Supporting Information for

C(sp^3)-H 1,3-Diamination of Cumene Derivatives Catalyzed by a Dirhodium(II) Catalyst

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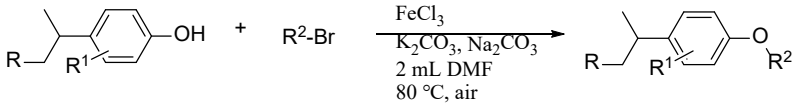
1. General experimental details

^{1}H、^{13}C and ^{19}F NMR spectra were obtained on a Bruker spectrometer at 400 MHz、101 MHz and 376 MHz. Unless otherwise stated, the ^{1}H NMR (400 MHz) chemical shifts were recorded relative to $CDCl_3$ as the internal reference ($CDCl_3$: δH = 7.260 ppm). The ^{13}C NMR (100 MHz) chemical shifts were given using $CDCl_3$ as the internal standard ($CDCl_3$: δC = 77.160 ppm). ^{1}H NMR data are reported as: chemical shift (ppm), multiplicity (s = singlet, brs = broad singlet, d = doublet, t = triplet, q = quartet, p = quintet, hept = heptet, m = multiplet), and coupling constant (Hz). All solvents before used were dried and degassed by standard methods. Unless otherwise noted, all reagents were obtained from commercial suppliers and used without further purification. Yields reported are NMR yields or isolated yields. $Rh_2(esp)_2$,[1] Rh_2(5 - Br - esp)$_2$,[2] Rh_2(5 - Cl - esp)$_2$, Rh_2(5 - ^{t}Bu - esp)$_2$,[3] Rh_2(5 – Me - esp)$_2$, Rh_2(h - esp)$_4$, Rh_2(OPiv)$_4$, Rh_2(cap)$_4$ and Rh_2(6 - NO_2 - esp)$_2$ were prepared as previously described. **1c – 1j**, **1n** – **1t** and **1x - 1z** were synthesized following the general procedure. High resolution mass spectrometric measurements were carried out using a Bruker autoflex MALDI-TOF mass spectrometer and Waters-Q-TOF Premier (ESI). X-Ray single-crystal diffraction data were collected on an Agilent Technologies Gemini plus single crystal diffraction and solved using SHELX program. Flash column chromatography was carried out using 300-400 or 200-300 mesh silica gel at increased pressure.

2. General procedure.

General procedure for 1c and 1x[4]



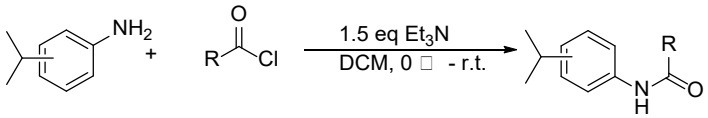
2mL DMF was added to a mixture of phenol (5 mmol, 1 eq.), Alkyl bromide (5.5 mmol, 1.1 eq.), K_2CO_3(0.6 mmol, 0.12 eq.), Na_2CO_3(5.4 mmol, 1.08 eq.) and Ferric chloride (0.25 mmol, 0.05 eq.) in a 10 mL sealed tube, The resulting mixture was stirred at 80 ℃ under air for 6 h. After cooling, the mixture was filtered through a short pad of silica gel, the filter cake was subsequently washed with CH_2Cl_2. After evaporation of the

organic solvent, the residue was purified by silica gel column chromatography (hexanes) to give the title product as a colorless oil.

General procedure for 1d[5]

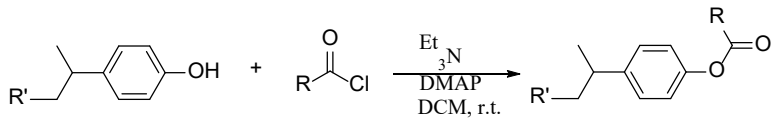
1 mL DMSO was added to a mixture of 4-isopropylphenol (163 mg, 1.2 mmol), bromobenzene (156 mg, 1 mmol), CsOH • H_2O (330 mg, 2.2 mmol) in a 10 mL tube. The resulting mixture was stirred at 150 ℃ under air for 15 h. Then the mixture was filtered through a short pad of silica gel, which was subsequently washed with CH_2Cl_2. After evaporation of the organic solvent, the residue was purified by silica gel column chromatography (hexanes) to give the title product as a colorless oil.

General procedure for 1e - 1g[6]



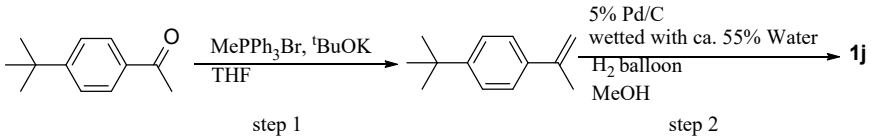
To a solution of aniline (500 mg, 1.0 eq.), triethylamine (1.5 eq.) in dry DCM (10 mL) at 0 ℃ under N_2 atmosphere, acyl chloride (1.03 eq.) was added slowly by syringe. The resulting solution was slowly allowed to warm to room temperature and monitored by TLC. After the reaction was finished, water was added to quench this reaction. Then the mixture was extracted with CH_2Cl_2 and the combined organic phase was washed with brine. The organic phase was then dried over anhydrous Na_2SO_4 and concentrated under reduced pressure. The residue was purified by flash chromatography to afford the corresponding products.

General procedure for 1h, 1i and 1y[7]



To a solution of phenol (500 mg, 1.0 eq.), triethylamine (1.2 eq.), DMAP (4-Dimethylaminopyridine, 0.1 eq.) in dry DCM (15 mL) at 0 ℃ under N_2 atmosphere, acyl chloride (1.2 eq.) was added slowly by syringe. The resulting solution was slowly allowed to warm to room temperature and monitored by TLC. After the reaction was finished, water was added to quench this reaction. Then the mixture was extracted with CH_2Cl_2 and the combined organic phase was washed with brine. The organics was then dried over anhydrous Na_2SO_4 and concentrated under reduced pressure. The obtained residue was purified by flash chromatography to afford the corresponding products.

General procedure for 1j



Step 1:[8]

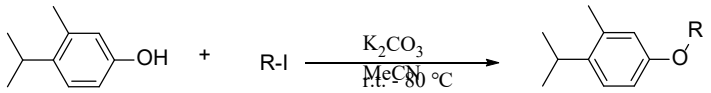
$MePPh_3Br$ (2.5 g, 6.8 mmol, 1.2 eq.) was added to a suspension of ^tBuOK (0.77 g, 6.8 mmol, 1.2 eq.) in anhydrous THF (10 mL) under argon atmosphere. 1-(4-(tert-butyl)phenyl)ethan-1-one (1 g, 5.7 mmol, 1 eq.) was then added after the suspension was stirred at room temperature for 1 h. The resulting mixture was stirred at same temperature for 1 h. Then the mixture was filtered through a short pad of silica gel and the filter cake was subsequently washed with hexanes. After evaporation of the organic solvent, the residue was purified by silica gel column chromatography (hexanes) to give the title product as a colorless oil (660 mg, 67% yield).

Step 2:[9]

1-(tert-butyl)-4-(prop-1-en-2-yl)benzene (1 g) was added to a suspension of Pd/C (100 mg, 5% Pd/C wetted with ca. 55% Water) in anhydrous MeOH (10 m

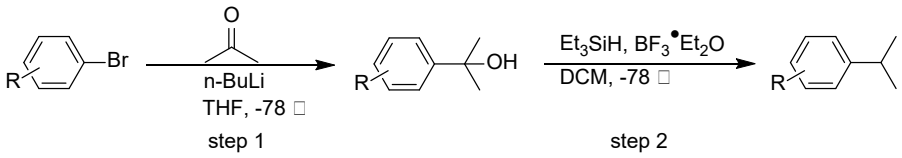
L) in a 25 mL round bottom flask equipped with a hydrogen balloon. Then th e resulting mixture was stirred at room temperature and monitored by TLC. Af ter the reaction finished, the mixture was filtered through a short pad of silica gel, the filter cake was subsequently washed with hexanes. After evaporation o f the organic solvent, the residue was purified by silica gel column chromatogr aphy (hexanes) to give the title product as a colorless oil (750 mg, 75% yield).

General procedure for 1n and 1o[10]



To a 50 mL sealing tube equipped with a stir bar was charged with phenol (1 g, 1 eq.) and K_2CO_3 (1.5 eq.), 10 mL CH_3CN was added. Iodoalkane (1.5 eq.) was added after the resulting mixture was stirred for 1 hour at room temp erature. Then the reaction temperature was rised to 80℃. Once the reaction co mpleted monitored by TLC, the mixture was filtered through a short pad of sil ica gel, the filter cake was subsequently washed with hexanes. After evaporatio n of the organic solvent, the residue was purified by silica gel column chroma tography (hexanes) to give the title product as a colorless oil.

General procedure for 1p – 1s



Step 1:[11]

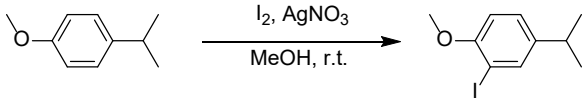
To a 100 mL tube equipped with a stir bar, bromobenzene (1 g, 1eq.) was ad ded. After sealed by a rubber plug, the tube was evacuated and backfilled with argon for three times, THF (20 mL) was added then. After the mixture was cooled to -78 ℃, n-BuLi (1.2 eq. 2.5 M in hexane) was added slowly with sy

ringe. Acetone (1.2 eq.) was added after the mixture was stirred for 30 minute s. Once the reaction completed monitored by TLC, the mixture was quenched with saturated NH_4Cl solution. Then this mixture was extracted with dichlorom ethane. The combined organic phase was dried over Na_2SO_4 and concentrated i n vacuum. The resulting residue was purified by silica gel column chromatogrp hy (petrol ether/ethyl acetate) to afford the tertiary alcohol.

Step 2:[12]

To a 100 mL tube equipped with a stir bar, tertiary alcohol (1eq.) was added. After sealed by a rubber plug, the tube was evacuated and backfilled with arg on for three times, DCM (20 mL) was added then. After the mixture was cool ed to -78 ℃, Et_3SiH (2 eq.) was added. After 30 minutes, $BF_3 \cdot Et_2O$ (3.2 e q.) was added slowly by syringe at same temperature. Once the reaction compl eted monitored by TLC, the mixture was quenched with saturated $NaHCO_3$ sol ution. Then this mixture was extracted with dichloromethane. The combined or ganic phase was dried over Na_2SO_4 and concentrated in vacuum. The resulting residue was purified by silica gel column chromatogrphy (petrol ether) to give the title product.

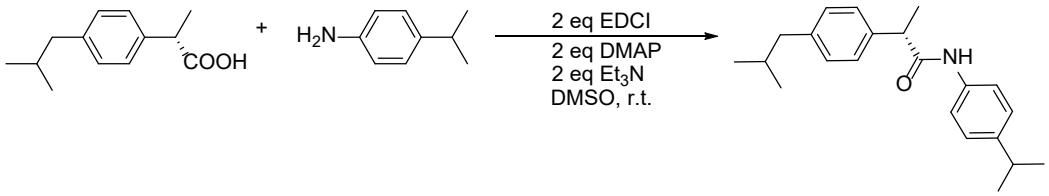
Procedure for synthesis of 1t[13]



To a 10 mL tube equipped with a stir bar, 1.8 M solution of iodine (1 eq.) i n methanol and $AgNO_3$ (1 eq.) was added, then the 1.8M solution of 1-isopro pyl-4-methoxybenzene (1 eq.) in methanol was added. The resulting mixture wa s stirred at room temperature for 18h. Then the mixture was filtered through a short pad of silica gel, the filter cake was subsequently washed with dichlorom ethane. Saturated $Na_2S_2O_3$ solution was added then to the mother liquid until t

he solution became colorless. Then this mixture was extracted with dichloromet hane. The combined organic phase was dried over Na_2SO_4 and concentrated in vacuum. The resulting residue was purified by silica gel column chromatogrphy (petrol ether) to give the title product.

Procedure for synthesis of 1y



To a 25 mL round-bottomed flask equipped with a stir bar was charged with (*S*)-Ibuprofen (14.8 mmol, 2 eq.), 4-isopropylaniline (7.4 mmol, 1 eq.), EDCI (3-(((ethylimino)methylene)amino)-N,N-dimethylpropan-1-amine hydrochloride (14.8 mmol, 2eq.), DMAP (4-Dimethylaminopyridine, 14.8 mmol, 2 eq.) and Et_3N (14.8 mmol, 2 eq.), 10 mL DMSO was added. The mixture was stirred at room temperature for 12h. After the reaction completed, water was added to quench this reaction. Then the mixture was extracted with CH_2Cl_2 and the organic phase was washed with brine. The organics was then dried over anhydrous Na_2SO_4 and concentrated under reduced pressure. The residue was purified by flash chromatography to afford the corresponding products as a white solid (2 g, 84% yield).

General procedure for synthesis of 2a – 2z, 3a – 3z, 2aa and 3aa

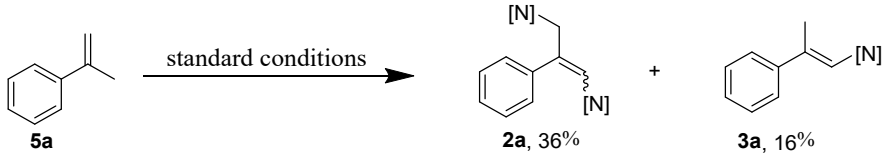
To a 25 mL tube equipped with a stir bar, substrates **1a – 1z** and **1aa** (0.4 m mol), Dirhodium(II) - catalyst, NFSI (378 mg, 1.2 mmol) and $NaHCO_3$ (67 m g, 0.8 mmol) were added. After sealed by a rubber plug, the tube was evacuat ed and backfilled with nitrogen for three times, $CHCl_3$ (1 mL or 2 mL) was a dded then. The mixture was subsequently stirred at 65 ℃. Monitored by TLC,

after the reaction finished, Et_3N was added to quench excess NFSI. Then the r esulting mixture was added 20 mL H_2O and extracted with dichloromethane. T he combined organic phase was dried over Na_2SO_4 and concentrated in vacuu m. The resulting residue was purified by silica gel column chromatogrphy (petr ol ether/ethyl acetate) to afford the desired products.

3. Mechanism studies ([N] = $N(SO_2Ph)_2$)

2-Phenyl-1-propene (5a) is the probable intermediate

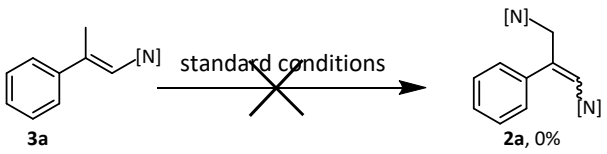
To a 25 mL tube equipped with a stir bar, **5a** (0.4 mmol), $Rh_2(5\text{ - }^tBu\text{ - esp})_2$ (3.5 mg, 0.004 mmol), NFSI (378 mg, 1.2 mmol) and $NaHCO_3$ (67 mg, 0.8 mmol) were added. After sealed by a rubber plug, the tube was evacuated and backfilled with nitrogen for three times, $CHCl_3$ (2 mL) was added then. The mixture was subsequently stirred at 65 ℃. Monitored by TLC, After the reaction finished, Et_3N was added to quench excess NFSI. Then the resulting mixture was added 20 mL H_2O and extracted subsequently with dichloromethane. The combined organic extracts were dried over Na_2SO_4 and concentrated in vacuum. The resulting residue was purified by silica gel column chromatography (petrol ether/ethyl acetate) to afford the desired products.



2a and 3a are obtained by two different paths

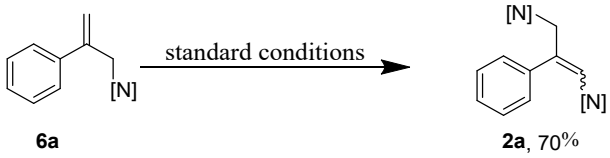
To a 25 mL tube equipped with a stir bar, **3a** (50 mg, 0.121 mmol), $Rh_2(5\text{ - }^tBu\text{ - esp})_2$ (1 mg, 0.0012 mmol), NFSI (114 mg, 0.363 mmol), $NaHCO_3$ (20 mg, 0.242 mmol) were added. After sealed by a rubber plug, the tube was evacuated and backfilled with nitrogen for three times, $CHCl_3$ (1 mL) was added then. The mixture was subsequently

stirred at 65 ℃. Not any reaction was detected with TLC.



6a[14] is the possible important intermediate for the 2a's generation

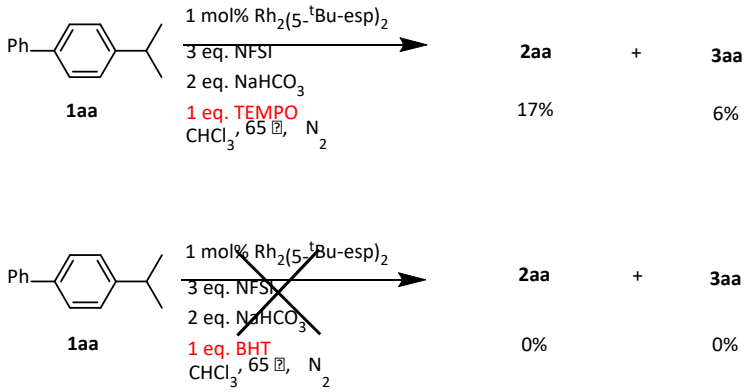
To a 25 mL tube equipped with a stir bar, **6a** (50 mg, 0.121 mmol), Rh_2(5 - ^{t}Bu - esp)$_2$ (1 mg, 0.0012 mmol), NFSI (114 mg, 0.363 mmol) and $NaHCO_3$ (20 mg, 0.242 mmol) were added. After sealed by a rubber plug, the tube was evacuated and backfilled with nitrogen for three times, $CHCl_3$ (1 mL) was added then. The mixture was subsequently stirred at 65 ℃. Monitored by TLC, After the reaction finished, Et_3N was added to quench excess NFSI. Then the resulting mixture was added 20 mL H_2O and extracted subsequently with dichloromethane. The combined organic extracts were dried over Na_2SO_4 and concentrated in vacuum. The resulting residue was purified by silica gel column chromatography (petrol ether/ethyl acetate) to afford the desired products.



Experiments of radical inhibition.

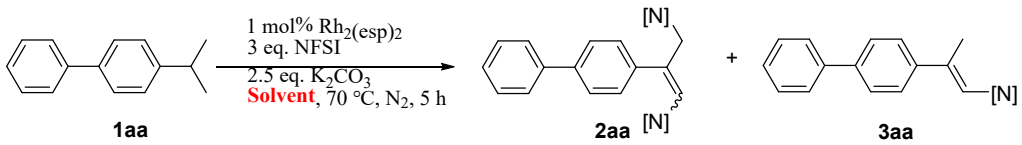
To a 25 mL tube equipped with a stir bar was charged with **1aa** (0.4 mmol), Rh_2(5 - ^{t}Bu - esp)$_2$ (3.5 mg, 0.004 mmol), NFSI (378 mg, 1.2 mmol), NaHCO $_3$ (67 mg, 0.8 mmol), and $CHCl_3$ (2 mL), TEMPO (2, 2, 6, 6 - Tetramethylpip eridinooxy, 63 mg, 0.4 mmol) or BHT (2, 6 - Di - tert - butyl - 4 - methylp henol, 88 mg, 0.4 mmol) was added at last. After sealed by a rubber plug, th e tube was evacuated and backfilled with nitrogen for three times at low temp

erature. The mixture was subsequently stirred at 65 ℃. After five hours, Et_3N was added to quench NFSI. Then the resulting mixture was added 20 mL H_2O and extracted subsequently with dichloromethane. The combined organic extracts were dried over Na_2SO_4 and concentrated in vacuum. The yields of **2aa**、**3aa** and the ratio of *E*/*Z* of **2aa** are determined via ^1H NMR with nitromethane as the internal standard.



4. Optimization details ([N] = $N(SO_2Ph)_2$)

Table S1 Screening of **solvents**[a].

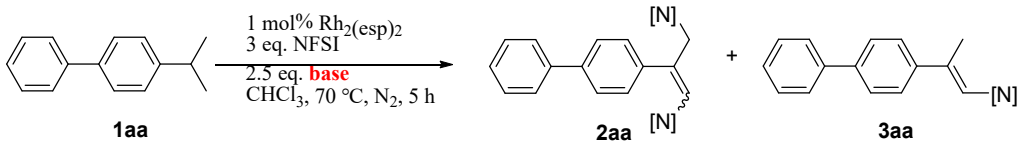


Entry	Solvent	Yield[b] (%)	
		2aa (*Z*/*E*)	**3aa**
1	CH_2Cl_2	28 (75/25)	9
2	DME[c]	9 (68/32)	3
3	EtOAc	N.R.	N.R.
4	Acetonitrile	N.R.	N.R.
5	1,4 - Dioxane	19 (74/26)	6
6	THF	N.R.	N.R.
7	MeOH	N.R.	N.R.

8	$CHCl_3$	70 (78/22)	20
9	Acetone	trace	trace
10	Hexane	trace	trace
11	DCE	34 (77/23)	10
12	Benzene	46 (78/22)	14

[a]Reaction conditions: **1aa** (0.4 mmol), $Rh_2(esp)_2$ (0.004 mmol), NFSI (3 eq., 1.2 mmol), K_2CO_3 (2 .5 eq., 1 mmol) and solvent (2 mL) at 70 ℃ for 5 h under nitrogen. [b]Yields of **2aa**、**3aa** and the ratio of *Z*/*E* of **2aa** are determined via ^1H NMR with nitromethane as the internal standard. DME = Dimethoxyethane. DCE = 1, 2 - Dichloroethane. NFSI = N - Fluorobenzenesulfonimide.

Table S2 Screening of **bases**[a].

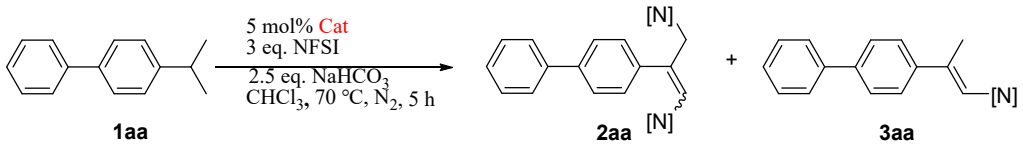


Entry	Base	Yield[b] (%)	
		2aa (*Z*/*E*)	**3aa**
1	Na_2CO_3	75(81/19)	21
2	$NaHCO_3$	75(79/21)	21
3	K_2CO_3	64(78/22)	20
4	K_2HPO_4	74(79/21)	20
5	$K_2HPO_4·3H_2O$	64(78/22)	18
6	KF	65(78/22)	18
7	NaOH	60(74/26)	25
8	NaOAc	8(65/35)	4
9	MgO	12(67/33)	6
10	None	8(71/29)	6

[a]Reaction conditions: **1aa** (0.4 mmol), $Rh_2(esp)_2$ (0.004 mmol), NFSI (3 eq., 1.2 mmol), base (2.5 eq., 1 mmol) and $CHCl_3$ (2 mL) at 70 ℃ for 5 h under nitrogen. [b]Yields of **2aa**、**3aa** and the ratio

of *Z*/*E* of **2aa** are determined via ^{1}H NMR with nitromethane as the internal standard. NFSI = N - Fluorobenzenesulfonimide.

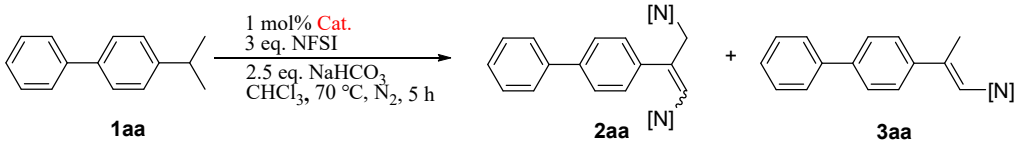
Table S3 Screening of other metal catalysts[a].

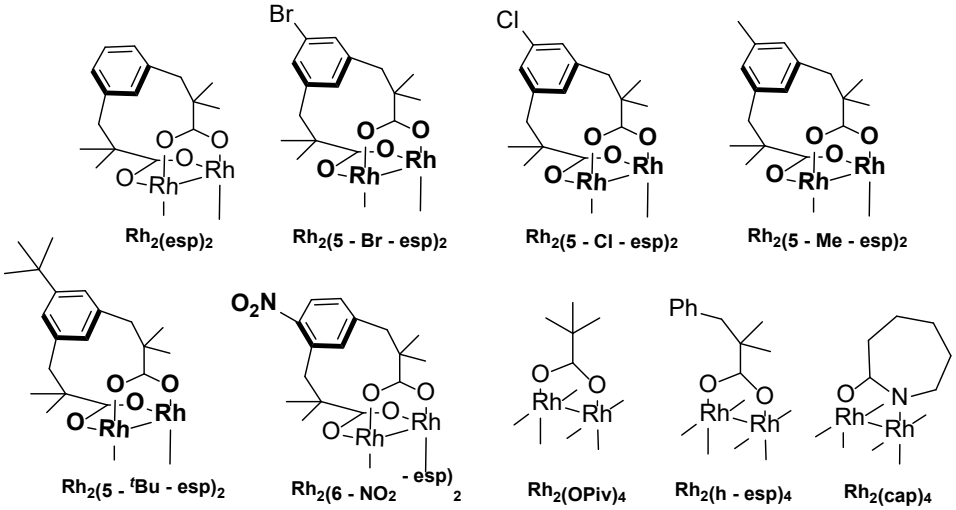


Entry	Catalyst	Yield[b] (%)	
		2aa (*Z*/*E*)	**3aa**
1	$Cu(OAc)_2$	N.D.	N.D.
2	$Cu(acac)_2$	trace	trace
3	$Cu(TFA)_2$	N.D.	N.D.
4	CuI	N.D.	N.D.
5	CuCl	N.D.	N.D.
6	$Fe(acac)_2$	N.R.	N.R.
7	$FeCl_3$	N.R.	N.R.
8	$Mn(OAc)_2$	N.R.	N.R.
9	$Mn(acac)_2$	N.D.	N.D.
10	$Co(OAc)_2$	N.D.	N.D.
11	$Co(acac)_2$	N.R.	N.R.
12	$(Cp^*RhCl_2)_2$	N.R.	N.R.
13	$RhCl_3 \cdot 3H_2O$	N.R.	N.R.

[a]Reaction conditions: **1aa** (0.4 mmol), catalyst (0.02 mmol), NFSI (3 eq., 1.2 mmol), NaH CO_3 (2.5 eq.,1 mmol) and $CHCl_3$ (2 mL) at 70 ℃ for 5 h under nitrogen. [b]Yields of **2a a**、**3aa** and the ratio of *Z*/*E* of **2aa** are determined via ^{1}H NMR with nitromethane as the internal standard. $(Cp^*RhCl_2)_2$ = Bis[(pentamethylcyclopentadienyl)dichloro-rhodium]. NFSI = N - Fluorobenzenesulfonimide.

Table S4 Screening of Dirhodium catalysts [a].

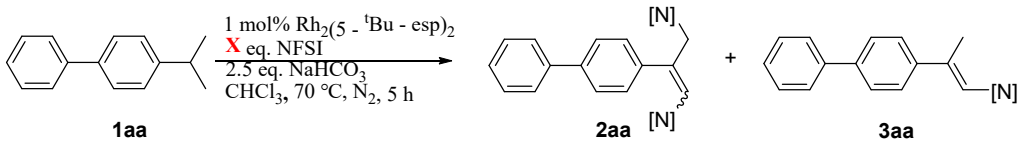




Entry	Cat.	Yield[b] (%)	
		2aa (*Z*/*E*)	**3aa**
1	$Rh_2(OAc)_4$	65(78/22)	18
2	$Rh_2(tfa)_4$	N.D.	N.D.
3	$Rh_2(cap)_4$	7(74/26)	3
4	$Rh_2(opiv)_4$	51(76/24)	15
5	$Rh_2(esp)_2$	75(78/22)	21
6	$Rh_2(5\text{ - }^tBu\text{ - esp})_2$	77(80/20)	21
7	$Rh_2(5 – Br\text{ - esp})_2$	71(80/20)	20
8	$Rh_2(5 – Cl\text{ - esp})_2$	71(79/21)	19
9	$Rh_2(5 – Me\text{ - esp})_2$	77(79/21)	20
10	$Rh_2(h\text{ - esp})_4$	65(77/23)	17
11	$Rh_2(6\text{ - }NO_2\text{ - esp})_2$	74(79/21)	22
12	None	N.R.	N.R.

[a]Reaction conditions: **1aa** (0.4 mmol), catalyst (0.004 mmol), NFSI (3 eq., 1.2 mmol), $NaHCO_3$ (2 .5 eq.,1 mmol) and $CHCl_3$ (2 mL) at 70 ℃ for 5 h under nitrogen. [b]Yields of **2aa**、**3aa** and the ratio of *Z*/*E* of **2aa** are determined via ^1H NMR with nitromethane as the internal standard. NFSI = N - Fluorobenzenesulfonimide.

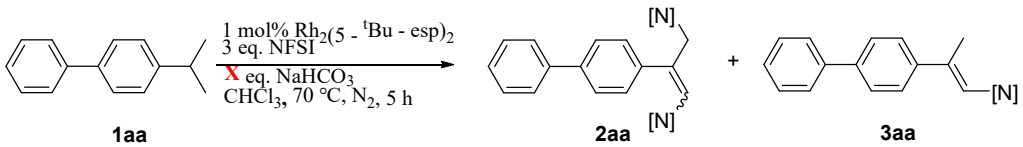
Table S5 Screening of equivalent of NFSI [a].



Entry	X	Yield[b] (%)	
		2aa (*Z*/*E*)	**3aa**
1	1	25(80/20)	9
2	2	54(79/21)	18
3	3	71(78/22)	22
4	4	59(79/21)	18
5	5	60(77/23)	18

[a]Reaction conditions: **1aa** (0.4 mmol), Rh_2(5 - ^{t}Bu - esp)$_2$ (0.004 mmol), NFSI (X eq., X * 0.4 mmol), $NaHCO_3$ (2.5 eq., 1 mmol) and $CHCl_3$ (2 mL) at 70 ℃ for 5 h under nitrogen. [b]Yields of **2aa**、**3aa** and the ratio of *Z*/*E* of **2aa** are determined via ^1H NMR with nitromethane as the internal standard. NFSI = N - Fluorobenzenesulfonimide.

Table S6 Screening of equivalent of $NaHCO_3$ [a].

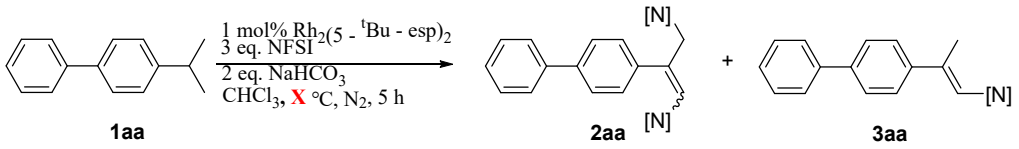


Entry	X	Yield[b] (%)	
		2aa (*Z*/*E*)	**3aa**
1	2	76(79/21)	22

2	2.5	74(79/21)	22
3	3	77(79/21)	22

[a]Reaction conditions: **1aa** (0.4 mmol), Rh_2(5 - ^{t}Bu - esp)$_2$ (0.004 mmol), NFSI (3 eq., 1.2 mmol), $NaHCO_3$ (X eq., X * 0.4 mmol) and $CHCl_3$ (2 mL) at 70 ℃ for 5 h under nitrogen. [b]Yields of **2aa**、**3aa** and the ratio of *Z*/*E* of **2aa** are determined via ^{1}H NMR with nitromethane as the internal standard. NFSI = N - Fluorobenzenesulfonimide.

Table S7 Screening of reaction temperature [a].

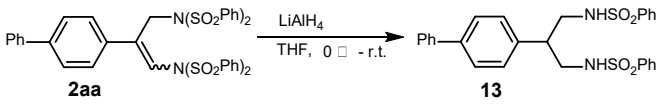


Entry	X	Yield[b] (%)	
		2aa (*Z*/*E*)	**3aa**
1	r.t.	15(78/22)	5
2	40	28(75/25)	9
3	50	50(78/22)	17
4	60	72(80/20)	22
5	65	78(79/21) [70][c]	21[25][c]
6	70	77(79/21)	22
7	90	67(76/24)	19

[a]Reaction conditions: **1aa** (0.4 mmol), Rh_2(5 - ^{t}Bu - esp)$_2$ (0.004 mmol), NFSI (3 eq., 1.2 mmol), $NaHCO_3$(2 eq., 0.8 mmol) and $CHCl_3$(2 mL) at X ℃ for 5 h under nitrogen. [b]Yields of **2aa**、**3aa** and the ratio of *Z*/*E* of **2aa** are determined via ^{1}H NMR with nitromethane as the internal standard. [c]Isolated yields. NFSI = N - Fluorobenzenesulfonimide.

5. Reduction and further transformation of product 2aa

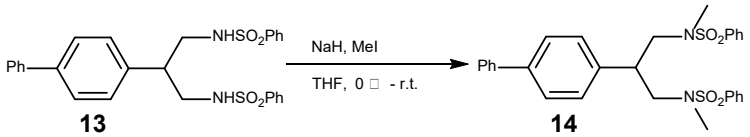
Reduction and deprotection of **2aa**[15]



2aa 13

To a 250 mL round bottom flask equipped with a stir bar, **2aa** was added (500 mg). After sealed by a rubber plug, the flask was then evacuated and backfilled with argon for three times. 20 mL dry THF was then added to the flask. Once completed, 20 mL $LiAlH_4$ solution (1 M in THF) was added slowly with a syringe in the ice bath condition. The reaction mixture was then moved to room temperature. Monitored by TLC, after the reaction completed, THF/H_2O = 10/1 and 1 M NaOH solution were added to quench this reaction. Then the mixture was filtered through a short pad of silica gel and the fiter cake was washed with ethyl acetate. The filtrate was extracted with ethyl acetate after was added 100 mL water. Then the combined organic phase was concentrated in vacuum after the extracts was washed with brine and dried over anhydrous Na_2SO_4. The resulting residue was purified by silica gel column chromatography with a gradient eluant of petrol ether/ethyl acetate to afford the desired products **13** as a white solid (152 mg, 47% yield).

Synsthsis of **14**

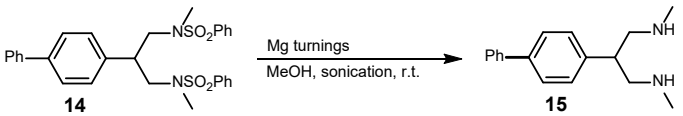


13 14

To a 25 mL round bottom flask equipped with a stir bar, **13** was added (20 mg), The round bottom flask was then evacuated and backfilled with argon for three times after sealed by a rubber plug. Once 5 mL THF was added, At Ar atmosphere, NaH (6 eq.) was added in the ice bath condition. After 30 minutes, MeI (3 eq.) was added. The mixture was then moved to room temperature. Monitored by TLC, after the reaction completed, it was quenched by 10 mL water and extracted with ethyl acetate. After washed with brine and dried over anhydrous Na_2SO_4, the combined organic layer was concentrated in vacuum and was purified by silica gel column chromatography with a

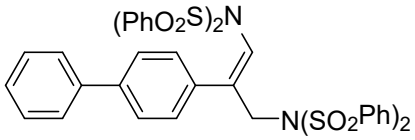
gradient eluant of petrol ether/ethyl acetate to afford the desired products **14** as a colorless viscous liquid (20 mg, 95% yield).

Deprotection of **14**[16-18]



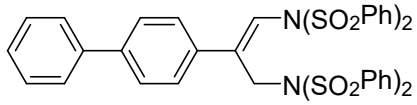
To a 25 mL tube charged with **14** (40 mg), Mg turnings (180 mg 100 eq.) was added. The tube was then evacuated and backfilled with argon for three times after sealed by a rubber plug, 2 mL MeOH was then added. After sonicated for 4 hours at room temperature, 20 mL 1 M HCl was added to the mixture. The aqueous phase was washed with ethyl acetate. Then saturated $NaHCO_3$ and Na_2CO_3 solution was added to the reserved aqueous phase successively, the aqueous phase was washed with ethyl acetate sequentially. At last, NaOH solid was added to tune the aqueous phase PH to 14, and then extracted by ethyl acetate. This last organic layer was reserved and was then concentrated in vacuum after washed by brine and dried over anhydrous Na_2SO_4 to afford the desired product **15** as a light yellow oil (10 mg, 53% yield).

6. Characterization data of isolated products

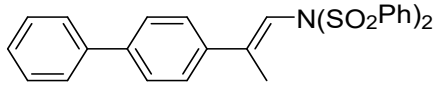


(*E*)-N,N'-(2-([1,1'-biphenyl]-4-yl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl)benzenesulfonamide) ((*E*)-2aa): Data for **(*E*)-2aa**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 8/1). White solid. TLC: R_f = 0.17 (n-hexane/EtOAc = 8/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.060 - 8.000 (m, 4H), 7.645 - 7.593 (m, 6H), 7.590 - 7.495 (m, 8H), 7.480 - 7.395 (m, 7H), 7.375 - 7.300 (m, 4H), 5.672 (t, *J* = 1.6 Hz, 1H), 4.747

(d, *J* = 1.6 Hz, 2H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 145.827, 141.614, 140.408, 139.000, 138.173, 134.190, 133.901, 133.034, 129.526, 129.198, 129.178, 129.137, 128.771, 127.925, 127.397, 127.113, 119.405, 52.329. HRMS (ESI, M/Z): calcd for $C_{39}H_{32}N_2O_8S_4Na$ [(M+Na) $^+$]: 807.0934, found 807.0939.

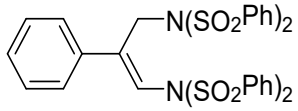


(*Z*)-N,N'-(2-([1,1'-biphenyl]-4-yl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl)benzenesulfonamide) ((*Z*)-2aa): Data for **(*Z*)-2aa**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 8/1). White solid. TLC: R_f = 0.15 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.050 - 7.980 (m, 4H), 7.675 - 7.585 (m, 8H), 7.580 - 7.450 (m, 12H), 7.440 - 7.330 (m, 5H), 5.930 (t, *J* = 1.6 Hz, 1H), 4.975 (d, *J* = 1.6 Hz, 2H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 147.419, 141.651, 140.394, 138.934, 138.753, 134.498, 134.377, 133.889, 129.200, 129.149, 128.966, 128.867, 128.729, 127.902, 127.231, 127.134, 119.588, 48.062. HRMS (ESI, M/Z): calcd for $C_{39}H_{32}N_2O_8S_4Na$ [(M+Na) $^+$]: 807.0934, found 807.0939.

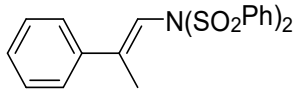


(*E*)-N-(2-([1,1'-biphenyl]-4-yl)prop-1-en-1-yl)-N-(phenylsulfonyl) benzenesulfonamide (3aa): Data for **3aa**: The general procedure was followed, and flash chromatography (n-hexane/EtOAc = 10/1) afforded 49 mg (25% yield). White solid. TLC: R_f = 0.33 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.060 - 8.005 (m, 4H), 7.708 - 7.652 (m, 2H), 7.625 - 7.545 (m, 8H), 7.500 - 7.435 (m, 4H), 7.405 - 7.350 (m, 1H), 6.185 - 6.144 (m, 1H), 1.760 (d, *J* = 1.2 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.514, 142.015, 140.416, 139.632, 137.989, 134.110, 129.255, 129.026, 128.408, 127.811, 127.382, 127.1

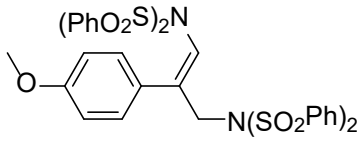
77, 126.977, 117.037, 16.496. HRMS (ESI, M/Z): calcd for $C_{27}H_{23}NO_4S_2Na$ [(M+Na) $^+$]: 512.0961, found 512.0962.



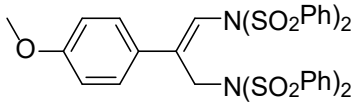
(*Z*)-N,N'-(2-phenylprop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl)benzenesulfonamide) ((*Z*)-2a): Data for **(*Z*)-2a**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 8/1). White powder**.** TLC: R_f = 0.27 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.020 - 7.965 (m, 4H), 7.640 - 7.550 (m, 8H), 7.505 - 7.445 (m, 4H), 7.420 - 7.340 (m, 7H), 7.320 - 7.270 (m, 2H), 5.849 (t, *J* = 1.6 Hz, 1H), 4.956 (d, *J* = 1.6 Hz, 2H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 147.780, 138.941, 138.673, 135.609, 134.376, 133.885, 129.184, 128.982, 128.916, 128.751, 128.710, 128.650, 128.599, 119.822, 48.033. HRMS (ESI, M/Z): calcd for $C_{33}H_{28}N_2O_8S_4Na$ [(M+Na) $^+$]: 731.0621, found 731.0627.



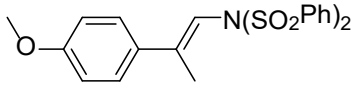
(*E*)-N-(2-phenylprop-1-en-1-yl)-N-(phenylsulfonyl)benzenesulfonamide (3a)[19]: Data for **3a**: The general procedure was followed, and flash chromatography (n-hexane/EtOAc = 10/1) afforded 20 mg (12% yield). White solid. TLC: R_f = 0.34 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.020 (d, *J* = 8 Hz, 4H), 7.670 (t, *J* = 7.2 Hz, 2H), 7.600 - 7.530 (m, 4H), 7.419 - 7.357 (m, 5H), 6.092 (s, 1H), 1.723 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 150.084, 139.643, 139.220, 134.098, 129.246, 129.104, 128.725, 128.410, 126.568, 117.150, 16.614. HRMS (ESI, M/Z): calcd for $C_{21}H_{19}NO_4S_2Na$ [(M+Na) $^+$]: 436.0648, found 436.0653.



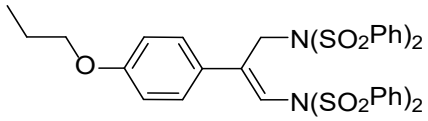
(*E*)-N,N'-(2-(4-methoxyphenyl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl)benzenesulfonamide) ((*E*)-2b): Data for **(*E*)-2b**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 8/1). Yellow solid. TLC: R_f = 0.12 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.050 - 7.990 (m, 4H), 7.622 (dd, *J* = 8.4, 1.2 Hz, 4H), 7.600 - 7.525 (m, 4H), 7.485 - 7.425 (m, 4H), 7.410 - 7.350 (m, 4H), 7.335 - 7.275 (m, 2H), 6.810 - 6.745 (m, 2H), 5.650 - 5.595 (m, 1H), 4.677 (d, *J* = 1.6 Hz, 2H), 3.830 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 160.130, 145.624, 139.049, 138.271, 134.148, 133.846, 130.345, 129.148，129.114，128.763，128.728, 126.105, 118.976, 114.187, 55.439, 52.420. HRMS (ESI, M/Z): calcd for $C_{34}H_{30}N_2O_9S_4Na$ [$(M+Na)^+$]: 761.0727, found 761.0732.



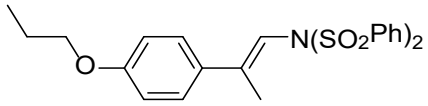
(*Z*)-N,N'-(2-(4-methoxyphenyl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl)benzenesulfonamide) ((*Z*)-2b): Data for **(*Z*)-2b**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 8/1). Yellow solid. TLC: R_f = 0.08 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.025 - 7.960 (m, 4H), 7.695 - 7.645 (m, 4H), 7.635 - 7.550 (m, 4H), 7.500 - 7.440 (m, 4H), 7.430 - 7.370 (m, 4H), 7.328 - 7.284 (m, 2H), 6.825 - 6.760 (m, 2H), 5.787 (t, *J* = 1.6 Hz, 1H), 4.948 (d, *J* = 1.6 Hz, 2H), 3.834 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 160.204, 147.262, 139.067, 138.664, 134.329, 133.842, 129.885, 129.140, 128.989, 128.862, 128.673, 127.782, 118.752, 113.968, 55.473, 48.194. HRMS (ESI, M/Z): calcd for $C_{34}H_{30}N_2O_9S_4Na$ [$(M+Na)^+$]:761.0727, found 761.0732.



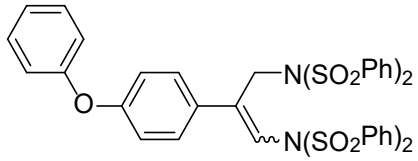
(*E*)-N-(2-(4-methoxyphenyl)prop-1-en-1-yl)-N-(phenylsulfonyl)benzenesulfonamide (3b)[20]: Data for **3b**: The general procedure was followed, and flash chrom atography (n-hexane/EtOAc = 10/1) afforded 36 mg (20% yield). Yellow solid. TLC: R_f = 0.32 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.04 5 - 7.965 (m, 4H), 7.690 - 7.630 (m, 2H), 7.595 - 7.525 (m, 4H), 7.390 - 7.3 10 (m, 2H), 6.920 - 6.865 (m, 2H), 6.037 (q, *J* = 1.2 Hz, 1H), 3.830 (s, 3H), 1.692 (d, *J* = 1.2 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 160.442, 149.31 5, 139.655, 134.040, 131.467, 129.208, 128.400, 127.780, 115.552, 114.058, 55. 502, 16.453. HRMS (ESI, M/Z): calcd for $C_{22}H_{21}NO_5S_2Na$ [(M+Na) $^+$]: 466.07 54, found 466.0765.



(*Z*)-N,N'-(2-(4-propoxyphenyl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl)benzene sulfonamide) ((*Z*)-2c): Data for **(*Z*)-2c**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 8/1). White po wder. TLC: R_f = 0.16 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.000 (d, *J* = 7.6 Hz, 4H), 7.666 (d, *J* = 7.6 Hz, 4H), 7.588 (dt, *J* = 14, 7. 2 Hz, 4H), 7.505 - 7.443 (m, 4H), 7.426 - 7.366 (m, 4H), 7.310 - 7.270 (m, 2H), 6.820 - 6.730 (m, 2H), 5.800 - 5.745 (m, 1H), 4.940 (d, *J* = 1.2 Hz, 2 H), 3.935 (t, *J* = 6.4 Hz, 2H), 1.905 - 1.790 (m, 2H), 1.145 - 1.030 (m, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 159.827, 147.314, 139.090, 138.702, 134.313, 133.823, 129.859, 129.136, 129.001, 128.855, 128.696, 127.533, 118.625, 114. 473, 69.692, 48.194, 22.710, 10.726. HRMS (ESI, M/Z): calcd for $C_{36}H_{34}N_2O_9S_4Na$ [(M+Na) $^+$]: 789.1040, found 789.1050.

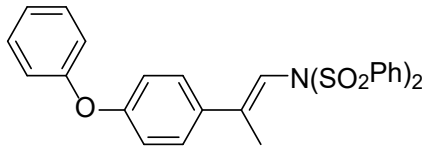


(*E*)-N-(phenylsulfonyl)-N-(2-(4-propoxyphenyl)prop-1-en-1-yl)benzenesulfonamide (3c): Data for **3c**: The general procedure was followed, and flash chromatography (n-hexane/EtOAc = 10/1) afforded 42 mg (22% yield). Yellow solid. TLC: R_f = 0.41 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.030 - 7.975 (m, 4H), 7.695 - 7.630 (m, 2H), 7.580 - 7.525 (m, 4H), 7.350 - 7.305 (m, 2H), 6.910 - 6.840 (m, 2H), 6.049 - 6.019 (m, 1H), 3.962 - 3.910 (m, 2H), 1.870 - 1.765 (m, 2H), 1.688 (d, *J* = 1.2 Hz, 3H), 1.073 - 1.015 (m, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 160.050, 149.368, 139.697, 134.020, 131.249, 129.201, 128.412, 127.746, 115.441, 114.617, 69.766, 22.668, 16.438, 10.631. HRMS (ESI, M/Z): calcd for $C_{24}H_{25}NO_5S_2Na$ [$(M+Na)^+$]: 494.1067, found 494.1073.

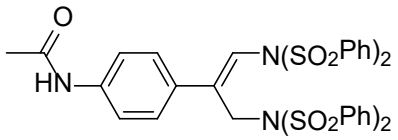


(*E/Z*)-N, N'-(2-(4-phenoxyphenyl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl)benzenesulfonamide) ((*E/Z*)-2d): Data for **(*E/Z*)-2d**: The general procedure was followed, and flash chromatography (n-hexane/EtOAc = 5/1) afforded 102 mg (32% yield). Yellow solid. TLC: R_f = 0.17 (n-hexane/EtOAc = 5/1). *Z*:*E* = 3:1. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.060 - 7.970 (m, 5.52H), 7.740 - 7.690 (m, 4.10H), 7.685 - 7.640 (m, 1.87H), 7.630 - 7.555 (m, 5.30H), 7.515 - 7.435 (m, 9.40H), 7.434 - 7.374 (m, 4.56H), 7.330 - 7.275 (m, 2.84H), 7.220 - 7.145 (m, 1.50H), 7.090 - 7.020 (m, 2.79H), 6.900 - 6.840 (m, 2.70H), 5.824 (t, *J* = 1.6 Hz, 1H), 5.680 - 5.650 (m, 0.33H), 4.974 (d, *J* = 1.2 Hz, 2H), 4.680 (d, *J* = 1.2 Hz, 0.68H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 158.201, 158.172, 156.352, 156.171, 146.976, 145.633, 139.107, 138.601, 138.200, 134.395, 134.204, 133.967, 133.928, 130.535, 130.083, 130.059, 129.996, 129.946, 129.166, 1

29.096, 129.030, 128.937, 128.816, 128.755, 128.677, 128.273, 124.200, 124.109, 119.694, 119.611, 119.425, 119.224, 118.116, 118.083, 52.427, 48.140. HR MS (ESI, M/Z): calcd for $C_{39}H_{32}N_2O_9S_4Na$ [(M+Na) $^+$]: 823.0883, found 823.0892.

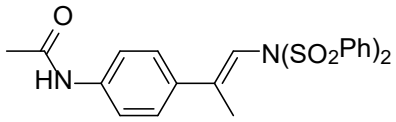


(*E*)–N-(2-(4-phenoxyphenyl)prop-1-en-1-yl)-N-(phenylsulfonyl)benzenesulfonamide (3d): Data for **3d**: The general procedure was followed, and flash chromatography (n-hexane/EtOAc = 10/1) afforded 34 mg (17% yield). Light yellow solid.TLC: R_f = 0.43 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.045 - 7.980 (m, 4H), 7.700 - 7.640 (m, 2H), 7.590 - 7.530 (m, 4H), 7.400 - 7.330 (m, 4H), 7.175 - 7.115 (m, 1H), 7.060 - 7.010 (m, 2H), 7.005 - 6.960 (m, 2H), 6.080 - 6.040 (m, 1H), 1.711 (d, *J* = 1.2 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 158.396, 156.746, 149.193, 139.665, 134.092, 133.854, 130.027, 129.244, 128.418, 127.998, 123.939, 119.446, 118.588, 116.424, 16.557. HRMS (ESI, M/Z): calcd for $C_{27}H_{23}NO_5S_2Na$ [(M+Na) $^+$]: 528.0910, found 528.0916.

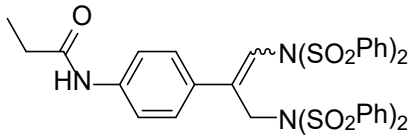


(*Z*)-N-(4-(1,3-bis(N-(phenylsulfonyl)phenylsulfonamido)prop-1-en-2-yl)phenyl)acetamide ((*Z*)-2e): Data for **(*Z*)-2e**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 1.5/1). White powder. TLC: R_f = 0.36 (n-hexane/EtOAc = 1/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.990 - 7.940 (m, 4H), 7.720 - 7.665 (m, 4H), 7.660 - 7.530 (m, 5H), 7.500 - 7.445 (m, 4H), 7.440 - 7.330 (m, 7H), 7.279 (s, 1H), 5.777 (s, 1H), 5.000 (d,

J = 1.2 Hz, 2H), 2.191 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 168.609, 147.123, 138.963, 138.599, 138.407, 134.451, 134.016, 131.097, 129.193, 129.127, 128.990, 128.977, 128.598, 119.772, 119.601, 48.149, 24.714. HRMS (ESI, M/Z): calcd for $C_{35}H_{31}N_3O_9S_4Na$ [(M+Na)$^+$]: 788.0836, found 788.0826.



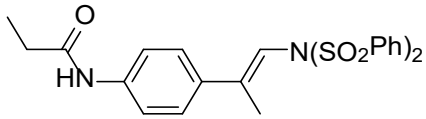
(*E*)-N-(4-(1-(N-(phenylsulfonyl)phenylsulfonamido)prop-1-en-2-yl)phenyl)acetamide (3e)[20]: Data for **3e**: The general procedure was followed, and flash chromatography (n-hexane/EtOAc = 2/1) afforded 52 mg (28% yield). White powder. TLC: R_f = 0.49 (n-hexane/EtOAc = 1/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.022 - 7.950 (m, 4H), 7.700 - 7.625 (m, 2H), 7.588 - 7.528 (m, 4H), 7.504 (d, *J* = 8.8 Hz, 2H), 7.335 (d, *J* = 8.4 Hz, 2H), 7.306 (s, 1H), 6.055 (d, *J* = 1.2 Hz, 1H), 2.173 (s, 3H), 1.698 (d, *J* = 1.6 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 168.500, 149.238, 139.527, 138.793, 134.761, 134.150, 129.265, 128.389, 127.209, 119.784, 116.429, 24.767, 16.380. HRMS (ESI, M/Z): calcd for $C_{23}H_{22}N_2O_5S_2Na$ [(M+Na)$^+$]: 493.0863, found 493.0860.



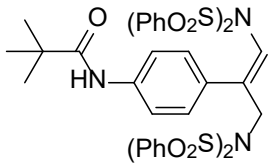
(*E/Z*)-N-(4-(1,3-bis(N-(phenylsulfonyl)phenylsulfonamido)prop-1-en-2-yl)phenyl)propionamide ((*E/Z*)-2f): Data for **(*E/Z*)-2f**: The general procedure was followed, and flash chromatography (n-hexane/EtOAc = 2/1) afforded 175 mg (56% yield). White solid. TLC: R_f = 0.06 (n-hexane/EtOAc = 2/1). *Z*:*E* = 2:1 ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.040 - 7.940 (m, 5.81H), 7.740 - 7.670 (m, 4.15H), 7.660 - 7.525 (m, 7.87H), 7.505 - 7.435 (m, 5.98H), 7.435 - 7.340 (m, 8.82H), 7.265 (s, 1.62H), 7.244 (s, 1.35H), 7.191 (s, 1.45H), 5.772 (s, 1H), 5.696 (s, 0.44H), 5.011 (d, *J* = 1.2 Hz, 2H), 4.660 (d, *J* = 1.2 Hz, 0.85H), 2.419

(qd, *J* = 7.6, 2.4 Hz, 2.98H), 1.275 (td, *J* = 7.6, 2.8 Hz, 4.89H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 172.348, 172.337, 147.115, 147.097, 145.698, 145.688, 1 38.838, 138.759, 138.727, 138.703, 138.254, 137.950, 134.378, 134.183, 133.94 9, 130.772, 129.442, 129.106, 128.991, 128.902, 128.851, 128.775, 128.592, 12 8.486, 119.701,119.567, 119.452, 119.115, 52.255, 48.062, 30.675, 9.716, 9.674.

HRMS (ESI, M/Z): calcd for $C_{36}H_{33}N_3O_9S_4Na$ [$(M+Na)^+$]: 802.0992, found 802.0993.

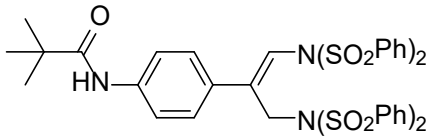


(*E*)-N-(4-(1-(N-(phenylsulfonyl)phenylsulfonamido)prop-1-en-2-yl)phenyl)propio namide (3f): Data for **3f**: The general procedure was followed, and flash chr omatography (n-hexane/EtOAc = 2/1) afforded 40 mg (21% yield). White solid. TLC: R_f = 0.11 (n-hexane/EtOAc = 2/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.0 25 - 7.960 (m, 4H), 7.700 - 7.625 (m, 2H), 7.585 - 7.500 (m, 6H), 7.365 - 7. 310 (m, 2H), 7.213 (s, 1H), 6.057 (d, *J* = 1.2 Hz, 1H), 2.399 (q, *J* = 7.6 Hz, 2H), 1.699 (d, *J* = 1.6 Hz, 3H), 1.276 - 1.228 (m, 3H). ^{13}C NMR (101 M Hz, $CDCl_3$) δ 172.213, 149.252, 139.522, 138.901, 134.585, 134.138, 129.253, 128.382, 127.193, 119.673, 116.354, 30.852, 16.372, 9.690. HRMS (ESI, M/Z): calcd for $C_{24}H_{24}N_2O_5S_2Na$ [$(M+Na)^+$]: 507.1019, found 507.1021.

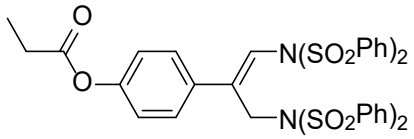


(*E*)-N-(4-(1,3-bis(N-(phenylsulfonyl)phenylsulfonamido)prop-1-en-2-yl)phenyl)pi valamide ((*E*)-2g): Data for **(*E*)-2g**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 3/1). White solid. TLC: R_f = 0.30 (n-hexane/EtOAc = 2/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.05 0 - 7.980 (m, 4H), 7.665 - 7.615 (m, 4H), 7.605 - 7.515 (m, 4H), 7.495 - 7.4

35 (m, 4H), 7.410 - 7.345 (m, 6H), 7.302 (s, 1H), 7.249 (d, *J* = 9.2 Hz, 2H), 5.712 (s, 1H), 4.658 (d, *J* = 1.6 Hz, 2H), 1.362 (s, 9H). ^{13}C NMR (101 M Hz, $CDCl_3$) δ 176.671, 145.517, 138.973, 138.661, 138.232, 134.210, 133.901, 129.649, 129.489, 129.194, 129.022, 128.832, 128.763, 119.989, 119.546, 52.29 5, 39.853, 27.791. HRMS (ESI, M/Z): calcd for $C_{38}H_{37}N_3O_9S_4Na$ [(M+Na) $^+$]: 830.1305, found 830.1305.

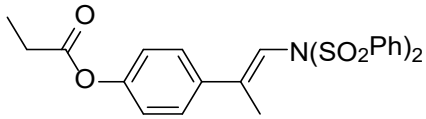


(*Z*)-N-(4-(1,3-bis(N-(phenylsulfonyl)phenylsulfonamido)prop-1-en-2-yl)phenyl)pi valamide ((*Z*)-2g): Data for **(*Z*)-2g**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 3/1). White solid. TLC: R_f = 0.24 (n-hexane/EtOAc = 2/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.00 4 - 7.966 (m, 4H), 7.745 - 7.695 (m, 4H), 7.640 - 7.560 (m, 4H), 7.474 (t, *J* = 8 Hz, 4H), 7.409 (t, *J* = 8.4 Hz, 6H), 7.322 (s, 1H), 7.248 (d, *J* = 10 Hz, 2H), 5.780 - 5.740 (m, 1H), 5.024 (d, *J* = 1.6 Hz, 2H), 1.352 (s, 9H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 176.758, 146.997, 139.226 ,138.616, 138.510, 134. 413, 133.916, 131.141, 129.172, 129.115, 129.080, 128.977, 128.631, 119.857, 119.728, 48.293, 39.854, 27.787. HRMS (ESI, M/Z): calcd for $C_{38}H_{37}N_3O_9S_4N$ a [(M+Na) $^+$]: 830.1305, found 830.1305.

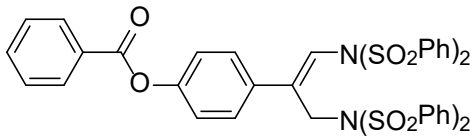


(*Z*)-4-(1,3-bis(N-(phenylsulfonyl)phenylsulfonamido)prop-1-en-2-yl)phenyl prop ionate ((*Z*)-2h): Data for **(*Z*)-2h**: The general procedure was followed, and w as purified with flash chromatography (n-hexane/EtOAc = 8/1). White powder. TLC: R_f = 0.11 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.98

5 (d, *J* = 7.6 Hz, 4H), 7.656 (d, *J* = 7.6 Hz, 4H), 7.625 - 7.560 (m, 4H), 7.510 - 7.420 (m, 8H), 7.387(d, *J* = 8.4 Hz, 2H), 7.013 (d, *J* = 8.4 Hz, 2H), 5.833 (s, 1H), 4.949 (d, *J* = 1.2 Hz, 2H), 2.637 (q, *J* = 7.6 Hz, 2H), 1.311 (t, *J* = 7.6 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 172.886, 151.343, 146.941, 138.821, 138.583, 134.413, 134.001, 132.949, 129.697, 129.213, 129.029, 128.956, 128.673, 121.858, 119.972, 47.873, 27.906, 9.225. HRMS (ESI, M/Z): calcd for $C_{36}H_{32}N_2O_{10}S_4Na$ [$(M+Na)^+$]: 803.0832, found 803.0817.

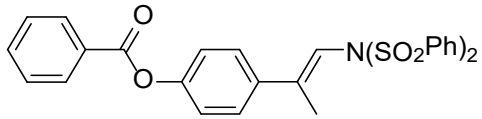


(*E*)-4-(1-(N-(phenylsulfonyl)phenylsulfonamido)prop-1-en-2-yl)phenyl propionate (3h): Data for **3h**: The general procedure was followed, and flash chromatography (n-hexane/EtOAc =10/1) afforded 22 mg (12% yield). White solid. TLC: R_f = 0.27 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.025 - 7.970 (m, 4H), 7.670 (tt, *J* = 6.8, 1.2 Hz, 2H), 7.590 - 7.530 (m, 4H), 7.397 (dt, *J* = 8.8, 2.8 Hz, 2H), 7.089 (dt, *J* = 8.8, 2.8 Hz, 2H), 6.072 (d, *J* = 1.2 Hz, 1H), 2.608 (q, *J* = 7.6 Hz, 2H), 1.707 (d, *J* = 1.2 Hz, 3H), 1.278 (t, *J* = 7.6 Hz, 4H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 173.009, 151.417, 149.136, 139.581, 136.702, 134.130, 129.270, 128.401, 127.671, 121.903, 117.28, 27.890, 16.610, 9.182. HRMS (ESI, M/Z): calcd for $C_{24}H_{23}NO_6S_2Na$ [$(M+Na)^+$]: 508.0859, found 508.0862.

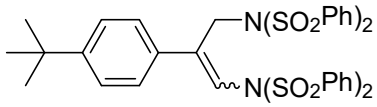


(*Z*)-4-(1,3-bis(N-(phenylsulfonyl)phenylsulfonamido)prop-1-en-2-yl)phenyl benzoate ((*Z*)-2i): Data for **(*Z*)-2i**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 8/1). White powder. TLC: R_f = 0.12 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.270

- 8.210 (m, 2H), 8.025 - 7.970 (m, 4H), 7.705 - 7.670 (m, 4H), 7.655 - 7.535 (m, 7H), 7.520 - 7.465 (m, 7H), 7.460 - 7.415 (m, 3H), 7.180 - 7.120 (m, 2 H), 5.862 (t, *J* = 1.6 Hz, 1H), 4.984 (d, *J* = 1.6 Hz, 2H). ^{13}C NMR (101 M Hz, $CDCl_3$) δ 165.080, 151.523, 146.979, 138.880, 138.588, 134.435, 134.028, 133,961, 133.143, 130.362, 129.798, 129.468, 129.235, 129.075, 128.985, 128.8 31, 128.702, 121.987, 120.079, 47.957. HRMS (ESI, M/Z): calcd for $C_{40}H_{32}N_2O_{10}S_4Na$ [(M+Na) $^+$]: 851.0832, found 851.0829.

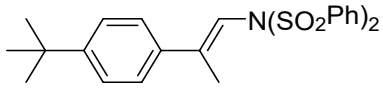


(*E*)-4-(1-(N-(phenylsulfonyl)phenylsulfonamido)prop-1-en-2-yl)phenyl benzoate (3i): Data for **3i**: The general procedure was followed, and flash chromatogra phy (n-hexane/EtOAc = 10/1) afforded 25 mg (12% yield). Light yellow solid. TLC: R_f = 0.28 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.23 2 - 8.194 (m, 2H), 8.045 - 7.990 (m, 4H), 7.705 - 7.635 (m, 3H), 7.595 - 7.5 10 (m, 6H), 7.480 - 7.435 (m, 2H), 7.250 - 7.208 (m, 2H), 6.106 (d, *J* = 1.2 Hz, 1H), 1.739 (d, *J* = 1.2 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 165.229, 151.626, 149.159, 139.607, 136.908, 134.138, 133.926, 130.374, 129.441, 129. 281, 128.779, 128.419, 127.767, 122.074, 117.390, 16.651. HRMS (ESI, M/Z): calcd for $C_{28}H_{23}NO_6S_2Na$ [(M+Na) $^+$]: 556.0859, found 556.0865.

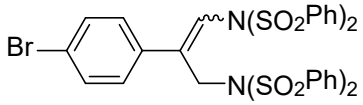


(*E/Z*)-N, N'-(2-(4-(tert-butyl)phenyl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl)b enzenesulfonamide) ((*E/Z*)-2j): Data for **(*E/Z*)-2j**: The general procedure was followed, and flash chromatography (n-hexane/EtOAc = 5/1) afforded 165 mg (54% yield). White powder. TLC: R_f = 0.27 (n-hexane/EtOAc = 5/1). *Z*:*E* = 2:1. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.050 - 7.960 (m, 6.20H), 7.650 - 7.515 (m, 12.66H), 7.505 - 7.420 (m, 6.44H), 7.415 - 7.295 (m, 12.75H), 5.874 (t, *J*

= 1.6 Hz, 1H), 5.563 (t, *J* = 1.6 Hz, 0.54H), 4.922 (d, *J* = 1.6 Hz, 2H), 4.672 (d, *J* = 1.6 Hz, 1H), 1.373 (d, *J* = 2.0 Hz, 13.98H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 152.035, 151.839, 147.521, 146.515, 138.941, 138.909, 138.776, 138.118, 134.298, 134.175, 133.861, 132.487, 131.193, 129.160, 129.150, 128.946, 128.836, 128.767, 128.727, 128.625, 128.215, 125.629, 125.480, 119.101, 118.273, 52.523, 47.845, 34.858, 34.845, 31.593, 31.559. HRMS (ESI, M/Z): calcd for $C_{37}H_{36}N_2O_8S_4Na$ [(M+Na)$^+$]: 787.1247, found 787.1252.

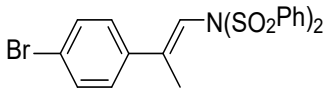


(*E*)-N-(2-(4-(tert-butyl)phenyl)prop-1-en-1-yl)-N-(phenylsulfonyl)benzenesulfonamide (3j): Data for **3j**: The general procedure was followed, and flash chromatography (n-hexane/EtOAc = 10/1) afforded 22 mg (12% yield). Light yellow solid. TLC: R_f = 0.44 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.040 - 7.980 (m, 4H), 7.690 - 7.630 (m, 2H), 7.590 - 7.515 (m, 4H), 7.420 - 7.370 (m, 2H), 7.365 - 7.315 (m, 2H), 6.095 (d, *J* = 1.6 Hz, 1H), 1.702 (d, *J* = 1.2 Hz, 3H), 1.333 (s, 9H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 152.425, 149.708, 139.684, 136.212, 134.044, 129.224, 128.405, 126.274, 125.640, 116.485, 34.812, 31.383, 16.435. HRMS (ESI, M/Z): calcd for $C_{25}H_{27}NO_4S_2Na$ [(M+Na)$^+$]: 492.1274, found 492.1273.

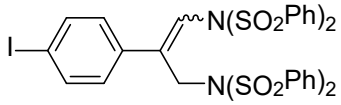


(*E/Z*)-N, N'-(2-(4-bromophenyl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl)benzenesulfonamide) ((*E/Z*)-2k): Data for **(*E/Z*)-2k**: The general procedure was followed, and flash chromatography (n-hexane/EtOAc = 5/1) afforded 118 mg (37% yield). White powder. TLC: R_f = 0.26 (n-hexane/EtOAc = 5/1). *Z*:*E* = 3:2. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.025 - 7.945 (m, 6.95H), 7.695 - 7.560 (m, 14.27H), 7.510 - 7.330 (m, 17.87H), 7.235 - 7.165 (m, 4H), 5.812 (t, *J* = 1.6

Hz, 1H), 5.730 (s, 0.71H), 4.951 (d, *J* = 1.6 Hz, 2H), 4.670 (d, *J* = 1.6 Hz, 1.45H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 146.752, 145.995, 138.946, 138.926, 138.526, 138.109, 134.490, 134.416, 134.259, 134.065, 134.007, 132.756, 131.923, 131.745, 130.749, 130.243, 129.222, 128.997, 128.901, 128.722, 128.610, 123.326, 123.234, 120.256, 120.199, 52.069, 48.087. HRMS (ESI, M/Z): calcd for $C_{33}H_{27}BrN_2O_8S_4Na$ [(M+Na) $^+$]: 808.9726, found 808.9718.

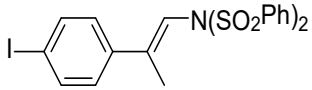


(*E*)-N-(2-(4-bromophenyl)prop-1-en-1-yl)-N-(phenylsulfonyl)benzenesulfonamide (3k): Data for **3k**: The general procedure was followed, and flash chromatography (n-hexane/EtOAc = 10/1) afforded 29 mg (15% yield). White powder. TLC: R_f = 0.53 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.024 - 7.970 (m, 4H), 7.700 - 7.640 (m, 2H), 7.600 - 7.530 (m, 4H), 7.520 - 7.470 (m, 2H), 7.265 - 7.230 (m, 2H), 6.076 (d, *J* = 1.2 Hz, 1H), 1.703 (d, *J* = 1.6 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 148.937, 139.531, 138.046, 134.188, 131.893, 129.283, 128.389, 128.116, 123.305, 117.580, 16.504. HRMS (ESI, M/Z): calcd for $C_{21}H_{18}BrNO_4S_2Na$ [(M+Na) $^+$]: 513.9753, found 513.9763.

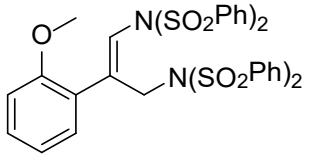


(*E/Z*)-N,N'-(2-(4-iodophenyl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl)benzenesulfonamide) ((*E/Z*)-2l): Data for **(*E/Z*)-2l**: The general procedure was followed, and flash chromatography (n-hexane/EtOAc = 5/1) afforded 140 mg (42% yield). White powder. TLC: R_f = 0.27 (n-hexane/EtOAc = 5/1). *Z*:*E* = 2:1. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.020 - 7.930 (m, 6.17H), 7.680 - 7.535 (m, 15.64H), 7.508 - 7.404 (m, 12.50H), 7.120 - 7.040 (m, 3.10H), 5.816 (t, *J* = 1.6 Hz, 1H), 5.716 (s, 0.50H), 4.940 (d, *J* = 1.6 Hz, 2H), 4.665 (d, *J* = 1.6 Hz, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 146.885, 145.086, 138.913, 138.541, 138.

103, 137.878, 137.715, 135.031, 134.480, 134.257, 134.056, 134.008, 133.377, 130.861, 130.398, 129.223, 129.010, 128.975, 128.929, 128.721, 128.615, 120.206, 120.111, 95.215, 95.015, 52.007, 48.017. HRMS (ESI, M/Z): calcd for $C_{33}H_{27}IN_2O_8S_4Na$ [(M+Na)$^+$]: 856.9588, found 856.9586.

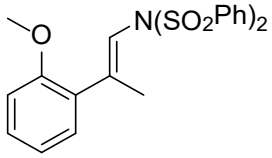


(*E*)-N-(2-(4-iodophenyl)prop-1-en-1-yl)-N-(phenylsulfonyl)benzenesulfonamide (3l): Data for **3l**: The general procedure was followed, and flash chromatography (n-hexane/EtOAc = 10/1) afforded 20 mg (10% yield). Light yellow solid. TLC: R_f = 0.50 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.020 - 7.970 (m, 4H), 7.715 - 7.645 (m, 4H), 7.590 - 7.535 (m, 4H), 7.140 - 7.095 (m, 2H), 6.076 (q, *J* = 1.2 Hz, 1H), 1.693 (d, *J* = 1.6 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.036, 139.549, 138.668, 137.873, 134.177, 129.275, 128.393, 128.273, 117.602, 94.970, 16.425. HRMS (ESI, M/Z): calcd for $C_{21}H_{18}INO_4S_2Na$ [(M+Na)$^+$]: 561.9615, found 561.9619.

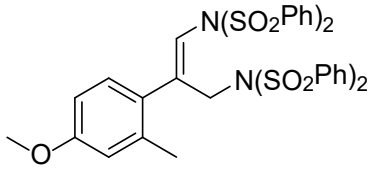


(*Z*)-N,N'-(2-(2-methoxyphenyl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl)benzenesulfonamide) ((*Z*)-2m): Data for **(*Z*)-2m**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 3/1). White solid. TLC: R_f = 0.44 (n-hexane/EtOAc = 3/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.974 (d, *J* = 7.6 Hz, 4H), 7.708 – 7.637 (m, 4H), 7.625 – 7.550 (m, 4H), 7.476 - 7.370 (m, 8H), 7.331 (td, *J* = 8, 1.6 Hz, 1H), 6.964 (dd, *J* = 7.2, 1.2 Hz, 1H), 6.860 - 6.775 (m, 2H), 5.678 (s, 1H), 5.000 (d, *J* = 1.2 Hz, 2H), 3.898 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 157.849, 146.057, 139.162, 138.256, 134.264, 133.698, 131.601, 130.118, 129.195, 128.975, 128.898, 128.706,

125.056, 120.673, 120.493, 110.245, 55.364, 47.962. HRMS (ESI, M/Z): calcd for $C_{34}H_{30}N_2O_9S_4H$ [(M+H) $^+$]: 739.0907, found 739.0910.

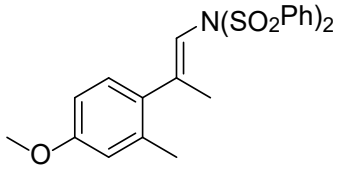


(*E*)-N-(2-(2-methoxyphenyl)prop-1-en-1-yl)-N-(phenylsulfonyl)benzenesulfonamide (3m): Data for **3m**: The general procedure was followed, and flash chrom atography (n-hexane/EtOAc = 5/1) afforded 30 mg (17% yield). Light yellow v iscous liquid. TLC: R_f = 0.25 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.085 – 7.970 (m, 4H), 7.659 (t, *J* = 7.6 Hz, 2H), 7.585 - 7.525 (m, 4H), 7.305 (td, *J* = 8.0, 1.6 Hz, 1H), 7.168 (dd, *J* = 8.0, 1.6 Hz, 1H), 6. 990 – 6.855 (m, 2H), 5.918 (d, *J* = 1.6 Hz, 1H), 3.837 (s, 3H), 1.640 (d, *J* = 1.2 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 156.963, 150.058, 139.770, 13 3.947, 129.769, 129.546, 129.380, 129.117, 128.466, 120.679, 118.799, 111.310, 55.700, 17.539. HRMS (ESI, M/Z): calcd for $C_{22}H_{21}NO_5S_2H$ [(M+H) $^+$]: 444. 0934, found 444.0940.

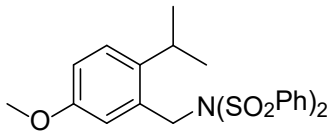


(*Z*)-N, N'-(2-(4-methoxy-2-methylphenyl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl)benzenesulfonamide) ((*Z*)-2n): Data for **(*Z*)-2n**: The general procedure wa s followed, and flash chromatography (n-hexane/EtOAc = 3/1) afforded 151 mg (50% yield). White solid. TLC: R_f = 0.5 (n-hexane/EtOAc = 3/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.975 - 7.881 (m, 4H), 7.657 – 7.512 (m, 8H), 7.475 – 7.420 (m, 4H), 7.414 - 7.354 (m, 4H), 7.281 – 7.244 (m, 1H), 6.735 – 6.614 (m, 2H), 5.685 (t, *J* = 1.6 Hz, 1H), 4.781 (d, *J* = 1.6 Hz, 2H), 3.830 (s, 3H), 2.405 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 159.836, 148.132, 139.178, 1

38.550, 138.509, 134.360, 133.750, 132.024, 129.190, 128.834, 128.782, 127.617, 120.668, 115.861, 111.126, 55.301, 47.974, 20.016. HRMS (ESI, M/Z): calcd for $C_{35}H_{32}N_2O_9S_4H$ [(M+H)$^+$]: 753.1064, found 753.1073.

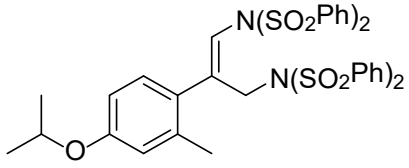


(*E*)-N-(2-(4-methoxy-2-methylphenyl)prop-1-en-1-yl)-N-(phenylsulfonyl)benzenesulfonamide (3n): Data for **3n**: The general procedure was followed, and flash chromatography (n-hexane/EtOAc = 5/1) afforded 29 mg (16% yield). Light yellow viscous liquid. TLC: R_f = 0.27 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.085 – 7.972 (m, 4H), 7.705 - 7.627 (m, 2H), 7.600 - 7.508 (m, 4H), 6.990 (d, *J* = 8.4 Hz, 1H), 6.770 - 6.664 (m, 2H), 5.697 (d, *J* = 1.6 Hz, 1H), 3.797 (s, 3H), 2.303 (s, 3H), 1.613 (d, *J* = 1.6 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 159.387, 151.908, 139.697, 136.863, 134.073, 132.594, 129.223, 129.033, 128.390, 118.836, 115.939, 111.151, 55.391, 20.089, 19.149. HRMS (ESI, M/Z): calcd for $C_{23}H_{23}NO_5S_2H$ [(M+H)$^+$]: 458.1091, found 458.1098.

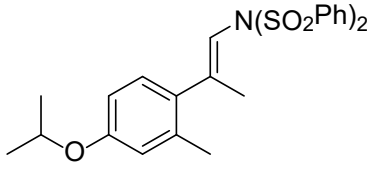


N-(2-isopropyl-5-methoxybenzyl)-N-(phenylsulfonyl)benzenesulfonamide (4n): Data for **4n**: The general procedure was followed, and flash chromatography (n-hexane/EtOAc = 5/1) afforded 44 mg (24% yield). White solid. TLC: R_f = 0.38 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.875 - 7.785 (m, 4H), 7.639 – 7.545 (m, 2H), 7.500 - 7.398 (m, 4H), 7.154 (d, *J* = 8.8 Hz, 1H), 6.774 – 6.662 (m, 2H), 5.081(s, 2H), 3.450 (s, 3H), 3.192 (hept, *J* = 6.8 Hz, 1H), 1.199 (d, *J* = 6.8 Hz, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 157.460,

140.177, 138.811, 133.766, 131.878, 128.923, 128.334, 126.378, 115.054, 112.906, 55.003, 49.390, 27.943, 23.949. HRMS (ESI, M/Z): calcd for $C_{23}H_{25}NO_5S_2H$ [$(M+H)^+$]: 460.1247, found 460.1254.

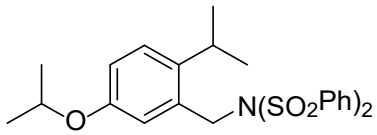


(*Z*)-N, N'-(2-(4-isopropoxy-2-methylphenyl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl)benzenesulfonamide) ((*Z*)-2o): Data for **(*Z*)-2o**: The general procedure was followed, and flash chromatography (n-hexane/EtOAc = 3/1) afforded 165 mg (53% yield). White solid. TLC: R_f = 0.57 (n-hexane/EtOAc = 3/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.983 - 7.880 (m, 4H), 7.665 – 7.513 (m, 8H), 7.498 – 7.340 (m, 8H), 7.241 (d, *J* = 8.4 Hz, 1H), 6.696 (d, *J* = 2.4 Hz, 1H), 6.631 (dd, *J* = 8.4, 2.8 Hz, 1H), 5.689 (t, *J* = 1.6 Hz, 1H), 4.768 (d, *J* = 1.2 Hz, 2H), 4.553 (hept, *J* = 6 Hz, 1H), 2.392 (s, 3H), 1.394 (d, *J* = 6.4 Hz, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 158.287, 148.164, 139.221, 138.543, 134.342, 133.746, 132.029, 129.191, 128.888, 128.831, 128.785, 127.186, 120.624, 117.370, 112.393, 69.624, 47.853, 22.343, 20.033. HRMS (ESI, M/Z): calcd for $C_{37}H_{36}N_2O_9S_4H$ [$(M+H)^+$]: 781.1377, found 781.1382.

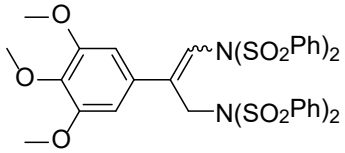


(*E*)-N-(2-(4-isopropoxy-2-methylphenyl)prop-1-en-1-yl)-N-(phenylsulfonyl)benzenesulfonamide (3o): Data for **3o**: The general procedure was followed, and flash chromatography (n-hexane/EtOAc = 5/1) afforded 31 mg (16% yield). Colorless viscous liquid. TLC: R_f = 0.36 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.062 – 7.989 (m, 4H), 7.714 – 7.617 (m, 2H), 7.617 – 7.50

4 (m, 4H), 6.966 (d, *J* = 8.4 Hz, 1H), 6.750 – 6.646 (m, 2H), 5.700 (q, *J* = 1.2 Hz, 1H), 4.532 (hept, *J* = 6 Hz, 1H), 2.283 (s, 3H), 1.608 (d, *J* = 1.6 H z, 3H), 1.333 (d, *J* = 6 Hz, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 157.716, 1 51.984, 139.713, 136.828, 134.056, 132.331, 129.215, 129.023, 128.390, 118.75 6, 117.838, 112.782, 69.914, 22.225, 20.094, 19.133. HRMS (ESI, M/Z): calcd for $C_{25}H_{27}NO_5S_2H$ [(M+H) $^+$]: 486.1404, found 486.1331.

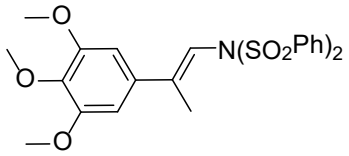


N-(5-isopropoxy-2-isopropylbenzyl)-N-(phenylsulfonyl)benzenesulfonamide (4 o): Data for **4o**: The general procedure was followed, and flash chromatograp hy (n-hexane/EtOAc = 5/1) afforded 43 mg (22% yield). White solid. TLC: R_f = 0.42 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.856 – 7.78 0 (m, 4H), 7.632 – 7.538 (m, 2H), 7.500 – 7.392 (m, 4H), 7.135 (d, *J* = 8.4 Hz, 1H), 6.755 – 6.664 (m, 2H), 5.063 (s, 2H), 4.068 (hept, *J* = 6 Hz, 1H), 3.199 (hept, *J* = 6.8 Hz, 1H), 1.191 (d, *J* = 6.8 Hz, 6H), 1.156 (d, *J* = 6 Hz, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 155.871, 140.177, 138.484, 133.728, 13 1.869, 128.917, 128.319, 126.357, 116.354, 114.816, 69.398, 49.388, 27.894, 2 3.988, 22.056. HRMS (ESI, M/Z): calcd for $C_{25}H_{29}NO_5S_2H$ [(M+H) $^+$]: 488.15 60, found 488.1567.

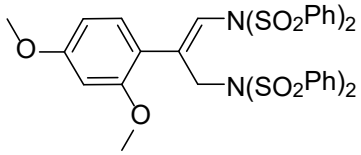


(*E*/*Z*)-N,N'-(2-(3,4,5-trimethoxyphenyl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl) benzenesulfonamide)((*E*/*Z*)-2p): Data for **(*E*/*Z*)-2p**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 3/1) to afford 156 mg (49% yield) of **(*E*/*Z*)-2p**. Yellow powder. TLC: R_f = 0.16 (n-hexane/EtOAc = 5/1). *Z*:*E* = 1:3. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.055 –

7.970 (m, 5.11H), 7.753 – 7.665 (m, 5.22H), 7.662 – 7.530 (m, 5.63H), 7.530 - 7.334 (m, 11.07H), 6.691 (s, 1.89H), 6.620 (s, 0.70H), 5.875 (s, 0.36H), 5.718 (s, 1H), 5.000 (s, 0.70H), 4.754 (s, 1.95H), 3.925 - 3.850 (m, 4H), 3.809 (s, 2.11H), 3.700 (s, 5.89H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.201, 147.714, 145.068, 139.125, 139.074, 138.625, 138.560, 138.318, 138.271, 134.425, 1344.122, 134.036, 133.948, 130.624, 129.154, 129.082, 129.049, 128.849, 128.768, 128.608, 128.471, 128.372, 119.734, 119.355, 106.117, 105.577, 61.022, 60.923, 56.420, 56.296, 52.130, 48.061. HRMS (ESI, M/Z): calcd for $C_{36}H_{34}N_2O_{11}S_4H$ [$(M+H)^+$]: 799.1119, found 799.1120.

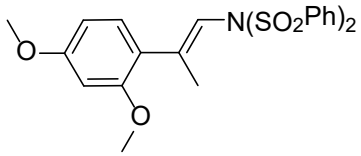


(*E*)-N-(phenylsulfonyl)-N-(2-(3,4,5-trimethoxyphenyl)prop-1-en-1-yl)benzenesulfonamide(3p): Data for **3p**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 5/1) to afford 16 mg (8% yield) of **3p**. Yellow solid. TLC: R_f = 0.3 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.045 – 7.980 (m, 4H), 7.710 – 7.638 (m, 2H), 7.589 - 7.540 (m, 4H), 6.574 (s, 2H), 6.04 (d, *J* = 1.4 Hz, 1H), 3.880 (s, 6H), 3.864 (s, 3H), 1.736 (d, *J* = 1.2 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.349, 149.946, 139.602, 139.123, 134.887, 134.144, 129.244, 128.446, 116.838, 104.007, 61.074, 56.424, 16.869. HRMS (ESI, M/Z): calcd for $C_{24}H_{25}NO_7S_2H$ [$(M+H)^+$]: 504.1146, found 504.1150.

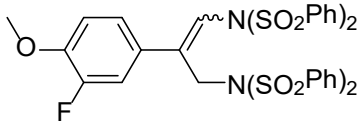


(*Z*)-N,N'-(2-(2,4-dimethoxyphenyl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl)benzenesulfonamide)((*Z*)-2q): Data for **(*Z*)-2q**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 3/1). Yellow solid. TLC: R_f = 0.39 (n-hexane/EtOAc = 3/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.000 - 7.930 (m, 4H), 7.745 - 7.675 (m, 4H), 7.630 – 7.545 (m, 4H), 7.480 – 7.365 (m, 8H), 6.908 (d, *J* = 8 Hz, 1H), 6.370 – 6.275 (m, 2H), 5.638

(t, *J* = 1.2 Hz, 1H), 4.958 (d, *J* = 1.2 Hz, 2H), 3.848 (s, 3H), 3.824 (s, 3 H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 161.563, 158.765, 145.870, 139.361, 138. 384, 134.228, 133.633, 132.124, 129.221, 128.970, 128.861, 128.687, 120.564, 117.668, 104.054, 98.298, 55.518, 55.390, 48.372. HRMS (ESI, M/Z): calcd f or $C_{35}H_{32}N_2O_{10}S_4Na$ [(M+Na) $^+$]: 791.0832, found 791.0825.

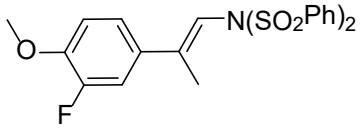


(*E*)-N-(2-(2,4-dimethoxyphenyl)prop-1-en-1-yl)-N-(phenylsulfonyl)benzenesulfon amide(3q): Data for **3q**: The general procedure was followed, and was purifie d with flash chromatography (n-hexane/EtOAc = 10/1) to afford 15 mg (8% yi eld) of **3q**. Yellow solid. TLC: R_f = 0.14 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.070 – 8.000 (m, 4H), 7.695 - 7.610 (m, 2H), 7.600 - 7.495 (m, 4H), 7.135 – 7.060 (m, 1H), 6.505 – 6.420 (m, 2H), 5.920 (d, *J* = 1.2 Hz, 1H), 3.817 (s, 3H), 3.805 (s, 3H), 1.625 (d, *J* = 1.2 Hz, 3H). ^{13}C N MR (101 MHz, $CDCl_3$) δ 161.254, 158.197, 149.506, 139.794, 133.908, 130.16 2, 129.095, 128.468, 122.069, 118.222, 104.301, 99.202, 55.678, 55.571, 17.56 6. HRMS (ESI, M/Z): calcd for $C_{23}H_{23}NO_6S_2H$ [(M+H) $^+$]: 474.1040, found 4 74.1043.

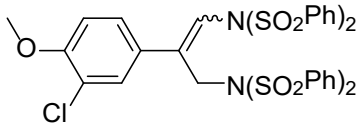


(*E*/*Z*)-N,N'-(2-(3-fluoro-4-methoxyphenyl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfo nyl)benzenesulfonamide)((*E*/*Z*)-2r): Data for **(*E*/*Z*)-2r**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 3/1) to afford 194 mg (64% yield) of **(*E*/*Z*)-2r**. White powder. TLC: R_f = 0.3 2 (n-hexane/EtOAc = 3/1). *Z*:*E* = 5:1. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.076 - 7.902 (m, 4.85H), 7.807 - 7.728 (m, 3.89H), 7.725 - 7.665 (m, 1.06H), 7.665 - 7.545 (m, 4.94H), 7.540 - 7.360 (m, 9.80H), 7.235 - 7.098 (m, 1.29H), 6.9 22 – 6.749 (m, 2.44H), 5.810 - 5.705 (m, 1.21H), 5.028 (d, *J* = 0.8 Hz, 2H), 4.648 (s, 0.43H), 3.930 - 3.855 (m, 3.57H). ^{19}F NMR (376 MHz, $CDCl_3$) δ -

134.225, -134.368. ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.045, 153.010, 150.597, 150.557, 148.188 (d, *J* = 10.0 Hz), 148.040, 145.862 (d, *J* = 1.0 Hz), 144.349, 139.238, 138.955, 138.367, 138.277, 134.465, 134.209, 134.004, 133.948, 129.151, 129.055, 128.922, 128.868, 128.805, 128.652, 128.477, 127.994 (d, *J* = 6.7 Hz), 126.141 (d, *J* = 6.9 Hz), 125.289 (d, *J* = 3.4 Hz), 124.553 (d, *J* = 3.3 Hz), 120.117, 119.983, 116.719 (d, *J* = 19.4 Hz), 116.002 (d, *J* = 19.4 Hz), 113.017 (d, *J* = 1.2 Hz), 112.924 (d, *J* = 1.3 Hz), 56.296, 56.238, 52.160, 48.187. HRMS (ESI, M/Z): calcd for $C_{34}H_{29}FN_2O_9S_4Na$ [(M+Na) $^+$]: 779.0633, found 779.0635.

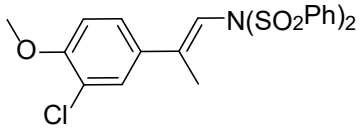


(*E*)-N-(2-(3-fluoro-4-methoxyphenyl)prop-1-en-1-yl)-N-(phenylsulfonyl)benzenesulfonamide(3r): Data for **3r**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 10/1) to afford 48 mg (26% yield) of **3r**. White solid. TLC: R_f = 0.16 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.040 - 7.950 (m, 4H), 7.715 – 7.638 (m, 2H), 7.595 - 7.520 (m, 4H), 7.185 - 7.090 (m, 2H), 6.937 (t, *J* = 8.8 Hz, 1H), 6.041 (q, *J* = 1.6 Hz, 1H), 3.909 (s, 3H), 1.683 (d, *J* = 1.6 Hz, 3H). ^{19}F NMR (376 MHz, $CDCl_3$) δ -134.618. ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.464, 151.016, 148.370 (dd, *J* = 10.9, 6.4 Hz), 139.523, 134.137, 131.962 (d, *J* = 6.5 Hz), 129.248, 128.365, 122.508 (d, *J* = 3.4 Hz), 116.503, 114.269 (d, *J* = 19.4 Hz), 113.276 (d, *J* = 2.3 Hz), 56.428, 16.359. HRMS (ESI, M/Z): calcd for $C_{22}H_{20}FNO_5S_2H$ [(M+H) $^+$]: 462.0840, found 462.0842.

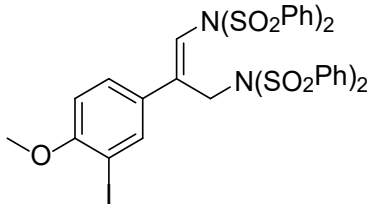


(*E*/*Z*)-N,N'-(2-(3-chloro-4-methoxyphenyl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl)benzenesulfonamide)((*E*/*Z*)-2s): Data for **(*E*/*Z*)-2s:** The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 3/1) to afford 185 mg (60% yield) of **(*E*/*Z*)-2s**. White powder. TLC: R_f = 0.2

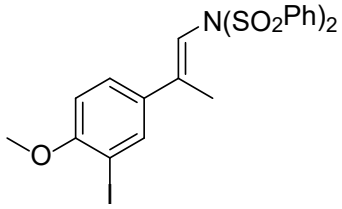
1 (n-hexane/EtOAc = 3/1). *Z*:*E* = 3:1. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.060 - 7.955 (m, 5.40H), 7.830 - 7.745 (m, 4.19H), 7.735 – 7.675 (m, 1.31H), 7.665 – 7.550 (m, 5.57H), 7.542 – 7.363 (m, 12.13H), 7.318 (dd, *J* = 8.8, 2 Hz, 0.36H), 7.114 (d, *J* = 2 Hz, 0.32H), 7.001 (d, *J* = 2 Hz, 1.01H), 6.809 (d, *J* = 8.8 Hz, 1.05H), 6.735 (d, *J* = 8.8 Hz, 0.32H), 5.791 (s, 0.36H), 5.755 (t, *J* = 1.2 Hz, 1H), 5.063 (d, *J* = 1.2 Hz, 2.04H), 4.652 (d, *J* = 1.2 Hz, 0.63H), 3.904 (s, 2.93H), 3.889 (s, 1.00H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 155.429, 155.327, 145.569, 144.091, 139.306, 138.984, 138.375, 138.307, 134.491, 134.235, 134.021, 130.421, 129.779, 129.170, 129.146, 128.922, 128.855, 128.825, 128.686, 128.478, 128.341, 127.934, 126.547, 122.489, 122.430, 120.292, 120.090, 111.792, 111.617, 56.303, 56.237, 52.157, 48.221. HRMS (ESI, M/Z): calcd for $C_{34}H_{29}ClN_2O_9S_4Na$ [$(M+Na)^+$]: 795.0337, found 795.0338.



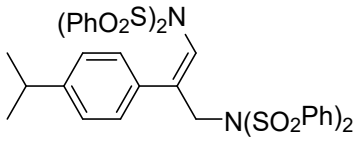
(*E*)-N-(2-(3-chloro-4-methoxyphenyl)prop-1-en-1-yl)-N-(phenylsulfonyl)benzenesulfonamide(3s): Data for **3s**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 10/1) to afford 23 mg (12% yield) of **3s**. White solid. TLC: R_f = 0.14 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.045 - 7.970 (m, 4H), 7.715 – 7.630 (m, 2H), 7.610 – 7.520 (m, 4H), 7.409 (d, *J* = 2.4 Hz, 1H), 7.294 – 7.242 (m, 1H), 6.910 (d, *J* = 8.4 Hz, 1H), 6.039 (d, *J* = 1.6 Hz, 1H), 3.922 (s, 3H), 1.685 (d, *J* = 1.6 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 155.682, 148.205, 139.524, 134.137, 132.290, 129.249, 128.367, 128.301, 125.985, 122.785, 116.536, 111.956, 56.380, 16.397. HRMS (ESI, M/Z): calcd for $C_{22}H_{20}ClNO_5S_2H$ [$(M+H)^+$]: 478.0545, found 478.0550.



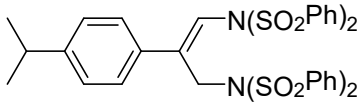
(*Z*)-N,N'-(2-(3-iodo-4-methoxyphenyl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl) benzenesulfonamide) ((*Z*)-2t): Data for **(*Z*)-2t**: The general procedure was foll owed, and was purified with flash chromatography (n-hexane/EtOAc = 3/1). W hite solid. TLC: R_f = 0.52 (n-hexane/EtOAc = 3/1). ^{1}H NMR (400 MHz, CD Cl_3) δ 8.040 - 7.955 (m, 4H), 7.820 - 7.730 (m, 4H), 7.680 – 7.570 (m, 4H), 7.555 – 7.374 (m, 10H), 6.692 (d, *J* = 8.4 Hz, 1H), 5.752 (t, *J* = 1.6 Hz, 1 H), 5.045 (d, *J* = 1.6 Hz, 2H), 3.881 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 158.517, 145.363, 139.248, 138.630, 138.390, 134.482, 134.093, 129.767, 12 9.404, 129.177, 129.145, 128.924, 128.496, 119.927, 110.322, 86.087, 56.553, 4 8.228. HRMS (ESI, M/Z): calcd for $C_{34}H_{29}IN_2O_9S_4H$ [(M+H) $^+$]: 864.9874, fo und 864.9880.



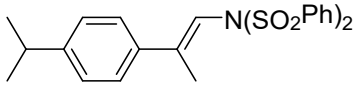
(*E*)-N-(2-(3-iodo-4-methoxyphenyl)prop-1-en-1-yl)-N-(phenylsulfonyl)benzenesul fonamide (3t): Data for **3t**: The general procedure was followed, and flash c hromatography (n-hexane/EtOAc = 5/1) afforded 52 mg (23% yield). White sol id. TLC: R_f = 0.17 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.045 – 7.957 (m, 4H), 7.796 (d, *J* = 2.4 Hz, 1H), 7.704 – 7.644 (m, 2H), 7. 595 - 7.540 (m, 4H), 7.352 (dd, *J* = 8.8, 2.4 Hz, 1H), 6.796 (d, *J* = 8.4 Hz, 1H), 6.018 (d, *J* = 1.6 Hz, 1H), 3.901 (s, 3H), 1.680 (d, *J* = 1.2 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 158.838, 148.019, 139.518, 137.409, 134.129, 1 33.416, 129.248, 128.374, 127.813, 116.444, 110.640, 86.304, 56.624, 16.475. HRMS (ESI, M/Z): calcd for $C_{22}H_{20}INO_5S_2H$ [(M+H) $^+$]: 569.9901, found 569.9 910.



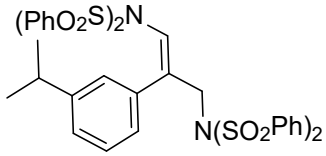
(*E*)-N, N'-(2-(4-isopropylphenyl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl)benzenesulfonamide) ((*E*)-2u): Data for **(*E*)-2u**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 8/1). White solid. TLC: R_f = 0.19 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.050 - 7.985 (m, 4H), 7.625 - 7.515 (m, 8H), 7.484 - 7.420 (m, 4H), 7.395 - 7.300 (m, 6H), 7.176 (d, *J* = 8 Hz, 2H), 5.559 (t, *J* = 1.6 Hz, 1H), 4.670 (d, *J* = 1.6 Hz, 2H), 2.955 (hept, *J* = 6.8 Hz, 1H), 1.317 (d, *J* = 7.2 Hz, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.533, 146.509, 138.969, 138.149, 134.179, 133.864, 131.563, 129.172, 128.924, 128.792, 128.716, 126.831, 118.317, 52.550, 34.016, 24.190. HRMS (ESI, M/Z): calcd for $C_{36}H_{34}N_2O_8S_4Na$ [(M+Na) $^+$]: 773.1091, found 773.1067.



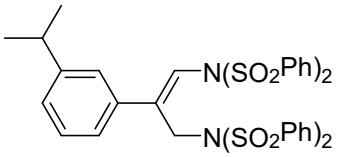
(*Z*)-N,N'-(2-(4-isopropylphenyl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl)benzenesulfonamide) ((*Z*)-2u): Data for **(*Z*)-2u**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 8/1). White solid. TLC: R_f = 0.15 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.025 - 7.960 (m, 4H), 7.650 - 7.610 (m, 4H), 7.610 - 7.530 (m, 4H), 7.470 (t, *J* = 8 Hz, 4H), 7.415 - 7.325 (m, 6H), 7.169 (d, *J* = 8.4 Hz, 2H), 5.862 (t, *J* = 1.6 Hz, 1H), 4.924 (d, *J* = 1.6 Hz, 2H), 2.950 (hept, *J* = 6.8 Hz, 1H), 1.308 (d, *J* = 6.8 Hz, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.730, 147.649, 138.931, 138.785, 134.305, 133.858, 132.939, 129.156, 128.966, 128.845, 128.739, 128.540, 126.651, 119.114, 47.910, 34.010, 24.174. HRMS (ESI, M/Z): calcd for $C_{36}H_{34}N_2O_8S_4Na$ [(M+Na) $^+$]: 773.1091, found 773.1067.



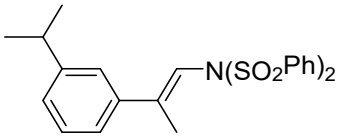
(*E*)-N-(2-(4-isopropylphenyl)prop-1-en-1-yl)-N-(phenylsulfonyl)benzenesulfonamide (3u): Data for **3u**: The general procedure was followed, and flash chromatography (n-hexane/EtOAc = 10/1) afforded 19 mg (10% yield). White solid. TLC: R_f = 0.42 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.030 - 7.990 (m, 4H), 7.690 - 7.635 (m, 2H), 7.585 - 7.520 (m, 4H), 7.350 - 7.305 (m, 2H), 7.245 - 7.210 (m, 2H), 6.086 (q, *J* = 1.2 Hz, 1H), 2.927 (hept, *J* = 6.8 Hz, 1H), 1.699 (d, *J* = 1.6 Hz, 3H), 1.262 (d, *J* = 7.2 Hz, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 150.147, 149.830, 139.677, 136.628, 134.043, 129.218, 128.400, 126.771, 126.539, 116.442, 34.021, 24.026, 16.485. HRMS (ESI, M/Z): calcd for $C_{24}H_{25}NO_4S_2Na$ [(M+Na) $^+$]: 478.1118, found 478.1120.



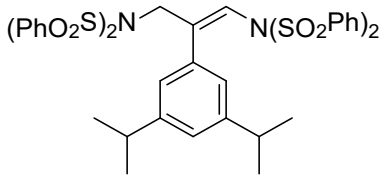
(*E*)-N,N'-(2-(3-isopropylphenyl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl)benzenesulfonamide) ((*E*)-2v): Data for **(*E*)-2v**: The general procedure was followed, and waspurified with flash chromatography (n-hexane/EtOAc = 8/1). White solid. TLC: R_f = 0.30 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.065 - 8.000 (m, 4H), 7.595 - 7.505 (m, 8H), 7.495 - 7.425 (m, 4H), 7.400 - 7.325 (m, 5H), 7.260 - 7.235 (m, 2H), 7.208 - 7.160 (m, 1H), 5.558 (t, *J* = 1.6 Hz, 1H), 4.707 (d, *J* = 1.6 Hz, 2H), 2.845 (hept, *J* = 6.8 Hz, 1H), 1.174 (d, *J* = 6.8 Hz, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.661, 146.669, 138.994, 138.187, 134.169, 133.804, 129.159, 128.875, 128.814, 128.722, 127.473, 126.866, 126.342, 118.775, 52.482, 34.194, 23.996. HRMS (ESI, M/Z): calcd for $C_{36}H_{34}N_2O_8S_4Na$ [(M+Na) $^+$]: 773.1091, found 773.1099.



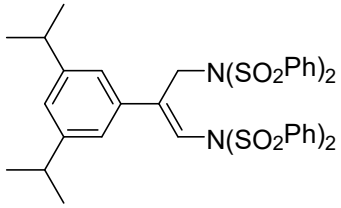
(*Z*)-N,N'-(2-(3-isopropylphenyl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl)benzenesulfonamide) ((*Z*)-2v): Data for **(*Z*)-2v**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 8/1). White solid. TLC: R_f = 0.29 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.045 - 7.975 (m, 4H), 7.640 - 7.530 (m, 8H), 7.505 - 7.445 (m, 4H), 7.430 - 7.345 (m, 5H), 7.293 - 7.220 (m, 3H), 7.208 - 7.168 (m, 1H), 5.894 (t, *J* = 1.6 Hz, 1H), 4.901 (d, *J* = 1.6 Hz, 2H), 2.894 (hept, *J* = 6.8 Hz, 1H), 1.221 (d, *J* = 6.8 Hz, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.471, 148.164, 138.852, 138.830, 135.536, 134.312, 133.833, 129.172, 128.927, 128.836, 128.768, 128.700, 127.166, 126.920, 126.280, 119.234, 47.972, 34.292, 24.033. HRMS (ESI, M/Z): calcd for $C_{36}H_{34}N_2O_8S_4Na$ [(M+Na)$^+$]: 773.1091, found 773.1099.



(*E*)-N-(2-(3-isopropylphenyl)prop-1-en-1-yl)-N-(phenylsulfonyl)benzenesulfonamide (3v): Data for **3v**: The general procedure was followed, and flash chromatography (n-hexane/EtOAc = 10/1) afforded 21 mg (12% yield). White solid. TLC: R_f = 0.57 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.050 - 7.995 (m, 4H), 7.698 - 7.642 (m, 2H), 7.595 - 7.530 (m, 4H), 7.325 - 7.274 (m, 1H), 7.255 - 7.180 (m, 3H), 6.079 (d, *J* = 1.2 Hz, 1H), 2.924 (hept, *J* = 6.8 Hz, 1H), 1.724 (d, *J* = 1.6 Hz, 3H), 1.270 (d, *J* = 6.8 Hz, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 150.391, 149.411, 139.676, 139.237, 134.076, 129.233, 128.704, 128.439, 127.150, 124.811, 124.122, 116.918, 34.342, 24.132, 16.720. HRMS (ESI, M/Z): calcd for $C_{24}H_{25}NO_4S_2Na$ [(M+Na)$^+$]: 478.1118, found 478.1118.

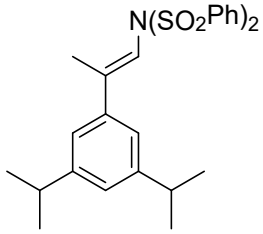


(*E*)-N,N'-(2-(3,5-diisopropylphenyl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl)benzenesulfonamide) ((*E*)-2w): Data for **(*E*)-2w**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 8/1). Light yellow solid. TLC: R_f = 0.41 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.070 - 8.005 (m, 4H), 7.575 - 7.500 (m, 8H), 7.480 - 7.415 (m, 4H), 7.380 - 7.315 (m, 4H), 7.197 (d, *J* = 1.6 Hz, 2H), 7.145 - 7.120 (m, 1H), 5.491 (t, *J* = 1.6 Hz, 1H), 4.725 (d, *J* = 1.6 Hz, 2H), 2.840 (hept, *J* = 6.8 Hz, 2H), 1.174 (d, *J* = 7.2 Hz, 12H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 149.688, 147.012, 139.058, 138.308, 134.134, 134.114, 133.707, 129.221, 129.128, 128.859, 128.674, 125.164, 124.798, 118.540, 52.497, 34.327, 24.094. HRMS (ESI, M/Z): calcd for $C_{39}H_{40}N_2O_8S_4Na$ [$(M+Na)^+$]: 815.1560, found 815.1559.

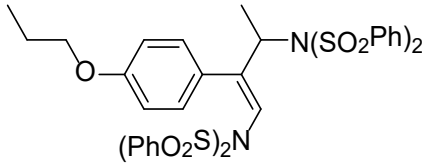


(*Z*)-N,N'-(2-(3,5-diisopropylphenyl)prop-1-ene-1,3-diyl)bis(N-(phenylsulfonyl)benzenesulfonamide) ((*Z*)-2w): Data for **(*Z*)-2w**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 8/1). Light yellow solid. TLC: R_f = 0.33 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.040 - 8.000 (m, 4H), 7.626 - 7.576 (m, 2H), 7.574 - 7.529 (m, 2H), 7.525 - 7.440 (m, 8H), 7.395 - 7.340 (m, 4H), 7.238 (d, *J* = 1.6 Hz, 2H), 7.190 - 7.165 (m, 1H), 5.936 (t, *J* = 1.6 Hz, 1H), 4.824 (d, *J* = 1.6 Hz, 2H), 2.893 (hept, *J* = 6.8 Hz, 2H), 1.222 (d, *J* = 6.8 Hz, 12H). ^{13}C NMR

(101 MHz, $CDCl_3$) δ 149.595, 148.672, 139.037, 138.771, 135.479, 134.240, 133.793, 129.171, 128.887, 128.761, 125.230, 124.869, 118.644, 47.921, 34.403, 24.139. HRMS (ESI, M/Z): calcd for $C_{39}H_{40}N_2O_8S_4Na$ [$(M+Na)^+$]: 815.1560, found 815.1559.

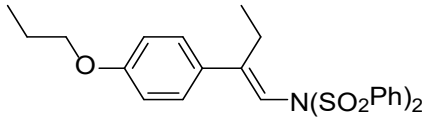


(*E*)-N-(2-(3,5-diisopropylphenyl)prop-1-en-1-yl)-N-(phenylsulfonyl)benzenesulfonamide (3w): Data for **3w**: The general procedure was followed, and flash chromatography (n-hexane/EtOAc = 10/1) afforded 22 mg (11% yield). Light yellow solid. TLC: R_f = 0.66 (n-hexane/EtOAc = 5/1). ^1H NMR (400 MHz, $CDCl_3$) δ 8.050 - 8.005 (m, 4H), 7.700 - 7.640 (m, 2H), 7.590 - 7.530 (m, 4H), 7.099 (s, 1H), 7.040 (d, *J* = 1.6 Hz, 2H), 6.068 (d, *J* = 1.2 Hz, 1H), 2.965 - 2.845 (m, 2H), 1.729 (d, *J* = 1.2 Hz, 3H), 1.265 (d, *J* = 6.8 Hz, 12H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 150.675, 149.365, 139.690, 139.206, 134.050, 129.212, 128.453, 125.455, 122.315, 116.694, 34.389, 24.182, 16.819. HRMS (ESI, M/Z): calcd for $C_{27}H_{31}NO_4S_2Na$ [$(M+Na)^+$]: 520.1587, found 520.1587.

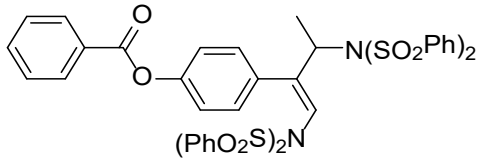


(*E*)-N, N'-(2-(4-propoxyphenyl)but-1-ene-1,3-diyl)bis(N-(phenylsulfonyl)benzenesulfonamide) ((*E*)-2x): Data for **(*E*)-2x**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 3/1). White powder. TLC: R_f = 0.17 (n-hexane/EtOAc = 5/1). ^1H NMR (400 MHz, $CDCl_3$) δ 7.989 (s, 4H), 7.682 - 7.515 (m, 8H), 7.498 - 7.328 (m, 8H), 7.168 - 7.105

(m, 2H), 6.710 - 6.645 (m, 2H), 5.813 (d, *J* = 2 Hz, 1H), 5.406 (qd, *J* = 7.2, 1.6 Hz, 1H), 3.910 (t, *J* = 6.8 Hz, 2H), 1.920 - 1.815 (m, 2H), 1.527 (d, *J* = 7.2 Hz, 3H), 1.112 (t, *J* = 7.2 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 159.286, 149.709, 138.445, 133.916, 133.840, 133.800, 130.328, 129.187, 129.008, 128.863, 128.701, 126.810, 119.733, 114.355, 69.523, 61.278, 22.778, 18.885, 10.811. HRMS (ESI, M/Z): calcd for $C_{37}H_{36}N_2O_9S_4K$ [(M+K)$^+$]: 819.0936, found 819.0899.

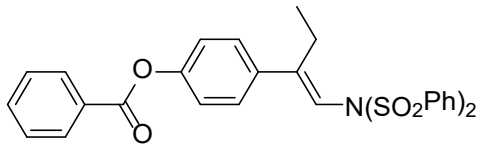


(*E*)-N-(phenylsulfonyl)-N-(2-(4-propoxyphenyl)but-1-en-1-yl)benzenesulfonamide (3x): Data for **3x**: The general procedure was followed, and flash chromatography (n-hexane/EtOAc = 10/1) afforded 27 mg (14% yield). Light yellow solid. TLC: R_f = 0.51 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.030 - 7.970 (m, 4H), 7.695 - 7.630 (m, 2H), 7.580 - 7.523 (m, 4H), 7.255 - 7.205 (m, 2H), 6.910 - 6.855 (m, 2H), 5.836 (s, 1H), 3.935 (t, *J* = 6.8 Hz, 2H), 2.245 (q, *J* = 7.6 Hz, 2H), 1.875 - 1.770 (m, 2H), 1.046 (t, *J* = 7.6 Hz, 3H), 0.596 (t, *J* = 7.6 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 159.674, 155.579, 139.468, 133.886, 129.827, 129.045, 128.361, 128.264, 114.782, 114.509, 69.588, 22.568, 11.696, 10.527. HRMS (ESI, M/Z): calcd for $C_{25}H_{27}NO_5S_2Na$ [(M+Na)$^+$]: 508.1223, found 508.1227.

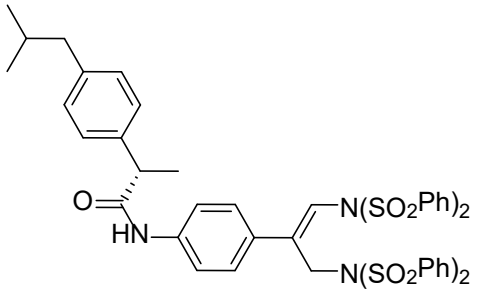


(*E*)-4-(1,3-bis(N-(phenylsulfonyl)phenylsulfonamido)but-1-en-2-yl)phenyl benzoate ((*E*)-2y): Data for **(*E*)-2y**: The general procedure was followed, and was purified with flash chromatography (n-hexane/EtOAc = 3/1). White powder. TLC: R_f = 0.14 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.285

- 8.225 (m, 2H), 7.988 (s, 4H), 7.717 - 7.660 (m, 2H), 7.645 - 7.545 (m, 10 H), 7.520 - 7.450 (m, 7H), 7.248 (d, *J* = 9.6 Hz, 2H), 7.051 (d, *J* = 8.8 Hz, 2H), 5.898 (d, *J* = 2 Hz, 1H), 5.396 (qd, *J* = 6.8, 2 Hz, 1H), 1.557 (d, *J* = 6.4 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 164.829, 151.013, 149.676, 138. 131, 134.070, 133.925, 132.474, 130.315, 129.577, 129.304, 129.209, 129.147, 128.977, 128.849, 121.757, 120.077, 61.146, 18.900. HRMS (ESI, M/Z): calcd for $C_{41}H_{34}N_2O_{10}S_4Na$ [$(M+Na)^+$]: 865.0989, found 865.0980.

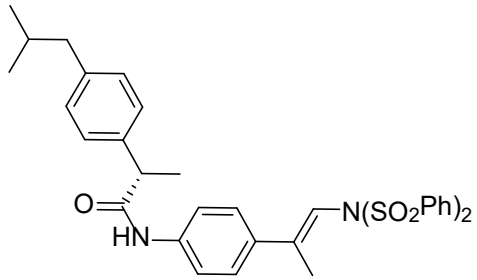


(*E*)-4-(1-(N-(phenylsulfonyl)phenylsulfonamido)but-1-en-2-yl)phenyl benzoate (3y): Data for **3y**: The general procedure was followed, and flash chromatogra phy (n-hexane/EtOAc = 10/1) afforded 18 mg (8% yield). White solid. TLC: R_f = 0.21 (n-hexane/EtOAc = 5/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.235 - 8. 190(m, 2H), 8.040 - 7.982 (m, 4H), 7.705 - 7.640 (m, 3H), 7.595 - 7.505 (m, 6H), 7.400 - 7.340 (m, 2H), 7.254 - 7.222 (m, 2H), 5.905 (s, 1H), 2.300 (q, *J* = 7.6 Hz, 2H), 0.623 (t, *J* = 7.6 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 165.217, 155.394, 151.404, 139.489, 135.643, 134.142, 133.917, 130.364, 129.2 58, 128.788, 128.495, 128.394, 122.065, 116.619, 22.967, 11.721. HRMS (ESI, M/Z): calcd for $C_{29}H_{25}NO_6S_2Na$ [$(M+Na)^+$]: 570.1016, found 570.0999.



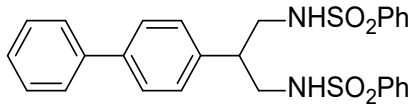
(*S*, *Z*)-N-(4-(1,3-bis(N-(phenylsulfonyl)phenylsulfonamido)prop-1-en-2-yl)phenyl)-2-(4-isobutylphenyl)propenamide ((*S*, *Z*)-2z): Data for **(*S*, *Z*)-2z**: The gener

al procedure was followed and was purified by silica gel column chromatograp hy with a gradient eluant of petrol ether/ethyl acetate to afford the desired pro ducts. Yellow solid. TLC: R_f = 0.20 (n-hexane/EtOAc = 3/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.996 – 7.928 (m, 4H), 7.699 – 7.648 (m, 4H), 7.630 – 7.57 5 (m, 2H), 7.535 – 7.490 (m, 2H), 7.484 - 7.438 (m, 4H), 7.379 - 7.333 (m, 4H), 7.315 - 7.264 (m, 4H), 7.223 – 7.187 (m, 4H), 7.082 (s, 1H), 5.754 - 5. 730 (m, 1H), 4.980 (d, *J* = 0.8 Hz, 2H), 3.712 (q, *J* = 7.2 Hz, 1H), 2.503 (d, *J* = 7.2 Hz, 2H), 1.889 (hept, *J* = 6.8 Hz, 1H), 1.613 (d, *J* = 7.2 Hz, 3H), 0.927 (d, *J* = 6.8 Hz, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 172.729, 147.070, 141.452, 139.089, 138.477, 138.111, 134.401, 133.876, 131.066, 130.123, 129. 164, 129.120, 129.015, 128.928, 128.574, 127.491, 119.547, 119.447, 48.279, 4 7.945, 45.164, 30.331, 22.537, 18.537. HRMS (ESI, M/Z): calcd for $C_{46}H_{45}N_3O_9S_4H$ [$(M+H)^+$]: 912.2112, found 912.2118.

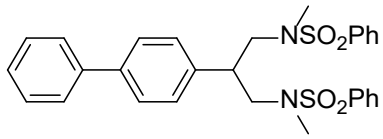


(*S*, *E*)-2-(4-isobutylphenyl)-N-(4-(1-(N-(phenylsulfonyl)phenylsulfonamido)prop-1-en-2-yl)phenyl)propenamide (3z): Data for **3z**: The general procedure was f ollowed and was purified by silica gel column chromatography with a gradient eluant of petrol ether/ethyl acetate to afford the desired products 32 mg (13% yield). White solid. TLC: R_f = 0.35 (n-hexane/EtOAc = 3/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.044 - 7.940 (m, 4H), 7.702 – 7.605 (m, 2H), 7.595 – 7.498 (m, 4H), 7.421 (d, *J* = 8.8 Hz, 2H), 7.352 - 7.206 (m, 5H), 7.185 – 7.114 (m, 3H), 6.020 (d, *J* = 1.2 Hz, 1H), 3.694 (q, *J* = 7.2 Hz, 1H), 2.477 (d, *J* = 7.2 Hz, 2H), 1.867 (hept, *J* = 6.8 Hz, 1H), 1.676 (d, *J* = 1.2 Hz, 3H), 1.5 86 (d, *J* = 7.2 Hz, 3H), 0.912 (d, *J* = 6.8 Hz, 6H). ^{13}C NMR (101 MHz, C

DCl_3) δ 172.792, 149.197, 141.349, 139.522, 138.804, 138.024, 134.683, 134.099, 130.059, 129.225, 128.383, 127.532, 127.100, 119.559, 116.376, 47.923, 45.144, 30.313, 22.510, 18.633, 16.373. HRMS (ESI, M/Z): calcd for $C_{34}H_{36}N_2O_5S_2H$ [$(M+H)^+$]: 617.2139, found 617.2142.

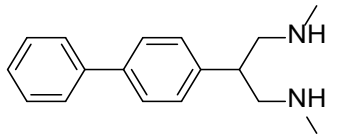


N, N'-(2-([1,1'-biphenyl]-4-yl)propane-1,3-diyl)dibenzenesulfonamide (13): Data for **13**: The general procedure was followed and was purified by silica gel column chromatography with a gradient eluant of petrol ether/ethyl acetate to afford the desired products 152 mg(47% yield). White solid. TLC: R_f = 0.38 (n-hexane/EtOAc = 2/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.865 - 7.760 (m, 4H), 7.640 - 7.400 (m, 12H), 7.390 - 7.325 (m, 1H), 7.106 (d, *J* = 8 Hz, 2H), 4.751 (t, *J* = 6.4 Hz, 2H), 3.376 - 3.175 (m, 4H), 3.069 (p, *J* = 6.4 Hz, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 141.001, 140.426, 139.842, 137.436, 132.975, 129.403, 129.021, 128.325, 127.982, 127.706, 127.146, 127.104, 45.399, 45.071. HRMS (ESI, M/Z): calcd for $C_{27}H_{26}N_2O_4S_2Na$ [$(M+Na)^+$]: 529.1227, found 529.1226.



N, N'-(2-([1,1'-biphenyl]-4-yl)propane-1,3-diyl)bis(N-methylbenzenesulfonamide) (14): Data for **14**: The general procedure was followed and was purified by silica gel column chromatography with a gradient eluant of petrol ether/ethyl acetate to afford the desired products 20 mg(95% yield). Colorless oil. TLC: R_f = 0.44 (n-hexane/EtOAc = 3/1). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.810 - 7.730 (m, 4H), 7.616 - 7.552 (m, 6H), 7.550 - 7.490 (m, 4H), 7.475 - 7.410 (m, 2H), 7.385 - 7.300 (m, 3H), 3.745 - 3.620 (m, 2H), 3.393 (p, *J* = 7.6 Hz, 1H), 3.040 - 2.930 (m, 2H), 2.662 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 140.606, 140.521, 138.722, 137.335, 132.839, 129.304, 128.951,

128.692, 127.657, 127.535, 127.504, 127.113, 53.838, 43.995, 36.193. HRMS (ESI, M/Z): calcd for $C_{29}H_{30}N_2O_4S_2Na$ [$(M+Na)^+$]: 557.1540, found 557.1496.



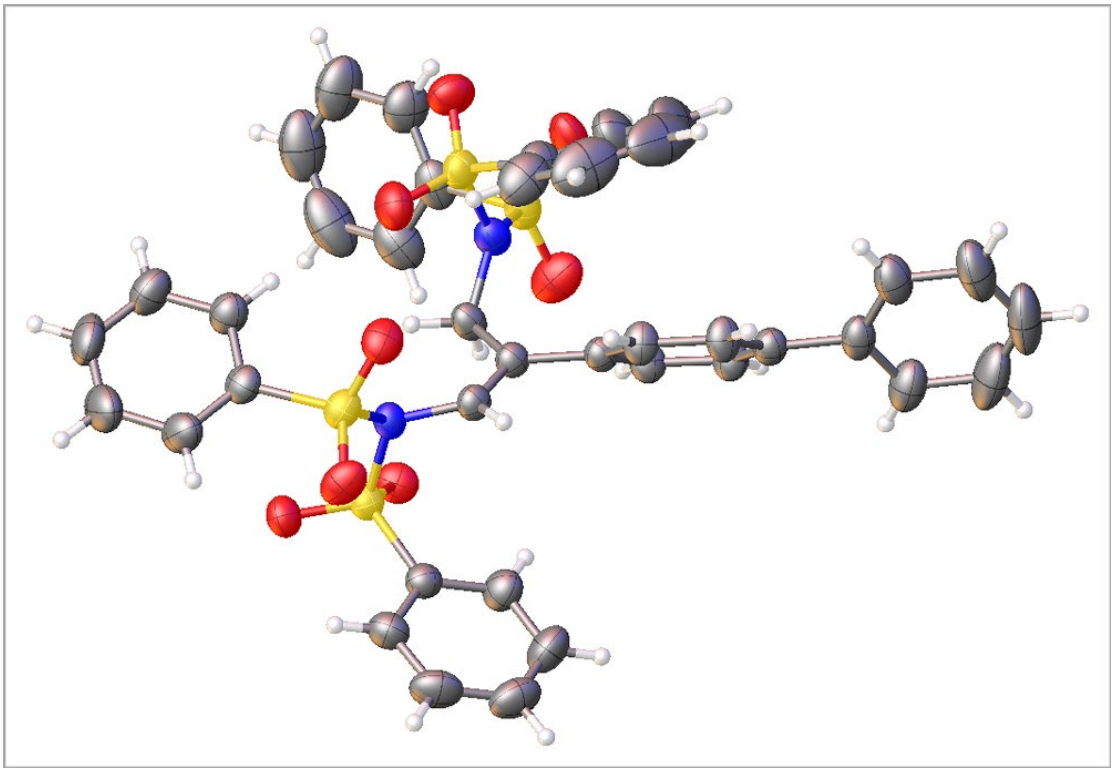
2-([1, 1'-biphenyl]-4-yl)-N_1, N_3-dimethylpropane-1, 3-diamine (15): Data for **15**: The general procedure was followed. Light yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.600 - 7.530 (m, 4H), 7.460 - 7.400 (m, 2H), 7.360 - 7.275 (m, 3H), 3.220 - 3.130 (m, 1H), 2.960 - 2.840 (m, 4H), 2.426 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 140.890, 140.688, 140.095, 128.909, 128.246, 127.705, 127.381, 127.139, 56.670, 44.839, 36.392. HRMS (ESI, M/Z): calcd for $C_{17}H_{22}N_2H$ [$(M+H)^+$]: 255.1856, found 255.1852.

7. ***X-ray Crystal Data***

Crystal of **(*Z*)-2aa**、**(*E*)-2b** and **(*E*)-2y** suitable for X-ray diffraction was obtained according the following procedure: Under ambient atmosphere, **(*Z*)-2aa**、**(*E*)-2b** and **(*E*)-2y** (30 mg) was dissolved separately in ethyl acetate (1 mL) completely, then hexane (2 mL) was dropped to the upper layer. The mixture was then allowed to stand and single crystals of **(*Z*)-2aa**、**(*E*)-2b** and **(*E*)-2y** were grown by slow evaporation of the organic phase.

Crystal structure of compound (Z)-2aa (CCDC 2088081)

Crystal data and structure refinement for (*Z*)-2aa

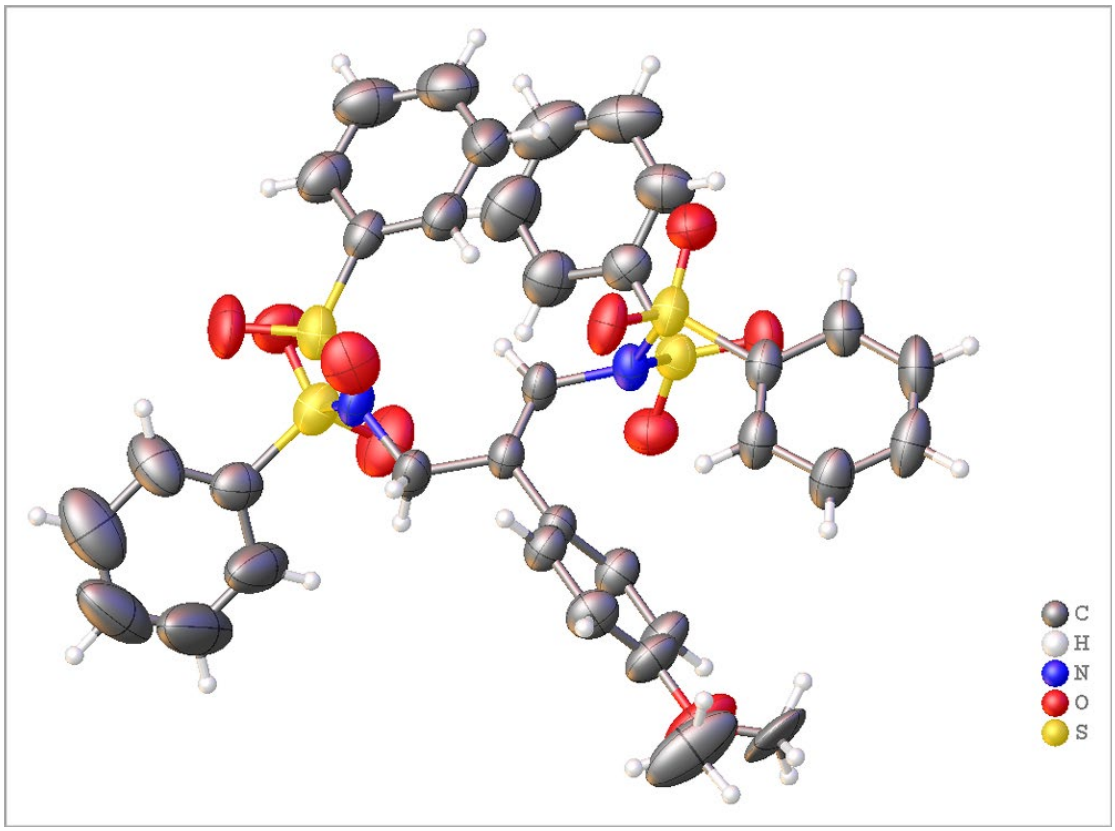


Identification code	**(*Z*)-2aa**
Empirical formula	$C_{39}H_{32}N_2O_8S_4$
Formula weight	784.90
Temperature/K	274(30)
Crystal system	triclinic
Space group	P-1
a/Å	11.5994(4)
b/Å	13.0157(5)
c/Å	13.7849(6)
α/°	92.349(3)
β/°	109.747(3)
γ/°	104.027(3)
Volume/Å^3	1883.09(13)
Z	2
ρ_{calc}g/cm^3	1.384
μ/mm^{-1}	2.781
F(000)	816.0
Crystal size/mm^3	0.5 × 0.4 × 0.1
Radiation	CuKα (λ = 1.54184)
2Θ range for data collection/°	7.064 to 142.962

Index ranges	$-12 \leq h \leq 14$, $-15 \leq k \leq 16$, $-16 \leq l \leq 16$
Reflections collected	20652
Independent reflections	7205 [R_{int} = 0.0500, R_{sigma} = 0.0436]
Data/restraints/parameters	7205/0/478
Goodness-of-fit on F^2	1.025
Final R indexes [I>=2σ (I)]	R_1 = 0.0611, wR_2 = 0.1647
Final R indexes [all data]	R_1 = 0.0677, wR_2 = 0.1769
Largest diff. peak/hole / e $Å^{-3}$	0.49/-0.46

Crystal structure of compound (E)-2b (CCDC 2087231)

Crystal data and structure refinement for (*E*)-2b

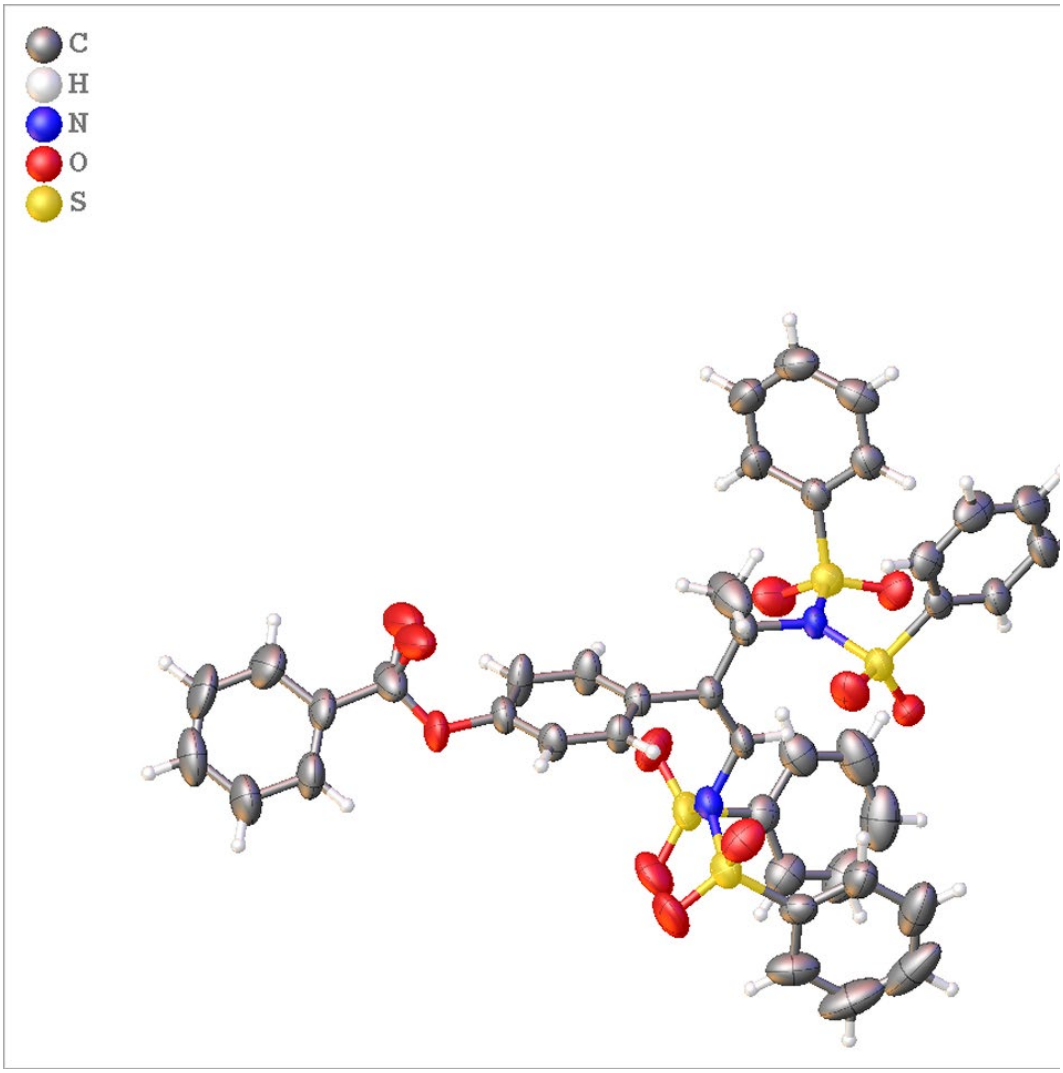


Identification code	**(*E*)-2b**
Empirical formula	$C_{34}H_{30}N_2O_9S_4$
Formula weight	738.84
Temperature/K	273.15
Crystal system	monoclinic
Space group	$P2_1/n$
a/Å	13.4039(5)
b/Å	19.3046(6)

c/Å	13.9983(5)
α/°	90
β/°	107.3350(10)
γ/°	90
Volume/Å^3	3457.6(2)
Z	4
ρ_{calc}g/cm^3	1.419
μ/mm^{-1}	0.332
F(000)	1536.0
Crystal size/mm^3	0.15 × 0.15 × 0.12
Radiation	MoKα (λ = 0.71073)
2Θ range for data collection/°	3.706 to 55.162
Index ranges	-17 ≤ h ≤ 17, -25 ≤ k ≤ 25, -18 ≤ l ≤ 18
Reflections collected	129729
Independent reflections	7984 [R_{int} = 0.1352, R_{sigma} = 0.0536]
Data/restraints/parameters	7984/0/454
Goodness-of-fit on F^2	1.018
Final R indexes [I>=2σ (I)]	R_1 = 0.0519, wR_2 = 0.1174
Final R indexes [all data]	R_1 = 0.1107, wR_2 = 0.1443
Largest diff. peak/hole / e Å^{-3}	0.30/-0.47

Crystal structure of compound (E)-2y (CCDC 2088082)

Crystal data and structure refinement for (*E*)-2y



Identification code	**(*E*)-2y**
Empirical formula	$C_{41}H_{34}N_2O_{10}S_4$
Formula weight	842.94
Temperature/K	293.15
Crystal system	triclinic
Space group	P-1
a/Å	11.7105(6)
b/Å	13.1872(8)
c/Å	13.7902(7)
α/°	110.882(5)

β/°	93.715(4)
γ/°	93.825(4)
Volume/Å^3	1976.32(19)
Z	2
ρ_{calc}g/cm^3	1.417
μ/mm^{-1}	0.302
F(000)	876.0
Crystal size/mm^3	0.35 × 0.3 × 0.25
Radiation	MoKα (λ = 0.71073)
2Θ range for data collection/°	6.008 to 52.742
Index ranges	-14 ≤ h ≤ 14, -15 ≤ k ≤ 16, -17 ≤ l ≤ 17
Reflections collected	16224
Independent reflections	8075 [R_{int} = 0.0298, R_{sigma} = 0.0587]
Data/restraints/parameters	8075/0/519
Goodness-of-fit on F^2	1.022
Final R indexes [I>=2σ (I)]	R_1 = 0.0556, wR_2 = 0.1189
Final R indexes [all data]	R_1 = 0.0938, wR_2 = 0.1354
Largest diff. peak/hole / e Å^{-3}	0.64/-0.38

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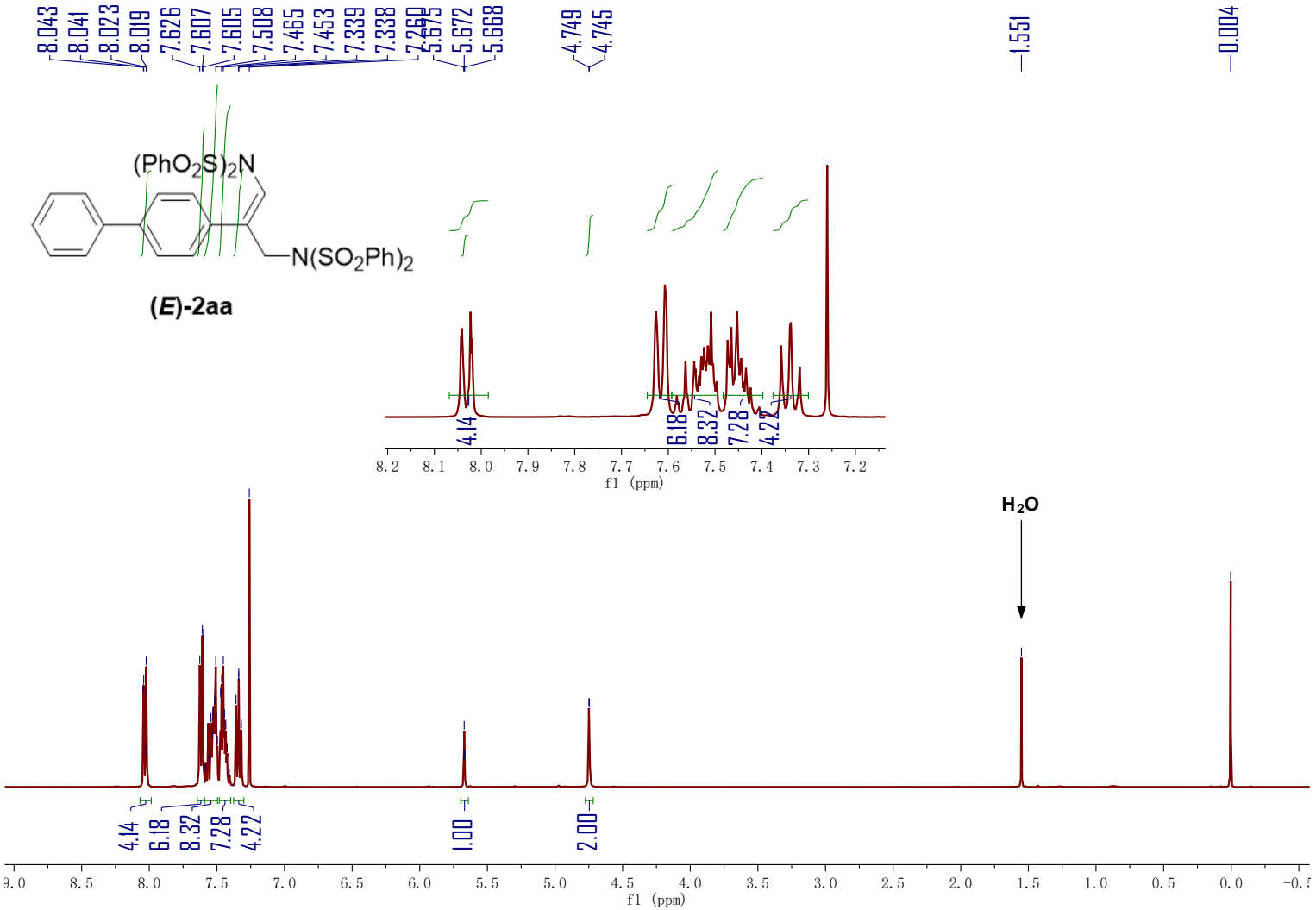
9. ^{1}H and ^{13}C NMR spectrum of compounds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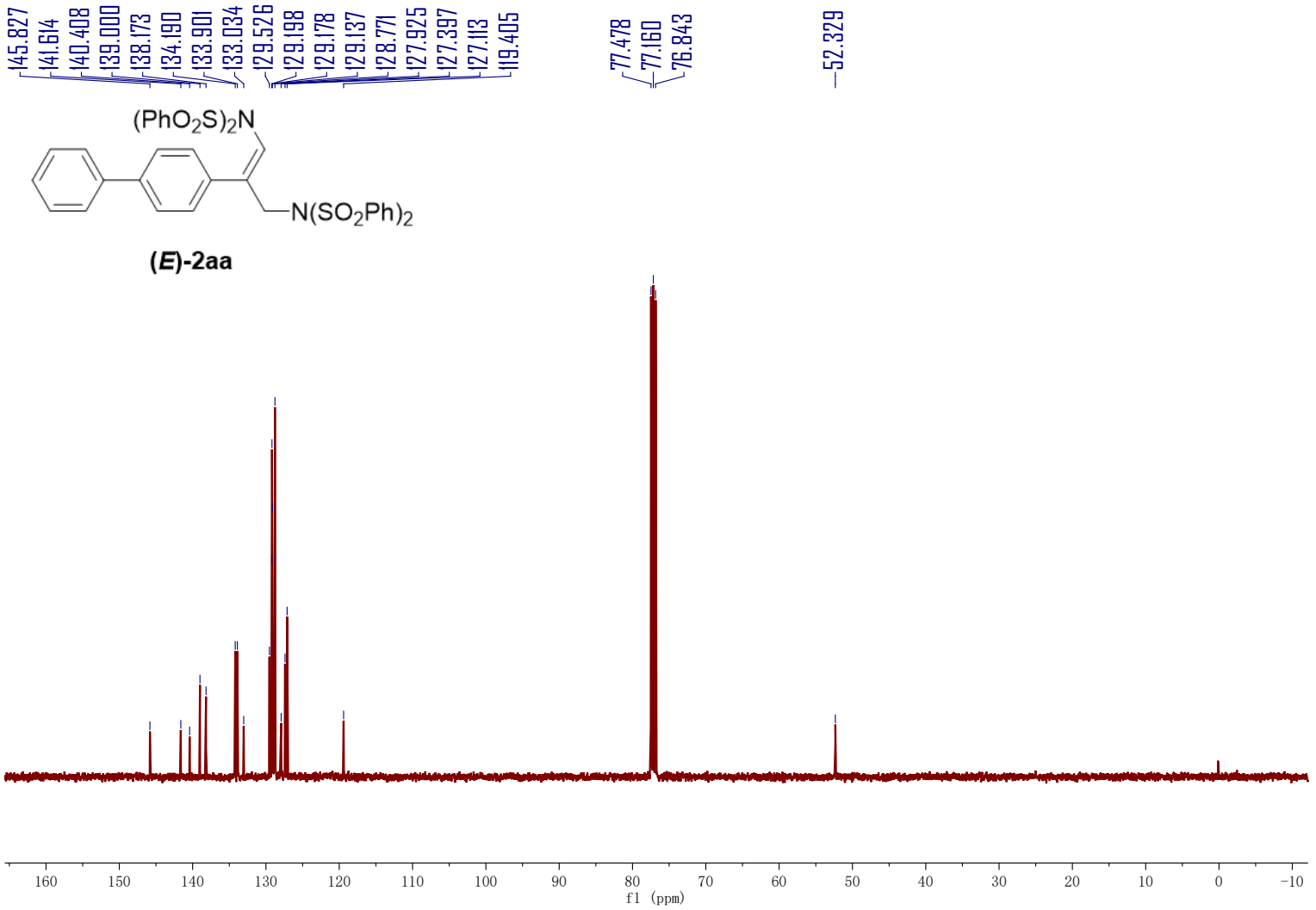
8.023
8.019
7.626
7.607
7.605
7.508
7.465
7.453
7.339
7.338
7.260
5.675
5.672
5.668
4.749
4.745
1.551
0.004
(PhO2S)2N
N(SO2Ph)2
(E)-2aa
4.14
6.18
8.32
7.28
4.22
1.00
2.00
H2O
f1 (ppm)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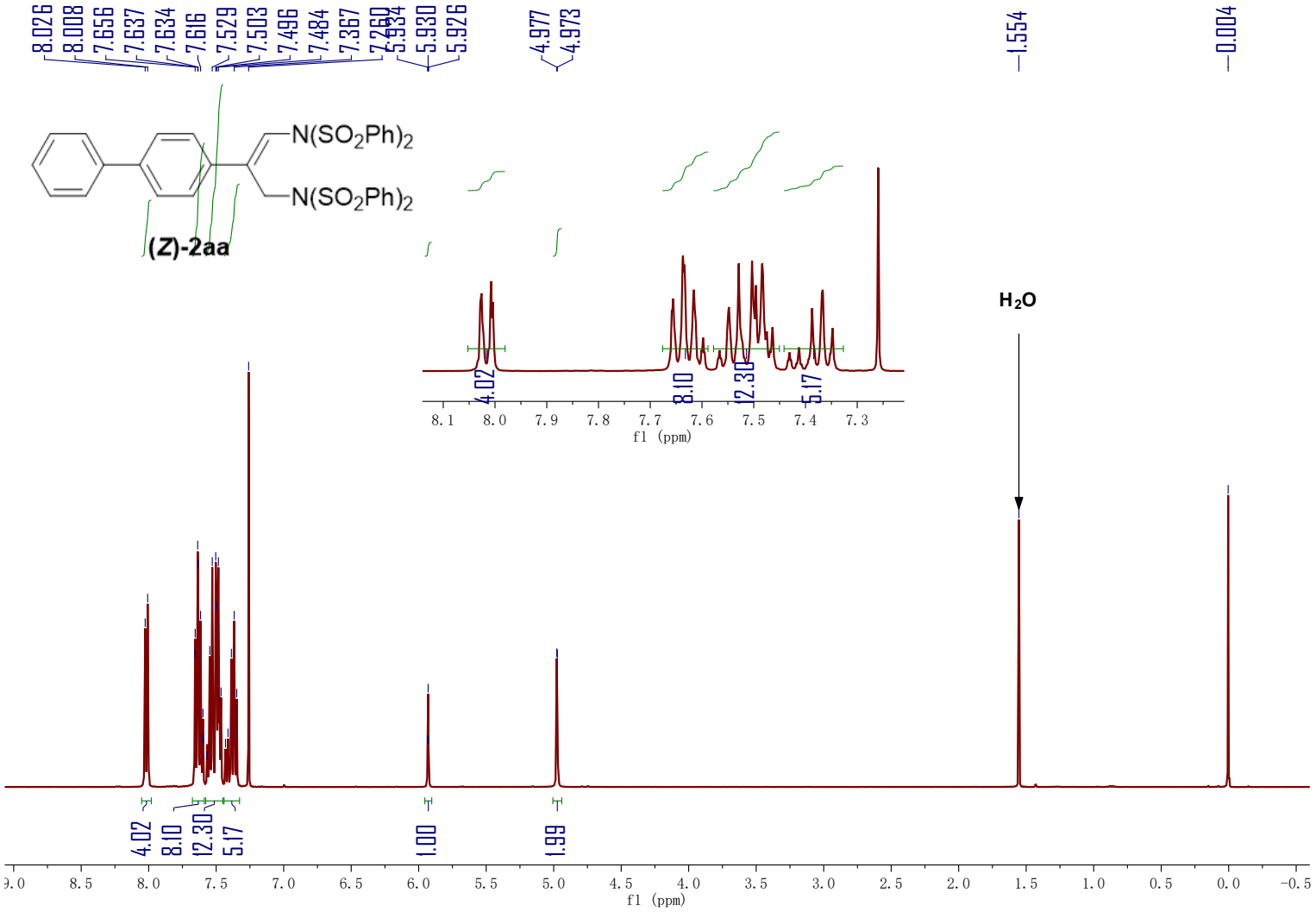
140.408
139.000
138.173
134.190
133.901
133.034
129.526
129.198
129.178
129.137
128.771
127.925
127.397
127.113
119.405
77.478
77.160
76.843
52.329
(PhO2S)2N
N(SO2Ph)2
(E)-2aa
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
−10
f1 (ppm)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8.008
7.656
7.637
7.634
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7.496
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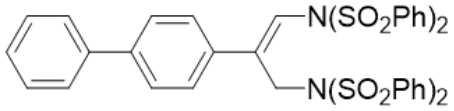
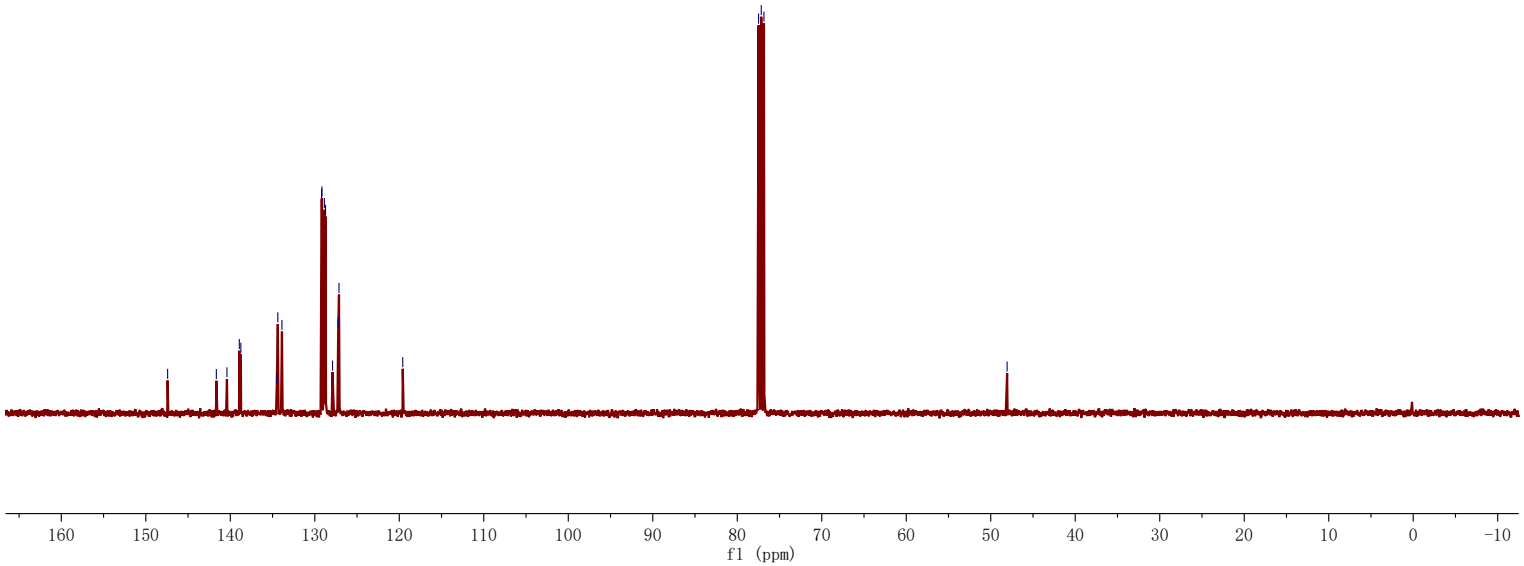
5.934
5.930
5.926
4.977
4.973
1.554
0.004
N(SO2Ph)2
N(SO2Ph)2
(Z)-2aa
H2O
4.02
8.10
12.30
5.17
1.00
1.99
f1 (ppm)


147.419
141.651
140.394
138.934
138.753
134.498
134.377
133.889
129.200
129.149
128.966
128.867
128.729
127.902
127.231
127.134
119.588
77.477
77.160
76.842
48.062


N(SO2Ph)2
N(SO2Ph)2

(*Z*)-2aa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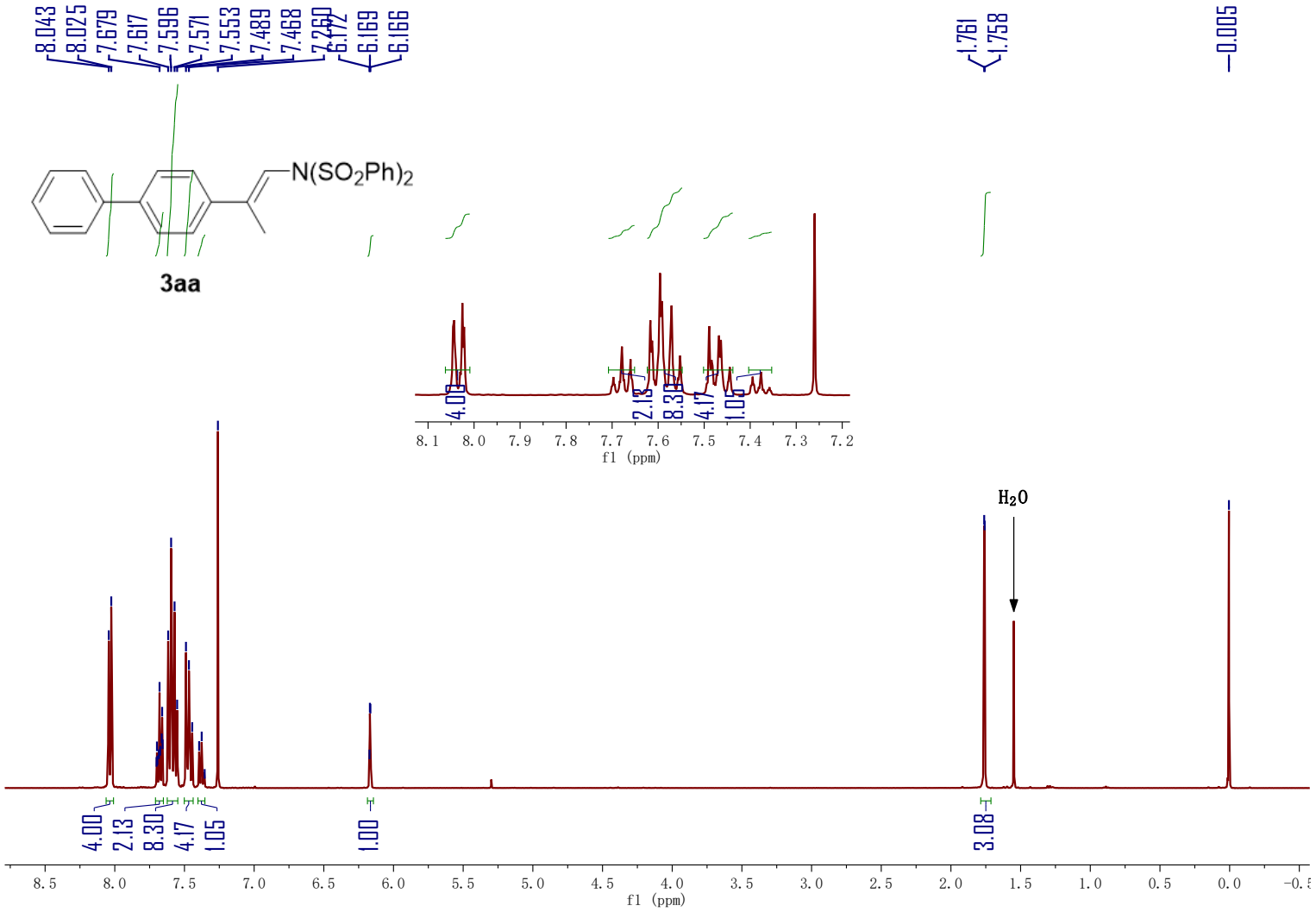
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)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7.260
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6.166
1.761
1.758
0.005
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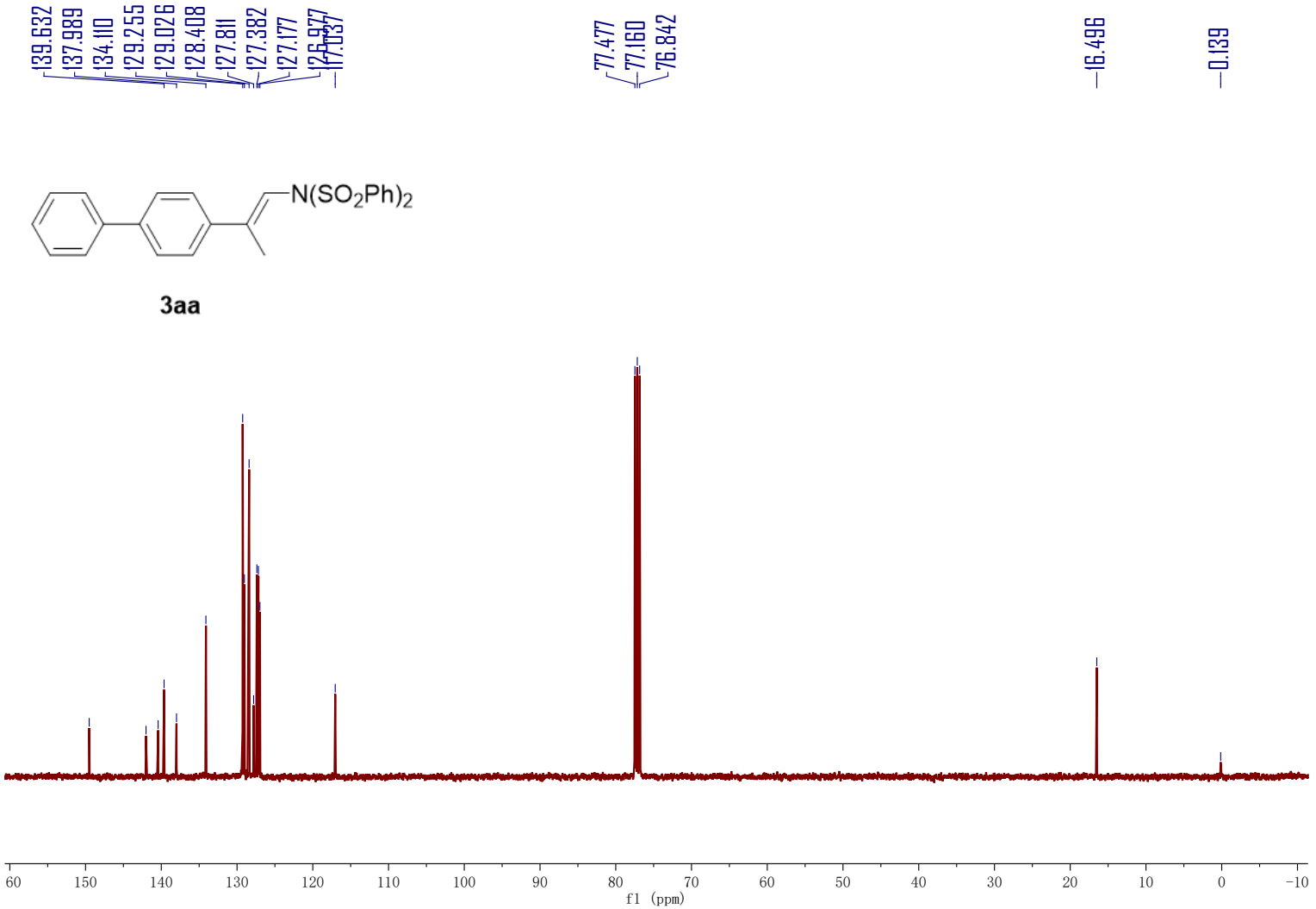
8.30
4.17
1.05
1.00
3.08
H2O
f1 (ppm)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128.408
127.811
127.382
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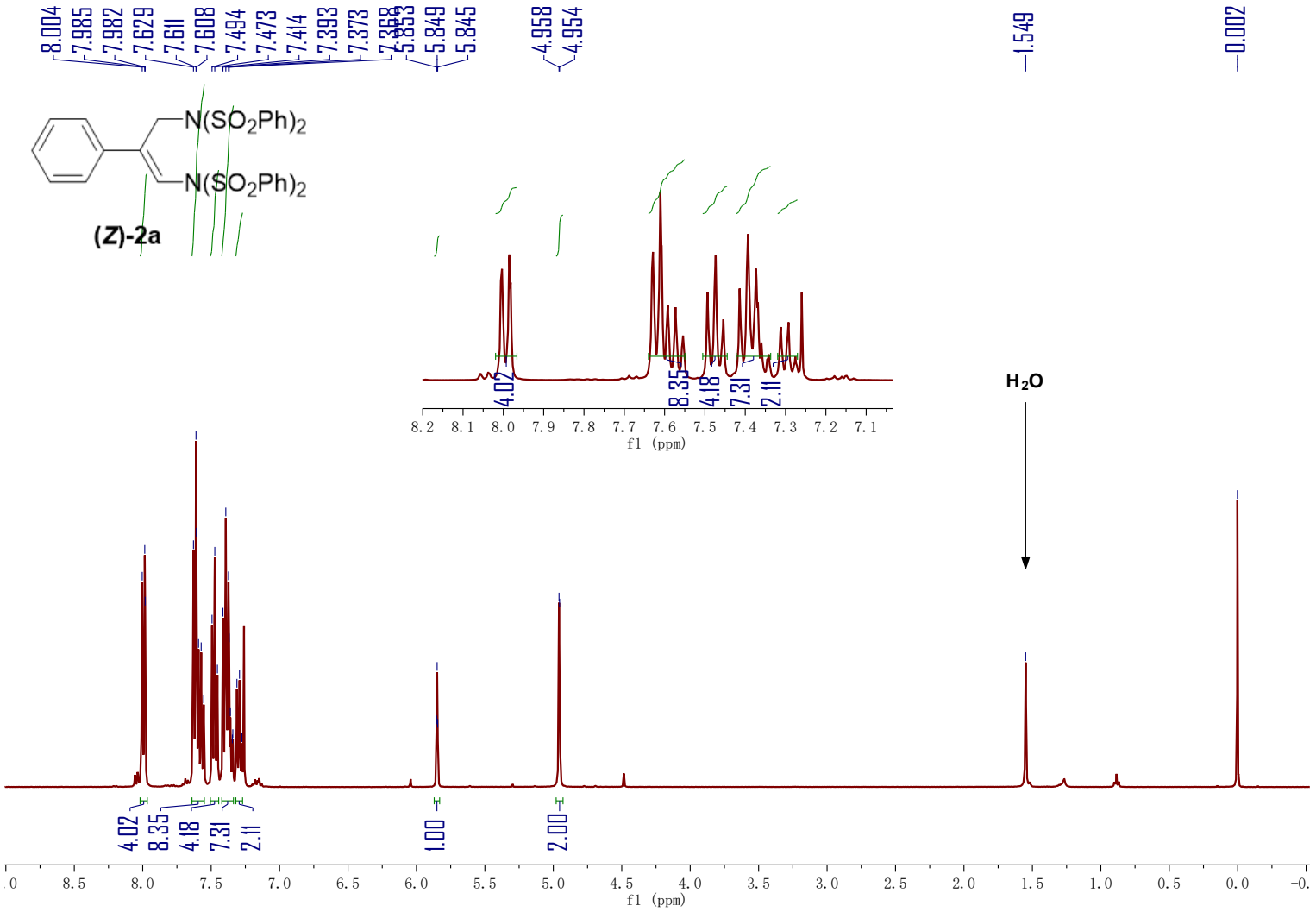
126.977
126.947
77.477
77.160
76.842
16.496
0.139
N(SO2Ph)2
3aa
60
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
−10
f1 (ppm)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7.494
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7.414
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5.853
5.849
5.845
4.958
4.954
1.549
0.002
N(SO2Ph)2
N(SO2Ph)2
(Z)-2a
H2O
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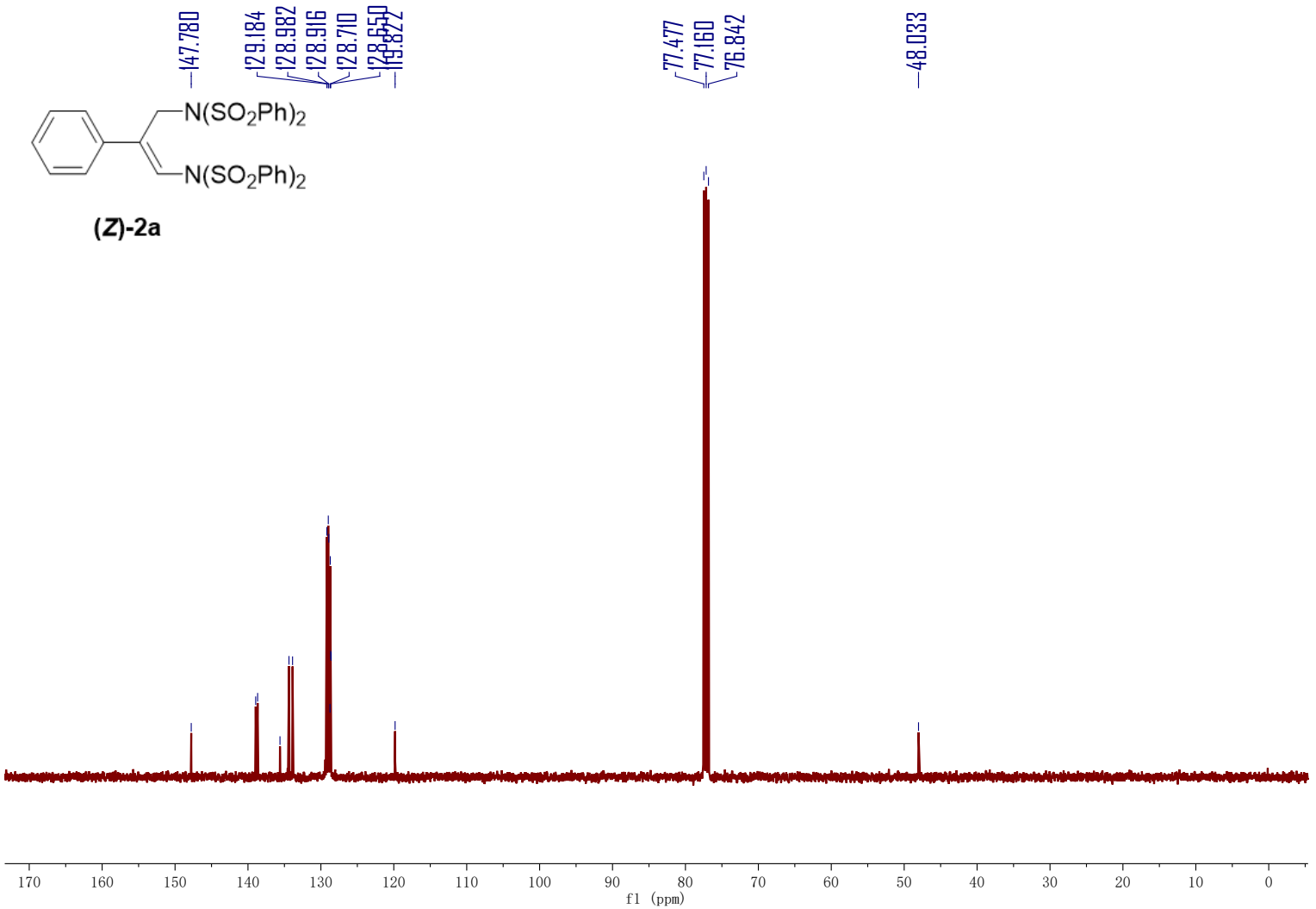
4.18
7.31
2.11
1.00
2.00
f1 (ppm)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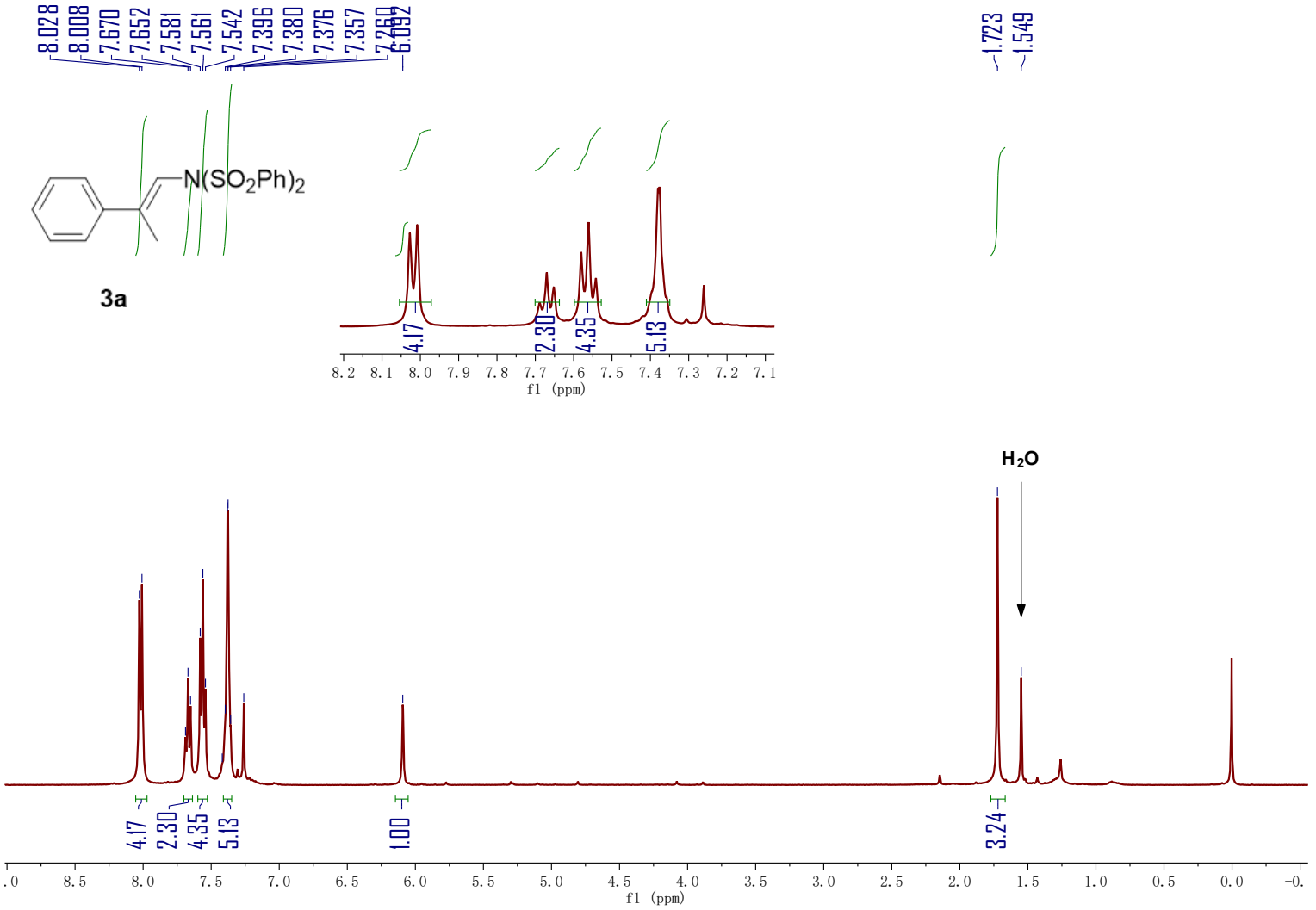
128.710
128.650
119.822
77.477
77.160
76.842
48.033
N(SO2Ph)2
N(SO2Ph)2
(Z)-2a
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)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7.376
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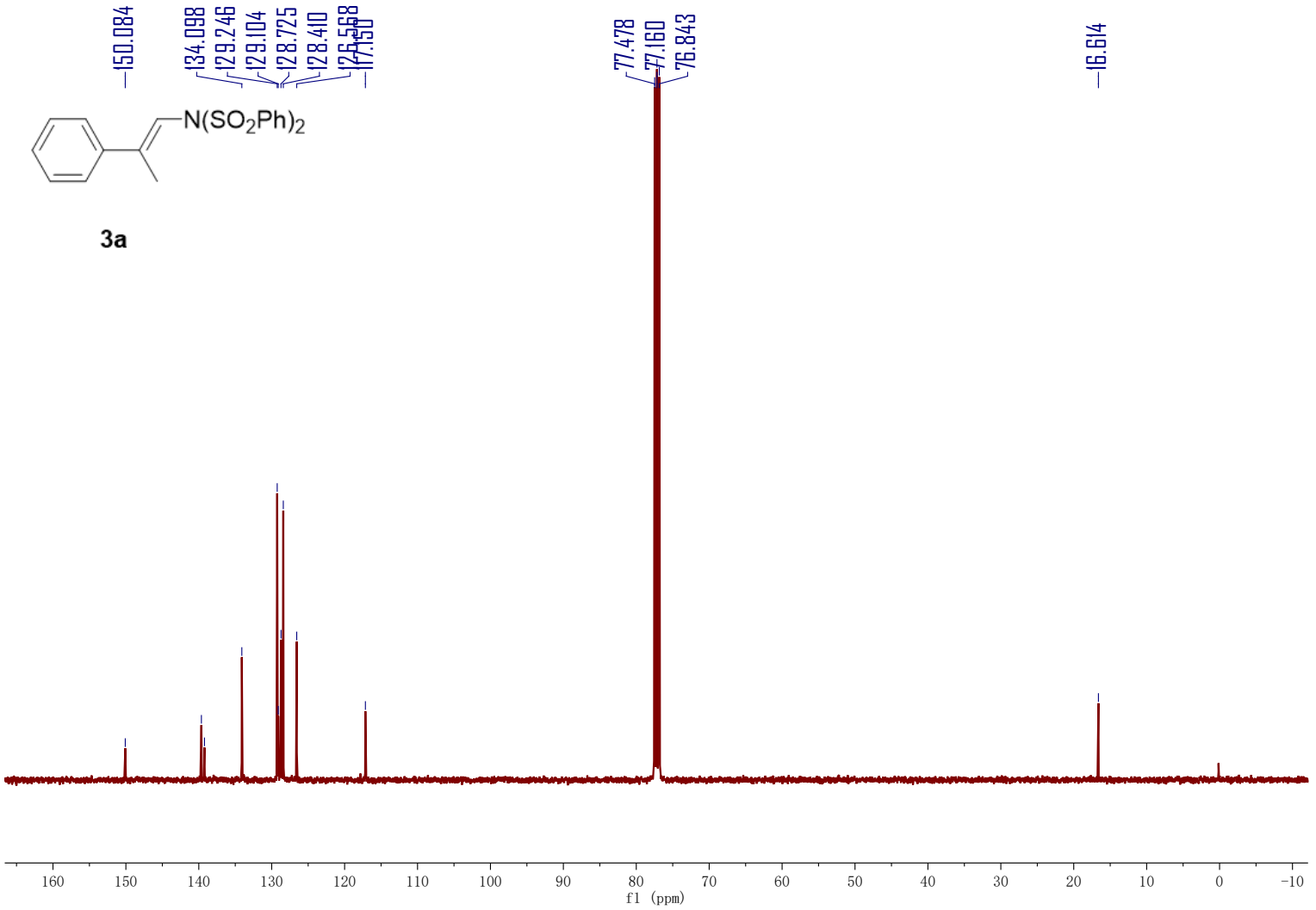
6.892
1.723
1.549
N(SO2Ph)2
3a
4.17
2.30
4.35
5.13
8.2 8.1 8.0 7.9 7.8 7.7 7.6 7.5 7.4 7.3 7.2 7.1
f1 (ppm)
H2O
4.17
2.30
4.35
5.13
1.00
3.24
.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.
f1 (ppm)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77.478
77.160
76.843
16.614
N(SO2Ph)2
3a
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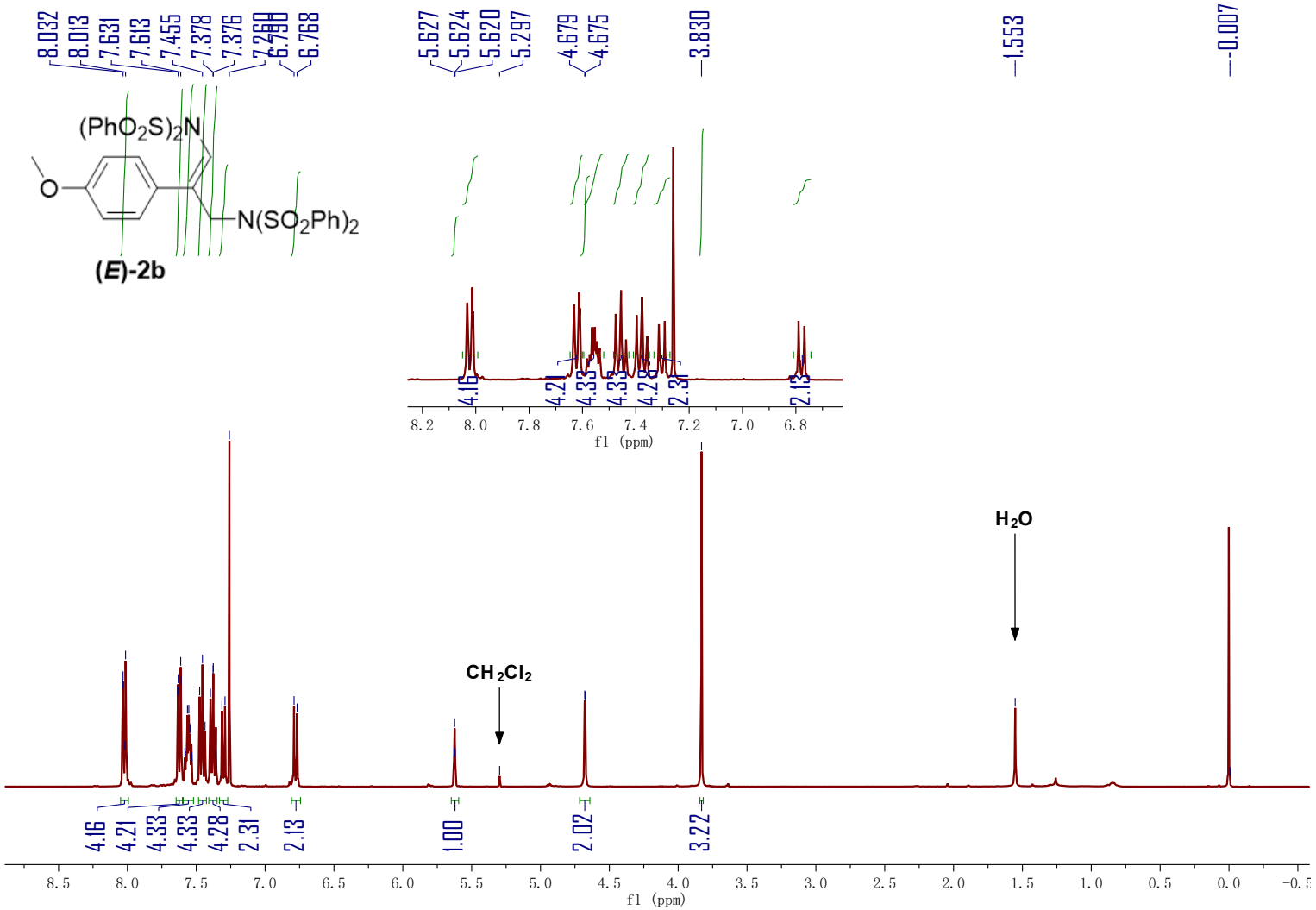
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
−10
f1 (ppm)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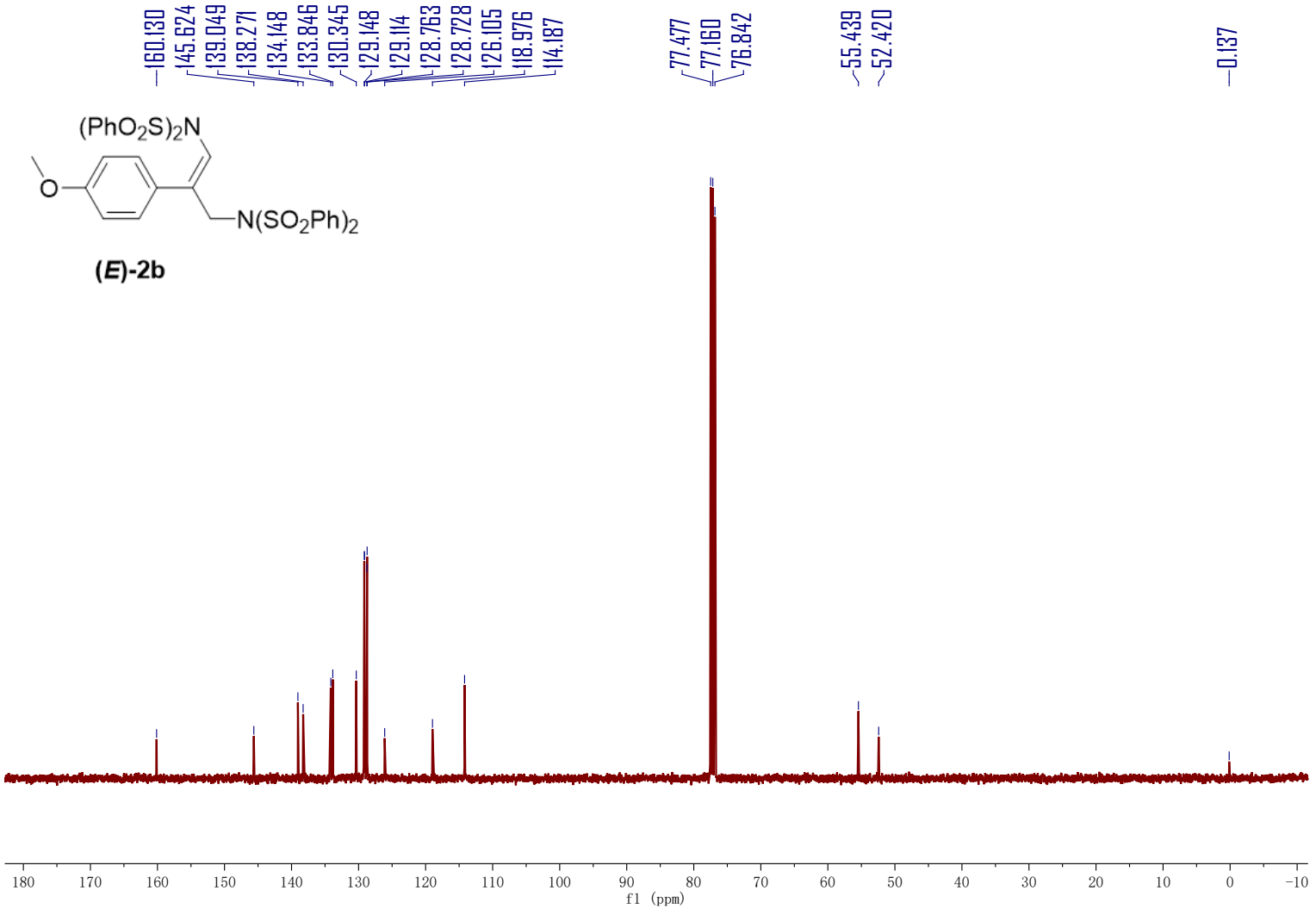
7.376
6.768
5.627
5.624
5.620
5.297
4.679
4.675
3.830
1.553
0.007
(PhO2S)2N
O
N(SO2Ph)2
(E)-2b
4.16
4.21
4.33
4.33
4.28
2.31
2.13
1.00
2.02
3.22
CH2Cl2
H2O
f1 (ppm)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129.148
129.114
128.763
128.728
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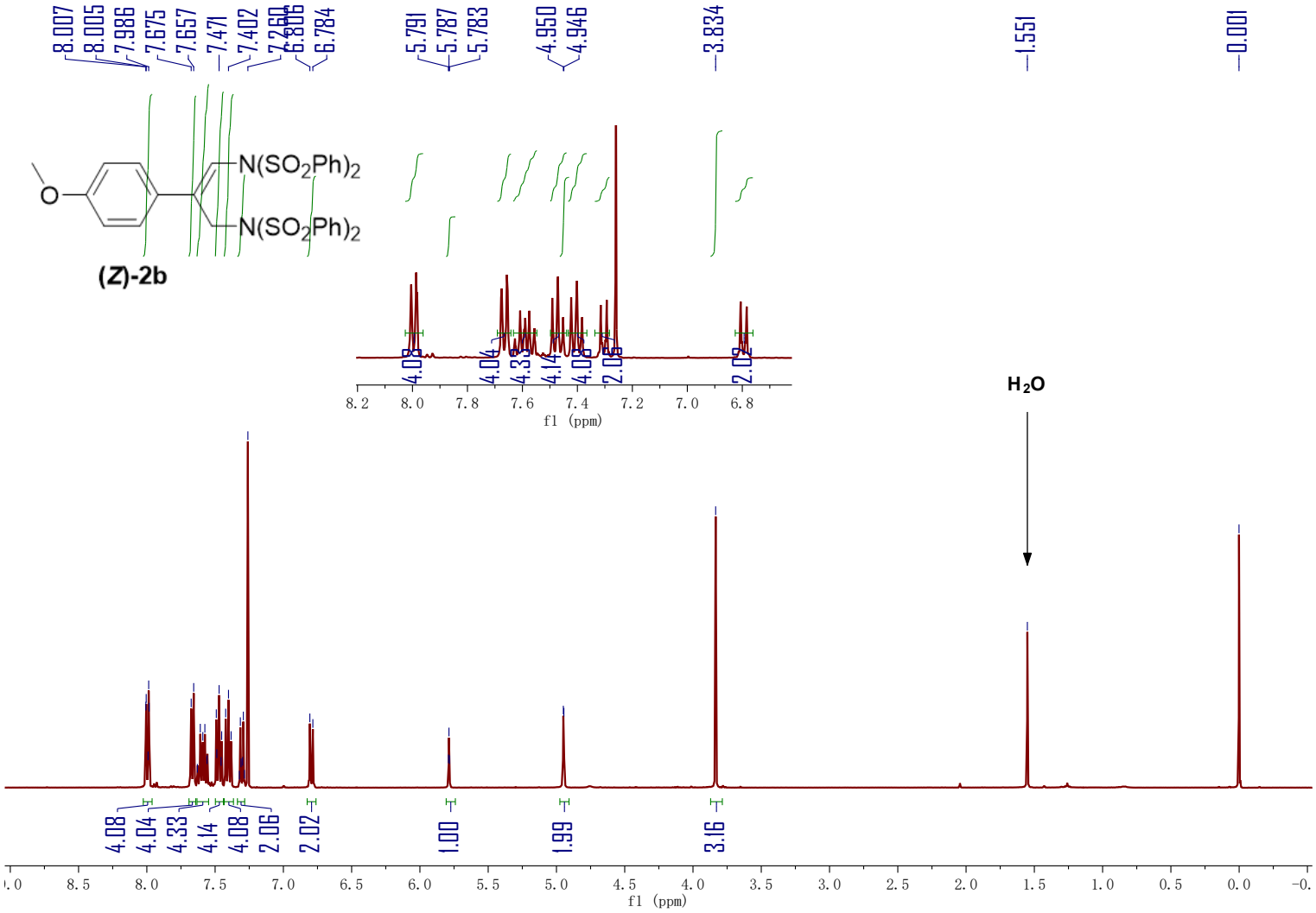
118.976
114.187
77.477
77.160
76.842
55.439
52.420
0.137
(PhO2S)2N
O
N(SO2Ph)2
(E)-2b
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
−10
f1 (ppm)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7.260
6.806
6.784
5.791
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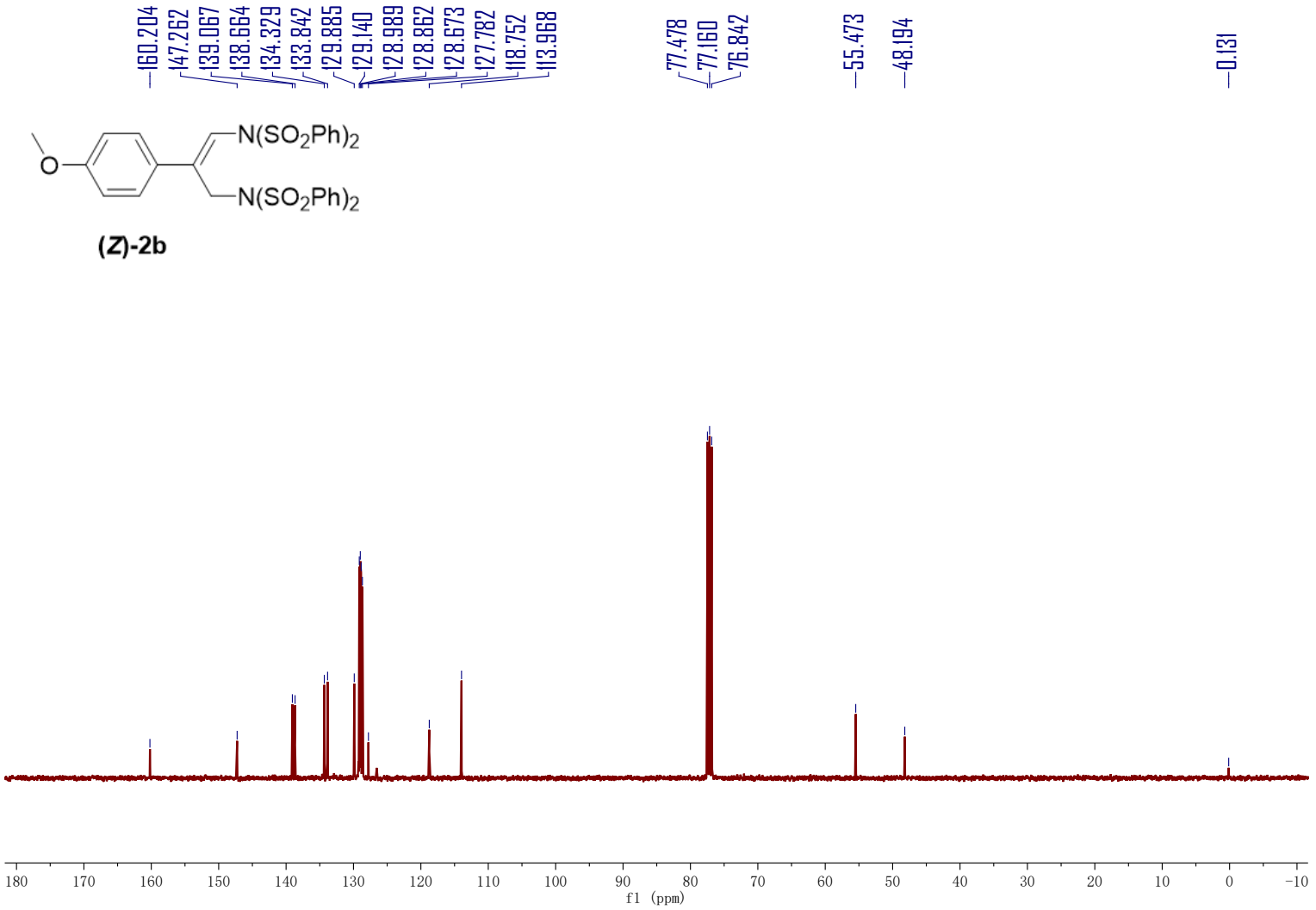
5.783
4.950
4.946
3.834
1.551
0.001
N(SO2Ph)2
N(SO2Ph)2
O
(Z)-2b
4.08
4.04
4.33
4.14
4.08
2.06
2.02
8.2
8.0
7.8
7.6
7.4
7.2
7.0
6.8
f1 (ppm)
H2O
4.08
4.04
4.33
4.14
4.08
2.06
2.02
1.00
1.99
3.16
f1 (ppm)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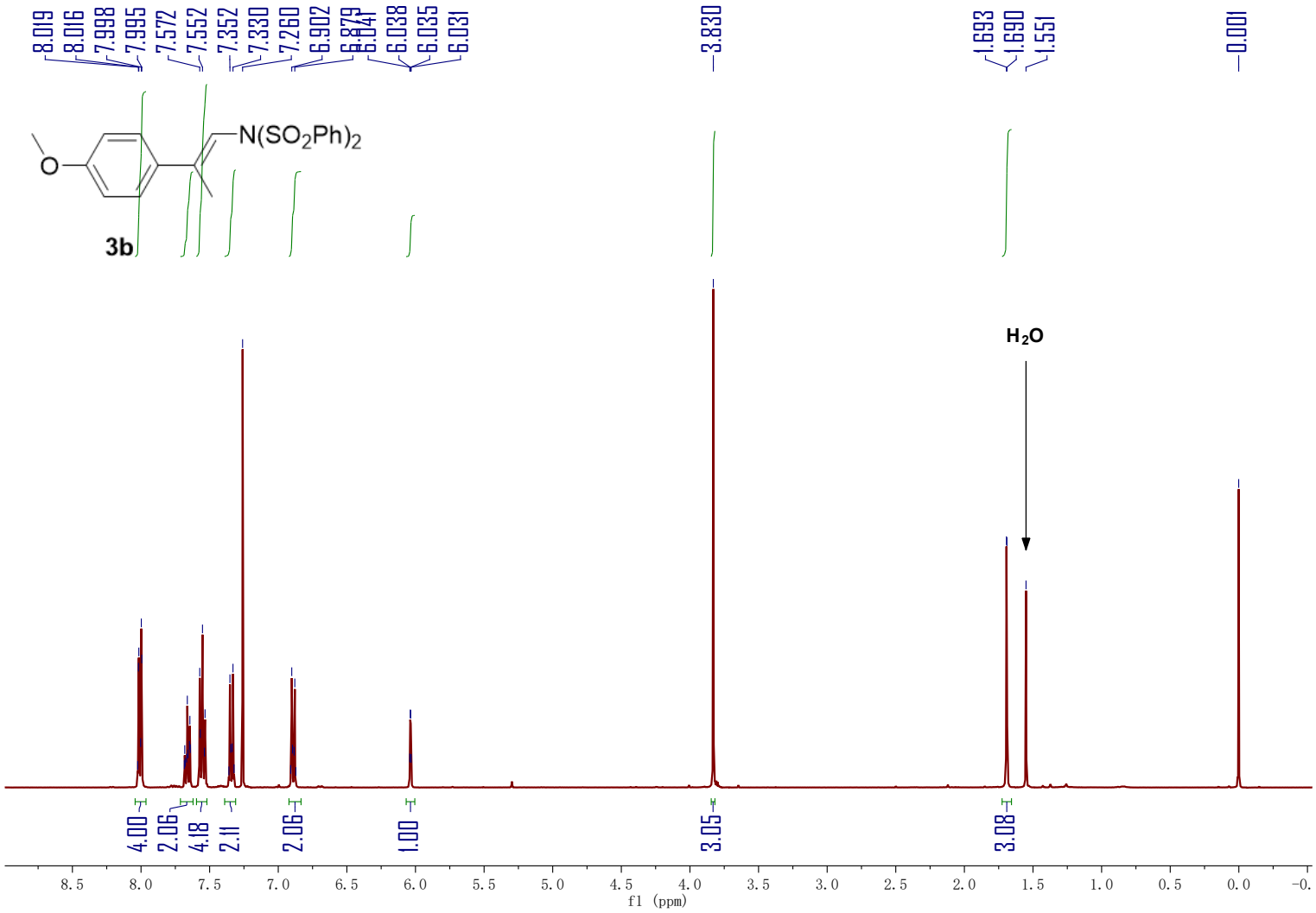
118.752
113.968
77.478
77.160
76.842
55.473
48.194
0.131
N(SO2Ph)2
N(SO2Ph)2
O
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
−10
f1 (ppm)

(*Z*)-2b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7.995
7.572
7.552
7.352
7.330
7.260
6.902
6.879
6.041
6.038
6.035
6.031
3.830
1.693
1.690
1.551
0.001
N(SO2Ph)2
O
3b
H2O
4.00
2.06
4.18
2.11
2.06
1.00
3.05
3.08
8.5
8.0
7.5
7.0
6.5
6.0
5.5
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4.5
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2.5
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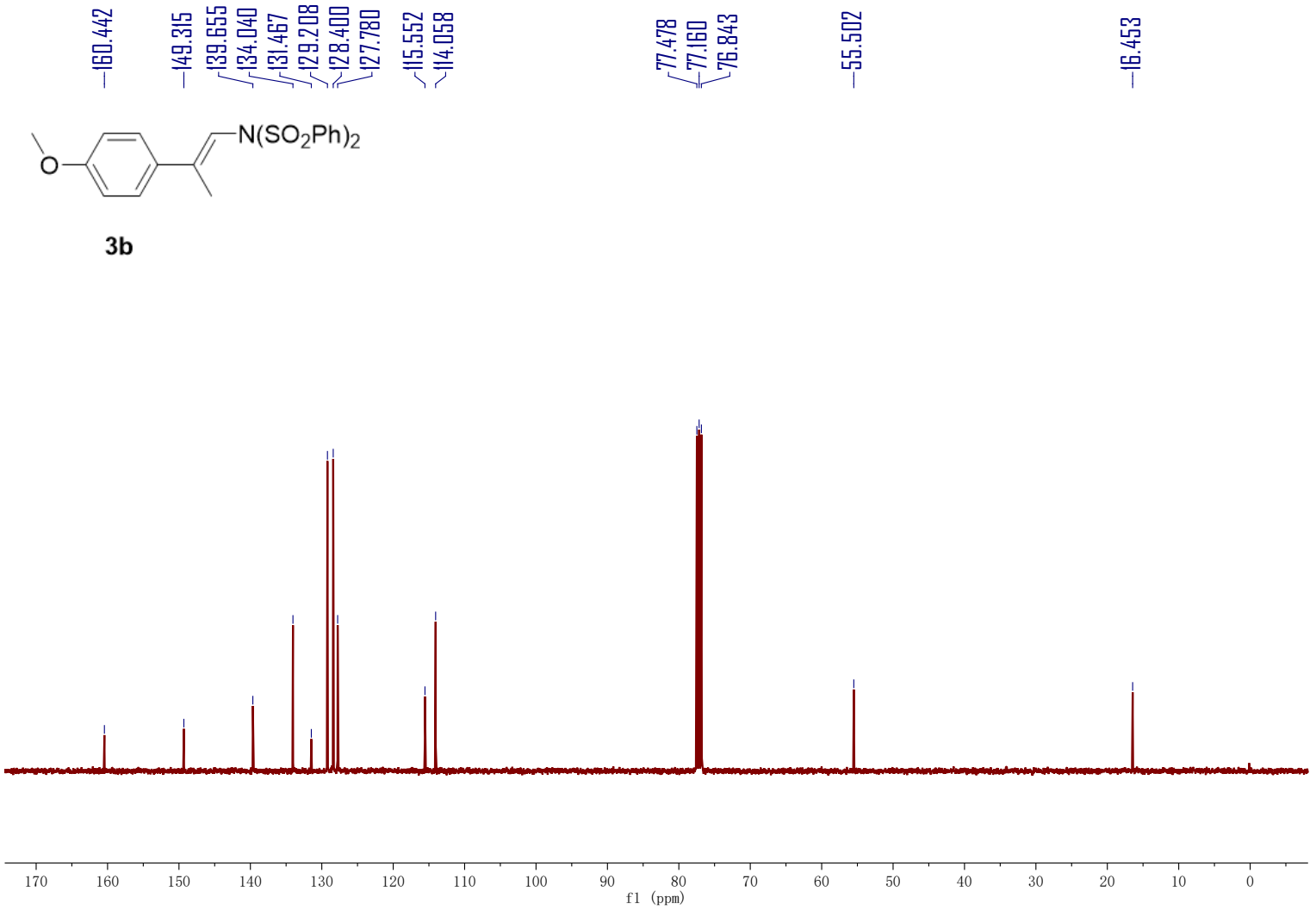
0.5
0.0
f1 (ppm)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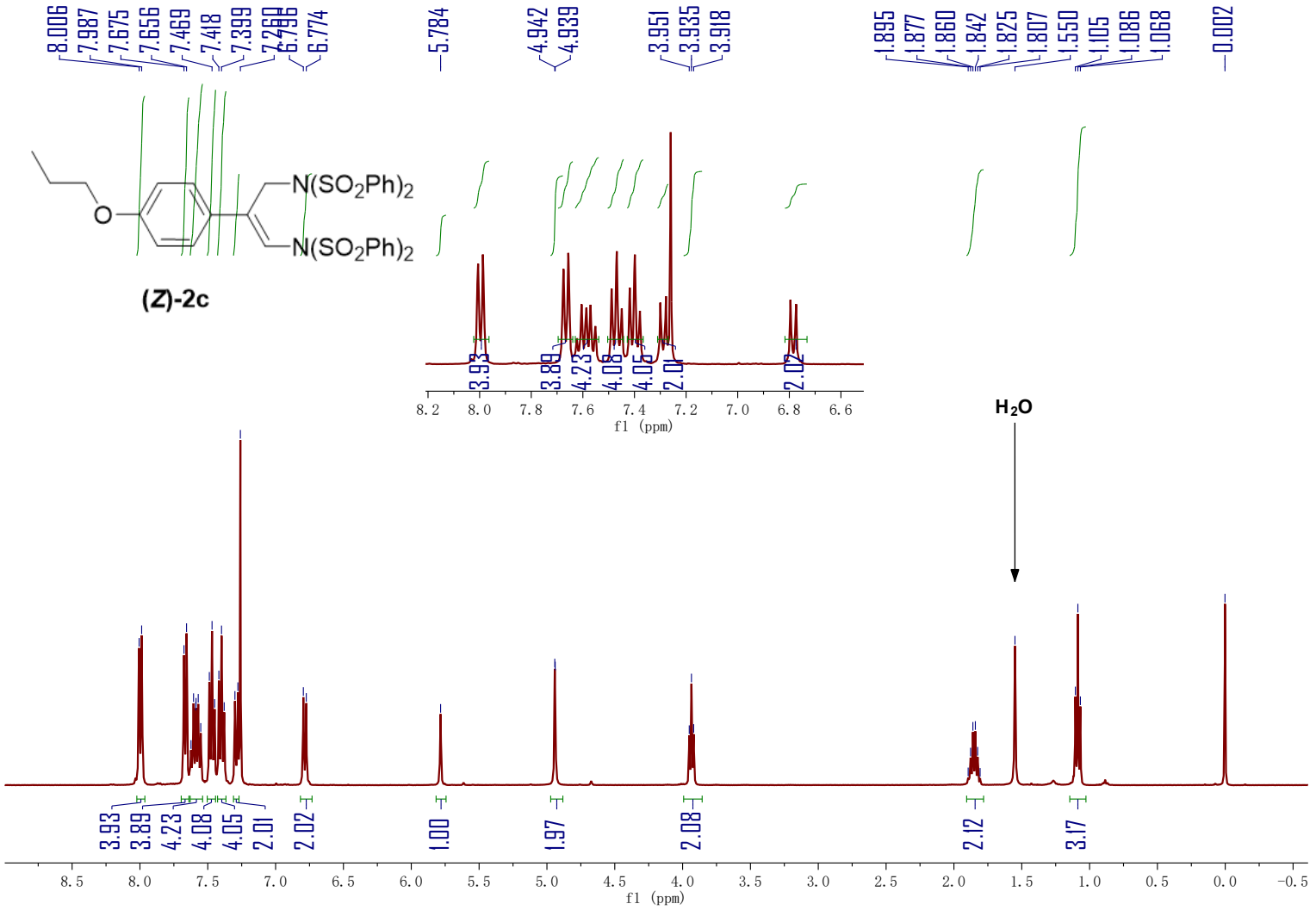
134.040
131.467
129.208
128.400
127.780
115.552
114.058
77.478
77.160
76.843
55.502
16.453
O
N(SO2Ph)2
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

3b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7.418
7.399
6.774
5.784
4.942
4.939
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3.935
3.918
1.895
1.877
1.860
1.842
1.825
1.807
1.550
1.105
1.086
1.068
0.002
N(SO2Ph)2
N(SO2Ph)2
O
(Z)-2c
H2O
3.93
3.89
4.23
4.08
4.05
2.01
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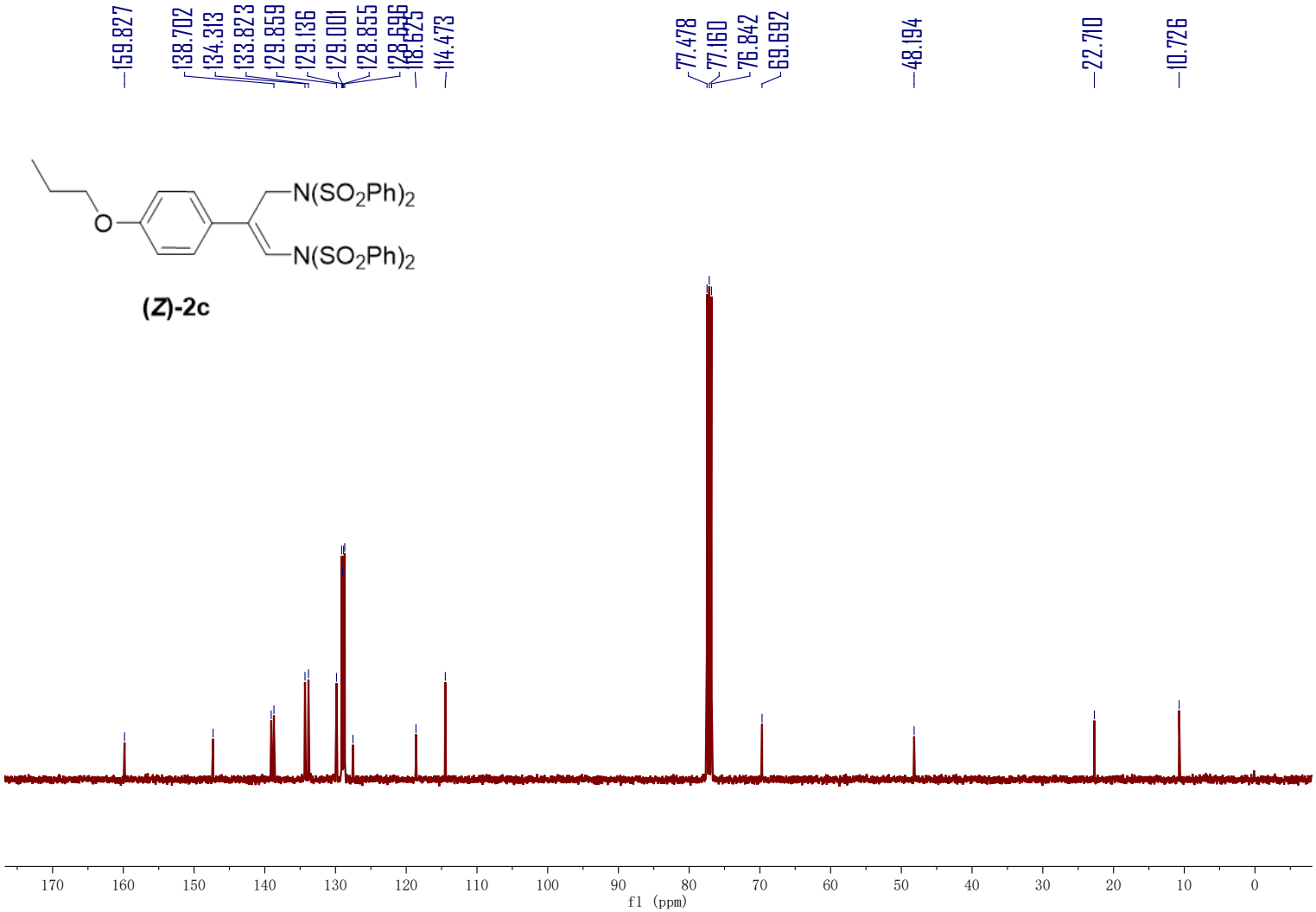
2.12
3.17
f1 (ppm)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128.696
128.625
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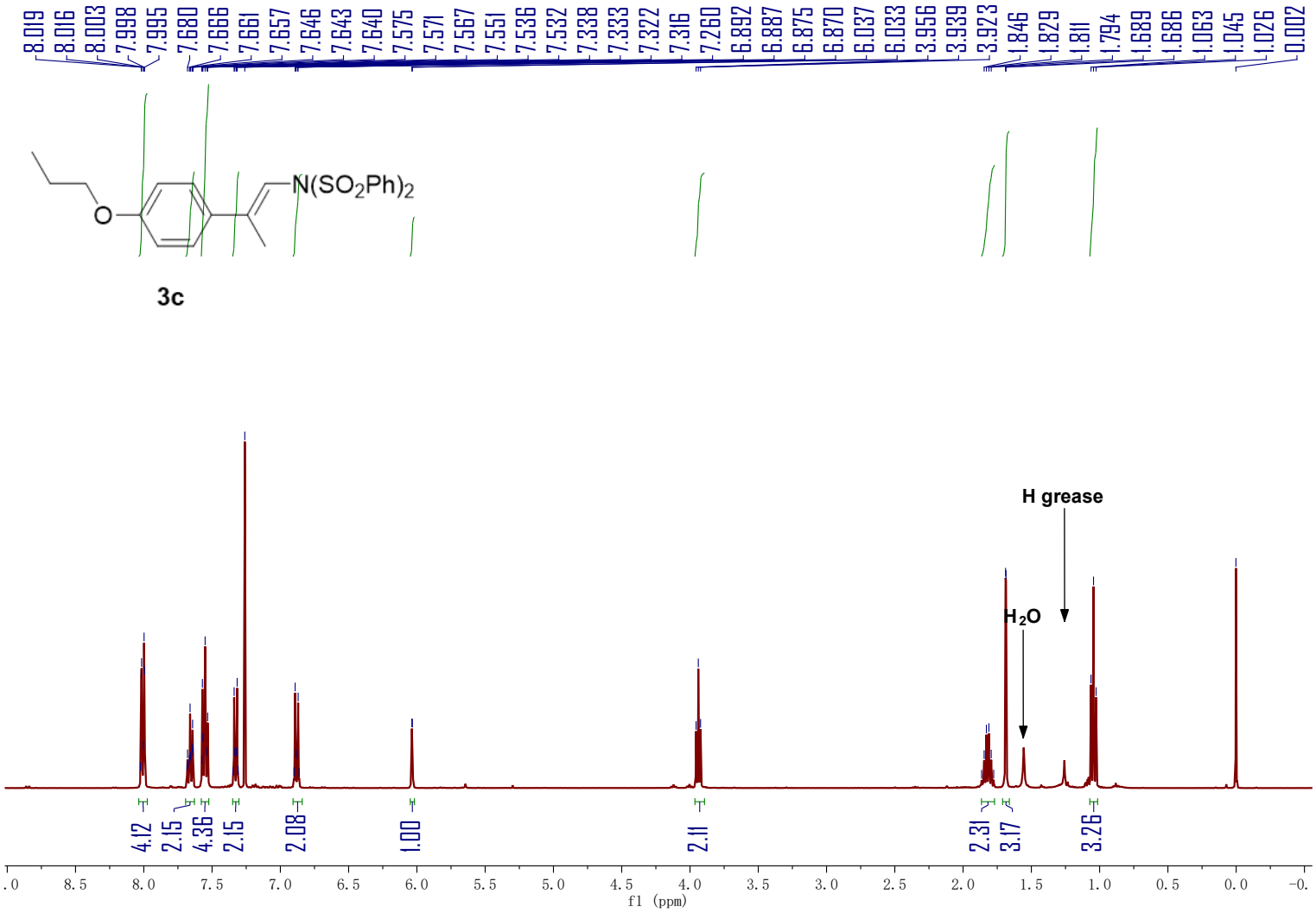
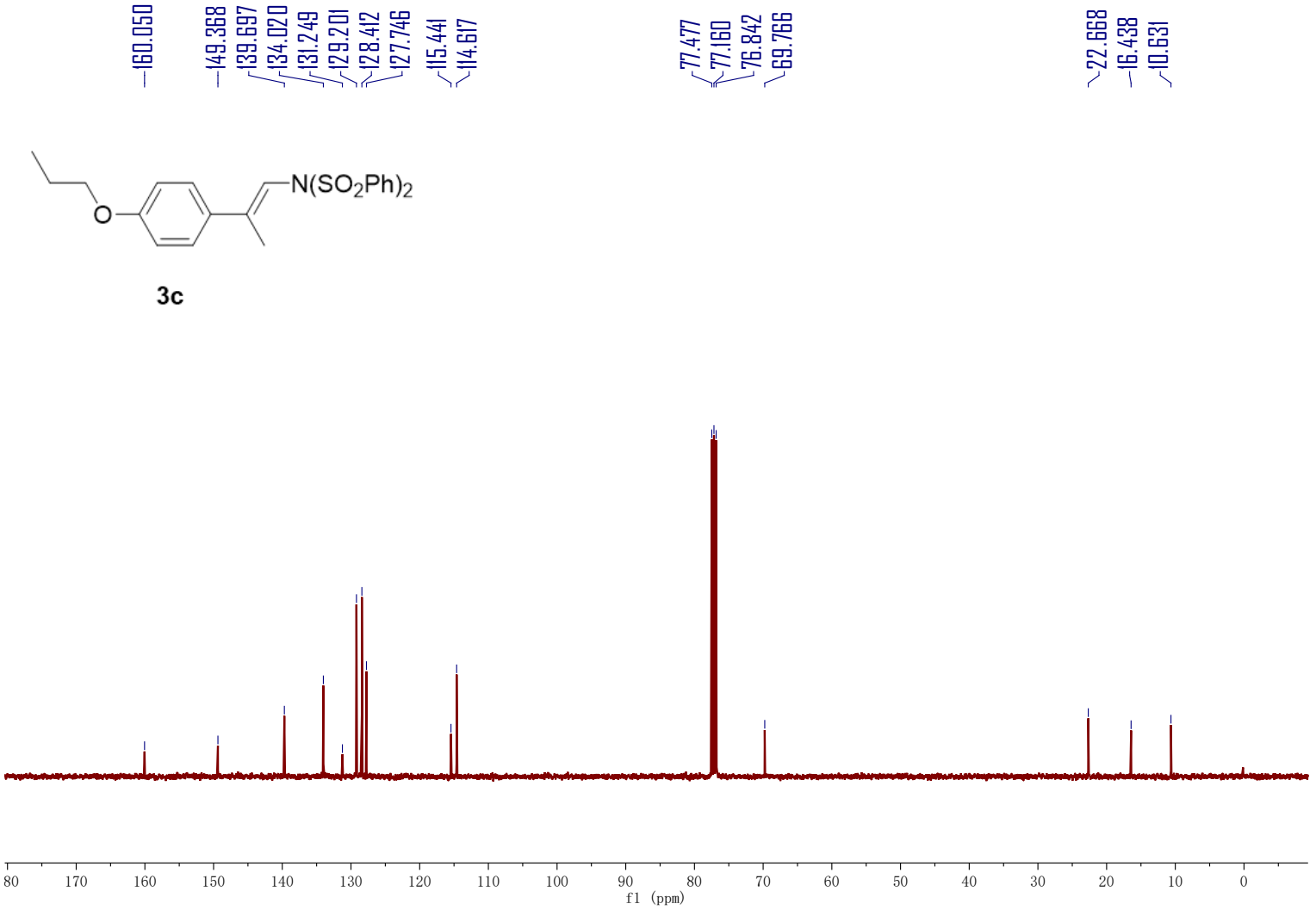
114.473
77.478
77.160
76.842
69.692
48.194
22.710
10.726
N(SO2Ph)2
N(SO2Ph)2
O
(Z)-2c
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


8.019
8.016
8.003
7.998
7.995
7.680
7.666
7.661
7.657
7.646
7.643
7.640
7.575
7.571
7.567
7.551
7.536
7.532
7.338
7.333
7.322
7.316
7.260
6.892
6.887
6.875
6.870
6.037
6.033
3.956
3.939
3.923
1.846
1.829
1.811
1.794
1.689
1.686
1.063
1.045
1.026
0.002
N(SO2Ph)2
O
H grease
H2O
4.12
2.15
4.36
2.15
2.08
1.00
2.11
2.31
3.17
3.26
f1 (ppm)

3c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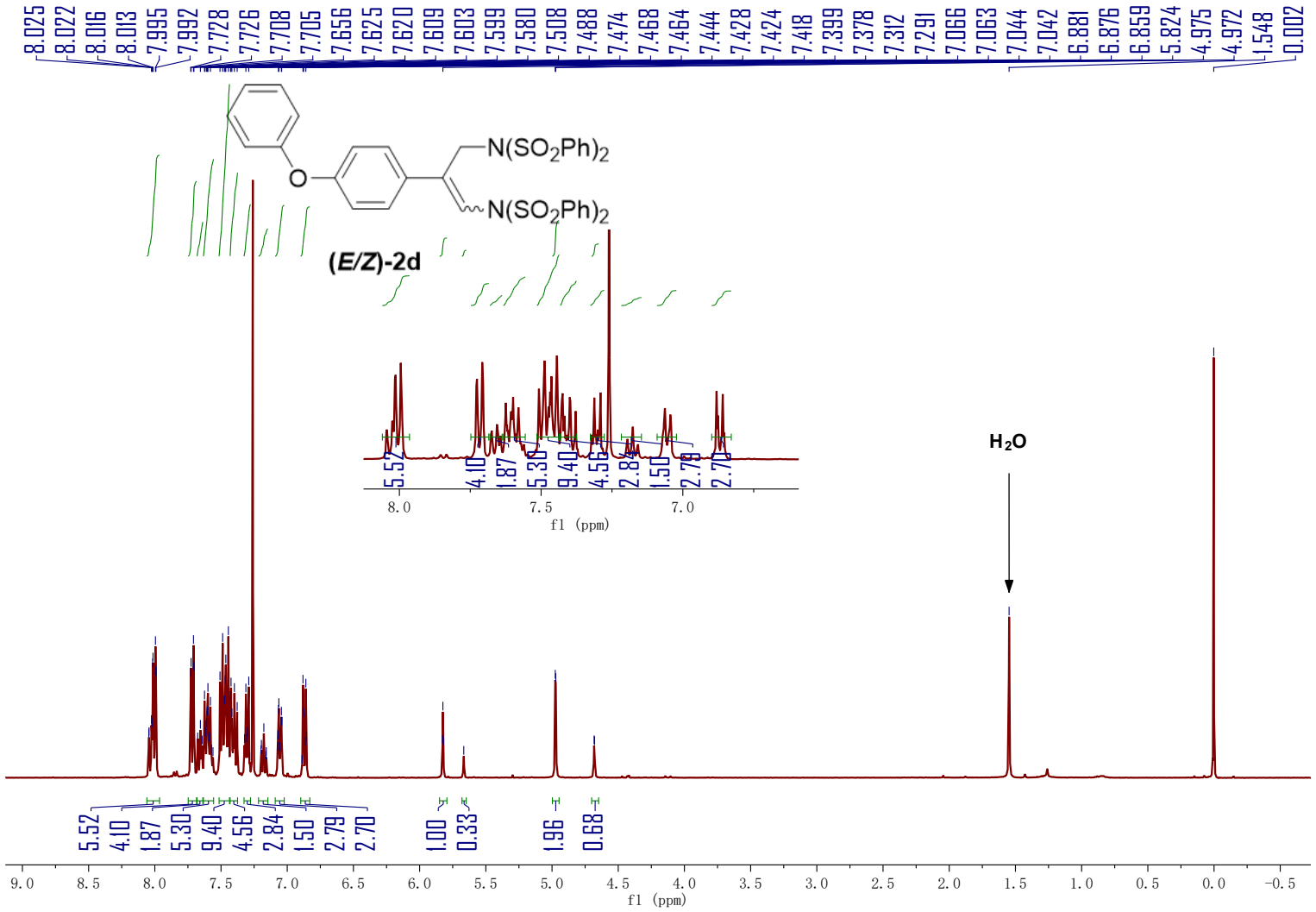
149.368
139.697
134.020
131.249
129.201
128.412
127.746
115.441
114.617
77.477
77.160
76.842
69.766
22.668
16.438
10.631
N(SO2Ph)2
O
80
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

3c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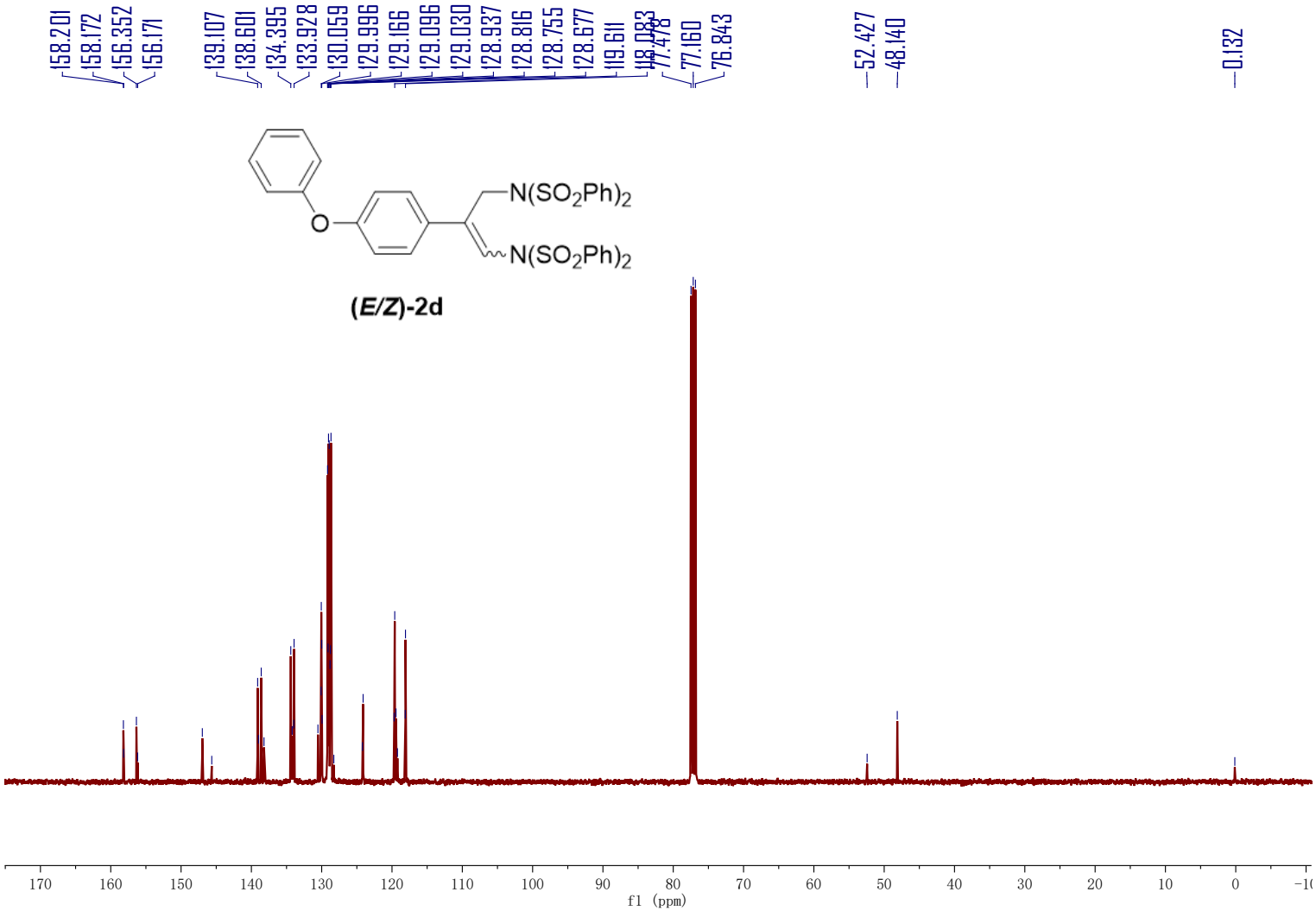
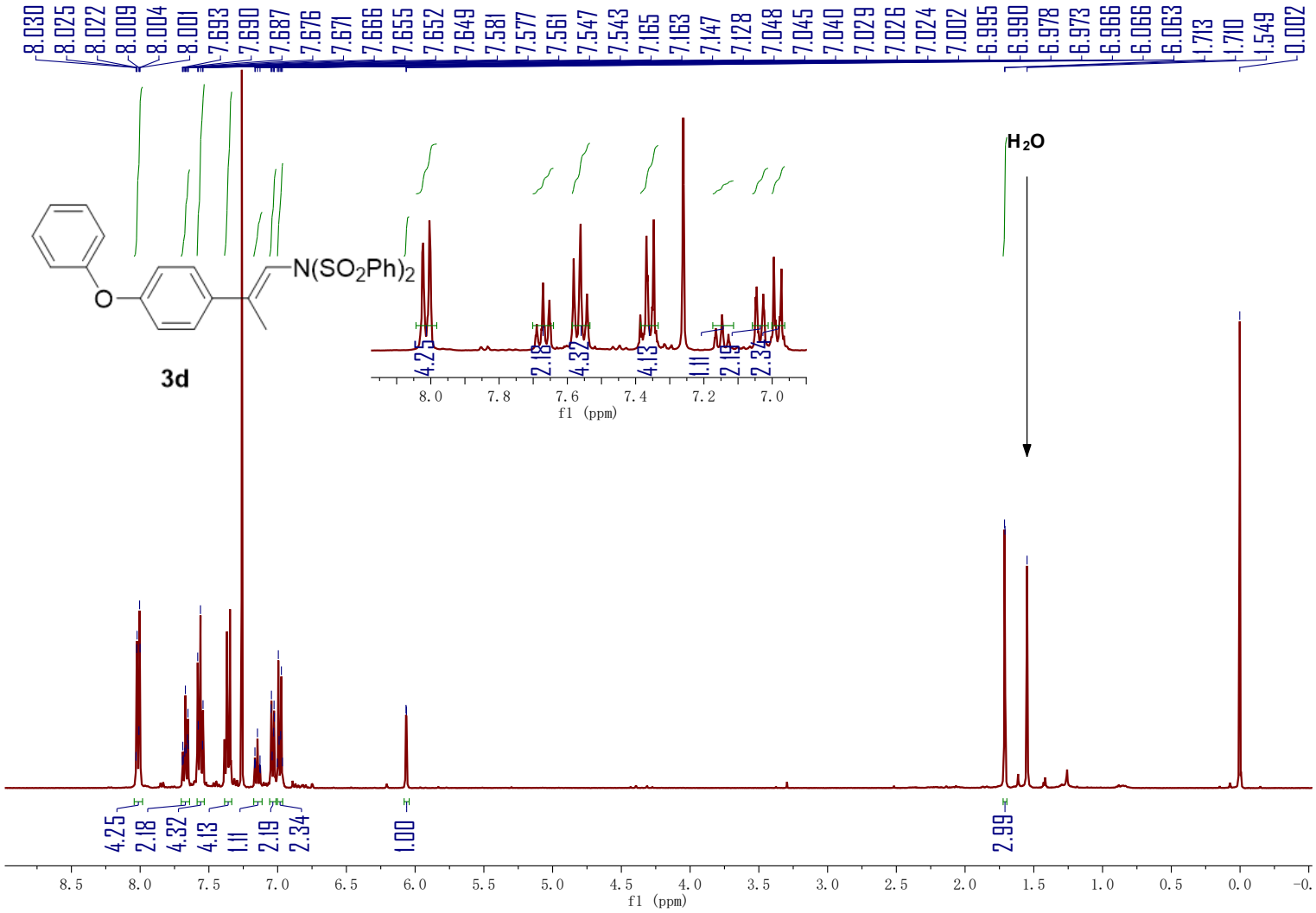
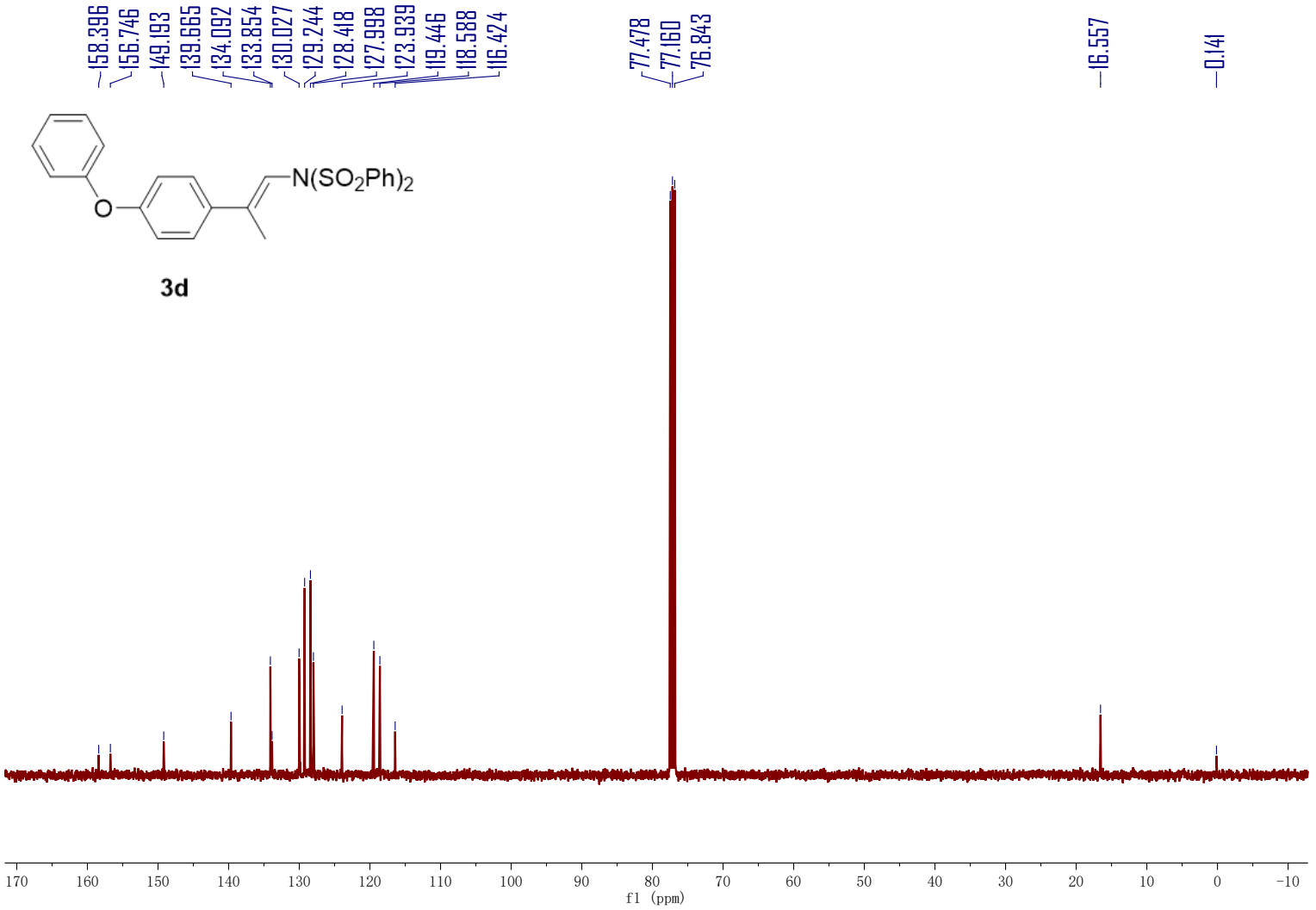
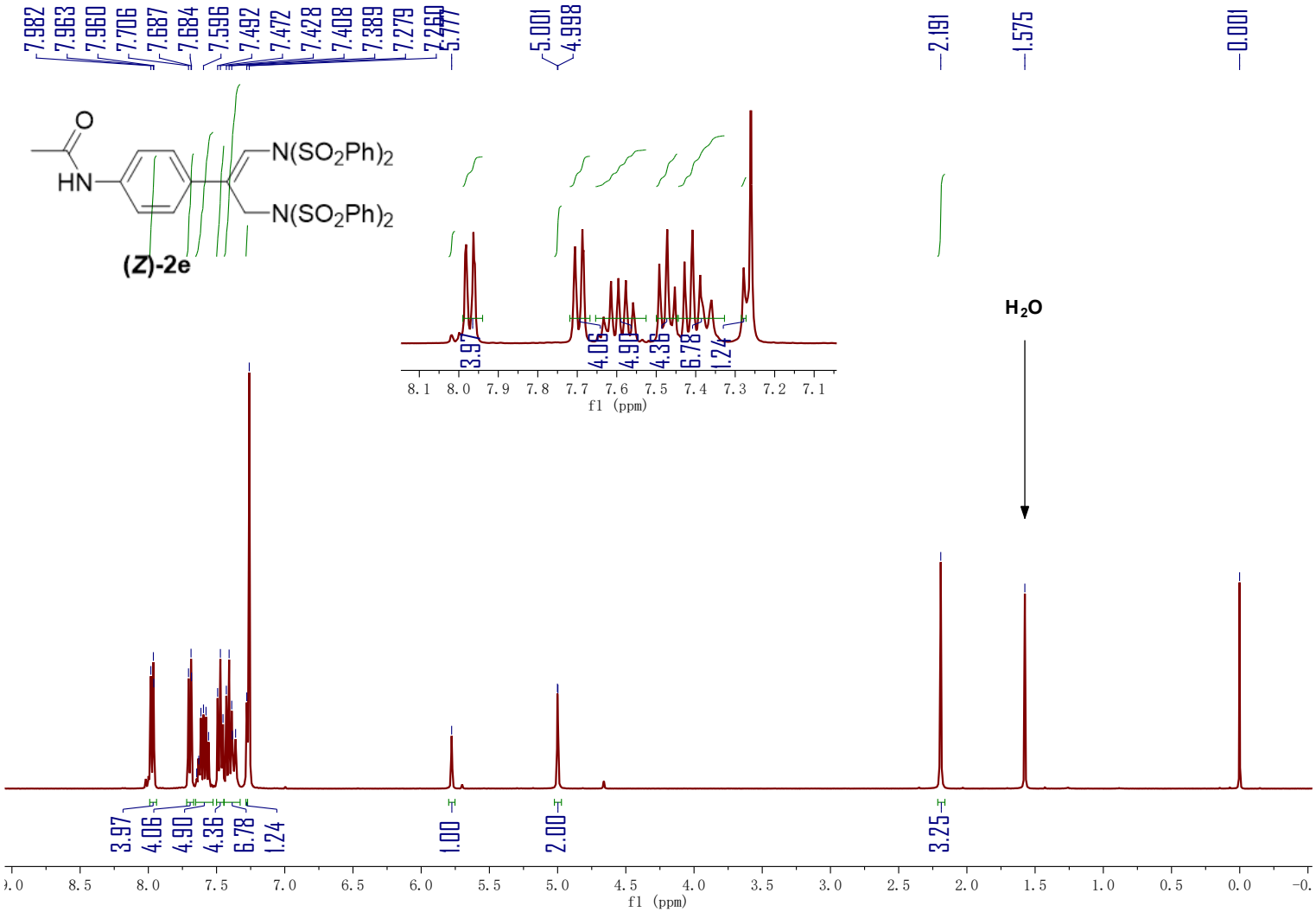
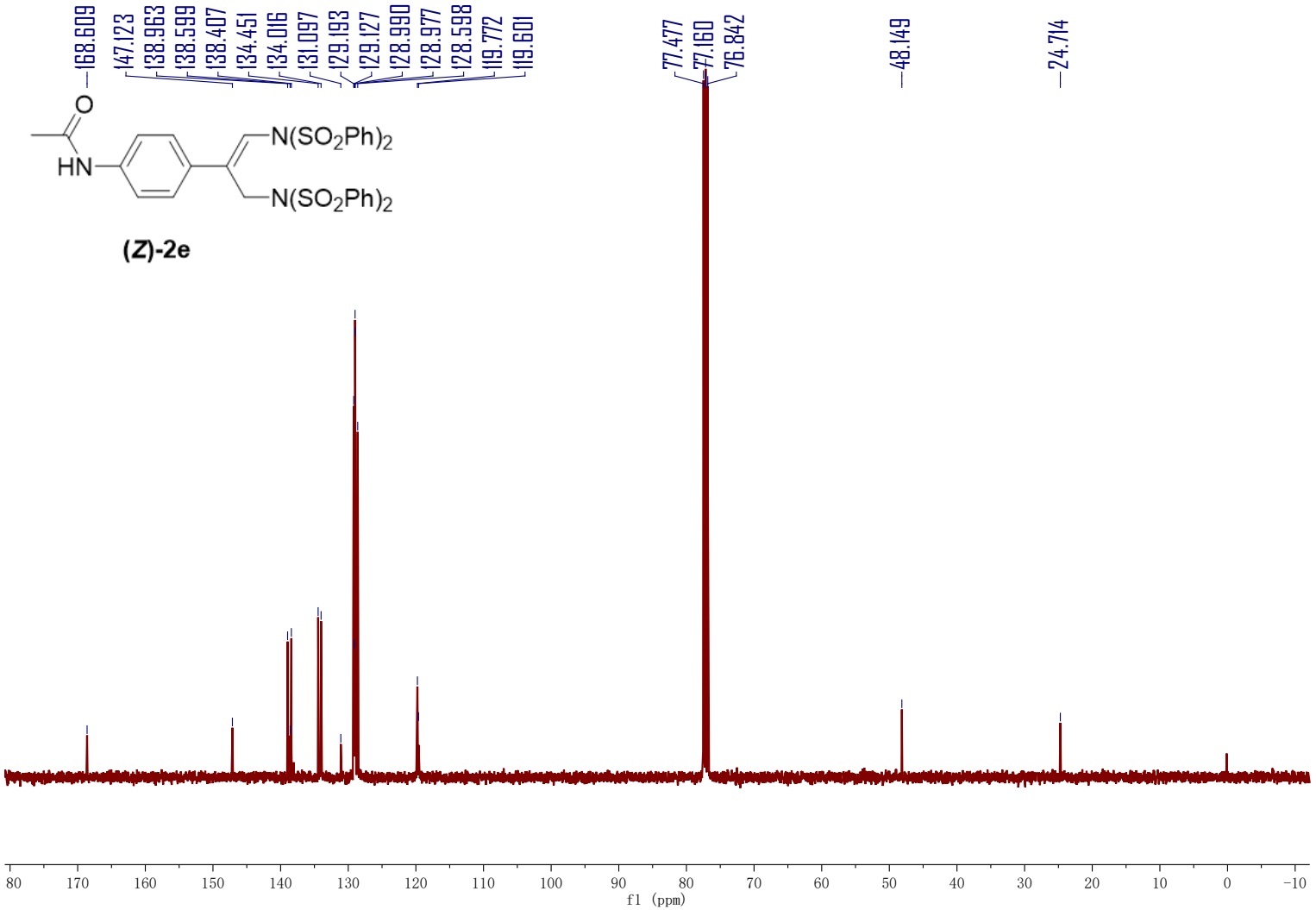
8.022
8.016
8.013
7.995
7.992
7.728
7.726
7.708
7.705
7.656
7.625
7.620
7.609
7.603
7.599
7.580
7.508
7.488
7.474
7.468
7.464
7.444
7.428
7.424
7.418
7.399
7.378
7.312
7.291
7.066
7.063
7.044
7.042
6.881
6.876
6.859
5.824
4.975
4.972
1.548
0.002
N(SO2Ph)2
N(SO2Ph)2
O
(E/Z)-2d
H2O
5.52
4.10
1.87
5.30
9.40
4.56
2.84
1.50
2.79
2.70
1.00
0.33
1.96
0.68
f1 (ppm)

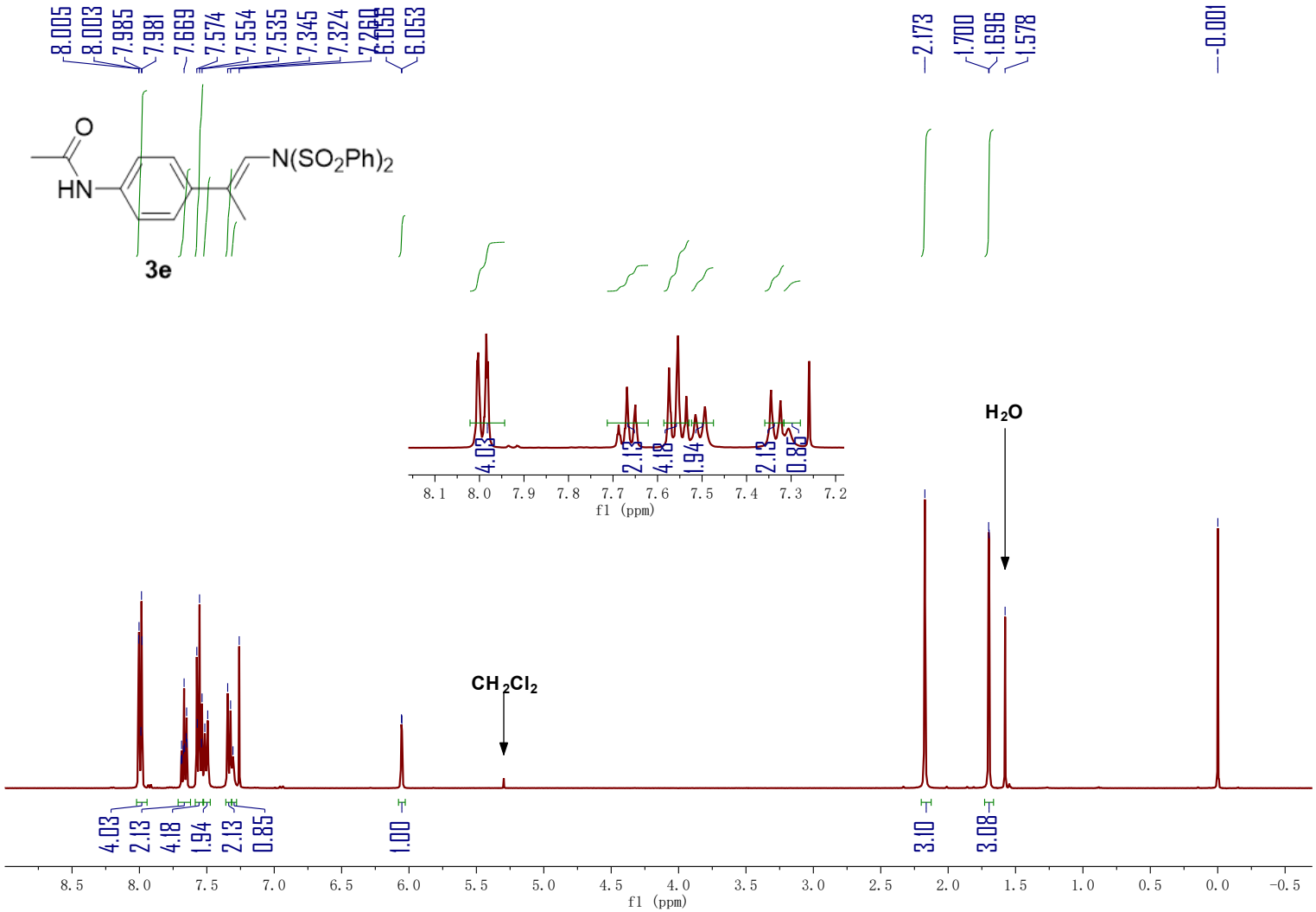

158.201
158.172
156.352
156.171
139.107
138.601
134.395
133.928
130.059
129.996
129.166
129.096
129.030
128.937
128.816
128.755
128.677
119.611
77.478
77.160
76.843
52.427
48.140
0.132
N(SO2Ph)2
N(SO2Ph)2
O
(E/Z)-2d
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

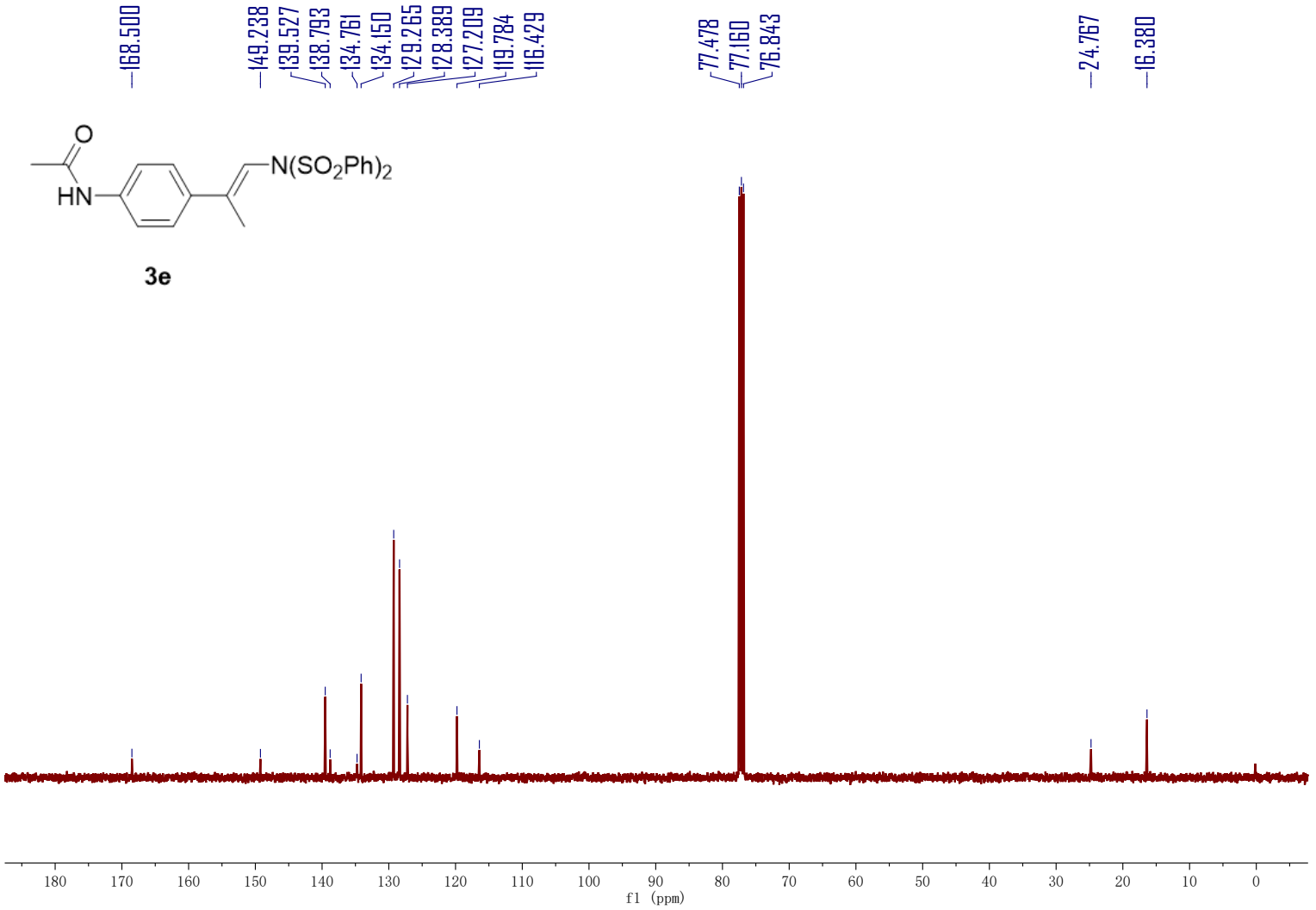

8.030
8.025
8.022
8.009
8.004
8.001
7.693
7.690
7.687
7.676
7.671
7.666
7.655
7.652
7.649
7.581
7.577
7.561
7.547
7.543
7.165
7.163
7.147
7.128
7.048
7.045
7.040
7.029
7.026
7.024
7.002
6.995
6.990
6.978
6.973
6.966
6.066
6.063
1.713
1.710
1.549
0.002
N(SO2Ph)2
O
3d
H2O
4.25
2.18
4.32
4.13
1.11
2.19
2.34
1.00
2.99
f1 (ppm)

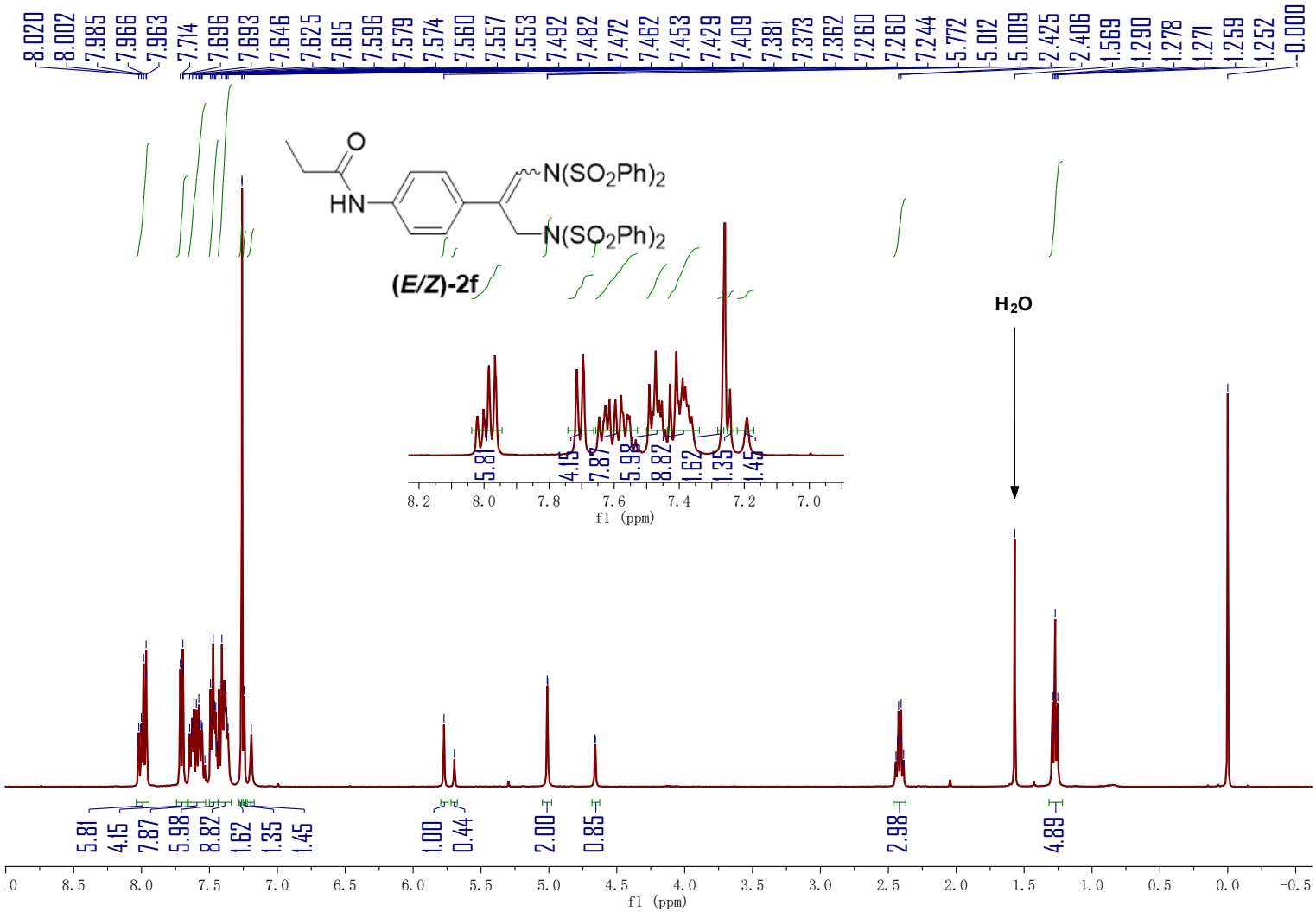

158.396
156.746
149.193
139.665
134.092
133.854
130.027
129.244
128.418
127.998
123.939
119.446
118.588
116.424
77.478
77.160
76.843
16.557
0.141
N(SO2Ph)2
O
3d
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

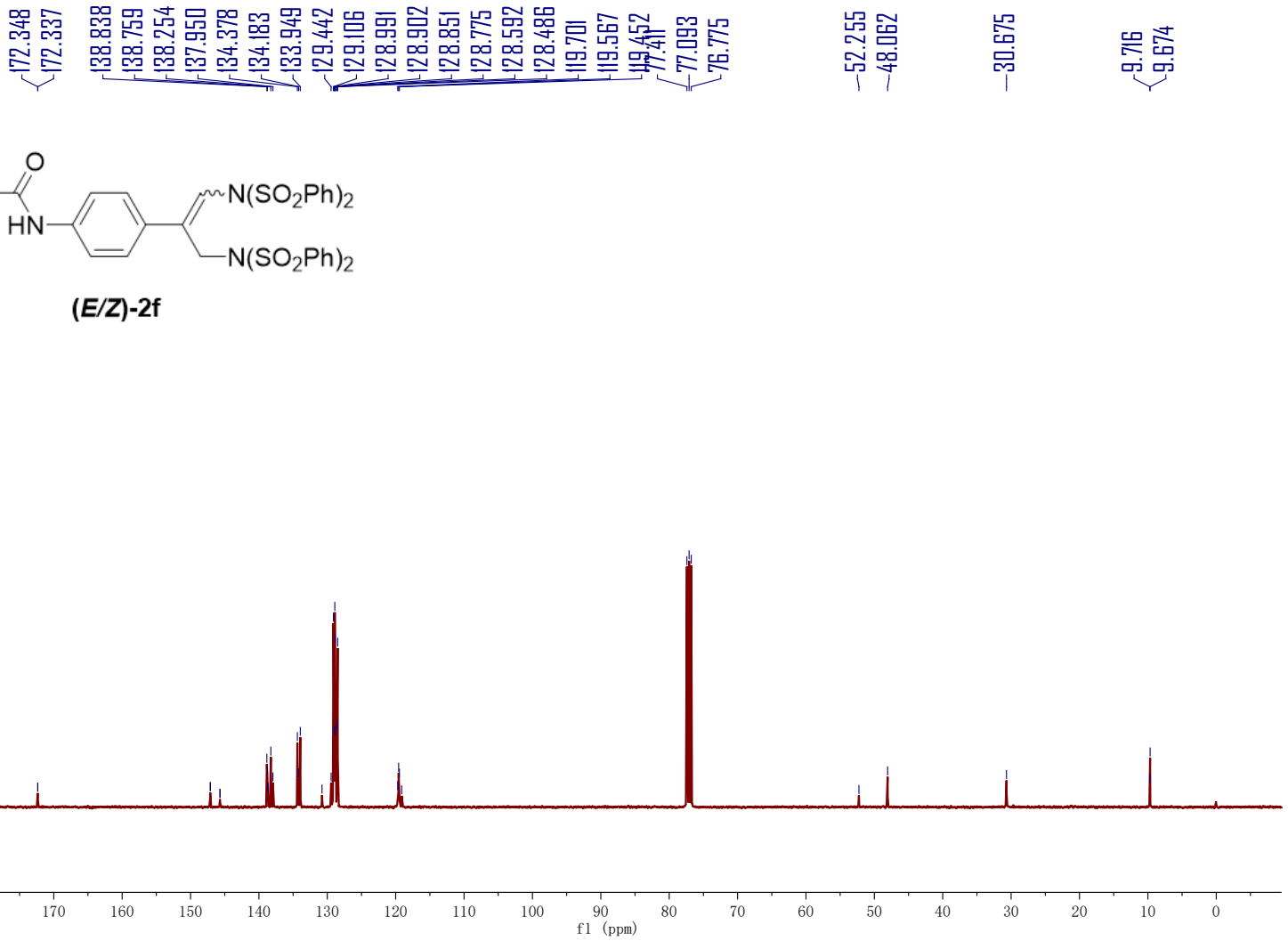

7.982
7.963
7.960
7.706
7.687
7.684
7.596
7.492
7.472
7.428
7.408
7.389
7.279
7.260
5.777
5.001
4.998
2.191
1.575
0.001
O
HN
N(SO2Ph)2
N(SO2Ph)2
(Z)-2e
H2O
3.97
4.06
4.90
4.36
6.78
1.24
1.00
2.00
3.25
f1 (ppm)

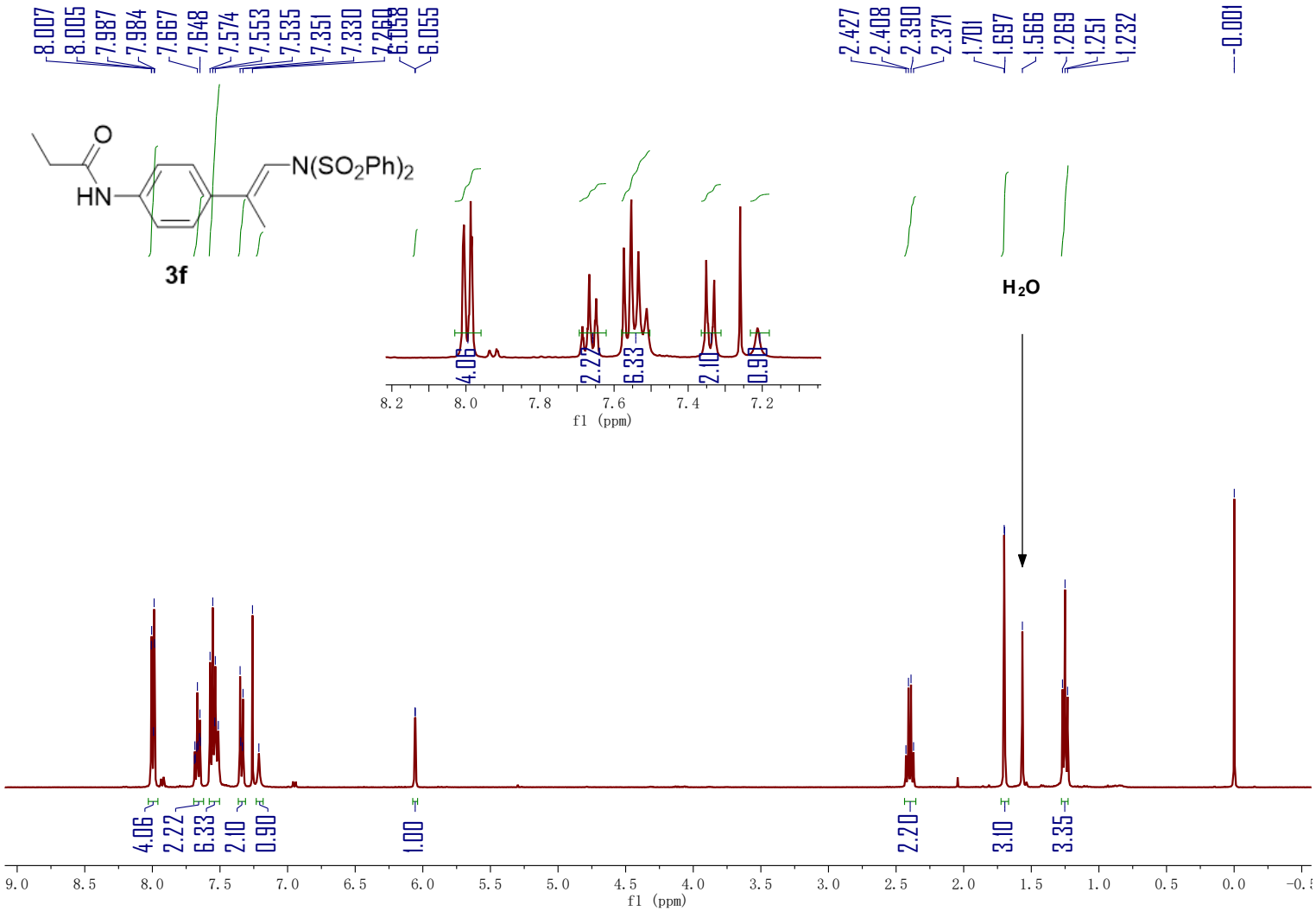

168.609
147.123
138.963
138.599
138.407
134.451
134.016
131.097
129.193
129.127
128.990
128.977
128.598
119.772
119.601
77.477
77.160
76.842
48.149
24.714
O
HN
N(SO2Ph)2
N(SO2Ph)2
(Z)-2e
80
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
−10
f1 (ppm)

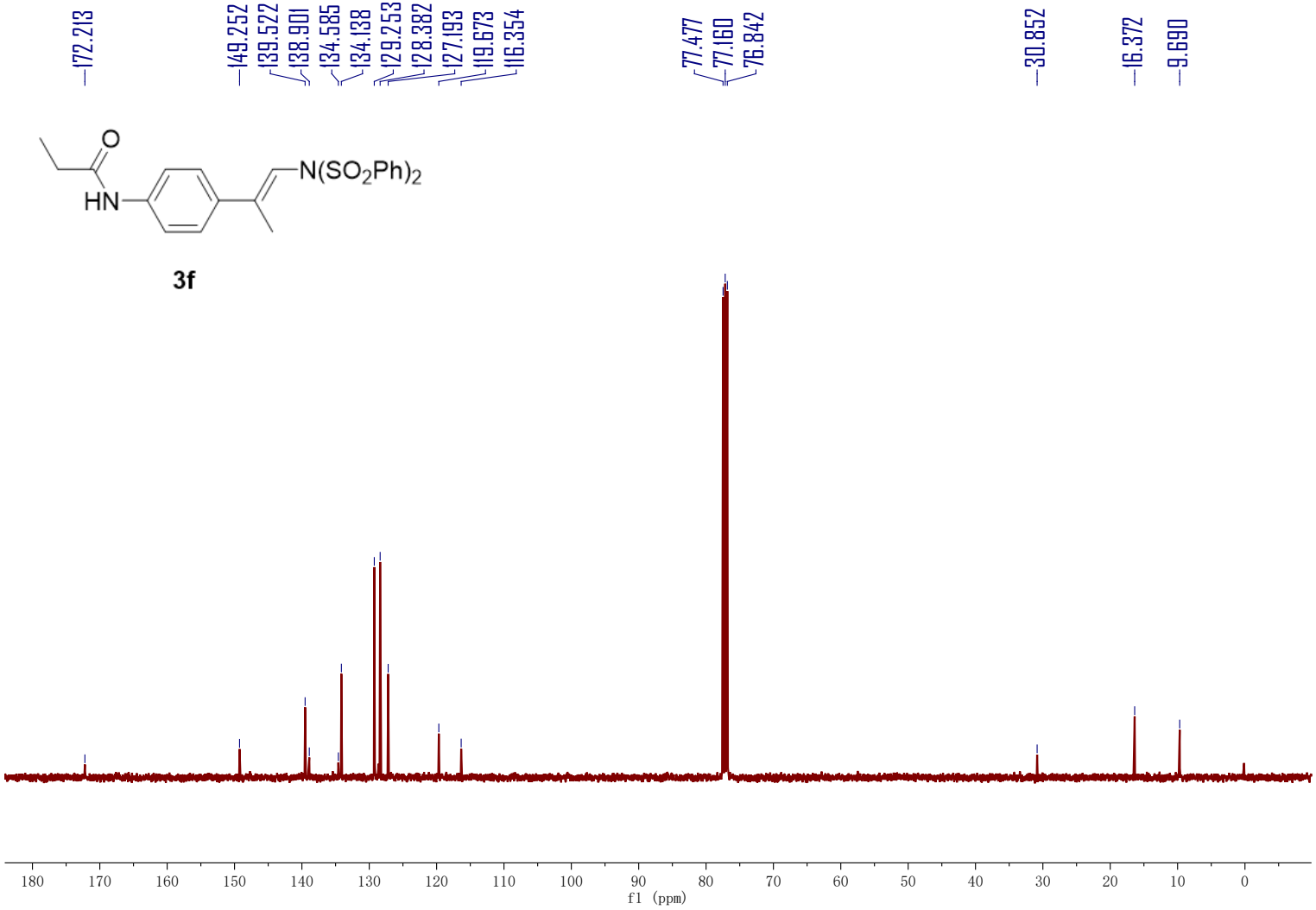

8.005
8.003
7.985
7.981
7.669
7.574
7.554
7.535
7.345
7.324
6.056
6.053
2.173
1.700
1.696
1.578
0.001
O
HN
N(SO2Ph)2
3e
H2O
CH2Cl2
4.03
2.13
4.18
1.94
2.13
0.85
1.00
3.10
3.08
f1 (ppm)

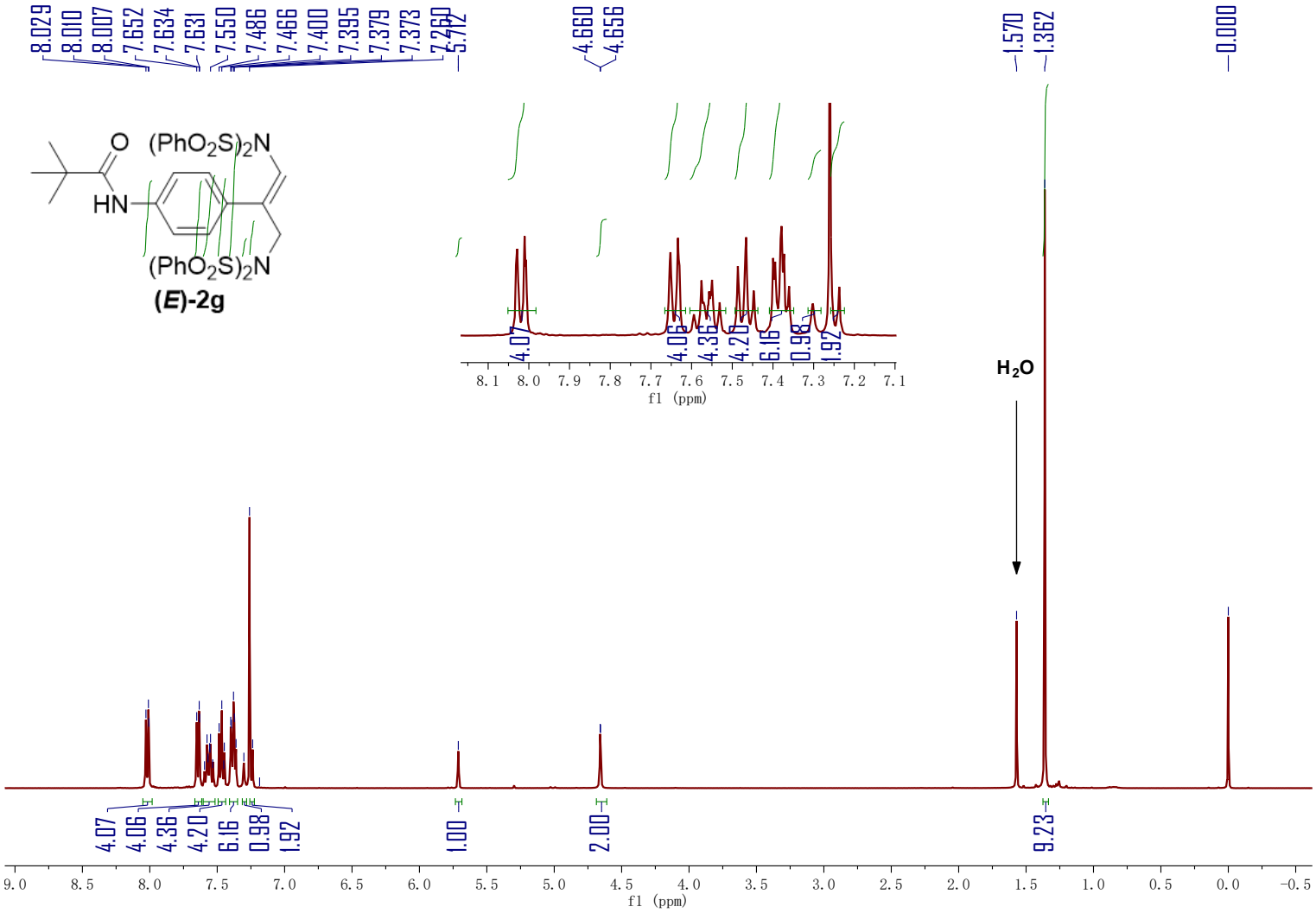

168.500
149.238
139.527
138.793
134.761
134.150
129.265
128.389
127.209
119.784
116.429
77.478
77.160
76.843
24.767
16.380
O
HN
N(SO2Ph)2
3e
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

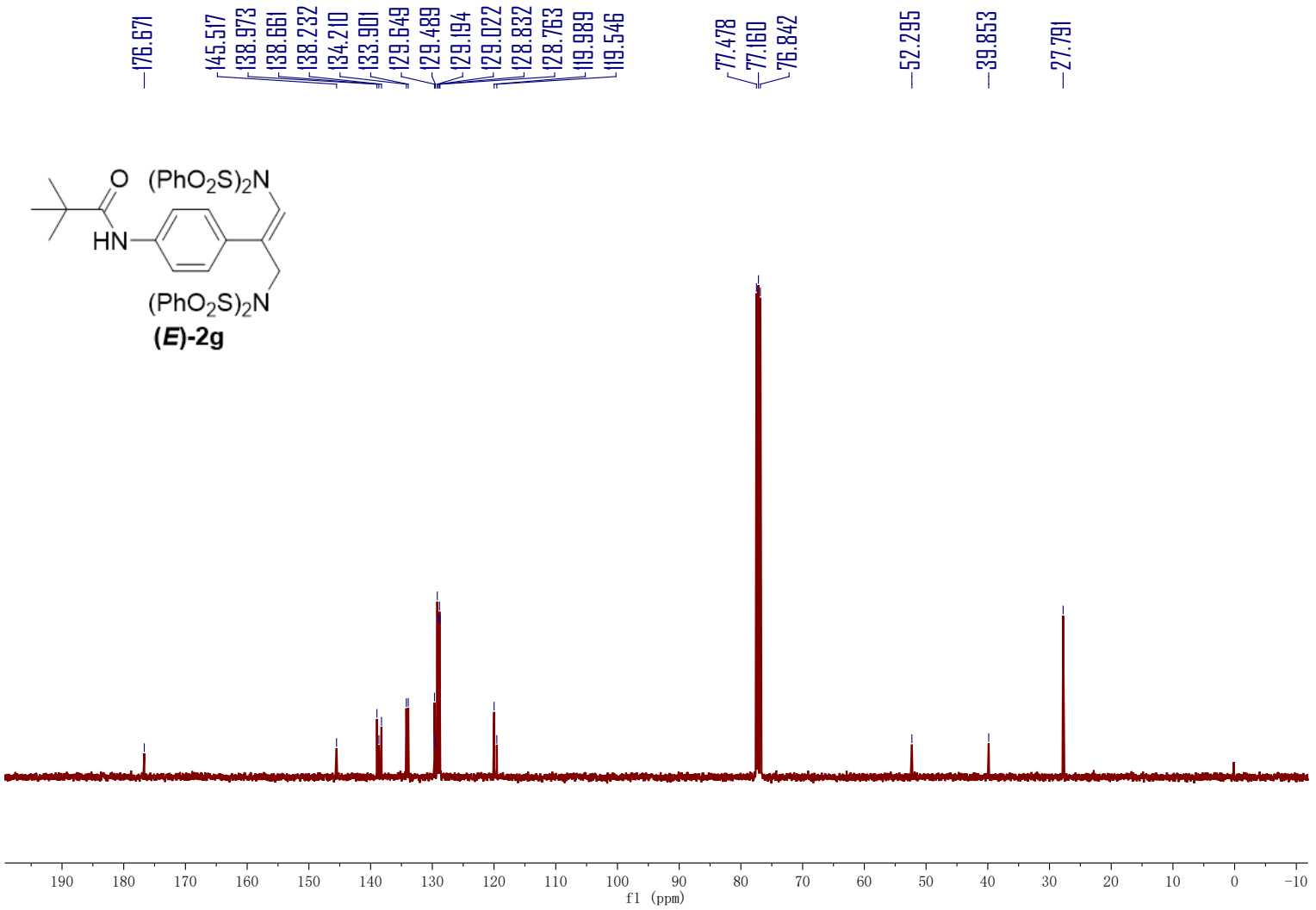

8.020
8.002
7.985
7.966
7.963
7.714
7.696
7.693
7.646
7.625
7.615
7.596
7.579
7.574
7.560
7.557
7.553
7.492
7.482
7.472
7.462
7.453
7.429
7.409
7.381
7.373
7.362
7.260
7.260
7.244
5.772
5.012
5.009
2.425
2.406
1.569
1.290
1.278
1.271
1.259
1.252
0.000
O
HN
N(SO2Ph)2
N(SO2Ph)2
(E/Z)-2f
H2O
5.81
4.15
7.87
5.98
8.82
1.62
1.35
1.45
1.00
0.44
2.00
0.85
2.98
4.89
f1 (ppm)

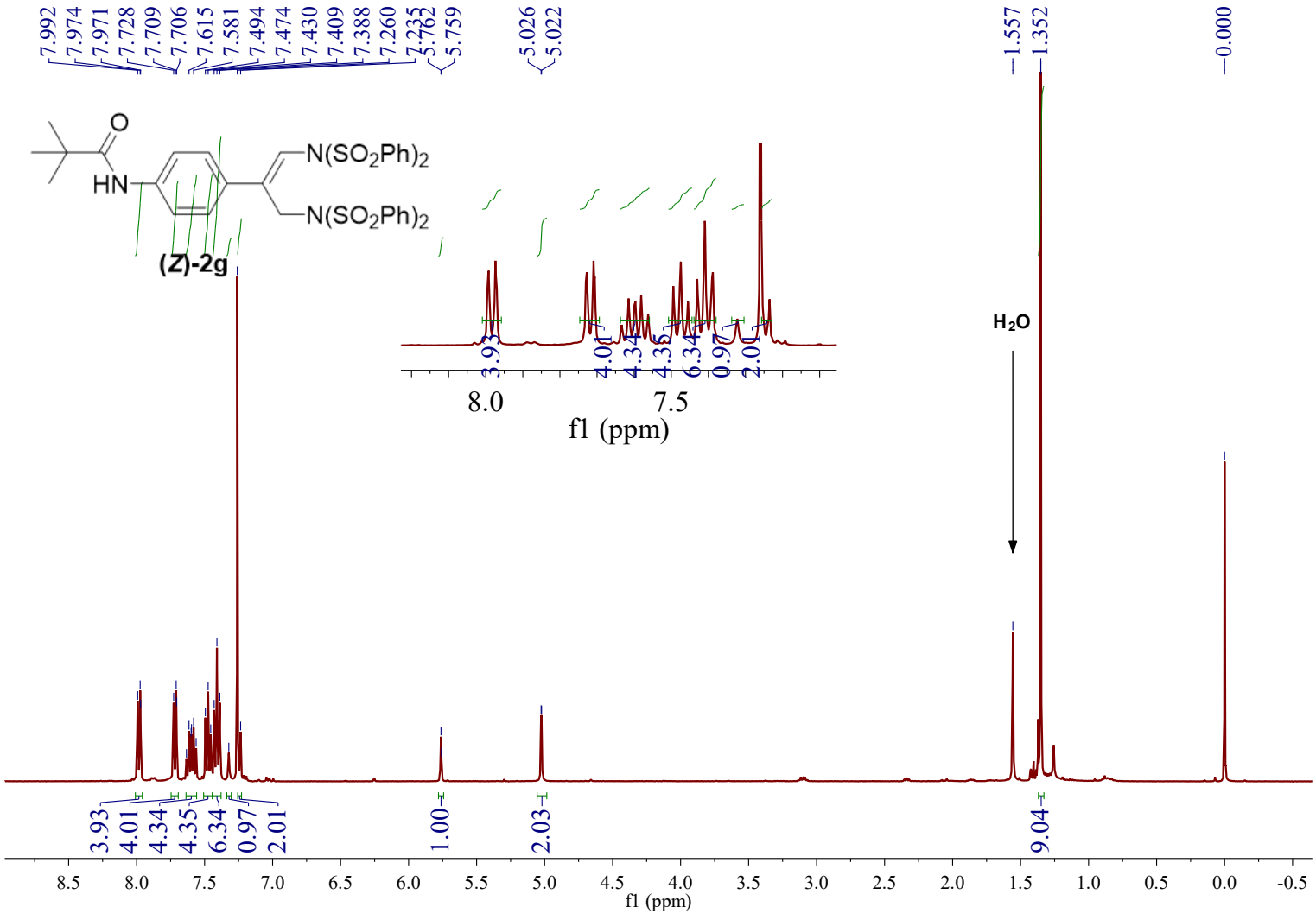

172.348
172.337
138.838
138.759
138.254
137.950
134.378
134.183
133.949
129.442
129.106
128.991
128.902
128.851
128.775
128.592
128.486
119.701
119.567
119.452
77.411
77.093
76.775
52.255
48.062
30.675
9.716
9.674
O
HN
N(SO2Ph)2
N(SO2Ph)2
(E/Z)-2f
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

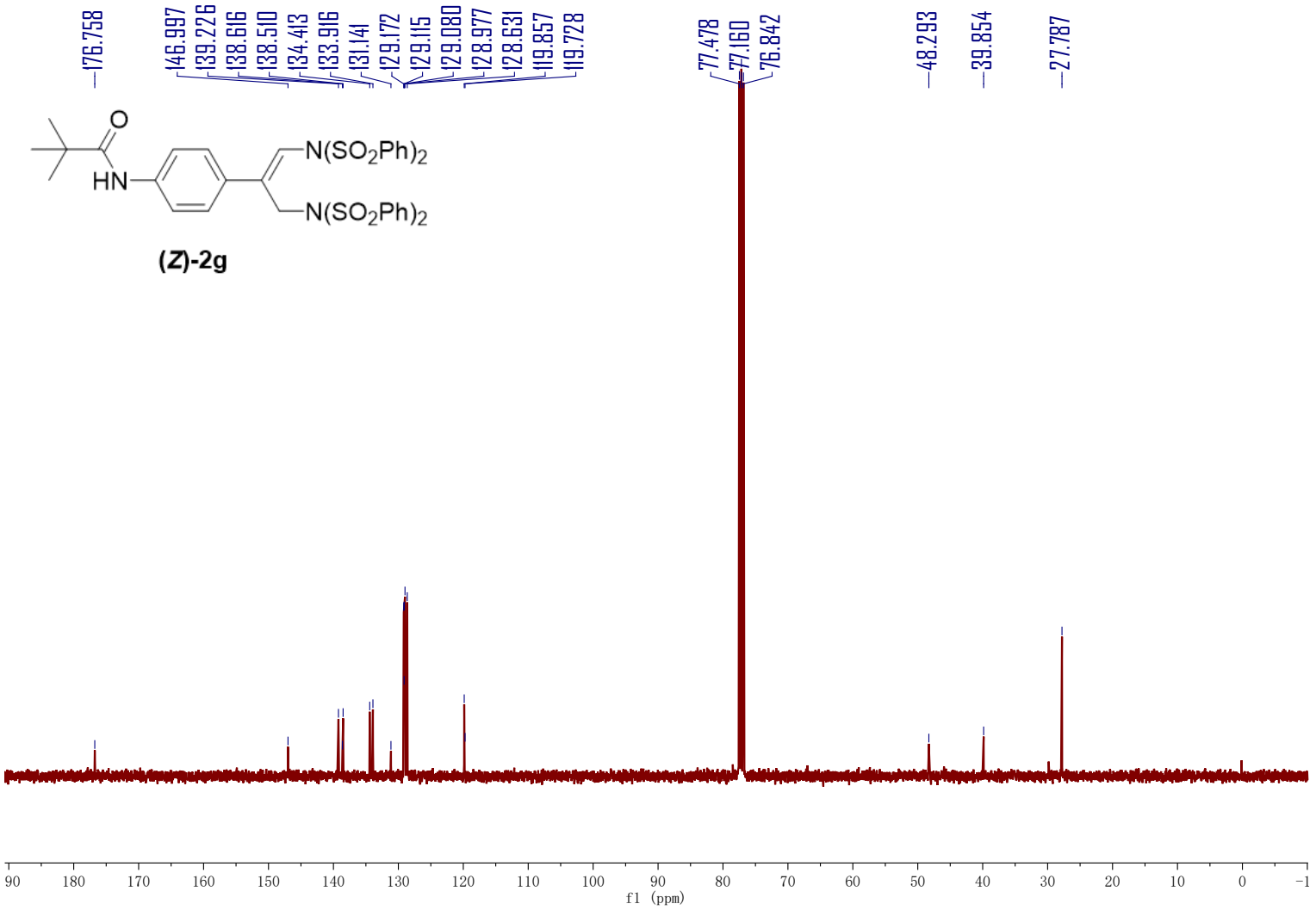

8.007
8.005
7.987
7.984
7.667
7.648
7.574
7.553
7.535
7.351
7.330
7.261
6.058
6.055
2.427
2.408
2.390
2.371
1.701
1.697
1.566
1.269
1.251
1.232
-0.001
O
HN
N(SO2Ph)2
3f
H2O
4.06
2.22
6.33
2.10
0.90
1.00
2.20
3.10
3.35
f1 (ppm)

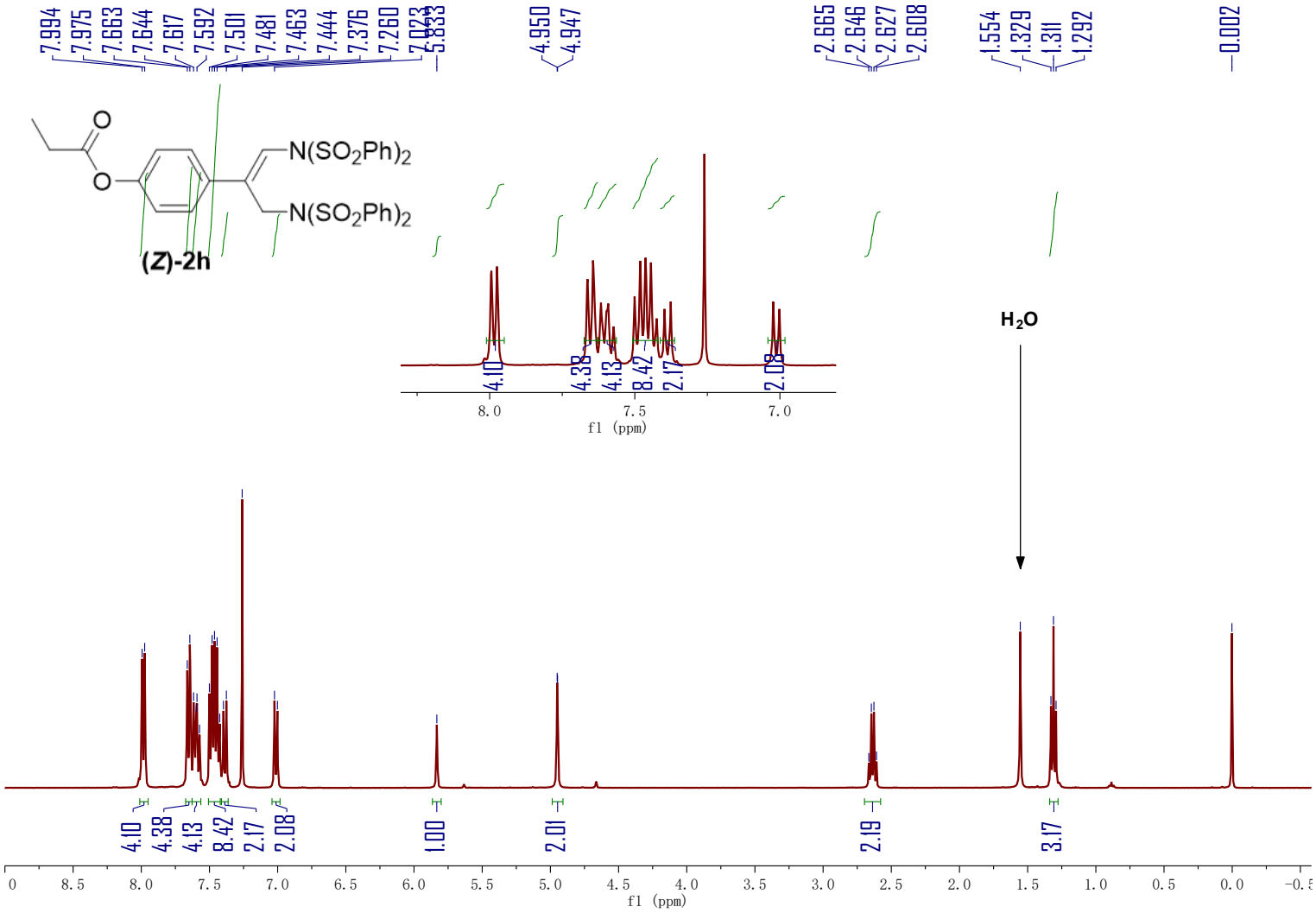

172.213
149.252
139.522
138.901
134.585
134.138
129.253
128.382
127.193
119.673
116.354
77.477
77.160
76.842
30.852
16.372
9.690
O
HN
N(SO2Ph)2
3f
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

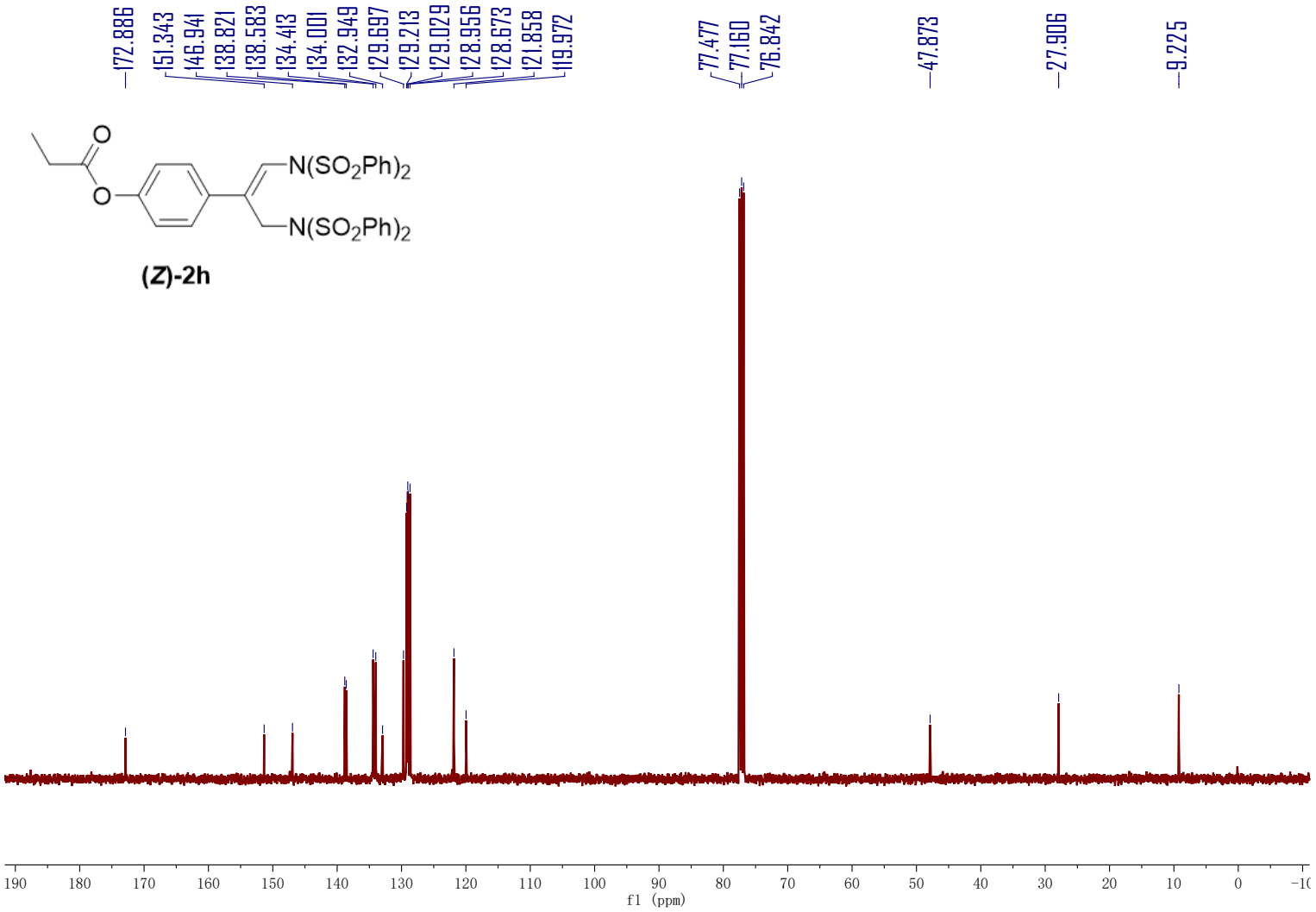

8.029
8.010
8.007
7.652
7.634
7.631
7.550
7.486
7.466
7.400
7.395
7.379
7.373
7.260
5.712
4.660
4.656
1.570
1.362
0.000
O
(PhO2S)2N
HN
(PhO2S)2N
(E)-2g
H2O
4.07
4.06
4.36
4.20
6.16
0.98
1.92
1.00
2.00
9.23
f1 (ppm)

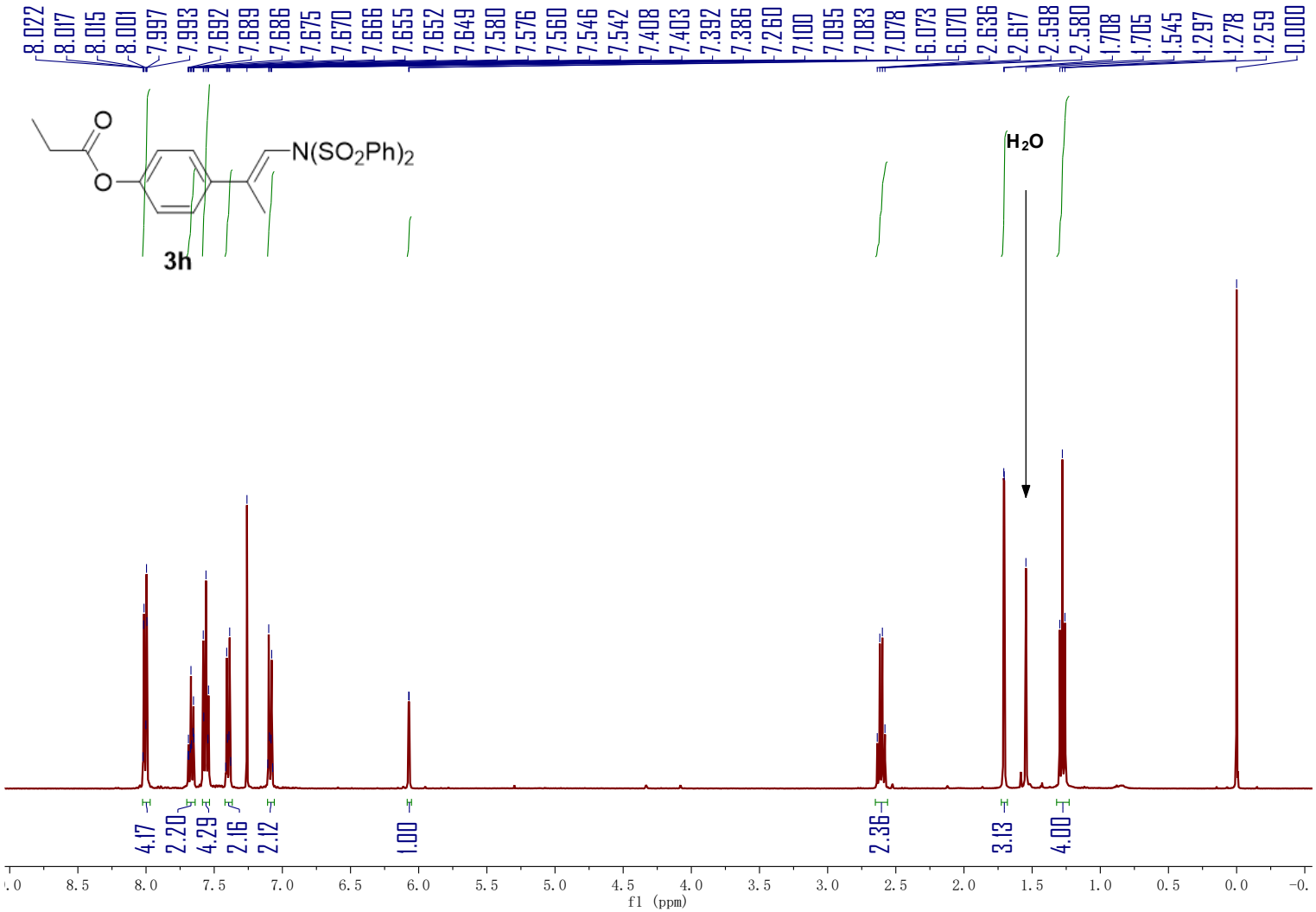

176.671
145.517
138.973
138.661
138.232
134.210
133.901
129.649
129.489
129.194
129.022
128.832
128.763
119.989
119.546
77.478
77.160
76.842
52.295
39.853
27.791
O
(PhO2S)2N
HN
(PhO2S)2N
(E)-2g
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
−10
f1 (ppm)

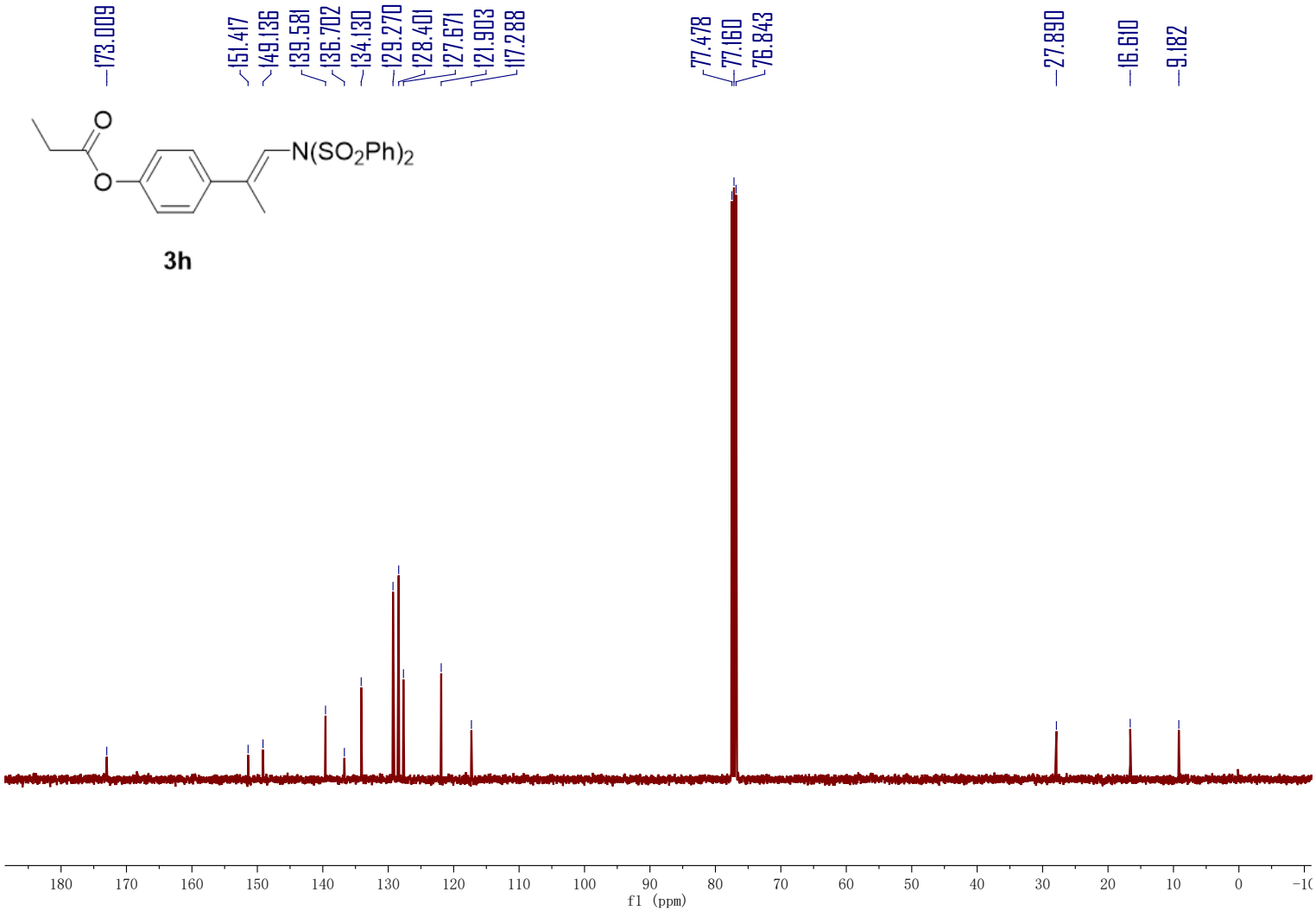

7.992
7.974
7.971
7.728
7.709
7.706
7.615
7.581
7.494
7.474
7.430
7.409
7.388
7.260
7.235
5.762
5.759
5.026
5.022
1.557
1.352
0.000
O
HN
N(SO2Ph)2
N(SO2Ph)2
(Z)-2g
H2O
3.93
4.01
4.34
4.35
6.34
0.97
2.01
1.00
2.03
9.04
8.0
7.5
f1 (ppm)
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

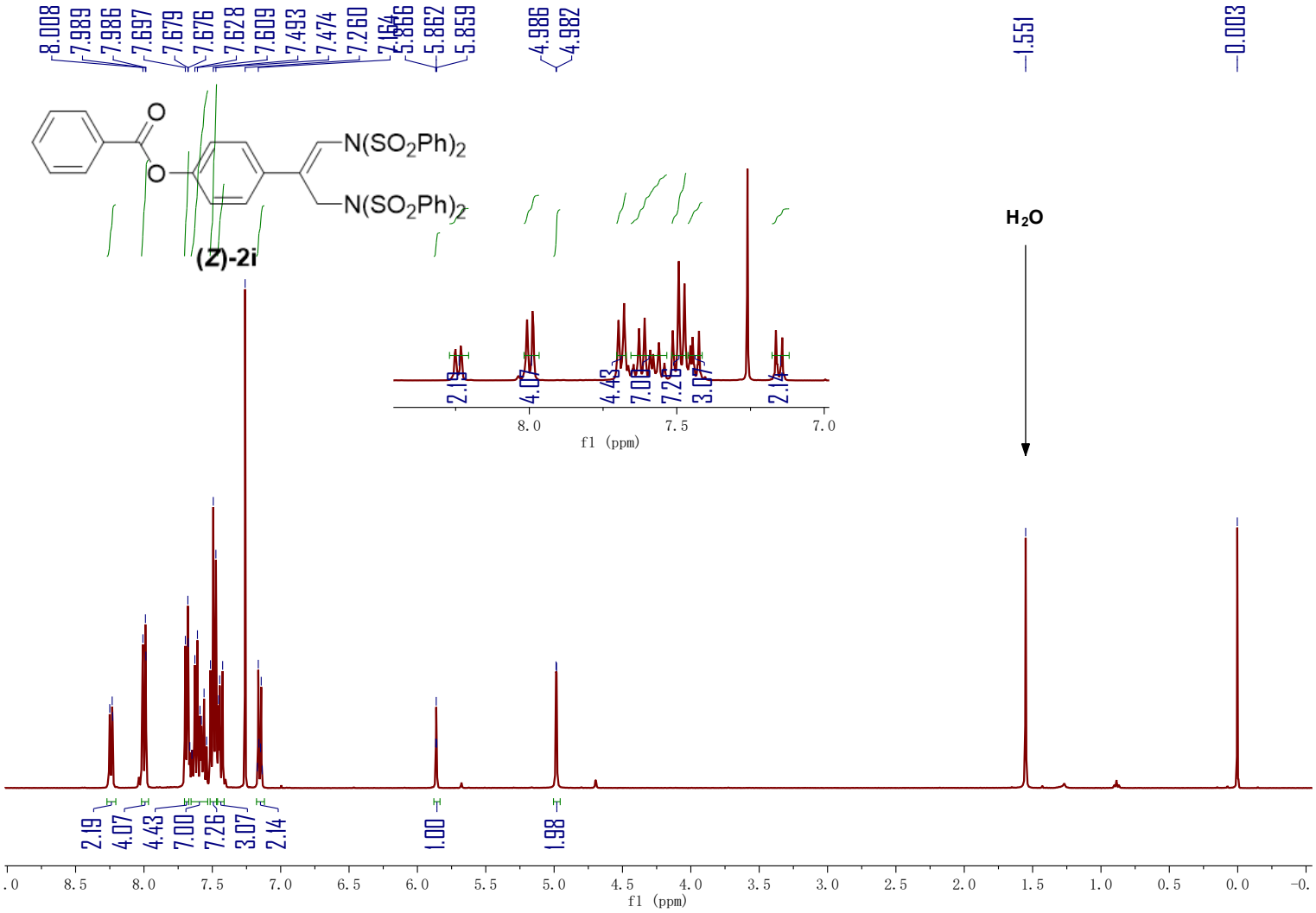

176.758
146.997
139.226
138.616
138.510
134.413
133.916
131.141
129.172
129.115
129.080
128.977
128.631
119.857
119.728
77.478
77.160
76.842
48.293
39.854
27.787
O
HN
N(SO2Ph)2
N(SO2Ph)2
(Z)-2g
90 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 −1
f1 (ppm)

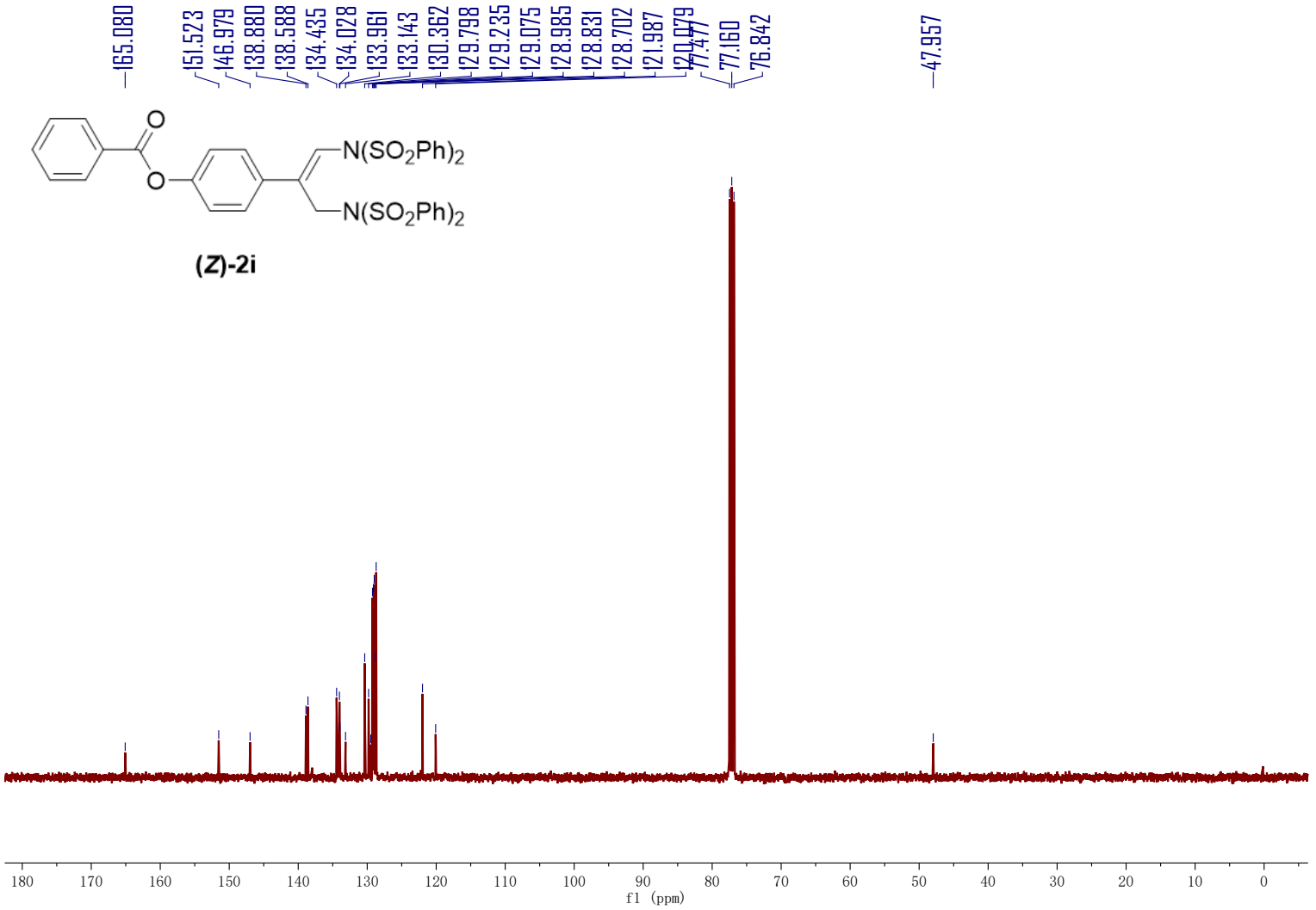

7.994
7.975
7.663
7.644
7.617
7.592
7.501
7.481
7.463
7.444
7.376
7.260
7.023
5.833
4.950
4.947
2.665
2.646
2.627
2.608
1.554
1.329
1.311
1.292
0.002
N(SO2Ph)2
N(SO2Ph)2
O
O
(Z)-2h
H2O
4.10
4.38
4.13
8.42
2.17
2.08
1.00
2.01
2.19
3.17
f1 (ppm)

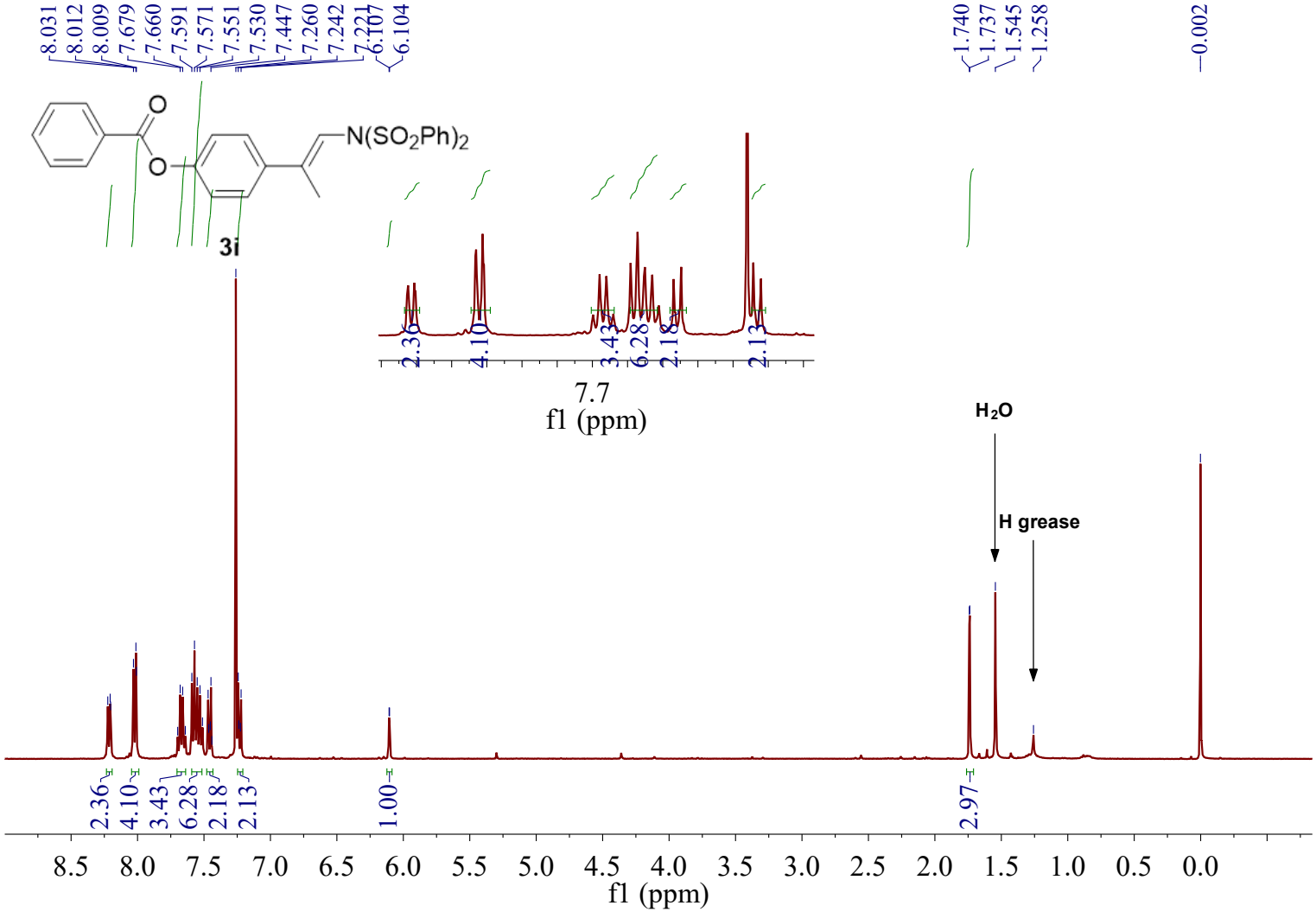

172.886
151.343
146.941
138.821
138.583
134.413
134.001
132.949
129.697
129.213
129.029
128.956
128.673
121.858
119.972
77.477
77.160
76.842
47.873
27.906
9.225
O
O
N(SO2Ph)2
N(SO2Ph)2
(Z)-2h
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

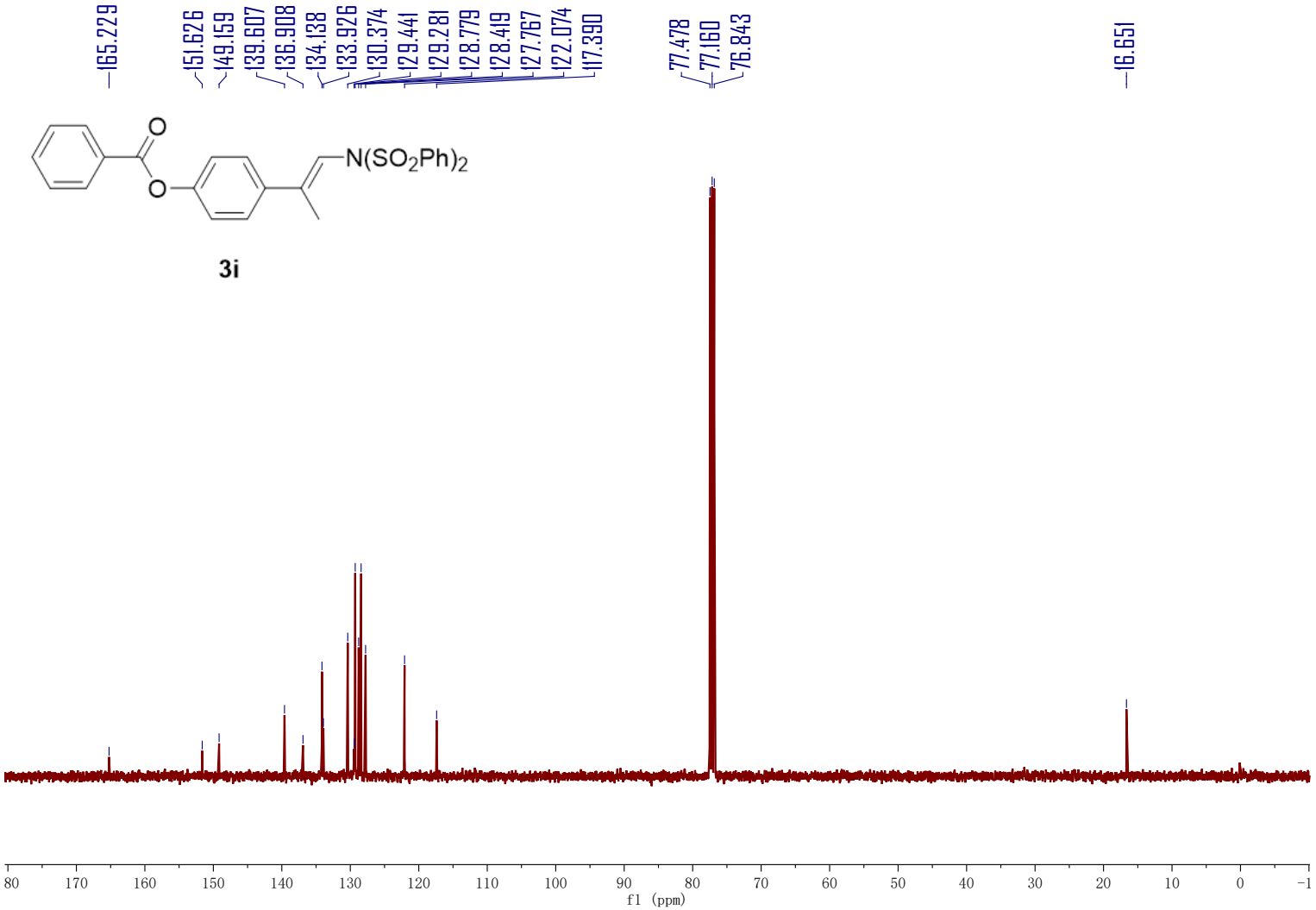

8.022
8.017
8.015
8.001
7.997
7.993
7.692
7.689
7.686
7.675
7.670
7.666
7.655
7.652
7.649
7.580
7.576
7.560
7.546
7.542
7.408
7.403
7.392
7.386
7.260
7.100
7.095
7.083
7.078
6.073
6.070
2.636
2.617
2.598
2.580
1.708
1.705
1.545
1.297
1.278
1.259
0.000
N(SO2Ph)2
3h
H2O
4.17
2.20
4.29
2.16
2.12
1.00
2.36
3.13
4.00
f1 (ppm)

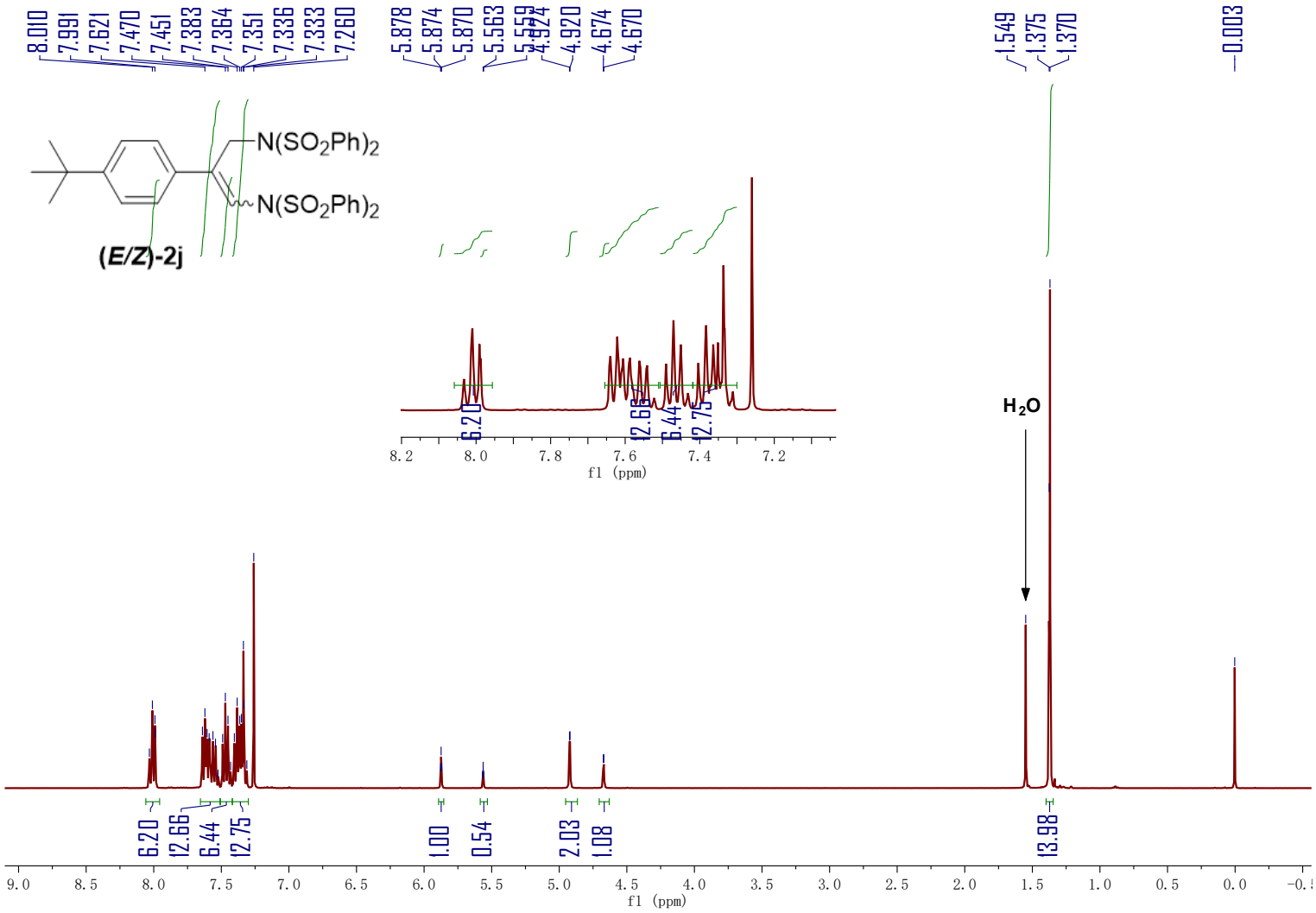

173.009
151.417
149.136
139.581
136.702
134.130
129.270
128.401
127.671
121.903
117.288
77.478
77.160
76.843
27.890
16.610
9.182
O
O
N(SO2Ph)2
3h
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

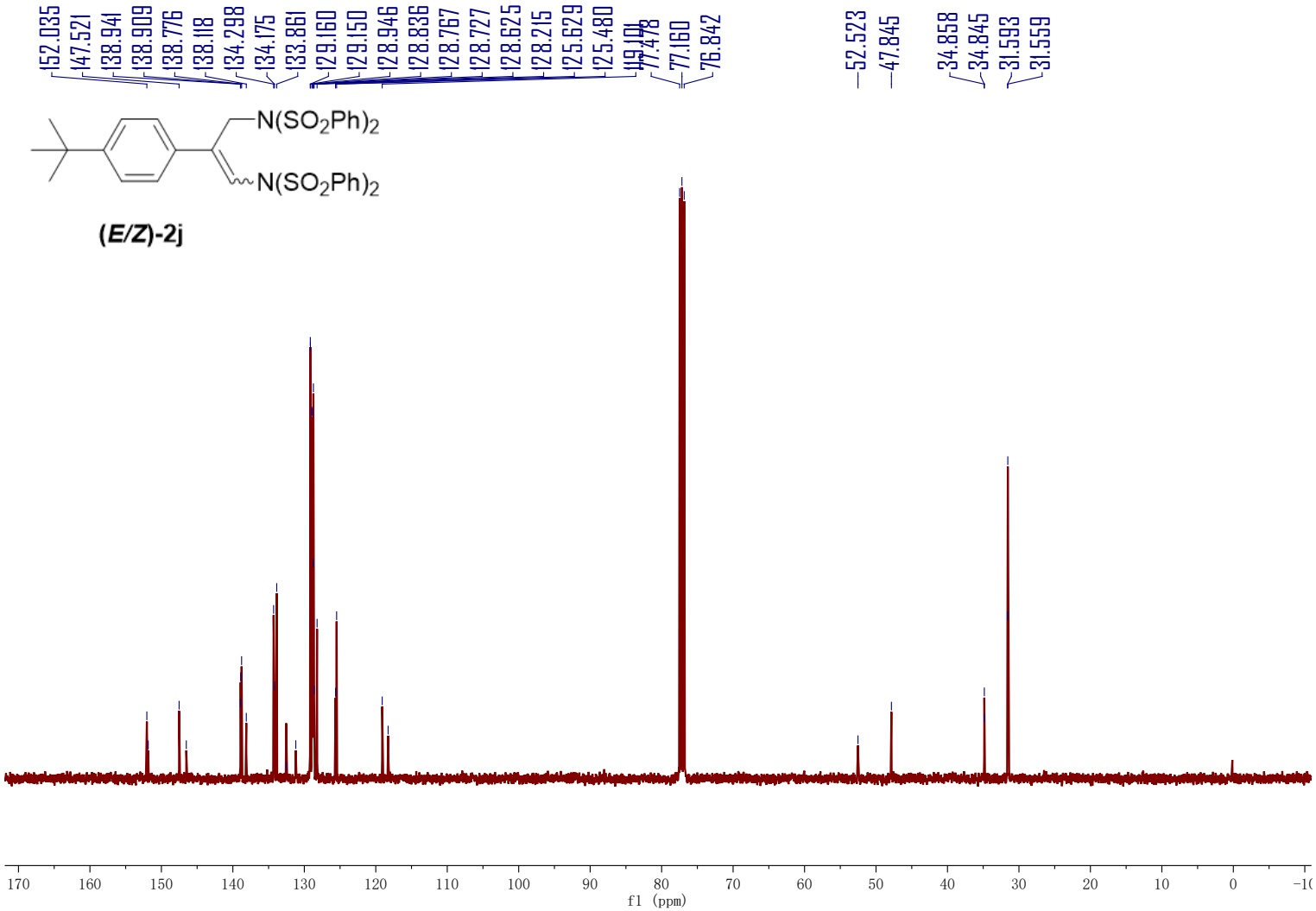

8.008
7.989
7.986
7.697
7.679
7.676
7.628
7.609
7.493
7.474
7.260
7.164
5.866
5.862
5.859
4.986
4.982
1.551
0.003
O
O
N(SO2Ph)2
N(SO2Ph)2
(Z)-2i
H2O
2.19
4.07
4.43
7.00
7.26
3.07
2.14
1.00
1.98
f1 (ppm)

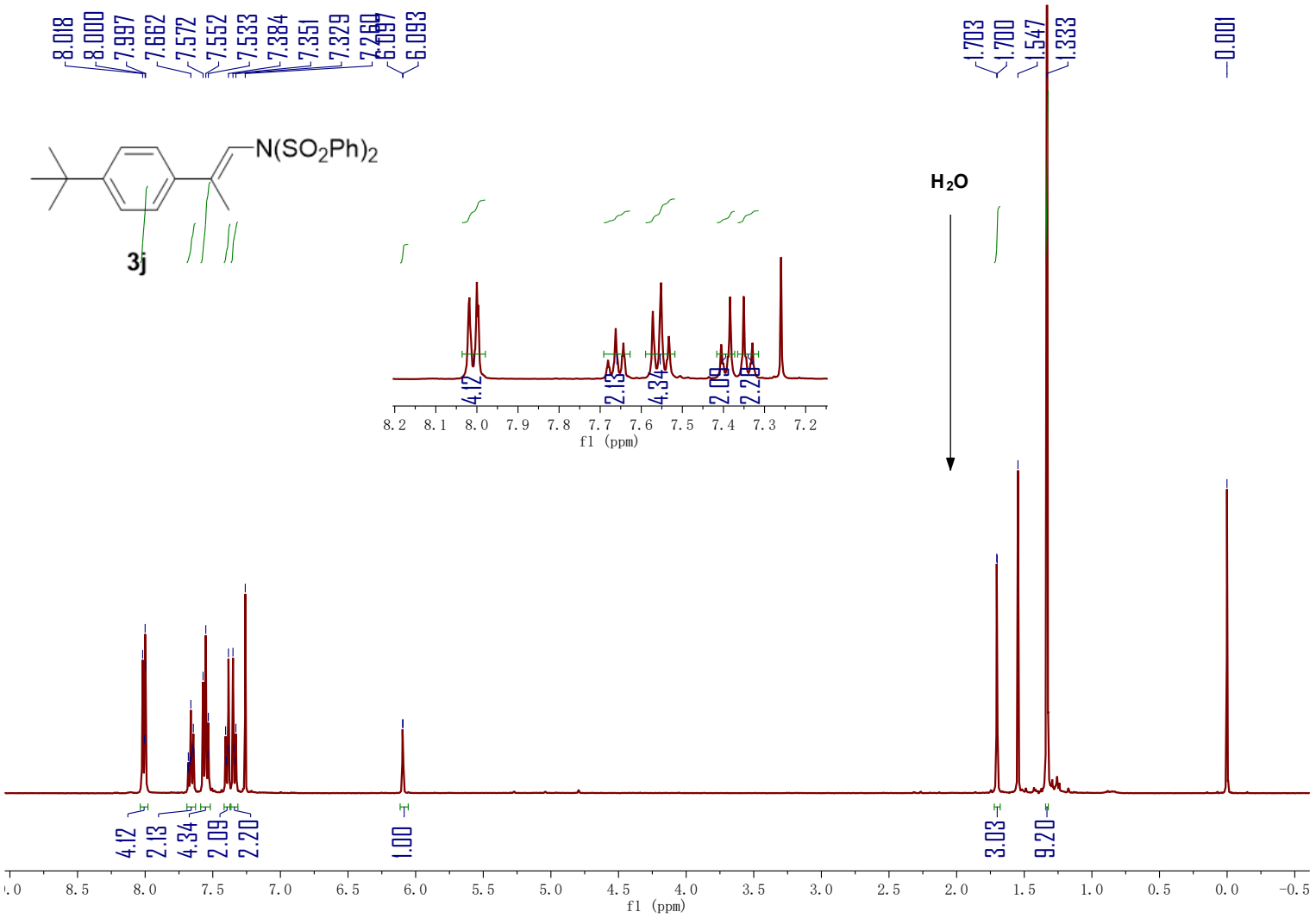

165.080
151.523
146.979
138.880
138.588
134.435
134.028
133.961
133.143
130.362
129.798
129.235
129.075
128.985
128.831
128.702
121.987
120.079
77.477
77.160
76.842
47.957
N(SO2Ph)2
N(SO2Ph)2
(Z)-2i
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

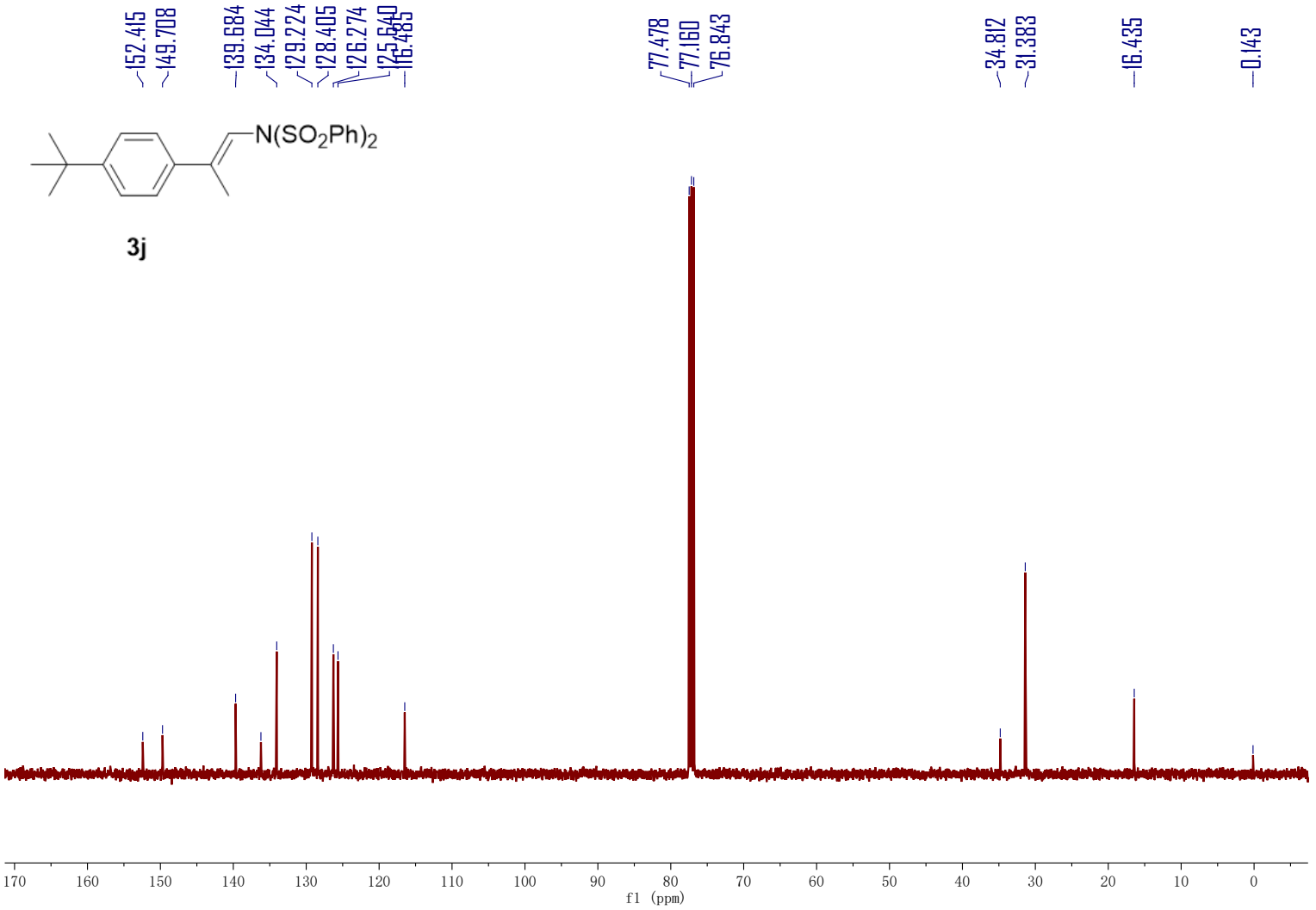

8.031
8.012
8.009
7.679
7.660
7.591
7.571
7.551
7.530
7.447
7.260
7.242
7.221
7.107
6.104
1.740
1.737
1.545
1.258
0.002
N(SO2Ph)2
O
O
3i
2.36
4.10
3.43
6.28
2.18
2.13
7.7
f1 (ppm)
H2O
H grease
1.00
2.97
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)

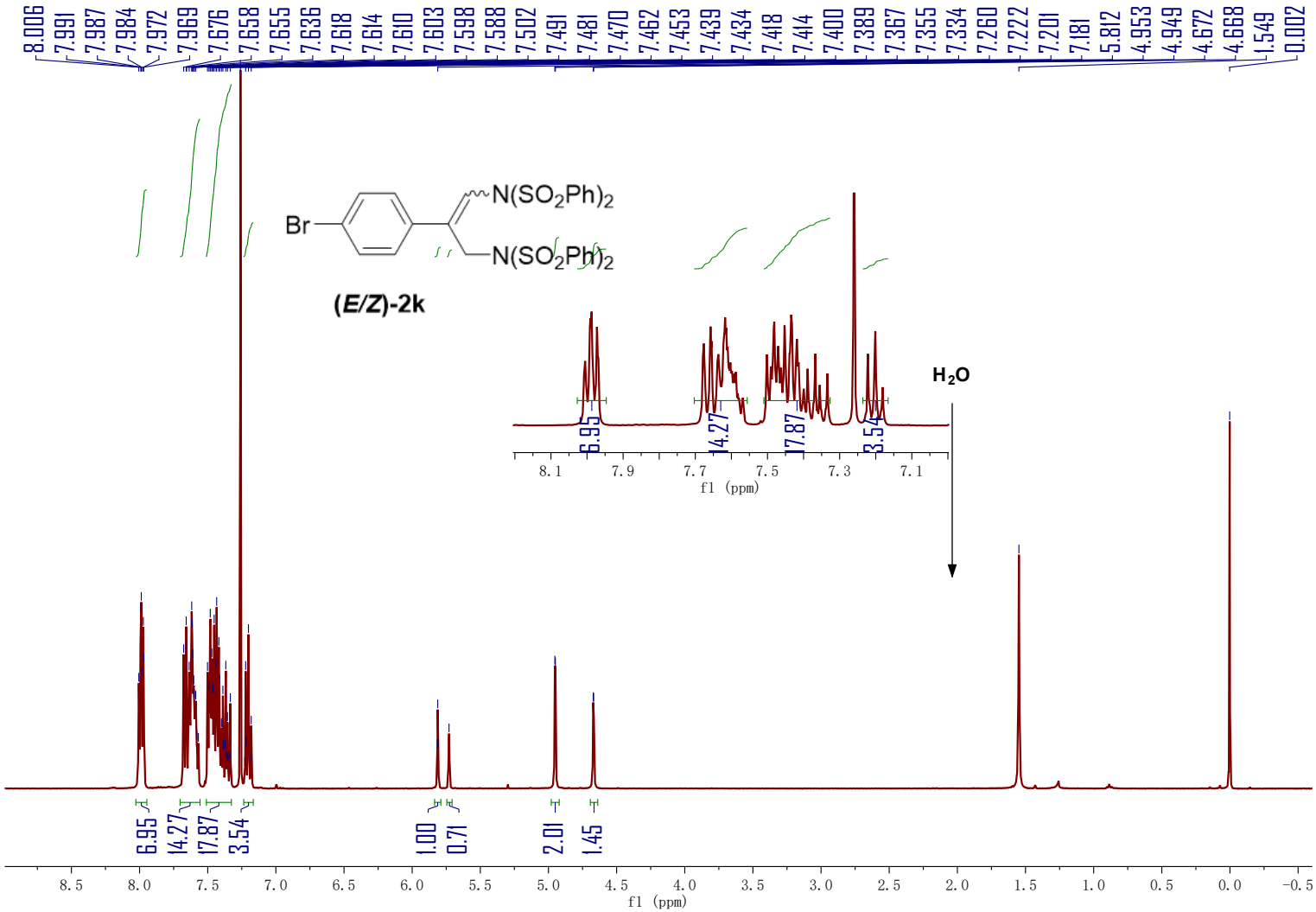

165.229
151.626
149.159
139.607
136.908
134.138
133.926
130.374
129.441
129.281
128.779
128.419
127.767
122.074
117.390
77.478
77.160
76.843
16.651
N(SO2Ph)2
O
O
3i
80
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
−1
f1 (ppm)

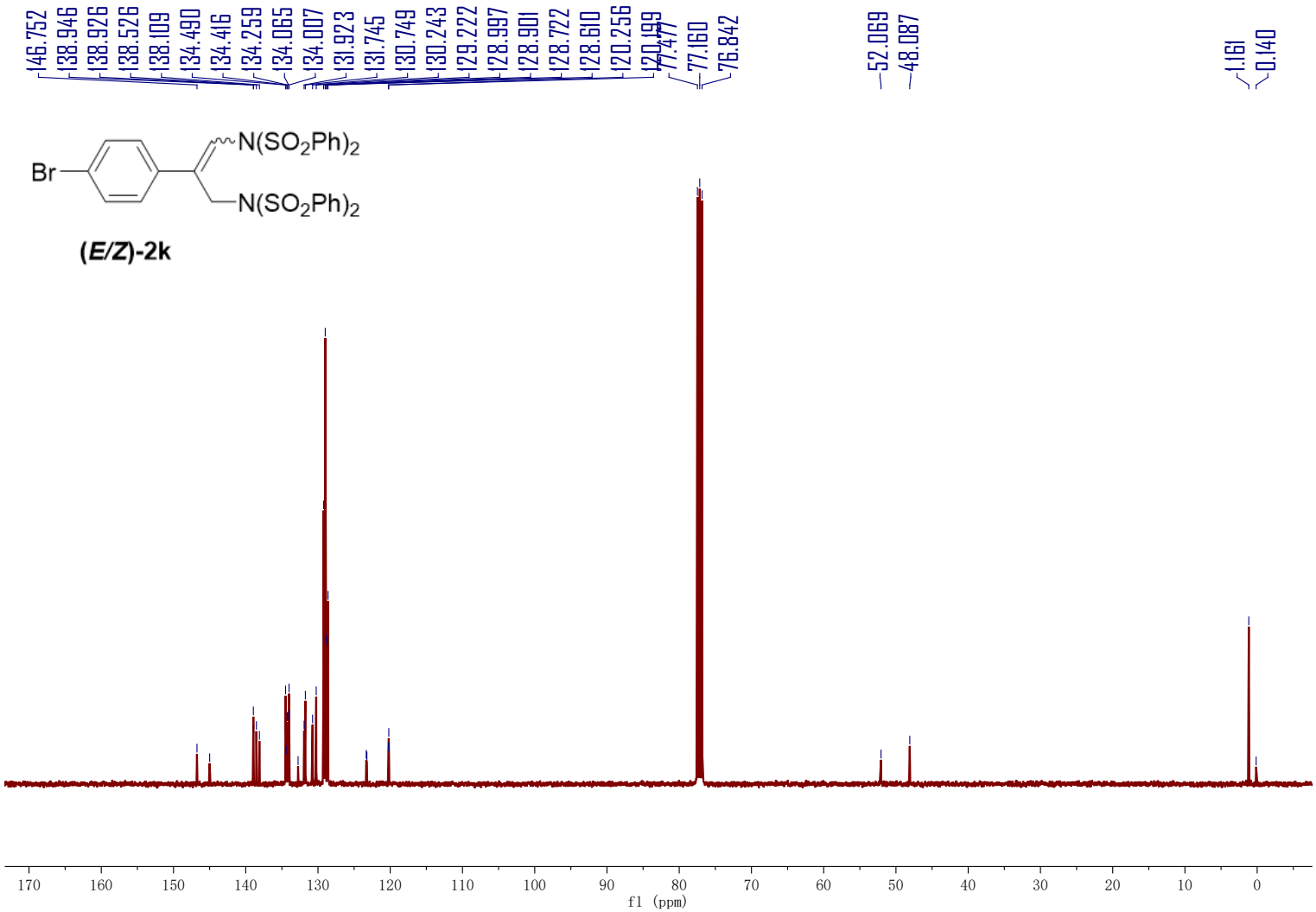

8.010
7.991
7.621
7.470
7.451
7.383
7.364
7.351
7.336
7.333
7.260
5.878
5.874
5.870
5.563
4.924
4.920
4.674
4.670
1.549
1.375
1.370
0.003
N(SO2Ph)2
N(SO2Ph)2
(E/Z)-2j
H2O
6.20
12.66
6.44
12.75
1.00
0.54
2.03
1.08
13.98
f1 (ppm)

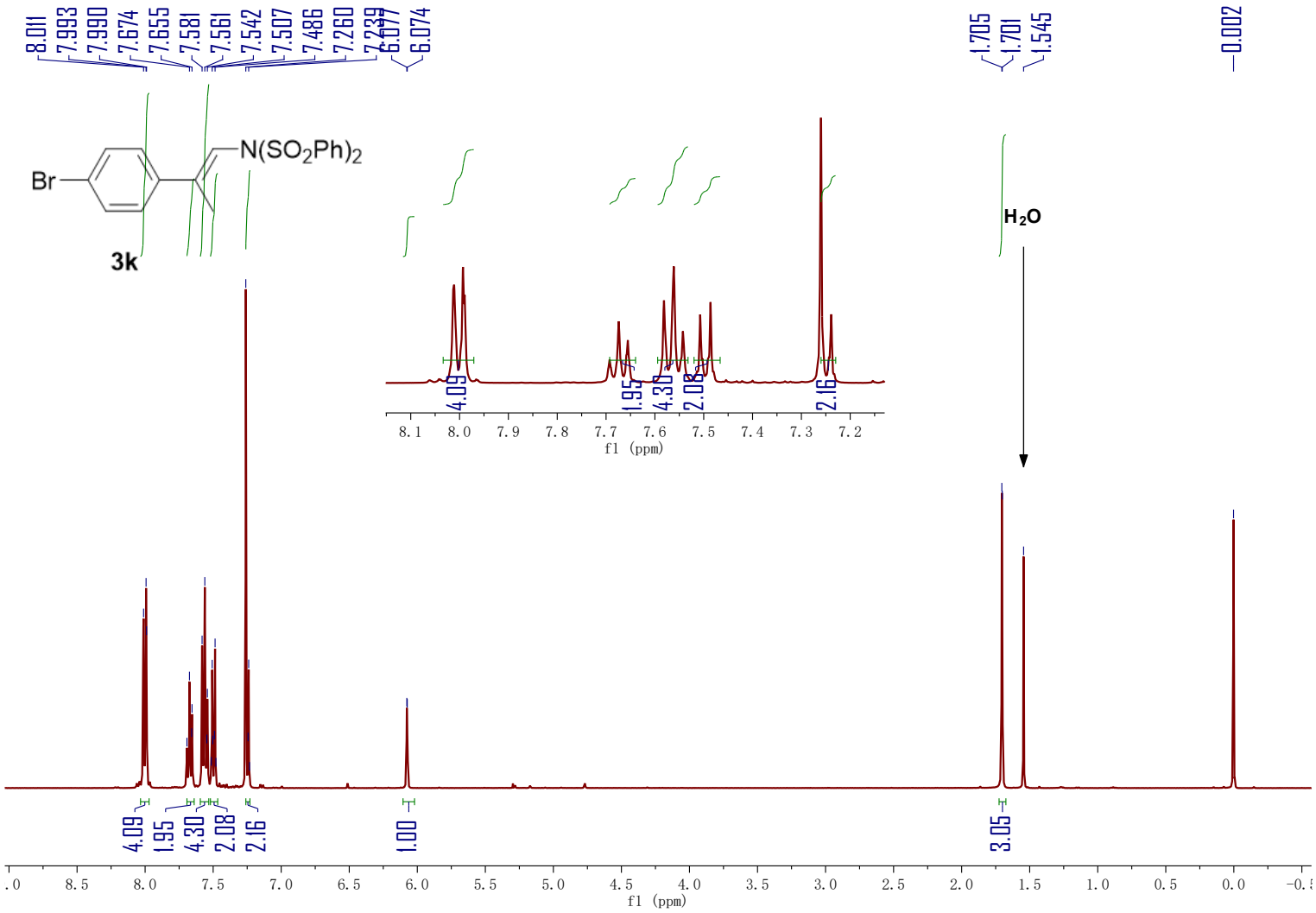

152.035
147.521
138.941
138.909
138.776
138.118
134.298
134.175
133.861
129.160
129.150
128.946
128.836
128.767
128.727
128.625
128.215
125.629
125.480
77.478
77.160
76.842
52.523
47.845
34.858
34.845
31.593
31.559
N(SO2Ph)2
N(SO2Ph)2
(E/Z)-2j
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

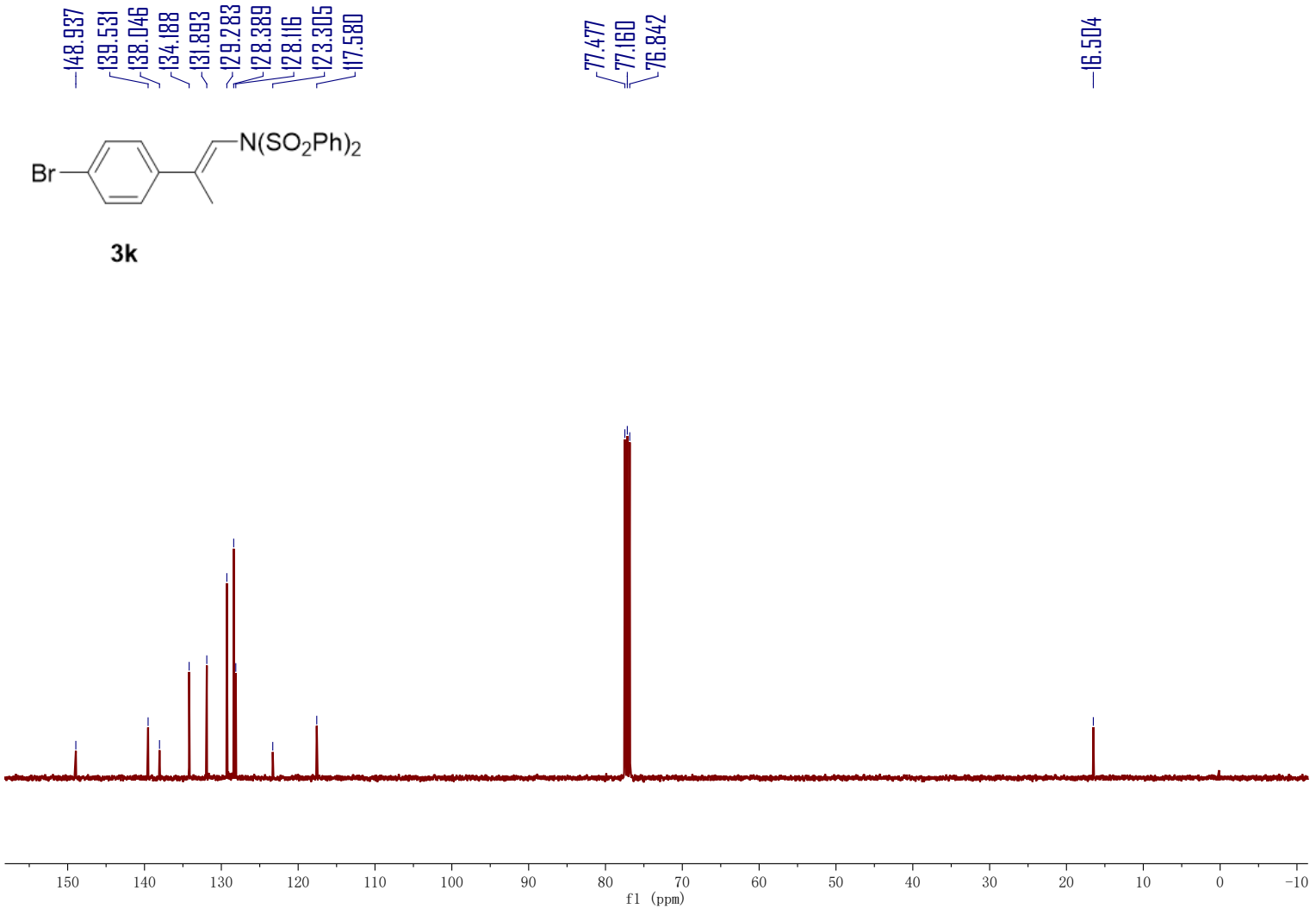

8.018
8.000
7.997
7.662
7.572
7.552
7.533
7.384
7.351
7.329
6.093
1.703
1.700
1.547
1.333
0.001
N(SO2Ph)2
3j
H2O
4.12
2.13
4.34
2.09
2.20
1.00
3.03
9.20
f1 (ppm)


152.415
149.708
139.684
134.044
129.224
128.405
126.274
125.640
116.485
77.478
77.160
76.843
34.812
31.383
16.435
0.143
N(SO2Ph)2
3j
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

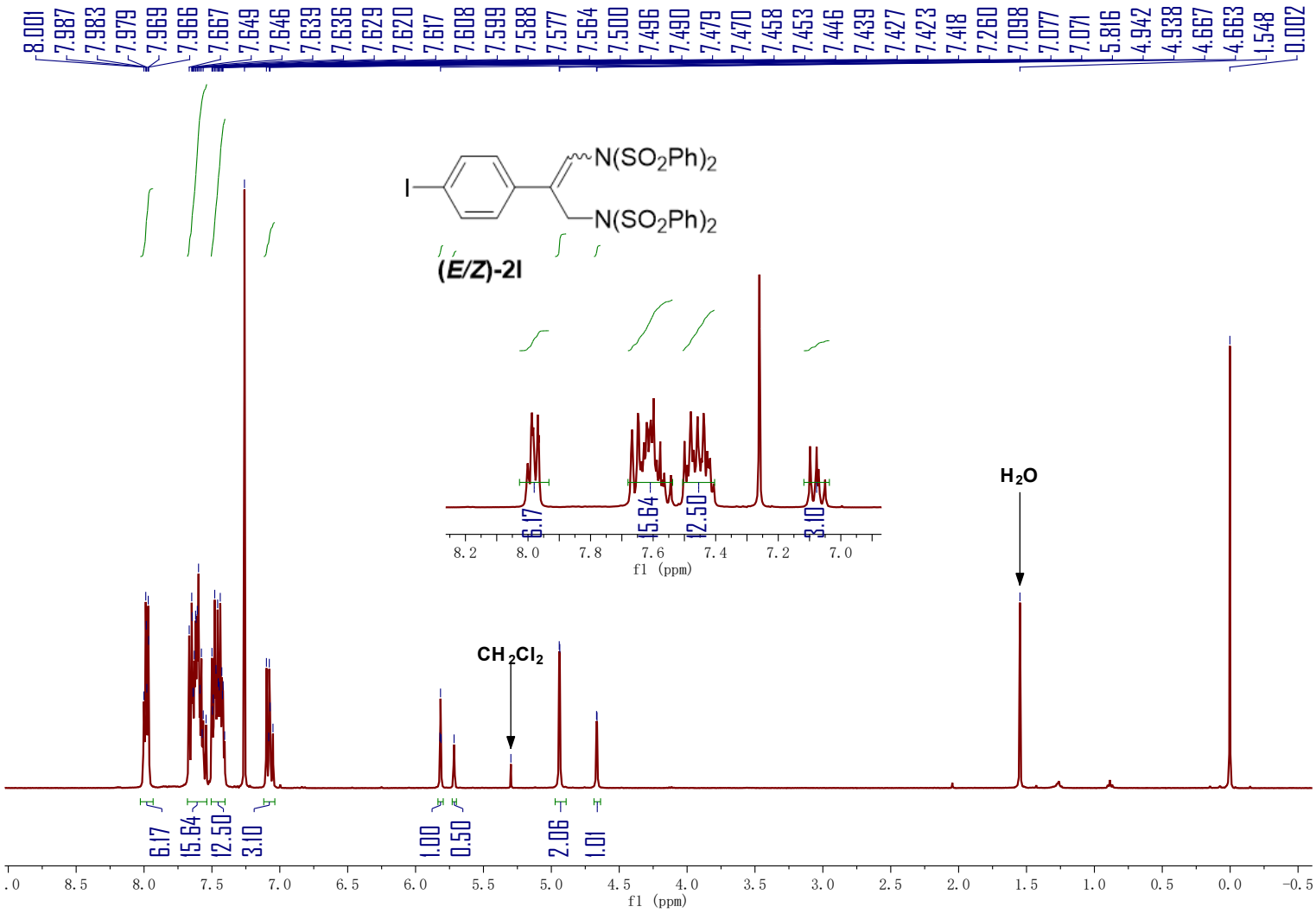

8.006
7.991
7.987
7.984
7.972
7.969
7.676
7.658
7.655
7.636
7.618
7.614
7.610
7.603
7.598
7.588
7.502
7.491
7.481
7.470
7.462
7.453
7.439
7.434
7.418
7.414
7.400
7.389
7.367
7.355
7.334
7.260
7.222
7.201
7.181
5.812
4.953
4.949
4.672
4.668
1.549
0.002
Br
N(SO2Ph)2
N(SO2Ph)2
(E/Z)-2k
H2O
6.95
14.27
17.87
3.54
1.00
0.71
2.01
1.45
f1 (ppm)

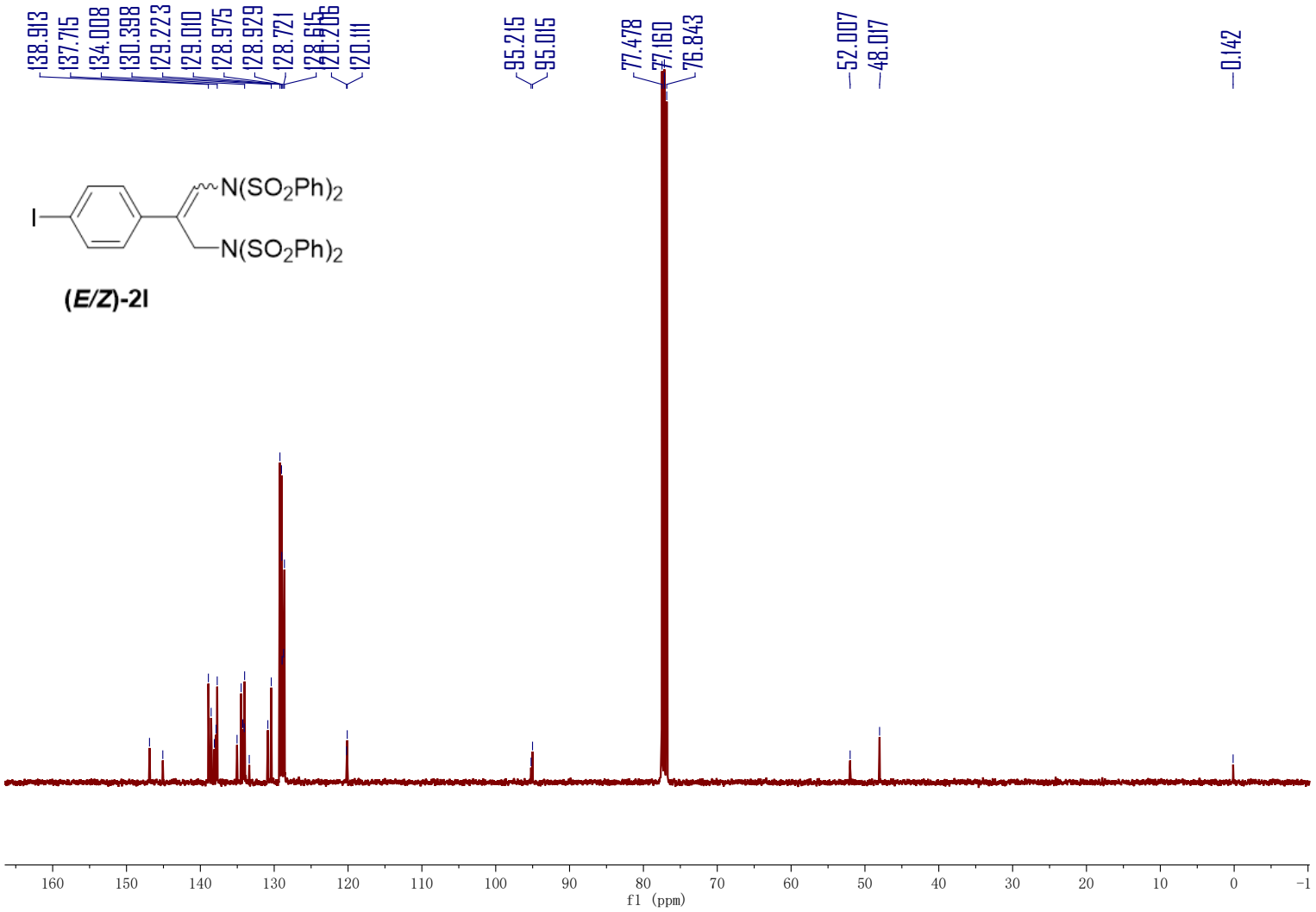

146.752
138.946
138.926
138.526
138.109
134.490
134.416
134.259
134.065
134.007
131.923
131.745
130.749
130.243
129.222
128.997
128.901
128.722
128.610
120.256
120.199
77.477
77.160
76.842
52.069
48.087
1.161
0.140
Br
N(SO2Ph)2
N(SO2Ph)2
(E/Z)-2k
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

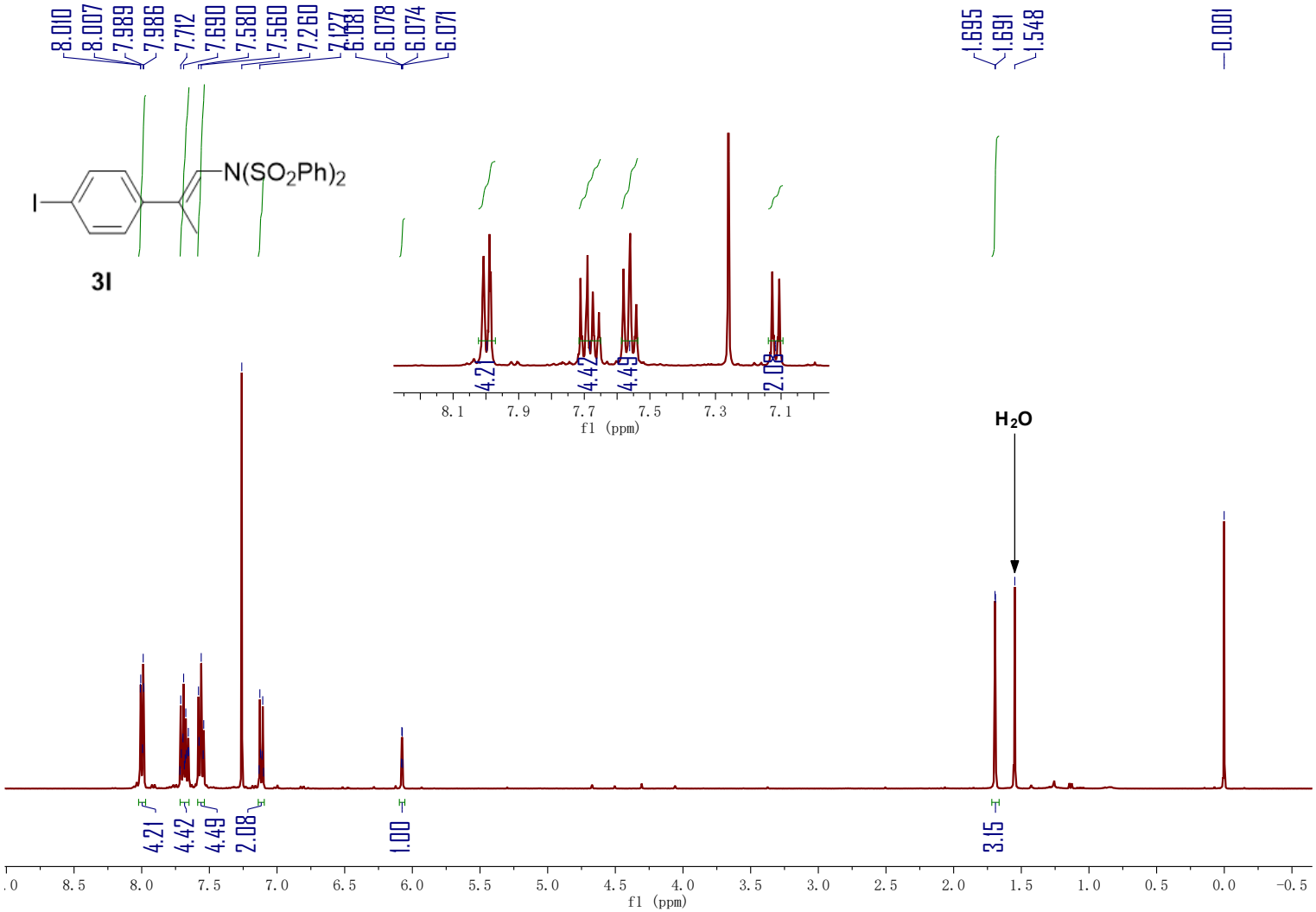

8.011
7.993
7.990
7.674
7.655
7.581
7.561
7.542
7.507
7.486
7.260
7.239
6.077
6.074
1.705
1.701
1.545
0.002
Br
N(SO2Ph)2
3k
H2O
4.09
1.95
4.30
2.08
2.16
1.00
3.05
f1 (ppm)

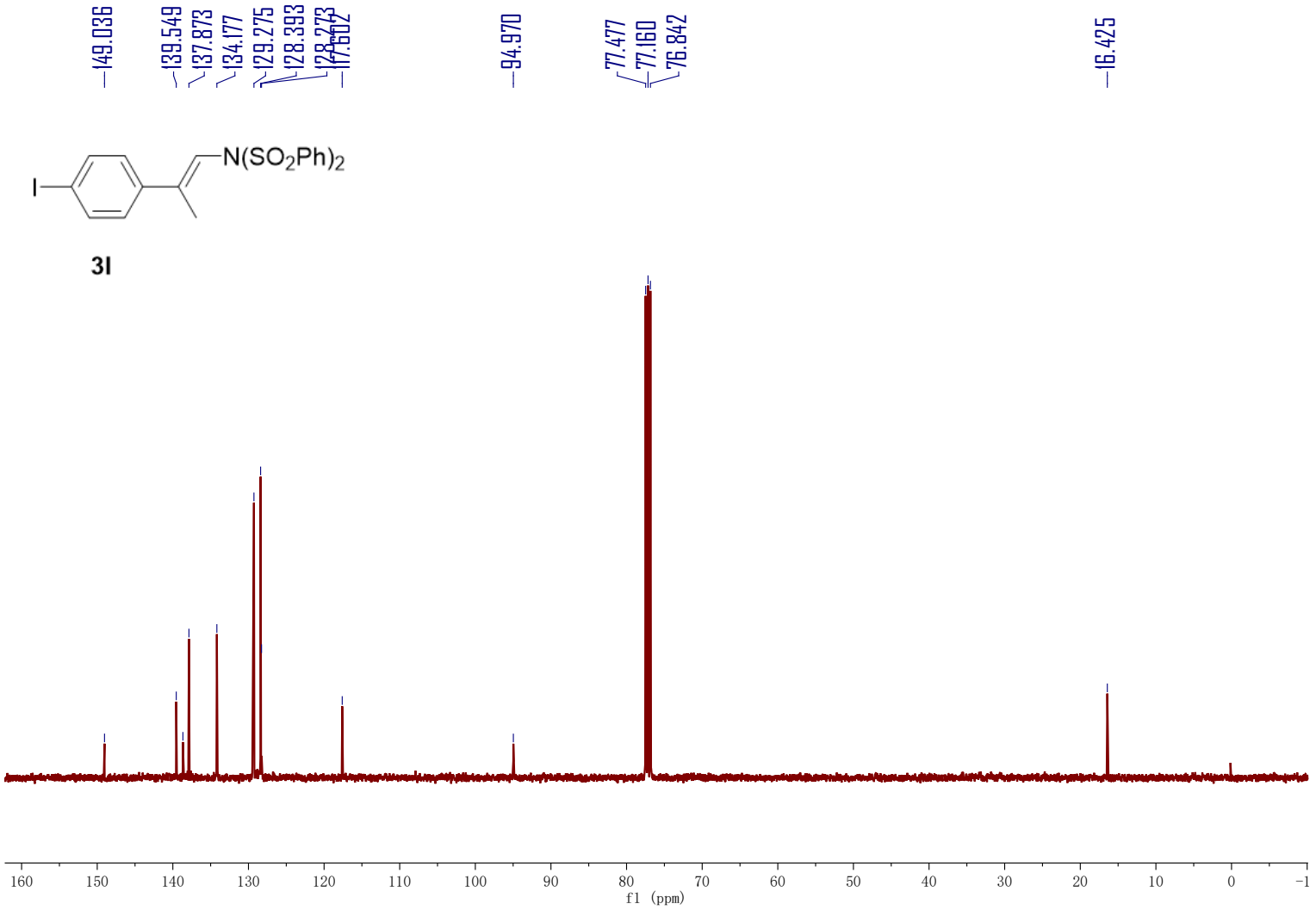

148.937
139.531
138.046
134.188
131.893
129.283
128.389
128.116
123.305
117.580
77.477
77.160
76.842
16.504
Br
N(SO2Ph)2
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
−10
f1 (ppm)

3k

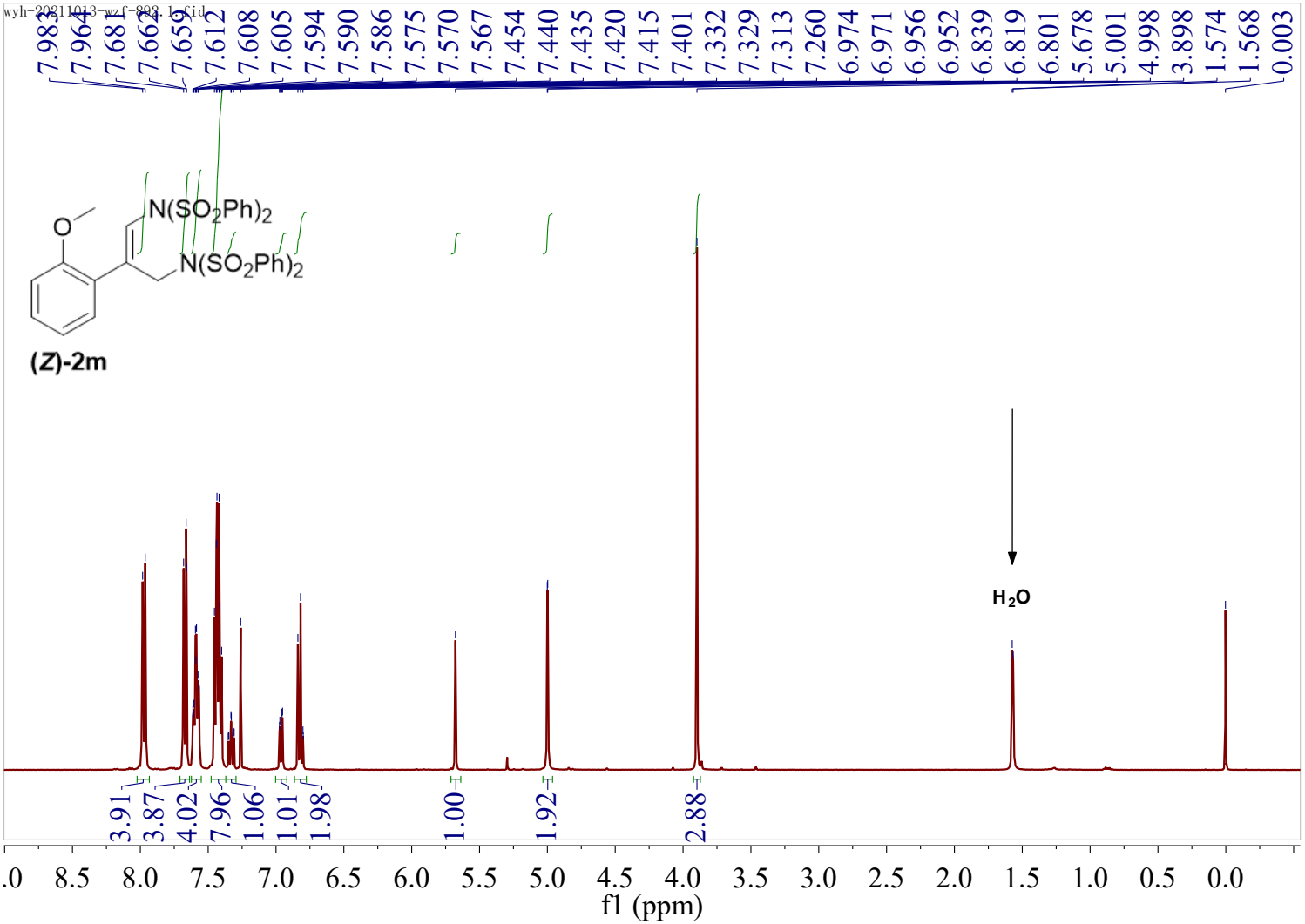

8.001
7.987
7.983
7.979
7.969
7.966
7.667
7.649
7.646
7.639
7.636
7.629
7.620
7.617
7.608
7.599
7.588
7.577
7.564
7.500
7.496
7.490
7.479
7.470
7.458
7.453
7.446
7.439
7.427
7.423
7.418
7.260
7.098
7.077
7.071
5.816
4.942
4.938
4.667
4.663
1.548
0.002
I
N(SO2Ph)2
N(SO2Ph)2
(E/Z)-2l
6.17
15.64
12.50
3.10
8.2
8.0
7.8
7.6
7.4
7.2
7.0
f1 (ppm)
H2O
CH2Cl2
6.17
15.64
12.50
3.10
1.00
0.50
2.06
1.01
.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
f1 (ppm)

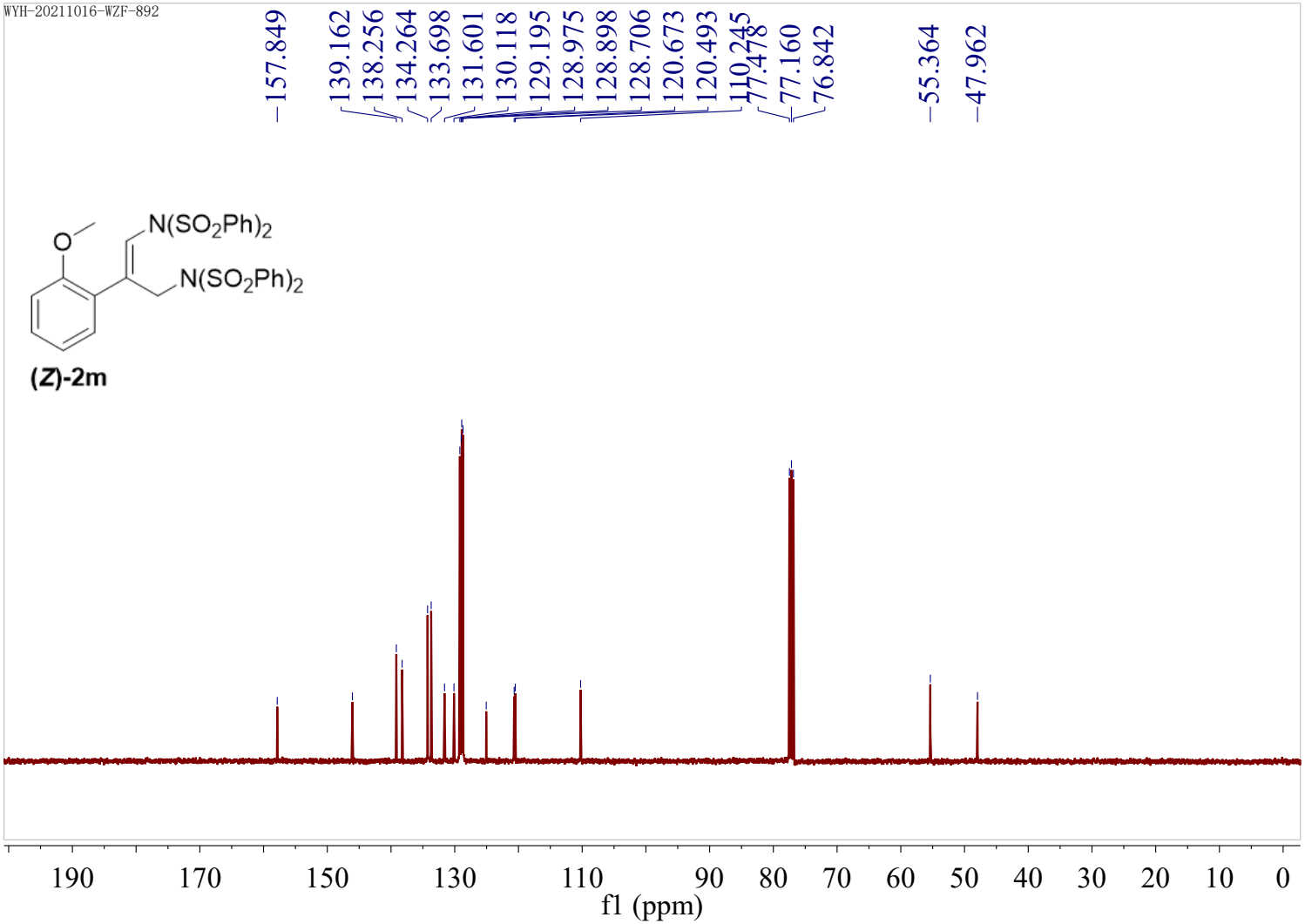

138.913
137.715
134.008
130.398
129.223
129.010
128.975
128.929
128.721
120.111
95.215
95.015
77.478
77.160
76.843
52.007
48.017
0.142
I
N(SO2Ph)2
N(SO2Ph)2
(E/Z)-2l
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
−1
f1 (ppm)

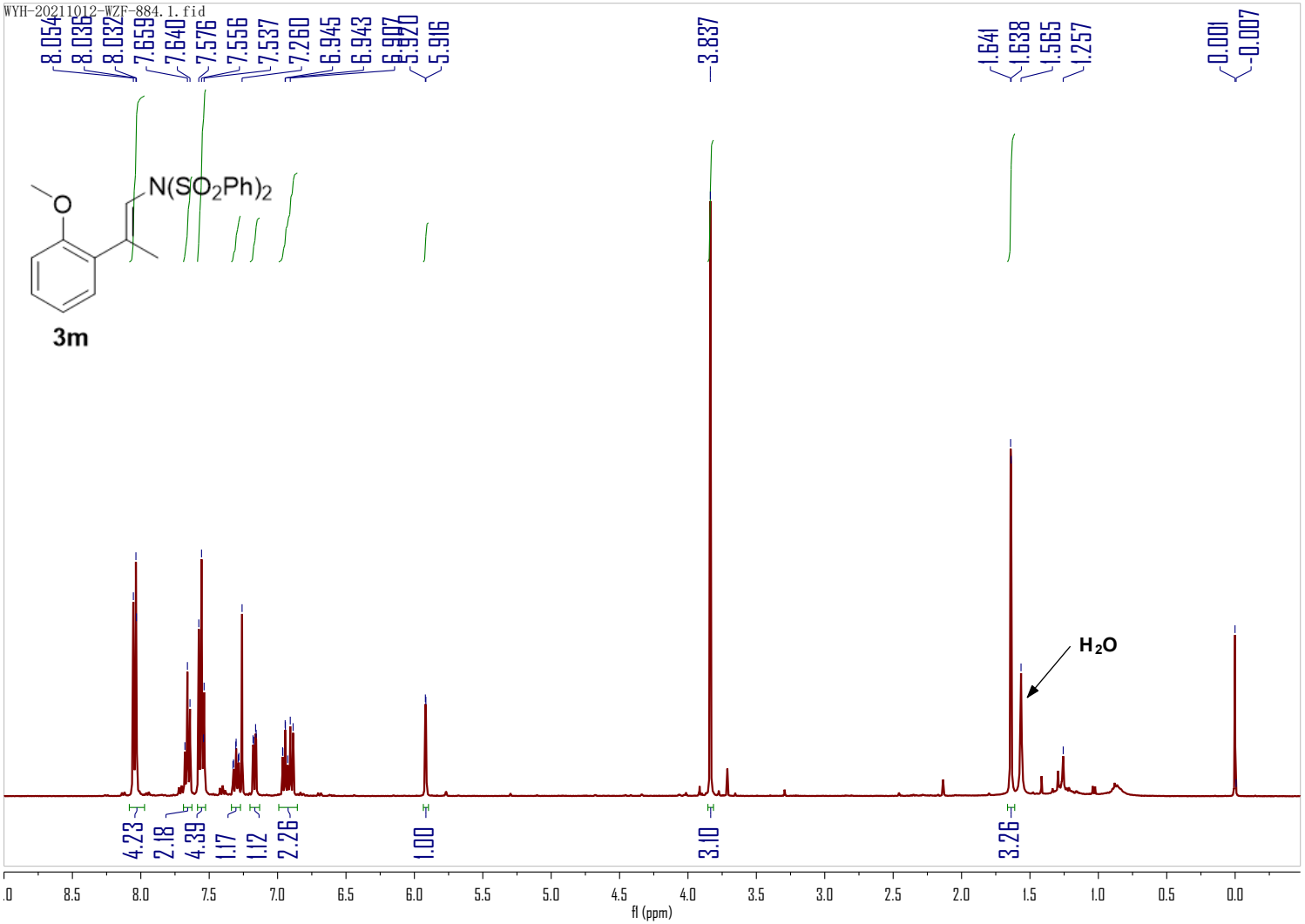

8.010
8.007
7.989
7.986
7.712
7.690
7.580
7.560
7.260
7.127
6.081
6.078
6.074
6.071
1.695
1.691
1.548
0.001
N(SO2Ph)2
I
3l
H2O
4.21
4.42
4.49
2.08
1.00
3.15
f1 (ppm)


149.036
139.549
137.873
134.177
129.275
128.393
128.273
94.970
77.477
77.160
76.842
16.425
N(SO2Ph)2
I
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
−1
f1 (ppm)

3l


wyh-20211013-wzf-893.1.fid
7.983
7.964
7.681
7.662
7.659
7.612
7.608
7.605
7.594
7.590
7.586
7.575
7.570
7.567
7.454
7.440
7.435
7.420
7.415
7.401
7.332
7.329
7.313
7.260
6.974
6.971
6.956
6.952
6.839
6.819
6.801
5.678
5.001
4.998
3.898
1.574
1.568
0.003
N(SO2Ph)2
N(SO2Ph)2
O
(Z)-2m
H2O
3.91
3.87
4.02
7.96
1.06
1.01
1.98
1.00
1.92
2.88
.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
f1 (ppm)


WYH-20211016-WZF-892
157.849
139.162
138.256
134.264
133.698
131.601
130.118
129.195
128.975
128.898
128.706
120.673
120.493
110.245
77.478
77.160
76.842
55.364
47.962
O
N(SO2Ph)2
N(SO2Ph)2
(Z)-2m
190
170
150
130
110
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


WYH-20211012-WZF-884.1.fid
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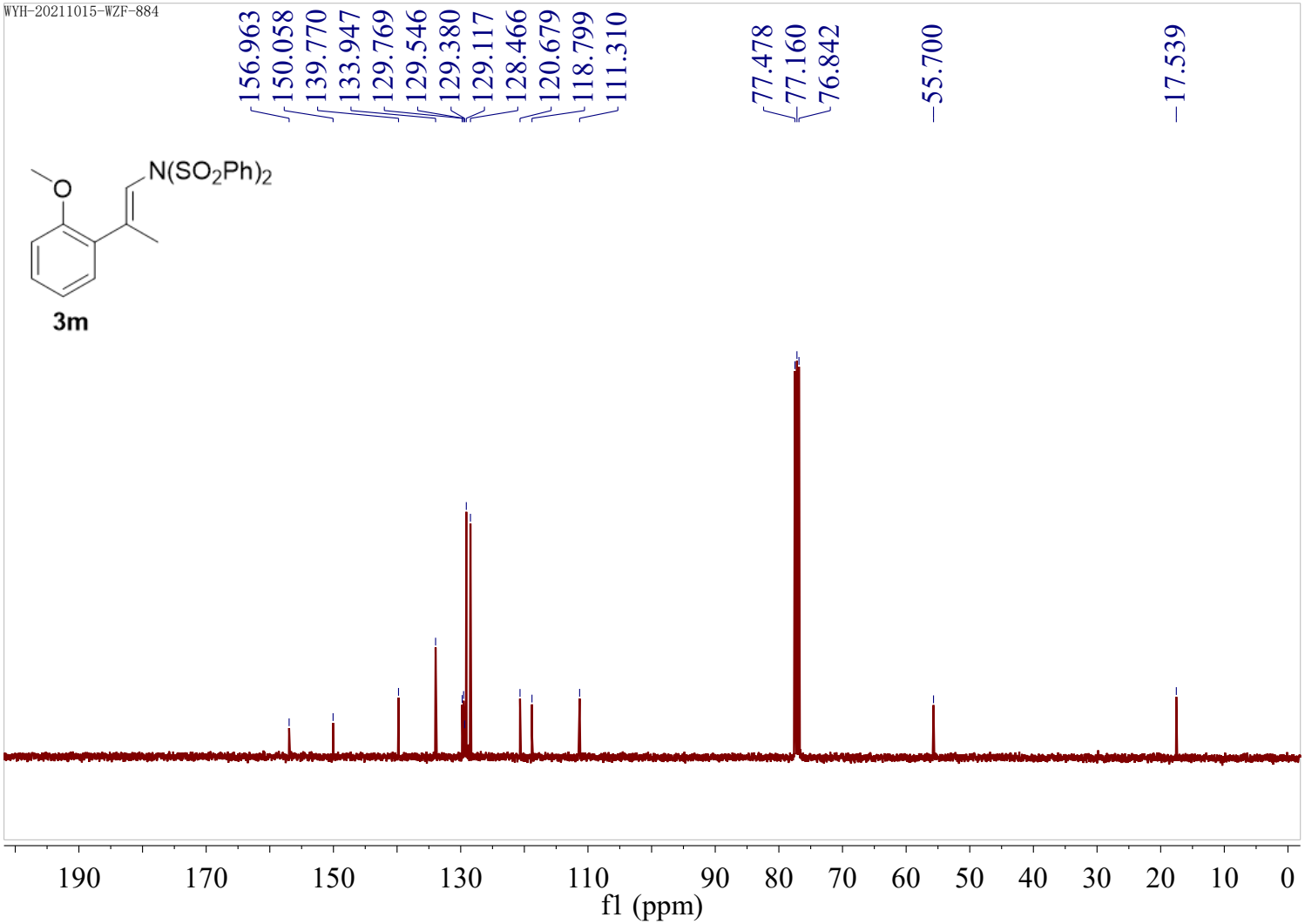
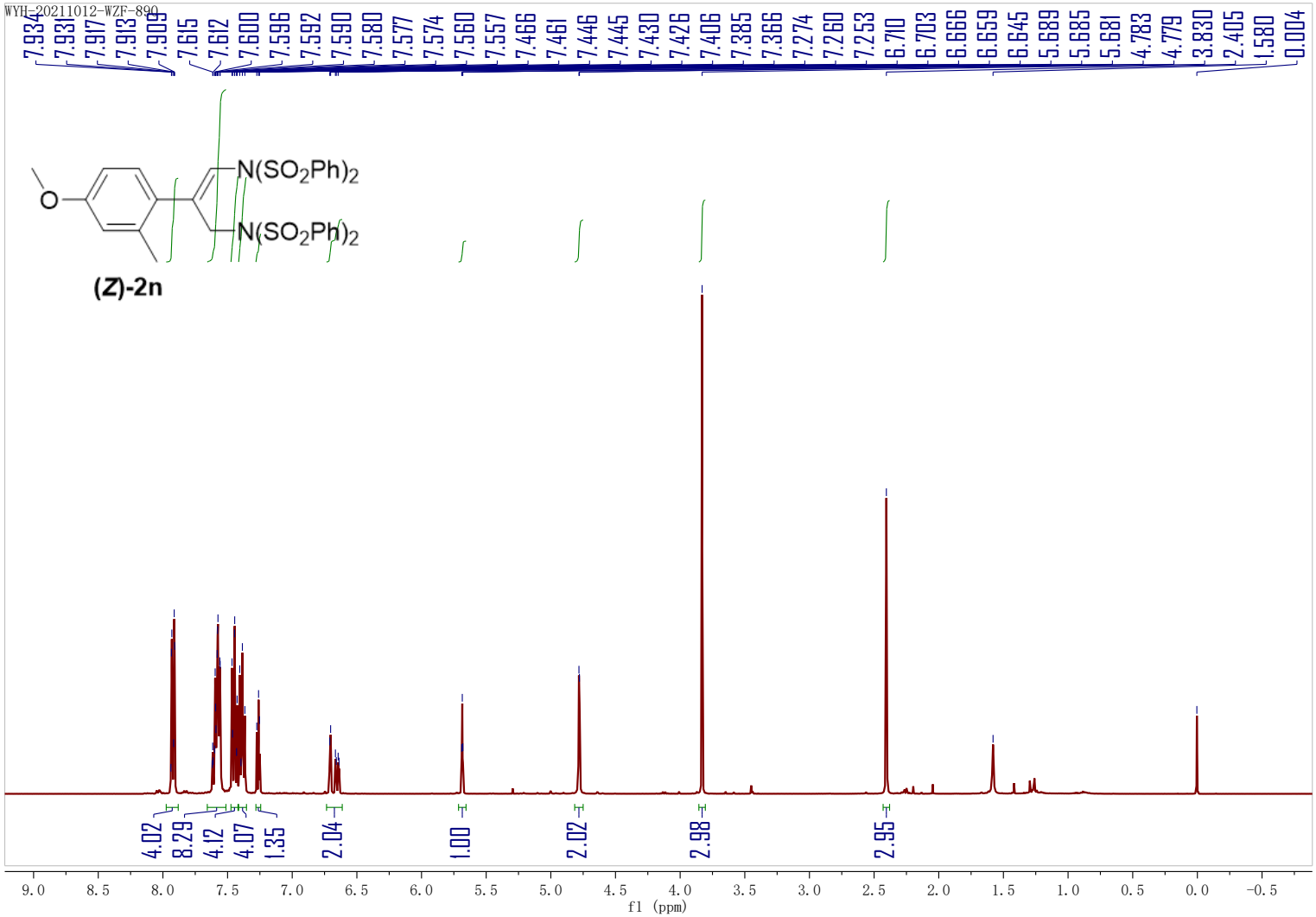
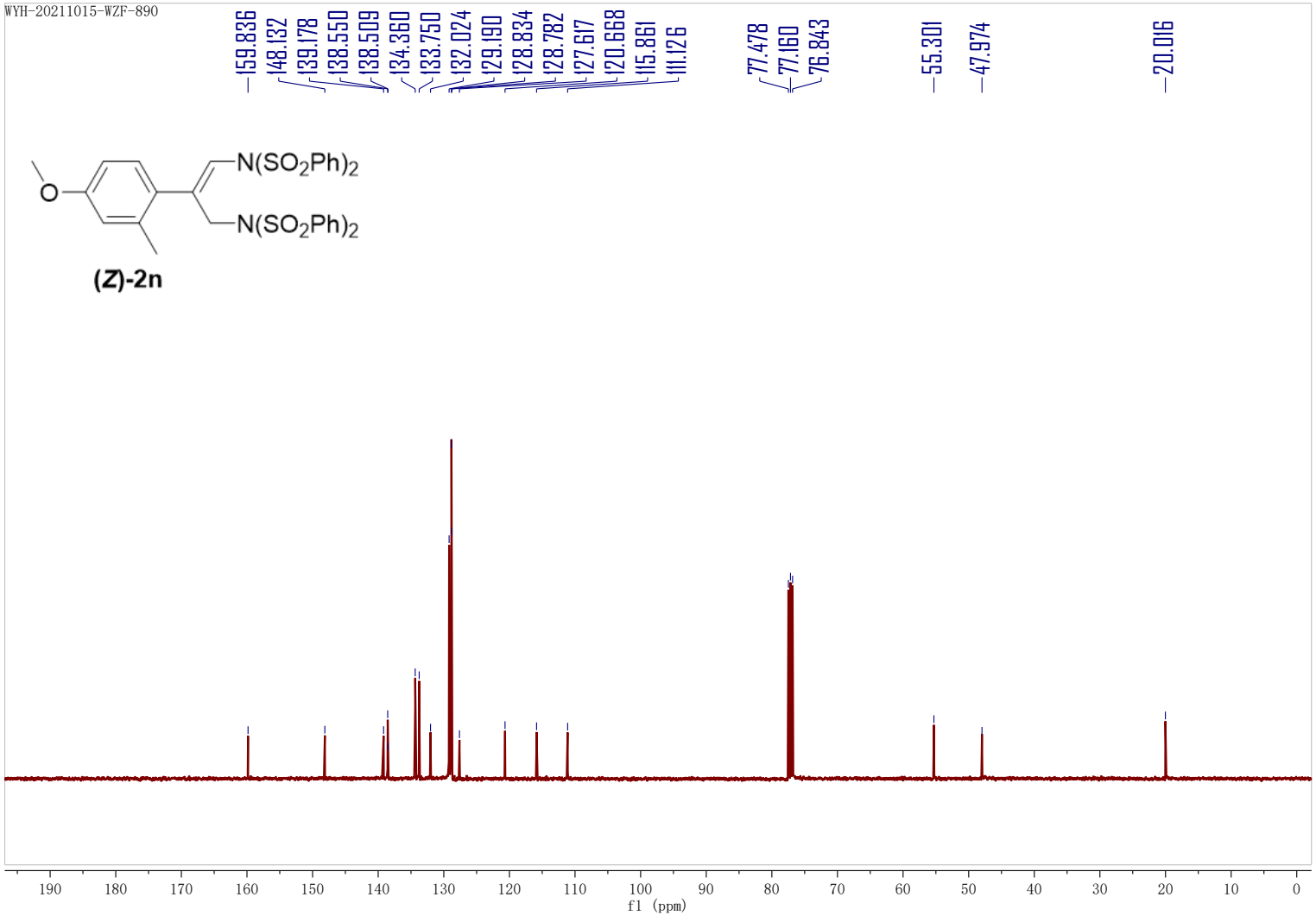
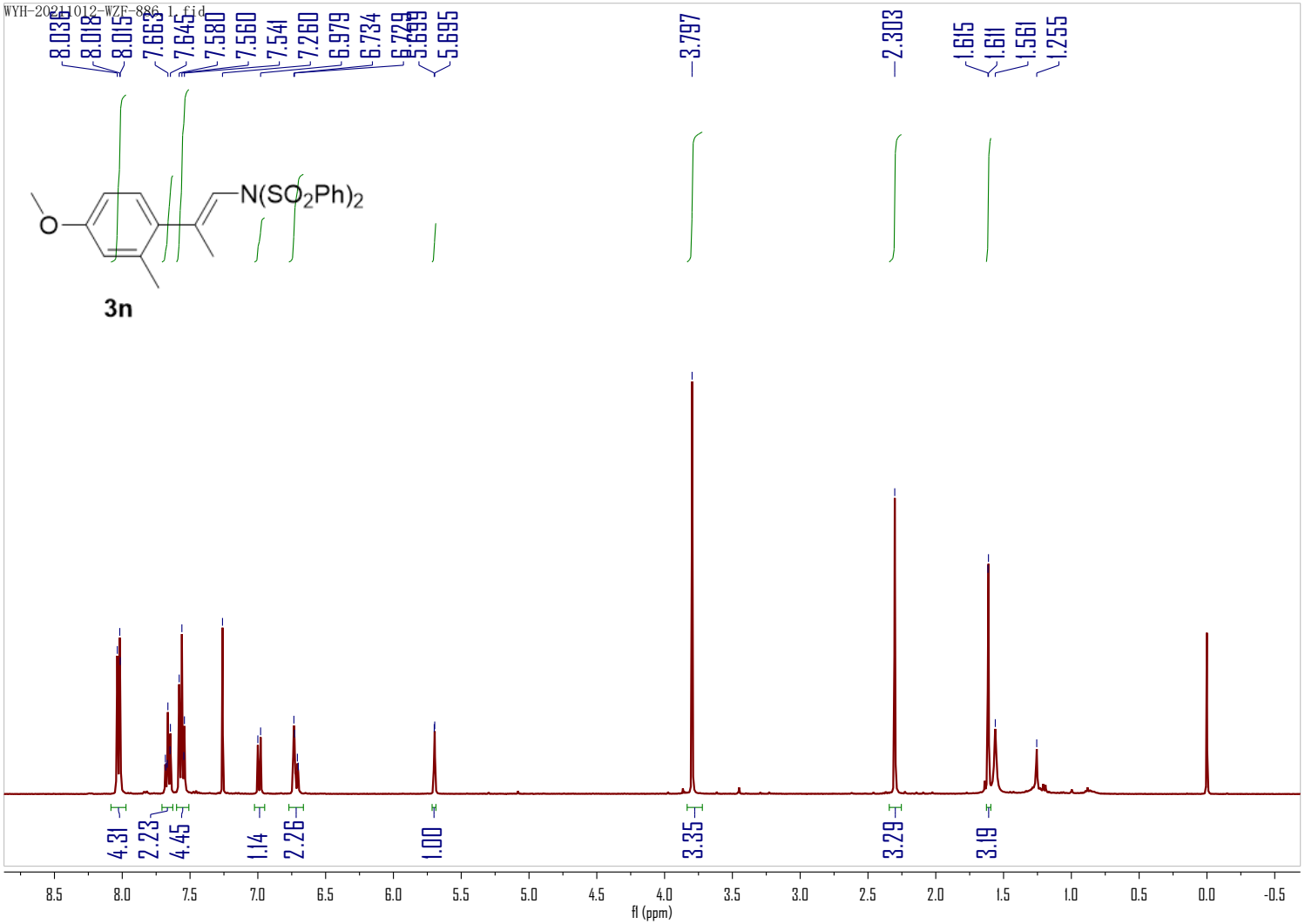
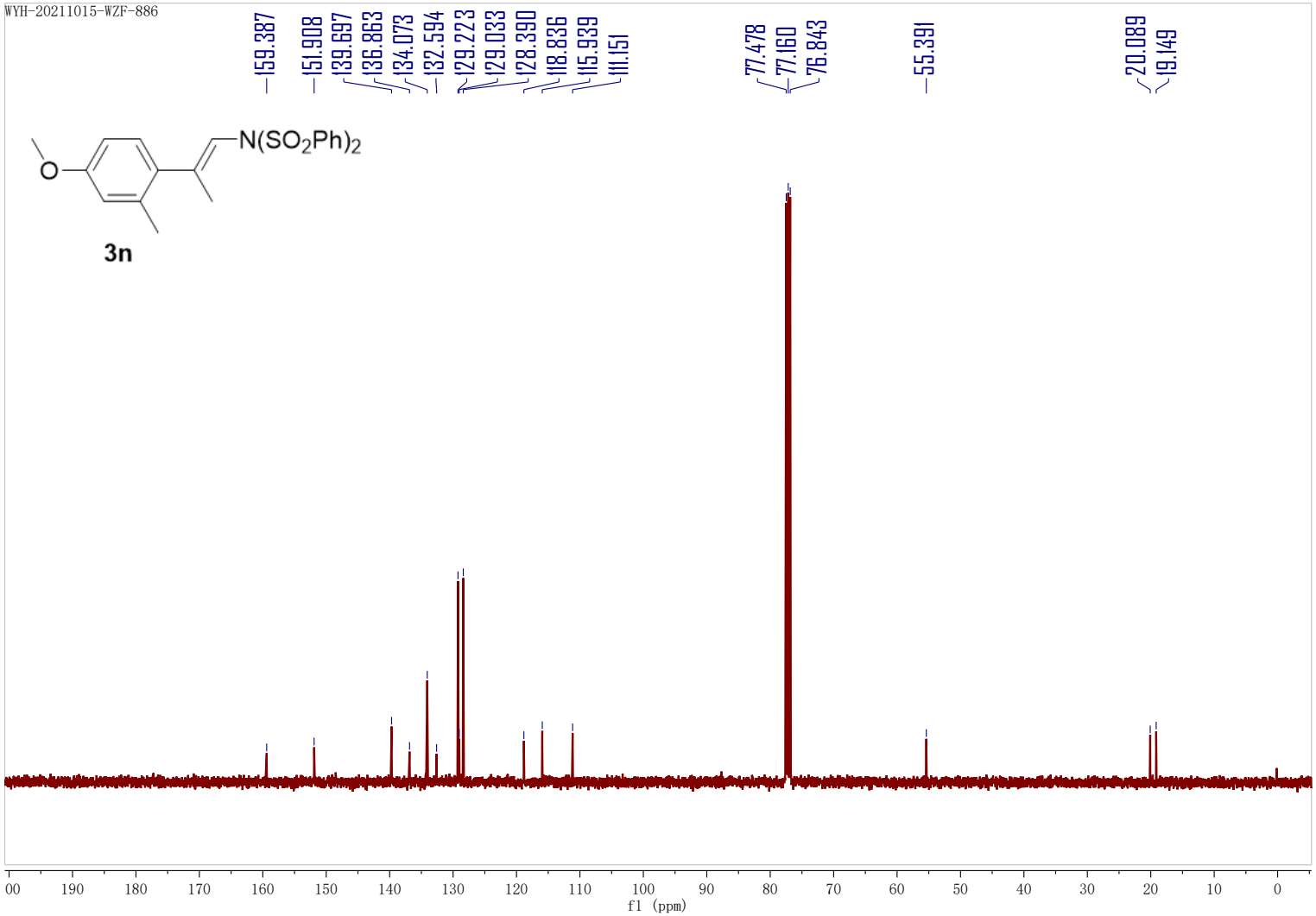
8.036
8.032
7.659
7.640
7.576
7.556
7.537
7.260
6.945
6.943
6.907
5.920
5.916
3.837
1.641
1.638
1.565
1.257
0.001
-0.007
N(SO2Ph)2
O
3m
H2O
4.23
2.18
4.39
1.17
1.12
2.26
1.00
3.10
3.26
f1 (ppm)

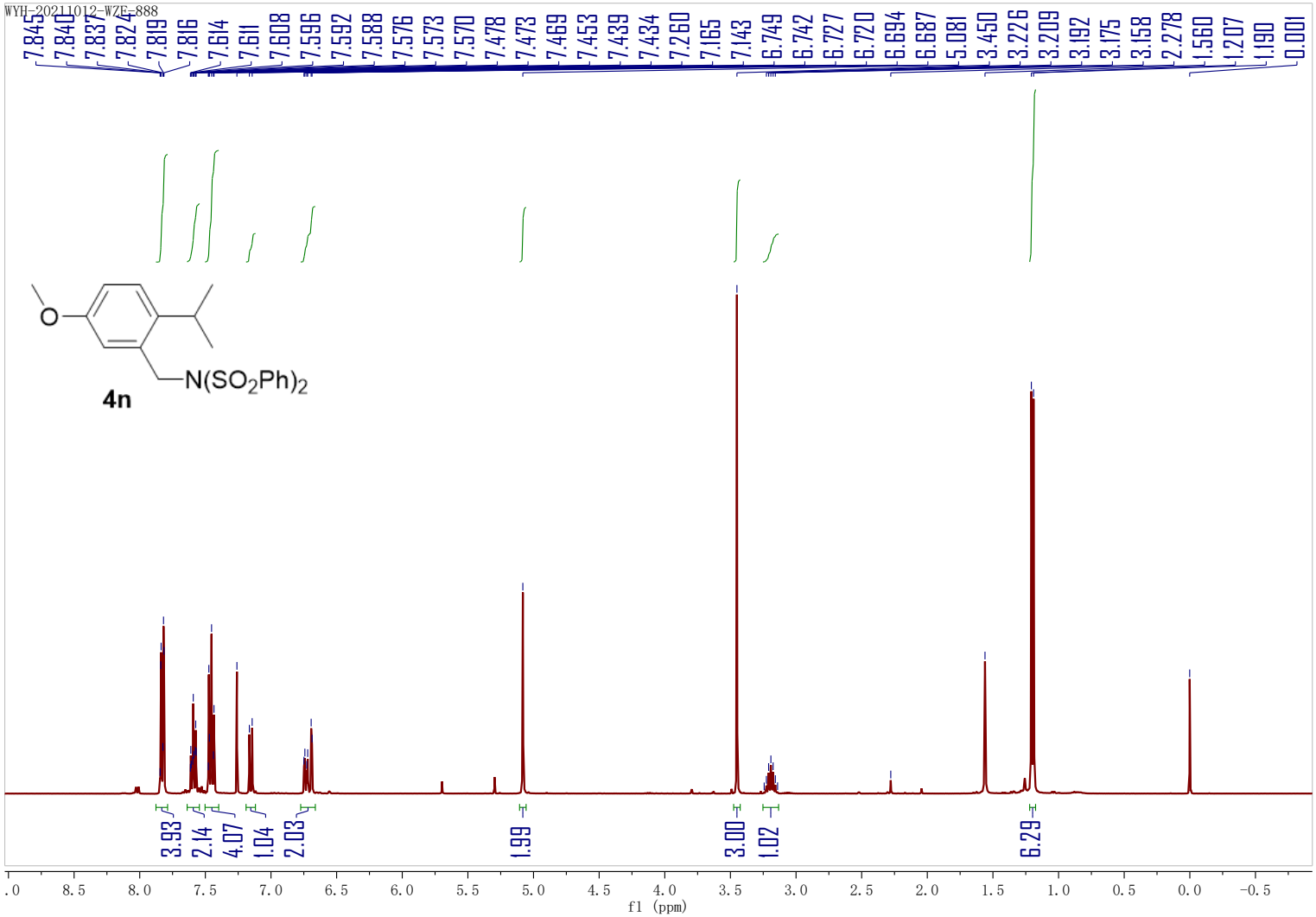

WYH-20211015-WZF-884
156.963
150.058
139.770
133.947
129.769
129.546
129.380
129.117
128.466
120.679
118.799
111.310
77.478
77.160
76.842
55.700
17.539
N(SO2Ph)2
O
3m
190
170
150
130
110
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

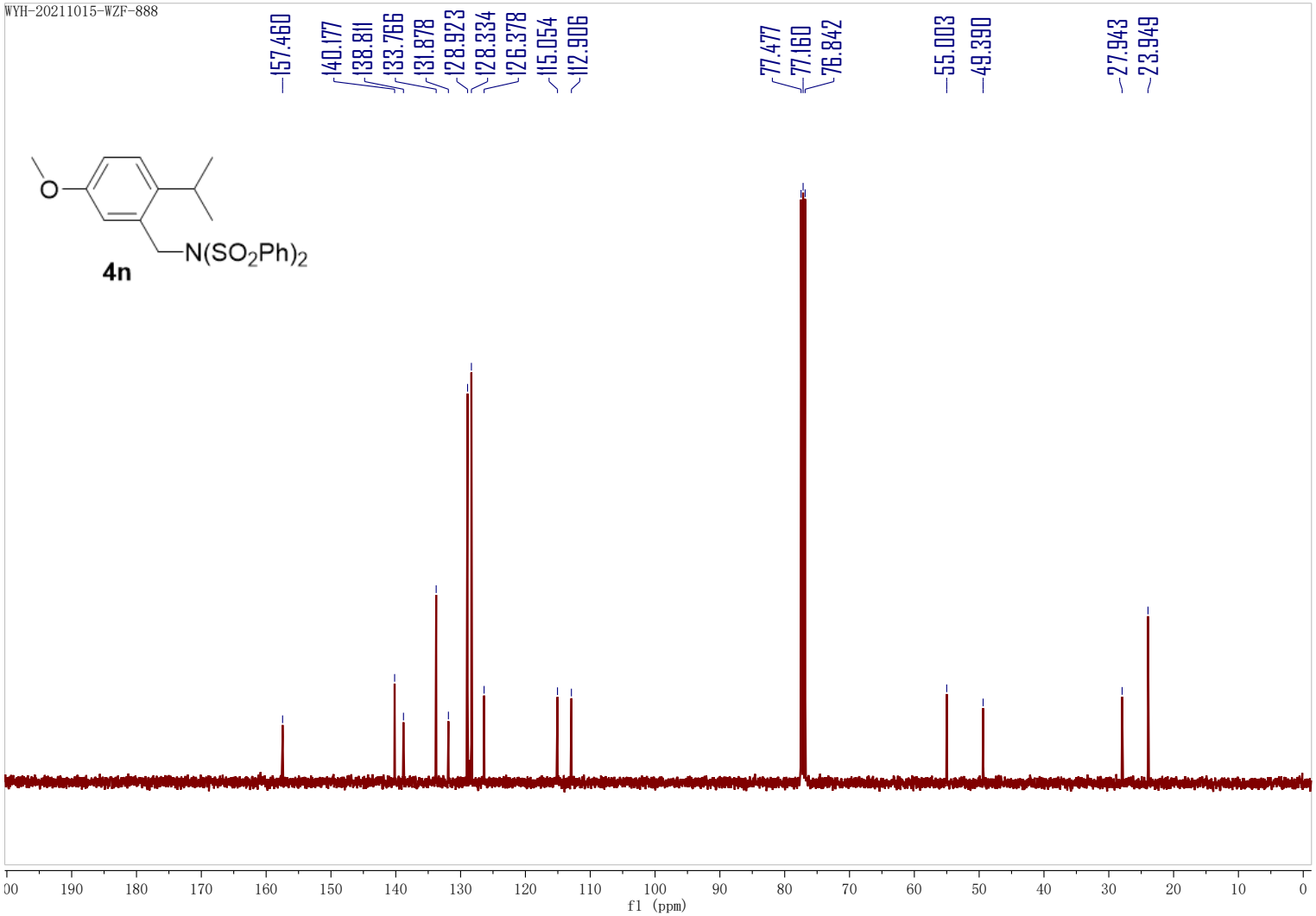

WYH-20211012-WZF-890
7.934
7.931
7.917
7.913
7.909
7.615
7.612
7.600
7.596
7.592
7.590
7.580
7.577
7.574
7.560
7.557
7.466
7.461
7.446
7.445
7.430
7.426
7.406
7.385
7.366
7.274
7.260
7.253
6.710
6.703
6.666
6.659
6.645
5.689
5.685
5.681
4.783
4.779
3.830
2.405
1.580
0.004
N(SO2Ph)2
N(SO2Ph)2
O
(Z)-2n
4.02
8.29
4.12
4.07
1.35
2.04
1.00
2.02
2.98
2.95
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
f1 (ppm)

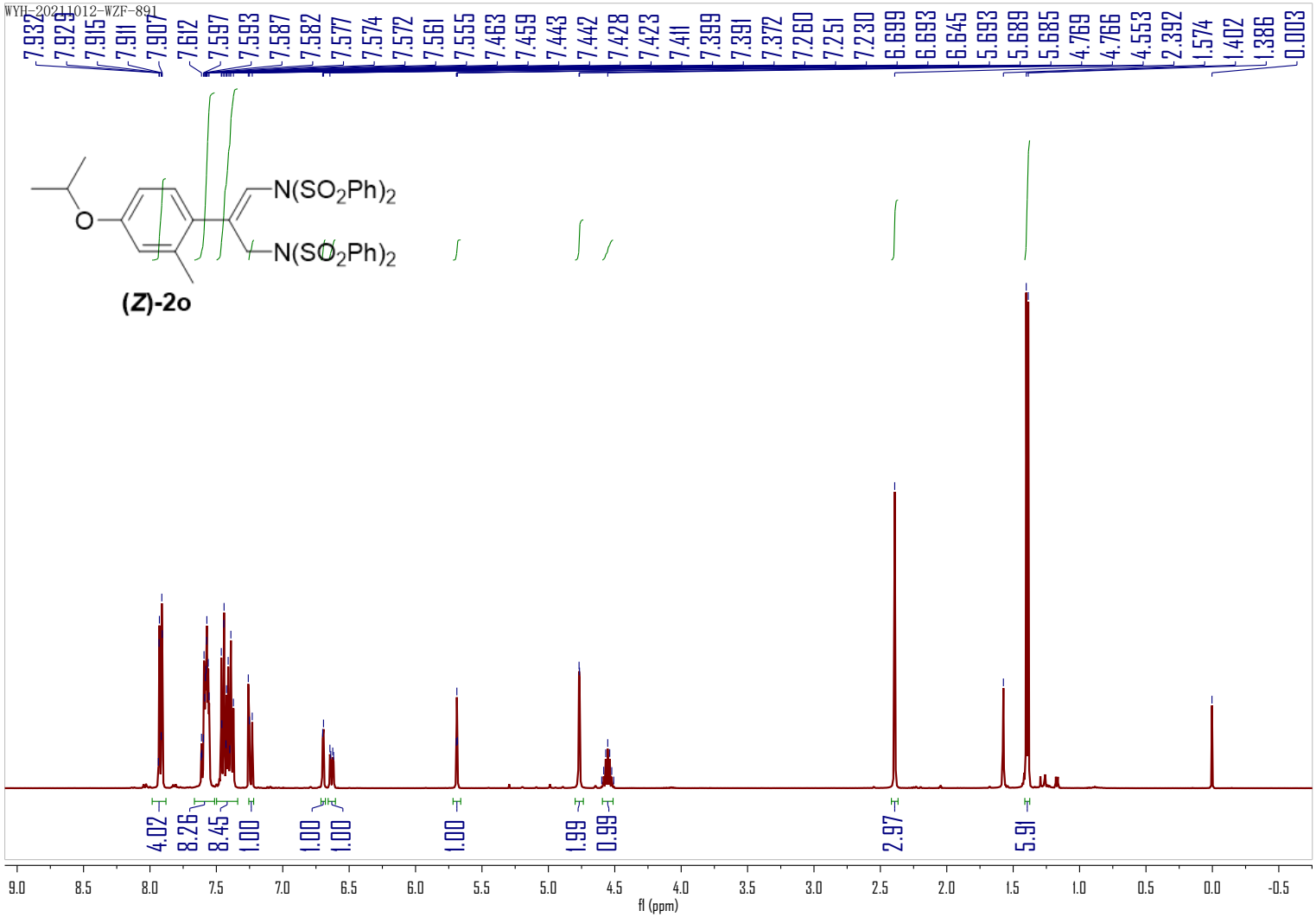

WYH-20211015-WZF-890
159.836
148.132
139.178
138.550
138.509
134.360
133.750
132.024
129.190
128.834
128.782
127.617
120.668
115.861
111.126
77.478
77.160
76.843
55.301
47.974
20.016
N(SO2Ph)2
N(SO2Ph)2
O
(Z)-2n
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

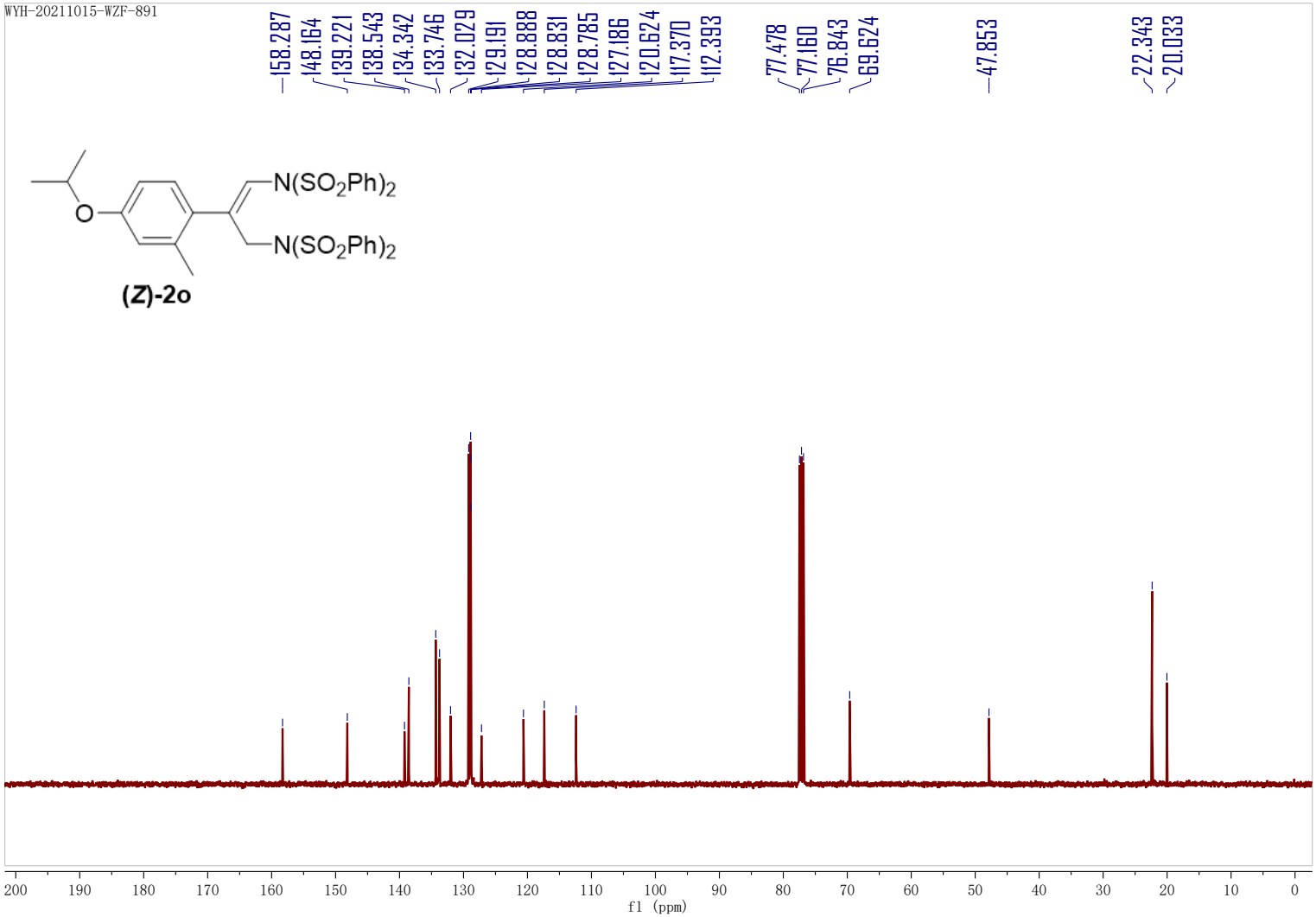

WYH-2021012-WZF-886-1.fid
8.036
8.018
8.015
7.663
7.645
7.580
7.560
7.541
7.260
6.979
6.734
6.729
6.699
5.695
3.797
2.303
1.615
1.611
1.561
1.255
N(SO2Ph)2
O
3n
4.31
2.23
4.45
1.14
2.26
1.00
3.35
3.29
3.19
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

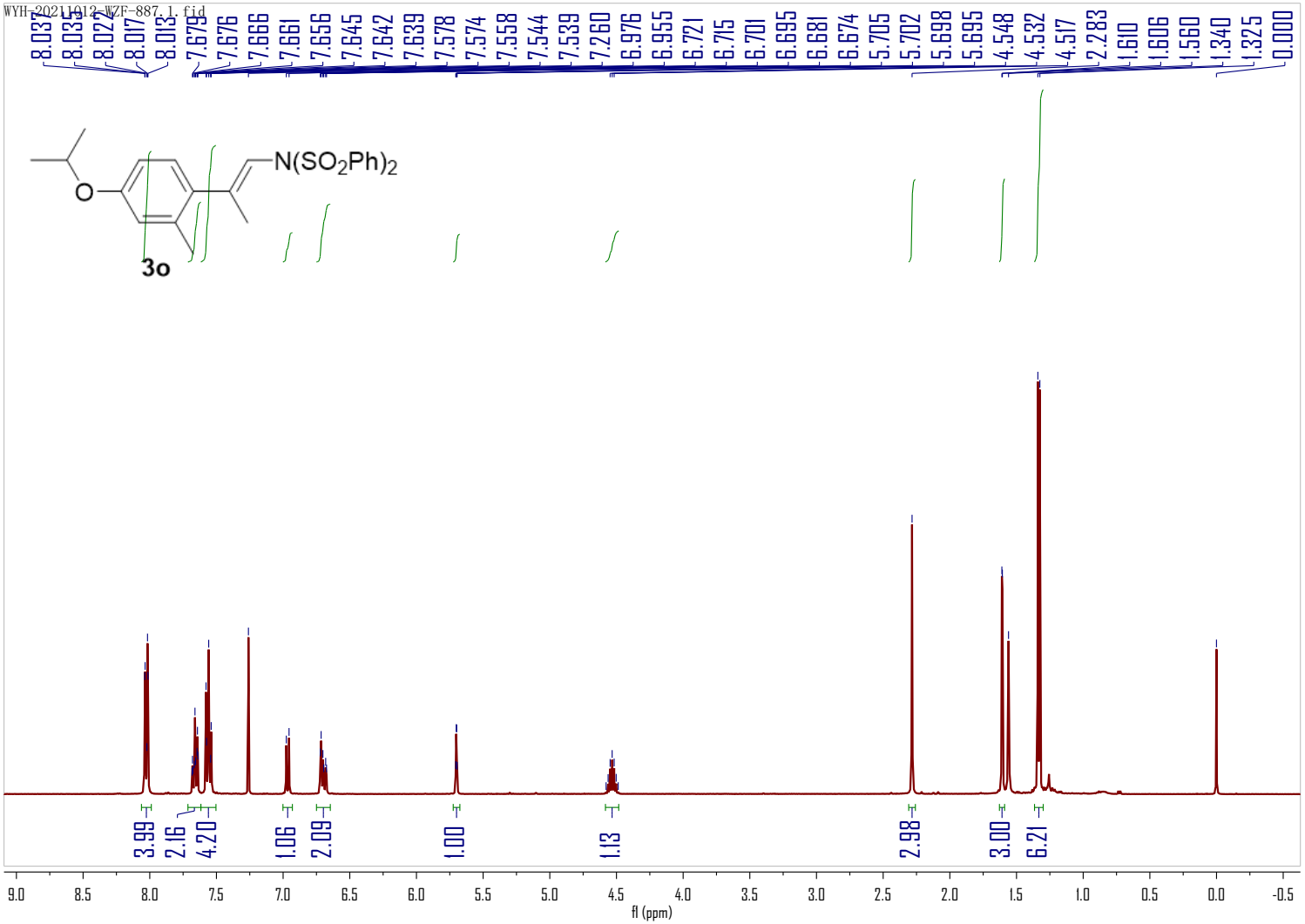

WYH-20211015-WZF-886
159.387
151.908
139.697
136.863
134.073
132.594
129.223
129.033
128.390
118.836
115.939
111.151
77.478
77.160
76.843
55.391
20.089
19.149
N(SO2Ph)2
O
3n
f1 (ppm)

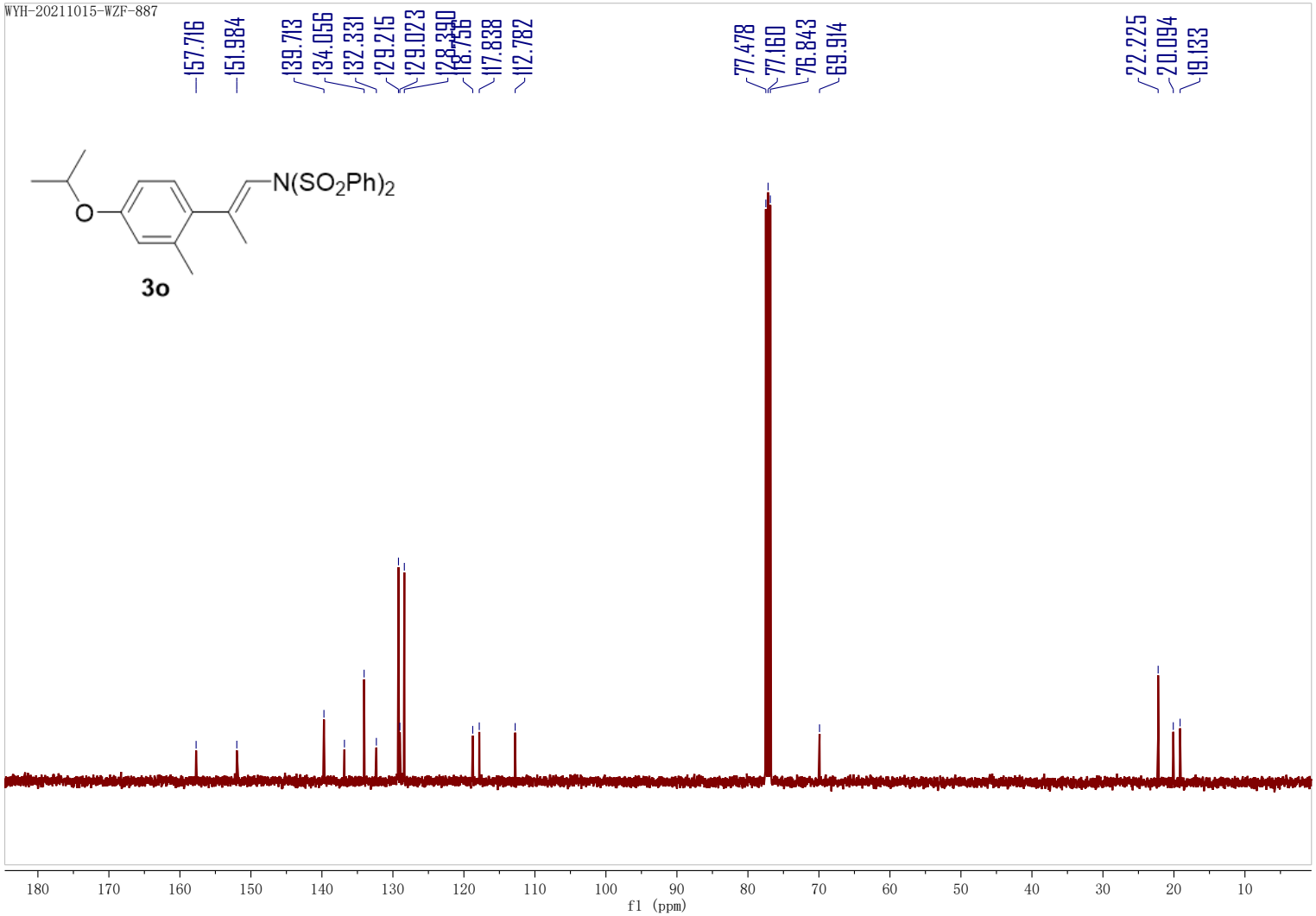

WYH-20211012-WZE-888
7.845
7.840
7.837
7.824
7.819
7.816
7.614
7.611
7.608
7.596
7.592
7.588
7.576
7.573
7.570
7.478
7.473
7.469
7.453
7.439
7.434
7.260
7.165
7.143
6.749
6.742
6.727
6.720
6.694
6.687
5.081
3.450
3.226
3.209
3.192
3.175
3.158
2.278
1.560
1.207
1.190
0.001
O
N(SO2Ph)2
4n
3.93
2.14
4.07
1.04
2.03
1.99
3.00
1.02
6.29
f1 (ppm)

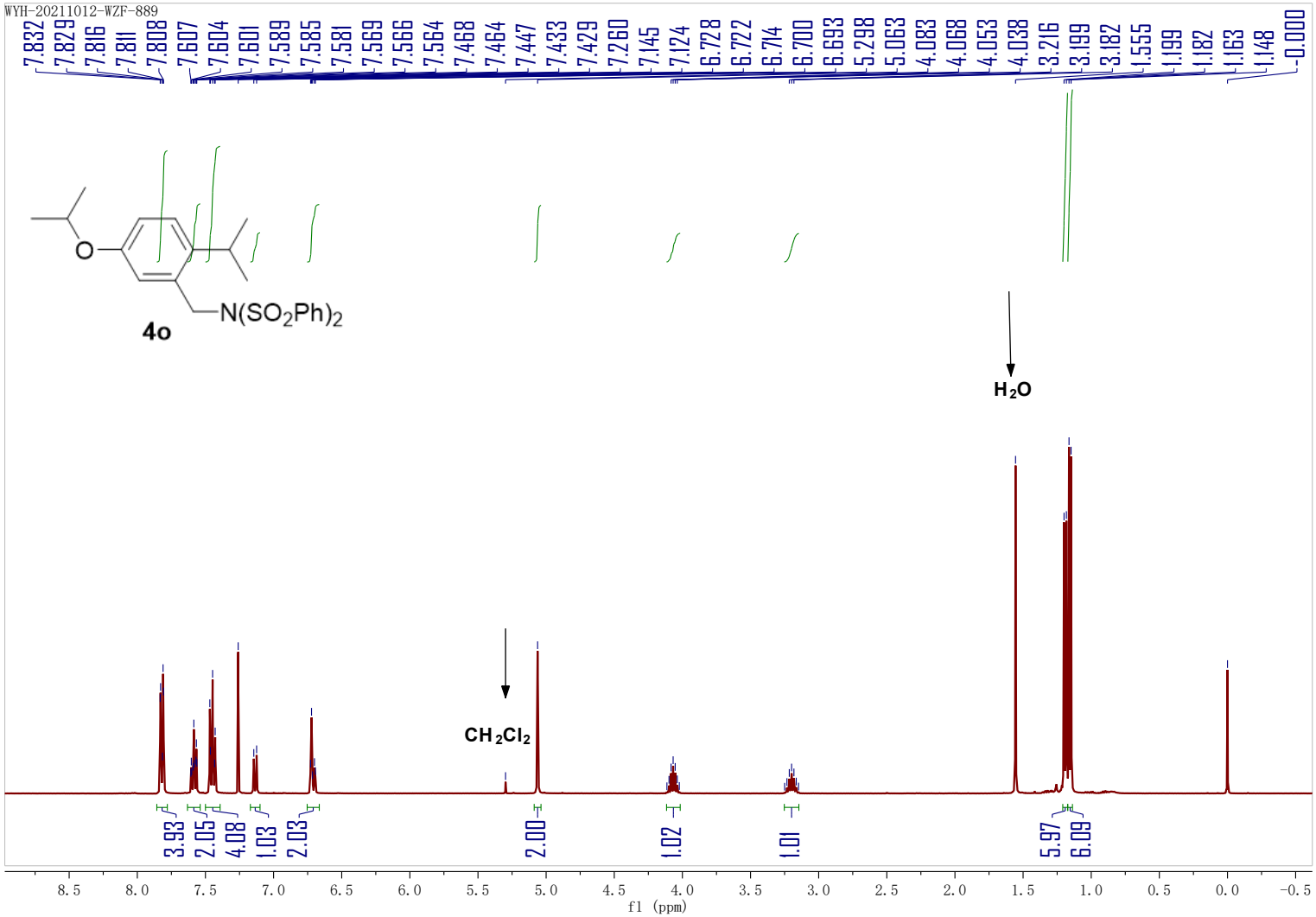

WYH-20211015-WZF-888
157.460
140.177
138.811
133.766
131.878
128.923
128.334
126.378
115.054
112.906
77.477
77.160
76.842
55.003
49.390
27.943
23.949
O
N(SO2Ph)2
4n
f1 (ppm)

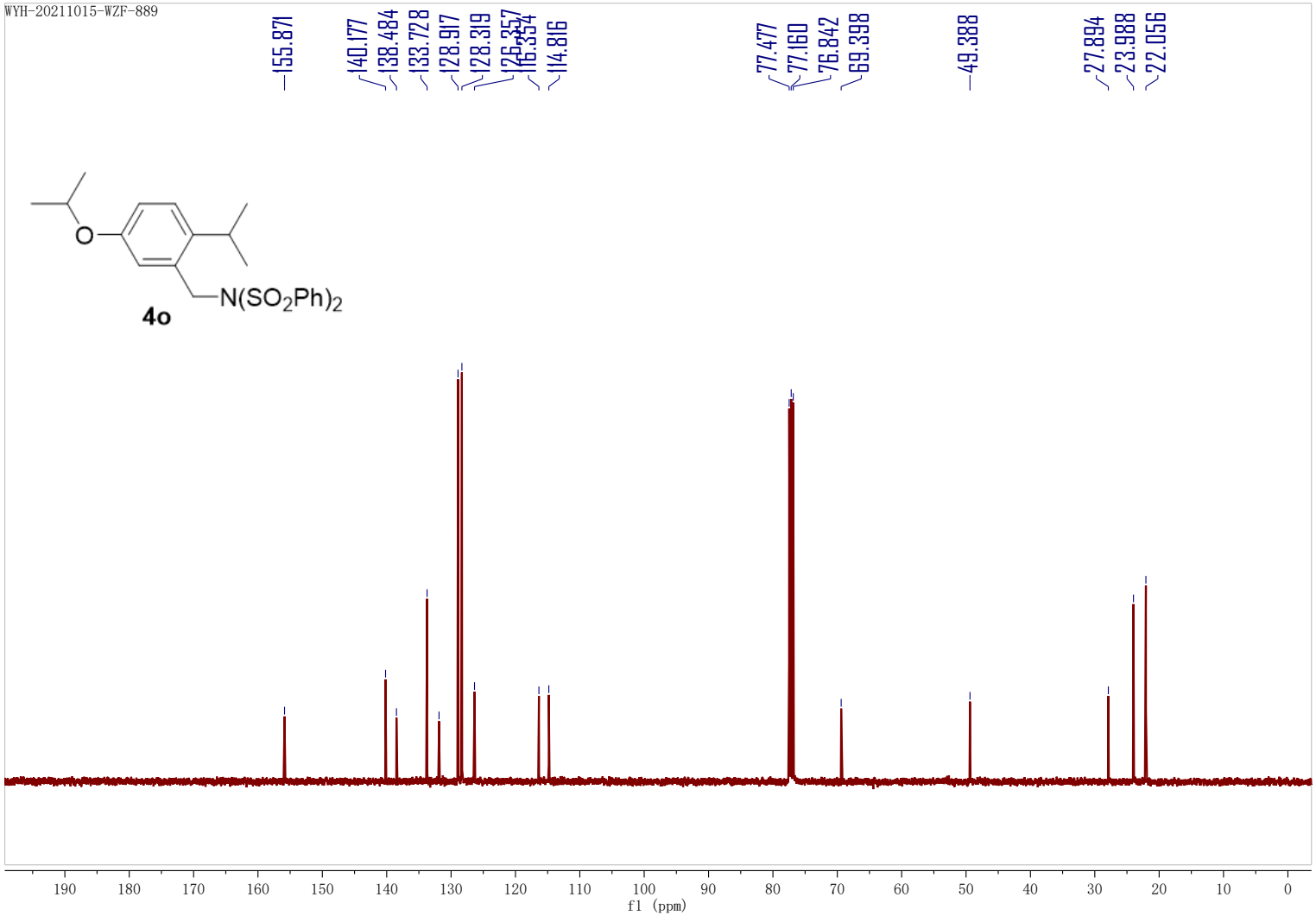

WYH-20211012-WZF-891
7.932
7.929
7.915
7.911
7.907
7.612
7.597
7.593
7.587
7.582
7.577
7.574
7.572
7.561
7.555
7.463
7.459
7.443
7.442
7.428
7.423
7.411
7.399
7.391
7.372
7.260
7.251
7.230
6.699
6.693
6.645
5.693
5.689
5.685
4.769
4.766
4.553
2.392
1.574
1.402
1.386
0.003
N(SO2Ph)2
N(SO2Ph)2
O
(Z)-2o
4.02
8.26
8.45
1.00
1.00
1.00
1.99
0.99
2.97
5.91
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
f1 (ppm)

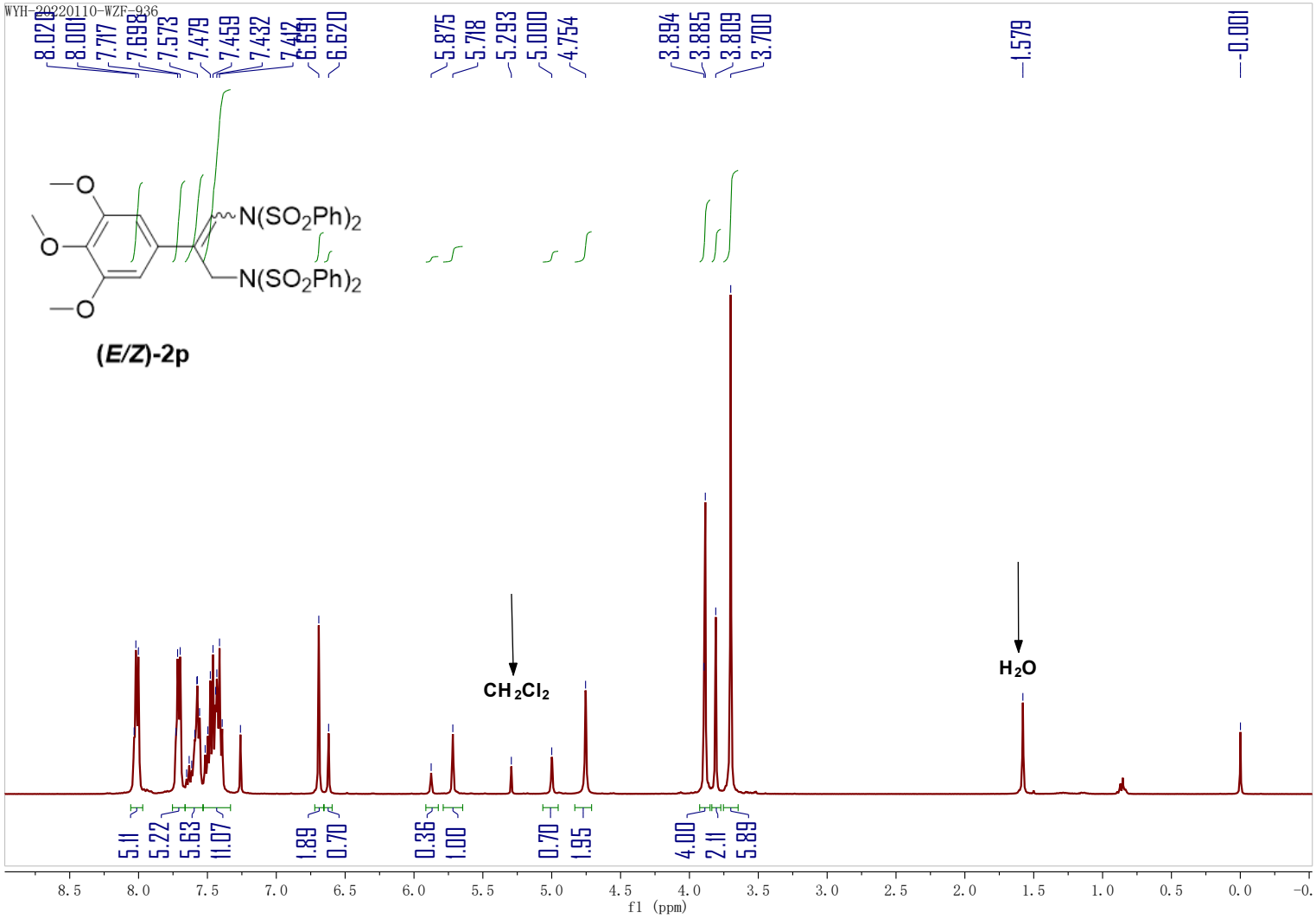

WYH-20211015-WZF-891
158.287
148.164
139.221
138.543
134.342
133.746
132.029
129.191
128.888
128.831
128.785
127.186
120.624
117.370
112.393
77.478
77.160
76.843
69.624
47.853
22.343
20.033
N(SO2Ph)2
N(SO2Ph)2
O
(Z)-2o
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

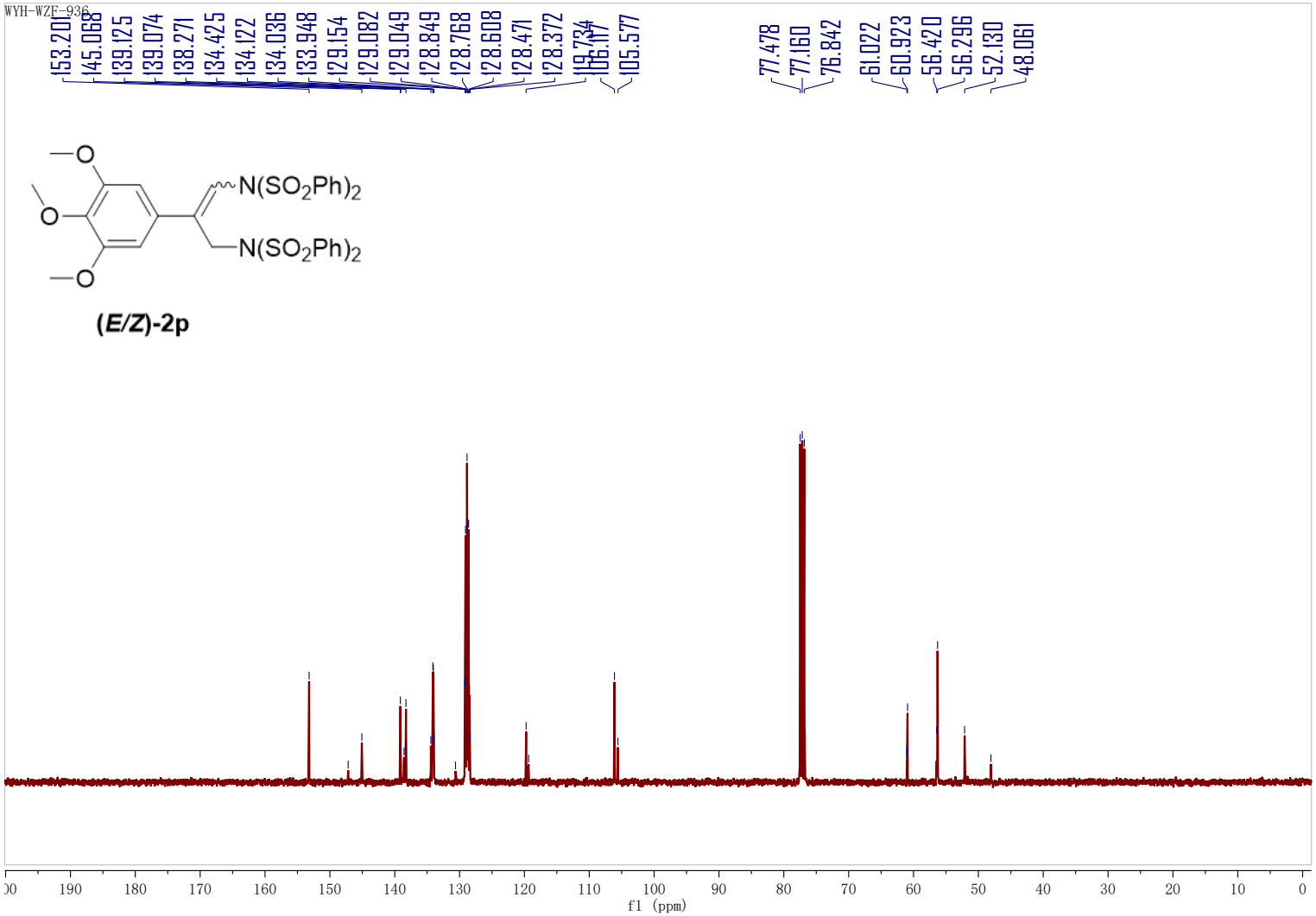

WYH-2021JQ12-WZF-887_1.fid
8.037
8.035
8.022
8.017
8.013
7.679
7.676
7.666
7.661
7.656
7.645
7.642
7.639
7.578
7.574
7.558
7.544
7.539
7.260
6.976
6.955
6.721
6.715
6.701
6.695
6.681
6.674
5.705
5.702
5.698
5.695
4.548
4.532
4.517
2.283
1.610
1.606
1.560
1.340
1.325
0.000
N(SO2Ph)2
O
3o
3.99
2.16
4.20
1.06
2.09
1.00
1.13
2.98
3.00
6.21
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
f1 (ppm)

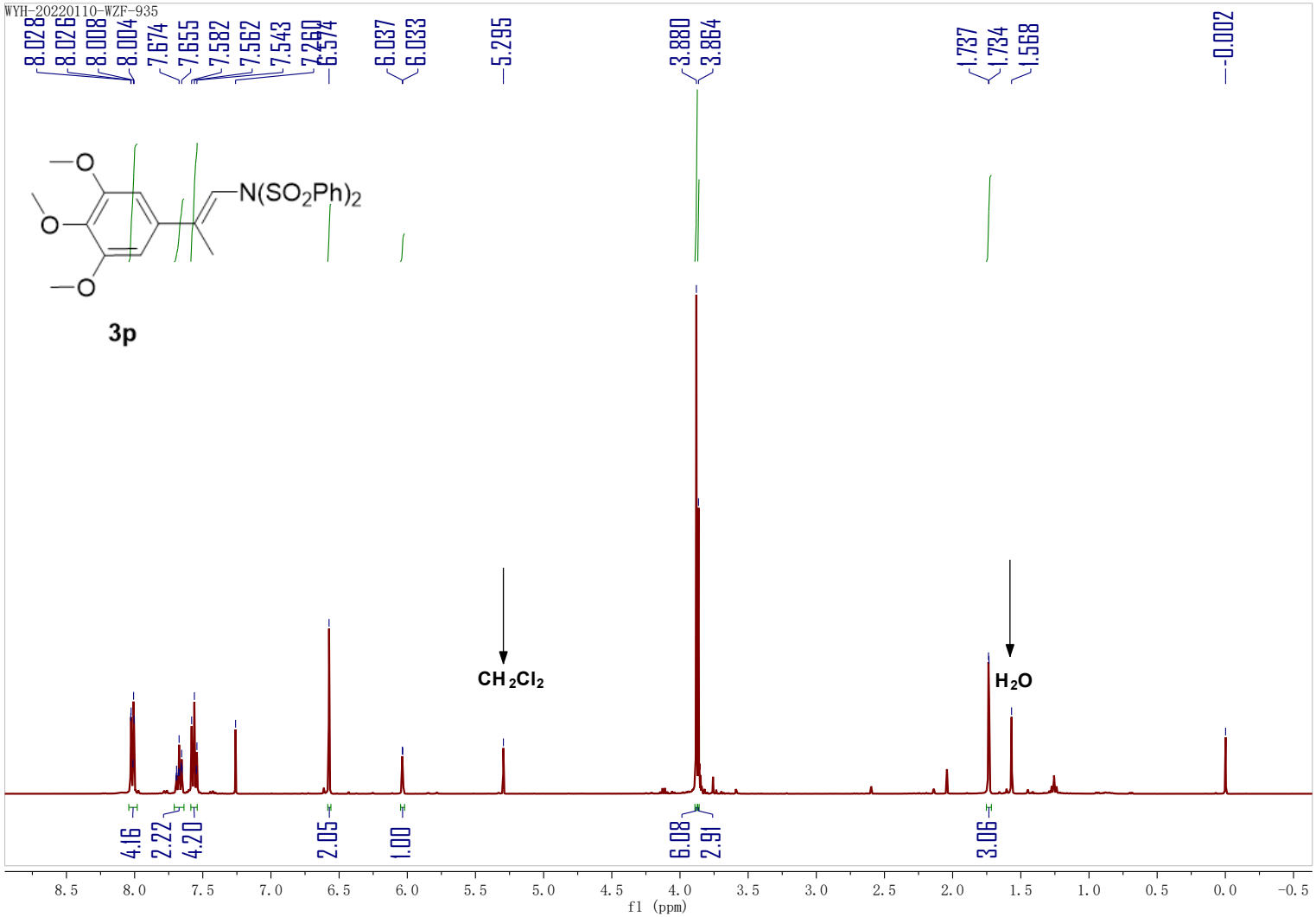

WYH-20211015-WZF-887
157.716
151.984
139.713
134.056
132.331
129.215
129.023
128.390
118.756
117.838
112.782
77.478
77.160
76.843
69.914
22.225
20.094
19.133
N(SO2Ph)2
O
3o
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

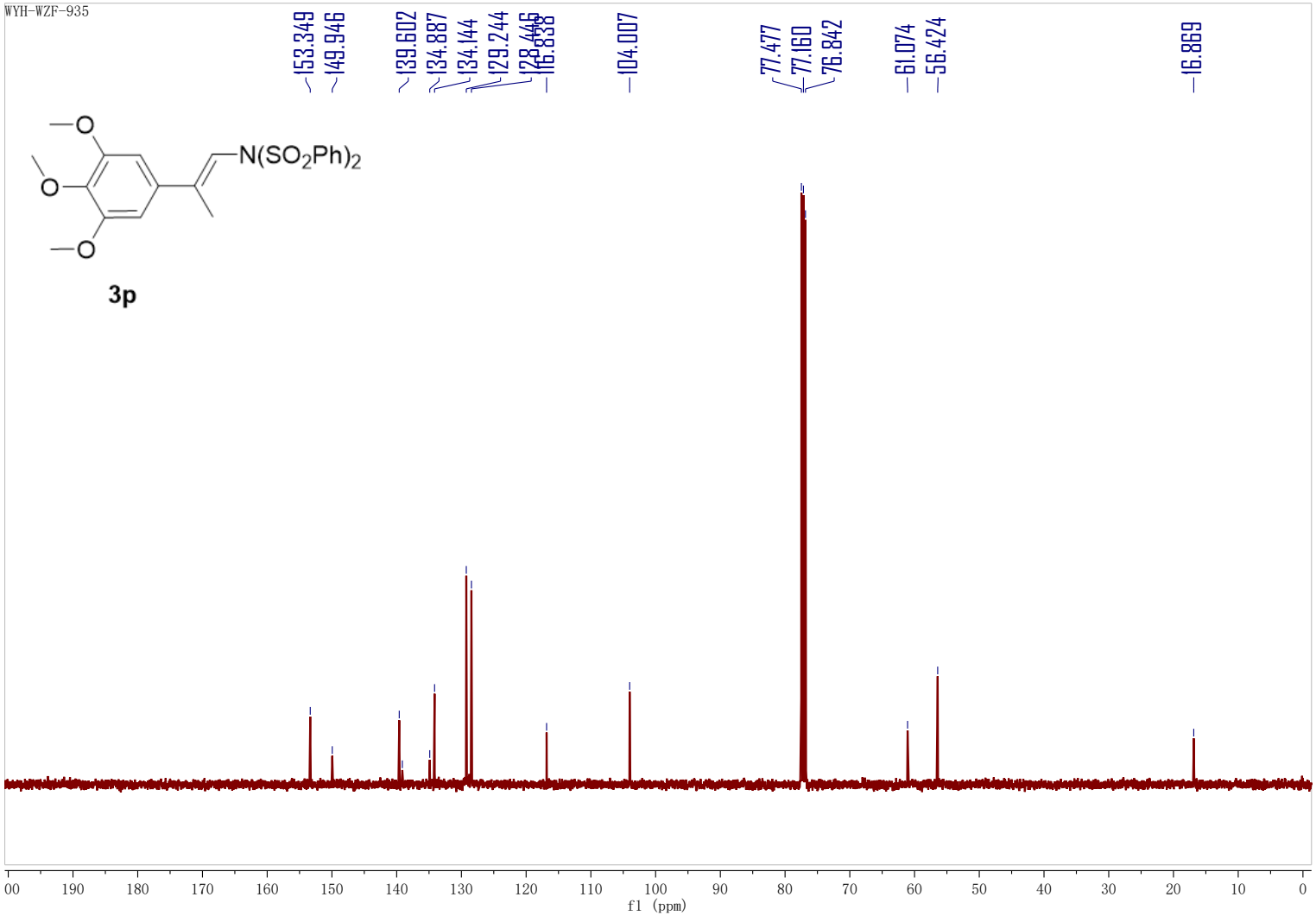

WYH-20211012-WZF-889
7.832
7.829
7.816
7.811
7.808
7.607
7.604
7.601
7.589
7.585
7.581
7.569
7.566
7.564
7.468
7.464
7.447
7.433
7.429
7.260
7.145
7.124
6.728
6.722
6.714
6.700
6.693
5.298
5.063
4.083
4.068
4.053
4.038
3.216
3.199
3.182
1.555
1.199
1.182
1.163
1.148
0.000
O
N(SO2Ph)2
4o
H2O
CH2Cl2
3.93
2.05
4.08
1.03
2.03
2.00
1.02
1.01
5.97
6.09
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
f1 (ppm)

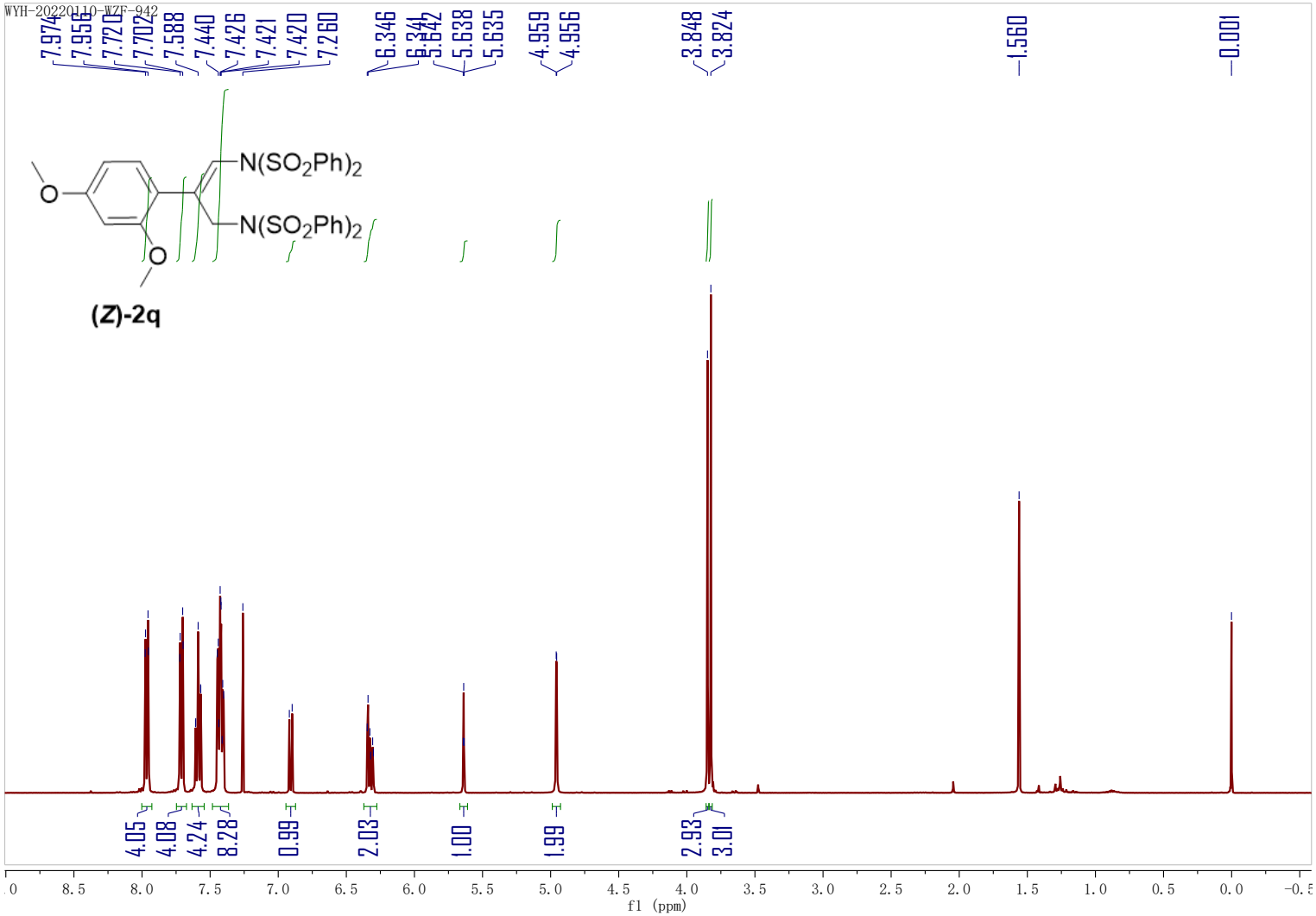

WYH-20211015-WZF-889
155.871
140.177
138.484
133.728
128.917
128.319
126.357
116.354
114.816
77.477
77.160
76.842
69.398
49.388
27.894
23.988
22.056
O
N(SO2Ph)2
4o
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

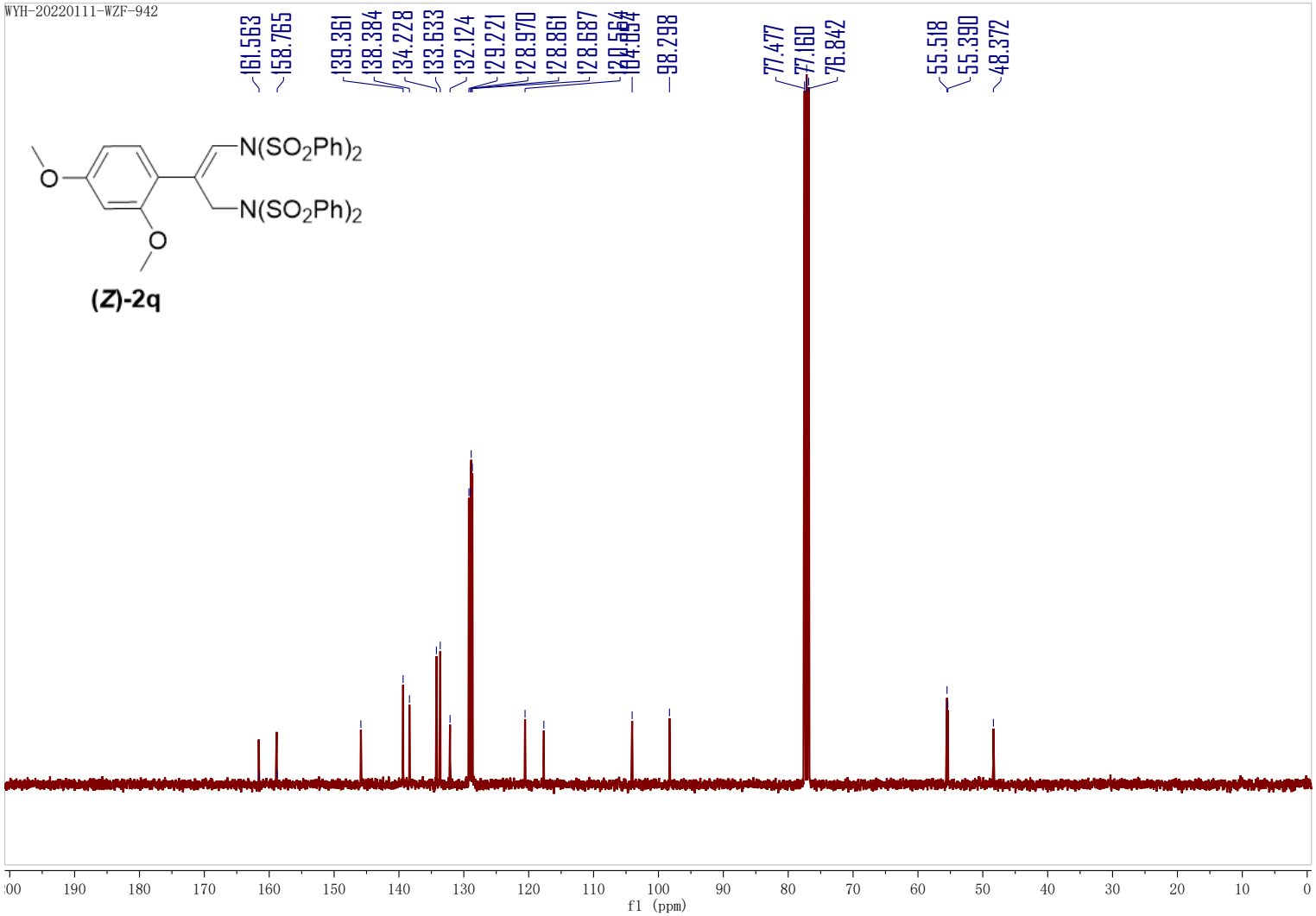

WYH-20220110-WZF-936
8.023
8.001
7.717
7.698
7.573
7.479
7.459
7.432
7.412
6.691
6.620
5.875
5.718
5.293
5.000
4.754
3.894
3.885
3.809
3.700
1.579
0.001
N(SO2Ph)2
N(SO2Ph)2
(E/Z)-2p
CH2Cl2
H2O
5.11
5.22
5.63
11.07
1.89
0.70
0.36
1.00
0.70
1.95
4.00
2.11
5.89
f1 (ppm)

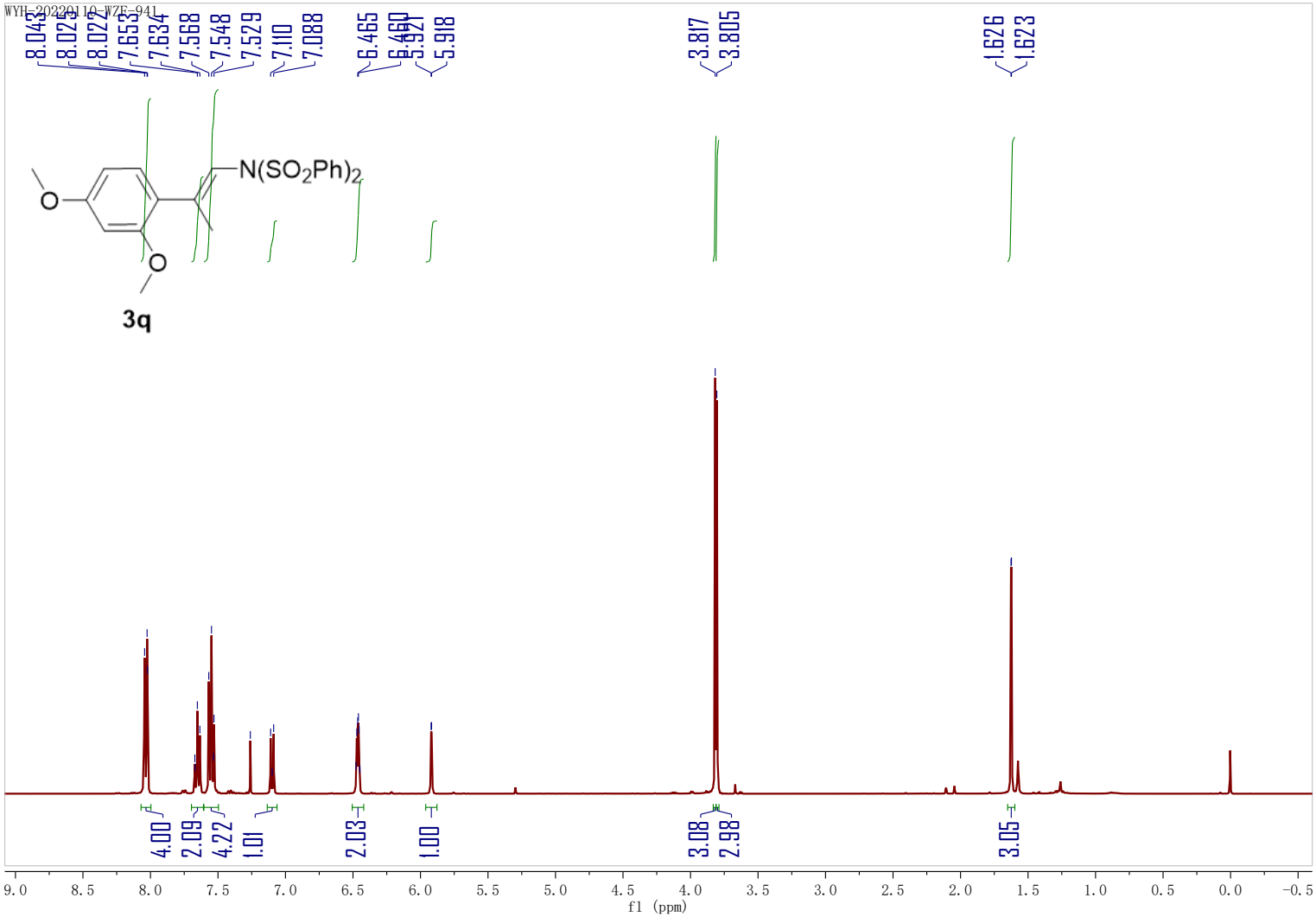

WYH-WZE-936
153.201
145.068
139.125
139.074
138.271
134.425
134.122
134.036
133.948
129.154
129.082
129.049
128.849
128.768
128.608
128.471
128.372
119.734
106.117
105.577
77.478
77.160
76.842
61.022
60.923
56.420
56.296
52.130
48.061
N(SO2Ph)2
N(SO2Ph)2
(E/Z)-2p
f1 (ppm)

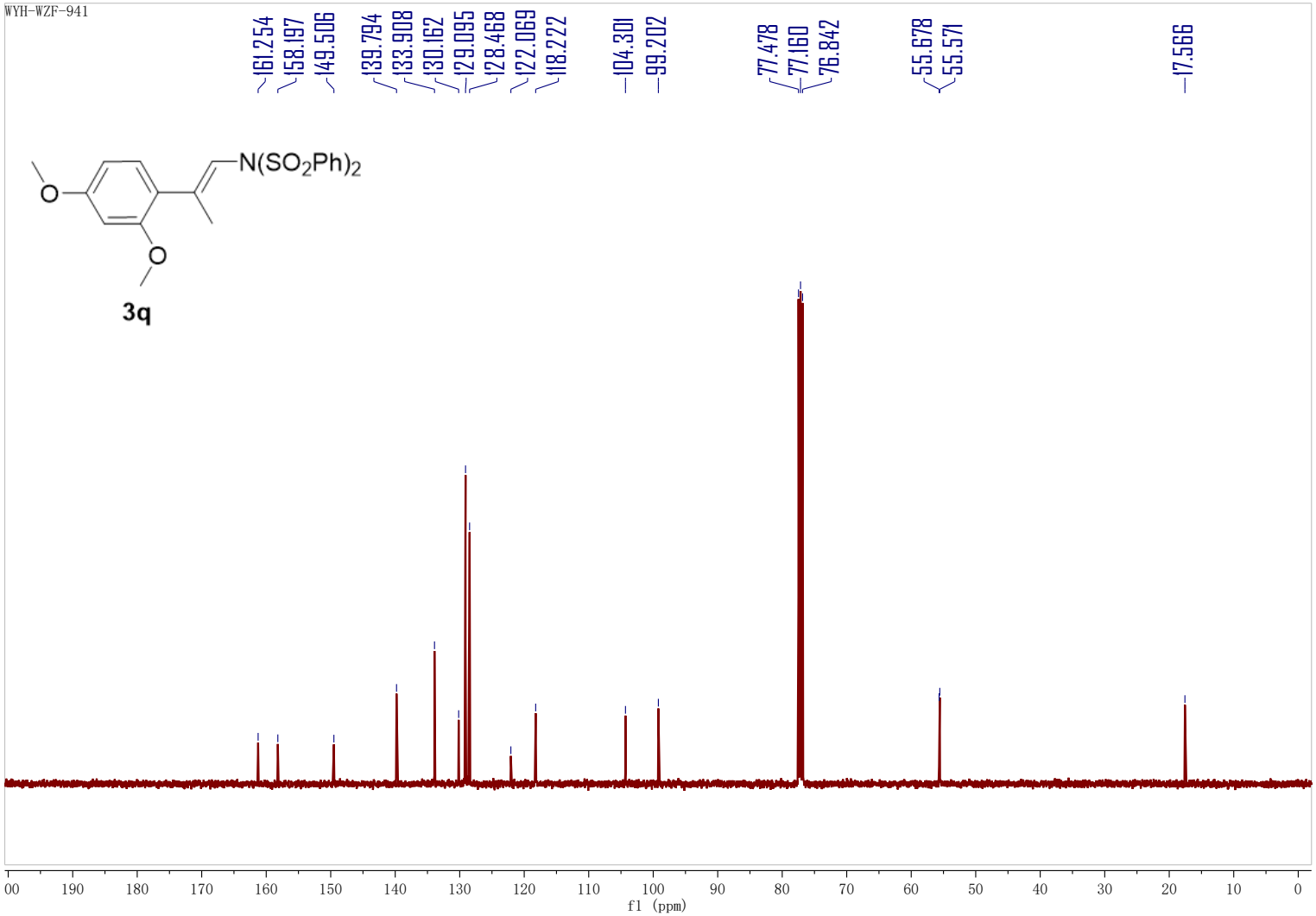

WYH-20220110-WZF-935
8.028
8.026
8.008
8.004
7.674
7.655
7.582
7.562
7.543
7.261
6.574
6.037
6.033
5.295
3.880
3.864
1.737
1.734
1.568
0.002
N(SO2Ph)2
3p
CH2Cl2
H2O
4.16
2.22
4.20
2.05
1.00
6.08
2.91
3.06
f1 (ppm)

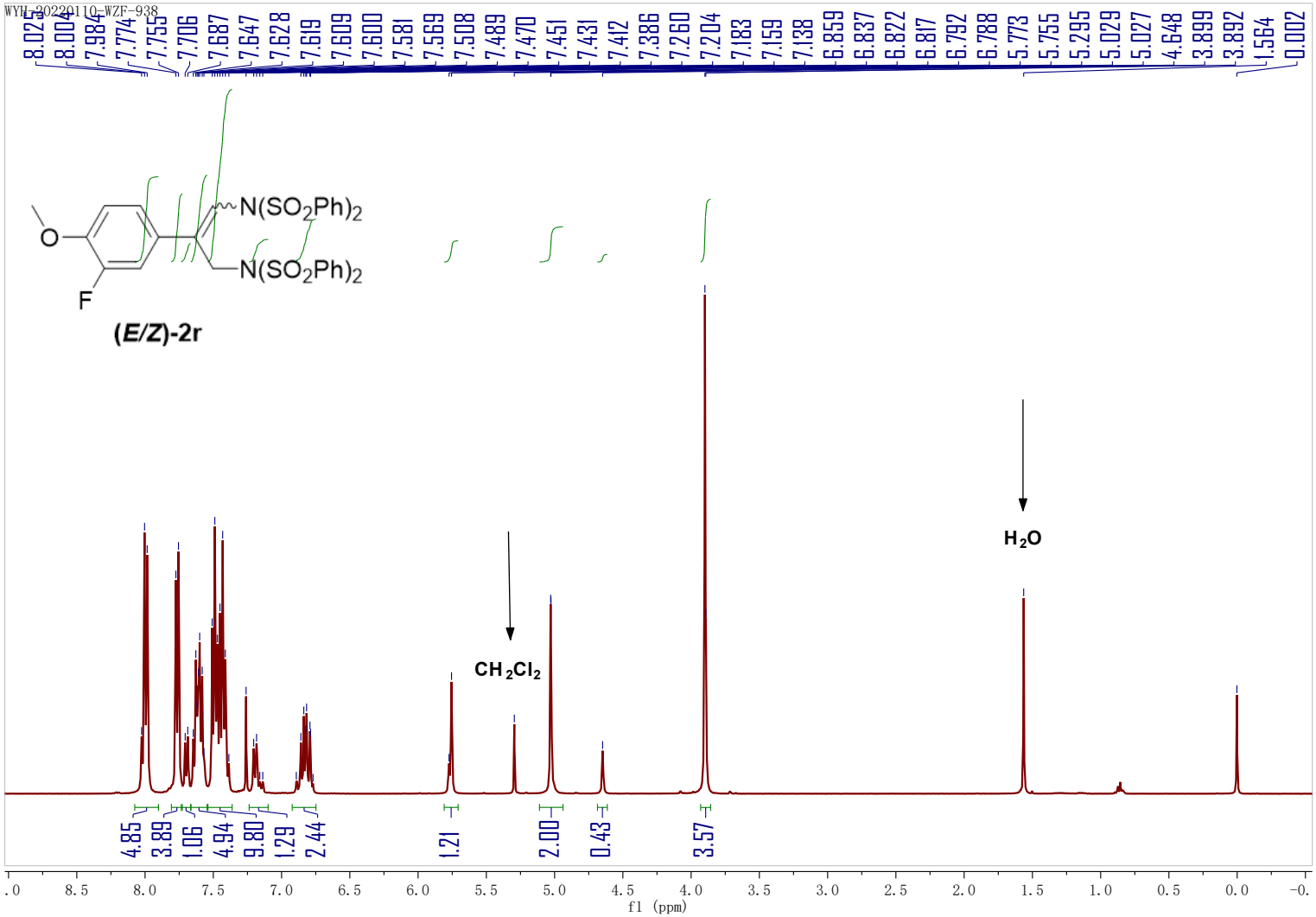

WYH-WZF-935
153.349
149.946
139.602
134.887
134.144
129.244
128.446
116.838
104.007
77.477
77.160
76.842
61.074
56.424
16.869
N(SO2Ph)2
3p
f1 (ppm)

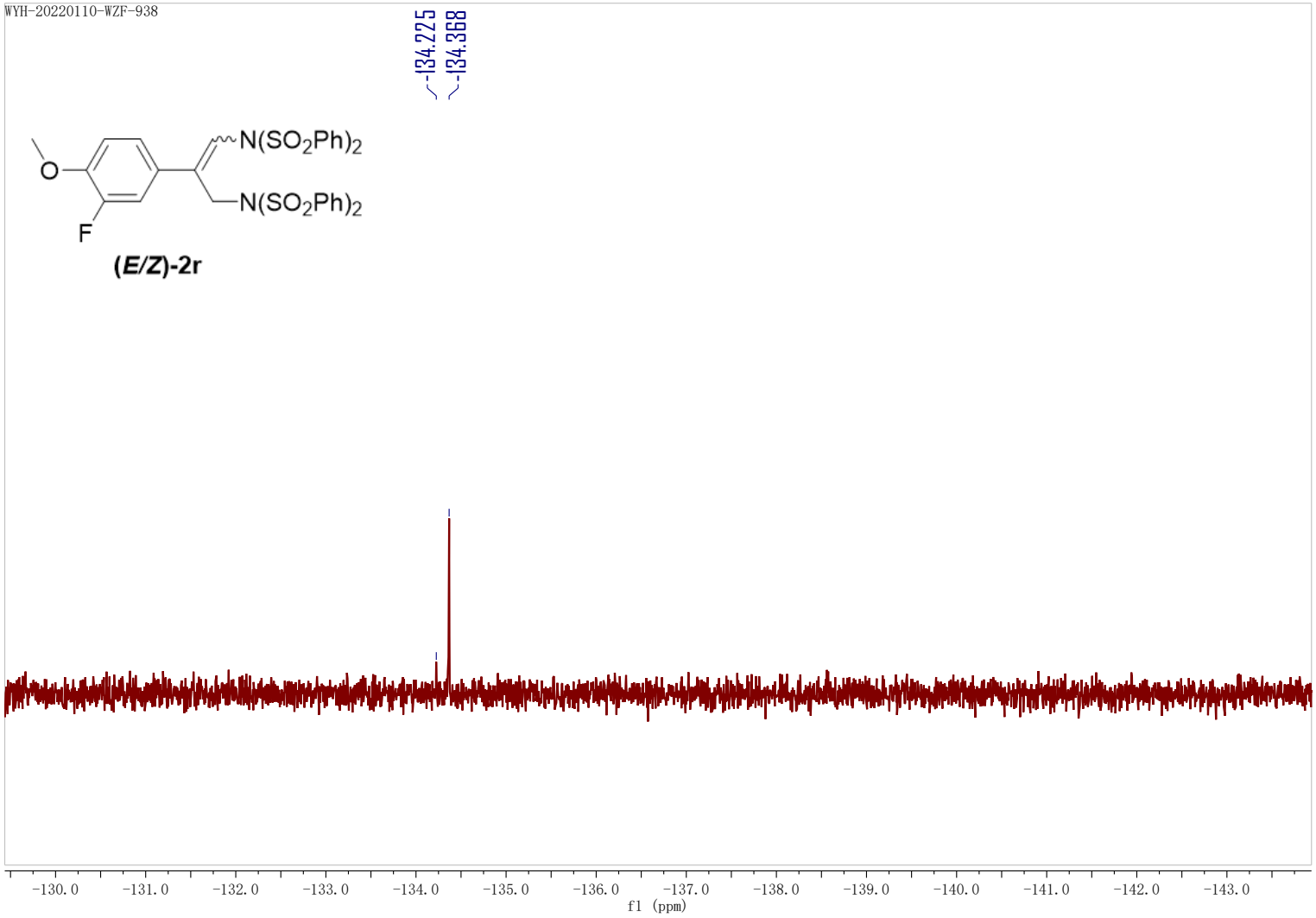

WYH-20220110-WZF-942
7.974
7.956
7.720
7.702
7.588
7.440
7.426
7.421
7.420
7.260
6.346
6.344
5.642
5.638
5.635
4.959
4.956
3.848
3.824
1.560
0.001
N(SO2Ph)2
N(SO2Ph)2
O
O
(Z)-2q
4.05
4.08
4.24
8.28
0.99
2.03
1.00
1.99
2.93
3.01
f1 (ppm)

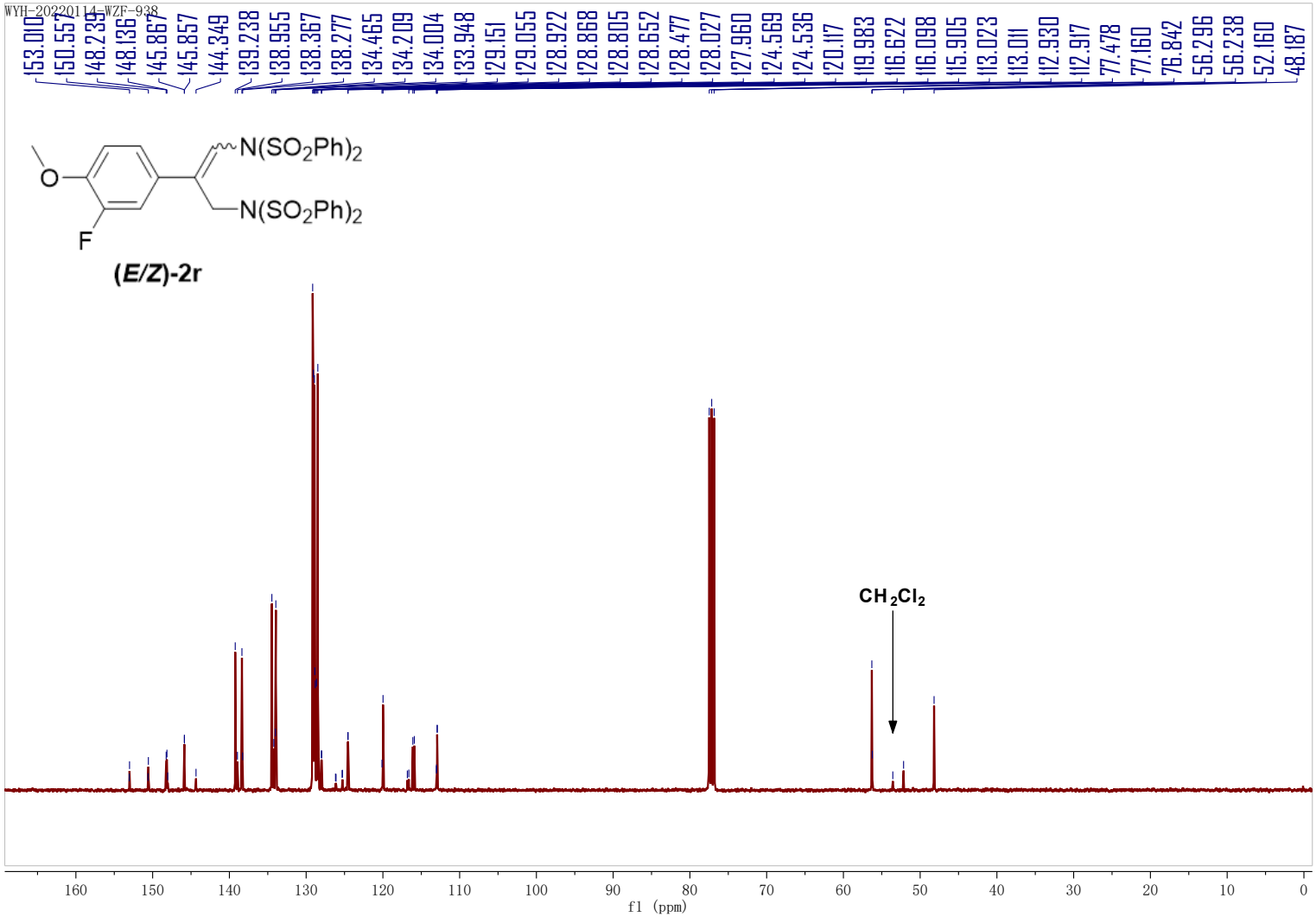

WYH-20220111-WZF-942
161.563
158.765
139.361
138.384
134.228
133.633
132.124
129.221
128.970
128.861
128.687
98.298
77.477
77.160
76.842
55.518
55.390
48.372
N(SO2Ph)2
N(SO2Ph)2
O
O
(Z)-2q
f1 (ppm)

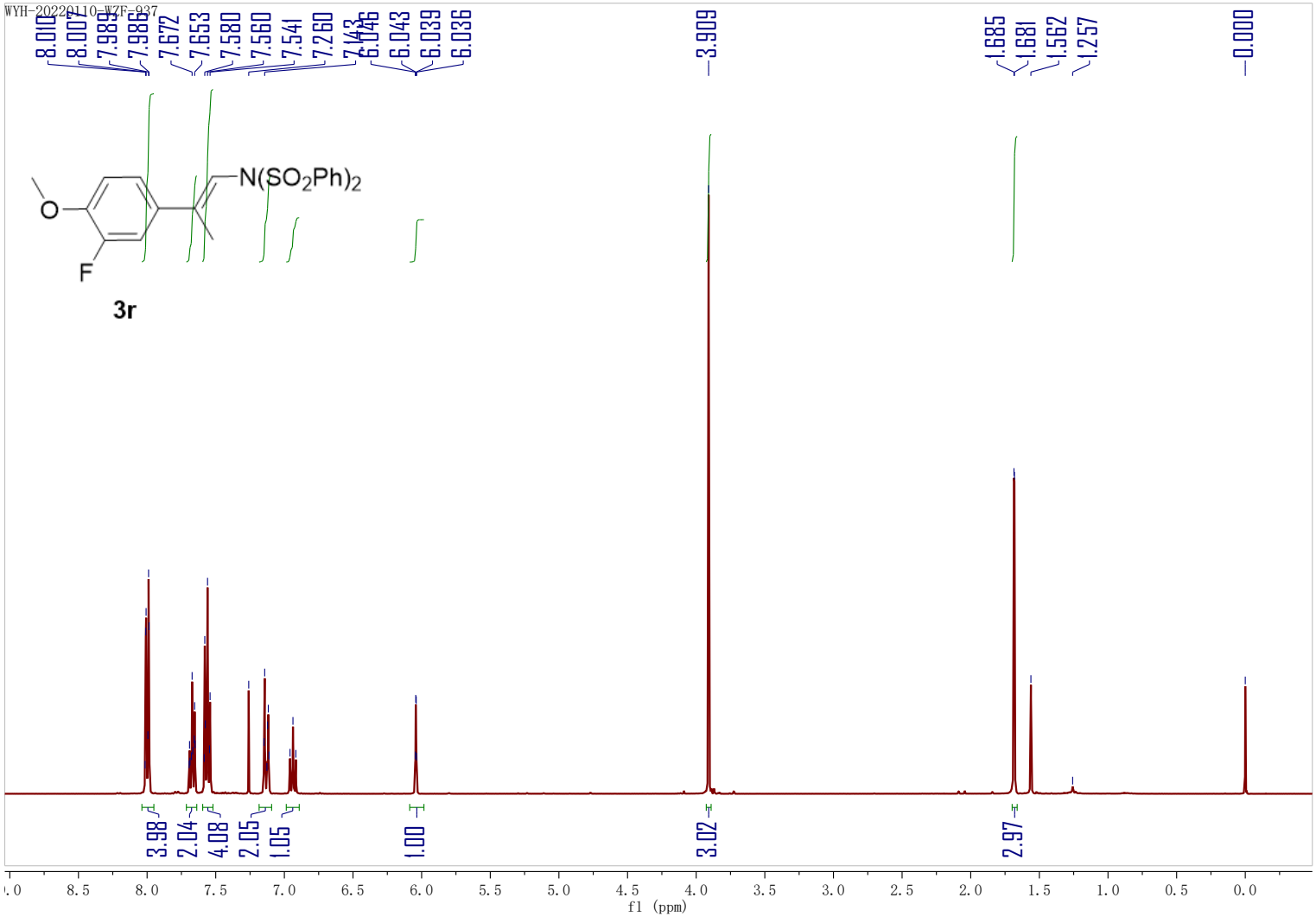

WYH-20220110-WZE-941
8.043
8.023
8.022
7.653
7.634
7.568
7.548
7.529
7.110
7.088
6.465
6.460
6.451
5.921
5.918
3.817
3.805
1.626
1.623
N(SO2Ph)2
O
O
3q
4.00
2.09
4.22
1.01
2.03
1.00
3.08
2.98
3.05
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

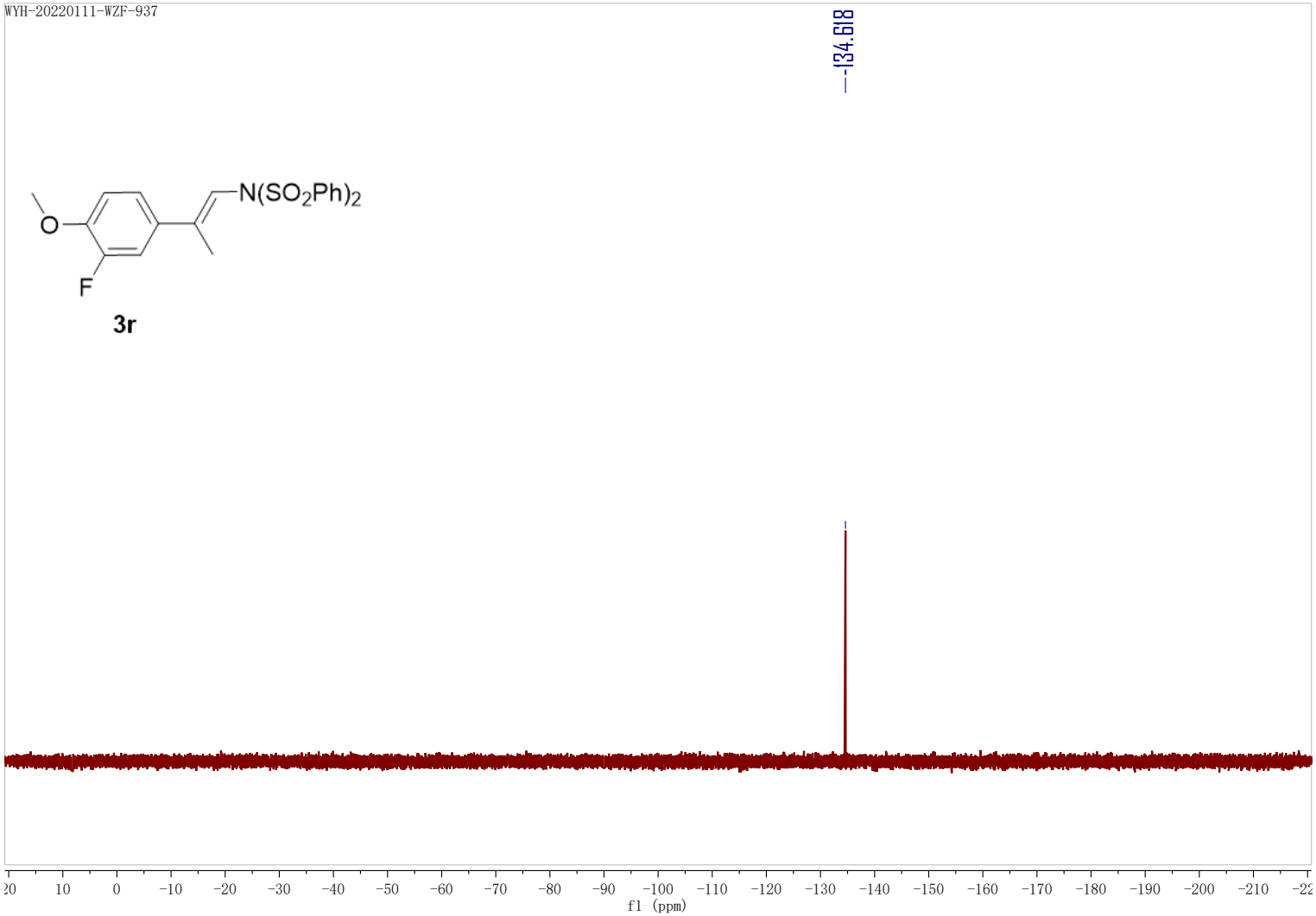

WYH-WZF-941
161.254
158.197
149.506
139.794
133.908
130.162
129.095
128.468
122.069
118.222
104.301
99.202
77.478
77.160
76.842
55.678
55.571
17.566
N(SO2Ph)2
O
O
3q
f1 (ppm)

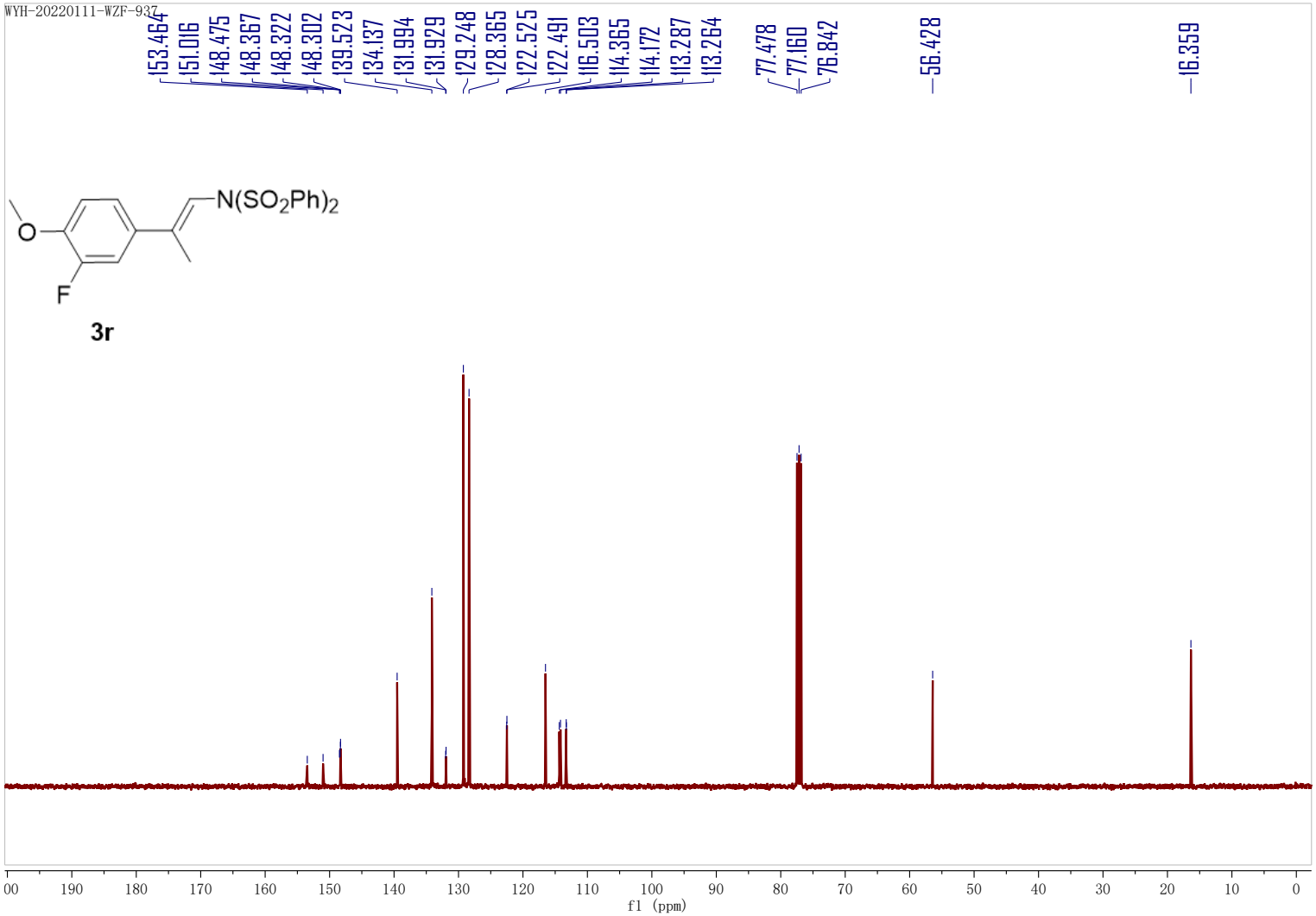

WYH-20220110-WZF-938
8.025
8.004
7.984
7.774
7.755
7.706
7.687
7.647
7.628
7.619
7.609
7.600
7.581
7.569
7.508
7.489
7.470
7.451
7.431
7.412
7.386
7.260
7.204
7.183
7.159
7.138
6.859
6.837
6.822
6.817
6.792
6.788
5.773
5.755
5.295
5.029
5.027
4.648
3.899
3.892
1.564
0.002
N(SO2Ph)2
N(SO2Ph)2
O
F
(E/Z)-2r
CH2Cl2
H2O
4.85
3.89
1.06
4.94
9.80
1.29
2.44
1.21
2.00
0.43
3.57
f1 (ppm)

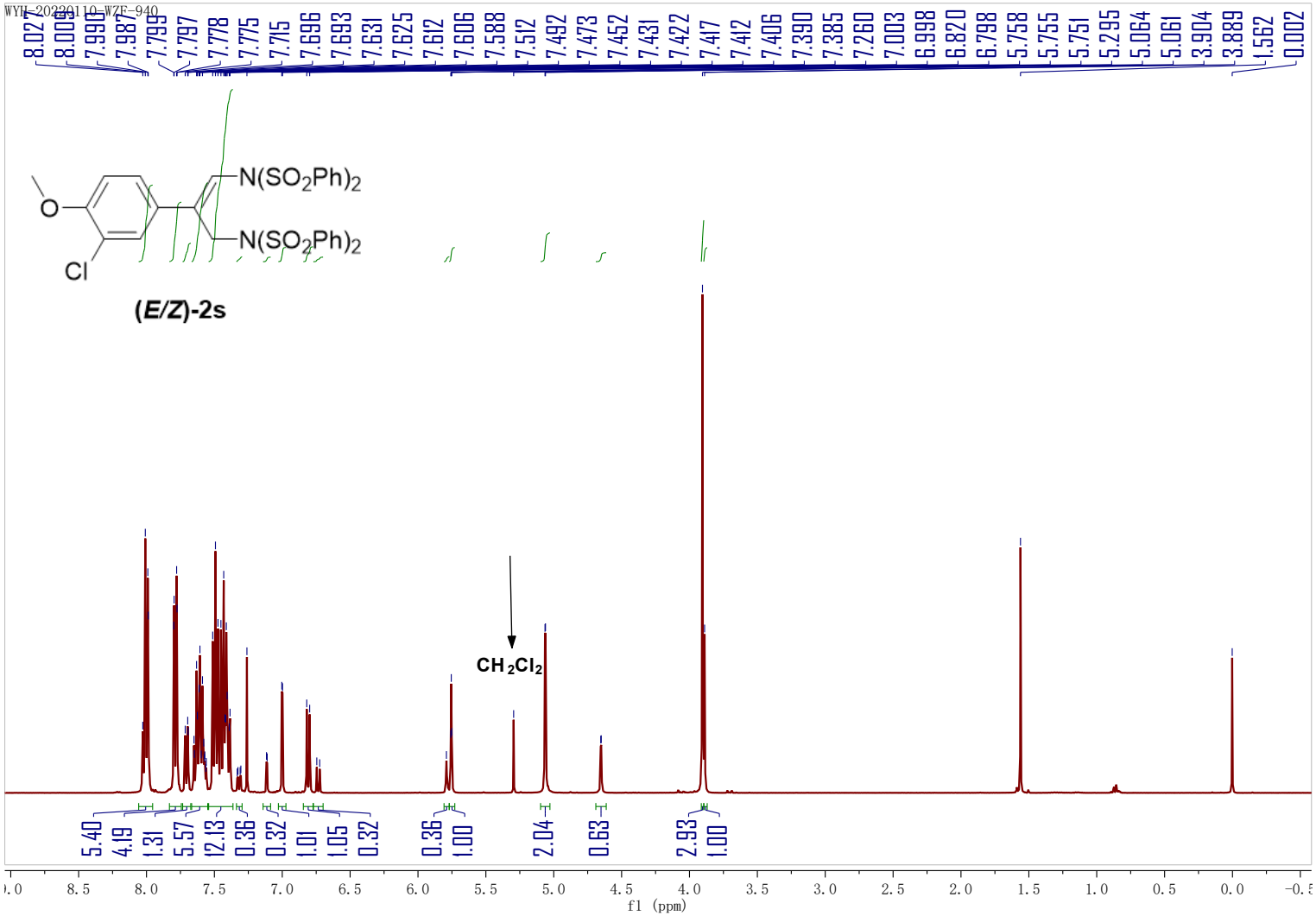

WYH-20220110-WZF-938
-134.225
-134.368
N(SO2Ph)2
N(SO2Ph)2
O
F
(E/Z)-2r
-130.0
-131.0
-132.0
-133.0
-134.0
-135.0
-136.0
-137.0
-138.0
-139.0
-140.0
-141.0
-142.0
-143.0
f1 (ppm)


WYH-20220114-WZF-938
153.010
150.557
148.235
148.136
145.867
145.857
144.349
139.238
138.955
138.367
138.277
134.465
134.209
134.004
133.948
129.151
129.055
128.922
128.868
128.805
128.652
128.477
128.027
127.960
124.569
124.536
120.117
119.983
116.622
116.098
115.905
113.023
113.011
112.930
112.917
77.478
77.160
76.842
56.296
56.238
52.160
48.187
N(SO2Ph)2
N(SO2Ph)2
O
F
(E/Z)-2r
CH2Cl2
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


WYH-20220110-WZF-937
8.010
8.007
7.989
7.986
7.672
7.653
7.580
7.560
7.541
7.260
7.143
6.046
6.043
6.039
6.036
3.909
1.685
1.681
1.562
1.257
0.000
N(SO2Ph)2
O
F
3r
3.98
2.04
4.08
2.05
1.05
1.00
3.02
2.97
f1 (ppm)


WYH-20220111-WZF-937
-134.618
N(SO2Ph)2
O
F
3r
20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -22
f1 (ppm)


WYH-20220111-WZF-937
153.464
151.016
148.475
148.367
148.322
148.302
139.523
134.137
131.994
131.929
129.248
128.365
122.525
122.491
116.503
114.365
114.172
113.287
113.264
77.478
77.160
76.842
56.428
16.359
N(SO2Ph)2
O
F
3r
f1 (ppm)


WYH-20220110-WZF-940
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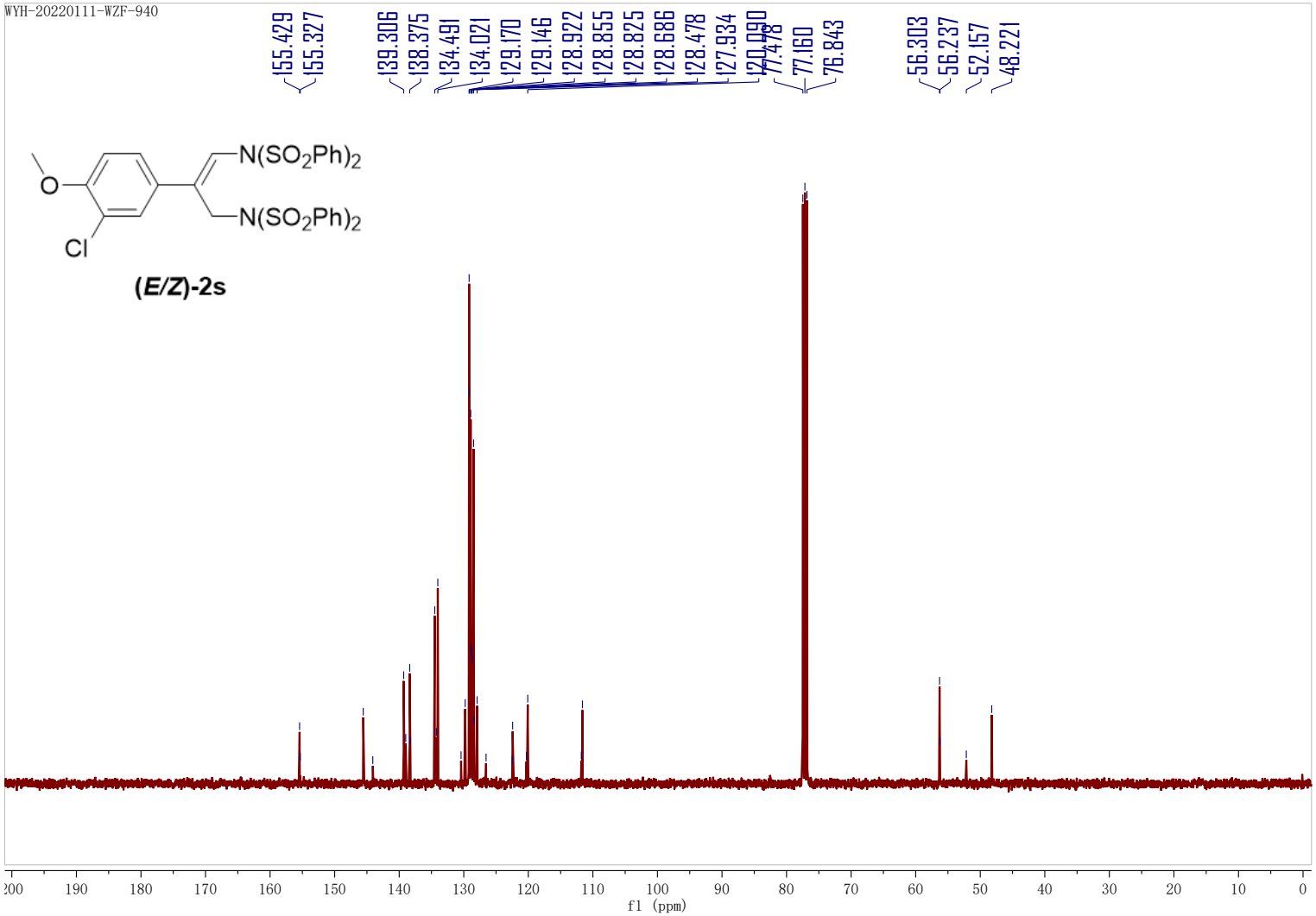
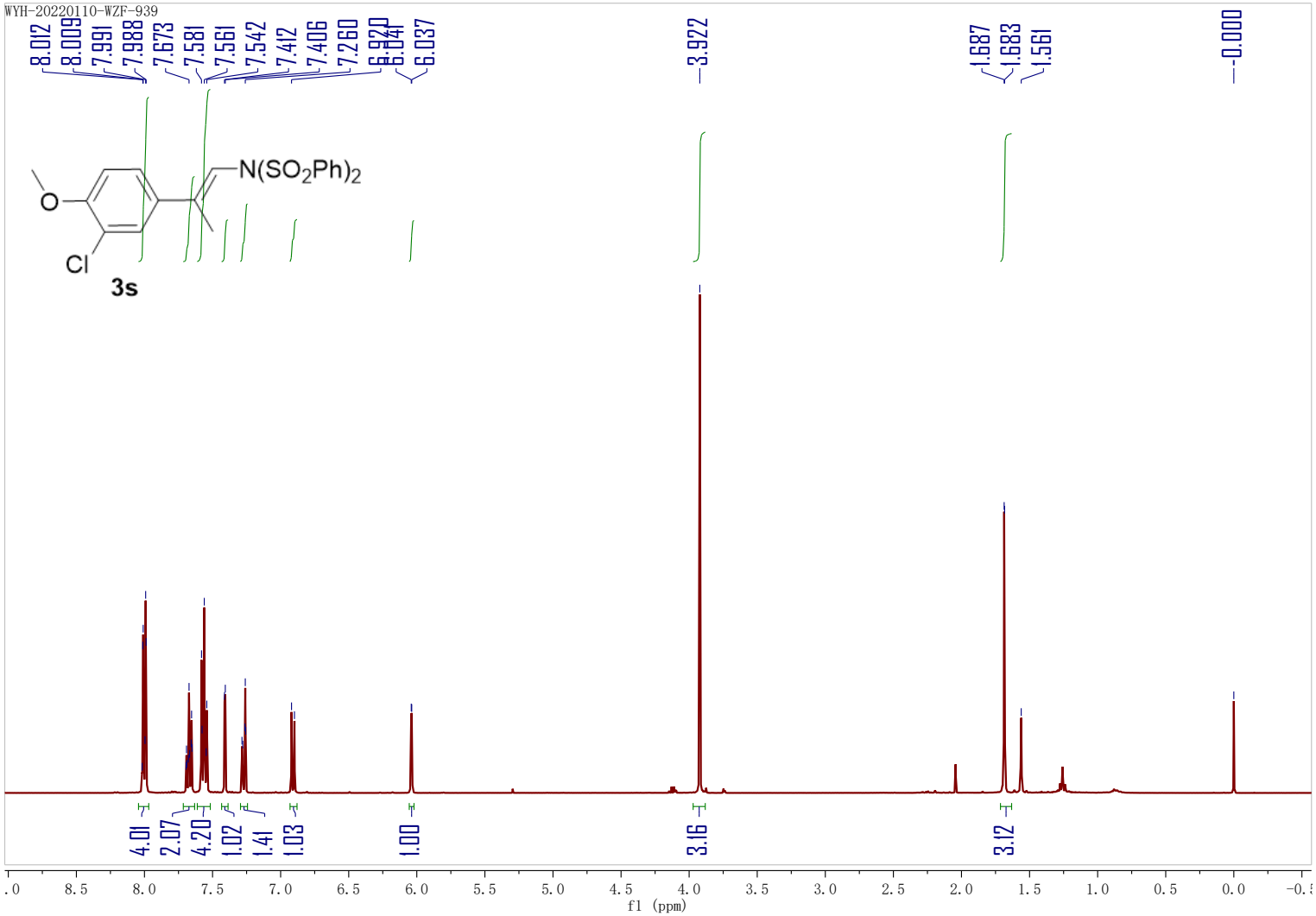
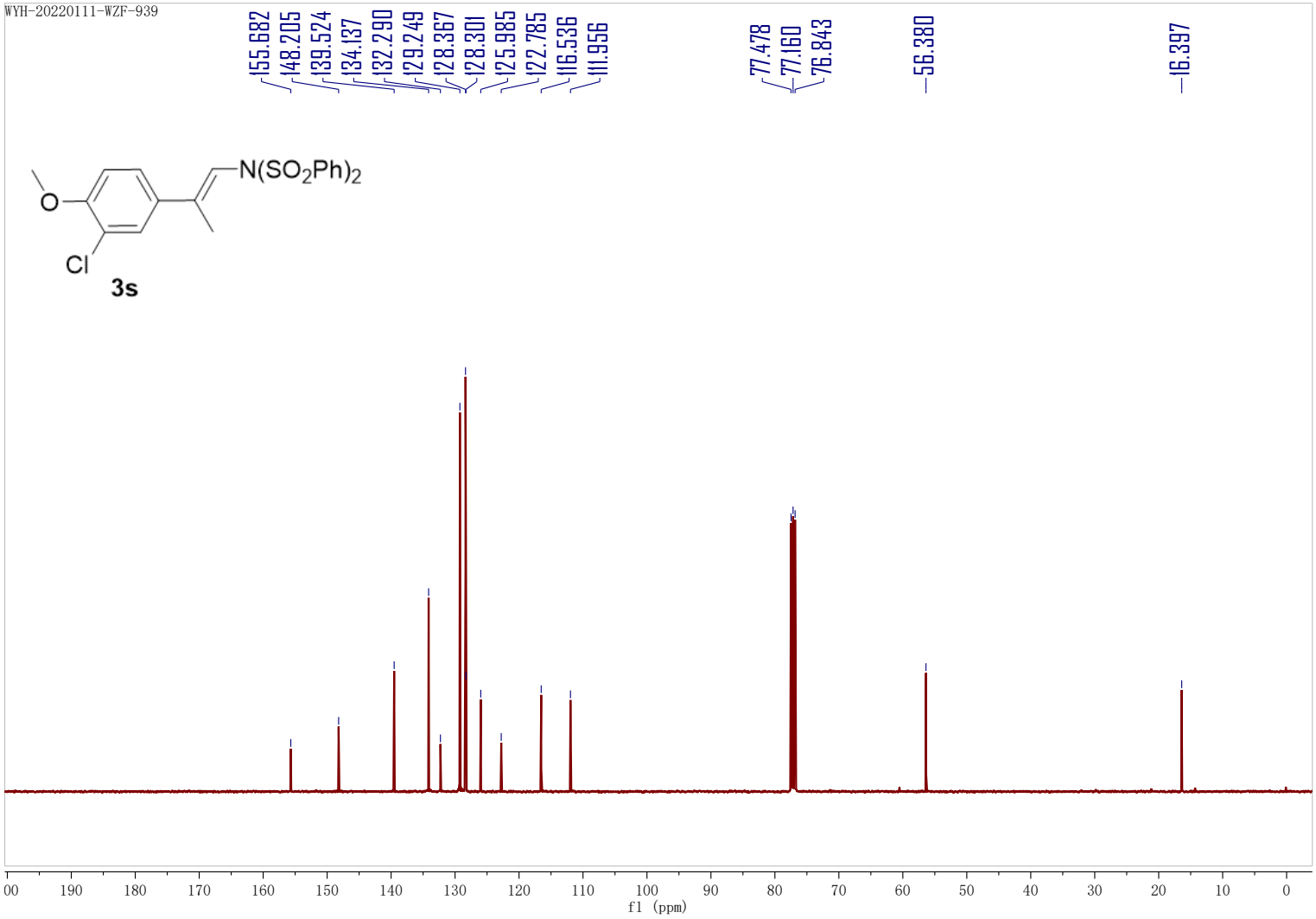
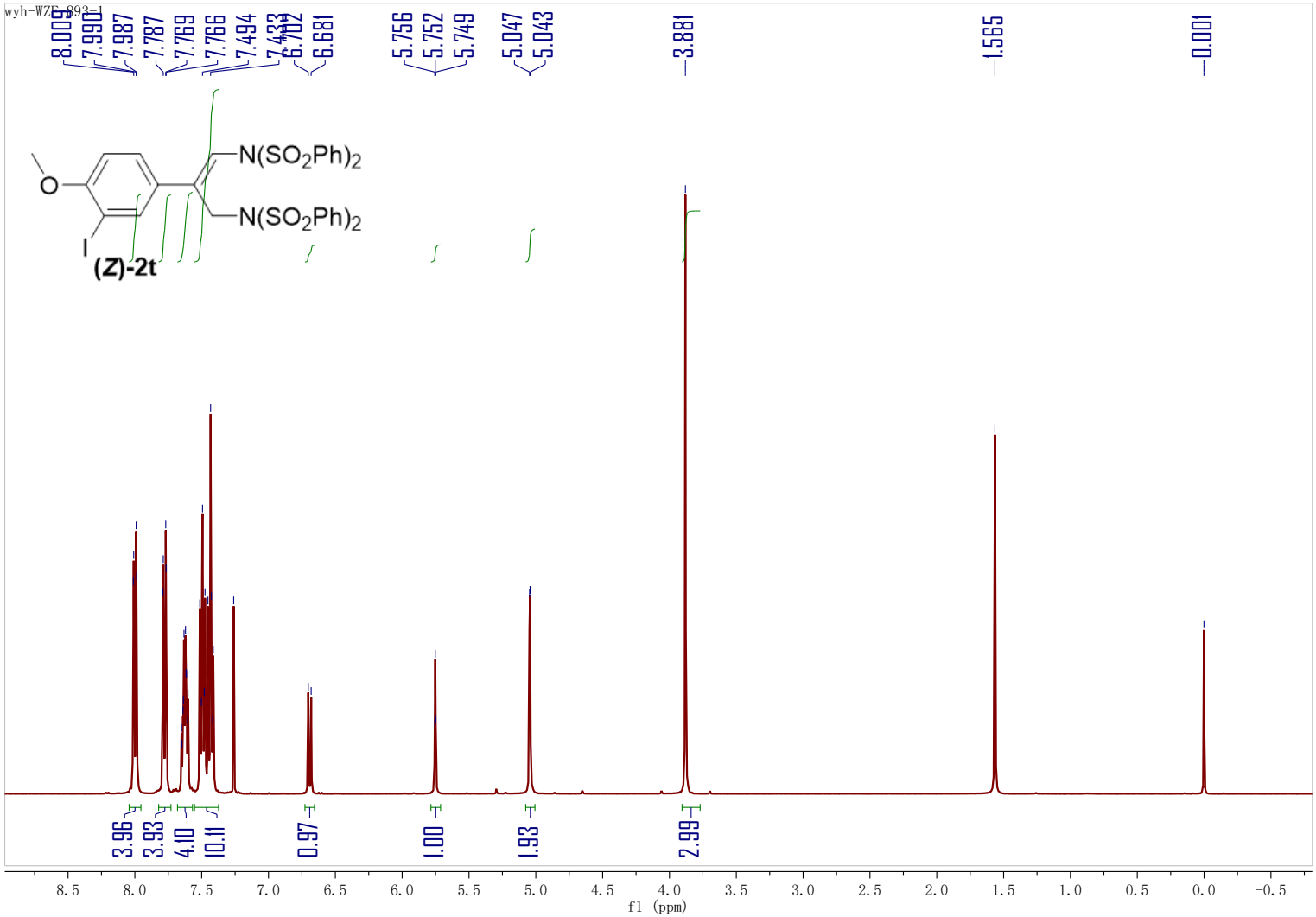
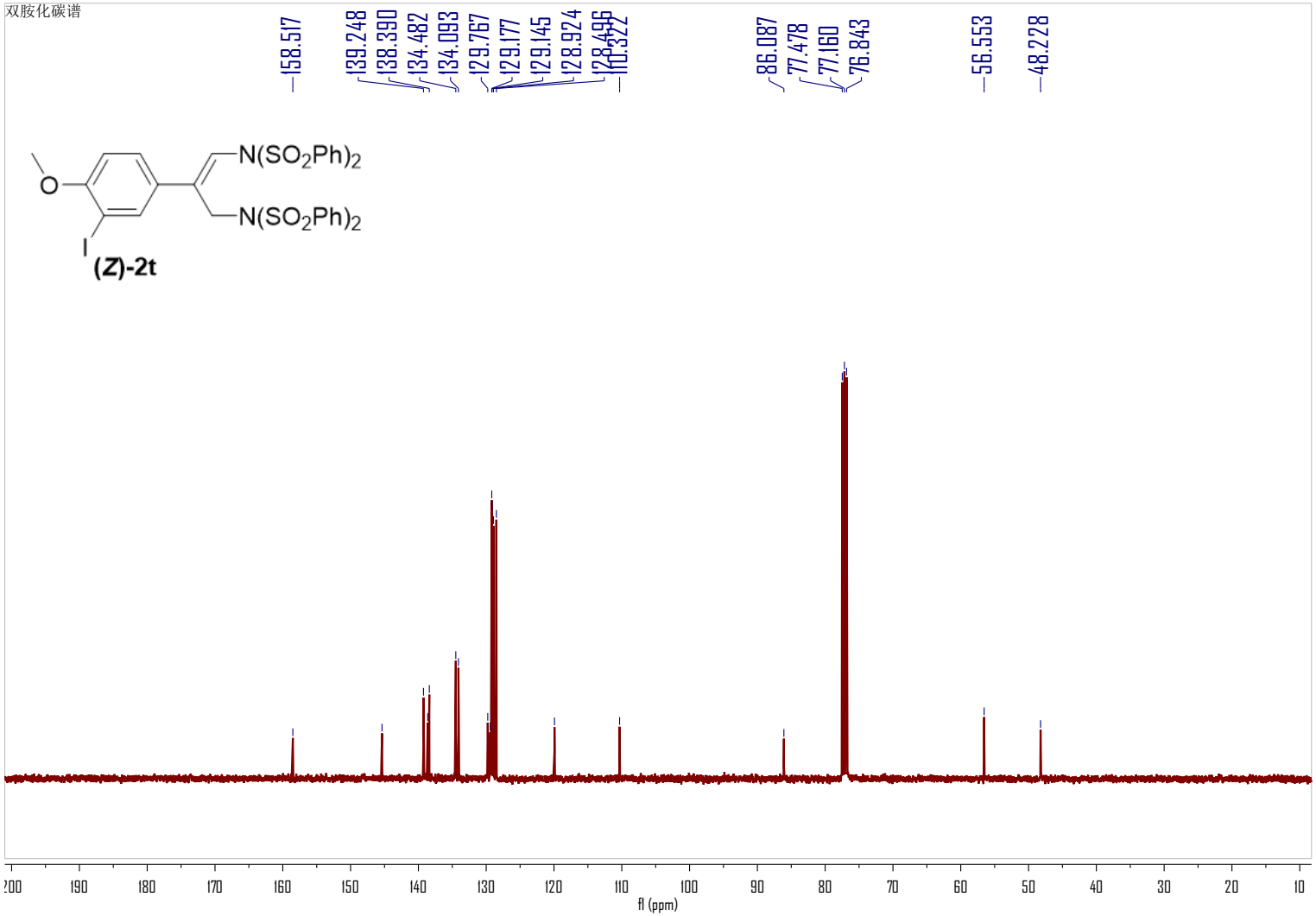
8.005
7.990
7.987
7.799
7.797
7.778
7.775
7.715
7.696
7.693
7.631
7.625
7.612
7.606
7.588
7.512
7.492
7.473
7.452
7.431
7.422
7.417
7.412
7.406
7.390
7.385
7.260
7.003
6.998
6.820
6.798
5.758
5.755
5.751
5.295
5.064
5.061
3.904
3.889
1.562
0.002
N(SO2Ph)2
N(SO2Ph)2
O
Cl
(E/Z)-2s
CH2Cl2
5.40
4.19
1.31
5.57
12.13
0.36
0.32
1.01
1.05
0.32
0.36
1.00
2.04
0.63
2.93
1.00
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
f1 (ppm)

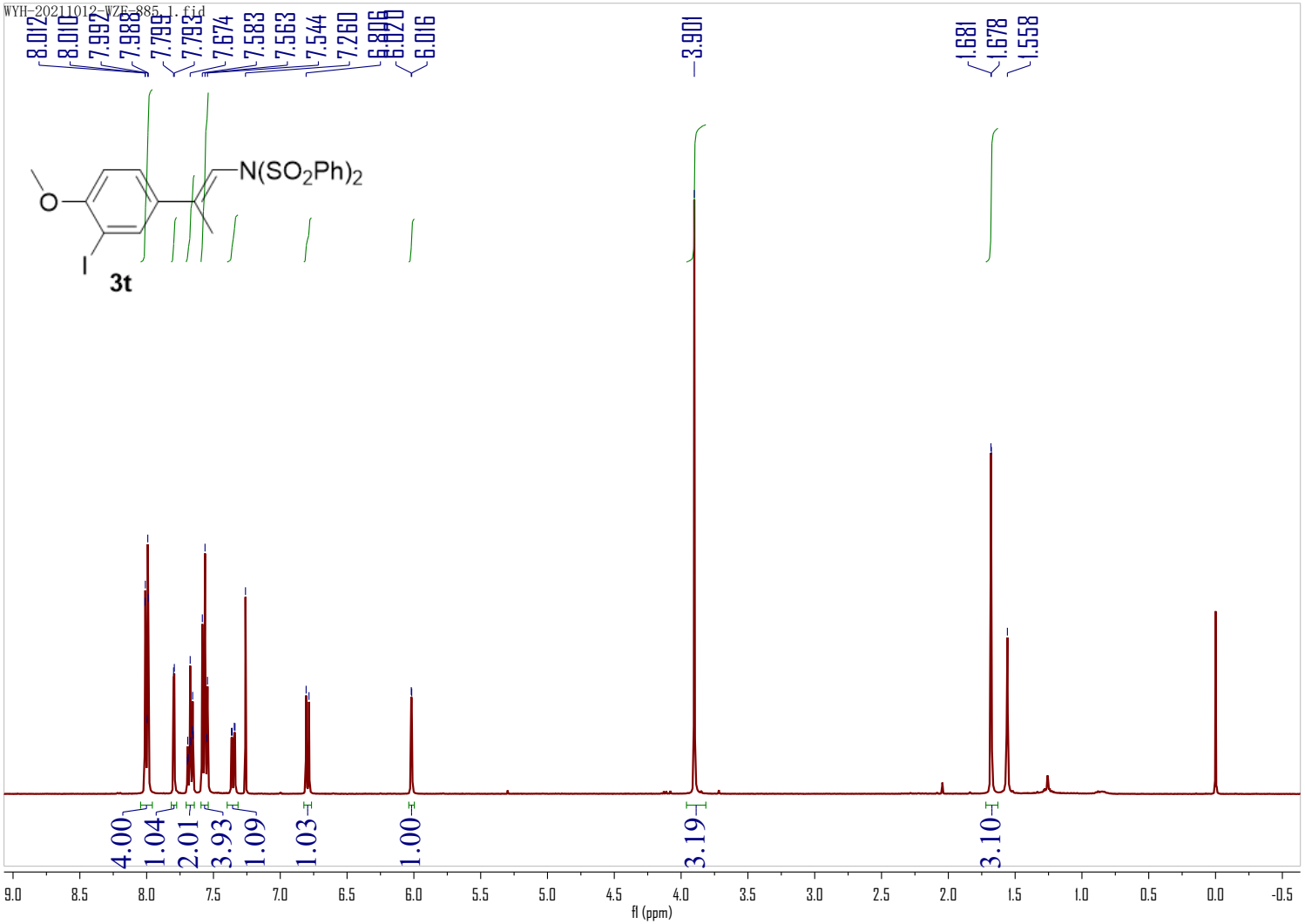

WYH-20220111-WZF-940
155.429
155.327
139.306
138.375
134.491
134.021
129.170
129.146
128.922
128.855
128.825
128.686
128.478
127.934
120.090
77.478
77.160
76.843
56.303
56.237
52.157
48.221
N(SO2Ph)2
N(SO2Ph)2
O
Cl
(E/Z)-2s
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

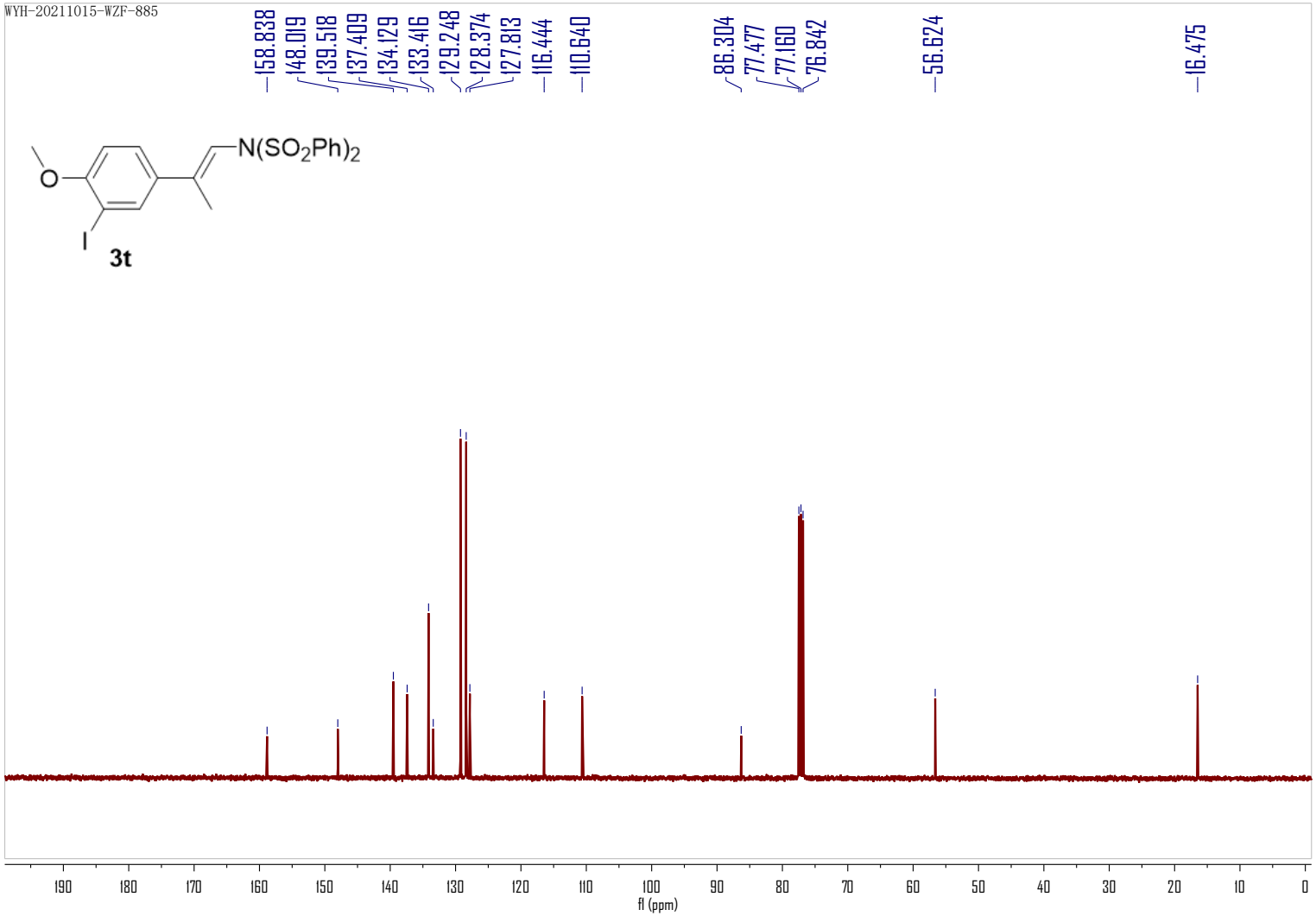

WYH-20220110-WZF-939
8.012
8.009
7.991
7.988
7.673
7.581
7.561
7.542
7.412
7.406
7.260
6.922
6.041
6.037
3.922
1.687
1.683
1.561
0.000
N(SO2Ph)2
O
Cl
3s
4.01
2.07
4.20
1.02
1.41
1.03
1.00
3.16
3.12
f1 (ppm)


WYH-20220111-WZF-939
155.682
148.205
139.524
134.137
132.290
129.249
128.367
128.301
125.985
122.785
116.536
111.956
77.478
77.160
76.843
56.380
16.397
N(SO2Ph)2
O
Cl
3s
f1 (ppm)


wyh-WZF-893-1
8.009
7.990
7.987
7.787
7.769
7.766
7.494
7.433
6.702
6.681
5.756
5.752
5.749
5.047
5.043
3.881
1.565
0.001
N(SO2Ph)2
N(SO2Ph)2
O
I
(Z)-2t
3.96
3.93
4.10
10.11
0.97
1.00
1.93
2.99
f1 (ppm)


双胺化碳谱
158.517
139.248
138.390
134.482
134.093
129.767
129.177
129.145
128.924
128.496
110.322
86.087
77.478
77.160
76.843
56.553
48.228
N(SO2Ph)2
N(SO2Ph)2
O
I
(Z)-2t
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)


WYH-20211012-WZE-885_1.fid
8.012
8.010
7.992
7.988
7.795
7.793
7.674
7.583
7.563
7.544
7.260
6.806
6.020
6.016
3.901
1.681
1.678
1.558
N(SO2Ph)2
O
I
3t
4.00
1.04
2.01
3.93
1.09
1.03
1.00
3.19
3.10
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
f1 (ppm)


WYH-20211015-WZF-885
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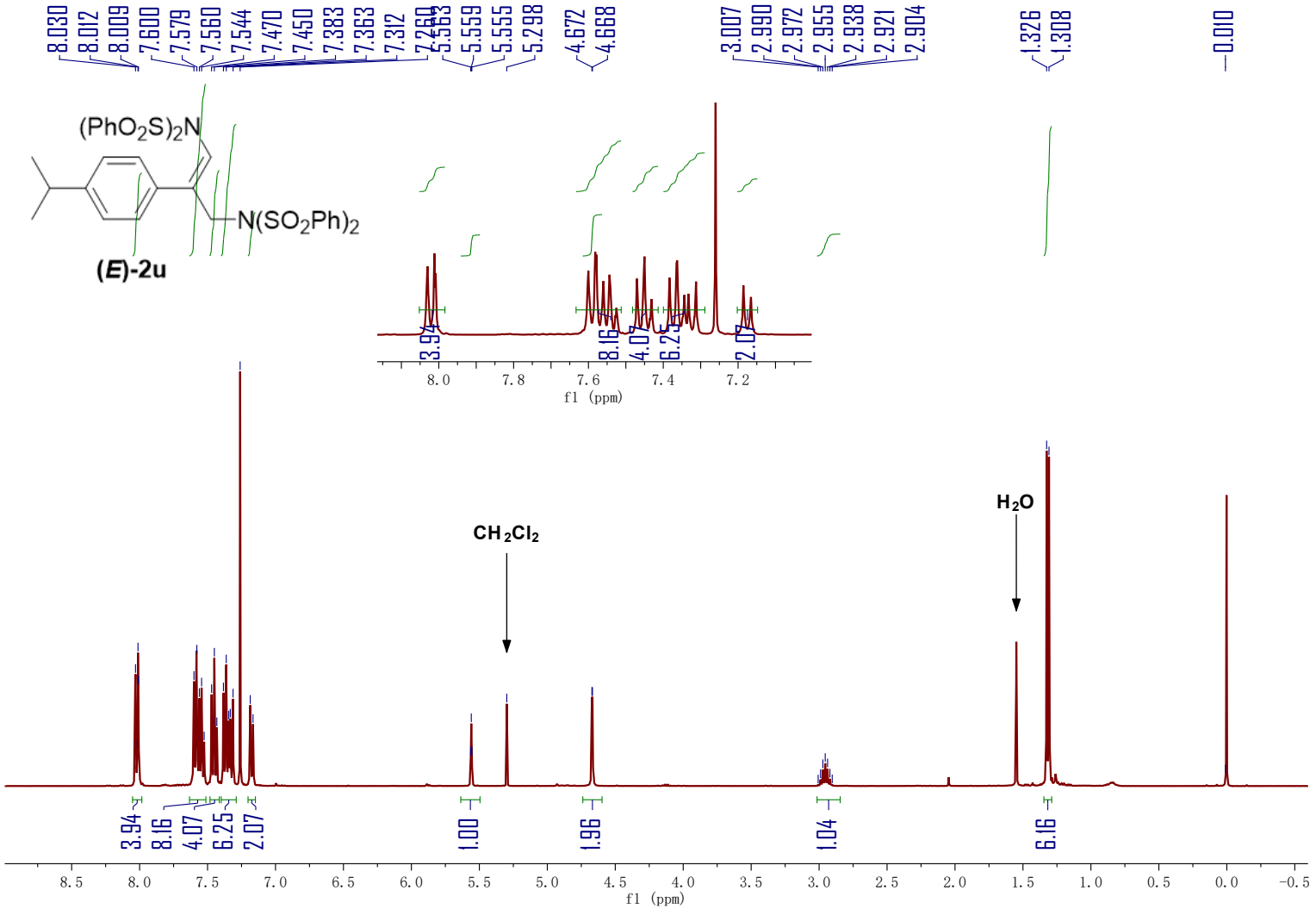
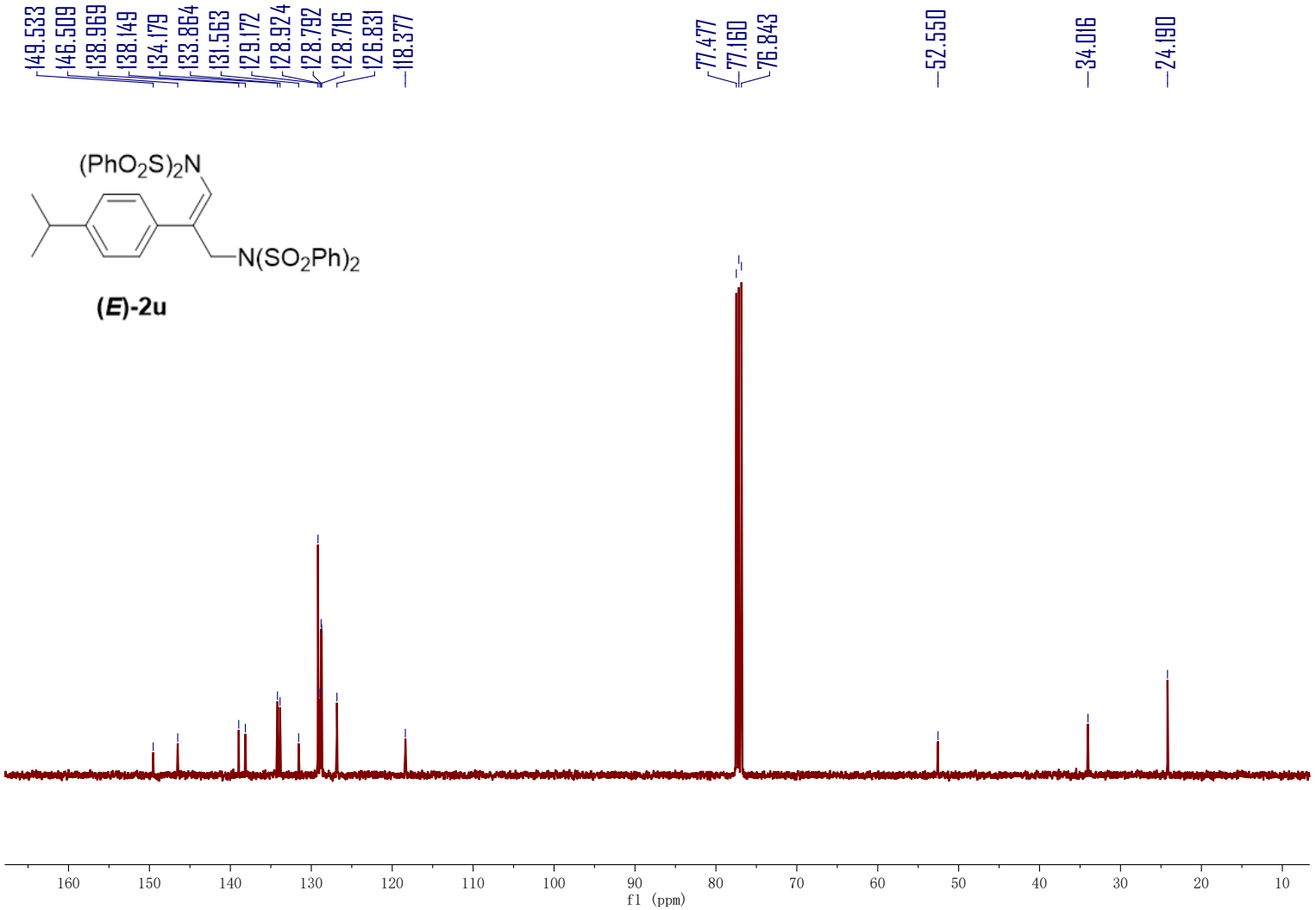
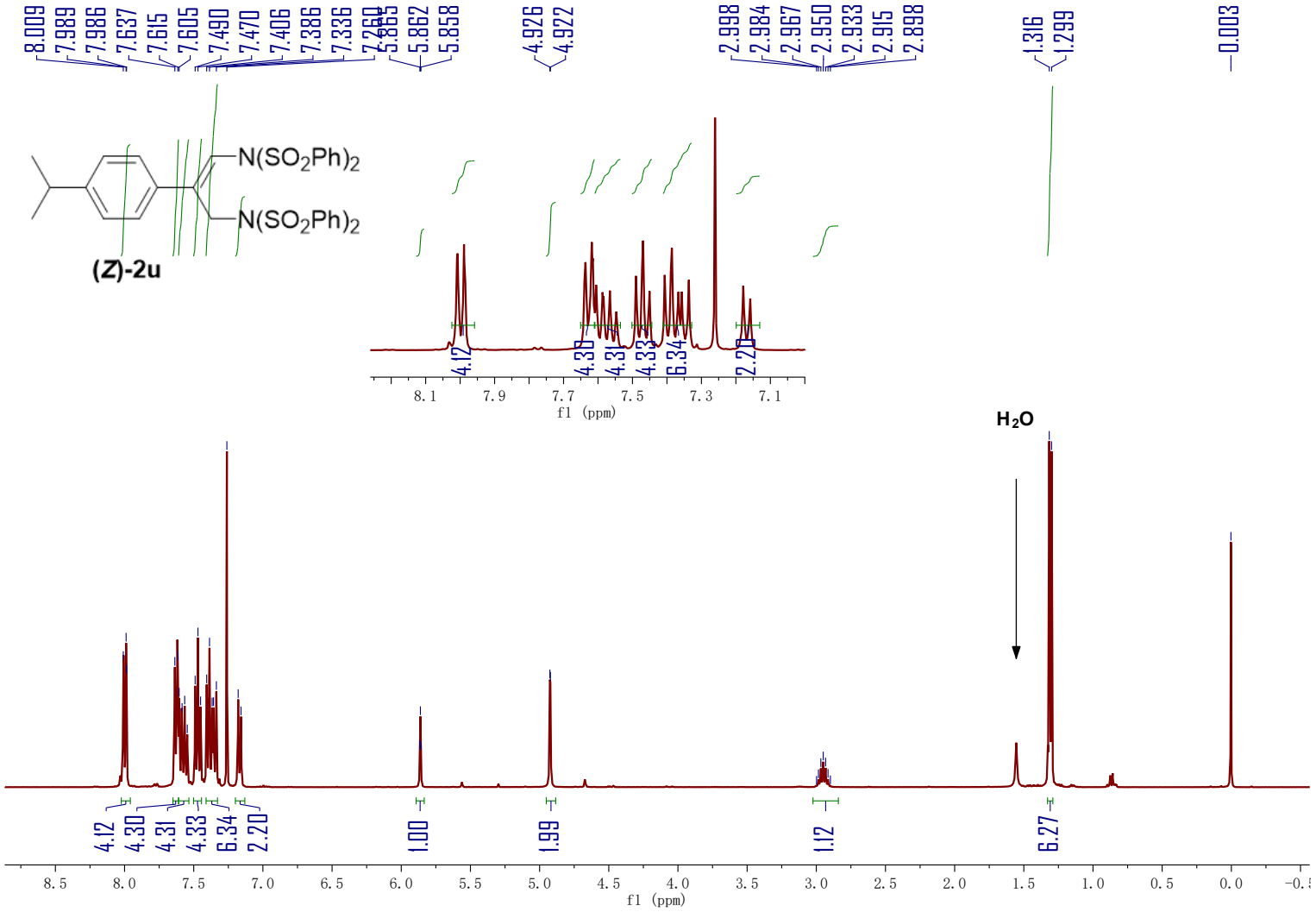
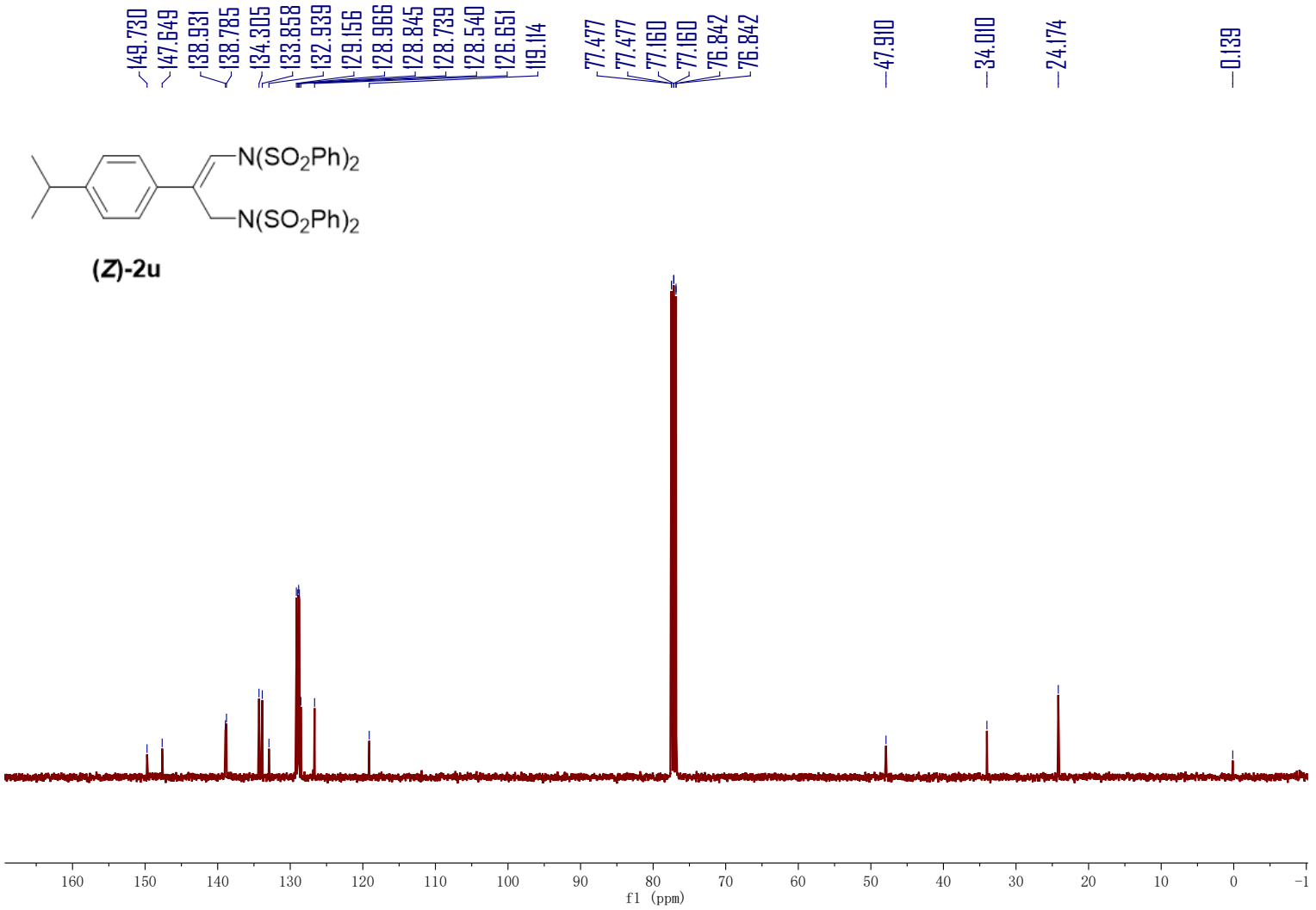
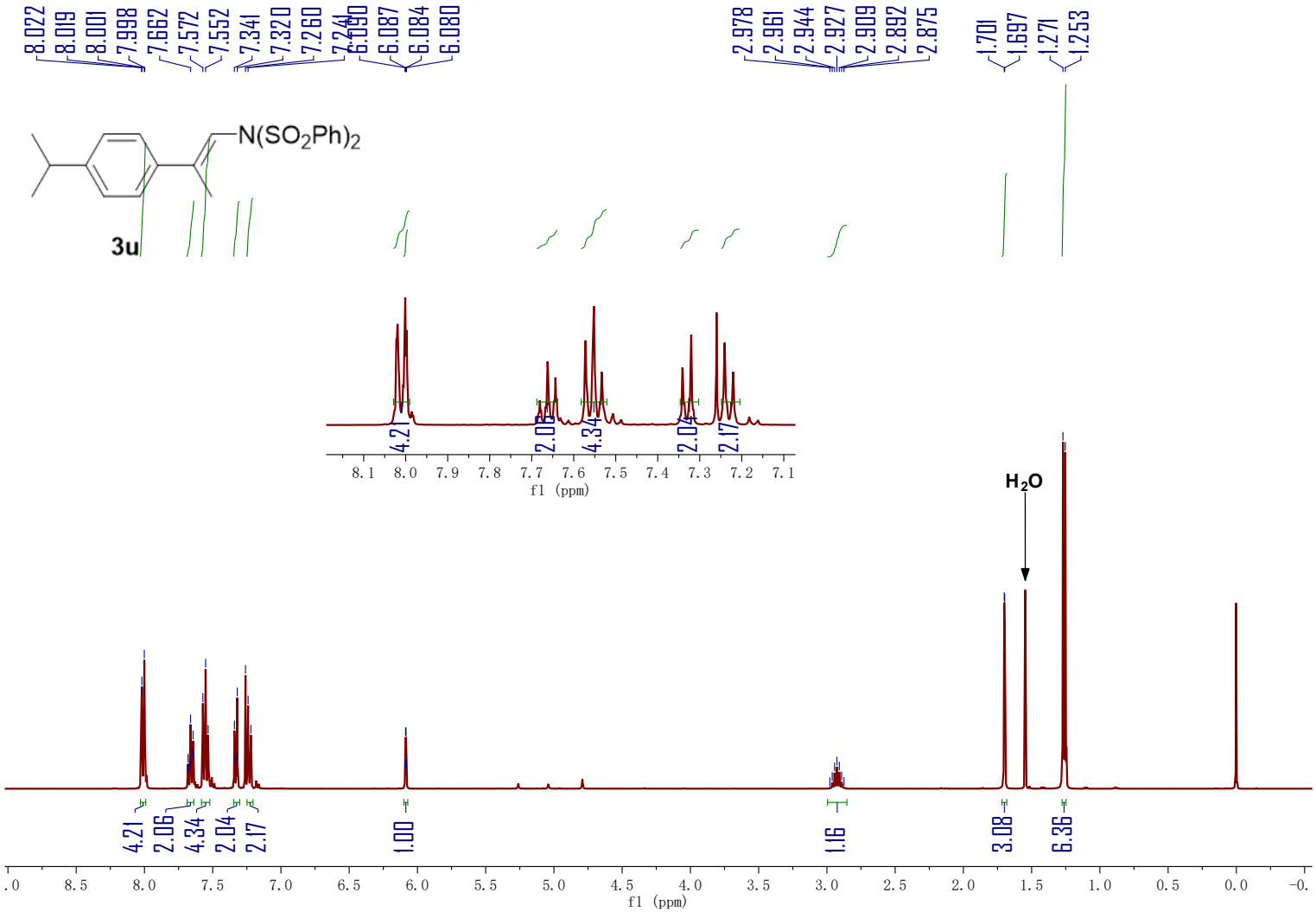
148.019
139.518
137.409
134.129
133.416
129.248
128.374
127.813
116.444
110.640
86.304
77.477
77.160
76.842
56.624
16.475
N(SO2Ph)2
O
I
3t
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

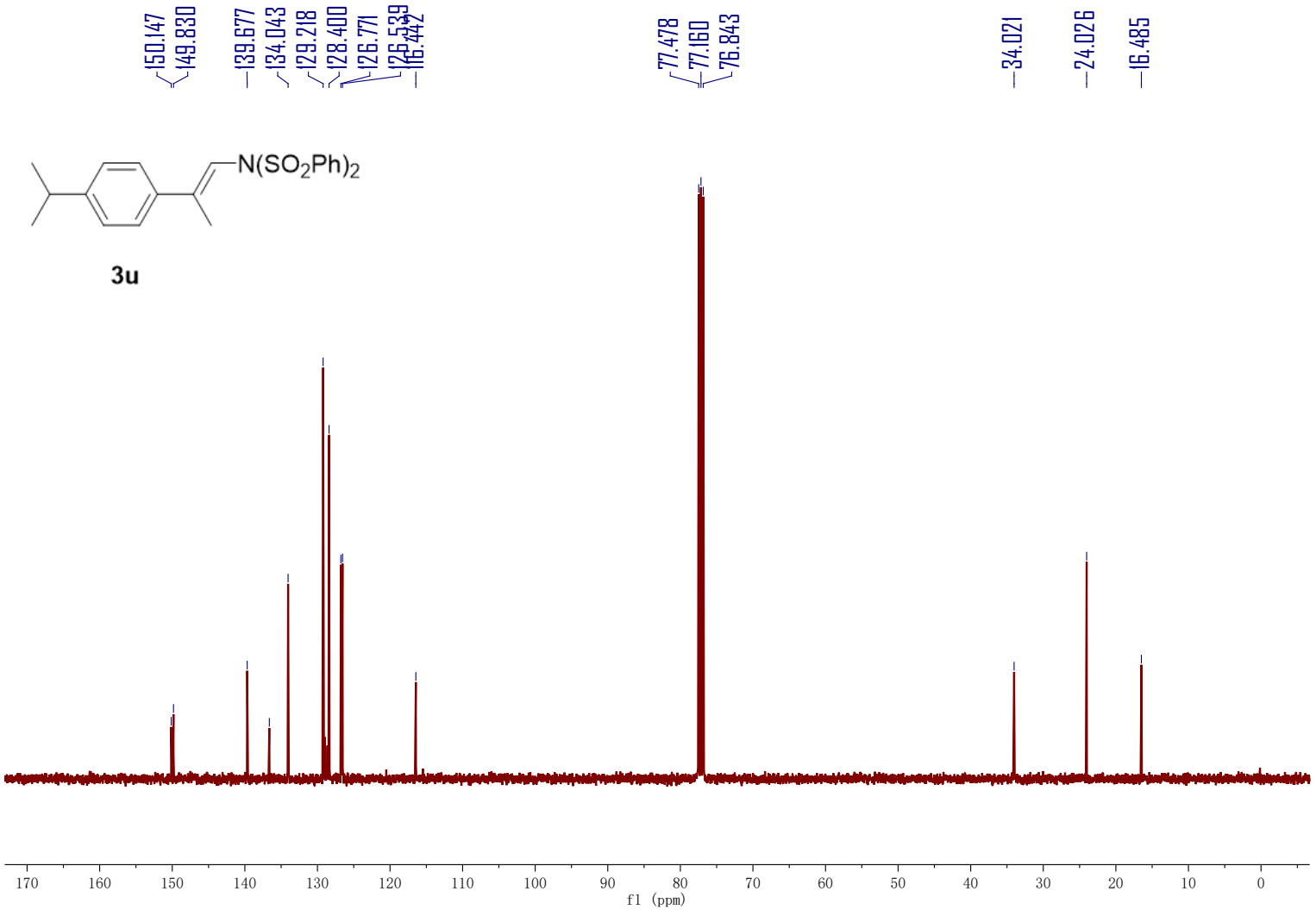

8.030
8.012
8.009
7.600
7.579
7.560
7.544
7.470
7.450
7.383
7.363
7.312
7.264
5.563
5.559
5.555
5.298
4.672
4.668
3.007
2.990
2.972
2.955
2.938
2.921
2.904
1.326
1.308
0.010
(PhO2S)2N
N(SO2Ph)2
(E)-2u
3.94
8.16
4.07
6.25
2.07
8.0
7.8
7.6
7.4
7.2
f1 (ppm)
CH2Cl2
H2O
1.00
1.96
1.04
6.16
8.5
8.0
7.5
7.0
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
f1 (ppm)

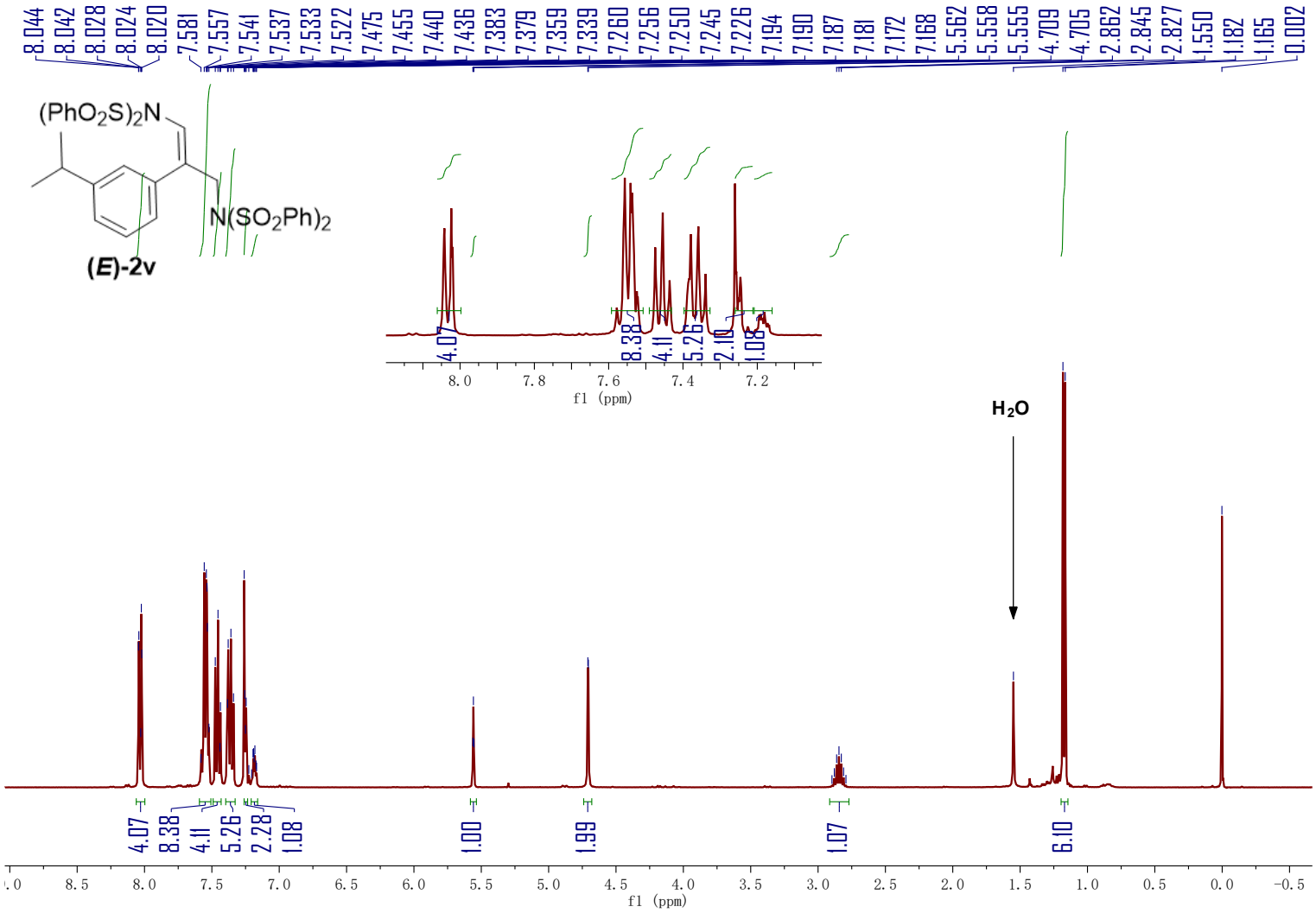

149.533
146.509
138.969
138.149
134.179
133.864
131.563
129.172
128.924
128.792
128.716
126.831
118.377
77.477
77.160
76.843
52.550
34.016
24.190
(PhO2S)2N
N(SO2Ph)2
(E)-2u
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

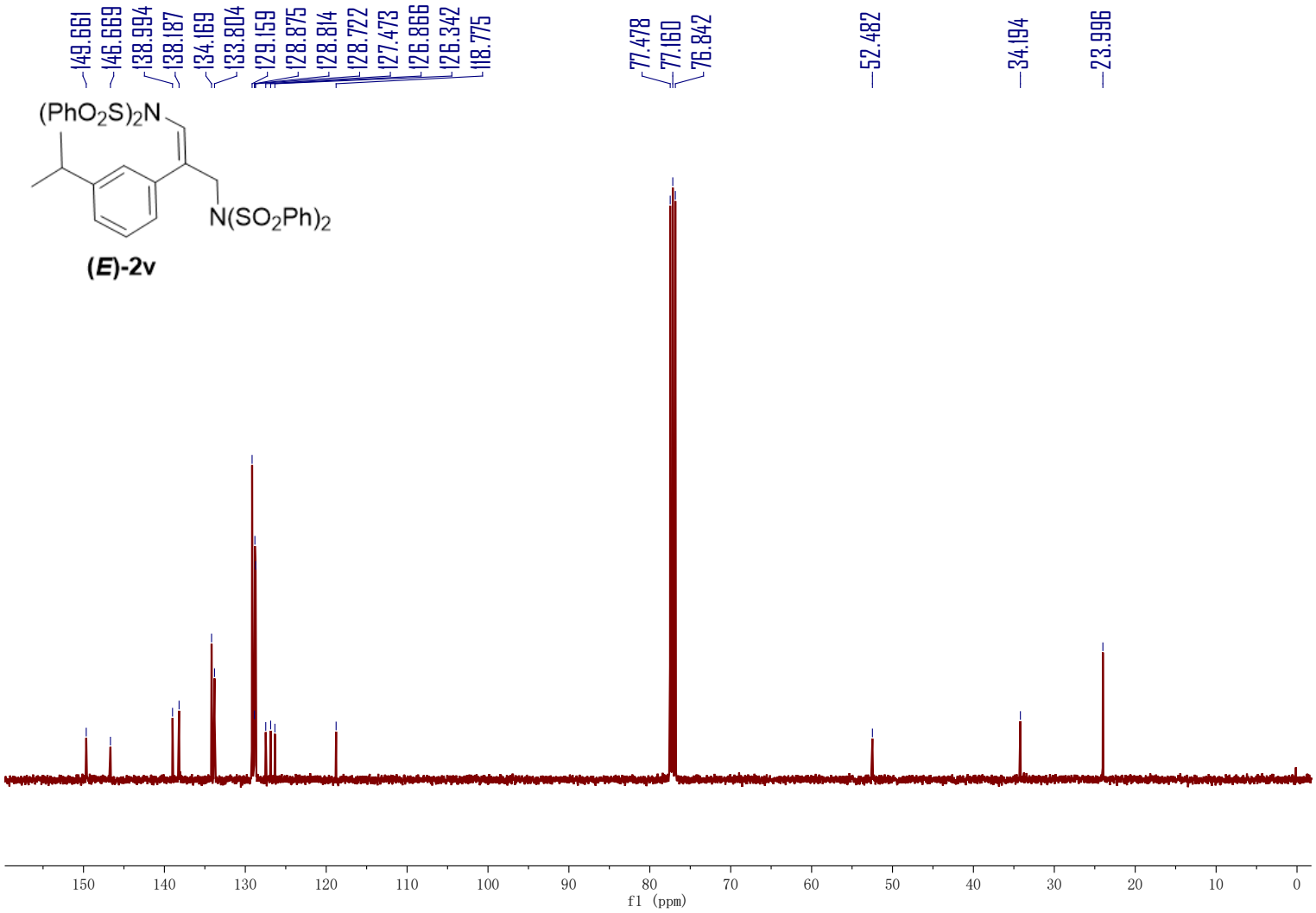

8.009
7.989
7.986
7.637
7.615
7.605
7.490
7.470
7.406
7.386
7.336
7.260
5.865
5.862
5.858
4.926
4.922
2.998
2.984
2.967
2.950
2.933
2.915
2.898
1.316
1.299
0.003
N(SO2Ph)2
N(SO2Ph)2
(Z)-2u
4.12
4.30
4.31
4.33
6.34
2.20
f1 (ppm)
H2O
1.00
1.99
1.12
6.27


149.730
147.649
138.931
138.785
134.305
133.858
132.939
129.156
128.966
128.845
128.739
128.540
126.651
119.114
77.477
77.477
77.160
77.160
76.842
76.842
47.910
34.010
24.174
0.139
N(SO2Ph)2
N(SO2Ph)2
(Z)-2u
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
−1
f1 (ppm)


8.022
8.019
8.001
7.998
7.662
7.572
7.552
7.341
7.320
7.260
7.244
6.090
6.087
6.084
6.080
2.978
2.961
2.944
2.927
2.909
2.892
2.875
1.701
1.697
1.271
1.253
N(SO2Ph)2
3u
4.21
2.06
4.34
2.04
2.17
f1 (ppm)
H2O
1.00
1.16
3.08
6.36


150.147
149.830
139.677
134.043
129.218
128.400
126.771
126.539
116.442
77.478
77.160
76.843
34.021
24.026
16.485
N(SO2Ph)2
3u
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


8.044
8.042
8.028
8.024
8.020
7.581
7.557
7.541
7.537
7.533
7.522
7.475
7.455
7.440
7.436
7.383
7.379
7.359
7.339
7.260
7.256
7.250
7.245
7.226
7.194
7.190
7.187
7.181
7.172
7.168
5.562
5.558
5.555
4.709
4.705
2.862
2.845
2.827
1.550
1.182
1.165
0.002
(PhO2S)2N
N(SO2Ph)2
(E)-2v
4.07
8.38
4.11
5.26
2.10
1.08
8.0
7.8
7.6
7.4
7.2
f1 (ppm)
H2O
4.07
8.38
4.11
5.26
2.28
1.08
1.00
1.99
1.07
6.10
f1 (ppm)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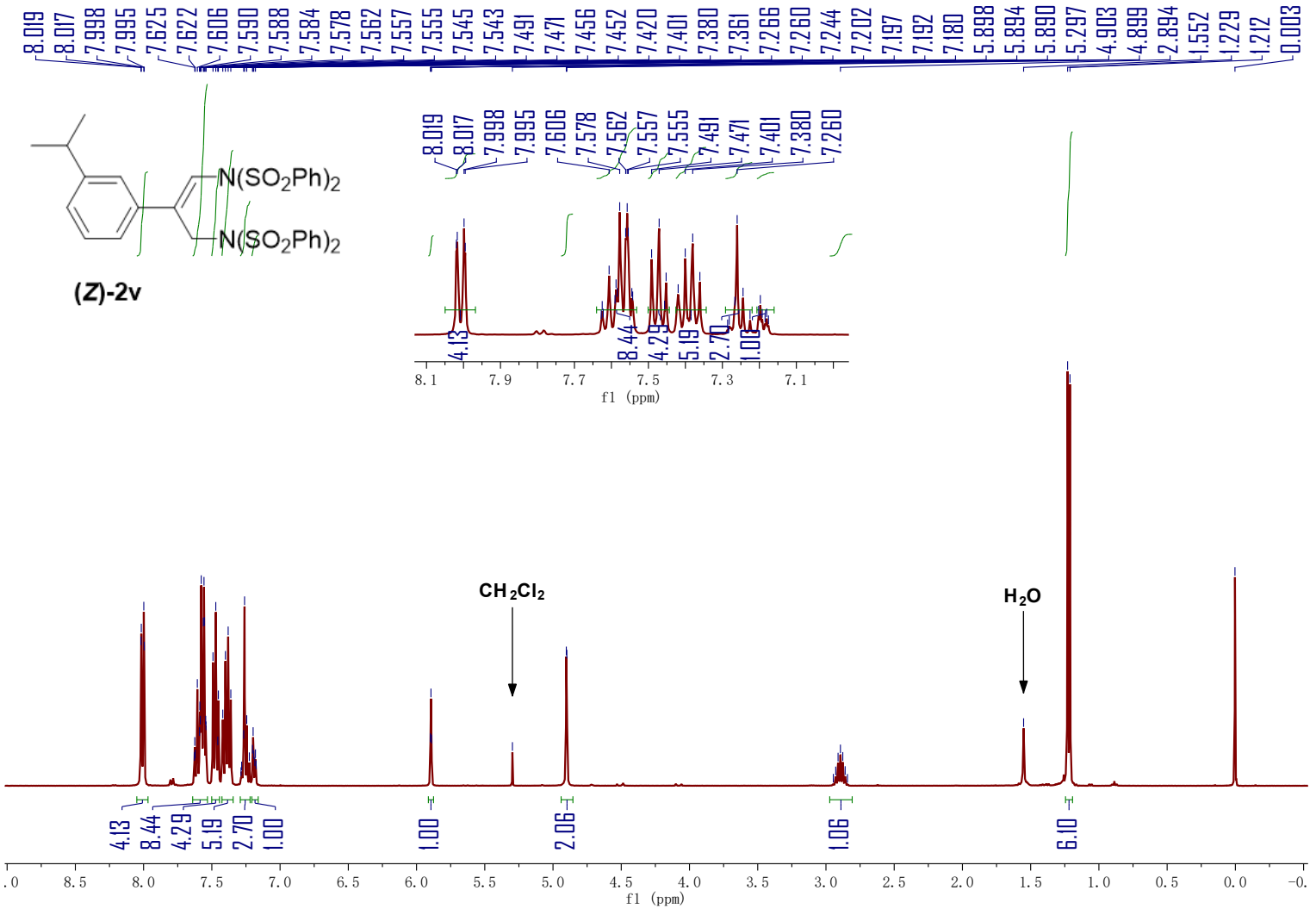
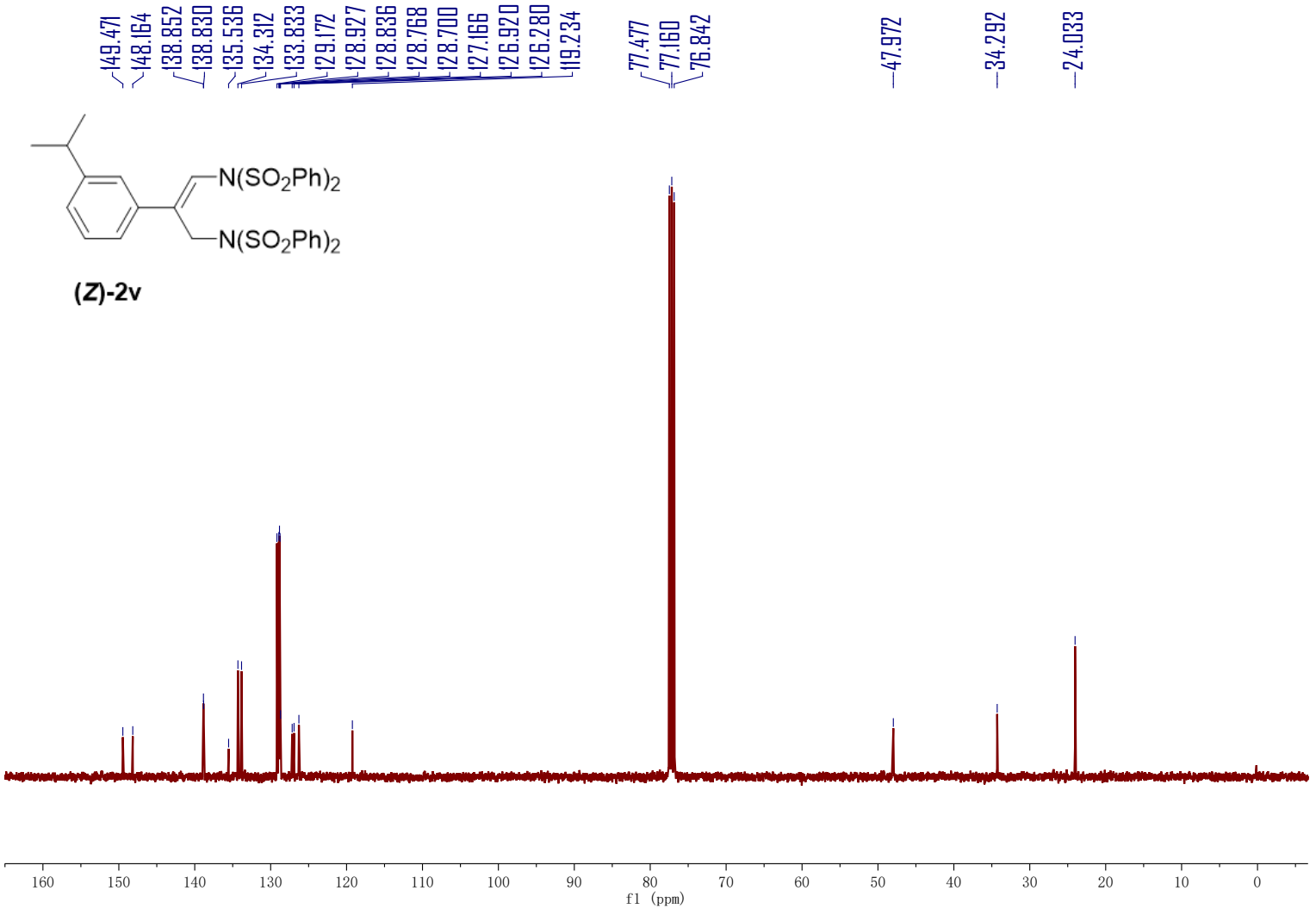
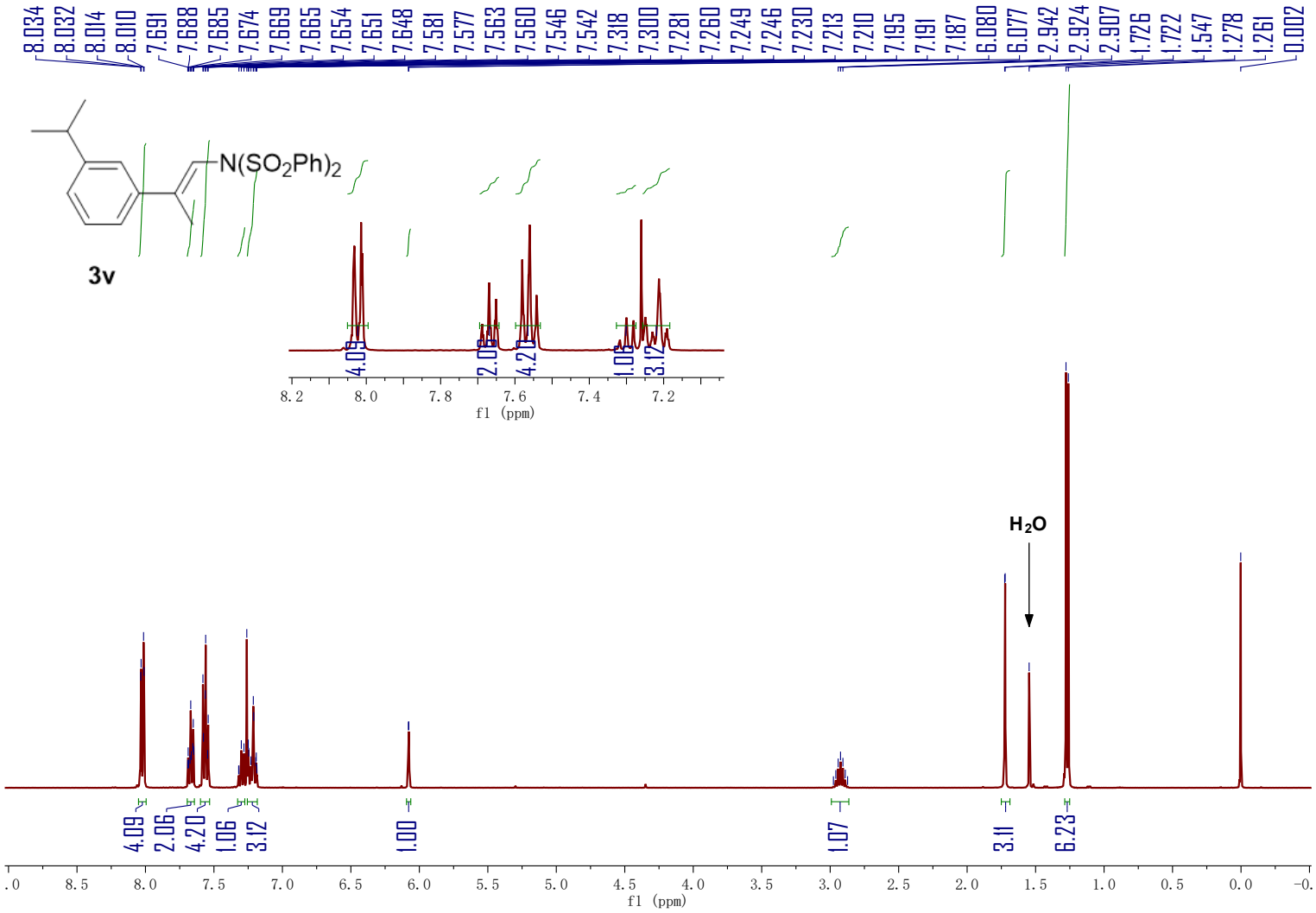
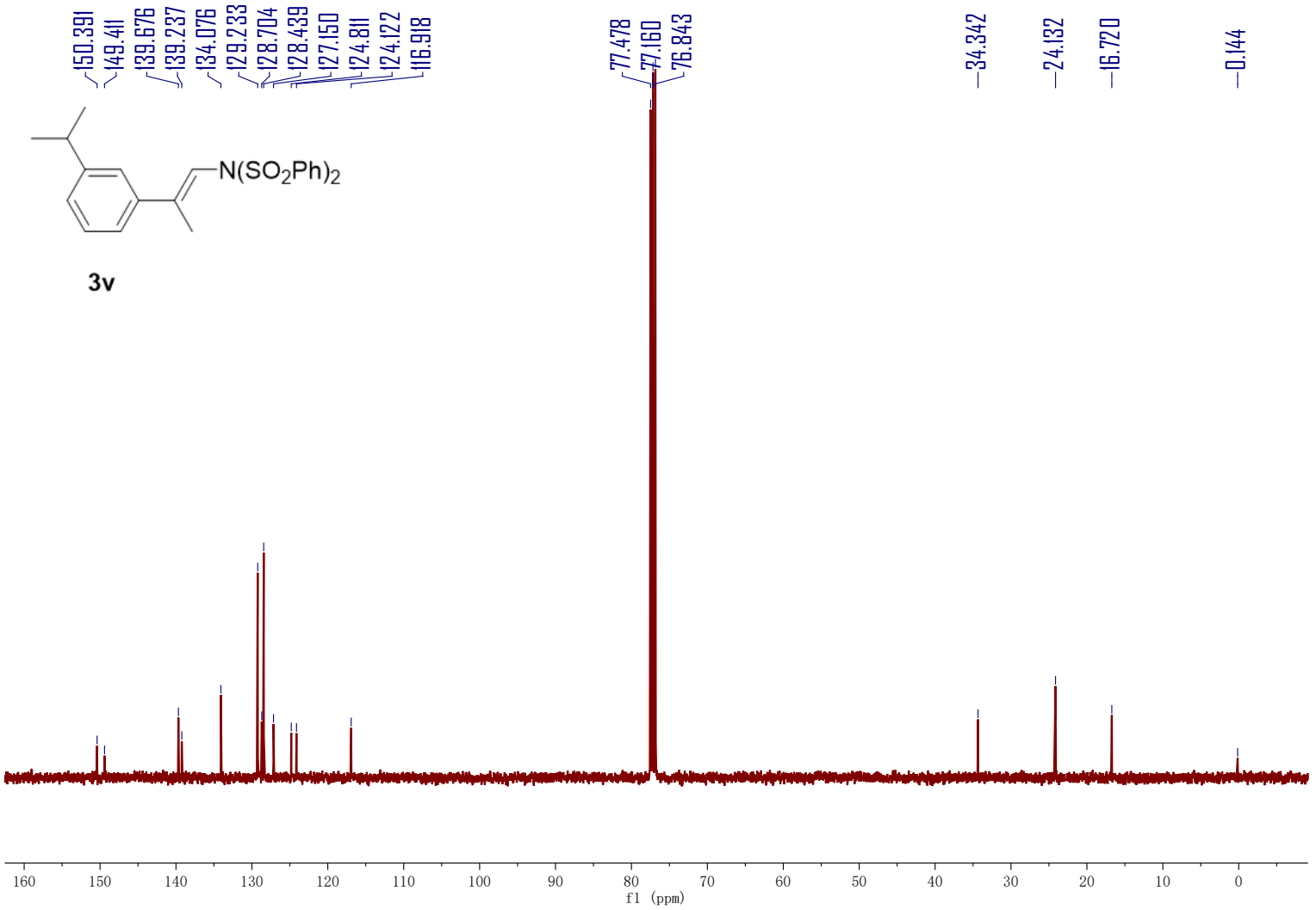
146.669
138.994
138.187
134.169
133.804
129.159
128.875
128.814
128.722
127.473
126.866
126.342
118.775
77.478
77.160
76.842
52.482
34.194
23.996
(PhO2S)2N
N(SO2Ph)2
(E)-2v
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

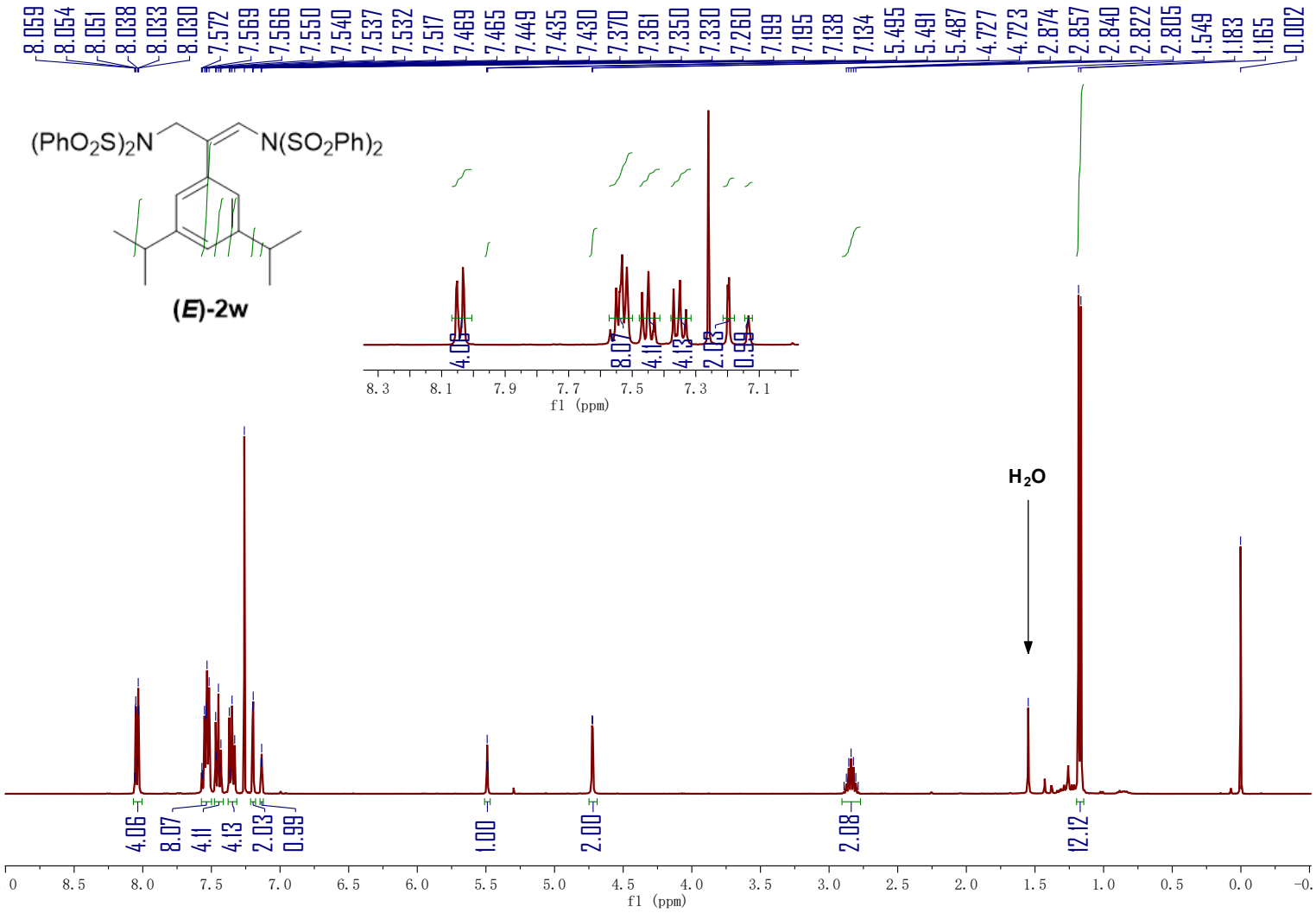

8.019
8.017
7.998
7.995
7.625
7.622
7.606
7.590
7.588
7.584
7.578
7.562
7.557
7.555
7.545
7.543
7.491
7.471
7.456
7.452
7.420
7.401
7.380
7.361
7.266
7.260
7.244
7.202
7.197
7.192
7.180
5.898
5.894
5.890
5.297
4.903
4.899
2.894
1.552
1.229
1.212
0.003
N(SO2Ph)2
N(SO2Ph)2
(Z)-2v
4.13
8.44
4.29
5.19
2.70
1.00
f1 (ppm)
CH2Cl2
H2O
1.00
2.06
1.06
6.10
f1 (ppm)

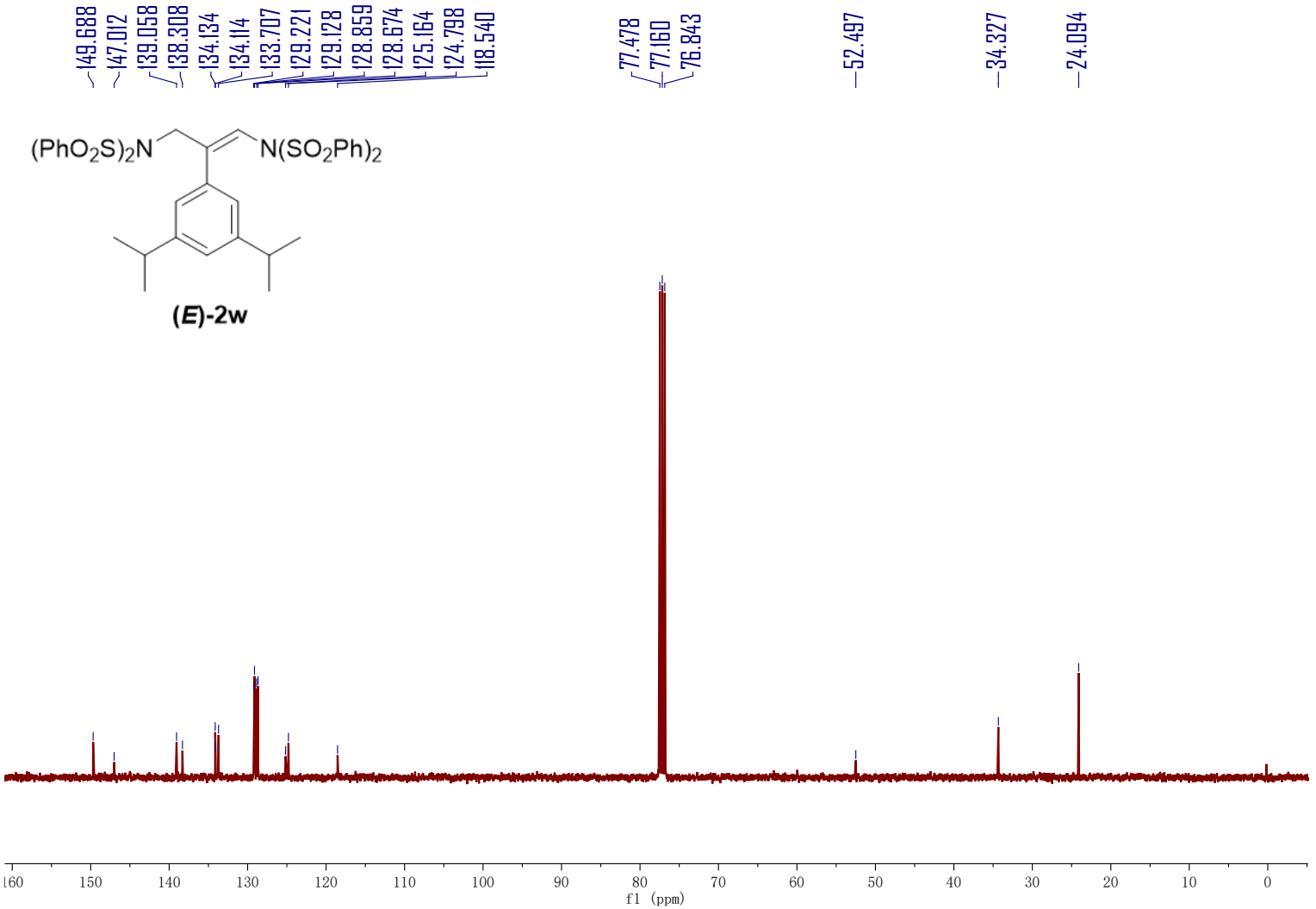

149.471
148.164
138.852
138.830
135.536
134.312
133.833
129.172
128.927
128.836
128.768
128.700
127.166
126.920
126.280
119.234
77.477
77.160
76.842
47.972
34.292
24.033
N(SO2Ph)2
N(SO2Ph)2
(Z)-2v
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

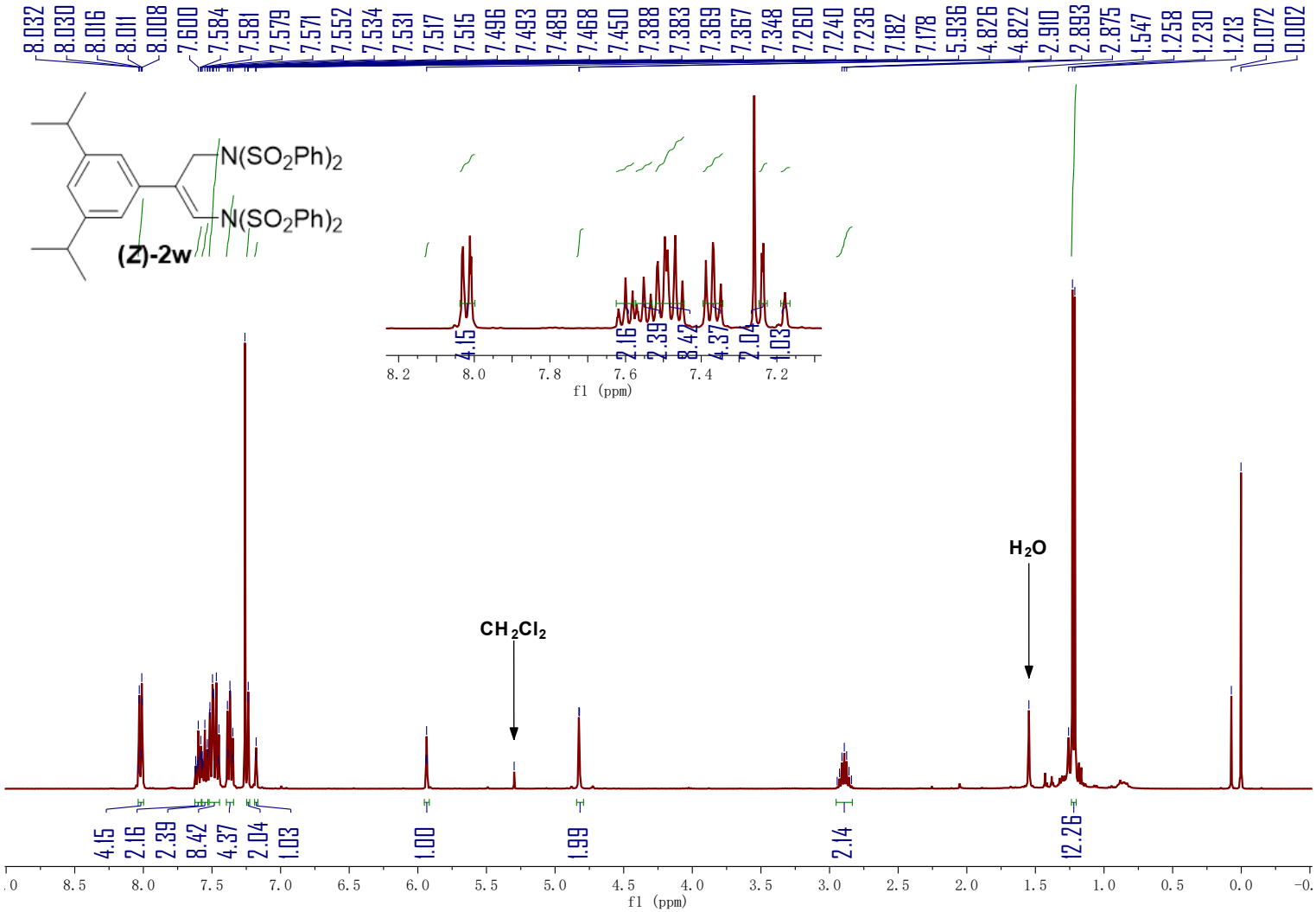

8.034
8.032
8.014
8.010
7.691
7.688
7.685
7.674
7.669
7.665
7.654
7.651
7.648
7.581
7.577
7.563
7.560
7.546
7.542
7.318
7.300
7.281
7.260
7.249
7.246
7.230
7.213
7.210
7.195
7.191
7.187
6.080
6.077
2.942
2.924
2.907
1.726
1.722
1.547
1.278
1.261
0.002
N(SO2Ph)2
3v
4.09
2.06
4.20
1.06
3.12
1.00
1.07
3.11
6.23
H2O
f1 (ppm)

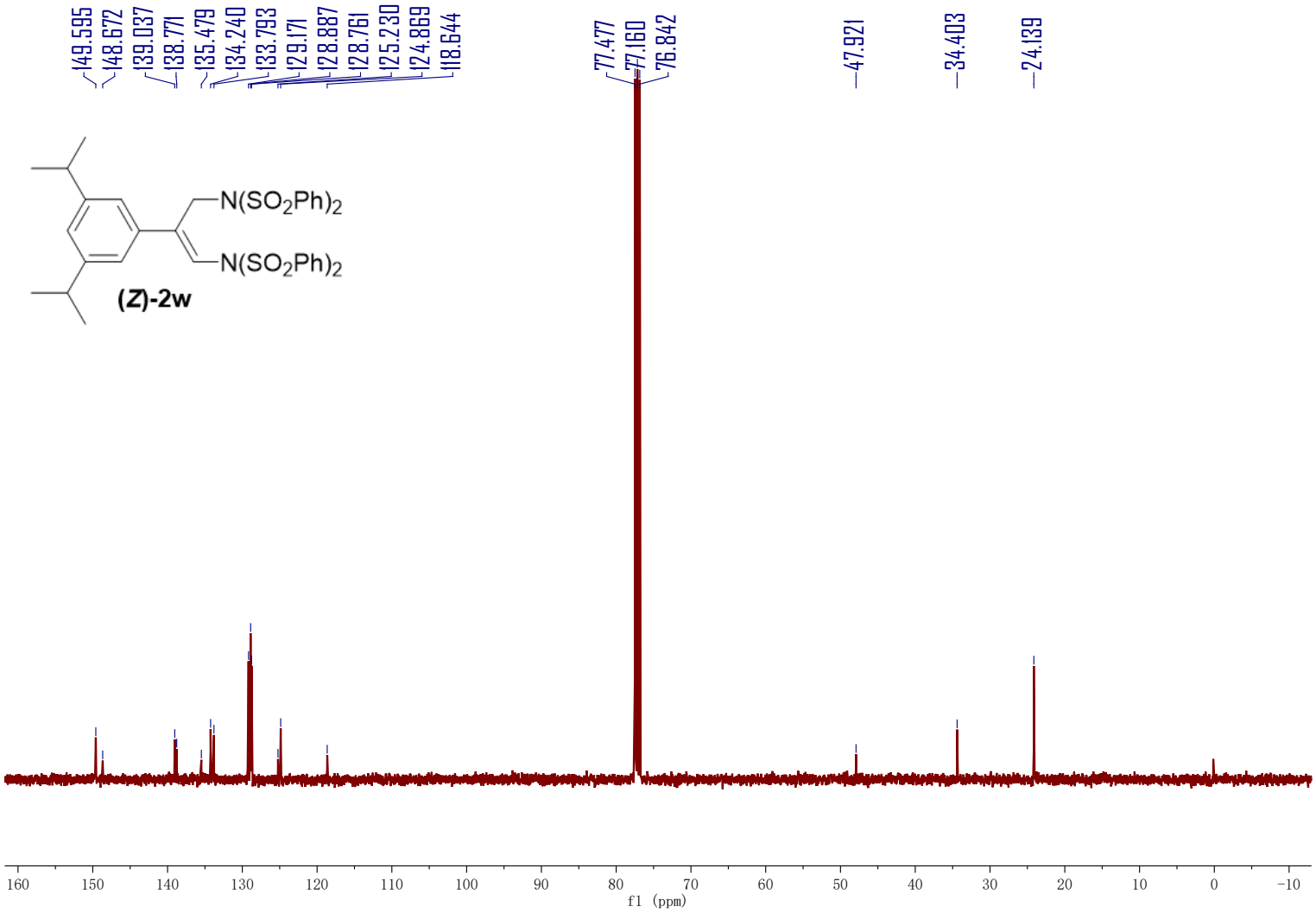
S162


150.391
149.411
139.676
139.237
134.076
129.233
128.704
128.439
127.150
124.811
124.122
116.918
77.478
77.160
76.843
34.342
24.132
16.720
0.144
N(SO2Ph)2
3v
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


8.059
8.054
8.051
8.038
8.033
8.030
7.572
7.569
7.566
7.550
7.540
7.537
7.532
7.517
7.469
7.465
7.449
7.435
7.430
7.370
7.361
7.350
7.330
7.260
7.199
7.195
7.138
7.134
5.495
5.491
5.487
4.727
4.723
2.874
2.857
2.840
2.822
2.805
1.549
1.183
1.165
0.002
(PhO2S)2N
N(SO2Ph)2
(E)-2w
4.06
8.07
4.11
4.13
2.03
0.99
f1 (ppm)
H2O
1.00
2.00
2.08
12.12
f1 (ppm)


149.688
147.012
139.058
138.308
134.134
134.114
133.707
129.221
129.128
128.859
128.674
125.164
124.798
118.540
77.478
77.160
76.843
52.497
34.327
24.094
(PhO2S)2N
N(SO2Ph)2
(E)-2w
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


N(SO2Ph)2
N(SO2Ph)2
(Z)-2w
CH2Cl2
H2O
f1 (ppm)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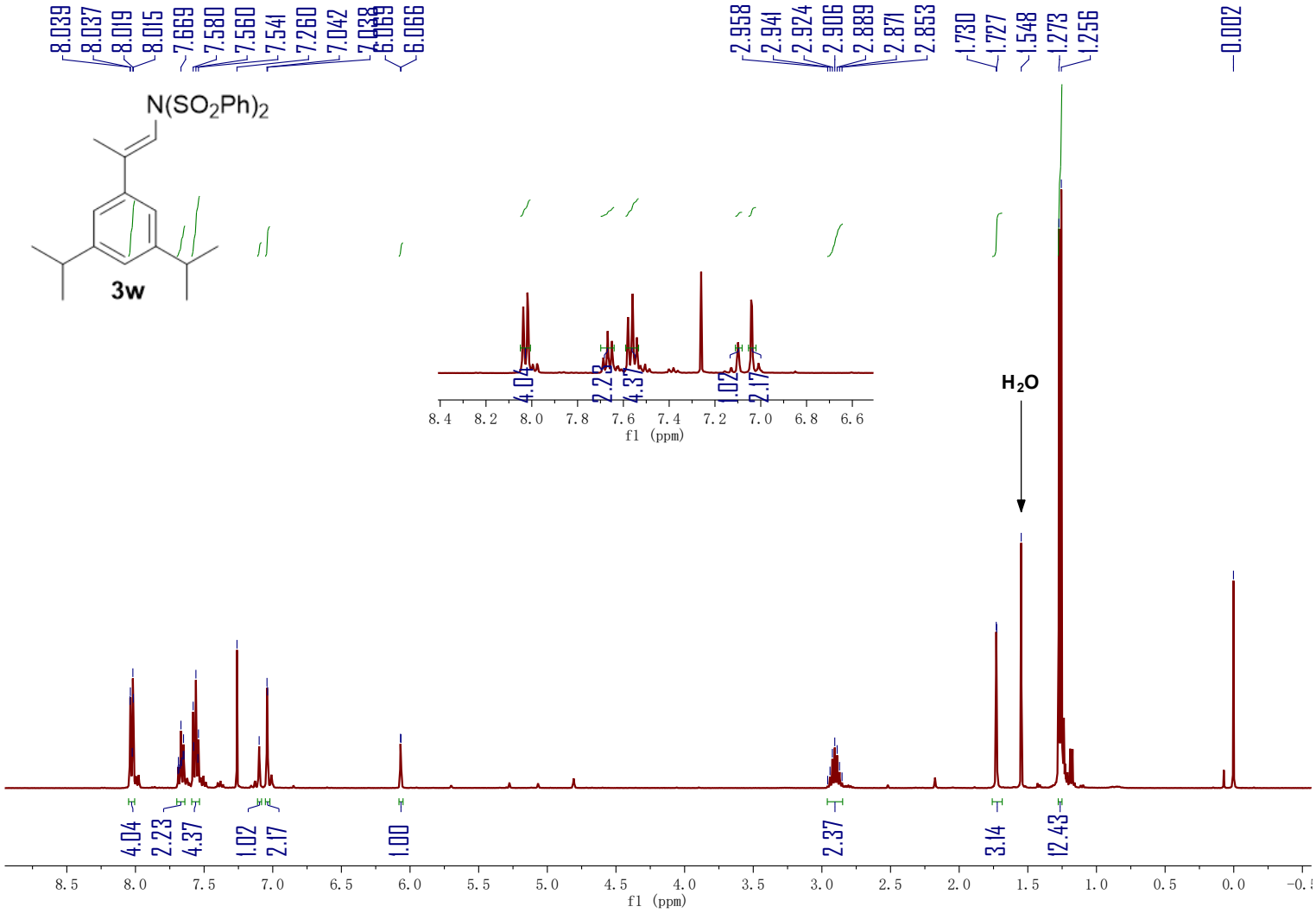
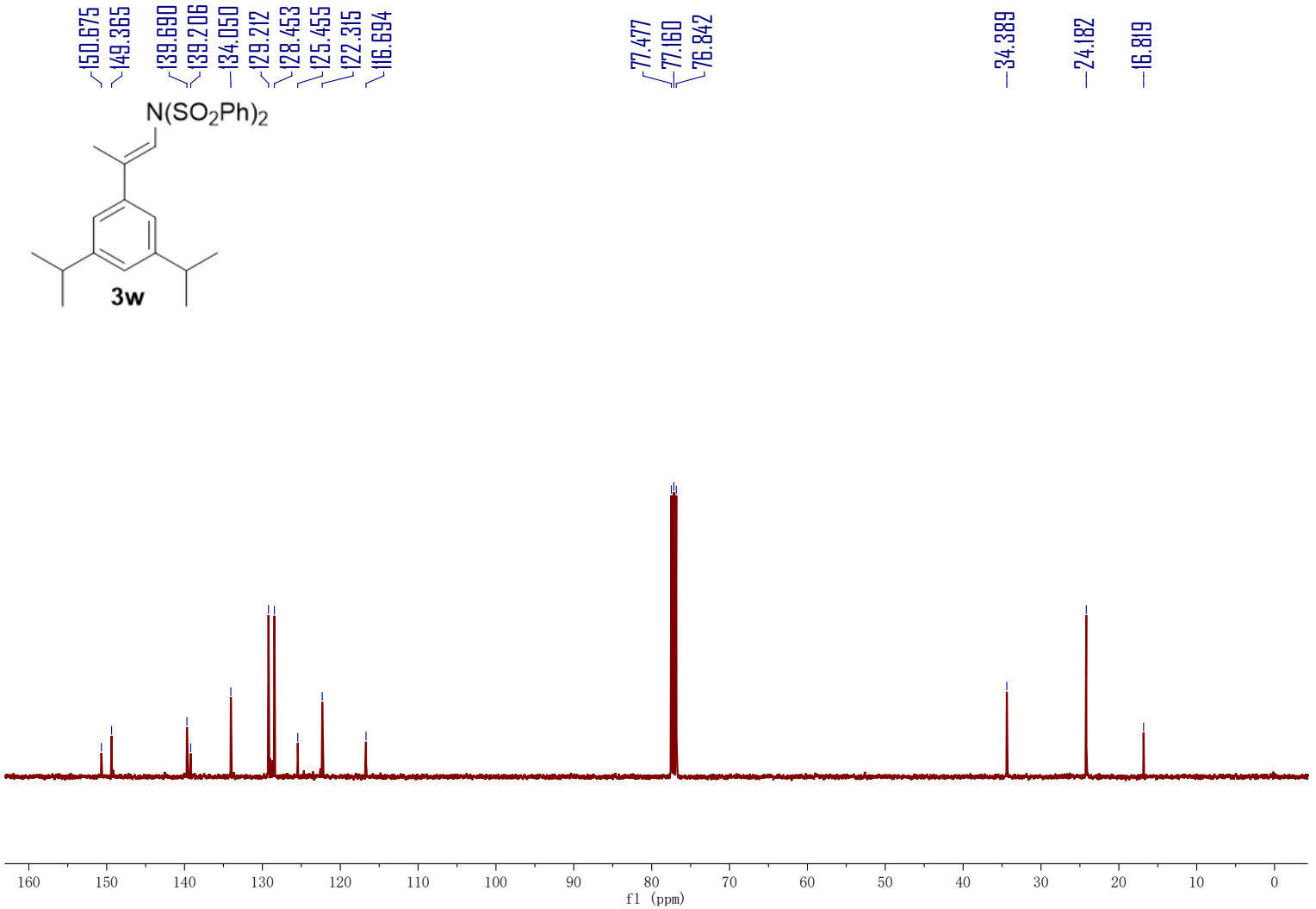
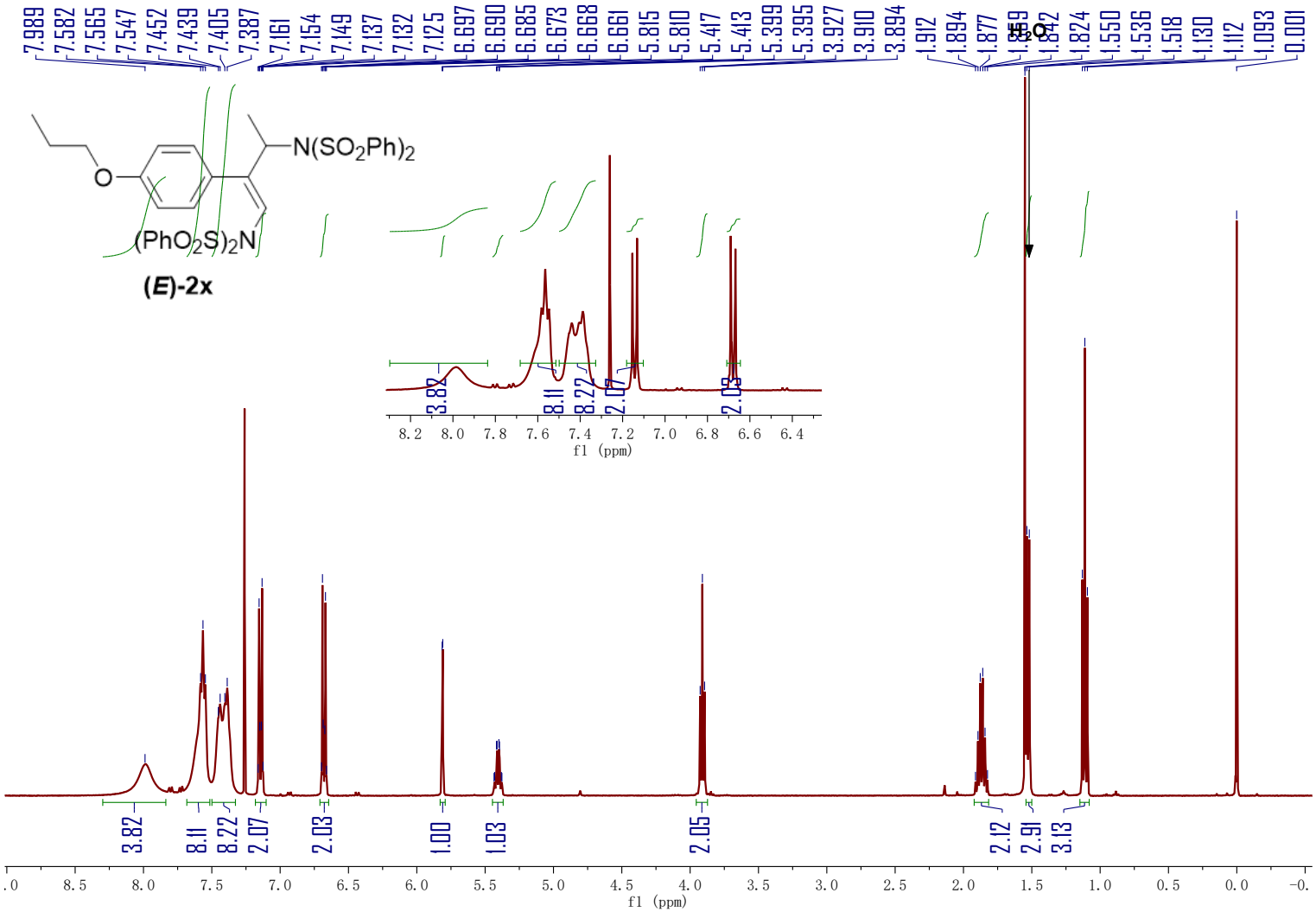
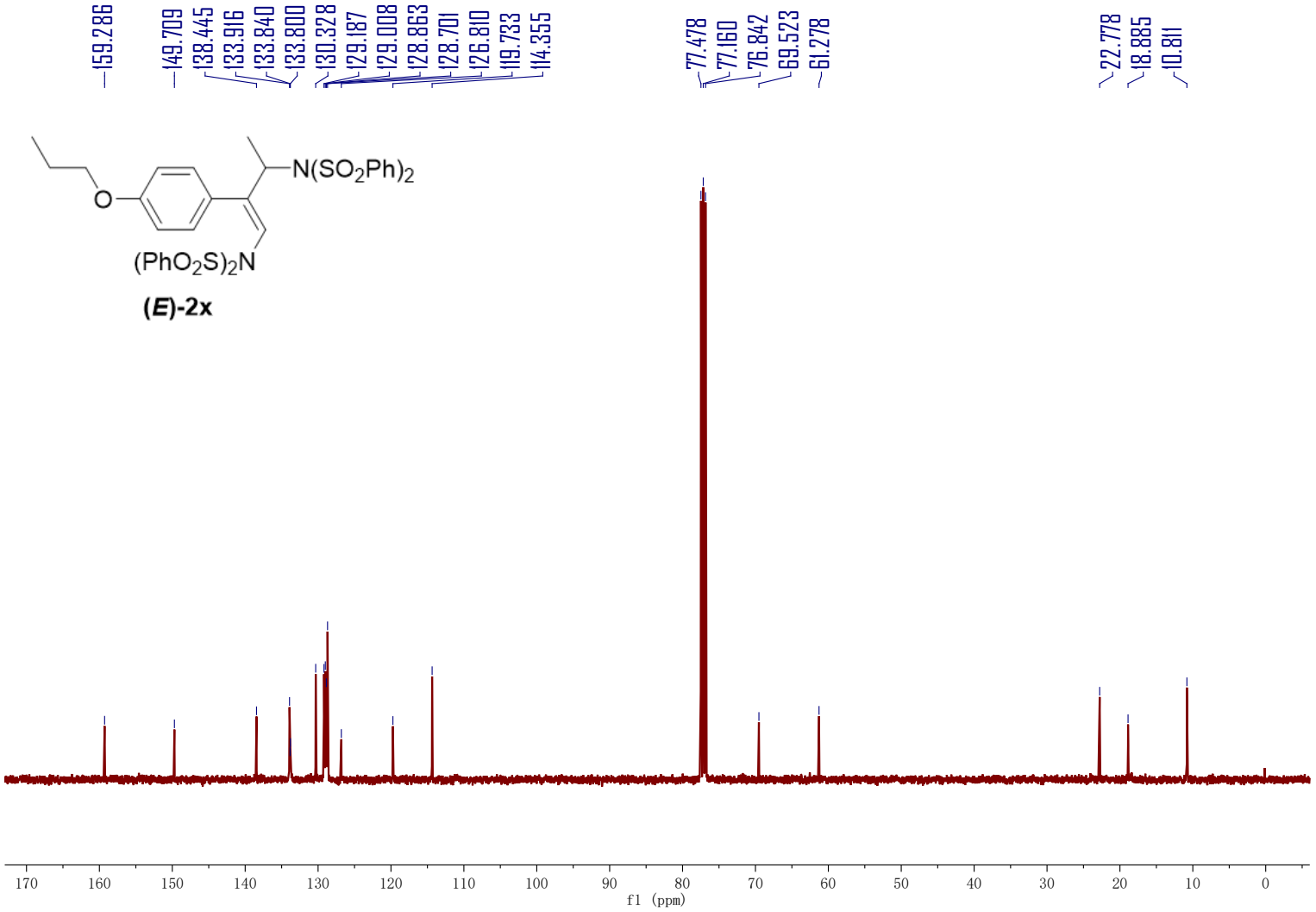
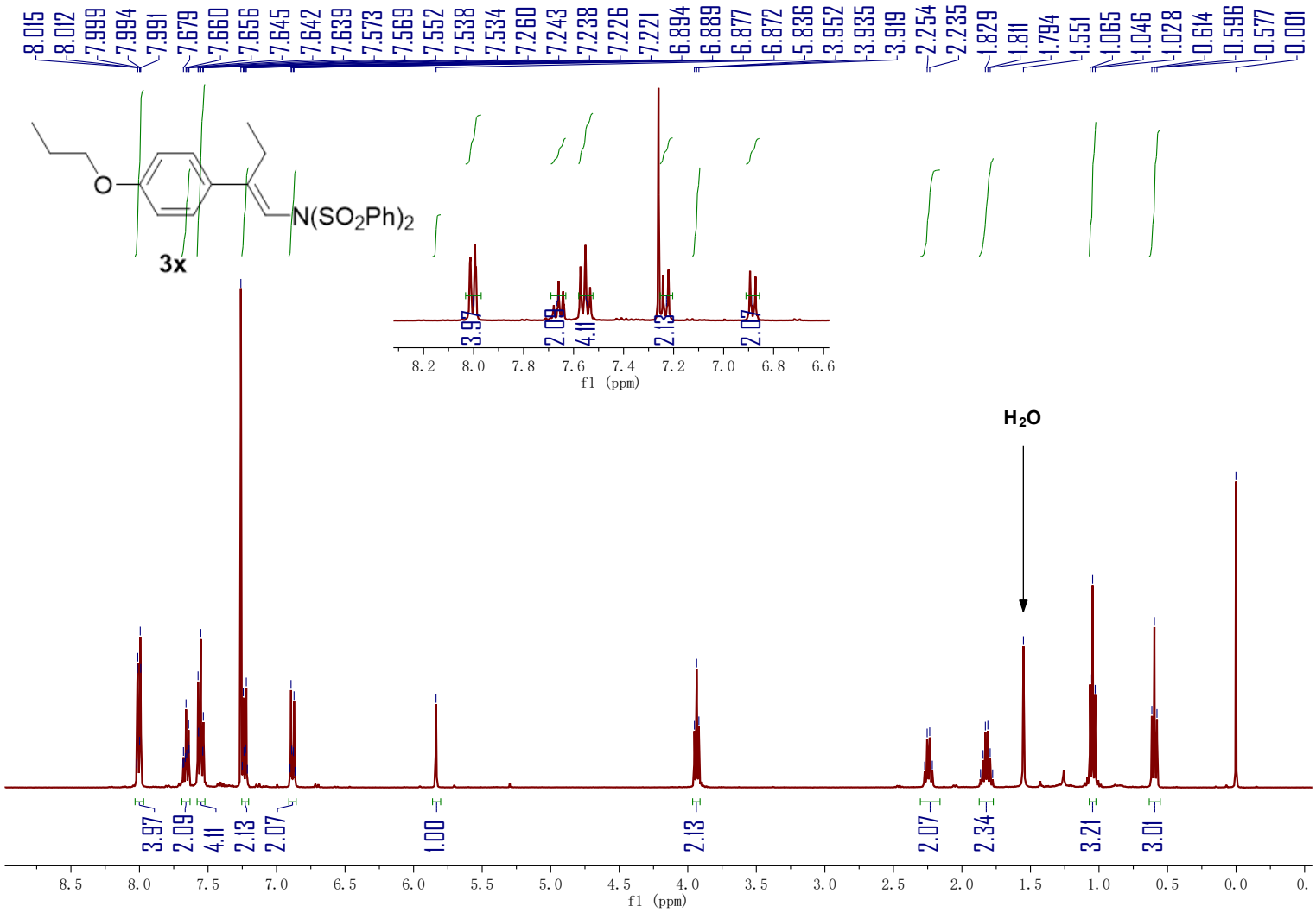
148.672
139.037
138.771
135.479
134.240
133.793
129.171
128.887
128.761
125.230
124.869
118.644
77.477
77.160
76.842
47.921
34.403
24.139
N(SO2Ph)2
N(SO2Ph)2
(Z)-2w
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

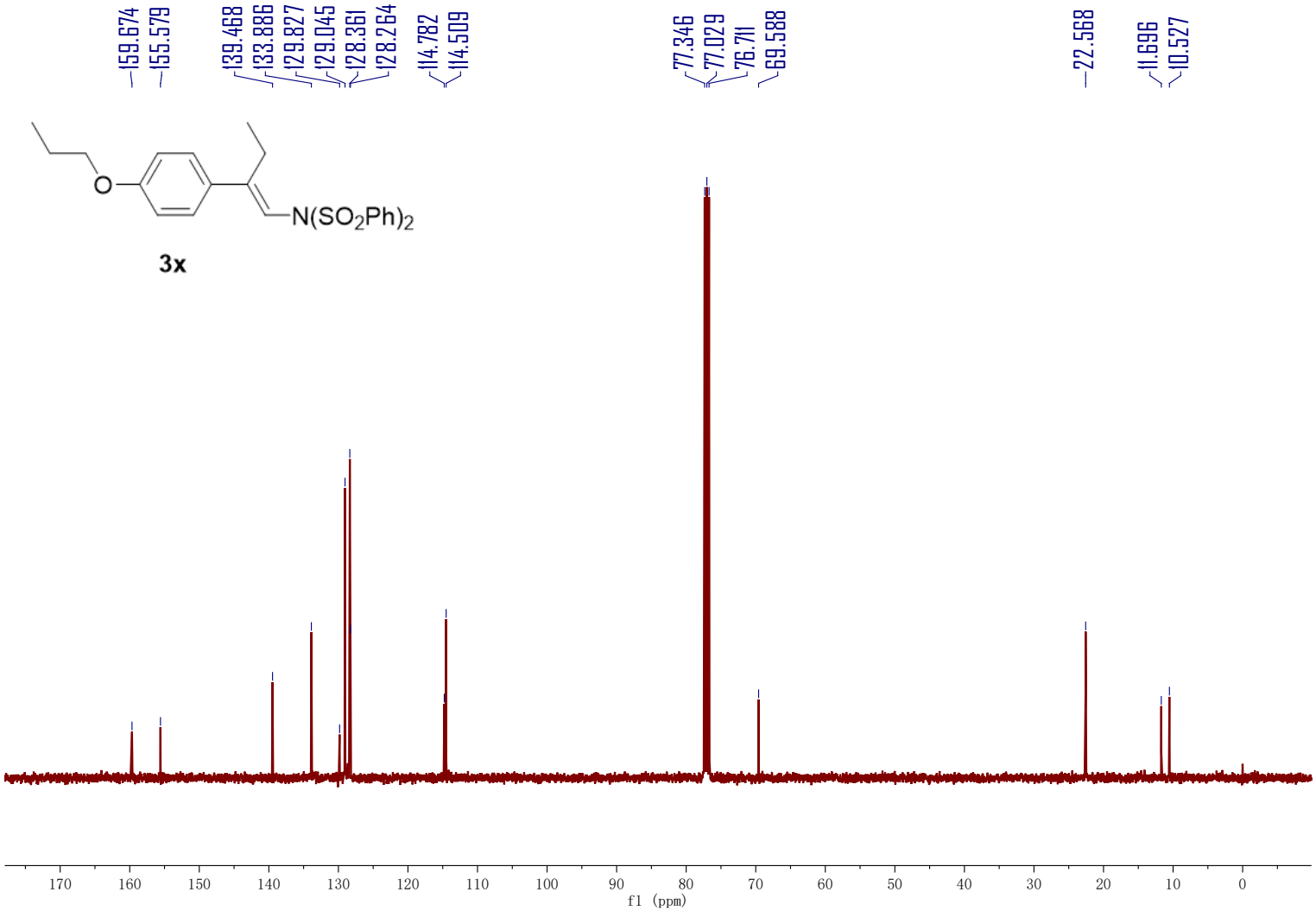

8.039
8.037
8.019
8.015
7.669
7.580
7.560
7.541
7.260
7.042
7.038
6.069
6.066
2.958
2.941
2.924
2.906
2.889
2.871
2.853
1.730
1.727
1.548
1.273
1.256
0.002
N(SO2Ph)2
3w
H2O
4.04
2.23
4.37
1.02
2.17
1.00
2.37
3.14
12.43
f1 (ppm)

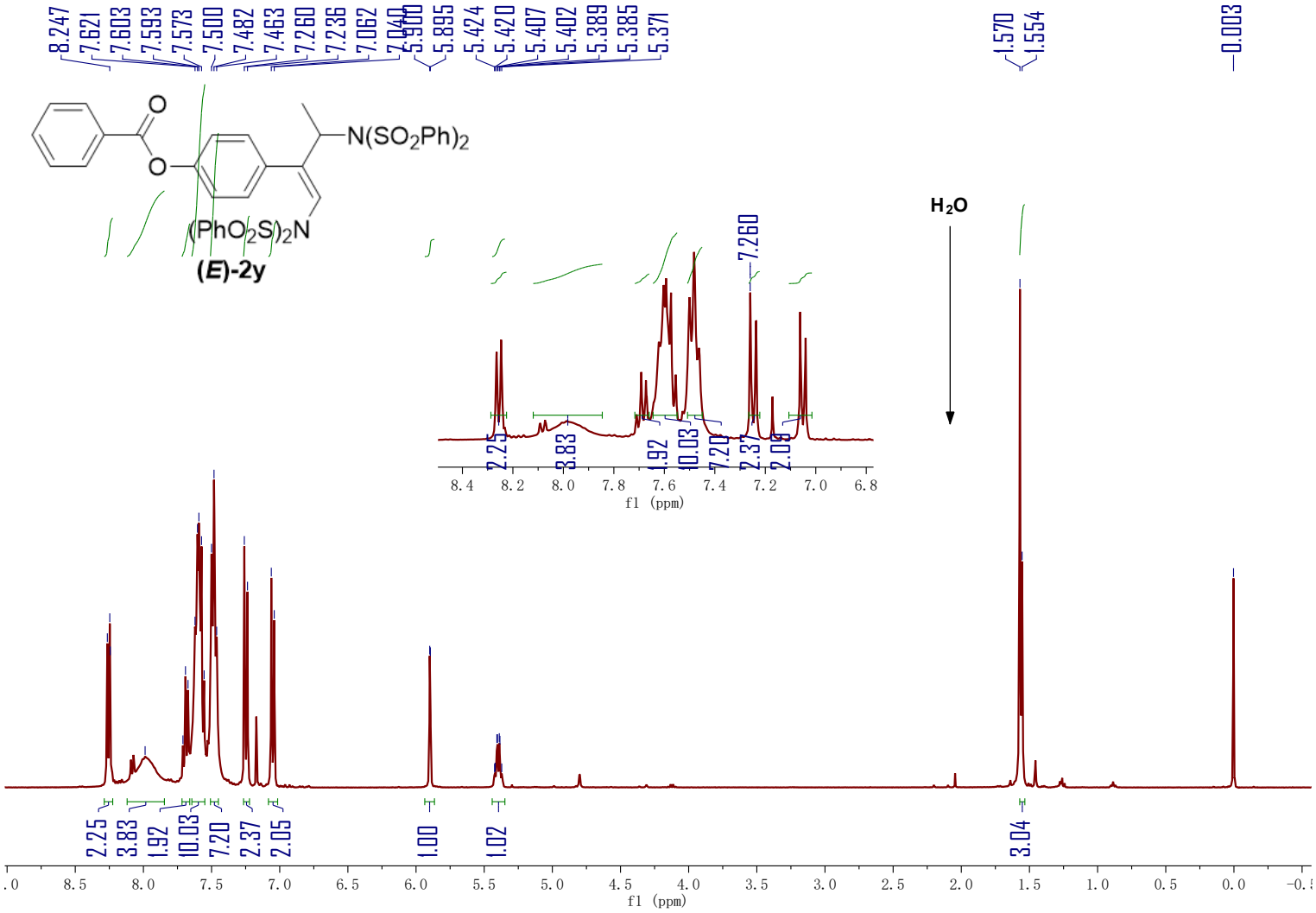

150.675
149.365
139.690
139.206
134.050
129.212
128.453
125.455
122.315
116.694
77.477
77.160
76.842
34.389
24.182
16.819
N(SO2Ph)2
3w
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

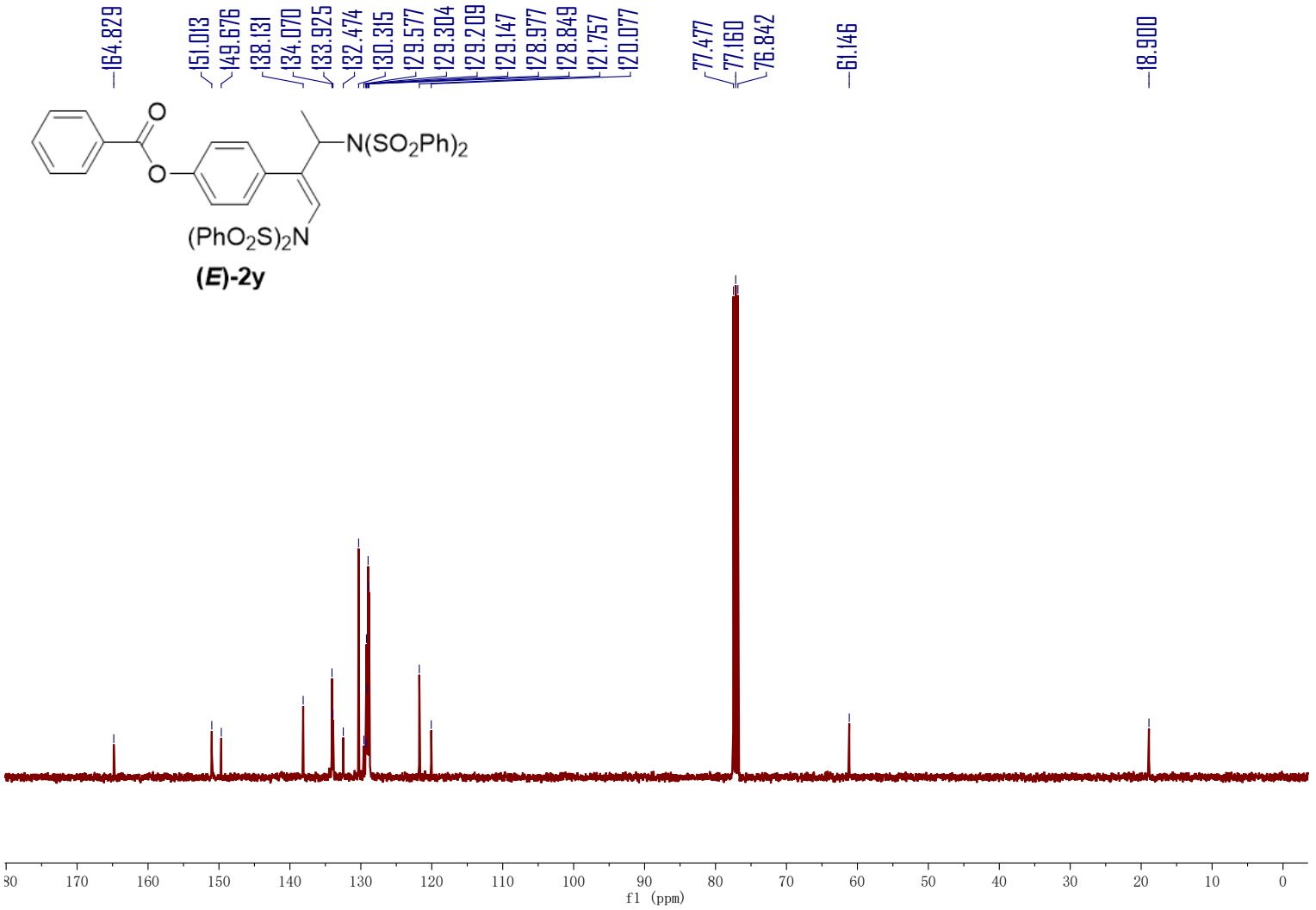

7.989
7.582
7.565
7.547
7.452
7.439
7.405
7.387
7.161
7.154
7.149
7.137
7.132
7.125
6.697
6.690
6.685
6.673
6.668
6.661
5.815
5.810
5.417
5.413
5.399
5.395
3.927
3.910
3.894
1.912
1.894
1.877
1.859
1.842
1.824
1.550
1.536
1.518
1.130
1.112
1.093
0.001
N(SO2Ph)2
O
(PhO2S)2N
(E)-2x
3.82
8.11
8.22
2.07
2.03
1.00
1.03
2.05
2.12
2.91
3.13
f1 (ppm)

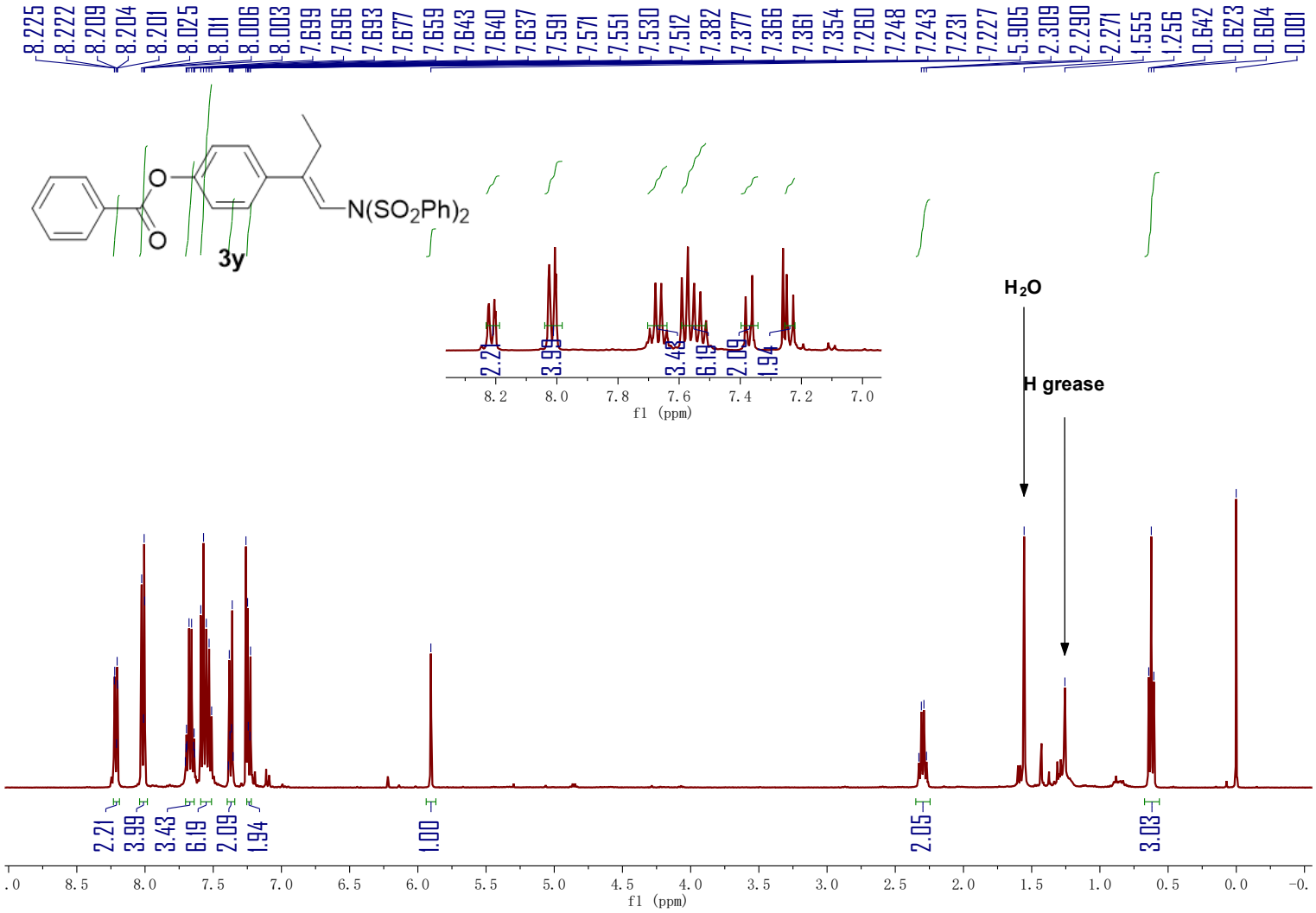

159.286
149.709
138.445
133.916
133.840
133.800
130.328
129.187
129.008
128.863
128.701
126.810
119.733
114.355
77.478
77.160
76.842
69.523
61.278
22.778
18.885
10.811
N(SO2Ph)2
O
(PhO2S)2N
(E)-2x
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

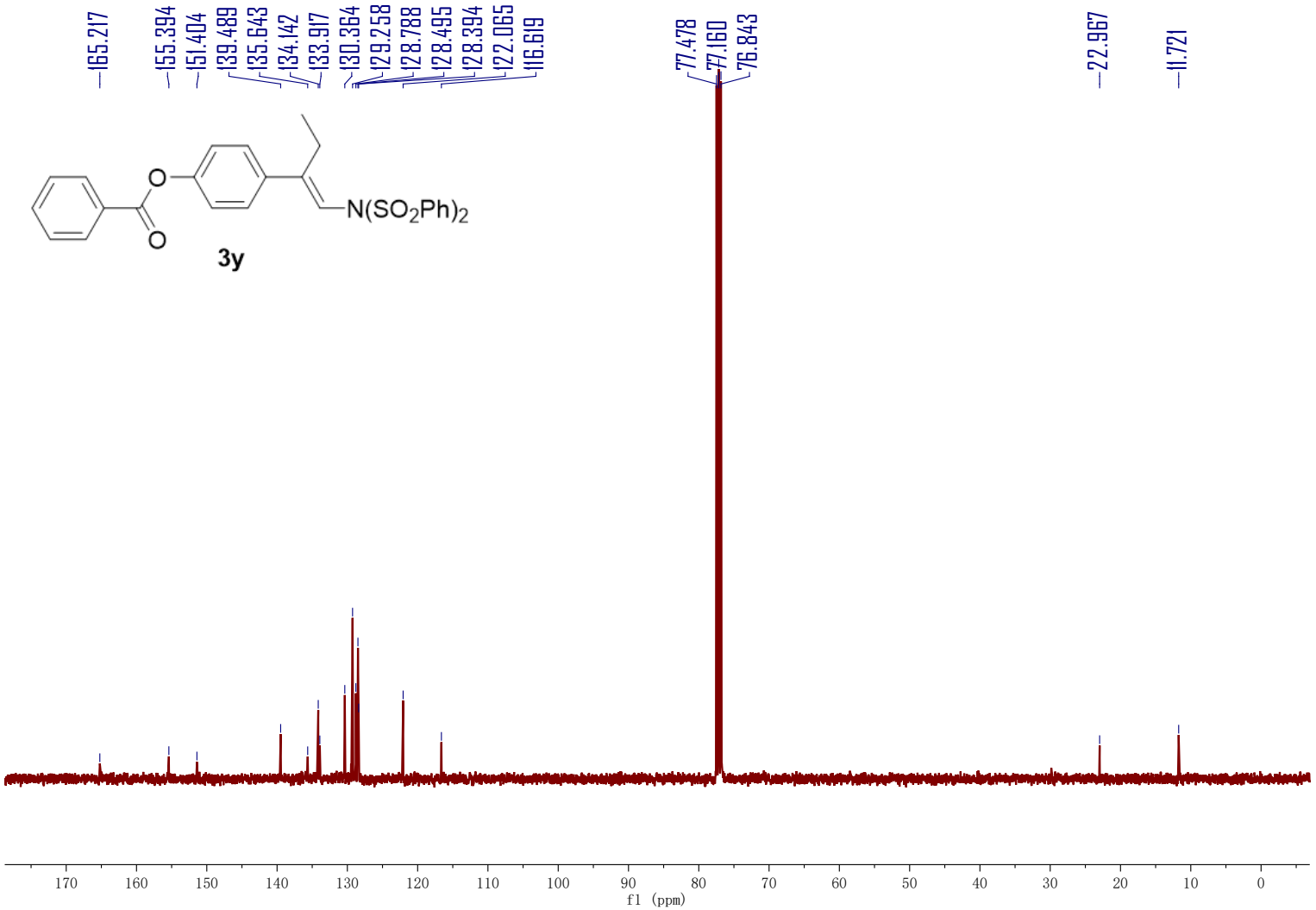

8.015
8.012
7.999
7.994
7.991
7.679
7.660
7.656
7.645
7.642
7.639
7.573
7.569
7.552
7.538
7.534
7.260
7.243
7.238
7.226
7.221
6.894
6.889
6.877
6.872
5.836
3.952
3.935
3.919
2.254
2.235
1.829
1.811
1.794
1.551
1.065
1.046
1.028
0.614
0.596
0.577
0.001
O
N(SO2Ph)2
3x
H2O
3.97
2.09
4.11
2.13
2.07
1.00
2.13
2.07
2.34
3.21
3.01
f1 (ppm)

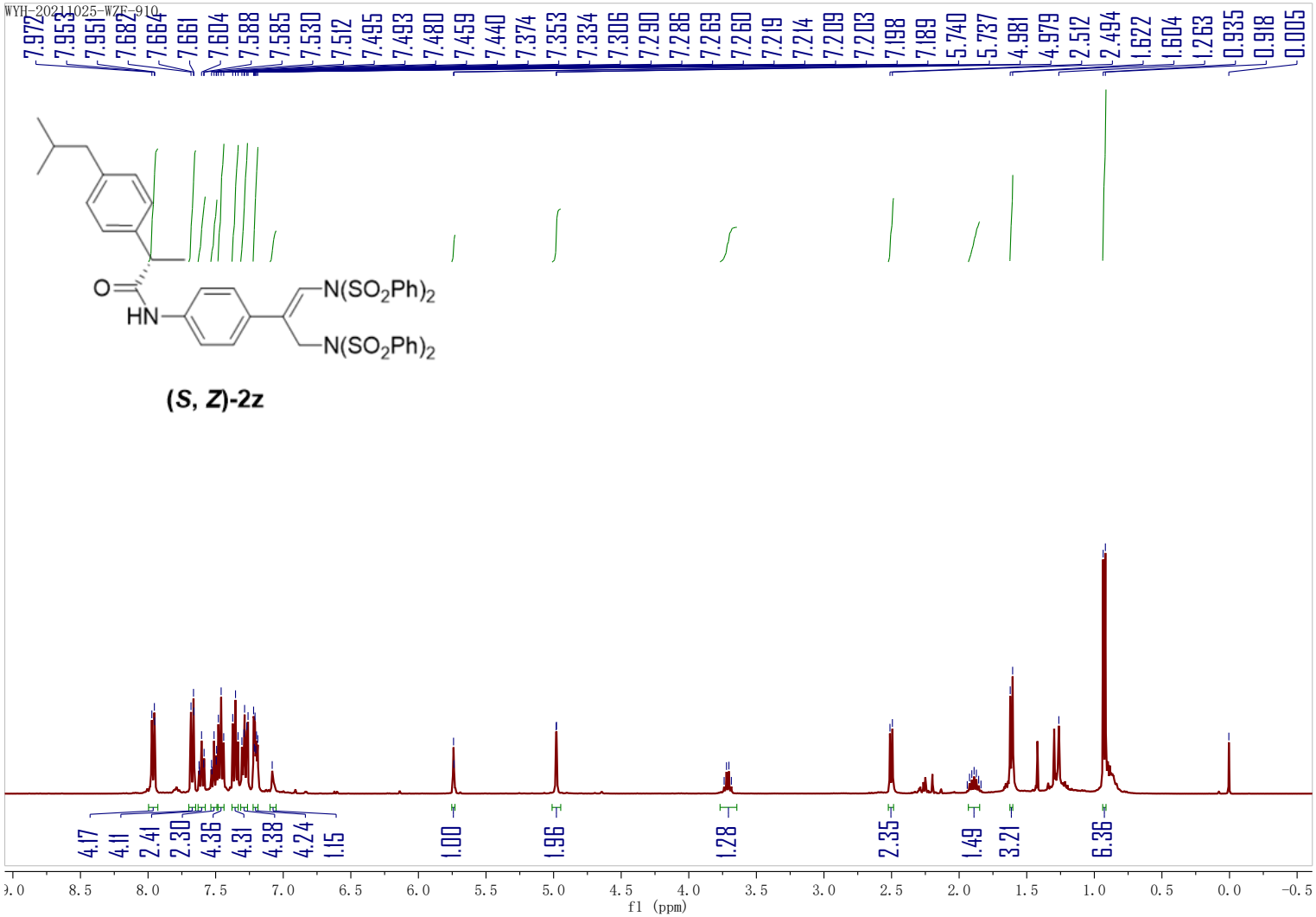

159.674
155.579
139.468
133.886
129.827
129.045
128.361
128.264
114.782
114.509
77.346
77.029
76.711
69.588
22.568
11.696
10.527
O
N(SO2Ph)2
3x
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

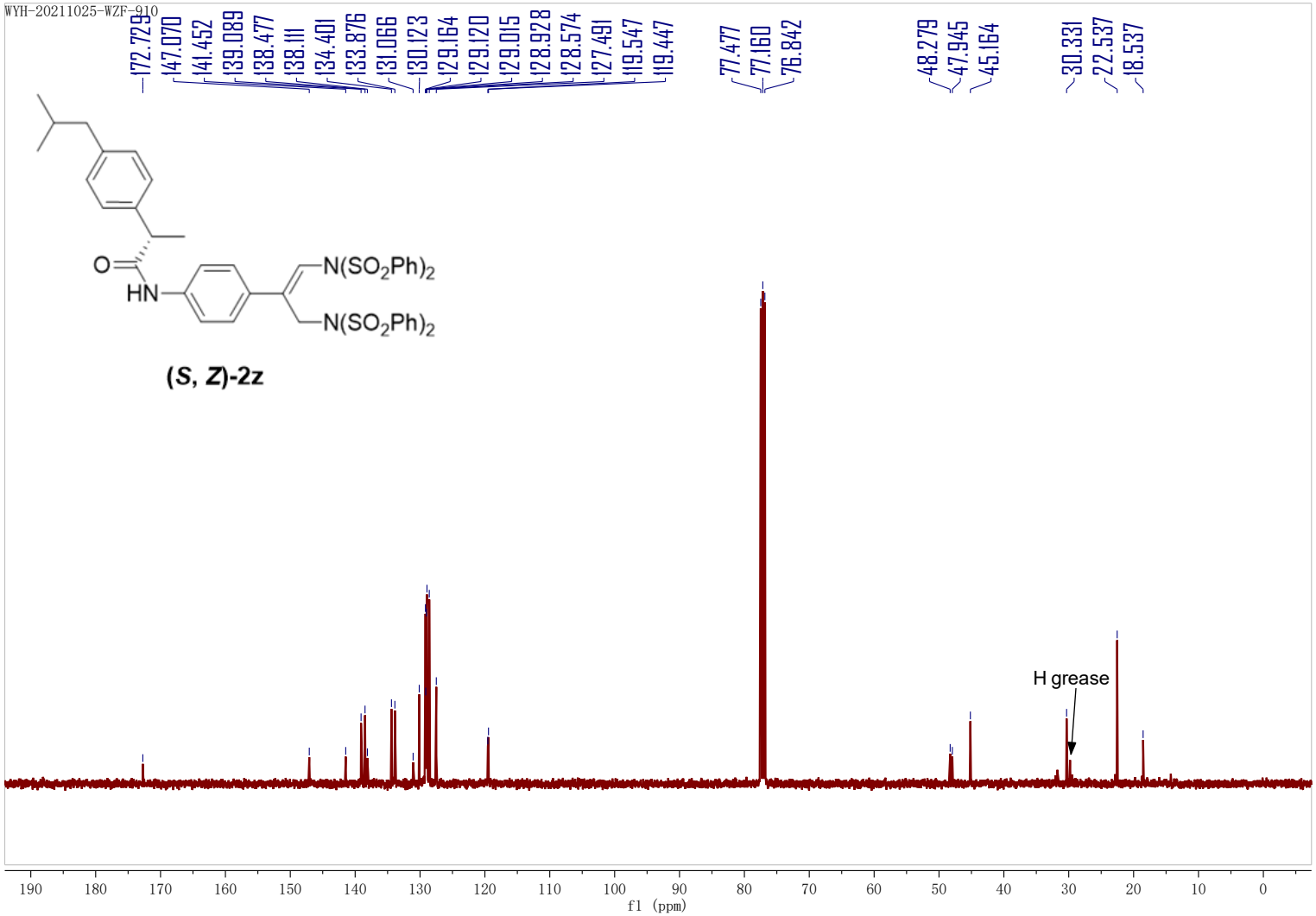

8.247
7.621
7.603
7.593
7.573
7.500
7.482
7.463
7.260
7.236
7.062
7.040
5.900
5.895
5.424
5.420
5.407
5.402
5.389
5.385
5.371
1.570
1.554
0.003
N(SO2Ph)2
(PhO2S)2N
(E)-2y
H2O
7.260
2.25
3.83
1.92
10.03
7.20
2.37
2.05
1.00
1.02
3.04
f1 (ppm)

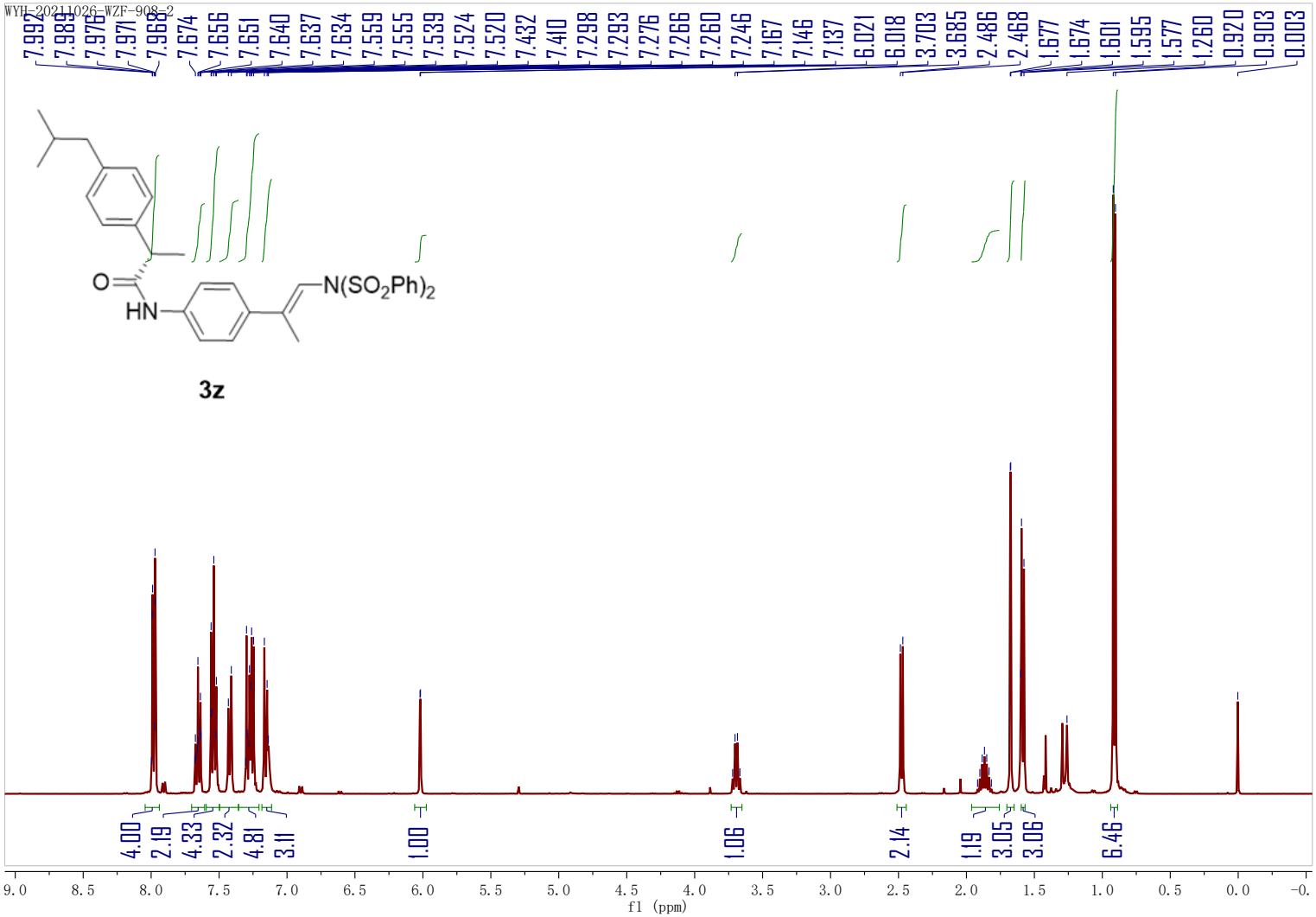

164.829
151.013
149.676
138.131
134.070
133.925
132.474
130.315
129.577
129.304
129.209
129.147
128.977
128.849
121.757
120.077
77.477
77.160
76.842
61.146
18.900
N(SO2Ph)2
O
O
(PhO2S)2N
(E)-2y
f1 (ppm)

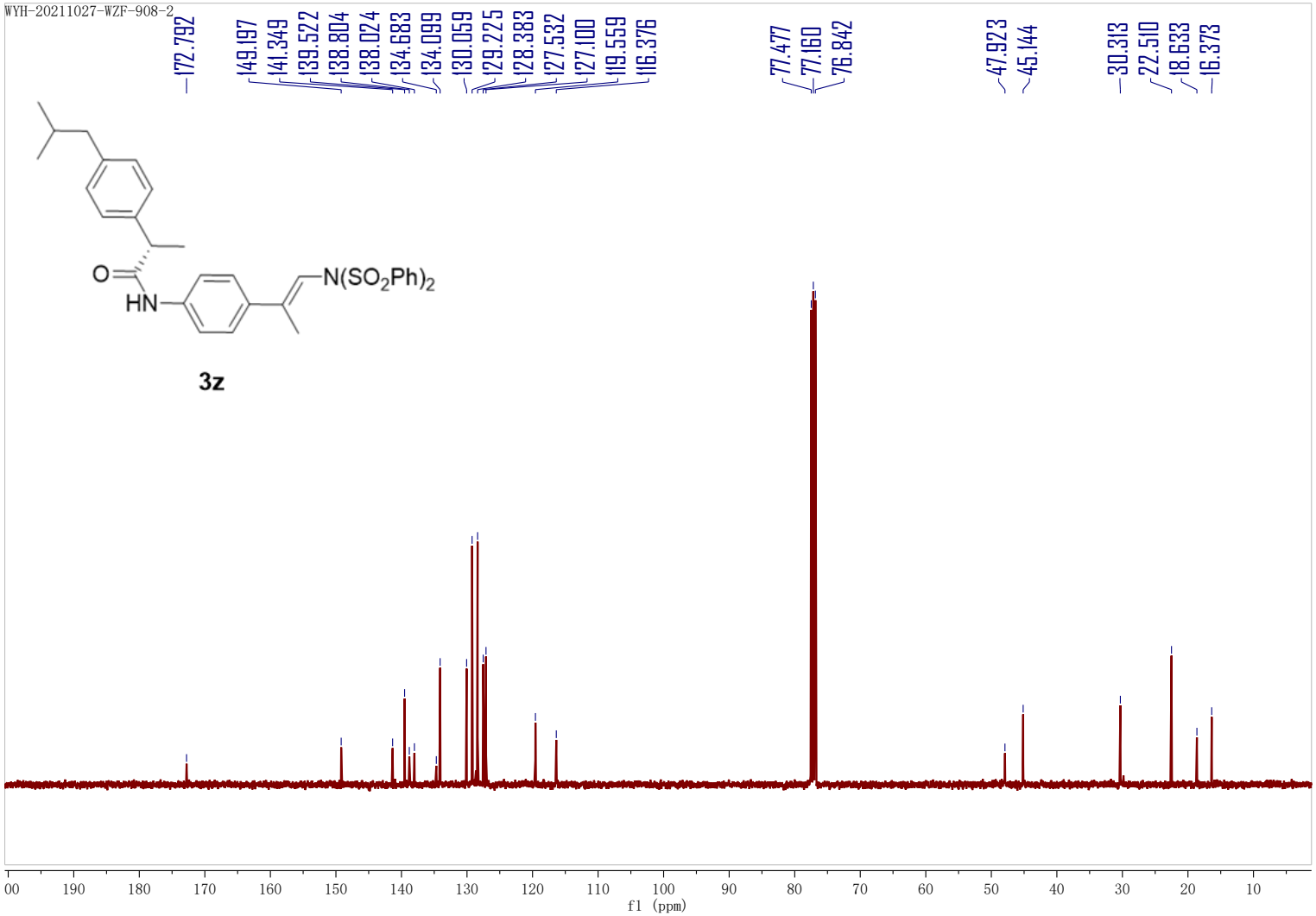

8.225
8.222
8.209
8.204
8.201
8.025
8.011
8.006
8.003
7.699
7.696
7.693
7.677
7.659
7.643
7.640
7.637
7.591
7.571
7.551
7.530
7.512
7.382
7.377
7.366
7.361
7.354
7.260
7.248
7.243
7.231
7.227
5.905
2.309
2.290
2.271
1.555
1.256
0.642
0.623
0.604
0.001
O
O
N(SO2Ph)2
3y
H2O
H grease
2.21
3.99
3.43
6.19
2.09
1.94
1.00
2.05
3.03
f1 (ppm)

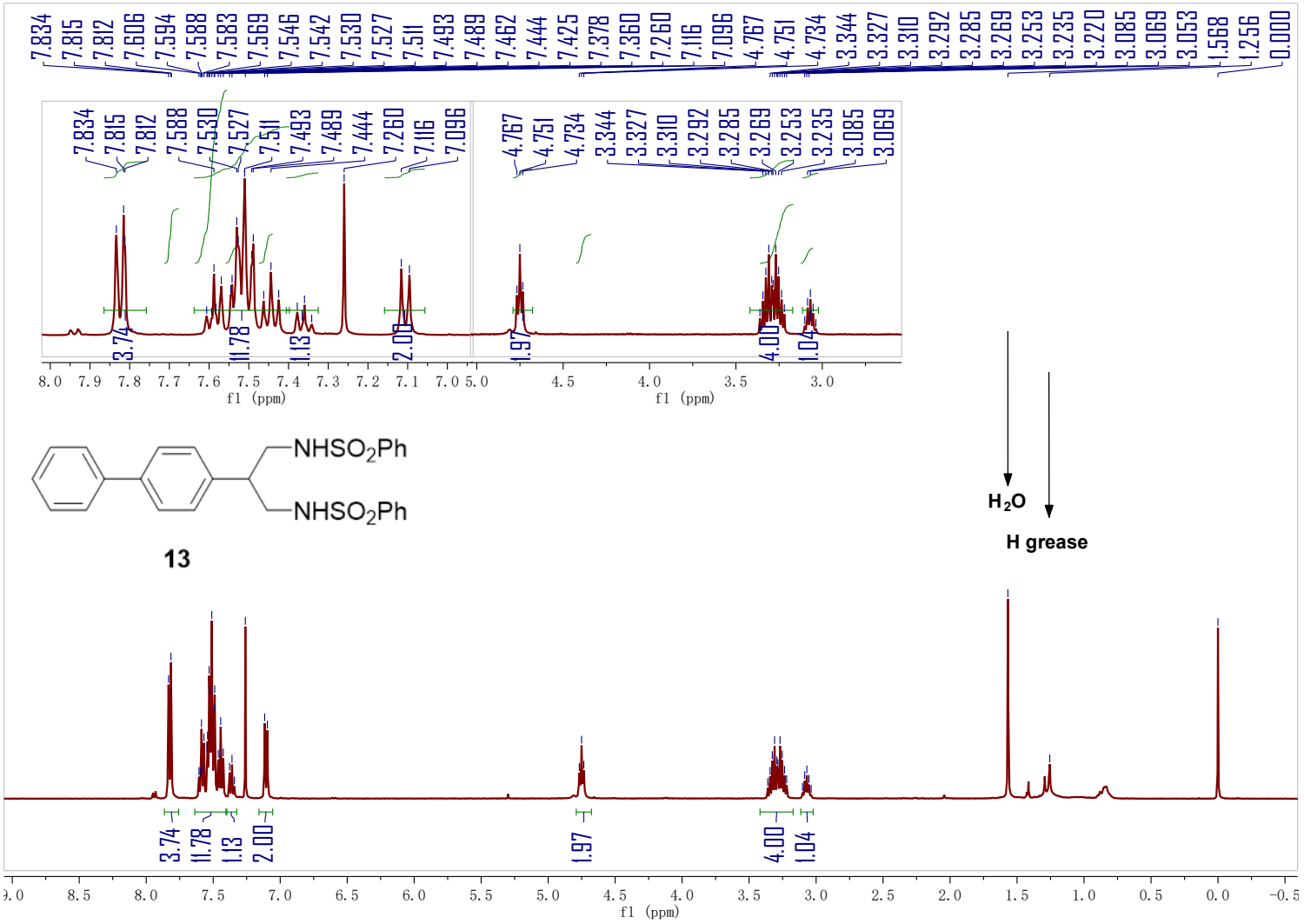

165.217
155.394
151.404
139.489
135.643
134.142
133.917
130.364
129.258
128.788
128.495
128.394
122.065
116.619
77.478
77.160
76.843
22.967
11.721
O
O
N(SO2Ph)2
3y
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

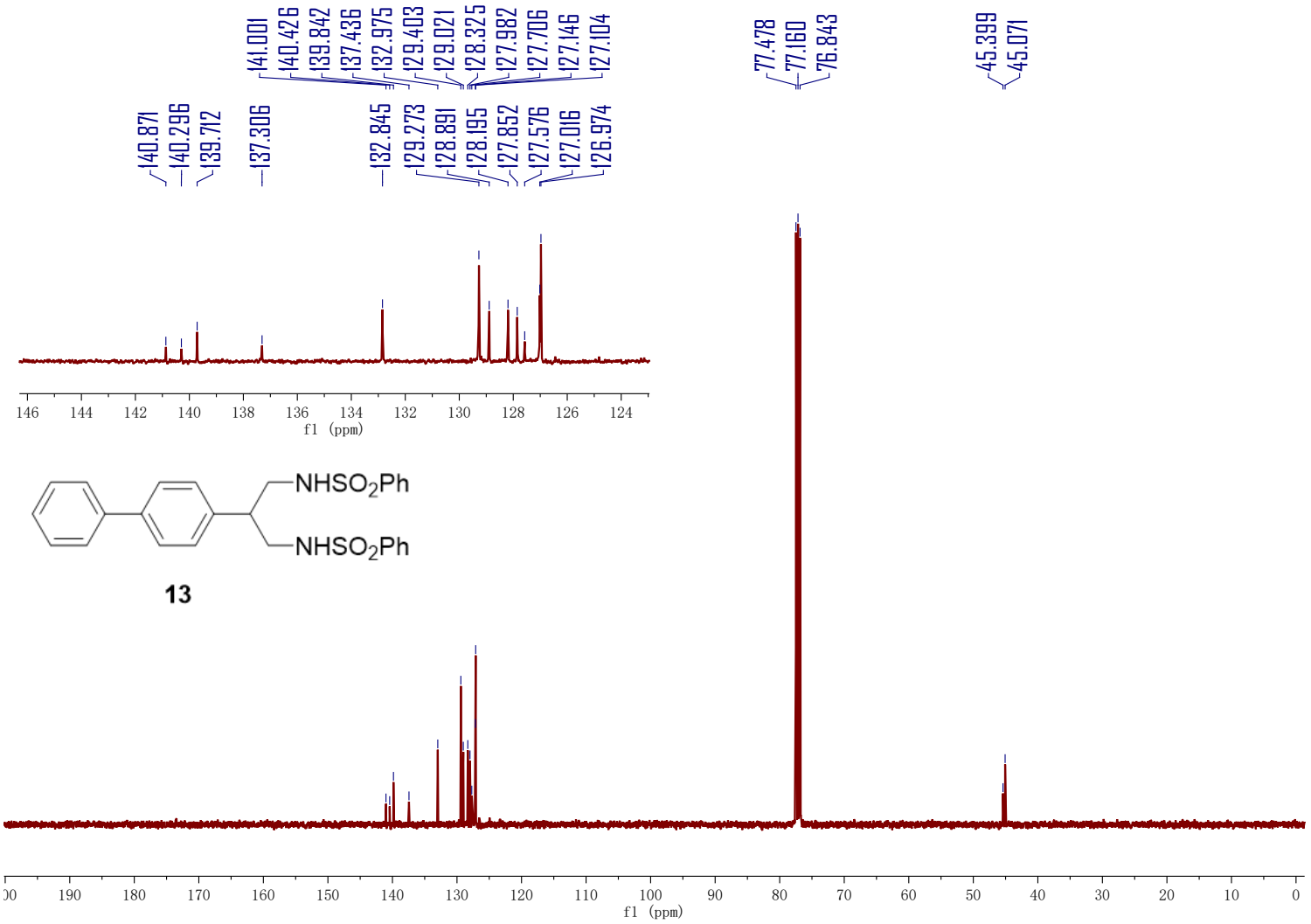

WYH-20211025-WZF-910
7.972
7.953
7.951
7.682
7.664
7.661
7.604
7.588
7.585
7.530
7.512
7.495
7.493
7.480
7.459
7.440
7.374
7.353
7.334
7.306
7.290
7.286
7.269
7.260
7.219
7.214
7.209
7.203
7.198
7.189
5.740
5.737
4.981
4.979
2.512
2.494
1.622
1.604
1.263
0.935
0.918
0.005
O
HN
N(SO2Ph)2
N(SO2Ph)2
(S, Z)-2z
4.17
4.11
2.41
2.30
4.36
4.31
4.38
4.24
1.15
1.00
1.96
1.28
2.35
1.49
3.21
6.36
f1 (ppm)

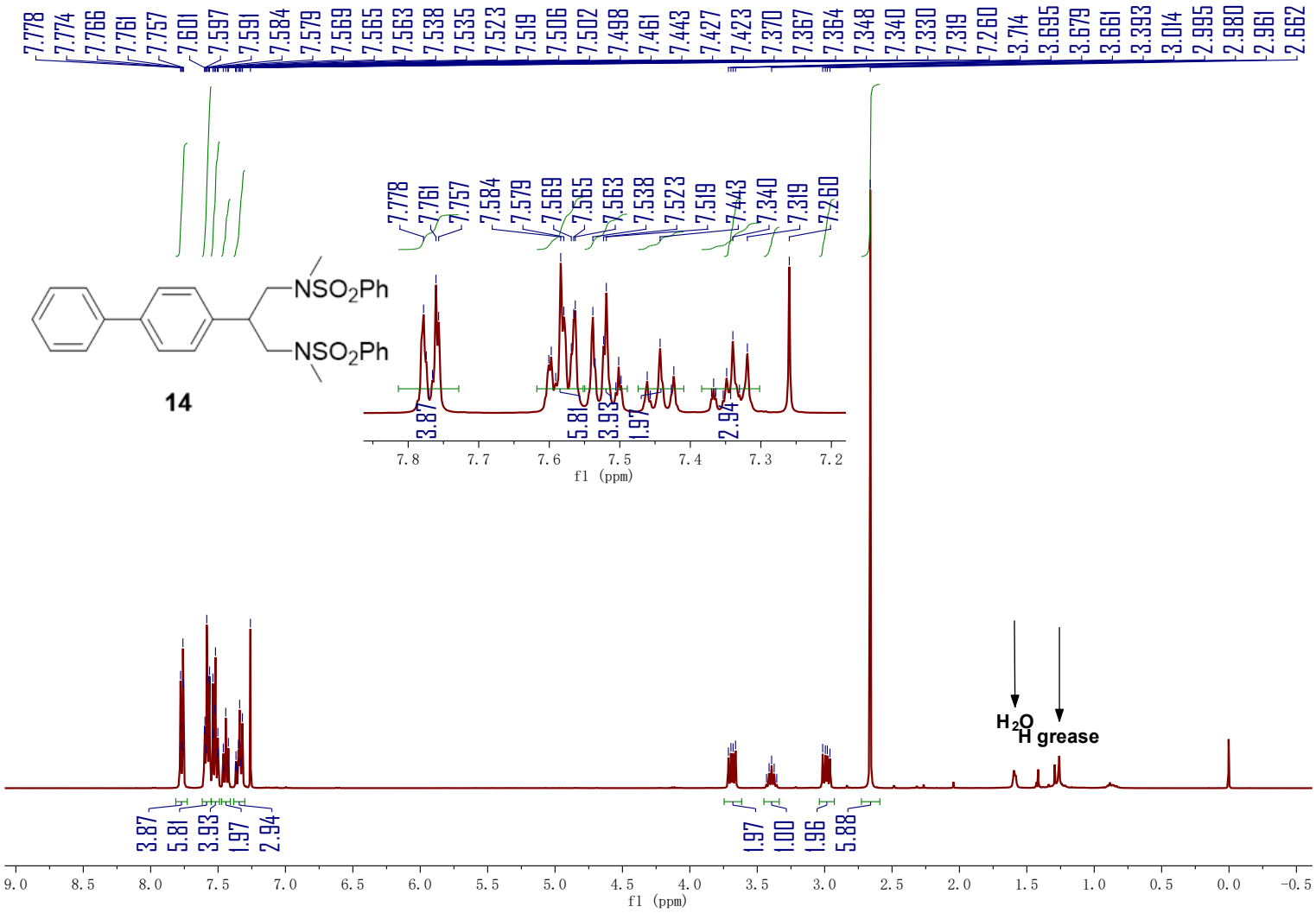

WYH-20211025-WZF-910
172.729
147.070
141.452
139.089
138.477
138.111
134.401
133.876
131.066
130.123
129.164
129.120
129.015
128.928
128.574
127.491
119.547
119.447
77.477
77.160
76.842
48.279
47.945
45.164
30.331
22.537
18.537
O
HN
N(SO2Ph)2
N(SO2Ph)2
(S, Z)-2z
H grease
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

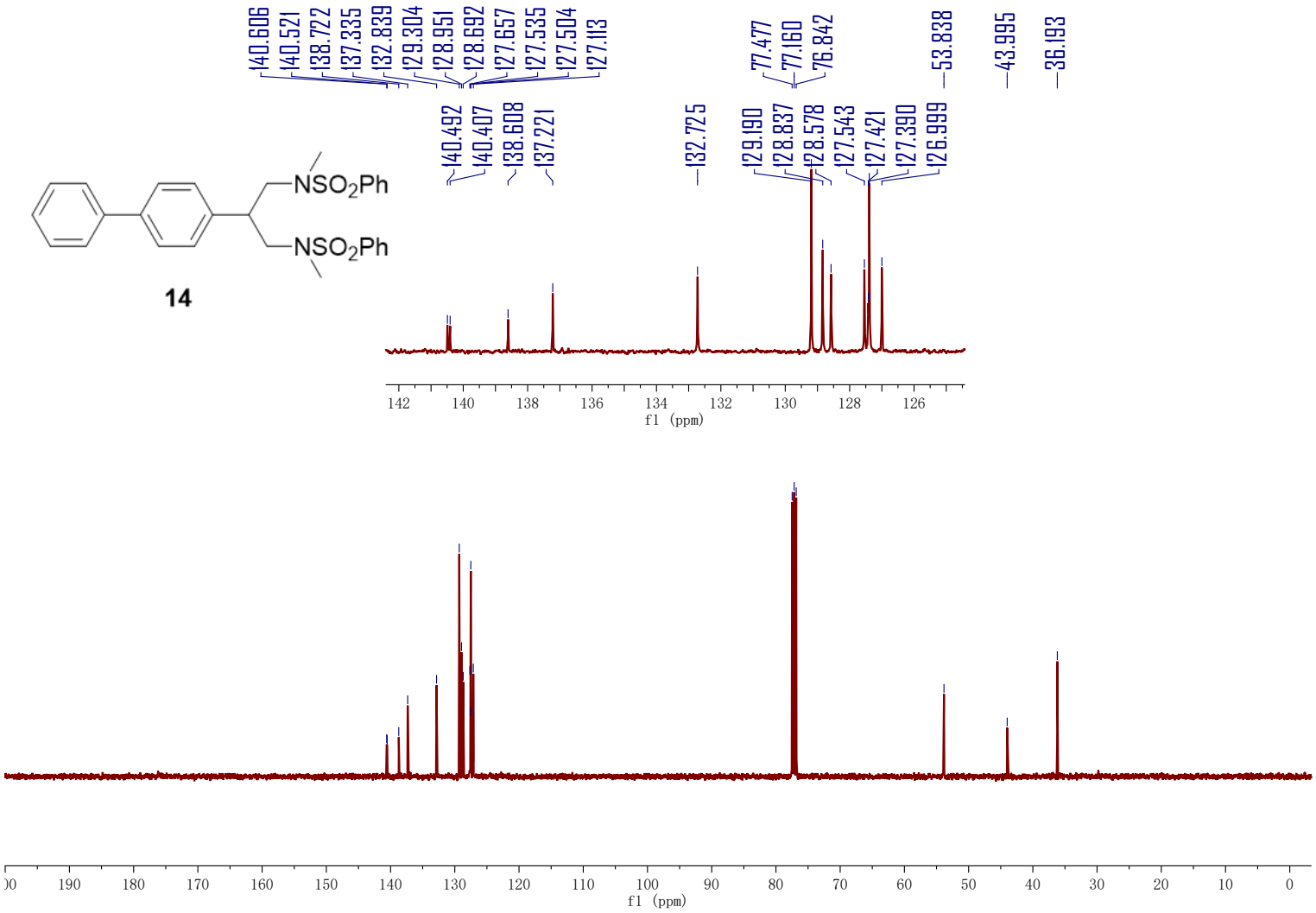

WYH-20211026-WZF-908-2
7.992
7.985
7.976
7.971
7.968
7.674
7.656
7.651
7.640
7.637
7.634
7.559
7.555
7.539
7.524
7.520
7.432
7.410
7.298
7.293
7.276
7.266
7.260
7.246
7.167
7.146
7.137
6.021
6.018
3.703
3.685
2.486
2.468
1.677
1.674
1.601
1.595
1.577
1.260
0.920
0.903
0.003
O
HN
N(SO2Ph)2
3z
4.00
2.19
4.33
2.32
4.81
3.11
1.00
1.06
2.14
1.19
3.05
3.06
6.46
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.
f1 (ppm)

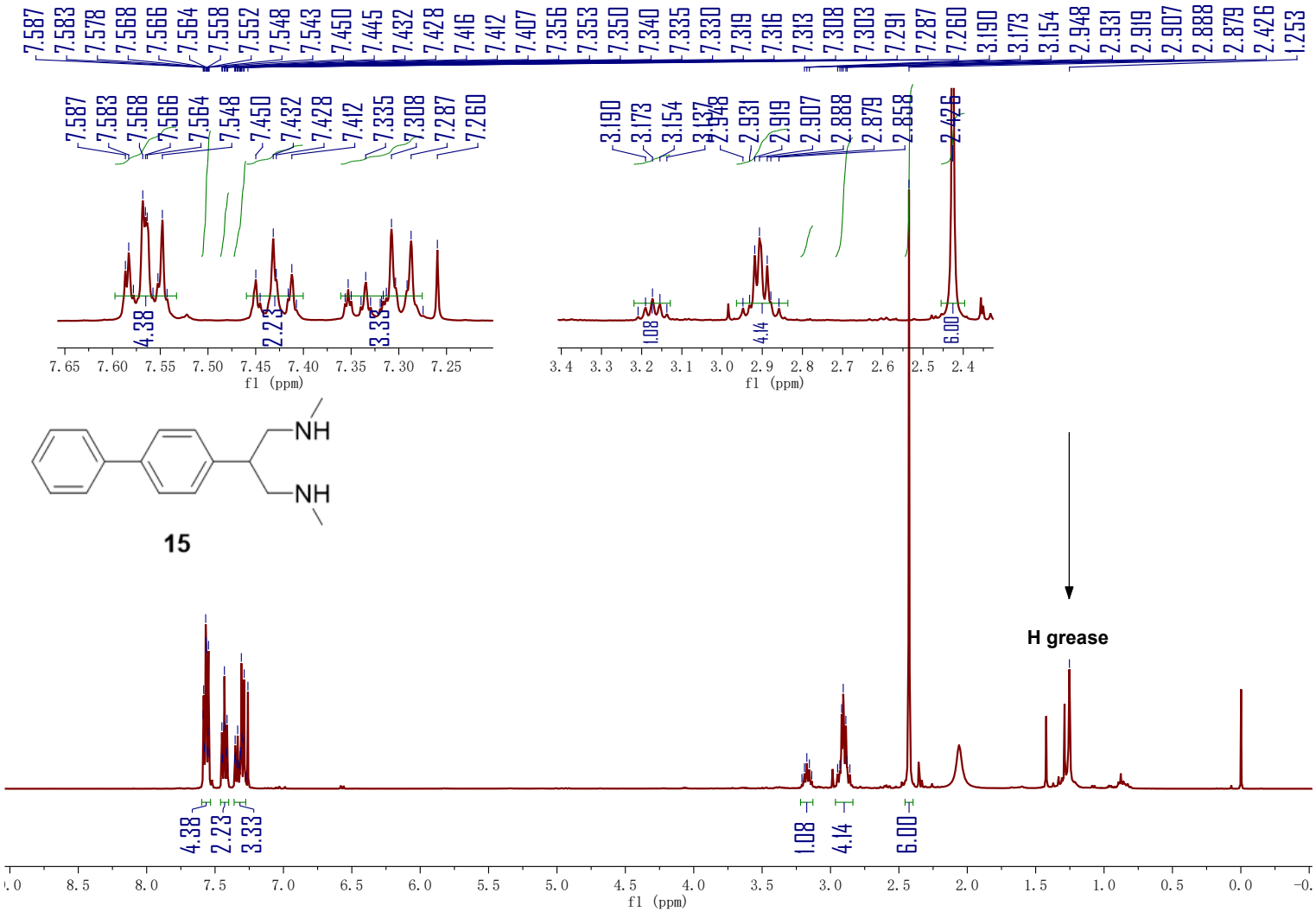

WYH-20211027-WZF-908-2
172.792
149.197
141.349
139.522
138.804
138.024
134.683
134.099
130.059
129.225
128.383
127.532
127.100
119.559
116.376
77.477
77.160
76.842
47.923
45.144
30.313
22.510
18.633
16.373
O
HN
N(SO2Ph)2
3z
f1 (ppm)

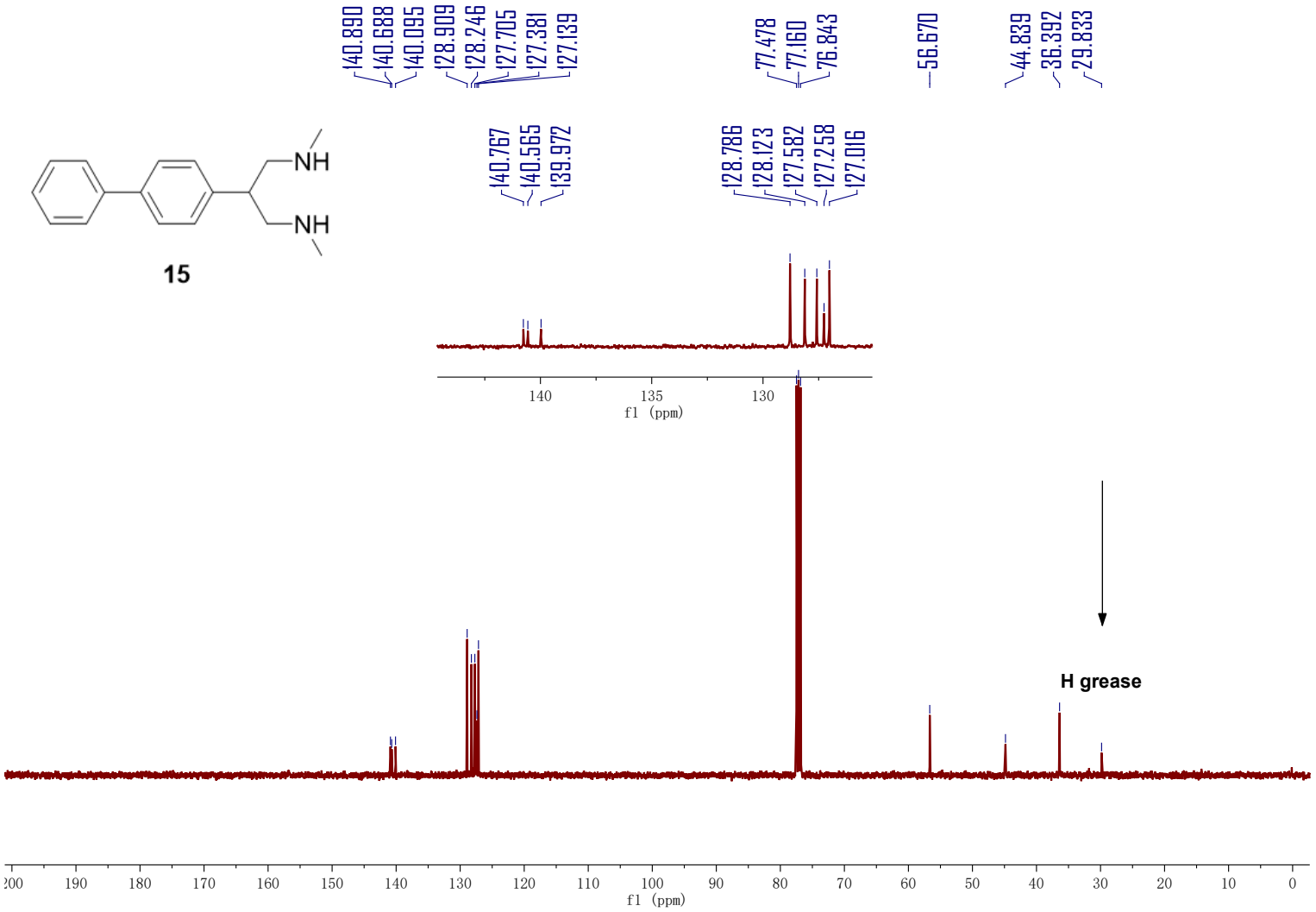

NHSO2Ph
NHSO2Ph
13
H2O
H grease
f1 (ppm)


141.001
140.426
139.842
137.436
132.975
129.403
129.021
128.325
127.982
127.706
127.146
127.104
77.478
77.160
76.843
45.399
45.071
140.871
140.296
139.712
137.306
132.845
129.273
128.891
128.195
127.852
127.576
127.016
126.974
146 144 142 140 138 136 134 132 130 128 126 124
f1 (ppm)
NHSO2Ph
NHSO2Ph
13
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


NSO2Ph
NSO2Ph
14
H2O
H grease
f1 (ppm)


140.606
140.521
138.722
137.335
132.839
129.304
128.951
128.692
127.657
127.535
127.504
127.113
77.477
77.160
76.842
53.838
43.995
36.193
140.492
140.407
138.608
137.221
132.725
129.190
128.837
128.578
127.543
127.421
127.390
126.999
NSO2Ph
NSO2Ph
14
142
140
138
136
134
132
130
128
126
f1 (ppm)
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


NH
NH
15
H grease
f1 (ppm)


140.890
140.688
140.095
128.909
128.246
127.705
127.381
127.139
77.478
77.160
76.843
56.670
44.839
36.392
29.833
140.767
140.565
139.972
128.786
128.123
127.582
127.258
127.016
NH
NH
15
140
135
130
f1 (ppm)
H grease
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)