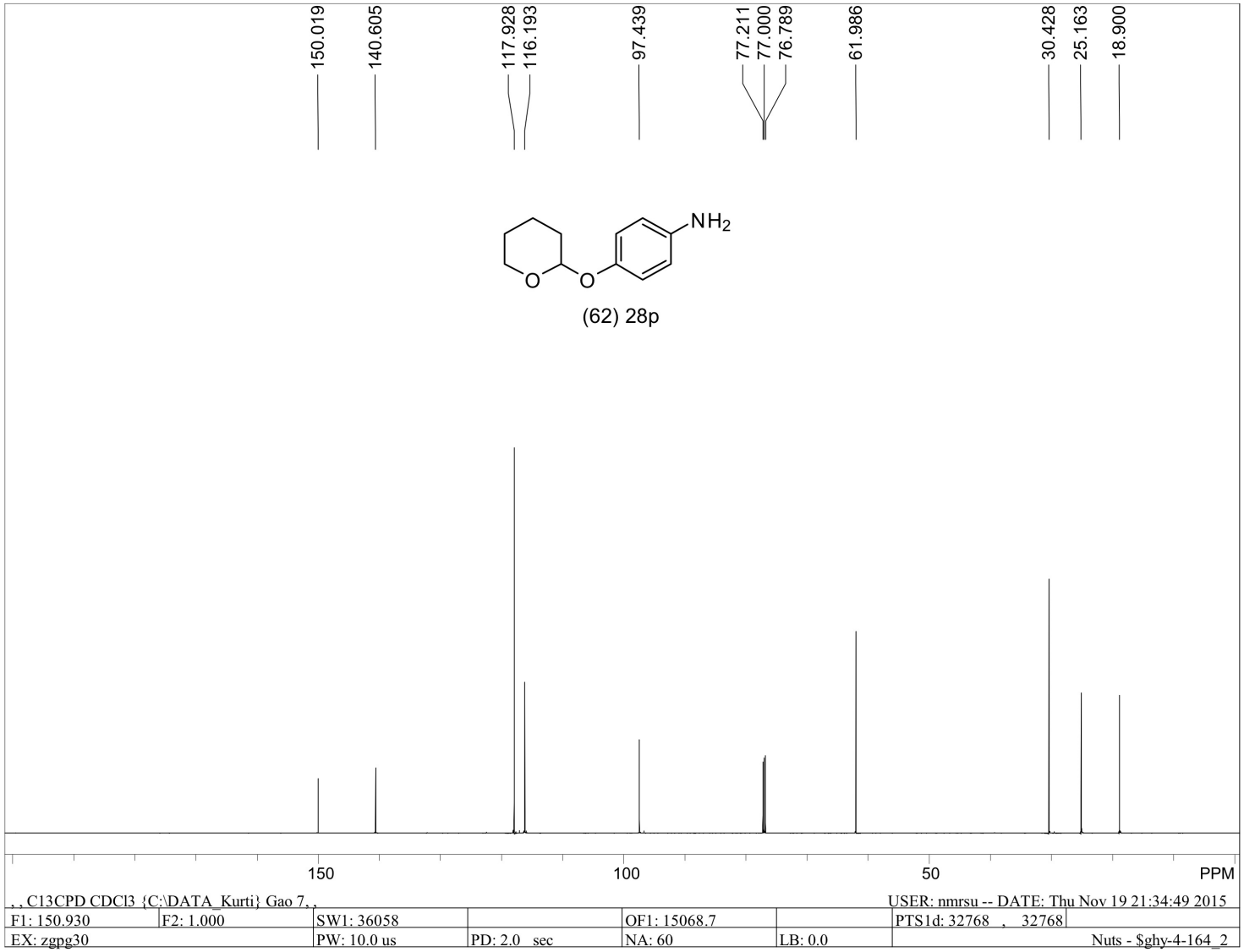

7.260
7.077
7.064
7.052
6.731
6.730
6.728
6.726
6.718
6.717
6.715
6.714
6.660
6.656
6.653
6.500
6.498
6.497
6.495
6.487
6.486
6.483
6.481
3.548
2.937
2.924
2.912
2.900
1.324
1.312
1.300
EtS
NH2
(60) 28n
3.32
2.19
1.90
1.02
1.02
1.01
1.00
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 15, ,
USER: nmrsu -- DATE: Mon Mar 14 14:29:27 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.5
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 6
LB: 0.0
Nuts - $ghy-4-278_1

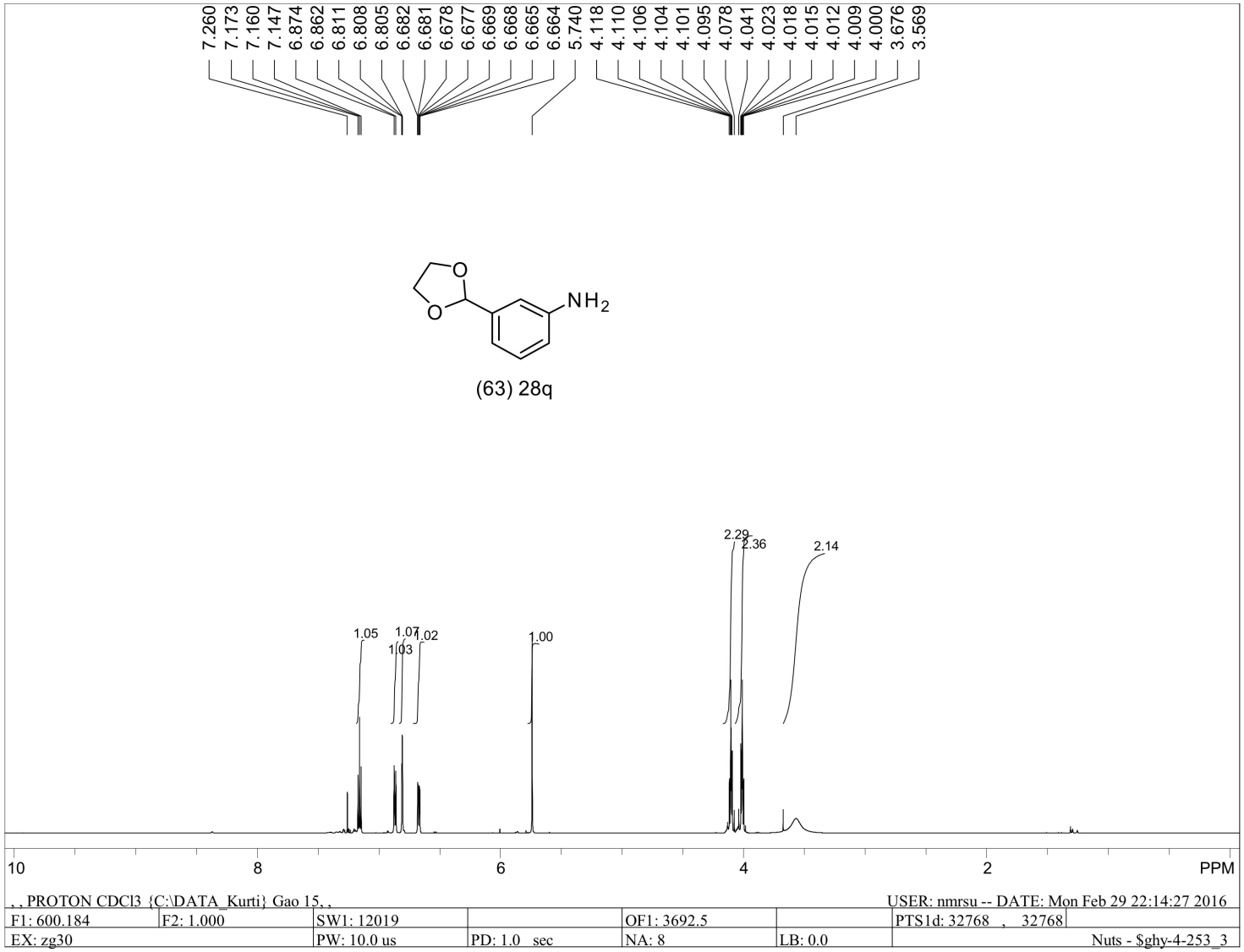

146.708
137.521
129.588
118.898
115.165
112.715
77.211
77.000
76.789
27.344
14.372
EtS
NH2
(60) 28n
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 15, ,
USER: nmrsu -- DATE: Mon Mar 14 14:33:08 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15081.9
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 60
LB: 0.0
Nuts - $ghy-4-278_2

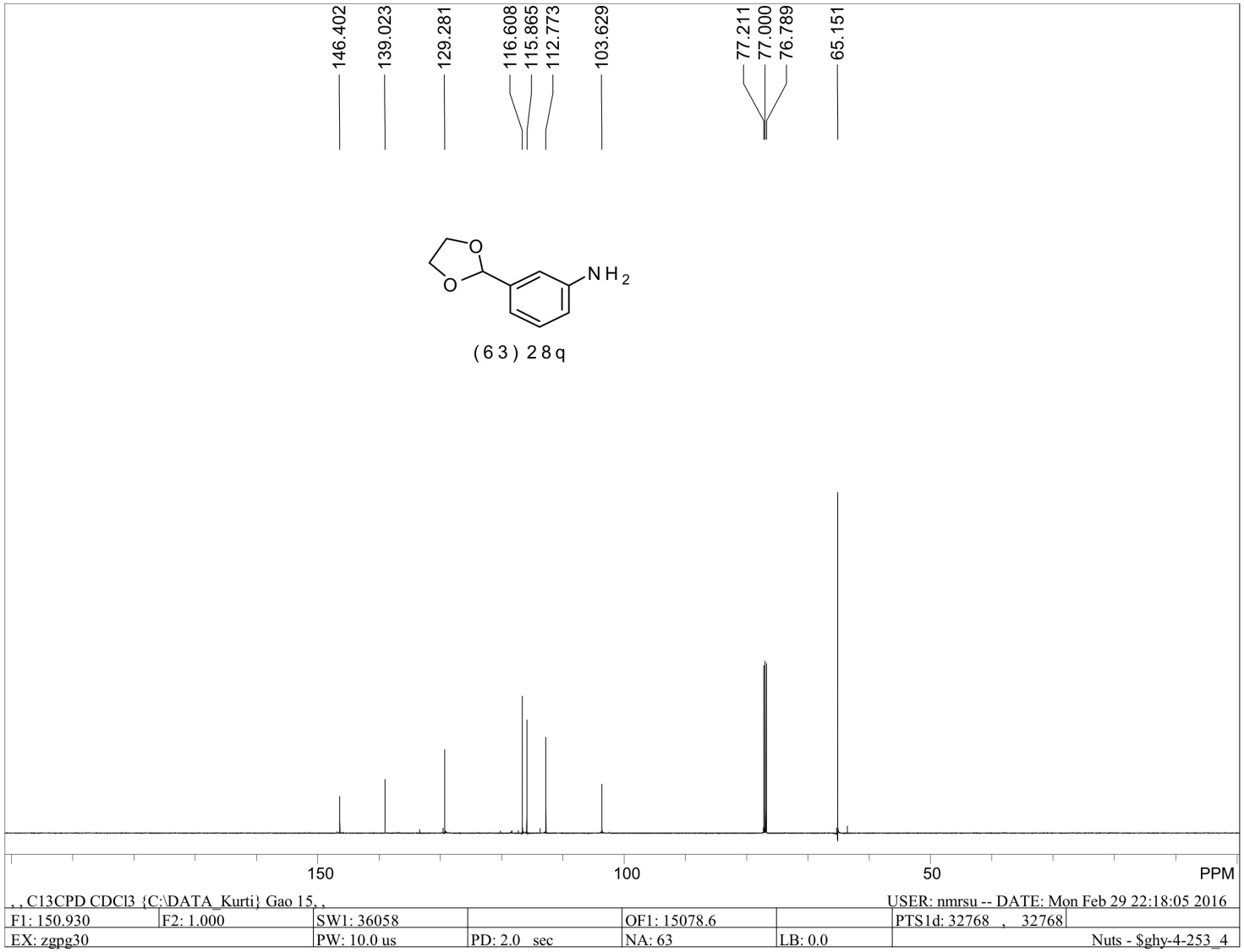

7.260
7.136
7.123
7.110
6.883
6.882
6.880
6.879
6.871
6.869
6.868
6.866
6.820
6.816
6.813
6.616
6.615
6.613
6.611
6.604
6.602
6.599
6.598
4.026
4.018
4.015
4.012
4.009
4.002
3.985
3.818
3.800
3.793
3.790
3.787
3.784
3.777
3.686
3.680
1.635
O
O
Me
NH2
(61) 28o
3.44
2.23
2.37
1.91
1.05
1.00
1.05
1.00
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 14, ,
USER: nmrsu -- DATE: Sat Feb 27 19:34:07 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ZZ-1-41-pub_1

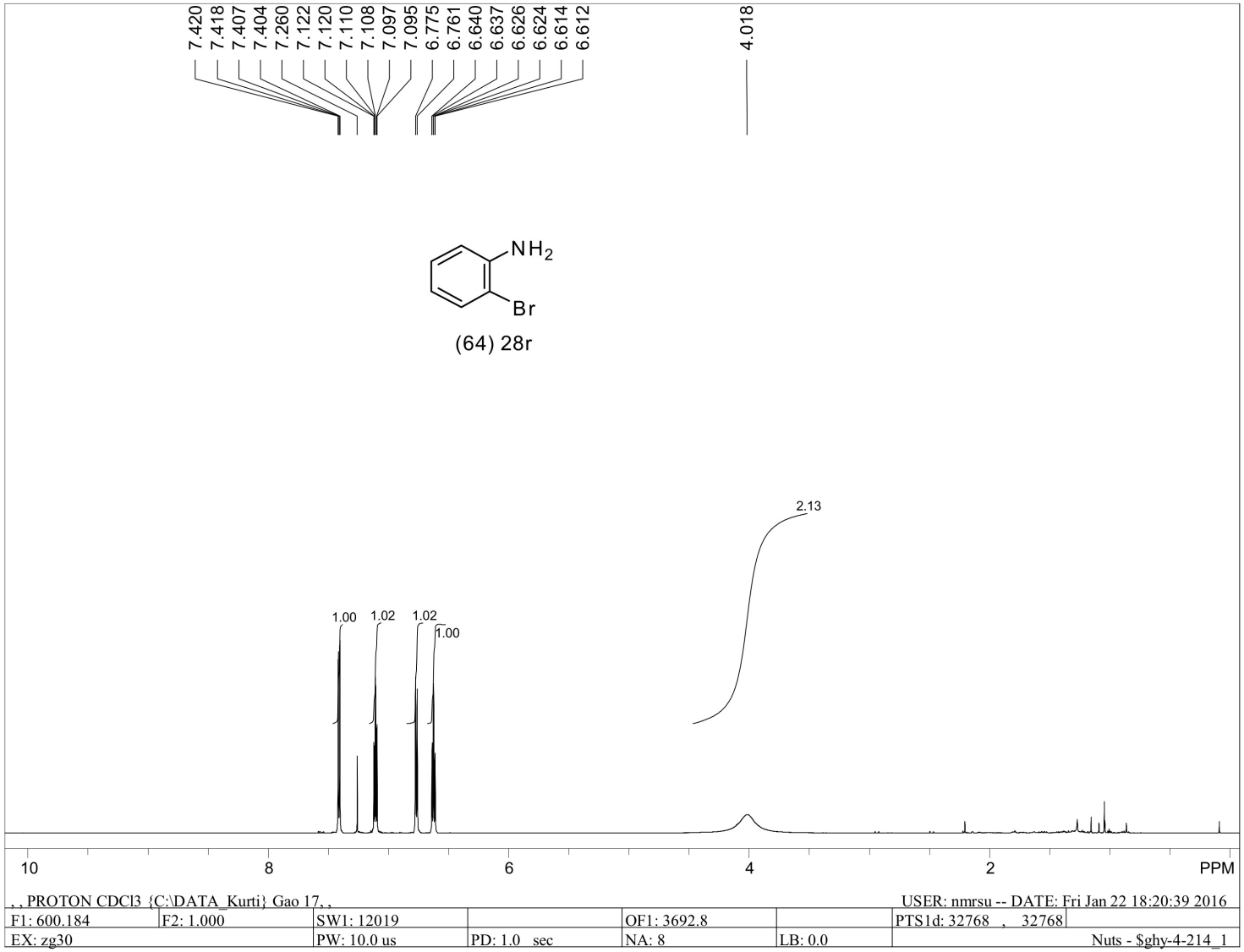

146.191
144.550
129.128
115.529
114.450
111.993
108.741
77.211
77.000
76.789
64.334
27.468
O
O
Me
NH2
(61) 28o
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Zhe 14, ,
USER: nmrsu -- DATE: Sat Feb 27 19:35:22 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15079.7
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 53
LB: 0.0
Nuts - $ZZ-1-41-pub_2

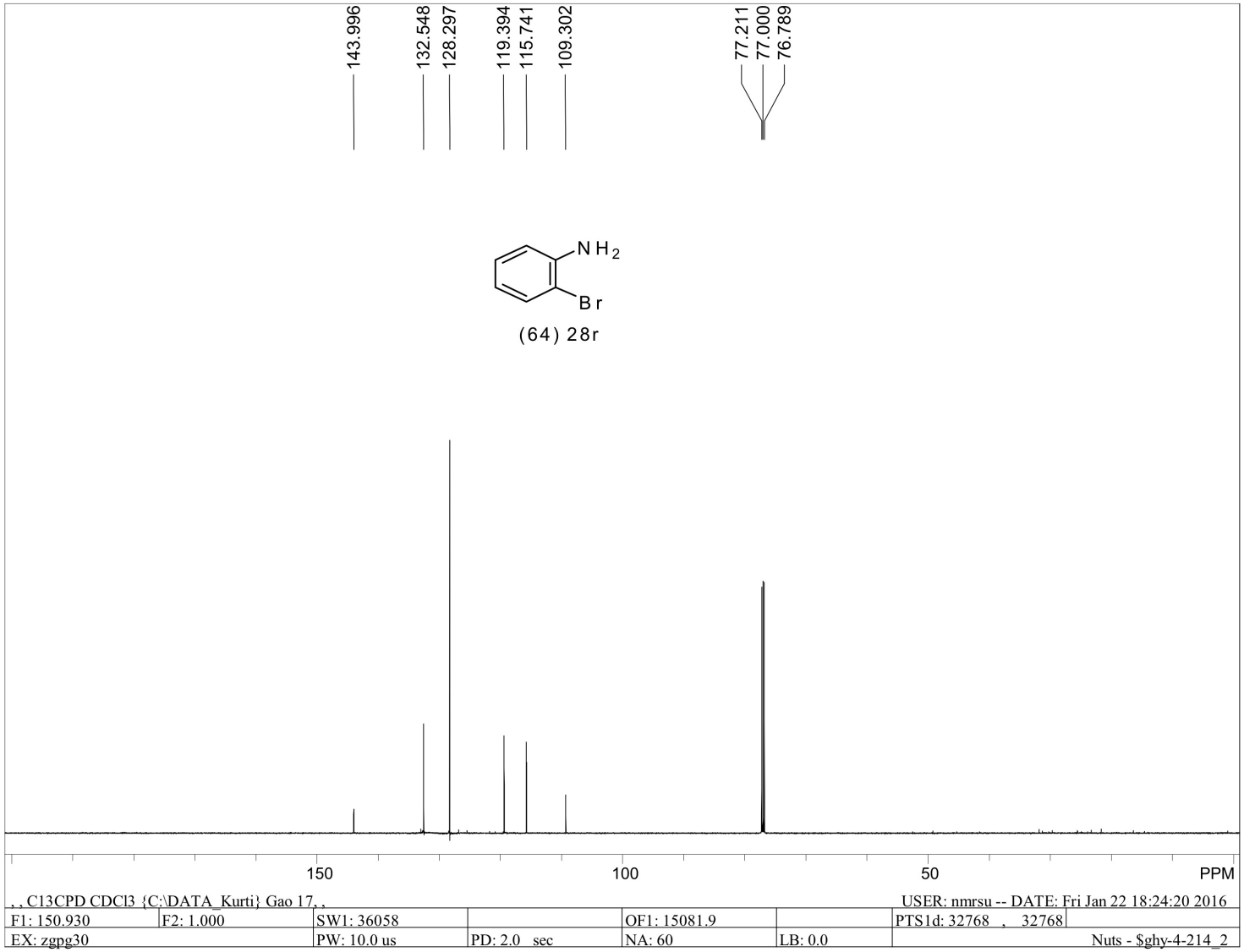

7.260
6.894
6.879
6.629
6.614
5.249
5.244
5.239
3.969
3.965
3.950
3.935
3.930
3.594
3.588
3.580
3.569
3.562
3.543
1.994
1.985
1.978
1.972
1.964
1.847
1.840
1.827
1.822
1.667
1.661
1.646
1.640
1.634
1.628
1.618
1.606
1.598
1.590
1.585
1.578
1.572
NH2
O
O
(62) 28p
3.43
2.22
2.13
2.08
2.03
1.28
1.07
1.04
1.00
10
8
6
4
2
0
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 7, ,
USER: nmrsu -- DATE: Thu Nov 19 21:31:08 2015
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-164_1

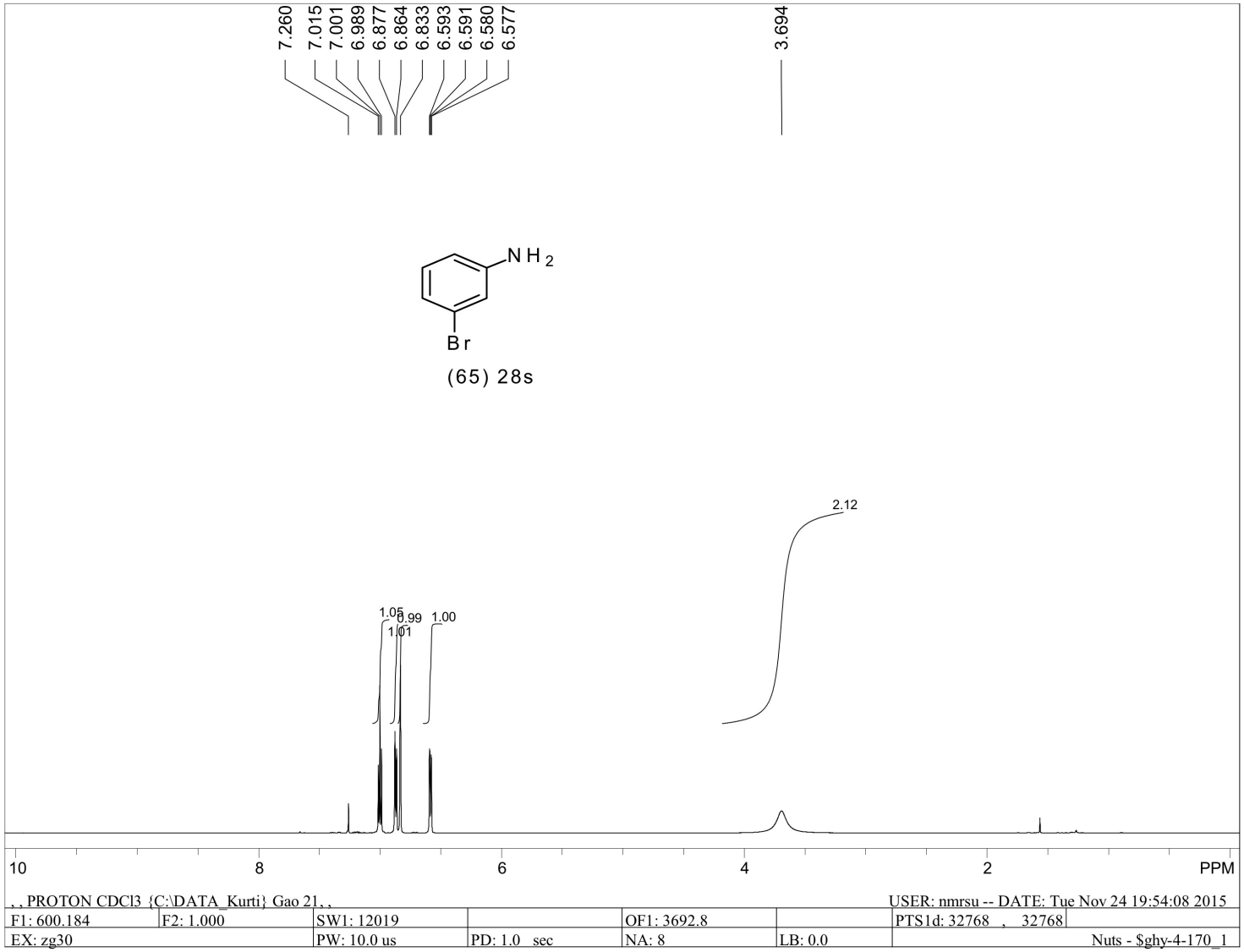

150.019
140.605
117.928
116.193
97.439
77.211
77.000
76.789
61.986
30.428
25.163
18.900
NH2
O
O
(62) 28p
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 7, ,
USER: nmrsu -- DATE: Thu Nov 19 21:34:49 2015
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15068.7
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 60
LB: 0.0
Nuts - $ghy-4-164_2

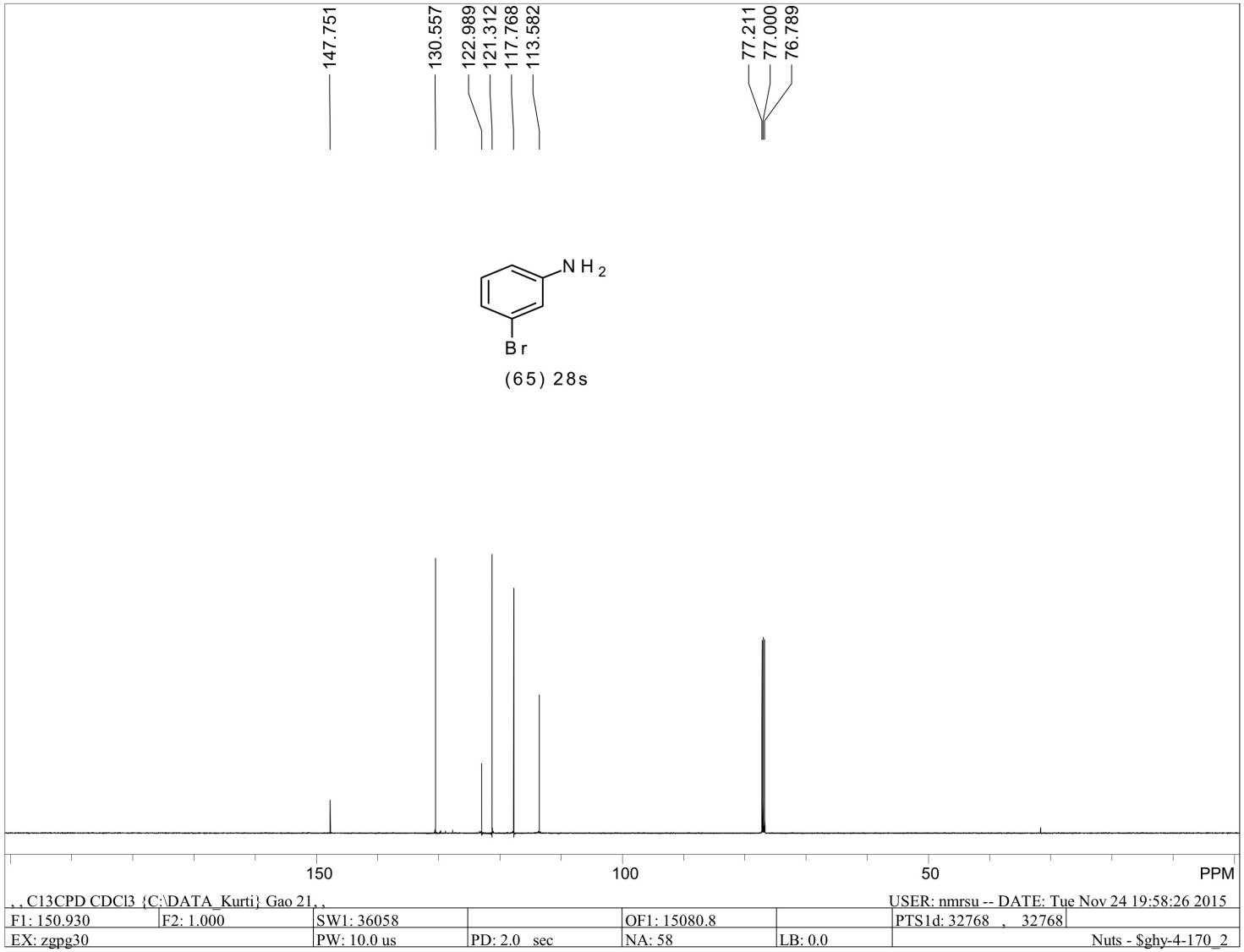

7.260
7.173
7.160
7.147
6.874
6.862
6.811
6.808
6.805
6.682
6.681
6.678
6.677
6.669
6.668
6.665
6.664
5.740
4.118
4.110
4.106
4.104
4.101
4.095
4.078
4.041
4.023
4.018
4.015
4.012
4.009
4.000
3.676
3.569
O
O
NH2
(63) 28q
2.29
2.36
2.14
1.05
1.07
1.03
1.02
1.00
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 15, ,
USER: nmrsu -- DATE: Mon Feb 29 22:14:27 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.5
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-253_3

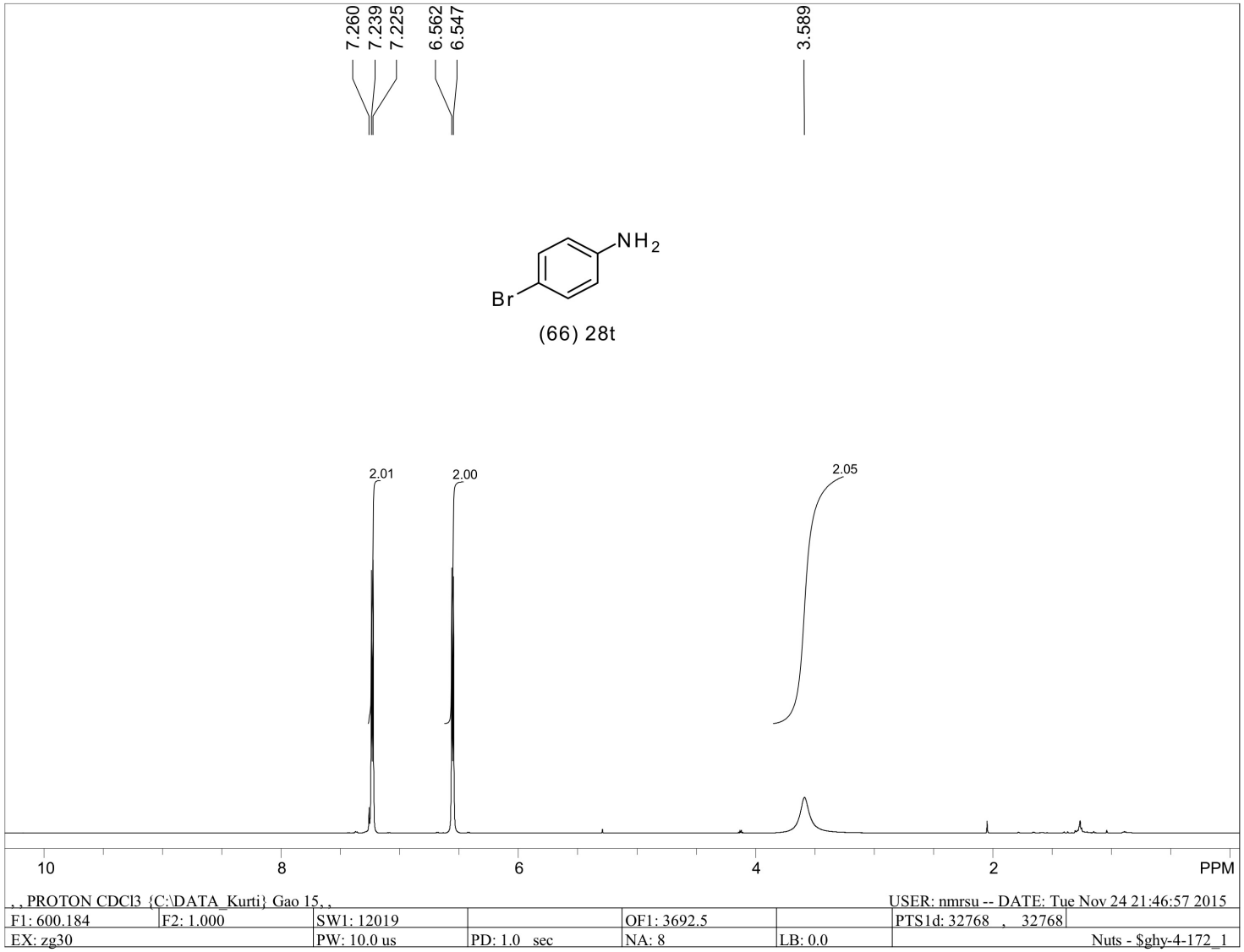

146.402
139.023
129.281
116.608
115.865
112.773
103.629
77.211
77.000
76.789
65.151
O
O
NH2
(63) 28q
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 15, ,
USER: nmrsu -- DATE: Mon Feb 29 22:18:05 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15078.6
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 63
LB: 0.0
Nuts - $ghy-4-253_4

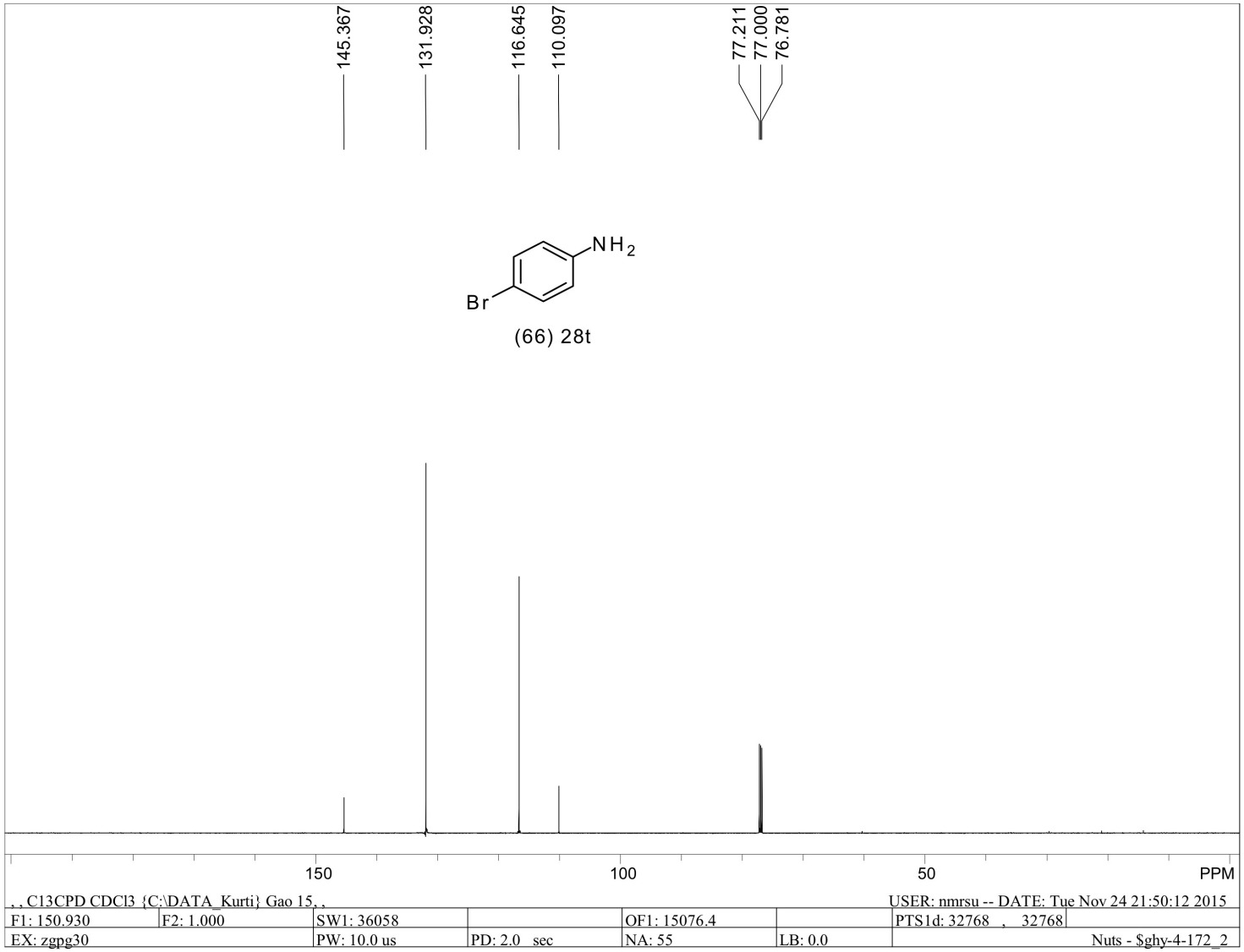

7.420
7.418
7.407
7.404
7.260
7.122
7.120
7.110
7.108
7.097
7.095
6.775
6.761
6.640
6.637
6.626
6.624
6.614
6.612
4.018
NH2
Br
(64) 28r
2.13
1.00
1.02
1.02
1.00
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 17, ,
USER: nmrsu -- DATE: Fri Jan 22 18:20:39 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-214_1

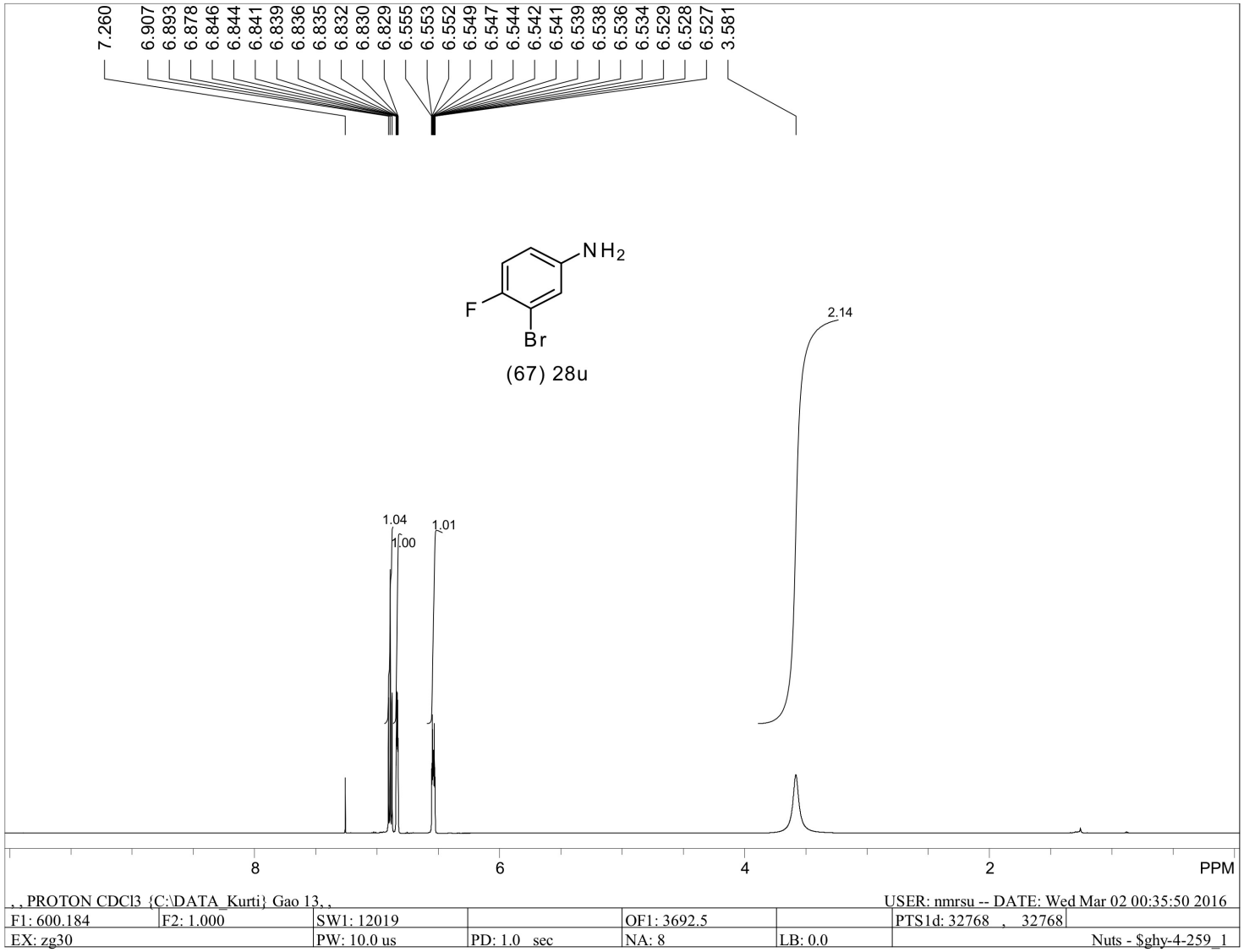

143.996
132.548
128.297
119.394
115.741
109.302
77.211
77.000
76.789
NH2
Br
(64) 28r
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 17, ,
USER: nmrsu -- DATE: Fri Jan 22 18:24:20 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15081.9
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 60
LB: 0.0
Nuts - $ghy-4-214_2

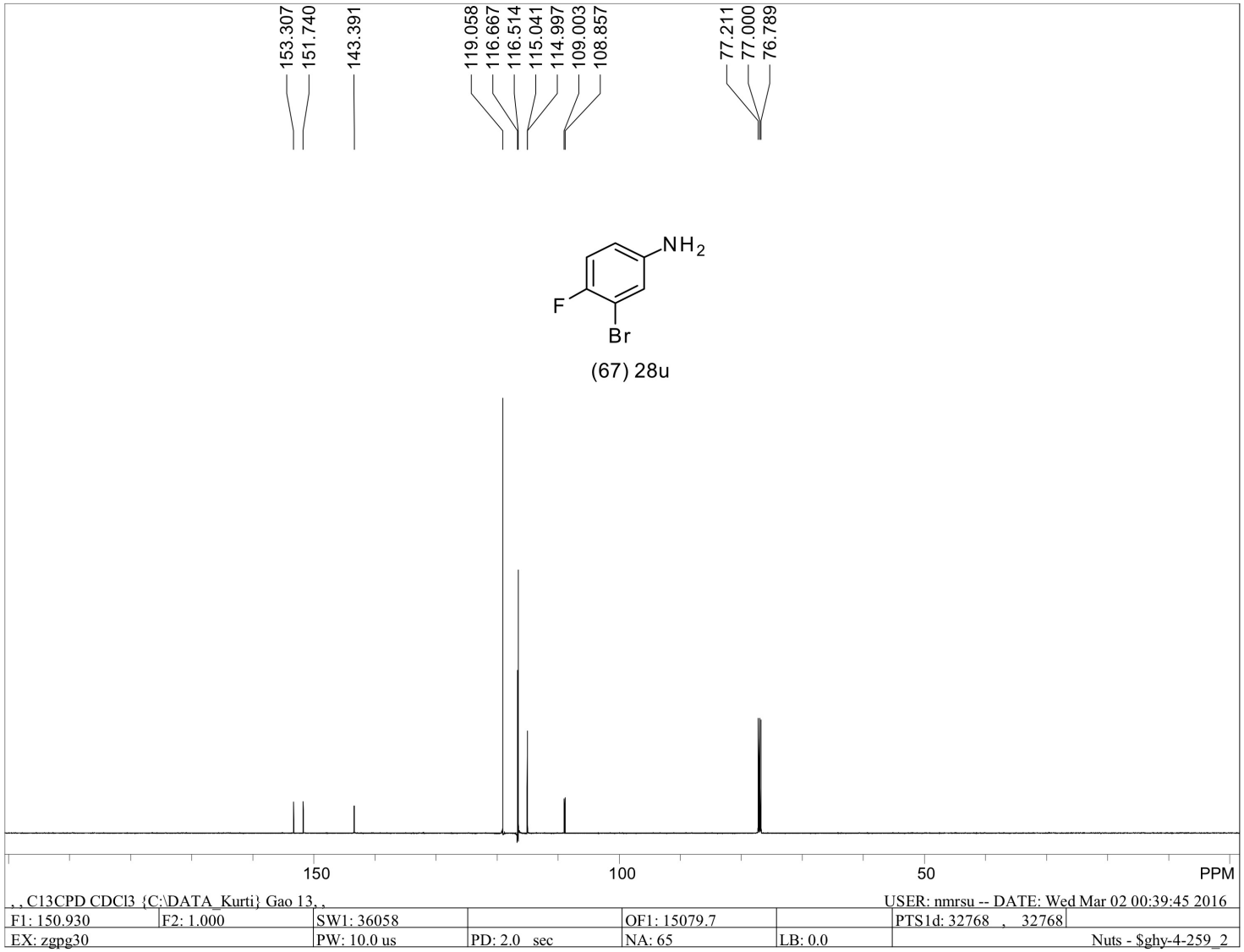

7.260
7.015
7.001
6.989
6.877
6.864
6.833
6.593
6.591
6.580
6.577
3.694
NH2
Br
(65) 28s
2.12
1.05
0.99
1.01
1.00
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 21, ,
USER: nmrsu -- DATE: Tue Nov 24 19:54:08 2015
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-170_1

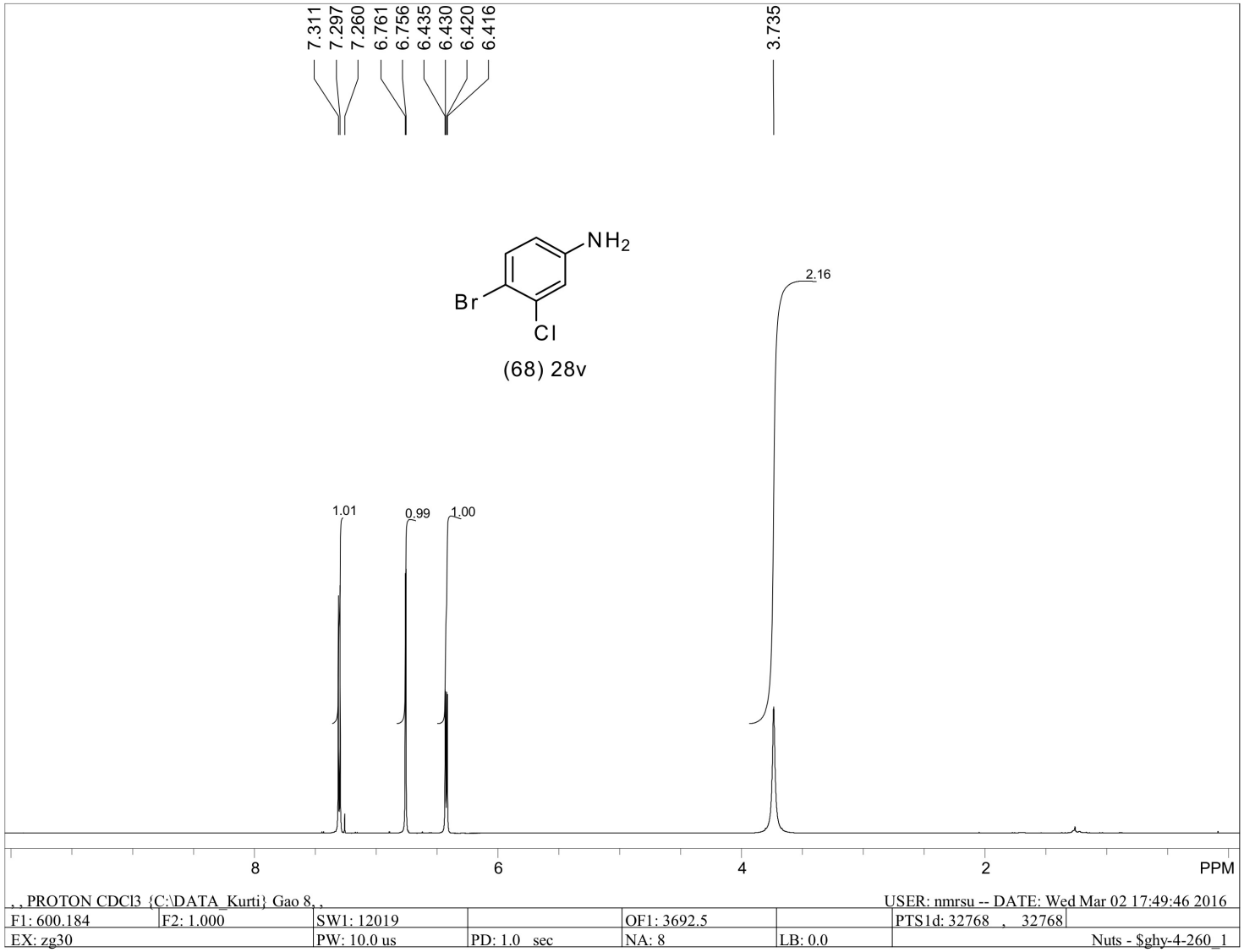

147.751
130.557
122.989
121.312
117.768
113.582
77.211
77.000
76.789
NH2
Br
(65) 28s
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 21, ,
USER: nmrsu -- DATE: Tue Nov 24 19:58:26 2015
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15080.8
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 58
LB: 0.0
Nuts - $ghy-4-170_2

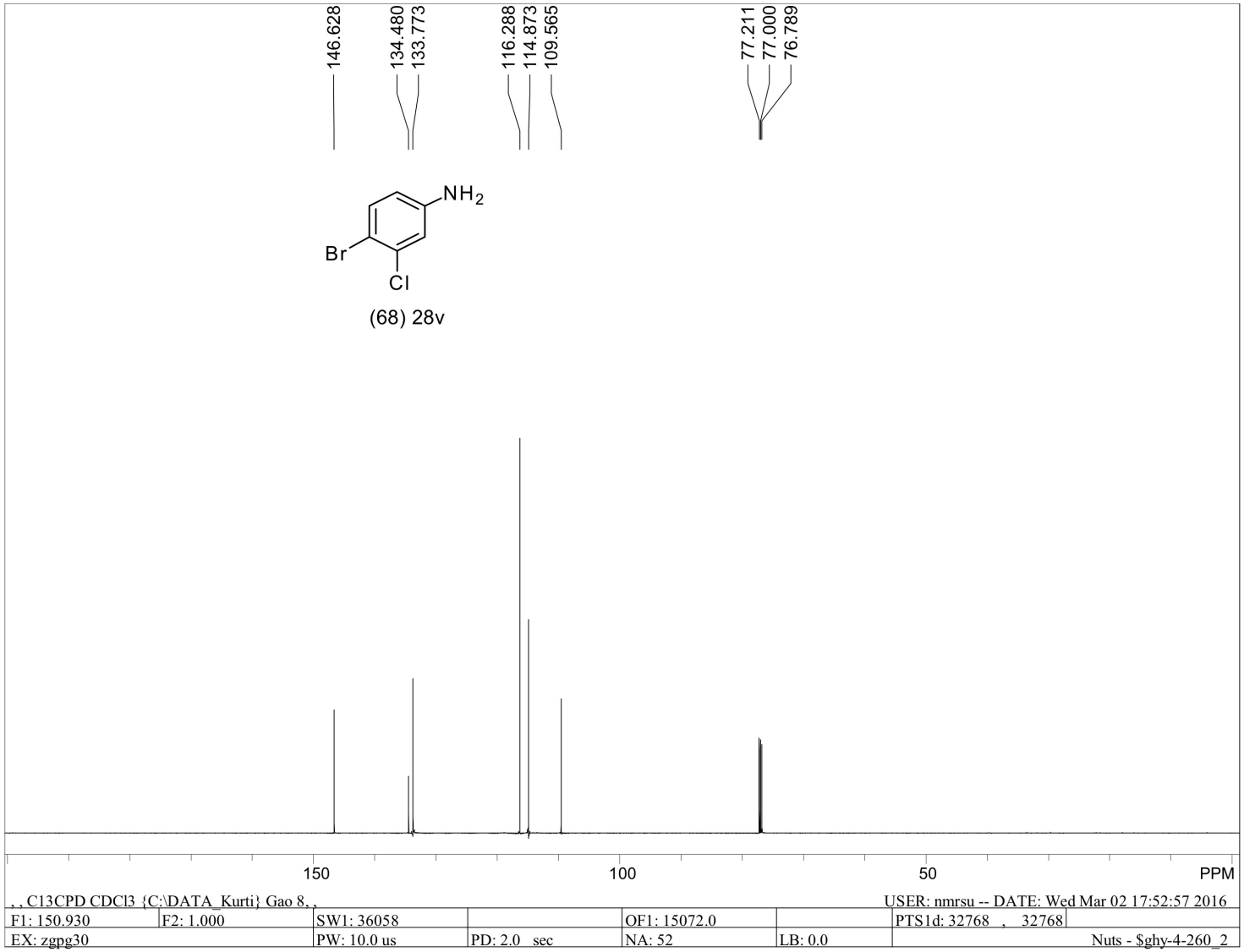

7.260
7.239
7.225
6.562
6.547
3.589
NH2
Br
(66) 28t
2.01
2.00
2.05
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 15, ,
USER: nmrsu -- DATE: Tue Nov 24 21:46:57 2015
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.5
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-172_1

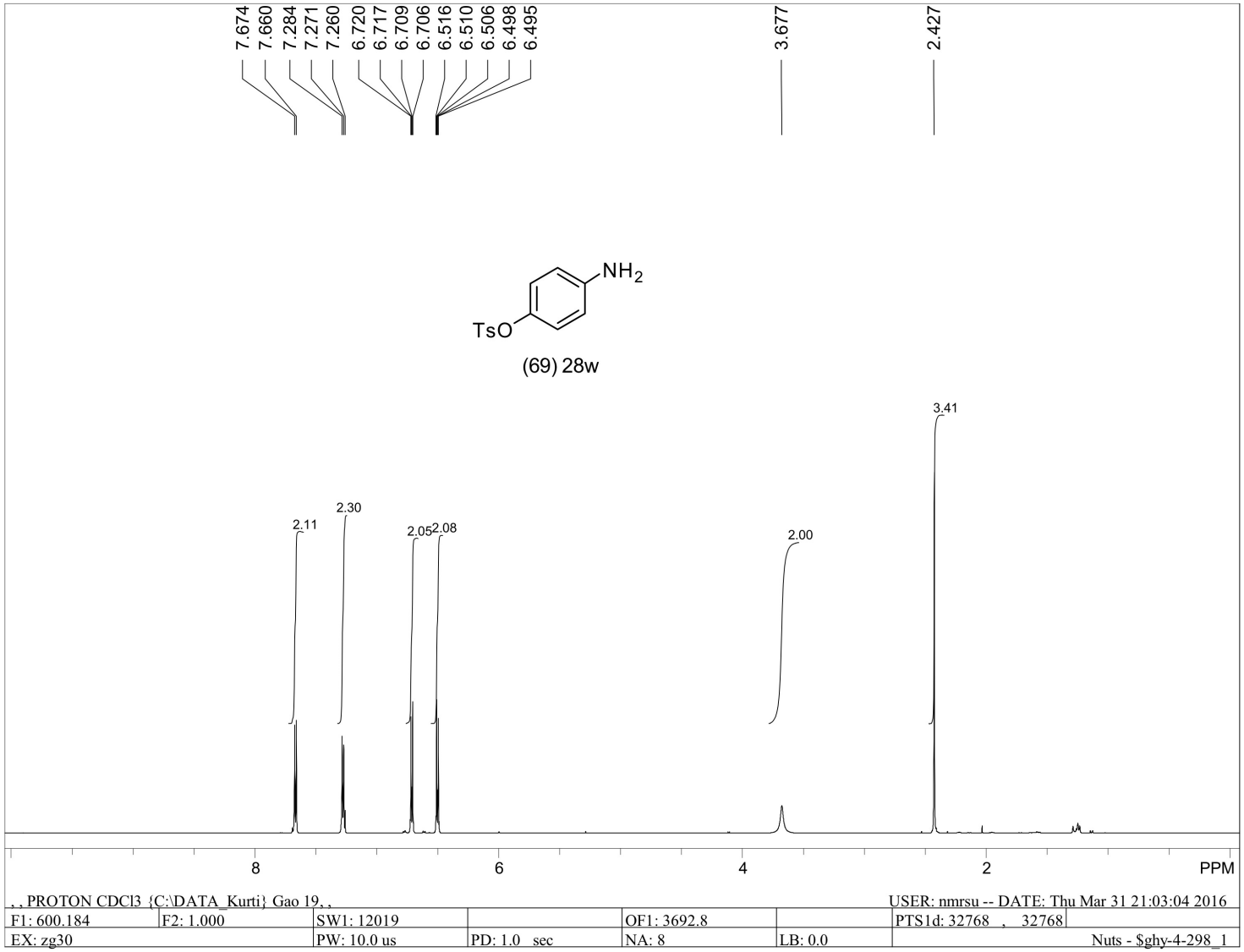

145.367
131.928
116.645
110.097
77.211
77.000
76.781
NH2
Br
(66) 28t
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 15, ,
USER: nmrsu -- DATE: Tue Nov 24 21:50:12 2015
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15076.4
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 55
LB: 0.0
Nuts - $ghy-4-172_2

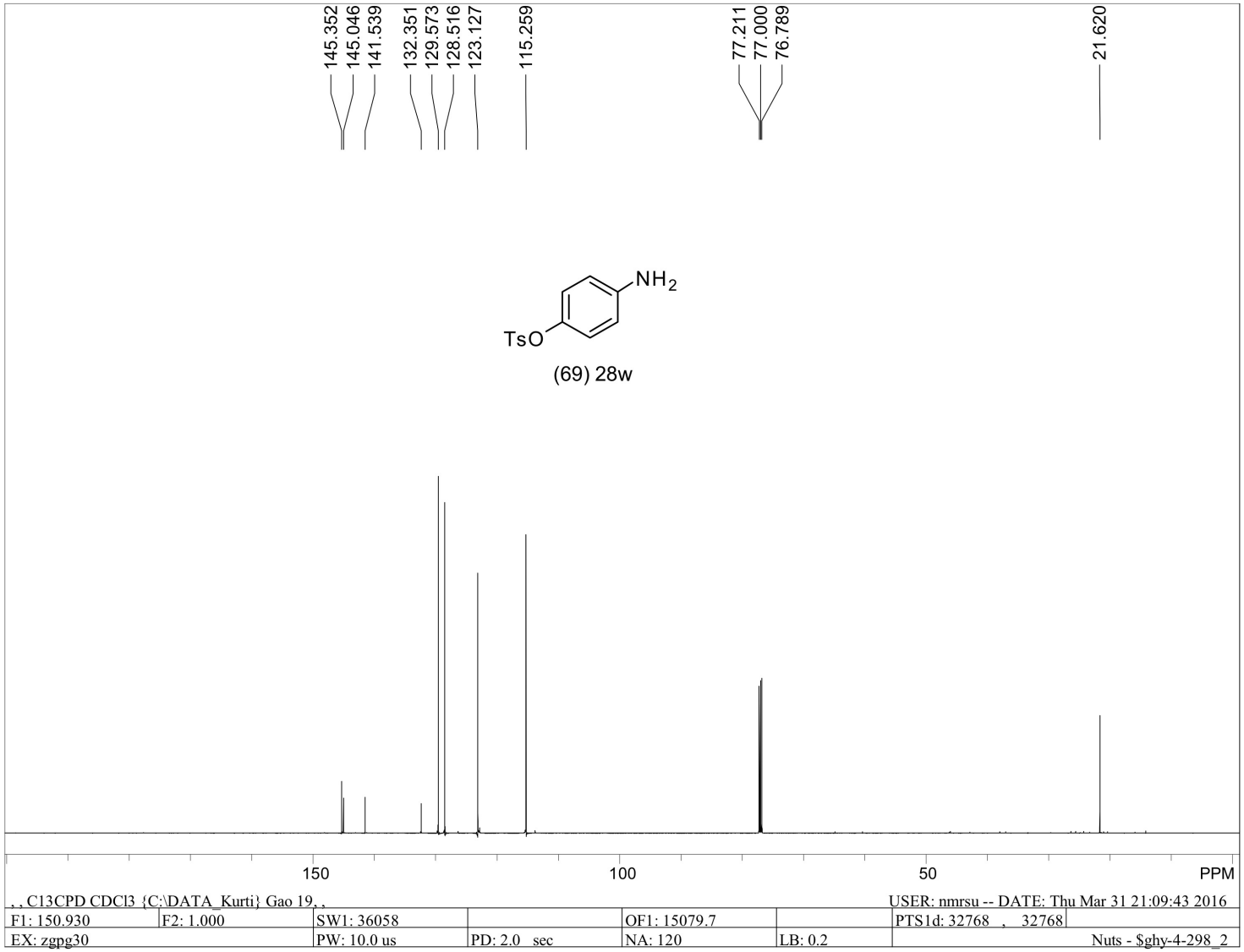

7.260
6.907
6.893
6.878
6.846
6.844
6.841
6.839
6.836
6.835
6.832
6.830
6.829
6.555
6.553
6.552
6.549
6.547
6.544
6.542
6.541
6.539
6.538
6.536
6.534
6.529
6.528
6.527
3.581
NH2
F
Br
(67) 28u
2.14
1.04
1.00
1.01
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 13, ,
USER: nmrsu -- DATE: Wed Mar 02 00:35:50 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.5
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-259_1

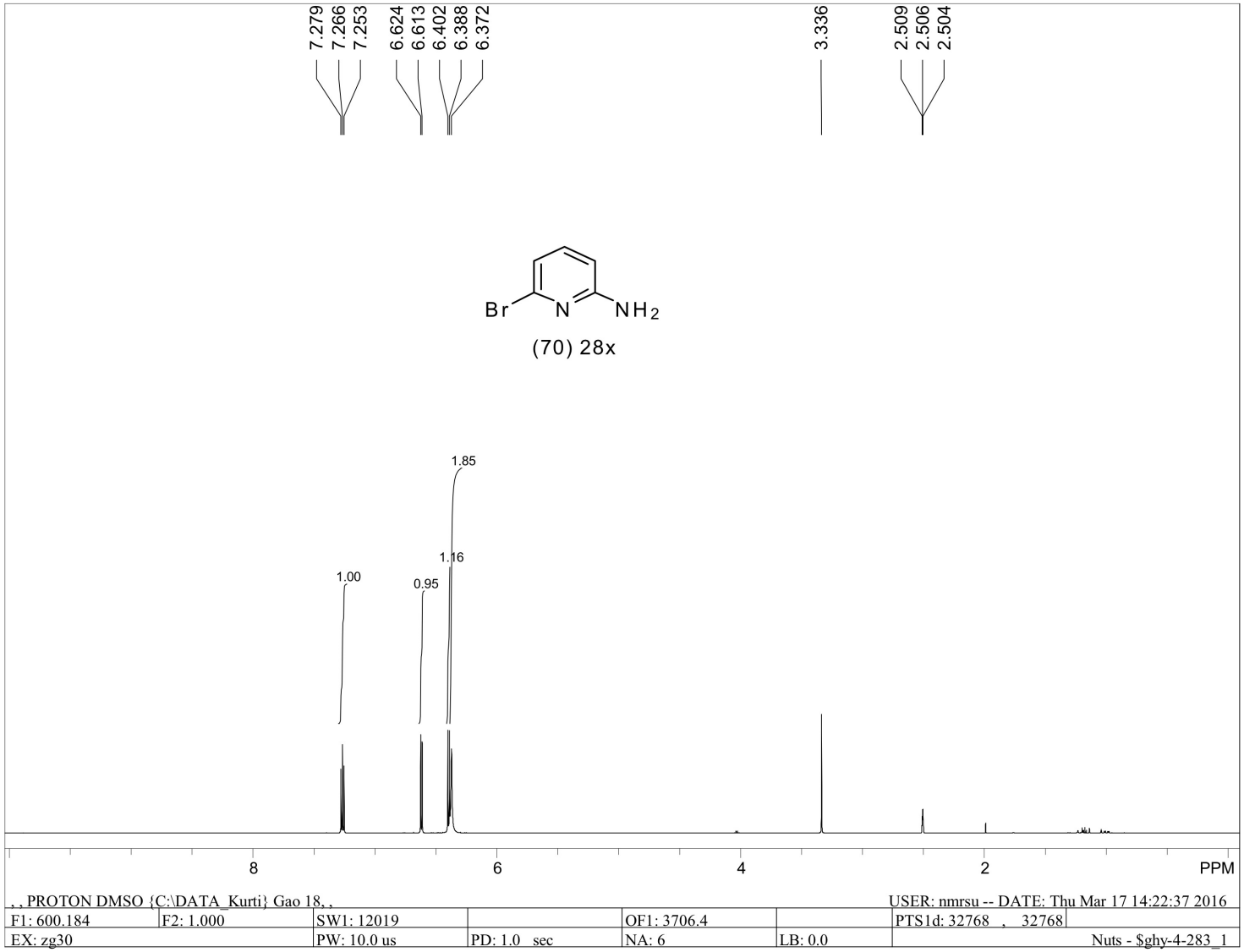

153.307
151.740
143.391
119.058
116.667
116.514
115.041
114.997
109.003
108.857
77.211
77.000
76.789
NH2
F
Br
(67) 28u
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 13, ,
USER: nmrsu -- DATE: Wed Mar 02 00:39:45 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15079.7
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 65
LB: 0.0
Nuts - $ghy-4-259_2

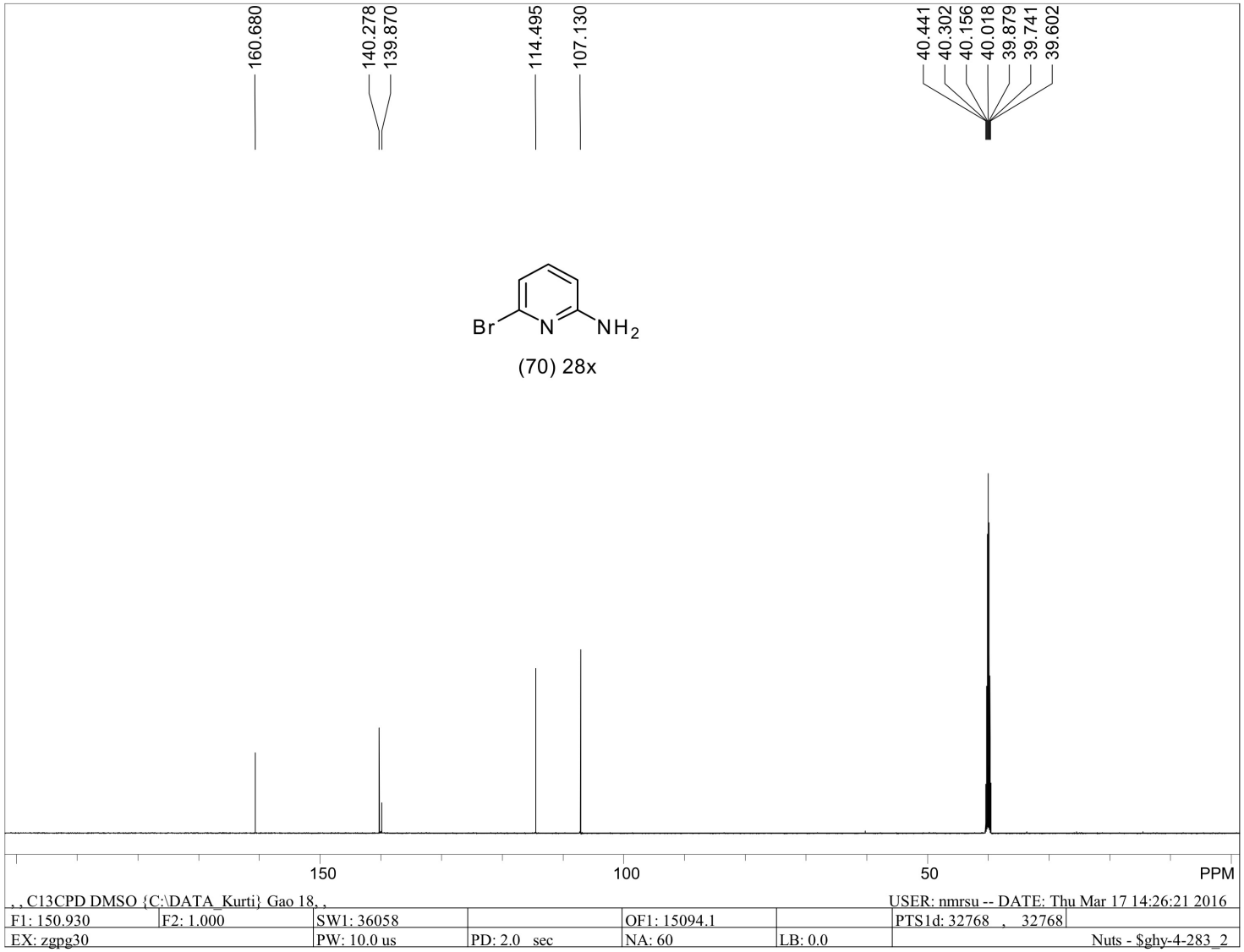

7.311
7.297
7.260
6.761
6.756
6.435
6.430
6.420
6.416
3.735
NH2
Br
Cl
(68) 28v
2.16
1.01
0.99
1.00
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 8, ,
USER: nmrsu -- DATE: Wed Mar 02 17:49:46 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.5
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-260_1

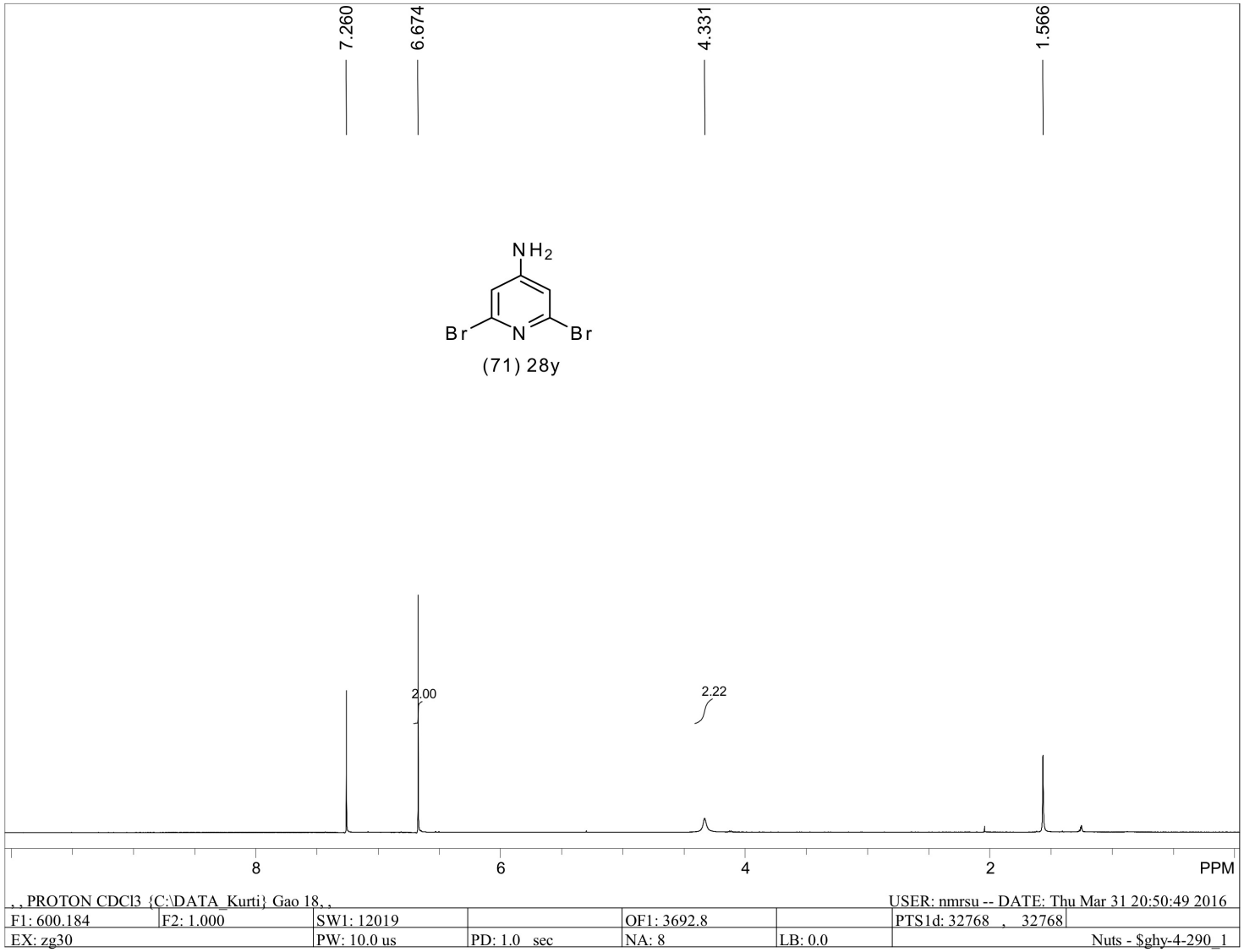

146.628
134.480
133.773
116.288
114.873
109.565
77.211
77.000
76.789
NH2
Br
Cl
(68) 28v
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 8, ,
USER: nmrsu -- DATE: Wed Mar 02 17:52:57 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15072.0
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 52
LB: 0.0
Nuts - $ghy-4-260_2

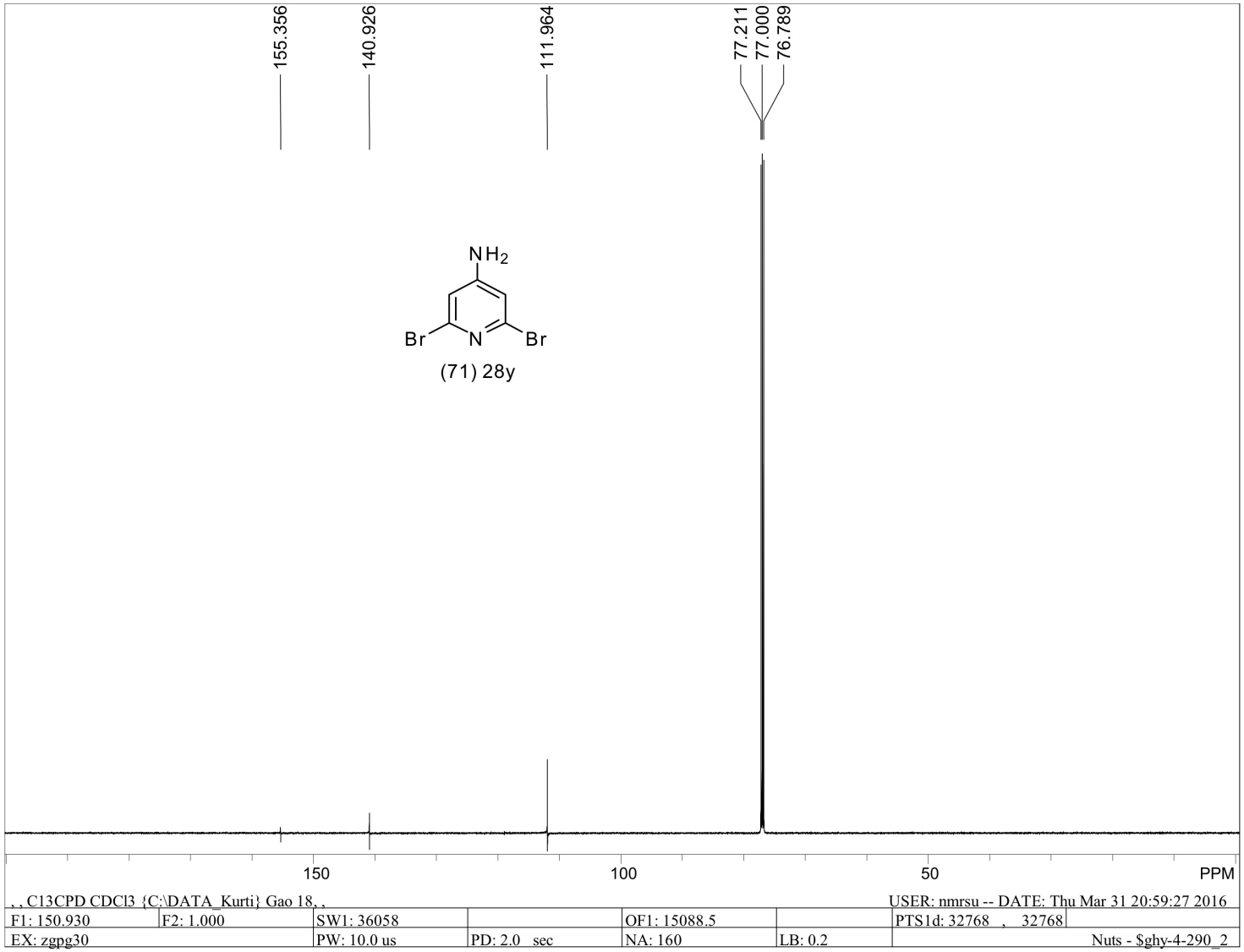

7.674
7.660
7.284
7.271
7.260
6.720
6.717
6.709
6.706
6.516
6.510
6.506
6.498
6.495
3.677
2.427
NH2
TsO
(69) 28w
3.41
2.30
2.11
2.05
2.08
2.00
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 19, ,
USER: nmrsu -- DATE: Thu Mar 31 21:03:04 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-298_1

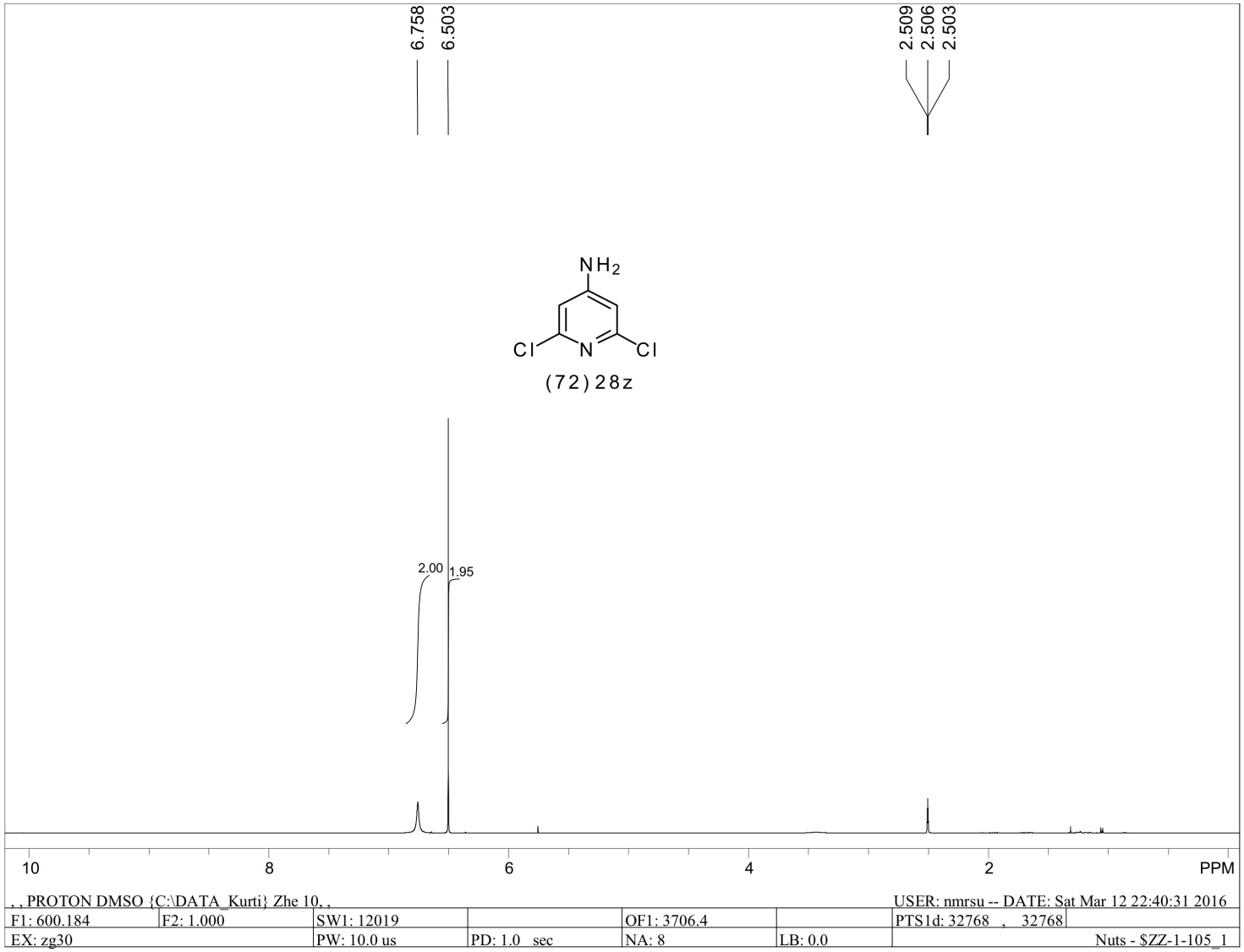

145.352
145.046
141.539
132.351
129.573
128.516
123.127
115.259
77.211
77.000
76.789
21.620
NH2
TsO
(69) 28w
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 19, ,
USER: nmrsu -- DATE: Thu Mar 31 21:09:43 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15079.7
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 120
LB: 0.2
Nuts - $ghy-4-298_2

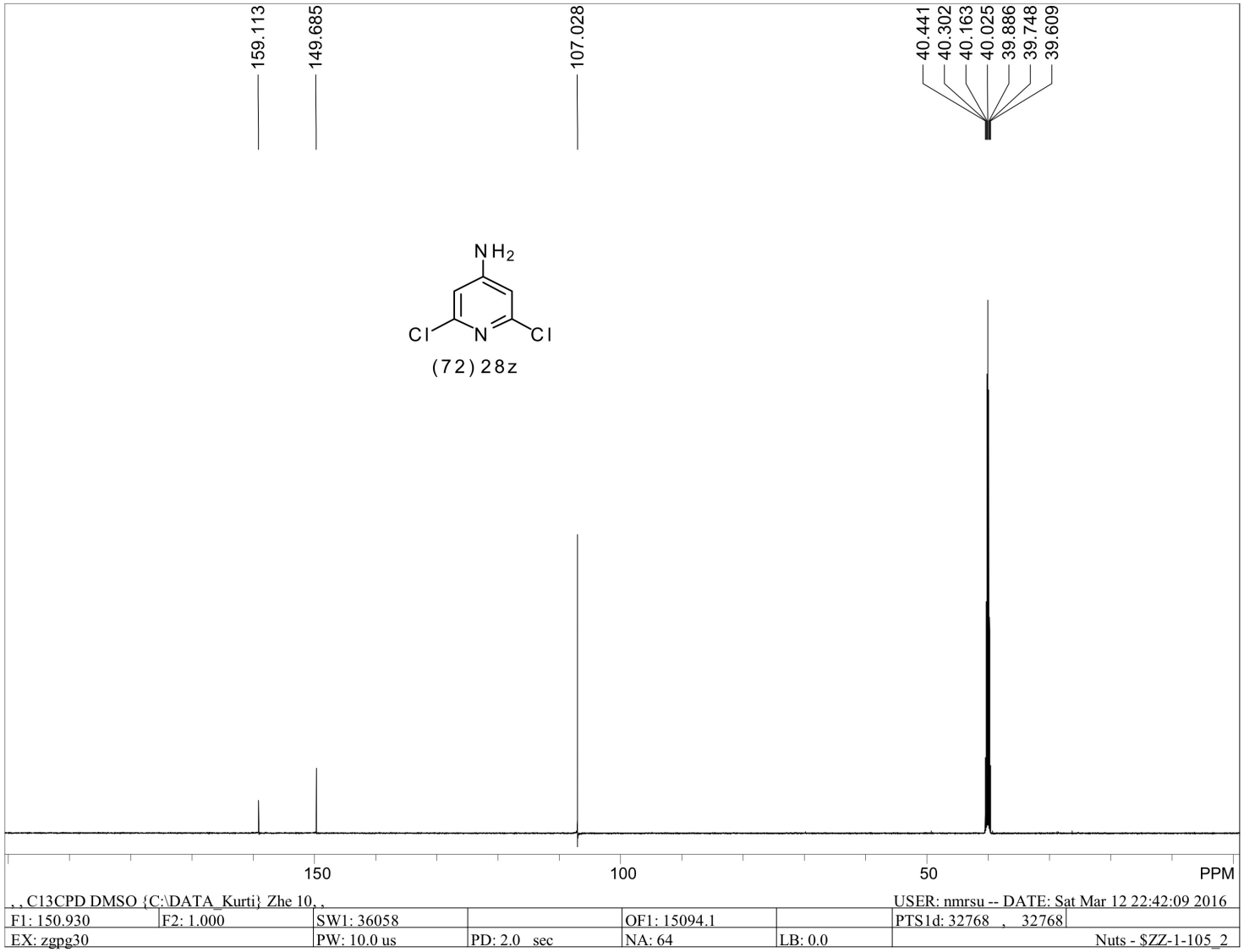

7.279
7.266
7.253
6.624
6.613
6.402
6.388
6.372
3.336
2.509
2.506
2.504
Br
N
NH2
(70) 28x
1.85
1.16
1.00
0.95
8
6
4
2
PPM
, , PROTON DMSO {C:\DATA_Kurti} Gao 18, ,
USER: nmrsu -- DATE: Thu Mar 17 14:22:37 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3706.4
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 6
LB: 0.0
Nuts - $ghy-4-283_1

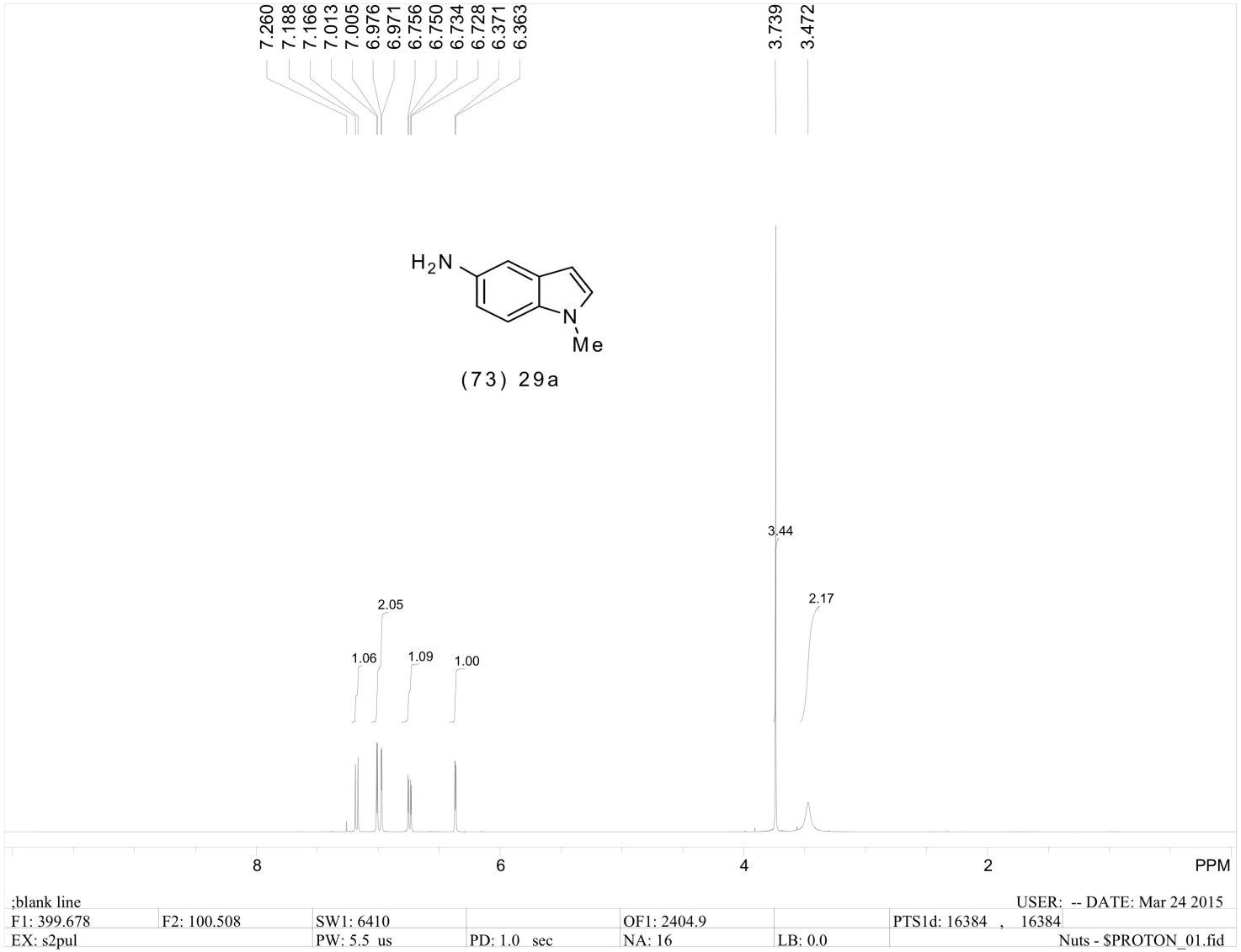

160.680
140.278
139.870
114.495
107.130
40.441
40.302
40.156
40.018
39.879
39.741
39.602
Br
N
NH2
(70) 28x
150
100
50
PPM
, , C13CPD DMSO {C:\DATA_Kurti} Gao 18, ,
USER: nmrsu -- DATE: Thu Mar 17 14:26:21 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15094.1
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 60
LB: 0.0
Nuts - $ghy-4-283_2

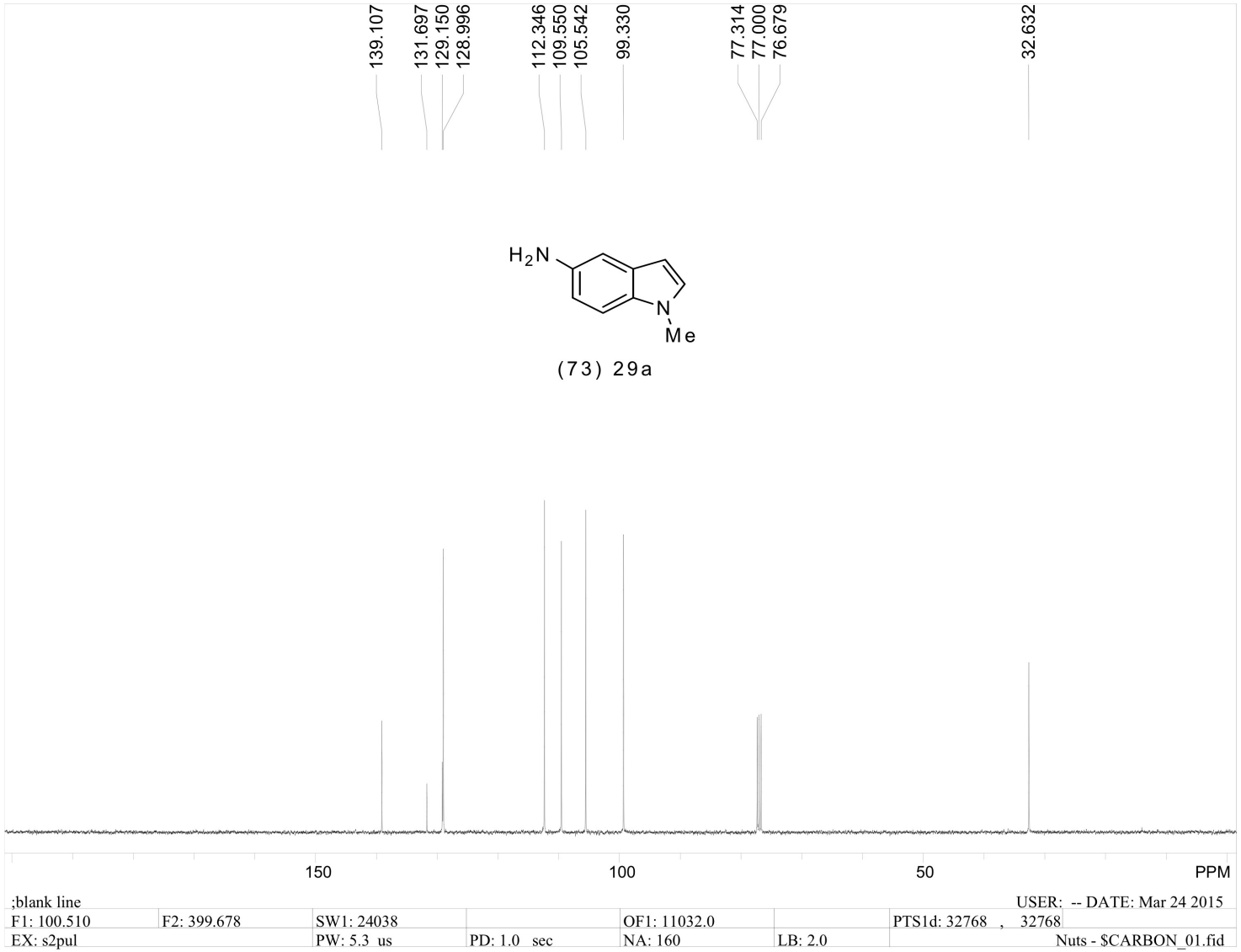

7.260
6.674
4.331
1.566
NH2
Br
N
Br
(71) 28y
2.00
2.22
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 18, ,
USER: nmrsu -- DATE: Thu Mar 31 20:50:49 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-290_1

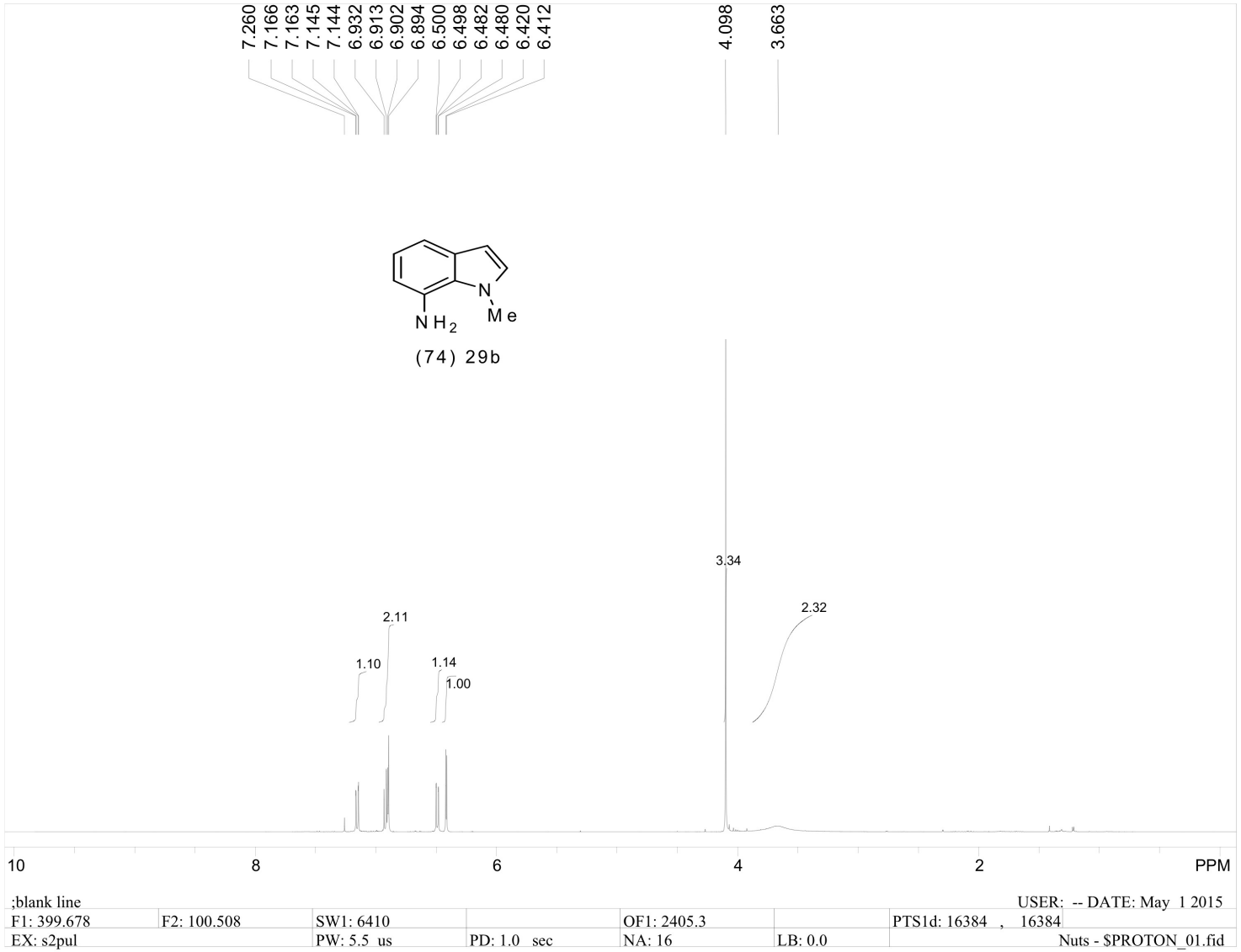

155.356
140.926
111.964
77.211
77.000
76.789
NH2
Br
N
Br
(71) 28y
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 18, ,
USER: nmrsu -- DATE: Thu Mar 31 20:59:27 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15088.5
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 160
LB: 0.2
Nuts - $ghy-4-290_2

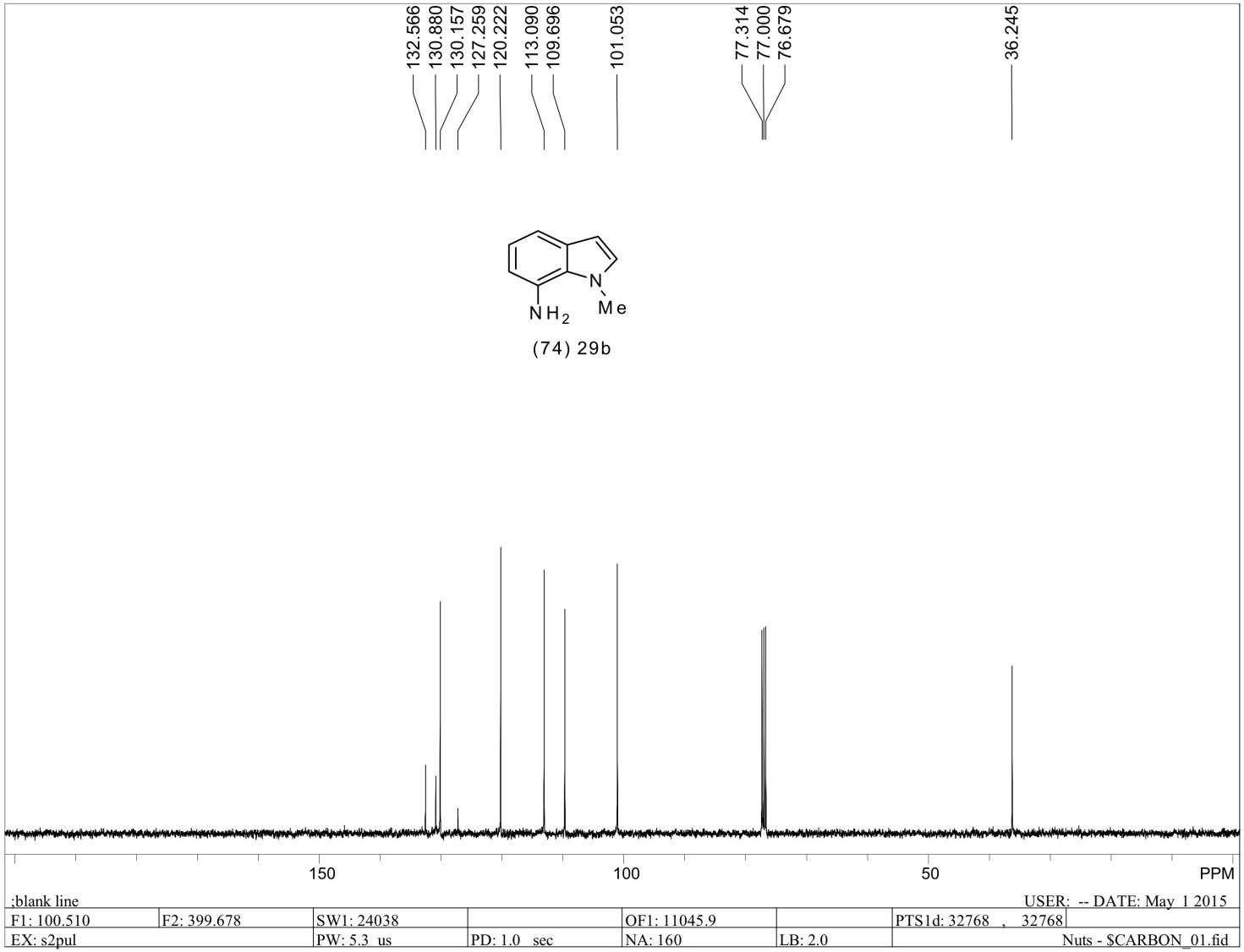

6.758
6.503
2.509
2.506
2.503
NH2
Cl
N
Cl
(72)28z
2.00
1.95
10
8
6
4
2
PPM
, , PROTON DMSO {C:\DATA_Kurti} Zhe 10, ,
USER: nmrsu -- DATE: Sat Mar 12 22:40:31 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3706.4
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ZZ-1-105_1

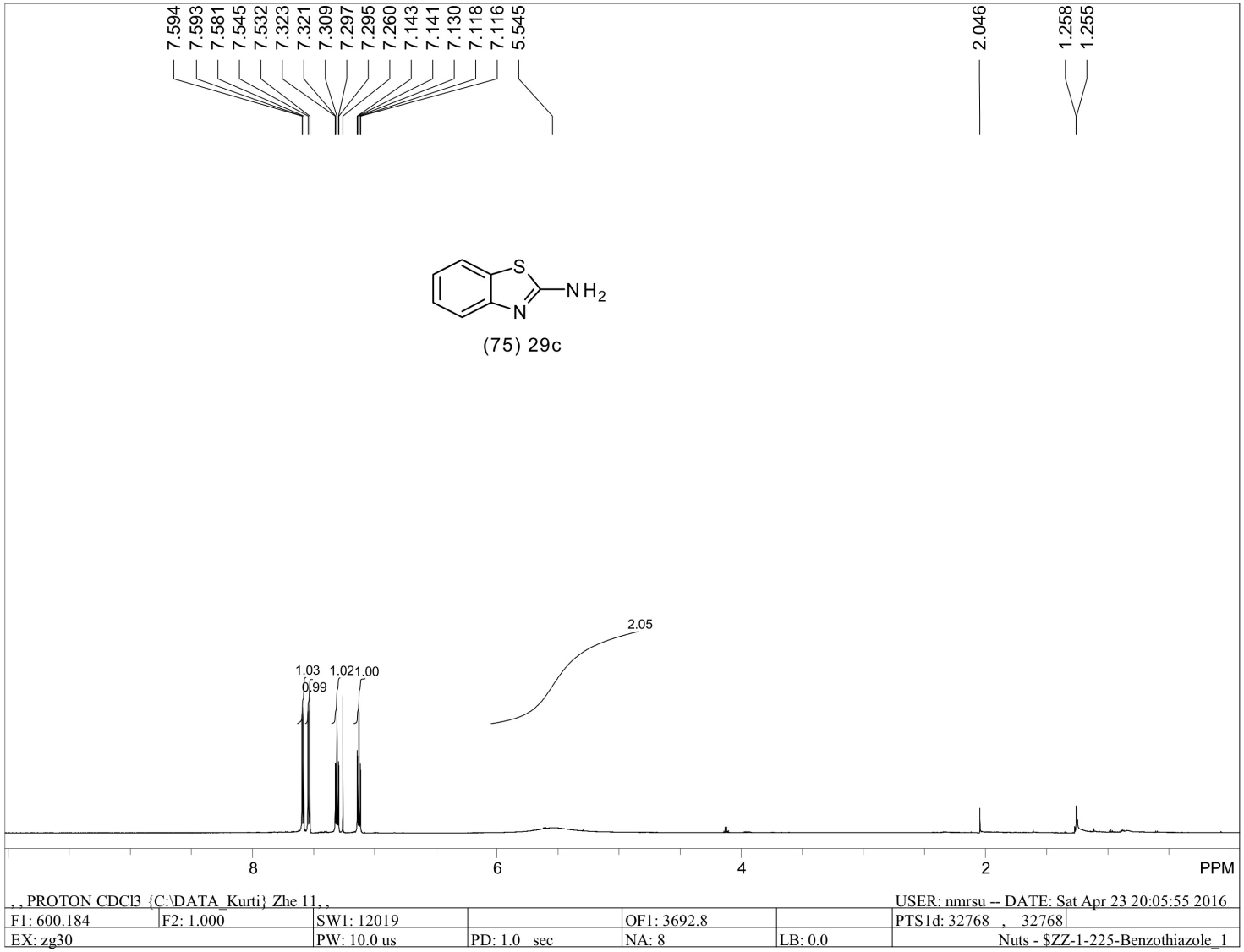

159.113
149.685
107.028
40.441
40.302
40.163
40.025
39.886
39.748
39.609
NH2
Cl
N
Cl
(72)28z
150
100
50
PPM
, , C13CPD DMSO {C:\DATA_Kurti} Zhe 10, ,
USER: nmrsu -- DATE: Sat Mar 12 22:42:09 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15094.1
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 64
LB: 0.0
Nuts - $ZZ-1-105_2

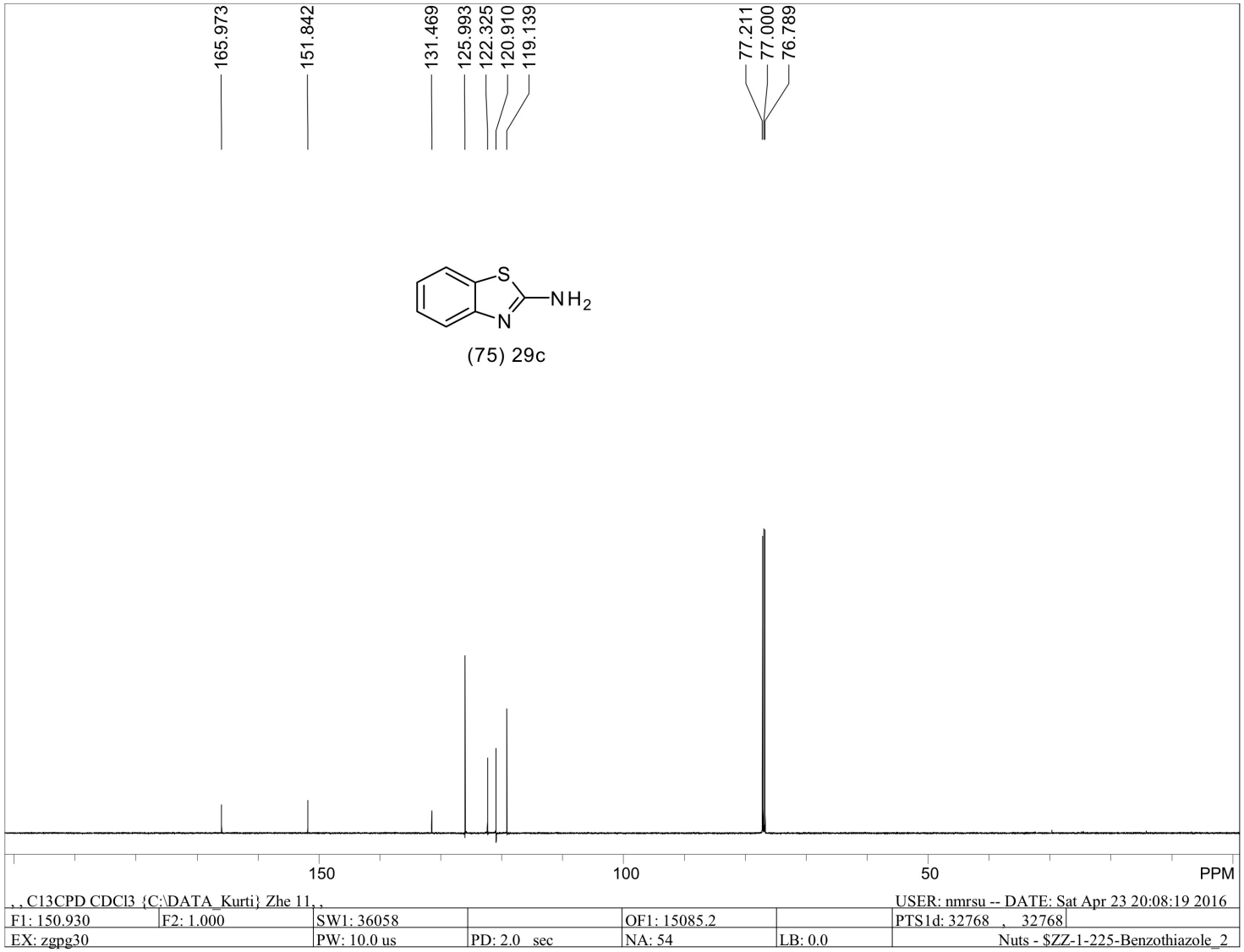

7.260
7.188
7.166
7.013
7.005
6.976
6.971
6.756
6.750
6.734
6.728
6.371
6.363
3.739
3.472
H2N
N
Me
(73) 29a
3.44
2.17
2.05
1.06
1.09
1.00
8
6
4
2
PPM
;blank line
USER: -- DATE: Mar 24 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2404.9
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

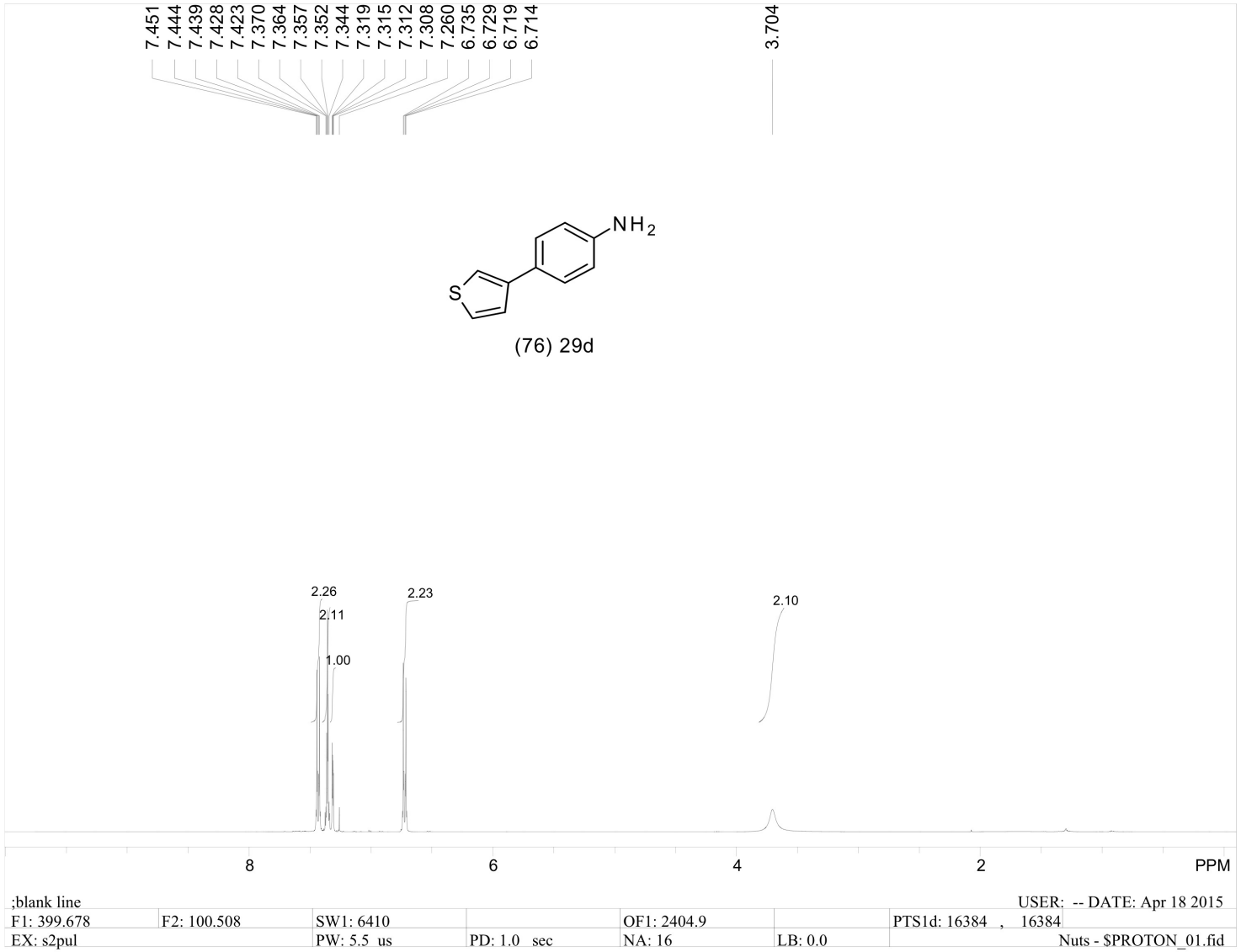

139.107
131.697
129.150
128.996
112.346
109.550
105.542
99.330
77.314
77.000
76.679
32.632
H2N
N
Me
(73) 29a
150
100
50
PPM
;blank line
USER: -- DATE: Mar 24 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11032.0
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 160
LB: 2.0
Nuts - $CARBON_01.fid

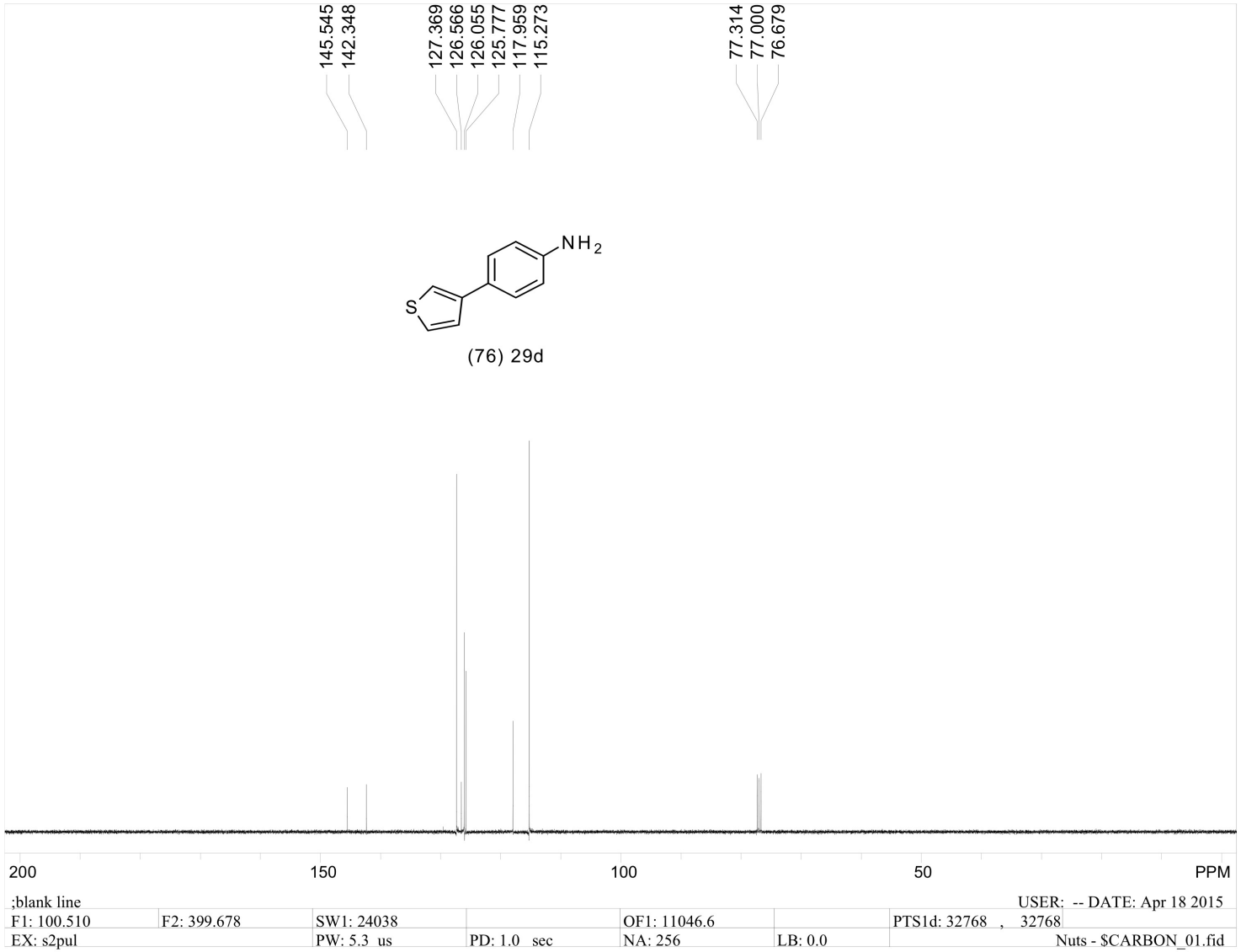

7.260
7.166
7.163
7.145
7.144
6.932
6.913
6.902
6.894
6.500
6.498
6.482
6.480
6.420
6.412
4.098
3.663
N
Me
NH2
(74) 29b
3.34
2.32
2.11
1.10
1.14
1.00
10
8
6
4
2
PPM
;blank line
USER: -- DATE: May 1 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2405.3
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

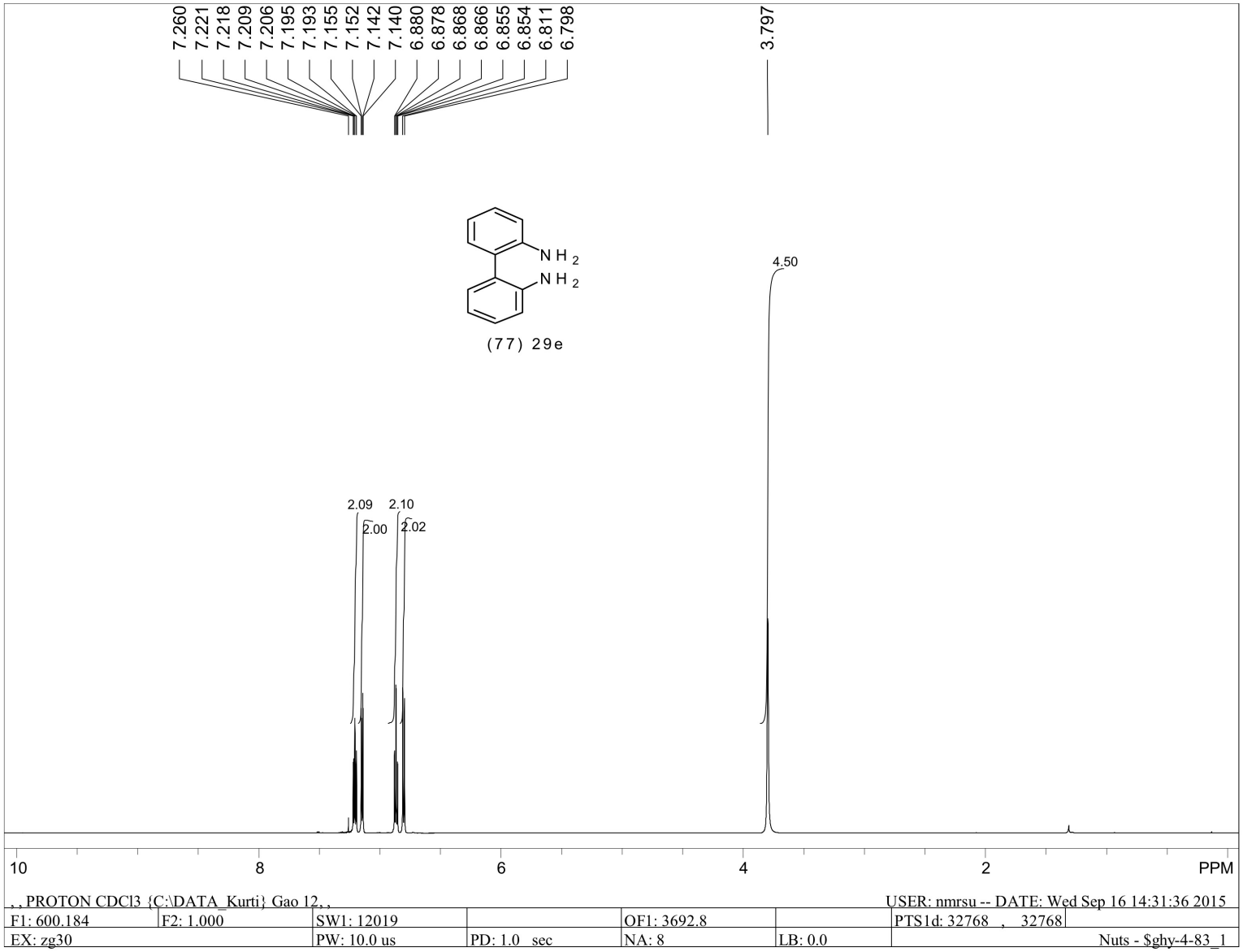

132.566
130.880
130.157
127.259
120.222
113.090
109.696
101.053
77.314
77.000
76.679
36.245
NH2
N
Me
(74) 29b
150
100
50
PPM
;blank line
USER: -- DATE: May 1 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11045.9
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 160
LB: 2.0
Nuts - $CARBON_01.fid

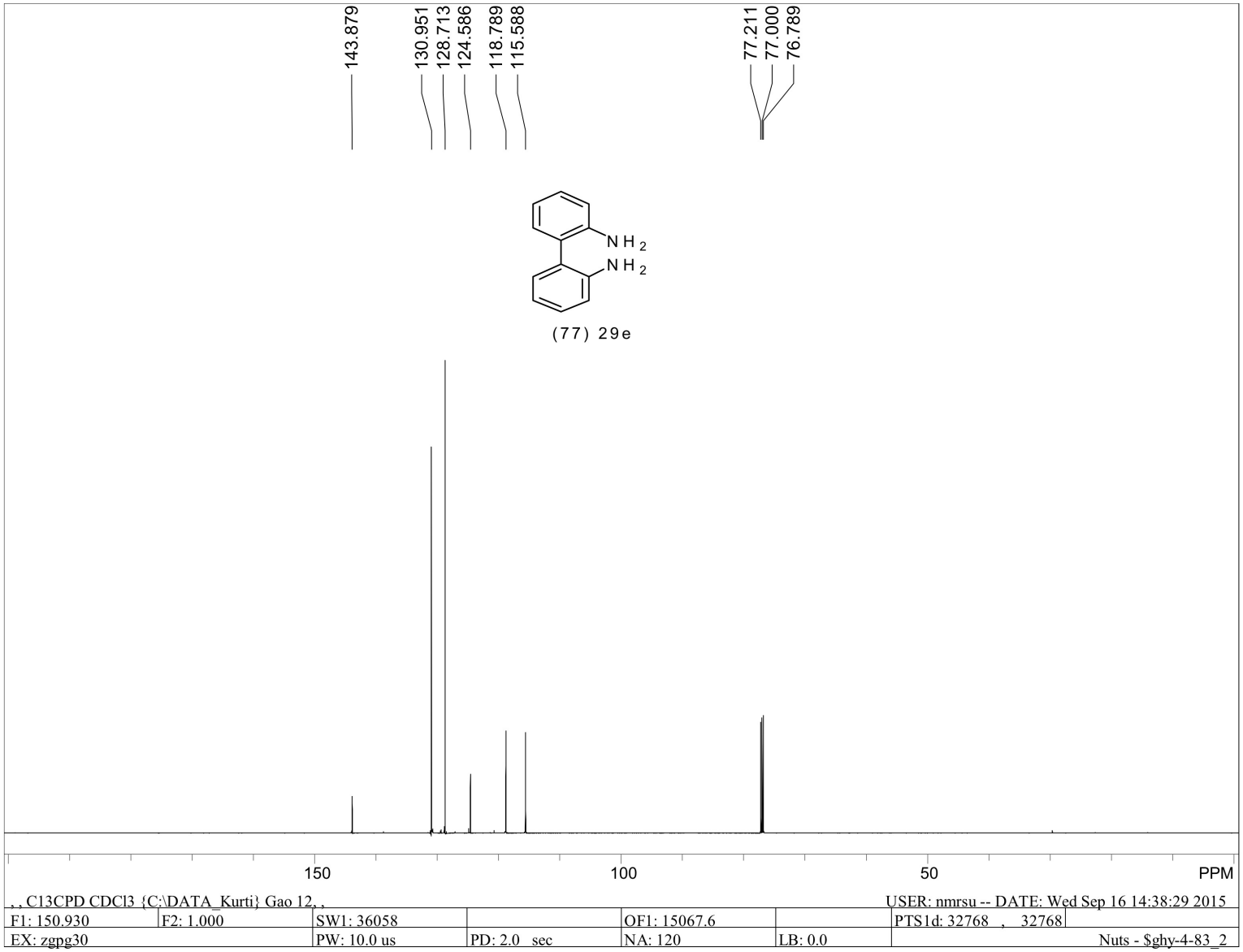

7.594
7.593
7.581
7.545
7.532
7.323
7.321
7.309
7.297
7.295
7.260
7.143
7.141
7.130
7.118
7.116
5.545
2.046
1.258
1.255
S
NH2
N
(75) 29c
2.05
1.03
0.99
1.02
1.00
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 11, ,
USER: nmrsu -- DATE: Sat Apr 23 20:05:55 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ZZ-1-225-Benzothiazole_1

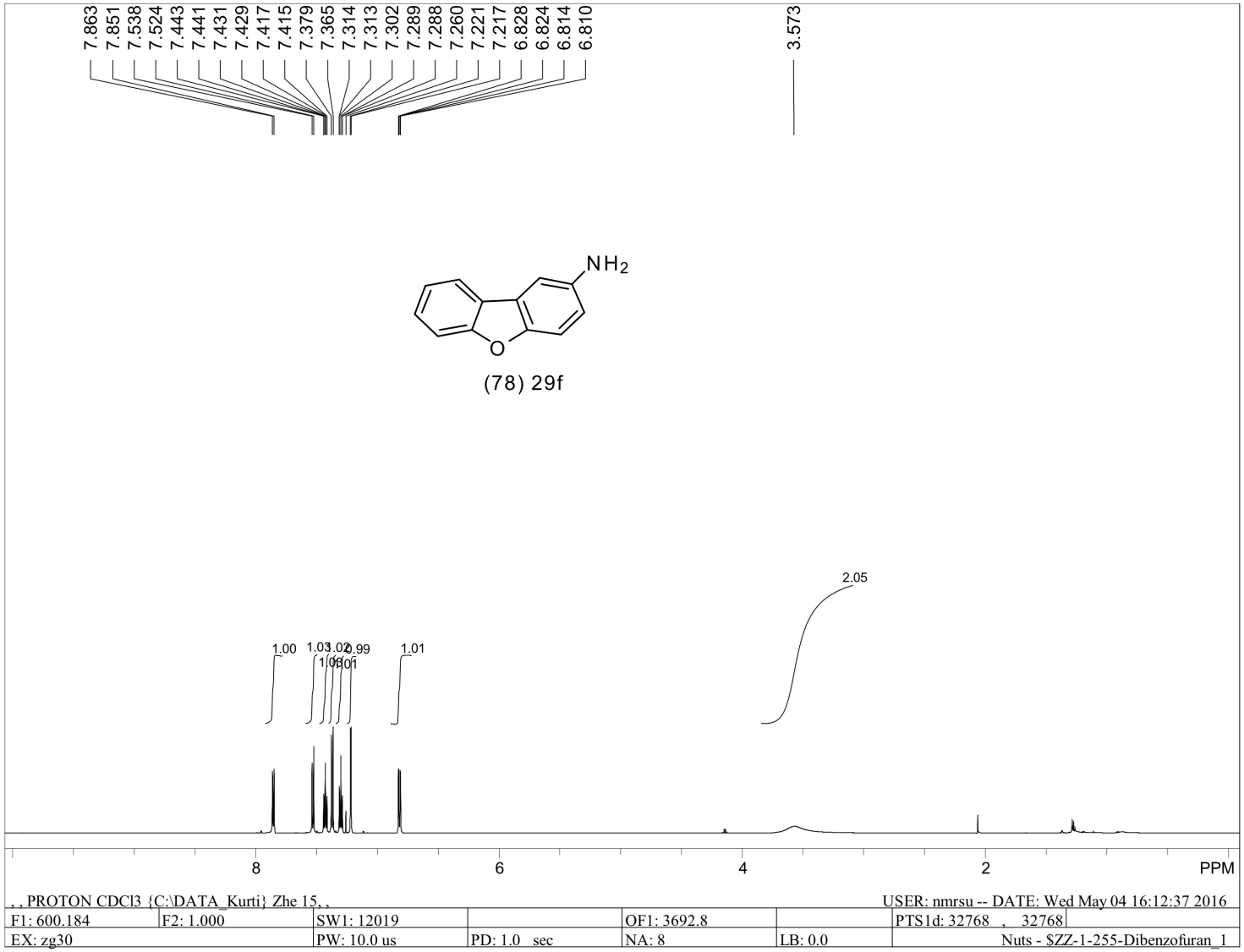

165.973
151.842
131.469
125.993
122.325
120.910
119.139
77.211
77.000
76.789
S
NH2
N
(75) 29c
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Zhe 11, ,
USER: nmrsu -- DATE: Sat Apr 23 20:08:19 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15085.2
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 54
LB: 0.0
Nuts - $ZZ-1-225-Benzothiazole_2


7.451
7.444
7.439
7.428
7.423
7.370
7.364
7.357
7.352
7.344
7.319
7.315
7.312
7.308
7.260
6.735
6.729
6.719
6.714
3.704
NH2
S
(76) 29d
2.26
2.11
1.00
2.23
2.10
8
6
4
2
PPM
;blank line
USER: -- DATE: Apr 18 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2404.9
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

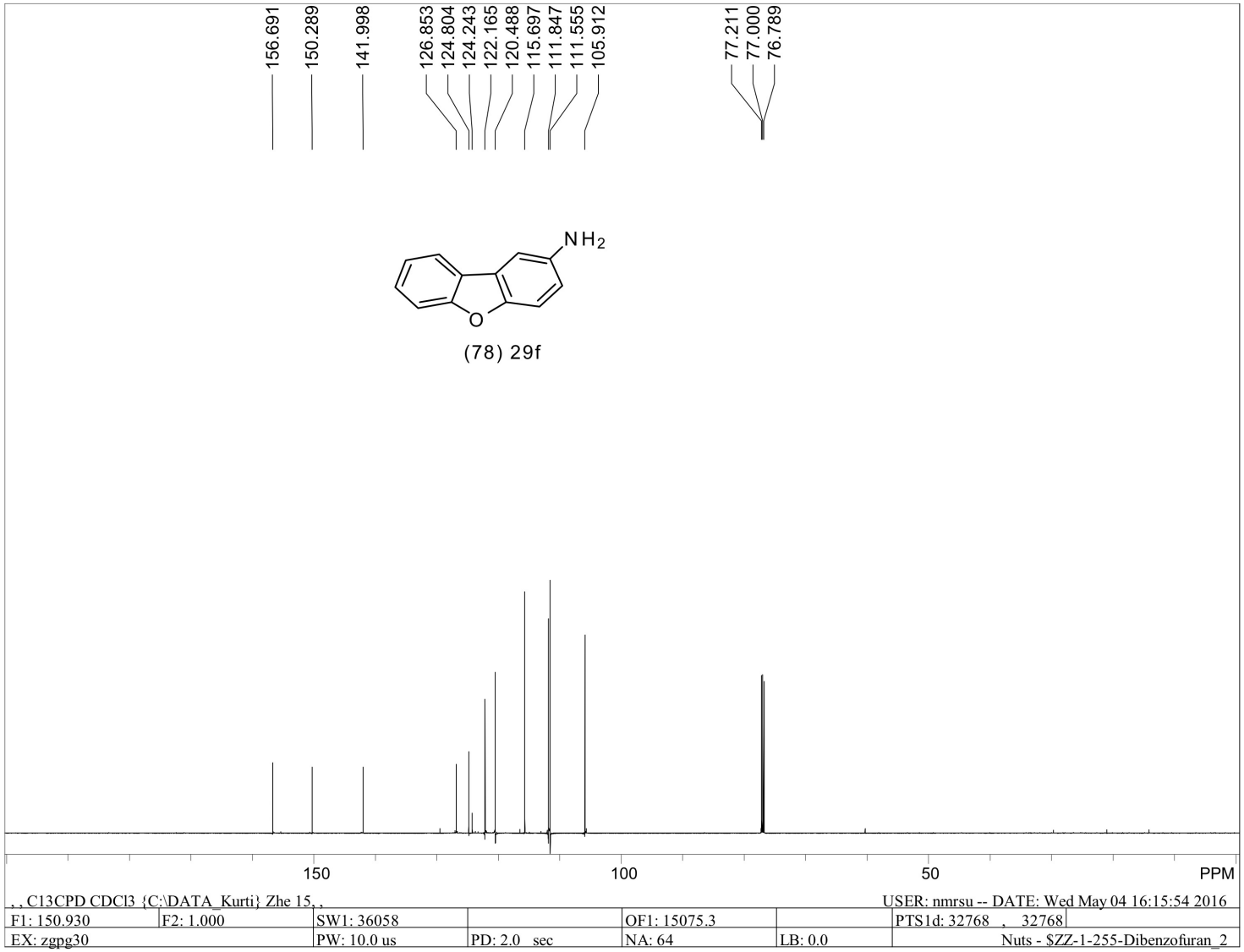

145.545
142.348
127.369
126.566
126.055
125.777
117.959
115.273
77.314
77.000
76.679
NH2
S
(76) 29d
200
150
100
50
PPM
;blank line
USER: -- DATE: Apr 18 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11046.6
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 0.0
Nuts - $CARBON_01.fid

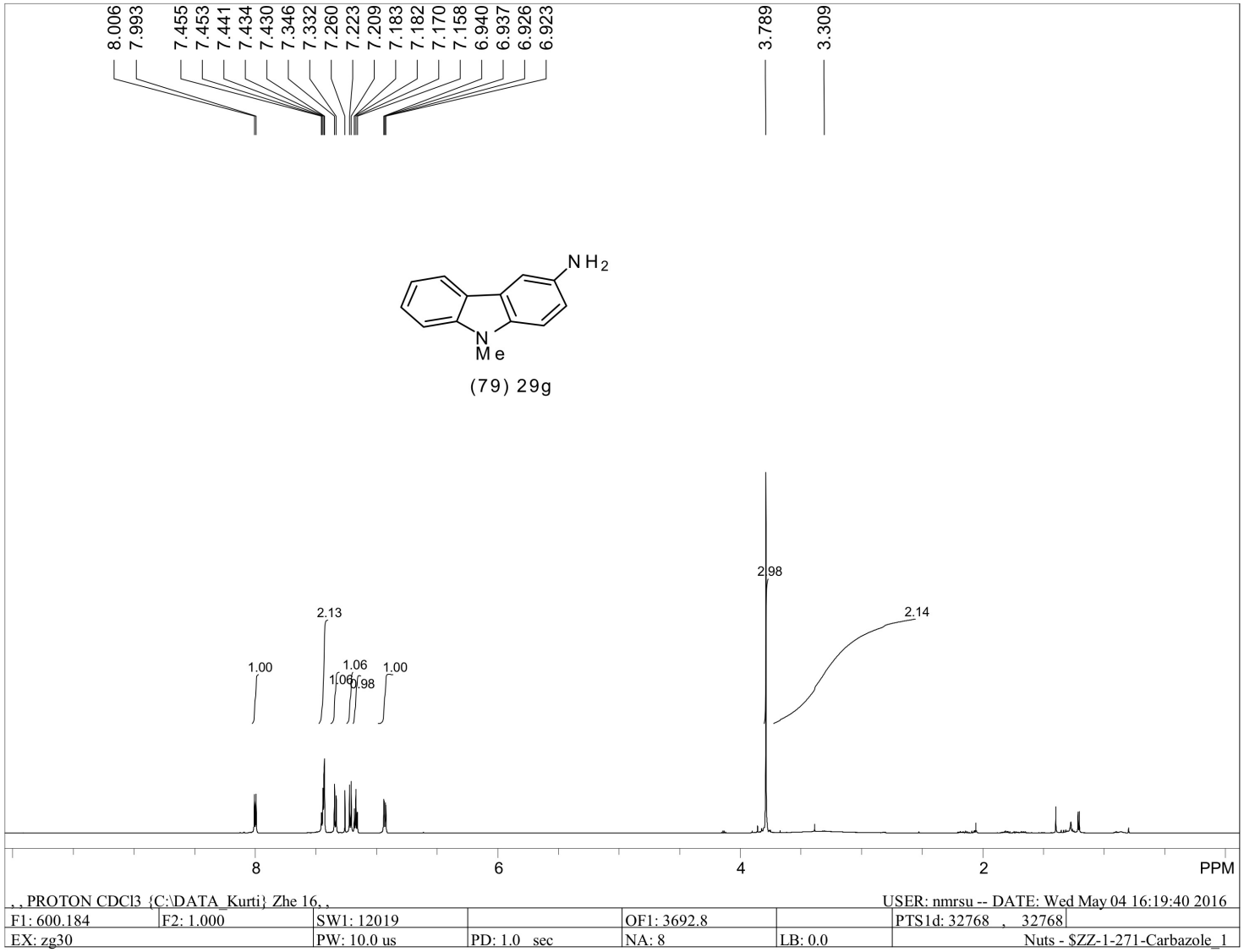

7.260
7.221
7.218
7.209
7.206
7.195
7.193
7.155
7.152
7.142
7.140
6.880
6.878
6.868
6.866
6.855
6.854
6.811
6.798
3.797
NH2
NH2
(77) 29e
4.50
2.09
2.10
2.00
2.02
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 12, ,
USER: nmrsu -- DATE: Wed Sep 16 14:31:36 2015
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-83_1

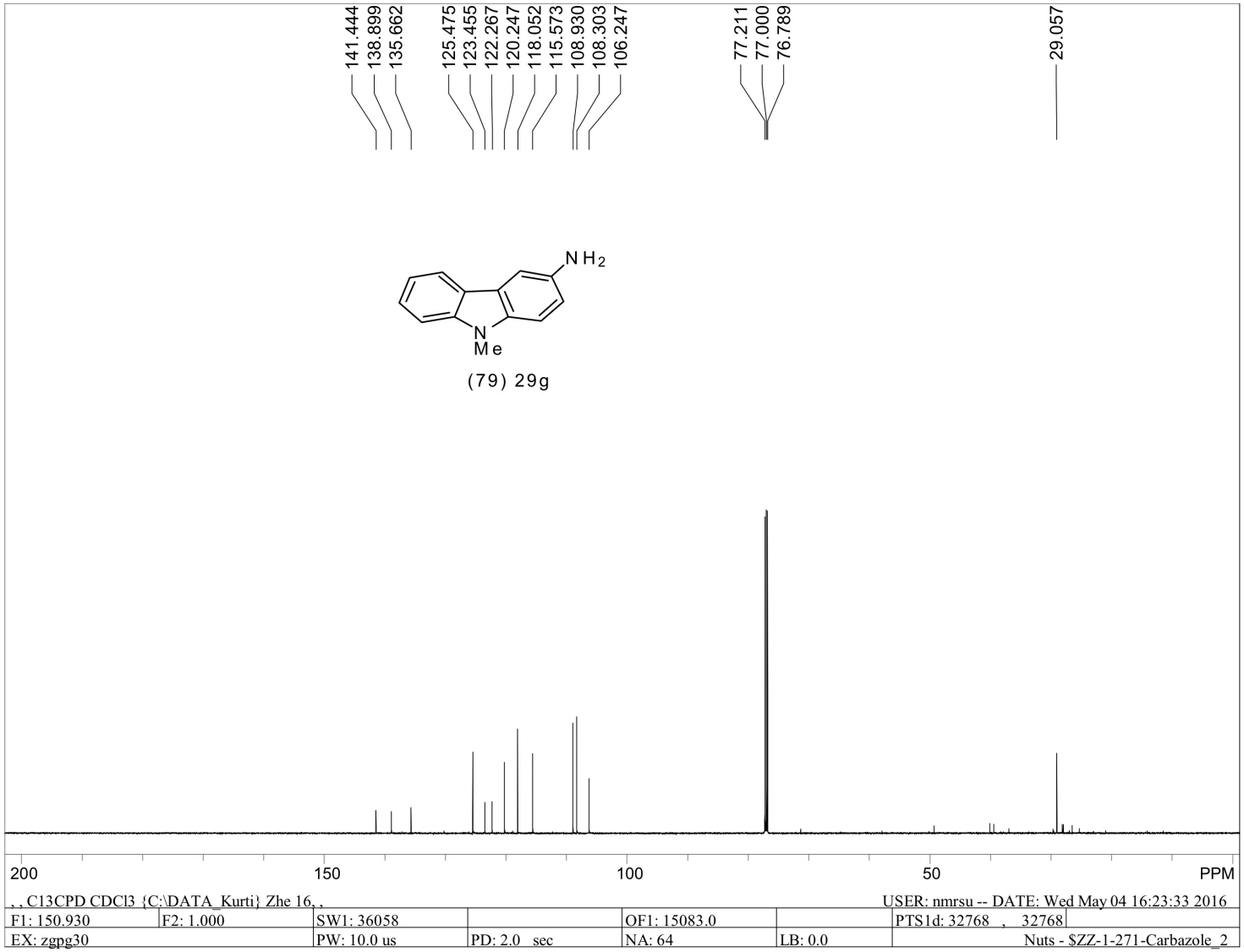

143.879
130.951
128.713
124.586
118.789
115.588
77.211
77.000
76.789
NH2
NH2
(77) 29e
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 12, ,
USER: nmrsu -- DATE: Wed Sep 16 14:38:29 2015
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15067.6
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 120
LB: 0.0
Nuts - $ghy-4-83_2

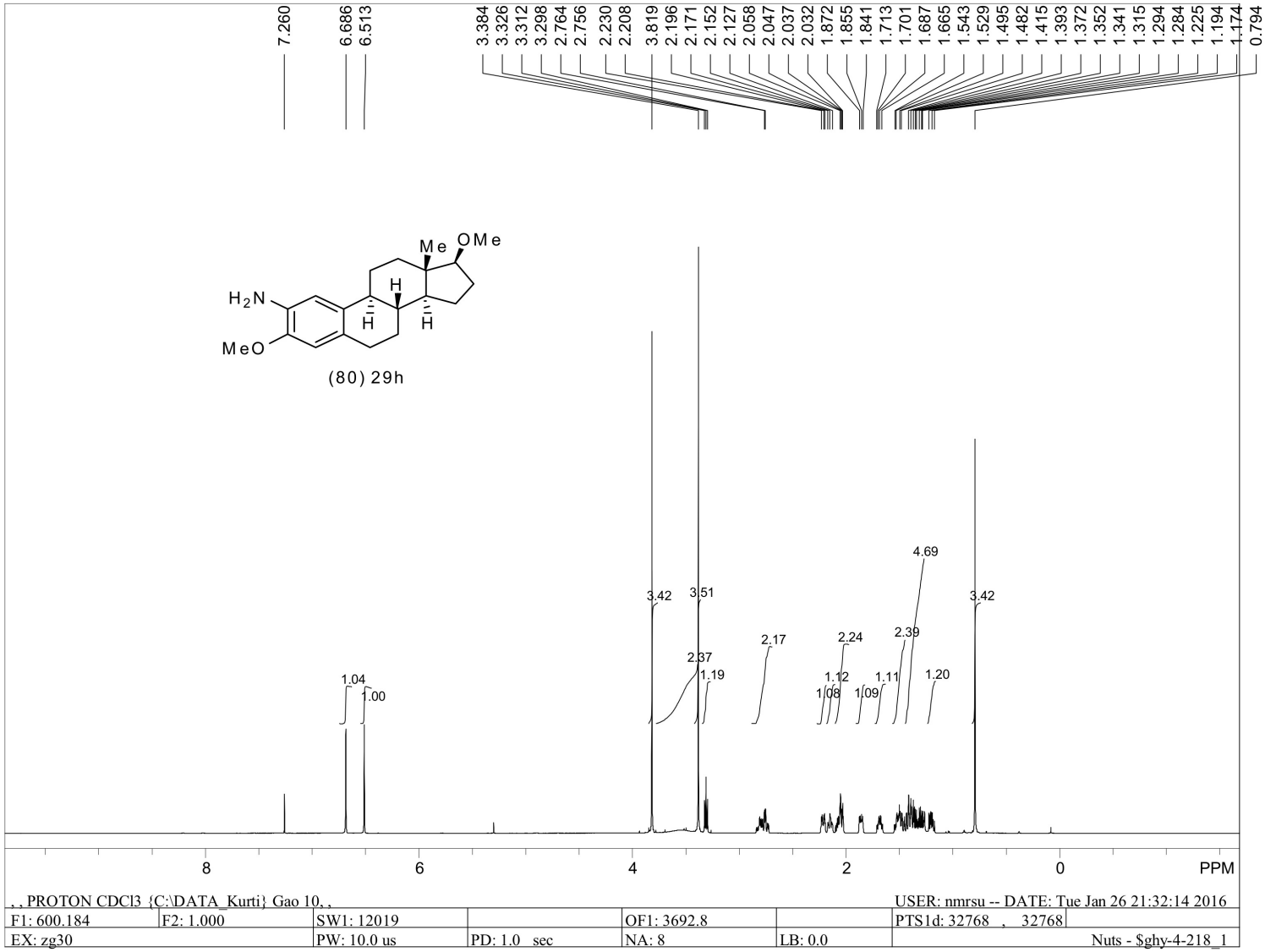

7.863
7.851
7.538
7.524
7.443
7.441
7.431
7.429
7.417
7.415
7.379
7.365
7.314
7.313
7.302
7.289
7.288
7.260
7.221
7.217
6.828
6.824
6.814
6.810
3.573
NH2
O
(78) 29f
2.05
1.00
1.03
3.02
2.99
1.01
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 15, ,
USER: nmrsu -- DATE: Wed May 04 16:12:37 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ZZ-1-255-Dibenzofuran_1

S278

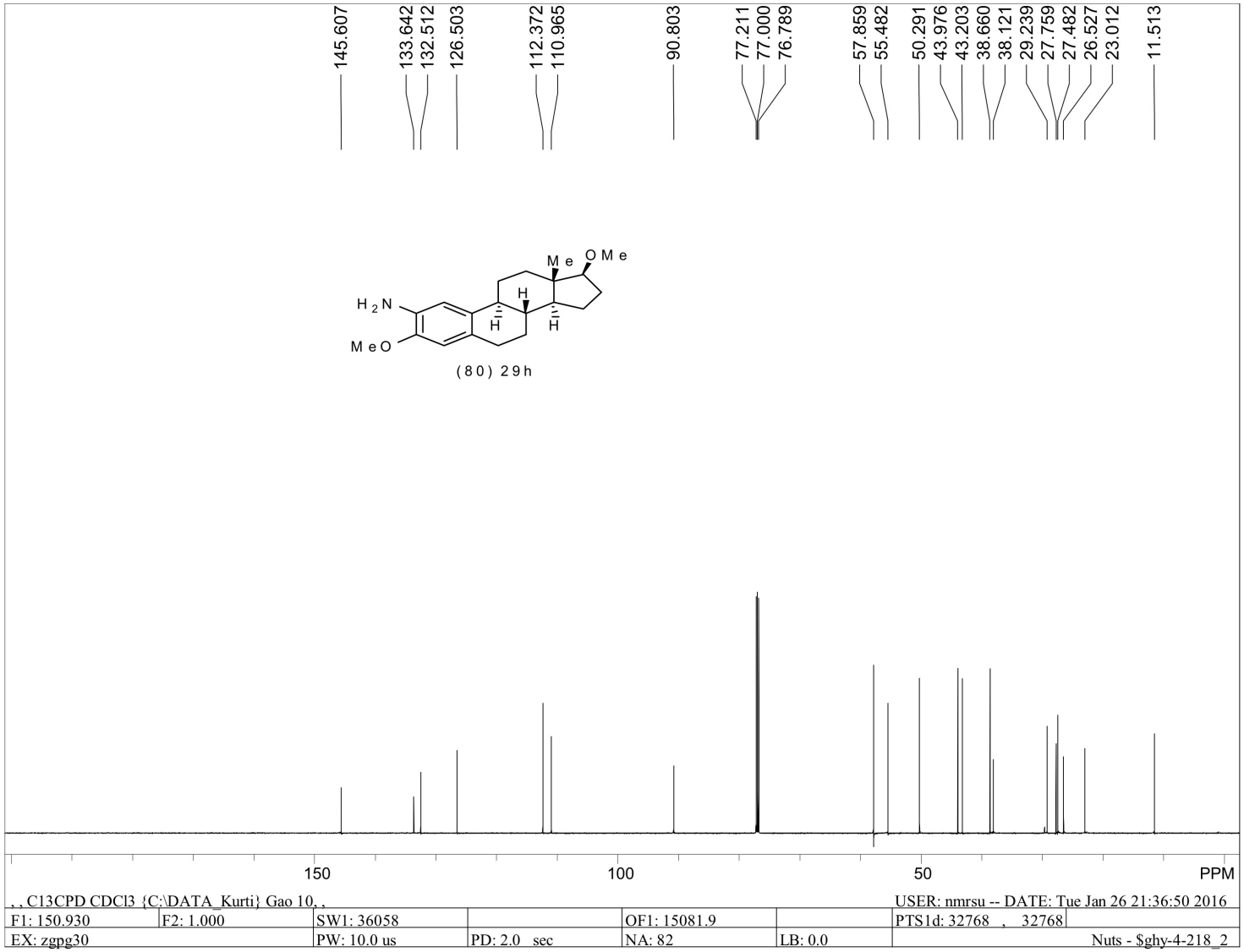

156.691
150.289
141.998
126.853
124.804
124.243
122.165
120.488
115.697
111.847
111.555
105.912
77.211
77.000
76.789
NH2
O
(78) 29f
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Zhe 15, ,
USER: nmrsu -- DATE: Wed May 04 16:15:54 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15075.3
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 64
LB: 0.0
Nuts - $ZZ-1-255-Dibenzofuran_2


8.006
7.993
7.455
7.453
7.441
7.434
7.430
7.346
7.332
7.260
7.223
7.209
7.183
7.182
7.170
7.158
6.940
6.937
6.926
6.923
3.789
3.309
NH2
N
Me
(79) 29g
2.98
2.14
2.13
1.00
1.06
1.06
0.98
1.00
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 16, ,
USER: nmrsu -- DATE: Wed May 04 16:19:40 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ZZ-1-271-Carbazole_1

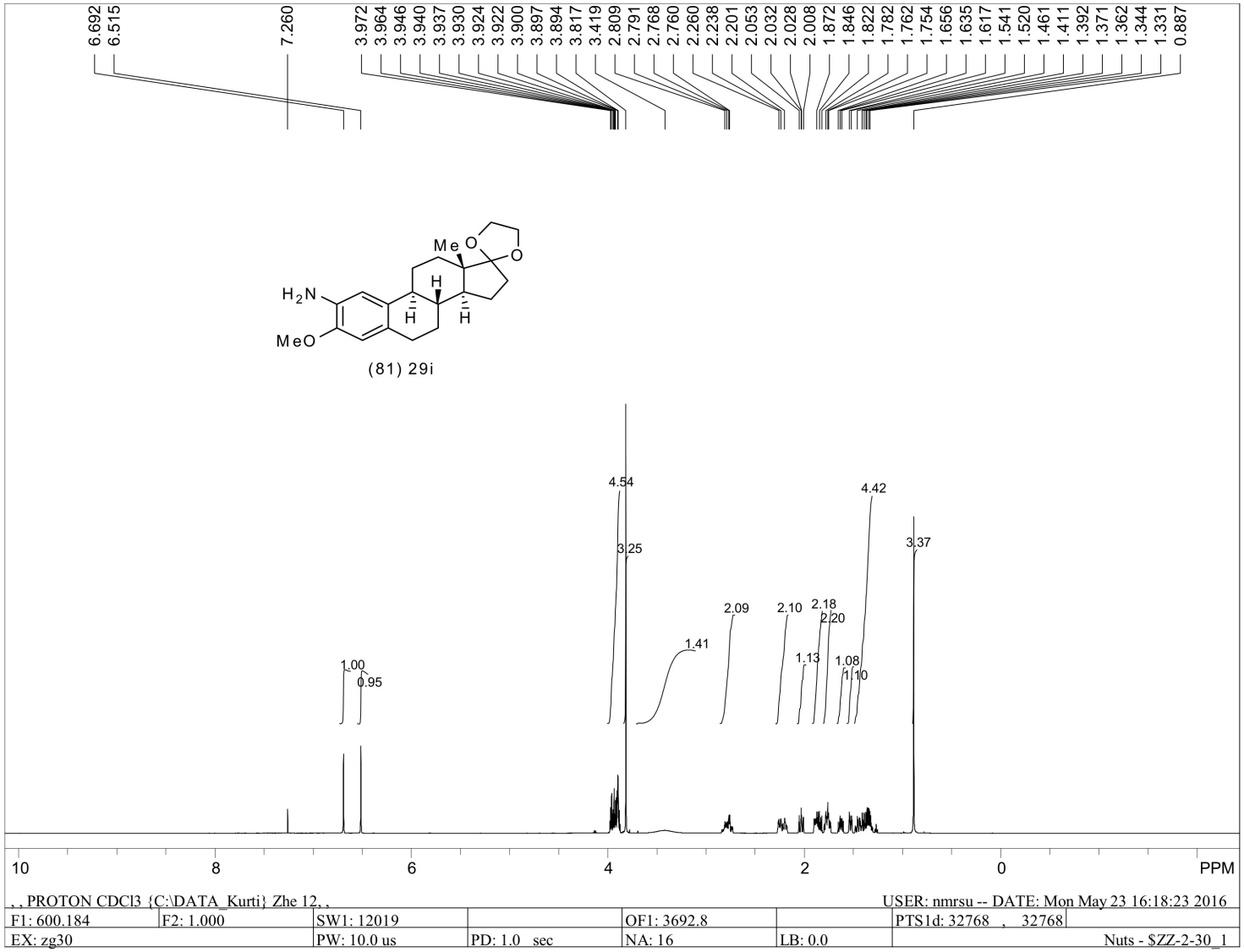

141.444
138.899
135.662
125.475
123.455
122.267
120.247
118.052
115.573
108.930
108.303
106.247
77.211
77.000
76.789
29.057
NH2
N
Me
(79) 29g
200
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Zhe 16, ,
USER: nmrsu -- DATE: Wed May 04 16:23:33 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15083.0
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 64
LB: 0.0
Nuts - $ZZ-1-271-Carbazole_2


7.260
6.686
6.513
3.384
3.326
3.312
3.298
2.764
2.756
2.230
2.208
3.819
2.196
2.171
2.152
2.127
2.058
2.047
2.037
2.032
1.872
1.855
1.841
1.713
1.701
1.687
1.665
1.543
1.529
1.495
1.482
1.415
1.393
1.372
1.352
1.341
1.315
1.294
1.284
1.225
1.194
1.174
0.794
Me
OMe
H2N
MeO
H
H
H
(80) 29h
4.69
3.42
3.51
3.42
2.17
2.24
2.39
2.37
1.19
1.04
1.00
1.12
1.11
1.20
1.08
1.09
8
6
4
2
0
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 10, ,
USER: nmrsu -- DATE: Tue Jan 26 21:32:14 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-218_1

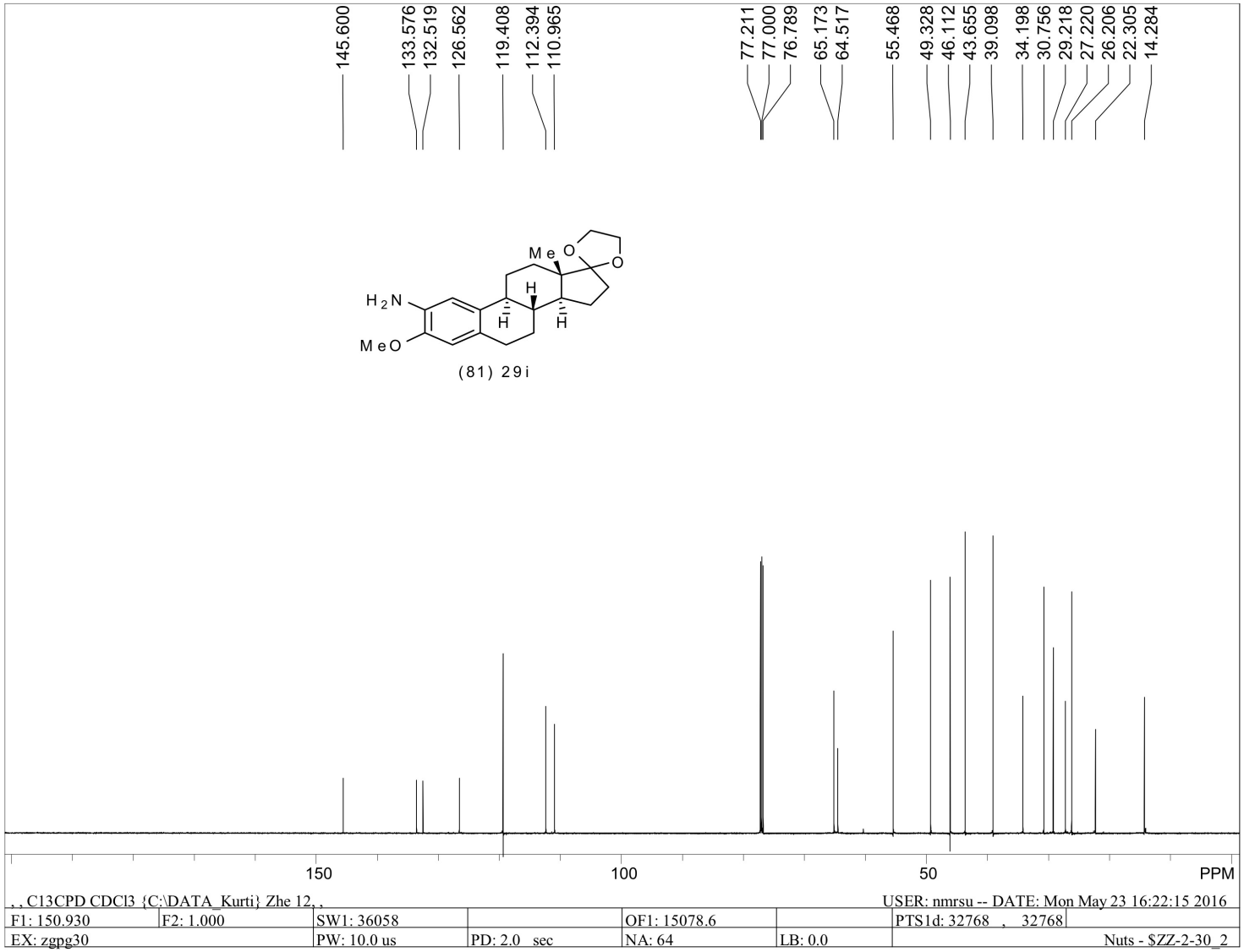
S282


145.607
133.642
132.512
126.503
112.372
110.965
90.803
77.211
77.000
76.789
57.859
55.482
50.291
43.976
43.203
38.660
38.121
29.239
27.759
27.482
26.527
23.012
11.513
Me
OMe
H2N
MeO
H
H
H
(80) 29h
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 10, ,
USER: nmrsu -- DATE: Tue Jan 26 21:36:50 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15081.9
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 82
LB: 0.0
Nuts - $ghy-4-218_2

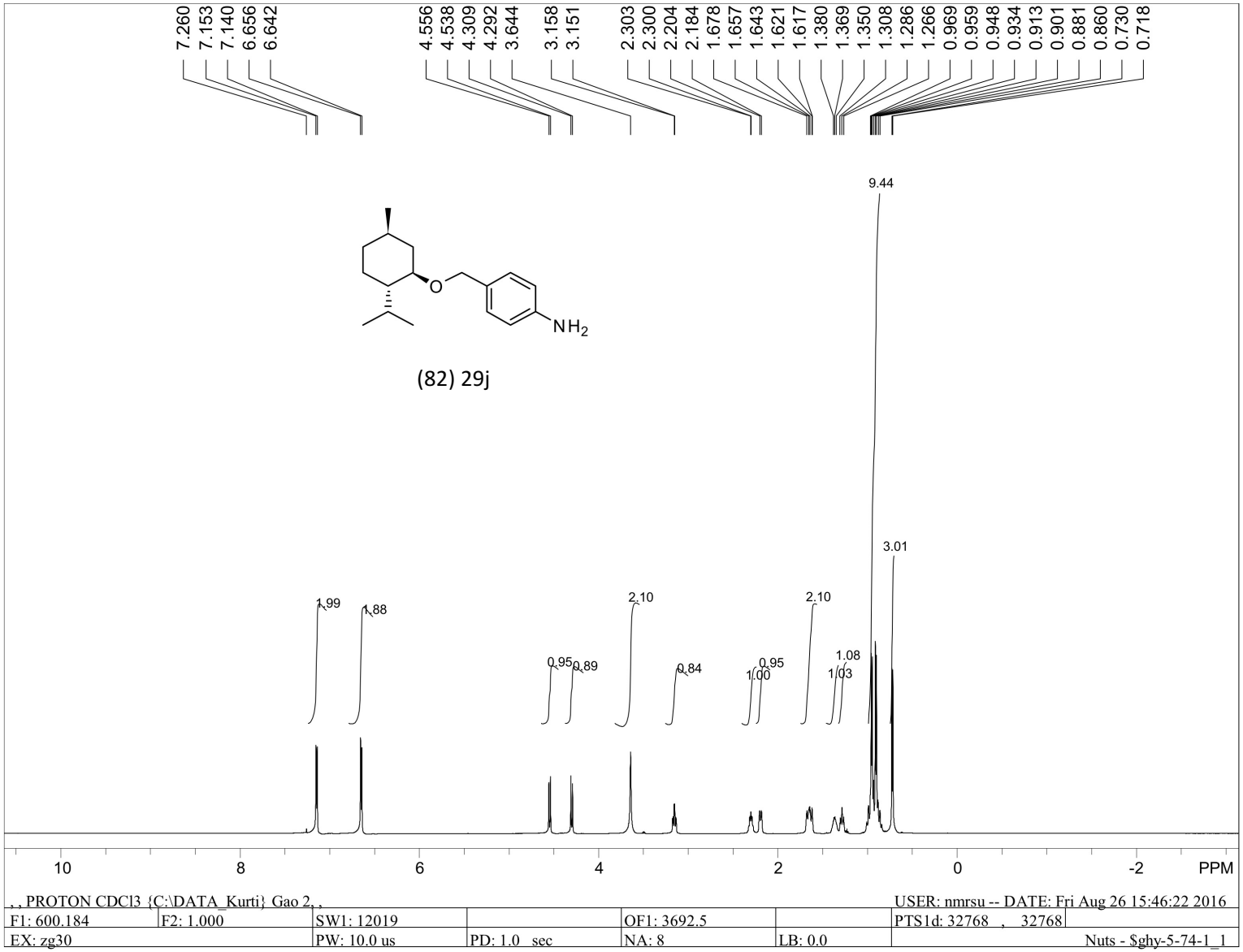
S283

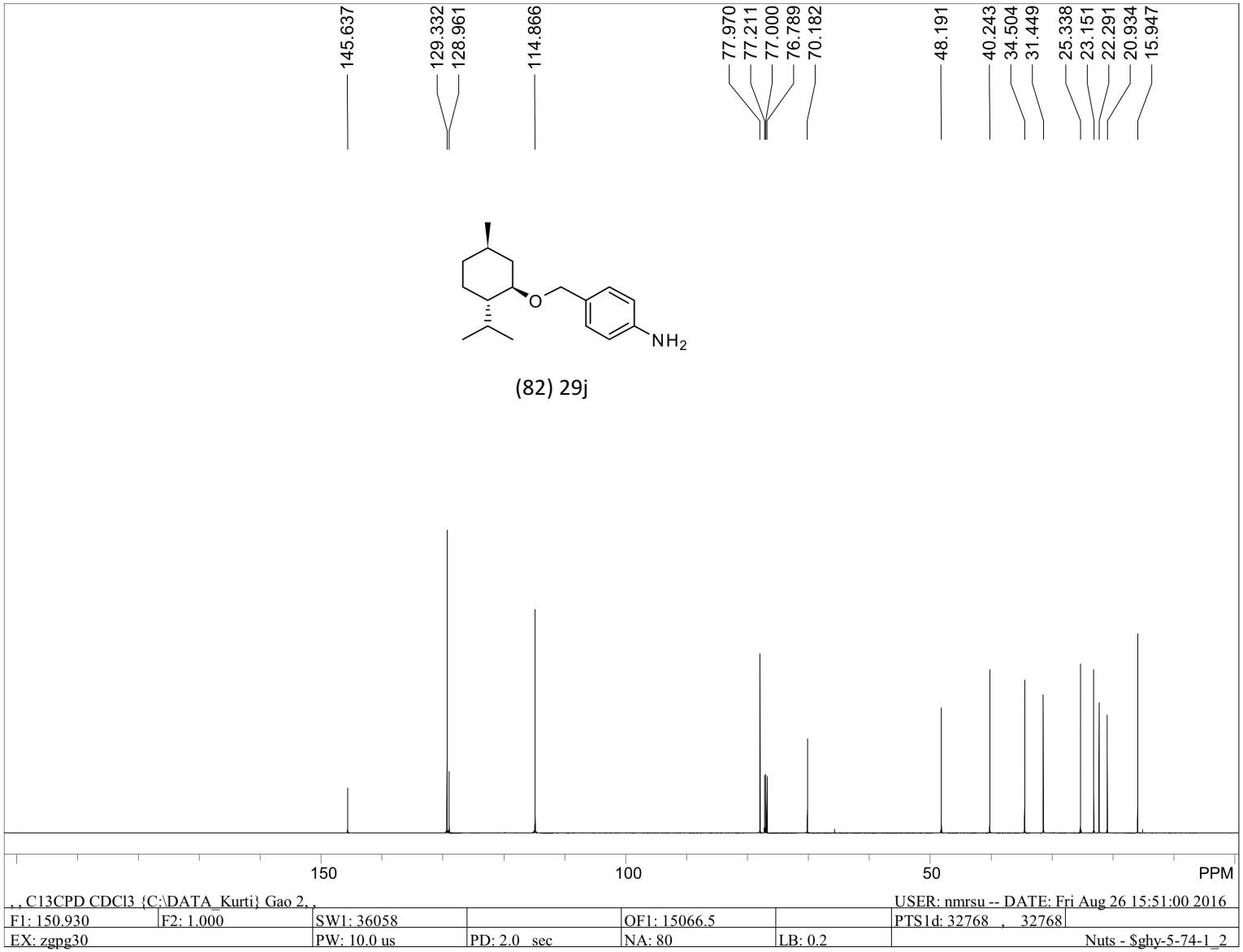

6.692
6.515
7.260
3.972
3.964
3.946
3.940
3.937
3.930
3.924
3.922
3.900
3.897
3.894
3.817
3.419
2.809
2.791
2.768
2.760
2.260
2.238
2.201
2.053
2.032
2.028
2.008
1.872
1.846
1.822
1.782
1.762
1.754
1.656
1.635
1.617
1.541
1.520
1.461
1.411
1.392
1.371
1.362
1.344
1.331
0.887
Me
O
O
H
H2N
H
H
MeO
(81) 29i
4.54
4.42
3.25
3.37
2.09
2.10
2.18
2.20
1.41
1.13
1.08
1.10
1.00
0.95
10
8
6
4
2
0
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 12, ,
USER: nmrsu -- DATE: Mon May 23 16:18:23 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $ZZ-2-30_1

S284

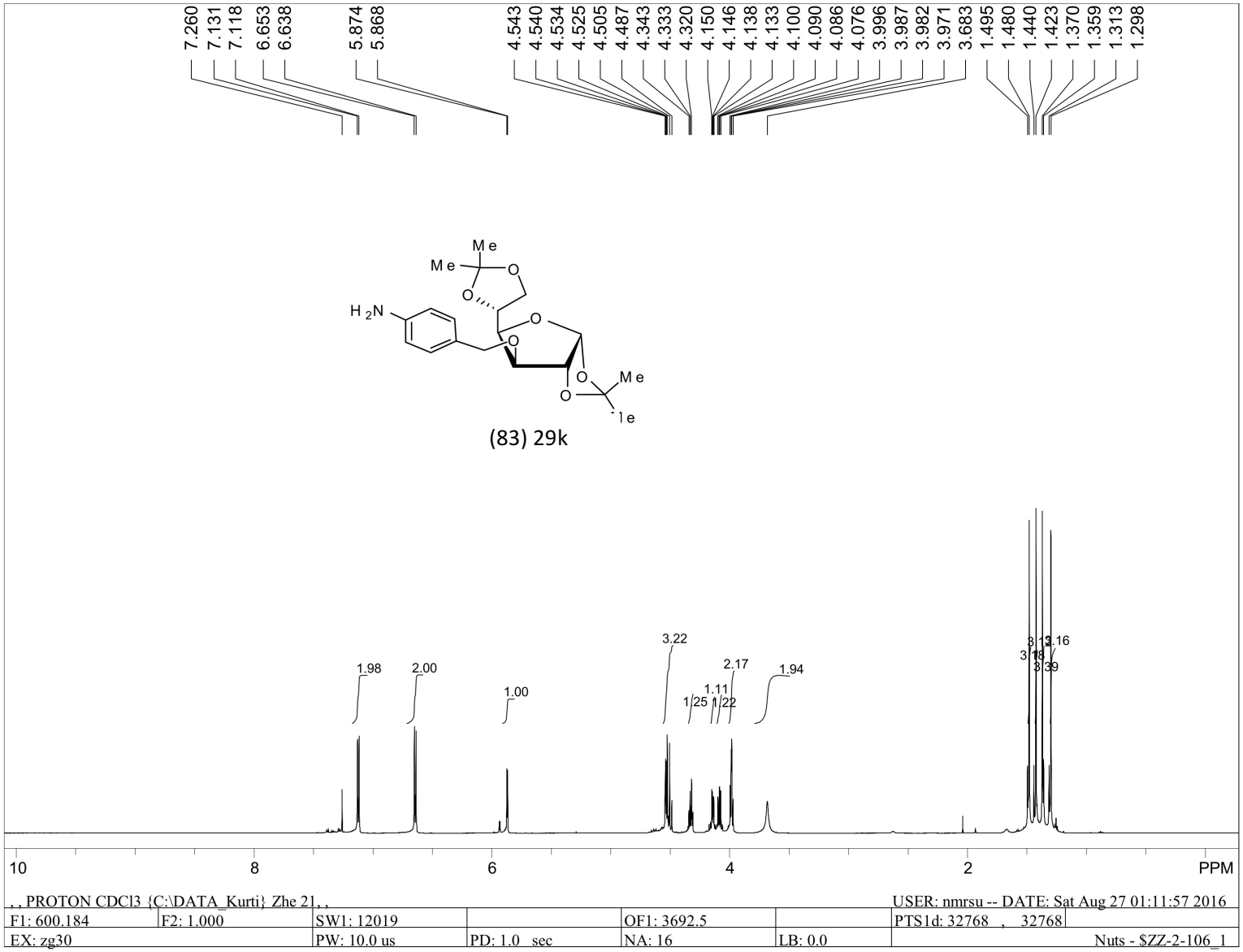

145.600
133.576
132.519
126.562
119.408
112.394
110.965
77.211
77.000
76.789
65.173
64.517
55.468
49.328
46.112
43.655
39.098
34.198
30.756
29.218
27.220
26.206
22.305
14.284
Me O
O
H2N
H
H
H
MeO
(81) 29i
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Zhe 12, ,
USER: nmrsu -- DATE: Mon May 23 16:22:15 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15078.6
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 64
LB: 0.0
Nuts - $ZZ-2-30_2

S285

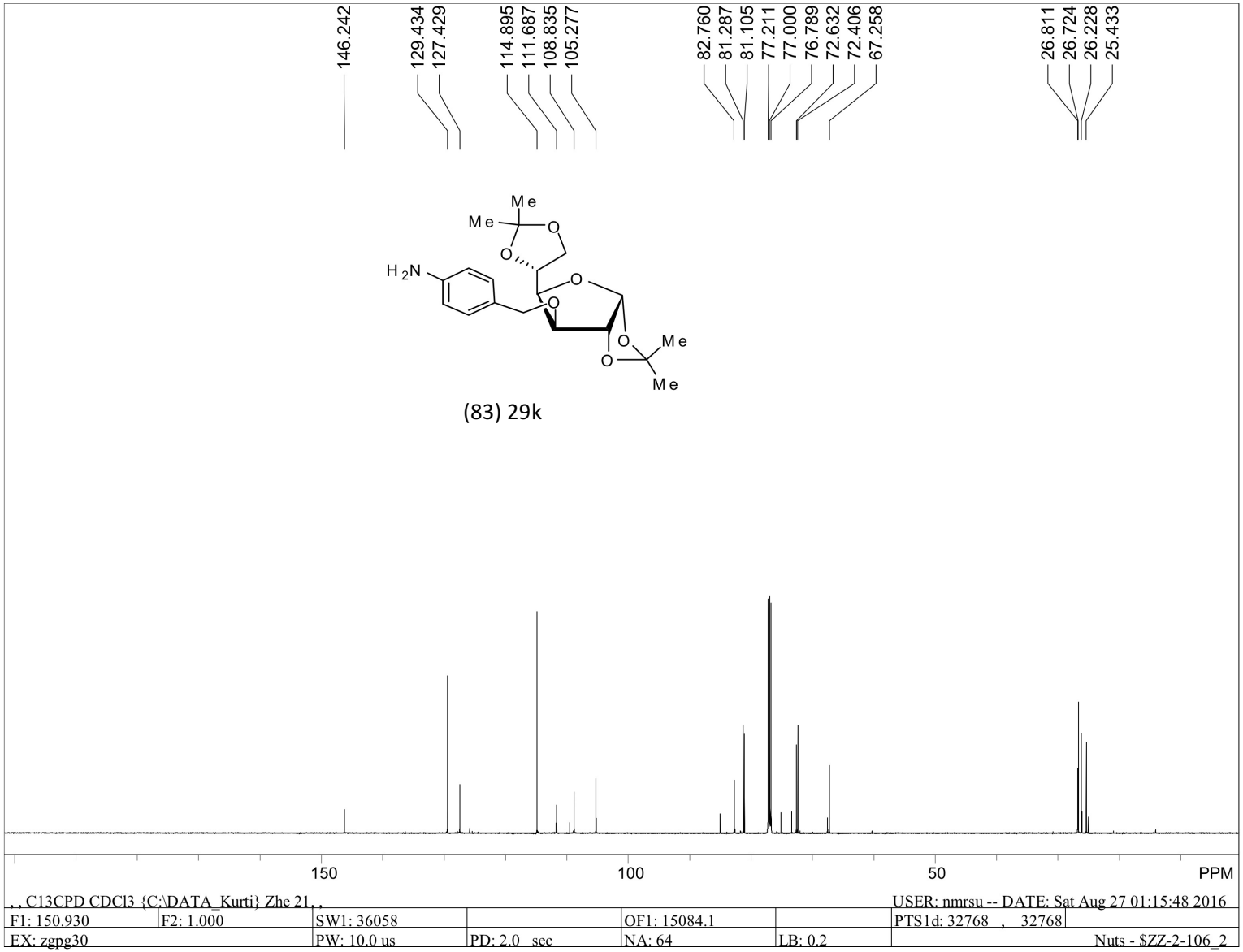

7.260
7.153
7.140
6.656
6.642
4.556
4.538
4.309
4.292
3.644
3.158
3.151
2.303
2.300
2.204
2.184
1.678
1.657
1.643
1.621
1.617
1.380
1.369
1.350
1.308
1.286
1.266
0.969
0.959
0.948
0.934
0.913
0.901
0.881
0.860
0.730
0.718
O
NH2
(82) 29j
9.44
3.01
1.99
1.88
2.10
2.10
0.95
0.89
0.84
0.95
1.00
1.08
1.03
10
8
6
4
2
0
-2
PPM
. , PROTON CDCl3 {C:\DATA_Kurti} Gao 2, ,
USER: nmrsu -- DATE: Fri Aug 26 15:46:22 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.5
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-5-74-1_1


145.637
129.332
128.961
114.866
77.970
77.211
77.000
76.789
70.182
48.191
40.243
34.504
31.449
25.338
23.151
22.291
20.934
15.947
O
NH2
150
100
50
PPM
. , C13CPD CDCl3 {C:\DATA_Kurti} Gao 2, .
USER: nmrsu -- DATE: Fri Aug 26 15:51:00 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15066.5
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 80
LB: 0.2
Nuts - $ghy-5-74-1_2

(82) 29j

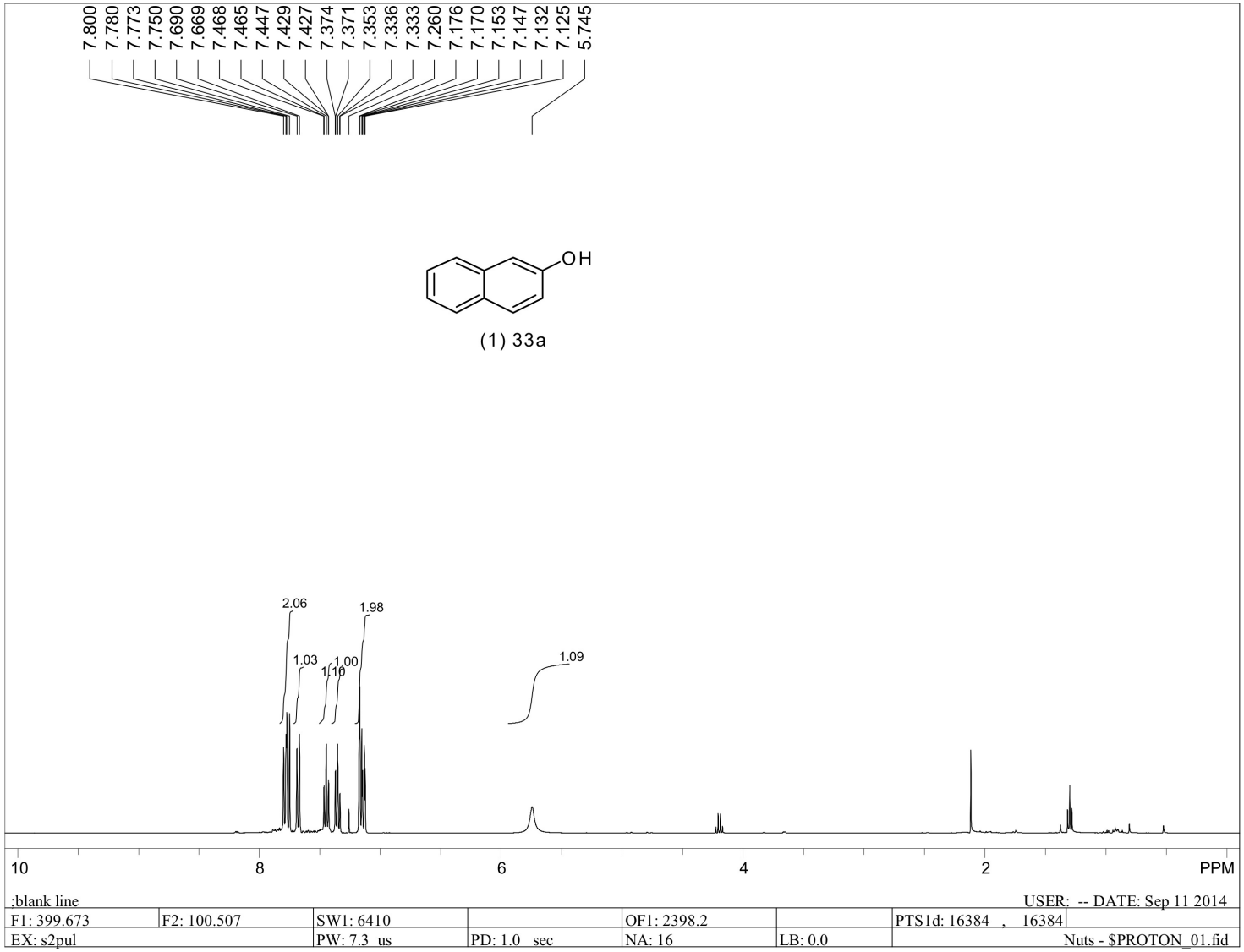

7.260
7.131
7.118
6.653
6.638
5.874
5.868
4.543
4.540
4.534
4.525
4.505
4.487
4.343
4.333
4.320
4.150
4.146
4.138
4.133
4.100
4.090
4.086
4.076
3.996
3.987
3.982
3.971
3.683
1.495
1.480
1.440
1.423
1.370
1.359
1.313
1.298
Me
Me
O
O
H2N
O
O
O
Me
O
Me
1.98
2.00
1.00
3.22
1.25
1.11
1.22
2.17
1.94
3.16
3.39
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 21, ,
USER: nmrsu -- DATE: Sat Aug 27 01:11:57 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.5
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $ZZ-2-106_1

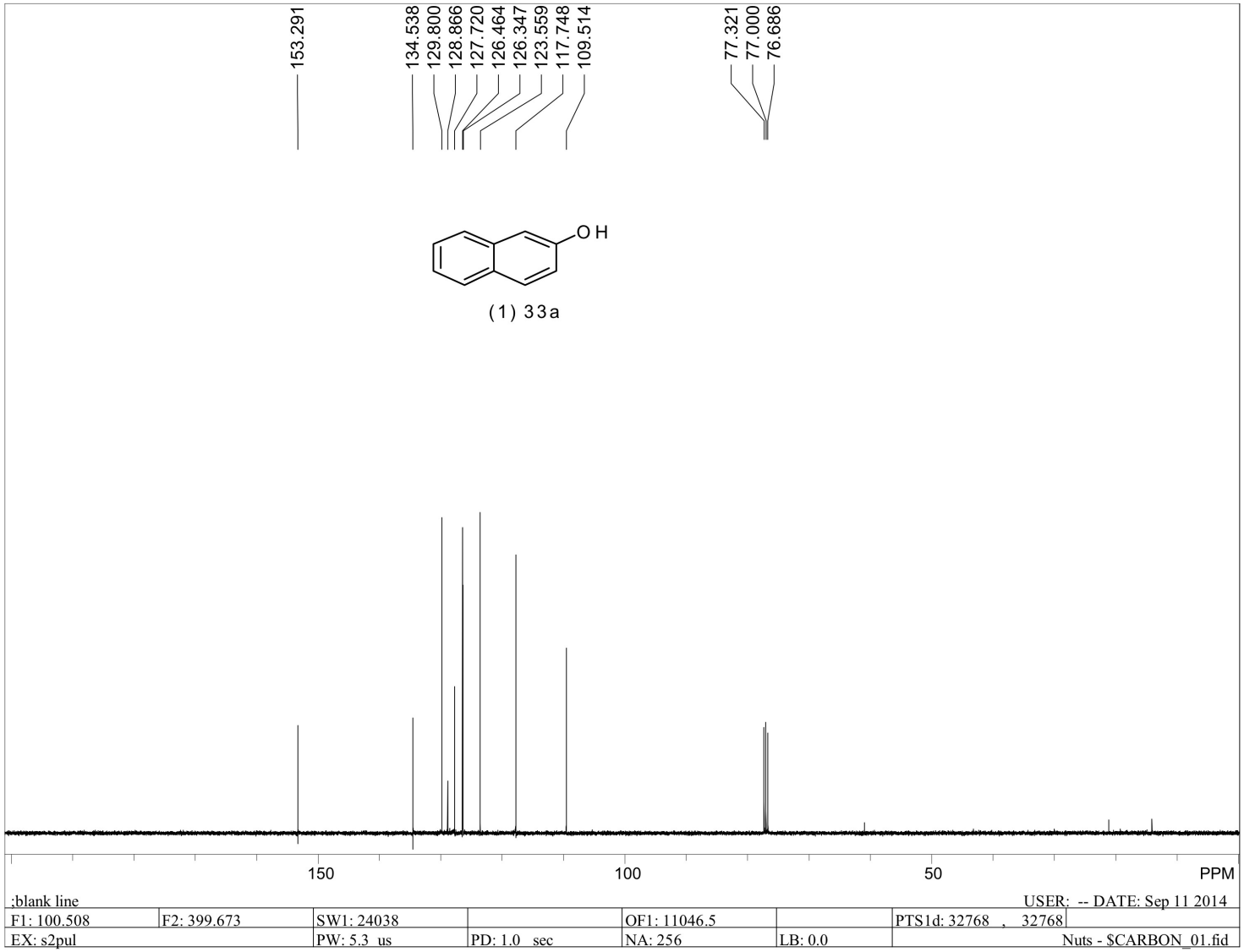
(83) 29k

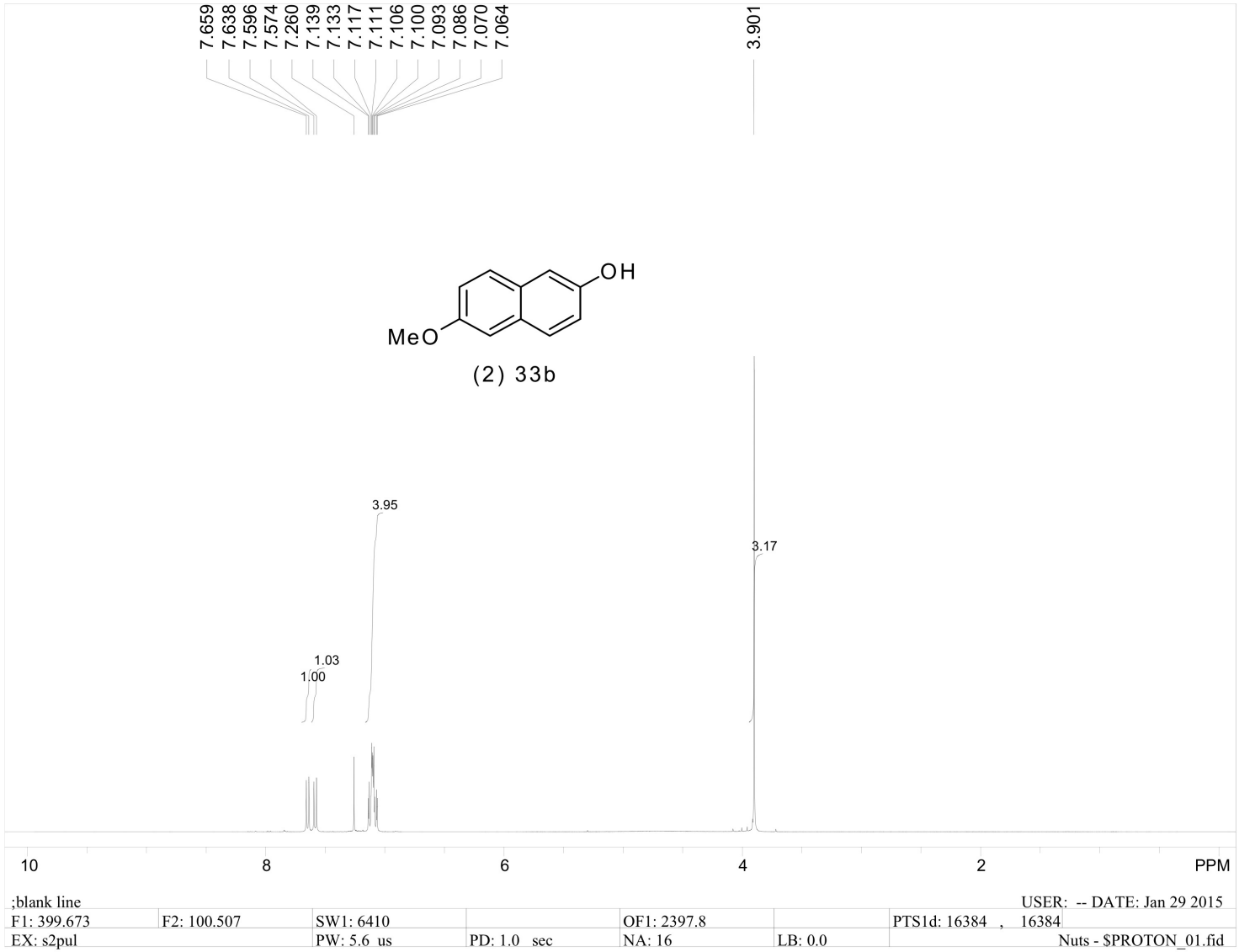

146.242
129.434
127.429
114.895
111.687
108.835
105.277
82.760
81.287
81.105
77.211
77.000
76.789
72.632
72.406
67.258
26.811
26.724
26.228
25.433
Me
Me
O
O
O
O
O
O
Me
O
Me
H2N
150
100
50
PPM
. , C13CPD CDCl3 {C:\DATA_Kurti} Zhe 21 , ,
USER: nmrsu -- DATE: Sat Aug 27 01:15:48 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15084.1
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 64
LB: 0.2
Nuts - $ZZ-2-106_2

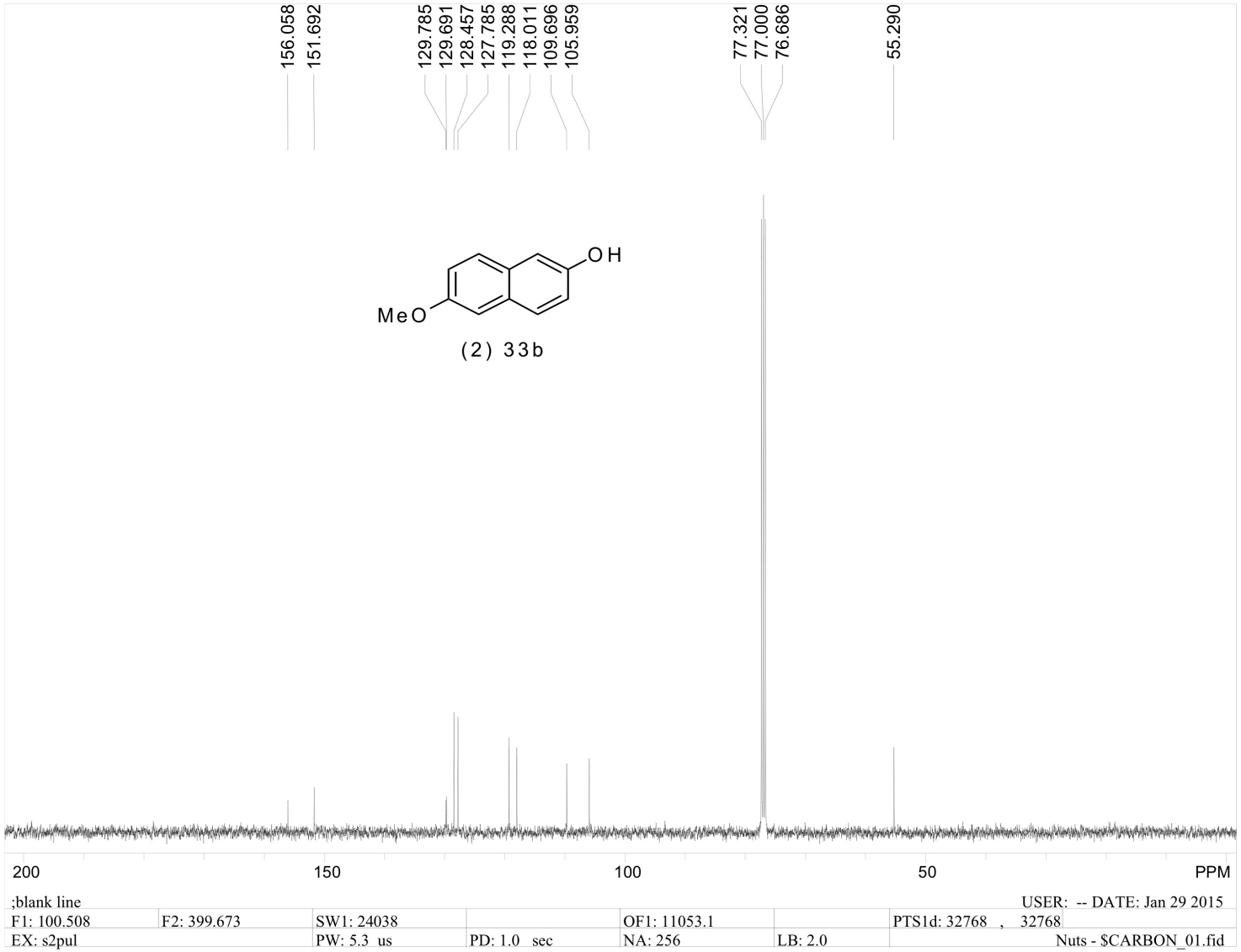
(83) 29k

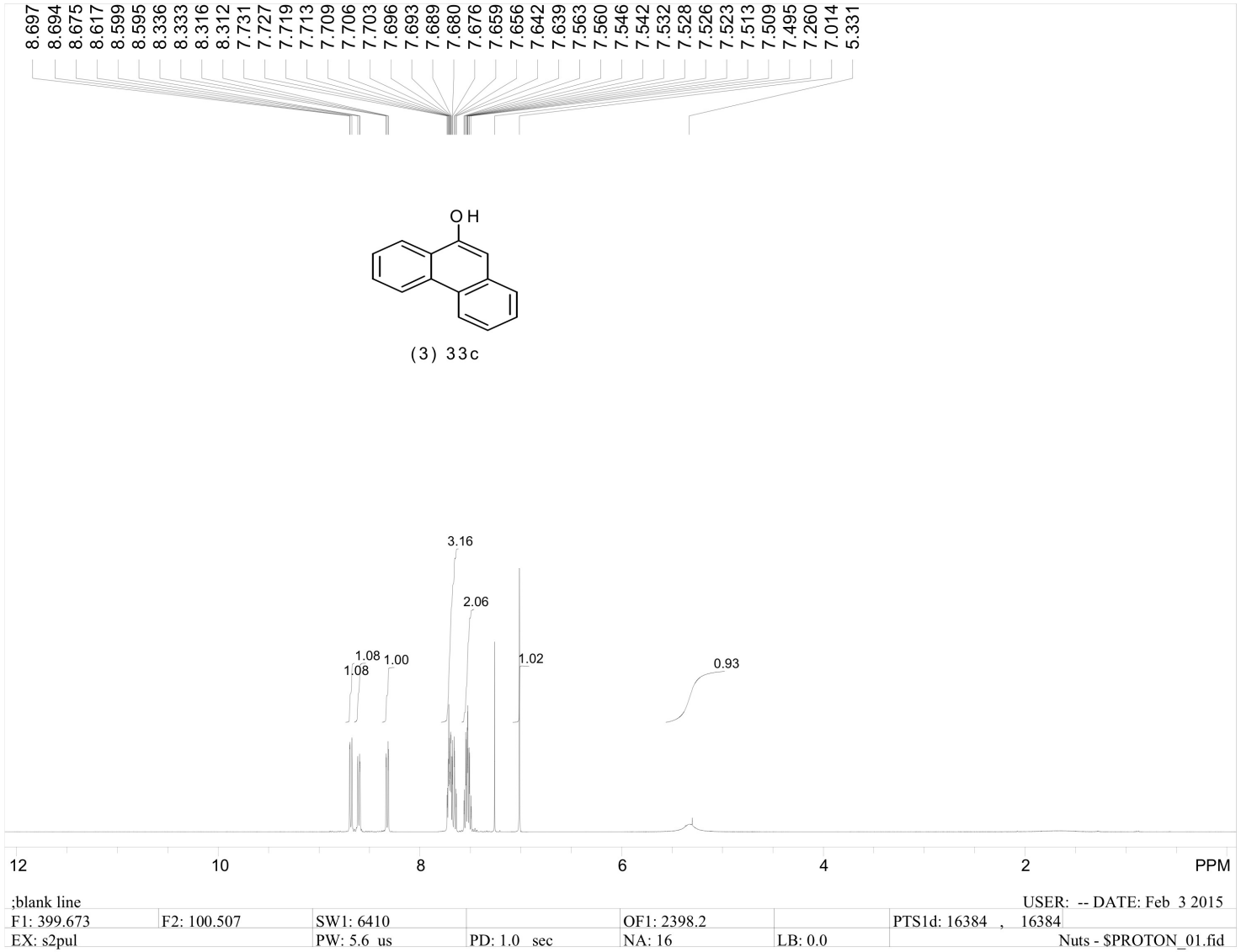
NMR Spectra of Phenols

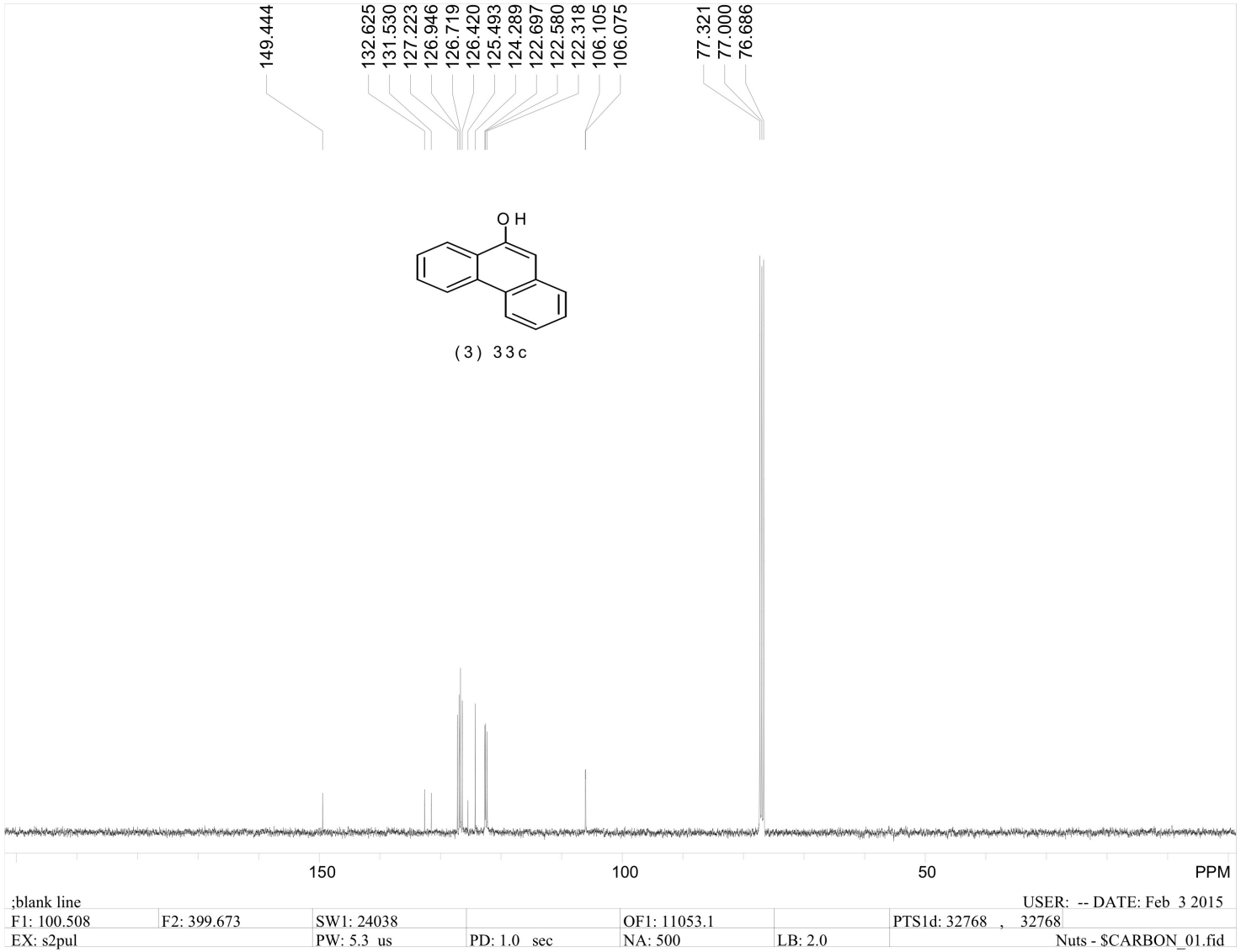

7.800
7.780
7.773
7.750
7.690
7.669
7.468
7.465
7.447
7.429
7.427
7.374
7.371
7.353
7.336
7.333
7.260
7.176
7.170
7.153
7.147
7.132
7.125
5.745
OH
(1) 33a
2.06
1.98
1.03
1.00
1.10
1.09
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Sep 11 2014
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.2
PTS1d: 16384 , 16384
EX: s2pul
PW: 7.3 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

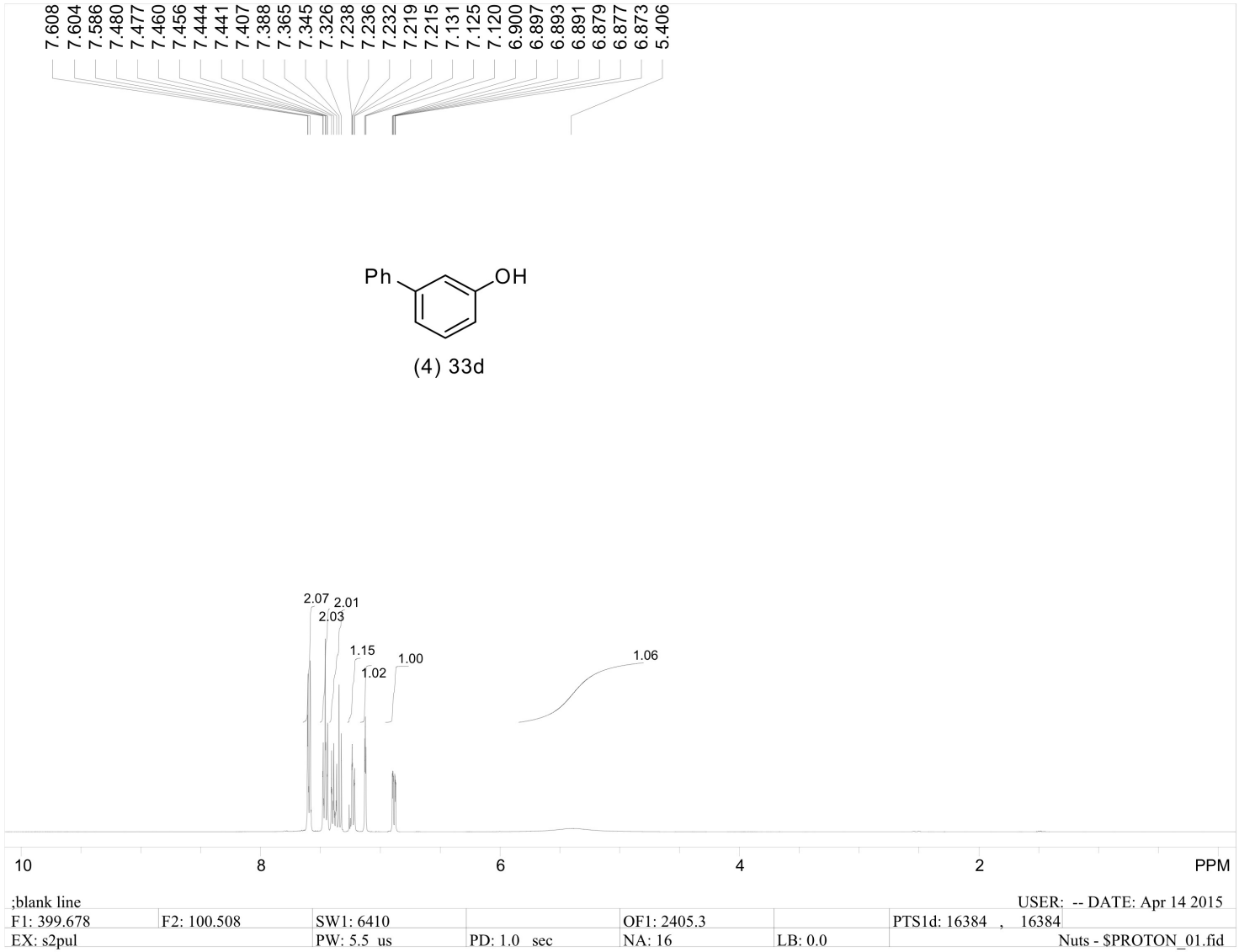

153.291
134.538
129.800
128.866
127.720
126.464
126.347
123.559
117.748
109.514
77.321
77.000
76.686
OH
(1) 33a
150
100
50
PPM
;blank line
USER: -- DATE: Sep 11 2014
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11046.5
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 0.0
Nuts - $CARBON_01.fid

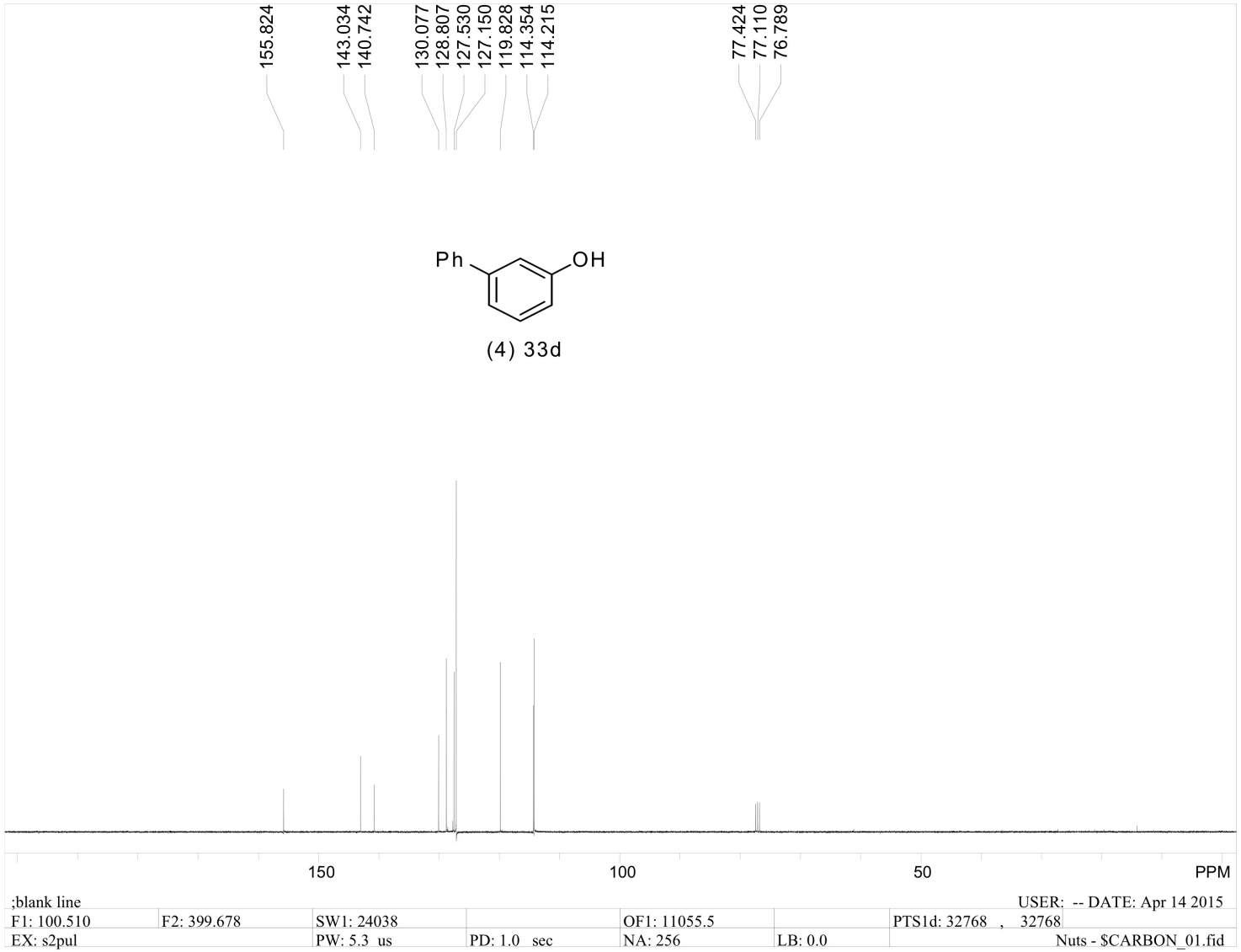

7.659
7.638
7.596
7.574
7.260
7.139
7.133
7.117
7.111
7.106
7.100
7.093
7.086
7.070
7.064
3.901
OH
MeO
(2) 33b
3.95
3.17
1.03
1.00
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Jan 29 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2397.8
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.6 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

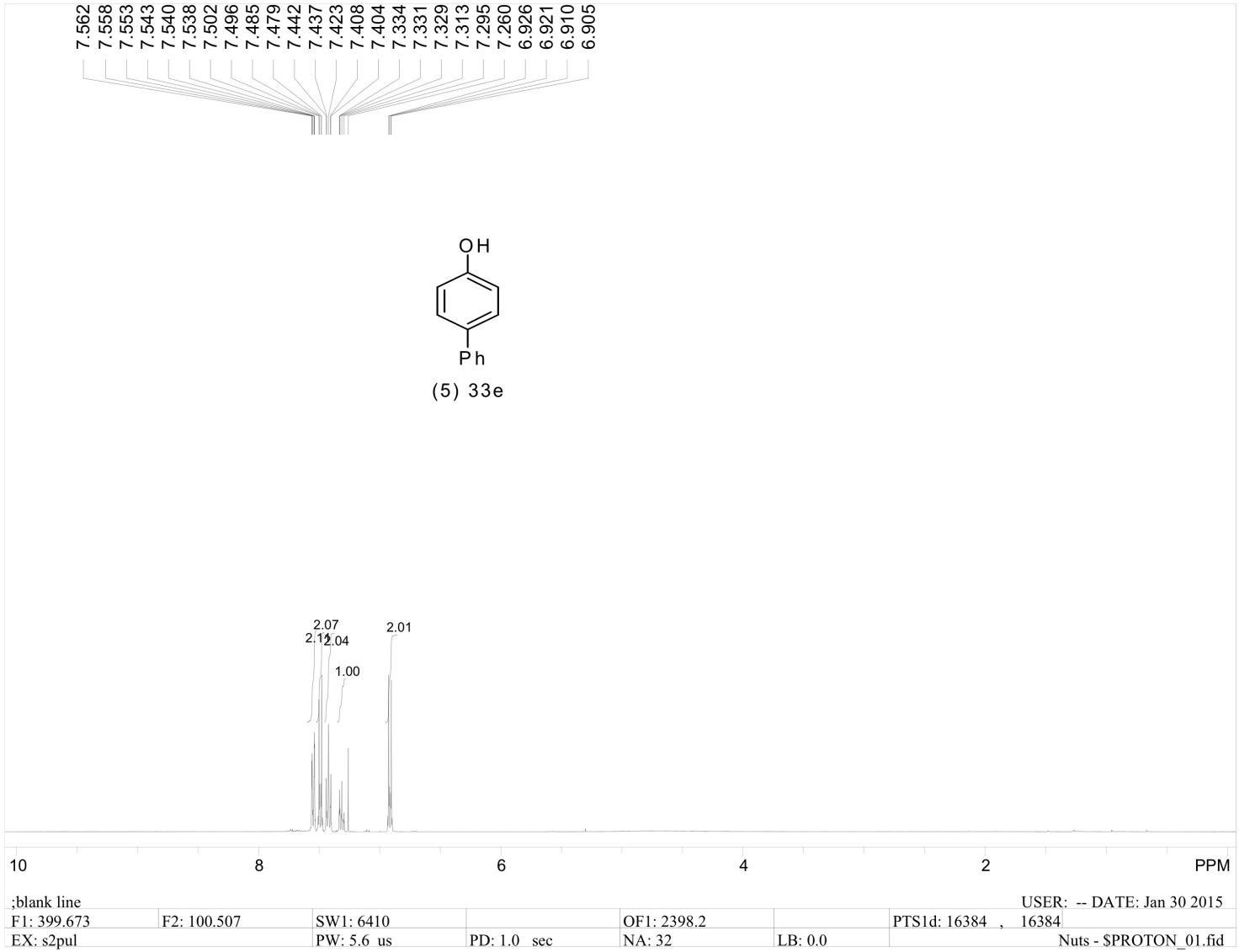

156.058
151.692
129.785
129.691
128.457
127.785
119.288
118.011
109.696
105.959
77.321
77.000
76.686
55.290
OH
MeO
(2) 33b
200
150
100
50
PPM
;blank line
USER: -- DATE: Jan 29 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11053.1
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 2.0
Nuts - $CARBON_01.fid

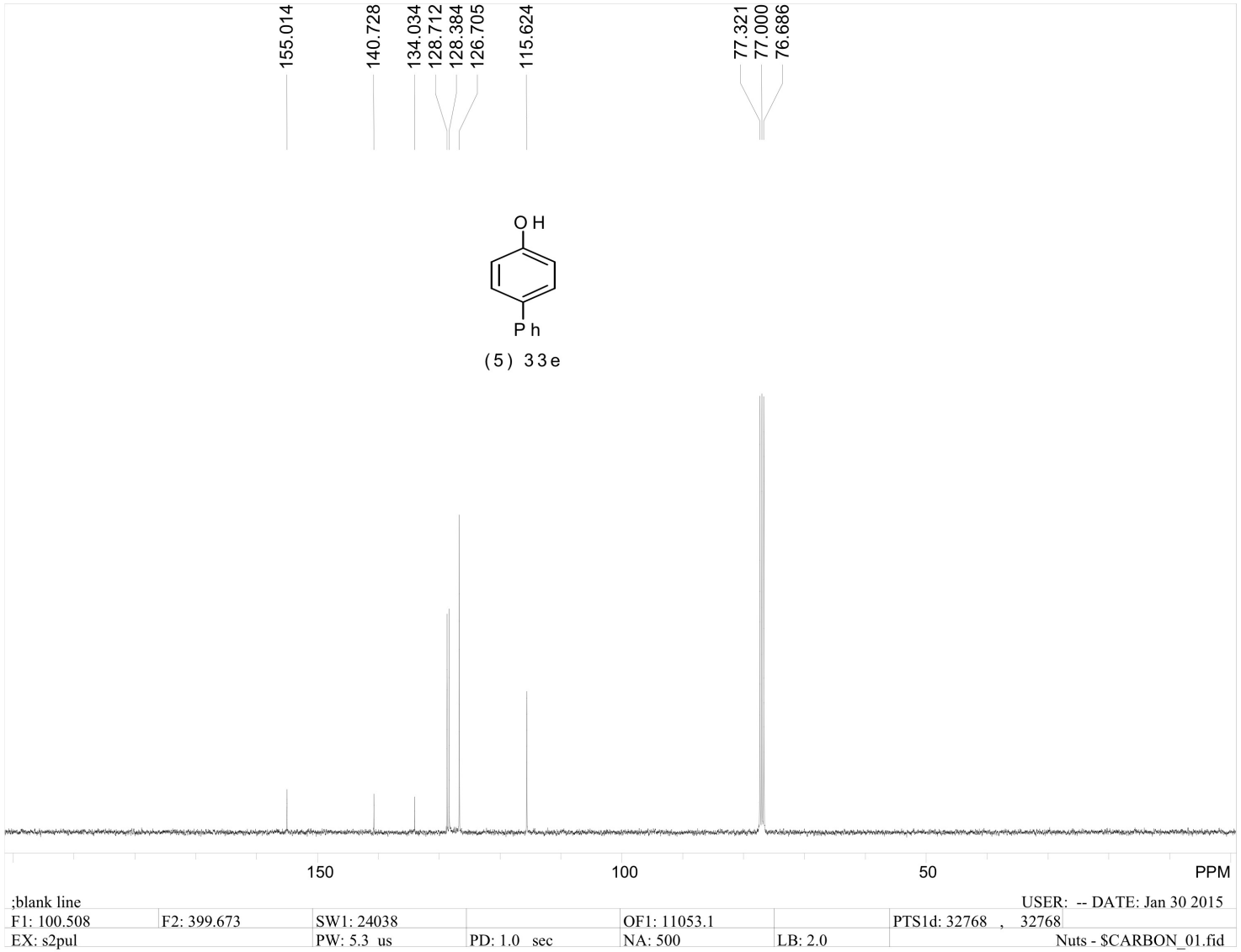

8.697
8.694
8.675
8.617
8.599
8.595
8.336
8.333
8.316
8.312
7.731
7.727
7.719
7.713
7.709
7.706
7.703
7.696
7.693
7.689
7.680
7.676
7.659
7.656
7.642
7.639
7.563
7.560
7.546
7.542
7.532
7.528
7.526
7.523
7.513
7.509
7.495
7.260
7.014
5.331
OH
(3) 33c
3.16
2.06
1.08
1.08
1.00
1.02
0.93
12
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Feb 3 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.2
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.6 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

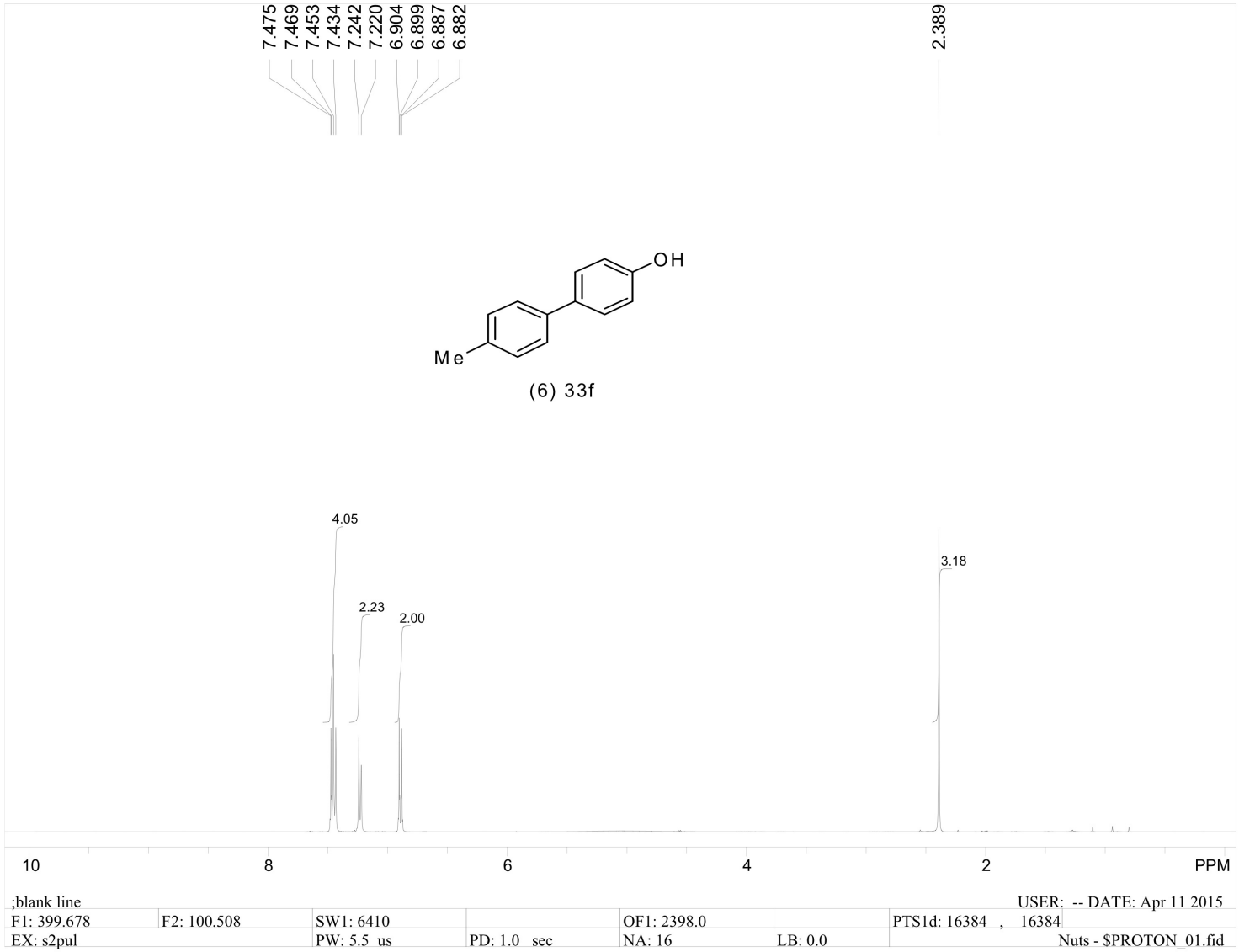

149.444
132.625
131.530
127.223
126.946
126.719
126.420
125.493
124.289
122.697
122.580
122.318
106.105
106.075
77.321
77.000
76.686
OH
(3) 33c
150
100
50
PPM
;blank line
USER: -- DATE: Feb 3 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11053.1
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 500
LB: 2.0
Nuts - $CARBON_01.fid

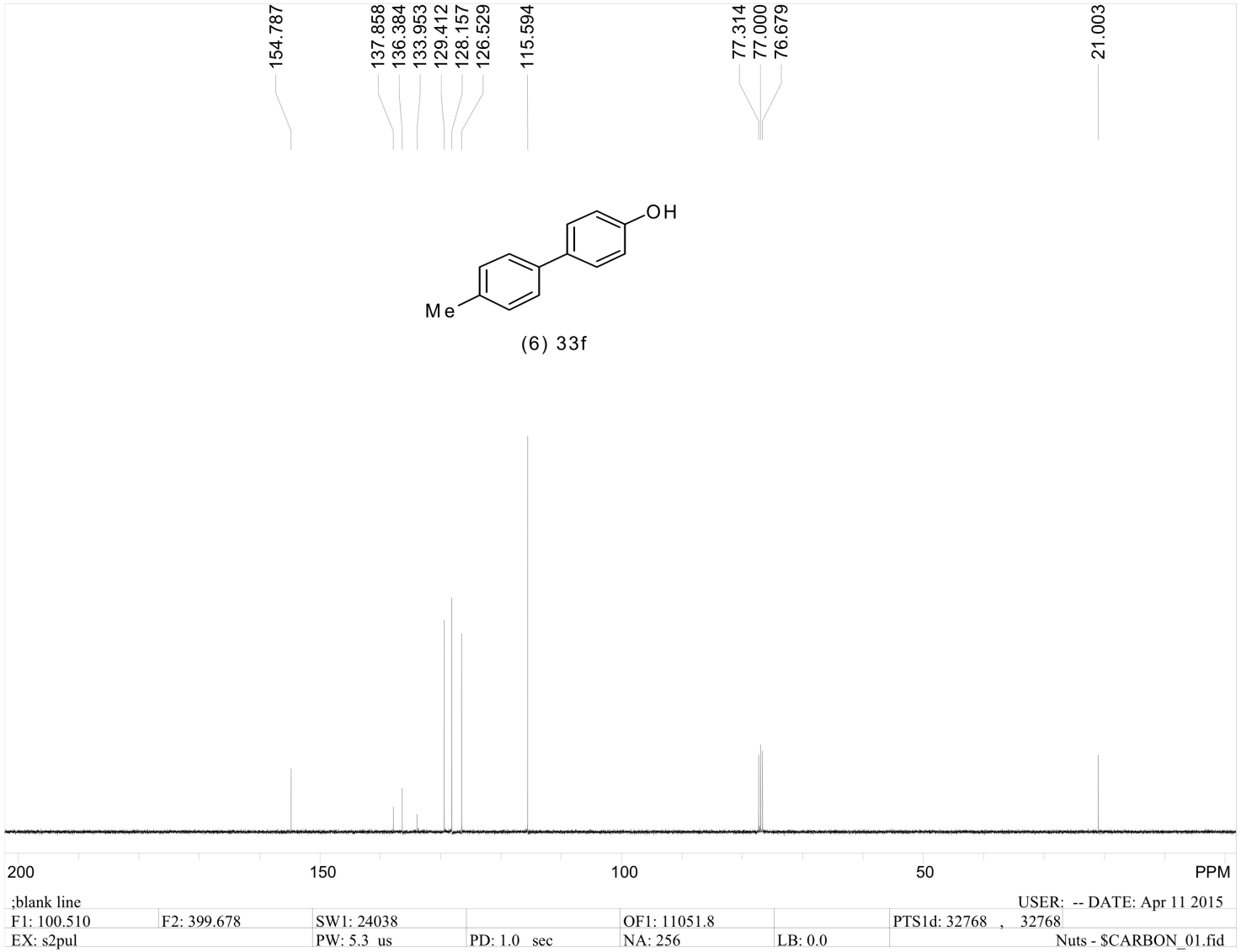

7.608
7.604
7.586
7.480
7.477
7.460
7.456
7.444
7.441
7.407
7.388
7.365
7.345
7.326
7.238
7.236
7.232
7.219
7.215
7.131
7.125
7.120
6.900
6.897
6.893
6.891
6.879
6.877
6.873
5.406
Ph
OH
(4) 33d
2.07
2.03
2.01
1.15
1.02
1.00
1.06
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Apr 14 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2405.3
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

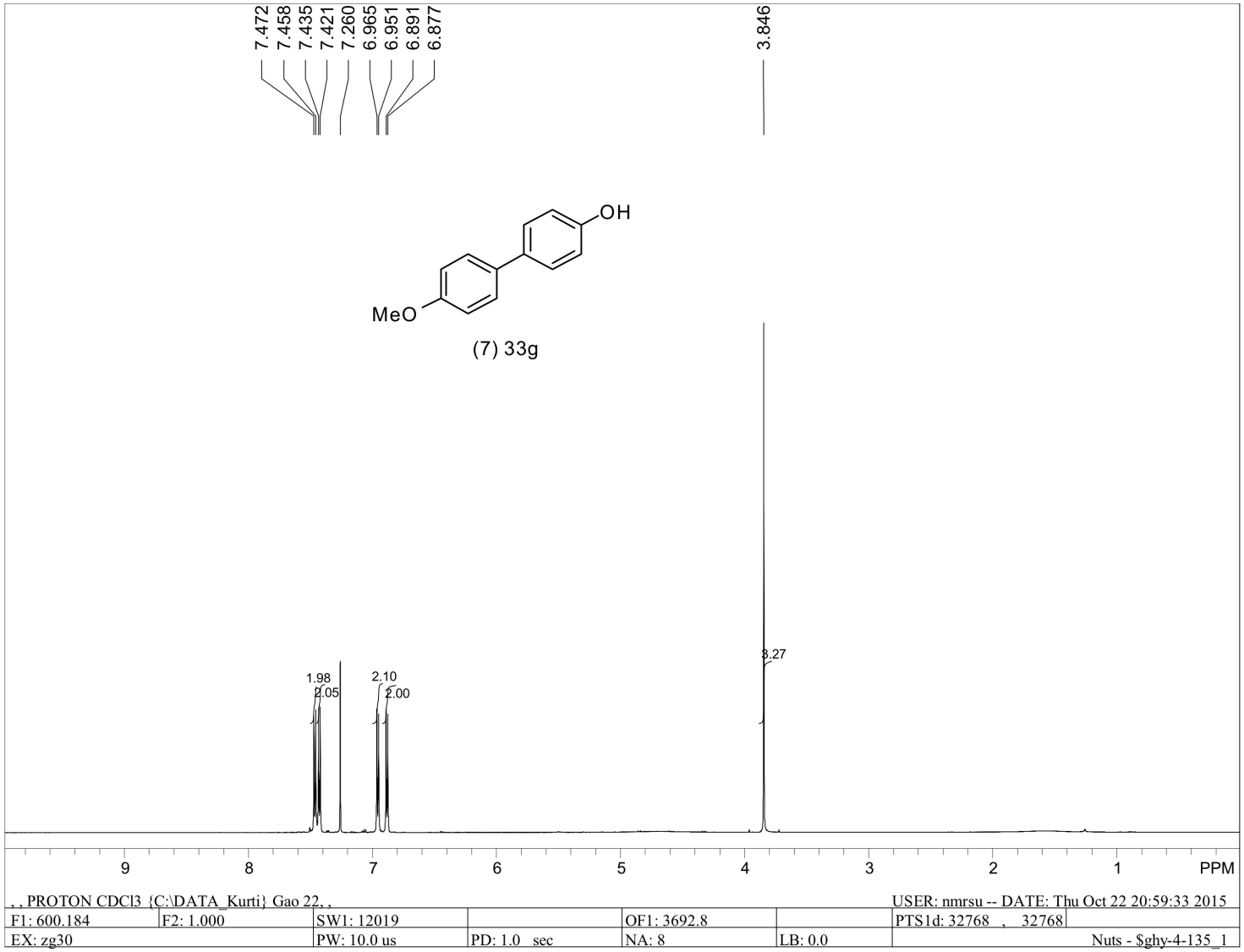

155.824
143.034
140.742
130.077
128.807
127.530
127.150
119.828
114.354
114.215
77.424
77.110
76.789
Ph
OH
(4) 33d
150
100
50
PPM
;blank line
USER: -- DATE: Apr 14 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11055.5
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 0.0
Nuts - $CARBON_01.fid

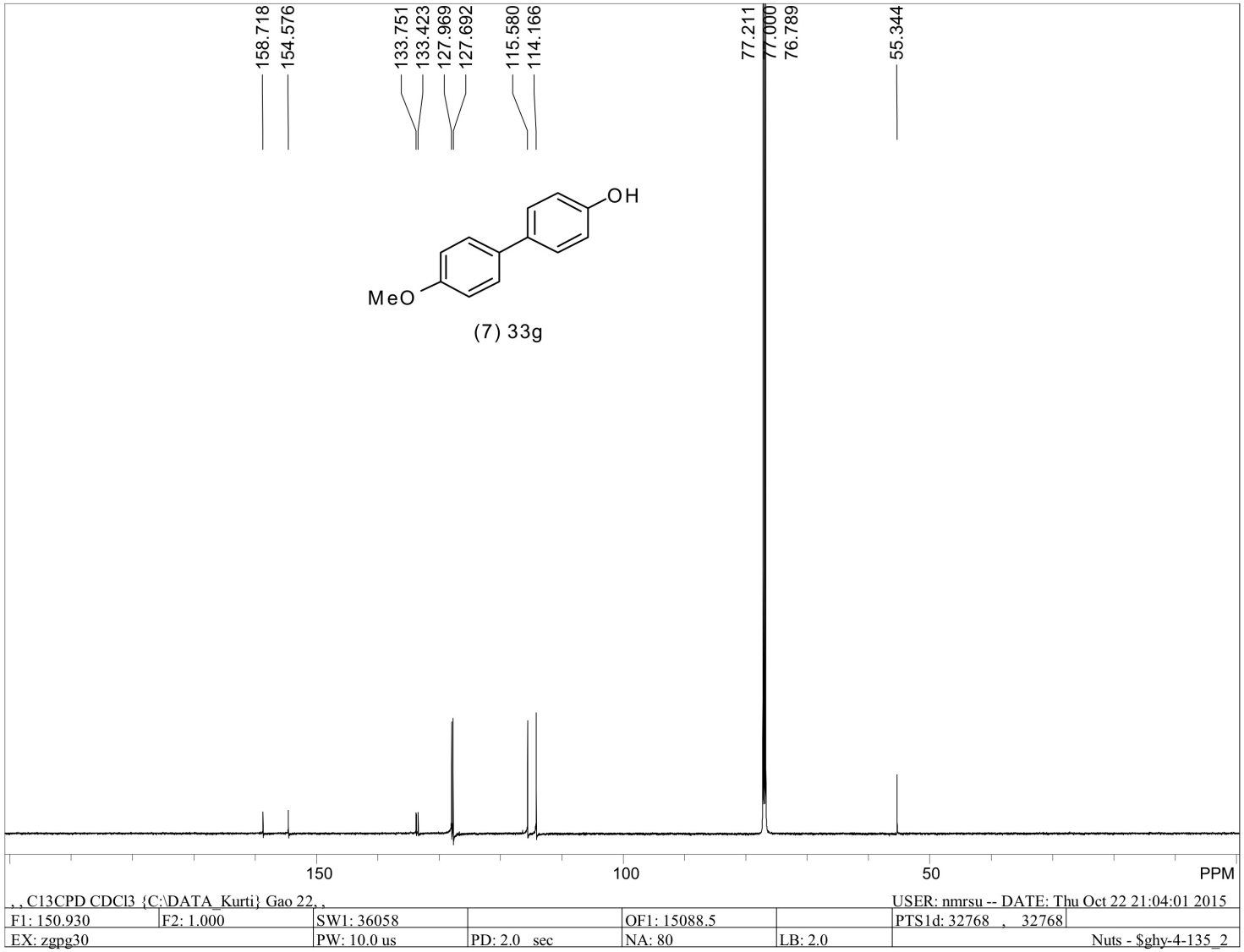

7.562
7.558
7.553
7.543
7.540
7.538
7.502
7.496
7.485
7.479
7.442
7.437
7.423
7.408
7.404
7.334
7.331
7.329
7.313
7.295
7.260
6.926
6.921
6.910
6.905
OH
Ph
(5) 33e
2.07
2.11
2.04
1.00
2.01
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Jan 30 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.2
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.6 us
PD: 1.0 sec
NA: 32
LB: 0.0
Nuts - $PROTON_01.fid

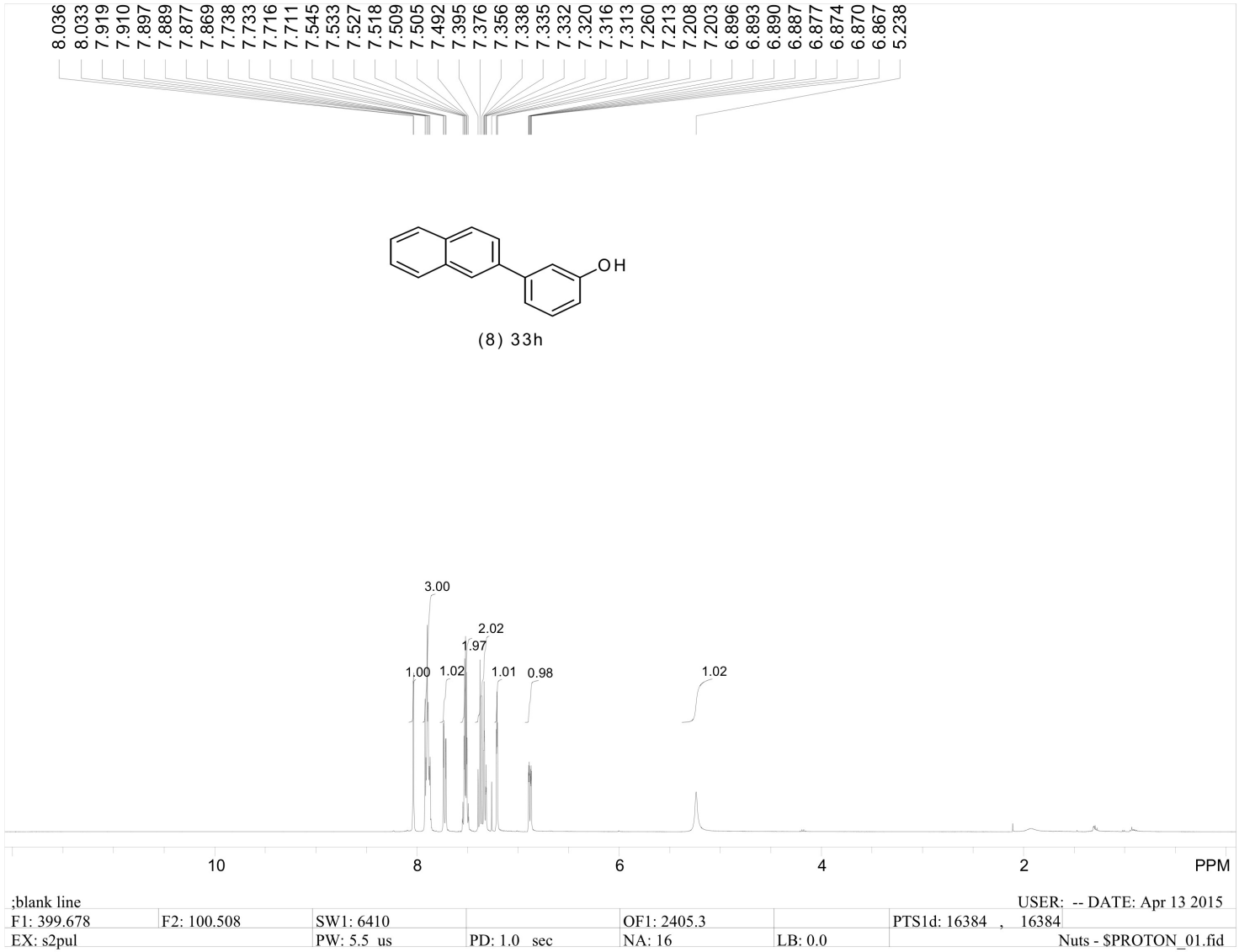

155.014
140.728
134.034
128.712
128.384
126.705
115.624
77.321
77.000
76.686
OH
Ph
(5) 33e
150
100
50
PPM
;blank line
USER: -- DATE: Jan 30 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11053.1
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 500
LB: 2.0
Nuts - $CARBON_01.fid

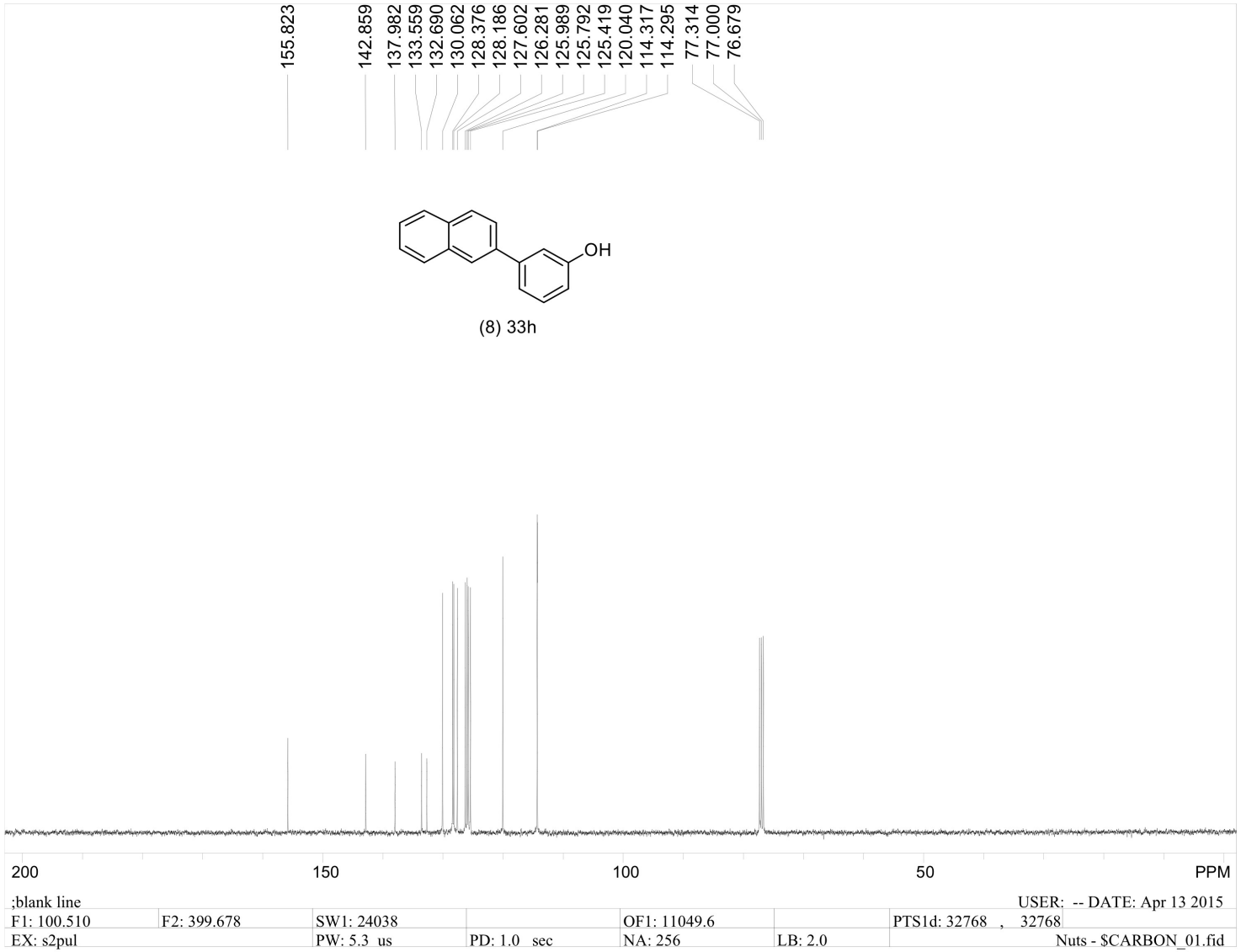

7.475
7.469
7.453
7.434
7.242
7.220
6.904
6.899
6.887
6.882
2.389
OH
Me
(6) 33f
4.05
2.23
2.00
3.18
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Apr 11 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2398.0
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

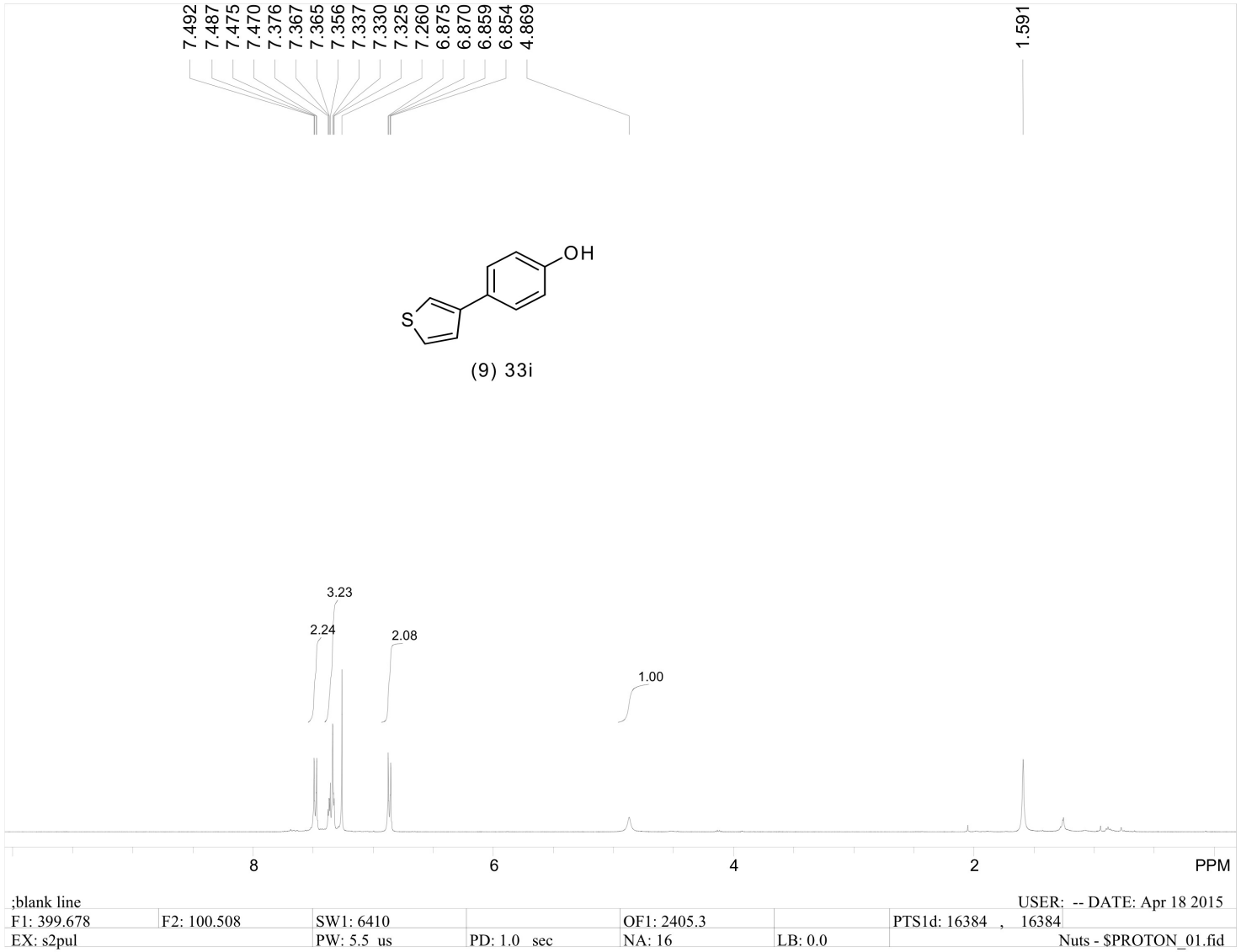

154.787
137.858
136.384
133.953
129.412
128.157
126.529
115.594
77.314
77.000
76.679
21.003
OH
Me
(6) 33f
200
150
100
50
PPM
;blank line
USER: -- DATE: Apr 11 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11051.8
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 0.0
Nuts - $CARBON_01.fid

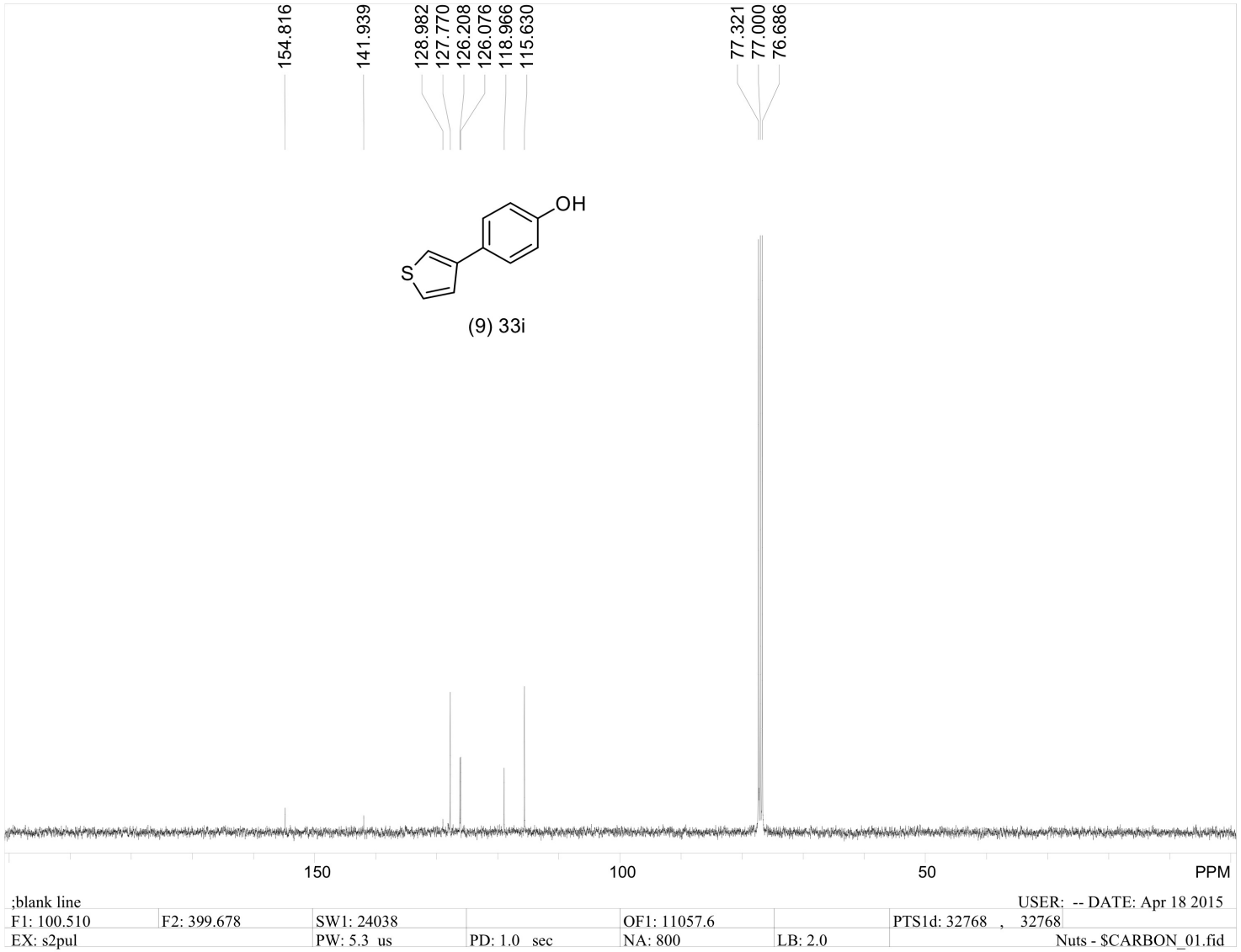

7.472
7.458
7.435
7.421
7.260
6.965
6.951
6.891
6.877
3.846
OH
MeO
(7) 33g
1.98
2.05
2.10
2.00
3.27
9
8
7
6
5
4
3
2
1
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 22, ,
USER: nmrsu -- DATE: Thu Oct 22 20:59:33 2015
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-135_1

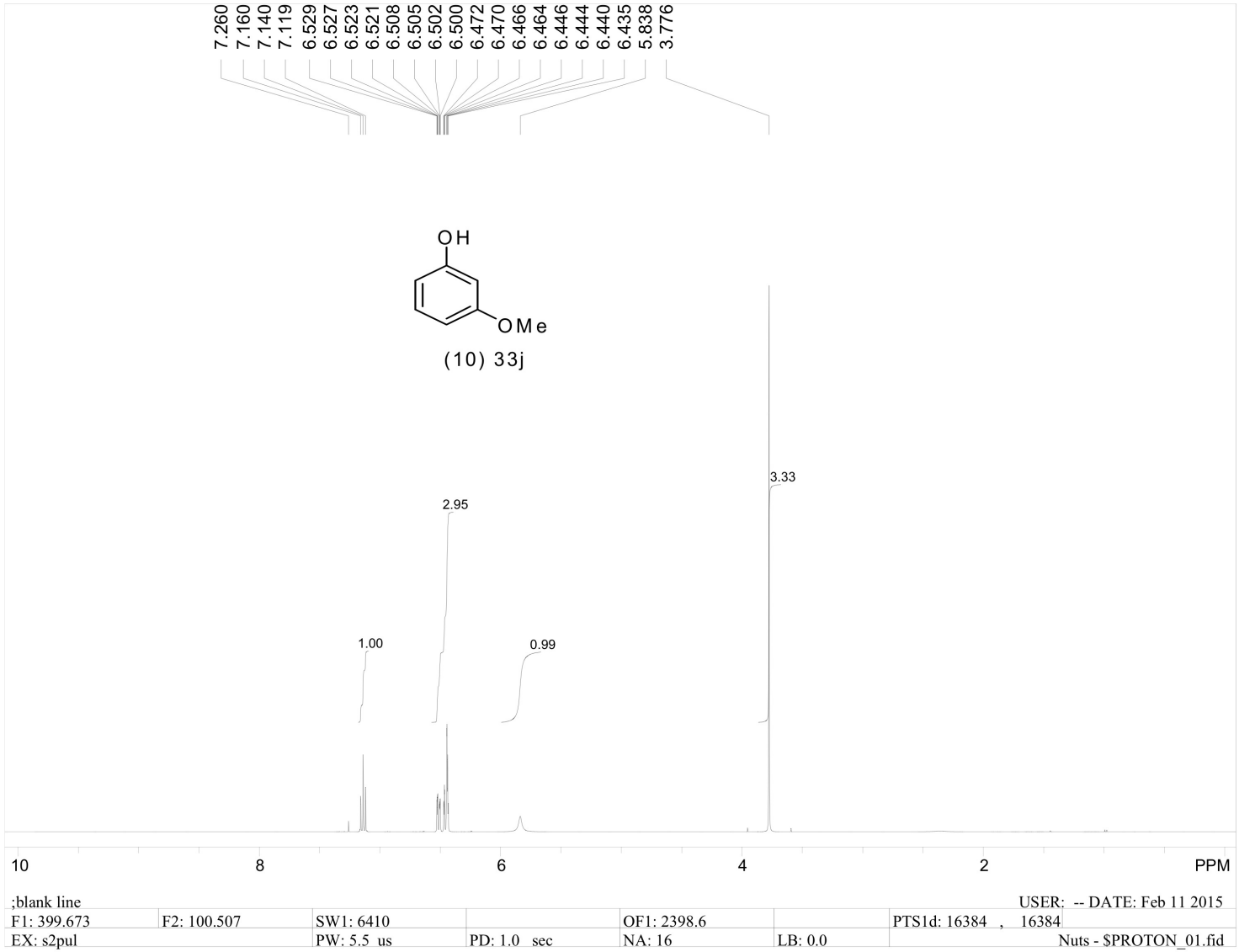

158.718
154.576
133.751
133.423
127.969
127.692
115.580
114.166
77.211
77.000
76.789
55.344
OH
MeO
(7) 33g
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 22, ,
USER: nmrsu -- DATE: Thu Oct 22 21:04:01 2015
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15088.5
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 80
LB: 2.0
Nuts - $ghy-4-135_2

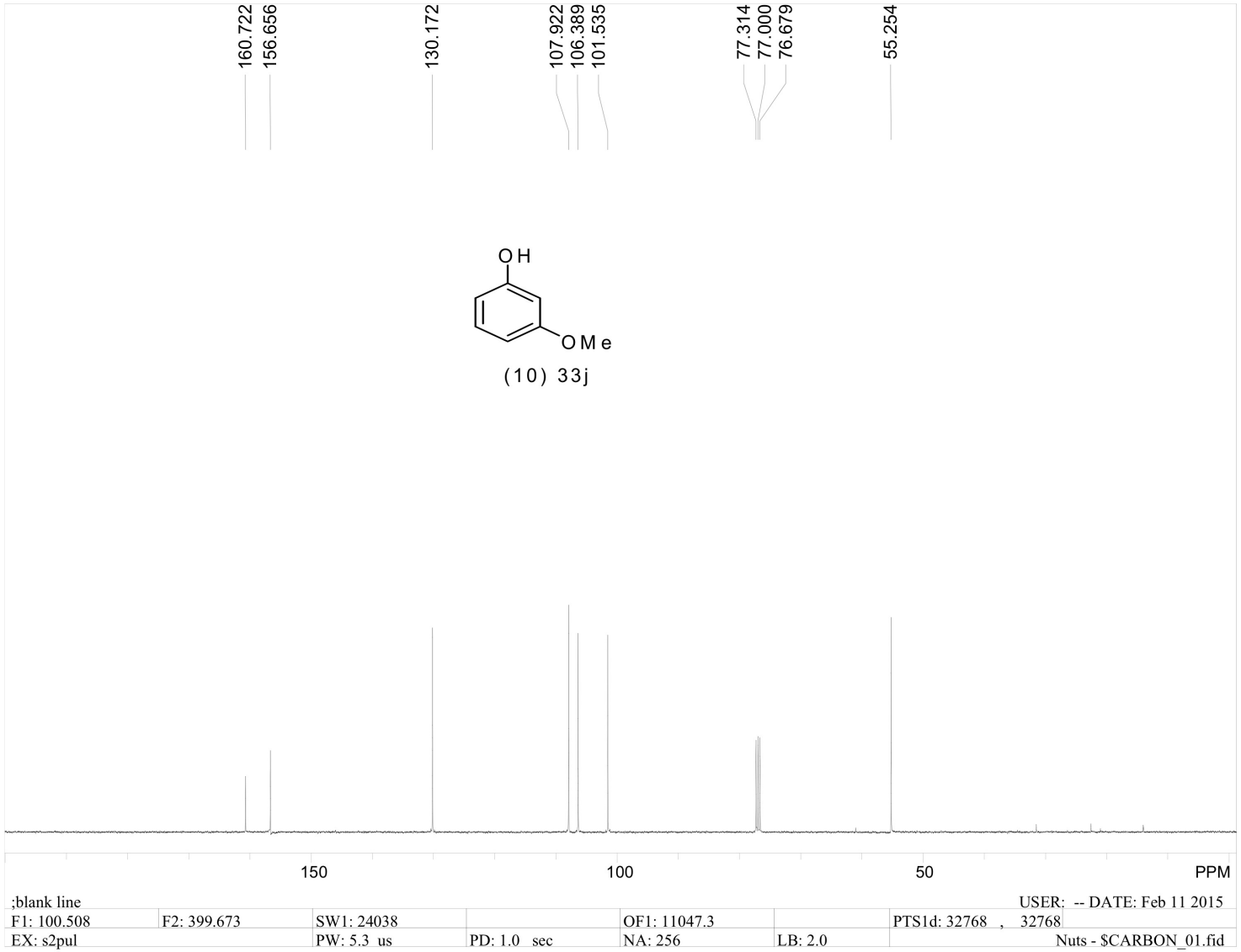

8.036
8.033
7.919
7.910
7.897
7.889
7.877
7.869
7.738
7.733
7.716
7.711
7.545
7.533
7.527
7.518
7.509
7.505
7.492
7.395
7.376
7.356
7.338
7.335
7.332
7.320
7.316
7.313
7.260
7.213
7.208
7.203
6.896
6.893
6.890
6.887
6.877
6.874
6.870
6.867
5.238
OH
(8) 33h
3.00
2.02
1.97
1.00
1.02
1.01
0.98
1.02
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Apr 13 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2405.3
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

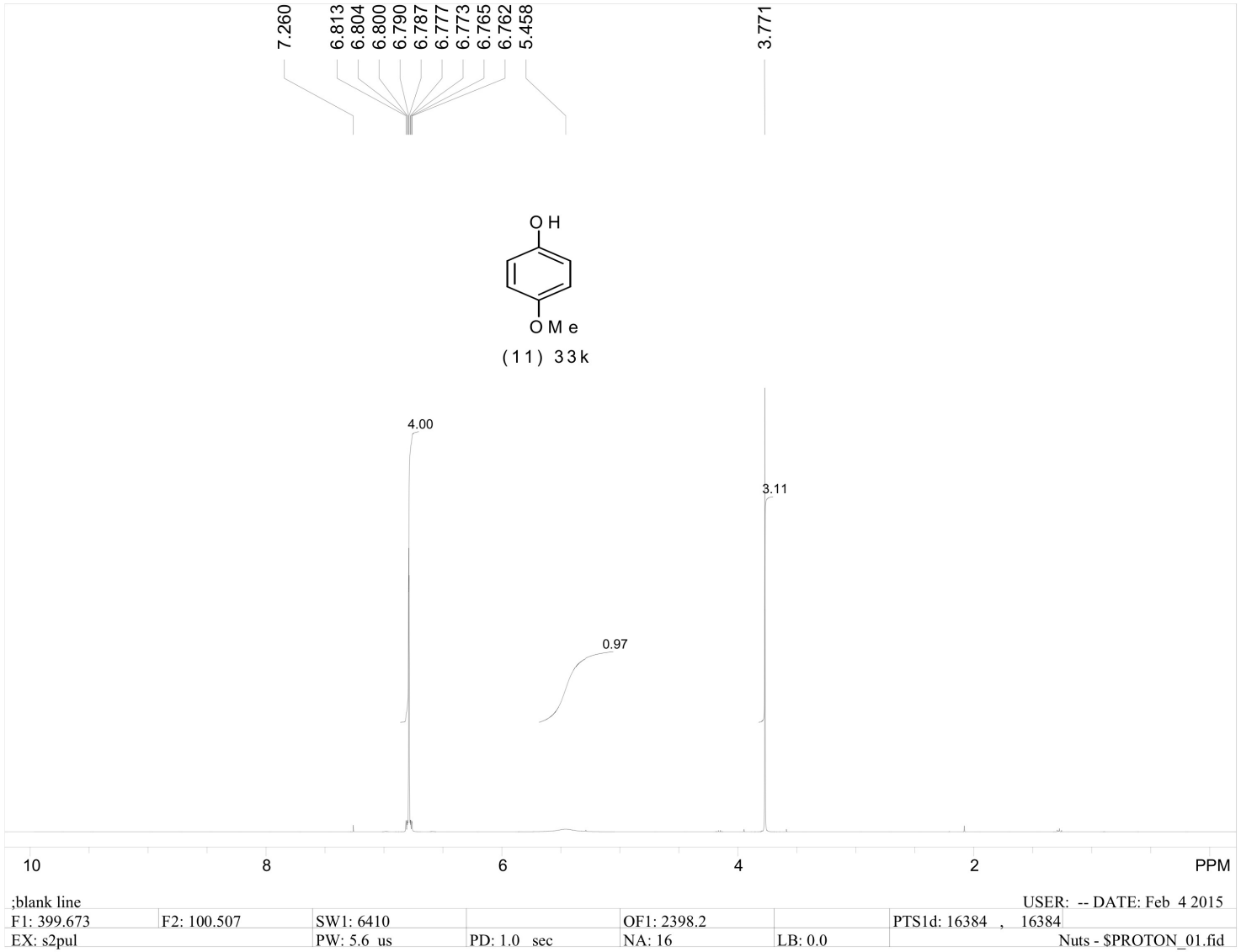

155.823
142.859
137.982
133.559
132.690
130.062
128.376
128.186
127.602
126.281
125.989
125.792
125.419
120.040
114.317
114.295
77.314
77.000
76.679
OH
(8) 33h
200
150
100
50
PPM
;blank line
USER: -- DATE: Apr 13 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11049.6
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 2.0
Nuts - $CARBON_01.fid

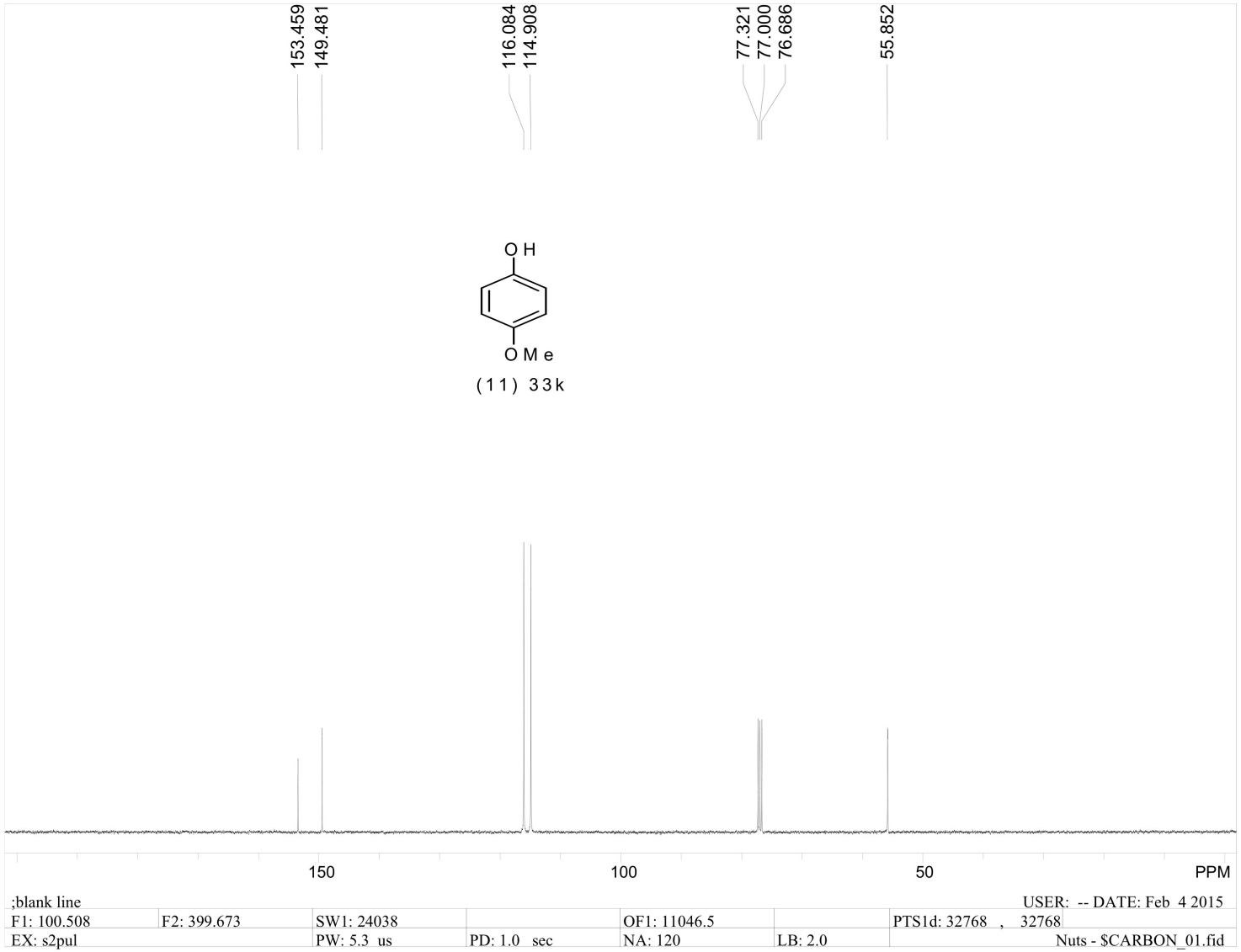

7.492
7.487
7.475
7.470
7.376
7.367
7.365
7.356
7.337
7.330
7.325
7.260
6.875
6.870
6.859
6.854
4.869
1.591
OH
S
(9) 33i
3.23
2.24
2.08
1.00
8
6
4
2
PPM
;blank line
USER: -- DATE: Apr 18 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2405.3
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

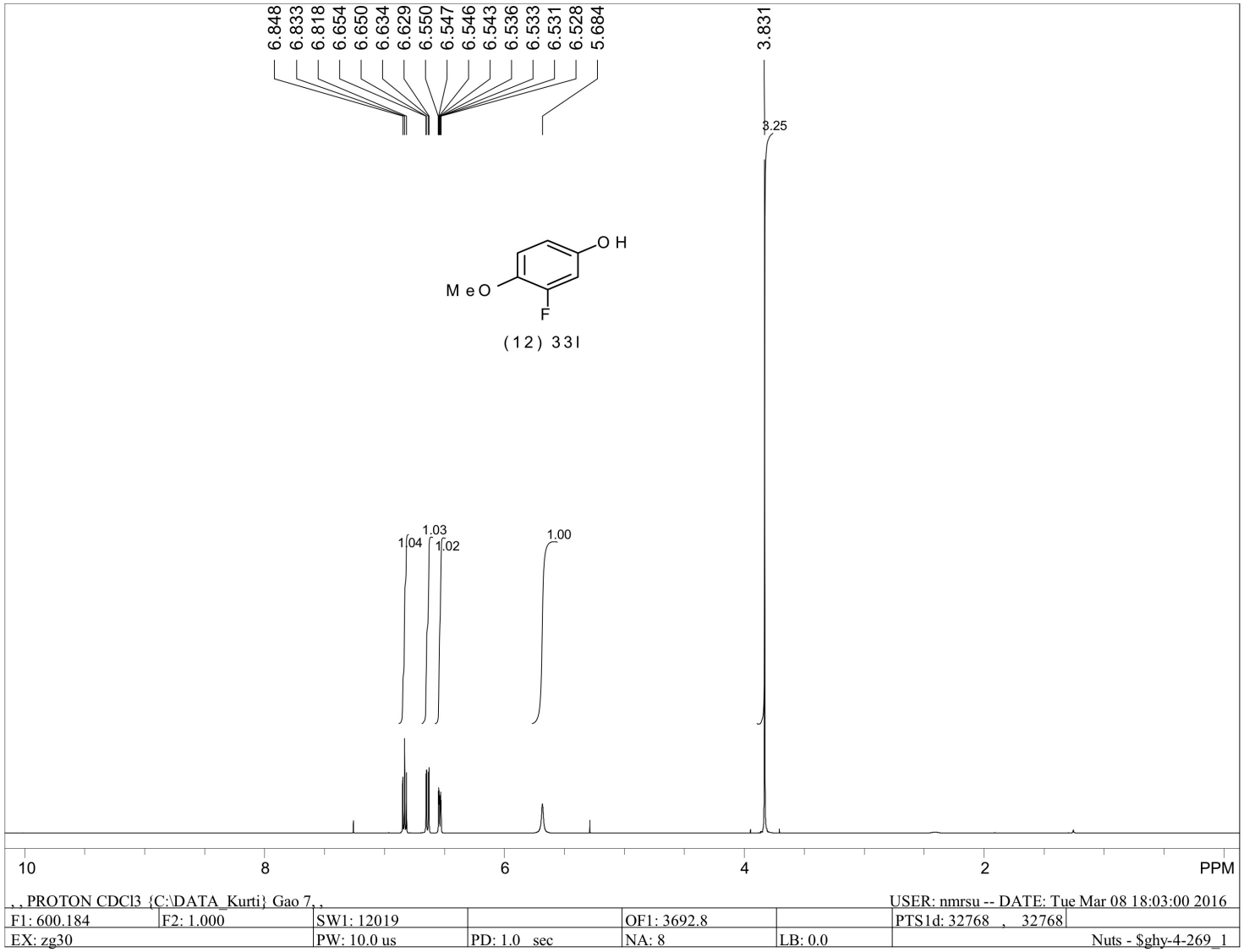

154.816
141.939
128.982
127.770
126.208
126.076
118.966
115.630
77.321
77.000
76.686
OH
S
(9) 33i
150
100
50
PPM
;blank line
USER: -- DATE: Apr 18 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11057.6
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 800
LB: 2.0
Nuts - $CARBON_01.fid

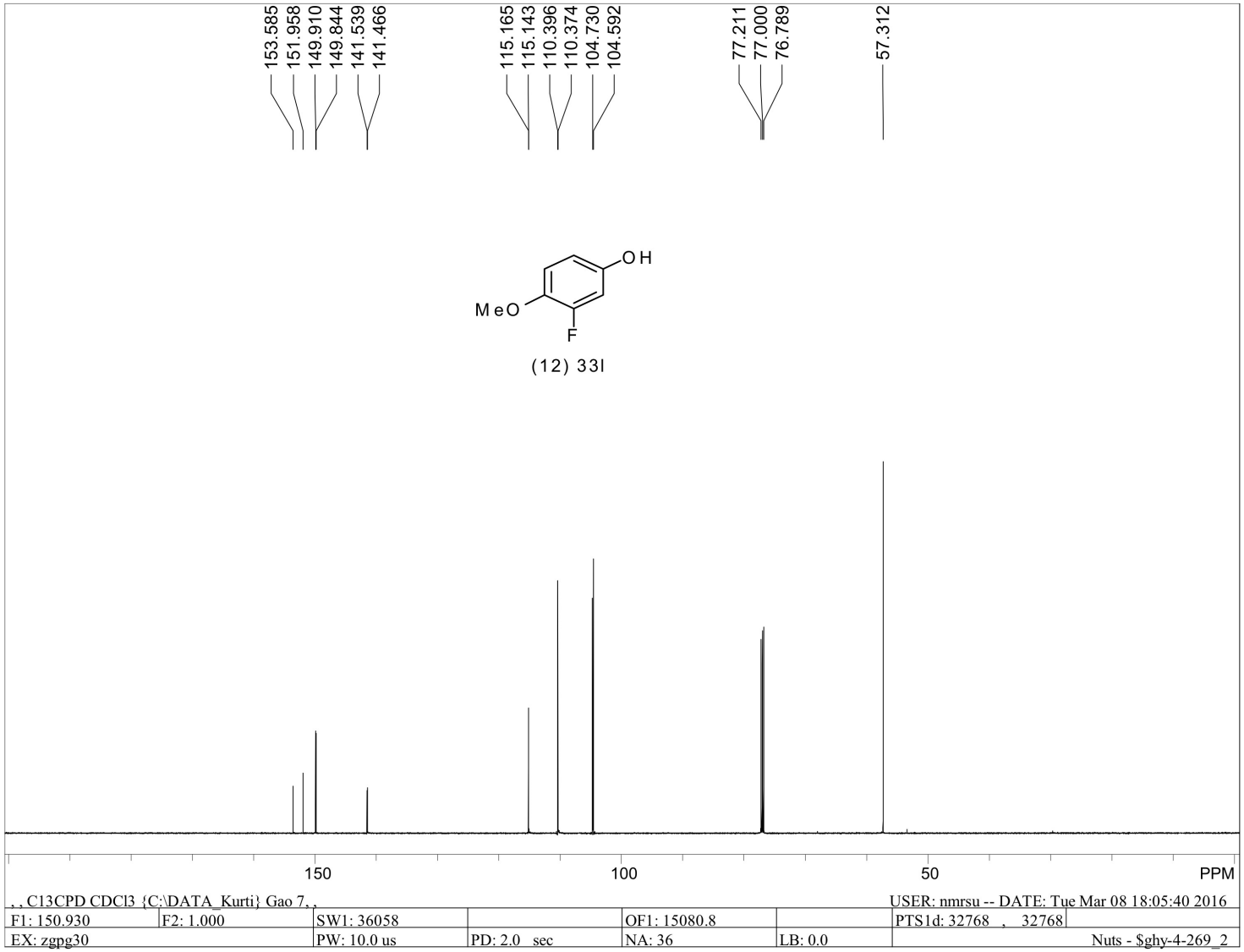

7.260
7.160
7.140
7.119
6.529
6.527
6.523
6.521
6.508
6.505
6.502
6.500
6.472
6.470
6.466
6.464
6.446
6.444
6.440
6.435
5.838
3.776
OH
OMe
(10) 33j
3.33
2.95
1.00
0.99
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Feb 11 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.6
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

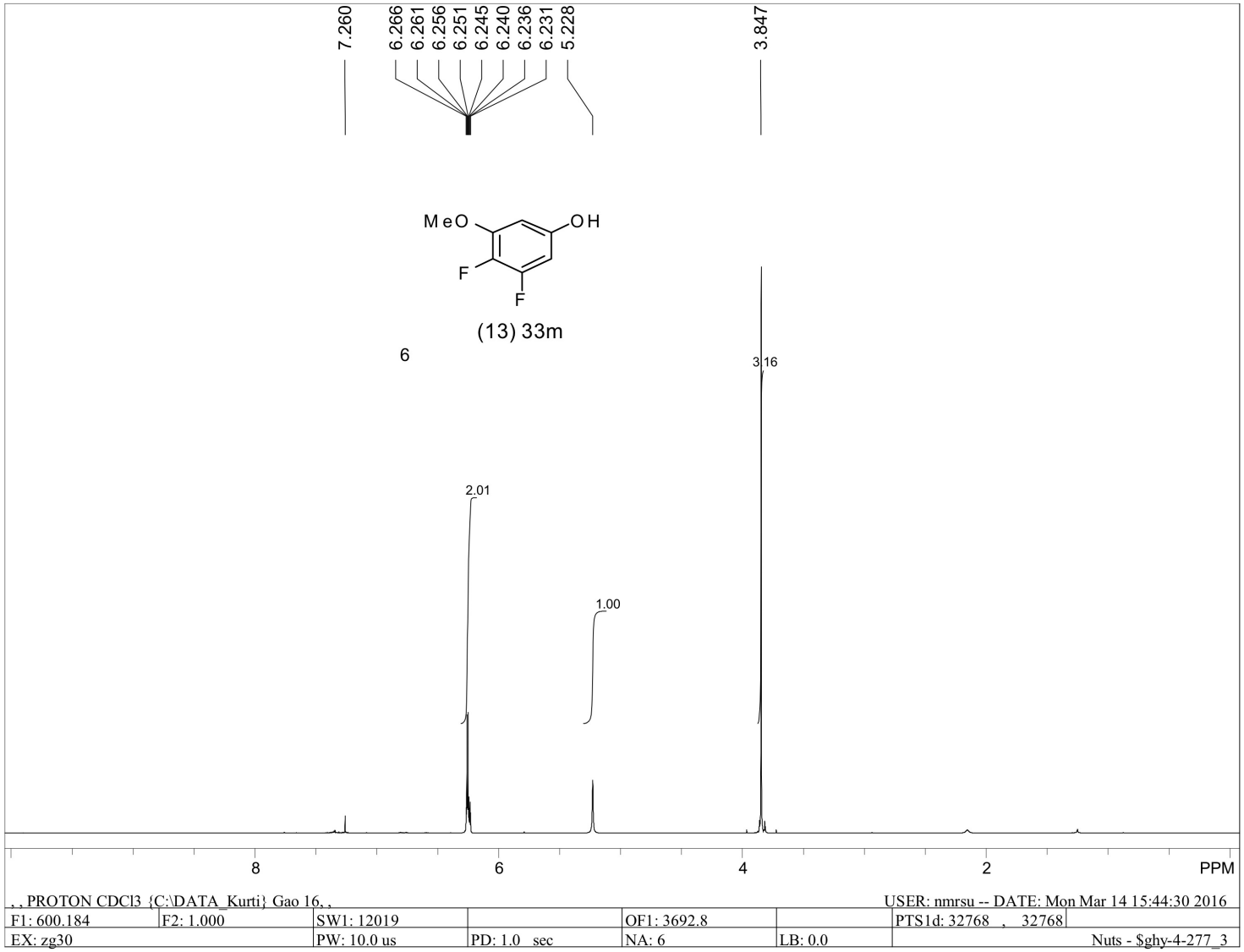

160.722
156.656
130.172
107.922
106.389
101.535
77.314
77.000
76.679
55.254
OH
OMe
(10) 33j
150
100
50
PPM
;blank line
USER: -- DATE: Feb 11 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11047.3
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 2.0
Nuts - $CARBON_01.fid

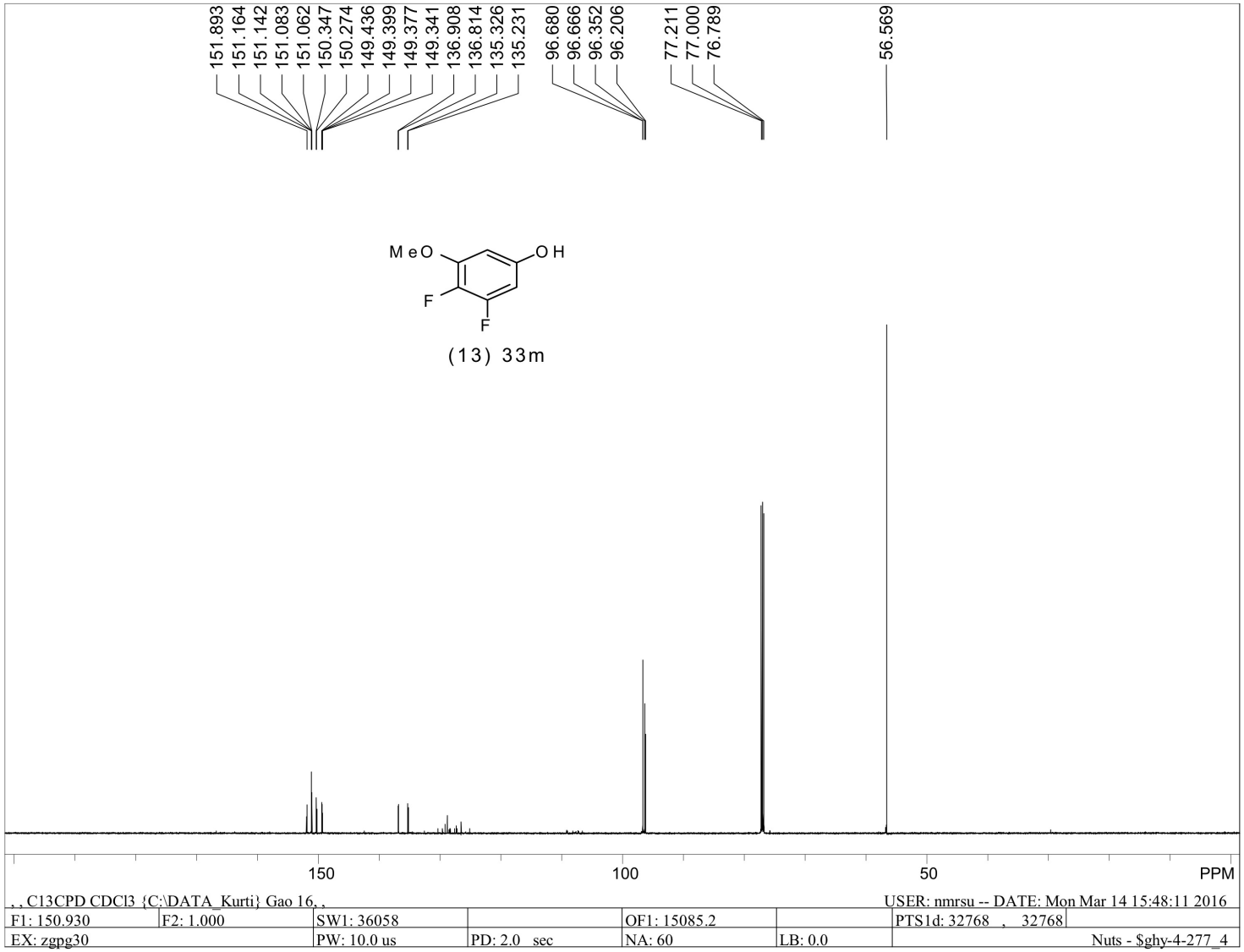

7.260
6.813
6.804
6.800
6.790
6.787
6.777
6.773
6.765
6.762
5.458
3.771
OH
OMe
(11) 33k
4.00
3.11
0.97
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Feb 4 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.2
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.6 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

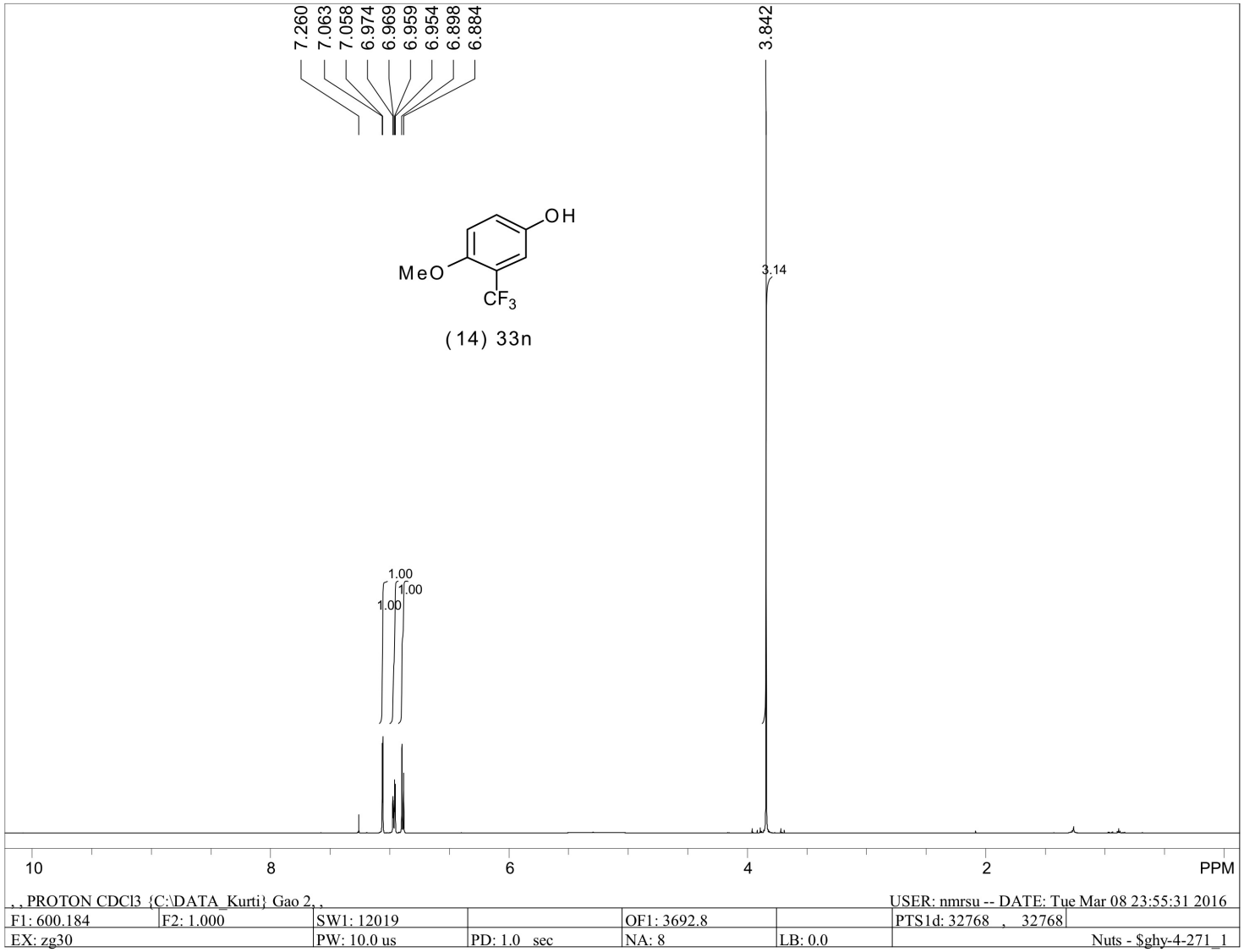

153.459
149.481
116.084
114.908
77.321
77.000
76.686
55.852
OH
OMe
(11) 33k
150
100
50
PPM
;blank line
USER: -- DATE: Feb 4 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11046.5
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 120
LB: 2.0
Nuts - $CARBON_01.fid

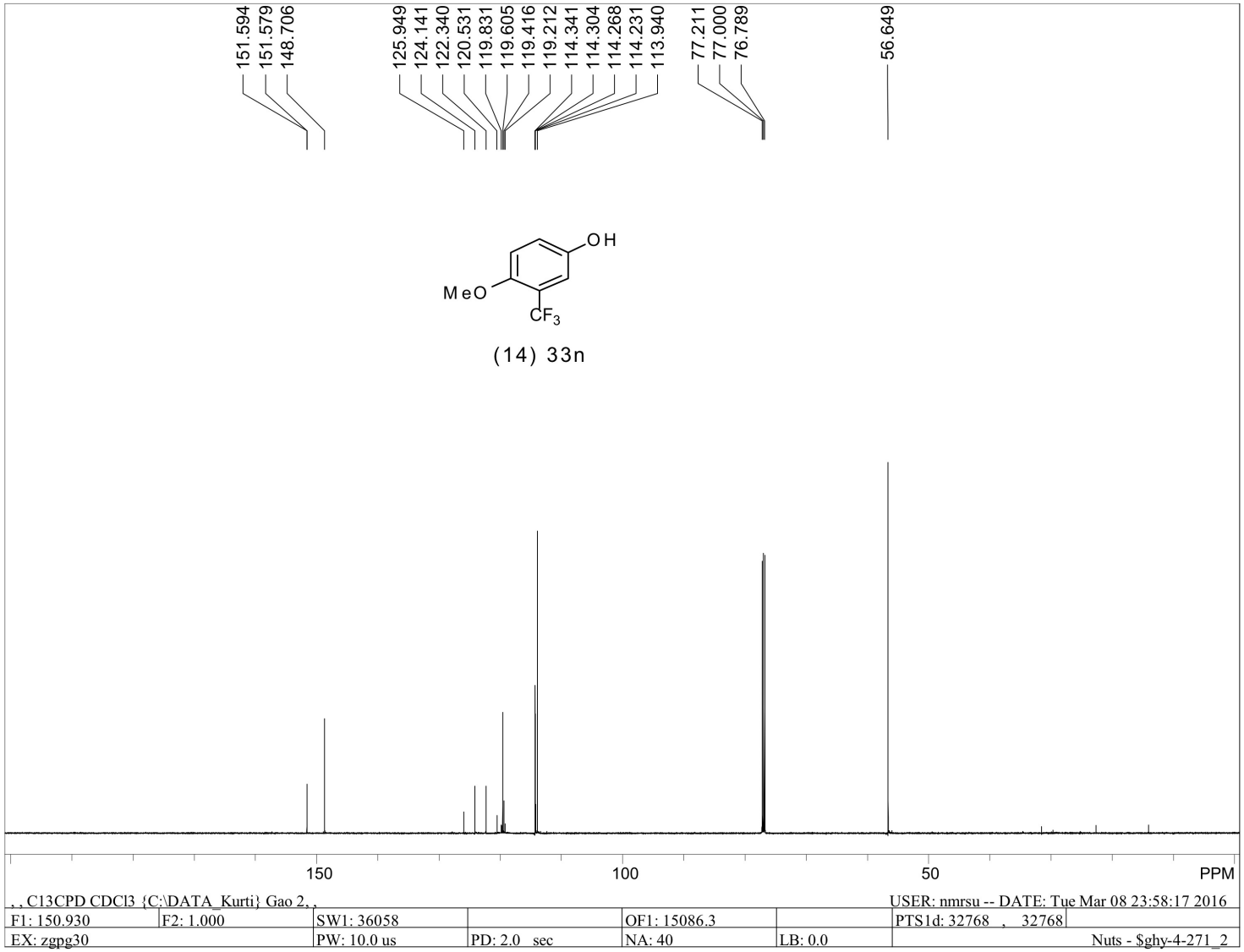

6.848
6.833
6.818
6.654
6.650
6.634
6.629
6.550
6.547
6.546
6.543
6.536
6.533
6.531
6.528
5.684
3.831
3.25
O H
M e O
F
(12) 33I
1.04
1.03
1.02
1.00
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 7, ,
USER: nmrsu -- DATE: Tue Mar 08 18:03:00 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-269_1

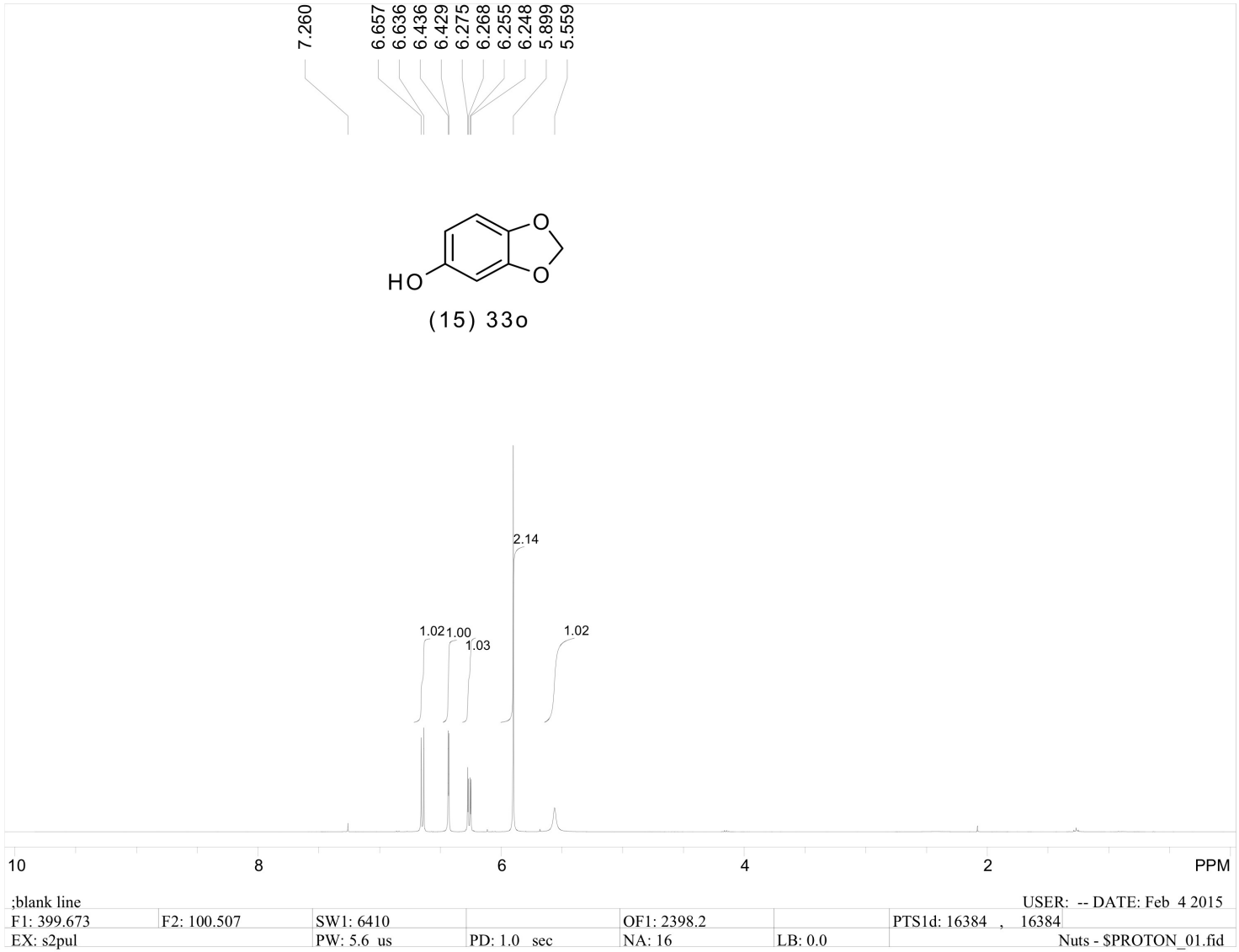

153.585
151.958
149.910
149.844
141.539
141.466
115.165
115.143
110.396
110.374
104.730
104.592
77.211
77.000
76.789
57.312
OH
MeO
F
(12) 33l
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 7, ,
USER: nmrsu -- DATE: Tue Mar 08 18:05:40 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15080.8
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 36
LB: 0.0
Nuts - $ghy-4-269_2

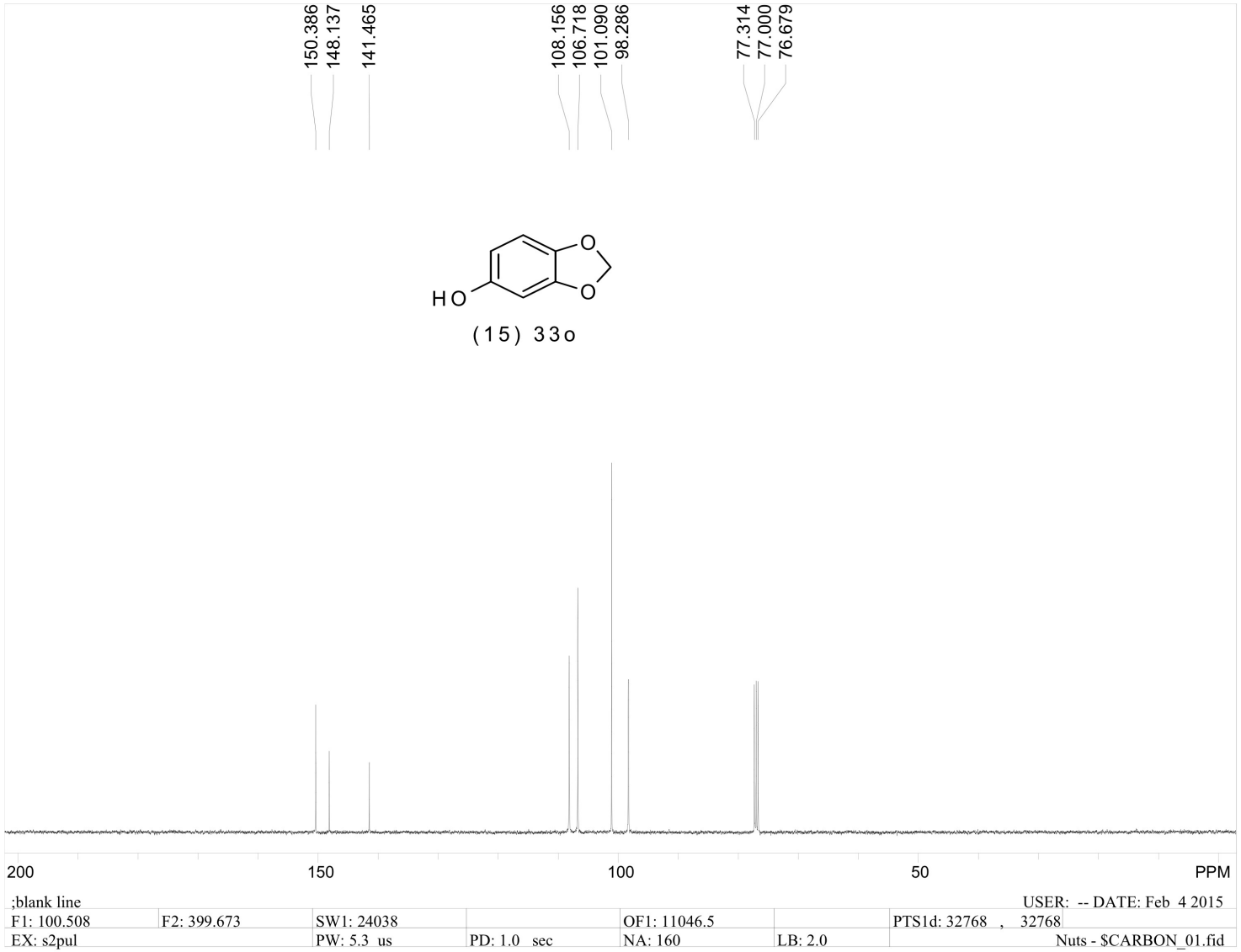

7.260
6.266
6.261
6.256
6.251
6.245
6.240
6.236
6.231
5.228
3.847
MeO
OH
F
F
(13) 33m
6
3.16
2.01
1.00
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 16, ,
USER: nmrsu -- DATE: Mon Mar 14 15:44:30 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 6
LB: 0.0
Nuts - $ghy-4-277_3

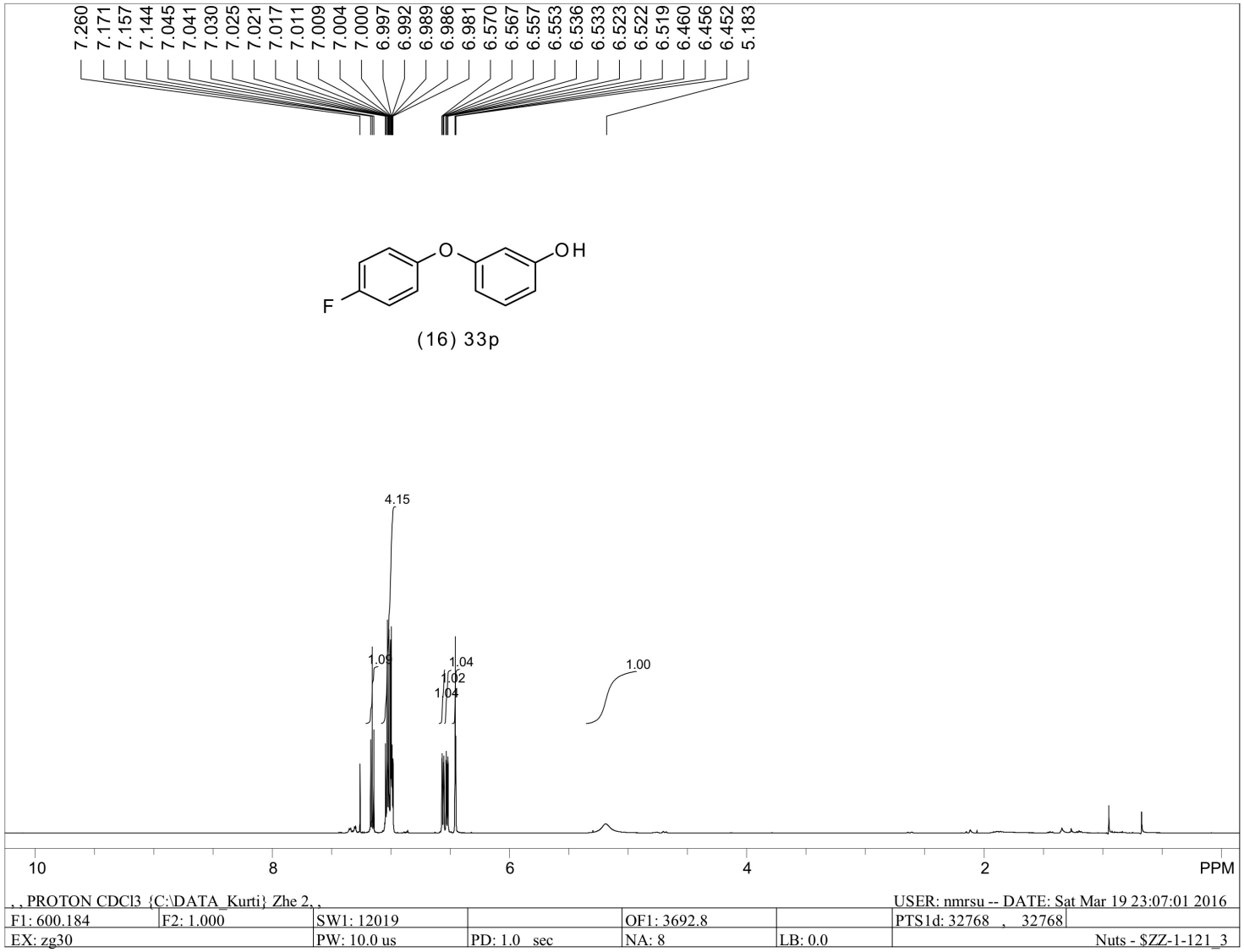

151.893
151.164
151.142
151.083
151.062
150.347
150.274
149.436
149.399
149.377
149.341
136.908
136.814
135.326
135.231
96.680
96.666
96.352
96.206
77.211
77.000
76.789
56.569
MeO
OH
F
F
(13) 33m
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 16, ,
USER: nmrsu -- DATE: Mon Mar 14 15:48:11 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15085.2
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 60
LB: 0.0
Nuts - $ghy-4-277_4

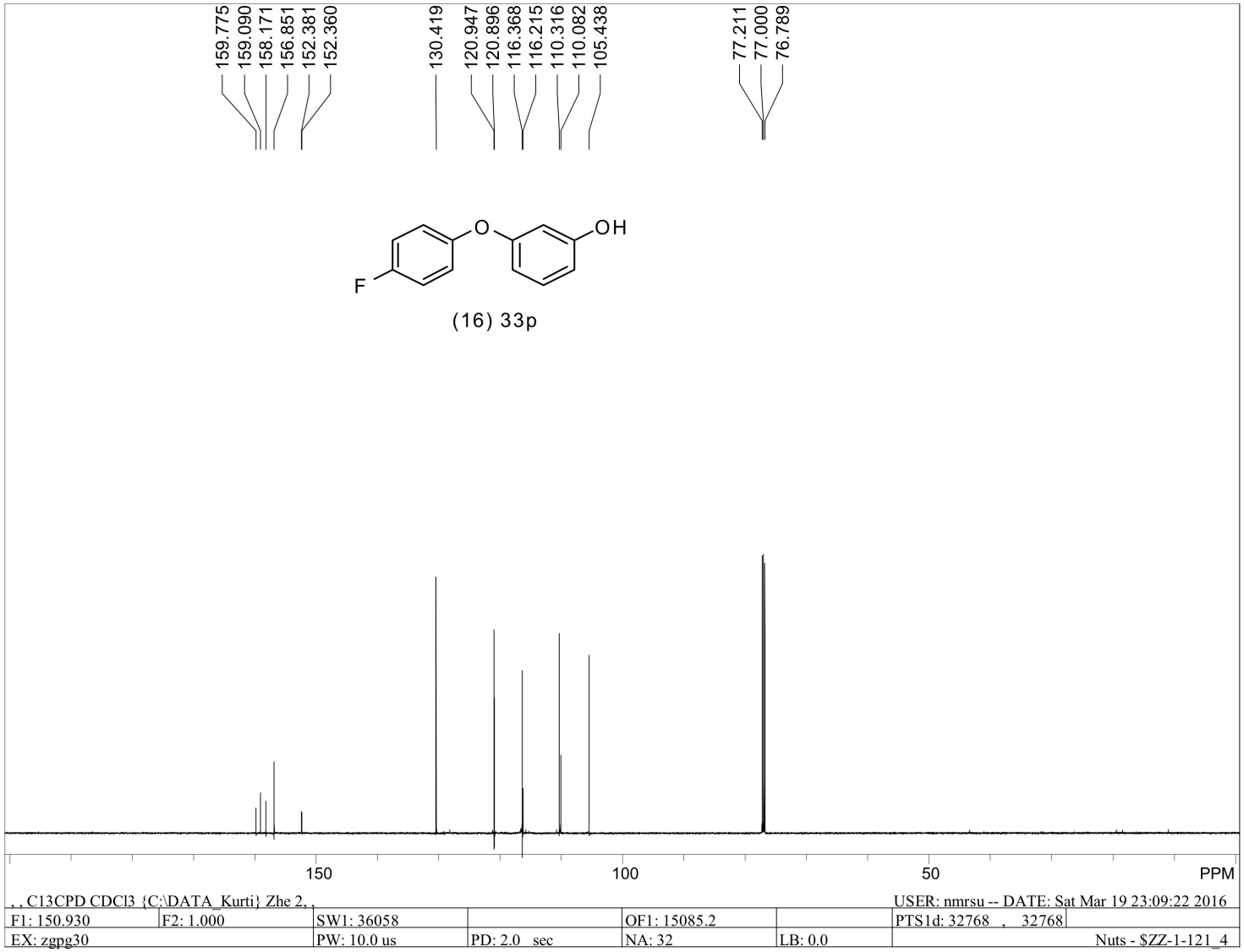

7.260
7.063
7.058
6.974
6.969
6.959
6.954
6.898
6.884
3.842
OH
MeO
CF3
3.14
(14) 33n
1.00
1.00
1.00
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 2, ,
USER: nmrsu -- DATE: Tue Mar 08 23:55:31 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-271_1

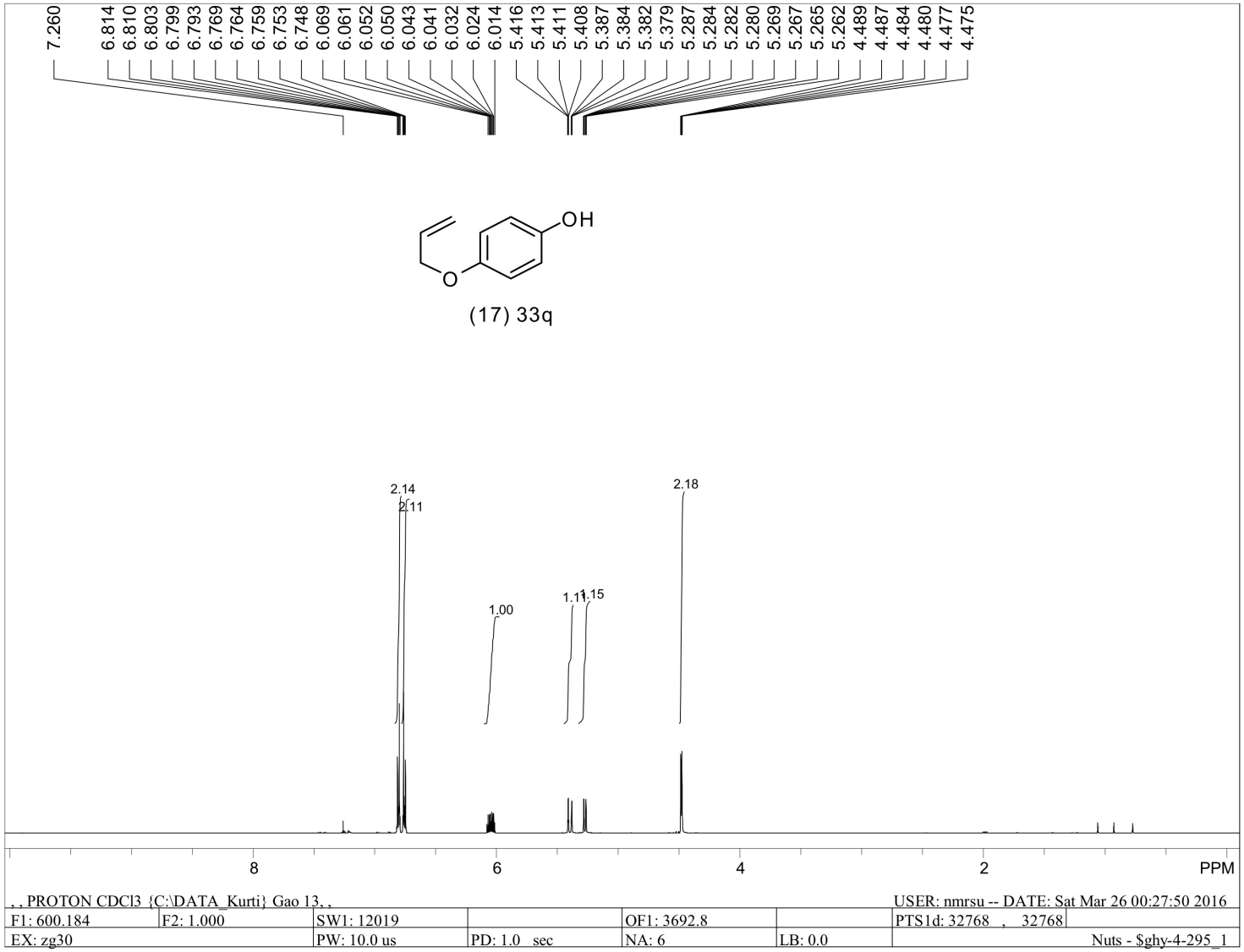

151.594
151.579
148.706
125.949
124.141
122.340
120.531
119.831
119.605
119.416
119.212
114.341
114.304
114.268
114.231
113.940
77.211
77.000
76.789
56.649
OH
MeO
CF3
(14) 33n
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 2, ,
USER: nmrsu -- DATE: Tue Mar 08 23:58:17 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15086.3
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 40
LB: 0.0
Nuts - $ghy-4-271_2

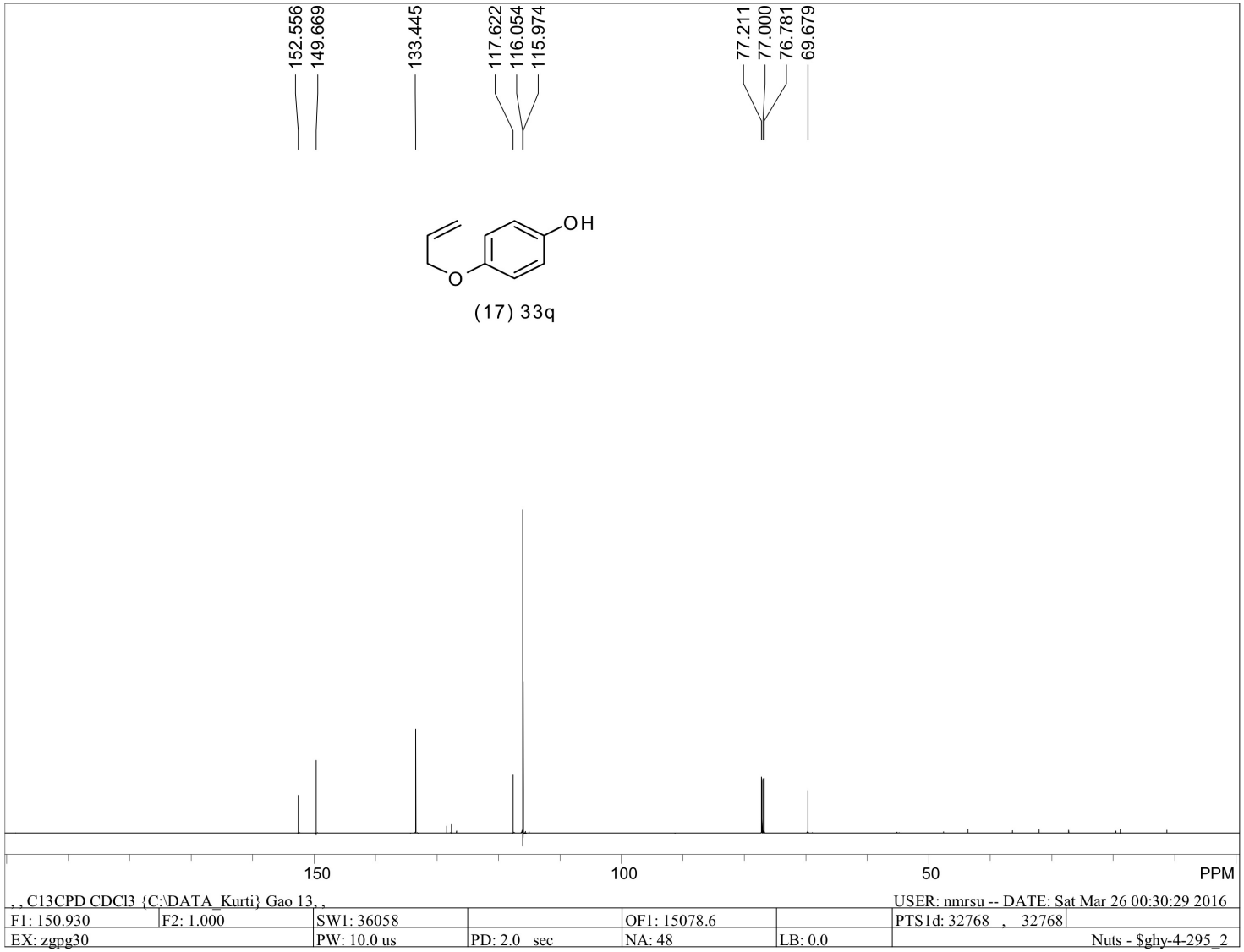

7.260
6.657
6.636
6.436
6.429
6.275
6.268
6.255
6.248
5.899
5.559
HO
O
O
(15) 33o
2.14
1.02
1.00
1.03
1.02
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Feb 4 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.2
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.6 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

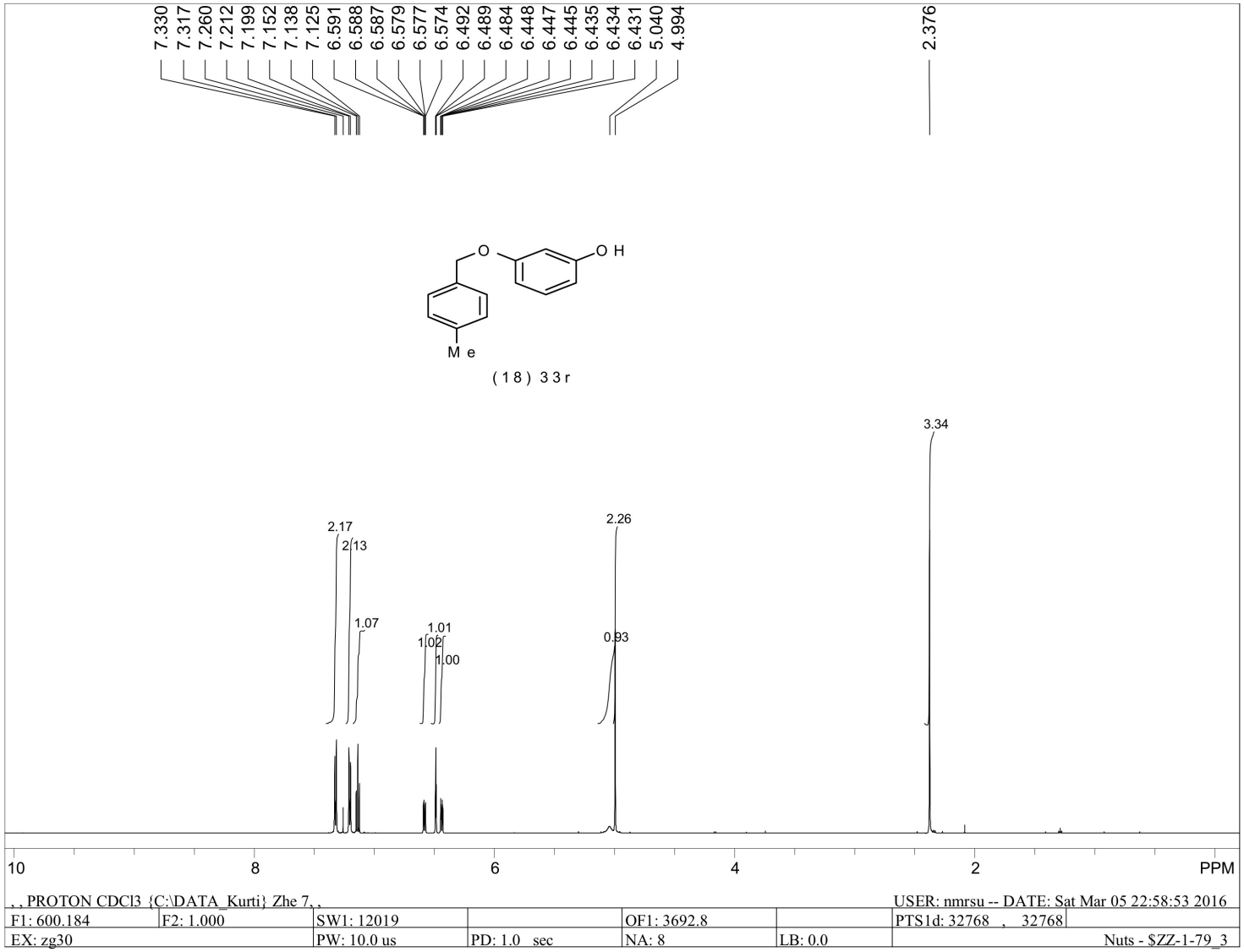

150.386
148.137
141.465
108.156
106.718
101.090
98.286
77.314
77.000
76.679
HO
O
O
(15) 33o
200
150
100
50
PPM
;blank line
USER: -- DATE: Feb 4 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11046.5
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 160
LB: 2.0
Nuts - $CARBON_01.fid

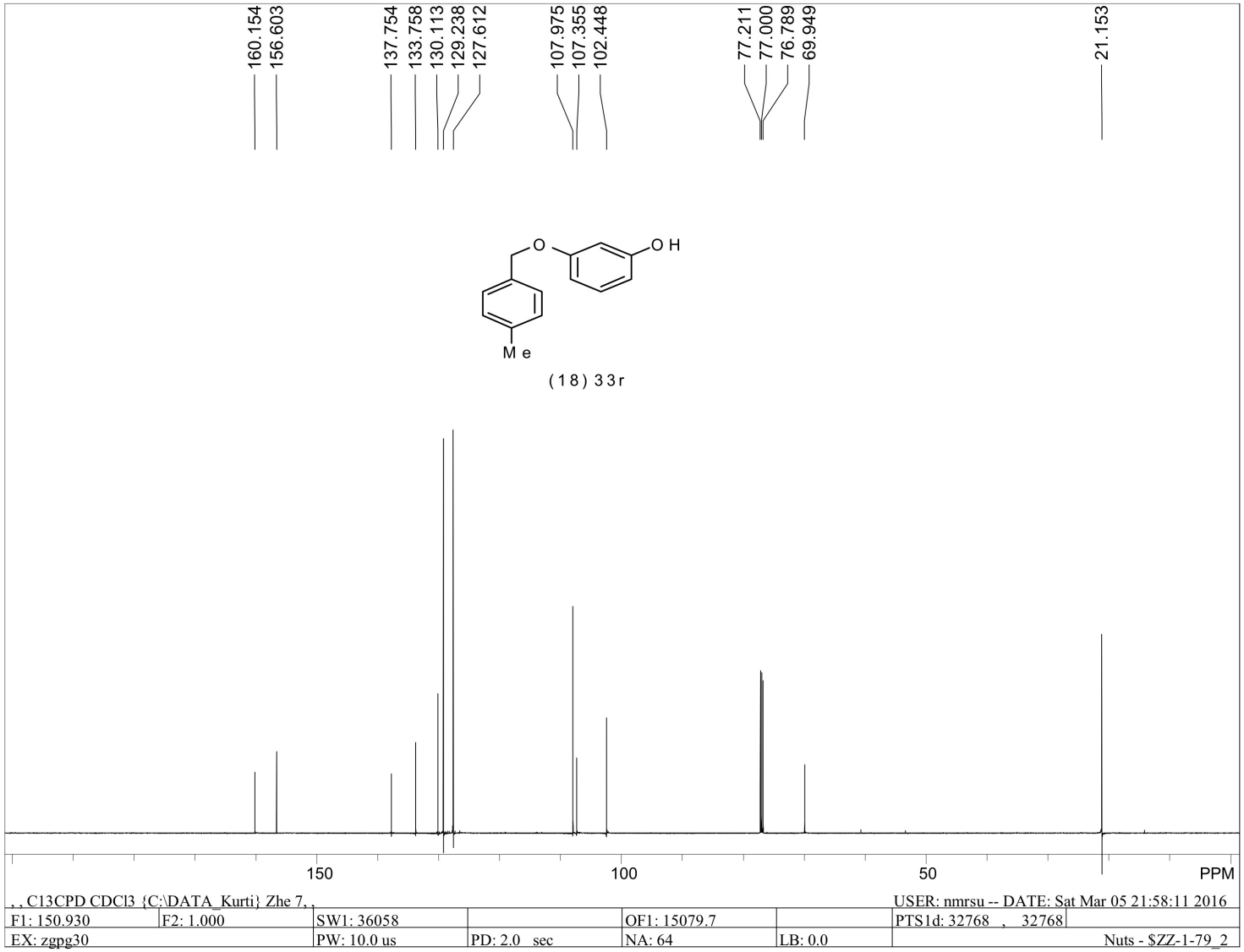

7.260
7.171
7.157
7.144
7.045
7.041
7.030
7.025
7.021
7.017
7.011
7.009
7.004
7.000
6.997
6.992
6.989
6.986
6.981
6.570
6.567
6.557
6.553
6.536
6.533
6.523
6.522
6.519
6.460
6.456
6.452
5.183
O
OH
F
(16) 33p
4.15
1.09
1.04
1.02
1.04
1.00
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 2, ,
USER: nmrsu -- DATE: Sat Mar 19 23:07:01 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ZZ-1-121_3

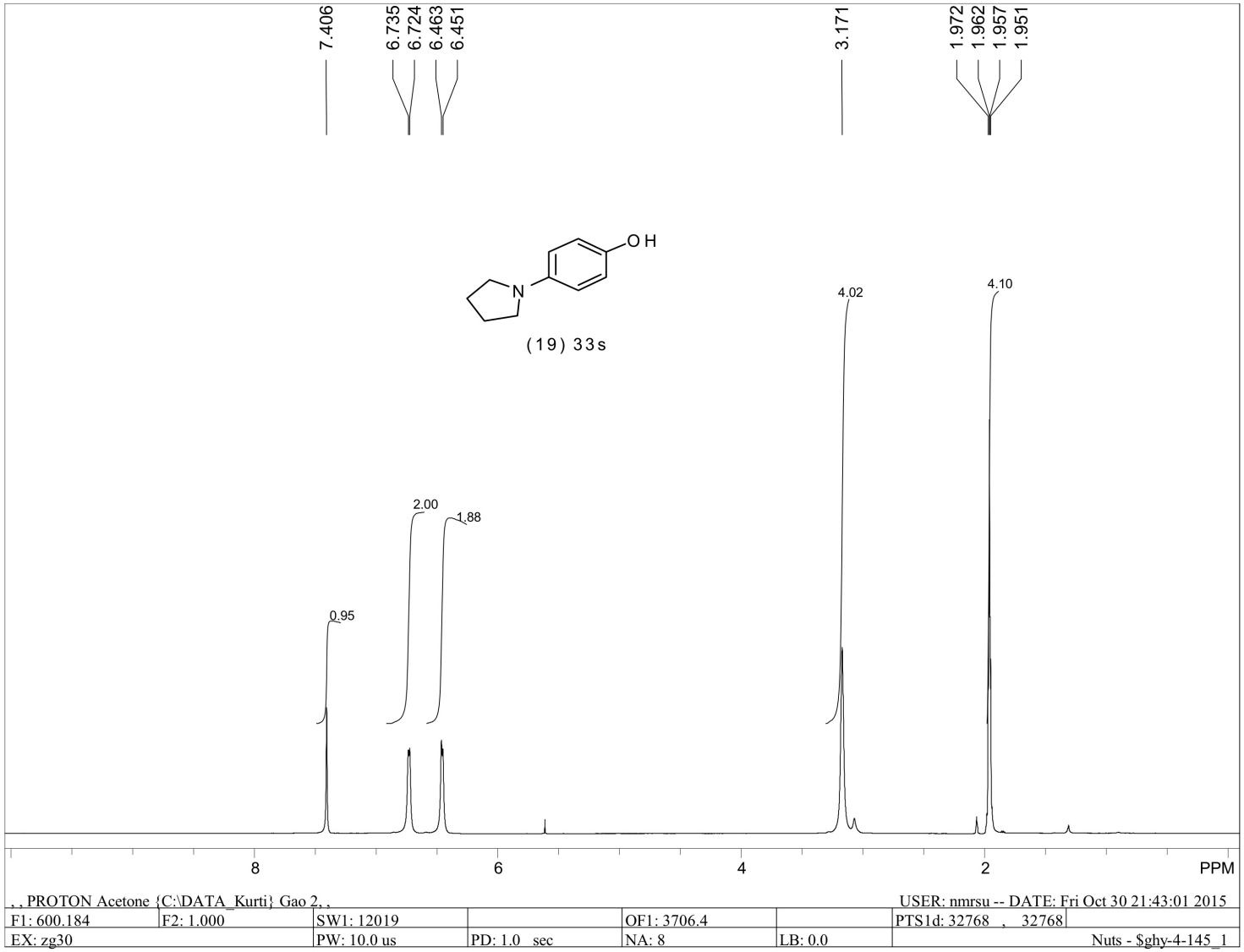

159.775
159.090
158.171
156.851
152.381
152.360
130.419
120.947
120.896
116.368
116.215
110.316
110.082
105.438
77.211
77.000
76.789
O
OH
F
(16) 33p
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Zhe 2, ,
USER: nmrsu -- DATE: Sat Mar 19 23:09:22 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15085.2
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 32
LB: 0.0
Nuts - $ZZ-1-121_4

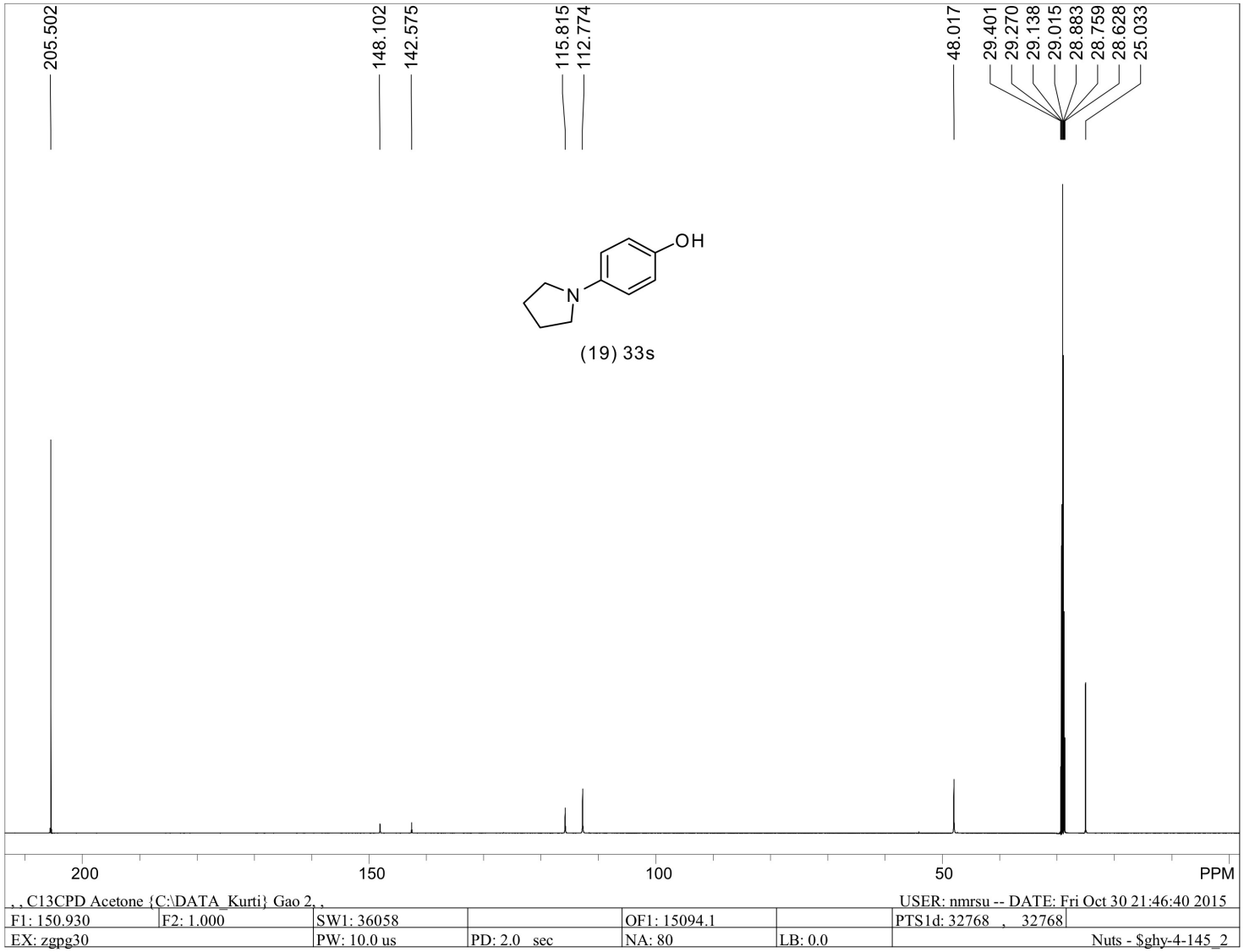

7.260
6.814
6.810
6.803
6.799
6.793
6.769
6.764
6.759
6.753
6.748
6.069
6.061
6.052
6.050
6.043
6.041
6.032
6.024
6.014
5.416
5.413
5.411
5.408
5.387
5.384
5.382
5.379
5.287
5.284
5.282
5.280
5.269
5.267
5.265
5.262
4.489
4.487
4.484
4.480
4.477
4.475
OH
O
(17) 33q
2.14
2.11
1.00
1.11
1.15
2.18
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 13, ,
USER: nmrsu -- DATE: Sat Mar 26 00:27:50 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 6
LB: 0.0
Nuts - $ghy-4-295_1

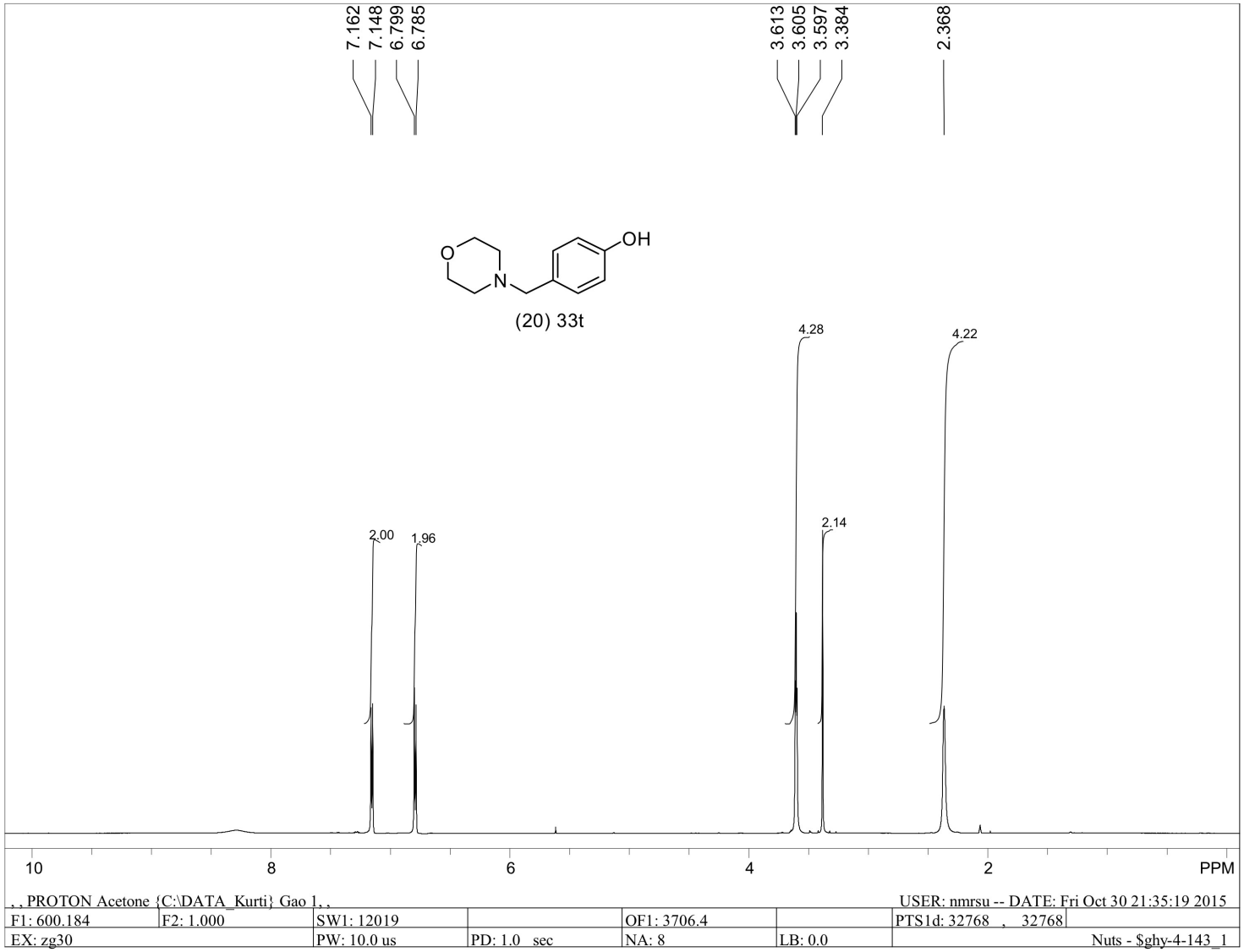

152.556
149.669
133.445
117.622
116.054
115.974
77.211
77.000
76.781
69.679
OH
O
(17) 33q
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 13, ,
USER: nmrsu -- DATE: Sat Mar 26 00:30:29 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15078.6
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 48
LB: 0.0
Nuts - $ghy-4-295_2

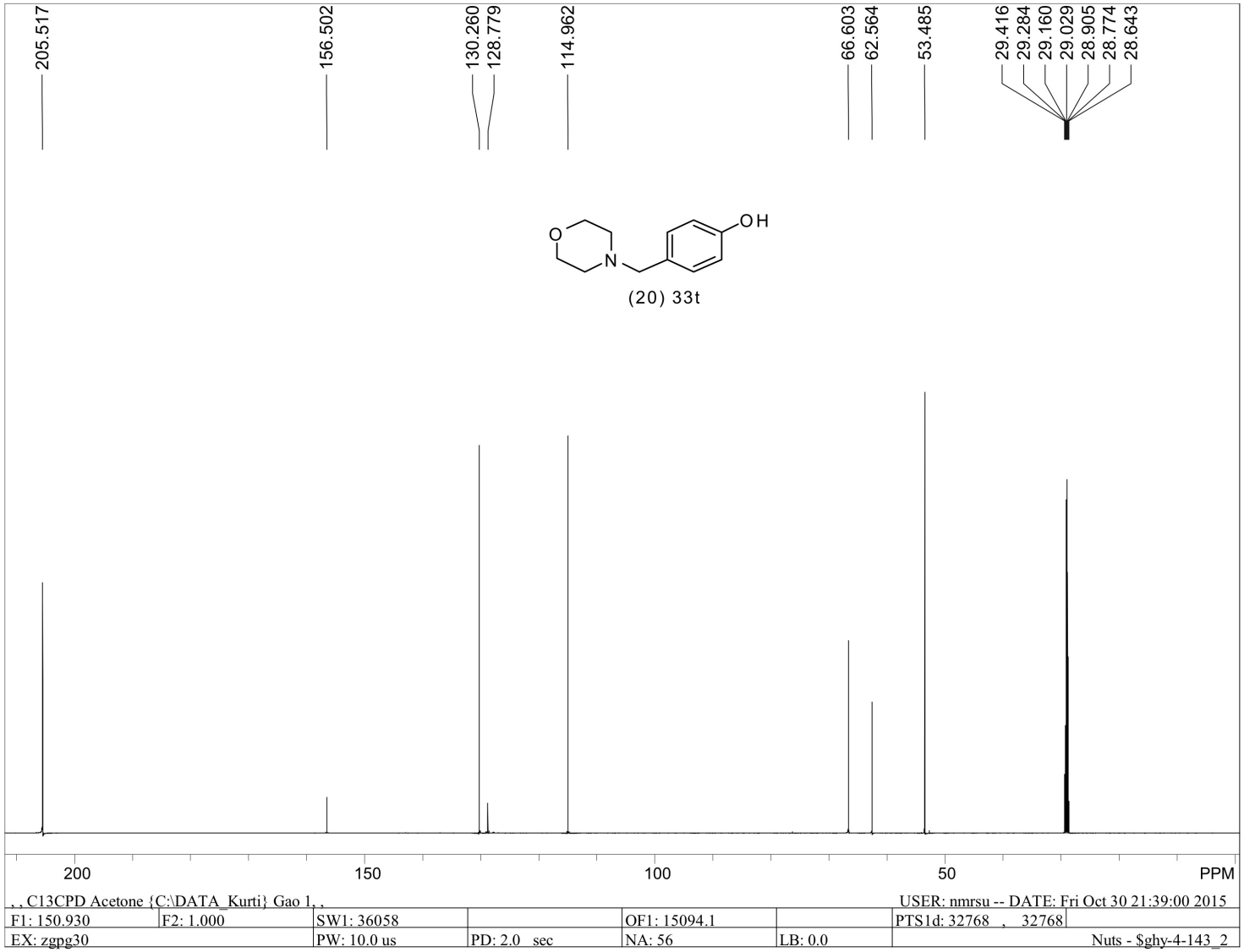

7.330
7.317
7.260
7.212
7.199
7.152
7.138
7.125
6.591
6.588
6.587
6.579
6.577
6.574
6.492
6.489
6.484
6.448
6.447
6.445
6.435
6.434
6.431
5.040
4.994
2.376
O
O H
M e
(1 8) 3 3 r
3.34
2.17
2.13
1.07
1.01
1.02
1.00
2.26
0.93
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 7, ,
USER: nmrsu -- DATE: Sat Mar 05 22:58:53 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ZZ-1-79_3

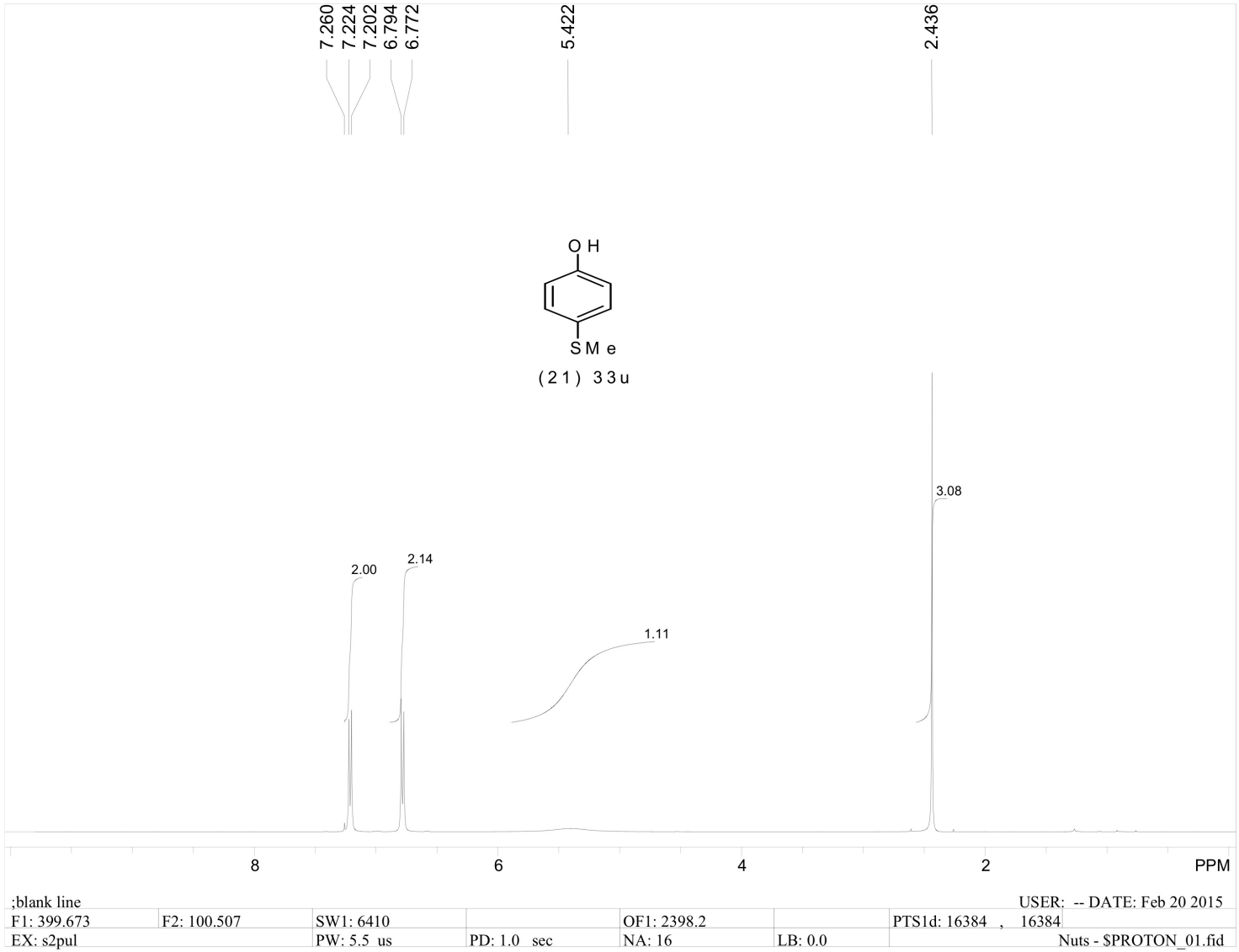

160.154
156.603
137.754
133.758
130.113
129.238
127.612
107.975
107.355
102.448
77.211
77.000
76.789
69.949
21.153
O
O H
M e
(18) 33r
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Zhe 7, ,
USER: nmrsu -- DATE: Sat Mar 05 21:58:11 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15079.7
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 64
LB: 0.0
Nuts - $ZZ-1-79_2

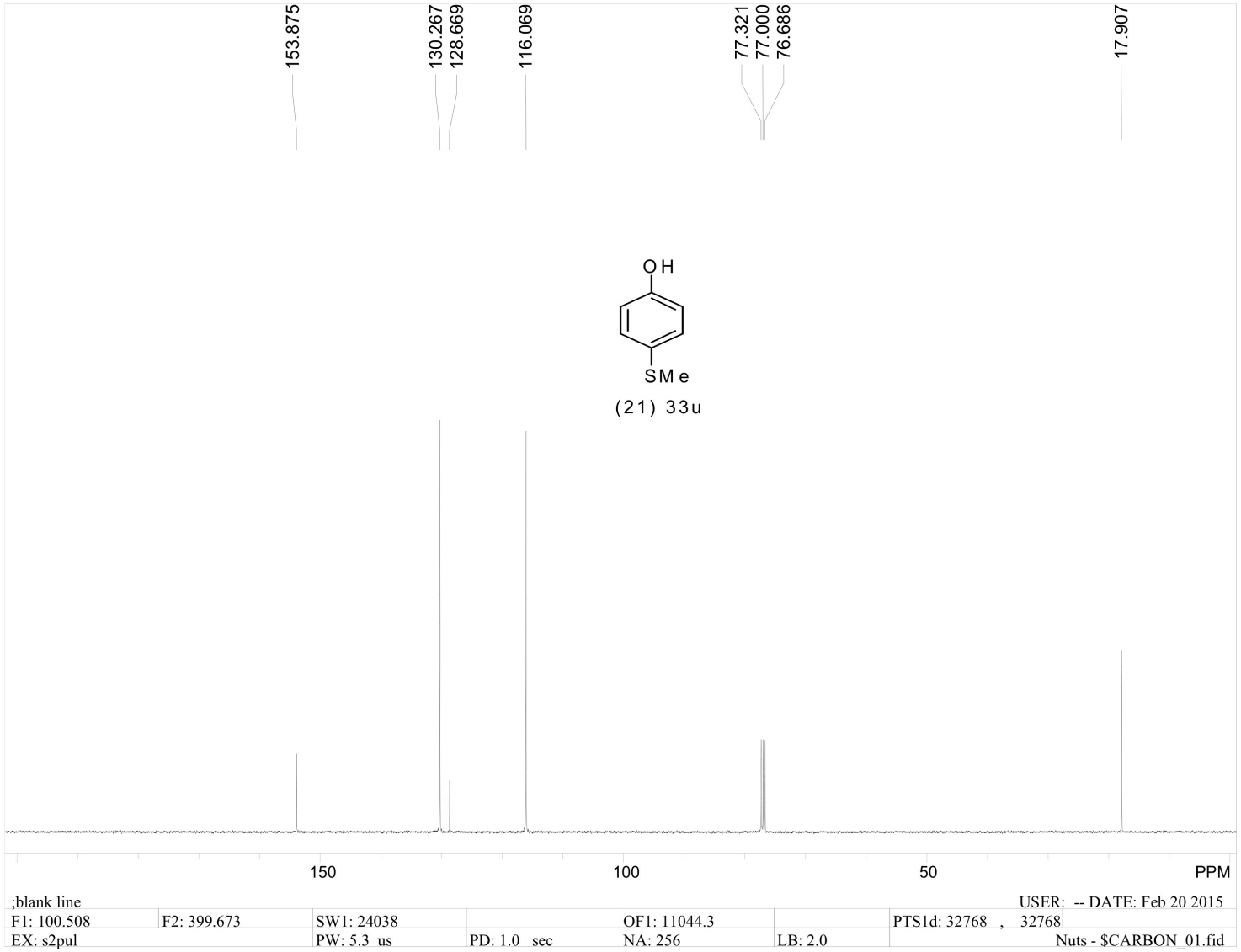

7.406
6.735
6.724
6.463
6.451
3.171
1.972
1.962
1.957
1.951
OH
N
(19) 33s
4.02
4.10
2.00
1.88
0.95
8
6
4
2
PPM
, , PROTON Acetone {C:\DATA_Kurti} Gao 2, ,
USER: nmrsu -- DATE: Fri Oct 30 21:43:01 2015
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3706.4
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-145_1

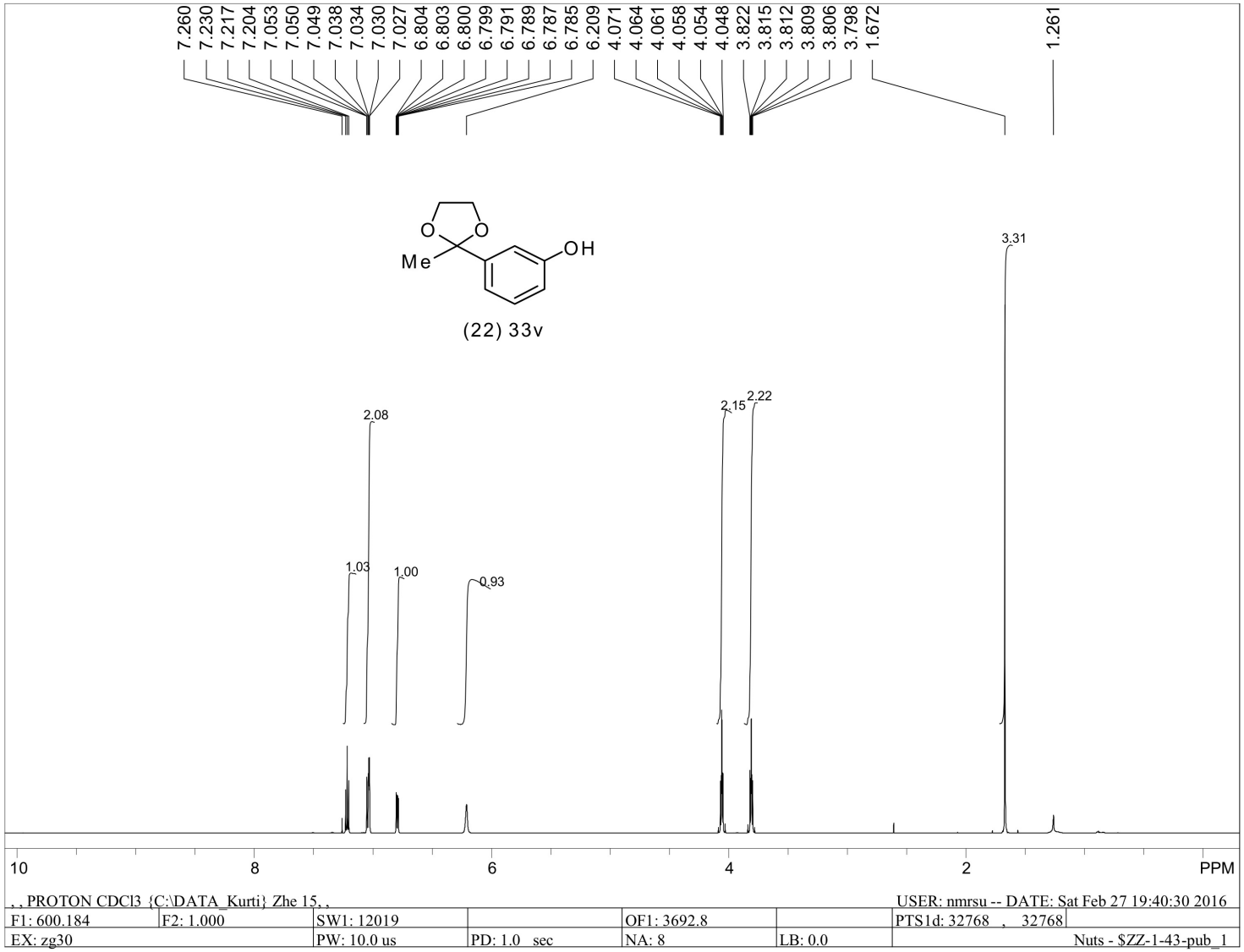

205.502
148.102
142.575
115.815
112.774
48.017
29.401
29.270
29.138
29.015
28.883
28.759
28.628
25.033
OH
N
(19) 33s
200
150
100
50
PPM
, , C13CPD Acetone {C:\DATA_Kurti} Gao 2, ,
USER: nmrsu -- DATE: Fri Oct 30 21:46:40 2015
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15094.1
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 80
LB: 0.0
Nuts - $ghy-4-145_2

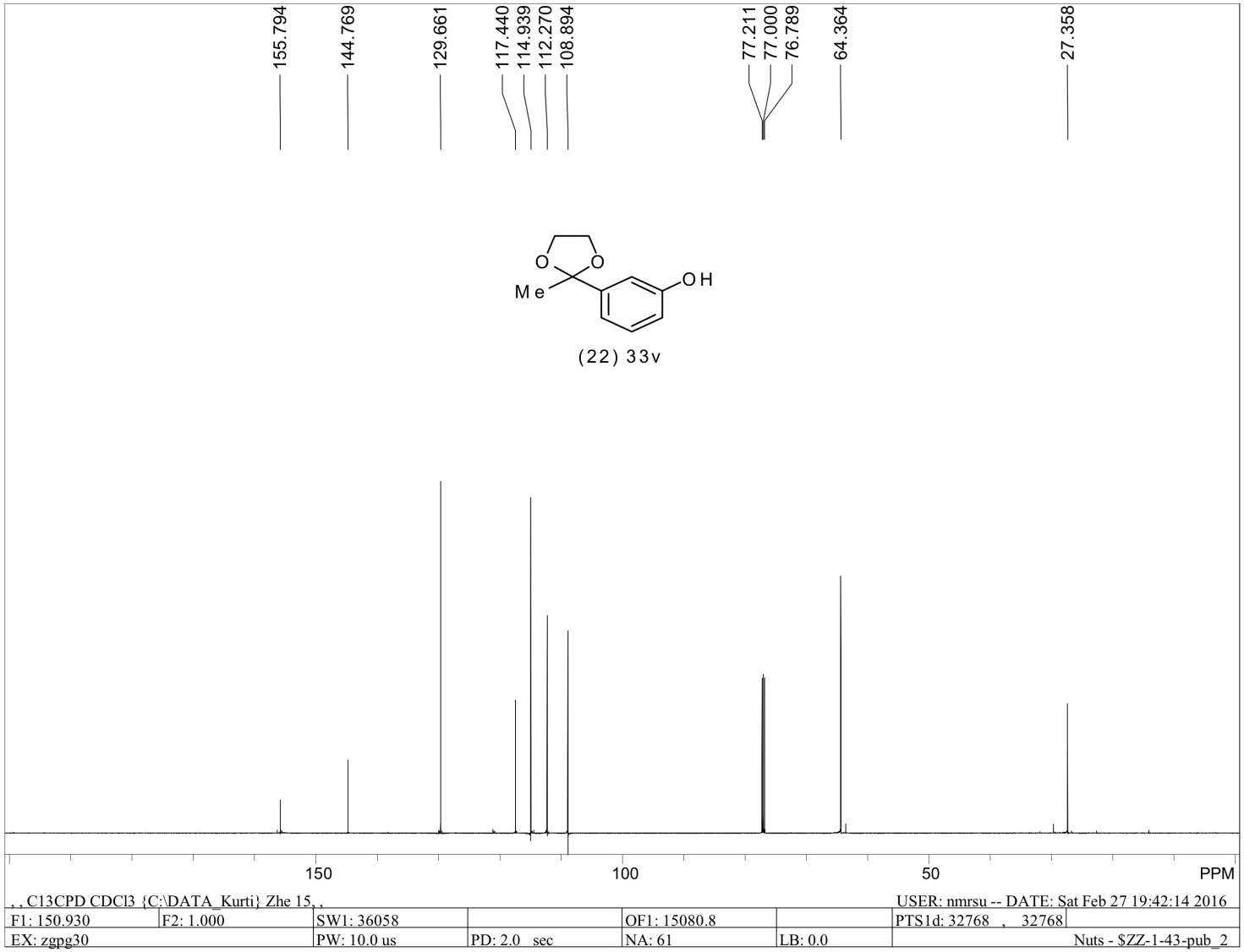

7.162
7.148
6.799
6.785
3.613
3.605
3.597
3.384
2.368
OH
O
N
(20) 33t
4.28
4.22
2.14
2.00
1.96
10
8
6
4
2
PPM
, , PROTON Acetone {C:\DATA_Kurti} Gao 1, ,
USER: nmrsu -- DATE: Fri Oct 30 21:35:19 2015
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3706.4
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-143_1

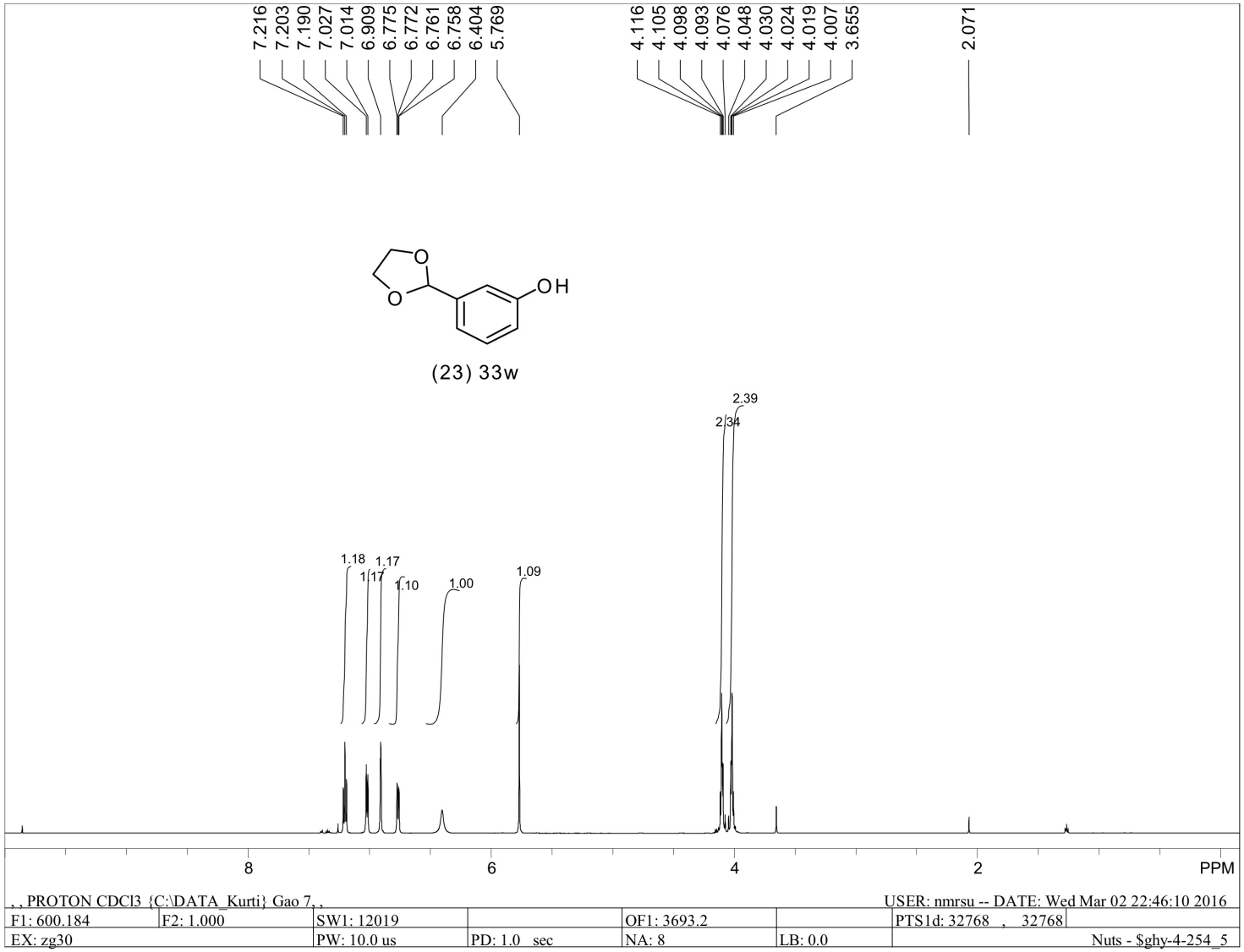

205.517
156.502
130.260
128.779
114.962
66.603
62.564
53.485
29.416
29.284
29.160
29.029
28.905
28.774
28.643
O
N
OH
(20) 33t
200
150
100
50
PPM
, , C13CPD Acetone {C:\DATA_Kurti} Gao 1, ,
USER: nmrsu -- DATE: Fri Oct 30 21:39:00 2015
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15094.1
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 56
LB: 0.0
Nuts - $ghy-4-143_2

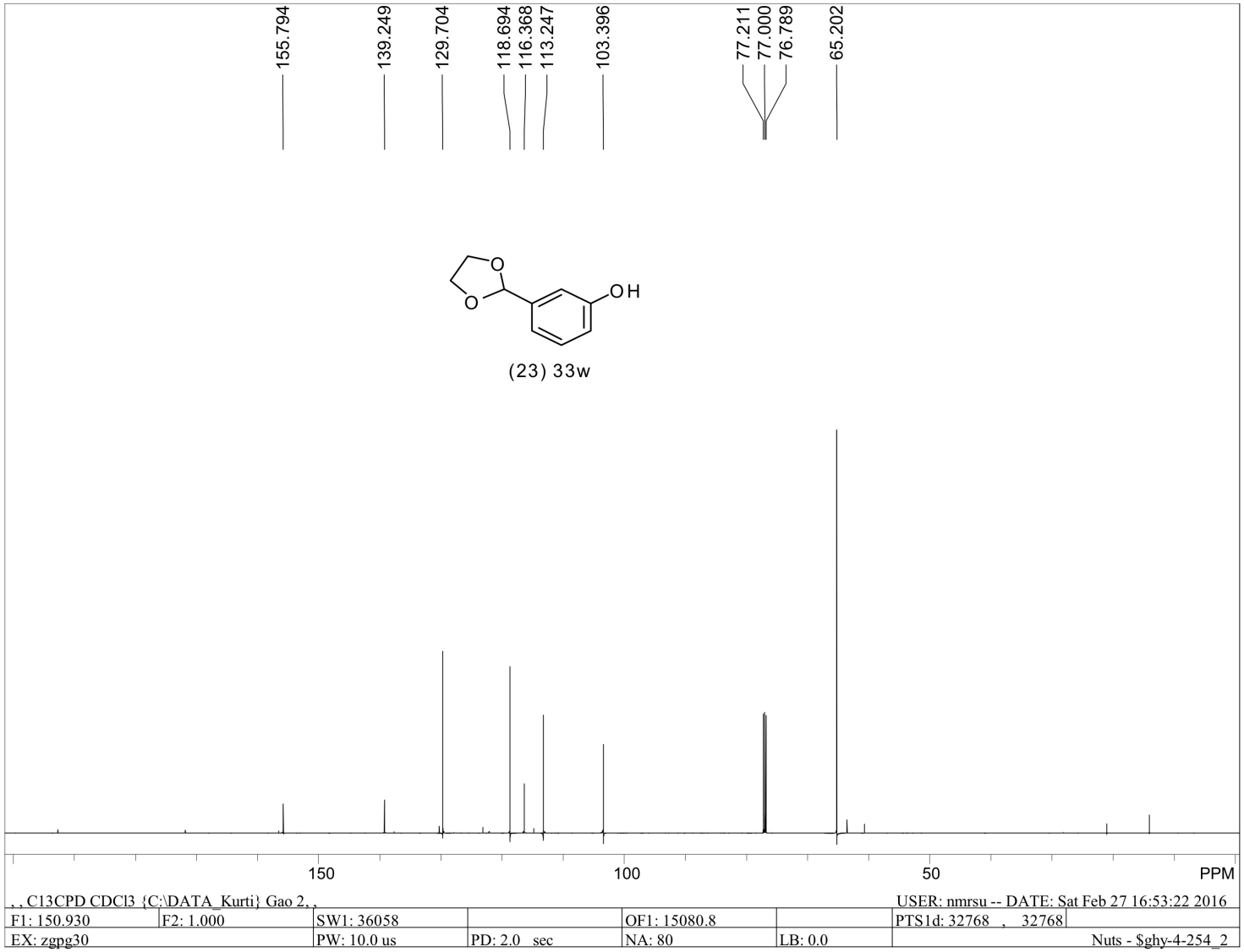

7.260
7.224
7.202
6.794
6.772
5.422
2.436
OH
SMe
(21) 33u
3.08
2.14
2.00
1.11
8
6
4
2
PPM
;blank line
USER: -- DATE: Feb 20 2015
F1: 399.673
F2: 100.507
SW1: 6410
OF1: 2398.2
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

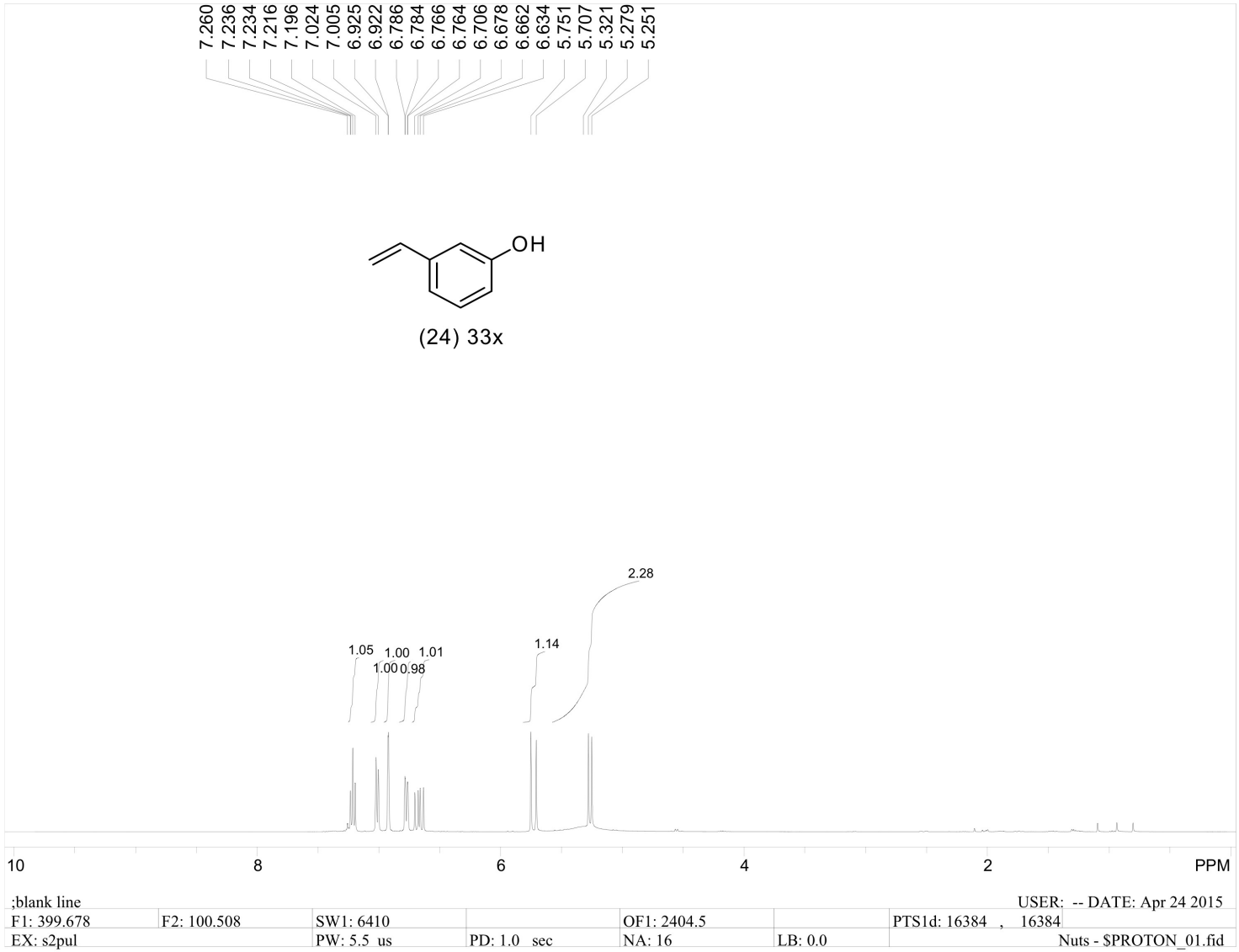

153.875
130.267
128.669
116.069
77.321
77.000
76.686
17.907
OH
SMe
(21) 33u
150
100
50
PPM
;blank line
USER: -- DATE: Feb 20 2015
F1: 100.508
F2: 399.673
SW1: 24038
OF1: 11044.3
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 2.0
Nuts - $CARBON_01.fid

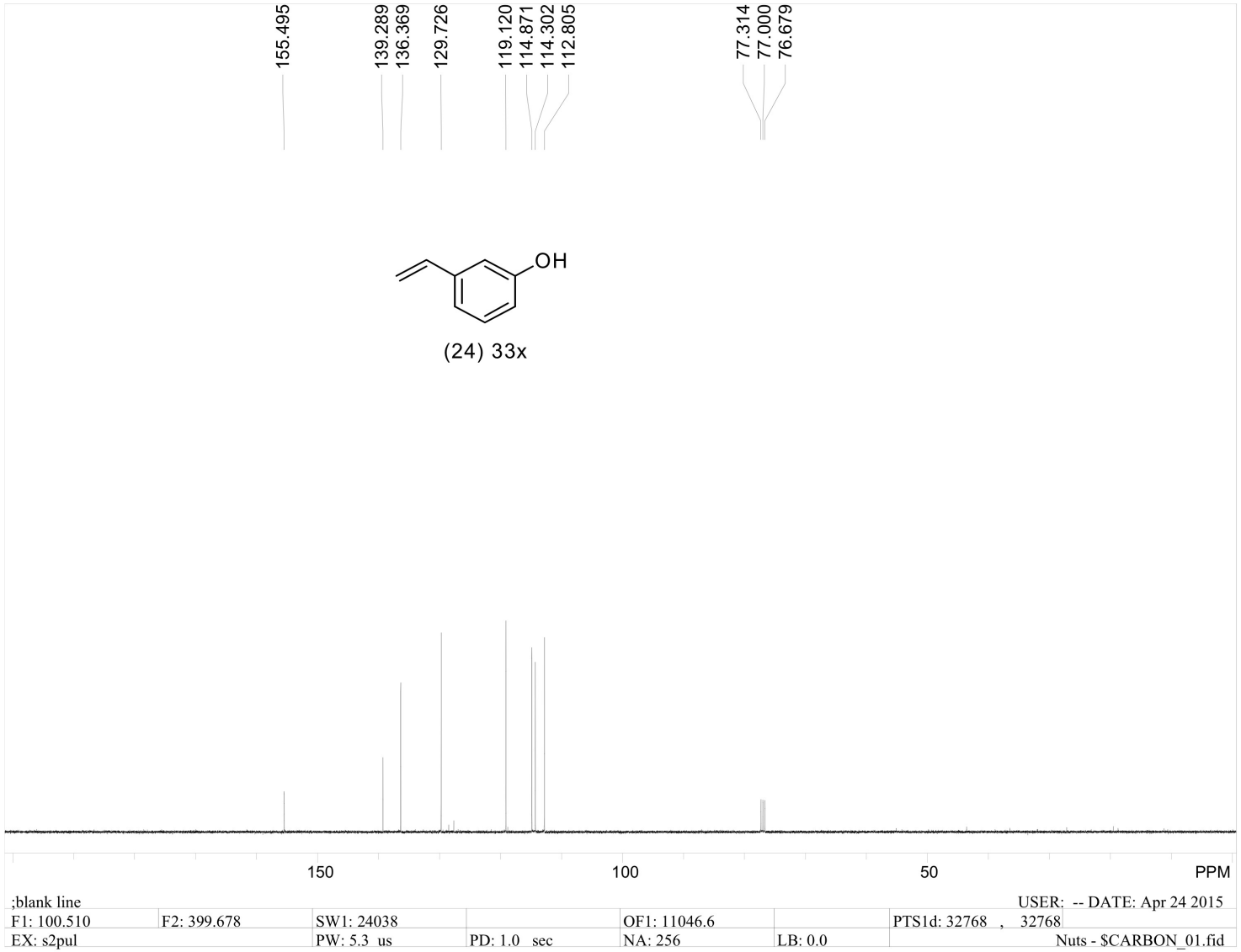

7.260
7.230
7.217
7.204
7.053
7.050
7.049
7.038
7.034
7.030
7.027
6.804
6.803
6.800
6.799
6.791
6.789
6.787
6.785
6.209
4.071
4.064
4.061
4.058
4.054
4.048
3.822
3.815
3.812
3.809
3.806
3.798
1.672
1.261
O
O
Me
OH
(22) 33v
3.31
2.15
2.22
2.08
1.03
1.00
0.93
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Zhe 15, ,
USER: nmrsu -- DATE: Sat Feb 27 19:40:30 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ZZ-1-43-pub_1

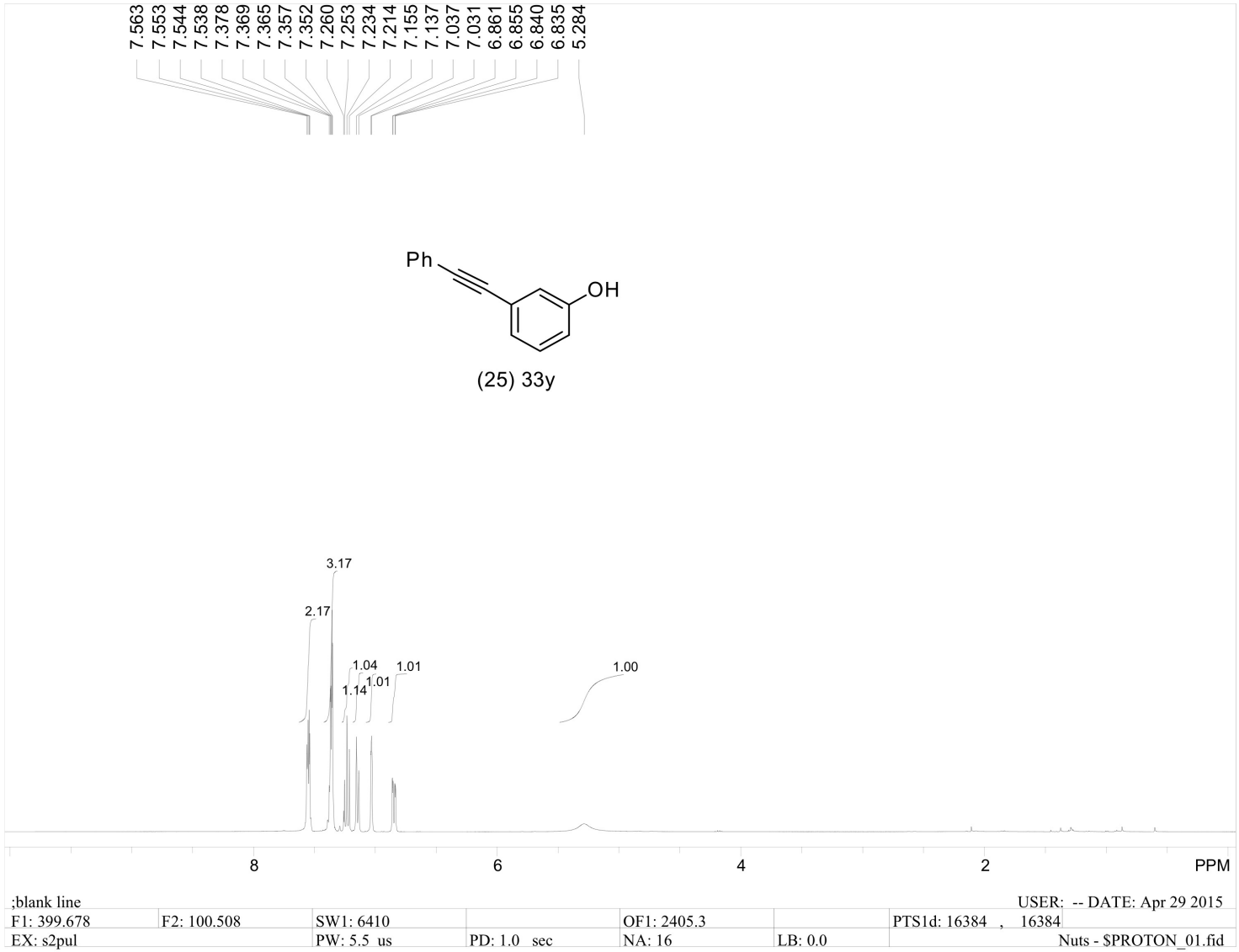

155.794
144.769
129.661
117.440
114.939
112.270
108.894
77.211
77.000
76.789
64.364
27.358
O
O
Me
OH
(22) 33v
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Zhe 15, ,
USER: nmrsu -- DATE: Sat Feb 27 19:42:14 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15080.8
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 61
LB: 0.0
Nuts - $ZZ-1-43-pub_2

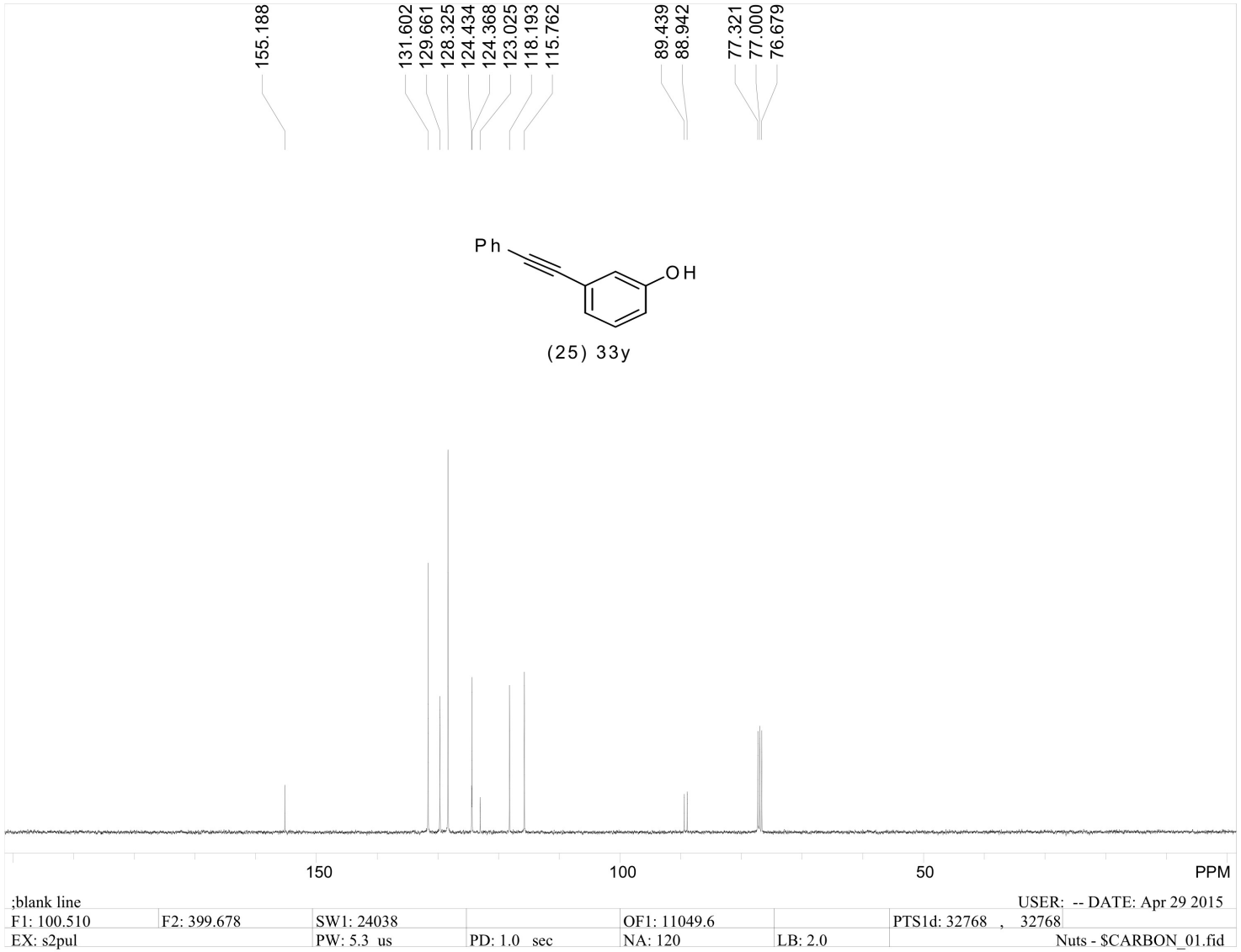

7.216
7.203
7.190
7.027
7.014
6.909
6.775
6.772
6.761
6.758
6.404
5.769
4.116
4.105
4.098
4.093
4.076
4.048
4.030
4.024
4.019
4.007
3.655
2.071
O
O
OH
(23) 33w
2.39
2.34
1.18
1.17
1.17
1.10
1.00
1.09
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 7, ,
USER: nmrsu -- DATE: Wed Mar 02 22:46:10 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3693.2
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-4-254_5

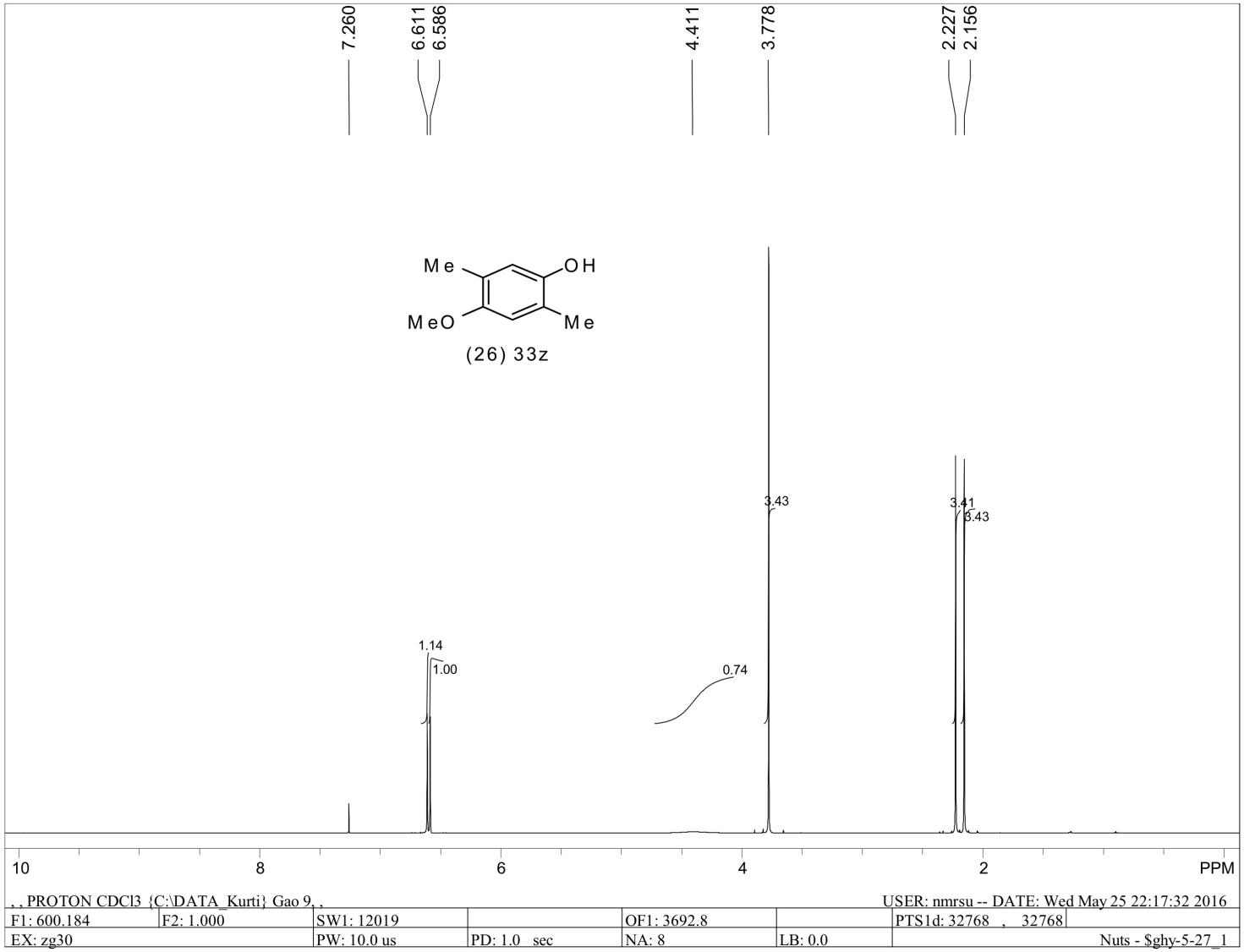

155.794
139.249
129.704
118.694
116.368
113.247
103.396
77.211
77.000
76.789
65.202
O
O
OH
(23) 33w
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 2, ,
USER: nmrsu -- DATE: Sat Feb 27 16:53:22 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15080.8
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 80
LB: 0.0
Nuts - $ghy-4-254_2

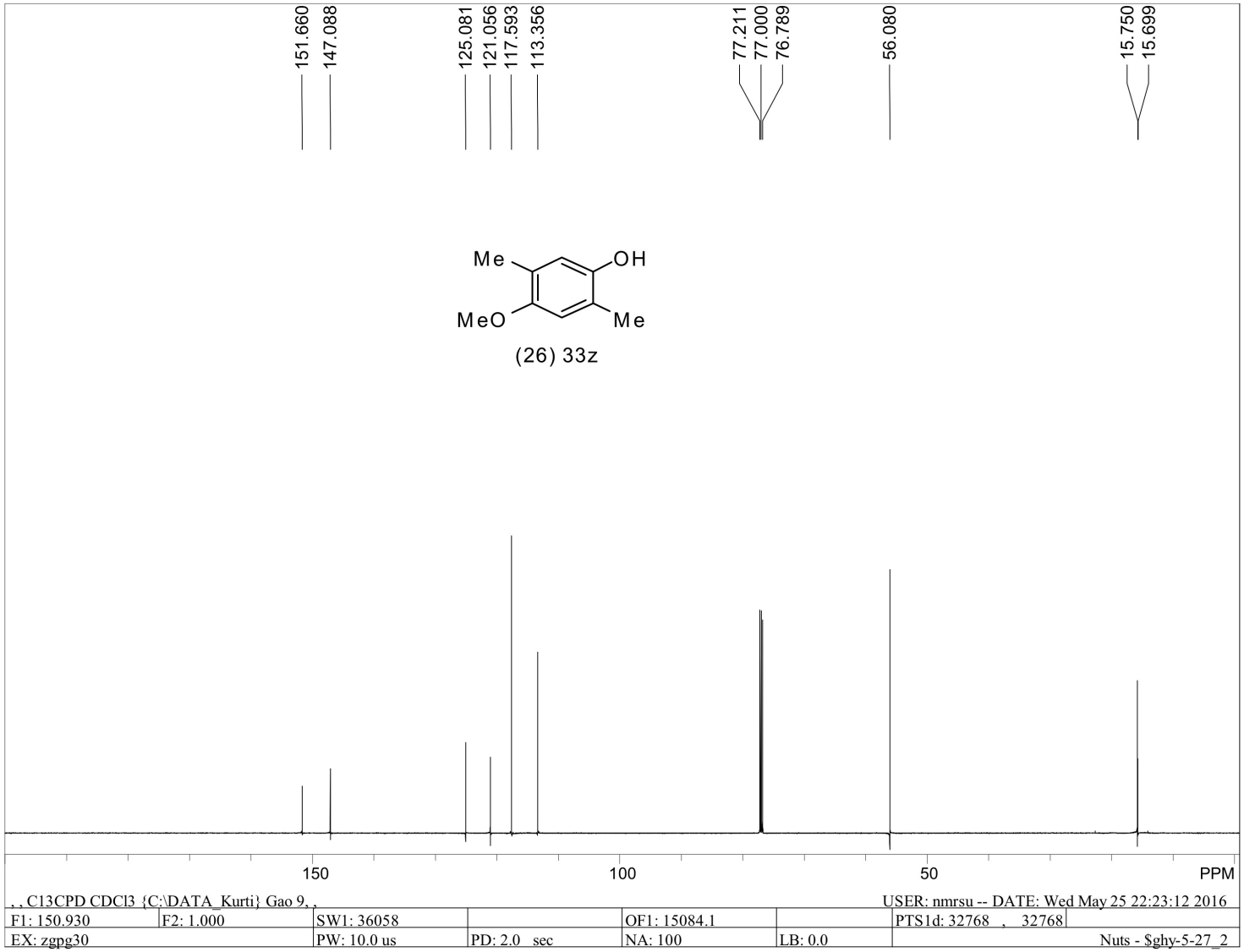

7.260
7.236
7.234
7.216
7.196
7.024
7.005
6.925
6.922
6.786
6.784
6.766
6.764
6.706
6.678
6.662
6.634
5.751
5.707
5.321
5.279
5.251
OH
(24) 33x
2.28
1.14
1.05
1.00
1.01
1.00
0.98
10
8
6
4
2
PPM
;blank line
USER: -- DATE: Apr 24 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2404.5
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid

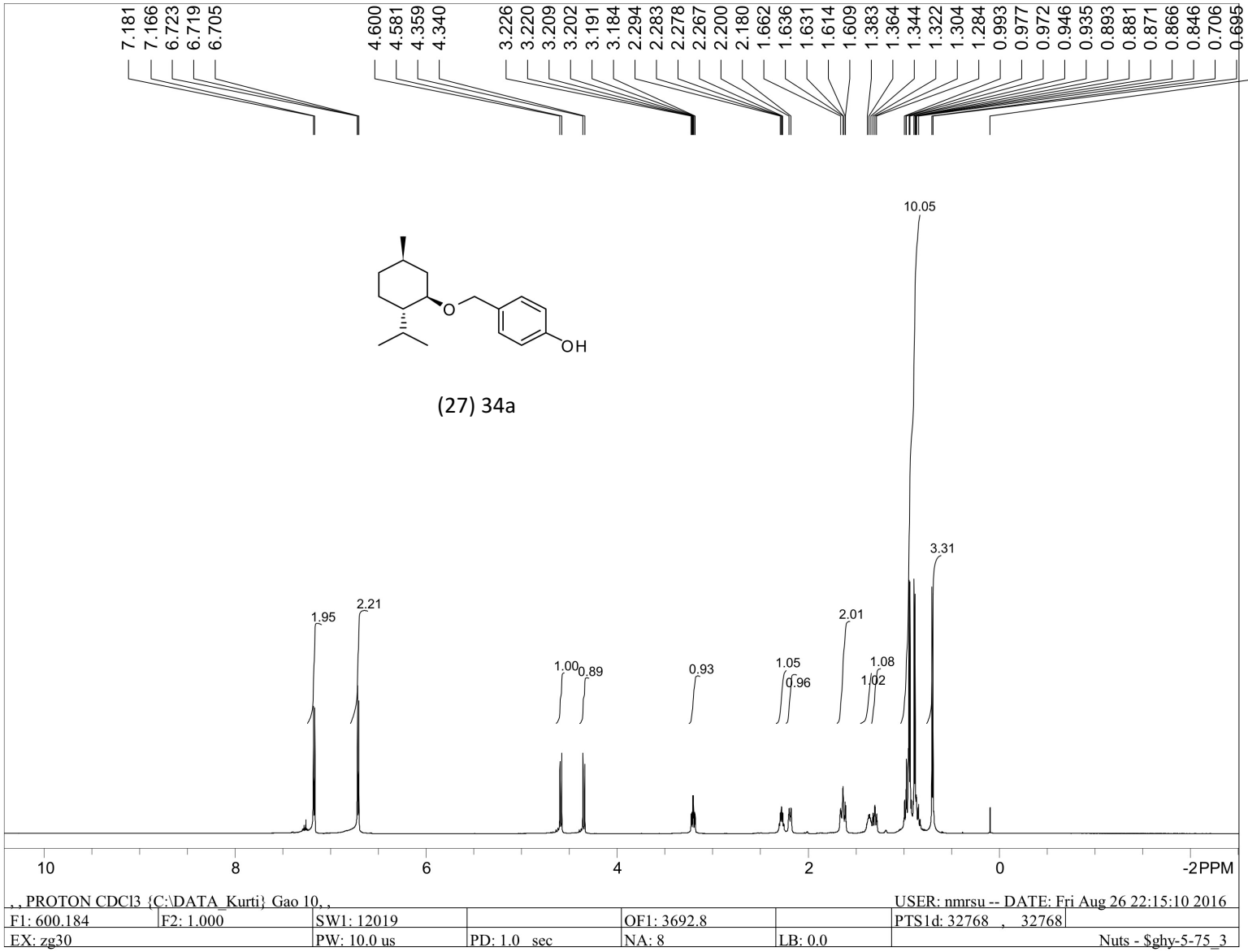

155.495
139.289
136.369
129.726
119.120
114.871
114.302
112.805
77.314
77.000
76.679
OH
(24) 33x
150
100
50
PPM
;blank line
USER: -- DATE: Apr 24 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11046.6
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 256
LB: 0.0
Nuts - $CARBON_01.fid

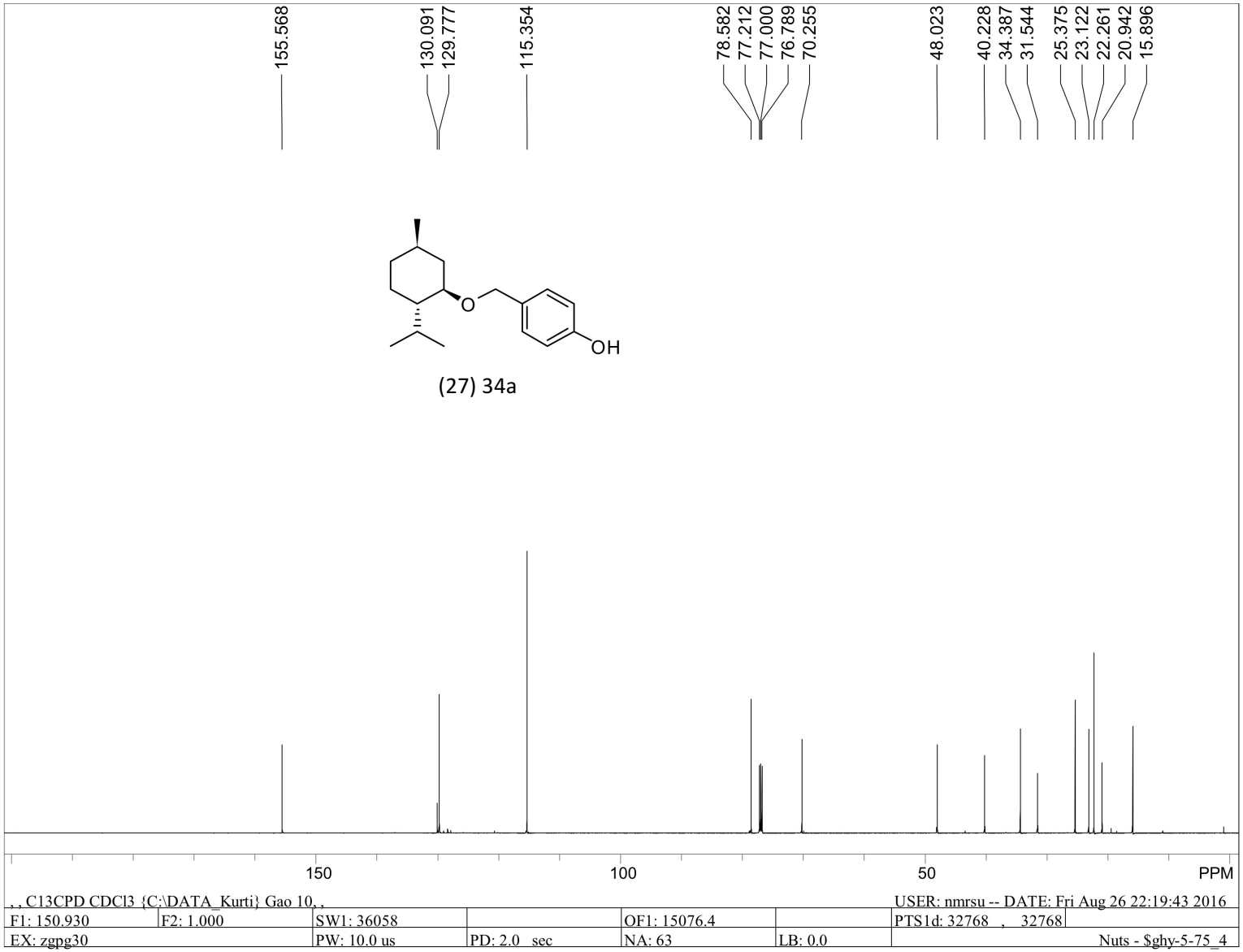

7.563
7.553
7.544
7.538
7.378
7.369
7.365
7.357
7.352
7.260
7.253
7.234
7.214
7.155
7.137
7.037
7.031
6.861
6.855
6.840
6.835
5.284
Ph
OH
(25) 33y
3.17
2.17
1.04
1.01
1.14
1.01
1.00
8
6
4
2
PPM
;blank line
USER: -- DATE: Apr 29 2015
F1: 399.678
F2: 100.508
SW1: 6410
OF1: 2405.3
PTS1d: 16384 , 16384
EX: s2pul
PW: 5.5 us
PD: 1.0 sec
NA: 16
LB: 0.0
Nuts - $PROTON_01.fid


155.188
131.602
129.661
128.325
124.434
124.368
123.025
118.193
115.762
89.439
88.942
77.321
77.000
76.679
Ph
OH
(25) 33y
150
100
50
PPM
;blank line
USER: -- DATE: Apr 29 2015
F1: 100.510
F2: 399.678
SW1: 24038
OF1: 11049.6
PTS1d: 32768 , 32768
EX: s2pul
PW: 5.3 us
PD: 1.0 sec
NA: 120
LB: 2.0
Nuts - $CARBON_01.fid


7.260
6.611
6.586
4.411
3.778
2.227
2.156
Me
OH
MeO
Me
(26) 33z
3.43
3.41
3.43
1.14
1.00
0.74
10
8
6
4
2
PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 9, ,
USER: nmrsu -- DATE: Wed May 25 22:17:32 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-5-27_1


151.660
147.088
125.081
121.056
117.593
113.356
77.211
77.000
76.789
56.080
15.750
15.699
Me
OH
MeO
Me
(26) 33z
150
100
50
PPM
, , C13CPD CDCl3 {C:\DATA_Kurti} Gao 9, ,
USER: nmrsu -- DATE: Wed May 25 22:23:12 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15084.1
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 100
LB: 0.0
Nuts - $ghy-5-27_2


7.181
7.166
6.723
6.719
6.705
4.600
4.581
4.359
4.340
3.226
3.220
3.209
3.202
3.191
3.184
2.294
2.283
2.278
2.267
2.200
2.180
1.662
1.636
1.631
1.614
1.609
1.383
1.364
1.344
1.322
1.304
1.284
0.993
0.977
0.972
0.946
0.935
0.893
0.881
0.871
0.866
0.846
0.706
0.695
0.097
O
OH
(27) 34a
10.05
3.31
2.21
1.95
2.01
1.00
0.89
0.93
1.05
0.96
1.08
1.02
10
8
6
4
2
0
-2PPM
, , PROTON CDCl3 {C:\DATA_Kurti} Gao 10, ,
USER: nmrsu -- DATE: Fri Aug 26 22:15:10 2016
F1: 600.184
F2: 1.000
SW1: 12019
OF1: 3692.8
PTS1d: 32768 , 32768
EX: zg30
PW: 10.0 us
PD: 1.0 sec
NA: 8
LB: 0.0
Nuts - $ghy-5-75_3


155.568
130.091
129.777
115.354
78.582
77.212
77.000
76.789
70.255
48.023
40.228
34.387
31.544
25.375
23.122
22.261
20.942
15.896
O
OH
150
100
50
PPM
. , C13CPD CDCl3 {C:\DATA_Kurti} Gao 10, ,
USER: nmrsu -- DATE: Fri Aug 26 22:19:43 2016
F1: 150.930
F2: 1.000
SW1: 36058
OF1: 15076.4
PTS1d: 32768 , 32768
EX: zgpg30
PW: 10.0 us
PD: 2.0 sec
NA: 63
LB: 0.0
Nuts - $ghy-5-75_4

(27) 34a