Synthesis of Aminoalcohols from Substituted Alkenes via Tungstenooxaziridine Catalysis

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Supporting Information

A. MATERIALS AND METHODS

Reagents were obtained from Aldrich Chemical (www.sigma-aldrich.com), Acros Organics (www.us.vwr.com) or Alfa Aesar (www.us.vwr.com) and used without further purification. Solvents were obtained from EMD Miliphore DrySol (www.us.vwr.com) and degassed with N_2. Solution phase reactions were performed in glass vials or round bottom flasks with inert atmosphere and magnetic stirring. Cold baths were generated as follows: 0 °C, wet ice/water; –10 °C, ice/acetone; –20 °C, dry ice/isopropanol monitored with a thermometer; –44 °C, dry ice/CH_3CN; –63 °C, dry ice/chloroform; –78 °C, dry ice/acetone; –100 °C, liquid nitrogen in hexanes/Et_2O. Heated reactions were performed using IKA heating blocks. TLC was performed on 0.25 mm E. Merck silica gel 60 F254 plates and visualized under UV light and/or the following stain solutions: cerium ammonium molybdate (CAM), phosphomolybdic acid (PMA), iodine (I_2), or *p*-anisaldehyde. Silica flash chromatography was performed on E. Merck 230–400 mesh silica gel 60. Automated chromatography was performed on a ISOLERA Prime instrument with 10 g. SNAP silica gel normal phase cartridges using a flow rate of 12.0 mL/min and a gradient of 0–100% EtOAc in heptanes over 20 min with UV detection at 254 nm. NMR spectra were recorded on a Bruker Avance Neo 400 MHz Spectrometer at 24 °C in $CDCl_3$ unless otherwise indicated. Chemical shifts are expressed in ppm relative to TMS (^{1}H, 0 ppm) or solvent signals: $CDCl_3$ (^{1}H, 7.23 ppm; ^{13}C, 77.0 ppm); coupling constants are expressed in Hz. Low and high resolution mass spectroscopy was performed on a Agilent 6230 Accurate-Mass Time-of-Flight 1290 Infinity UHPLC/MS. Elemental analysis was performed on a Perkin Elmer CHN 2400 analyzer.

General method for the synthesis of aminoalcohol 3:

In a 16 mL vial packed with a magnetic stirrer, sulfonamide (0.75 mmol, 1.5 equiv.) and TCCA (0.25 mmol, 0.5 equiv.) were mixed in CH_2Cl_2 (4 mL) at 0 °C for 30 min. The solvent was then removed under vacuum and the residue was reconstituted with CH_3CN/H_2O (4 mL, 10:1) and then WO_2Dipic(H_2O) (0.005 mmol, 1 mol%), TBAI (0.0375 mmol, 7.5 mol%) and alkene **2** (0.5 mmol, 1 equiv.) were added and the resulting mixture was allowed to stir for 16h or until disappearance of alkene by TLC. The crude was then filtered by a 1:1 silica gel/celite pad and the resulting crude was then purified by silica gel chromatography to provide the corresponding aminoalcohol **3**.

Mechanism and kinetic experiments:

Based on our previous efforts on studying the kinetics of metallooxaziridine catalysis. We anticipate [Ts-chloramine] having saturation kinetics, thus WO_2Dipic(H_2O) would undergo fast reaction with Ts-chloramine to form complex **1** prior to alkene coordination. Moreover, if the hydrolytic step is the rate-determining-step, the rate constant for tungstenooxaziridine addition to form intermediate **A** must be much larger than the rate constant for the hydrolytic step. Given the fact that H_2O is in high excess relative to the substrate, we anticipate pseudo-first-order kinetics for this reaction. We tested pseudo-first order kinetics for styrene and four other para-substituted styrenes (Figure S1).

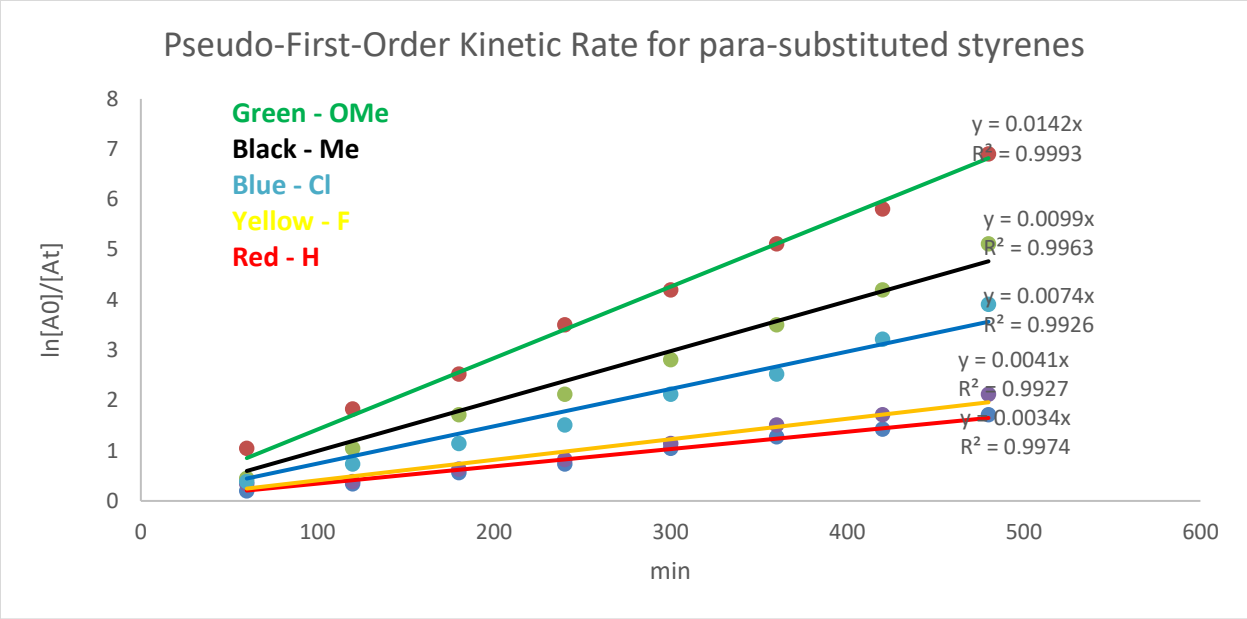
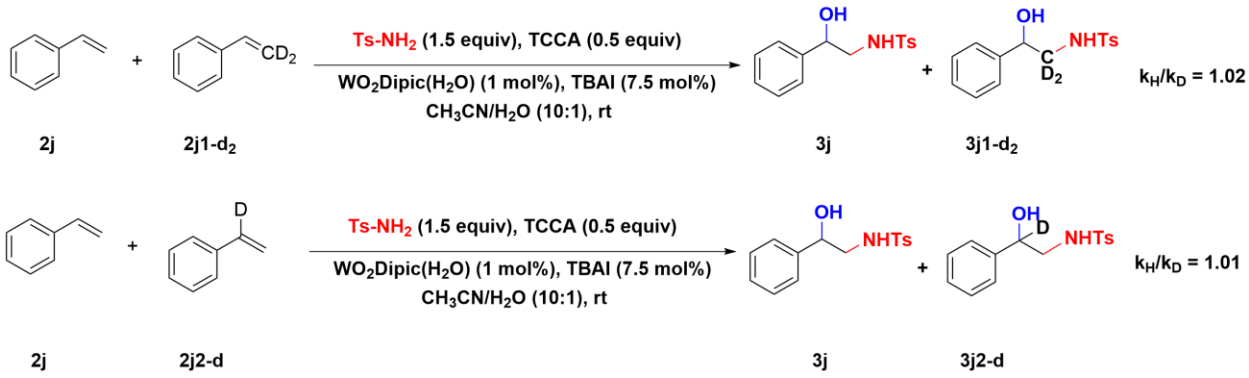


Figure S1. Pseudo-first order kinetic rate plots for different para-substituted styrenes.

Reaction rates in kinetic experiments were monitored every hour up to full conversion to aminoalcohol **3j**, **3k**, **3p**, **3s**, and **3t**. The observed pseudo-first order kinetic plots for para-substituted styrenes are in agreement with fast addition of tungstenooxaziridine across alkene and slow, rate-determining-step, hydrolytic step.

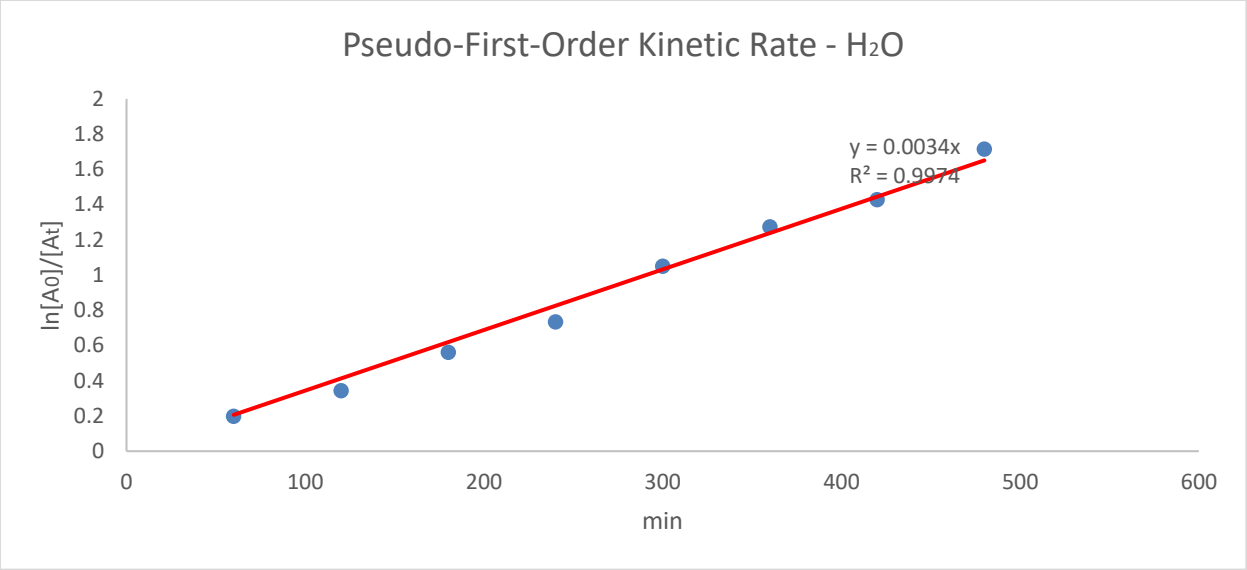
General procedure for pseudo-first-order kinetic plots: In a 16 mL vial packed with a magnetic stirrer, toluenesulfonamide (1.5 mmol, 3 equiv.) and TCCA (0.5 mmol, 1 equiv.) were mixed in CH_2Cl_2 (12 mL) at 0 °C for 30 min. The solvent was then removed under vacuum and the residue was reconstituted with CH_3CN/H_2O (12 mL, 10:1) and then $WO_2Dipic(H_2O)$ (0.005 mmol, 1 mol%), TBAI (0.0375 mmol, 7.5 mol%) and alkene **2j** (1.5 mmol, 3 equiv.) were added. Aliquots (200 µL) were removed periodically over a period of 12 hours, filtered by a 1:1 silica gel/celite pad, washed with EtOAc and the resulting mixture was then analyzed by ^{1}H-NMR to quantify the formation of aminoalcohol **3j**.



Scheme S1. Deuterium-labeling competition experiments.

Competition experiments: These experiments were designed using deuterated α-*d* styrene 2j2-*d* and β-*d*$_2$ styrene 2j1-*d*$_2$ were designed to address the nature of the proposed catalytic cycle (Scheme S1). A competition experiment between 2j versus 2j1-*d*$_2$ and 2j versus 2j2-*d* would provide secondary kinetic isotope effect data. Thus, both mixtures (1:1, 4 equiv. each) of 2j/2j1-*d*$_2$ and 2j/2i2-*d* were reacted under general method to provide the respective aminoalcohols 3j, 3j1-*d*$_2$, and 3j2-*d*. After correcting for 2j1-*d*$_2$ deuterium purity (96%-*d*) and

2j2-*d* deuterium purity (95%-*d*), we obtained k_H/k_D of 1.02 and 1.01 respectively. The lack of secondary kinetic isotope effect confirms that tungstenoxaziridine addition across the alkene is rather fast. This is also in agreement with a highly concerted tungstenooxazolidine (intermediate **A**) formation step, thus supporting the formation of a biradical species in the transition state.



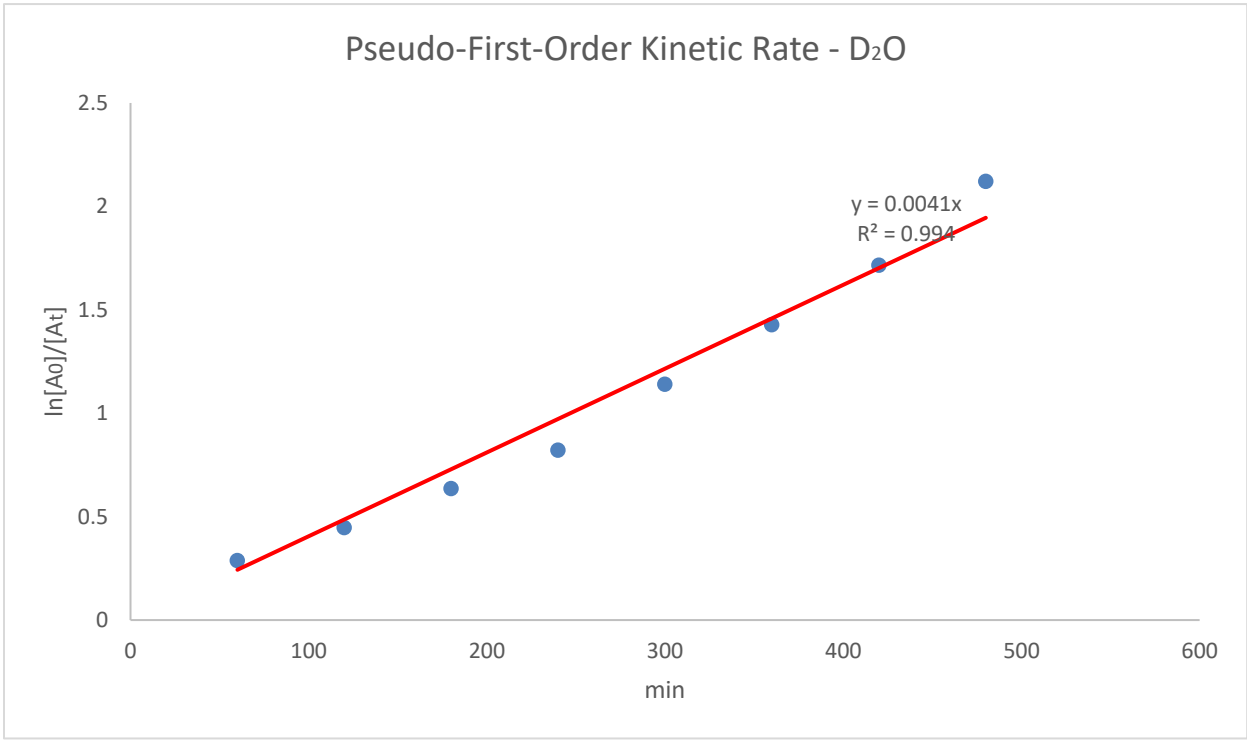


Figure S2. Pseudo-first-order kinetic plots for KSIE.

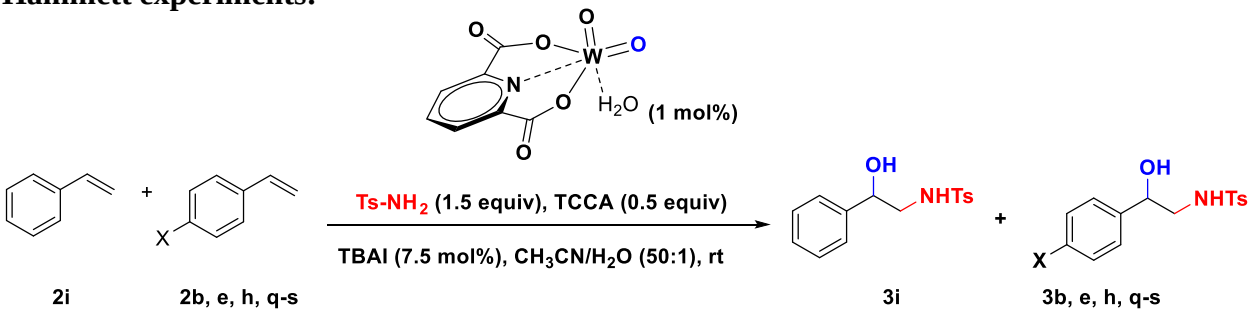
Kinetic solvent isotope effect (KSIE) studies were also performed using **2j** in CH_3CN/H_2O and CH_3CN/D_2O. Pseudo-first order kinetic plots were determined for both conditions and the rate constants determined (Figure S2). The results indicate a clear rate acceleration from CH_3CN/H_2O

to CH_3CN/D_2O, with a K_{H2O}/K_{D2O} = 0.83. The inverse KSIE corroborates that hydrolysis is the rate-determining-step and that a second molecule of H_2O participates during the hydrolytic rate-determining-step.

General Procedure for competition experiments with deuterated-alkenes: In a 16 mL vial packed with a magnetic stirrer, toluenesulfonamide (0.75 mmol, 1.5 equiv.) and TCCA (0.25 mmol, 0.5 equiv.) were mixed in CH_2Cl_2 (4 mL) at 0 °C for 30 min. The solvent was then removed under vacuum and the residue was reconstituted with CH_3CN/H_2O (4 mL, 10:1) and then WO_2Dipic(H_2O) (0.005 mmol, 1 mol%), TBAI (0.0375 mmol, 7.5 mol%) and alkene **2j** (0.25 mmol, 0.5 equiv.), and alkene **2j1-d$_2$** (0.25 mmol, 0.5 equiv.) were added. The reaction was then quickly flashed with nitrogen and allowed to stir at rt for 8 hours. The crude was then filtered by a 1:1 silica gel/celite pad and the resulting mixture was then purified by silica gel chromatography and the ratio of aminoalcohols **3j** and **3j1-d$_2$** was calculated from the resulting ^{1}H-NMR spectra.

General procedure for KSIE under pseudo-first-order rate constants: In a 16 mL vial packed with a magnetic stirrer, toluenesulfonamide (1.5 mmol, 3 equiv.) and TCCA (0.5 mmol, 1 equiv.) were mixed in CH_2Cl_2 (12 mL) at 0 °C for 30 min. The solvent was then removed under vacuum and the residue was reconstituted with CH_3CN/D_2O (12 mL, 10:1) and then WO_2Dipic(H_2O) (0.005 mmol, 1 mol%), TBAI (0.0375 mmol, 7.5 mol%) and alkene **2j** (1.5 mmol, 3 equiv.) were added. Aliquots (200 µL) were removed periodically over a period of 12 hours, filtered by a 1:1 silica gel/celite pad, washed with EtOAc and the resulting mixture was then analyzed by ^{1}H-NMR to quantify the formation of aminoalcohol **3j**.

Hammett experiments:



General Procedure for competition experiments for Hammett plot: In a 16 mL vial packed with a magnetic stirrer, toluenesulfonamide (0.75 mmol, 1.5 equiv.) and TCCA (0.25 mmol, 0.5 equiv.) were mixed in CH_2Cl_2 (8 mL) at 0 °C for 30 min. The solvent was then removed under vacuum and the residue was reconstituted with CH_3CN/H_2O (8 mL, 10:1) and then WO_2Dipic(H_2O) (0.005 mmol, 1 mol%), TBAI (0.0375 mmol, 7.5 mol%) and alkene **2j** (1 mmol, 2 equiv.), and alkene **2k** (1 mmol, 2 equiv.) were added. The reaction was then quickly flashed with nitrogen and allowed to stir at rt for 12 hours. The crude was then filtered by a 1:1 silica gel/celite pad and the resulting mixture was then purified by silica gel chromatography and the ratio of aminoalcohols **3j** and **3k** was calculated from the resulting ^{1}H-NMR spectra. The same procedure was performed separately for alkenes **2n**, **2p**, **2s-u**.

Entry	X	K_X/K_H	$Log(K_X/K_H)$	constant
1	H	1	0	0
2	Me	1.93	0.2855	-0.17
3	t-Bu	2.48	0.3944	-0.20
4	MeO	3.18	0.5024	-0.27
5	Cl	1.52	0.1818	0.23

6	I	1.34	0.1271	0.18
7	F	1.12	0.0492	0.06

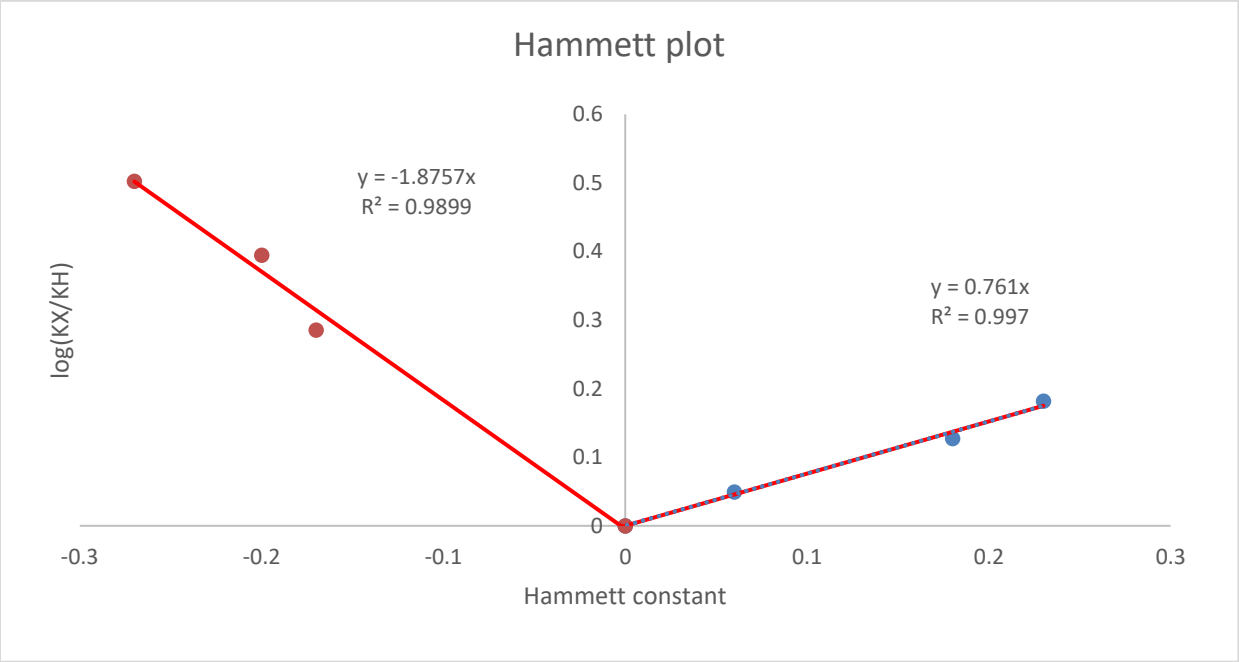


Figure S3. Hammet plot.

The Hammett experiments provided a ρ = -1.87 for EDGs and 0.75 for EWGs, indicating that both groups lead to increase rates of oxyamination. This result is in agreement with a fast and highly concerted *syn*-addition of tungstenooxaziridine **1** across **2**. This is also in agreement with the development of a biradical character through *N*-*O* bond homolytic cleavage in the transition state. The observed acceleration in the hydrolytic rate-determining-step can be rationalized for EDG as a positive charge develops on the tungstenooxazolidine *O* in **TS-A**. On the other hand, the observed small acceleration in the hydrolytic step for EWG is rationalized as a small negative charge develops in the tungstenooxazolidine *N* in **TS-B**. In **TS-A** the H_2O low-field ligand does not engage in proton transfer, thus allowing for the *O* to develop a strong positive charge. While, in **TS-B** the H_2O low-field ligand participates in intramolecular proton transfer to accelerate the hydrolysis as the weakly negative charges develop on *N* (Figure S4).

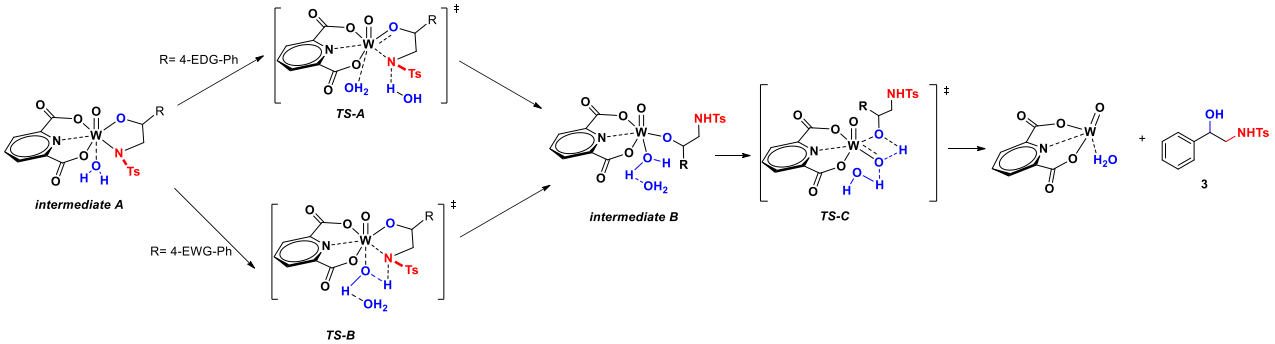


Figure S4. Proposed mechanistic rationales for oxyamination catalytic cycle.

Intermediate A characterization:

We prepared a stoichiometric reaction (1 equiv. of 1 + 1 equiv. 4-methoxystyrene) in CH_3CN under anhydrous conditions, and we were able to observe intermediate A by mass spectrometry (ESI *m/z* : M+H = 703.3. characteristic isotopic pattern for W was observed) and by ^{1}H-NMR. It is clear by this experiment that in complete absence of exogenous water, intermediate **A** does not undergo hydrolysis to eventually form the aminohydroxylation product. This mixture was then reacted with 20 equiv. of H_2O and the expected aminohydroxylation **3p** was then observed. These results prove the formation of intermediate **A**, but also demonstrate that a second molecule of water is needed to trigger the hydrolysis step and thus be included in the mechanism.

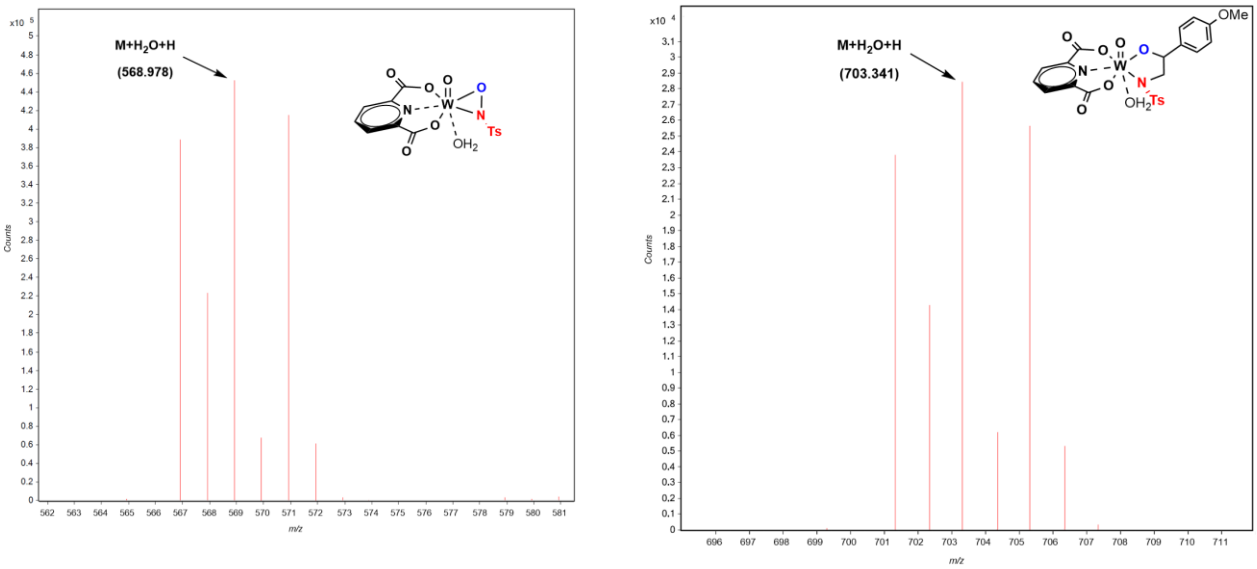


Figure S6. MS for tungstenooxaziridine 1 and intermediate A.

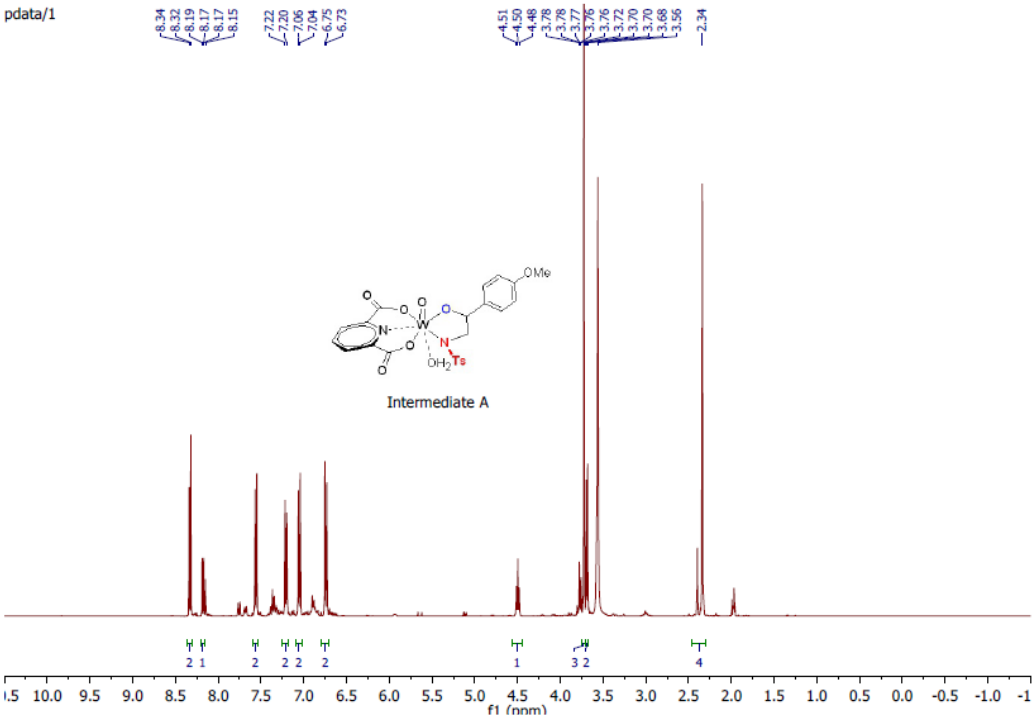
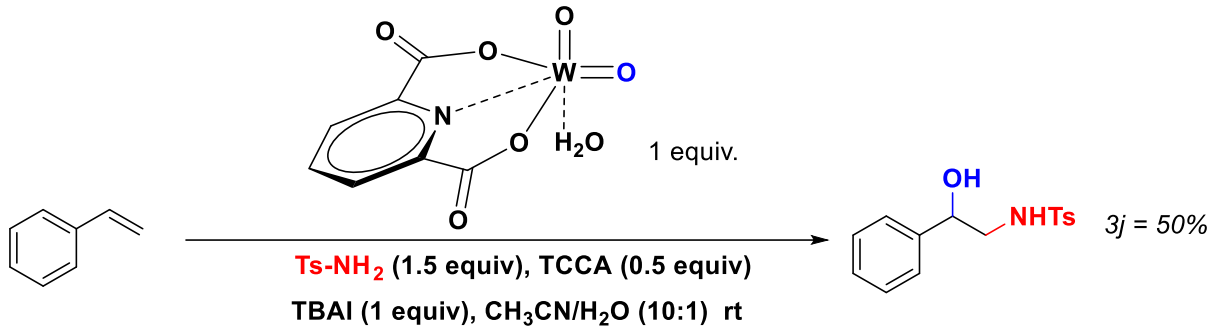
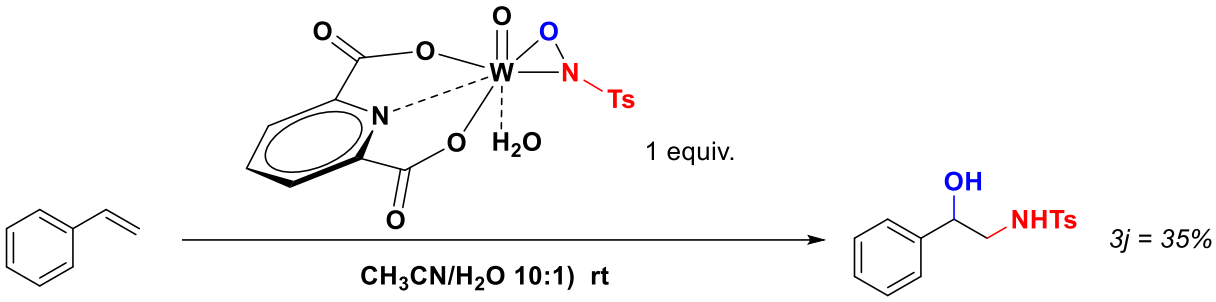


Figure S7. H-NMR for intermediate A in CD_3CN.

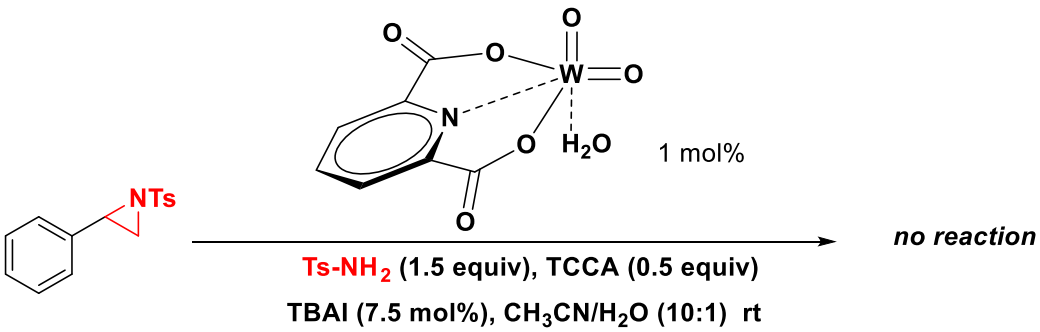
Control experiments: Experiments in the absence of WO_2Dipic(H_2O) did not provide any product **3**. Moreover, no combination of sulfonamide/TCAA and PTC were able to produce aminoalcohol **3**. The reaction under catalytic conditions in the absence of PTC achieves moderate conversion for **3j** (35%) after 96h.
Below there is a list of some other control experiments that further validate the proposed mechanism:



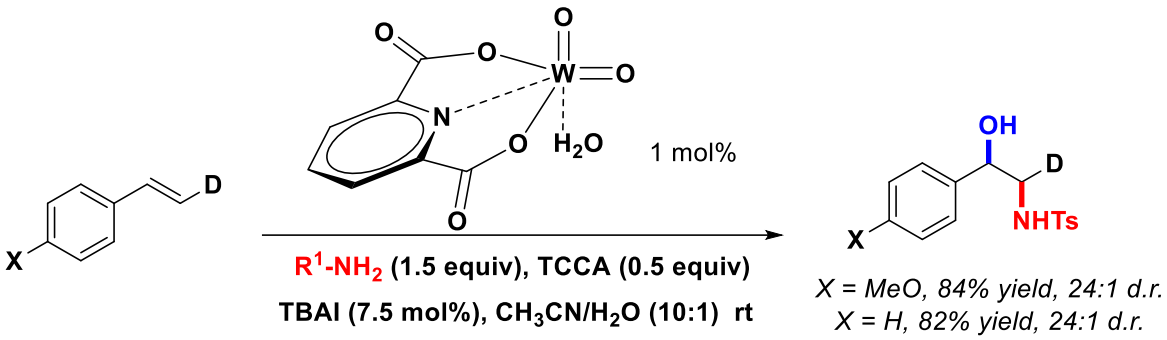
The reaction with stoichiometric amounts of WO_2Dipic(H_2O) proved to work in moderate yield. WO_2Dipic(H_2O) is a light green solid and tungstenooxaziridine **1** (active catalyst) is a slightly darker green solid, thus upon mixing WO_2Dipic(H_2O) with sulfonamide/TCCA we did observe a subtle change in color. However, the liquid/solid interface was greatly disturbed, and the increased heterogeneity hurt the reaction conversion. The conversion to **3** validates the required formation of active catalyst **1** to promote the observed reaction. Moreover, MS proves the formation of **1** and that it can be measured spectroscopically.



The reaction with stoichiometric amounts of **1** provided the expected product in low yield. Despite the increased solubility of **1**, the reaction was cloudy and after 3 h the reaction was completely heterogeneous. Despite the low conversion due to decomposition pathways, this experiment further proves that the reaction does not go through a LA-activated pathway neither PTC plays a role in the actual transformation. Thus, providing further evidence for the proposed pathway and the first report of a metallooxaziridine-mediated oxyamination reaction.

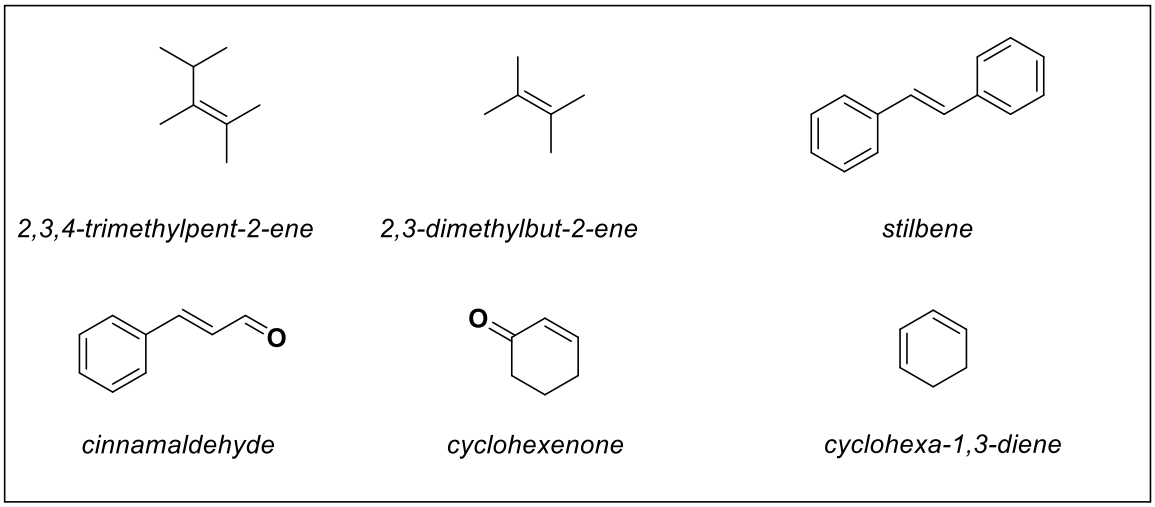


Under the reaction conditions, 2-phenyl-1-tosylaziridine does not react and no traces of the respective aminoalcohol are observed in the crude reaction mixture. This clearly indicated that aziridine is not an intermediate for this oxyamination reaction.

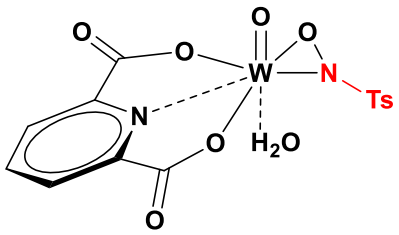


The reaction with β-D styrenes provided further evidence that the reaction is highly stereospecific and that a highly concerted pathway is likely due to the lack of observable 1,2-H/D exchange. These ratios were measured by analysis of the crude ^{1}H-NMR spectra.

List of other substrates that failed to react in comparable yields:

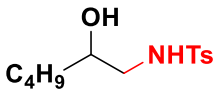


B. SYNTHESIS OF TUNGSTENOOXAZIRIDINE 1:

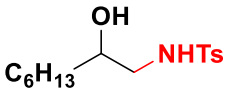


N-tosyl-Dipic(H_2O)Tungstenooxaziridine (1): WO_2Cl_2 (10 mmol, 1 equiv.) is mixed in CH_2Cl_2 (0.1M, 100 mL) with Dipic (10 mmol, 1 equiv.) and H_2O (10 mmol, 1 equiv.) and the resulting heterogeneous mixture allowed to react at rt for 2 hours. The filtrate was then washed with CH_2Cl_2 and dried under vacuum to obtain residue. Toluenesulfonamide (10 mmol, 1 equiv.) and TCCA (3.35 mmol, 0.33 equiv) were dissolved in CH_2Cl_2 (0.1M, 100 mL) at 0 ºC for 30 min. The resulting crude is then dried under vacuum and then reconstituted in MeOH (0.1M, 100 mL) and then added to the residue **A** and the resulting heterogeneous mixture is then stirred vigorously at rt for 8h. The reaction is then allowed to settle, and the supernatant is removed and another portion of MeOH (100 mL) is added, and the reaction is then stirred at rt for another hour. This step was repeated two more times to provide pure tungstenoxaziridine **1** as green crystals (3.280 g, 6.4 mmol, 64% yield). **MP**: 251-253°C. **^{1}H-NMR** (400 MHz, CD_3OD): δ 8.26-8.24 (m, 2H), 8.10 (t, *J* = 9.3 Hz, 1H), 7.68 (d, *J* = 8.4 Hz, 2H), 7.25 (d, *J* = 8.4, 2H), 2.32 (s, 3H). **^{13}C-NMR** (100 MHz, CD_3OD): δ 165.7, 164.9, 148.2, 147.5, 139.5, 138.9, 127.9, 127.7, 34.1 ppm. **ESI-MS** *m/z* (rel int): (pos) 590.5 ($[M+Na]^+$, 100). **Anal.** Calculated for: $C_{14}H_{12}N_2O_9SW$: C, 29.60; H, 2.13; N, 4.93. Found: C, 29.64; H, 2.24; N, 4.97.

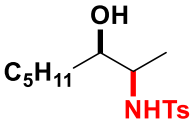
C. SYNTHESIS OF AMINOALCOHOLS FROM TABLES 2, 3 AND 4:



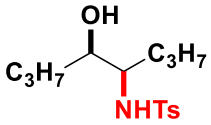
N-(2-hydroxyhexyl)-4-methylbenzenesulfonamide (3a): Alkene **2a** (0.1 mmol) reacted under the general method to produce aminoalcohol **3b** as a white solid (24 mg, 0.088 mmol, 88%). **TLC**: R_f : 0.28 (2:1 heptanes/EtOAc).[2] **IR** (thin film): υ 3850, 3230, 2950, 1700, 1503, 1340, 1160, 970 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.69 (d, *J* = 8.0 Hz, 2H), 7.24 (d, *J* = 8.0 Hz, 2H), 5.12 (bs, 1H), 3.63-3.60 (m, 1H), 2.99 (dd, *J* = 8.8, 3.5 Hz, 1H), 2.71(dd, *J* = 8.8, 5.3 Hz, 1H), 2.35 (s 3H), 2.06 (bs, 1H), 1.33-1.33 (m, 2H), 1.23-1.16 (m, 4H), 0.80 (t, *J* = 7.5 Hz, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.6, 136.6, 129.9, 127.2, 70.5, 48.7, 34.3, 27.5, 22.6, 21.6, 14.0 ppm. **ESI-MS** *m/z* (rel int): (pos) 272.1 ($[M+H]^+$, 100); (neg) 270.1 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{13}H_{22}NO_3S^+$: 272.13149, found: 272.13158. Absolute difference (ppm): 0.31.



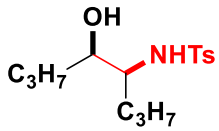
N-(2-hydroxyoctyl)-4-methylbenzenesulfonamide (3b): Alkene **2b** (0.1 mmol) reacted under the general method to produce aminoalcohol **3b** as a white solid (27 mg, 0.091 mmol, 91%).[3] **TLC**: R_f : 0.28 (2:1 heptanes/EtOAc).[3] **IR** (thin film): υ 3805, 3203, 2932, 1717, 1512, 1331, 1151, 961 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.67 (d, *J* = 8.2 Hz, 2H), 7.21 (d, *J* = 8.2 Hz, 2H), 5.36 (bs, 1H), 3.62-3.58 (m, 1H), 2.98 (dd, *J* = 8.8, 2.6 Hz, 1H), 2.71 (dd, *J* = 8.8, 4.8 Hz, 1H), 2.43 (bs, 1H), 234 (s 3H), 1.29-128 (m, 2H), 1.19-1.16 (m, 8H), 0.78 (t, *J* = 7.5 Hz, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.5, 136.6, 129.8, 127.1, 70.5, 48.7, 34.6, 31.7, 29.2, 25.4, 22.6, 21.6, 14.1 ppm. **ESI-MS** *m/z* (rel int): (pos) 300.2 ($[M+H]^+$, 100); (neg) 298.2 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{15}H_{26}NO_3S^+$: 300.16279, found: 300.16248. Absolute difference (ppm): 1.03.



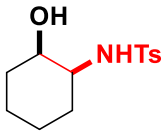
N-((2R*,3R*)-3-hydroxy-2-octyl)-4-methylbenzenesulfonamide (3c): Alkene **2c** (0.1 mmol) reacted under the general method to produce aminoalcohol **3c** as a white solid (24 mg, 0.082 mmol, 82%). **TLC**: R_f : 0.26 (2:1 heptanes/EtOAc).[4] **IR** (thin film): υ 3832, 3212, 2923, 1726, 1521, 1322, 1142, 952 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.72 (d, *J* = 8.2 Hz, 2H), 7.34 (d, *J* = 8.2 Hz, 2H), 3.61 (dq, *J* = 8.8, 7.1 Hz, 1H), 3.37 (ddd, *J* = 8.8, 6.4, 4.3 Hz, 1H), 2.44 (s 3H), 1.38 (d, *J* = 7.1 Hz, 3H), 1.34-1.32 (m, 1H), 1.16-1.07 (m, 7H), 0.88 (t, *J* = 7.5 Hz, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 144.4, 135.9, 129.9, 127.2, 72.5, 61.2, 35.7, 24.8, 22.6, 22.4, 21.6, 17.6, 14.1 ppm. **ESI-MS** *m/z* (rel int): (pos) 300.2 ($[M+H]^+$, 100); (neg) 298.2 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{15}H_{26}NO_3S^+$: 300.16279, found: 300.16224. Absolute difference (ppm): 1.83.



N-((4R*,5R*)-5-hydroxy-4-octyl)-4-methylbenzenesulfonamide (3d): Alkene **2d** (0.1 mmol) reacted under the general method to produce aminoalcohol **3d** as a white solid (25 mg, 0.084 mmol, 84%). **TLC**: R_f : 0.32 (2:1 heptanes/EtOAc).[5] **IR** (thin film): υ 3841, 3221, 2914, 1735, 1503, 1304, 1133, 934 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.68 (d, *J* = 8.0 Hz, 2H), 7.17 (d, *J* = 8.0 Hz, 2H), 5.59 (d, *J* = 6.4, 1H), 3.46-3.43 (m, 1H), 3.05 (ddt, *J* = 6.8, 6.4, 4.8 Hz, 1H), 2.94 (bs, 1H), 2.30 (s 3H), 1.41-1.37 (m, 2H), 1.27-1.18 (m, 4H), 1.10-1.03 (m, 2H), 0.69 (t, *J* = 7.5 Hz, 3H), 0.62 (t, *J* = 7.5 Hz, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.0, 138.6, 129.5, 126.9, 72.1, 57.5, 36.0, 34.5, 21.4, 18.9, 13.9, 13.8 ppm. **ESI-MS** *m/z* (rel int): (pos) 300.2 ($[M+H]^+$, 100); (neg) 298.2 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{15}H_{26}NO_3S^+$: 300.16279, found: 300.16305. Absolute difference (ppm): 2.35.

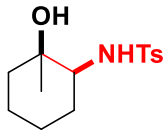


N-((4S*,5R*)-5-hydroxy-4-octyl)-4-methylbenzenesulfonamide (3e): Alkene **2e** (0.1 mmol) reacted under the general method to produce aminoalcohol **3e** as a white solid (26 mg, 0.088 mmol, 88%). **TLC**: R_f : 0.32 (2:1 heptanes/EtOAc).[5] **IR** (thin film): υ 3850, 3203, 2905, 1744, 1512, 1313, 1124, 943 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.72 (d, *J* = 8.0 Hz, 2H), 7.21 (d, *J* = 8.0 Hz, 2H), 5.46 (d, *J* = 6.4, 1H), 3.47-3.43 (m, 1H), 3.10 (dt, *J* = 7.1, 5.3 Hz, 1H), 2.33 (s 3H), 1.38-1.34 (m, 3H), 1.27-1.19 (m, 4H), 0.92-0.88 (m, 1H), 0.77 (t, *J* = 7.5 Hz, 3H), 0.62 (t, *J* = 7.5 Hz, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.3, 137.8, 129.6, 127.1, 73.4, 58.1, 34.9, 30.8, 21.5, 19.2, 18.9, 13.9, 13.7 ppm. **ESI-MS** *m/z* (rel int): (pos) 300.2 ($[M+H]^+$, 100); (neg) 298.2 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{15}H_{26}NO_2S^+$: 300.16279, found: 300.16233. Absolute difference (ppm): 1.52.

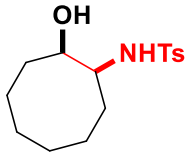


N-((1S*,2R*)-2-hydroxycyclohexyl)-4-methylbenzenesulfonamide (3f): Alkene **2f** (0.1 mmol) reacted under the general method to produce aminoalcohol **3f** as a white solid (25 mg, 0.093 mmol, 93%). **TLC**: R_f : 0.0.35 (2:1 heptanes/EtOAc).[2] **IR** (thin film): υ 3832, 3230, 2950, 1708, 1503, 1313, 1124, 971 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.72 (d, *J* = 8.0 Hz, 2H), 7.25 (d, *J* = 8.0 Hz, 2H), 4.77 (d, *J* = 4.8 Hz, 1H), 3.72 (dt, *J* = 6.8, 3.5 Hz, 1H), 3.15 (dt, *J* = 5.8, 3.5 Hz, 1H), 2.36 (s 3H), 1.61-1.52 (m, 6H), 1.34-1.25 (m, 2H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.1, 137.5, 129.8, 127.1, 68.8, 55.1, 31.5, 28.0, 23.6, 21.6, 19.8 ppm. **ESI-MS** *m/z* (rel int): (pos) 270.1

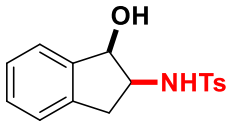
([M+H]$^+$, 100); (neg) 268.1 ([M–H]$^-$, 100). **HRMS** (ESI): [M+H]$^+$ Calculated for: $C_{13}H_{20}NO_3S^+$: 270.11584, found: 270.11564. Absolute difference (ppm): 0.74.



N-((1S*,2S*)-2-hydroxy-2-methylcyclohexyl)-4-methylbenzenesulfonamide (3g): Alkene **2g** (0.1 mmol) reacted under the general method to produce aminoalcohol **3g** as a white solid (26 mg, 0.091 mmol, 91%). **TLC**: R_f: 0.35 (2:1 heptanes/EtOAc).[6] **IR** (thin film): υ 3823, 3212, 2941, 1717, 1521, 1331, 1142, 962 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.69 (d, *J* = 8.2 Hz, 2H), 7.21 (d, *J* = 8.2 Hz, 2H), 5.03 (d, *J* = 3.5, 1H), 2.94 (ddd, *J* = 8.2, 4.0, 3.5 Hz, 1H), 2.34 (s 3H), 1.70 (bs, 1H), 1,64-1.61 (m, 1H), 1.52-1.47 (m, 1H), 1.36-1.32 (m, 6H), 1.07 (s, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.1, 138.6, 129.6, 126.9, 71.4, 59.2, 38.9, 29.6, 27.8, 24.6, 21.6, 20.9 ppm. **ESI-MS** *m/z* (rel int): (pos) 284.1 ([M+H]$^+$, 100); (neg) 282.1 ([M–H]$^-$, 100). **HRMS** (ESI): [M+H]$^+$ Calculated for: $C_{14}H_{22}NO_3S^+$: 284.13149, found: 284.13161. Absolute difference (ppm): 0.42.

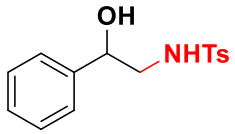


N-((1S*,2R*)-2-hydroxycyclooctyl)-4-methylbenzenesulfonamide (3h): Alkene **2h** (0.1 mmol) reacted under the general method to produce aminoalcohol **3h** as a white solid (28 mg, 0.095 mmol, 95%). **TLC**: R_f : 0.36 (2:1 heptanes/EtOAc). **IR** (thin film): υ 3841, 3230, 2914, 1771, 1530, 1340, 1160, 926 cm^{-1}.**^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.78 (d, *J* = 8.2 Hz, 2H), 7.30 (d, *J* = 8.2 Hz, 2H), 5.03 (d, *J* = 2.8, 1H), 3.96 (td, *J* = 5.3, 3.3 Hz, 1H), 3.41 (td, *J* = 5.1, 3.3 Hz, 1H), 2.40 (s 3H), 2.18-1.96 (m, 3H), 1.85-1.75 (m, 5H), 1.76-1.72 (m, 2H), 1.52-1.47 (m, 2H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.5, 136.7, 129.6, 127.6, 65.7, 60.6, 31.9, 31.3, 25.6, 25.4, 25.3, 23.9, 21.6 ppm. **ESI-MS** *m/z* (rel int): (pos) 298.2 ([M+H]$^+$, 100); (neg) 296.2 ([M–H]$^-$, 100). **HRMS** (ESI): [M+H]$^+$ Calculated for: $C_{15}H_{24}NO_3S^+$: 298.14714, found: 298.14727. Absolute difference (ppm): 0.44.

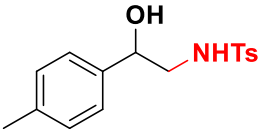


N-((1R*,2S*)-1-hydroxy-2,3-dihydro-1H-inden-2-yl)-4-methylbenzenesulfonamide (3i): Alkene **2i** (0.1 mmol) reacted under the general method to produce aminoalcohol **3i** as a pale yellow solid (28 mg, 0.092 mmol, 92%). **TLC**: R_f : 0.42 (2:1 heptanes/EtOAc).[6] **IR** (thin film): υ 3804, 3207, 2925, 1780, 1520, 1348, 1160, 962 cm^{-1}.**^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.88 (d, *J* = 8.2 Hz, 2H), 7.36 (d, *J* = 8.2 Hz, 2H), 7.24-7.21 (m, 4H), 5.36 (d, *J* = 6.2 Hz, 1H), 5.03 (dd, *J* = 6.2, 3.5 Hz, 1H), 4.46 (td, *J* = 4.4, 3.5 Hz, 1H), 3.29 (dd, *J* = 16.1, 6.4 Hz, 1H), 3.14 (dd, *J* = 16.1, 2.4 Hz, 1H) 2.46 (s, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.9, 138.7, 137.9, 137.8, 130.0, 128.7, 127.6, 127.3, 125.2, 124.4, 65.3, 61.4, 40.6, 21.5 ppm. **ESI-MS** *m/z* (rel int): (pos) 304.1 ([M+H]$^+$,

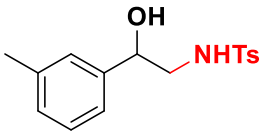
100); (neg) 302.1 ([M–H]$^-$, 100). **HRMS** (ESI): [M+H]$^+$ Calculated for: $C_{16}H_{18}NO_3S^+$: 304.10019, found: 304.10044. Absolute difference (ppm): 0.82.



N-(2-hydroxy-2-phenylethyl)-4-methylbenzenesulfonamide (3j): Alkene **2j** (0.1 mmol) reacted under the general method to produce aminoalcohol **3j** as a white solid (26 mg, 0.091 mmol, 91%). **TLC**: R_f : 0.40 (2:1 heptanes/EtOAc).[2] **IR** (thin film): υ 3841, 3221, 2941, 1762, 1521, 1344, 1142, 961 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.63 (d, *J* = 8.2 Hz, 2H), 7.25-7.19 (m, 7H), 5.03 (bs, 1H), 4.73 (dd, *J* = 6.4, 4.8 Hz, 1H), 3.18-3.15 (m, 1H), 2.95 (ddd, *J* = 6.4, 5.8, 4.8 Hz, 1H), 2.35 (s, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.7, 140.8, 136.6, 129.9, 128.7, 128.3, 127.1, 125.8, 72.8, 50.2, 21.6 ppm. **ESI-MS** *m/z* (rel int): (pos) 292.1 ([M+H]$^+$, 100); (neg) 290.1 ([M–H]$^-$, 100). **HRMS** (ESI): [M+H]$^+$ Calculated for: $C_{15}H_{18}NO_3S^+$: 292.10019, found: 292.10026. Absolute difference (ppm): 1.24.

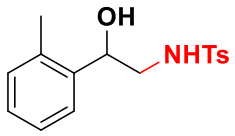


N-(2-hydroxy-2-(p-tolyl)ethyl)-4-methylbenzenesulfonamide (3k): Alkene **2k** (0.1 mmol) reacted under the general method to produce aminoalcohol **3k** as a white solid (27 mg, 0.088 mmol, 88%). **TLC**: R_f : 0.53 (2:1 heptanes/EtOAc).[7] **IR** (thin film): υ 3850, 3230, 2981, 1755, 1555, 1304, 1124, 943 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.63 (d, *J* = 8.0 Hz, 2H), 7.21 (d, *J* = 8.0 Hz, 2H), 7.08-7.06 (m, 4H), 5.03 (dd, *J* = 3.5, 3.2, 1H), 4.69 (dd, *J* = 8.2, 6.2 Hz, 1H), 3.16 (ddd, *J* = 8.2, 7.1, 3.5 Hz, 1H), 2.93 (ddd, *J* = 7.1, 6.2, 3.2 Hz, 1H), 2.36 (s 3H), 2.25 (s, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.6, 138.1, 137.8, 136.7, 129.8, 129.4, 127.1, 126.5, 72.6, 50.2, 21.6, 21.1 ppm. **ESI-MS** *m/z* (rel int): (pos) 306.1 ([M+H]$^+$, 100); (neg) 304.1 ([M–H]$^-$, 100). **HRMS** (ESI): [M+H]$^+$ Calculated for: $C_{16}H_{20}NO_3S^+$: 306.11584, found: 306.11562. Absolute difference (ppm): 0.69.

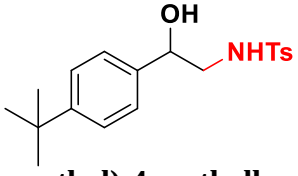


N-(2-hydroxy-2-(m-tolyl)ethyl)-4-methylbenzenesulfonamide (3l): Alkene **2l** (0.1 mmol) reacted under the general method to produce aminoalcohol **3l** as a white solid (27 mg, 0.089 mmol, 89%). **TLC**: R_f : 0.53 (2:1 heptanes/EtOAc).[7] **IR** (thin film): υ 3841, 3203, 2981, 1753, 1555, 1322, 1140, 952 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.64 (d, *J* = 8.0 Hz, 2H), 7.18 (d, *J* = 8.0

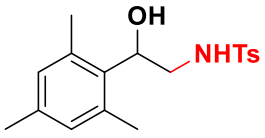
Hz, 2H), 7.10-7.08 (m, 1H), 6.99-6.96 (m, 3H), 5.36 (dd, *J* = 3.5, 3.2, 1H), 4.66 (dd, *J* = 8.2, 6.2 Hz, 1H), 3.14 (ddd, *J* = 8.2, 7.1, 3.5 Hz, 1H), 2.91 (ddd, *J* = 7.1, 6.2, 3.2 Hz, 1H), 2.32 (s 3H), 2.22 (s, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.6, 140.8, 138.4, 136.7, 129.8, 128.9, 128.5, 127.1, 126.6, 122.9, 72.8, 50.3, 21.6, 21.4 ppm. **ESI-MS** *m/z* (rel int): (pos) 306.1 ($[M+H]^+$, 100); (neg) 304.1 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{16}H_{20}NO_3S^+$: 306.11584, found: 306.11553. Absolute difference (ppm): 1.01.



N-(2-hydroxy-2-(o-tolyl)ethyl)-4-methylbenzenesulfonamide (3m): Alkene **2m** (0.1 mmol) reacted under the general method to produce aminoalcohol **3m** as a white solid (26 mg, 0.086 mmol, 86%). **TLC**: R_f : 0.53 (2:1 heptanes/EtOAc).[7] **IR** (thin film): υ 3839, 3230, 2918, 1735, 1551, 1322, 1142, 953 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.66 (d, *J* = 8.0 Hz, 2H), 7.32-7.30 (m, 1H), 7.21 (d, *J* = 8.0 Hz, 2H), 7.08-7.06 (m, 2H), 7.01-6.99 (m, 1H), 5.51 (dd, *J* = 3.5, 3.2, 1H), 4.93 (dd, *J* = 8.2, 6.2 Hz, 1H), 3.09 (ddd, *J* = 8.2, 7.1, 3.5 Hz, 1H), 2.84 (ddd, *J* = 7.1, 6.2, 3.2 Hz, 1H), 2.33 (s 3H), 2.15 (s, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.6, 139.0, 136.8, 134.6, 130.5, 129.8, 127.9, 127.1, 126.4, 125.4, 69.6, 49.2, 21.6, 18.9 ppm. **ESI-MS** *m/z* (rel int): (pos) 306.1 ($[M+H]^+$, 100); (neg) 304.1 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{16}H_{20}NO_3S^+$: 306.11584, found: 306.11535. Absolute difference (ppm): 1.6.

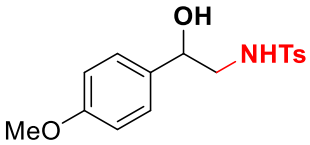


N-(2-(4-(tert-butyl)phenyl)-2-hydroxyethyl)-4-methylbenzenesulfonamide (3n): Alkene **2n** (0.1 mmol) reacted under the general method to produce aminoalcohol **3n** as a white solid (31 mg, 0.090 mmol, 90%). **TLC**: R_f : 0.58 (2:1 heptanes/EtOAc). **IR** (thin film): υ 3850, 3234, 2983, 1748, 1555, 1322, 1142, 934 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.66 (d, *J* = 8.0 Hz, 2H), 7.28 (d, *J* = 8.0 Hz, 2H), 7.22 (d, *J* = 8.0 Hz, 2H), 7.12 (d, *J* = 8.0 Hz, 2H), 5.13 (bs, 1H), 4.69 (d, *J* = 6.4, 3.2 Hz, 1H), 3.14 (ddd, *J* = 7.1, 6.4, 4.0 Hz, 1H), 2.93 (ddd, *J* = 7.1, 4.0, 3.2 Hz, 2H), 2.34 (s 3H), 1.22 (s, 9H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 151.3, 143.6, 137.8, 136.7, 129.8, 127.2, 125.7, 125.6, 72.6, 50.1, 34.6, 31.3, 21.6 ppm. **ESI-MS** *m/z* (rel int): (pos) 348.2 ($[M+H]^+$, 100); (neg) 346.2 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{19}H_{26}NO_3S^+$: 348.16279, found: 348.16288. Absolute difference (ppm): 0.26.

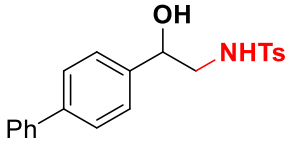


N-(2-hydroxy-2-mesitylethyl)-4-methylbenzenesulfonamide (3o): Alkene **2o** (0.1 mmol) reacted under the general method to produce aminoalcohol **3o** as a white solid (29 mg, 0.086 mmol,

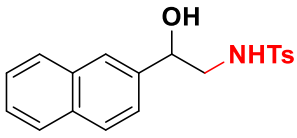
86%). **TLC**: R_f : 0.56 (2:1 heptanes/EtOAc). **IR** (thin film): υ 3805, 3230, 2981, 1744, 1551, 1322, 1133, 970 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.55 (d, *J* = 8.0 Hz, 2H), 7.16 (d, *J* = 8.0 Hz, 2H), 6.68 (s, 2H), 5.21 (bs, 1H), 4.88 (dt, *J* = 6.8, 6.4 Hz, 1H), 3.92 (dd, *J* = 6.8, 6.2 Hz, 1H), 3.72 (dd, *J* = 6.8, 6.4 Hz, 1H), 2.37 (s 3H), 2.19 (s, 9H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.5, 137.9, 136.4, 129.9, 129.3, 127.2, 55.2, 45.1, 21.5, 20.7 ppm. **ESI-MS** *m/z* (rel int): (pos) 334.2 ($[M+H]^+$, 100); (neg) 332.2 ($[M-H]^-$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{18}H_{24}NO_3S^+$: 334.14714, found: 334.14744. Absolute difference (ppm): 0.89.



N-(2-hydroxy-2-(4-methoxyphenyl)ethyl)-4-methylbenzenesulfonamide (3p): Alkene **2p** (0.1 mmol) reacted under the general method to produce aminoalcohol **3p** as a white solid (26 mg, 0.088 mmol, 88%). **TLC**: R_f: 0.24 (2:1 heptanes/EtOAc).[6] **IR** (thin film): υ 3832, 3212, 2983, 1751, 1551, 1322, 1142, 952 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.74 (d, *J* = 8.0 Hz, 2H), 7.30 (d, *J* = 8.0 Hz, 2H), 7.21 (d, *J* = 8.0 Hz, 2H), 6.86 (d, *J* = 8.0 Hz, 2H), 5.47 (dd, *J* = 4.8, 4.4 Hz, 1H), 4.75 (dd, *J* = 6.8, 6.2 Hz, 1H), 3.79 (s, 3H), 3.18 (ddd, *J* = 7.1, 6.8, 4.8 Hz, 1H), 3.01 (ddd, *J* = 7.1, 6.2, 4.4 Hz, 1H), 2.43 (s, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 159.5, 143.6, 136.6, 132.9, 129.8, 127.2, 127.1, 114.0, 72.4, 55.3, 50.2, 21.6 ppm. **ESI-MS** *m/z* (rel int): (pos) 322.1 ($[M+H]^+$, 100); (neg) 320.1 ($[M-H]^-$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{16}H_{20}NO_4S^+$: 322.11076, found: 322.11088. Absolute difference (ppm): 0.37.

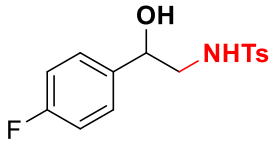


N-(2-([1,1'-biphenyl]-4-yl)-2-hydroxyethyl)-4-methylbenzenesulfonamide (3q): Alkene **2q** (0.1 mmol) reacted under the general method to produce aminoalcohol **3q** as a white solid (31 mg, 0.084 mmol, 84%).[6] **TLC**: R_f : 0.57 (2:1 heptanes/EtOAc). **IR** (thin film): υ 3841, 3232, 2974, 1744, 1555, 1340, 1124, 961 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.63 (d, *J* = 8.0 Hz, 2H), 7.53-7.51 (m, 2H), 7.46-7.41 (m, 4H), 7.36-7.34 (m, 1H), 7.21 (d, *J* = 8.0 Hz, 4H), 5.21 (d, *J* = 4.8 Hz, 1H), 4.64 (dt, *J* = 6.4, 4.8 Hz, 1H), 3.76 (d, *J* = 6.4 Hz, 2H), 2.37 (s, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.7, 143.6, 141.4, 140.4, 136.9, 136.1, 129.6, 128.9, 127.6, 127.4, 127.1, 127.0, 58.1, 47.9, 21.5 ppm. **ESI-MS** *m/z* (rel int): (pos) 368.1 ($[M+H]^+$, 100); (neg) 366.1 ($[M-H]^-$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{21}H_{22}NO_3S^+$: 368.13149, found: 368.13171. Absolute difference (ppm): 0.59.

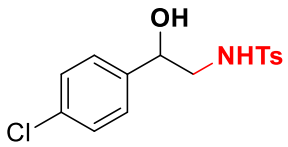


N-(2-hydroxy-2-(naphthalen-2-yl)ethyl)-4-methylbenzenesulfonamide (3r): Alkene **2r** (0.1 mmol) reacted under the general method to produce aminoalcohol **3r** as a white solid (27 mg,

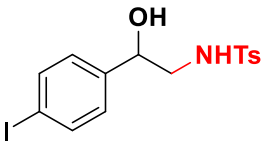
0.080 mmol, 80%). **TLC**: R_f : 0.55 (2:1 heptanes/EtOAc).[8] **IR** (thin film): υ 3850, 3234, 2972, 1748, 1555, 1340, 1142, 952 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.78-7.75 (m, 1H), 7.71-7.67 (m, 2H), 7.58 (d, *J* = 8.2 Hz, 2H), 7.53 (s,1H), 7.47-7.43 (m, 2H), 7.21 (d, *J* = 8.0 Hz, 1H), 7.07 (d, *J* = 8.2 Hz, 2H), 4.91 (dd, *J* = 6.4, 5.3 Hz, 2H), 3.28 (dd, *J* = 6.4, 6.2 Hz, 1H), 3.05 (dd, *J* = 6.2, 5.3 Hz, 1H), 2.33 (s 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.6, 133.1, 129.8, 129.7, 128.5, 128.0, 127.7, 127.1, 126.4, 126.2, 124.9, 123.7, 72.8, 50.1, 21.5 ppm. **ESI-MS** *m/z* (rel int): (pos) 342.1 ($[M+H]^+$, 100); (neg) 340.1 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{19}H_{20}NO_3S^+$: 342.11584, found: 342.11531. Absolute difference (ppm): 1.55.



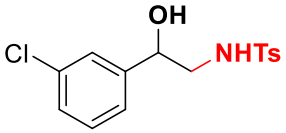
N-(2-(4-fluorophenyl)-2-hydroxyethyl)-4-methylbenzenesulfonamide (3s): Alkene **2s** (0.1 mmol) reacted under the general method to produce aminoalcohol **3s** as a white solid (25 mg, 0.082 mmol, 82%). **TLC**: R_f : 0.42 (2:1 heptanes/EtOAc).[6] **IR** (thin film): υ 3841, 3221, 2941, 1704, 1506, 1344, 1164, 972 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.66 (d, *J* = 8.0 Hz, 2H), 7.24-7.17 (m, 4H), 6.94 (t, *J* = 8.0 Hz, 2H), 4.97 (dd, *J* = 4.8, 4.4 Hz, 1H), 4.75 (dd, *J* = 6.8, 6.2 Hz, 1H), 3.16 (ddd, *J* = 7.1, 6.8, 4.8 Hz, 1H), 2.91 (ddd, *J* = 7.1, 6.2, 4.4 Hz, 1H), 2.36 (s, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 162.2 (d, *J* = 251 Hz), 143.8, 136.6, 130.1, 129.5, 127.7 (d, *J* = 3.5 Hz), 126.5, 115.5 (d, *J* = 22.4 Hz), 72.2, 50.2, 21.5 ppm. **ESI-MS** *m/z* (rel int): (pos) 310.1 ($[M+H]^+$, 100); (neg) 308.1 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{15}H_{17}FNO_3S^+$: 310.09077, found: 310.09088. Absolute difference (ppm): 0.35.



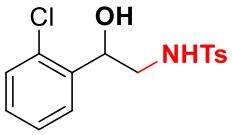
N-(2-(4-chlorophenyl)-2-hydroxyethyl)-4-methylbenzenesulfonamide (3t): Alkene **2t** (0.1 mmol) reacted under the general method to produce aminoalcohol **3t** as a white solid (26 mg, 0.080 mmol, 80%). **TLC**: R_f : 0.44 (2:1 heptanes/EtOAc).[6] **IR** (thin film): υ 3848, 3212, 2988, 1704, 1560, 1344, 1146, 952 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.63 (d, *J* = 8.0 Hz, 2H), 7.21-7.13 (m, 6H), 5.36 (dd, *J* = 4.8, 4.4 Hz, 1H), 4.71 (dd, *J* = 6.8, 6.2 Hz, 1H), 3.14 (ddd, *J* = 7.1, 6.8, 4.8 Hz, 1H), 2.88 (ddd, *J* = 7.1, 6.2, 4.4 Hz, 1H), 2.33 (s, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.8, 139.3, 136.4, 133.9, 129.9, 128.7, 127.3, 127.0, 72.1, 50.2, 21.6 ppm. **ESI-MS** *m/z* (rel int): (pos) 326.1 ($[M+H]^+$, 100); (neg) 324.1 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{15}H_{17}ClNO_3S^+$: 326.06122, found: 326.06153. Absolute difference (ppm): 0.95.



N-(2-hydroxy-2-(4-iodophenyl)ethyl)-4-methylbenzenesulfonamide (3u): Alkene **2u** (0.1 mmol) reacted under the general method to produce aminoalcohol **3u** as a white solid (29 mg, 0.086 mmol, 86%). **TLC**: R_f : 0.46 (2:1 heptanes/EtOAc). **IR** (thin film): υ 3814, 3226, 2944, 1708, 1560, 1308, 1164, 953 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.63 (d, *J* = 8.0 Hz, 2H), 7.35 (d, *J* = 8.0 Hz, 2H), 7.21 (d, *J* = 8.0 Hz, 2H), 7.07 (d, *J* = 8.0 Hz, 2H), 5,29 (dd, *J* = 4.8, 4.4 Hz, 1H), 4.71 (dd, *J* = 6.8, 6.2 Hz, 1H), 3.12 (ddd, *J* = 7.1, 6.8, 4.8 Hz, 1H), 2.88 (ddd, *J* = 7.1, 6.2, 4.4 Hz, 1H), 2.35 (s, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.8, 139.8, 136.5, 131.7, 129.2, 127.6, 127.1, 122.1, 72.2, 50.0, 21.6 ppm. **ESI-MS** *m/z* (rel int): (pos) 418.0 ($[M+H]^+$, 100); (neg) 416.0 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{15}H_{17}INO_3S^+$: 417.99683, found: 417.99602. Absolute difference (ppm): 1.93.

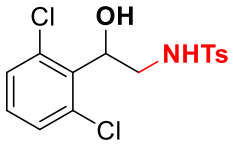


N-(2-(3-chlorophenyl)-2-hydroxyethyl)-4-methylbenzenesulfonamide (3v): Alkene **2v** (0.1 mmol) reacted under the general method to produce aminoalcohol **3v** as a white solid (29 mg, 0.089 mmol, 89%). **TLC**: R_f: 0.41 (2:1 heptanes/EtOAc). **IR** (thin film): υ 3841, 3234, 2932, 1744, 1513, 1340, 1124, 952 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.64 (d, *J* = 8.0 Hz, 2H), 7.20-7.18 (m, 3H), 7.14 (d, *J* = 8.0 Hz, 2H), 7.08-7.07 (m, 1H), 5,85 (bs, 1H), 4.68 (dd, *J* = 6.8, 6.2 Hz, 1H), 3.41 (bs, 1H), 3.08 (ddd, *J* = 7.1, 6.8, 4.6 Hz, 1H), 2.88 (ddd, *J* = 7.1, 6.2, 4.2 Hz, 1H), 2.29 (s, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.8, 132.9, 136.4, 134.5, 129.9, 129.0, 128.2, 127.1, 126.1, 124.1, 72.2, 50.2, 21.6 ppm. **ESI-MS** *m/z* (rel int): (pos) 326.1 ($[M+H]^+$, 100); (neg) 324.1 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{15}H_{17}ClNO_3S^+$: 326.06122, found: 326.06134. Absolute difference (ppm): 0.37.

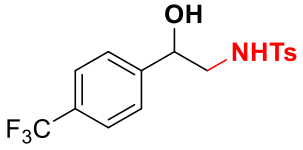


N-(2-(2-chlorophenyl)-2-hydroxyethyl)-4-methylbenzenesulfonamide (3w): Alkene **2w** (0.1 mmol) reacted under the general method to produce aminoalcohol **3w** as a white solid (27 mg, 0.084 mmol, 84%). **TLC**: R_f: 0.41 (2:1 heptanes/EtOAc).[7] **IR** (thin film): υ 3850, 3230, 2970, 1708, 1531, 1344, 1142, 961 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.76 (d, *J* = 8.2 Hz, 2H), 7.59-

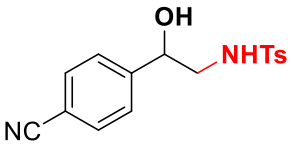
7.55 (m, 1H), 7.28-7.21 (m, 5H), 5.17 (dd, *J* = 8.2, 6.4 Hz, 1H), 3.41 (dd, *J* = 8.2, 4.0 Hz, 1H), 2.97 (dd, *J* = 6.4, 4.0 Hz, 1H), 2.42 (s, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.7, 138.2, 136.6, 131.4, 129.8, 129.4, 129.1, 127.5, 127.2, 69.5, 48.4, 21.5 ppm. **ESI-MS** *m/z* (rel int): (pos) 326.1 ($[M+H]^+$, 100); (neg) 324.1 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{15}H_{17}ClNO_3S^+$: 326.06122, found: 326.06143. Absolute difference (ppm): 0.64.



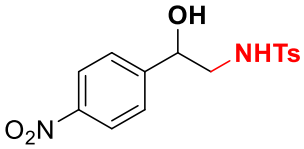
N-(2-(2,6-dichlorophenyl)-2-hydroxyethyl)-4-methylbenzenesulfonamide (3x): Alkene **2x** (0.1 mmol) reacted under the general method to produce aminoalcohol **3x** as a white solid (33 mg, 0.091 mmol, 91%). **TLC**: R_f : 0.42 (2:1 heptanes/EtOAc). **IR** (thin film): υ 3843, 3236, 2934, 1742, 1511, 1322, 1126, 943 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.72 (d, *J* = 8.2 Hz, 2H), 7.30-7.25 (m, 4H), 7.16 (t, *J* = 8.0 Hz, 1H), 5.78 (dd, *J* = 6.4, 6.2 Hz, 1H), 5.16-5.12 (m, 1H), 3.87 (ddd, *J* = 8.6, 6.4, 6.2 Hz, 1H), 3.81 (ddd, *J* = 8.0, 6.4, 6.2 Hz, 1H), 2.42 (s, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.7, 136.9, 135.9, 135.6, 132.2, 130.6, 130.3, 129.8, 129.7, 126.9, 126.8, 56.3, 46.1, 21.5 ppm. **ESI-MS** *m/z* (rel int): (pos) 360.0 ($[M+H]^+$, 100); (neg) 358.0 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{15}H_{16}Cl_2NO_3S^+$: 360.02225, found: 360.02244. Absolute difference (ppm): 0.53.



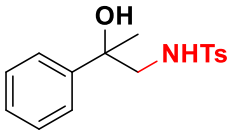
N-(2-hydroxy-2-(4-(trifluoromethyl)phenyl)ethyl)-4-methylbenzenesulfonamide (3y): Alkene **2y** (0.1 mmol) reacted under the general method to produce aminoalcohol **3y** as a white solid (31 mg, 0.086 mmol, 86%). **TLC**: R_f : 0.44 (2:1 heptanes/EtOAc). **IR** (thin film): υ 3850, 3250, 2985, 1744, 1555, 1322, 1126, 970 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.70 (d, *J* = 8.4 Hz, 2H), 7.58 (d, *J* = 8.4 Hz, 2H), 7.43 (d, *J* = 8.2 Hz, 2H), 7.30 (d, *J* = 8.2 Hz, 2H), 5.08 (t, *J* = 5.3 Hz, 1H), 4.95 (t, *J* = 6.8 Hz, 1H), 3.47-3.41 (m, 2H), 2.42 (s, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 144.1, 141.8, 136.7, 130.4 (q, *J* = 32 Hz), 129.8, 129.7, 127.8, 127.0, 125.8 (q, *J* = 4 Hz), 125.0 (q, *J* = 273 Hz), 60.6. 50.3, 21.5 ppm. **ESI-MS** *m/z* (rel int): (pos) 360.1 ($[M+H]^+$, 100); (neg) 358.1 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{16}H_{17}F_3NO_3S^+$: 360.08758, found: 360.08824. Absolute difference (ppm): 1.83.



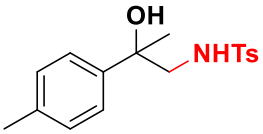
N-(2-(4-cyanophenyl)-2-hydroxyethyl)-4-methylbenzenesulfonamide (3z): Alkene **2z** (0.1 mmol) reacted under the general method to produce aminoalcohol **3z** as a white solid (25 mg, 0.080 mmol, 80%). **TLC**: R_f:: 0.46 (2:1 heptanes/EtOAc). **IR** (thin film): υ 3850, 3232, 2950, 2240, 1753, 1322, 1124, 970 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.64 (d, *J* = 8.0 Hz, 2H), 7.53 (d, *J* = 8.0 Hz, 2H), 7.36 (d, *J* = 8.0 Hz, 2H), 7.23 (d, *J* = 8.0 Hz, 2H), 5.26 (t, *J* = 4.6 Hz, 1H), 4.84 (dd, *J* = 6.8, 6.2 Hz, 1H), 3.20-3.14 (m, 2H), 2.93 (dd, *J* = 6.8, 4.6 Hz, 1H), 2.36 (s, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 146.1, 144.1, 136.3, 132.4, 129.9, 127.0, 126.7, 118.6, 111.8, 72.2, 50.0, 21.6 ppm. **ESI-MS** *m/z* (rel int): (pos) 317.1 ($[M+H]^+$, 100); (neg) 315.1 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{16}H_{17}N_2O_3S^+$: 317.09544, found: 317.09553. Absolute difference (ppm): 0.28.



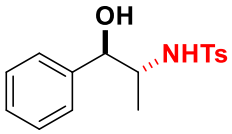
N-(2-hydroxy-2-(4-nitrophenyl)ethyl)-4-methylbenzenesulfonamide (3aa): Alkene **2aa** (0.1 mmol) reacted under the general method to produce aminoalcohol **3aa** as a white solid (28 mg, 0.082 mmol, 82%). **TLC**: R_f : 0.48 (2:1 heptanes/EtOAc). **IR** (thin film): υ 3850, 3221, 2985, 1753, 1555, 1322, 1142, 970 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 8.15 (d, *J* = 8.2 Hz, 2H), 7.68 (d, *J* = 8.2 Hz, 2H), 7.46 (d, *J* = 8.2 Hz, 2H), 7.27 (d, *J* = 8.2 Hz, 2H), 4.99 (bs, 1H), 4.96 (dd, *J* = 6.4, 6.2 Hz, 1H), 3.28 (dd, *J* = 6.2, 5.8 Hz, 1H), 2.99 (dd, *J* = 6.4, 5.3 Hz, 1H), 2.39 (s, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 147.9, 147.7, 144.1, 136.4, 129.9, 127.1, 126.8, 123.8, 72.1, 50.0, 21.6 ppm. **ESI-MS** *m/z* (rel int): (pos) 337.1 ($[M+H]^+$, 100); (neg) 335.1 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{15}H_{17}N_2O_5S^+$: 337.08527, found: 337.08566. Absolute difference (ppm): 1.16.



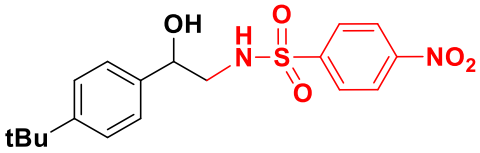
N-(2-hydroxy-2-phenylpropyl)-4-methylbenzenesulfonamide (3ab): Alkene **2ab** (0.1 mmol) reacted under the general method to produce aminoalcohol **3ab** as a white solid (28 mg, 0.091 mmol, 91%). **TLC**: R_f : 0.51 (2:1 heptanes/EtOAc). **IR** (thin film): υ 3850, 3232, 2983, 1748, 1551, 1340, 1133, 961 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.58 (d, *J* = 8.0 Hz, 2H), 7.28-7.26 (m, 2H), 7.23-7.21 (m, 2H), 7.18-7.16 (m, 3H), 5.03 (t, *J* = 6.4 Hz, 1H), 3.10 (dd, *J* = 6.4, 6.2 Hz, 1H), 3.01 (dd, *J* = 6.8, 6.2 Hz, 1H), 2.54 (bs, 1H), 2.33 (s, 3H), 1.45 (s, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 144.9, 143.6, 136.5, 129.8, 128.5, 127.4, 127.1, 124.9, 73.7, 53.8, 27.4, 21.6 ppm. **ESI-MS** *m/z* (rel int): (pos) 306.1 ($[M+H]^+$, 100); (neg) 304.1 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{16}H_{20}NO_3S^+$: 306.11584, found: 306.11566. Absolute difference (ppm): 0.59.



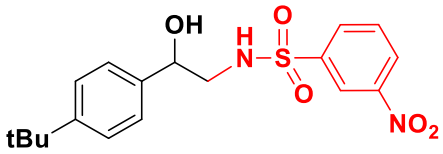
N-(2-hydroxy-2-(p-tolyl)propyl)-4-methylbenzenesulfonamide (3ac): Alkene **2ac** (0.1 mmol) reacted under the general method to produce aminoalcohol **3ac** as an oil (28 mg, 0.088 mmol, 88%). **TLC**: R_f : 0.53 (2:1 heptanes/EtOAc). **IR** (thin film): υ 3841, 3252, 2992, 1753, 1551, 1348, 1137, 970 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.69 (d, *J* = 8.0 Hz, 2H), 7.27 (d, *J* = 8.2 Hz, 4H), 7.14 (d, *J* = 8.0 Hz, 2H), 4.91 (dd, *J* = 6.4, 4.8 Hz, 1H), 3.23 (dd, *J* = 8.2, 6.4 Hz, 1H), 3.10 (dd, *J* = 8.2, 4.8 Hz, 1H), 2.42 (s 3H), 2.33 (s, 3H), 1.56 (s, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.5, 141.6, 137.1, 136.6, 129.8, 129.1, 127.1, 124.9, 73.6, 53.9, 27.5, 21.5, 20.9 ppm. **ESI-MS** *m/z* (rel int): (pos) 320.1 ($[M+H]^+$, 100); (neg) 318.1 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{17}H_{22}NO_3S^+$: 320.13149, found: 320.13117. Absolute difference (ppm): 0.99.



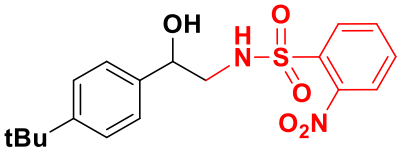
N-((1R*,2R*)-1-hydroxy-1-phenyl-2-propyl)-4-methylbenzenesulfonamide (3ad): Alkene **2ad** (0.1 mmol) reacted under the general method to produce aminoalcohol **3ad** as a white solid (26 mg, 0.084 mmol, 84%). **TLC**: R_f : 0.48 (2:1 heptanes/EtOAc). **IR** (thin film): υ 3850, 3252, 2987, 1740, 1555, 1340, 1142, 952 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.59 (d, *J* = 8.0 Hz, 2H), 7.18-7.14 (m, 7H), 5.11 (d, *J* = 6.8 Hz, 1H), 4.37 (d, *J* = 6.4 Hz, 1H), 3.33 (dq, *J* = 6.4, 6.2 Hz, 1H), 2.33 (s 3H), 0.84 (d, *J* = 6.2 Hz, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.4, 140.4, 137.3, 129.7, 128.4, 128.1, 127.1, 126.8, 69.9, 55.7, 21.6, 12.9 ppm. **ESI-MS** *m/z* (rel int): (pos) 306.1 ($[M+H]^+$, 100); (neg) 304.1 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{16}H_{20}NO_3S^+$: 306.11584, found: 306.11564. Absolute difference (ppm): 0.22.



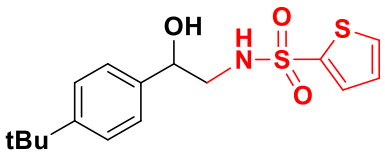
N-(2-(4-(tert-butyl)phenyl)-2-hydroxyethyl)-4-nitrobenzenesulfonamide (3ae): Alkene **2n** (0.1 mmol) reacted under the general method to produce aminoalcohol **3ae** as a white solid (35 mg, 0.093 mmol, 93%). **TLC**: R_f: 0.35 (2:1 heptanes/EtOAc). **IR** (thin film): υ 3807, 3203, 2992, 1757, 1553, 1362, 1106, 977 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 8.11 (d, *J* = 8.0 Hz, 2H), 7.78 (d, *J* = 8.0 Hz, 2H), 7.16 (d, *J* = 8.0 Hz, 2H), 6.97 (d, *J* = 8.0 Hz, 2H), 5.56 (d, *J* = 4.4 Hz, 1H), 4.72 (dt, *J* = 6.2, 4.4 Hz, 1H), 3.78 (dd, *J* = 11.6, 6.2 Hz, 1H), 3.68 (dd, *J* = 11.6, 6.2 Hz, 2H), 1.25 (s, 9H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 152.2, 149.8, 145.9, 133.1, 132.9, 128.5, 128.3, 126.9, 126.8, 126.7, 125.6, 125.5, 123.8, 58.6, 47.9, 34.5, 21.2 ppm. **ESI-MS** *m/z* (rel int): (pos) 379.1 ($[M+H]^+$, 100); (neg) 377.1 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{18}H_{23}N_2O_5S^+$: 379.13222, found: 379.13253. Absolute difference (ppm): 0.82.



N-(2-(4-(tert-butyl)phenyl)-2-hydroxyethyl)-3-nitrobenzenesulfonamide (3af): Alkene **2n** (0.1 mmol) reacted under the general method to produce aminoalcohol **3af** as a white solid (33 mg, 0.089 mmol, 89%). **TLC**: R_f : 0.35 (2:1 heptanes/EtOAc). **IR** (thin film): υ 3843, 3225, 2983, 1759, 1559, 1324, 1148, 975 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 8.39 (t, *J* = 2.2 Hz, 1H), 8.24 (dd, *J* = 7.3, 2.2 Hz, 1H), 7.96 (dd, *J* = 7.3, 2.2 Hz, 1H), 7.52 (t, *J* = 8.2 Hz, 1H), 7.16 (d, *J* = 8.0 Hz, 2H), 6.97 (d, *J* = 8.0 Hz, 2H), 5.30 (d, *J* = 4.8 Hz, 1H), 4.75 (dt, *J* = 6.4, 4.8 Hz, 1H), 3.81 (dd, *J* = 11.2, 6.4 Hz, 1H), 3.70 (dd, *J* = 11.2, 6.4 Hz, 2H), 1.25 (s, 9H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 151.9, 142.4, 132.9, 132.6, 132.5, 130.0, 129.9, 126.9, 126.8, 126.7, 125.7, 125.6, 122.7, 58.6, 48.0, 34.5, 31.1 ppm. **ESI-MS** *m/z* (rel int): (pos) 379.1 ($[M+H]^+$, 100); (neg) 377.1 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{18}H_{23}N_2O_5S^+$: 379.13222, found: 379.13264. Absolute difference (ppm): 1.11.

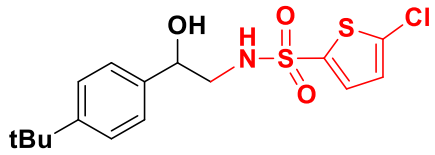


N-(2-(4-(tert-butyl)phenyl)-2-hydroxyethyl)-2-nitrobenzenesulfonamide (3ag): Alkene **2n** (0.1 mmol) reacted under the general method to produce aminoalcohol **3ag** as a white solid (32 mg, 0.084 mmol, 84%). **TLC**: R_f : 0.35 (2:1 heptanes/EtOAc). **IR** (thin film): υ 3881, 3252, 2934, 1755, 1557, 1328, 1124, 970 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.78 (d, *J* = 6.4 Hz, 1H), 7.72 (d, *J* = 5.4 Hz, 1H), 7.56 (t, *J* = 7.1 Hz, 1H), 7.43 (t, *J* = 7.1 Hz, 1H), 7.16 (d, *J* = 8.0 Hz, 2H), 7.03 (d, *J* = 8.0 Hz, 2H), 6.20 (d, *J* = 4.8 Hz, 1H), 4.82 (dt, *J* = 6.4, 4.8 Hz, 1H), 3.83 (dd, *J* = 10.7, 6.4 Hz, 1H), 3.76 (dd, *J* = 10.7, 6.4 Hz, 2H), 1.23 (s, 9H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 151.6, 147.4, 134.3, 133.7, 133.1, 132.5, 132.4, 130.8, 126.6, 126.5, 125.5, 125.1, 125.0, 59.3, 48.0, 34.5, 31.2 ppm. **ESI-MS** *m/z* (rel int): (pos) 379.1 ($[M+H]^+$, 100); (neg) 377.1 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{18}H_{23}N_2O_5S^+$: 379.13222, found: 379.13288. Absolute difference (ppm): 1.74.

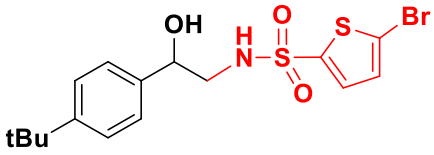


N-(2-(4-(tert-butyl)phenyl)-2-hydroxyethyl)thiophene-2-sulfonamide (3ah): Alkene **2n** (0.1 mmol) reacted under the general method to produce aminoalcohol **3ah** as a clear liquid (28 mg, 0.082 mmol, 82%). **TLC**: R_f : 0.64 (2:1 heptanes/EtOAc). **IR** (thin film): υ 3821, 3289, 2992, 1748, 1508, 1308, 1164, 943 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.49 (d, *J* = 7.1 Hz, 1H), 7.43 (dd, *J* = 7.1, 3.5 Hz, 1H), 7.27 (d, *J* = 8.0 Hz, 2H), 7.09 (d, *J* = 8.0 Hz, 2H), 6.93 (d, *J* = 7.1 Hz,

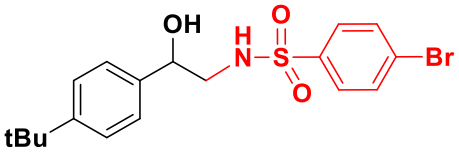
1H), 5.40 (bs, 1H), 4.66 (dt, *J* = 6.2, 4.2 Hz, 1H), 3.78 (d, *J* = 6.2 Hz, 2H), 1.27 (s, 9H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 151.5, 140.9, 133.9, 132.7, 132.2, 127.2, 126.5, 125.7, 125.6, 58.5, 47.7, 34.6, 31.2 ppm. **ESI-MS** *m/z* (rel int): (pos) 340.1 ($[M+H]^+$, 100); (neg) 338.1 ($[M-H]^-$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{16}H_{22}NO_3S_2^+$: 340.10356, found: 340.10316. Absolute difference (ppm): 1.18.



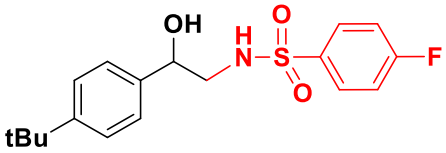
N-(2-(4-(tert-butyl)phenyl)-2-hydroxyethyl)-5-chlorothiophene-2-sulfonamide (3ai): Alkene **2n** (0.1 mmol) reacted under the general method to produce aminoalcohol **3ai** as a clear oil (32 mg, 0.086 mmol, 86%). **TLC**: R_f : 0.64 (2:1 heptanes/EtOAc). **IR** (thin film): υ 3838, 3253, 2998, 1753, 1502, 1304, 1124, 947 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.29 (d, *J* = 8.0 Hz, 2H), 7.14 (d, *J* = 4.4 Hz, 1H), 7.10 (d, *J* = 8.0 Hz, 2H), 6.70 (d, *J* = 4.4 Hz, 1H), 5.49 (d, *J* = 4.4 Hz, 1H), 4.66 (dt, *J* = 6.2, 4.2 Hz, 1H), 3.79-3.74 (m, 2H), 1.29 (s, 9H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 151.9, 138.9, 137.6, 133.5, 132.2, 132.1, 126.9, 126.8, 126.6, 126.4, 125.7, 125.5, 58.5, 47.9, 34.6, 31.2 ppm. **ESI-MS** *m/z* (rel int): (pos) 374.1 ($[M+H]^+$, 100); (neg) 372.1 ($[M-H]^-$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{16}H_{21}ClNO_3S_2^+$: 374.06459, found: 374.06435. Absolute difference (ppm): 0.64.



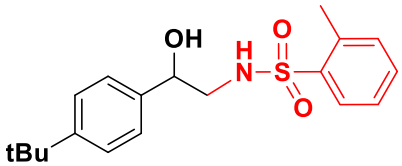
5-bromo-N-(2-(4-(tert-butyl)phenyl)-2-hydroxyethyl)thiophene-2-sulfonamide (3aj): Alkene **2n** (0.1 mmol) reacted under the general method to produce aminoalcohol **3aj** as a thick clear oil (35 mg, 0.088 mmol, 88%). **TLC**: R_f : 0.64 (2:1 heptanes/EtOAc). **IR** (thin film): υ 3898, 3203, 2996, 1744, 1520, 1340, 1106, 941 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.29 (d, *J* = 8.0 Hz, 2H), 7.12-7.09 (m, 3H), 6.82 (d, *J* = 3.5 Hz, 1H), 5.63 (d, *J* = 2.8 Hz, 1H), 4.66 (dt, *J* = 6.2, 2.8 Hz, 1H), 3.79-3.74 (m, 2H), 1.29 (s, 9H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 151.7, 141.8, 133.6, 132.8, 130.0, 126.9, 126.6, 126.5, 125.7, 125.6, 120.1, 58.6, 47.8, 34.5, 31.2 ppm. **ESI-MS** *m/z* (rel int): (pos) 418.0 ($[M+H]^+$, 100); (neg) 416.0 ($[M-H]^-$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{16}H_{21}BrNO_3S_2^+$: 418.01407, found: 418.01448. Absolute difference (ppm): 0.98.



4-bromo-N-(2-(4-(tert-butyl)phenyl)-2-hydroxyethyl)benzenesulfonamide (3ak): Alkene **2n** (0.1 mmol) reacted under the general method to produce aminoalcohol **3ak** as a yellow oil (35 mg, 0.080 mmol, 80%). **TLC**: R_f : 0.42 (2:1 heptanes/EtOAc). **IR** (thin film): υ 3892, 3199, 2989, 1735, 1503, 1322, 1098, 934 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.59 (d, *J* = 8.0 Hz, 2H), 7.41 (d, *J* = 8.0 Hz, 2H), 7.16 (d, *J* = 8.0 Hz, 2H), 6.97 (d, *J* = 8.0 Hz, 2H), 5.61 (d, *J* = 3.5 Hz, 1H), 4.62 (dt, *J* = 6.2, 3.5 Hz, 1H), 3.73-3.69 (m, 2H), 1.27 (s, 9H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 151.7, 139.2, 133.5, 132.6, 132.0, 131.9, 128.7, 127.4, 126.9, 126.7, 126.6, 125.9, 125.6, 125.5, 58.5, 47.9, 34.5, 31.2 ppm. **ESI-MS** *m/z* (rel int): (pos) 412.1 ($[M+H]^+$, 100); (neg) 410.1 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{18}H_{23}BrNO_3S^+$: 412.05765, found: 412.05724. Absolute difference (ppm): 0.99.

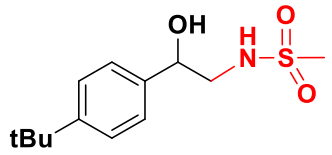


N-(2-(4-(tert-butyl)phenyl)-2-hydroxyethyl)-4-fluorobenzenesulfonamide (3al): Alkene **2n** (0.1 mmol) reacted under the general method to produce aminoalcohol **3al** as an oil (29 mg, 0.084 mmol, 84%). **TLC**: R_f : 0.42 (2:1 heptanes/EtOAc). **IR** (thin film): υ 3881, 3164, 2993, 1724, 1524, 1340, 1096, 950 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.66 (d, *J* = 8.2 Hz, 2H), 7.17 (d, *J* = 8.0 Hz, 2H), 6.99-6.93 (m, 4H), 5.62 (d, *J* = 4.0 Hz, 1H), 4.62 (dt, *J* = 6.2, 4.0 Hz, 1H), 3.73-3.70 (m, 2H), 1.25 (s, 9H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 165.1 (d, *J* = 250 Hz, 1C), 151.5, 136.2, 136.1, 129.8, 129.7, 125.6, 125.5, 116.0 (d, *J* = 77 Hz, 2C), 58.5, 47.9, 34.5, 31.2 ppm. **ESI-MS** *m/z* (rel int): (pos) 352.1 ($[M+H]^+$, 100); (neg) 350.1 ($[M–H]^–$, 100). **HRMS** (ESI): $[M+H]^+$ Calculated for: $C_{18}H_{23}FNO_3S^+$: 352.13772, found: 352.13724. Absolute difference (ppm): 1.36.

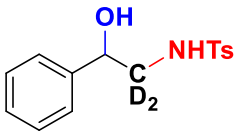


N-(2-(4-(tert-butyl)phenyl)-2-hydroxyethyl)-2-methylbenzenesulfonamide (3am): Alkene **2n** (0.1 mmol) reacted under the general method to produce aziridine **3am** as an oil (32 mg, 0.091 mmol, 91%). **TLC**: R_f : 0.62 (2:1 heptanes/EtOAc).[6] **IR** (thin film): υ 3825, 3155, 2995, 1722, 1528, 1324, 1106, 952 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.76 (d, *J* = 6.4 Hz, 1H), 7.72 (t, *J* = 5.3 Hz, 1H), 7.25 (t, *J* = 5.3 Hz, 1H), 7.19-7.14 (m, 3H), 6.98 (d, *J* = 8.0 Hz, 2H), 5.43 (d, *J* = 3.5 Hz, 1H), 4.53 (dt, *J* = 6.4, 3.5 Hz, 1H), 3.74-3.69 (m, 2H), 2.57 (s, 3H), 1.25 (s, 9H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 151.6, 147.4, 134.3, 133.7, 133.1, 132.5, 132.4, 130.8, 126.6, 126.5, 125.5, 125.1, 125.0, 59.3, 48.0, 34.5, 31.2 ppm. **ESI-MS** *m/z* (rel int): (pos) 348.2 ($[M+H]^+$, 100); (neg)

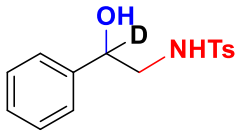
346.2 ([M–H]$^-$, 100). **HRMS** (ESI): [M+H]$^+$ Calculated for: $C_{19}H_{26}NO_3S^+$: 348.16279, found: 348.16232. Absolute difference (ppm): 1.34.



N-(2-(4-(tert-butyl)phenyl)-2-hydroxyethyl)methanesulfonamide (3an): Alkene **2n** (0.1 mmol) reacted under the general method to produce aziridine **3an** as a yellow oil (22 mg, 0.084 mmol, 84%). **TLC**: R_f : 0.64 (2:1 heptanes/EtOAc).[3] **IR** (thin film): υ 3881, 3175, 2998, 1744, 1526, 1317, 1104, 950 cm^{-1}. **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.42 (d, J = 8.0 Hz, 2H), 7.27 (d, J = 8.0 Hz, 2H), 5.25 (bs, 1H), 4.77 (dt, J = 4.8, 3.2 Hz, 1H), 3.87 (dd, J = 11.2, 4.8 Hz, 1H), 3.74 (dd, J = 11.2, 4.8 Hz, 1H), 2.79 (s, 3H), 1.32 (s, 9H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 151.9, 134.7, 126.6, 58.4, 48.4, 42.0, 34.6, 31.2 ppm. **ESI-MS** *m/z* (rel int): (pos) 272.1 ([M+H]$^+$, 100); (neg) 270.1 ([M–H]$^-$, 100). **HRMS** (ESI): [M+H]$^+$ Calculated for: $C_{13}H_{22}NO_3S^+$: 272.13149, found: 272.13162. Absolute difference (ppm): 0.48.



N-(2-hydroxy-2-phenylethyl-1,1-d2)-4-methylbenzenesulfonamide (3j1-d$_2$): Obtained through general procedure for competition experiments with deuterated-alkenes as a white solid. **TLC**: R_f : 0.48 (2:1 heptanes/EtOAc). **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.68 (d, J = 8.2 Hz, 2H), 7.29-7.19 (m, 7H), 5.12 (bs, 1H), 4.80 (d, J = 4.8 Hz, 1H), 2.33 (s, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.4, 140.3, 136.6, 129.4, 128.5, 128.1, 127.2, 125.8, 72.3, 50.3, 21.5 ppm. **ESI-MS** *m/z* (rel int): (pos) 294.1 ([M+H]$^+$, 100); (neg) 292.1 ([M–H]$^-$, 100). **HRMS** (ESI): [M+H]$^+$ Calculated for: $C_{15}H_{16}D_2NO_3S^+$: 294.11274, found: 294.11224. Absolute difference (ppm): 1.70.



N-(2-hydroxy-2-phenylethyl-2-d)-4-methylbenzenesulfonamide (3j2-d): Obtained through general procedure for competition experiments with deuterated-alkenes as a white solid. **TLC**: R_f : 0.48 (2:1 heptanes/EtOAc). **^{1}H-NMR** (400 MHz, $CDCl_3$): δ 7.72 (d, J = 8.2 Hz, 2H), 7.29-7.23 (m, 7H), 5.01 (bs, 1H), 3.50 (dd, J = 6.4, 4.8 Hz, 1H), 3.32 (dd, J = 6.4, 4.8 Hz, 1H), 2.37 (s, 3H). **^{13}C-NMR** (100 MHz, $CDCl_3$): δ 143.8, 140.7, 136.8, 129.8, 128.5, 128.1, 127.2, 125.4, 72.2, 50.3, 21.3 ppm. **ESI-MS** *m/z* (rel int): (pos) 293.1 ([M+H]$^+$, 100); (neg) 291.1 ([M–H]$^-$, 100). **HRMS** (ESI): [M+H]$^+$ Calculated for: $C_{15}H_{17}DNO_3S^+$: 293.10647, found: 293.10693. Absolute difference (ppm): 1.57.

References:

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E. ^{1}H-NMR AND ^{13}C-NMR SPECTRA

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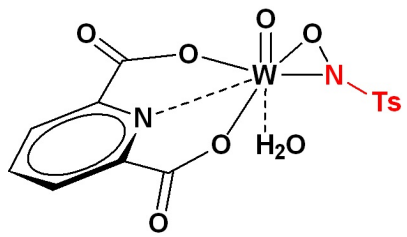

1

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127.65
48.31
48.24
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47.88
47.81
47.67
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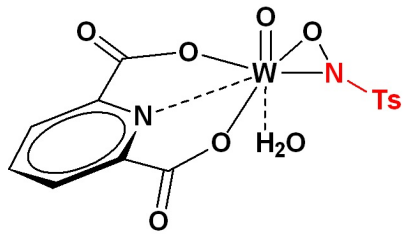
47.32
47.18
47.14
46.96
34.00



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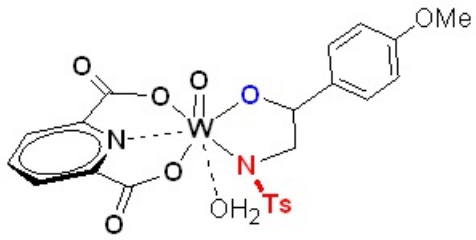

Intermediate A

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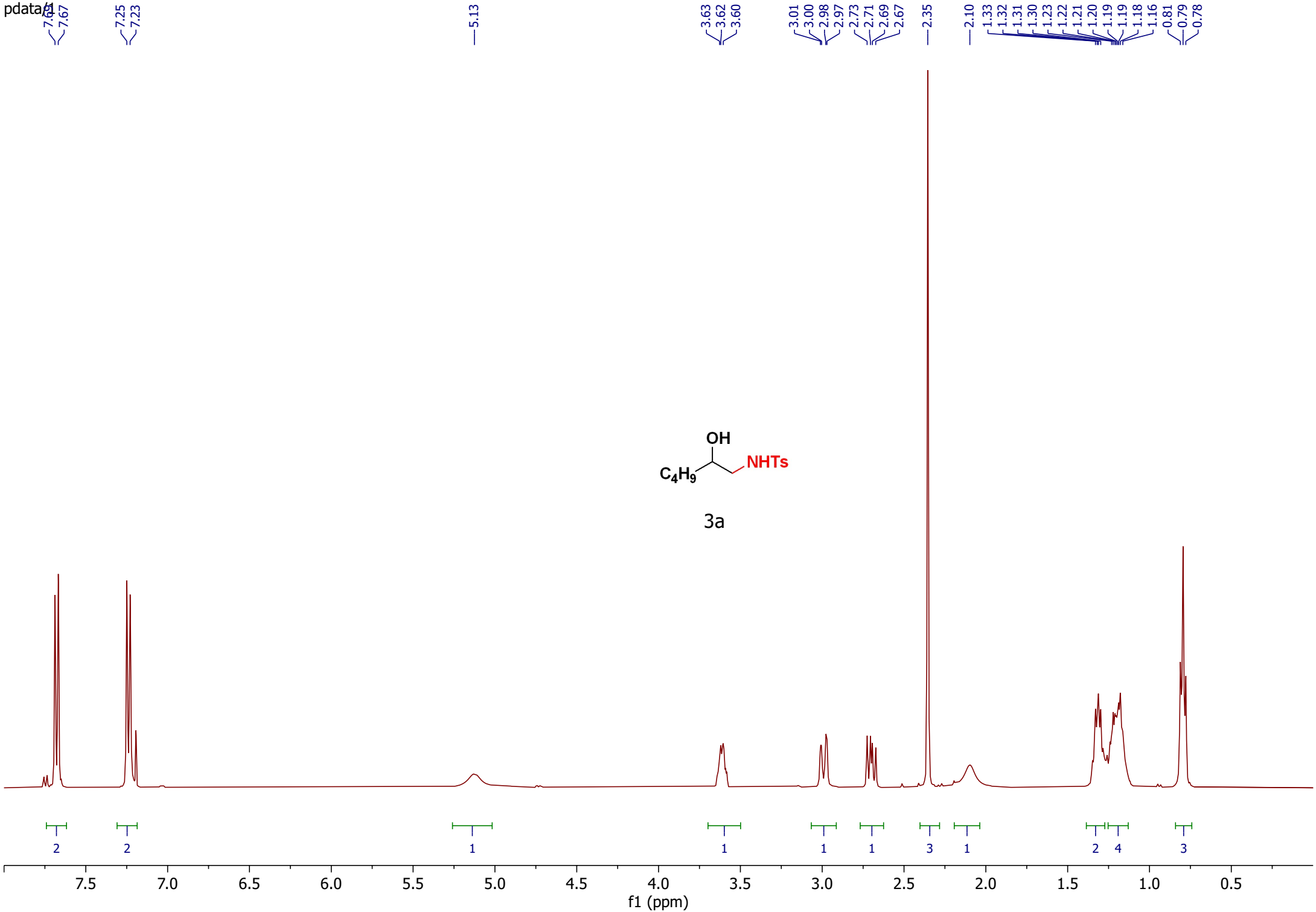
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2.71
2.69
2.67
2.35
2.10
1.33
1.32
1.31
1.30
1.23
1.22
1.21
1.20
1.19
1.19
1.18
1.16
0.81
0.79
0.78
OH
NHTs
C4H9
3a
2
2
1
1
1
1
3
1
2
4
3
7.5
7.0
6.5
6.0
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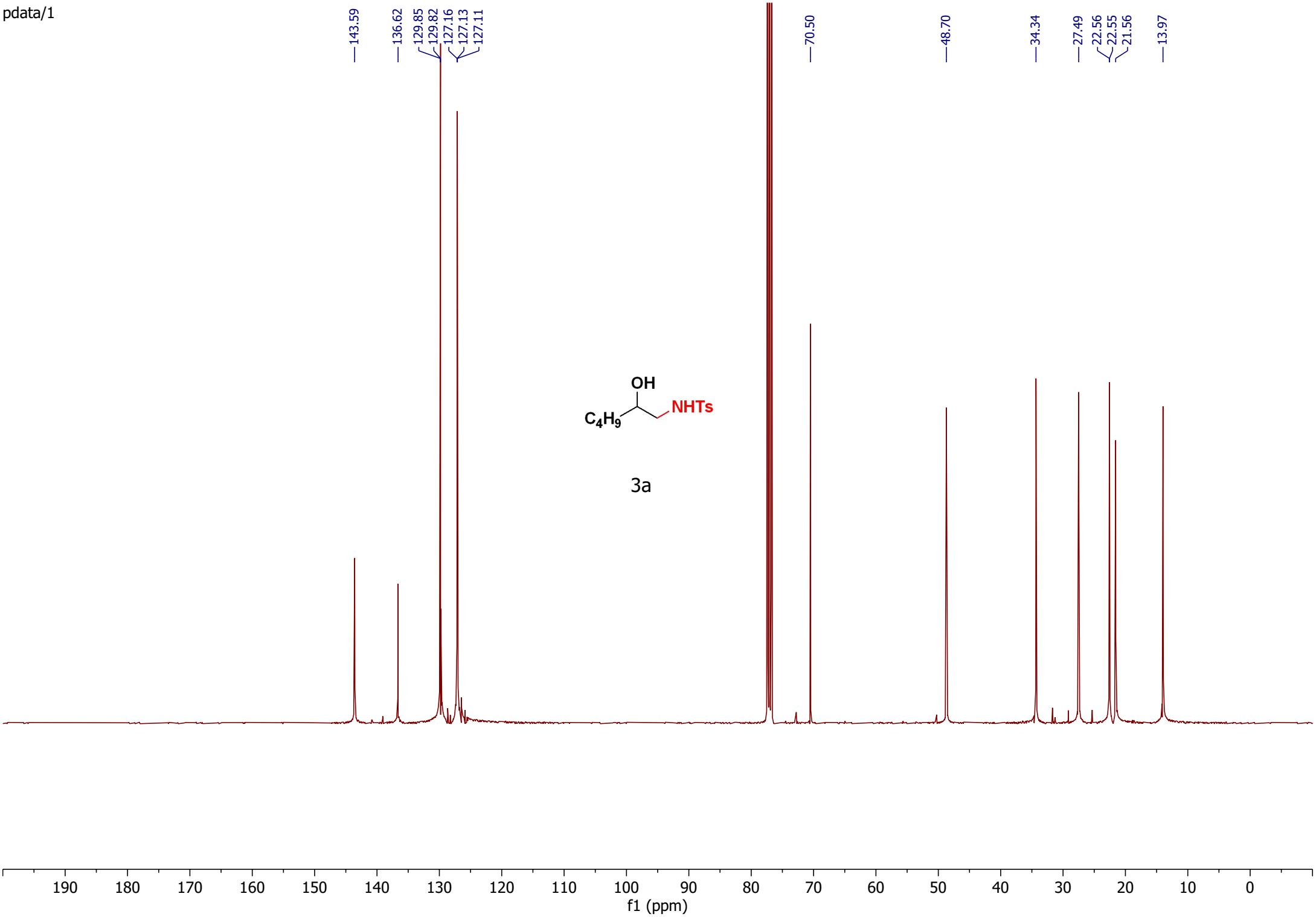
f1 (ppm)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C4H9
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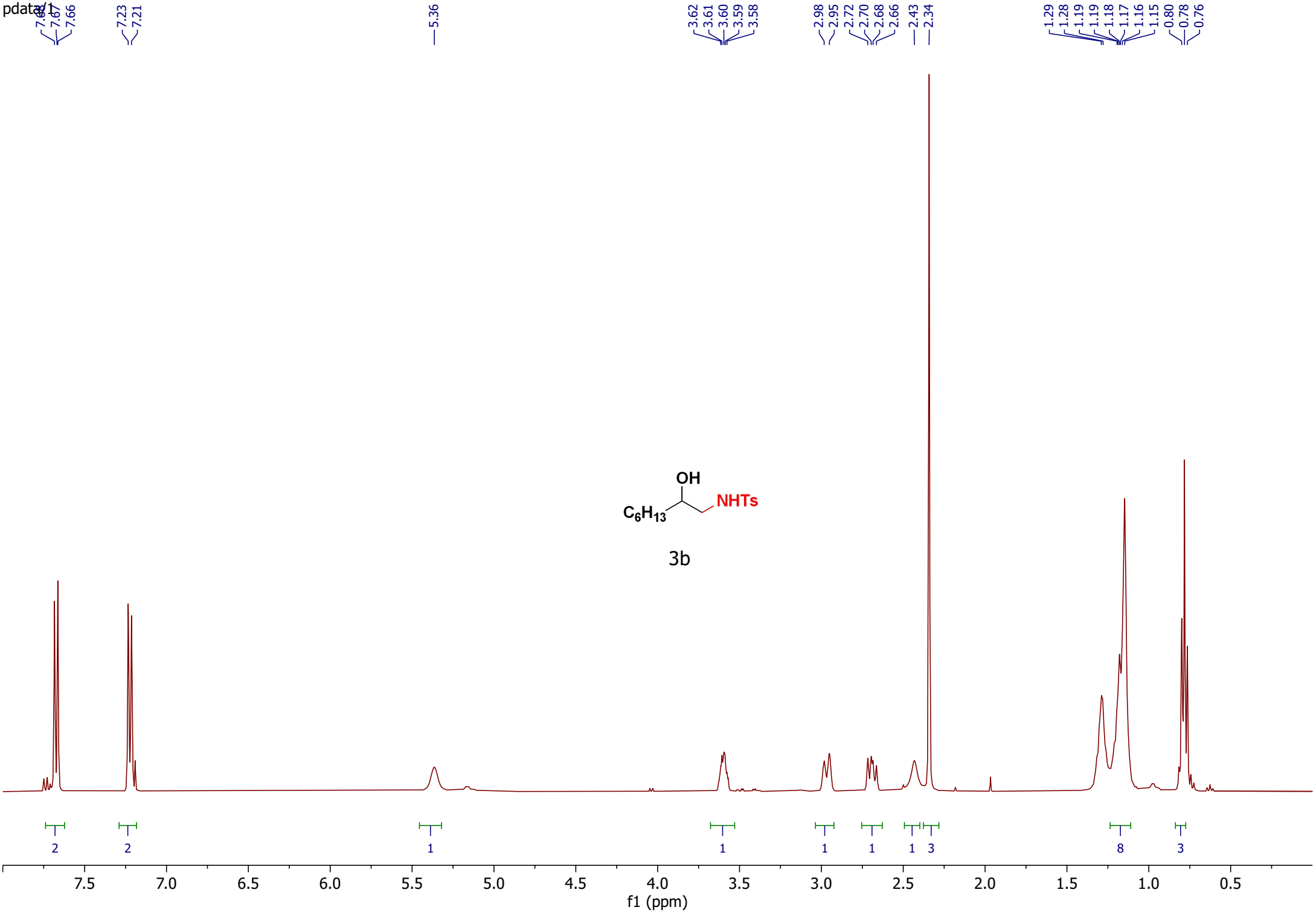
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1.18
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NHTs
C6H13
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1
1
1
1
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f1 (ppm)

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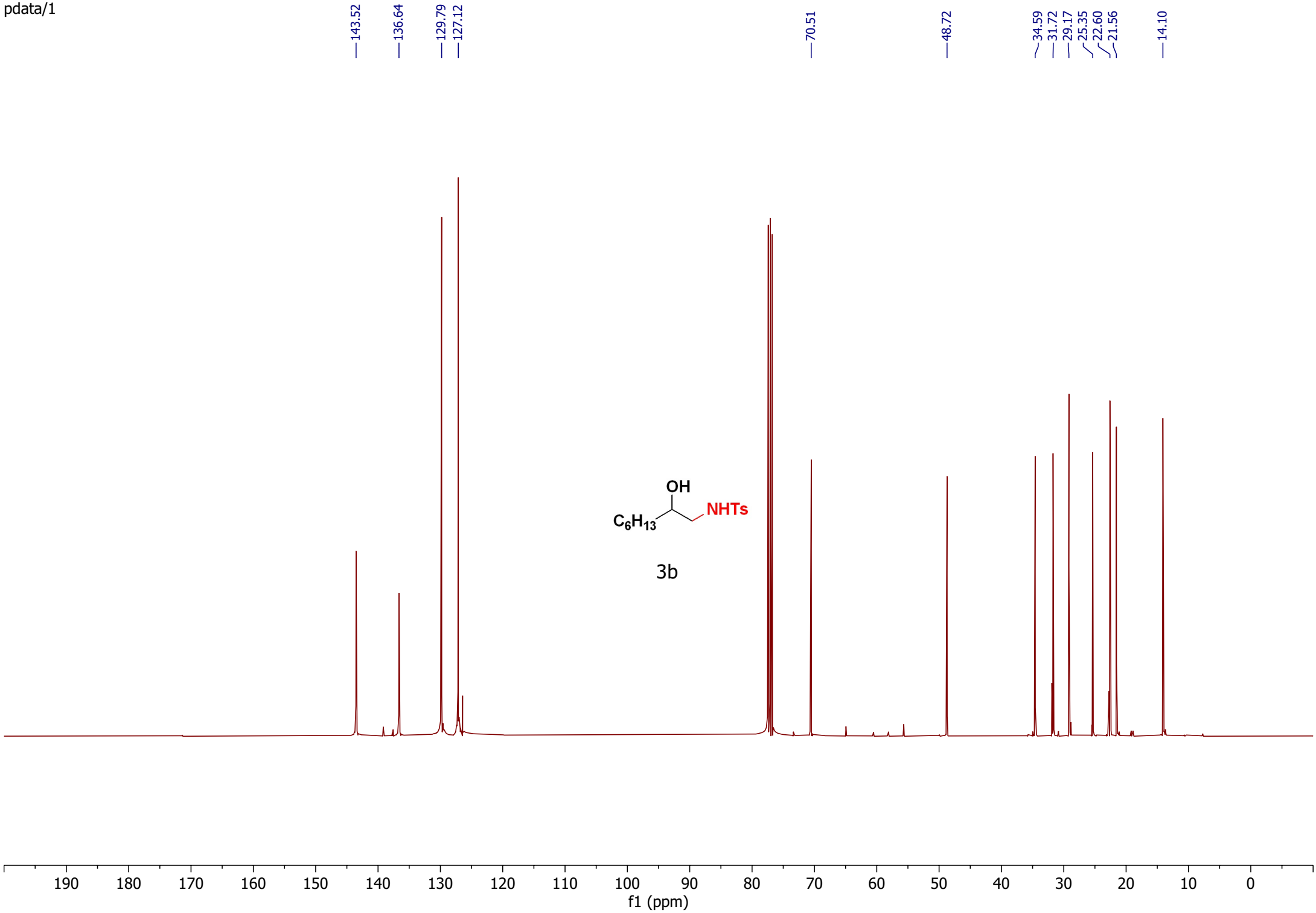
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NHTs
C6H13
3b
190
180
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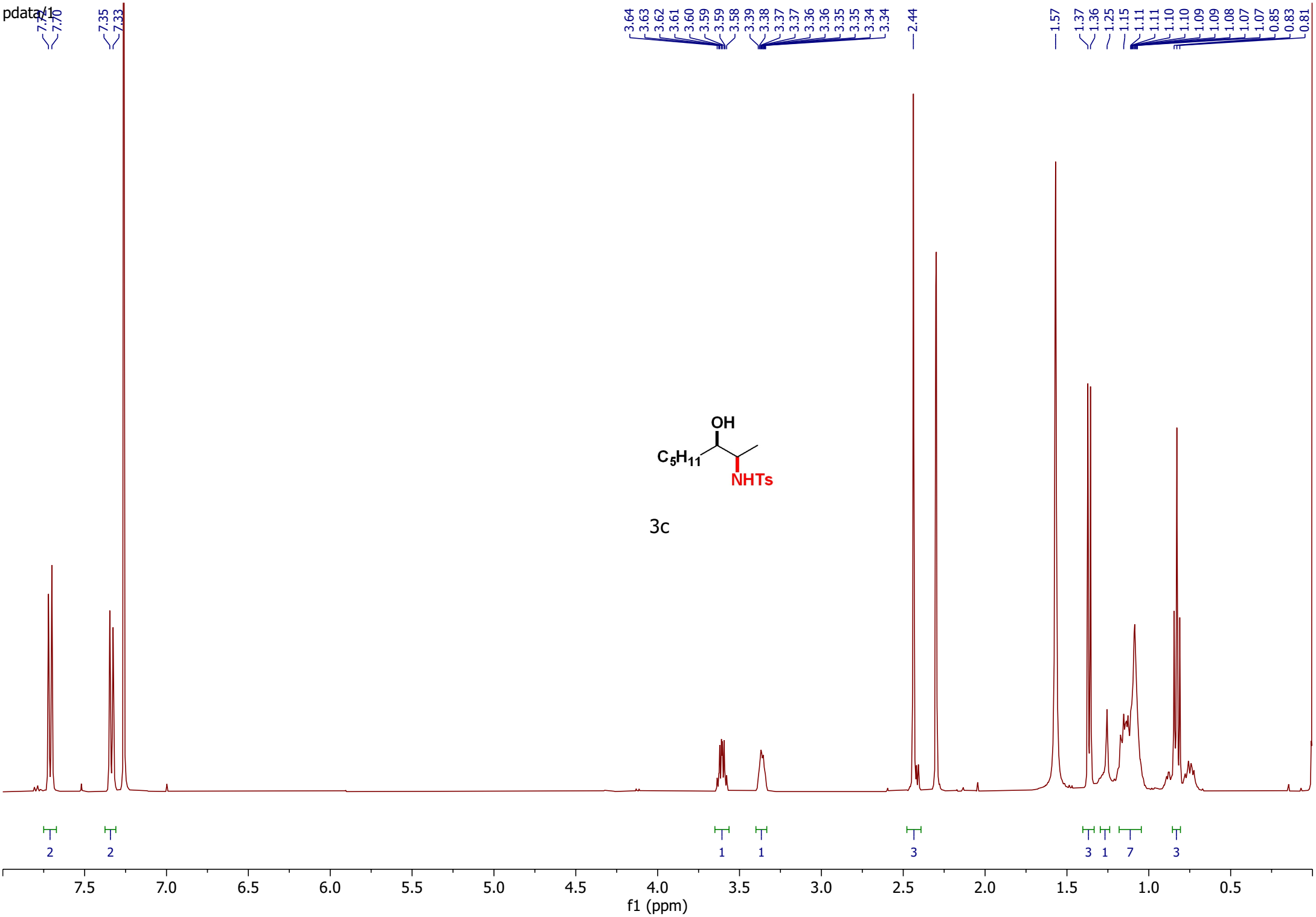
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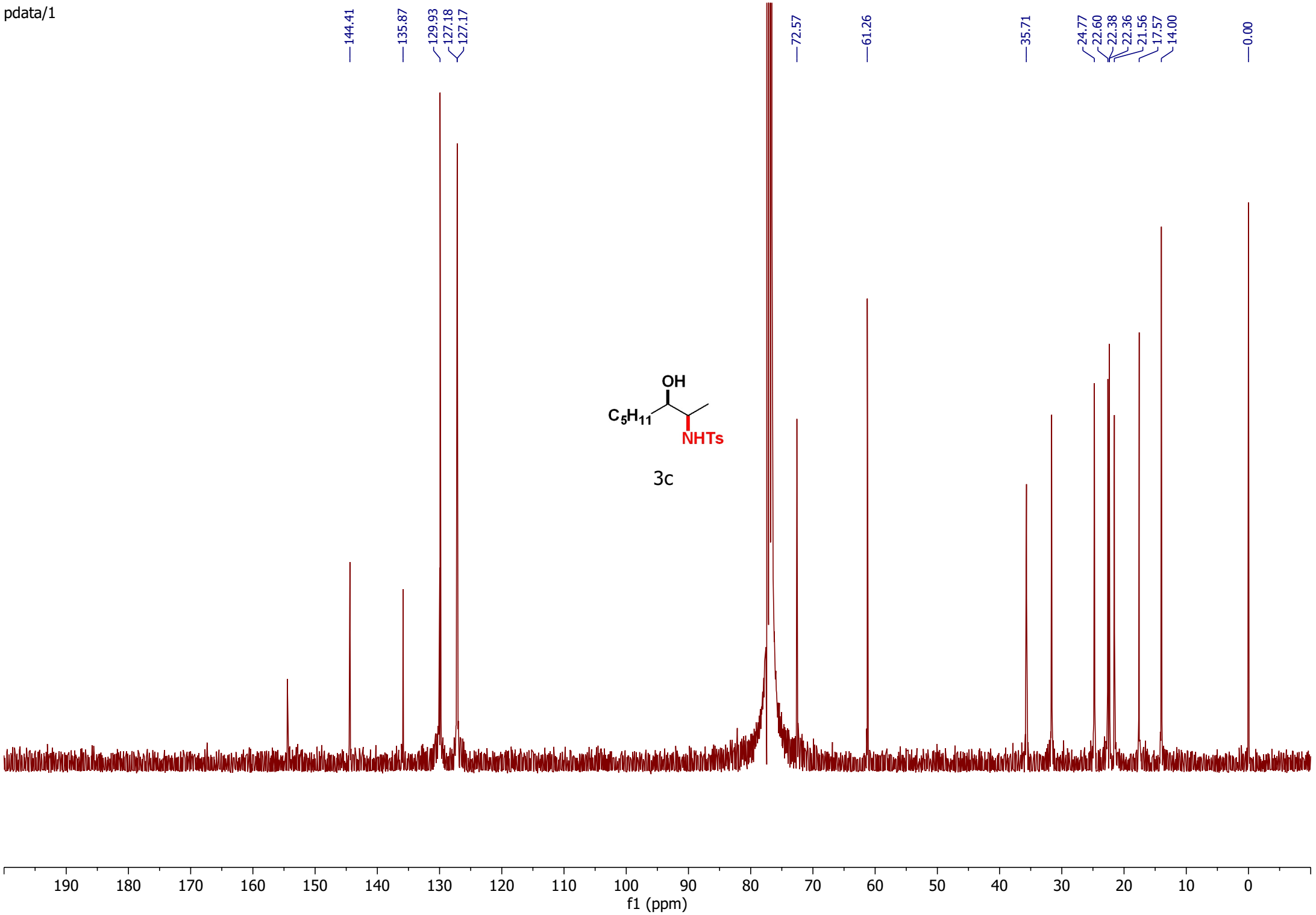
f1 (ppm)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NHTs
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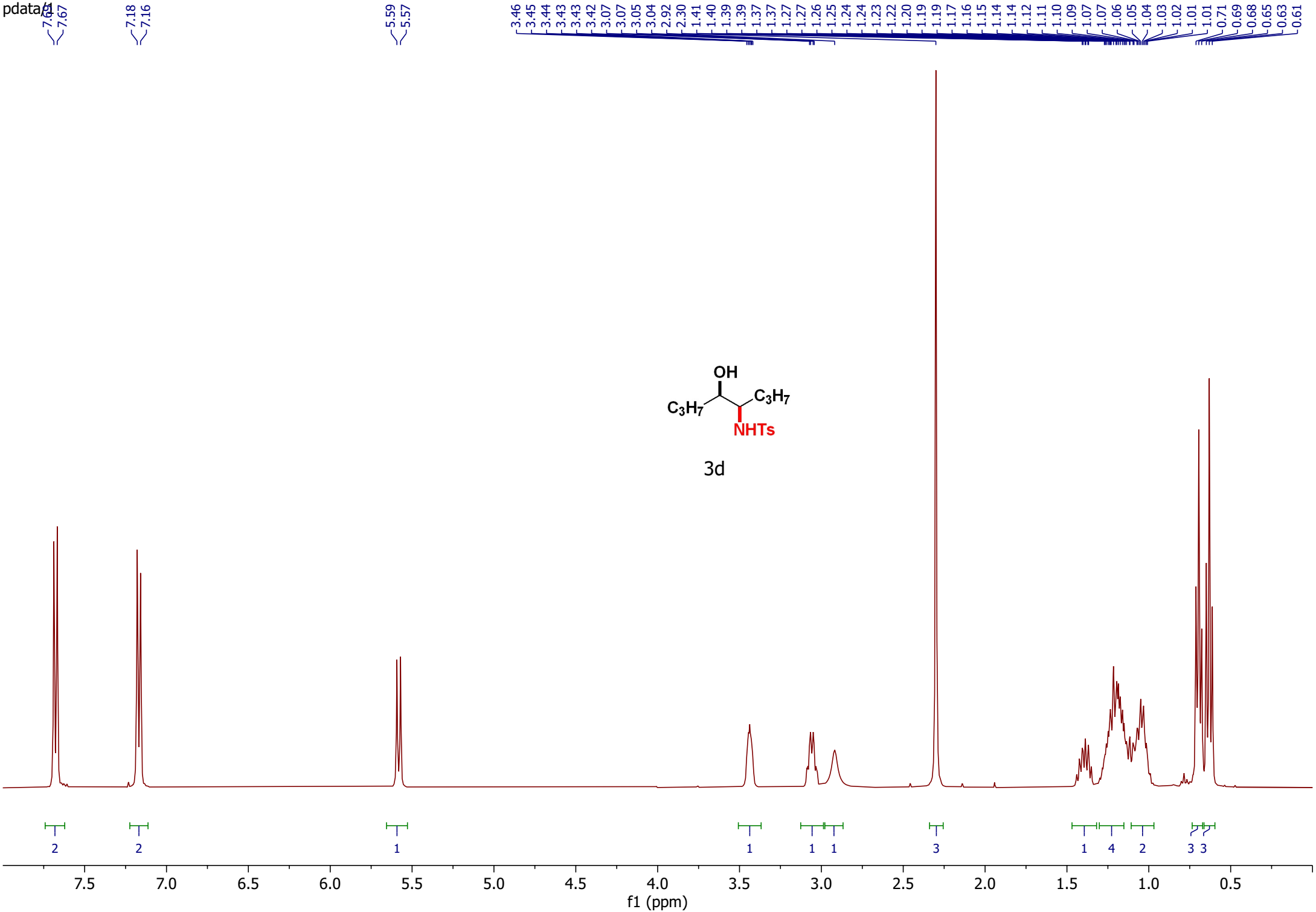
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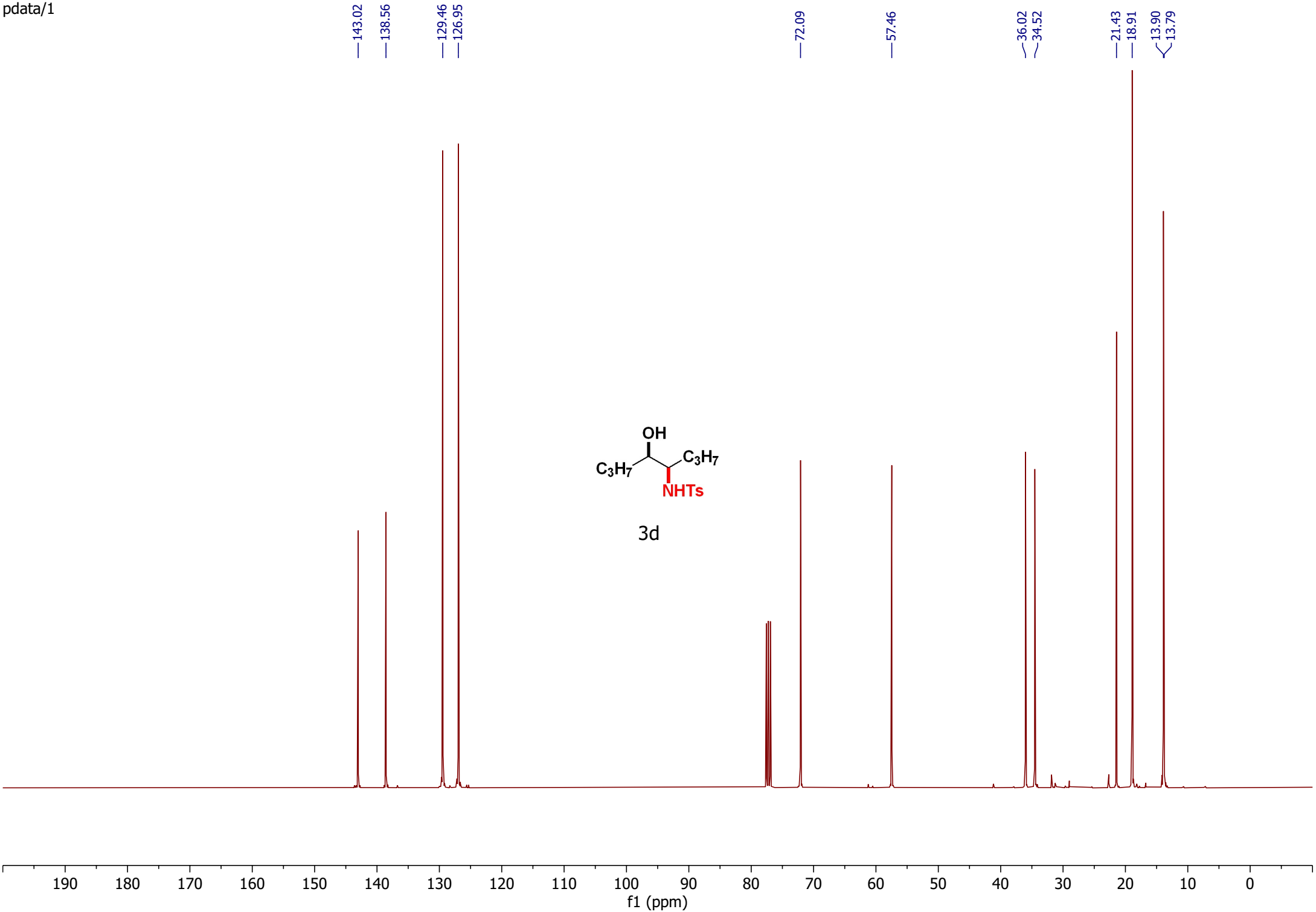
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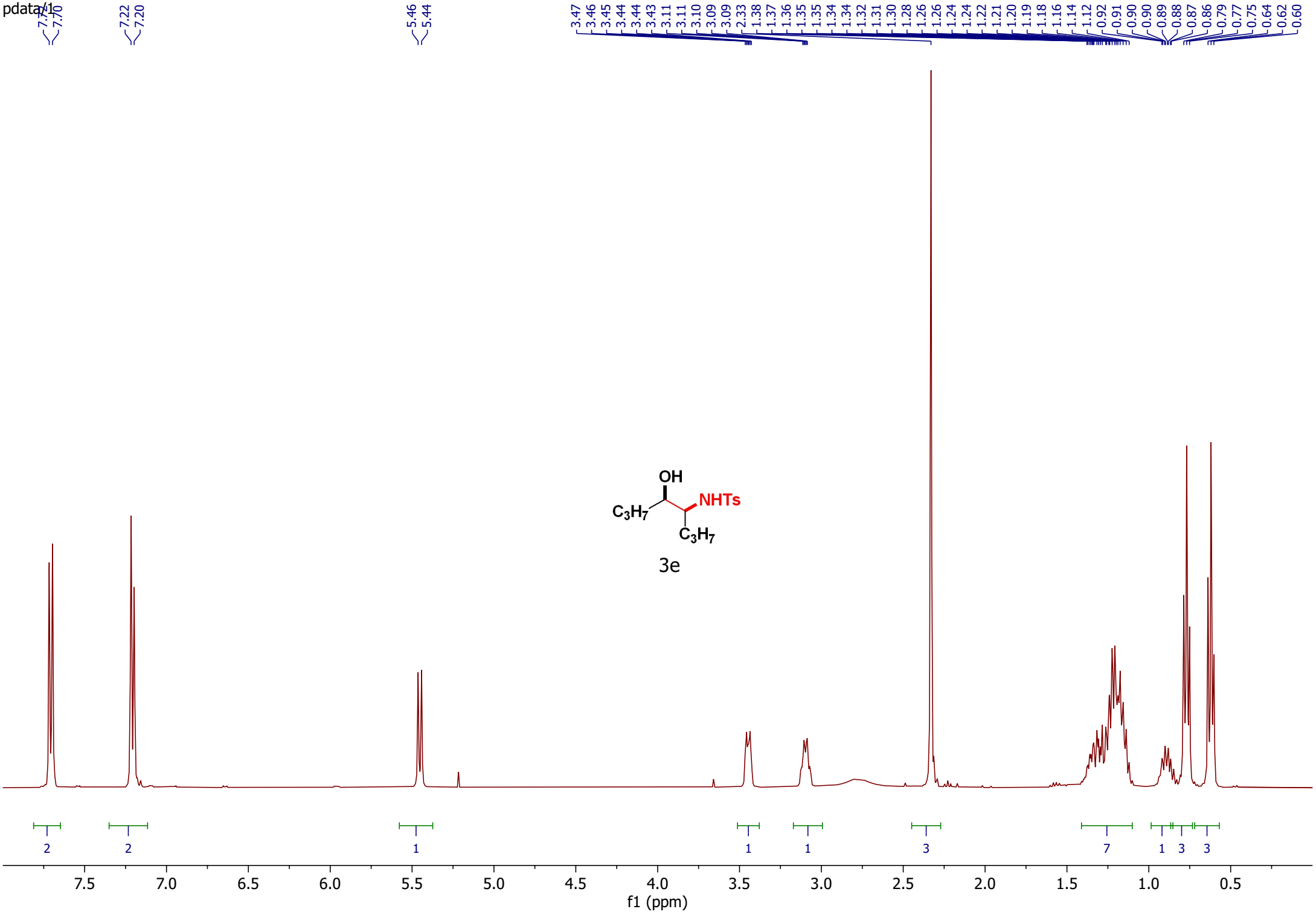
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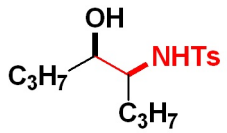

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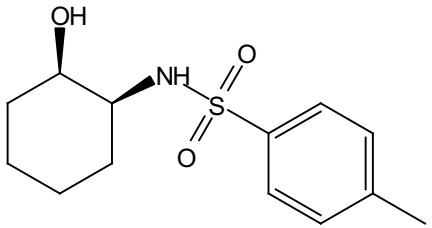

3f

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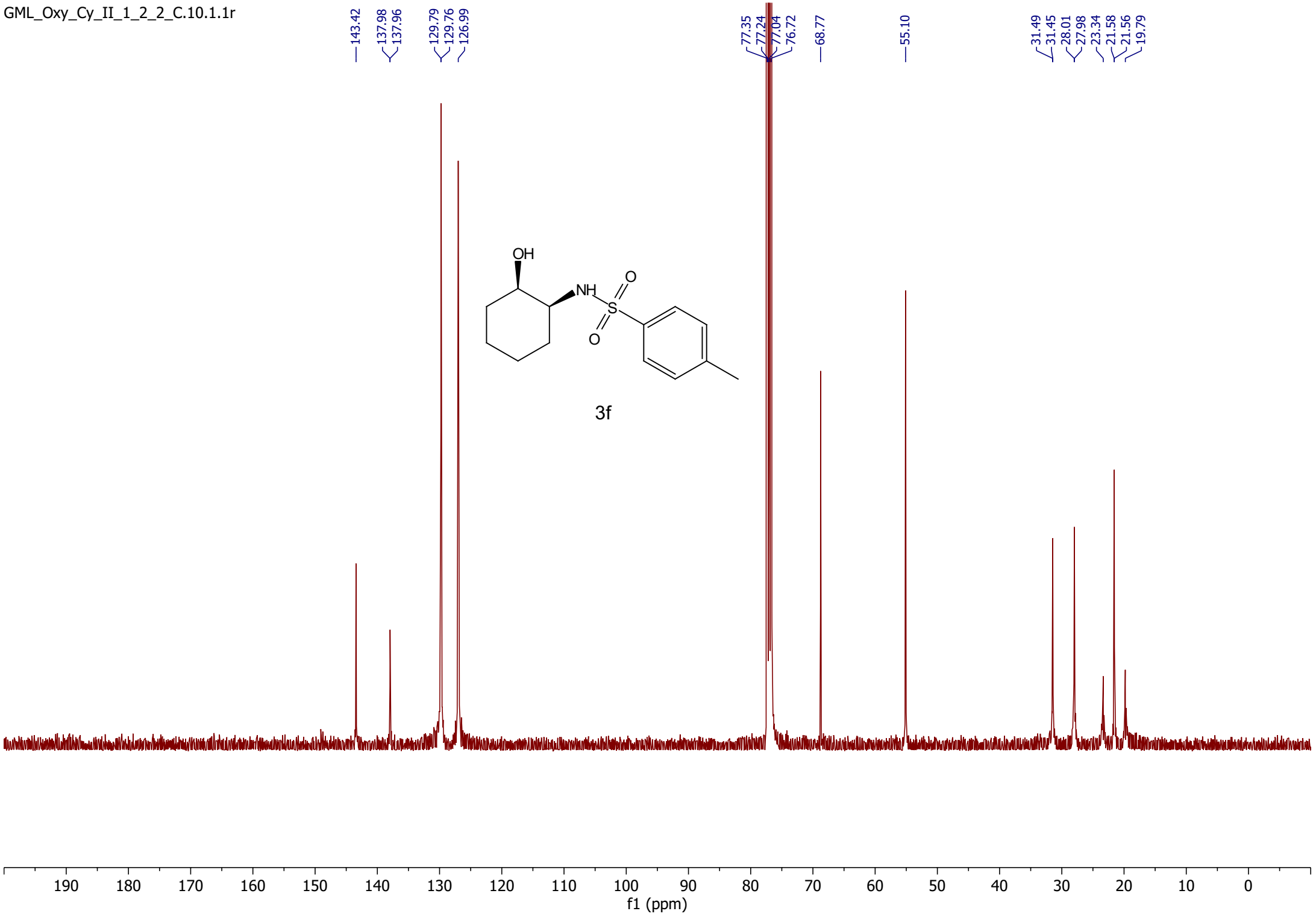

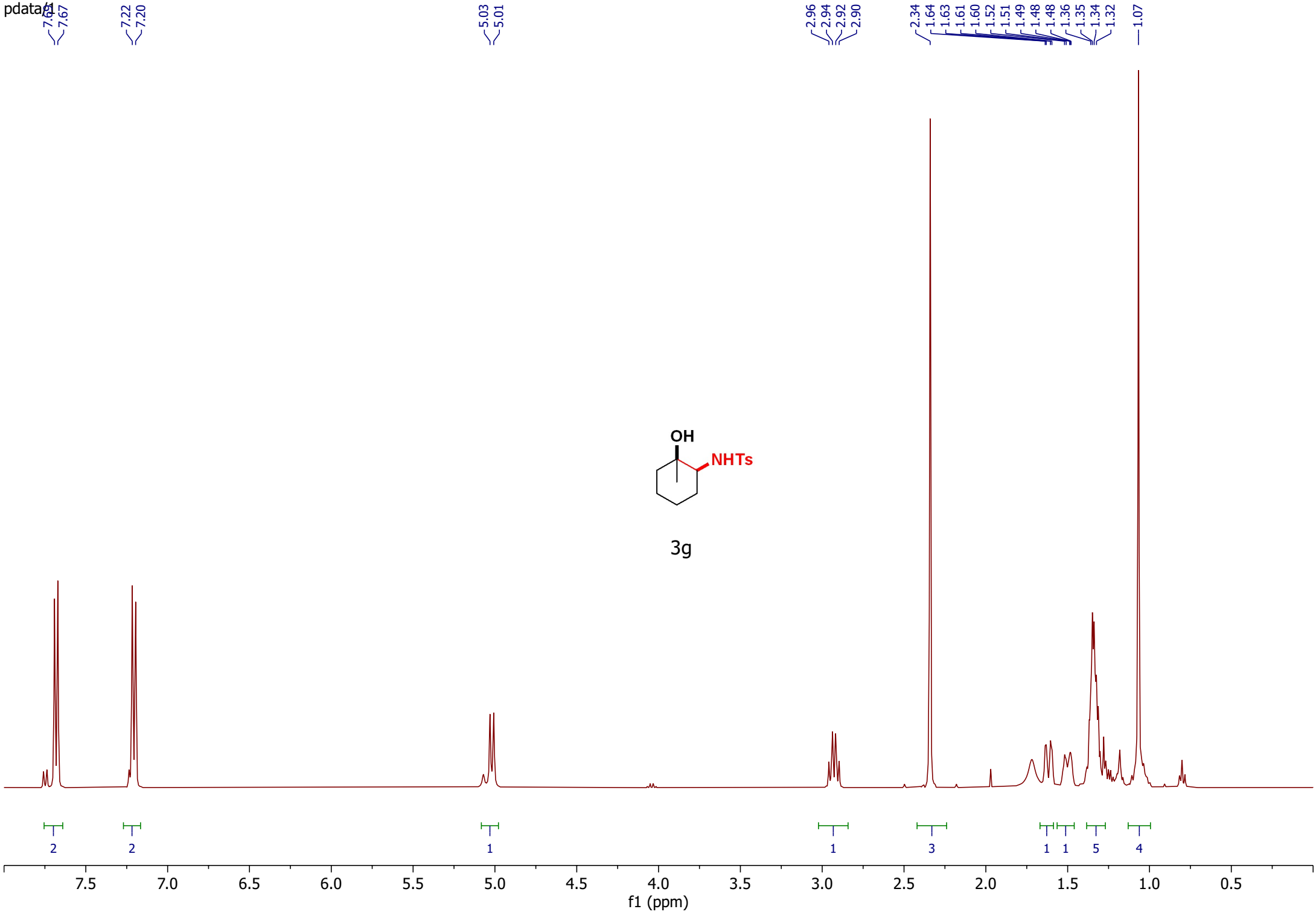
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1.61
1.60
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OH
NHTs
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6.5
6.0
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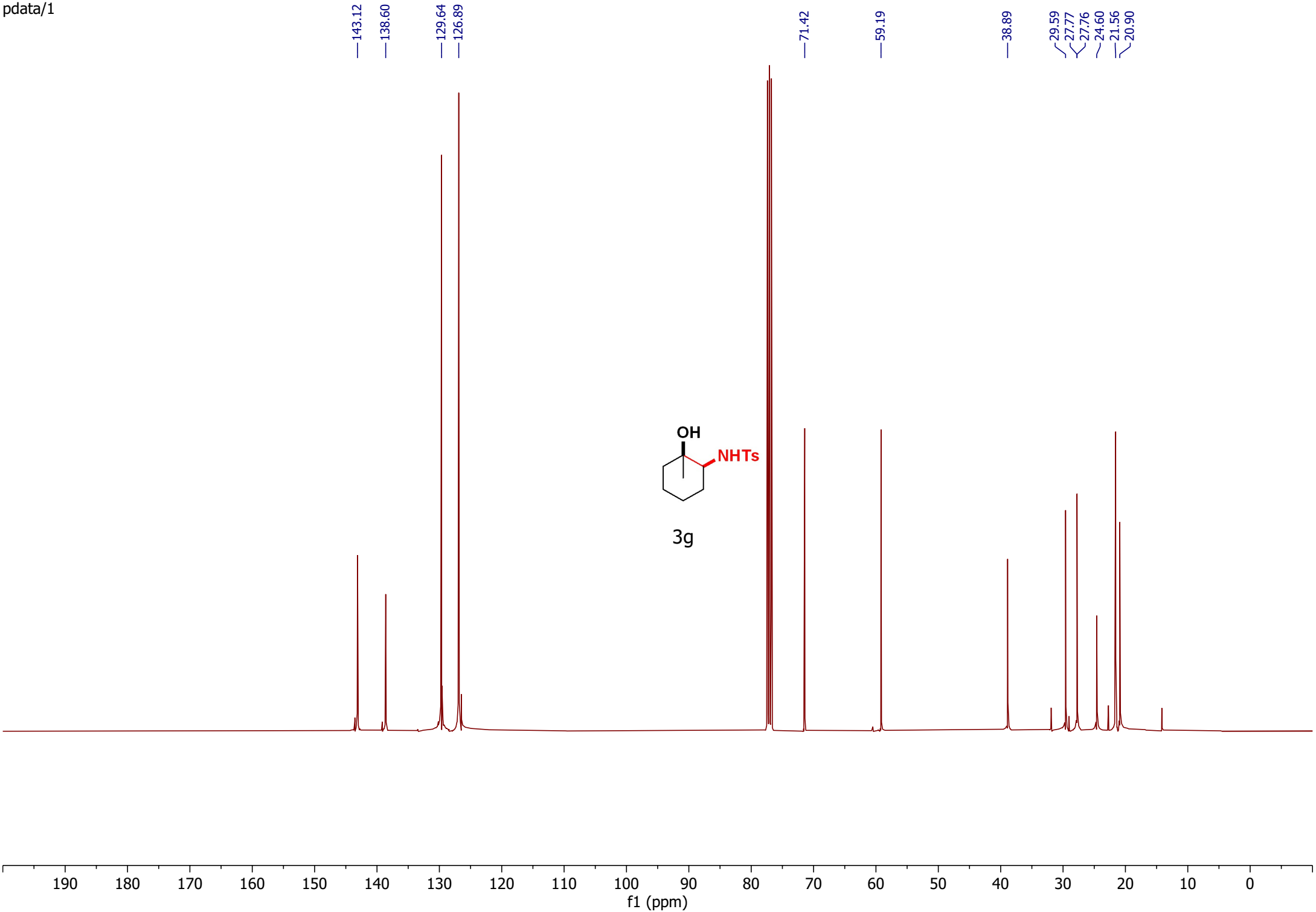
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3g
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180
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160
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140
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f1 (ppm)

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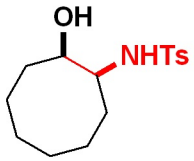

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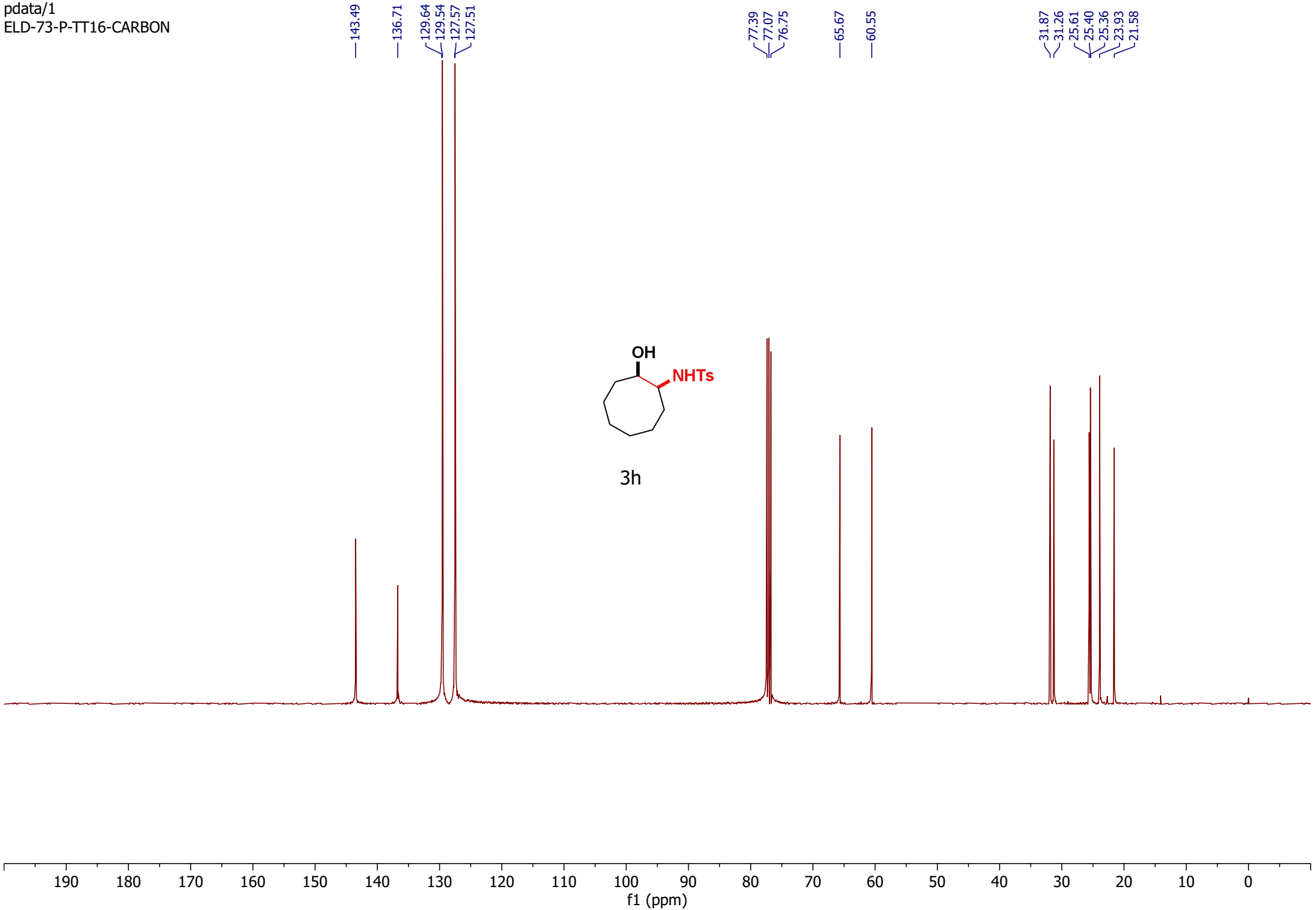

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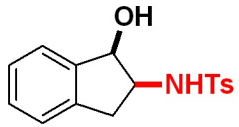
3.29 3.28 3.25 3.24 3.17 3.13 2.46



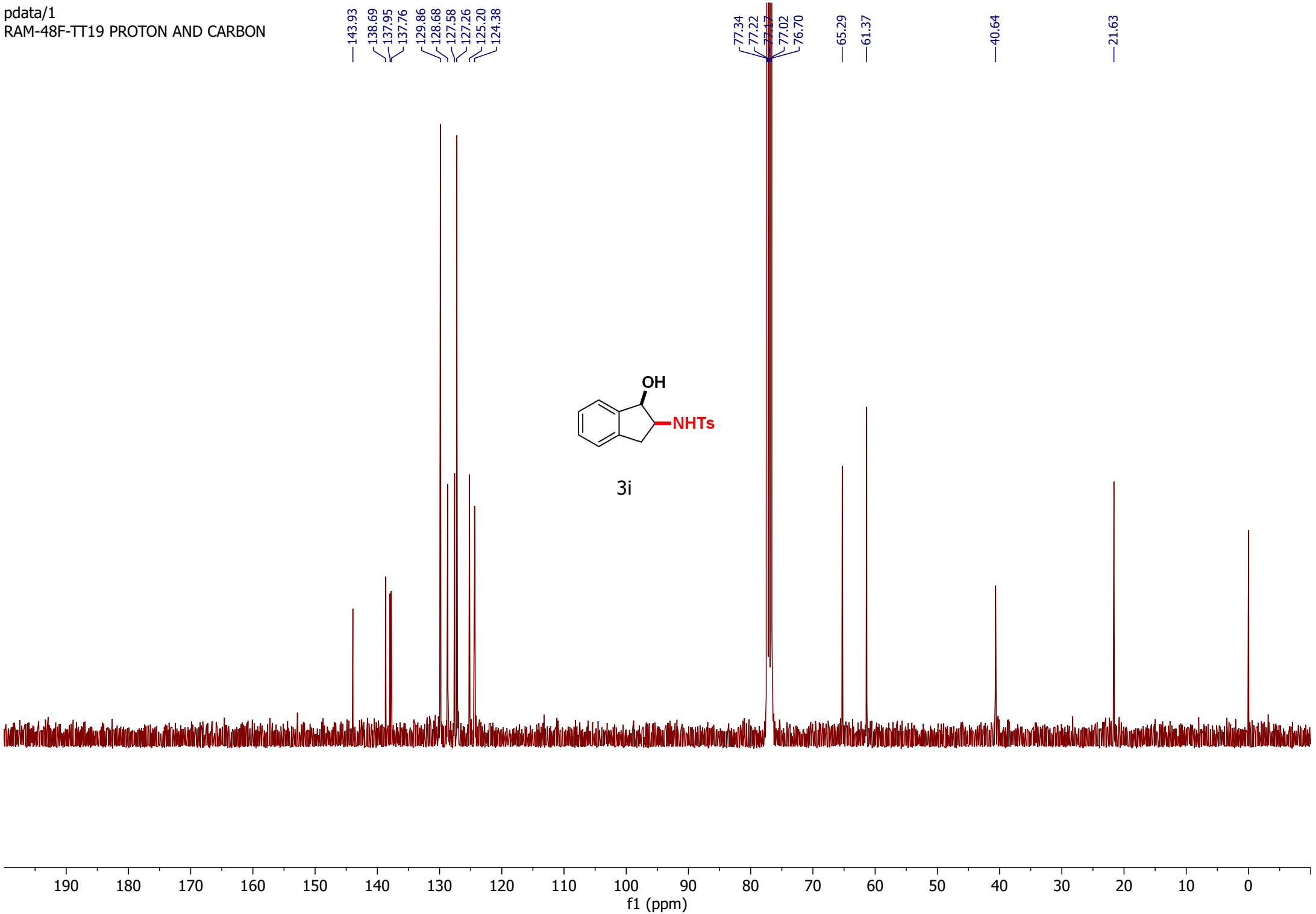
3i

2 2 5 1 1 1 1 1 3

7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5

f1 (ppm)

pdata/1
RAM-48F-TT19 PROTON AND CARBON



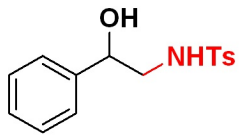
pdata/1

7.66 7.64 7.26 7.25 7.24 7.23 7.23 7.22 7.21 7.20 7.19

5.03 4.74 4.73 4.72 4.71

3.18 3.16 3.15 2.97 2.95 2.94 2.92

2.36 2.35



3j

2 7 1 1 1 1 4

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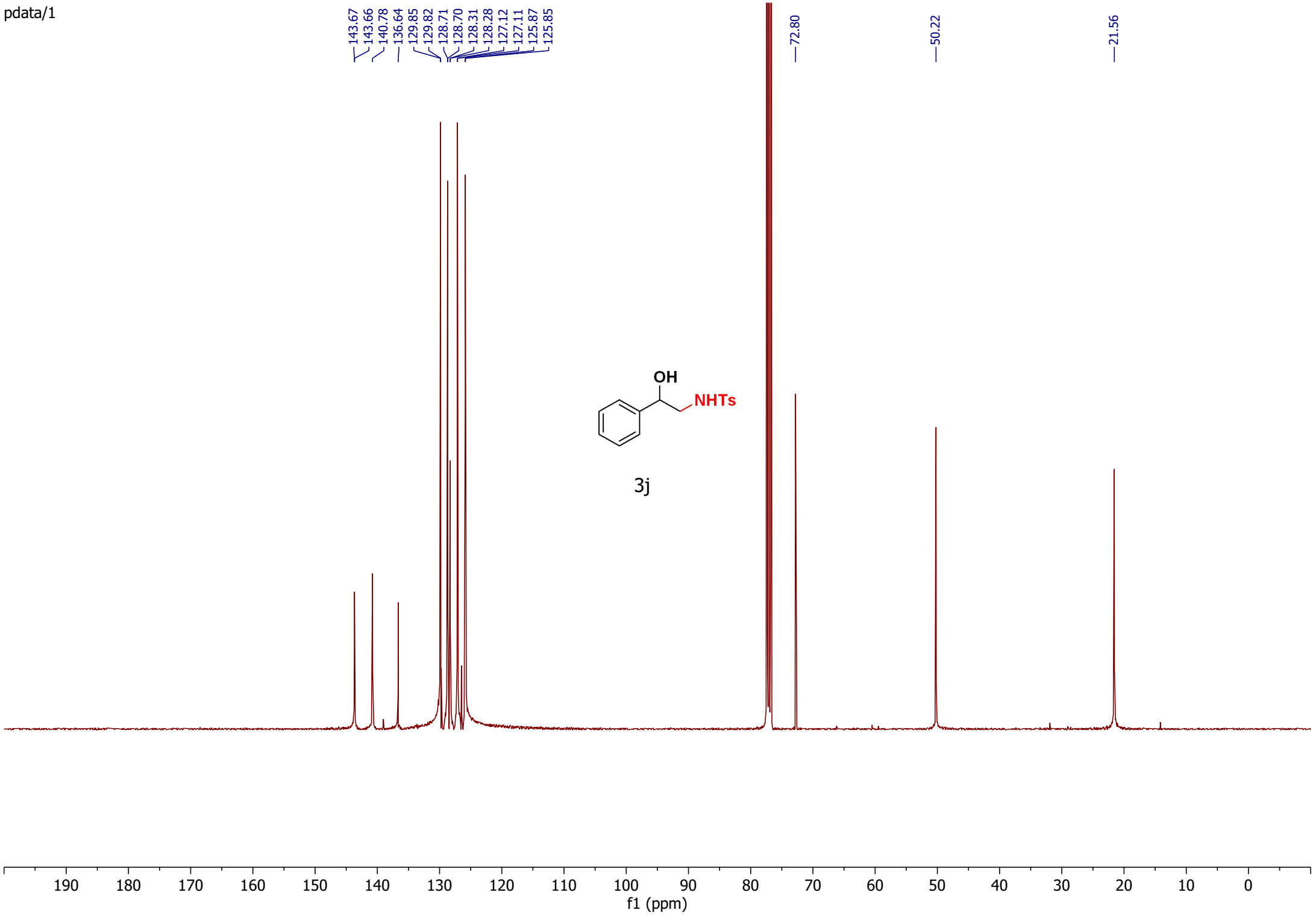
f1 (ppm)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140.78
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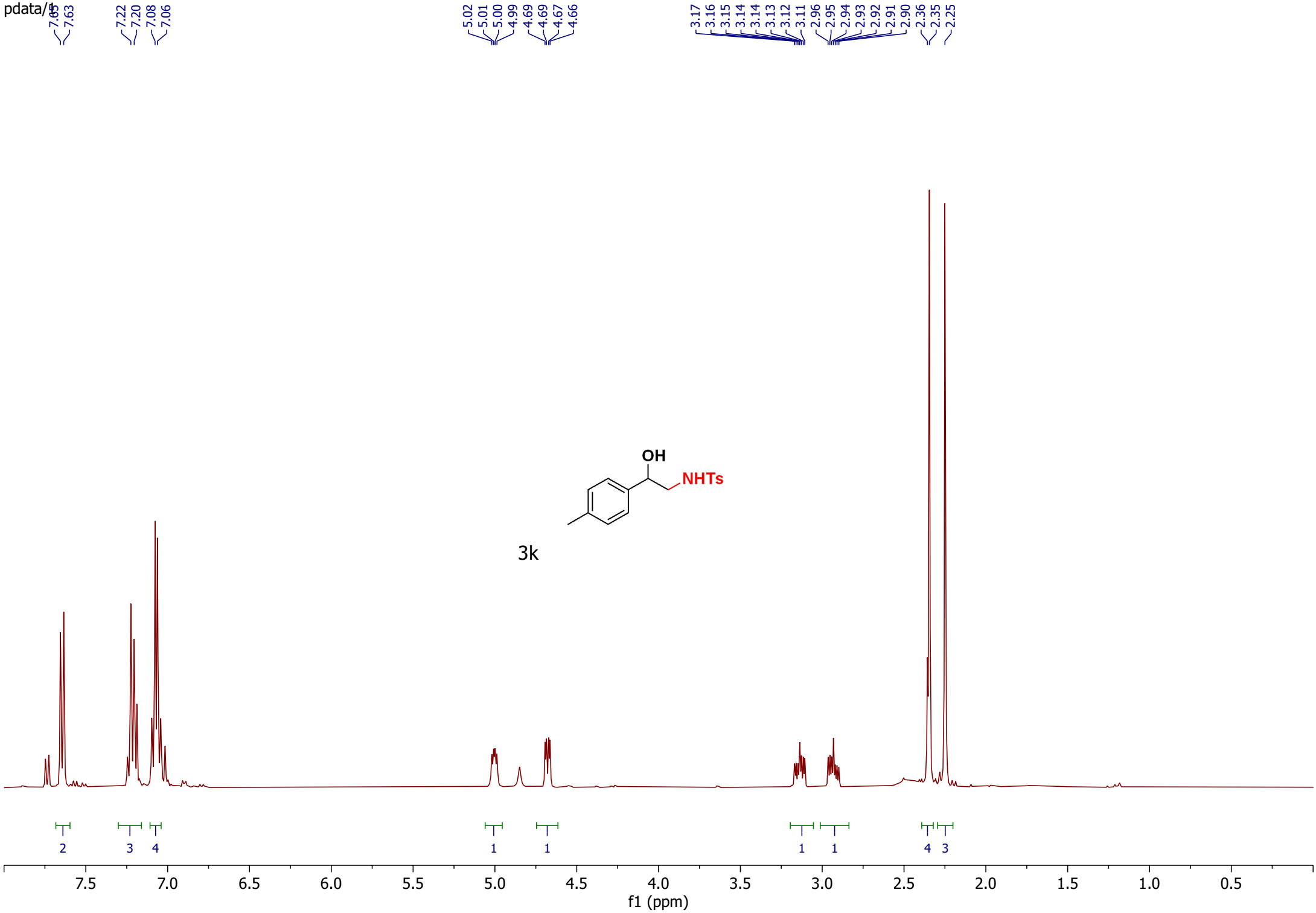
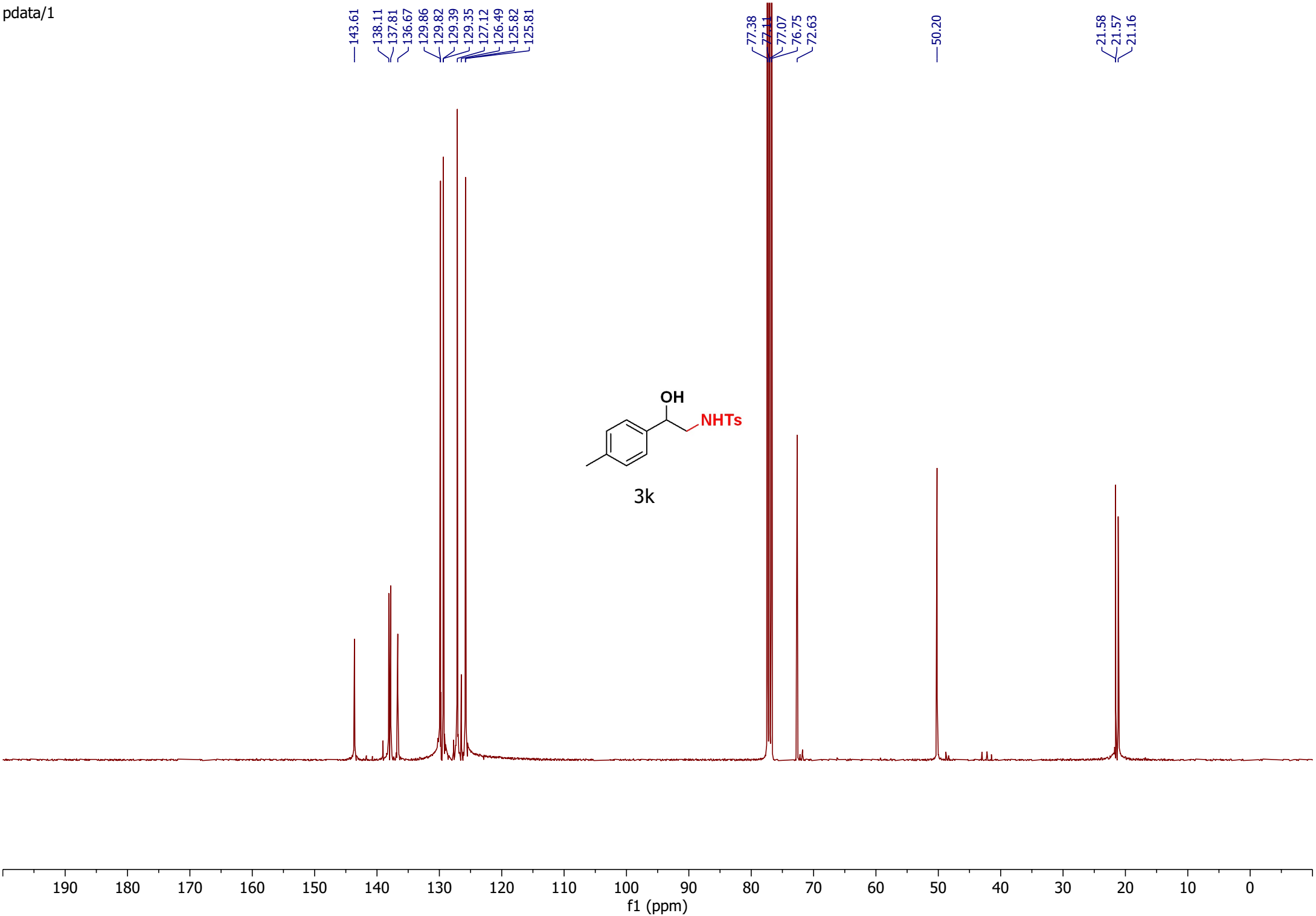
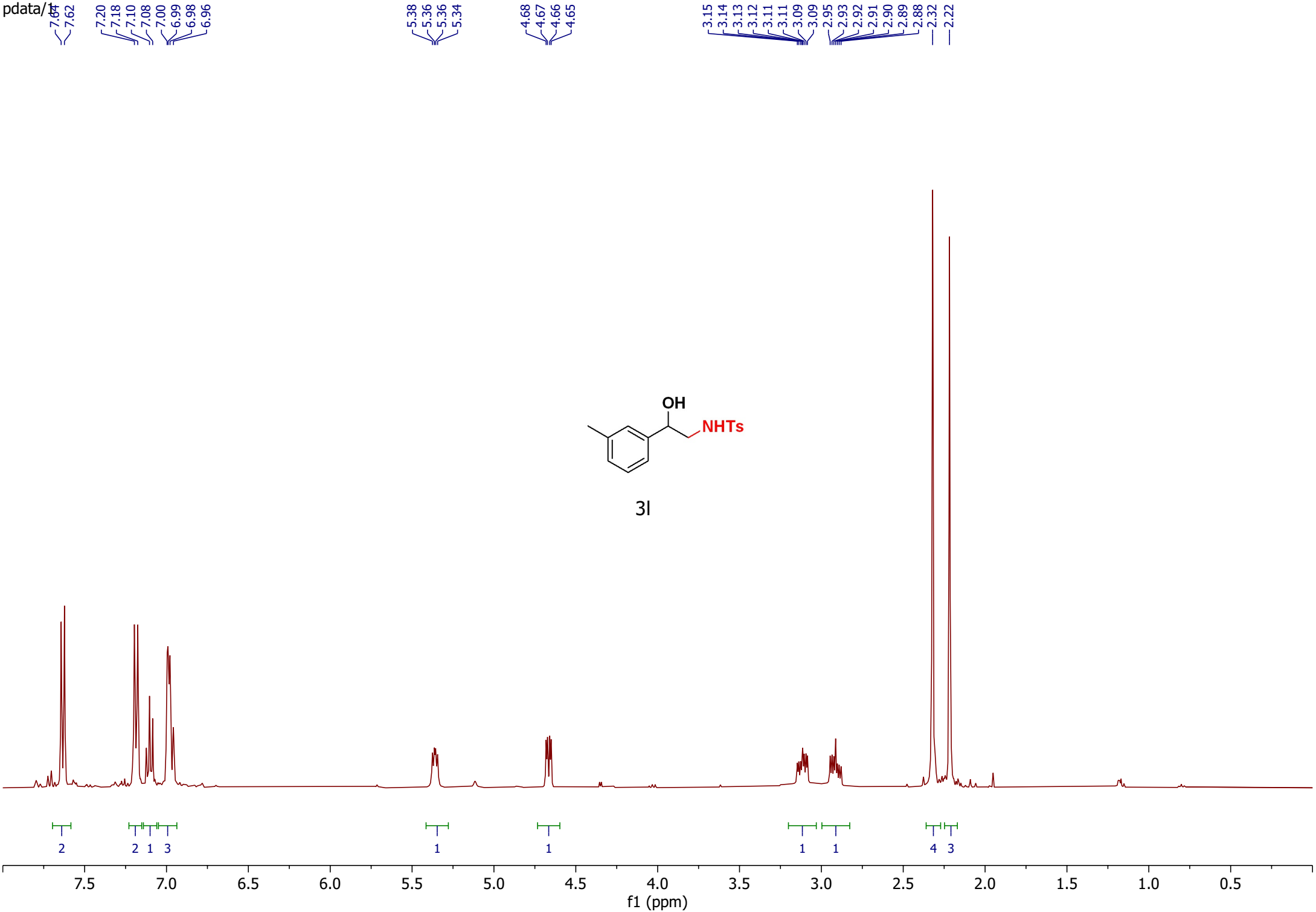
129.85
129.82
128.71
128.70
128.31
128.28
127.12
127.11
125.87
125.85
72.80
50.22
21.56
OH
NHTs
3j
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


pdata/1
7.65
7.63
7.22
7.20
7.08
7.06
5.02
5.01
5.00
4.99
4.69
4.69
4.67
4.66
3.17
3.16
3.15
3.14
3.14
3.13
3.12
3.11
2.96
2.95
2.94
2.93
2.92
2.91
2.90
2.36
2.35
2.25
OH
NHTs
3k
2
3
4
1
1
1
1
4
3
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)

pdata/1

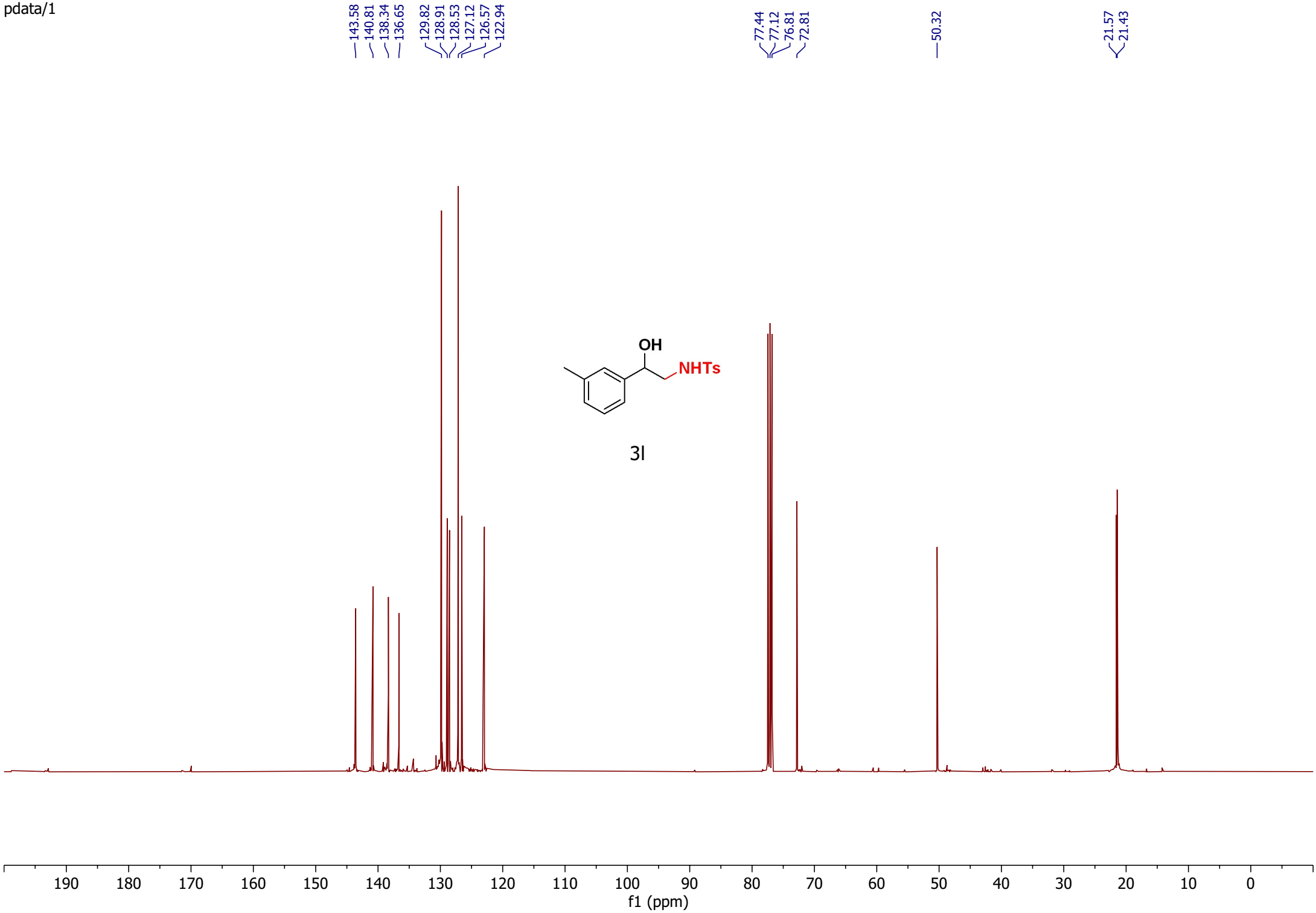

143.61
138.11
137.81
136.67
129.86
129.82
129.39
129.35
127.12
126.49
125.82
125.81
77.38
77.11
77.07
76.75
72.63
50.20
21.58
21.57
21.16
OH
NHTs
3k
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

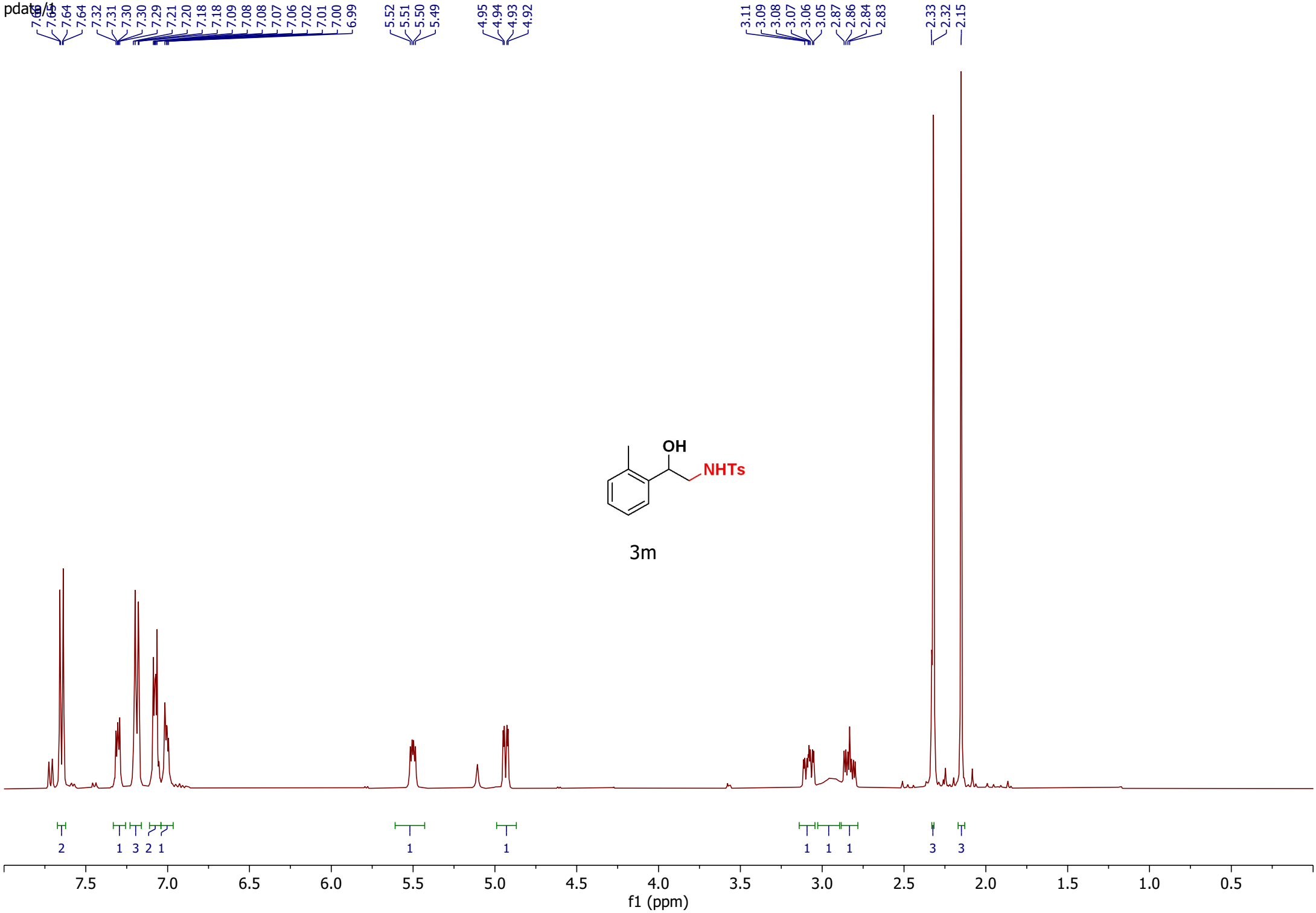
pdata/1

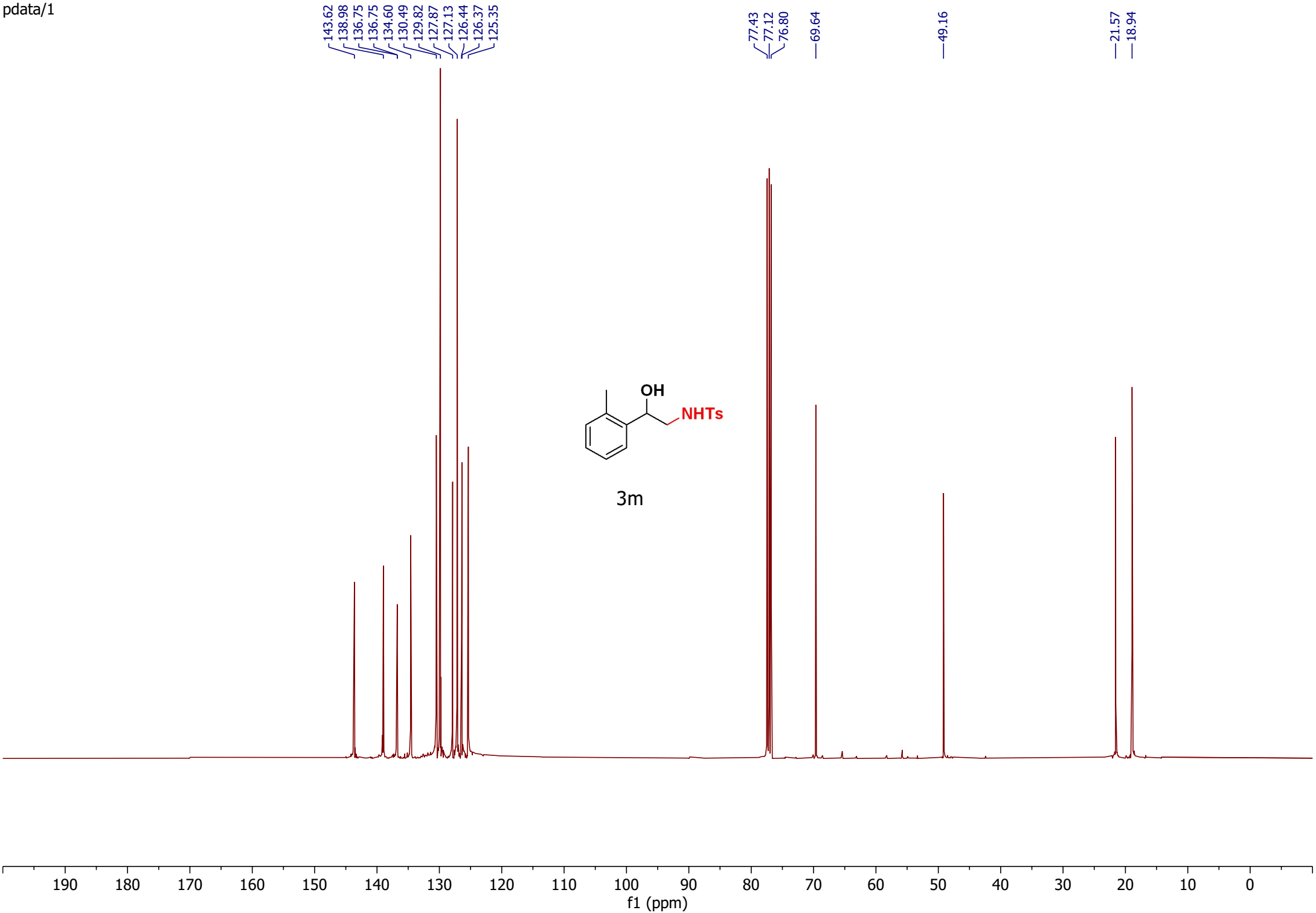

7.64
7.62
7.20
7.18
7.10
7.08
7.00
6.99
6.98
6.96
5.38
5.36
5.36
5.34
4.68
4.67
4.66
4.65
3.15
3.14
3.13
3.12
3.11
3.11
3.09
3.09
2.95
2.93
2.92
2.91
2.90
2.89
2.88
2.32
2.22
OH
NHTs
2
2
1
3
1
1
1
1
4
3
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)

3l

pdata/1


143.58
140.81
138.34
136.65
129.82
128.91
128.53
127.12
126.57
122.94
77.44
77.12
76.81
72.81
50.32
21.57
21.43
OH
NHTs
3l
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


pdata/1
7.66
7.64
7.64
7.32
7.31
7.30
7.30
7.29
7.21
7.20
7.18
7.18
7.09
7.08
7.08
7.07
7.06
7.02
7.01
7.00
6.99
5.52
5.51
5.50
5.49
4.95
4.94
4.93
4.92
3.11
3.09
3.08
3.07
3.06
3.05
2.87
2.86
2.84
2.83
2.33
2.32
2.15
OH
NHTs
3m
2
1
3
2
1
1
1
1
1
1
3
3
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)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136.75
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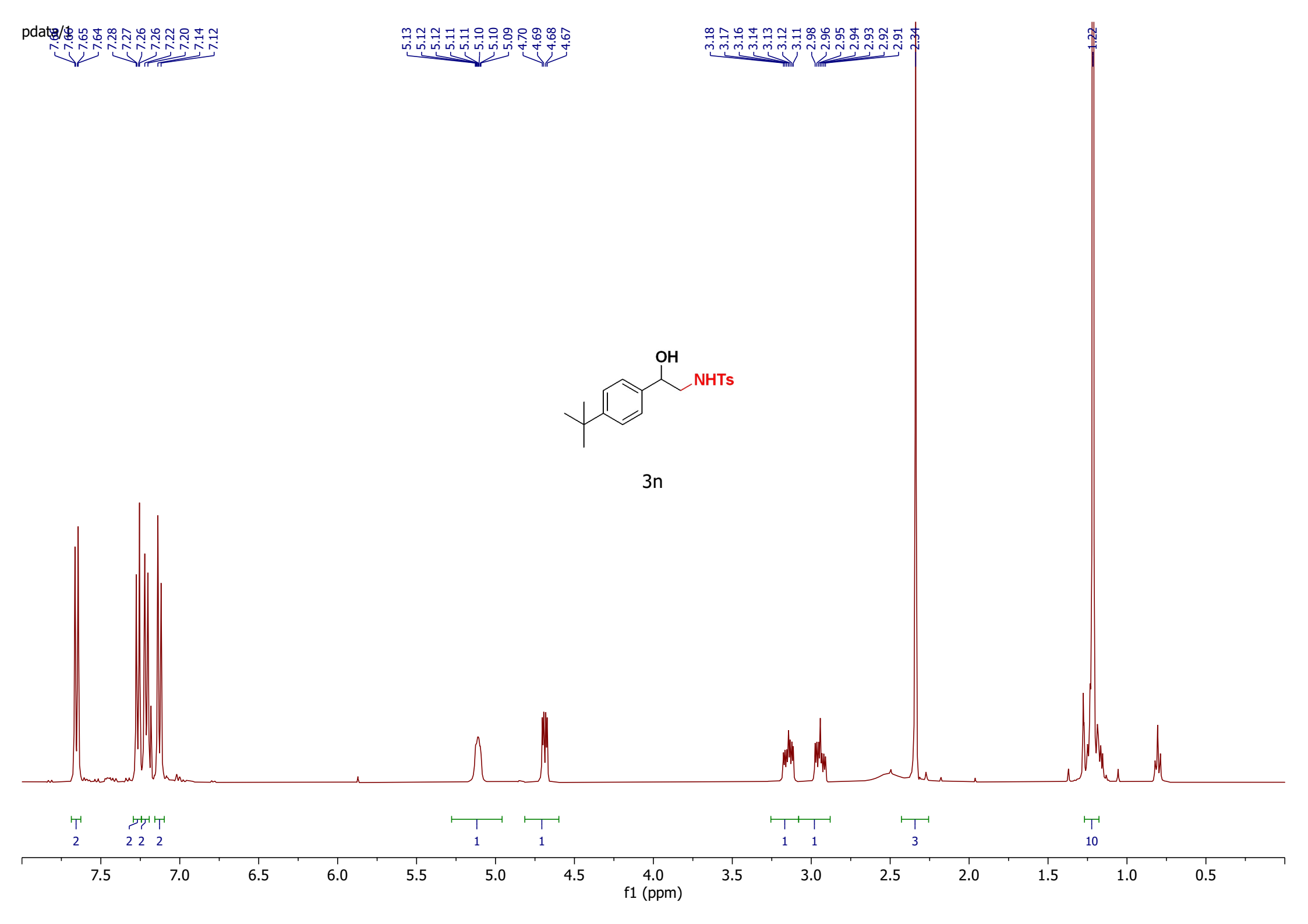
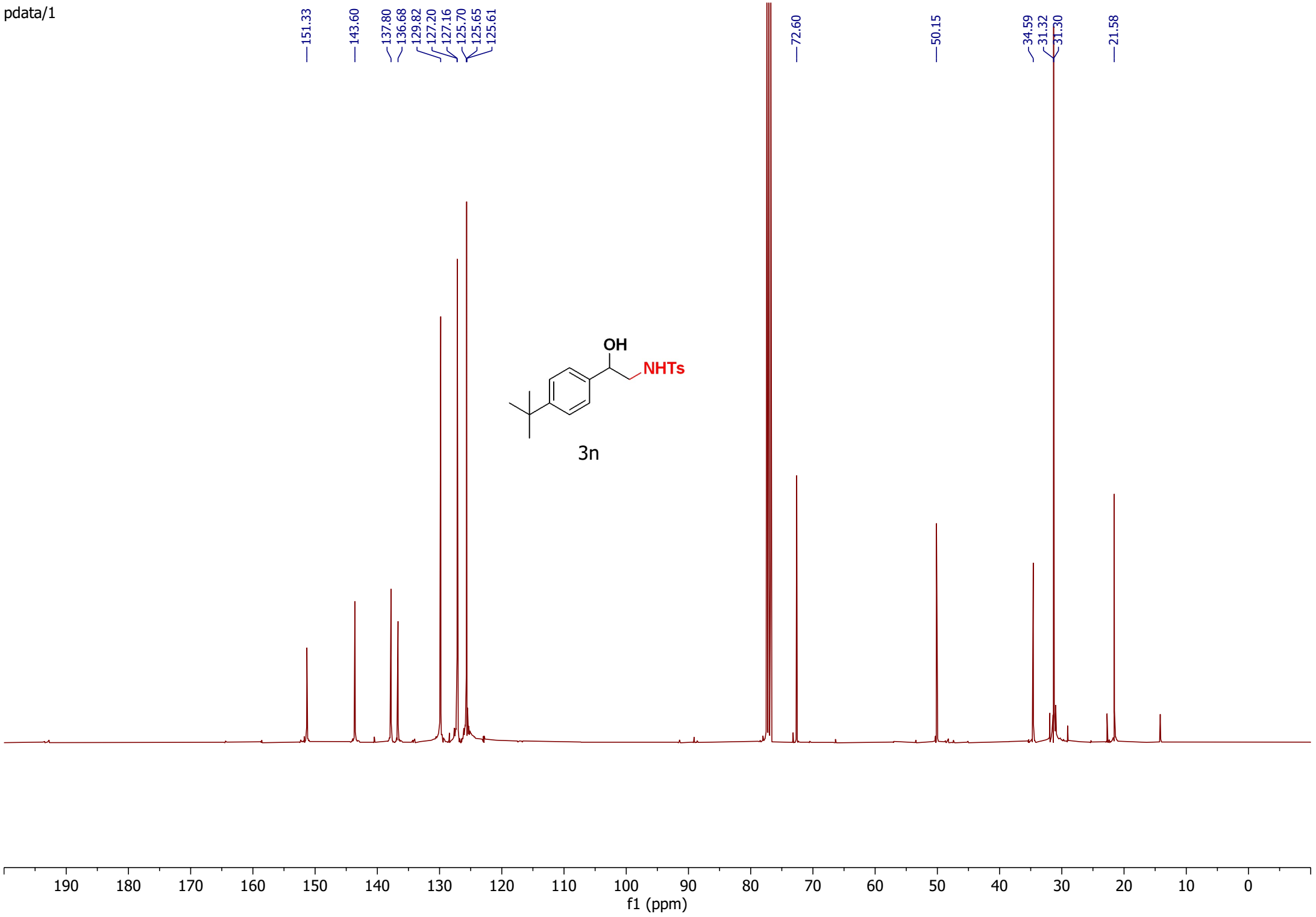
134.60
130.49
129.82
127.87
127.13
126.44
126.37
125.35
77.43
77.12
76.80
69.64
49.16
21.57
18.94
OH
NHTs
3m
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


pdata/1
7.66
7.65
7.64
7.28
7.27
7.26
7.26
7.22
7.20
7.14
7.12
5.13
5.12
5.12
5.11
5.11
5.10
5.10
5.09
4.70
4.69
4.68
4.67
3.18
3.17
3.16
3.14
3.13
3.12
3.11
2.98
2.96
2.95
2.94
2.93
2.92
2.91
2.34
1.22
OH
NHTs
3n
2
2 2
2
1
1
1
1
3
10
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)

pdata/1


151.33
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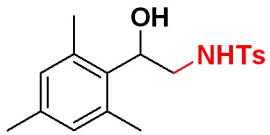
137.80
136.68
129.82
127.20
127.16
125.70
125.65
125.61
72.60
50.15
34.59
31.32
31.30
21.58
OH
NHTs
3n
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

pdata/1
AAP-III-62F-t19+H

7.7636
7.7451
7.7403
7.7221
7.1659
7.1461
6.6868
5.2106
5.2038
5.1911
5.1773
4.9077
4.8963
4.8887
4.8765
3.9496
3.9450
3.9292
3.9221
3.9002
3.8955
3.7541
3.7499
3.7360
3.7257
3.7079
3.7034
2.3805
2.2189
2.1882

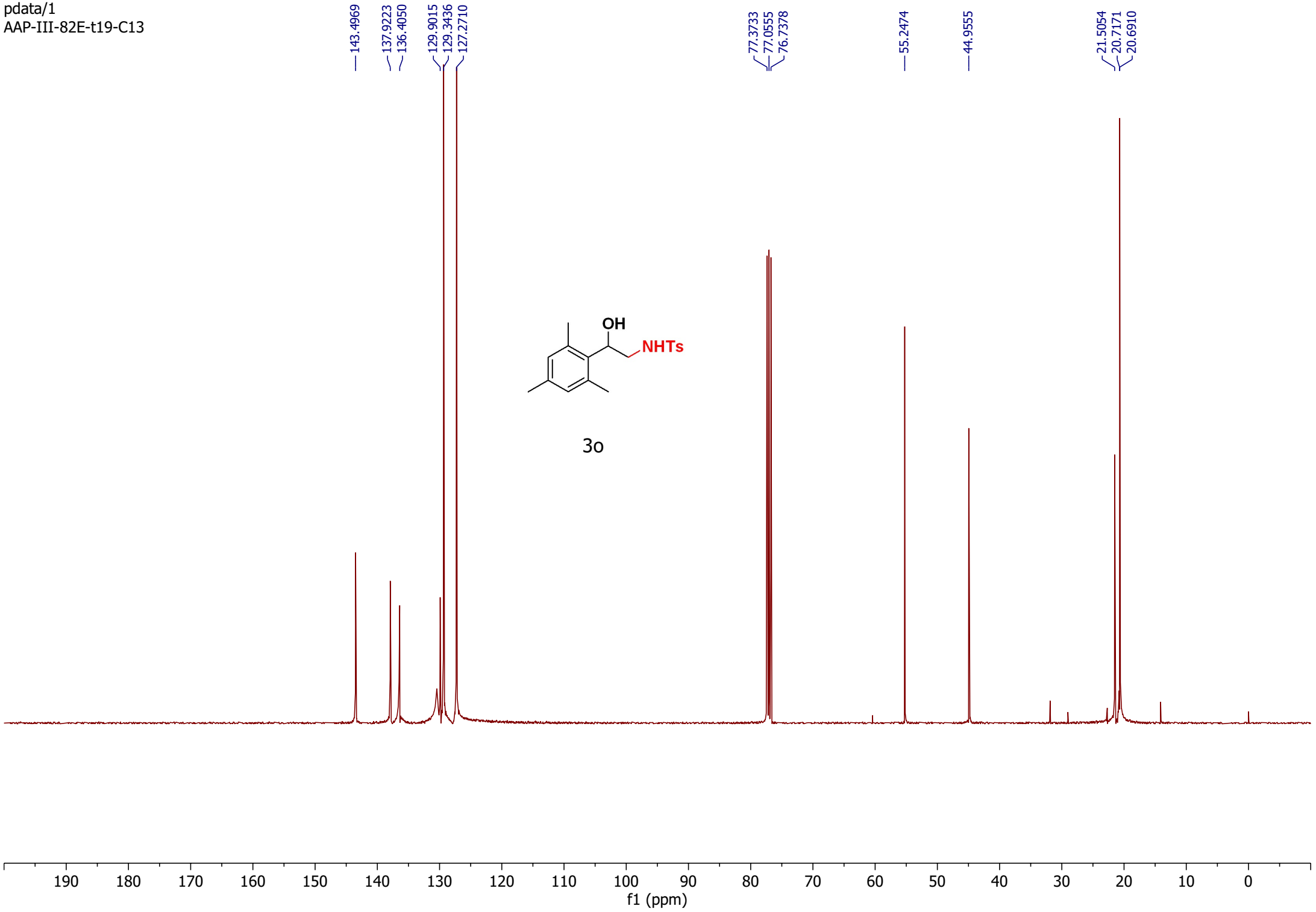


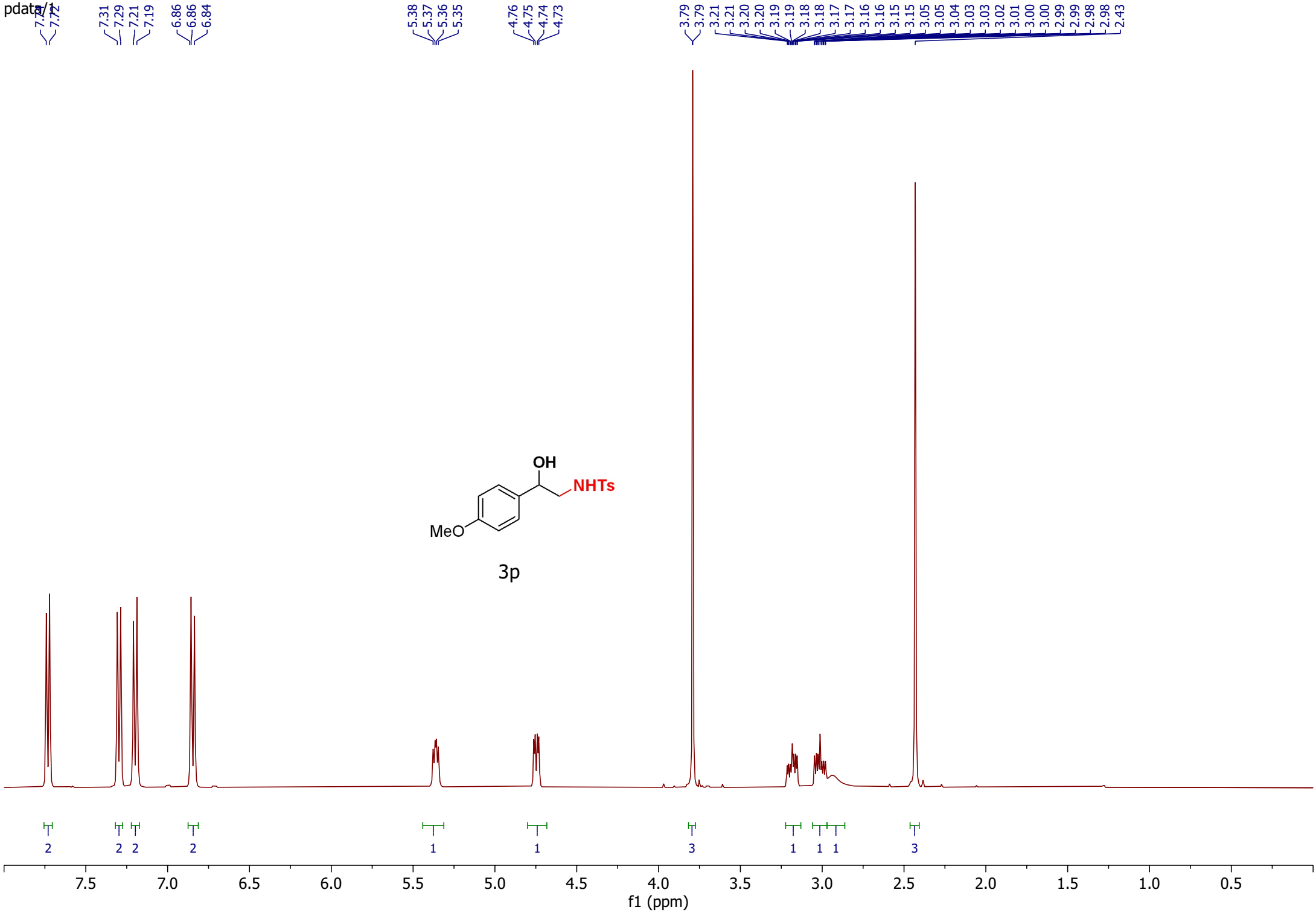
3o

2
2
2
1
1
1
1
3
9

7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)

pdata/1
AAP-III-82E-t19-C13

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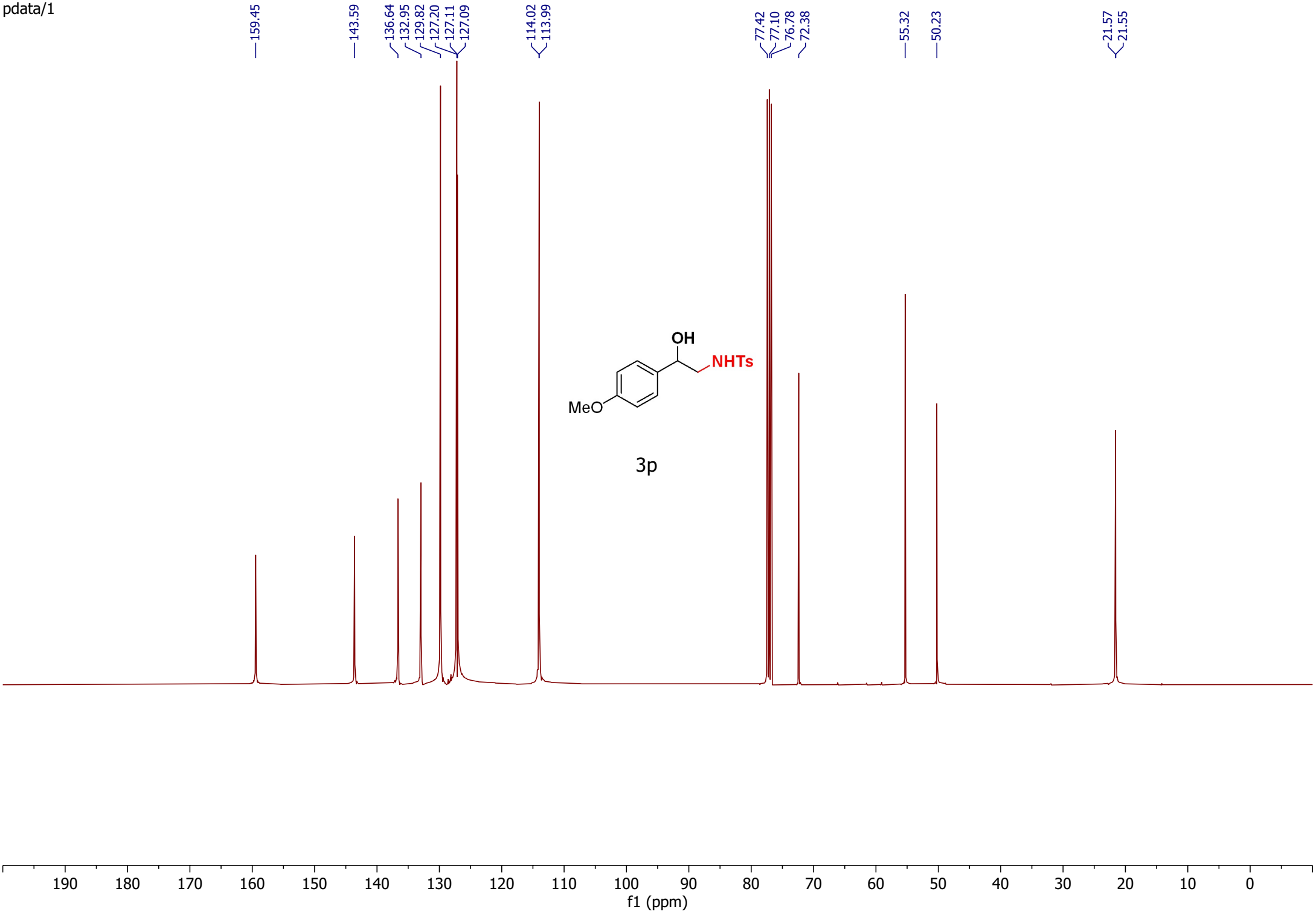
7.31
7.29
7.21
7.19
6.86
6.86
6.84
5.38
5.37
5.36
5.35
4.76
4.75
4.74
4.73
3.79
3.79
3.21
3.21
3.20
3.20
3.19
3.19
3.18
3.18
3.17
3.17
3.16
3.16
3.15
3.15
3.05
3.05
3.04
3.03
3.03
3.02
3.01
3.00
3.00
2.99
2.99
2.98
2.98
2.43
OH
NHTs
MeO
3p
2
2
2
2
1
1
3
1
1
1
3
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)

pdata/1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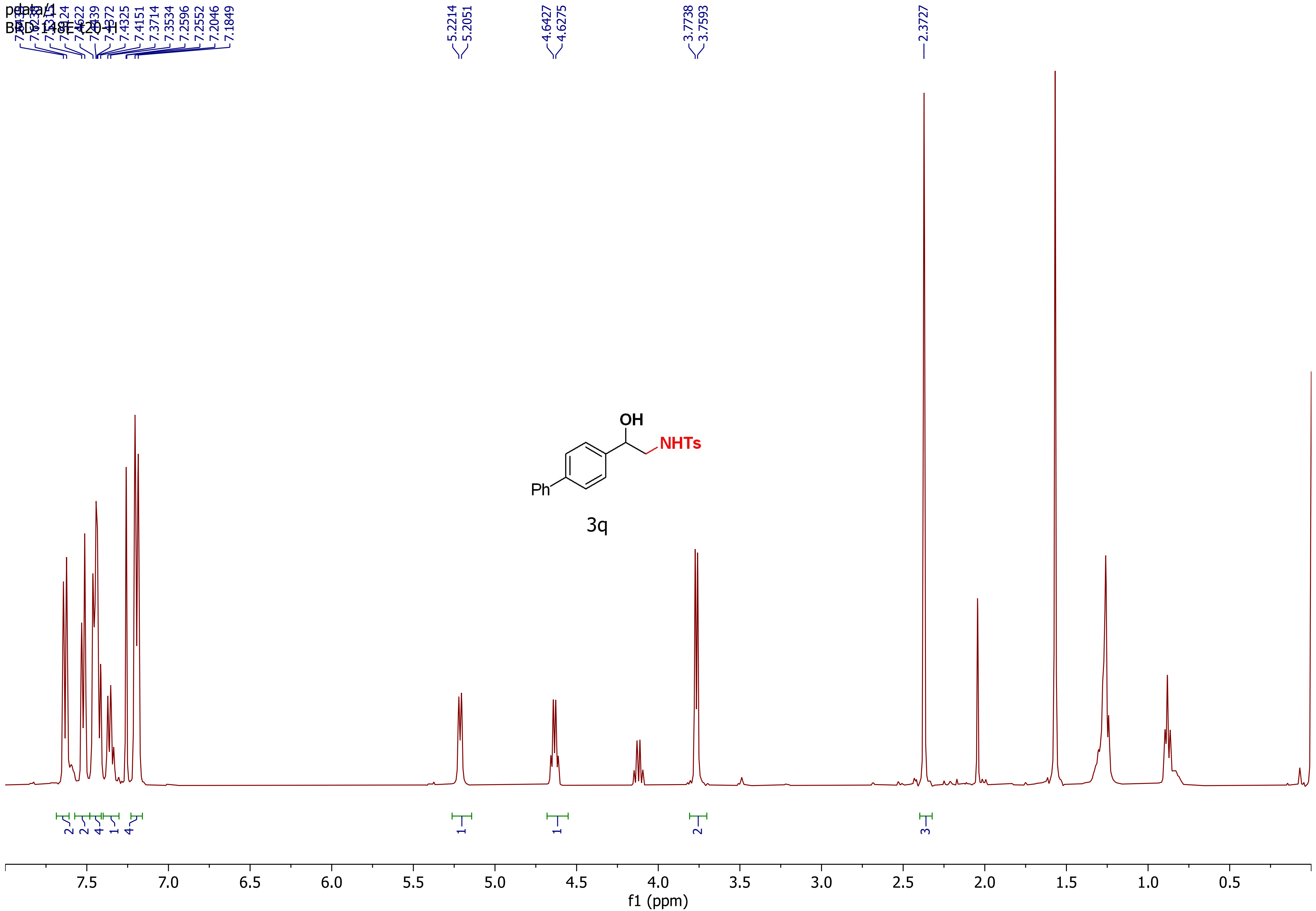
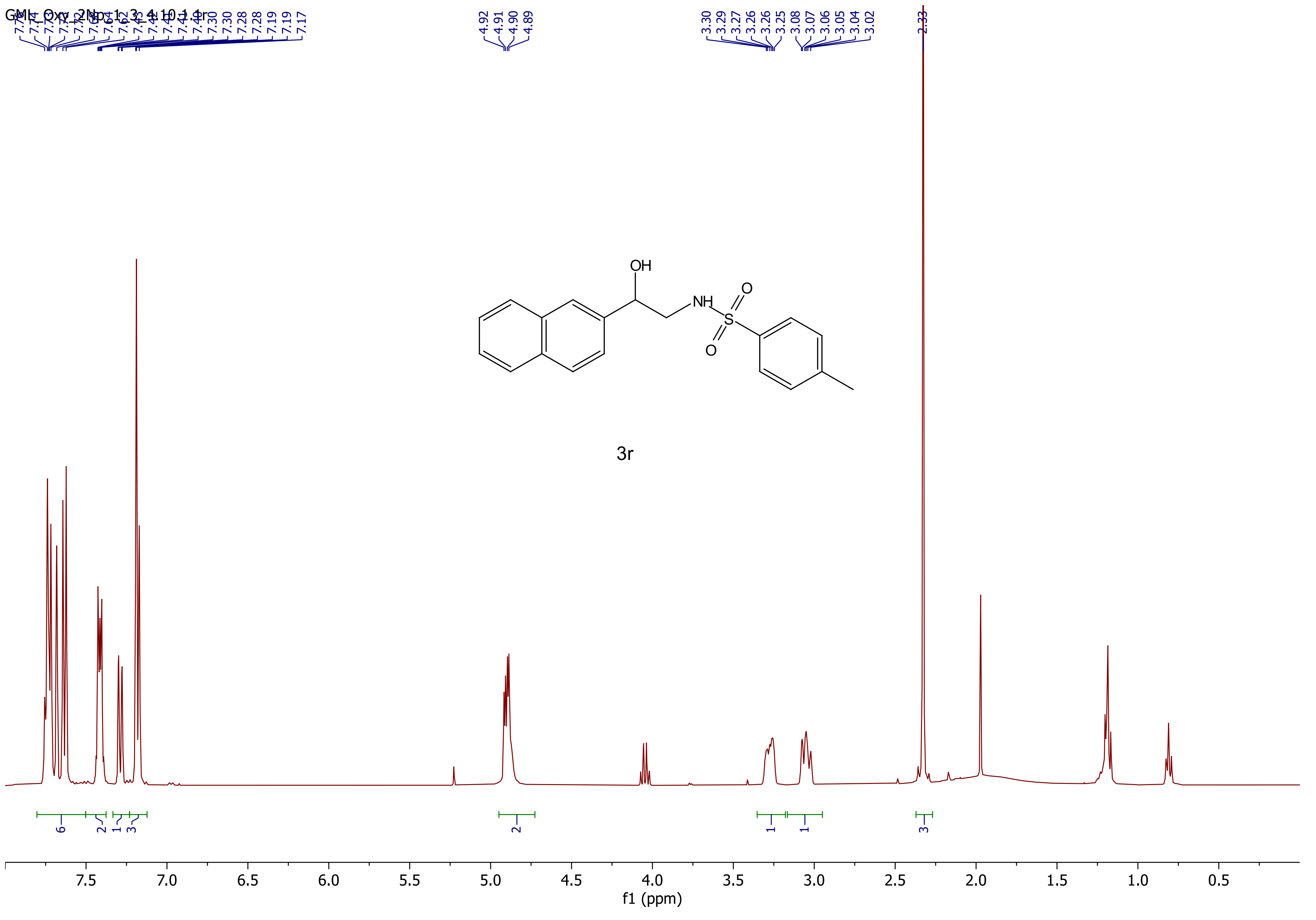
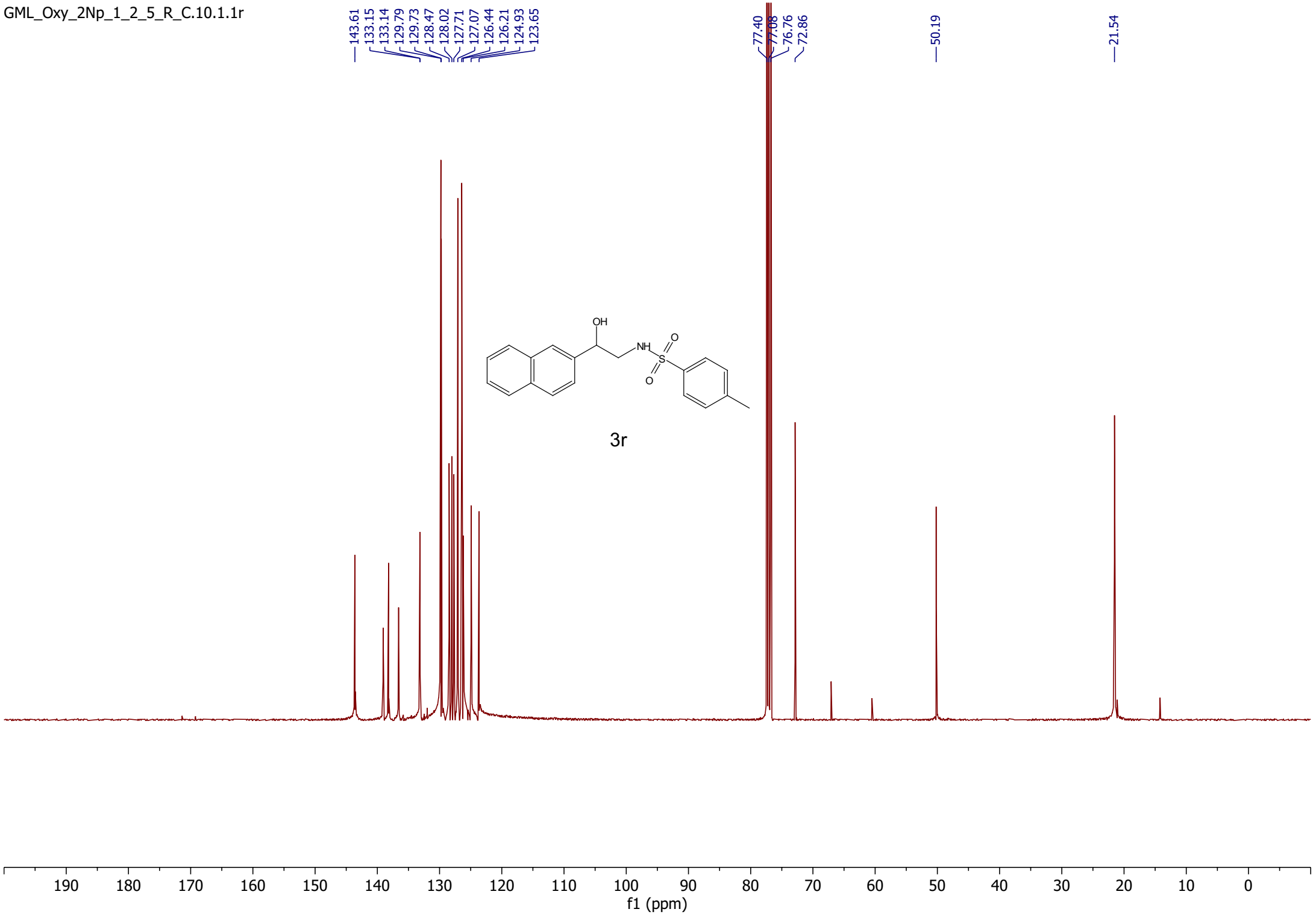
136.64
132.95
129.82
127.20
127.11
127.09
114.02
113.99
77.42
77.10
76.78
72.38
55.32
50.23
21.57
21.55
OH
NHTs
MeO
3p
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


7.4622
7.4325
7.4151
7.3714
7.3534
7.2596
7.2552
7.2046
7.1849
5.2214
5.2051
4.6427
4.6275
3.7738
3.7593
2.3727
OH
NHTs
Ph
3q
2
2
4
1
4
1
1
2
3
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)

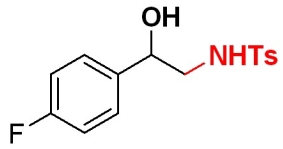


4.92
4.91
4.90
4.89
3.30
3.29
3.27
3.26
3.26
3.25
3.08
3.07
3.06
3.05
3.04
3.02
2.33
7.30
7.28
7.28
7.19
7.19
7.17
OH
NH
S
O
O
3r
6
2
1
3
2
1
1
3
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)

GML_Oxy_2Np_1_2_5_R_C.10.1.1r



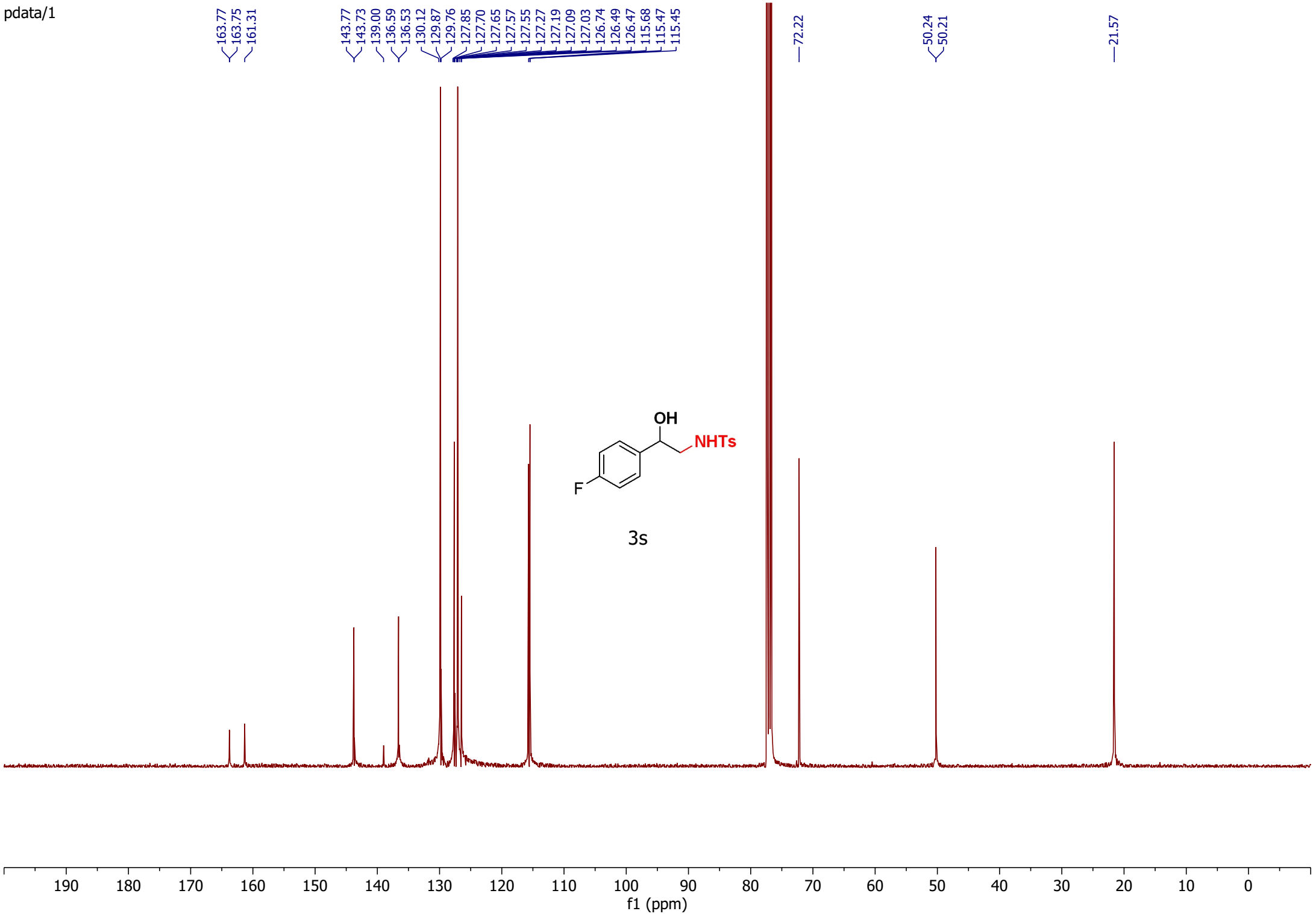
pdata/1



3s

f1 (ppm)

pdata/1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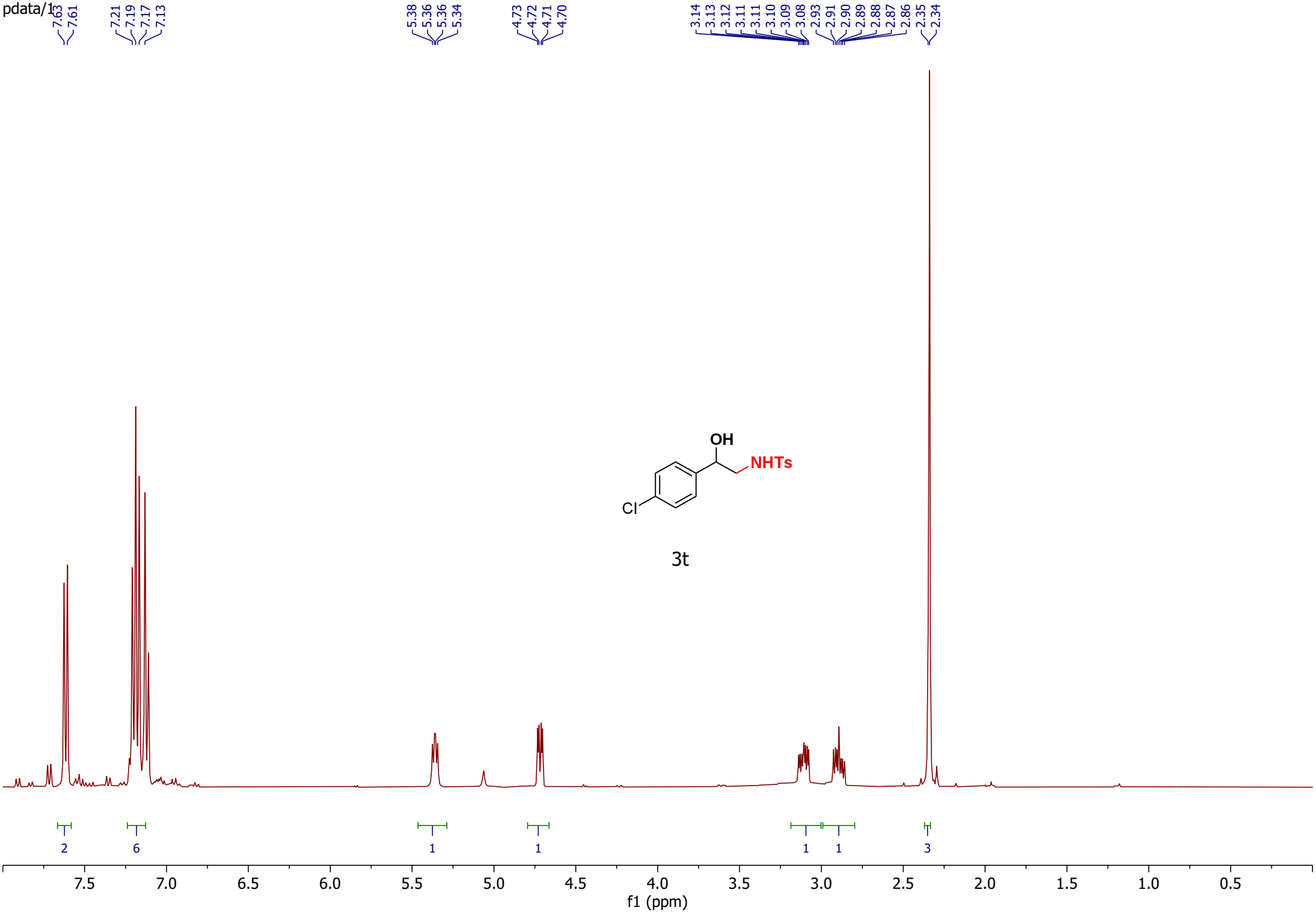
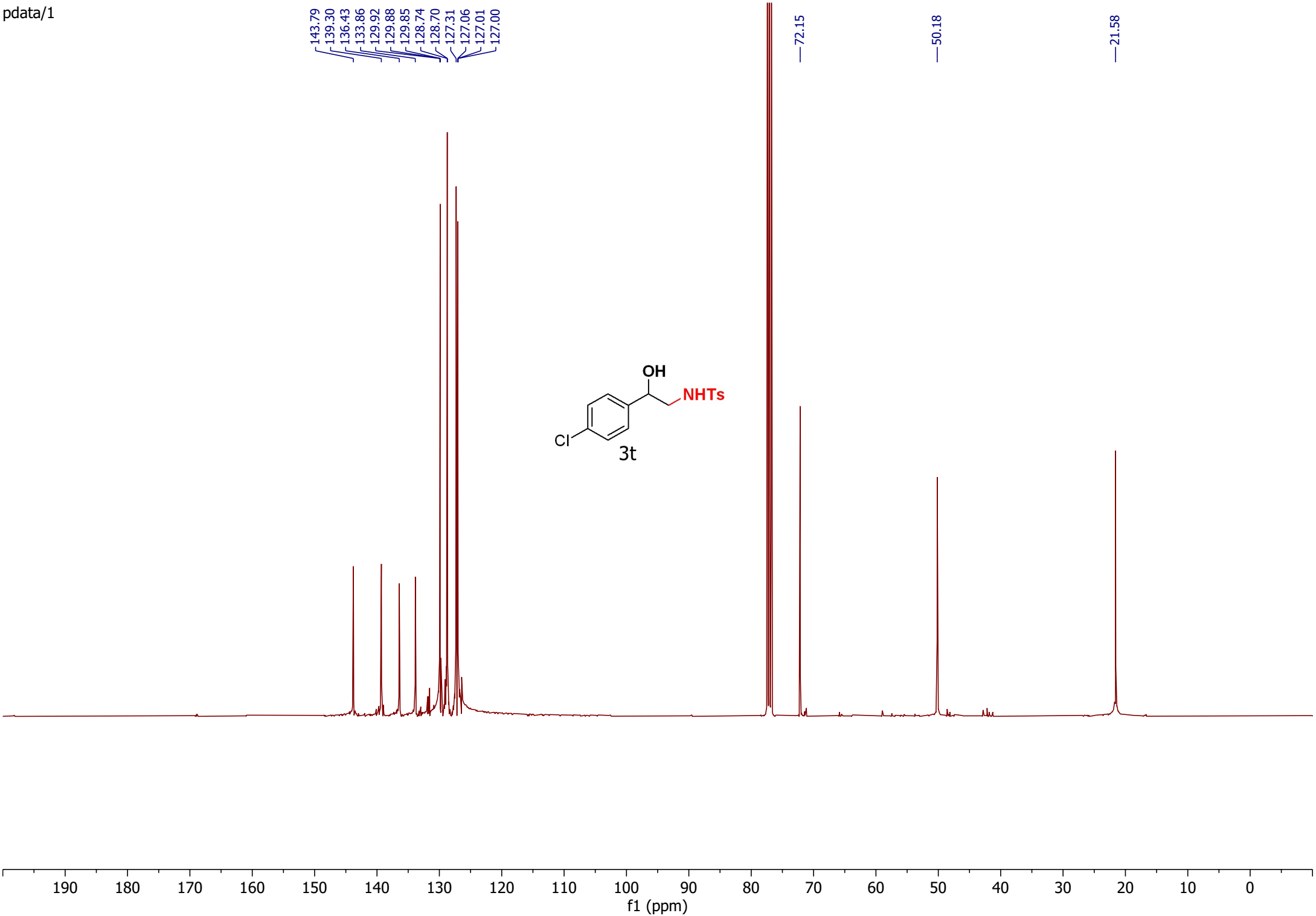
161.31
143.77
143.73
139.00
136.59
136.53
130.12
129.87
129.76
127.85
127.70
127.65
127.57
127.55
127.27
127.19
127.09
127.03
126.74
126.49
126.47
115.68
115.47
115.45
72.22
50.24
50.21
21.57
OH
NHTs
F
3s
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


pdata/1
7.63
7.61
7.21
7.19
7.17
7.13
5.38
5.36
5.36
5.34
4.73
4.72
4.71
4.70
3.14
3.13
3.12
3.11
3.11
3.10
3.09
3.08
2.93
2.91
2.90
2.89
2.88
2.87
2.86
2.35
2.34
OH
NHTs
Cl
3t
2
6
1
1
1
1
3
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)

pdata/1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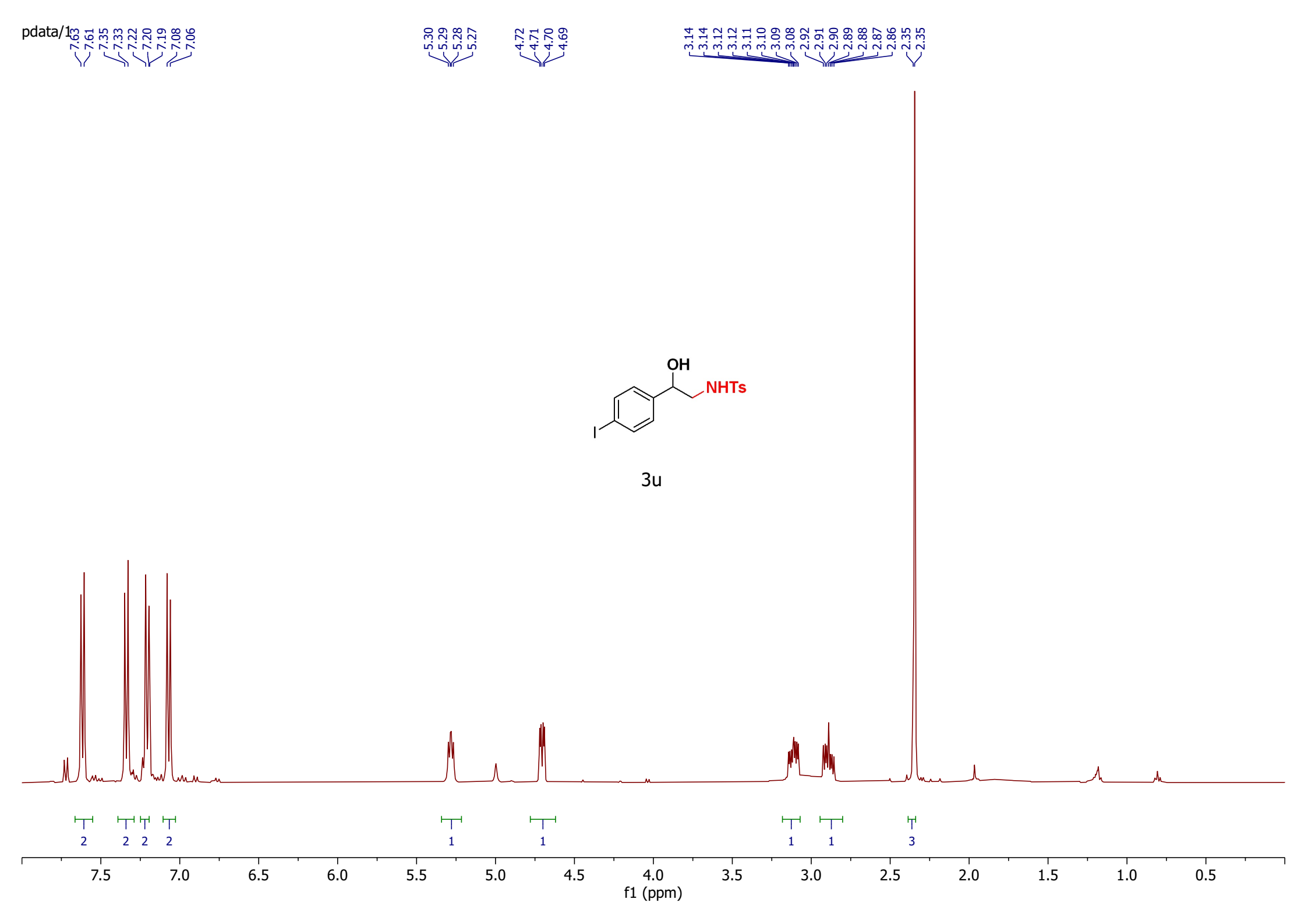
139.30
136.43
133.86
129.92
129.88
129.85
128.74
128.70
127.31
127.06
127.01
127.00
72.15
50.18
21.58
OH
NHTs
Cl
3t
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

pdata/1


7.63
7.61
7.35
7.33
7.22
7.20
7.19
7.08
7.06
5.30
5.29
5.28
5.27
4.72
4.71
4.70
4.69
3.14
3.14
3.12
3.12
3.11
3.10
3.09
3.08
2.92
2.91
2.90
2.89
2.88
2.87
2.86
2.35
2.35
OH
NHTs
I
3u
2
2
2
2
1
1
1
1
3
7.5
7.0
6.5
6.0
5.5
5.0
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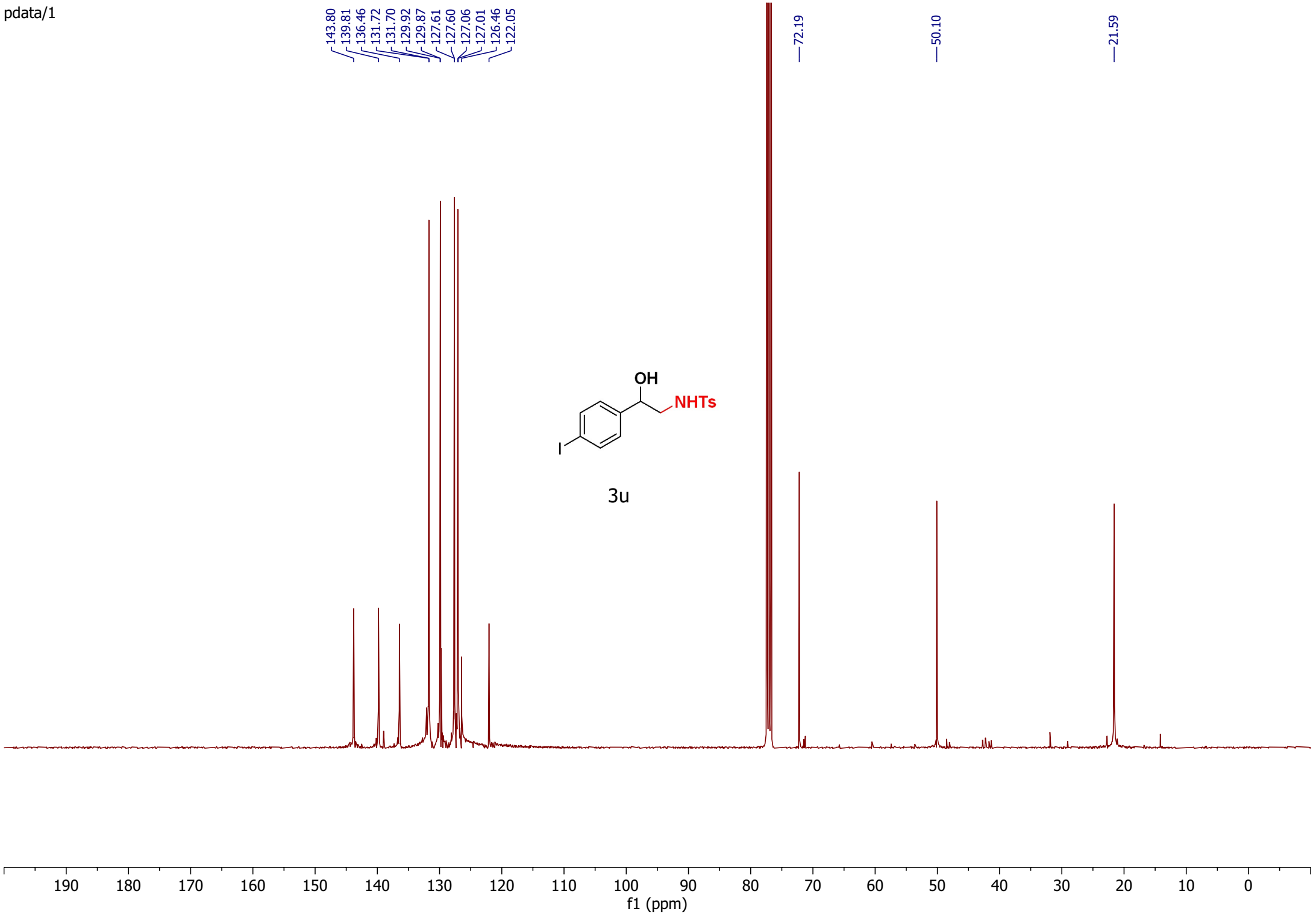
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)


pdata/1
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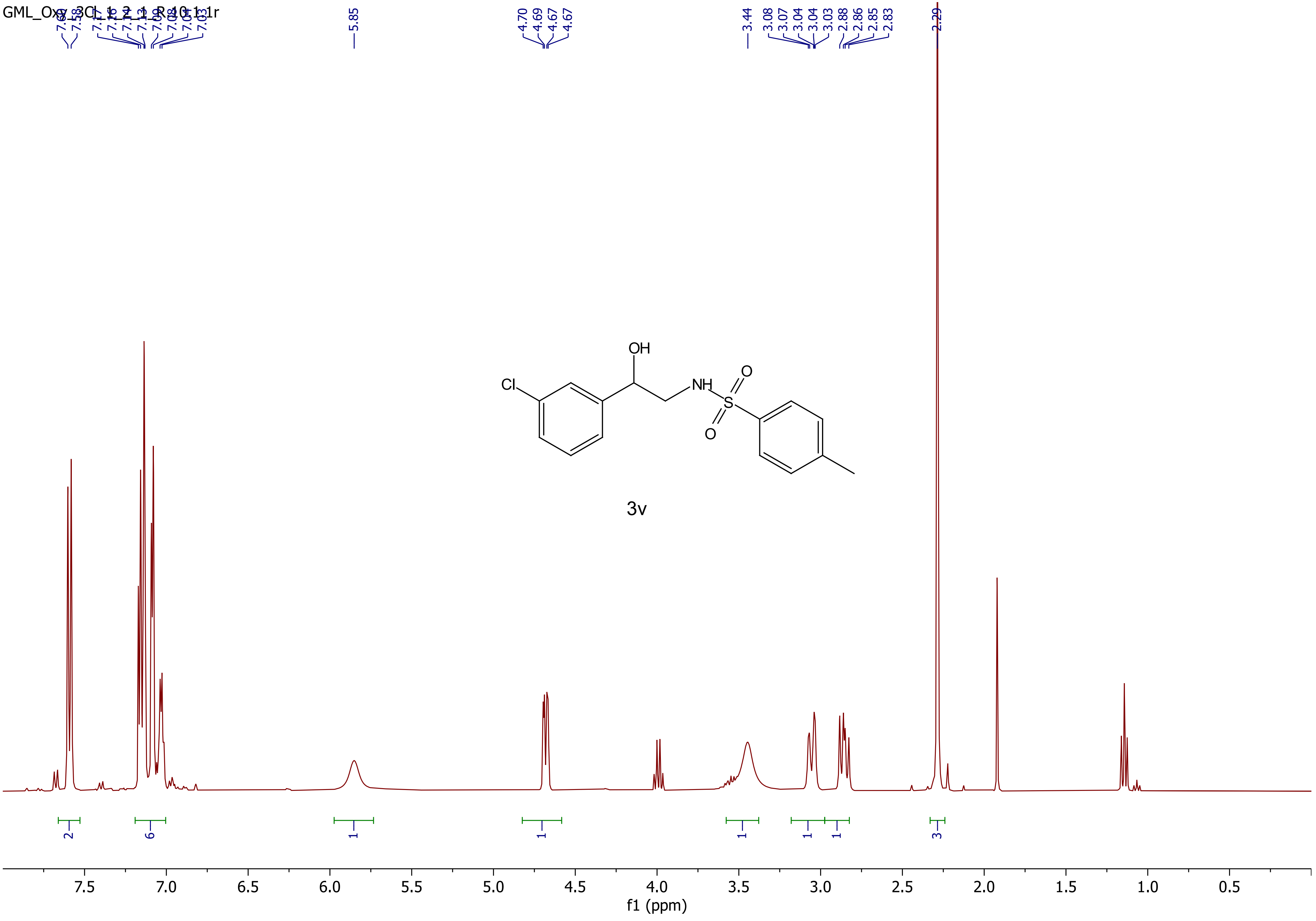
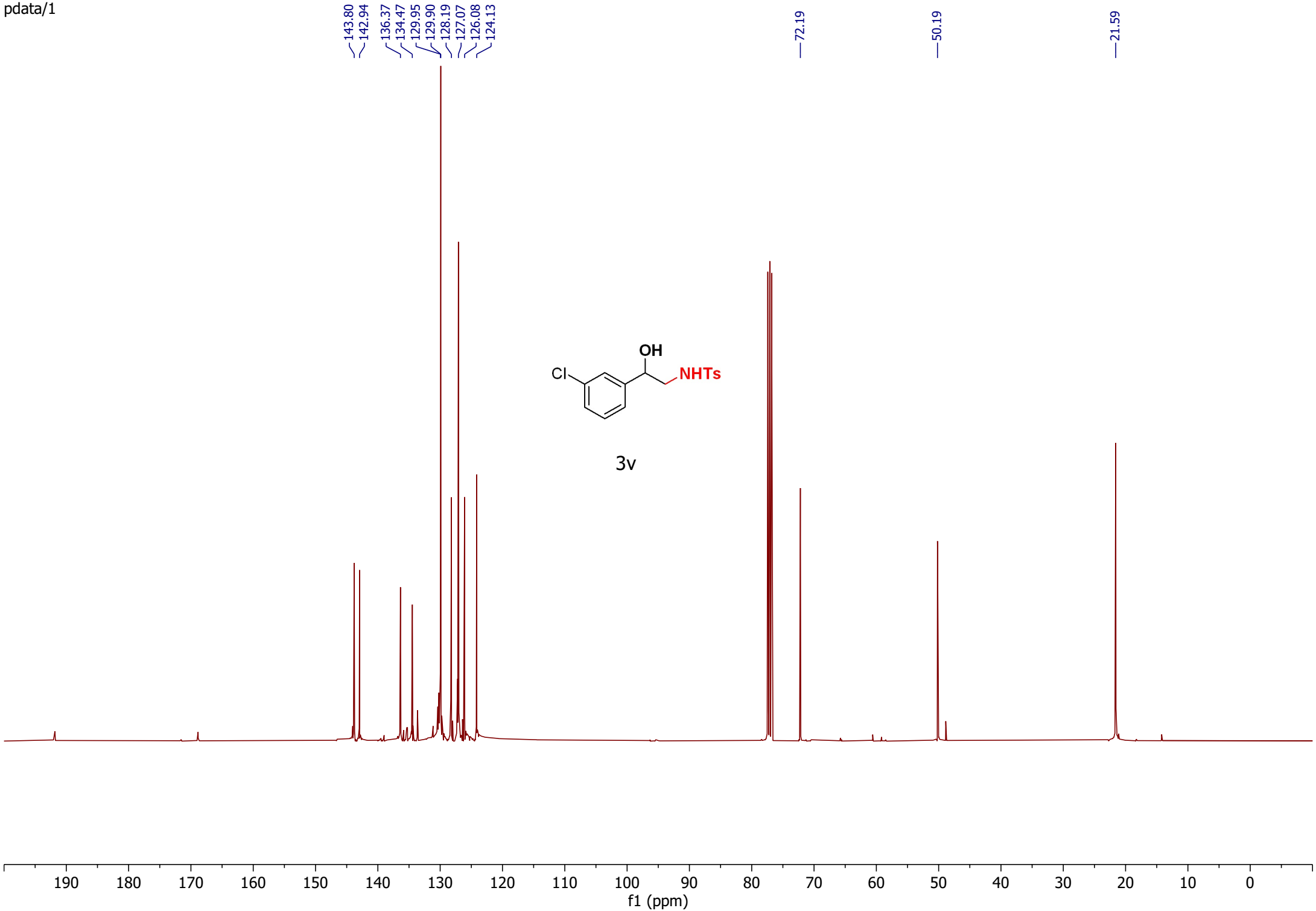
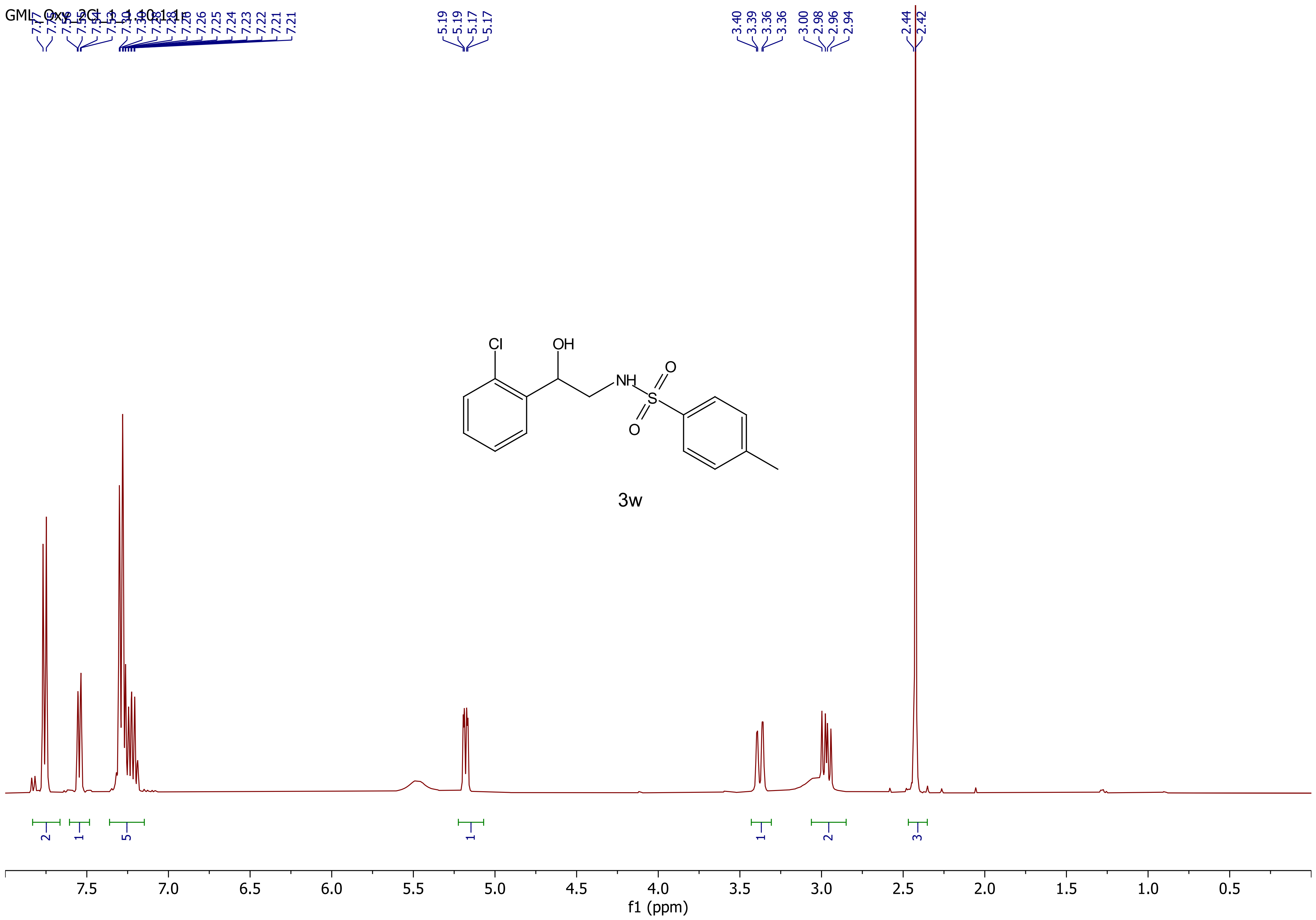
131.70
129.92
129.87
127.61
127.60
127.06
127.01
126.46
122.05
72.19
50.10
21.59
OH
NHTs
I
3u
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

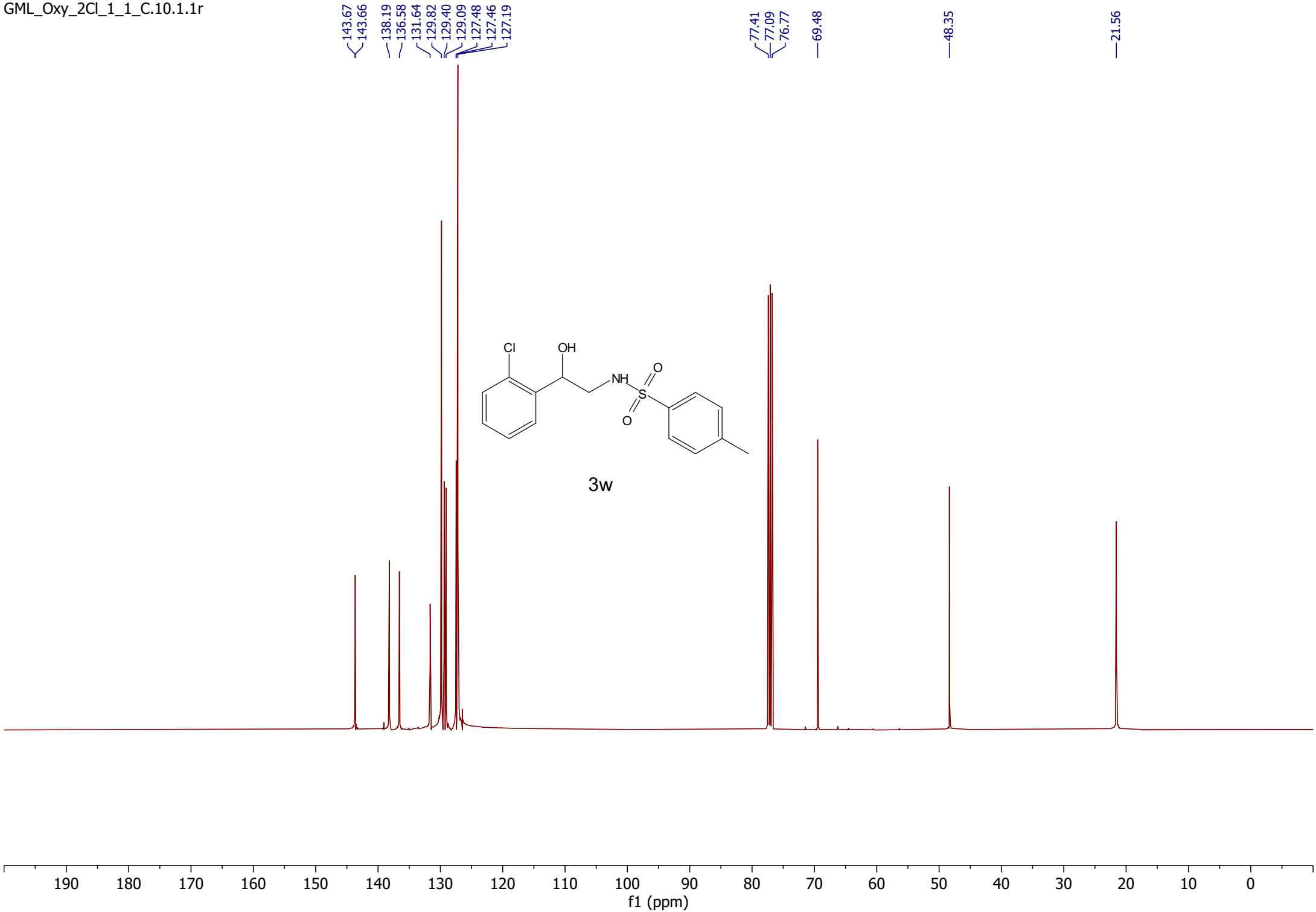

GML_Oxy_3Cl_1_2_1_R40.1.1r
5.85
4.70
4.69
4.67
4.67
3.44
3.08
3.07
3.04
3.04
3.03
2.88
2.86
2.85
2.83
2.29
OH
Cl
NH
O
S
O
3v
2
6
1
1
1
1
1
3
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)

pdata/1

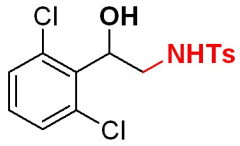

143.80
142.94
136.37
134.47
129.95
129.90
128.19
127.07
126.08
124.13
72.19
50.19
21.59
OH
Cl
NHTs
3v
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


7.26
7.25
7.24
7.23
7.22
7.21
7.21
5.19
5.19
5.17
5.17
3.40
3.39
3.36
3.36
3.00
2.98
2.96
2.94
2.44
2.42
Cl
OH
NH
S
O
O
3w
2
1
5
1
1
2
3
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)

GML_Oxy_2Cl_1_1_C.10.1.1r



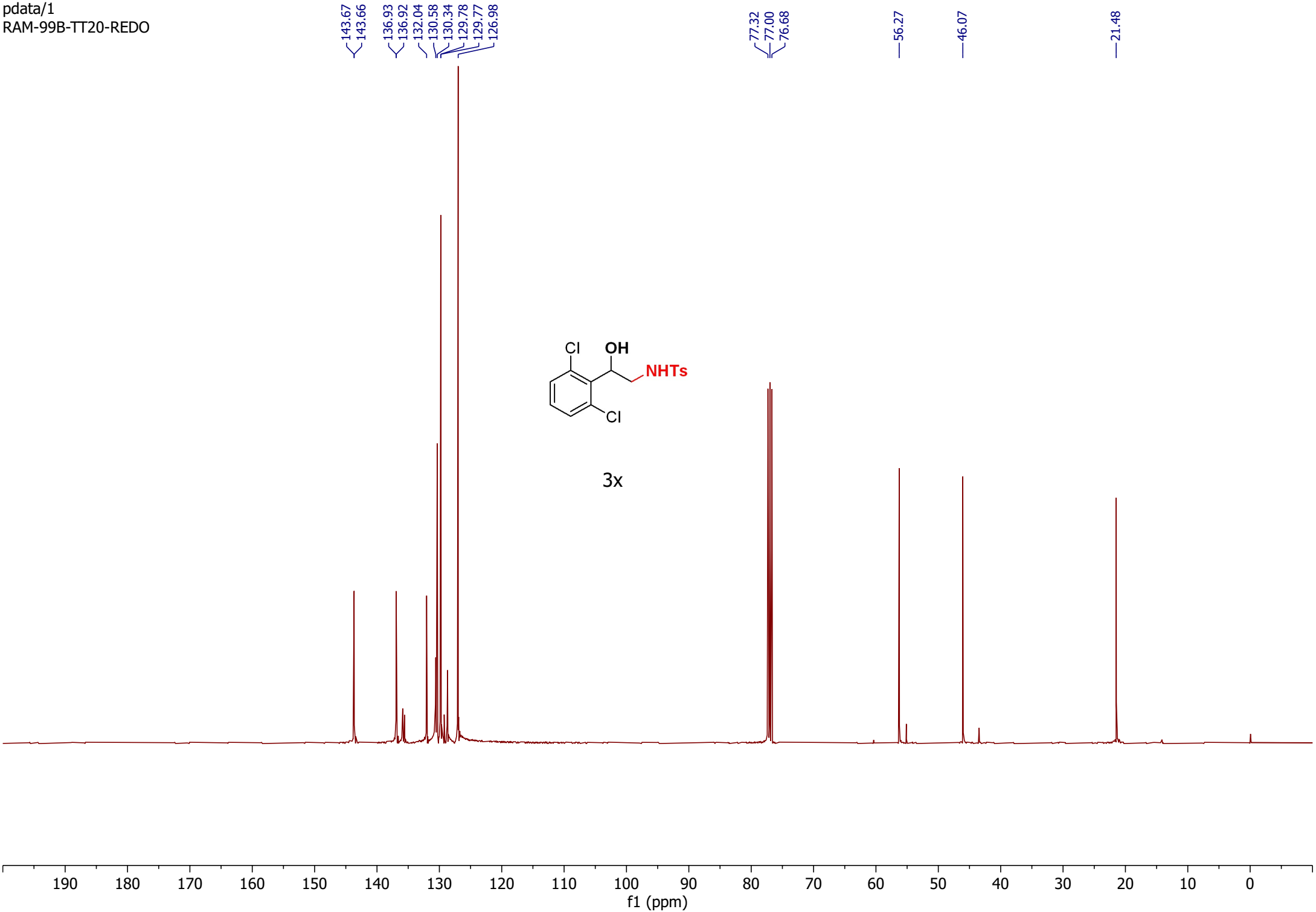
pdata/1
RAM-99B-TT20-REDO



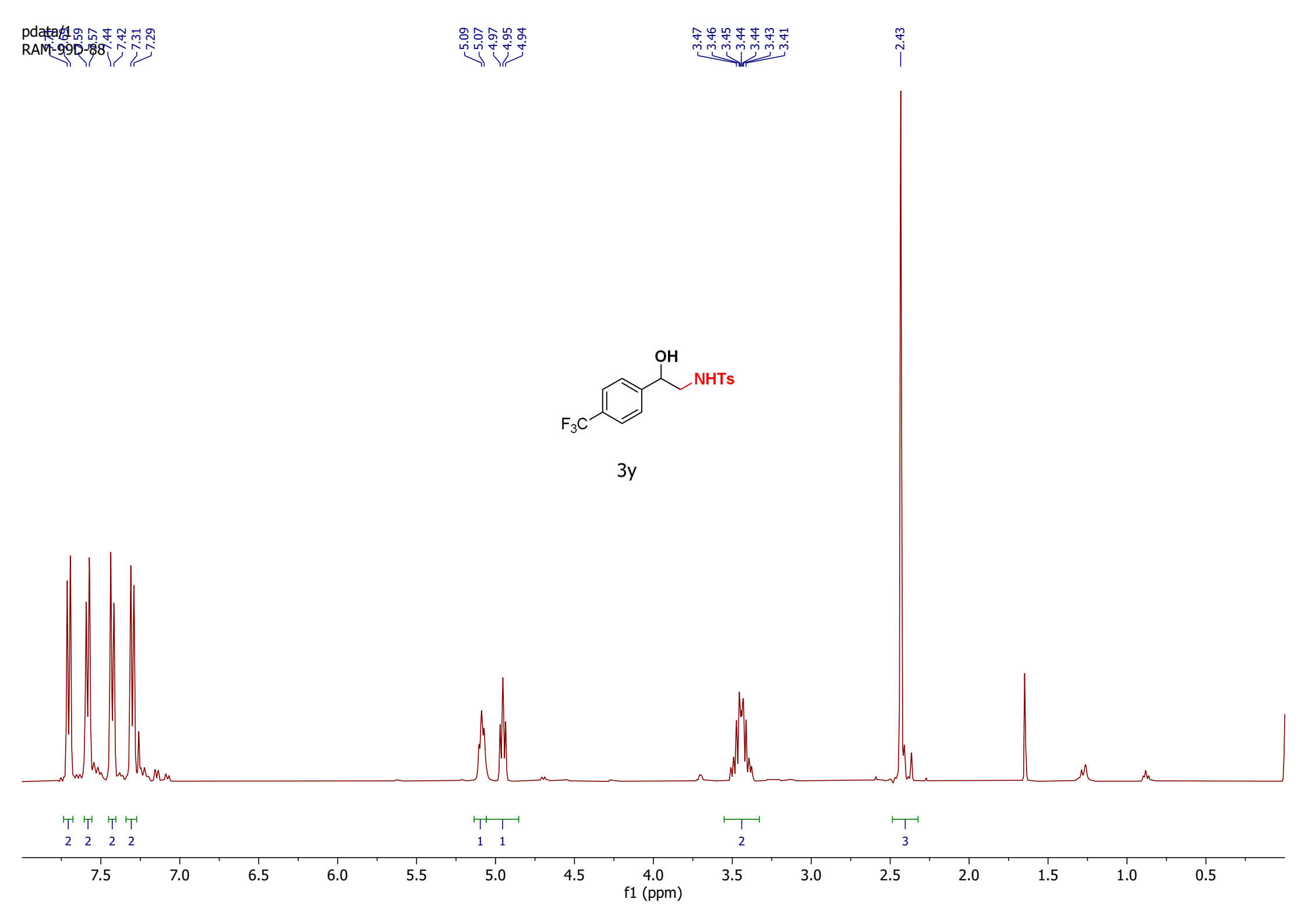
3x

f1 (ppm)

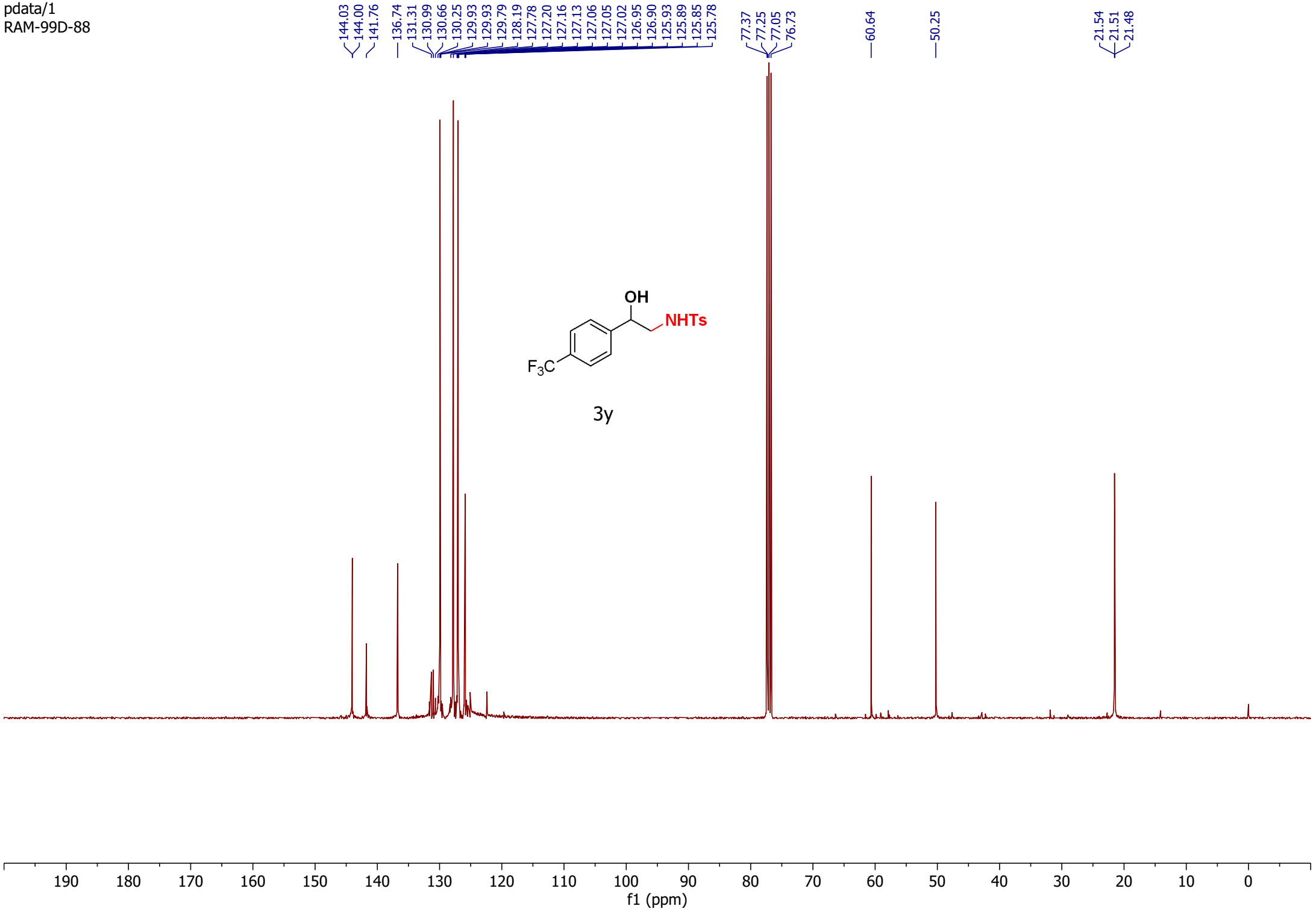
pdata/1
RAM-99B-TT20-REDO



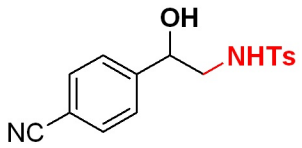
pdata/1
RAM-99D-88



pdata/1
RAM-99D-88



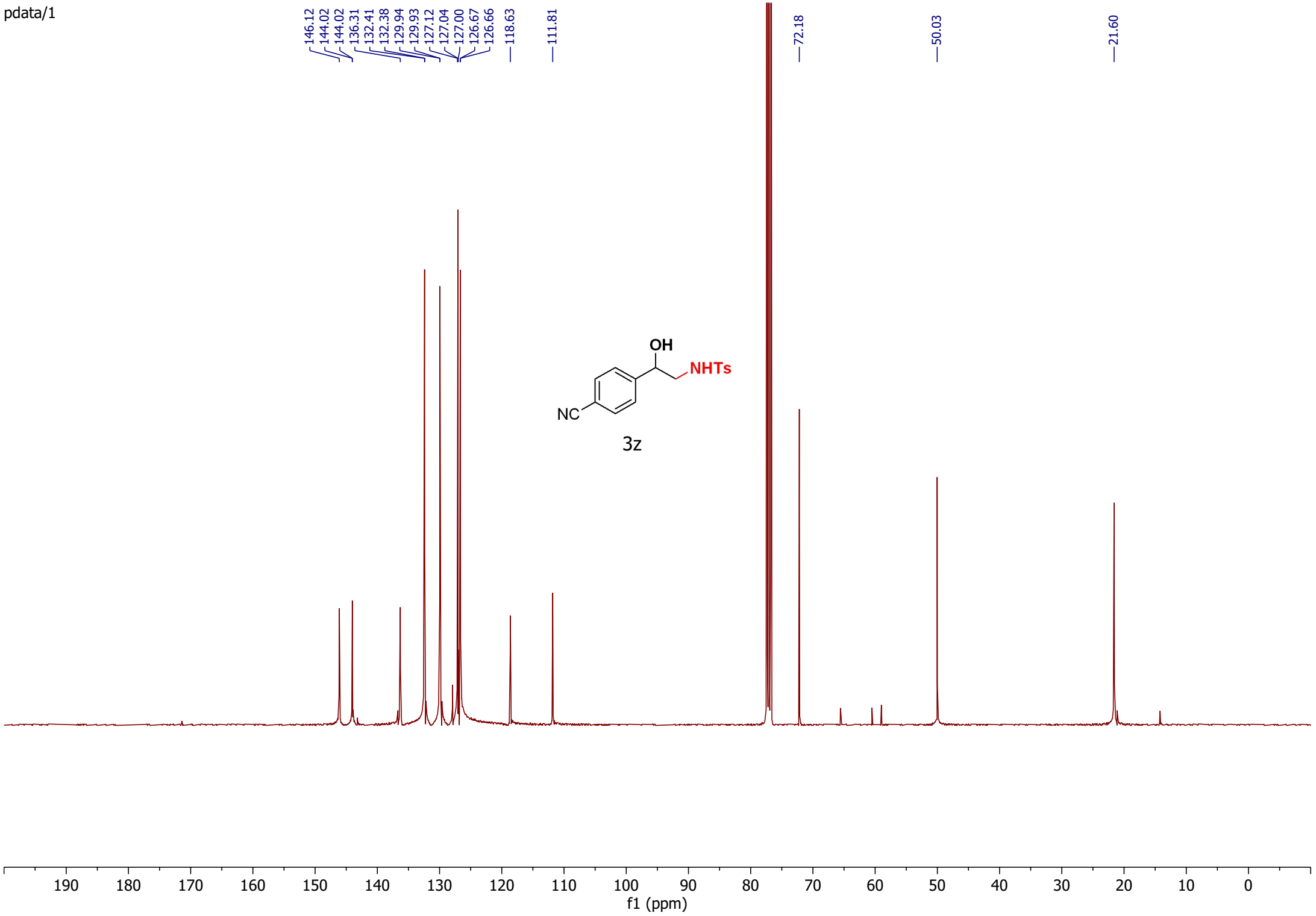
pdata/1



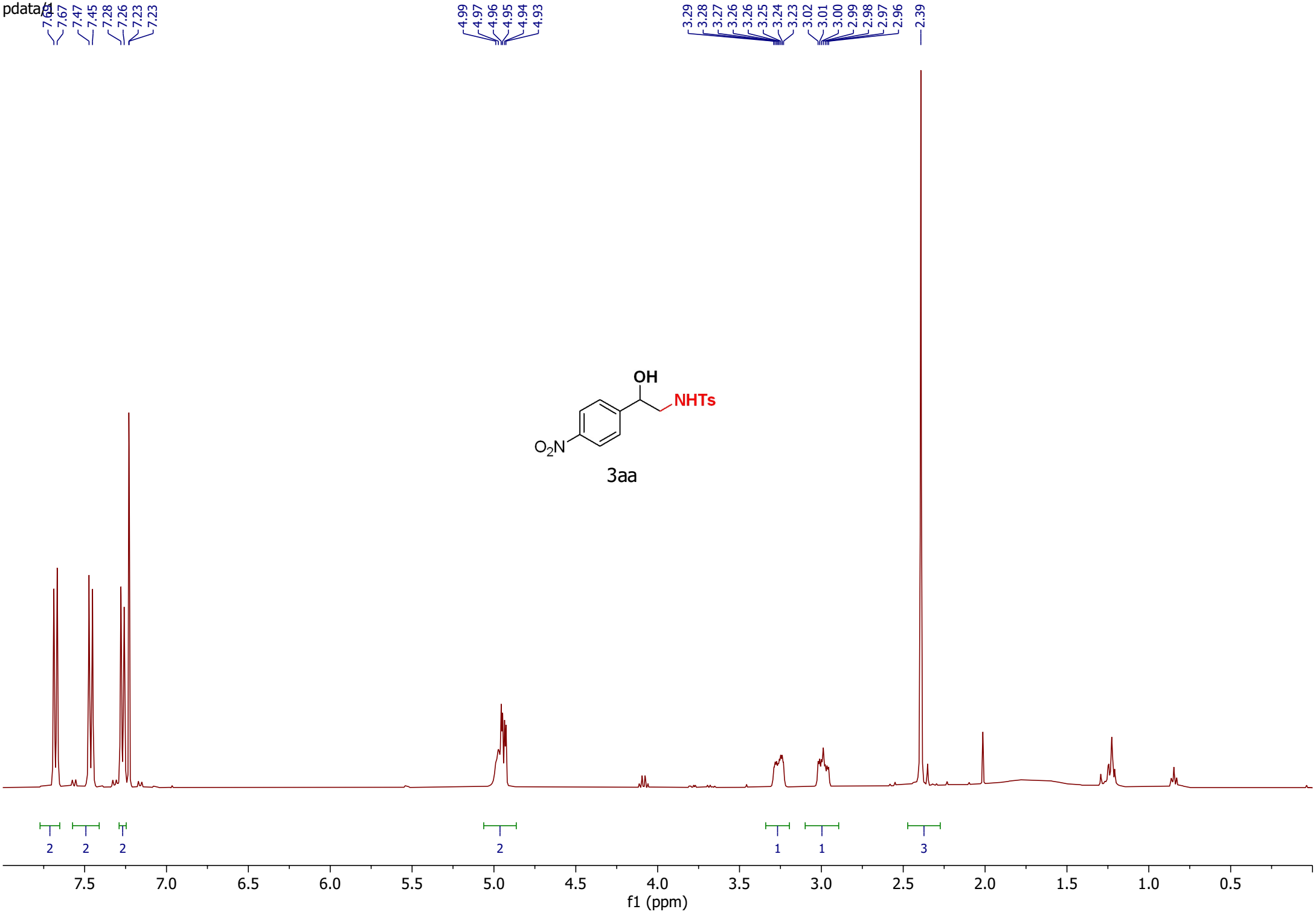
3z

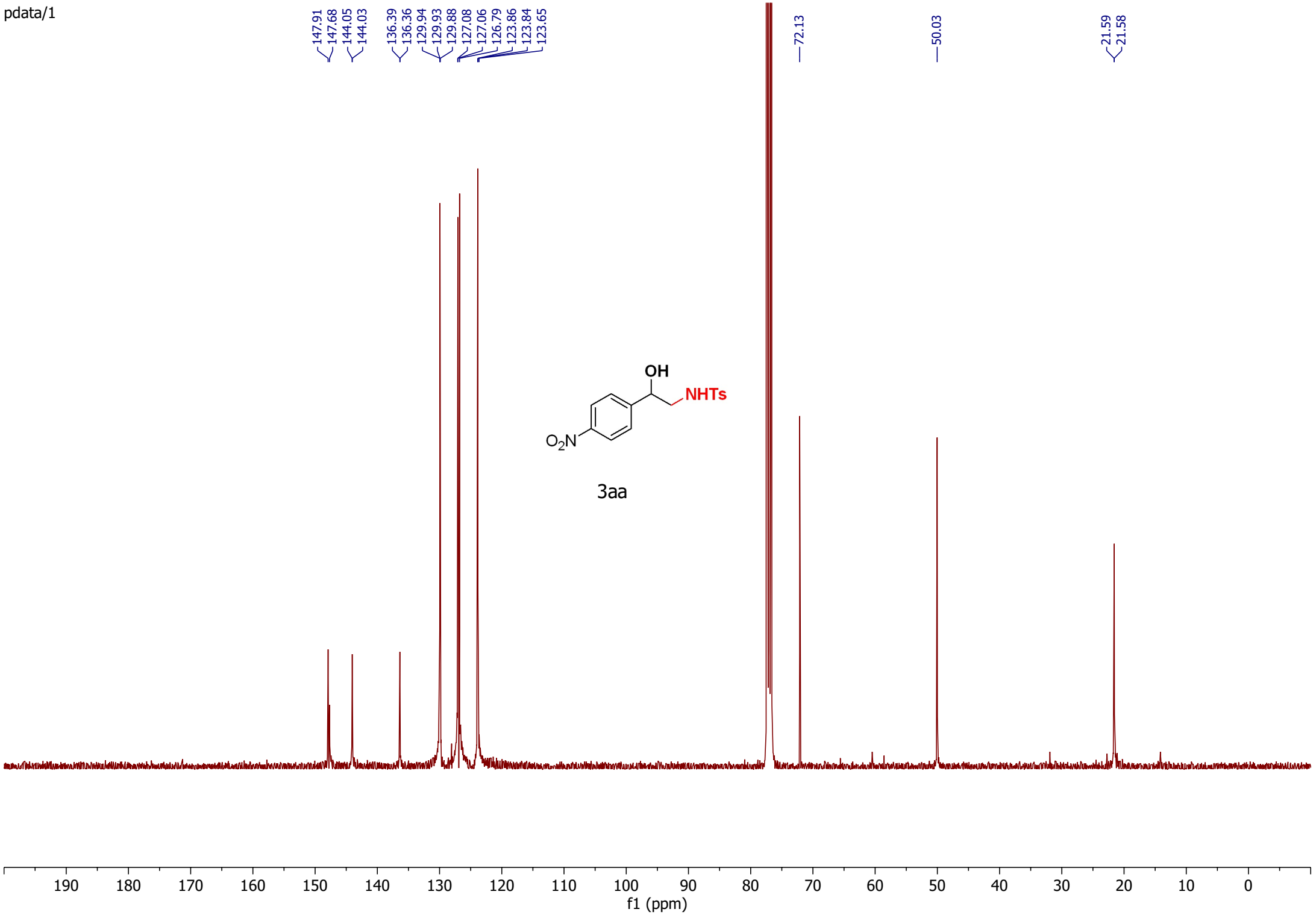
f1 (ppm)

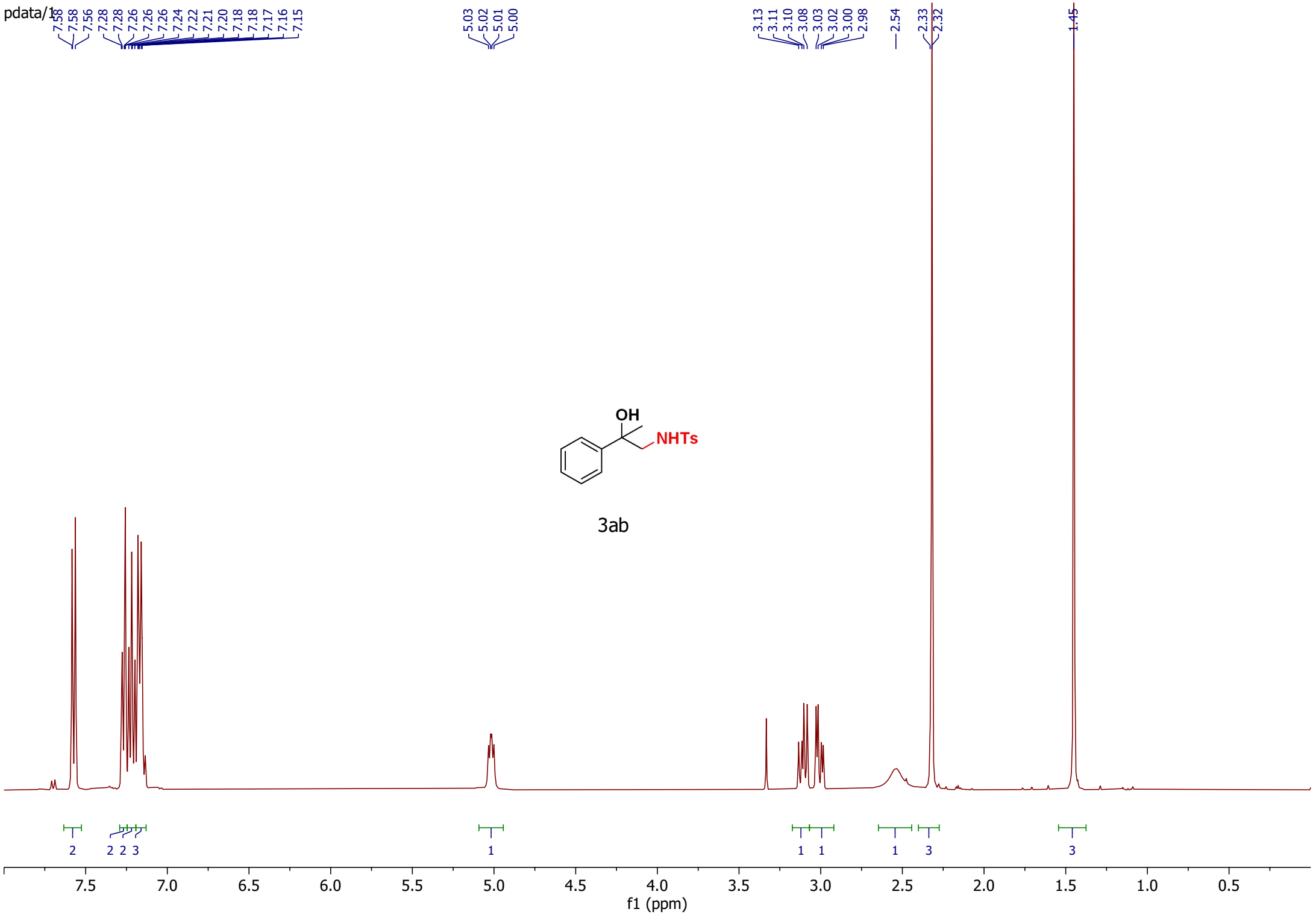
pdata/1


146.12
144.02
144.02
136.31
132.41
132.38
129.94
129.93
127.12
127.04
127.00
126.67
126.66
118.63
111.81
72.18
50.03
21.60
OH
NHTs
NC
3z
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

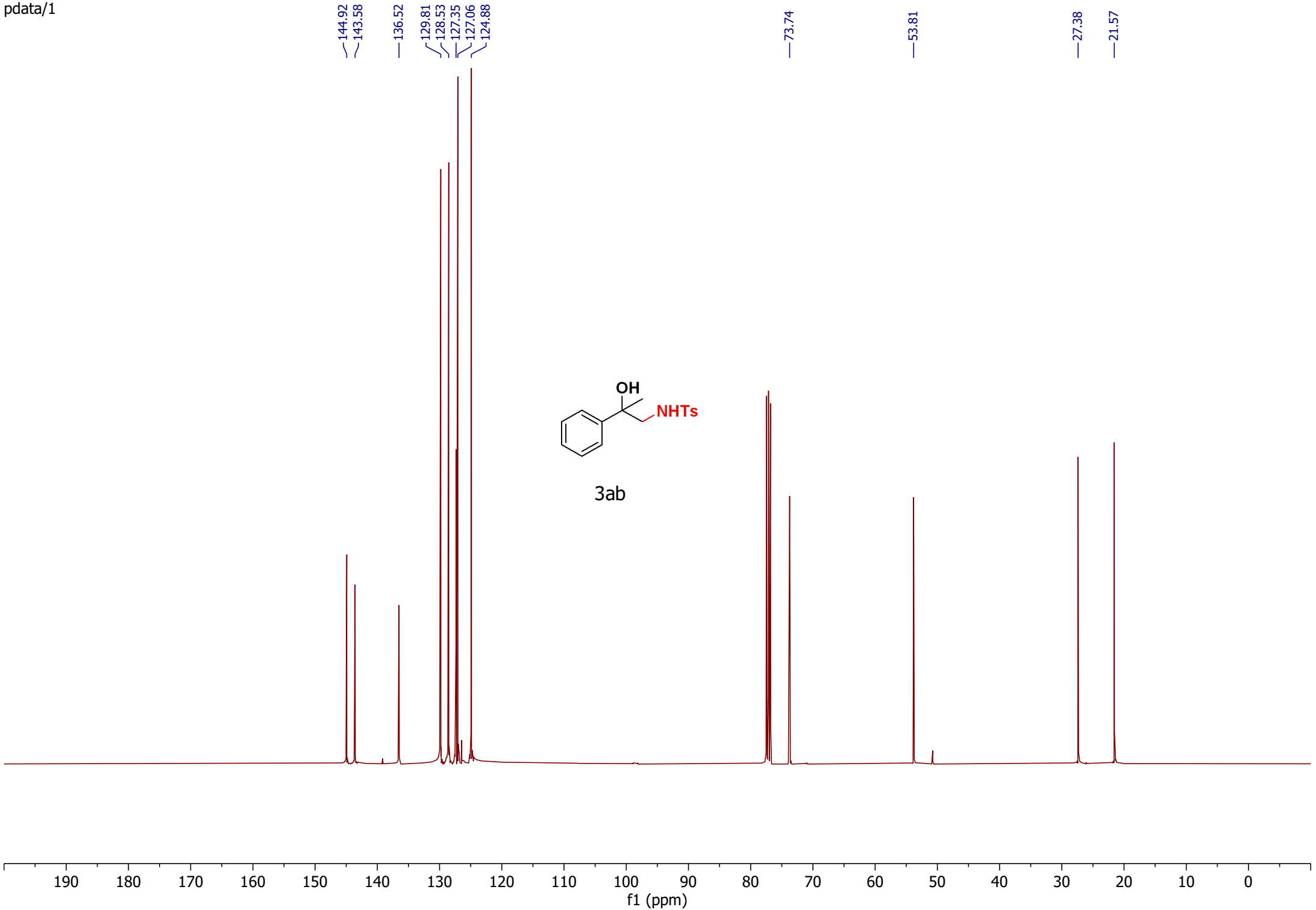
pdata/1

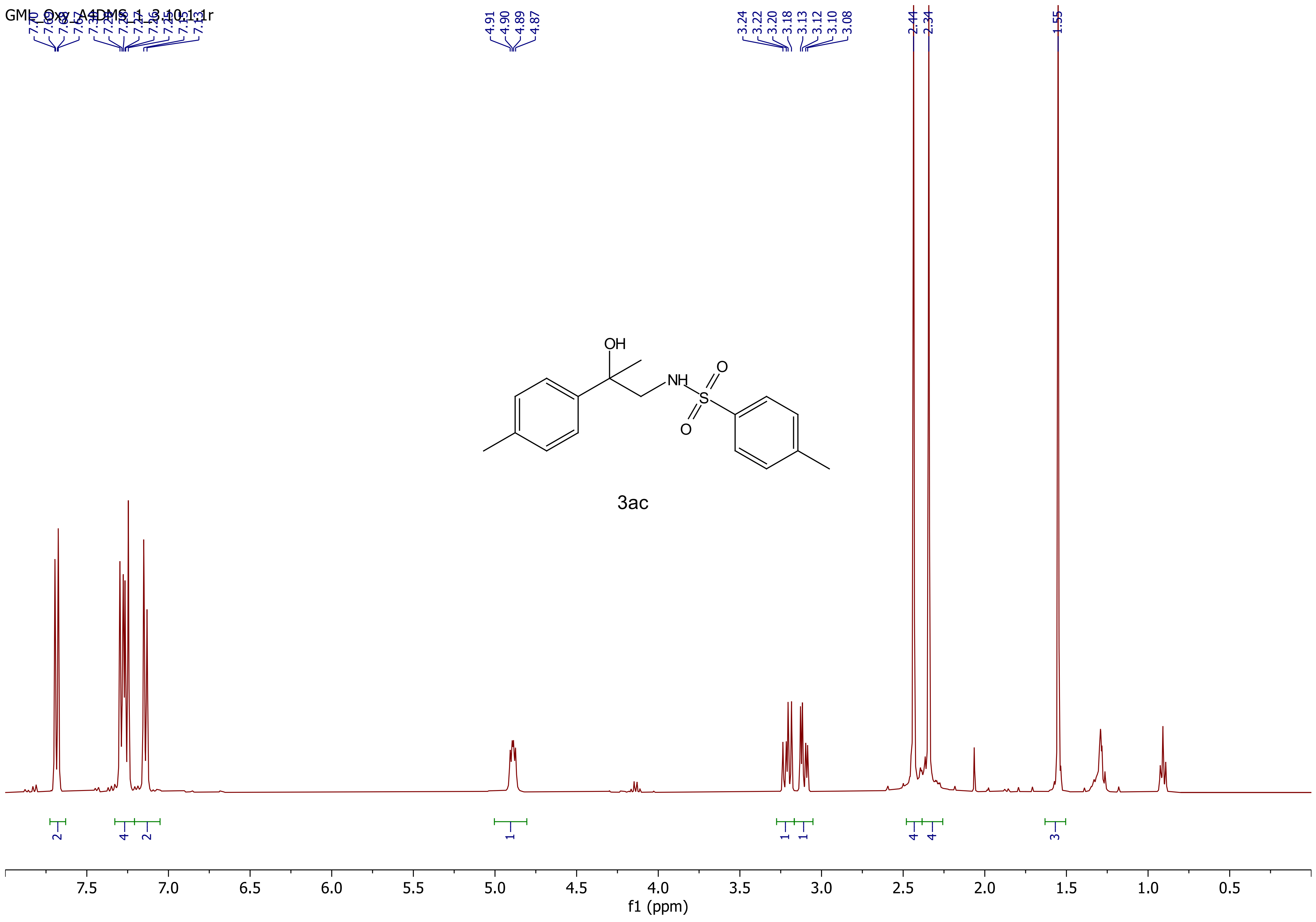

7.68
7.67
7.47
7.45
7.28
7.26
7.23
7.23
4.99
4.97
4.96
4.95
4.94
4.93
3.29
3.28
3.27
3.26
3.26
3.25
3.24
3.23
3.02
3.01
3.00
2.99
2.98
2.97
2.96
2.39
OH
NHTs
O2N
3aa
2
2
2
2
1
1
3
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)


pdata/1
147.91
147.68
144.05
144.03
136.39
136.36
129.94
129.93
129.88
127.08
127.06
126.79
123.86
123.84
123.65
72.13
50.03
21.59
21.58
OH
NHTs
O2N
3aa
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

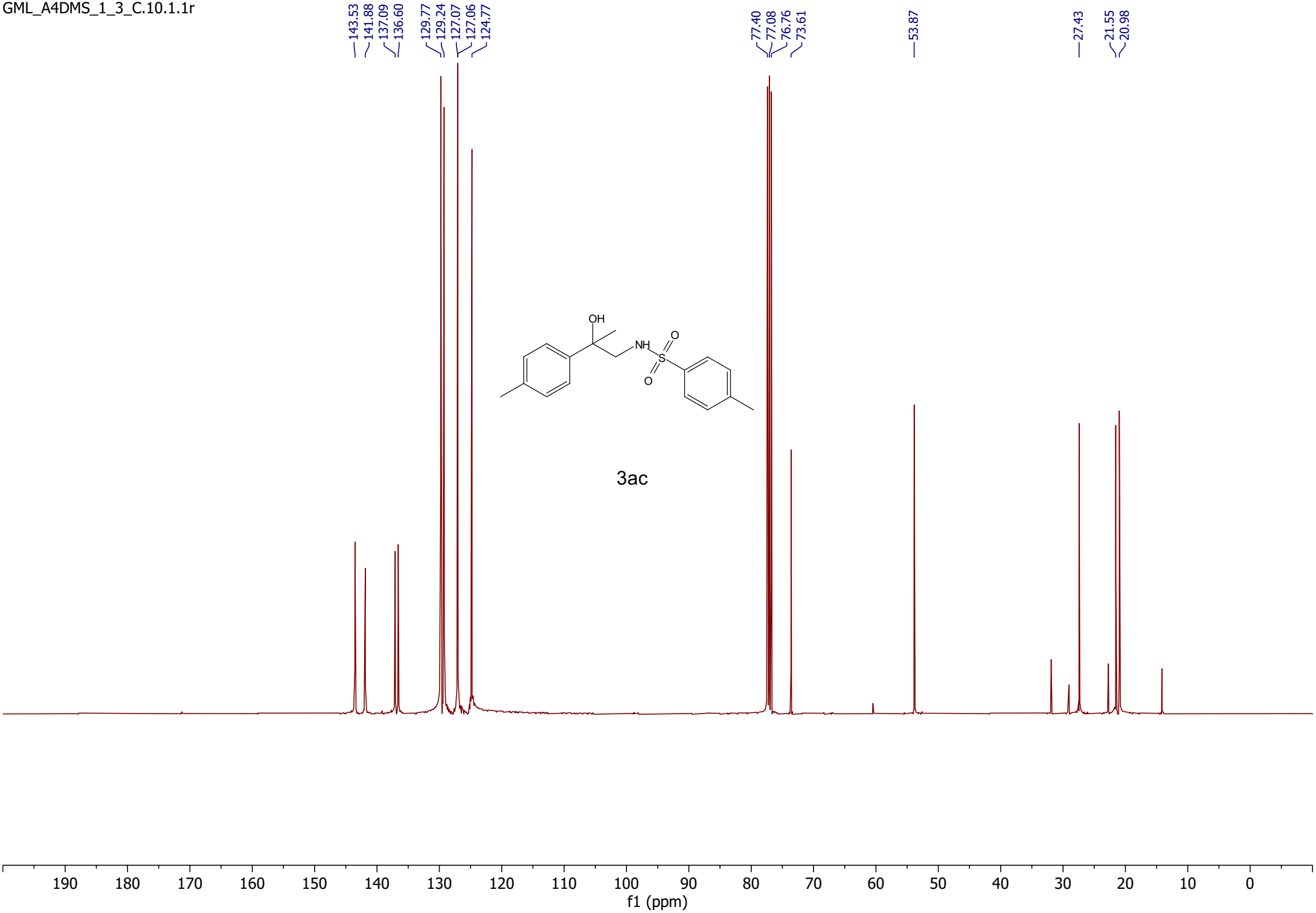

pdata/1
7.58
7.58
7.56
7.28
7.28
7.26
7.26
7.26
7.24
7.22
7.21
7.20
7.18
7.18
7.17
7.16
7.15
5.03
5.02
5.01
5.00
3.13
3.11
3.10
3.08
3.03
3.02
3.00
2.98
2.54
2.33
2.32
1.45
OH
NHTs
3ab
2
2 2 3
1
1 1
1
3
3
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)

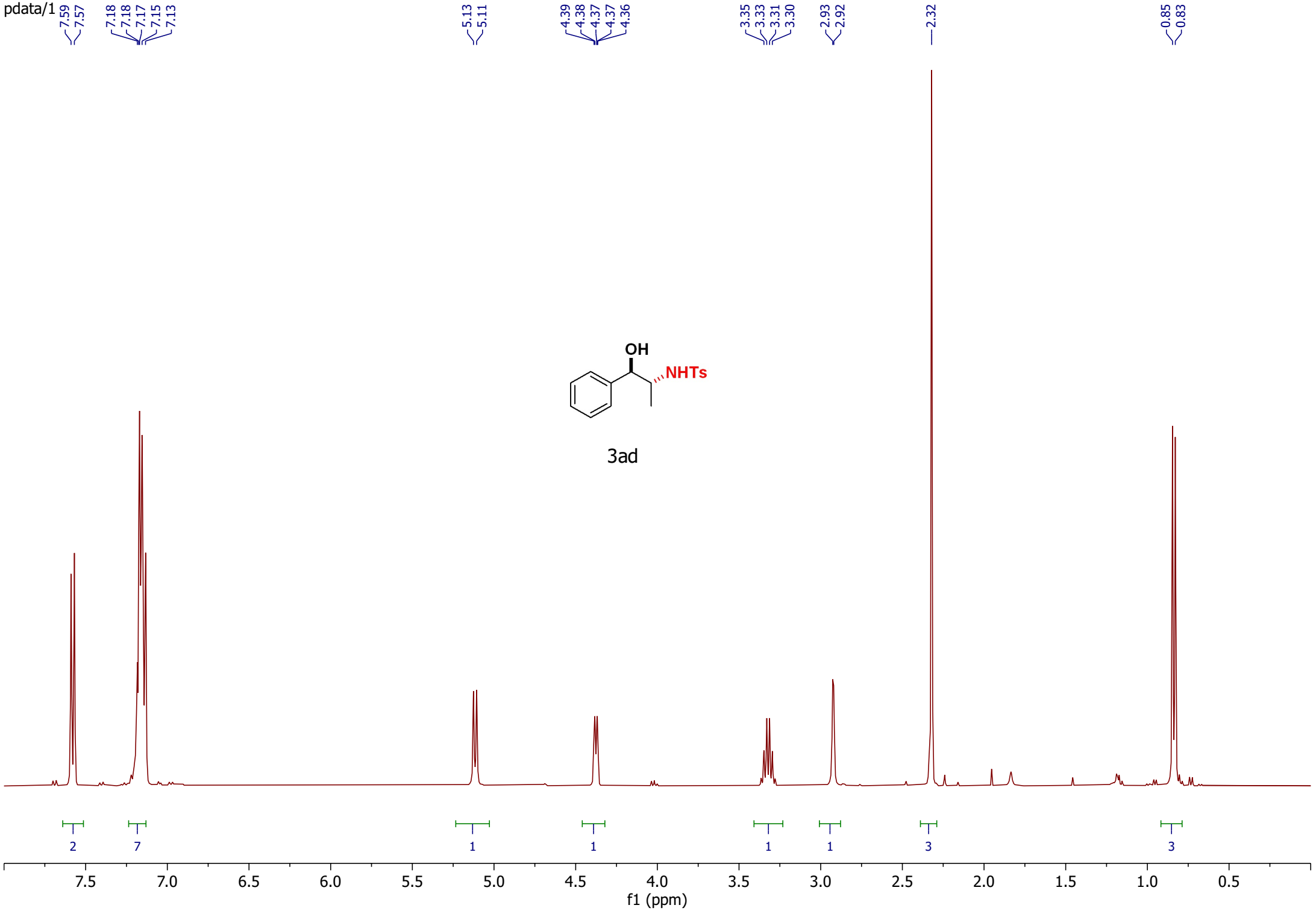
pdata/1


144.92
143.58
136.52
129.81
128.53
127.35
127.06
124.88
73.74
53.81
27.38
21.57
OH
NHTs
3ab
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

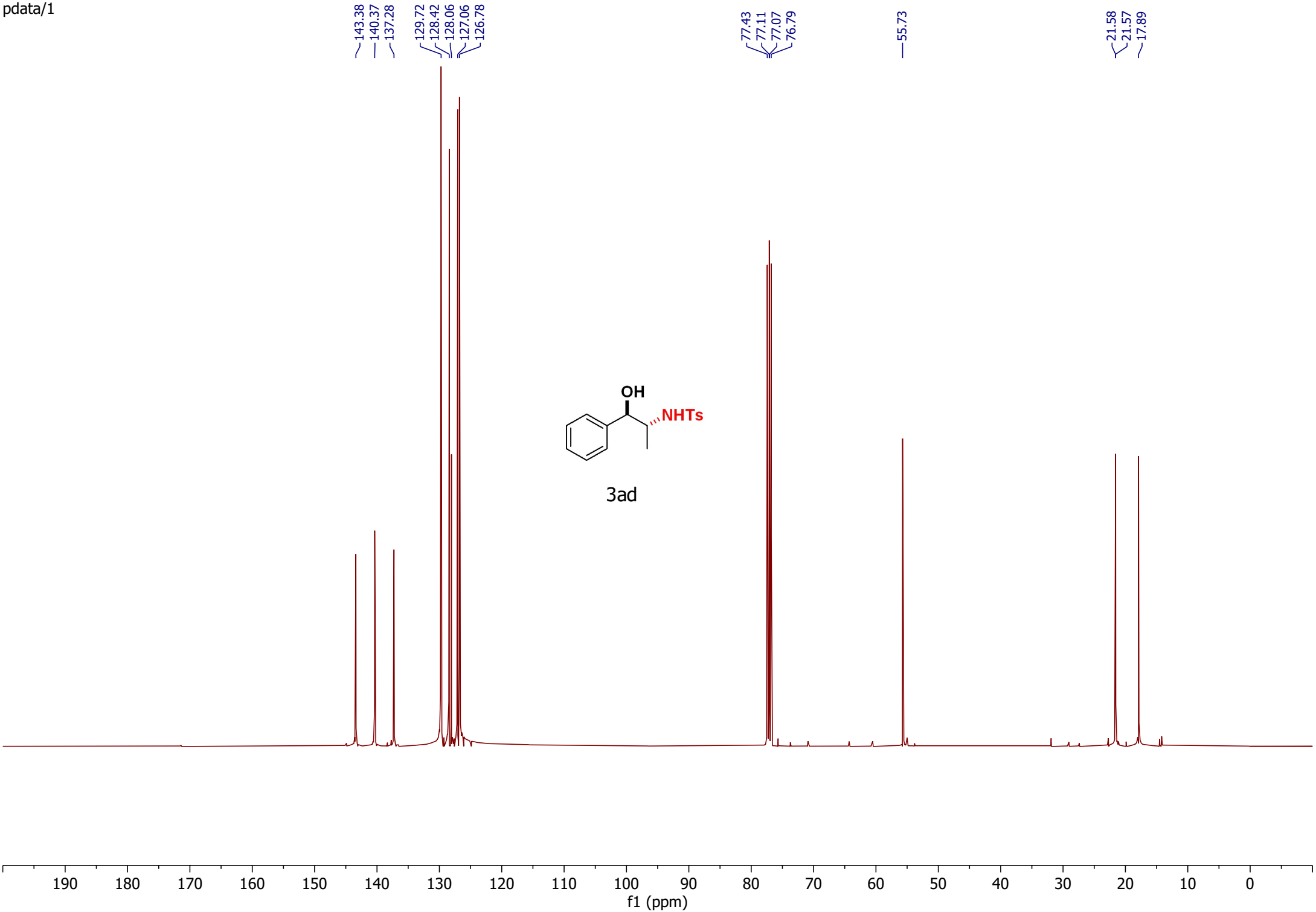

4.91
4.90
4.89
4.87
3.24
3.22
3.20
3.18
3.13
3.12
3.10
3.08
2.44
2.34
1.55
OH
NH
S
O
O
3ac
f1 (ppm)

GML_A4DMS_1_3_C.10.1.1r

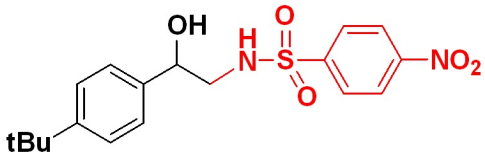



pdata/1
7.59
7.57
7.18
7.18
7.17
7.15
7.13
5.13
5.11
4.39
4.38
4.37
4.37
4.36
3.35
3.33
3.31
3.30
2.93
2.92
2.32
0.85
0.83
OH
NHTs
3ad
2
7
1
1
1
1
3
3
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)

pdata/1


143.38
140.37
137.28
129.72
128.42
128.06
127.06
126.78
77.43
77.11
77.07
76.79
55.73
21.58
21.57
17.89
OH
NHTs
3ad
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

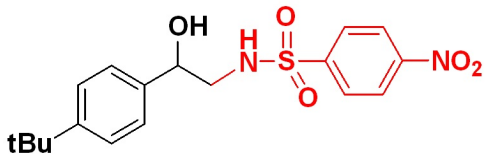
pdata/1
RAM-NITRO-22



3ae

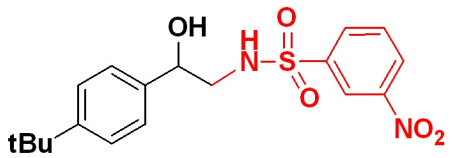
f1 (ppm)

pdata/1
RAM-NITRO-22 Carbon



3ae

pdata/1
RAM-NITRO-2

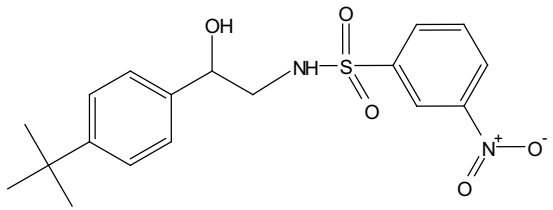


3af

f1 (ppm)

pdata/1
RAM-NITRO-2

151.94
142.40
132.92
132.61
132.57
130.01
129.98
126.88
126.82
126.80
126.75
126.72
125.70
125.66
125.63
122.72
77.34
77.23
77.03
76.71
58.62
47.97
34.53
31.12

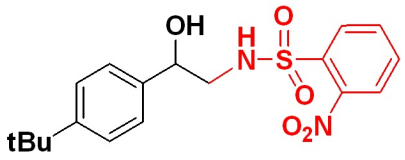


3af

190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

pdata/1
RAM-106A-TT20

7.70 7.58 7.56 7.54 7.44 7.42 7.26 7.16 7.15 7.13 7.13 7.09 7.07 6.21 6.19 4.84 4.83 4.82 3.84 3.83 3.78 3.77 1.58 1.22 1.22



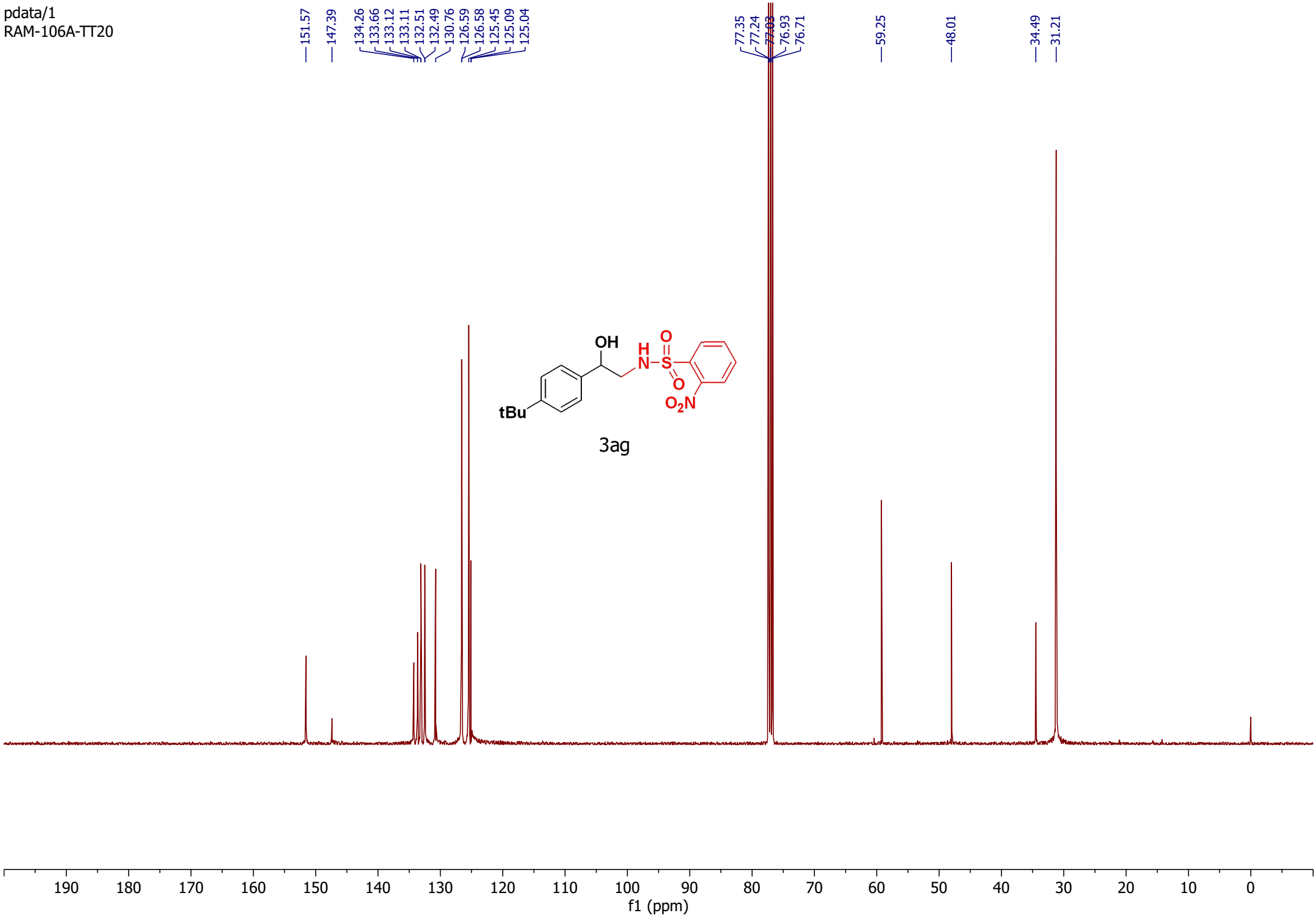
3ag

2 1 1 2 2 1 1 1 1 9

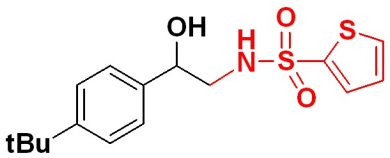
7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5

f1 (ppm)

pdata/1
RAM-106A-TT20



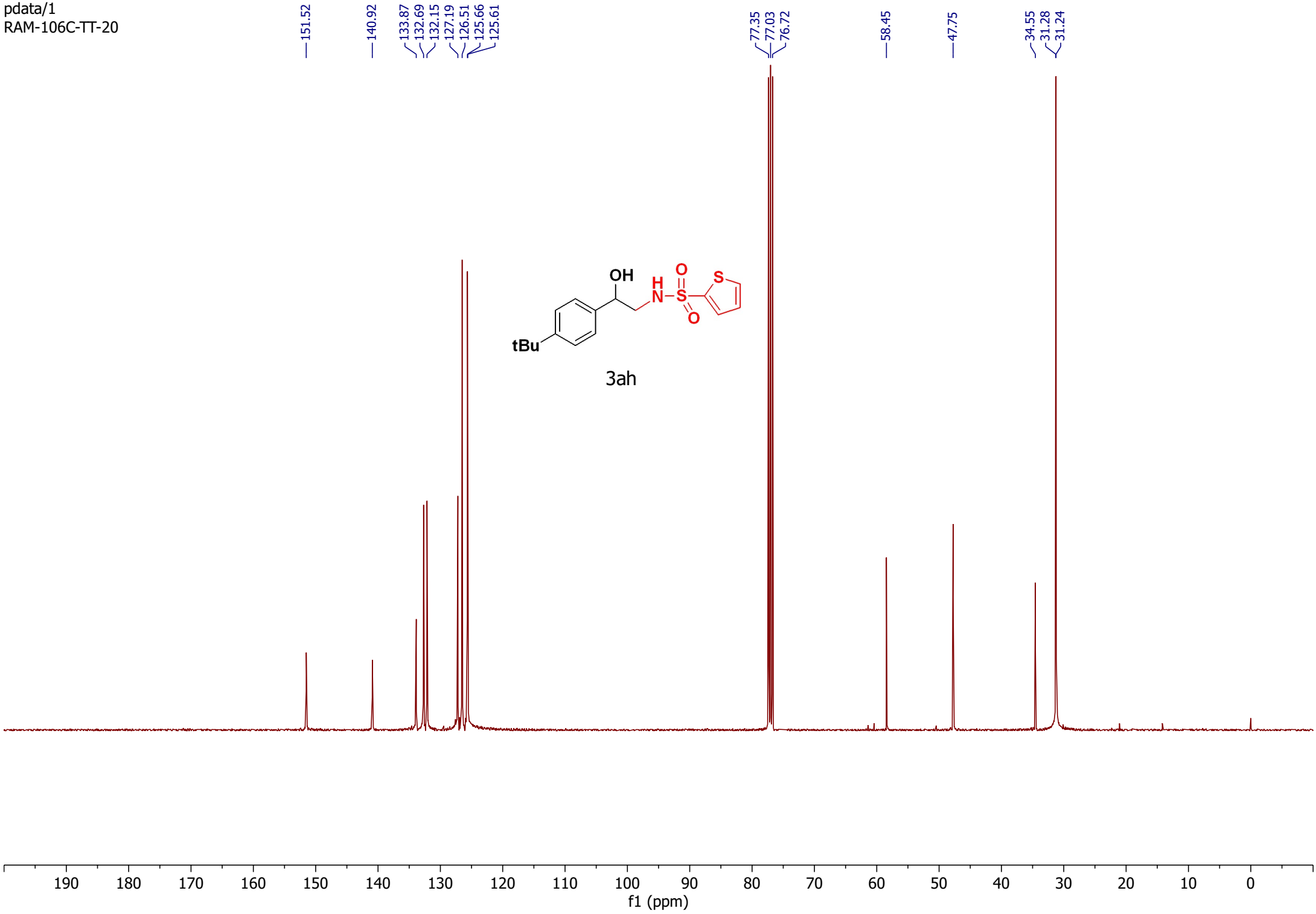
pdata/1
RAM-106C-TT-20



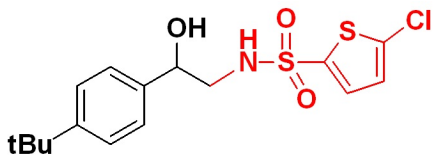
3ah

f1 (ppm)

pdata/1
RAM-106C-TT-20



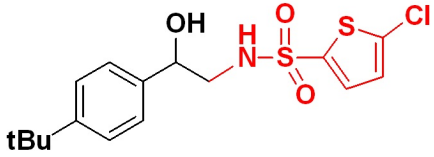
pdata/1


OH
H
N
O
S
O
S
Cl
tBu

3ai

7.28
7.27
7.27
7.27
7.26
7.15
7.14
7.14
7.10
7.09
7.08
7.07
6.71
6.70
6.69
5.49
5.48
4.67
4.66
3.79
3.77
3.77
3.76
3.75
3.74
3.74
2.04
2.04
1.33
1.32
1.32
1.31
1.29
1.29
1.27
1.26
1.24
3
3
1
1
1
2
13
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)

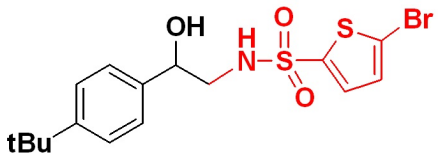
pdata/1



3ai

f1 (ppm)

pdata/1
AAP-II-55A-E13-1D-1H

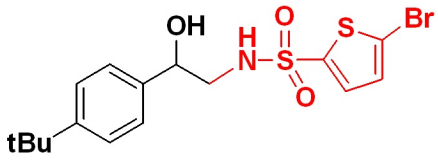


3aj

f1 (ppm)

pdata/1
AAP-III-55A

151.73
141.76
133.57
132.81
130.04
130.03
126.90
126.55
126.54
125.68
125.64
125.56
120.12
77.35
77.04
76.72
58.63
47.83
34.56
31.27
31.22

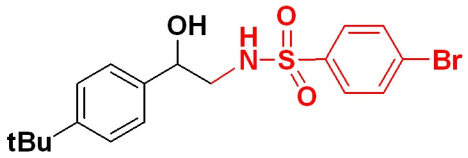


3aj

f1 (ppm)

pdata/4
RAM-B-TT-17

7.44 7.43 7.42 7.40 7.19 7.19 7.17 7.17 6.98 6.96 5.61 5.59 4.63 4.62 3.73 3.72 3.71 3.71 3.69 1.67 1.32 1.30 1.27 1.27



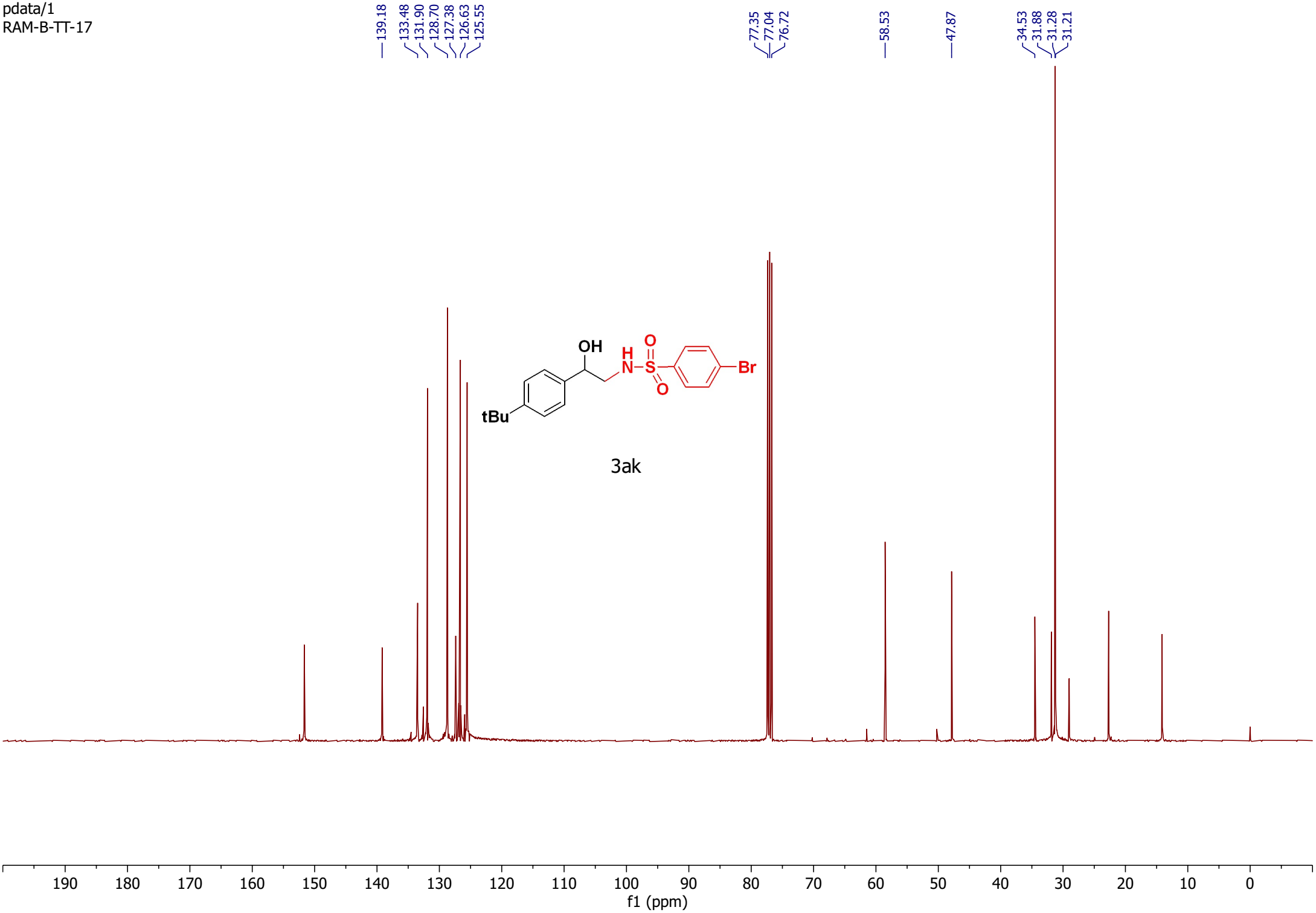
3ak

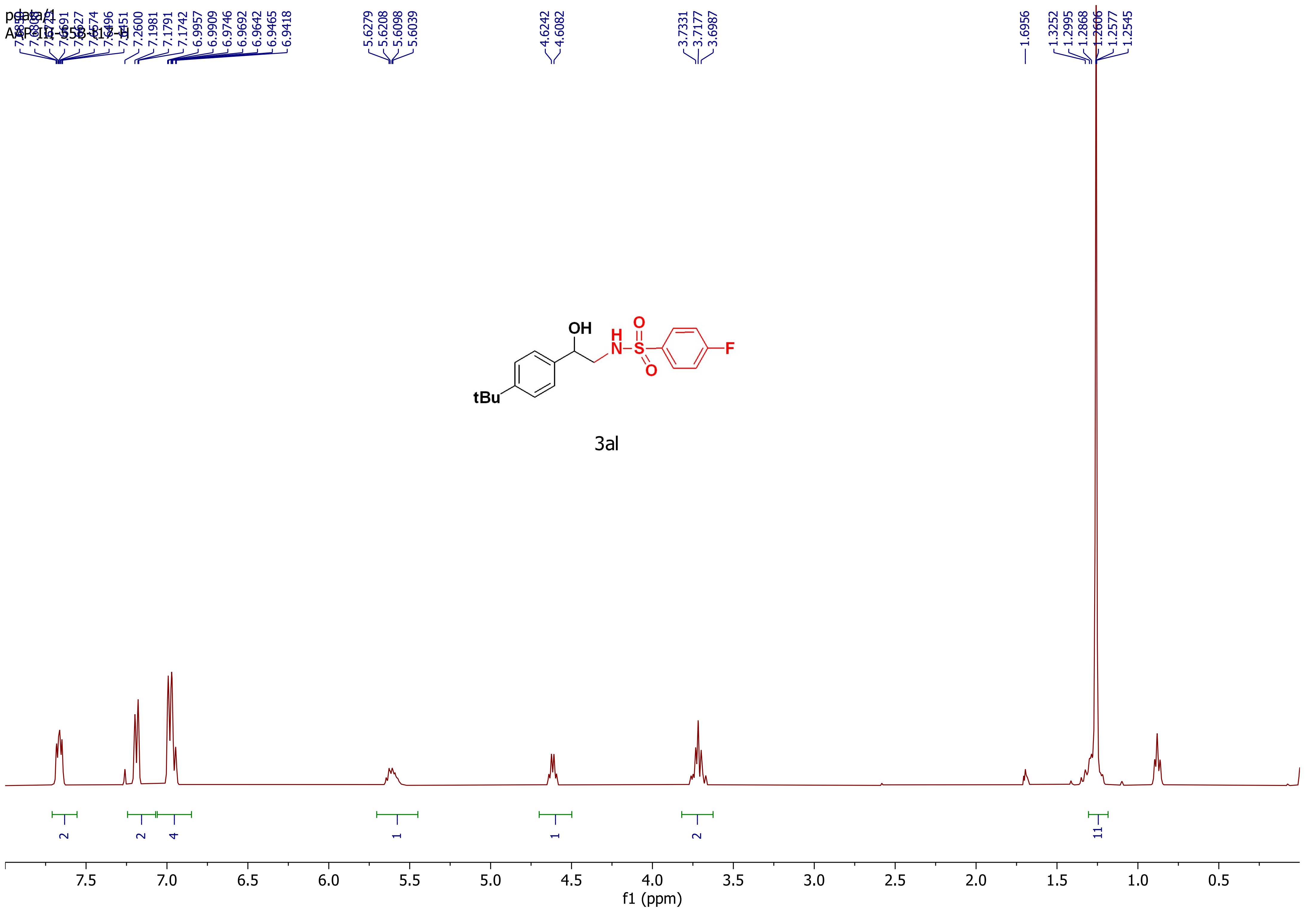
2 2 2 2 1 1 2 14

7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5

f1 (ppm)

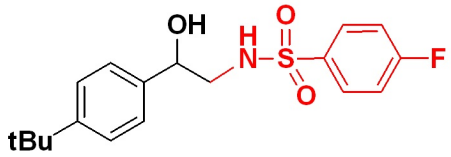
pdata/1
RAM-B-TT-17




pdata/1
AAP-II-55B-117-H
7.6691
7.6627
7.6574
7.6496
7.2600
7.1981
7.1791
7.1742
6.9957
6.9909
6.9746
6.9692
6.9642
6.9465
6.9418
5.6279
5.6208
5.6098
5.6039
4.6242
4.6082
3.7331
3.7177
3.6987
1.6956
1.3252
1.2995
1.2868
1.2606
1.2577
1.2545
OH
H
N
S
O
O
F
tBu
3al
2
2
4
1
1
2
11
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)

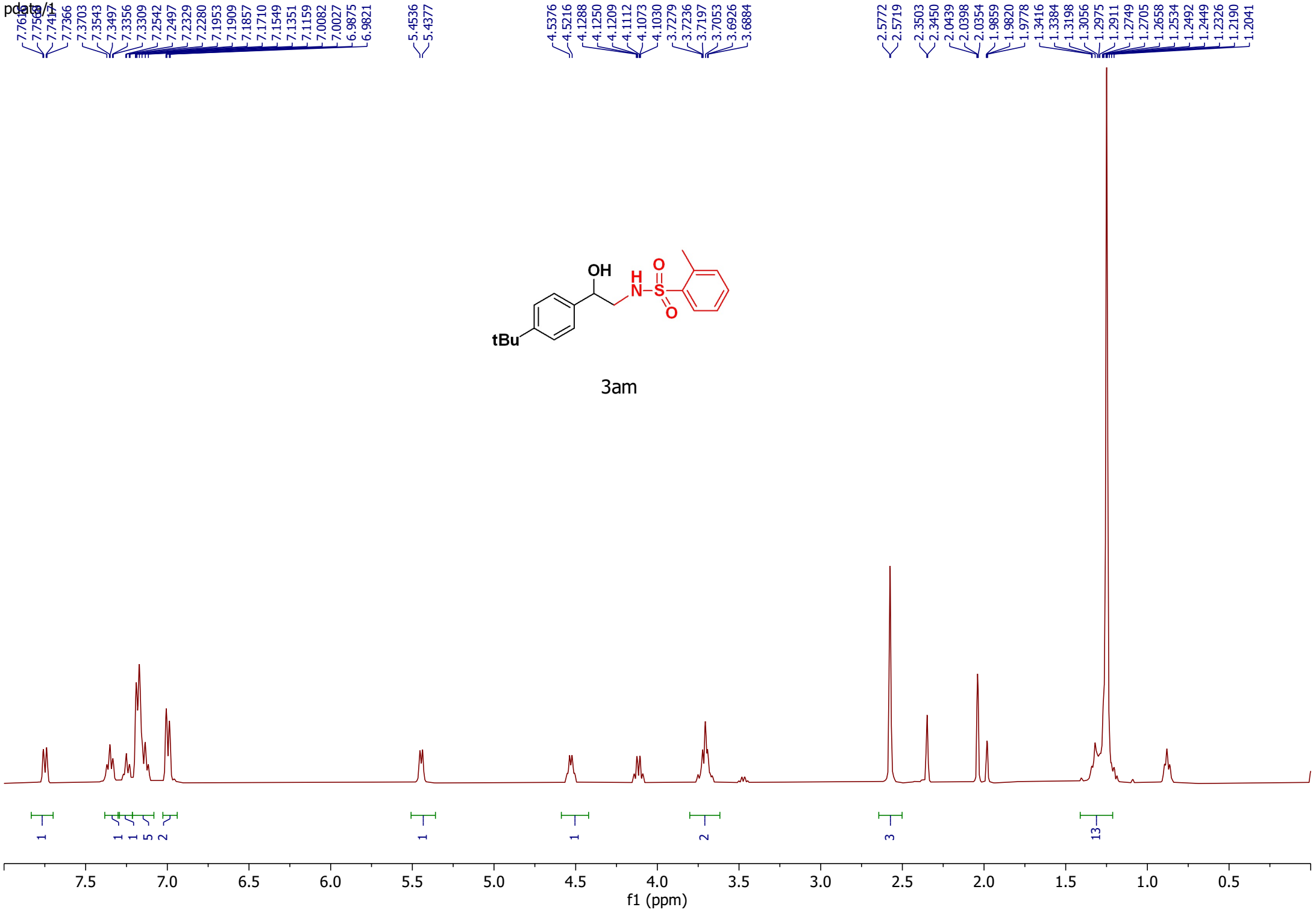
pdata/1
AAP-III-55B

166.13
163.60
151.55
151.53
136.19
136.15
133.64
130.02
129.98
129.89
129.88
129.84
129.81
126.73
126.63
126.56
125.62
125.58
125.55
116.07
116.00
115.77
77.36
77.25
77.05
76.73
58.53
47.86
47.81
34.51
31.27
31.22
31.04



3al

190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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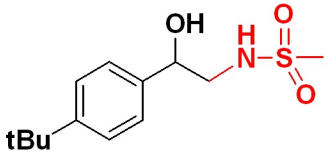
7.7501
7.7411
7.7366
7.3703
7.3543
7.3497
7.3356
7.3309
7.2542
7.2497
7.2329
7.2280
7.1953
7.1909
7.1857
7.1710
7.1549
7.1351
7.1159
7.0082
7.0027
6.9875
6.9821
5.4536
5.4377
4.5376
4.5216
4.1288
4.1250
4.1209
4.1112
4.1073
4.1030
3.7279
3.7236
3.7197
3.7053
3.6926
3.6884
2.5772
2.5719
2.3503
2.3450
2.0439
2.0398
2.0354
1.9859
1.9820
1.9778
1.3416
1.3384
1.3198
1.3056
1.2975
1.2911
1.2749
1.2705
1.2658
1.2534
1.2492
1.2449
1.2326
1.2190
1.2041
OH
H
N
S
O
O
tBu
3am
1
1
1
5
2
1
1
2
3
13
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)

pdata/1
RAM-106D-TT-21-REDO

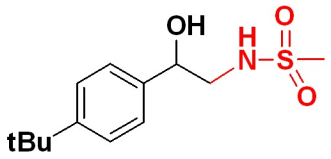


3an

f1 (ppm)

pdata/1
RAM-106D-TT-21-REDO

151.94
134.69
126.55
126.01
77.35
77.04
76.72
58.43
48.41
48.39
42.01
34.64
31.26



3an

190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)