Supporting Information

Mapping Aldehydic Load *In Vivo* By Positron Emission Tomography with $[^{18}F]NA_3BF_3$

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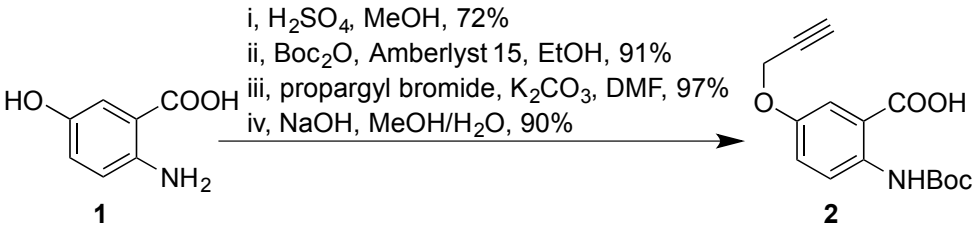
***authors contributed equally**

General Synthetic Procedures

Reagents were commercially available, or prepared as stated below. All solvents were HPLC grade except for water (18.2 MΩ cm millipore water), CH_2Cl_2 and Et_2O (dried over Al_2O_3 in a solvent purification system). Solvents were removed under reduced pressure in a rotary evaporator, aqueous solutions were lyophilized and organic extracts were dried over Na_2SO_4. Flash column chromatography (FCC) was carried out using silica gel (SiO_2), mesh size 230 - 400 Å. Thin-layer chromatography (TLC) was carried out on Al backed silica gel plates with compounds visualised byanisaldehyde stain, 5% ninhydrin stain, and UV light. HPLC purification (Method A) was performed using a Luna C_{18} 100 Å column (particle size 5 μm; 21.2 × 250 mm). Mobile phase for Method A was 0 min, 99% H_2O – 1% MeCN to 25 min, 100% MeCN, linear gradient and 10 mL/min flow rate. HPLC analysis associated with the radiolabeling (Method B) was performed using a Luna C_{18} 100 Å column (particle size 5 μm; 4.6 × 250 mm). Mobile phase for Method B was 0 min, 99% H_2O – 1% MeCN to 21 min, 100% MeCN, linear gradient and 1 mL/min flow rate. NMR spectra were recorded on a 300 or 400 MHz spectrometers for ^1H NMR spectra δ values were recorded as follows: DMSO-D_6 (2.50 ppm), D_2O (4.79 ppm), CD_3OD (3.31 ppm); for ^{13}C (93.75 or 125 MHz) δ DMSO-D_6 (39.50 ppm), CD_3OD (49.00 ppm). Mass spectra (MS) were obtained using electron impact (EI) or electrospray ionisation (ESI). Synthetic procedures associated with this work can be found in Scheme 1 in the main text.

Preparation of 5-*O*-propargyl-*N*-Boc-anthranilic acid (2)

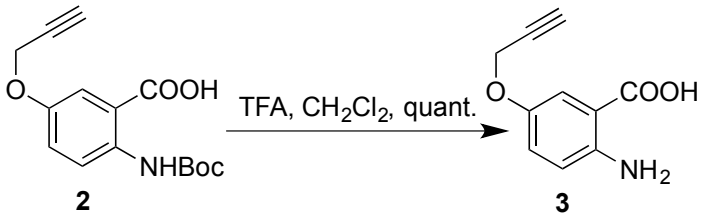
5-*O*-Propargyl-*N*-Boc-anthranilic acid (**2**) was prepared in four steps from 5-hydroxyanthranilic acid (**1**) as described in ref.[1]; spectral characteristics of all of the intermediates and the 5-*O*-propargyl-*N*-Boc-anthranilic acid (**2**) werein agreement with those described previously.[1]



1 **2**

Preparation of 5-*O*-propargyl-anthranilic acid (3)

TFA (500 μL) was added to a stirred suspension of 5-*O*-propargyl-*N*-Boc-anthranilic acid (**2**, 29 mg, 0.1 mmol) in CH_2Cl_2. The mixture was stirred for 1 h at room temperature (rt), volatiles were evaporated and the residue was co-evaporated with CH_2Cl_2 (3 × 50 mL). 5-*O*-propargyl-anthranilic acid (**3**) was obtained in quantitative yield as a white solid and was used for the subsequent step without further purification. Spectral characteristics of 5-*O*-propargyl-anthranilic acid (**3**) were in agreement with those described previously.[1]

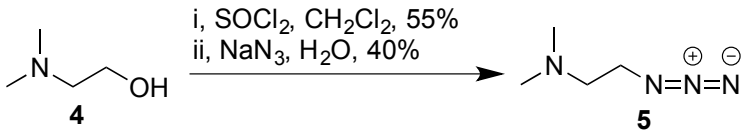


2 **3**

Preparation of 2-azido-*N*,*N*-dimethylethaneamine (5)

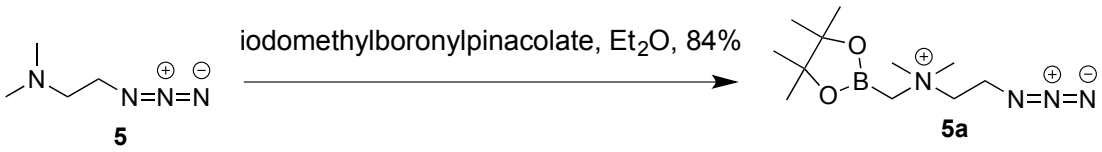
This material was prepared according to the procedure described in ref.[2], which was modified as follows. A stirred solution of *N*,*N*-dimethylaminoethanol (**4**, 2 mL, 20 mmol) in dry CH_2Cl_2 (8 mL) was cooled to 0 ºC, while being flushed with N_2. $SOCl_2$ (1.6 mL, 22 mmol) was added dropwise over 5 min period. The cooling bath was removed and the mixture was stirred for 2 h at rt (N_2 atmosphere). The mixture was diluted with EtOH (10 mL), was concentrated to ca. one third of its original volume and was set aside for 18 h at 3 ºC. Colorless needles formed; they were filtered off with suction, were washed with cold Et_2O and were dried to afford *N*,*N*-dimethylamino-2-chloroethaneamine dihydrochloride (1.58 g, 55%); its spectral characteristics were in agreement with those described in ref.[2].

NaN_3 (902 mg, 13.88 mmol) was added to a stirred solution of *N*,*N*-dimethylamino-2-chloroethaneamine dihydrochloride (1 g, 6.94 mmol)in water (4 mL). The mixture was stirred for 18 h at 80 ºC, was cooled to rt and was treated with a solution of NaOH (279 mg, 6.94 mmol) in water (1 mL). The resulting mixture was stirred for 2 h at rt, was transferred into a separatory funnel and was extracted with EtOAc (4 × 10 mL). Combined organic extract was dried and concentrated to leave *N*,*N*-dimethylamino-2-azidoethaneamine (**5**, 315 mg, 40%) as colourless oil; its spectral characteristics were in agreement with those described in ref.[2].



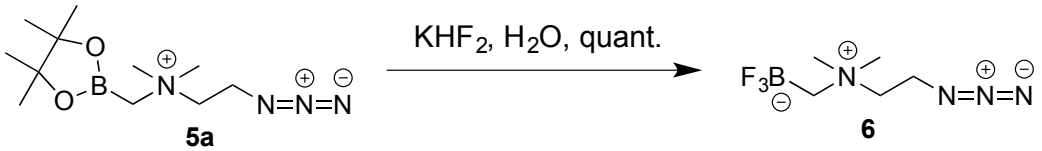
Reaction of *N*,*N*-dimethylamino-2-azidoethaneamine (5) with iodomethylboronylpinacolate

Modified literature protocol[3] was used to perform this reaction. Iodomethylboronic acid pinacol ester (510 µL, 2.76 mmol) was added dropwise (over 1 min period) to a solution of *N*,*N*-dimethylamino-2-azidoethaneamine (**5**, 315 mg, 2.76 mmol) in dry Et_2O (12 mL). The mixture was stirred for 18 h at rt, separated white precipitate was filtered off, was washed with ice-cold Et_2O and was dried to afford intermediate **5a**. No spectral characterization of intermediate **5a** is provided in the original reference.[3] Intermediate **5a**; white solid, 885 mg, 84%. ^{1}H NMR δ (D_2O) 3.91 (m, 2H); 3.69 (m, 2H); 3.22 (s, 6H); 3.10 (s, 2H); 1.20 (s, 12H).^{13}C NMR δ (D_2O) 75.7, 63.7, 54.2, 45.0, 23.8. ^{11}B NMR δ (D_2O) 26.9 (s).



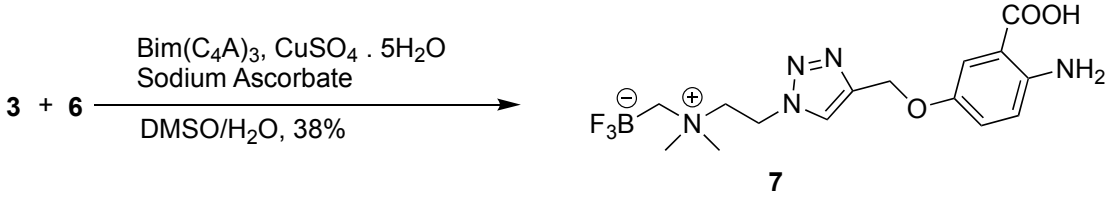
Preparation of trifluoroborate azide6

Modified literature protocol was used to perform this reaction.[3] A solution (3 M in water) of KHF_2 (1.2 mL, 3.6 mmol) was added to a Falcon tube containing a stirred suspension of intermediate **5a**(225 mg, 0.59 mmol) in water (800 µL). The mixture was stirred for 2 h at 45 ºC, was cooled to room temperature and the pH was adjusted to ~7 (several drops of conc. NH_4OH). The reaction mixture was passed through a C_{18} normal phase SiO_2Seppak cartridge directly attached to QMA ion-exchange cartridge. The cartridges wee eluted with water (5 × 1 mL), the aqueous solution was extracted with Et_2O (6 × 5 mL) to remove the pinacol formed during the reaction. The aqueous solution was lyophilized to afford 330 mg of a white solid residue containing ca. 33% of trifluoroborate azide**6** along with other inorganic material (mainly KI). This material was used for the subsequent step without further purification. No spectral characterization (except for ESI-MS) of trifluoroborate azide**6** is provided in the original reference.[3]^{1}H NMR δ (D_2O) 3.89 (t, *J* = 5.5 Hz, 2H); 3.51 (t, *J* = 6.5 Hz, 2H); 3.11 (s, 6H); 2.56 (m, 2H). ^{13}C NMR δ (D_2O) 64.0, 53.9, 44.9. ^{11}B NMR δ (D_2O) 2.1 (m).^{19}F NMR δ (D_2O) -136.9 (m).



Click reaction between 5-*O*-propargyl-anthranilic acid (3)and trifluoroborate azide6 to yield 7

This reaction was carried out as two batches run in parallel. Separate round bottom flasks containing 5-*O*-propargyl-anthranilic acid (**3**, 19 mg, 0.1 mmol) were charged with the lyophilized mixture containing ~ 33% of trifluoroborate azide (**6**, 58 mg, 0.1 mmol). DMSO (1.5 mL) was added into each flask, followed by the addition of $(BimC4A)_3$ (16 mg, 0.02 mmol). 1 M solutions of $CuSO_4 \cdot 5H_2O$ (50 µL, 0.05 mmol) and sodium ascorbate (100 µL, 0.1 mmol) were added and the reaction mixtures were stirred for 18 h at 50 ºC. The mixtures were cooled to rt, were diluted with water (10 mL), were transferred into Falcon tubes and were centrifuged (5 min at 5,000 rpm). The supernatants were combined and were subjected to preparative HPLC purification (Method A, General experimental procedures). The fractions containing the peak with t_R ~ 15 min were combined and were lyophilized to afford 39 mg of the solid residue. The residue was dissolved in water (15 mL) and was subjected to repeated preparative HPLC purification under identical conditions. The fractions containing the peak with t_R ~ 15 min were combined and were lyophilized to afford the desired anthranilic acid-derived trifluoroborate. A small amount of the product was aliquoted into Eppendorf tubes, so that each tube contained 0.09 mg (2.32×10^{-7} mol) of the anthranilic acid-derived trifluoroborate; this was used for the radiofluorination as described below. Anthranilic acid-derived trifluoroborate**7**; pale yellow fluffy solid, 29 mg, 38%. ^{1}H NMR δ (CD_3OD) 8.14 (s, 1H); 7.47 (d, J = 3.0 Hz, 1H); 7.06 (dd, J = 9.0, 3.0 Hz, 1H); 6.81 (d, J = 9.0 Hz, 1H); 5.13 (s, 2H); 4.98 (t, J = 7.0 Hz, 2H); 3.87 (t, J = 7.0 Hz, 2H); 3.09 (s, 3H); 2.54 (m, 2H).^{11}B NMR δ (CD_3OD) 2.1 (m). ^{19}F NMR δ (CD_3OD) -140.8 (m).HRMS (ESI) *m/z* found 410.1578 $[M + Na]^+$ (calcd 410.1587 for $C_{15}H_{21}BF_3N_5O_3Na$).

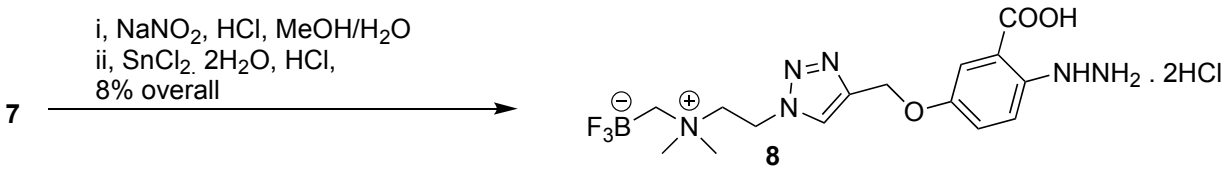


7

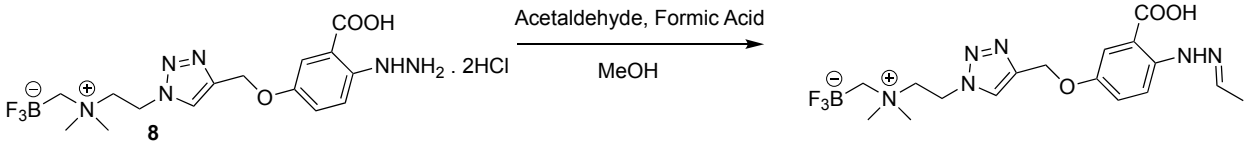
Diazotization and reduction of anthranilic acid-derived trifluoroborate 7 to yield 8

A solution of **7** (14 mg, 3.6×10^{-5} mol) in 6 M HCl and MeOH (120 µL each) was cooled to 4 ºC, followed by the addition of a solution of $NaNO_2$ (54 µL, 1 M in water, 5.4×10^{-5} mol). The mixture was stirred for 40 min at 4 ºC, followed by the addition of a solution of $SnCl_2 \cdot 2H_2O$ (16 mg, 7.2×10^{-5} mol) in 6 M HCl (120 µL). The stirring continued for further 30 min at rt. The mixture was diluted with water (10 mL) and was subjected to preparative HPLC purification (Method A, General experimental procedures). The fractions containing the peak with t_R ~ 13 min were combined, one drop of 6 M HCl was added followed by lyophilization. The material was then aliquoted into Eppendorf tubes, so that each tube contained 0.1 mg (2.1×10^{-7} mol) of hydrazine-derived trifluoroborate; this was used for the radiofluorination as described below. Hydrazine-derived trifluoroborate dihydrochloride**8**; white fluffy solid, 1.3 mg,

8%. ^{1}H NMR δ (CD_3OD) 8.18 (s, 1H); 7.69 (d, *J* = 3.0 Hz, 1H); 7.33 (dd, *J* = 9.0, 3.0 Hz, 1H); 7.10 (d, *J* = 9.0 Hz, 1H); 5.22 (s, 2H); 4.99 (t, *J* = 7.0 Hz, 2H); 3.87 (t, *J* = 7.0 Hz, 2H); 3.11 (s, 3H); 2.53 (m, 2H). ^{11}B NMR δ (CD_3OD) 1.5 (m). ^{19}F NMR δ (CD_3OD) -140.6 (m). HRMS (ESI) *m/z* found 403.1891 $[M+H]^+$ (calcd 403.1877 for $C_{15}H_{23}BF_3N_6O_3$).

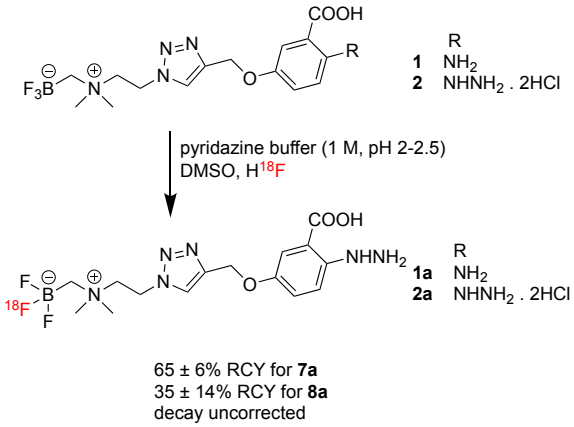


The identity of the hydrazine-derived trifluoroborate dihydrochloride was also verified by reaction with acetaldehyde which occurred instantaneously[4] as follows: Small amount of the HPLC fraction containing the hydrazine-derived trifluoroborate dihydrochloride (50 µL) was treated with 3 drops of a solution of acetaldehyde and formic acid (1 drop each) in MeOH (500 µL); resulting solution was analyzed by HR-ESI-MS. HRMS (ESI) *m/z* found 429.2036 $[M + H]^+$ (calcd 429.2033 for $C_{17}H_{25}BF_3N_6O_3$).



Radiolabeling of hydrazine-derived trifluoroborate dihydrochloride and hydrazine-derived anthranilic acid

The radiolabeling protocols were adopted from the previously described methods.[3,5] Multiple radiolabelings were performed as described below and shown in the Supporting Scheme 1; the results are summarized in the Supporting Table 1.



Concentration of the [^{18}F] HF solution

A 0.1 M solution of $NaHCO_3$ (10 µL)[5a] was added to a cyclotron produced solution of [^{18}F]HF in water (~ 250 µL, 30 – 50 mCi) in a Falcon tube (5 mL). The mixture was heated at 105 – 110 ºC (sand bath) under stream of nitrogen. The heating was stopped when the residual volume in the tube was ~ 50 µL. Resulting solution was used for the radiofluorination as described below.

Radiofluorination of hydrazine-derived trifluoroborate dihydrochloride

An aliquot of hydrazine-derived trifluoroborate dihydrochloride (**8**) (0.1 mg, 2.1 × 10^{-7} mol) in an Eppendorf tube was dissolved in 1 M pyridazine buffer (pH 2 – 2.5, 10 µL)[3,5a] and DMSO (5 µL).[5b] A concentrated [^{18}F]HF solution (15 µL) was added and the mixture was heated for 10 min at 95 – 100 ºC (sand bath). The reaction was quenched with 1 M $NaHCO_3$ solution (100 µL) and saline (500 µL) and was loaded on an acidic Sep-Pak light alumina cartridge. The cartridge was eluted with saline, 5 fractions (500 µL each) were obtained. The activity in each fraction was measured, revealing that the substantial amount of the radiotracer was consistently found in fractions 1 and2. The identity and purity of the radiotracer was verified by radio-HPLC (Method B, t_R 8.7 min) and by comparison with the corresponding cold standard (t_R8.6 min), as depicted in Figure 1 of the main text. The material in these fractions was used for *in vivo* studies, as well as for calculating the decay uncorrected radiochemical yield (RCY) and molar activity (MA). The results are summarized in the Supporting Table 1.

Radiofluorination of anthranilic acid-derived trifluoroborate

An aliquot of anthranilic acid-derived trifluoroborate (**7**) (0.09 mg, 2.32 × 10^{-7} mol) in an Eppendorf tube was dissolved in 1 M pyridazine buffer (pH 2 – 2.5, 10 µL)[3,5a] and DMSO (5 µL).[5b] A concentrated [^{18}F]HF solution (15 µL) was added and the mixture was heated for 10 min at 95 – 100 ºC (sand bath). The reaction was quenched with 1 M $NaHCO_3$ solution (100 µL) and saline (500 µL) and was loaded on an acidic Sep-Pak light alumina cartridge. The cartridge was eluted with saline, 5 fractions (500 µL) were obtained. The activity in each fraction was measured, revealing that the substantial amount of the radiotracer was consistently found in fractions 1 and 2. The identity and purity of the radiotracer was verified by radio-HPLC (Method B, t_R 8.0 min) and by comparison with the corresponding cold standard (t_R 7.9 min), as depicted in Supporting Figure 1. The material in these fractions was used for *in vivo* studies, as well as for calculating the decay uncorrected radiochemical yield (RCY) and specific activity. The results are summarized in the Supporting Table 1.

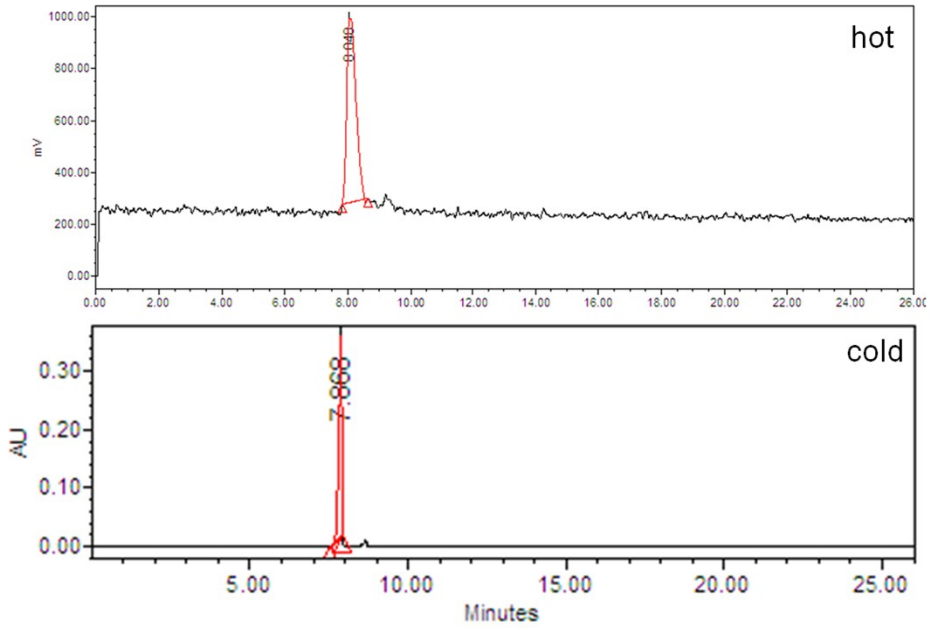


Figure S1: HPLC traces of [^{18}F]-anthranilic acid-derived trifluoroborate (**1a**) (top) and the corresponding radiofluorination precursor/cold standard **1** (bottom); due to the interference of pyridazine with the UV trace, the cold standard sample was prepared by dissolving an aliquot (0.1 mg) in 100 µL 1 M $NaHCO_3$/400 µL saline/500 µL water.

Precursor Used	Initial Activity (mCi)	Activity after 10 min (mCi)	Activity in Fraction 1 (mCi)	Activity in Fraction 2 (mCi)	Overall Activity (mCi)	Decay Uncorrected Radiochemical Yield (%)	Molar Activity (mCi/µmol)
2	5.20	4.85	1.04	0.99	2.03	42	9.64
2	4.60	4.23	0.84	0.85	1.69	40	8.04
2	3.13	2.96	0.70	0.74	1.44	49	6.85
2	8.14	7.33	0.42	0.55	0.97	13	4.64
2	5.28	4.77	0.31	0.40	0.71	15	3.37
2	12.96	12.33	1.24	1.45	2.69	22	12.81
2	14.72	14.06	1.51	1.45	2.96	21	14.10
2	8.72	8.53	1.86	1.75	3.61	42	17.19
2	8.88	8.72	2.03	2.08	4.11	46	19.57
2	4.76	4.60	1.03	1.04	2.07	45	9.86
2	5.46	5.24	1.39	1.29	2.68	51	12.76
1	2.36	2.23	0.55	0.73	1.28	58	5.53
1	3.23	3.05	1.03	1.03	2.06	68	8.88
1	4.52	4.04	1.49	1.26	2.75	68	11.85

Supporting Table 1: Radiolabeling of hydrazine-derived trifluoroborate dihydrochloride (**2**) and anthranilic acid-derived trifluoroborate (**1**).

Synthesis and Characterization of Polyglutaraldehyde Microparticles (AldMP)

AldMP were prepared as previously described.[6] Briefly, a solution comprising 100 mL of 5% v/v glutaraldehyde in water (70% aqueous glutaraldehyde solution) with 1% w/v Pluronic F127 was bubbled with N_2 and stirred for 10 min. 10 N NaOH was added dropwise to this solution until the pH of the solution was confirmed to be pH 11. The solution was stirred at room temperature overnight, with the pH being assessed 1, 2, and 4 hr after the initial addition of NaOH to maintain the solution at pH 11. The milky solution was washed three times with water by centrifugation (3500rpm for 10min). In order to acquire SEM images, particles were freeze dried and applied to an aluminum sample holder. The sample was then coated with 5 nm of gold using an EM ACE200 vacuum coater (Leica Microsystems, Inc., Concord ON, Canada). Micrographs were then acquired on a JSM-7500F FESEM (Jeol USA, Inc., Peabody MA, USA) using 2.00 kV acceleration voltage and 20.0 uA under 4.4×10^{-4} Pa vacuum. Aldehyde presentation on theAldMP surface was evaluated using a fluorophore, methyl 5-methoxy-*N*-aminoanthranilate, as previously reported.[7] A DMSO solution of methyl 5-methoxy-*N*-aminoanthranilate was added to a suspension of AldMP diluted to approximately 1% w/v in 1× PBS, or to an equal volume of 1×PBS to a final concentration of 100 μM. The solution was mixed briefly by agitation and placed on a transilluminator with excitation wavelength of 302 nm immediately after mixing.

Serum Stability Study

A solution of **8a** in saline (300 μL) was added to a tube containing freshly thawed mouse serum (1 mL), to reach the activity of 206 μCi. Samples were withdrawn at 0 min (200 μL, 25.7 μCi), 30 min (250 μL, 26.0 μCi), 60 min (300 μL, 26.1 μCi) and 120 min (400 μL, 24.1 μCi), they were diluted with water to reach the final volume 1 mL, were filtered (Pasteur pipette with a cotton plug) and were analyzed by HPLC.

Cell Uptake Study

HEK293 cells (1×10^6 cells/mL) were plated in Eagle's Modified MEM supplemented with non-essential amino acids and FBS, and kept overnight in a humidified incubator at 37°C and 5% CO_2 atmosphere. Cells were treated with DMSO (vehicle) or a DMSO solution of diethyl maleate (DEM) to a final concentration of 1.5 mM for 1 or 2 hr. To each well was added 5 μCi/mL of $[^{18}F]NA_3BF_3$, and cells were incubated for 30 min. Cells were washed with cold DPBS three times, and lysed and lifted with RIPA buffer. One-half of the RIPA solution was counted on a Packard Cobra Quantum 5200 gamma counter, while the other half was subjected to protein quantitation by Bradford Assay following standard procedures.

Animal Models and Imaging

All animal work was approved by the IACUC of the University of Ottawa under AUP sc-3036, and ensures that experimental protocols and animal welfare meet that standards set out by the Canadian Council on Animal Care. Female Balb/C mice (8 weeks old, Charles River

Laboratories, Sherbrooke QC, Canada) were acclimated for 1week prior to experimentation. For studies involving AldMP, mice received an injection of a saline suspension of AldMP (50 μL, 10% w/v) or saline alone s.c. above the right and left shoulders, respectively. Tail veins were cannulated and mice received approximately 180 μCi of either [^{18}F]NA_3BF_3 (**2a**,*n*=4) or control probe (compound **1a**) (*n*=4) 30 min after AldMP injection. For pre-labeled AldMP study, [^{18}F]NA_3BF_3 (200 μCi/50μL particles) and AldMP solution was incubated at room temperature for 10 min, and washed twice by pelleting (3500 rpm, 5min) and resuspending in saline. PET imaging was performed on an InveonD-PET small animal imaging system (Siemens, Munich, Germany) from 30 to 45 min following radiotracer administration. For studies involving sepsis, mice received i.v.administration of either 5 mg/kg E. coli bacterial cell wall lipopolysaccharide O55:B5 in saline (*n*=4), or saline alone (*n*=4). Two hours later, tail veins were cannulated and mice received approximately 180 μCi of [^{18}F]NA_3BF_3, followed 30 min later by a 15 min static PET scan. All PET images were acquired using Inveon Acquisition Workstation software and were reconstructed using a 3D-OSEM algorithm with attenuation correction. Data were analyzed and images were generated using VivoQuant v 2.5 (inviCRO LLC, Boston MA, USA).

Statistics

Uptake ratio was compared between the control compound (**1a**) and [^{18}F]NA_3BF_3(**2a**) using a two-tailed t-test, and radiotracer uptake differences after sepsis was evaluated by ANOVA followed by Tukey's Test for HSD. All statistical analyses were performed with GraphPad Prism v.7 (GraphPad Software, La Jolla CA, USA).

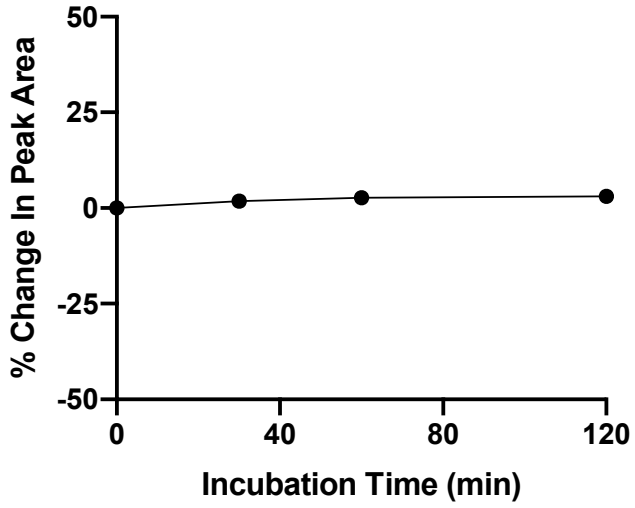


Figure S2. Serum stability of [^{18}F]NA_3BF_3. The stability of the radiotracer, [^{18}F]NA_3BF_3, was assayed in mouse serum at 37°C. Samples were extracted and analyzed by HPLC, with the resulting change in peak area plotted over time.

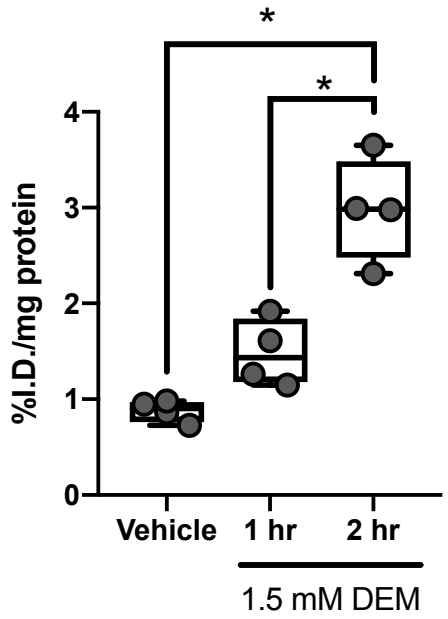


Figure S3. Uptake of [^{18}F]NA_3BF_3 in HEK293 cells following electrophilic stress. Cell uptake is shown following incubation of [^{18}F]NA_3BF_3 for 30 min with HEK293 cells treated with DMSO (vehicle), or with 1.5 mM DEM for 1 or 2 hr. Individual data points are shown, as well as box and whisker plots (horizontal line = mean, box = standard deviation, and whiskers = min/max range). * significant difference (p<0.05 by two-way ANOVA).

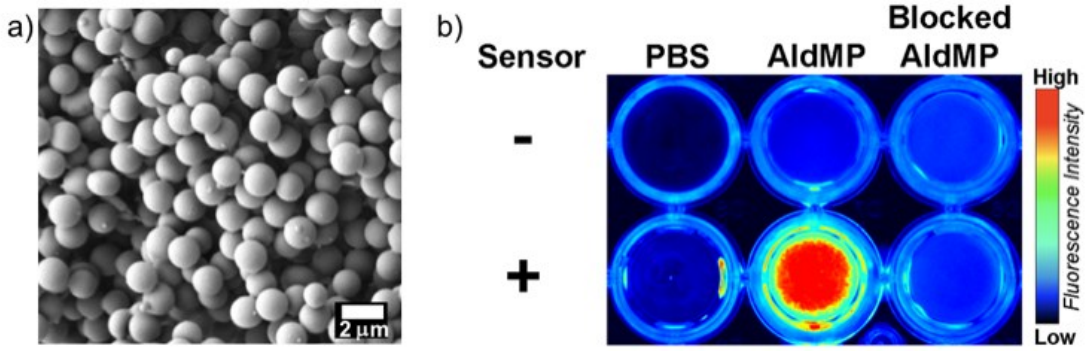


Figure S4. Morphological and functional characterization of (poly)glutaraldehyde microparticles (AldMP). An emulsion polymerization method was utilized for the preparation of AldMP. (**a**) SEM of AldMP was acquired with 5 nm gold coating, and shows spherical microparticles less than 2 µm in diameter. (**b**) The presentation of aldehydes on the surface of AldMP was verified using an aldehyde-sensitive fluorogenic probe methyl 5-methoxy-*N*-aminoanthranilate (i.e. sensor). The samples pictured contain PBS (*left*), AldMP (*middle*), and AldMP pre-saturated with *N*-amino anthranilic acid (Blocked AldMP, *right*) either without (*top row*) or with (*bottom row*) the addition of aldehyde-reactive fluorogenic sensor.

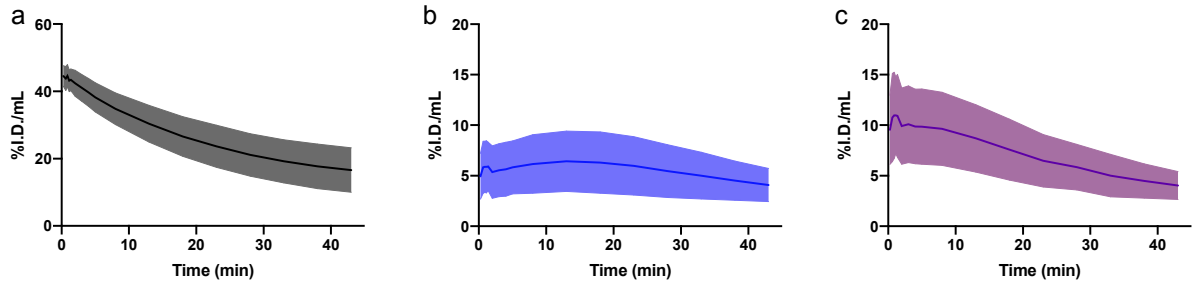


Figure S5. Kinetics of AldMP pre-labeled with [^{18}F]NA_3BF_3. AldMP were pre-inucbated with [^{18}F]NA_3BF_3, washed, and inoculated into the shoulder of Balb/C mice at a dose of 20 μCi per animal. Dynamic PET imaging was initiated 30 min post-injection. The quantity of AldMP was determined for the injected shoulder (a, black), the liver (b, blue) and the kidney (c, purple). Data represent the mean±s.d. for n=4 mice.

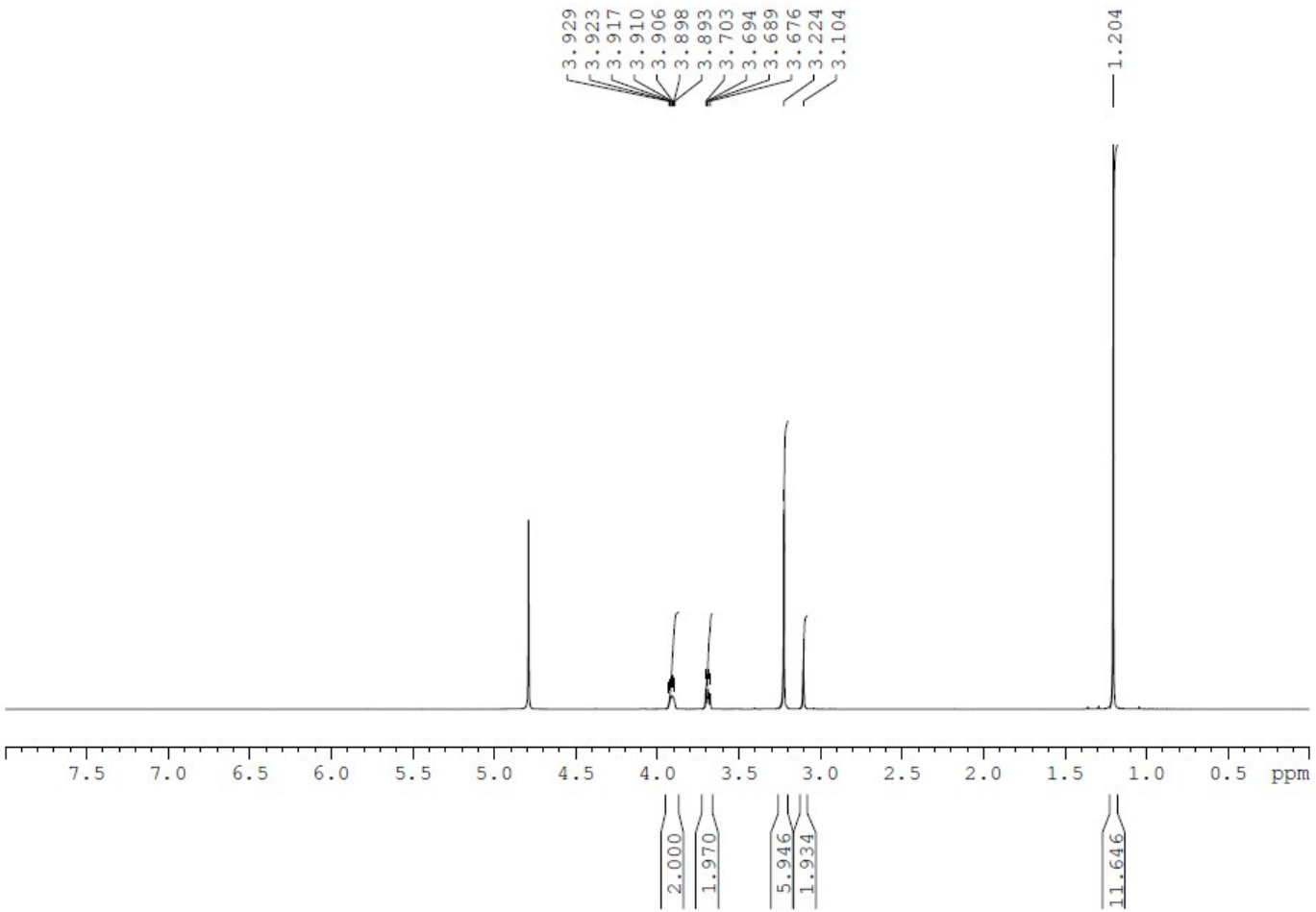


Figure S6: ^{1}H NMR (D_2O) spectrum of intermediate **5a**

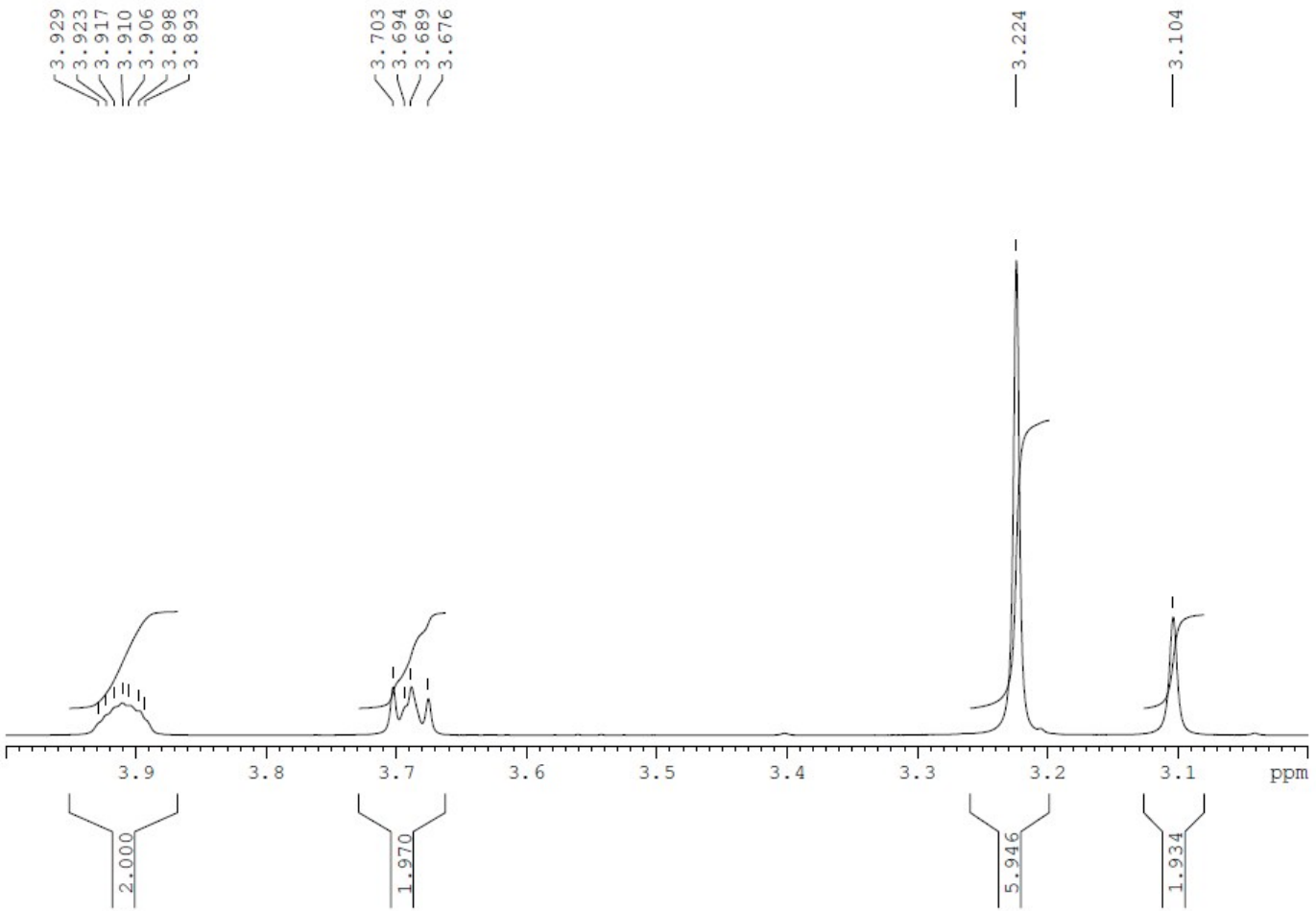


Figure S7: ^{1}H NMR (D_2O) spectrum of intermediate **5a**, expanded view

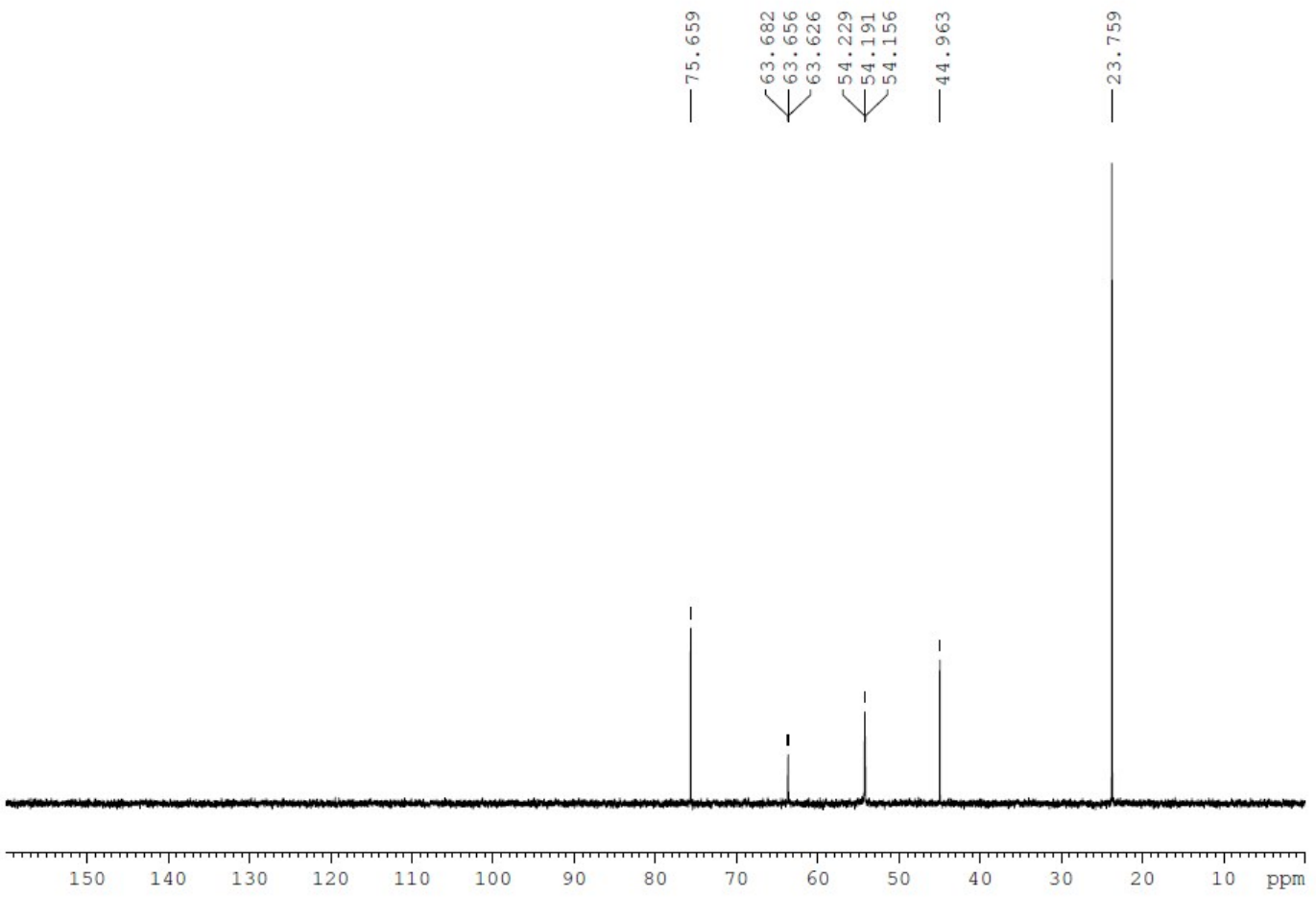


Figure S8: ^{13}C NMR (D_2O) spectrum of intermediate **5a**

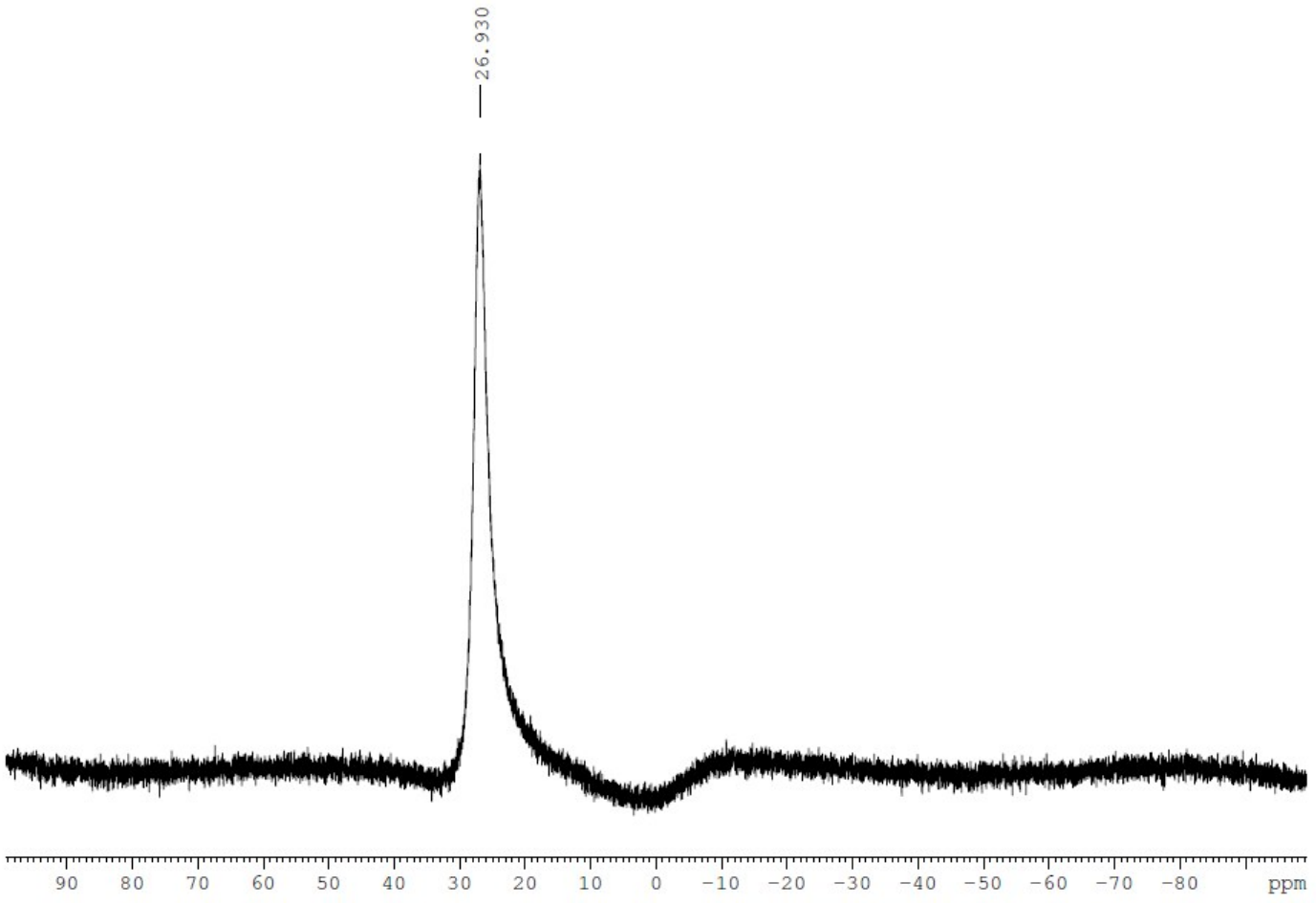


Figure S9: ^{11}B NMR (D_2O) spectrum of intermediate **5a**

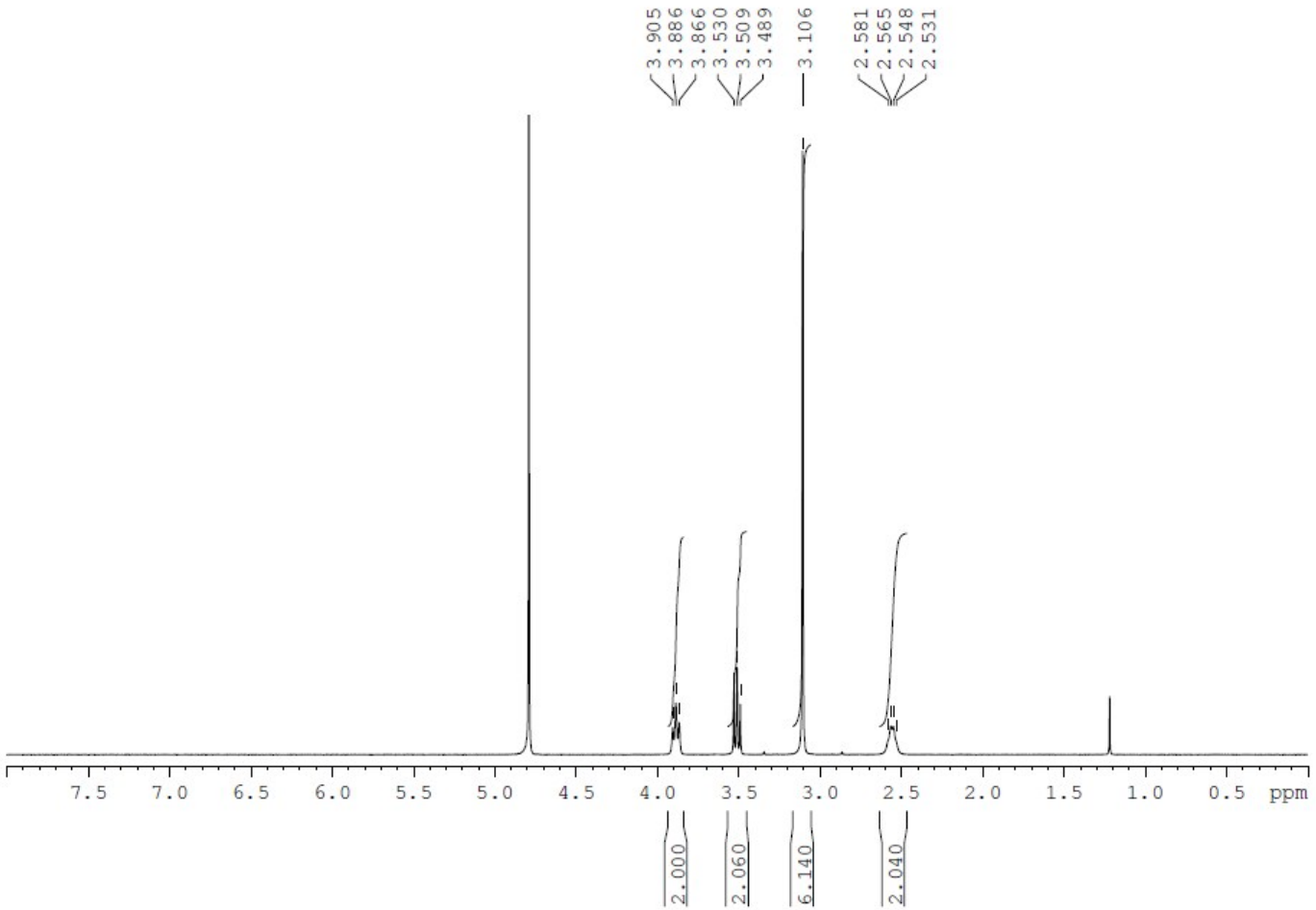


Figure S10: ^{1}H NMR (D_2O) spectrum of intermediate **6**, the signal at 1.2 ppm belongs to residual pinacol

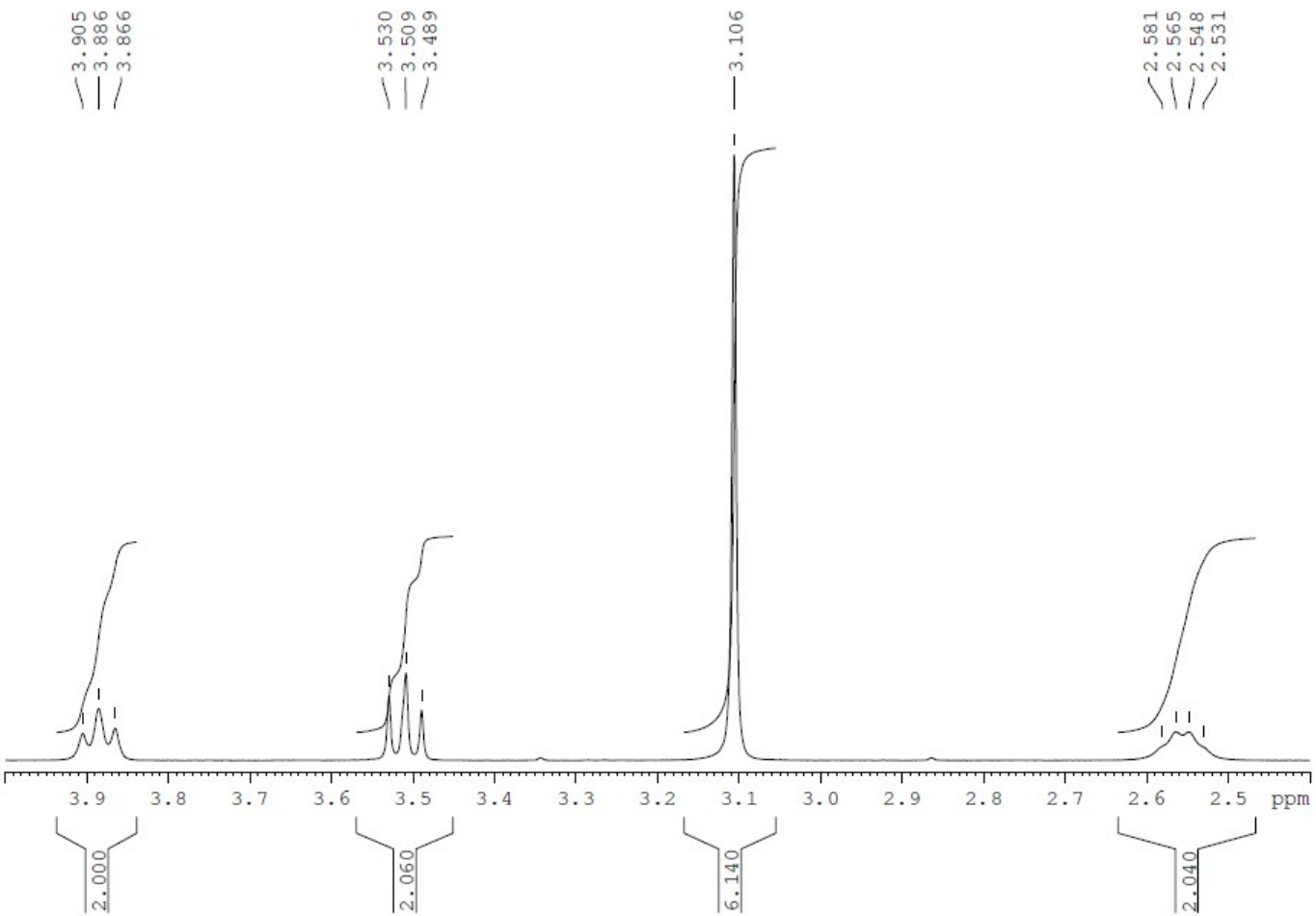


Figure S11: ^{1}H NMR (D_2O) spectrum of intermediate **6**, expanded view

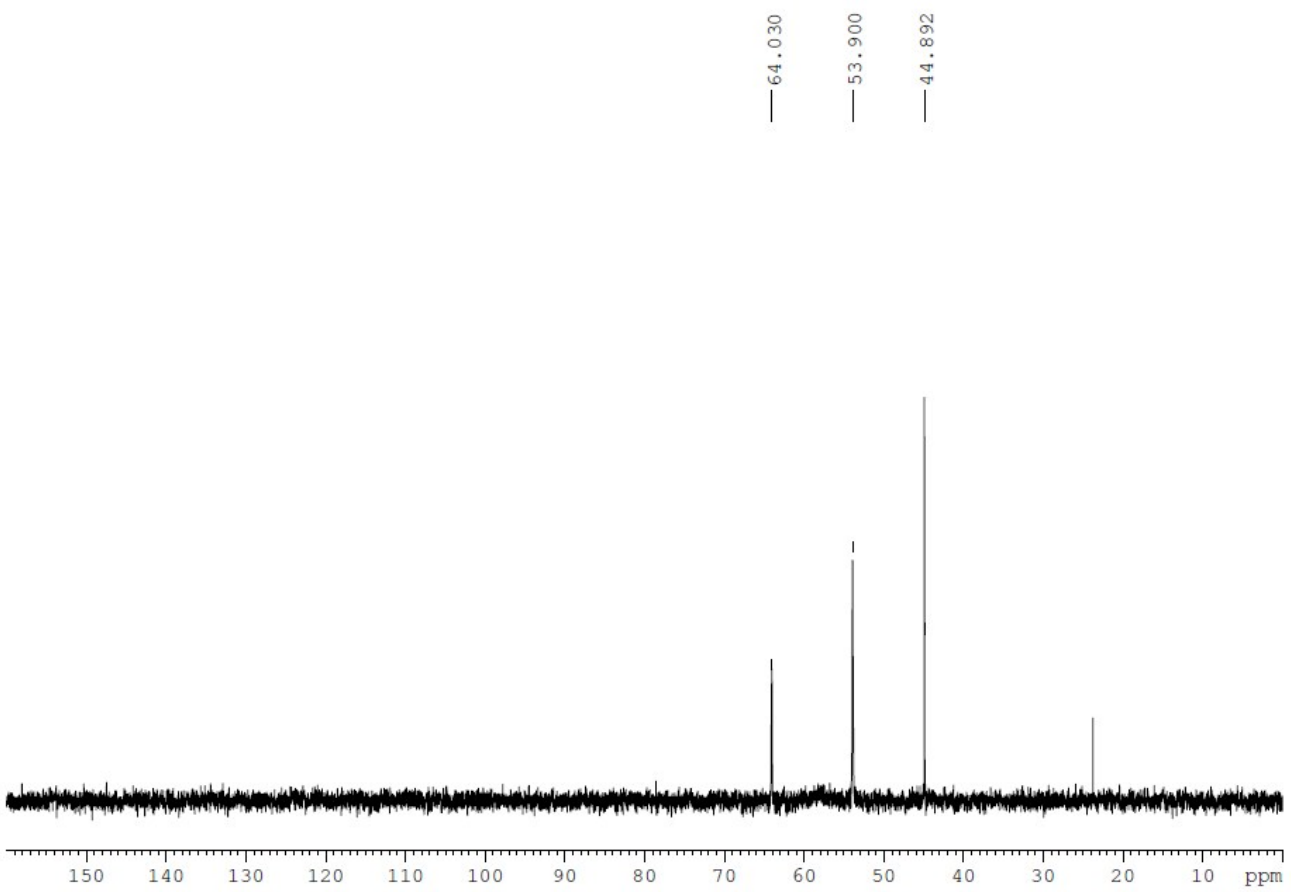


Figure S12: ^{13}C NMR (D_2O) spectrum of intermediate **6**, the signal at 24 ppm belongs to residual pinacol. As listed on page 7 of the Supporting Information file associated with reference 5[a] sic. "it is difficult to observe carbons directly bonded to boron due to quadrupolar coupling." This explains the lack of one signal in the spectrum shown above.

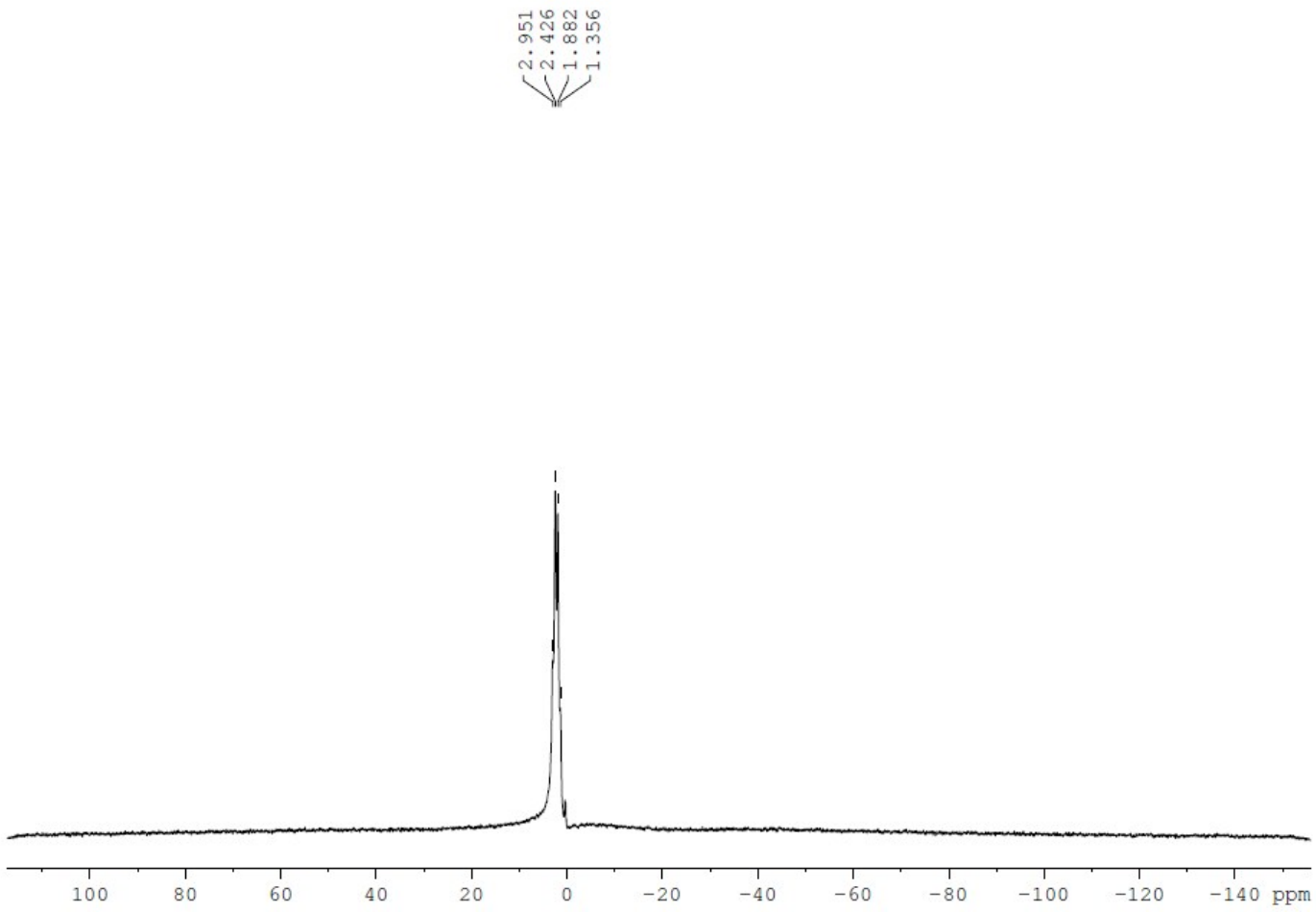


Figure S13: ^{11}B NMR (D_2O) spectrum of intermediate **6**

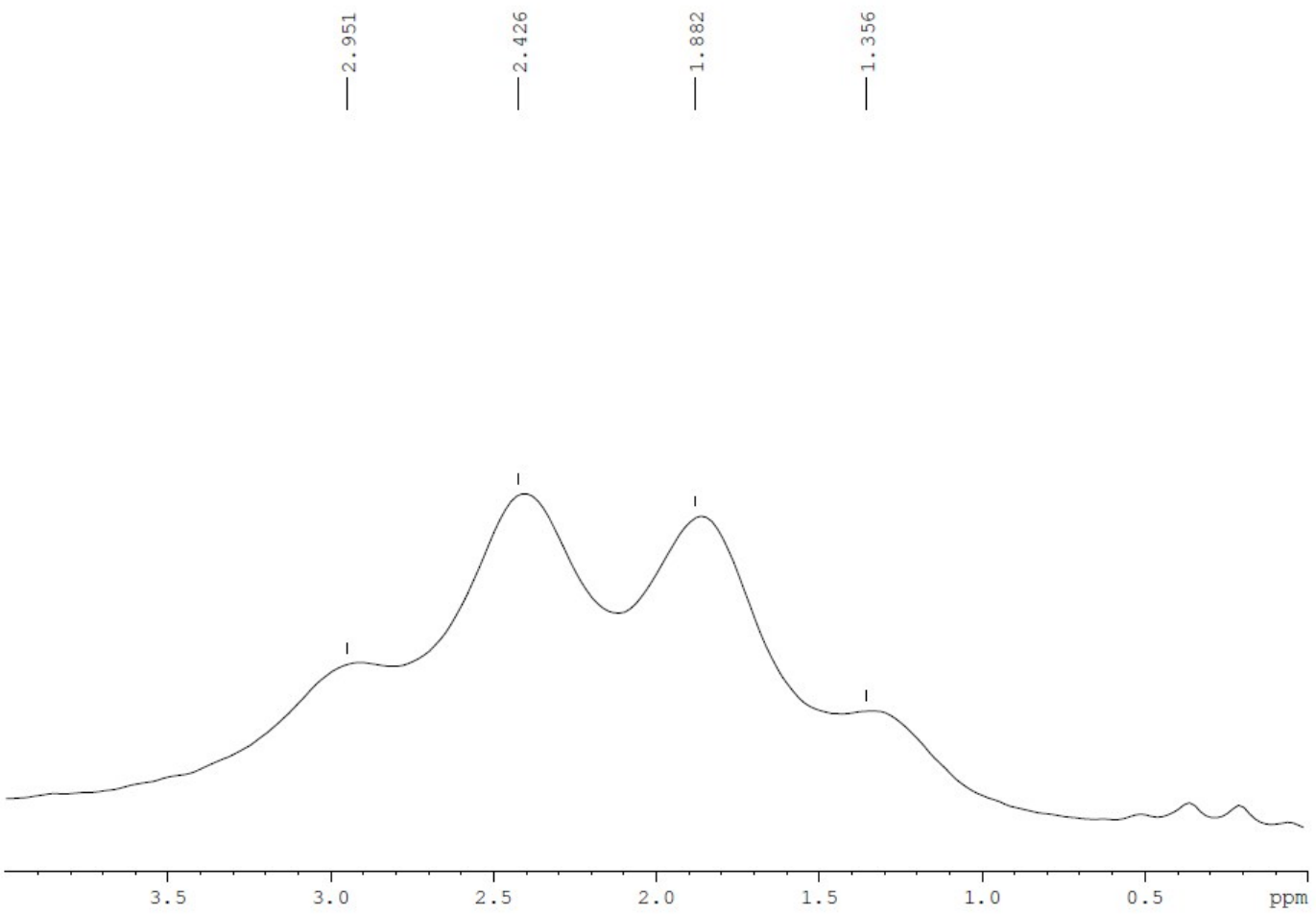


Figure S14: ^{11}B NMR (D_2O) spectrum of intermediate **6**, expanded view

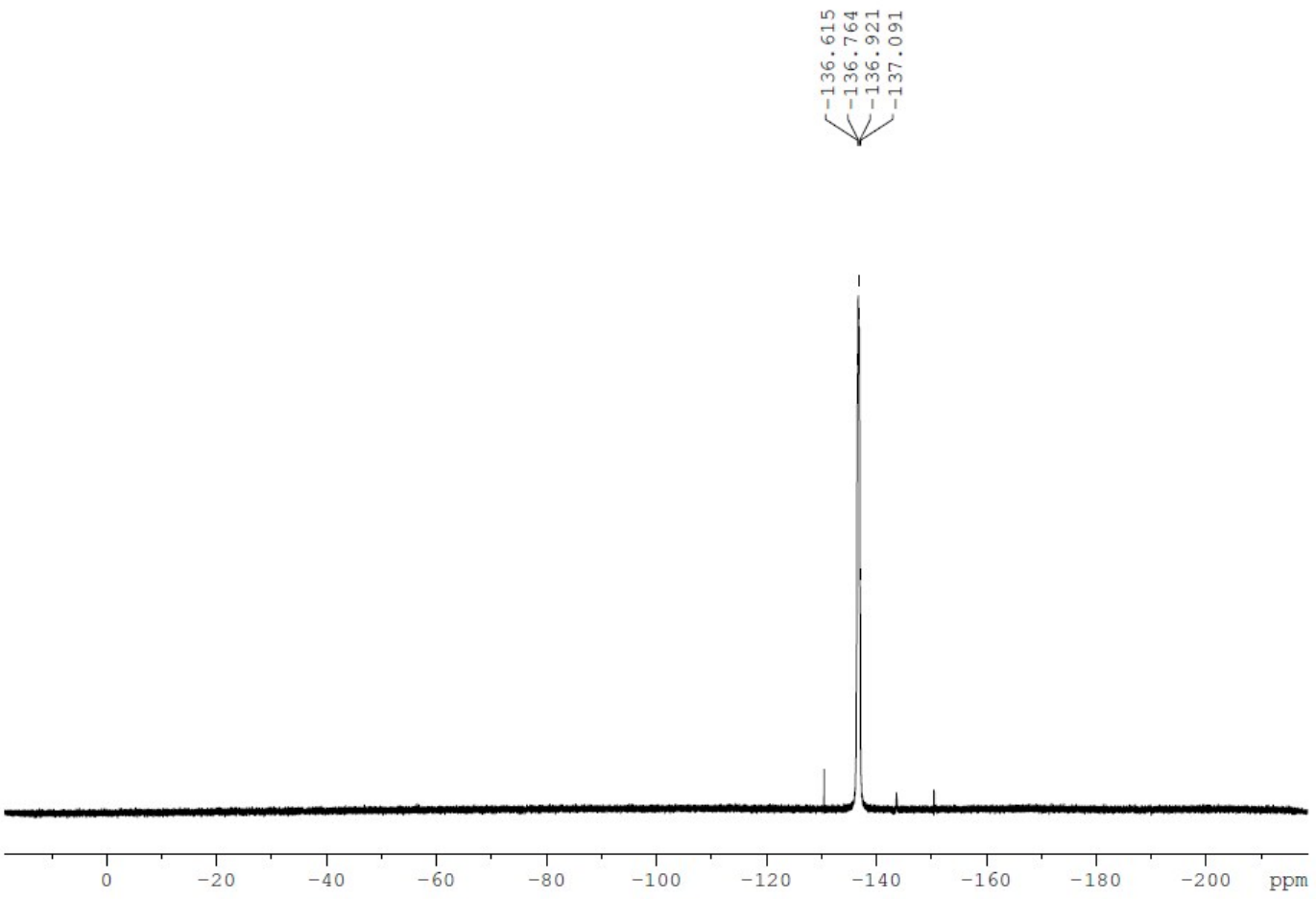


Figure S15: ^{19}F NMR (D_2O) spectrum of intermediate **6**

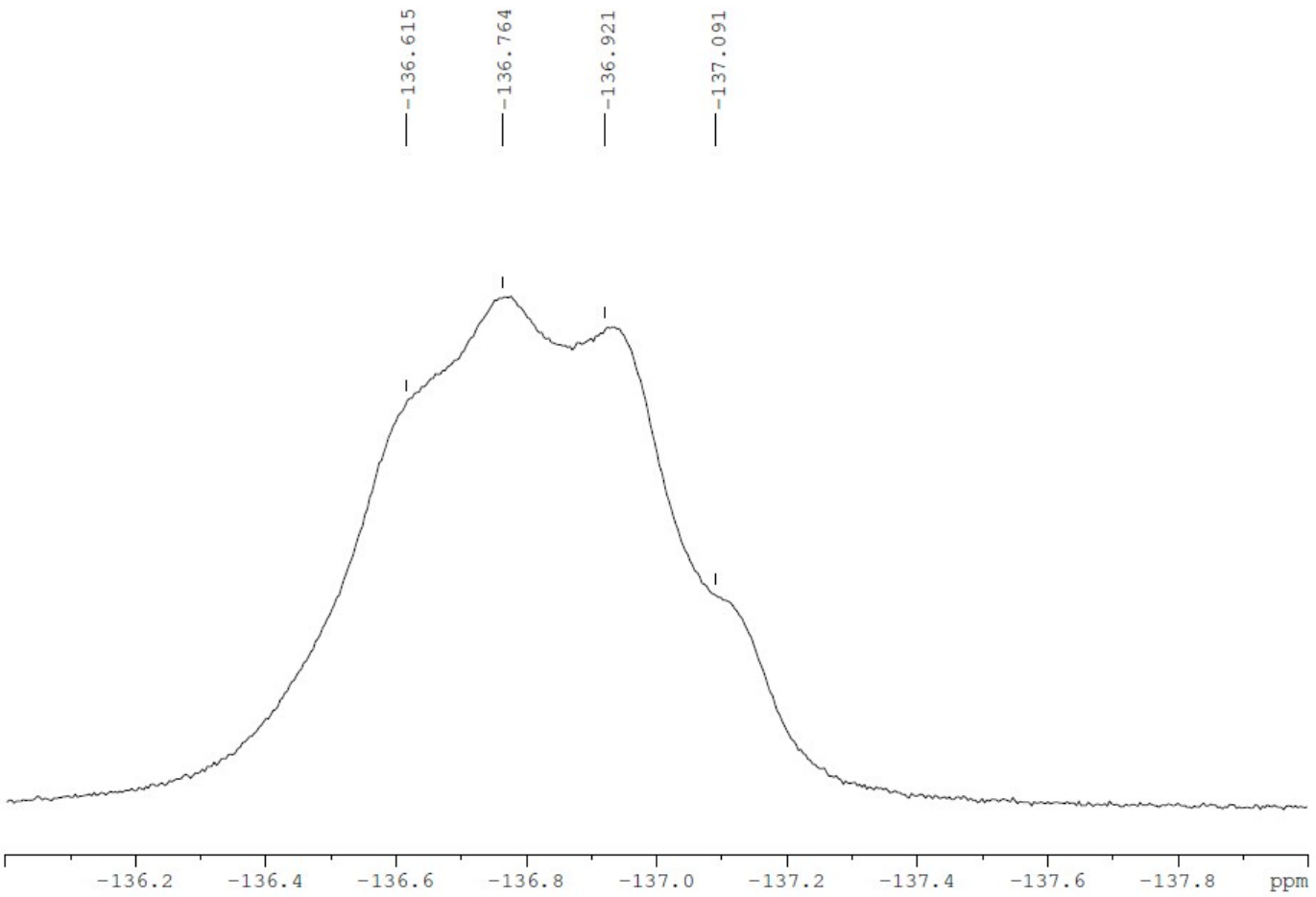


Figure S16: ^{19}F NMR (D_2O) spectrum of intermediate **6**, expanded view

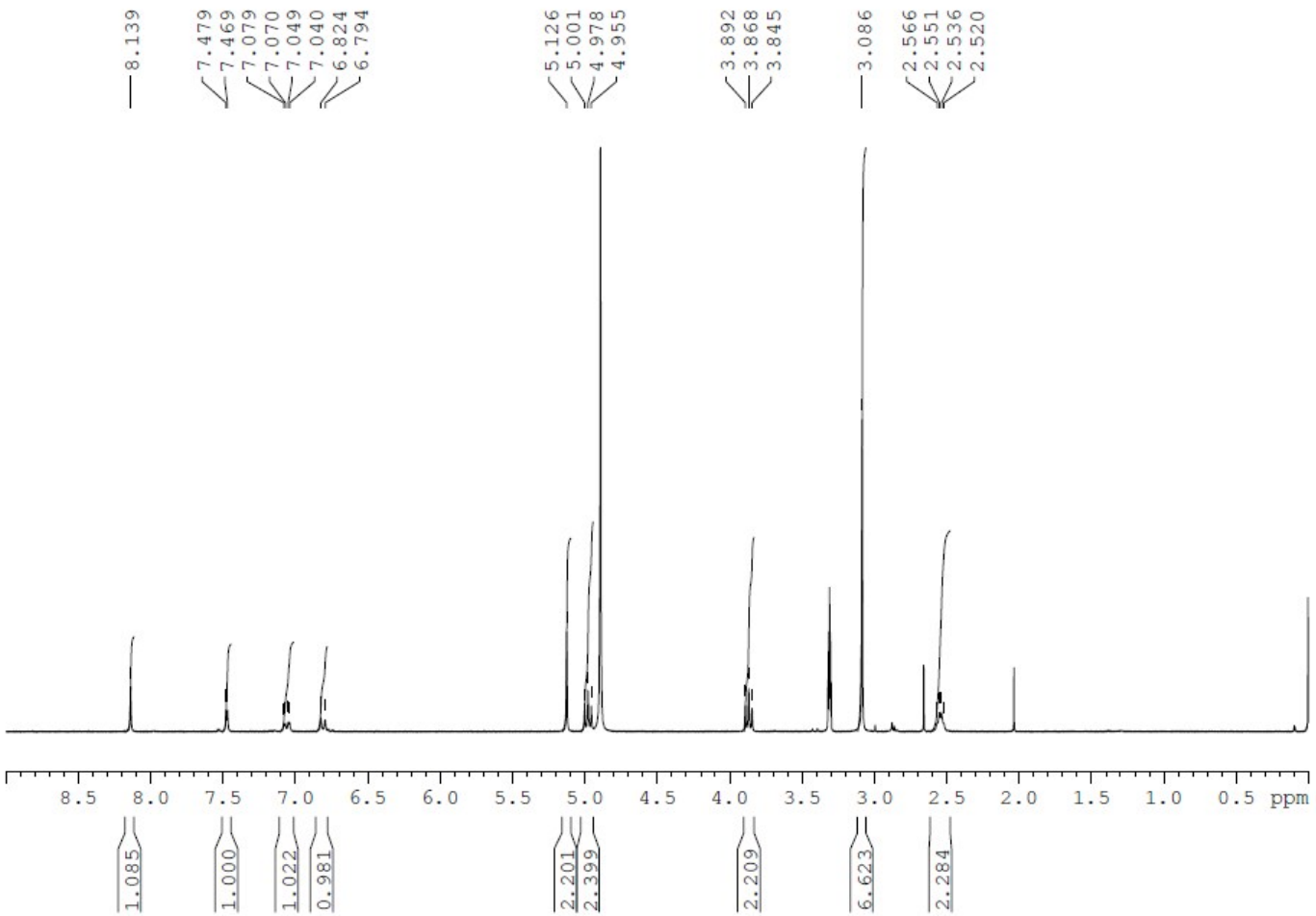


Figure S17: ^{1}H NMR (CD_3OD) spectrum of anthranilic acid-derived trifluroborate (**7**)

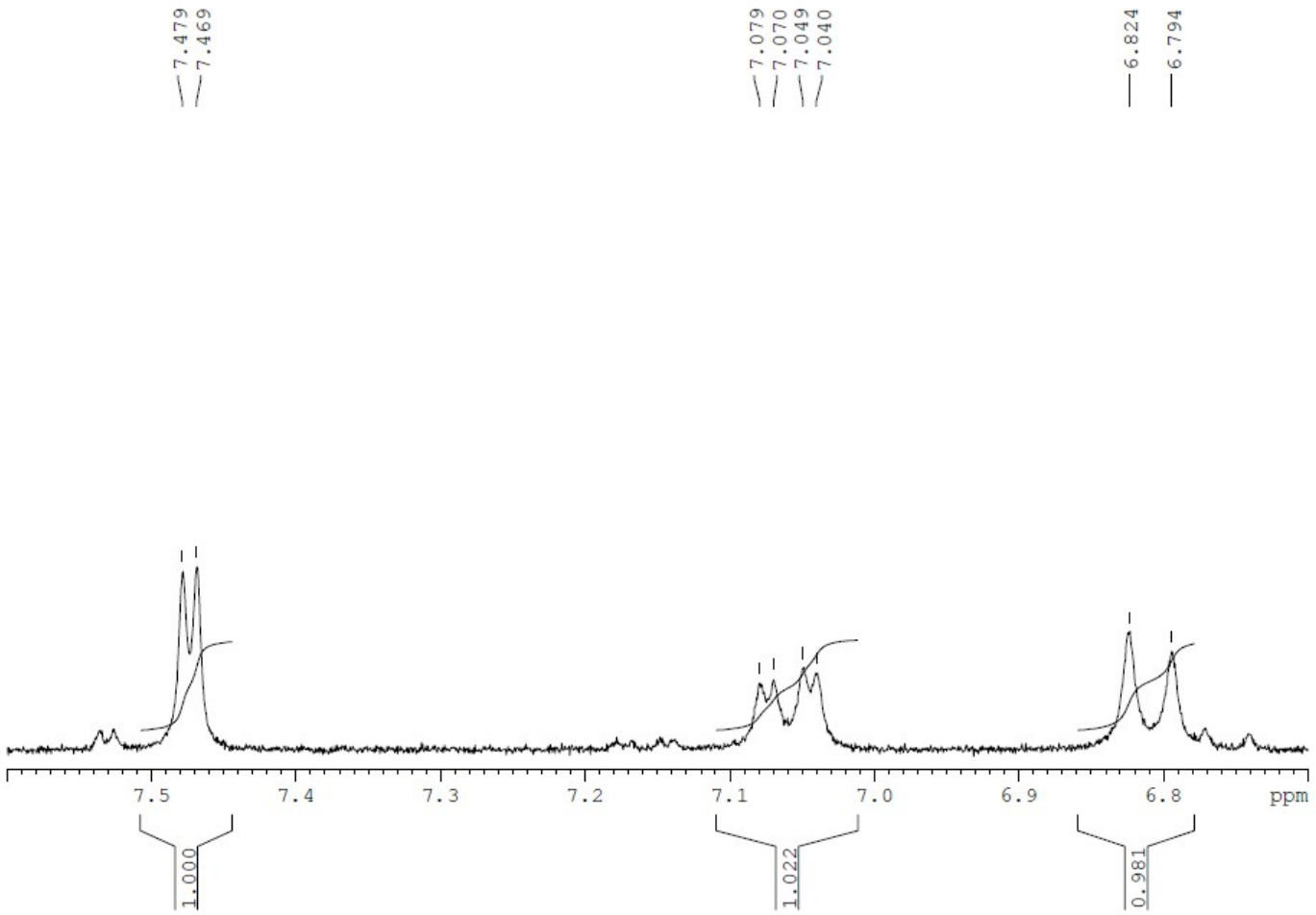


Figure S18: ^{1}H NMR (CD_3OD) spectrum of anthranilic acid-derived trifluroborate (**7**), expanded view

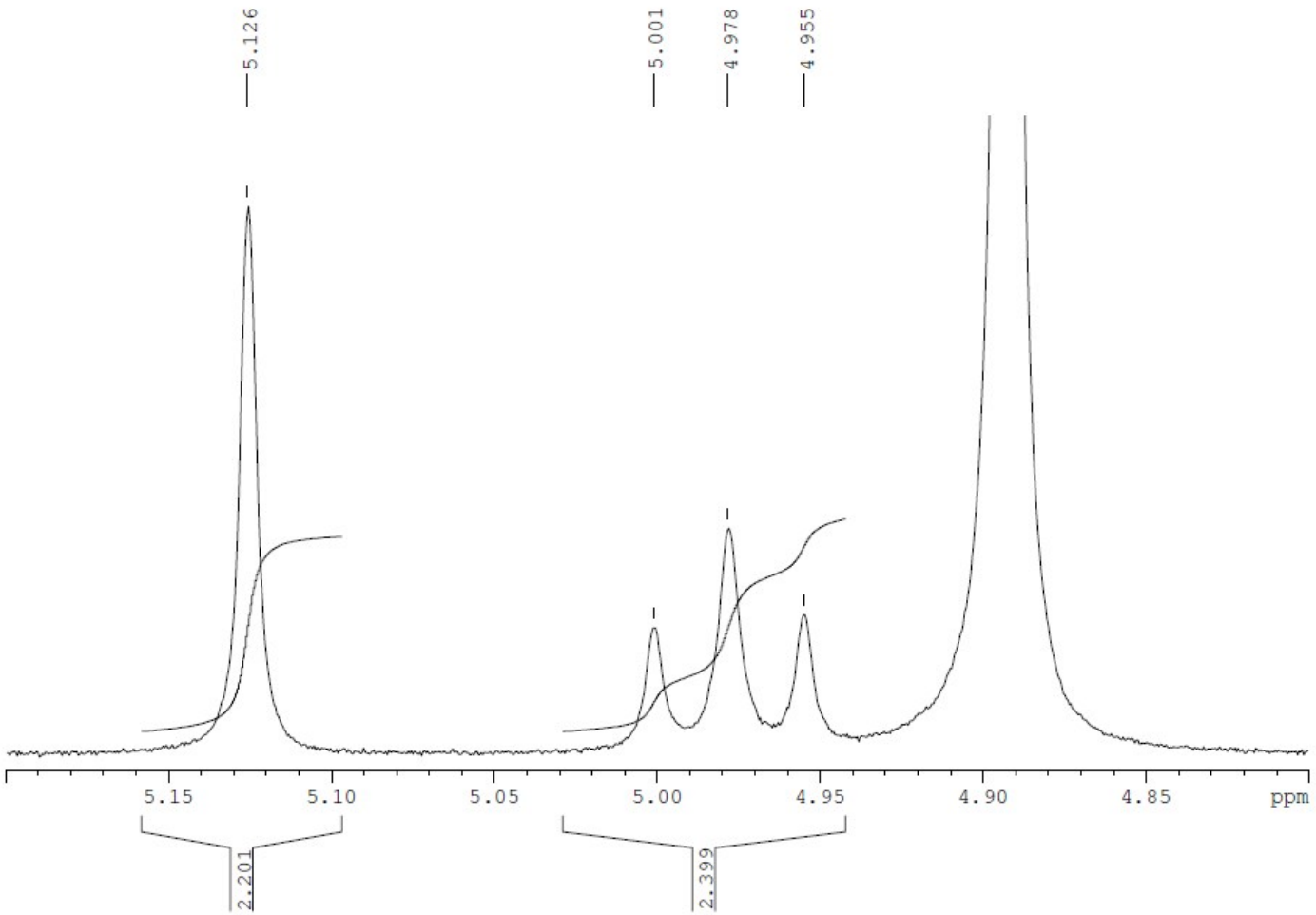


Figure S19: ^{1}H NMR (CD_3OD) spectrum of anthranilic acid-derived trifluroborate (**7**), expanded view

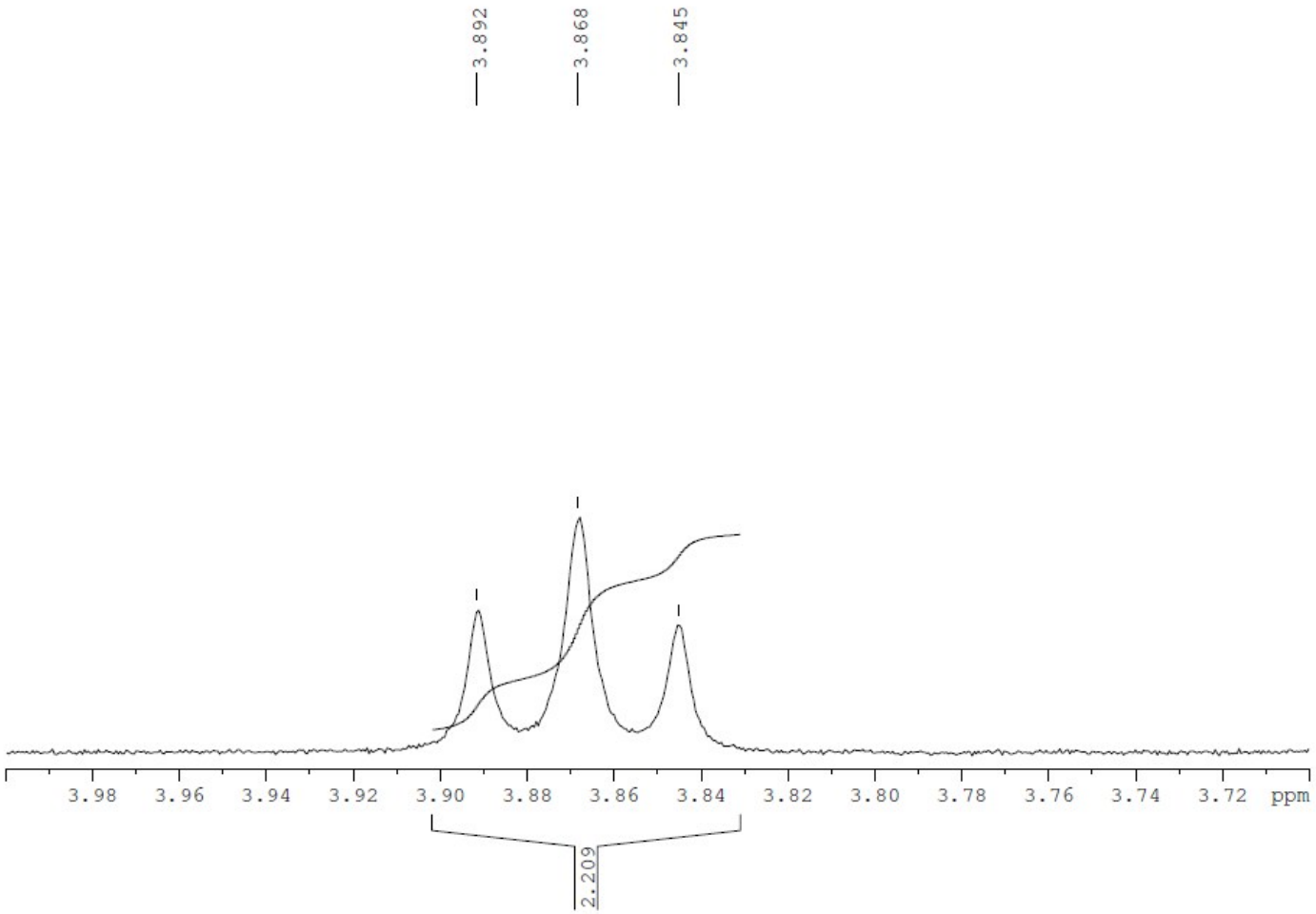


Figure S20: ^{1}H NMR (CD_3OD) spectrum of anthranilic acid-derived trifluroborate (**7**), expanded view

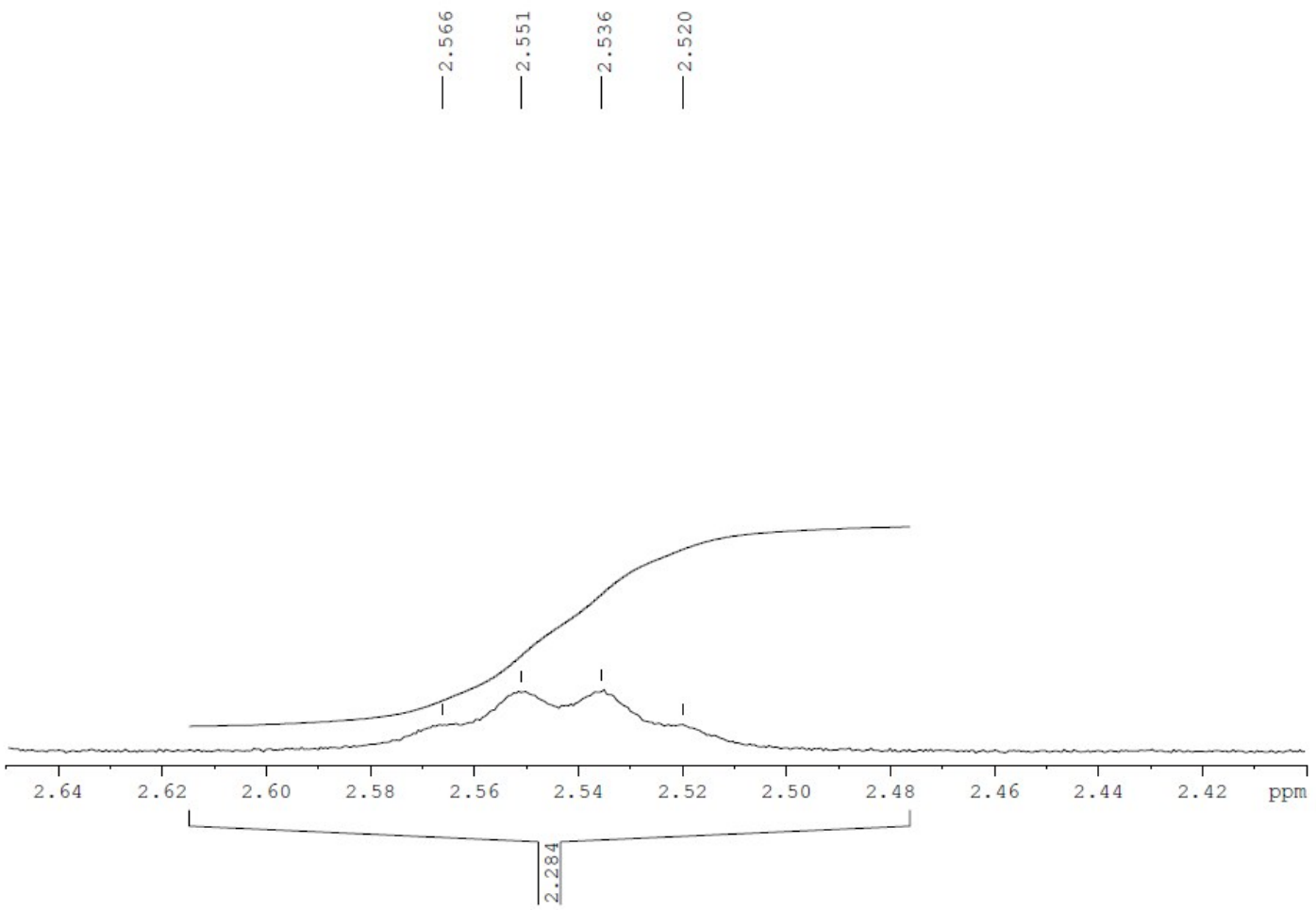


Figure S21: ^{1}H NMR (CD_3OD) spectrum of anthranilic acid-derived trifluroborate (**7**), expanded view

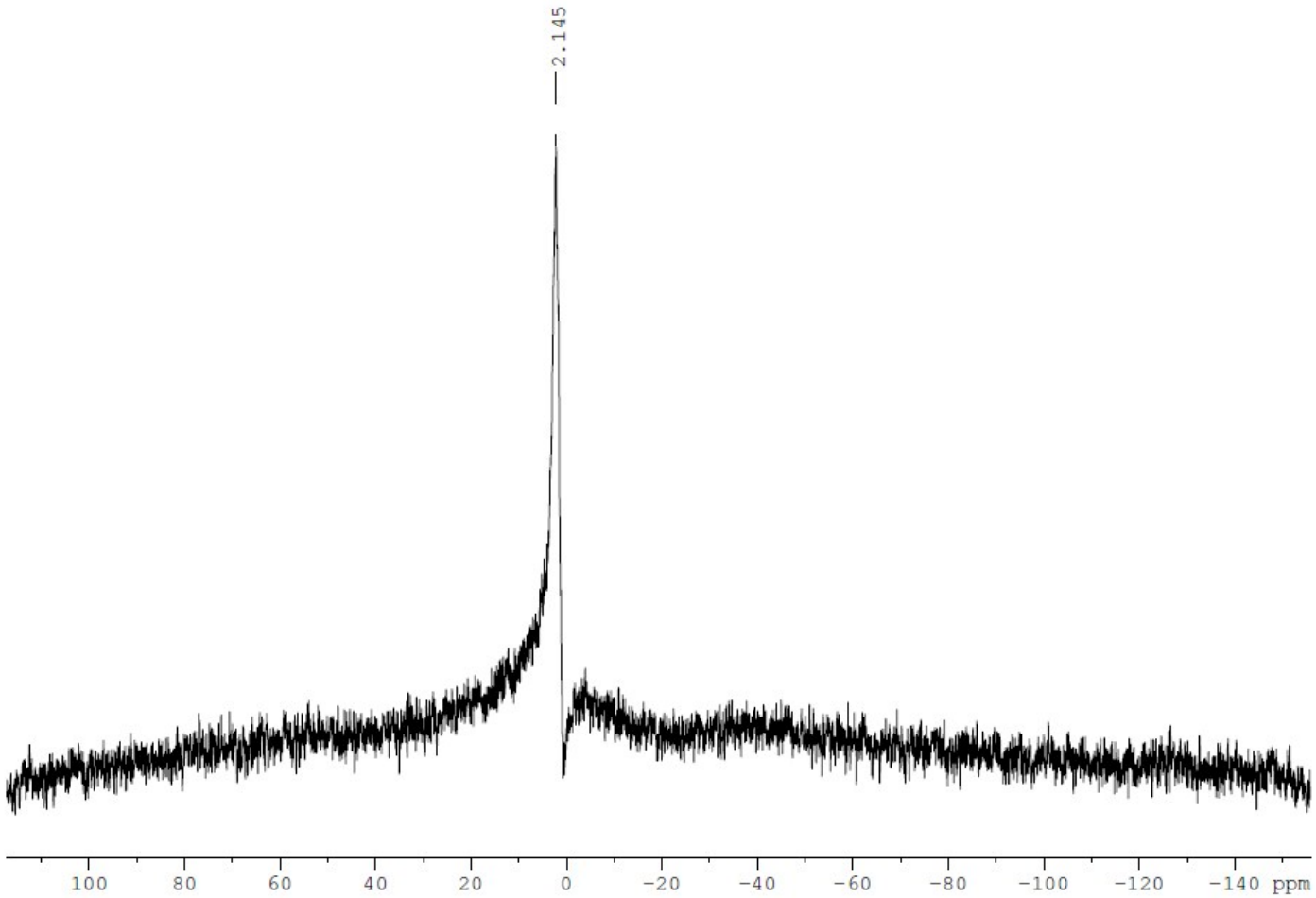


Figure S22: ^{11}B NMR (CD_3OD) spectrum of anthranilic acid-derived trifluroborate (**7**)

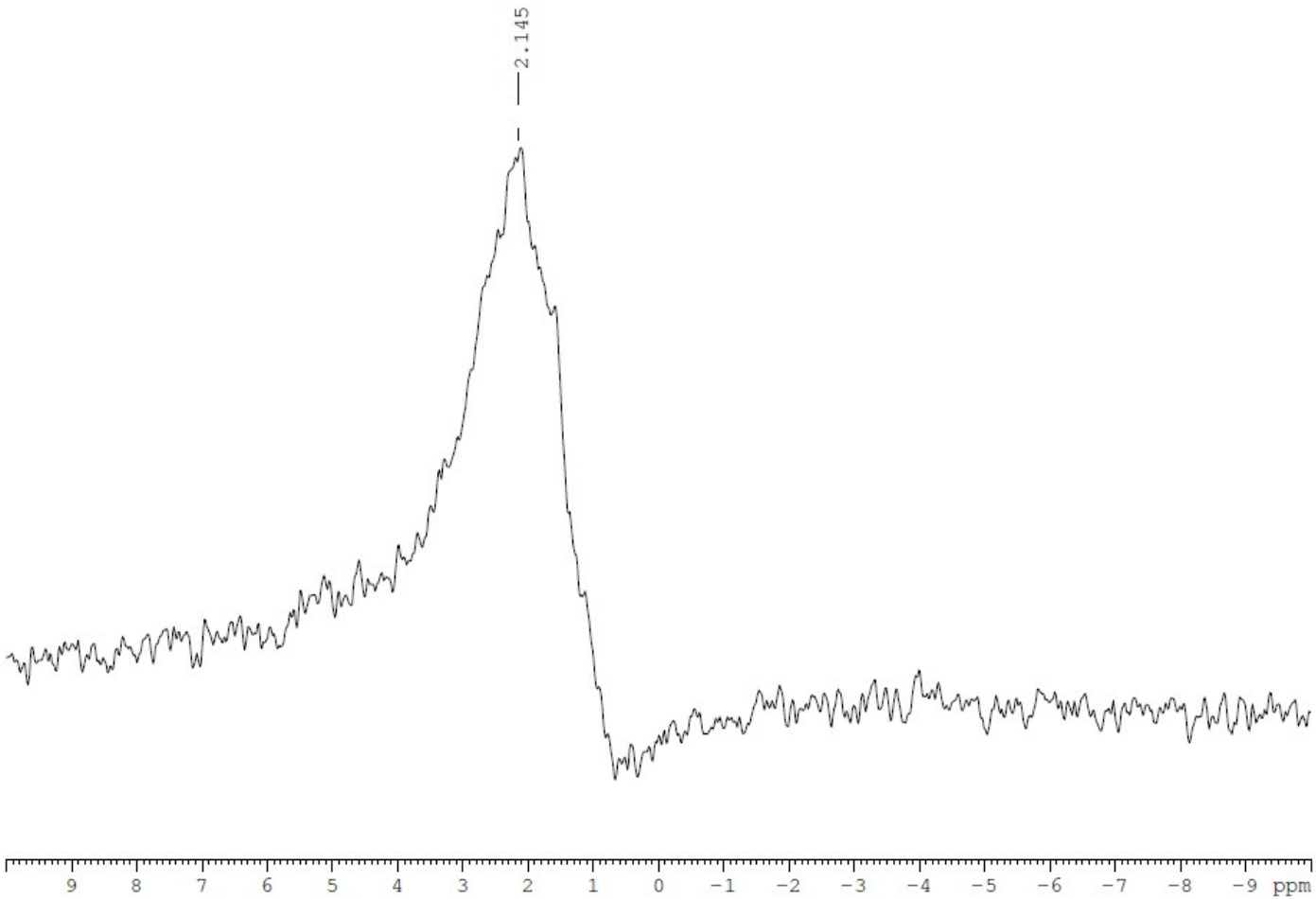


Figure S23: ^{11}B NMR (CD_3OD) spectrum of anthranilic acid-derived trifluroborate (**7**), expanded view

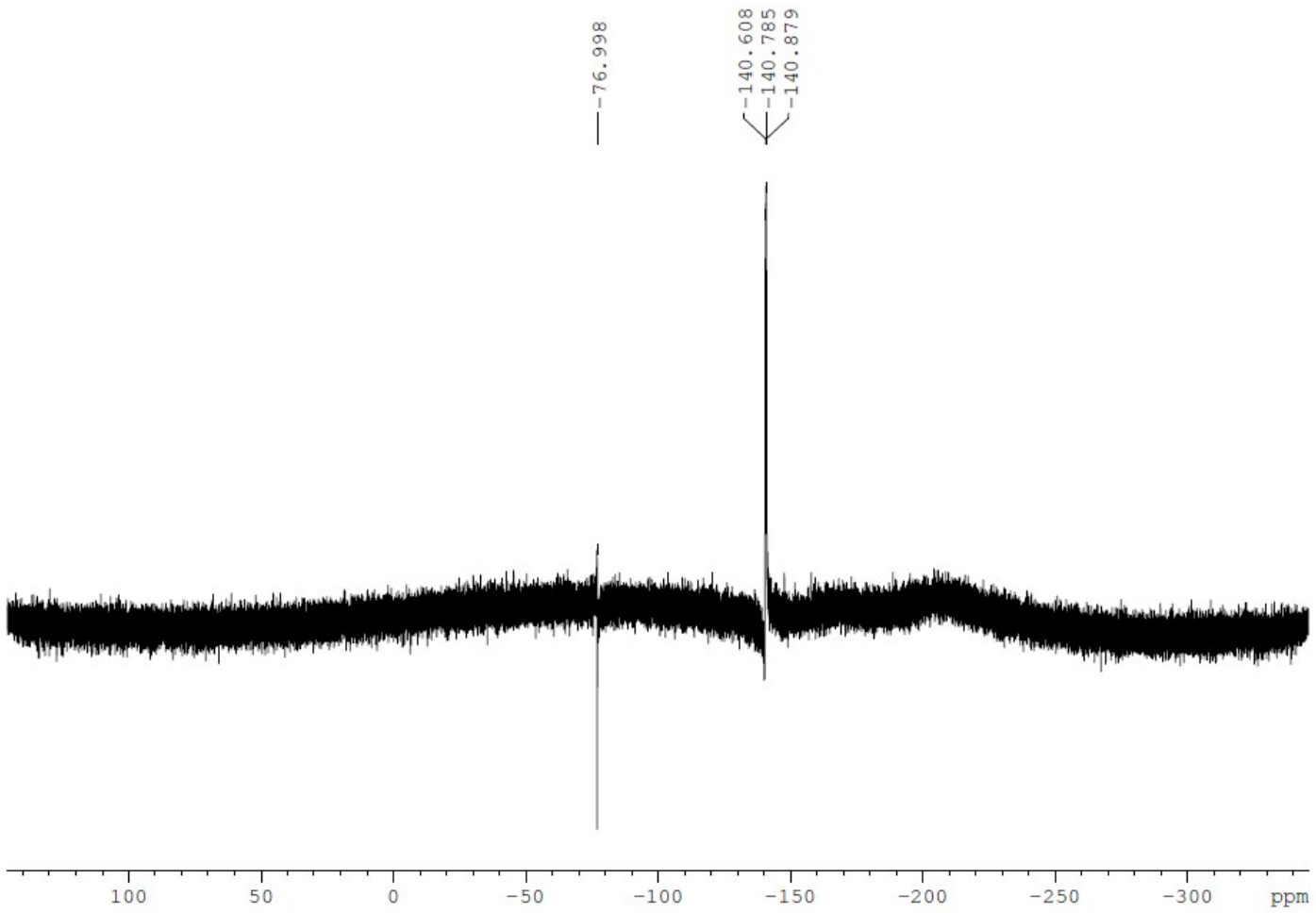


Figure S24: ^{19}F NMR (CD_3OD) spectrum of anthranilic acid-derived trifluroborate (**7**), signal at -77 ppm belongs to residual (HPLC chromatograph solvent lines) CF_3COOH

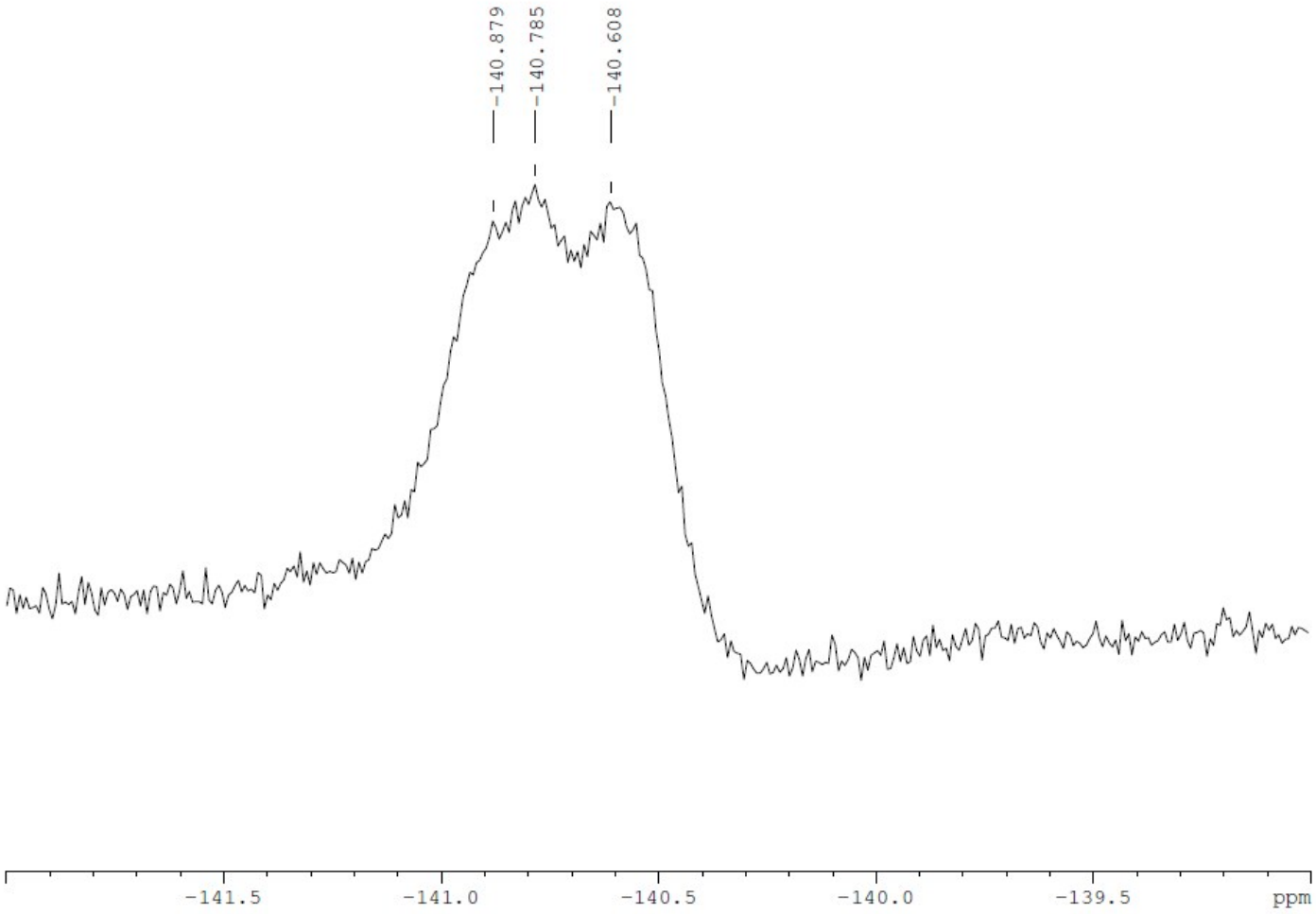


Figure S25: ^{19}F NMR (CD_3OD) spectrum of anthranilic acid-derived trifluroborate (**7**), expanded view

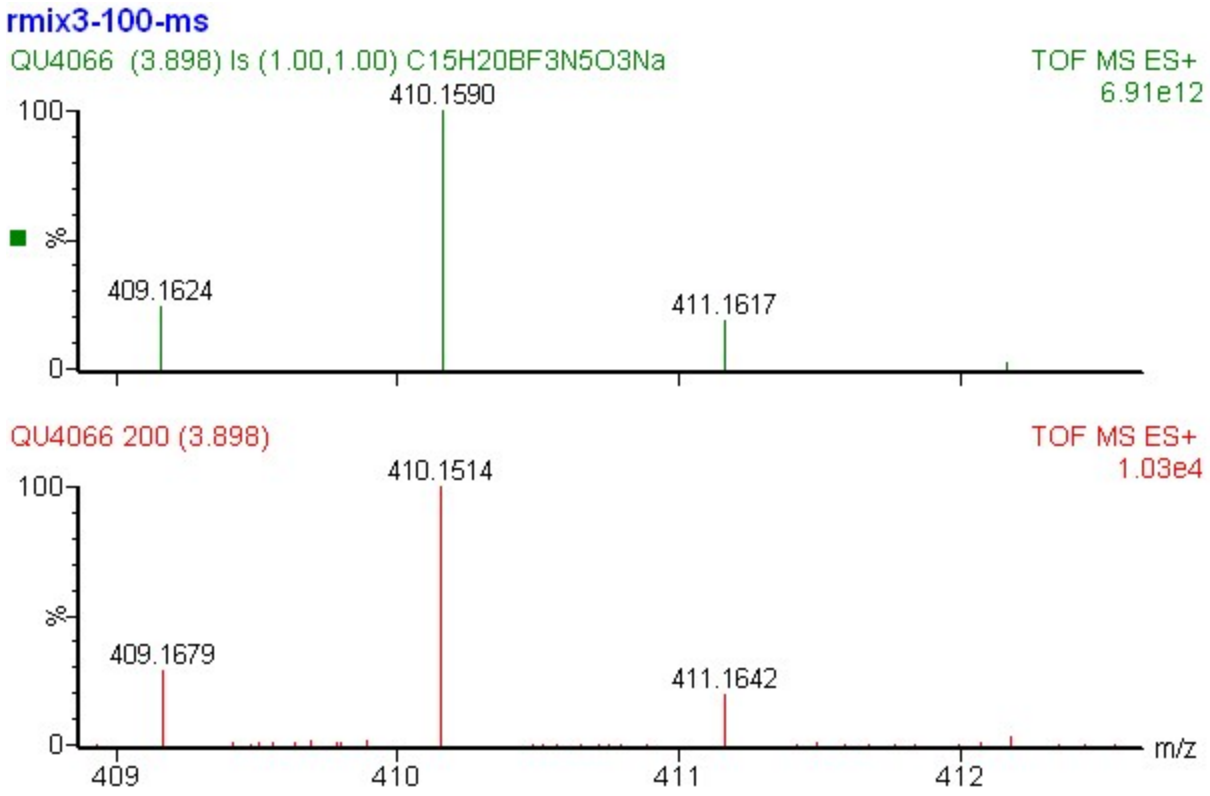


Figure S26: HR-ESI-MS spectrum [M + Na^+] of anthranilic acid-derived trifluroborate (**7**) (measured – bottom; simulated – top), note the isotope pattern due to the presence of boron

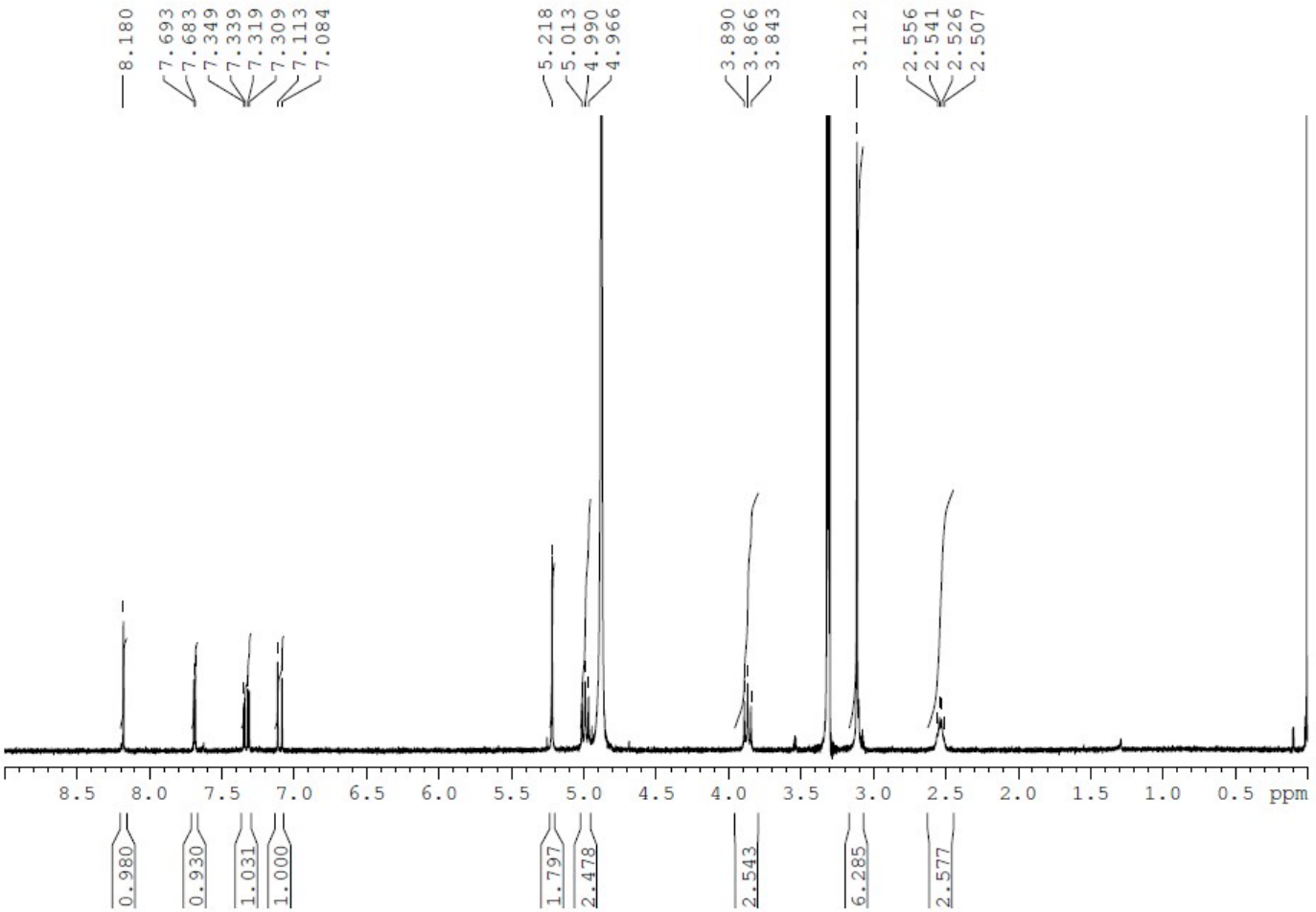


Figure S27: ^{1}H NMR (CD_3OD) spectrum of hydrazine-derived trifluroborate (**8**)

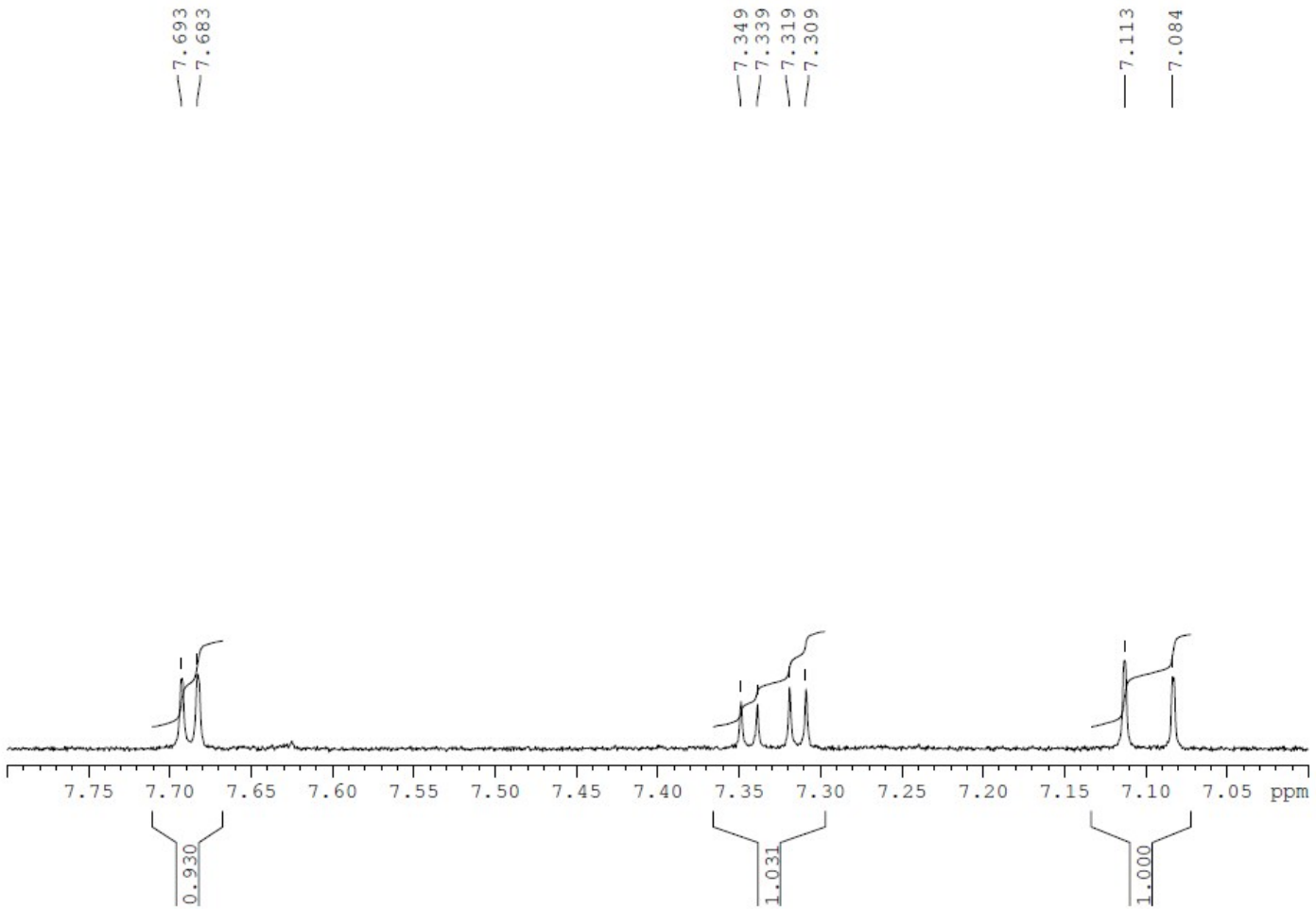


Figure S28: ^{1}H NMR (CD_3OD) spectrum of hydrazine-derived trifluroborate (**8**), expanded view

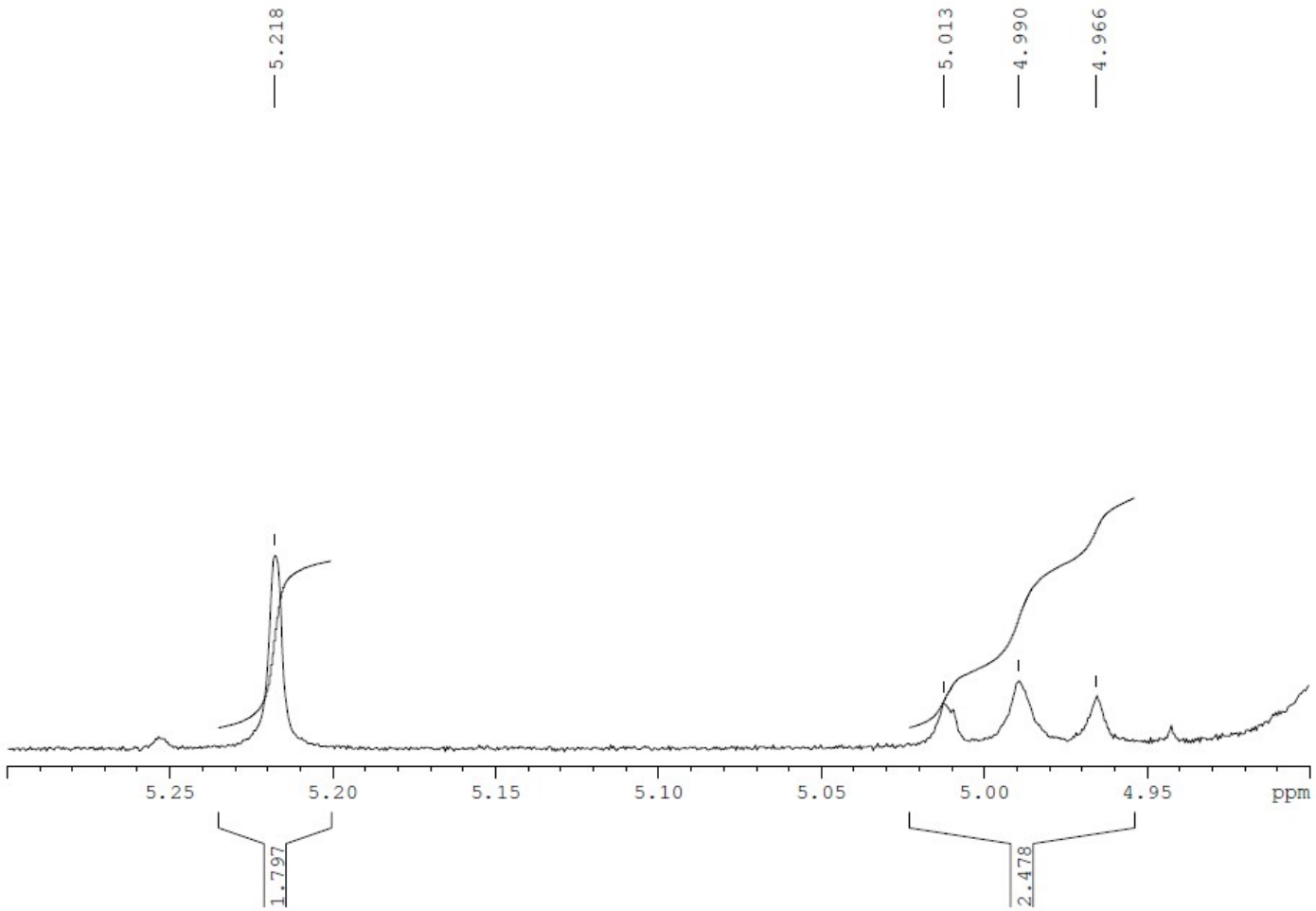


Figure S29: ^{1}H NMR (CD_3OD) spectrum of hydrazine-derived trifluroborate (**8**), expanded view

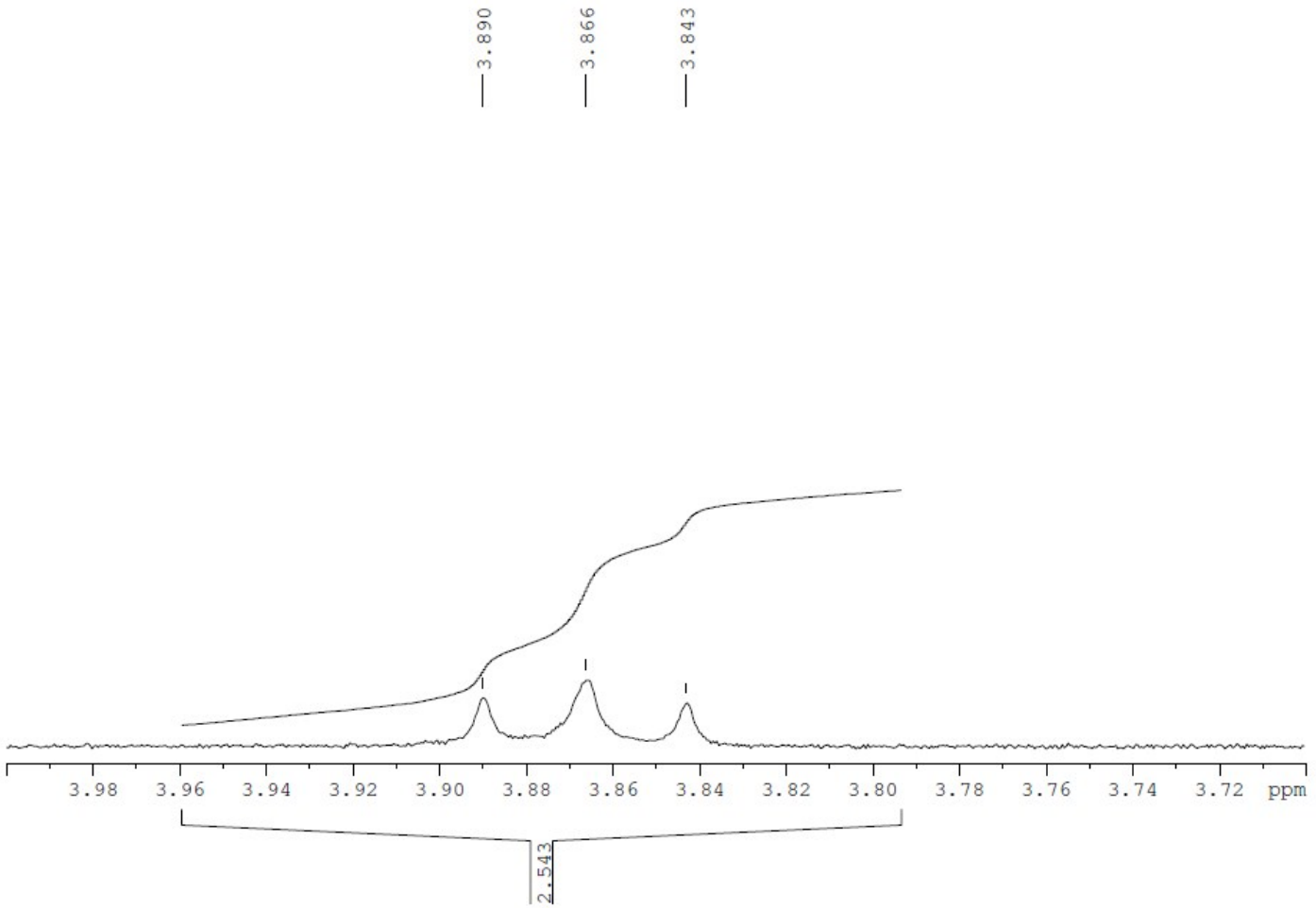


Figure S30: ^{1}H NMR (CD_3OD) spectrum of hydrazine-derived trifluroborate (**8**), expanded view

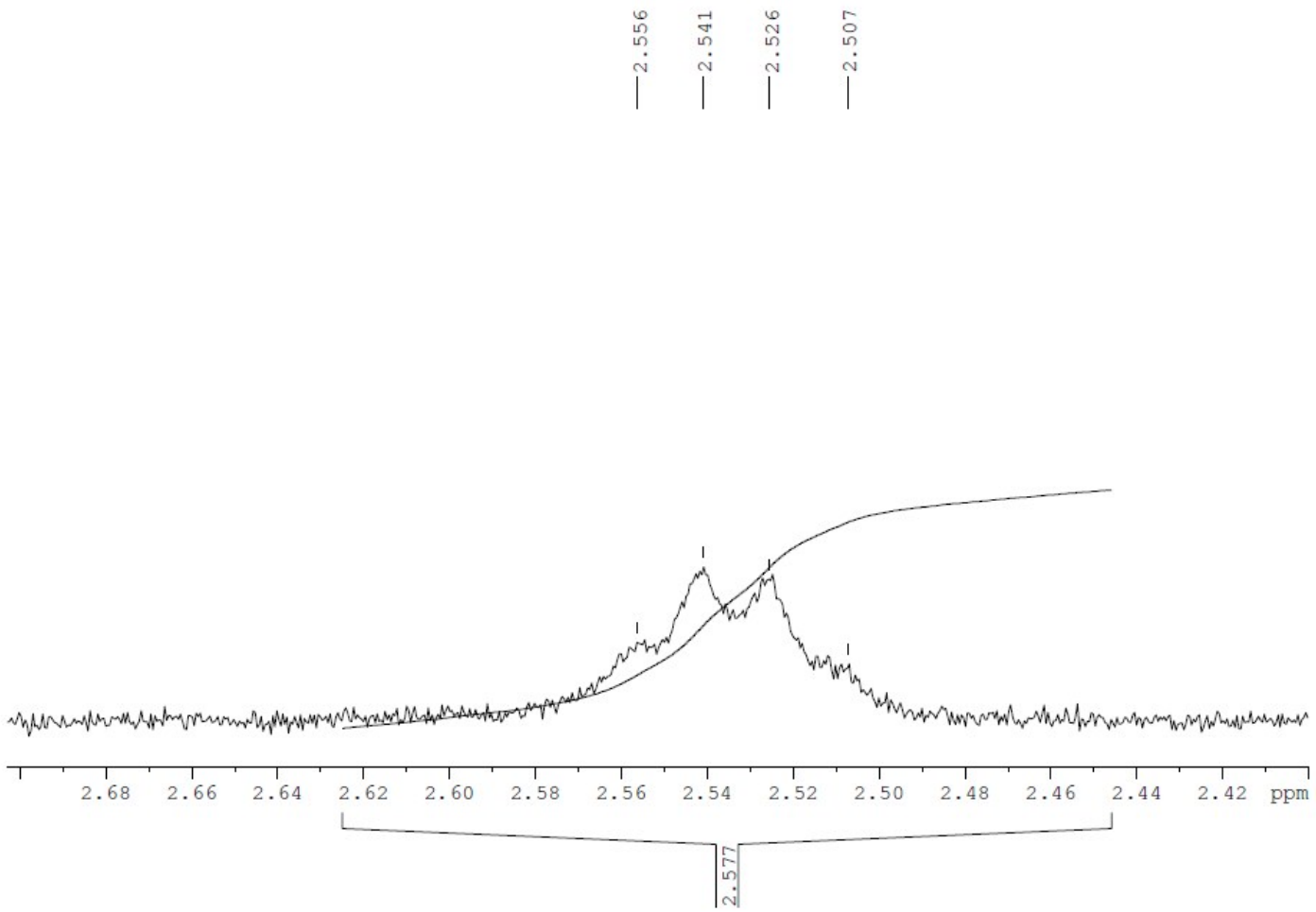


Figure S31: ^{1}H NMR (CD_3OD) spectrum of hydrazine-derived trifluroborate (**8**), expanded view

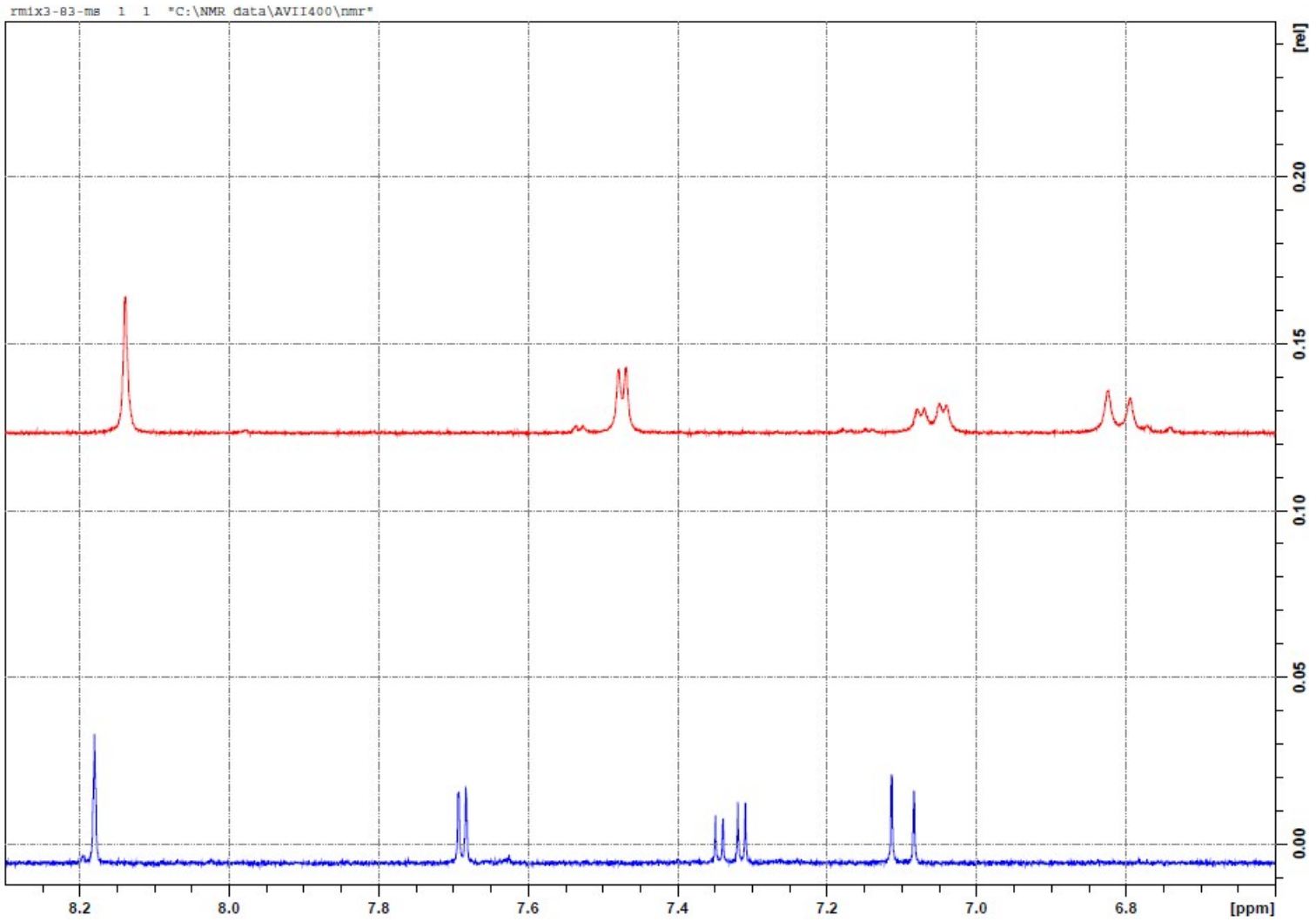


Figure S32: Aromatic signal part of the ^{1}H NMR (CD_3OD) spectrum of hydrazine-derived trifluroborate (**8**) (bottom) aligned with that of anthranilic acid-derived hydrazine (**7**) (top). Note the changes in chemical shift between the two compounds

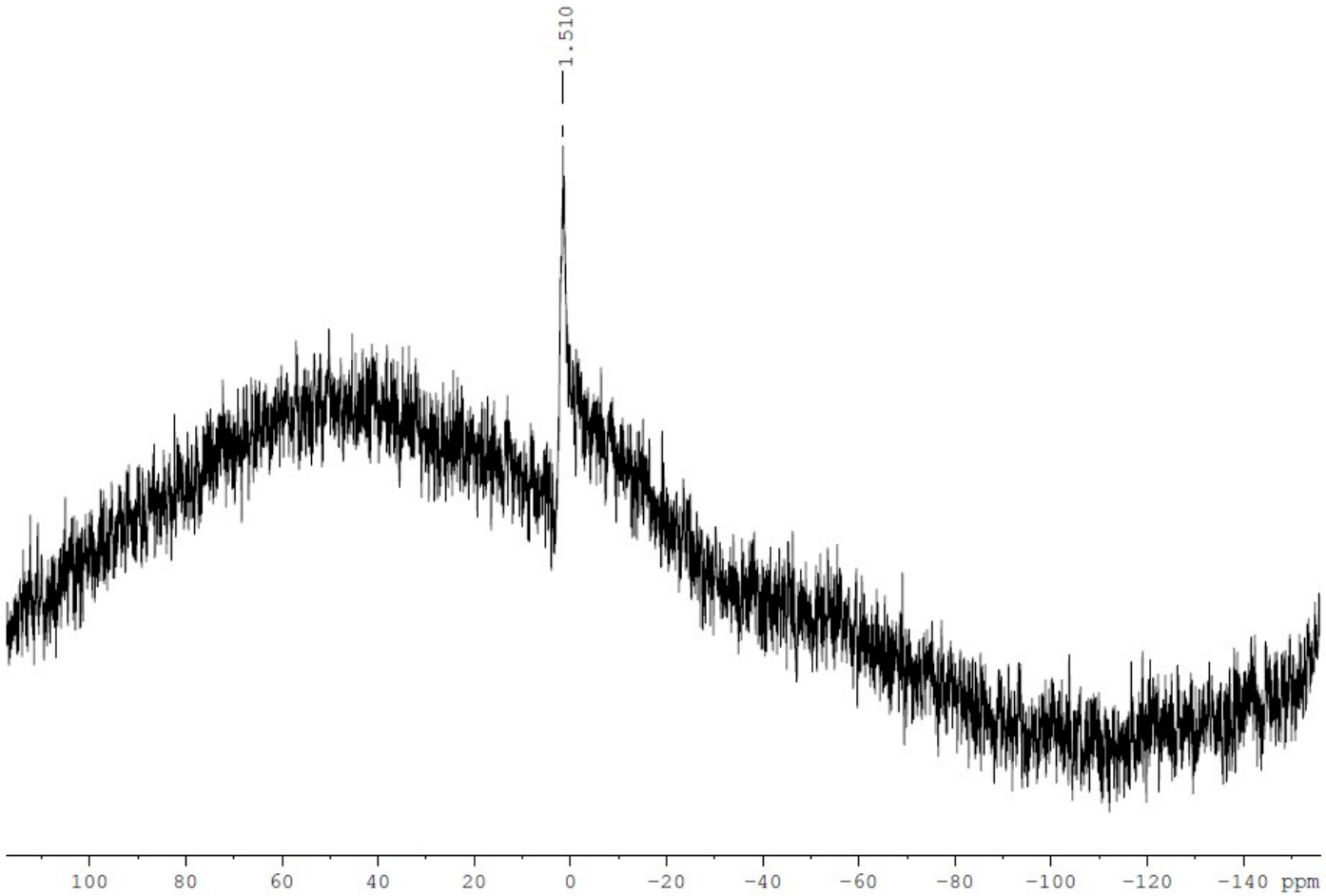


Figure S33: ^{11}B NMR (CD_3OD) spectrum of hydrazine-derived trifluroborate (**9**)

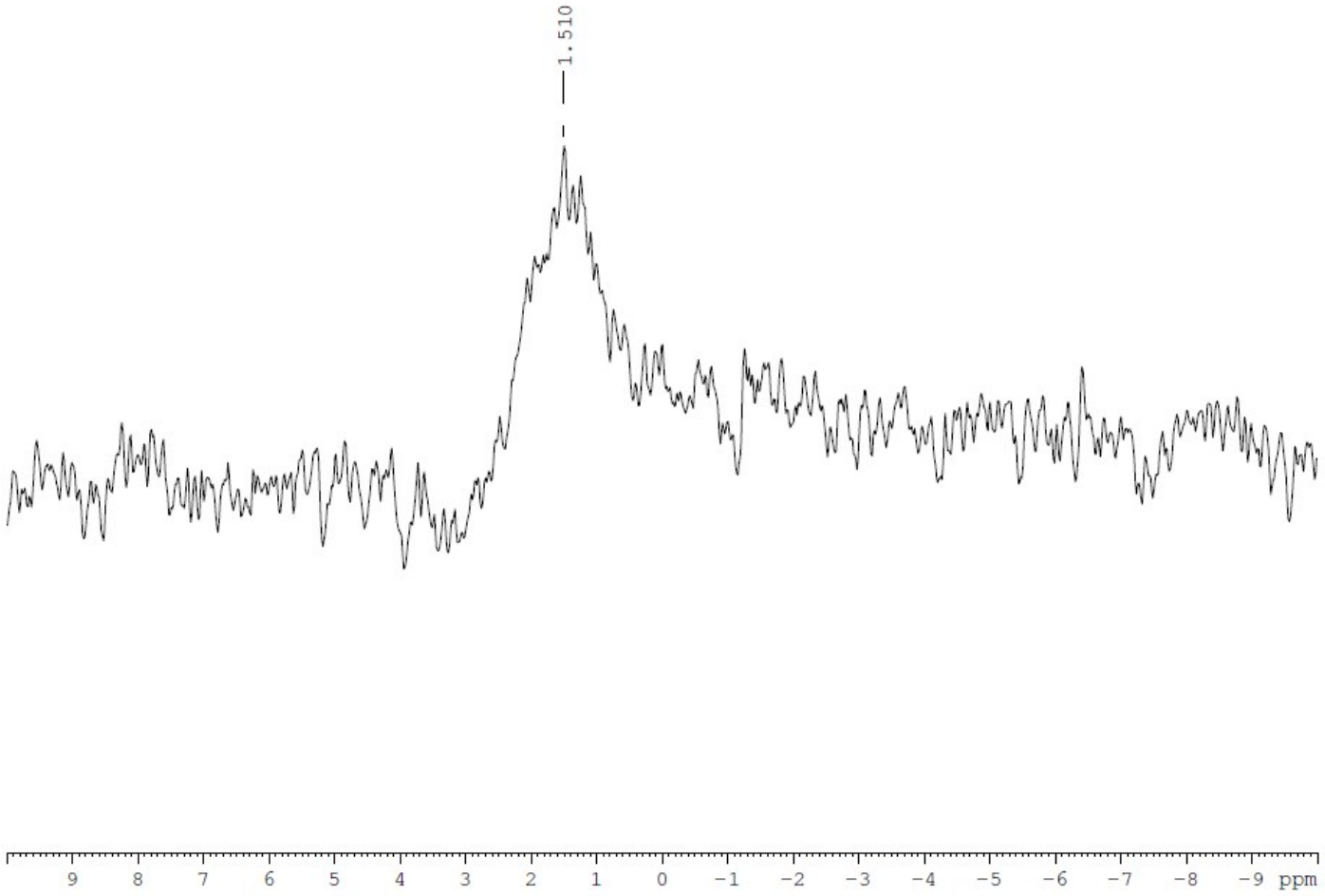


Figure S34: ^{11}B NMR (CD_3OD) spectrum of hydrazine-derived trifluroborate (**9**), expanded view

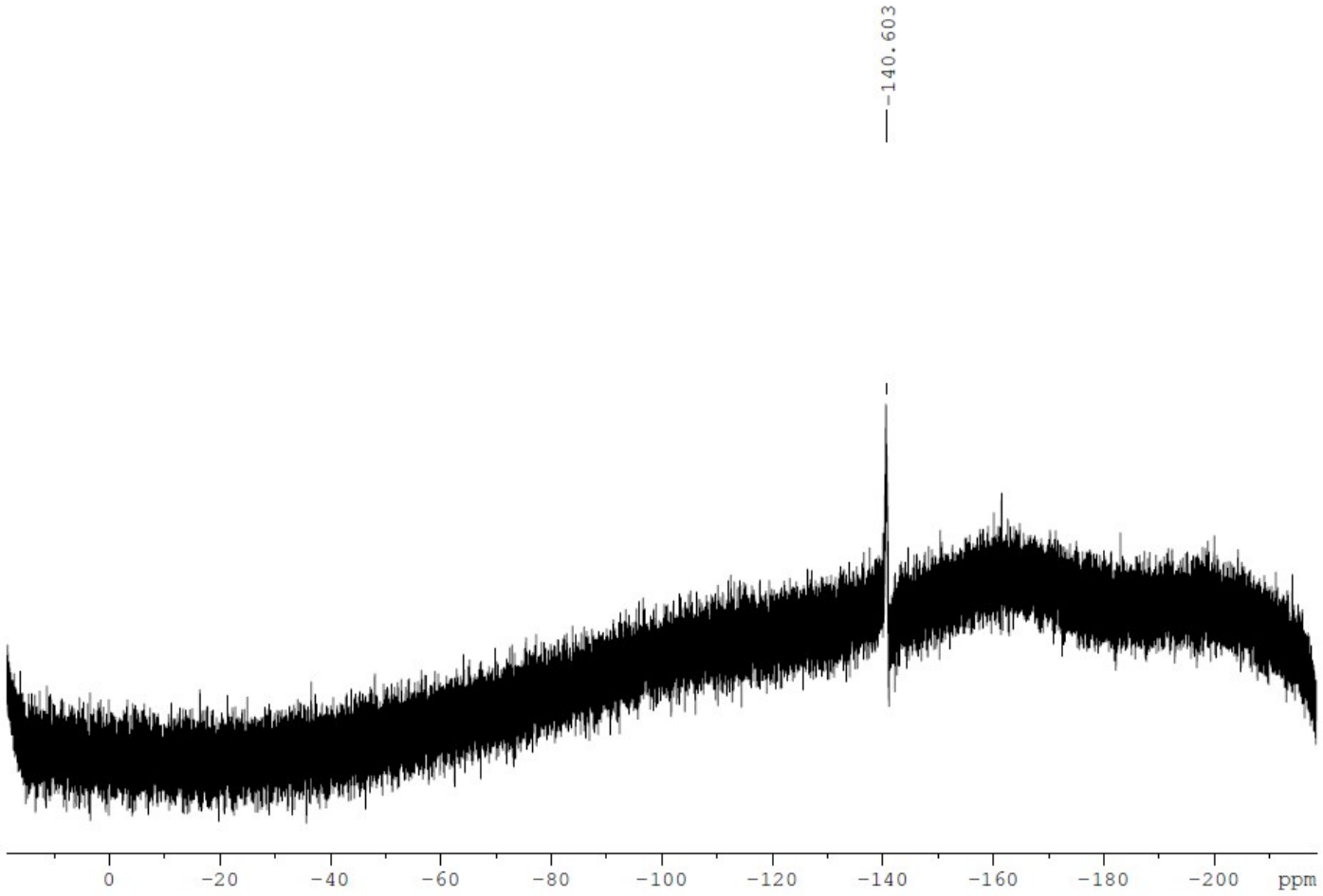


Figure S35: ^{19}F NMR (CD_3OD) spectrum of hydrazine-derived trifluroborate (**9**)

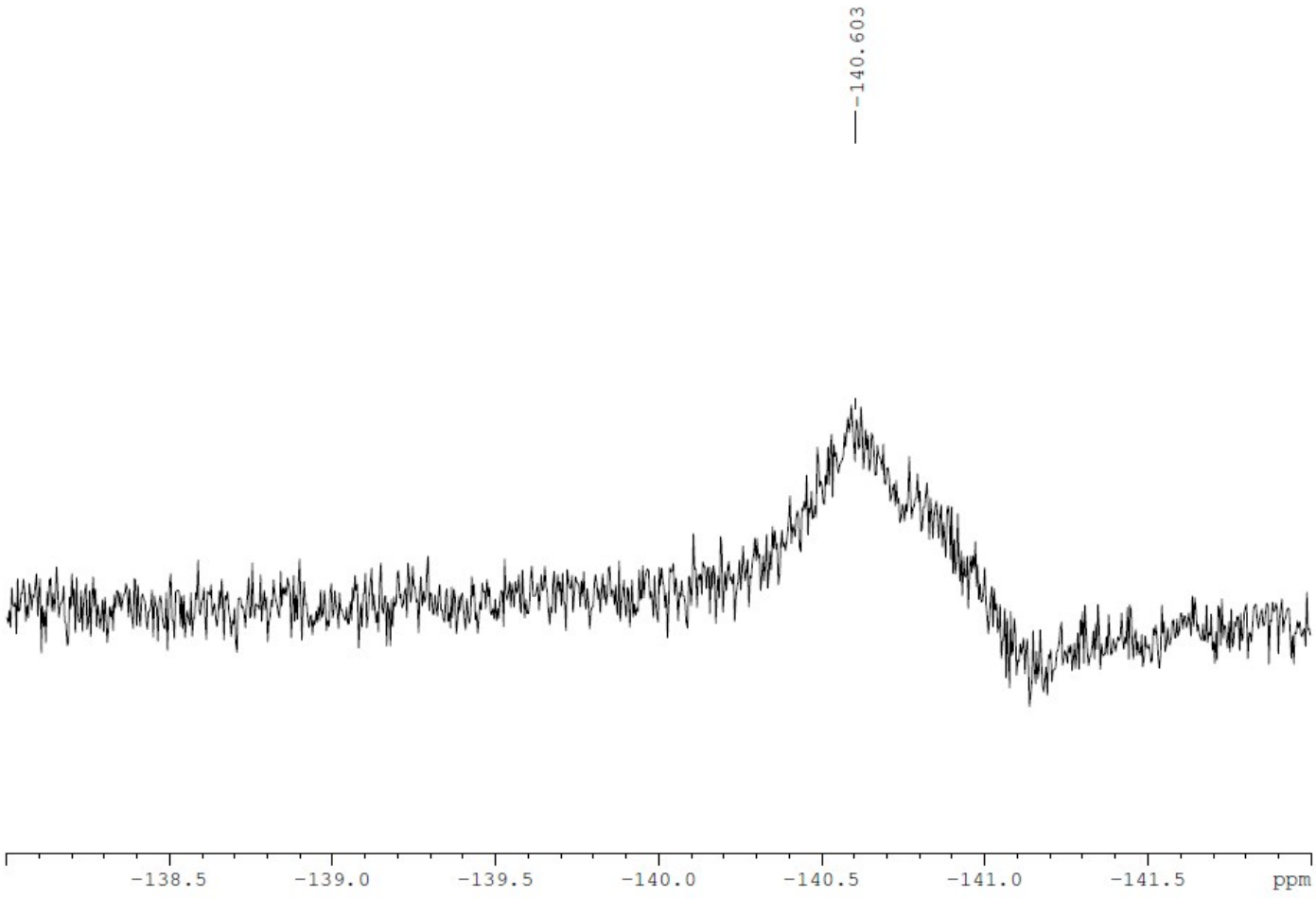


Figure S36: ^{19}F NMR (CD_3OD) spectrum of hydrazine-derived trifluroborate (**8**), expanded view

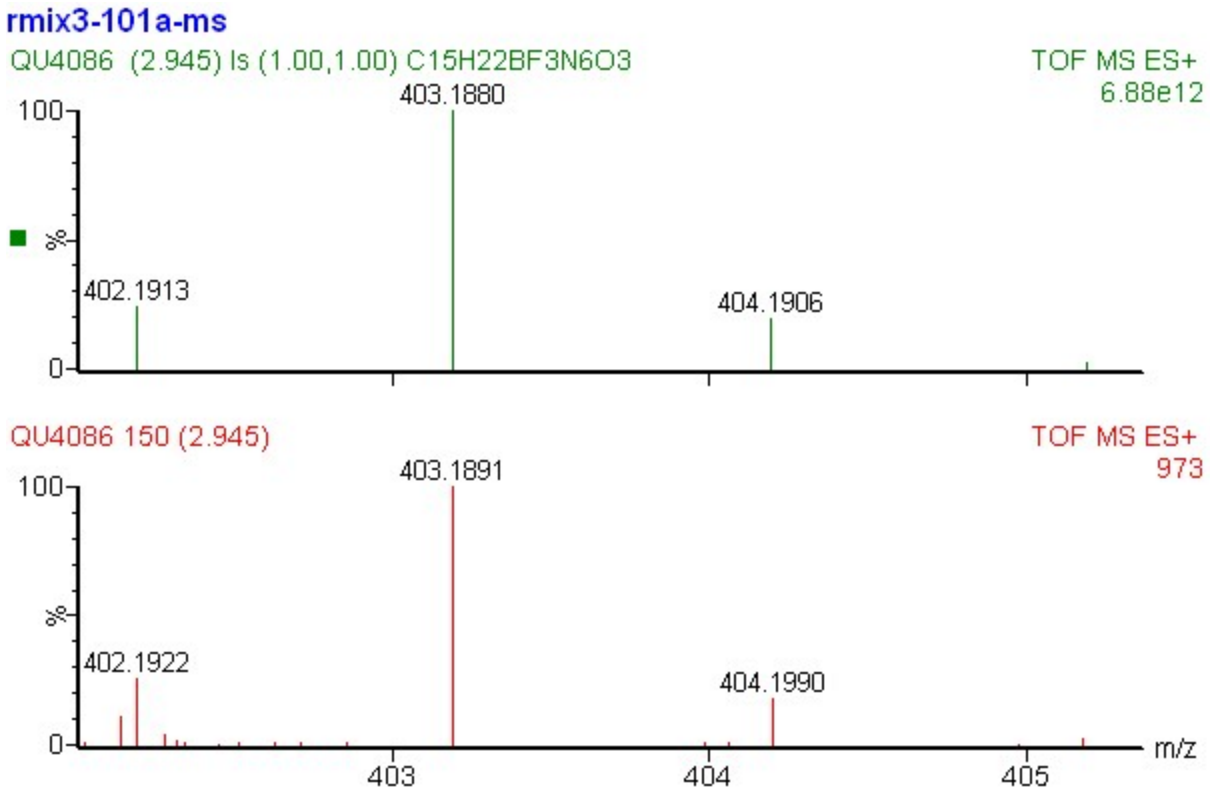


Figure S37: HR-ESI-MS spectrum [M + H^+] of hydrazine-derived trifluroborate (**8**) (measured – bottom; simulated – top), note the isotope pattern due to the presence of boron

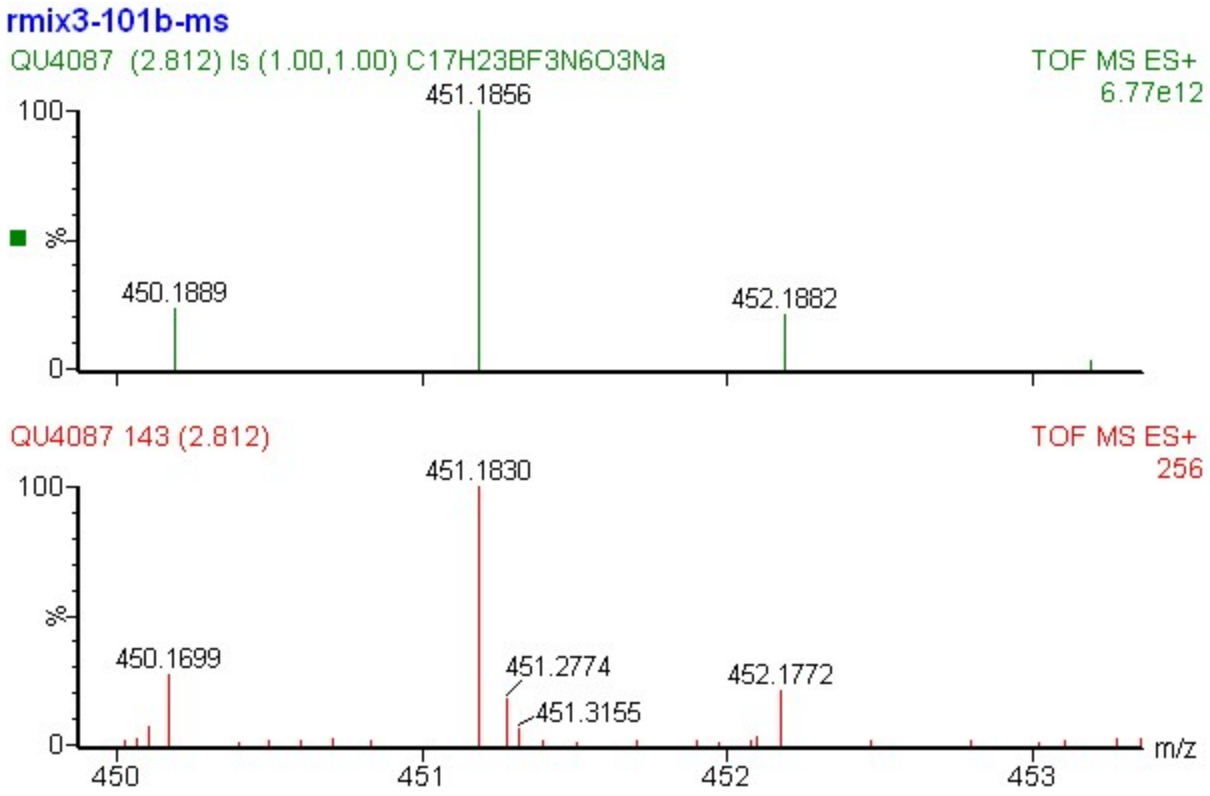


Figure S38: HR-ESI-MS spectrum [M + Na^+] of the reaction product (measured – bottom; simulated – top) obtained by reacting hydrazine-derived trifluroborate (**8**) with acetaldehyde, note the isotope pattern due to the presence of boron

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