Nickel-Catalyzed Asymmetric *C*-Alkylation of Nitroalkanes: Synthesis of Enantioenriched β–Nitroamides

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Supporting Information

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1. General Experimental Details:

Benzene, diethyl ether, dichloromethane, tetrahydrofuran, dimethyl formamide and dioxane were dried on alumina according to a published procedure.[1] Copper bromide, nickel(II)bromide methoxyethyl ether, nickel(II) chloride ethylene glycol dimethyl ether, potassium *tert*-butoxide, lithium methoxide, lithium *tert*-butoxide, lithium trimethylsilanolate sodium methoxide, sodium *tert*-butoxide, potassium trimethylsilanolate and potassium methoxide were purchased commercially; the bulk was stored in a N_2 filled glovebox. All hot glassware was oven dried for a minimum of two hours or flame-dried under vacuum prior to use. *N*-((2*Z*,4*E*)-4-((2,6-dimethylphenyl)imino)pent-2-en-2-yl)-2,6-dimethylaniline,[2] *N*-((2*Z*,4*E*)-4-((2,6-diisopropylphenyl)imino)pent-2-en-2-yl)-2,6-diisopropylaniline,[2] 2-methyl-1-nitropropane,[3] 6-nitrohex-1-ene,[4] 4-nitrobutyl acetate,[5-6] methyl 4-nitrobutanoate,[7] 5-nitropentan-2-one,[8] 2-methyl-2-(3-nitropropyl)-1,3-dioxolane,[9] (2-nitroethyl)benzene,[10] 5-(2-nitroethyl)benzo[d][1,3]dioxole,[11-13] methyl 4-nitropentanoate,[14] 2-bromo-*N*-methoxy-*N*,2-dimethylpropanamide,[15] allyl *tert*-butyl carbonate,[16] 2-bromo-*N*-methoxy-*N*-methylpropanamide,[17] *N*-benzyl-2-bromo-*N*-phenylbutanamide,[18] 2-bromo-*N*,*N*-diethylpropanamide[15] and *N*-benzyl-2-bromo-*N*-phenylhexanamide[18] were synthesized according to the published procedures. Bis(1,5-cyclooctadiene) nickel was purchased commercially and stored in a nitrogen filled glovebox freezer at –35 °C. All other substrates and reagents were purchased in highest analytical purity from commercial suppliers and used as received. Reaction optimization (Table 1 and Table S.1 to S.7) was conducted on a 250 μmol scale in 17 x 60 mm vials with Teflon lined caps. All yields determined by ^{1}H NMR analysis using 1,3,5-trimethoxybenzene as an internal standard. All reactions preformed outside the glovebox were set up using standard Schlenk technique. “Double manifold” refers to a standard Schlenk-line gas manifold equipped with N_2 and vacuum (ca. 0.1 mm Hg).Reactions were heated with stirring in temperature-controlled oil baths or Al heating blocks. Reactions run at subambient temperature were cooled with stirring using a thermoelectric cooling block (see below for details).

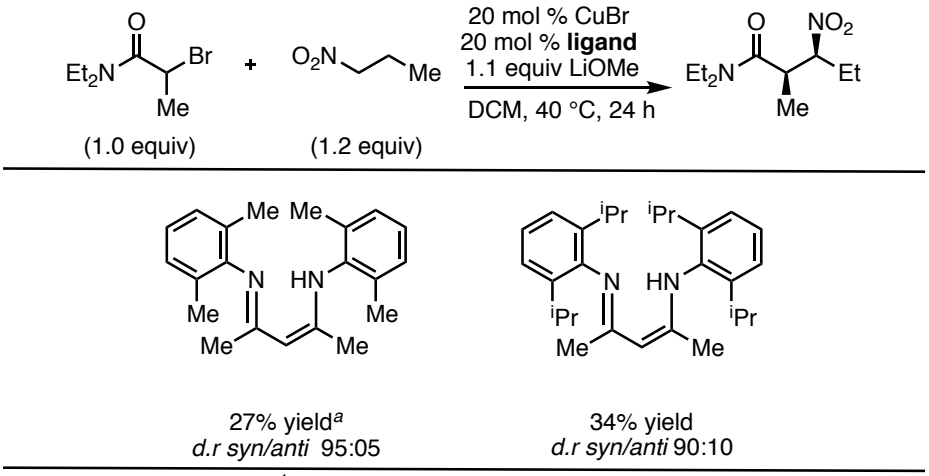
2. Instrumentation and Chromatography:

400 MHz ^{1}H, 101 MHz ^{13}C, and 376 MHz ^{19}F spectra were obtained on a 400 MHz FT-NMR spectrometer equipped with a Bruker CryoPlatform. 600 MHz ^{1}H and 151 MHz ^{13}C NMR spectra were obtained on a 600 MHz FTNMR spectrometer equipped with a Bruker SMART probe. ^{13}C NMR spectra were recorded using Attached Proton Test phase pulse sequence; carbons with an odd number of protons are phased down and those with an even number of protons are phased up.[19] All samples were analyzed in the indicated deutero-solvent and were recorded at ambient temperatures. Chemical shifts are reported in ppm. ^{1}H NMR spectra were calibrated using the residual protio-signal in deutero-solvents as a standard. ^{13}C NMR spectra were calibrated using the deutero-solvent as a standard. IR spectra were recorded on a Nicolet Magma-IR 560 FT-IR spectrometer as thin films on NaCl plates or using KBr pellets. Unless otherwise noted, column chromatography was performed with 40-63 μm silica gel with the eluent reported in parentheses. Where noted 5-20 μm silica gel was used to improve separation. Analytical thin-layer chromatography (TLC) was performed on precoated glass plates and visualized by UV or by staining with $KMnO_4$. GCMS data was collected using an Agilent 6850 series GC and 5973 MS detectors. Low resolution ESI data was collected on a Thermo LCQ Advantage running in positive ion mode. High resolution MS data was obtained on a Waters GCT Premier spectrometer using chemical ionization (CI) or liquid injection field desorption ionization (LIFDI) or on a Thermo Scientific, Q Exactive model Orbitrap instrument using electrospray ionization (ESI).

3. Observations on Copper-Catalyzed Nitroalkane Alkylation: While studying the reaction illustrated below, we observed a small but reproducible change in the diastereoselection of the transformation that depended upon the structure of the ligand. This strongly suggests that the ligand is involved in the C-C bond forming step, and argues against the previously believe outer-sphere mechanism.

Experimental Procedure for the Copper-Catalyzed Nitroalkane Alkylation: In a nitrogen filled glovebox, a stir bar, CuBr (0.0125 mmol), ligand (0.0125 mmol), base (0.275 mmol), dichloromethane (1.5 mL), 1-nitropropane (0.300 mmol) and α-bromoamide (0.25 mmol). The vial was sealed with a Teflon lined cap and heated in an aluminum block on a temperature controlled stir plate to 40 °C with vigorous stirring for 24 h. The vial was removed from the glovebox, opened to air, diluted with a solution of 1,3,5-trimethoxybenzene (0.25 equiv. internal standard) in ethyl acetate (1 mL) and filtered through Celite and concentrated *in vacuo* to give crude material. This material was dissolved in $CDCl_3$ and quantified by ^1H NMR. The product β-nitroamide is a known compound and its spectra are in accordance with literature data.[15]

Ligand Effects on Copper-Catalyzed Nitroalkane Alkylation:



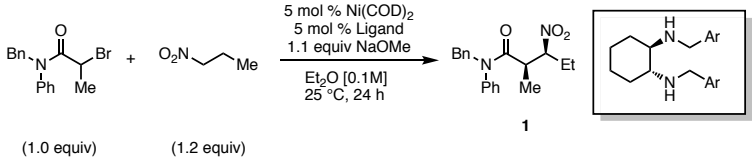
[a]yield determined by ^1H NMR using 1,3,5 trimethoxy benzene as an internal standard.

4. Additional Optimization Studies of Asymmetric Alkylation Reaction

Experimental Details for Optimization of the Nickel-Catalyzed Nitroalkane Alkylation: In a nitrogen-filled glovebox, a stir bar, $Ni(COD)_2$ (0.0125 mmol), ligand (0.0125 mmol), and the base (0.275 mmol) were added to a 1-dram vial, followed by Et_2O (2.5 mL). The vial was sealed with Teflon-line screw cap and the mixture was stirred for 30 min in the glovebox at ambient temperature. Then, 1-nitropropane (0.30 mmol), was added and the suspension was stirred for 1 min. α-Bromoamide (0.25 mmol) was then added as solid and the suspension was stirred at rt for 24 h. The vial was removed from the glovebox, opened to air, diluted with a solution of 1,3,5-trimethoxybenzene (0.25 equiv. internal standard) in diethyl ether (1 mL) and filtered through Celite and concentrated *in vacuo* to give crude material. This material was dissolved in $CDCl_3$ and quantified by ^1H NMR. The ee of the crude material was determined using chiral HPLC analysis.

Optimization of the Ligand:Outlined in Table S1 is the series of experiments aimed at the optimization of the chiral 1,2 diamine ligand in the nickel catalyzed nitroalkane alkylation. The modular nature of the ligand scaffold allowed us to vary steric and electronic properties at various position in the aromatic ring. After extensive study, ligand **7** found to be optimal for the desired transformation. Synthesis of ligand **7**, **5, 6** and **S1-S18** were carried out using reductive amination procedure as described in the literature.[20-21]

Table S1: Optimization of Ligand



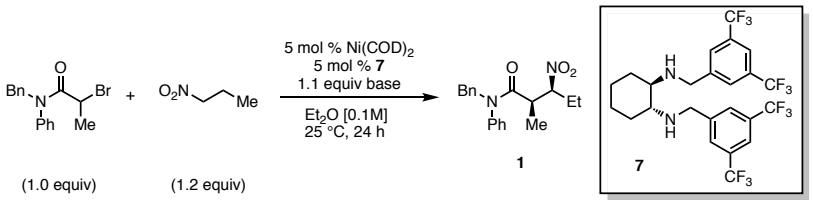
Entry	Ligand	Ar	%Yield **1**[a]	d.r *syn*/*anti*	%ee *syn*[b]
1	**7**	3,5- CF_3- C_6H_3	82	85:15	88
2	**5**	C_6H_5	80	82:18	79
3	**S1**	4-OMe-C_6H_4	70	79:21	80
2	**S2**	4-NMe_2-C_6H_4	84	76:24	79
5	**S3**	4-Me-C_6H_4	69	77:23	80
6	**S4**	4-CF_3-C_6H_4	63	81:19	80
7	**6**	3,5-Me- C_6H_3	80	84:16	82
7	**S6**	3,5-^{t}Bu- C_6H_3	52	83:17	86
8	**S7**	1-napthyl	20	80:20	79
9	**S8**	2-napthyl	55	81:19	82
10	**S9**	cyclohexyl	58	67:33	66
11	**S10**	C_6F_5	16	70:30	86
12	**S11**	2-pyridyl	08	62:38	74
13	**S12**	4-OCF_3-C_6H_4	68	79:21	77
14	**S13**	3-CF_3-C_6H_4	58	79:21	82
15	**S14**	3,4,5-F-C_6H_2	58	79:21	80
16	**S15**	3,5-F- C_6H_3	57	81:19	80
17	**S16**	2-MeO- C_6H_4	22	64:36	72
18	**S17**	3-MeO- C_6H_4	66	85:15	84
19	**S18**	3,5-MeO- C_6H_3	64	85:15	86

[a]Yield determined by ^1H NMR using 1,3,5-trimethoxybenzene as an internal standard
[b] Determined by chiral HPLC analysis

Effect of Bases:

As shown in Table S2, NaOMe found to be optimal base for the desired transformation.

Table S2: Optimization of Bases



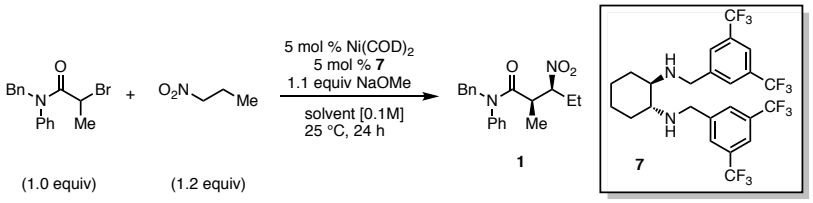
Entry	Base	% Yield **1**[a]	d.r *syn*/*anti*	% ee *syn*[b]
1	LiO^{t}Bu	56	77:23	18
2	LiOMe	17	76:24	37
3	NaO^{t}Bu	53	79:21	82
4	NaOMe	82	85:15	88
5	KOMe	75	76:24	88
6	KO^{t}Bu	85	76:24	84

[a]Yield determined by 1H NMR using 1,3,5-trimethoxybenzene as an internal standard.
[b] Determined by chiral HPLC analysis

Effect of Solvents:

As shown in Table S3, Et_2O found to be optimal solvent for the desired transformation.

Table S3: Optimization of Solvents



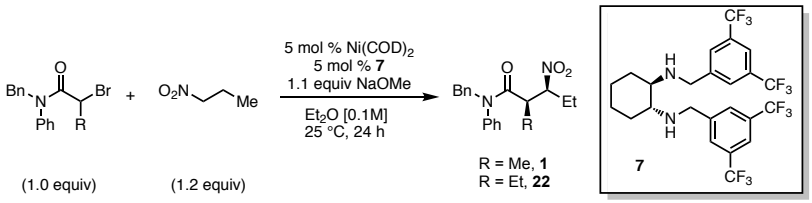
Entry	Solvent	% Yield **1**[a]	d.r *syn*/*anti*	% ee *syn*[b]
1	DMF	34	60:40	27
2	hexane	44	82:18	80
3	dioxane	70	73:27	82
4	DCM	23	70:30	84
5	benzene	45	71:29	84
6	THF	61	74:26	85
7	Et_2O	82	85:15	88

[a]Yield determined by 1H NMR using 1,3,5-trimethoxybenzene as an internal standard.
[b] Determined by chiral HPLC analysis

Effect of α-Substitution on the Electrophile:

As outlined in Table S4 on switching methyl to ethyl group at the α position of the electrophile drastically decreased the reactivity. Hence a better catalytic system was needed for this transformation.

Table S4: Comparison of Methyl vs Ethyl Substitution



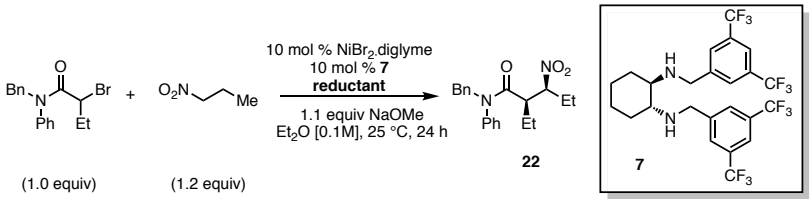
Entry	R	% Yield[a]	d.r *syn*/*anti*	% ee *syn*[b]
1	Me	74	81:19	88
2	Et	34	62:38	84

[a]Yield determined by 1H NMR using 1,3,5-trimethoxybenzene as an internal standard.
[b] Determined by chiral HPLC analysis

Effect of Internal Reductants:

As outlined in Table S5 Ni(II) precursor, $NiBr_2$·diglyme is reduced *in situ* to an active Ni(0) using several internal reductants. Et_2Zn was found to be the optimal reductant with excellent reactivity compared to the $Ni(COD)_2$ condition (Table S4). Importantly, under this catalytic condition diastereo- and enantioselectivity were comparable to the $Ni(COD)_2$ condition (Table S4).

Table S5: Survey of Different Reductants.



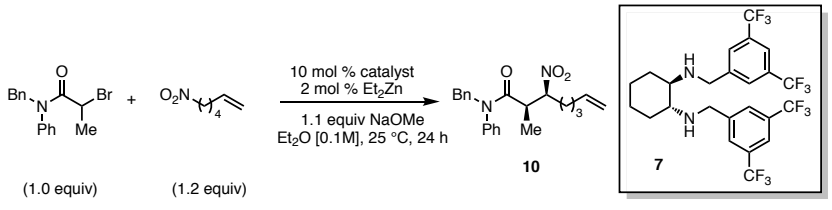
Entry	Reductant	% Yield **22**[a]	d.r *syn*/*anti*	% ee *syn*[b]
1	none	<1	-	-
2	Zn (3.0 equiv)	<1	-	-
3	Mn (3.0 equiv)	<1	-	-
4	Ph-Bpin (20 mol %)	12	55:45	-
5	MeMgCl (20 mol %)	76	57:43	80
6	MeMgCl (10 mol %)	49	59:41	80
7	MeMgCl (5 mol %)	18	60:40	82
8	Et_2Zn (10 mol %)	48	62:38	40
9	Et_2Zn (5 mol %)	88	58:42	69
10	Et_2Zn (2.5 mol %)	89	62:38	75
11	Et_2Zn (1 mol %)	95	60:40	84

[a]Yield determined by 1H NMR using 1,3,5-trimethoxybenzene as an internal standard.
[b] Determined by chiral HPLC analysis

Effect of Single Component Catalyst on the Functionalized Nitroalkanes:

As outlined in Table S6, single component catalyst was effective for the functionalized nitroalkane.

Table S6: Comparison of Single Component Vs Multicomponent Catalyst With Functionalized Nitroalkane.



(1.0 equiv) (1.2 equiv)

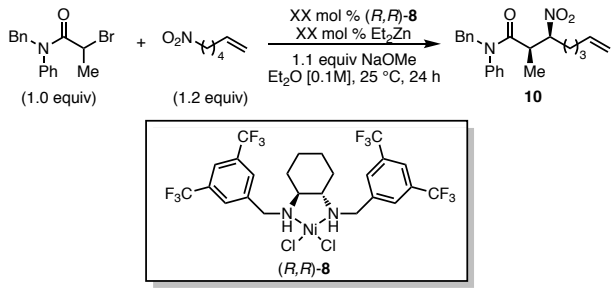
Entry	catalyst	% Yield **10**[a]	d.r *syn*/*anti*	% ee *syn*[b]
1	$NiCl_2$·dme/**7**	25	95:05	88
2	**8**	70	88:12	88

[a]Yield determined by 1H NMR using 1,3,5-trimethoxybenzene as an internal standard. [b] Determined by chiral HPLC analysis

Effect of Catalyst Loading:

As outlined in Table S7, greater concentration of Ni(II) compared to Et_2Zn is necessary for the efficient catalytic system. Presumably, this indicates that only a little low valent Nigenerated is generated.

Table S7: Optimization of Catalyst Loading



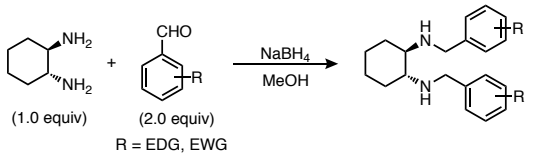
Entry	**8** mol %	Et_2Zn mol %	% Yield 10[a]	d.r *syn*/*anti*	% ee *syn*[b]
1	2.5	0.25	2	-	-
2	5	0.5	23	91:9	87
3	10	1	76	89:11	87
4	20	2	90	77:23	87
5	2.5	1	64	81:19	87
6	5	1	65	85:15	87
7	10	1	76	88:12	87
8	20	1	48	96:04	87

[a]Yield determined by 1H NMR using 1,3,5-trimethoxybenzene as an internal standard.
[b] Determined by chiral HPLC analysis

5. Preparation of Novel 1,2-Diamine Ligands

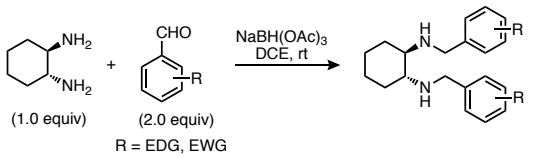
Note: All yields in this section are unoptimized.

Chiral 1,2 diamine ligands were synthesized based on previously published procedure.[21]



General Protocol A:

A 25 mL oven-dried round-bottom flask equipped with a stirbar and rubber septum is cooled under a stream of nitrogen. The flask was opened to air, (1*R*,2*R*)-(−)-1,2-diaminocyclohexane (1.0 equiv) and anhydrous methanol were sequentially added under air. The rubber septum was replaced, purged with nitrogen for ca. 3 min and then aromatic aldehyde (2.0 equiv) was added dropwise over 3 minutes via syringe. The flask was fitted with condenser and refluxed (oil bath, 70 °C) for 1:30 h with stirring. The reaction was cooled to rt, and reflux condenser was removed. The reaction cooled to 0 °C in an ice-water bath, and $NaBH_4$ (2.1 equiv) was added portion-wise under air. After the vigorous effervescence subsided, the reaction flask was fitted with condenser and refluxed (oil bath, 70 °C) for 1 h with stirring. The reaction was then cooled to 0 °C in an ice-water bath and quenched the excess $NaBH_4$ by adding H_2O until the bubbling subsides. The aqueous layer extracted with DCM (3x) and combined organic layers were dried over magnesium sulfate, filtered and the filtrate was concentrated *in vacuo*. The product was purified by silica gel flash chromatography.

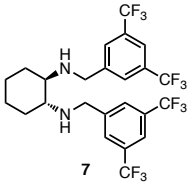


Several chiral 1,2 diamine ligands were synthesized by reductive amination using sodium triacetoxy borohydride.[20]

General Protocol B:

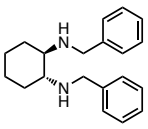
A 100 mL oven-dried round-bottom flask equipped with a stirbar and rubber septum is cooled under a stream of nitrogen. The flask was opened to air, (1*R*,2*R*)-(−)-1,2-diaminocyclohexane (1.0 equiv) and anhydrous 1,2-dichloroethane were sequentially added under air. The rubber septum was replaced, purged with nitrogen for ca. 3 min and then aromatic aldehyde (2.0 equiv) was added dropwise over 3 minutes via syringe. The rubber septum was removed and $NaBH(OAc)_3$ (2.5 equiv) was added portion-wise over 10 minutes, septum replaced and stirred at rt overnight under nitrogen. The reaction mixture was quenched with $NaHCO_3$ extracted with DCM (3x) and combined organic layers were dried over magnesium sulfate, filtered and the filtrate was concentrated in vacuo. The product was purified by silica gel flash chromatography.

Preparation of Ligands:



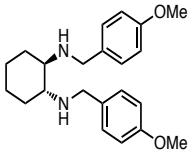
7

(**7**): According to general protocol B: (1*R*,2*R*)-(−)-1,2-diaminocyclohexane (500 mg, 4.38 mmol), 3,5-bis(trifluoromethyl)benzaldehyde, (1.44 mL, 8.77 mmol), and anhydrous 1,2 DCE (16.0 mL) were combined under air and $NaBH(OAc)_3$ (2.32 g, 11.0 mmol) was added portion-wise over 10 minutes and stirred at rt overnight. The reaction was worked up according to the general protocol B. The crude reaction was purified by flash silica gel chromatography (98:2 DCM : triethyl amine) to afford **7** (1.93 g, 78%). Note: Impure fractions can be further purified by recrystallization using EtOH/H_2O mixture. $[\alpha]_D^{25}$=–45.0° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.78 (s, 4H), 7.74 (s, 2H), 4.01 (d, *J* = 14.1 Hz, 2H), 3.81 (d, *J* = 14.0 Hz, 2H), 2.34 – 2.23 (m, 2H), 2.16 (dt, *J* = 13.9, 2.6 Hz, 2H), 1.86 (s, 2H), 1.75 (dtd, *J* = 9.8, 6.6, 6.1, 2.8 Hz, 2H), 1.32 – 1.19 (m, 2H), 1.11 – 0.99 (m, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 143.8, 131.6 (q, *J* = 33 Hz), 128.0, 123.4 (q, *J* = 273 Hz), 120.9, 61.5, 50.2, 31.6, 24.8; ^{19}F NMR (565 MHz, $CDCl_3$) δ -63.01; FTIR (cm^{-1}): 3258, 2933, 2866, 1493, 1382, 1281, 1127, 705; mp = 66-68 °C. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{24}H_{23}N_2F_{12}]^+$: 567.1670; found: 567.1659.



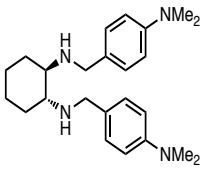
5

(**5**): According to general protocol A: (1*R*,2*R*)-(−)-1,2-diaminocyclohexane (500 mg, 4.4 mmol), benzaldehyde**,** (0.89 mL, 8.8 mmol), and anhydrous MeOH (3.0 mL) were combined under air and refluxed for 1:30 h with stirring. The solution allowed to cool to 0 °C in an ice-bath and $NaBH_4$ (347 mg, 9.2 mmol) was added portion-wise. After the vigorous effervescence had subsided the mixture was refluxed for 1 h with stirring. The reaction was worked up according to the general protocol A. The crude reaction was purified by flash silica gel chromatography (98:2 DCM : triethyl amine) to afford **5** (1.00 g, 78%) as a viscous yellow oil. $[\alpha]_D^{25}$=–83.4° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.29 – 7.21 (m, 8H), 7.21 – 7.15 (m, 2H), 3.84 (d, *J* = 13.2 Hz, 2H), 3.60 (d, *J* = 13.1 Hz, 2H), 2.26 – 2.16 (m, 2H), 2.11 (dt, *J* = 13.2, 2.5 Hz, 2H), 1.85 (s, 2H), 1.66 (dp, *J* = 9.3, 3.5 Hz, 2H), 1.26 – 1.10 (m, 2H), 1.05 – 0.91 (m, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 141.0, 128.2, 127.9, 126.6, 60.8, 50.8, 31.4, 24.9; FTIR (cm^{-1}): 3300, 2926, 2853, 1603, 1452, 1117,1028, 857, 697. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{20}H_{27}N_2]^+$: 295.2174; found: 295.2162.



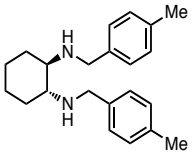
S1

(**S1**): According to general protocol B: (1*R*,2*R*)-(−)-1,2-diaminocyclohexane (500 mg, 4.4 mmol), 4-methoxy benzaldehyde**,** (1.06 mL, 8.8 mmol), and anhydrous 1,2 DCE (16.0 mL) were combined under air and $NaBH(OAc)_3$ (2.32 g, 11.0 mmol) was added portion-wise over 10 minutes and stirred at rt overnight. The reaction was worked up according to the general protocol B. The crude reaction was purified by flash silica gel chromatography (98:2 DCM : triethyl amine) to afford **S1** as a white solid (1.10 g, 71%). $[\alpha]_D^{25}$=–62.5° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.25 – 7.20 (m, 4H), 6.87 – 6.81 (m, 4H), 3.83 (d, *J* = 12.9 Hz, 2H), 3.80 (s, 6H), 3.58 (d, *J* = 12.9 Hz, 2H), 2.27 – 2.18 (m, 2H), 2.15 (dt, *J* = 13.4, 2.8 Hz, 2H), 1.83 – 1.66 (m, 4H), 1.22 (tdd, *J* = 9.8, 3.4, 2.0 Hz, 2H), 1.01 (dq, *J* = 16.3, 6.7, 3.7 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 164.4, 158.4, 133.2, 129.1, 113.6, 60.7, 55.2, 50.2, 31.5, 25.0; FTIR (cm^{-1}): 3207, 2922, 1612, 1510, 1446, 1246, 1178, 1032, 817; mp = 78-80 °C. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{22}H_{31}N_2O_2]^+$: 355.2386; found: 355.2366.



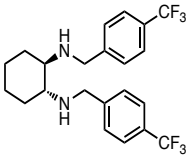
S2

(**S2**): According to general protocol B: (1*R*,2*R*)-(−)-1,2-diaminocyclohexane (500 mg, 4.4 mmol), 4-(dimethylamino)benzaldehyde**,** (1.30 g, 8.8 mmol), and anhydrous 1,2 DCE (16.0 mL) were combined under air and $NaBH(OAc)_3$ (2.32 g, 11.0 mmol) was added portion-wise over 10 minutes and stirred at rt overnight. The reaction was worked up according to the general protocol B. The crude reaction was purified by flash silica gel chromatography (98:2 DCM : triethyl amine) to afford **S2** as a white solid (697 mg, 42%). $[\alpha]_D^{25}$=–58.5° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.20 – 7.16 (m, 4H), 6.73 – 6.67 (m, 4H), 3.82 (d, *J* = 12.8 Hz, 2H), 3.57 (d, *J* = 12.7 Hz, 2H), 2.93 (s, 12H), 2.36 – 2.22 (m, 2H), 2.22 – 2.09 (m, 2H), 1.79 – 1.65 (m, 2H), 1.22 (td, *J* = 9.7, 9.0, 4.9 Hz, 2H), 1.07 (d, *J* = 11.5 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.7, 128.9, 112.7, 60.4, 50.0, 40.7, 31.2, 24.9; FTIR (cm^{-1}): 3299**,** 2925, 1615, 1522, 1445, 1346, 1163, 947, 804; mp = 108-110 °C. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{24}H_{37}N_4]^+$: 381.3018; found: 381.3003.



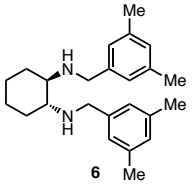
S3

(**S3**): According to general protocol A: (1*R*,2*R*)-(−)-1,2-diaminocyclohexane (500 mg, 4.4 mmol), 4-methyl benzaldehyde**,** (1.04 mL, 8.8 mmol), and anhydrous MeOH (3.0 mL) were combined under air and refluxed for 1:30 h with stirring. The solution allowed to cool to 0 °C in an ice-bath and $NaBH_4$ (347 mg, 9.2 mmol) was added portion-wise. After the vigorous effervescence had subsided the mixture was refluxed for 1 h with stirring. The reaction was worked up according to the general protocol A. The crude reaction was purified by flash silica gel chromatography (98:2 DCM : triethyl amine) to afford **S3** (973 mg, 69%). $[\alpha]_D^{25}$=–78.0° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.20 (d, *J* = 8.0 Hz, 4H), 7.12 (d, *J* = 7.8 Hz, 4H), 3.87 (d, *J* = 13.0 Hz, 2H), 3.62 (d, *J* = 13.0 Hz, 2H), 2.33 (s, 6H), 2.31 – 2.22 (m, 4H), 2.16 (dq, *J* = 11.4, 2.4 Hz, 2H), 1.71 (tq, *J* = 15.8, 6.2, 4.6 Hz, 2H), 1.31 – 1.15 (m, 2H), 1.14 – 0.98 (m, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 137.6, 136.3, 130.0, 128.0, 60.6, 50.4, 31.3, 24.9, 21.1; FTIR (cm^{-1}): 3299, 2924, 1514, 1456, 1355, 1112, 803. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{22}H_{31}N_2]^+$: 323.2487; found: 323.2479.



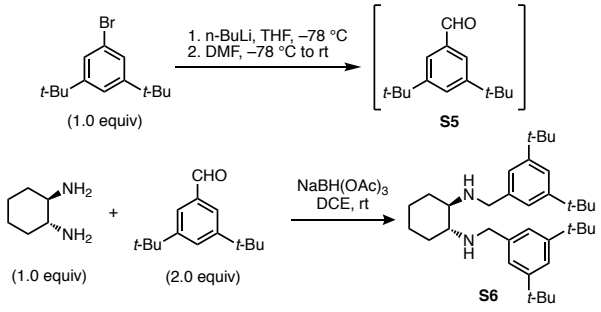
S4

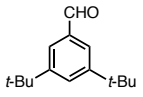
(**S4**): According to general protocol A: (1*R*,2*R*)-(−)-1,2-diaminocyclohexane (500 mg, 4.4 mmol), 4-(trifluoromethyl)benzaldehyde**,** (1.2 mL, 8.8 mmol), and anhydrous MeOH (3.0 mL) were combined under air and refluxed for 1:30 h with stirring. The solution allowed to cool to 0 °C in an ice-bath and $NaBH_4$ (347 mg, 9.2 mmol) was added portion-wise. After the vigorous effervescence had subsided the mixture was refluxed for 1 h with stirring. The reaction was worked up according to the general protocol A. The crude reaction was purified by flash silica gel chromatography (98:2 DCM : triethyl amine) to afford **S4** (1.41 g, 75%). $[\alpha]_D^{25}$=–62.2° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.56 (d, *J* = 8.0 Hz, 4H), 7.41 (d, *J* = 8.0 Hz, 4H), 3.94 (d, *J* = 13.7 Hz, 2H), 3.71 (d, *J* = 13.7 Hz, 2H), 2.30 – 2.19 (m, 2H), 2.15 (dt, *J* = 13.0, 2.4 Hz, 2H), 1.85 (s, 2H), 1.74 (dq, *J* = 8.4, 3.0 Hz, 2H), 1.32 – 1.14 (m, 2H), 1.12 – 0.95 (m, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 145.1, 129.0 (q, *J* = 32 Hz), 128.15, 125.2 (q, *J* = 4 Hz), 124.2 (q, *J* = 272 Hz), 60.9, 50.3, 31.5, 24.9; ^{19}F NMR (565 MHz, $CDCl_3$) δ -62.4; FTIR (cm^{-1}): 3299, 2931, 1619, 1458, 1328, 1124, 823. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{22}H_{25}N_2F_6]^+$: 431.1922; found: 431.1908.



6

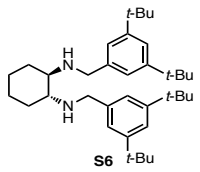
(**6**): According to general protocol B: (1*R*,2*R*)-(−)-1,2-diaminocyclohexane (500 mg, 4.38 mmol), 3,5-dimethylbenzaldehyde, (1.18 mL, 8.77 mmol), and anhydrous 1,2 DCE (16.0 mL) were combined under air and $NaBH(OAc)_3$ (2.32 g, 11.0 mmol) was added portion-wise over 10 minutes and stirred at rt overnight. The reaction was worked up according to the general protocol B. The reaction was worked up according to the general protocol B. The crude reaction was purified by flash silica gel chromatography (98:2 DCM : triethyl amine) to afford **6** (0.890 mg, 58%) as yellow oil. $[\alpha]_D^{25}$=–59.2° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 6.95 (s, 4H), 6.87 (s, 2H), 3.83 (d, *J* = 12.8 Hz, 2H), 3.58 (d, *J* = 12.8 Hz, 2H), 2.29 (s, 14H), 2.17 (dt, *J* = 13.4, 2.5 Hz, 2H), 1.85 (s, 2H), 1.73 (qt, *J* = 9.7, 4.1 Hz, 2H), 1.33 – 1.18 (m, 2H), 1.15 – 1.00 (m, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 141.0, 137.7, 128.3, 125.8, 61.1, 50.9, 31.6, 25.1, 21.2; FTIR (cm^{-1}): 3300, 2924, 2854, 1607, 1458, 1118, 841. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{24}H_{35}N_2]^+$: 351.2800; found: 351.2790.





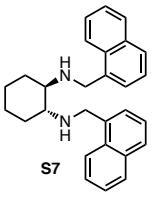
S5

(**S5**): A flame-dried 100mL round bottomed flask equipped with a magnetic stir bar and a rubber septum was cooled under stream of N_2 for 10 minutes. 1-Bromo-3,5-di-*tert*-butylbenzene (4.0 g, 14.8 mmol), and anhydrous THF (24.0 mL) was added sequentially via syringe. The mixture was cooled to –78 °C in a dry-ice/acetone bath. n-BuLi (6.21 mL of a 2.62 M solution in hexane, 16.3 mmol) was added to the flask via syringe slowly, and the reaction allowed to stir for 45 minutes at –78 °C. After 45 minutes, at –78 °C, anhydrous DMF (1.48 mL, 19.2 mmol) was added into the reaction, warmed to rt, and stirred overnight. The rubber septum was removed, and the reaction was quenched with saturated aqueous NH_4Cl (50.0 mL) and extracted into Et_2O (75.0 mL). The aqueous layer was back extracted into Et_2O (2x 30 mL). The combined organic layer was dried over magnesium sulfate, concentrated in vacuo to afford **S5** (3.05 g, 95%) as a viscous oil. The crude material was taken to the next step without further purification.

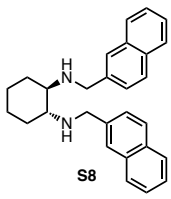


S6

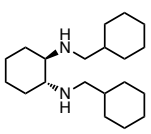
(**S6**): According to general protocol B: (1*R*,2*R*)-(−)-1,2-diaminocyclohexane (797 mg, 6.99 mmol), 3,5-di-*tert*-butylbenzaldehyde, (3.050 g, 14.0 mmol), and anhydrous 1,2 DCE (25.0 mL) were combined under air and $NaBH(OAc)_3$ (3.70 g, 17.5 mmol) was added portion-wise over 10 minutes and stirred at rt overnight. The reaction was worked up according to the general protocol B. The crude reaction was purified by flash silica gel chromatography (98:2 DCM : triethyl amine) to **S6** (2.46 g, 68%). $[\alpha]_D^{25}$=–37.3° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.28 (t, *J* = 1.9 Hz, 2H), 7.14 (d, *J* = 1.9 Hz, 4H), 3.90 (d, *J* = 12.9 Hz, 2H), 3.65 (d, *J* = 12.9 Hz, 2H), 2.34 – 2.24 (m, 2H), 2.24 – 2.14 (m, 2H), 1.83 (s, 2H), 1.78 – 1.65 (m, 2H), 1.34 – 1.31 (m, 2H), 1.28 (s, 36H), 1.05 (d, *J* = 11.3 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 150.5, 140.0, 122.3, 120.7, 61.0, 51.7, 34.7, 31.6, 31.5, 25.0; FTIR (cm^{-1}): 2962, 2361, 1600, 1457, 1248, 871, 713; mp = 56-58 °C. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{36}H_{59}N_2]^+$: 519.4678; found: 519.4663.


S7

(**S7**): According to general protocol A: (1*R*,2*R*)-(−)-1,2-diaminocyclohexane (500 mg, 4.4 mmol), 1-napthaldehyde**,** (1.2 mL, 8.8 mmol), and anhydrous MeOH (3.0 mL) were combined under air and refluxed for 1:30 h with stirring. The solution allowed to cool to 0 °C in an ice-bath and $NaBH_4$ (347 mg, 9.2 mmol) was added portion-wise. After the vigorous effervescence had subsided the mixture was refluxed for 1 h with stirring. The reaction was worked up according to the general protocol A. The crude reaction was purified by flash silica gel chromatography (98:2 DCM : triethyl amine) to afford **S7** (1.05 g, 61%) as thick viscous colorless oil. $[\alpha]_D^{25}$=–12.9° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.01 (td, *J* = 8.5, 0.9 Hz, 2H), 7.84 – 7.79 (m, 2H), 7.73 (dd, *J* = 7.4, 2.0 Hz, 2H), 7.42 – 7.36 (m, 2H), 7.36 – 7.30 (m, 4H), 7.23 (ddd, *J* = 8.3, 6.9, 1.4 Hz, 2H), 4.31 (d, *J* = 12.9 Hz, 2H), 4.02 (d, *J* = 12.9 Hz, 2H), 2.42 – 2.29 (m, 4H), 1.86 – 1.73 (m, 2H), 1.66 (s, 2H), 1.41 – 1.24 (m, 2H), 1.13 (d, *J* = 11.5 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 136.3, 133.7, 131.7, 128.4, 127.5, 125.8, 125.8, 125.4, 125.2, 123.8, 61.4, 48.7, 31.6, 25.1; FTIR (cm^{-1}): 3299, 3045, 2925, 1597, 1509, 1456, 1115, 790. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{28}H_{31}N_2]^+$: 395.2487; found: 395.2489.

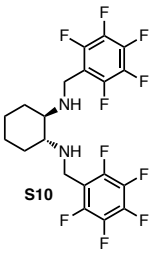

S8

(**S8**): According to general protocol A: (1*R*,2*R*)-(−)-1,2-diaminocyclohexane (500 mg, 4.4 mmol), 2-napthaldehyde**,** (1.2 mL, 8.8 mmol), and anhydrous MeOH (3.0 mL) were combined under air and refluxed for 1:30 h with stirring. The solution allowed to cool to 0 °C in an ice-bath and $NaBH_4$ (347 mg, 9.2 mmol) was added portion-wise. After the vigorous effervescence had subsided the mixture was refluxed for 1 h with stirring. The reaction was worked up according to the general protocol A. The crude reaction was purified by flash silica gel chromatography (98:2 DCM : triethyl amine) to afford **S8** (948 mg, 55%) as a white solid. $[\alpha]_D^{25}$=–13.8° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.84 – 7.80 (m, 2H), 7.79 (s, 1H), 7.77 – 7.72 (m, 5H), 7.49 – 7.42 (m, 6H), 4.08 (d, *J* = 13.3 Hz, 2H), 3.83 (d, *J* = 13.3 Hz, 2H), 2.43 – 2.29 (m, 2H), 2.27 – 2.16 (m, 2H), 2.08 (s, 2H), 1.85 – 1.63 (m, 2H), 1.24 (td, *J* = 9.7, 9.1, 4.7 Hz, 2H), 1.16 – 1.00 (m, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 136.3, 133.7, 131.7, 128.4, 127.5, 125.8, 125.8, 125.4, 125.2, 123.8, 61.4, 48.8, 31.6, 25.1; FTIR (cm^{-1}): 3296, 3051, 2925, 1507, 1456, 1124, 855, 815, 790; mp = 72-74 °C. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{28}H_{31}N_2]^+$: 395.2487; found: 395.2483.



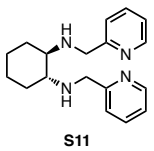
S9

(**S9**): According to general protocol A: (1*R*,2*R*)-(−)-1,2-diaminocyclohexane (500 mg, 4.4 mmol), cyclohexanecarbaldehyde**,** (1.06 mL, 8.8 mmol), and anhydrous MeOH (3.0 mL) were combined under air and refluxed for 1:30 h with stirring. The solution allowed to cool to 0 °C in an ice-bath and $NaBH_4$ (347 mg, 9.2 mmol) was added portion-wise. After the vigorous effervescence had subsided the mixture was refluxed for 1 h with stirring. The reaction was worked up according to the general protocol A. The crude reaction was purified by flash silica gel chromatography (98:2 DCM : triethyl amine) to afford two diastereomerically pure products **S9** as a colorless oil (817 mg, 61%). $[\alpha]_D^{25}$=–60.0° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 2.55 (dd, *J* = 11.4, 6.4 Hz, 2H), 2.23 (dd, *J* = 11.4, 6.8 Hz, 2H), 2.12 – 1.98 (m, 4H), 1.82 – 1.56 (m, 14H), 1.44 – 1.31 (m, 2H), 1.31 – 1.06 (m, 8H), 1.04 – 0.81 (m, 6H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 61.8, 53.7, 38.3, 31.7, 31.5, 31.4, 26.7, 26.0, 25.1; FTIR (cm^{-1}): 3310, 2921, 2850, 1448, 1355, 1133, 730. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{20}H_{38}N_2]^+$: 307.3035; found: 307.3109.



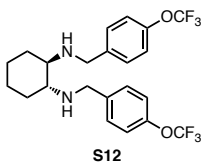
S10

(**S10**): According to general protocol B: (1*R*,2*R*)-(−)-1,2-diaminocyclohexane (500 mg, 4.38 mmol), 2,3,4,5,6-pentafluorobenzaldehyde**,** (1.08 mL, 8.77 mmol), and anhydrous 1,2 DCE (16.0 mL) were combined under air and $NaBH(OAc)_3$ (2.32 g, 11.0 mmol) was added portion-wise over 10 minutes and stirred at rt overnight. The reaction was worked up according to the general protocol B. The crude reaction was purified by flash silica gel chromatography (98:2 DCM : triethyl amine) to afford **S10** as a white solid (1.22 g, 59%). $[\alpha]_D^{25}$=–38.0° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 3.94 (d, *J* = 13.3 Hz, 2H), 3.79 (d, *J* = 13.2 Hz, 2H), 2.18 – 2.02 (m, 4H), 1.86 – 1.69 (m, 4H), 1.31 – 1.16 (m, 2H), 1.08 – 0.93 (m, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 146.6 – 146.3 (m), 144.1 – 143.9 (m), 141.8 – 141.4 (m), 139.2 – 138.9 (m), 138.8 – 138.4 (m), 136.3 – 135.9 (m), 114.0 – 113.6 (m), 60.6, 37.9, 31.4, 24.8; ^{19}F NMR (565 MHz, $CDCl_3$) δ -144.7 (dd, *J* = 22.5, 8.5 Hz), -155.9 (t, *J* = 20.7 Hz), -162.3 (td, *J* = 22.3, 8.6 Hz); FTIR (cm^{-1}): 3293, 2924, 2851, 1447, 1366, 1134, 888, 727; mp = 44-46 °C. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{20}H_{17}N_2F_{10}]^+$: 475.1232; found: 475.1219.



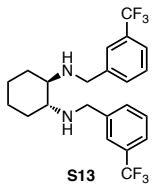
S11

(**S11**): According to general protocol A: (1*R*,2*R*)-(−)-1,2-diaminocyclohexane (500 mg, 4.4 mmol), 2-pyridinecarboxaldehyde**,** (0.83 mL, 8.8 mmol), and anhydrous MeOH (3.0 mL) were combined under air and refluxed for 1:30 h with stirring. The solution allowed to cool to 0 °C in an ice-bath and $NaBH_4$ (347 mg, 9.2 mmol) was added portion-wise. After the vigorous effervescence had subsided the mixture was refluxed for 1 h with stirring. The reaction was worked up according to the general protocol A. The crude reaction was purified by flash silica gel chromatography (98:2 DCM : triethyl amine) to afford **S11** as a yellow oil (933 mg, 72%). $[\alpha]_D^{25}$=–61.6° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.51 (d, *J* = 4.9 Hz, 2H), 7.61 (td, *J* = 7.7, 1.8 Hz, 2H), 7.39 (dt, *J* = 7.8, 1.1 Hz, 2H), 7.13 (ddd, *J* = 7.5, 4.8, 1.2 Hz, 2H), 4.02 (d, *J* = 14.1 Hz, 2H), 3.84 (d, *J* = 14.2 Hz, 2H), 2.44 (s, 2H), 2.36 – 2.27 (m, 2H), 2.14 (dt, *J* = 13.2, 2.5 Hz, 2H), 1.77 – 1.65 (m, 2H), 1.30 – 1.15 (m, 2H), 1.13 – 0.99 (m, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 160.4, 148.9, 136.2, 122.1, 121.6, 61.1, 52.3, 31.4, 24.8; FTIR (cm^{-1}): 3292, 2926, 2853, 1591, 1433, 1121, 993, 757. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{18}H_{25}N_4]^+$: 297.2079; found: 297.2069.



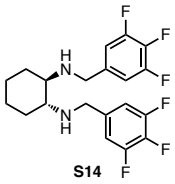
S12

(**S12**): According to general protocol B: (1*R*,2*R*)-(−)-1,2-diaminocyclohexane (500 mg, 4.38 mmol), 4-(trifluoromethoxy)benzaldehyde, (1.25 mL, 8.77 mmol), and anhydrous 1,2 DCE (16.0 mL) were combined under air and $NaBH(OAc)_3$ (2.32 g, 11.0 mmol) was added portion-wise over 10 minutes and stirred at rt overnight. The reaction was worked up according to the general protocol B. The crude reaction was purified by flash silica gel chromatography (98:2 DCM : triethyl amine) to afford **S12** (1.29 g, 64%). $[\alpha]_D^{25}$=–62.9° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.35 – 7.29 (m, 4H), 7.18 – 7.12 (m, 4H), 3.89 (d, *J* = 13.4 Hz, 2H), 3.65 (d, *J* = 13.4 Hz, 2H), 2.29 – 2.20 (m, 2H), 2.19 – 2.12 (m, 2H), 1.86 (s, 2H), 1.79 – 1.67 (m, 2H), 1.32 – 1.15 (m, 2H), 1.11 – 0.95 (m, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 148.0, 139.8, 129.2, 120.9, 120.4 (q, *J* = 258 Hz), 60.9, 50.1, 31.5, 24.9; ^{19}F NMR (565 MHz, $CDCl_3$) δ -57.9; FTIR (cm^{-1}): 3300, 2930, 2857, 1508, 1263, 1161, 920, 846. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{22}H_{25}N_2O_2F_6]^+$: 463.1743; found: 463.1809.



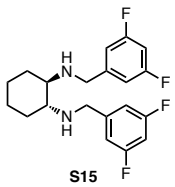
S13

(**S13**): According to general protocol B: (1*R*,2*R*)-(−)-1,2-diaminocyclohexane (500 mg, 4.38 mmol), 3-(trifluoromethyl)benzaldehyde**,** (1.17 mL, 8.77 mmol), and anhydrous 1,2 DCE (16.0 mL) were combined under air and $NaBH(OAc)_3$ (2.32 g, 11.0 mmol) was added portion-wise over 10 minutes and stirred at rt overnight. The reaction was worked up according to the general protocol B. The crude reaction was purified by flash silica gel chromatography (98:2 DCM : triethyl amine) to afford **S13** (1.35 g, 72%) as a pale yellow oil. $[\alpha]_D^{25}$=–50.2° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.58 (s, 2H), 7.50 (dt, *J* = 8.3, 1.6 Hz, 4H), 7.41 (t, *J* = 7.6 Hz, 2H), 3.95 (d, *J* = 13.5 Hz, 2H), 3.71 (d, *J* = 13.5 Hz, 2H), 2.31 – 2.21 (m, 2H), 2.17 (dt, *J* = 13.1, 2.5 Hz, 2H), 1.85 (s, 2H), 1.80 – 1.69 (m, 2H), 1.33 – 1.17 (m, 2H), 1.10 – 0.97 (m, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 142.0, 131.3, 130.6 (q, *J* = 32 Hz), 128.8, 124.6, 124.2 (q, *J* = 272 Hz), 123.7, 61.1, 50.5, 31.6, 24.9; ^{19}F NMR (565 MHz, $CDCl_3$) δ - 62.6; FTIR (cm^{-1}): 3298, 2930, 2857, 1449, 1329, 1123, 796, 702. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{22}H_{25}N_2F_6]^+$: 431.1743; found: 431.1913.



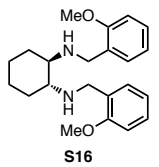
S14

(**S14**): According to general protocol B: (1*R*,2*R*)-(−)-1,2-diaminocyclohexane (500 mg, 4.38 mmol), 3,4,5-trifluorobenzaldehyde, (0.99 mL, 8.77 mmol), and anhydrous 1,2 DCE (16.0 mL) were combined under air and $NaBH(OAc)_3$ (2.32 g, 11.0 mmol) was added portion-wise over 10 minutes and stirred at rt overnight. The reaction was worked up according to the general protocol B. The reaction was worked up according to the general protocol. The crude reaction was purified by flash silica gel chromatography (98:2 DCM : triethyl amine) to afford **S14** as a white solid (1.19 g, 68%). $[\alpha]_D^{25}$=–66.0° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 6.99 – 6.90 (m, 4H), 3.82 (d, *J* = 14.0 Hz, 2H), 3.62 (d, *J* = 14.0 Hz, 2H), 2.24 – 2.14 (m, 2H), 2.13 – 2.05 (m, 2H), 1.84 – 1.67 (m, 4H), 1.21 (t, *J* = 11.8, 7.9, 5.9 Hz, 2H), 1.06 – 0.91 (m, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 152.3 (dd, *J* = 10.0, 3.9 Hz), 149.8 (dd, *J* = 9.9, 3.9 Hz), 139.7 (t, *J* = 15.4 Hz), 137.6 – 137.0 (m), 111.5 (d, *J* = 21.2 Hz), 60.9, 49.7, 31.4, 24.8; ^{19}F NMR (565 MHz, $CDCl_3$) δ –134.8 (d, *J* = 22 Hz), –163.1 (t, *J* = 22 Hz); FTIR (cm^{-1}): 3294, 2930, 2863, 1618, 1526, 1444, 1226, 1038, 857; mp = 60-62 °C. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{20}H_{21}N_2F_6]^+$: 403.1609; found: 403.1611.



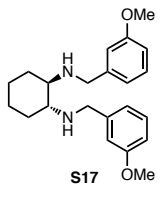
S15

(**S15**): According to general protocol B: (1*R*,2*R*)-(−)-1,2-diaminocyclohexane (500 mg, 4.38 mmol), 3,5-difluorobenzaldehyde, (0.96 mL, 8.77 mmol), and anhydrous 1,2 DCE (16.0 mL) were combined under air and $NaBH(OAc)_3$ (2.32 g, 11.0 mmol) was added portion-wise over 10 minutes and stirred at rt overnight. The reaction was worked up according to the general protocol B. The reaction was worked up according to the general protocol B. The crude reaction was purified by flash silica gel chromatography (98:2 DCM : triethyl amine) to afford **S15** (1.11 g, 70%) as yellow oil. $[\alpha]_D^{25}$=–60.0° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 6.89 – 6.81 (m, 4H), 6.67 (tt, *J* = 9.0, 2.4 Hz, 2H), 3.87 (d, *J* = 14.0 Hz, 2H), 3.66 (d, *J* = 14.0 Hz, 2H), 2.27 – 2.17 (m, 2H), 2.16 – 2.08 (m, 2H), 1.84 (s, 2H), 1.78 – 1.67 (m, 2H), 1.30 – 1.14 (m, 2H), 1.01 (tdd, *J* = 17.0, 8.4, 4.0 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 164.2 (d, *J* = 12.8 Hz), 161.7 (d, *J* = 12.8 Hz), 145.3 (t, *J* = 8.5 Hz), 111.4 – 109.6 (m), 102.1 (t, *J* = 25.5 Hz), 60.8, 50.1, 31.5, 24.8; ^{19}F NMR (565 MHz, $CDCl_3$) δ -110.32; FTIR (cm^{-1}): 2930, 2856, 1652, 1596, 1457, 1315, 1116, 1044, 847. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{20}H_{23}N_2F_4]^+$: 366.1719; found: 366.1791.



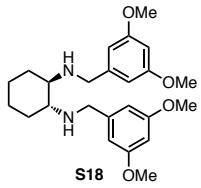
S16

(**S16**): According to general protocol A: (1R,2R)-(−)-1,2-diaminocyclohexane (500 mg, 4.4 mmol), 2-methoxybenzaldehyde, (1.2 g, 8.8 mmol), and anhydrous MeOH (3.0 mL) were combined under air and refluxed for 1:30 h with stirring. The solution allowed to cool to 0 °C in an ice-bath and $NaBH_4$ (347 mg, 9.2 mmol) was added portion-wise. After the vigorous effervescence had subsided the mixture was refluxed for 1 h with stirring. The reaction was worked up according to the general protocol A. The crude reaction was purified by flash silica gel chromatography (99:1 DCM : triethyl amine) to afford **S16** (0.945 g, 61%). $[\alpha]_D^{25}$=–95.2° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$) δ 7.28 (dd, J = 7.4, 1.7 Hz, 2H), 7.20 (td, J = 7.8, 1.8 Hz, 2H), 6.90 (td, J = 7.4, 1.1 Hz, 2H), 6.82 (dd, J = 8.2, 1.0 Hz, 2H), 3.90 (d, J = 13.4 Hz, 2H), 3.74 (s, 6H), 3.64 (d, J = 13.4 Hz, 2H), 2.32 – 2.21 (m, 2H), 2.18 – 2.12 (m, 2H), 2.06 (s, 2H), 1.78 – 1.65 (m, 2H), 1.30 – 1.16 (m, 2H), 1.14 – 1.00 (m, 2H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 157.5, 129.3, 127.7, 120.2, 110.0, 61.0, 55.0, 45.9, 31.6, 25.1; FTIR (cm^{-1}): 3300, 2930, 2855, 1604, 1492, 1242, 1105, 1029, 753. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{22}H_{31}N_2O_2]^+$: 355.2386; found: 355.2382.



S17

(**S17**): According to general protocol A: (1R,2R)-(−)-1,2-diaminocyclohexane (500 mg, 4.4 mmol), 3-methoxybenzaldehyde, (1.07 mL, 8.8 mmol), and anhydrous MeOH (3.0 mL) were combined under air and refluxed for 1:30 h with stirring. The solution allowed to cool to 0 °C in an ice-bath and $NaBH_4$ (347 mg, 9.2 mmol) was added portion-wise. After the vigorous effervescence had subsided the mixture was refluxed for 1 h with stirring. The reaction was worked up according to the general protocol A. The crude reaction was purified by flash silica gel chromatography (99:1 DCM : triethyl amine) to afford **S17** (1.13 g, 73%). $[\alpha]_D^{25}$=–61.2° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.21 (t, *J* = 7.8 Hz, 2H), 6.92 – 6.88 (m, 4H), 6.79 – 6.75 (m, 2H), 3.89 (d, *J* = 13.2 Hz, 2H), 3.76 (s, 6H), 3.64 (d, *J* = 13.2 Hz, 2H), 2.31 – 2.23 (m, 2H), 2.16 (d, *J* = 13.6, 2.6 Hz, 2H), 1.88 (s, 2H), 1.78 – 1.68 (m, 2H), 1.30 – 1.18 (m, 2H), 1.09 – 0.99 (m, 2H); ^{13}C NMR (151 MHz, $CDCl_3$) δ159.7, 142.8, 129.2, 120.3, 113.3, 112.3, 60.9, 55.0, 50.9, 31.6, 25.0; FTIR (cm^{-1}): 2929, 2834, 1600, 1488, 1263, 1153, 1044, 781. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{22}H_{31}N_2O_2]^+$: 355.2386; found: 355.2376.

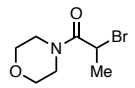


S18

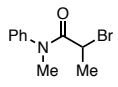
(**S18**): According to general protocol B: (1*R*,2*R*)-(−)-1,2-diaminocyclohexane (500 mg, 4.38 mmol), 3,5-dimethoxybenzaldehyde, (1.46 g, 8.77 mmol), and anhydrous 1,2 DCE (16.0 mL) were combined under air and $NaBH(OAc)_3$ (2.32 g, 11.0 mmol) was added portion-wise over 10 minutes and stirred at rt overnight. The reaction was worked up according to the general protocol B. The reaction was worked up according to the general protocol B. The crude reaction was purified by flash silica gel chromatography (98:2 DCM : triethyl amine) to afford **S18** (1.34 g, 74%) as a yellow oil. $[\alpha]_D^{25}$=–54.3° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 6.49 (d, *J* = 2.3 Hz, 4H), 6.33 (t, *J* = 2.3 Hz, 2H), 3.88 (d, *J* = 13.2 Hz, 2H), 3.73 (s, 12H), 3.61 (d, *J* = 13.3 Hz, 2H), 2.83 (s, 2H), 2.37 – 2.26 (m, 2H), 2.16 (d, *J* = 13.4, 2.6 Hz, 2H), 1.80 – 1.66 (m, 2H), 1.32 – 1.01 (m, 4H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 160.7, 142.6, 105.8, 98.9, 60.5, 55.1, 50.7, 31.1, 24.8; FTIR (cm^{-1}): 3298, 2930, 2837, 1596, 1461, 1204, 1152,1063, 857. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{24}H_{35}N_2O_4]^+$: 415.2597; found: 415.2587.

7. Preparation of Novel α-Bromo Amides:

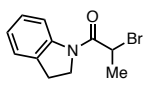
Note: All yields in this section are unoptimized.


S19

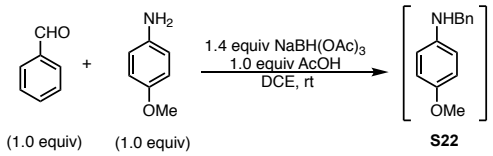
(**S19**): A hot 500 mL round bottom flask equipped with a magnetic stir bar and rubber septum was attached via needle to a double manifold and cooled under vacuum. The flask was evacuated and backfilled with N_2 three times. Anhydrous THF (104.0 mL), triethylamine (8.0 mL, 57.4 mmol), and morpholine (5.02 mL, 57.4 mmol) were added to the flask sequentially via syringe and the reaction flask was cooled to 0 °C. 2-Bromopropionyl bromide (5.41 mL, 51.7 mmol) was added dropwise via syringe. Once the addition is complete, ice bath was removed and the reaction stirred overnight at rt. The septum was removed and the reaction was quenched with 1 M HCl (50.0 mL) and extracted with Et_2O (2x 50 mL). The combined organic layers are washed once with H_2O (50.0 mL). The organic layer was dried over magnesium sulfate, and concentrated in vacuo. The crude reaction was purified by flash silica gel chromatography (60:40 hexanes : ethyl acetate) to afford **S19** (8.3 g, 65% yield) as a colorless oil**:** ^{1}H NMR (400 MHz, $CDCl_3$): δ 4.51 (q, *J* = 6.6 Hz, 1H), 3.83 (ddd, *J* = 13.3, 5.2, 3.5 Hz, 1H), 3.77 – 3.66 (m, 3H), 3.62 (dt, *J* = 17.7, 3.8 Hz, 1H), 3.47 (dddd, *J* = 13.6, 10.6, 6.9, 4.0 Hz, 2H), 1.84 (d, *J* = 6.6 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 167.6, 66.6, 66.2, 46.5, 42.5, 37.7, 21.5; FTIR (cm^{-1}): 2970, 2857, 1653, 1434, 1375, 1248, 1115, 1029, 847. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_7H_{13}NO_2Br]^+$: 222.00051; found: 222.01230.

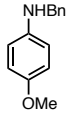

S20

(**S20**): A hot 250 mL round bottom flask equipped with a magnetic stir bar and rubber septum was attached via needle to a double manifold and cooled under vacuum. The flask was evacuated and backfilled with N_2 three times. Anhydrous THF (50.0 mL), triethylamine (3.8 mL, 27.5 mmol), and N-methylaniline (3.0 mL, 27.5 mmol) were added to the flask sequentially via syringe and the reaction flask was cooled to 0 °C. 2-Bromopropionyl bromide (2.61 mL, 25.0 mmol) was added dropwise via syringe. Once the addition is complete, ice bath was removed and the reaction stirred overnight at rt. The septum was removed and the reaction was quenched with 1 M HCl (50.0 mL) and extracted with Et_2O (2x 50 mL). The combined organic layers are washed once with H_2O (50.0 mL). The organic layer was dried over magnesium sulfate, and concentrated in vacuo. The crude reaction was purified by flash silica gel chromatography (90:10 hexanes : ethyl acetate) to afford **S20** (3.75 g, 62% yield) as off white solid**:**^{1}H NMR (400 MHz, $CDCl_3$): δ 7.50 – 7.37 (m, 3H), 7.29 (d, *J* = 7.6 Hz, 2H), 4.27 (q, *J* = 6.7 Hz, 1H), 3.30 (s, 3H), 1.74 (d, *J* = 6.7 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.5, 142.8, 129.9, 128.4, 127.1, 39.1, 38.1, 21.8; FTIR (cm^{-1}): 2923, 1668, 1595, 1495, 1388, 1120, 700; mp = 35-37 °C. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{10}H_{13}NOBr]^+$: 242.0102; found: 242.0173.

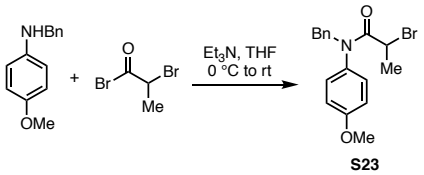

S21

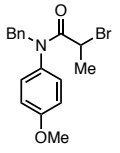
(**S21**): A hot 250 mL round bottom flask equipped with a magnetic stir bar and rubber septum was attached via needle to a double manifold and cooled under vacuum. The flask was evacuated and backfilled with N_2 three times. Anhydrous THF (50.0 mL), triethylamine (3.8 mL, 27.5 mmol), and indoline (3.08 mL, 27.5 mmol) were added to the flask sequentially via syringe and the reaction flask was cooled to 0 °C. 2-Bromopropionyl bromide (2.61 mL, 25.0 mmol) was added dropwise via syringe. Once the addition is complete, ice bath was removed and the reaction stirred overnight at rt. The septum was removed and the reaction was quenched with 1 M HCl (30.0 mL) and extracted with ethyl acetate (2x 30 mL). The combined organic layers are washed once with H_2O (30.0 mL). The organic layer was dried over magnesium sulfate, and concentrated in vacuo. The crude reaction was purified by recrystallization using Ethyl acetate to afford **S21** (4.31 g, 68% yield) as pale brown crystalline solid**:** ^{1}H NMR (400 MHz, DMSO-d_6): δ 8.09 (d, *J* = 8.0 Hz, 1H), 7.27 (dd, *J* = 7.5, 1.4 Hz, 1H), 7.18 (t, *J* = 8.0 Hz, 1H), 7.05 (td, *J* = 7.4, 1.1 Hz, 1H), 4.98 (q, *J* = 6.5 Hz, 1H), 4.32 – 4.23 (m, 1H), 4.20 – 4.11 (m, 1H), 3.28 – 3.09 (m, 2H), 1.75 (d, *J* = 6.4 Hz, 3H); ^{13}C NMR (101 MHz, DMSO-d_6) δ 166.9, 142.6, 132.2, 127.1, 125.0, 124.0, 116.4, 47.4, 42.6, 27.4, 21.3; FTIR (cm^{-1}): 2923, 1647, 1594, 1480, 1370, 1162, 758; mp = 138-140 °C. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{11}H_{13}NOBr]^+$: 254.0102; found: 254.0169.



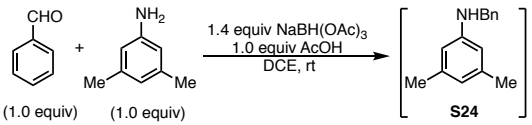


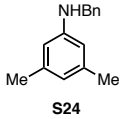
(**S22**)**:** A 250 mL oven-dried round-bottom flask equipped with a stir bar and rubber septum is cooled under a stream of nitrogen. The flask was opened to air, 4-methoxy aniline (2.7 mL, 23.6 mmol) and anhydrous 1,2-dichloroethane (80.0 mL) were sequentially added under air. The rubber septum was replaced, purged with nitrogen for ca. 3 min and then benzaldehyde (2.4 mL, 23.6 mmol) was added dropwise over 3 minutes via syringe. The rubber septum was removed, $NaBH(OAc)_3$ (7.0 g, 33 mmol) was added portion-wise over 15 minutes, and then acetic acid (1.35 mL, 23.6 mmol) was added slowly via pipette, septum replaced, and stirred at rt overnight under nitrogen. The reaction mixture was quenched with $NaHCO_3$ extracted with DCM (3x 30 mL) and combined organic layers were dried over magnesium sulfate, filtered and the filtrate was concentrated in vacuo to afford **S22** (5.0g). The product was taken to the next step without further purification.





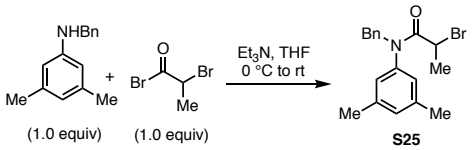
(**S23**): A hot 250 mL round bottom flask equipped with a magnetic stir bar and rubber septum was attached via needle to a double manifold and cooled under vacuum. The flask was backfilled with N_2, the septum was removed, and the **S22** (5.0 g, 23.2 mmol) was added. The septum was replaced, the flask was attached to a double manifold, and evacuated and backfilled with N_2 three times. Anhydrous THF (45.0 mL), and triethylamine (3.56 mL, 25.5 mmol), were added to the flask sequentially via syringe and the reaction flask was cooled to 0 °C. 2-Bromopropionyl bromide (2.42 mL, 23.2mmol) was added dropwise via syringe. Once the addition is complete, ice bath was removed and the reaction stirred overnight at rt. The septum was removed and the reaction was quenched with 1 M HCl (50.0 mL) and extracted with Et_2O (2x 50 mL). The combined organic layers are washed once with H_2O (50.0 mL). The organic layer was dried over magnesium sulfate, and concentrated in vacuo. The crude reaction was purified by flash silica gel chromatography (95:05 → 90:10 hexanes : ethyl acetate) to afford **S23** (5.25 g, 65% yield) as a colorless oil**:** ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.31 – 7.23 (m, 3H), 7.21 – 7.17 (m, 2H), 6.95 (s, 2H), 6.86 – 6.80 (m, 2H), 4.94 (d, *J* = 14.1 Hz, 1H), 4.75 (d, *J* = 14.2 Hz, 1H), 4.25 (q, *J* = 6.7 Hz, 1H), 3.80 (s, 3H), 1.76 (d, *J* = 6.6 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.7, 159.2, 136.8, 133.4, 129.2, 128.7, 128.3, 127.4, 114.5, 55.3, 53.5, 39.4, 21.6; FTIR (cm^{-1}): 2932, 2850, 1668, 1511, 1444, 1251, 1180, 1038, 838. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{17}H_{19}NO_2Br]^+$: 348.0599; found: 348.0593.

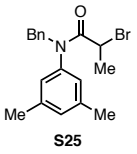




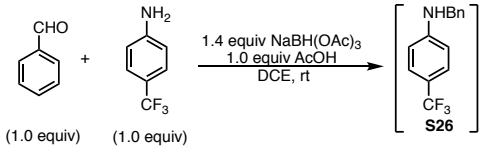
(**S24**)**:** A 250 mL oven-dried round-bottom flask equipped with a stir bar and rubber septum is cooled under a stream of nitrogen. The flask was opened to air, 3,5-dimethyl aniline (2.95 mL, 23.6 mmol) and anhydrous 1,2-dichloroethane (80.0 mL) were sequentially added under air. The rubber septum was replaced, purged with nitrogen for ca. 3 min and then benzaldehyde (2.4 mL, 23.6 mmol) was added dropwise over 3 minutes via syringe. The rubber septum was removed, $NaBH(OAc)_3$ (7.0 g, 33 mmol) was added portion-wise over 15 minutes, and then acetic acid (1.35 mL, 23.6 mmol) was added slowly via pipette, septum replaced, and stirred at rt overnight under nitrogen. The

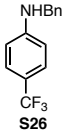
reaction mixture was quenched with $NaHCO_3$ extracted with DCM (3x 30 mL) and combined organic layers were dried over magnesium sulfate, filtered and the filtrate was concentrated in vacuo to afford **S24** (4.5 g). The product was taken to the next step without further purification.



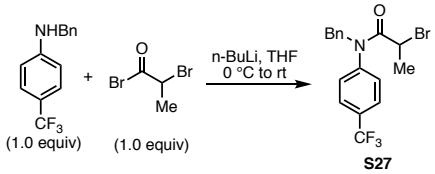


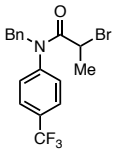
(**S25**): A hot 250 mL round bottom flask equipped with a magnetic stir bar and rubber septum was attached via needle to a double manifold and cooled under vacuum. The flask was backfilled with N_2, the septum was removed, and the **S24** (4.5 g, 21.2 mmol) was added. The septum was replaced, the flask was attached to a double manifold, and evacuated and backfilled with N_2 three times. Anhydrous THF (40.0 mL), and triethylamine (3.25 mL, 23.3 mmol), were added to the flask sequentially via syringe and the reaction flask was cooled to 0 °C. 2-Bromopropionyl bromide (2.42 mL, 21.2 mmol) was added dropwise via syringe. Once the addition is complete, ice bath was removed and the reaction stirred overnight at rt. The septum was removed and the reaction was quenched with 1 M HCl (50.0 mL) and extracted with Et_2O (2x 50 mL). The combined organic layers are washed once with H_2O (50.0 mL). The organic layer was dried over magnesium sulfate, and concentrated in vacuo. The crude reaction was purified by flash silica gel chromatography (95:05 → 90:10 hexanes : ethyl acetate) to afford **S25** (4.3 g, 62% yield) as a viscous yellow oil**:** ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.31 – 7.22 (m, 3H), 7.23 – 7.18 (m, 2H), 6.96 (s, 1H), 6.66 (s, 2H), 4.94 (d, *J* = 14.3 Hz, 1H), 4.75 (d, *J* = 14.3 Hz, 1H), 4.28 (d, *J* = 6.7 Hz, 1H), 2.26 (s, 6H), 1.76 (d, *J* = 6.7 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.5, 140.9, 139.3, 136.8, 130.1, 128.6, 128.3, 127.3, 125.5, 53.5, 39.5, 21.8, 21.0; FTIR (cm^{-1}): 2920, 1668, 1594, 1399, 1236, 1184, 1061, 855, 710. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{17}H_{17}NO_2Br]^+$: 346.0807; found: 346.0802.



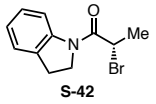


(**S26**)**:** A 250 mL oven-dried round-bottom flask equipped with a stir bar and rubber septum is cooled under a stream of nitrogen. The flask was opened to air, 4-(trifluoromethyl) aniline (2.96 mL, 23.6 mmol) and anhydrous 1,2-dichloroethane (80.0 mL) were sequentially added under air. The rubber septum was replaced, purged with nitrogen for ca. 3 min and then benzaldehyde (2.4 mL, 23.6 mmol) was added dropwise over 3 minutes via syringe. The rubber septum was removed, $NaBH(OAc)_3$ (7.0 g, 33 mmol) was added portion-wise over 15 minutes, and then acetic acid (1.35 mL, 23.6 mmol) was added slowly via pipette, septum replaced, and stirred at rt overnight under nitrogen. The reaction mixture was quenched with $NaHCO_3$ extracted with DCM (3x 30 mL) and combined organic layers were dried over magnesium sulfate, filtered and the filtrate was concentrated in vacuo to afford **S26** (5.0 g) as a yellow oil. The product was taken to the next step without further purification.



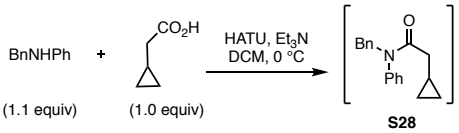


(**S27**): A flame-dried 100mL round bottomed flask equipped with a magnetic stir bar and a rubber septum was cooled under stream of N_2 for 10 minutes. **S26** (5.0 g, 19.9 mmol), and anhydrous THF (40.0 mL) was added sequentially via syringe. The mixture was cooled to 0 °C in an ice bath. n-BuLi (8.64 mL of a 2.60 M solution in hexane, 21.9 mmol) was added to the flask via syringe slowly, and the reaction allowed to stir for 30 minutes at 0 °C. 2-Bromopropionyl bromide (2.3 mL, 21.9 mmol) was added dropwise via syringe. Once the addition is complete, ice bath was removed and the reaction stirred overnight at rt. The septum was removed and the reaction was quenched with saturated NH_4Cl (50.0 mL) and extracted with Et_2O (2x 50 mL). The combined organic layers are washed once with H_2O (50.0 mL). The organic layer was dried over magnesium sulfate, and concentrated in vacuo. The crude reaction was purified by flash silica gel chromatography (95:05 → 90:10 hexanes : ethyl acetate) to afford **S27** (2.5 g, 33% yield) as a pale yellow solid**:** ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.62 (d, *J* = 8.2 Hz, 2H), 7.32 – 7.27 (m, 3H), 7.23 – 7.16 (m, 4H), 5.00 (d, *J* = 14.4 Hz, 1H), 4.80 (d, *J* = 14.4 Hz, 1H), 4.13 (q, *J* = 6.6 Hz, 1H), 1.79 (d, *J* = 6.6 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.2, 144.2, 136.3, 130.8 (q, *J* = 33 Hz*)*,128.9, 128.8, 128.7,127.9, 126.9, 123.6 (q, *J* = 273 Hz), 53.6, 39.1, 21.7; ^{19}F NMR (565 MHz, $CDCl_3$) δ -63.6; FTIR (cm^{-1}): 2928, 1672, 1613, 1324, 1169, 1069, 851; mp = 48-50 °C. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{17}H_{16}NOBrF_3]^+$: 386.0367; found: 386.0369.



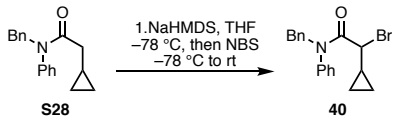
S-(**42**): A hot 100 mL round bottom flask equipped with a magnetic stir bar and rubber septum was purged with a stream of nitrogen until cool. Indoline (1.1 mL, 9.8 mmol), (S)-(–)-2-bromopropanoic acid (0.88 mL, 9.80 mmol), DCM (33.0 mL), and triethylamine (1.37 mL, 9.8 mmol), were added to the flask sequentially via syringe and the reaction flask was cooled to 0 °C in an ice bath. The rubber septum was removed, HATU (4.1 g, 10.8 mmol) was added portion-wise over 3 min, septum replaced and stirred at 0 °C for 2 hours and upon completion (as monitored by TLC) the reaction was quenched with brine (30 mL) and diluted with DCM (30 mL). The resulting biphasic mixture was then transferred to separatory funnel and the layers were separated. The organic layer was washed with brine (2x 30 mL), dried over magnesium sulfate, filtered through a glass frit and concentrated in vacuo to give crude product. The crude reaction was purified by recrystallization using DCM to afford ***S*-(42)** (1.27 g, 51% yield) as white crystalline solid**.** The ^{1}H NMR and ^{13}C NMR matches with racemic **S21;** mp = 138-140 °C; $[\alpha]_D^{24}$=+143.0° (c = 1.00, $CHCl_3$) HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{11}H_{13}NOBr]^+$: 254.0102; found: 254.0169.

R-(**42**) was prepared based on the above procedure and ^{1}H, ^{13}C, NMR matches with racemic **S21** and ***R***-(**42**); specific rotation $[\alpha]_D^{24}$=–143.0°.

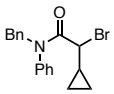


(**S28**): A hot 100 mL round bottom flask equipped with a magnetic stir bar and rubber septum was purged with a stream of nitrogen until cool. N-Benzylaniline (2.0 g, 11.0 mmol), cyclopropyl acetic acid (1.0 g, 10.0 mmol), DCM (33.0 mL), and diisopropylethylamine (5.2 mL, 30.0 mmol), were added to the flask sequentially via syringe and the reaction flask was cooled to 0 °C in an ice bath. The rubber septum was removed, HATU (4.5 g, 12.0 mmol) was added portion-wise over 3 min, septum replaced and stirred at rt for 2 hours and upon completion (as monitored by TLC) the reaction was quenched with brine (30 mL) and diluted with DCM (30 mL). The resulting biphasic mixture was then transferred to separatory funnel and the layers were separated. The organic layer was washed with brine (2x 30 mL),

dried over magnesium sulfate, filtered through a glass frit and concentrated in vacuo to give crude product. The crude reaction was partially purified by flash silica gel chromatography (95:05 → 90:10 hexanes : ethyl acetate) to afford of slightly impure **S28 (**1.72 g**).** The product was taken to the next step without further purification.



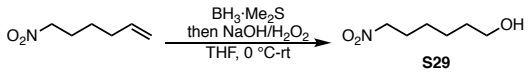
S28 **40**



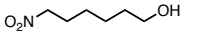
(**40**): A flame-dried 100mL round bottomed flask equipped with a magnetic stir bar and a rubber septum was cooled under stream of N_2 for 10 minutes. **S28** (1.0 g, 3.76 mmol), and anhydrous THF (35 mL) was added sequentially via syringe. The mixture was cooled to –78 °C in a dry-ice/acetone bath. NaHMDS (2.8 mL of a 2.0 M solution in THF, 5.64 mmol) was added to the flask via syringe slowly, and the reaction allowed to stir for 45 minutes at to –78 °C. N-Bromosuccinimide (0.8 g, 4.5 mmol) was dissolved in 8 mL THF and then, the solution was added dropwise via syringe. Once the addition is complete, dry-ice/acetone bath was removed and the reaction stirred overnight at rt. The septum was removed and the reaction was quenched with saturated H_2O (50.0 mL) and extracted with EtOAc (2x 100 mL). The combined organic layers are washed once with H_2O (50.0 mL). The organic layer was dried over magnesium sulfate, and concentrated in vacuo. The crude reaction was purified by flash silica gel chromatography (95:05 hexanes : ethyl acetate) to afford **40** (0.672 g, 52% yield) as a white solid**:** ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.35 – 7.31 (m, 3H), 7.30 – 7.26 (m, 3H), 7.20 (dd, *J* = 7.3, 2.2 Hz, 2H), 7.07 – 6.98 (m, 2H), 5.03 (d, *J* = 14.2 Hz, 1H), 4.77 (d, *J* = 14.3 Hz, 1H), 3.38 (d, *J* = 10.3 Hz, 1H), 1.83 (dddd, *J* = 12.9, 10.0, 8.1, 4.9 Hz, 1H), 0.89 – 0.81 (m, 1H), 0.81 – 0.72 (m, 1H), 0.28 – 0.14 (m, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 168.5, 141.0, 136.7, 129.7, 128.8, 128.6, 128.4, 128.2, 127.5, 53.4, 51.2, 16.1, 9.2, 6.8; FTIR (cm^{-1}): 3062, 1667, 1594, 1498, 1409, 1178, 699; mp = 103-105 °C; HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{18}H_{19}NOBr]^+$: 344.0572; found: 344.0638.

7. Preparation of Novel Starting Nitroalkanes

Note: All yields in this section are unoptimized.

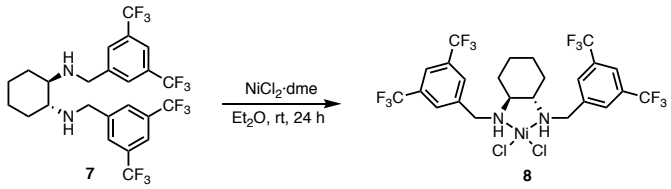


S29

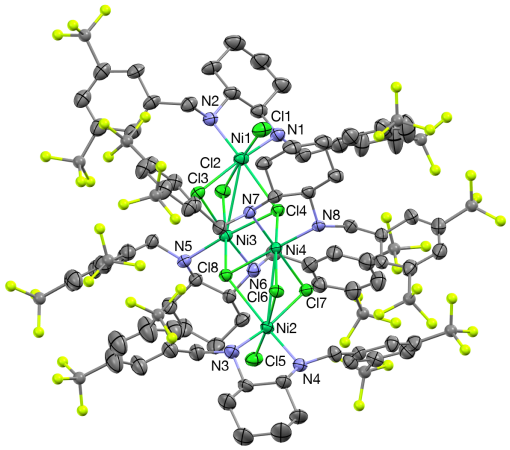


(**S29**): A flame-dried 250 mL round bottom flask equipped with a magnetic stir bar and a rubber septum was charged with the 6-nitrohex-1-ene (3.0 g, 23.2 mmol) and the flask was purged with a stream of nitrogen for 5 minutes and cooled to 0 °C in an ice-water bath. Anhydrous THF (100 mL) was added via syringe. Borane-dimethylsulfide complex (~18.0 mL of a 2M solution in THF, 34.8 mmol) was added to the flask slowly via syringe. The mixture was stirred at 0 °C for 25 minutes, then warmed to rt and stirred for 4 hours. The mixture was stirred was cooled to 0 °C in an ice-water bath and 3M NaOH (12 mL, 34.8 mmol) was added slowly via syringe *(caution: vigorous gas evolution)*. Next, 30% aqueous H_2O_2 (4.0 mL) was added via syringe. The mixture was warmed to rt and stirred overnight. The septum was removed, and the mixture was diluted EtOAc (80 mL) and the layer were separated. The organic layer was washed with brine (50 mL). The combined aqueous layers were extracted with EtOAc (50 mL). The combined organic layers were again washed with brine (50 mL), dried with magnesium sulfate, filtered and concentrated in vacuo. The crude reaction was purified by flash silica gel chromatography (70:30 hexanes : ethyl acetate) to afford **S29** (2.5 g, 74% yield) as a colorless oil**:** ^{1}H NMR (600 MHz, $CDCl_3$): δ 4.39 (t, *J* = 7.0 Hz, 2H), 3.65 (t, *J* = 6.5 Hz, 2H), 2.14 – 1.84 (m, 2H), 1.58 (tdd, *J* = 6.9, 5.4, 2.6 Hz, 2H), 1.43 (p, *J* = 3.7 Hz, 4H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 75.5, 62.4, 32.2, 27.3, 26.0, 25.0; FTIR (cm^{-1}): 3355, 2935, 1551, 1434, 1383, 1055, 733. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_6H_{14}NO_3]^+$: 148.0895; found: 148.0962.

8. Synthesis of the Single-Component Precatalyst 8 and X-ray Structure



A 100 mL oven-dried round-bottom flask equipped with magnetic stir bar was sealed with a septum and cooled under a stream of nitrogen. The septum was partly removed and the diamine ligand **7** (1.36 g, 2.4 mmol) and anhydrous $NiCl_2{\cdot}$dme (0.54 g, 2.4 mmol) were added. The septum was replaced, purged with nitrogen for ca. 3 min and anhydrous Et_2O (64 mL) was added under nitrogen. The reaction mixture was stirred under nitrogen at rt for 24 h. The reaction was concentrated under reduced pressure and the contents were dissolved in DCM (10 mL). The insoluble particles were removed using filtration through filter paper and product recrystallized by vapor diffusion (DCM/hexanes) to afford green crystals. X-ray quality crystals were obtained by slow evaporation of saturated solution of complex **8** in toluene. The complex **8** crystallized as tetrameric species. To further characterize **8**, the DCM was decanted and the green crystals were washed with hexane. The crystals were transferred to a new vial via spatula and crushed to provide a green powder. The resulting complex **8** was dried under vacuum to afford 1.43 g, 85 % yield. Anal. Calculated: C, 41.42%; H, 3.48%; N, 4.02%; Found: C, 41.32%; H, 3.15%; N, 4.95%. mp = >300 °C. HRMS (LIFDI) $(M)^+$ m/z, calculated for $[C_{24}H_{22}Cl_2F_{12}N_2Ni]^+$: 694.0322; found: 694.0334.



X-ray Structure of **8** (Tetramer in Solid State)

9. Description of Thermoelectric Cooling Block

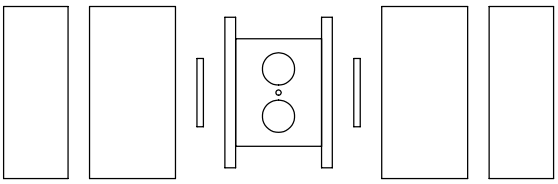
It is important to mention that the asymmetric alkylation of nitroalkane reaction was air sensitive and attempts to run the reaction on the bench-top adversely affected the yield. Consequently, the reaction was performed in the oxygen-free glove box. The enantioselectivity of the reaction was slightly higher at 0 °C, hence we designed and built a thermoelectric cooling block which could be used inside the glove box. The pictorial representation of the cooling block is depicted below.

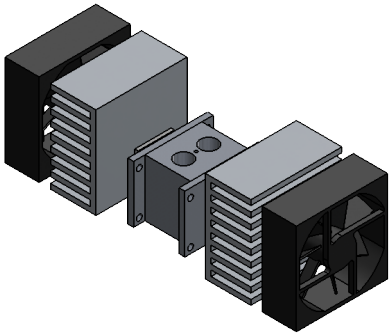
The low cost solid state cooling apparatus capable of chilling magnetically stirred sample vials in an inert glovebox without the potential to introduce moisture or other contaminants to the environment.

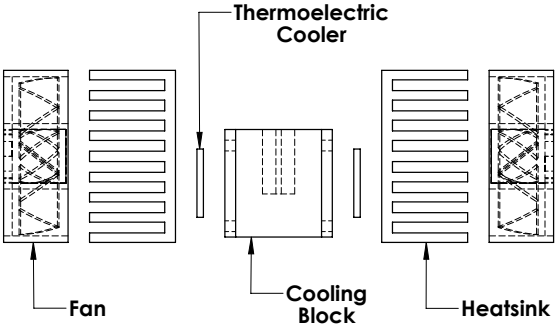
At the center of the cooling unit is an aluminum block with multiple machined holes designed to hold sample vials. Cooling is achieved by thermoelectric elements mounted on either side of the block. The cold side of each thermoelectric element is mounted to opposite ends of the cooling block and the warm side of each element is mounted to a heatsink and fan assembly designed to remove heat and allow for optimal cooling. A thermocouple is mounted onto the top of the cooling block to provide temperature measurement. The thermoelectric elements and fans are powered by a single 12Vdc power supply. In this configuration, the thermoelectric elements are running at full power and will lower the temperature of the block to a uniform temperature approximately 30 °C below the interior temperature of the glovebox. The entire apparatus can be easily placed on top of a magnetic stir plate. The close proximity between the stir bar in the bottom of the vial and the top of the stir plate allows for strong magnetic coupling ensuring consistent and reliable stirring.

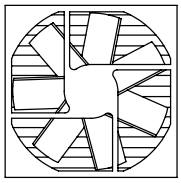
Details of thermoelectric cooling block is provided below and specific part numbers of items are included for reference however, similar parts from other manufacturer serve the same purpose.

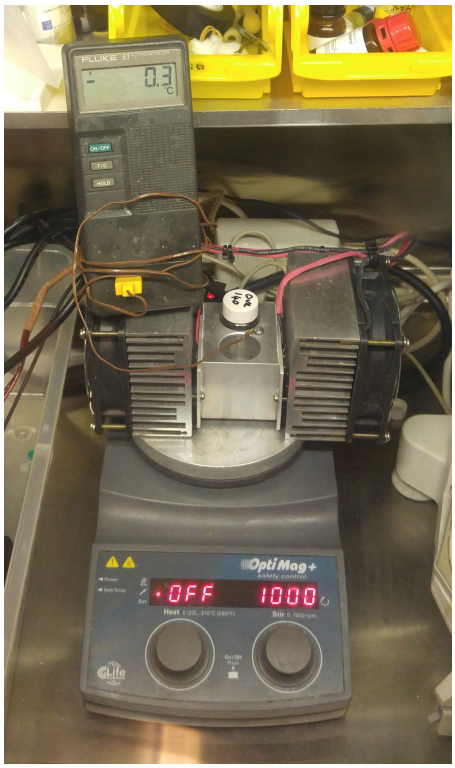
The thermoelectric element, fan and heatsink were purchased as a compete set from Adafruit.com (Part number 1135). The element is a 12VDC 5A thermoelectric Peltier part number TEC1-12706. Binzet model 1210 power supply was used but any generic 12VDC 10 Amp power supply can be used.






Thermoelectric Cooler
Fan
Cooling Block
Heatsink

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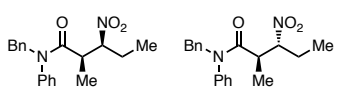
10. Asymmetric Alkylation of Nitroalkanes

***General Protocol C**:* Synthesis of enantioenriched β-nitroamide at 0 °C (5 min prestirring): In a nitrogen-filled glovebox, **8** (0.1 equiv) and anhydrous Et_2O (4.0 mL) was added into a 20 mL vial containing magnetic stir bar, which was sealed with a Teflon-lined screw cap and the resulting mixture was stirred at rt for 30 min. In a separate 20 mL vial, base (1.1 equiv), nitroalkane (1.2 equiv), anhydrous Et_2O (4.0 mL), and stir bar were added sequentially, the vial was capped with a Teflon-lined screw cap. The resulting suspension then stirred at rt for 5 min. After 5 min, the electrophile (1.0 equiv) was added as a solid (unless otherwise noted) to vial containing nitronate anion, and was cooled to 0 °C. Et_2Zn was then added into the vial containing catalyst, stirred for 2 minutes at rt, and then was cooled to 0 °C. The resulting brown, homogeneous catalyst solution was transferred to vial containing nitronate anion via pipette; followed by 2.0 mL Et_2O rinse. The reaction mixture was then stirred vigorously at 0 °C for indicated time (ca. 20-26 h). Once completed, the reaction was warmed to rt and removed from the glovebox. The reaction mixture was then opened to air, diluted with Et_2O (10 mL) and filtered through Celite, which was then rinsed with Et_2O (15 mL). The filtrate was concentrated *in vacuo* and the crude reaction was purified by silica gel flash chromatography.

***General Protocol D**:* Synthesis of enantioenriched β-nitroamide at 0 °C (30 min prestirring): In a nitrogen-filled glovebox, **8** (0.1 equiv) and anhydrous Et_2O (4.0 mL) was added into a 20 mL vial containing magnetic stir bar, which was sealed with a Teflon-lined screw cap and the resulting mixture was stirred at rt for 30 min. In a separate 20 mL vial, base (1.1 equiv), nitroalkane (1.2 equiv), anhydrous Et_2O (4.0 mL), and stir bar were added sequentially, the vial was capped with a Teflon-lined scew cap. The resulting suspension then stirred at rt for 30 min. After 30 min, the electrophile (1.0 equiv) was added as a solid (unless otherwise noted) to vial containing nitronate anion, and was cooled to 0 °C. Et_2Zn was then added into the vial containing catalyst, stirred for 2 minutes at rt, and then was cooled to 0 °C. The resulting brown, homogeneous catalyst solution was transferred to vial containing nitronate anion via pipette; followed by 2.0 mL Et_2O rinse. The reaction mixture was then stirred vigorously at 0 °C for indicated time (ca. 20-26 h). Once completed, the reaction was warmed to room temperature and removed from the glovebox. The reaction mixture was then opened to air, diluted with Et_2O (10 mL) and filtered through Celite, which was then rinsed with Et_2O (15 mL). The filtrate was concentrated *in vacuo* and the crude reaction was purified by silica gel flash chromatography.

***General Protocol E**:* Synthesis of enantioenriched β-nitroamide at rt (5 min prestirring): In a nitrogen-filled glovebox, **8** (0.1 equiv) and anhydrous Et_2O (4.0 mL) was added into a 20 mL vial containing magnetic stir bar, which was sealed with a Teflon-lined screw cap and the resulting mixture was stirred at rt for 30 min. In a separate 20 mL vial, base (1.1 equiv), nitroalkane (1.2 equiv), anhydrous Et_2O (4.0 mL), and stir bar were added sequentially, the vial was capped with a Teflon-lined scew cap. The resulting suspension then stirred at rt for 5 min. After 5 min, the electrophile (1.0 equiv) was added as a solid (unless otherwise noted) to vial containing nitronate anion. Et_2Zn was then added into the vial containing catalyst, stirred for 2 minutes at rt. The resulting brown, homogeneous catalyst solution was transferred to vial containing nitronate anion via pipette; followed by 2.0 mL Et_2O rinse. The reaction mixture was then stirred vigorously at rt for indicated time (ca. 20-26 h). Once completed, the reaction was warmed to room temperature and removed from the glovebox. The reaction mixture was then opened to air, diluted with Et_2O (10 mL) and filtered through Celite, which was then rinsed with Et_2O (15 mL). The filtrate was concentrated *in vacuo* and the crude reaction was purified by silica gel flash chromatography.

Asymmetric Alkylation Reactions:



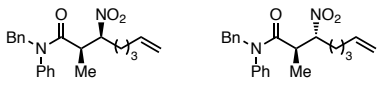
1A **75:25** **1B**

(**1**) According to general protocol C: **8** (34.7 mg, 0.05 mmol), N-benzyl-2-bromo-N-phenylpropionamide (318 mg, 1.0 mmol), 1-nitropropane (107 μL, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.01 mmol, 10 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 cooled to 0 °C with rapid stirring for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed a 75:25 mixture

of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (95:5 → 90:10 hexanes : ethyl acetate) to afford two diastereomerically pure products **1** (290 mg, 89% combined).

1A (syn diastereomer) (91%ee, 221 mg, 68%, clear oil): The enantiomeric excess was determined to be 91% by chiral HPLC analysis (CHIRALPAK IB, 1.0 mL/min, 0.8% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 13.858 min, t_R(minor) = 15.236 min. $[\alpha]_D^{24}$=–49.2° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.40 – 7.34 (m, 3H), 7.31 – 7.23 (m, 3H), 7.19 – 7.12 (m, 2H), 6.95 – 6.89 (m, 2H), 4.87 (q, 2H), 4.70 (td, *J* = 10.6, 3.1 Hz, 1H), 2.82 (dq, *J* = 10.3, 6.7 Hz, 1H), 1.85 (dqd, *J* = 14.9, 7.5, 3.1 Hz, 1H), 1.77 (ddq, *J* = 14.3, 10.8, 7.2 Hz, 1H), 1.08 (d, *J* = 6.6 Hz, 3H), 0.92 (t, *J* = 7.3 Hz, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 171.9, 141.2, 136.9, 130.0, 128.9, 128.7, 128.5, 128.4, 127.7, 93.4, 53.2, 41.0, 25.8, 15.7, 10.4; FTIR (cm^{-1}): 2974, 2881, 1653, 1545, 1405, 1200, 812, 700. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{19}H_{23}N_2O_3]^+$: 327.1703; found: 327.1704.

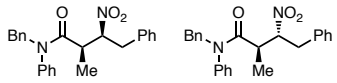
1B (anti diastereomer) (83%ee, 70 mg, 21%, off-white solid): The enantiomeric excess was determined to be 83% by chiral HPLC analysis (CHIRALPAK IB, 1.0 mL/min, 0.8% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 36.585 min, t_R(minor) = 40.556 min. $[\alpha]_D^{24}$=+54.5° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.38 – 7.30 (m, 3H), 7.29 – 7.20 (m, 3H), 7.15 – 7.09 (m, 2H), 7.11 – 7.05 (m, 2H), 4.90 (d, *J* = 14.3 Hz, 1H), 4.86 (ddd, *J* = 10.1, 8.7, 3.5 Hz, 1H), 4.78 (d, *J* = 14.3 Hz, 1H), 3.01 (dq, *J* = 10.1, 7.0 Hz, 1H), 1.96 (dqd, *J* = 14.9, 7.5, 3.6 Hz, 1H), 1.67 (ddq, *J* = 14.7, 8.8, 7.3 Hz, 1H), 1.06 (d, *J* = 7.0 Hz, 3H), 0.85 (t, *J* = 7.4 Hz, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 172.9, 141.4, 137.1, 129.6, 128.7, 128.6, 128.4, 128.3, 127.4, 90.5, 53.2, 39.2, 23.9, 14.5, 9.3; FTIR (cm^{-1}): 2975, 1653, 1545, 1407, 1259, 810, 700; mp = 101-103 °C. HRMS (ESI) m/z calculated for $[C_{19}H_{23}N_2O_3]^+$ $(M+H)^+$: 327.1703; found: 327.1704.



(**10**) According to general protocol C: **8** (69.4 mg, 0.1 mmol), N-benzyl-2-bromo-N-phenylpropionamide (318 mg, 1.0 mmol), 1-nitrohexene (164 μL, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 cooled to 0 °C with rapid stirring for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed a 79:21 mixture of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (100:0 → 95:05 hexanes : ethyl acetate) to afford two diastereomerically pure products **10** (307 mg, 84% combined).

10A (syn diastereomer) (91%ee, 241 mg, 66%, clear oil): The enantiomeric excess was determined to be 91% by chiral HPLC analysis (CHIRALPAK IC, 1.0 mL/min, 2.0% *i*-PrOH/hexane, λ=210 nm); t_R(major) = 18.968 min, t_R(minor) = 15.837 min. $[\alpha]_D^{24}$=–30.1° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.37 (dp, *J* = 5.5, 2.0 Hz, 3H), 7.29 – 7.26 (m, 3H), 7.19 – 7.12 (m, 2H), 6.94 – 6.86 (m, 2H), 5.73 (ddt, *J* = 17.0, 10.2, 6.7 Hz, 1H), 5.06 – 4.93 (m, 3H), 4.81 – 4.70 (m, 2H), 2.81 (dq, *J* = 10.3, 6.7 Hz, 1H), 2.14 – 1.97 (m, 2H), 1.82 – 1.70 (m, 2H), 1.49 – 1.36 (m, 1H), 1.37 – 1.26 (m, 1H), 1.08 (d, *J* = 6.6 Hz, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 171.8, 141.2, 137.4, 137.0, 130.0, 129.0, 128.7, 128.5, 128.4, 127.7, 115.5, 91.8, 53.3, 41.1, 32.8, 31.7, 24.9, 15.6; FTIR (cm^{-1}): 3064, 2929, 1653, 1549, 1405, 1262, 915, 701. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{22}H_{27}N_2O_3]^+$: 367.2016; found: 327.2014.

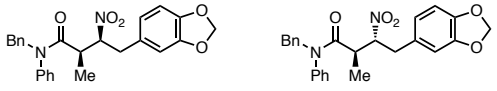
10B (anti diastereomer) (79%ee, 66 mg, 18%, clear oil): The enantiomeric excess was determined to be 79% by chiral HPLC analysis (CHIRALPAK IB, 1.0 mL/min, 0.8% *i*-PrOH/hexane, λ=210 nm); t_R(major) = 31.082 min, t_R(minor) = 28.802 min. $[\alpha]_D^{24}$=+50.3° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.38 – 7.32 (m, 3H), 7.29 – 7.21 (m, 3H), 7.14 – 7.10 (m, 2H), 7.10 – 7.02 (m, 2H), 5.68 (ddt, *J* = 16.9, 10.2, 6.7 Hz, 1H), 5.00 – 4.92 (m, 2H), 4.92 – 4.84 (m, 2H), 4.78 (d, *J* = 14.3 Hz, 1H), 2.99 (dq, *J* = 10.1, 7.0 Hz, 1H), 2.10 – 1.95 (m, 2H), 1.88 – 1.79 (m, 1H), 1.64 (dtd, *J* = 14.8, 9.8, 5.1 Hz, 1H), 1.34 (dddt, *J* = 16.3, 13.5, 10.9, 6.5 Hz, 2H), 1.06 (d, *J* = 7.0 Hz, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 172.8, 141.3, 137.3, 137.0, 129.6, 128.7, 128.3, 128.3, 127.4, 89.3, 53.1, 39.8, 32.7, 30.0, 24.1, 14.5; FTIR (cm^{-1}): 3064, 2930, 1653, 1548, 1409, 1251, 916, 701. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{22}H_{27}N_2O_3]^+$: 367.2016; found: 367.2015.



(**11**) According to general protocol E: **8** (34.7 mg, 0.05 mmol), N-benzyl-2-bromo-N-phenylpropionamide (318 mg, 1.0 mmol), 2-phenylnitroethane (181 mg, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.01 mmol, 10 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 and stirred rapidly at rt for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed an 88:12 mixture of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (95:05 → 85:15 hexanes : ethyl acetate) to afford two diastereomerically pure products **11** (321 mg, 83% combined).

11A (syn diastereomer) (87%ee, 274 mg, 71%, clear oil): The enantiomeric excess was determined to be 87% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 5.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 11.475 min, t_R(minor) = 10.712 min. $[\alpha]_D^{24}$=–58.2° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ7.39 (p, *J* = 3.5 Hz, 2H), 7.31 – 7.21 (m, 6H), 7.21 – 7.16 (m, 2H), 7.15 – 7.10 (m, 2H), 6.95 (dd, *J* = 6.6, 3.0 Hz, 2H), 5.04 – 4.94 (m, 2H), 4.83 (d, *J* = 14.1 Hz, 1H), 3.14 (dd, *J* = 14.3, 2.9 Hz, 1H), 3.00 – 2.87 (m, 3H), 1.11 (d, *J* = 6.7 Hz, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 171.7, 141.1, 136.9, 135.4, 128.9, 128.7, 128.6, 128.5, 128.4, 127.7, 127.4, 93.3, 53.3, 41.1, 38.4, 15.5; FTIR (cm^{-1}): 3031, 2980, 1652, 1553, 1456, 1258, 859, 747. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{24}H_{25}N_2O_3]^+$: 389.1859; found: 389.1860.

11B (anti diastereomer) (68%ee, 47 mg, 12%, clear oil): The enantiomeric excess was determined to be 68% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 5.0% *i*-PrOH/hexane, λ=254 nm); t_R(major) = 23.708 min, t_R(minor) = 13.292 min. $[\alpha]_D^{24}$=+46.5° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ7.35 – 7.28 (m, 3H), 7.27 – 7.20 (m, 6H), 7.14 – 7.09 (m, 2H), 7.04 – 6.98 (m, 4H), 5.09 (td, *J* = 9.4, 3.8 Hz, 1H), 4.92 (d, *J* = 14.3 Hz, 1H), 4.75 (d, *J* = 14.4 Hz, 1H), 3.21 (dd, *J* = 14.7, 3.8 Hz, 1H), 3.04 (dq, *J* = 9.7, 6.9 Hz, 1H), 2.91 (dd, *J* = 14.7, 9.0 Hz, 1H), 1.18 (d, *J* = 6.9 Hz, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ172.6, 141.3, 137.0, 134.9, 129.6, 128.7, 128.7, 128.7, 128.4, 128.3, 127.4, 127.4, 90.5, 53.1, 39.6, 36.9, 14.6; FTIR (cm^{-1}): 3648, 2360, 1653, 1558, 1456, 1250, 858, 699. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{24}H_{25}N_2O_3]^+$: 389.1859; found: 389.1861.

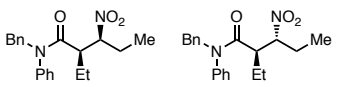


(**12**) According to general protocol C: **8** (69.4 mg, 0.1 mmol), N-benzyl-2-bromo-N-phenylpropionamide (318 mg, 1.0 mmol), 5-(2-nitroethyl)benzo[1,3]dioxole (234 mg, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 cooled to 0 °C with rapid stirring for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed a 83:17 mixture of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (90:10 → 80:20 hexanes : ethyl acetate) to afford two diastereomerically pure products **12** (346 mg, 80% combined).

12A (syn diastereomer) (89%ee, 295 mg, 68%, clear oil): The enantiomeric excess was determined to be 89% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 3.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 31.504 min, t_R(minor) = 34.915 min. $[\alpha]_D^{24}$=–77.5° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ7.44 – 7.36 (m, 3H), 7.32 – 7.25 (m, 3H), 7.19 (dd, *J* = 7.3, 2.3 Hz, 2H), 7.00 – 6.91 (m, 2H), 6.70 (d, *J* = 7.9 Hz, 1H), 6.63 (d, *J* = 1.7 Hz, 1H), 6.57 (dd, *J* = 7.9, 1.7 Hz, 1H), 5.93 (s, 2H), 4.99 – 4.91 (m, 2H), 4.84 (d, *J* = 14.1 Hz, 1H), 3.05 (dd, *J* = 14.2, 2.8 Hz, 1H), 2.92 – 2.84 (m, 2H), 1.11 (d, *J* = 6.7 Hz, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ171.6, 147.9, 146.9, 141.0, 136.9, 130.0, 129.0, 128.9, 128.8, 128.5, 128.4, 127.7, 121.9, 109.0, 108.4, 101.0, 93.6, 53.3, 41.0, 38.2, 15.5; FTIR (cm^{-1}): 2979, 1652, 1550, 1492, 1249, 1039, 701. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{25}H_{25}N_2O_5]^+$: 433.1758; found: 433.1764.

12B (anti diastereomer) (81%ee, 51 mg, 12%, clear oil): The enantiomeric excess was determined to be 81% by chiral HPLC analysis (CHIRALPAK IB, 1.0 mL/min, 3.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 28.783 min, t_R(minor) = 25.203 min. $[\alpha]_D^{24}$=+6.4° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.36 – 7.29 (m, 3H), 7.27 – 7.20 (m, 3H), 7.14 – 7.09 (m, 2H), 7.05 – 6.97 (m, 2H), 6.65 (d, *J* = 7.9 Hz, 1H), 6.49 (s, 1H), 6.45 (dd, *J* = 8.0, 1.7 Hz, 1H), 5.92 (d, 2H), 5.02 (td, *J* = 9.4, 3.8 Hz, 1H), 4.91 (d, *J* = 14.3 Hz, 1H), 4.75 (d, *J* = 14.3 Hz, 1H), 3.12 (dd, *J* = 14.8, 3.8 Hz, 1H), 3.02 (dq, *J* = 9.8, 7.0 Hz, 1H), 2.82 (dd, *J* = 14.7,

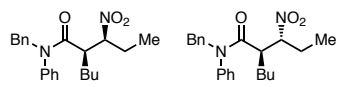
9.1 Hz, 1H), 1.16 (d, *J* = 7.0 Hz, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 172.5, 147.7, 146.9, 141.2, 136.9, 129.6, 128.7, 128.4, 128.3, 128.3, 127.4, 121.9, 109.0, 108.4, 101.0, 90.7, 53.0, 39.6, 36.7, 14.6; FTIR (cm^{-1}): 2936, 2337, 1653, 1550, 1446, 1250, 1039, 701. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{24}H_{25}N_2O_3]^+$: 433.1758; found: 433.1762.



(**22**) According to general protocol C: **8** (69.4 mg, 0.1 mmol), N-benzyl-2-bromo-N-phenylbutanamide (332 mg, 1.0 mmol), 1-nitropropane (107μL, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 cooled to 0 °C with rapid stirring for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed a 55:45 mixture of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (95:05 → 90:10 hexanes : ethyl acetate) to afford two diastereomerically pure products **22** (305 mg, 90% combined).

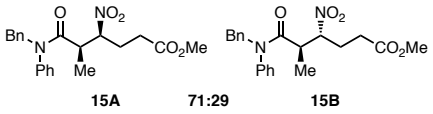
22A (syn diastereomer) (85%ee, 162 mg, 48%, clear oil): The enantiomeric excess was determined to be 85% by chiral HPLC analysis (CHIRALPAK IC, 1.0 mL/min, 3.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 16.928 min, t_R(minor) = 13.016 min. $[\alpha]_D^{24}$=–16.8° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ7.40 – 7.33 (m, 3H), 7.27 (dd, *J* = 5.0, 2.0 Hz, 3H), 7.17 (dd, *J* = 6.5, 2.9 Hz, 2H), 6.95 – 6.89 (m, 2H), 4.90 (q, *J* = 14.0 Hz, 2H), 4.66 (td, *J* = 10.0, 4.3 Hz, 1H), 2.83 (td, *J* = 9.5, 3.9 Hz, 1H), 1.91 – 1.76 (m, 2H), 1.75 – 1.64 (m, 1H), 1.35 (dtd, *J* = 13.7, 7.4, 4.0 Hz, 1H), 0.91 (t, *J* = 7.3 Hz, 3H), 0.87 (t, *J* = 7.5 Hz, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ170.7, 141.0, 137.0, 129.7, 129.1, 129.1, 128.5, 128.4, 127.6, 92.8, 53.5, 46.6, 25.7, 23.9, 10.9, 10.5; FTIR (cm^{-1}): 2970, 1653, 1549, 1495, 1276, 1079, 701. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{25}H_{25}N_2O_5]^+$: 341.1859; found: 341.1854.

22B (anti diastereomer) (81%ee, 143 mg, 42%, off-white solid): The enantiomeric excess was determined to be 81% by chiral HPLC analysis (CHIRALPAK IF, 1.0 mL/min, 3.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 21.365 min, t_R(minor) = 23.468 min. $[\alpha]_D^{24}$=+51.1° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.36 – 7.29 (m, 3H), 7.28 – 7.20 (m, 3H), 7.16 – 7.12 (m, 2H), 7.09 – 7.02 (m, 2H), 4.91 – 4.83 (m, 3H), 3.00 (ddd, *J* = 9.7, 7.4, 4.4 Hz, 1H), 1.92 (dqd, *J* = 14.9, 7.4, 3.4 Hz, 1H), 1.70 (ddq, *J* = 14.5, 9.6, 7.2 Hz, 1H), 1.60 – 1.46 (m, 2H), 0.86 (t, *J* = 7.5 Hz, 6H); ^{13}C NMR (151 MHz, $CDCl_3$) δ171.4, 141.2, 137.1, 129.4, 128.9, 128.8, 128.3, 128.2, 127.4, 90.0, 53.3, 45.0, 23.8, 22.0, 10.6, 9.7; FTIR (cm^{-1}): 2972, 1652, 1546, 1495, 1270, 1079, 700; mp = 88-90 °C. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{20}H_{25}N_2O_3]^+$: 341.1859; found: 341.1854.



(**23**) According to general protocol C: **8** (69.4 mg, 0.1 mmol), N-benzyl-2-bromo-N-phenylhexanamide (360 mg, 1.0 mmol), 1-nitropropane (107μL, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 cooled to 0 °C with rapid stirring for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed a 54:46 mixture of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (95:05 → 90:10 hexanes : ethyl acetate) to afford mixture of diastereomers **23A and 23B** (327 mg, 89% combined, isolated dr 53:47). The enantiomeric excess was determined to be 83% by chiral HPLC analysis for syn diastereomer, **23A** (CHIRALPAK IE, 1.0 mL/min, 3.0% *i*-PrOH/hexane, λ=254 nm); t_R(major) = 13.522 min, t_R(minor) = 15.697 min; The enantiomeric excess was determined to be 77% by chiral HPLC analysis for anti diastereomer, **23B** (CHIRALPAK IE, 1.0 mL/min, 3.0% *i*-PrOH/hexane, λ=254 nm); t_R(major) = 42.670 min, t_R(minor) = 55.276 min. Optical rotation for the mixture of diastereomers **23A** and **23B** $[\alpha]_D^{24}$=–5.9° (c = 1.00, $CHCl_3$); The reported spectra are for a mixture of two diastereomers ^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.41 – 7.30 (m, 7H), 7.29 – 7.22 (m, 4H), 7.20 – 7.11 (m, 5H), 7.04 (d, *J* = 6.7 Hz, 2H), 6.94 – 6.89 (m, 2H), 4.94 – 4.88 (m, 3H), 4.87 – 4.79 (m, 2H), 4.63 (ddd, *J* = 9.9, 8.7, 5.6 Hz, 1H), 3.02 (ddd, *J* = 9.6, 7.8, 4.2 Hz, 1H), 2.85 (td, *J* = 9.6, 3.2 Hz, 1H), 1.92 (ddt, *J* = 14.9, 7.5, 3.8 Hz, 1H), 1.87 – 1.78 (m, 2H), 1.77 – 1.64 (m, 2H), 1.55 – 1.45 (m, 1H), 1.45 – 1.34 (m, 1H), 1.32 – 1.22 (m, 2H), 1.17 (td, *J* = 6.3, 5.1, 2.9 Hz, 7H), 0.94 – 0.80 (m, 12H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 171.7, 170.9, 141.1, 140.9, 137.1, 136.9, 129.7, 129.4, 129.1, 129.1, 128.9, 128.8, 128.6, 128.4, 128.3, 128.2, 127.7, 127.4, 93.1, 90.3, 53.5, 53.3, 45.6, 44.2,

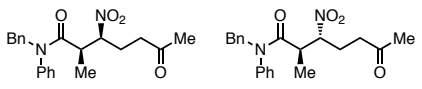
30.7, 28.8, 28.6, 28.2, 25.7, 23.9, 22.9, 22.7, 13.8, 13.8, 10.6, 9.8; FTIR (cm^{-1}): 2958, 1653, 1595, 1495, 1198, 1080, 701. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{22}H_{29}N_2O_3]^+$: 369.2172; found: 369.2166.



(**15**) According to general protocol E: **8** (34.7 mg, 0.05 mmol), N-benzyl-2-bromo-N-phenylpropionamide (318 mg, 1.0 mmol), methyl 4-nitrobutyrate (152 μL, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.01 mmol, 10 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 and stirred rapidly at rt for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed a 71:29 mixture of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (90:10 → 80:20 hexanes : ethyl acetate) to afford two diastereomerically pure products **15** (298 mg, 78% combined).

15A (syn diastereomer) (87%ee, 208 mg, 54%, clear oil): The enantiomeric excess was determined to be 87% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 1.5% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 46.611 min, t_R(minor) = 34.712 min. $[\alpha]_D^{24}$=–27.9° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ7.40 – 7.35 (m, 3H), 7.30 – 7.26 (m, 3H), 7.19 – 7.14 (m, 2H), 6.96 – 6.92 (m, 2H), 4.90 (d, *J* = 14.1 Hz, 1H), 4.83 (d, *J* = 14.1 Hz, 1H), 4.79 (td, *J* = 10.5, 2.9 Hz, 1H), 3.70 (s, 3H), 2.85 (dq, *J* = 10.1, 6.7 Hz, 1H), 2.37 (ddd, *J* = 16.1, 9.7, 6.3 Hz, 1H), 2.28 (ddd, *J* = 16.5, 9.7, 5.1 Hz, 1H), 2.20 (dddd, *J* = 16.2, 9.5, 6.3, 2.9 Hz, 1H), 2.14 – 2.05 (m, 1H), 1.09 (d, *J* = 6.6 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ171.9, 171.4, 140.9, 136.8, 130.0, 128.9, 128.7, 128.5, 128.3, 127.7, 90.8, 53.2, 51.9, 40.9, 30.4, 27.3, 15.6; FTIR (cm^{-1}): 2950, 1734, 1653, 1550, 1495, 1257, 989, 702. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{21}H_{25}N_2O_5]^+$: 385.4320; found: 385.1752.

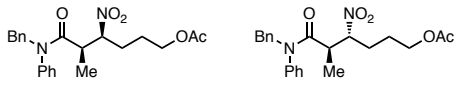
15B (anti diastereomer) (63%ee, 90 mg, 24%, off-white solid): The enantiomeric excess was determined to be 63% by chiral HPLC analysis (CHIRALPAK IB, 1.0 mL/min, 5.0% *i*-PrOH/hexane, λ=254 nm); t_R(major) = 14.988 min, t_R(minor) = 16.460 min. $[\alpha]_D^{24}$=+45.7° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.40 – 7.31 (m, 3H), 7.26 – 7.19 (m, 3H), 7.15 – 7.04 (m, 4H), 4.95 – 4.86 (m, 2H), 4.77 (d, *J* = 14.3 Hz, 1H), 3.65 (s, 3H), 2.98 (dq, *J* = 10.0, 7.0 Hz, 1H), 2.43 – 2.15 (m, 3H), 1.89 (dddd, *J* = 15.1, 10.1, 7.9, 5.2 Hz, 1H), 1.11 (d, *J* = 7.0 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 172.5, 172.2, 141.2, 136.9, 129.7, 128.7, 128.4, 127.4, 88.5, 53.1, 51.9, 39.9, 29.6, 25.9, 14.5; FTIR (cm^{-1}): 2951, 1738, 1654, 1549, 1495, 1257, 1079, 702; mp = 97-99 °C. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{21}H_{25}N_2O_5]^+$: 385.1758; found: 385.1755.



(**16**) According to general protocol D: **8** (69.4 mg, 0.1 mmol), N-benzyl-2-bromo-N-phenylpropionamide (318 mg, 1.0 mmol), 5-nitro-2-pentanone (157 mg, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 cooled to 0 °C with rapid stirring for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed a 67:33 mixture of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (90:10 → 80:20 hexanes : ethyl acetate) to afford two diastereomerically pure products **16** (261 mg, 71% combined).

16A (syn diastereomer) (85%ee, 174 mg, 47%, clear oil): The enantiomeric excess was determined to be 87% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 3.0% *i*-PrOH/hexane, λ=254 nm); t_R(major) = 29.473 min, t_R(minor) = 26.210 min. $[\alpha]_D^{24}$=–31.4° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.41 – 7.35 (m, 3H), 7.31 – 7.24 (m, 3H), 7.16 (dd, *J* = 7.4, 2.1 Hz, 2H), 6.99 – 6.94 (m, 2H), 4.90 (d, *J* = 14.1 Hz, 1H), 4.83 (d, *J* = 14.1 Hz, 1H), 4.73 (td, *J* = 10.6, 2.9 Hz, 1H), 2.85 (dq, *J* = 10.1, 6.6 Hz, 1H), 2.51 (ddd, *J* = 18.1, 9.9, 5.5 Hz, 1H), 2.37 (ddd, *J* = 18.1, 10.2, 4.9 Hz, 1H), 2.17 (ddt, *J* = 14.7, 4.7, 2.2 Hz, 1H), 2.14 (s, 3H), 2.05 – 1.95 (m, 1H), 1.08 (d, *J* = 6.6 Hz, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 205.7, 171.5, 141.0, 136.8, 130.0, 128.9, 128.7, 128.5, 128.4, 127.7, 91.0, 53.3, 41.0, 39.7, 29.9, 26.1, 15.6; FTIR (cm^{-1}): 2938, 1718, 1653, 1594, 1495, 1256, 1079, 702. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{21}H_{25}N_2O_4]^+$: 369.1808; found: 369.1807.

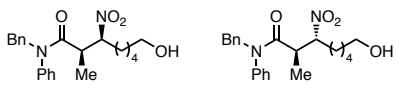
16B (anti diastereomer) (84%ee, 87 mg, 24%, clear oil): The enantiomeric excess was determined to be 84% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 3.0% *i*-PrOH/hexane, λ=254 nm); t_R(major) = 49.050 min, t_R(minor) = 43.622 min. $[\alpha]_D^{24}$=+66.2° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.38 – 7.32 (m, 3H), 7.28 – 7.21 (m, 3H), 7.13 – 7.09 (m, 2H), 7.09 – 7.05 (m, 2H), 4.88 (d, *J* = 14.3 Hz, 1H), 4.84 (td, *J* = 10.3, 3.1 Hz, 1H), 4.78 (d, *J* = 14.3 Hz, 1H), 2.96 (dq, *J* = 10.1, 7.0 Hz, 1H), 2.53 (dt, *J* = 18.5, 7.6 Hz, 1H), 2.42 (ddd, *J* = 18.4, 8.1, 5.1 Hz, 1H), 2.26 – 2.15 (m, 1H), 2.12 (s, 3H), 1.76 (dddd, *J* = 15.4, 10.5, 7.9, 5.2 Hz, 1H), 1.11 (d, *J* = 7.0 Hz, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 206.1, 172.6, 140.9, 136.9, 129.6, 128.7, 128.6, 128.4, 127.4, 88.8, 53.1, 40.2, 38.8, 30.1, 24.7, 14.6; FTIR (cm^{-1}): 2938, 1717, 1653, 1548, 1495, 1256, 1079, 701. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{21}H_{25}N_2O_4]^+$: 369.1808; found: 369.1807.



(**13**) According to general protocol D: **8** (69.4 mg, 0.1 mmol), N-benzyl-2-bromo-N-phenylpropionamide (318 mg, 1.0 mmol), 4-nitrobutyl acetate (172 μL, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 cooled to 0 °C with rapid stirring for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed a 72:28 mixture of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (90:10:1 → 80:20:1 hexanes : ethyl acetate : acetic acid) to afford two diastereomerically pure products **13** (281 mg, 71% combined).

13A (syn diastereomer) (91%ee, 203 mg, 51%, clear oil): The enantiomeric excess was determined to be 91% by chiral HPLC analysis (CHIRALPAK IB, 1.0 mL/min, 1.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 33.625 min, t_R(minor) = 30.039 min. $[\alpha]_D^{24}$=–14.0° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.40 – 7.34 (m, 3H), 7.29 – 7.23 (m, 3H), 7.18 – 7.13 (m, 2H), 6.95 – 6.89 (m, 2H), 4.90 (d, *J* = 14.1 Hz, 1H), 4.84 – 4.73 (m, 2H), 4.10 – 3.99 (m, 2H), 2.82 (dq, *J* = 10.1, 6.7 Hz, 1H), 2.06 (s, 3H), 1.89 – 1.79 (m, 2H), 1.66 (ddq, *J* = 13.0, 9.3, 6.5 Hz, 1H), 1.55 (ddq, *J* = 12.8, 9.1, 6.0 Hz, 1H), 1.08 (d, *J* = 6.6 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ171.5, 170.9, 140.9, 136.8, 130.0, 128.8, 128.7, 128.4, 128.2, 127.6, 91.3, 63.0, 53.2, 41.0, 29.0, 25.1, 20.9, 15.6; FTIR (cm^{-1}): 2938, 1739, 1654, 1550, 1494, 1240, 1079, 702. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{22}H_{27}N_2O_5]^+$: 399.1914; found: 399.1921.

13B (anti diastereomer) (76%ee, 78 mg, 20%, clear oil): The enantiomeric excess was determined to be 77% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 5.0% *i*-PrOH/hexane, λ=210 nm); t_R(major) = 24.744 min, t_R(minor) = 16.721 min. $[\alpha]_D^{24}$=+35.6° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.38 – 7.32 (m, 3H), 7.28 – 7.21 (m, 3H), 7.14 – 7.10 (m, 2H), 7.09 – 7.04 (m, 2H), 4.95 – 4.86 (m, 2H), 4.78 (d, *J* = 14.3 Hz, 1H), 4.07 – 3.97 (m, 2H), 3.00 (dq, *J* = 10.1, 7.0 Hz, 1H), 2.01 (s, 3H), 1.98 – 1.88 (m, 1H), 1.78 – 1.67 (m, 1H), 1.65 – 1.53 (m, 2H), 1.08 (d, *J* = 7.0 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 172.6, 170.9, 141.1, 136.9, 129.6, 128.6, 128.4, 128.4, 127.4, 88.9, 63.1, 53.1, 39.7, 27.3, 24.4, 20.8, 14.5; FTIR (cm^{-1}): 2938, 1738, 1655, 1549, 1495, 1243, 1074, 702. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{22}H_{27}N_2O_5]^+$: 399.1914; found: 399.1923.

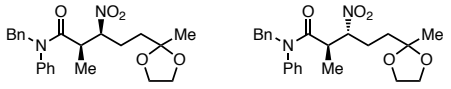


(**14**) According to general protocol D: **8** (69.4 mg, 0.1 mmol), N-benzyl-2-bromo-N-phenylpropionamide (318 mg, 1.0 mmol), 6-nitrohexanol, **S29** (164 μL, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 cooled to 0 °C with rapid stirring for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed a 72:28 mixture of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (85:15:1 → 60:40:1 hexanes : ethyl acetate : acetic acid) to afford two diastereomerically pure products **14** (260 mg, 68% combined).

14A (syn diastereomer) (88%ee, 181 mg, 47%, clear oil): The enantiomeric excess was determined to be 88% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 5.0% *i*-PrOH/hexane, λ=210 nm); t_R(minor) = 24.526 min, t_R(major) = 43.331 min. $[\alpha]_D^{24}$=–28.0° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.40 – 7.36 (m, 3H), 7.30 – 7.26 (m, 3H), 7.19 – 7.14 (m, 2H), 6.95 – 6.90 (m, 2H), 4.91 (d, *J* = 14.1 Hz, 1H), 4.81 (d, *J* = 14.1 Hz, 1H), 4.77 (dt, *J* = 9.9, 5.0 Hz, 1H), 3.64 (q, *J* = 6.2 Hz, 2H), 2.81 (dq, *J* = 10.3, 6.7 Hz, 1H),

1.84 – 1.73 (m, 2H), 1.57 – 1.50 (m, 2H), 1.46 – 1.32 (m, 3H), 1.29 – 1.22 (m, 2H), 1.08 (d, *J* = 6.7 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 171.8, 141.0, 136.9, 130.0, 128.9, 128.7, 128.5, 128.3, 127.7, 91.7, 62.6, 53.2, 41.1, 32.2, 25.6, 24.8, 15.6; FTIR (cm^{-1}): 3421, 2935, 2862, 1653, 1549, 1495, 1200, 1077, 701. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{22}H_{29}N_2O_4]^+$: 385.2121; found: 385.2129.

14B (anti diastereomer) (77%ee, 79 mg, 21%, clear oil): The enantiomeric excess was determined to be 77% by chiral HPLC analysis (CHIRALPAK IB, 1.0 mL/min, 5.0% *i*-PrOH/hexane, λ=210 nm); t_R(major) = 10.167 min, t_R(minor) = 12.878 min. $[\alpha]_D^{24}$=+35.5° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.30 – 7.23 (m, 2H), 7.21 – 7.12 (m, 4H), 7.06 – 7.01 (m, 2H), 6.98 (d, *J* = 6.9 Hz, 2H), 4.83 – 4.78 (m, 2H), 4.70 (d, *J* = 14.3 Hz, 1H), 3.51 (t, *J* = 6.5 Hz, 2H), 2.91 (dq, *J* = 10.0, 7.0 Hz, 1H), 1.75 (dtt, *J* = 14.3, 5.5, 3.3 Hz, 1H), 1.57 (dtd, *J* = 14.5, 9.5, 5.0 Hz, 1H), 1.47 – 1.39 (m, 2H), 1.35 – 1.13 (m, 4H), 0.98 (d, *J* = 7.0 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 172.8, 141.4, 137.1, 129.6, 128.7, 128.6, 128.4, 128.4, 127.4, 89.4, 62.5, 53.2, 39.9, 32.2, 30.7, 25.1, 24.9, 14.6; FTIR (cm^{-1}): 3431, 2933, 2862, 1653, 1548, 1495, 1279, 1074, 701. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{22}H_{29}N_2O_4]^+$: 385.2121; found: 385.2127.



(**17**) According to general protocol D: **8** (34.7 mg, 0.05 mmol), N-benzyl-2-bromo-N-phenylpropionamide (318 mg, 1.0 mmol), 2-methyl-2-(3-nitropropyl)-1,3-dioxolane (210 mg, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.01 mmol, 10 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 cooled to 0 °C with rapid stirring for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed a 71:29 mixture of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (90:10:1 → 80:20:1 hexanes : ethyl acetate : acetic acid) to afford two diastereomerically pure products **17** (353 mg, 86% combined).

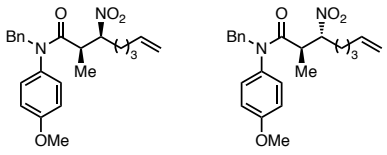
17A (syn diastereomer) (89%ee, 249 mg, 61%, clear oil): The enantiomeric excess was determined to be 89% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 3.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 24.103 min, t_R(minor) = 16.561min. $[\alpha]_D^{24}$=–37.3° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ7.40 – 7.34 (m, 3H), 7.30 – 7.25 (m, 3H), 7.20 – 7.14 (m, 2H), 6.95 – 6.90 (m, 2H), 5.02 (d, *J* = 14.2 Hz, 1H), 4.83 (td, *J* = 10.5, 3.0 Hz, 1H), 4.70 (d, *J* = 14.2 Hz, 1H), 4.00 – 3.84 (m, 4H), 2.81 (dq, *J* = 10.3, 6.6 Hz, 1H), 1.94 (dddd, *J* = 13.7, 10.6, 5.9, 3.0 Hz, 1H), 1.84 (dtd, *J* = 14.6, 10.3, 4.8 Hz, 1H), 1.67 (ddd, *J* = 14.0, 10.0, 5.9 Hz, 1H), 1.56 – 1.51 (m, 1H), 1.28 (s, 3H), 1.08 (d, *J* = 6.6 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ171.7, 141.1, 137.0, 130.0, 128.9, 128.7, 128.5, 128.3, 127.6, 108.9, 91.6, 64.7, 53.2, 41.1, 34.9, 27.0, 24.0, 15.6; FTIR (cm^{-1}): 2982, 1654, 1550, 1495, 1257, 1075, 857, 702. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{23}H_{29}N_2O_5]^+$: 413.1998; found: 413.2070.

17B (anti diastereomer) (75%ee, 104 mg, 25%, off white solid): The enantiomeric excess was determined to be 75% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 3.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 36.984 min, t_R(minor) = 22.725 min. $[\alpha]_D^{24}$=+38.1° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ7.39 – 7.31 (m, 3H), 7.28 – 7.20 (m, 3H), 7.12 (d, 2H), 7.07 (d, *J* = 7.3 Hz, 2H), 4.94 – 4.86 (m, 2H), 4.78 (d, *J* = 14.3 Hz, 1H), 3.93 – 3.87 (m, 2H), 3.87 – 3.80 (m, 2H), 2.99 (dq, *J* = 10.0, 7.0 Hz, 1H), 1.99 (ddt, *J* = 14.9, 11.4, 4.0 Hz, 1H), 1.78 – 1.67 (m, 1H), 1.63 (td, *J* = 13.6, 11.1, 4.7 Hz, 1H), 1.59 – 1.50 (m, 1H), 1.24 (s, 3H), 1.08 (d, *J* = 7.0 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ172.7, 141.2, 136.9, 129.6, 128.6, 128.5, 128.4, 128.3, 127.4, 108.9, 89.3, 64.6, 53.1, 39.7, 34.2, 25.1, 23.82, 14.5; FTIR (cm^{-1}): 2982, 1655, 1548, 1495, 1257, 858, 701; mp = 107-109 °C. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{22}H_{29}N_2O_5]^+$: 413.1998; found: 413.2071.

(**9**) According to general protocol C: **8** (69.4 mg, 0.1 mmol), N-benzyl-2-bromo-N-phenylpropionamide (318 mg, 1.0 mmol), 2-methyl-1-nitropropane (130 μL, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 cooled to 0 °C with rapid stirring for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed an 93:07 mixture of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (95:05 → 90:10 hexanes : ethyl acetate) to afford two diastereomerically pure products **9** (295 mg, 87% combined).

9A (syn diastereomer) (94%ee, 270 mg, 80%, clear oil): The enantiomeric excess was determined to be 94% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 1.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 17.559 min, t_R(minor) = 22.117 min. $[\alpha]_D^{24}$=–74.1° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.40 – 7.35 (m, 3H), 7.29 – 7.26 (m, 3H), 7.17 – 7.12 (m, 2H), 6.99 – 6.94 (m, 2H), 4.90 (d, *J* = 14.1 Hz, 1H), 4.82 (d, *J* = 14.1 Hz, 1H), 4.77 (dd, *J* = 10.2, 4.7 Hz, 1H), 2.92 (dq, *J* = 10.2, 6.6 Hz, 1H), 2.15 (pd, *J* = 6.9, 4.7 Hz, 1H), 1.13 (d, *J* = 6.6 Hz, 3H), 1.00 (d, *J* = 6.9 Hz, 3H), 0.84 (d, *J* = 6.8 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 171.9, 141.0, 136.9, 129.9, 128.9, 128.7, 128.4, 128.2, 127.6, 96.2, 53.2, 38.4, 30.1, 20.1, 17.0, 16.0; FTIR (cm^{-1}): 2972, 1654, 1545, 1495, 1200, 1079, 701. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{20}H_{25}N_2O_3]^+$: 341.1859; found: 341.1849.

9B (anti diastereomer) (76%ee, 25 mg, 7%, clear oil): The enantiomeric excess was determined to be 76% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 5.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 16.688 min, t_R(minor) = 8.950 min. $[\alpha]_D^{24}$=+27.2° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.39 – 7.31 (m, 3H), 7.25 – 7.20 (m, 3H), 7.16 – 7.08 (m, 4H), 4.91 (d, *J* = 14.3 Hz, 1H), 4.85 (dd, *J* = 10.7, 2.8 Hz, 1H), 4.77 (d, *J* = 14.3 Hz, 1H), 3.12 (dq, *J* = 10.7, 7.0 Hz, 1H), 2.03 (ddq, *J* = 13.7, 6.8, 3.5, 2.9 Hz, 1H), 1.09 (d, *J* = 6.9 Hz, 3H), 1.05 (d, *J* = 7.0 Hz, 3H), 0.68 (d, *J* = 6.8 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 173.1, 141.3, 137.0, 129.5, 128.6, 128.4, 128.3, 127.4, 94.0, 53.0, 37.8, 27.8, 20.6, 15.5, 14.6; FTIR (cm^{-1}): 2970, 1655, 1545, 1495, 1259, 1079, 700. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{20}H_{25}N_2O_3]^+$: 341.1859; found: 341.1847.

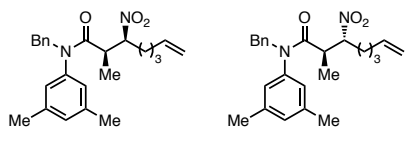


19A **82:18** **19B**

(**19**) According to general protocol C: **8** (69.4 mg, 0.1 mmol), N-benzyl-2-bromo-N-(4-methoxyphenyl)propanamide (**S23**, 348 mg, 1.0 mmol), 1-nitrohexene (164 μL, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 cooled to 0 °C with rapid stirring for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed a 82:18 mixture of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (95:05 → 90:10 hexanes : ethyl acetate) to afford two diastereomerically pure products **19** (312 mg, 79% combined).

19A (syn diastereomer) (90%ee, 260 mg, 66%, white solid): The enantiomeric excess was determined to be 90% by chiral HPLC analysis (CHIRALPAK IC, 1.0 mL/min, 2.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 29.259 min, t_R(minor) = 22.363 min. $[\alpha]_D^{24}$=–35.4° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.30 – 7.24 (m, 3H), 7.19 – 7.13 (m, 2H), 6.87 – 6.83 (m, 2H), 6.80 (d, *J* = 9.1 Hz, 2H), 5.73 (ddt, *J* = 17.0, 10.2, 6.7 Hz, 1H), 5.05 – 4.97 (m, 2H), 4.94 (d, *J* = 14.0 Hz, 1H), 4.79 – 4.73 (m, 1H), 4.70 (d, *J* = 14.0 Hz, 1H), 3.82 (s, 3H), 2.84 (dq, *J* = 10.3, 6.6 Hz, 1H), 2.14 – 1.99 (m, 2H), 1.75 (td, *J* = 8.1, 6.4 Hz, 2H), 1.47 – 1.38 (m, 1H), 1.32 (dddd, *J* = 15.1, 13.3, 8.1, 6.6 Hz, 1H), 1.07 (d, *J* = 6.7 Hz, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 172.1, 159.3, 137.4, 137.1, 133.7, 129.3, 128.9, 128.4, 127.6, 115.4, 115.0, 91.8, 55.4, 53.2, 40.9, 32.7, 31.7, 25.0, 15.5; FTIR (cm^{-1}): 2933, 1653, 1549, 1405, 1250, 1037, 701; mp = 66-68 °C. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{23}H_{29}N_2O_4]^+$: 397.2121; found: 397.2103.

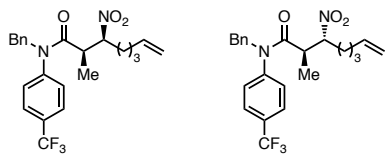
19B (anti diastereomer) (82%ee, 52 mg, 13%, clear oil): The enantiomeric excess was determined to be 82% by chiral HPLC analysis (CHIRALPAK IB, 1.0 mL/min, 0.8% *i*-PrOH/hexane, λ=254 nm); t_R(major) = 44.576 min, t_R(minor) = 40.614 min. $[\alpha]_D^{24}$=+34.7° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.29 – 7.21 (m, 3H), 7.15 – 7.09 (m, 2H), 6.96 (d, *J* = 9.2 Hz, 2H), 6.87 – 6.81 (m, 2H), 5.68 (ddt, *J* = 17.0, 10.3, 6.7 Hz, 1H), 4.99 – 4.93 (m, 2H), 4.88 (td, *J* = 9.8, 3.4 Hz, 1H), 4.85 (d, *J* = 14.3 Hz, 1H), 4.74 (d, *J* = 14.2 Hz, 1H), 3.80 (s, 3H), 3.00 (dq, *J* = 10.1, 7.0 Hz, 1H), 2.11 – 1.96 (m, 2H), 1.89 – 1.79 (m, 1H), 1.65 (dtd, *J* = 14.9, 9.7, 5.3 Hz, 1H), 1.42 – 1.29 (m, 2H), 1.05 (d, *J* = 7.0 Hz, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 173.2, 159.2, 137.3, 137.1, 133.9, 128.8, 128.4, 127.4, 115.5, 114.6, 89.3, 55.3, 53.2, 39.7, 32.7, 30.0, 24.1, 14.5; FTIR (cm^{-1}): 2932, 1653, 1549, 1409, 1250, 916, 700. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{23}H_{29}N_2O_4]^+$: 397.2121; found: 397.2103.



(**21**) According to general protocol C: **8** (69.4 mg, 0.1 mmol), 1-nitrohexene (164 μL, 1.2 mmol), N-benzyl-2-bromo-N-(3,5-dimethylphenyl)propanamide (**S25,** 346 mg, 1.0 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 cooled to 0 °C with rapid stirring for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed a 83:17 mixture of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (95:05 → 90:10 hexanes : ethyl acetate) to afford two diastereomerically pure products **21** (300 mg, 76% combined).

21A (syn diastereomer) (91%ee, 250 mg, 63%, clear oil): The enantiomeric excess was determined to be 91% by chiral HPLC analysis (CHIRALPAK IC, 1.0 mL/min, 2.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 21.293 min, t_R(minor) = 17.692 min. $[\alpha]_D^{24}$=–49.0° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.32 – 7.24 (m, 3H), 7.20 – 7.14 (m, 2H), 6.98 (s, 1H), 6.49 (s, 2H), 5.72 (ddt, *J* = 17.0, 10.2, 6.7 Hz, 1H), 5.05 – 4.95 (m, 2H), 4.91 (d, *J* = 14.0 Hz, 1H), 4.82 – 4.73 (m, 1H), 4.71 (d, *J* = 14.1 Hz, 1H), 2.85 (dq, *J* = 10.3, 6.7 Hz, 1H), 2.26 (s, 6H), 2.15 – 1.96 (m, 2H), 1.80 – 1.69 (m, 2H), 1.50 – 1.36 (m, 1H), 1.36 – 1.24 (m, 1H), 1.07 (d, *J* = 6.7 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 171.7, 141.0, 139.6, 137.4, 137.1, 130.3, 128.9, 128.3, 127.5, 125.8, 115.4, 91.8, 53.2, 40.9, 32.8, 31.7, 24.9, 21.1, 15.7; FTIR (cm^{-1}): 2925, 1653, 1555, 1403, 1217, 915, 711. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{24}H_{31}N_2O_3]^+$: 395.2329; found: 395.2312.

21B (anti diastereomer) (83%ee, 50 mg, 13%, off white solid): The enantiomeric excess was determined to be 83% by chiral HPLC analysis (CHIRALPAK IC, 1.0 mL/min, 8.0% *i*-PrOH/hexane, λ=254 nm); t_R(major) = 39.319 min, t_R(minor) = 50.571 min. $[\alpha]_D^{24}$=+32.2° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.30 – 7.20 (m, 3H), 7.16 – 7.09 (m, 2H), 6.95 (s, 1H), 6.65 (s, 2H), 5.69 (ddt, *J* = 17.0, 10.2, 6.7 Hz, 1H), 5.02 – 4.87 (m, 2H), 4.85 (td, 1H), 4.82 (q, 2H), 3.03 (dq, *J* = 10.0, 7.0 Hz, 1H), 2.26 (s, 6H), 2.13 – 1.94 (m, 2H), 1.90 – 1.76 (m, 1H), 1.72 – 1.59 (m, 1H), 1.44 – 1.28 (m, 2H), 1.06 (d, *J* = 7.0 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 172.8, 141.2, 137.4, 137.2, 129.9, 128.6, 128.3, 127.3, 115.5, 89.3, 53.1, 39.8, 32.8, 29.9, 24.2, 21.1, 14.7; FTIR (cm^{-1}): 2924, 1654, 1549, 1406, 1233, 915, 711; mp = 84-86 °C. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{24}H_{31}N_2O_3]^+$: 395.2329; found: 395.2310.

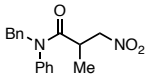


(**20**) According to general protocol C: **8** (69.4 mg, 0.1 mmol), 1-nitrohexene (164 μL, 1.2 mmol), N-benzyl-2-bromo-N-(4-(trifluoromethyl)phenyl)propanamide (**S27,** 386 mg, 1.0 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 cooled to 0 °C with rapid stirring for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed an 79:21 mixture of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (95:05 → 90:10 hexanes : ethyl acetate) to afford two diastereomerically pure products **20** (342 mg, 79% combined).

20A (syn diastereomer) (89%ee, 274 mg, 63%, off white solid): The enantiomeric excess was determined to be 89% by chiral HPLC analysis (CHIRALPAK IC, 1.0 mL/min, 2.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 12.618 min, t_R(minor) = 10.102 min. $[\alpha]_D^{24}$=–29.7° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.65 (d, *J* = 8.2 Hz, 2H), 7.33 – 7.27 (m, 3H), 7.18 – 7.12 (m, 2H), 7.04 (d, *J* = 8.0 Hz, 2H), 5.73 (ddt, *J* = 17.0, 10.2, 6.7 Hz, 1H), 5.06 – 4.94 (m, 3H), 4.80 – 4.72 (m, 2H), 2.74 (dq, *J* = 10.0, 6.7 Hz, 1H), 2.16 – 2.00 (m, 2H), 1.76 (dt, *J* = 9.8, 6.7 Hz, 2H), 1.50 – 1.40 (m, 1H), 1.38 – 1.29 (m, 1H), 1.10 (d, *J* = 6.7 Hz, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 171.4, 144.3, 137.,4 136.4, 131.0 (q, *J* = 33 Hz), 129.0, 128.9, 128.7, 128.0, 127.3, 127.2, 123.5 (q, *J* = 273 Hz), 115.6, 91.5, 53.2, 41.3, 32.8, 31.7, 25.0, 15.6; ^{19}F NMR (565 MHz, $CDCl_3$) δ -62.7; FTIR (cm^{-1}): 2932, 1661, 1555, 1404, 1325, 852, 701; mp = 89-91 °C. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{23}H_{26}N_2O_3F_3]^+$: 435.1890; found: 435.1887.

20B (anti diastereomer) (80%ee, 68 mg, 16%, clear oil): The enantiomeric excess was determined to be 80% by chiral HPLC analysis (CHIRALPAK IC, 1.0 mL/min, 5.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 24.873 min, t_R(minor) = 30.304 min. $[\alpha]_D^{24}$=+37.3° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.63 (d,

J = 8.1 Hz, 2H), 7.31 – 7.23 (m, 3H), 7.21 (d, *J* = 8.0 Hz, 2H), 7.13 – 7.06 (m, 2H), 5.68 (ddt, *J* = 17.0, 10.3, 6.7 Hz, 1H), 5.03 – 4.93 (m, 2H), 4.93 – 4.86 (m, 2H), 4.79 (d, *J* = 14.4 Hz, 1H), 2.92 (dq, *J* = 10.1, 7.0 Hz, 1H), 2.12 – 1.95 (m, 2H), 1.90 – 1.80 (m, 1H), 1.64 (dtd, *J* = 14.9, 9.8, 5.2 Hz, 1H), 1.42 – 1.28 (m, 2H), 1.07 (d, *J* = 7.0 Hz, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 172.5, 144.6, 137.2, 136.5, 130.6 (q, *J* = 33 Hz), 129.1, 128.7, 128.6, 127.8, 126.8, 126.8, 123.6 (q, *J* = 273 Hz), 115.6, 89.3, 53.1, 40.0, 32.7, 30.0, 24.2, 14.6; ^{19}F NMR (565 MHz, $CDCl_3$) δ -62.6; FTIR (cm^{-1}): 2932, 1661, 1550, 1408, 1325, 853, 700. HRMS (ESI) $(M+H)^+$ m/z calculated for $[[C_{23}H_{26}N_2O_3F_3]^+$: 435.1890; found: 435.1887.



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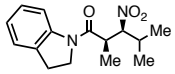
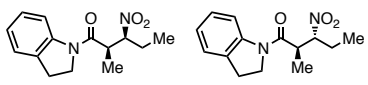
(**18**) According to general protocol C: **8** (69.4 mg, 0.1 mmol), N-benzyl-2-bromo-N-phenylpropionamide (318 mg, 1.0 mmol), nitromethane (322 μL, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 cooled to 0 °C with rapid stirring for 24 h. The reaction was worked up according to the general protocol. The crude reaction was purified by flash silica gel chromatography (90:10 hexanes : ethyl acetate) to afford **18** (82%ee, 121 mg, 41% Yield) as a white solid**.** The enantiomeric excess was determined to be 84% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 3.0% *i*-PrOH/hexane, λ=210 nm); t_R(major) = 20.837 min, t_R(minor) = 18.654 min. $[\alpha]_D^{24}$=+73.0° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.38 – 7.31 (m, 3H), 7.30 – 7.22 (m, 3H), 7.19 – 7.14 (m, 2H), 7.13 – 7.07 (m, 2H), 4.97 (dd, *J* = 14.4, 10.6 Hz, 2H), 4.81 (d, *J* = 14.3 Hz, 1H), 4.17 (dd, *J* = 14.4, 4.0 Hz, 1H), 3.18 (dddd, *J* = 14.1, 10.9, 7.1, 3.9 Hz, 1H), 1.05 (d, *J* = 7.1 Hz, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ172.5, 141.3, 137.0, 129.7, 128.7, 128.6, 128.4, 128.4, 127.4, 76.7, 53.3, 35.0, 14.9; FTIR (cm^{-1}): 2982, 1653, 1551, 1414, 1380, 1079, 699; mp = 110-112 °C. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{23}H_{26}N_2O_3F_3]^+$: 299.1390; found: 299.1386.



24

(**24**) According to general protocol E: **8** (69.4 mg, 0.1 mmol), 2-bromo-1-(indolin-1-yl) propan-1-one (**S21,** 254 mg, 1.0 mmol), 2-methyl-1-nitropropane (128 μL, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 and stirred rapidly at rt for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed a 95:05 mixture of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (90:10 hexanes : ethyl acetate) to afford diastereomerically pure product **24** (99%ee, 242 mg, 88% Yield) as off-white solid. The enantiomeric excess was determined to be 99% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 1.0% *i*-PrOH/hexane, λ=254 nm); t_R(major) = 15.458 min, t_R(minor) = 17.698 min. $[\alpha]_D^{24}$=–58.3° (c = 1.00, $CHCl_3$);^{1}H NMR (400 MHz, DMSO-d_6): δ 8.07 (d, *J* = 8.0 Hz, 1H), 7.26 (d, *J* = 7.4 Hz, 1H), 7.16 (t, *J* = 7.8 Hz, 1H), 7.03 (t, *J* = 7.6 Hz, 1H), 4.73 (dd, *J* = 8.8, 6.7 Hz, 1H), 4.36 – 4.13 (m, 2H), 3.38 – 3.27 (m, 2H), 3.20 (t, *J* = 8.4 Hz, 1H), 2.35 – 2.13 (m, *J* = 6.8 Hz, 1H), 1.17 (d, *J* = 6.7 Hz, 3H), 0.93 (t, *J* = 6.8 Hz, 6H); ^{13}C NMR (101 MHz, DMSO-d_6) δ 169.9, 142.6, 132.3, 127.0, 124.9, 123.9, 116.5, 95.5, 47.7, 39.5, 29.9, 27.4, 19.0, 17.6, 14.1; FTIR (cm^{-1}): 2970, 1656, 1545, 1482, 1413, 1161, 758; mp = 129-131 °C. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{15}H_{21}N_2O_3]^+$: 277.1546; found: 277.1540.



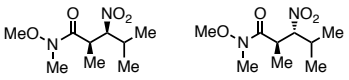
28A **88:12** **28B**

(**28**) According to general protocol E: **8** (69.4 mg, 0.1 mmol), 2-bromo-1-(indolin-1-yl) propan-1-one (**S21,** 254 mg, 1.0 mmol), 1-nitropropane (108 μL, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 and stirred rapidly at rt for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed a 88:12 mixture of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (95:05 → 80:20 hexanes : ethyl acetate) to afford two diastereomerically pure products **28** (225 mg, 86% combined).

28A (syn diastereomer) (85%ee, 198mg, 76%, white solid): The enantiomeric excess was determined to be 85% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 1.0% *i*-PrOH/hexane, λ=254 nm); t_R(major) = 17.566 min, t_R(minor) = 21.375 min. $[\alpha]_D^{24}$=–59.4° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, DMSO-d_6): δ 8.09 (d, *J* = 8.1 Hz, 1H), 7.26 (dd, *J* = 7.5, 1.5 Hz, 1H), 7.16 (t, *J* = 7.8, 1.5 Hz, 1H), 7.04 (t, *J* = 7.4, 1.1 Hz, 1H), 4.68 (td, *J* = 10.6, 9.3, 3.3 Hz, 1H), 4.33 – 4.14 (m, 2H), 3.29 – 3.21 (m, 1H), 3.18 (t, *J* = 8.5 Hz, 2H), 1.95 (ddq, *J* = 14.4, 10.6, 7.2 Hz, 1H), 1.78 (dqd, *J* = 14.7, 7.5, 3.3 Hz, 1H), 1.16 (d, *J* = 6.7 Hz, 3H), 0.86

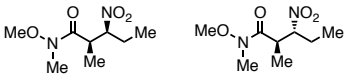
(t, *J* = 7.3 Hz, 3H); ^{13}C NMR (101 MHz, DMSO-d_6) δ 169.8, 142.5, 132.4, 127.0, 124.9, 124.0, 116.5, 92.8, 47.8, 42.0, 27.4, 25.2, 14.4, 10.2; FTIR (cm^{-1}): 2973, 1653, 1548, 1482, 1263, 940, 759; mp = 72-74 °C. HRMS (ESI) (M+H)$^+$ m/z calculated for $[C_{15}H_{21}N_2O_3]^+$: 263.1317; found: 263.1386.

28B (anti diastereomer) (64%ee, 27 mg, 10%, white solid): The enantiomeric excess was determined to be 64% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 5.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 15.807 min, t_R(minor) = 11.990 min. $[\alpha]_D^{24}$=+21.9° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, DMSO-d_6): δ 8.00 (d, *J* = 8.0 Hz, 1H), 7.25 (d, *J* = 7.3 Hz, 1H), 7.14 (t, *J* = 7.7 Hz, 1H), 7.01 (dd, *J* = 8.1, 6.9 Hz, 1H), 4.86 (td, *J* = 9.7, 8.3, 3.6 Hz, 1H), 4.21 (ddd, *J* = 9.6, 7.8, 2.6 Hz, 2H), 3.45 – 3.35 (m, 1H), 3.20 (t, *J* = 8.5 Hz, 2H), 2.16 – 2.02 (m, 1H), 1.92 – 1.77 (m, 1H), 1.20 (d, *J* = 6.9 Hz, 3H), 0.89 (t, *J* = 7.4 Hz, 3H); ^{13}C NMR (101 MHz, DMSO-d_6) δ 171.5, 142.6, 132.1, 127.0, 124.9, 123.8, 116.3, 90.1, 47.6, 40.6, 27.4, 23.7, 13.5, 9.2; FTIR (cm^{-1}): 2975, 1655, 1548, 1420, 1278, 1132, 759; mp = 102-104 °C. HRMS (ESI) (M+H)$^+$ m/z calculated for $[C_{15}H_{21}N_2O_3]^+$: 263.1317; found: 263.1391.



27A **93:07** **27B**

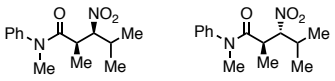
(**27**) According to general protocol E: **8** (69.4 mg, 0.1 mmol), 2-bromo-N-methoxy-N-methylpropanamide (196 mg, 1.0 mmol), 2-methyl-1-nitropropane (130 μL, 1.2 mmol), potassium tert-butoxide (123 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 and stirred rapidly at rt for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed a 93:07 mixture of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (90:10 hexanes : ethyl acetate) to afford a mixture of diastereomers **27** (90%ee, isolated dr 96:04, 161 mg, 74% Yield) as clear oil: The enantiomeric excess was determined to be 90% for **27A** by chiral HPLC analysis (CHIRALPAK IB, 1.0 mL/min, 2.0% *i*-PrOH/hexane, λ=210 nm); t_R(major) = 7.159 min, t_R(minor) = 7.980 min. $[\alpha]_D^{24}$=–22.3° (c = 1.00, $CHCl_3$); The enantiomeric excess was determined to be 44% for **27B** by chiral HPLC analysis (CHIRALPAK IB, 1.0 mL/min, 2.0% *i*-PrOH/hexane, λ=210 nm); t_R(major) = 13.241 min, t_R(minor) = 12.513 min. ^{1}H NMR (400 MHz, $CDCl_3$: mixture of diastereomers; useful diagnostic peaks for each compound are listed. See attached spectra for details): δ **27A:** 4.68 (dd, *J* = 10.4, 5.2 Hz, 1H), 3.75 (s, 3H), 3.58 (dq, *J* = 10.1, 6.8 Hz, 1H), 3.18 (s, 3H), 2.15 (pd, *J* = 6.9, 5.3 Hz, 1H), 1.17 (d, *J* = 6.8 Hz, 3H), 0.97 (dd, *J* = 6.9, 2.7 Hz, 6H), **27B:** 4.81 (dd, *J* = 11.0, 3.1 Hz, 1H), 1.12 (d, *J* = 6.9 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ **27A:** 173.4, 95.6, 61.7, 36.8, 32.3, 30.2, 19.7, 17.0, 15.4, **27B:** 93.1, 61.4, 27.8, 20.6, 13.8; FTIR (cm^{-1}): 2973, 1664, 1548, 1464, 1376, 1178, 996. HRMS (ESI) (M+H)$^+$ m/z calculated for $[C_9H_{19}N_2O_4]^+$: 219.1267; found: 219.1339.



31A **92:08** **31B**

(**31**) According to general protocol E: **8** (69.4 mg, 0.1 mmol), 2-bromo-N-methoxy-N-methylpropanamide (196 mg, 1.0 mmol), 1-nitropropane (108 μL, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 and stirred rapidly at rt for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed a 92:08 mixture of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (95:05 → 90:10 hexanes : ethyl acetate) to afford a mixture of diastereomers **31** (85%ee, isolated dr 93:07, 147 mg, 74% Yield) as clear oil: The enantiomeric excess was determined to be 85% for **31A** by chiral HPLC analysis (CHIRALPAK IF, 1.0 mL/min, 2.0% *i*-PrOH/hexane, λ=210 nm); t_R(major) = 11.489 min, t_R(minor) = 14.258 min. $[\alpha]_D^{24}$=–47.3° (c = 1.00, $CHCl_3$); The enantiomeric excess was determined to be 52% for **31B** by chiral HPLC analysis (CHIRALPAK IB, 1.0 mL/min, 2.0% *i*-PrOH/hexane, λ=210 nm); t_R(major) = 28.742 min, t_R(minor) = 33.026 min. ^{1}H NMR (600 MHz, $CDCl_3$: mixture of diastereomers; useful diagnostic peaks for each compound are listed. See attached spectra for details): δ **31A:** 4.63 (td, *J* = 10.6, 3.0 Hz, 1H), 3.74 (s, 3H), 3.42 (dq, *J* = 13.3, 6.8 Hz, 1H), 3.20 (s, 3H), 1.89 (ddq, *J* = 14.4, 10.5, 7.2 Hz, 1H), 1.77 (dqd, *J* = 14.8, 7.4, 3.0 Hz, 1H), 1.17 (d, *J* = 6.8 Hz, 3H), 0.94 (t, *J* = 7.3 Hz, 3H), **31B:** 4.81 (td, *J* = 10.2, 8.7, 3.5 Hz, 1H), 3.78 (s, 3H), 3.52 (dq, *J* = 8.5 Hz, 1H), 3.18 (s, 3H), 2.08 (ddt, *J* = 11.0, 7.5, 3.6 Hz, 1H), 0.98 (t, *J* = 7.4 Hz, 3H), ^{13}C NMR (101 MHz, $CDCl_3$) δ **31A:** 172.9, 92.8, 61.8, 39.4, 32.1, 25.9, 15.0, 10.3, **31B:** 89.5, 61.4, 38.1, 31.9, 23.9, 13.6, 9.3; FTIR (cm-

[1]): 2975, 1663, 1550, 1462, 1376, 1178, 994. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_8H_{17}N_2O_4]^+$: 205.1110; found: 205.1183.

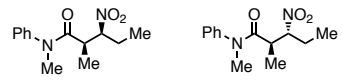


26A **91:09** **26B**

(**26**) According to general protocol E: **8** (69.4 mg, 0.1 mmol), 2-bromo-N-methyl-N-Phenylpropanamide (**S20,** 242 mg, 1.0 mmol), 2-methyl-1-nitropropane (128 μL, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 and stirred rapidly at rt for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed a 91:09 mixture of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (90:10:01 hexanes:ethyl acetate : acetic acid) to afford diastereomerically pure product **26** (211 mg, 80% combined).

26A (syn diastereomer) (90%ee, 170mg, 64%, clear oil): The enantiomeric excess was determined to be 90% by chiral HPLC analysis (CHIRALPAK ID, 1.0 mL/min, 1.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 15.659 min, t_R(minor) = 17.670 min. $[\alpha]_D^{24}$=–135.2° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.51 – 7.39 (m, 3H), 7.23 – 7.18 (m, 2H), 4.72 (dd, *J* = 10.3, 4.5 Hz, 1H), 3.27 (s, 3H), 2.99 (dq, *J* = 10.3, 6.6 Hz, 1H), 2.10 (pd, *J* = 6.9, 4.5 Hz, 1H), 1.12 (d, *J* = 6.6 Hz, 3H), 0.99 (d, *J* = 6.9 Hz, 3H), 0.82 (d, *J* = 6.8 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 172.0, 142.9, 130.1, 128.6, 127.0, 96.2, 38.1, 37.7, 30.0, 20.0, 16.9, 15.9; FTIR (cm^{-1}): 2972, 1653, 1541, 1496, 1271, 1032, 703. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{14}H_{21}N_2O_3]^+$: 265.1474; found: 265.1536.

26B (anti diastereomer) (43%ee, 41mg, 16%, combined **26A** and **26B**, clear oil): The enantiomeric excess was determined to be 43% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 5.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 11.390 min, t_R(minor) = 7.949 min. The diastereomer **26B** is contaminated with diastereomer **26A:** ^{1}H NMR (400 MHz, $CDCl_3$: mixture of diastereomers; useful diagnostic peaks for each compound are listed. See attached spectra for details): δ **26A:** 4.72 (dd, *J* = 10.3, 4.5 Hz, 1H), 3.27 (s, 3H), 2.99 (dq, *J* = 10.3, 6.6 Hz, 1H), 2.10 (pd, *J* = 6.9, 4.5 Hz, 1H), 1.12 (d, *J* = 6.6 Hz, 3H), 0.99 (d, *J* = 6.8 Hz, 3H), 0.83 (d, *J* = 6.8 Hz, 3H), **26B:** 4.82 (dd, *J* = 10.7, 2.9 Hz, 1H), 3.23 (s, 3H), 3.16 (dq, *J* = 10.7, 7.1 Hz, 1H), 2.03 (td, *J* = 6.9, 2.6 Hz, 1H), 1.08 (d, *J* = 6.9 Hz, 3H), 1.02 (d, *J* = 7.0 Hz, 3H), 0.69 (d, *J* = 6.8 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ **26A:** 172.0, 142.9, 130.1, 128.6, 127.0, 96.2, 38.1, 37.7, 30.0, 20.0, 16.9, 15.9, **26B:** 173.0, 143.2, 129.8, 128.2, 127.4, 93.9, 37.6, 37.5, 27.8, 20.5, 16.0, 14.5; FTIR (cm^{-1}): 2969, 1654, 1538, 1458, 1274, 1123, 701. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{14}H_{21}N_2O_3]^+$: 265. 1474; found: 265.1544.



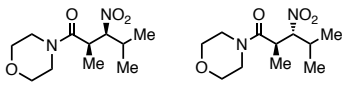
20A **79:21** **30B**

(**30**) According to general protocol E: **8** (69.4 mg, 0.1 mmol), 2-bromo-N-methyl-N-Phenylpropanamide (**S20,** 242 mg, 1.0 mmol), 1-nitropropane (108 μL, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 and stirred rapidly at rt for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed a 79:21 mixture of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (95:05 → 85:15 hexanes : ethyl acetate) to afford two diastereomerically pure products **30** (210 mg, 84% combined).

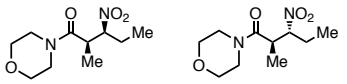
30A (syn diastereomer) (84%ee, 168mg, 67%, clear oil): The enantiomeric excess was determined to be 84% by chiral HPLC analysis (CHIRALPAK IB, 1.0 mL/min, 1.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 13.082 min, t_R(minor) = 14.879 min. $[\alpha]_D^{24}$=–101.1° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.52 – 7.44 (m, 2H), 7.44 – 7.38 (m, 1H), 7.20 – 7.15 (m, 2H), 4.65 (td, *J* = 10.4, 3.5 Hz, 1H), 3.27 (s, 3H), 2.87 (dq, *J* = 10.3, 6.7 Hz, 1H), 1.92 – 1.68 (m, 2H), 1.07 (d, *J* = 6.7 Hz, 3H), 0.91 (t, *J* = 7.3 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 171.9, 142.9, 130.2, 128.5, 127.2, 93.4, 40.7, 37.6, 25.8, 15.6, 10.4; FTIR (cm^{-1}): 2974, 1655, 1596, 1549, 1496, 1390, 1120, 1029, 701. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{13}H_{19}N_2O_3]^+$: 251.1317; found: 251.1387.

30B (anti diastereomer) (54%ee, 42mg, 17%, white solid): The enantiomeric excess was determined to be 54% by chiral HPLC analysis (CHIRALPAK IB, 1.0 mL/min, 1.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) =

27.086 min, t_R(minor) = 33.261 min. $[\alpha]_D^{24}$=+27.5° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.47 (dd, *J* = 8.2, 7.0 Hz, 2H), 7.41 – 7.37 (m, 1H), 7.34 – 7.29 (m, 2H), 4.81 (td, *J* = 10.0, 8.9, 3.5 Hz, 1H), 3.23 (s, 3H), 3.05 (dq, *J* = 10.1, 7.0 Hz, 1H), 1.93 (dqd, *J* = 14.9, 7.5, 3.5 Hz, 1H), 1.66 (ddq, *J* = 14.7, 9.0, 7.3 Hz, 1H), 1.04 (d, *J* = 7.0 Hz, 3H), 0.85 (t, *J* = 7.4 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 172.9, 143.2, 129.9, 128.2, 127.4, 90.5, 39.0, 37.6, 23.9, 14.4, 9.4; FTIR (cm^{-1}): 2975, 1653, 1558, 1446, 1378, 1280, 1071, 709; mp = 95-97 °C. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{13}H_{19}N_2O_3]^+$: 251.1317; found: 251.1387.



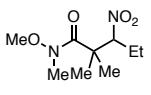
(**25**) According to general protocol E: **8** (69.4 mg, 0.1 mmol), α-bromomorpholinopropanamide (**S19,** 222 mg, 1.0 mmol), 2-methyl-1-nitropropane (128 μL, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 and stirred rapidly at rt for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed a 92:08 mixture of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (90:10:1 → 80:20:1 hexanes : ethyl acetate : acetic acid) to afford single diastereomer **25** (88%ee, 199 mg, 82%) as clear oil. The enantiomeric excess was determined to be 88% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 5.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 8.623 min, t_R(minor) = 10.790 min. $[\alpha]_D^{24}$=–23.0° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 4.80 (ddd, *J* = 10.3, 4.8, 1.3 Hz, 1H), 3.77 – 3.63 (m, 5H), 3.62 – 3.51 (m, 3H), 3.34 (dqd, *J* = 10.5, 6.9, 1.0 Hz, 1H), 2.20 (dtdd, *J* = 13.6, 6.8, 4.9, 1.2 Hz, 1H), 1.16 (dd, *J* = 6.8, 1.3 Hz, 3H), 0.97 (ddd, *J* = 14.0, 6.9, 1.2 Hz, 6H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.6, 95.8, 66.6, 46.1, 42.1, 36.6, 29.8, 19.7, 16.5, 15.7; FTIR (cm^{-1}): 2971, 1639, 1545, 1437, 1226, 1116, 849. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{11}H_{21}N_2O_4]^+$: 245.1495; found: 245.1490.



(**29**) According to general protocol E: **8** (69.4 mg, 0.1 mmol), α-bromomorpholinopropanamide (**S19,** 222 mg, 1.0 mmol), 1-nitropropane (108 μL, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 and stirred rapidly at rt for 24 h. The reaction was worked up according to the general protocol. NMR analysis of the crude reaction mixture revealed an 81:19 mixture of syn and anti isomers. The crude reaction was purified by flash silica gel chromatography (90:10:1 → 75:25:1 hexanes : ethyl acetate : acetic acid) to afford two diastereomerically pure products **29** (200 mg, 87% combined).

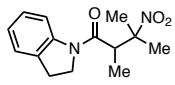
29A (syn diastereomer) (82%ee, 164mg, 71%, clear oil): The enantiomeric excess was determined to be 82% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 5.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 11.920 min, t_R(minor) = 9.460 min. $[\alpha]_D^{24}$=–28.9° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 4.80 (ddd, *J* = 10.3, 4.8, 1.3 Hz, 1H), 3.77 – 3.63 (m, 5H), 3.62 – 3.51 (m, 3H), 3.34 (dqd, *J* = 10.5, 6.9, 1.0 Hz, 1H), 2.20 (dtdd, *J* = 13.6, 6.8, 4.9, 1.2 Hz, 1H), 1.16 (dd, *J* = 6.8, 1.3 Hz, 3H), 0.97 (ddd, *J* = 14.0, 6.9, 1.2 Hz, 6H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.6, 95.8, 66.6, 46.1, 42.1, 36.6, 29.8, 19.7, 16.5, 15.7; FTIR (cm^{-1}): 2974, 2858, 1645, 1548, 1457, 1225, 1116, 1028, 813. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{10}H_{19}N_2O_4]^+$: 231.1267; found: 231.1337.

29B (anti diastereomer) (49% ee, 36 mg, 16%, clear oil): The enantiomeric excess was determined to be 49% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 5.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 16.599 min, t_R(minor) = 19.398 min. $[\alpha]_D^{24}$=+31.2° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 4.86 (td, *J* = 9.8, 8.6, 3.5 Hz, 1H), 3.77 – 3.58 (m, 6H), 3.55 – 3.45 (m, 2H), 3.38 (dq, *J* = 9.8, 7.2 Hz, 1H), 2.10 (dqd, *J* = 15.0, 7.5, 3.5 Hz, 1H), 1.85 (ddq, *J* = 14.7, 8.8, 7.3 Hz, 1H), 1.17 (d, *J* = 7.2 Hz, 3H), 0.98 (t, *J* = 7.4 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 171.56, 90.17, 66.60, 46.18, 42.32, 37.49, 24.05, 14.06, 9.36; FTIR (cm^{-1}): 2974, 2857, 1643, 1548, 1439, 1378, 1115, 809. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{10}H_{19}N_2O_4]^+$: 231.1267; found: 231.1340.



32

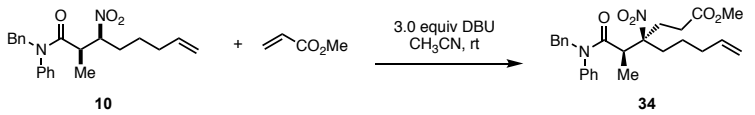
(**32**) According to general protocol E: **8** (69.4 mg, 0.1 mmol), 2-bromo-*N*-methoxy-*N*,2-dimethylpropanamide (210 mg, 1.0 mmol), 1-nitropropane (107 μL, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 and stirred rapidly at rt for 24 h. The reaction was worked up according to the general protocol. The crude reaction was purified by flash silica gel chromatography (90:10 hexanes : ethyl acetate) to afford **32** (78%ee, 83 mg, 38%) as clear oil. The enantiomeric excess was determined to be 78% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 1.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 11.341 min, t_R(minor) = 12.722 min. $[\alpha]_D^{24}$=+29.1° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 5.07 (dd, *J* = 11.6, 2.2 Hz, 1H), 3.73 (s, 3H), 3.19 (s, 3H), 2.10 (ddq, *J* = 14.3, 11.7, 7.1 Hz, 1H), 1.58 (dqd, *J* = 14.8, 7.4, 2.2 Hz, 1H), 1.33 (s, 6H), 0.95 (t, *J* = 7.3 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 174.6, 94.3, 60.8, 46.5, 34.1, 22.3, 22.1, 20.3, 11.2; FTIR (cm^{-1}): 2976, 1649, 1548, 1462, 1365, 1295, 997. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_9H_{19}N_2O_4]^+$: 219.1267; found: 219.1331.



33

(**33**) According to general protocol E: **8** (69.4 mg, 0.1 mmol), 2-bromo-1-(indolin-1-yl) propan-1-one (**S21,** 254 mg, 1.0 mmol), 2-nitropropane (108 μL, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 and stirred rapidly at rt for 24 h. The reaction was worked up according to the general protocol. The crude reaction was purified by flash silica gel chromatography (95:05 hexanes : ethyl acetate) to afford **33** (61%ee, 107 mg, 41%) as white solid. The enantiomeric excess was determined to be 61% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 1.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 21.497 min, t_R(minor) = 16.497 min. $[\alpha]_D^{24}$=–18.2° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.20 (d, *J* = 8.0 Hz, 1H), 7.22 – 7.16 (m, 2H), 7.07 – 7.02 (m, 1H), 4.34 (td, *J* = 9.7, 7.6 Hz, 1H), 4.15 (td, *J* = 9.8, 7.2 Hz, 1H), 3.58 (q, *J* = 7.1 Hz, 1H), 3.33 – 3.17 (m, 2H), 1.78 (s, 3H), 1.75 (s, 3H), 1.27 (d, *J* = 7.1 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.8, 142.6, 131.4, 127.5, 124.6, 124.1, 117.5, 91.0, 48.6, 45.5, 27.9, 23.9, 13.7; FTIR (cm^{-1}): 2988, 1653, 1539, 1482, 1418, 1264, 757; mp = 126-128 °C. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{14}H_{19}N_2O_3]^+$: 263.1317; found: 263.1386.

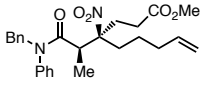
11. Down Stream Functionalization of Alkylated Products



10 34

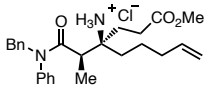
Entry	10 dr	10 % ee	34 dr	34 % ee[a]	% Yield 34
1	>95:05	91	>95:05	91	84
2	79:21	91/82	>95:05	89	83

[a] Determined by chiral HPLC analysis



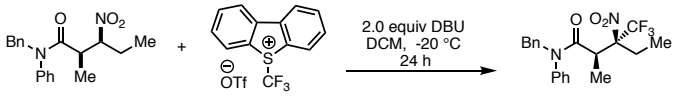
34

(**34**) To a 25 mL round bottom flask equipped with a magnetic stir bar was added **10** (Run 1: 200 mg, 0.54 mmol, dr: >95:05, 91% ee), (Run 2: 200 mg, 0.54 mmol, dr: >79:21, 91/82% ee), acetonitrile (5.5 mL), methyl acrylate (147 μL, 1.63 mmol), and DBU (243 μL, 1.63 mmol). The reaction was sealed with a polypropylene cap. The resulting homogenous solution was stirred at rt for 1 h. The reaction was diluted with ethyl acetate (10 mL), washed with brine (2X 10 mL), dried over magnesium sulfate and concentrated in vacuo. NMR analysis of the crude reaction mixture revealed a >95:05 mixture of syn- and anti-isomers for both runs. The crude reaction was purified by flash silica gel chromatography (90:10 hexanes : ethyl acetate) to afford **34** (Run 1: 91%ee, 205mg, 84% yield), (Run 2: 89%ee, 202mg, 83% yield) as a clear oil**.** The enantiomeric excess was determined to be 91% for Run 1 and 89% for Run 2 by chiral HPLC analysis (CHIRALPAK IF, 1.0 mL/min, 3.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 31.502 min, t_R(minor) = 25.165 min. $[\alpha]_D^{24}$=–30.8° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.34 (dd, *J* = 5.2, 2.0 Hz, 1H), 7.26 (d, *J* = 5.9 Hz, 2H), 7.19 – 7.13 (m, 1H), 6.97 (s, 1H), 5.70 (ddt, *J* = 17.0, 10.3, 6.7 Hz, 0H), 5.03 – 4.95 (m, 1H), 4.85 (s, 1H), 3.67 (s, 1H), 3.03 (q, *J* = 7.1 Hz, 0H), 2.48 (ddd, *J* = 14.1, 10.5, 5.3 Hz, 0H), 2.40 – 2.25 (m, 1H), 2.14 (ddd, *J* = 14.6, 12.7, 4.1 Hz, 0H), 2.02 (q, *J* = 7.2 Hz, 1H), 1.95 (ddd, *J* = 14.6, 12.5, 4.7 Hz, 0H), 1.33 (dddd, *J* = 19.8, 12.4, 7.2, 4.6 Hz, 0H), 1.26 – 1.16 (m, 1H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 172.8, 171.8, 141.5, 137.4, 137.0, 129.8, 128.9, 128.5, 128.4, 128.3, 127.5, 115.6, 94.9, 53.2, 51.8, 42.4, 34.4, 33.6, 29.0, 28.5, 23.2, 14.3; FTIR (cm^{-1}): 2950, 1738, 1660, 1540, 1403, 1198, 993, 702. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{26}H_{33}N_2O_5]^+$: 453.2311; found: 453.2390.



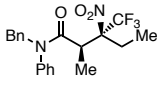
37

(**37**): **34** (200 mg, 0.44 mmol, 91%ee), ethyl acetate (13 mL), ethanol (18 mL), and HCl (6 M, 15.8 mmol, 2.64 mL) were added to a 100 mL round bottom flask equipped with a magnetic stir bar. The flask was cooled to 0 °C and Zn dust (1.44g, 22.1 mmol) was added in 3 portions over 10 minutes under air. The mixture was warmed to room temperature and stirred for 1 h. The resulting mixture was quenched with brine (50 mL) and extracted with ethyl acetate (50mL, 1x). The aqueous layer contains insoluble zinc salts was filtered through celite and back extracted with ethyl acetate (30mL, 3x). The combined organic layer was dried over magnesium sulfate and concentrated i*n vacuo* to afford **37** (88%ee, 189mg, 94% yield) as a white solid. The enantiomeric excess was determined to be 88% by reverse-phase chiral HPLC analysis (CHIRALPAK IF-3, 1.0 mL/min, 10% CH_3CN/water isocratic 1 minute, then 30 minute gradient 35% CH_3CN/water, 30 minute isocratic 35% CH_3CN/water λ=210 nm); t_R(major) = 38.342 min, t_R(minor) = 41.382 min. $[\alpha]_D^{24}$=–20.3° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 8.37 (s, 3H), 7.38 (dd, *J* = 5.1, 1.9 Hz, 3H), 7.28 (dd, *J* = 5.0, 1.9 Hz, 3H), 7.13 (dd, *J* = 6.6, 2.9 Hz, 2H), 6.93 (dd, *J* = 6.4, 2.8 Hz, 2H), 5.67 (ddt, *J* = 16.9, 10.2, 6.6 Hz, 1H), 4.95 – 4.89 (m, 3H), 4.81 (d, *J* = 14.0 Hz, 1H), 3.71 (s, 3H), 2.72 (ddd, *J* = 16.7, 11.3, 5.5 Hz, 1H), 2.41 (q, *J* = 7.1 Hz, 1H), 2.31 (ddd, *J* = 16.3, 11.1, 4.8 Hz, 1H), 2.19 (ddd, *J* = 15.5, 11.1, 5.6 Hz, 1H), 2.09 – 1.92 (m, 2H), 1.93 – 1.72 (m, 3H), 1.27 (d, *J* = 7.1 Hz, 3H), 1.21 – 1.11 (m, 1H), 0.82 (dh, *J* = 12.8, 6.3 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 175.3, 172.8, 140.5, 137.4, 136.2, 130.1, 129.1, 128.9, 128.6, 127.9, 127.8, 115.7, 61.0, 53.1, 52.1, 39.2, 33.0, 31.2, 29.4, 28.0, 21.5, 12.8; FTIR (cm^{-1}): 2942, 1735, 1634, 1592, 1493, 1201, 914, 703; mp = 68-70 °C. HRMS (ESI) $(M)^+$ m/z calculated for $[C_{26}H_{35}N_2O_3]^+$: 423.2642; found: 423.2652.

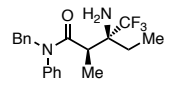


Entry	1 dr	1 % ee	35 dr	35 % ee[a]	% Yield 35
1	>95:05	90	>95:05	89	67
2	76:24	90/84	>95:05	86	67

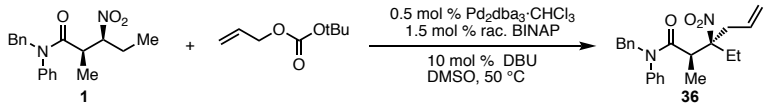
[a] Determined by chiral HPLC analysis

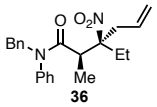

35

(**35**) A hot 25 mL round bottom flask equipped with a magnetic stir bar and a rubber spectrum was attached via needle to a double manifold and cooled under vacuum. Once cooled, the flask was backfilled with N_2, the septum was removed, and **1** (Run 1: 215 mg, 0.66 mmol, dr: >95:05, 90% ee), (Run 2: 215 mg, 0.66 mmol, dr: 76:24, 90/84% ee), and Umemoto's reagent (344 mg, 0.86 mmol) were added. The septum was replaced, the flask was reattached to a double manifold and evacuated and backfilled with N_2 three times. Anhydrous dichloromethane was added via syringe and the flask was lowered into a precooled –25 °C cooling bath and stirred. DBU (197 μL, 1.32 mmol) was then added dropwise via syringe. The resulting homogenous solution was stirred at –25 °C for 24 h after which the flask was removed from the cooling unit and the septum was removed. The reaction mixture was washed with brine (10 mL, 1x), dried over magnesium sulfate, and concentrated *in vacuo* onto Celite. The product was purified by silica gel flash chromatography (100:0 → 95:05 hexanes : ethyl acetate) to afford **35** (Run 1: 88% ee, 174mg, 67% yield), (Run 2: 86%ee, 174mg, 67% yield) as a clear oil**.** The enantiomeric excess was determined to be 89% for Run 1 and 86% for Run 2 by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 2.0% *i*-PrOH/hexane, λ=254 nm); t_R(major) = 9.605 min, t_R(minor) = 6.687 min. $[\alpha]_D^{24}$=–59.1° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.40 – 7.34 (m, 3H), 7.31 – 7.24 (m, 3H), 7.16 – 7.11 (m, 2H), 7.05 – 6.94 (m, 2H), 4.81 (q, 2H), 3.51 (q, *J* = 7.1 Hz, 1H), 3.07 (dq, *J* = 15.1, 7.5, 2.5 Hz, 1H), 2.14 (dq, *J* = 14.9, 7.3 Hz, 1H), 1.31 (d, *J* = 7.1 Hz, 3H), 1.13 (t, *J* = 7.3, 3.9 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.1, 140.8, 136.6, 129.7, 128.8, 128.6, 128.4, 127.5, 122.9 (q, *J* = 288 Hz), 94.9 (q, *J* = 24 Hz), 53.3, 40.0, 22.9, 14.0, 8.5; ^{19}F NMR (565 MHz, $CDCl_3$) δ - 67.2; FTIR (cm^{-1}): 2986, 1665, 1562, 1495, 1408, 1202, 1120, 824, 701. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{20}H_{22}N_2O_3F_3]^+$: 395.1504; found: 395.1568.

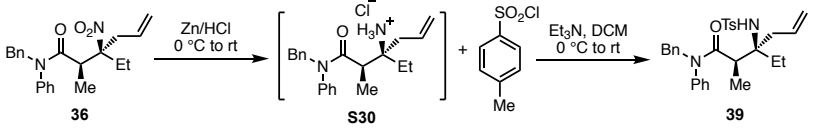

38

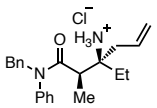
(**38**): α-Trifluoromethylnitroalkane **35** (190 mg, 0.48 mmol, 88%ee), ethyl acetate (15 mL), ethanol (19 mL), and HCl (6 M, 17.3 mmol, 2.9 mL) were added to a 100 mL round bottom flask equipped with a magnetic stir bar. The flask was cooled to 0 °C and Zn dust (1.57g, 24.0 mmol) was added in 3 portions over 10 minutes. The mixture was warmed to room temperature and stirred for 1 h. The resulting mixture was quenched with 1.0 M aqueous NaOH (50 mL) and extracted with ethyl acetate (50mL, 1x). The aqueous layer contains insoluble zinc salts was filtered through Celite and back extracted with ethyl acetate (30mL, 3x). The combined organic layer was dried over magnesium sulfate and concentrated i*n vacuo* onto Celite. The crude reaction was purified by flash silica gel chromatography (90:10 → 80:20 hexanes : ethyl acetate) to afford **38** (88%ee, 142mg, 81% yield) as a clear oil**.** The enantiomeric excess was determined to be 88% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 5.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 17.099 min, t_R(minor) = 20.364 min. $[\alpha]_D^{24}$=–75.3° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.34 – 7.28 (m, 3H), 7.26 – 7.21 (m, 3H), 7.19 – 7.13 (m, 2H), 6.96 (s, 2H), 4.86 (q, *J* = 14.2 Hz, 2H), 2.62 (q, *J* = 6.9 Hz, 1H), 2.24 (s, 2H), 1.66 (dq, *J* = 15.2, 7.6 Hz, 1H), 1.49 – 1.37 (m, 1H), 1.17 (d, *J* = 6.9 Hz, 3H), 0.66 (t, *J* = 7.9, 1.8 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 174.4, 141.5, 137.1, 129.4, 128.9, 128.3, 128.2, 128.0 (q, *J* = 288 Hz), 127.3, 60.5 (q, *J* = 24.1 Hz), 52.8, 35.4, 27.4, 12.9, 7.5; ^{19}F NMR (565 MHz, $CDCl_3$) δ - 74.5; FTIR (cm^{-1}): 3403, 2974, 1656, 1593, 1495, 1403, 1143, 915, 701; mp = 55-57 °C. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{20}H_{24}N_2OF_3]^+$: 365.1835; found: 365.1827.



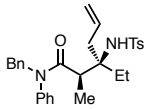


(**36**) **36** was synthesized by modification of a previously published procedure.[22] A hot 10 mL round bottom flask equipped with a magnetic stir bar and a rubber spectrum was attached via needle to a double manifold and cooled under vacuum. Once cooled, the flask was backfilled with N_2, the septum was removed, and tris(dibenzylideneacetone)dipalladium(0)-chloroform adduct (3.4 mg, 3.3 μmol), (±)-BINAP (6.2 mg, 6.6 μmol), and **1** (215 mg, 0.66 mmol, 90%ee) were added. The septum was replaced, the flask was reattached to a double manifold and evacuated and backfilled with N_2 three times. Anhydrous DMSO (0.66 mL) was added via syringe and the reaction was stirred at rt for 5 minutes. DBU (10 μL, 66 μmol), and tert-butyl allyl carbonate (144 μL, 0.79 mmol) were added via syringe. The resulting brown solution was stirred in an oil bath at 50 °C for 48 h. Once complete, the reaction was cooled to rt, opened to air, diluted with ethyl acetate (40 mL) and it was filtered through celite. The filtrate was washed with water (20 mL, 3x). The organic layer was dried over magnesium sulfate and concentrated i*n vacuo* onto Celite. The crude reaction was purified by flash silica gel chromatography (95:05 hexanes : ethyl acetate) to afford **36** (90%ee, 178mg, 74% yield) as a clear oil**.** The enantiomeric excess was determined to be 90% by chiral HPLC analysis (CHIRALPAK IE, 1.0 mL/min, 3.0% *i*-PrOH/hexane, λ=254 nm); t_R(major) = 38.353 min, t_R(minor) = 29.727 min. $[\alpha]_D^{24}$=–46.4° (c = 1.00, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$): δ 7.36 – 7.29 (m, 3H), 7.29 – 7.21 (m, 3H), 7.20 – 7.14 (m, 2H), 7.01 – 6.94 (m, 2H), 5.54 (ddt, *J* = 17.1, 10.1, 7.0 Hz, 1H), 5.09 (dd, *J* = 17.2, 1.9 Hz, 1H), 5.02 (d, 1H), 4.86 (q, 2H), 3.04 (q, *J* = 7.0 Hz, 1H), 2.91 (dd, *J* = 15.2, 6.7 Hz, 1H), 2.72 (dd, *J* = 15.2, 7.4 Hz, 1H), 2.35 (dq, *J* = 14.9, 7.5 Hz, 1H), 1.96 (dq, *J* = 14.7, 7.4 Hz, 1H), 1.18 (d, *J* = 7.0 Hz, 3H), 0.86 (t, *J* = 7.4 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 172.2, 141.5, 137.1, 131.9, 129.6, 128.9, 128.4, 128.4, 128.3, 127.4, 95.5, 53.1, 41.8, 37.5, 27.7, 14.2, 8.4; FTIR (cm^{-1}): 3063, 2979, 1658, 1594, 1494, 1403, 1245, 924, 702. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{22}H_{27}N_2O_3]^+$: 367.2016; found: 367.2005.





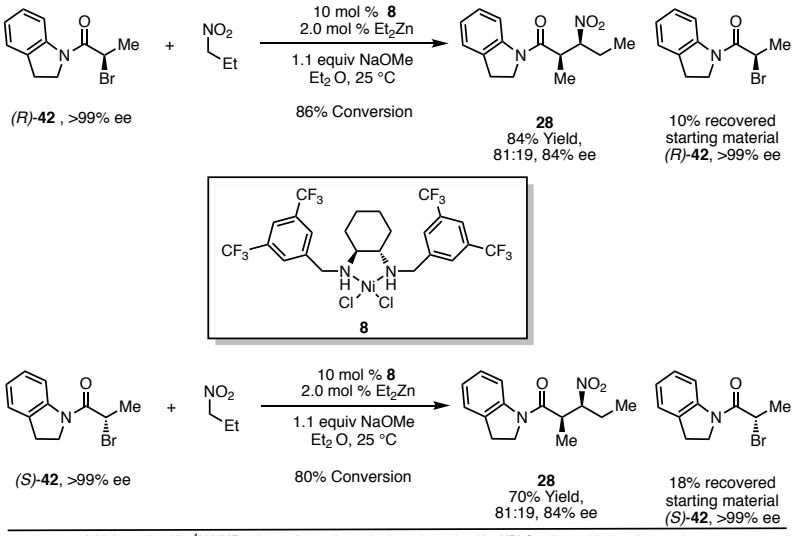
(**S30**) **36** (350 mg, 0.96 mmol, 90%ee), ethyl acetate (29 mL), ethanol (38 mL), and HCl (6 M, 34.4 mmol, 5.7 mL) were added to a 200 mL round bottom flask equipped with a magnetic stir bar. The flask was cooled to 0 °C and Zn dust (3.125g, 47.8 mmol) was added in 3 portions over 10 minutes. The mixture was warmed to room temperature and stirred for 1 h. The resulting mixture was quenched with brine (100 mL) and extracted with ethyl acetate (80mL, 1x). The aqueous layer contains insoluble zinc salts was filtered through celite and back extracted with ethyl acetate (50 mL, 3x). The combined organic layer was dried over magnesium sulfate and concentrated i*n vacuo* to afford crude (336 mg) as a white solid. The crude material was taken to the next step without further purification.



(**39**) A hot 10 mL round bottom flask equipped with a magnetic stir bar and rubber septum was attached via needle to a double manifold and cooled under vacuum. The flask was backfilled with N_2, the septum was removed, and the **S30** (120 mg, 0.32 mmol), p–toluene sulfonyl chloride (68 mg, 0.35mmol), and 4-(dimethylamino) pyridine (8 mg, 0.064mmol), was added sequentially. The septum was replaced, the flask was attached to a double manifold, and evacuated and backfilled with N_2 three times. Anhydrous dichloromethane (1.6 mL), and triethylamine (90 μL, 0.64 mmol), were added to the flask sequentially via syringe and the reaction stirred at rt for 8 h. The septum was removed and the reaction was diluted with dichloromethane (10.0 mL) and washed with water (10 mL, 2x). The aqueous layer was back extracted with dichloromethane (10 mL, 1x). The organic layers were combined, dried over magnesium sulfate, and concentrated in vacuo. The crude reaction was purified by flash silica gel chromatography (90:10 hexanes : ethyl acetate) to afford **39** (96%ee, 133mg, 85% yield) as a white solid**.** The enantiomeric excess was determined to be 96% by chiral HPLC analysis (CHIRALPAK IB, 1.0 mL/min, 3.0% *i*-PrOH/hexane, λ=210 nm); t_R(major) = 25.128 min, t_R(minor) = 23.737 min. $[\alpha]_D^{24}$=–11.8° (c = 1.00, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.76 (d, 2H), 7.51 (s, 1H), 7.37 – 7.31 (m, 4H), 7.29 – 7.26 (m, 2H), 7.24 – 7.20 (m, 2H), 7.16 (dd, *J* = 6.7, 2.9 Hz, 2H), 6.99 – 6.88 (m, 2H), 5.97

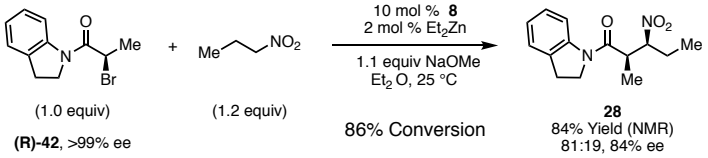
– 5.82 (m, 1H), 5.08 – 4.98 (m, 2H), 4.92 (d, *J* = 14.1 Hz, 1H), 4.75 (d, *J* = 14.0 Hz, 1H), 2.39 (s, 3H), 2.38 – 2.26 (m, 2H), 2.20 (dd, *J* = 14.3, 7.8 Hz, 1H), 1.94 (dq, *J* = 15.0, 7.5 Hz, 1H), 1.51 – 1.38 (m, 1H), 0.89 (d, *J* = 6.9 Hz, 3H), 0.31 (t, *J* = 7.5 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 175.9, 142.2, 141.5, 141.2, 136.8, 133.7, 129.7, 129.2, 129.0, 128.5, 128.1, 127.6, 127.0, 117.8, 64.0, 52.8, 42.7, 39.8, 29.5, 23.6, 21.5, 13.2, 7.1; FTIR (cm^{-1}): 3220, 2975, 1635, 1594, 1495, 1404, 1340, 1149, 702; mp = 120-122 °C. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{29}H_{35}N_2O_3S]^+$: 491.2290; found: 491.2342. Crystals for X-ray analysis were obtained by slow evaporation of diethyl ether.

12. Mechanistic Studies:



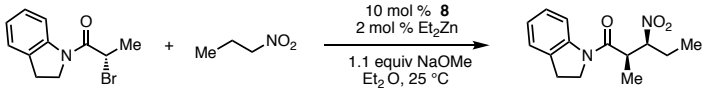
yield determined by ^{1}H NMR using an internal standard. ee determined by HPLC using a chiral stationary phase.
ee of the major syn diastereomer reported.

Reaction beginning with (R)-42:

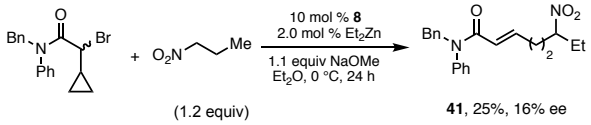


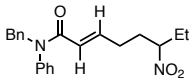
According to general protocol E: **8** (17.3 mg, 0.025 mmol), (R)-2-bromo-1-(indolin-1-yl) propan-1-one (**42,** 64 mg, 0.25 mmol), 1-nitropropane (28 μL, 0.3 mmol), sodium methoxide (14.9 mg, 0.275 mmol), diethyl zinc (1 M in hexane, 0.005 mmol, 5 μL) and anhydrous Et_2O (2.5 mL) were combined under N_2 and stirred rapidly at rt. After 30 min, the reaction was removed from the glovebox and quenched by opening the reaction to air. 1,3,5-trimethoxybenzene (10.5 mg, 0.0625 mmol) was added as an internal standard and the reaction was worked up according to the general protocol E. ^{1}H NMR analysis of the crude reaction mixture revealed a diastereomeric ratio of 81:19 favoring of syn isomer and 86% conversion of starting material **(R)-42** and 84% yield of **28**. The chiral HPLC analysis of starting material **(R)-42** showed ee of 99% and a product **28** ee of 84%**.** (CHIRALPAK IA, 1.0 mL/min, 1.0% *i*-PrOH/hexane, λ=254 nm; starting material **(R)-42**: t_R(major) = 26.099 min, t_R(minor) = 32.910 min; product **28**: t_R(major) = 16.738 min, t_R(minor) = 20.710 min).

Reaction beginning with (S)-42



According to general protocol E: **8** (17.3 mg, 0.025 mmol), (S)-2-bromo-1-(indolin-1-yl) propan-1-one (**42,** 64 mg, 0.25 mmol), 1-nitropropane (28 μL, 0.3 mmol), sodium methoxide (14.9 mg, 0.275 mmol), diethyl zinc (1 M in hexane, 0.005 mmol, 5 μL) and anhydrous Et_2O (2.5 mL) were combined under N_2 and stirred rapidly at rt. After 30 min, the reaction was removed from the glovebox and quenched by opening the reaction to air. 1,3,5-trimethoxybenzene (10.5 mg, 0.0625 mmol) was added as an internal standard and the reaction was worked up according to the general protocol E. ^{1}H NMR analysis of the crude reaction mixture revealed a diastereomeric ratio of 81:19 favoring of syn isomer and 80% conversion of starting material **(S)-42** and 70% yield of **28**. The chiral HPLC ananlysis of starting material **(S)-42** showed ee of 99% and a product **28** ee of 84%**.** (CHIRALPAK IA, 1.0 mL/min, 1.0% *i*-PrOH/hexane, λ=254 nm; starting material **(S)-42**: t_R(major) = 32.910 min, t_R(minor) = 26.099 min; product **28**: t_R(major) = 16.509 min, t_R(minor) = 20.422 min).





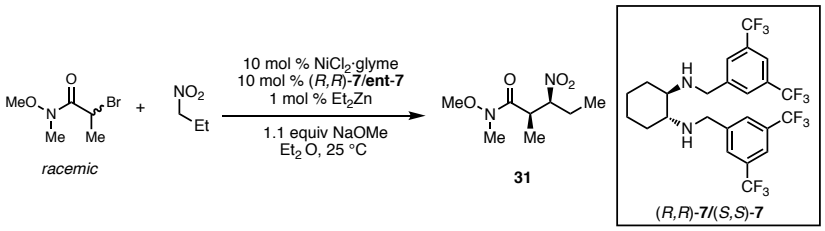
41

(**41**) According to general protocol E: **8** (69.4 mg, 0.1 mmol), N-benzyl-2-bromo-2-cyclopropyl-N-phenylpropionamide (**40,** 222 mg, 1.0 mmol), 1-nitropropane (108 μL, 1.2 mmol), sodium methoxide (59.4 mg, 1.1 mmol), diethyl zinc (1 M in hexane, 0.02 mmol, 20 μL) and anhydrous Et_2O (10.0 mL) were combined under N_2 and stirred rapidly at rt for 24 h. The reaction was worked up according to the general protocol. The crude reaction was purified by flash silica gel chromatography (75:25:01 hexanes : ethyl acetate : acetic acid) to afford **41** (16%ee, 87mg, 25% yield) as a clear oil**.** The enantiomeric excess was determined to be 16% by chiral HPLC analysis (CHIRALPAK IA, 1.0 mL/min, 5.0% *i*-PrOH/hexane, λ=220 nm); t_R(major) = 22.898 min, t_R(minor) = 25.021 min. $[\alpha]_D^{24}$=+5.9° (c = 1.00, $CHCl_3$);^{1}H NMR (400 MHz, $CDCl_3$): δ 7.38 – 7.29 (m, 3H), 7.29 – 7.18 (m, 5H), 7.03 – 6.96 (m, 2H), 6.85 (dt, *J* = 15.1, 6.9 Hz, 1H), 5.72 (d, *J* = 15.2 Hz, 1H), 4.96 (s, 2H), 4.32 (tt, *J* = 9.1, 4.3 Hz, 1H), 2.06 (dtdd, *J* = 20.8, 14.5, 9.6, 7.7 Hz, 3H), 1.91 (ddt, *J* = 14.6, 9.3, 7.3 Hz, 1H), 1.80 – 1.64 (m, 2H), 0.91 (t, *J* = 7.4 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 165.4, 142.9, 141.7, 137.3, 129.4, 128.6, 128.3, 128.3, 127.8, 127.3, 123.3, 89.2, 53.1, 31.8, 28.4, 27.2, 10.1; FTIR (cm^{-1}): 3060, 1665, 1594, 1495, 1410, 1242, 958, 700. HRMS (ESI) $(M+H)^+$ m/z calculated for $[C_{21}H_{25}N_2O_3]^+$: 353.1787; found: 353.1844.

Non-Linear Studies

To probe the possible catalyst aggregation in the nickel-catalyzed enantioselective C-alkylation reaction, we investigated the dependence of product enantiomeric excess on catalyst ee. To perform this study we prepared ligand (S,S)-7, and mixed with ligand (R,R)-7 to afford 75%, 50%, 25% and 0% ee of the catalyst. As outlined in Table S8, a linear correlation was observed by plotting the ee of syn-isomer of **31** (Chart S1) against the ee of the catalyst **7** and similar linearity was observed for the anti-isomer **31** (Chart S2) This linear relationship between enantiomeric excess and catalyst ee reveals that the active catalyst is likely a monomeric species.

Table S8: Study of Product ee and Catalyst ee



Entry	% ee of the ligand **7**	% Yield **31**[a]	d.r *syn*/*anti*	% ee *syn*/*anti*[b] **31**
1	100	77	88:12	85/42
2	75	70	89:11	64/33
3	50	70	91:09	46/20
4	25	71	90:10	26/10
5	0	71	90:10	0/0

[a]Yield determined by ^{1}H NMR using 1,3,5-trimethoxybenzene as an internal standard
[b] Determined by chiral HPLC analysis

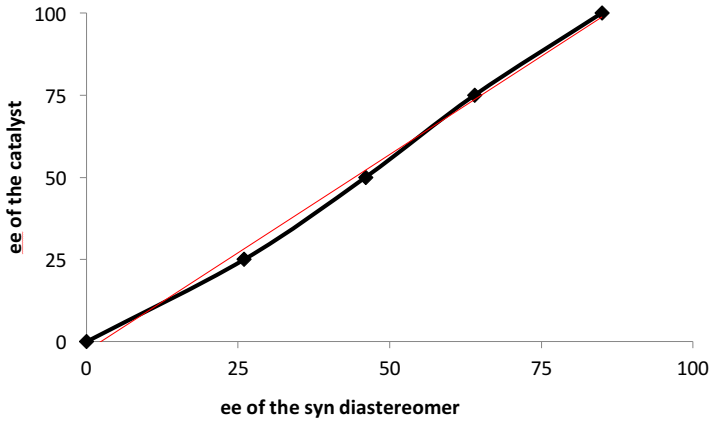


Chart S1: Plot of enantiomeric excess of the catalyst **7** Vs enantiomeric excess of the *syn* diastereomer **31**

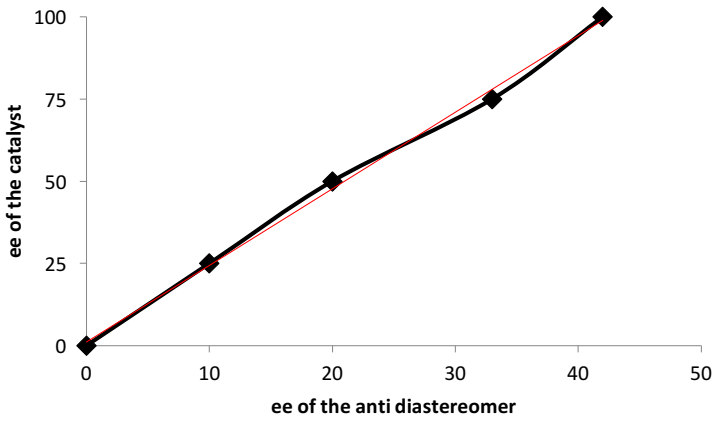
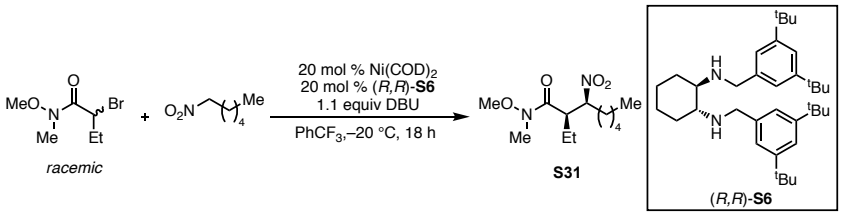


Chart S2: Plot of enantiomeric excess of the catalyst **7** Vs enantiomeric excess of the *anti* diastereomer **31**

Initial Studies Using DBU as the Base

Under our unoptimized conditions, using DBU as the base we found enantioselectivity and diastereoselectivity of the desired product **S31** was not reproducible as shown in Table S9. This suggests that the product **S31** was not stable under the reaction conditions.

Table S9: Inconsistent Results Using DBU as the Base



Entry	Run	% Yield **S31**[a]	d.r *syn*/*anti*	% ee *syn*/*anti*[b] **S31**
1	A	62	74:26	77/40
2	B	64	63:36	62/58
3	C	65	74:26	81/32
4	D	69	80:20	80/42

[a]Yield determined by ^{1}H NMR using 1,3,5-trimethoxybenzene as an internal standard
[b] Determined by chiral HPLC analysis

We performed the following experiment to study the kinetic stability of *syn* and *anti* diastereomers of **S31**. On subjecting racemic, *syn* diastereomer of **S31** into the nickel-catalyzed enantioselective reaction, the syn diastereomer was epimerized to mixture of diastereomers (*syn:anti* 61:39, Figure 1, top) and similar results were obtained on subjecting racemic, *anti* diastereomer **S31** to the reaction conditions (Figure 1, bottom).

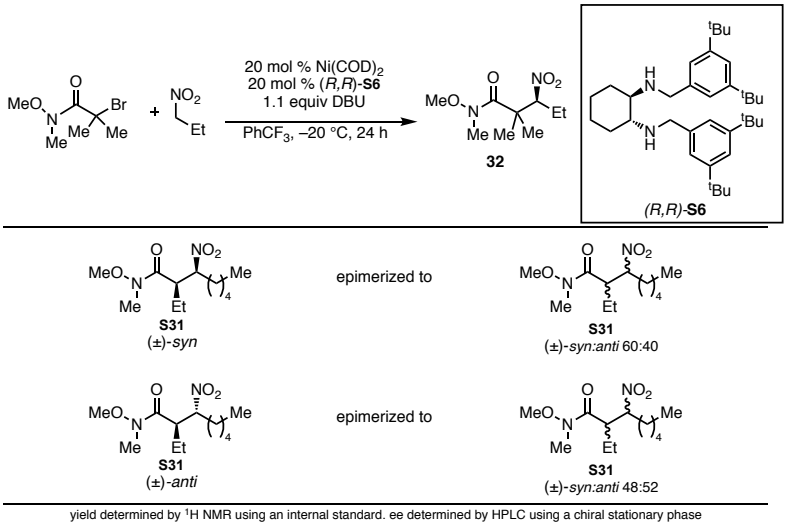


Figure 1: Studies on Diastereomer Stability.

Based on our previous studies between DBU and nitroalkanes using ^{1}H NMR spectroscopy, the deprotonation event is slow, taking about 10 minutes for a 2:1 mixture of nitroalkane and nitronate anion to reach equilibrium at -25 °C.[23] Hence, there would be a significant concentration of soluble DBU base and soluble nitronate anion under the homogeneous reaction conditions. Presumably, the soluble DBU deprotonates the formed **S31** slowly, consequently the product loses its configurational integrity (Figure 2, top).

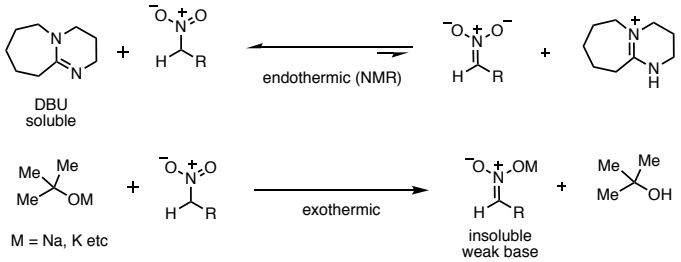
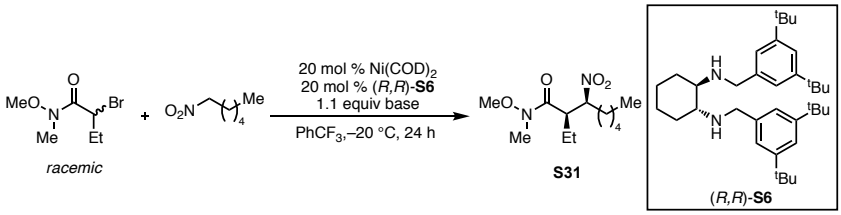


Figure 2: Rationalization for Epimerization of **S31** and Proposed Solution

Investigation of Metal alkoxide Bases: To avoid this epimerization issue, we utilized a much stronger base than DBU, such as metal alkoxides. As shown in Table S10, potassium tert-butoxide found to be superior. Significantly the ee's were reproducible and this suggests that the enantioenriched product **S31** does not epimerize under this heterogeneous reaction conditions. Our mechanistic working hypothesis is, presumably KO^{t}Bu would quantitatively deprotanates the nitroalkane generating weakly basic metal nitronate anions which are sparingly soluble in the non-polar reaction media (Figure 2, bottom). Importantly, the heterogeneous reaction media might prevent the formed enantioenriched product (it would be in solution phase) from epimerization as the weakly basic metal nitronate anion would be in the solid phase.

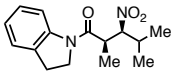
Table S10: Investigation of Metal Alkoxide Bases



Entry	Base	% Yield **S31**[a]	d.r *syn*/*anti*	% ee *syn*/*anti*[b] **S31**
1	LiO^{t}Bu	17	71:29	00/00
2	Mg(O^{t}Bu)$_2$	09	78:28	81/36
3	NaO^{t}Bu	31	77:23	49/28
4	KO^{t}Bu	51	75:25	58/32

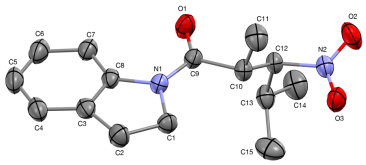
[a]Yield determined by ^{1}H NMR using 1,3,5-trimethoxybenzene as an internal standard
[b] Determined by chiral HPLC analysis

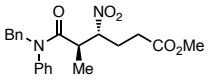
13. Assignment of Absolute Stereochemistry of β-nitroamides



(***R,S***)- **24**

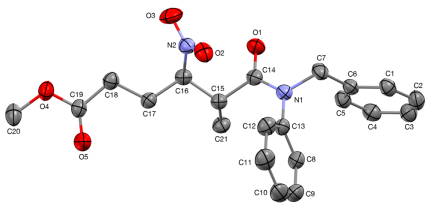
The relative and absolute stereochemistry of **24** (major diastereomer) was determined by X-ray crystallographic analysis. This compound was prepared using general procedure F from **S21** and 2-methyl-1-nitropropane with **8** as catalyst.

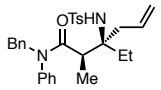




(***R,R***) - **15**

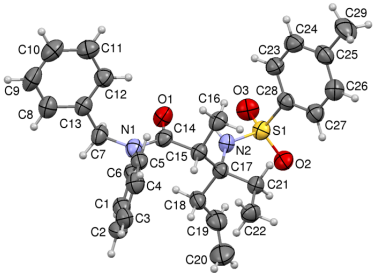
The relative and absolute stereochemistry of **15** (minor diastereomer) was determined by X-ray crystallographic analysis. This compound was prepared using general procedure E from N-benzyl-2-bromo-N-phenylpropionamide and methyl-4-nitrobutanoate with **8** as catalyst.





(*R,R*) - **39**

The relative and absolute stereochemistry of **39** was determined by X-ray crystallographic analysis. This compound was prepared by reducing **36** followed by tosylation.



14. X-ray Structural Solution and Refinement:

Crystals were mounted using viscous oil onto a plastic mesh and cooled to the data collection temperature. Data were collected on a Bruker-AXS APEX II DUO CCD diffractometer with with graphite-monochromated Mo-Kα radiation (λ=0.71073 Å) for 59 and Cu-Kα radiation (λ = 1.54178 Å) focused with Goebel mirrors for **15, 24** and **39**. Unit cell parameters were obtained from 36 data frames, 0.5 º ω, from three different sections of the Ewald sphere. The unit cell parameters, and systematic absences in the diffraction data are consistent with P21 (4) and P21/m (11) for 59; and, uniquely, for P212121 for 63, 71 and 73. The non-centrosymmetric space groups are consistent with the chiral compound molecules and they yielded chemically reasonable and computationally stable results of refinement. Refinement of the absolute structure parameters to nil indicates the true hands of the data have been determined. The data were treated with multi-scan absorption corrections.[24] The structures were solved using intrinsic phasing methods and refined with full-matrix, least-squares procedures on F2.

Compound **8** consistently packs inefficiently leading to multiple crystal growth, high mosaicity and disorder at the CF_3 groups. The results herein represent the best of several trials. Two symmetry unique but chemically identical compound molecules and seven cocrystallized toluene solvent molecules were found in the asymmetric unit of **8**. In order to converge the chemically reasonable model, the CF_3 groups and toluene solvent molecules were treated as idealized rigid groups and three-dimensional rigid bond restraints were required.

All non-hydrogen atoms were refined with anisotropic displacement parameters. Hydrogen atoms were treated as idealized contributions with geometrically calculated positions and with Uiso equal to 1.2 (or 1.5 for methyl) Ueq of the attached atom. Atomic scattering factors are contained in the SHELXTL program library.[25]

16. References:

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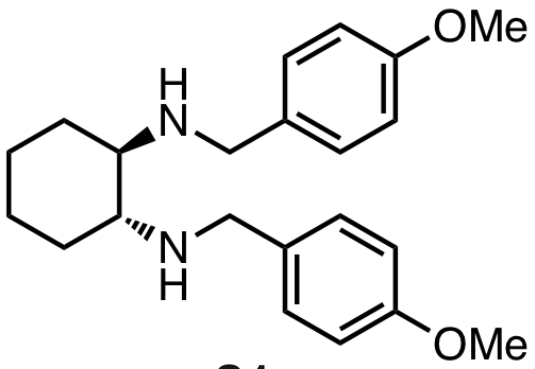
9 Nucleus	1H



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S50

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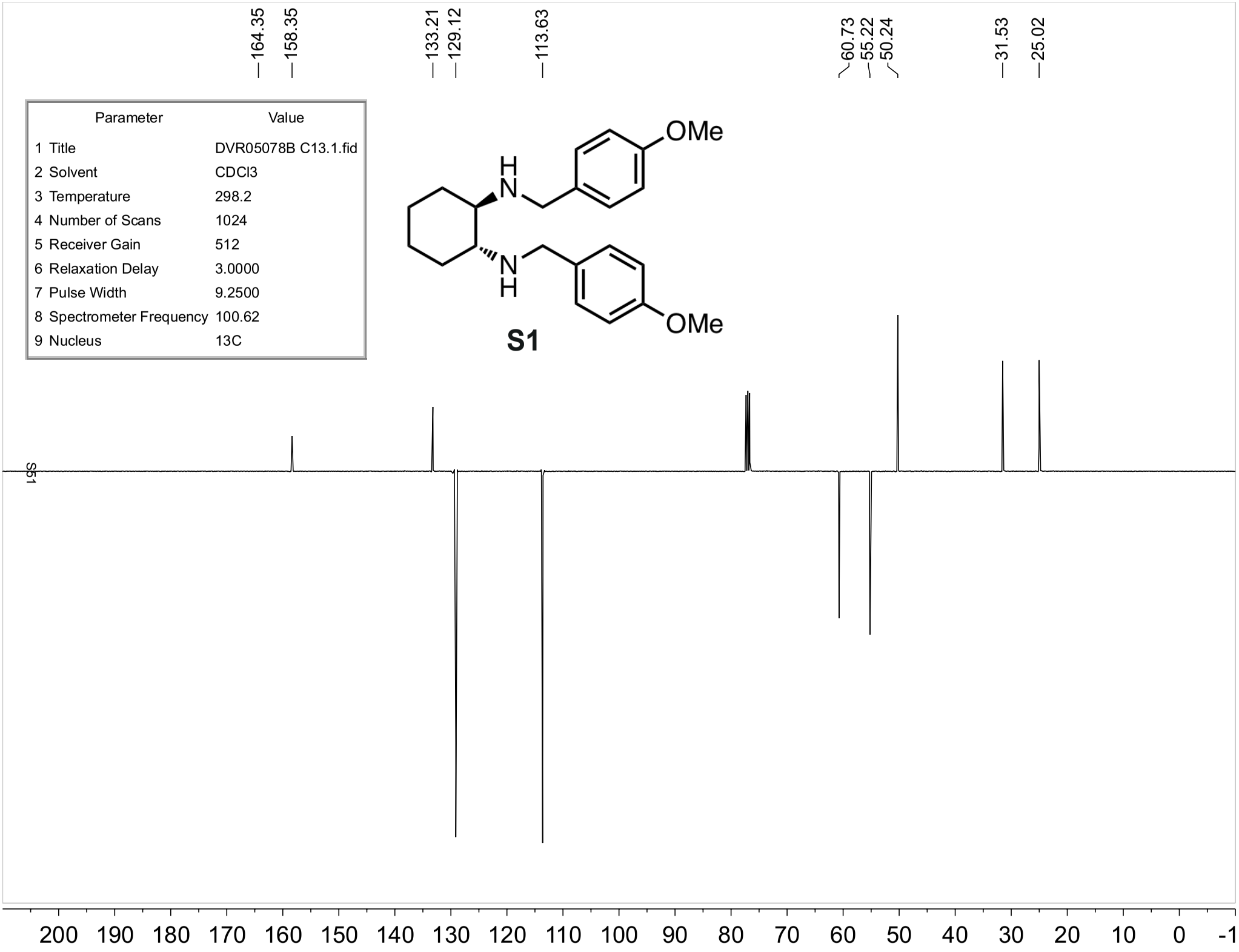
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60.73
55.22
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31.53
25.02
Parameter
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DVR05078B C13.1.fid
2 Solvent
CDCl3
3 Temperature
298.2
4 Number of Scans
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5 Receiver Gain
512
6 Relaxation Delay
3.0000
7 Pulse Width
9.2500
8 Spectrometer Frequency
100.62
9 Nucleus
13C
OMe
H
N
N
H
OMe
S1
S51
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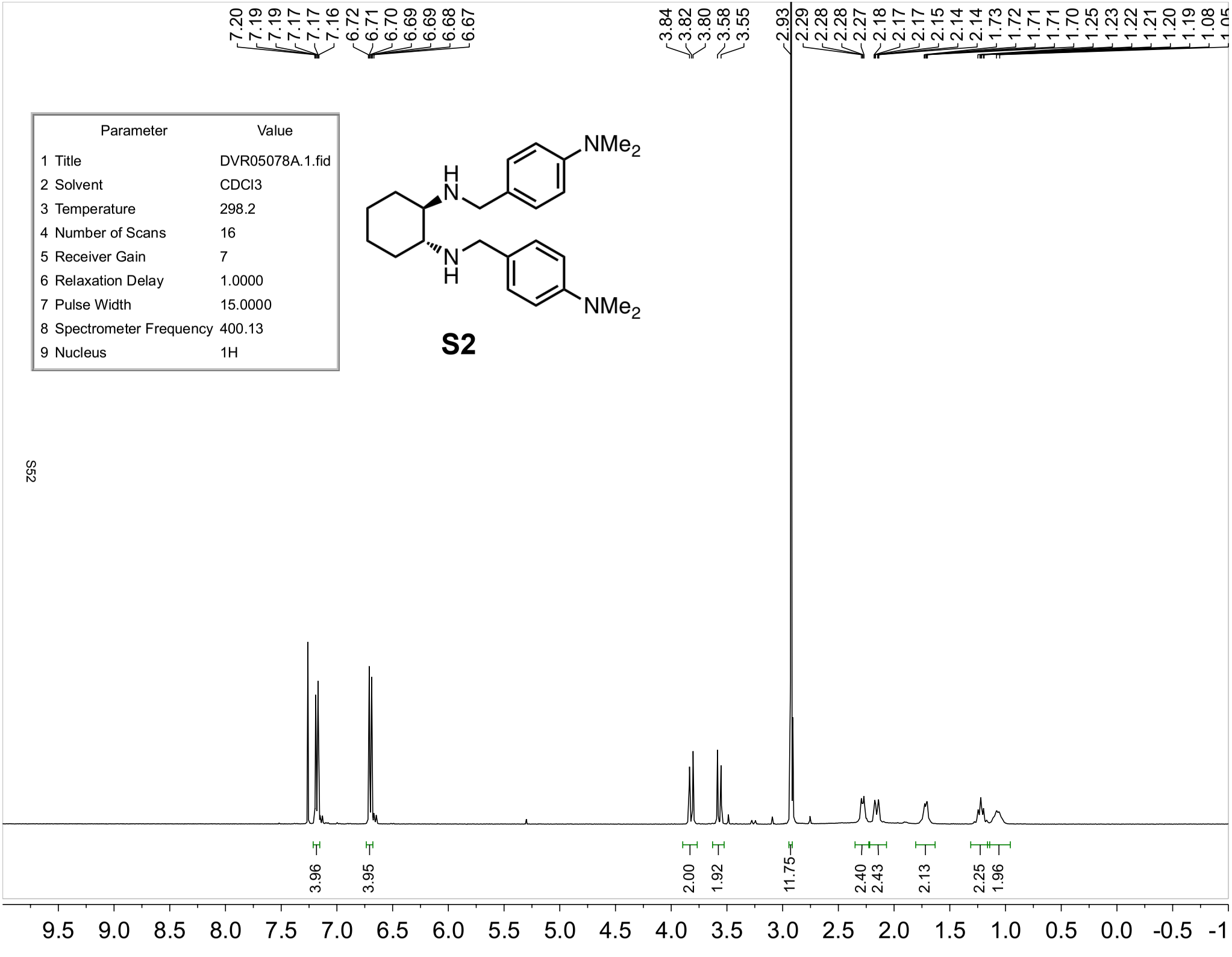
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2.93
2.29 2.28 2.28 2.27 2.18 2.17 2.17 2.15 2.14 2.14 1.73 1.72 1.71 1.71 1.70 1.25 1.23 1.22 1.21 1.20 1.19 1.08
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7 Pulse Width 15.0000
8 Spectrometer Frequency 400.13
9 Nucleus 1H
NMe2
H
N
N
H
NMe2
S2
S52
3.96 3.95 2.00 1.92 11.75 2.40 2.43 2.13 2.25 1.96
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1

149.66
128.95
112.69
60.36
50.03
40.76
31.17
24.95

Parameter	Value
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6 Relaxation Delay	3.0000
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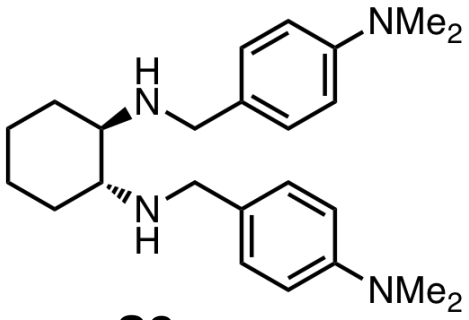
8 Spectrometer Frequency	100.62
9 Nucleus	13C



S2

S53

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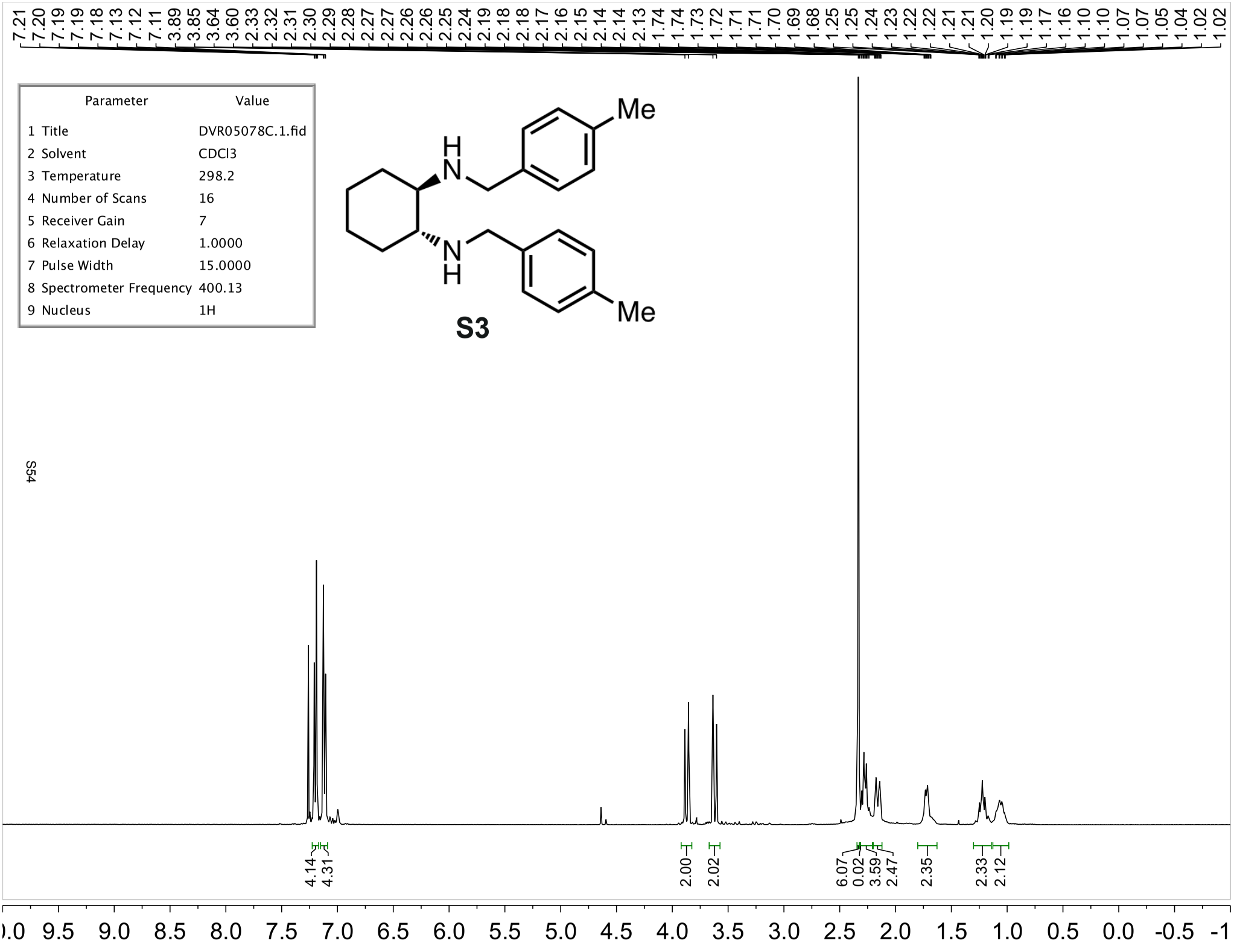
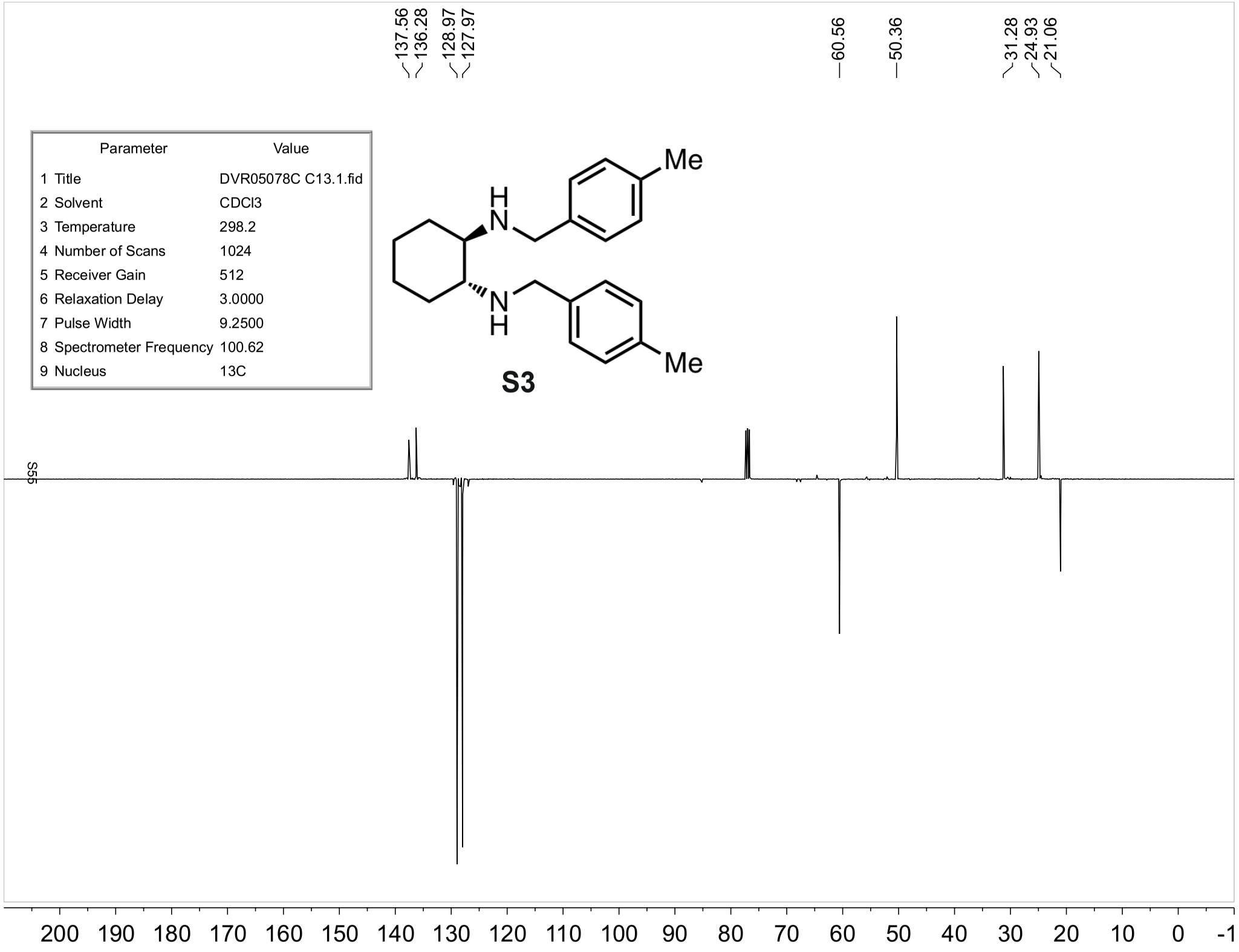
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H

S3

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3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
Me
H
N
N
H
Me
S3
55
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

Parameter	Value
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3 Temperature	298.1
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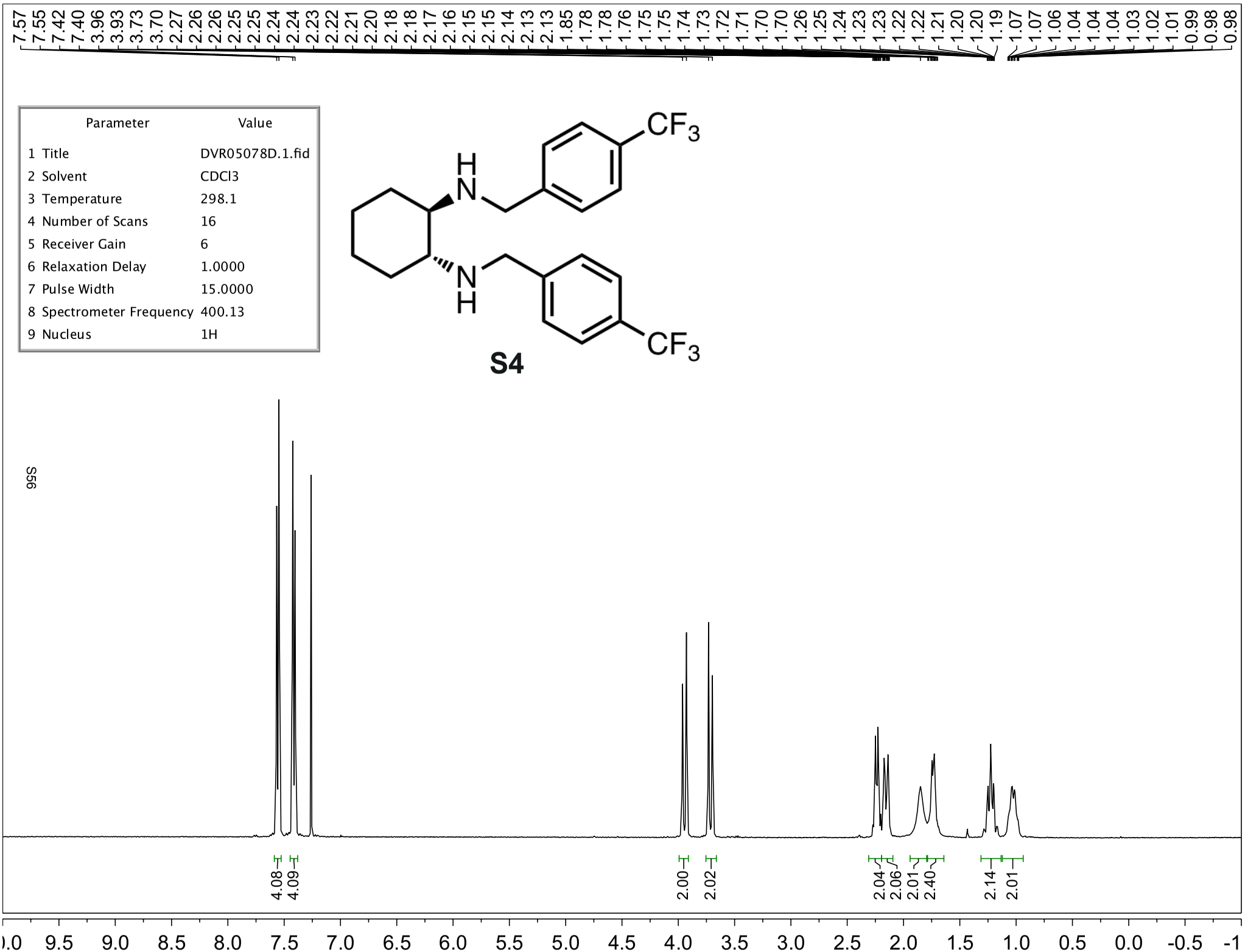
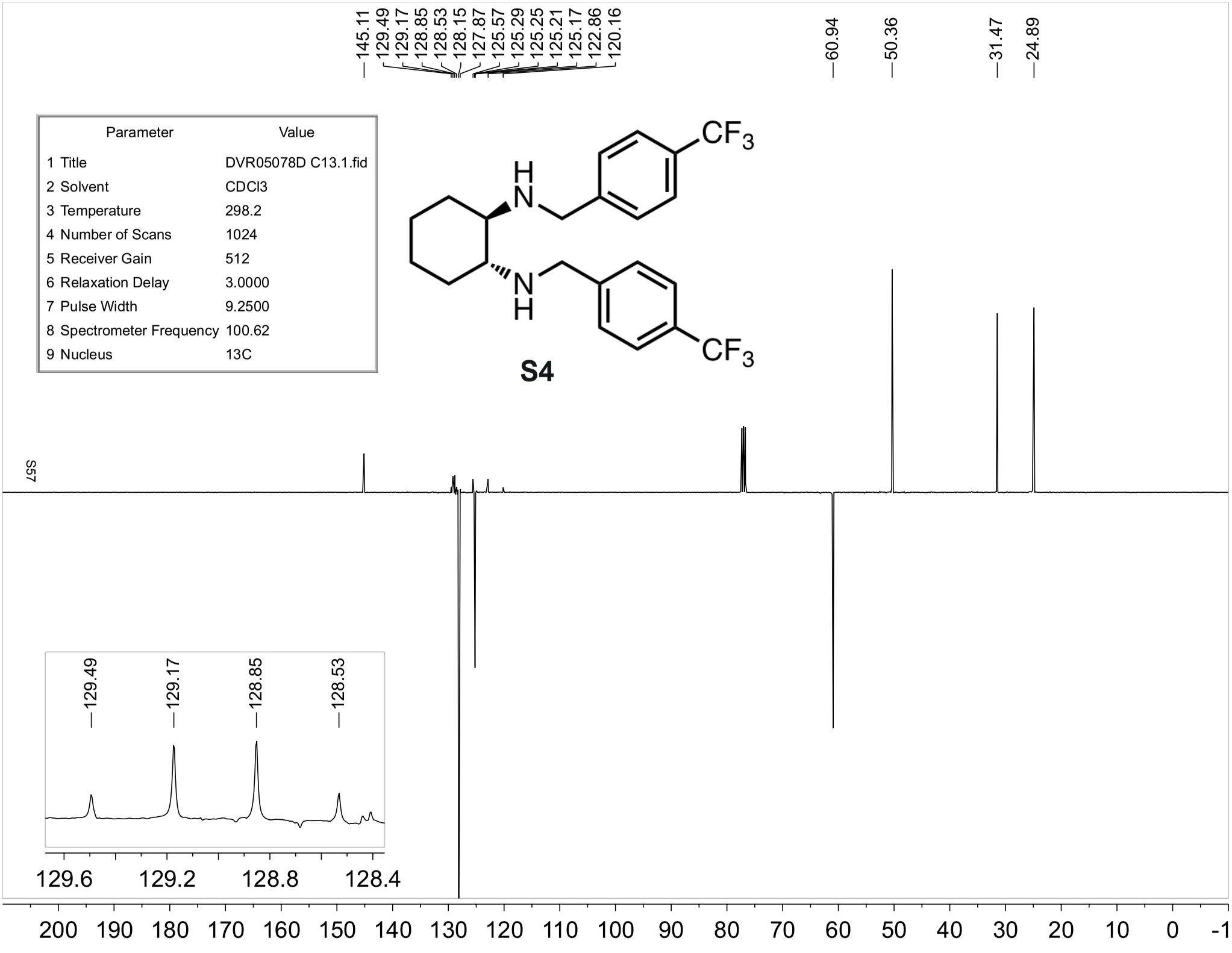
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H

S4

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122.86
120.16
60.94
50.36
31.47
24.89
Parameter
Value
1 Title
DVR05078D C13.1.fid
2 Solvent
CDCl3
3 Temperature
298.2
4 Number of Scans
1024
5 Receiver Gain
512
6 Relaxation Delay
3.0000
7 Pulse Width
9.2500
8 Spectrometer Frequency
100.62
9 Nucleus
13C
CF3
H
N
N
H
CF3
S4
S57
129.49
129.17
128.85
128.53
129.6
129.2
128.8
128.4
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-1

Parameter	Value
1 Title	DVR05078D F19.1.fid
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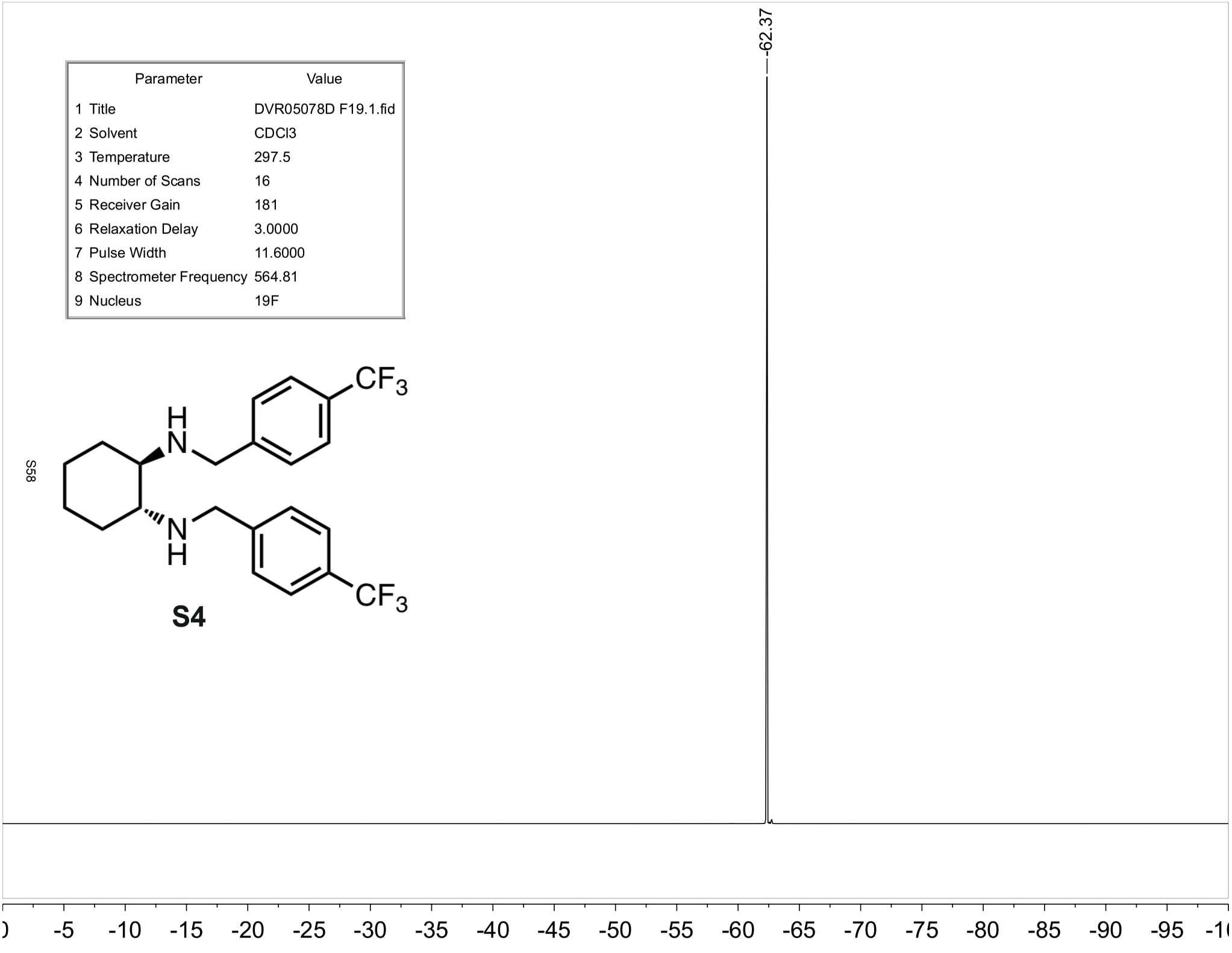
8 Spectrometer Frequency	564.81
9 Nucleus	19F

S4



Parameter	Value
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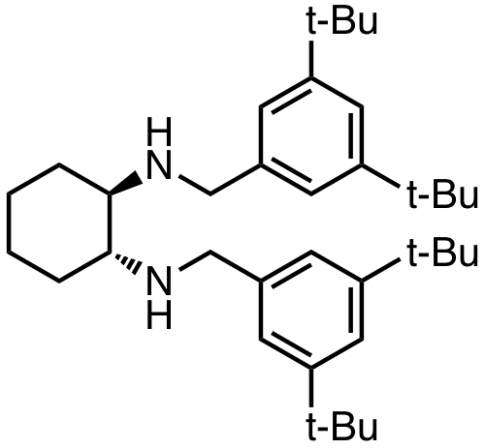
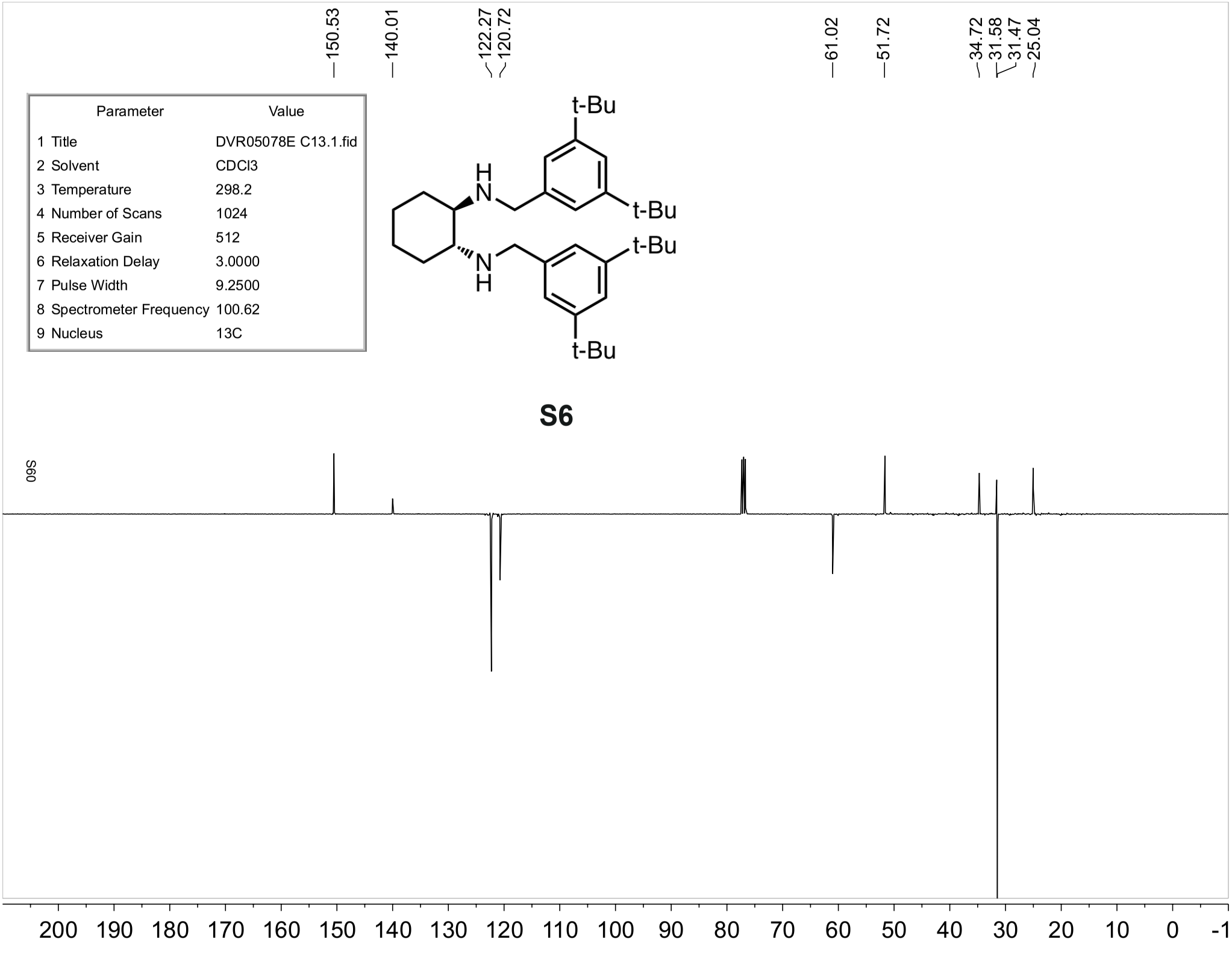
8 Spectrometer Frequency	400.13
9 Nucleus	1H



S6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5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
t-Bu
t-Bu
t-Bu
t-Bu
H
N
H
N
S6
S60
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

Parameter	Value
1 Title	DVR05078F.1.fid
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3 Temperature	298.2
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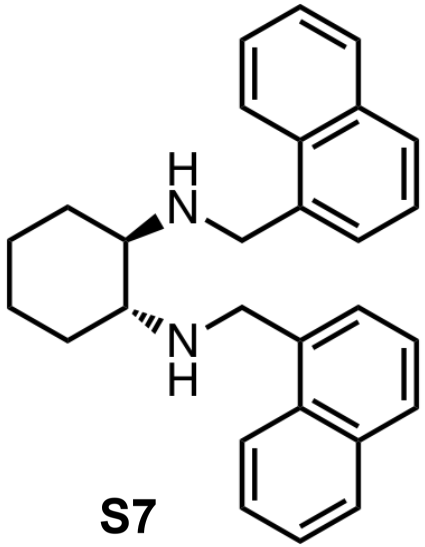
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H



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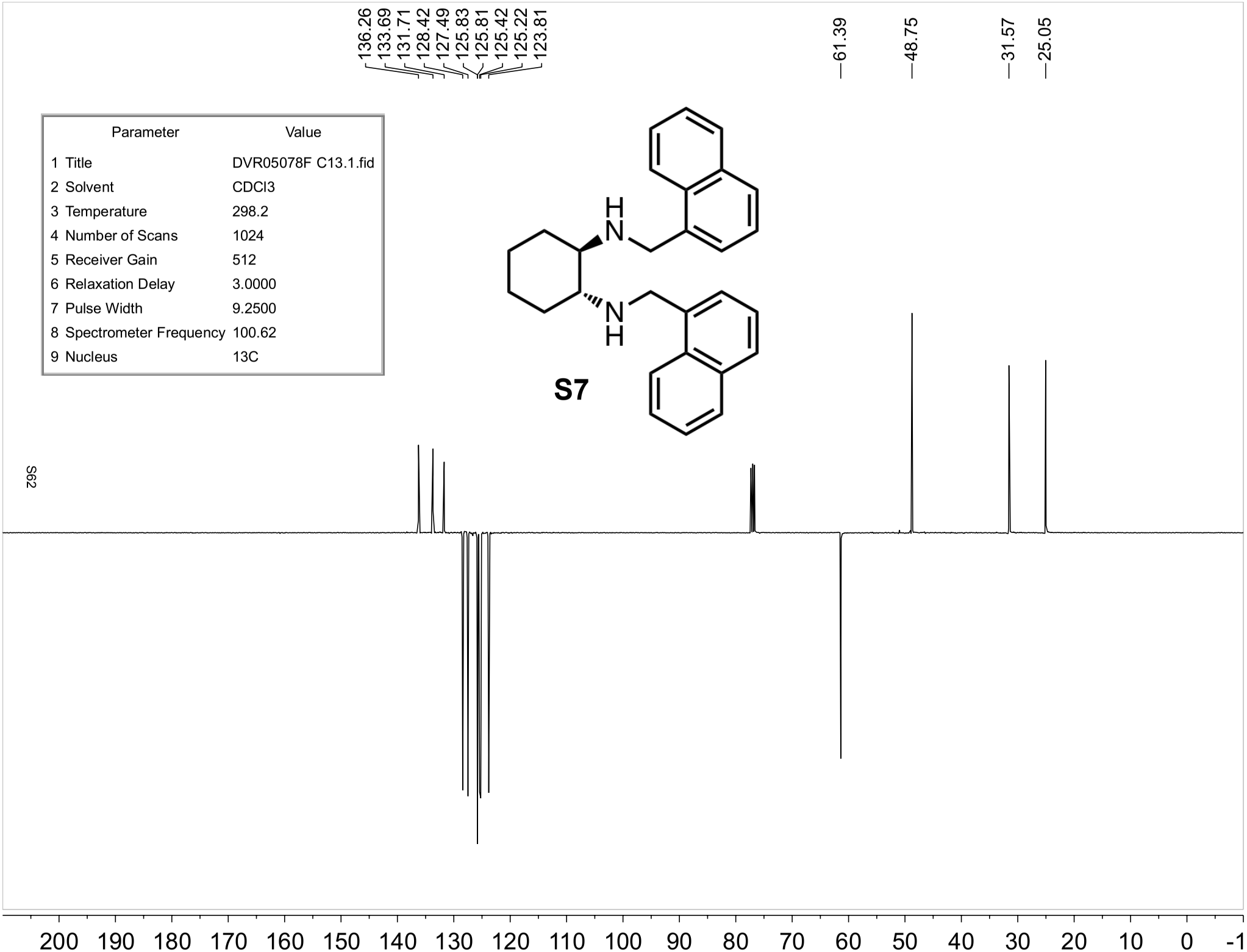
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Parameter Value
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2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
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9 Nucleus 13C
S7
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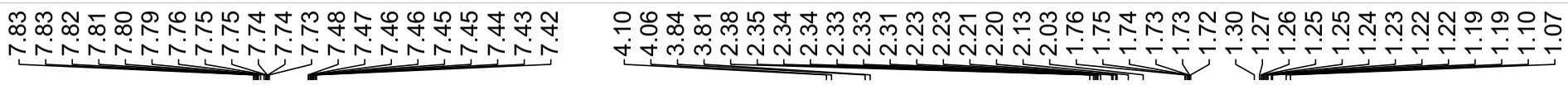

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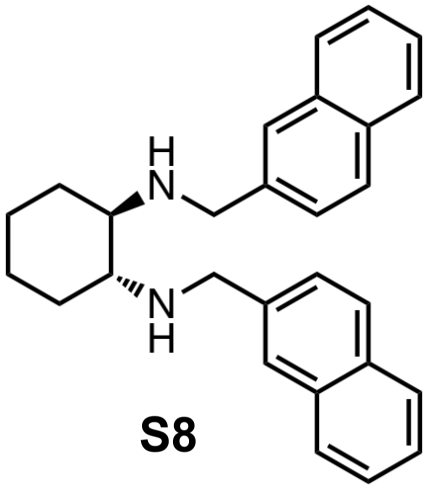
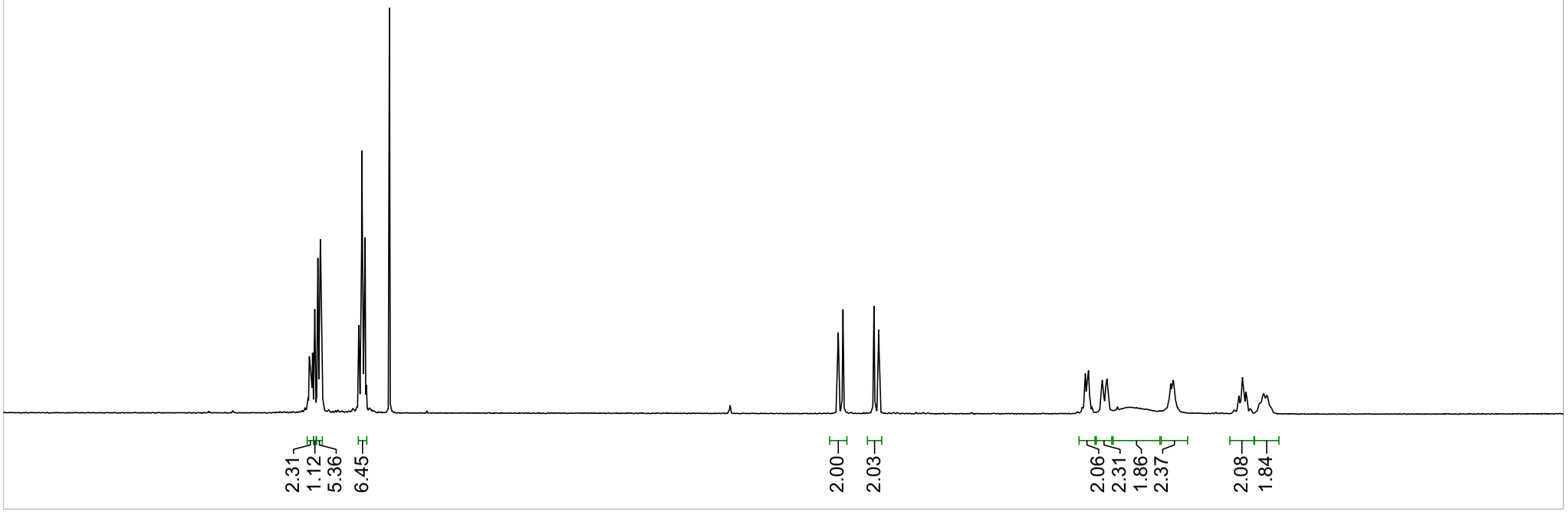
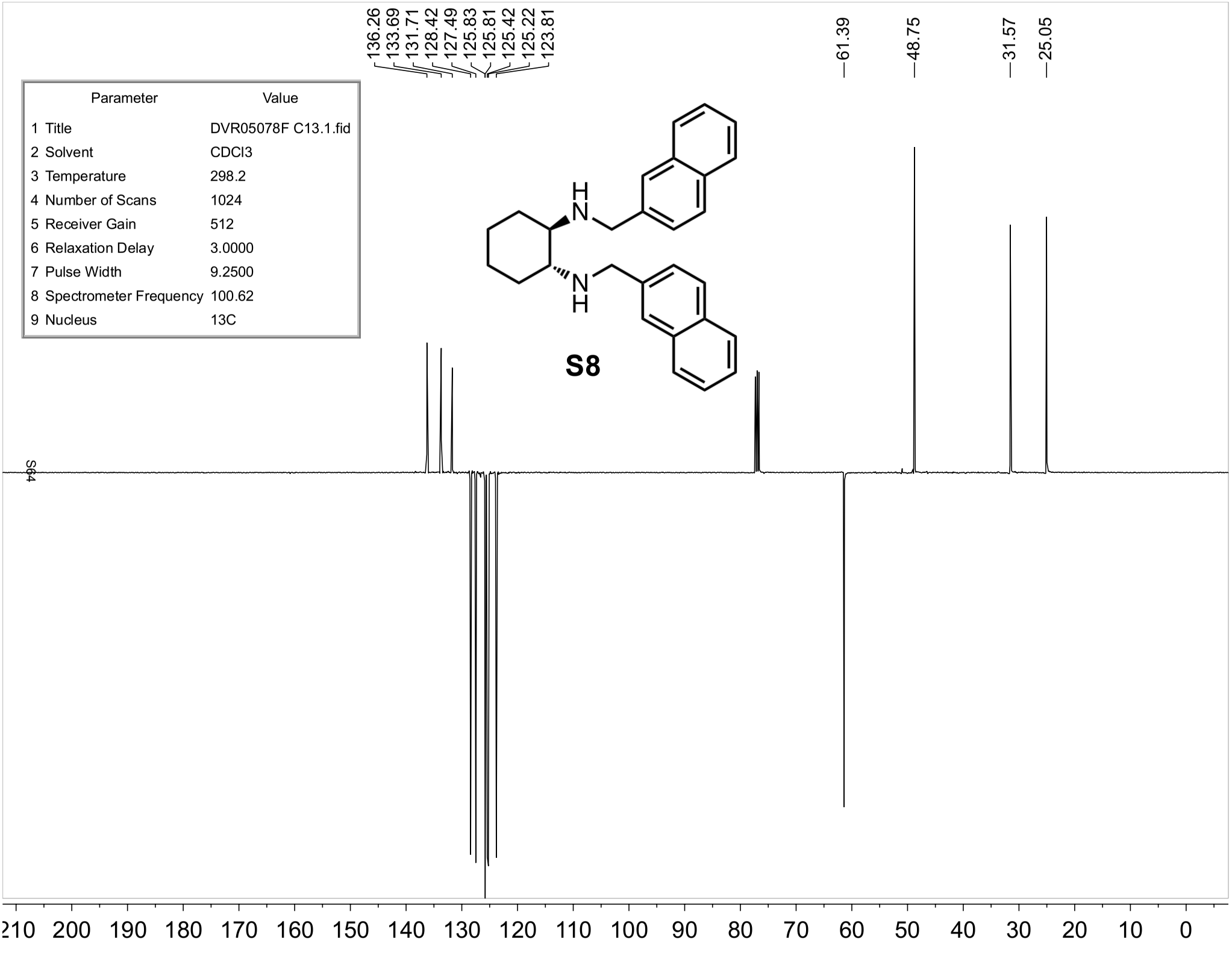
8 Spectrometer Frequency	400.13
9 Nucleus	1H



S8

S63

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31.57
25.05
Parameter
Value
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DVR05078F C13.1.fid
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CDCl3
3 Temperature
298.2
4 Number of Scans
1024
5 Receiver Gain
512
6 Relaxation Delay
3.0000
7 Pulse Width
9.2500
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9 Nucleus
13C
S8
S64
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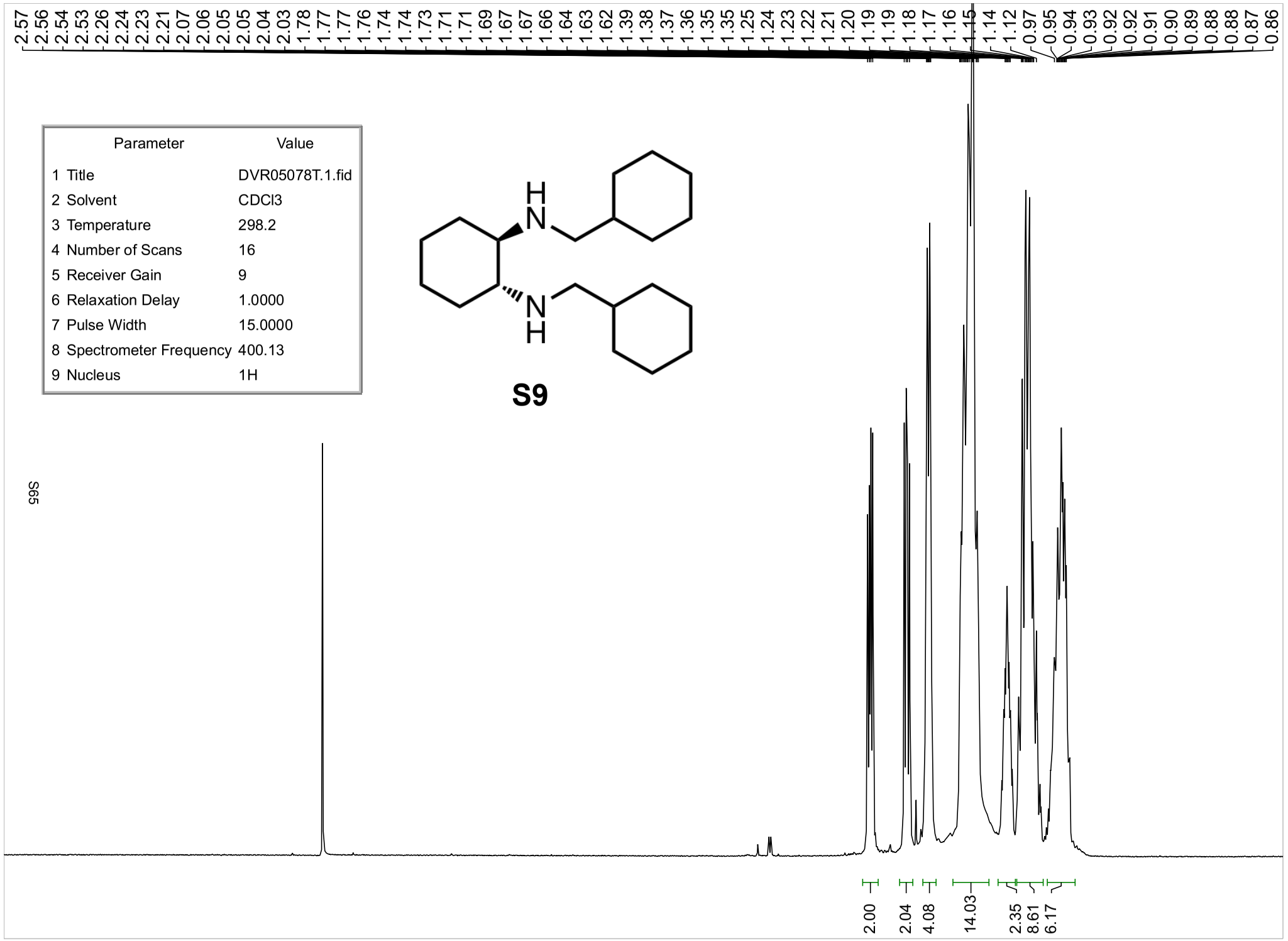
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7 Pulse Width 15.0000
8 Spectrometer Frequency 400.13
9 Nucleus 1H
H N N H
S9
S65
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Parameter	Value
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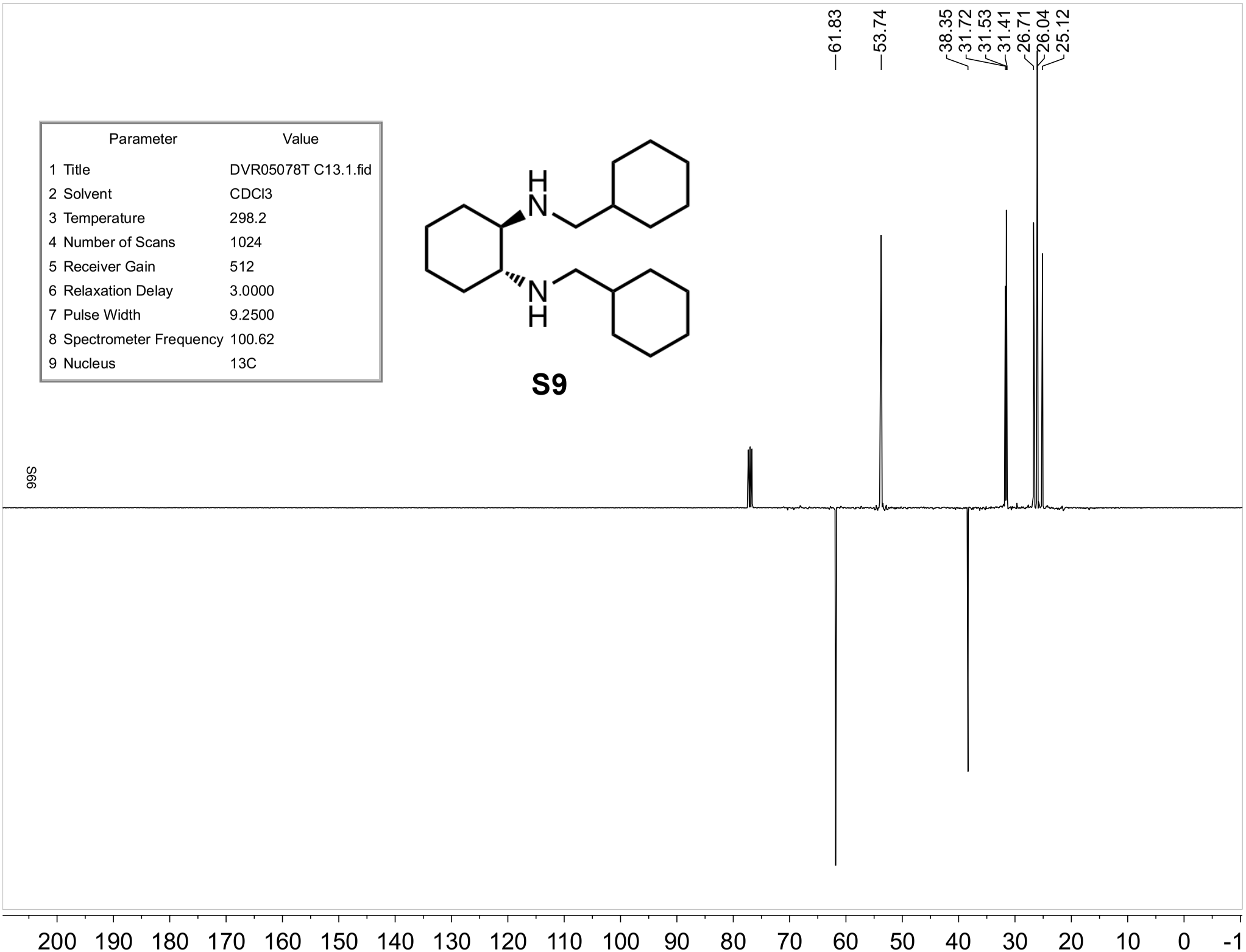
8 Spectrometer Frequency	100.62
9 Nucleus	13C

S9



Parameter	Value
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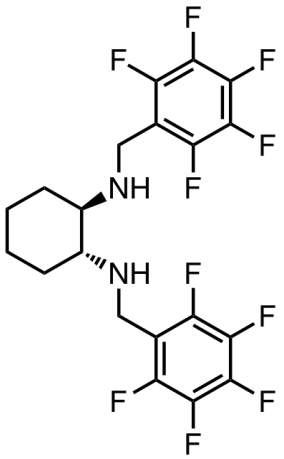
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H



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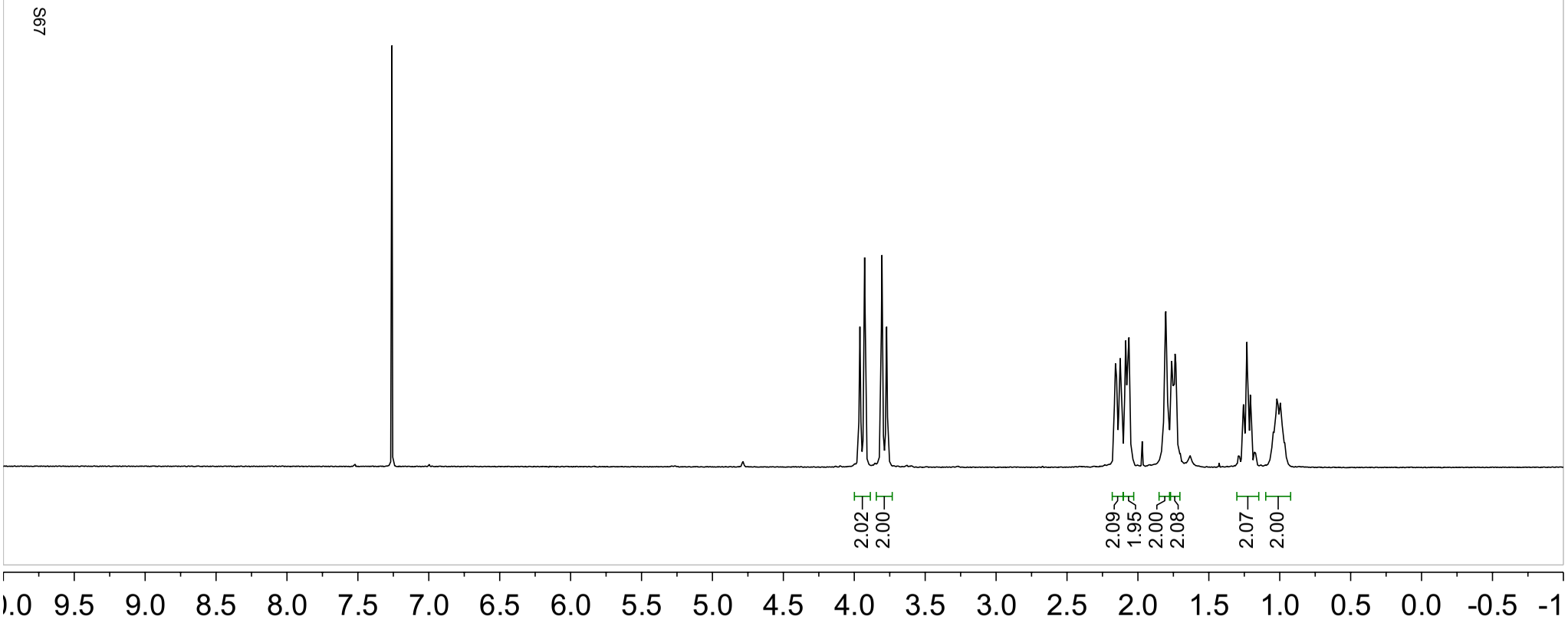

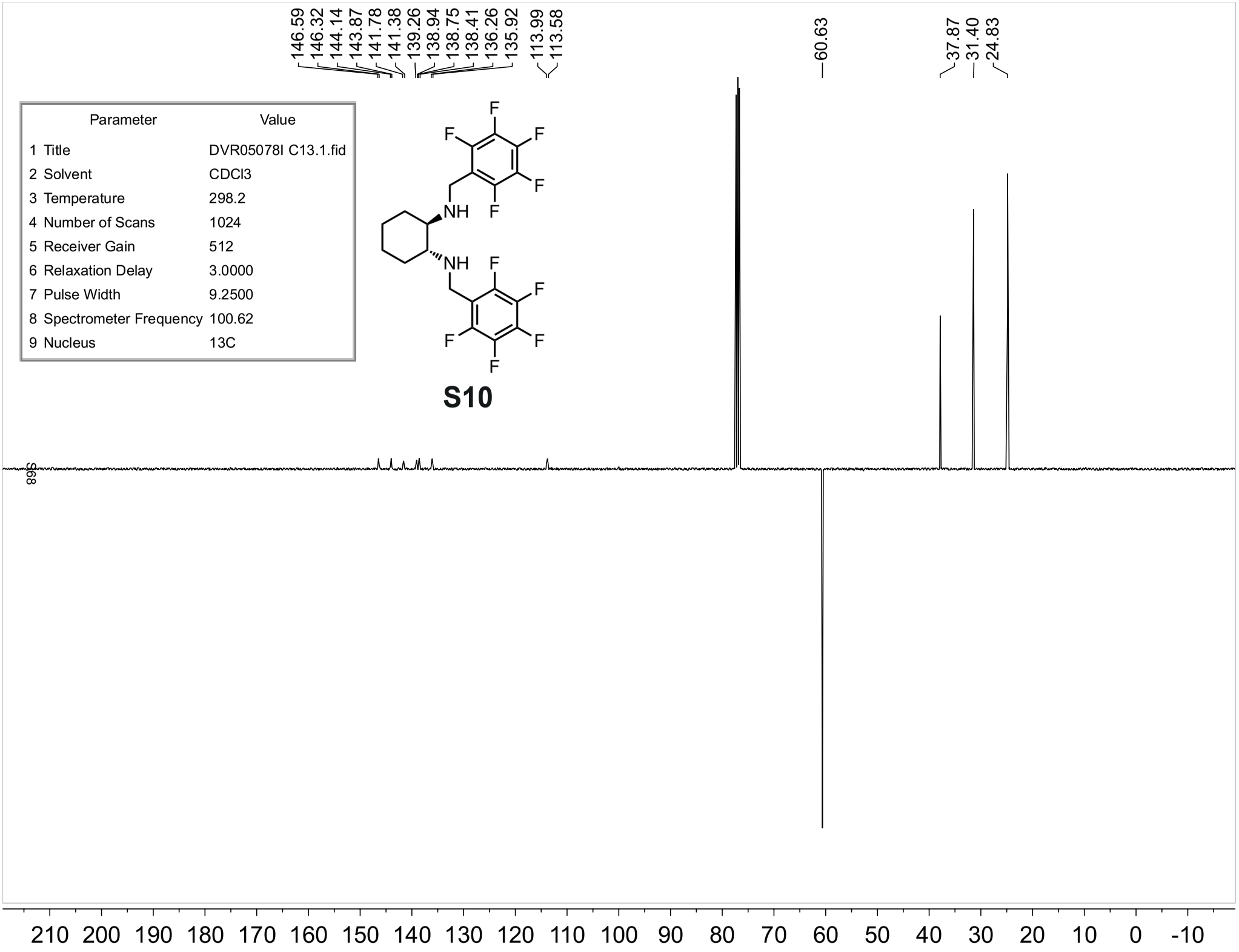
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113.58
60.63
37.87
31.40
24.83
Parameter Value
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2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
NH
NH
F
S10
9968
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10

Parameter	Value
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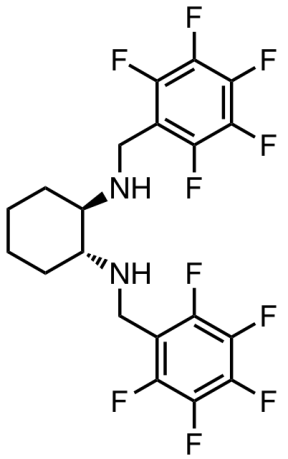
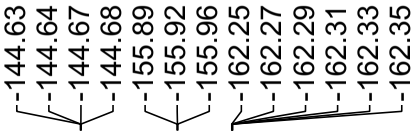
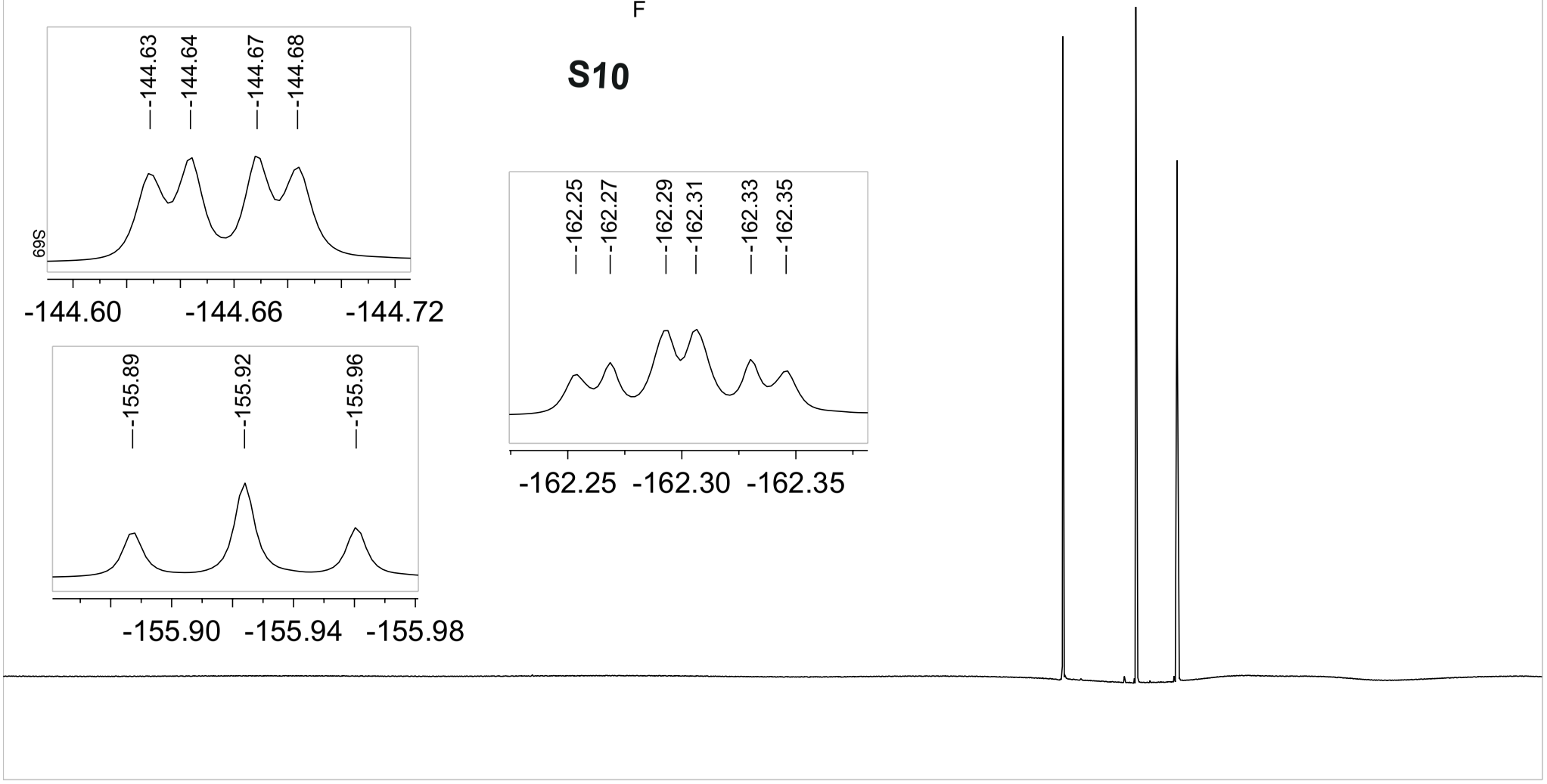
7 Pulse Width	11.6000
8 Spectrometer Frequency	564.81
9 Nucleus	19F

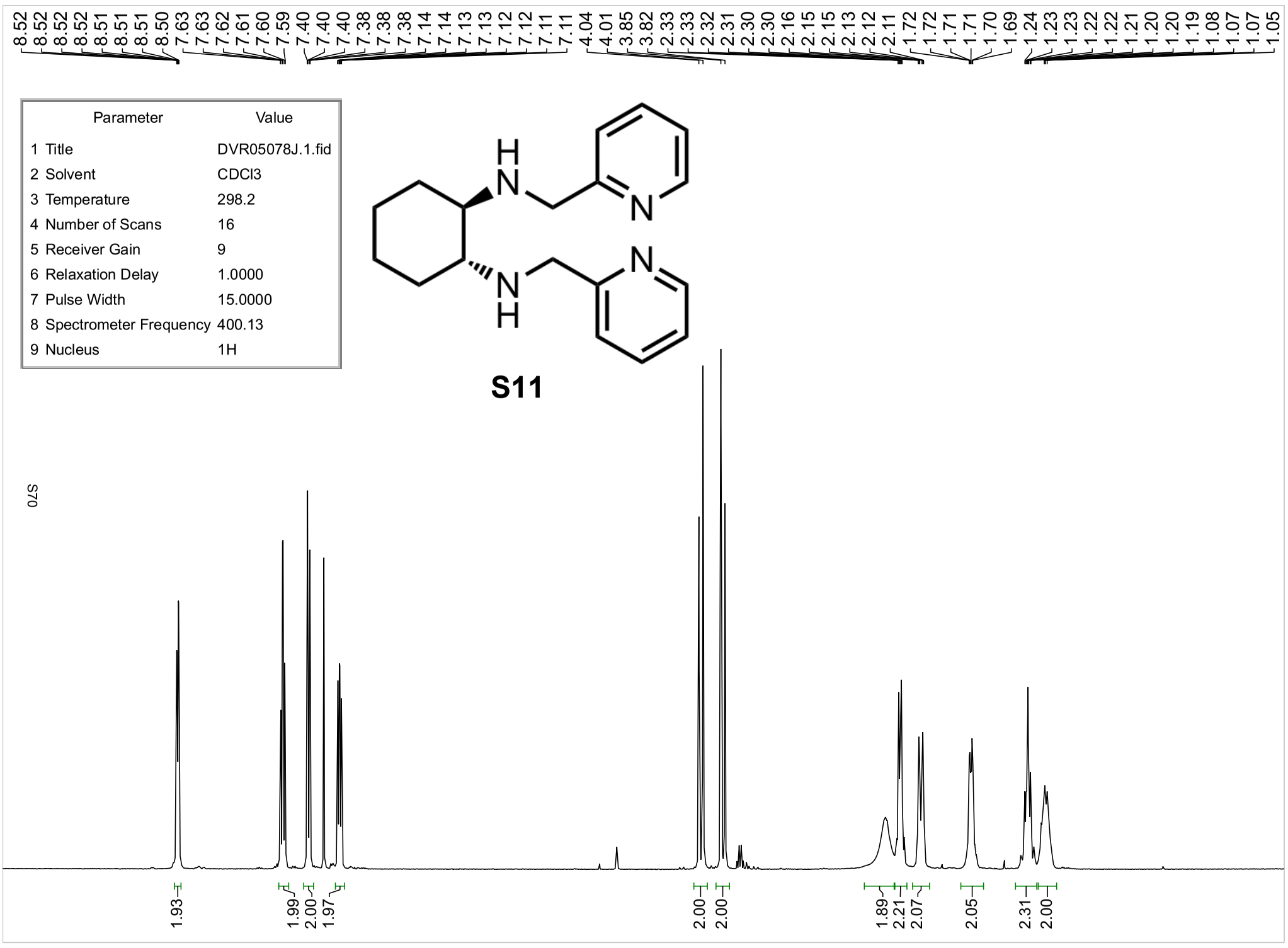


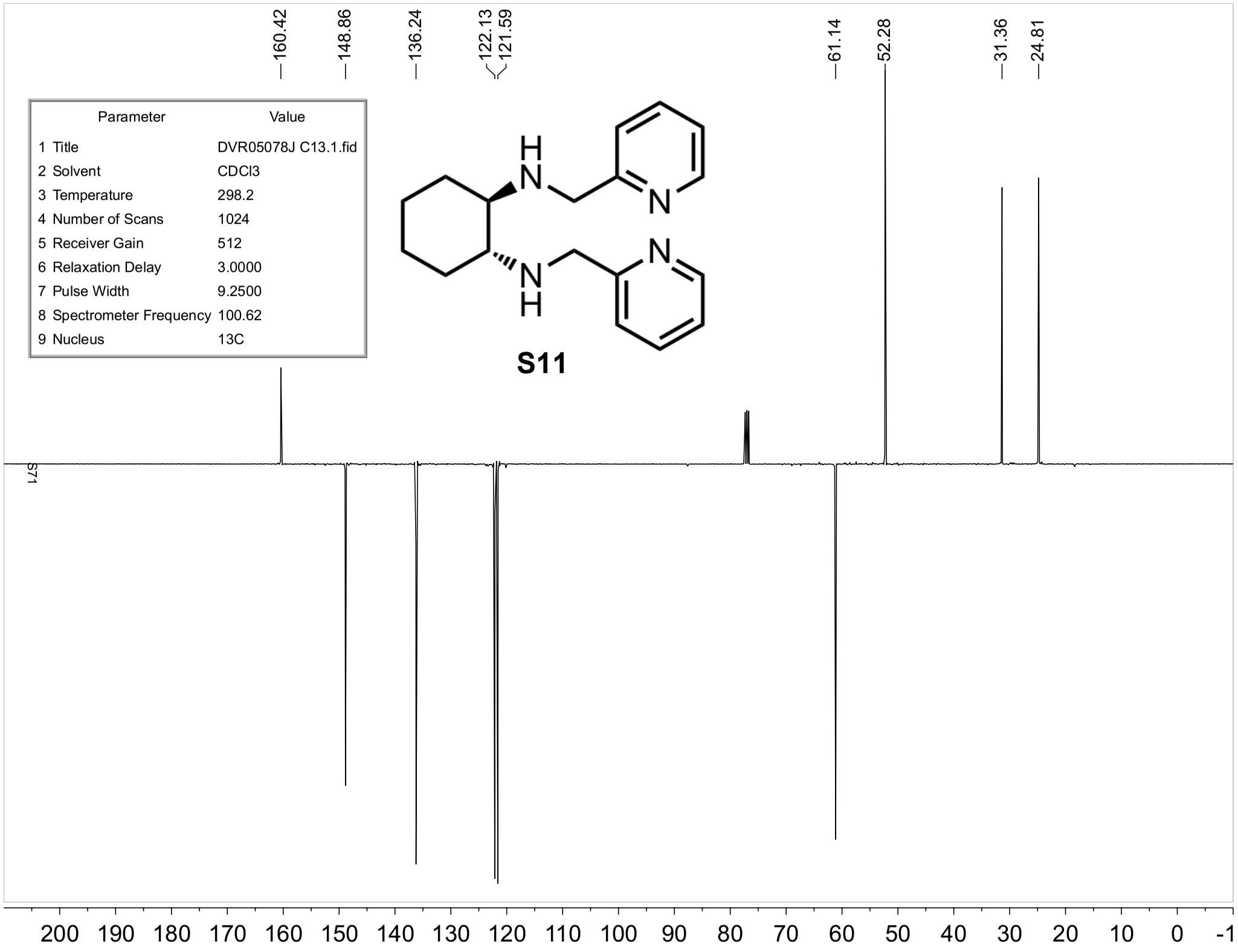


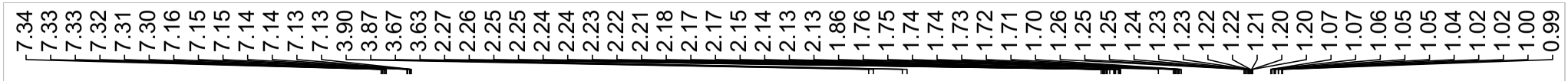


Parameter	Value
1 Title	DVR05078J.1.fid
2 Solvent	CDCl3
3 Temperature	298.2
4 Number of Scans	16
5 Receiver Gain	9
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H

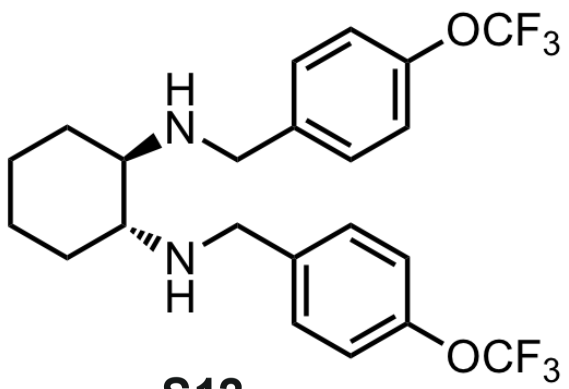
S11




160.42
148.86
136.24
122.13
121.59
61.14
52.28
31.36
24.81
Parameter Value
1 Title DVR05078J C13.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
S11
S71
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

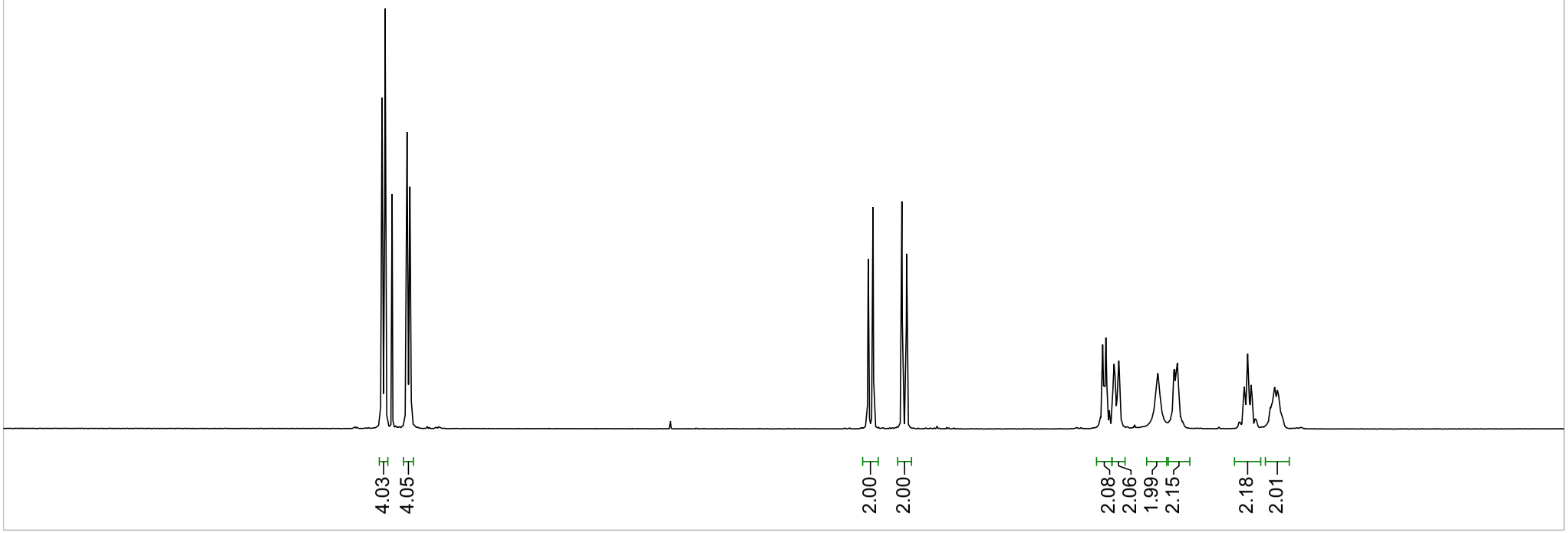


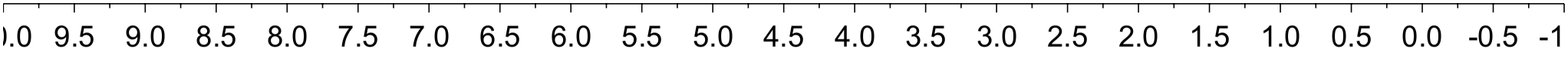
Parameter	Value
1 Title	DVR05078K.1.fid
2 Solvent	CDCl3
3 Temperature	298.2
4 Number of Scans	16
5 Receiver Gain	8
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H

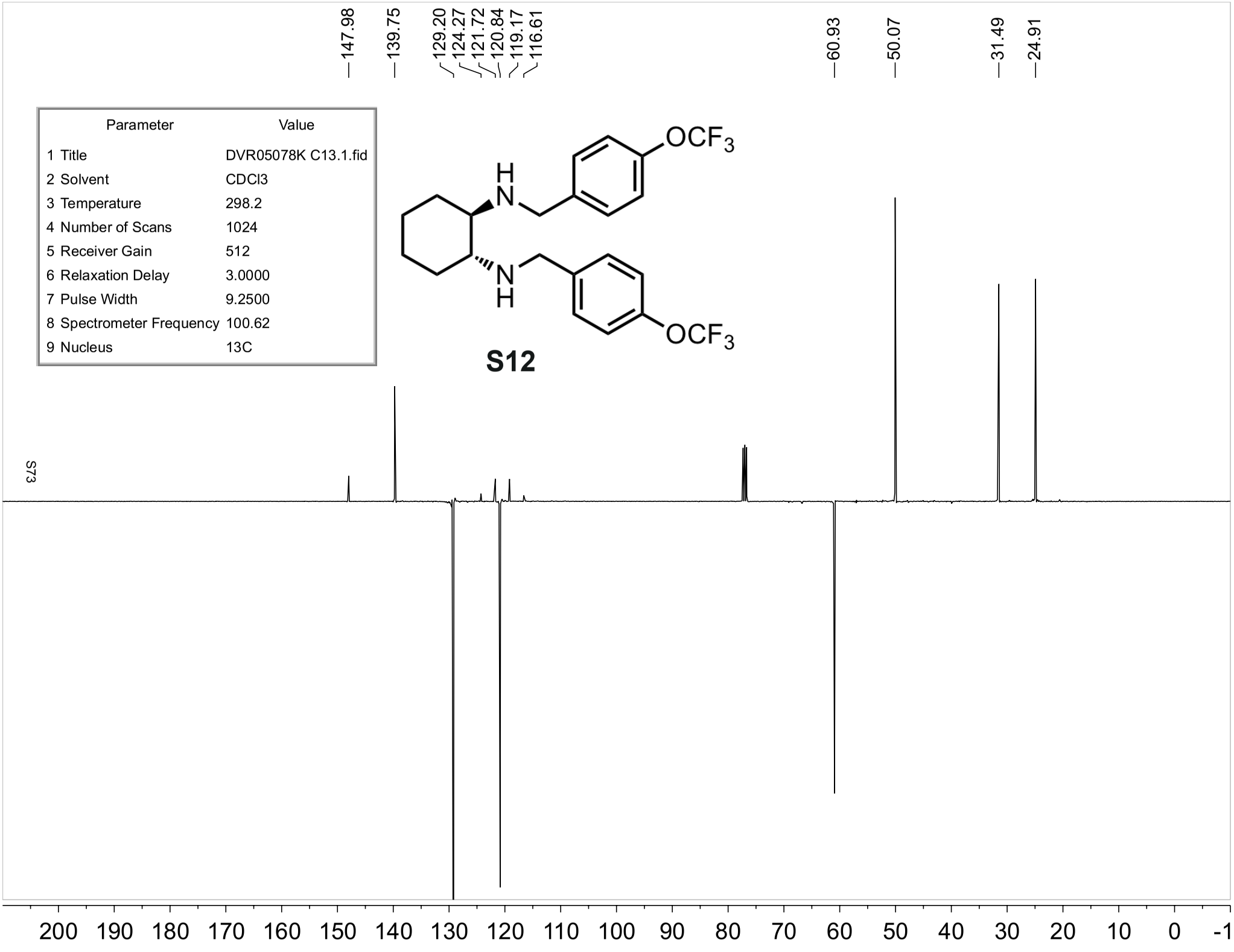


S12

S72

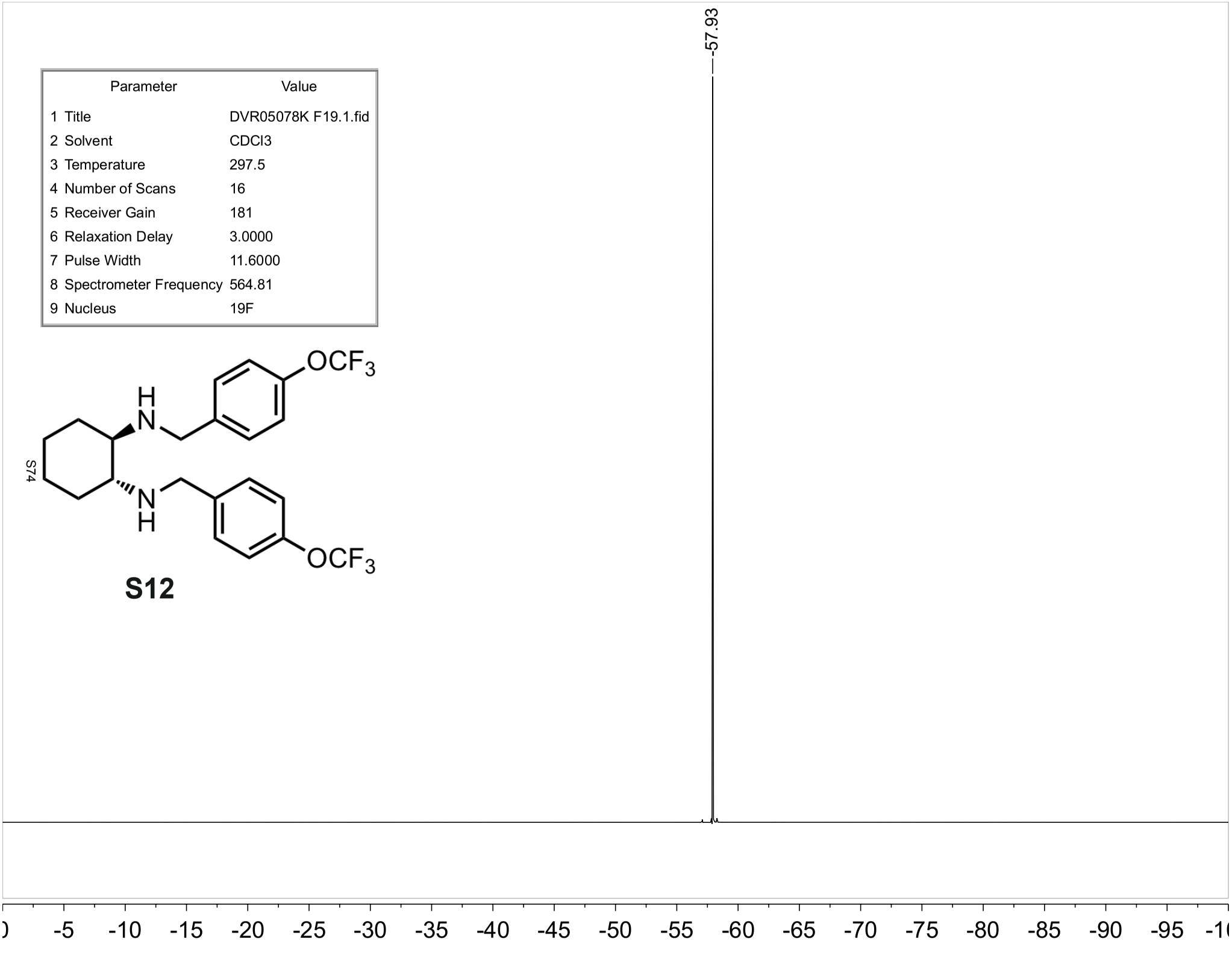


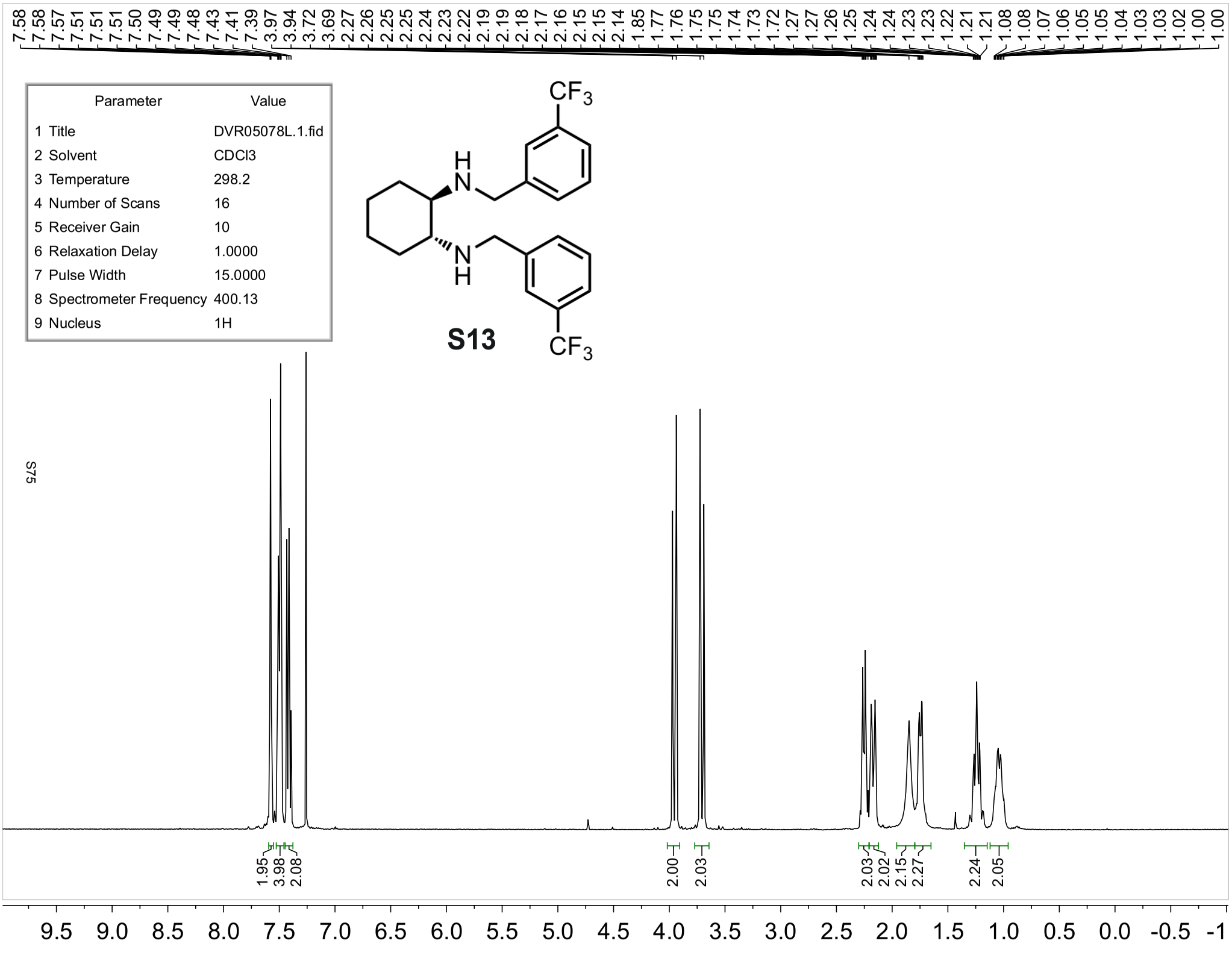


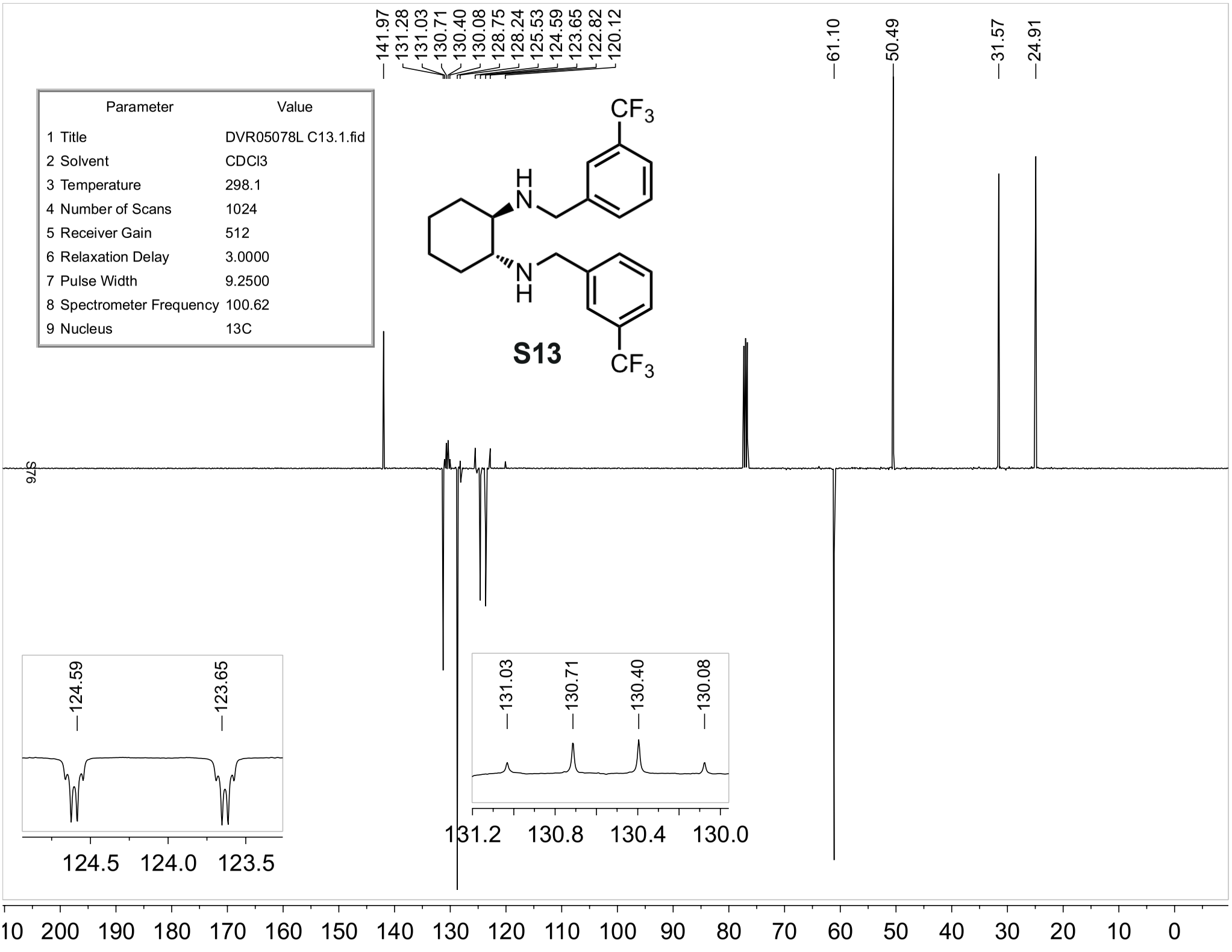

147.98
139.75
129.20
124.27
121.72
120.84
119.17
116.61
60.93
50.07
31.49
24.91
Parameter Value
1 Title DVR05078K C13.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
OCF3
H
N
N
H
OCF3
S12
S73
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

Parameter	Value
1 Title	DVR05078K F19.1.fid
2 Solvent	CDCl3
3 Temperature	297.5
4 Number of Scans	16
5 Receiver Gain	181
6 Relaxation Delay	3.0000
7 Pulse Width	11.6000
8 Spectrometer Frequency	564.81
9 Nucleus	19F

S12

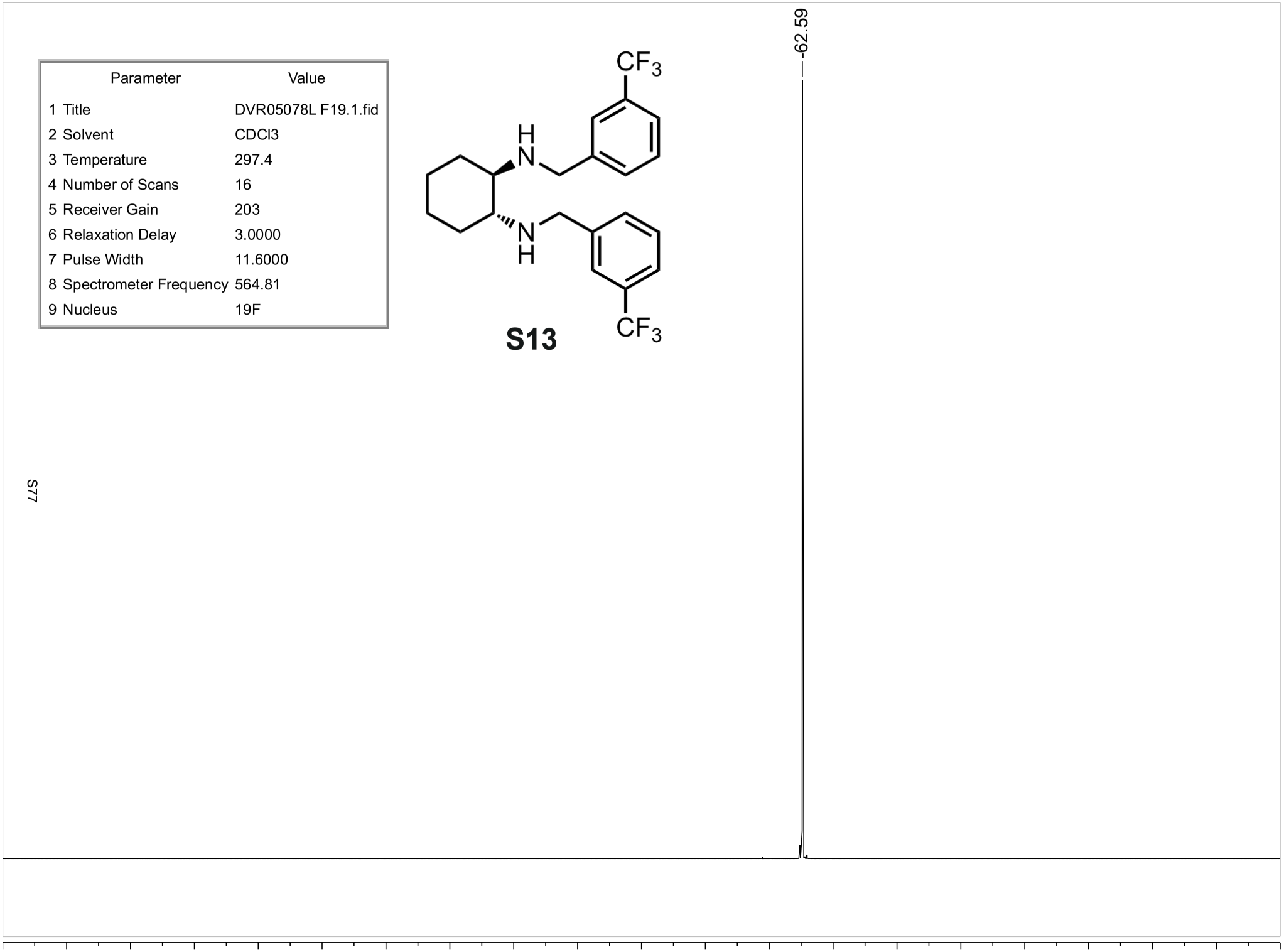



7.58 7.58 7.57 7.51 7.51 7.51 7.50 7.49 7.49 7.48 7.43 7.41 7.39 3.97 3.94 3.72 3.69 2.27 2.26 2.25 2.25 2.24 2.23 2.22 2.19 2.19 2.18 2.17 2.16 2.15 2.15 2.14 1.85 1.77 1.76 1.75 1.75 1.74 1.73 1.72 1.27 1.27 1.26 1.25 1.24 1.24 1.23 1.23 1.22 1.21 1.21 1.08 1.08 1.07 1.06 1.05 1.05 1.04 1.03 1.03 1.02 1.00 1.00
Parameter Value
1 Title DVR05078L.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 16
5 Receiver Gain 10
6 Relaxation Delay 1.0000
7 Pulse Width 15.0000
8 Spectrometer Frequency 400.13
9 Nucleus 1H
CF3
H
N
N
H
CF3
S13
S75
1.95 3.98 2.08 2.00 2.03 2.03 2.02 2.15 2.27 2.24 2.05
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1

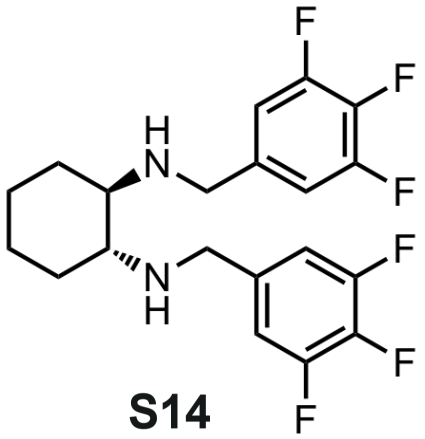

141.97
131.28
131.03
130.71
130.40
130.08
128.75
128.24
125.53
124.59
123.65
122.82
120.12
61.10
50.49
31.57
24.91
Parameter Value
1 Title DVR05078L C13.1.fid
2 Solvent CDCl3
3 Temperature 298.1
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
CF3
H
N
N
H
CF3
S13
S76
124.59
123.65
124.5 124.0 123.5
131.03
130.71
130.40
130.08
131.2 130.8 130.4 130.0
10 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0

Parameter	Value
1 Title	DVR05078L F19.1.fid
2 Solvent	CDCl3
3 Temperature	297.4
4 Number of Scans	16
5 Receiver Gain	203
6 Relaxation Delay	3.0000
7 Pulse Width	11.6000
8 Spectrometer Frequency	564.81
9 Nucleus	19F

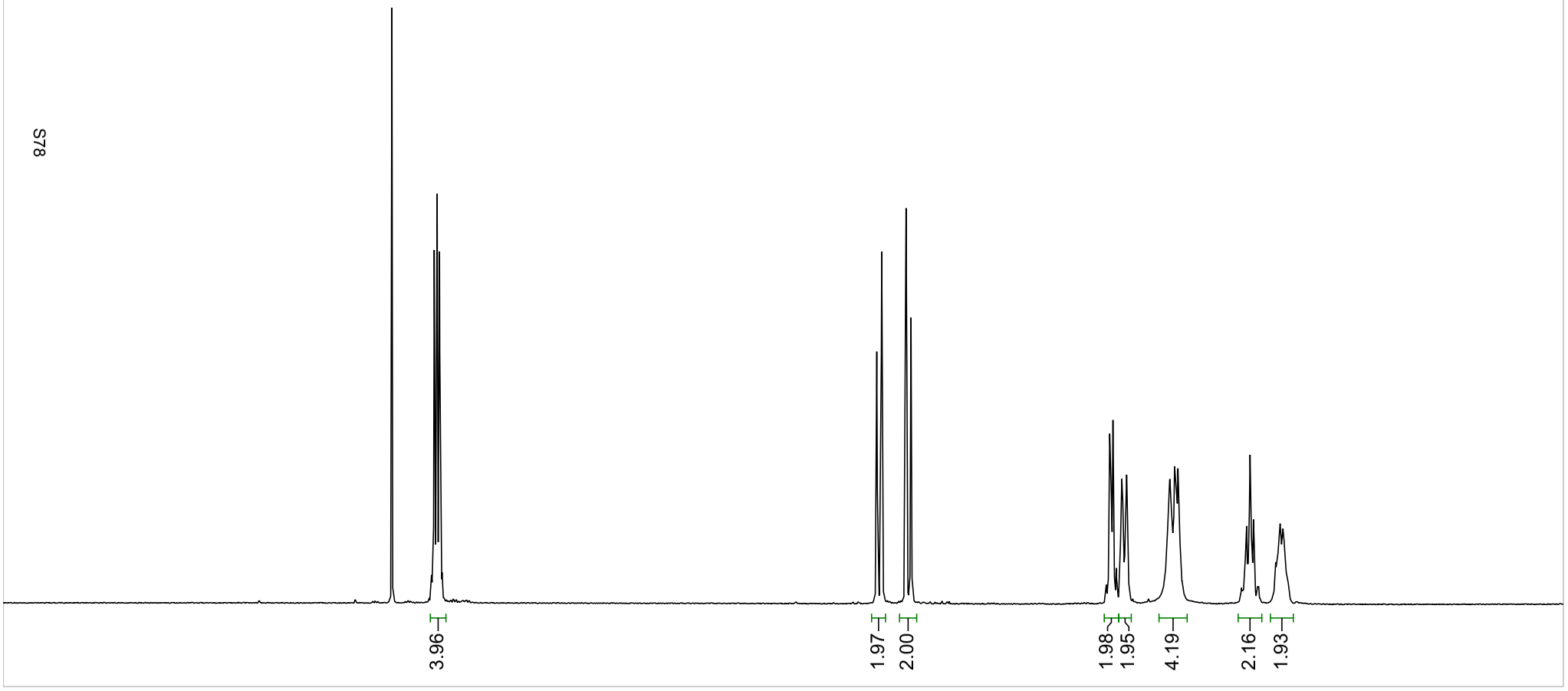
S13

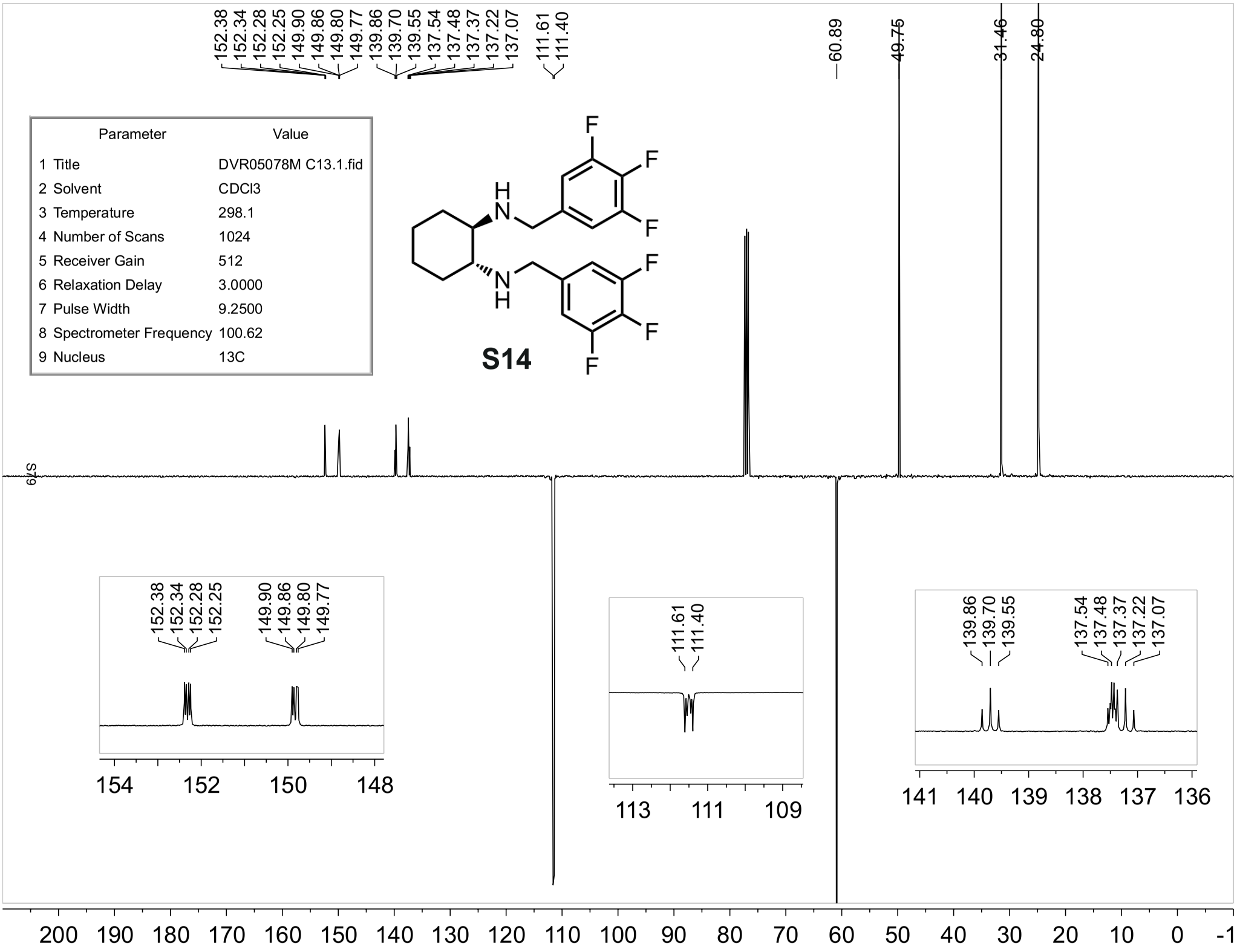


Parameter	Value
1 Title	DVR05078M.1.fid
2 Solvent	CDCl3
3 Temperature	298.2
4 Number of Scans	16
5 Receiver Gain	9
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H

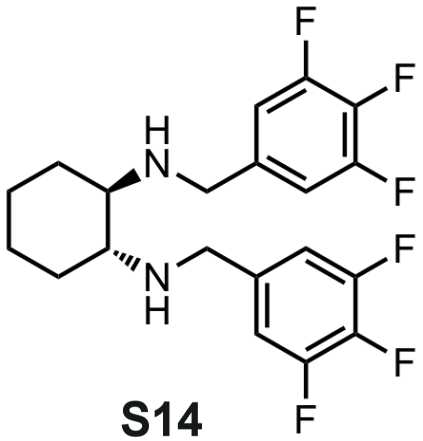


S14

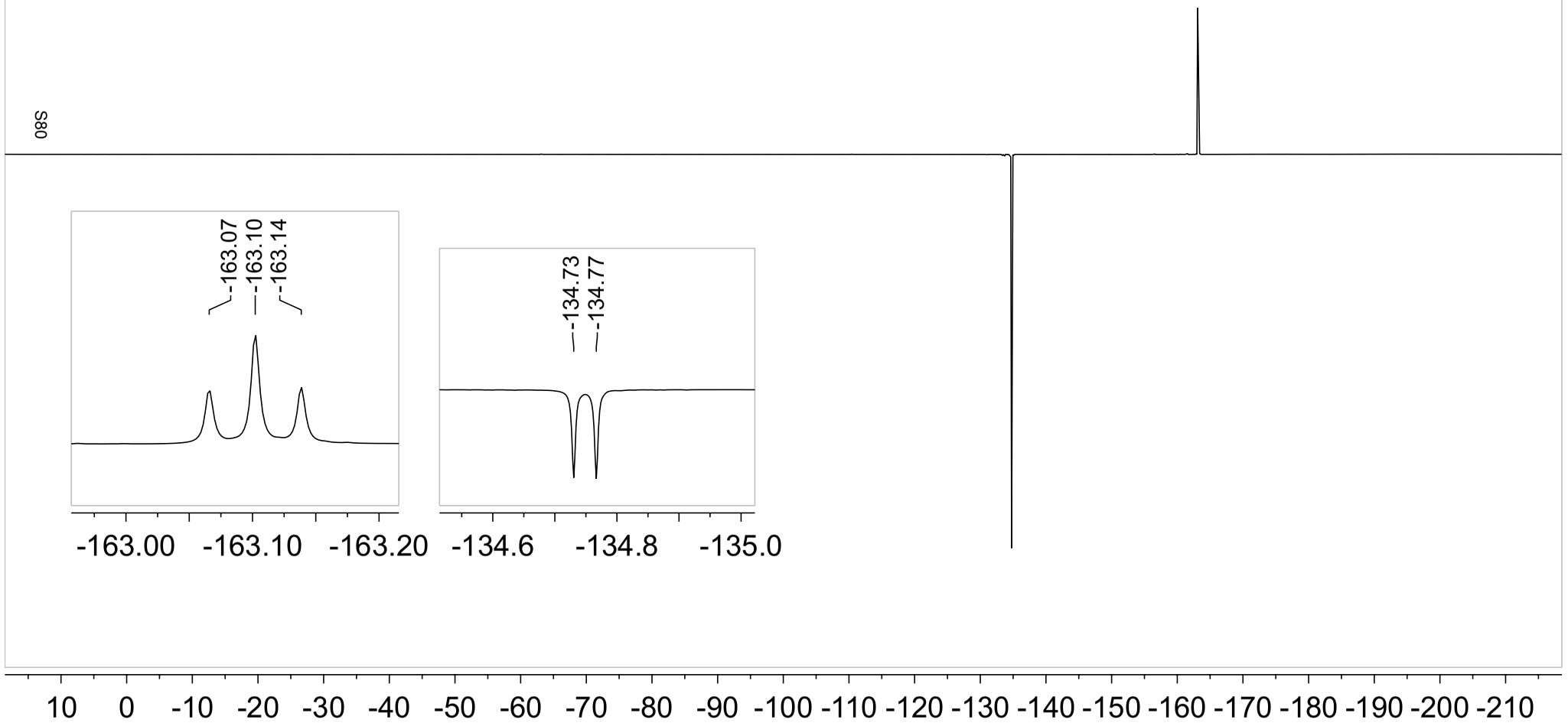


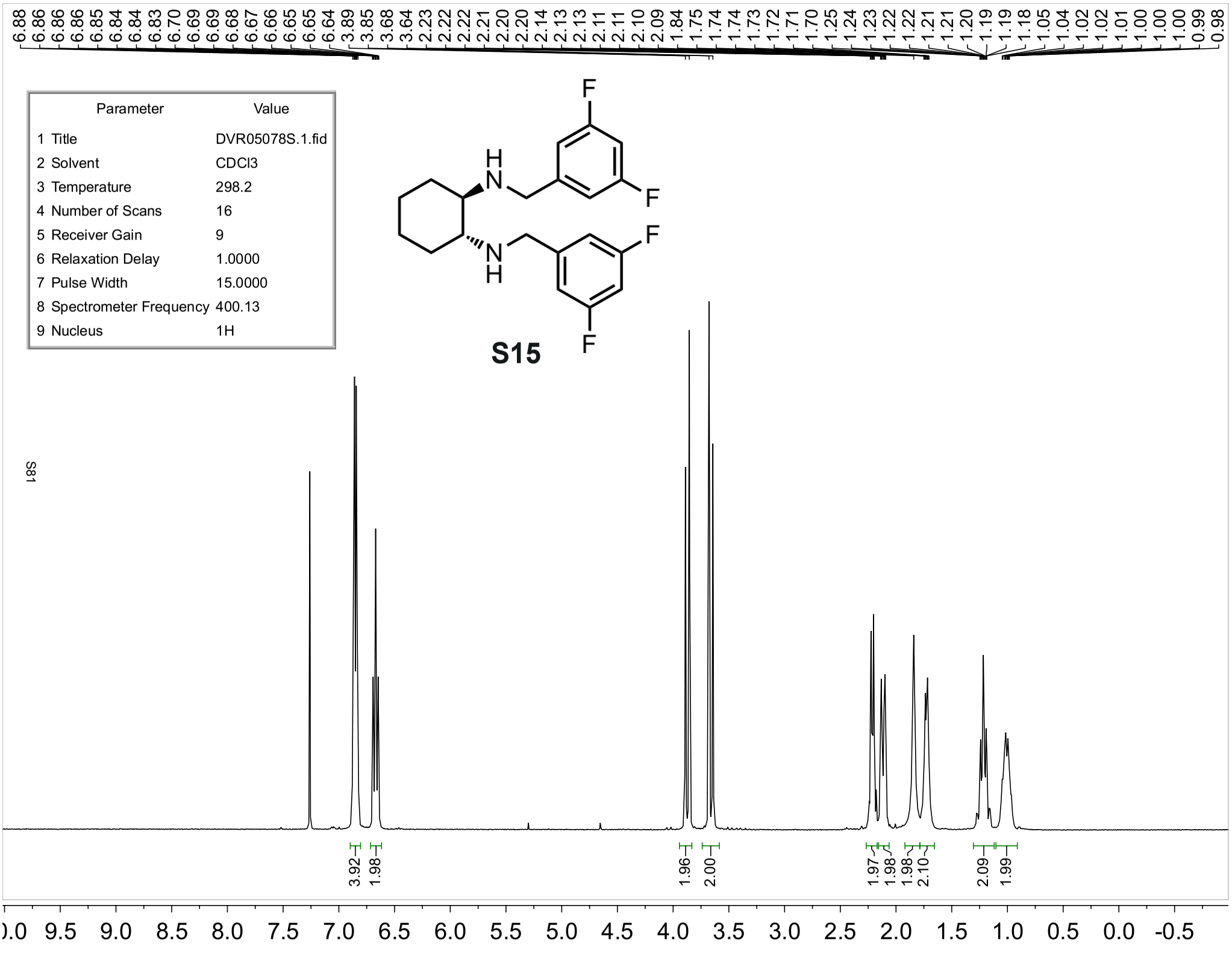

152.38
152.34
152.28
152.25
149.90
149.86
149.80
149.77
139.86
139.70
139.55
137.54
137.48
137.37
137.22
137.07
111.61
111.40
60.89
49.75
31.46
24.80
Parameter Value
1 Title DVR05078M C13.1.fid
2 Solvent CDCl3
3 Temperature 298.1
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
S14
S79
154 152 150 148
113 111 109
141 140 139 138 137 136
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

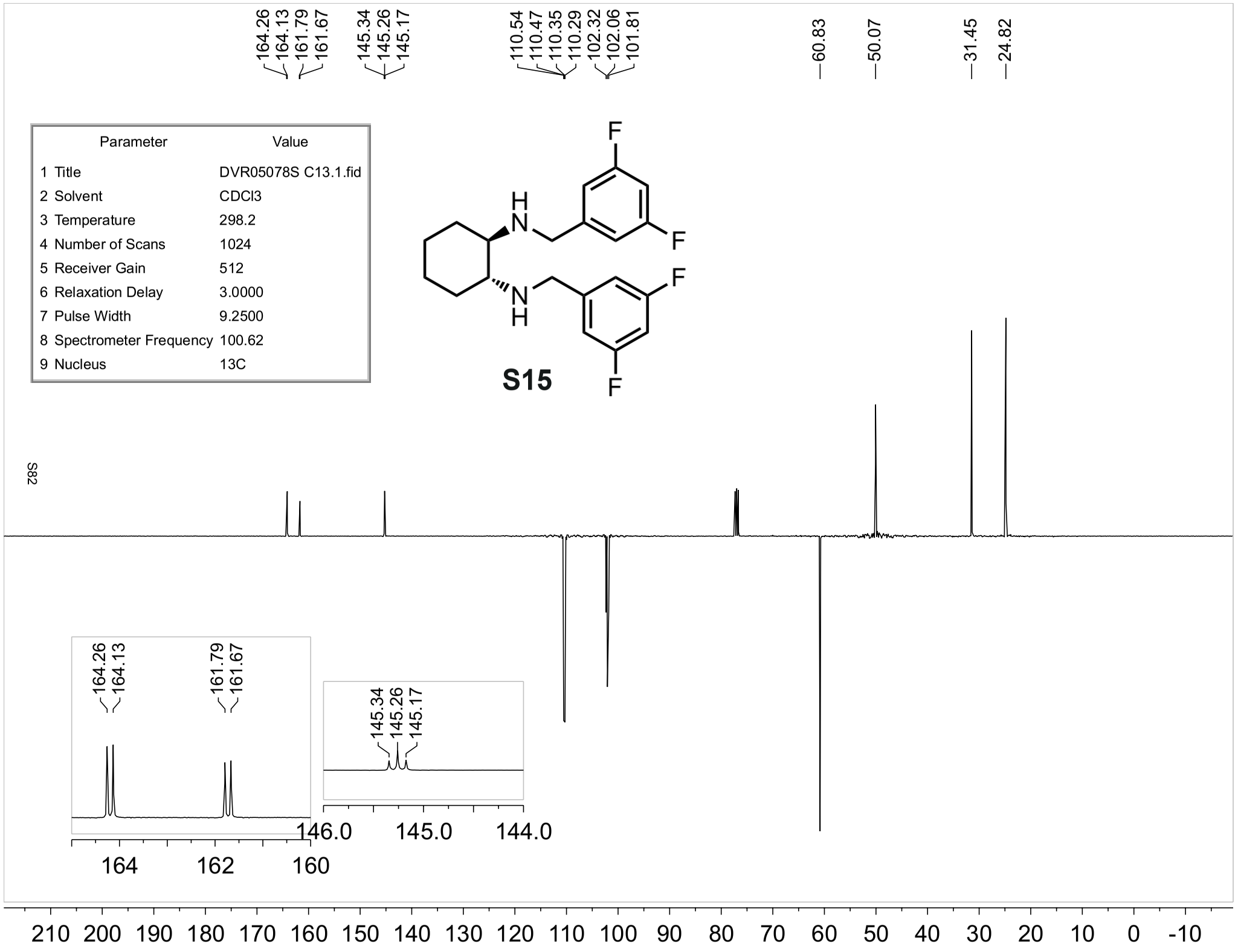
Parameter	Value
1 Title	DVR05078M F19.1.fid
2 Solvent	CDCl3
3 Temperature	297.4
4 Number of Scans	16
5 Receiver Gain	287
6 Relaxation Delay	3.0000
7 Pulse Width	11.6000
8 Spectrometer Frequency	564.81
9 Nucleus	19F



S14

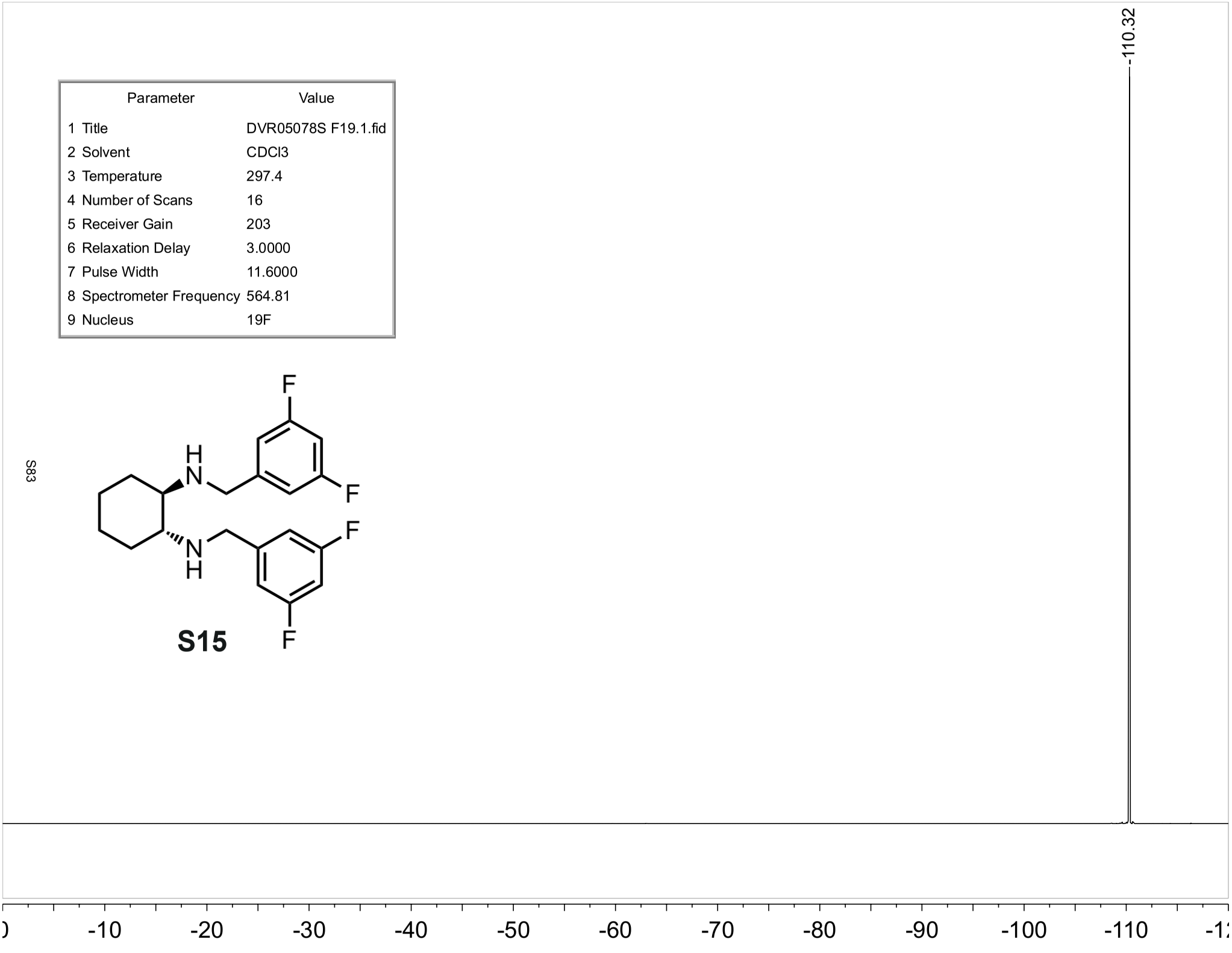



6.88 6.86 6.86 6.86 6.85 6.84 6.84 6.83 6.70 6.69 6.69 6.68 6.67 6.66 6.65 6.65 6.64 3.89 3.85 3.68 3.64 2.23 2.22 2.22 2.21 2.20 2.20 2.14 2.13 2.13 2.11 2.11 2.10 2.09 1.84 1.75 1.74 1.74 1.73 1.72 1.71 1.70 1.25 1.24 1.23 1.22 1.22 1.21 1.21 1.20 1.19 1.19 1.18 1.05 1.04 1.02 1.02 1.01 1.00 1.00 1.00 0.99 0.98
Parameter Value
1 Title DVR05078S.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 16
5 Receiver Gain 9
6 Relaxation Delay 1.0000
7 Pulse Width 15.0000
8 Spectrometer Frequency 400.13
9 Nucleus 1H
S15
S81
3.92
1.98
1.96
2.00
1.97
1.98
1.98
2.10
2.09
1.99
0.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5


164.26
164.13
161.79
161.67
145.34
145.26
145.17
110.54
110.47
110.35
110.29
102.32
102.06
101.81
60.83
50.07
31.45
24.82
Parameter Value
1 Title DVR05078S C13.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
S15
S82
146.0
145.0
144.0
164
162
160
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10

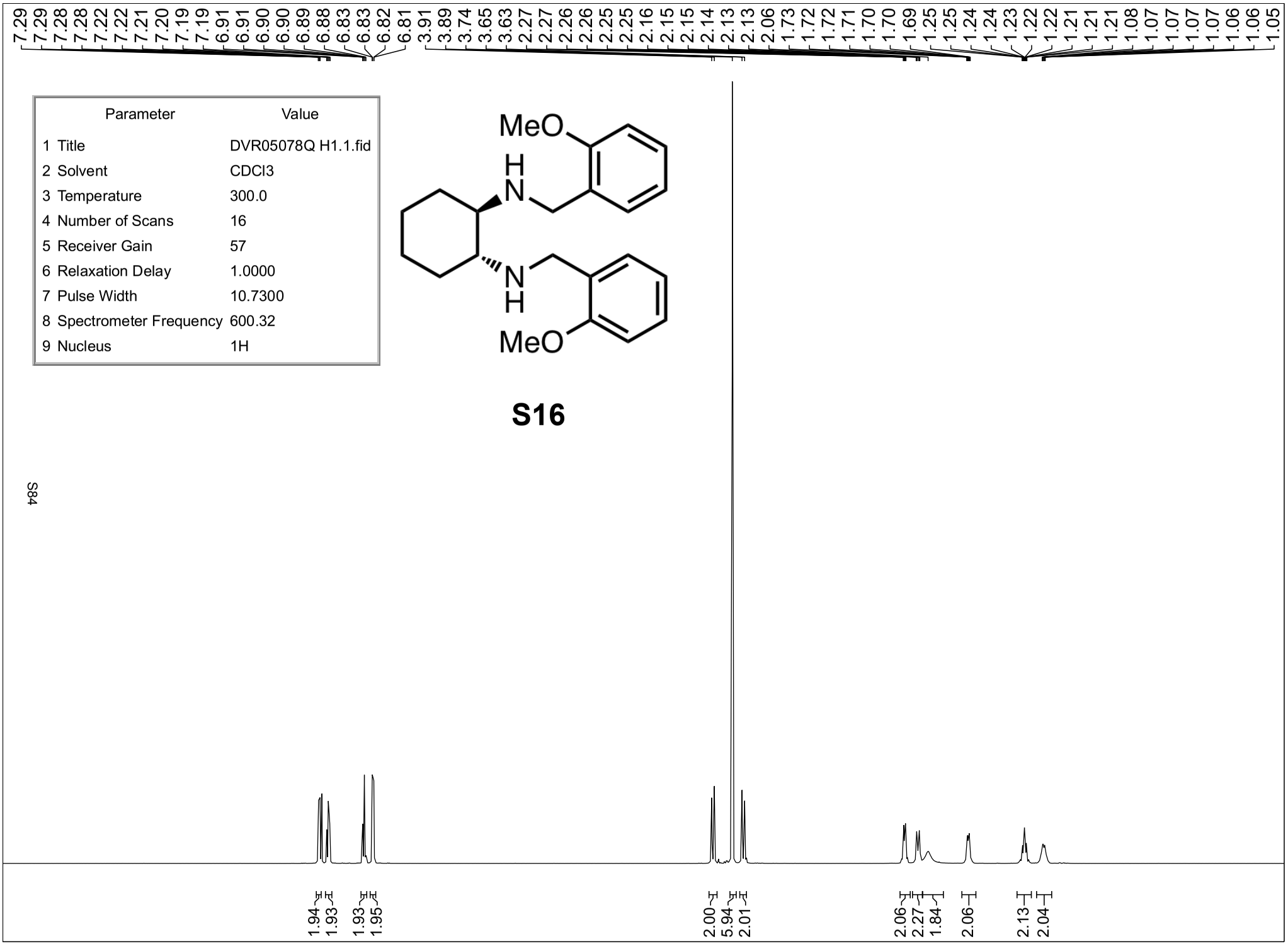
Parameter	Value
1 Title	DVR05078S F19.1.fid
2 Solvent	CDCl3
3 Temperature	297.4
4 Number of Scans	16
5 Receiver Gain	203
6 Relaxation Delay	3.0000
7 Pulse Width	11.6000
8 Spectrometer Frequency	564.81
9 Nucleus	19F

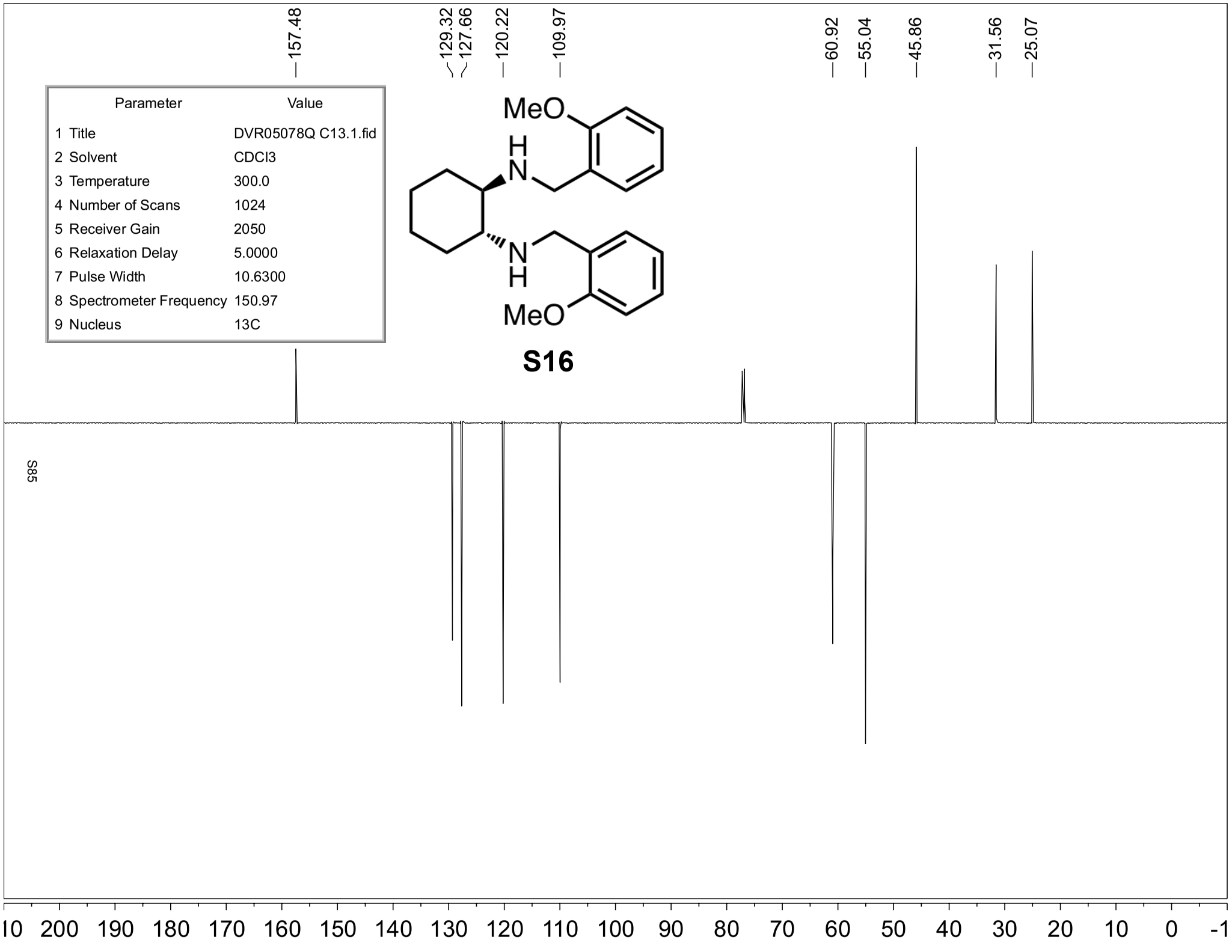
S15

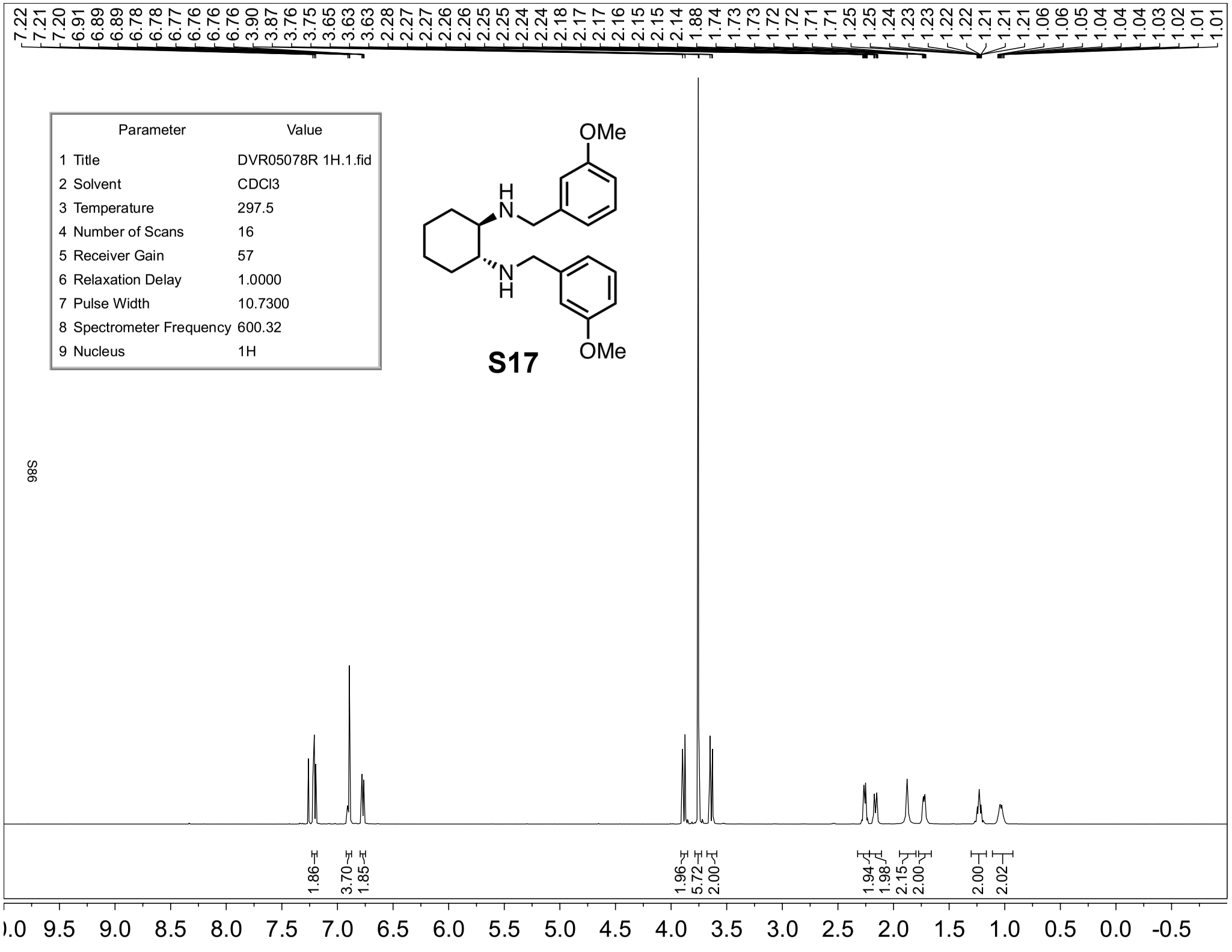


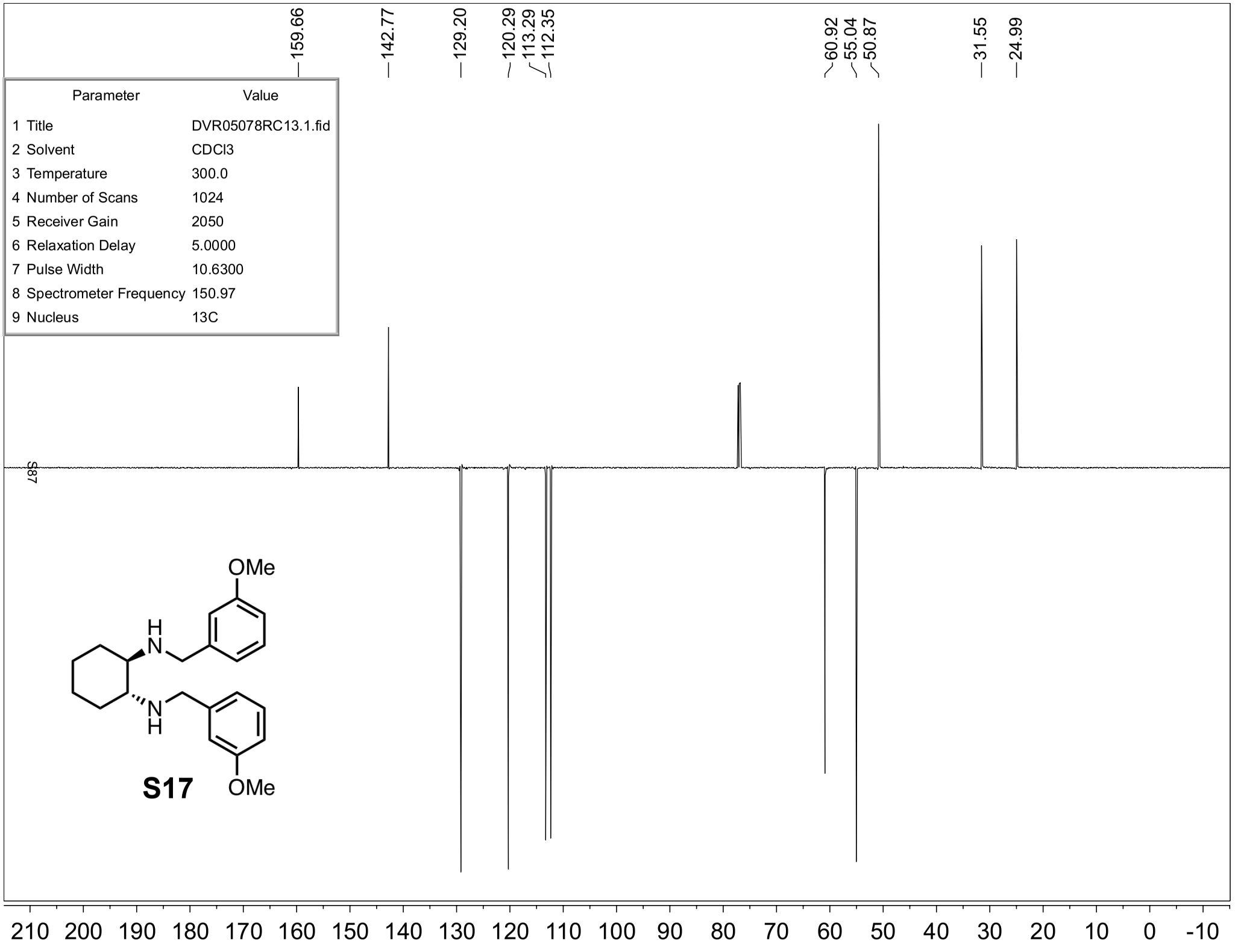
Parameter	Value
1 Title	DVR05078Q H1.1.fid
2 Solvent	CDCl3
3 Temperature	300.0
4 Number of Scans	16
5 Receiver Gain	57
6 Relaxation Delay	1.0000
7 Pulse Width	10.7300
8 Spectrometer Frequency	600.32
9 Nucleus	1H

S16

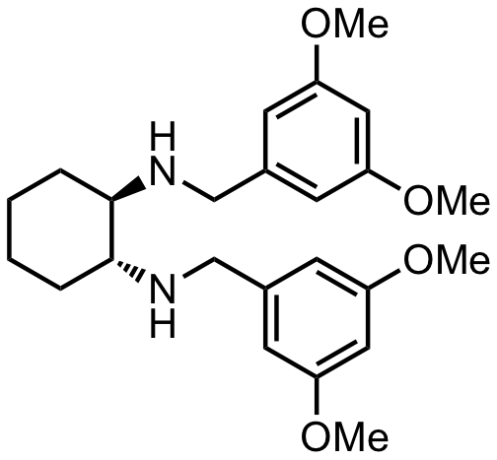



157.48
129.32
127.66
120.22
109.97
60.92
55.04
45.86
31.56
25.07
Parameter Value
1 Title DVR05078Q C13.1.fid
2 Solvent CDCl3
3 Temperature 300.0
4 Number of Scans 1024
5 Receiver Gain 2050
6 Relaxation Delay 5.0000
7 Pulse Width 10.6300
8 Spectrometer Frequency 150.97
9 Nucleus 13C
MeO
H
N
N
H
MeO
S16
S85
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10

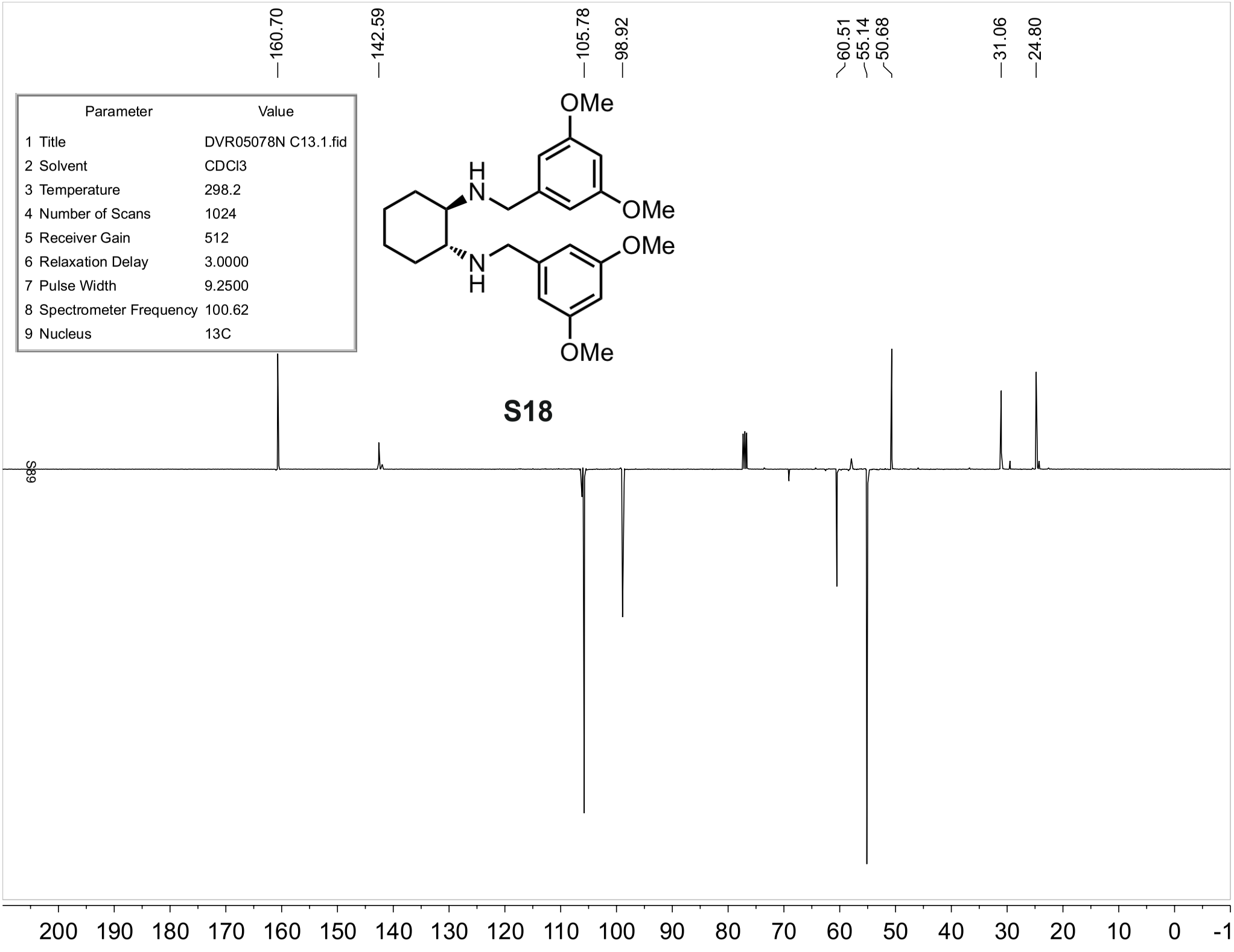

7.22 7.21 7.20 6.91 6.89 6.89 6.78 6.78 6.77 6.76 6.76 6.76 3.90 3.87 3.76 3.75 3.65 3.63 3.63 2.28 2.27 2.27 2.26 2.26 2.25 2.25 2.24 2.24 2.18 2.17 2.17 2.16 2.15 2.15 2.14 1.88 1.74 1.73 1.73 1.72 1.72 1.71 1.71 1.25 1.25 1.24 1.23 1.23 1.22 1.22 1.21 1.21 1.21 1.06 1.06 1.05 1.04 1.04 1.04 1.03 1.02 1.01 1.01
Parameter Value
1 Title DVR05078R 1H.1.fid
2 Solvent CDCl3
3 Temperature 297.5
4 Number of Scans 16
5 Receiver Gain 57
6 Relaxation Delay 1.0000
7 Pulse Width 10.7300
8 Spectrometer Frequency 600.32
9 Nucleus 1H
OMe
H
N
N
H
OMe
S17
S86
1.86 3.70 1.85 1.96 5.72 2.00 1.94 1.98 2.15 2.00 2.00 2.02
0.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5


159.66
142.77
129.20
120.29
113.29
112.35
60.92
55.04
50.87
31.55
24.99
Parameter Value
1 Title DVR05078RC13.1.fid
2 Solvent CDCl3
3 Temperature 300.0
4 Number of Scans 1024
5 Receiver Gain 2050
6 Relaxation Delay 5.0000
7 Pulse Width 10.6300
8 Spectrometer Frequency 150.97
9 Nucleus 13C
S87
OMe
H
N
N
H
OMe
S17
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10

Parameter	Value
1 Title	DVR05078N.1.fid
2 Solvent	CDCl3
3 Temperature	298.2
4 Number of Scans	16
5 Receiver Gain	9
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H

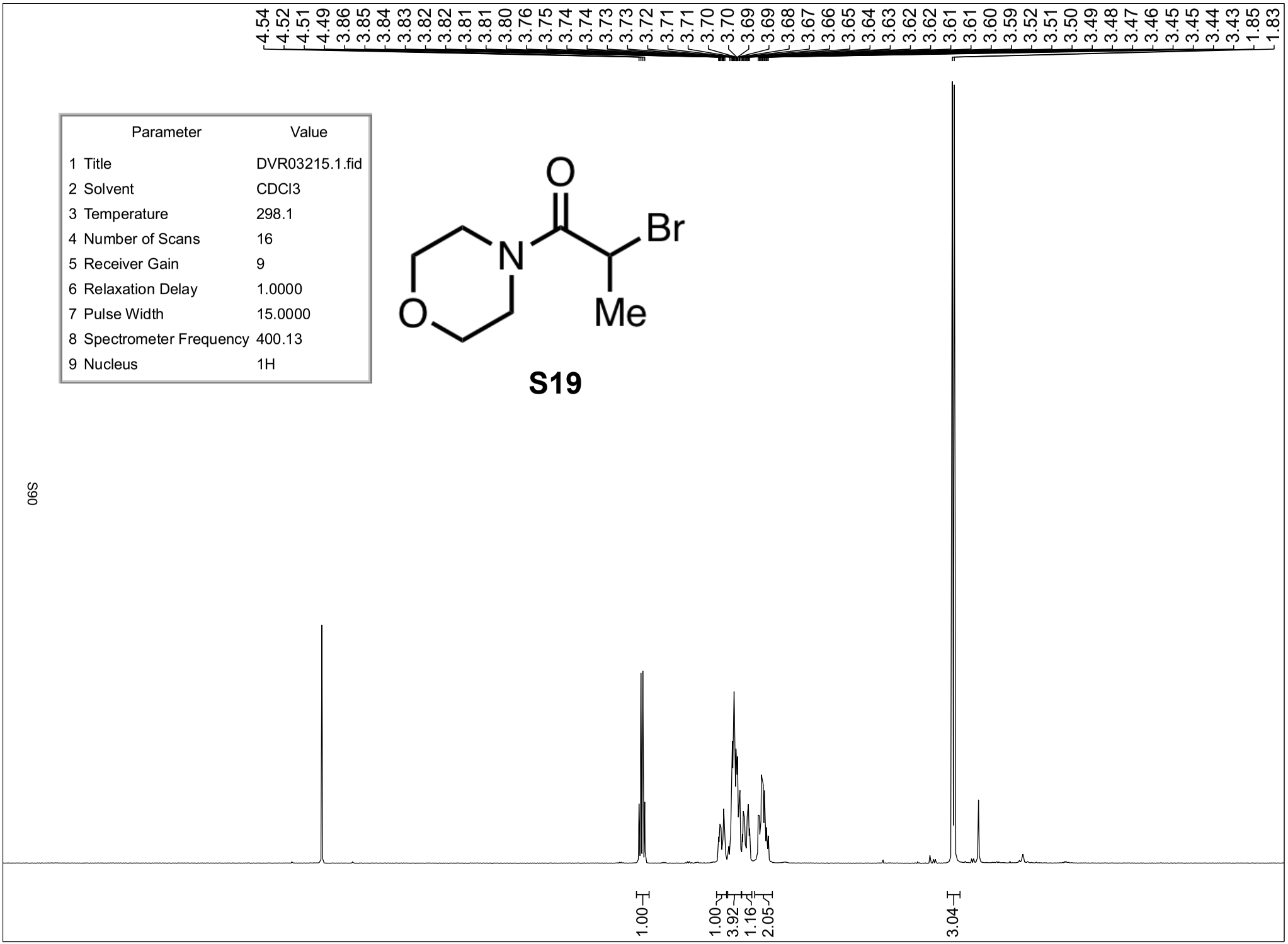


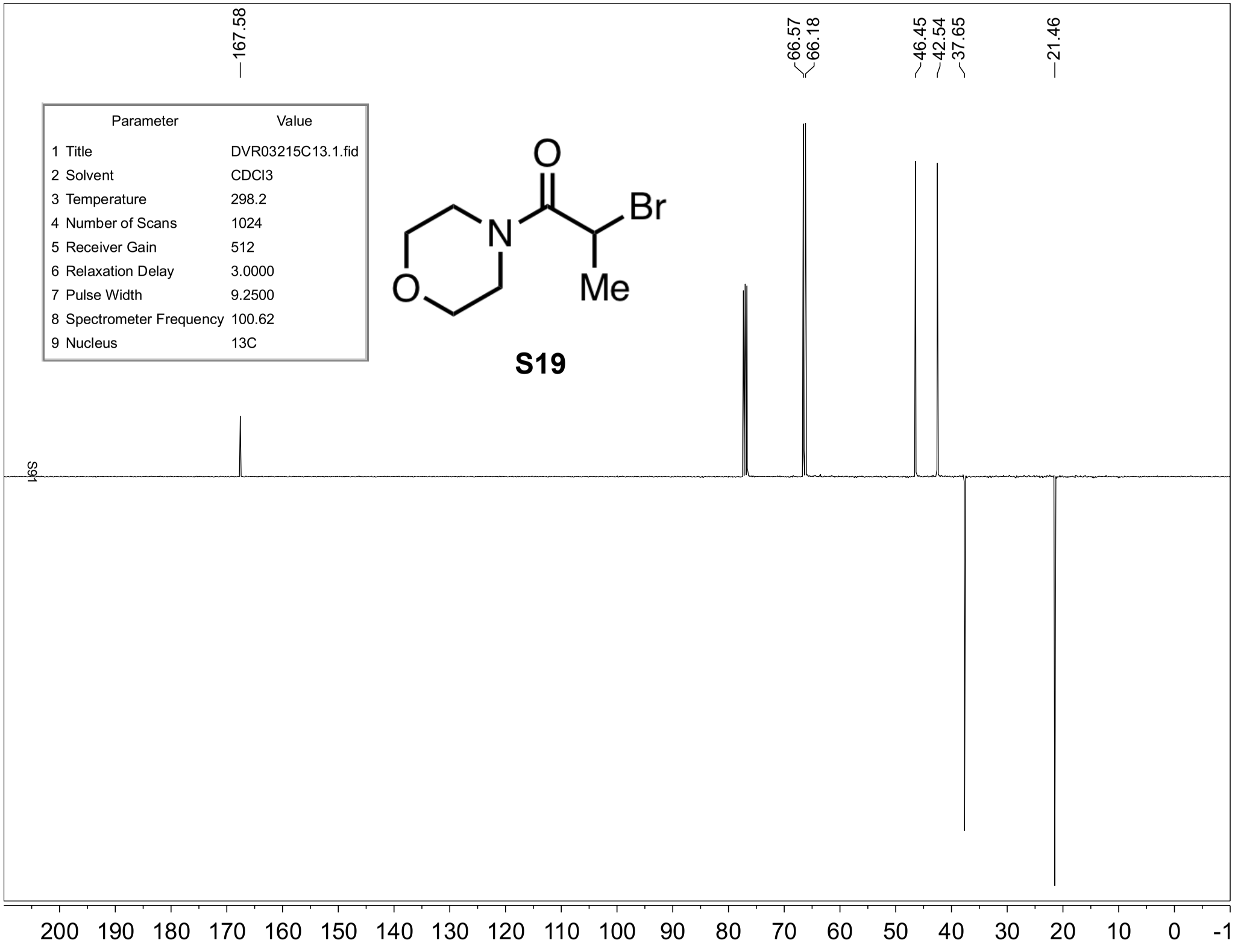
S18

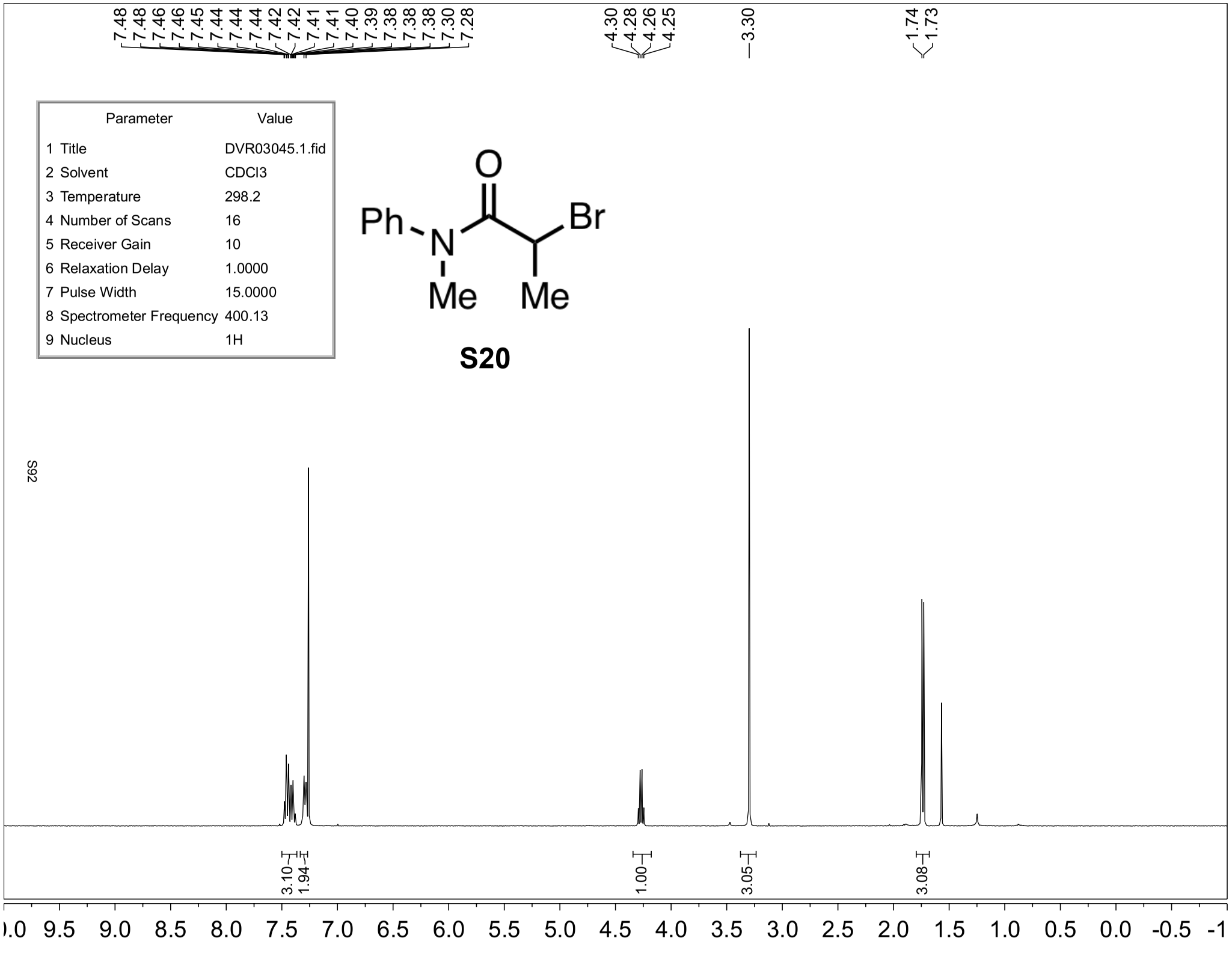

160.70
142.59
105.78
98.92
60.51
55.14
50.68
31.06
24.80
Parameter Value
1 Title DVR05078N C13.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
OMe
OMe
OMe
OMe
H
N
H
N
S18
S89
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

Parameter	Value
1 Title	DVR03215.1.fid
2 Solvent	CDCl3
3 Temperature	298.1
4 Number of Scans	16
5 Receiver Gain	9
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H

S19




167.58
66.57
66.18
46.45
42.54
37.65
21.46
Parameter Value
1 Title DVR03215C13.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
O
N
O
Br
Me
S19
S94
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1


7.48
7.48
7.46
7.46
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7.44
7.44
7.44
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7.42
7.41
7.41
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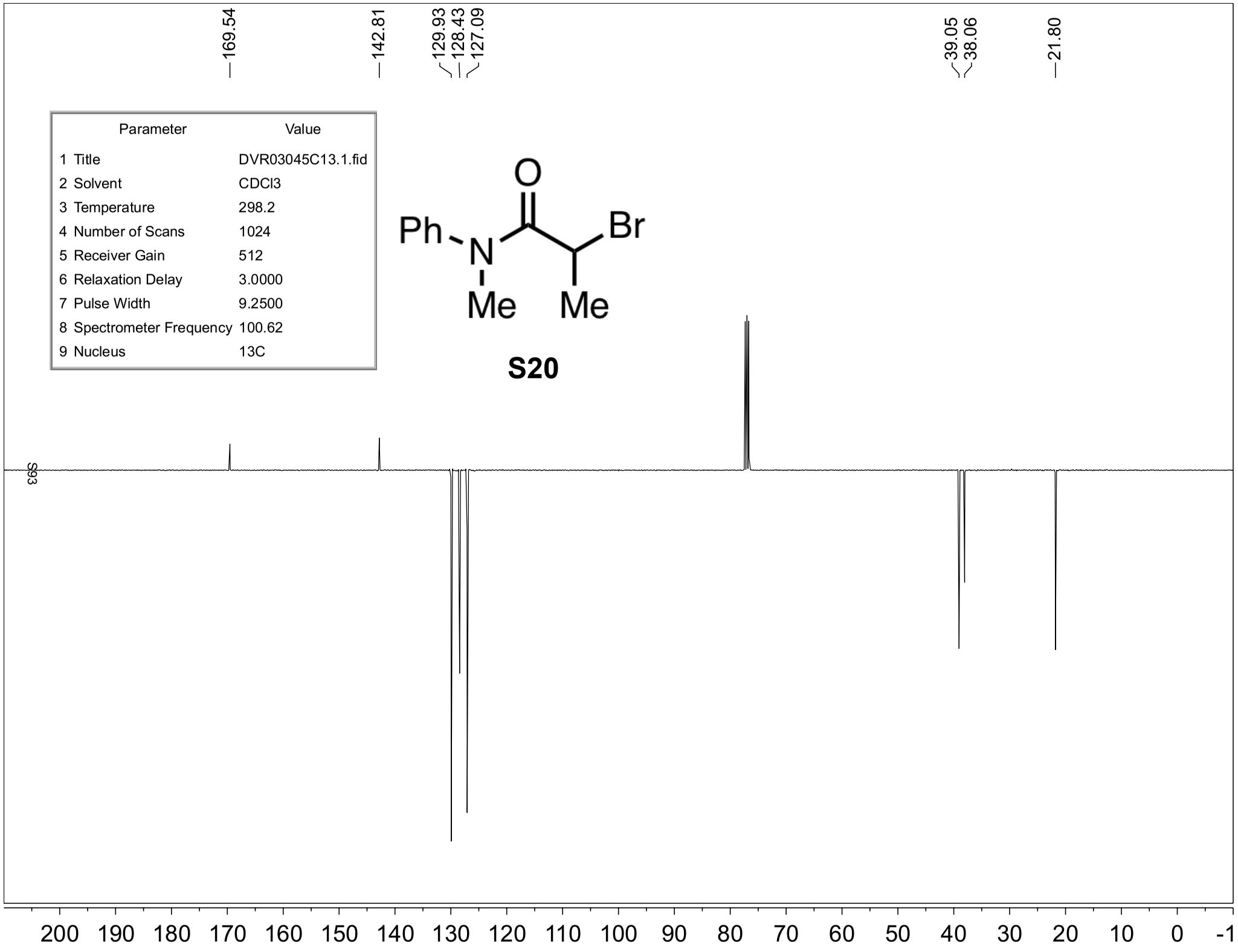
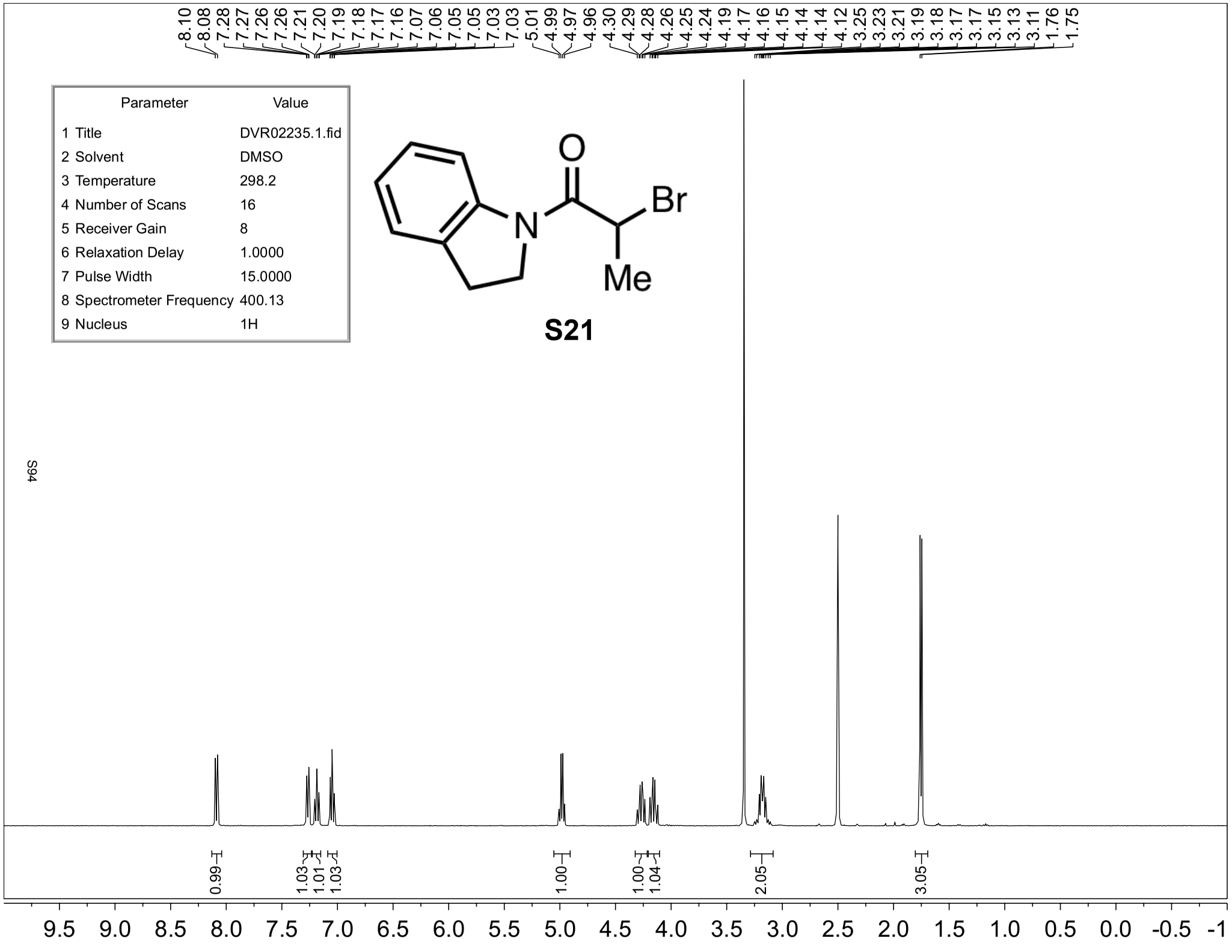
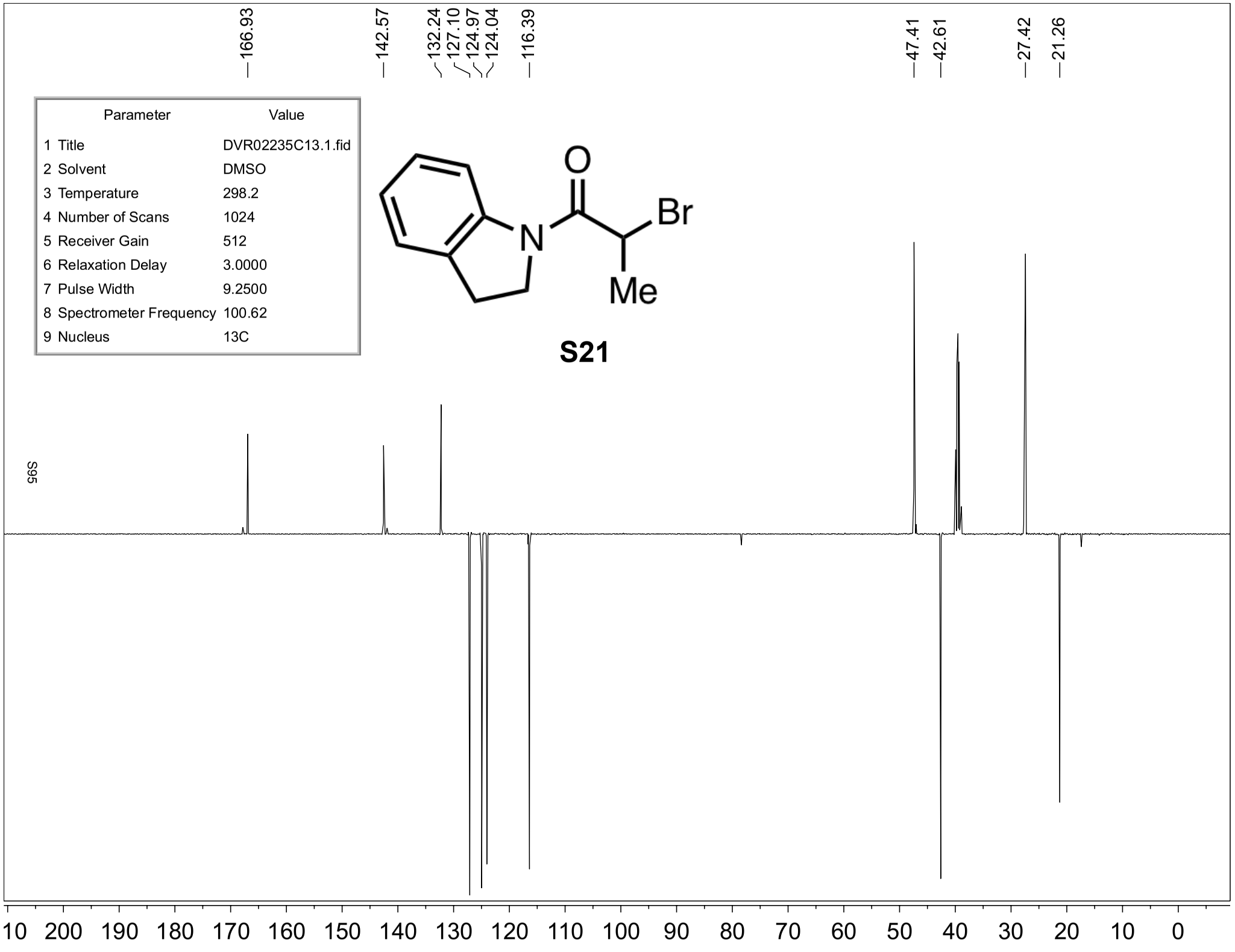
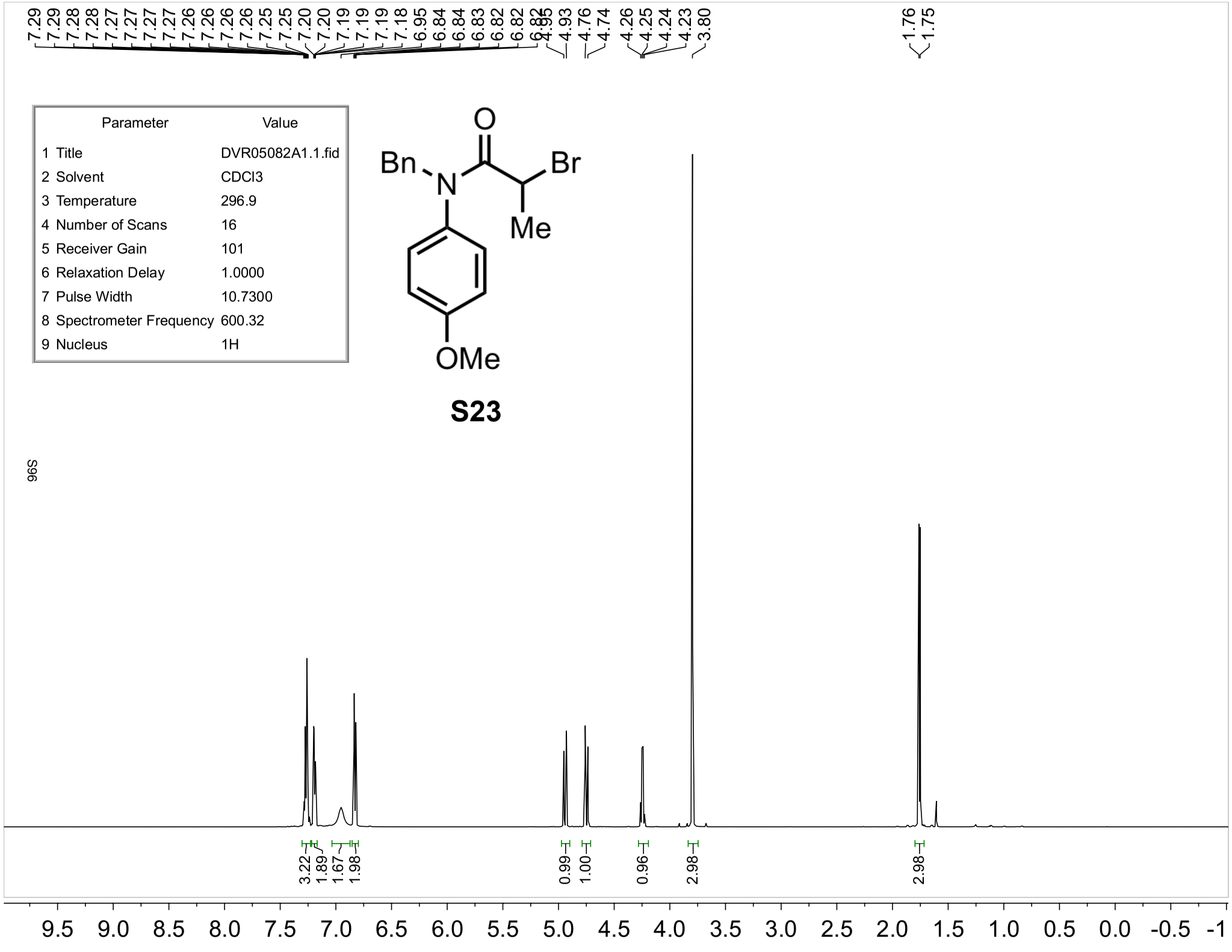
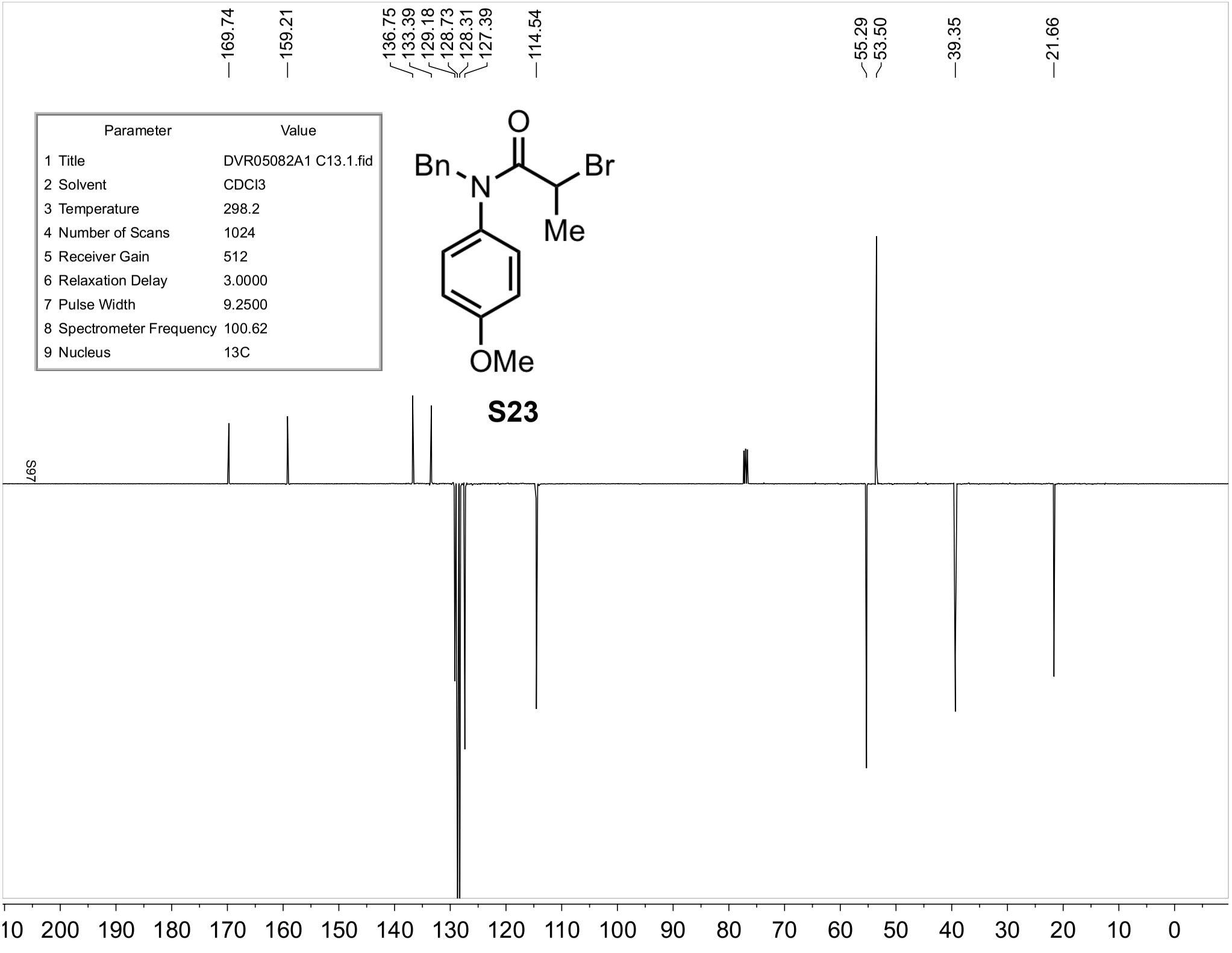
7.39
7.38
7.38
7.38
7.30
7.28
4.30
4.28
4.26
4.25
3.30
1.74
1.73
Parameter Value
1 Title DVR03045.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 16
5 Receiver Gain 10
6 Relaxation Delay 1.0000
7 Pulse Width 15.0000
8 Spectrometer Frequency 400.13
9 Nucleus 1H
O
Ph
N
Br
Me
Me
S20
S92
3.10
1.94
1.00
3.05
3.08
.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1


169.54
142.81
129.93
128.43
127.09
39.05
38.06
21.80
Parameter Value
1 Title DVR03045C13.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
O
Ph
N
Br
Me
Me
S20
S93
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1


8.10 8.08 7.28 7.27 7.26 7.26 7.21 7.20 7.19 7.18 7.17 7.16 7.07 7.06 7.05 7.05 7.03 7.03 5.01 4.99 4.97 4.96 4.30 4.29 4.28 4.26 4.25 4.24 4.19 4.17 4.16 4.15 4.14 4.14 4.12 3.25 3.23 3.21 3.19 3.18 3.17 3.17 3.15 3.13 3.11 1.76 1.75
Parameter Value
1 Title DVR02235.1.fid
2 Solvent DMSO
3 Temperature 298.2
4 Number of Scans 16
5 Receiver Gain 8
6 Relaxation Delay 1.0000
7 Pulse Width 15.0000
8 Spectrometer Frequency 400.13
9 Nucleus 1H
O
Br
N
Me
S21
S94
0.99
1.03
1.01
1.03
1.00
1.00
1.04
2.05
3.05
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1


166.93
142.57
132.24
127.10
124.97
124.04
116.39
47.41
42.61
27.42
21.26
Parameter Value
1 Title DVR02235C13.1.fid
2 Solvent DMSO
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
O
N
Br
Me
S21
S95
10 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0


7.29 7.29 7.28 7.28 7.27 7.27 7.27 7.27 7.26 7.26 7.26 7.26 7.25 7.25 7.20 7.20 7.19 7.19 7.19 7.18 6.95 6.84 6.84 6.83 6.82 6.82 6.82 4.95 4.93 4.76 4.74 4.26 4.25 4.24 4.23 3.80 1.76 1.75
Parameter Value
1 Title DVR05082A1.1.fid
2 Solvent CDCl3
3 Temperature 296.9
4 Number of Scans 16
5 Receiver Gain 101
6 Relaxation Delay 1.0000
7 Pulse Width 10.7300
8 Spectrometer Frequency 600.32
9 Nucleus 1H
Bn
N
O
Br
Me
OMe
S23
96S
3.22 1.89 1.67 1.98 0.99 1.00 0.96 2.98 2.98
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1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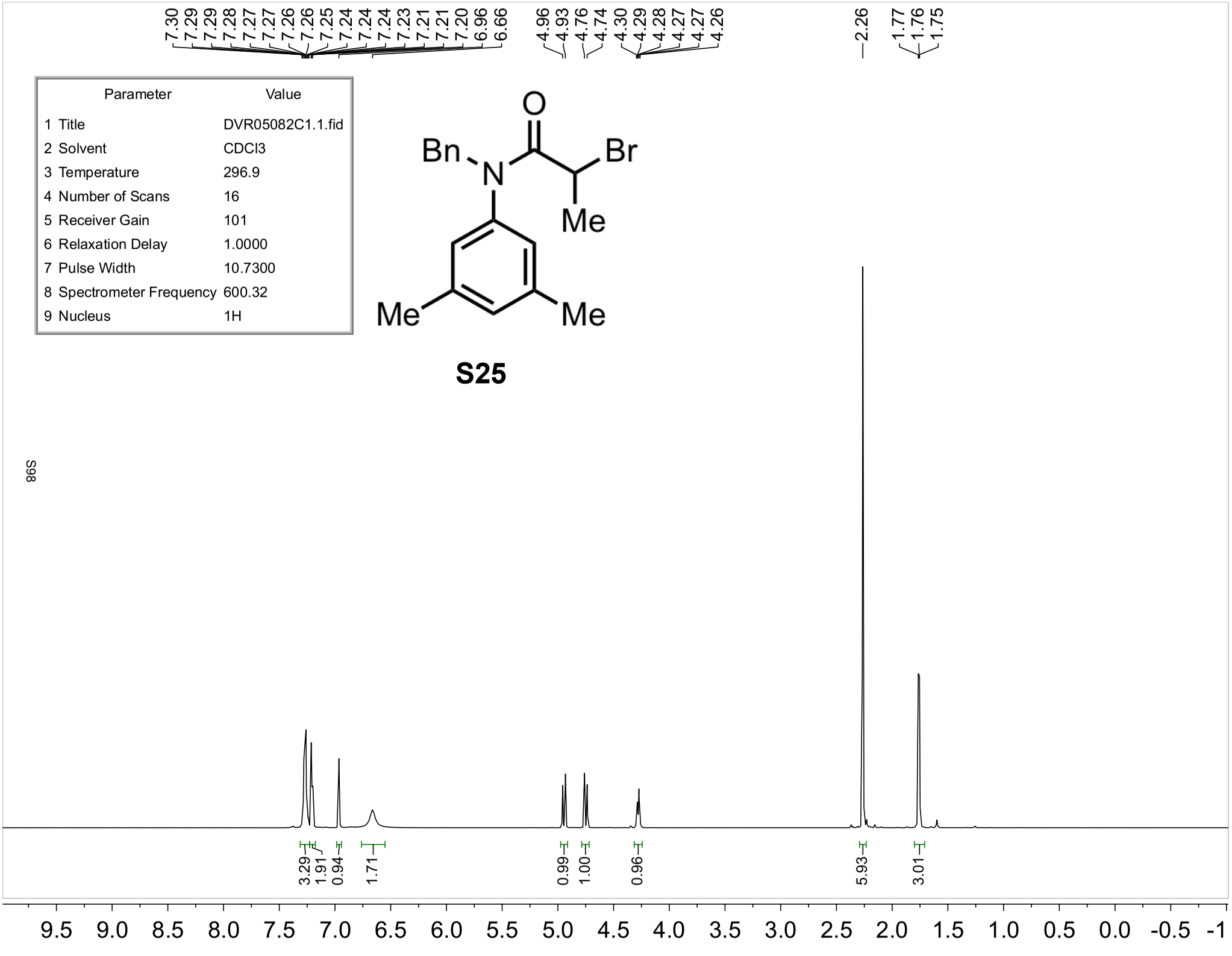
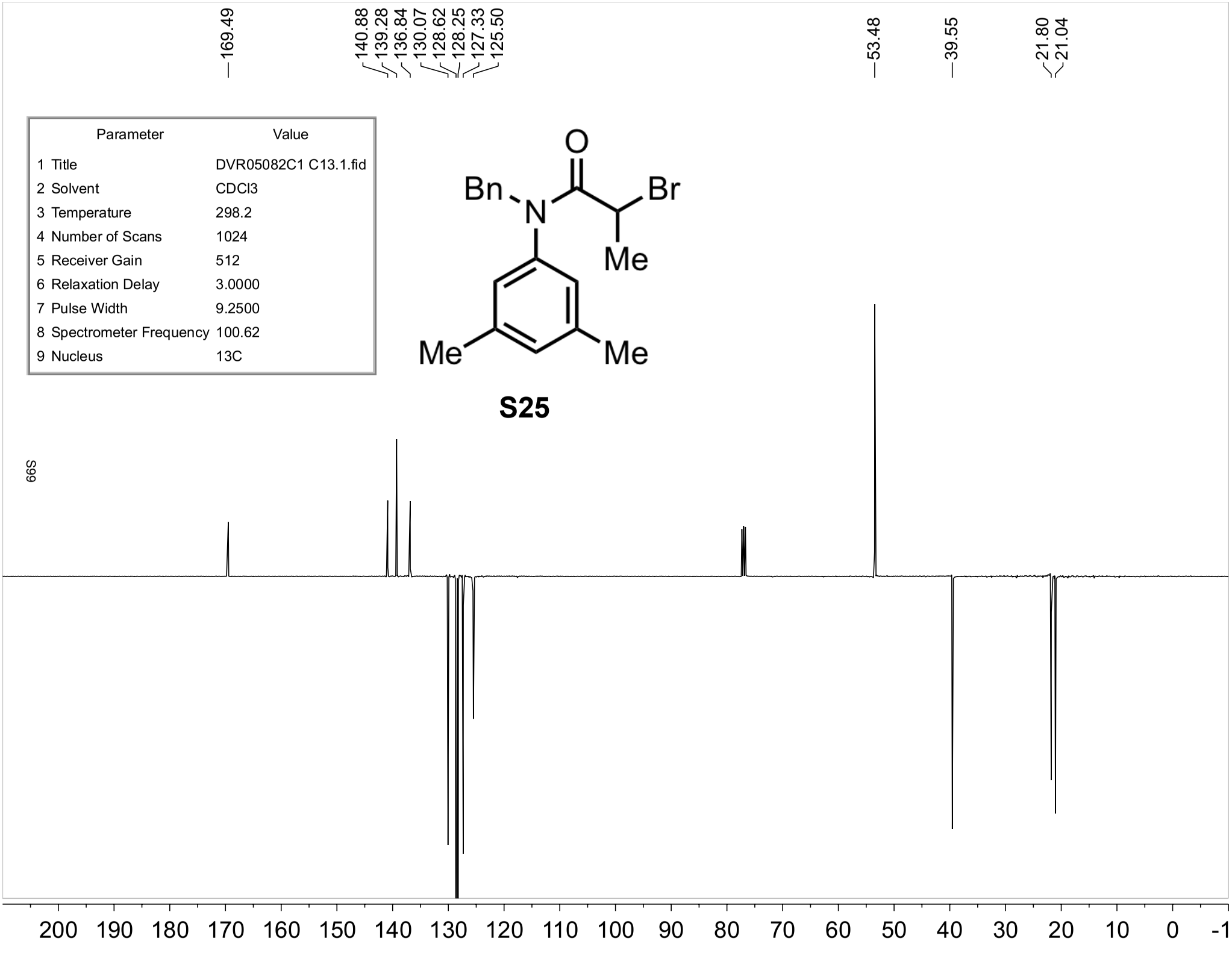
159.21
136.75
133.39
129.18
128.73
128.31
127.39
114.54
55.29
53.50
39.35
21.66
Parameter Value
1 Title DVR05082A1 C13.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
O
Bn
N
Br
Me
OMe
S23
S97
10 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0

Parameter	Value
1 Title	DVR05082C1.1.fid
2 Solvent	CDCl3
3 Temperature	296.9
4 Number of Scans	16
5 Receiver Gain	101
6 Relaxation Delay	1.0000
7 Pulse Width	10.7300
8 Spectrometer Frequency	600.32
9 Nucleus	1H

S25




169.49
140.88
139.28
136.84
130.07
128.62
128.25
127.33
125.50
53.48
39.55
21.80
21.04
Parameter
Value
1 Title
DVR05082C1 C13.1.fid
2 Solvent
CDCl3
3 Temperature
298.2
4 Number of Scans
1024
5 Receiver Gain
512
6 Relaxation Delay
3.0000
7 Pulse Width
9.2500
8 Spectrometer Frequency
100.62
9 Nucleus
13C
O
Bn
N
Br
Me
Me
Me
S25
66S
200
190
180
170
160
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140
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120
110
100
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80
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50
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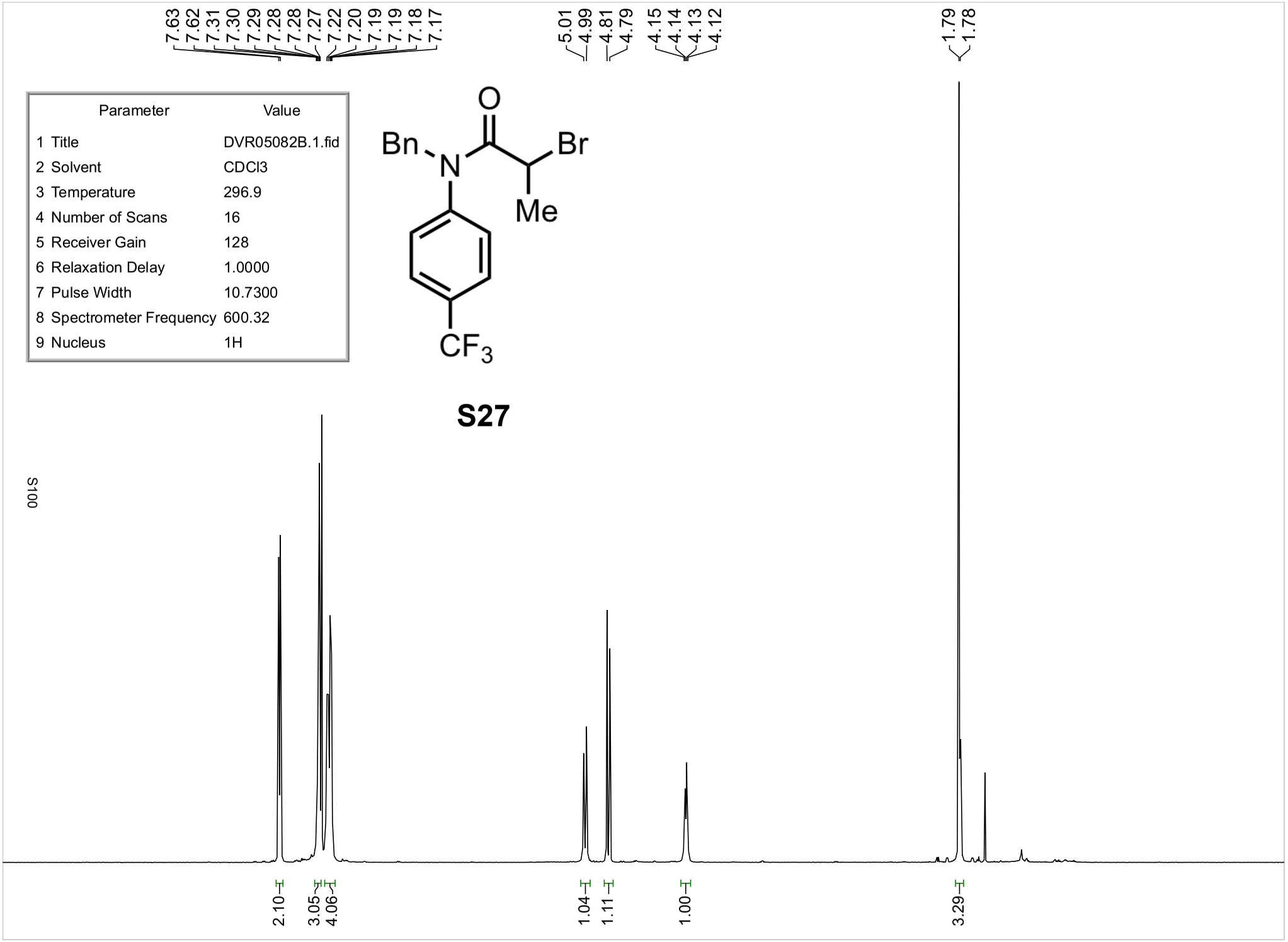
30
20
10
0
-1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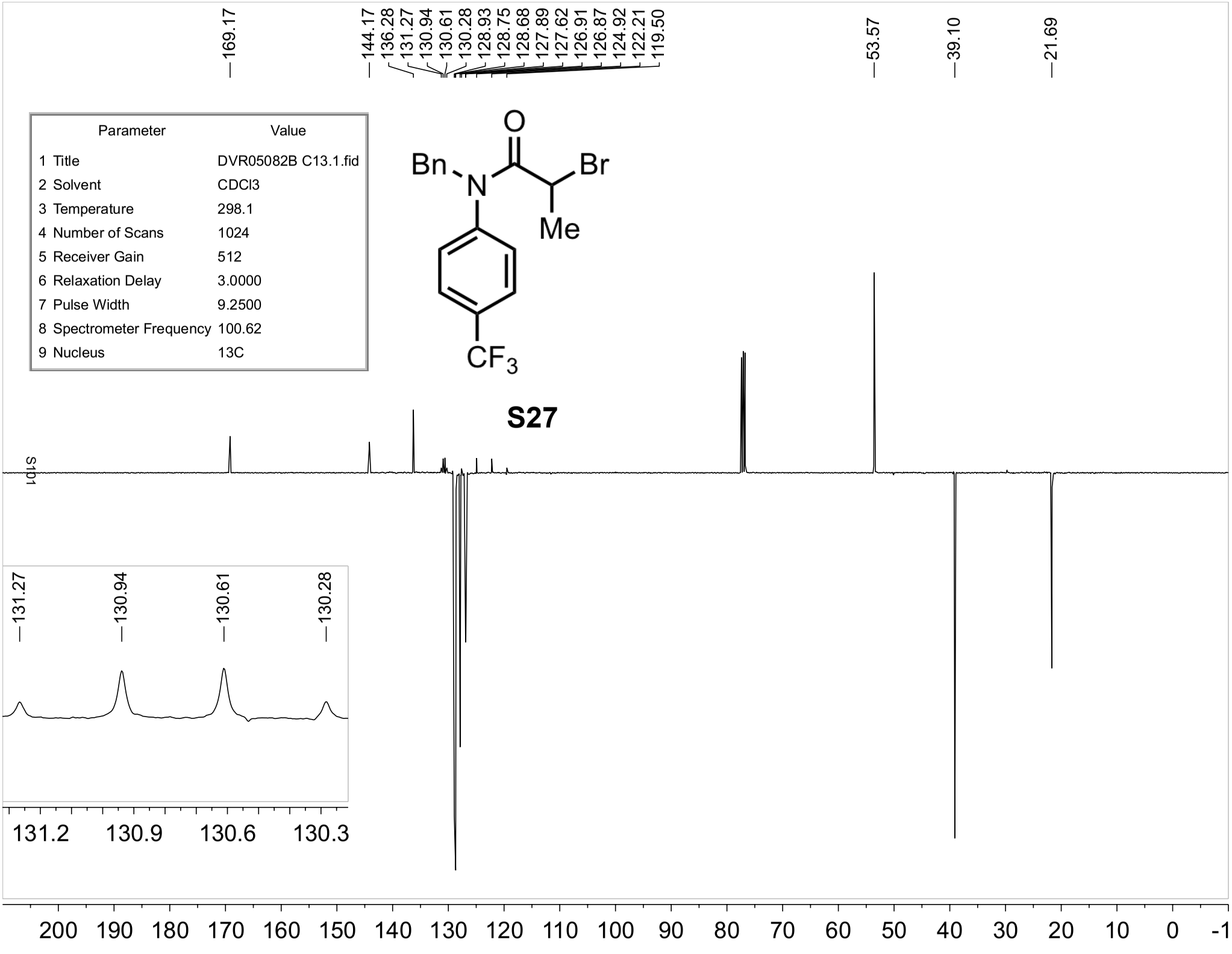
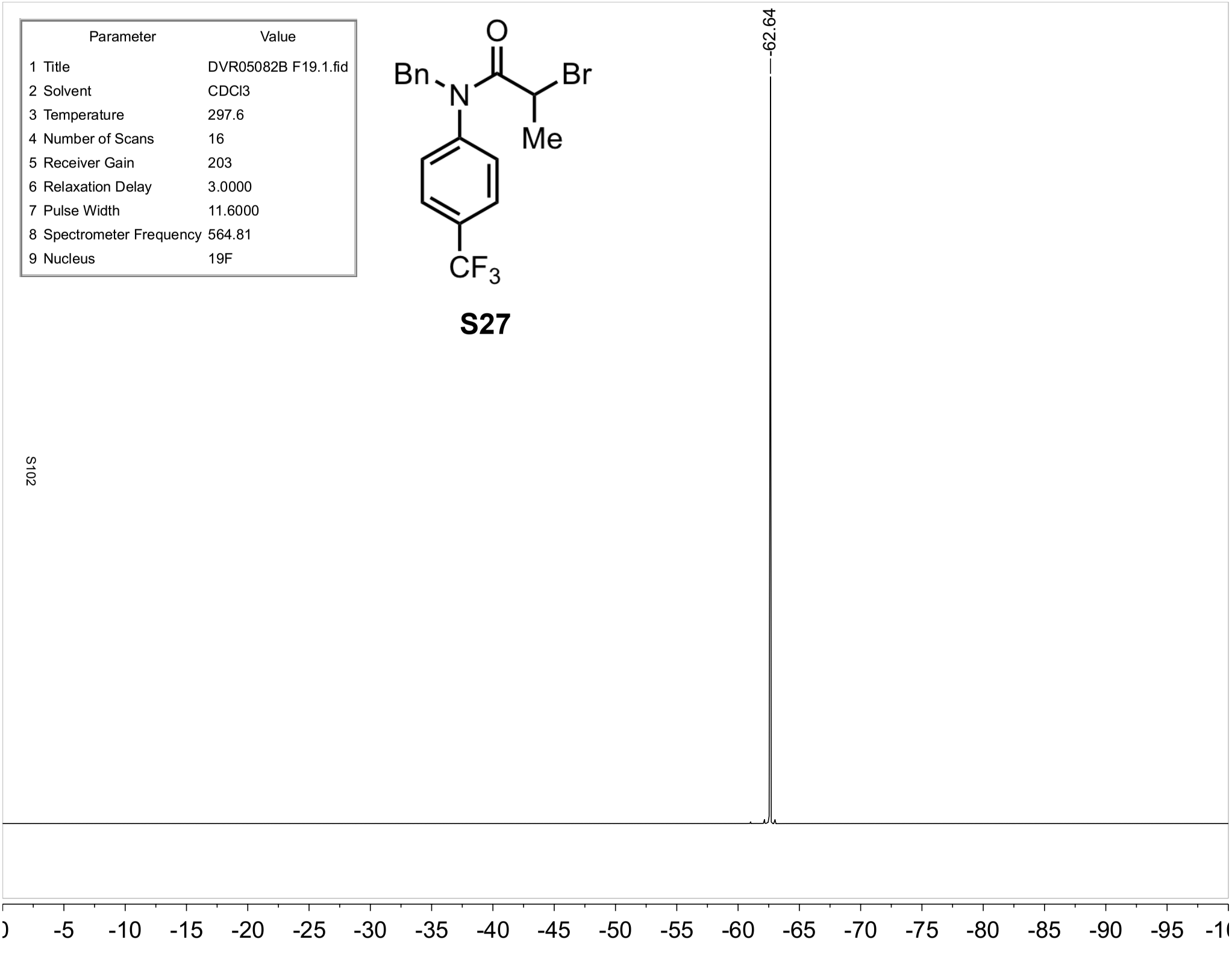
7.62
7.31
7.30
7.29
7.28
7.28
7.27
7.22
7.20
7.19
7.19
7.18
7.17
5.01
4.99
4.81
4.79
4.15
4.14
4.13
4.12
1.79
1.78
Parameter Value
1 Title DVR05082B.1.fid
2 Solvent CDCl3
3 Temperature 296.9
4 Number of Scans 16
5 Receiver Gain 128
6 Relaxation Delay 1.0000
7 Pulse Width 10.7300
8 Spectrometer Frequency 600.32
9 Nucleus 1H
Bn
N
O
Br
Me
CF3
S27
S100
2.10
3.05
4.06
1.04
1.11
1.00
3.29
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5


169.17
144.17
136.28
131.27
130.94
130.61
130.28
128.93
128.75
128.68
127.89
127.62
126.91
126.87
124.92
122.21
119.50
53.57
39.10
21.69
Parameter Value
1 Title DVR05082B C13.1.fid
2 Solvent CDCl3
3 Temperature 298.1
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
Bn
N
O
Br
Me
CF3
S27
S101
131.27
130.94
130.61
130.28
131.2
130.9
130.6
130.3
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

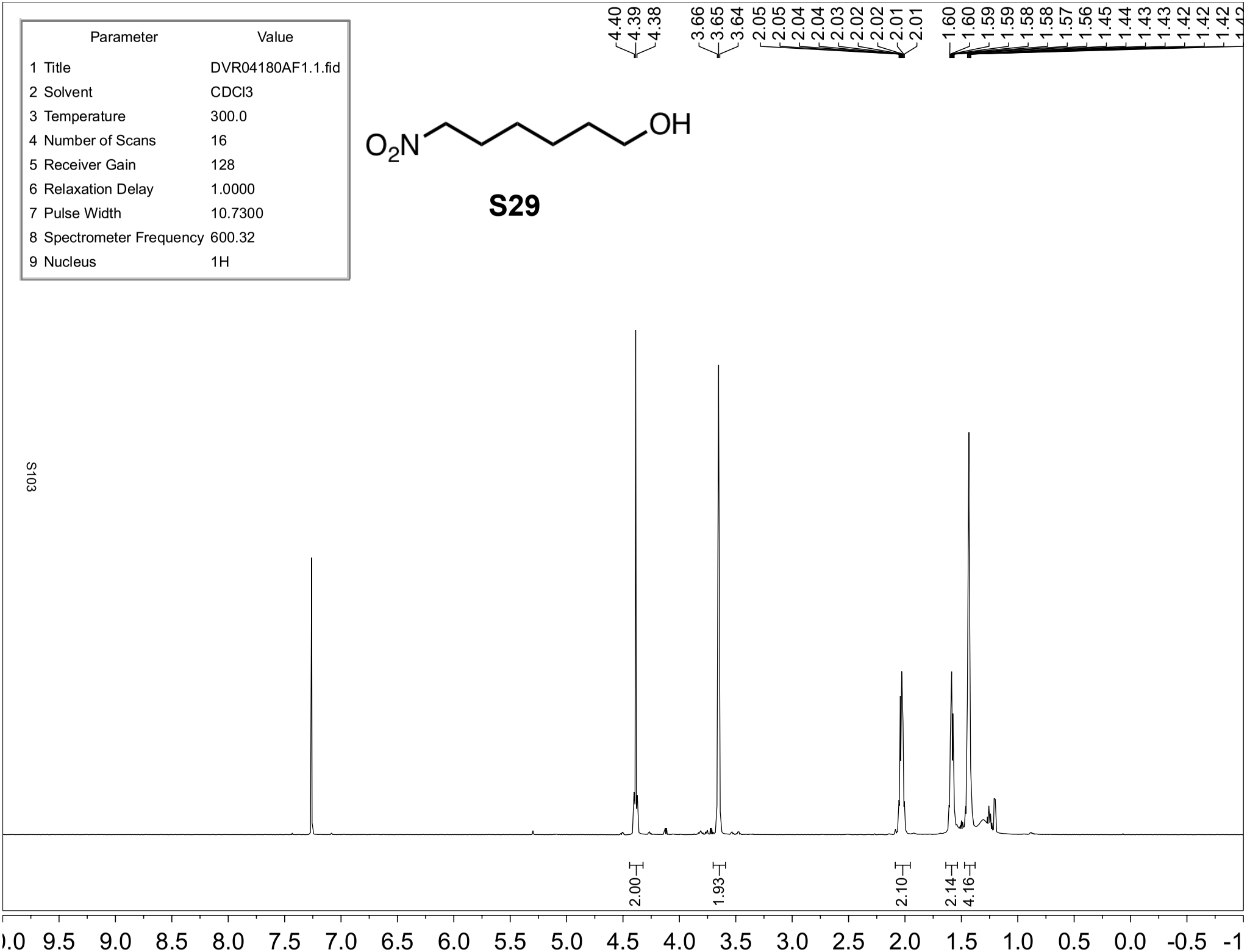
Parameter	Value
1 Title	DVR05082B F19.1.fid
2 Solvent	CDCl3
3 Temperature	297.6
4 Number of Scans	16
5 Receiver Gain	203
6 Relaxation Delay	3.0000
7 Pulse Width	11.6000
8 Spectrometer Frequency	564.81
9 Nucleus	19F

S27



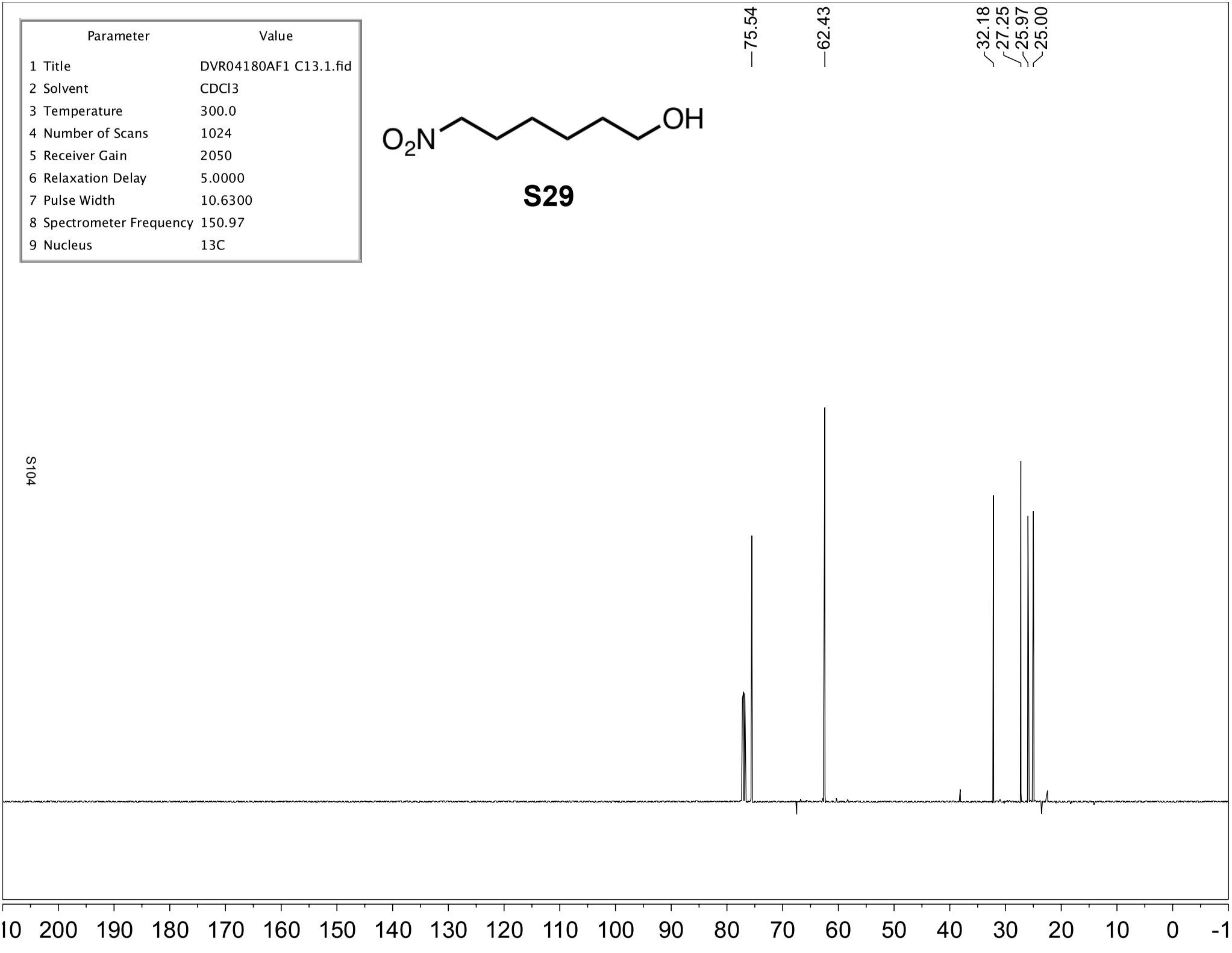
Parameter	Value
1 Title	DVR04180AF1.1.fid
2 Solvent	CDCl3
3 Temperature	300.0
4 Number of Scans	16
5 Receiver Gain	128
6 Relaxation Delay	1.0000
7 Pulse Width	10.7300
8 Spectrometer Frequency	600.32
9 Nucleus	1H

S29



Parameter	Value
1 Title	DVR04180AF1 C13.1.fid
2 Solvent	CDCl3
3 Temperature	300.0
4 Number of Scans	1024
5 Receiver Gain	2050
6 Relaxation Delay	5.0000
7 Pulse Width	10.6300
8 Spectrometer Frequency	150.97
9 Nucleus	13C

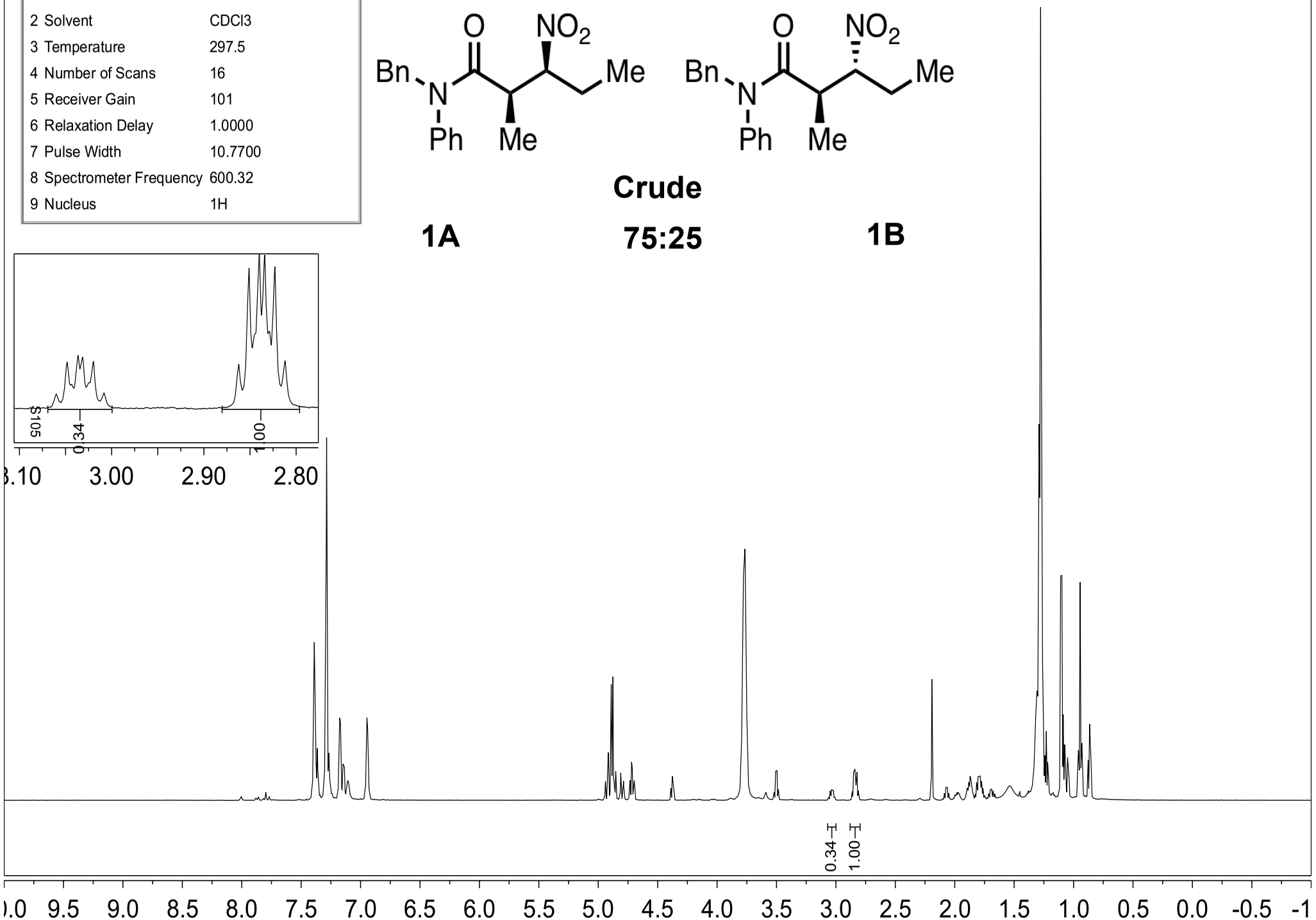
S29

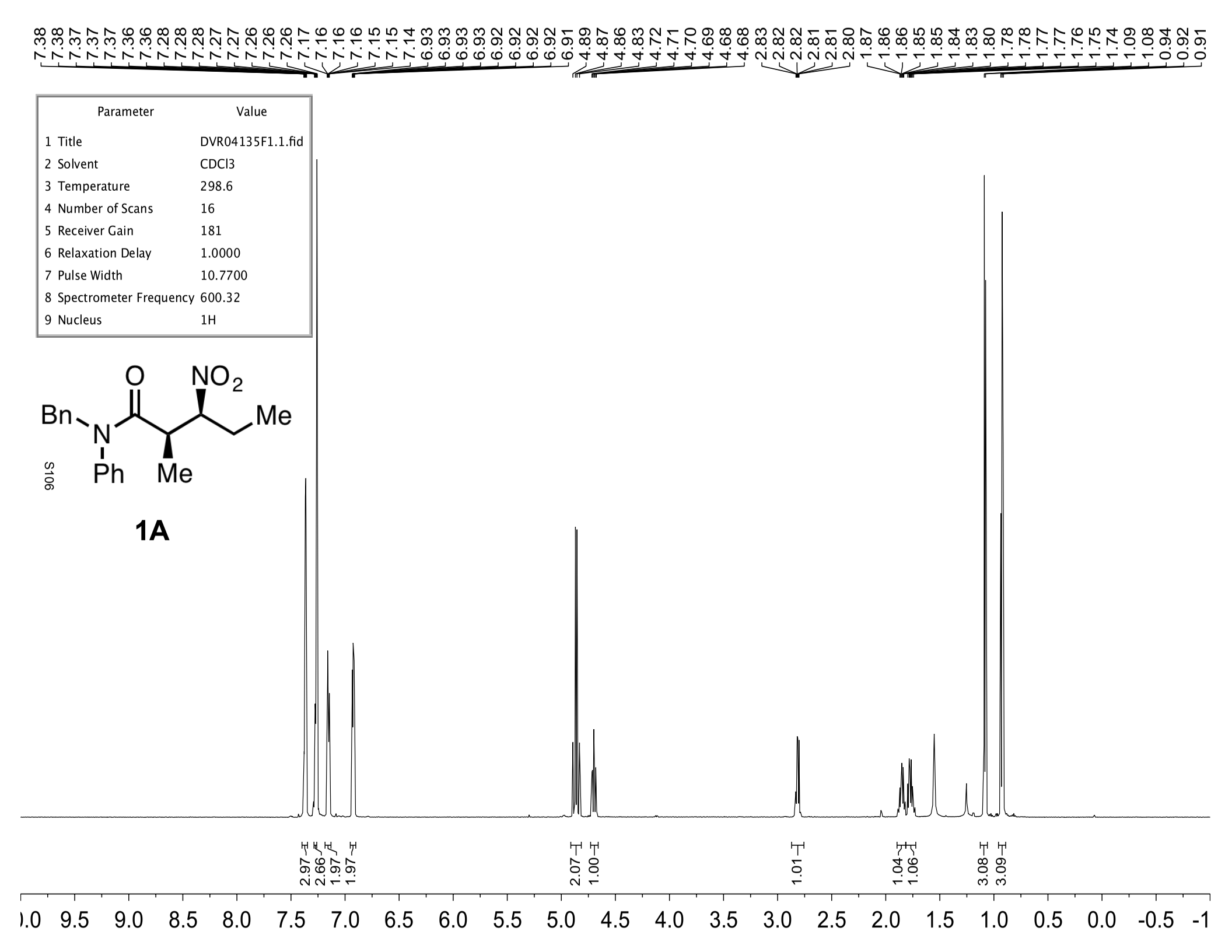


Parameter	Value
1 Title	DVR04263ACRD.1.fid
2 Solvent	CDCl3
3 Temperature	297.5
4 Number of Scans	16
5 Receiver Gain	101
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H

Crude

1A **75:25** **1B**

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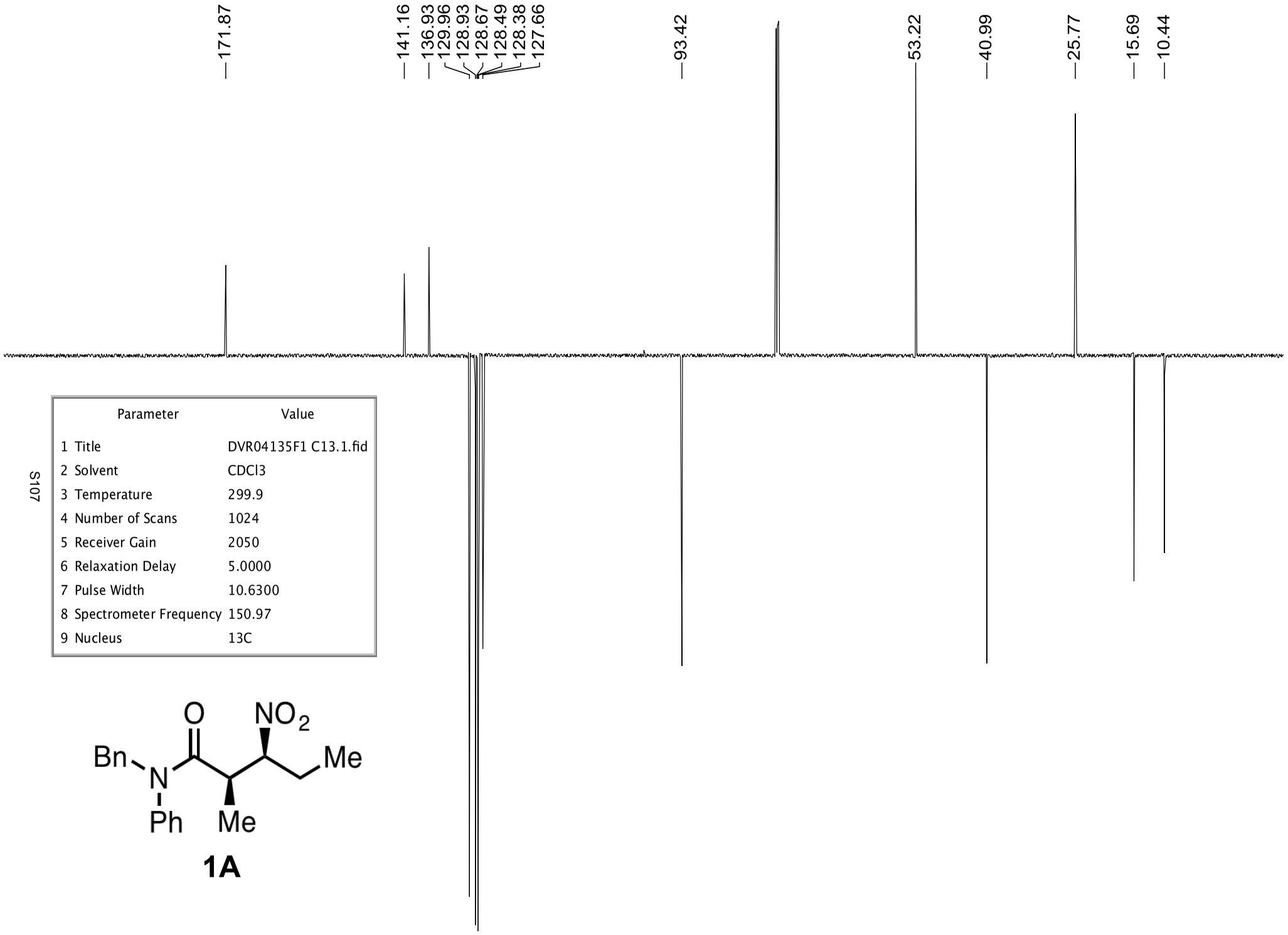
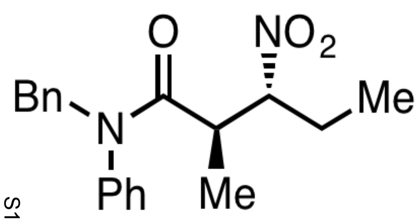
Parameter Value
1 Title DVR04135F1.1.fid
2 Solvent CDCl3
3 Temperature 298.6
4 Number of Scans 16
5 Receiver Gain 181
6 Relaxation Delay 1.0000
7 Pulse Width 10.7700
8 Spectrometer Frequency 600.32
9 Nucleus 1H
O
NO2
Bn
N
Me
Ph
Me
S106
1A
2.97 2.66 1.97 1.97 2.07 1.00 1.01 1.04 1.06 3.08 3.09
0.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1


171.87
141.16
136.93
129.96
128.93
128.67
128.49
128.38
127.66
93.42
53.22
40.99
25.77
15.69
10.44
Parameter Value
1 Title DVR04135F1 C13.1.fid
2 Solvent CDCl3
3 Temperature 299.9
4 Number of Scans 1024
5 Receiver Gain 2050
6 Relaxation Delay 5.0000
7 Pulse Width 10.6300
8 Spectrometer Frequency 150.97
9 Nucleus 13C
S107
O
NO2
Bn
N
Me
Ph
Me
1A
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

Parameter	Value
1 Title	DVR04135F2.1.fid
2 Solvent	CDCl3
3 Temperature	298.3
4 Number of Scans	16
5 Receiver Gain	256
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H



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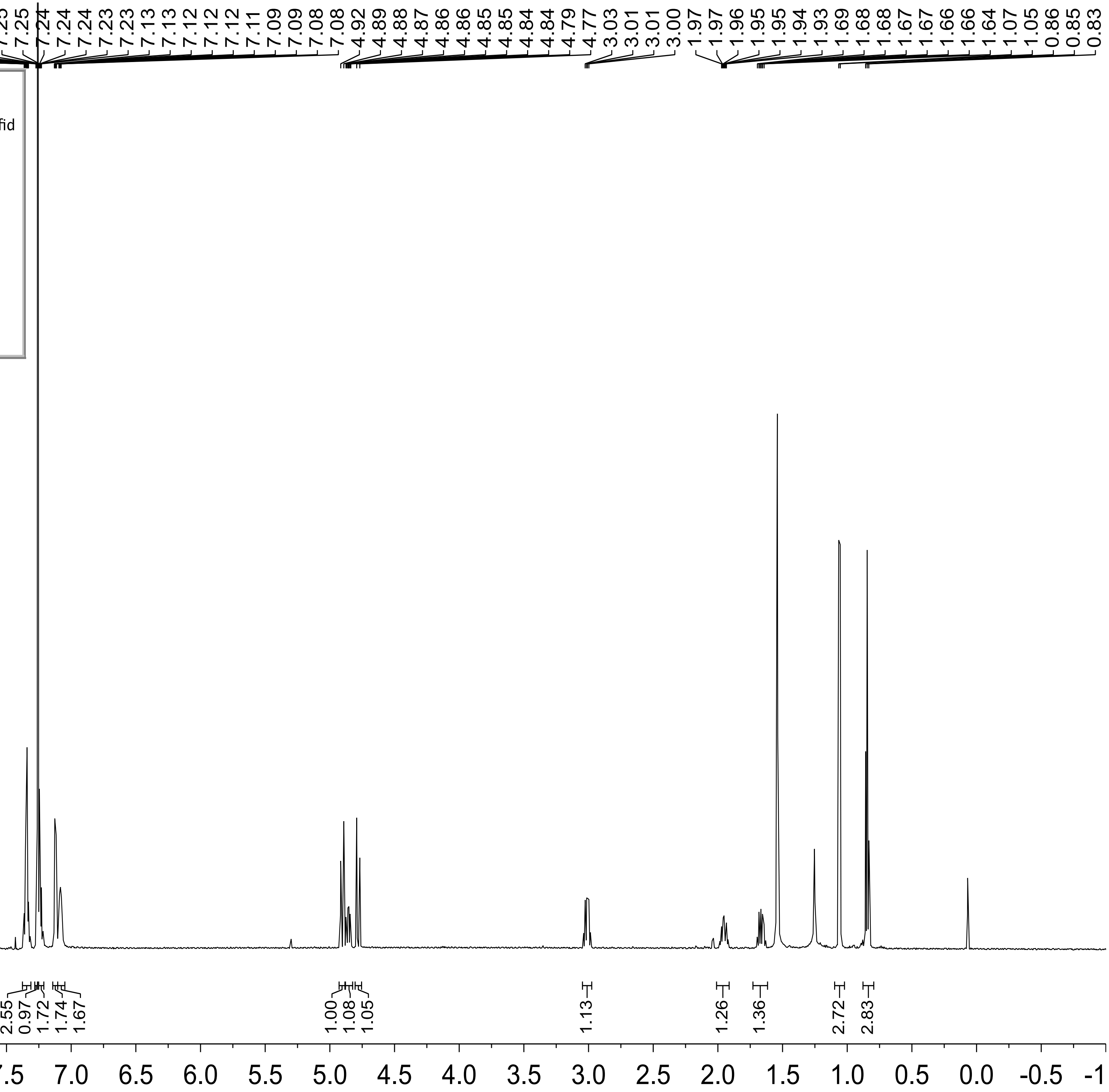

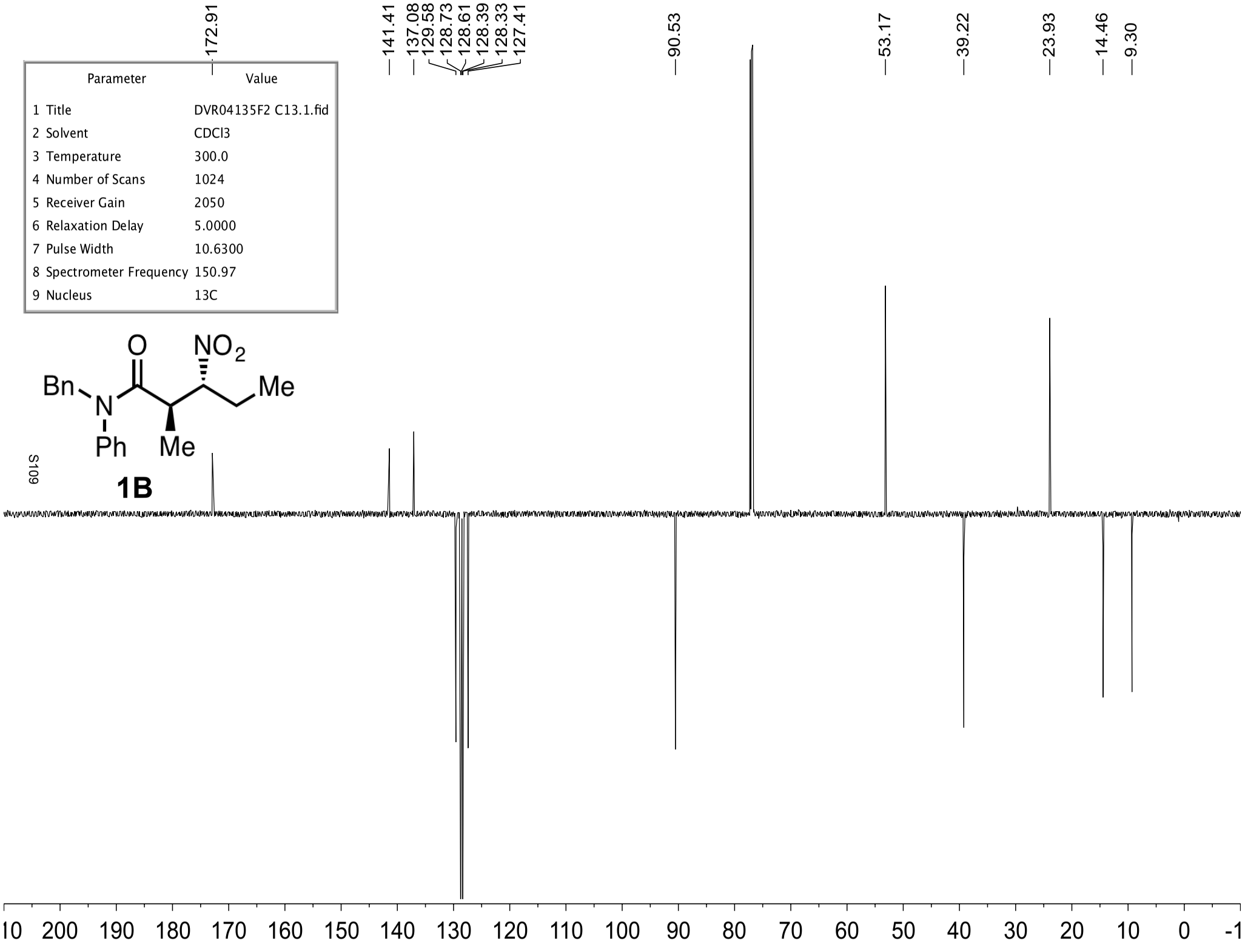
172.91
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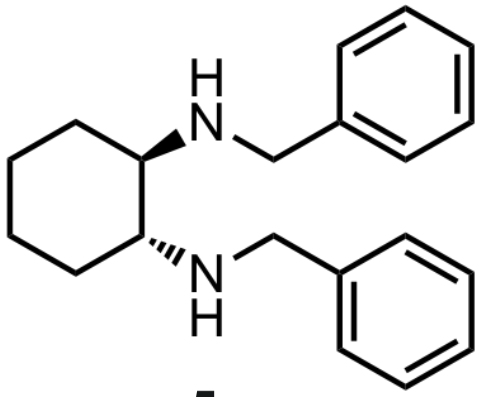
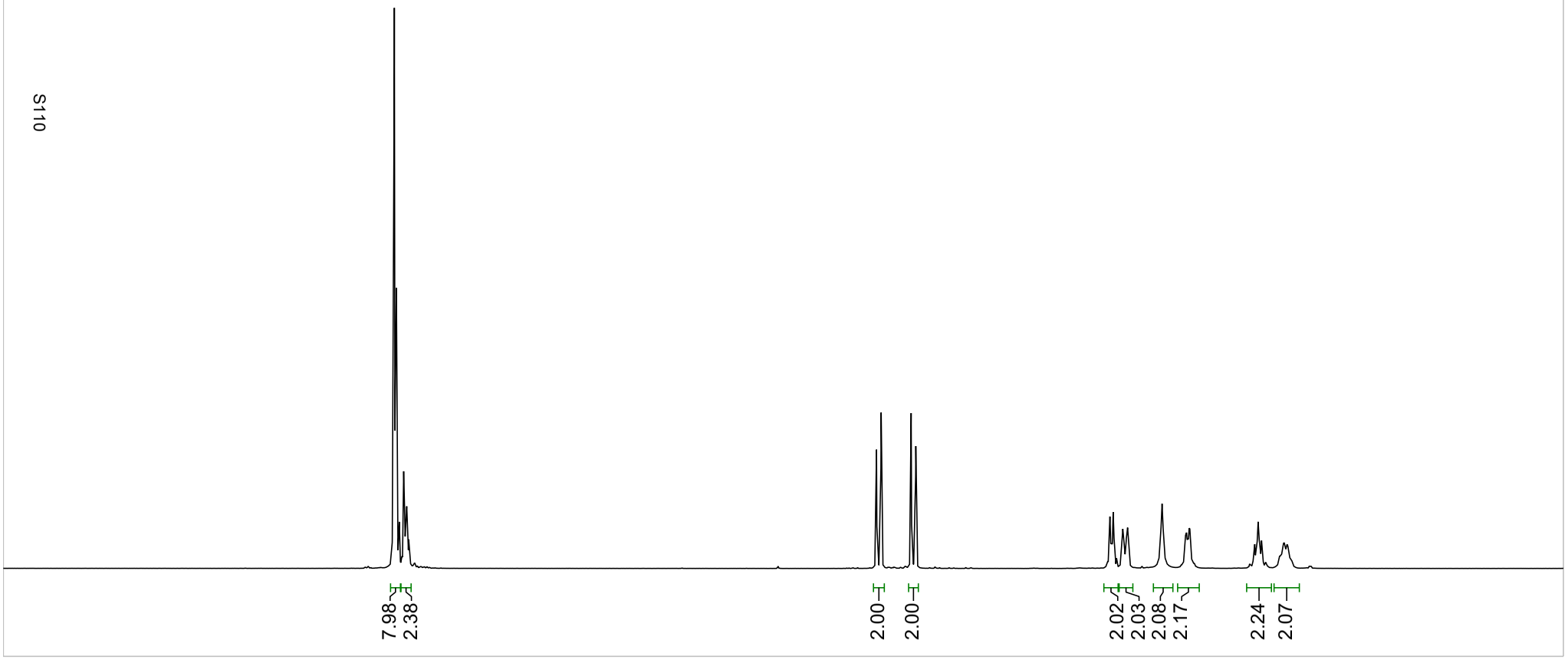
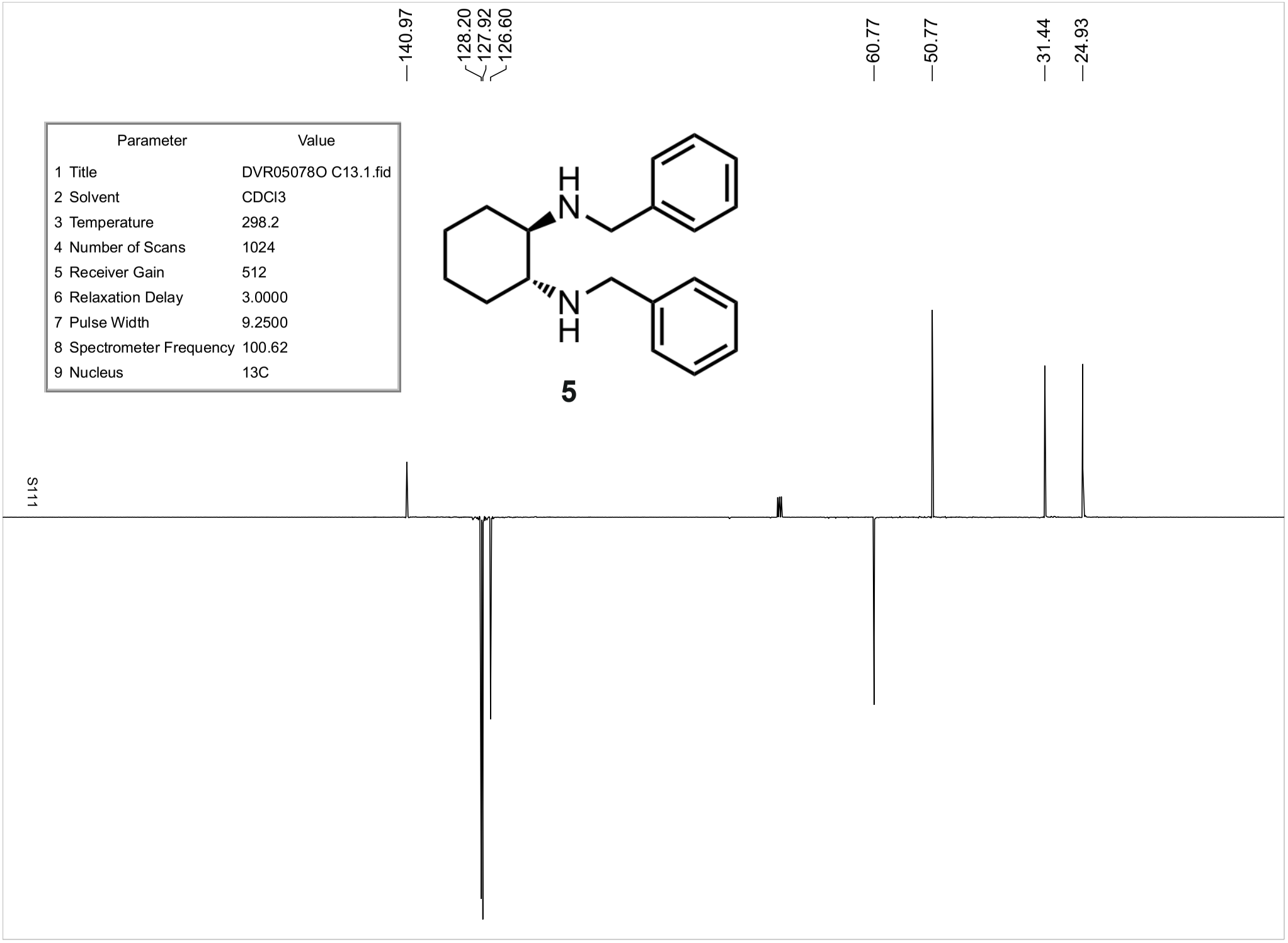
137.08
129.58
128.73
128.61
128.39
128.33
127.41
90.53
53.17
39.22
23.93
14.46
9.30
Parameter
Value
1 Title
DVR04135F2 C13.1.fid
2 Solvent
CDCl3
3 Temperature
300.0
4 Number of Scans
1024
5 Receiver Gain
2050
6 Relaxation Delay
5.0000
7 Pulse Width
10.6300
8 Spectrometer Frequency
150.97
9 Nucleus
13C
O
NO2
Bn
N
Me
Ph
Me
1B
S109
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10

Parameter	Value
1 Title	DVR05078O.1.fid
2 Solvent	CDCl3
3 Temperature	298.2
4 Number of Scans	16
5 Receiver Gain	11
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H



5

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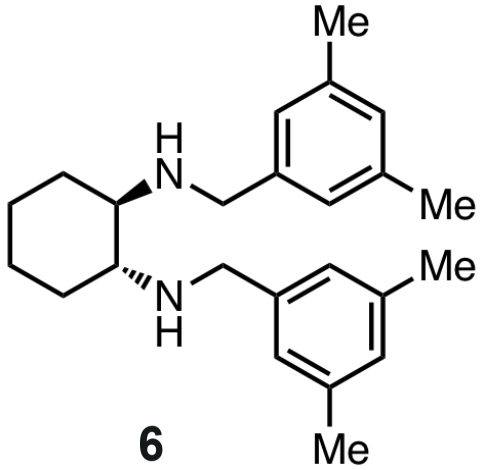
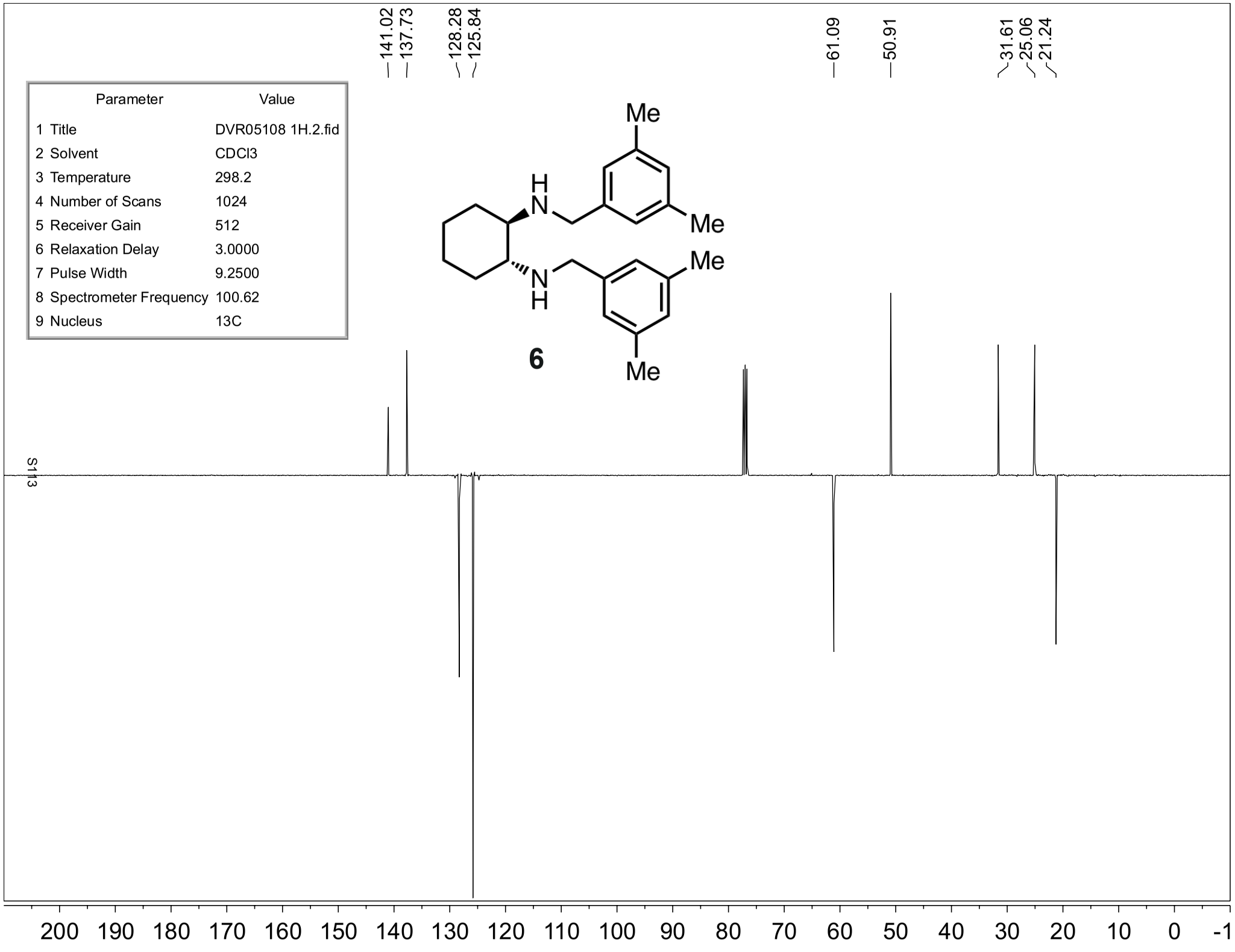
128.20
127.92
126.60
60.77
50.77
31.44
24.93
Parameter Value
1 Title DVR05078O C13.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
H
N
N
H
5
S111
10 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0

Parameter	Value
1 Title	DVR05108 1H.1.fid
2 Solvent	CDCl3
3 Temperature	298.2
4 Number of Scans	16
5 Receiver Gain	9
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H

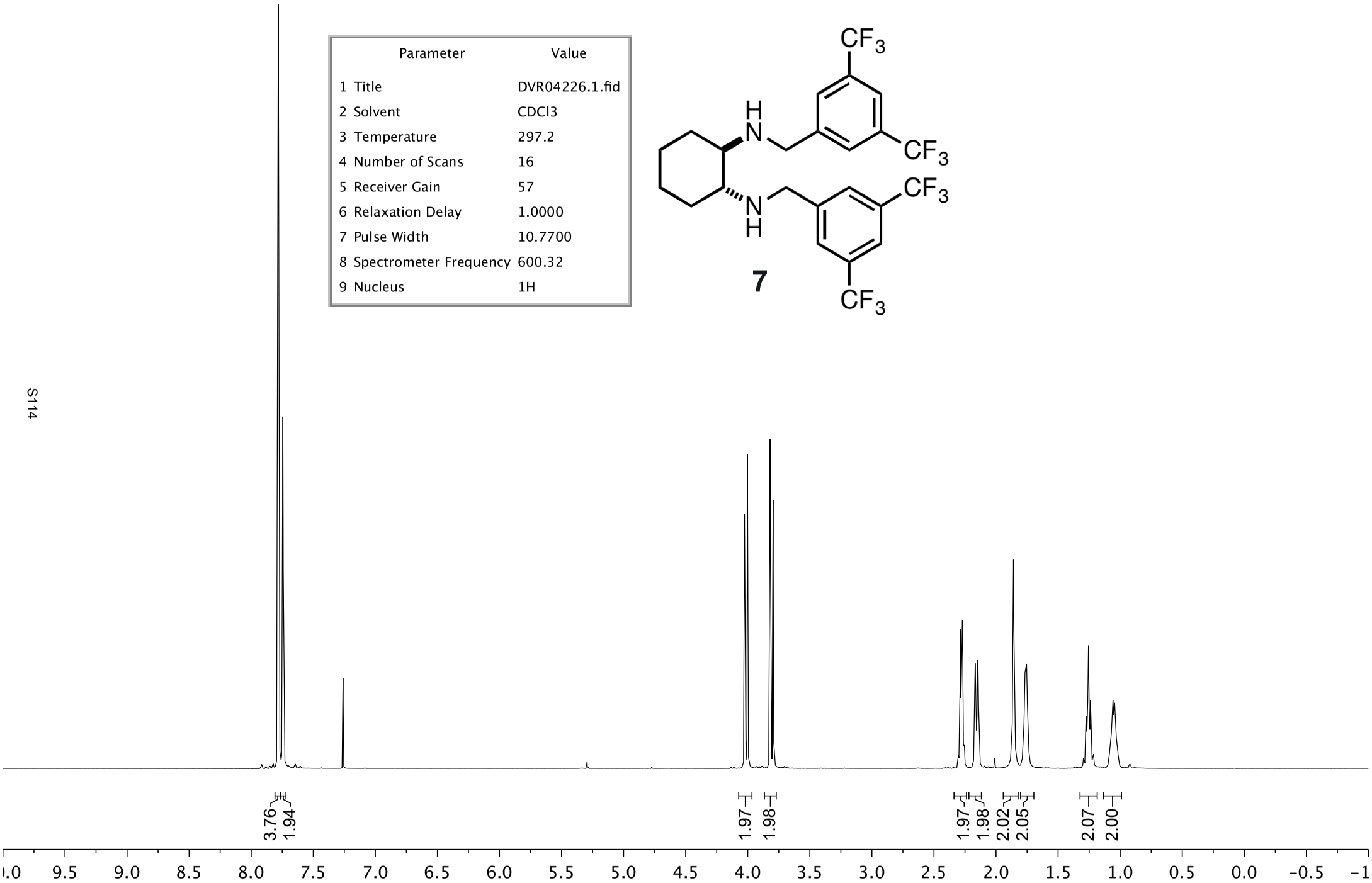


6


141.02
137.73
128.28
125.84
61.09
50.91
31.61
25.06
21.24
Parameter Value
1 Title DVR05108 1H.2.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
Me
H
N
Me
Me
H
N
Me
6
S113
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

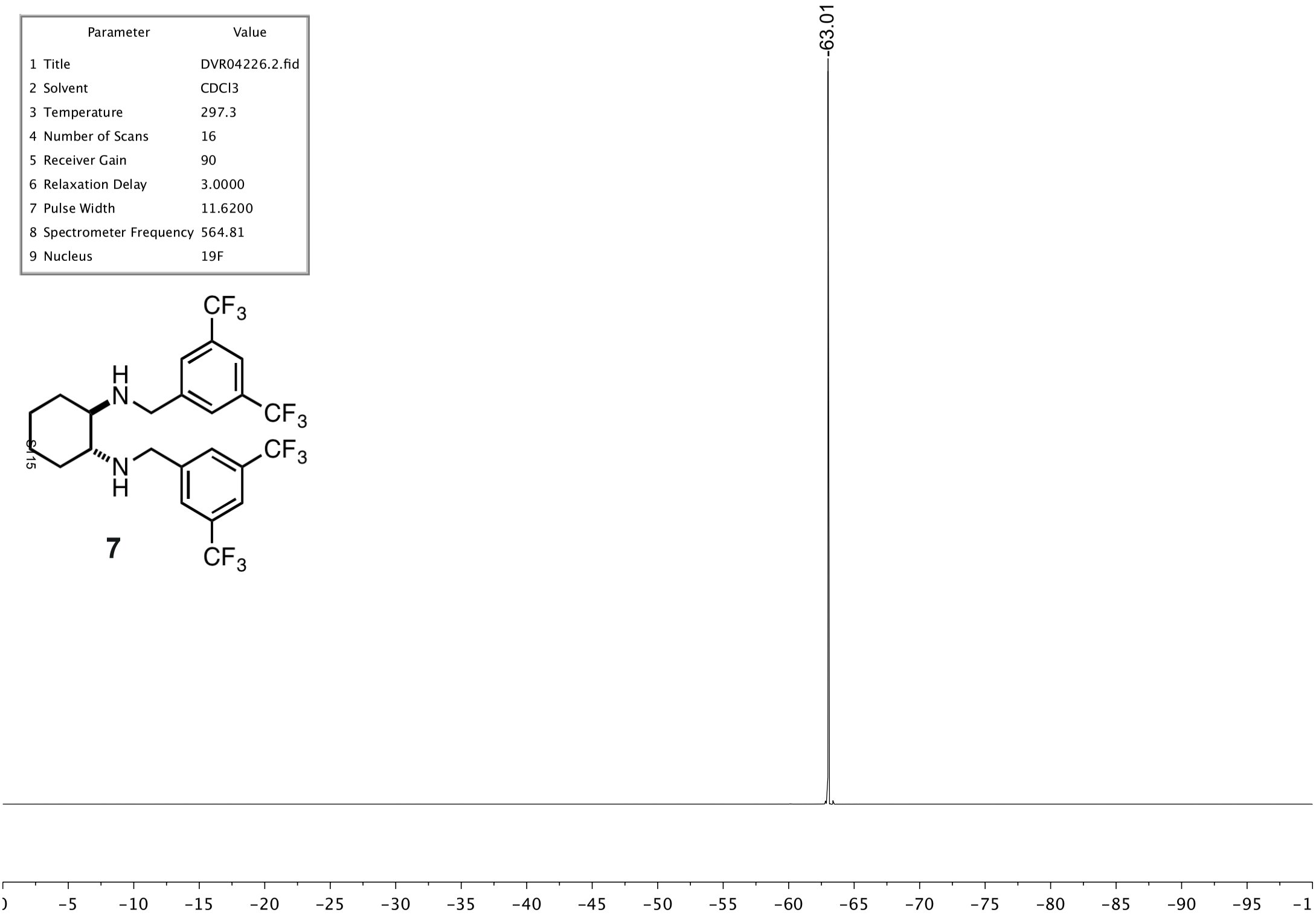
Parameter	Value
1 Title	DVR04226.1.fid
2 Solvent	CDCl3
3 Temperature	297.2
4 Number of Scans	16
5 Receiver Gain	57
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H

7



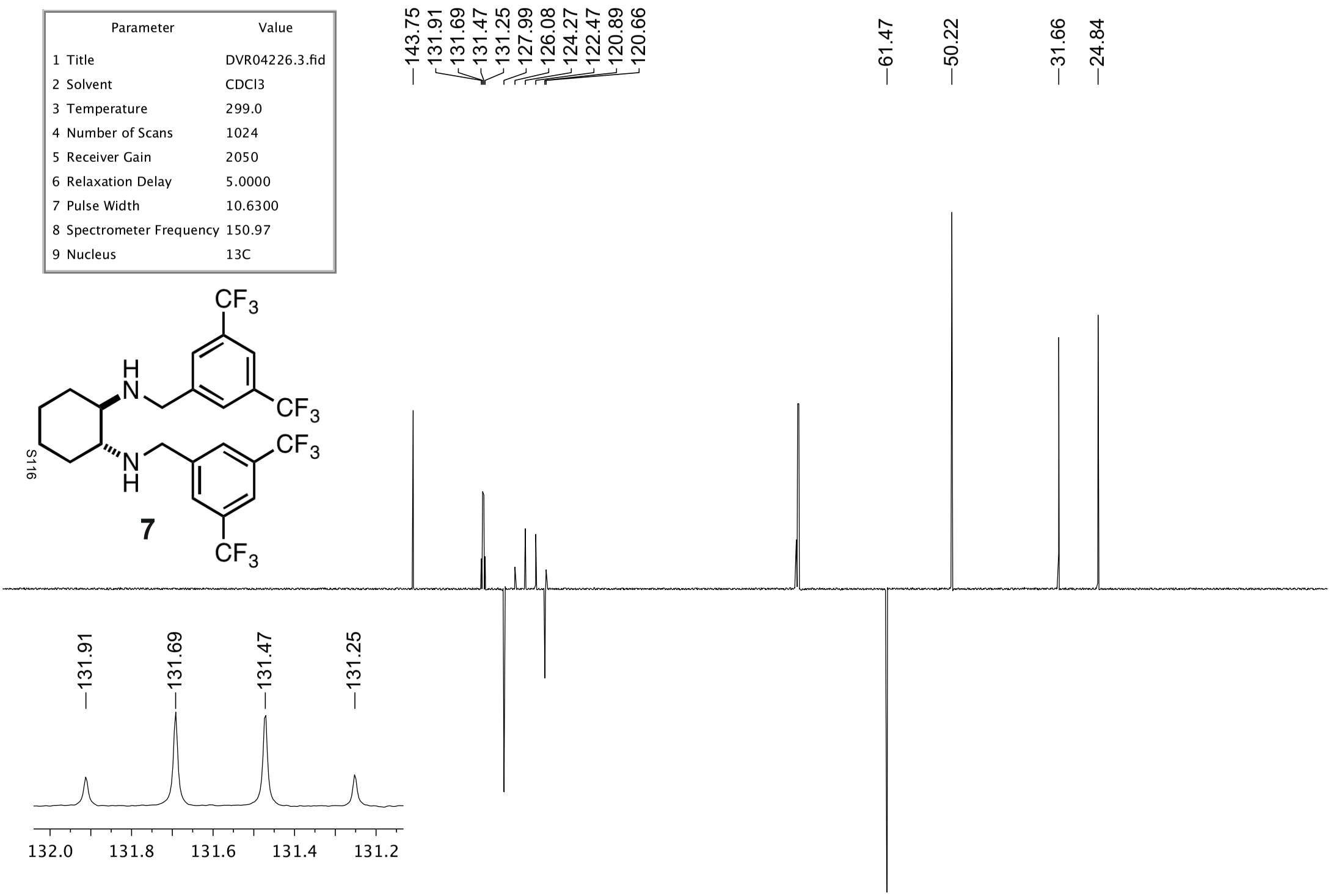
Parameter	Value
1 Title	DVR04226.2.fid
2 Solvent	CDCl3
3 Temperature	297.3
4 Number of Scans	16
5 Receiver Gain	90
6 Relaxation Delay	3.0000
7 Pulse Width	11.6200
8 Spectrometer Frequency	564.81
9 Nucleus	19F

7

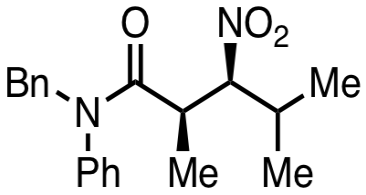


Parameter	Value
1 Title	DVR04226.3.fid
2 Solvent	CDCl3
3 Temperature	299.0
4 Number of Scans	1024
5 Receiver Gain	2050
6 Relaxation Delay	5.0000
7 Pulse Width	10.6300
8 Spectrometer Frequency	150.97
9 Nucleus	13C

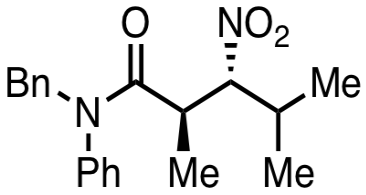
7



Parameter	Value
1 Title	DVR04192CRD.1.fid
2 Solvent	CDCl3
3 Temperature	298.1
4 Number of Scans	16
5 Receiver Gain	9
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H



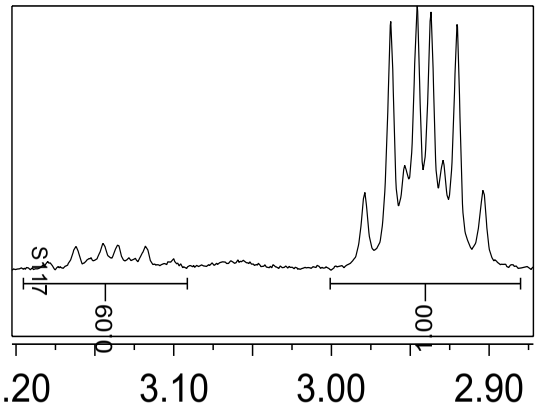
9A

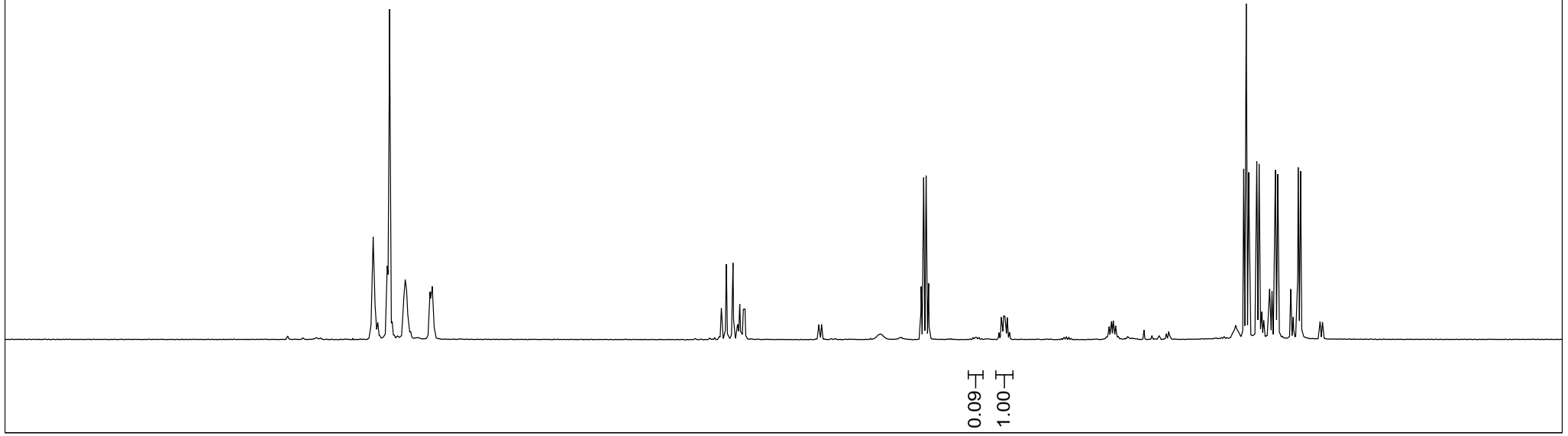


9B

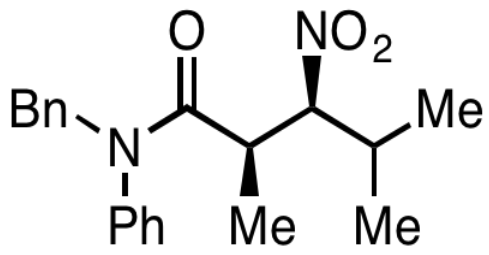
Crude

93:07





Parameter	Value
1 Title	DVR04192D1.1.fid
2 Solvent	CDCl3
3 Temperature	298.0
4 Number of Scans	16
5 Receiver Gain	181
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H



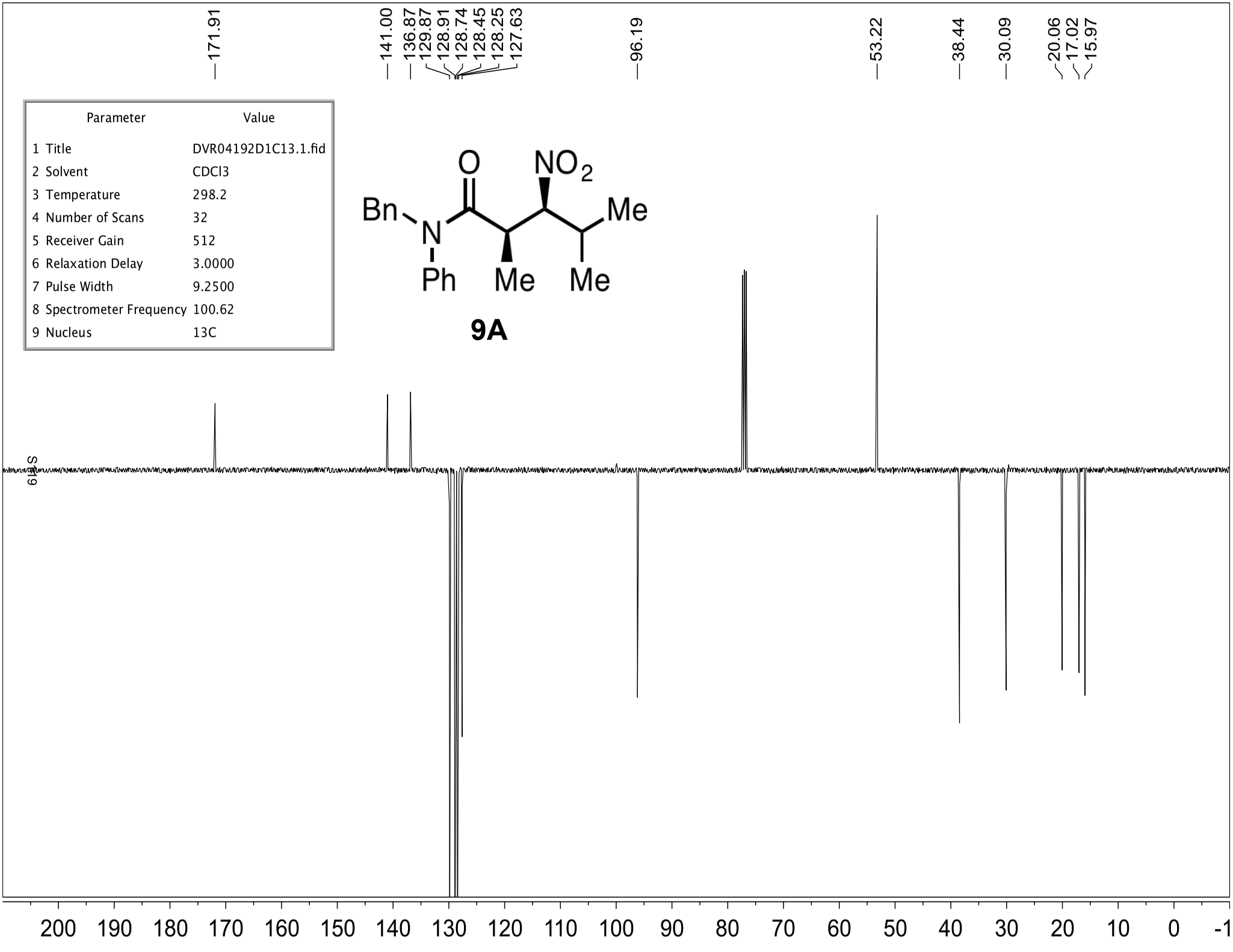
9A

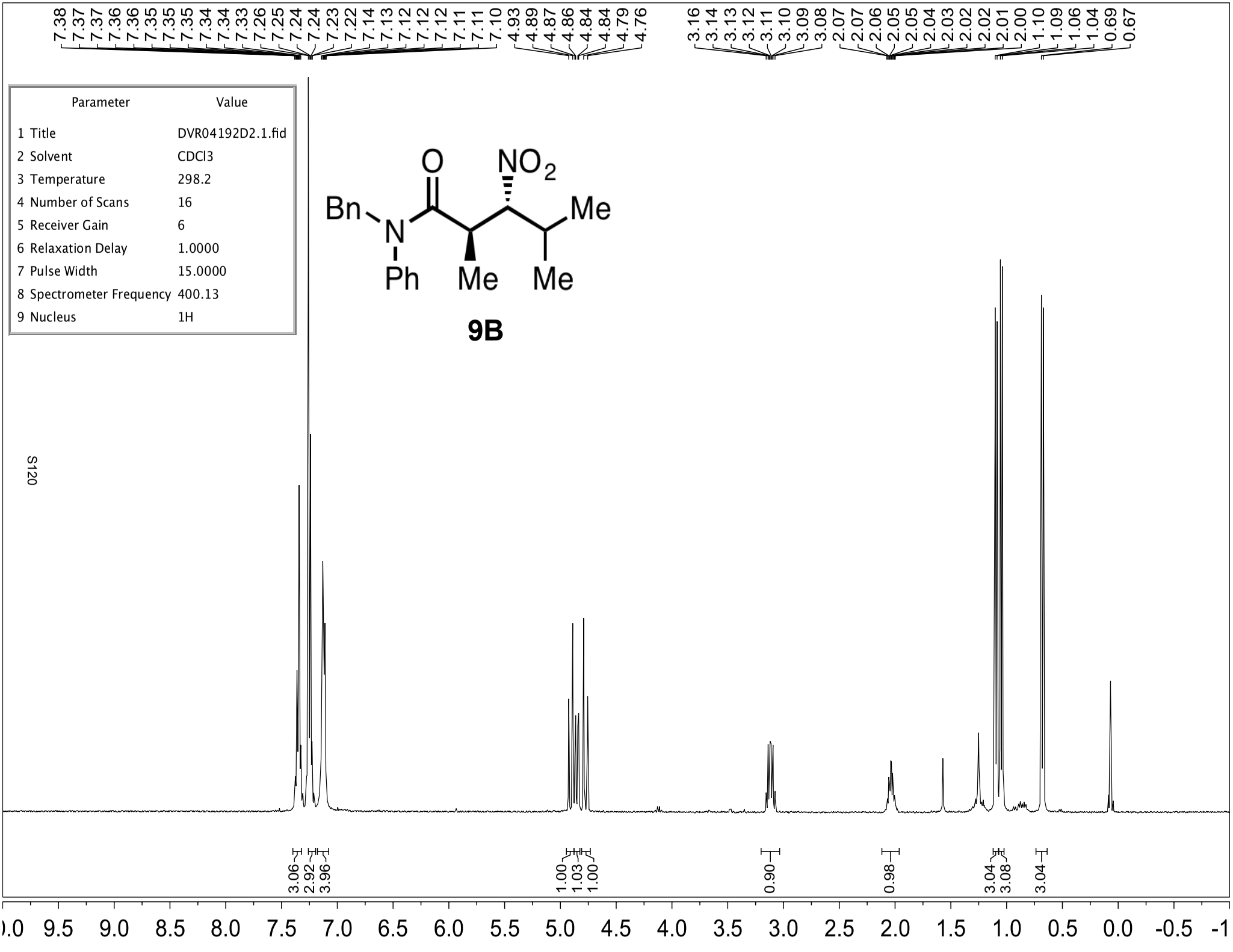
S118

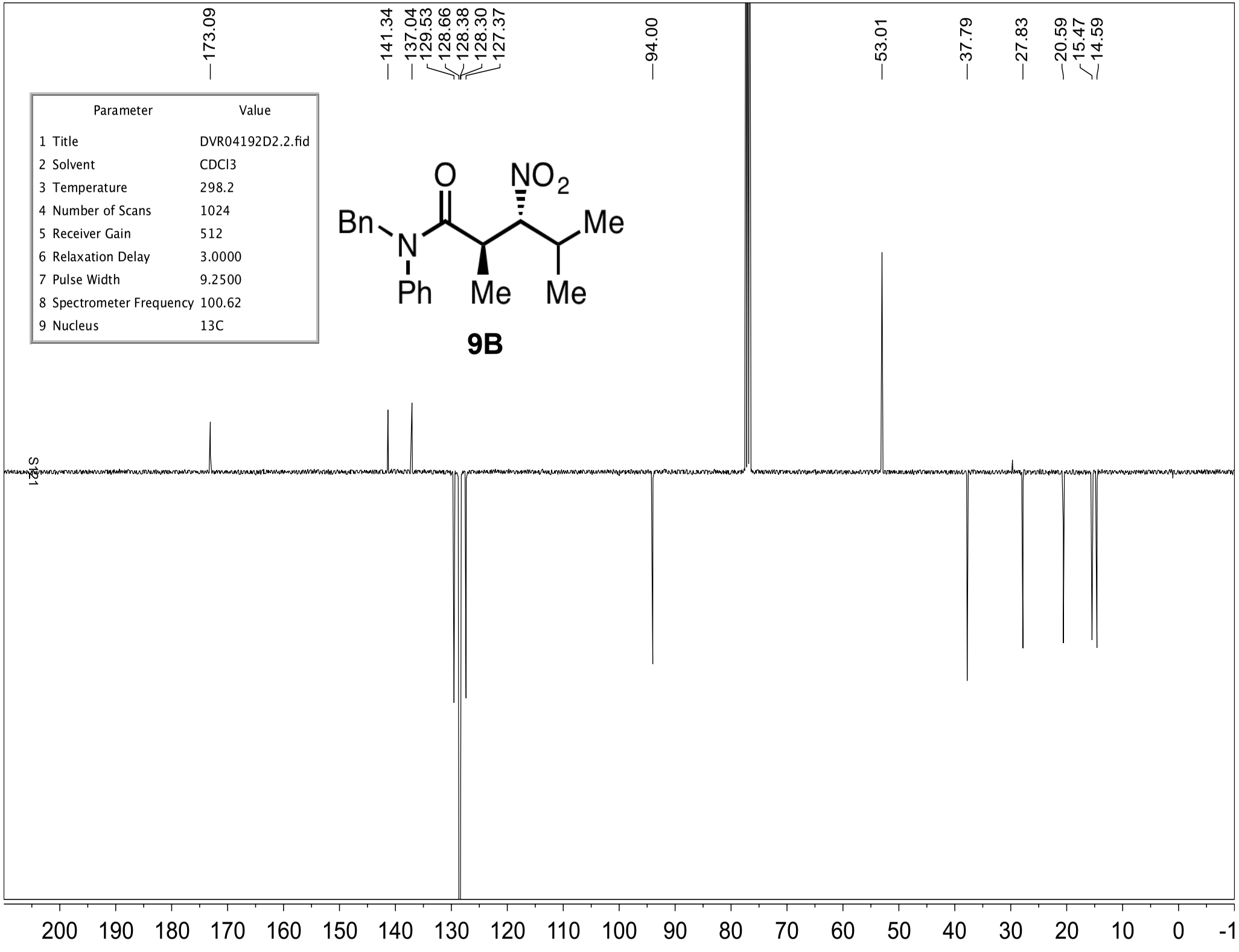
7.39 7.38 7.38 7.37 7.37 7.36 7.36 7.16 7.15 7.14 7.14 7.13 6.98 6.97 6.97 6.96 6.96 6.96 6.95
4.91 4.89 4.83 4.81 4.78 4.77 4.76 4.75
2.95 2.93 2.93 2.92 2.92 2.91 2.91 2.90 2.18 2.17 2.17 2.16 2.16 2.15 2.15 2.14 2.14 2.13 1.13 1.12 1.11 1.01 1.00 0.99 0.84 0.83

2.97 3.36 1.97 1.97 1.01 1.02 1.03 1.00 1.01 3.03 3.07 3.08

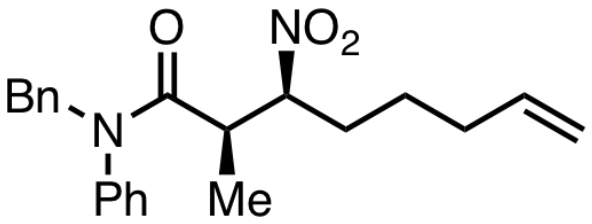
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1

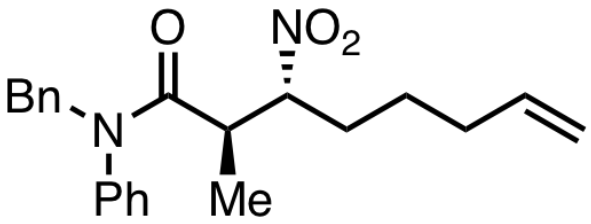

171.91
141.00
136.87
129.87
128.91
128.74
128.45
128.25
127.63
96.19
53.22
38.44
30.09
20.06
17.02
15.97
Parameter Value
1 Title DVR04192D1C13.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 32
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
O
NO2
Bn
N
Me
Ph
Me
Me
9A
S19
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1


7.38 7.37 7.37 7.36 7.36 7.35 7.35 7.35 7.34 7.34 7.33 7.26 7.25 7.24 7.24 7.23 7.22 7.14 7.13 7.12 7.12 7.12 7.11 7.11 7.10 4.93 4.89 4.87 4.86 4.84 4.84 4.79 4.76
3.16 3.14 3.13 3.12 3.11 3.10 3.09 3.08 2.07 2.07 2.06 2.05 2.05 2.04 2.03 2.02 2.02 2.01 2.00 1.10 1.09 1.06 1.04 0.69 0.67
Parameter Value
1 Title DVR04192D2.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 16
5 Receiver Gain 6
6 Relaxation Delay 1.0000
7 Pulse Width 15.0000
8 Spectrometer Frequency 400.13
9 Nucleus 1H
O
NO2
Bn
N
Me
Ph
Me
Me
9B
S120
3.06 2.92 3.96 1.00 1.03 1.00 0.90 0.98 3.04 3.08 3.04
0.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1


173.09
141.34
137.04
129.53
128.66
128.38
128.30
127.37
94.00
53.01
37.79
27.83
20.59
15.47
14.59
Parameter Value
1 Title DVR04192D2.2.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
O
NO2
Bn
N
Ph
Me
Me
Me
9B
S121
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

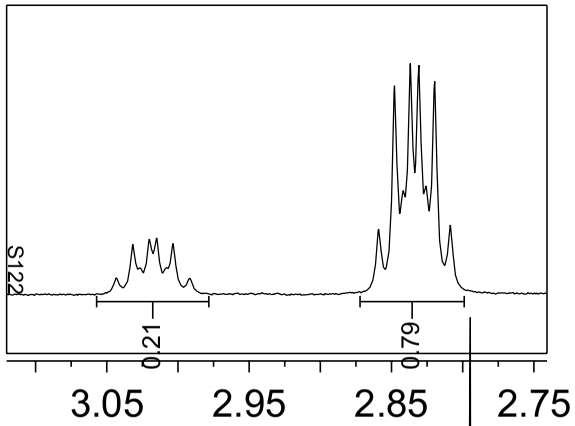
Parameter	Value
1 Title	DVR04130CRD.1.fid
2 Solvent	CDCl3
3 Temperature	297.8
4 Number of Scans	16
5 Receiver Gain	144
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H

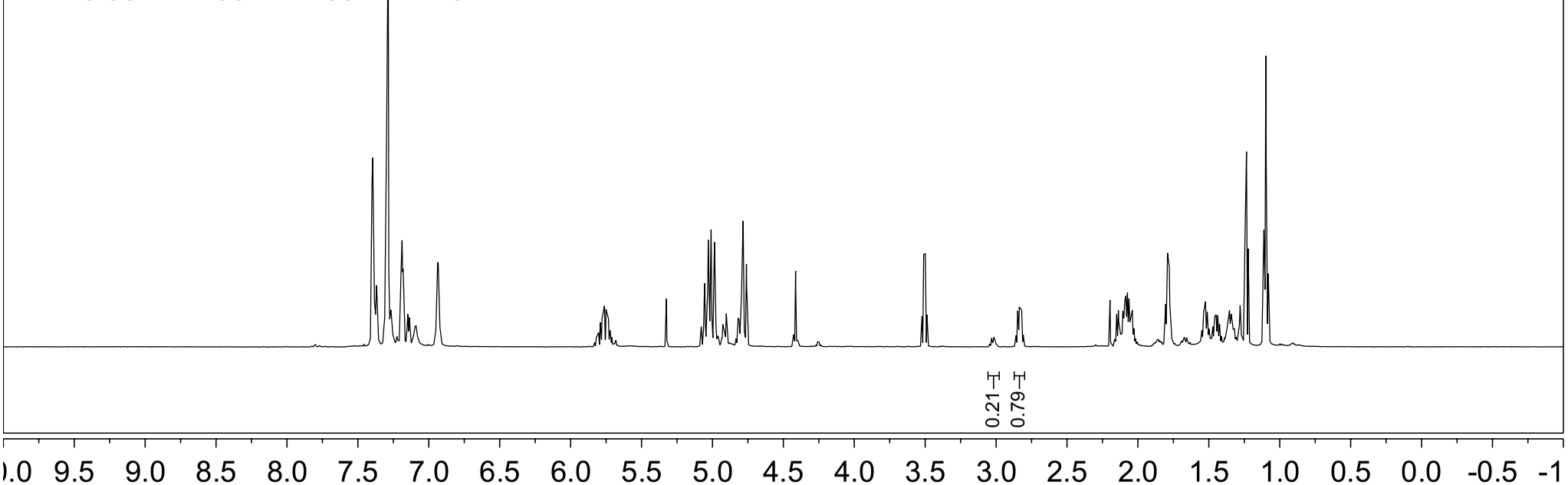


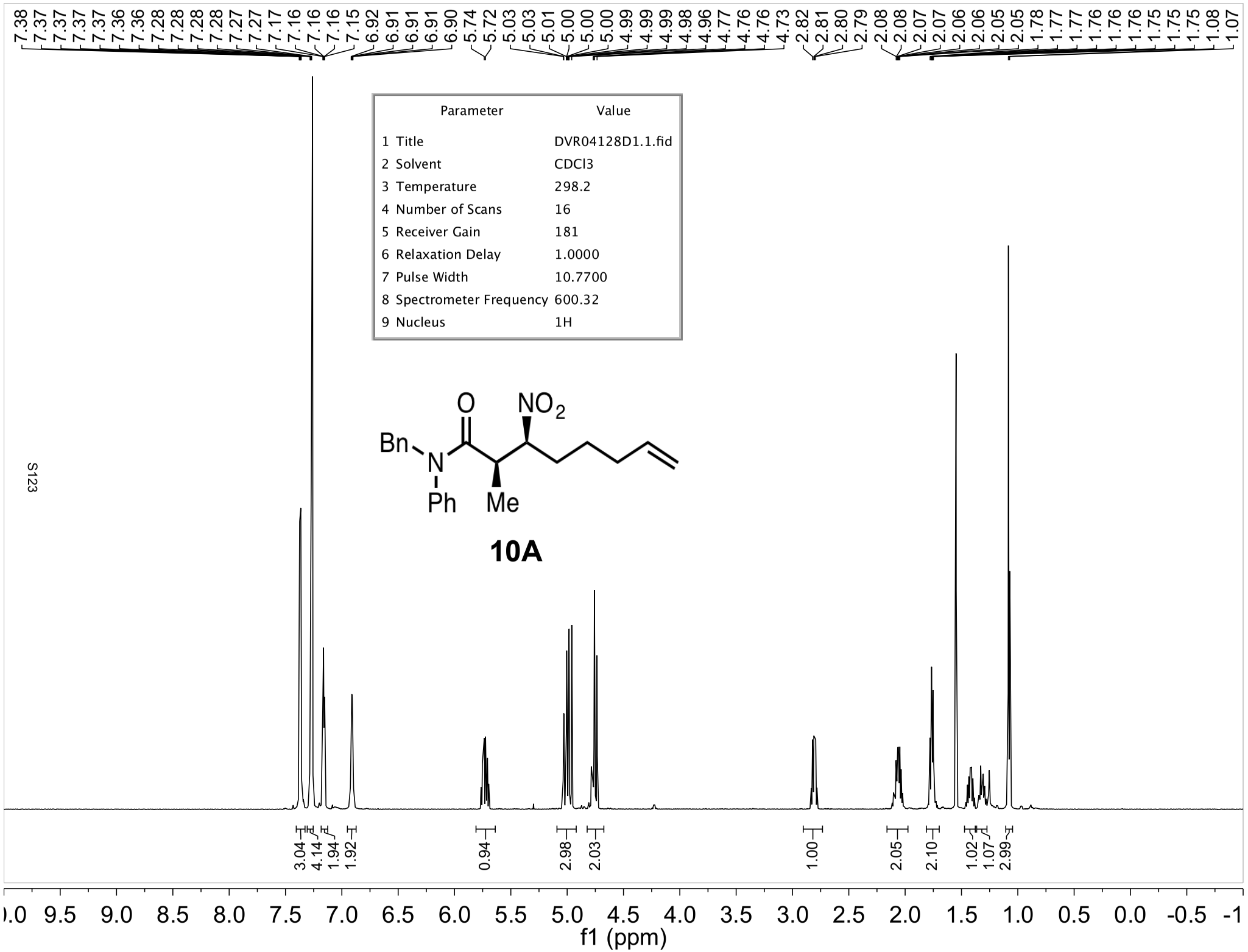


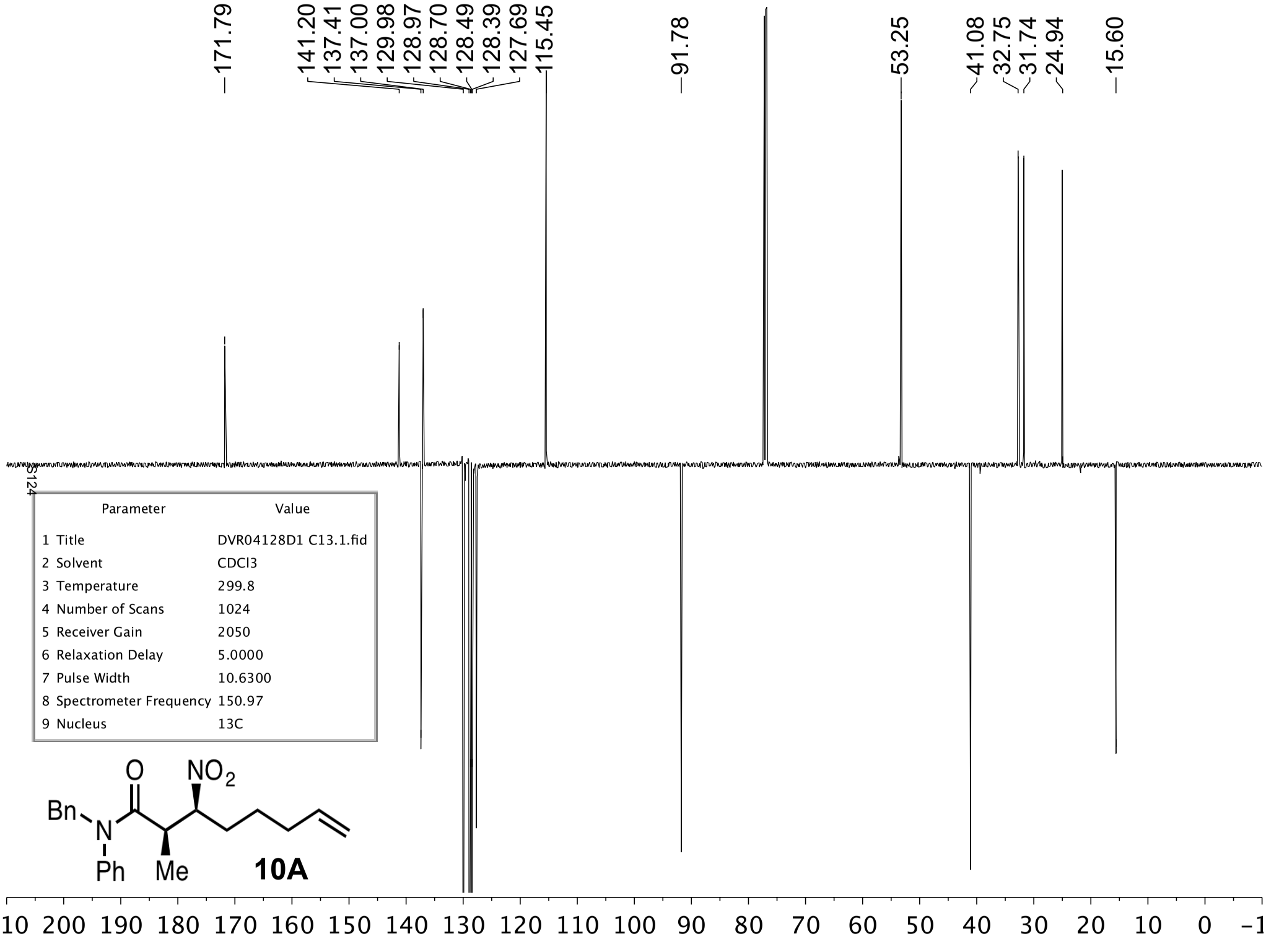
Crude

10A **79:21** **10B**



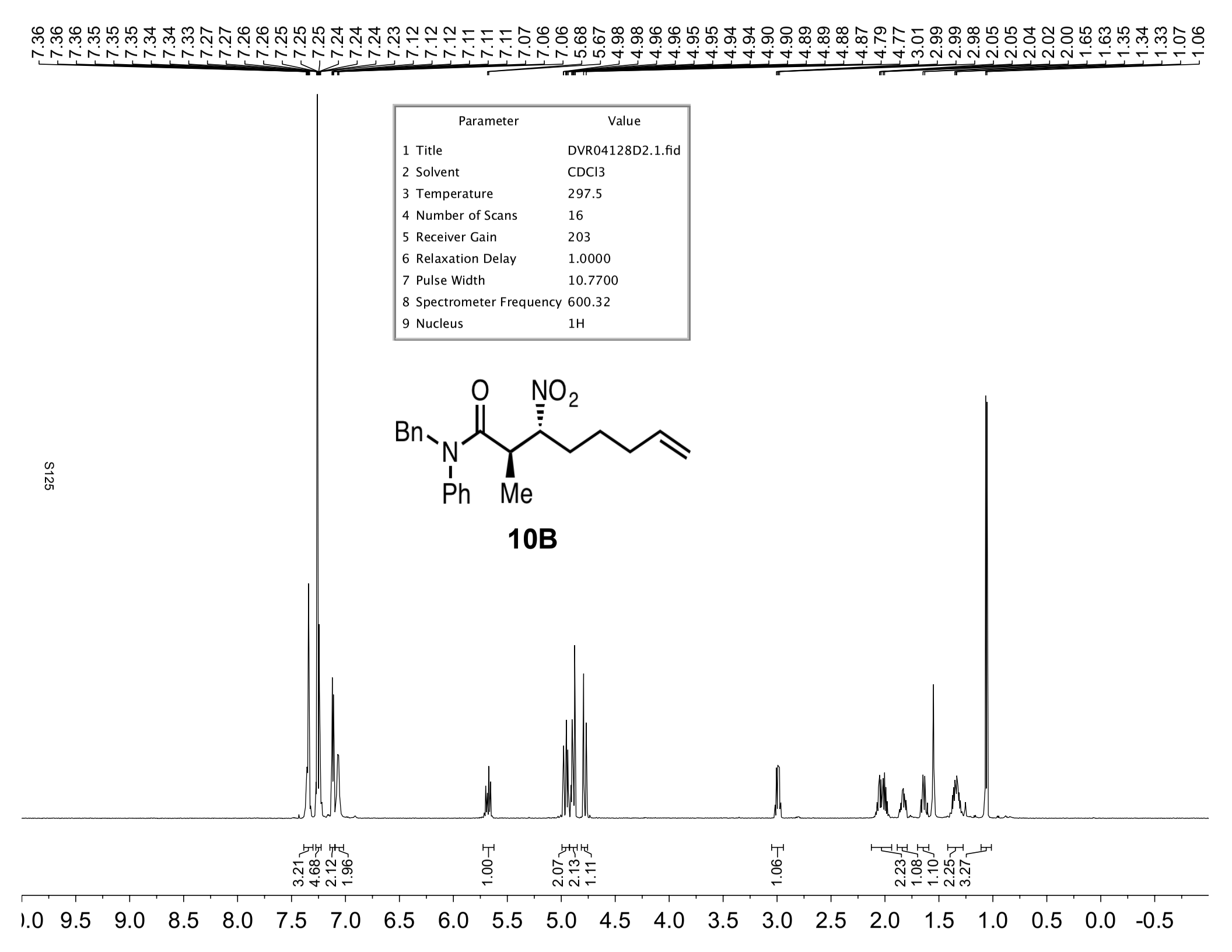


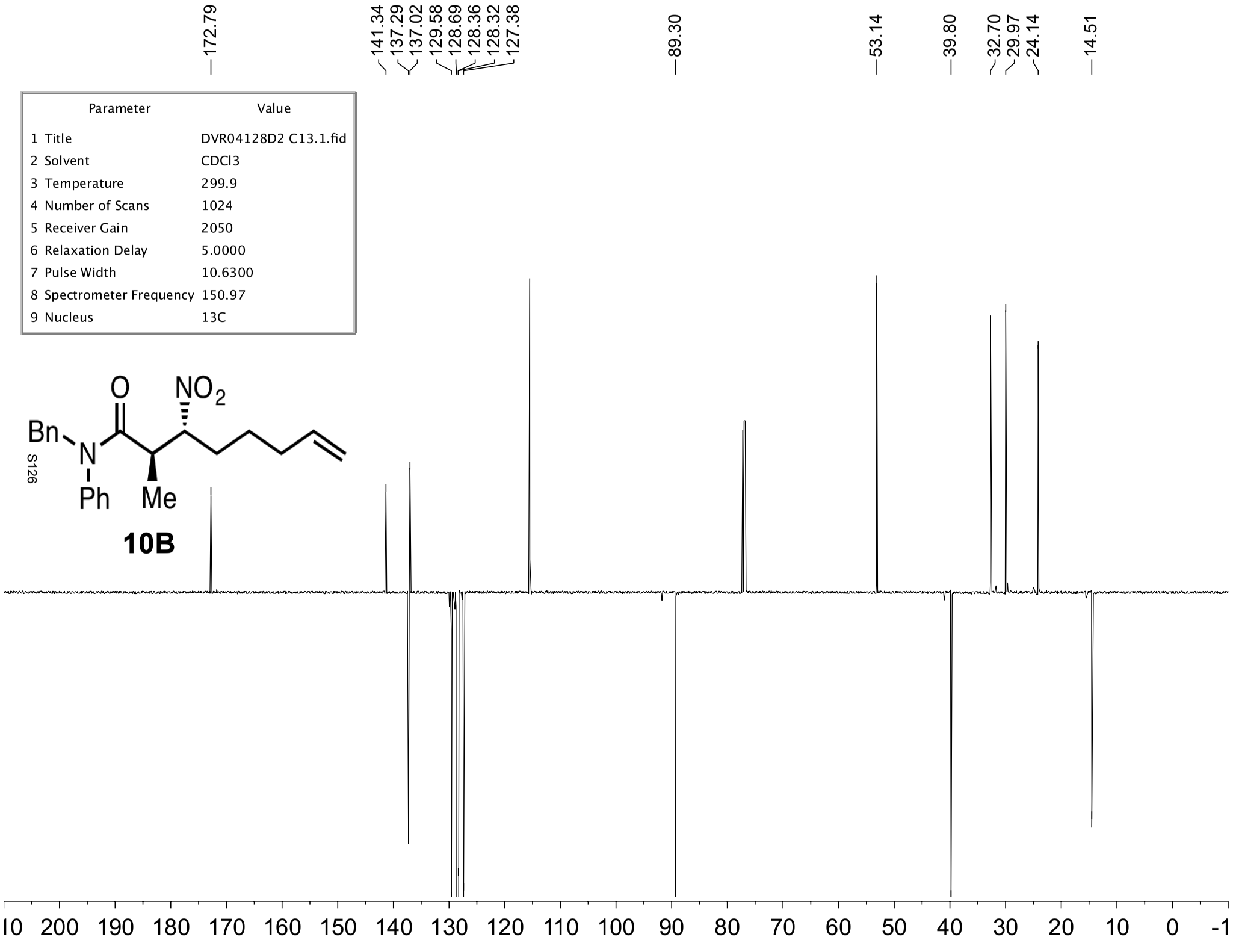

7.38 7.37 7.37 7.37 7.37 7.36 7.36 7.28 7.28 7.28 7.28 7.27 7.27 7.17 7.16 7.16 7.16 7.15 6.92 6.91 6.91 6.91 6.90 5.74 5.72 5.03 5.03 5.01 5.00 5.00 5.00 4.99 4.99 4.99 4.98 4.96 4.77 4.76 4.76 4.73 2.82 2.81 2.80 2.79 2.08 2.08 2.07 2.07 2.06 2.06 2.05 2.05 1.78 1.77 1.77 1.76 1.76 1.76 1.75 1.75 1.75 1.08 1.07
Parameter Value
1 Title DVR04128D1.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 16
5 Receiver Gain 181
6 Relaxation Delay 1.0000
7 Pulse Width 10.7700
8 Spectrometer Frequency 600.32
9 Nucleus 1H
O
NO2
Bn
N
Ph
Me
10A
S123
3.04 4.14 1.94 1.92 0.94 2.98 2.03 1.00 2.05 2.10 1.02 1.07 2.99
f1 (ppm)



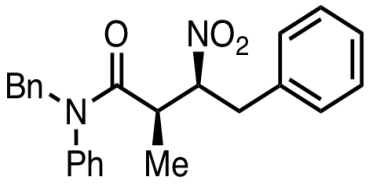
Parameter	Value
1 Title	DVR04128D1 C13.1.fid
2 Solvent	CDCl3
3 Temperature	299.8
4 Number of Scans	1024
5 Receiver Gain	2050
6 Relaxation Delay	5.0000
7 Pulse Width	10.6300
8 Spectrometer Frequency	150.97
9 Nucleus	13C

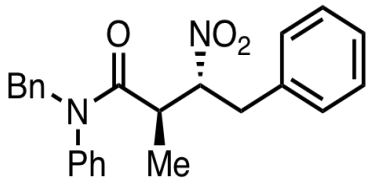
10A


7.36 7.36 7.36 7.35 7.35 7.35 7.34 7.34 7.33 7.27 7.27 7.26 7.26 7.25 7.25 7.25 7.24 7.24 7.24 7.23 7.12 7.12 7.12 7.11 7.11 7.11 7.07 7.06 7.06 5.68 5.67 4.98 4.98 4.96 4.96 4.95 4.95 4.94 4.94 4.90 4.90 4.89 4.89 4.88 4.87 4.79 4.77 3.01 2.99 2.99 2.98 2.05 2.05 2.04 2.02 2.00 1.65 1.63 1.35 1.34 1.33 1.07 1.06
Parameter Value
1 Title DVR04128D2.1.fid
2 Solvent CDCl3
3 Temperature 297.5
4 Number of Scans 16
5 Receiver Gain 203
6 Relaxation Delay 1.0000
7 Pulse Width 10.7700
8 Spectrometer Frequency 600.32
9 Nucleus 1H
O
NO2
Bn
N
Ph
Me
10B
S125
3.21 4.68 2.12 1.96 1.00 2.07 2.13 1.11 1.06 2.23 1.08 1.10 2.25 3.27
.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5


172.79
141.34
137.29
137.02
129.58
128.69
128.36
128.32
127.38
89.30
53.14
39.80
32.70
29.97
24.14
14.51
Parameter Value
1 Title DVR04128D2 C13.1.fid
2 Solvent CDCl3
3 Temperature 299.9
4 Number of Scans 1024
5 Receiver Gain 2050
6 Relaxation Delay 5.0000
7 Pulse Width 10.6300
8 Spectrometer Frequency 150.97
9 Nucleus 13C
O
NO2
Bn
N
Ph
Me
S126
10B
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10

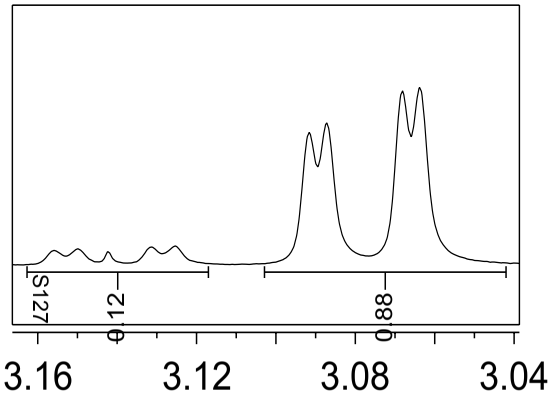
Parameter	Value
1 Title	DVR04140CRD.1.fid
2 Solvent	CDCl3
3 Temperature	298.1
4 Number of Scans	16
5 Receiver Gain	144
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H

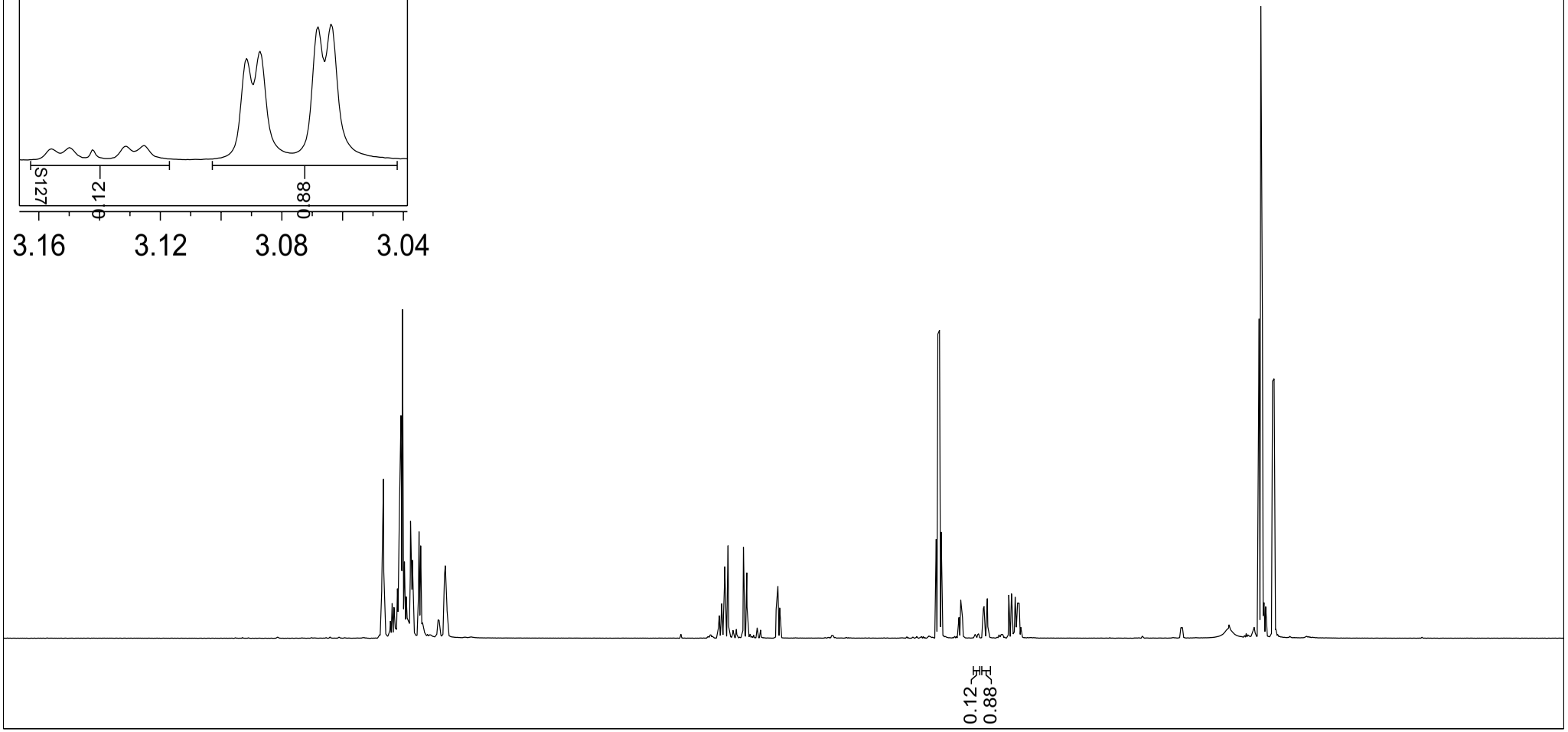


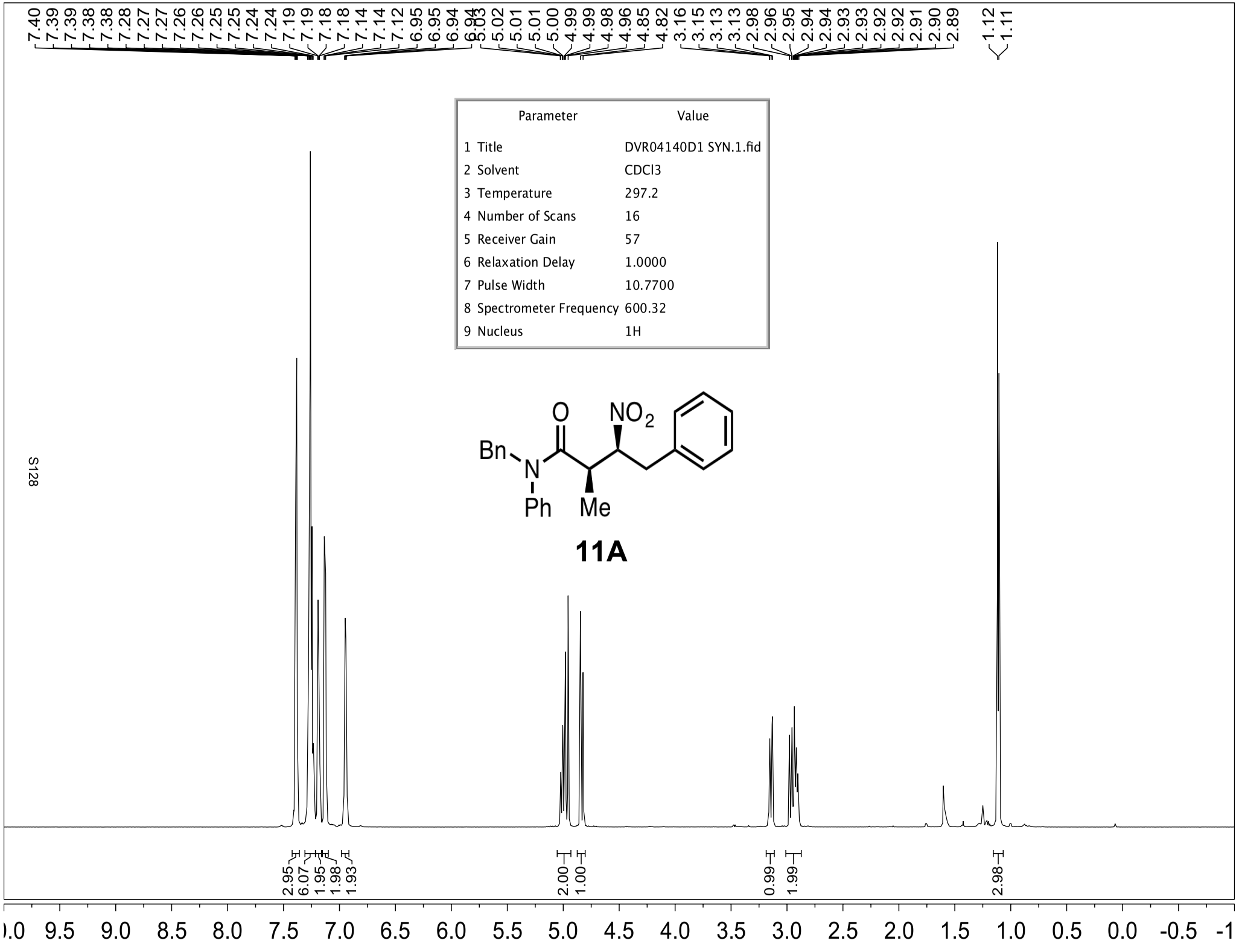


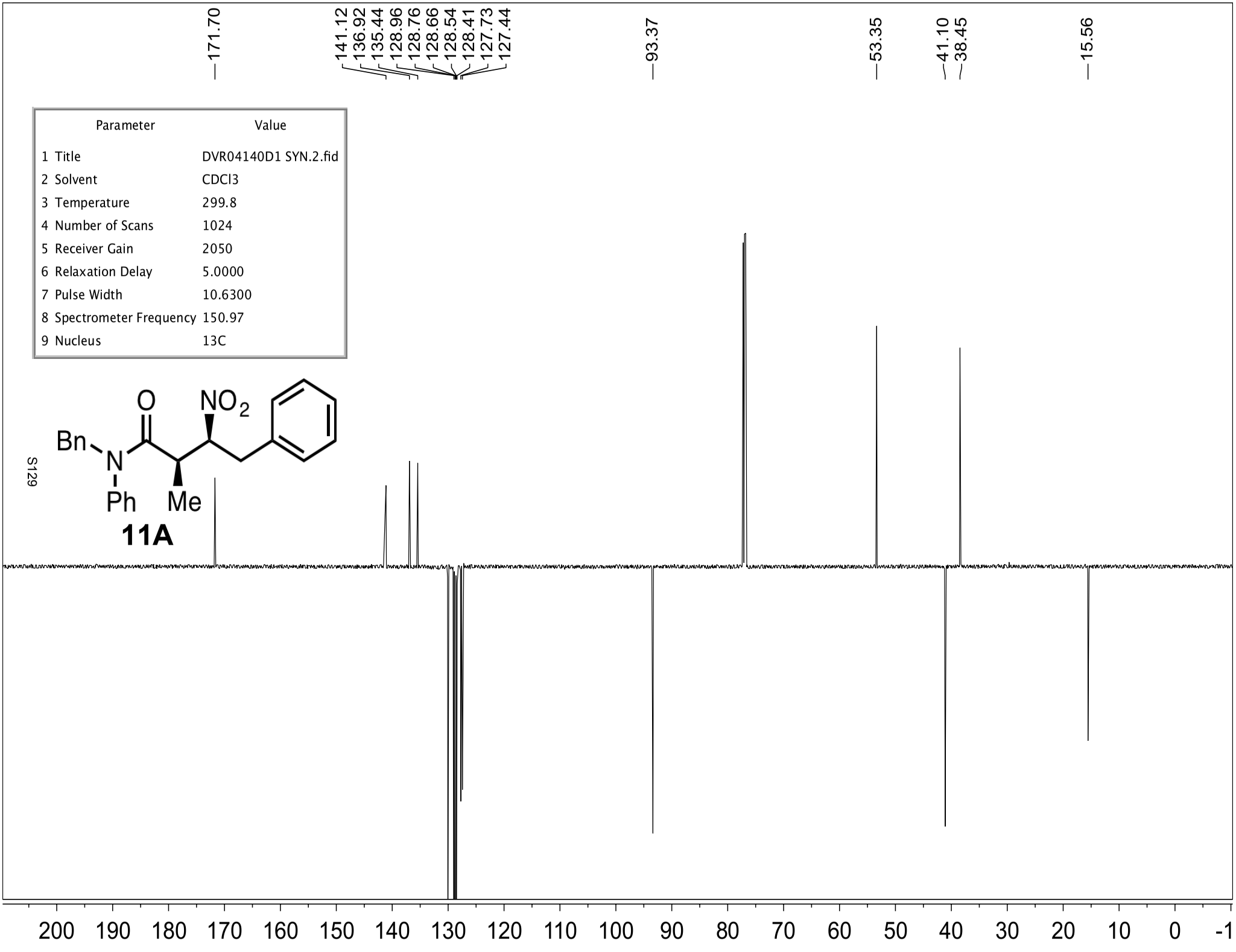
11A **Crude** **11B**

88:12

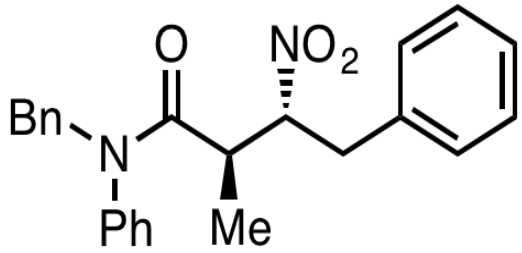




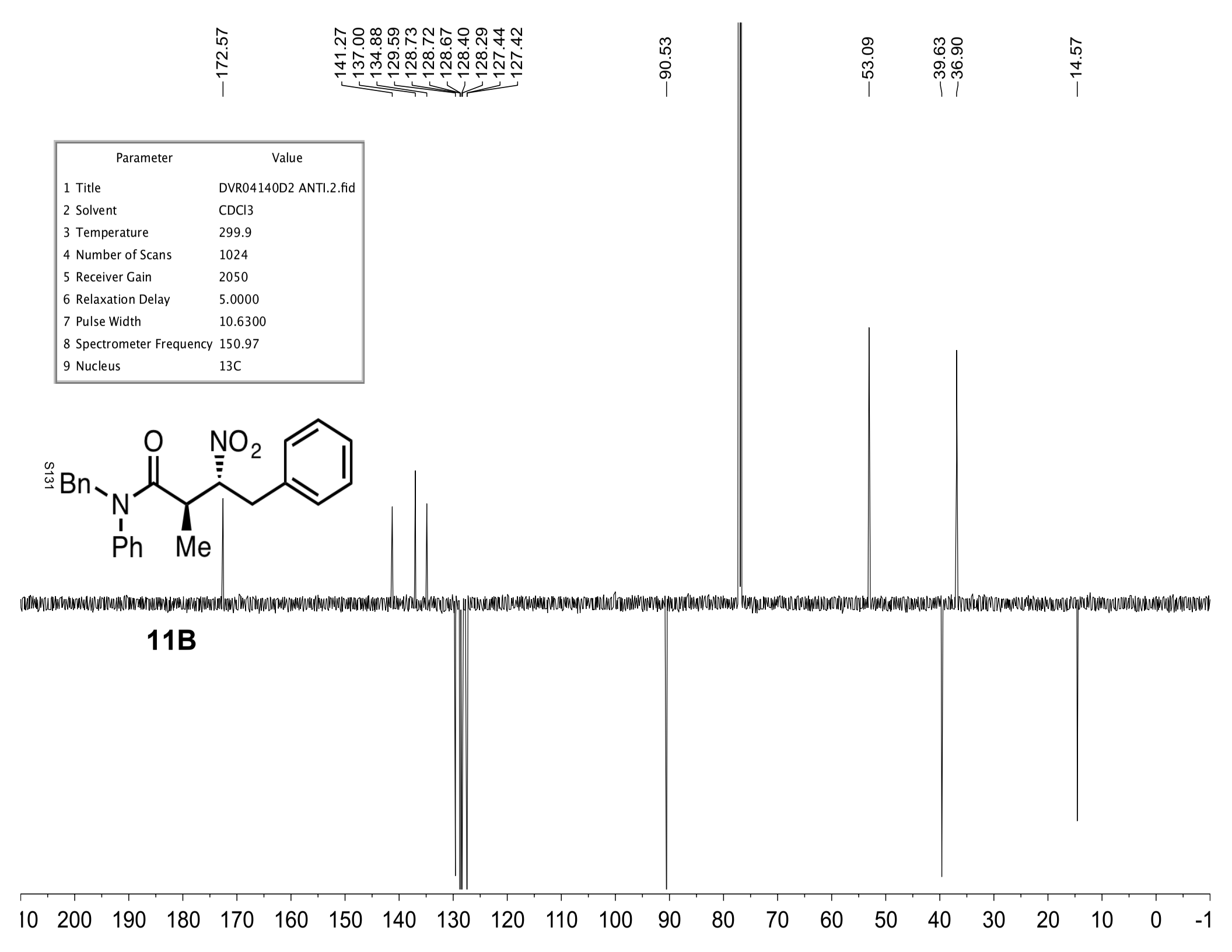

7.40 7.39 7.39 7.38 7.38 7.28 7.27 7.27 7.26 7.26 7.25 7.25 7.24 7.24 7.19 7.19 7.18 7.18 7.14 7.14 7.12 6.95 6.95 6.94 6.94 6.93 5.02 5.01 5.01 5.00 4.99 4.99 4.98 4.96 4.85 4.82 3.16 3.15 3.13 3.13 2.98 2.96 2.95 2.94 2.94 2.93 2.93 2.92 2.92 2.91 2.90 2.89 1.12 1.11
Parameter Value
1 Title DVR04140D1 SYN.1.fid
2 Solvent CDCl3
3 Temperature 297.2
4 Number of Scans 16
5 Receiver Gain 57
6 Relaxation Delay 1.0000
7 Pulse Width 10.7700
8 Spectrometer Frequency 600.32
9 Nucleus 1H
O
NO2
Bn
N
Ph
Me
11A
S128
2.95 6.07 1.95 1.98 1.93 2.00 1.00 0.99 1.99 2.98
0.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1


171.70
141.12
136.92
135.44
128.96
128.76
128.66
128.54
128.41
127.73
127.44
93.37
53.35
41.10
38.45
15.56
Parameter
Value
1 Title
DVR04140D1 SYN.2.fid
2 Solvent
CDCl3
3 Temperature
299.8
4 Number of Scans
1024
5 Receiver Gain
2050
6 Relaxation Delay
5.0000
7 Pulse Width
10.6300
8 Spectrometer Frequency
150.97
9 Nucleus
13C
O
NO2
Bn
N
Ph
Me
11A
S129
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-1

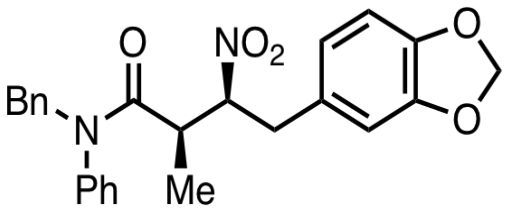
Parameter	Value
1 Title	DVR04140D2 ANTI.1.fid
2 Solvent	CDCl3
3 Temperature	297.2
4 Number of Scans	16
5 Receiver Gain	161
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H

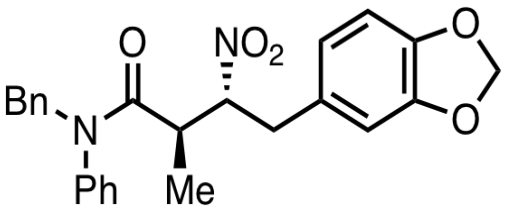


11B

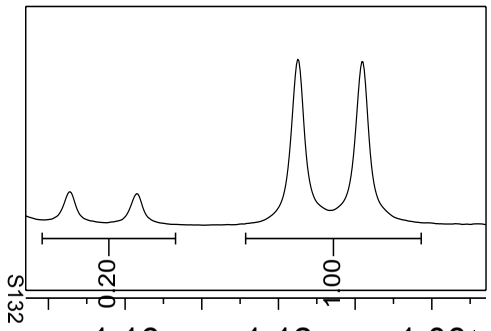

172.57
141.27
137.00
134.88
129.59
128.73
128.72
128.67
128.40
128.29
127.44
127.42
90.53
53.09
39.63
36.90
14.57
Parameter Value
1 Title DVR04140D2 ANTI.2.fid
2 Solvent CDCl3
3 Temperature 299.9
4 Number of Scans 1024
5 Receiver Gain 2050
6 Relaxation Delay 5.0000
7 Pulse Width 10.6300
8 Spectrometer Frequency 150.97
9 Nucleus 13C
O
NO2
Bn
N
Ph
Me
S131
11B
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10

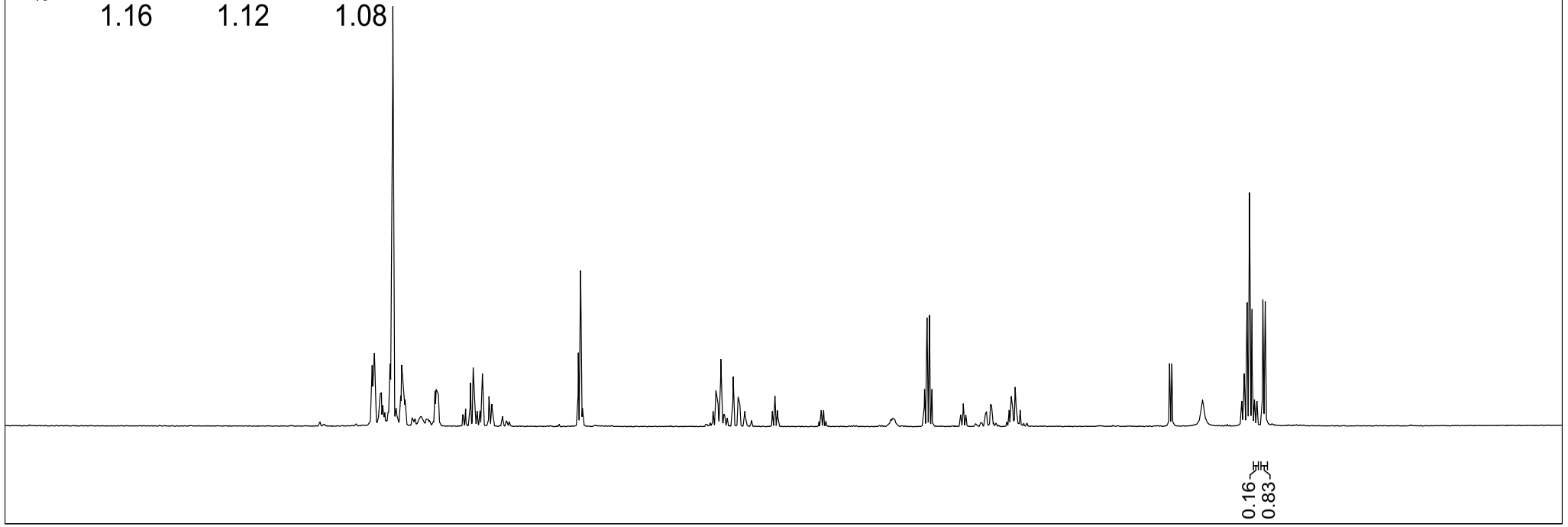
Parameter	Value
1 Title	DVR04148CRD.1.fid
2 Solvent	CDCl3
3 Temperature	298.2
4 Number of Scans	16
5 Receiver Gain	9
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H

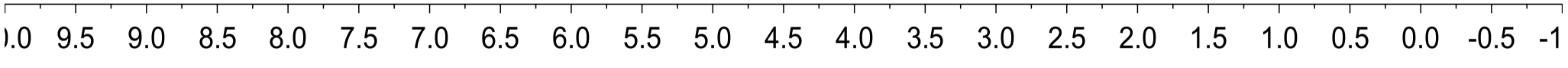


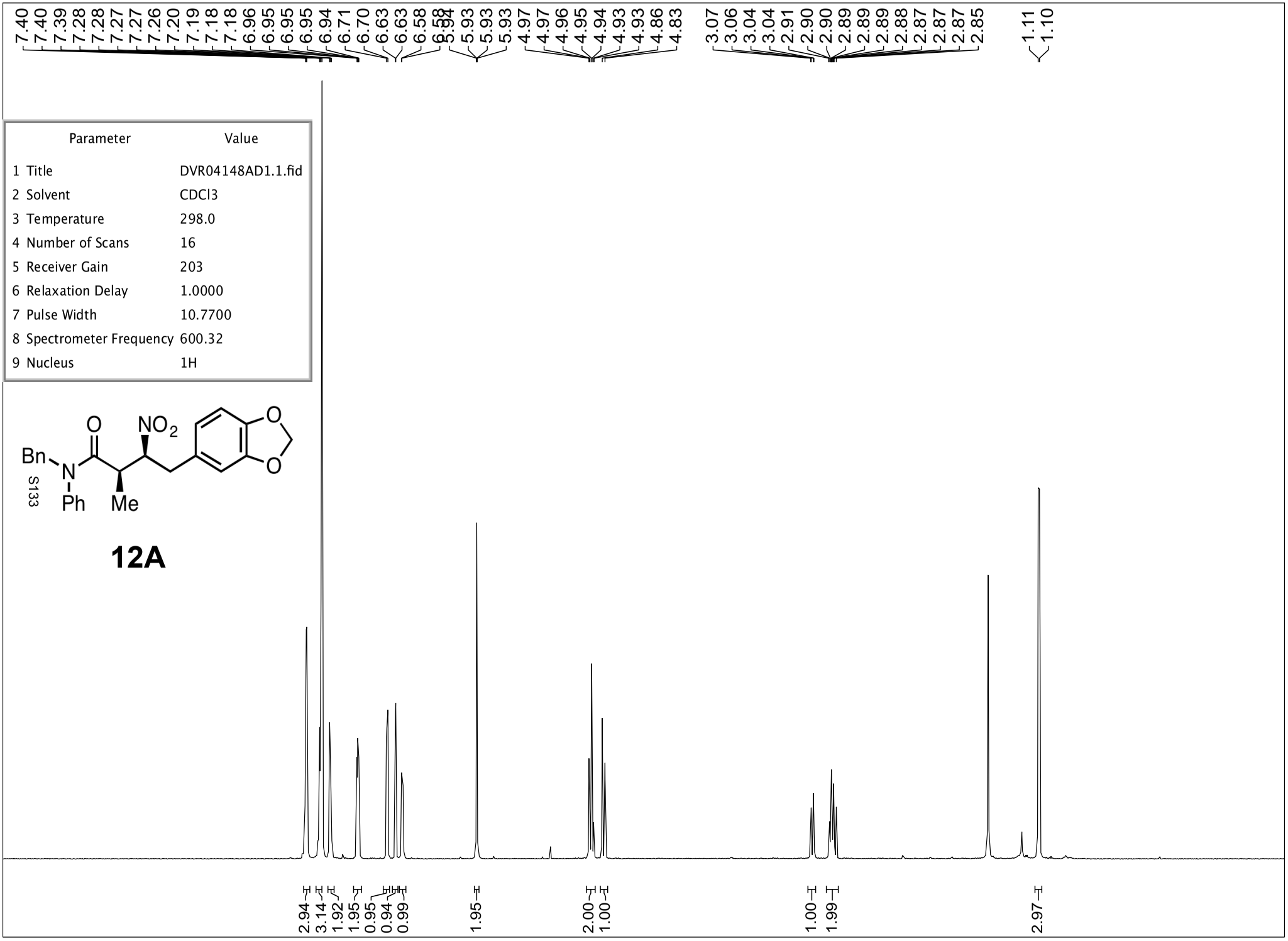


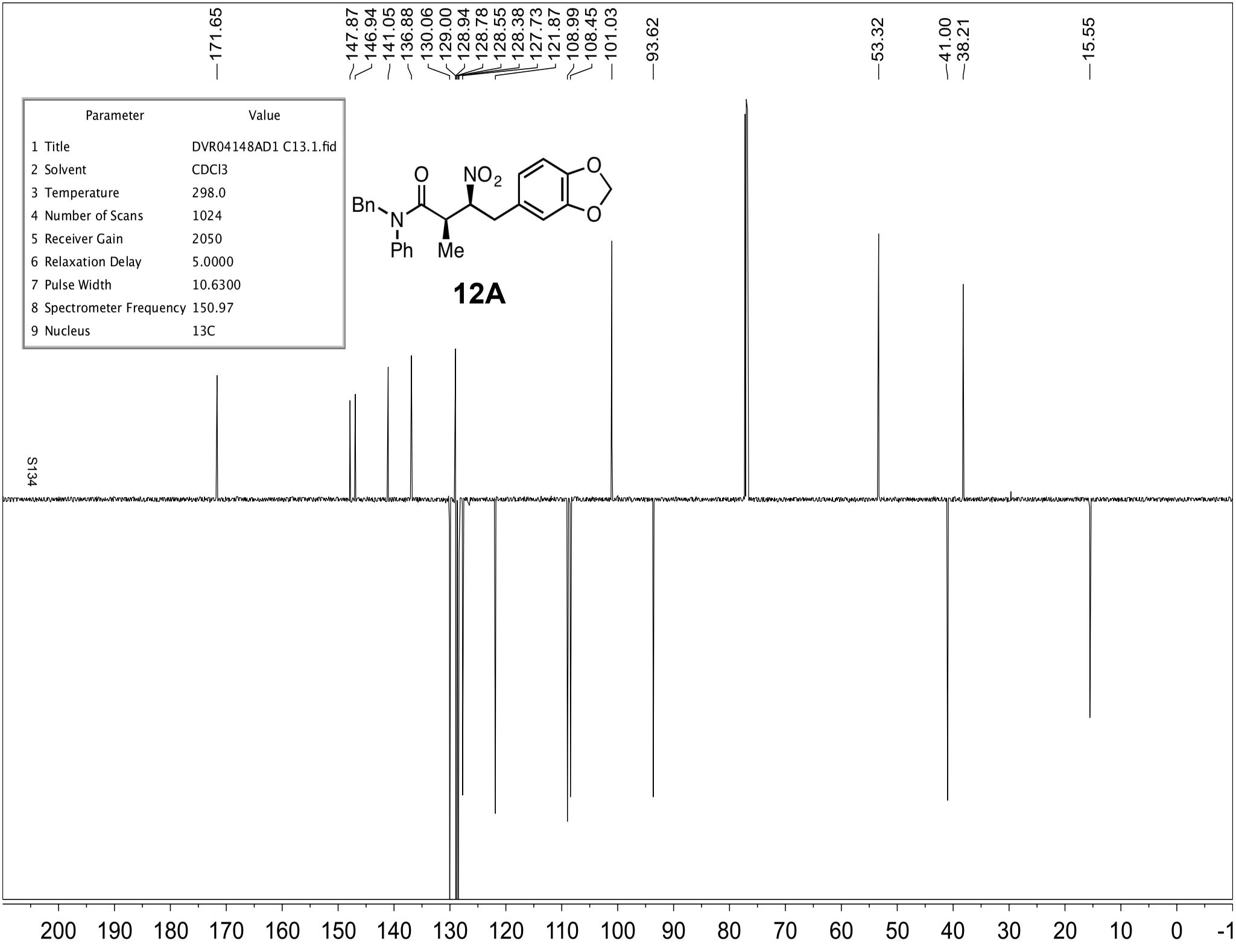
12A **Crude** **87:13** **12B**

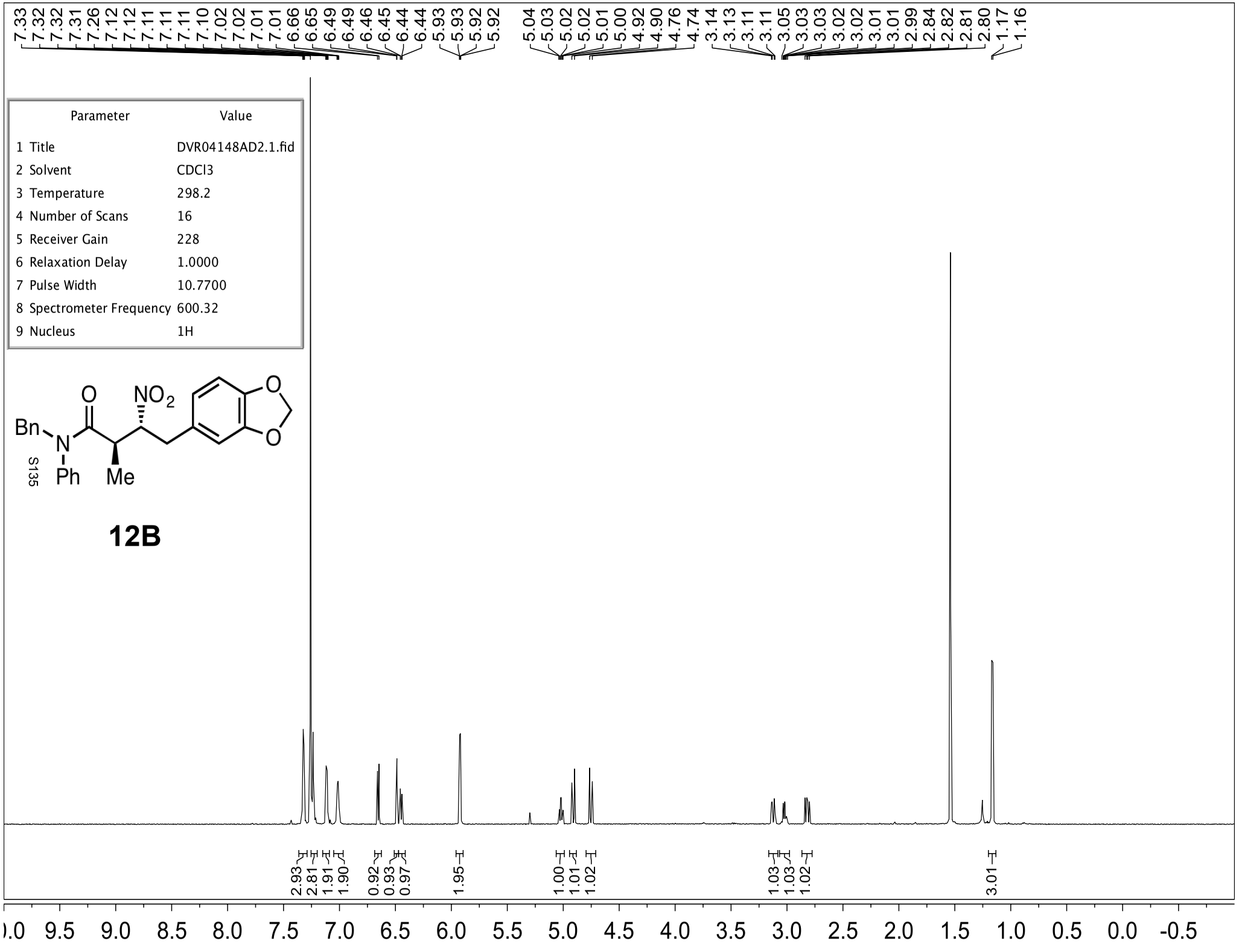


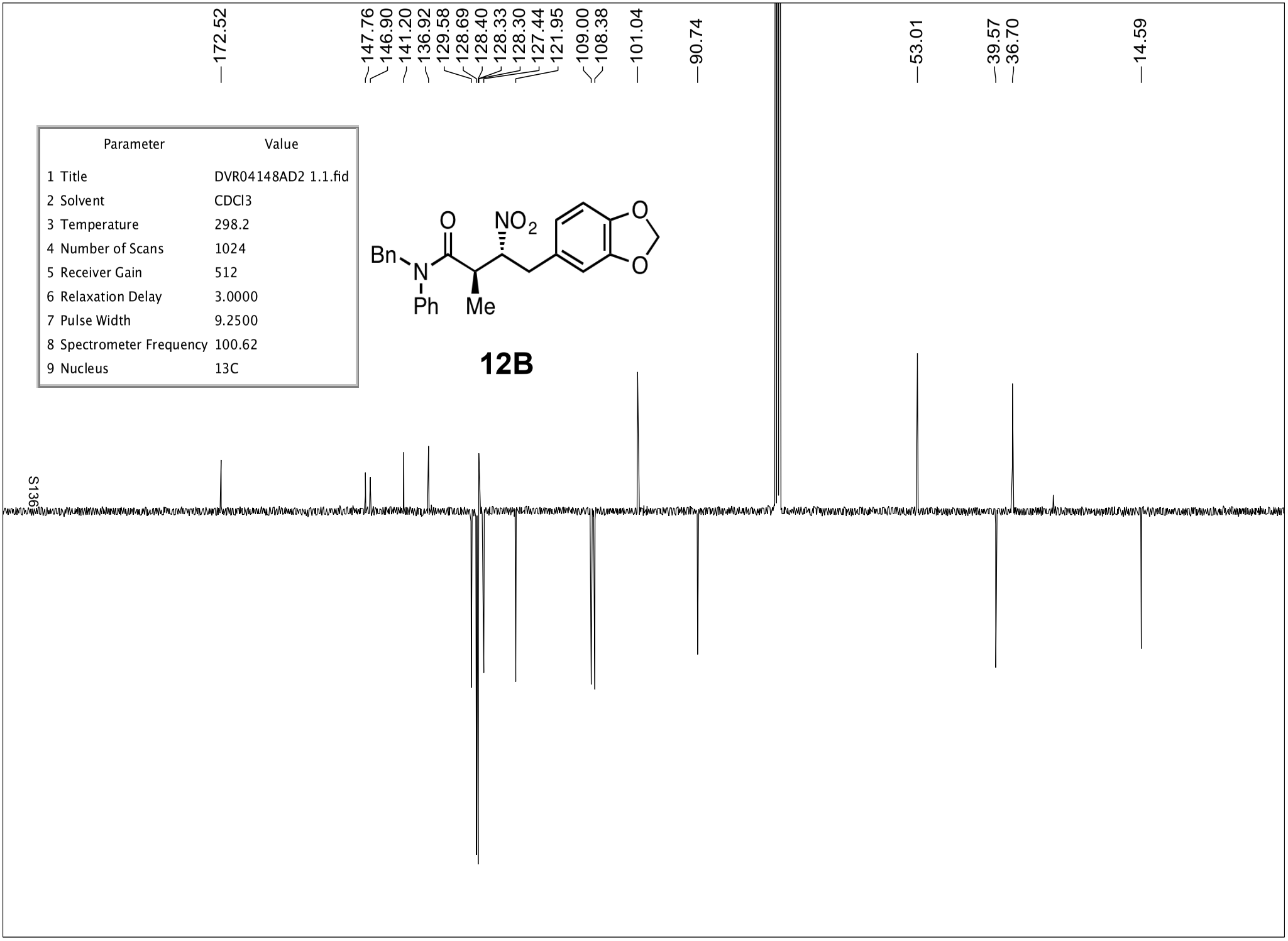




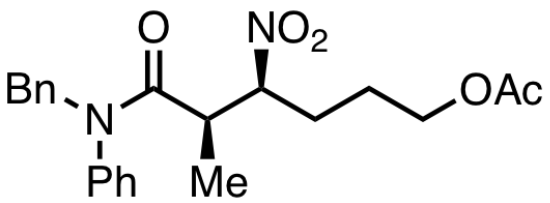

7.40 7.40 7.39 7.28 7.28 7.27 7.27 7.26 7.20 7.19 7.18 7.18 6.96 6.95 6.95 6.95 6.94 6.71 6.70 6.63 6.63 6.58 6.58 5.94 5.93 5.93 5.93 4.97 4.97 4.96 4.95 4.94 4.93 4.93 4.86 4.83 3.07 3.06 3.04 3.04 2.91 2.90 2.90 2.89 2.89 2.89 2.88 2.87 2.87 2.87 2.85 1.11 1.10
Parameter Value
1 Title DVR04148AD1.1.fid
2 Solvent CDCl3
3 Temperature 298.0
4 Number of Scans 16
5 Receiver Gain 203
6 Relaxation Delay 1.0000
7 Pulse Width 10.7700
8 Spectrometer Frequency 600.32
9 Nucleus 1H
Bn
N
Ph
Me
O
NO2
O
O
S133
12A
2.94 3.14 1.92 1.95 0.95 0.94 0.99 1.95 2.00 1.00 1.00 1.99 2.97
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1

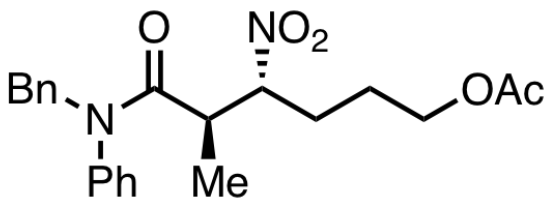

171.65
147.87
146.94
141.05
136.88
130.06
129.00
128.94
128.78
128.55
128.38
127.73
121.87
108.99
108.45
101.03
93.62
53.32
41.00
38.21
15.55
Parameter Value
1 Title DVR04148AD1 C13.1.fid
2 Solvent CDCl3
3 Temperature 298.0
4 Number of Scans 1024
5 Receiver Gain 2050
6 Relaxation Delay 5.0000
7 Pulse Width 10.6300
8 Spectrometer Frequency 150.97
9 Nucleus 13C
Bn
N
Ph
O
NO2
Me
O
O
12A
S134
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1


7.33 7.32 7.32 7.31 7.26 7.12 7.12 7.11 7.11 7.11 7.10 7.02 7.02 7.01 7.01 6.66 6.65 6.49 6.49 6.46 6.45 6.44 6.44 5.93 5.93 5.92 5.92
5.04 5.03 5.02 5.02 5.01 5.00 4.92 4.90 4.76 4.74 3.14 3.13 3.11 3.11 3.05 3.03 3.03 3.02 3.02 3.01 3.01 2.99 2.84 2.82 2.81 2.80 1.17 1.16
Parameter Value
1 Title DVR04148AD2.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 16
5 Receiver Gain 228
6 Relaxation Delay 1.0000
7 Pulse Width 10.7700
8 Spectrometer Frequency 600.32
9 Nucleus 1H
Bn
N
Ph
Me
O
NO2
O
O
S135
12B
2.93 2.81 1.91 1.90 0.92 0.93 0.97 1.95 1.00 1.01 1.02 1.03 1.03 1.02 3.01
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5

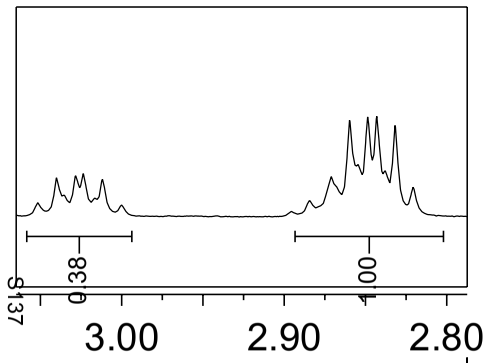

172.52
147.76
146.90
141.20
136.92
129.58
128.69
128.40
128.33
128.30
127.44
121.95
109.00
108.38
101.04
90.74
53.01
39.57
36.70
14.59
Parameter Value
1 Title DVR04148AD2 1.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
Bn
N
Ph
O
NO2
Me
O
O
12B
S136
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

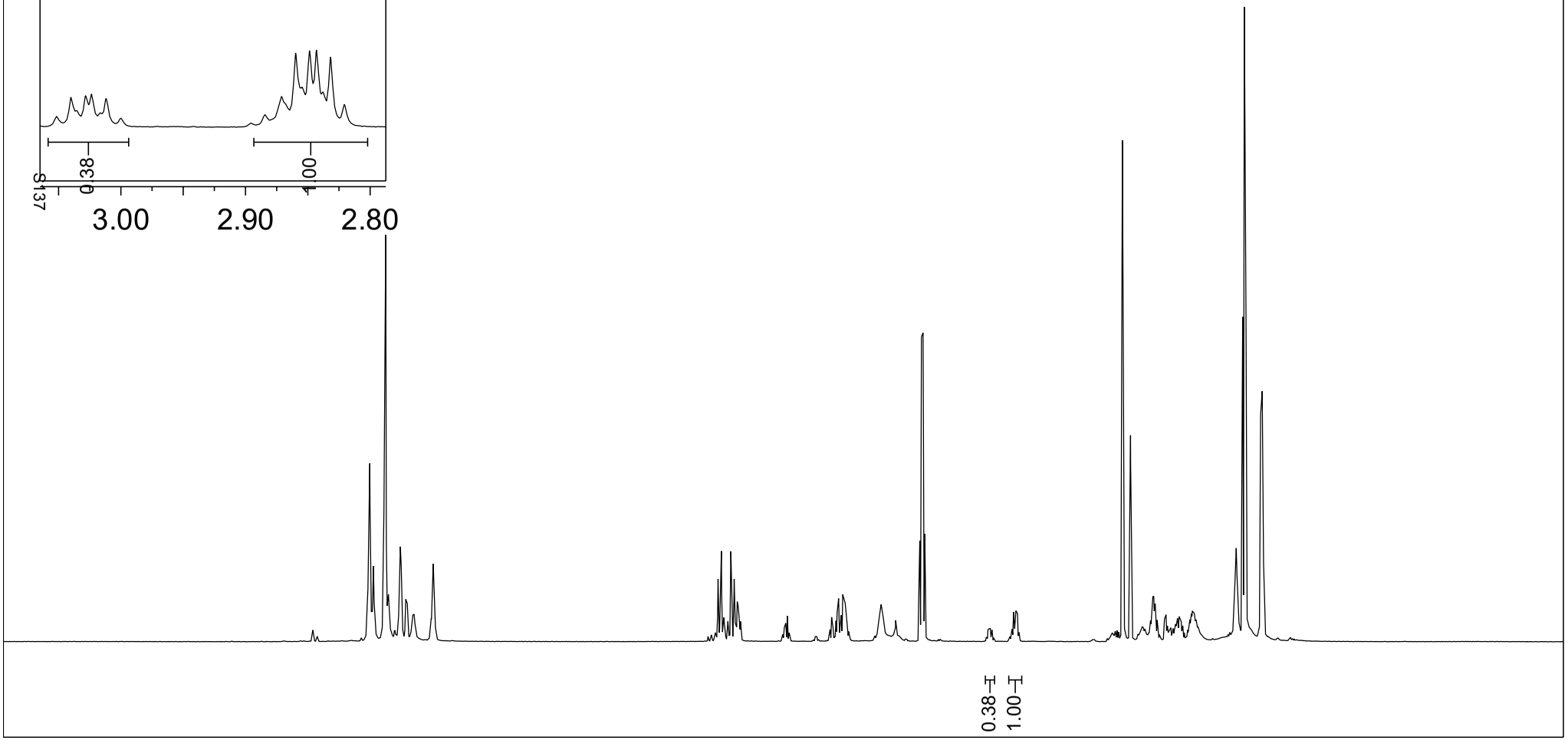
Parameter	Value
1 Title	DVR04167CRD.1.fid
2 Solvent	CDCl3
3 Temperature	298.0
4 Number of Scans	16
5 Receiver Gain	128
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H



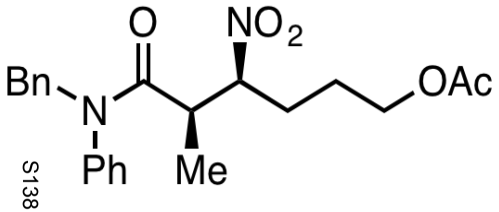


13A **Crude** **72:28** **13B**

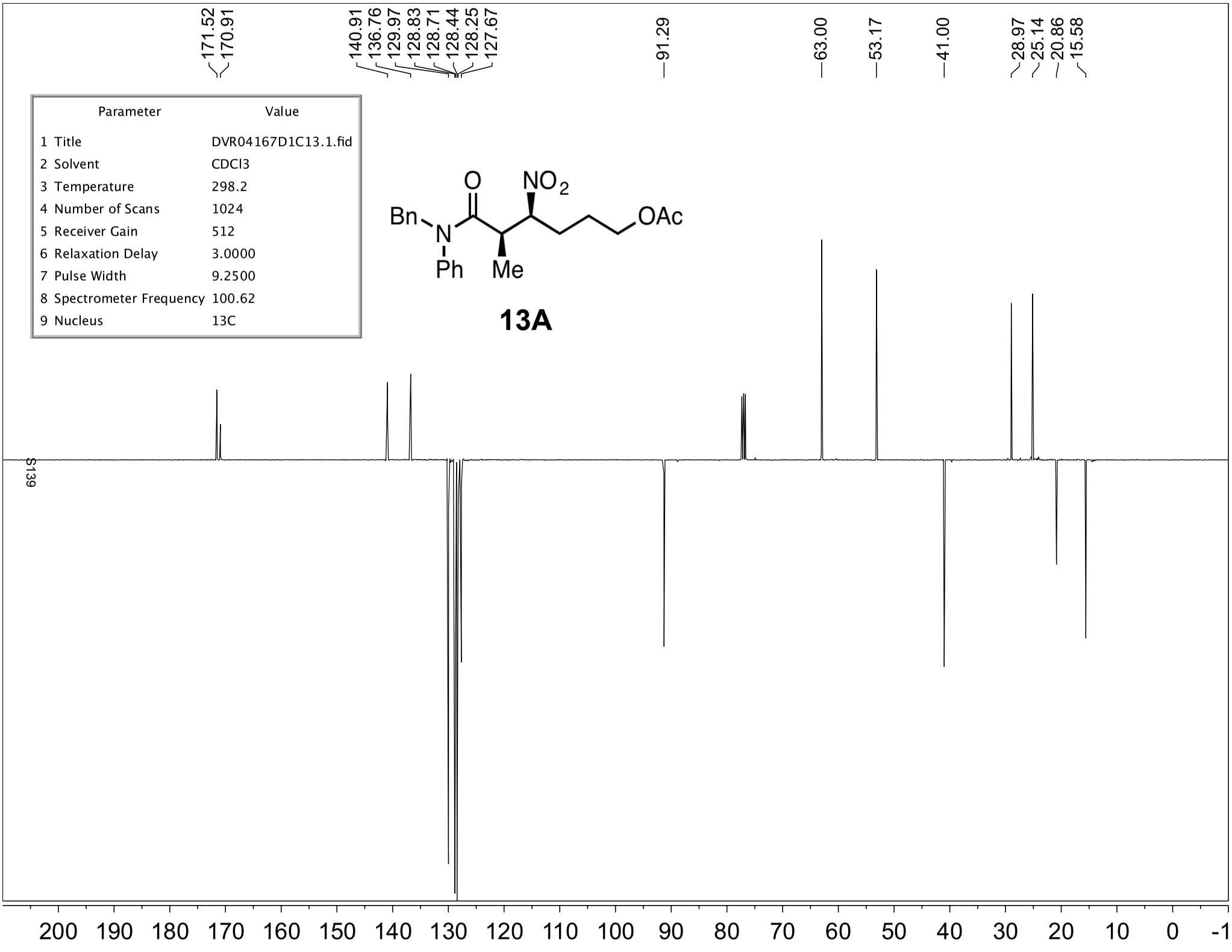


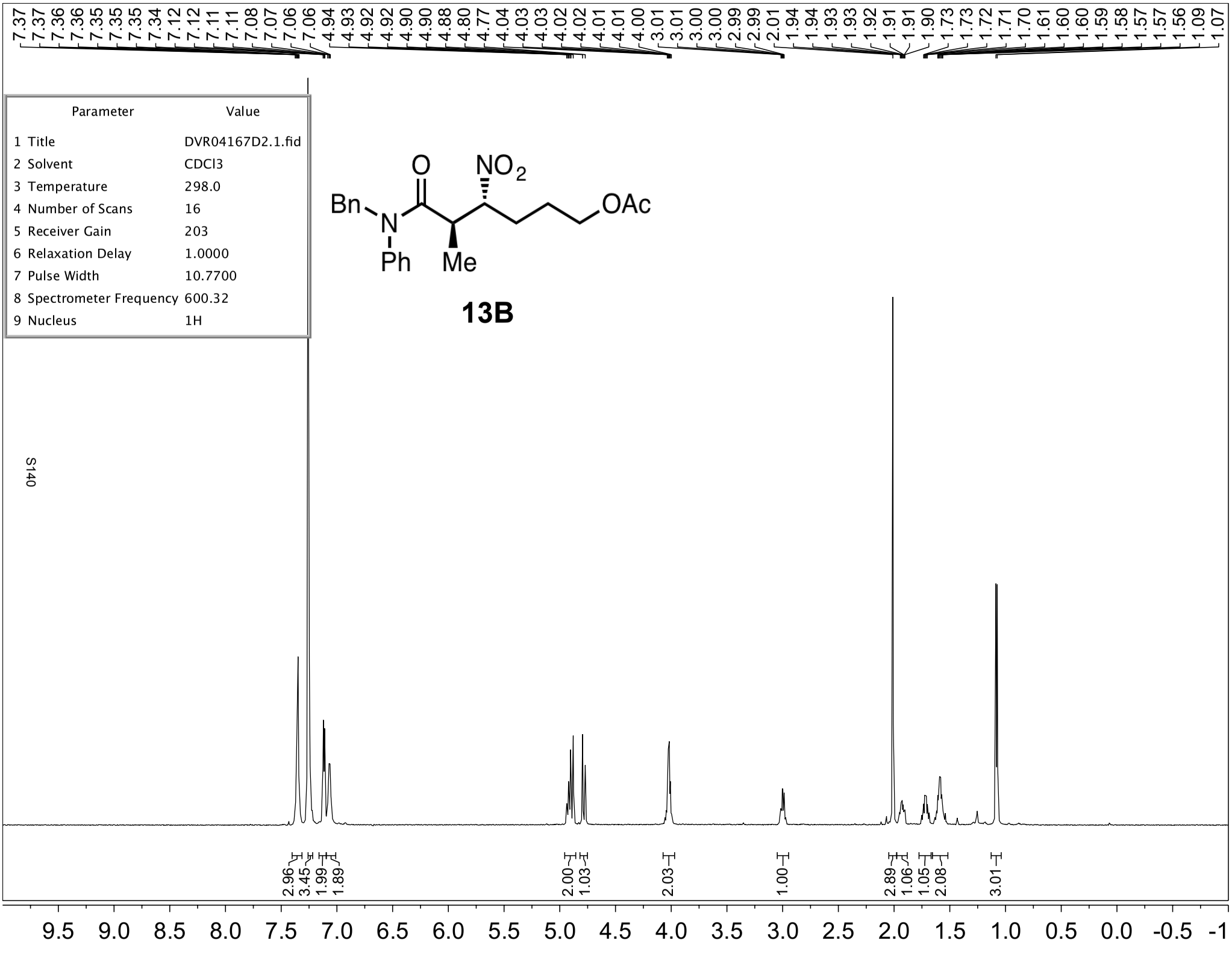


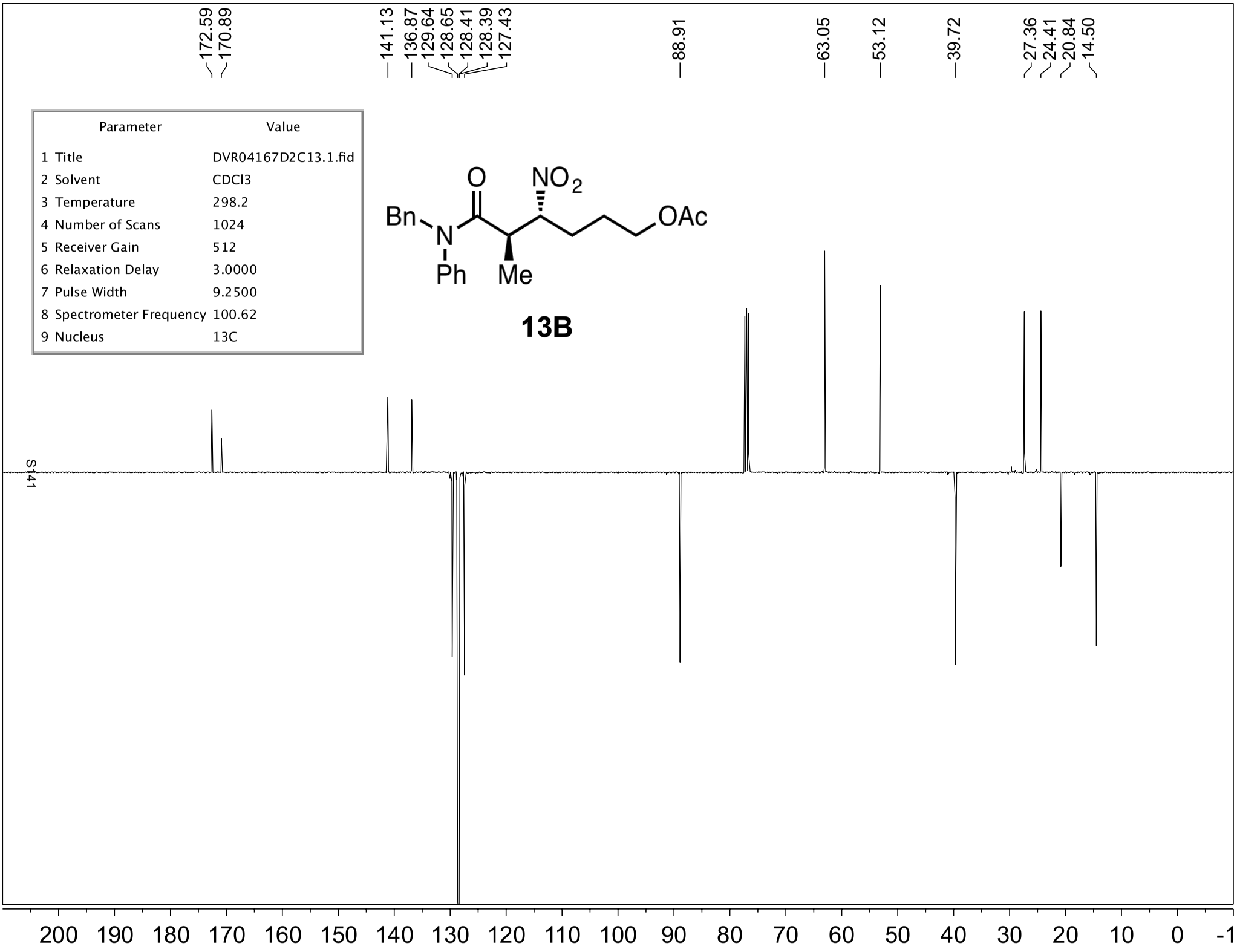
Parameter	Value
1 Title	DVR04167D1.1.fid
2 Solvent	CDCl3
3 Temperature	298.0
4 Number of Scans	16
5 Receiver Gain	128
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H



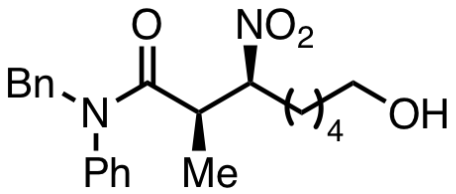
13A

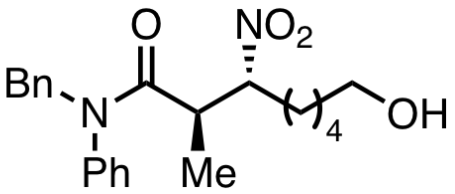

171.52
170.91
140.91
136.76
129.97
128.83
128.71
128.44
128.25
127.67
91.29
63.00
53.17
41.00
28.97
25.14
20.86
15.58
Parameter Value
1 Title DVR04167D1C13.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
O
NO2
Bn
N
OAc
Ph
Me
13A
S139
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1


7.37 7.37 7.36 7.36 7.35 7.35 7.35 7.34 7.12 7.12 7.11 7.11 7.08 7.07 7.06 7.06 4.94 4.93 4.92 4.92 4.90 4.90 4.88 4.80 4.77 4.04 4.03 4.03 4.02 4.02 4.01 4.01 4.00 3.01 3.01 3.00 3.00 2.99 2.99 2.01 1.94 1.94 1.93 1.93 1.92 1.91 1.91 1.90 1.73 1.73 1.72 1.71 1.70 1.61 1.60 1.60 1.59 1.58 1.57 1.57 1.56 1.09 1.07
Parameter Value
1 Title DVR04167D2.1.fid
2 Solvent CDCl3
3 Temperature 298.0
4 Number of Scans 16
5 Receiver Gain 203
6 Relaxation Delay 1.0000
7 Pulse Width 10.7700
8 Spectrometer Frequency 600.32
9 Nucleus 1H
O
NO2
Bn
N
OAc
Ph
Me
13B
S140
2.96 3.45 1.99 1.89 2.00 1.03 2.03 1.00 2.89 1.06 1.05 2.08 3.01
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1


172.59
170.89
141.13
136.87
129.64
128.65
128.41
128.39
127.43
88.91
63.05
53.12
39.72
27.36
24.41
20.84
14.50
Parameter Value
1 Title DVR04167D2C13.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
O
NO2
Bn
N
OAc
Ph
Me
13B
S141
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

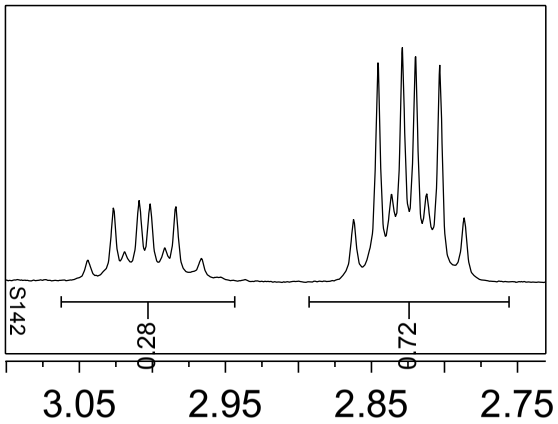
Parameter	Value
1 Title	DVR04186BCRD.1.fid
2 Solvent	CDCl3
3 Temperature	298.2
4 Number of Scans	64
5 Receiver Gain	8
6 Relaxation Delay	6.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H

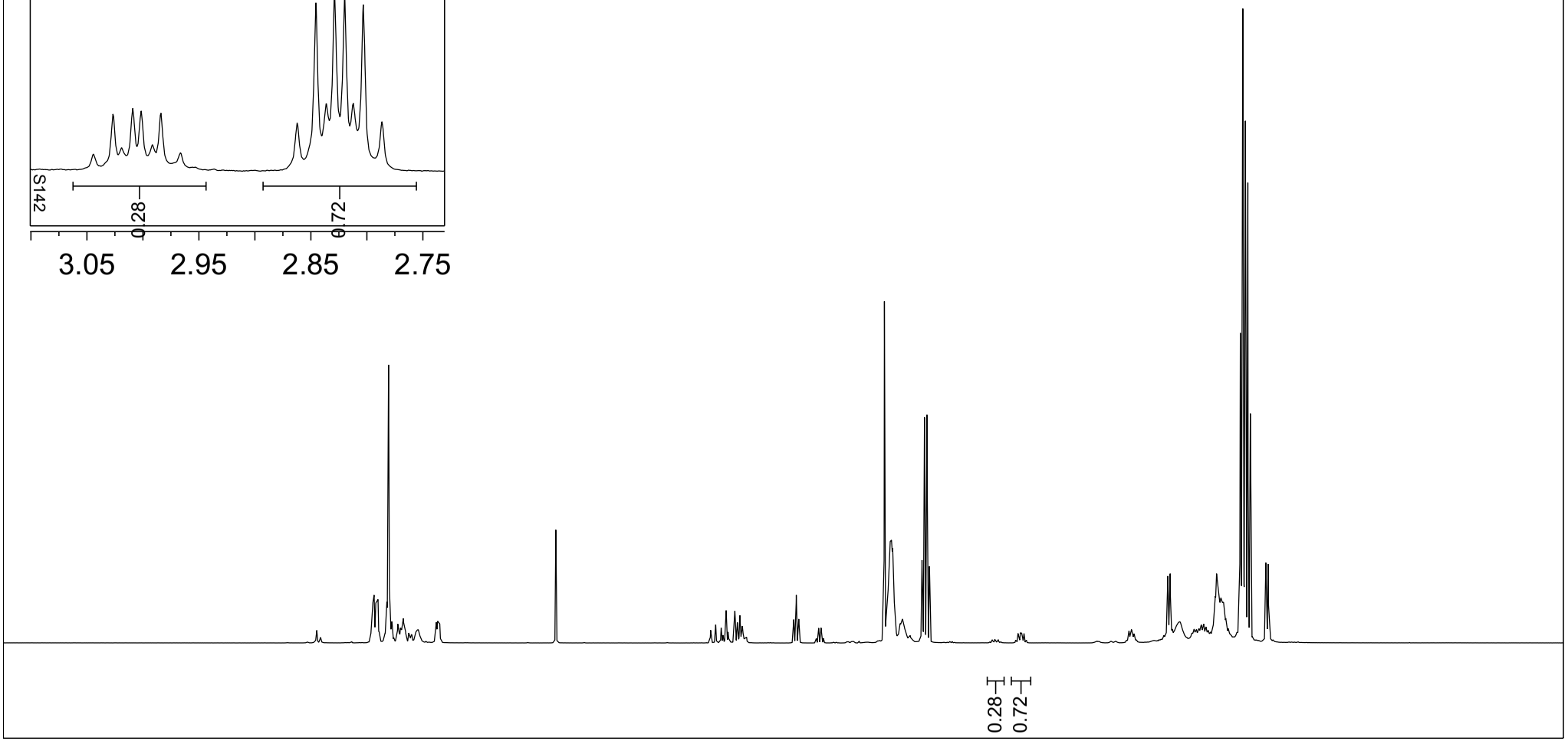




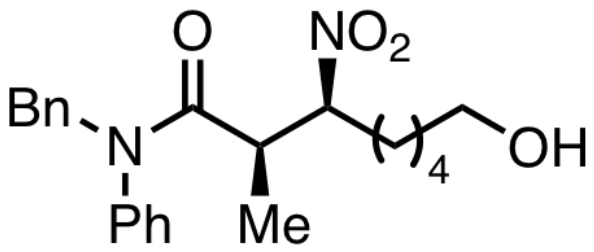
Crude

14A **72:28** **14B**

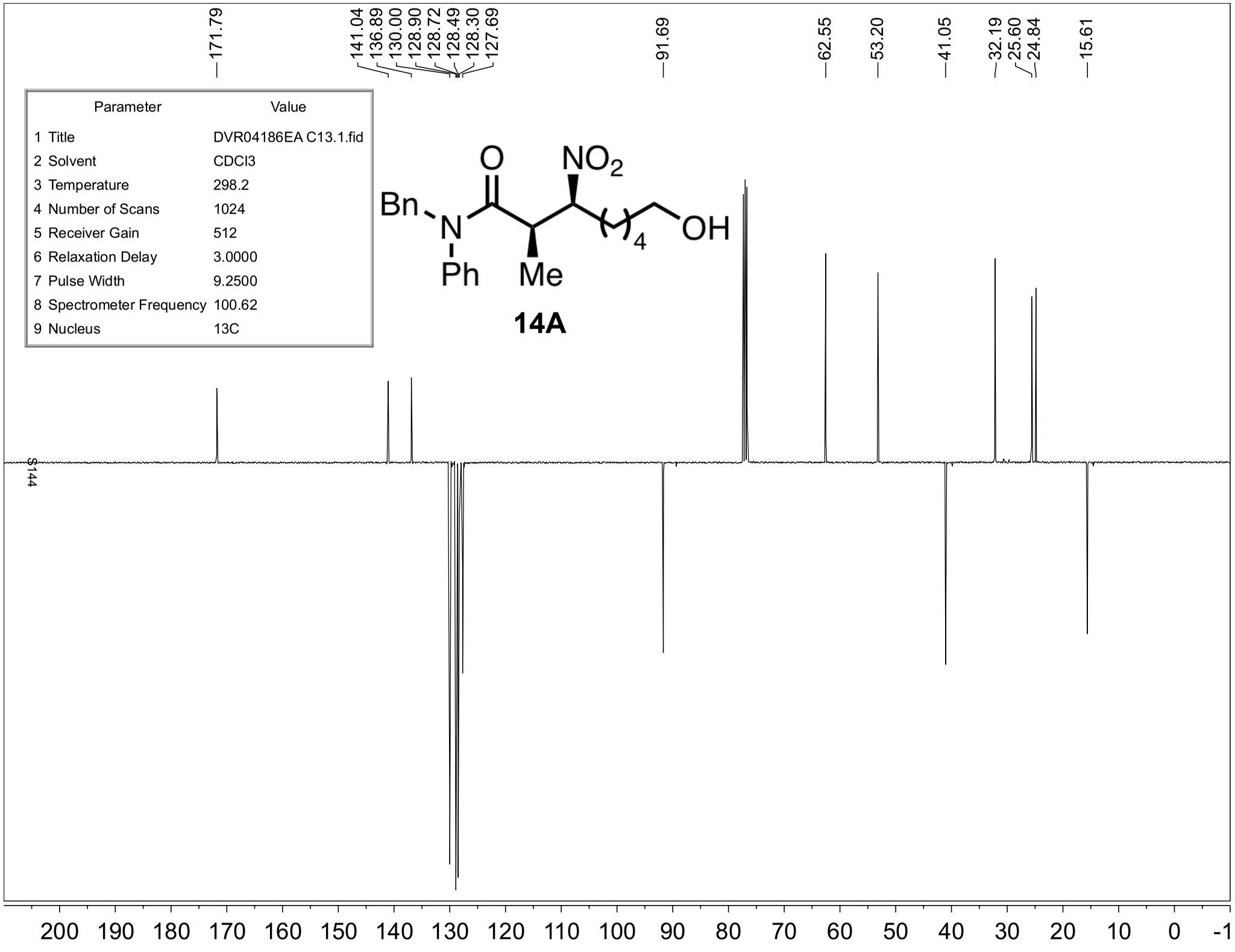




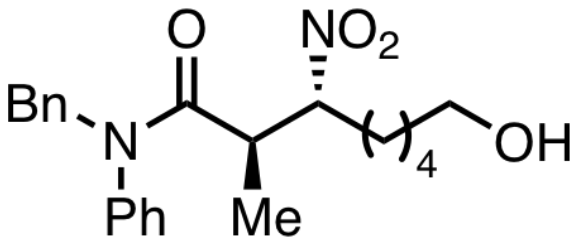
Parameter	Value
1 Title	DVR04186E1-A.1.fid
2 Solvent	CDCl3
3 Temperature	297.1
4 Number of Scans	16
5 Receiver Gain	161
6 Relaxation Delay	1.0000
7 Pulse Width	10.7300
8 Spectrometer Frequency	600.32
9 Nucleus	1H



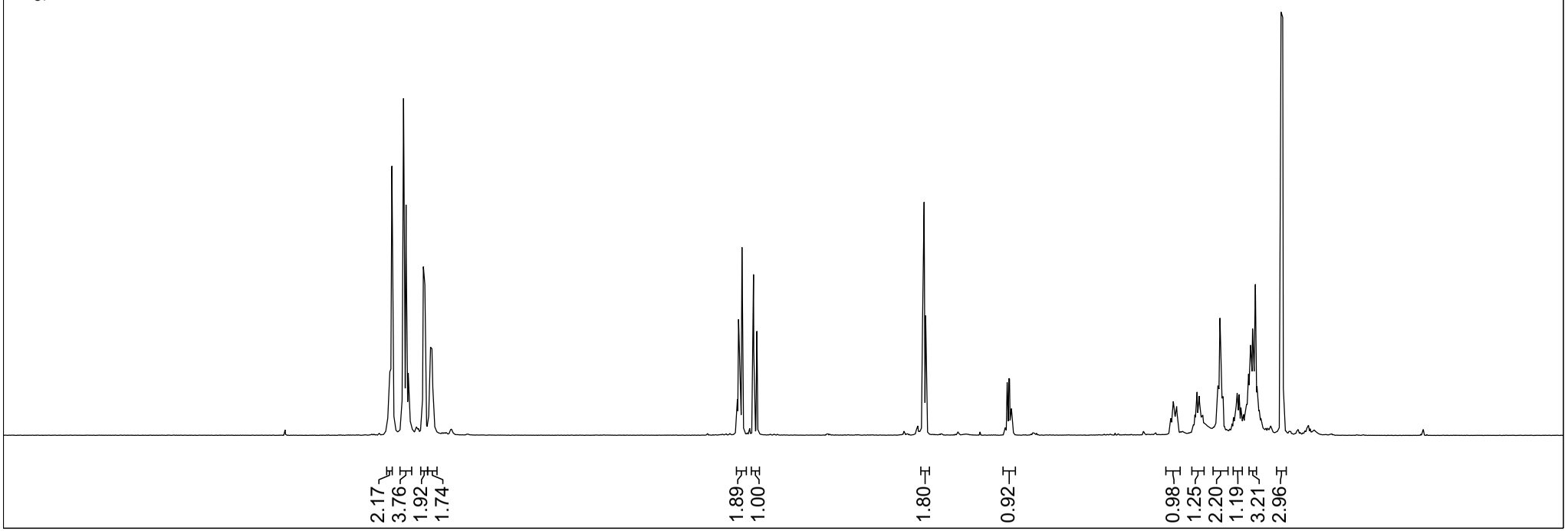
14A

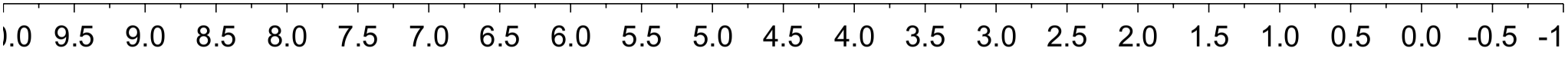

171.79
141.04
136.89
130.00
128.90
128.72
128.49
128.30
127.69
91.69
62.55
53.20
41.05
32.19
25.60
24.84
15.61
Parameter Value
1 Title DVR04186EA C13.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
O
NO2
Bn
N
Ph
Me
4
OH
14A
S1414
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

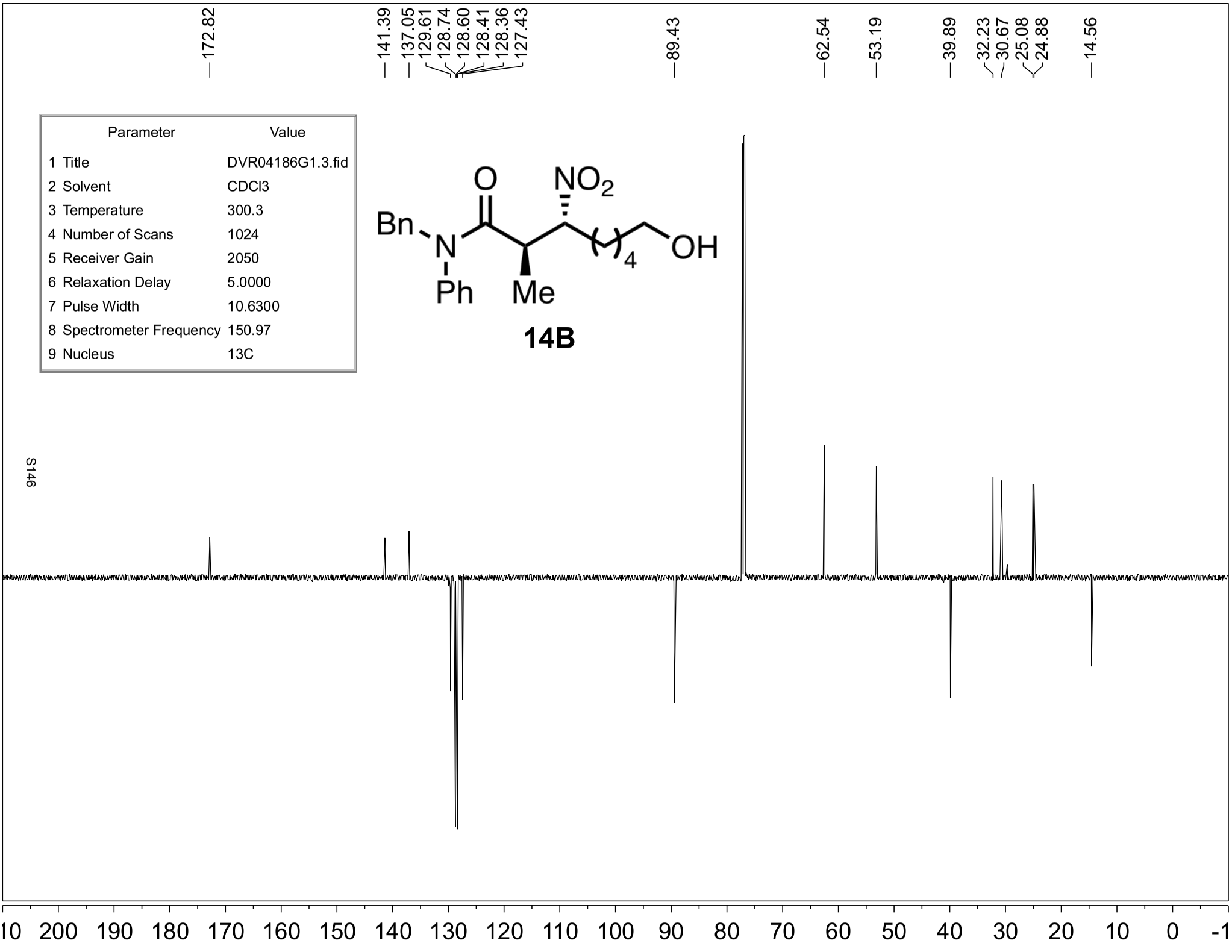
Parameter	Value
1 Title	DVR04186G1.2.fid
2 Solvent	CDCl3
3 Temperature	298.5
4 Number of Scans	16
5 Receiver Gain	114
6 Relaxation Delay	1.0000
7 Pulse Width	10.7300
8 Spectrometer Frequency	600.32
9 Nucleus	1H



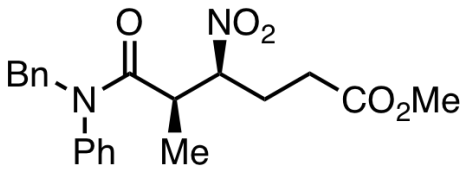
14B

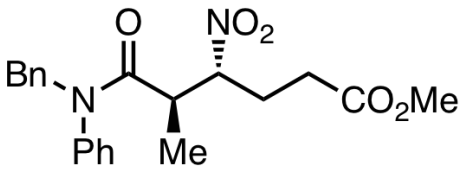





172.82
141.39
137.05
129.61
128.74
128.60
128.41
128.36
127.43
89.43
62.54
53.19
39.89
32.23
30.67
25.08
24.88
14.56
Parameter Value
1 Title DVR04186G1.3.fid
2 Solvent CDCl3
3 Temperature 300.3
4 Number of Scans 1024
5 Receiver Gain 2050
6 Relaxation Delay 5.0000
7 Pulse Width 10.6300
8 Spectrometer Frequency 150.97
9 Nucleus 13C
Bn
N
Ph
O
NO2
Me
4
OH
14B
S146
10 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

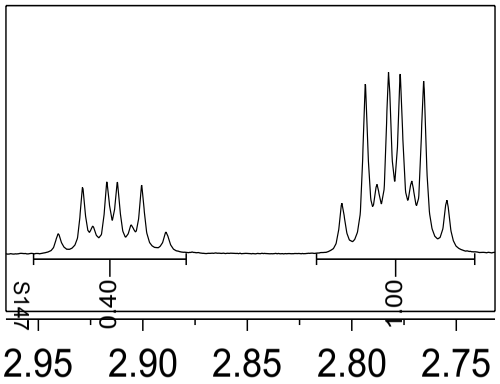
Parameter	Value
1 Title	DVR04156CRD.1.fid
2 Solvent	CDCl3
3 Temperature	297.6
4 Number of Scans	16
5 Receiver Gain	114
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H

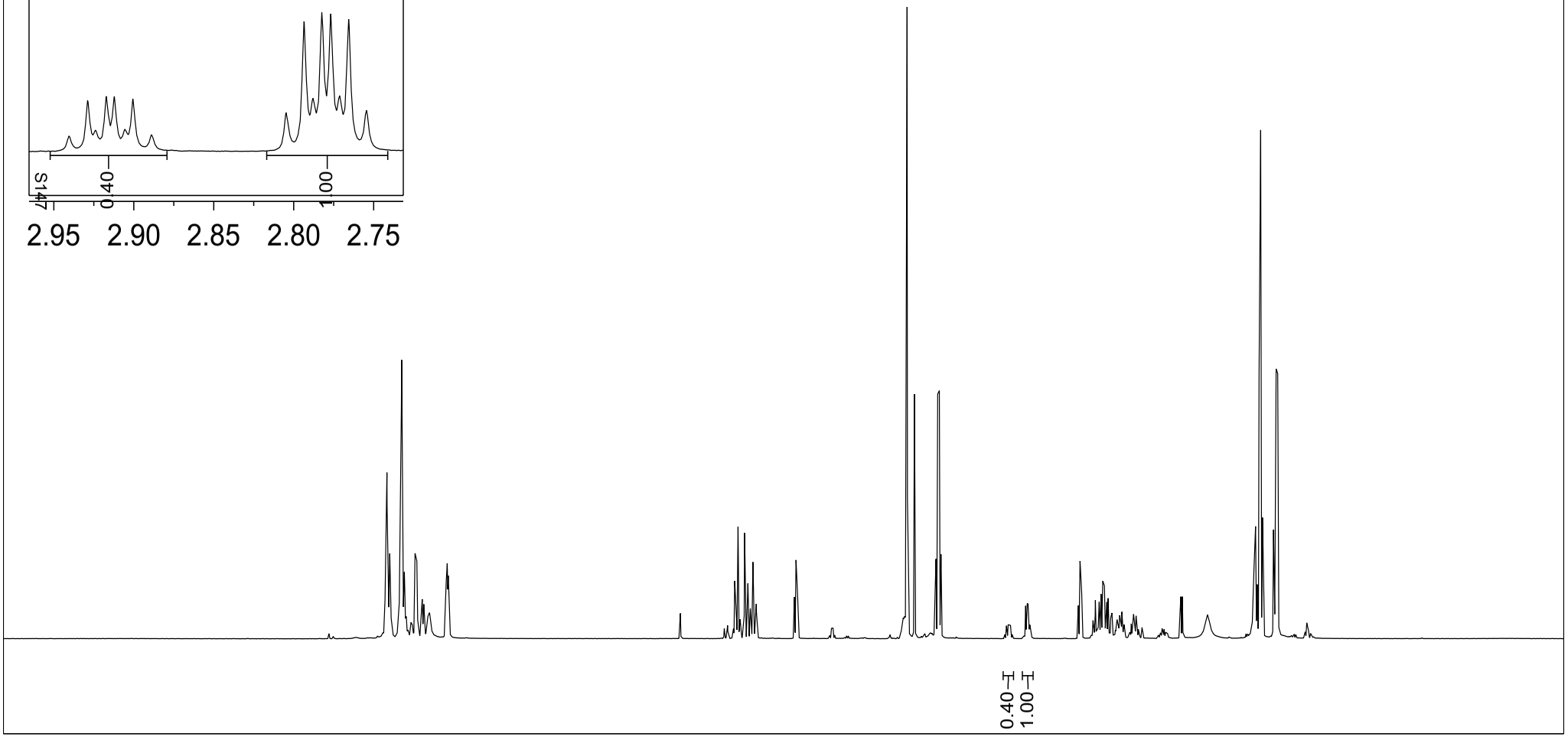


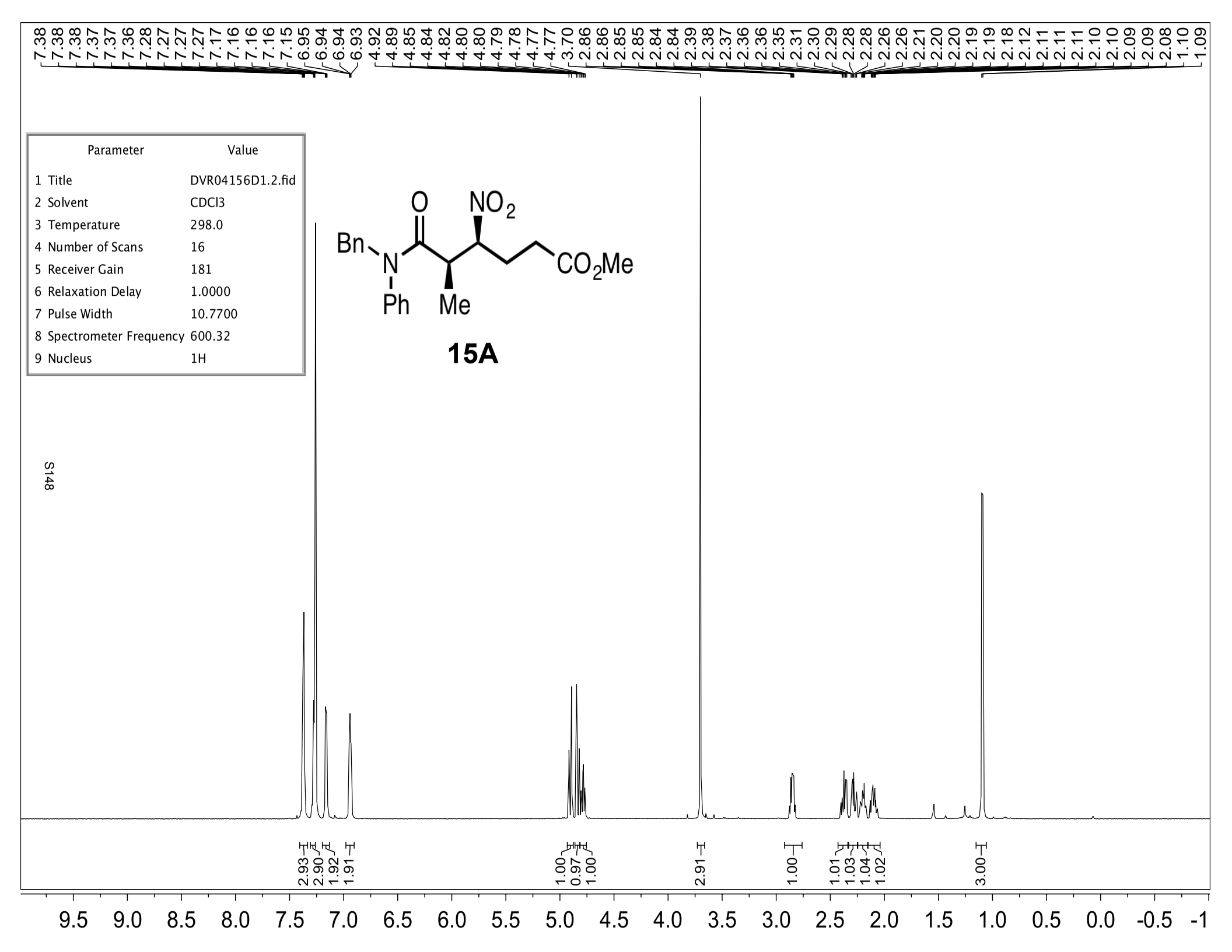


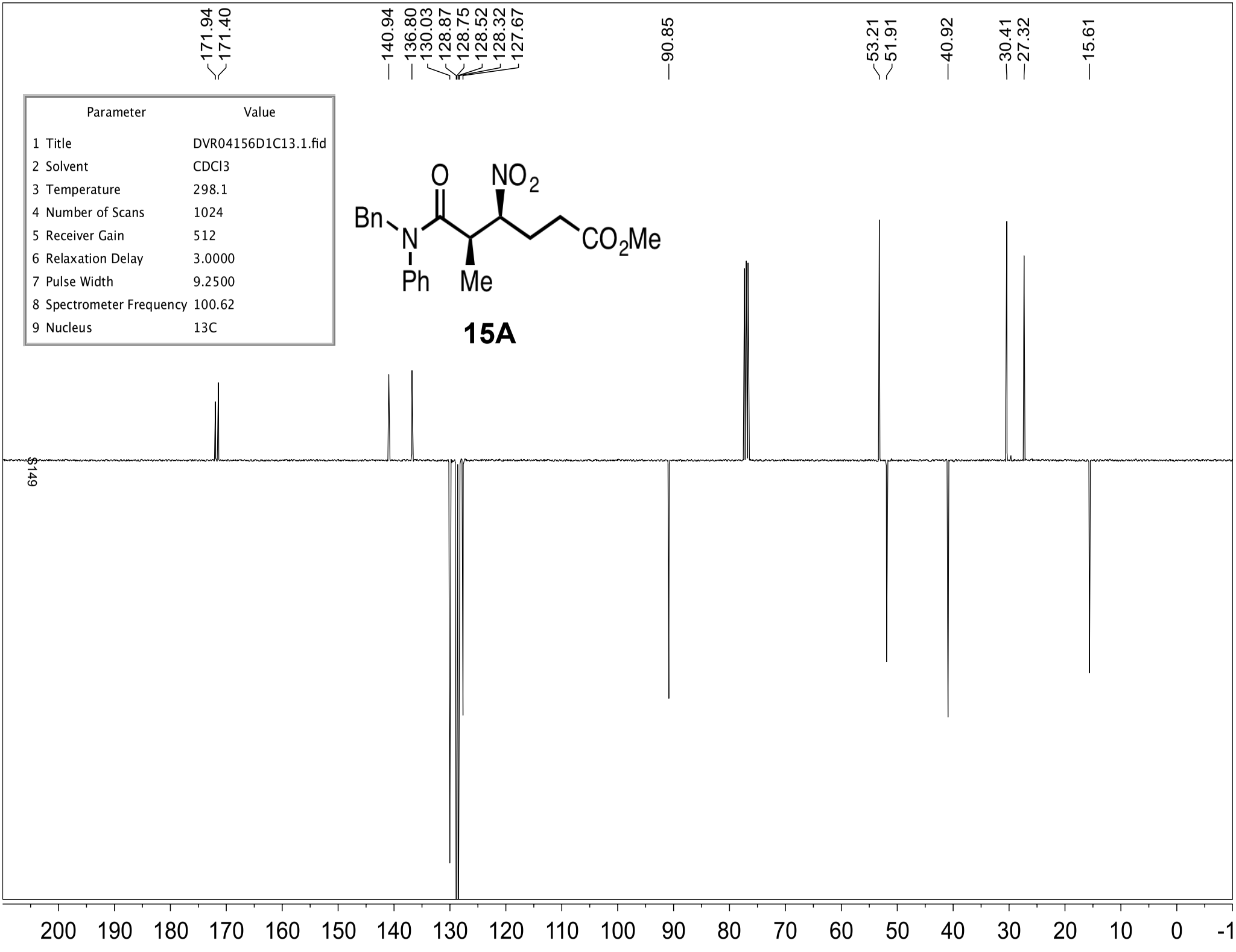
Crude

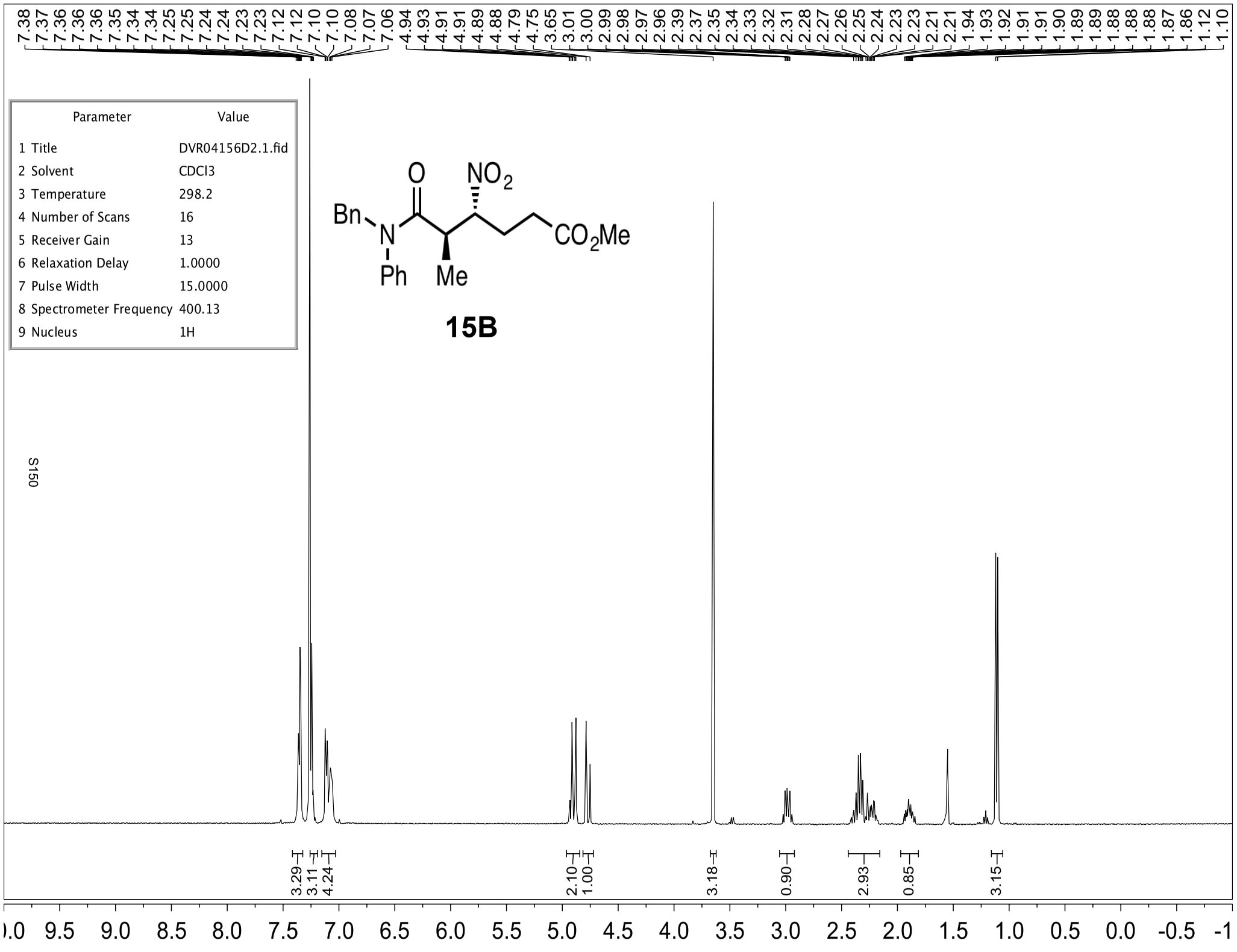
15A **71:29** **15B**

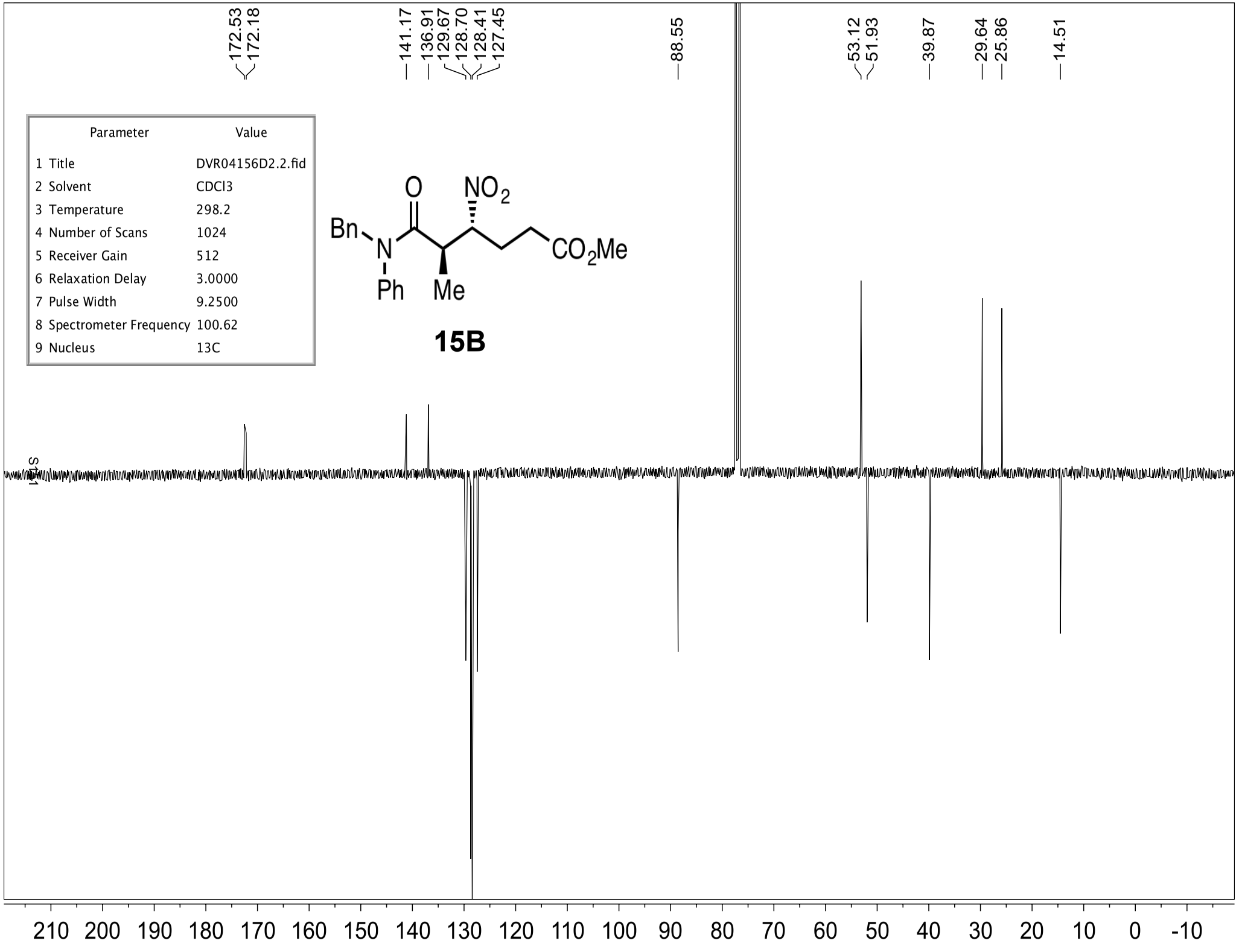




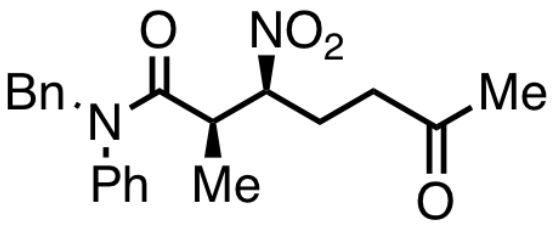

7.38 7.38 7.38 7.37 7.37 7.36 7.28 7.27 7.27 7.27 7.17 7.16 7.16 7.16 7.15 6.95 6.94 6.94 6.93
4.92 4.89 4.85 4.84 4.82 4.80 4.80 4.79 4.78 4.77 4.77 3.70 2.86 2.86 2.85 2.85 2.84 2.84 2.39 2.38 2.37 2.36 2.36 2.35 2.31 2.30 2.29 2.28 2.28 2.26 2.26 2.21 2.20 2.20 2.19 2.19 2.18 2.12 2.11 2.11 2.11 2.10 2.10 2.09 2.09 2.08 1.10 1.09
Parameter Value
1 Title DVR04156D1.2.fid
2 Solvent CDCl3
3 Temperature 298.0
4 Number of Scans 16
5 Receiver Gain 181
6 Relaxation Delay 1.0000
7 Pulse Width 10.7700
8 Spectrometer Frequency 600.32
9 Nucleus 1H
Bn
N
Ph
O
NO2
Me
CO2Me
15A
S148
2.93 2.90 1.92 1.91 1.00 0.97 1.00 2.91 1.00 1.01 1.03 1.04 1.02 3.00
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1

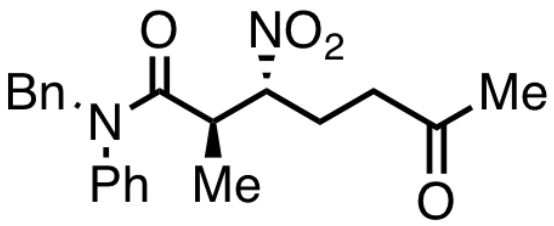

171.94
171.40
140.94
136.80
130.03
128.87
128.75
128.52
128.32
127.67
90.85
53.21
51.91
40.92
30.41
27.32
15.61
Parameter Value
1 Title DVR04156D1C13.1.fid
2 Solvent CDCl3
3 Temperature 298.1
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
O
NO2
Bn
N
Ph
Me
CO2Me
15A
S149
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1


7.38 7.37 7.36 7.36 7.36 7.35 7.34 7.34 7.25 7.25 7.24 7.24 7.23 7.23 7.12 7.12 7.10 7.10 7.08 7.07 7.06
4.94 4.93 4.91 4.91 4.89 4.88 4.79 4.75 3.65 3.01 3.00 2.99 2.98 2.97 2.96 2.39 2.37 2.35 2.34 2.33 2.32 2.31 2.28 2.27 2.26 2.25 2.24 2.23 2.23 2.21 2.21 1.94 1.93 1.92 1.91 1.91 1.90 1.89 1.89 1.88 1.88 1.88 1.87 1.86 1.12 1.10
Parameter Value
1 Title DVR04156D2.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 16
5 Receiver Gain 13
6 Relaxation Delay 1.0000
7 Pulse Width 15.0000
8 Spectrometer Frequency 400.13
9 Nucleus 1H
O
NO2
Bn
N
Ph
Me
CO2Me
15B
S150
3.29 3.11 4.24 2.10 1.00 3.18 0.90 2.93 0.85 3.15
0.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1


172.53
172.18
141.17
136.91
129.67
128.70
128.41
127.45
88.55
53.12
51.93
39.87
29.64
25.86
14.51
Parameter Value
1 Title DVR04156D2.2.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
O
NO2
Bn
N
Ph
Me
CO2Me
15B
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10

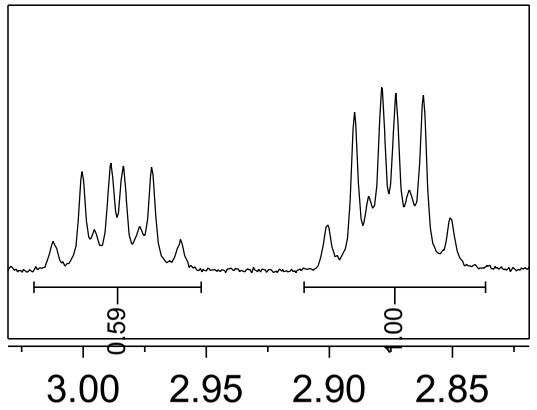
Parameter	Value
1 Title	RS-01-247-crude.1.fid
2 Solvent	CDCl3
3 Temperature	297.1
4 Number of Scans	16
5 Receiver Gain	181
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H





Crude

16A **67:33** **16B**



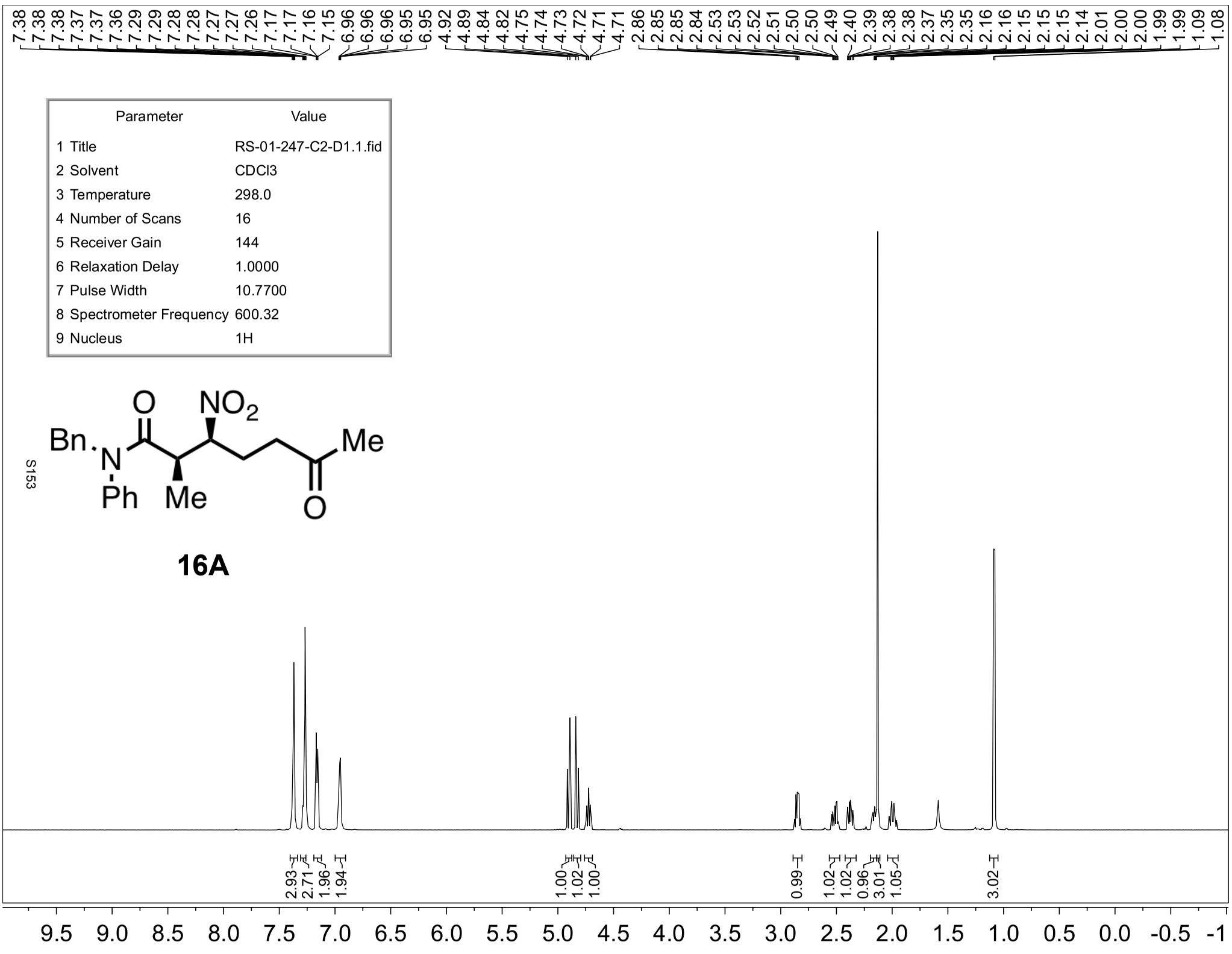
S152

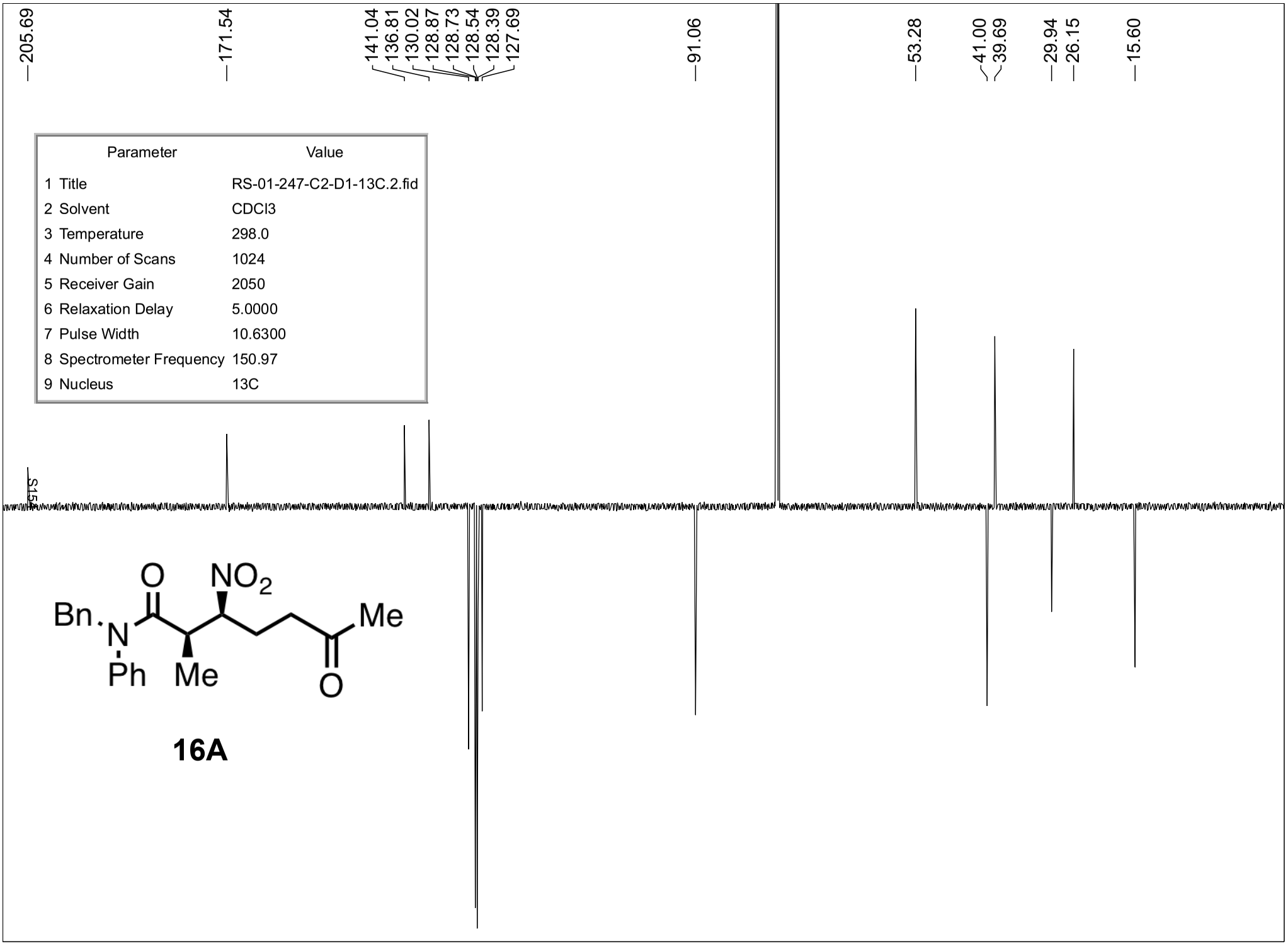
0.59
1.00

9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1

Parameter	Value
1 Title	RS-01-247-C2-D1.1.fid
2 Solvent	CDCl3
3 Temperature	298.0
4 Number of Scans	16
5 Receiver Gain	144
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H

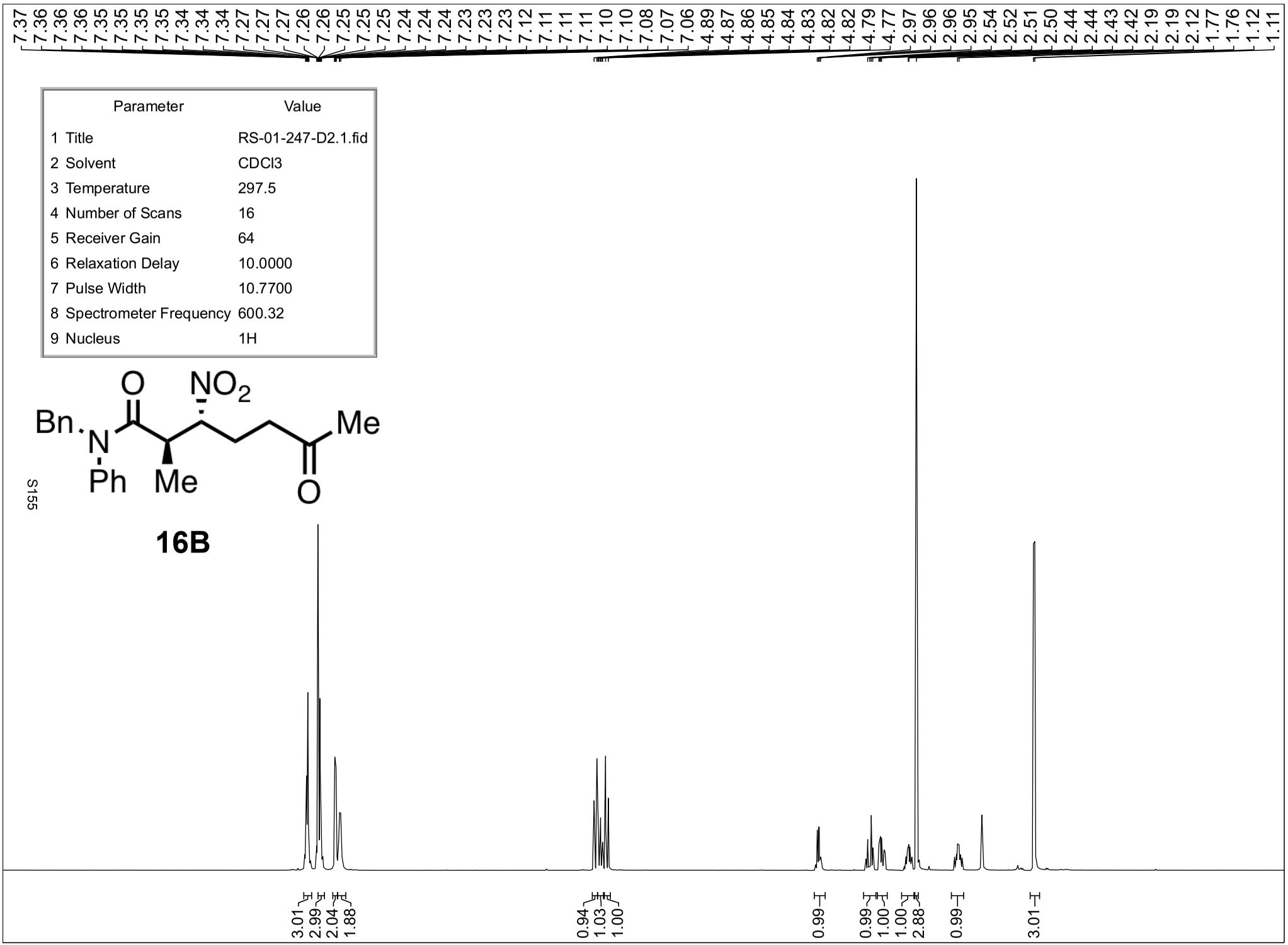
16A

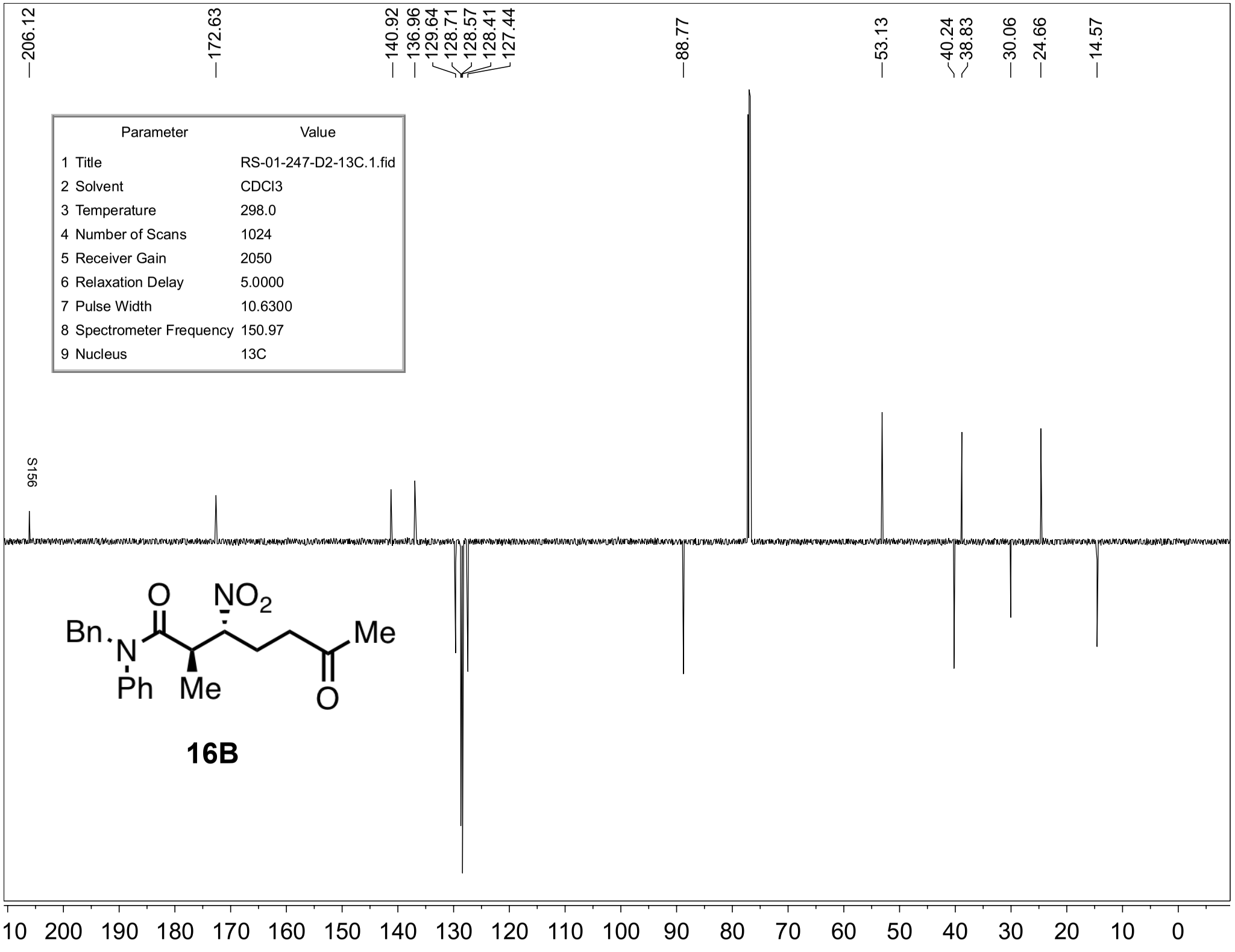



205.69
171.54
141.04
136.81
130.02
128.87
128.73
128.54
128.39
127.69
91.06
53.28
41.00
39.69
29.94
26.15
15.60
Parameter Value
1 Title RS-01-247-C2-D1-13C.2.fid
2 Solvent CDCl3
3 Temperature 298.0
4 Number of Scans 1024
5 Receiver Gain 2050
6 Relaxation Delay 5.0000
7 Pulse Width 10.6300
8 Spectrometer Frequency 150.97
9 Nucleus 13C
S15
O
NO2
Bn
N
Ph
Me
Me
O
16A
10 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

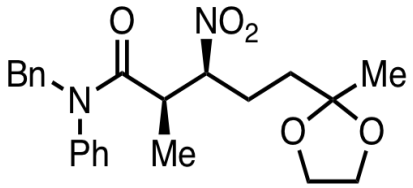
Parameter	Value
1 Title	RS-01-247-D2.1.fid
2 Solvent	CDCl3
3 Temperature	297.5
4 Number of Scans	16
5 Receiver Gain	64
6 Relaxation Delay	10.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H

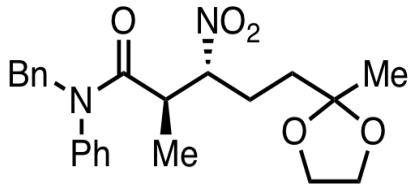
16B



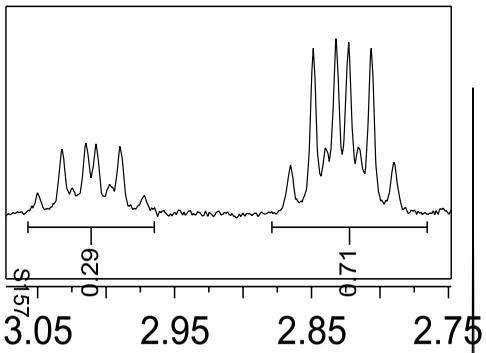

206.12
172.63
140.92
136.96
129.64
128.71
128.57
128.41
127.44
88.77
53.13
40.24
38.83
30.06
24.66
14.57
S156
Parameter Value
1 Title RS-01-247-D2-13C.1.fid
2 Solvent CDCl3
3 Temperature 298.0
4 Number of Scans 1024
5 Receiver Gain 2050
6 Relaxation Delay 5.0000
7 Pulse Width 10.6300
8 Spectrometer Frequency 150.97
9 Nucleus 13C
Bn
N
Ph
Me
O
NO2
Me
O
16B
10 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0

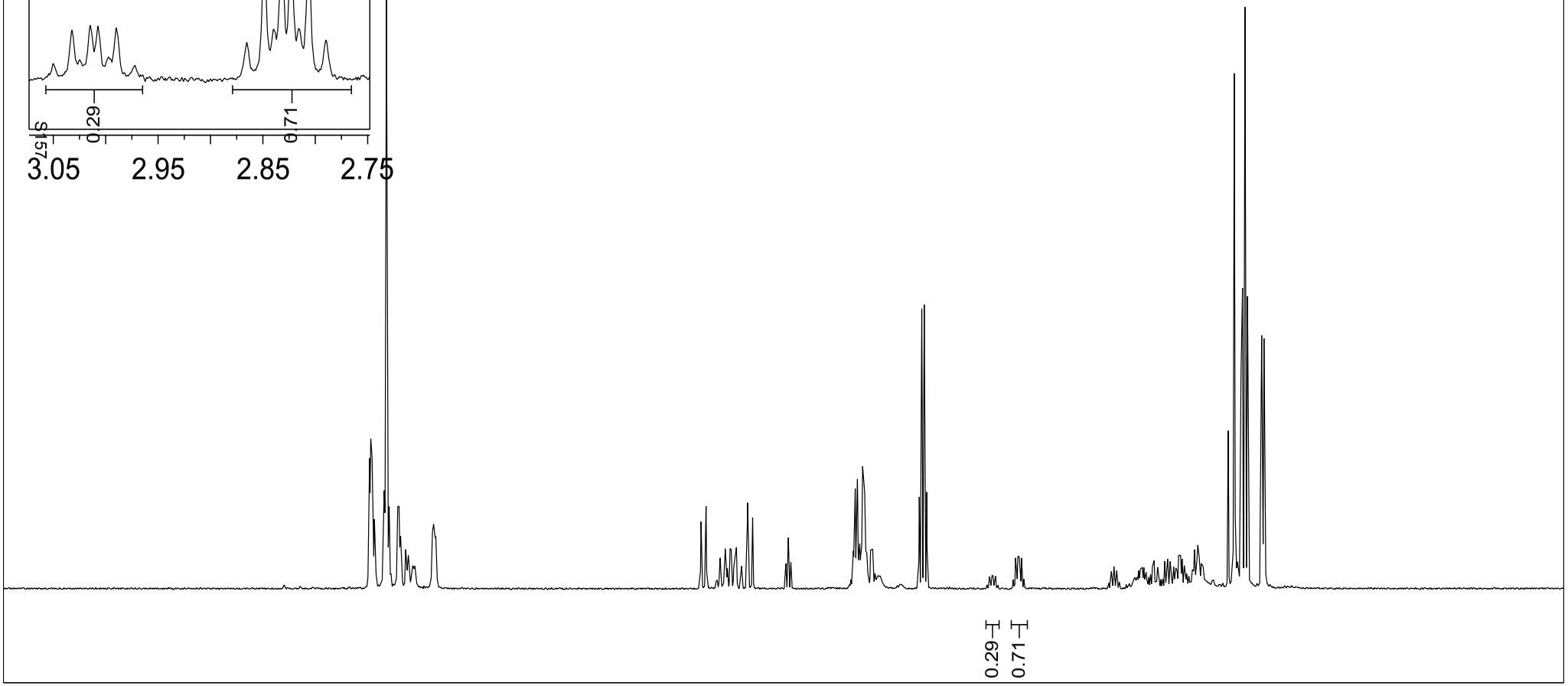
Parameter	Value
1 Title	DVR04176CRD.1.fid
2 Solvent	CDCl3
3 Temperature	298.2
4 Number of Scans	16
5 Receiver Gain	4
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H

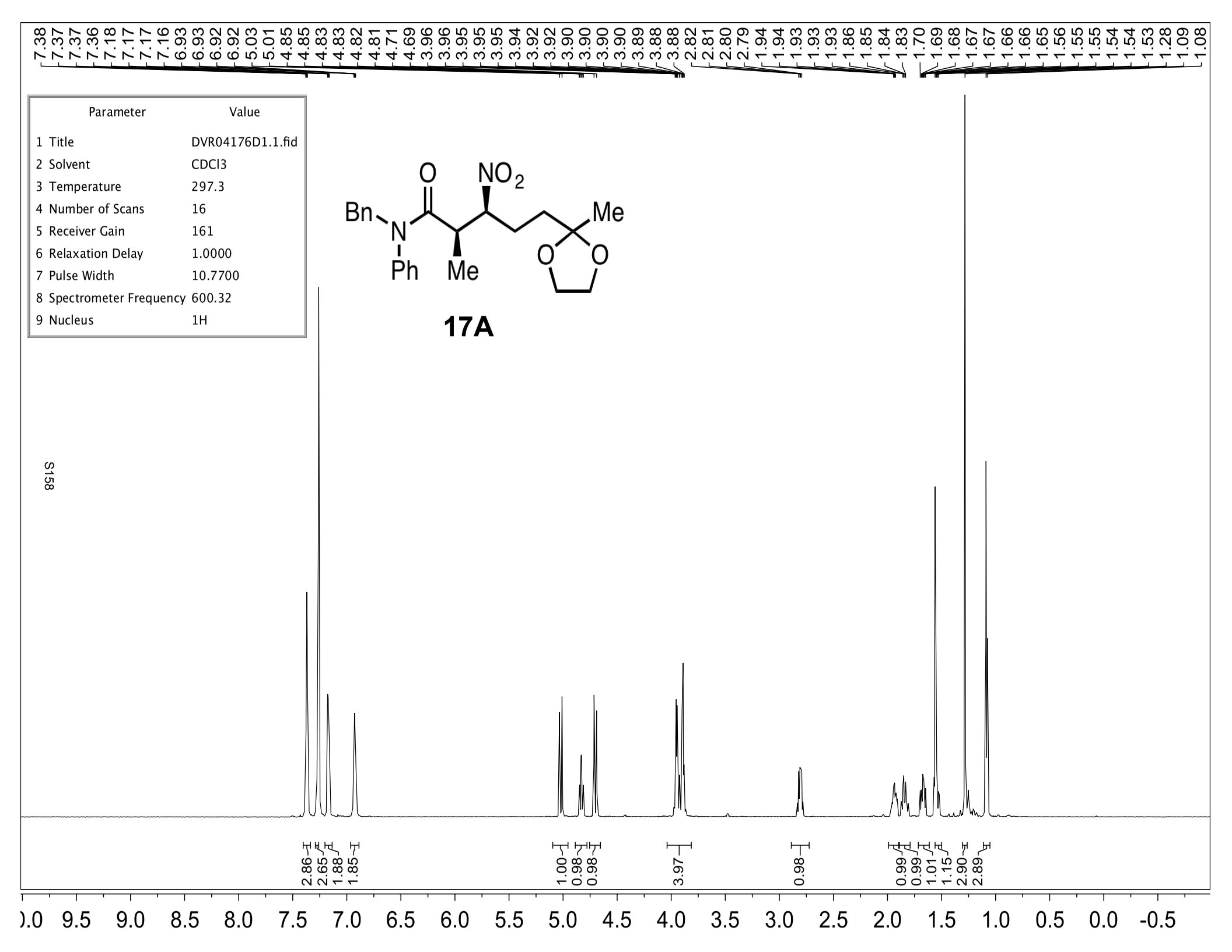


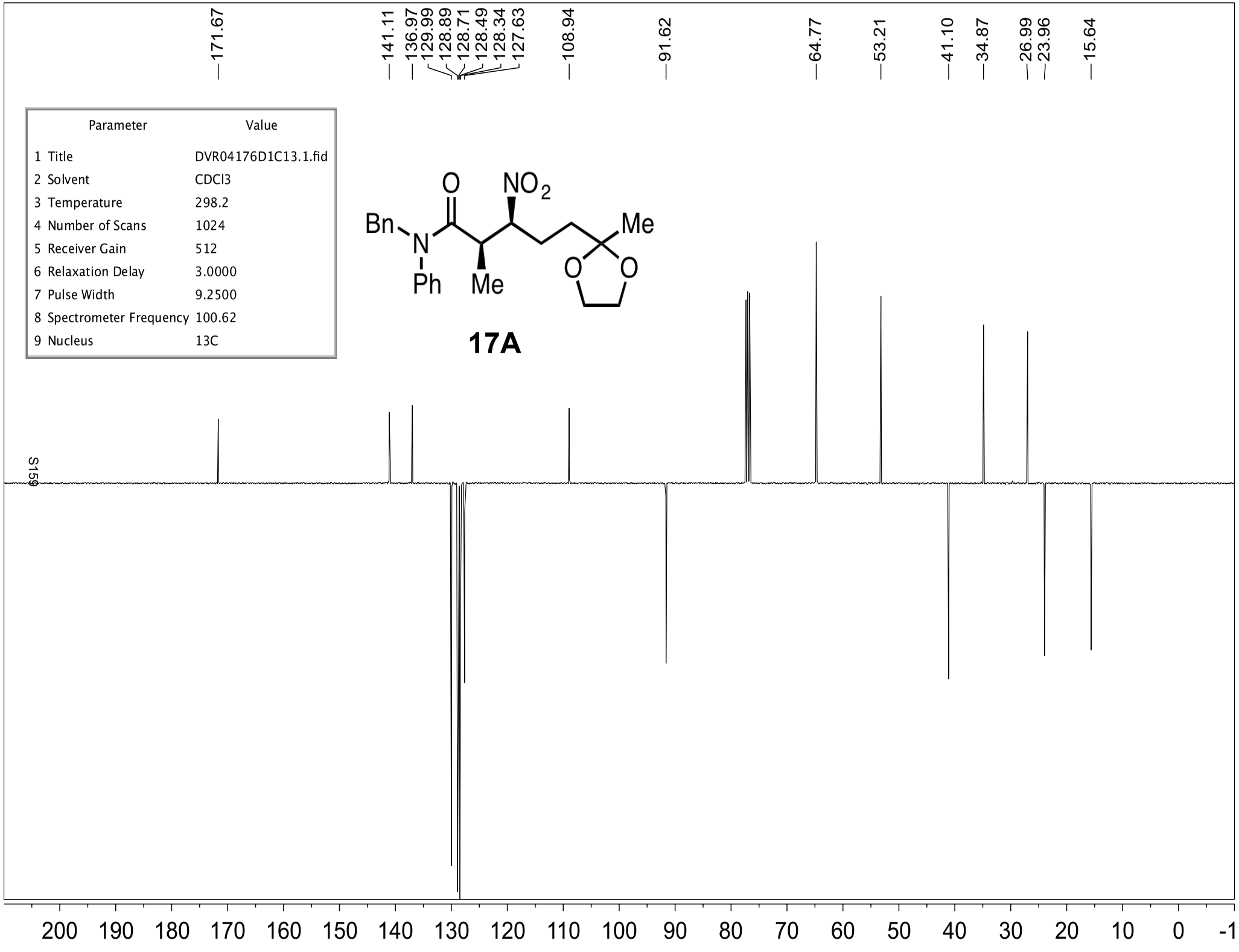


17A **Crude** **71:29** **17B**

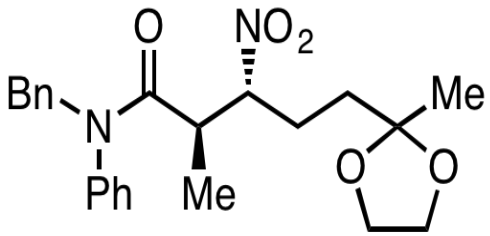





7.38 7.37 7.37 7.36 7.18 7.17 7.17 7.16 6.93 6.93 6.92 6.92 5.03 5.01 4.85 4.85 4.83 4.83 4.82 4.81 4.71 4.69 3.96 3.96 3.95 3.95 3.95 3.94 3.92 3.92 3.90 3.90 3.90 3.90 3.89 3.88 3.88 2.82 2.81 2.80 2.79 1.94 1.94 1.93 1.93 1.93 1.86 1.85 1.84 1.83 1.70 1.69 1.68 1.67 1.67 1.66 1.66 1.65 1.56 1.55 1.55 1.54 1.54 1.53 1.28 1.09 1.08
Parameter Value
1 Title DVR04176D1.1.fid
2 Solvent CDCl3
3 Temperature 297.3
4 Number of Scans 16
5 Receiver Gain 161
6 Relaxation Delay 1.0000
7 Pulse Width 10.7700
8 Spectrometer Frequency 600.32
9 Nucleus 1H
O
NO2
Bn
N
Ph
Me
Me
O
O
17A
S158
2.86 2.65 1.88 1.85 1.00 0.98 0.98 3.97 0.98 0.99 0.99 1.01 1.15 2.90 2.89
0.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5


171.67
141.11
136.97
129.99
128.89
128.71
128.49
128.34
127.63
108.94
91.62
64.77
53.21
41.10
34.87
26.99
23.96
15.64
Parameter Value
1 Title DVR04176D1C13.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
O
NO2
Bn
N
Ph
Me
Me
O
O
17A
S159
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

Parameter	Value
1 Title	DVR04176D2-2.1.fid
2 Solvent	CDCl3
3 Temperature	297.4
4 Number of Scans	16
5 Receiver Gain	181
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H



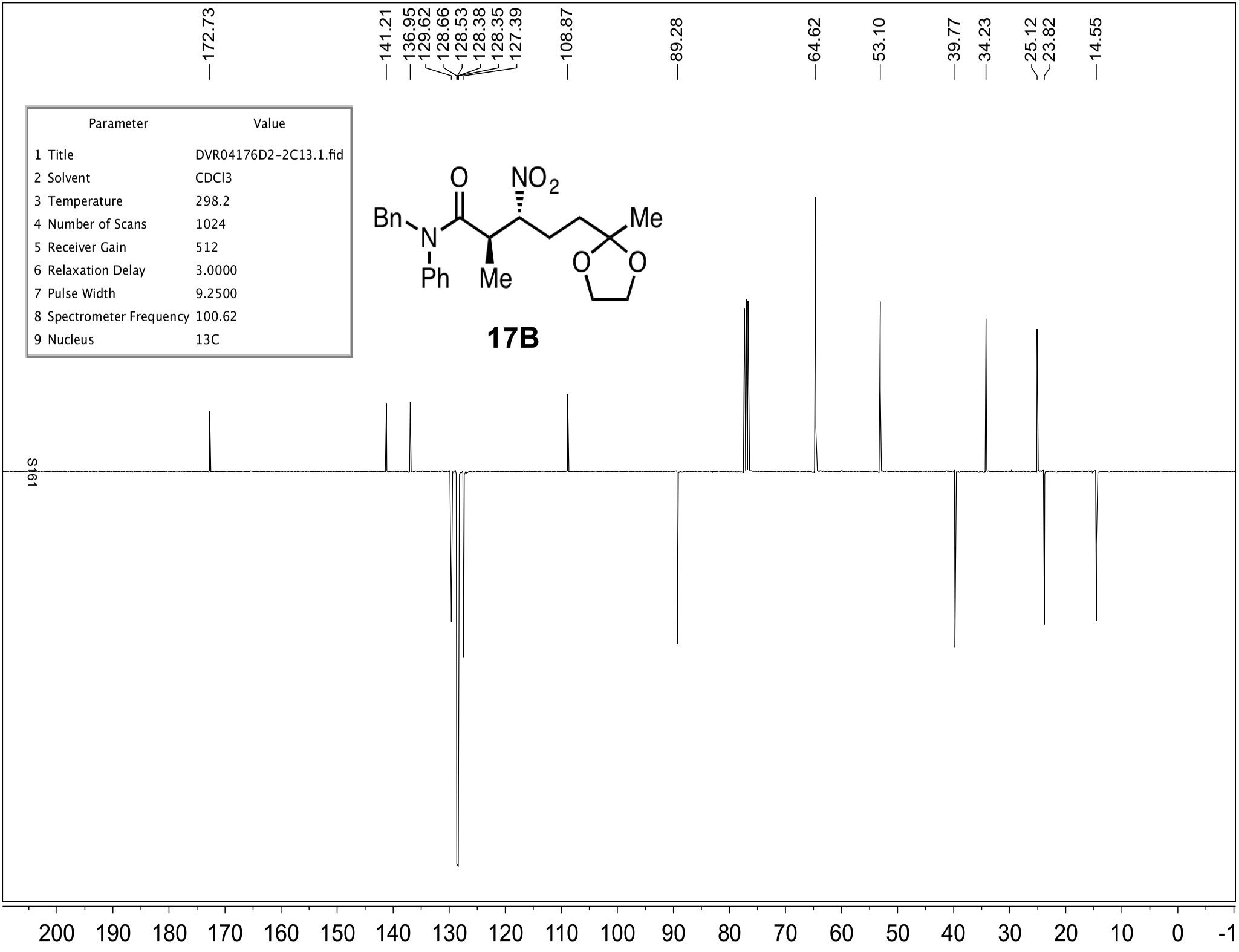
17B

S160

7.37 7.36 7.35 7.35 7.34 7.34 7.33 7.12 7.12 7.11 7.11 7.08 7.07 7.07 7.06 4.93 4.92 4.91 4.91 4.90 4.89 4.87 4.80 4.77 3.91 3.91 3.91 3.90 3.90 3.89 3.86 3.85 3.84 3.84 3.83 3.83 3.83 3.00 2.99 2.99 2.97 2.00 1.99 1.97 1.73 1.73 1.72 1.71 1.71 1.65 1.65 1.63 1.63 1.62 1.61 1.60 1.57 1.56 1.55 1.54 1.54 1.54 1.53 1.25 1.24 1.08 1.07

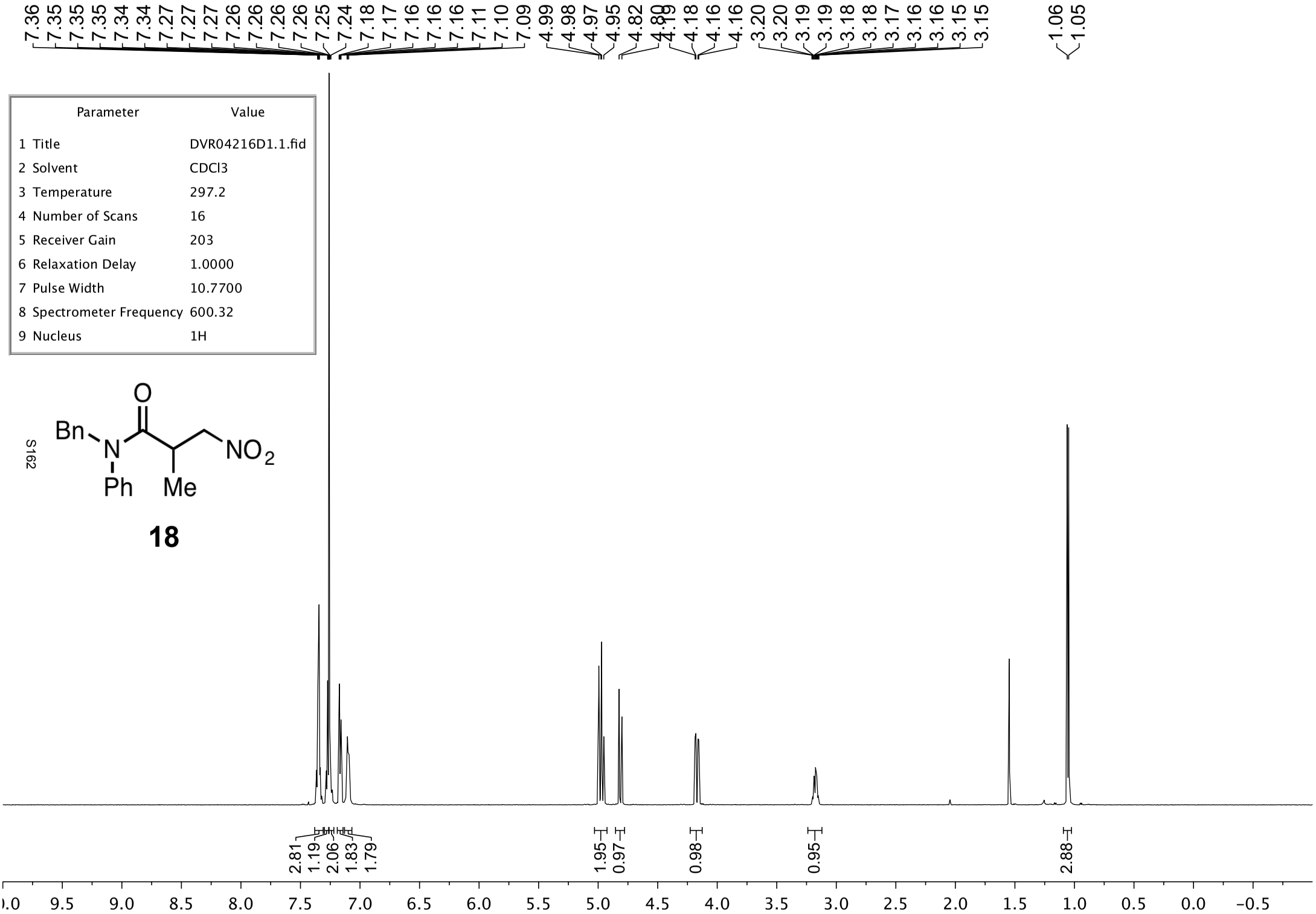
2.69 2.71 1.80 1.69 1.93 1.00 1.87 1.91 1.15 1.12 1.13 1.04 1.47 2.82 2.65

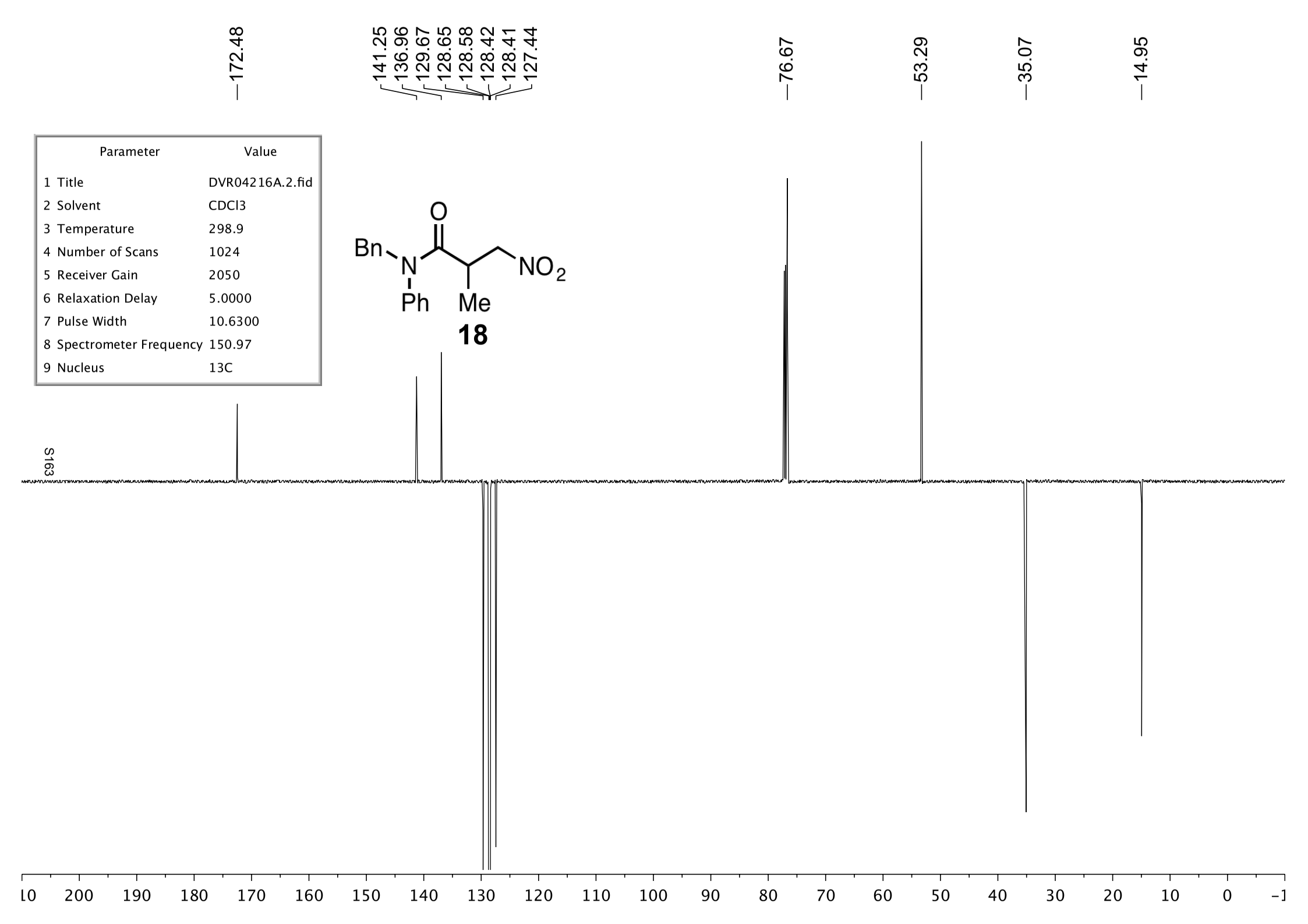
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5


172.73
141.21
136.95
129.62
128.66
128.53
128.38
128.35
127.39
108.87
89.28
64.62
53.10
39.77
34.23
25.12
23.82
14.55
Parameter Value
1 Title DVR04176D2-2C13.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
O
NO2
Bn
N
Ph
Me
Me
O
O
17B
S161
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

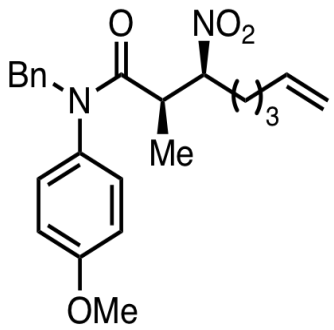
Parameter	Value
1 Title	DVR04216D1.1.fid
2 Solvent	CDCl3
3 Temperature	297.2
4 Number of Scans	16
5 Receiver Gain	203
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H

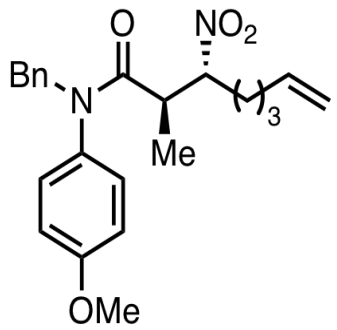
18




172.48
141.25
136.96
129.67
128.65
128.58
128.42
128.41
127.44
76.67
53.29
35.07
14.95
Parameter Value
1 Title DVR04216A.2.fid
2 Solvent CDCl3
3 Temperature 298.9
4 Number of Scans 1024
5 Receiver Gain 2050
6 Relaxation Delay 5.0000
7 Pulse Width 10.6300
8 Spectrometer Frequency 150.97
9 Nucleus 13C
Bn
N
Ph
O
Me
NO2
18
S163
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10

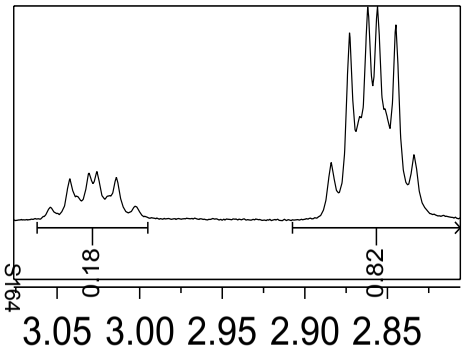
Parameter	Value
1 Title	DVR04203CRD.1.fid
2 Solvent	CDCl3
3 Temperature	300.0
4 Number of Scans	16
5 Receiver Gain	114
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H

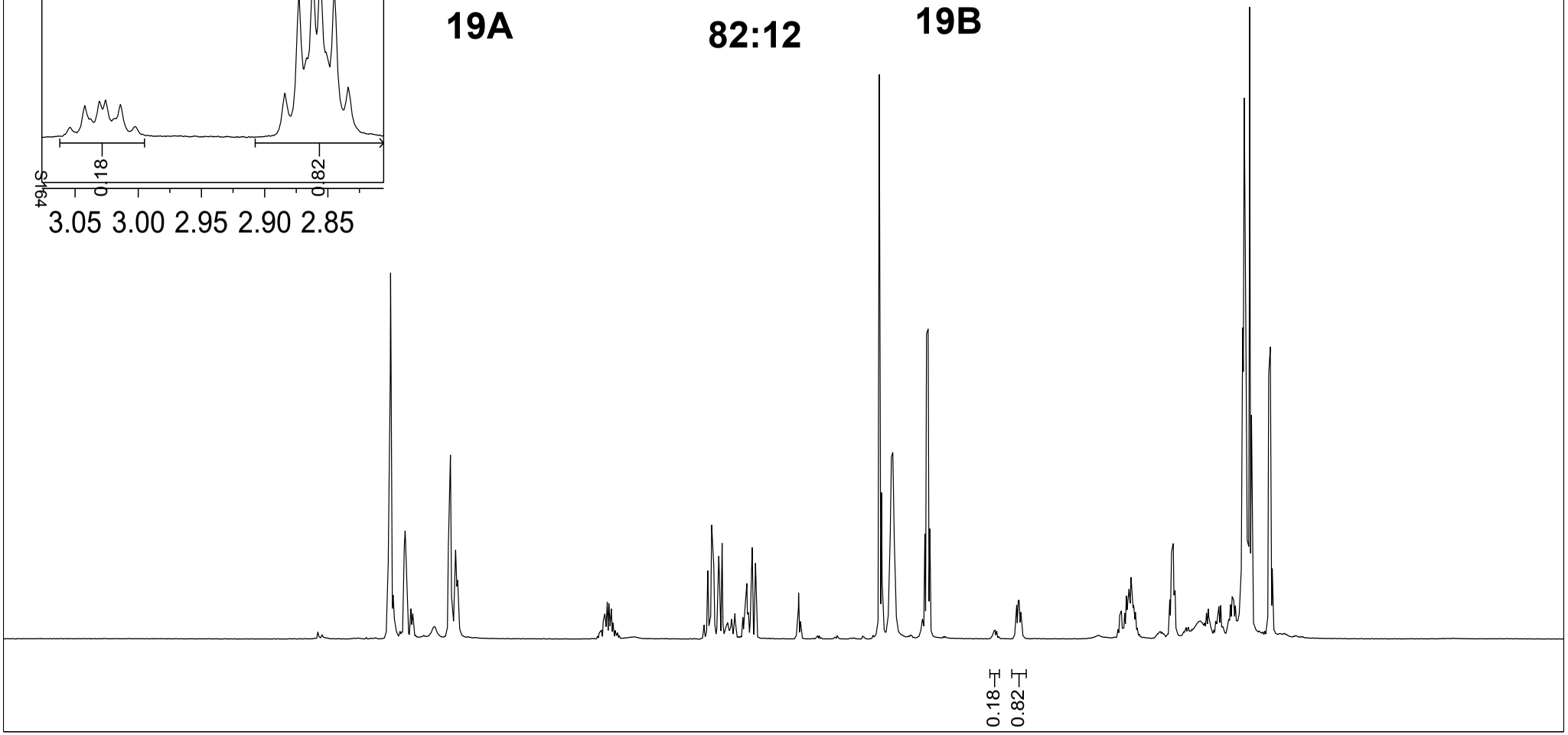




Crude

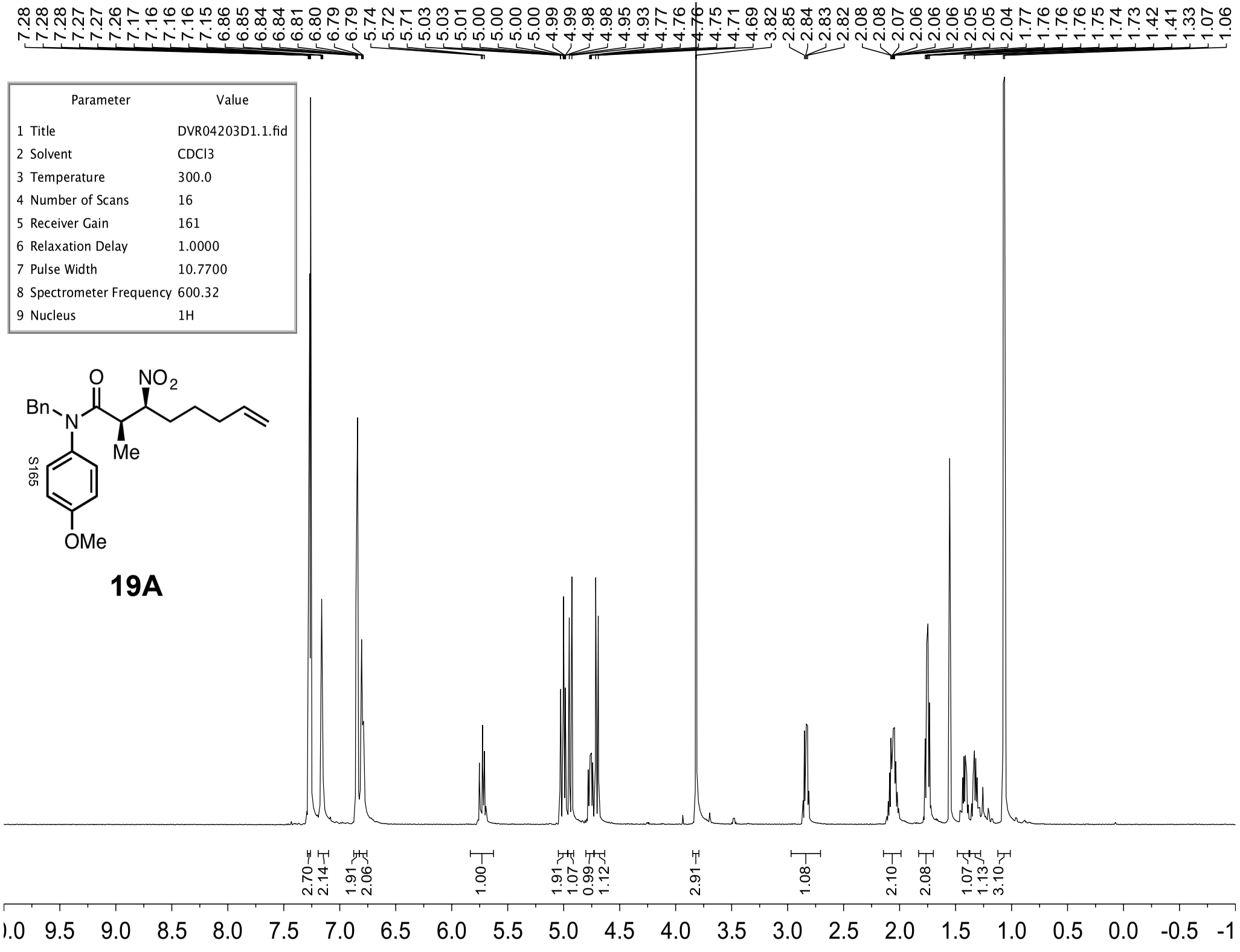
19A **82:12** **19B**

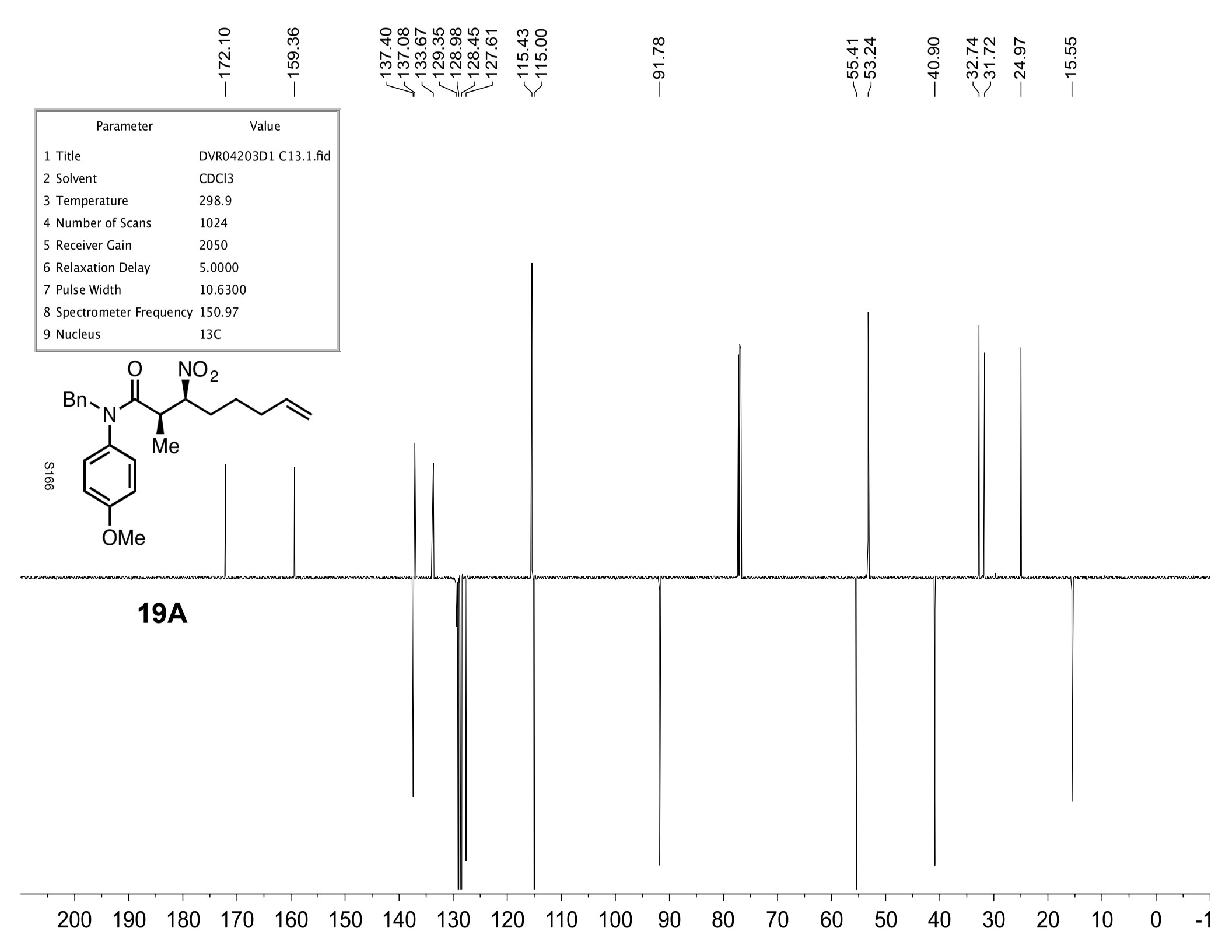




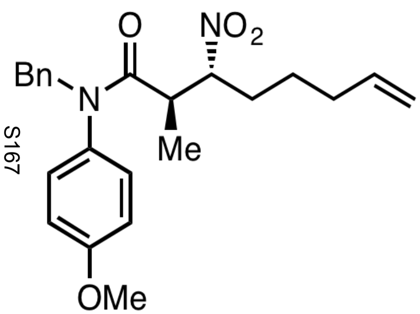
Parameter	Value
1 Title	DVR04203D1.1.fid
2 Solvent	CDCl3
3 Temperature	300.0
4 Number of Scans	16
5 Receiver Gain	161
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H

19A

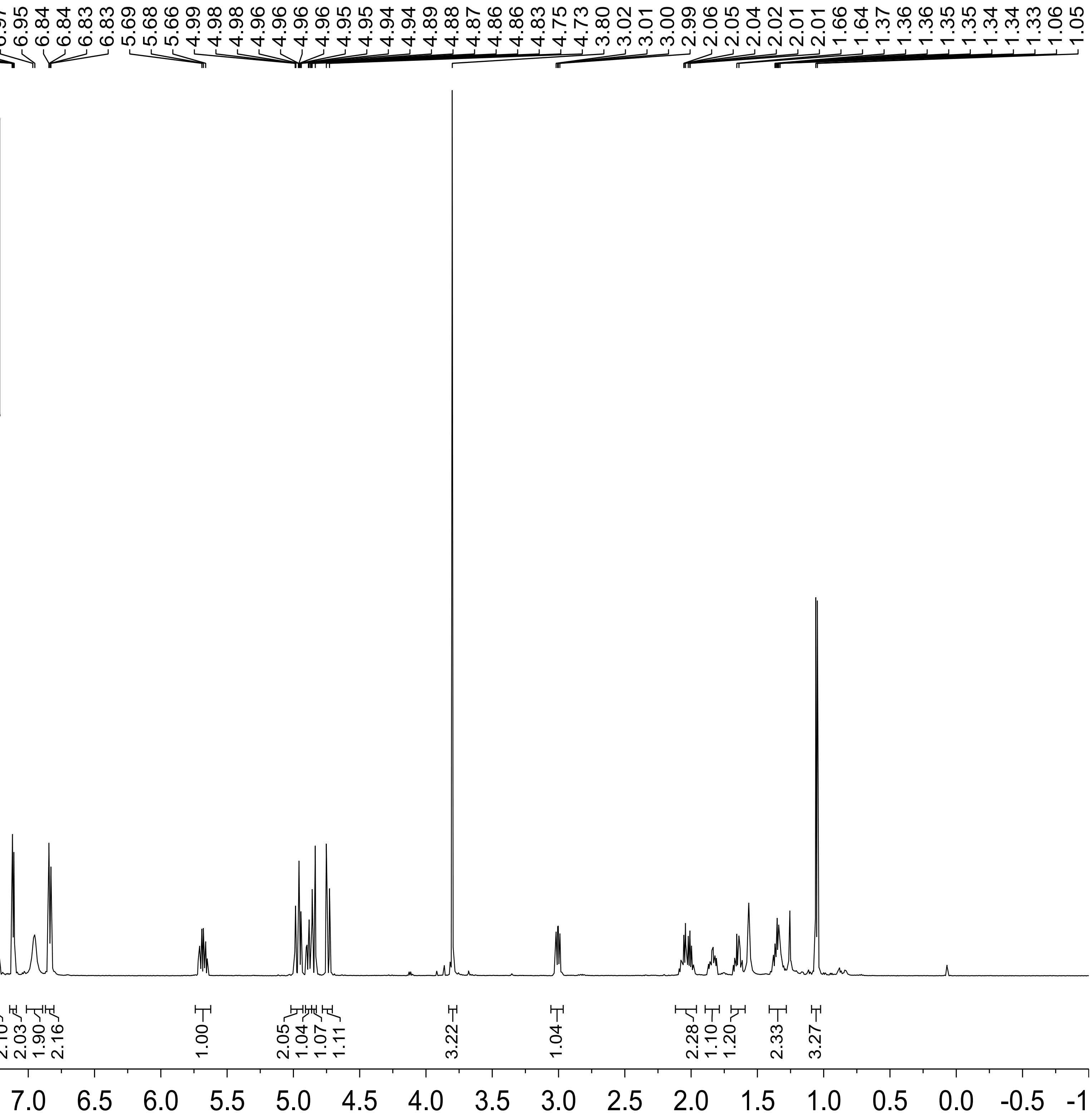


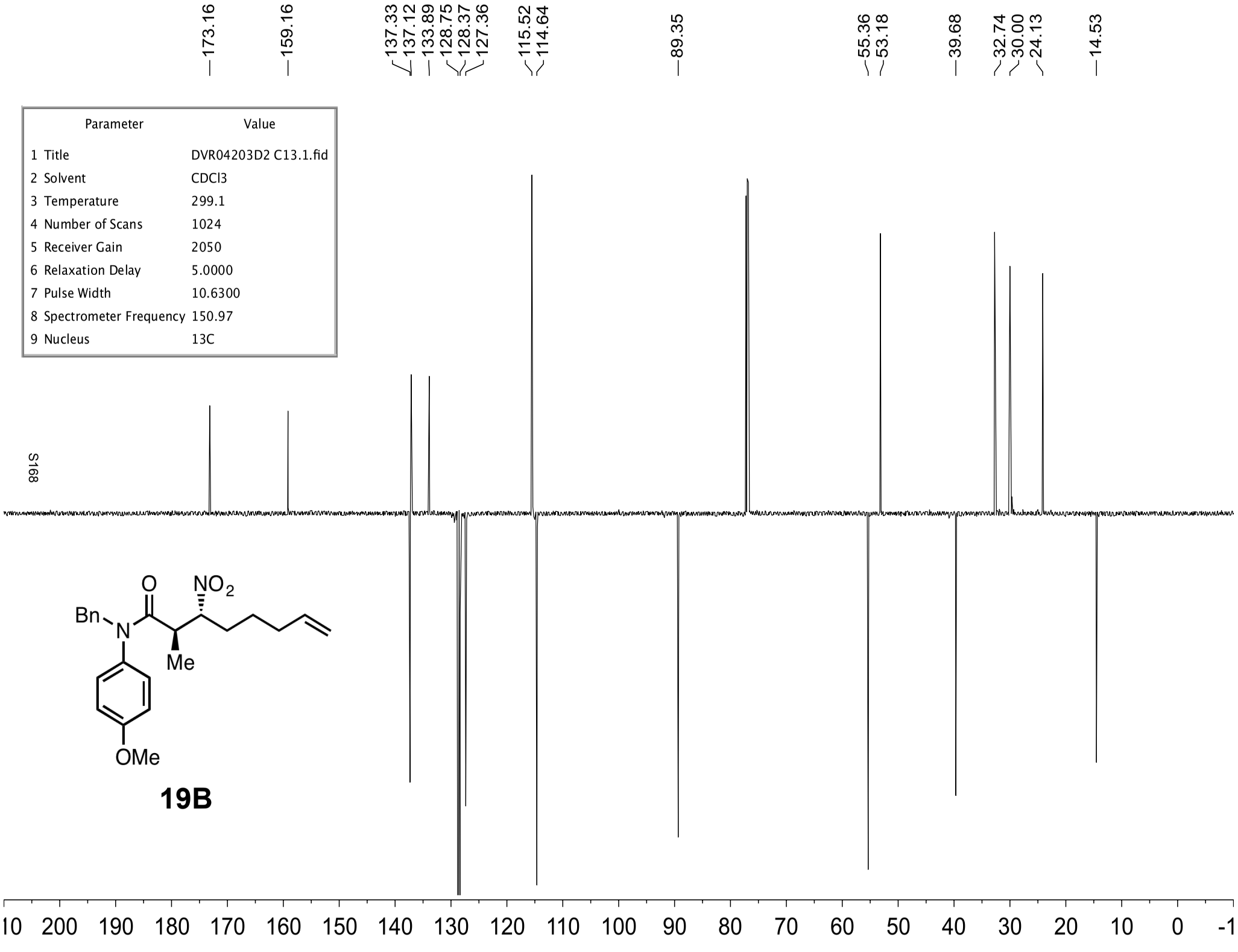

172.10
159.36
137.40
137.08
133.67
129.35
128.98
128.45
127.61
115.43
115.00
91.78
55.41
53.24
40.90
32.74
31.72
24.97
15.55
Parameter Value
1 Title DVR04203D1 C13.1.fid
2 Solvent CDCl3
3 Temperature 298.9
4 Number of Scans 1024
5 Receiver Gain 2050
6 Relaxation Delay 5.0000
7 Pulse Width 10.6300
8 Spectrometer Frequency 150.97
9 Nucleus 13C
O
NO2
Bn
N
Me
OMe
S166
19A
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

Parameter	Value
1 Title	DVR04203D2.1.fid
2 Solvent	CDCl3
3 Temperature	300.0
4 Number of Scans	16
5 Receiver Gain	144
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H

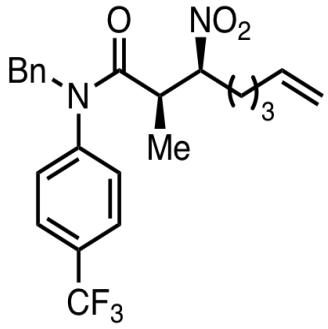


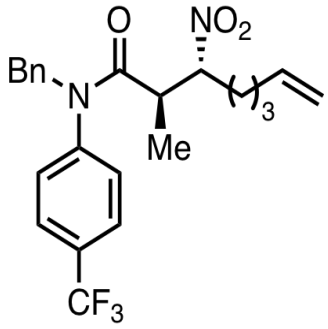
19B




173.16
159.16
137.33
137.12
133.89
128.75
128.37
127.36
115.52
114.64
89.35
55.36
53.18
39.68
32.74
30.00
24.13
14.53
Parameter Value
1 Title DVR04203D2 C13.1.fid
2 Solvent CDCl3
3 Temperature 299.1
4 Number of Scans 1024
5 Receiver Gain 2050
6 Relaxation Delay 5.0000
7 Pulse Width 10.6300
8 Spectrometer Frequency 150.97
9 Nucleus 13C
S168
O
NO2
Bn
N
Me
OMe
19B
10 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

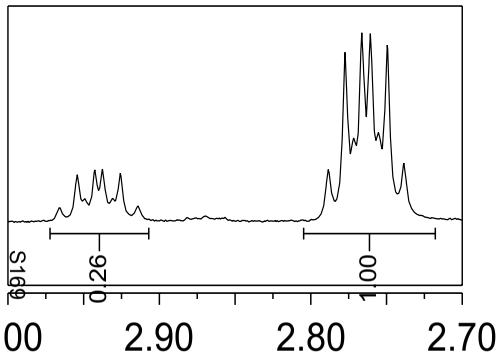
Parameter	Value
1 Title	DVR04211CRD.1.fid
2 Solvent	CDCl3
3 Temperature	298.1
4 Number of Scans	16
5 Receiver Gain	128
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H

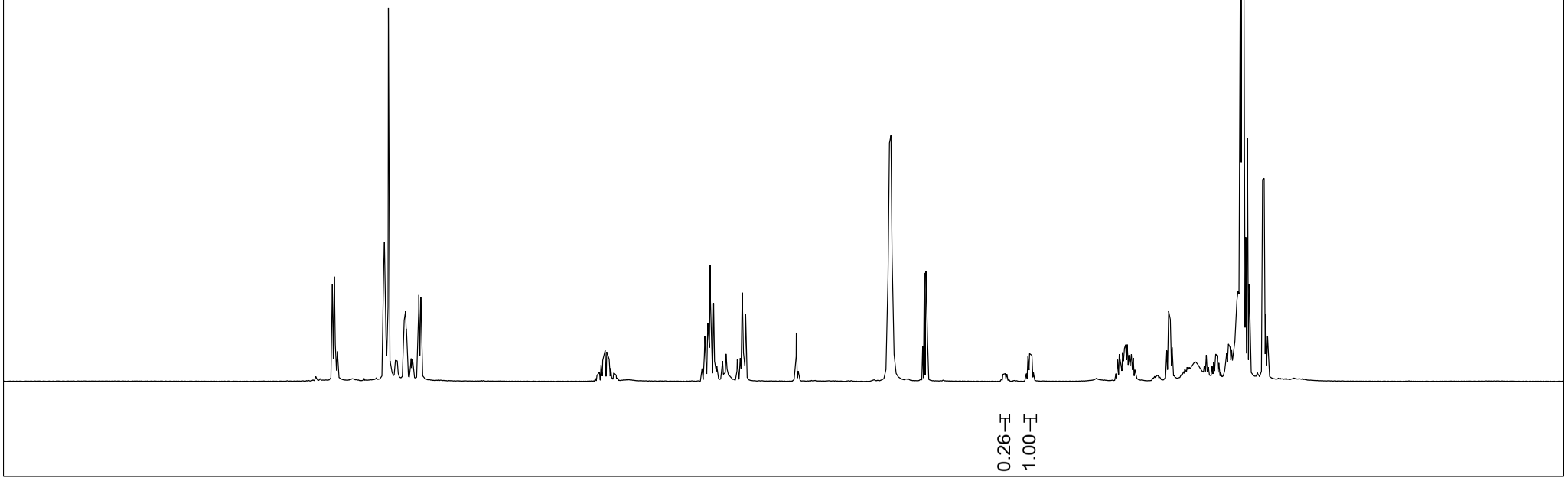


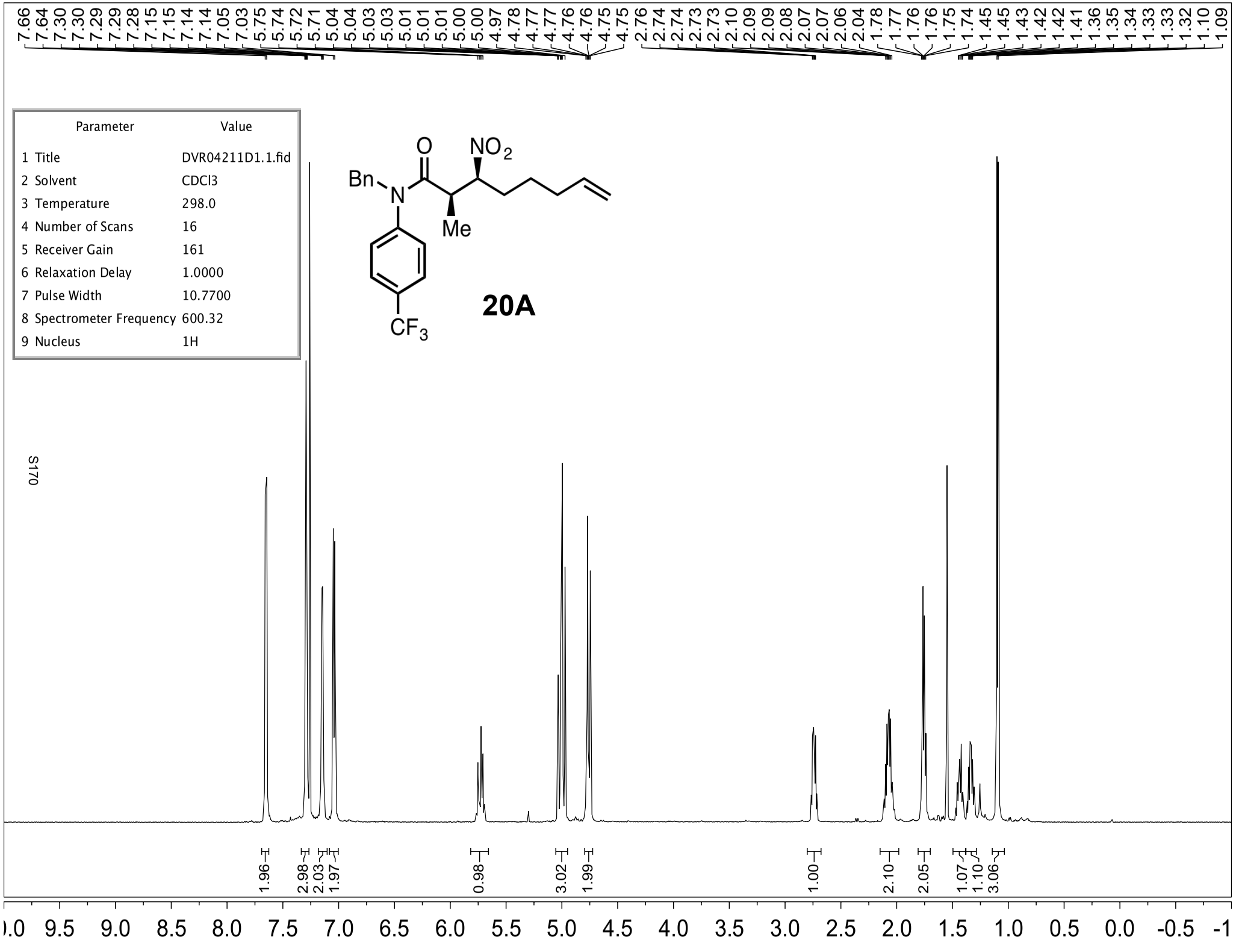


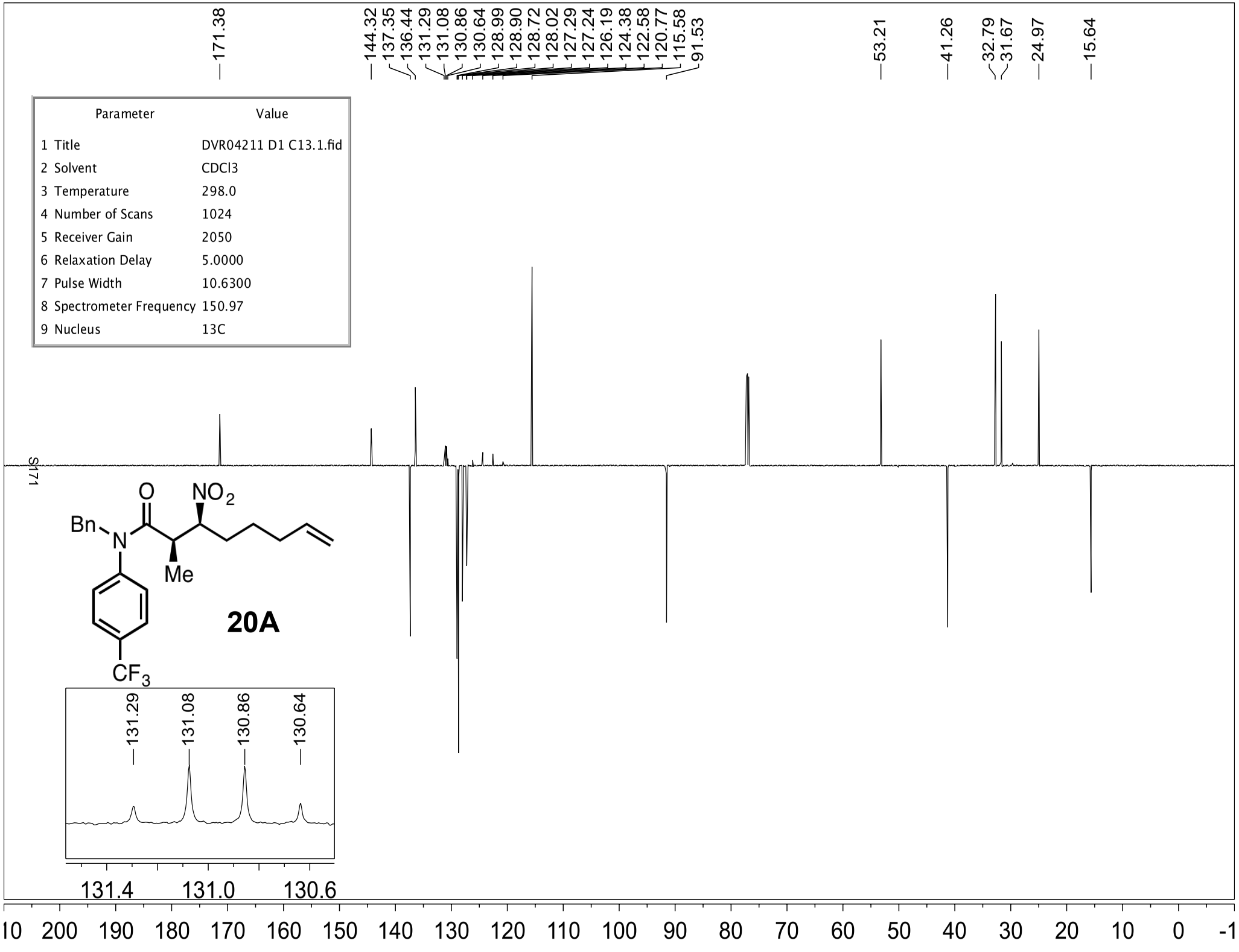
Crude

20A **79:21** **20B**



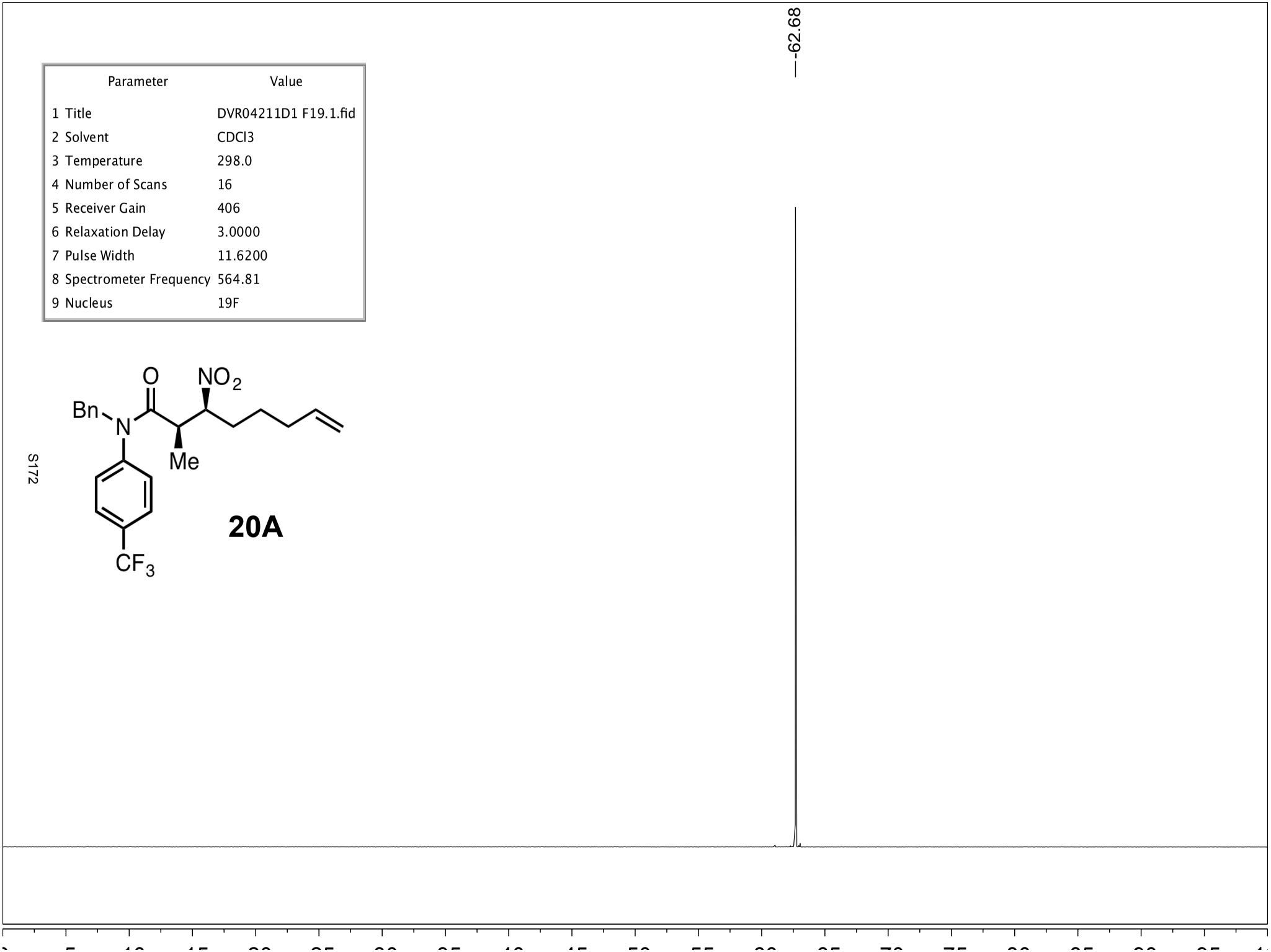


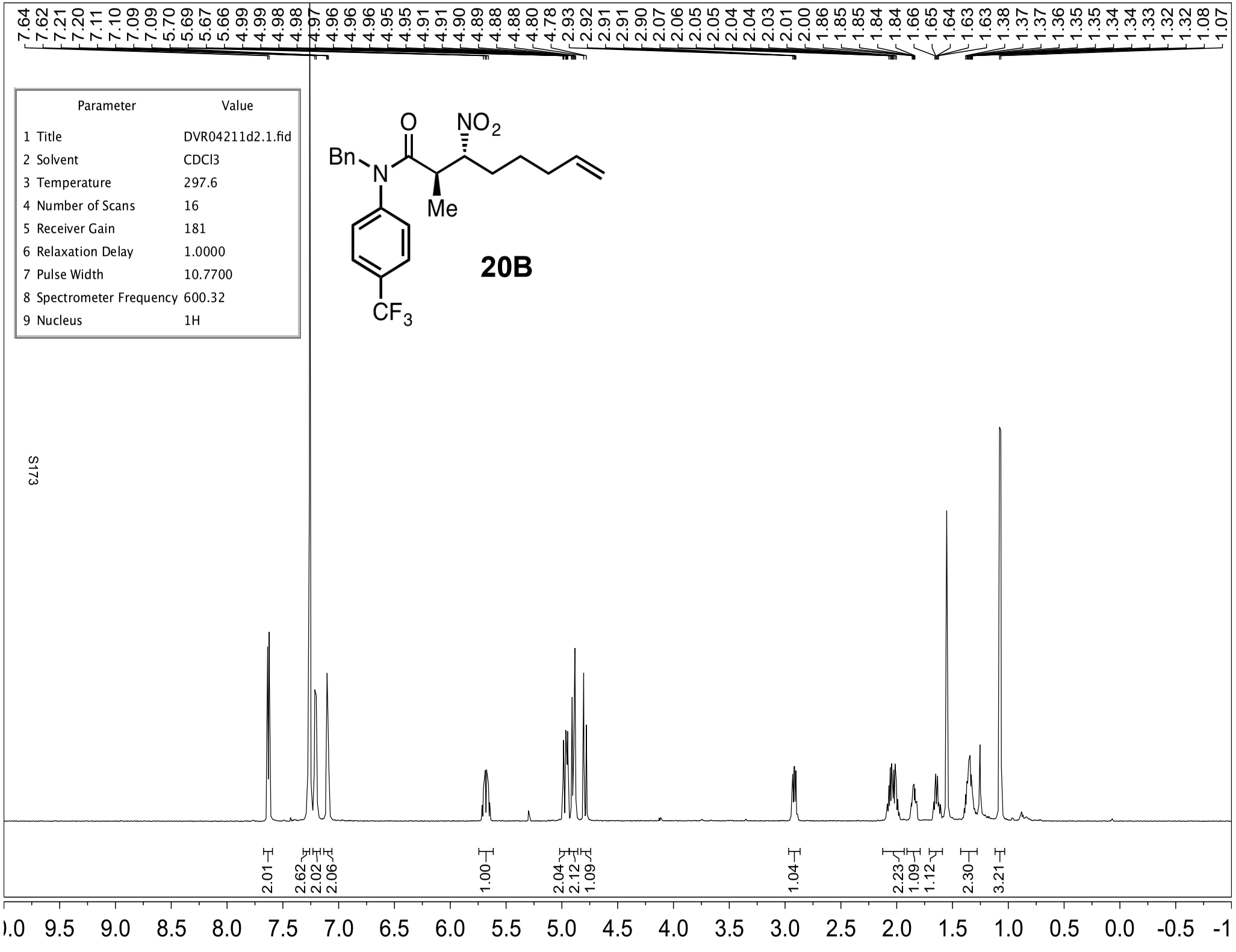

7.66 7.64 7.30 7.30 7.29 7.29 7.28 7.15 7.15 7.14 7.14 7.05 7.03 5.75 5.74 5.72 5.71 5.04 5.04 5.03 5.03 5.01 5.01 5.01 5.00 5.00 4.97 4.78 4.77 4.77 4.76 4.76 4.75 4.75 2.76 2.74 2.74 2.73 2.73 2.10 2.09 2.09 2.08 2.07 2.07 2.06 2.04 1.78 1.77 1.76 1.76 1.75 1.74 1.45 1.45 1.43 1.42 1.42 1.41 1.36 1.35 1.34 1.33 1.33 1.32 1.10 1.09
Parameter Value
1 Title DVR04211D1.1.fid
2 Solvent CDCl3
3 Temperature 298.0
4 Number of Scans 16
5 Receiver Gain 161
6 Relaxation Delay 1.0000
7 Pulse Width 10.7700
8 Spectrometer Frequency 600.32
9 Nucleus 1H
O
NO2
Bn
N
Me
CF3
20A
S170
1.96 2.98 2.03 1.97 0.98 3.02 1.99 1.00 2.10 2.05 1.07 1.10 3.06
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1

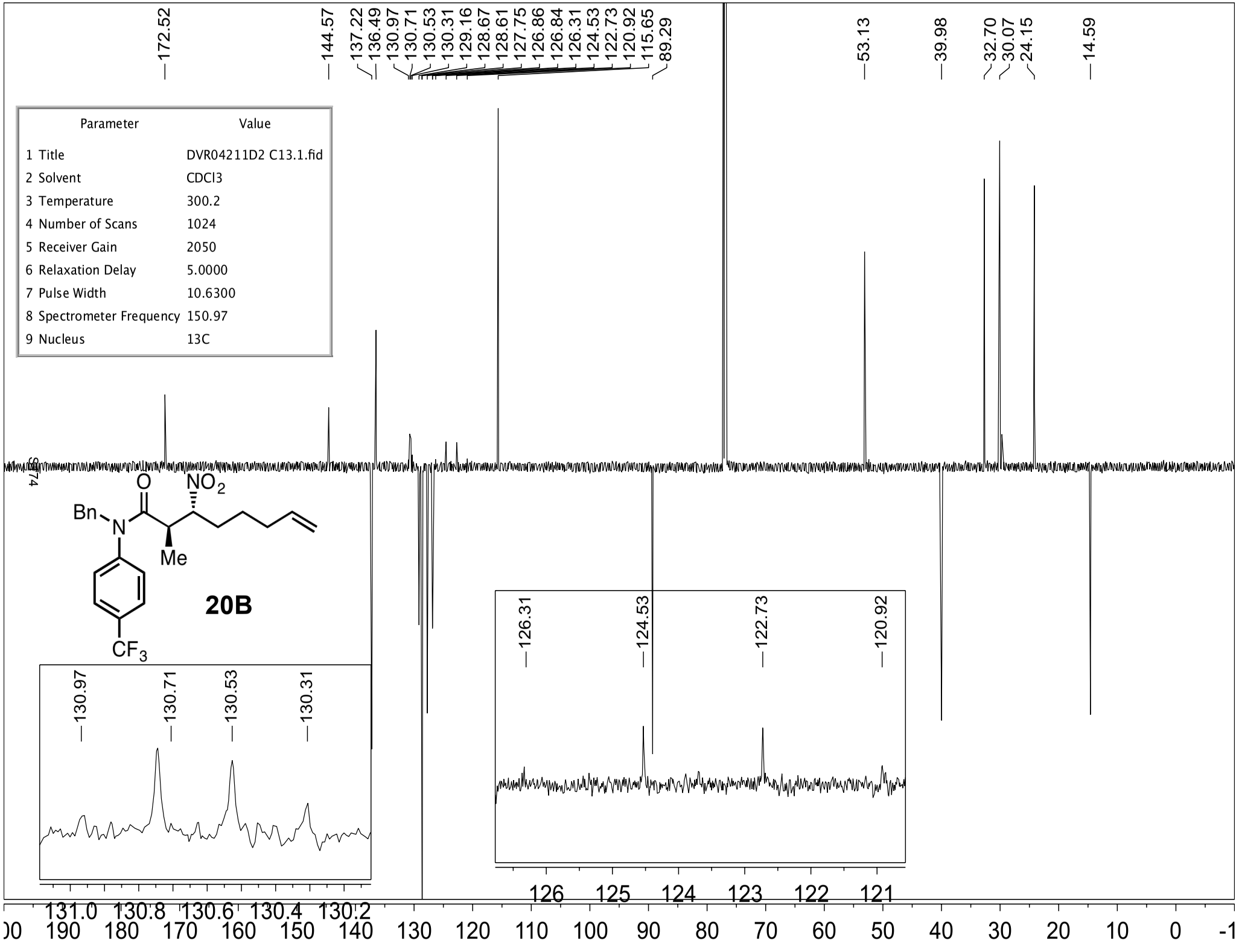

171.38
144.32
137.35
136.44
131.29
131.08
130.86
130.64
128.99
128.90
128.72
128.02
127.29
127.24
126.19
124.38
122.58
120.77
115.58
91.53
53.21
41.26
32.79
31.67
24.97
15.64
Parameter Value
1 Title DVR04211 D1 C13.1.fid
2 Solvent CDCl3
3 Temperature 298.0
4 Number of Scans 1024
5 Receiver Gain 2050
6 Relaxation Delay 5.0000
7 Pulse Width 10.6300
8 Spectrometer Frequency 150.97
9 Nucleus 13C
SM71
O
NO2
Bn
N
Me
CF3
20A
131.29
131.08
130.86
130.64
131.4
131.0
130.6
10 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

Parameter	Value
1 Title	DVR04211D1 F19.1.fid
2 Solvent	CDCl3
3 Temperature	298.0
4 Number of Scans	16
5 Receiver Gain	406
6 Relaxation Delay	3.0000
7 Pulse Width	11.6200
8 Spectrometer Frequency	564.81
9 Nucleus	19F

20A

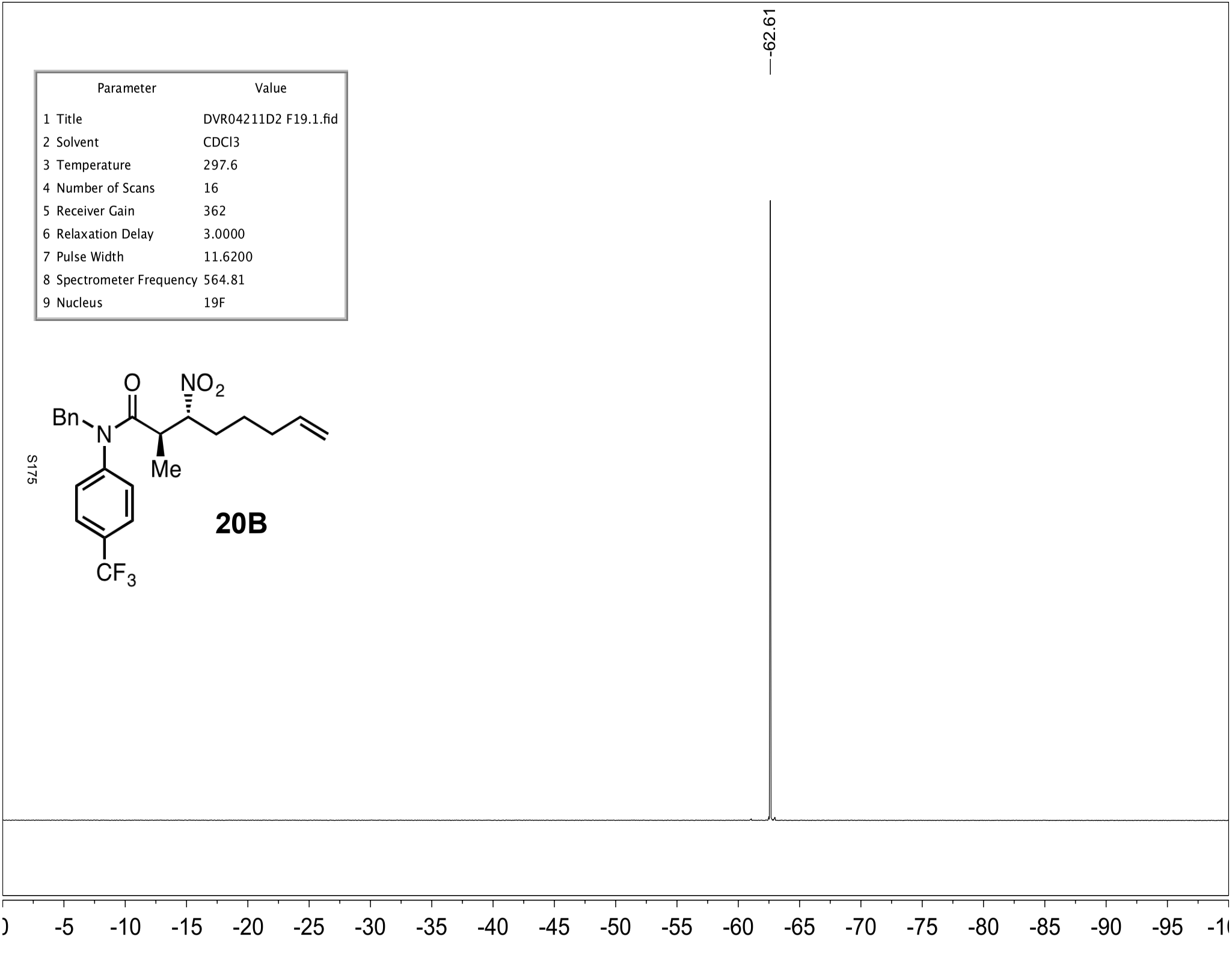



7.64 7.62 7.21 7.20 7.11 7.10 7.09 7.09 5.70 5.69 5.67 5.66 4.99 4.99 4.98 4.98 4.97 4.96 4.96 4.96 4.95 4.95 4.91 4.91 4.90 4.89 4.88 4.88 4.80 4.78 2.93 2.92 2.91 2.91 2.90 2.07 2.06 2.05 2.05 2.04 2.04 2.03 2.01 2.00 1.86 1.85 1.85 1.84 1.84 1.66 1.65 1.64 1.63 1.63 1.38 1.37 1.37 1.36 1.35 1.35 1.34 1.34 1.33 1.32 1.32 1.08 1.07
Parameter Value
1 Title DVR04211d2.1.fid
2 Solvent CDCl3
3 Temperature 297.6
4 Number of Scans 16
5 Receiver Gain 181
6 Relaxation Delay 1.0000
7 Pulse Width 10.7700
8 Spectrometer Frequency 600.32
9 Nucleus 1H
O
NO2
Bn
N
Me
CF3
20B
S173
2.01
2.62
2.02
2.06
1.00
2.04
2.12
1.09
1.04
2.23
1.09
1.12
2.30
3.21
0.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1


172.52
144.57
137.22
136.49
130.97
130.71
130.53
130.31
129.16
128.67
128.61
127.75
126.86
126.84
126.31
124.53
122.73
120.92
115.65
89.29
53.13
39.98
32.70
30.07
24.15
14.59
Parameter Value
1 Title DVR04211D2 C13.1.fid
2 Solvent CDCl3
3 Temperature 300.2
4 Number of Scans 1024
5 Receiver Gain 2050
6 Relaxation Delay 5.0000
7 Pulse Width 10.6300
8 Spectrometer Frequency 150.97
9 Nucleus 13C
O
NO2
Bn
N
Me
CF3
20B
130.97
130.71
130.53
130.31
126.31
124.53
122.73
120.92
131.0 130.8 130.6 130.4 130.2
126 125 124 123 122 121
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

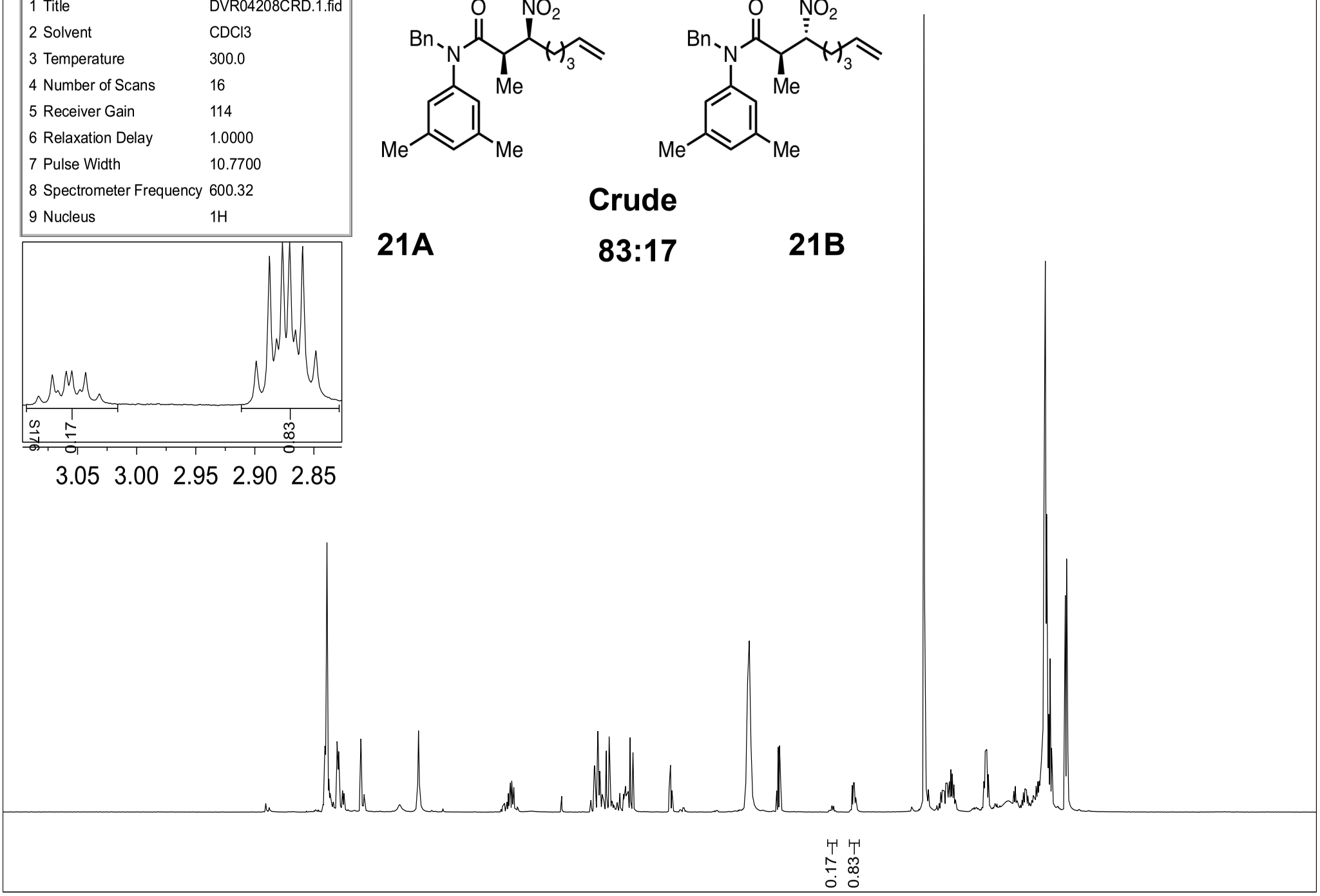
Parameter	Value
1 Title	DVR04211D2 F19.1.fid
2 Solvent	CDCl3
3 Temperature	297.6
4 Number of Scans	16
5 Receiver Gain	362
6 Relaxation Delay	3.0000
7 Pulse Width	11.6200
8 Spectrometer Frequency	564.81
9 Nucleus	19F

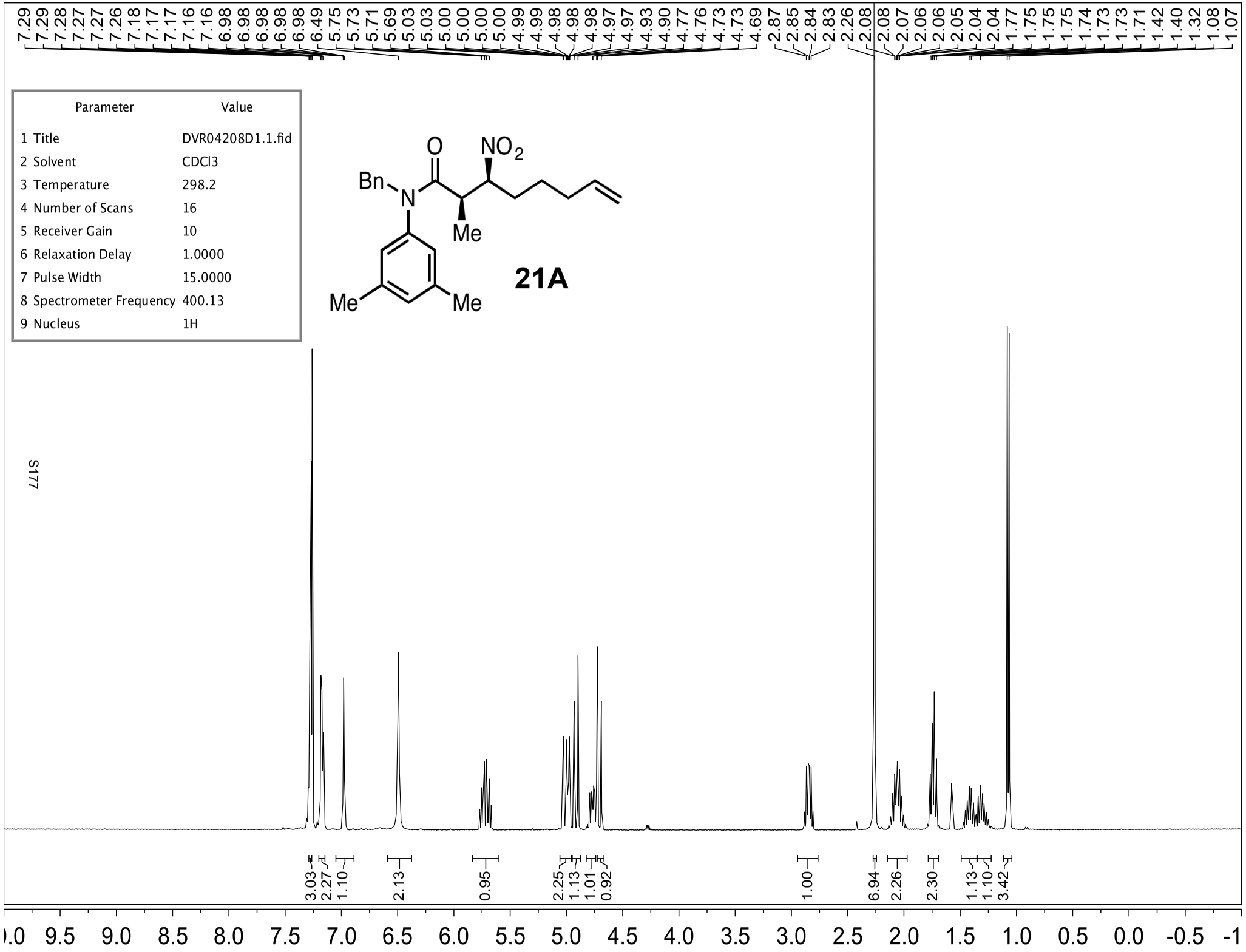
20B

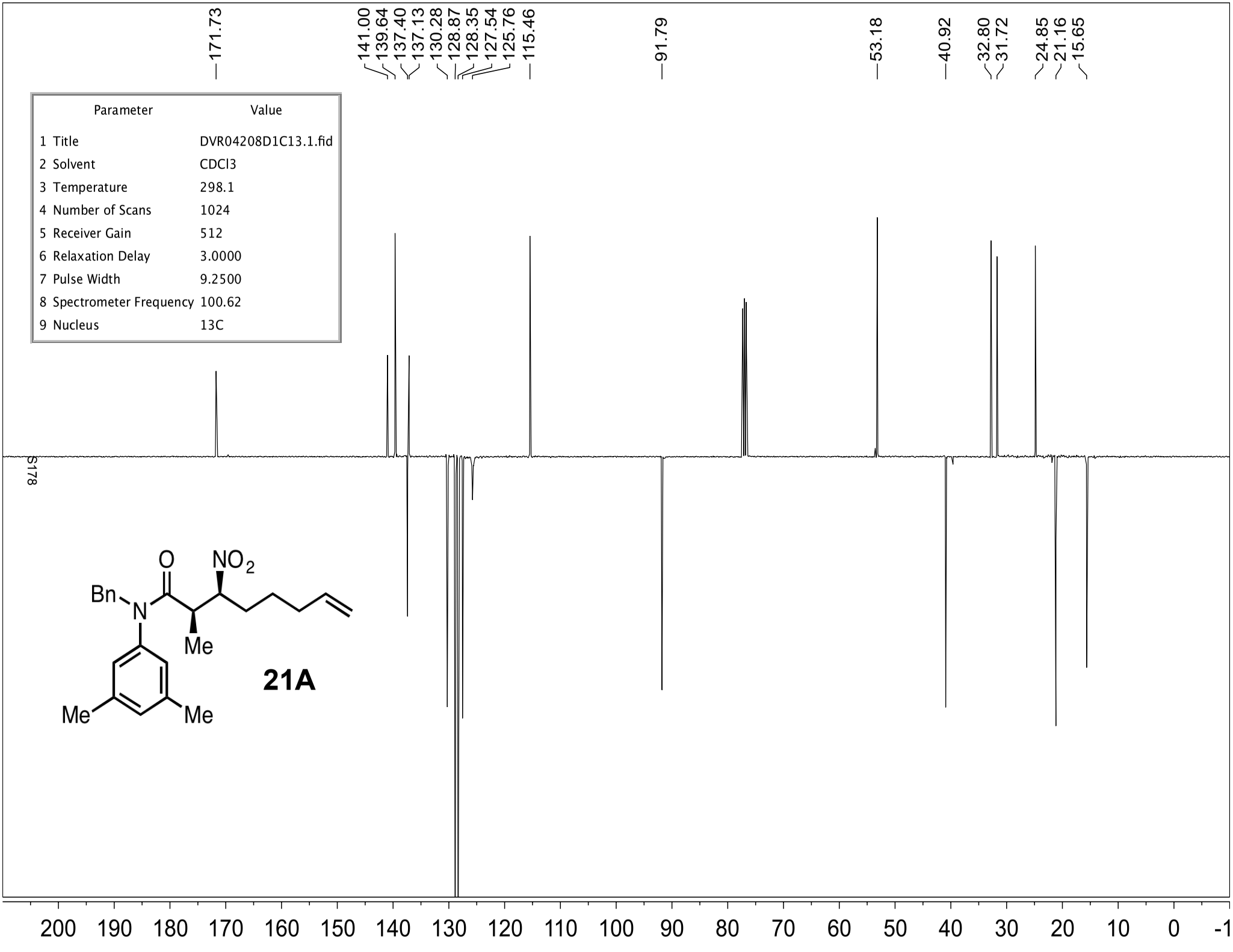


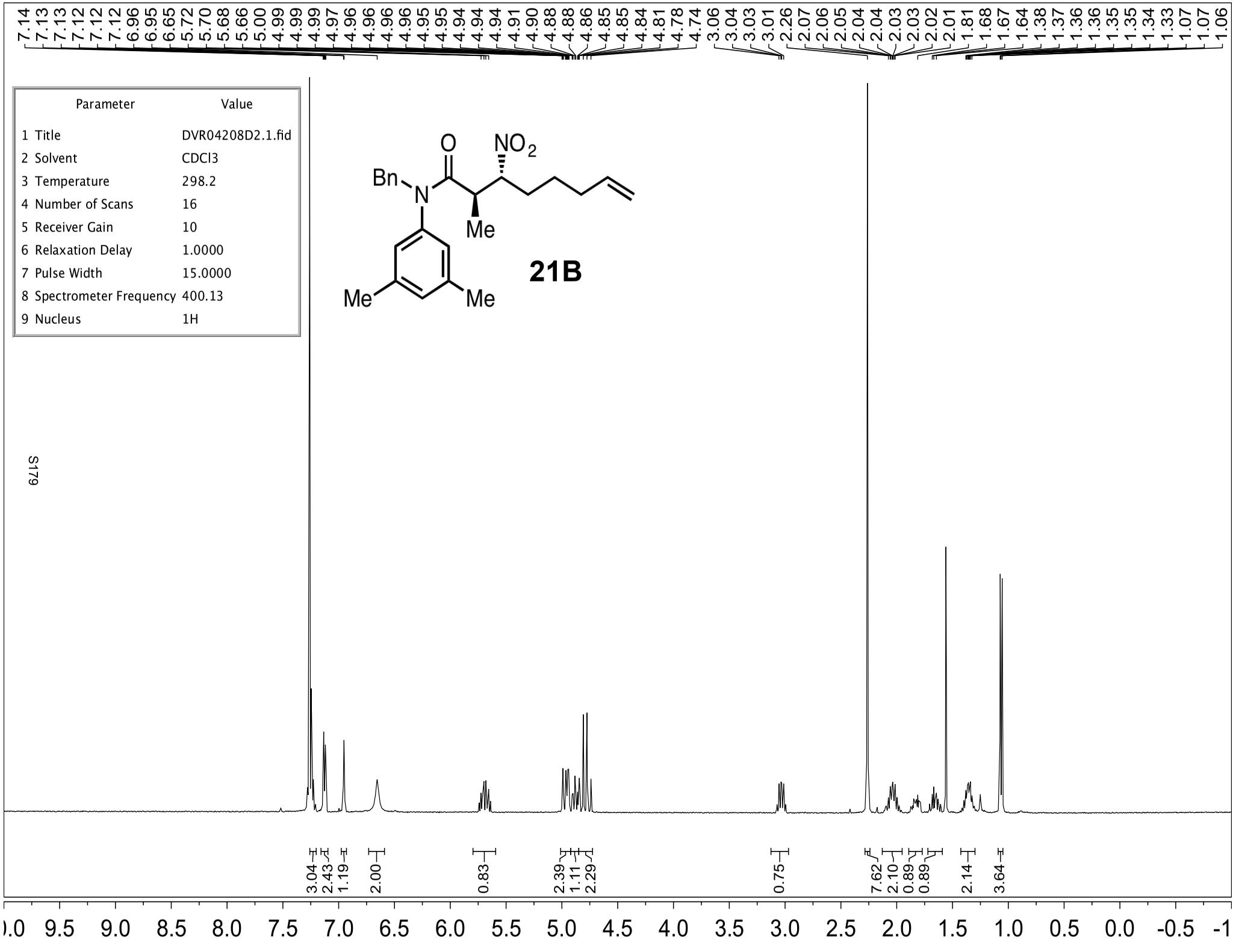
Parameter	Value
1 Title	DVR04208CRD.1.fid
2 Solvent	CDCl3
3 Temperature	300.0
4 Number of Scans	16
5 Receiver Gain	114
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H

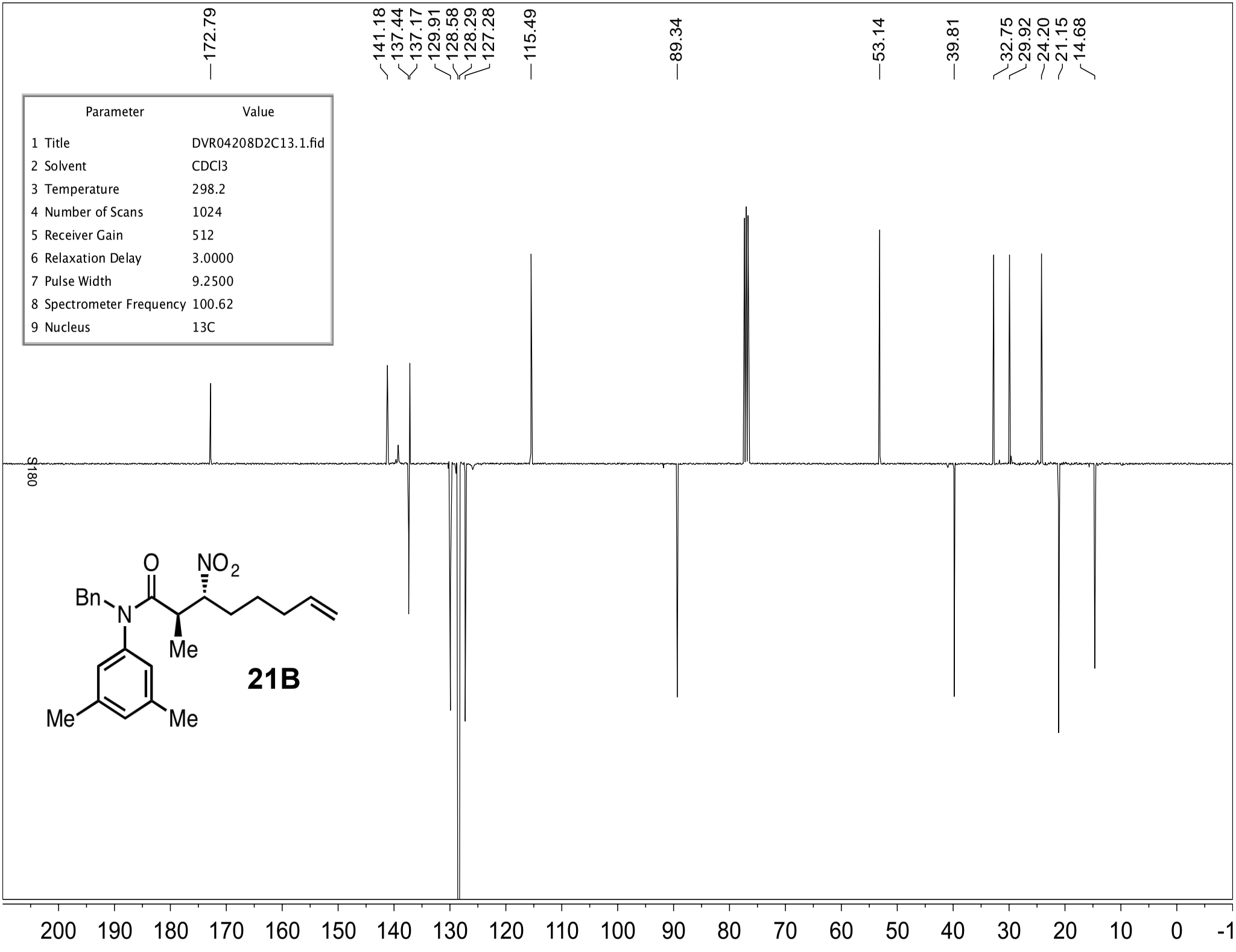
21A **Crude** **83:17** **21B**



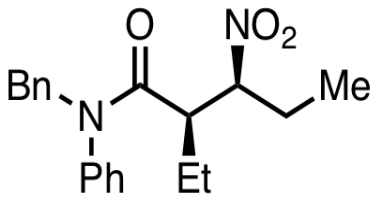

7.29 7.29 7.28 7.27 7.27 7.26 7.18 7.17 7.17 7.16 7.16 6.98 6.98 6.98 6.98 6.49 5.75 5.73 5.71 5.69 5.03 5.03 5.00 5.00 5.00 5.00 4.99 4.99 4.98 4.98 4.98 4.97 4.97 4.93 4.90 4.77 4.76 4.73 4.73 4.69 2.87 2.85 2.84 2.83 2.26 2.08 2.08 2.07 2.06 2.06 2.05 2.04 2.04 1.77 1.75 1.75 1.75 1.74 1.73 1.73 1.71 1.42 1.40 1.32 1.08 1.07
Parameter Value
1 Title DVR04208D1.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 16
5 Receiver Gain 10
6 Relaxation Delay 1.0000
7 Pulse Width 15.0000
8 Spectrometer Frequency 400.13
9 Nucleus 1H
O
NO2
Bn
N
Me
Me
Me
21A
S177
3.03 2.27 1.10 2.13 0.95 2.25 1.13 1.01 0.92 1.00 6.94 2.26 2.30 1.13 1.10 3.42
0.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1

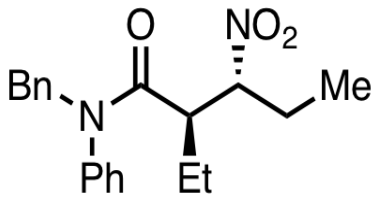

171.73
141.00
139.64
137.40
137.13
130.28
128.87
128.35
127.54
125.76
115.46
91.79
53.18
40.92
32.80
31.72
24.85
21.16
15.65
Parameter Value
1 Title DVR04208D1C13.1.fid
2 Solvent CDCl3
3 Temperature 298.1
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
S178
O
NO2
Bn
N
Me
Me
Me
21A
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1


7.14 7.13 7.13 7.12 7.12 7.12 6.96 6.95 6.65 5.72 5.70 5.68 5.66 5.00 4.99 4.99 4.99 4.97 4.96 4.96 4.96 4.96 4.95 4.95 4.94 4.94 4.94 4.91 4.90 4.88 4.88 4.86 4.85 4.85 4.84 4.81 4.78 4.74 3.06 3.04 3.03 3.01 2.26 2.07 2.06 2.05 2.04 2.04 2.03 2.03 2.02 2.01 1.81 1.68 1.67 1.64 1.38 1.37 1.36 1.36 1.35 1.35 1.34 1.33 1.07 1.07 1.06
Parameter Value
1 Title DVR04208D2.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 16
5 Receiver Gain 10
6 Relaxation Delay 1.0000
7 Pulse Width 15.0000
8 Spectrometer Frequency 400.13
9 Nucleus 1H
O
NO2
Bn
N
Me
Me
Me
21B
S179
3.04 2.43 1.19 2.00 0.83 2.39 1.11 2.29 0.75 7.62 2.10 0.89 0.89 2.14 3.64
0.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1


172.79
141.18
137.44
137.17
129.91
128.58
128.29
127.28
115.49
89.34
53.14
39.81
32.75
29.92
24.20
21.15
14.68
Parameter Value
1 Title DVR04208D2C13.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
9180
O
NO2
Bn
N
Me
Me
Me
21B
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

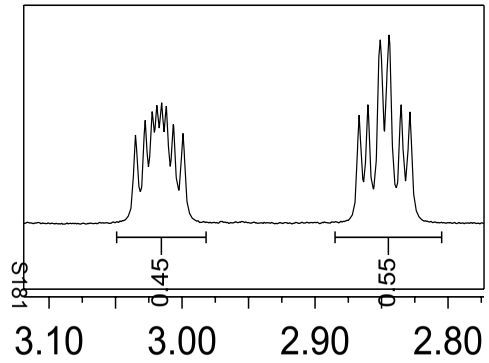
Parameter	Value
1 Title	DVR04150CRD.1.fid
2 Solvent	CDCl3
3 Temperature	297.9
4 Number of Scans	16
5 Receiver Gain	114
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H

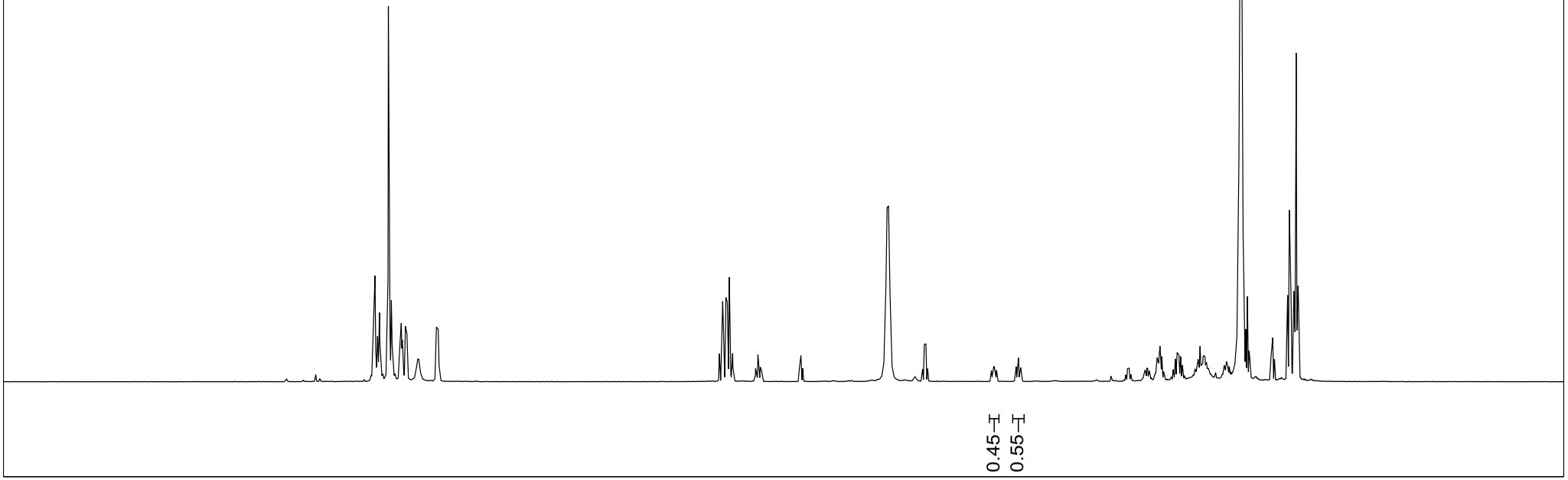




Crude

22A **55:45** **22B**

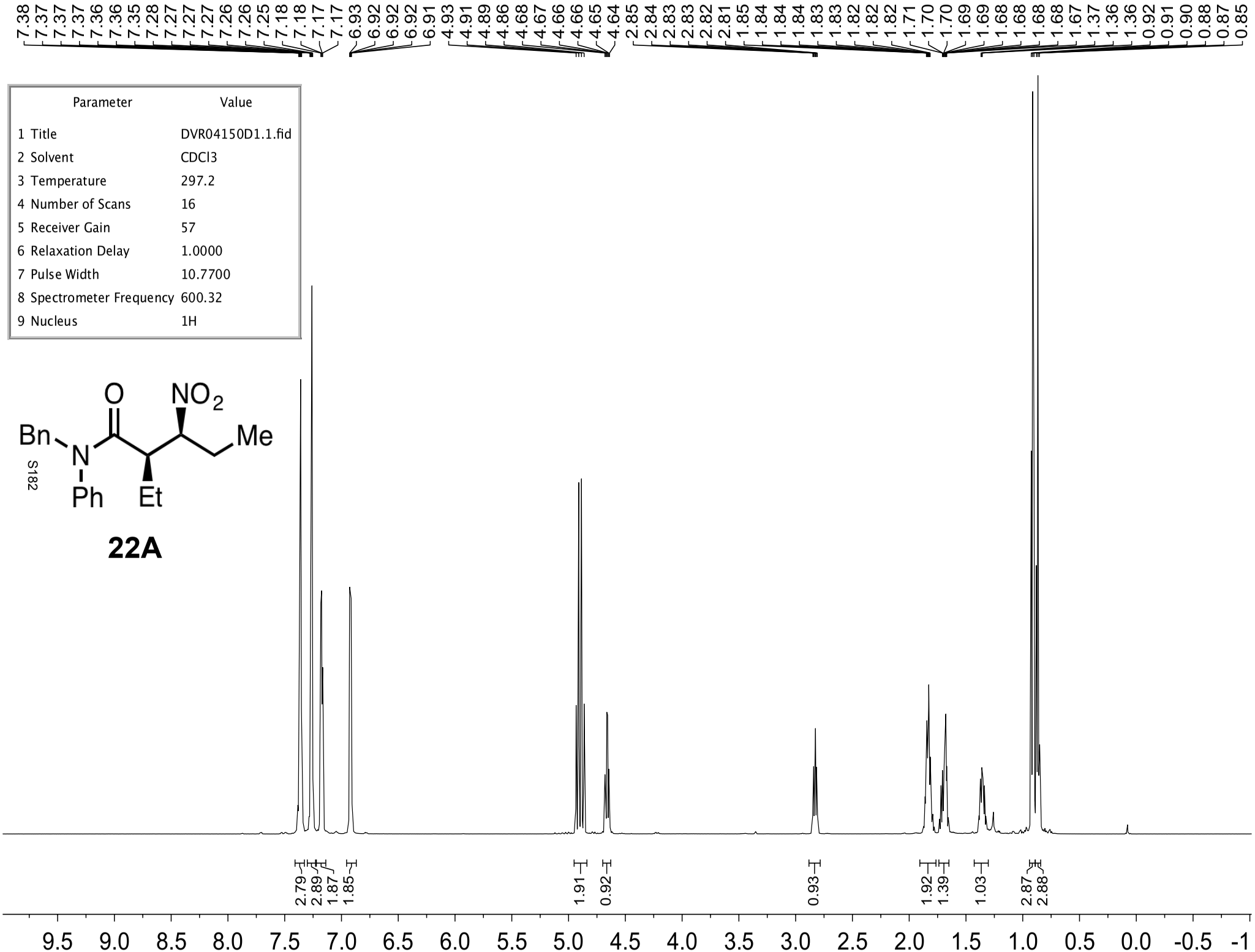


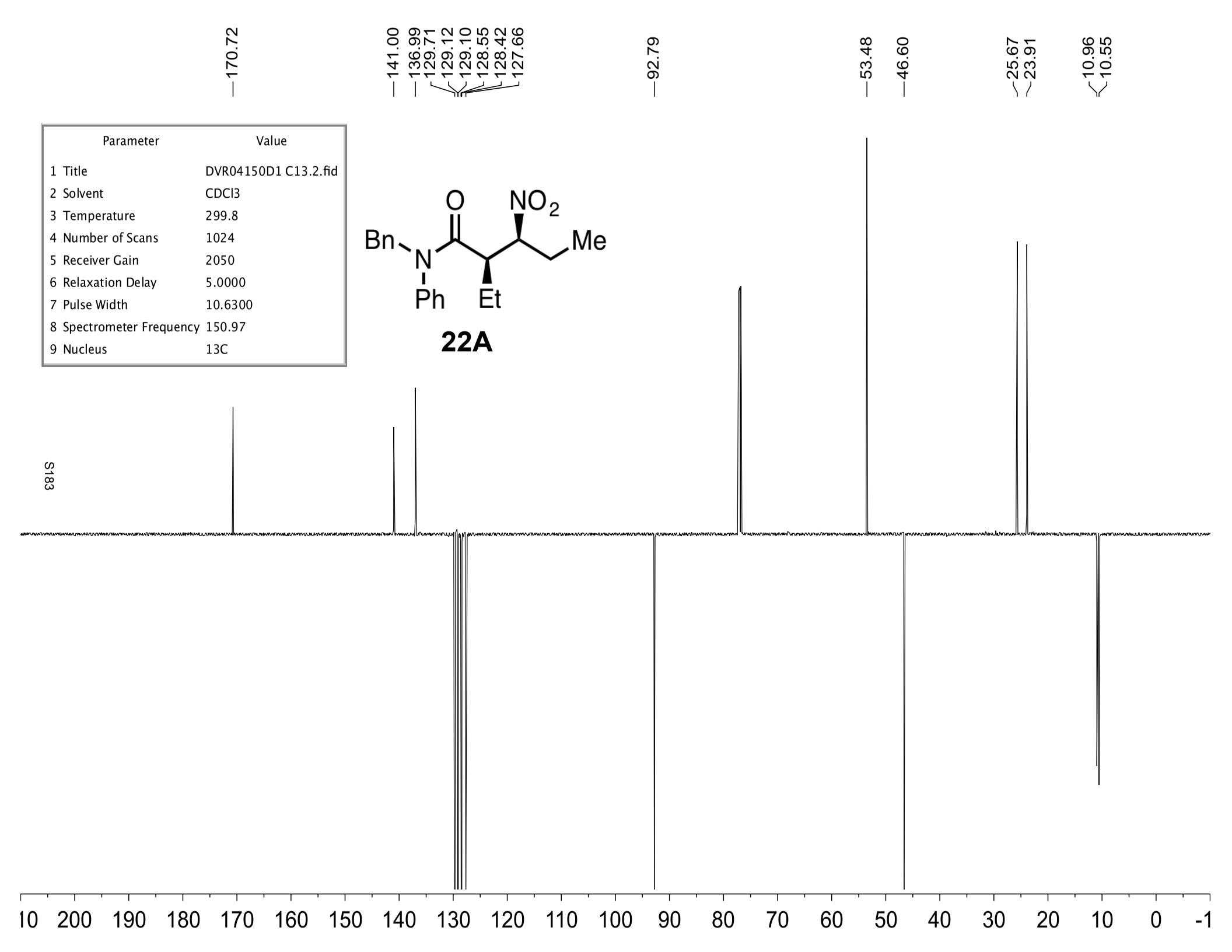


Parameter	Value
1 Title	DVR04150D1.1.fid
2 Solvent	CDCl3
3 Temperature	297.2
4 Number of Scans	16
5 Receiver Gain	57
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H

S182

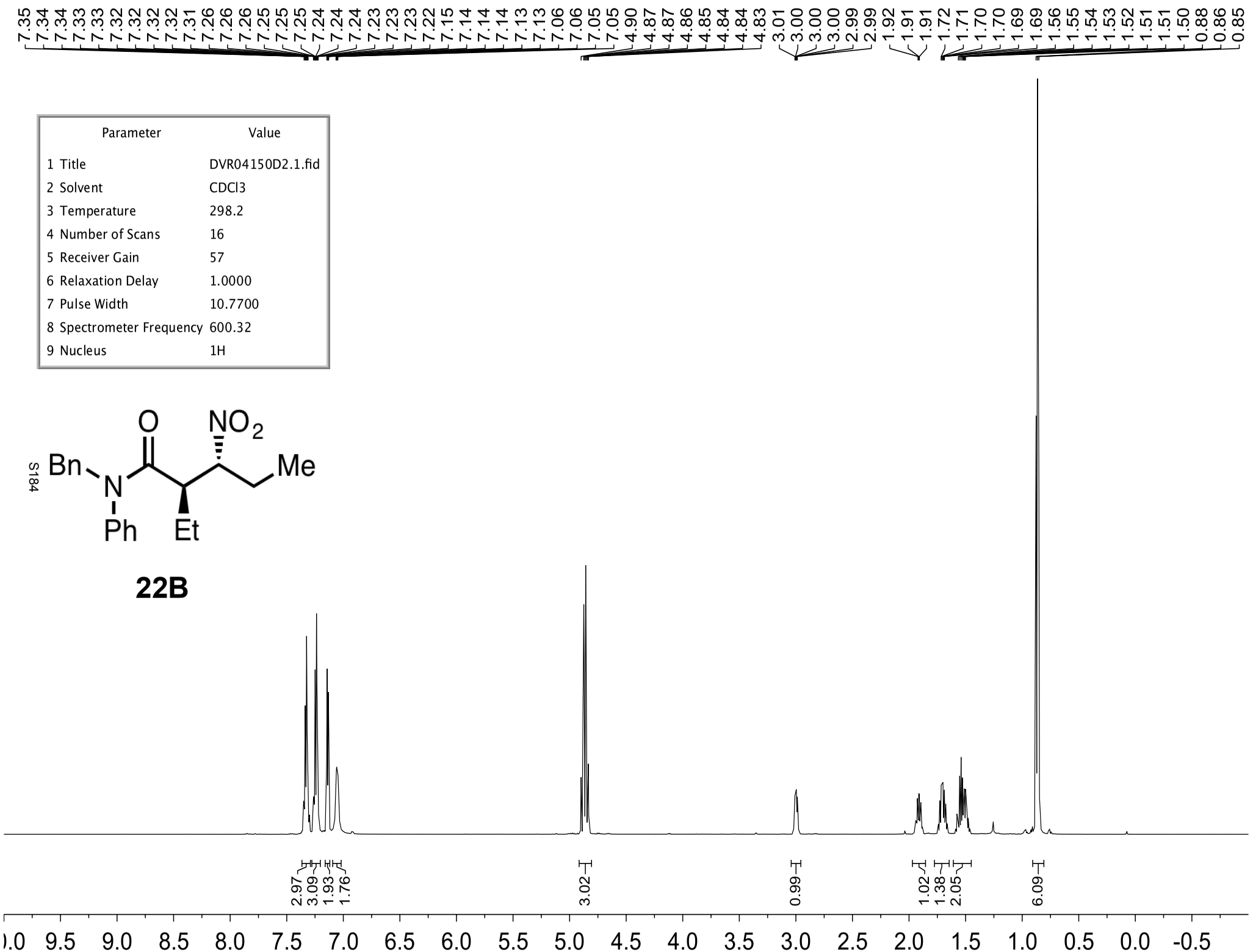
22A

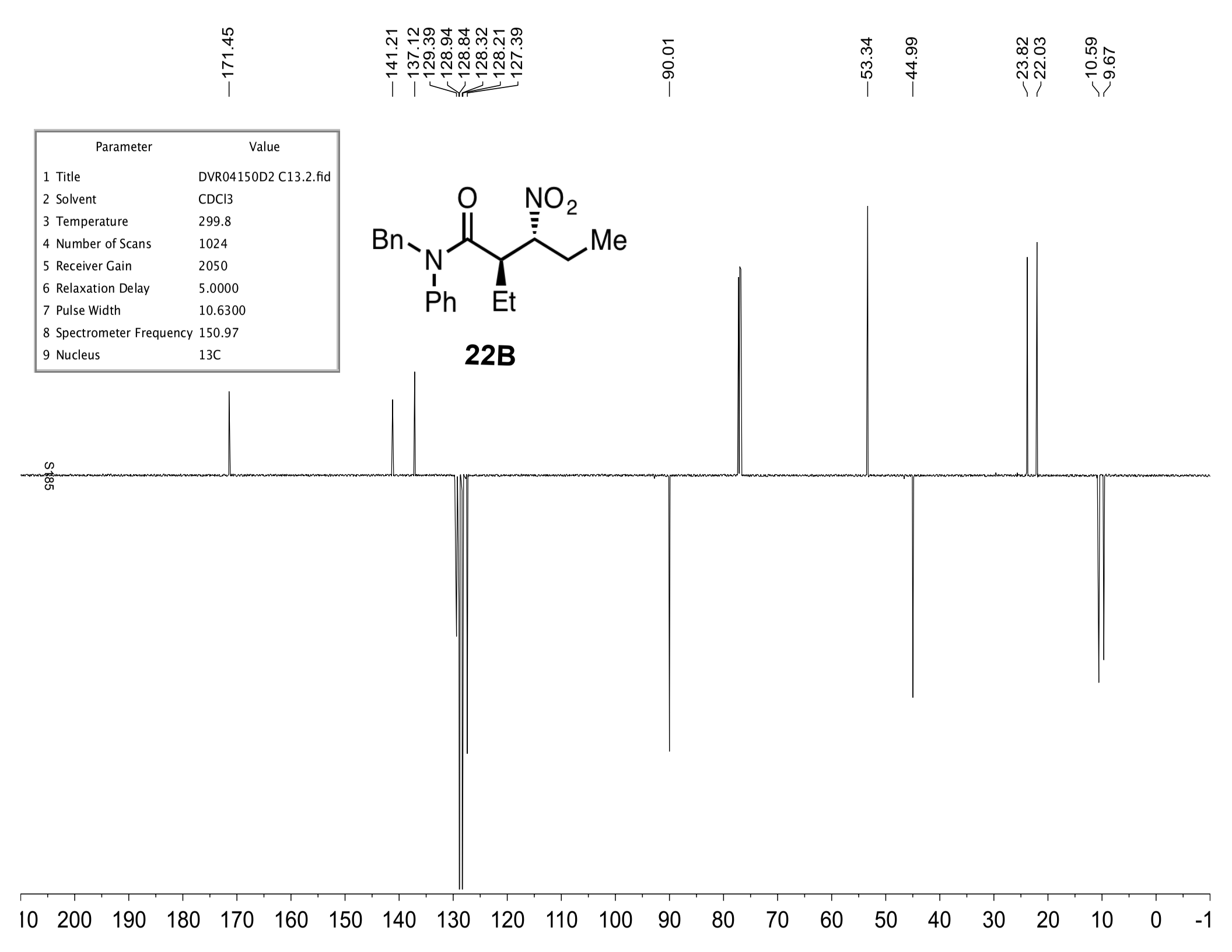



170.72
141.00
136.99
129.71
129.12
129.10
128.55
128.42
127.66
92.79
53.48
46.60
25.67
23.91
10.96
10.55
Parameter Value
1 Title DVR04150D1 C13.2.fid
2 Solvent CDCl3
3 Temperature 299.8
4 Number of Scans 1024
5 Receiver Gain 2050
6 Relaxation Delay 5.0000
7 Pulse Width 10.6300
8 Spectrometer Frequency 150.97
9 Nucleus 13C
O
NO2
Bn
N
Me
Ph
Et
22A
S183
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10

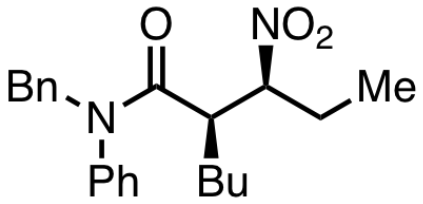
Parameter	Value
1 Title	DVR04150D2.1.fid
2 Solvent	CDCl3
3 Temperature	298.2
4 Number of Scans	16
5 Receiver Gain	57
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H

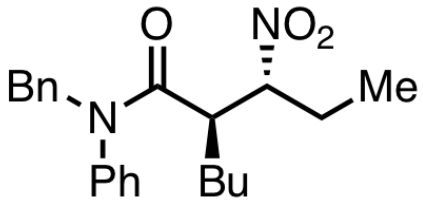
22B




171.45
141.21
137.12
129.39
128.94
128.84
128.32
128.21
127.39
90.01
53.34
44.99
23.82
22.03
10.59
9.67
Parameter
Value
1 Title
DVR04150D2 C13.2.fid
2 Solvent
CDCl3
3 Temperature
299.8
4 Number of Scans
1024
5 Receiver Gain
2050
6 Relaxation Delay
5.0000
7 Pulse Width
10.6300
8 Spectrometer Frequency
150.97
9 Nucleus
13C
O
NO2
Bn
N
Me
Ph
Et
22B
S485
10 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

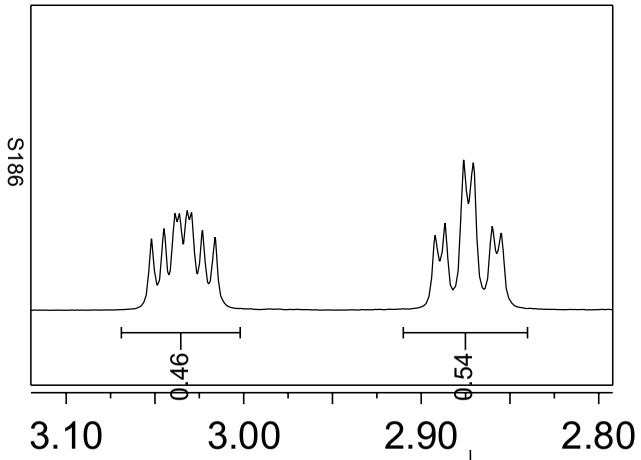
Parameter	Value
1 Title	RS-01-229-crude.1.fid
2 Solvent	CDCl3
3 Temperature	300.0
4 Number of Scans	16
5 Receiver Gain	32
6 Relaxation Delay	10.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H

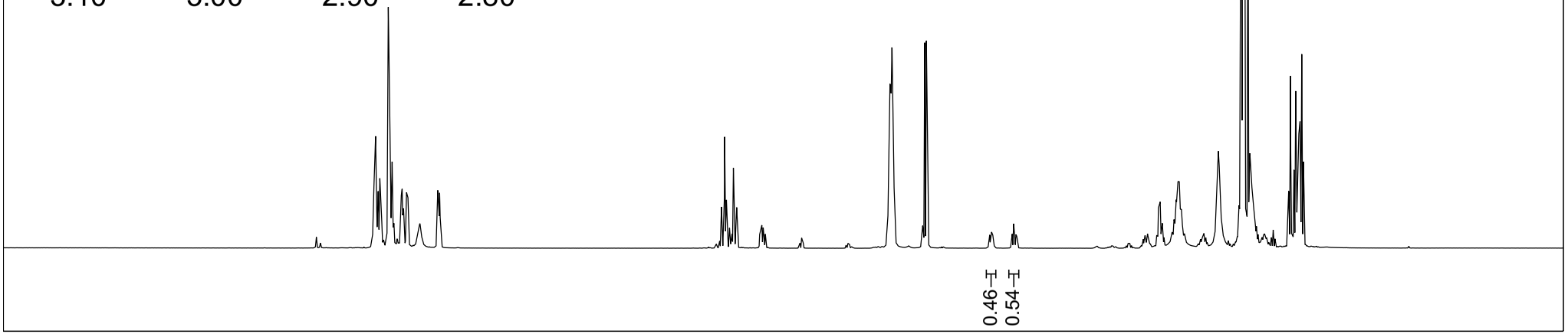




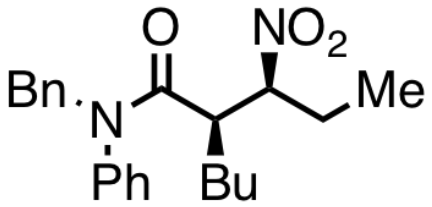
23A **Crude** **23B**

54:46

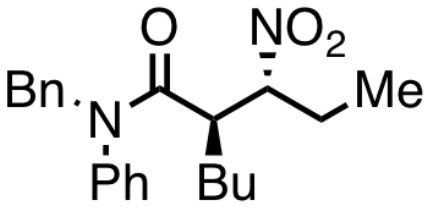




Parameter	Value
1 Title	RS-01-229-run2.1.fid
2 Solvent	CDCl3
3 Temperature	298.2
4 Number of Scans	64
5 Receiver Gain	11
6 Relaxation Delay	6.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H



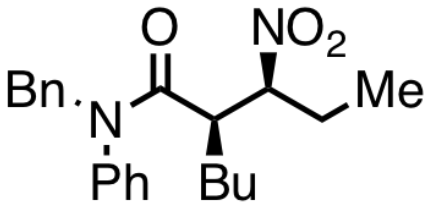
23A



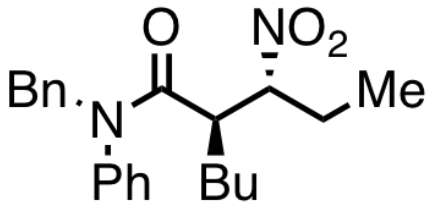
23B

171.71
170.94
141.14
140.89
137.09
136.94
129.72
129.41
129.14
129.08
128.90
128.83
128.57
128.43
128.34
128.23
127.69
127.43
93.11
90.26
53.49
53.34
45.59
44.24
30.71
28.82
28.63
28.25
25.68
23.89
22.89
22.72
13.79
13.78
10.63
9.78

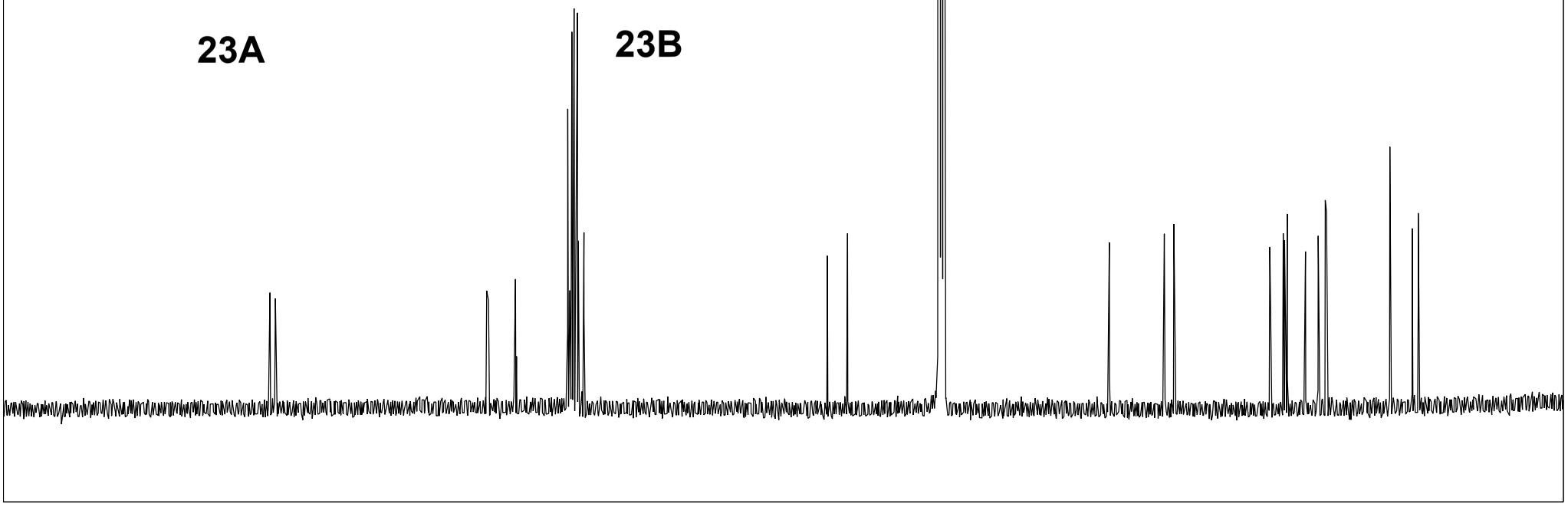
Parameter	Value
1 Title	RS-01-229-run2-13C.1.fid
2 Solvent	CDCl3
3 Temperature	298.2
4 Number of Scans	1024
5 Receiver Gain	512
6 Relaxation Delay	2.0000
7 Pulse Width	9.2500
8 Spectrometer Frequency	100.62
9 Nucleus	13C



23A

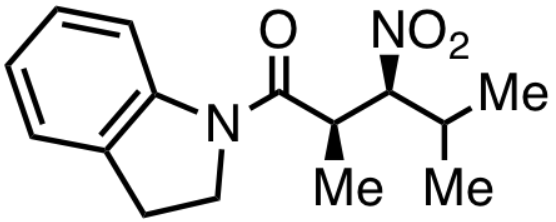


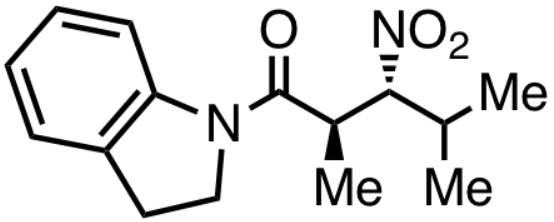
23B



200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

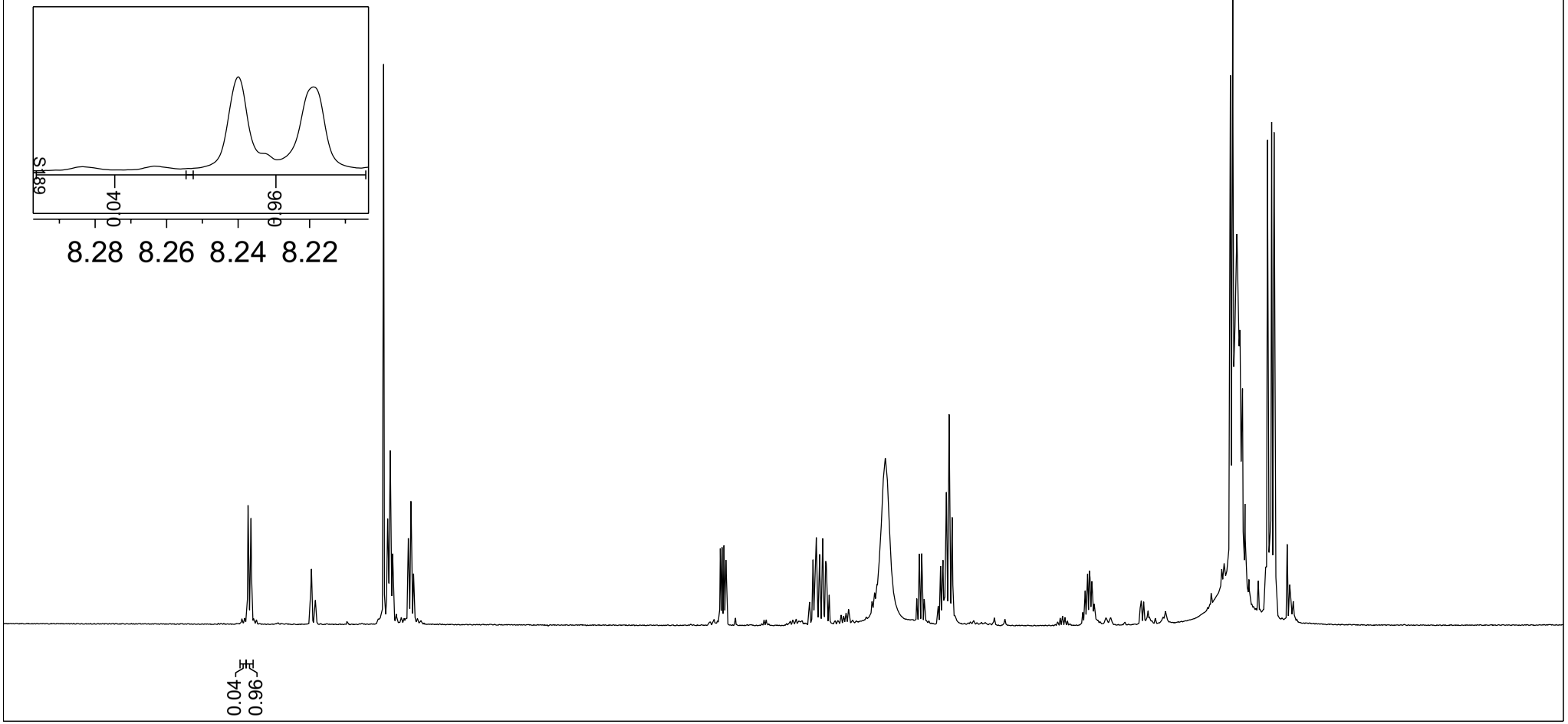
Parameter	Value
1 Title	DVR05049CRD CDCL3.1.fid
2 Solvent	CDCl3
3 Temperature	298.2
4 Number of Scans	16
5 Receiver Gain	10
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H

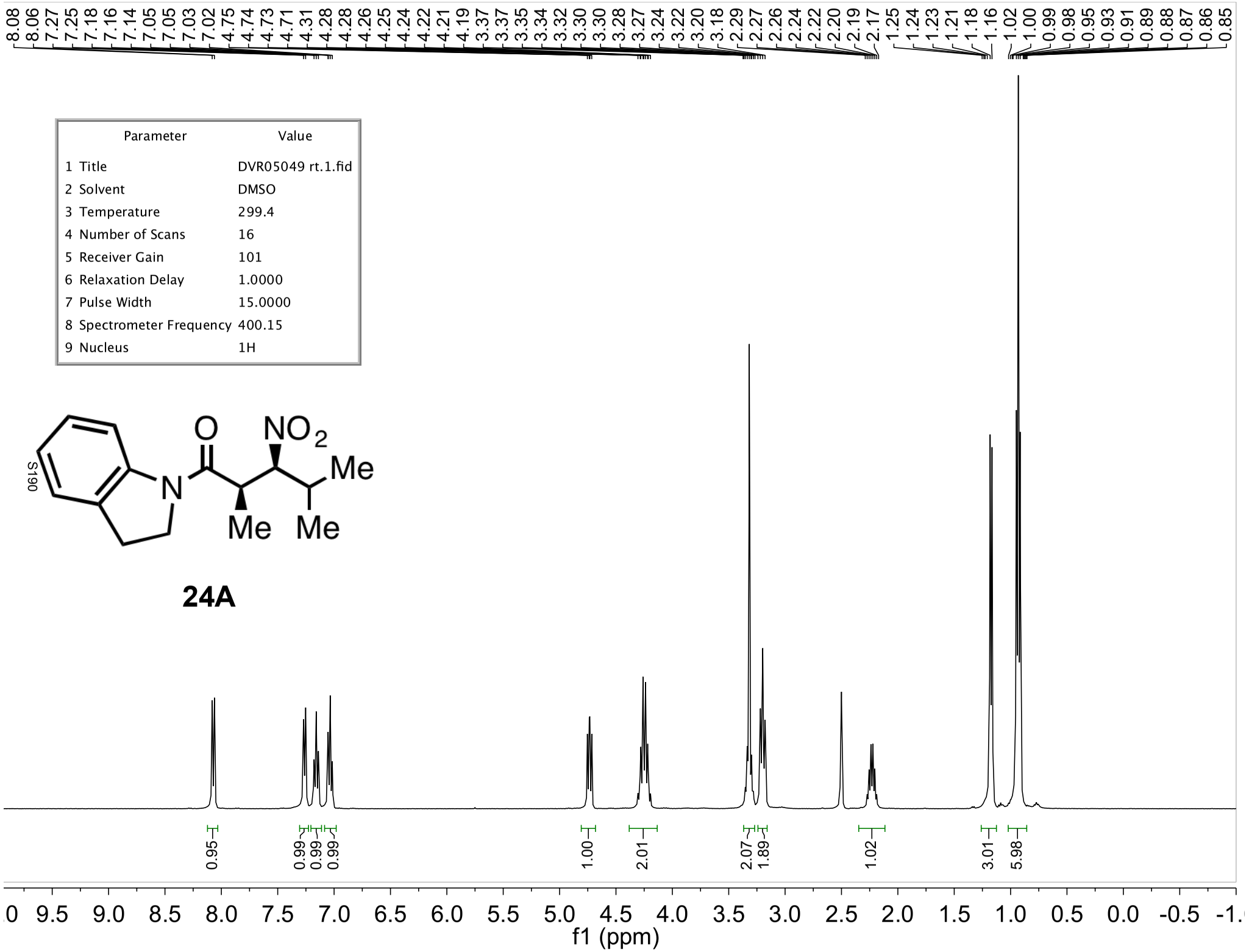


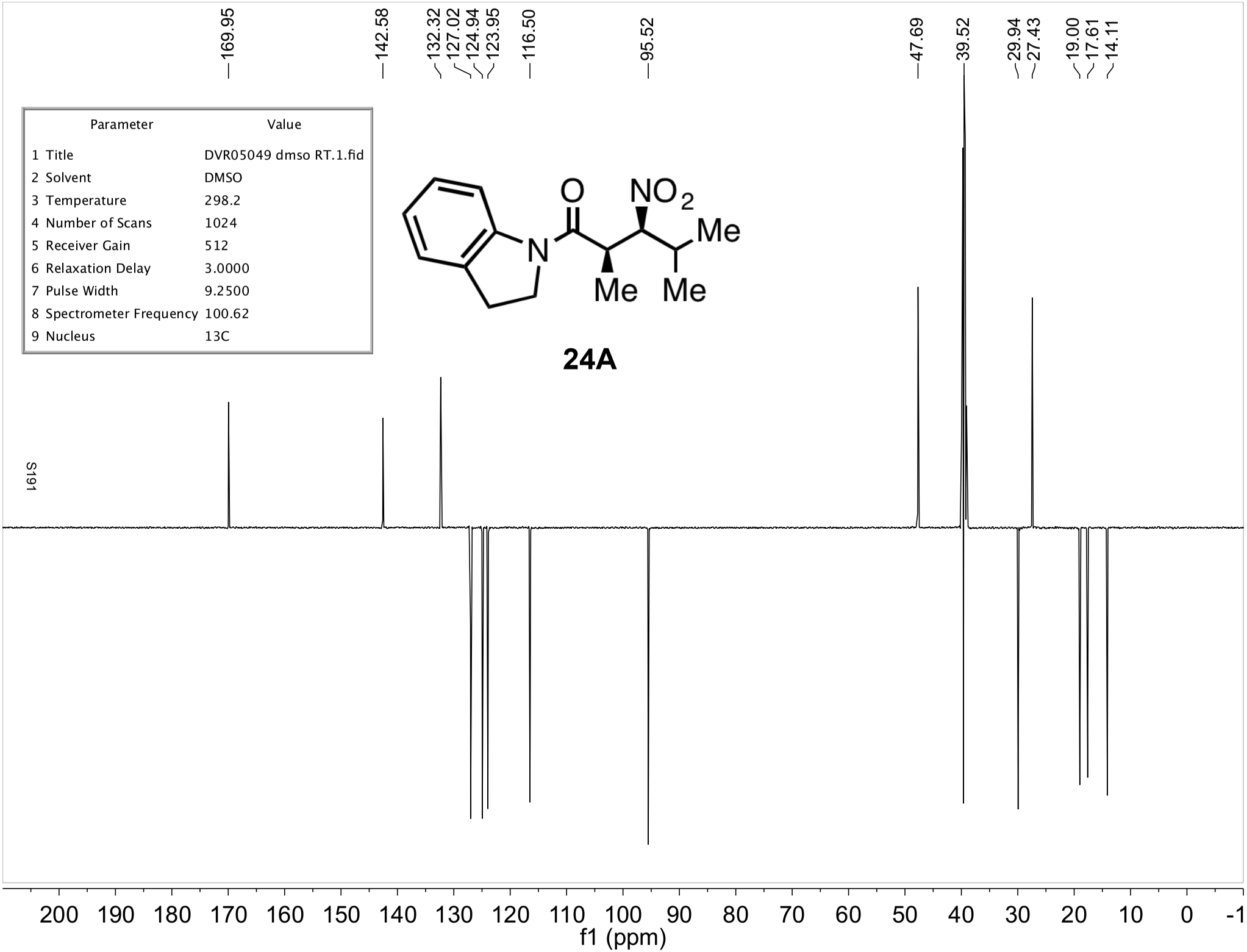


Crude

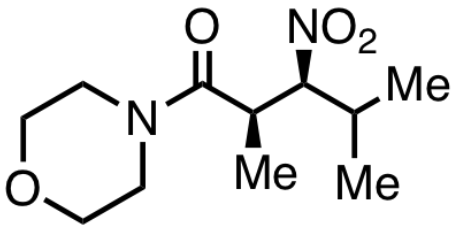
24A 96:04 **24B**

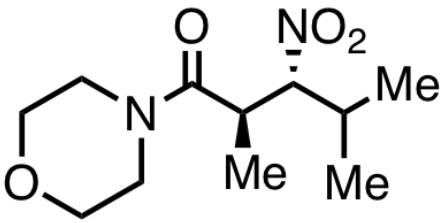



8.08 8.06 7.27 7.25 7.18 7.16 7.14 7.05 7.05 7.03 7.02 4.75 4.74 4.73 4.71 4.31 4.28 4.28 4.26 4.25 4.24 4.22 4.21 4.19 3.37 3.37 3.35 3.34 3.32 3.30 3.30 3.28 3.27 3.24 3.22 3.20 3.18 2.29 2.27 2.26 2.24 2.22 2.20 2.19 2.17 1.25 1.24 1.23 1.21 1.18 1.16 1.02 1.00 0.99 0.98 0.95 0.93 0.91 0.89 0.88 0.87 0.86 0.85
Parameter Value
1 Title DVR05049 rt.1.fid
2 Solvent DMSO
3 Temperature 299.4
4 Number of Scans 16
5 Receiver Gain 101
6 Relaxation Delay 1.0000
7 Pulse Width 15.0000
8 Spectrometer Frequency 400.15
9 Nucleus 1H
S190
O
NO2
Me
N
Me
Me
24A
0.95
0.99
0.99
0.99
1.00
2.01
2.07
1.89
1.02
3.01
5.98
f1 (ppm)


169.95
142.58
132.32
127.02
124.94
123.95
116.50
95.52
47.69
39.52
29.94
27.43
19.00
17.61
14.11
Parameter
Value
1 Title
DVR05049 dmso RT.1.fid
2 Solvent
DMSO
3 Temperature
298.2
4 Number of Scans
1024
5 Receiver Gain
512
6 Relaxation Delay
3.0000
7 Pulse Width
9.2500
8 Spectrometer Frequency
100.62
9 Nucleus
13C
O
NO2
N
Me
Me
Me
24A
S191
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1
f1 (ppm)

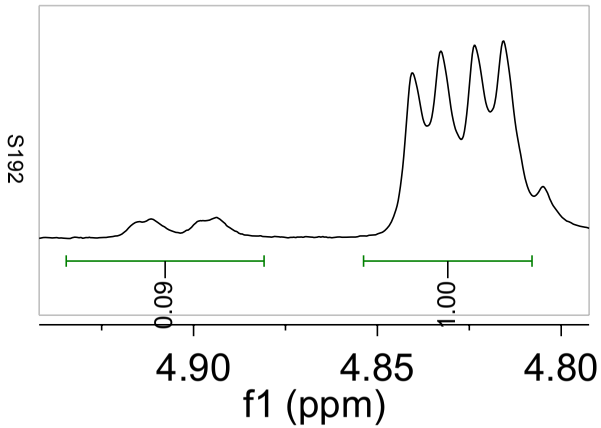
Parameter	Value
1 Title	DVR05024CRD.1.fid
2 Solvent	CDCl3
3 Temperature	298.0
4 Number of Scans	16
5 Receiver Gain	161
6 Relaxation Delay	1.0000
7 Pulse Width	13.5000
8 Spectrometer Frequency	600.32
9 Nucleus	1H

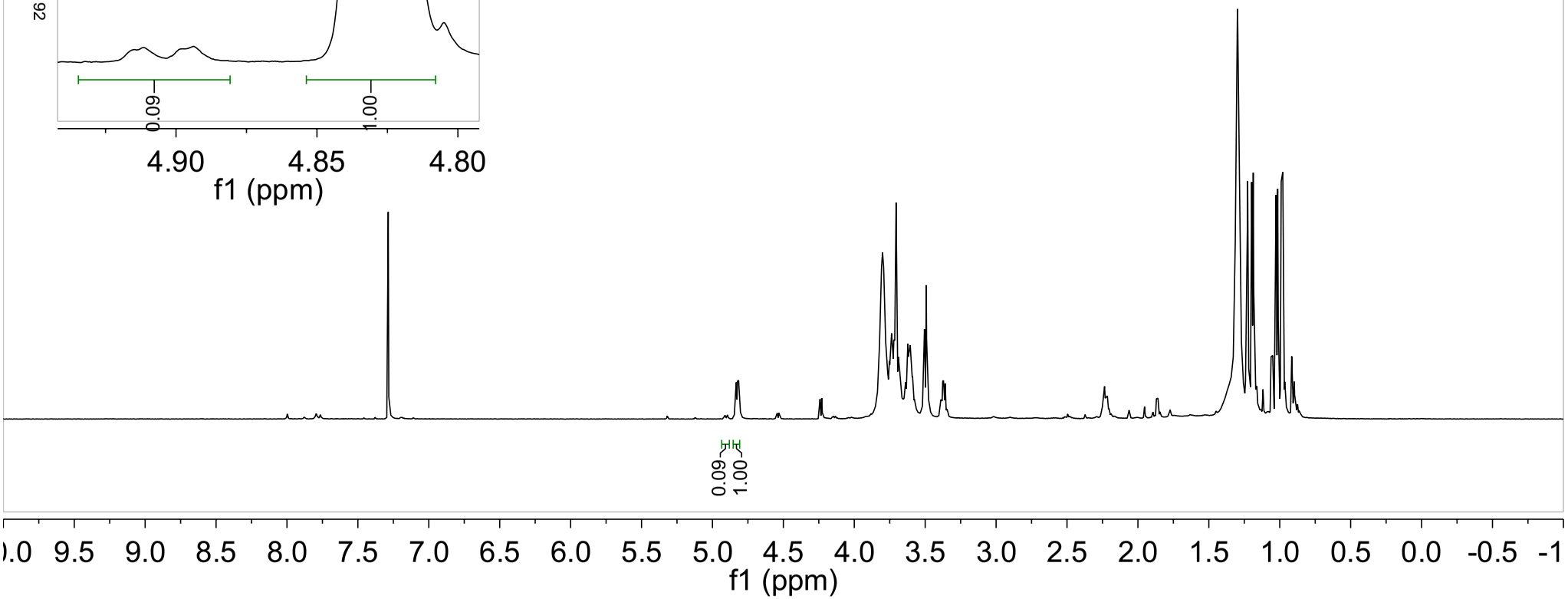


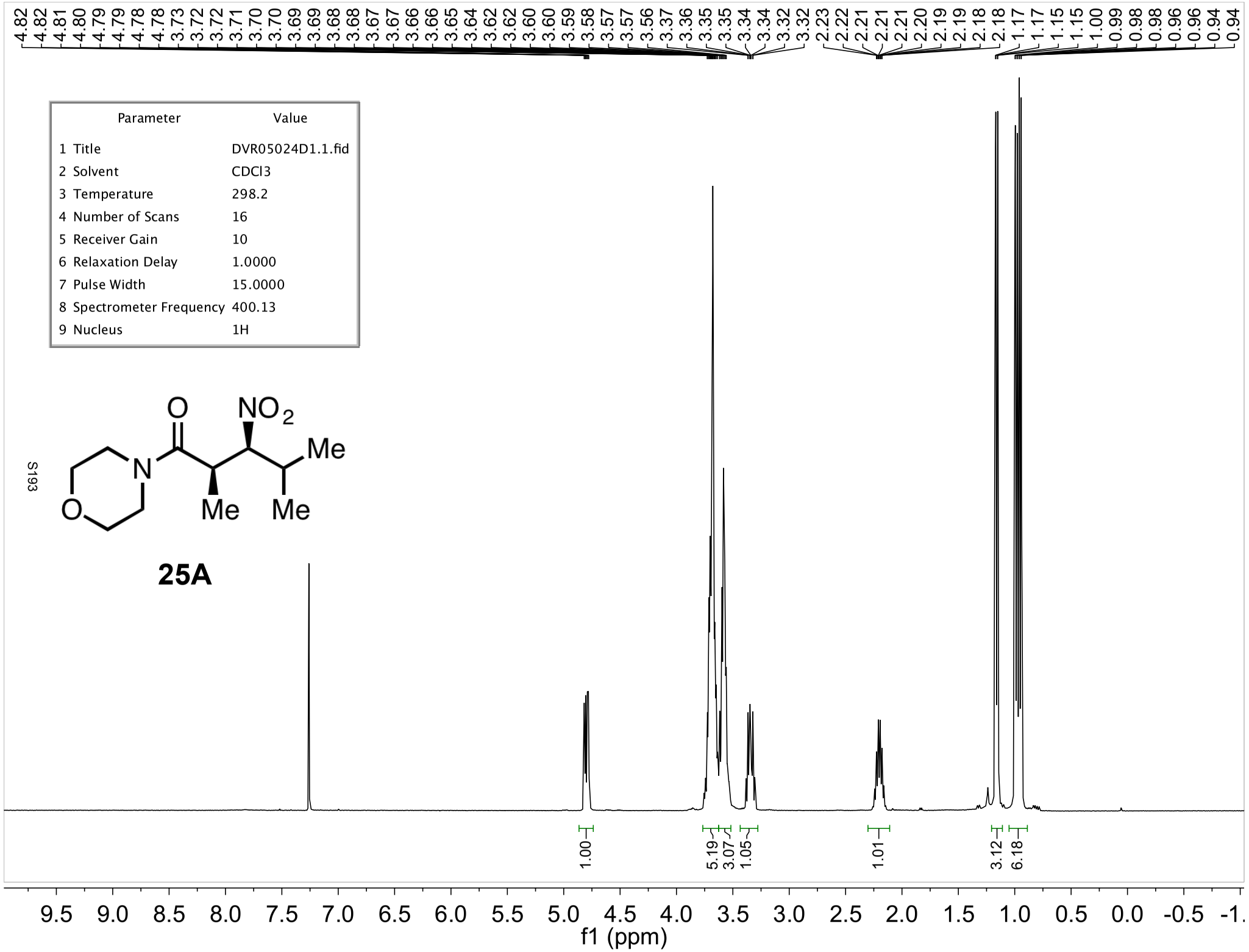


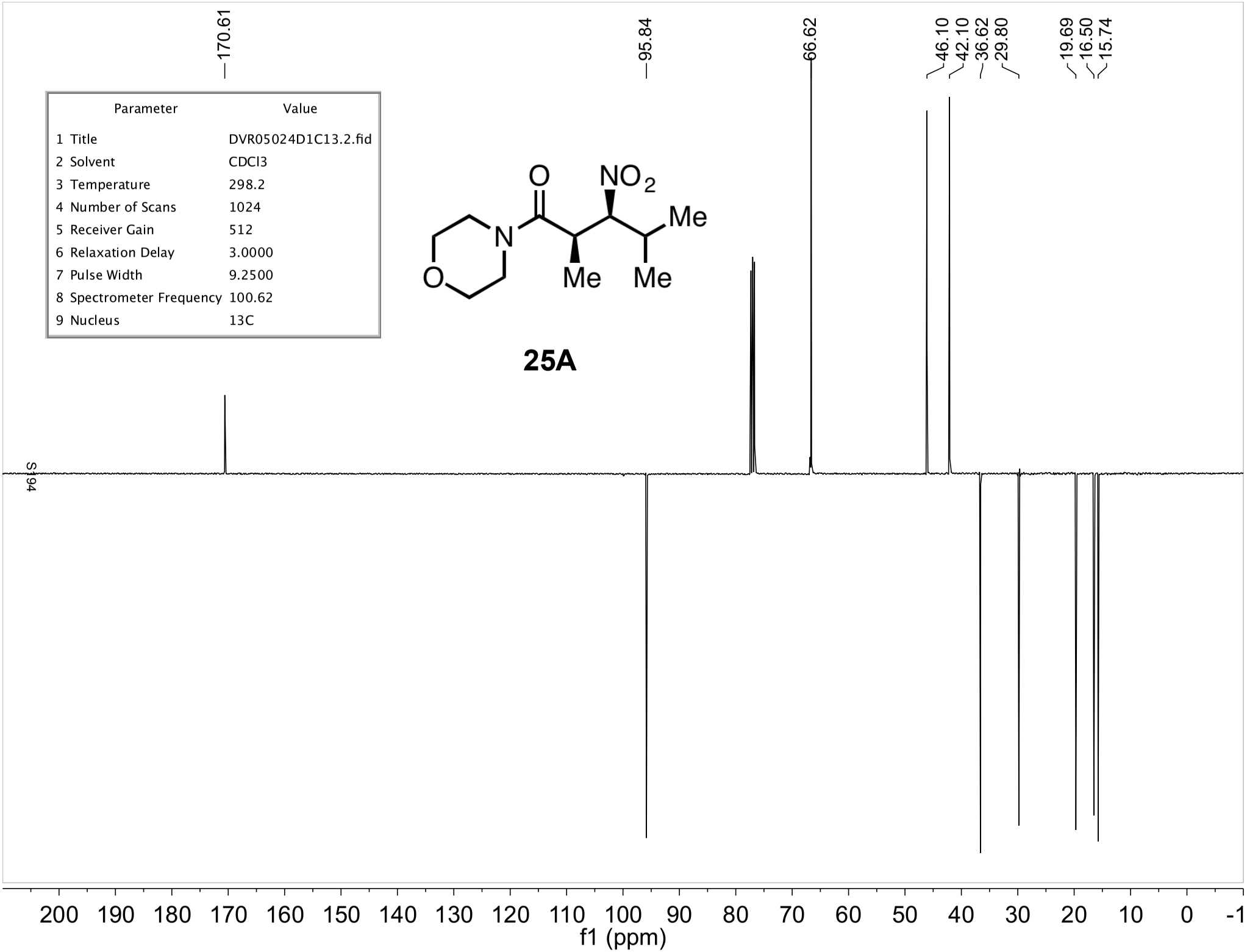
Crude

25A **92:08** **25B**

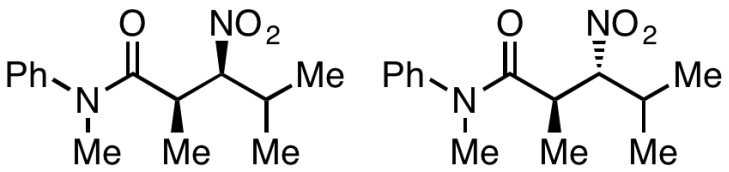





4.82 4.82 4.81 4.80 4.79 4.79 4.78 4.78 3.73 3.72 3.72 3.71 3.70 3.70 3.69 3.69 3.68 3.68 3.67 3.67 3.66 3.66 3.65 3.64 3.62 3.62 3.60 3.60 3.59 3.58 3.57 3.57 3.56 3.37 3.36 3.35 3.35 3.34 3.34 3.32 3.32 2.23 2.22 2.21 2.21 2.21 2.20 2.19 2.19 2.18 2.18 1.17 1.17 1.15 1.15 1.00 0.99 0.98 0.98 0.96 0.96 0.94 0.94
Parameter Value
1 Title DVR05024D1.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 16
5 Receiver Gain 10
6 Relaxation Delay 1.0000
7 Pulse Width 15.0000
8 Spectrometer Frequency 400.13
9 Nucleus 1H
O
NO2
Me
N
O
Me
Me
S193
25A
1.00
5.19
3.07
1.05
1.01
3.12
6.18
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.
f1 (ppm)

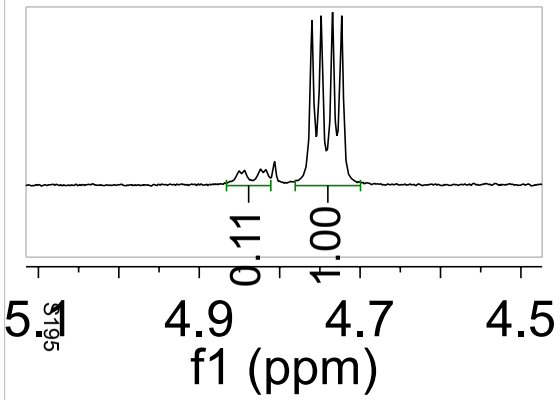

170.61
95.84
66.62
46.10
42.10
36.62
29.80
19.69
16.50
15.74
Parameter Value
1 Title DVR05024D1C13.2.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
O
NO2
N
O
Me
Me
Me
25A
S194
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1
f1 (ppm)

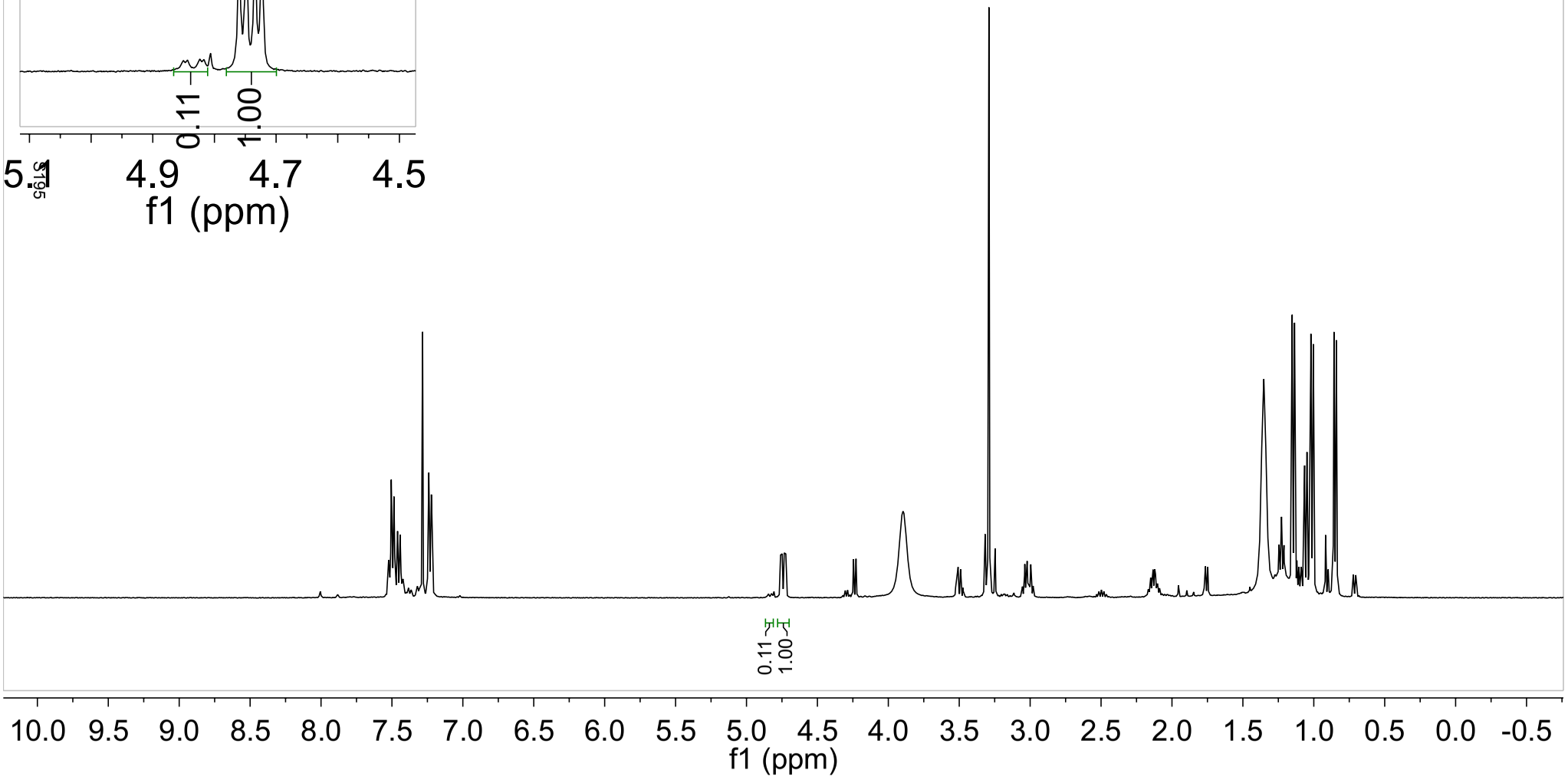
Parameter	Value
1 Title	DVR05052crd.1.fid
2 Solvent	CDCl3
3 Temperature	297.7
4 Number of Scans	16
5 Receiver Gain	203
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.15
9 Nucleus	1H

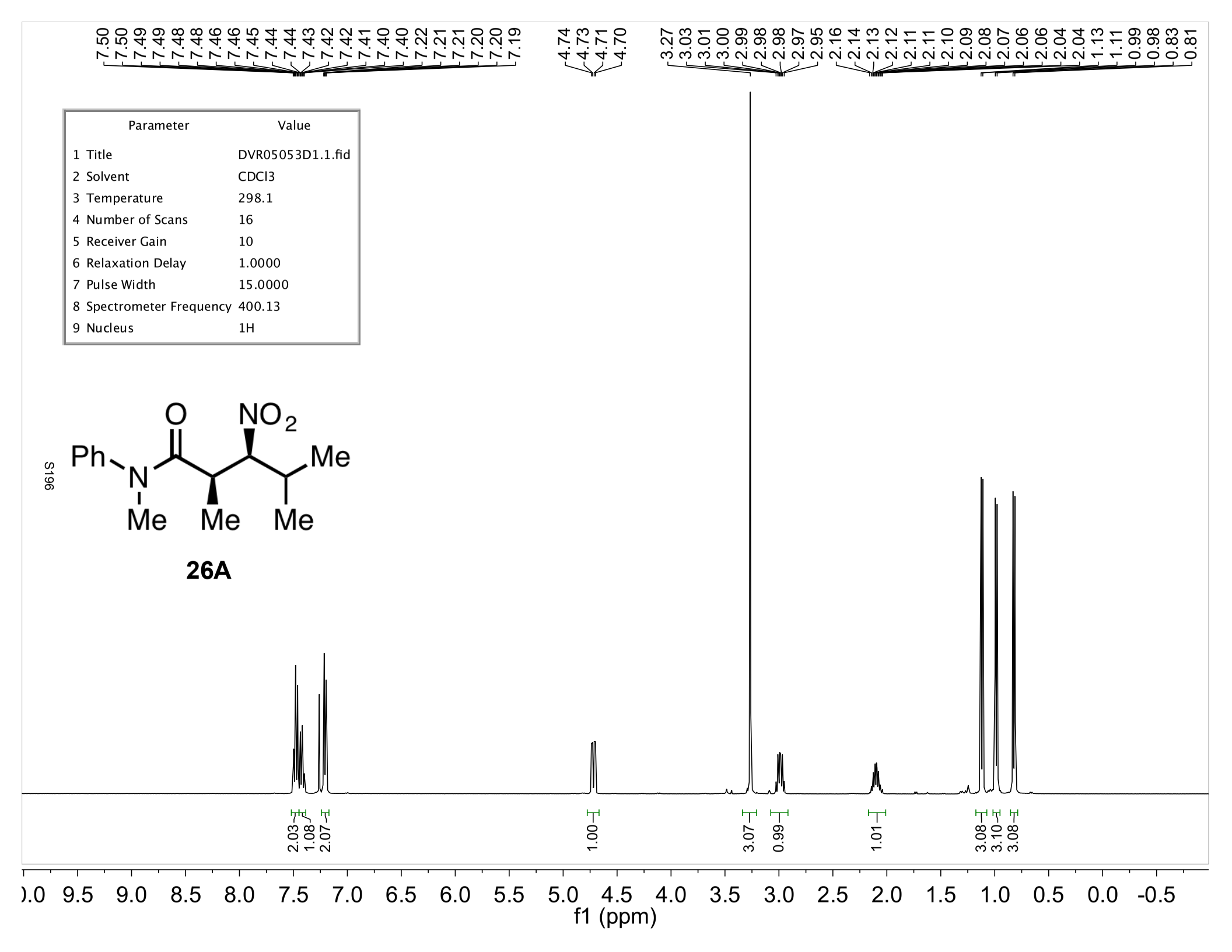


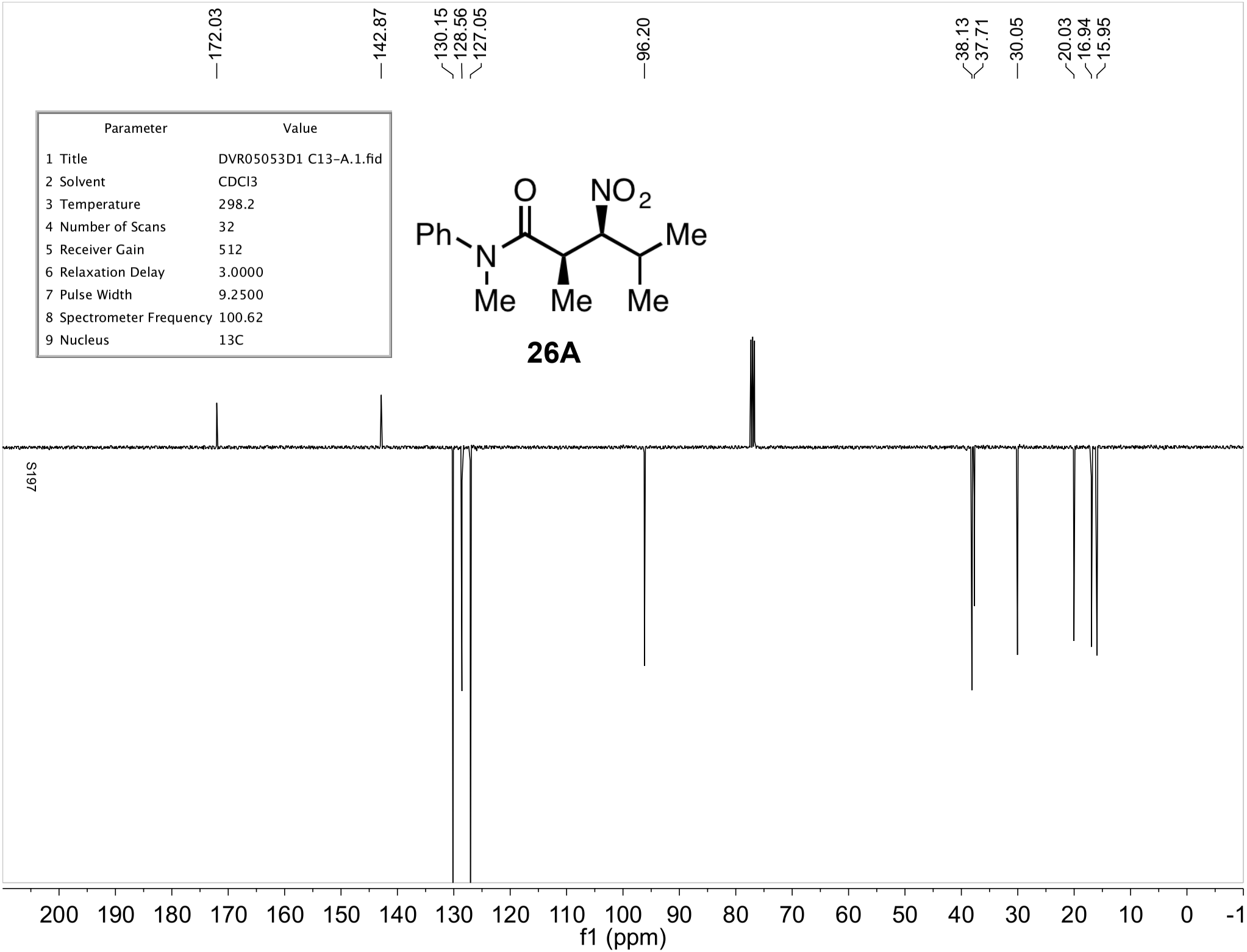
Crude

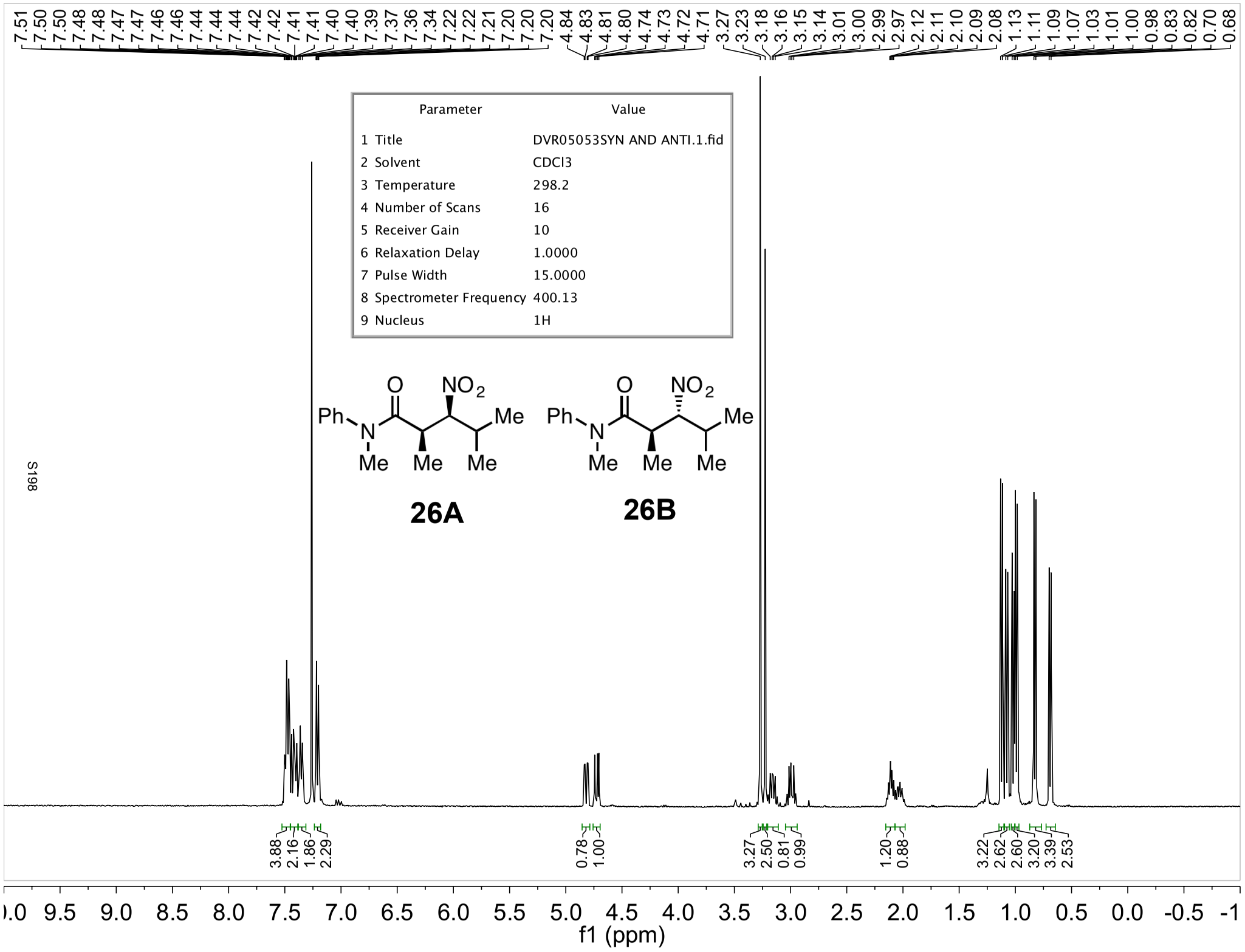
26A **91:09** **26B**

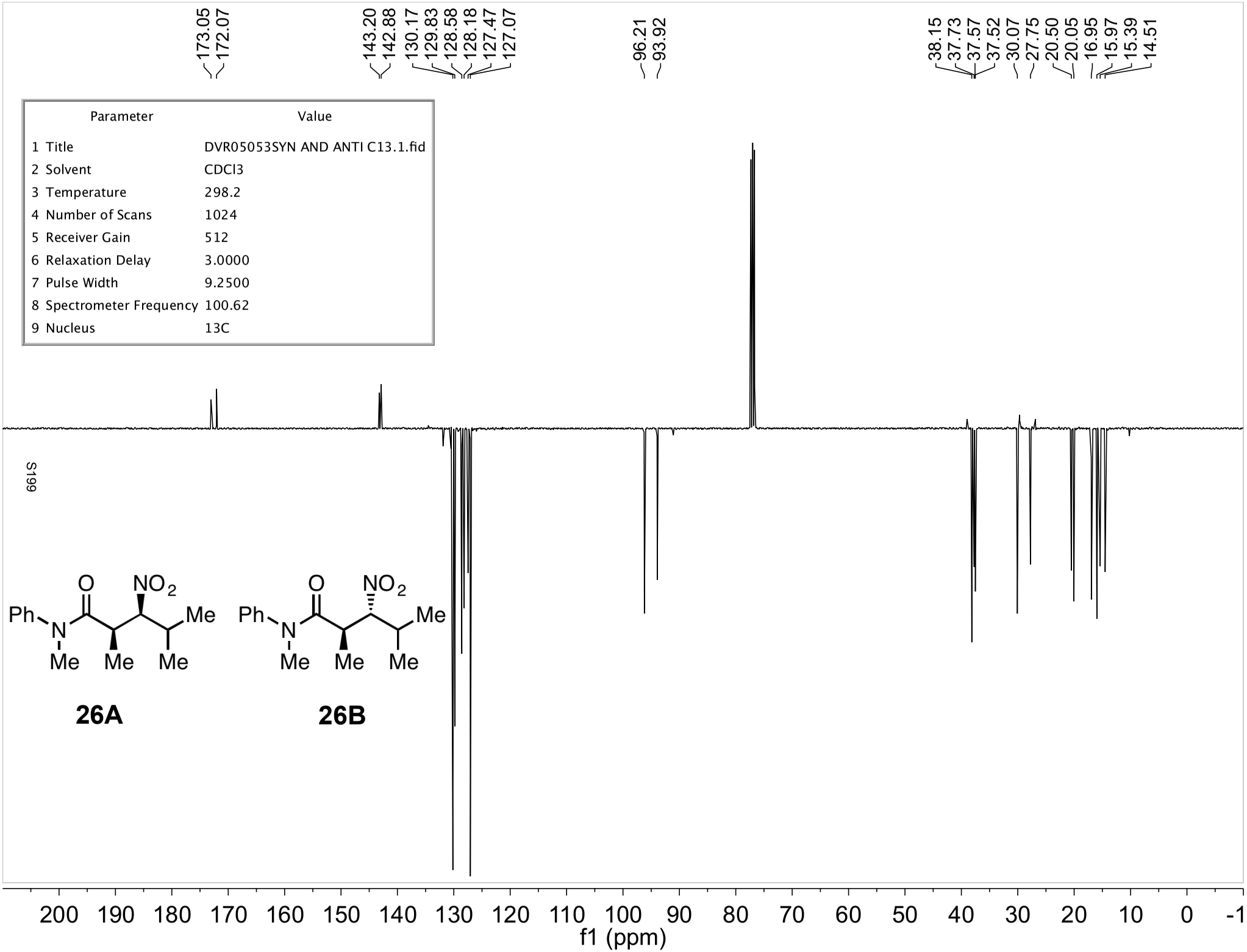





7.50 7.50 7.49 7.49 7.48 7.48 7.46 7.46 7.45 7.44 7.44 7.43 7.42 7.42 7.41 7.40 7.40 7.22 7.21 7.21 7.20 7.20 7.19
4.74 4.73 4.71 4.70
3.27 3.03 3.01 3.00 2.99 2.98 2.98 2.97 2.95
2.16 2.14 2.13 2.12 2.11 2.11 2.10 2.09 2.08 2.07 2.06 2.06 2.04 2.04
1.13 1.11 0.99 0.98 0.83 0.81
Parameter Value
1 Title DVR05053D1.1.fid
2 Solvent CDCl3
3 Temperature 298.1
4 Number of Scans 16
5 Receiver Gain 10
6 Relaxation Delay 1.0000
7 Pulse Width 15.0000
8 Spectrometer Frequency 400.13
9 Nucleus 1H
S196
O
NO2
Ph
N
Me
Me
Me
Me
26A
2.03
1.08
2.07
1.00
3.07
0.99
1.01
3.08
3.10
3.08
f1 (ppm)


172.03
142.87
130.15
128.56
127.05
96.20
38.13
37.71
30.05
20.03
16.94
15.95
Parameter Value
1 Title DVR05053D1 C13-A.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 32
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
O
NO2
Ph
N
Me
Me
Me
Me
26A
S197
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1
f1 (ppm)

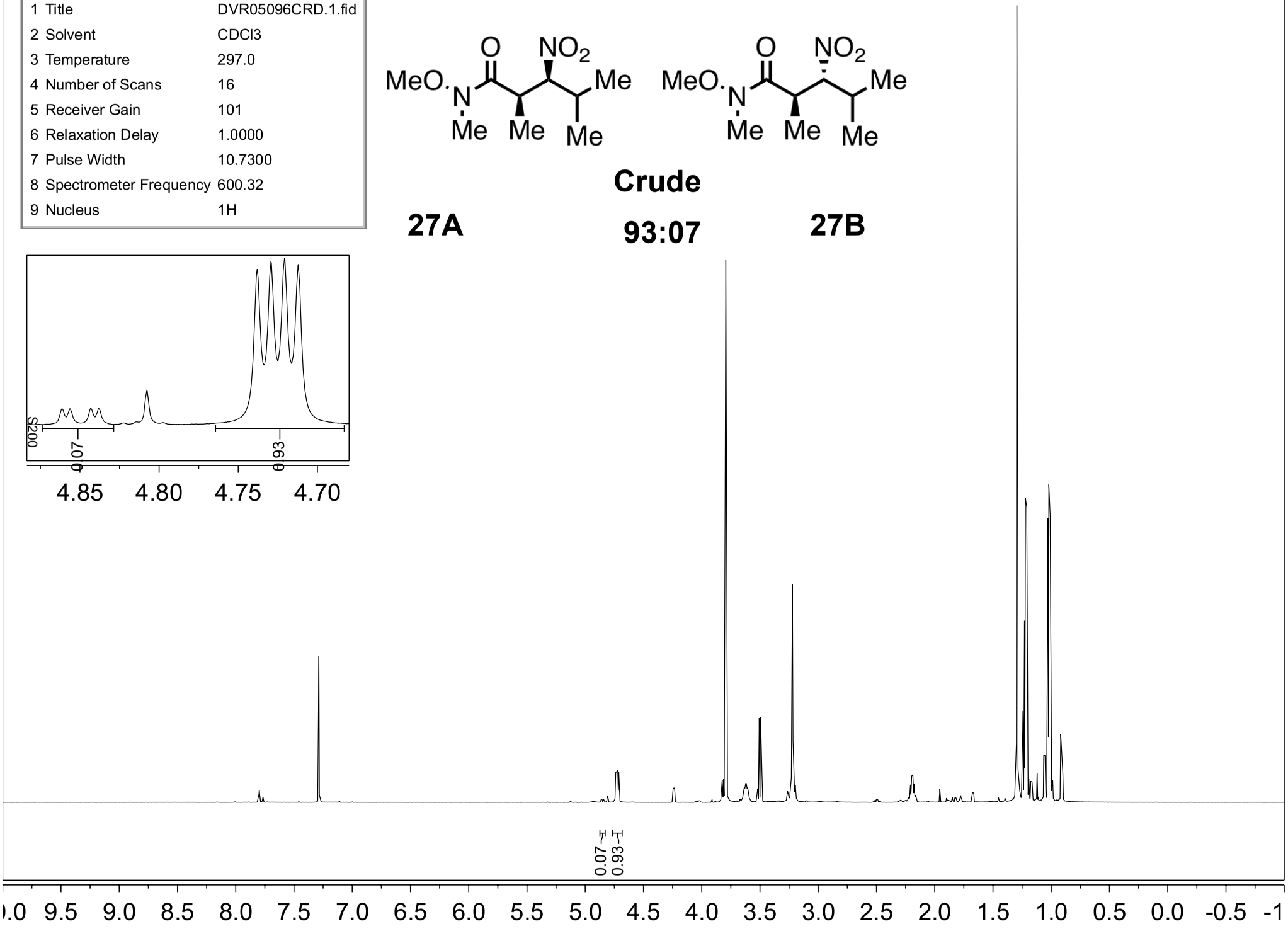

7.51 7.50 7.50 7.48 7.48 7.47 7.47 7.46 7.46 7.44 7.44 7.44 7.42 7.42 7.41 7.41 7.40 7.40 7.39 7.37 7.36 7.34 7.22 7.22 7.21 7.20 7.20 7.20
4.84 4.83 4.81 4.80 4.74 4.73 4.72 4.71
3.27 3.23 3.18 3.16 3.15 3.14 3.01 3.00 2.99 2.97
2.12 2.11 2.10 2.09 2.08
1.13 1.11 1.09 1.07 1.03 1.01 1.00 0.98 0.83 0.82 0.70 0.68
Parameter Value
1 Title DVR05053SYN AND ANTI.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 16
5 Receiver Gain 10
6 Relaxation Delay 1.0000
7 Pulse Width 15.0000
8 Spectrometer Frequency 400.13
9 Nucleus 1H
Ph N Me O NO2 Me Me Me
26A
Ph N Me O NO2 Me Me Me
26B
S198
3.88 2.16 1.86 2.29
0.78 1.00
3.27 2.50 0.81 0.99
1.20 0.88
3.22 2.62 2.60 3.20 3.39 2.53
f1 (ppm)


173.05
172.07
143.20
142.88
130.17
129.83
128.58
128.18
127.47
127.07
96.21
93.92
38.15
37.73
37.57
37.52
30.07
27.75
20.50
20.05
16.95
15.97
15.39
14.51
Parameter
Value
1 Title
DVR05053SYN AND ANTI C13.1.fid
2 Solvent
CDCl3
3 Temperature
298.2
4 Number of Scans
1024
5 Receiver Gain
512
6 Relaxation Delay
3.0000
7 Pulse Width
9.2500
8 Spectrometer Frequency
100.62
9 Nucleus
13C
S199
Ph
N
O
NO2
Me
Me
Me
Me
26A
26B
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1
f1 (ppm)

Parameter	Value
1 Title	DVR05096CRD.1.fid
2 Solvent	CDCl3
3 Temperature	297.0
4 Number of Scans	16
5 Receiver Gain	101
6 Relaxation Delay	1.0000
7 Pulse Width	10.7300
8 Spectrometer Frequency	600.32
9 Nucleus	1H

Crude

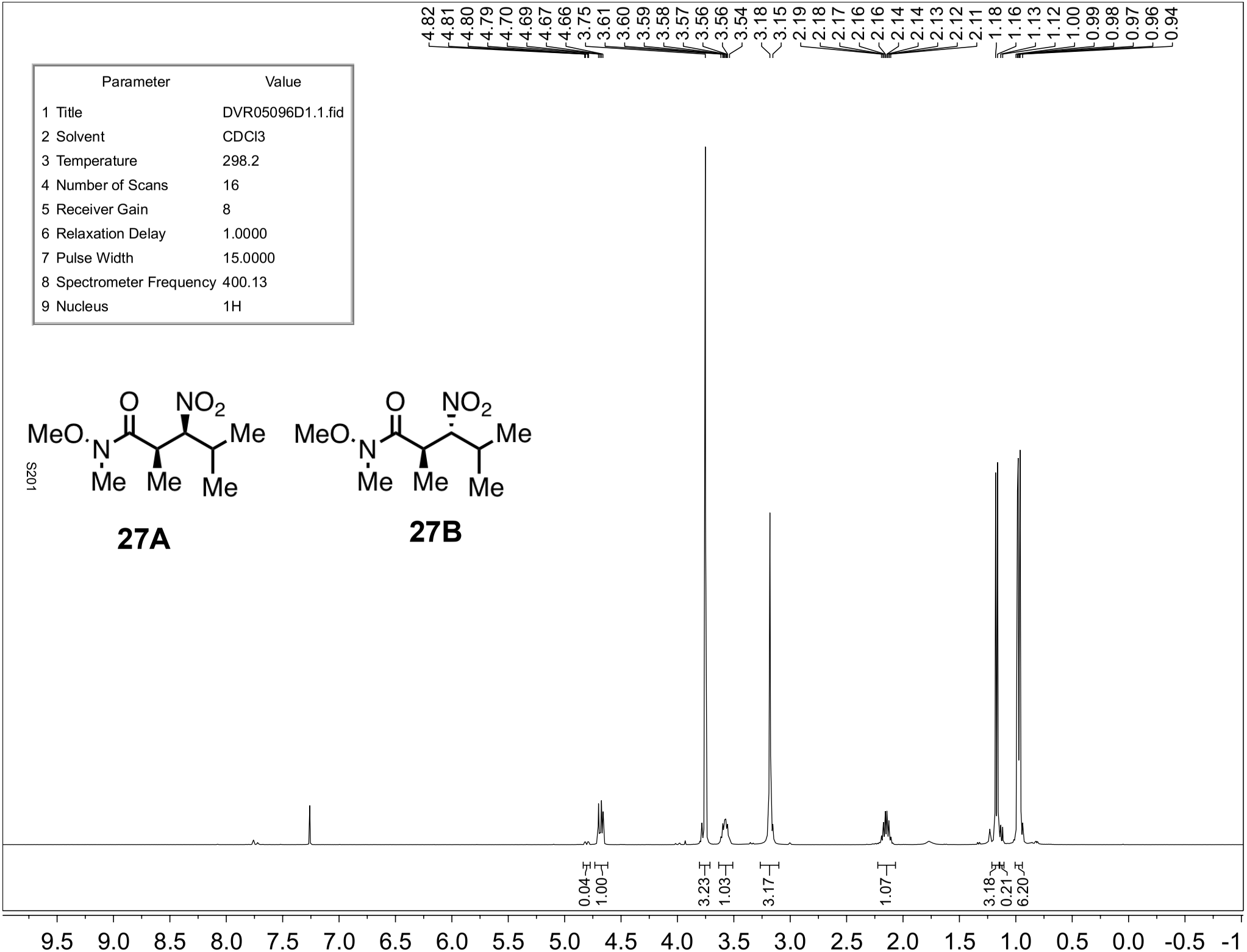
27A **93:07** **27B**

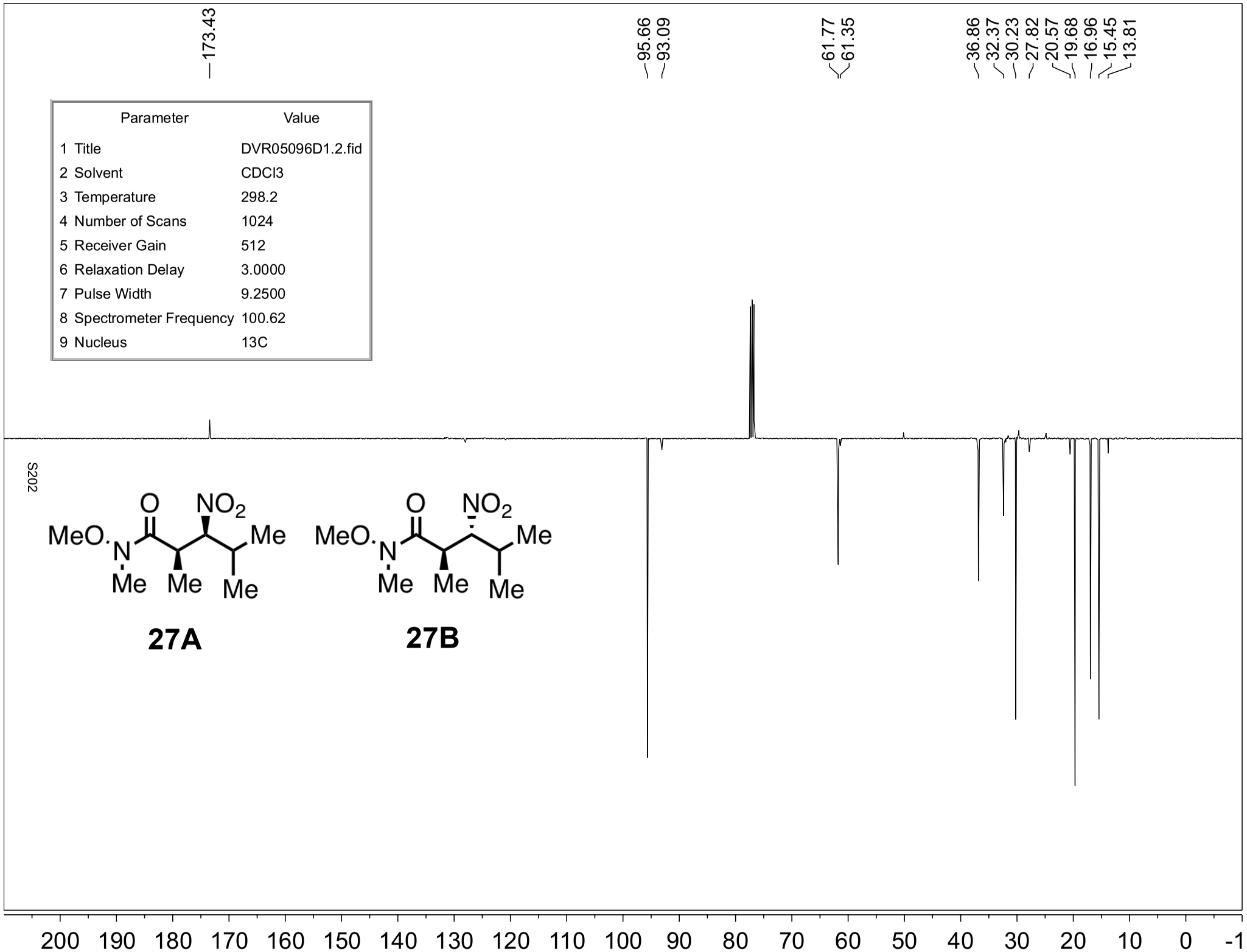


Parameter	Value
1 Title	DVR05096D1.1.fid
2 Solvent	CDCl3
3 Temperature	298.2
4 Number of Scans	16
5 Receiver Gain	8
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H

27A

27B

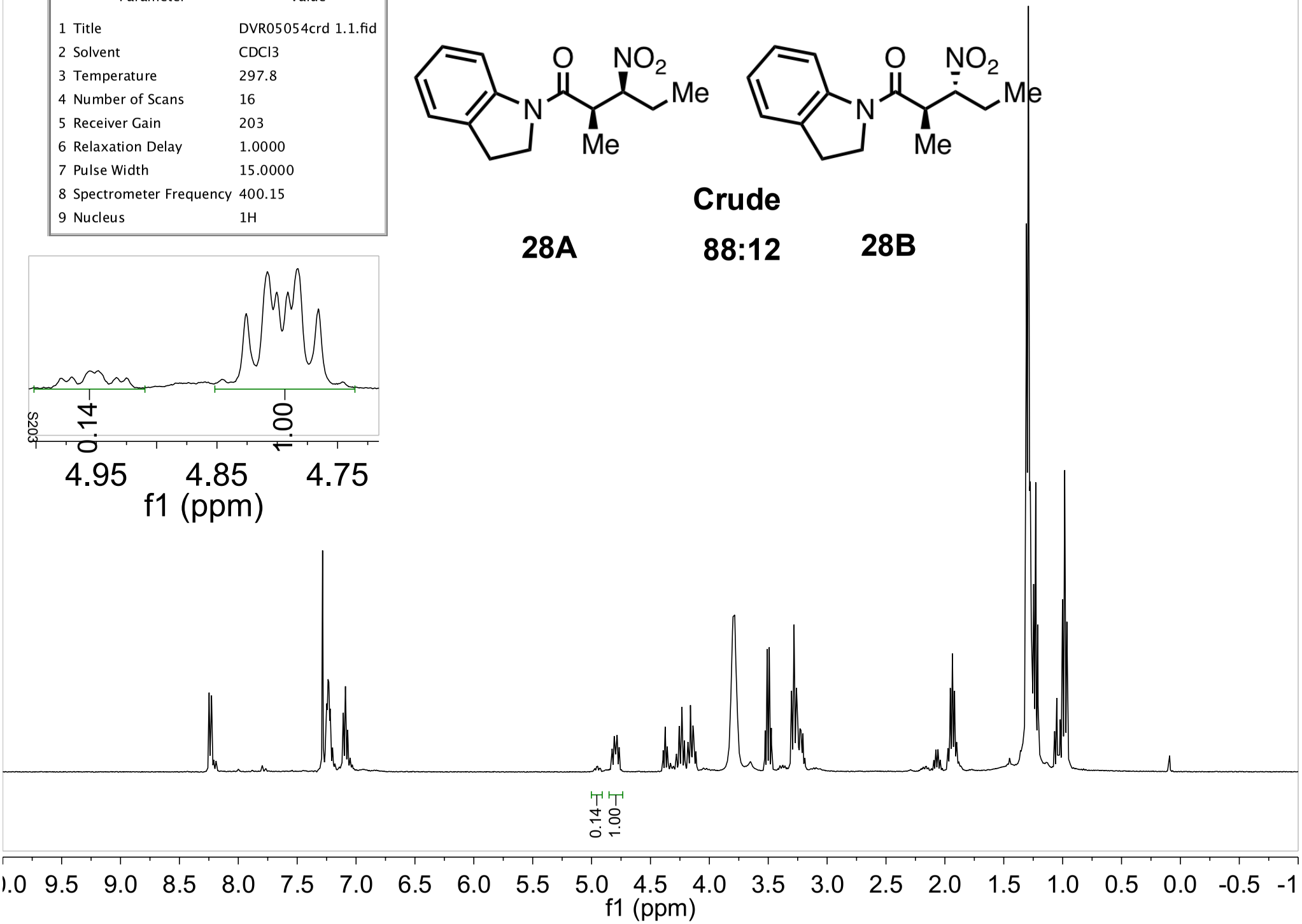



173.43
95.66
93.09
61.77
61.35
36.86
32.37
30.23
27.82
20.57
19.68
16.96
15.45
13.81
Parameter Value
1 Title DVR05096D1.2.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
S202
MeO. N Me
O
NO2
Me
Me Me Me
27A
MeO. N Me
O
NO2
Me
Me Me Me
27B
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

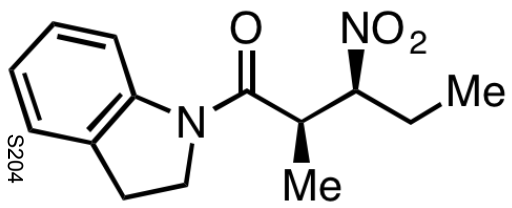
Parameter	Value
1 Title	DVR05054crd 1.1.fid
2 Solvent	CDCl3
3 Temperature	297.8
4 Number of Scans	16
5 Receiver Gain	203
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.15
9 Nucleus	1H

Crude

28A **88:12** **28B**

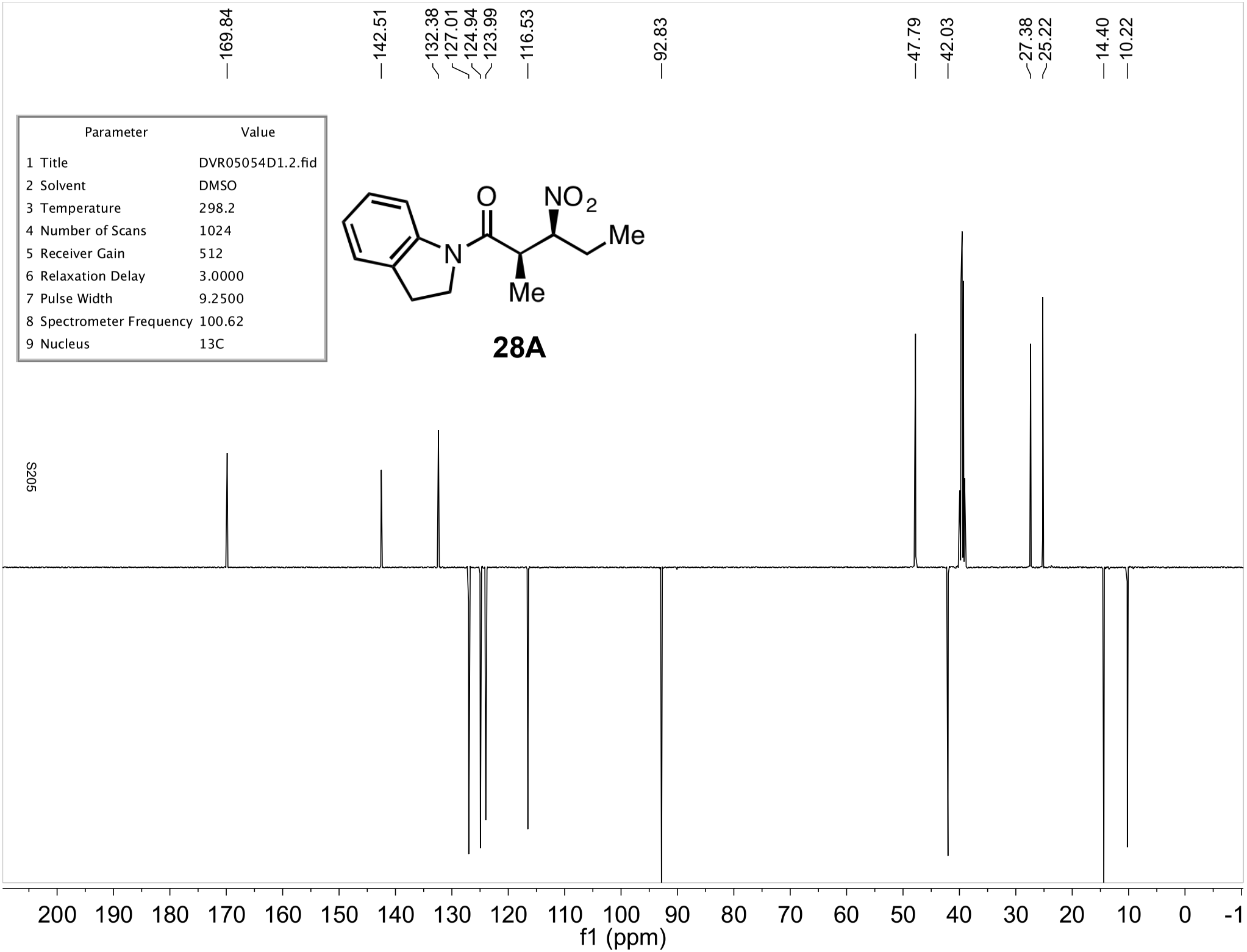


Parameter	Value
1 Title	DVR05054D1.1.fid
2 Solvent	DMSO
3 Temperature	298.2
4 Number of Scans	16
5 Receiver Gain	8
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H

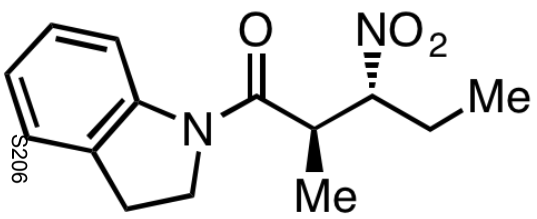


S204

28A

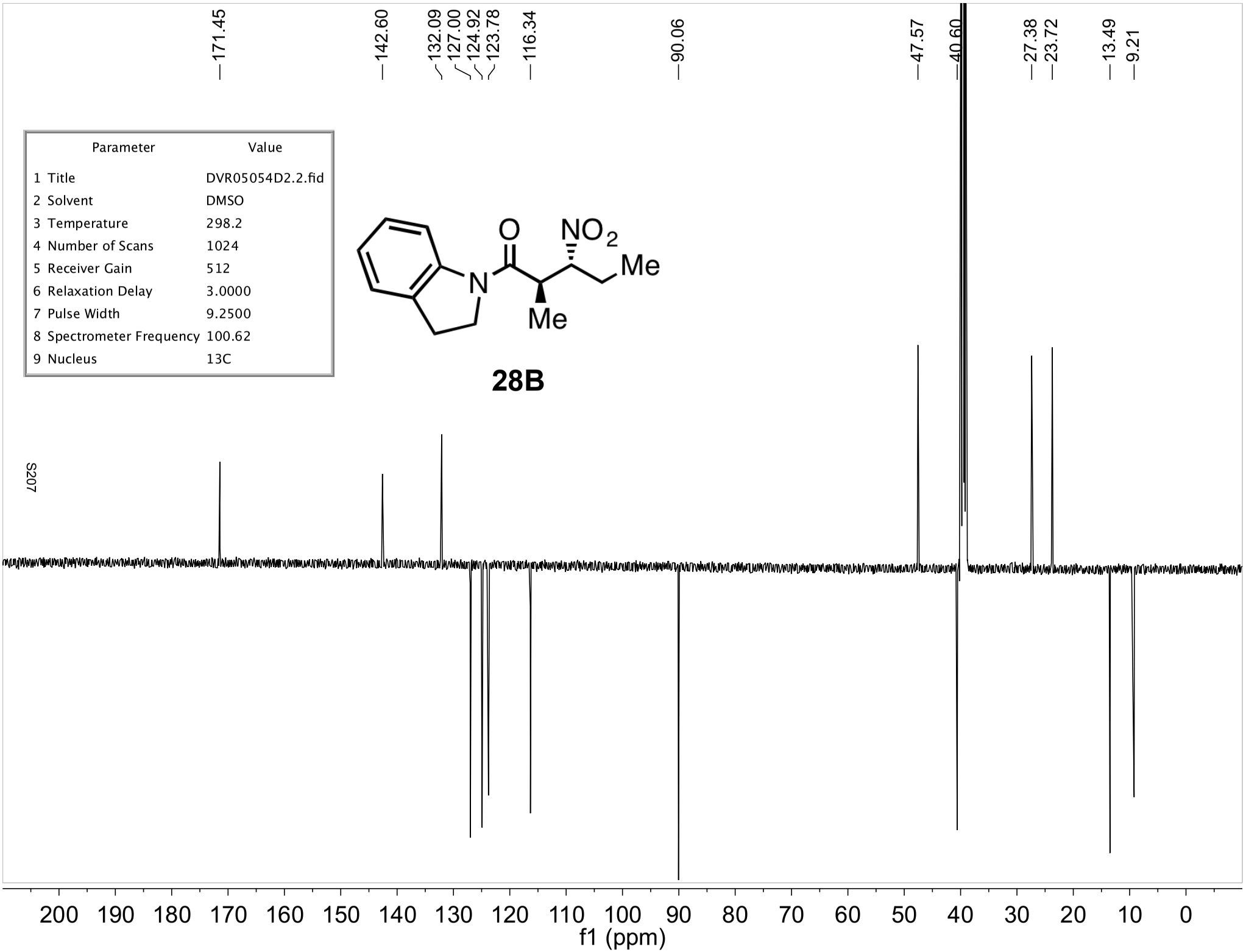

169.84
142.51
132.38
127.01
124.94
123.99
116.53
92.83
47.79
42.03
27.38
25.22
14.40
10.22
Parameter Value
1 Title DVR05054D1.2.fid
2 Solvent DMSO
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
O
NO2
N
Me
Me
28A
S205
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1
f1 (ppm)

Parameter	Value
1 Title	DVR05054D2.1.fid
2 Solvent	DMSO
3 Temperature	298.2
4 Number of Scans	16
5 Receiver Gain	6
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H

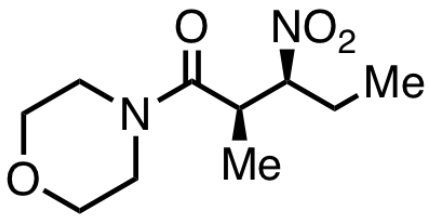


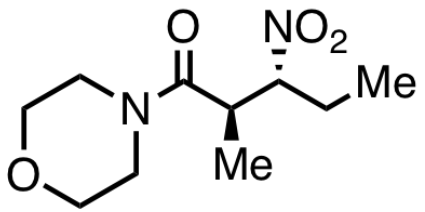
28B

f1 (ppm)


171.45
142.60
132.09
127.00
124.92
123.78
116.34
90.06
47.57
40.60
27.38
23.72
13.49
9.21
Parameter Value
1 Title DVR05054D2.2.fid
2 Solvent DMSO
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
O
NO2
N
Me
Me
28B
S207
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

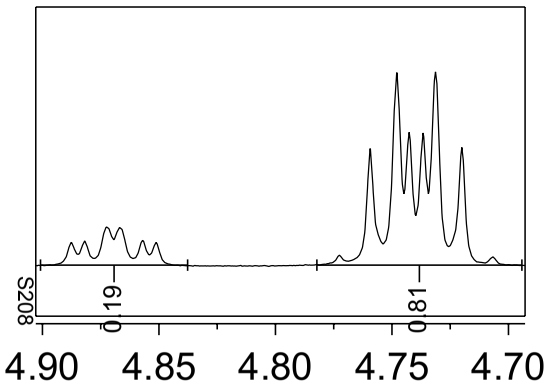
Parameter	Value
1 Title	DVR05064CRD.1.fid
2 Solvent	CDCl3
3 Temperature	300.0
4 Number of Scans	16
5 Receiver Gain	161
6 Relaxation Delay	1.0000
7 Pulse Width	13.1400
8 Spectrometer Frequency	600.32
9 Nucleus	1H

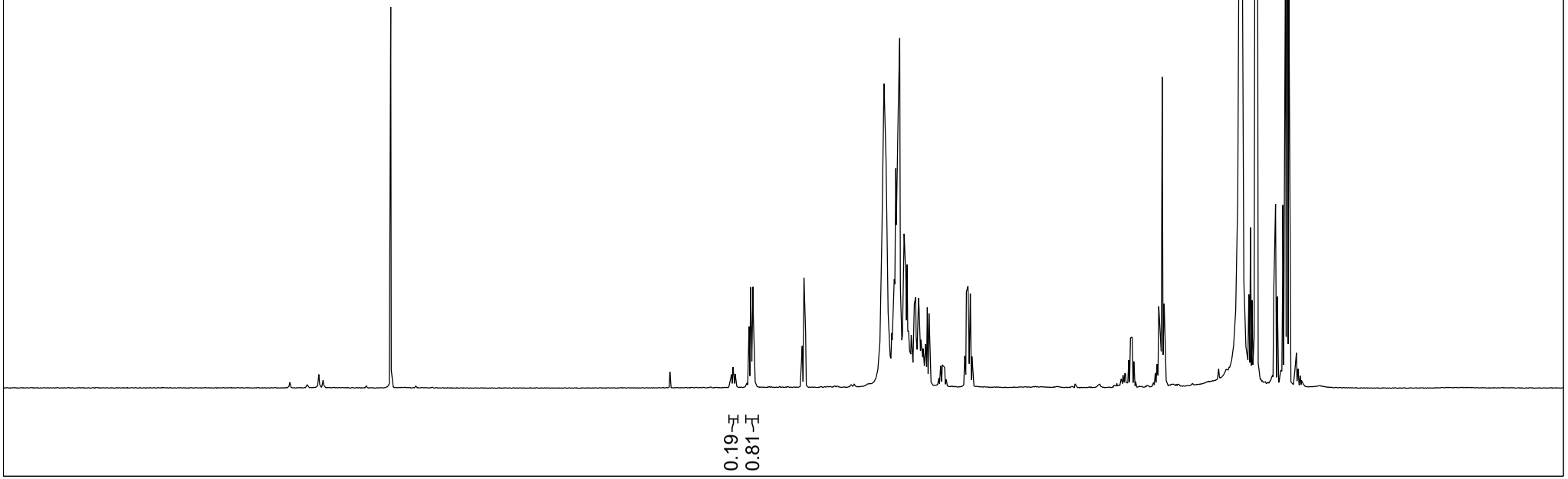




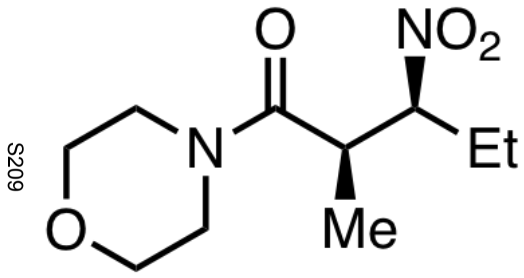
29A **Crude** **29B**

81:19



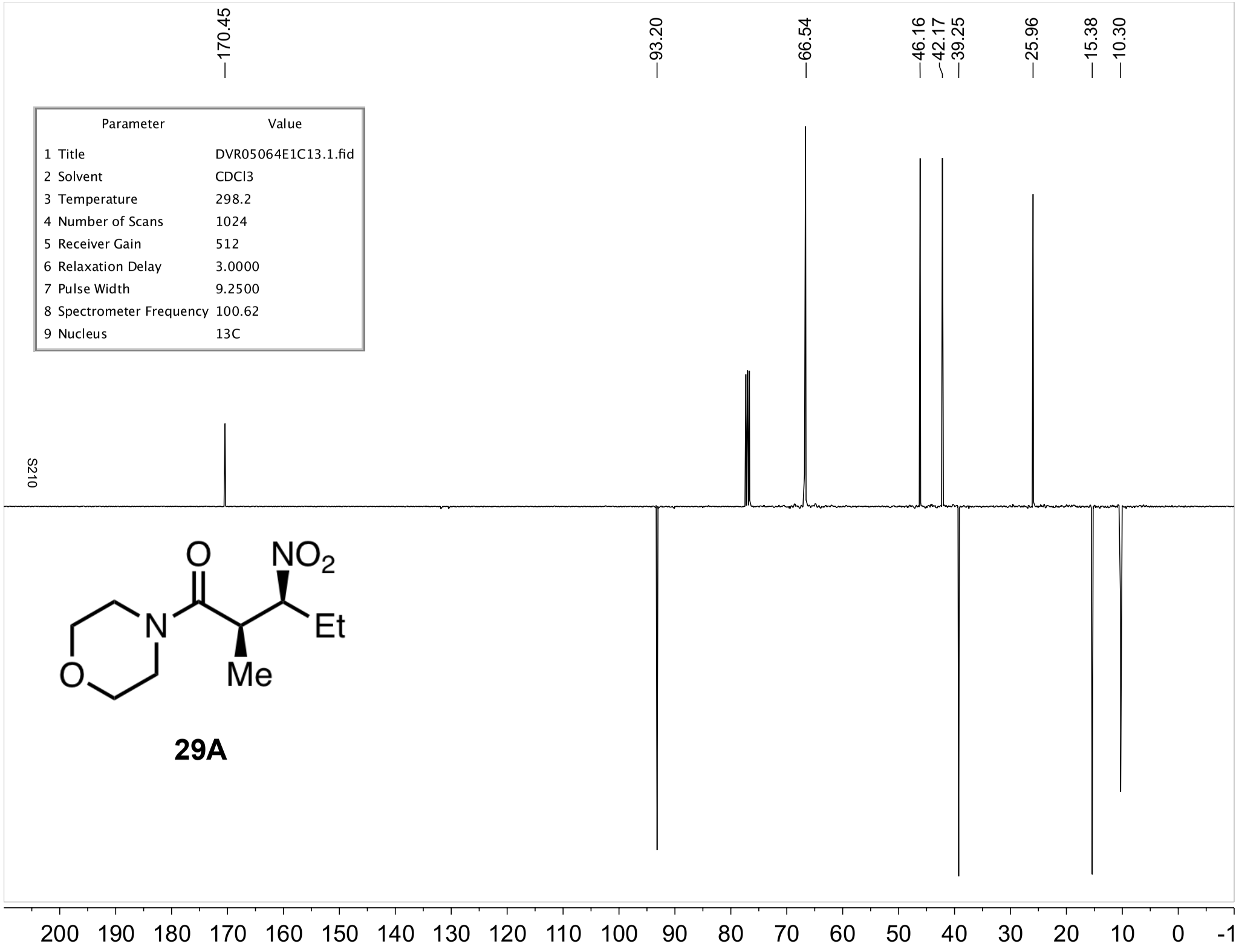


Parameter	Value
1 Title	DVR05064E1.1.fid
2 Solvent	CDCl3
3 Temperature	298.2
4 Number of Scans	16
5 Receiver Gain	9
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H

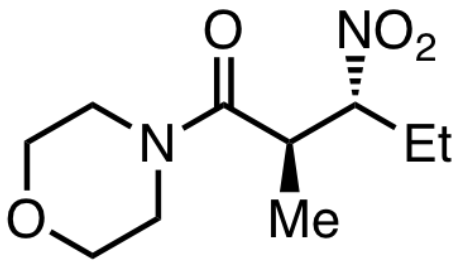


S209

29A


170.45
93.20
66.54
46.16
42.17
39.25
25.96
15.38
10.30
Parameter Value
1 Title DVR05064E1C13.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
S210
O
NO2
N
Et
O
Me
29A
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

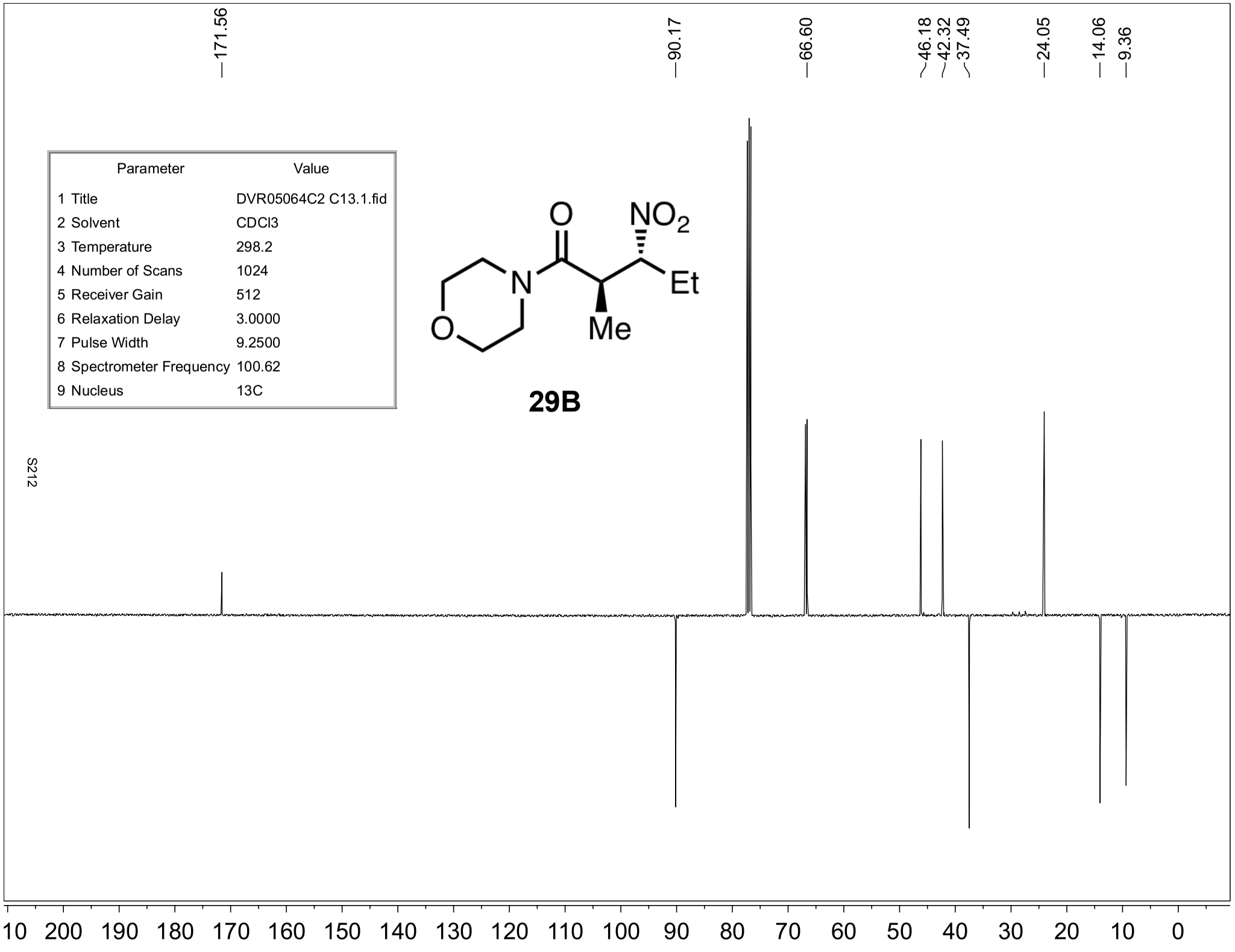
Parameter	Value
1 Title	DVR05064C2.1.fid
2 Solvent	CDCl3
3 Temperature	300.0
4 Number of Scans	16
5 Receiver Gain	161
6 Relaxation Delay	1.0000
7 Pulse Width	10.7300
8 Spectrometer Frequency	600.32
9 Nucleus	1H



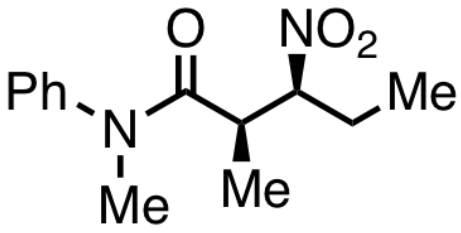
29B

S211

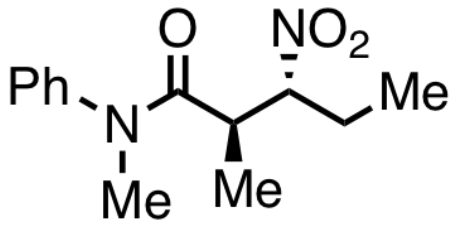
1.00 6.46 2.18 1.15 1.41 1.13 3.25 3.26


171.56
90.17
66.60
46.18
42.32
37.49
24.05
14.06
9.36
Parameter Value
1 Title DVR05064C2 C13.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
O
NO2
N
Et
O
Me
29B
S212
10 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0

Parameter	Value
1 Title	DVR05063crd.1.fid
2 Solvent	CDCl3
3 Temperature	299.4
4 Number of Scans	8
5 Receiver Gain	181
6 Relaxation Delay	1.0000
7 Pulse Width	15.9700
8 Spectrometer Frequency	400.15
9 Nucleus	1H



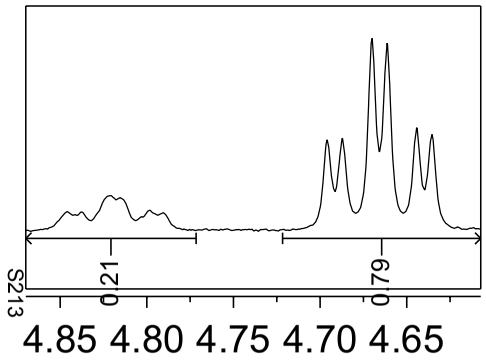
30A

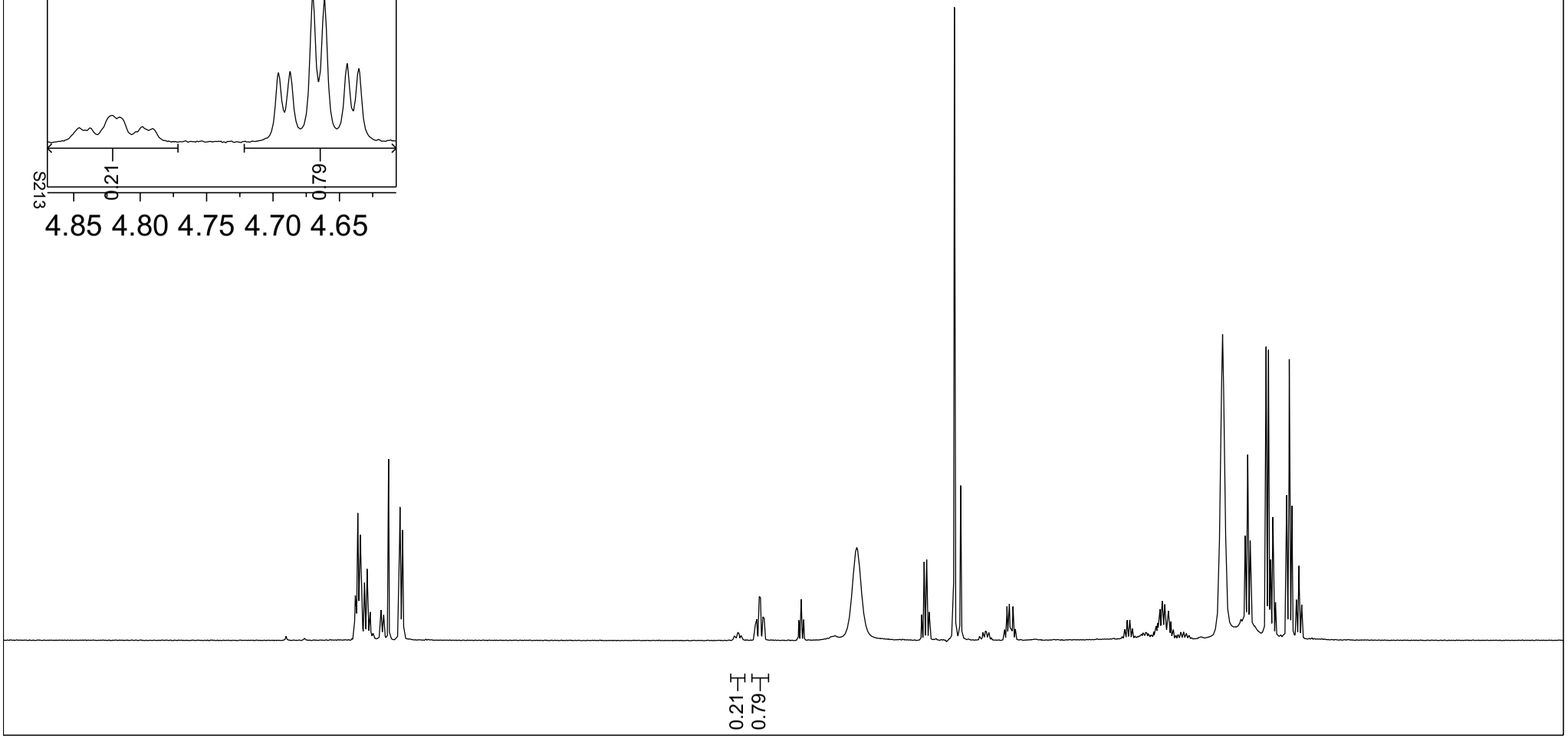


30B

Crude

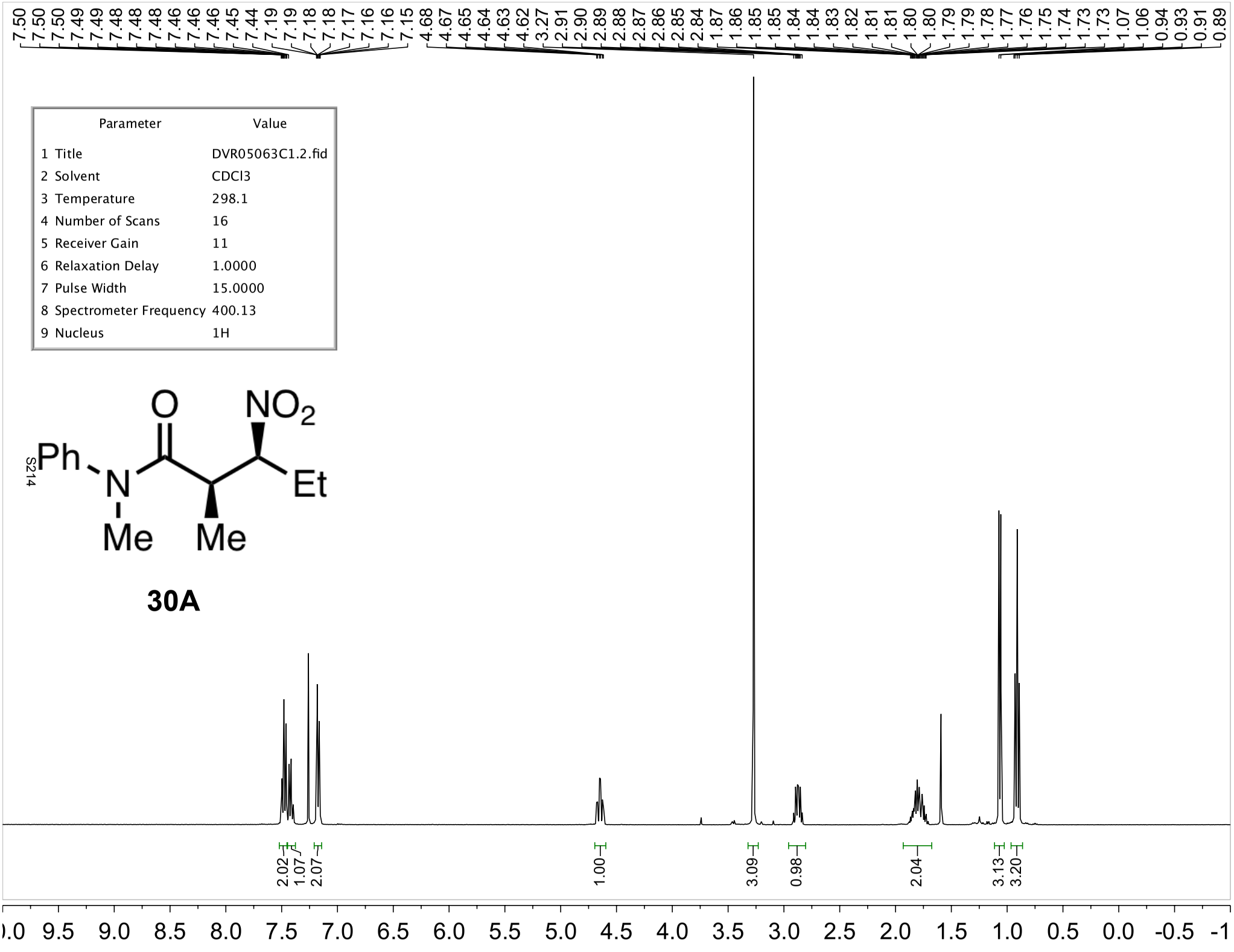
79:21

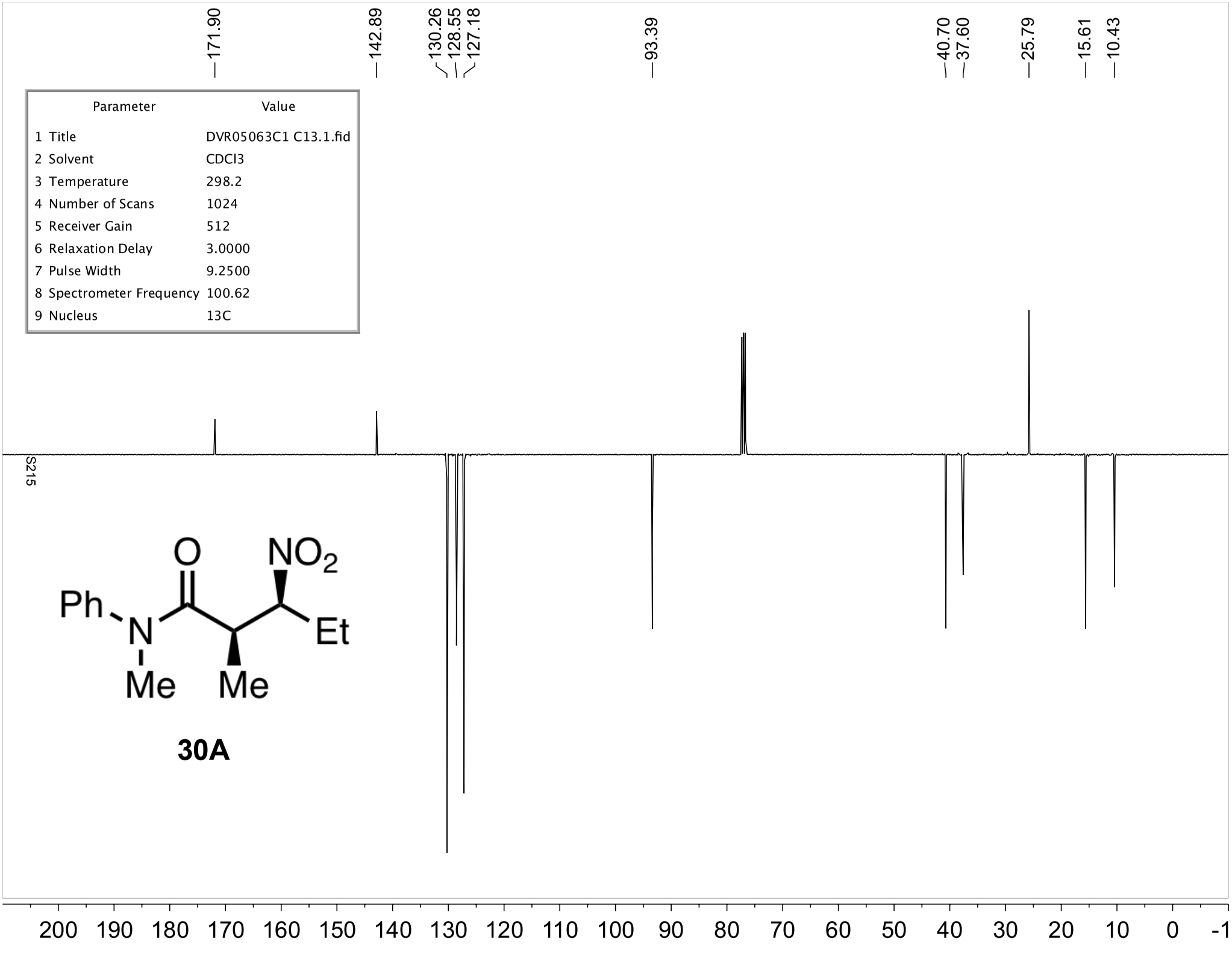




Parameter	Value
1 Title	DVR05063C1.2.fid
2 Solvent	CDCl3
3 Temperature	298.1
4 Number of Scans	16
5 Receiver Gain	11
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H

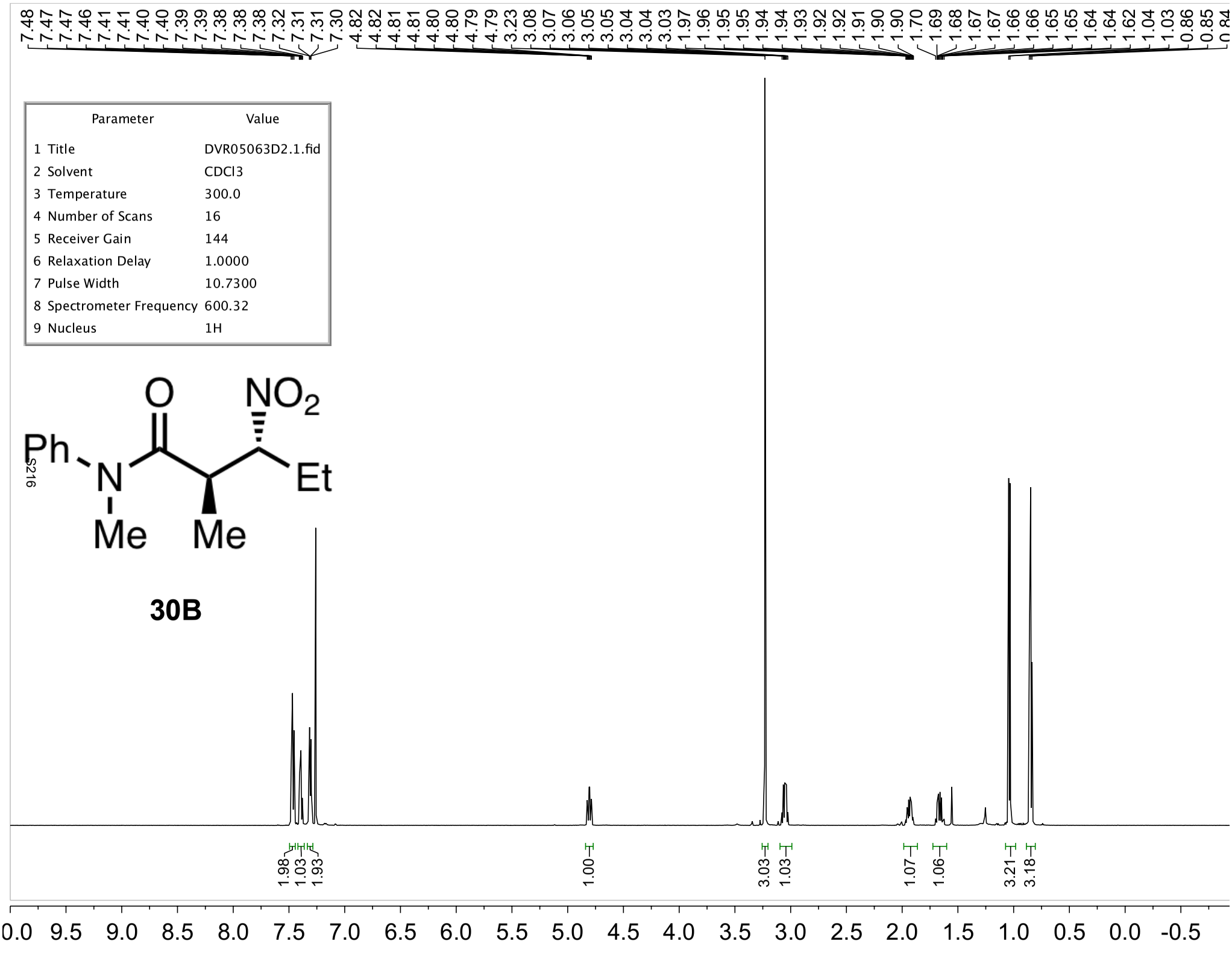
30A

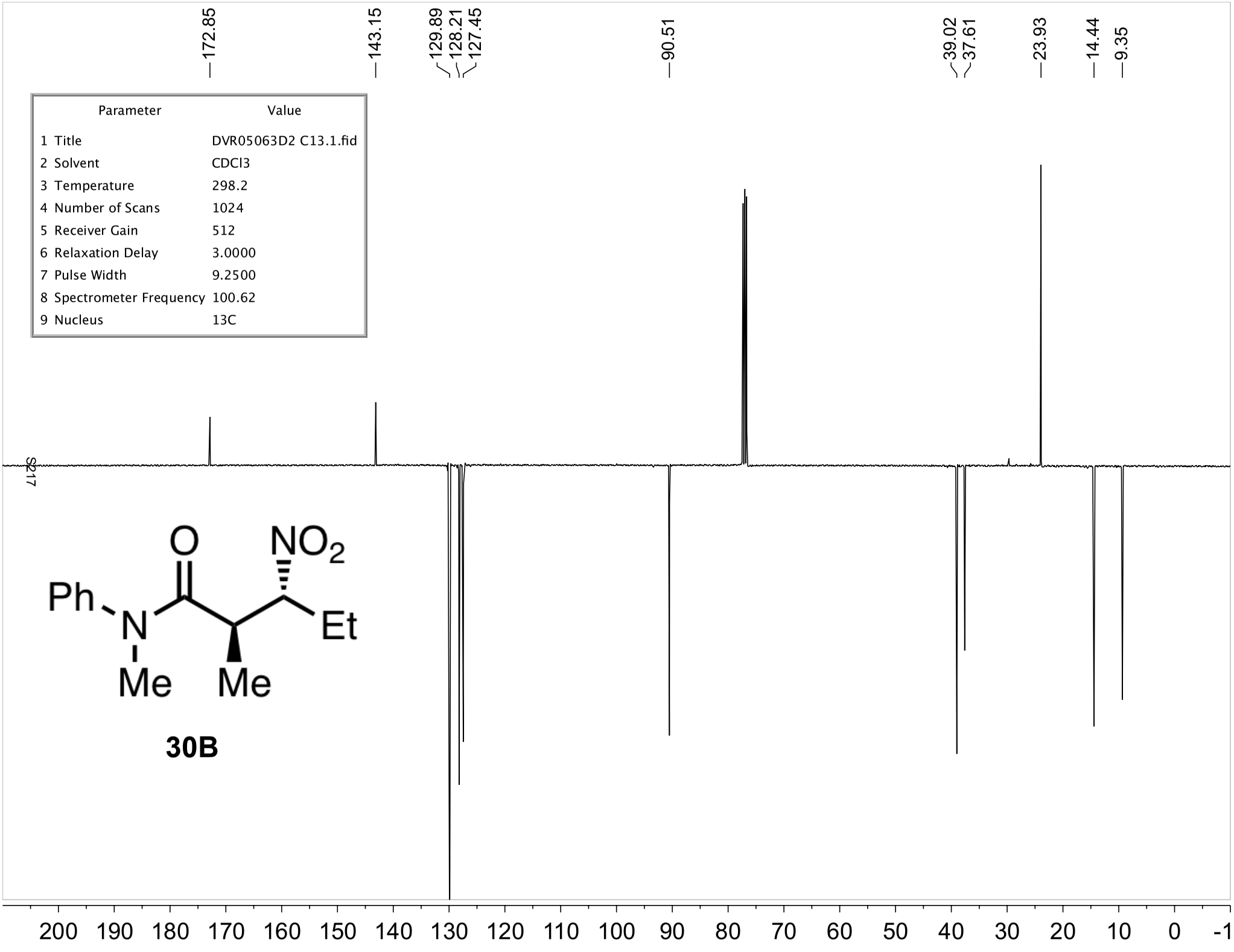



171.90
142.89
130.26
128.55
127.18
93.39
40.70
37.60
25.79
15.61
10.43
Parameter Value
1 Title DVR05063C1 C13.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
S215
O
NO2
Ph
N
Et
Me
Me
30A
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

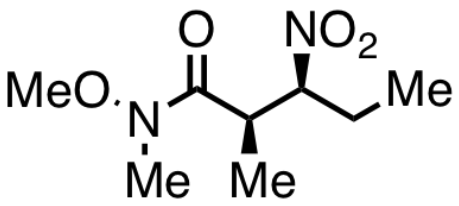
Parameter	Value
1 Title	DVR05063D2.1.fid
2 Solvent	CDCl3
3 Temperature	300.0
4 Number of Scans	16
5 Receiver Gain	144
6 Relaxation Delay	1.0000
7 Pulse Width	10.7300
8 Spectrometer Frequency	600.32
9 Nucleus	1H

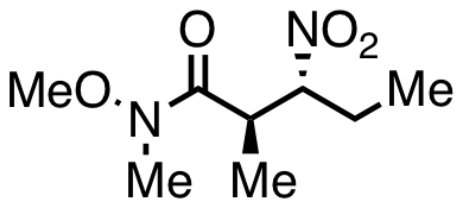
30B




172.85
143.15
129.89
128.21
127.45
90.51
39.02
37.61
23.93
14.44
9.35
Parameter Value
1 Title DVR05063D2 C13.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
SP17
O
NO2
Ph
N
Et
Me
Me
30B
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

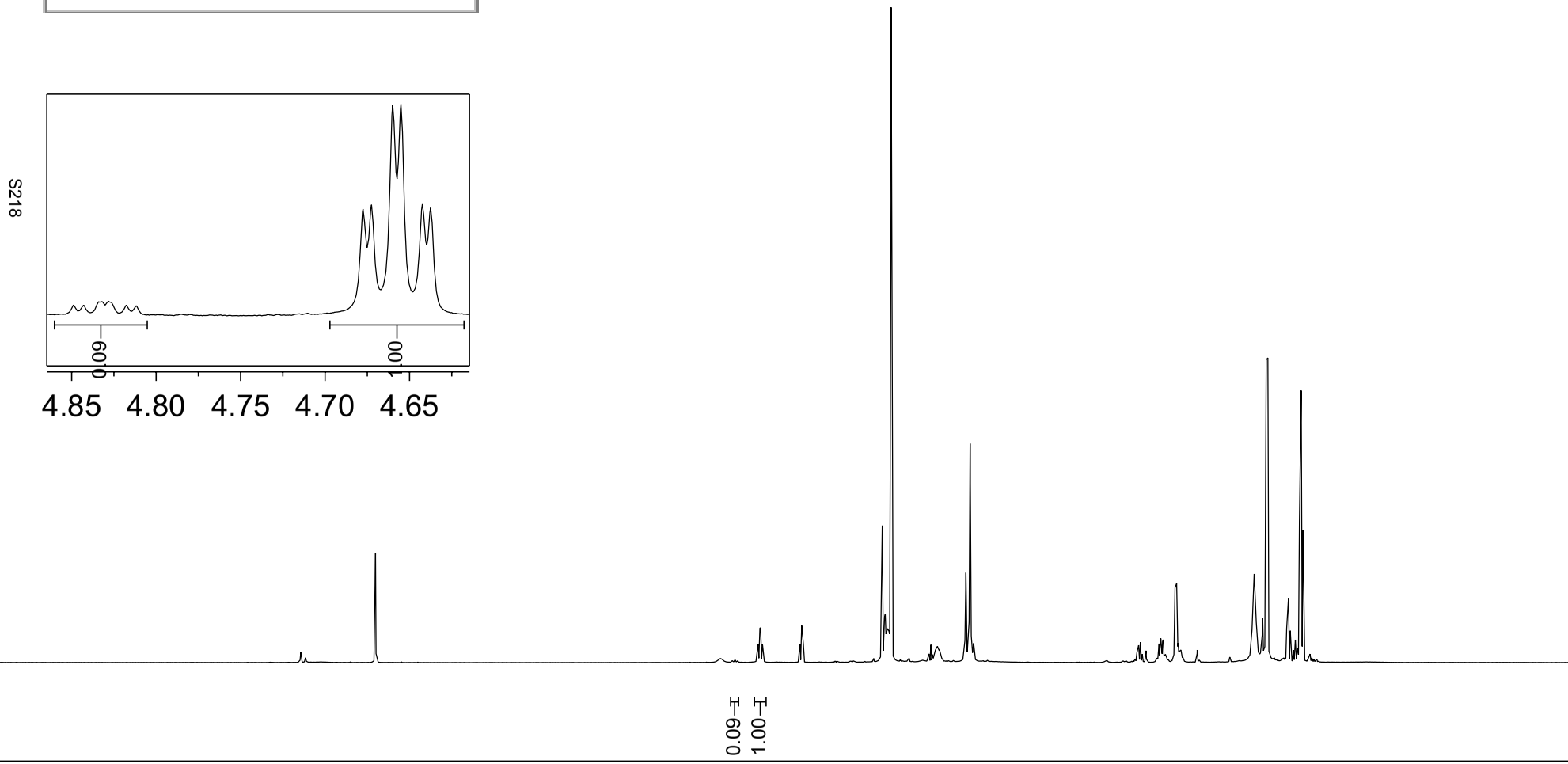
Parameter	Value
1 Title	DVR05058CRD.1.fid
2 Solvent	CDCl3
3 Temperature	300.0
4 Number of Scans	16
5 Receiver Gain	181
6 Relaxation Delay	1.0000
7 Pulse Width	13.1400
8 Spectrometer Frequency	600.32
9 Nucleus	1H

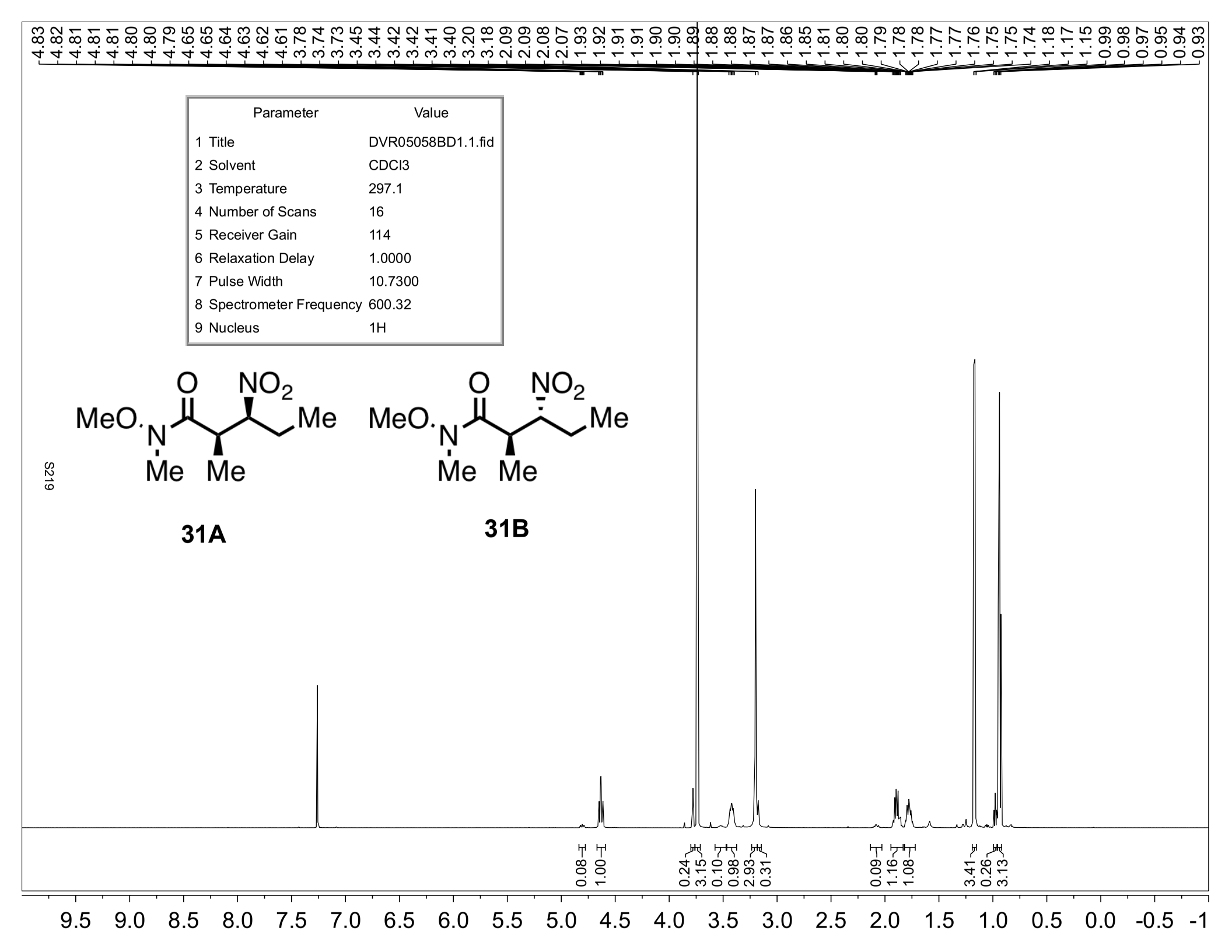


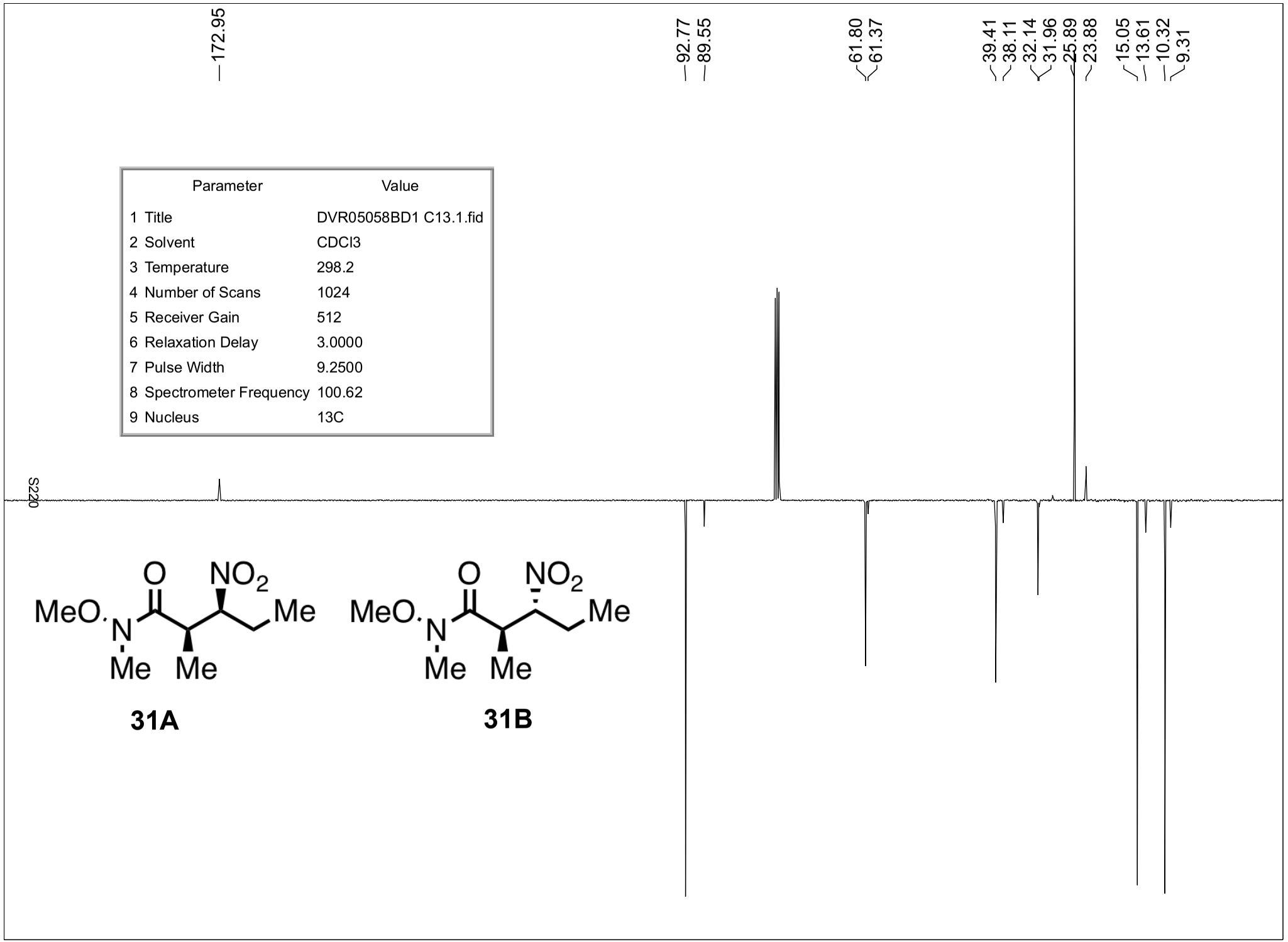


Crude

31A **92:08** **31B**




4.83 4.82 4.81 4.81 4.81 4.80 4.80 4.79 4.65 4.65 4.64 4.63 4.62 4.61 3.78 3.74 3.73 3.45 3.44 3.42 3.42 3.41 3.40 3.20 3.18 2.09 2.09 2.08 2.07 1.93 1.92 1.91 1.91 1.90 1.90 1.89 1.88 1.88 1.87 1.87 1.86 1.85 1.81 1.80 1.80 1.79 1.78 1.78 1.77 1.77 1.76 1.75 1.75 1.74 1.18 1.17 1.15 0.99 0.98 0.97 0.95 0.94 0.93
Parameter Value
1 Title DVR05058BD1.1.fid
2 Solvent CDCl3
3 Temperature 297.1
4 Number of Scans 16
5 Receiver Gain 114
6 Relaxation Delay 1.0000
7 Pulse Width 10.7300
8 Spectrometer Frequency 600.32
9 Nucleus 1H
MeO. N Me Me O NO2 Me
31A
MeO. N Me Me O NO2 Me
31B
S219
0.08 1.00 0.24 3.15 0.10 0.98 2.93 0.31 0.09 1.16 1.08 3.41 0.26 3.13
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1

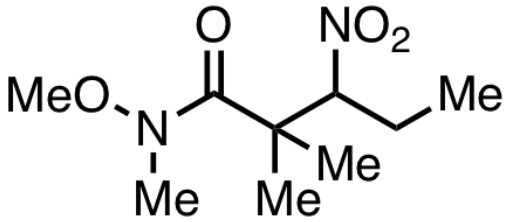


Parameter	Value
1 Title	DVR05058BD1 C13.1.fid
2 Solvent	CDCl3
3 Temperature	298.2
4 Number of Scans	1024
5 Receiver Gain	512
6 Relaxation Delay	3.0000
7 Pulse Width	9.2500
8 Spectrometer Frequency	100.62
9 Nucleus	13C

31A

31B

Parameter	Value
1 Title	DVR05098D1.1.fid
2 Solvent	CDCl3
3 Temperature	298.2
4 Number of Scans	16
5 Receiver Gain	9
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H



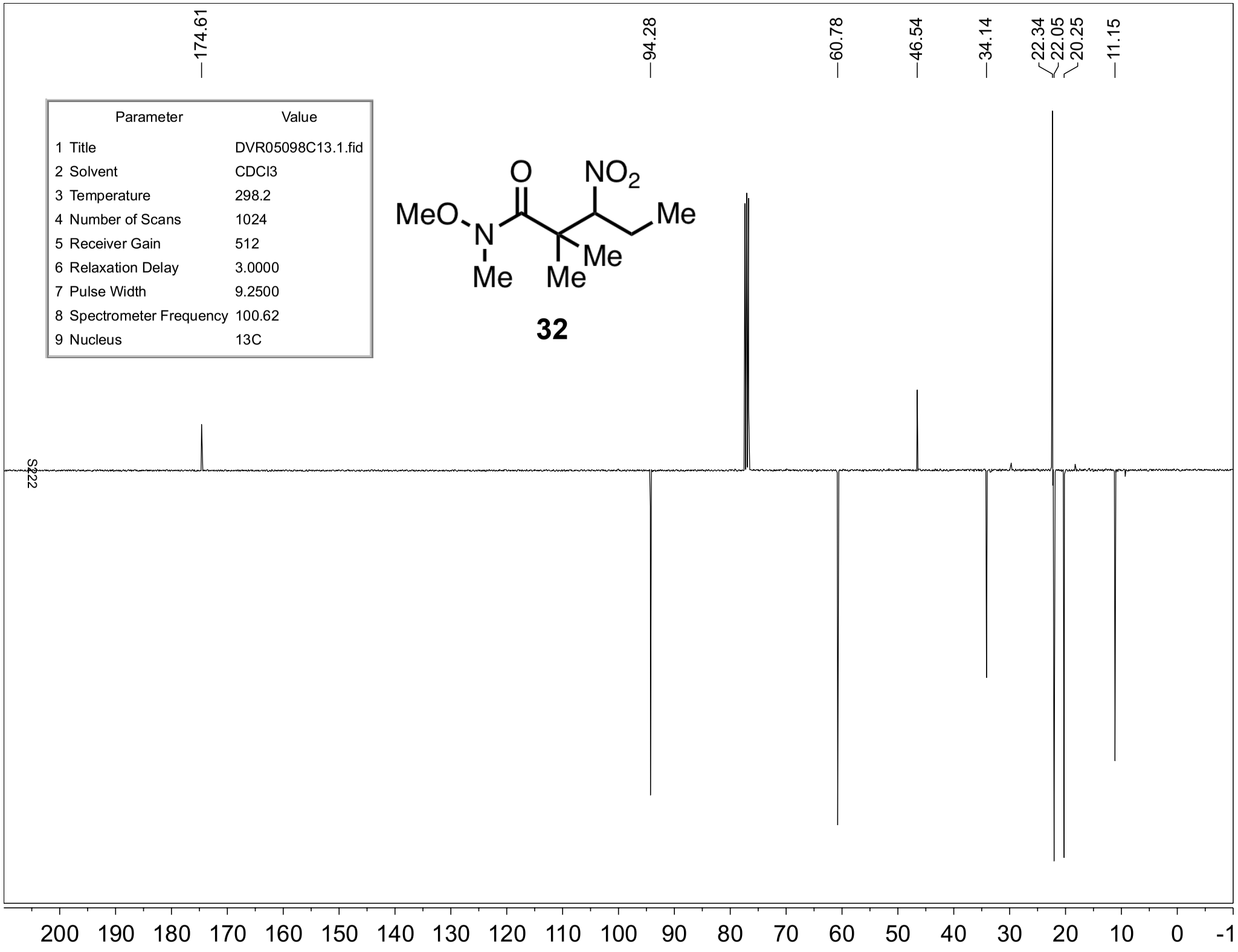
32

S221

5.09 5.08 5.06 5.05 3.73 3.19 2.14 2.12 2.11 2.11 2.09 2.09 2.08 2.07 2.06 2.04 1.62 1.61 1.60 1.59 1.58 1.57 1.56 1.55 1.54 1.33 0.97 0.95

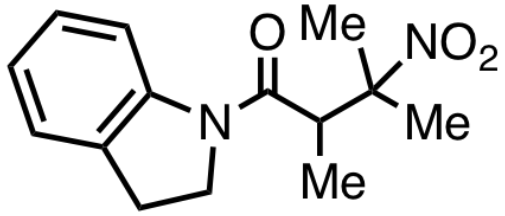
1.00 3.09 3.06 1.05 1.35 6.24 3.14

0.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1


174.61
94.28
60.78
46.54
34.14
22.34
22.05
20.25
11.15
Parameter
Value
1 Title
DVR05098C13.1.fid
2 Solvent
CDCl3
3 Temperature
298.2
4 Number of Scans
1024
5 Receiver Gain
512
6 Relaxation Delay
3.0000
7 Pulse Width
9.2500
8 Spectrometer Frequency
100.62
9 Nucleus
13C
O
NO2
MeO
N
Me
Me
Me
Me
32
S222
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

8.21 8.19 7.21 7.19 7.19 7.17 7.06 7.06 7.04 7.02 7.02 4.37 4.35 4.34 4.33 4.32 4.30 4.19 4.17 4.16 4.15 4.14 4.13 4.12 4.11 3.61 3.59 3.58 3.56 3.28 3.27 3.27 3.26 3.25 3.23 3.23 1.78 1.75 1.28 1.26

Parameter	Value
1 Title	DVR05091F1.1.fid
2 Solvent	CDCl3
3 Temperature	298.2
4 Number of Scans	16
5 Receiver Gain	10
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H

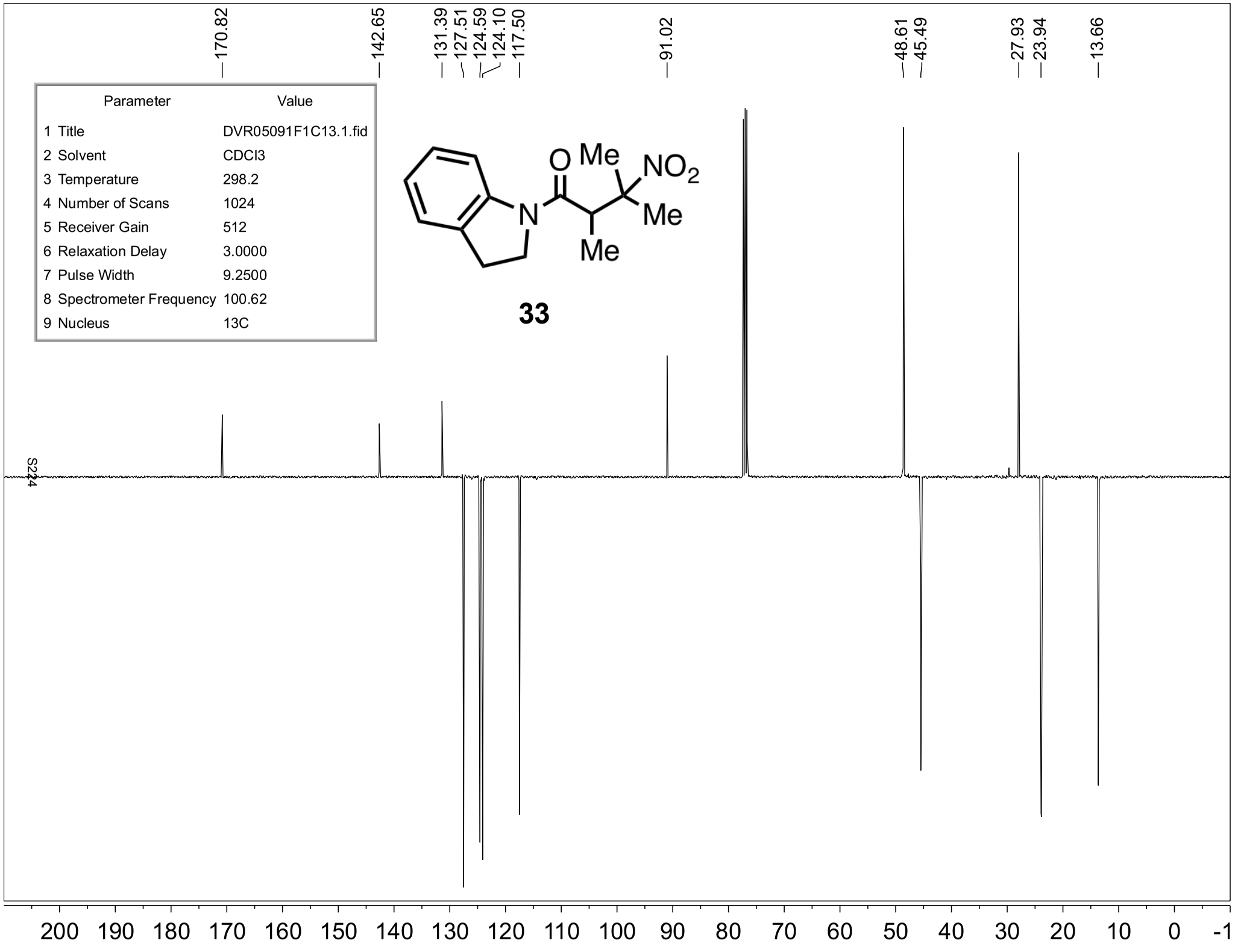


33

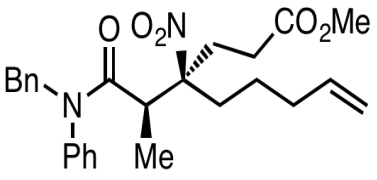
S223

1.02 2.15 1.10 1.00 1.09 0.98 1.98 3.17 3.35 3.34

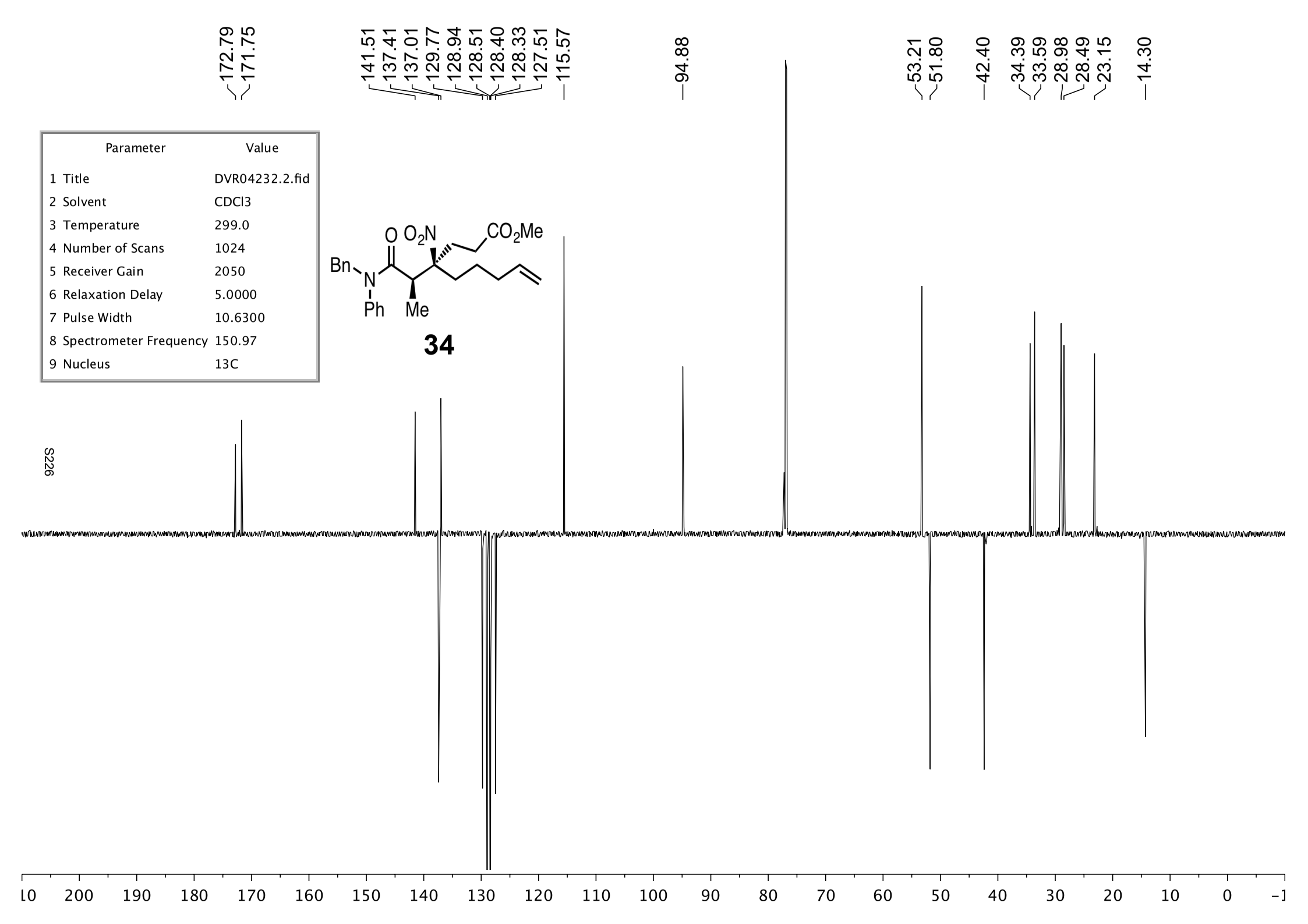
0.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5


170.82
142.65
131.39
127.51
124.59
124.10
117.50
91.02
48.61
45.49
27.93
23.94
13.66
Parameter Value
1 Title DVR05091F1C13.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
O
Me
NO2
N
Me
Me
33
S224
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

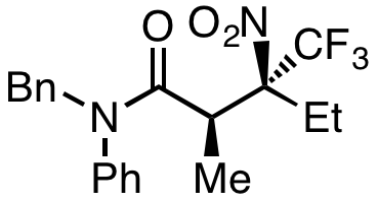
Parameter	Value
1 Title	DVR04232D2.1.fid
2 Solvent	CDCl3
3 Temperature	297.2
4 Number of Scans	16
5 Receiver Gain	228
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H



34


172.79
171.75
141.51
137.41
137.01
129.77
128.94
128.51
128.40
128.33
127.51
115.57
94.88
53.21
51.80
42.40
34.39
33.59
28.98
28.49
23.15
14.30
Parameter Value
1 Title DVR04232.2.fid
2 Solvent CDCl3
3 Temperature 299.0
4 Number of Scans 1024
5 Receiver Gain 2050
6 Relaxation Delay 5.0000
7 Pulse Width 10.6300
8 Spectrometer Frequency 150.97
9 Nucleus 13C
O O2N CO2Me
Bn N Ph Me
34
S226
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0

Parameter	Value
1 Title	DVR04265D1.1.fid
2 Solvent	CDCl3
3 Temperature	297.9
4 Number of Scans	16
5 Receiver Gain	181
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H



35

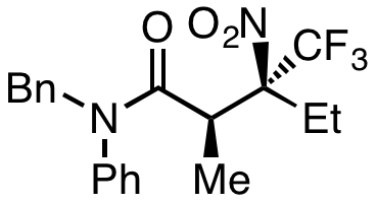
S227

7.38 7.38 7.37 7.37 7.36 7.30 7.29 7.29 7.28 7.27 7.27 7.26 7.14 7.14 7.13 7.12 7.01 6.99 4.86 4.84 4.81 4.79 3.52 3.51 3.50 3.49 3.10 3.09 3.08 3.08 3.07 3.07 3.07 3.06 3.05 2.16 2.15 2.13 2.12 1.31 1.30 1.15 1.14 1.13 1.13 1.12 1.12

2.86 3.96 1.94 1.76 1.98 0.96 1.00 0.99 3.08 3.01

9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1

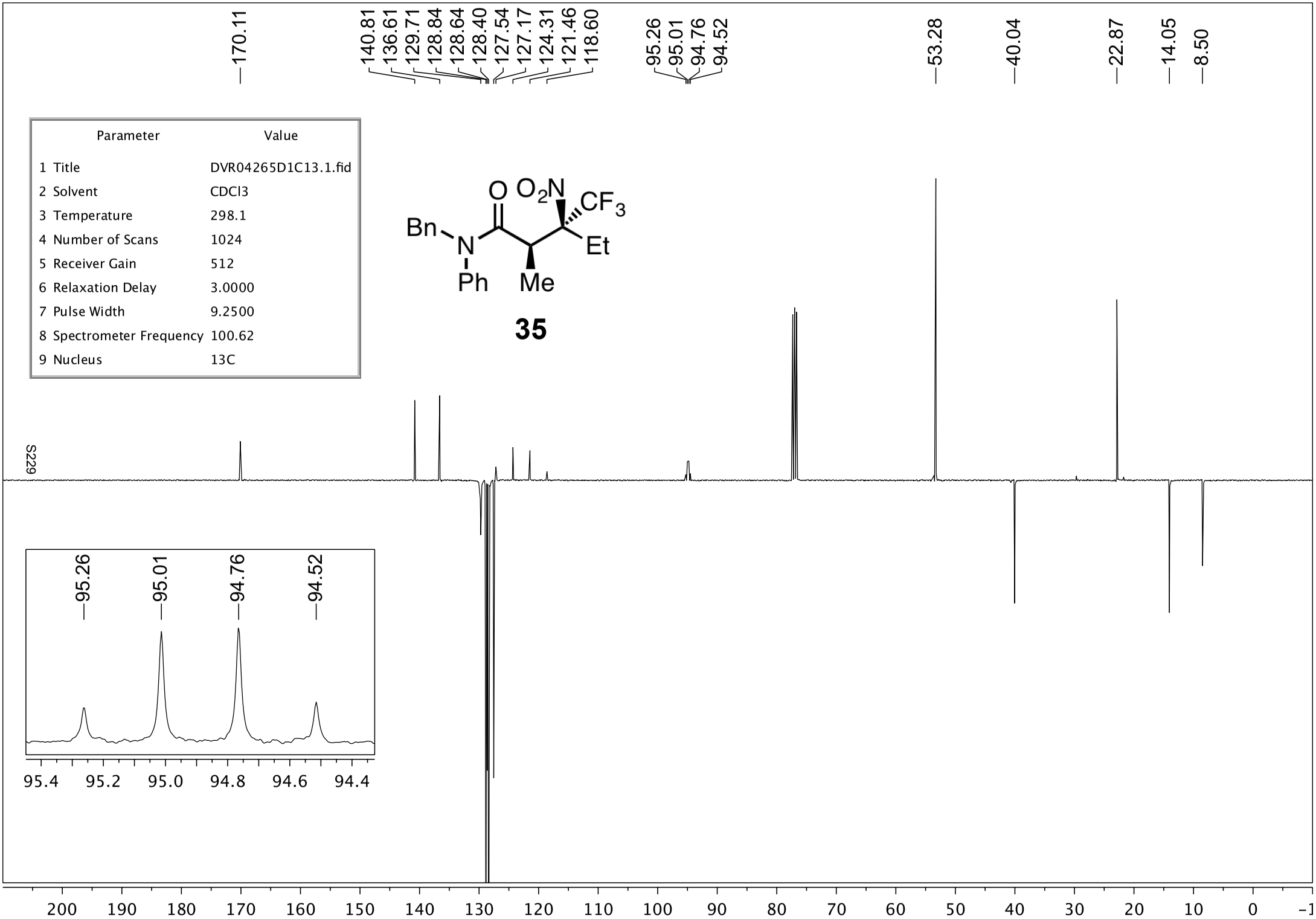
Parameter	Value
1 Title	DVR04265D1.2.fid
2 Solvent	CDCl3
3 Temperature	297.9
4 Number of Scans	16
5 Receiver Gain	362
6 Relaxation Delay	3.0000
7 Pulse Width	11.6200
8 Spectrometer Frequency	564.81
9 Nucleus	19F



35

-67.20

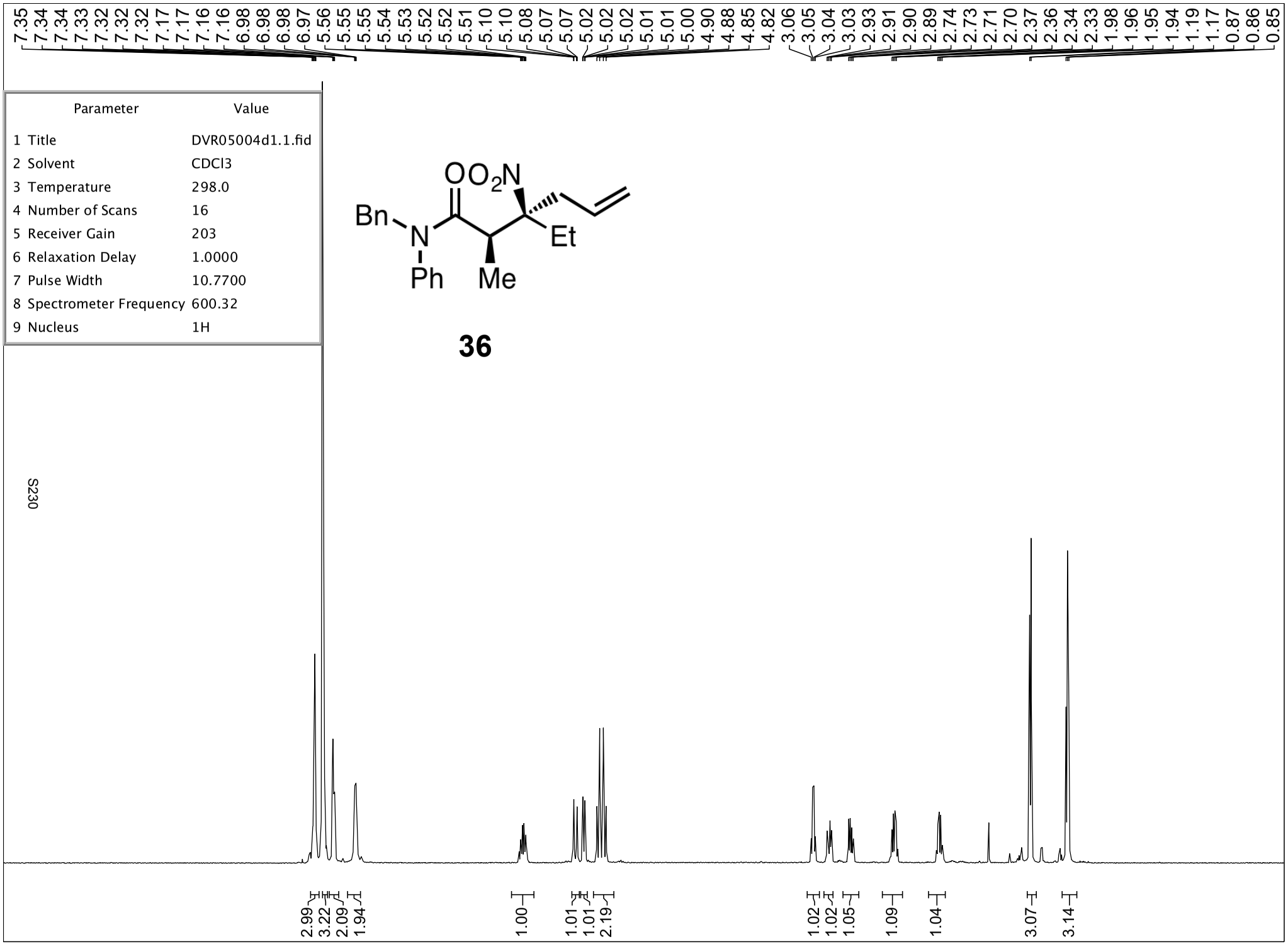
) -5 -10 -15 -20 -25 -30 -35 -40 -45 -50 -55 -60 -65 -70 -75 -80 -85 -90 -95 -1

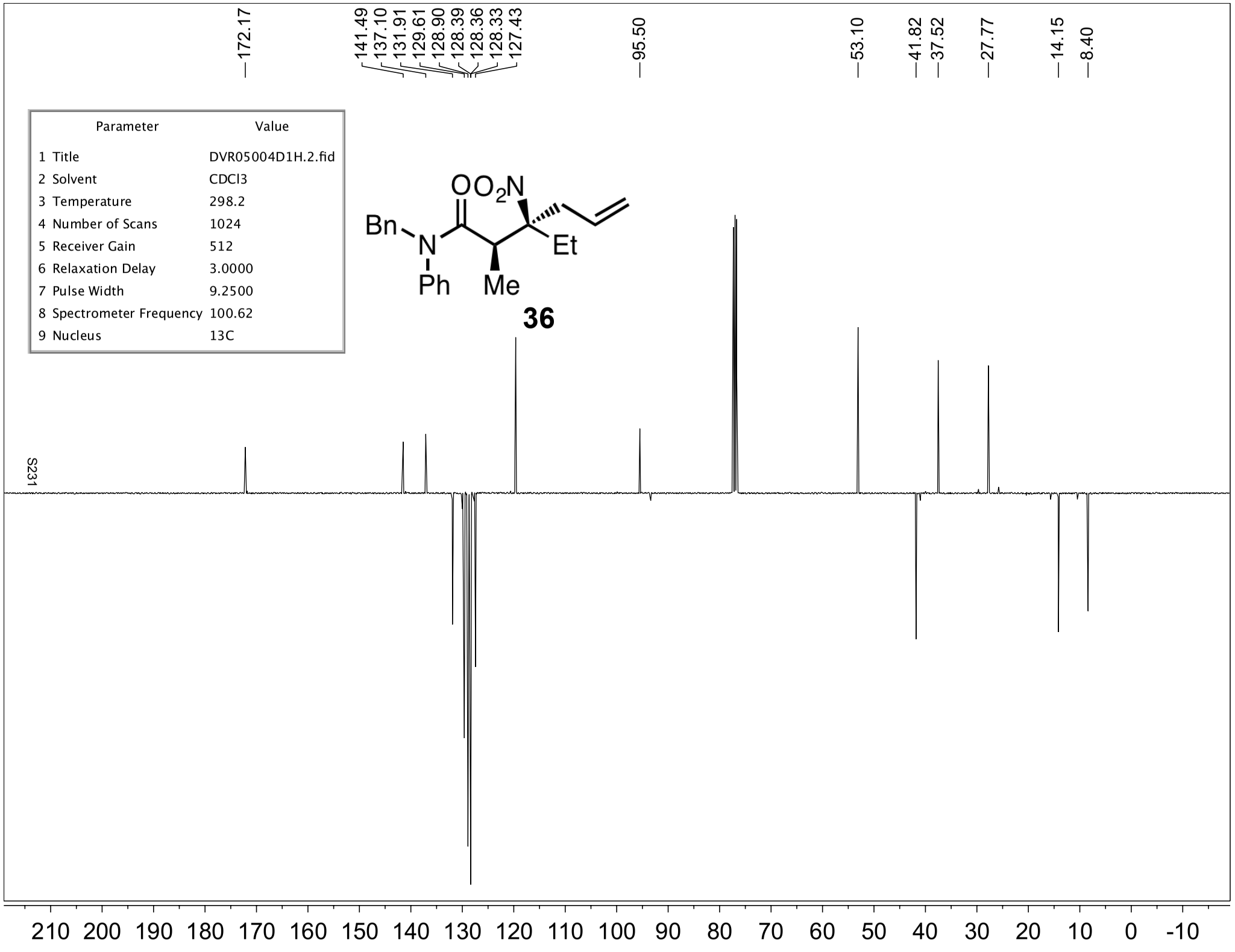

170.11
140.81
136.61
129.71
128.84
128.64
128.40
127.54
127.17
124.31
121.46
118.60
95.26
95.01
94.76
94.52
53.28
40.04
22.87
14.05
8.50
Parameter
Value
1 Title
DVR04265D1C13.1.fid
2 Solvent
CDCl3
3 Temperature
298.1
4 Number of Scans
1024
5 Receiver Gain
512
6 Relaxation Delay
3.0000
7 Pulse Width
9.2500
8 Spectrometer Frequency
100.62
9 Nucleus
13C
O
O2N
CF3
Bn
N
Et
Ph
Me
35
S229
95.4
95.2
95.0
94.8
94.6
94.4
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-1

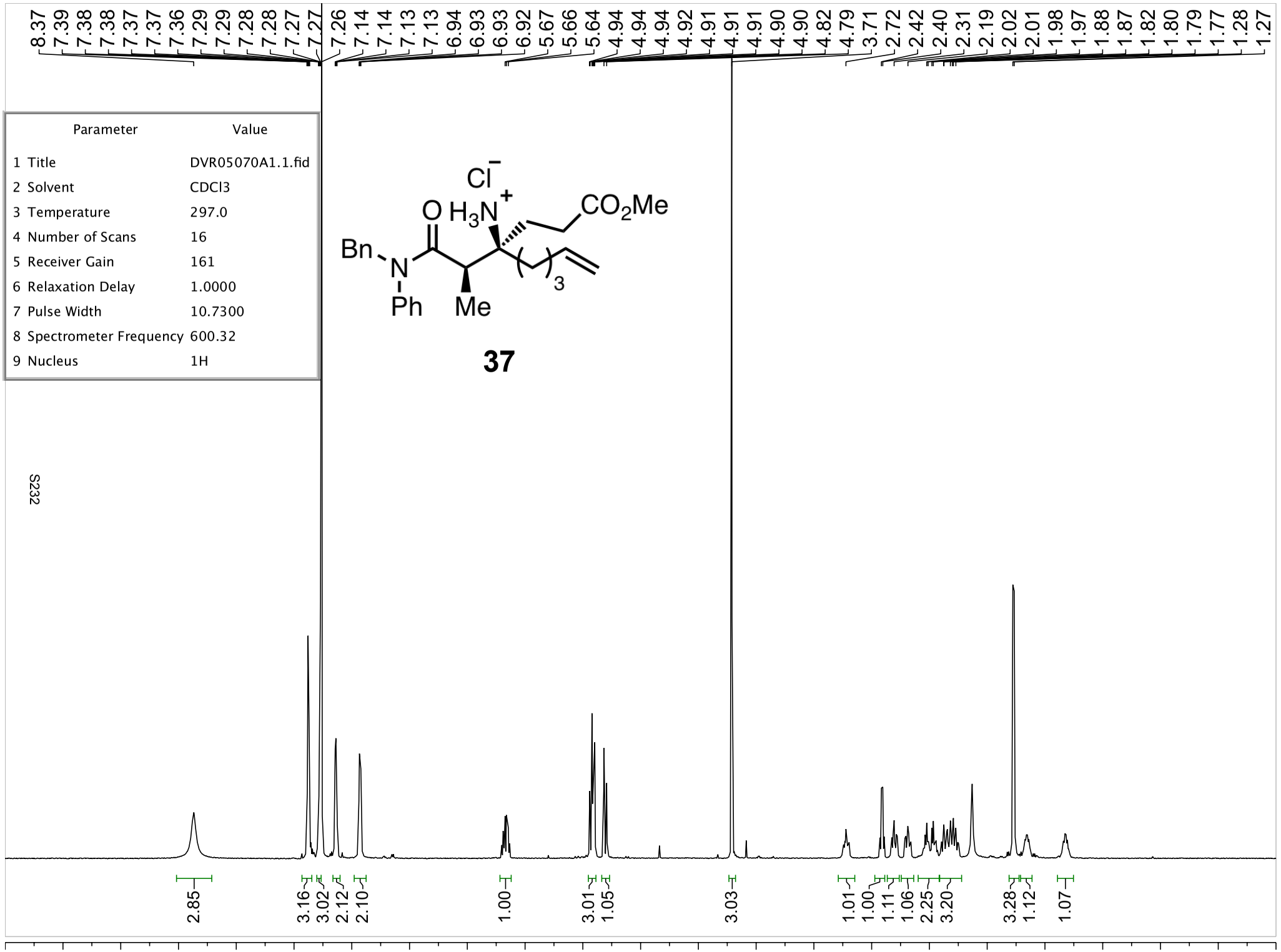
Parameter	Value
1 Title	DVR05004d1.1.fid
2 Solvent	CDCl3
3 Temperature	298.0
4 Number of Scans	16
5 Receiver Gain	203
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H

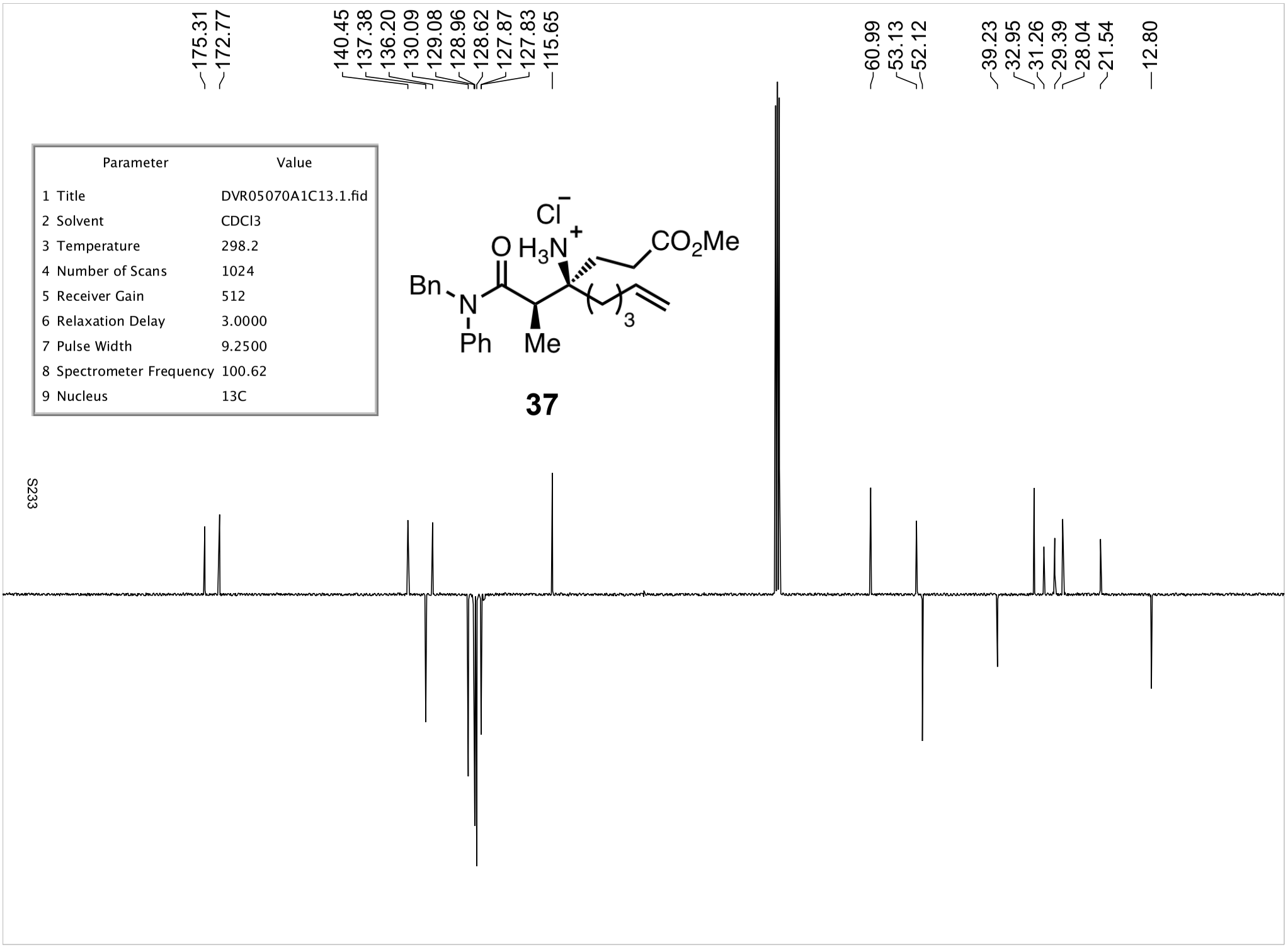
36

S230

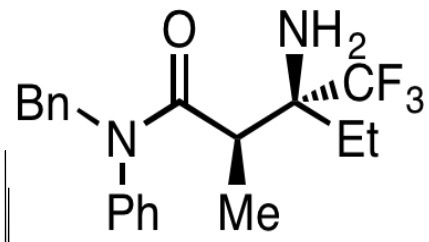



172.17
141.49
137.10
131.91
129.61
128.90
128.39
128.36
128.33
127.43
95.50
53.10
41.82
37.52
27.77
14.15
8.40
Parameter Value
1 Title DVR05004D1H.2.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
O
O2N
Bn
N
Et
Ph
Me
36
S231
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10


8.37 7.39 7.38 7.38 7.37 7.37 7.36 7.29 7.29 7.28 7.28 7.27 7.27 7.26 7.14 7.14 7.13 7.13 6.94 6.93 6.93 6.92 5.67 5.66 5.64 4.94 4.94 4.94 4.92 4.91 4.91 4.91 4.90 4.90 4.82 4.79 3.71 2.72 2.42 2.40 2.31 2.19 2.02 2.01 1.98 1.97 1.88 1.87 1.82 1.80 1.79 1.77 1.28 1.27
Parameter Value
1 Title DVR05070A1.1.fid
2 Solvent CDCl3
3 Temperature 297.0
4 Number of Scans 16
5 Receiver Gain 161
6 Relaxation Delay 1.0000
7 Pulse Width 10.7300
8 Spectrometer Frequency 600.32
9 Nucleus 1H
Cl⁻
O H3N+
CO2Me
Bn
N
Ph
Me
3
37
S222
2.85 3.16 3.02 2.12 2.10 1.00 3.01 1.05 3.03 1.01 1.00 1.11 1.06 2.25 3.20 3.28 1.12 1.07
.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1


175.31
172.77
140.45
137.38
136.20
130.09
129.08
128.96
128.62
127.87
127.83
115.65
60.99
53.13
52.12
39.23
32.95
31.26
29.39
28.04
21.54
12.80
Parameter Value
1 Title DVR05070A1C13.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
Cl⁻
O H3N+
CO2Me
Bn
N
Ph
Me
3
37
S233
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

Parameter	Value
1 Title	DVR04296D1.1.fid
2 Solvent	CDCl3
3 Temperature	298.0
4 Number of Scans	16
5 Receiver Gain	161
6 Relaxation Delay	1.0000
7 Pulse Width	10.7700
8 Spectrometer Frequency	600.32
9 Nucleus	1H



38

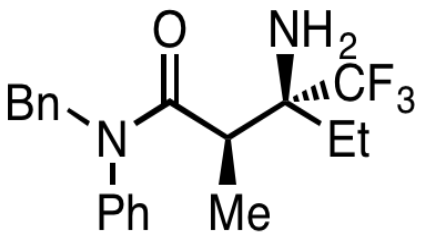
S234

7.34 7.33 7.32 7.32 7.31 7.31 7.30 7.30 7.29 7.29 7.26 7.17 7.16 7.16 7.15 7.15 6.97 6.96 6.95 4.89 4.87 4.85 4.82 2.64 2.63 2.62 2.61 2.24 2.24 1.69 1.68 1.67 1.66 1.64 1.63 1.47 1.46 1.45 1.44 1.44 1.43 1.43 1.42 1.42 1.18 1.17 0.68 0.67 0.66 0.66 0.65

2.99 3.09 2.01 1.90 2.00 0.99 1.99 1.13 1.06 2.98 2.99

0.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1

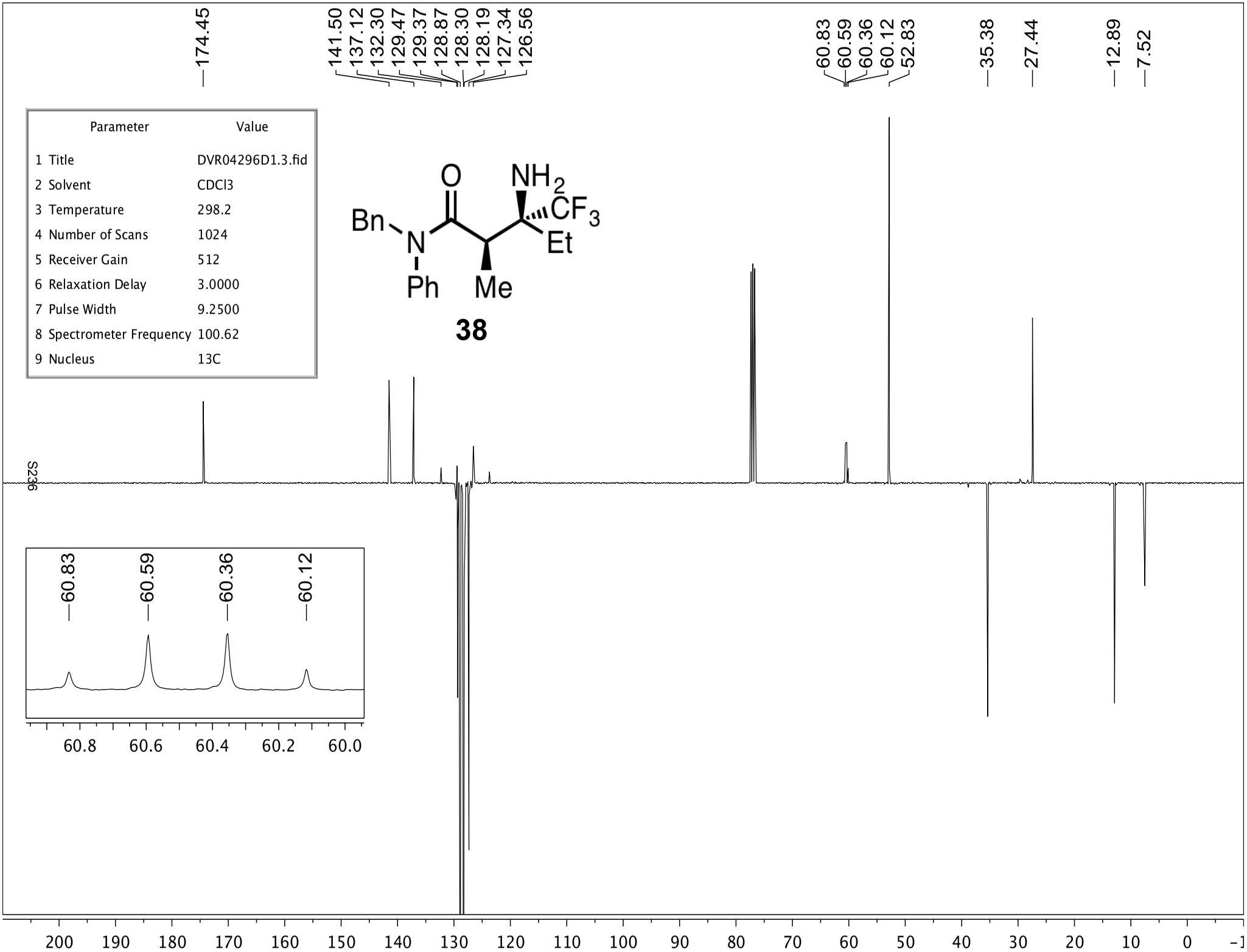
Parameter	Value
1 Title	DVR04296D1.2.fid
2 Solvent	CDCl3
3 Temperature	298.0
4 Number of Scans	16
5 Receiver Gain	362
6 Relaxation Delay	3.0000
7 Pulse Width	11.6200
8 Spectrometer Frequency	564.81
9 Nucleus	19F



38

-74.47

0 -5 -10 -15 -20 -25 -30 -35 -40 -45 -50 -55 -60 -65 -70 -75 -80 -85 -90 -95 -1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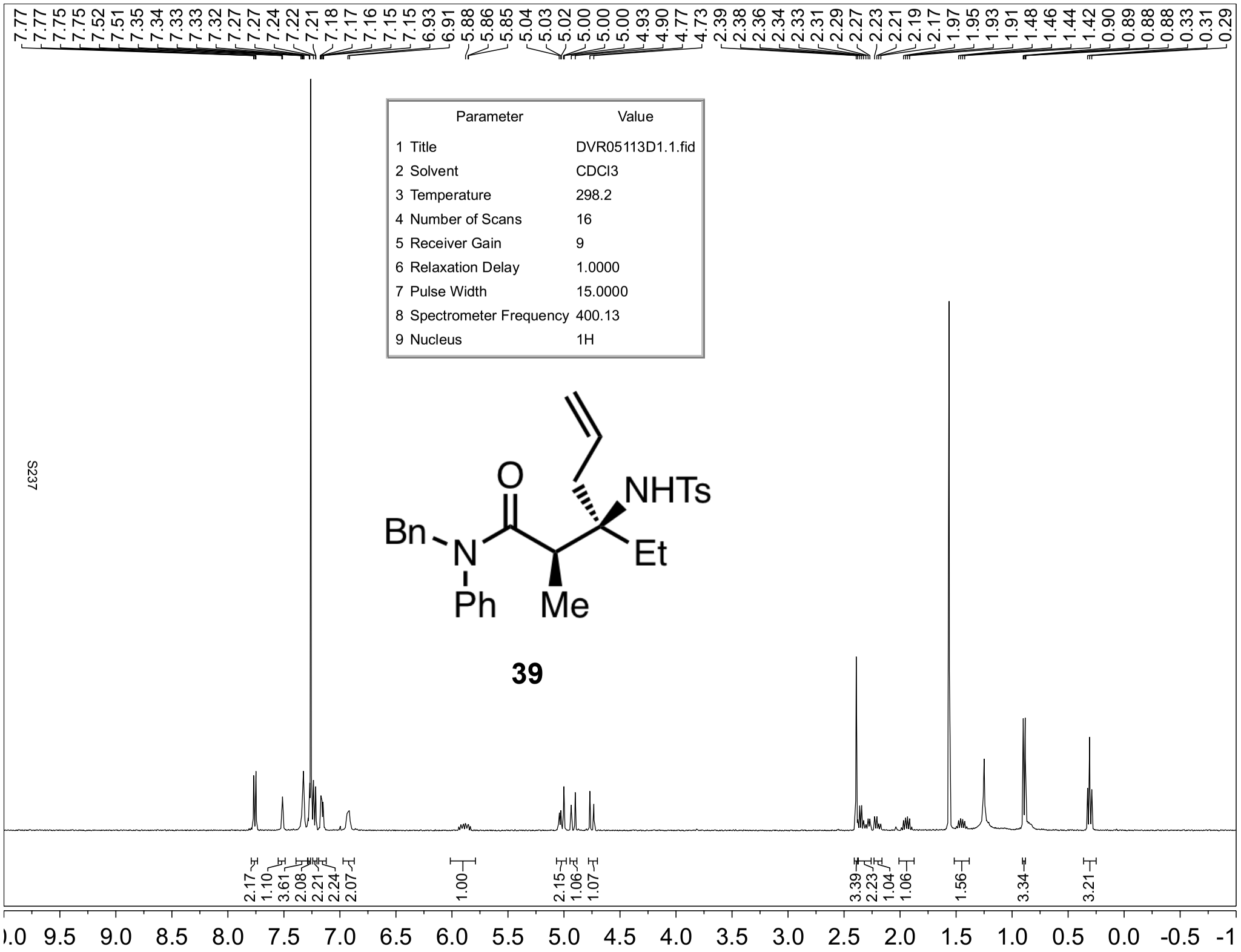
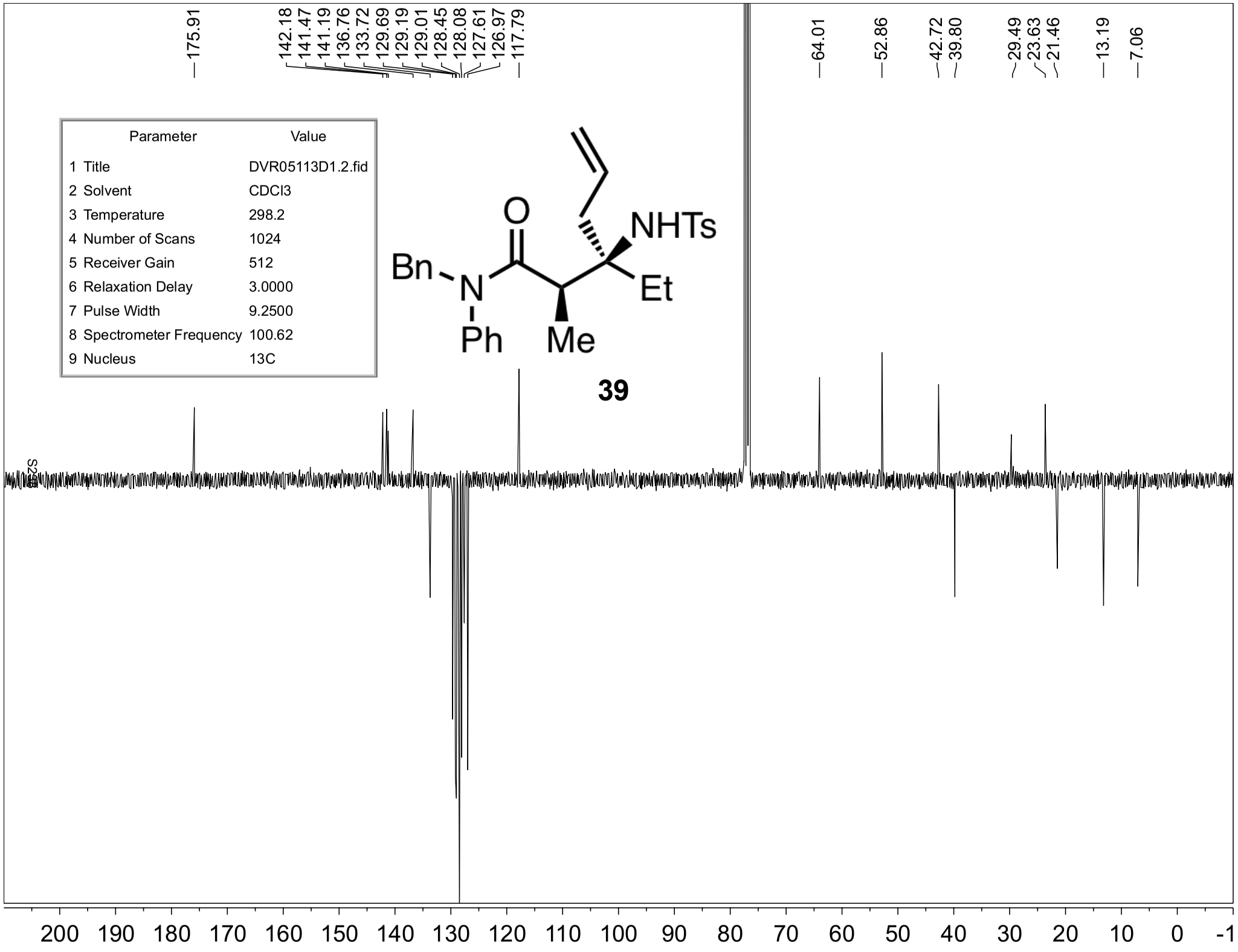
137.12
132.30
129.47
129.37
128.87
128.30
128.19
127.34
126.56
60.83
60.59
60.36
60.12
52.83
35.38
27.44
12.89
7.52
Parameter Value
1 Title DVR04296D1.3.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
Bn
N
Ph
O
NH2
CF3
Et
Me
38
S236
60.8
60.6
60.4
60.2
60.0

Parameter	Value
1 Title	DVR05113D1.1.fid
2 Solvent	CDCl3
3 Temperature	298.2
4 Number of Scans	16
5 Receiver Gain	9
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H

39

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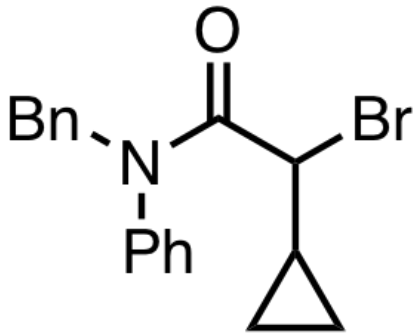
133.72
129.69
129.19
129.01
128.45
128.08
127.61
126.97
117.79
64.01
52.86
42.72
39.80
29.49
23.63
21.46
13.19
7.06
Parameter Value
1 Title DVR05113D1.2.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
O
NHTs
Bn
N
Et
Ph
Me
39
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

Parameter	Value
1 Title	DVR04259H1.1.fid
2 Solvent	CDCl3
3 Temperature	298.2
4 Number of Scans	16
5 Receiver Gain	10
6 Relaxation Delay	1.0000
7 Pulse Width	15.0000
8 Spectrometer Frequency	400.13
9 Nucleus	1H



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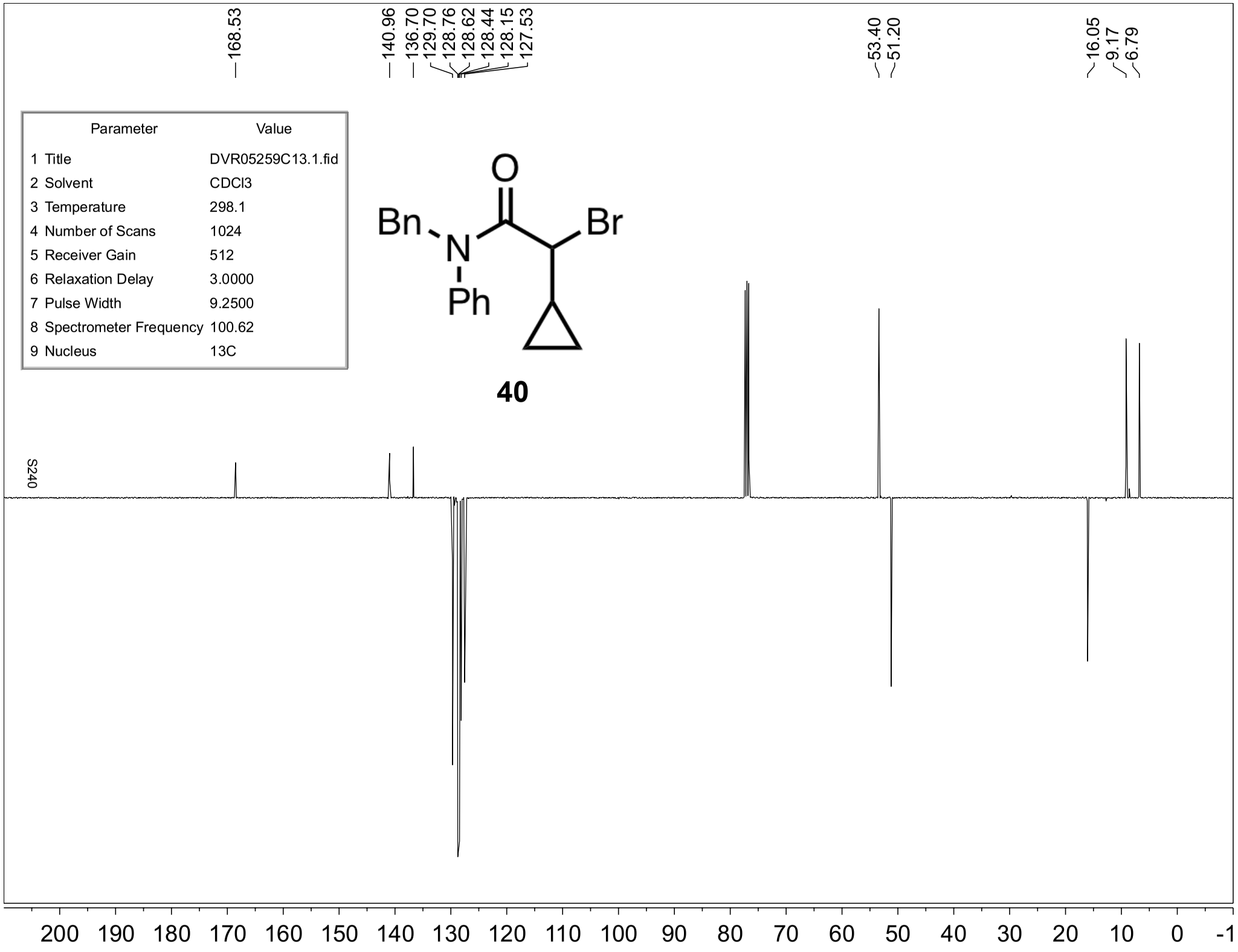
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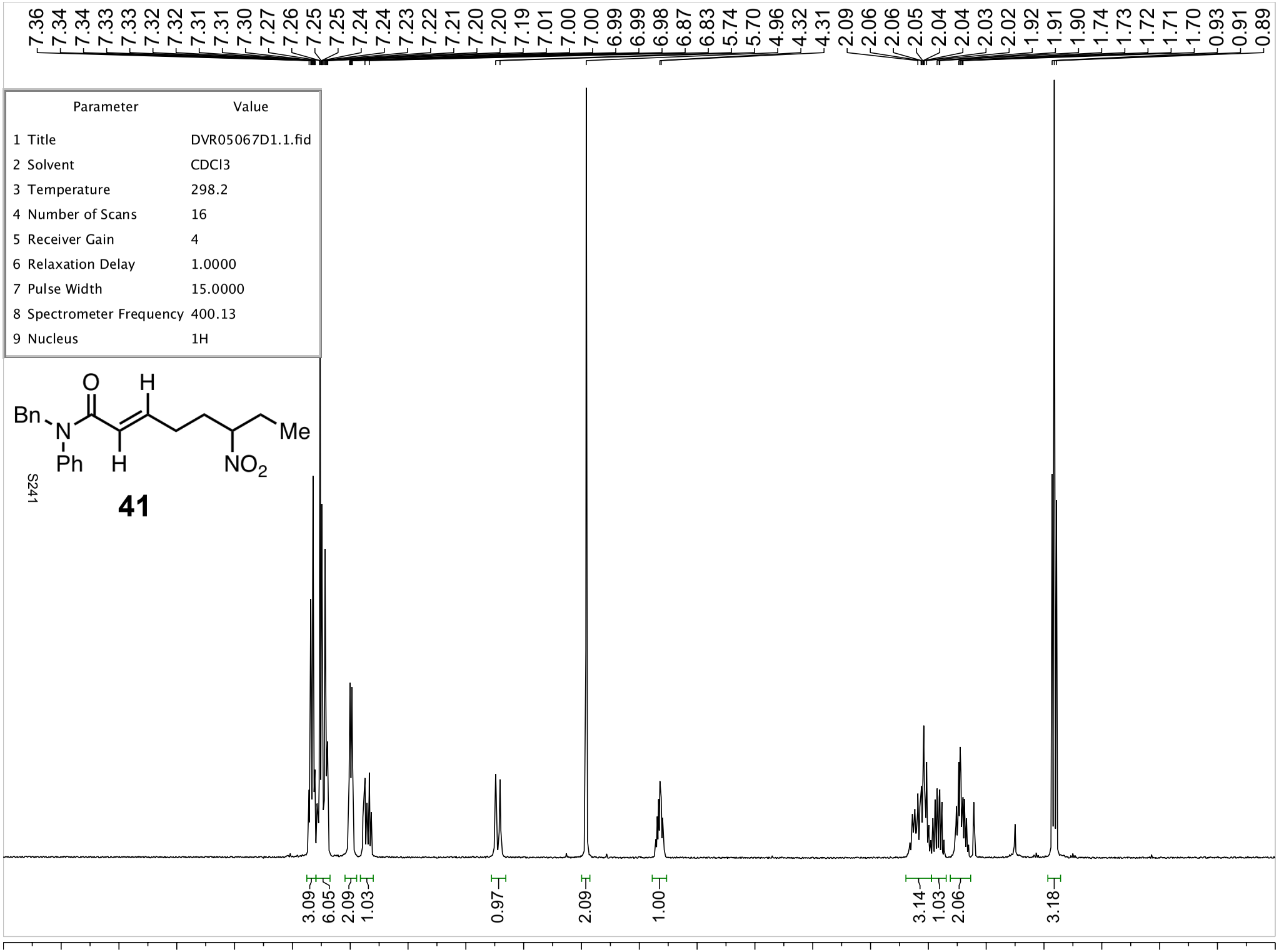
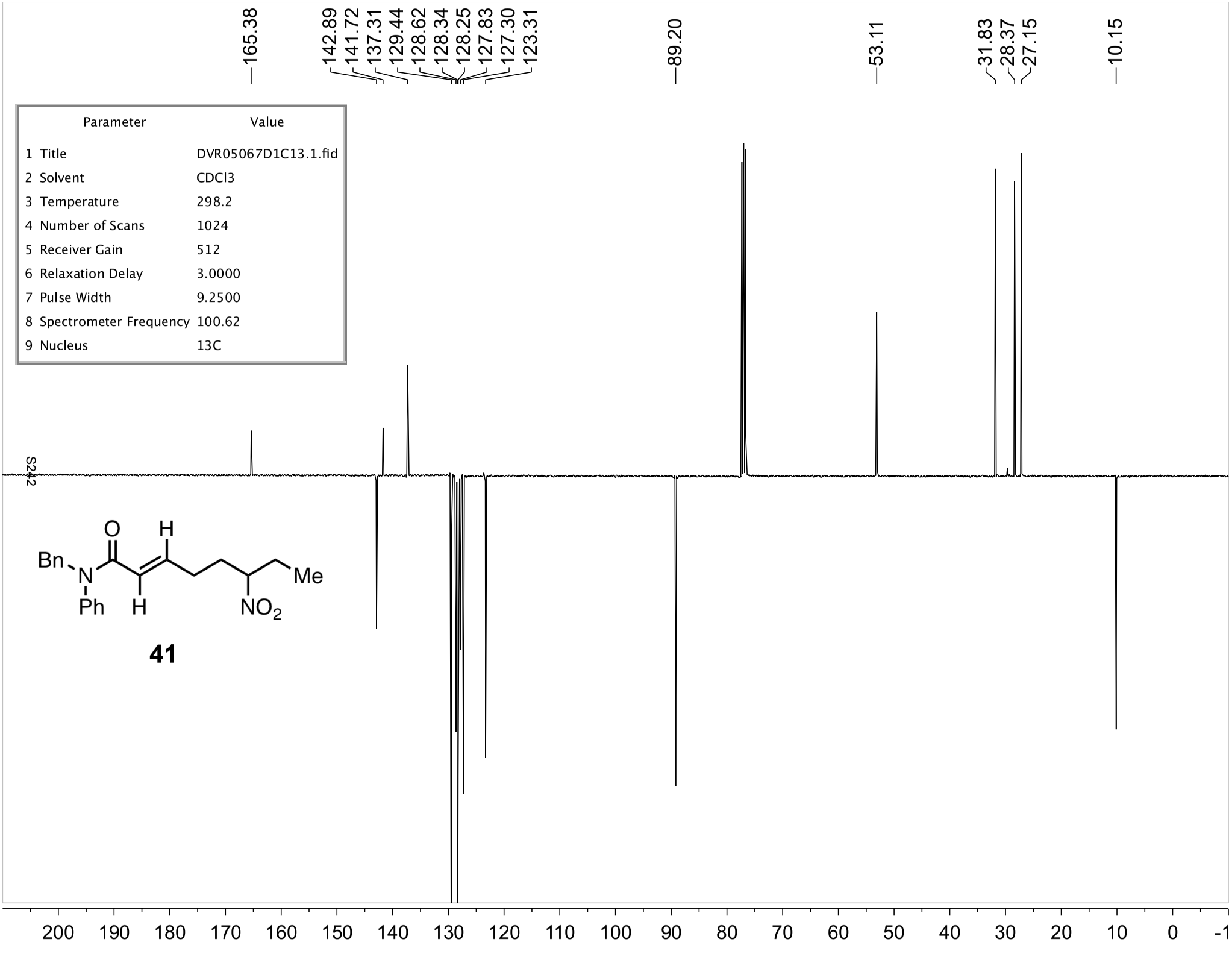
136.70
129.70
128.76
128.62
128.44
128.15
127.53
53.40
51.20
16.05
9.17
6.79
Parameter
Value
1 Title
DVR05259C13.1.fid
2 Solvent
CDCl3
3 Temperature
298.1
4 Number of Scans
1024
5 Receiver Gain
512
6 Relaxation Delay
3.0000
7 Pulse Width
9.2500
8 Spectrometer Frequency
100.62
9 Nucleus
13C
O
Bn
N
Ph
Br
40
S240
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1


7.36 7.34 7.34 7.33 7.33 7.32 7.32 7.31 7.31 7.30 7.27 7.26 7.25 7.25 7.24 7.24 7.23 7.22 7.21 7.20 7.20 7.19 7.01 7.00 7.00 6.99 6.99 6.98 6.87 6.83 5.74 5.70 4.96 4.32 4.31 2.09 2.06 2.06 2.05 2.04 2.04 2.03 2.02 1.92 1.91 1.90 1.74 1.73 1.72 1.71 1.70 0.93 0.91 0.89
Parameter Value
1 Title DVR05067D1.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 16
5 Receiver Gain 4
6 Relaxation Delay 1.0000
7 Pulse Width 15.0000
8 Spectrometer Frequency 400.13
9 Nucleus 1H
Bn
N
Ph
O
H
H
Me
NO2
S241
41
3.09
6.05
2.09
1.03
0.97
2.09
1.00
3.14
1.03
2.06
3.18
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1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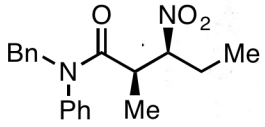
141.72
137.31
129.44
128.62
128.34
128.25
127.83
127.30
123.31
89.20
53.11
31.83
28.37
27.15
10.15
Parameter Value
1 Title DVR05067D1C13.1.fid
2 Solvent CDCl3
3 Temperature 298.2
4 Number of Scans 1024
5 Receiver Gain 512
6 Relaxation Delay 3.0000
7 Pulse Width 9.2500
8 Spectrometer Frequency 100.62
9 Nucleus 13C
S242
Bn
N
Ph
O
H
H
Me
NO2
41
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04136RAC SYN 3_7142016_1001 AM_3.lcd

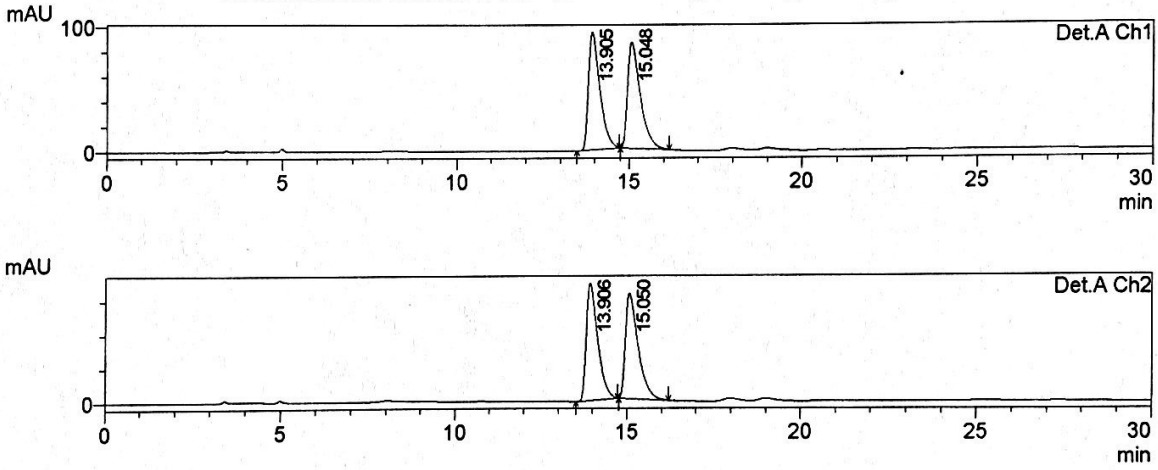
Acquired by	: LC User
Sample Name	: DVR04136RAC SYN 3
Sample ID	: DVR04136RAC SYN 3
Tray#	: 1
Vail #	: 6
Injection Volume	: 2 uL
Data File Name	: DVR04136RAC SYN 3_7142016_1001 AM_3.lcd
Method File Name	: col2_0.8isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 7/14/2016 12:14:11 PM
Data Processed	: 7/14/2016 12:44:14 PM



1A
racemic

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04136RAC SYN 3_7142016_1001 AM_3.lcd



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.905	2190844	95013	50.043	52.727
2	15.048	2187053	85184	49.957	47.273
Total		4377897	180197	100.000	100.000

PeakTable

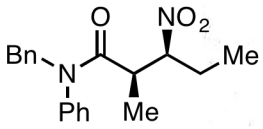
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.906	4055770	175507	50.093	52.761
2	15.050	4040646	157140	49.907	47.239
Total		8096415	332647	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04136 SYN 2_7142016_1001 AM_7.lcd

Acquired by	: LC User
Sample Name	: DVR04136 SYN 2
Sample ID	: DVR04136 SYN 2
Tray#	: 1
Vail #	: 7
Injection Volume	: 2 uL
Data File Name	: DVR04136 SYN 2_7142016_1001 AM_7.lcd
Method File Name	: col2_0.8isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 7/14/2016 1:25:10 PM
Data Processed	: 7/14/2016 1:55:11 PM

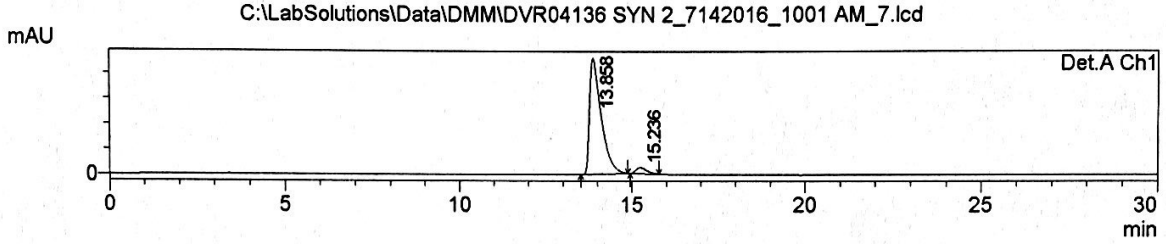


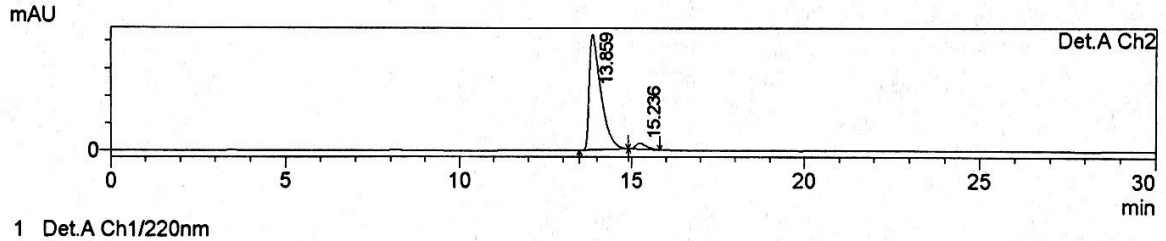
1A

91% ee

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04136 SYN 2_7142016_1001 AM_7.lcd





1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.858	5398412	229800	95.553	95.199
2	15.236	251218	11590	4.447	4.801
Total		5649631	241390	100.000	100.000

PeakTable

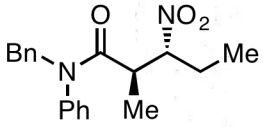
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.859	9954946	422399	95.449	95.115
2	15.236	474650	21693	4.551	4.885
Total		10429596	444092	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04135RAC ANTI 3_7162016_1752 PM_2.lcd

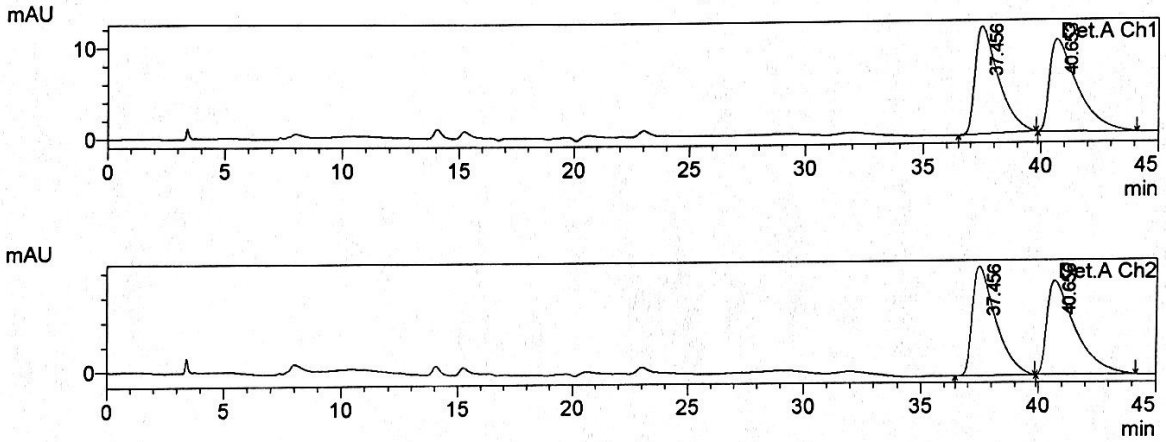
Acquired by	: LC User
Sample Name	: DVR04135RAC ANTI 3
Sample ID	: DVR04135RAC ANTI 3
Tray#	: 1
Vail #	: 6
Injection Volume	: 2 uL
Data File Name	: DVR04135RAC ANTI 3_7162016_1752 PM_2.lcd
Method File Name	: col2_0.8isoiPA_45min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 7/16/2016 6:38:35 PM
Data Processed	: 7/16/2016 10:46:56 PM



1B
racemic

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04135RAC ANTI 3_7162016_1752 PM_2.lcd



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	37.456	817118	11850	49.593	53.836
2	40.653	830543	10161	50.407	46.164
Total		1647661	22011	100.000	100.000

PeakTable

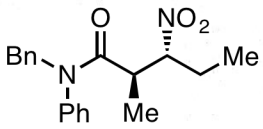
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	37.456	1545683	22392	49.041	53.793
2	40.656	1606133	19234	50.959	46.207
Total		3151816	41627	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

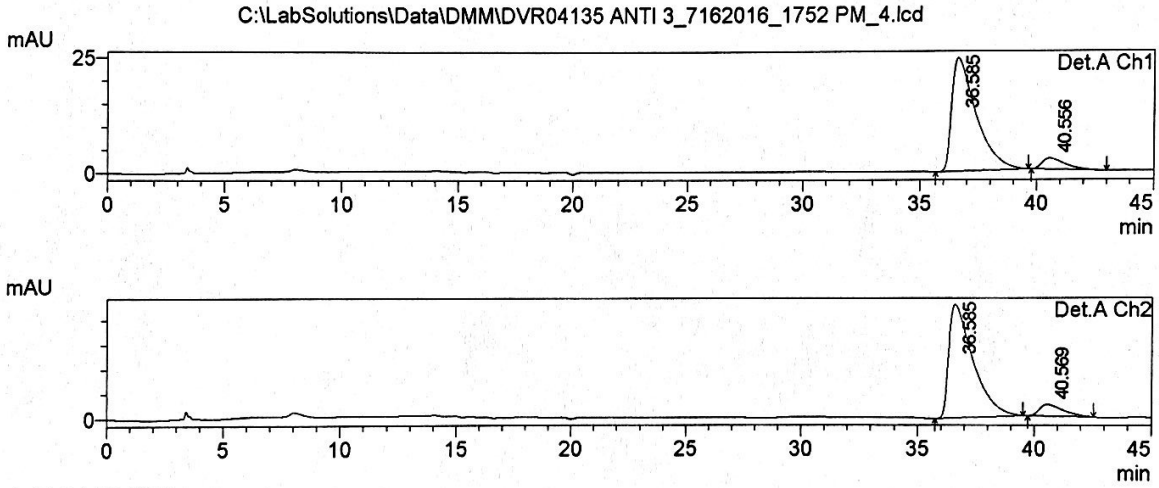
C:\LabSolutions\Data\DMM\DVR04135 ANTI 3_7162016_1752 PM_4.lcd

Acquired by	: LC User
Sample Name	: DVR04135 ANTI 3
Sample ID	: DVR04135 ANTI 3
Tray#	: 1
Vail #	: 7
Injection Volume	: 2 uL
Data File Name	: DVR04135 ANTI 3_7162016_1752 PM_4.lcd
Method File Name	: col2_0.8isoiPA_45min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 7/16/2016 8:19:26 PM
Data Processed	: 7/16/2016 10:48:54 PM



1B
83% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	36.585	1778887	24567	91.507	91.057
2	40.556	165100	2413	8.493	8.943
Total		1943987	26980	100.000	100.000

PeakTable

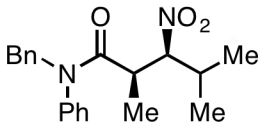
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	36.585	3325547	46346	90.964	90.776
2	40.569	330327	4709	9.036	9.224
Total		3655875	51055	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

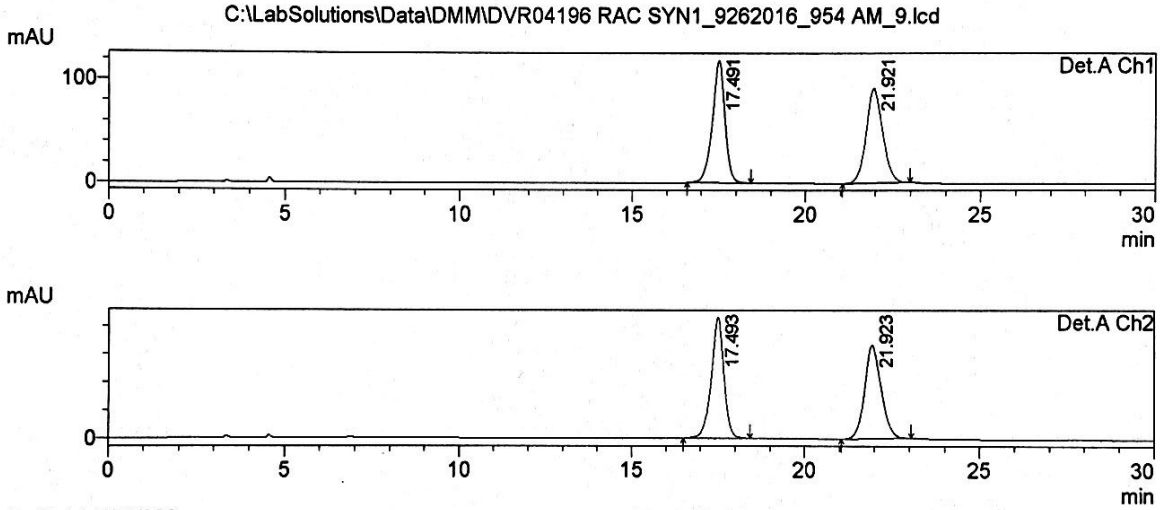
C:\LabSolutions\Data\DMM\DVR04196 RAC SYN1_9262016_954 AM_9.lcd

Acquired by	: LC User
Sample Name	: DVR04196 RAC SYN1
Sample ID	: DVR04196 RAC SYN1
Tray#	: 1
Vail #	: 1
Injection Volume	: 2 uL
Data File Name	: DVR04196 RAC SYN1_9262016_954 AM_9.lcd
Method File Name	: col1_1isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 9/26/2016 2:54:01 PM
Data Processed	: 9/26/2016 3:24:02 PM



9A
racemic

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.491	2997080	118652	50.031	56.408
2	21.921	2993359	91694	49.969	43.592
Total		5990440	210346	100.000	100.000

PeakTable

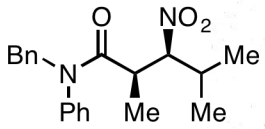
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.493	5481415	216292	50.105	56.428
2	21.923	5458508	167013	49.895	43.572
Total		10939923	383305	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

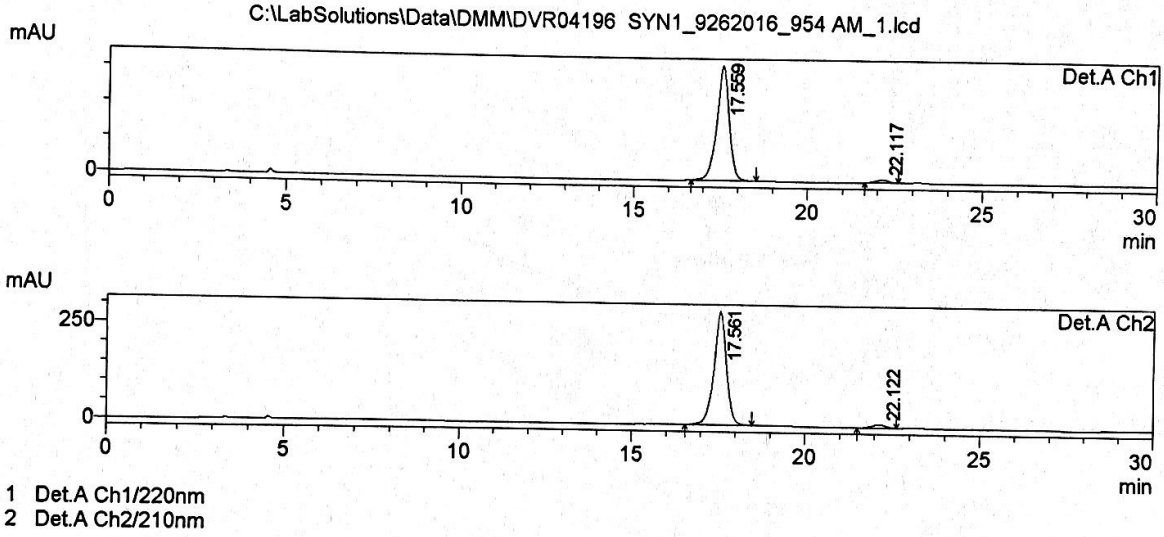
C:\LabSolutions\Data\DMM\DVR04196 SYN1_9262016_954 AM_1.lcd

Acquired by	: LC User
Sample Name	: DVR04196 SYN1
Sample ID	: DVR04196 SYN1
Tray#	: 1
Vail #	: 2
Injection Volume	: 2 uL
Data File Name	: DVR04196 SYN1_9262016_954 AM_1.lcd
Method File Name	: col1_1isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 9/26/2016 4:04:56 PM
Data Processed	: 9/26/2016 4:34:56 PM



9A
94% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.559	4033823	162734	97.235	97.433
2	22.117	114706	4288	2.765	2.567
Total		4148529	167022	100.000	100.000

PeakTable

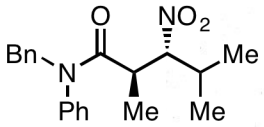
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.561	7372880	296393	97.038	97.348
2	22.122	225026	8074	2.962	2.652
Total		7597906	304467	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04192 RAC ANTI _9252016_1431 PM_1.lcd

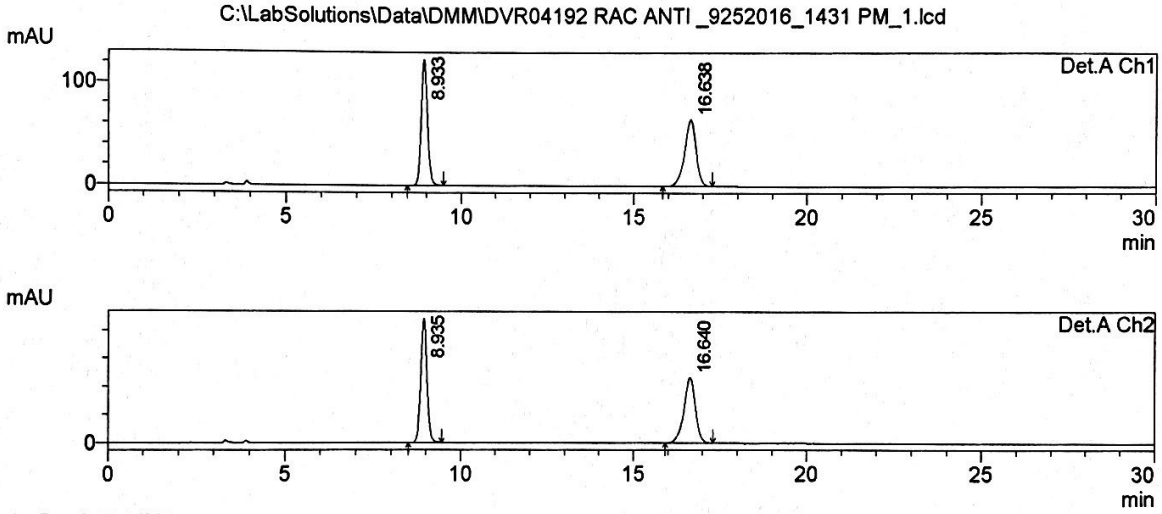
Acquired by	: LC User
Sample Name	: DVR04192 RAC ANTI
Sample ID	: DVR04192 RAC ANTI
Tray#	: 1
Vail #	: 1
Injection Volume	: 2 uL
Data File Name	: DVR04192 RAC ANTI _9252016_1431 PM_1.lcd
Method File Name	: col1_5isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 9/25/2016 3:04:06 PM
Data Processed	: 9/25/2016 3:34:09 PM



9B
racemic

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04192 RAC ANTI _9252016_1431 PM_1.lcd



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	8.933	1508239	123366	50.180	65.477
2	16.638	1497399	65044	49.820	34.523
Total		3005638	188411	100.000	100.000

PeakTable

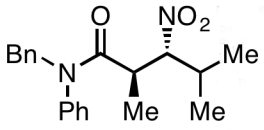
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	8.935	2705991	221558	50.166	65.484
2	16.640	2688042	116781	49.834	34.516
Total		5394033	338339	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

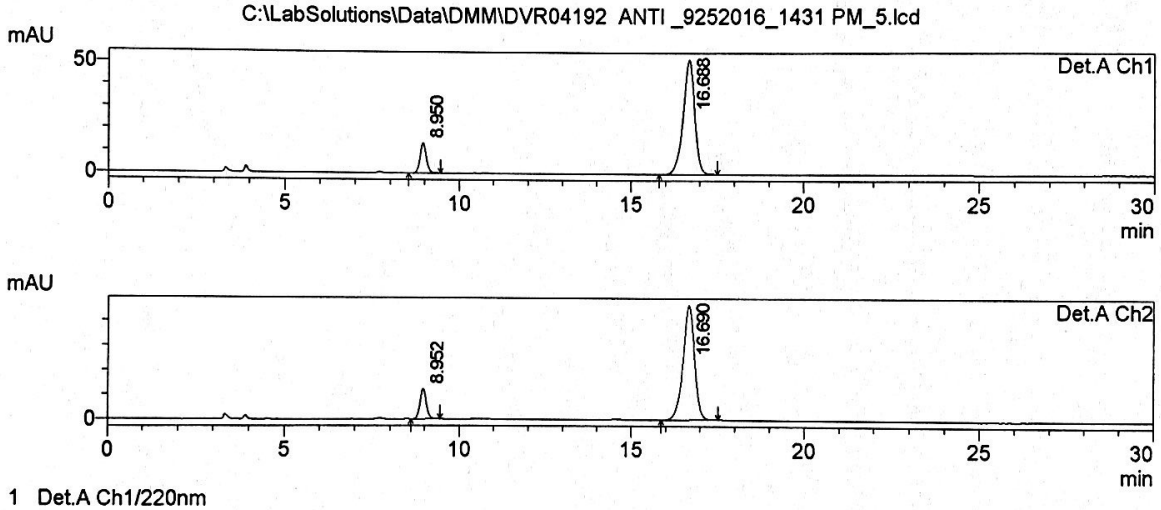
C:\LabSolutions\Data\DMM\DVR04192 ANTI _9252016_1431 PM_5.lcd

Acquired by	: LC User
Sample Name	: DVR04192 ANTI
Sample ID	: DVR04192 ANTI
Tray#	: 1
Vail #	: 2
Injection Volume	: 2 uL
Data File Name	: DVR04192 ANTI _9252016_1431 PM_5.lcd
Method File Name	: col1_5isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 9/25/2016 4:15:02 PM
Data Processed	: 9/25/2016 4:45:04 PM



9B
76% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	8.950	167797	13712	12.237	20.879
2	16.688	1203456	51963	87.763	79.121
Total		1371253	65676	100.000	100.000

PeakTable

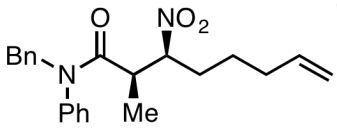
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	8.952	302717	24702	12.268	20.922
2	16.690	2164882	93365	87.732	79.078
Total		2467599	118067	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

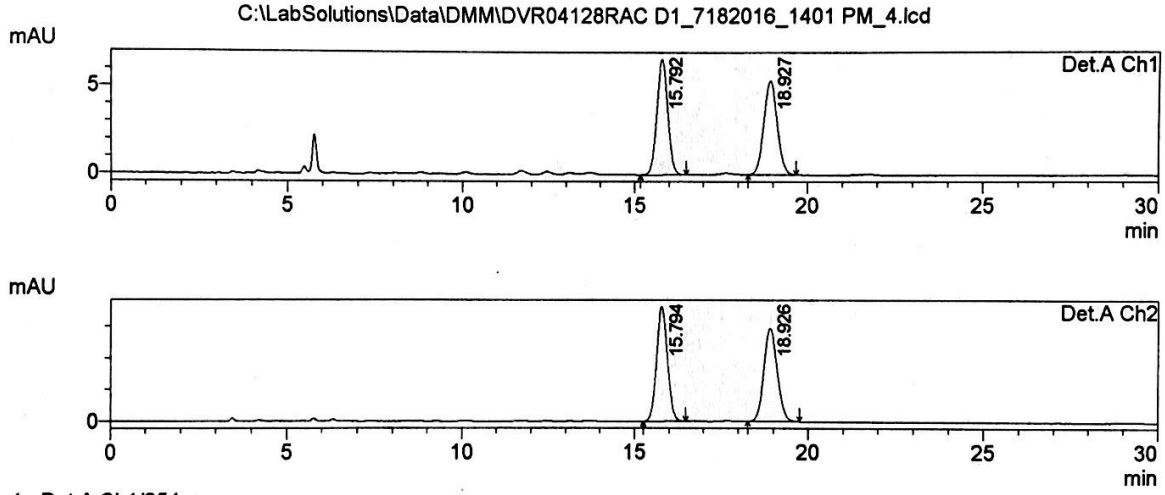
C:\LabSolutions\Data\DMM\DVR04128RAC D1_7182016_1401 PM_4.lcd

Acquired by	: LC User
Sample Name	: DVR04128RAC D1
Sample ID	: DVR04128RAC D1
Tray#	: 1
Vail #	: 1
Injection Volume	: 3 uL
Data File Name	: DVR04128RAC D1_7182016_1401 PM_4.lcd
Method File Name	: col3_2isoiPA_30min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 7/18/2016 3:52:45 PM
Data Processed	: 7/18/2016 4:22:47 PM



10A
racemic

<Chromatogram>



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.792	145324	6641	50.250	55.124
2	18.927	143877	5406	49.750	44.876
Total		289200	12047	100.000	100.000

PeakTable

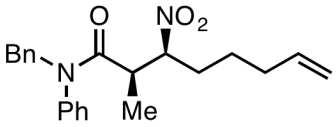
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.794	3980250	182070	50.162	55.173
2	18.926	3954586	147927	49.838	44.827
Total		7934836	329997	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04128 D1_7182016_1401 PM_8.lcd

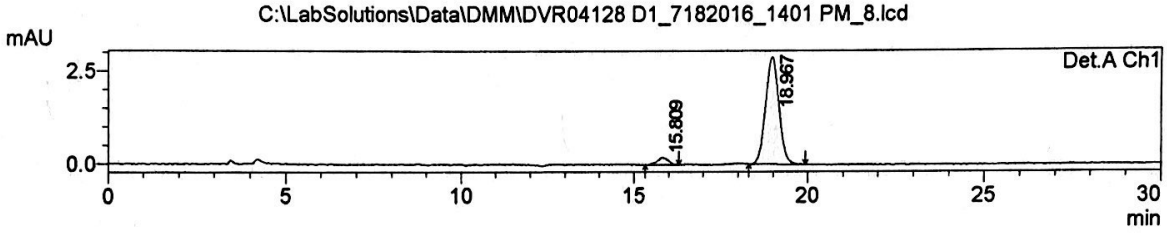
Acquired by	: LC User
Sample Name	: DVR04128 D1
Sample ID	: DVR04128 D1
Tray#	: 1
Vail #	: 2
Injection Volume	: 3 uL
Data File Name	: DVR04128 D1_7182016_1401 PM_8.lcd
Method File Name	: col3_2isoiPA_30min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 7/18/2016 5:03:45 PM
Data Processed	: 7/18/2016 5:33:46 PM

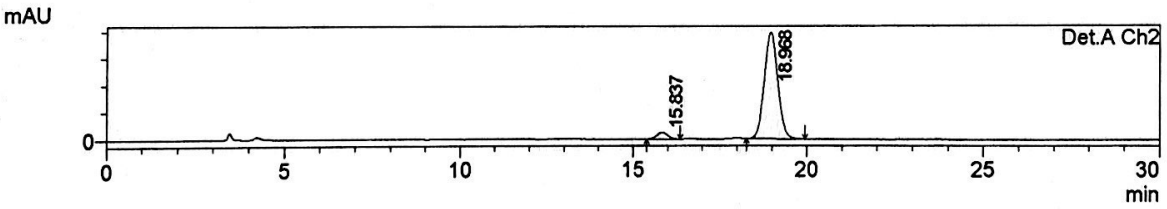


10A
91% ee

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04128 D1_7182016_1401 PM_8.lcd





1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.809	4289	192	5.271	6.220
2	18.967	77076	2897	94.729	93.780
Total		81364	3089	100.000	100.000

PeakTable

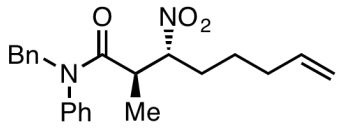
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.837	104022	4891	4.655	5.792
2	18.968	2130706	79554	95.345	94.208
Total		2234727	84445	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

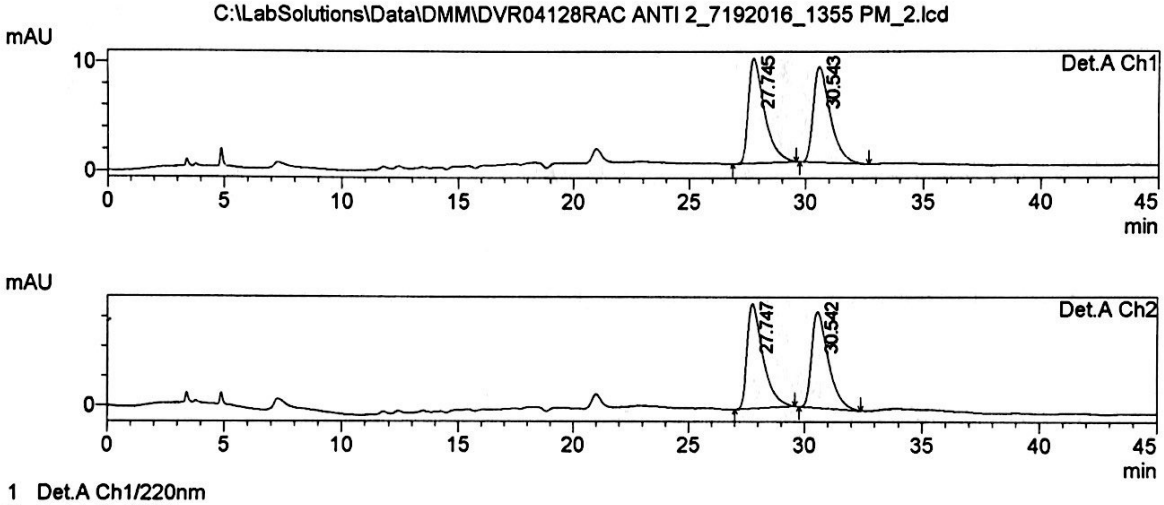
C:\LabSolutions\Data\DMM\DVR04128RAC ANTI 2_7192016_1355 PM_2.lcd

Acquired by	: LC User
Sample Name	: DVR04128RAC ANTI 2
Sample ID	: DVR04128RAC ANTI 2
Tray#	: 1
Vail #	: 2
Injection Volume	: 1 uL
Data File Name	: DVR04128RAC ANTI 2_7192016_1355 PM_2.lcd
Method File Name	: col2_0.8isoiPA_45min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 7/19/2016 2:25:58 PM
Data Processed	: 7/19/2016 3:11:00 PM



10B
racemic

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	27.745	457217	9571	51.168	52.288
2	30.543	436342	8733	48.832	47.712
Total		893559	18304	100.000	100.000

PeakTable

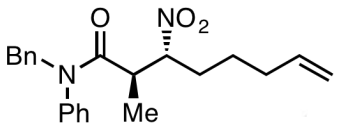
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	27.747	851750	17849	51.218	52.190
2	30.542	811240	16351	48.782	47.810
Total		1662990	34200	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04128 ANTI D2_7192016_1355 PM_6.lcd

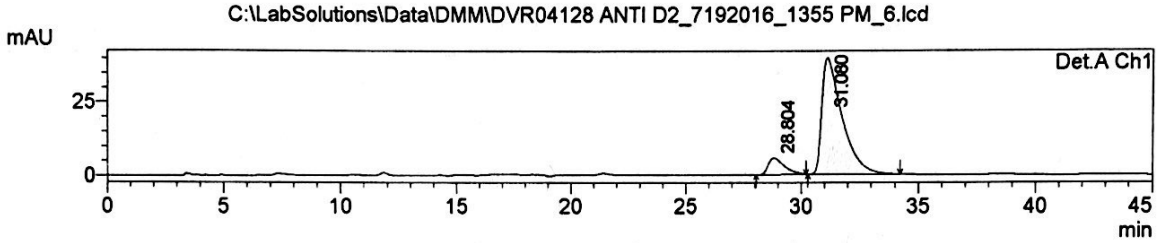
Acquired by	: LC User
Sample Name	: DVR04128 ANTI D2
Sample ID	: DVR04128 ANTI D2
Tray#	: 1
Vail #	: 3
Injection Volume	: 1 uL
Data File Name	: DVR04128 ANTI D2_7192016_1355 PM_6.lcd
Method File Name	: col2_0.8isoiPA_45min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 7/19/2016 3:51:55 PM
Data Processed	: 7/19/2016 4:36:58 PM

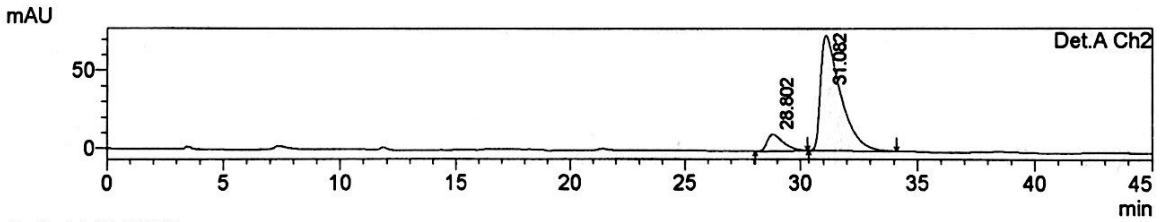


10B
79% ee

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04128 ANTI D2_7192016_1355 PM_6.lcd





1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	28.804	272983	5675	10.343	12.534
2	31.080	2366354	39606	89.657	87.466
Total		2639337	45281	100.000	100.000

PeakTable

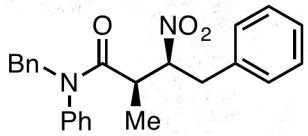
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	28.802	521687	10686	10.578	12.586
2	31.082	4409944	74216	89.422	87.414
Total		4931631	84902	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

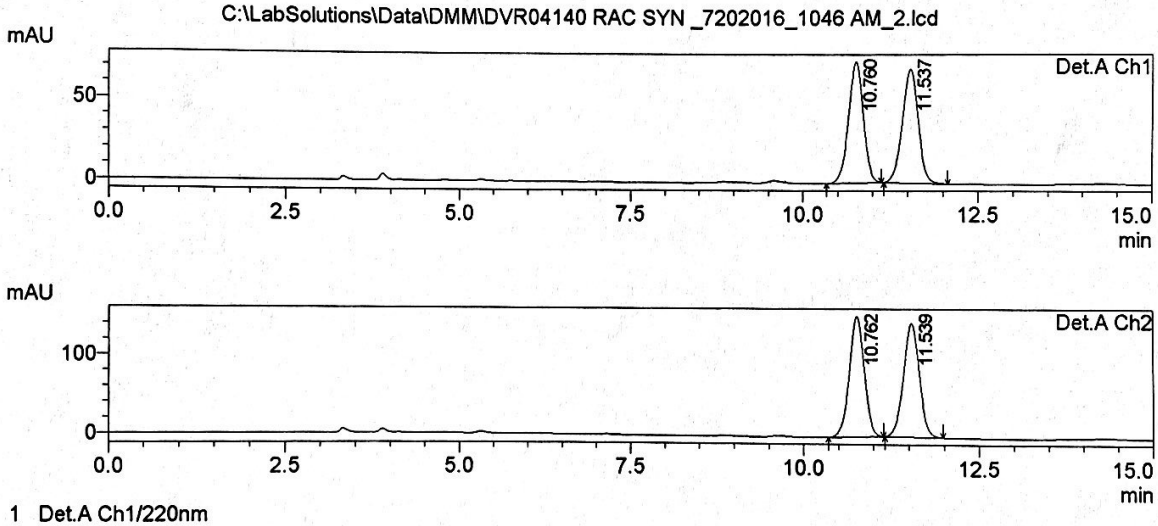
C:\LabSolutions\Data\DMM\DVR04140 RAC SYN _7202016_1046 AM_2.lcd

Acquired by	: LC User
Sample Name	: DVR04140 RAC SYN
Sample ID	: DVR04140 RAC SYN
Tray#	: 1
Vail #	: 4
Injection Volume	: 3 uL
Data File Name	: DVR04140 RAC SYN _7202016_1046 AM_2.lcd
Method File Name	: col1_5isoiPA_15min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 7/20/2016 11:02:13 AM
Data Processed	: 7/20/2016 11:17:14 AM



11A
racemic

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.760	1093144	74436	50.032	51.502
2	11.537	1091760	70093	49.968	48.498
Total		2184904	144529	100.000	100.000

PeakTable

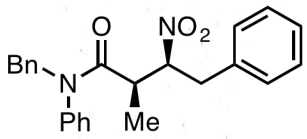
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.762	2254340	153508	50.098	51.537
2	11.539	2245525	144353	49.902	48.463
Total		4499866	297861	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04140 SYN 1_7202016_1046 AM_6.lcd

Acquired by	: LC User
Sample Name	: DVR04140 SYN 1
Sample ID	: DVR04140 SYN 1
Tray#	: 1
Vail #	: 5
Injection Volume	: 3 uL
Data File Name	: DVR04140 SYN 1_7202016_1046 AM_6.lcd
Method File Name	: col1_5isoiPA_15min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 7/20/2016 11:43:09 AM
Data Processed	: 7/20/2016 11:58:11 AM

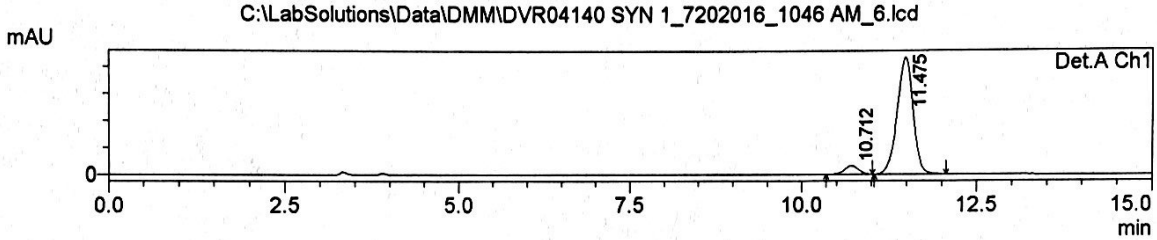


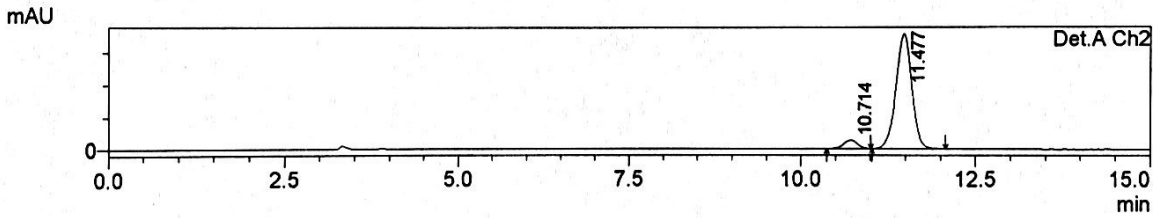
11A

87% ee

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04140 SYN 1_7202016_1046 AM_6.lcd





1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.712	92346	6486	6.370	6.968
2	11.475	1357267	86586	93.630	93.032
Total		1449613	93072	100.000	100.000

PeakTable

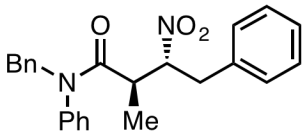
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.714	189162	13361	6.329	6.961
2	11.477	2799668	178582	93.671	93.039
Total		2988829	191943	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

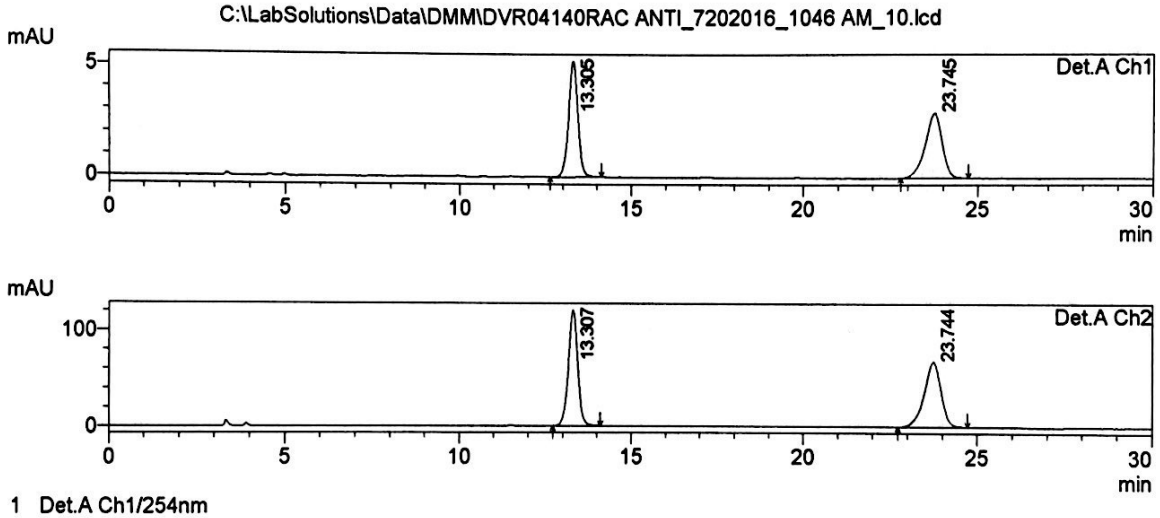
C:\LabSolutions\Data\DMM\DVR04140RAC ANTI_7202016_1046 AM_10.lcd

Acquired by	: LC User
Sample Name	: DVR04140RAC ANTI
Sample ID	: DVR04140RAC ANTI
Tray#	: 1
Vail #	: 6
Injection Volume	: 3 uL
Data File Name	: DVR04140RAC ANTI_7202016_1046 AM_10.lcd
Method File Name	: col1_5isoiPA_30min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 7/20/2016 12:39:06 PM
Data Processed	: 7/20/2016 1:09:06 PM



11B
racemic

<Chromatogram>



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.305	97959	5205	49.970	64.063
2	23.745	98077	2920	50.030	35.937
Total		196036	8124	100.000	100.000

PeakTable

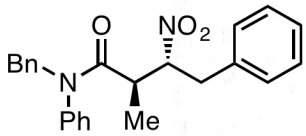
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.307	2280277	121019	50.026	64.053
2	23.744	2277909	67917	49.974	35.947
Total		4558186	188936	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04140 RAC ANTI 1_7202016_1046 AM_14.lcd

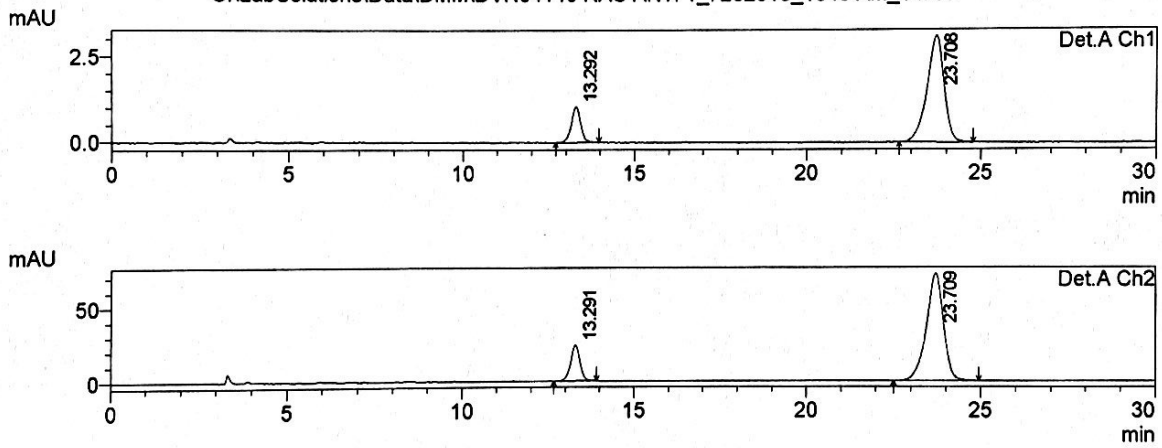
Acquired by	: LC User
Sample Name	: DVR04140 RAC ANTI 1
Sample ID	: DVR04140 RAC ANTI 1
Tray#	: 1
Vail #	: 7
Injection Volume	: 3 uL
Data File Name	: DVR04140 RAC ANTI 1_7202016_1046 AM_14.lcd
Method File Name	: col1_5isoiPA_30min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 7/20/2016 1:50:02 PM
Data Processed	: 7/20/2016 2:20:04 PM



11B
68% ee

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04140 RAC ANTI 1_7202016_1046 AM_14.lcd



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.292	20287	1051	16.159	25.144
2	23.708	105258	3128	83.841	74.856
Total		125544	4179	100.000	100.000

PeakTable

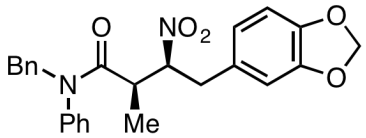
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.291	454382	24182	15.632	24.942
2	23.709	2452271	72770	84.368	75.058
Total		2906652	96953	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

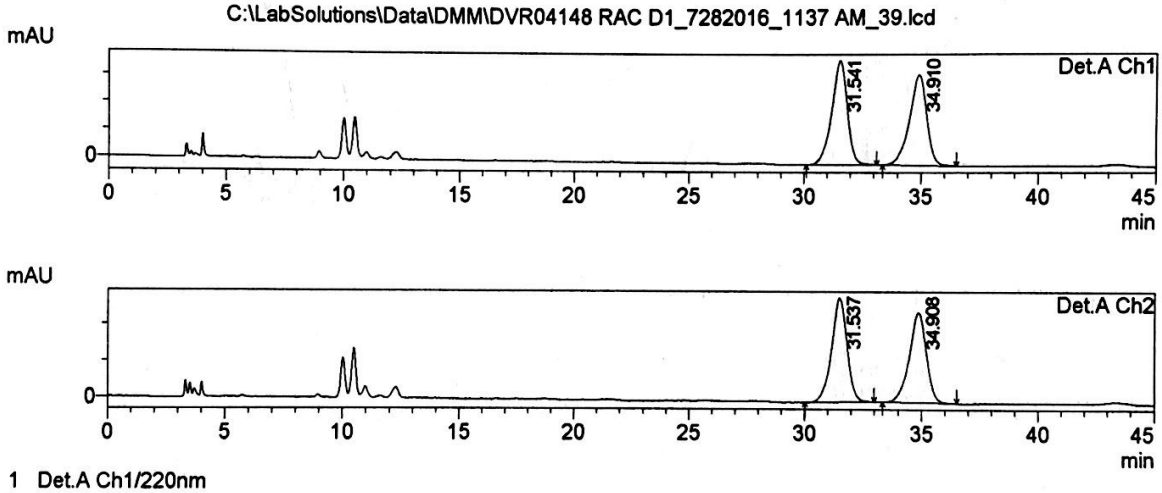
C:\LabSolutions\Data\DMM\DVR04148 RAC D1_7282016_1137 AM_39.lcd

Acquired by	: LC User
Sample Name	: DVR04148 RAC D1
Sample ID	: DVR04148 RAC D1
Tray#	: 1
Vail #	: 2
Injection Volume	: 1 uL
Data File Name	: DVR04148 RAC D1_7282016_1137 AM_39.lcd
Method File Name	: col1_3isoiPA_45min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 7/29/2016 3:28:24 AM
Data Processed	: 7/29/2016 4:13:27 AM



12A
racemic

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	31.541	351187	7591	51.175	53.528
2	34.910	335062	6591	48.825	46.472
Total		686249	14182	100.000	100.000

PeakTable

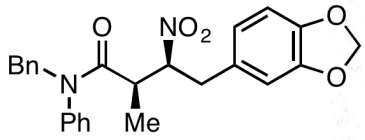
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	31.537	659926	14299	51.196	53.593
2	34.908	629093	12382	48.804	46.407
Total		1289019	26681	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04148 D1_7282016_1137 AM_43.lcd

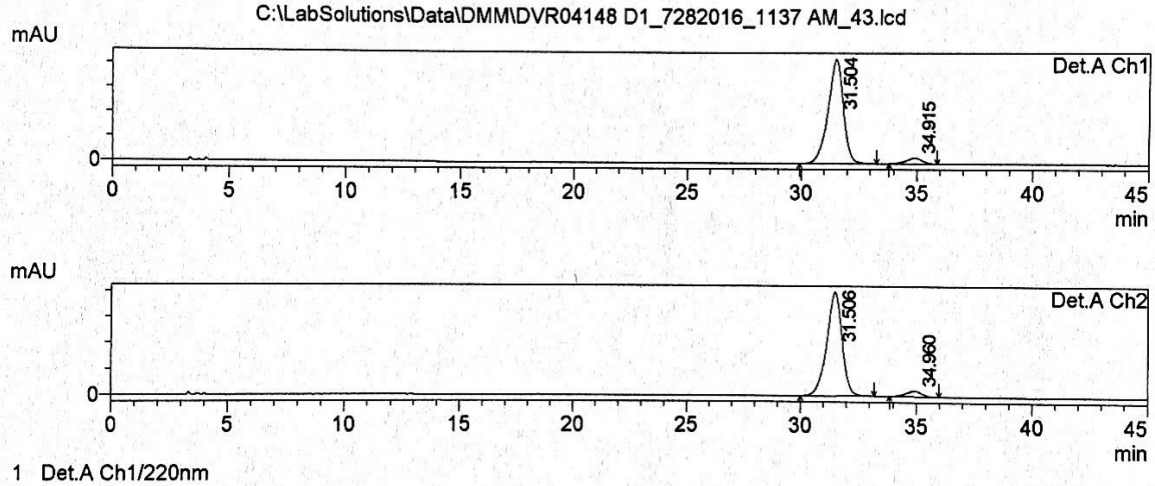
Acquired by	: LC User
Sample Name	: DVR04148 D1
Sample ID	: DVR04148 D1
Tray#	: 1
Vail #	: 3
Injection Volume	: 1 uL
Data File Name	: DVR04148 D1_7282016_1137 AM_43.lcd
Method File Name	: col1_3isoiPA_45min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 7/29/2016 5:09:21 AM
Data Processed	: 7/29/2016 5:54:23 AM



12A
89% ee

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04148 D1_7282016_1137 AM_43.lcd



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	31.504	1984056	42980	94.535	94.787
2	34.915	114704	2364	5.465	5.213
Total		2098760	45344	100.000	100.000

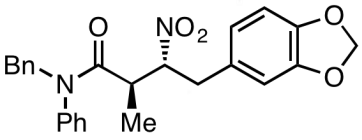
PeakTable

Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	31.506	3721912	80347	94.562	94.757
2	34.960	214020	4446	5.438	5.243
Total		3935932	84793	100.000	100.000

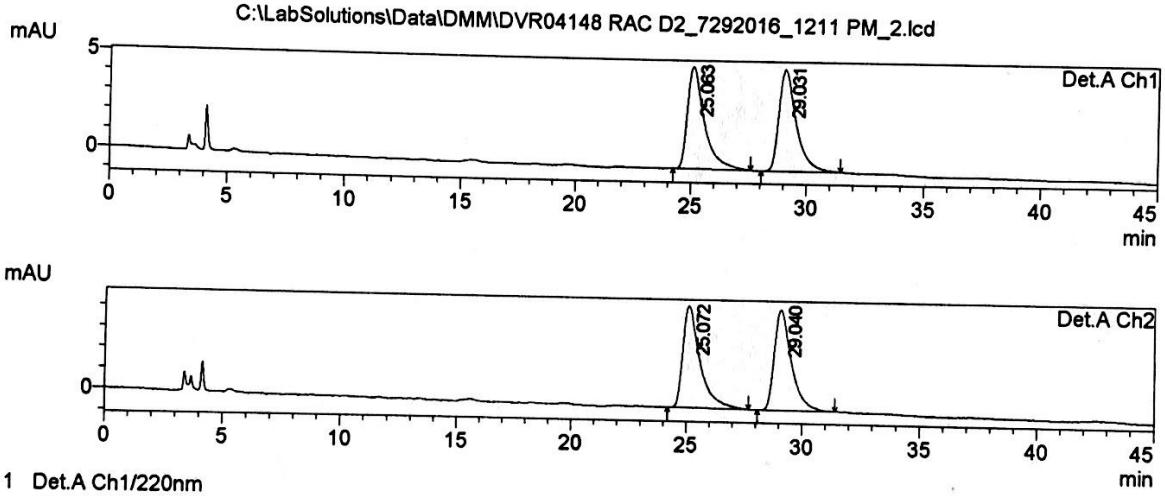
==== Shimadzu LCsolution Analysis Report ====

Acquired by	: C:\LabSolutions\Data\DMM\DVR04148 RAC D2_7292016_1211 PM_2.lcd
Sample Name	: LC User
Sample ID	: DVR04148 RAC D2
Tray#	: DVR04148 RAC D2
Vail #	: 1
Injection Volume	: 2
Data File Name	: 1 uL
Method File Name	: DVR04148 RAC D2_7292016_1211 PM_2.lcd
Batch File Name	: col2_3isoiPA_45min_1ML_220and210.lcm
Report File Name	: DMM.lcb
Data Acquired	: Default.lcr
Data Processed	: 7/29/2016 12:57:24 PM
	: 7/29/2016 1:42:23 PM



12B
racemic

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	25.063	269990	5265	49.936	50.107
2	29.031	270677	5242	50.064	49.893
Total		540666	10507	100.000	100.000

PeakTable

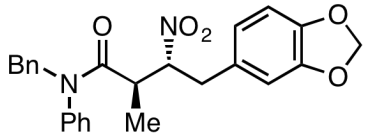
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	25.072	506479	9808	50.801	50.336
2	29.040	490498	9677	49.199	49.664
Total		996977	19485	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

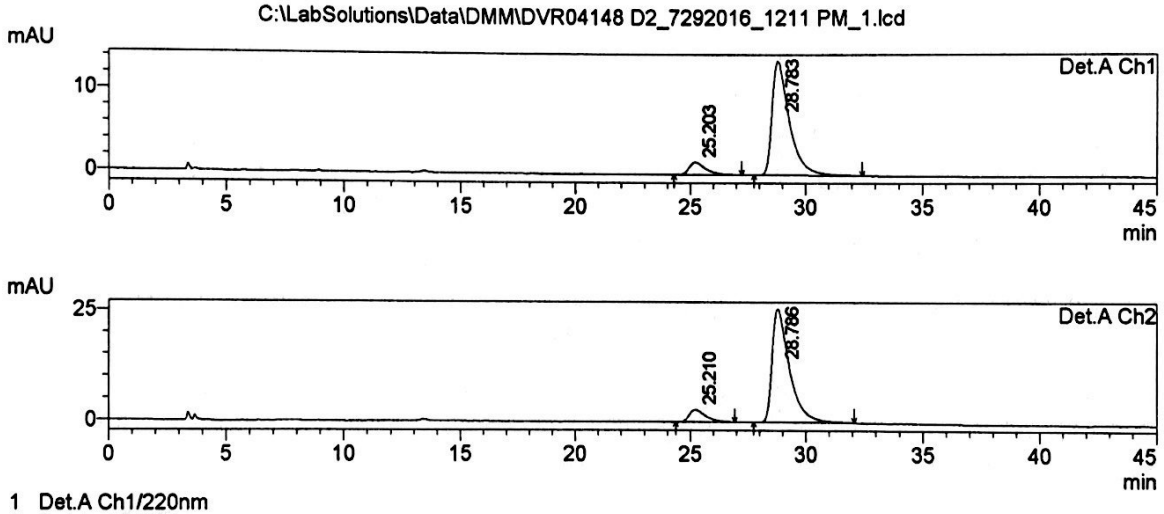
C:\LabSolutions\Data\DMM\DVR04148 D2_7292016_1211 PM_1.lcd

Acquired by	: LC User
Sample Name	: DVR04148 D2
Sample ID	: DVR04148 D2
Tray#	: 1
Vail #	: 3
Injection Volume	: 1 uL
Data File Name	: DVR04148 D2_7292016_1211 PM_1.lcd
Method File Name	: col2_3isoiPA_45min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 7/29/2016 2:39:22 PM
Data Processed	: 7/29/2016 3:24:23 PM



12B
81% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	25.203	78122	1532	9.695	9.909
2	28.783	727654	13928	90.305	90.091
Total		805775	15460	100.000	100.000

PeakTable

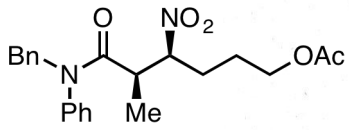
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	25.210	141313	2831	9.455	9.829
2	28.786	1353283	25973	90.545	90.171
Total		1494596	28804	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04167 D1 RAC_8212016_1521 PM_1.lcd

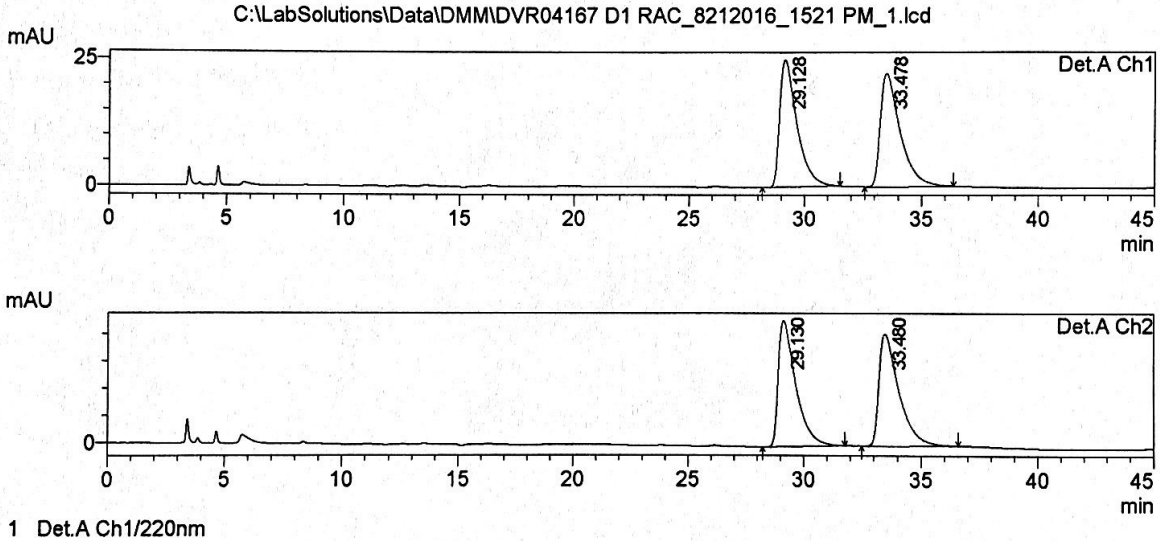
Acquired by	: LC User
Sample Name	: DVR04167 D1 RAC
Sample ID	: DVR04167 D1 RAC
Tray#	: 1
Vail #	: 1
Injection Volume	: 7 uL
Data File Name	: DVR04167 D1 RAC_8212016_1521 PM_1.lcd
Method File Name	: col2_1isoiPA_45min_1ML_220 and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 8/21/2016 4:07:01 PM
Data Processed	: 8/21/2016 4:52:04 PM



13A
racemic

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04167 D1 RAC_8212016_1521 PM_1.lcd



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	29.128	1305476	25180	49.826	52.953
2	33.478	1314597	22372	50.174	47.047
Total		2620073	47552	100.000	100.000

PeakTable

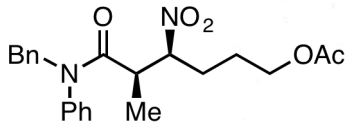
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	29.130	2424328	46353	49.960	52.975
2	33.480	2428165	41147	50.040	47.025
Total		4852493	87501	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

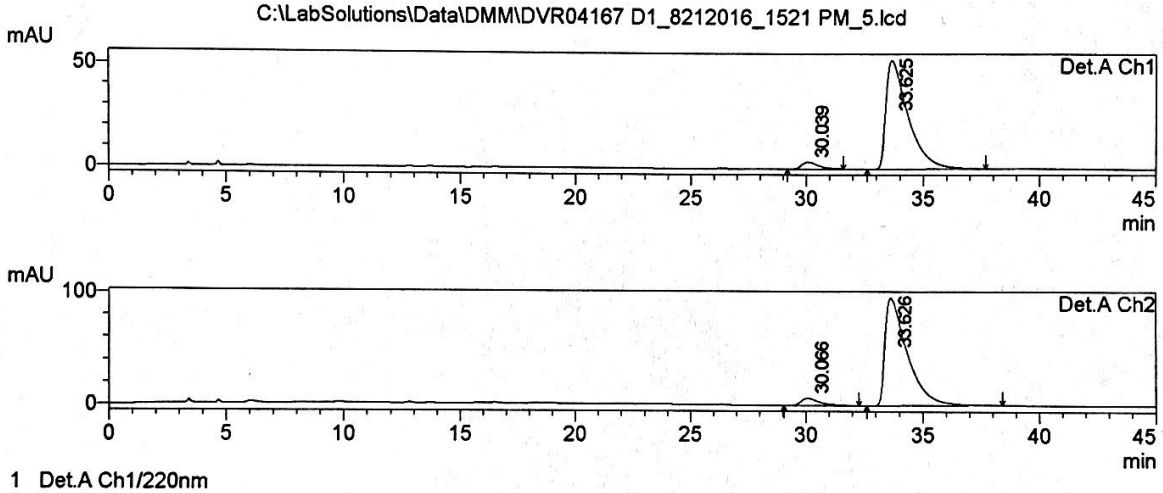
C:\LabSolutions\Data\DMM\DVR04167 D1_8212016_1521 PM_5.lcd

Acquired by	: LC User
Sample Name	: DVR04167 D1
Sample ID	: DVR04167 D1
Tray#	: 1
Vail #	: 2
Injection Volume	: 2 uL
Data File Name	: DVR04167 D1_8212016_1521 PM_5.lcd
Method File Name	: col2_1isoiPA_45min_1ML_220 and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 8/21/2016 5:47:58 PM
Data Processed	: 8/21/2016 6:32:59 PM



13A
91% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	30.039	173900	3441	4.744	6.115
2	33.625	3491407	52837	95.256	93.885
Total		3665307	56278	100.000	100.000

PeakTable

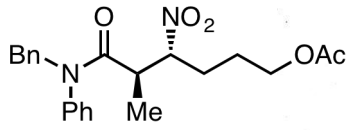
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	30.066	365998	6533	5.361	6.313
2	33.626	6460729	96957	94.639	93.687
Total		6826726	103490	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

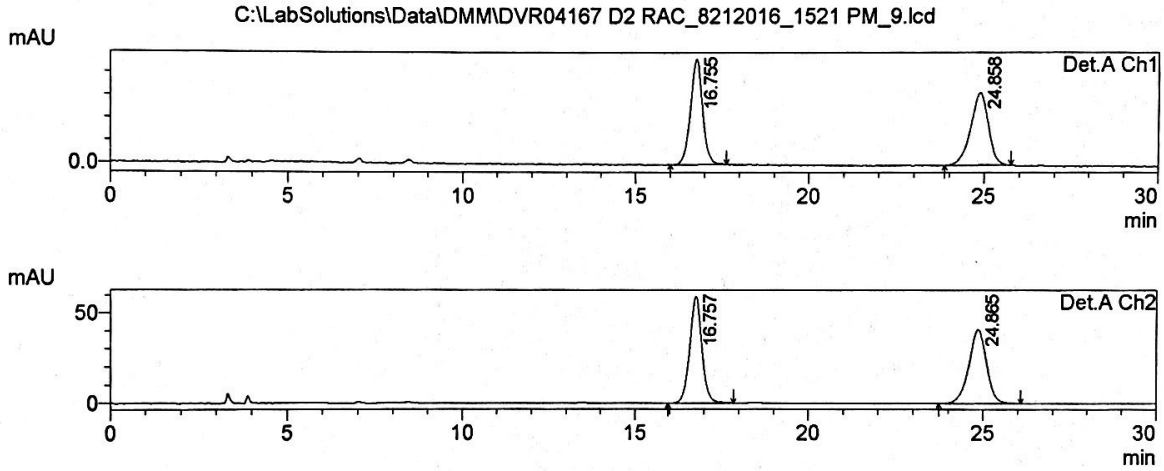
C:\LabSolutions\Data\DMM\DVR04167 D2 RAC_8212016_1521 PM_9.lcd

Acquired by	: LC User
Sample Name	: DVR04167 D2 RAC
Sample ID	: DVR04167 D2 RAC
Tray#	: 1
Vail #	: 3
Injection Volume	: 3 uL
Data File Name	: DVR04167 D2 RAC_8212016_1521 PM_9.lcd
Method File Name	: col1_05isoiPA_30min_1ml_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 8/21/2016 7:13:54 PM
Data Processed	: 8/21/2016 7:43:54 PM



13B
racemic

<Chromatogram>



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	16.755	56733	2346	50.344	59.378
2	24.858	55958	1605	49.656	40.622
Total		112690	3951	100.000	100.000

PeakTable

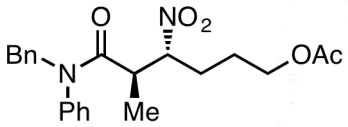
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	16.757	1449925	59478	50.026	59.132
2	24.865	1448408	41106	49.974	40.868
Total		2898332	100584	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04167 D2_8212016_1521 PM_13.lcd

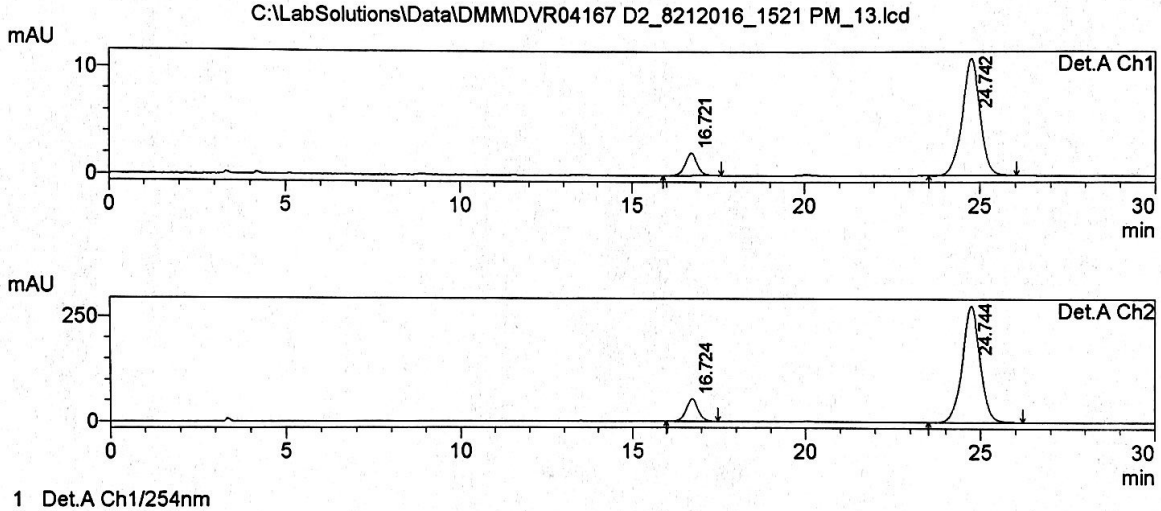
Acquired by	: LC User
Sample Name	: DVR04167 D2
Sample ID	: DVR04167 D2
Tray#	: 1
Vail #	: 4
Injection Volume	: 3 uL
Data File Name	: DVR04167 D2_8212016_1521 PM_13.lcd
Method File Name	: col1_05isoiPA_30min_1ml_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 8/21/2016 8:24:48 PM
Data Processed	: 8/21/2016 8:54:51 PM



13B
76% ee

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04167 D2_8212016_1521 PM_13.lcd



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	16.721	50971	2127	11.753	16.262
2	24.742	382709	10952	88.247	83.738
Total		433680	13080	100.000	100.000

PeakTable

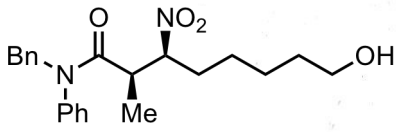
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	16.724	1288866	53750	11.620	16.189
2	24.744	9802457	278264	88.380	83.811
Total		11091323	332014	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04186B RAC D1_9182016_1754 PM_2.lcd

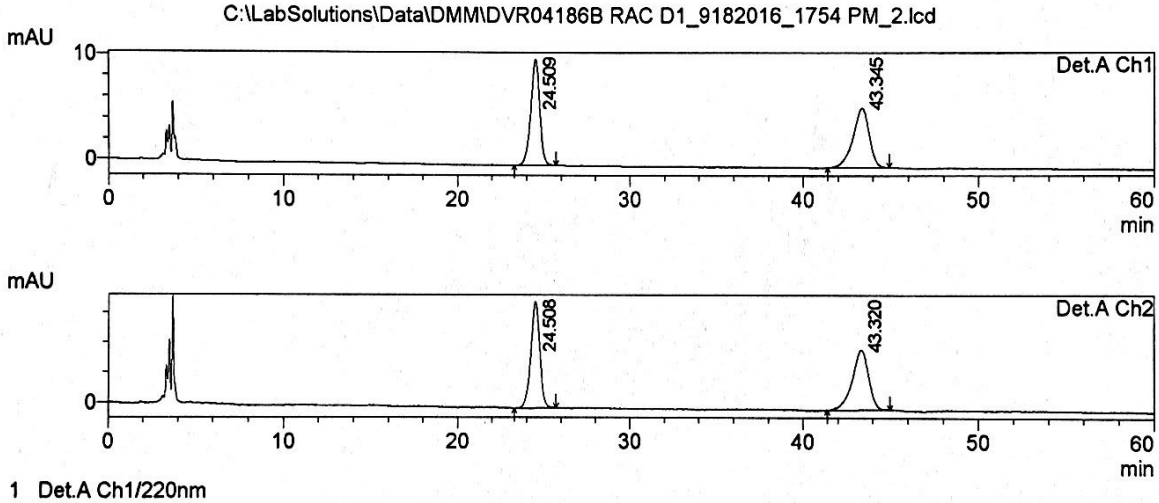
Acquired by	: LC User
Sample Name	: DVR04186B RAC D1
Sample ID	: DVR04186B RAC D1
Tray#	: 1
Vail #	: 1
Injection Volume	: 3 uL
Data File Name	: DVR04186B RAC D1_9182016_1754 PM_2.lcd
Method File Name	: col1_5isoiPA_60min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 9/18/2016 6:25:08 PM
Data Processed	: 9/18/2016 7:25:09 PM



14A
racemic

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04186B RAC D1_9182016_1754 PM_2.lcd



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	24.509	366519	10125	49.929	64.058
2	43.345	367559	5681	50.071	35.942
Total		734078	15806	100.000	100.000

PeakTable

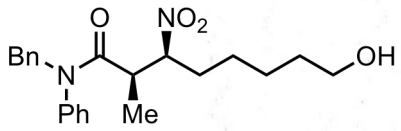
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	24.508	643739	17786	49.731	64.074
2	43.320	650704	9973	50.269	35.926
Total		1294443	27759	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

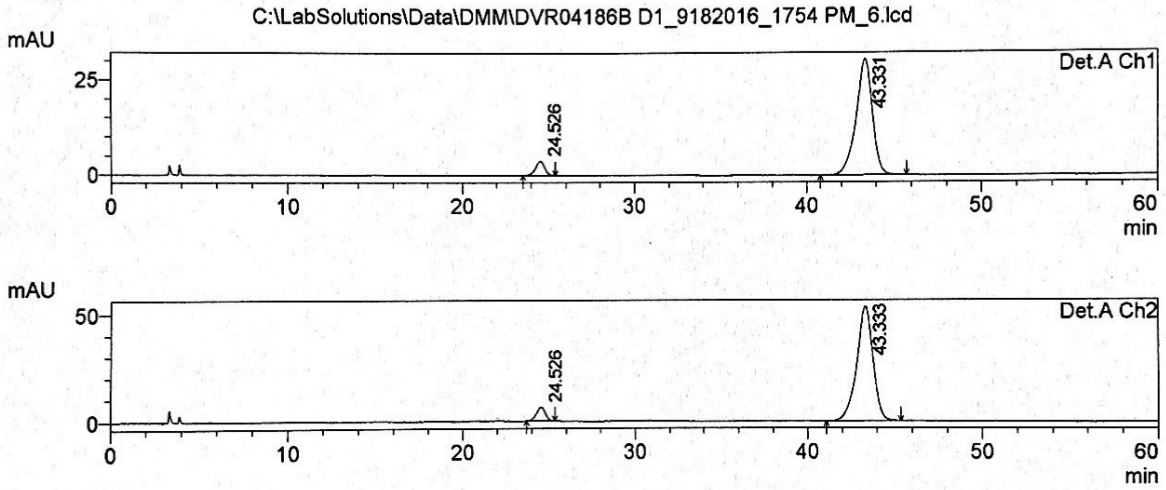
C:\LabSolutions\Data\DMM\DVR04186B D1_9182016_1754 PM_6.lcd

Acquired by	: LC User
Sample Name	: DVR04186B D1
Sample ID	: DVR04186B D1
Tray#	: 1
Vail #	: 2
Injection Volume	: 3 uL
Data File Name	: DVR04186B D1_9182016_1754 PM_6.lcd
Method File Name	: col1_5isoiPA_60min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 9/18/2016 8:06:04 PM
Data Processed	: 9/18/2016 9:06:05 PM



14A
88% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	24.526	134003	3734	6.313	10.848
2	43.331	1988561	30690	93.687	89.152
Total		2122564	34424	100.000	100.000

PeakTable

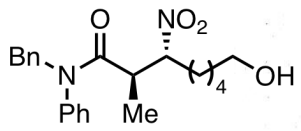
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	24.526	229459	6505	6.186	10.782
2	43.333	3479887	53829	93.814	89.218
Total		3709345	60334	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

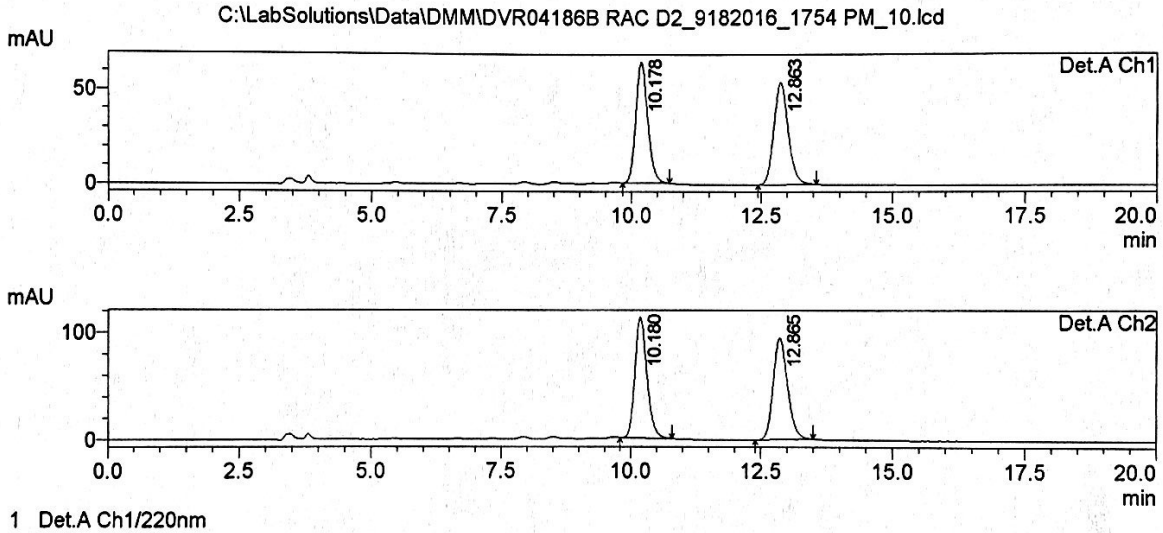
C:\LabSolutions\Data\DMM\DVR04186B RAC D2_9182016_1754 PM_10.lcd

Acquired by	: LC User
Sample Name	: DVR04186B RAC D2
Sample ID	: DVR04186B RAC D2
Tray#	: 1
Vail #	: 3
Injection Volume	: 3 uL
Data File Name	: DVR04186B RAC D2_9182016_1754 PM_10.lcd
Method File Name	: col2_15isoiPA_20min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 9/18/2016 9:37:02 PM
Data Processed	: 9/18/2016 9:57:02 PM



14B
racemic

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.178	1035088	64444	49.991	54.356
2	12.863	1035462	54116	50.009	45.644
Total		2070550	118559	100.000	100.000

PeakTable

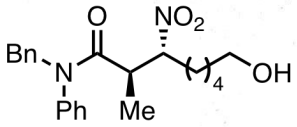
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.180	1824405	113225	50.147	54.363
2	12.865	1813704	95049	49.853	45.637
Total		3638109	208274	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04186B D2_9182016_1754 PM_14.lcd

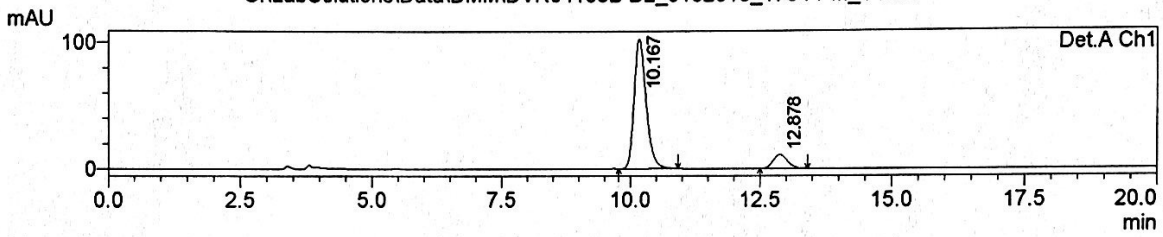
Acquired by	: LC User
Sample Name	: DVR04186B D2
Sample ID	: DVR04186B D2
Tray#	: 1
Vail #	: 4
Injection Volume	: 3 uL
Data File Name	: DVR04186B D2_9182016_1754 PM_14.lcd
Method File Name	: col2_15isoiPA_20min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 9/18/2016 10:27:57 PM
Data Processed	: 9/18/2016 10:47:57 PM

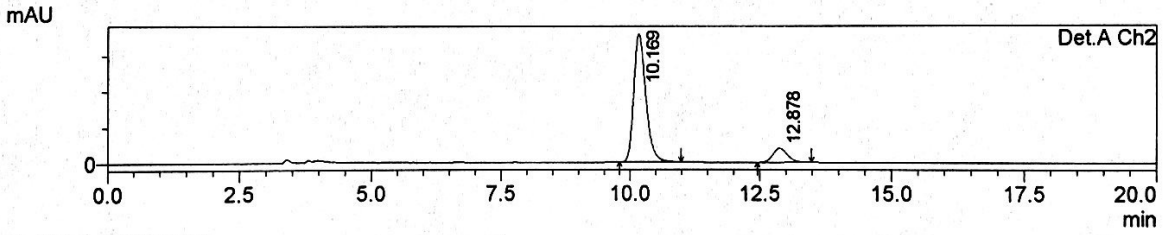


14B
77% ee

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04186B D2_9182016_1754 PM_14.lcd





1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.167	1660610	102762	88.791	90.266
2	12.878	209636	11081	11.209	9.734
Total		1870245	113843	100.000	100.000

PeakTable

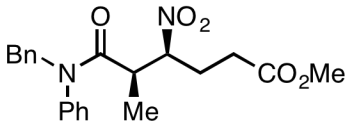
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.169	2924609	180679	88.656	90.262
2	12.878	374237	19494	11.344	9.738
Total		3298846	200173	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

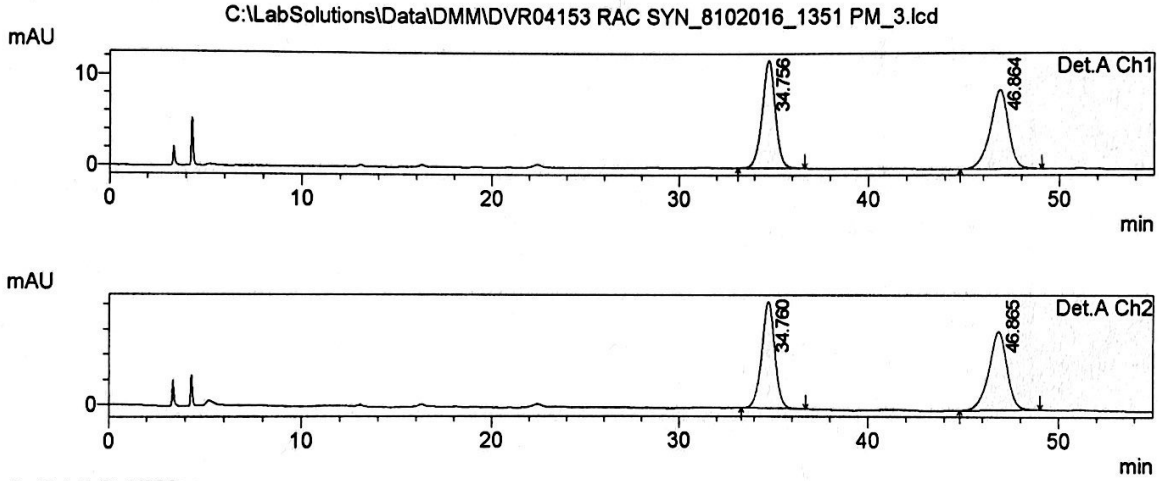
C:\LabSolutions\Data\DMM\DVR04153 RAC SYN_8102016_1351 PM_3.lcd

Acquired by	: LC User
Sample Name	: DVR04153 RAC SYN
Sample ID	: DVR04153 RAC SYN
Tray#	: 1
Vail #	: 1
Injection Volume	: 3 uL
Data File Name	: DVR04153 RAC SYN_8102016_1351 PM_3.lcd
Method File Name	: col1_1.5isoiPA_55min_1ml_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 8/10/2016 3:37:04 PM
Data Processed	: 8/10/2016 4:32:07 PM



15A
racemic

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	34.756	572557	11875	49.859	57.801
2	46.864	575787	8670	50.141	42.199
Total		1148343	20545	100.000	100.000

PeakTable

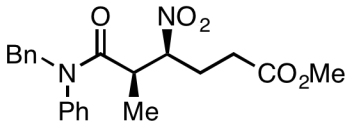
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	34.760	1036821	21570	49.769	57.706
2	46.865	1046448	15809	50.231	42.294
Total		2083269	37379	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

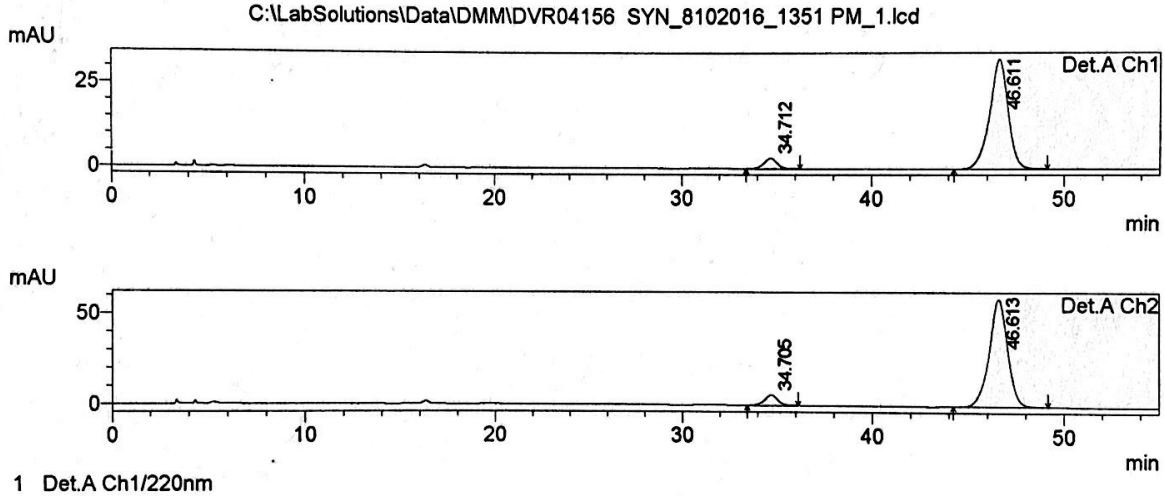
C:\LabSolutions\Data\DMM\DVR04156 SYN_8102016_1351 PM_1.lcd

Acquired by	: LC User
Sample Name	: DVR04156 SYN
Sample ID	: DVR04156 SYN
Tray#	: 1
Vail #	: 2
Injection Volume	: 1 uL
Data File Name	: DVR04156 SYN_8102016_1351 PM_1.lcd
Method File Name	: col1_1.5isoiPA_55min_1ml_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 8/10/2016 5:13:02 PM
Data Processed	: 8/10/2016 6:08:03 PM



15A
87% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	34.712	150536	3140	6.474	8.778
2	46.611	2174624	32634	93.526	91.222
Total		2325160	35774	100.000	100.000

PeakTable

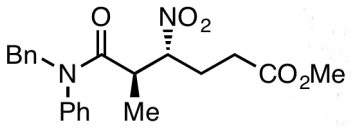
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	34.705	279420	5785	6.590	8.862
2	46.613	3960833	59486	93.410	91.138
Total		4240253	65270	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04153 RAC ANTI1_8122016_859 AM_11.lcd

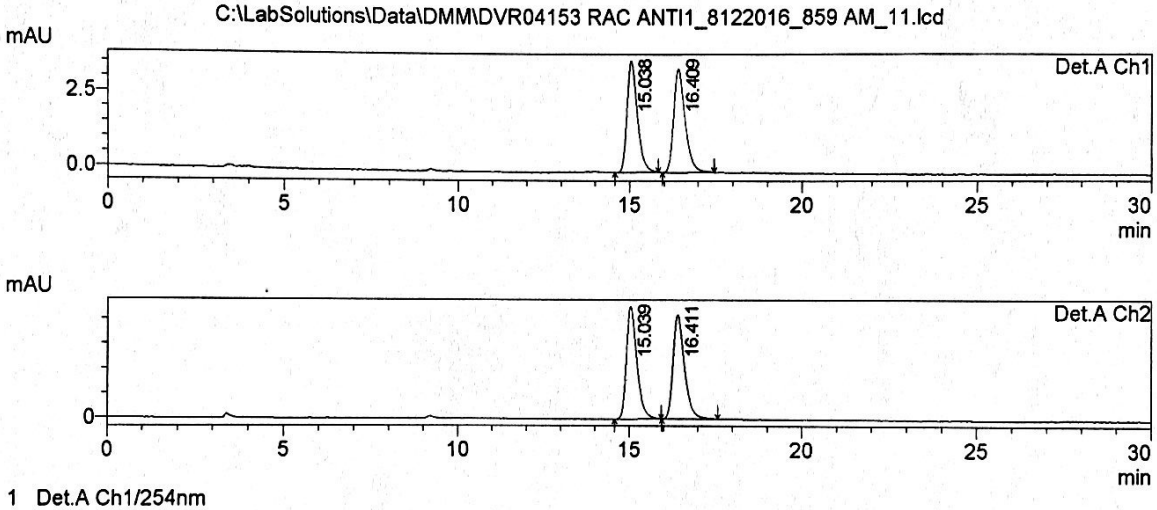
Acquired by	: LC User
Sample Name	: DVR04153 RAC ANTI1
Sample ID	: DVR04153 RAC ANTI1
Tray#	: 1
Vail #	: 3
Injection Volume	: 2 uL
Data File Name	: DVR04153 RAC ANTI1_8122016_859 AM_11.lcd
Method File Name	: col2_5isoiPA_30min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 8/12/2016 8:03:35 PM
Data Processed	: 8/12/2016 8:33:37 PM



15B
racemic

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04153 RAC ANTI1_8122016_859 AM_11.lcd



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.038	78844	3721	49.687	51.848
2	16.409	79837	3456	50.313	48.152
Total		158681	7177	100.000	100.000

PeakTable

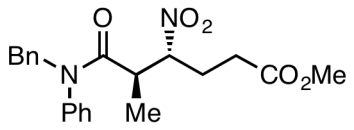
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.039	1950335	91811	49.929	51.982
2	16.411	1955899	84808	50.071	48.018
Total		3906234	176619	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04156 ANTI 1_8122016_859 AM_15.lcd

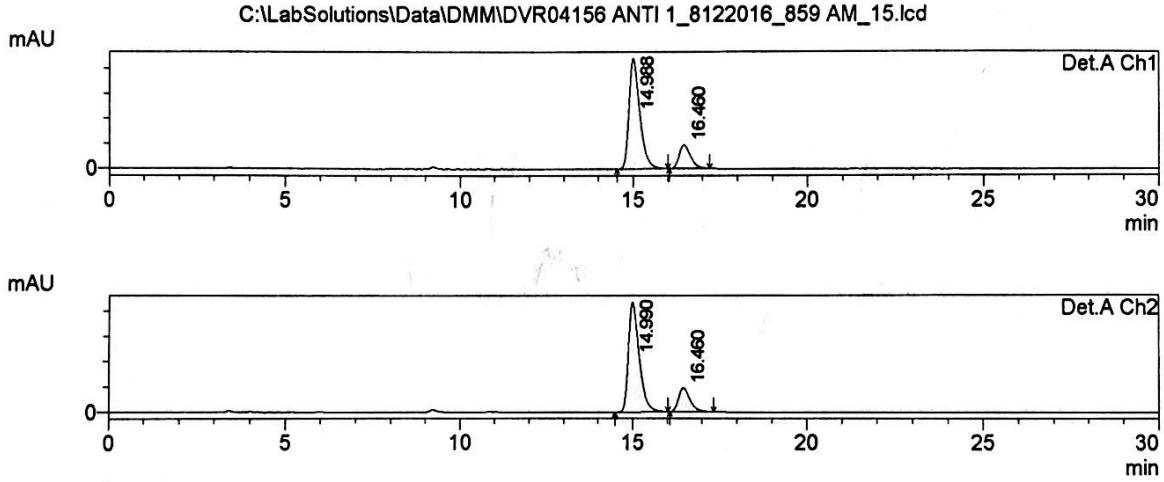
Acquired by	: LC User
Sample Name	: DVR04156 ANTI 1
Sample ID	: DVR04156 ANTI 1
Tray#	: 1
Vail #	: 4
Injection Volume	: 2 uL
Data File Name	: DVR04156 ANTI 1_8122016_859 AM_15.lcd
Method File Name	: col2_5isoiPA_30min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 8/12/2016 9:14:34 PM
Data Processed	: 8/12/2016 9:44:36 PM



15B
63% ee

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04156 ANTI 1_8122016_859 AM_15.lcd



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	14.988	190860	8863	81.634	82.328
2	16.460	42939	1902	18.366	17.672
Total		233799	10765	100.000	100.000

PeakTable

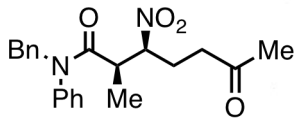
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	14.990	4691540	217336	81.423	82.165
2	16.460	1070383	47175	18.577	17.835
Total		5761923	264510	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

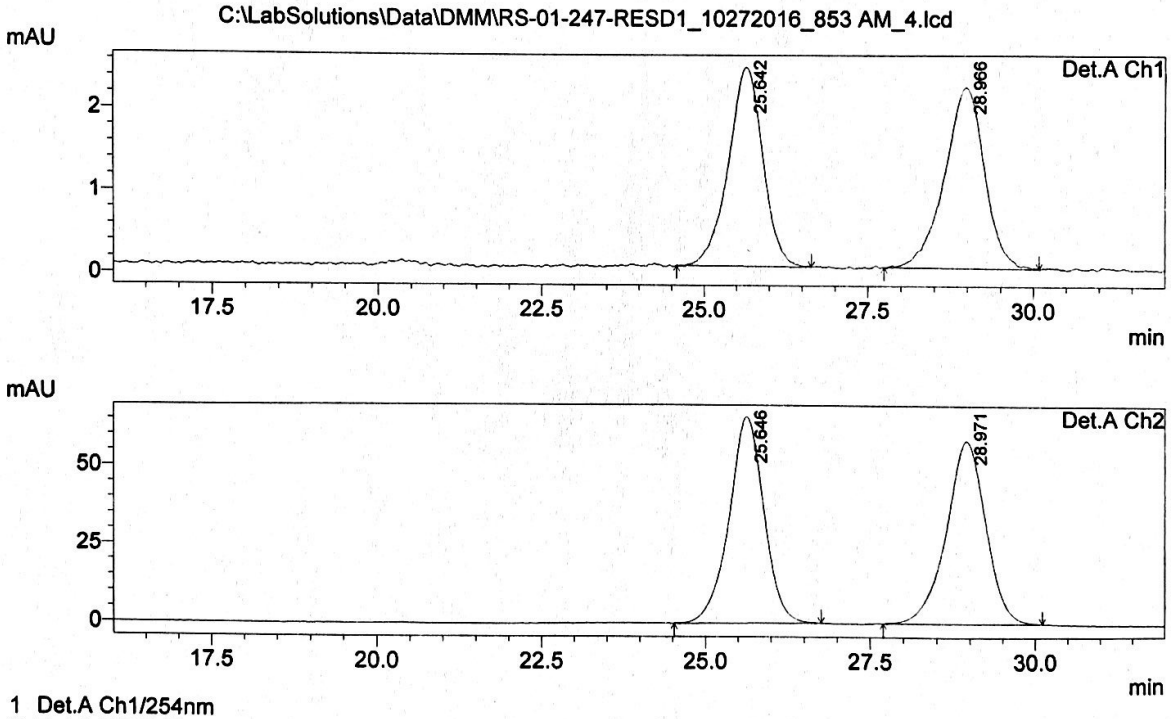
C:\LabSolutions\Data\DMM\RS-01-247-RESD1_10272016_853 AM_4.lcd

Acquired by	: LC User
Sample Name	: RS-01-247-RESD1
Sample ID	: RS-01-247-RESD1
Tray#	: 1
Vail #	: 91
Injection Volume	: 3 uL
Data File Name	: RS-01-247-RESD1_10272016_853 AM_4.lcd
Method File Name	: col1_3isoiPA_45min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/27/2016 10:49:50 AM
Data Processed	: 10/27/2016 11:34:53 AM



16A
racemic

<Chromatogram>



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	25.642	89065	2431	49.047	52.432
2	28.966	92527	2205	50.953	47.568
Total		181592	4636	100.000	100.000

PeakTable

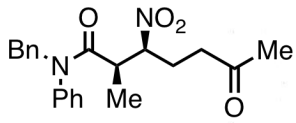
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	25.646	2422797	65652	49.984	53.023
2	28.971	2424345	58167	50.016	46.977
Total		4847142	123819	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

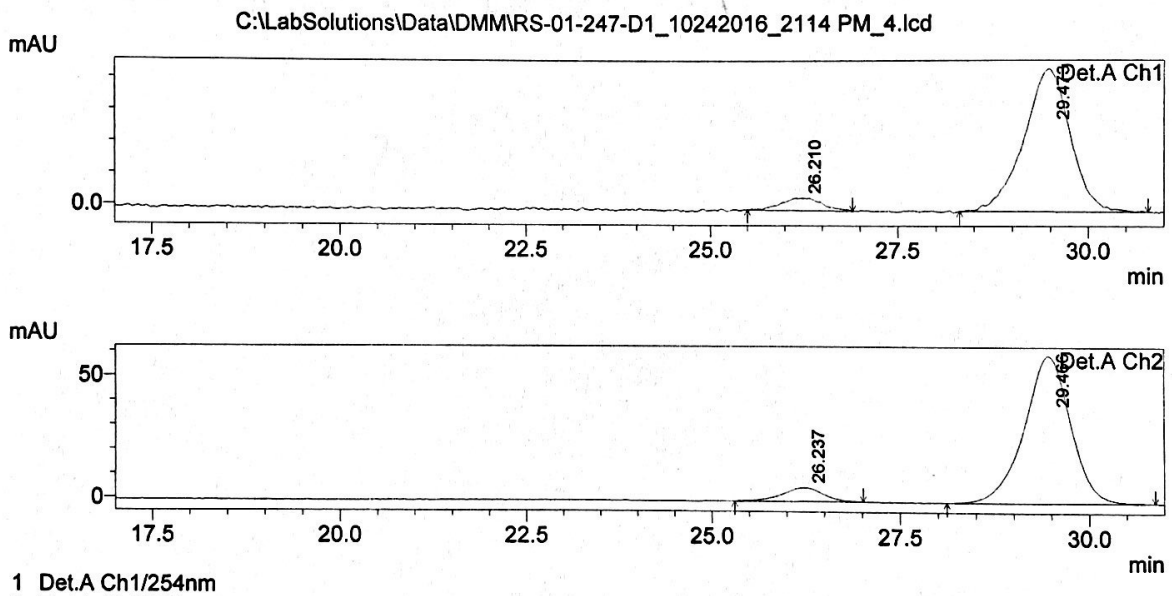
C:\LabSolutions\Data\DMM\RS-01-247-D1_10242016_2114 PM_4.lcd

Acquired by	: LC User
Sample Name	: RS-01-247-D1
Sample ID	: RS-01-247-D1
Tray#	: 1
Vail #	: 92
Injection Volume	: 3 uL
Data File Name	: RS-01-247-D1_10242016_2114 PM_4.lcd
Method File Name	: col1_3isoiPA_60min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/24/2016 10:06:00 PM
Data Processed	: 12/20/2016 12:42:13 PM



16A
85% ee

<Chromatogram>



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	26.210	7729	196	7.547	8.102
2	29.473	94683	2225	92.453	91.898
Total		102412	2421	100.000	100.000

PeakTable

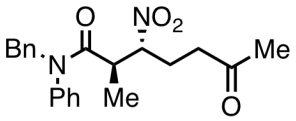
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	26.237	210828	5600	7.591	8.553
2	29.466	2566655	59873	92.409	91.447
Total		2777482	65474	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

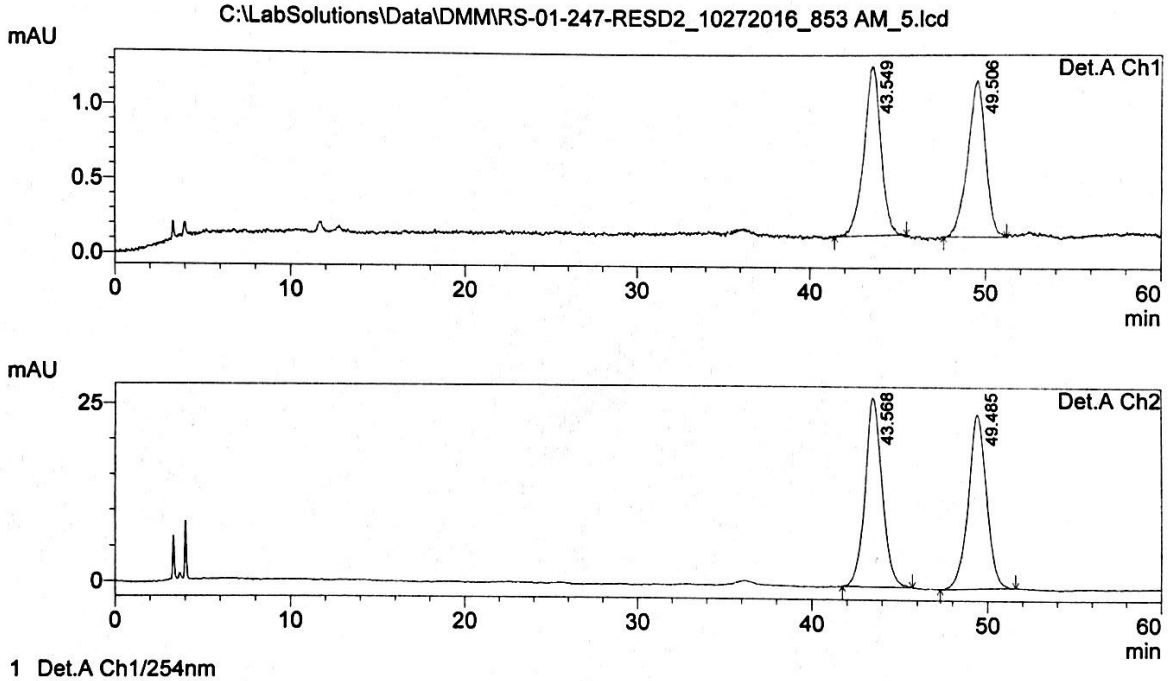
C:\LabSolutions\Data\DMM\RS-01-247-RESD2_10272016_853 AM_5.lcd

Acquired by	: LC User
Sample Name	: RS-01-247-RESD2
Sample ID	: RS-01-247-RESD2
Tray#	: 1
Vail #	: 93
Injection Volume	: 3 uL
Data File Name	: RS-01-247-RESD2_10272016_853 AM_5.lcd
Method File Name	: col1_3isoiPA_60min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/27/2016 12:42:20 PM
Data Processed	: 10/31/2016 8:14:16 AM



16B
racemic

<Chromatogram>



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	43.549	76267	1139	50.922	52.067
2	49.506	73505	1049	49.078	47.933
Total		149773	2188	100.000	100.000

PeakTable

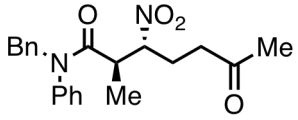
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	43.568	1790765	26534	50.525	52.094
2	49.485	1753536	24401	49.475	47.906
Total		3544301	50935	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

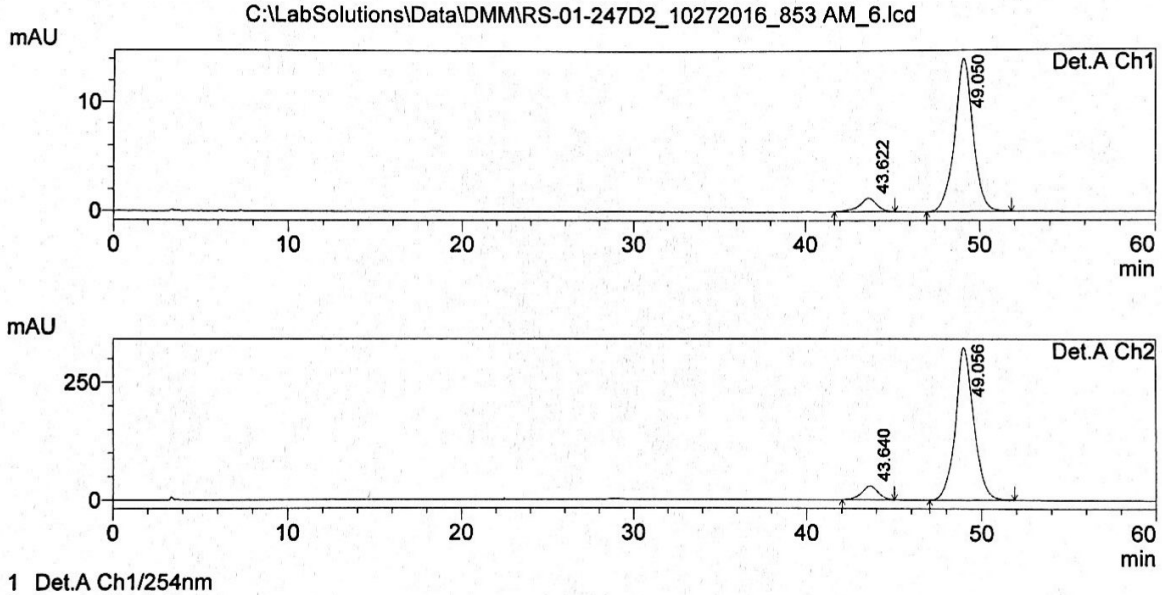
C:\LabSolutions\Data\DMM\RS-01-247D2_10272016_853 AM_6.lcd

Acquired by	: LC User
Sample Name	: RS-01-247D2
Sample ID	: RS-01-247D2
Tray#	: 1
Vail #	: 94
Injection Volume	: 3 uL
Data File Name	: RS-01-247D2_10272016_853 AM_6.lcd
Method File Name	: col1_3isoiPA_60min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/27/2016 1:42:57 PM
Data Processed	: 10/31/2016 8:12:11 AM



16B
84% ee

<Chromatogram>



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	43.622	87935	1268	7.909	8.278
2	49.050	1023909	14050	92.091	91.722
Total		1111844	15318	100.000	100.000

PeakTable

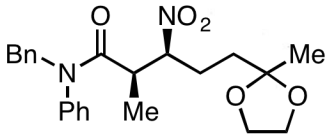
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	43.640	1888494	29071	7.384	8.229
2	49.056	23688716	324191	92.616	91.771
Total		25577210	353262	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

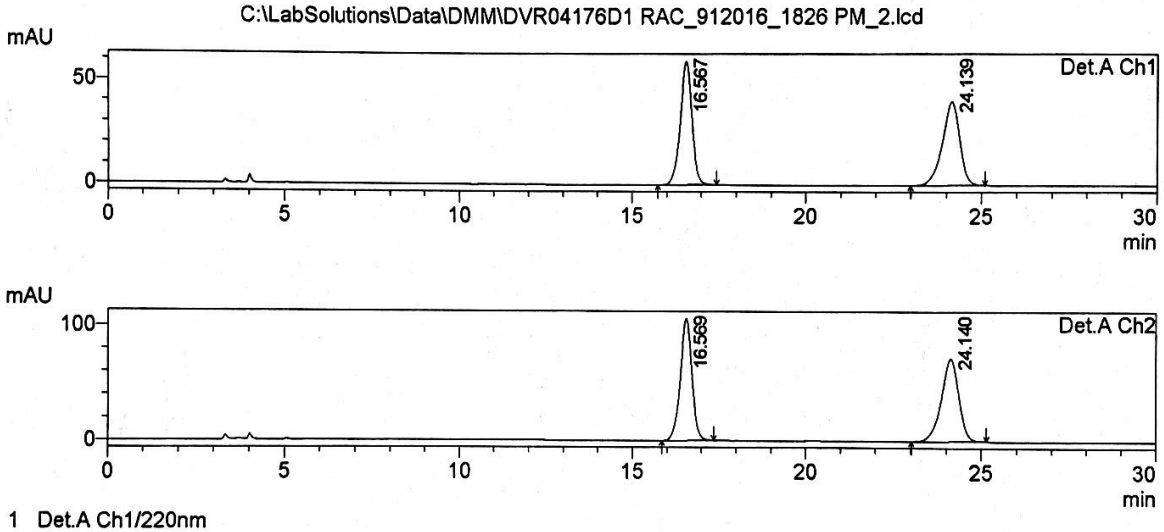
C:\LabSolutions\Data\DMM\DVR04176D1 RAC_912016_1826 PM_2.lcd

Acquired by	: LC User
Sample Name	: DVR04176D1 RAC
Sample ID	: DVR04176D1 RAC
Tray#	: 1
Vail #	: 1
Injection Volume	: 2 uL
Data File Name	: DVR04176D1 RAC_912016_1826 PM_2.lcd
Method File Name	: col1_3isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 9/1/2016 6:56:42 PM
Data Processed	: 9/1/2016 7:26:45 PM



17A
racemic

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	16.567	1385353	59416	50.092	59.595
2	24.139	1380273	40283	49.908	40.405
Total		2765626	99700	100.000	100.000

PeakTable

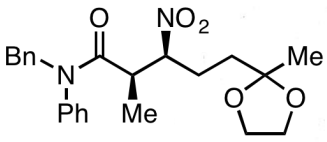
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	16.569	2486420	106893	49.990	59.569
2	24.140	2487449	72551	50.010	40.431
Total		4973869	179444	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

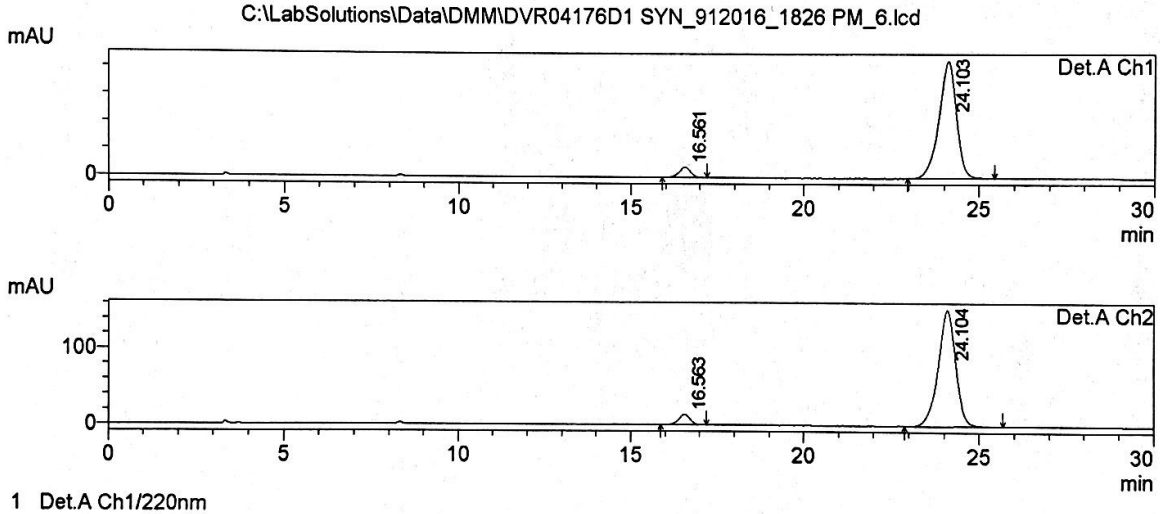
C:\LabSolutions\Data\DMM\DVR04176D1 SYN_912016_1826 PM_6.lcd

Acquired by	: LC User
Sample Name	: DVR04176D1 SYN
Sample ID	: DVR04176D1 SYN
Tray#	: 1
Vail #	: 2
Injection Volume	: 2 uL
Data File Name	: DVR04176D1 SYN_912016_1826 PM_6.lcd
Method File Name	: col1_3isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 9/1/2016 8:07:38 PM
Data Processed	: 9/1/2016 8:37:39 PM



17A
89% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	16.561	178292	7696	5.702	8.267
2	24.103	2948606	85402	94.298	91.733
Total		3126898	93098	100.000	100.000

PeakTable

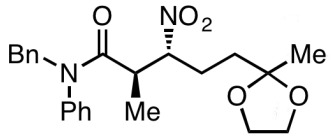
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	16.563	320036	13837	5.672	8.257
2	24.104	5321908	153737	94.328	91.743
Total		5641945	167574	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

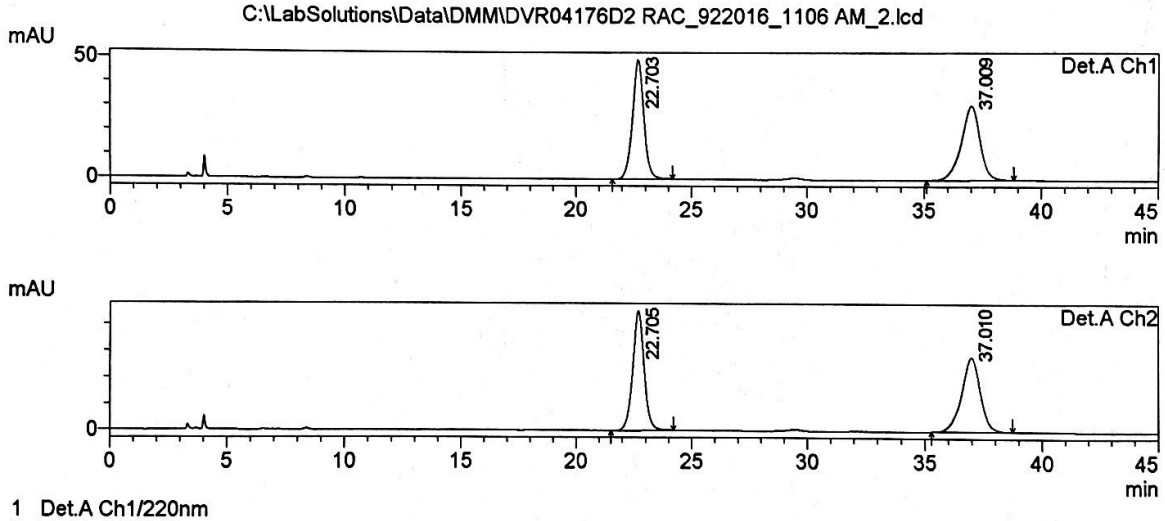
C:\LabSolutions\Data\DMM\DVR04176D2 RAC_922016_1106 AM_2.lcd

Acquired by	: LC User
Sample Name	: DVR04176D2 RAC
Sample ID	: DVR04176D2 RAC
Tray#	: 1
Vail #	: 1
Injection Volume	: 2 uL
Data File Name	: DVR04176D2 RAC_922016_1106 AM_2.lcd
Method File Name	: col1_3isoiPA_45min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 9/2/2016 11:52:31 AM
Data Processed	: 9/2/2016 12:37:32 PM



17B
racemic

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	22.703	1695439	49784	49.579	61.673
2	37.009	1724221	30939	50.421	38.327
Total		3419661	80723	100.000	100.000

PeakTable

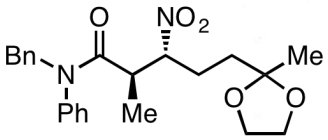
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	22.705	3103114	91134	49.746	61.735
2	37.010	3134829	56487	50.254	38.265
Total		6237943	147621	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

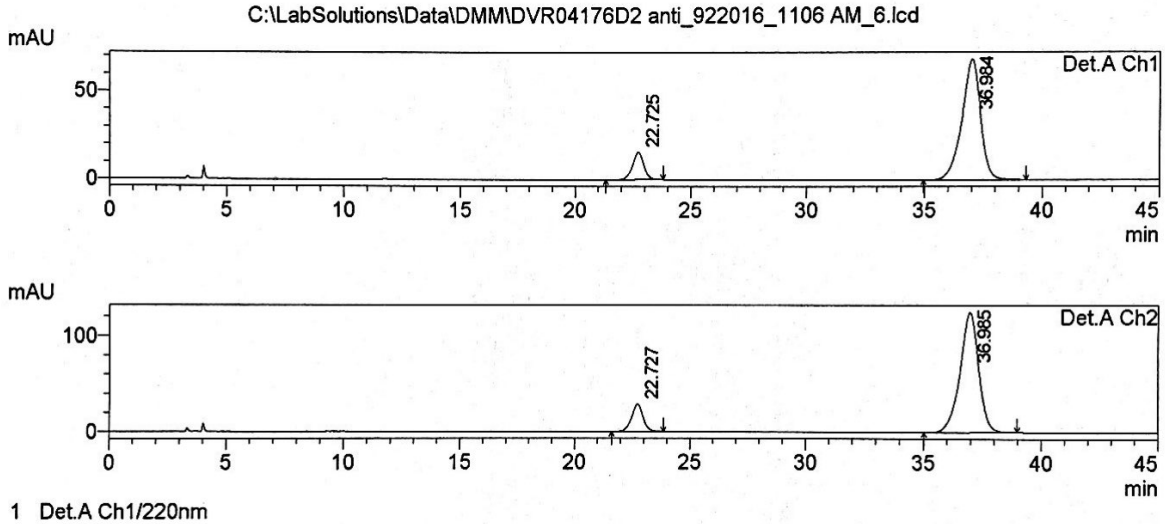
C:\LabSolutions\Data\DMM\DVR04176D2 anti_922016_1106 AM_6.lcd

Acquired by	: LC User
Sample Name	: DVR04176D2 anti
Sample ID	: DVR04176D2 anti
Tray#	: 1
Vail #	: 2
Injection Volume	: 2 uL
Data File Name	: DVR04176D2 anti_922016_1106 AM_6.lcd
Method File Name	: col1_3isoiPA_45min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 9/2/2016 1:33:25 PM
Data Processed	: 9/2/2016 2:18:28 PM



17B
75% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	22.725	532796	15633	12.406	18.626
2	36.984	3761888	68295	87.594	81.374
Total		4294684	83928	100.000	100.000

PeakTable

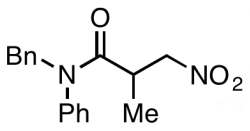
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	22.727	982074	28668	12.515	18.662
2	36.985	6865144	124952	87.485	81.338
Total		7847218	153621	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

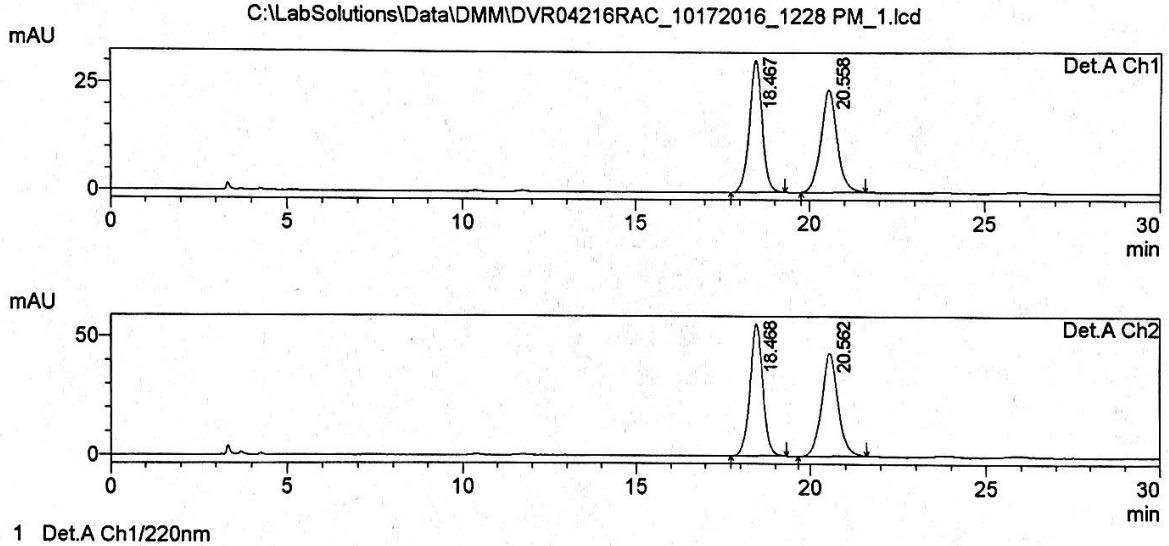
C:\LabSolutions\Data\DMM\DVR04216RAC_10172016_1228 PM_1.lcd

Acquired by	: LC User
Sample Name	: DVR04216RAC
Sample ID	: DVR04216RAC
Tray#	: 1
Vail #	: 2
Injection Volume	: 2 uL
Data File Name	: DVR04216RAC_10172016_1228 PM_1.lcd
Method File Name	: col1_3isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/17/2016 8:58:59 PM
Data Processed	: 10/17/2016 9:29:00 PM



18
racemic

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	18.467	779496	30751	50.358	56.225
2	20.558	768425	23941	49.642	43.775
Total		1547921	54692	100.000	100.000

PeakTable

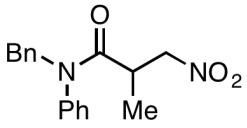
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	18.468	1419230	56009	50.219	56.182
2	20.562	1406872	43683	49.781	43.818
Total		2826102	99693	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

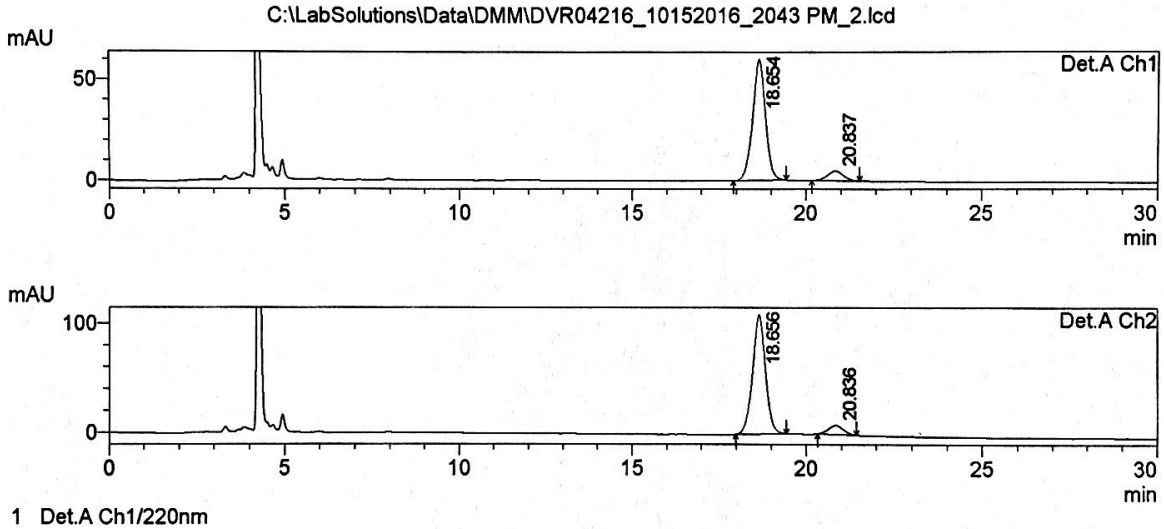
C:\LabSolutions\Data\DMM\DVR04216_10152016_2043 PM_2.lcd

Acquired by	: LC User
Sample Name	: DVR04216
Sample ID	: DVR04216
Tray#	: 1
Vail #	: 1
Injection Volume	: 2 uL
Data File Name	: DVR04216_10152016_2043 PM_2.lcd
Method File Name	: col1_3isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/15/2016 8:54:06 PM
Data Processed	: 10/15/2016 9:24:09 PM



18
82% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	18.654	1541824	60100	90.868	92.496
2	20.837	154941	4876	9.132	7.504
Total		1696765	64975	100.000	100.000

PeakTable

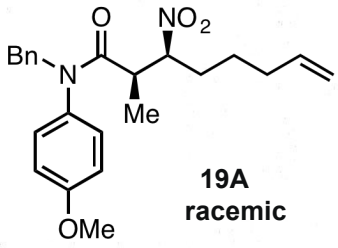
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	18.656	2802804	109497	91.979	92.920
2	20.836	244404	8343	8.021	7.080
Total		3047208	117840	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04203 RAC SYN_9292016_1421 PM_2.lcd

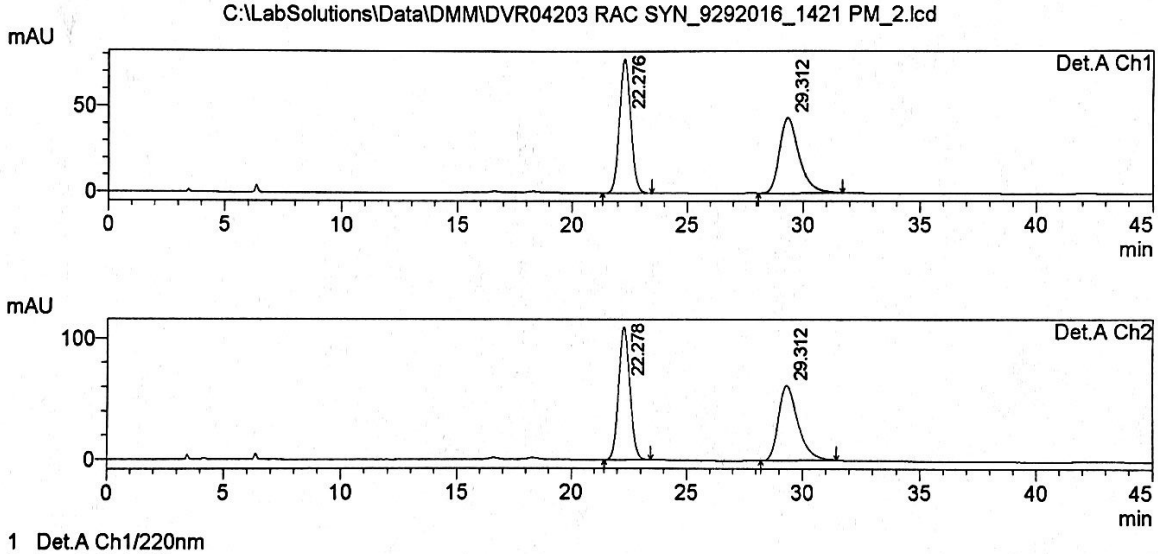
Acquired by	: LC User
Sample Name	: DVR04203 RAC SYN
Sample ID	: DVR04203 RAC SYN
Tray#	: 1
Vail #	: 1
Injection Volume	: 2 uL
Data File Name	: DVR04203 RAC SYN_9292016_1421 PM_2.lcd
Method File Name	: col3_2isoiPA_45min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 9/29/2016 3:07:12 PM
Data Processed	: 9/29/2016 3:52:14 PM



19A
racemic

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04203 RAC SYN_9292016_1421 PM_2.lcd



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	22.276	2659822	77815	50.873	63.959
2	29.312	2568546	43848	49.127	36.041
Total		5228369	121663	100.000	100.000

PeakTable

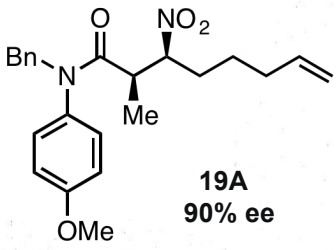
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	22.278	3778750	110421	51.048	63.956
2	29.312	3623583	62230	48.952	36.044
Total		7402333	172651	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04203D1 _1022016_1418 PM_6.lcd

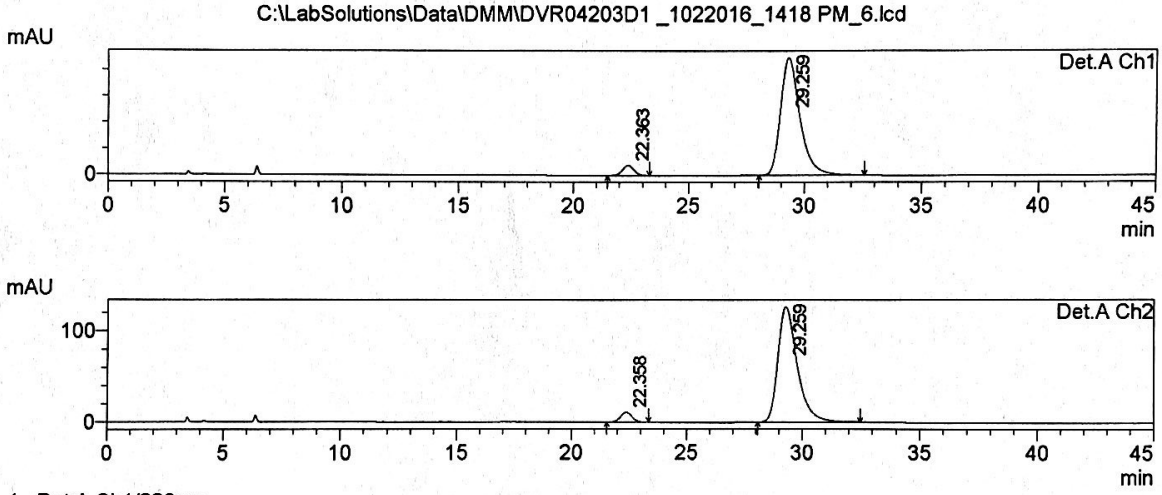
Acquired by	: LC User
Sample Name	: DVR04203D1
Sample ID	: DVR04203D1
Tray#	: 1
Vail #	: 2
Injection Volume	: 3 uL
Data File Name	: DVR04203D1 _1022016_1418 PM_6.lcd
Method File Name	: col3_2isoiPA_45min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/2/2016 4:45:26 PM
Data Processed	: 10/2/2016 5:30:28 PM



19A
90% ee

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04203D1 _1022016_1418 PM_6.lcd



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	22.363	265768	7743	4.856	7.942
2	29.259	5206917	89759	95.144	92.058
Total		5472685	97503	100.000	100.000

PeakTable

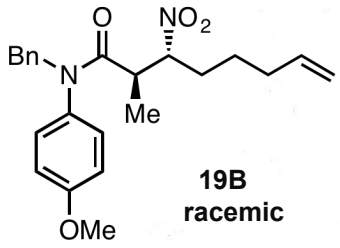
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	22.358	377460	11067	4.868	8.003
2	29.259	7376937	127221	95.132	91.997
Total		7754396	138288	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

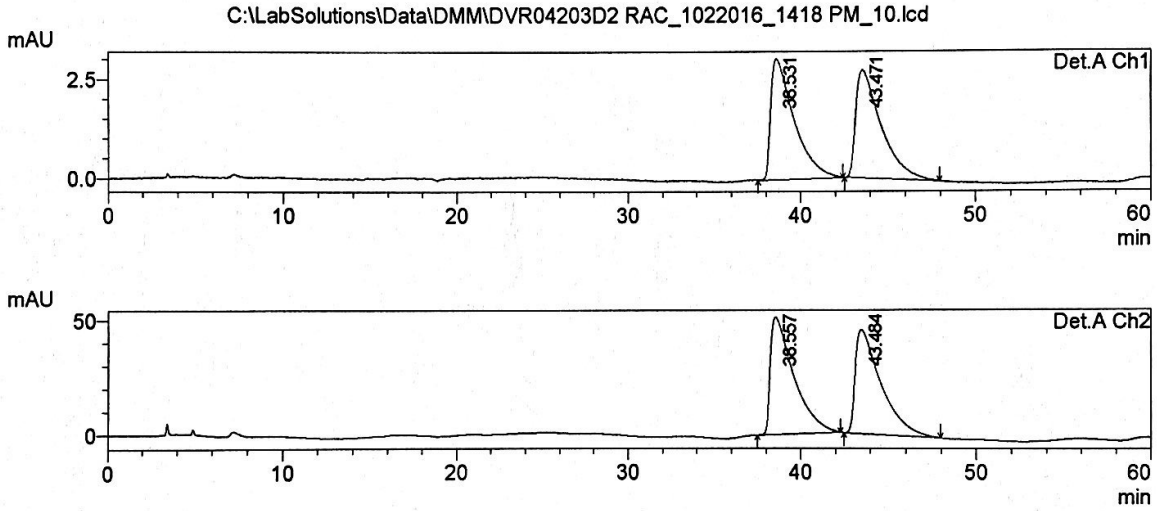
C:\LabSolutions\Data\DMM\DVR04203D2 RAC_1022016_1418 PM_10.lcd

Acquired by	: LC User
Sample Name	: DVR04203D2 RAC
Sample ID	: DVR04203D2 RAC
Tray#	: 1
Vail #	: 3
Injection Volume	: 3 uL
Data File Name	: DVR04203D2 RAC_1022016_1418 PM_10.lcd
Method File Name	: col2_0.8isoIPA_60min_1ml_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/2/2016 6:11:24 PM
Data Processed	: 10/2/2016 7:11:28 PM



19B racemic

<Chromatogram>



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	38.531	283737	3051	50.830	52.782
2	43.471	274466	2729	49.170	47.218
Total		558203	5780	100.000	100.000

PeakTable

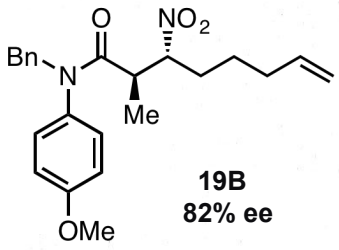
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	38.557	4806533	51199	51.067	53.053
2	43.484	4605717	45307	48.933	46.947
Total		9412251	96505	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04203D2_1022016_1418 PM_14.lcd

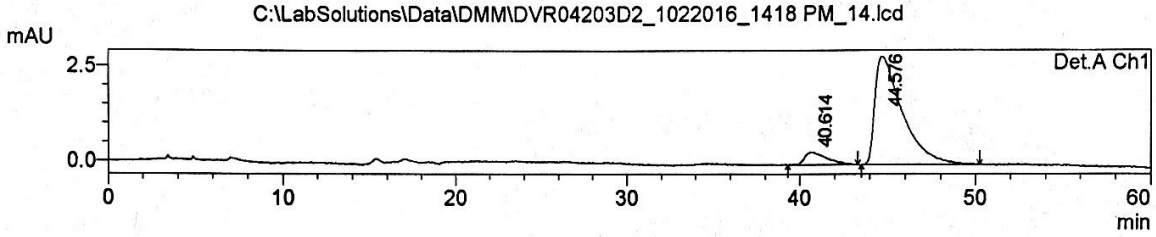
Acquired by	: LC User
Sample Name	: DVR04203D2
Sample ID	: DVR04203D2
Tray#	: 1
Vail #	: 4
Injection Volume	: 3 uL
Data File Name	: DVR04203D2_1022016_1418 PM_14.lcd
Method File Name	: col2_0.8isoIPA_60min_1ml_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/2/2016 7:52:23 PM
Data Processed	: 10/2/2016 8:52:25 PM

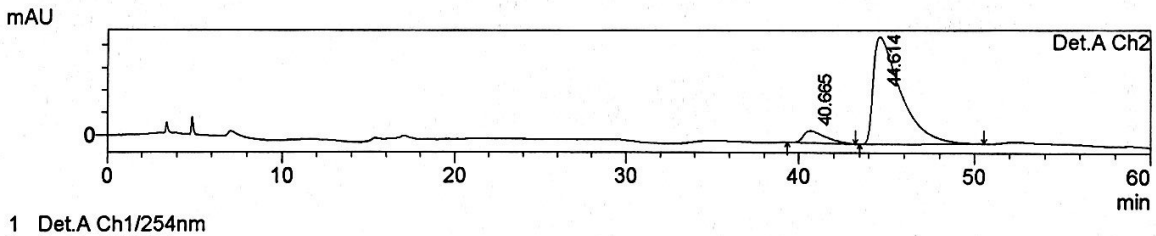


19B
82% ee

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04203D2_1022016_1418 PM_14.lcd





1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	40.614	29603	330	8.822	10.432
2	44.576	305968	2835	91.178	89.568
Total		335571	3165	100.000	100.000

PeakTable

Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	40.665	474842	5394	8.388	10.157
2	44.614	5186184	47717	91.612	89.843
Total		5661027	53111	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04211 RAC D1_1082016_2042 PM_2.lcd

Acquired by	: LC User
Sample Name	: DVR04211 RAC D1
Sample ID	: DVR04211 RAC D1
Tray#	: 1
Vail #	: 1
Injection Volume	: 2 uL
Data File Name	: DVR04211 RAC D1_1082016_2042 PM_2.lcd
Method File Name	: col3_2isoiPA_20min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
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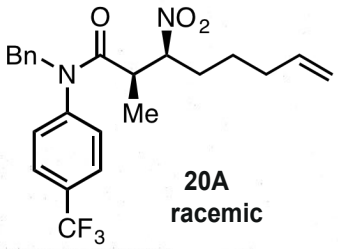
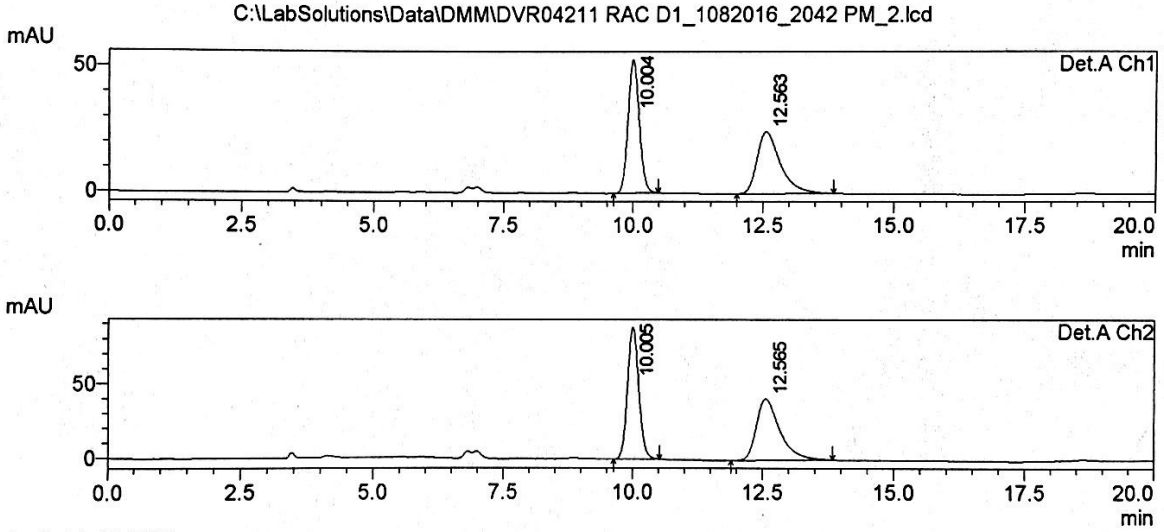
Data Processed	: 10/8/2016 9:23:01 PM



20A
racemic

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04211 RAC D1_1082016_2042 PM_2.lcd



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.004	802330	53218	50.985	68.246
2	12.563	771334	24762	49.015	31.754
Total		1573665	77980	100.000	100.000

PeakTable

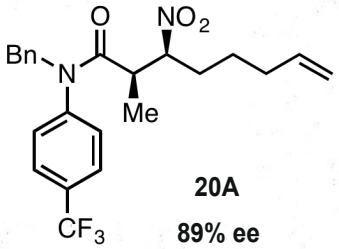
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.005	1348201	89182	50.972	68.225
2	12.565	1296787	41535	49.028	31.775
Total		2644988	130717	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04211 D1_1082016_2042 PM_6.lcd

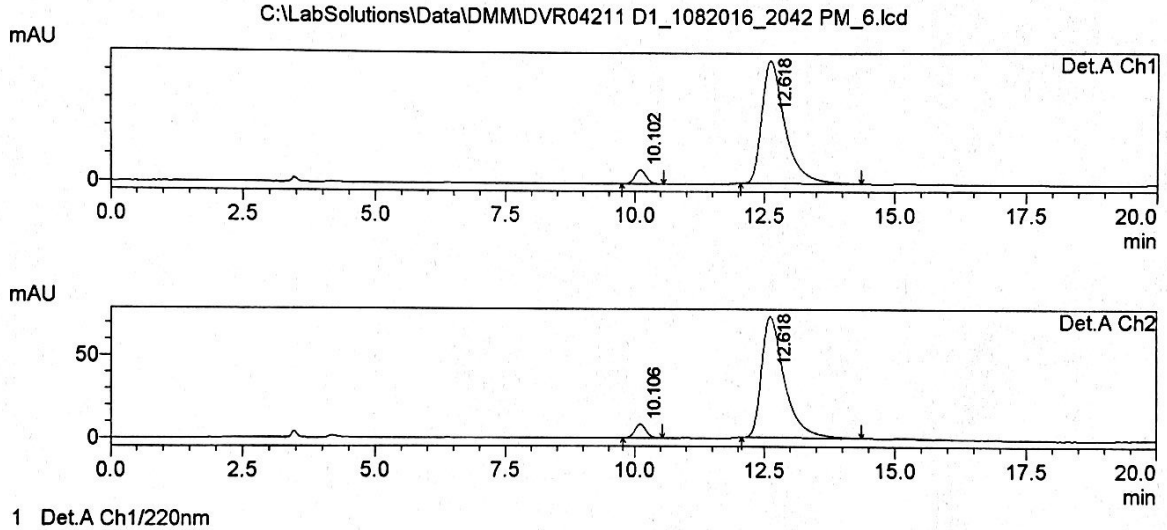
Acquired by	: LC User
Sample Name	: DVR04211 D1
Sample ID	: DVR04211 D1
Tray#	: 1
Vail #	: 2
Injection Volume	: 2 uL
Data File Name	: DVR04211 D1_1082016_2042 PM_6.lcd
Method File Name	: col3_2isoiPA_20min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/8/2016 9:53:54 PM
Data Processed	: 10/8/2016 10:13:55 PM



20A

89% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.102	75639	5029	5.271	10.226
2	12.618	1359251	44152	94.729	89.774
Total		1434890	49181	100.000	100.000

PeakTable

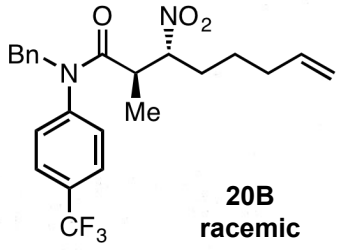
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.106	126593	8417	5.283	10.226
2	12.618	2269788	73897	94.717	89.774
Total		2396380	82314	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

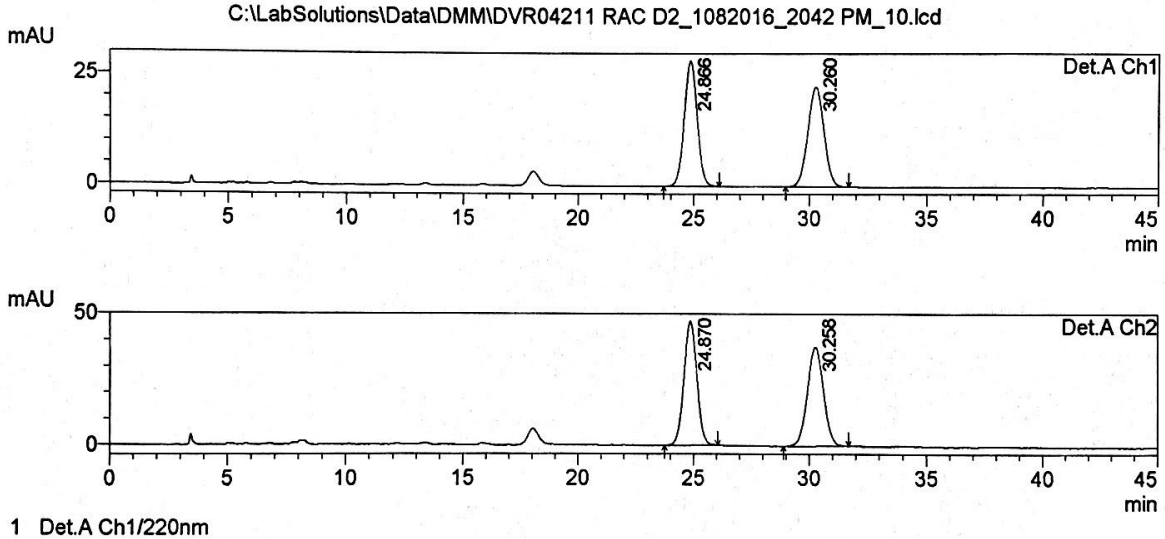
C:\LabSolutions\Data\DMM\DVR04211 RAC D2_1082016_2042 PM_10.lcd

Acquired by	: LC User
Sample Name	: DVR04211 RAC D2
Sample ID	: DVR04211 RAC D2
Tray#	: 1
Vail #	: 3
Injection Volume	: 2 uL
Data File Name	: DVR04211 RAC D2_1082016_2042 PM_10.lcd
Method File Name	: col3_5isoiPA_45min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/8/2016 11:09:50 PM
Data Processed	: 10/8/2016 11:54:51 PM



20B racemic

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	24.866	1109817	28443	50.406	55.693
2	30.260	1091922	22628	49.594	44.307
Total		2201739	51071	100.000	100.000

PeakTable

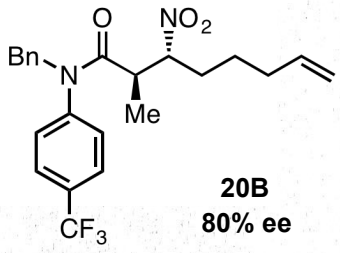
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	24.870	1855855	47618	50.177	55.620
2	30.258	1842744	37995	49.823	44.380
Total		3698599	85612	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

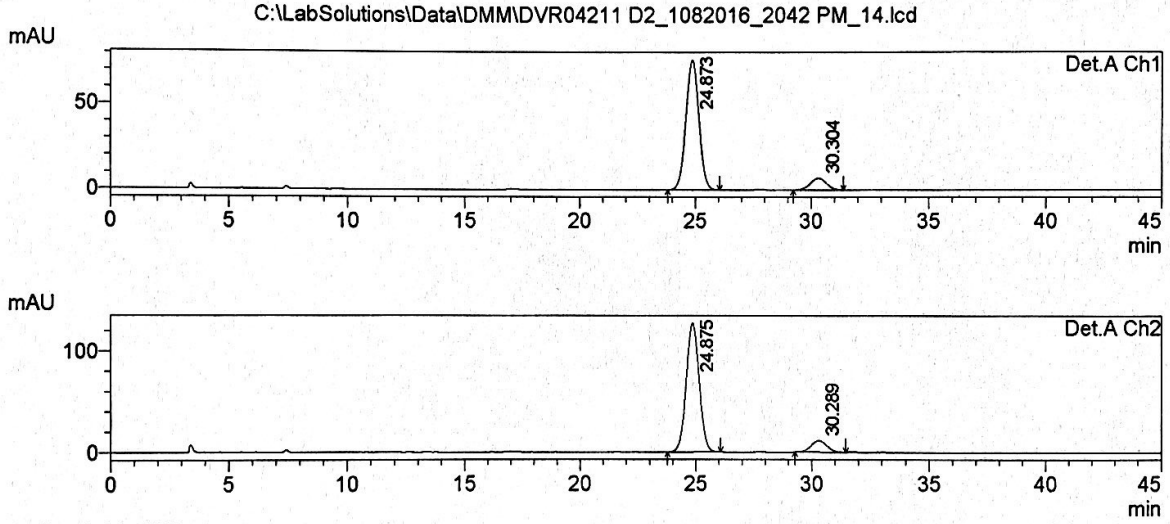
C:\LabSolutions\Data\DMM\DVR04211 D2_1082016_2042 PM_14.lcd

Acquired by	: LC User
Sample Name	: DVR04211 D2
Sample ID	: DVR04211 D2
Tray#	: 1
Vail #	: 4
Injection Volume	: 2 uL
Data File Name	: DVR04211 D2_1082016_2042 PM_14.lcd
Method File Name	: col3_5isoiPA_45min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/9/2016 12:50:45 AM
Data Processed	: 10/9/2016 1:35:49 AM



20B
80% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	24.873	2991187	76619	90.165	91.787
2	30.304	326271	6856	9.835	8.213
Total		3317458	83475	100.000	100.000

PeakTable

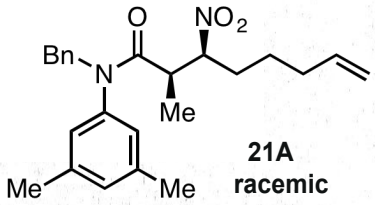
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	24.875	5010876	128349	90.308	91.847
2	30.289	537780	11394	9.692	8.153
Total		5548656	139742	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04208 RAC SYN_1052016_1934 PM_2.lcd

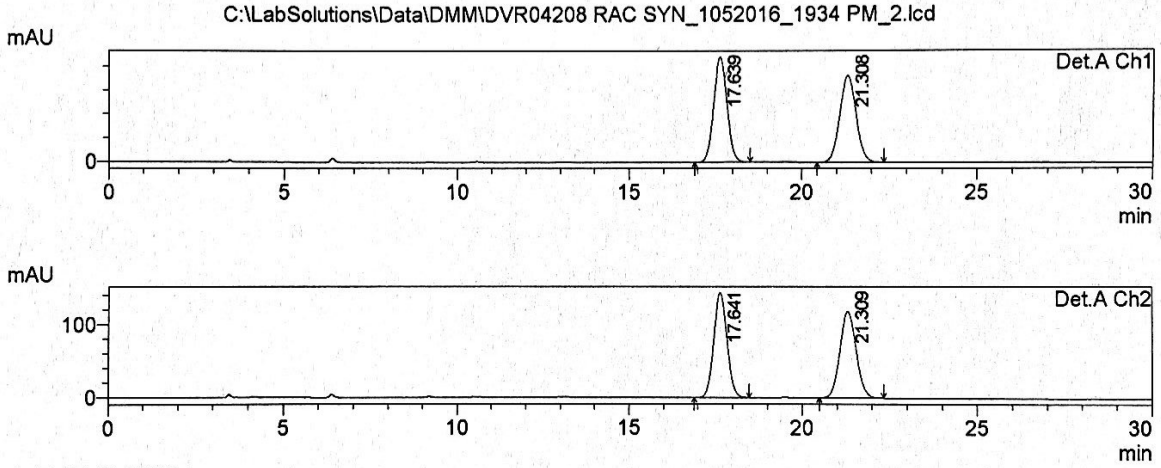
Acquired by	: LC User
Sample Name	: DVR04208 RAC SYN
Sample ID	: DVR04208 RAC SYN
Tray#	: 1
Vail #	: 1
Injection Volume	: 2 uL
Data File Name	: DVR04208 RAC SYN_1052016_1934 PM_2.lcd
Method File Name	: col3_2isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/5/2016 8:04:47 PM
Data Processed	: 10/5/2016 8:34:50 PM



21A
racemic

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04208 RAC SYN_1052016_1934 PM_2.lcd



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.639	2341462	88122	49.919	54.847
2	21.308	2349054	72547	50.081	45.153
Total		4690517	160669	100.000	100.000

PeakTable

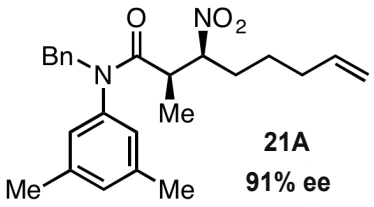
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.641	3828553	144185	49.931	54.846
2	21.309	3839066	118705	50.069	45.154
Total		7667619	262890	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04208 SYN_1052016_1934 PM_6.lcd

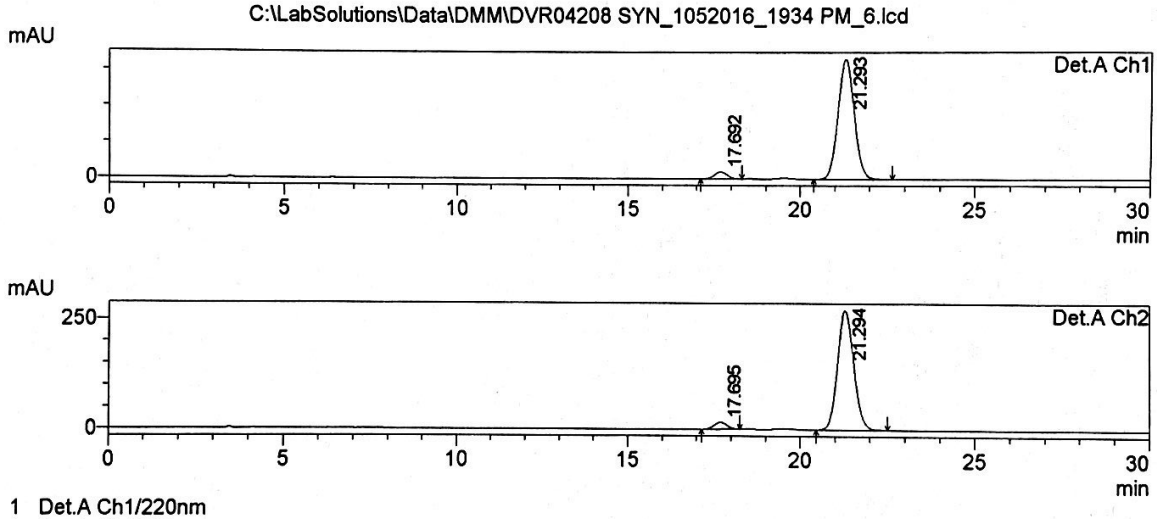
Acquired by	: LC User
Sample Name	: DVR04208 SYN
Sample ID	: DVR04208 SYN
Tray#	: 1
Vail #	: 2
Injection Volume	: 2 uL
Data File Name	: DVR04208 SYN_1052016_1934 PM_6.lcd
Method File Name	: col3_2isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/5/2016 9:15:42 PM
Data Processed	: 10/5/2016 9:45:44 PM



21A

91% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.692	244609	9507	4.360	5.410
2	21.293	5366253	166221	95.640	94.590
Total		5610862	175728	100.000	100.000

PeakTable

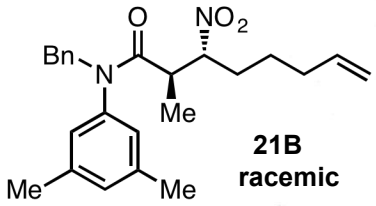
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.695	399783	15548	4.355	5.400
2	21.294	8780463	272387	95.645	94.600
Total		9180246	287934	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

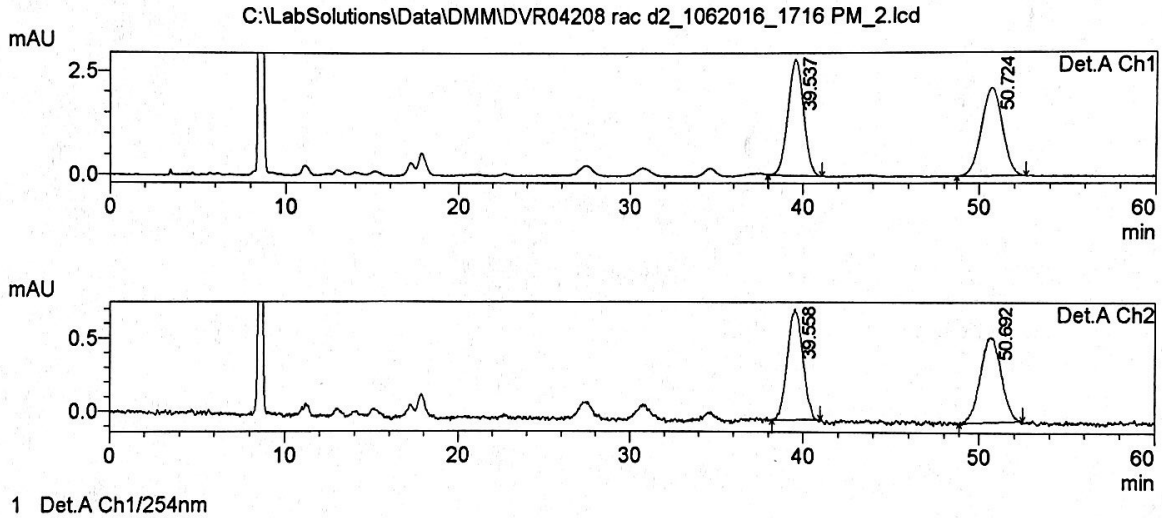
C:\LabSolutions\Data\DMM\DVR04208 rac d2_1062016_1716 PM_2.lcd

Acquired by	: LC User
Sample Name	: DVR04208 rac d2
Sample ID	: DVR04208 rac d2
Tray#	: 1
Vail #	: 2
Injection Volume	: 3 uL
Data File Name	: DVR04208 rac d2_1062016_1716 PM_2.lcd
Method File Name	: col3_8isoIPA_60min_1mL_254and280.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/6/2016 5:46:50 PM
Data Processed	: 10/6/2016 6:46:53 PM



21B
racemic

<Chromatogram>



1 Det.A Ch1/254nm
2 Det.A Ch2/280nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	39.537	173539	2778	49.844	56.853
2	50.724	174629	2108	50.156	43.147
Total		348168	4886	100.000	100.000

PeakTable

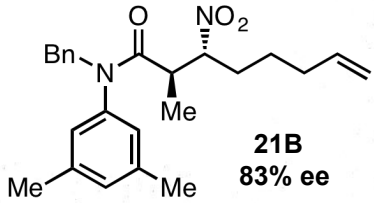
Detector A Ch2 280nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	39.558	46436	760	49.192	56.765
2	50.692	47963	578	50.808	43.235
Total		94399	1338	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04208 D2_1062016_1716 PM_6.lcd

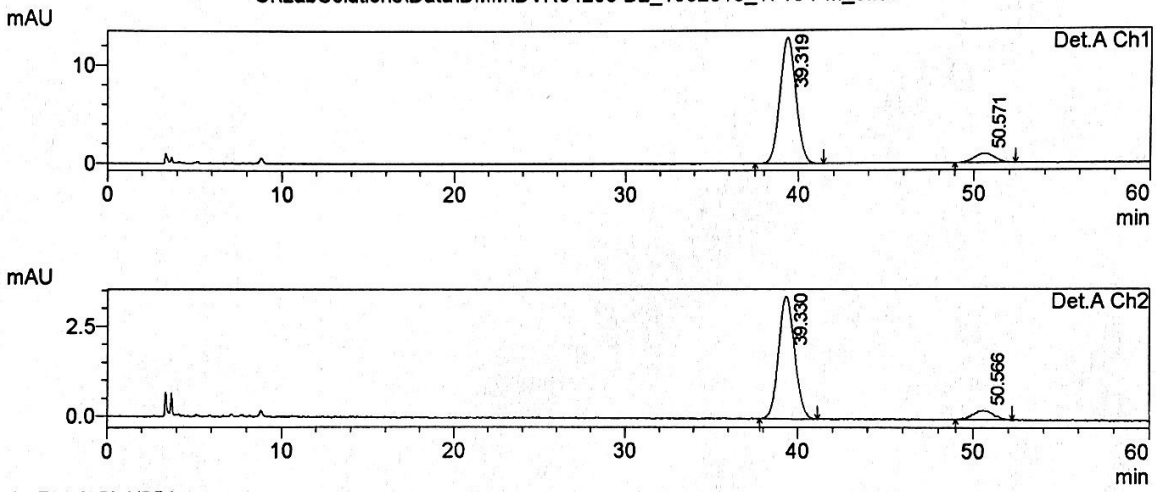
Acquired by	: LC User
Sample Name	: DVR04208 D2
Sample ID	: DVR04208 D2
Tray#	: 1
Vail #	: 3
Injection Volume	: 3 uL
Data File Name	: DVR04208 D2_1062016_1716 PM_6.lcd
Method File Name	: col3_8isoIPA_60min_1mL_254and280.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/6/2016 7:27:44 PM
Data Processed	: 10/6/2016 8:27:45 PM



21B
83% ee

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04208 D2_1062016_1716 PM_6.lcd



1 Det.A Ch1/254nm
2 Det.A Ch2/280nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	39.319	813272	12797	91.477	93.159
2	50.571	75775	940	8.523	6.841
Total		889047	13736	100.000	100.000

PeakTable

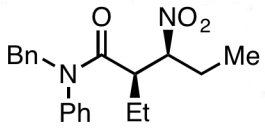
Detector A Ch2 280nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	39.330	219035	3412	91.165	92.897
2	50.566	21228	261	8.835	7.103
Total		240263	3673	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04150 RAC SYN 1_822016_841 AM_25.lcd

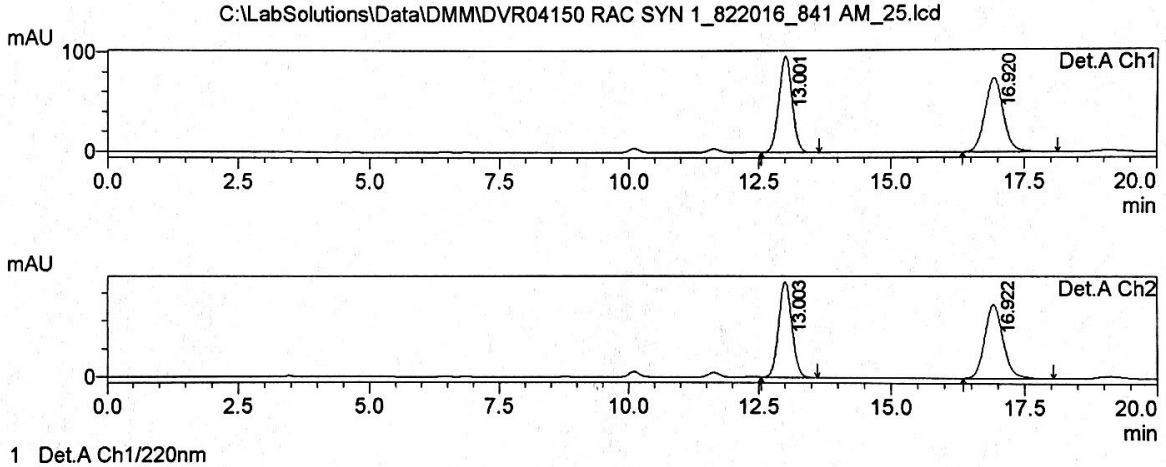
Acquired by	: LC User
Sample Name	: DVR04150 RAC SYN 1
Sample ID	: DVR04150 RAC SYN 1
Tray#	: 1
Vail #	: 3
Injection Volume	: 1 uL
Data File Name	: DVR04150 RAC SYN 1_822016_841 AM_25.lcd
Method File Name	: col3_3isoiPA_20min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 8/2/2016 7:37:05 PM
Data Processed	: 8/2/2016 7:57:07 PM



22A
racemic

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04150 RAC SYN 1_822016_841 AM_25.lcd



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.001	1683886	96541	48.958	56.693
2	16.920	1755548	73745	51.042	43.307
Total		3439434	170286	100.000	100.000

PeakTable

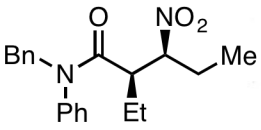
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.003	2977086	170612	48.719	56.656
2	16.922	3133617	130525	51.281	43.344
Total		6110703	301138	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

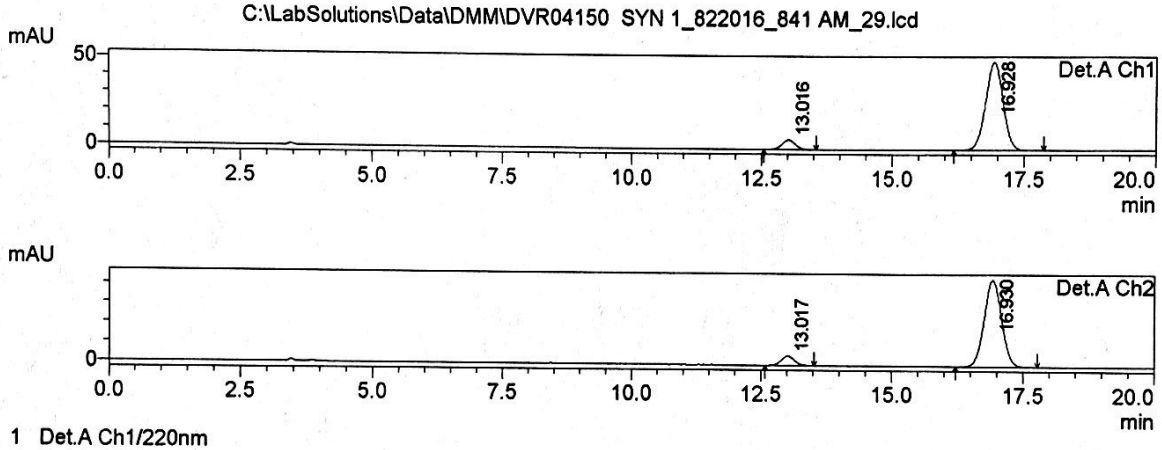
C:\LabSolutions\Data\DMM\DVR04150 SYN 1_822016_841 AM_29.lcd

Acquired by	: LC User
Sample Name	: DVR04150 SYN 1
Sample ID	: DVR04150 SYN 1
Tray#	: 1
Vail #	: 4
Injection Volume	: 1 uL
Data File Name	: DVR04150 SYN 1_822016_841 AM_29.lcd
Method File Name	: col3_3isoiPA_20min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 8/2/2016 8:28:03 PM
Data Processed	: 8/2/2016 8:48:05 PM



22A
85% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.016	94791	5413	7.531	9.707
2	16.928	1163865	50348	92.469	90.293
Total		1258656	55761	100.000	100.000

PeakTable

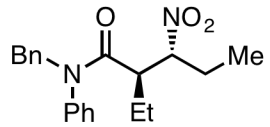
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.017	166990	9557	7.511	9.698
2	16.930	2056243	88980	92.489	90.302
Total		2223234	98536	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04150 RAC ANTI 1_812016_1017 AM_1.lcd

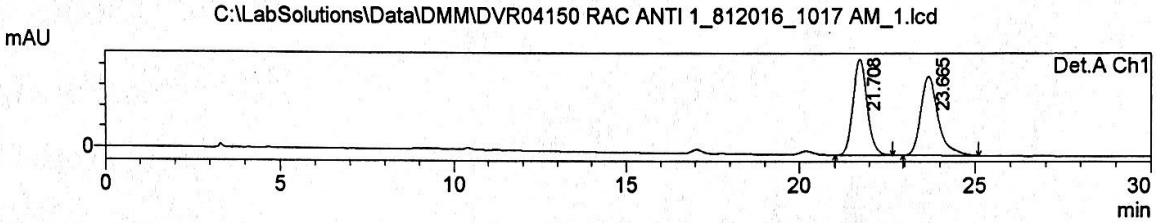
Acquired by	: LC User
Sample Name	: DVR04150 RAC ANTI 1
Sample ID	: DVR04150 RAC ANTI 1
Tray#	: 1
Vail #	: 1
Injection Volume	: 1 uL
Data File Name	: DVR04150 RAC ANTI 1_812016_1017 AM_1.lcd
Method File Name	: col6_3isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 8/1/2016 10:48:37 AM
Data Processed	: 8/1/2016 11:18:39 AM

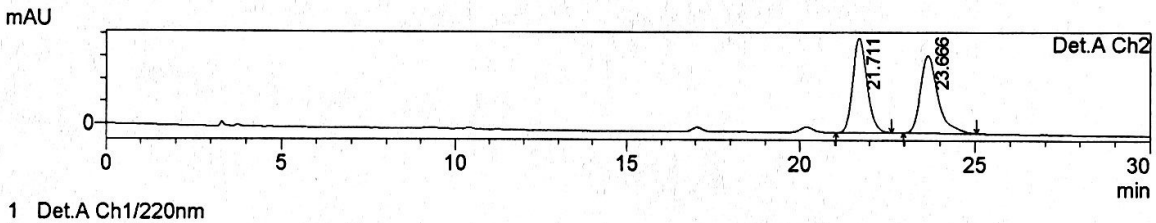


22B
racemic

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04150 RAC ANTI 1_812016_1017 AM_1.lcd





1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	21.708	648485	23201	49.674	54.878
2	23.665	656990	19076	50.326	45.122
Total		1305475	42277	100.000	100.000

PeakTable

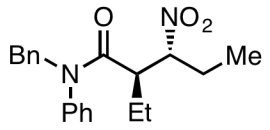
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	21.711	1182722	41875	49.776	54.948
2	23.666	1193362	34333	50.224	45.052
Total		2376083	76208	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

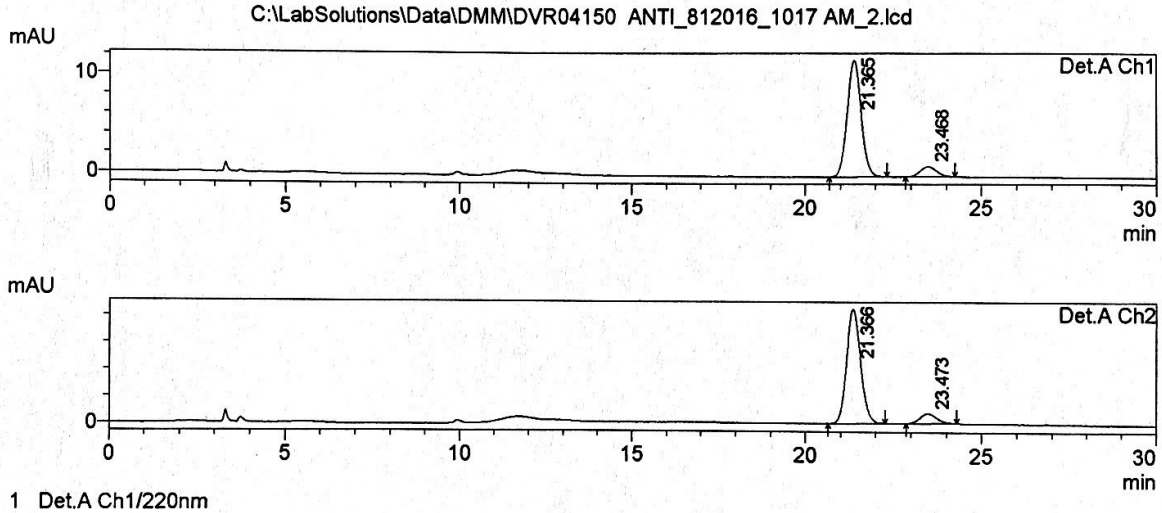
C:\LabSolutions\Data\DMM\DVR04150 ANTI_812016_1017 AM_2.lcd

Acquired by	: LC User
Sample Name	: DVR04150 ANTI
Sample ID	: DVR04150 ANTI
Tray#	: 1
Vail #	: 2
Injection Volume	: 1 uL
Data File Name	: DVR04150 ANTI_812016_1017 AM_2.lcd
Method File Name	: col6_3isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 8/1/2016 11:19:14 AM
Data Processed	: 8/1/2016 11:49:14 AM



22B
81% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	21.365	326032	11828	90.671	92.066
2	23.468	33547	1019	9.329	7.934
Total		359579	12847	100.000	100.000

PeakTable

Detector A Ch2 210nm

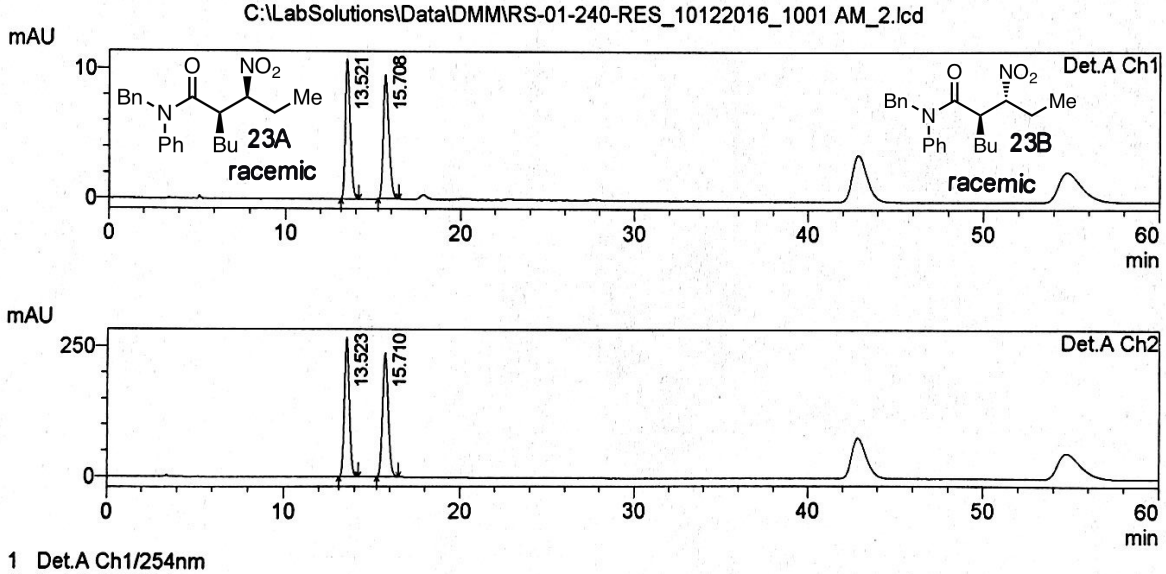
Peak#	Ret. Time	Area	Height	Area %	Height %
1	21.366	585715	21277	90.446	92.013
2	23.473	61872	1847	9.554	7.987
Total		647587	23124	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\RS-01-240-RES_10122016_1001 AM_2.lcd

Acquired by	: LC User
Sample Name	: RS-01-240-RES
Sample ID	: RS-01-240-RES
Tray#	: 1
Vail #	: 91
Injection Volume	: 2 uL
Data File Name	: RS-01-240-RES_10122016_1001 AM_2.lcd
Method File Name	: col5_3isoiPA_60min_1.0ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/12/2016 10:16:44 AM
Data Processed	: 10/12/2016 11:16:45 AM

<Chromatogram>



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.521	208119	10773	49.292	52.984
2	15.708	214099	9559	50.708	47.016
Total		422218	20332	100.000	100.000

PeakTable

Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.523	5197100	268121	49.269	52.943
2	15.710	5351355	238314	50.731	47.057
Total		10548455	506435	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\RS-01-229-final_10122016_1001 AM_3.lcd

Acquired by	: LC User
Sample Name	: RS-01-229-final
Sample ID	: RS-01-229-final
Tray#	: 1
Vail #	: 92
Injection Volume	: 3 uL
Data File Name	: RS-01-229-final_10122016_1001 AM_3.lcd
Method File Name	: col5_3isoiPA_60min_1.0ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/12/2016 11:17:19 AM
Data Processed	: 10/12/2016 12:17:22 PM

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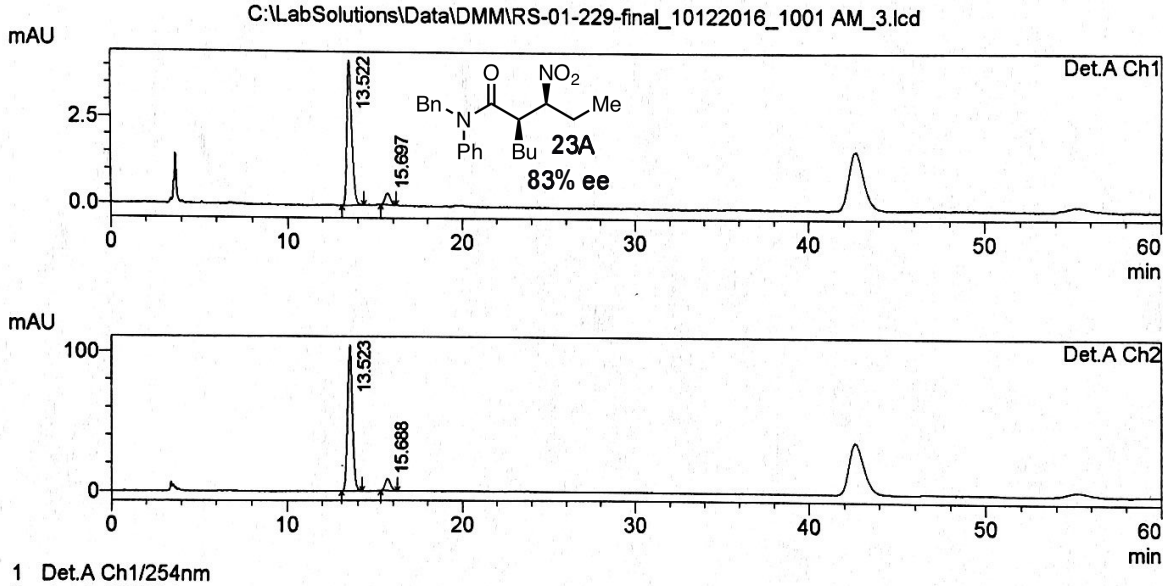


1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.522	80975	4207	91.552	92.401
2	15.697	7472	346	8.448	7.599
Total		88447	4553	100.000	100.000

PeakTable

Detector A Ch2 210nm

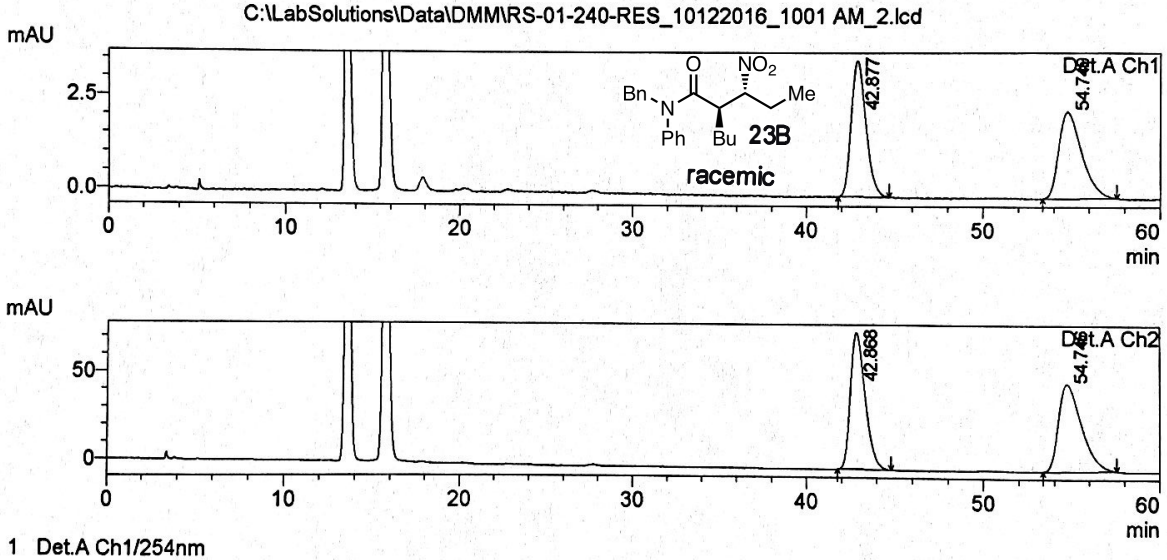
Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.523	2016783	105053	91.495	92.403
2	15.688	187468	8638	8.505	7.597
Total		2204252	113690	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\RS-01-240-RES_10122016_1001 AM_2.lcd

Acquired by	: LC User
Sample Name	: RS-01-240-RES
Sample ID	: RS-01-240-RES
Tray#	: 1
Vail #	: 91
Injection Volume	: 2 uL
Data File Name	: RS-01-240-RES_10122016_1001 AM_2.lcd
Method File Name	: col5_3isoiPA_60min_1.0ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/12/2016 10:16:44 AM
Data Processed	: 10/12/2016 12:20:03 PM

<Chromatogram>



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	42.877	211348	3617	50.119	60.969
2	54.749	210348	2316	49.881	39.031
Total		421696	5933	100.000	100.000

PeakTable

Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	42.868	4542037	78030	50.118	61.045
2	54.746	4520585	49793	49.882	38.955
Total		9062621	127824	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\RS-01-229-final_10122016_1001 AM_3.lcd

Acquired by	: LC User
Sample Name	: RS-01-229-final
Sample ID	: RS-01-229-final
Tray#	: 1
Vail #	: 92
Injection Volume	: 3 uL
Data File Name	: RS-01-229-final_10122016_1001 AM_3.lcd
Method File Name	: col5_3isoiPA_60min_1.0ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/12/2016 11:17:19 AM
Data Processed	: 10/12/2016 12:17:22 PM

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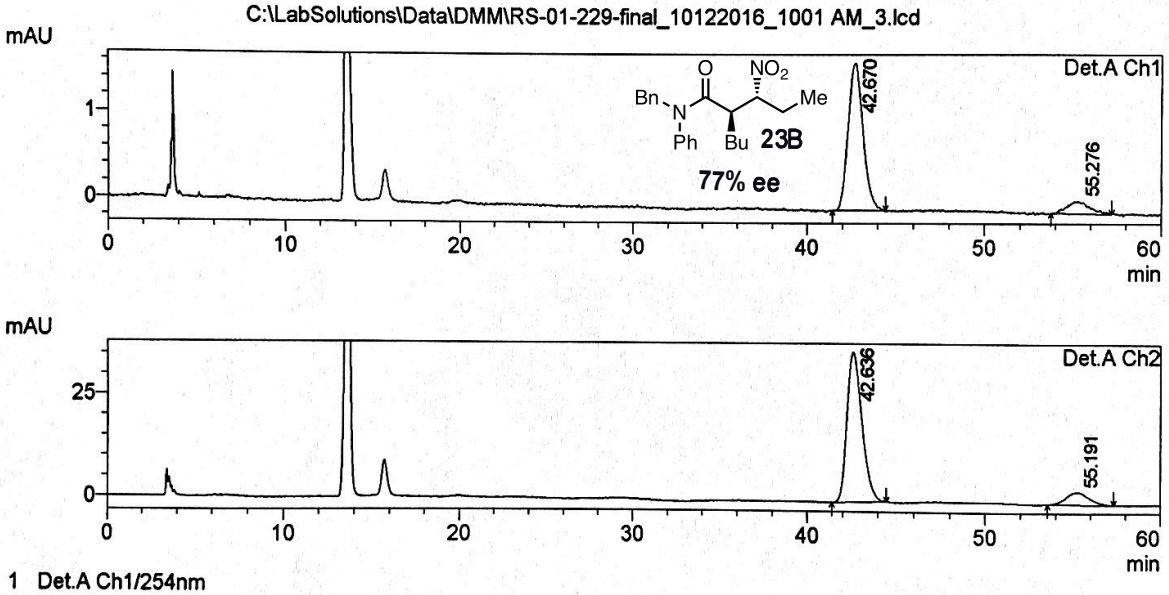


1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	42.670	99819	1699	88.563	92.074
2	55.276	12891	146	11.437	7.926
Total		112709	1845	100.000	100.000

PeakTable

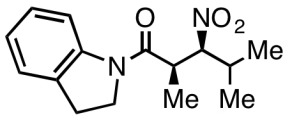
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	42.636	2163440	36678	88.746	92.388
2	55.191	274361	3022	11.254	7.612
Total		2437801	39700	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

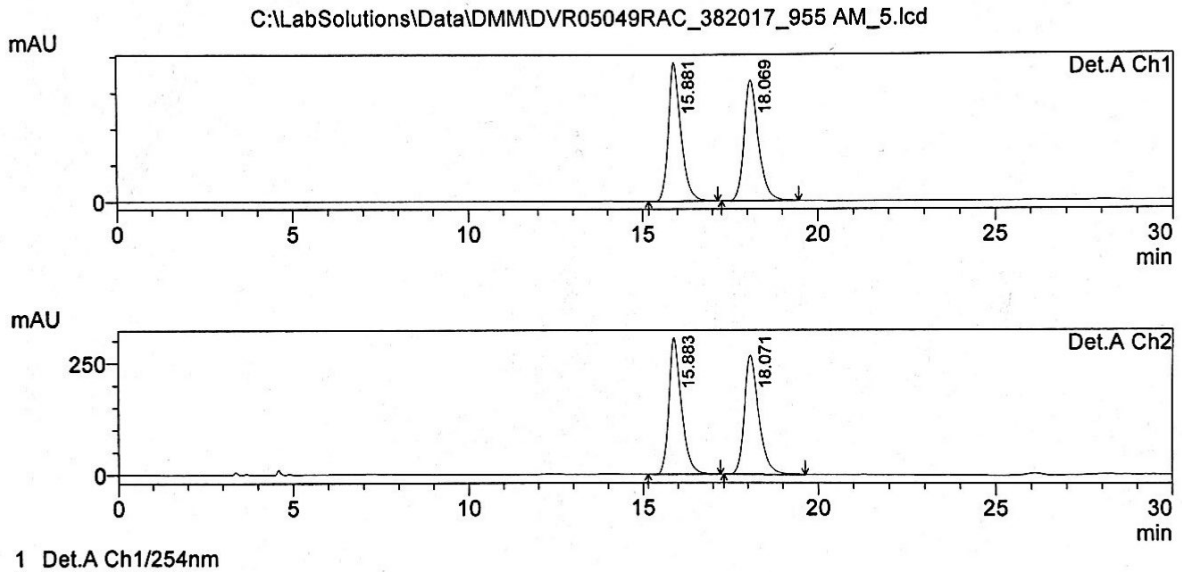
C:\LabSolutions\Data\DMM\DVR05049RAC_382017_955 AM_5.lcd

Acquired by	: LC User
Sample Name	: DVR05049RAC
Sample ID	: DVR05049RAC
Tray#	: 1
Vail #	: 1
Injection Volume	: 3 uL
Data File Name	: DVR05049RAC_382017_955 AM_5.lcd
Method File Name	: col1_1isoiPA_30min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 3/8/2017 12:48:27 PM
Data Processed	: 3/8/2017 1:18:28 PM



24
racemic

<Chromatogram>



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.881	4746999	191118	50.154	53.475
2	18.069	4717929	166282	49.846	46.525
Total		9464928	357400	100.000	100.000

PeakTable

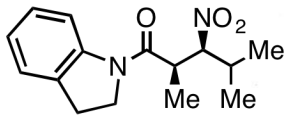
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.883	7628150	306467	50.087	53.427
2	18.071	7601695	267148	49.913	46.573
Total		15229845	573615	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR05049 D1_382017_955 AM_9.lcd

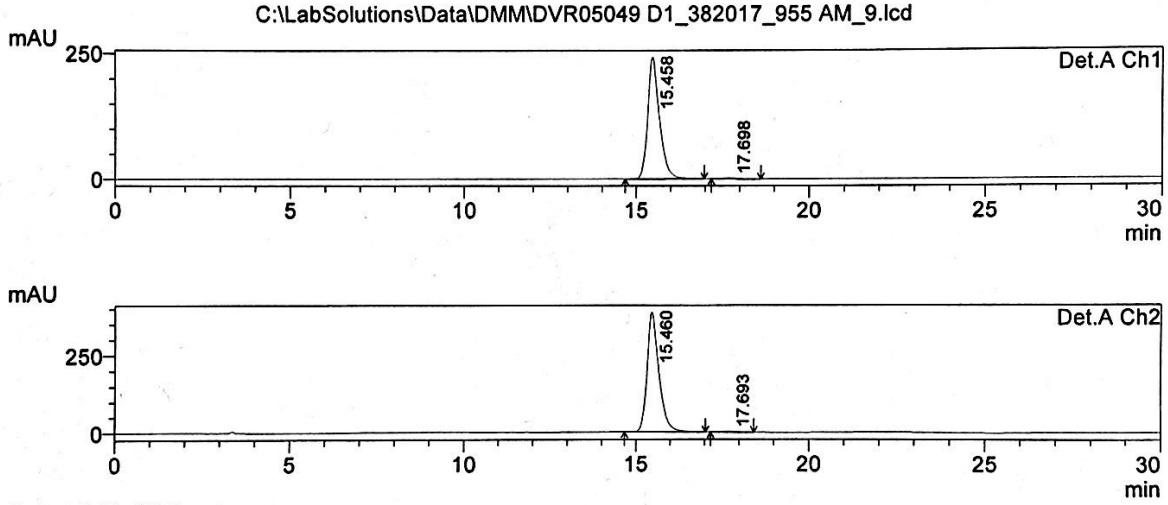
Acquired by	: LC User
Sample Name	: DVR05049 D1
Sample ID	: DVR05049 D1
Tray#	: 1
Vail #	: 2
Injection Volume	: 3 uL
Data File Name	: DVR05049 D1_382017_955 AM_9.lcd
Method File Name	: col1_1isoiPA_30min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 3/8/2017 1:59:26 PM
Data Processed	: 3/8/2017 2:29:27 PM



24
99% ee

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR05049 D1_382017_955 AM_9.lcd



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.458	5749436	242233	99.419	99.426
2	17.698	33618	1397	0.581	0.574
Total		5783054	243630	100.000	100.000

PeakTable

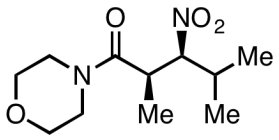
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.460	9262467	388183	99.470	99.457
2	17.693	49334	2118	0.530	0.543
Total		9311801	390302	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

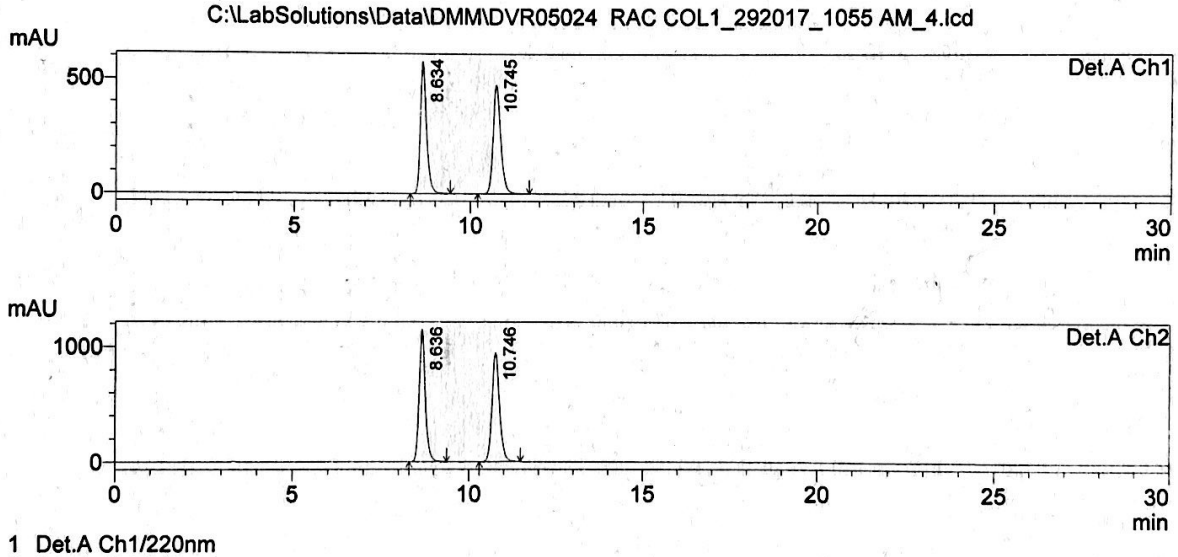
C:\LabSolutions\Data\DMM\DVR05024 RAC COL1_292017_1055 AM_4.lcd

Acquired by	: LC User
Sample Name	: DVR05024 RAC COL1
Sample ID	: DVR05024 RAC COL1
Tray#	: 1
Vail #	: 1
Injection Volume	: 3 uL
Data File Name	: DVR05024 RAC COL1_292017_1055 AM_4.lcd
Method File Name	: col1_5isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 2/9/2017 12:35:22 PM
Data Processed	: 2/9/2017 1:05:25 PM



25A
racemic

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	8.634	7177016	581006	49.806	54.856
2	10.745	7232806	478140	50.194	45.144
Total		14409822	1059146	100.000	100.000

PeakTable

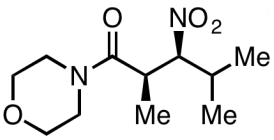
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	8.636	14177266	1151903	49.779	54.792
2	10.746	14302886	950428	50.221	45.208
Total		28480152	2102331	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

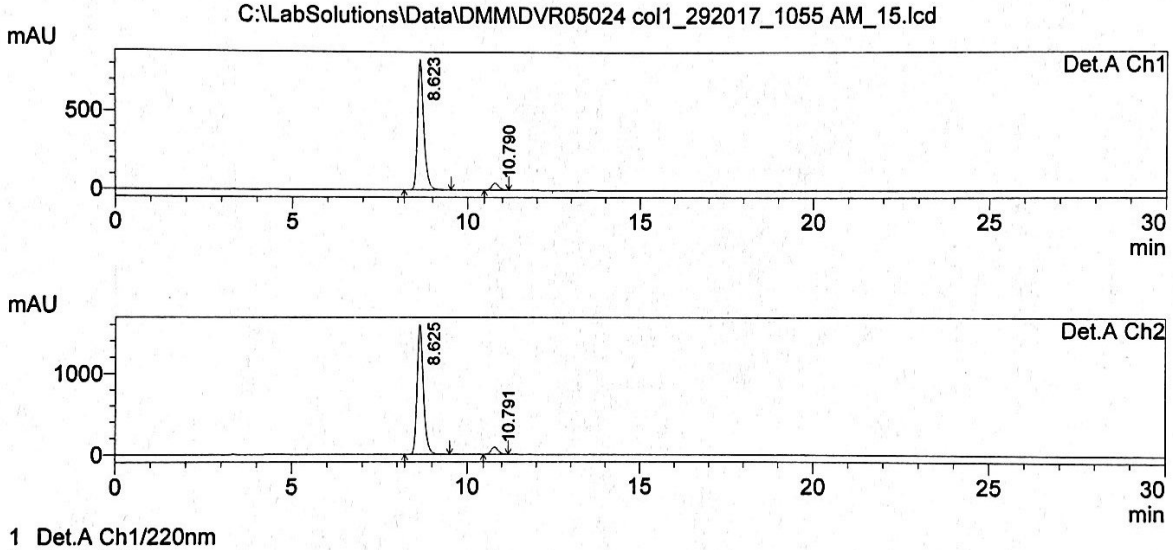
C:\LabSolutions\Data\DMM\DVR05024 col1_292017_1055 AM_15.lcd

Acquired by	: LC User
Sample Name	: DVR05024 col1
Sample ID	: DVR05024 col1
Tray#	: 1
Vail #	: 2
Injection Volume	: 3 uL
Data File Name	: DVR05024 col1_292017_1055 AM_15.lcd
Method File Name	: col1_5isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 2/10/2017 12:29:01 AM
Data Processed	: 2/10/2017 12:59:03 AM



25A
88% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	8.623	10504819	836720	94.139	94.827
2	10.790	653983	45642	5.861	5.173
Total		11158802	882362	100.000	100.000

PeakTable

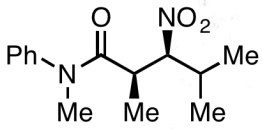
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	8.625	20521889	1601647	94.125	94.719
2	10.791	1280955	89297	5.875	5.281
Total		21802844	1690944	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR05053 SYN RAC_3222017_1208 PM_2.lcd

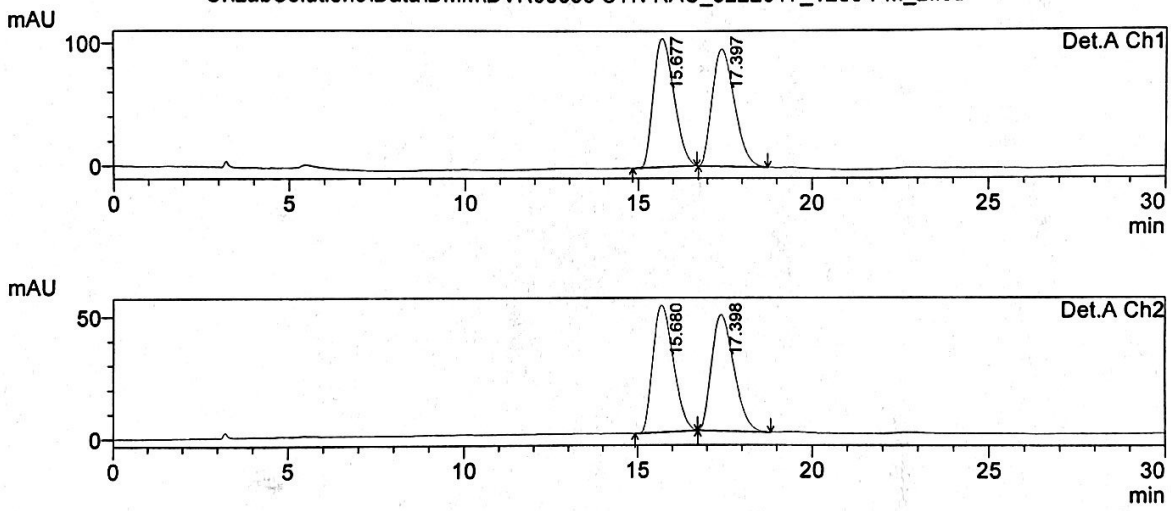
Acquired by	: LC User
Sample Name	: DVR05053 SYN RAC
Sample ID	: DVR05053 SYN RAC
Tray#	: 1
Vail #	: 7
Injection Volume	: 3 uL
Data File Name	: DVR05053 SYN RAC_3222017_1208 PM_2.lcd
Method File Name	: col4_1isoiPA_30min_1ML_210and220.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 3/22/2017 12:23:51 PM
Data Processed	: 3/22/2017 12:53:54 PM



26A
racemic

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR05053 SYN RAC_3222017_1208 PM_2.lcd



1 Det.A Ch1/210nm
2 Det.A Ch2/220nm

PeakTable

Detector A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.677	4350073	105559	50.347	52.301
2	17.397	4290082	96271	49.653	47.699
Total		8640155	201830	100.000	100.000

PeakTable

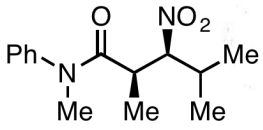
Detector A Ch2 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.680	2144959	52093	50.222	52.168
2	17.398	2125976	47763	49.778	47.832
Total		4270935	99856	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR05053R1_3222017_1101 AM_2.lcd

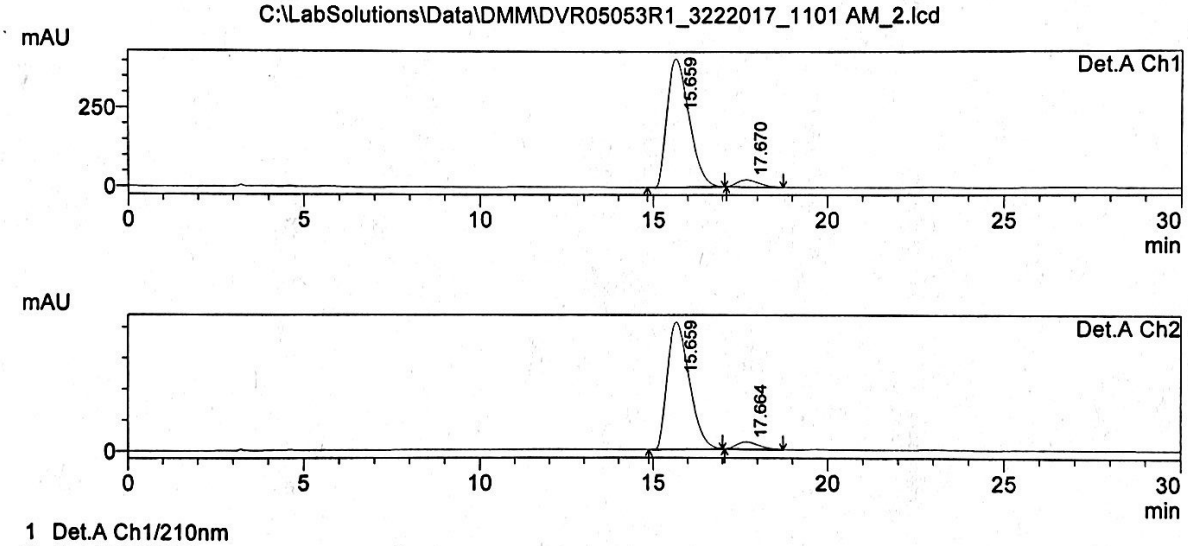
Acquired by	: LC User
Sample Name	: DVR05053R1
Sample ID	: DVR05053R1
Tray#	: 1
Vail #	: 6
Injection Volume	: 3 uL
Data File Name	: DVR05053R1_3222017_1101 AM_2.lcd
Method File Name	: col4_1isoiPA_30min_1ML_210and220.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 3/22/2017 11:16:45 AM
Data Processed	: 3/22/2017 11:46:46 AM



26A
90% ee

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR05053R1_3222017_1101 AM_2.lcd



1 Det.A Ch1/210nm
2 Det.A Ch2/220nm

PeakTable

Detector A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.659	18070828	409433	94.732	94.656
2	17.670	1004850	23116	5.268	5.344
Total		19075678	432549	100.000	100.000

PeakTable

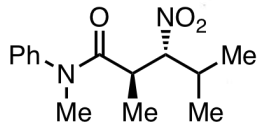
Detector A Ch2 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.659	9038728	206005	94.800	94.755
2	17.664	495833	11403	5.200	5.245
Total		9534561	217408	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

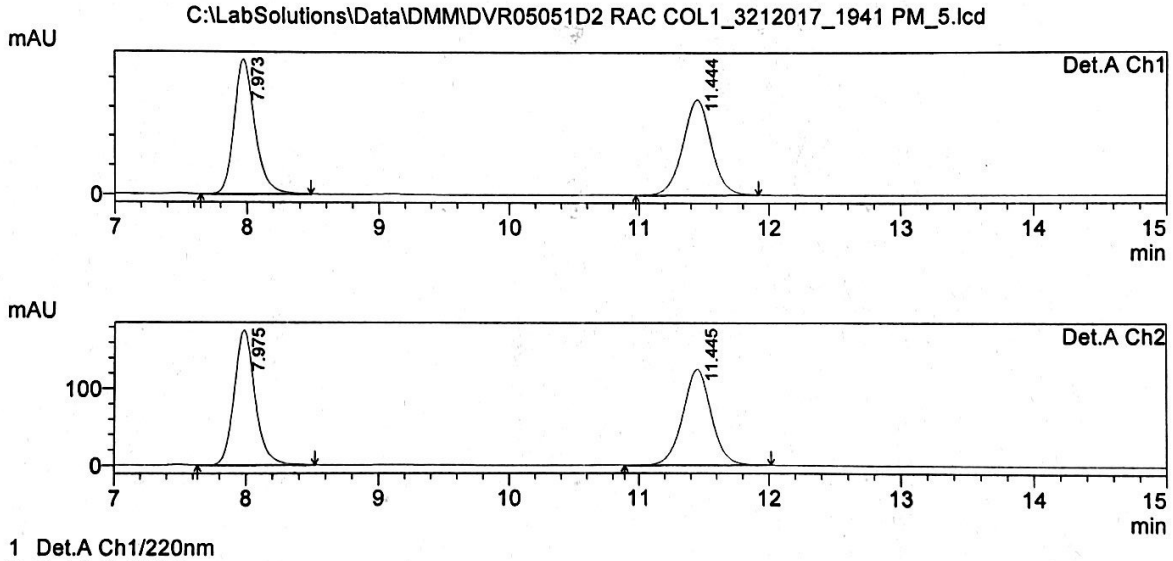
C:\LabSolutions\Data\DMM\DVR05051D2 RAC COL1_3212017_1941 PM_5.lcd

Acquired by	: LC User
Sample Name	: DVR05051D2 RAC COL1
Sample ID	: DVR05051D2 RAC COL1
Tray#	: 1
Vail #	: 5
Injection Volume	: 3 uL
Data File Name	: DVR05051D2 RAC COL1_3212017_1941 PM_5.lcd
Method File Name	: col1_5isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 3/21/2017 8:56:16 PM
Data Processed	: 3/22/2017 11:55:56 AM



26B
racemic

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	7.973	1003185	92461	50.237	58.486
2	11.444	993731	65631	49.763	41.514
Total		1996916	158092	100.000	100.000

PeakTable

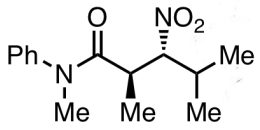
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	7.975	1917627	176028	50.094	58.360
2	11.445	1910441	125595	49.906	41.640
Total		3828068	301623	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

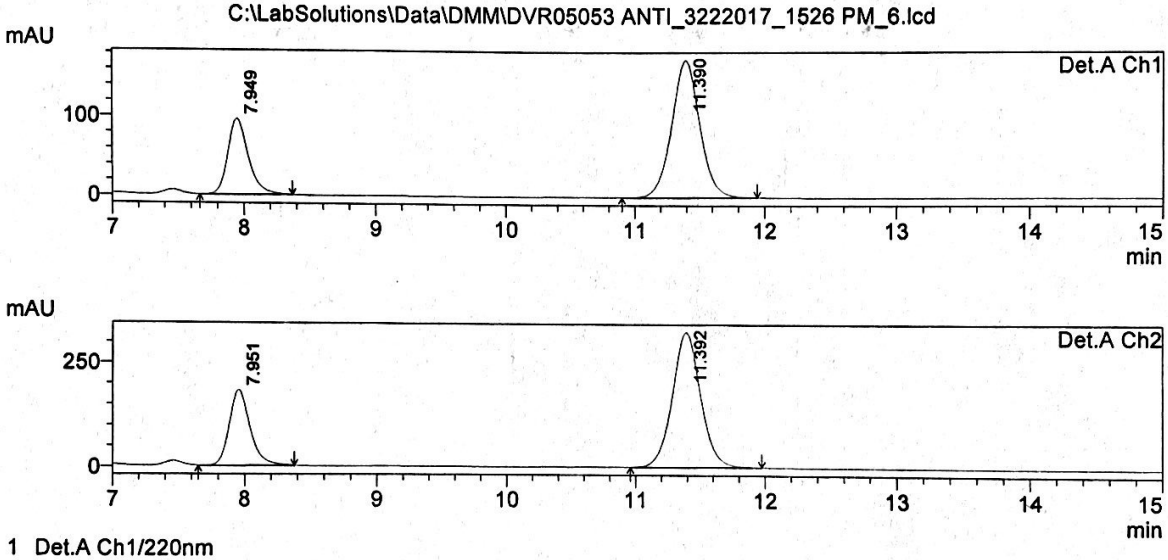
C:\LabSolutions\Data\DMM\DVR05053 ANTI_3222017_1526 PM_6.lcd

Acquired by	: LC User
Sample Name	: DVR05053 ANTI
Sample ID	: DVR05053 ANTI
Tray#	: 1
Vail #	: 2
Injection Volume	: 3 uL
Data File Name	: DVR05053 ANTI_3222017_1526 PM_6.lcd
Method File Name	: col1_5isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 3/22/2017 4:53:20 PM
Data Processed	: 3/22/2017 7:24:22 PM



26B
43%ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	7.949	1032740	95668	28.309	35.617
2	11.390	2615418	172937	71.691	64.383
Total		3648159	268605	100.000	100.000

PeakTable

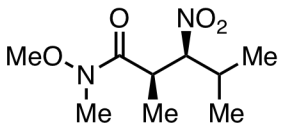
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	7.951	1971180	182055	28.366	35.787
2	11.392	4977953	326658	71.634	64.213
Total		6949133	508713	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

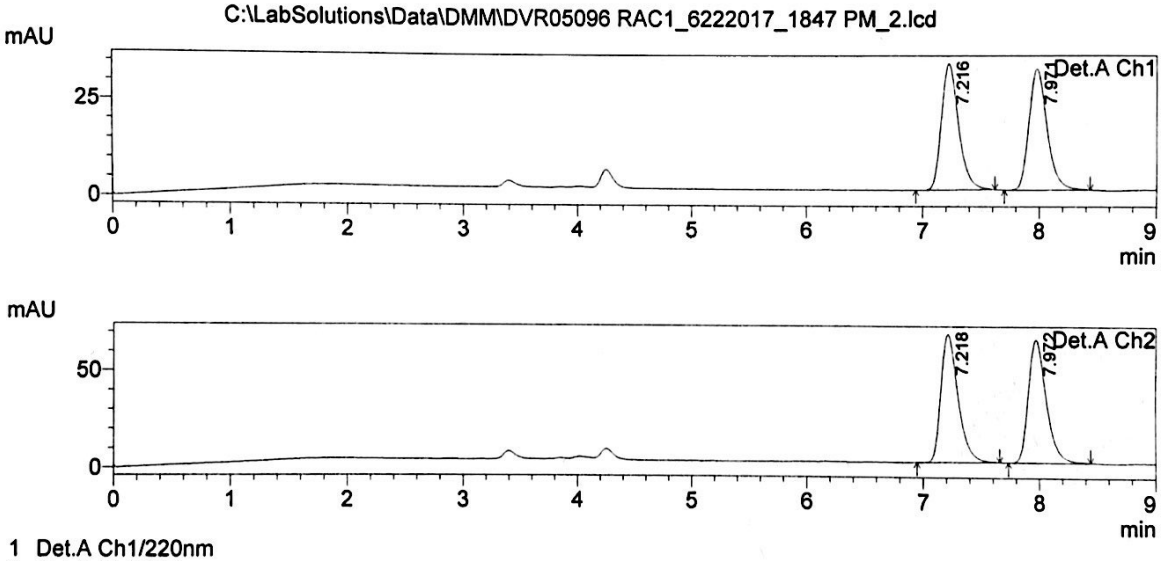
C:\LabSolutions\Data\DMM\DVR05096 RAC1_6222017_1847 PM_2.lcd

Acquired by	: LC User
Sample Name	: DVR05096 RAC1
Sample ID	: DVR05096 RAC1
Tray#	: 1
Vail #	: 3
Injection Volume	: 3 uL
Data File Name	: DVR05096 RAC1_6222017_1847 PM_2.lcd
Method File Name	: col2_2isoiPA_20min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 6/22/2017 6:58:25 PM
Data Processed	: 6/22/2017 7:18:27 PM



27A
racemic

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	7.216	335148	32765	49.851	51.031
2	7.971	337158	31441	50.149	48.969
Total		672306	64206	100.000	100.000

PeakTable

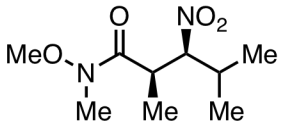
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	7.218	676907	66033	49.917	51.038
2	7.972	679157	63346	50.083	48.962
Total		1356064	129379	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

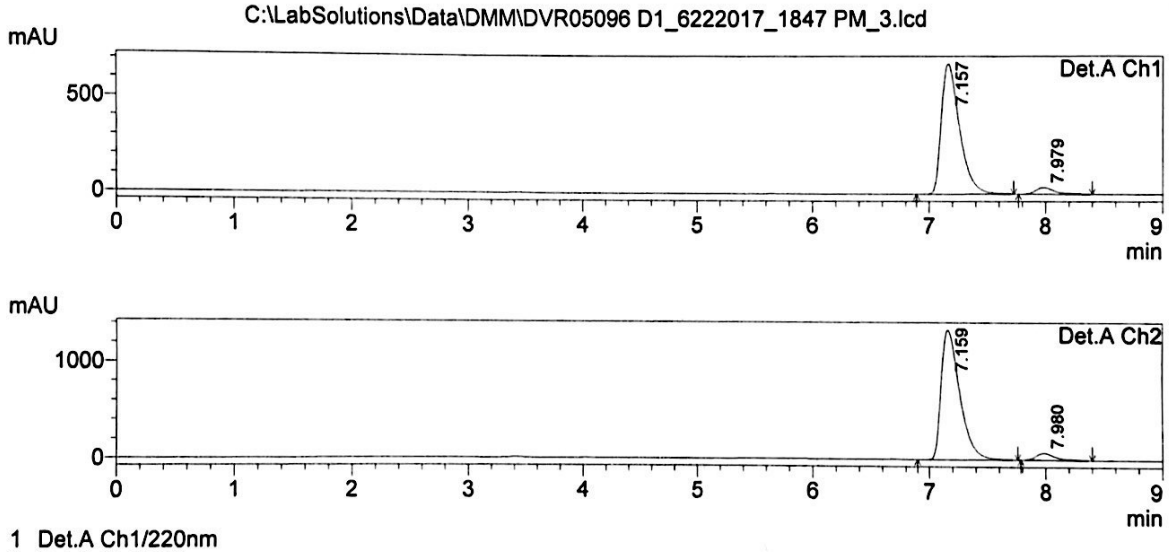
C:\LabSolutions\Data\DMM\DVR05096 D1_6222017_1847 PM_3.lcd

Acquired by	: LC User
Sample Name	: DVR05096 D1
Sample ID	: DVR05096 D1
Tray#	: 1
Vail #	: 4
Injection Volume	: 3 uL
Data File Name	: DVR05096 D1_6222017_1847 PM_3.lcd
Method File Name	: col2_2isoiPA_20min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 6/22/2017 7:19:00 PM
Data Processed	: 6/22/2017 7:39:02 PM



27A
90% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	7.157	7448257	684968	94.858	95.094
2	7.979	403717	35340	5.142	4.906
Total		7851974	720308	100.000	100.000

PeakTable

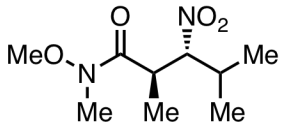
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	7.159	14946443	1348215	94.973	94.971
2	7.980	791193	71392	5.027	5.029
Total		15737636	1419607	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR05096 RAC1_6222017_1847 PM_2.lcd

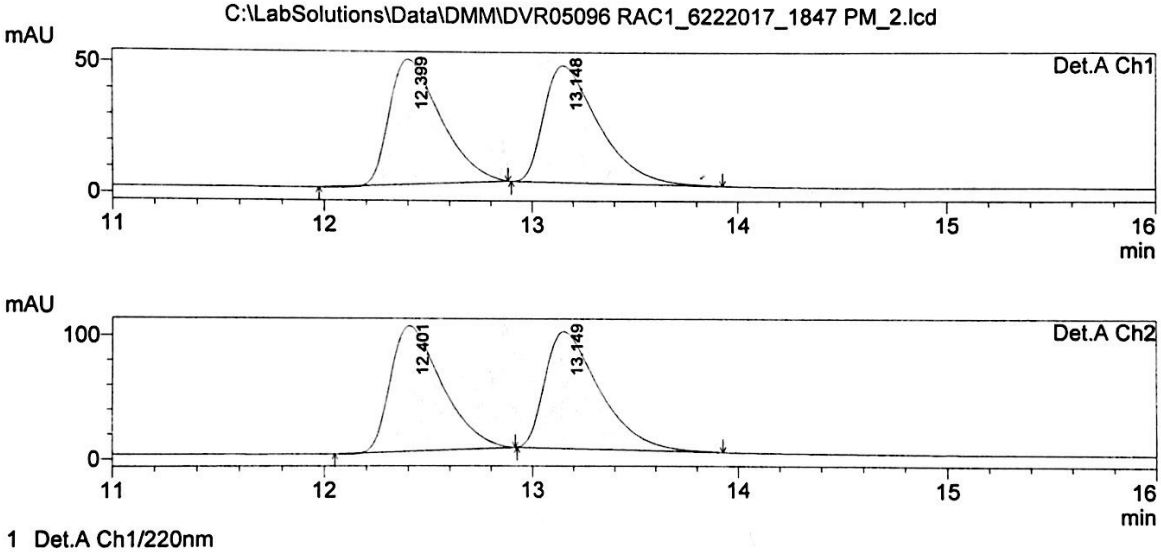
Acquired by	: LC User
Sample Name	: DVR05096 RAC1
Sample ID	: DVR05096 RAC1
Tray#	: 1
Vail #	: 3
Injection Volume	: 3 uL
Data File Name	: DVR05096 RAC1_6222017_1847 PM_2.lcd
Method File Name	: col2_2isoiPA_20min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 6/22/2017 6:58:25 PM
Data Processed	: 6/22/2017 8:30:04 PM



27B
racemic

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR05096 RAC1_6222017_1847 PM_2.lcd



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	12.399	815274	47869	49.467	51.573
2	13.148	832837	44949	50.533	48.427
Total		1648111	92818	100.000	100.000

PeakTable

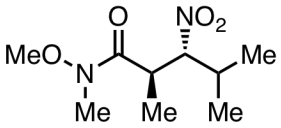
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	12.401	1753453	102119	49.856	51.741
2	13.149	1763598	95247	50.144	48.259
Total		3517051	197366	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

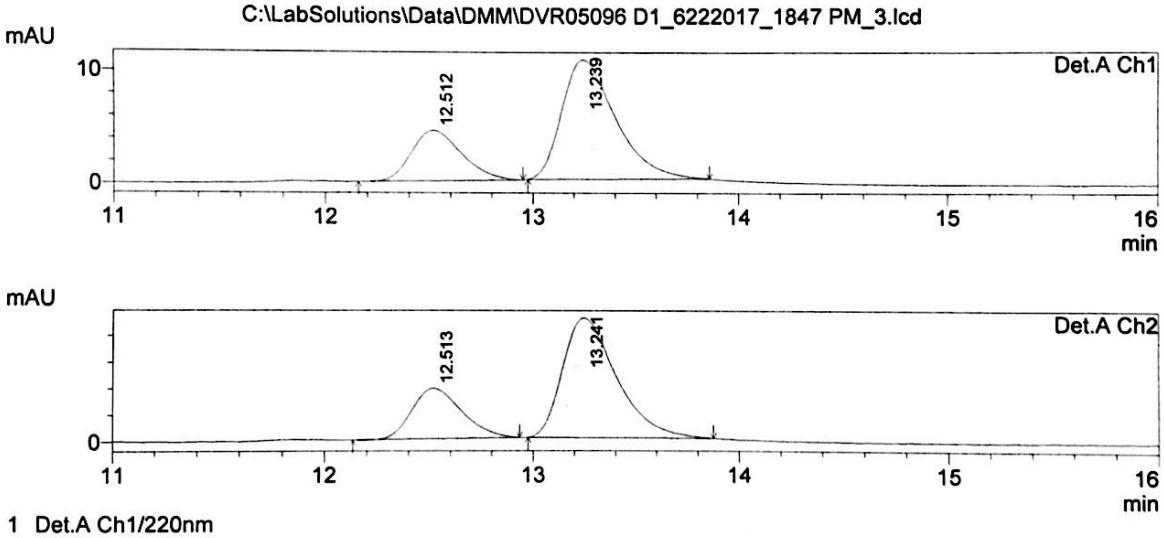
C:\LabSolutions\Data\DMM\DVR05096 D1_6222017_1847 PM_3.lcd

Acquired by	: LC User
Sample Name	: DVR05096 D1
Sample ID	: DVR05096 D1
Tray#	: 1
Vail #	: 4
Injection Volume	: 3 uL
Data File Name	: DVR05096 D1_6222017_1847 PM_3.lcd
Method File Name	: col2_2isoiPA_20min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 6/22/2017 7:19:00 PM
Data Processed	: 6/22/2017 8:33:52 PM



27B
44% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	12.512	75349	4503	28.007	29.709
2	13.239	193688	10655	71.993	70.291
Total		269037	15158	100.000	100.000

PeakTable

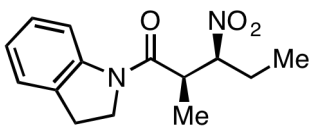
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	12.513	158531	9527	27.733	29.604
2	13.241	413097	22654	72.267	70.396
Total		571628	32180	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

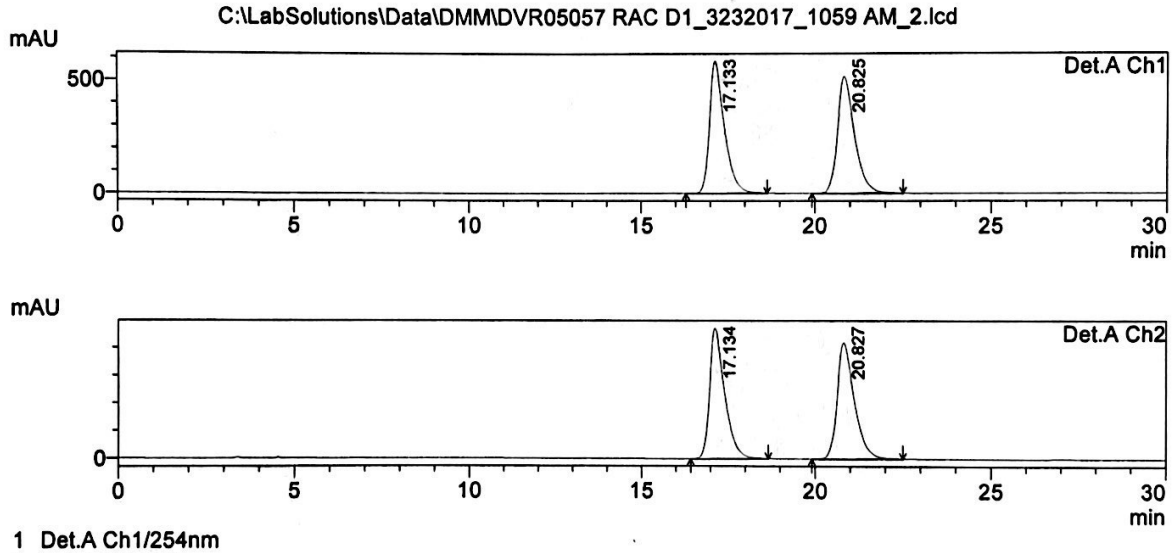
C:\LabSolutions\Data\DMM\DVR05057 RAC D1_3232017_1059 AM_2.lcd

Acquired by	: LC User
Sample Name	: DVR05057 RAC D1
Sample ID	: DVR05057 RAC D1
Tray#	: 1
Vail #	: 1
Injection Volume	: 3 uL
Data File Name	: DVR05057 RAC D1_3232017_1059 AM_2.lcd
Method File Name	: col1_1isoiPA_30min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 3/23/2017 11:15:40 AM
Data Processed	: 3/23/2017 11:45:42 AM



28A
racemic

<Chromatogram>



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.133	17410414	585976	50.036	53.102
2	20.825	17385493	517516	49.964	46.898
Total		34795906	1103492	100.000	100.000

PeakTable

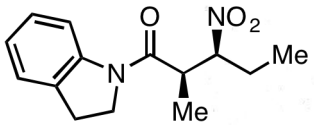
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.134	28484540	949339	49.925	52.982
2	20.827	28569783	842484	50.075	47.018
Total		57054323	1791823	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

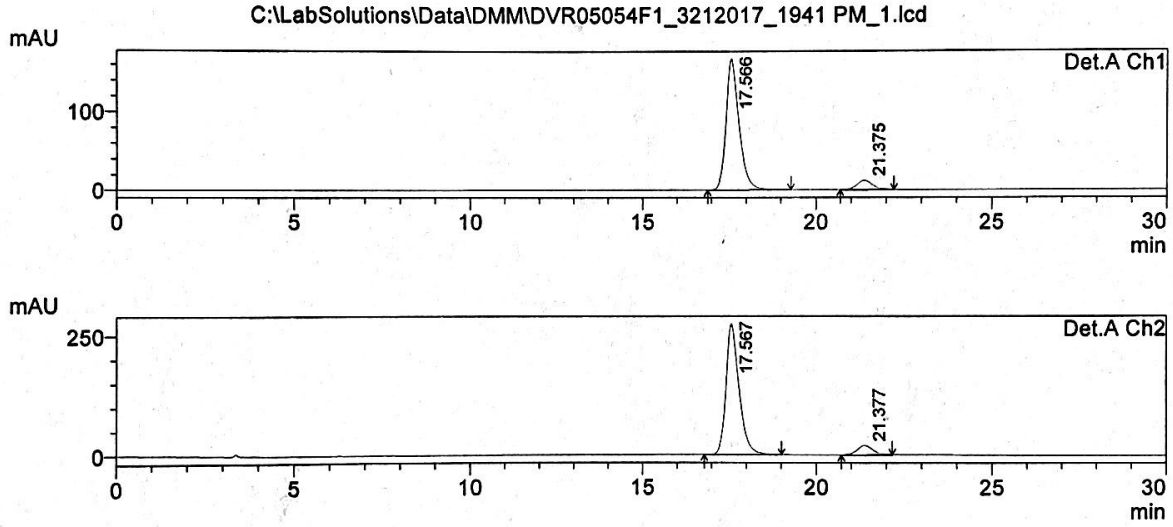
C:\LabSolutions\Data\DMM\DVR05054F1_3212017_1941 PM_1.lcd

Acquired by	: LC User
Sample Name	: DVR05054F1
Sample ID	: DVR05054F1
Tray#	: 1
Vail #	: 4
Injection Volume	: 2 uL
Data File Name	: DVR05054F1_3212017_1941 PM_1.lcd
Method File Name	: col1_1isoiPA_30min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 3/21/2017 8:05:18 PM
Data Processed	: 3/22/2017 9:02:54 AM



28A
85% ee

<Chromatogram>



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.566	4379186	167345	92.314	93.285
2	21.375	364615	12046	7.686	6.715
Total		4743801	179391	100.000	100.000

PeakTable

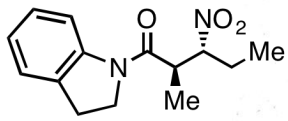
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.567	7242536	276749	92.329	93.267
2	21.377	601759	19978	7.671	6.733
Total		7844295	296727	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

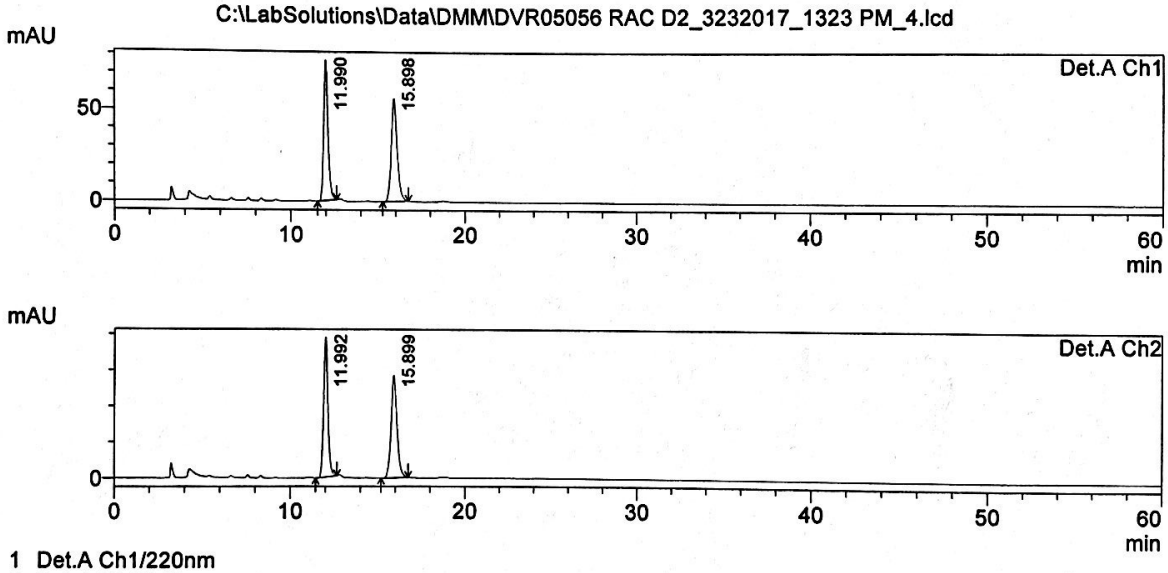
C:\LabSolutions\Data\DMM\DVR05056 RAC D2_3232017_1323 PM_4.lcd

Acquired by	: LC User
Sample Name	: DVR05057 RAC D2
Sample ID	: DVR05056 RAC D2
Tray#	: 1
Vail #	: 3
Injection Volume	: 3 uL
Data File Name	: DVR05056 RAC D2_3232017_1323 PM_4.lcd
Method File Name	: col1_5isoiPA_60min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 3/23/2017 9:39:19 PM
Data Processed	: 3/23/2017 10:39:19 PM



28B
racemic

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	11.990	1302409	76793	49.604	57.681
2	15.898	1323191	56341	50.396	42.319
Total		2625600	133134	100.000	100.000

PeakTable

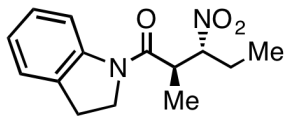
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	11.992	3277661	194717	49.618	57.758
2	15.899	3328124	142408	50.382	42.242
Total		6605785	337125	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

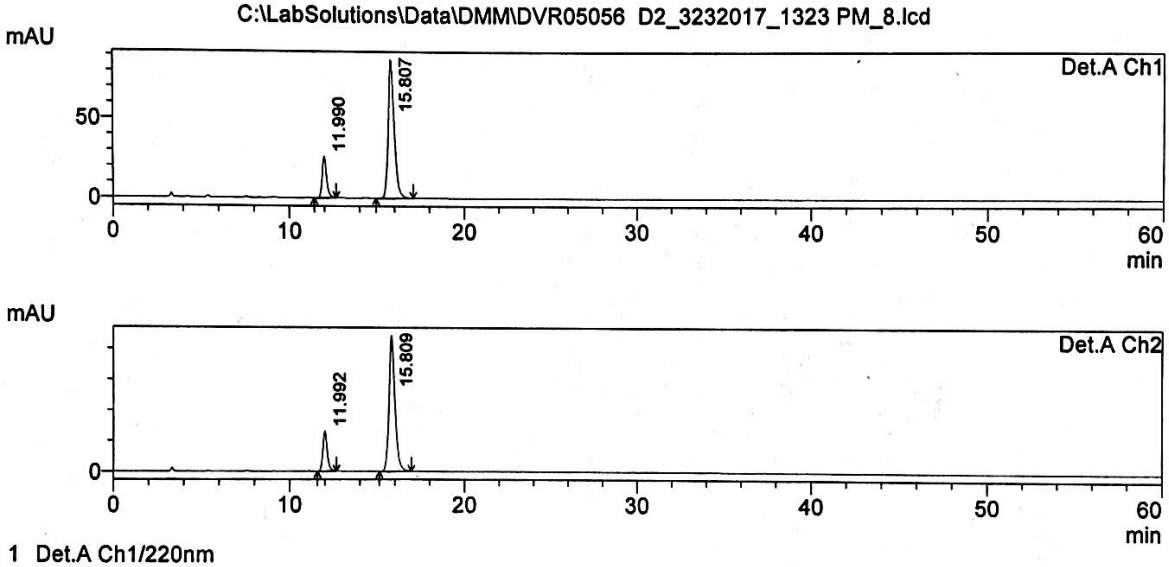
C:\LabSolutions\Data\DMM\DVR05056 D2_3232017_1323 PM_8.lcd

Acquired by	: LC User
Sample Name	: DVR05057 D2
Sample ID	: DVR05056 D2
Tray#	: 1
Vail #	: 4
Injection Volume	: 3 uL
Data File Name	: DVR05056 D2_3232017_1323 PM_8.lcd
Method File Name	: col1_5isoiPA_60min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 3/23/2017 11:20:12 PM
Data Processed	: 3/24/2017 12:20:15 AM



28B
64% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	11.990	448172	26222	17.777	23.091
2	15.807	2072970	87337	82.223	76.909
Total		2521141	113559	100.000	100.000

PeakTable

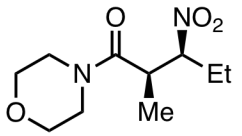
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	11.992	1122696	65808	17.661	22.853
2	15.809	5234057	222154	82.339	77.147
Total		6356753	287962	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR05062B SYN RAC_4132017_1444 PM_1.lcd

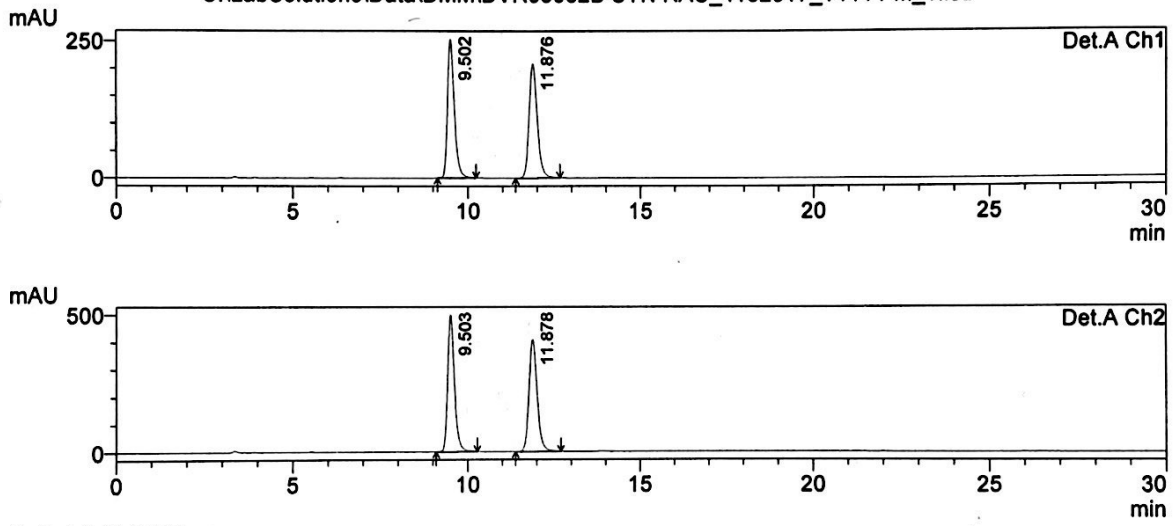
Acquired by	: LC User
Sample Name	: DVR05062B SYN RAC
Sample ID	: DVR05062B SYN RAC
Tray#	: 1
Vail #	: 1
Injection Volume	: 3 uL
Data File Name	: DVR05062B SYN RAC_4132017_1444 PM_1.lcd
Method File Name	: col1_5isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 4/13/2017 4:27:31 PM
Data Processed	: 4/26/2017 8:07:54 PM



29A
racemic

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR05062B SYN RAC_4132017_1444 PM_1.lcd



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	9.502	3400093	254233	49.892	54.860
2	11.876	3414842	209185	50.108	45.140
Total		6814935	463417	100.000	100.000

PeakTable

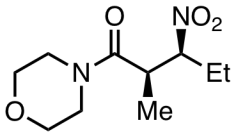
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	9.503	6685168	499845	50.023	54.929
2	11.878	6678977	410134	49.977	45.071
Total		13364145	909979	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

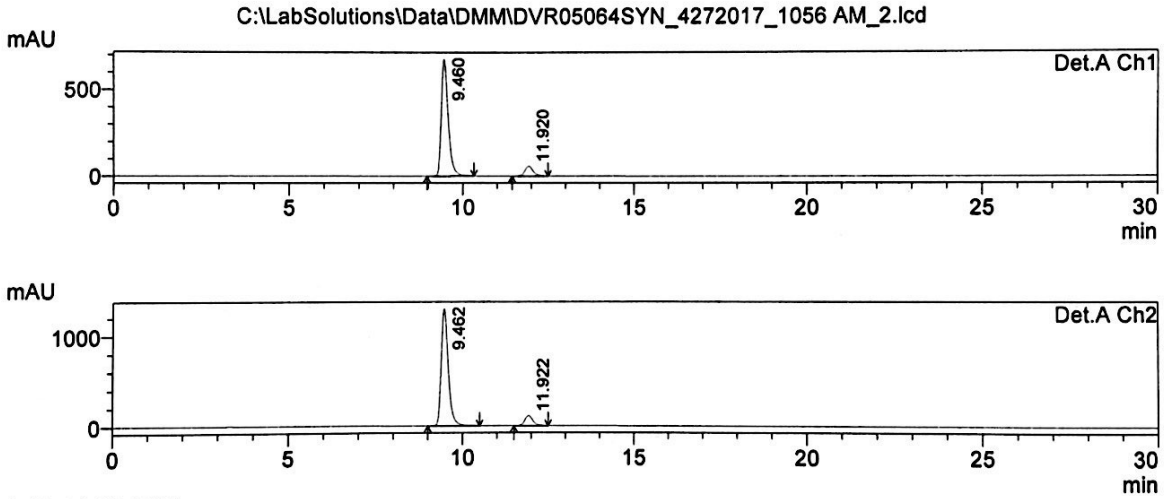
C:\LabSolutions\Data\DMM\DVR05064SYN_4272017_1056 AM_2.lcd

Acquired by	: LC User
Sample Name	: DVR05064SYN
Sample ID	: DVR05064SYN
Tray#	: 1
Vail #	: 1
Injection Volume	: 3 uL
Data File Name	: DVR05064SYN_4272017_1056 AM_2.lcd
Method File Name	: col1_5isoiPA_35min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 4/27/2017 11:12:37 AM
Data Processed	: 4/27/2017 4:51:01 PM



29A
82% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	9.460	9282986	679090	90.839	92.145
2	11.920	936213	57888	9.161	7.855
Total		10219199	736978	100.000	100.000

PeakTable

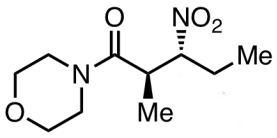
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	9.462	18152526	1311597	90.899	92.084
2	11.922	1817481	112747	9.101	7.916
Total		19970007	1424344	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

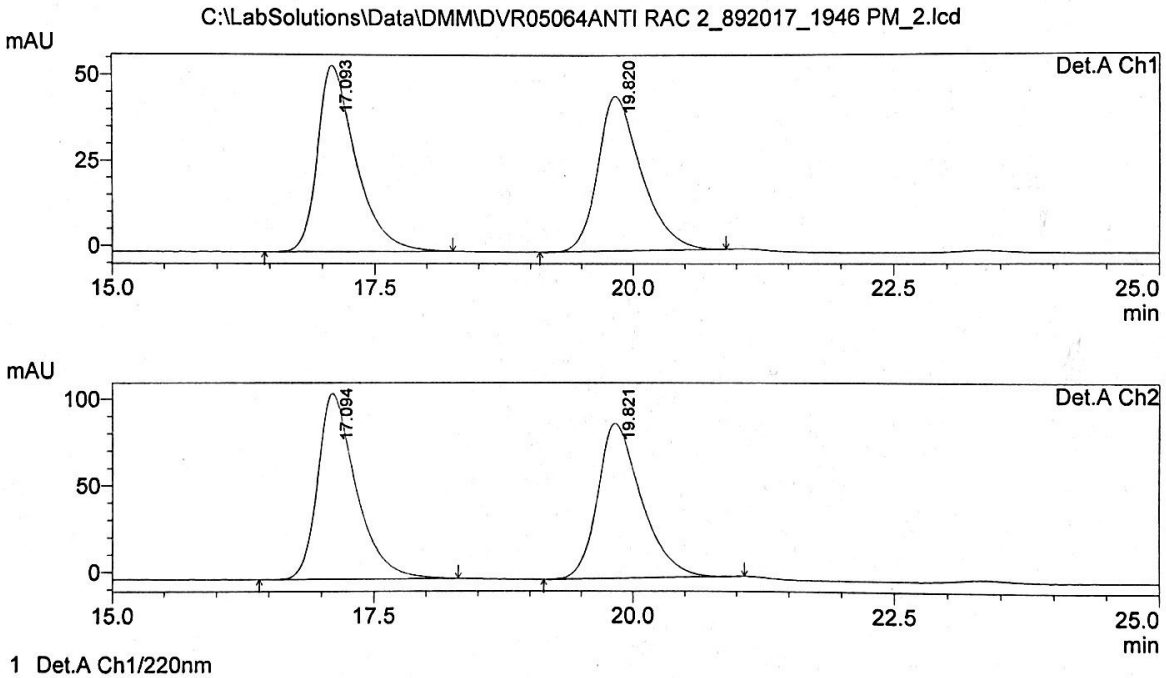
C:\LabSolutions\Data\DMM\DVR05064ANTI RAC 2_892017_1946 PM_2.lcd

Acquired by	: LC User
Sample Name	: DVR05064ANTI RAC 2
Sample ID	: DVR05064ANTI RAC 2
Tray#	: 1
Vail #	: 1
Injection Volume	: 5 uL
Data File Name	: DVR05064ANTI RAC 2_892017_1946 PM_2.lcd
Method File Name	: col1_5isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 8/9/2017 7:57:11 PM
Data Processed	: 8/11/2017 11:21:57 AM



29B
racemic

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.093	1386247	54558	50.838	54.487
2	19.820	1340558	45572	49.162	45.513
Total		2726805	100130	100.000	100.000

PeakTable

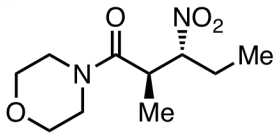
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.094	2723976	107119	50.856	54.491
2	19.821	2632268	89461	49.144	45.509
Total		5356244	196580	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR05064 D2-A_8152017_1731 PM_2.lcd

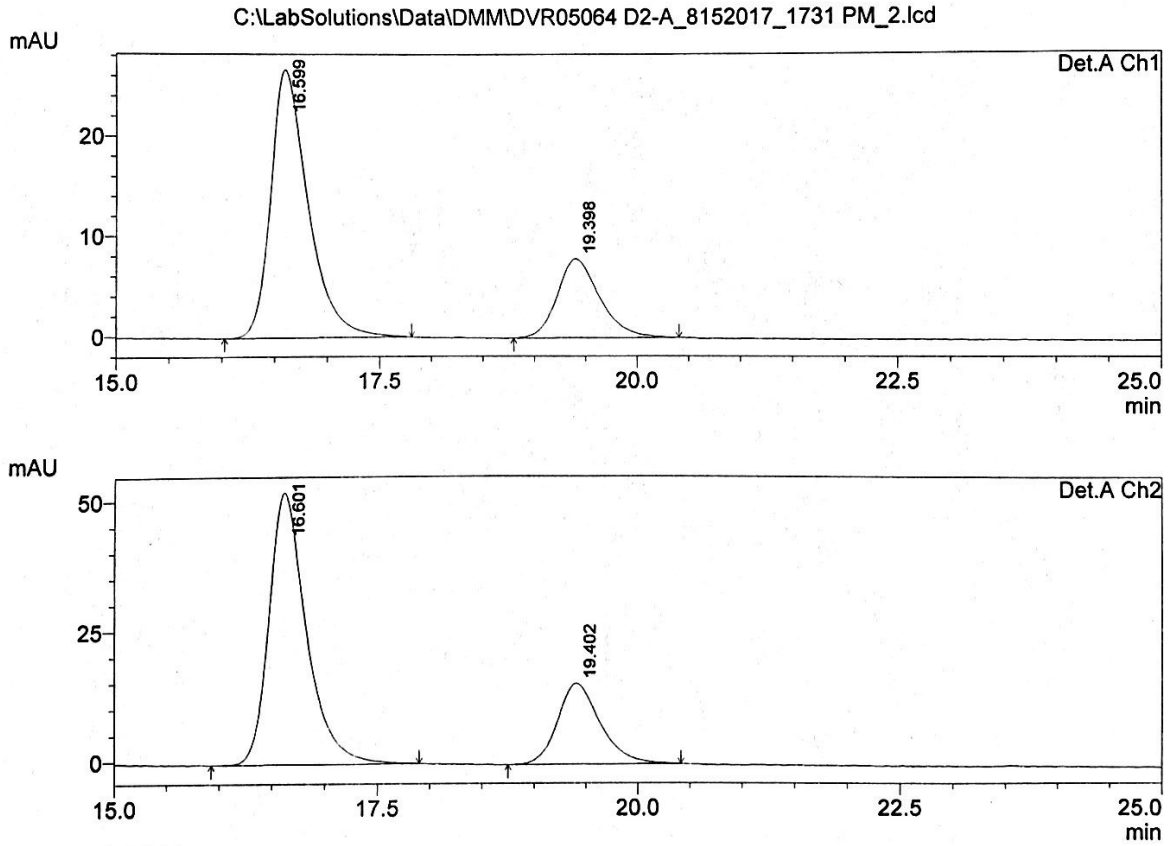
Acquired by	: LC User
Sample Name	: DVR05064 D2-A
Sample ID	: DVR05064 D2-A
Tray#	: 1
Vail #	: 5
Injection Volume	: 5 uL
Data File Name	: DVR05064 D2-A_8152017_1731 PM_2.lcd
Method File Name	: col1_5isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 8/15/2017 5:42:34 PM
Data Processed	: 8/15/2017 6:12:36 PM



29B

49% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	16.599	661030	26807	74.380	77.191
2	19.398	227688	7921	25.620	22.809
Total		888718	34728	100.000	100.000

PeakTable

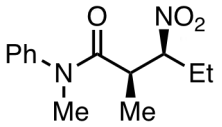
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	16.601	1288922	52217	74.407	77.144
2	19.402	443330	15471	25.593	22.856
Total		1732252	67688	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR05063 SYN RAC_4142017_1035 AM_4.lcd

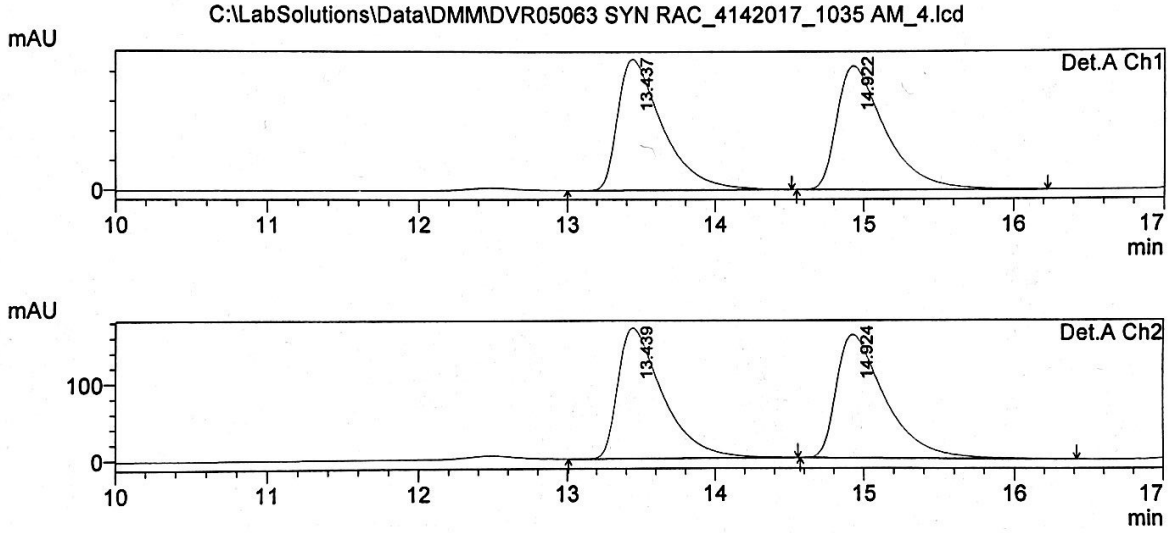
Acquired by	: LC User
Sample Name	: DVR05063 SYN RAC
Sample ID	: DVR05063 SYN RAC
Tray#	: 1
Vail #	: 1
Injection Volume	: 3 uL
Data File Name	: DVR05063 SYN RAC_4142017_1035 AM_4.lcd
Method File Name	: col2_1isoiPA_45min_1ML_220 and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 4/14/2017 12:21:24 PM
Data Processed	: 4/14/2017 9:27:36 PM



30A
racemic

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR05063 SYN RAC_4142017_1035 AM_4.lcd



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.437	1875039	89147	49.907	51.483
2	14.922	1882004	84011	50.093	48.517
Total		3757042	173158	100.000	100.000

PeakTable

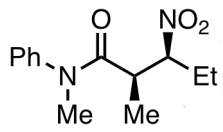
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.439	3640912	172661	49.757	51.429
2	14.924	3676496	163067	50.243	48.571
Total		7317407	335728	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

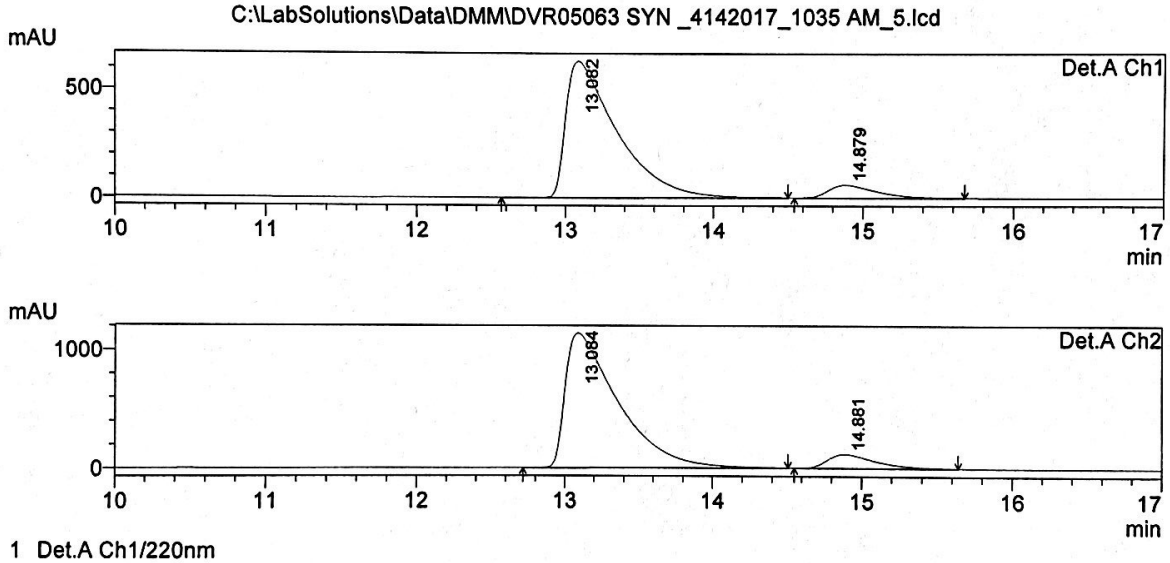
C:\LabSolutions\Data\DMM\DVR05063 SYN _4142017_1035 AM_5.lcd

Acquired by	: LC User
Sample Name	: DVR05063 SYN
Sample ID	: DVR05063 SYN
Tray#	: 1
Vail #	: 2
Injection Volume	: 3 uL
Data File Name	: DVR05063 SYN _4142017_1035 AM_5.lcd
Method File Name	: col2_1isoiPA_45min_1ML_220 and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 4/14/2017 1:47:22 PM
Data Processed	: 4/14/2017 9:21:59 PM



30A
84% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.082	15144440	630793	91.992	91.337
2	14.879	1318328	59830	8.008	8.663
Total		16462767	690623	100.000	100.000

PeakTable

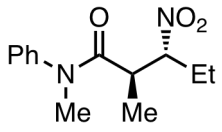
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.084	28213573	1139857	91.710	90.757
2	14.881	2550271	116082	8.290	9.243
Total		30763844	1255939	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR05063 ANTI RAC_4142017_1035 AM_6.lcd

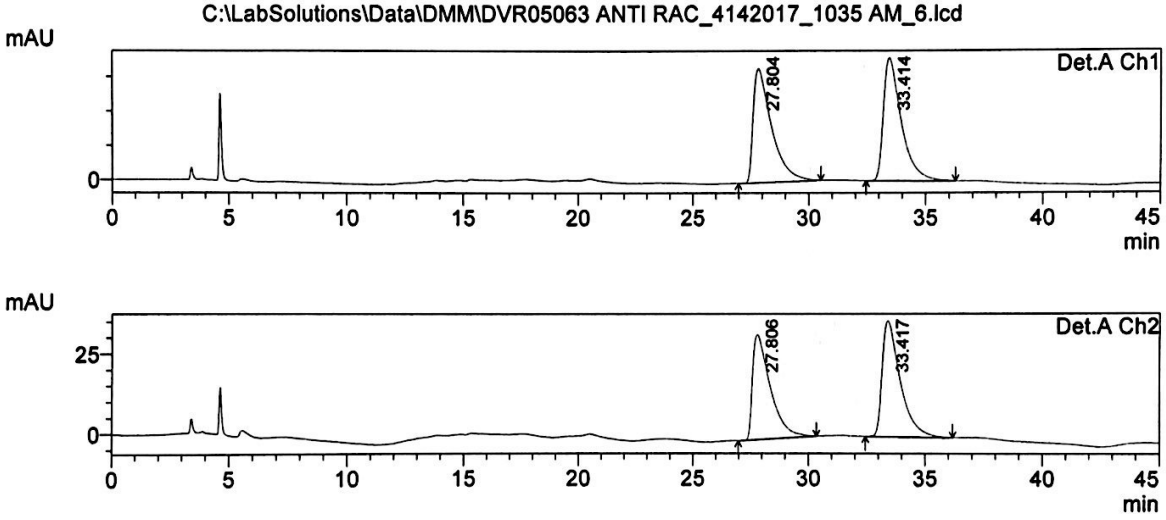
Acquired by	: LC User
Sample Name	: DVR05063 ANTI RAC
Sample ID	: DVR05063 ANTI RAC
Tray#	: 1
Vail #	: 3
Injection Volume	: 3 uL
Data File Name	: DVR05063 ANTI RAC_4142017_1035 AM_6.lcd
Method File Name	: col2_1isoiPA_45min_1ML_220 and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 4/14/2017 3:13:18 PM
Data Processed	: 4/14/2017 3:58:18 PM



30B
racemic

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR05063 ANTI RAC_4142017_1035 AM_6.lcd



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	27.804	918935	16637	49.096	48.143
2	33.414	952791	17920	50.904	51.857
Total		1871727	34557	100.000	100.000

PeakTable

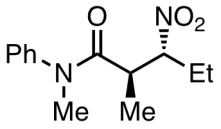
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	27.806	1751437	32953	47.277	47.555
2	33.417	1953216	36341	52.723	52.445
Total		3704653	69294	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

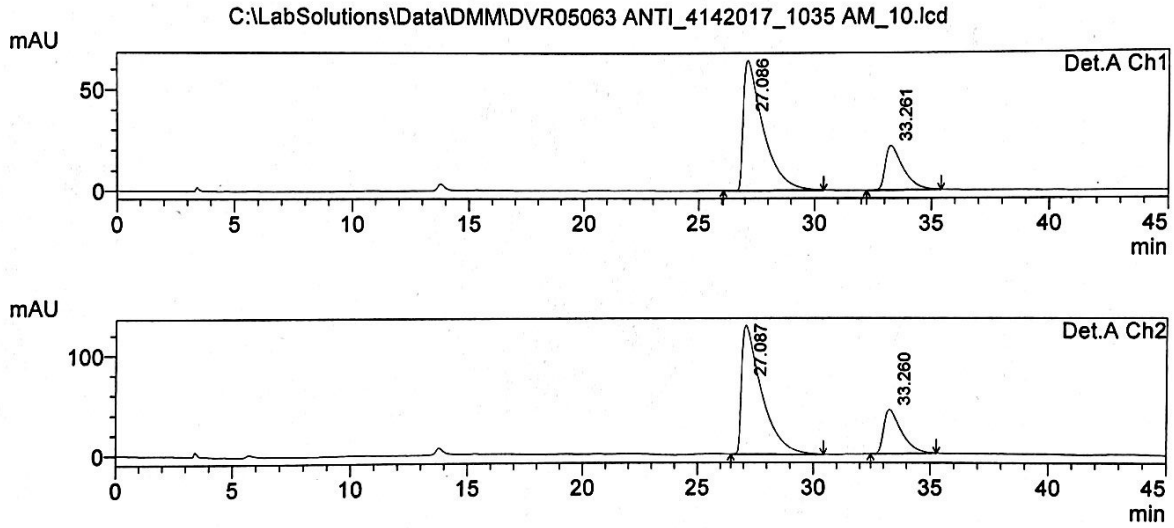
C:\LabSolutions\Data\DMM\DVR05063 ANTI_4142017_1035 AM_10.lcd

Acquired by	: LC User
Sample Name	: DVR05063 ANTI
Sample ID	: DVR05063 ANTI
Tray#	: 1
Vail #	: 4
Injection Volume	: 3 uL
Data File Name	: DVR05063 ANTI_4142017_1035 AM_10.lcd
Method File Name	: col2_1isoiPA_45min_1ML_220 and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 4/14/2017 4:39:16 PM
Data Processed	: 4/14/2017 5:24:17 PM



30B
54% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	27.086	3841588	64821	76.841	74.649
2	33.261	1157821	22014	23.159	25.351
Total		4999409	86835	100.000	100.000

PeakTable

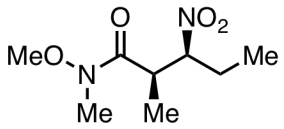
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	27.087	7752624	130001	76.981	74.578
2	33.260	2318221	44313	23.019	25.422
Total		10070845	174314	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

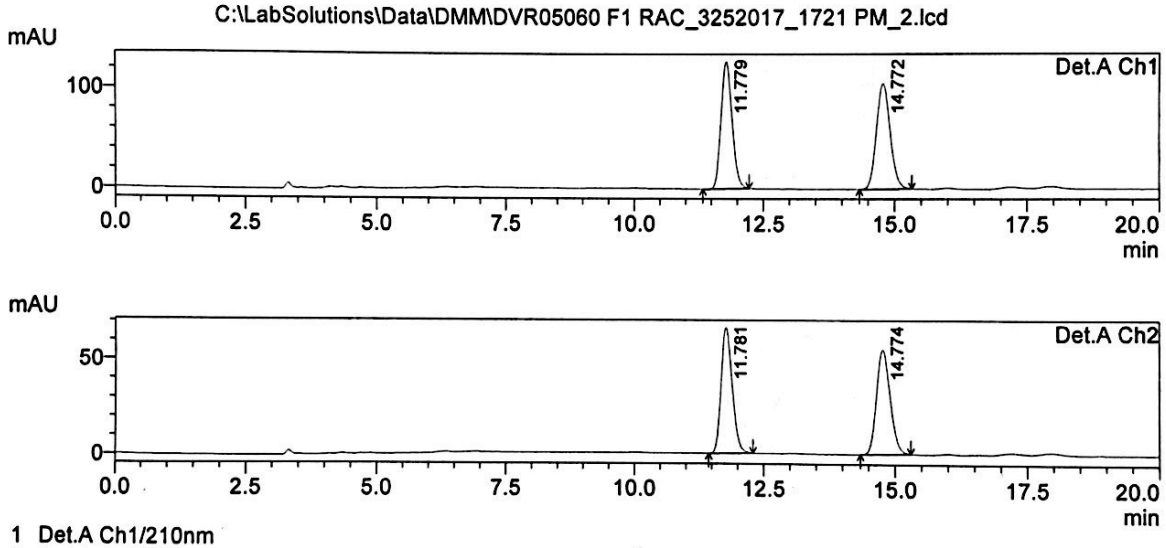
C:\LabSolutions\Data\DMM\DVR05060 F1 RAC_3252017_1721 PM_2.lcd

Acquired by	: LC User
Sample Name	: DVR05060 F1 RAC
Sample ID	: DVR05060 F1 RAC
Tray#	: 1
Vail #	: 2
Injection Volume	: 3 uL
Data File Name	: DVR05060 F1 RAC_3252017_1721 PM_2.lcd
Method File Name	: col6_2isoiPA_45min_1ML_210and220.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 3/25/2017 5:32:40 PM
Data Processed	: 5/8/2017 10:08:00 AM



31A
racemic

<Chromatogram>



1 Det.A Ch1/210nm
2 Det.A Ch2/220nm

PeakTable

Detector A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	11.779	1892057	127392	49.826	54.694
2	14.772	1905263	105526	50.174	45.306
Total		3797320	232918	100.000	100.000

PeakTable

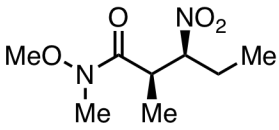
Detector A Ch2 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	11.781	991580	66313	50.039	54.729
2	14.774	990019	54853	49.961	45.271
Total		1981598	121166	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

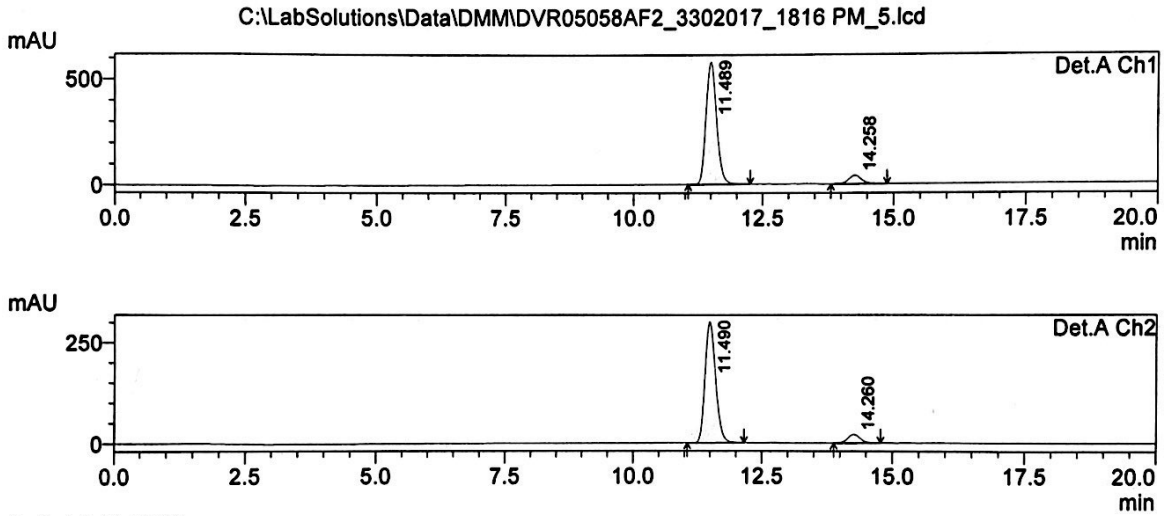
C:\LabSolutions\Data\DMM\DVR05058AF2_3302017_1816 PM_5.lcd

Acquired by	: LC User
Sample Name	: DVR05058AF2
Sample ID	: DVR05058AF2
Tray#	: 1
Vail #	: 1
Injection Volume	: 2 uL
Data File Name	: DVR05058AF2_3302017_1816 PM_5.lcd
Method File Name	: col6_2isoiPA_45min_1ML_210and220.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 3/30/2017 7:37:52 PM
Data Processed	: 3/30/2017 8:22:54 PM



31A
85% ee

<Chromatogram>



1 Det.A Ch1/210nm
2 Det.A Ch2/220nm

PeakTable

Detector A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	11.489	8231186	578832	92.537	93.512
2	14.258	663851	40164	7.463	6.488
Total		8895037	618996	100.000	100.000

PeakTable

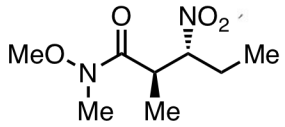
Detector A Ch2 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	11.490	4294914	301110	92.621	93.458
2	14.260	342155	21079	7.379	6.542
Total		4637070	322189	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

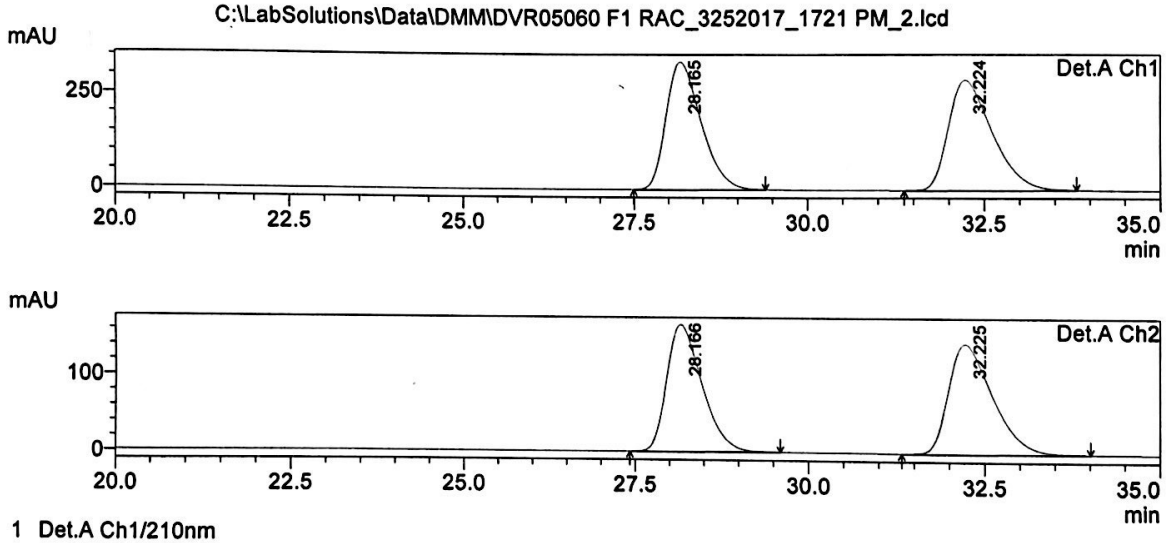
C:\LabSolutions\Data\DMM\DVR05060 F1 RAC_3252017_1721 PM_2.lcd

Acquired by	: LC User
Sample Name	: DVR05060 F1 RAC
Sample ID	: DVR05060 F1 RAC
Tray#	: 1
Vail #	: 2
Injection Volume	: 3 uL
Data File Name	: DVR05060 F1 RAC_3252017_1721 PM_2.lcd
Method File Name	: col6_2isoiPA_45min_1ML_210and220.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 3/25/2017 5:32:40 PM
Data Processed	: 3/26/2017 4:45:00 PM



31B
racemic

<Chromatogram>



1 Det.A Ch1/210nm
2 Det.A Ch2/220nm

PeakTable

Detector A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	28.165	11971890	336483	48.889	53.786
2	32.224	12516074	289114	51.111	46.214
Total		24487965	625597	100.000	100.000

PeakTable

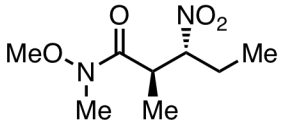
Detector A Ch2 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	28.166	5944017	166301	48.907	53.781
2	32.225	6209711	142920	51.093	46.219
Total		12153728	309221	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

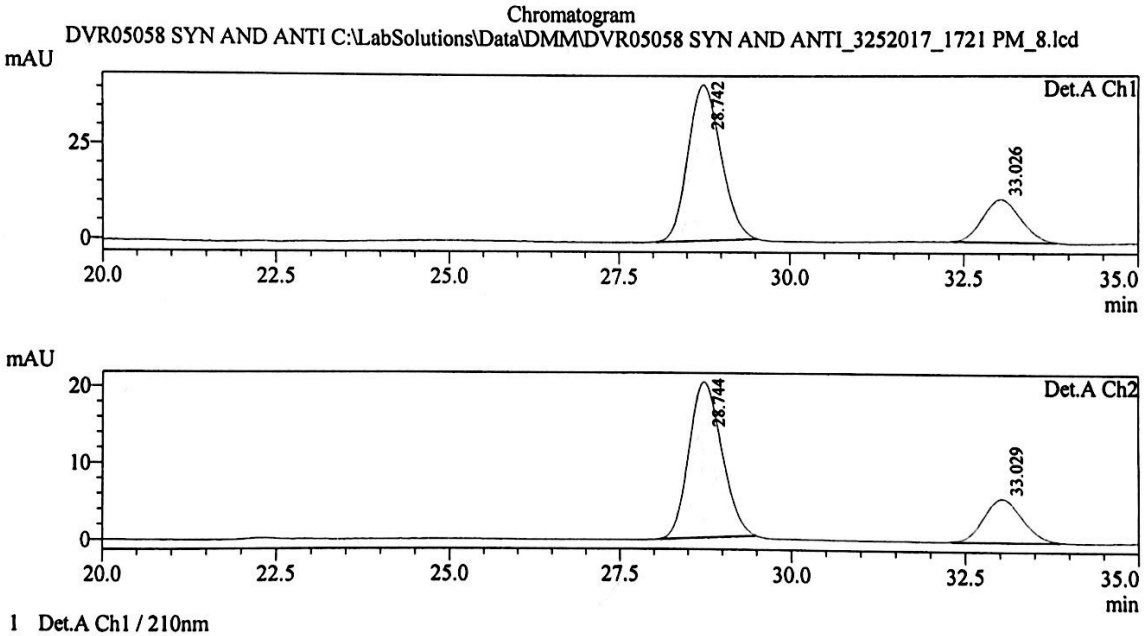
C:\LabSolutions\Data\DMM\DVR05058 SYN AND ANTI_3252017_1721 PM_8.lcd

Acquired by	: LC User
Sample Name	: DVR05058 SYN AND ANTI
Sample ID	: DVR05058 SYN AND ANTI
Tray#	: 1
Vail #	: 3
Injection Volume	: 3 uL
Data File Name	: DVR05058 SYN AND ANTI_3252017_1721 PM_8.lcd
Method File Name	: col6_2isoiPA_45min_1ML_210and220.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 3/25/2017 9:40:09 PM
Data Processed	: 5/8/2017 10:44:10 AM



31B
52% ee

<Chromatogram>



1 Det.A Ch1 / 210nm
2 Det.A Ch2 / 220nm

PeakTable

Detector A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	28.742	1395448	41405	76.647	78.632
2	33.026	425178	11252	23.353	21.368
Total		1820626	52656	100.000	100.000

PeakTable

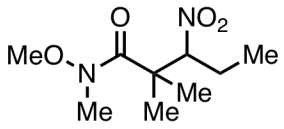
Detector A Ch2 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	28.744	681645	20378	75.992	78.385
2	33.029	215346	5619	24.008	21.615
Total		896991	25998	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

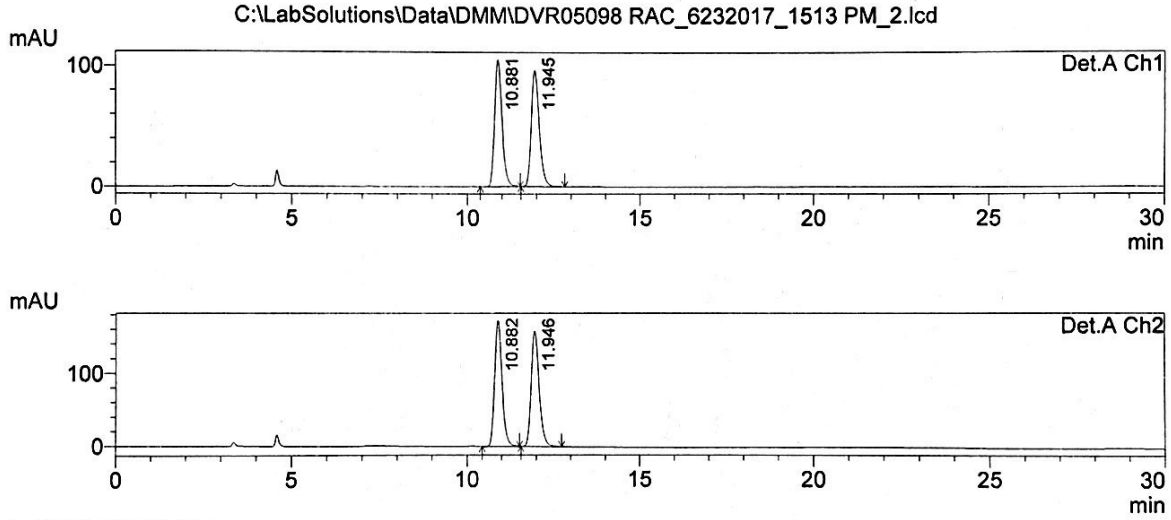
C:\LabSolutions\Data\DMM\DVR05098 RAC_6232017_1513 PM_2.lcd

Acquired by	: LC User
Sample Name	: DVR05098 RAC
Sample ID	: DVR05098 RAC
Tray#	: 1
Vail #	: 1
Injection Volume	: 3 uL
Data File Name	: DVR05098 RAC_6232017_1513 PM_2.lcd
Method File Name	: col1_1isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 6/23/2017 3:43:47 PM
Data Processed	: 6/23/2017 4:13:48 PM



32
racemic

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.881	1546789	105485	49.965	52.192
2	11.945	1548959	96625	50.035	47.808
Total		3095748	202110	100.000	100.000

PeakTable

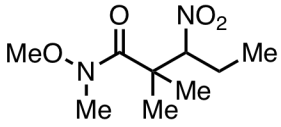
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.882	2537933	173332	49.986	52.196
2	11.946	2539398	158750	50.014	47.804
Total		5077332	332082	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR05098_6232017_1513 PM_3.lcd

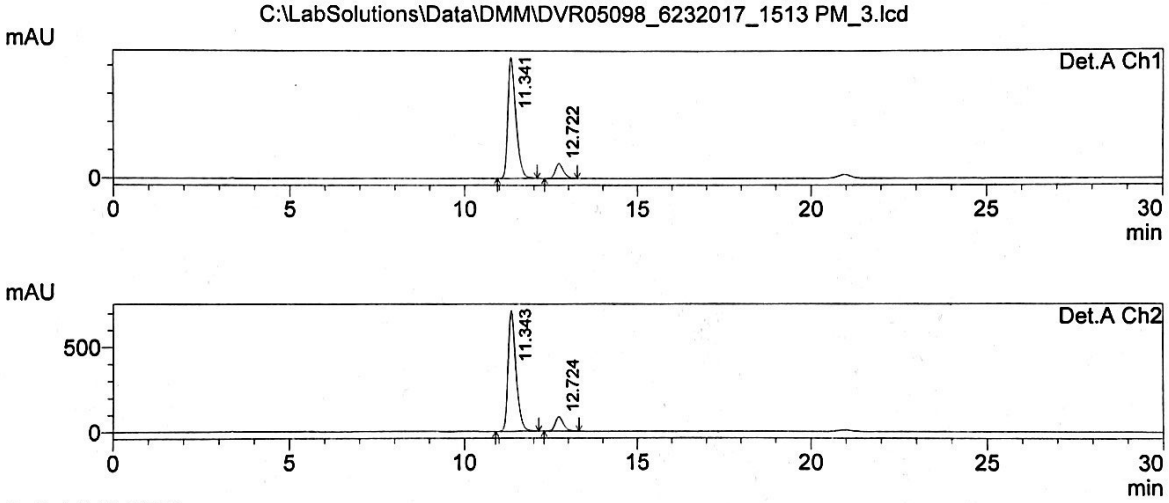
Acquired by	: LC User
Sample Name	: DVR05098
Sample ID	: DVR05098
Tray#	: 1
Vail #	: 2
Injection Volume	: 3 uL
Data File Name	: DVR05098_6232017_1513 PM_3.lcd
Method File Name	: col1_1isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 6/23/2017 4:14:22 PM
Data Processed	: 6/23/2017 4:44:24 PM



32
78% ee

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR05098_6232017_1513 PM_3.lcd



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	11.341	6877766	429717	88.925	89.090
2	12.722	856564	52623	11.075	10.910
Total		7734330	482340	100.000	100.000

PeakTable

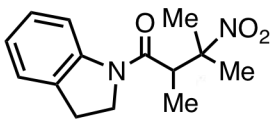
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	11.343	11403339	714499	88.999	89.219
2	12.724	1409584	86336	11.001	10.781
Total		12812924	800835	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR05091 rac_6162017_2153 PM_2.lcd

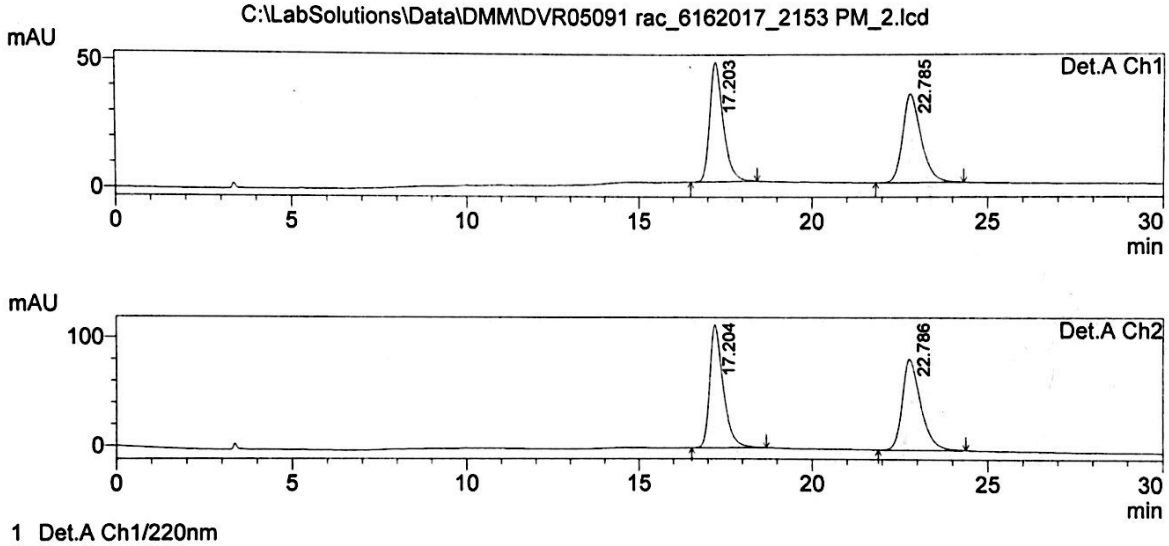
Acquired by	: LC User
Sample Name	: DVR05091 rac
Sample ID	: DVR05091 rac
Tray#	: 1
Vail #	: 1
Injection Volume	: 3 uL
Data File Name	: DVR05091 rac_6162017_2153 PM_2.lcd
Method File Name	: col1_1isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 6/16/2017 10:08:59 PM
Data Processed	: 6/16/2017 10:39:00 PM



33
racemic

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR05091 rac_6162017_2153 PM_2.lcd



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.203	1278229	47202	50.021	57.413
2	22.785	1277175	35013	49.979	42.587
Total		2555404	82214	100.000	100.000

PeakTable

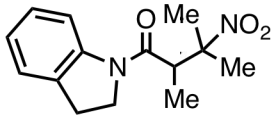
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.204	3112654	114185	50.327	57.542
2	22.786	3072236	84254	49.673	42.458
Total		6184890	198439	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR05091 _6162017_2153 PM_6.lcd

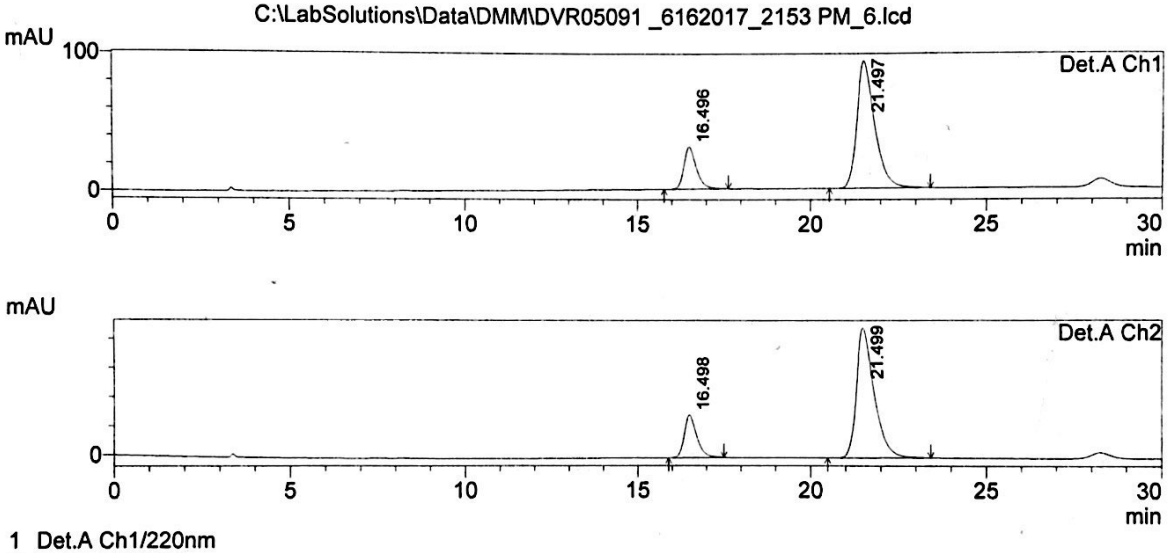
Acquired by	: LC User
Sample Name	: DVR05091
Sample ID	: DVR05091
Tray#	: 1
Vail #	: 2
Injection Volume	: 3 uL
Data File Name	: DVR05091 _6162017_2153 PM_6.lcd
Method File Name	: col1_1isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 6/16/2017 11:04:57 PM
Data Processed	: 6/16/2017 11:35:00 PM



33
61% ee

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR05091 _6162017_2153 PM_6.lcd



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	16.496	783513	30863	19.410	25.034
2	21.497	3253029	92425	80.590	74.966
Total		4036541	123288	100.000	100.000

PeakTable

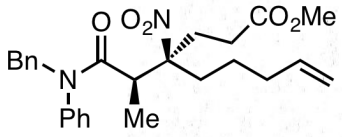
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	16.498	1856427	73951	19.108	24.742
2	21.499	7859066	224938	80.892	75.258
Total		9715493	298889	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04232 rac 1_10272016_853 AM_2.lcd

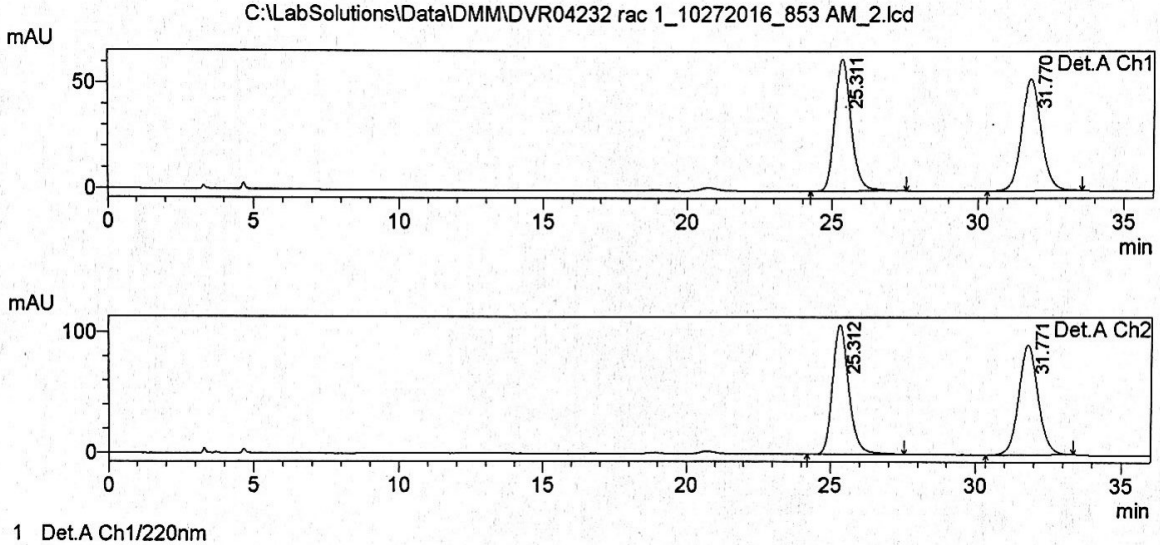
Acquired by	: LC User
Sample Name	: DVR04232 rac 1
Sample ID	: DVR04232 rac 1
Tray#	: 1
Vail #	: 2
Injection Volume	: 2 uL
Data File Name	: DVR04232 rac 1_10272016_853 AM_2.lcd
Method File Name	: col6_3isoiPA_36min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/27/2016 9:29:51 AM
Data Processed	: 10/27/2016 10:05:55 AM



34
racemic

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04232 rac 1_10272016_853 AM_2.lcd



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	25.311	2423234	62422	49.620	54.151
2	31.770	2460372	52853	50.380	45.849
Total		4883607	115274	100.000	100.000

PeakTable

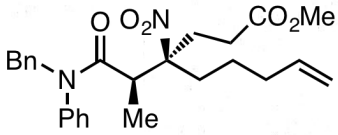
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	25.312	4202740	108032	49.810	54.197
2	31.771	4234796	91299	50.190	45.803
Total		8437535	199331	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

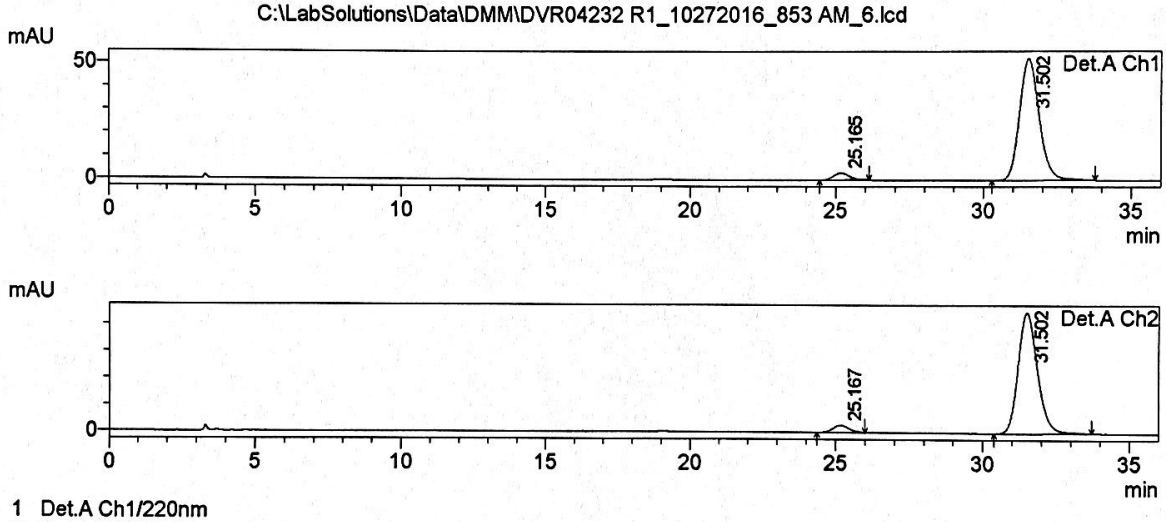
C:\LabSolutions\Data\DMM\DVR04232 R1_10272016_853 AM_6.lcd

Acquired by	: LC User
Sample Name	: DVR04232 R1
Sample ID	: DVR04232 R1
Tray#	: 1
Vail #	: 3
Injection Volume	: 2 uL
Data File Name	: DVR04232 R1_10272016_853 AM_6.lcd
Method File Name	: col6_3isoiPA_36min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/27/2016 10:52:50 AM
Data Processed	: 10/27/2016 11:28:52 AM



34
91% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	25.165	113659	3031	4.515	5.504
2	31.502	2403724	52035	95.485	94.496
Total		2517382	55067	100.000	100.000

PeakTable

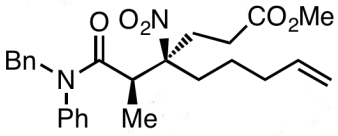
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	25.167	199572	5343	4.590	5.606
2	31.502	4148749	89962	95.410	94.394
Total		4348320	95305	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

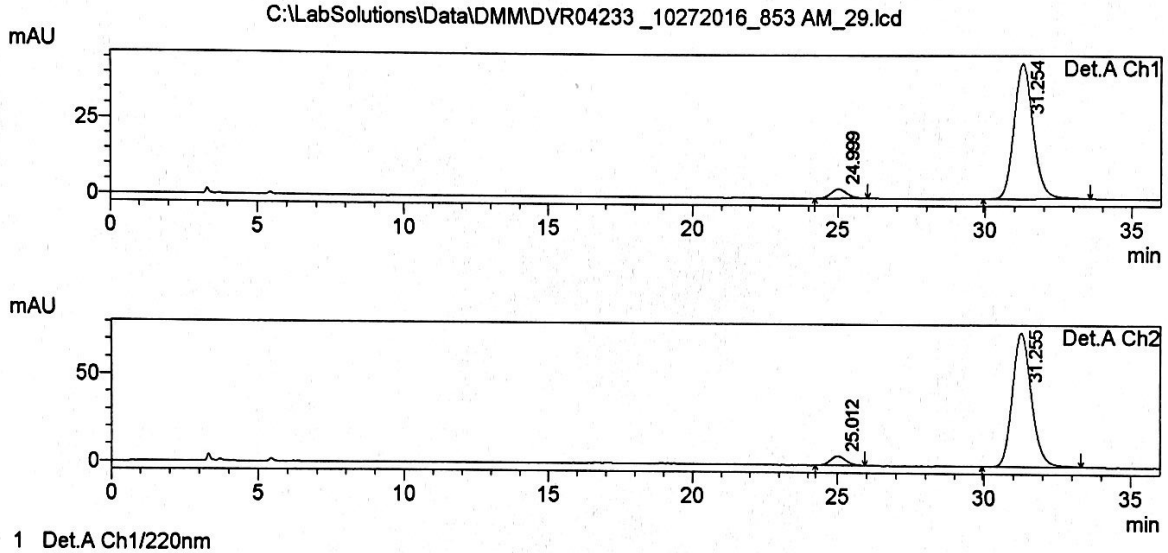
C:\LabSolutions\Data\DMM\DVR04233 _10272016_853 AM_29.lcd

Acquired by	: LC User
Sample Name	: DVR04233
Sample ID	: DVR04233
Tray#	: 1
Vail #	: 6
Injection Volume	: 2 uL
Data File Name	: DVR04233 _10272016_853 AM_29.lcd
Method File Name	: col6_3isoiPA_36min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 10/28/2016 4:14:37 AM
Data Processed	: 10/28/2016 4:50:38 AM



34
89% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	24.999	112827	3044	5.315	6.435
2	31.254	2010087	44252	94.685	93.565
Total		2122914	47296	100.000	100.000

PeakTable

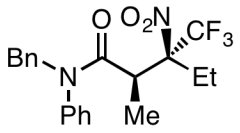
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	25.012	191251	5259	5.234	6.440
2	31.255	3462427	76405	94.766	93.560
Total		3653678	81664	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04264 RAC 1_11302016_2048 PM_2.lcd

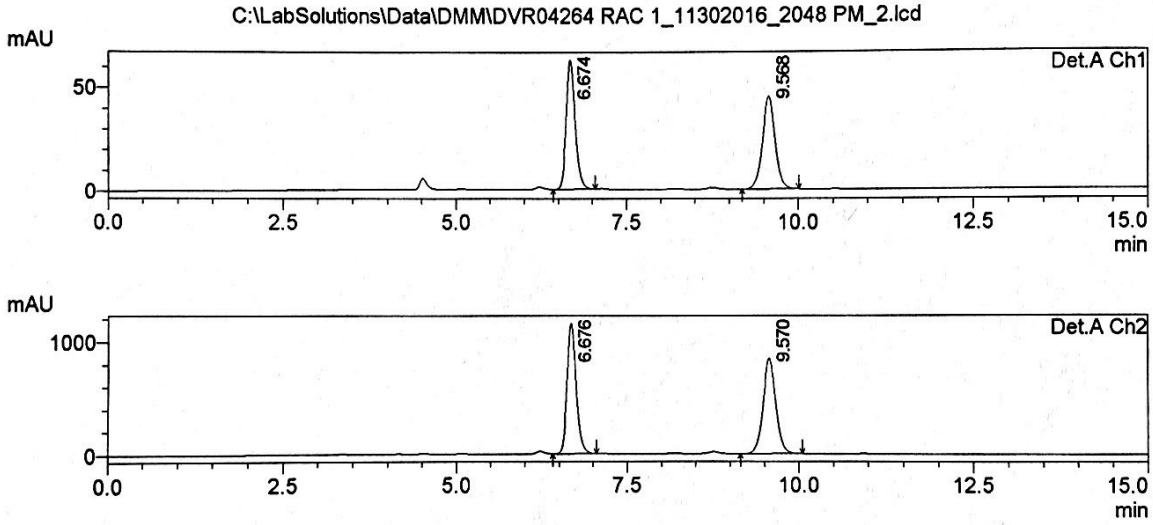
Acquired by	: LC User
Sample Name	: DVR04264 RAC 1
Sample ID	: DVR04264 RAC 1
Tray#	: 1
Vail #	: 3
Injection Volume	: 3 uL
Data File Name	: DVR04264 RAC 1_11302016_2048 PM_2.lcd
Method File Name	: col1_2isoiPA_15min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 11/30/2016 9:04:28 PM
Data Processed	: 11/30/2016 9:19:30 PM



35
racemic

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04264 RAC 1_11302016_2048 PM_2.lcd



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	6.674	564738	62397	49.815	58.217
2	9.568	568939	44783	50.185	41.783
Total		1133677	107181	100.000	100.000

PeakTable

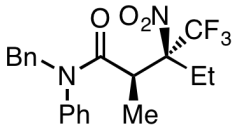
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	6.676	10644936	1157078	49.477	57.720
2	9.570	10870050	847565	50.523	42.280
Total		21514986	2004643	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

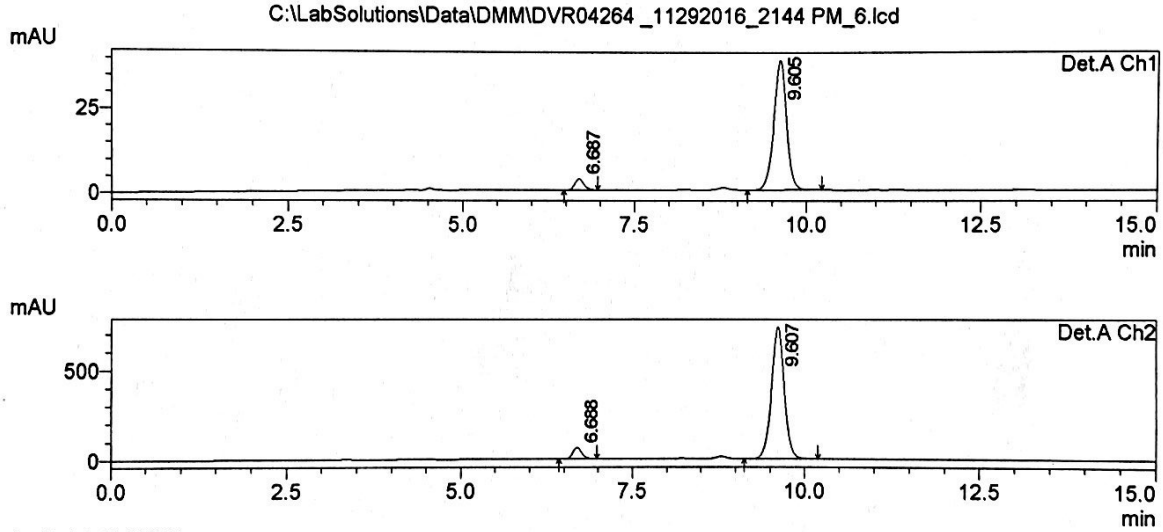
C:\LabSolutions\Data\DMM\DVR04264 _11292016_2144 PM_6.lcd

Acquired by	: LC User
Sample Name	: DVR04264
Sample ID	: DVR04264
Tray#	: 1
Vail #	: 4
Injection Volume	: 2 uL
Data File Name	: DVR04264 _11292016_2144 PM_6.lcd
Method File Name	: col1_2isoiPA_15min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 11/29/2016 10:40:54 PM
Data Processed	: 11/29/2016 10:55:57 PM



35
88% ee

<Chromatogram>



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	6.687	29874	3354	5.685	7.954
2	9.605	495594	38805	94.315	92.046
Total		525468	42159	100.000	100.000

PeakTable

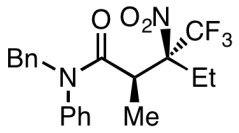
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	6.688	581319	64771	5.780	8.074
2	9.607	9476777	737467	94.220	91.926
Total		10058095	802238	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04265_11302016_2048 PM_6.lcd

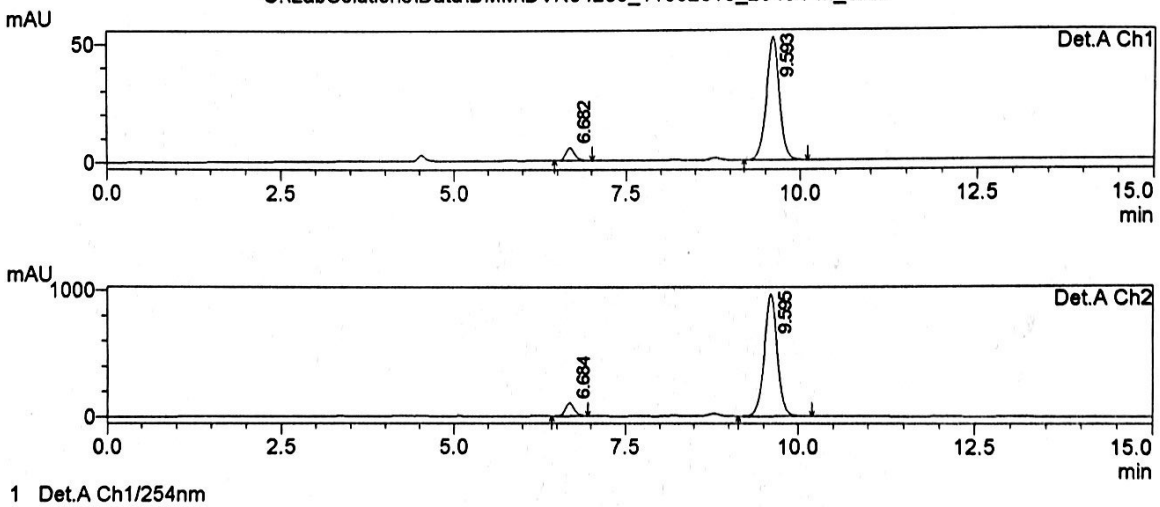
Acquired by	: LC User
Sample Name	: DVR04265
Sample ID	: DVR04265
Tray#	: 1
Vail #	: 4
Injection Volume	: 2 uL
Data File Name	: DVR04265_11302016_2048 PM_6.lcd
Method File Name	: col1_2isoiPA_15min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 11/30/2016 9:45:24 PM
Data Processed	: 11/30/2016 10:00:25 PM



35
86% ee

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04265_11302016_2048 PM_6.lcd



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	6.682	48174	5344	6.812	9.414
2	9.593	659029	51421	93.188	90.586
Total		707203	56765	100.000	100.000

PeakTable

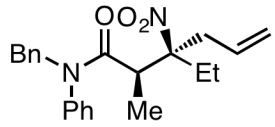
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	6.684	921805	102959	6.845	9.623
2	9.595	12544487	967024	93.155	90.377
Total		13466292	1069984	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

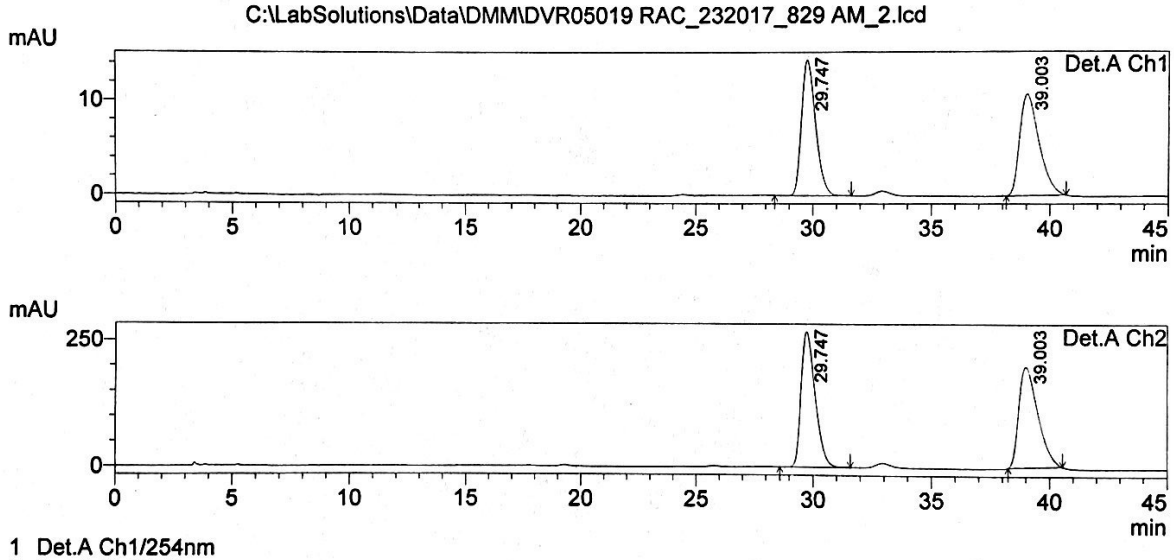
C:\LabSolutions\Data\DMM\DVR05019 RAC_232017_829 AM_2.lcd

Acquired by	: LC User
Sample Name	: DVR05019 RAC
Sample ID	: DVR05019 RAC
Tray#	: 1
Vail #	: 1
Injection Volume	: 3 uL
Data File Name	: DVR05019 RAC_232017_829 AM_2.lcd
Method File Name	: col5_3isoiPA_45min_1.0ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 2/3/2017 9:15:06 AM
Data Processed	: 2/3/2017 10:00:07 AM



36
racemic

<Chromatogram>



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	29.747	593529	14336	49.395	57.284
2	39.003	608072	10690	50.605	42.716
Total		1201602	25026	100.000	100.000

PeakTable

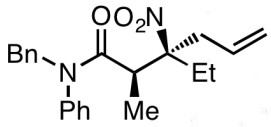
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	29.747	11134103	267848	50.058	57.486
2	39.003	11108142	198088	49.942	42.514
Total		22242245	465937	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

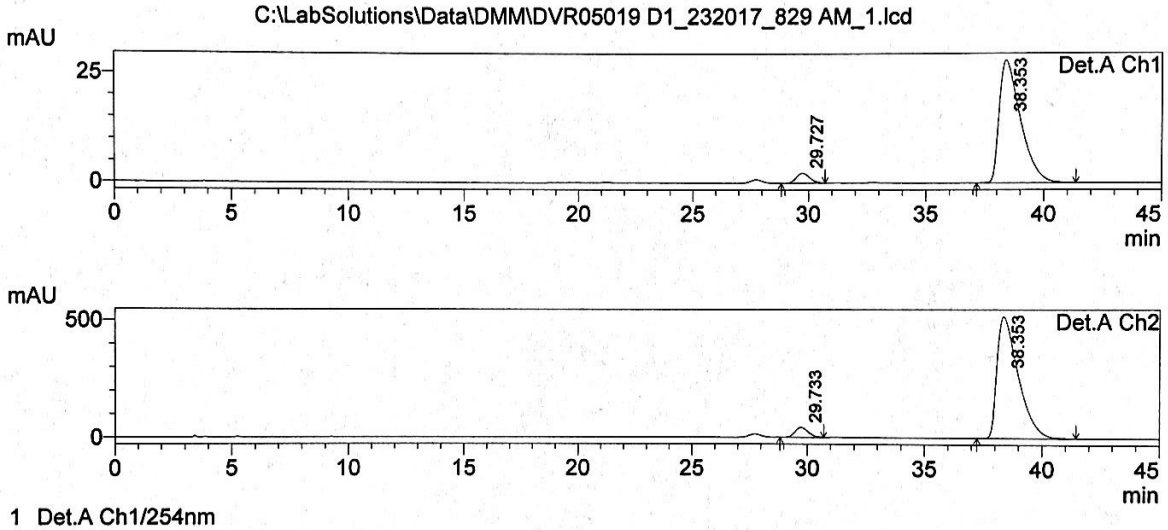
C:\LabSolutions\Data\DMM\DVR05019 D1_232017_829 AM_1.lcd

Acquired by	: LC User
Sample Name	: DVR05019 D1
Sample ID	: DVR05019 D1
Tray#	: 1
Vail #	: 2
Injection Volume	: 3 uL
Data File Name	: DVR05019 D1_232017_829 AM_1.lcd
Method File Name	: col5_3isoiPA_45min_1.0ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 2/3/2017 10:57:44 AM
Data Processed	: 2/3/2017 11:42:46 AM



36
90% ee

<Chromatogram>



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	29.727	90114	2270	4.872	7.510
2	38.353	1759547	27962	95.128	92.490
Total		1849661	30233	100.000	100.000

PeakTable

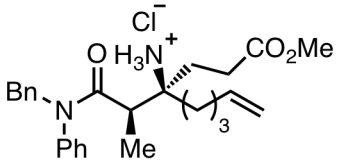
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	29.733	1685056	42713	4.901	7.615
2	38.353	32699963	518217	95.099	92.385
Total		34385020	560930	100.000	100.000

Data File C:\Chem32\1\Data\DVR\DVR05065-1 rac IF3 2017-05-10 12-26-42.D
Sample Name: DVR05065-1 rac IF3

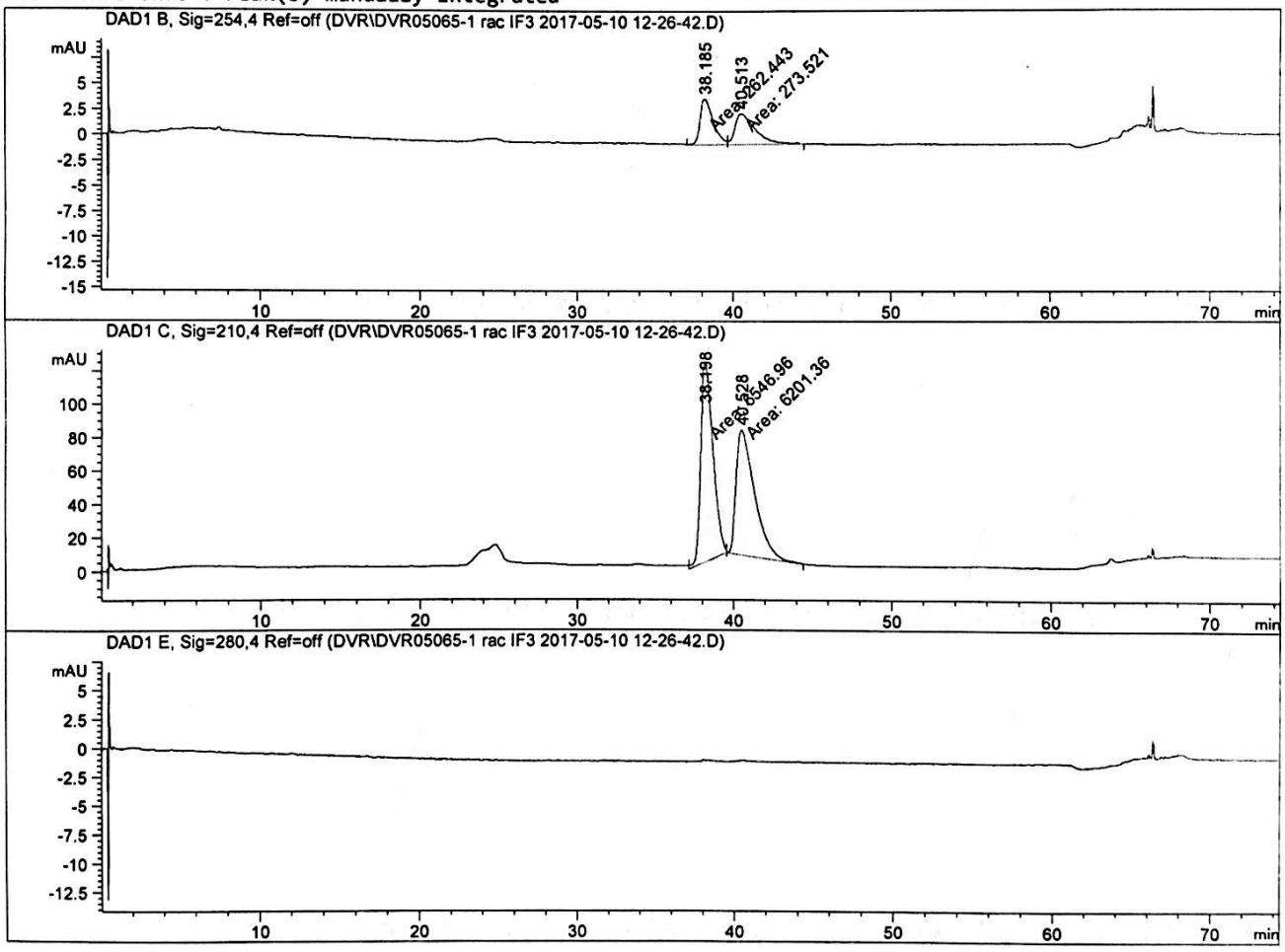
==========

Acq. Operator : SYSTEM
Sample Operator : SYSTEM
Acq. Instrument : LC1 Reverse DAD-WPALS Location : 21
Injection Date : 5/10/2017 12:27:17 PM
Inj Volume : 5.000 µl
Acq. Method : C:\Chem32\1\Methods\BZV_Initial_05mL_lowerslope.M
Last changed : 5/10/2017 12:23:38 PM by SYSTEM
(modified after loading)
Analysis Method : C:\Chem32\1\Methods\BZV_Initial_05mL_lowerslop
Last changed : 12/6/2016 3:08:01 PM by SYSTEM
Sample Info : 1 min 10/90 MeCN/water
30 min gradient 35/65 MeCN/H2O
30 min hold 35/65 MeCN/H2O
4 min 90/10 MeCn/H2o Flush
IF-3 rac
1.0 mL/min



37
racemic

Additional Info : Peak(s) manually integrated



Data File C:\Chem32\1\Data\DVR\DVR05065-1 rac IF3 2017-05-10 12-26-42.D
Sample Name: DVR05065-1 rac IF3

==========

Area Percent Report

==========

Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Sample Amount: : 5.00000 [ng/ul] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 B, Sig=254,4 Ref=off

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	38.185	MF	0.9771	262.44263	4.47667	48.9665
2	40.513	FM	1.5147	273.52121	3.00964	51.0335
Totals :				535.96384	7.48630	

Signal 2: DAD1 C, Sig=210,4 Ref=off

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	38.198	MM	0.9071	6546.96143	120.28767	51.3555
2	40.528	MM	1.3773	6201.35938	75.04160	48.6445
Totals :				1.27483e4	195.32926	

Signal 3: DAD1 E, Sig=280,4 Ref=off

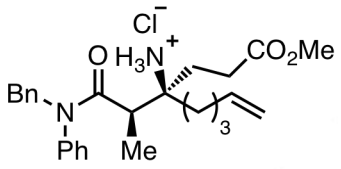
==========

*** End of Report ***

Data File C:\Chem32\1\Data\DVR\DVR05065-ee IF3 2017-05-10 14-06-22.D
Sample Name: DVR05065-ee IF3

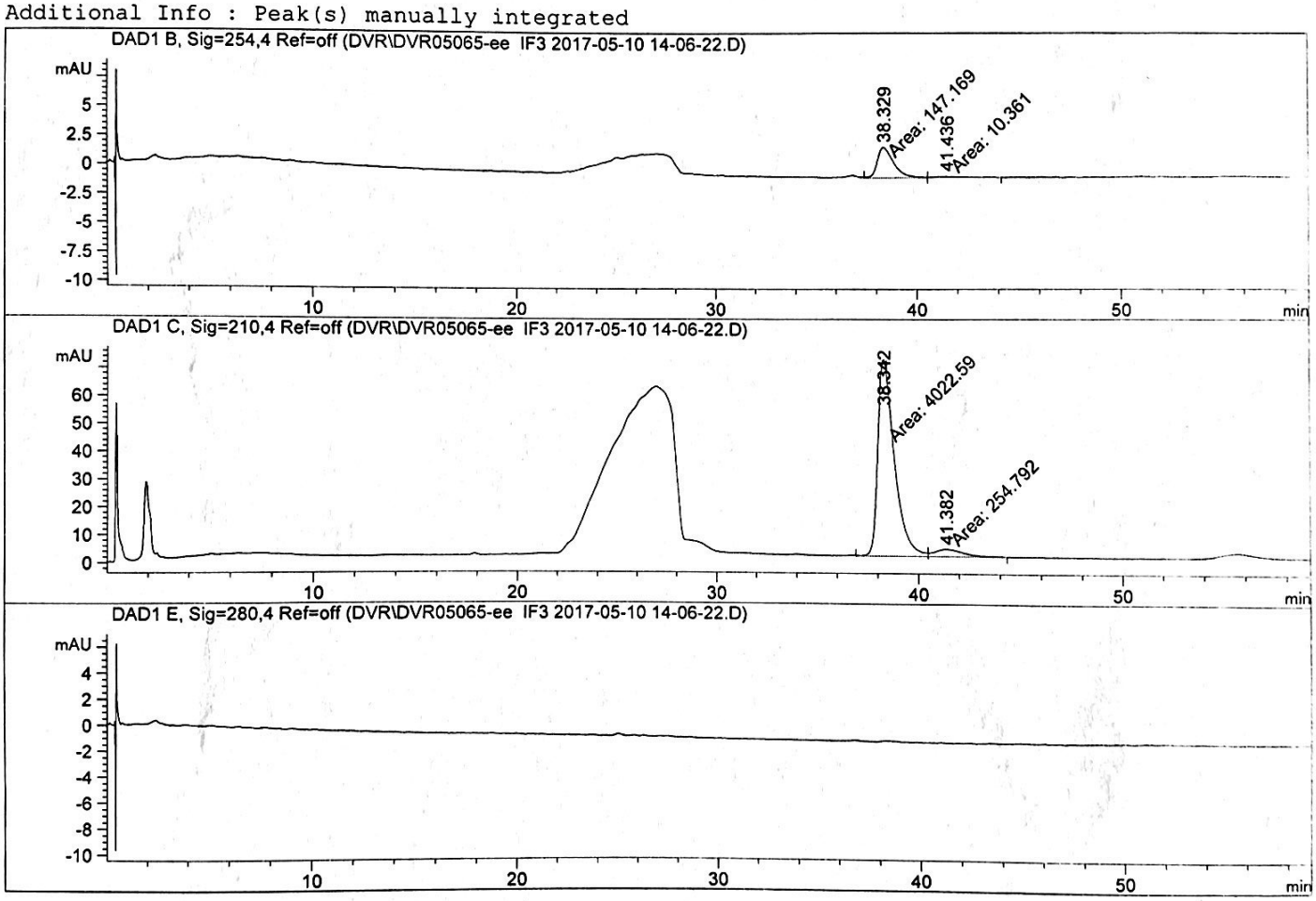
==========

Acq. Operator : SYSTEM
Sample Operator : SYSTEM
Acq. Instrument : LC1 Reverse DAD-WPALS Location : 21
Injection Date : 5/10/2017 2:06:57 PM
Inj Volume : 5.000 µl
Acq. Method : C:\Chem32\1\Methods\BZV_Initial_05mL_lowerslope.M
Last changed : 5/10/2017 2:03:03 PM by SYSTEM
(modified after loading)
Analysis Method : C:\Chem32\1\Methods\BZV_Initial_05mL_lower.
Last changed : 12/6/2016 3:08:01 PM by SYSTEM
Sample Info : 1 min 10/90 MeCN/water
30 min gradient 35/65 MeCN/H2O
30 min hold 35/65 MeCN/H2O
4 min 90/10 MeCn/H2o Flush
IF-3 rac
1.0 mL/min



37
88% ee

Additional Info : Peak(s) manually integrated



Data File C:\Chem32\1\Data\DVR\DVR05065-ee IF3 2017-05-10 14-06-22.D
Sample Name: DVR05065-ee IF3

==========

Area Percent Report

==========

Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Sample Amount: : 5.00000 [ng/ul] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 B, Sig=254,4 Ref=off

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	38.329	MF T	0.9395	147.16916	2.61075	93.4228
2	41.436	FM T	1.4913	10.36101	1.15792e-1	6.5772
Totals :				157.53017	2.72654	

Signal 2: DAD1 C, Sig=210,4 Ref=off

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	38.342	MF T	1.1691	4022.58813	71.16277	94.0433
2	41.382	FM T	1.6251	254.79185	2.61314	5.9567
Totals :				4277.37999	73.77592	

Signal 3: DAD1 E, Sig=280,4 Ref=off

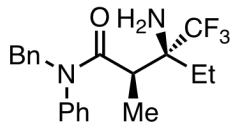
==========

*** End of Report ***

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04296 rac_1122017_1914 PM_2.lcd

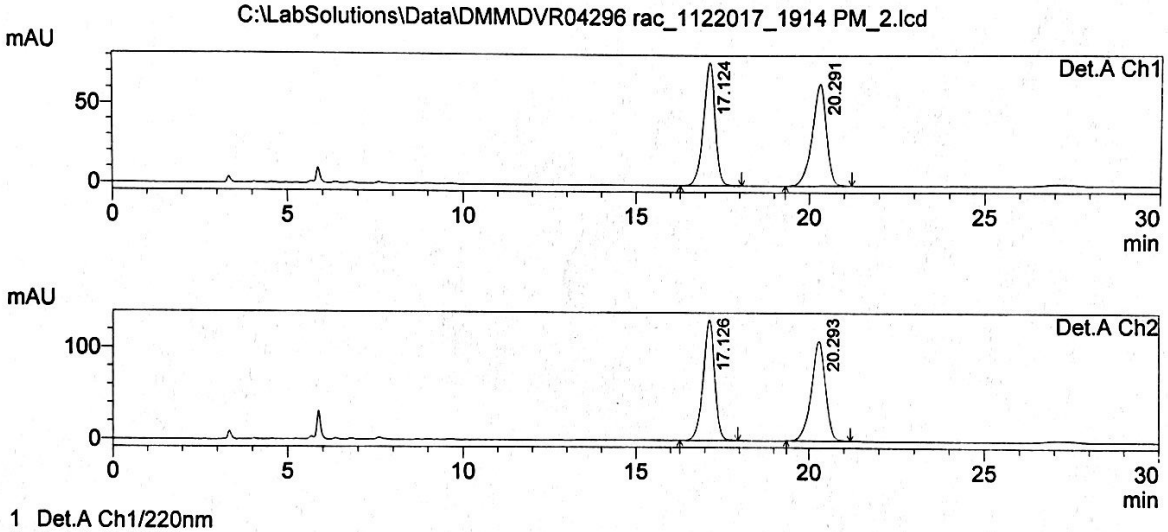
Acquired by	: LC User
Sample Name	: DVR04296 rac
Sample ID	: DVR04296 rac
Tray#	: 1
Vail #	: 1
Injection Volume	: 5 uL
Data File Name	: DVR04296 rac_1122017_1914 PM_2.lcd
Method File Name	: col1_5isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 1/12/2017 7:45:40 PM
Data Processed	: 1/12/2017 8:15:42 PM



38
racemic

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04296 rac_1122017_1914 PM_2.lcd



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.124	1797024	77416	50.015	54.705
2	20.291	1795951	64098	49.985	45.295
Total		3592976	141514	100.000	100.000

PeakTable

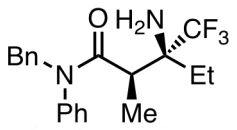
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.126	3072160	132476	49.987	54.689
2	20.293	3073760	109758	50.013	45.311
Total		6145919	242234	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04296 D1_1122017_1914 PM_6.lcd

Acquired by	: LC User
Sample Name	: DVR04296 D1
Sample ID	: DVR04296 D1
Tray#	: 1
Vail #	: 2
Injection Volume	: 5 uL
Data File Name	: DVR04296 D1_1122017_1914 PM_6.lcd
Method File Name	: col1_5isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 1/12/2017 8:56:37 PM
Data Processed	: 1/12/2017 9:26:41 PM

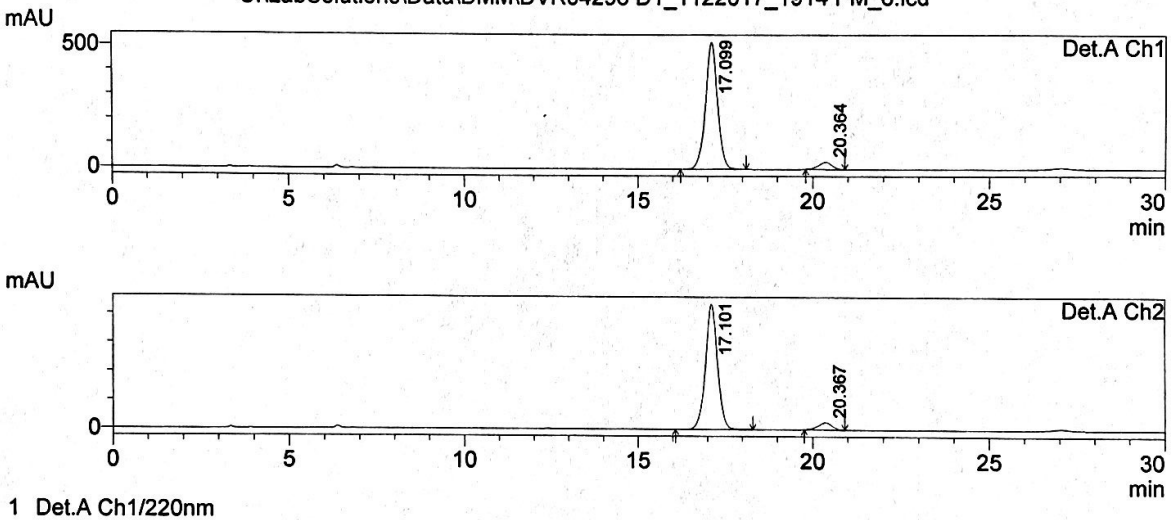


38

88% ee

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR04296 D1_1122017_1914 PM_6.lcd



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.099	12356691	518103	94.085	94.670
2	20.364	776888	29168	5.915	5.330
Total		13133579	547271	100.000	100.000

PeakTable

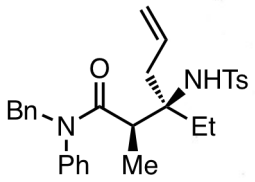
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.101	21012325	874462	93.919	94.550
2	20.367	1360378	50401	6.081	5.450
Total		22372703	924864	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

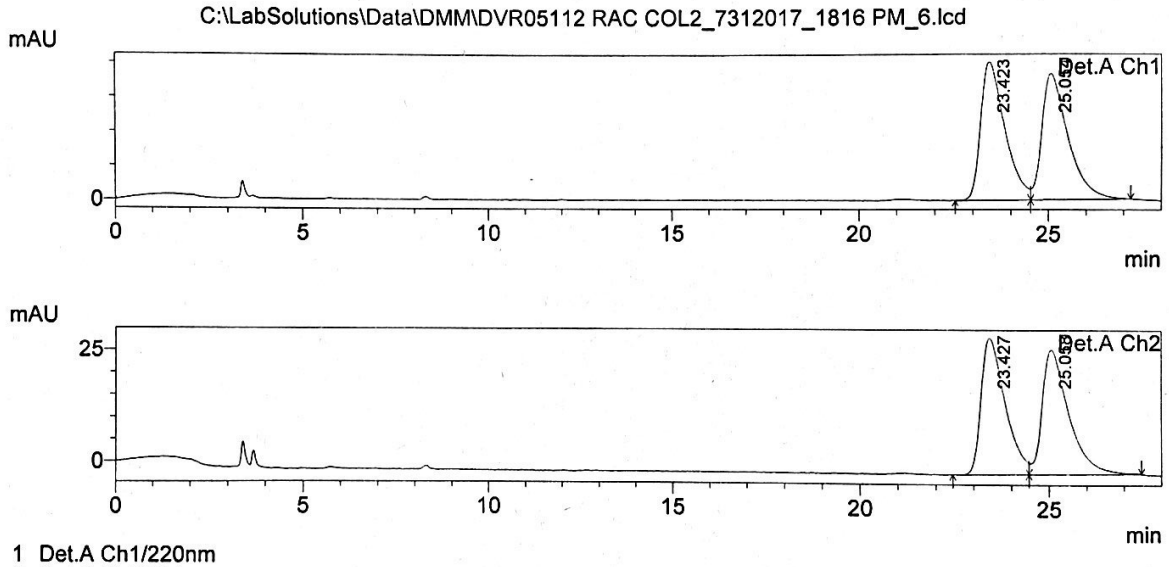
C:\LabSolutions\Data\DMM\DVR05112 RAC COL2_7312017_1816 PM_6.lcd

Acquired by	: LC User
Sample Name	: DVR05112 RAC COL2
Sample ID	: DVR05112 RAC COL2
Tray#	: 1
Vail #	: 1
Injection Volume	: 4 uL
Data File Name	: DVR05112 RAC COL2_7312017_1816 PM_6.lcd
Method File Name	: col2_3isoiPA_45min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 7/31/2017 7:33:04 PM
Data Processed	: 8/28/2017 9:09:03 AM



39
racemic

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	23.423	887881	19932	50.195	52.288
2	25.054	880972	18187	49.805	47.712
Total		1768853	38119	100.000	100.000

PeakTable

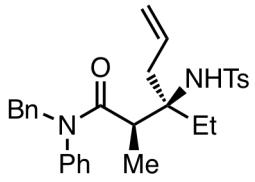
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	23.427	1346497	30425	49.495	52.327
2	25.058	1373982	27719	50.505	47.673
Total		2720479	58143	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR05113 R1_812017_1914 PM_3.lcd

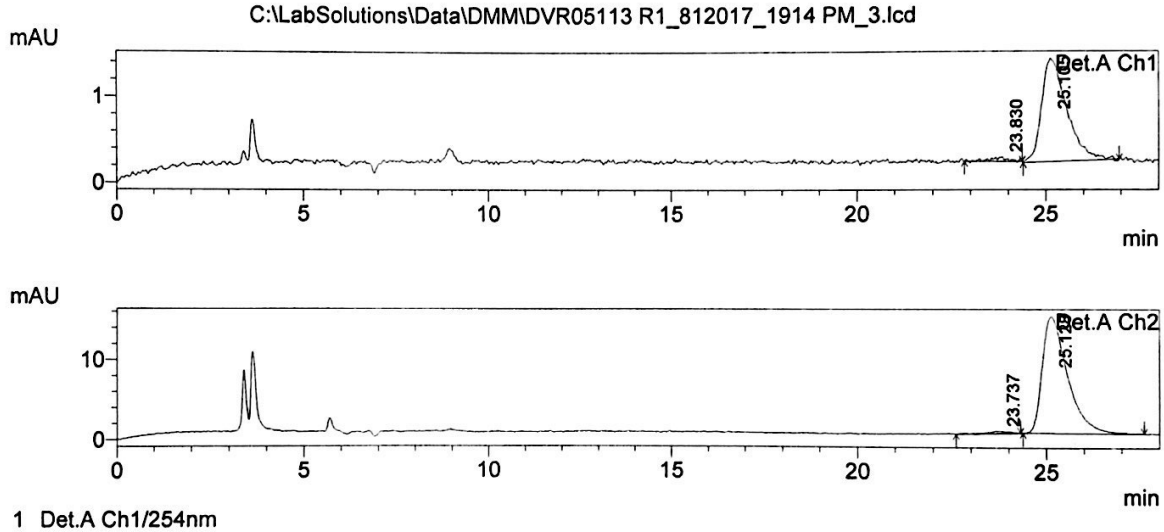
Acquired by	: LC User
Sample Name	: DVR05113 R1
Sample ID	: DVR05113 R1
Tray#	: 1
Vail #	: 3
Injection Volume	: 5 uL
Data File Name	: DVR05113 R1_812017_1914 PM_3.lcd
Method File Name	: col2_3isoiPA_45min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 8/1/2017 8:30:52 PM
Data Processed	: 8/28/2017 9:06:53 AM



39

96% ee

<Chromatogram>



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	23.830	1431	50	2.515	4.018
2	25.105	55484	1190	97.485	95.982
Total		56915	1240	100.000	100.000

PeakTable

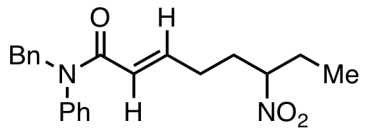
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	23.737	13302	305	1.922	2.063
2	25.128	678853	14504	98.078	97.937
Total		692155	14810	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

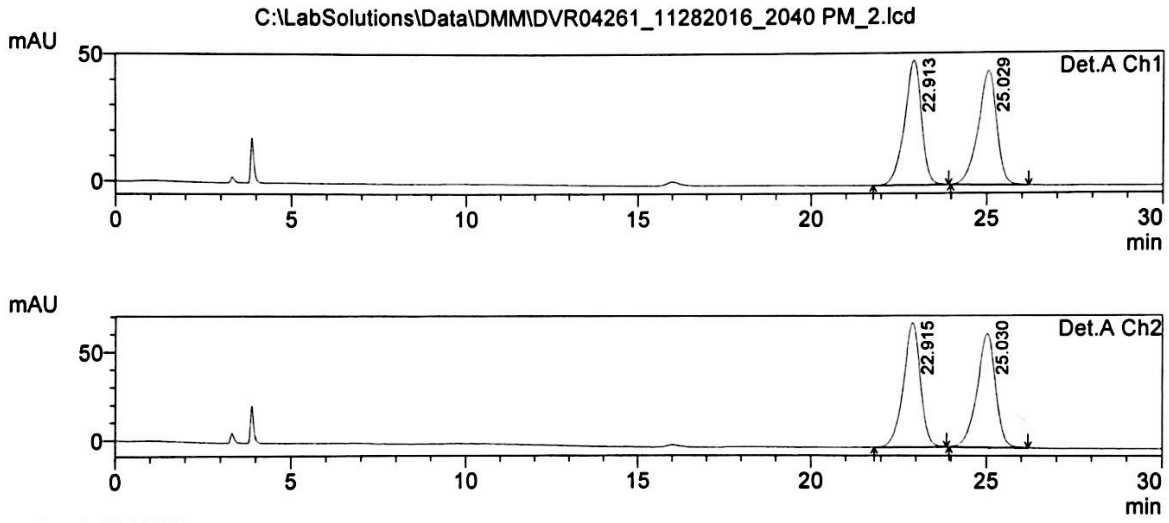
C:\LabSolutions\Data\DMM\DVR04261_11282016_2040 PM_2.lcd

Acquired by	: LC User
Sample Name	: DVR04261
Sample ID	: DVR04261
Tray#	: 1
Vail #	: 1
Injection Volume	: 3 uL
Data File Name	: DVR04261_11282016_2040 PM_2.lcd
Method File Name	: col1_5isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 11/28/2016 9:51:02 PM
Data Processed	: 11/29/2016 10:15:06 AM



41
racemic

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	22.913	1640779	49207	50.076	52.291
2	25.029	1635815	44896	49.924	47.709
Total		3276593	94103	100.000	100.000

PeakTable

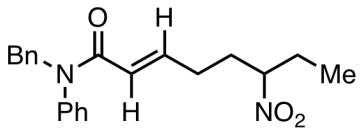
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	22.915	2351690	70527	50.093	52.300
2	25.030	2342912	64325	49.907	47.700
Total		4694603	134852	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR04258 COL1_11232016_1332 PM_10.lcd

Acquired by	: LC User
Sample Name	: DVR04258 COL1
Sample ID	: DVR04258 COL1
Tray#	: 1
Vail #	: 1
Injection Volume	: 3 uL
Data File Name	: DVR04258 COL1_11232016_1332 PM_10.lcd
Method File Name	: col1_5isoiPA_30min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 11/23/2016 8:08:57 PM
Data Processed	: 11/28/2016 10:02:36 AM



41
16% ee

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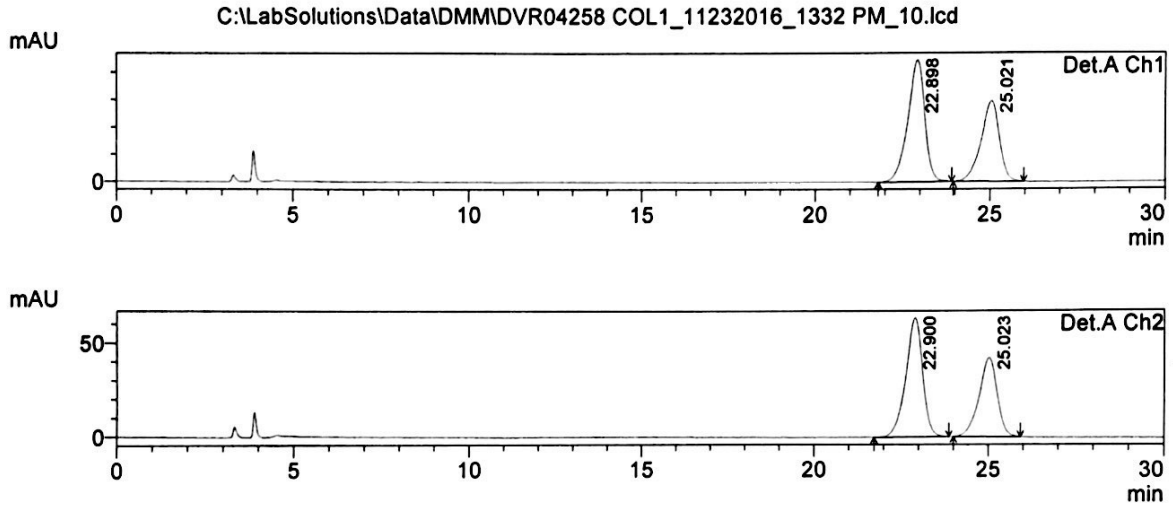


1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	22.898	1498085	44612	58.180	60.219
2	25.021	1076816	29471	41.820	39.781
Total		2574901	74083	100.000	100.000

PeakTable

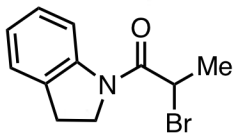
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	22.900	2140251	63852	58.118	60.128
2	25.023	1542333	42341	41.882	39.872
Total		3682584	106193	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR05088 RAC_682017_1612 PM_3.lcd

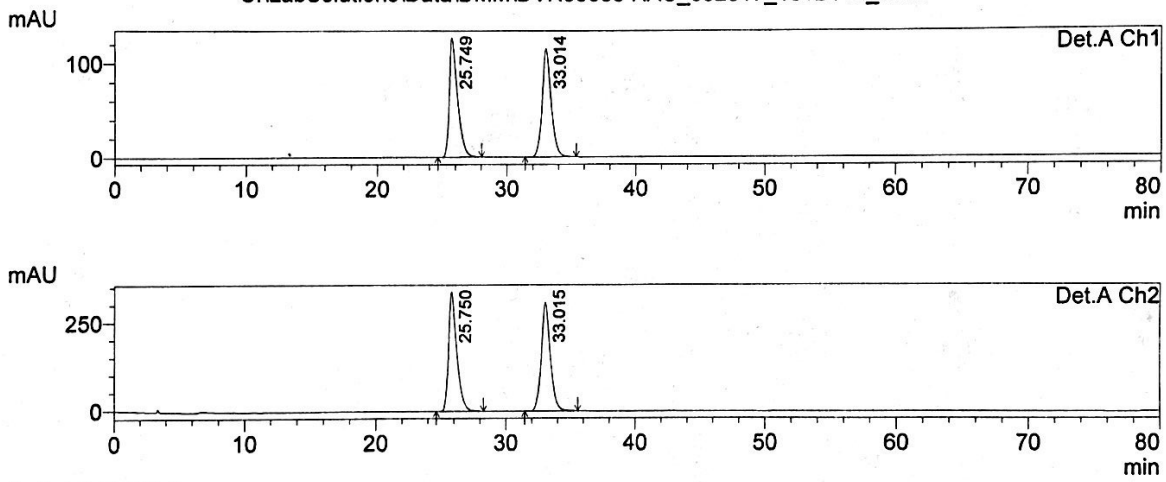
Acquired by	: LC User
Sample Name	: DVR05088 RAC
Sample ID	: DVR05088 RAC
Tray#	: 1
Vail #	: 3
Injection Volume	: 5 uL
Data File Name	: DVR05088 RAC_682017_1612 PM_3.lcd
Method File Name	: col1_1isoiPA_70min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 6/8/2017 6:14:24 PM
Data Processed	: 6/8/2017 7:34:27 PM



racemic-42

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR05088 RAC_682017_1612 PM_3.lcd



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	25.749	5523757	126927	50.001	52.473
2	33.014	5523525	114965	49.999	47.527
Total		11047282	241892	100.000	100.000

PeakTable

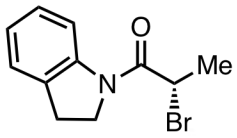
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	25.750	14973238	341657	49.948	52.416
2	33.015	15004329	310163	50.052	47.584
Total		29977568	651820	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR05080 CROP2_5312017_1028 AM_4.lcd

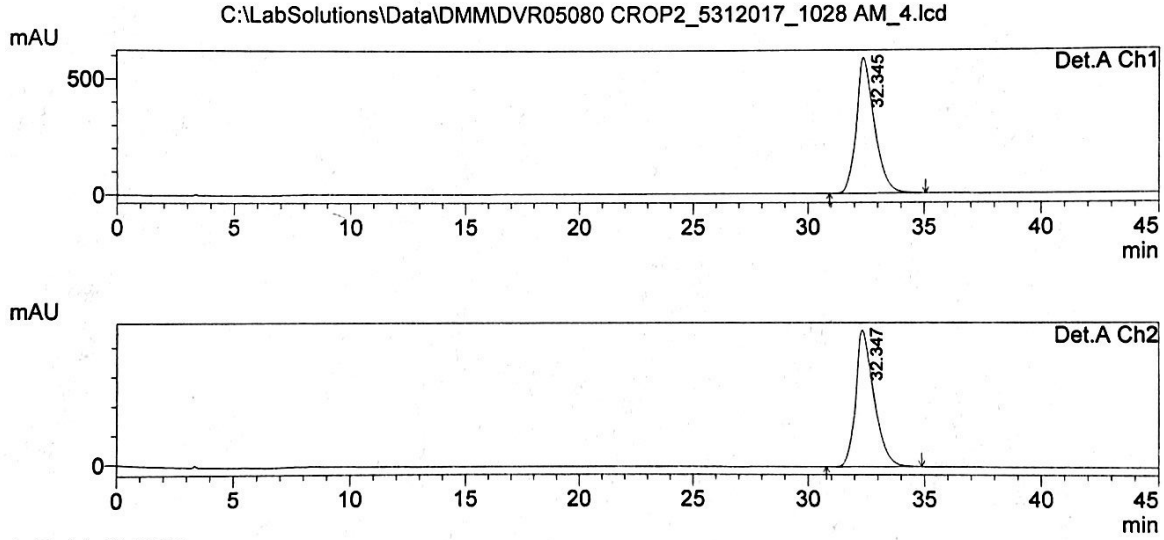
Acquired by	: LC User
Sample Name	: DVR05080 CROP2
Sample ID	: DVR05080 CROP2
Tray#	: 1
Vail #	: 1
Injection Volume	: 7 uL
Data File Name	: DVR05080 CROP2_5312017_1028 AM_4.lcd
Method File Name	: col1_1isoiPA_45min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 5/31/2017 12:20:55 PM
Data Processed	: 5/31/2017 1:05:56 PM



(*S*)-42, >99% ee

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR05080 CROP2_5312017_1028 AM_4.lcd



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	32.345	31626570	585635	100.000	100.000
Total		31626570	585635	100.000	100.000

PeakTable

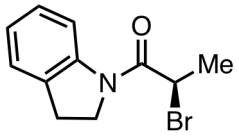
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	32.347	50981975	932861	100.000	100.000
Total		50981975	932861	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

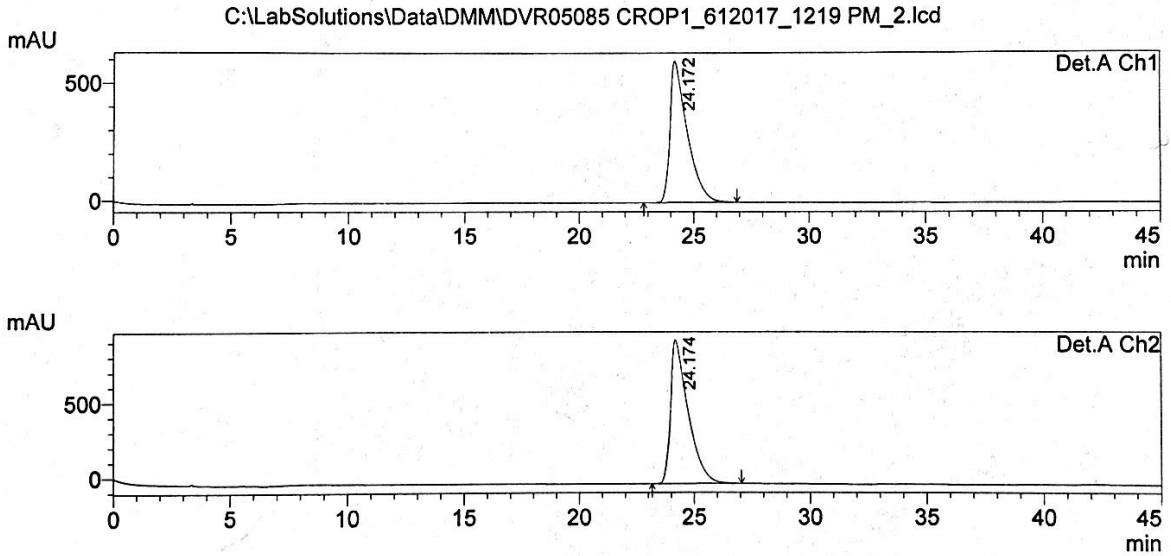
C:\LabSolutions\Data\DMM\DVR05085 CROP1_612017_1219 PM_2.lcd

Acquired by	: LC User
Sample Name	: DVR05085 CROP1
Sample ID	: DVR05085 CROP1
Tray#	: 1
Vail #	: 1
Injection Volume	: 5 uL
Data File Name	: DVR05085 CROP1_612017_1219 PM_2.lcd
Method File Name	: col1_1isoiPA_45min_1ML_220and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 6/1/2017 12:29:48 PM
Data Processed	: 6/1/2017 1:14:50 PM



(*R*)-42, >99% ee

<Chromatogram>



1 Det.A Ch1/220nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	24.172	31383329	603604	100.000	100.000
Total		31383329	603604	100.000	100.000

PeakTable

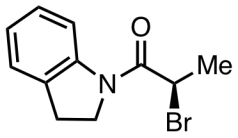
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	24.174	50736042	961453	100.000	100.000
Total		50736042	961453	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR05088B_682017_1612 PM_2.lcd

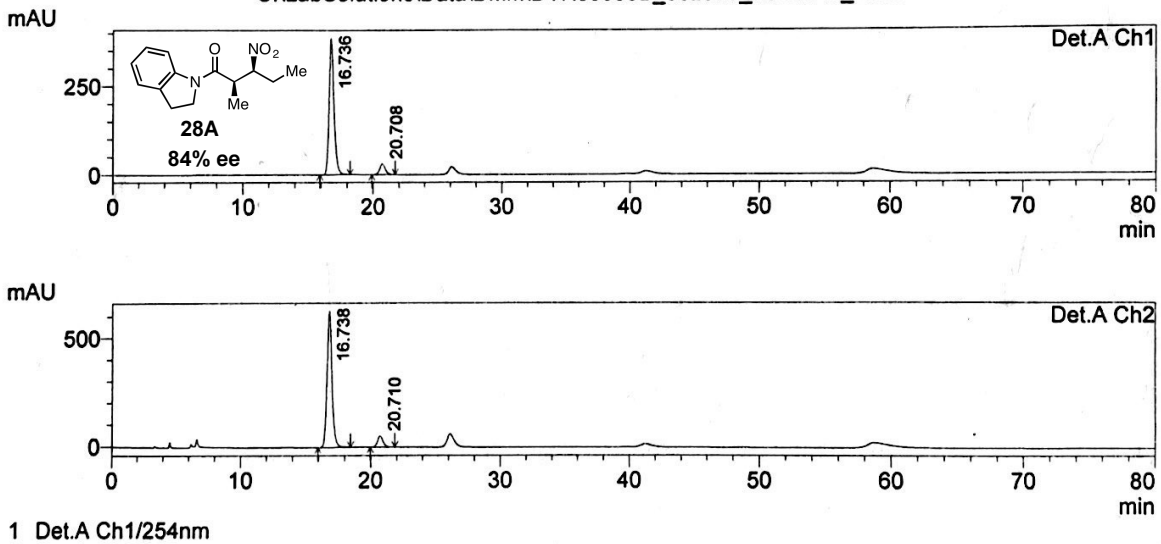
Acquired by	: LC User
Sample Name	: DVR05088B
Sample ID	: DVR05088B
Tray#	: 1
Vail #	: 2
Injection Volume	: 3 uL
Data File Name	: DVR05088B_682017_1612 PM_2.lcd
Method File Name	: col1_1isoiPA_70min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 6/8/2017 4:28:27 PM
Data Processed	: 6/8/2017 5:58:36 PM



using (*R*)-42, >99% ee

<Chromatogram>

C:\LabSolutions\Data\DMM\DVR05088B_682017_1612 PM_2.lcd



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	16.736	9966909	385908	91.608	92.589
2	20.708	913061	30889	8.392	7.411
Total		10879970	416797	100.000	100.000

PeakTable

Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	16.738	16383132	628903	91.531	92.486
2	20.710	1515871	51098	8.469	7.514
Total		17899003	680001	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR05088B_682017_1612 PM_2.lcd

Acquired by	: LC User
Sample Name	: DVR05088B
Sample ID	: DVR05088B
Tray#	: 1
Vail #	: 2
Injection Volume	: 3 uL
Data File Name	: DVR05088B_682017_1612 PM_2.lcd
Method File Name	: col1_1isoiPA_70min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 6/8/2017 4:28:27 PM
Data Processed	: 6/8/2017 5:48:30 PM

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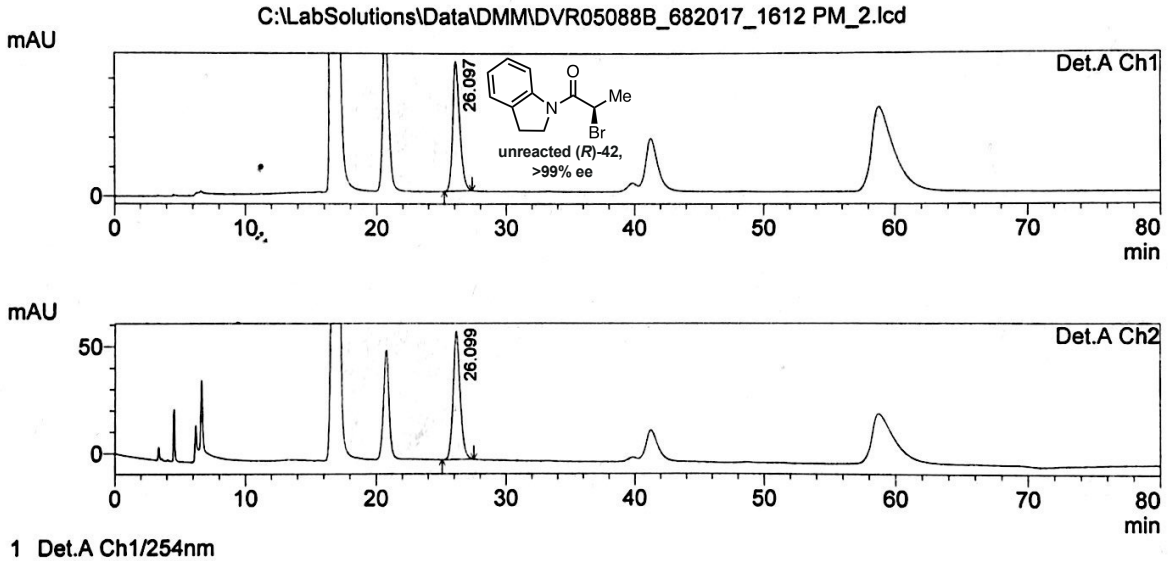


1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	26.097	827395	22041	100.000	100.000
Total		827395	22041	100.000	100.000

PeakTable

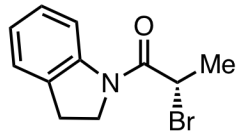
Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	26.099	2270685	60158	100.000	100.000
Total		2270685	60158	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

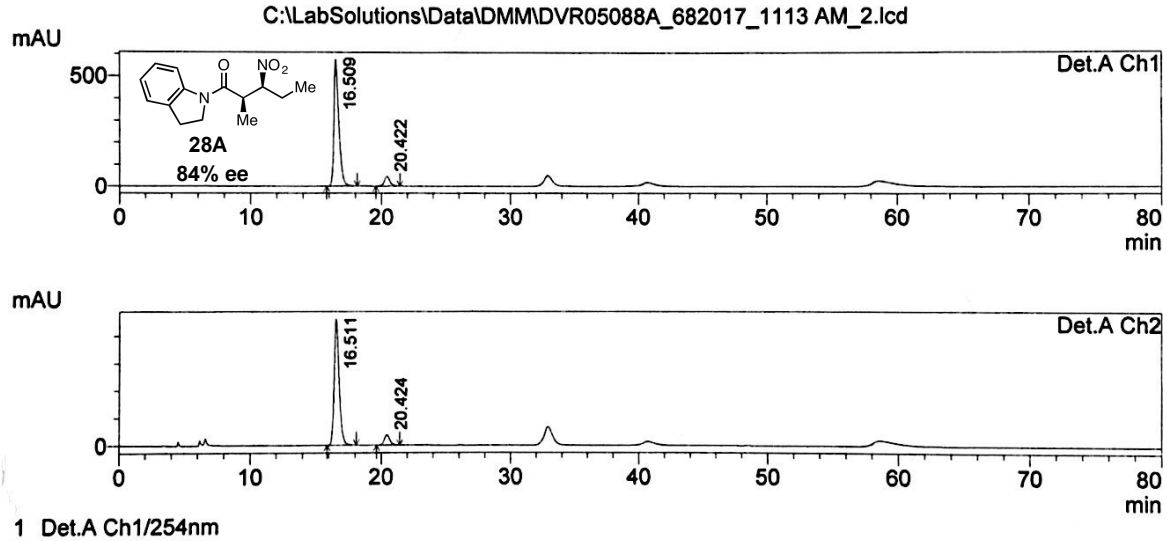
C:\LabSolutions\Data\DMM\DVR05088A_682017_1113 AM_2.lcd

Acquired by	: LC User
Sample Name	: DVR05088A
Sample ID	: DVR05088A
Tray#	: 1
Vail #	: 1
Injection Volume	: 3 uL
Data File Name	: DVR05088A_682017_1113 AM_2.lcd
Method File Name	: col1_1isoiPA_70min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 6/8/2017 11:28:54 AM
Data Processed	: 6/8/2017 12:48:55 PM



using (*S*)-42, >99% ee

<Chromatogram>



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	16.509	14896468	575351	91.767	92.689
2	20.422	1336390	45383	8.233	7.311
Total		16232859	620734	100.000	100.000

PeakTable

Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	16.511	24214155	924284	91.633	92.488
2	20.424	2210874	75070	8.367	7.512
Total		26425029	999354	100.000	100.000

==== Shimadzu LCsolution Analysis Report ====

C:\LabSolutions\Data\DMM\DVR05088A_682017_1113

Acquired by	: LC User
Sample Name	: DVR05088A
Sample ID	: DVR05088A
Tray#	: 1
Vail #	: 1
Injection Volume	: 3 uL
Data File Name	: DVR05088A_682017_1113 AM_2.lcd
Method File Name	: col1_1isoiPA_70min_1ML_254and210.lcm
Batch File Name	: DMM.lcb
Report File Name	: Default.lcr
Data Acquired	: 6/8/2017 11:28:54 AM
Data Processed	: 6/8/2017 5:33:03 PM

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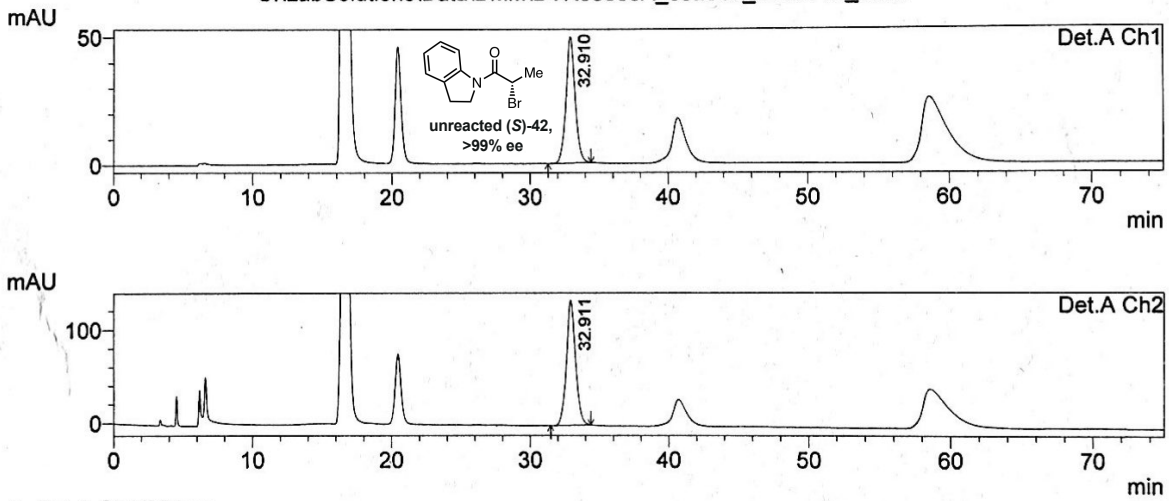
C:\LabSolutions\Data\DMM\DVR05088A_682017_1113 AM_2.lcd



1 Det.A Ch1/254nm
2 Det.A Ch2/210nm

PeakTable

Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	32.910	2257829	49329	100.000	100.000
Total		2257829	49329	100.000	100.000

PeakTable

Detector A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	32.911	6129378	133936	100.000	100.000
Total		6129378	133936	100.000	100.000