Supporting Information

Organocatalytic Atroposelective *N*-Alkylation: Divergent Synthesis of Axially Chiral Sulfonamides and Biaryl Amino Phenols

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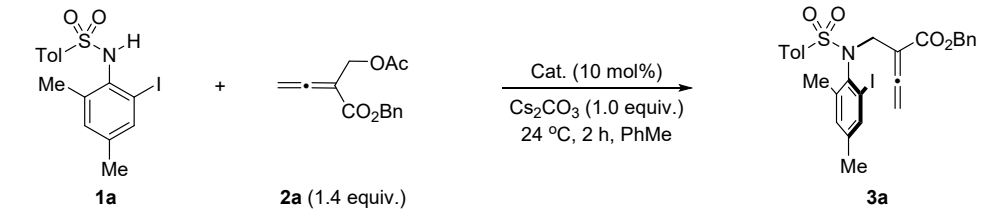
I. Supplementary Methods

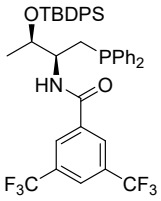
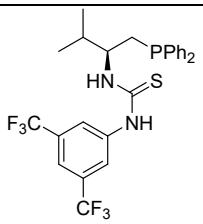
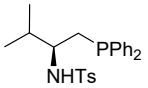
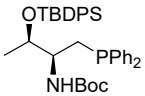
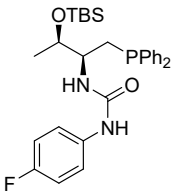
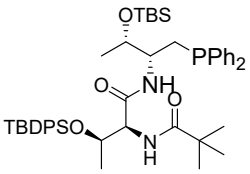
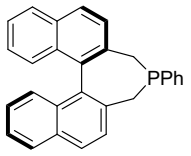
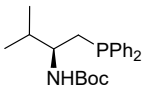
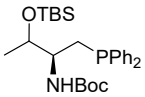
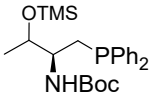
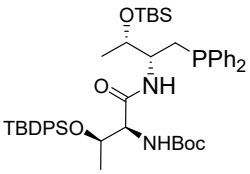
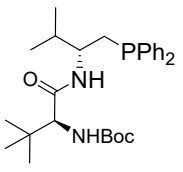
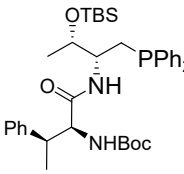
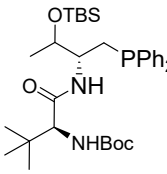
General information. All experiments were conducted under air atmosphere unless otherwise noted. ^{1}H and ^{13}C NMR spectra were recorded on a Bruker Ascend^{TM} 400 (400 MHz) spectrometer. Chemical shifts were reported in parts per million (ppm), and the residual solvent peak was used as an internal reference: ^{1}H (chloroform δ 7.26; DMSO δ 2.50), ^{13}C (chloroform δ 77.0; DMSO δ 39.5). Data are reported as follows: chemical shift, multiplicity (s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet, br = broad), coupling constants (Hz) and integration. For thin layer chromatography (TLC), Merck pre-coated TLC plates (Merck 60 F254) were used, and compounds were visualized with a UV light at 254nm. High resolution mass spectra (HRMS) were obtained on an Agilent 1290II-6545 spectrometer. Optical rotations were recorded on a Rudolph Research Analytical Autopol I automatic polarimeter. Enantiomeric excesses (*ee*) were determined by HPLC analysis on Agilent HPLC units, and Waters e2695; column of Chiralcel OD-H, Chiralpak AD-H, AS-H, ID or IE was used. Column chromatography was performed with silica gel (200-300 mesh ASTM). Unless otherwise noted, commercially available reagents purchased from Adamas-beta, TCI, or Energy Chemical and were used as received.

The 2,3-dienoate adducts 2[1], MBH acetates 4[2] and *rac*-**8**[3] were synthesized in one step from commercially available materials by literature methods.

II. Optimization of axially chiral sulfonamides synthesis

Supplementary Table 1. Attempt of Synthesis of Axially Chiral Sulfonamides from Allenoates *via* Phosphine Catalysis[a,b]

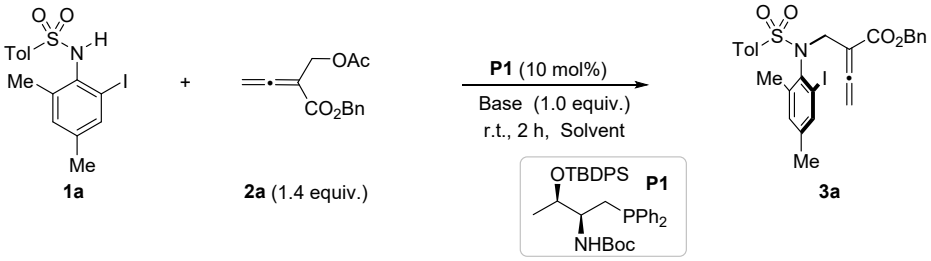


				
-2% *ee*	-1% *ee*	0% *ee*	***18% ee***	-3% *ee*
				
0% *ee*	3% *ee*	16% *ee*	13% *ee*	6% *ee*
				
3% *ee*	5% *ee*	3% *ee*	0% *ee*	

[a]Unless noted otherwise, the reactions were performed with **1** (0.05 mmol), **2** (0.07 mmol, 1.4 equiv.), cat. (10 mol%), and Cs_2CO_3 (0.05 mmol, 1.0 equiv.) in toluene (0.5 mL) at 24 °C for 2 h. [b]The *ee* value was determined by chiral HPLC.

To a Schlenk tube containing **1** (0.1 mmol), phosphine (10 mol%) and Cs_2CO_3 (0.1 mmol, 1.0 equiv.) were added toluene (0.5 mL) and dienoate **2a** (0.14 mmol, 1.4 equiv.). The reaction mixture was stirred at 24 °C for 2 h. Then, the *ee* value of **3a** was determined by chiral HPLC.

Supplementary Table 2. Base and Solvent Screening[a]



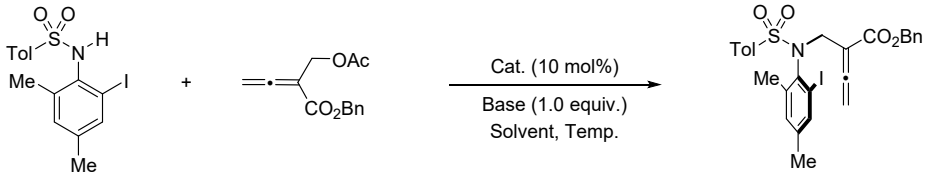
Entry	Base	Solvent	*ee* (%)[b]
1	***Cs_2CO_3***	***PhMe***	***18***
2	K_2CO_3	PhMe	12
3	Na_2CO_3	PhMe	13
4	Li_2CO_3	PhMe	-
5	$KHCO_3$	PhMe	10
6	$NaHCO_3$	PhMe	-
7	K_3PO_4	PhMe	7
8	Na_2HPO_4	PhMe	-
9	Cs_2CO_3	THF	0
10	Cs_2CO_3	$HCCl_3$	0
11	Cs_2CO_3	Et_2O	9
12	Cs_2CO_3	EtOAc	3
13	Cs_2CO_3	CH_3CN	3
14	Cs_2CO_3	PhCl	0
15	Cs_2CO_3	Hexanes	3
16	Cs_2CO_3	Acetone	0
17	Cs_2CO_3	$PhCF_3$	0

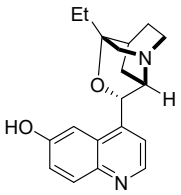
[a]Unless noted otherwise, the reactions were performed with **1** (0.05 mmol), **2** (0.07 mmol, 1.4 equiv.), **P1** (10 mol%), and Cs_2CO_3 (0.05 mmol, 1.0 equiv.) in toluene (0.5 mL) at 24 °C for 2 h. [b]The *ee* value was determined by chiral HPLC.

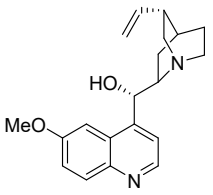
To a Schlenk tube containing **1** (0.1 mmol), **P1** (10 mol%) and base (0.1 mmol, 1.0 equiv.) were added toluene (0.5 mL) and dienoate **2a** (0.14 mmol, 1.4 equiv.). The reaction mixture was stirred at 24 °C for 2 h. Then, the *ee* value of **3a** was determined by chiral HPLC.

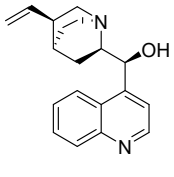
Supplementary Table 3. Optimization of the Reaction Conditions to Access

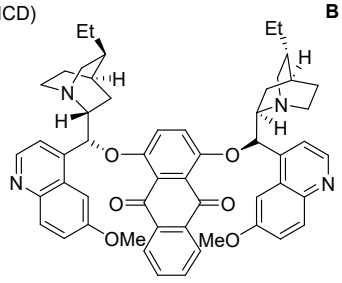
Axially Chiral Sulfonamides from Allenoates *via* Amine Catalysis[a]

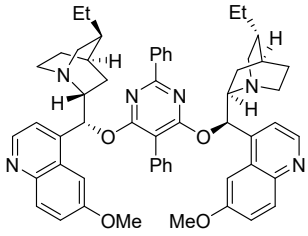












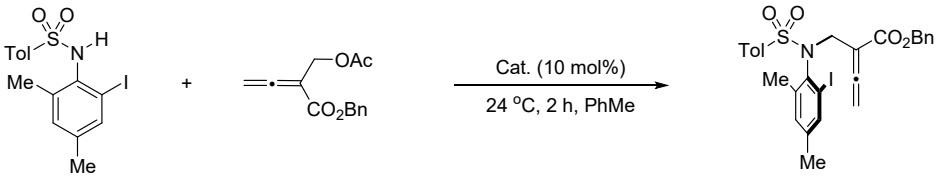
Entry	Cat.	Base	Solvent	Temp. (^{o}C)	Yield (%)[b]	*ee* (%)[c]
1	**A**	-	PhMe	24	71	51
2	**B**	-	PhMe	24	75	21
3	**C**	-	PhMe	24	63	15
4	**D**	-	PhMe	24	67	-27
5	**E**	-	PhMe	24	85	-17
6	**A**	-	Mesitylene	24	84	72
7[d]	**A**	-	Mesitylene	24	83	79
8[d]	**A**	-	Mesitylene	-20	9	88
9[d]	**A**	Cs_2CO_3	Mesitylene	-20	91	84
10[d]	**A**	Cs_2CO_3	Mesitylene	-40	92	89
11[d]	**A**	K_2CO_3	Mesitylene	-40	73	88
12[d]	**A**	Na_2CO_3	Mesitylene	-40	61	89
13[d]	**A**	$KHCO_3$	Mesitylene	-40	35	83
14[d]	**A**	K_3PO_4	Mesitylene	-40	31	89
15[d]	**A**	Cs_2CO_3	Mesitylene	-50	92	90

[a]Unless noted otherwise, the reactions were performed with **1a** (0.05 mmol, 1.0 equiv.), **2a** (0.07 mmol, 1.4 equiv.), catalyst (10 mol%), and base (1.0 equiv.) in solvent (0.5 mL) at 24 to -50 ^{o}C for 12 h. [b]Yield was detected by ^{1}H-NMR. [c]The *ee* value was determined by chiral HPLC. [d]Mesitylene (4 mL) was added.

To a Schlenk tube containing **1** (0.05 mmol), amine (10 mol%) and base (1.0 equiv.)

were added solvent (4 mL) and dienoate **2a** (0.07 mmol, 1.4 equiv.). The reaction mixture was stirred at 24 to -50 °C for 12 h. The solvent was removed by silica gel column chromatography and the residue was then purified by silica gel column chromatography to afford the product **3a**.

Supplementary Table 4. Optimization of the Reaction Conditions via Amine Catalysis[a,b]



1a **2a** (1.4 equiv.) **3a**

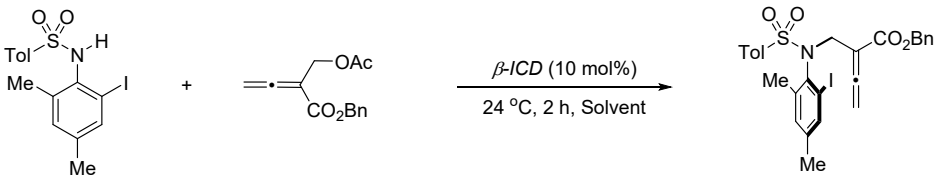
Entry	Cat.	*ee* (%)
1	Hydroquinine	19
2	***β-ICD***	***51***
3	Quinidine	21
4	Cinchonine	15
5	Cinchonidine	14
6	$(DHQD)_2AQN$	-27
7	$(DHQD)_2Pyr$	-17
8	$(DHQD)_2PHAL$	-17
9	$(DHQ)_2AQN$	-27
10	$(DHQ)_2Pyr$	3
11	$(DHQD)_2PHAL$	14

[a]Unless noted otherwise, the reactions were performed with **1a** (0.05 mmol, 1.0 equiv.), **2a** (0.07 mmol, 1.4 equiv.), catalyst (10 mol%), in toluene (0.5 mL) at 24 °C for 2 h. [b]The *ee* value was determined by chiral HPLC.

To a Schlenk tube containing **1** (0.05 mmol), amine (10 mol%) were added PhMe (0.5 mL) and dienoate **2a** (0.07 mmol, 1.4 equiv.). The reaction mixture was stirred at 24 °C for 2 h. The solvent was removed by silica gel column chromatography and the residue was then purified by silica gel column chromatography to afford the product **3a**. The *ee* value of **3a** was determined by chiral HPLC.

Supplementary Table 5. Solvent Screening of the Reaction Conditions via Amine

Catalysis[a,b]



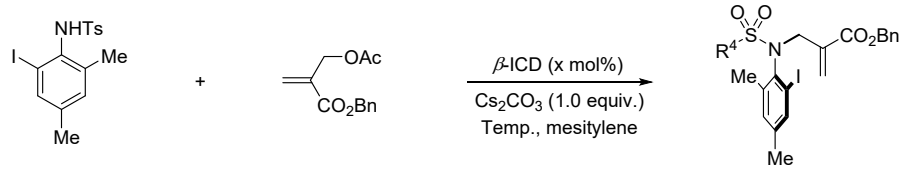
1a **2a** (1.4 equiv.) **3a**

Entry	Solvent	*ee* (%)
1	DCM	47
2	THF	5
3	EtOAc	21
4	CH_3CN	33
5	DMSO	2
6	DMF	0
7	$HCCl_3$	49
8	PhCl	57
9	PhF	55
10	*o*-DCB	53
11	$PhCF_3$	41
12	PhH	57
13	Hexanes	32
14	*o*-Xylene	41
15	*m*-Xylene	69
16	*p*-Xylene	67
17	PhEt	70
18	PhOMe	57
19	Mesitylene	72
20[c]	***Mesitylene***	***79***

[a]Unless noted otherwise, the reactions were performed with **1a** (0.05 mmol, 1.0 equiv.), **2a** (0.07 mmol, 1.4 equiv.), catalyst (10 mol%), in toluene (0.5 mL) at 24 °C for 2 h. [b]The *ee* value was determined by chiral HPLC. [c]Mesitylene (4 mL) was added. To a Schlenk tube containing **1** (0.05 mmol), amine (10 mol%) were added PhMe (0.5 mL) and dienoate **2a** (0.07 mmol, 1.4 equiv.). The reaction mixture was stirred at 24 °C for 2 h. The solvent was removed by silica gel column chromatography and the residue was then purified by silica gel column chromatography to afford the product **3a**. The *ee* value of **3a** was determined by chiral HPLC.

Supplementary Table 6. Optimization of the Reaction Conditions to Access

Axially Chiral Sulfonamides from MBH Acetate[a]



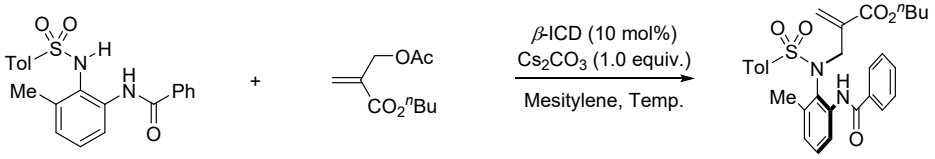
1a **4e** (1.4 equiv.) **5e**

Entry	Temp. (°C)	β-ICD (x mol%)	*ee* (%)[b]	Yield (%)[c]
1	-50	5	91	95
2	-40	5	91	96
3	-30	5	91	95
4	-20	5	87	95
5	-30	3	91	93
6[e]	-30	2	91	95
7[e]	-30	1	91	96
8[d, f]	-30	1	91	94

[a]Reaction: **1** (0.1 mmol), **4** (0.14 mmol, 1.4 equiv.), *β*-ICD (x mol%), Cs_2CO_3 (0.1 mmol, 1.0 equiv.) in mesitylene (2 mL) at -30 to -50 °C for 24 h. [b]Isolated yield. [c]The *ee* value was determined by chiral HPLC. [d]Mesitylene (1 mL) was added. [e]48 h. [f]72 h.

To a Schlenk tube containing **1** (0.1 mmol), *β*-ICD (x mol%) and Cs_2CO_3 (0.1 mmol, 1.0 equiv.) were added mesitylene and MBH acetate **4e** (0.07 mmol, 1.4 equiv.). The reaction mixture was stirred at 24 to -50 °C for 12 h. The solvent was removed by silica gel column chromatography and the residue was then purified by silica gel column chromatography to afford the product **5e**.

Supplementary Table 7. Optimization of the Selective N-H Activation[a]



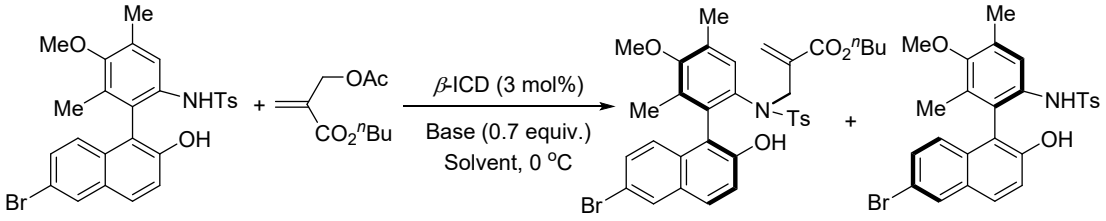
6a **4c** (1.4 equiv.) **7a**

Entry	Temp. (°C)	Yield (%)[b]	*ee* (%)[c]
1	-30	71	77
2	-50	76	84

[a]Unless noted otherwise, the reactions were performed with **6a** (0.05 mmol), **4a** (0.07 mmol, 1.4 equiv.), *β*-ICD (10 mol%), Cs_2CO_3 (0.05 mmol, 1.0 equiv.) in mesitylene (3 mL) at -30 to -50 °C for 24 h. [b]Isolated yield. [c]The *ee* value was determined by chiral HPLC.

To a Schlenk tube containing **6a** (0.05 mmol), *β*-ICD (10 mol%) and Cs_2CO_3 (0.05 mmol, 1.0 equiv.) were added mesitylene (3 mL) and MBH acetate **4c** (0.07 mmol, 1.4 equiv.). The reaction mixture was stirred at -30 to -50 °C for 24 h. The solvent was removed by silica gel column chromatography and the residue was then purified by silica gel column chromatography to afford the product **7a**.

Supplementary Table 8. Optimization of Kinetic Resolution of NOBINs[a]



(±)-**8** (0.1 mmol) **4** (0.7 equiv.) **9** (*R*)-**8**

Entry	Base	Solvent	Temp. (°C)	C[b] (%)	8a, *ee*[c]	9a, *ee*[c]	*s*[d]
1	Cs_2CO_3	THF	0	54	71	60	8
2	Cs_2CO_3	CH_3CN	0	58	33	24	2
3	Cs_2CO_3	DCM	0	30	30	70	8
4	Cs_2CO_3	toluene	0	32	36	76	11
5	Cs_2CO_3	mesitylene	0	43	37	50	4
6	Cs_2CO_3	Chlorobenzene	0	51	73	70	12
7	K_2CO_3	Chlorobenzene	0	43	60	81	16
8	Na_2CO_3	Chlorobenzene	0	22	23	81	12
9	K_2CO_3	Chlorobenzene	-10	40	52	80	14
10[e]	K_2CO_3	Chlorobenzene	0	55	77	94	27

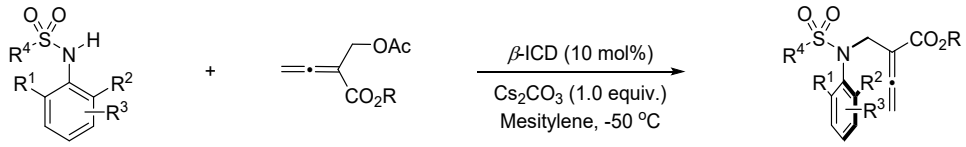
[a]Unless noted otherwise, the reactions were performed with **8a** (0.1 mmol), **4a** (0.07 mmol, 0.7 equiv.), *β*-ICD (3 mol%), Base (0.07 mmol, 0.7 equiv.) in Solvent (2 mL)

at 0 °C for 12 h. [b]Conversion (C) = $ee_{8a}/(ee_{8a}+ee_{9a})$. [c]The *ee* value was determined by chiral HPLC. [d]S = In[(1-Conv.)(1-ee_{8a})]/In(1-Conv.)(1+ee_{8a})]. [e]the reactions were performed with **8a** (0.1 mmol), **4a** (0.035 mmol, 0.35 equiv.), *β*-ICD (3 mol%), Base (0.035 mmol, 0.35 equiv.) in Solvent (8 mL) at 0 °C for 36 h

To a Schlenk tube containing **6a** (0.05 mmol), *β*-ICD (10 mol%) and Cs_2CO_3 (0.05 mmol, 1.0 equiv.) were added mesitylene (3 mL) and MBH acetate **4c** (0.07 mmol, 1.4 equiv.). The reaction mixture was stirred at -30 to -50 °C for 24 h. The solvent was removed by silica gel column chromatography and the residue was then purified by silica gel column chromatography to afford the product **7a**.

III. General procedure and spectra data of axially chiral sulfonamides and biaryl amino phenols

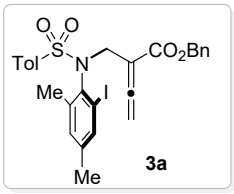
Representative procedure for synthesis of 3:



1 **2** (1.4 equiv.) **3**

To a Schlenk tube containing **1** (0.05 mmol), *β*-ICD (1.5 mg, 10 mol%) and Cs_2CO_3 (0.05 mmol, 1.0 equiv.) were added mesitylene (4 mL) and dienoate **2** (0.07 mmol, 1.4 equiv.). The reaction mixture was stirred at -50 °C for 24 hours to 7 days. The solvent was removed by silica gel column chromatography and the residue was then purified by silica gel column chromatography with hexanes/ethyl acetate as the eluent to afford the product **3**.

Characterization of compounds 3:

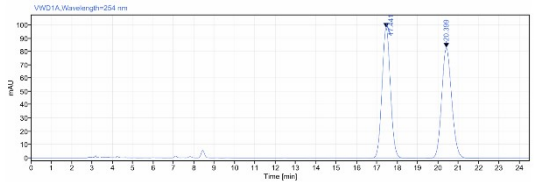


3a

3a (91% yield, Hexane-EtOAc = 10:1, Rf = 0.3). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.69 (d, *J* = 8.3 Hz, 2H), 7.44 – 7.37 (m, 1H), 7.28 – 7.14 (m, 7H), 6.86 (m, 1H), 5.03 (d, *J* = 12.5 Hz, 1H), 4.98 (d, *J* = 14.6 Hz, 1H), 4.95 (d, *J* = 12.5 Hz, 1H), 4.87 (d, *J* = 14.6 Hz, 1H), 4.49 (s, 2H), 2.35 (s, 3H), 2.15 (s, 3H), 2.06 (s, 3H). **^{13}C NMR** (100

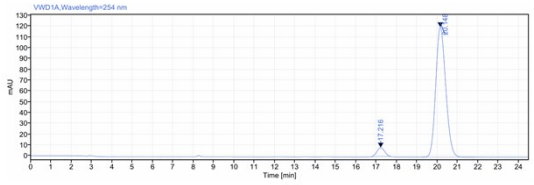
MHz, $CDCl_3$) δ 216.45, 165.7, 143.4, 141.9, 139.8, 138.9, 138.3, 137.4, 135.7, 132.1, 129.4, 128.4, 128.4, 128.1, 128.1, 101.4, 96.2, 79.3, 66.8, 48.7, 21.6, 20.4, 20.3. **HRMS (ESI)** m/z Calcd for $[C_{27}H_{26}INO_4S, M + H]^+$: 588.0700; Found: 588.0703.

Optical Rotation: $[\alpha]^{25}_D$ -30.0 (*c* = 1.0, $CHCl_3$). 90% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 17.216 min for minor isomer, t_R = 20.148 min for major isomer).



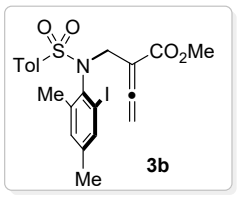
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
17.441	BB	2.24	2806.96	97.95	49.93	
20.399	BB	2.59	2814.58	82.99	50.07	
		Sum	5621.55			



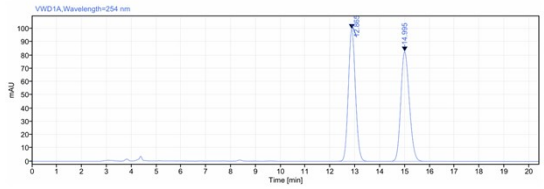
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
17.216	MM m	0.42	216.58	8.22	5.02	
20.148	BB	2.66	4100.12	120.05	94.98	
		Sum	4316.70			



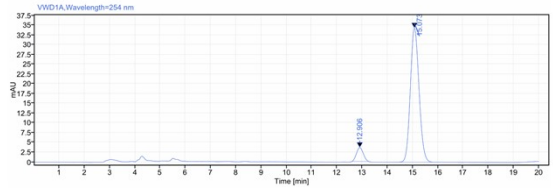
3b (92% yield, Hexane-EtOAc = 5:1, Rf = 0.4). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.78 (d, *J* = 8.2 Hz, 2H), 7.51 (s, 1H), 7.28 (d, *J* = 8.2 Hz, 2H), 6.99 (s, 1H), 5.03 (d, *J* = 14.6 Hz, 1H), 4.93 (d, *J* = 14.6 Hz, 1H), 4.54 (s, 2H), 3.61 (s, 3H), 2.42 (s, 3H), 2.24 (s, 3H), 2.19 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.2, 166.2, 143.4, 141.9, 139.8, 138.9, 138.2, 137.3, 132.1, 129.3, 128.3, 101.4, 96.0, 79.2, 52.4, 48.7, 21.5, 20.3, 20.2. **HRMS (ESI)** m/z Calcd for $[C_{20}H_{22}INO_4S, M + Na]^+$: 532.0050; Found: 532.0053.

Optical Rotation: $[\alpha]^{25}_D$ -35.0 (*c* = 1.0, $CHCl_3$). 85% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 90:10, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 12.906 min for minor isomer, t_R = 15.073 min for major isomer).



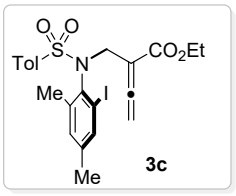
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
12.865	BB	1.44	1980.15	99.60	49.93	
14.995	BB	1.61	1985.46	82.75	50.07	
		Sum	3965.61			



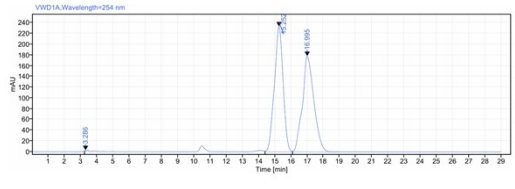
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
12.906	MM m	0.29	64.73	3.51	7.31	
15.073	BB	1.83	821.27	34.33	92.69	
		Sum	886.00			



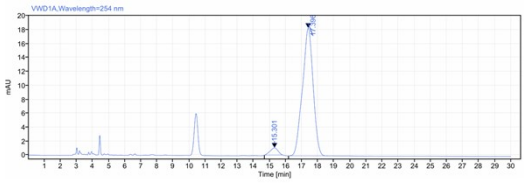
3c (85% yield, Hexane-EtOAc = 5:1, Rf = 0.4). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.77 (d, *J* = 8.2 Hz, 2H), 7.51 (s, 1H), 7.28 (d, *J* = 8.2 Hz, 2H), 6.99 (s, 1H), 5.04 (d, *J* = 14.5 Hz, 1H), 4.93 (d, *J* = 14.5 Hz, 1H), 4.64 – 4.46 (m, 2H), 4.13 – 3.96 (m, 2H), 2.41 (s, 3H), 2.23 (s, 3H), 2.20 (s, 3H), 1.14 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.2, 165.7, 143.4, 141.9, 139.8, 138.9, 138.2, 137.3, 132.0, 129.3, 128.3, 101.4, 96.23, 79.1, 61.3, 48.6, 21.5, 20.3, 20.2, 14.0. **HRMS (ESI)** m/z Calcd for $[C_{22}H_{24}INO_4S, M + Na]^+$: 548.0363; Found:548.0365.

Optical Rotation: $[\alpha]^{25}_D$ -30.0 (*c* = 1.0, $CHCl_3$). 92% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 90:10, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 15.301 min for minor isomer, t_R = 17.396 min for major isomer).



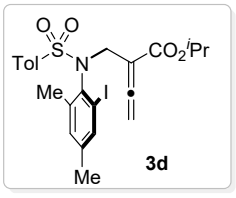
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
3.286	VV	0.11	9.89	1.89	0.06	
15.252	VV	1.70	8779.03	233.09	49.95	
16.995	VB	2.83	8786.80	177.93	49.99	
		Sum	17575.72			



Signal: VWD1A,Wavelength=254 nm

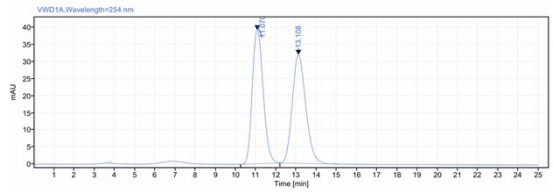
RT [min]	Type	Width [min]	Area	Height	Area%	Name
15.301	MM m	0.49	35.37	1.03	4.01	
17.396	BB	2.46	847.61	18.36	95.99	
		Sum	882.98			



3d (95% yield, Hexane-EtOAc = 5:1, Rf = 0.4). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.77 (d, *J* = 8.2 Hz, 2H), 7.50 (s, 1H), 7.28 (d, *J* = 8.2 Hz, 2H), 6.99 (s, 1H), 5.03 (d, *J* = 14.4 Hz, 1H), 4.92

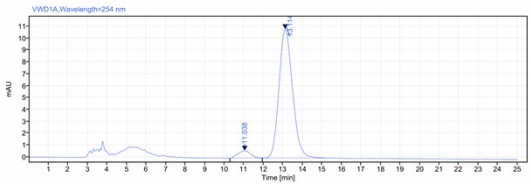
(d, J = 14.4 Hz, 1H), 4.90 – 4.84 (m, 1H), 4.64 – 4.46 (m, 2H), 2.42 (s, 3H), 2.23 (s, 3H), 2.20 (s, 3H), 1.14 (d, J = 6.3 Hz, 3H), 1.11 (d, J = 6.3 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.2, 165.3, 143.4, 142.1, 139.8, 138.9, 138.4, 137.2, 132.1, 129.4, 128.29, 101.3, 96.5, 78.9, 68.8, 48.5, 21.6, 21.5, 20.3, 20.3. **HRMS (ESI)** m/z Calcd for $[C_{22}H_{24}INO_4S, M + Na]^+$: 548.0363; Found: 548.0368.

Optical Rotation: $[\alpha]^{25}_D$ -30.0 (c = 1.0, $CHCl_3$). 90% *ee* (HPLC conditions: Chiralpak AS-H column, *n*-Hexane/*i*-PrOH = 90:10, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 11.038 min for minor isomer, t_R = 13.114 min for major isomer).



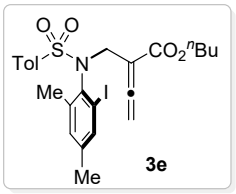
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
11.070	BB	1.95	1475.15	39.13	50.01	
13.108	BB	2.96	1474.71	31.77	49.99	
		Sum	2949.86			



Signal: VWD1A,Wavelength=254 nm

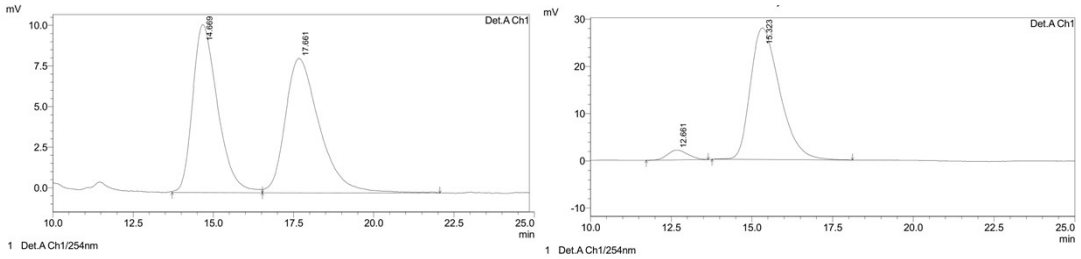
RT [min]	Type	Width [min]	Area	Height	Area%	Name
11.038	MM m	0.54	27.19	0.61	4.96	
13.114	BB	3.61	521.49	10.82	95.04	
		Sum	548.69			



3e. (94% yield, Hexane-EtOAc = 5:1, Rf = 0.4). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.77 (d, J = 8.3 Hz, 2H), 7.51 (d, J = 0.9 Hz, 1H), 7.28 (d, J = 8.3 Hz, 2H), 6.99 (d, J = 0.9 Hz, 1H), 5.05 (d, J = 14.5 Hz, 1H), 4.94 (d, J = 14.5 Hz, 1H), 4.63 – 4.47 (m, 2H), 3.99 (qt, J = 10.8, 6.7 Hz, 2H), 2.42 (s, 3H), 2.23 (s, 3H), 2.20 (s, 3H), 1.52-1.45 (m, 6.8 Hz, 2H), 1.31-1.26 (m, J = 15.2, 7.5 Hz, 2H), 0.88 (t, J = 7.4 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.2, 165.8, 143.4, 141.9, 139.8, 138.9, 138.3, 137.4, 132.0, 129.4, 128.3, 101.4, 96.3, 79.1, 65.2, 48.6, 30.4, 21.6, 20.3, 20.2, 19.0, 13.7. **HRMS (ESI)** m/z Calcd for $[C_{24}H_{28}INO_4S, M + Na]^+$: 576.0676; Found: 576.0680.

Optical Rotation: $[\alpha]^{25}_D$ -32.0 (c = 1.0, $CHCl_3$). 90% *ee* (HPLC conditions: Chiralpak AS-H column, *n*-Hexane/*i*-PrOH = 98:2, flow rate = 1.0 mL/min,

wavelength = 254 nm, t_R = 12.661 min for minor isomer, t_R = 15.323 min for major isomer).



PeakTable

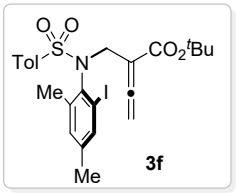
Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %
1	14.669	561904	10352	47.753
2	17.661	614785	8290	52.247
Total		1176688	18642	100.000

PeakTable

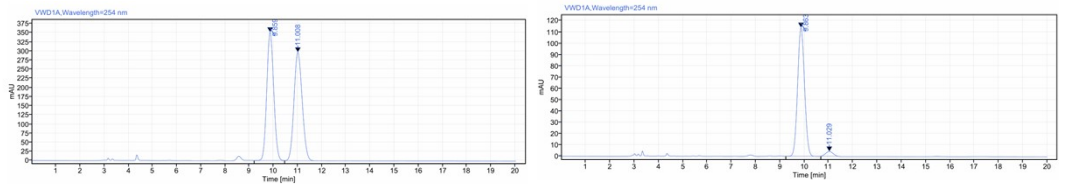
Detector A Ch1 254nm

Peak#	Ret. Time	Area	Height	Area %
1	12.661	88518	2059	4.784
2	15.323	1761711	27858	95.216
Total		1850229	29916	100.000



3f (94% yield, Hexane-EtOAc = 5:1, Rf = 0.4). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.76 (d, *J* = 8.3 Hz, 2H), 7.50 (dd, *J* = 1.4, 0.5 Hz, 1H), 7.27 (d, *J* = 8.3 Hz, 2H), 6.99 (dd, *J* = 1.4, 0.5 Hz, 1H), 5.01 (d, *J* = 14.3 Hz, 1H), 4.87 (d, *J* = 14.3 Hz, 1H), 4.56 (d, *J* = 14.1 Hz, 1H), 4.48 (d, *J* = 14.1 Hz, 1H), 2.41 (s, 3H), 2.23 (s, 3H), 2.23 (s, 3H), 1.32 (s, 9H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.3, 164.8, 143.3, 142.2, 139.8, 138.9, 138.5, 137.4, 132.1, 129.3, 128.3, 101.1, 97.5, 81.2, 78.6, 48.5, 27.7, 21.5, 20.3, 20.3. **HRMS (ESI)** m/z Calcd for $[C_{24}H_{28}INO_4S, M + Na]^+$: 576.0676; Found: 576.0681.

Optical Rotation: $[\alpha]^{25}_D$ -30.0 (*c* = 1.0, $CHCl_3$). 92% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 11.029 min for minor isomer, t_R = 9.863 min for major isomer).

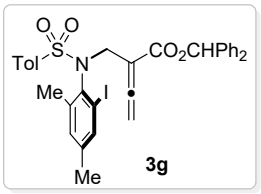


Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
9.859	BB	1.26	7036.72	351.54	50.07	
11.008	BB	1.35	7016.31	296.82	49.93	
		Sum	14053.03			

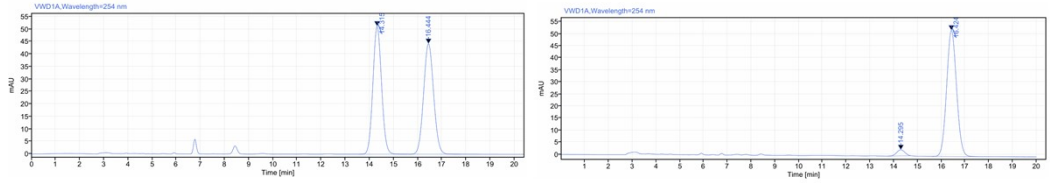
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
9.863	BM m	0.31	2256.67	113.73	96.21	
11.029	MM m	0.34	88.82	4.18	3.79	
		Sum	2345.50			



3g (85% yield, Hexane-EtOAc-Chlorobenzene = 7:1:1, Rf = 0.5). syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.66 (d, *J* = 8.0 Hz, 2H), 7.35 (s, 1H), 7.19-7.14 (m, 12H), 6.74 (s, 1H), 6.70 (s, 1H), 5.03 (d, *J* = 14.6 Hz, 1H), 4.92 (d, *J* = 14.6 Hz, 1H), 4.49 (s, 2H), 2.32 (s, 3H), 2.09 (s, 3H), 1.94 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.7, 164.8, 143.3, 141.9, 140.0, 139.7, 138.9, 138.3, 137.2, 132.0, 129.3, 128.3 127.8, 127.7, 127.2, 126.9, 101.3, 96.1, 79.1, 77.3, 48.5, 21.5, 20.3, 20.0. **HRMS (ESI)** m/z Calcd for $[C_{33}H_{30}INO_4S, M + Na]^+$: 686.0832; Found: 686.0834.

Optical Rotation: $[\alpha]^{25}_D$ -30.0 (*c* = 1.0, $CHCl_3$). 92% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 14.295 min for minor isomer, t_R = 16.424 min for major isomer).

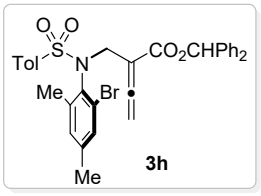


Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
14.315	BB	2.05	1281.81	51.26	49.99	
16.444	BB	2.16	1282.15	44.27	50.01	
		Sum	2563.96			

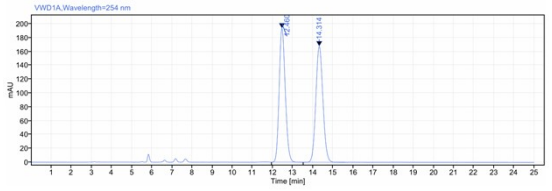
Signal: VWD1A,Wavelength=254 nm

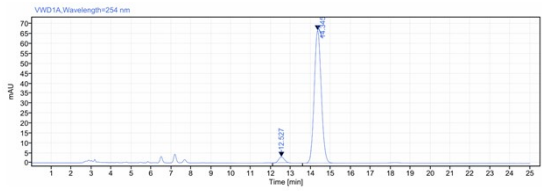
RT [min]	Type	Width [min]	Area	Height	Area%	Name
14.295	BM m	0.37	60.43	2.54	3.83	
16.424	BB	2.48	1516.51	52.33	96.17	
		Sum	1576.95			



3h (92% yield, Hexane-EtOAc = 5:1, Rf = 0.3). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.63 (d, *J* = 7.8 Hz, 2H), 7.29 – 7.10 (m, 12H), 7.03 (s, 1H), 6.74 (s, 1H), 6.70 (s, 1H), 5.06 (d, *J* = 14.6 Hz, 1H), 4.92 (d, *J* = 14.6 Hz, 1H), 4.53 (d, *J* = 14.1 Hz, 1H), 4.40 (d, *J* = 14.1 Hz, 1H), 2.33 (s, 3H), 2.13 (s, 3H), 1.99 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.6, 164.9, 143.3, 142.8, 140.15, 139.7, 138.0, 133.8, 132.0, 131.2, 129.3, 128.4, 128.2, 127.9, 127.8, 127.2, 127.0, 125.0, 96.3, 79.3, 77.4, 48.3, 21.6, 20.7, 19.8. **HRMS (ESI)** m/z Calcd for $[C_{33}H_{30}BrNO_4S, M + Na]^+$: 638.0971, 640.0956; Found: 638.0976, 640.0958.

Optical Rotation: $[\alpha]^{25}_{D}$ -8.5 (*c* = 0.5, $CHCl_3$). 93% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 12.527 min for minor isomer, t_R = 14.345 min for major isomer).



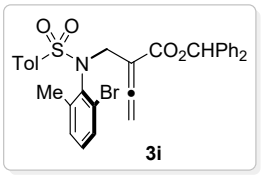


Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
12.460	BB	1.55	4084.44	193.46	49.88	
14.314	BB	2.07	4104.53	167.60	50.12	
		Sum	8188.97			

Signal: VWD1A,Wavelength=254 nm

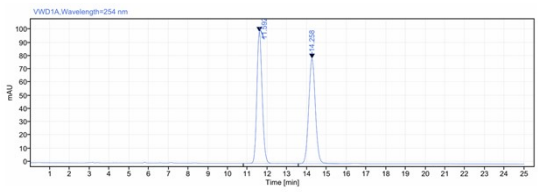
RT [min]	Type	Width [min]	Area	Height	Area%	Name
12.527	BM m	0.31	58.20	2.93	3.43	
14.345	BB	2.15	1638.18	66.86	96.57	
		Sum	1696.38			



3i

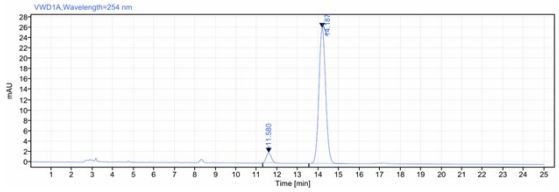
3i (84% yield, Hexane-EtOAc-Chlorobenzene = 7:1:1, Rf = 0.5). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.74 (d, *J* = 7.8 Hz, 2H), 7.41 – 7.23 (m, 13H), 7.05-6.98 (m, 2H), 6.80 (s, 1H), 5.14 (d, *J* = 14.7 Hz, 1H), 4.98 (d, *J* = 14.7 Hz, 1H), 4.64 (d, *J* = 14.1 Hz, 1H), 4.51 (d, *J* = 14.1 Hz, 1H), 2.42 (s, 3H), 2.13 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.5, 164.7, 143.5, 143.3, 140.0, 137.8, 136.4, 131.4, 130.2, 129.4, 129.3, 128.3, 128.1, 127.8, 127.7, 127.1, 126.9, 125.3, 96.1, 79.2, 77.4, 48.1, 21.5, 19.8. **HRMS (ESI)** m/z Calcd for $[C_{32}H_{28}BrNO_4S, M + Na]^+$: 624.0815, 626.0799; Found: 625.0811, 626.0804.

Optical Rotation: $[\alpha]^{25}_{D}$ -10.6 (*c* = 0.5, $CHCl_3$). 90% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 11.580 min for minor isomer, t_R = 14.187 min for major isomer).



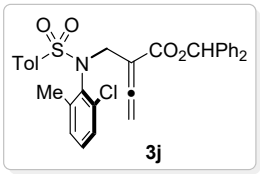
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
11.592	BB	1.80	1834.12	99.34	49.88	
14.258	BB	2.07	1842.62	79.23	50.12	
		Sum	3676.74			



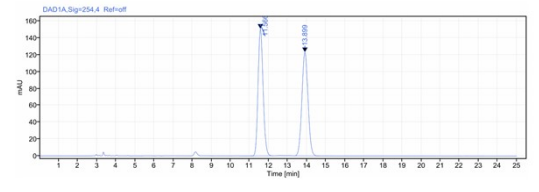
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
11.580	MM m	0.27	32.92	1.92	5.20	
14.187	BB	1.88	599.67	26.23	94.80	
		Sum	632.58			



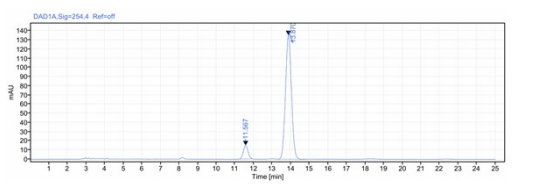
3j (91% yield, Hexane-EtOAc-Chlorobenzene = 7:1:1, Rf = 0.4). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.70 (d, *J* = 8.2 Hz, 2H), 7.33 – 7.21 (m, 12H), 7.12–7.03 (m, 2H), 7.01-6.99 (m, 1H), 6.79 (s, 1H), 5.13 (d, *J* = 14.6 Hz, 1H), 4.97 (d, *J* = 14.6 Hz, 1H), 4.66 (d, *J* = 14.0 Hz, 1H), 4.41 (d, *J* = 14.0 Hz, 1H), 2.41 (s, 3H), 2.13 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.4, 164.7, 143.4, 143.3, 140.0, 137.6, 135.0, 134.9, 129.6, 129.3, 129.1, 128.4, 128.0, 127.9, 127.8, 127.8, 127.1, 126.9, 96.1, 79.2, 77.4, 48.1, 21.5, 19.4. **HRMS (ESI)** m/z Calcd for $[C_{32}H_{28}ClNO_4S, M + Na]^+$: 580.1320, 582.1304; Found: 580.1325, 582.1308.

Optical Rotation: $[\alpha]^{25}_D$ -5.4 (*c* = 0.25, $CHCl_3$). 84% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 11.567 min for minor isomer, t_R = 13.870 min for major isomer).



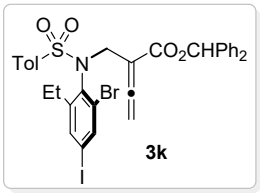
Signal: DAD1A,Sig=254,4 Ref=off

RT [min]	Type	Width [min]	Area	Height	Area%	Name
11.566	BB	1.18	2769.63	150.94	50.13	
13.899	BB	1.31	2755.38	123.10	49.87	
		Sum	5525.01			



Signal: DAD1A,Sig=254,4 Ref=off

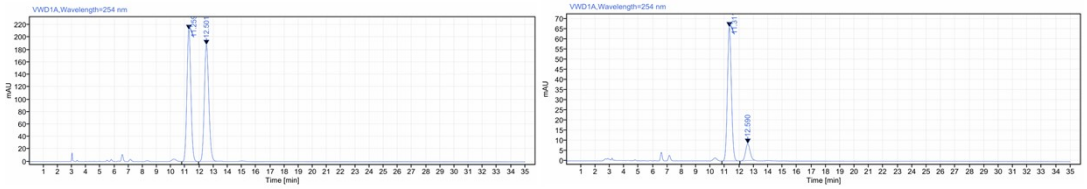
RT [min]	Type	Width [min]	Area	Height	Area%	Name
11.567	MM m	0.28	254.95	14.60	7.80	
13.870	VB	1.45	3015.27	134.89	92.20	
		Sum	3270.22			



3k (98% yield, Hexane-EtOAc = 5:1, Rf = 0.3). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.85 – 7.67 (m, 3H), 7.37 – 7.22 (m, 13H), 6.80 (s, 1H), 5.15 (d, *J* = 14.8 Hz, 1H), 5.04 (d, J =

14.8 Hz, 1H), 4.58 (d, J = 14.2 Hz, 1H), 4.52 (d, J = 14.2 Hz, 1H), 2.56 (dq, *J* = 15.1, 7.5 Hz, 1H), 2.43 (s, 3H), 2.31 (dq, *J* = 15.0, 7.5 Hz, 1H), 0.97 (t, *J* = 7.5 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.8, 164.7, 149.8, 143.7, 140.1, 139.9, 138.7, 138.0, 132.1, 129.4, 128.4, 127.9, 127.8, 127.3, 127.0, 123.0, 102.0, 95.9, 79.4, 77.5, 48.8, 25.3, 21.6, 14.0. **HRMS (ESI)** m/z Calcd for $[C_{33}H_{29Br}INO_4S, M + Na]^+$: 763.9938, 765,9922; Found: 763.9939, 769.9924.

Optical Rotation: $[\alpha]^{25}_D$ -15.3 (*c* = 0.5, $CHCl_3$). 75% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 12.590 min for minor isomer, t_R = 11.311 min for major isomer).

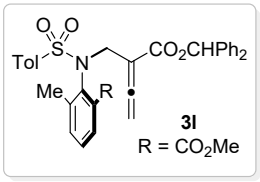


Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
11.259	VB	1.19	4113.13	211.82	49.94	
12.501	BB	1.32	4123.40	187.34	50.06	
		Sum	8236.53			

Signal: VWD1A,Wavelength=254 nm

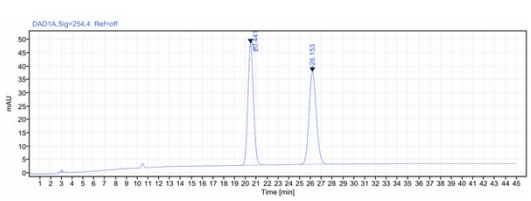
RT [min]	Type	Width [min]	Area	Height	Area%	Name
11.311	BM m	0.30	1274.89	66.08	87.70	
12.590	BM m	0.33	178.86	8.30	12.30	
		Sum	1453.75			



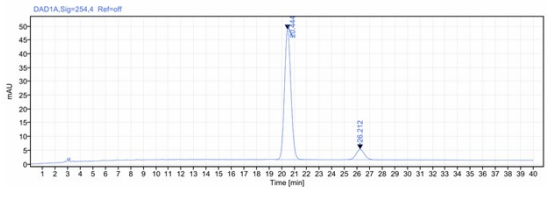
3l (72% yield, Hexane-EtOAc-Chlorobenzene = 7:1:1, R_f = 0.5). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.63 (dd, *J* = 6.6, 2.8 Hz, 1H), 7.55 (d, *J* = 8.2 Hz, 2H), 7.29-7.18 (m, 14H), 6.78 (s, 1H), 5.15 (d, *J* = 14.6 Hz, 1H), 5.03 (d, *J* = 14.6 Hz, 1H), 4.75 (d, *J* = 14.4 Hz, 1H), 4.66 (d, *J* = 14.4 Hz, 1H), 3.45 (s, 3H), 2.39 (s, 3H), 1.83 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.7, 166.6, 165.2, 142.9, 141.3, 140.2, 138.3, 136.5, 134.8, 132.4, 129.5, 129.3, 128.4, 128.3, 128.1, 127.8, 127.8, 127.5, 127.0, 96.9, 78.9, 51.8, 50.3, 21.5, 18.7. **HRMS (ESI)** m/z Calcd for $[C_{34}H_{31}NO_6S, M + Na]^+$: 604.1764; Found: 604.1767.

Optical Rotation: $[\alpha]^{25}_D$ -45.0 (*c* = 1.0, $CHCl_3$). 82% *ee* (HPLC conditions:

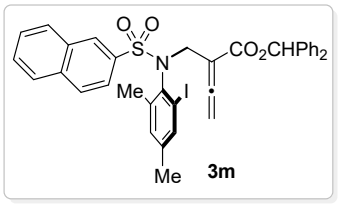
Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 26.212 min for minor isomer, t_R = 20.444 min for major isomer).



Signal:	DAD1A,Sig=254,4 Ref=off					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
20.441	BB	2.31	1619.47	45.48	50.02	
26.153	BB	2.75	1617.87	34.44	49.98	
		Sum	3237.34			

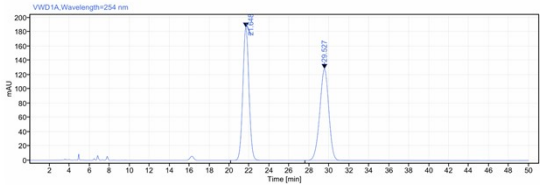


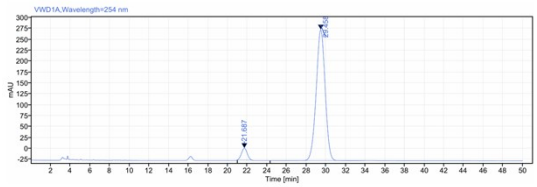
Signal:	DAD1A,Sig=254,4 Ref=off					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
20.444	BB	2.23	1677.13	47.07	90.76	
26.212	BB	2.39	170.70	3.68	9.24	
		Sum	1847.83			



3m (98% yield, Hexane-EtOAc-Chlorobenzene = 7:1:1, R_f = 0.5). White solid. MP: 69-70 °C. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.40 (s, 1H), 7.94 – 7.82 (m, 4H), 7.26-7.53 (m, 2H), 7.40 (d, *J* = 1.4 Hz, 1H), 7.25 – 7.19 (m, 10H), 6.85 – 6.79 (m, 1H), 6.75 (s, 1H), 5.08 (d, *J* = 14.7 Hz, 1H), 4.97 (d, *J* = 14.7 Hz, 1H), 4.63 (s, 2H), 2.16 (s, 3H), 1.99 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.8, 164.9, 142.0, 140.1, 140.1, 139.9, 139.0, 138.3, 137.1, 135.0, 132.3, 132.2, 129.8, 129.5, 129.4, 128.9, 128.6, 128.4, 127.9, 127.9, 127.8, 127.3, 127.0, 124.1, 101.4, 96.1, 79.3, 77.4, 48.8, 20.5, 20.2. **HRMS (ESI)** m/z Calcd for [$C_{36}H_{30}INO_4S$, M + Na]$^+$: 722.0832; Found: 722.0833.

Optical Rotation: $[\alpha]^{25}_D$ -44.0 (*c* = 1.0, $CHCl_3$). 89% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 21.687 min for minor isomer, t_R = 29.458 min for major isomer).



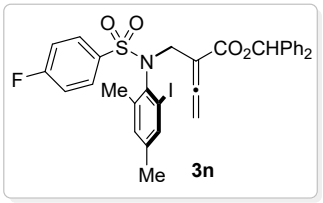


Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
21.648	BB	3.95	7963.39	186.11	49.67	
29.527	BB	4.44	8067.77	128.10	50.33	
		Sum	16031.16			

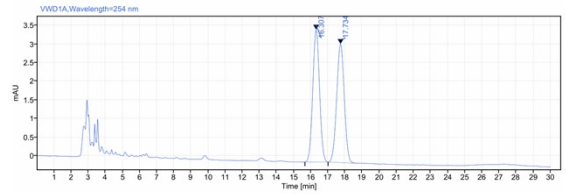
Signal: VWD1A,Wavelength=254 nm

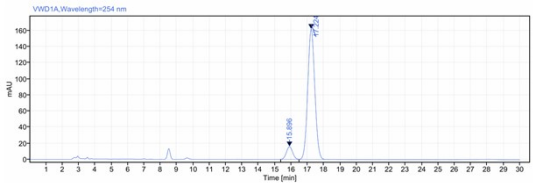
RT [min]	Type	Width [min]	Area	Height	Area%	Name
21.687	MM m	0.64	1110.48	27.25	5.53	
29.458	MM m	0.98	18957.38	300.02	94.47	
		Sum	20067.86			



3n (90% yield, Hexane-EtOAc-Chlorobenzene = 7:1:1, R_f = 0.5). White solid. MP: 69-70 °C. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.88-7.84 (m, 2H), 7.43 (s, 1H), 7.30 – 7.19 (m, 10H), 7.10 (t, *J* = 8.6 Hz, 2H), 6.85 (s, 1H), 6.78 (s, 1H), 5.08 (d, *J* = 14.7 Hz, 1H), 4.97 (d, *J* = 14.7 Hz, 1H), 4.59 (d, *J* = 14.2 Hz, 1H), 4.54 (d, *J* = 14.2 Hz, 1H), 2.19 (s, 3H), 2.04 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.7, 165.2 (d, $^1J_{C\text{-}F}$ = 252.7 Hz), 164.8, 141.9, 140.0, 140.0, 138.9, 137.3 (d, $^4J_{C\text{-}F}$ = 3.0 Hz), 136.9, 132.2, 131.0 (d, $^3J_{C\text{-}F}$ = 9.3 Hz), 128.3, 127.9, 127.8, 127.2, 126.9, 115.8 (d, $^2J_{C\text{-}F}$ = 22.4 Hz), 101.0, 95.9, 79.2, 77.4, 48.8, 20.6, 20.0. **^{19}F NMR** (376 MHz, $CDCl_3$) δ -105.53. **HRMS (ESI)** m/z Calcd for $[C_{32}H_{27}FINO_4S, M + Na]^+$: 690.0582; Found: 690.0587.

Optical Rotation: $[\alpha]^{25}_D$ -30.0 (*c* = 1.0, $CHCl_3$). 84% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 90:10, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 15.896 min for minor isomer, t_R = 17.224 min for major isomer).



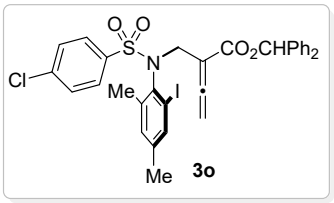


Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
16.307	BB	1.35	97.73	3.54	49.90	
17.734	BB	1.69	98.13	3.17	50.10	
		Sum	195.85			

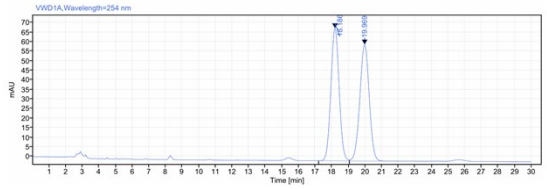
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
15.896	MM m	0.41	422.13	15.93	7.95	
17.224	VB	1.84	4887.85	162.26	92.05	
		Sum	5309.97			



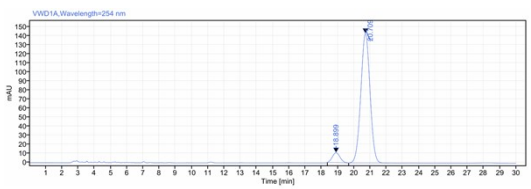
3o (98% yield, Hexane-EtOAc-Chlorobenzene = 7:1:1, R_f = 0.5). White solid. MP: 139-140 °C. **^{1}H NMR** (400 MHz, $CDCl_3$)δ 7.82 (d, *J* = 8.6 Hz, 2H), 7.45 (s, 1H), 7.43 (d, *J* = 8.6 Hz, 2H), 7.33 – 7.25 (m, 10H), 6.88 (s, 1H), 6.81 (s, 1H), 5.10 (d, *J* = 14.7 Hz, 1H), 4.99 (d, *J* = 14.7 Hz, 1H), 4.63 (d, *J* = 14.1 Hz, 1H), 4.56 (d, *J* = 14.1 Hz, 1H), 2.21 (s, 3H), 2.05 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.7, 164.8, 141.9, 140.0, 139.9, 139.7, 139.0, 138.9, 136.8, 132.2, 129.8, 128.9, 128.3, 127.9, 127.8, 127.3, 126.9, 101.1, 95.9, 77.4, 48.9, 20.4, 20.0. **HRMS (ESI)** m/z Calcd for $[C_{32}H_{27}ClINO_4S, M + Na]^+$: 706.0286; Found: 706.0286.

Optical Rotation: $[\alpha]^{25}_D$ -33.0 (*c* = 1.0, $CHCl_3$). 88% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 90:10, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 18.899 min for minor isomer, t_R = 20.709 min for major isomer).



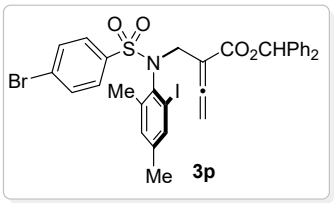
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
18.186	BV	1.85	2382.74	69.18	49.92	
19.969	VB	2.96	2390.02	60.76	50.08	
		Sum	4772.77			



Signal: VWD1A,Wavelength=254 nm

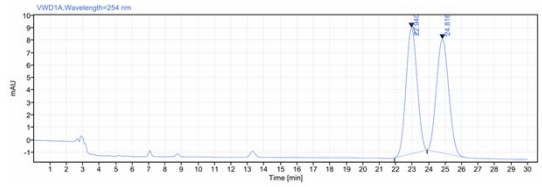
RT [min]	Type	Width [min]	Area	Height	Area%	Name
18.899	MM m	0.52	357.49	10.95	5.95	
20.709	BB	2.45	5651.63	143.25	94.05	
		Sum	6009.12			



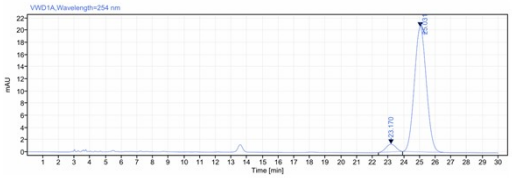
3p (92% yield, Hexane-EtOAc-Chlorobenzene = 7:1:1, R_f = 0.4). White solid. MP: 139-149 °C. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.75 (d, *J* = 8.5 Hz, 2H), 7.59 (d, *J* = 8.5 Hz, 2H), 7.45 (s, 1H), 7.34 – 7.22 (m, 10H), 6.88 (s, 1H), 6.81 (s, 1H), 5.09 (d, *J* = 14.7 Hz, 1H), 4.99 (d, *J* = 14.7 Hz, 1H), 4.63 (d, *J* = 14.1 Hz, 1H), 4.56 (d, *J* = 14.1 Hz, 1H), 2.21 (s, 3H), 2.05 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.7, 164.8, 141.9, 140.2, 140.0, 139.9, 138.9, 136.7, 132.2, 131.9, 129.9, 128.3, 127.9, 127.8, 127.5, 127.3, 126.9, 101.1, 95.8, 79.2, 77.4, 48.9, 20.4, 20.0.

HRMS (ESI) m/z Calcd for $[C_{32}H_{27}BrINO_4S, M + Na]^+$: 749.9781, 751.9765; Found: 749.9785, 751.9761.

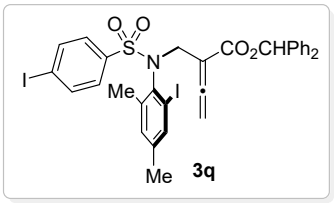
Optical Rotation: $[\alpha]^{25}_D$ -32.0 (*c* = 1.0, $CHCl_3$). 90% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 90:10, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 23.170 min for minor isomer, t_R = 25.031 min for major isomer).



Signal:	VWD1A,Wavelength=254 nm					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
22.940	BB	1.98	473.18	10.11	49.98	
24.816	BB	2.29	473.47	9.13	50.02	
		Sum	946.65			

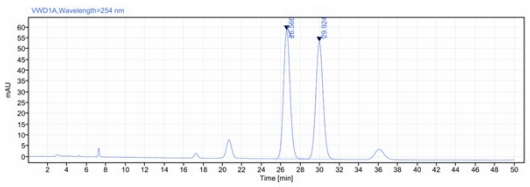


Signal:	VWD1A,Wavelength=254 nm					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
23.170	MM m	0.59	55.69	1.28	4.86	
25.031	BB	2.87	1091.06	20.55	95.14	
		Sum	1146.74			



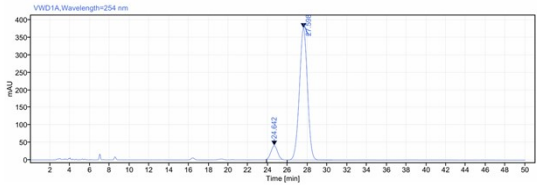
3q (95% yield, Hexane-EtOAc-Chlorobenzene = 7:1:1, R_f = 0.4). White solid. MP: 139-140 °C. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.81 (d, *J* = 8.5 Hz, 2H), 7.59 (d, *J* = 8.5 Hz, 2H), 7.45 (s, 1H), 7.34 – 7.25 (m, 10H), 6.87 (s, 1H), 6.80 (s, 1H), 5.09 (d, *J* = 14.7 Hz, 1H), 4.98 (d, *J* = 14.7 Hz, 1H), 4.62 (d, *J* = 14.1 Hz, 1H), 4.55 (d, *J* = 14.1 Hz, 1H), 2.21 (s, 3H), 2.04 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.7, 164.8, 141.9, 140.9, 140.0, 139.9, 138.9, 137.9, 136.7, 132.2, 129.8, 128.3, 127.9, 127.8, 127.3, 126.9, 101.2, 100.0, 95.9, 79.2, 77.4, 48.9, 20.4, 20.0. **HRMS (ESI)** m/z Calcd for $[C_{32}H_{27}I_2NO_4S, M + Na]^+$: 797.9642; Found: 797.9647.

Optical Rotation: $[\alpha]^{25}_D$ -13.0 (*c* = 1.0, $CHCl_3$). 85% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 24.642 min for minor isomer, t_R = 27.598 min for major isomer).



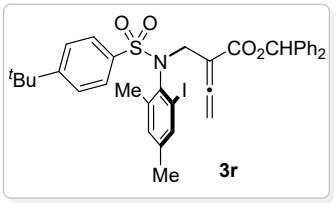
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
26.566	BB	3.17	2802.16	59.64	49.95	
29.924	BB	3.12	2807.48	54.50	50.05	
		Sum	5609.64			



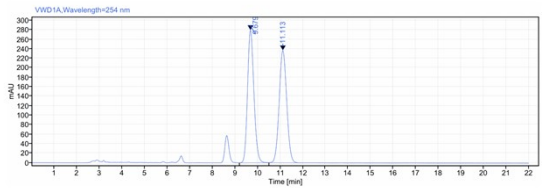
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
24.642	MM m	0.71	1760.33	39.05	7.60	
27.598	BB	4.57	21391.92	377.17	92.40	
		Sum	23152.25			



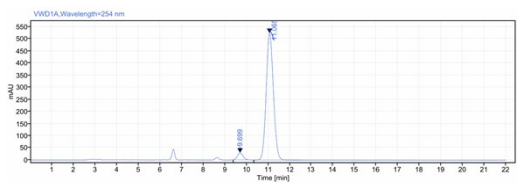
3r (97% yield, Hexane-EtOAc-Chlorobenzene = 7:1:1, R_f = 0.4). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.70 (d, *J* = 8.6 Hz, 2H), 7.39 (d, *J* = 8.6 Hz, 2H), 7.35 (s, 1H), 7.24 – 7.13 (m, 10H), 6.75 (s, 1H), 6.71 (s, 1H), 5.05 (d, *J* = 14.6 Hz, 1H), 4.94 (d, *J* = 14.6 Hz, 1H), 4.50 (s, 2H), 2.11 (s, 3H), 1.95 (s, 3H), 1.25 (s, 9H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.8, 164.8, 156.5, 142.0, 140.1, 140.0, 139.7, 138.9, 138.1, 137.2, 132.1, 128.3, 128.1, 127.8, 127.7, 127.2, 126.9, 125.7, 101.0, 96.3, 79.2, 77.4, 48.5, 35.1, 31.1, 20.3, 20.1. **HRMS (ESI)** m/z Calcd for $[C_{36}H_{36}INO_4S, M + Na]^+$: 728.1302; Found: 728.1306.

Optical Rotation: $[\alpha]^{25}_D$ -21.6 (*c* = 0.5, $CHCl_3$). 92% *ee* (HPLC conditions: Chiralpak OD-H column, *n*-Hexane/*i*-PrOH = 90:10, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 9.699 min for minor isomer, t_R = 11.065 min for major isomer).



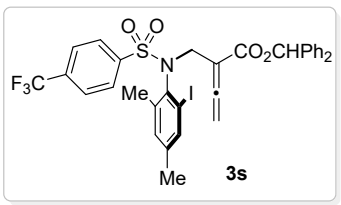
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
9.679	BB	1.30	5475.81	279.22	49.99	
11.113	BB	1.52	5477.56	236.56	50.01	
		Sum	10953.37			



Signal: VWD1A,Wavelength=254 nm

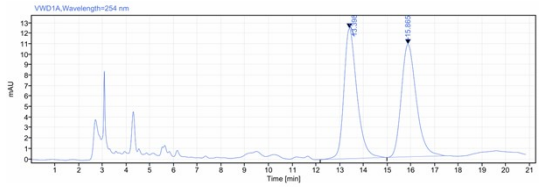
RT [min]	Type	Width [min]	Area	Height	Area%	Name
9.699	MM m	0.29	518.69	28.22	4.11	
11.065	BB	2.20	12114.93	522.85	95.89	
		Sum	12633.62			



3s (90% yield, Hexane-EtOAc-Chlorobenzene = 7:1:1, R_f = 0.5). White solid. MP: 138-139 °C. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.01 (d, *J* = 8.1 Hz, 2H), 7.72 (d, *J* = 8.1

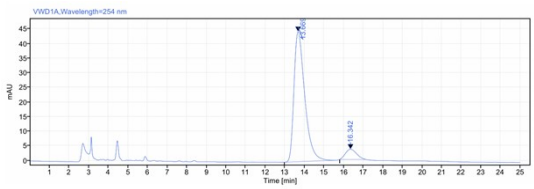
Hz, 2H), 7.45 (s, 1H), 7.35-7.26 (m, 10H), 6.89 (s, 1H), 6.80 (s, 1H), 5.09 (d, J = 14.8 Hz, 1H), 4.98 (d, J = 14.8 Hz, 1H), 4.66 (d, J = 14.1 Hz, 1H), 4.58 (d, J = 14.1 Hz, 1H), 2.22 (s, 3H), 2.05 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.8, 164.8, 144.5, 141.9, 140.2, 139.9, 139.9, 139.0, 136.5, 134.2 (q, $^2J_{C\text{-}F}$ = 32.8 Hz), 132.3, 128.9, 128.3, 127.9, 127.8, 127.30, 126.9, 125.8 (q, $^3J_{C\text{-}F}$= 3.3 Hz), 123.4 (q, $^1J_{C\text{-}F}$= 271.2 Hz), 101.0, 95.8, 79.2, 77.5, 49.1, 20.4, 20.0. **^{19}F NMR** (376 MHz, $CDCl_3$) δ -62.85. **HRMS (ESI)** m/z Calcd for $[C_{33}H_{27}F_3INO_4S, M + Na]^+$: 740.0550; Found: 740.0552.

Optical Rotation: $[\alpha]^{25}_D$ -28 (c = 1.0, $CHCl_3$). 85% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 16.342 min for minor isomer, t_R = 13.669 min for major isomer).



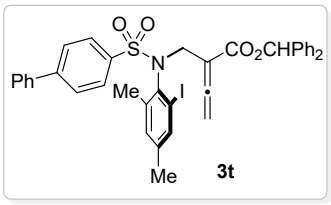
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
13.398	BB	2.80	472.40	12.42	50.09	
15.865	BB	2.54	470.78	10.74	49.91	
		Sum	943.18			



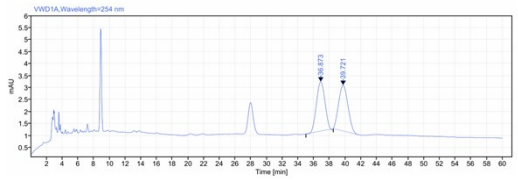
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
13.669	BB	2.57	1699.93	44.54	92.55	
16.342	MM m	0.61	136.94	3.49	7.45	
		Sum	1836.87			



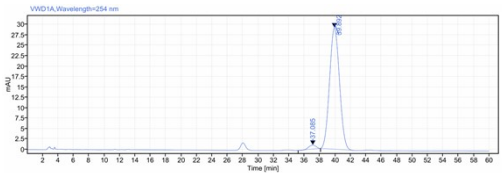
3t (93% yield, Hexane-EtOAc-Chlorobenzene = 7:1:1, R_f = 0.5). White solid. MP: 77-78 °C. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.93 (d, J = 8.3 Hz, 2H), 7.67 (d, J = 8.3 Hz, 2H), 7.62 (d, J = 7.5 Hz, 2H), 7.51 – 7.39 (m, 4H), 7.27-7.22 (m, 10H), 6.86 (s, 1H), 6.80 (s, 1H), 5.13 (d, J = 14.7 Hz, 1H), 5.01 (d, J = 14.7 Hz, 1H), 4.63 (s, 2H), 2.20 (s, 3H), 2.06 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.8, 164.8, 145.4, 142.0, 140.0, 139.8, 139.8, 139.4, 138.9, 137.1, 132.1, 129.0, 128.8, 128.3, 128.3, 127.8, 127.7, 127.3, 127.3, 127.2, 126.9, 101.2, 96.1, 79.2, 77.4, 48.7, 20.4, 20.1. **HRMS (ESI)** m/z Calcd for $[C_{38}H_{32}INO_4S, M + Na]^+$: 748.0989; Found: 748.0991.

Optical Rotation: $[\alpha]^{25}_{D}$ -31.0 (*c* = 1.0, $CHCl_3$). 95% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 90:10, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 37.085 min for minor isomer, t_R = 39.892 min for major isomer).



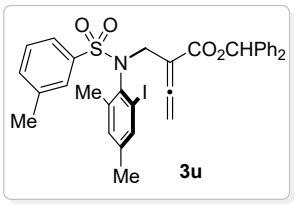
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
36.873	MM m	0.88	152.85	2.05	49.25	
39.721	MM m	0.97	157.48	1.90	50.75	
		Sum	310.33			



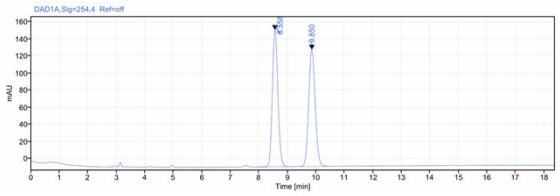
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
37.085	MM m	0.73	58.37	0.94	2.18	
39.892	MM m	1.39	2622.29	29.17	97.82	
		Sum	2680.66			



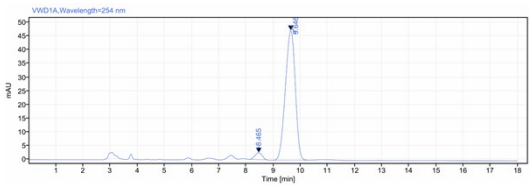
3u (83% yield). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.68 (s, 1H), 7.66-7.64 (m, 1H), 7.43 (s, 1H), 7.36 – 7.31 (m, 2H), 7.30 – 7.22 (m, 10H), 6.83 (s, 1H), 6.77 (s, 1H), 5.12 (d, *J* = 14.6 Hz, 1H), 5.00 (d, *J* = 14.6 Hz, 1H), 4.57 (s, 2H), 2.37 (s, 3H), 2.18 (s, 3H), 2.02 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.8, 164.8, 142.0, 141.0, 140.0, 140.0, 139.8, 138.9, 138.9, 137.1, 133.4 132.1, 128.7, 128.6, 128.3, 127.8, 127.7, 127.2, 126.9, 125.3, 101.1, 96.1, 79.2, 77.3, 48.6, 21.3, 20.4, 20.1. **HRMS (ESI)** m/z Calcd for $[C_{33}H_{30}INO_4S, M + Na]^+$: 686.0832; Found: 686.0837.

Optical Rotation: $[\alpha]^{25}_{D}$ -45.0 (*c* = 1.0, $CHCl_3$). 93% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 8.465 min for minor isomer, t_R = 9.646 min for major isomer).



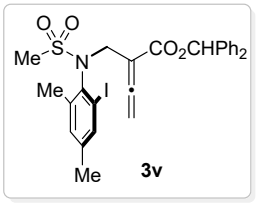
Signal: DAD1A,Sig=254,4 Ref=off

RT [min]	Type	Width [min]	Area	Height	Area%	Name
8.558	BB	1.24	2162.61	159.63	49.99	
9.850	VB	1.16	2163.66	136.23	50.01	
		Sum	4326.27			



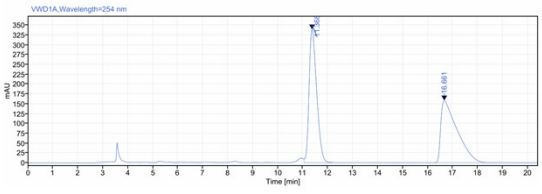
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
8.465	BM m	0.30	46.56	2.51	3.74	
9.646	BB	1.36	1197.56	47.26	96.26	
		Sum	1244.12			



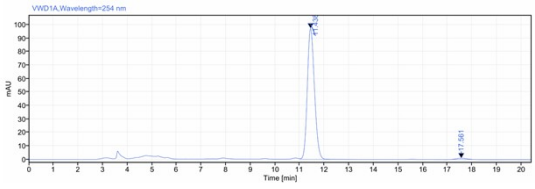
3v (90% yield, Hexane-EtOAc = 5:1, R_f = 0.3). White solid. MP: 134-135 °C. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.42 (s, 1H), 7.34 – 7.12 (m, 10H), 6.89 (s, 1H), 6.84 (s, 1H), 4.90 (d, *J* = 14.7 Hz, 1H), 4.78 (d, *J* = 14.7 Hz, 1H), 4.64 (d, *J* = 14.2 Hz, 1H), 4.02 (d, *J* = 14.2 Hz, 1H), 3.26 (s, 3H), 2.22 (s, 3H), 2.16 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.6, 165.4, 140.9, 140.0, 134.0, 139.8, 138.4, 137.2, 132.5, 128.4, 128.4, 128.0, 127.9, 127.6, 126.9, 103.6, 95.5, 78.8, 77.6, 48.9, 42.7, 20.4, 19.9. **HRMS (ESI)** m/z Calcd for $[C_{27}H_{26}INO_4S, M + Na]^+$: 610.0519; Found: 610.0524.

Optical Rotation: $[\alpha]^{25}_D$ -5.0 (*c* = 1.0, $CHCl_3$). 97% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 70:30, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 17.561 min for minor isomer, t_R = 11.438 min for major isomer).



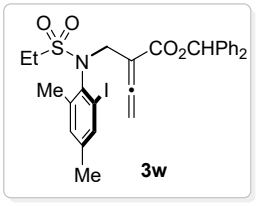
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
11.368	VB	1.43	7160.47	338.68	49.91	
16.661	BB	2.39	7185.43	157.98	50.09	
		Sum	14345.90			



Signal: VWD1A,Wavelength=254 nm

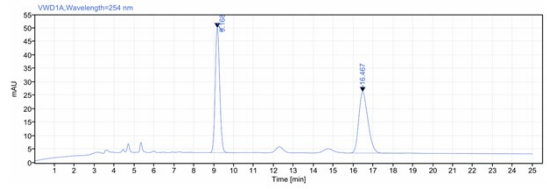
RT [min]	Type	Width [min]	Area	Height	Area%	Name
11.438	VB	1.21	1952.27	97.24	98.51	
17.561	MM m	0.45	29.60	0.97	1.49	
		Sum	1981.87			



3w (97% yield, Hexane-EtOAc = 5:1, R_f = 0.4). White solid. MP: 114-115 °C. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.41 (s, 1H), 7.33 – 7.13 (m, 10H), 6.87 (s, 1H), 6.81 (s, 1H), 4.90 (d, *J* = 14.7 Hz, 1H), 4.79 (d, *J* = 14.7 Hz, 1H), 4.61 (d, *J* = 14.0 Hz,

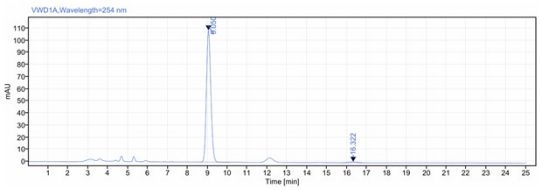
1H), 4.07 (d, J = 14.0 Hz, 1H), 3.48 (dq, J = 14.7, 7.4 Hz, 1H), 3.39 (dq, J = 14.7, 7.4 Hz, 1H), 2.23 (s, 3H), 2.14 (s, 3H), 1.35 (t, J = 7.4 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.8, 165.3, 141.2, 140.0, 139.9, 139.9, 138.4, 137.1, 132.5, 128.4, 128.4, 128.0, 127.9, 127.5, 126.9, 103.5, 95.6, 78.8, 77.5, 49.9, 48.9, 20.4, 20.0, 8.1. **HRMS (ESI)** m/z Calcd for $[C_{28}H_{28}INO_4S, M + Na]^+$: 624.0676; Found: 624.0672.

Optical Rotation: $[\alpha]^{25}_D$ -4 (c = 1.0, $CHCl_3$). 97% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 70:30, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 16.322 min for minor isomer, t_R = 9.050 min for major isomer).



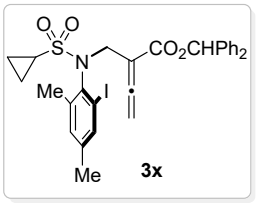
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
9.168	BB	1.36	724.41	46.29	50.13	
16.467	BB	1.95	720.54	22.64	49.87	
		Sum	1444.95			



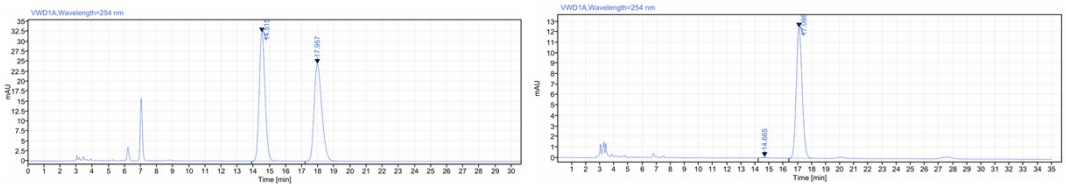
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
9.050	BB	1.49	1681.68	108.70	98.70	
16.322	MM m	0.44	22.08	0.72	1.30	
		Sum	1703.75			



3x (95% yield, Hexane-EtOAc = 5:1, R_f = 0.3). White solid. MP: 96-97 °C. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.51 (d, J = 0.8 Hz, 1H), 7.38 – 7.23 (m, 10H), 6.91 (d, J = 0.8 Hz, 1H), 6.86 (s, 1H), 4.98 (s, 2H), 4.65 (d, J = 14.0 Hz, 1H), 4.37 (d, J = 14.0 Hz, 1H), 2.93-2.86 (m, 1H), 2.25 (s, 3H), 2.22 (s, 3H), 1.31 – 1.23 (m, 1H), 1.21 – 1,14 (m, 1H), 1.10 – 1.01 (m, 1H), 1.0 – 0.94 (m, 1H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.7, 165.0, 141.2, 140.0, 139.9, 139.8, 138.5, 137.2, 132.3, 128.4, 128.3, 127.9, 127.8, 127.3, 126.9, 103.1, 95.8, 78.9, 77.4, 48.8, 32.2, 20.4, 20.0, 7.2, 6.5. **HRMS (ESI)** m/z Calcd for $[C_{29}H_{28}INO_4S, M + Na]^+$: 636.0676; Found: 636.0677.

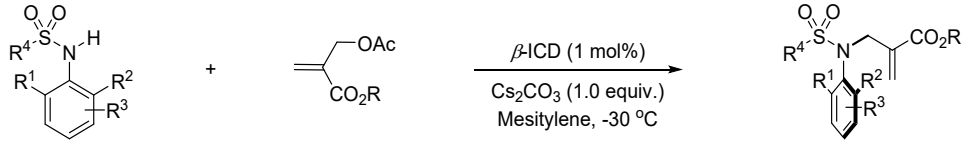
Optical Rotation: $[\alpha]^{25}_D$ -3.0 (c = 1.0, $CHCl_3$). 99% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 14.665 min for minor isomer, t_R = 17.098 min for major isomer).



Signal:	VWD1A,Wavelength=254 nm					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
14.515	BB	1.63	804.34	32.27	49.99	
17.957	BB	2.05	804.52	24.39	50.01	
		Sum	1608.85			

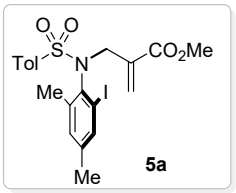
Signal:	VWD1A,Wavelength=254 nm					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
14.665	MM m	0.25	1.64	0.08	0.45	
17.098	BB	1.77	361.65	12.48	99.55	
		Sum	363.29			

Representative procedure for synthesis of 5:



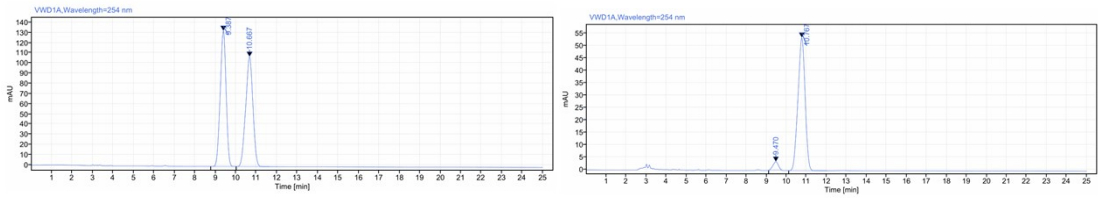
1 + **4** (1.4 equiv.) → **5**

To a Schlenk tube containing **6** (0.05 mmol), *β*-ICD (1.5 mg, 10 mol%) and Cs_2CO_3 (0.05 mmol, 1.0 equiv.) were added mesitylene (3 mL) and MBH acetate **4** (0.14 mmol, 1.4 equiv.). The reaction mixture was stirred at -50 °C for 24 h. The solvent was removed by silica gel column chromatography and the residue was then purified by silica gel column chromatography to afford the product **5**.



Characterization of compounds 5 5a. (94% yield, Hexane-EtOAc = 5:1, R_f = 0.5). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 77.75 (d, *J* = 8.2 Hz, 2H), 7.50 (s, 1H), 7.29 (d, *J* = 8.2 Hz, 2H), 6.98 (s, 1H), 6.27 (d, *J* = 0.8 Hz, 1H), 5.76 (s, 1H), 4.57 (d, *J* = 14.2 Hz, 1H), 4.51 (d, *J* = 14.2 Hz, 1H), 3.55 (s, 3H), 2.42 (s, 3H), 2.22 (s, 3H), 2.16 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 166.5, 143.5, 141.8, 139.8, 139.0, 138.2, 137.1, 135.4, 132.2, 131.9, 129.4, 128.3, 100.8, 51.9, 50.0, 21.5, 20.3, 20.2. **HRMS (ESI)** m/z Calcd for $[C_{20}H_{22}INO_4S, M + H]^+$: 500.0387; Found: 500.0391.

Optical Rotation: $[\alpha]^{25}_D$ - 32.0 (*c* = 1.0, $CHCl_3$). 90% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 10.767 min for minor isomer, t_R = 9.470 min for major isomer).

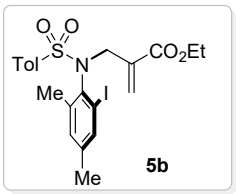


Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
9.387	BB	1.24	2651.19	133.04	50.11	
10.667	BB	1.62	2639.42	107.66	49.89	
		Sum	5290.61			

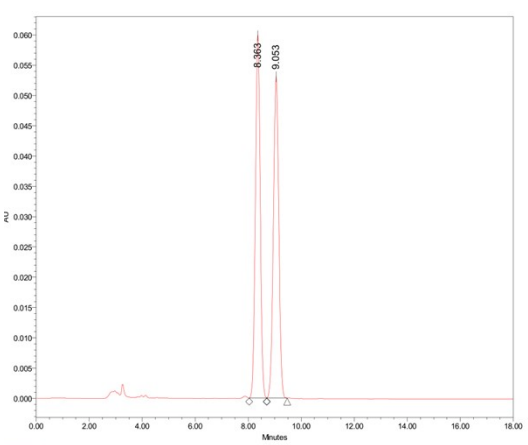
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
9.470	MM m	0.29	64.18	3.38	4.61	
10.767	BB	1.91	1329.10	53.58	95.39	
		Sum	1393.28			



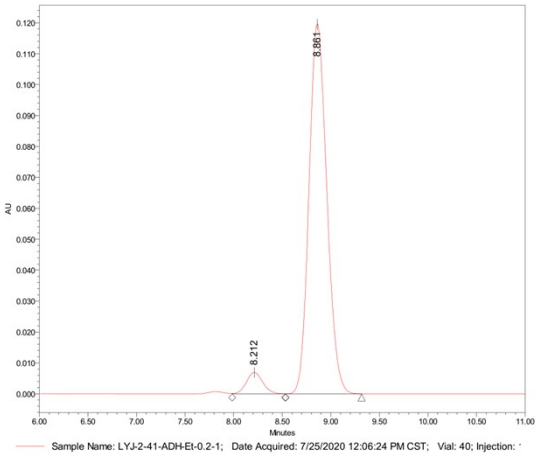
5b. (95% yield, Hexane-EtOAc = 5:1, R_f = 0.5). White solid. **MP:** 122-124 °C. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.74 (d, *J* = 8.2 Hz, 2H), 7.50 (s, 1H), 7.28 (d, *J* = 8.2 Hz, 2H), 6.98 (s, 1H), 6.29 (s, 1H), 5.80 (s, 1H), 4.58 (d, *J* = 14.2 Hz, 1H), 4.52 (d, *J* = 14.2 Hz, 1H), 4.13–3.92 (m, 2H), 2.42 (s, 3H), 2.22 (s, 3H), 2.18 (s, 3H), 1.12 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 166.1, 143.4, 142.1, 139.8, 139.0, 138.4, 137.3, 135.9, 132.2, 131.6, 129.4, 128.3, 100.6, 60.9, 49.9, 21.5, 20.3, 20.3, 13.8. **HRMS (ESI)** m/z Calcd for $[C_{21}H_{24}INO_4S, M + Na]^+$: 536.0363; Found: 536.0366.

Optical Rotation: $[\alpha]^{25}_D$ - 24.0 (*c* = 1.0, $CHCl_3$). 90% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 8.212 min for minor isomer, t_R = 8.861 min for major isomer).



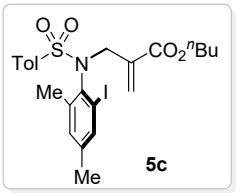
Peak Table

	Retention Time (min)	Area	Height	% Area
1	9.053	752997	53200	49.83
2	8.363	758140	60017	50.17
Sum		1511137.2	113217.1	



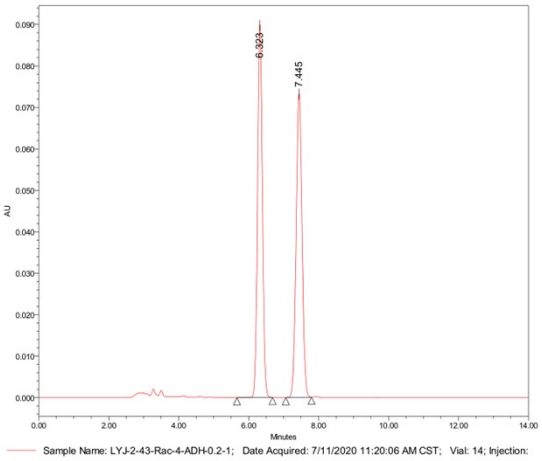
Peak Table

	Retention Time (min)	Area	Height	% Area
1	8.861	1528150	119833	94.99
2	8.212	80604	6902	5.01
Sum		1608753.7	126735.2	



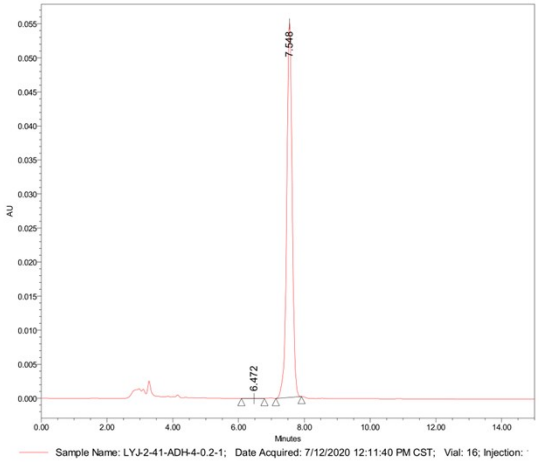
5c. (97% yield, Hexane-EtOAc = 5:1, R_f = 0.4). Syrup. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.74 (d, *J* = 8.3 Hz, 2H), 7.49 (s, 1H), 7.28 (d, *J* = 8.3 Hz, 2H), 6.98 (s, 1H), 6.29 (d, *J* = 0.9 Hz, 1H), 5.83 (s, 1H), 4.58 (d, *J* = 14.3 Hz, 1H), 4.51 (d, *J* = 14.3 Hz, 1H), 4.04 – 3.85 (m, 2H), 2.41 (s, 3H), 2.22 (s, 3H), 2.17 (s, 3H), 1.50 – 1.41 (m, 2H), 1.28 (dq, *J* = 14.4, 7.3 Hz, 2H), 0.88 (t, *J* = 7.3 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 166.1, 143.4, 142.0, 139.7, 139.0, 138.3, 137.3, 135.9, 132.2, 131.6, 129.4, 128.2, 100.6, 64.8, 49.9, 30.3, 21.5, 20.3, 20.3, 19.0, 13.6. **HRMS (ESI)** m/z Calcd for $[C_{23}H_{28}INO_4S, M + Na]^+$: 564.0676; Found: 564.0677.

Optical Rotation: $[\alpha]^{25}_D$ - 24.0 (*c* = 1.0, $CHCl_3$). >99% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 6.472 min for minor isomer, t_R = 7.548 min for major isomer).



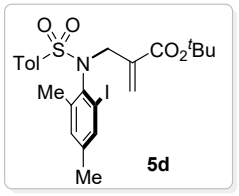
Peak Table

	Retention Time (min)	Area	Height	% Area
1	7.445	865405	73458	49.96
2	6.323	866786	90358	50.04
Sum		1732191.3	163816.7	



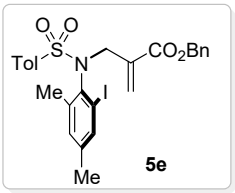
Peak Table

	Retention Time (min)	Area	Height	% Area
1	7.548	629951	54969	99.87
2	6.472	831	-26	0.13
Sum		630781.9	54942.8	



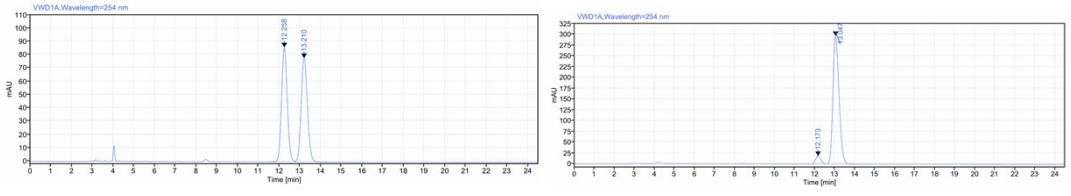
5d. (94% yield, Hexane-EtOAc = 5:1, R_f = 0.5). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ7.66 (d, *J* = 8.2 Hz, 2H), 7.42 (s, 1H), 7.20 (d, *J* = 8.2 Hz, 2H), 6.92 (s, 1H), 6.18 (d, *J* = 0.9 Hz, 1H), 5.73 (s, 1H), 4.50 (d, *J* = 14.3 Hz, 1H), 4.39 (d, *J* = 14.3 Hz, 1H), 2.35 (s, 3H), 2.15 (s, 3H), 2.14 (s, 3H), 1.24 (s, 9H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 165.1, 143.4, 142.4, 139.8, 139.0, 138.5, 137.2, 132.2, 131.2, 129.4, 128.3, 100.3, 81.0, 49.7, 27.7, 21.5, 20.5, 20.3. **HRMS (ESI)** m/z Calcd for $[C_{23}H_{28}INO_4S, M + Na]^+$: 564.0676; Found: 564.0681.

Optical Rotation: $[\alpha]^{25}_D$ - 14.0 (*c* = 1.0, $CHCl_3$). 91% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 9.470 min for minor isomer, t_R = 10.767 min for major isomer).



5e. (94% yield, Hexane-EtOAc = 5:1, R_f = 0.4). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.64 (d, *J* = 8.3 Hz, 2H), 7.35 (d, *J* = 0.6 Hz, 1H), 7.27 – 7.20 (m, 3H), 7.19 – 7.13 (m, 4H), 6.83 (d, *J* = 0.6 Hz, 1H), 6.25 (d, *J* = 0.8 Hz, 1H), 5.76 (s, 1H), 4.98 (d, *J* = 12.4 Hz, 1H), 4.88 (d, *J* = 12.4 Hz, 1H), 4.50 (d, *J* = 14.3 Hz, 1H), 4.45 (d, *J* = 14.3 Hz, 1H), 2.32 (s, 3H), 2.10 (s, 3H), 2.03 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 165.8, 143.4, 141.8, 139.7, 139.0, 138.1, 137.2, 135.6, 135.4, 132.1, 132.1, 129.4, 128.3, 128.2, 128.1, 128.1, 100.7, 66.6, 50.0, 21.5, 20.3, 20.2. **HRMS (ESI)** m/z Calcd for $[C_{26}H_{26}INO_4S, M + Na]^+$: 598.0519; Found: 598.0523.

Optical Rotation: $[\alpha]^{25}_D$ - 24.0 (*c* = 1.0, $CHCl_3$). 91% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 12.137 min for minor isomer, t_R = 13.047 min for major isomer).

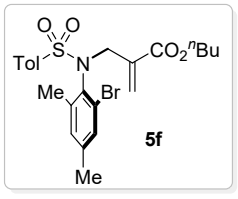


Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
12.258	BV	1.65	1645.74	85.93	50.30	
13.210	VB	1.60	1626.31	77.90	49.70	
		Sum	3272.05			

Signal: VWD1A,Wavelength=254 nm

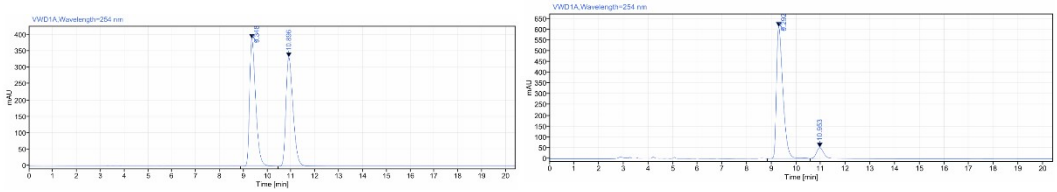
RT [min]	Type	Width [min]	Area	Height	Area%	Name
12.173	MM m	0.28	307.04	17.16	4.69	
13.047	MB m	0.33	6246.10	295.44	95.31	
		Sum	6553.14			



5f. (92% yield, Hexane-EtOAc = 5:1, R_f = 0.4). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.72 (d, *J* = 7.8 Hz, 2H), 7.27 (d, *J* = 8.0 Hz, 2H), 7.17 (s, 1H), 6.97 (s, 1H), 6.27 (s, 1H), 5.80 (s, 1H), 4.61 (d,

J = 14.2 Hz, 1H), 4.44 (d, J = 14.2 Hz, 1H), 4.13 – 3.82 (m, 2H), 2.42 (s, 3H), 2.25 (s, 6H), 1.52–1.45 (m, 2H), 1.35 – 1.24 (m, 2H), 0.89 (t, J = 7.3 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 166.1, 143.4, 142.8, 139.6, 137.9, 136.0, 133.9, 132.1, 131.3, 131.2, 129.4, 128.1, 124.6, 64.8, 49.7, 30.4, 21.6, 20.6, 20.0, 19.1, 13.7. **HRMS (ESI)** m/z Calcd for $[C_{23}H_{28}BrNO_4S, M + Na]^+$: 516.0815; Found: 516.0819.

Optical Rotation: $[\alpha]^{25}_D$ – 4.2 (c = 1.0, $CHCl_3$). 83% *ee* (HPLC conditions: Chiralpak OD-H column, *n*-Hexane/*i*-PrOH = 95:5, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 10.953 min for minor isomer, t_R = 9.292 min for major isomer).

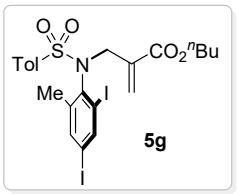


Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
9.348	BB	1.57	6893.91	389.02	50.12	
10.896	BB	1.85	6860.57	332.49	49.88	
		Sum	13754.48			

Signal: VWD1A,Wavelength=254 nm

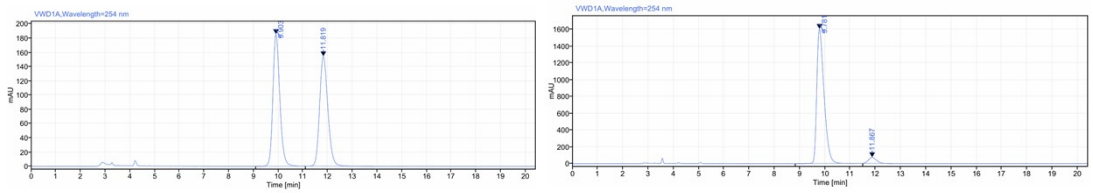
RT [min]	Type	Width [min]	Area	Height	Area%	Name
9.292	BM m	0.28	11093.10	610.05	91.72	
10.953	VM m	0.31	1001.05	50.13	8.28	
		Sum	12094.15			



5g. (82% yield, Hexane-EtOAc = 5:1, R_f = 0.5). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.00 (d, J = 1.6 Hz, 1H), 7.73 (d, J = 8.2 Hz, 2H), 7.52 (d, J = 1.6 Hz, 1H), 7.30 (d, J = 8.2 Hz, 2H), 6.33 (s, 1H), 5.88 (s, 1H), 4.56 (d, J = 14.3 Hz, 1H), 4.49 (d, J = 14.3 Hz, 1H), 4.00 (dt, J = 10.9, 6.8 Hz, 1H), 3.91 (dt, J = 10.9, 6.8 Hz, 1H), 2.43 (s, 3H), 2.18 (s, 3H), 1.50 – 1.41 (m, 2H), 1.33 – 1.26 (m, 2H), 0.90 (t, J = 7.3 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 166.0, 146.1, 144.6, 143.8, 140.3, 140.2, 138.0, 135.7, 132.0, 129.6, 128.3, 101.9, 94.8, 65.0, 50.0, 30.3, 21.6, 20.2, 19.1, 13.7. **HRMS (ESI)** m/z Calcd for $[C_{22}H_{25}I_2NO_4S, M + Na]^+$: 675.9486; Found: 675.9491.

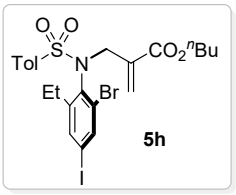
Optical Rotation: $[\alpha]^{25}_D$ – 2.4 (c = 0.5, $CHCl_3$). 90% *ee* (HPLC conditions: Chiralpak OD-H column, *n*-Hexane/*i*-PrOH = 95:5, flow rate = 1.0 mL/min,

wavelength = 254 nm, t_R = 11.867 min for minor isomer, t_R = 9.781 min for major isomer).



Signal:	VWD1A,Wavelength=254 nm					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
9.903	BB	2.01	3629.77	185.52	50.32	
11.819	BB	2.77	3583.25	154.30	49.68	
		Sum	7213.02			

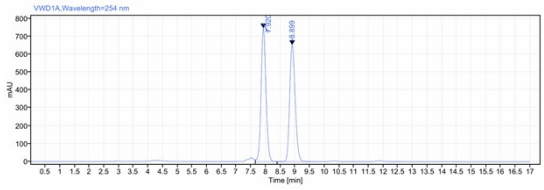
Signal:	VWD1A,Wavelength=254 nm					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
9.781	VM m	0.30	31893.88	1605.34	95.24	
11.867	MM m	0.35	1594.15	70.92	4.76	
		Sum	33488.03			



5h. (80% yield, Hexane-EtOAc = 5:1, R_f = 0.5). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.81 (d, *J* = 1.8 Hz, 1H), 7.73 (d, *J* = 8.1 Hz, 2H), 7.41 (d, *J* = 1.8 Hz, 1H), 7.30 (d, *J* = 8.1 Hz, 2H), 6.34 (s, 1H), 5.86 (s, 1H), 4.54 (d, *J* = 14.3 Hz, 1H), 4.49 (d, *J* = 14.3 Hz, 1H), 4.03 – 3.96 (m, 1H), 3.96 – 3.88 (m, 1H), 2.66 (dq, *J* = 15.1, 7.5 Hz, 1H), 2.50 (dq, *J* = 15.1, 7.5 Hz, 1H), 2.44 (s, 3H), 1.50 – 1.43 (m, 2H), 1.33 – 1.25 (m, 2H), 1.14 (t, *J* = 7.5 Hz, 3H), 0.90 (t, *J* = 7.3 Hz, 3H).. **^{13}C NMR** (100 MHz, $CDCl_3$) δ 166.0, 162.5, 149.9, 143.8, 140.3, 138.7, 138.0, 135.5, 132.2, 129.6, 128.3, 123.0, 101.3, 65.0, 50.0, 30.4, 25.4, 21.6, 19.1, 14.2, 13.7. **HRMS (ESI)** m/z Calcd for $[C_{23}H_{27}BrINO_4S, M + Na]^+$: 641.9781; Found: 641.9785.

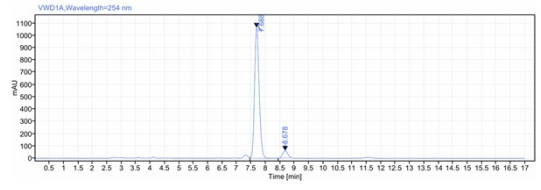
Optical Rotation: $[\alpha]^{25}_D$ – 5.6 (*c* = 1.0, $CHCl_3$). 89% *ee* (HPLC conditions: Chiralpak OD-H column, *n*-Hexane/*i*-PrOH = 95:5, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 8.678 min for minor isomer, t_R = 7.688 min for major isomer)

.



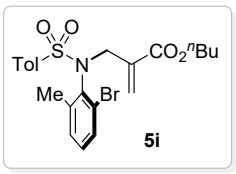
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
7.920	VB	0.74	8632.19	745.32	50.51	
8.899	BB	1.17	8456.22	651.33	49.49	
		Sum	17088.41			



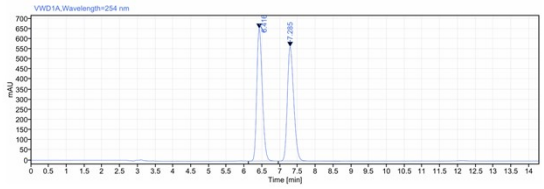
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
7.688	VB	0.71	11879.19	1062.07	94.45	
8.678	MM m	0.19	698.15	57.52	5.55	
		Sum	12577.34			



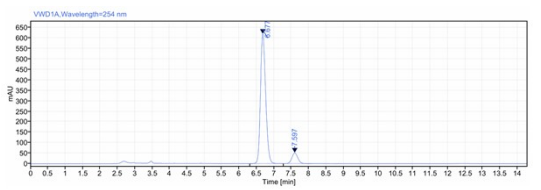
5i. (95% yield, Hexane-EtOAc = 5:1, R_f = 0.5). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.73 (d, *J* = 8.2 Hz, 2H), 7.35 (d, *J* = 7.9 Hz, 1H), 7.28 (d, *J* = 8.2 Hz, 2H), 7.17 (d, *J* = 7.5 Hz, 1H), 7.04 (dd, *J* = 7.9, 7.5 Hz, 1H), 6.28 (s, 1H), 5.82 (s, 1H), 4.62 (d, *J* = 14.3 Hz, 1H), 4.47 (d, *J* = 14.3 Hz, 1H), 4.00 (dt, *J* = 11.0, 6.6 Hz, 1H), 3.91 (dt, *J* = 11.0, 6.6 Hz, 1H), 2.43 (s, 3H), 2.30 (s, 3H), 1.52 – 1.43 (m, 2H), 1.34 – 1.25 (m, 2H), 0.89 (t, *J* = 7.3 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 166.1, 143.6, 143.5, 137.9, 136.7, 135.9, 131.6, 131.3, 130.4, 129.4, 129.4, 128.1, 125.0, 64.9, 49.7, 30.4, 21.6, 20.1, 19.1, 13.7. **HRMS (ESI)** m/z Calcd for $[C_{22}H_{26}BrNO_4S, M + Na]^+$: 502.0658; Found: 502.0662.

Optical Rotation: $[\alpha]^{25}_D$ - 10.4 (*c* = 1.0, $CHCl_3$). 83% *ee* (HPLC conditions: Chiralpak OD-H column, *n*-Hexane/*i*-PrOH = 90:10, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 7.597 min for minor isomer, t_R = 6.677 min for major isomer)



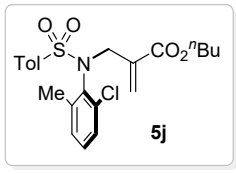
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
6.416	VB	0.84	7067.36	654.96	50.07	
7.285	BB	1.73	7048.42	564.64	49.93	
		Sum	14115.78			



Signal: VWD1A,Wavelength=254 nm

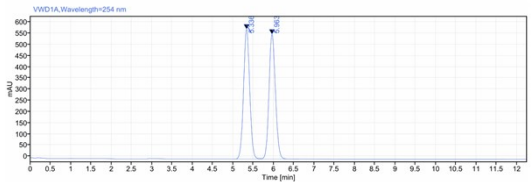
RT [min]	Type	Width [min]	Area	Height	Area%	Name
6.677	BM m	0.16	6465.58	619.70	91.41	
7.597	BB	0.81	607.79	51.22	8.59	
		Sum	7073.37			



5j. (92% yield, Hexane-EtOAc = 5:1, R_f = 0.4). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ7.68 (d, *J* = 8.3 Hz, 2H), 7.25 (d, *J* = 8.3 Hz,

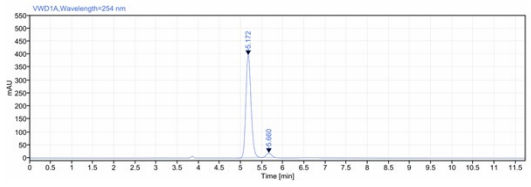
2H), 7.18 – 7.02 (m, 3H), 6.23 (d, J = 1.1 Hz, 1H), 5.77 (s, 1H), 4.61 (d, J = 14.2 Hz, 1H), 4.37 (d, J = 14.2 Hz, 1H), 3.99 (dt, J = 10.9, 6.7 Hz, 1H), 3.91 (dt, J = 10.9, 6.7 Hz, 1H), 2.41 (s, 3H), 2.29 (s, 3H), 1.51 – 1.42 (m, 2H), 1.33 – 1.23 (m, 2H), 0.87 (t, J = 7.4 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 166.32, 143.77, 143.64, 137.95, 136.23, 135.47, 135.12, 131.31, 130.09, 129.69, 129.40, 128.40, 128.31, 65.15, 50.00, 30.68, 21.86, 20.06, 19.36, 13.95. **HRMS (ESI)** m/z Calcd for $[C_{22}H_{26}ClNO_4S, M + Na]^+$: 458.1163; Found: 458.1168.

Optical Rotation: $[\alpha]^{25}_D$ - 2.6 (c = 1.0, $CHCl_3$). 92% *ee* (HPLC conditions: Chiralpak OD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 5.660 min for minor isomer, t_R = 5.172 min for major isomer).



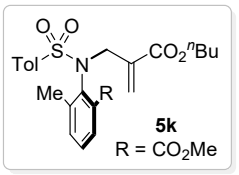
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
5.336	BV	0.68	6132.02	579.88	49.94	
5.963	VB	0.95	6147.69	557.25	50.06	
		Sum	12279.70			



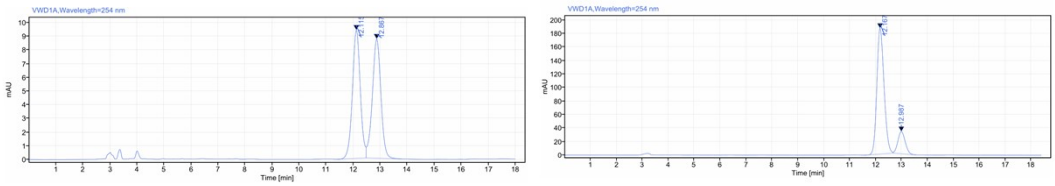
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
5.172	BM m	0.13	3372.48	395.07	95.80	
5.660	MM m	0.14	147.69	16.72	4.20	
		Sum	3520.17			



5k. (87% yield, Hexane-EtOAc-Chlorobenzene = 7:1:1, R_f = 0.6). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.64 (dd, J = 7.6, 1.4 Hz, 1H), 7.52 (d, J = 8.3 Hz, 2H), 7.31 (dd, J = 7.6, 1.4 Hz, 1H), 7.25 – 7.22 (m, 1H), 7.20 (d, J = 8.3 Hz, 2H), 6.31 (d, J = 1.3 Hz, 1H), 5.90 (s, 1H), 4.64 (d, J = 14.6 Hz, 1H), 4.58 (d, J = 14.6 Hz, 1H), 3.90 (t, J = 6.7 Hz, 2H), 3.54 (s, 3H), 2.38 (s, 3H), 1.94 (s, 3H), 1.41 – 1.32 (m, 2H), 1.26 – 1.16 (m, 2H), 0.82 (t, J = 7.3 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 166.8, 166.4, 143.0, 140.9, 138.1, 136.9, 135.0, 132.6, 131.1, 129.4, 128.1, 127.5, 64.7, 51.9, 51.8, 30.3, 21.5, 19.0, 18.9, 13.6. **HRMS (ESI)** m/z Calcd for $[C_{24}H_{29}NO_6S, M + H]^+$: 460.1788; Found: 460.1783.

Optical Rotation: $[\alpha]^{25}_{D}$ – 0.4 (*c* = 1.0, $CHCl_3$). 70% *ee* (HPLC conditions: Chiralpak AS-H column, *n*-Hexane/*i*-PrOH = 90:0, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 12.987 min for minor isomer, t_R = 12.167 min for major isomer).

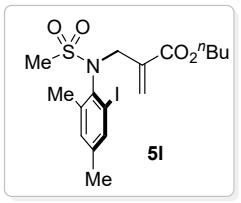


Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
12.115	BM m	0.31	189.72	9.36	49.75	
12.867	MB m	0.34	191.63	8.70	50.25	
		Sum	381.35			

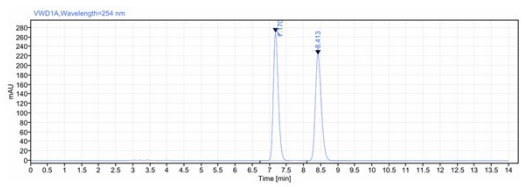
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
12.167	BM m	0.30	3580.46	186.29	84.78	
12.987	MM m	0.31	642.82	32.85	15.22	
		Sum	4223.28			



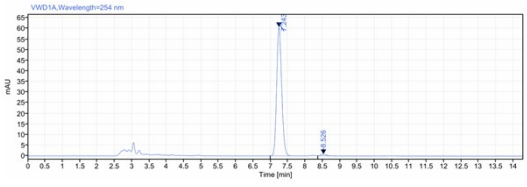
5l. (97% yield, Hexane-EtOAc = 5:1, R_f = 0.5). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.54 (s, 1H), 7.03 (s, 1H), 6.22 (s, 1H), 5.45 (s, 1H), 4.71 (d, *J* = 14.1 Hz, 1H), 4.21 – 4.03 (m, 3H), 3.40 (s, 3H), 2.37 (s, 3H), 2.24 (s, 3H), 1.63 – 1.57 (m, 2H), 1.46 – 1.32 (m, 2H), 0.93 (t, *J* = 7.3 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 166.3, 140.9, 140.1, 138.6, 137.2, 135.2, 132.6, 131.7, 103.1, 65.1, 50.5, 42.8, 30.5, 20.4, 20.1, 19.2, 13.7. **HRMS (ESI)** m/z Calcd for $[C_{17}H_{24}INO_4S, M + H]^+$: 466.0543; Found: 466.0547

Optical Rotation: $[\alpha]^{25}_{D}$ – 7.8 (*c* = 1.0, $CHCl_3$). 98% *ee* (HPLC conditions: Chiralpak OD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 7.17 min for minor isomer, t_R = 8.413 min for major isomer).



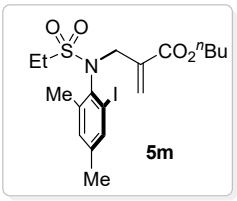
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
7.170	BB	0.87	2722.04	269.39	49.97	
8.413	BB	1.26	2724.83	222.86	50.03	
		Sum	5446.87			



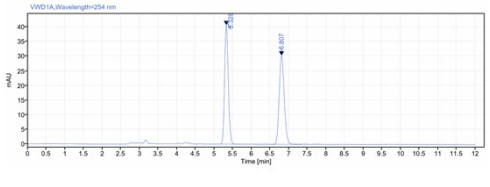
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
7.243	BB	0.66	608.60	60.57	98.80	
8.526	MM m	0.17	7.41	0.70	1.20	
		Sum	616.01			



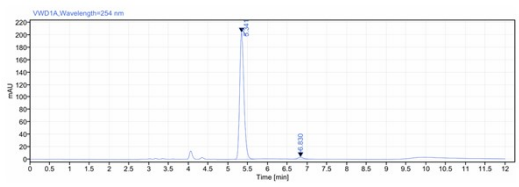
5m. (92% yield, Hexane-EtOAc = 5:1, R_f = 0.5). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.54 (s, 1H), 7.03 (s, 1H), 6.22 (s, 1H), 5.49 (s, 1H), 4.69 (d, *J* = 14.0 Hz, 1H), 4.19 (d, *J* = 14.0 Hz, 1H), 4.16 – 3.96 (m, 2H), 3.75 – 3.46 (m, 2H), 2.38 (s, 3H), 2.24 (s, 3H), 1.61 – 1.54 (m, 2H), 1.47 (t, *J* = 7.4 Hz, 3H), 1.41 – 1.31 (m, 2H), 0.92 (t, *J* = 7.4 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 166.3, 141.2, 140.0, 138.6, 137.2, 135.4, 132.6, 131.8, 103.0, 65.1, 50.4, 50.0, 30.5, 20.3, 20.2, 19.2, 13.7, 8.1. **HRMS (ESI)** m/z Calcd for $[C_{18}H_{26}INO_4S, M + Na]^+$: 502.0519; Found: 502.0523.

Optical Rotation: $[\alpha]^{25}_D$ – 4.6 (*c* = 1.0, $CHCl_3$). 98% *ee* (HPLC conditions: Chiralpak OD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 6.830 min for minor isomer, t_R = 5.341 min for major isomer).



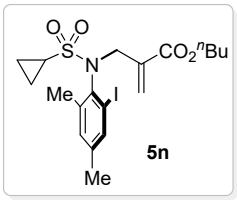
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
5.328	BB	0.51	282.81	40.55	49.92	
6.807	BB	0.77	283.76	30.24	50.08	
		Sum	566.57			



Signal: VWD1A,Wavelength=254 nm

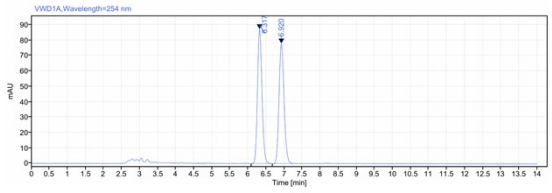
RT [min]	Type	Width [min]	Area	Height	Area%	Name
5.341	VV	0.48	1537.47	204.57	98.26	
6.830	MM m	0.14	27.22	3.00	1.74	
		Sum	1564.70			



5n. (87% yield, Hexane-EtOAc = 5:1, R_f = 0.5). Syrup. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.56 (s, 1H), 7.01 (s, 1H), 6.24 (s, 1H), 5.63 (s, 1H), 4.64 (d, *J* = 14.1 Hz, 1H), 4.42 (d, *J* = 14.1 Hz, 1H), 4.20 – 3.88 (m, 2H), 3.12 – 2.78 (m, 1H), 2.35 (s, 3H), 2.24 (s, 3H),

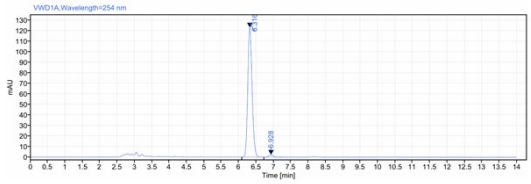
1.58 – 1.51 (m, 2H), 1.38 – 1.31 (m, 2H), 1.28 – 1.15 (m, 2H), 1.15 – 1.01 (m, 2H), 0.91 (t, J = 7.3 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.2, 141.4, 139.9, 138.7, 137.4, 135.7, 132.4, 131.6, 102.4, 65.0, 50.4, 32.4, 30.4, 20.3, 20.3, 19.1, 13.7, 7.2, 6.5. **HRMS (ESI)** m/z Calcd for $[C_{19}H_{26}INO_4S, M + Na]^+$: 514.0519; Found: 514.0521.

Optical Rotation: $[\alpha]^{25}_D$ – 2.3 (c = 1.0, $CHCl_3$). 96% *ee* (HPLC conditions: Chiralpak OD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 6.928 min for minor isomer, t_R = 6.316 min for major isomer).



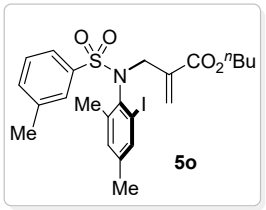
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
6.317	VB	0.58	755.04	87.09	50.01	
6.920	BB	0.93	754.70	77.77	49.99	
		Sum	1509.74			



Signal: VWD1A,Wavelength=254 nm

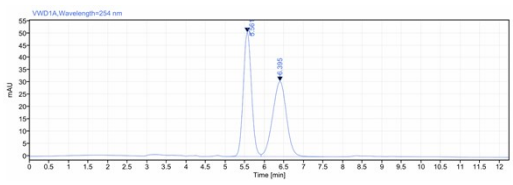
RT [min]	Type	Width [min]	Area	Height	Area%	Name
6.316	VB	0.63	1068.02	123.08	98.15	
6.928	BB	0.54	20.17	2.10	1.85	
		Sum	1088.19			

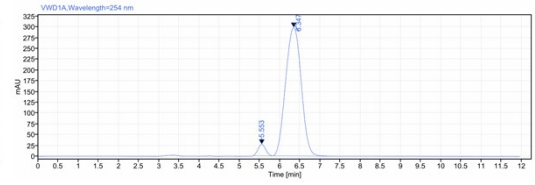


5o. (78% yield, Hexane-EtOAc = 5:1, R_f = 0.5). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.67–7.65 (m, 2H), 7.50 (s, 1H), 7.40–7.37 (m, 2H), 6.99 (s, 1H), 6.30 (s, 1H), 5.85 (s, 1H), 4.59 (d, J = 14.2 Hz, 1H), 4.52 (d, J = 14.2 Hz, 1H), 4.05 – 3.95 (m, 1H), 3.95 – 3.85 (m, 1H), 2.41 (s, 3H), 2.23 (s, 3H), 2.19 (s, 3H), 1.51 – 1.42 (m, 2H), 1.31 – 1.24 (m, 2H), 0.89 (t, J = 7.3 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 166.2, 142.2, 141.1, 139.8, 139.1, 139.0, 137.3, 136.0, 133.5, 132.2, 131.7, 128.7, 128.7, 125.4, 100.4, 64.9, 50.0, 30.4, 21.3, 20.4, 20.3, 19.1, 13.7. **HRMS (ESI)** m/z Calcd for $[C_{23}H_{28}NO_4S, M + Na]^+$: 564.0676; Found: 564.0681.

Optical Rotation: $[\alpha]^{25}_D$ – 0.4 (c = 1.0, $CHCl_3$). 92% *ee* (HPLC conditions: Chiralpak AS-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min,

wavelength = 254 nm, t_R = 5.553 min for minor isomer, t_R = 6.347 min for major isomer).



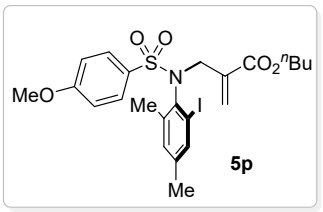


Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
5.561	BV	0.89	739.95	50.42	49.68	
6.395	VB	1.61	749.52	30.57	50.32	
		Sum	1489.48			

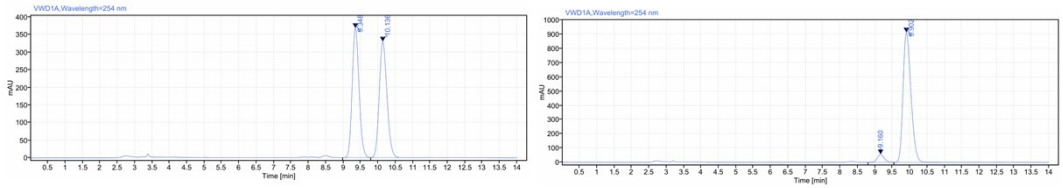
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
5.553	MM m	0.21	341.76	26.31	4.08	
6.347	MB m	0.43	8034.08	298.12	95.92	
		Sum	8375.84			



5p. (64% yield, Hexane-EtOAc = 5:1, R_f = 0.5). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.79 (d, *J* = 8.7 Hz, 2H), 7.50 (s, 1H), 6.99 (s, 1H), 6.96 (d, *J* = 8.7 Hz, 2H), 6.29 (s, 1H), 5.83 (s, 1H), 4.57 (d, *J* = 14.3 Hz, 1H), 4.51 (d, *J* = 14.3 Hz, 1H), 4.00 (dt, *J* = 11.2, 6.8 Hz, 1H), 3.91 (dt, *J* = 11.2, 6.8 Hz, 1H), 3.87 (s, 3H), 2.23 (s, 3H), 2.20 (s, 3H), 1.53 – 1.41 (m, 2H), 1.34 – 1.24 (m, 2H), 0.89 (t, *J* = 7.3 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 166.2, 163.1, 142.1, 139.8, 139.1, 137.5, 136.0, 133.2, 132.3, 131.5, 130.4, 113.9, 100.5, 64.9, 55.6, 50.0, 30.4, 20.4, 20.3, 19.1, 13.7. **HRMS (ESI)** m/z Calcd for $[C_{23}H_{28}INO_5S, M + H]^+$: 558.0806; Found: 558.0811.

Optical Rotation: $[\alpha]^{25}_D$ – 19.0 (*c* = 1.0, $CHCl_3$). 90% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 9.160 min for minor isomer, t_R = 9.902 min for major isomer).

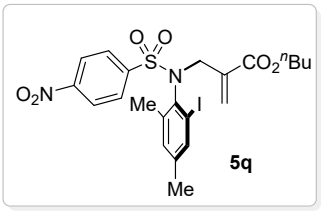


Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
9.348	BB	0.81	5083.38	367.95	50.04	
10.136	BB	0.98	5074.28	329.41	49.96	
		Sum	10157.66			

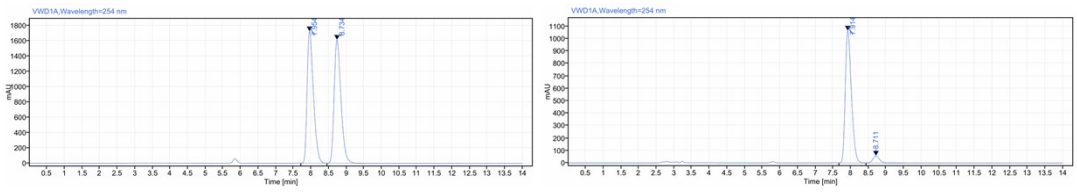
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
9.160	BV	0.74	763.03	55.18	5.01	
9.902	VB	1.35	14477.35	913.35	94.99	
		Sum	15240.38			



5q. (86% yield, Hexane-EtOAc = 5:1, R_f = 0.4). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.34 (d, *J* = 8.5 Hz, 2H), 8.05 (d, *J* = 8.5 Hz, 2H), 7.49 (s, 1H), 7.03 (s, 1H), 6.31 (s, 1H), 5.78 (s, 1H), 4.65 (d, *J* = 14.1 Hz, 1H), 4.57 (d, *J* = 14.1 Hz, 1H), 4.09 – 3.98 (m, 1H), 3.98 – 3.89 (m, 1H), 2.25 (s, 3H), 2.23 (s, 3H), 1.55 – 1.44 (m, 2H), 1.35 – 1.25 (m, 2H), 0.89 (t, *J* = 7.3 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 165.9, 150.1, 146.7, 142.3, 140.5, 139.2, 136.2, 135.3, 132.5, 132.2, 129.6, 124.1, 99.9, 65.0, 50.5, 30.4, 20.4, 20.4, 19.1, 13.6. **HRMS (ESI)** m/z Calcd for $[C_{22}H_{25}IN_2O_6S, M + Na]^+$: 595.0370; Found: 595.0373.

Optical Rotation: $[\alpha]^{25}_D$ – 15.6 (*c* = 1.0, $CHCl_3$). 89% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 7.914 min for minor isomer, t_R = 8.711 min for major isomer).

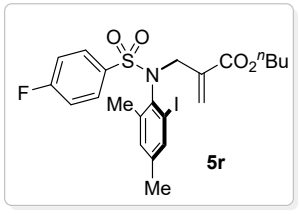


Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
7.954	VB	0.74	21497.69	1720.48	49.77	
8.734	BB	1.05	21693.86	1610.27	50.23	
		Sum	43191.55			

Signal: VWD1A,Wavelength=254 nm

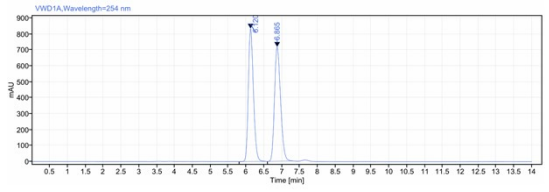
RT [min]	Type	Width [min]	Area	Height	Area%	Name
7.914	VV	0.76	12855.01	1064.47	94.57	
8.711	VB	1.10	737.75	56.61	5.43	
		Sum	13592.76			



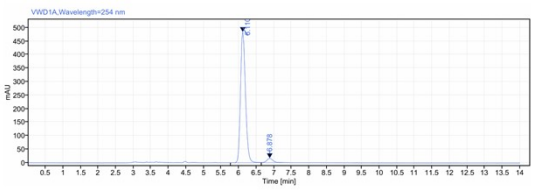
5r. (97% yield, Hexane-EtOAc = 5:1, R_f = 0.5). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.87 (dd, *J* = 8.6, 5.2 Hz, 2H), 7.49 (s, 1H), 7.17 (t, *J* = 8.6 Hz, 2H), 7.00 (s, 1H), 6.30 (s, 1H), 5.80 (s, 1H), 4.60 (d, *J* = 14.2 Hz, 1H), 4.52 (d, *J* =

14.2 Hz, 1H), 4.09 – 3.97 (m, 1H), 3.97 – 3.88 (m, 1H), 2.23 (s, 3H), 2.21 (s, 3H), 1.52 – 1.43 (m, 2H), 1.34 – 1.25 (m, 2H), 0.89 (t, J = 7.3 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 166.4, 165.3 ($^{1}J_{C\text{-}F}$ = 253.0 Hz), 142.2, 140.1, 139.2, 137.4 (d, $^{4}J_{C\text{-}F}$ = 3.3 Hz), 137.0, 135.8, 132.4, 131.8, 131.0 (d, $^{3}J_{C\text{-}F}$ = 9.3 Hz), 116.0 (d, $^{2}J_{C\text{-}F}$ = 22.5 Hz), 100.2, 64.9, 50.2, 30.4, 20.4, 20.3, 19.1, 13.7. **^{19}F NMR** (376 MHz, $CDCl_3$) δ -105.46. **HRMS (ESI)** m/z Calcd for $[C_{22}H_{25}FINO_4S, M + Na]^+$: 568.0425; Found: 568.0429.

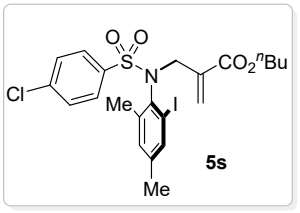
Optical Rotation: $[\alpha]^{25}_D$ – 30.0 (c = 1.0, $CHCl_3$). 93% *ee* (HPLC conditions: Chiralpak OD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 6.878 min for minor isomer, t_R = 6.110 min for major isomer).



Signal:	VWD1A,Wavelength=254 nm					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
6.120	BB	0.79	8277.08	832.77	49.46	
6.865	MM m	0.18	8457.45	715.78	50.54	
		Sum	16734.53			

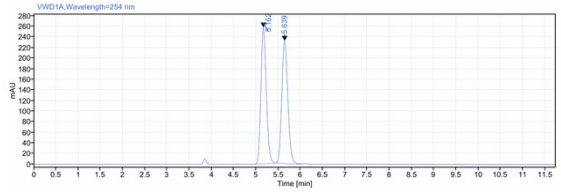


Signal:	VWD1A,Wavelength=254 nm					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
6.110	BV	0.88	4747.04	482.96	96.28	
6.878	VB	0.59	183.66	15.67	3.72	
		Sum	4930.70			



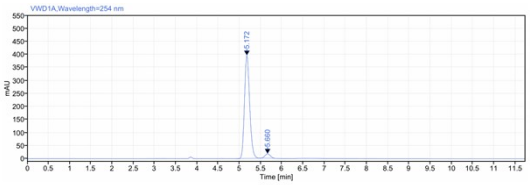
5s. (92% yield, Hexane-EtOAc = 5:1, R_f = 0.5). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.80 (d, J = 8.2 Hz, 2H), 7.50 (s, 1H), 7.47 (d, J = 8.2 Hz, 2H), 7.00 (s, 1H), 6.30 (s, 1H), 5.80 (s, 1H), 4.60 (d, J = 14.2 Hz, 1H), 4.52 (d, J = 14.2 Hz, 1H), 4.10 – 3.97 (m, 1H), 3.97 – 3.88 (m, 1H), 2.24 (s, 3H), 2.21 (s, 3H), 1.52 – 1.43 (m, 2H), 1.34 – 1.25 (m, 2H), 0.89 (t, J = 7.3 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 166.1, 142.2, 140.1, 139.7, 139.2, 139.2, 136.9, 135.7, 132.4, 131.9, 129.8, 129.1, 100.2, 65.0, 50.2, 30.4, 20.4, 20.3, 19.1, 13.7. **HRMS (ESI)** m/z Calcd for $[C_{22}H_{25}ClINO_4S, M + H]^+$: 584.0130; Found: 584.0132.

Optical Rotation: $[\alpha]^{25}_{D}$ – 15.0 (*c* = 1.0, $CHCl_3$). 92% *ee* (HPLC conditions: Chiralpak OD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 5.660 min for minor isomer, t_R = 5.172 min for major isomer).



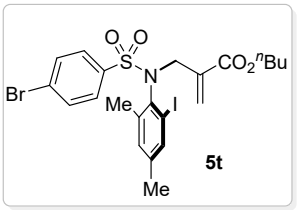
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
5.162	BM m	0.13	2165.59	256.56	49.67	
5.639	MV m	0.15	2194.13	231.08	50.33	
		Sum	4359.72			



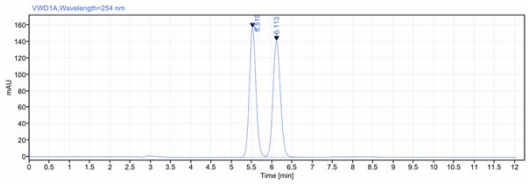
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
5.172	BM m	0.13	3372.48	395.07	95.80	
5.660	MM m	0.14	147.69	16.72	4.20	
		Sum	3520.17			



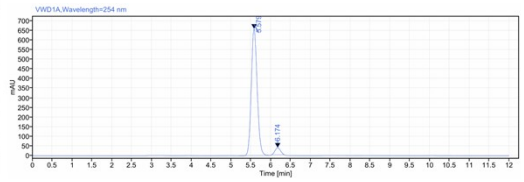
5t. (97% yield, Hexane-EtOAc = 5:1, R_f = 0.4). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.72 (d, *J* = 8.7 Hz, 2H), 7.63 (d, *J* = 8.7 Hz, 2H), 7.49 (s, 1H), 7.00 (s, 1H), 6.29 (d, *J* = 0.8 Hz, 1H), 5.79 (s, 1H), 4.59 (d, *J* = 14.2 Hz, 1H), 4.52 (d, *J* = 14.2 Hz, 1H), 4.01 (dt, *J* = 10.9, 6.6 Hz, 1H), 3.92 (dt, *J* = 10.9, 6.6 Hz, 1H), 2.23 (s, 3H), 2.20 (s, 3H), 1.51 – 1.43 (m, 2H), 1.33 – 1.25 (m, 2H), 0.88 (t, *J* = 7.3 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 166.0, 142.1, 140.2, 140.0, 139.1, 136.8, 135.6, 132.3, 132.1, 131.8, 129.8, 127.7, 100.2, 64.9, 50.2, 30.3, 20.4, 20.3, 19.0, 13.6. **HRMS (ESI)** m/z Calcd for $[C_{22}H_{25}BrINO_4S, M + Na]^+$: 627.9625; Found: 627.9630.

Optical Rotation: $[\alpha]^{25}_{D}$ – 25.5 (*c* = 1.0, $CHCl_3$). 90% *ee* (HPLC conditions: Chiralpak OD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 6.173 min for minor isomer, t_R = 5.579 min for major isomer).



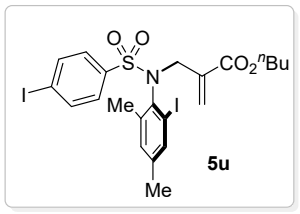
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
5.519	BV	0.66	1802.72	157.86	49.76	
6.113	VB	1.08	1819.79	141.90	50.24	
		Sum	3622.51			



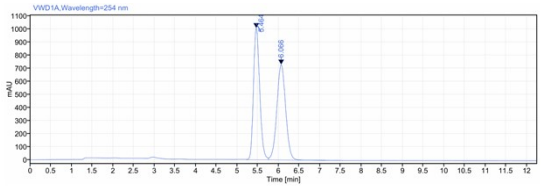
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
5.579	BM m	0.16	6781.80	657.07	94.99	
6.174	MM m	0.16	357.88	36.45	5.01	
		Sum	7139.68			



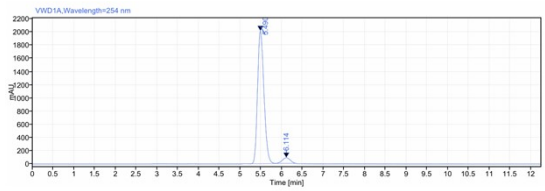
5u. (98% yield, Hexane-EtOAc = 5:1, R_f = 0.5). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.84 (d, *J* = 8.5 Hz, 2H), 7.57 (d, *J* = 8.5 Hz, 2H), 7.49 (s, 1H), 6.99 (s, 1H), 6.29 (d, *J* = 0.8 Hz, 1H), 5.79 (s, 1H), 4.59 (d, *J* = 14.2 Hz, 1H), 4.51 (d, *J* = 14.2 Hz, 1H), 4.00 (dt, *J* = 10.8, 6.8 Hz, 1H), 3.92 (dt, *J* = 10.8, 6.6 Hz, 1H), 2.22 (s, 3H), 2.20 (s, 3H), 1.50 – 1.43 (m, 2H), 1.33 – 1.24 (m, 2H), 0.88 (t, *J* = 7.4 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 166.0, 142.1, 140.8, 140.0, 139.1, 138.0, 136.8, 135.6, 132.3, 131.8, 129.7, 100.2, 100.1, 64.9, 50.2, 30.3, 20.4, 20.3, 19.0, 13.6. **HRMS (ESI)** m/z Calcd for $[C_{22}H_{25}BrI_2NO_4S, M + Na]^+$: 675.9486; Found: 675.9491.

Optical Rotation: $[\alpha]^{25}_D$ – 25.7 (*c* = 1.0, $CHCl_3$). 90% *ee* (HPLC conditions: Chiralpak OD-H column, *n*-Hexane/*i*-PrOH = 85:25, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 6.114 min for minor isomer, t_R = 5.490 min for major isomer).



Signal: VWD1A,Wavelength=254 nm

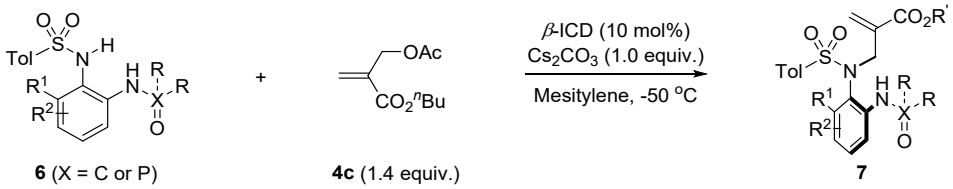
RT [min]	Type	Width [min]	Area	Height	Area%	Name
5.464	VV	0.54	10517.17	1006.14	49.31	
6.066	VB	1.37	10813.42	728.83	50.69	
		Sum	21330.58			



Signal: VWD1A,Wavelength=254 nm

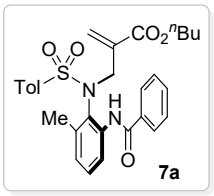
RT [min]	Type	Width [min]	Area	Height	Area%	Name
5.490	MM m	0.17	21586.90	2014.14	95.03	
6.114	MM m	0.21	1128.09	85.24	4.97	
		Sum	22714.99			

Representative procedure for synthesis of 7:



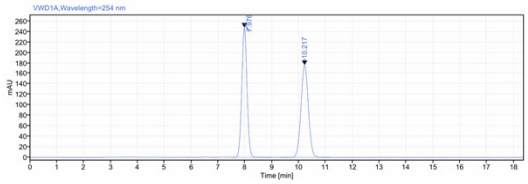
To a Schlenk tube containing **6**[4] (0.05 mmol), *β*-ICD (1.5 mg, 10 mol%) and Cs_2CO_3 (0.05 mmol, 1.0 equiv.) were added mesitylene (3 mL) and MBH acetate **4c** (0.14 mmol, 1.4 equiv.). The reaction mixture was stirred at -50 °C for 24 h. The solvent was removed by silica gel column chromatography and the residue was then purified by silica gel column chromatography with hexanes/ethyl acetate as the eluent to afford the product **7**.

Characterization of compounds of 7:



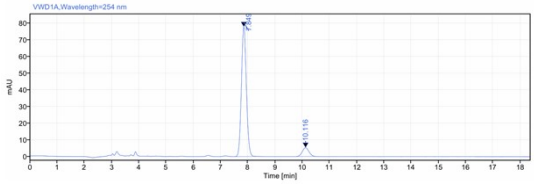
7a. (76% yield, Hexane-EtOAc = 3:1, R_f = 0.5). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 9.15 (s, 1H), 8.07 (d, *J* = 8.2 Hz, 1H), 7.85 (d, *J* = 7.4 Hz, 2H), 7.55 (d, *J* = 8.2 Hz, 2H), 7.48-7.44 (m, 1H), 7.41-7.38 (m, 2H), 7.19-7.14 (m, 3H), 6.82 (d, *J* = 7.5 Hz, 1H), 6.03 (s, 1H), 5.53 (s, 1H), 4.72 (d, *J* = 14.0 Hz, 1H), 4.02 (d, *J* = 14.0 Hz, 1H), 3.72 – 3.54 (m, 2H), 2.31 (s, 3H), 1.60 (s, 3H), 1.33-1.26 (m, 2H), 1.15-1.06 (m, 2H), 0.75 (t, *J* = 7.3 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 165.6, 165.0, 144.2, 138.5, 138.3, 136.1, 135.2, 134.4, 131.7, 130.9, 129.7, 129.2, 128.5, 127.8, 127.8, 127.4, 127.1, 121.7, 64.8, 51.1, 30.2, 21.5, 18.9, 17.9, 13.6. **HRMS (ESI)** m/z Calcd for $[C_{29}H_{32}N_2O_5S$, M + Na$]^+$: 543.1924; Found: 543.1929.

Optical Rotation: $[\alpha]^{25}_D$ 60.0 (*c* = 1.0, $CHCl_3$). 84% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 70:30, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 10.116 min for minor isomer, t_R = 7.849 min for major isomer).



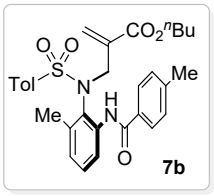
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
7.976	BB	1.42	3363.98	247.26	49.99	
10.217	BB	1.87	3364.89	175.73	50.01	
		Sum	6728.87			



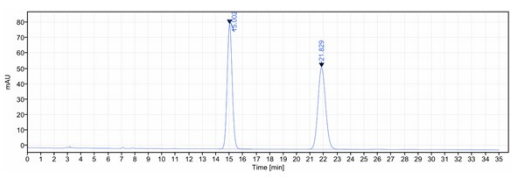
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
7.849	BB	0.80	986.53	78.00	91.79	
10.116	MM m	0.26	88.20	5.25	8.21	
		Sum	1074.73			



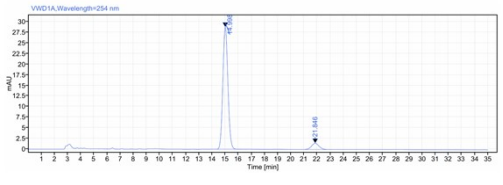
7b. (81% yield, Hexane-EtOAc = 3:1, R_f = 0.4). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 9.11 (s, 1H), 8.06 (d, *J* = 8.0 Hz, 1H), 7.74 (d, *J* = 8.2 Hz, 2H), 7.56 (d, *J* = 8.2 Hz, 2H), 7.20 (d, *J* = 7.8 Hz, 3H), 7.16 (d, *J* = 8.4 Hz, 2H), 6.81 (d, *J* = 7.5 Hz, 1H), 6.03 (s, 1H), 5.53 (s, 1H), 4.71 (d, *J* = 14.0 Hz, 1H), 4.02 (d, *J* = 14.0 Hz, 1H), 3.71-3.58 (m, 2H), 2.35 (s, 3H), 2.32 (s, 3H), 1.59 (s, 3H), 1.34 – 1.26 (m, 2H), 1.16-1.06 (m, 2H), 0.75 (t, *J* = 7.4 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 165.6, 165.0, 144.2, 142.2, 138.5, 138.4, 136.1, 135.2, 131.6, 131.0, 129.7, 129.2, 129.2, 127.8, 127.7, 127.4, 127.0, 121.7, 64.9, 51.1, 30.2, 21.6, 21.5, 18.9, 17.9, 13.6. **HRMS (ESI)** m/z Calcd for $[C_{30}H_{34}N_2O_4S, M + Na]^+$: 557.2081; Found: 557.2085.

Optical Rotation: $[\alpha]^{25}_D$ 51.0 (*c* = 1.0, $CHCl_3$). 86% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 21.846 min for minor isomer, t_R = 14.998 min for major isomer).



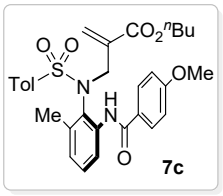
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
15.002	BB	2.44	2104.92	81.00	50.01	
21.829	BB	3.04	2104.09	53.10	49.99	
		Sum	4209.01			



Signal: VWD1A,Wavelength=254 nm

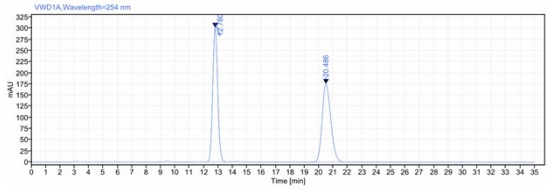
RT [min]	Type	Width [min]	Area	Height	Area%	Name
14.998	BB	1.99	769.83	28.74	92.86	
21.846	MM m	0.58	59.22	1.47	7.14	
		Sum	829.05			



7c. (45% yield, Hexane-EtOAc = 3:1, R_f = 0.4). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 9.15 (s, 1H), 8.12 (d, *J* = 8.0 Hz, 1H), 7.89 (d, *J* = 8.8 Hz, 2H), 7.63 (d, *J* = 8.2 Hz, 2H), 7.26 – 7.15 (m, 3H),

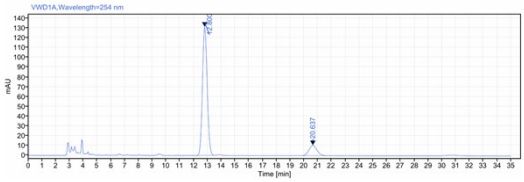
6.96 (d, J = 8.8 Hz, 2H), 6.86 (d, J = 7.4 Hz, 1H), 6.10 (s, 1H), 5.58 (s, 1H), 4.79 (d, J = 14.0 Hz, 1H), 4.07 (d, J = 14.0 Hz, 1H), 3.86 (s, 3H), 3.76 (dt, J = 10.9, 6.8 Hz, 1H), 3.68 (dt, J = 10.9, 6.8 Hz, 1H), 2.39 (s, 3H), 1.65 (s, 3H), 1.42 – 1.31 (m, 2H), 1.18 (dq, J = 14.5, 7.3 Hz, 2H), 0.82 (t, J = 7.3 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ165.6, 164.6, 162.4, 144.2, 138.4, 136.1, 135.1, 130.9, 129.7, 129.3, 129.1, 127.8, 127.6, 126.8, 126.7, 121.6, 113.7, 64.8, 55.4, 51.0, 30.2, 21.5, 18.9, 17.9, 13.6. **HRMS (ESI)** m/z Calcd for $[C_{30}H_{34}N_2O_6S, M + Na]^+$: 573.2030; Found: 573.2034.

Optical Rotation: $[\alpha]^{25}_D$ 34.0 (c = 1.0, $CHCl_3$). 76% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 70:30, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 20.637 min for minor isomer, t_R = 12.800 min for major isomer).



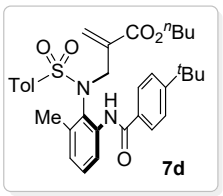
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
12.780	BB	1.46	7323.11	301.05	50.01	
20.486	BM m	0.65	7321.58	174.91	49.99	
		Sum	14644.70			



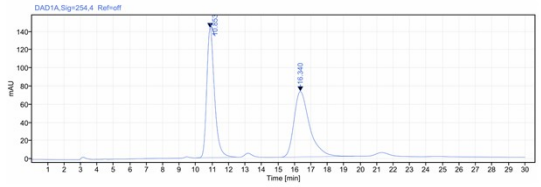
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
12.800	BB	1.35	3136.05	131.07	87.87	
20.637	MM m	0.63	432.77	10.53	12.13	
		Sum	3568.82			

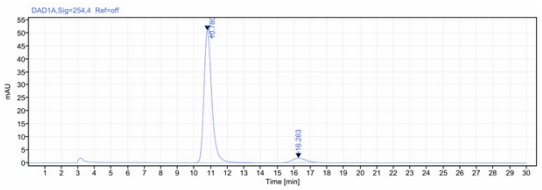


7d. (74% yield, Hexane-EtOAc = 3:1, R_f = 0.4). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 9.20 (s, 1H), 8.13 (d, J = 8.2 Hz, 1H), 7.85 (d, J = 8.5 Hz, 2H), 7.64 (d, J = 8.2 Hz, 2H), 7.48 (d, J = 8.5 Hz, 2H), 7.27 – 7.21 (m, 3H), 6.88 (d, J = 7.5 Hz, 1H), 6.10 (s, 1H), 5.58 (s, 1H), 4.78 (d, J = 14.0 Hz, 1H), 4.09 (d, J = 14.0 Hz, 1H), 3.74 (dt, J = 10.8, 6.8 Hz, 1H), 3.65 (dt, J = 10.8, 6.8 Hz, 1H), 2.39 (s, 3H), 1.66 (s, 3H), 1.42 – 1.28 (m, 11H), 1.17 (dq, J = 14.4, 7.4 Hz, 2H), 0.81 (t, J = 7.4 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 165.6, 164.9, 155.2, 144.1, 138.5, 138.4, 136.1, 135.1, 131.4, 131.0, 129.7, 129.1, 127.8, 127.7, 127.2, 127.0, 125.5, 121.7, 64.8, 51.0, 34.9, 31.1, 30.2, 21.5, 18.9, 17.9, 13.6. . **HRMS (ESI)** m/z Calcd for $[C_{33}H_{40}N_2O_5S, M + Na]^+$: 599.2550; Found: 599.2554.

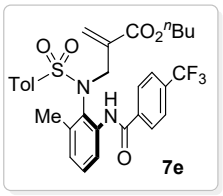
Optical Rotation: $[\alpha]^{25}_{D}$ 45.0 (*c* = 1.0, $CHCl_3$). 89% *ee* (HPLC conditions: Chiralpak OZ-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 16.263 min for minor isomer, t_R = 10.780 min for major isomer).



Signal:	DAD1A,Sig=254,4 Ref=off					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
10.853	BB	2.60	4652.48	142.55	49.57	
16.340	BB	4.59	4733.67	72.05	50.43	
		Sum	9386.15			



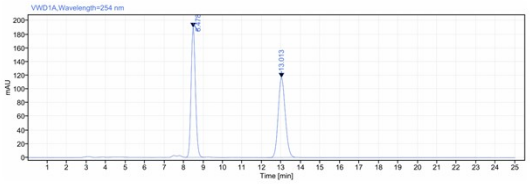
Signal:	DAD1A,Sig=254,4 Ref=off					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
10.780	BB	3.66	1666.39	50.90	94.51	
16.263	BM m	0.68	96.86	1.71	5.49	
		Sum	1763.25			



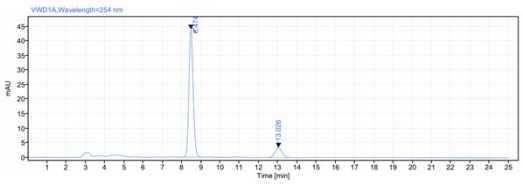
7e. (55% yield, Hexane-EtOAc = 3:1, R_f = 0.4). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 9.33 (s, 1H), 8.10 (d, *J* = 8.1 Hz, 1H), 8.03 (d, *J* = 8.1 Hz, 2H), 7.71 (d, *J* = 8.2 Hz, 2H), 7.57 (d, *J* = 8.2 Hz, 2H), 7.23 (d, *J* = 7.7 Hz, 1H), 7.18 (d, *J* = 8.1 Hz, 2H), 6.87 (d, *J* = 7.5 Hz, 1H), 6.07 (s, 1H), 5.58 (s, 1H), 4.79 (d, *J* = 13.9 Hz, 1H), 3.99 (d, *J* = 13.9 Hz, 1H), 3.74 – 3.55 (m, 2H), 2.35 (s, 3H), 1.62 (s, 3H), 1.35 – 1.27 (m, 2H), 1.12 (dq, *J* = 14.4, 7.3 Hz, 2H), 0.77 (t, *J* = 7.3 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 165.6, 163.7, 144.3, 138.5, 138.0, 137.7, 135.9, 135.2, 133.3 ($^2J_{C\text{-}F}$ = 32.5 Hz), 131.1, 129.7, 129.3, 127.9, 127.9, 127.7, 127.5, 125.6 ($^3J_{C\text{-}F}$ = 3.8 Hz), 123.7 ($^1J_{C\text{-}F}$ = 270.8 Hz), 121.5, 64.9, 51.3, 30.2, 21.5, 18.9, 17.9, 13.5. **^{19}F NMR** (376 MHz, $CDCl_3$) 62.94. **HRMS (ESI)** m/z Calcd for $[C_{30}H_{31}F_3N_2O_5S, M + Na]^+$: 599.2550; Found: 599.2554.

Optical Rotation: $[\alpha]^{25}_{D}$ 32.0 (*c* = 1.0, $CHCl_3$). 78% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 70:30, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 13.026 min for minor isomer, t_R = 8.474 min for major isomer).

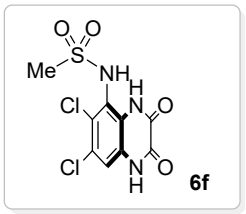
Figure 50. HPLC Trace of **7e.**



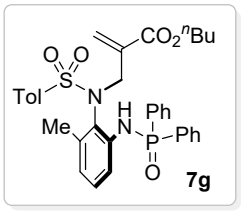
Signal:	VWD1A,Wavelength=254 nm				
RT [min]	Type	Width [min]	Area	Height	Area%
8.478	VB	0.95	2937.87	189.33	49.95
13.013	BM m	0.39	2943.35	116.35	50.05
		Sum	5881.21		



Signal:	VWD1A,Wavelength=254 nm				
RT [min]	Type	Width [min]	Area	Height	Area%
8.474	BB	1.12	682.31	43.92	88.92
13.026	BB	1.57	85.03	3.35	11.08
		Sum	767.34		



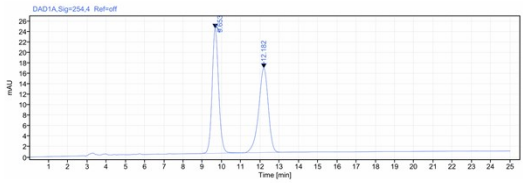
6f[5]**.** (85% yield). Yellow solid. **MP:** 91-92 °C. ^{1}H NMR (400 MHz, DMSO) δ 12.12 (s, 1H), 11.04 (s, 1H), 9.49 (s, 1H), 7.29 (s, 1H), 3.16 (s, 3H). ^{13}C NMR (100 MHz, DMSO) δ 154.7, 154.5, 126.6, 126.2, 125.3, 121.5, 115.1, 41.7. **HRMS (ESI)** m/z Calcd for $[C_9H_7Cl_2N_3O_4S, M + Na]^+$: 345.9427, 347.9396; Found: 345.9428, 347.9400.

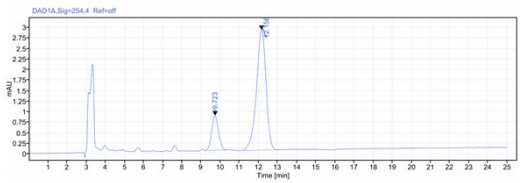


7g. (38% yield, Hexane-EtOAc = 2:1, R_f = 0.4). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.01 – 7.90 (m, 2H), 7.89 – 7.81 (m, 2H), 7.59 (d, *J* = 8.2 Hz, 2H), 7.48 – 7.35 (m, 6H), 7.13 (d, *J* = 8.1 Hz, 2H), 7.01 (d, *J* = 8.1 Hz, 1H), 6.85 – 6.81 (m, 1H), 6.54 (d, *J* = 7.4 Hz, 1H), 6.42 (d, *J* = 10.6 Hz, 1H), 6.06 (s, 1H), 5.56 (s, 1H), 4.58 (d, *J* = 14.1 Hz, 1H), 4.04 (d, *J* = 14.1 Hz, 1H), 3.85 – 3.69 (m, 2H), 2.33 (s, 3H), 1.65 (s, 3H), 1.44 – 1.32 (m, 2H), 1.22 – 1.16 (m, 2H), 0.80 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 165.8, 144.0, 141.2, 138.8, 136.3, 135.5, 132.4 ($^{1}J_{C\text{-}P}$ = 128.3 Hz), 132.2 ($^{2}J_{C\text{-}P}$ = 10.2 Hz), 132.0 ($^{1}J_{C\text{-}P}$ = 128.9 Hz), 132.0 ($^{3}J_{C\text{-}P}$ = 2.5 Hz), 131.9 ($^{3}J_{C\text{-}P}$ = 2.7 Hz), 131.5 ($^{2}J_{C\text{-}P}$ = 10 Hz), 130.9, 129.7, 129.1, 128.5 ($^{2}J_{C\text{-}P}$ = 24.7 Hz), 128.6, 128.5, 127.9, 125.9 ($^{3}J_{C\text{-}P}$ = 8.5 Hz), 123.7, 116.5 ($^{3}J_{C\text{-}P}$ = 4.7 Hz), 65.0, 50.6, 30.3, 21.6, 19.0, 18.4, 13.7. **^{31}P NMR** (162 MHz, $CDCl_3$) 18.02 (d, *J* = 11.1 Hz). **HRMS (ESI)** m/z Calcd for $[C_{34}H_{37}N_2O_5PS, M + Na]^+$: 639.2053; Found: 639.2058.

Optical Rotation: $[\alpha]^{25}_D$ 48.0 (*c* = 1.0, $CHCl_3$). 66% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 70:30, flow rate = 1.0 mL/min, wavelength = 254

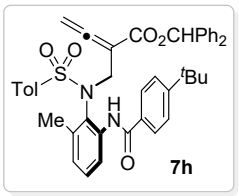
nm, t_R = 9.723 min for minor isomer, t_R = 12.157 min for major isomer).





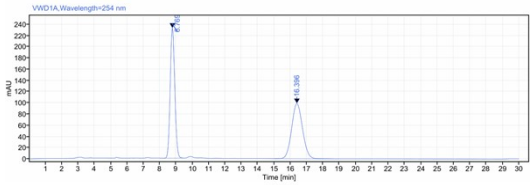
Signal:	DAD1A,Sig=254,4 Ref=off					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
9.653	BB	2.13	561.71	23.76	50.16	
12.182	BB	1.99	558.02	16.03	49.84	
		Sum	1119.74			

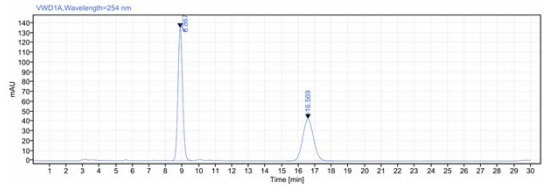
Signal:	DAD1A,Sig=254,4 Ref=off					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
9.723	MM m	0.32	20.06	0.82	16.83	
12.156	BB	1.91	99.10	2.84	83.17	
		Sum	119.15			



7h. (53% yield, Hexane-EtOAc = 5:1, R_f = 0.5). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 9.11 (s, 1H), 8.21 (d, *J* = 8.2 Hz, 1H), 7.75 (d, *J* = 8.4 Hz, 2H), 7.64 (d, *J* = 8.2 Hz, 2H), 7.40 (d, *J* = 8.4 Hz, 2H), 7.27– 7.22 (m, 4H), 7.21 – 7.13 (m, 7H), 7.12 – 7.04 (m, 2H), 6.83 (d, *J* = 7.3 Hz, 1H), 6.48 (s, 1H), 4.92 (d, *J* = 14.9 Hz, 1H), 4.86 (d, *J* = 14.9 Hz, 1H), 4.73 (d, *J* = 13.8 Hz, 1H), 4.19 (d, *J* = 13.8 Hz, 1H), 2.34 (s, 3H), 1.64 (s, 3H), 1.35 (s, 9H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 215.9, 164.8, 164.8, 155.0, 144.0, 140.0, 139.8, 138.9, 138.5, 136.2, 131.4, 129.7, 129.2, 128.3, 128.2, 127.7, 127.6, 127.3, 127.2, 127.0, 126.7, 126.5, 125.3, 121.0, 95.6, 79.9, 77.6, 49.1, 34.9, 31.1, 21.5, 18.1. **HRMS (ESI)** m/z Calcd for $[C_{43}H_{42}IN_2O_5S, M+Na]^+$: 721.2707; Found: 721.2711.

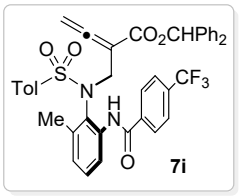
Optical Rotation: $[\alpha]^{25}_D$ -7.2 (*c* = 0.5, $CHCl_3$). 16% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 16.569 min for minor isomer, t_R = 8.867 min for major isomer).





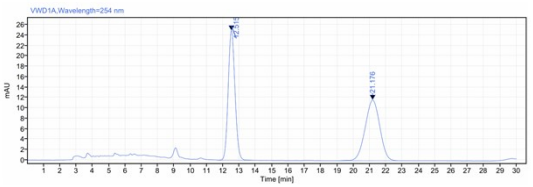
Signal:	VWD1A,Wavelength=254 nm					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
8.769	BB	1.27	4522.29	231.69	49.95	
16.396	BB	4.02	4531.20	98.22	50.05	
		Sum	9053.49			

Signal:	VWD1A,Wavelength=254 nm					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
8.867	BB	1.31	2625.78	134.70	57.76	
16.569	BM m	0.70	1919.99	42.53	42.24	
		Sum	4545.77			



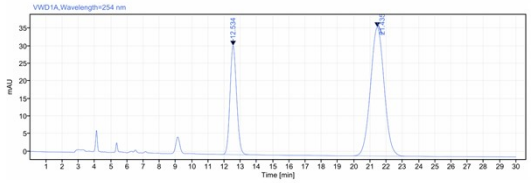
7i. (46% yield, Hexane-EtOAc = 5:1, R_f = 0.5). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 9.12 (s, 1H), 8.19 (d, *J* = 8.0 Hz, 1H), 7.83 (d, *J* = 8.3 Hz, 2H), 7.61 (d, *J* = 8.3 Hz, 2H), 7.57 (d, *J* = 8.3 Hz, 2H), 7.29 (d, *J* = 8.0 Hz, 1H), 7.26 – 7.21 (m, 3H), 7.20 – 7.11 (m, 7H), 7.08 – 7.03 (m, 2H), 6.89 (d, *J* = 7.5 Hz, 1H), 6.47 (s, 1H), 4.97 (d, *J* = 14.9 Hz, 1H), 4.91 (d, *J* = 14.9 Hz, 1H), 4.84 (d, *J* = 13.6 Hz, 1H), 4.10 (d, *J* = 13.6 Hz, 1H), 2.32 (s, 3H), 1.71 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 216.1, 165.0, 163.5, 144.2, 139.9, 139.7, 138.9, 138.2, 137.4, 136.2, 132.9 ($^2J_{C\text{-}F}$ = 32.3 Hz), 129.7, 129.3, 128.4, 128.3, 127.9, 127.8, 127.7, 127.3, 127.2, 126.9, 126.2, 125.3 ($^3J_{C\text{-}F}$ = 3.7 Hz), 123.7 ($^1J_{C\text{-}F}$ = 270.9 Hz), 120.9, 95.4, 79.7, 77.7, 49.2, 21.5, 18.1. **^{19}F NMR** (376 MHz, $CDCl_3$) 62.83. **HRMS (ESI)** m/z Calcd for $[C_{40}H_{33}F_3N_2O_5S, M + Na]^+$: 733.1954; Found: 733.1959.

Optical Rotation: $[\alpha]^{25}_D$ -6.6 (*c* = 0.5, $CHCl_3$). 42% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 70:30, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 12.534 min for minor isomer, t_R = 21.435 min for major isomer).



Signal: VWD1A,Wavelength=254 nm

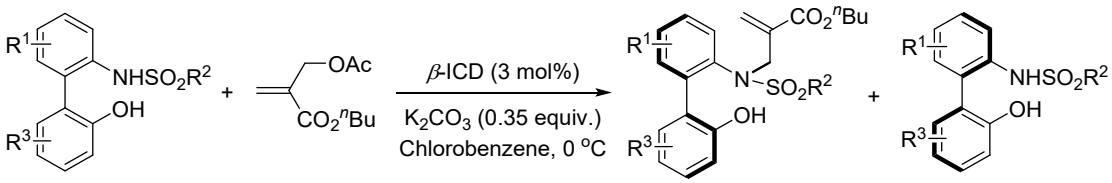
RT [min]	Type	Width [min]	Area	Height	Area%	Name
12.515	BB	2.26	719.69	24.89	49.85	
21.176	BB	3.65	723.92	11.65	50.15	
		Sum	1443.62			



Signal: VWD1A,Wavelength=254 nm

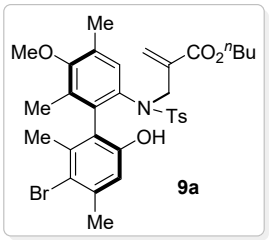
RT [min]	Type	Width [min]	Area	Height	Area%	Name
12.534	BB	2.21	878.16	31.00	29.01	
21.435	BB	3.58	2148.75	36.68	70.99	
		Sum	3026.90			

Representative procedure for synthesis of 8:



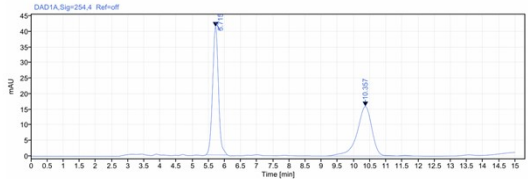
(±)-**8** (0.1 mmol) **4** (0.7 equiv.) **9** (*R*)-**8**

To a Schlenk tube containing *rac*-**8** (0.1 mmol), *β*-ICD (1.0 mg, 3 mol%) and K_2CO_3 (0.035 mmol, 0.35 equiv.) were added chlorobenzene (8 mL) and MBH acetate **4** (0.07 mmol, 0.7 equiv.). The reaction mixture was allowed to stir at 0 °C for 72 h. The solvent was removed by silica gel column chromatography and the residue was then purified by silica gel column chromatography to afford the product **9** and unreacted starting material **8**.

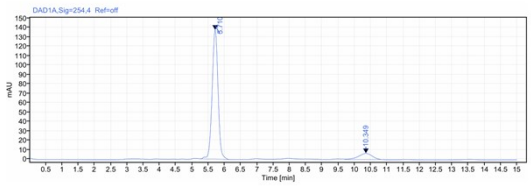


9a. (56% yield, Hexane-EtOAc = 5:1, R_f = 0.4). Syrup. **^{1}H NMR** (400 MHz, DMSO-d_6) δ 9.32 (s, 1H), 7.43 (d, *J* = 8.1 Hz, 2H), 7.31 (d, *J* = 8.1 Hz, 2H), 6.74 (s, 1H), 6.70 (s, 1H), 5.96 (s, 1H), 5.35 (s, 1H), 4.18 (d, *J* = 16.7 Hz, 1H), 3.96 (t, *J* = 6.6 Hz, 2H), 3.89 (d, *J* = 16.7 Hz, 1H), 2.39 (s, 3H), 2.36 (s, 3H), 2.19 (s, 3H), 1.96 (s, 3H), 1.78 (s, 3H), 1.55 – 1.42 (m, 2H), 1.32 – 1.23 (m, 2H), 0.86 (t, *J* = 7.3 Hz, 3H). **^{13}C NMR** (100 MHz, DMSO-d_6) δ 165.5, 156.1, 153.3, 143.5, 137.5, 137.3, 137.0, 136.2, 135.0, 134.3, 131.1, 130.4, 129.4, 129.4, 128.2, 127.8, 124.0, 116.8, 115.2, 64.1, 59.6, 50.3, 30.0, 23.7, 21.3, 21.0, 18.6, 15.7, 13.6, 13.1. **HRMS (ESI)** m/z Calcd for $[C_{32}H_{38}BrNO_6S, M + Na]^+$: 666.1495, 668.1480; Found: 666.1497, 668.1481.

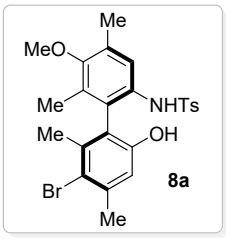
Optical Rotation: $[\alpha]^{25}_D$ 90.0 (*c* = 1.0, $CHCl_3$). 80% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 10.349 min for minor isomer, t_R = 5.710 min for major isomer).



Signal:	DAD1A,Sig=254,4 Ref=off					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
5.715	MM m	0.20	518.24	41.06	50.44	
10.357	MM m	0.48	509.24	15.89	49.56	
		Sum	1027.49			

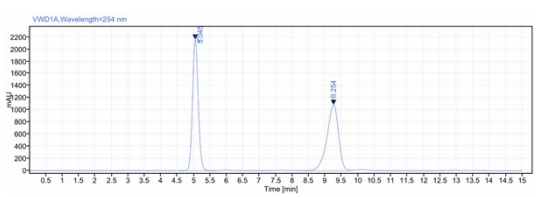


Signal:	DAD1A,Sig=254,4 Ref=off					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
5.710	MB m	0.20	1738.97	137.10	90.08	
10.349	VM m	0.45	191.52	6.45	9.92	
		Sum	1930.49			



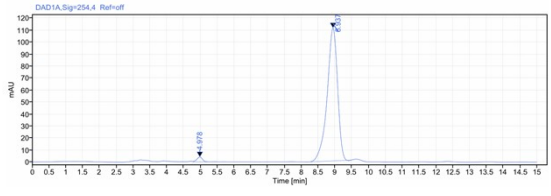
8a. (38% yield, Hexane-EtOAc = 2:1, R_f = 0.4). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.55 (d, *J* = 8.0 Hz, 2H), 7.41 (s, 1H), 7.22 (d, *J* = 8.0 Hz, 2H), 6.76 (s, 1H), 6.08 (s, 1H), 4.41 (s, 1H), 3.67 (s, 3H), 2.43 (s, 3H), 2.40 (s, 3H), 2.31 (s, 3H), 1.80 (s, 3H), 1.70 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 154.3, 151.6, 144.0, 140.3, 137.7, 136.3, 132.7, 131.8, 131.1, 129.7, 127.1, 124.1, 120.4, 120.0, 119.4, 115.7, 60.0, 24.2, 21.5, 20.4, 16.5, 13.1. **HRMS (ESI)** m/z Calcd for [$C_{24}H_{26}BrNO_4S$, M + Na]$^+$: 526.0658, 528.0640; Found: 526.0661, 528.0644.

Optical Rotation: $[\alpha]^{25}_D$ -34.0 (*c* = 1.0, $CHCl_3$). 96% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 4.978 min for minor isomer, t_R = 8.937 min for major isomer).



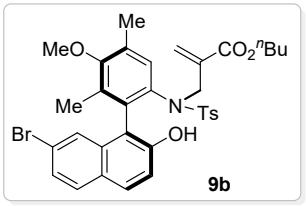
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
5.045	VV	1.10	26153.00	2163.67	49.56	
9.254	VV	1.40	26620.88	1085.62	50.44	
		Sum	52773.88			



Signal: DAD1A,Sig=254,4 Ref=off

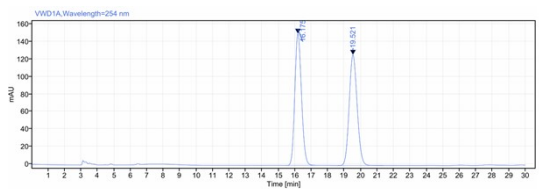
RT [min]	Type	Width [min]	Area	Height	Area%	Name
4.978	VB	0.46	44.69	4.02	1.84	
8.937	BM m	0.33	2383.17	110.93	98.16	
		Sum	2427.86			



9b. (58% yield, Hexane-EtOAc = 5:1, R_f = 0.5) Syrup. **^{1}H NMR** (400 MHz, DMSO-d_6) δ 9.75 (s, 1H), 7.84 (d, *J* = 8.9 Hz, 1H), 7.79 (t, *J* = 9.4 Hz, 1H), 7.38 (d, *J* = 8.9 Hz, 1H), 7.25 (d, *J* = 8.9 Hz, 2H), 7.20 – 6.97 (m, 4H), 6.88 (s, 1H), 5.84 (s, 1H), 5.13 (s, 1H), 4.14– 4.02 (m, 1H), 3.95 (t, *J* = 6.5 Hz, 2H), 3.83 (d, *J* = 16.7 Hz, 1H), 3.71 (s, 3H), 2.31 (s, 3H), 2.28 (s, 3H), 1.71 (s, 3H), 1.52 – 1.43 (m, 2H), 1.29– 1.22 (m, 2H), 0.86 (t, *J* = 7.3 Hz, 3H). **^{13}C NMR** (100 MHz, DMSO-d_6) δ 165.6, 156.1, 151.9, 135.7, 135.2, 135.2, 135.0, 133.3, 131.8, 131.7, 129.6, 129.4, 128.9, 127.9, 127.7, 127.7, 127.6, 126.1, 126.1, 124.1, 122.7, 118.3, 117.1, 64.1, 59.5,

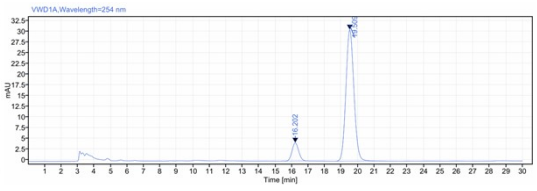
54.9, 49.6, 30.0, 18.6, 15.9, 13.6, 13.0. **HRMS (ESI)** m/z Calcd for $[C_{34}H_{36}BrNO_6S, M + Na]^+$: 688.1339, 690.1324; Found: 688.1337, 690.1324.

Optical Rotation: $[\alpha]^{25}_D$ 48 (*c* = 1.0, $CHCl_3$). 80% *ee* (HPLC conditions: Chiralpak IE column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 16.202 min for minor isomer, t_R = 19.509 min for major isomer).



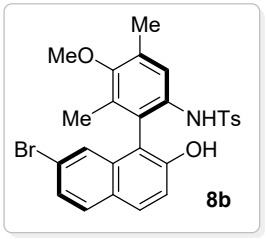
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
16.175	BB	1.94	4235.85	150.47	49.89	
19.521	BB	2.77	4254.84	126.42	50.11	
		Sum	8490.69			



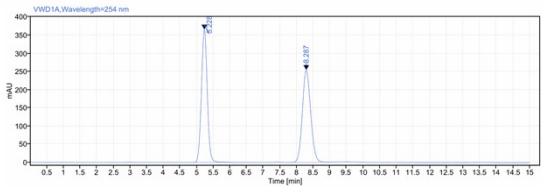
Signal: VWD1A,Wavelength=254 nm

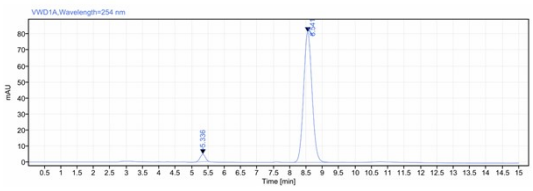
RT [min]	Type	Width [min]	Area	Height	Area%	Name
16.202	BM m	0.43	117.85	4.23	10.25	
19.509	BB	2.40	1032.06	30.61	89.75	
		Sum	1149.90			



8b. (32% yield, Hexane-EtOAc = 3:1, R_f = 0.3). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.82 (d, *J* = 8.9 Hz, 1H), 7.68 (d, *J* = 8.7 Hz, 1H), 7.49 (s, 1H), 7.41 (dd, *J* = 8.7, 1.9 Hz, 1H), 7.35 (d, *J* = 8.3 Hz, 2H), 7.23 (d, *J* = 8.9 Hz, 1H), 7.09 (d, *J* = 8.1 Hz, 2H), 6.87 (d, *J* = 1.6 Hz, 1H), 6.07 (s, 1H), 4.98 (s, 1H), 3.72 (s, 3H), 2.38 (s, 3H), 2.36 (s, 3H), 1.74 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 154.7, 151.8, 143.9, 135.8, 133.8, 133.3, 132.6, 131.7, 130.9, 130.0, 129.6, 127.6, 127.3, 127.0, 125.4, 125.4, 122.0, 122.0, 121.3, 118.1, 113.3, 60.1, 21.7, 16.6, 13.3. **HRMS (ESI)** m/z Calcd for $[C_{26}H_{24}BrNO_4S, M + Na]^+$: 548.0502, 550.0484; Found: 548.0504, 550.0479.

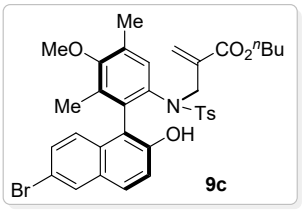
Optical Rotation: $[\alpha]^{25}_D$ -53 (*c* = 1.0, $CHCl_3$). 93% *ee* (HPLC conditions: Chiralpak IE column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 5.336 min for minor isomer, t_R = 8.541 min for major isomer).





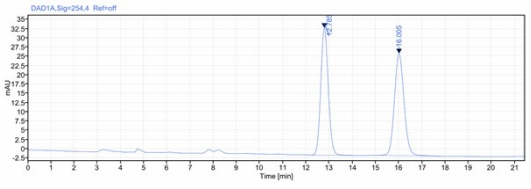
Signal:	VWD1A,Wavelength=254 nm					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
5.228	BB	2.02	4445.66	365.70	50.26	
8.287	BB	1.15	4399.59	253.75	49.74	
		Sum	8845.26			

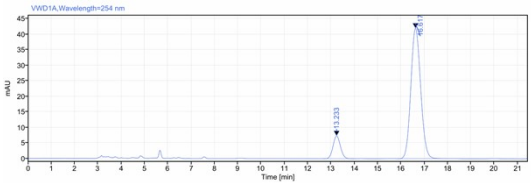
Signal:	VWD1A,Wavelength=254 nm					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
5.336	MM m	0.18	52.63	4.65	3.44	
8.541	BB	1.33	1475.86	81.55	96.56	
		Sum	1528.49			



9c. (56% yield, Hexane-EtOAc = 4:1, R_f = 0.5). Syrup. **^{1}H NMR** (400 MHz, DMSO-d_6) δ 9.67 (br, 1H), 8.08 (d, *J* = 1.8 Hz, 1H), 7.81 (d, *J* = 8.9 Hz, 1H), 7.33 (d, *J* = 8.7 Hz, 1H), 7.26 (d, *J* = 8.9 Hz, 1H), 7.24 – 6.89 (m, 5H), 6.87 (s, 1H), 5.88 (s, 1H), 5.21 (s, 1H), 4.12 (s, 1H), 3.95 (t, *J* = 6.4 Hz, 2H), 3.84 (d, *J* = 16.6 Hz, 1H), 3.70 (s, 3H), 2.31 (s, 3H), 2.26 (s, 3H), 1.69 (s, 3H), 1.54 – 1.42 (m, 2H), 1.31 – 1.22 (m, 2H), 0.86 (t, *J* = 7.4 Hz, 3H). **^{13}C NMR** (100 MHz, DMSO-d_6) δ 165.5, 156.2, 152.4, 143.3, 136.0, 135.3, 134.9, 134.9, 132.0, 131.9, 130.6, 129.8, 129.3, 129.1, 128.7, 128.4, 128.0, 128.0, 127.7, 127.1, 119.3, 117.4, 115.5, 64.1, 59.6, 50.3, 30.0, 21.0, 18.6, 15.8, 13.6, 13.0. **HRMS (ESI)** m/z Calcd for [$C_{34}H_{36}BrNO_6S$, M + Na]$^+$: 688.1339, 690.1324; Found: 688.1338, 690.1321.

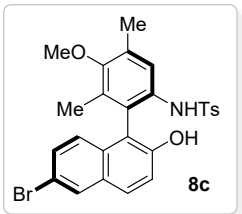
Optical Rotation: $[\alpha]^{25}_D$ 68 (*c* = 1.0, $CHCl_3$). 77% *ee* (HPLC conditions: Chiralpak IE column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 13.233 min for minor isomer, t_R = 16.617 min for major isomer).





Signal:	DAD1A,Sig=254,4 Ref=off					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
12.785	BB	1.91	775.64	34.41	49.41	
16.005	BB	2.95	794.31	27.59	50.59	
		Sum	1569.95			

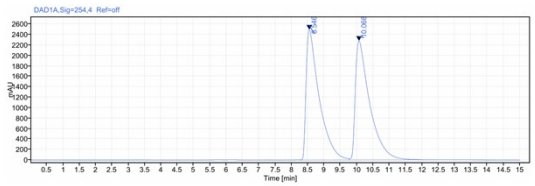
Signal:	VWD1A,Wavelength=254 nm					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
13.233	BB	1.32	161.33	7.35	11.59	
16.617	BB	2.13	1230.36	41.97	88.41	
		Sum	1391.69			



8c. (32% yield, Hexane-EtOAc = 3:1, R_f = 0.3). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.95 (d, *J* = 1.8 Hz, 1H), 7.75 (d, *J* = 8.9

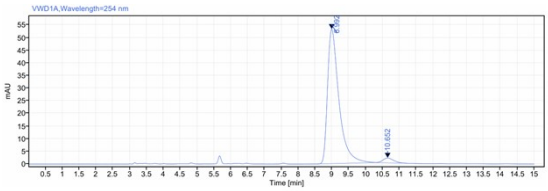
Hz, 1H), 7.54 (s, 1H), 7.32 (d, J = 8.2 Hz, 2H), 7.23 (d, J = 8.9 Hz, 1H), 7.13 (dd, J = 8.9, 1.8 Hz, 1H), 7.05 (d, J = 8.2 Hz, 2H), 6.52 (d, J = 8.9 Hz, 1H), 6.02 (s, 1H), 4.96 (s, 1H), 3.72 (s, 3H), 2.39 (s, 3H), 2.38 (s, 3H), 1.72 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 154.7, 151.2, 144.0, 136.0, 133.2, 132.6, 131.7, 131.0, 130.5, 130.2, 129.9, 129.5, 127.0, 125.0, 122.4, 121.5, 118.8, 117.5, 114.2, 60.1, 21.6, 16.6, 13.2. **HRMS (ESI)** m/z Calcd for $[C_{26}H_{24}BrNO_4S, M + Na]^+$: 548.0502, 550.0484; Found: 548.0505, 550.0489.

Optical Rotation: $[\alpha]^{25}_D$ -82 (c = 1.0, $CHCl_3$). 94% *ee* (HPLC conditions: Chiralpak IE column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 10.652 min for minor isomer, t_R = 8.992 min for major isomer).



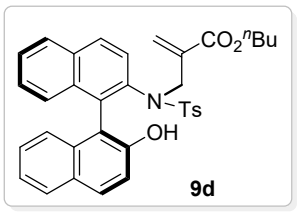
Signal: DAD1A,Sig=254,4 Ref=off

RT [min]	Type	Width [min]	Area	Height	Area%	Name
8.546	VV	1.53	69515.78	2493.05	49.87	
10.068	VB	2.67	69867.29	2277.23	50.13	
		Sum	139383.06			



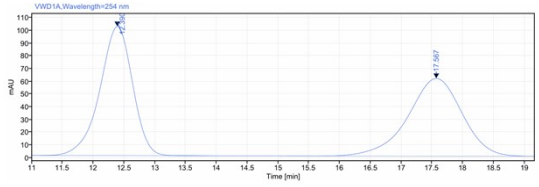
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
8.992	BB	1.72	1251.84	53.19	96.88	
10.652	BM m	0.33	40.28	1.88	3.12	
		Sum	1292.12			



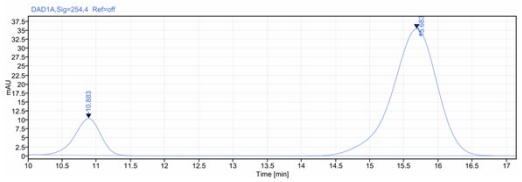
9d. (43% yield, Hexane-EtOAc = 5:1, R_f = 0.5). Syrup. **^{1}H NMR** (400 MHz, DMSO-d_6) δ 9.64 (s, 1H), 8.02 (d, J = 8.6 Hz, 2H), 7.96 – 7.85 (m, 2H), 7.52 (t, J = 7.5 Hz, 1H), 7.43 (d, J = 8.8 Hz, 1H), 7.34 – 7.24 (m, 3H), 7.23 – 7.05 (m, 5H), 7.04 (d, J = 8.5 Hz, 1H), 6.91 (d, J = 8.2 Hz, 1H), 5.87 (s, 1H), 5.21 (s, 1H), 4.21 (d, J = 16.6 Hz, 1H), 3.96 (t, J = 5.3 Hz, 2H), 3.88 (d, J = 16.6 Hz, 1H), 2.30 (s, 3H), 1.51 – 1.40 (m, 2H), 1.28 – 1.19 (m, 2H), 0.83 (t, J = 7.4 Hz, 3H). **^{13}C NMR** (100 MHz, DMSO-d_6) δ 165.4, 152.7, 143.5, 137.3, 135.9, 135.0, 134.0, 133.9, 133.5, 132.4, 129.7, 129.2, 128.6, 128.1, 127.9, 127.8, 127.7, 126.5, 126.5, 126.2, 126.0, 125.0, 122.7, 118.1, 115.5, 64.1, 49.7, 40.1, 38.9, 30.0, 20.9, 18.6, 13.6. **HRMS (ESI)** m/z Calcd for $[C_{35}H_{33}NO_5S, M + Na]^+$: 602.1972; Found: 602.1969.

Optical Rotation: $[\alpha]^{25}_{D}$ 70 (*c* = 1.0, $CHCl_3$). 71% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 70:30, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 10.883 min for minor isomer, t_R = 15.683 min for major isomer).



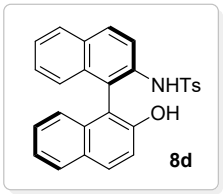
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
12.390	BB	2.73	3753.72	101.52	50.08	
17.567	MM m	0.93	3742.20	61.18	49.92	
		Sum	7495.92			



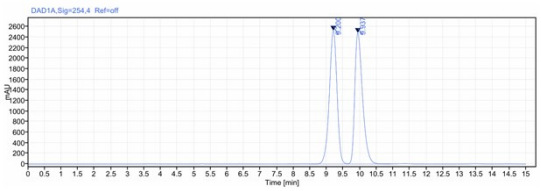
Signal: DAD1A,Sig=254,4 Ref=off

RT [min]	Type	Width [min]	Area	Height	Area%	Name
10.883	MM m	0.41	271.50	10.20	14.27	
15.683	MM m	0.70	1631.55	35.33	85.73	
		Sum	1903.05			



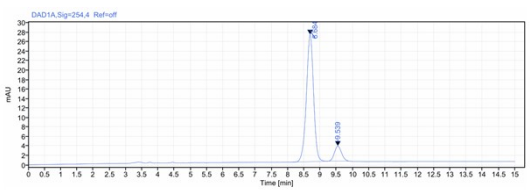
8d. (51% yield, Hexane-EtOAc = 4:1, R_f = 0.5). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.13 (d, *J* = 9.0 Hz, 1H), 8.04 – 7.93 (m, 2H), 7.88 (d, *J* = 8.2 Hz, 2H), 7.46 (d, *J* = 8.2 Hz, 2H), 7.41 (t, *J* = 7.5 Hz, 1H), 7.35 (t, *J* = 7.5 Hz, 1H), 7.30 (d, *J* = 8.9 Hz, 1H), 7.25 (t, *J* = 7.5 Hz, 1H), 7.12 – 7.07 (m, 3H), 7.04 (d, *J* = 8.5 Hz, 1H), 6.64 (d, *J* = 8.5 Hz, 1H), 6.51 (s, 1H), 4.69 (s, 1H), 2.34 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 151.8, 144.0, 135.8, 134.5, 132.9, 132.9, 131.5, 131.1, 130.5, 129.6, 129.2, 128.4, 128.2, 127.5, 127.4, 127.1, 1256, 125.2, 123.9, 123.7, 119.1, 118.4, 117.8, 111.9, 21.48. **HRMS (ESI)** m/z Calcd for $[C_{27}H_{21}NO_3S, M+Na]^+$: 462.1134; Found: 462.1135.

Optical Rotation: $[\alpha]^{25}_{D}$ -47 (*c* = 1.0, $CHCl_3$). 79% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 70:30, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 9.539 min for minor isomer, t_R = 8.684 min for major isomer).



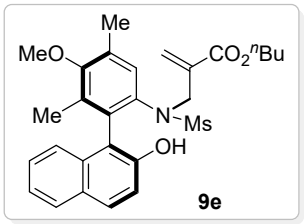
Signal: DAD1A,Sig=254,4 Ref=off

RT [min]	Type	Width [min]	Area	Height	Area%	Name
9.200	VV	1.11	40543.12	2523.62	50.06	
9.937	VV	1.29	40451.36	2481.24	49.94	
		Sum	80994.48			



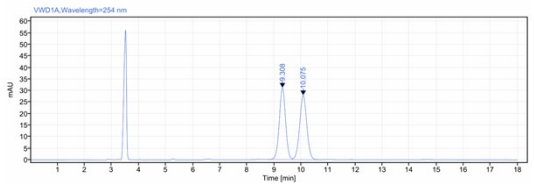
Signal: DAD1A,Sig=254,4 Ref=off

RT [min]	Type	Width [min]	Area	Height	Area%	Name
8.684	BM m	0.24	412.72	26.78	89.50	
9.539	MM m	0.24	48.40	3.16	10.50	
		Sum	461.12			



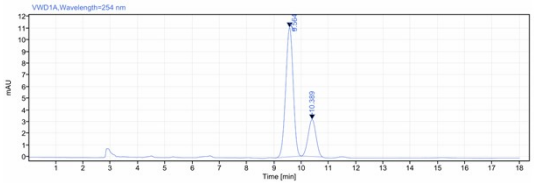
9e. (60% yield, Hexane-EtOAc = 3:1, R_f = 0.6). Syrup. 1H NMR (400 MHz, DMSO) δ 9.55 (s, 1H), 7.81 – 7.71 (m, 2H), 7.25 – 7.13 (m, 3H), 7.06 (s, 1H), 6.97 (d, *J* = 13.3 Hz, 1H), 6.03 (s, 1H), 5.56 (s, 1H), 4.18 – 3.75 (m, 4H), 3.61 (s, 3H), 2.54 – 2.29 (m, 3H), 2.25 (s, 3H), 1.61 (s, 3H), 1.49 – 1.36 (m, 2H), 1.26 – 1.17 (m, 2H), 0.80 (t, *J* = 7.4 Hz, 3H). **^{13}C NMR** (100 MHz, DMSO-d_6) δ 165.6, 156.1, 151.9, 135.7, 135.2, 135.1, 133.3, 131.8, 131.7, 129.7, 129.4, 127.9, 127.7, 126.1, 124.2, 124.2, 122.7, 118.3, 117.1, 64.1, 59.5, 49.6, 39.9, 30.0, 18.6, 15.9, 13.6, 13.0. **HRMS (ESI)** m/z Calcd for [$C_{28}H_{33}NO_6S$, M + Na]$^+$: 534.1921; Found: 534.1921.

Optical Rotation: $[\alpha]^{25}_D$ 26.0 (*c* = 1.0, $CHCl_3$). 54% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 90:10, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 10.389 min for minor isomer, t_R = 9.564 min for major isomer).



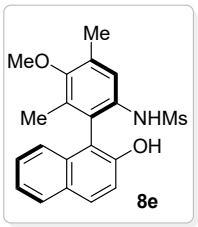
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
9.308	BV	0.88	500.94	31.03	49.64	
10.075	VB	1.00	508.24	27.79	50.36	
		Sum	1009.19			



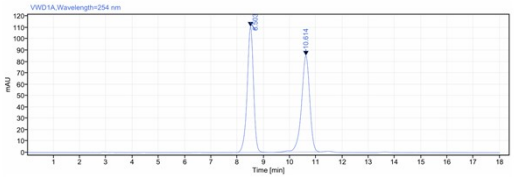
Signal: VWD1A,Wavelength=254 nm

RT [min]	Type	Width [min]	Area	Height	Area%	Name
9.564	BB	0.96	211.26	11.07	76.99	
10.389	BM m	0.31	63.16	3.16	23.01	
		Sum	274.42			

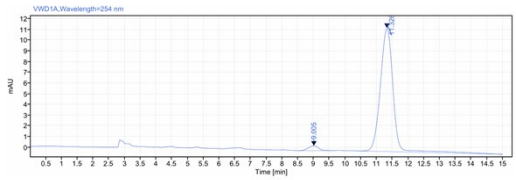


8e. (26% yield, Hexane-EtOAc = 5:1, R_f = 0.2). Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.87 – 7.83 (m, 2H), 7.48 (s, 1H), 7.40 – 7.31 (m, 2H), 7.24 (s, 1H), 7.13 – 7.04 (m, 1H), 5.77 (s, 1H), 5.22 (s, 1H), 3.75 (s, 3H), 2.69 (s, 3H), 2.40 (s, 3H), 1.86 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 155.0, 151.0, 133.23, 133.0, 132.4, 132.0, 131.1, 129.4, 128.7, 127.6, 124.2, 123.6, 123.1, 121.5, 117.7, 114.1, 60.1, 39.6, 16.5, 13.3. **HRMS (ESI)** m/z Calcd for [$C_{20}H_{21}NO_4S$, M + Na]$^+$: 394.1083; Found: 394.1086.

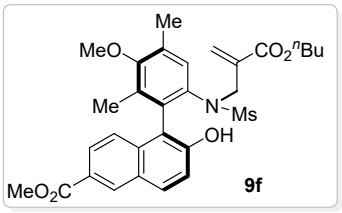
Optical Rotation: $[\alpha]^{25}_{D}$ -30.0 (*c* = 1.0, $CHCl_3$). 94% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 90:10, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 9.005 min for minor isomer, t_R = 11.326 min for major isomer).



Signal:	VWD1A,Wavelength=254 nm					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
8.503	BB	1.33	1851.82	110.63	49.93	
10.614	BB	1.86	1856.72	84.79	50.07	
		Sum	3708.53			

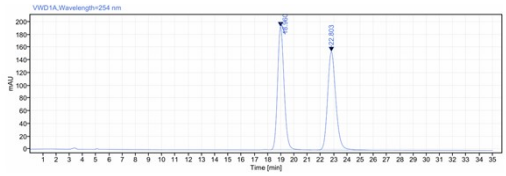


Signal:	VWD1A,Wavelength=254 nm					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
9.005	MM m	0.31	9.80	0.43	2.92	
11.326	BBA	4.48	326.04	11.52	97.08	
		Sum	335.84			

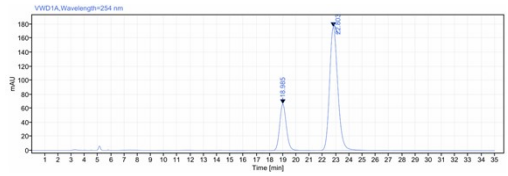


9f. (60% yield, Hexane-EtOAc = 5:1, R_f = 0.4) Syrup. **^{1}H NMR** (400 MHz, DMSO-d_6) δ 10.11 (s, 1H), 8.55 (d, *J* = 1.4 Hz, 1H), 8.07 (d, *J* = 8.9 Hz, 1H), 7.70 (dd, *J* = 8.9, 1.6 Hz, 1H), 7.37 (d, *J* = 8.9 Hz, 1H), 7.15 (s, 1H), 7.09 (d, *J* = 7.0 Hz, 1H), 6.02 (s, 1H), 5.57 (s, 1H), 4.14 – 3.98 (m, 4H), 3.87 (s, 3H), 3.70 (s, 3H), 2.50 (s, 3H), 2.32 (s, 3H), 1.68 (s, 3H), 1.51 – 1.40 (m, 2H), 1.29 – 1.23 (m, 2H), 0.86 (t, *J* = 7.3 Hz, 3H). **^{13}C NMR** (100 MHz, DMSO-d_6) δ 166.5, 165.5, 156.1, 154.4, 135.8, 135.5, 135.3, 134.5, 131.7, 131.5, 131.2, 130.8, 130.1, 127.9, 127.8,126.8, 125.0, 123.7, 119.3, 117.4, 64.1, 59.6, 52.0, 49.8, 39.7, 30.0, 18.6, 15.9, 13.5, 13.0. **HRMS (ESI)** m/z Calcd for $[C_{30}H_{35}NO_8S, M + Na]^+$: 592.1976; Found: 592.1978.

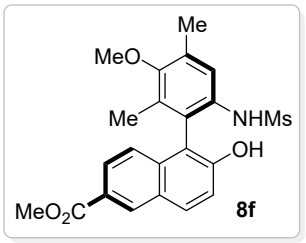
Optical Rotation: $[\alpha]^{25}_{D}$ 10.3 (*c* = 1.0, $CHCl_3$). 53% *ee* (HPLC conditions: Chiralpak IE column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 18.985 min for minor isomer, t_R = 22.803 min for major isomer).



Signal:	VWD1A,Wavelength=254 nm					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
18.960	BB	3.11	6601.10	193.16	49.89	
22.803	BB	5.23	6630.70	154.34	50.11	
		Sum	13231.81			

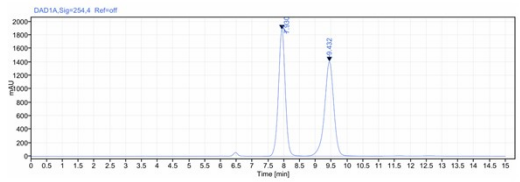


Signal:	VWD1A,Wavelength=254 nm					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
18.985	BB	2.95	2312.45	66.28	23.27	
22.803	BB	5.15	7625.97	176.17	76.73	
		Sum	9938.42			

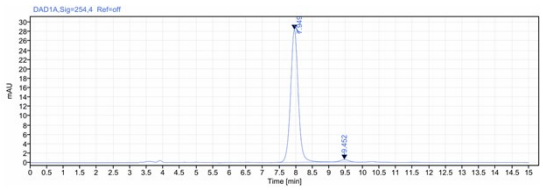


8f. (33% yield, Hexane-EtOAc = 2:1, R_f = 0.4) Syrup. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.61 (d, *J* = 1.5 Hz, 1H), 8.00 (d, *J* = 8.8 Hz, 1H), 7.94 (dd, *J* = 8.8, 1.5 Hz, 1H), 7.49 (s, 1H), 7.35 (d, *J* = 8.8 Hz, 1H), 7.14 (d, *J* = 8.8 Hz, 1H), 5.75 (s, 1H), 5.53 (brs, 1H), 3.96 (s, 3H), 3.77 (s, 3H), 2.74 (s, 3H), 2.42 (s, 3H), 1.86 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 167.0, 155.1, 153.2, 135.0, 133.7, 133.0, 132.6, 132.0, 131.8, 128.4, 127.1, 125.8, 123.4, 122.8, 121.5, 118.8, 114.4, 60.2, 52.3, 39.8, 16.6, 13.3. **HRMS (ESI)** m/z Calcd for $[C_{22}H_{23}NO_6S, M + Na]^+$: 452.1138; Found: 452.1139.

Optical Rotation: $[\alpha]^{25}_D$ -36.0 (*c* = 1.0, $CHCl_3$). 97% *ee* (HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 80:20, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 9.452 min for minor isomer, t_R = 7.949 min for major isomer).



Signal:	DAD1A,Sig=254,4 Ref=off					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
7.930	BV	1.32	28396.09	1879.94	49.67	
9.432	VB	2.45	28772.42	1405.30	50.33	
		Sum	57168.51			



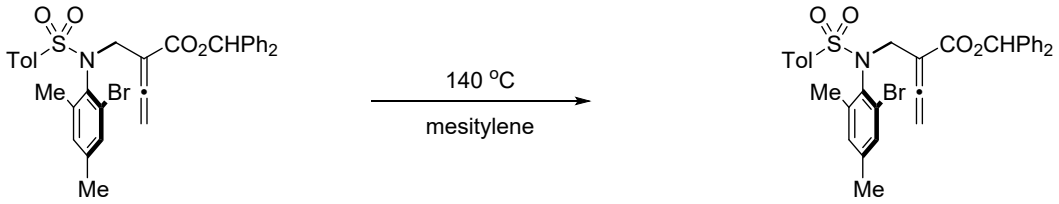
Signal:	DAD1A,Sig=254,4 Ref=off					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
7.949	BB	1.80	457.04	28.34	98.25	
9.452	MM m	0.24	8.12	0.47	1.75	
		Sum	465.16			

IV. Racemization experiment

$$\Delta G^{\ddagger} = RTln\left(\frac{K_B \cdot T}{hK_{enantiomerization}}\right), \quad K_{enantiomerization} = \frac{1}{2}K_{rac}$$

K_B is the Boltzmann, $K_B = 1.38066E-23$ J·K^{-1}. T is temperature. h is the Plance constant. h = 6.62608E-34 Js. R is the specific gas constant, R = 8.31451 J·K^{-1}mol^{-1}

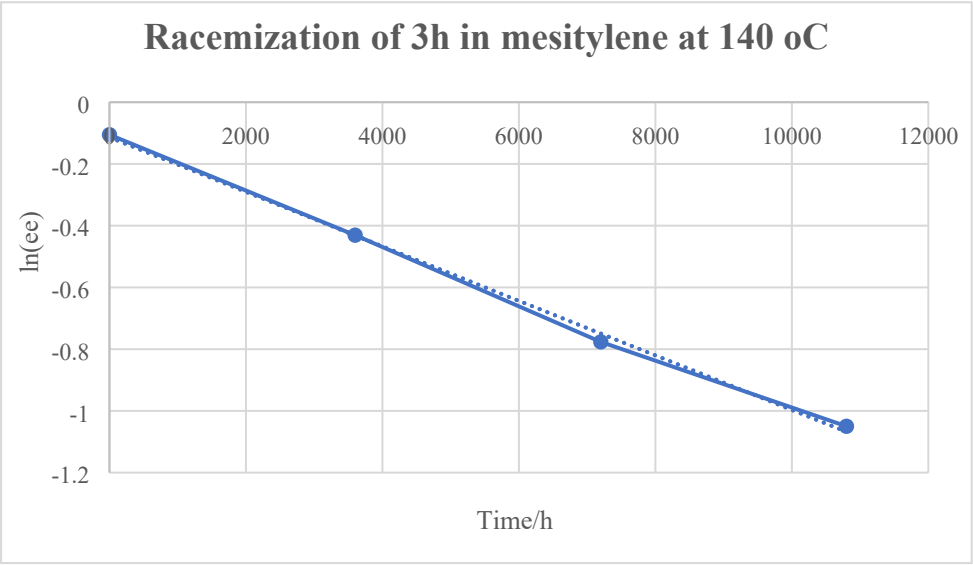
Compound (0.1 mmol) was dissolved in mesitylene (1 mL) in a Schlenk tube. The tube was immersed in a pre-heated oil bath at 100-140 °C. At given interval of time, small samples (50 μL) was removed via syringe and injected into the HPLC to measure the enantiomeric excess.



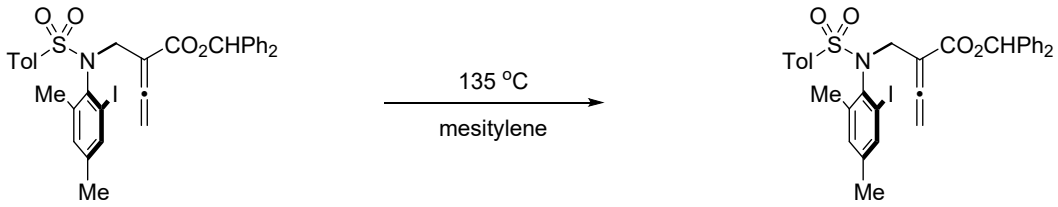
3h **recovered-3h**

t (h)	*ee* (%)	ln(*ee*)
0	90	-0.083
1	65	-0.117
2	46	-0.151
3	35	-0.198
3[a]	90	-0.083

[a]T = 110 °C

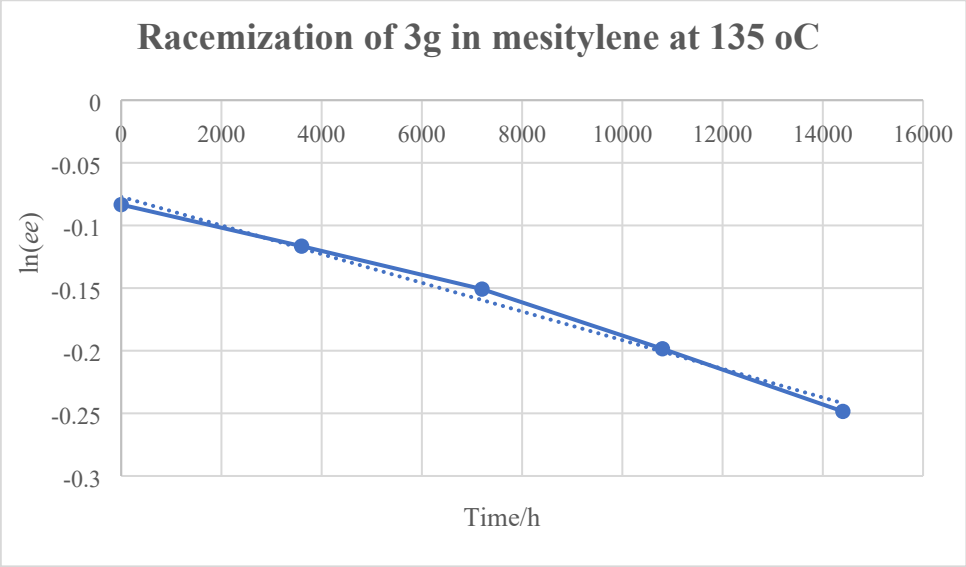


K_{rac} = 9E-5, $K_{enantiomerization}$ = 4.5E-5, $\Delta G^{\ddagger}$ = 32.65 Kcal/mol

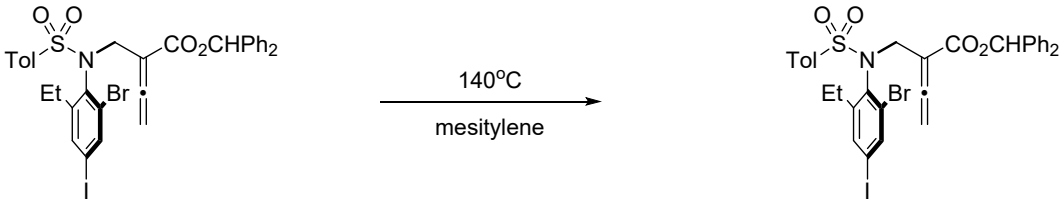


3g **recovered-3g**

t (h)	*ee* (%)	ln(*ee*)
0	92	-0.083
1	89	-0.117
2	86	-0.151
3	82	-0.198

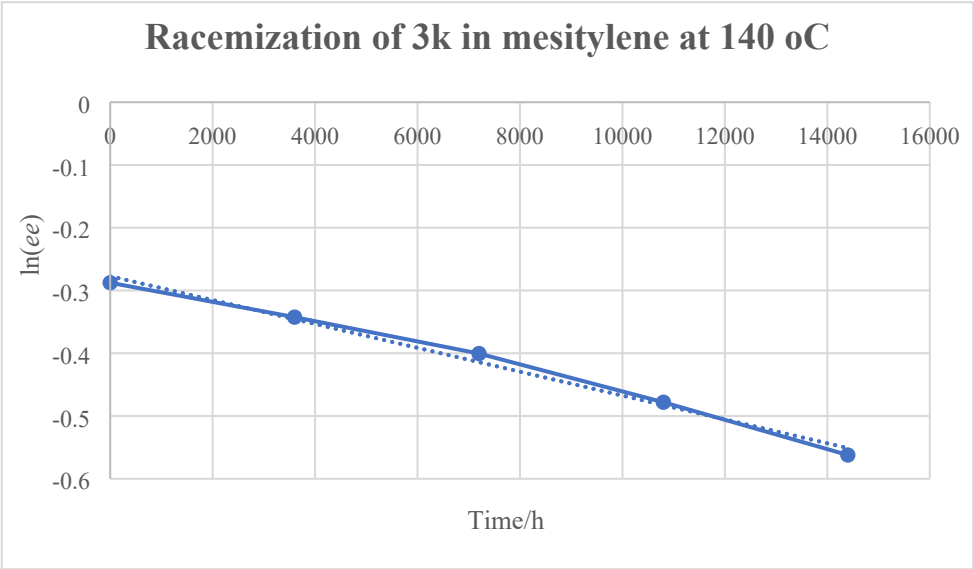


K_{rac} = 1E-5, $K_{enantiomerization}$ = 5E-6, $\Delta G^{\ddagger}$ = 34.02 Kcal/mol

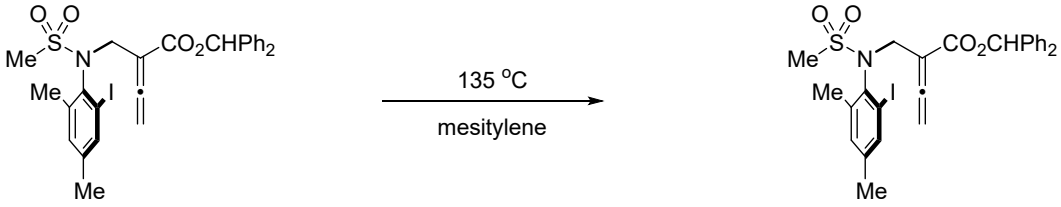


3k **recovered-3k**

t (h)	*ee* (%)	ln(*ee*)
0	75	-0.288
1	71	-0.342
2	67	-0.400
3	62	-0.478
4	66	-0.562

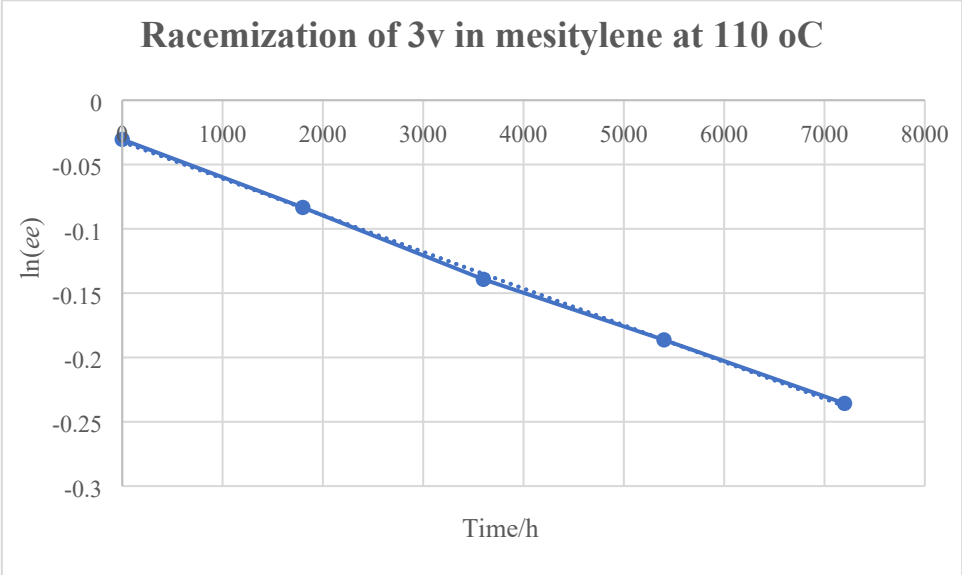


K_{rac} = 2E-5, $K_{enantiomerization}$ = 1E-5, $\Delta G^{\ddagger}$ = 33.88 Kcal/mol

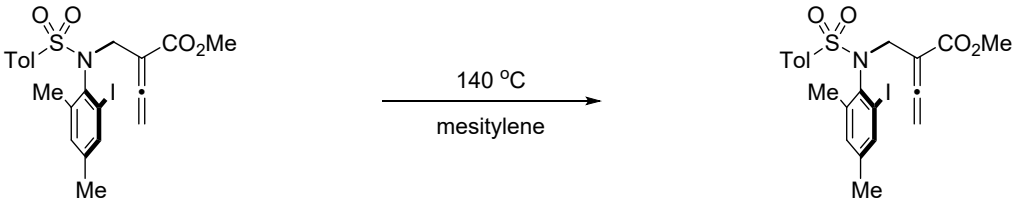


3v **recovered-3v**

t (h)	*ee* (%)	ln(*ee*)
0	97	-0.030
0.5	92	-0.083
1	87	-0.139
1.5	83	-0.186
2	79	-0.236

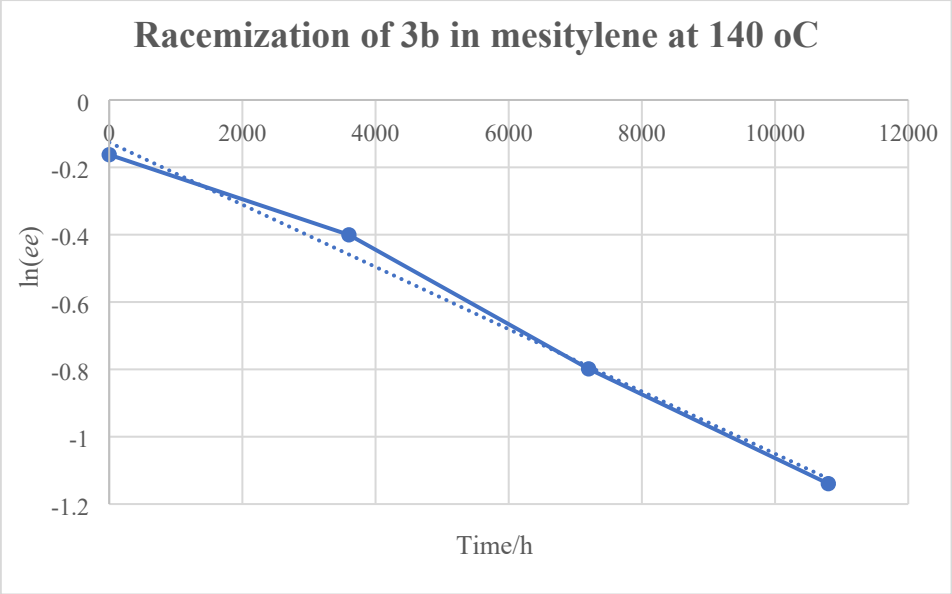


K_{rac} = 3E-5, $K_{enantiomerization}$ = 1.5E-5, $\Delta G^{\ddagger}$ = 33.13 Kcal/mol

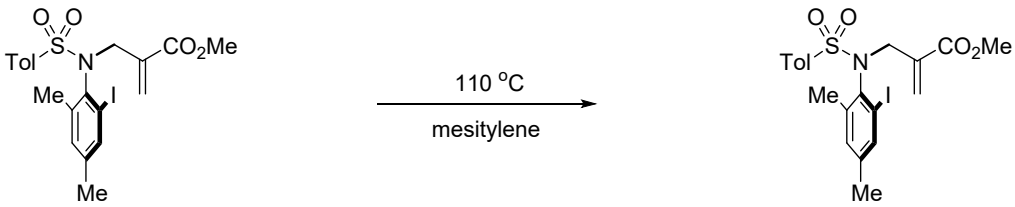


3b **recovered-3b**

t (h)	*ee* (%)	ln(*ee*)
0	85	-0.163
1	68	-0.400
2	45	-0.799
3	32	-1.139

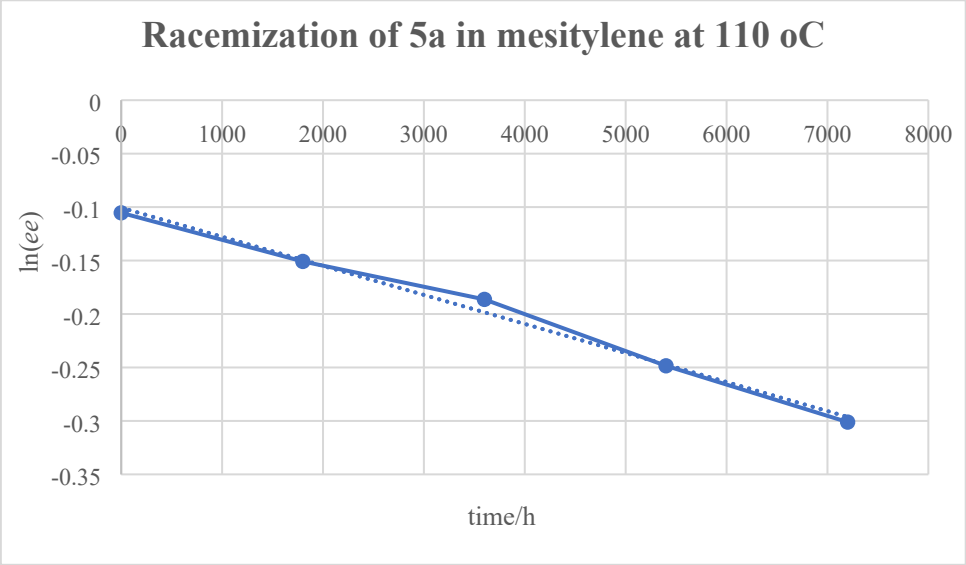


K_{rac} = 9E-5, $K_{enantiomerization}$ = 4.5E-5, $\Delta G^{\ddagger}$ = 32.65 Kcal/mol

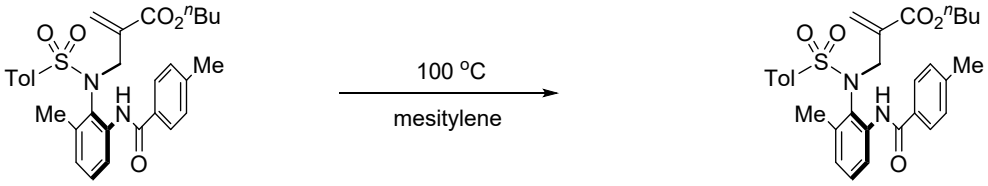


5a **recovered-5a**

t (h)	*ee* (%)	ln(*ee*)
0	90	-0.105
0.5	86	-0.151
1	83	-0.186
1.5	78	-0.248
2	74	-0.301

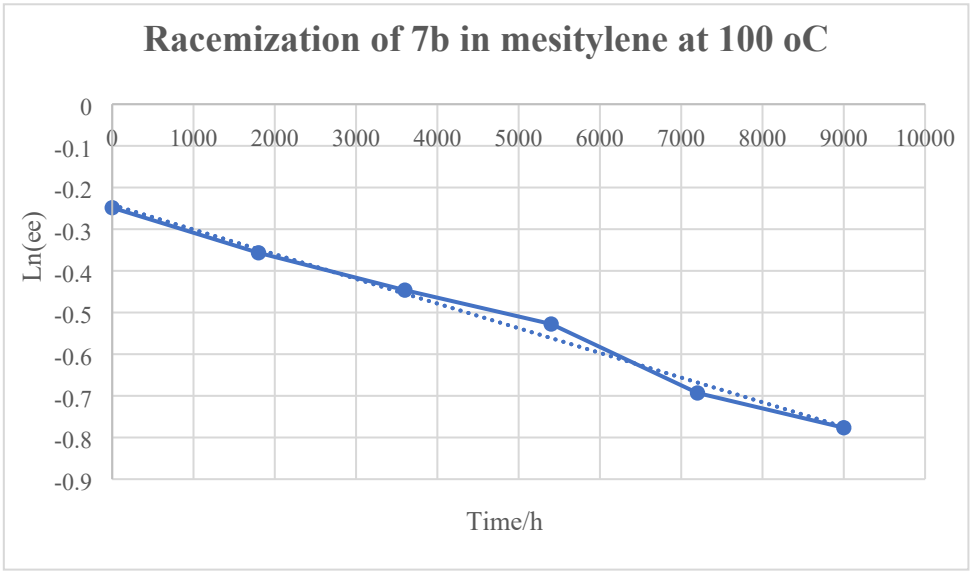


K_{rac} = 3E-5, $K_{enantiomerization}$ = 1.5E-5, $\Delta G^{\ddagger}$ = 31.05 Kcal/mol

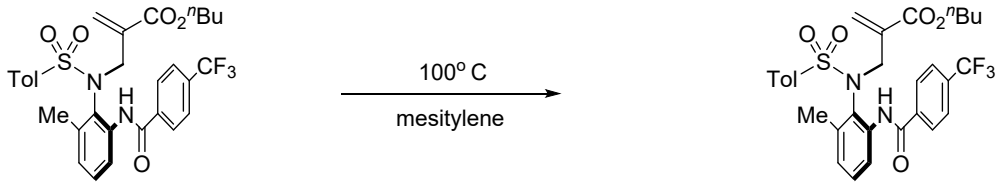


7b **recovered-7b**

t (h)	*ee* (%)	ln(*ee*)
0	78	-0.248
0.5	70	-0.357
1	64	-0.446
1.5	59	-0.528
2	50	-0.693
2.5	46	-0.777

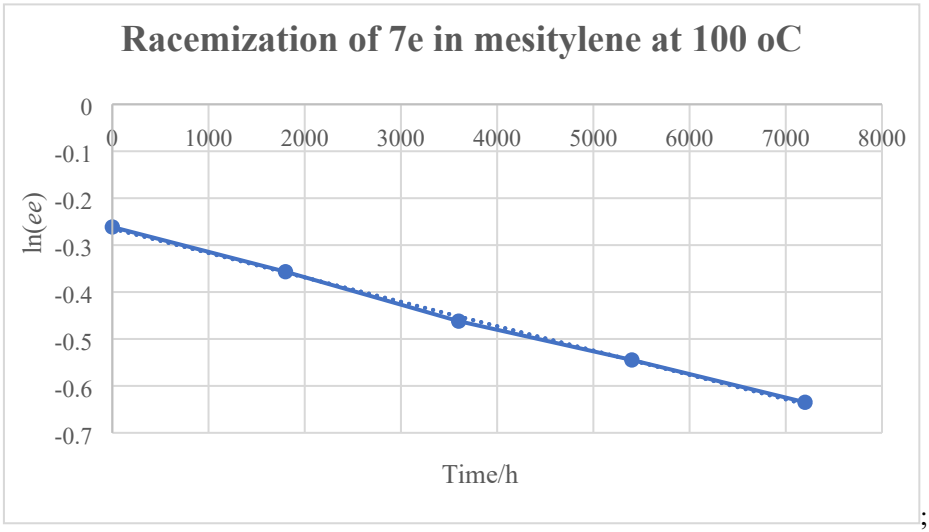


K_{rac} = 6E-5, $K_{enantiomerization}$ = 3E-5, $\Delta G^{\ddagger}$ = 29.83 Kcal/mol



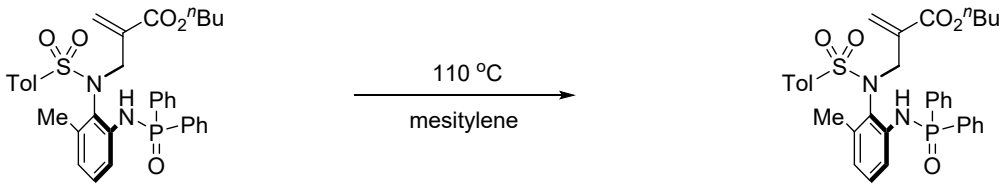
7e **recovered-7e**

t (h)	*ee* (%)	ln(*ee*)
0	77	-0.261
0.5	70	-0.357
1	63	-0.462
1.5	58	-0.545
2	53	-0.635



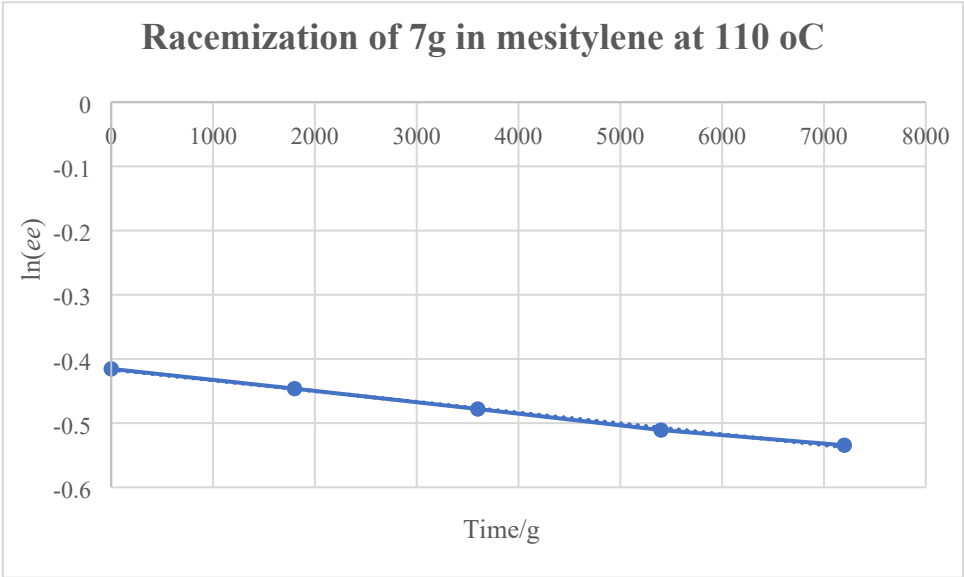
;

K_{rac} = 5E-5, $K_{enantiomerization}$ = 2.5E-5, $\Delta G^{\ddagger}$= 29.85 Kcal/mol



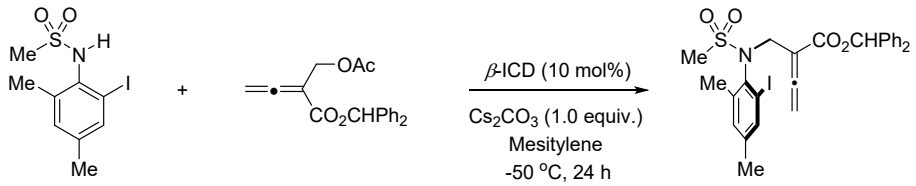
7g **recovered-7g**

t (h)	*ee* (%)	ln(*ee*)
0	66	-0.416
0.5	64	-0.446
1	62	-0.478
1.5	60	-0.511
2	57	-0.534



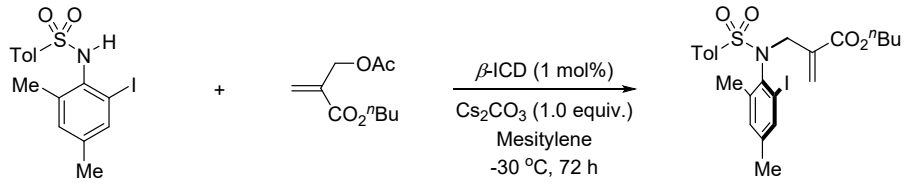
K_{rac} = 2E-5, $K_{enantiomerization}$ = 1E-5, $\Delta G^{\ddagger}$ = 31.36 Kcal/mol

V. Gram scale reaction



1p (2 mmol) **2g** (1.2 equiv.) **3v**, 822 mg 70%, 97% *ee*

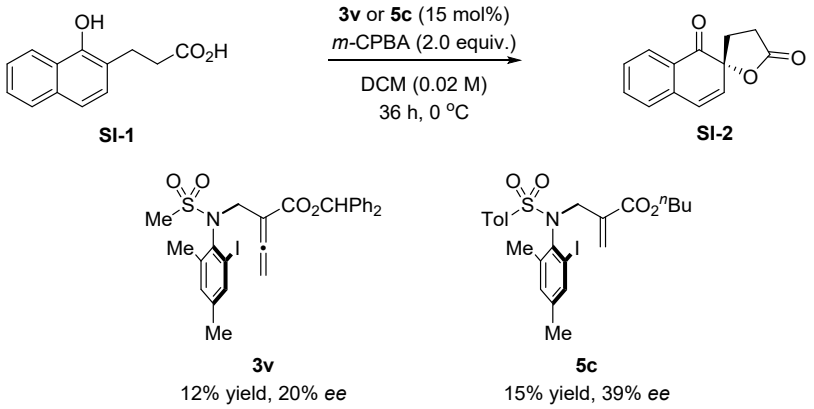
To a three-necked flask containing **1p** (650.3 mg, 2 mmol), *β*-ICD (60 mg, 0.2 mmol, 10 mol%) and Cs_2CO_3 (651.6 mg, 2 mmol, 1.0 equiv.) were added mesitylene (120 mL) and dienoate **2g** (773.7 mg, 2.4 mmol, 1.2 equiv.). The reaction mixture was stirred at -50 °C for 24 hours. The solvent was removed by silica gel column chromatography and the residue was then purified by silica gel column chromatography (Hexane-EtOAc = 5:1) to afford the product **3v** (822 mg) in 70% yield with 97% *ee*.



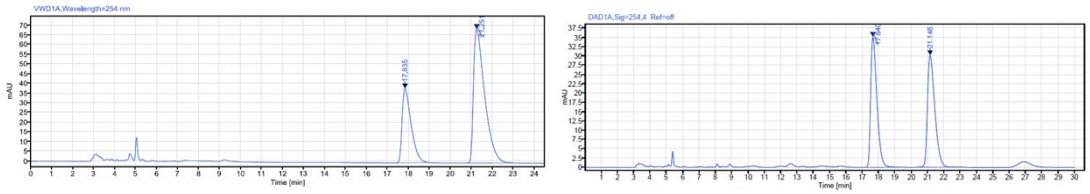
1a (2 mmol) **4c** (1.1 equiv.) **5c**, 953 mg 88%, 91% *ee*

To a three-necked flask containing **1a** (802.5 mg, 2 mmol), *β*-ICD (6 mg, 0.02 mmol, 1 mol%) and Cs_2CO_3 (651.6 mg, 2 mmol, 1.0 equiv.) were added mesitylene (20 mL) and MBH acetate **4c** (440.5 mg, 2.2 mmol, 1.1 equiv.). The reaction mixture was stirred at -30 °C for 72 hours. The solvent was removed by silica gel column chromatography and the residue was then purified by silica gel column chromatography (Hexane-EtOAc = 15:1) to afford the product **5c** (953 mg) in 88% yield with 91% *ee*.

VI. Further transformation

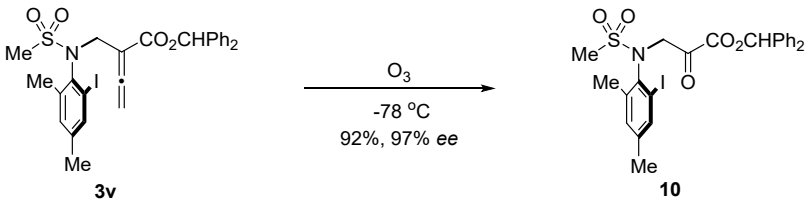


A solution of **3w** or **5c** (26.6 mg, 0.123 mmol, 15 mol%) and *m*-CPBA (85%, 37.3 mg, 0.218 mmol, 1.5 equiv.) in CH_2Cl_2 was stirred at 0 °C for 5 min, then 3-(1-hydroxy-2-naphthyl)propionic acid **SI-1** was added. After 36 h, the resulting mixture poured into aqueous $Na_2S_2O_3$ (5 mL) and aqueous $NaHCO_3$, and extracted with CH_2Cl_2. The organic layers were dried over anhydrous Na_2SO_4 and solvents were removed in vacuo. The residue was purified by column chromatography on silica gel (eluent: Hexane-EtOAc-CH_2Cl_2 = 8:1:1) to give **SI-2** .^{1}H NMR ($CDCl_3$, 400 MHz) δ8.00 (d, *J* = 7.7 Hz, 1H), 7.62 (td, *J* = 7.5, 1.0 Hz, 1H), 7.40 (t, *J* = 7.5 Hz, 1H), 7.25 (d, *J* = 7.7 Hz, 1H), 6.65 (d, *J* = 9.9 Hz, 1H), 6.20 (d, *J* = 9.9 Hz, 1H), 2.90 (ddd, *J* = 9.7, 11.2, 17.6 Hz, 1H), 2.59 (ddd, *J* = 2.0, 9.6, 17.6 Hz, 1H), 2.41 (ddd, *J* = 2.0, 9.6, 13.2Hz, 1H), 2.18 (ddd, *J* = 9.8, 11.2, 13.2 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 196.5, 176.5, 136.8, 135.7, 132.3, 128.9, 127.9, 127.9, 127.7, 127.3, 83.4, 31.2, 26.5; **MS** (EI) m/z 214.06 (M^+); HPLC condition: Chiralpak OD-H column, *n*-Hexane/*i*-PrOH = 85:15, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 17.6 min for minor isomer, t_R = 21.1 min for major isomer).

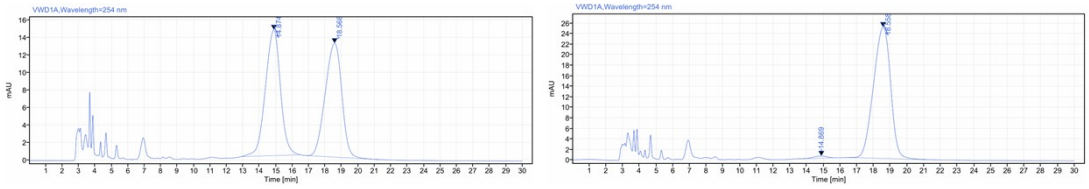


Signal: VWD1A,Wavelength=254 nm							
RT [min]	Type	Width [min]	Area	Height	Area%	Name
17.835	BBA	1.62	1144.44	38.20	30.98	
21.251	BBA	2.63	2549.34	68.96	69.02	
		Sum	3693.78			

Signal: DAD1A,Sig=254,4 Ref=off						
RT [min]	Type	Width [min]	Area	Height	Area%	Name
17.640	BB	2.08	930.65	35.15	49.74	
21.146	BB	2.24	940.40	30.16	50.26	
		Sum	1871.05			

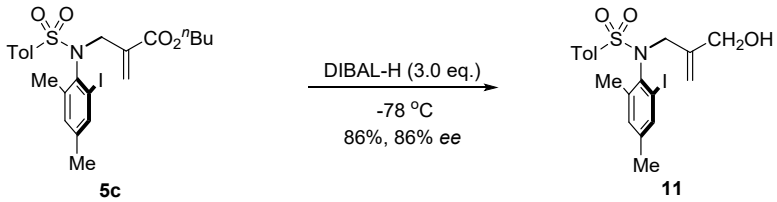


Through a solution containing **3v** (108 mg, 0.2 mmol) in 2 mL of CH_2Cl_2 was bubbled an ozone-oxygen stream at -78 °C until the starting material was consumed. The resulting mixture poured into aqueous $Na_2O_3S_2$ (5 mL) and extracted with CH_2Cl_2. The organic layer is dried on anhydrous Na_2SO_4 and the solvent is removed in vacuum to obtain the product **10**. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.57 (s, 1H), 7.43 – 7.31 (m, 10H), 7.06 (s, 1H), 6.96 (s, 1H), 5.05 (d, *J* = 19.5 Hz, 1H), 4.91 (d, *J* = 19.5 Hz, 1H), 3.36 (s, 3H), 2.53 (s, 3H), 2.25 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 188.0, 159.1, 141.6, 141.0, 139.4, 139.3, 138.8, 133.1, 129.0, 128.8, 128.8, 127.6, 127.4, 101.2, 79.9, 58.9, 44.0, 20.6. HRMS (ESI) m/z Calcd for [$C_{25}H_{24}INO_5S$, M + Na]$^+$: 600.0310; Found: 600.0311. $[\alpha]^{25}_D$ -13.3 (c = 1.0, $CHCl_3$). 97% *ee*. HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 70:30, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 14.869 min for minor isomer, t_R = 18.558 min for major isomer).

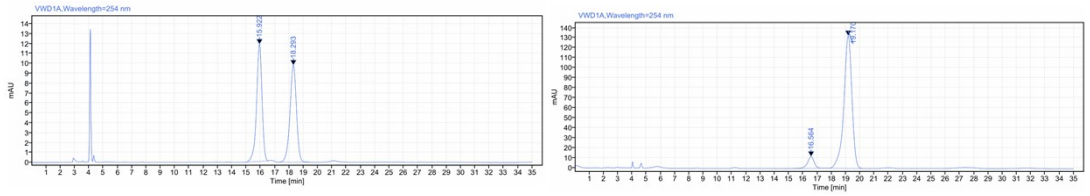


Signal: VWD1A,Wavelength=254 nm						
RT [min]	Type	Width [min]	Area	Height	Area%	Name
14.874	MM m	0.98	910.19	14.30	50.15	
18.568	BM m	1.08	904.73	12.94	49.85	
		Sum	1814.92			

Signal: VWD1A,Wavelength=254 nm						
RT [min]	Type	Width [min]	Area	Height	Area%	Name
14.869	MM m	0.66	22.28	0.40	1.24	
18.558	BB	5.01	1773.85	24.89	98.76	
		Sum	1796.13			



A solution of **5c** (108 mg, 0.2 mmol) and DIBAL-H (0.4 mL, 0.6 mmol, 3 equiv.) in CH_2Cl_2 (0.6 mL) was stirred at -78 °C for 8 h. the resulting mixture poured into aqueous NH_4Cl (5 mL) and extracted with CH_2Cl_2. The organic layers were dried over anhydrous Na_2SO_4 and solvents were removed in vacuo. The residue was purified by column chromatography on silica gel (Hexane-EtOAc = 4:1) to give **11**. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.69 (d, *J* = 8.2 Hz, 2H), 7.51 (s, 1H), 7.28 (d, *J* = 8.1 Hz, 2H), 7.01 (s, 1H), 5.06 (s, 1H), 4.67 (s, 1H), 4.43 (d, *J* = 14.0 Hz, 1H), 4.29 (dd, *J* = 14.6, 2.7 Hz, 2H), 4.16 (d, *J* = 14.6 Hz, 1H), 2.50 (s, 1H), 2.42 (s, 3H), 2.23 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 143.7, 143.4, 142.2, 140.0, 139.3, 138.1, 136.9, 132.5, 129.6, 128.2, 117.6, 100.1, 64.3, 52.4, 21.5, 20.4, 20.3. HRMS (ESI) m/z Calcd for $[C_{19}H_{22}INO_3S, M + Na]^+$: 494.0257; Found: 494.0258. $[\alpha]^{25}_D$ -22.5 (c = 1.0, $CHCl_3$). 86% *ee*. HPLC conditions: Chiralpak AD-H column, *n*-Hexane/*i*-PrOH = 90:10, flow rate = 1.0 mL/min, wavelength = 254 nm, t_R = 16.564 min for minor isomer, t_R = 19.170 min for major isomer).

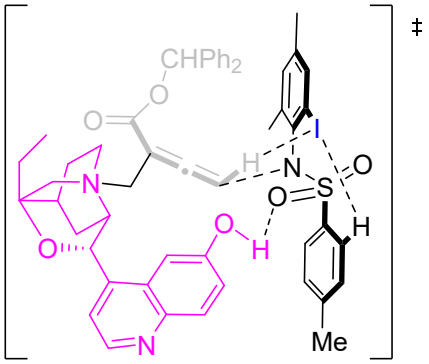


Signal:	VWD1A,Wavelength=254 nm					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
15.922	BB	1.65	313.59	11.82	50.38	
18.293	BB	2.35	308.83	9.79	49.62	
		Sum	622.41			

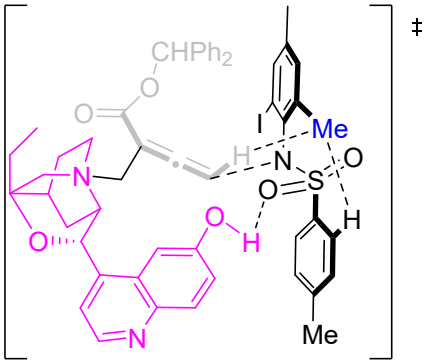
Signal:	VWD1A,Wavelength=254 nm					
RT [min]	Type	Width [min]	Area	Height	Area%	Name
16.564	BB	2.98	386.05	11.84	6.86	
19.170	BB	2.80	5237.79	132.71	93.14	
		Sum	5623.84			

VII. Geometries of the enantiomeric transition states

The atroposelective model are depicted as follows: the deprotonated **1g** binds to catalyst *β*-ICD by hydrogen-bonding interaction between the S=O oxygen of **1g** and the OH of *β*-ICD; subsequently, the product **3g** was readily afforded by nucleophilic attack under the chiral environment; the orientation of the electronic abundant iodine atom in the favored TS-3g-major shows more favorable noncovalent interactions with hydrogens; hence placing the *ortho*-iodine inside gives rise to the favored transition state TS-3g-major, while placing the *ortho*-methyl inside results in the less favored TS-3g-minor.



TS-3g-major



TS-3g-minor

VIII. References

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[2] (a) Q. Zhang, H. Jin, J. Feng, Y. Zhu, P. Jia, C. Wu and Y. Huang, *Org. Lett.,* 2019, **21**, 1407–1411; (b) D.T. Ziegler, L. Riesgo, T. Ikeda, Y. Fujiwara and C. Fu. *Angew. Chem. Int. Ed*., 2014, **53**, 13183.

[3] H. Gao, Q. Xu, C, Keene, M. Yousufuddin, D. D. Ess and L. Kürti. P, *Angew. Chem. Int. Ed.,* 2016, **128**,576 –581.

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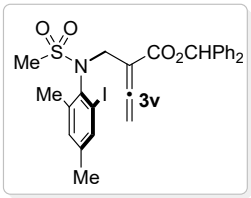
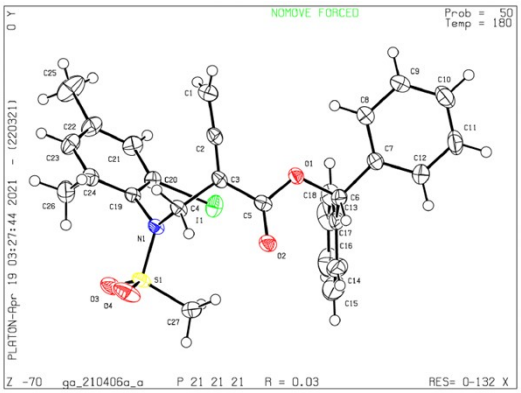
[5] (a) J. F. W. Keana, S. M. Kher, S. Cai, C. M. Dinsomore, A. G. Glenn, J. Guastella, J. Huang, V. llyin, Y, Lu. P. L. Mouser, R. M. Woodward and E. Weber. *J. Med. Chem*., 1995, **38**, 4367–4379. (b) M. J. Fray, D. J. Bull, C. L. Carr, E. C. L. Gautier, C. E. Mowbray and A. Stobie, *J. Med. Chem*., 2001, **44**, 1951–1962; (c) C. Deur, A. K. Agrawal, H. Baum, J. Booth, S. Bove, J. Brieland, A. Bunker, C. Connolly, J. Cornicelli, J. D. B. Finzel, X. Gan, S. Guppy, G. K. K. Kilgore, P. L. C. Loi, Z. Lou, M. Morris, L. P. S. Przybranowski, F. Riley, B. Samas, B. Sanchez, H. Tecle, Z. Wang, K. Welch, M. Wilson and K. Yates. *Bioorganic & Medicinal Chemistry Letters*., 2007, **17**, 4599–4603

IX. X-Ray crystallography analysis of compound 3v (CCDC-2078431)





Datablock: ga_210406a_a

Bond precision: C-C = 0.0065 A Wavelength=1.34138

Cell: a=9.5319(7) b=15.1834(11) c=18.2181(14)
alpha=90 beta=90 gamma=90

Temperature: 180 K

	Calculated	Reported
Volume	2636.6(3)	2636.6(3)
Space group	P 21 21 21	P 21 21 21
Hall group	P 2ac 2ab	P 2ac 2ab
Moiety formula	C27 H26 I N O4 S	?
Sum formula	C27 H26 I N O4 S	C27 H26 I N O4 S
Mr	587.45	587.45
Dx,g cm-3	1.480	1.480
Z	4	4
Mu (mm-1)	7.205	7.205
F000	1184.0	1184.0
F000'	1187.51	
h,k,lmax	11,19,22	11,19,22
Nref	5475[3091]	5459
Tmin,Tmax	0.374,0.487	0.430,0.752
Tmin'	0.178	

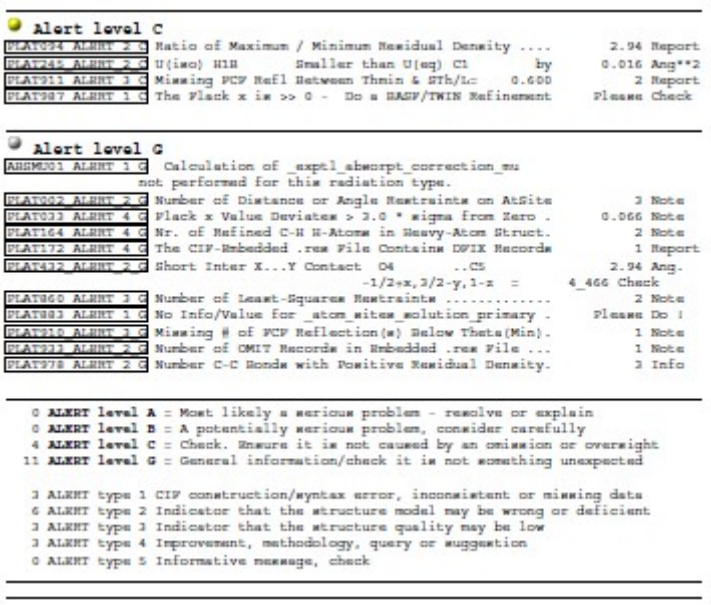
Correction method= # Reported T Limits: Tmin=0.430 Tmax=0.752
AbsCorr = MULTI-SCAN

Data completeness= 1.77/1.00 Theta(max)= 57.467

R(reflections)= 0.0295(5355) wR2(reflections)= 0.0723(5459)

S = 1.055 Npar= 318

The following ALERTS were generated. Each ALERT has the format
test-name_ALERT_alert-type_alert-level.
Click on the hyperlinks for more details of the test.

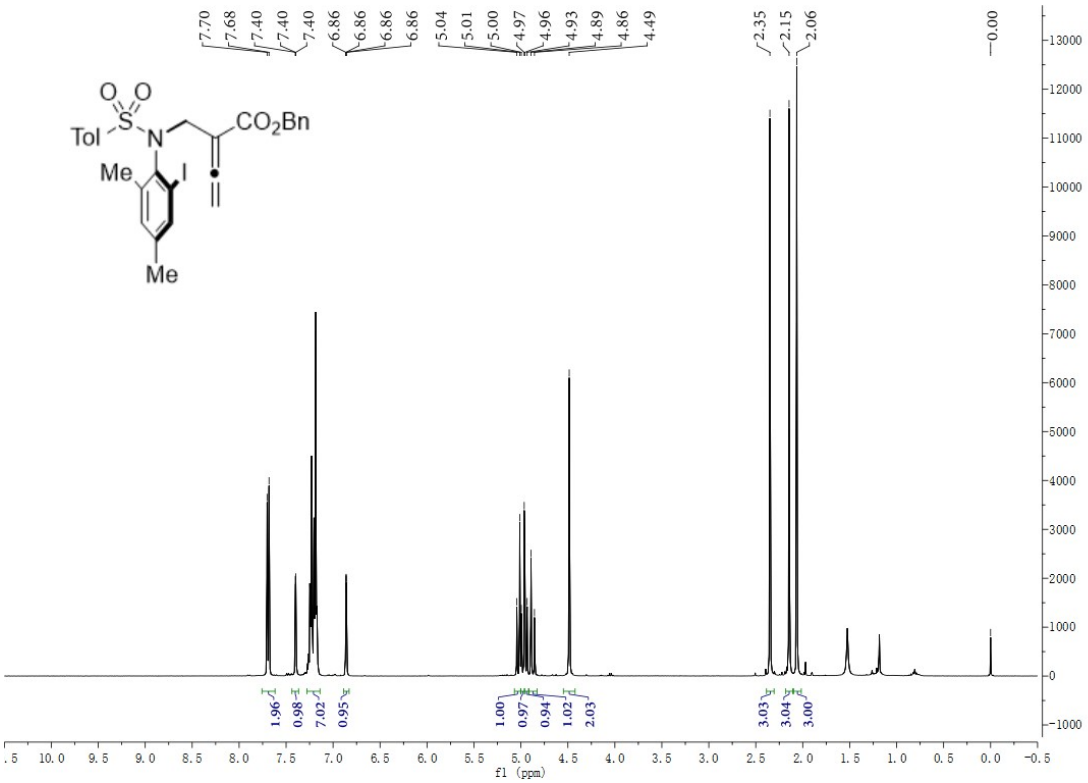


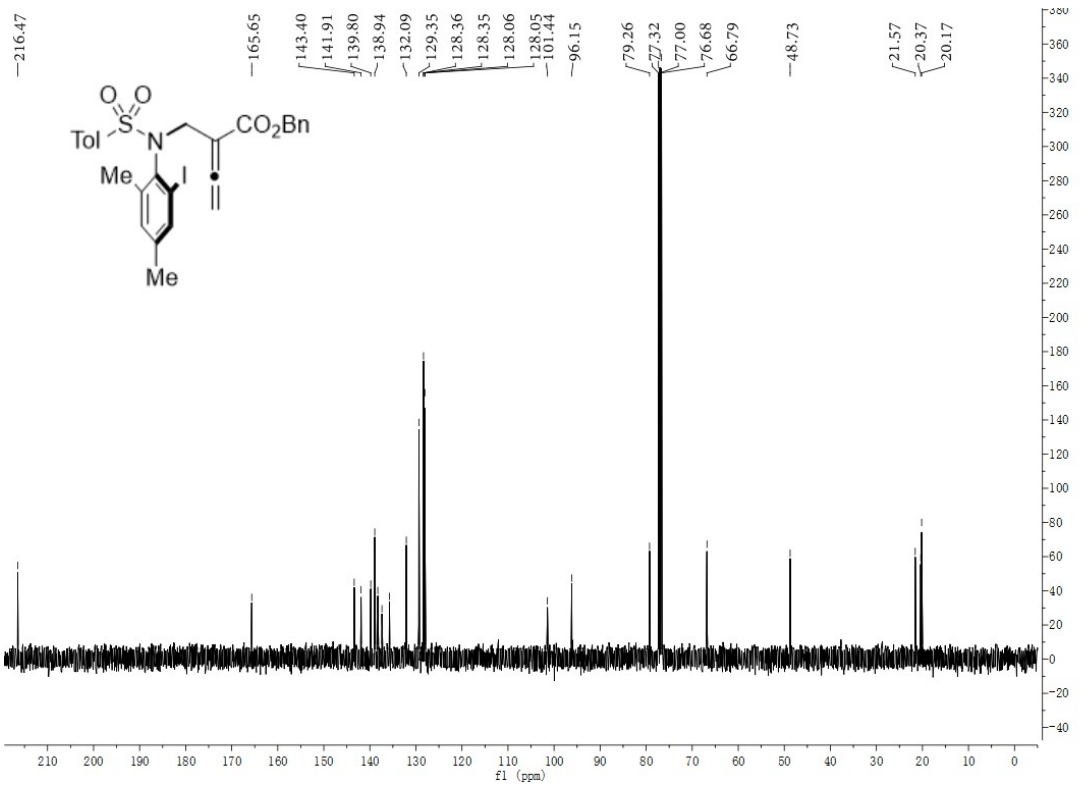
```
 Alert level C
PLAT034_ALERT_2_C Ratio of Maximum / Minimum Residual Density ....      2.94 Report
PLAT242_ALERT_2_C U(iso) H1B       Smaller than U(eq) C1        by     0.016 Ang**2
PLAT911_ALERT_3_C Missing FCF Refl Between Thmin & STh/L=  0.600          2 Report
PLAT987_ALERT_1_G The Flack x is >> 0 -  Do a BASF/TWIN Refinement    Please Check

 Alert level G
ABSM301_ALERT_1_G  Calculation of _exptl_absorpt_correction_mu
                   not performed for this radiation type.
PLAT002_ALERT_2_G Number of Distance or Angle Restraints on AtSite         3 Note
PLAT033_ALERT_4_G Flack x Value Deviates > 3.0 * sigma from Zero .     0.066 Note
PLAT164_ALERT_4_G Nr. of Refined C-H H-Atoms in Heavy-Atom Struct.         2 Note
PLAT172_ALERT_4_G The CIF-Embedded .res File Contains DFIX Records         1 Report
PLAT432_ALERT_2_G Short Inter X...Y Contact  O4       ..C5              2.94 Ang.
                                      -1/2+x,3/2-y,1-z  =      4_466 Check
PLAT860_ALERT_3_G Number of Least-Squares Restraints .............        2 Note
PLAT883_ALERT_1_G No Info/Value for _atom_sites_solution_primary .    Please Do !
PLAT910_ALERT_3_G Missing # of FCF Reflection(s) Below Theta(Min).         1 Note
PLAT933_ALERT_2_G Number of OMIT Records in Embedded .res File ...         1 Note
PLAT978_ALERT_2_G Number C-C Bonds with Positive Residual Density.         3 Info

  0 ALERT level A = Most likely a serious problem - resolve or explain
  0 ALERT level B = A potentially serious problem, consider carefully
  4 ALERT level C = Check. Ensure it is not caused by an omission or oversight
 11 ALERT level G = General information/check it is not something unexpected

  3 ALERT type 1 CIF construction/syntax error, inconsistent or missing data
  6 ALERT type 2 Indicator that the structure model may be wrong or deficient
  3 ALERT type 3 Indicator that the structure quality may be low
  3 ALERT type 4 Improvement, methodology, query or suggestion
  0 ALERT type 5 Informative message, check
```

All these data can be obtained free of charge from Cambridge Crystallographic Data Centre via www.ccdc.cam.ac.uk/ data_request/ci.

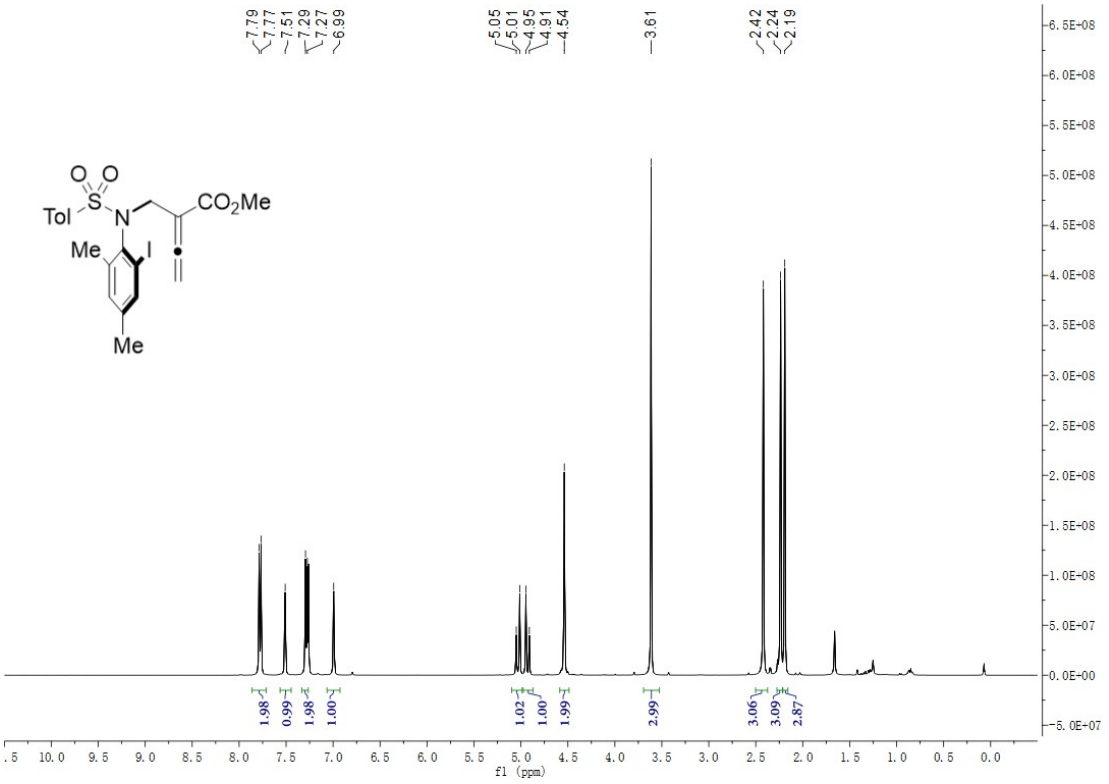
X. NMR Spectra

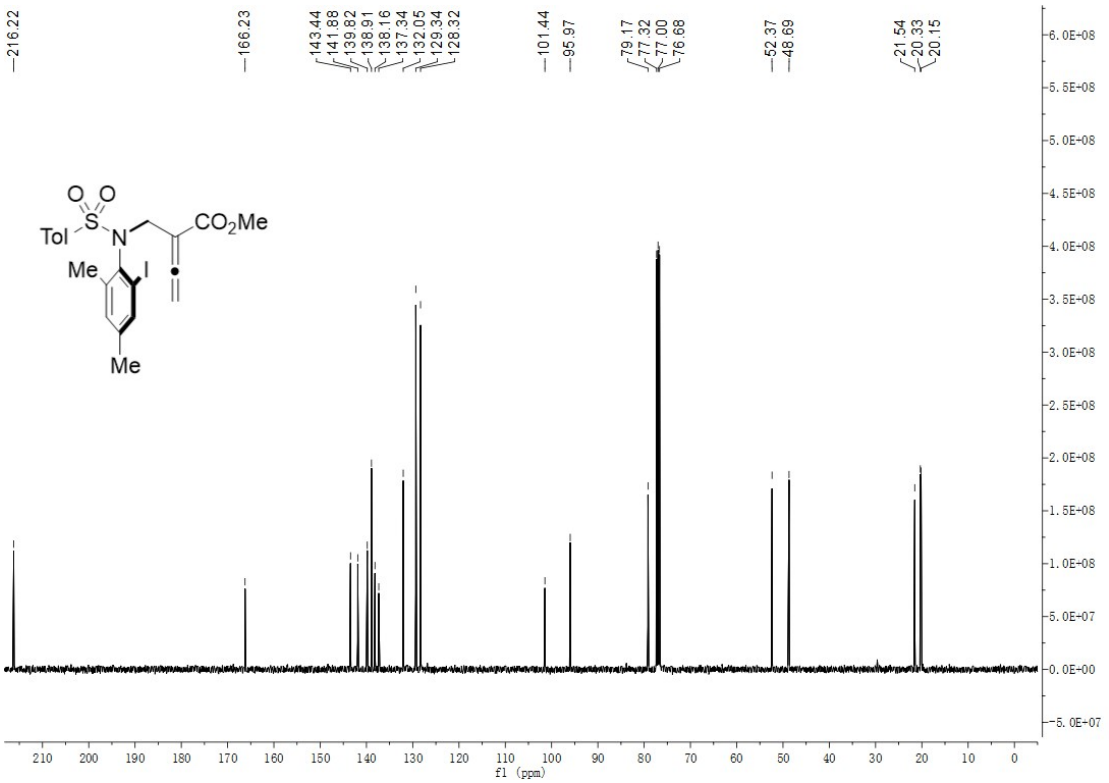
Compound **3a**



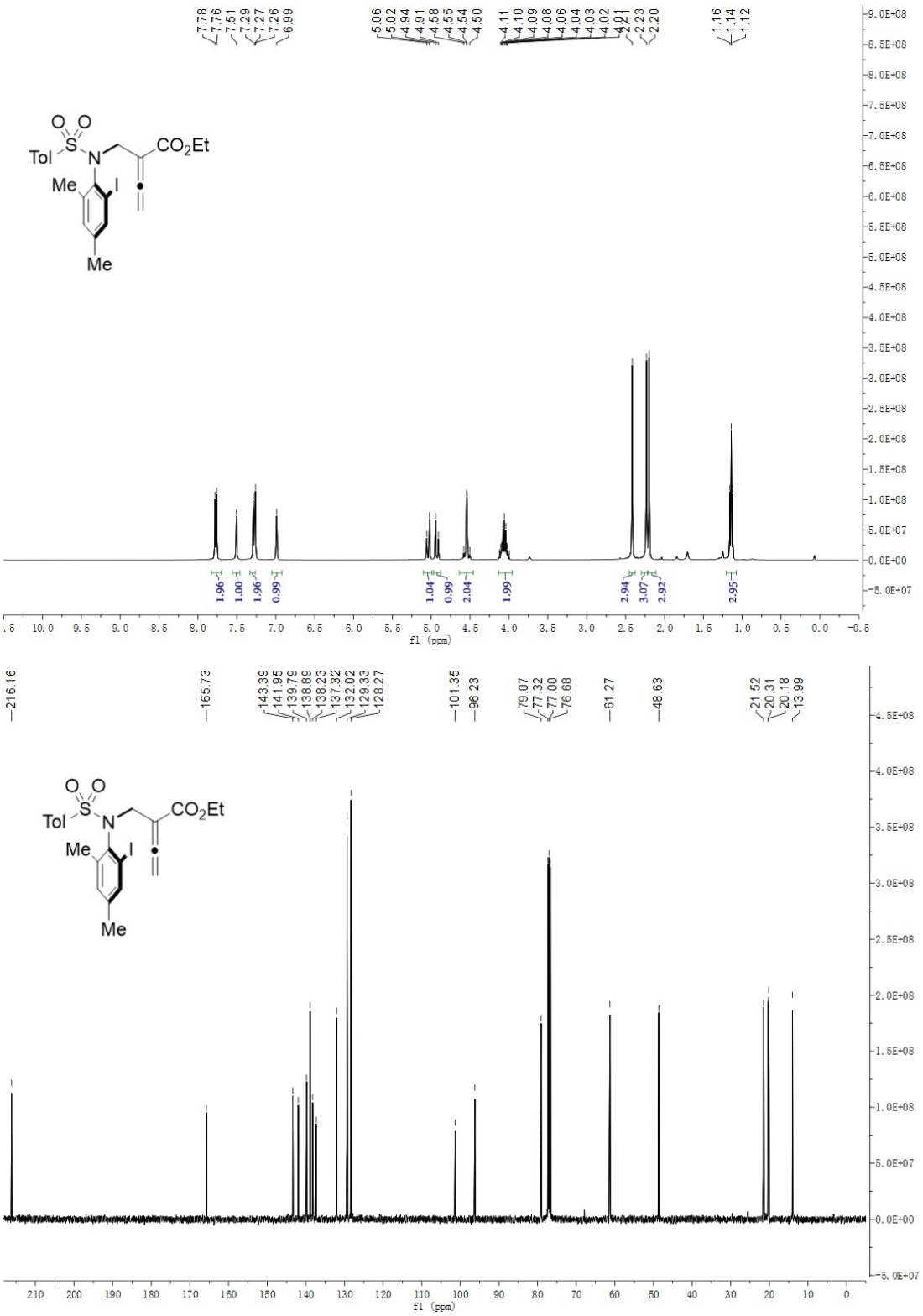


Compound **3b**

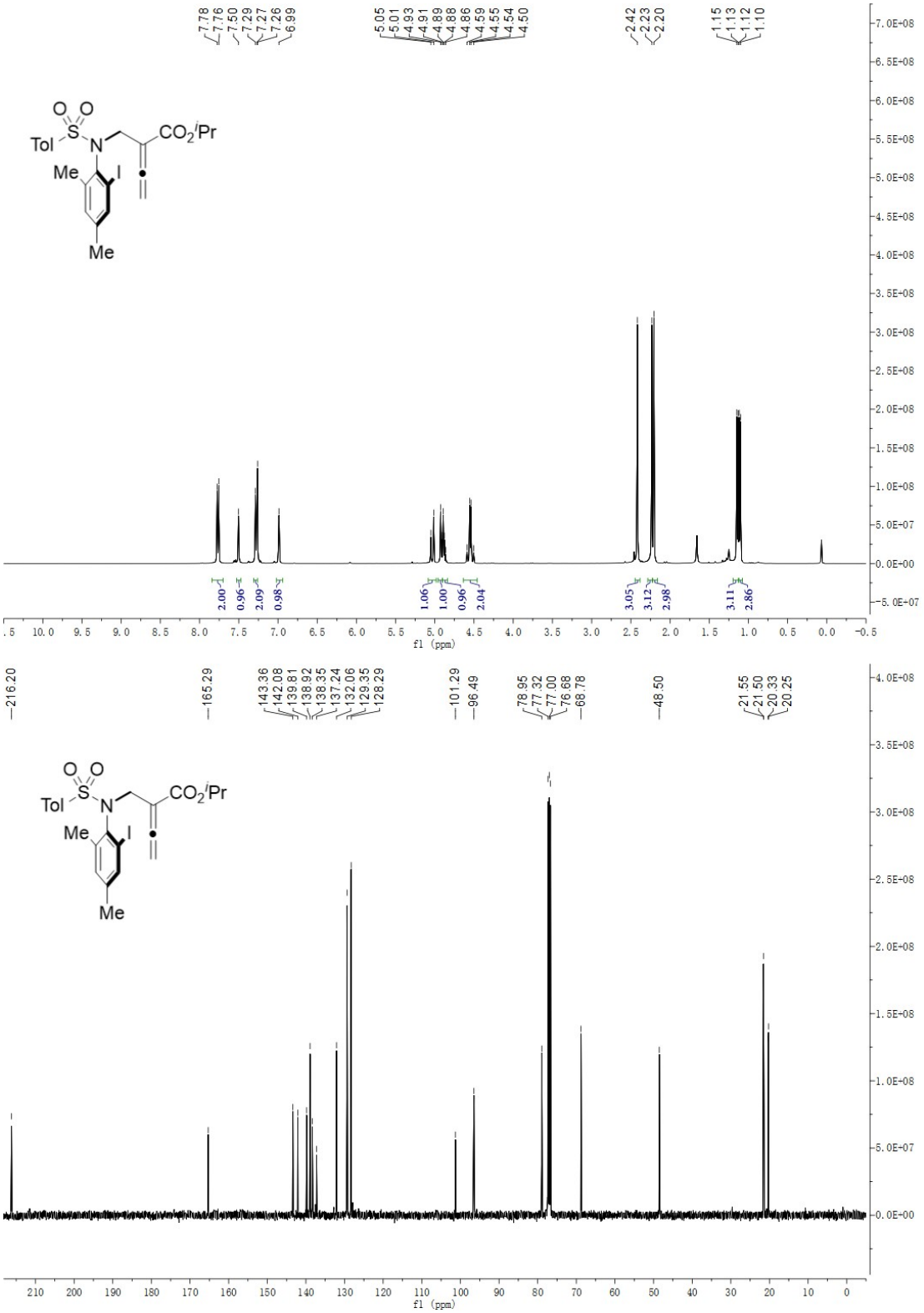

7.79
7.77
7.51
7.29
7.27
6.99
5.05
5.01
4.95
4.91
4.54
3.61
2.42
2.24
2.19
Tol
Me
I
Me
CO2Me
1.98
0.99
1.98
1.00
1.02
1.00
1.99
2.99
3.06
3.09
2.87
f1 (ppm)


216.22
166.23
143.44
141.88
139.82
138.91
138.16
137.34
132.05
129.34
128.32
101.44
95.97
79.17
77.32
77.00
76.68
52.37
48.69
21.54
20.33
20.15
Tol
Me
I
Me
CO2Me
f1 (ppm)

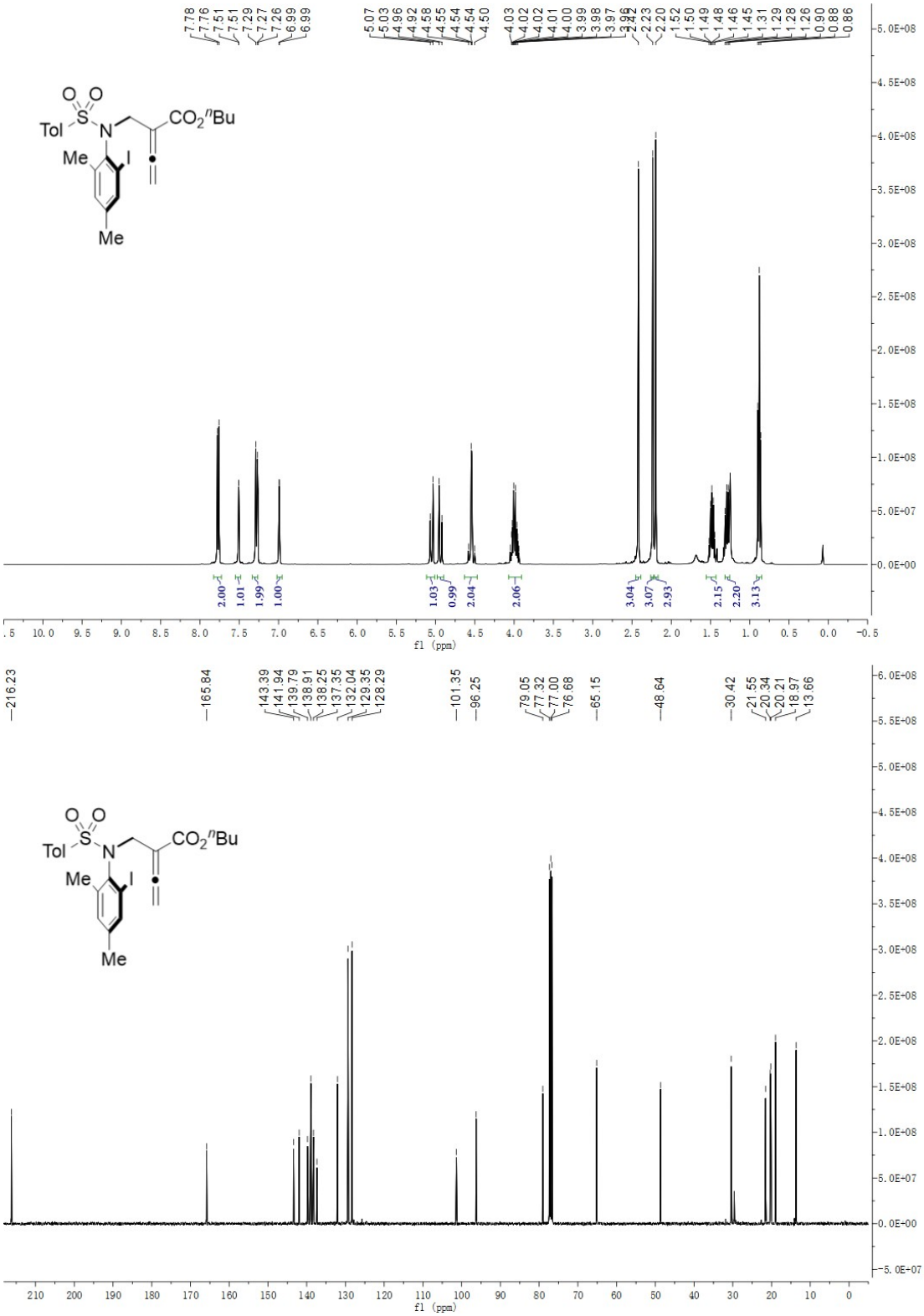
Compound **3c**


7.78
7.76
7.51
7.29
7.27
7.26
6.99
5.06
5.02
4.94
4.91
4.58
4.55
4.54
4.50
4.11
4.10
4.09
4.08
4.06
4.04
4.03
4.02
4.01
2.41
2.23
2.20
1.16
1.14
1.12
Tol
S
N
O
O
CO2Et
Me
I
Me
1.96
1.00
1.96
0.99
1.04
0.99
2.04
1.99
2.94
3.07
2.92
2.95
f1 (ppm)
216.16
165.73
143.39
141.95
139.79
138.89
138.23
137.32
132.02
129.33
128.27
101.35
96.23
79.07
77.32
77.00
76.68
61.27
48.63
21.52
20.31
20.18
13.99
f1 (ppm)

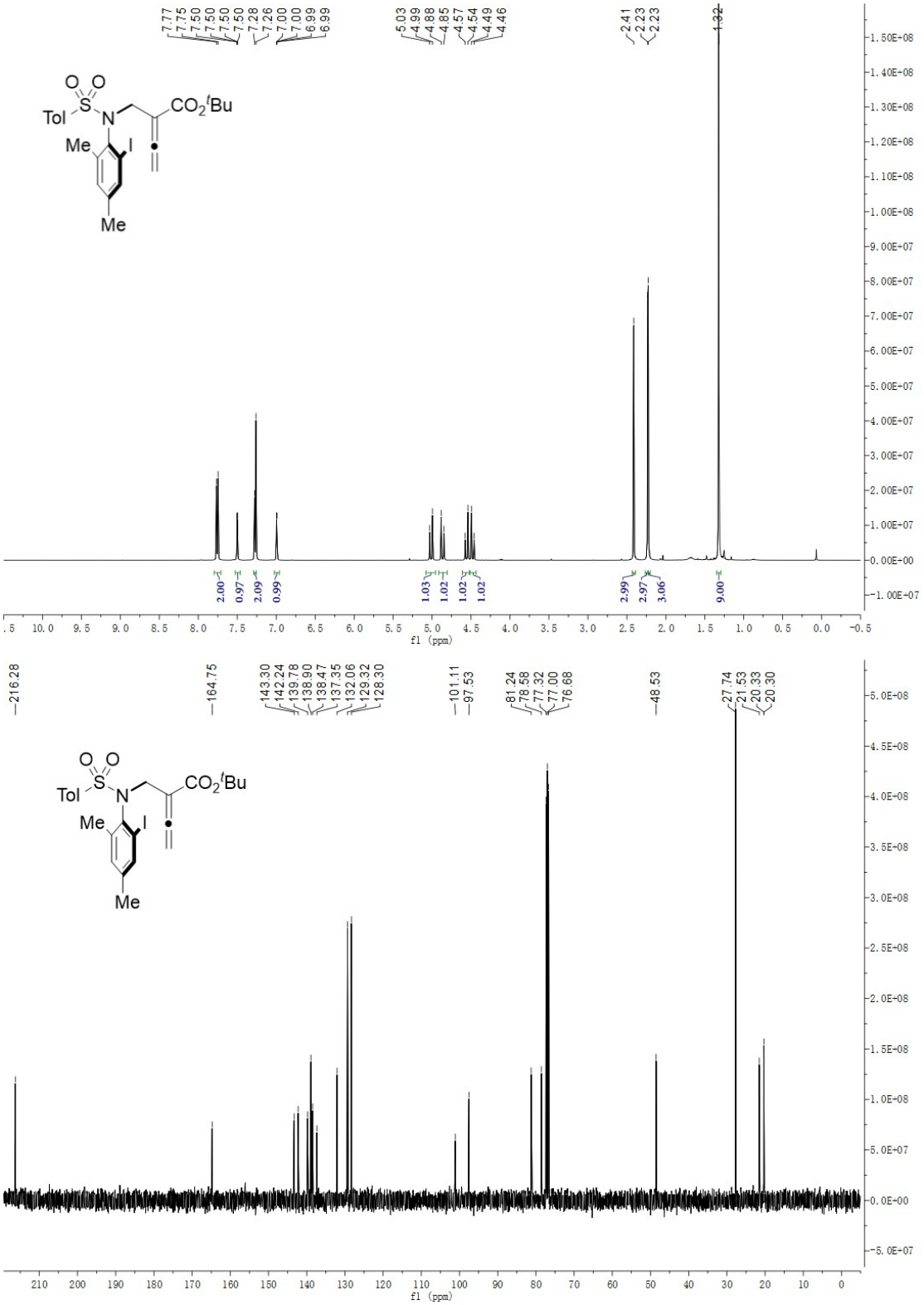
Compound **3d**


7.78
7.76
7.50
7.29
7.27
7.26
6.99
5.05
5.01
4.93
4.91
4.89
4.88
4.86
4.59
4.55
4.54
4.50
2.42
2.23
2.20
1.15
1.13
1.12
1.10
Tol
Me
I
Me
CO2iPr
2.00
0.96
2.09
0.98
1.06
1.00
0.96
2.04
3.05
3.12
2.98
3.11
2.86
f1 (ppm)
216.20
165.29
143.36
142.08
139.81
138.92
138.35
137.24
132.06
129.35
128.29
101.29
96.49
78.95
77.32
77.00
76.68
68.78
48.50
21.55
21.50
20.33
20.25
f1 (ppm)

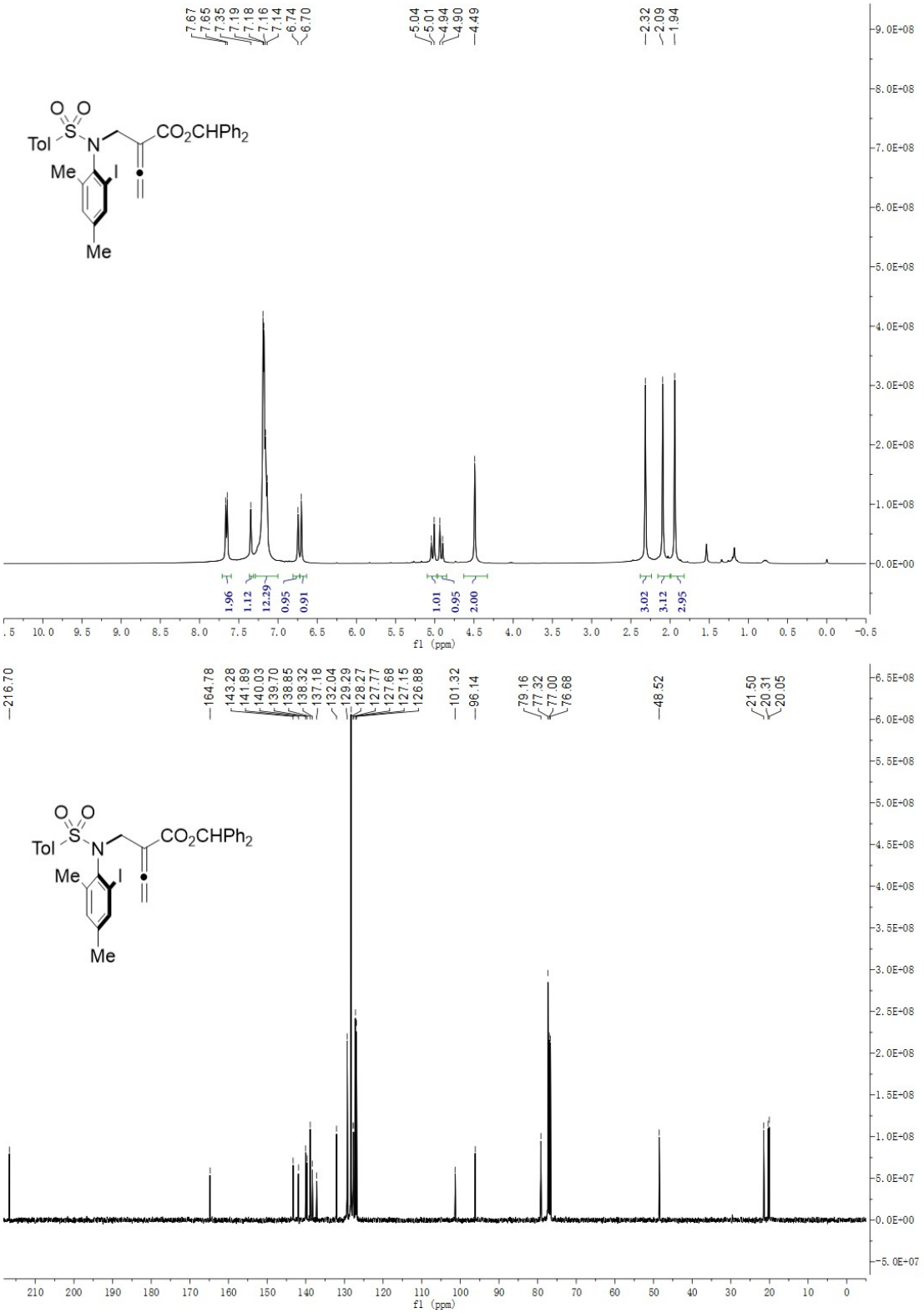
Compound **3e**


7.78
7.76
7.51
7.51
7.29
7.27
7.26
6.99
6.99
5.07
5.03
4.96
4.92
4.58
4.55
4.54
4.54
4.50
4.03
4.02
4.02
4.01
4.00
3.99
3.98
3.97
2.23
2.20
1.52
1.50
1.49
1.48
1.46
1.45
1.31
1.29
1.28
1.26
0.90
0.88
0.86
Tol
Me
I
Me
CO2nBu
2.00
1.01
1.99
1.00
1.03
0.99
2.04
2.06
3.04
3.07
2.93
2.15
2.20
3.13
f1 (ppm)
216.23
165.84
143.39
141.94
139.79
138.91
138.25
137.35
132.04
129.35
128.29
101.35
96.25
79.05
77.32
77.00
76.68
65.15
48.64
30.42
21.55
20.34
20.21
18.97
13.66
f1 (ppm)

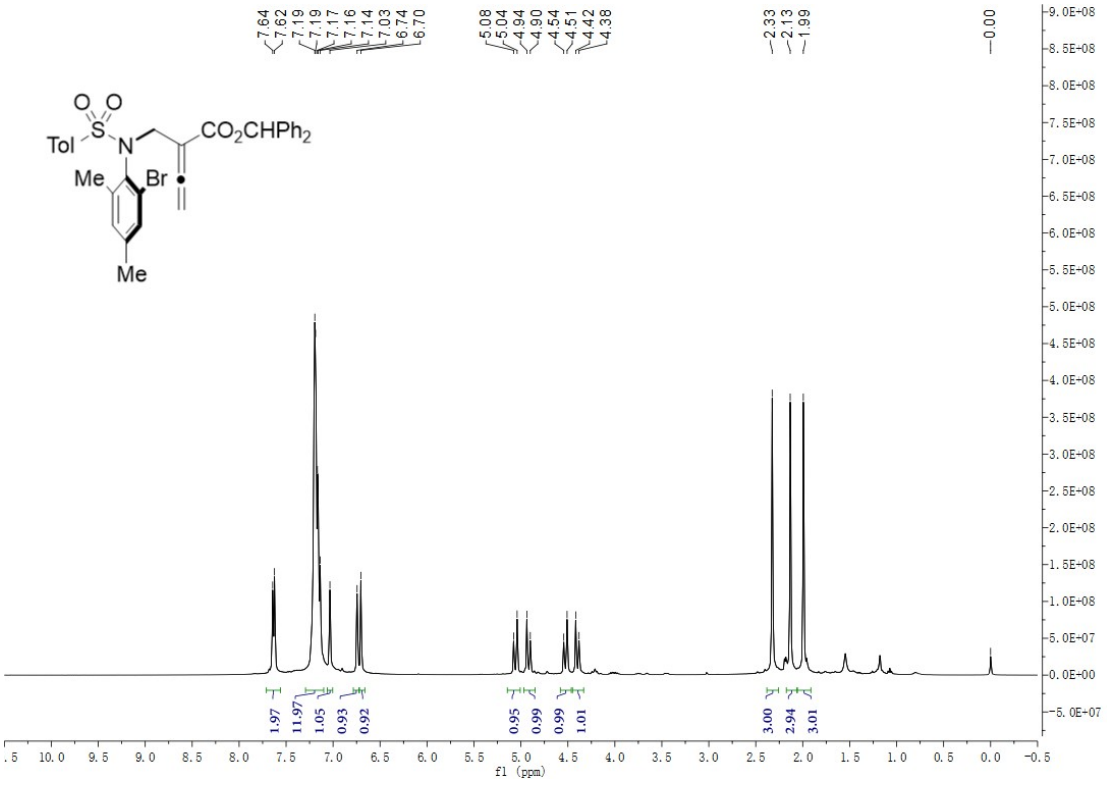
Compound **3f**

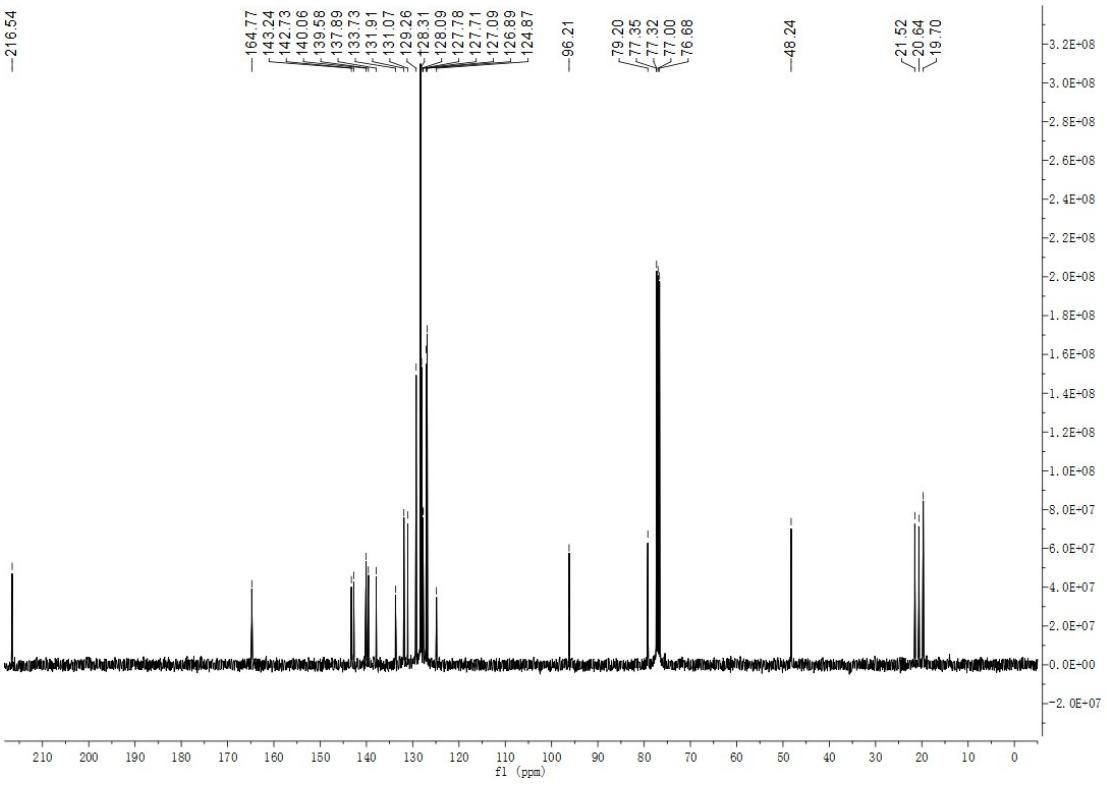

7.77
7.75
7.50
7.50
7.50
7.50
7.28
7.26
7.00
7.00
6.99
6.99
5.03
4.99
4.88
4.85
4.57
4.54
4.49
4.46
2.41
2.23
2.23
1.32
Tol
Me
I
Me
CO2tBu
2.00
0.97
2.09
0.99
1.03
1.02
1.02
1.02
2.99
2.97
3.06
9.00
f1 (ppm)
216.28
164.75
143.30
142.24
139.78
138.90
138.47
137.35
132.06
129.32
128.30
101.11
97.53
81.24
78.58
77.32
77.00
76.68
48.53
27.74
21.53
20.33
20.30
f1 (ppm)

Compound **3g**

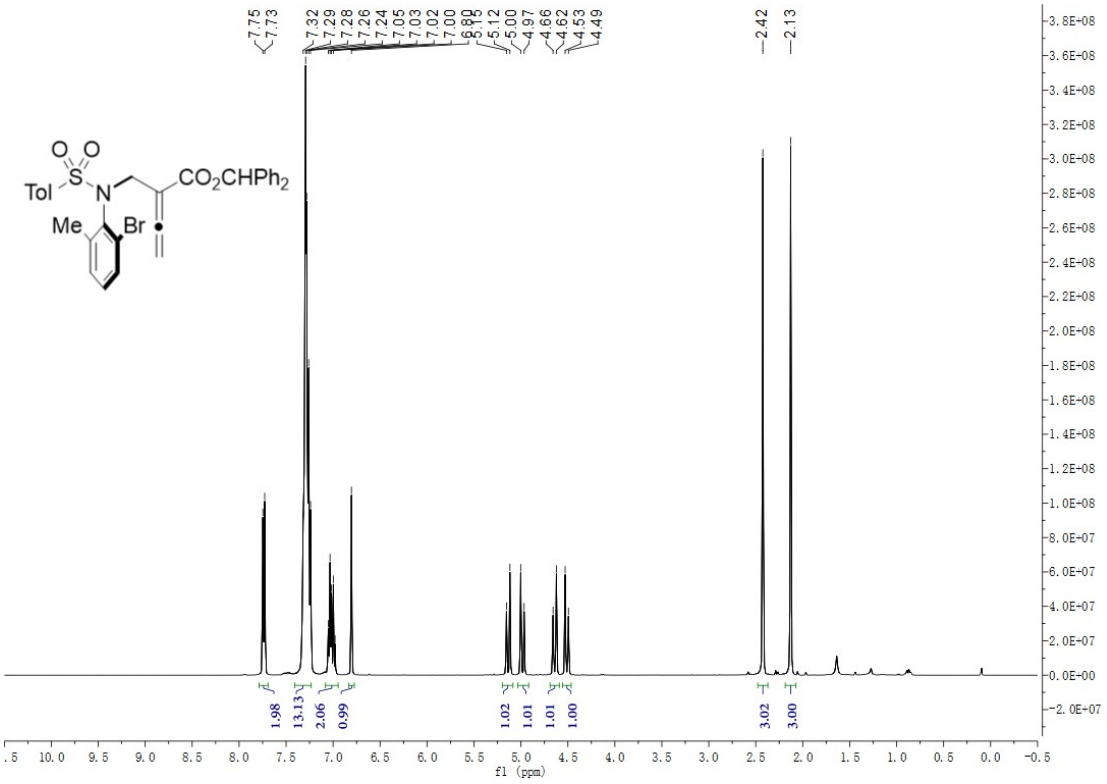

7.67
7.65
7.35
7.19
7.18
7.16
7.14
6.74
6.70
5.04
5.01
4.94
4.90
4.49
2.32
2.09
1.94
Tol
Me
I
Me
CO2CHPh2
1.96
1.12
12.29
0.95
0.91
1.01
0.95
2.00
3.02
3.12
2.95
f1 (ppm)
216.70
164.78
143.28
141.89
140.03
139.70
138.85
138.32
137.18
132.04
129.29
128.27
127.77
127.68
127.15
126.88
101.32
96.14
79.16
77.32
77.00
76.68
48.52
21.50
20.31
20.05
f1 (ppm)

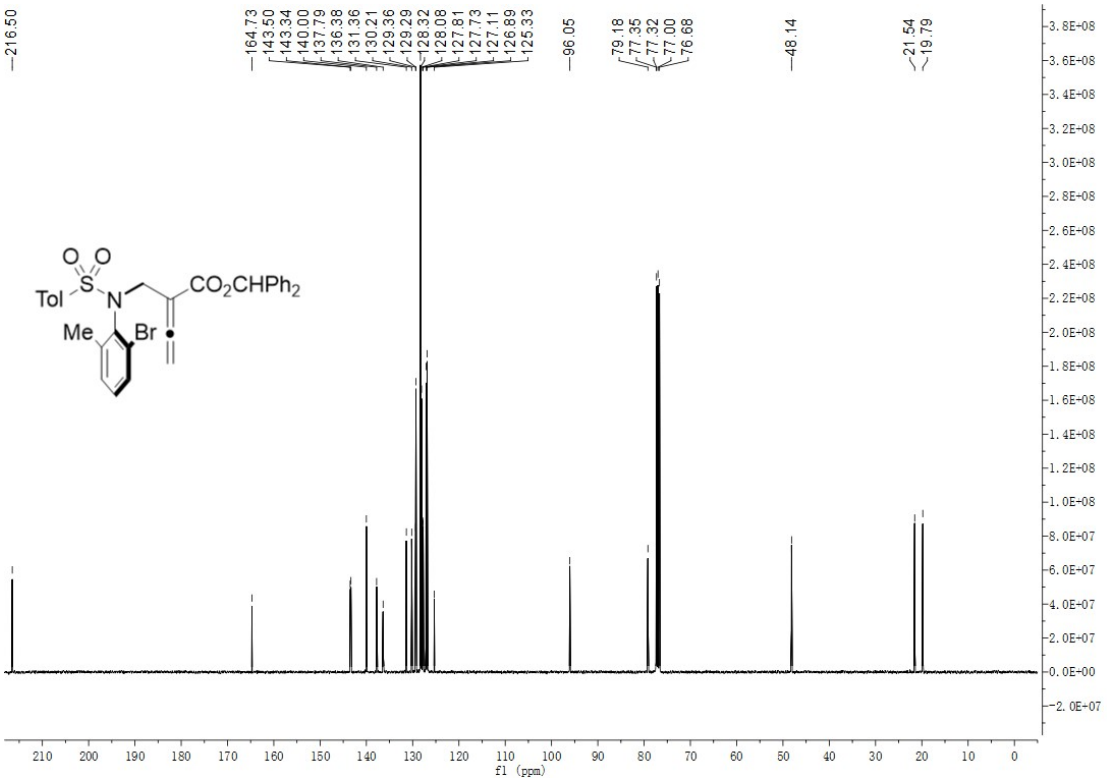
Compound **3h**


7.64
7.62
7.19
7.19
7.17
7.16
7.14
7.03
6.74
6.70
5.08
5.04
4.94
4.90
4.54
4.51
4.42
4.38
2.33
2.13
1.99
0.00
Tol
N
CO2CHPh2
Me
Br
Me
1.97
11.97
1.05
0.93
0.92
0.95
0.99
0.99
1.01
3.00
2.94
3.01
f1 (ppm)

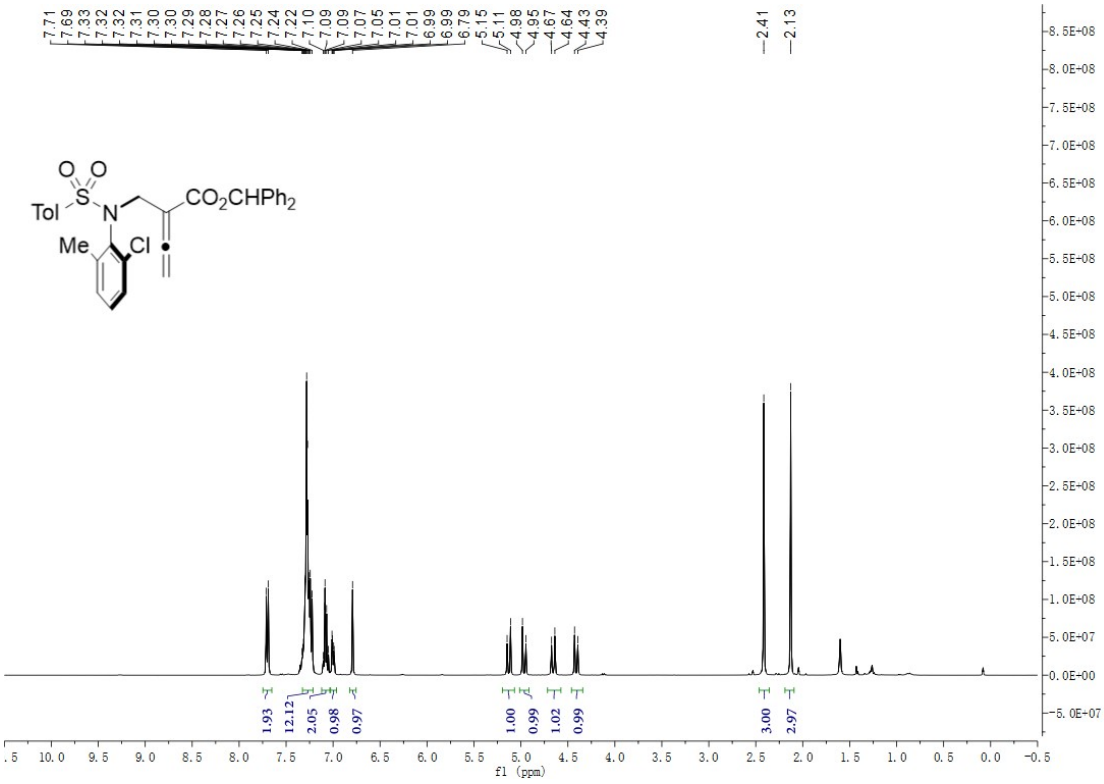

216.54
164.77
143.24
142.73
140.06
139.58
137.89
133.73
131.91
131.07
129.26
128.31
128.09
127.78
127.71
127.09
126.89
124.87
96.21
79.20
77.35
77.32
77.00
76.68
48.24
21.52
20.64
19.70
f1 (ppm)

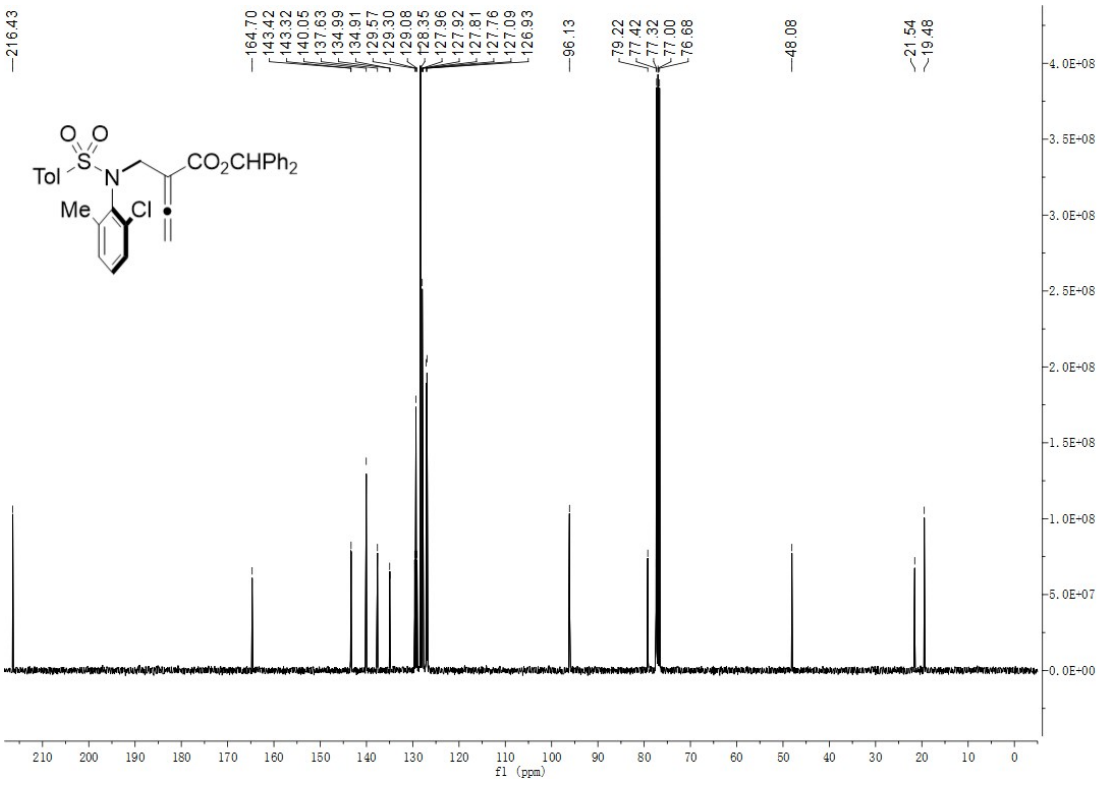
Compound **3i**


7.75
7.73
7.32
7.29
7.28
7.26
7.24
7.05
7.03
7.02
7.00
6.99
5.15
5.12
5.00
4.97
4.66
4.62
4.53
4.49
2.42
2.13
1.98
13.13
2.06
0.99
1.02
1.01
1.01
1.00
3.02
3.00
f1 (ppm)


216.50
164.73
143.50
143.34
140.00
137.79
136.38
131.36
130.21
129.36
129.29
128.32
128.08
127.81
127.73
127.11
126.89
125.33
96.05
79.18
77.35
77.32
77.00
76.68
48.14
21.54
19.79
f1 (ppm)

Compound **3j**


7.71
7.69
7.33
7.32
7.32
7.31
7.30
7.30
7.29
7.28
7.27
7.26
7.25
7.24
7.22
7.10
7.09
7.09
7.07
7.05
7.01
7.01
6.99
6.99
6.79
5.15
5.11
4.98
4.95
4.67
4.64
4.43
4.39
2.41
2.13
Tol
Me
Cl
CO2CHPh2
1.93
12.12
2.05
0.98
0.97
1.00
0.99
1.02
0.99
3.00
2.97
f1 (ppm)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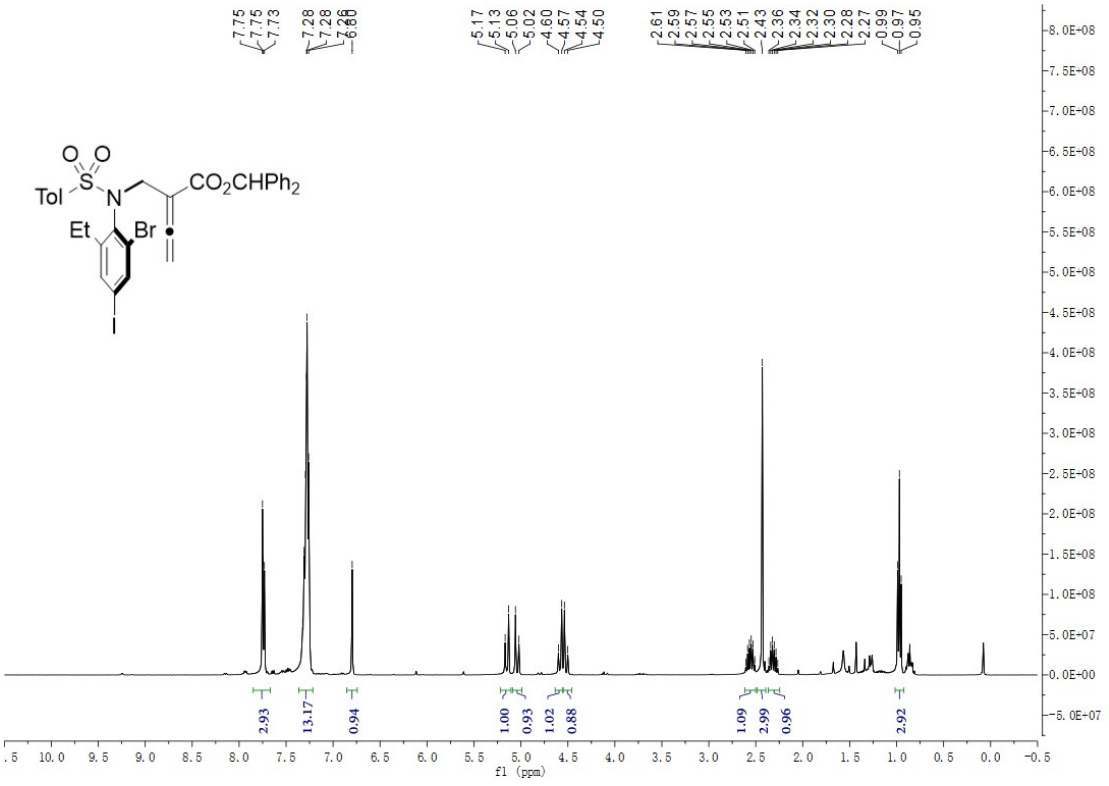
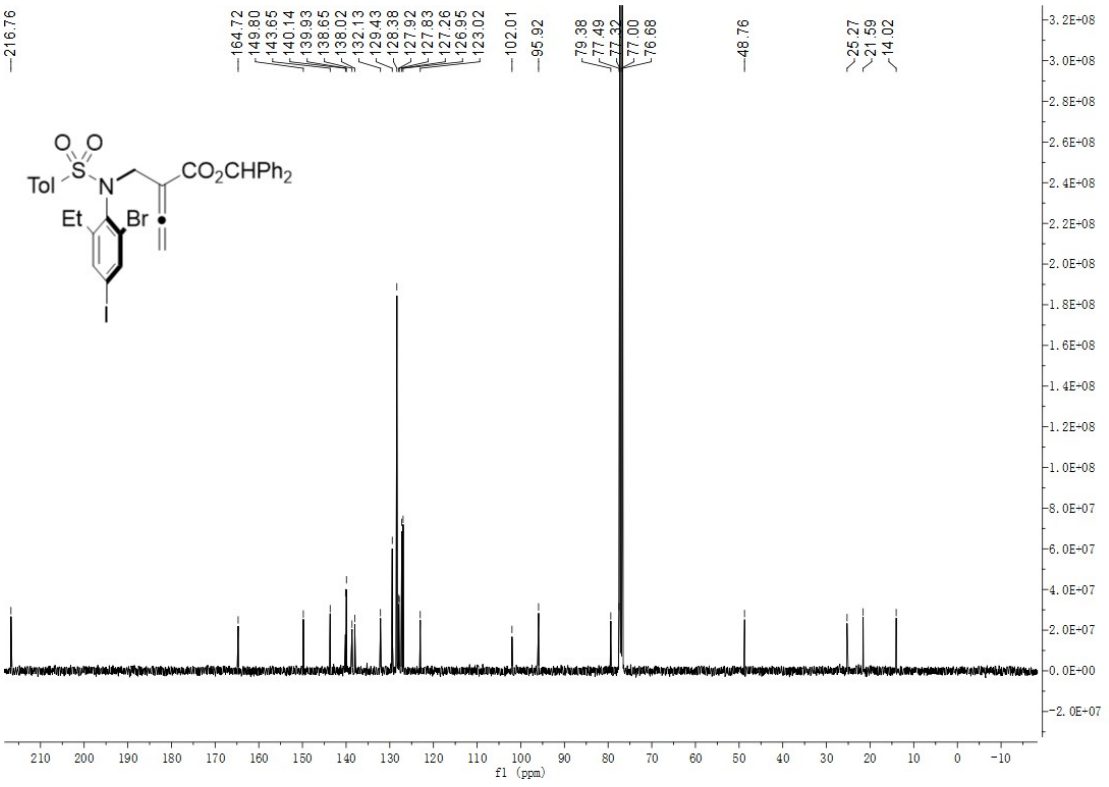
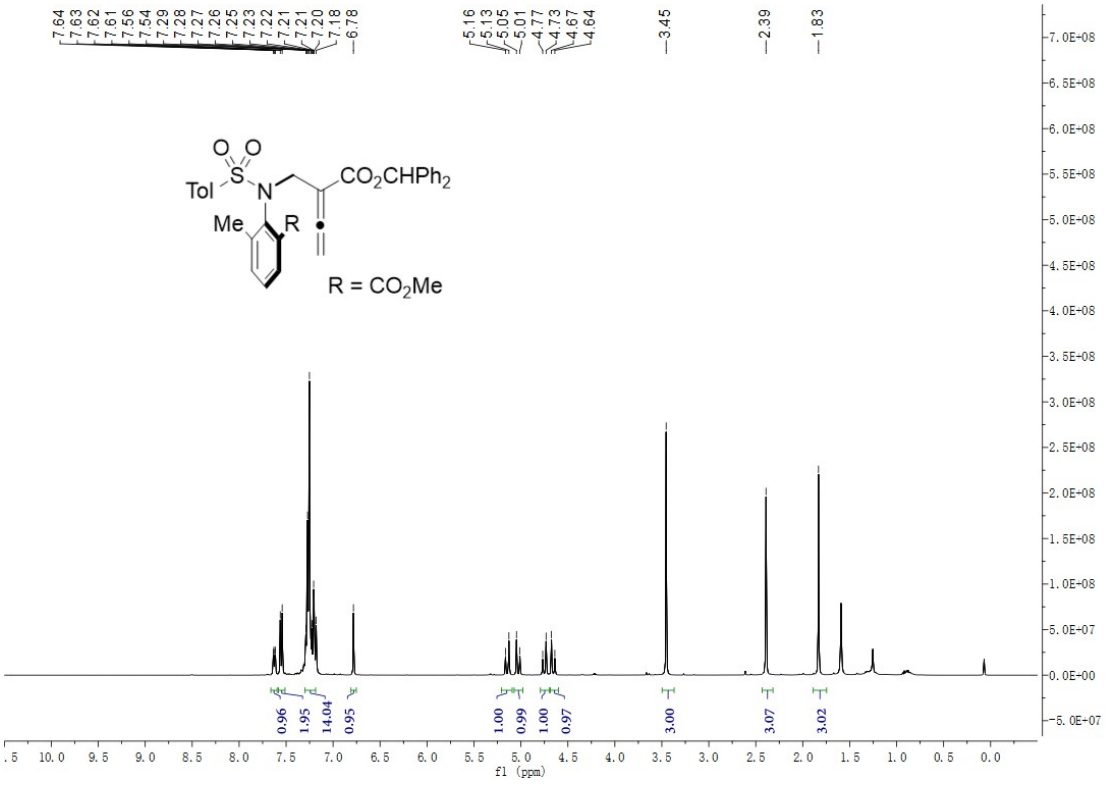
164.70
143.42
143.32
140.05
137.63
134.99
134.91
129.57
129.30
129.08
128.35
127.96
127.92
127.81
127.76
127.09
126.93
96.13
79.22
77.42
77.32
77.00
76.68
48.08
21.54
19.48
Tol
Me
Cl
CO2CHPh2
f1 (ppm)

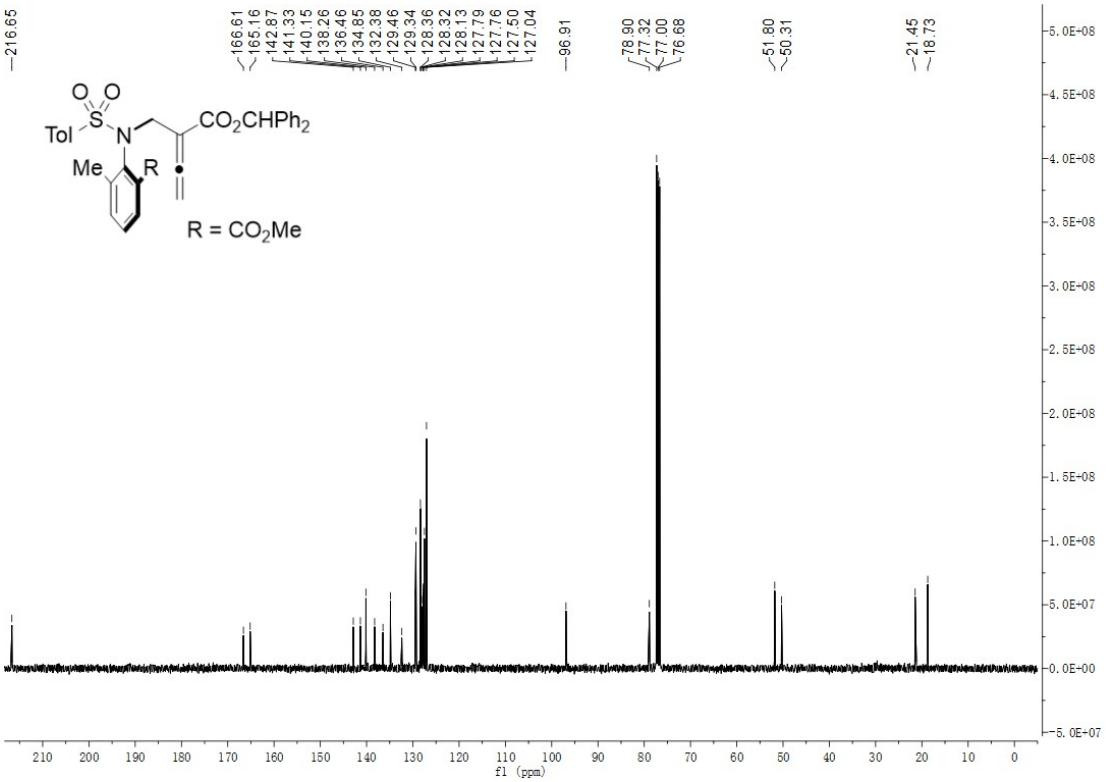
Compound **3k**


7.75
7.73
7.28
5.17
5.13
5.06
5.02
4.60
4.57
4.54
4.50
2.61
2.59
2.57
2.55
2.53
2.51
2.43
2.36
2.34
2.32
2.30
2.28
2.27
0.99
0.97
0.95
Tol
S
N
CO2CHPh2
Et
Br
I
2.93
13.17
0.94
1.00
0.93
1.02
0.88
1.09
2.99
0.96
2.92
f1 (ppm)

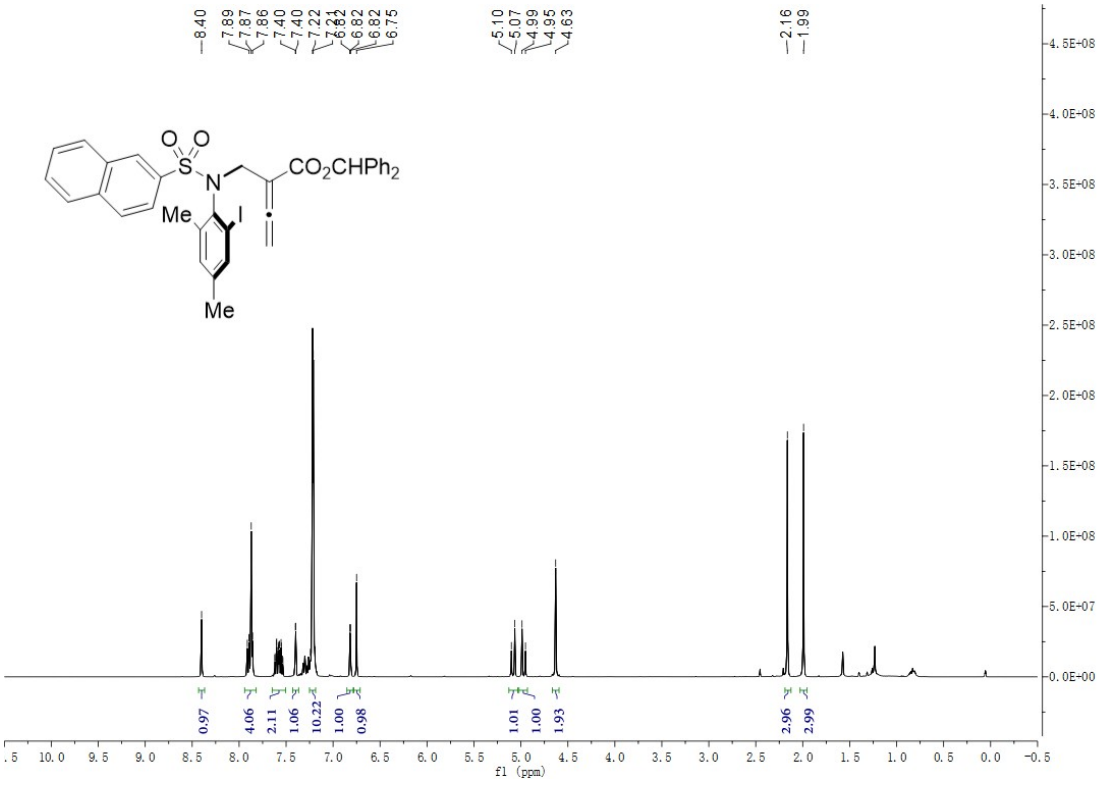

216.76
164.72
149.80
143.65
140.14
139.93
138.65
138.02
132.13
129.43
128.38
127.92
127.83
127.26
126.95
123.02
102.01
95.92
79.38
77.49
77.32
77.00
76.68
48.76
25.27
21.59
14.02
Tol
S
N
CO2CHPh2
Et
Br
I
f1 (ppm)

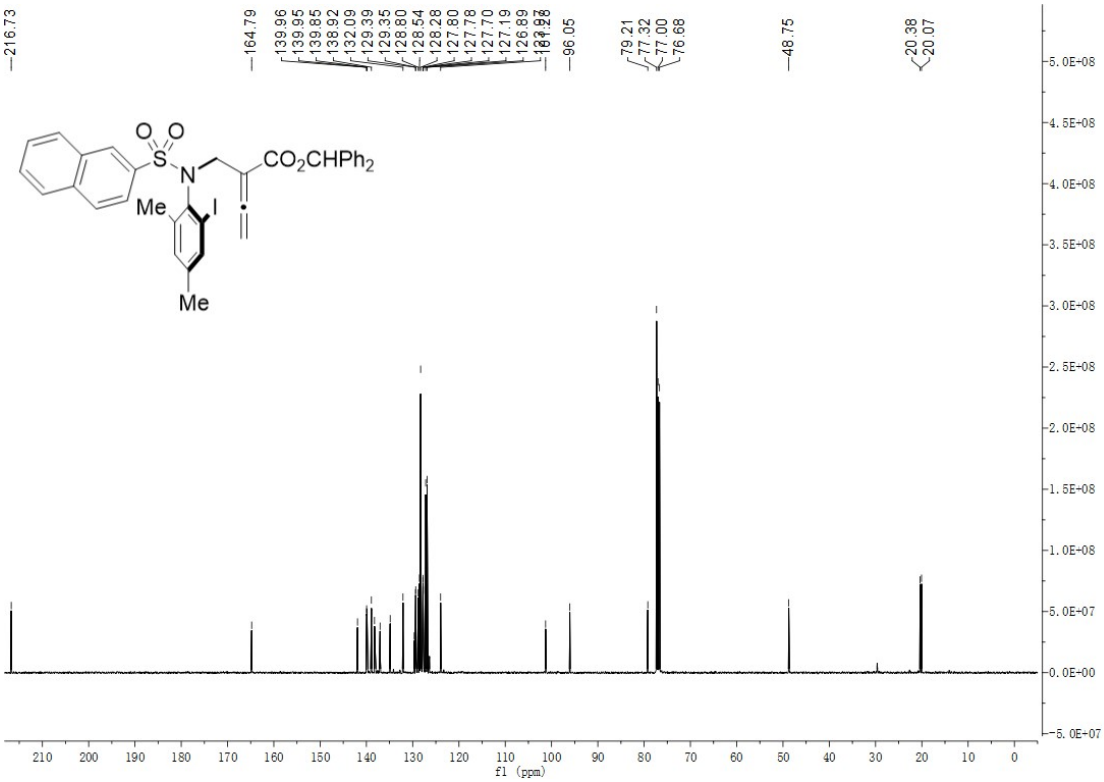
Compound **3l**


7.64
7.63
7.62
7.61
7.56
7.54
7.29
7.28
7.27
7.26
7.25
7.23
7.22
7.21
7.21
7.20
7.18
6.78
5.16
5.13
5.05
5.01
4.77
4.73
4.67
4.64
3.45
2.39
1.83
O
O
S
N
Tol
Me
R
CO2CHPh2
R = CO2Me
0.96
1.95
14.04
0.95
1.00
0.99
1.00
0.97
3.00
3.07
3.02
f1 (ppm)

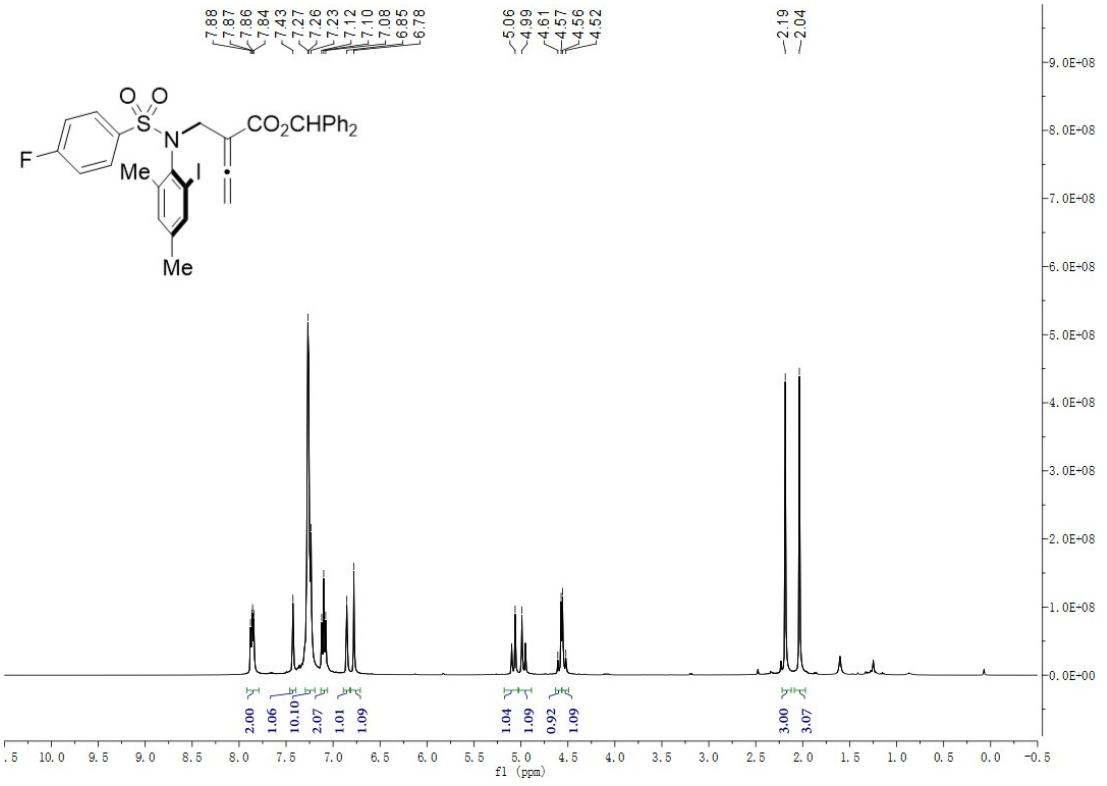

216.65
166.61
165.16
142.87
141.33
140.15
138.26
136.46
134.85
132.38
129.46
129.34
128.36
128.32
128.13
127.79
127.76
127.50
127.04
96.91
78.90
77.32
77.00
76.68
51.80
50.31
21.45
18.73
O
O
S
N
Tol
Me
R
CO2CHPh2
R = CO2Me
f1 (ppm)

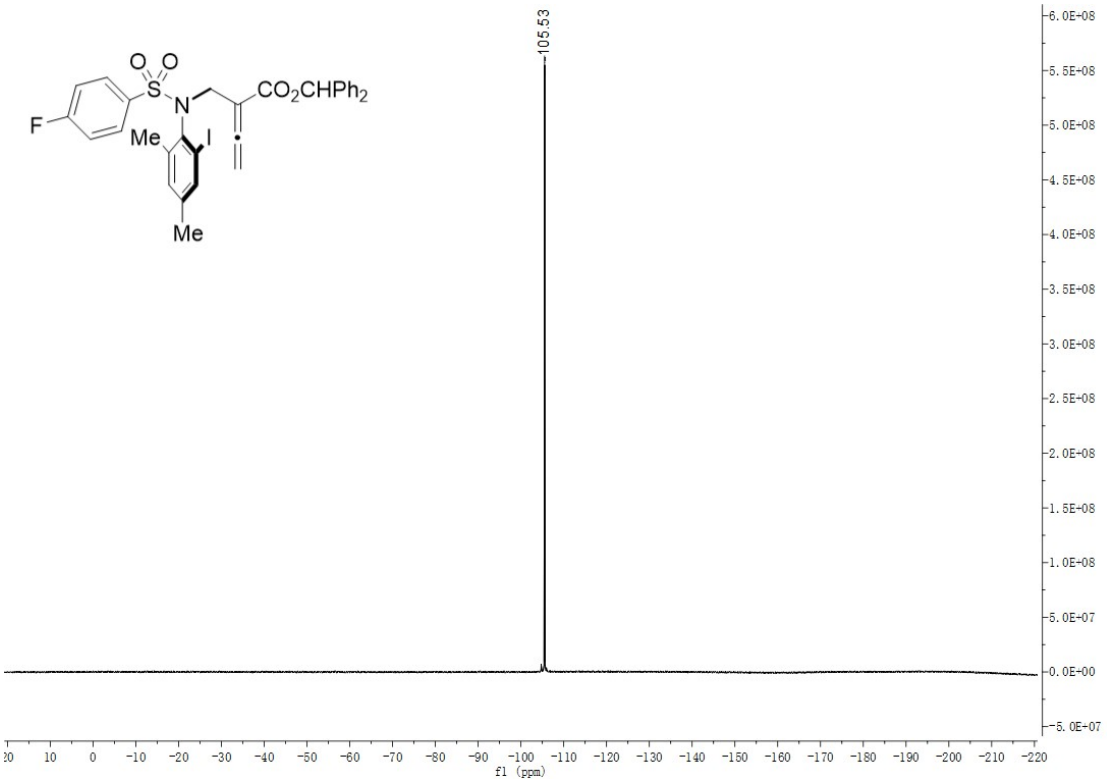
Compound **3m**

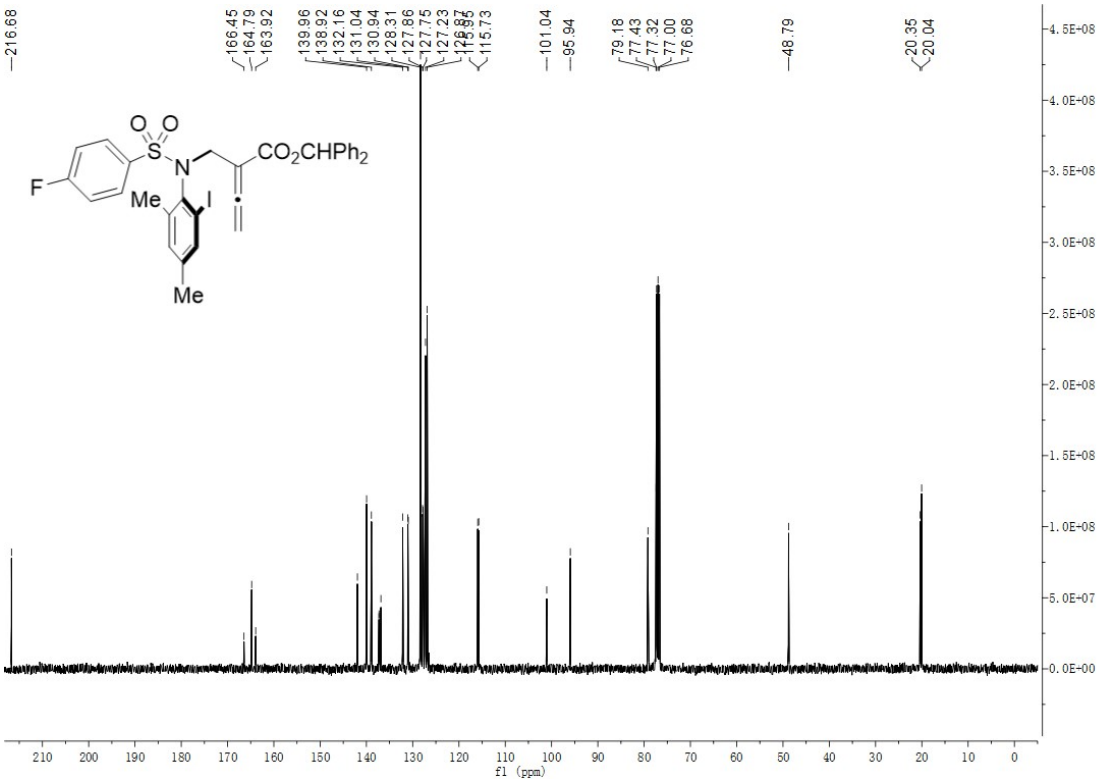

8.40
7.89
7.87
7.86
7.40
7.40
7.22
6.82
6.82
6.82
6.75
5.10
5.07
4.99
4.95
4.63
2.16
1.99
CO2CHPh2
Me
I
Me
0.97
4.06
2.11
1.06
10.22
1.00
0.98
1.01
1.00
1.93
2.96
2.99
f1 (ppm)


216.73
164.79
139.96
139.95
139.85
138.92
132.09
129.39
129.35
128.80
128.54
128.28
127.80
127.78
127.70
127.19
126.89
96.05
79.21
77.32
77.00
76.68
48.75
20.38
20.07
CO2CHPh2
Me
I
Me
f1 (ppm)

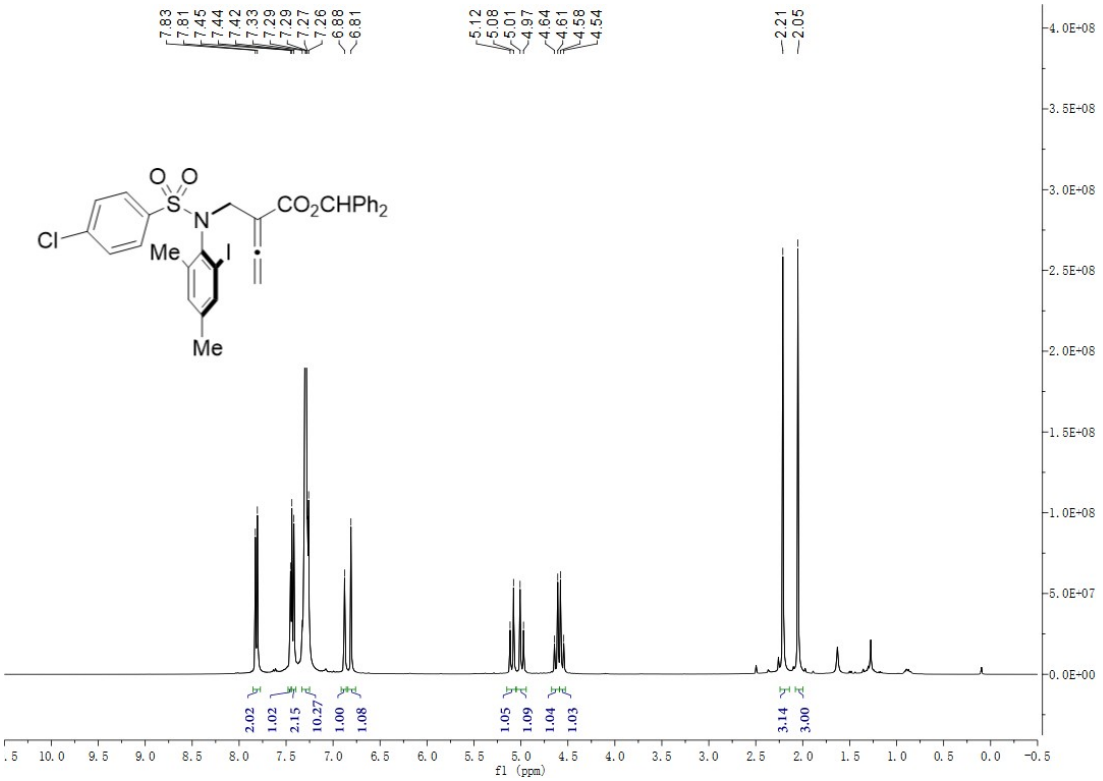
Compound **3n**

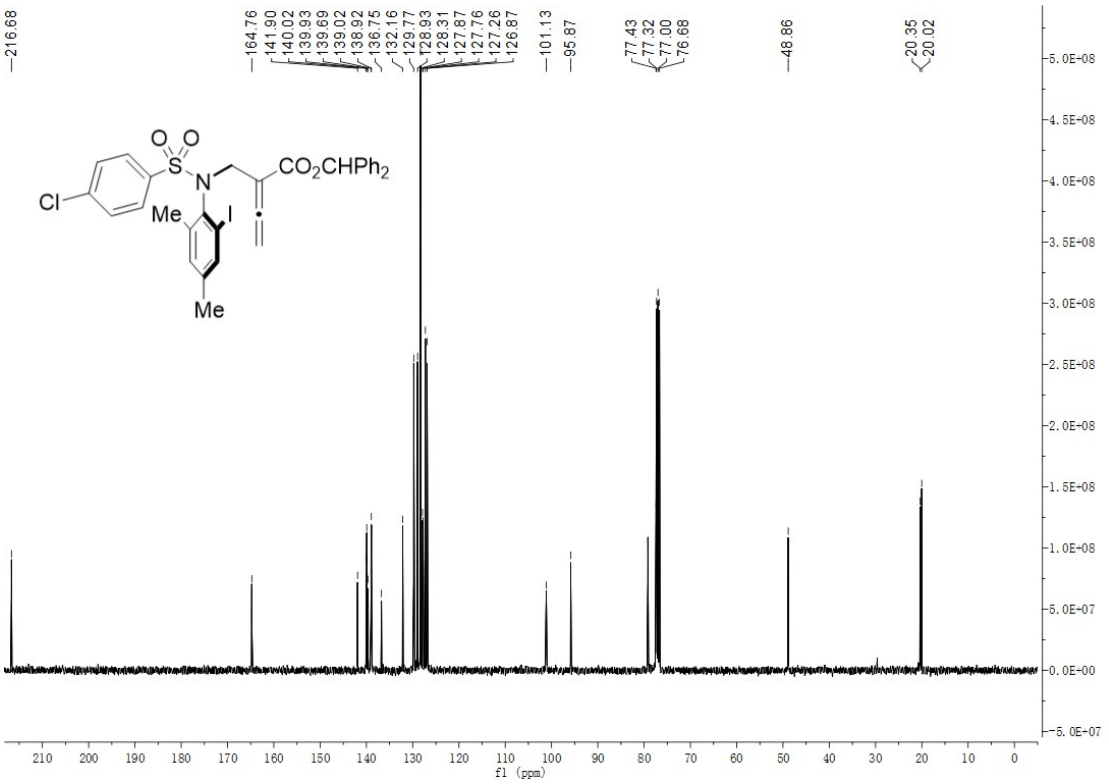

7.88
7.87
7.86
7.84
7.43
7.27
7.26
7.23
7.12
7.10
7.08
6.85
6.78
5.06
4.99
4.61
4.57
4.56
4.52
2.19
2.04
O
O
S
N
CO2CHPh2
F
Me
I
Me
2.00
1.06
10.10
2.07
1.01
1.09
1.04
1.09
0.92
1.09
3.00
3.07
f1 (ppm)


105.53
O
O
S
N
CO2CHPh2
F
Me
I
Me
f1 (ppm)

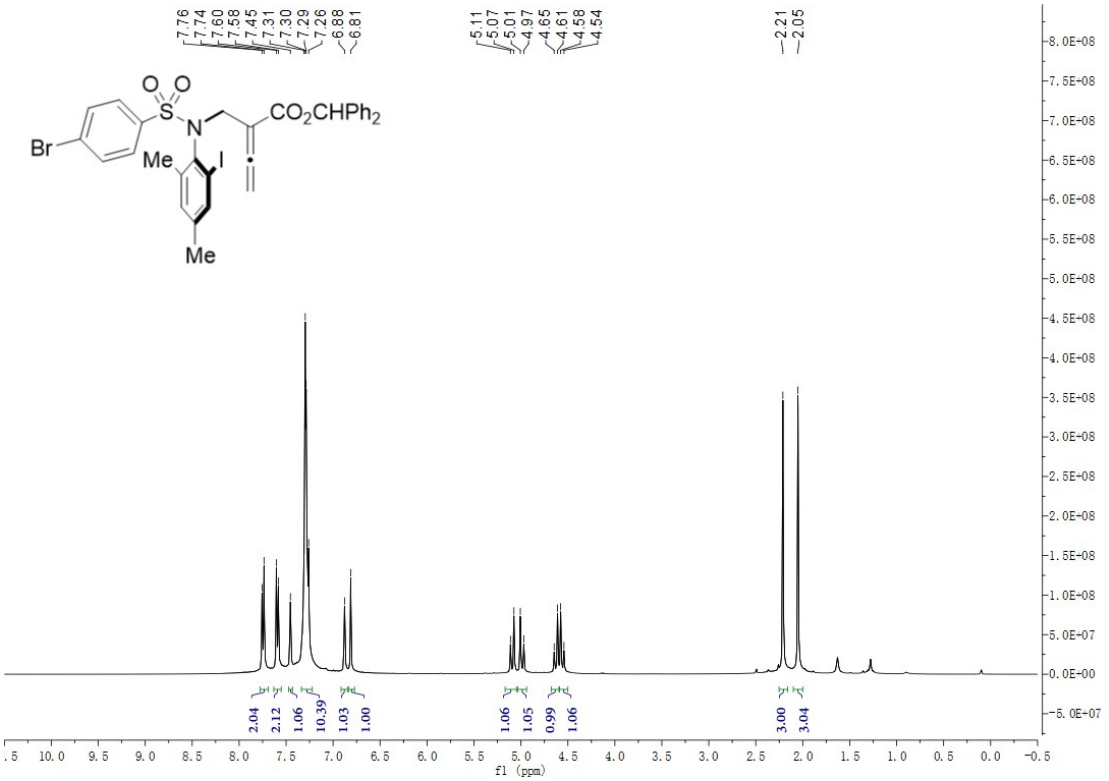

216.68
166.45
164.79
163.92
139.96
138.92
132.16
131.04
130.94
128.31
127.86
127.75
127.23
115.73
101.04
95.94
79.18
77.43
77.32
77.00
76.68
48.79
20.35
20.04
O
O
S
N
CO2CHPh2
F
Me
I
Me
f1 (ppm)

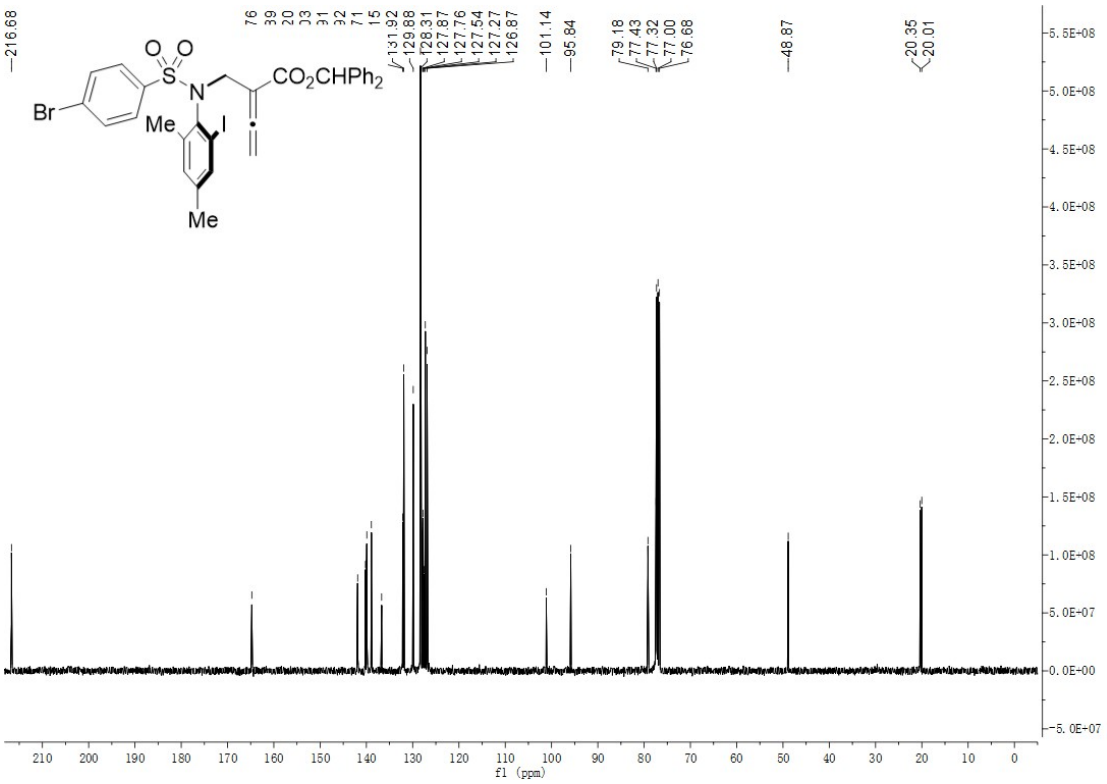
Compound **3o**


7.83
7.81
7.45
7.44
7.42
7.33
7.29
7.29
7.27
7.26
6.88
6.81
5.12
5.08
5.01
4.97
4.64
4.61
4.58
4.54
2.21
2.05
O
O
S
N
CO2CHPh2
Cl
Me
I
Me
2.02
1.02
2.15
10.27
1.00
1.08
1.05
1.09
1.04
1.03
3.14
3.00
f1 (ppm)

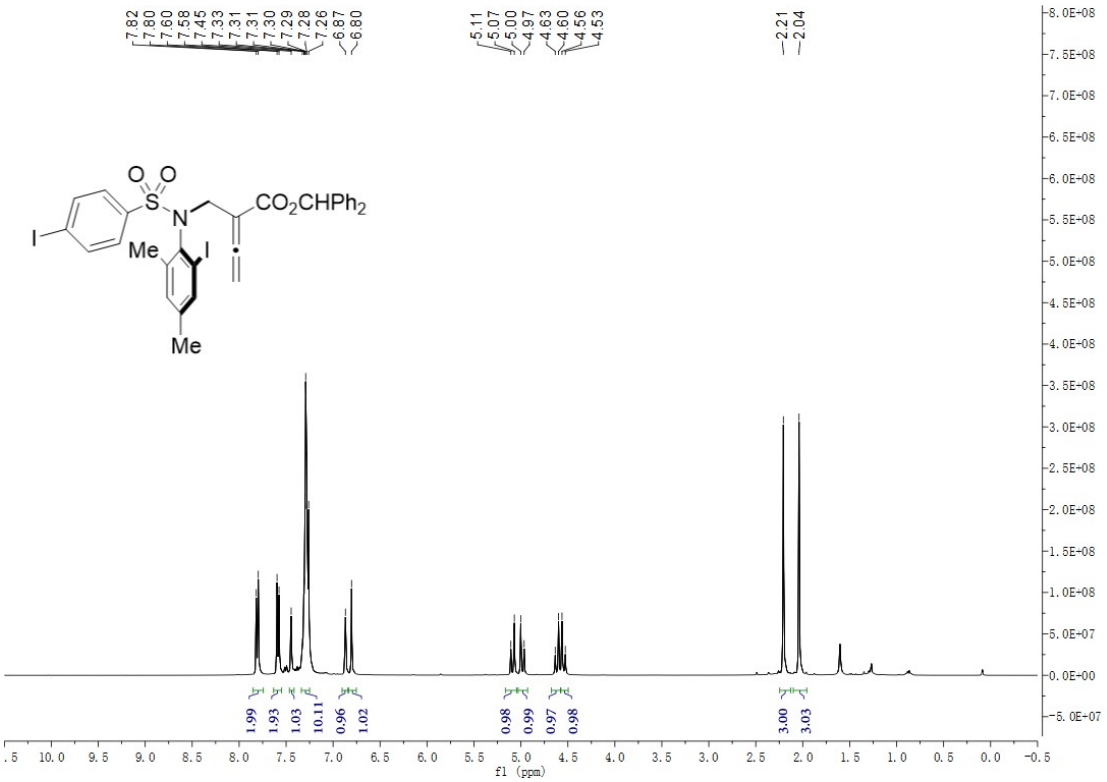

216.68
164.76
141.90
140.02
139.93
139.69
139.02
138.92
136.75
132.16
129.77
128.93
128.31
127.87
127.76
127.26
126.87
101.13
95.87
77.43
77.32
77.00
76.68
48.86
20.35
20.02
Cl
Me
I
Me
CO2CHPh2
f1 (ppm)

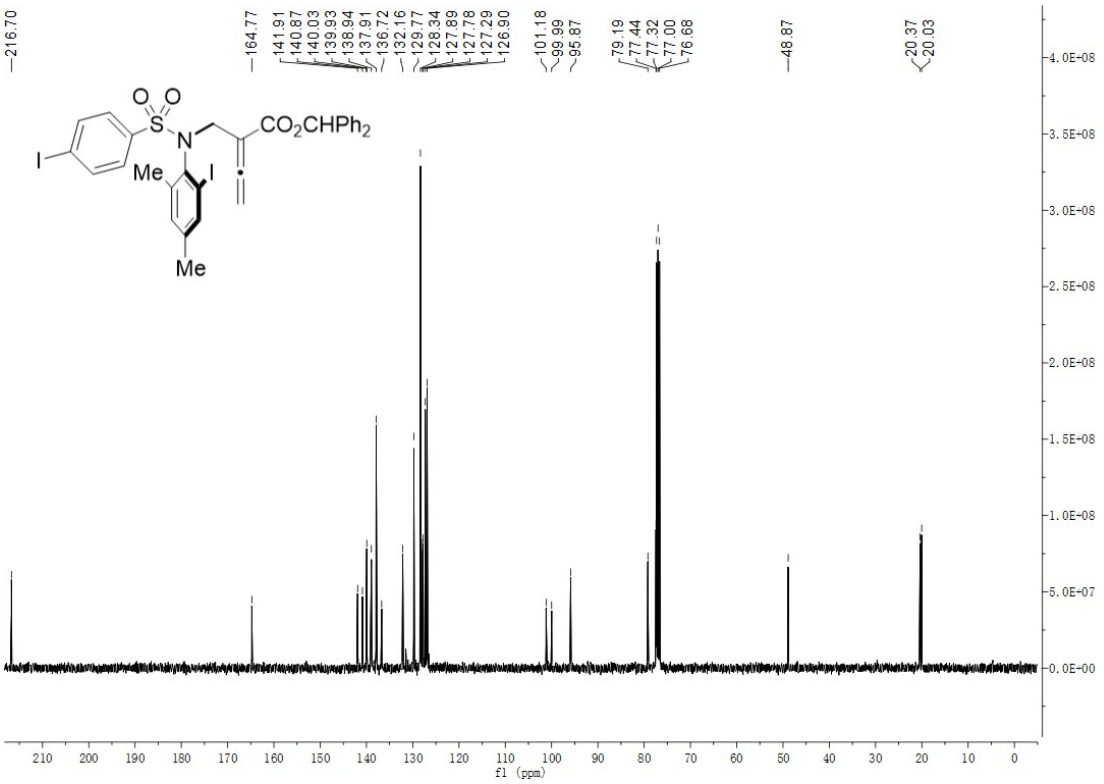
Compound **3p**


7.76
7.74
7.60
7.58
7.45
7.31
7.30
7.29
7.26
6.88
6.81
5.11
5.07
5.01
4.97
4.65
4.61
4.58
4.54
2.21
2.05
Br
Me
I
Me
CO2CHPh2
2.04
2.12
1.06
10.39
1.03
1.00
1.06
1.05
0.99
1.06
3.00
3.04
f1 (ppm)

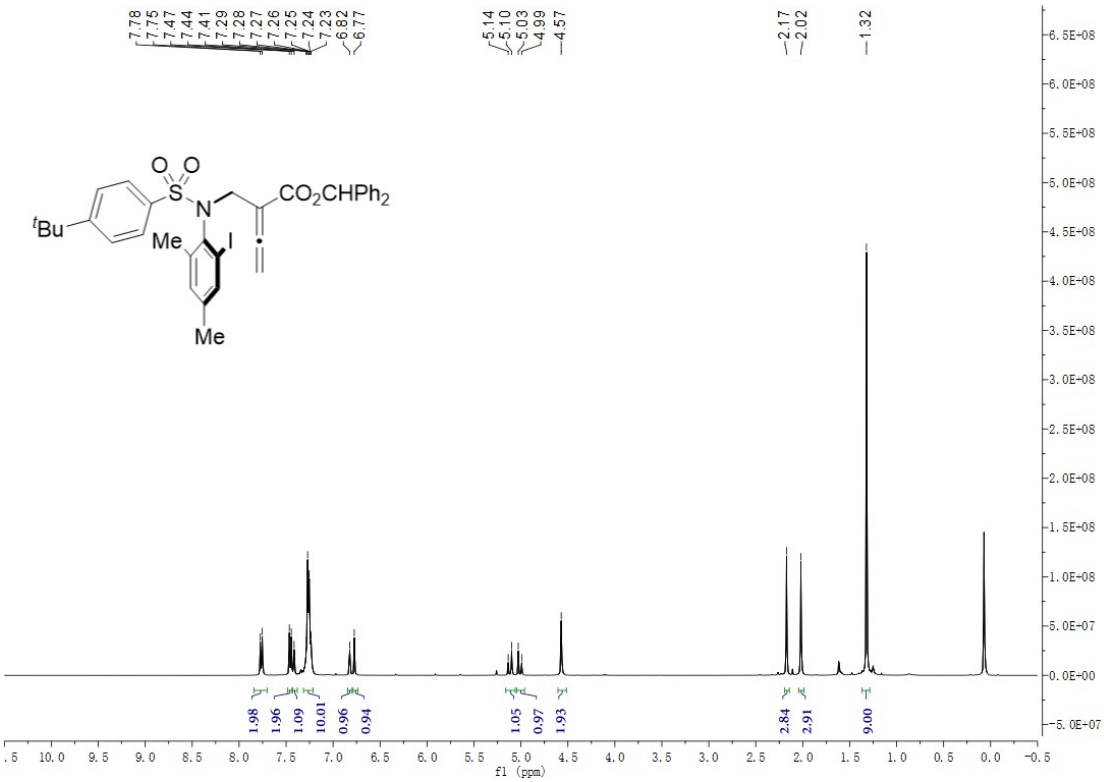

216.68
76
39
20
33
31
92
71
15
131.92
129.88
128.31
127.87
127.76
127.54
127.27
126.87
101.14
95.84
79.18
77.43
77.32
77.00
76.68
48.87
20.35
20.01
O
O
S
N
CO2CHPh2
Br
Me
I
Me
f1 (ppm)

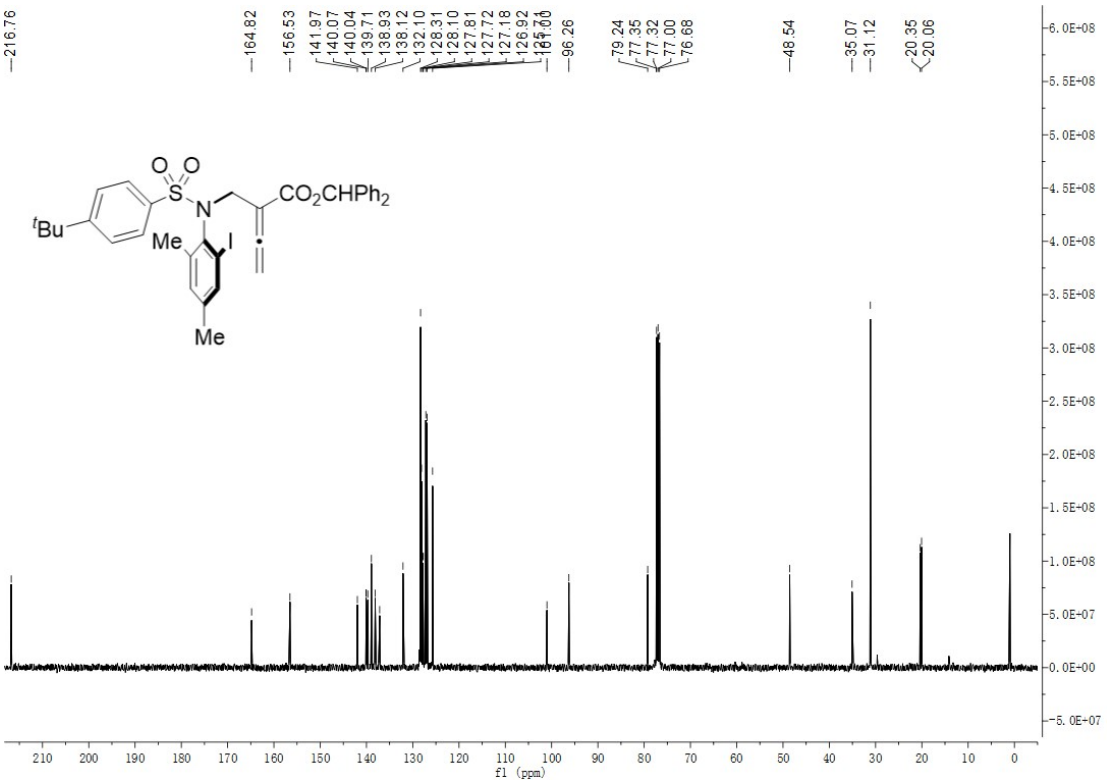
Compound **3q**


7.82
7.80
7.60
7.58
7.45
7.33
7.31
7.31
7.30
7.29
7.28
7.26
6.87
6.80
5.11
5.07
5.00
4.97
4.63
4.60
4.56
4.53
2.21
2.04
O
O
S
N
CO2CHPh2
I
Me
I
Me
1.99
1.93
1.03
10.11
0.96
1.02
0.98
0.99
0.97
0.98
3.00
3.03
f1 (ppm)

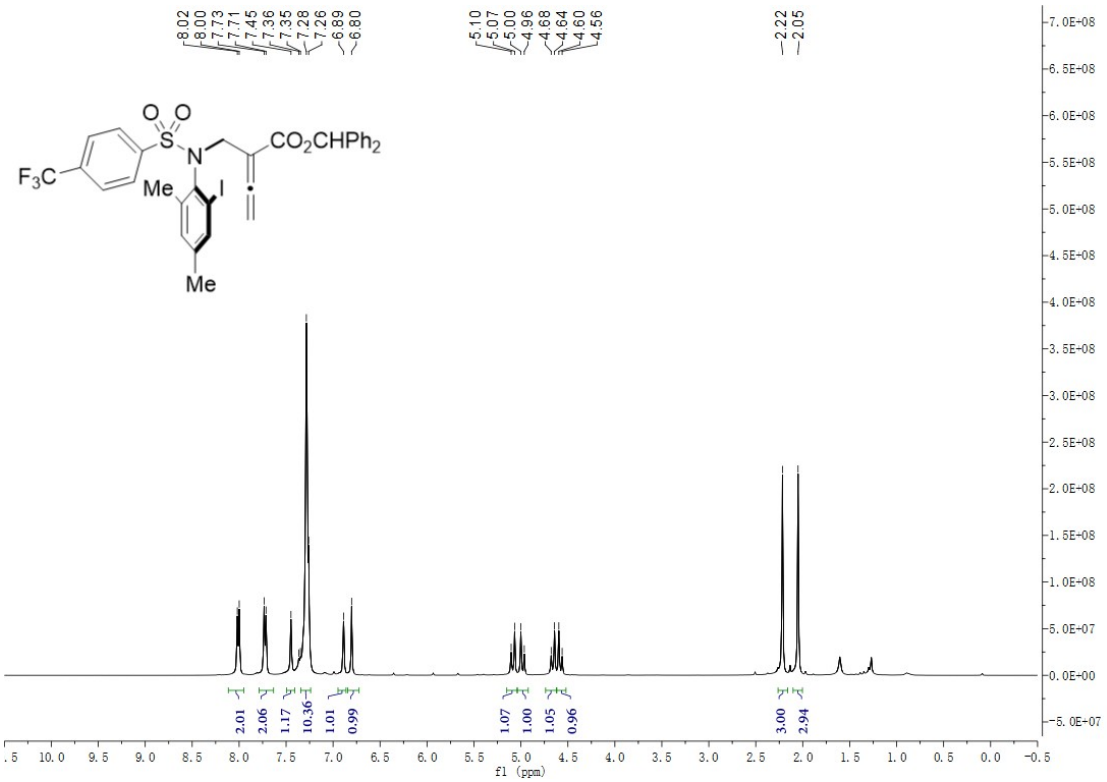

216.70
164.77
141.91
140.87
140.03
139.93
138.94
137.91
136.72
132.16
129.77
128.34
127.89
127.78
127.29
126.90
101.18
99.99
95.87
79.19
77.44
77.32
77.00
76.68
48.87
20.37
20.03
CO2CHPh2
Me
I
Me
fl (ppm)

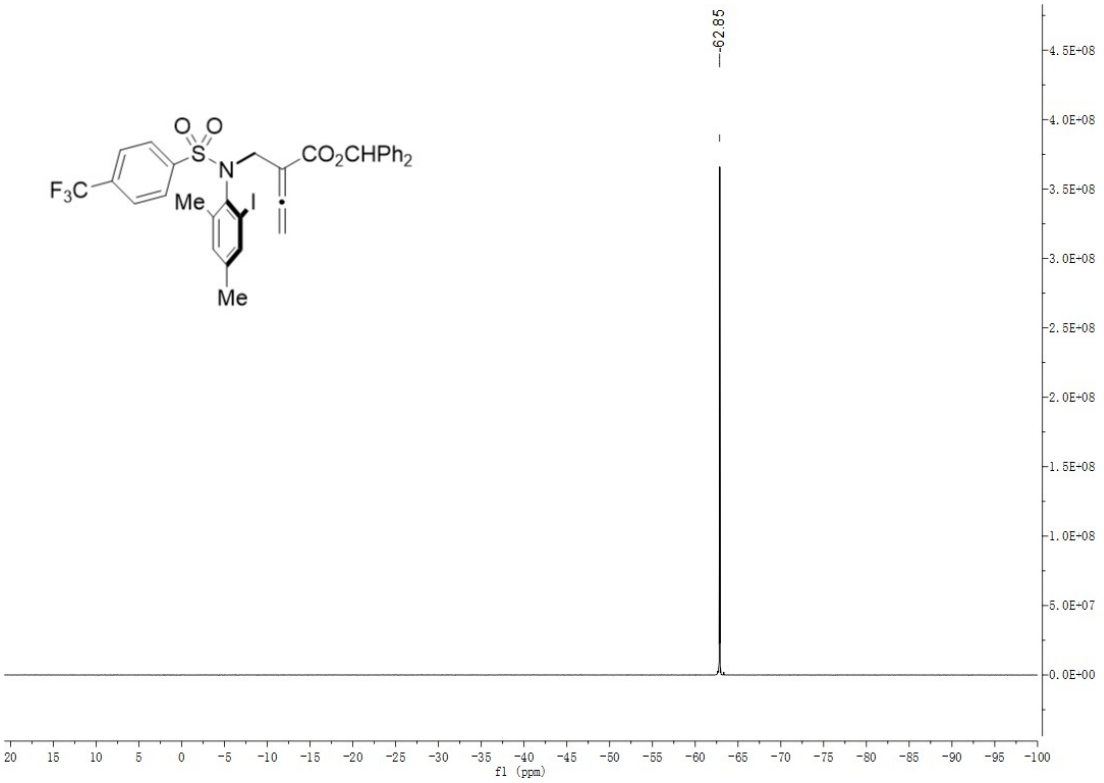
Compound **3r**

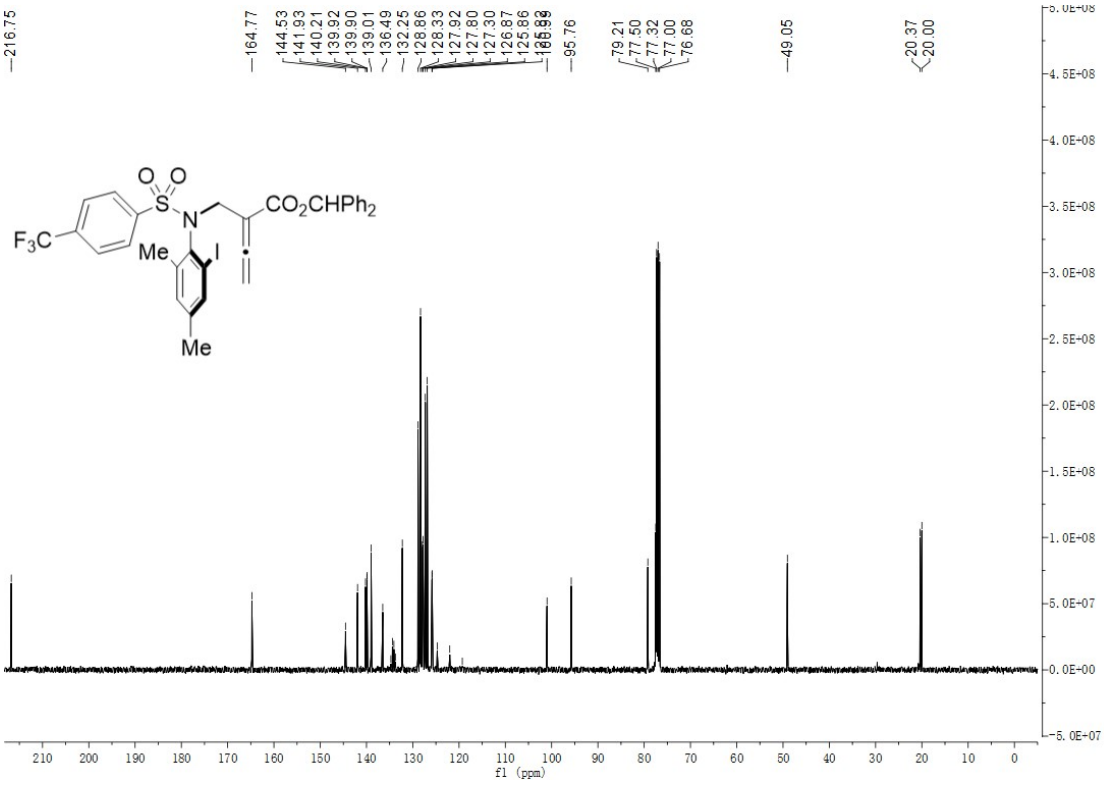

7.78
7.75
7.47
7.44
7.41
7.29
7.28
7.27
7.26
7.25
7.24
7.23
6.82
6.77
5.14
5.10
5.03
4.99
4.57
2.17
2.02
1.32
tBu
CO2CHPh2
Me
I
Me
1.98
1.96
1.09
10.01
0.96
0.94
1.05
0.97
1.93
2.84
2.91
9.00
fl (ppm)


216.76
164.82
156.53
141.97
140.07
140.04
139.71
138.93
138.12
132.10
128.31
128.10
127.81
127.72
127.18
126.92
96.26
79.24
77.35
77.32
77.00
76.68
48.54
35.07
31.12
20.35
20.06
tBu
Me
I
Me
CO2CHPh2
f1 (ppm)

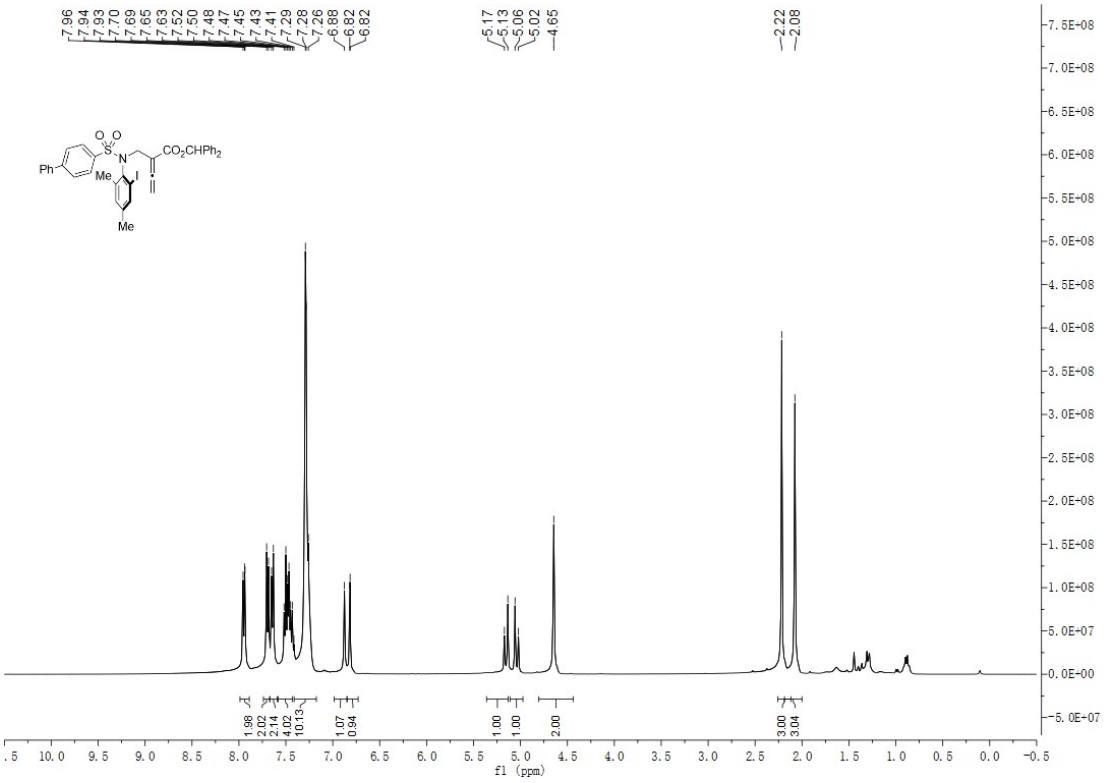
Compound **3s**

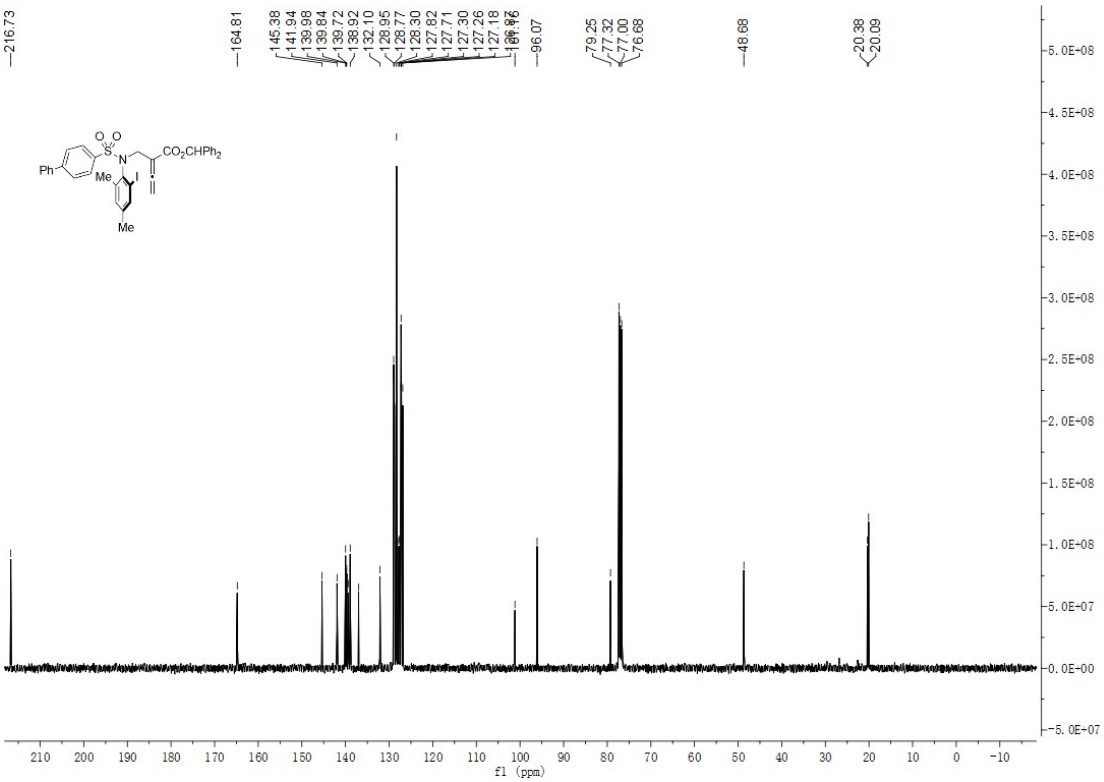

8.02
8.00
7.73
7.71
7.45
7.36
7.35
7.28
7.26
6.89
6.80
5.10
5.07
5.00
4.96
4.68
4.64
4.60
4.56
2.22
2.05
F3C
Me
I
Me
CO2CHPh2
2.01
2.06
1.17
10.36
1.01
0.99
1.07
1.00
1.05
0.96
3.00
2.94
f1 (ppm)


-62.85
F3C
Me
I
Me
O
O
S
N
CO2CHPh2
f1 (ppm)

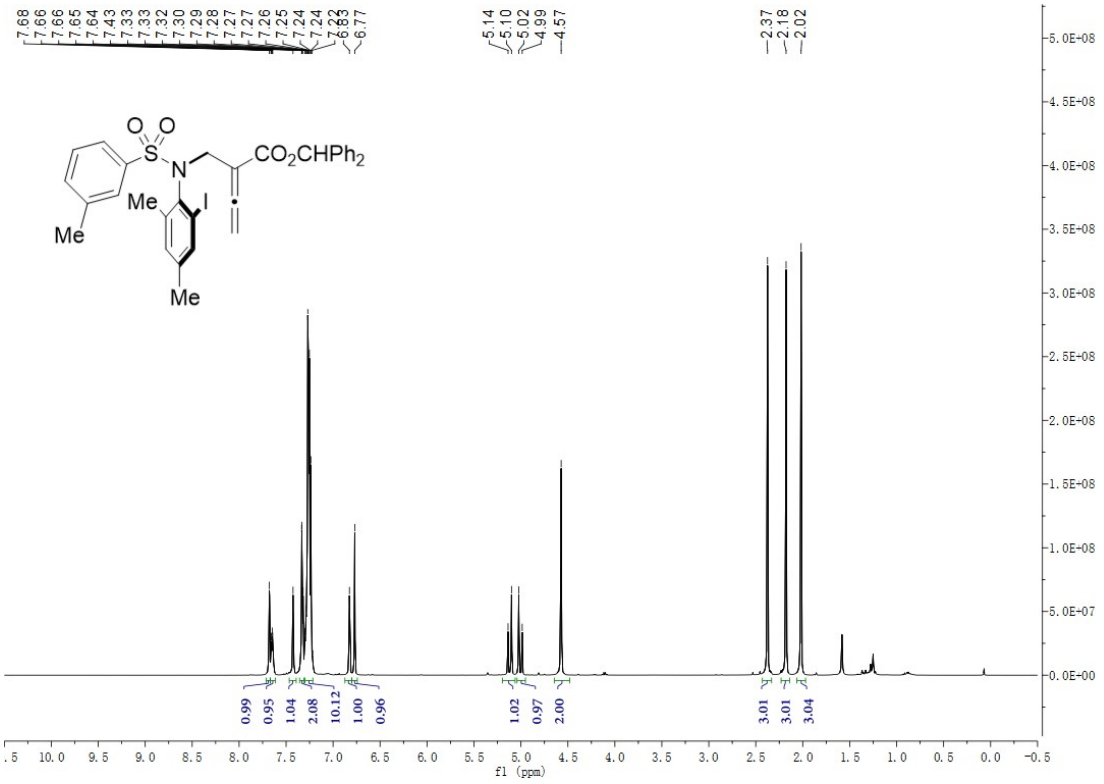

216.75
164.77
144.53
141.93
140.21
139.92
139.90
139.01
136.49
132.25
128.86
128.33
127.92
127.80
127.30
126.87
125.86
95.76
79.21
77.50
77.32
77.00
76.68
49.05
20.37
20.00
F3C
Me
I
Me
O
O
S
N
CO2CHPh2
f1 (ppm)

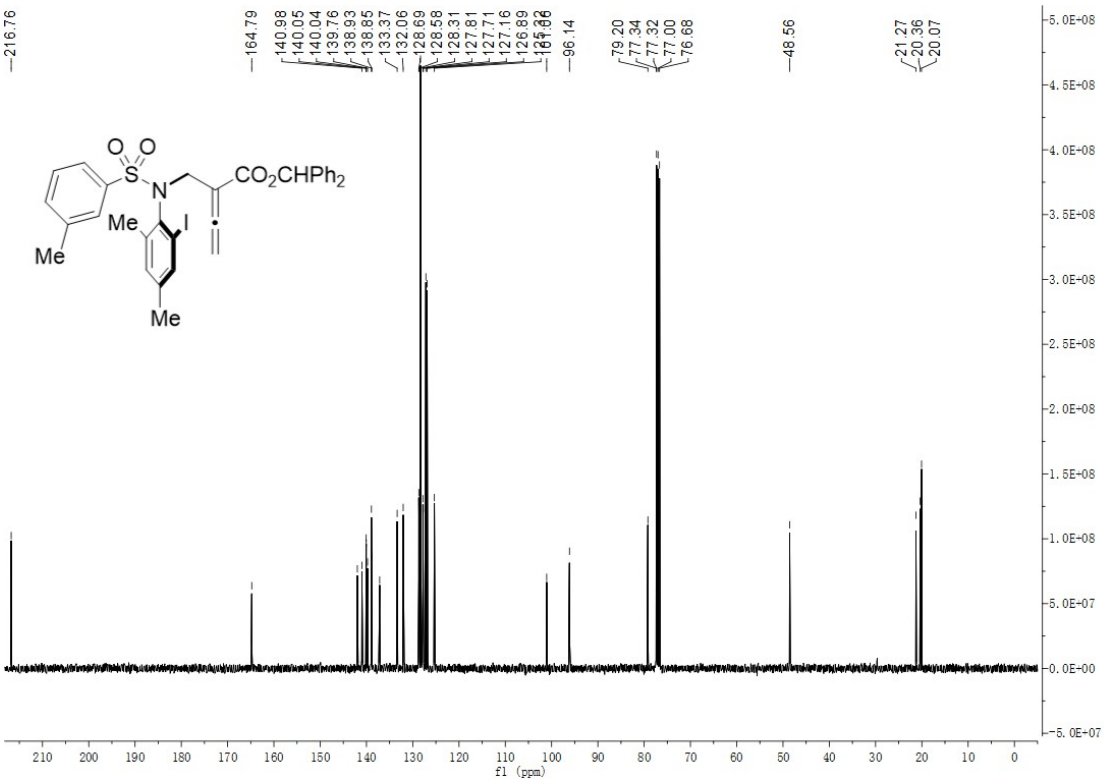
Compound **3t**


7.96
7.94
7.93
7.70
7.69
7.65
7.63
7.52
7.50
7.48
7.47
7.45
7.43
7.41
7.29
7.28
7.26
6.88
6.82
6.82
5.17
5.13
5.06
5.02
4.65
2.22
2.08
Ph
Me
I
Me
CO2CHPh2
1.98
2.02
2.14
4.02
10.13
1.07
0.94
1.00
1.00
2.00
3.00
3.04
f1 (ppm)

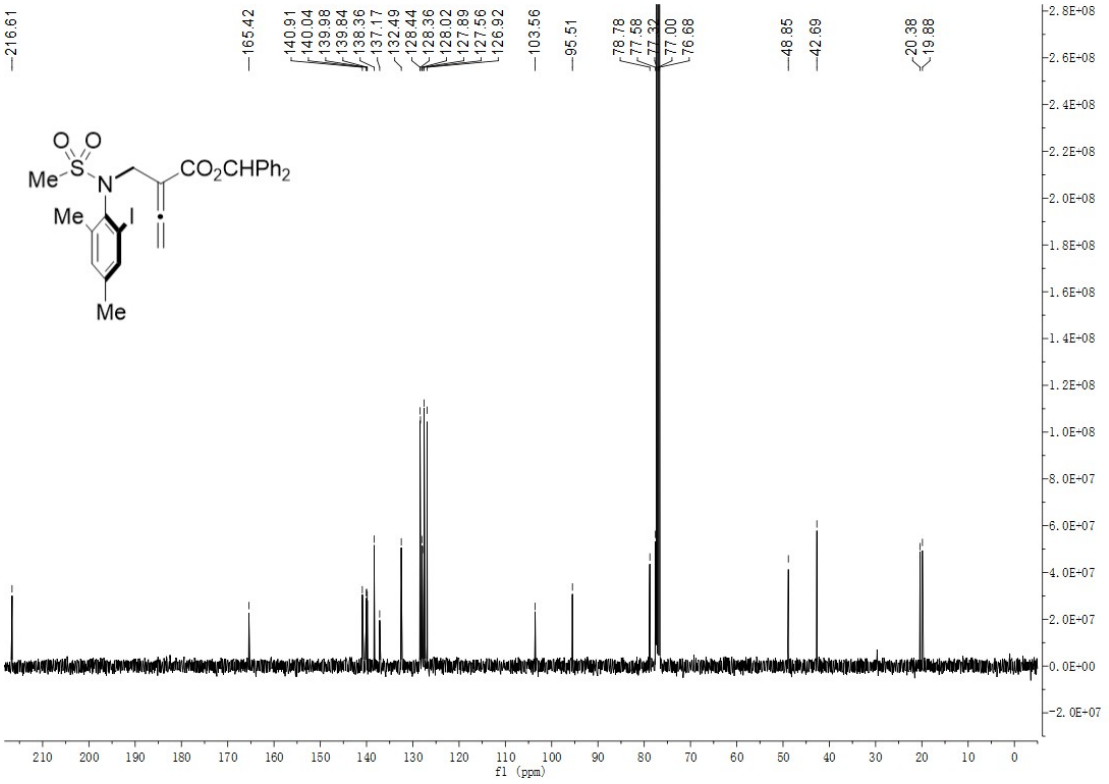

216.73
164.81
145.38
141.94
139.98
139.84
139.72
138.92
132.10
128.95
128.77
128.30
127.82
127.71
127.30
127.26
127.18
96.07
79.25
77.32
77.00
76.68
48.68
20.38
20.09
Ph
Me
I
Me
CO2CHPh2
f1 (ppm)

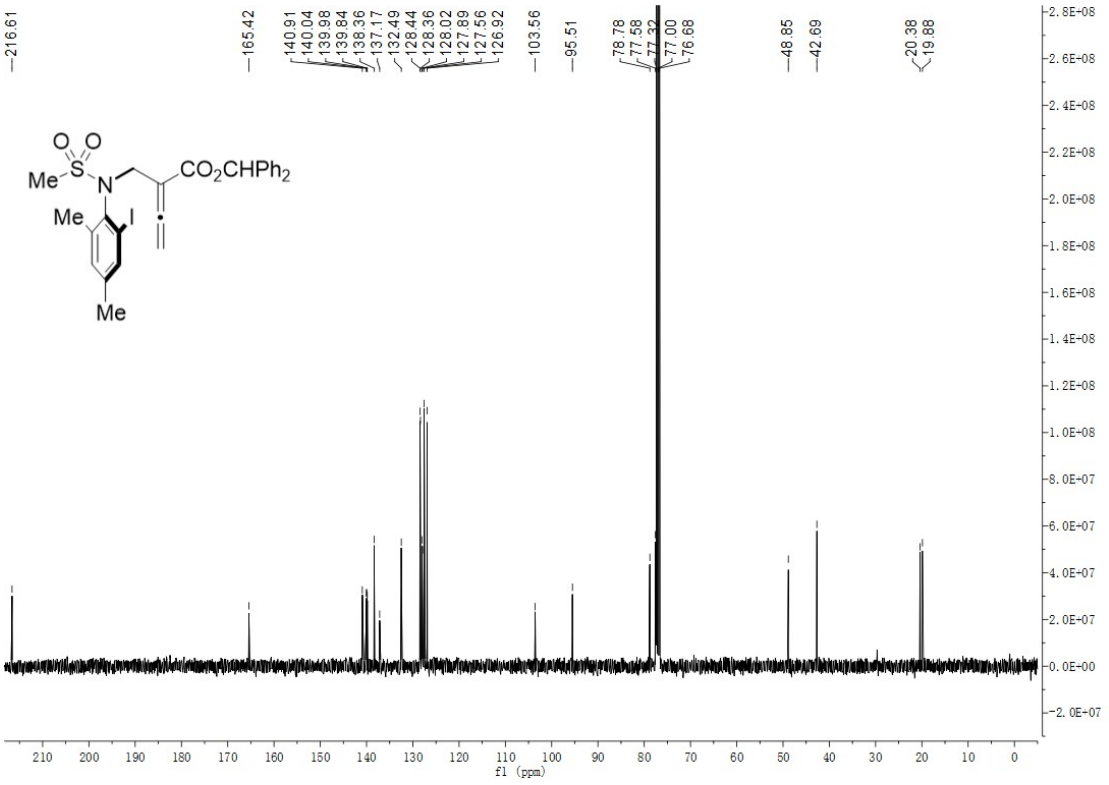
Compound **3u**


7.68
7.66
7.66
7.65
7.64
7.43
7.33
7.33
7.32
7.30
7.29
7.28
7.27
7.27
7.26
7.25
7.24
7.24
7.22
6.83
6.77
5.14
5.10
5.02
4.99
4.57
2.37
2.18
2.02
CO2CHPh2
Me
I
Me
Me
0.99
0.95
1.04
2.08
10.12
1.00
0.96
1.02
0.97
2.00
3.01
3.01
3.04
f1 (ppm)

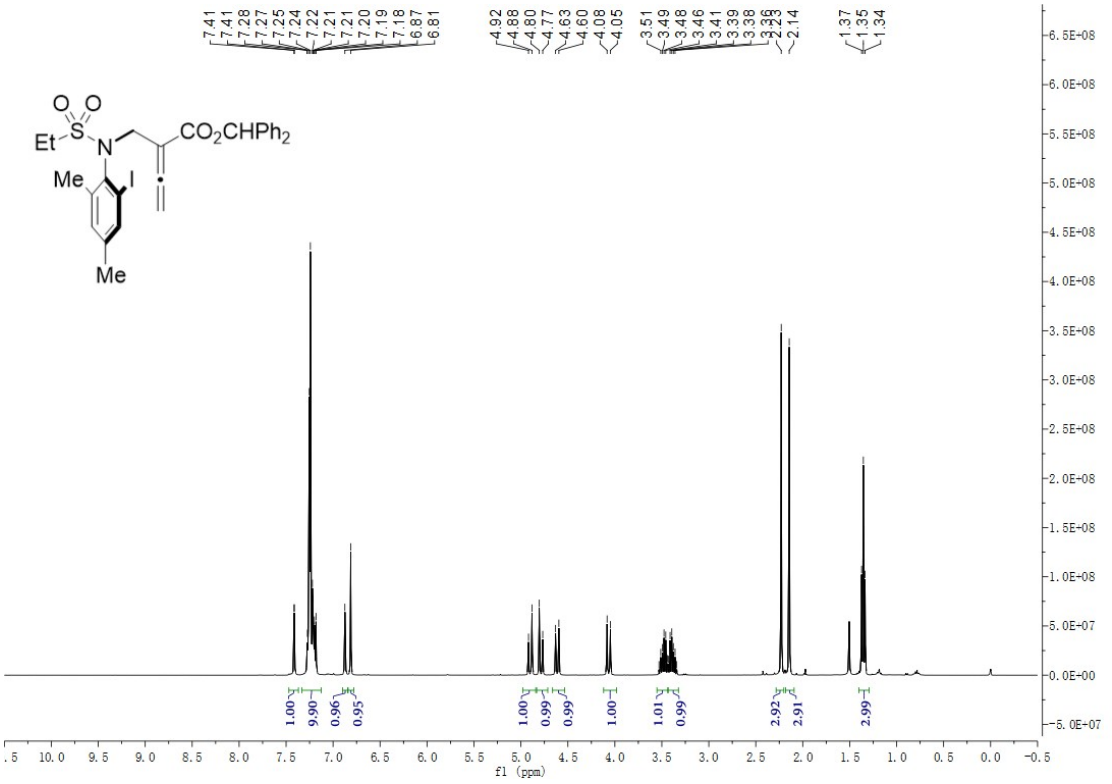

216.76
164.79
140.98
140.05
140.04
139.76
138.93
138.85
133.37
132.06
128.69
128.58
128.31
127.81
127.71
127.16
126.89
96.14
79.20
77.34
77.32
77.00
76.68
48.56
21.27
20.36
20.07
CO2CHPh2
Me
I
Me
Me
f1 (ppm)

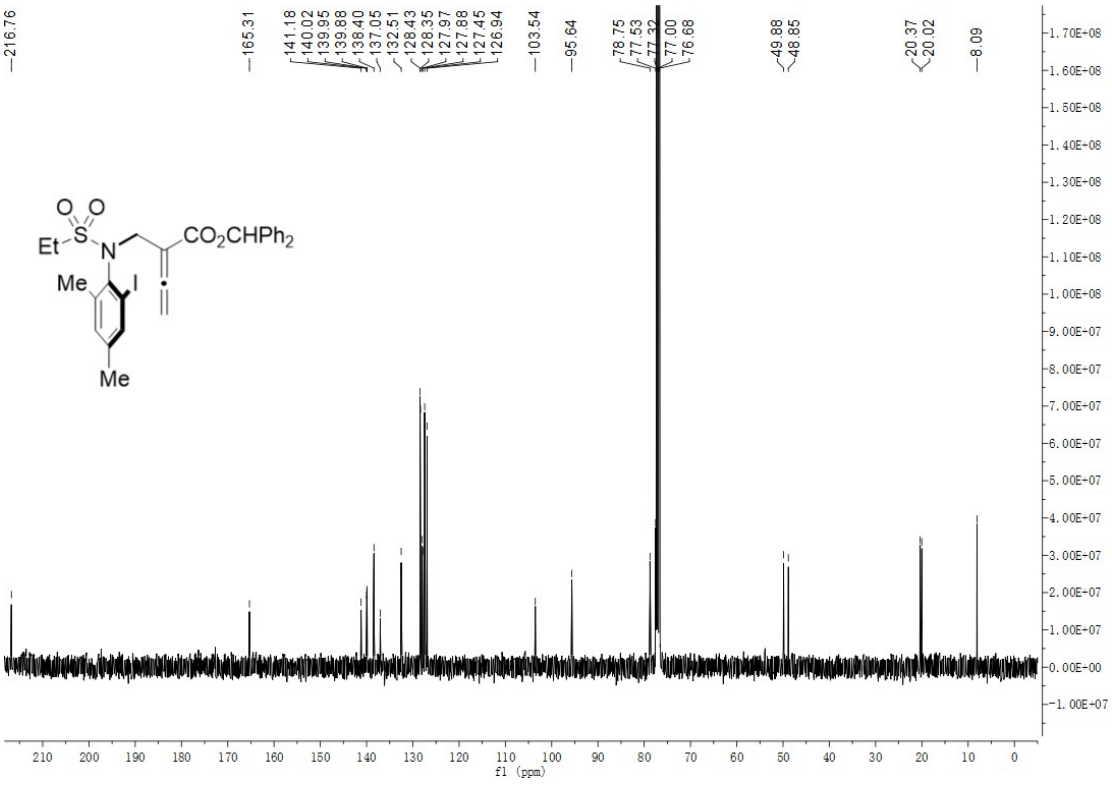
Compound **3v**


216.61
165.42
140.91
140.04
139.98
139.84
138.36
137.17
132.49
128.44
128.36
128.02
127.89
127.56
126.92
103.56
95.51
78.78
77.58
77.32
77.00
76.68
48.85
42.69
20.38
19.88
Me
Me
I
Me
O
O
S
N
CO2CHPh2
f1 (ppm)

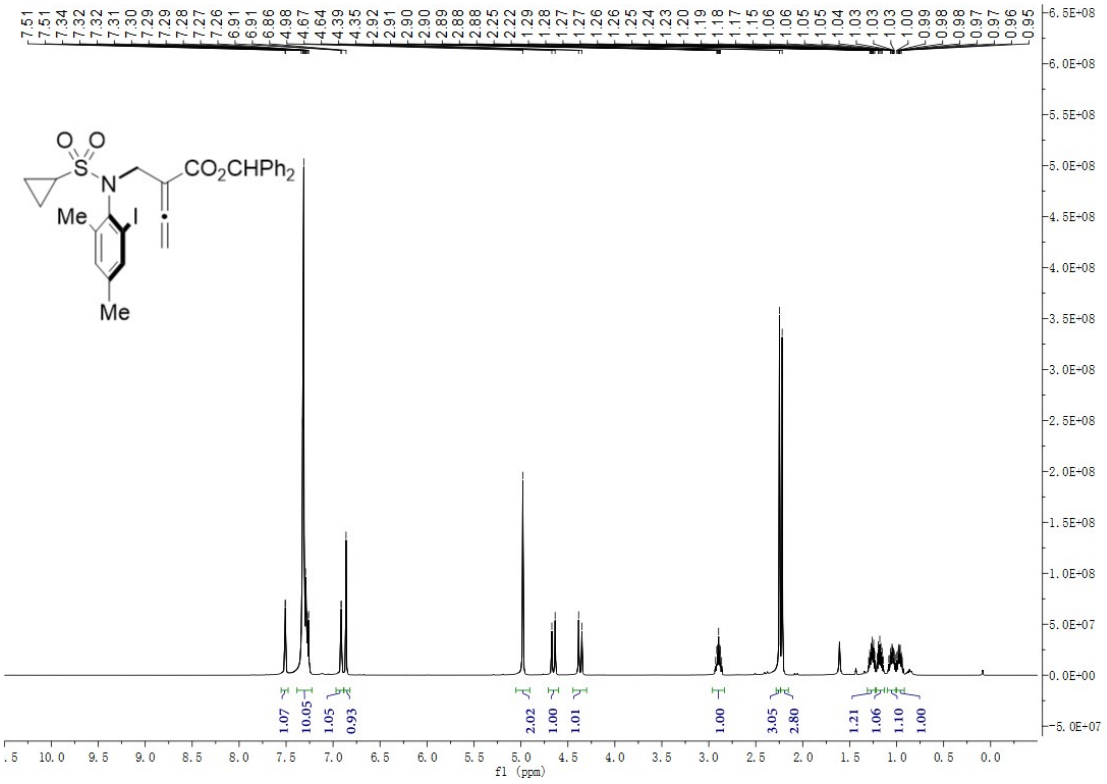

216.61
165.42
140.91
140.04
139.98
139.84
138.36
137.17
132.49
128.44
128.36
128.02
127.89
127.56
126.92
103.56
95.51
78.78
77.58
77.32
77.00
76.68
48.85
42.69
20.38
19.88
Me
Me
I
Me
O
O
S
N
CO2CHPh2
f1 (ppm)

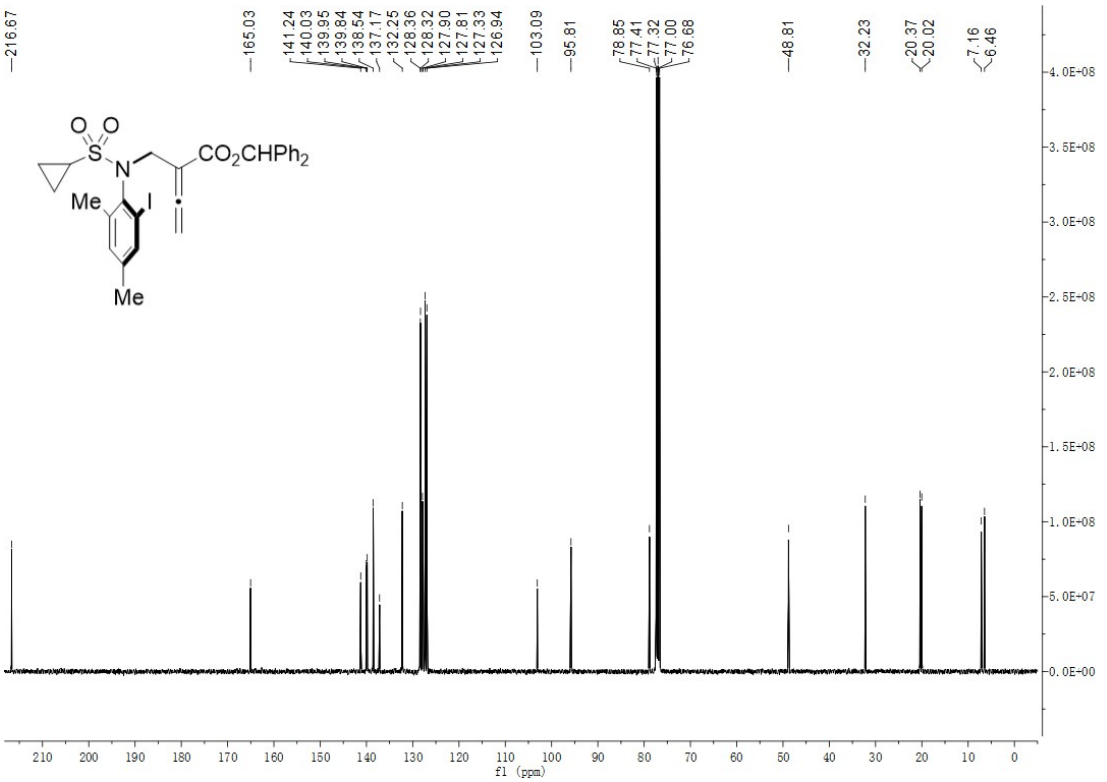
Compound **3w**


7.41
7.41
7.28
7.27
7.25
7.24
7.22
7.21
7.21
7.20
7.19
7.18
6.87
6.81
4.92
4.88
4.80
4.77
4.63
4.60
4.08
4.05
3.51
3.49
3.48
3.46
3.41
3.39
3.38
3.36
2.23
2.14
1.37
1.35
1.34
Et
S
N
O
O
CO2CHPh2
Me
I
Me
1.00
9.90
0.96
0.95
1.00
0.99
0.99
1.00
1.01
0.99
2.92
2.91
2.99
f1 (ppm)

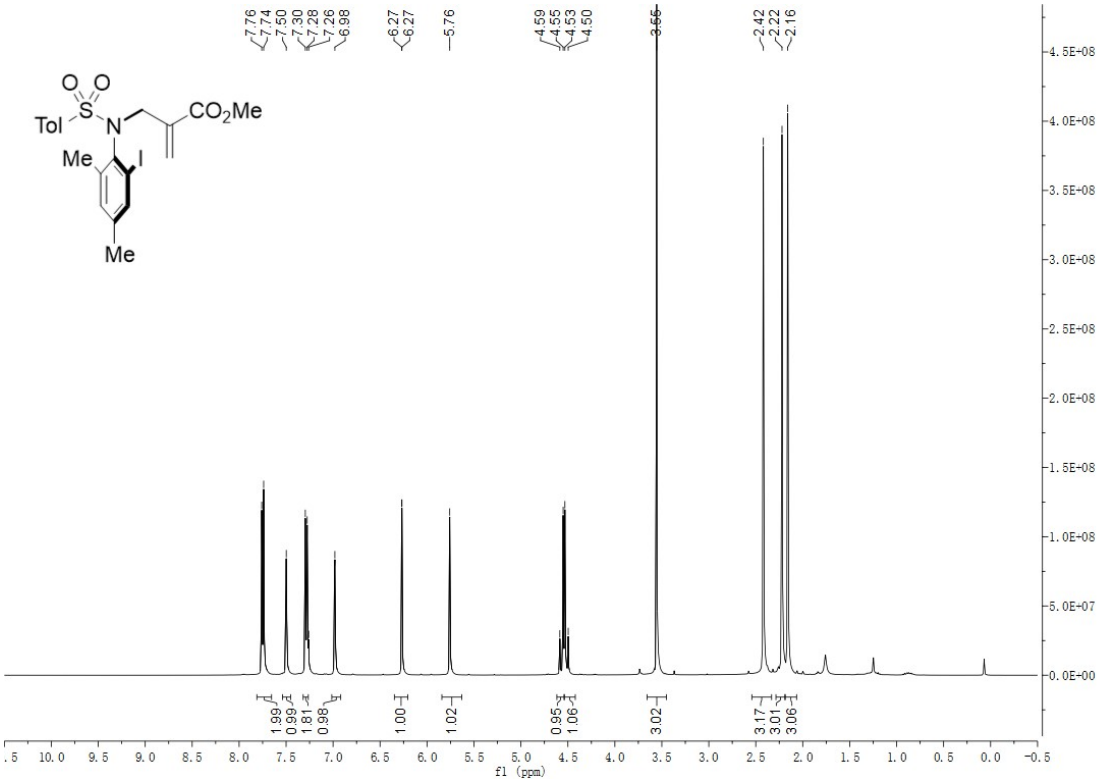

216.76
165.31
141.18
140.02
139.95
139.88
138.40
137.05
132.51
128.43
128.35
127.97
127.88
127.45
126.94
103.54
95.64
78.75
77.53
77.32
77.00
76.68
49.88
48.85
20.37
20.02
8.09
Et
S
N
O
O
CO2CHPh2
Me
I
Me
f1 (ppm)

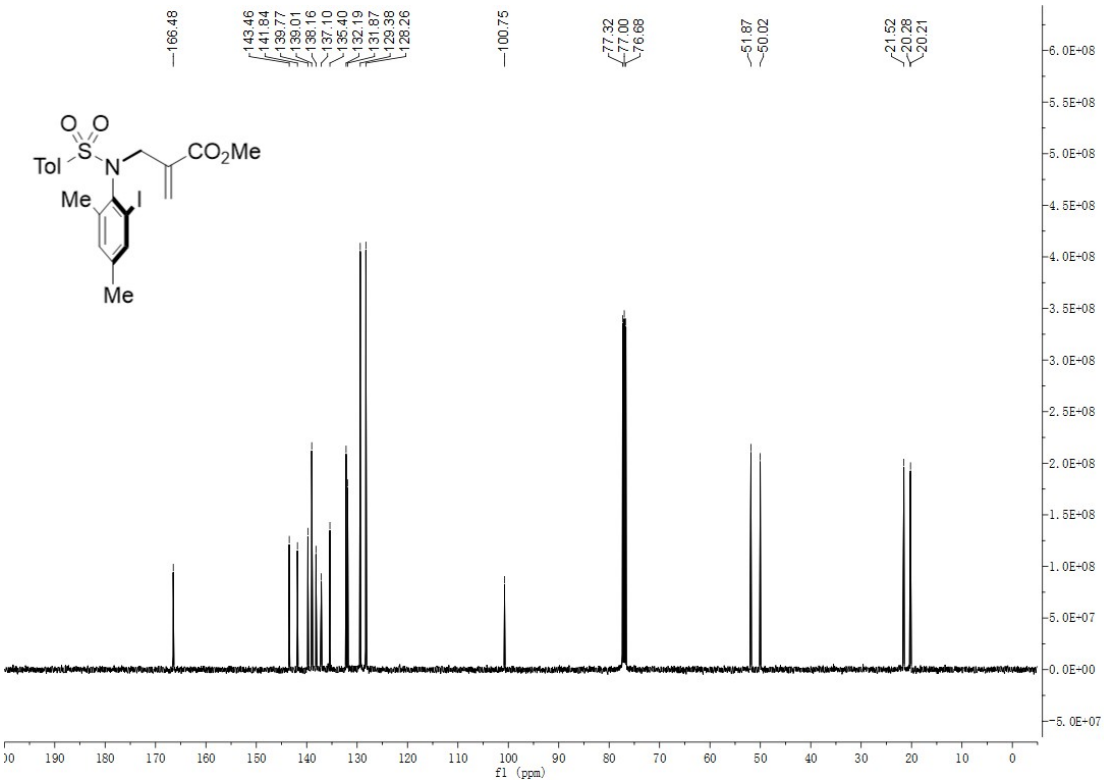
Compound **3x**


7.51
7.51
7.34
7.32
7.32
7.31
7.30
7.29
7.29
7.28
7.27
7.26
6.91
6.91
6.86
4.98
4.67
4.64
4.39
4.35
2.92
2.91
2.90
2.90
2.89
2.88
2.88
2.25
2.22
1.29
1.28
1.27
1.27
1.26
1.26
1.25
1.24
1.23
1.20
1.19
1.18
1.17
1.15
1.06
1.06
1.05
1.05
1.04
1.03
1.03
1.03
1.00
0.99
0.98
0.98
0.97
0.97
0.96
0.95
O
O
S
N
CO2CHPh2
Me
I
Me
1.07
10.05
1.05
0.93
2.02
1.00
1.01
1.00
3.05
2.80
1.21
1.06
1.10
1.00
f1 (ppm)

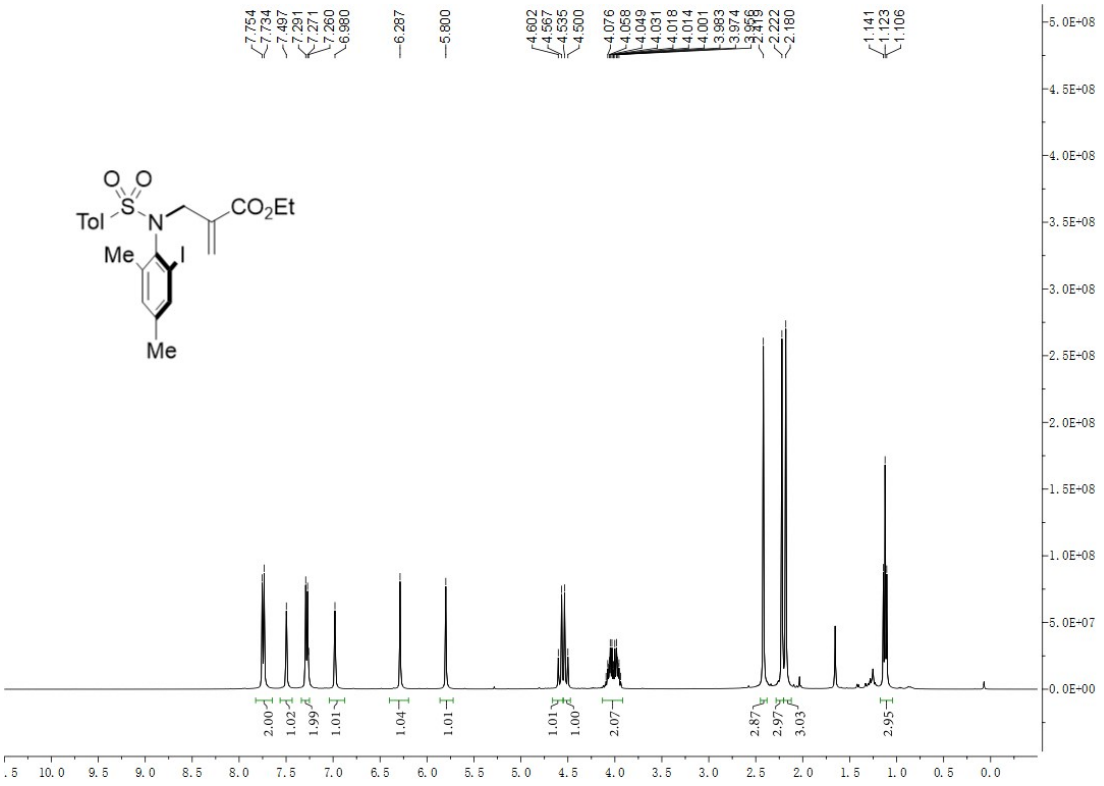

216.67
165.03
141.24
140.03
139.95
139.84
138.54
137.17
132.25
128.36
128.32
127.90
127.81
127.33
126.94
103.09
95.81
78.85
77.41
77.32
77.00
76.68
48.81
32.23
20.37
20.02
7.16
6.46
O
O
S
N
CO2CHPh2
Me
I
Me
f1 (ppm)

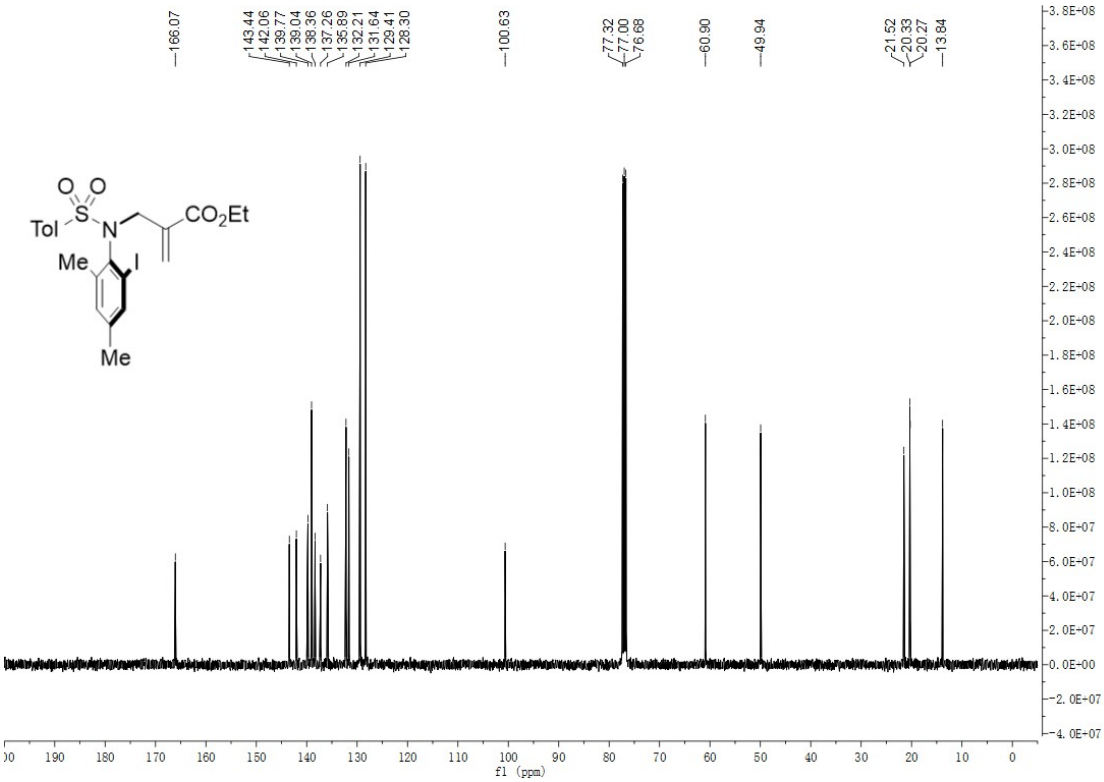
Compound **5a**


7.76
7.74
7.50
7.30
7.28
7.26
6.98
6.27
6.27
5.76
4.59
4.55
4.53
4.50
3.65
2.42
2.22
2.16
Tol
O
O
S
N
CO2Me
Me
I
Me
1.99
0.99
1.81
0.98
1.00
1.02
0.95
1.06
3.02
3.17
3.01
3.06
f1 (ppm)

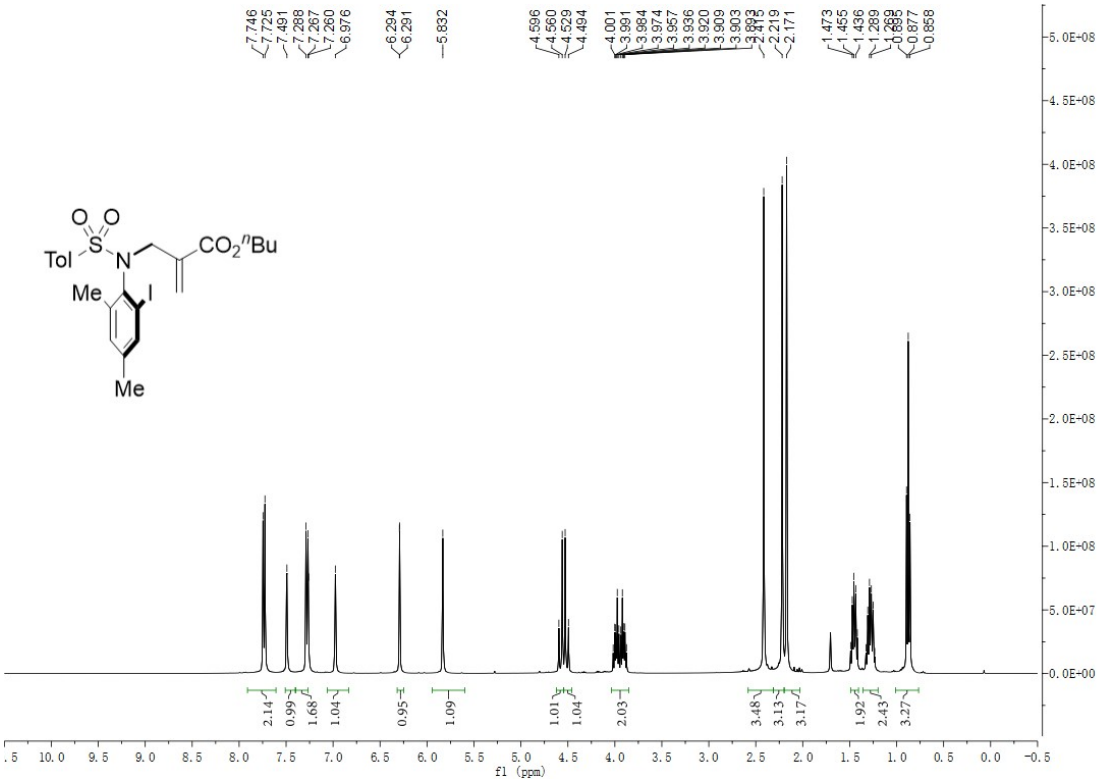

166.48
143.46
141.84
139.77
139.01
138.16
137.10
135.40
132.19
131.87
129.38
128.26
100.75
77.32
77.00
76.68
51.87
50.02
21.52
20.28
20.21
Tol
O
O
S
N
CO2Me
Me
I
Me
f1 (ppm)

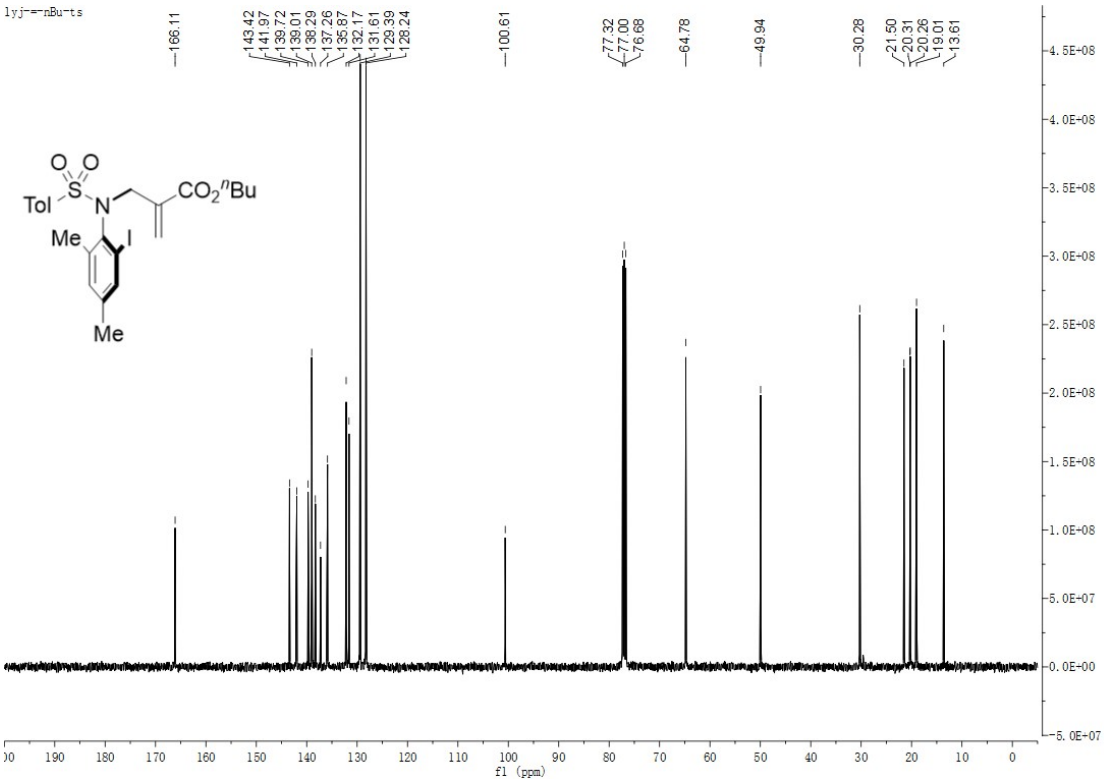
Compound **5b**


7.754
7.734
7.497
7.291
7.271
7.260
6.980
6.287
5.800
4.602
4.567
4.535
4.500
4.076
4.058
4.049
4.031
4.018
4.014
4.001
3.983
3.974
2.222
2.180
1.141
1.123
1.106
Tol
Me
I
Me
CO2Et
2.00
1.02
1.99
1.01
1.04
1.01
1.01
1.00
2.07
2.87
2.97
3.03
2.95

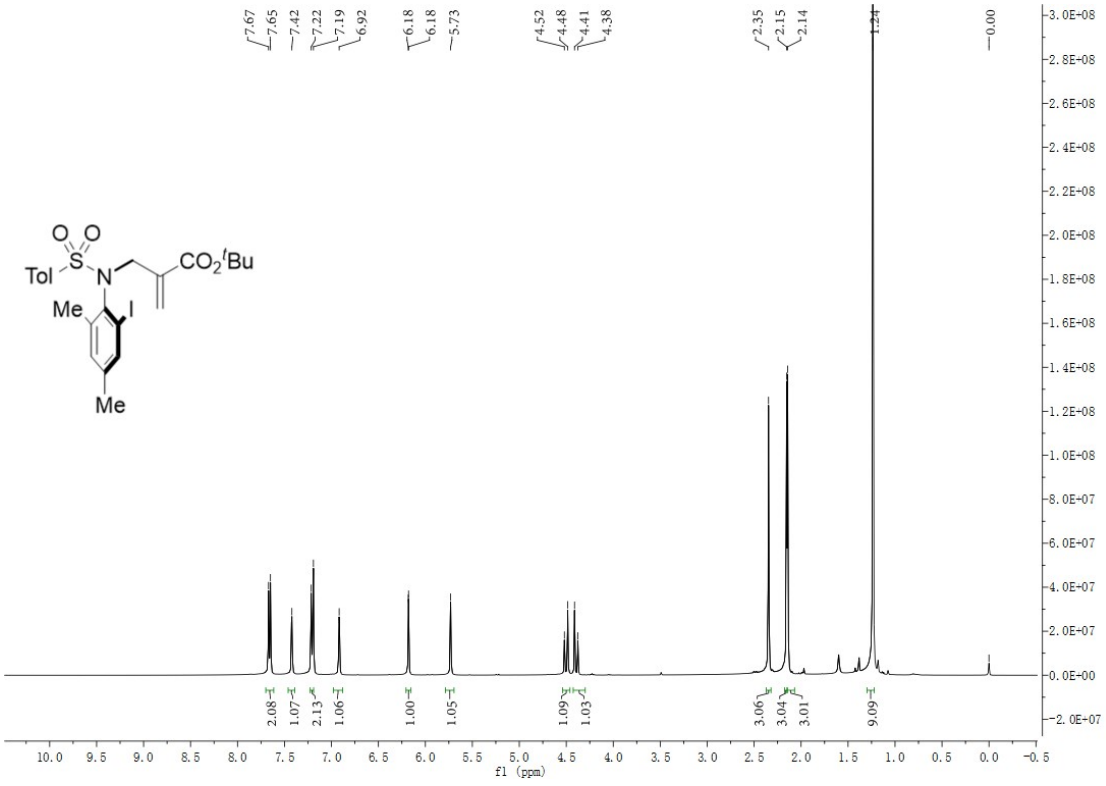

166.07
143.44
142.06
139.77
139.04
138.36
137.26
135.89
132.21
131.64
129.41
128.30
100.63
77.32
77.00
76.68
60.90
49.94
21.52
20.33
20.27
13.84
Tol
Me
I
Me
CO2Et
f1 (ppm)

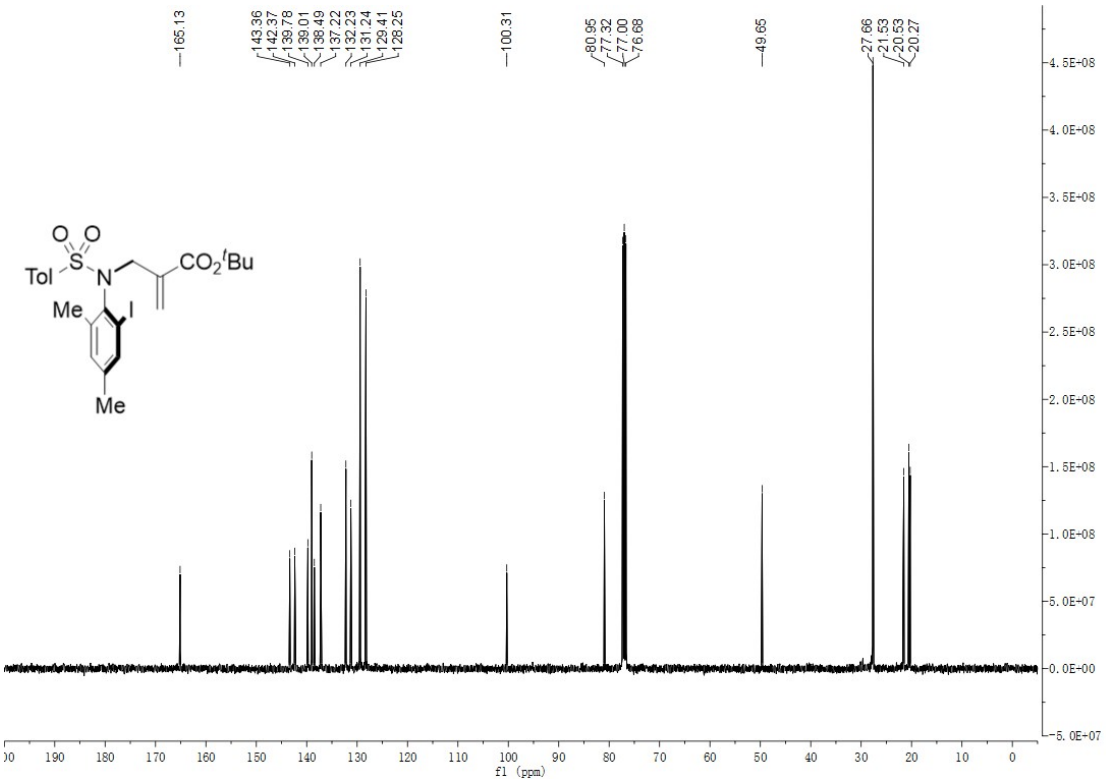
Compound **5c**


7.746
7.725
7.491
7.288
7.267
7.260
6.976
6.294
6.291
5.832
4.596
4.560
4.529
4.494
4.001
3.991
3.984
3.974
3.957
3.936
3.920
3.909
3.903
2.415
2.219
2.171
1.473
1.455
1.436
1.289
0.895
0.877
0.858
Tol
Me
I
Me
CO2nBu
2.14
0.99
1.68
1.04
0.95
1.09
1.01
1.04
2.03
3.48
3.13
3.17
1.92
2.43
3.27
f1 (ppm)

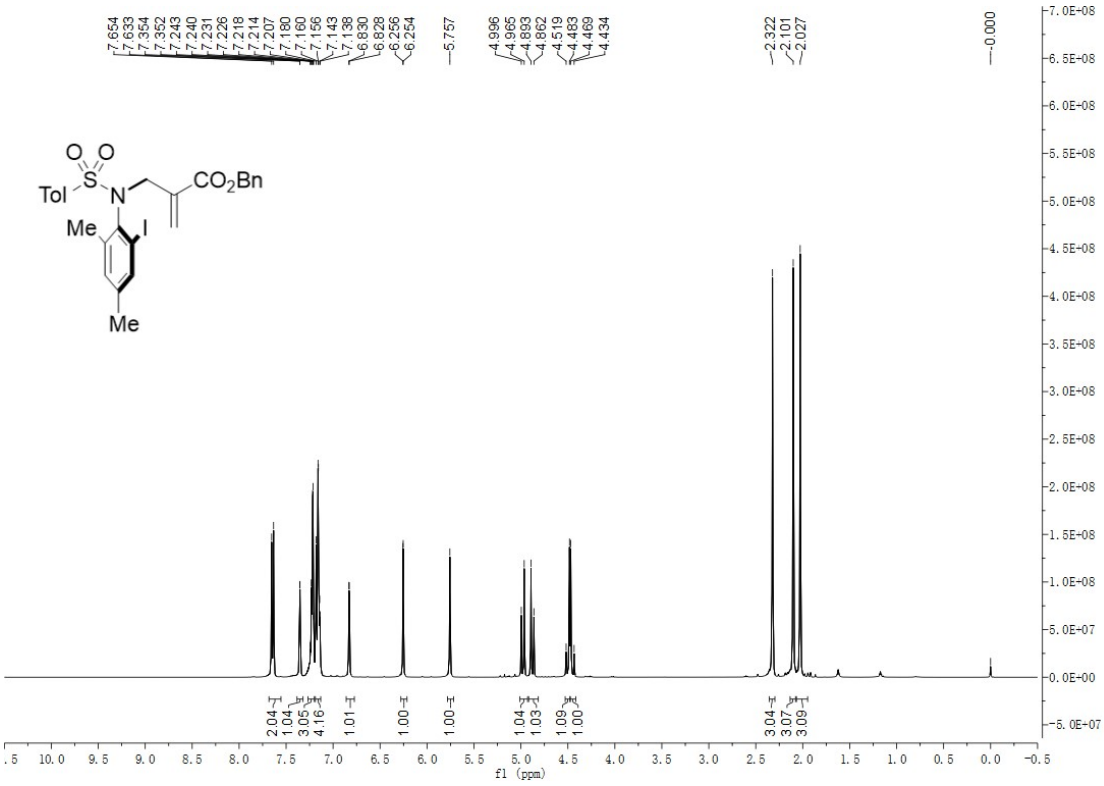

lyj-=-nBu-ts
166.11
143.42
141.97
139.72
139.01
138.29
137.26
135.87
132.17
131.61
129.39
128.24
100.61
77.32
77.00
76.68
64.78
49.94
30.28
21.50
20.31
20.26
19.01
13.61
Tol
Me
I
Me
CO2nBu
f1 (ppm)

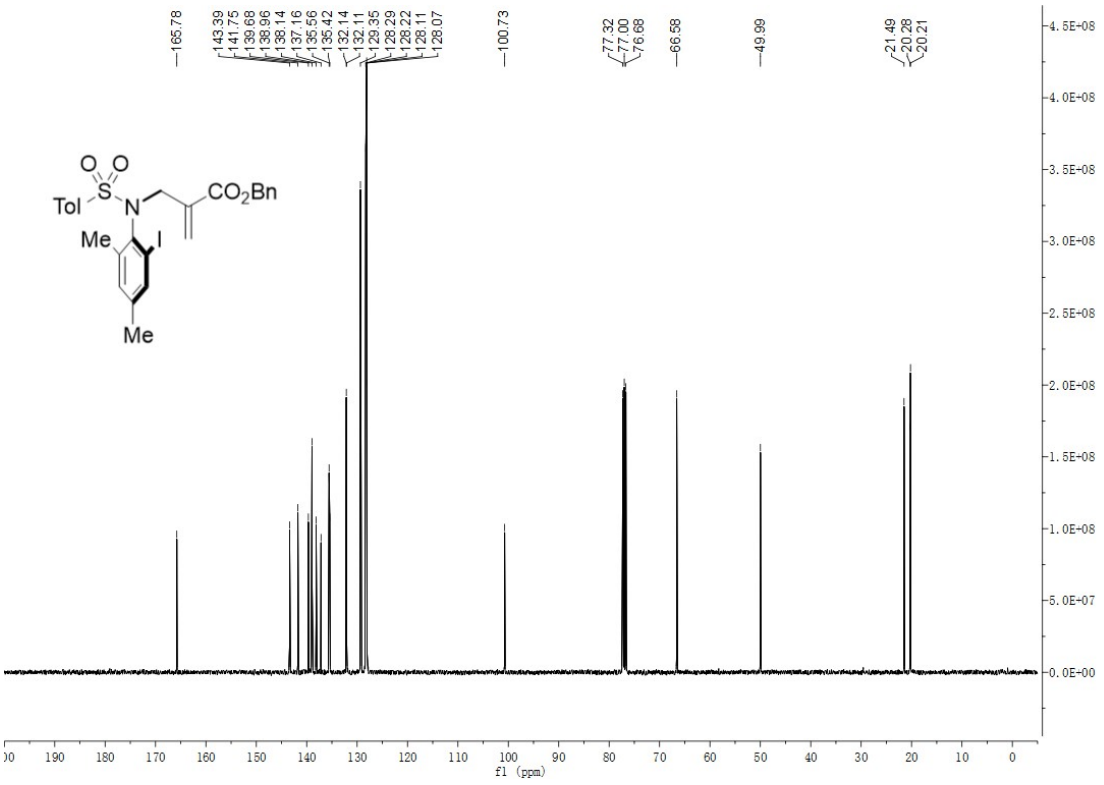
Compound **5d**


7.67
7.65
7.42
7.22
7.19
6.92
6.18
6.18
5.73
4.52
4.48
4.41
4.38
2.35
2.15
2.14
1.24
0.00
Tol
Me
I
Me
CO2tBu
2.08
1.07
2.13
1.06
1.00
1.05
1.09
1.03
3.06
3.04
3.01
9.09
f1 (ppm)

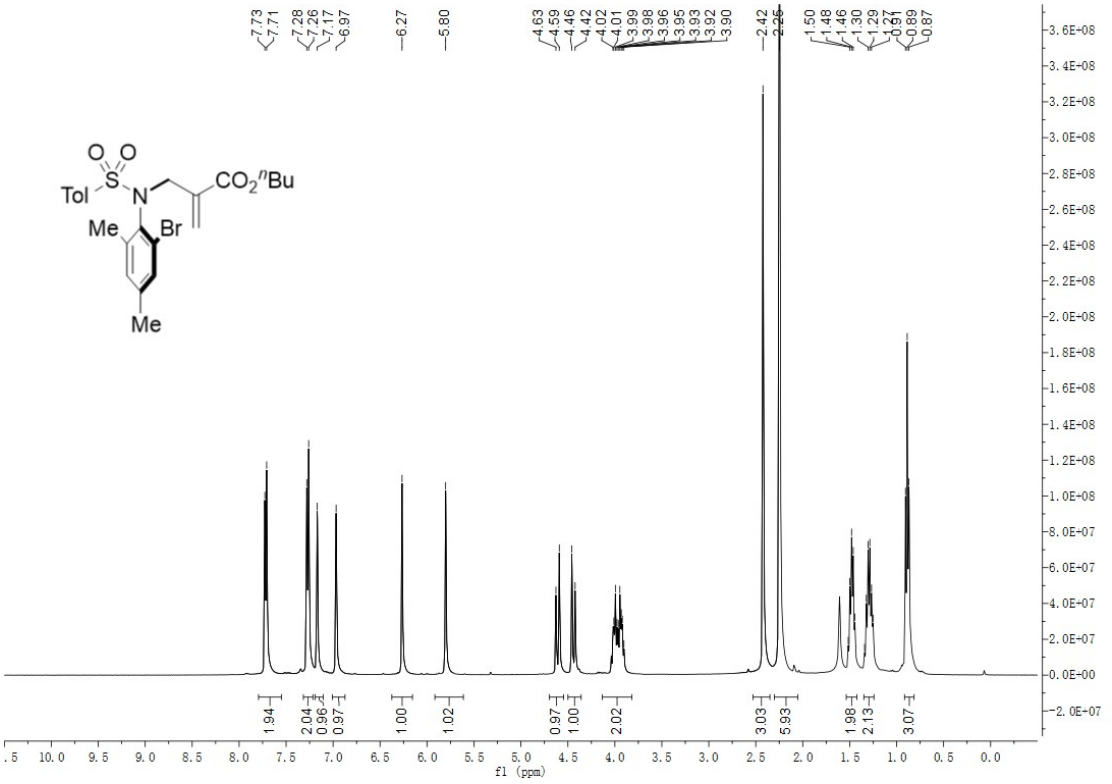

165.13
143.36
142.37
139.78
139.01
138.49
137.22
132.23
131.24
129.41
128.25
100.31
80.95
77.32
77.00
76.68
49.65
27.66
21.53
20.53
20.27
Tol
Me
I
Me
CO2tBu
f1 (ppm)

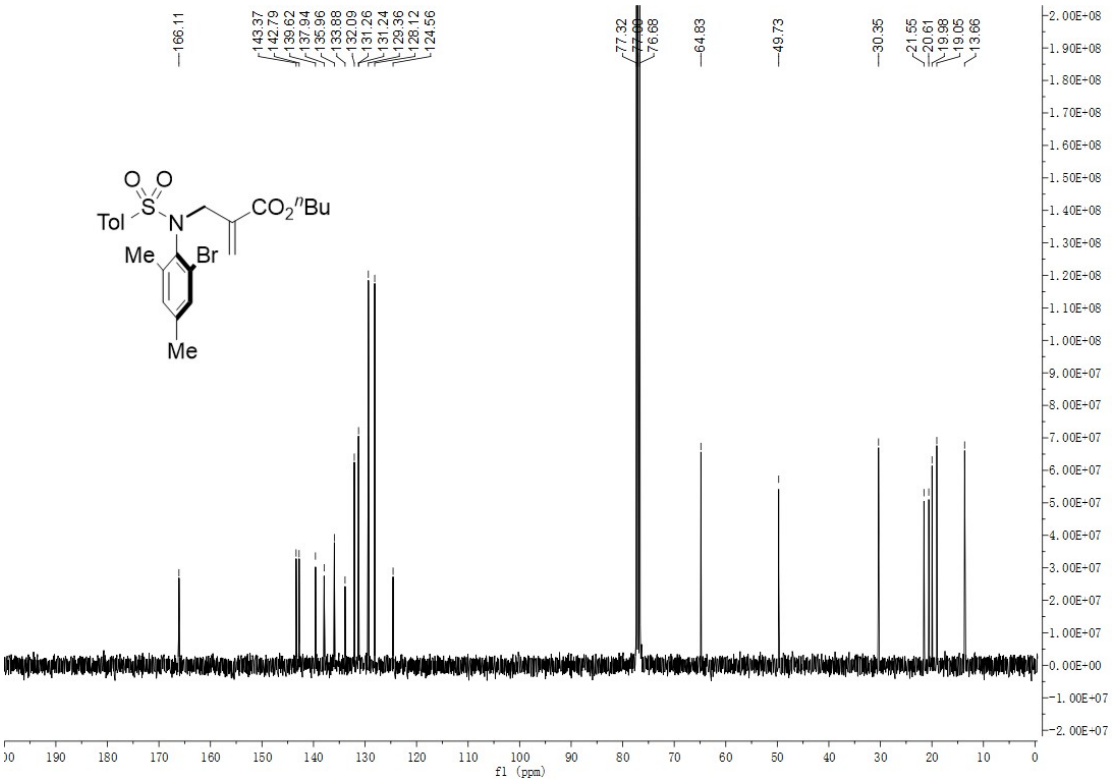
Compound **5e**


7.654
7.633
7.354
7.352
7.243
7.240
7.231
7.226
7.218
7.214
7.207
7.180
7.160
7.156
7.143
7.138
6.830
6.828
6.256
6.254
5.757
4.996
4.965
4.893
4.862
4.519
4.483
4.469
4.434
2.322
2.101
2.027
0.000
Tol
CO2Bn
Me
I
Me
2.04
1.04
3.05
4.16
1.01
1.00
1.00
1.04
1.03
1.09
1.00
3.04
3.07
3.09
f1 (ppm)

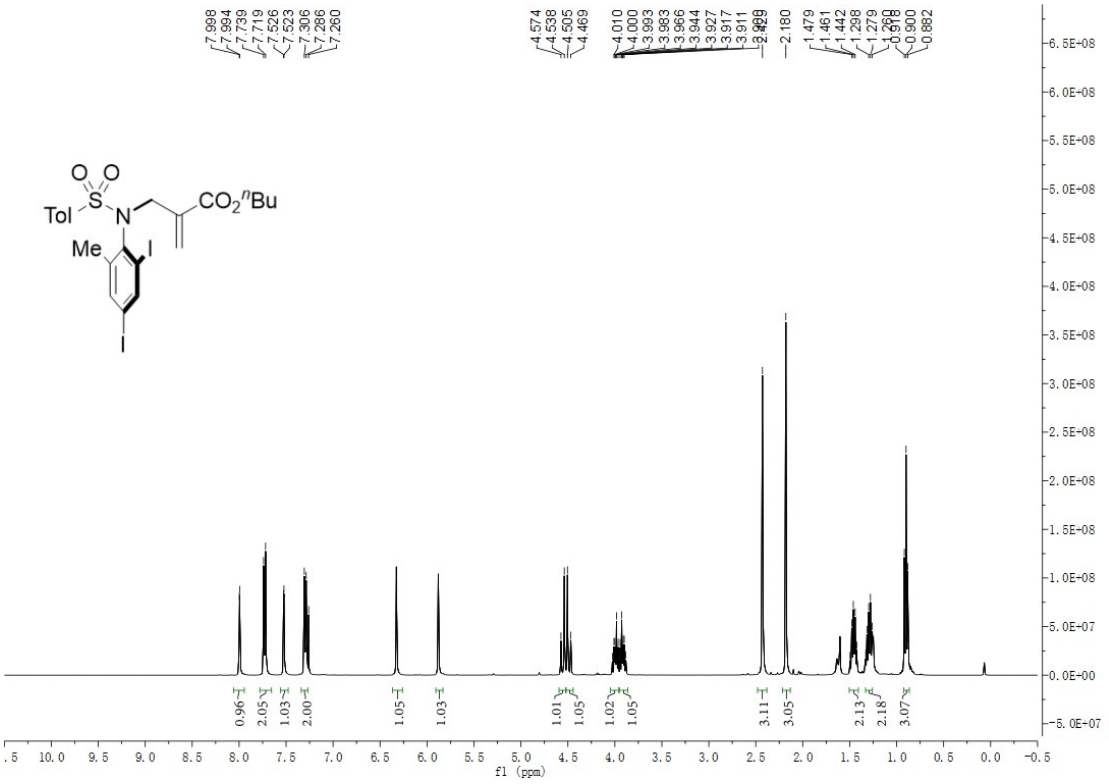

165.78
143.39
141.75
139.68
138.96
138.14
137.16
135.56
135.42
132.14
132.11
129.35
128.29
128.22
128.11
128.07
100.73
77.32
77.00
76.68
66.58
49.99
21.49
20.28
20.21
Tol
CO2Bn
Me
I
Me
f1 (ppm)

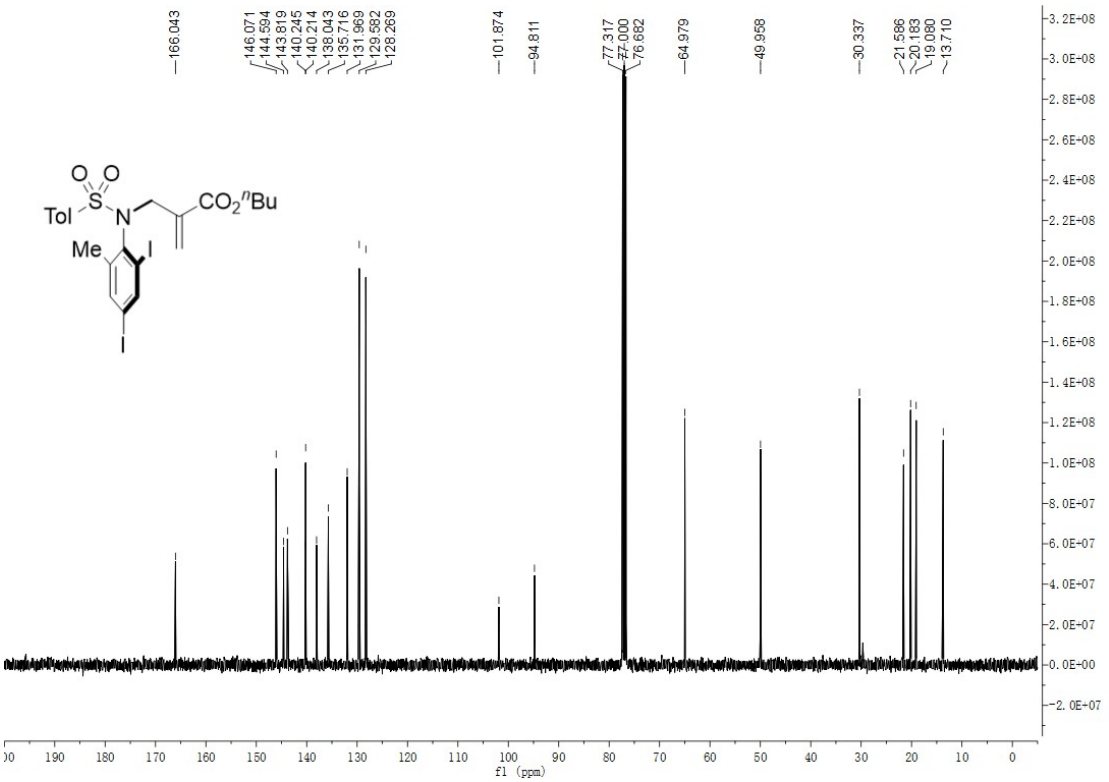
Compound **5f**


7.73
7.71
7.28
7.26
7.17
6.97
6.27
5.80
4.63
4.59
4.46
4.42
4.02
4.01
3.99
3.98
3.96
3.95
3.93
3.92
3.90
2.42
2.26
1.50
1.48
1.46
1.30
1.29
0.91
0.89
0.87
Tol
Me
Br
Me
CO2nBu
1.94
2.04
0.96
0.97
1.00
1.02
0.97
1.00
2.02
3.03
5.93
1.98
2.13
3.07
f1 (ppm)

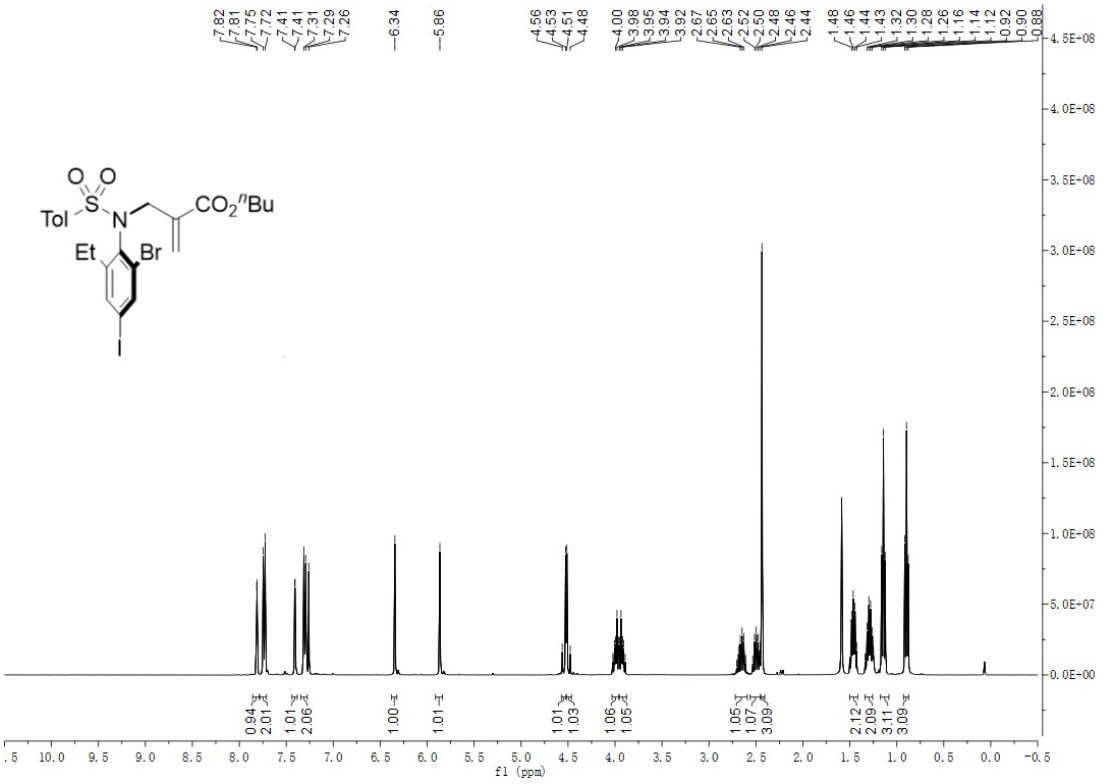

166.11
143.37
142.79
139.62
137.94
135.96
133.88
132.09
131.26
131.24
129.36
128.12
124.56
77.32
77.00
76.68
64.83
49.73
30.35
21.55
20.61
19.98
19.05
13.66
Tol
Me
Br
Me
CO2nBu
f1 (ppm)

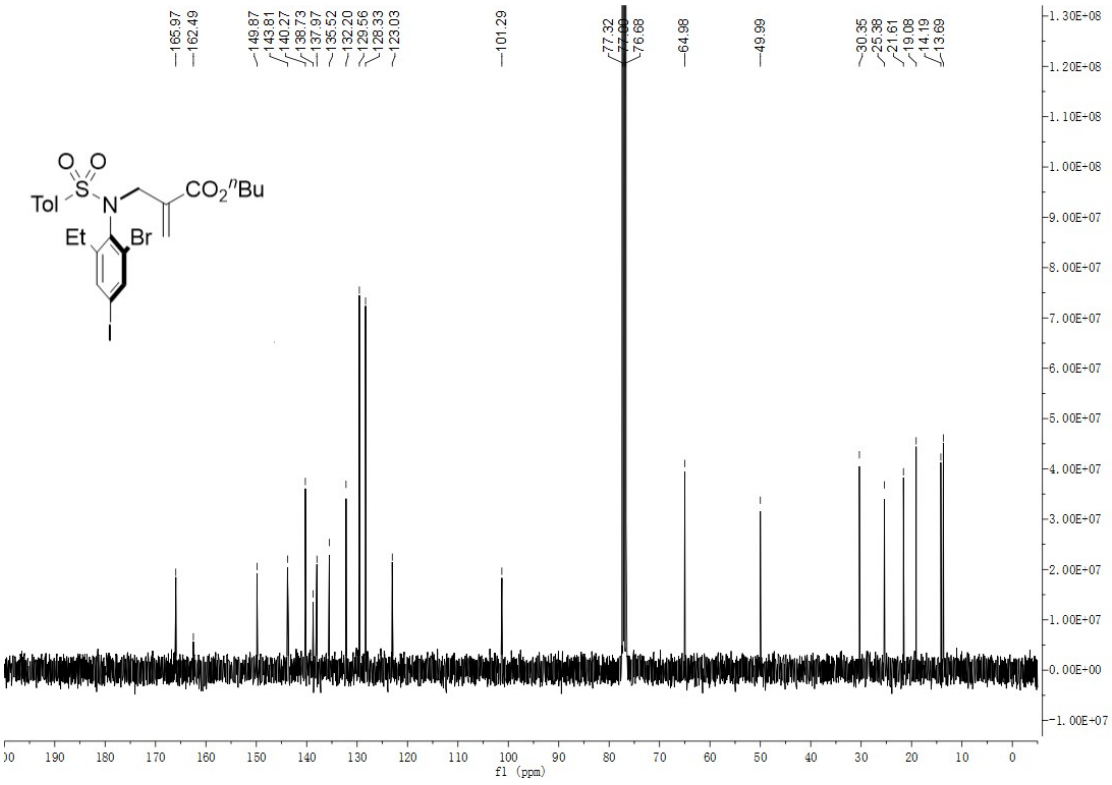
Compound **5g**


7.998
7.994
7.739
7.719
7.526
7.523
7.306
7.286
7.260
4.574
4.538
4.505
4.469
4.010
4.000
3.993
3.983
3.966
3.944
3.927
3.917
3.911
2.180
1.479
1.461
1.442
1.298
1.279
0.900
0.882
Tol
Me
I
I
O
O
S
N
CO2nBu
0.96
2.05
1.03
2.00
1.05
1.03
1.01
1.05
1.02
1.05
3.11
3.05
2.13
2.18
3.07
f1 (ppm)

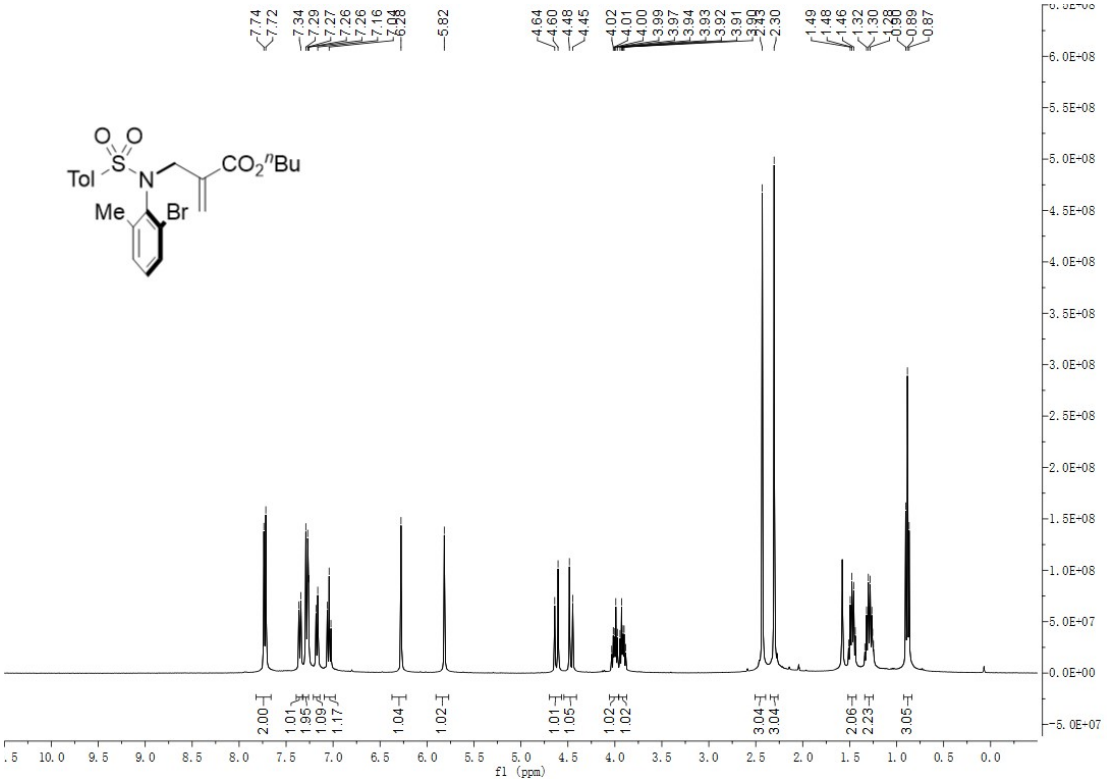

166.043
146.071
144.594
143.819
140.245
140.214
138.043
135.716
131.969
129.582
128.269
101.874
94.811
77.317
77.000
76.682
64.979
49.958
30.337
21.586
20.183
19.080
13.710
Tol
Me
I
I
O
O
S
N
CO2nBu
f1 (ppm)

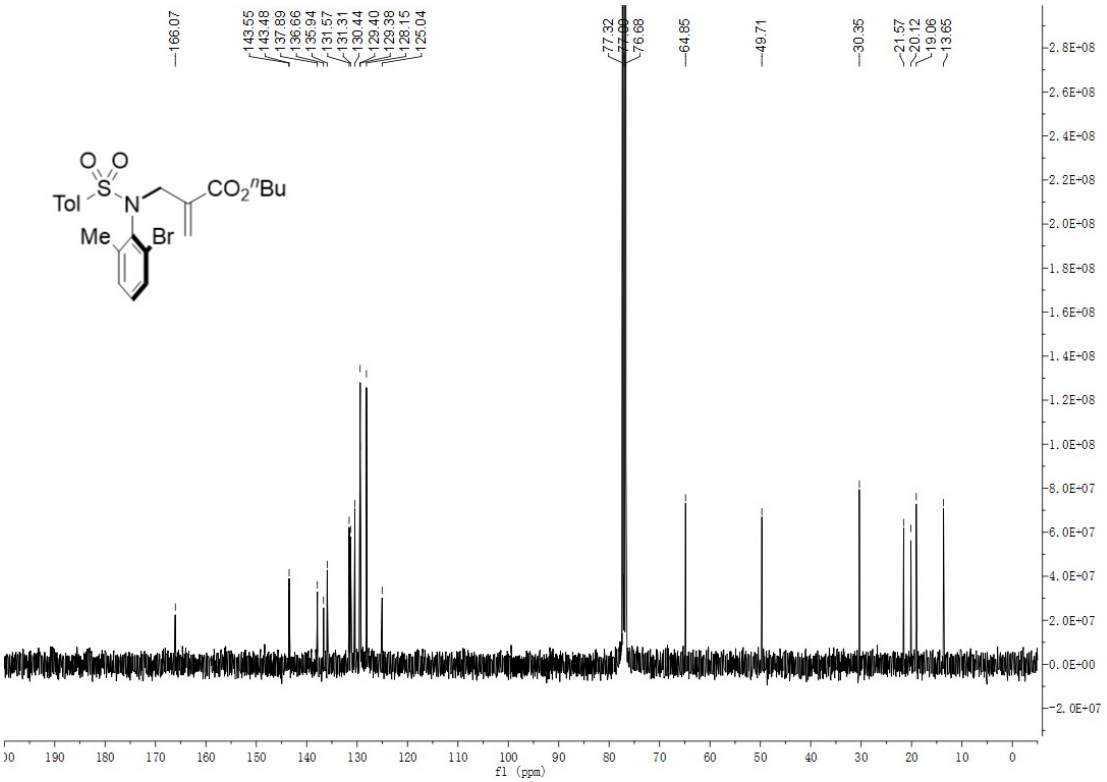
Compound **5h**


7.82
7.81
7.75
7.72
7.41
7.41
7.31
7.29
7.26
6.34
5.86
4.56
4.53
4.51
4.48
4.00
3.98
3.95
3.94
3.92
2.67
2.65
2.63
2.52
2.50
2.48
2.46
2.44
1.48
1.46
1.44
1.43
1.32
1.30
1.28
1.26
1.16
1.14
1.12
0.92
0.90
0.88
Tol
Et
Br
I
CO2nBu
0.94
2.01
1.01
2.06
1.00
1.01
1.01
1.03
1.06
1.05
1.05
1.07
3.09
2.12
2.09
3.11
3.09
f1 (ppm)

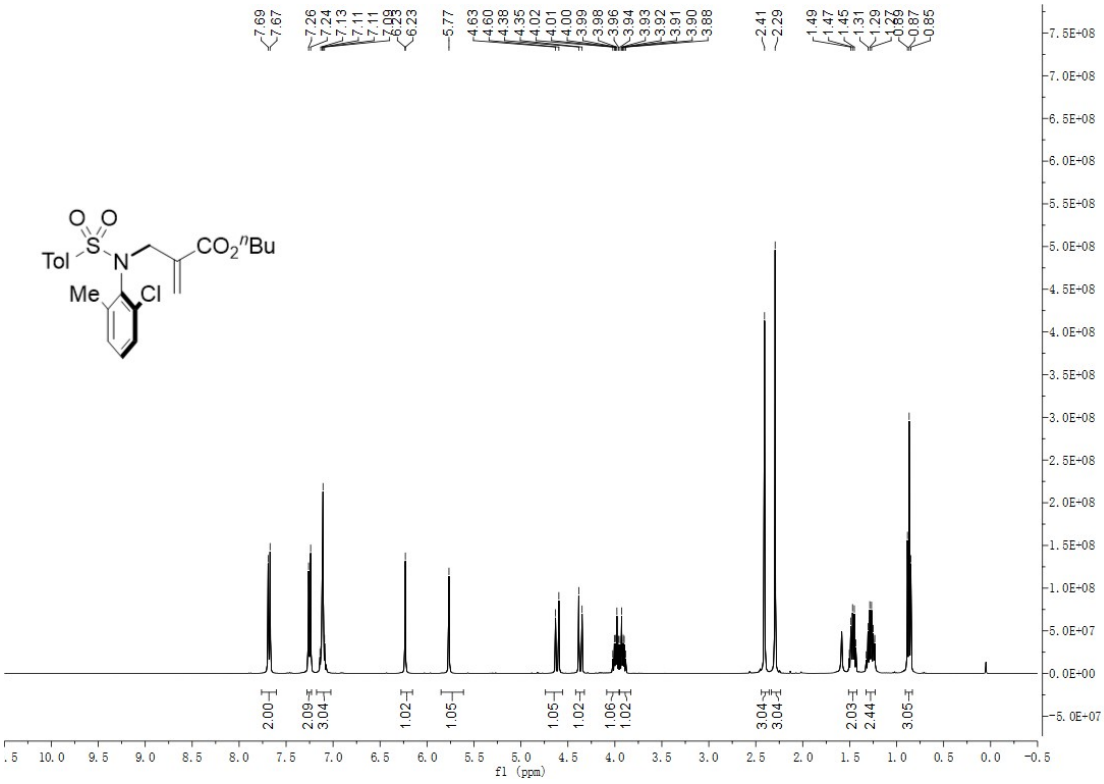

165.97
162.49
149.87
143.61
140.27
138.73
137.97
135.52
132.20
129.56
128.33
123.03
101.29
77.32
77.00
76.68
64.98
49.99
30.35
25.38
21.61
19.08
14.19
13.69
Tol
Et
Br
I
CO2nBu
f1 (ppm)

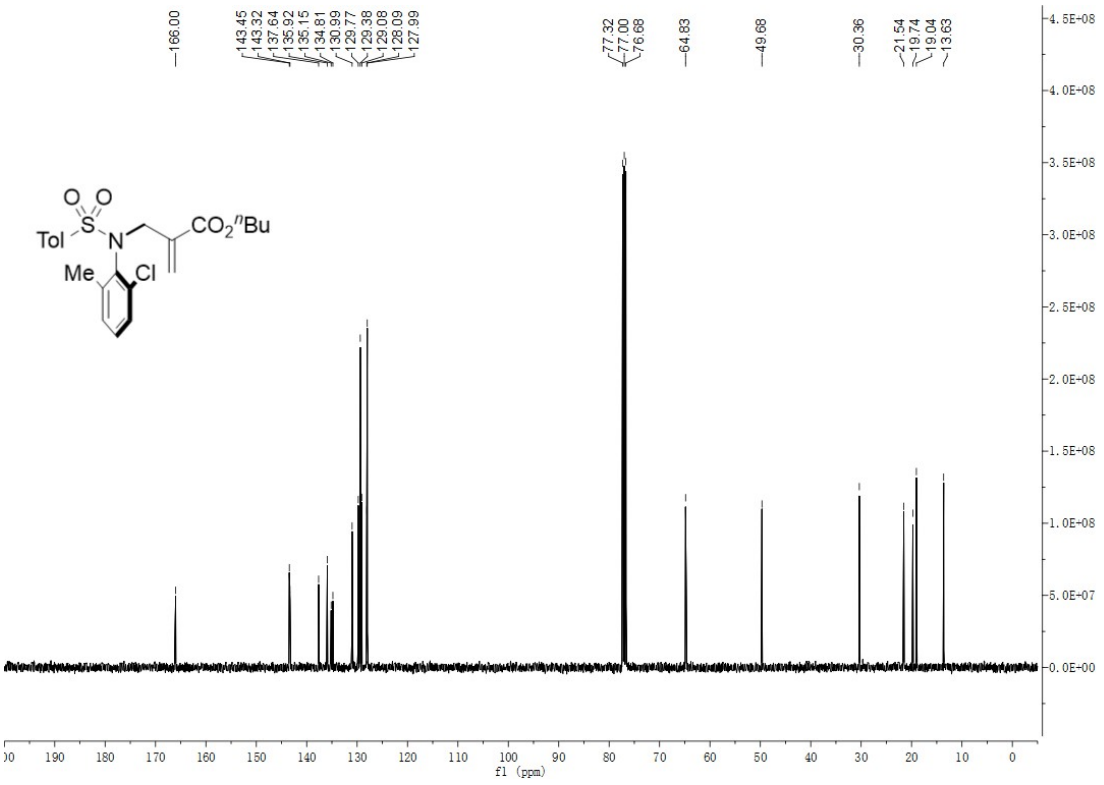
Compound **5i**


7.74
7.72
7.34
7.29
7.27
7.26
7.26
7.16
7.04
6.28
5.82
4.64
4.60
4.48
4.45
4.02
4.01
4.00
3.99
3.97
3.94
3.93
3.92
3.91
2.43
2.30
1.49
1.48
1.46
1.32
1.30
0.89
0.87
Tol
S
N
O
O
CO2nBu
Me
Br
2.00
1.01
1.95
1.09
1.17
1.04
1.02
1.01
1.05
1.02
1.02
3.04
3.04
2.06
2.23
3.05
f1 (ppm)

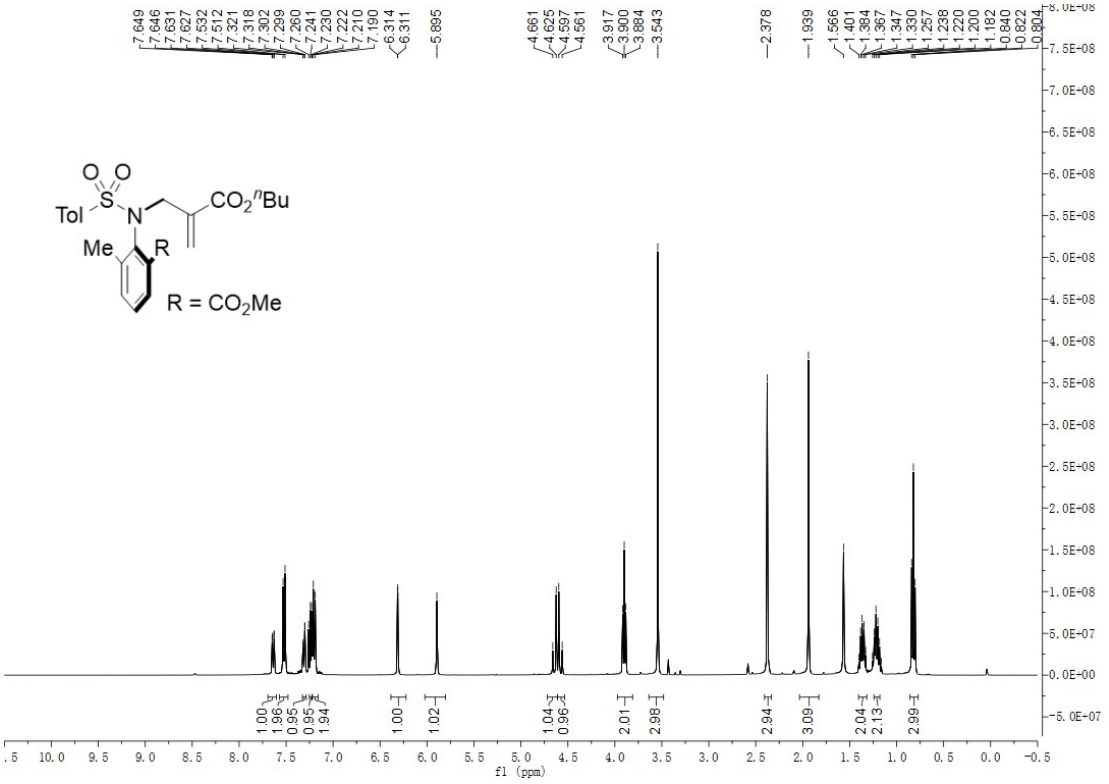

166.07
143.55
143.48
137.89
136.66
135.94
131.57
131.31
130.44
129.40
129.38
128.15
125.04
77.32
77.00
76.68
64.85
49.71
30.35
21.57
20.12
19.06
13.65
Tol
S
N
O
O
CO2nBu
Me
Br
f1 (ppm)

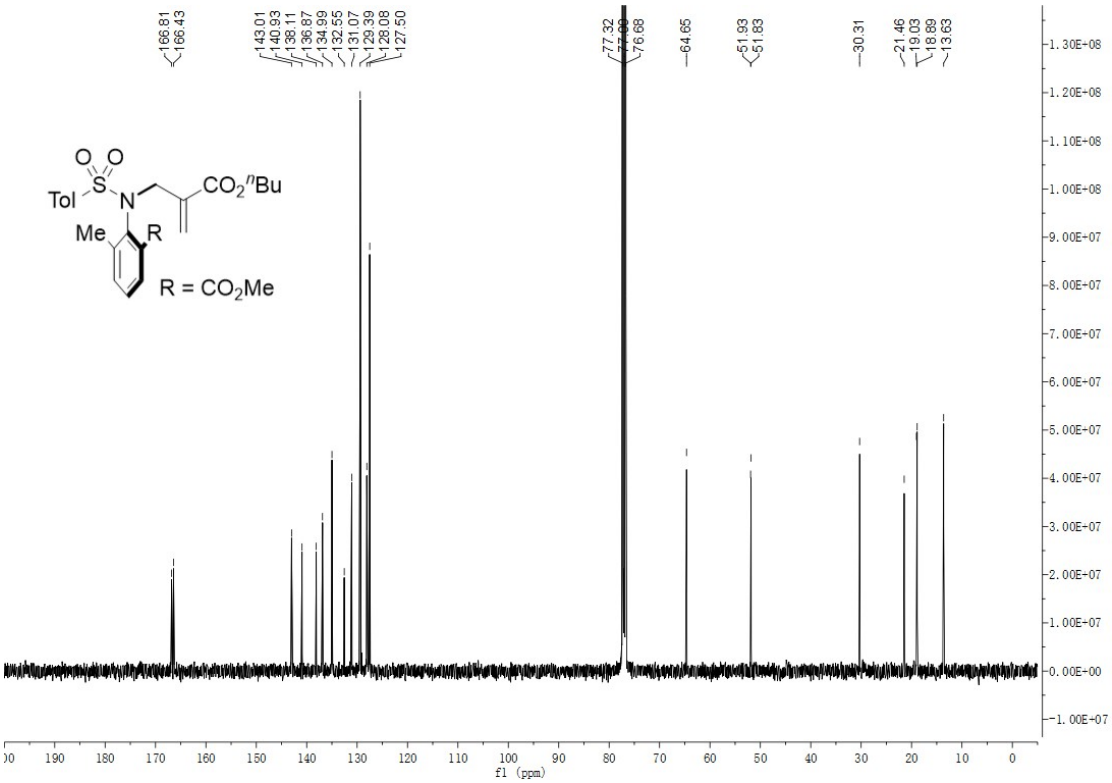
Compound **5j**


7.69
7.67
7.26
7.24
7.13
7.11
7.09
6.23
6.23
5.77
4.63
4.60
4.38
4.35
4.02
4.01
4.00
3.99
3.98
3.96
3.94
3.93
3.92
3.91
3.90
3.88
2.41
2.29
1.49
1.47
1.45
1.31
1.29
1.27
0.89
0.87
0.85
Tol
S
N
O
O
CO2nBu
Me
Cl
2.00
2.09
3.04
1.02
1.05
1.05
1.02
1.06
1.02
3.04
3.04
2.03
2.44
3.05
f1 (ppm)

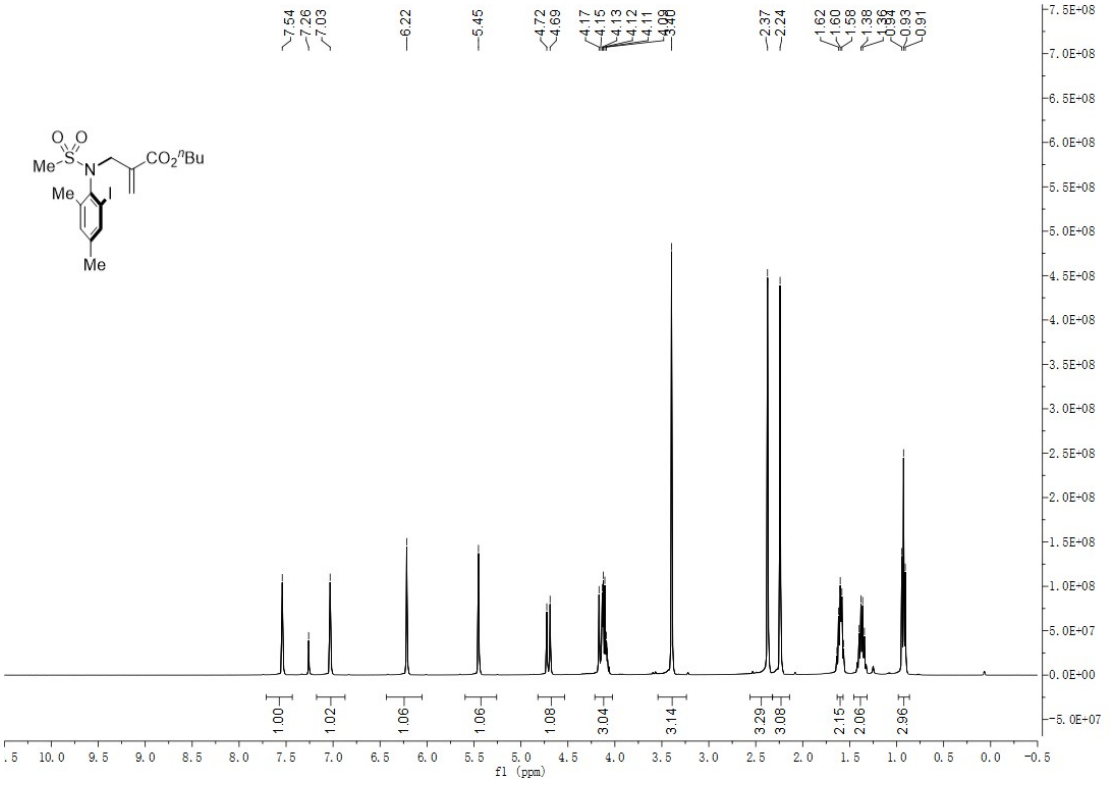

166.00
143.45
143.32
137.64
135.92
135.15
134.81
130.99
129.77
129.38
129.08
128.09
127.99
77.32
77.00
76.68
64.83
49.68
30.36
21.54
19.74
19.04
13.63
Tol
S
N
O
O
CO2nBu
Me
Cl
f1 (ppm)

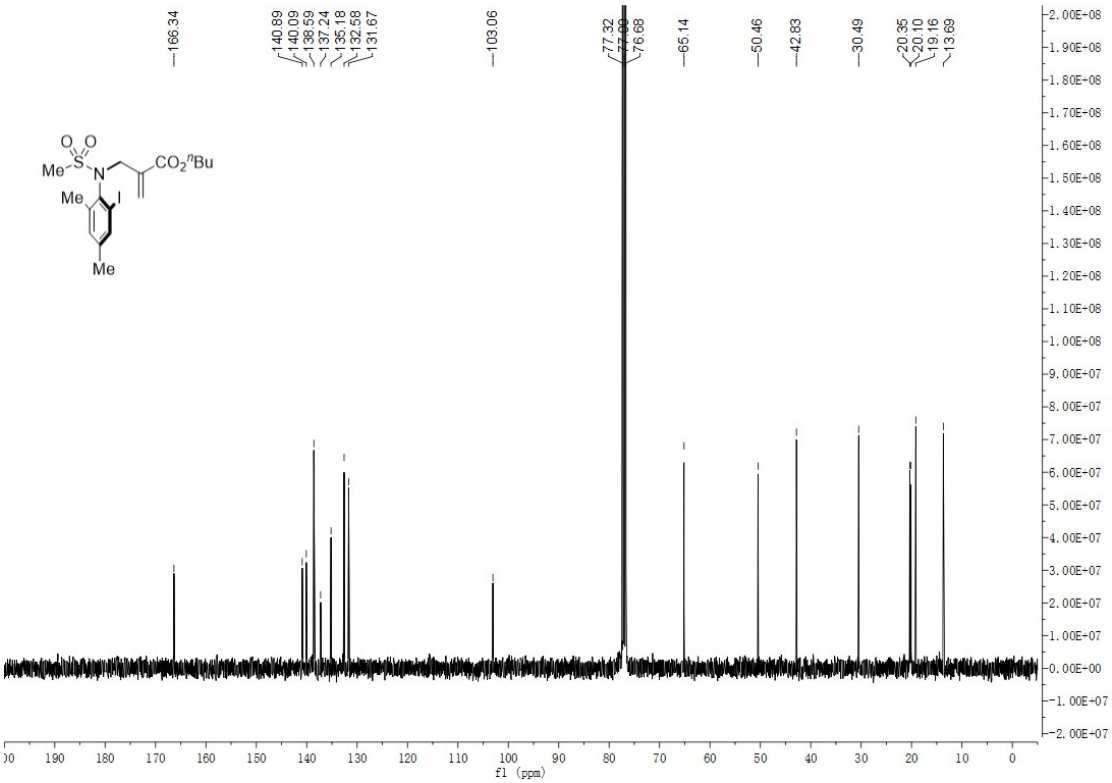
Compound **5k**


7.649
7.646
7.631
7.627
7.532
7.512
7.321
7.318
7.302
7.299
7.260
7.241
7.230
7.222
7.210
7.190
6.314
6.311
5.895
4.661
4.625
4.597
4.561
3.917
3.900
3.884
3.543
2.378
1.939
1.566
1.401
1.384
1.367
1.347
1.330
1.257
1.238
1.220
1.200
1.182
0.840
0.822
0.804
Tol
CO2nBu
Me
R
R = CO2Me
1.00
1.96
0.95
0.95
1.94
1.00
1.02
1.04
0.96
2.01
2.98
2.94
3.09
2.04
2.13
2.99
f1 (ppm)

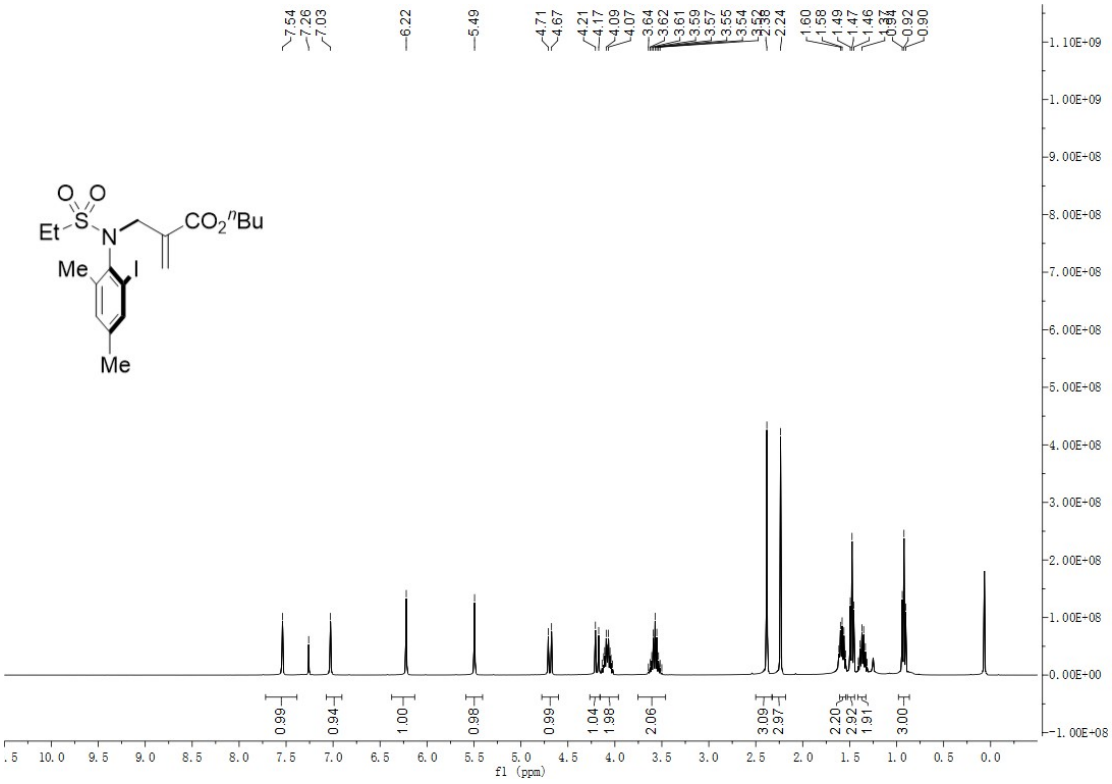

166.81
166.43
143.01
140.93
138.11
136.87
134.99
132.55
131.07
129.39
128.08
127.50
77.32
77.00
76.68
64.65
51.93
51.83
30.31
21.46
19.03
18.89
13.63
Tol
CO2nBu
Me
R
R = CO2Me
f1 (ppm)

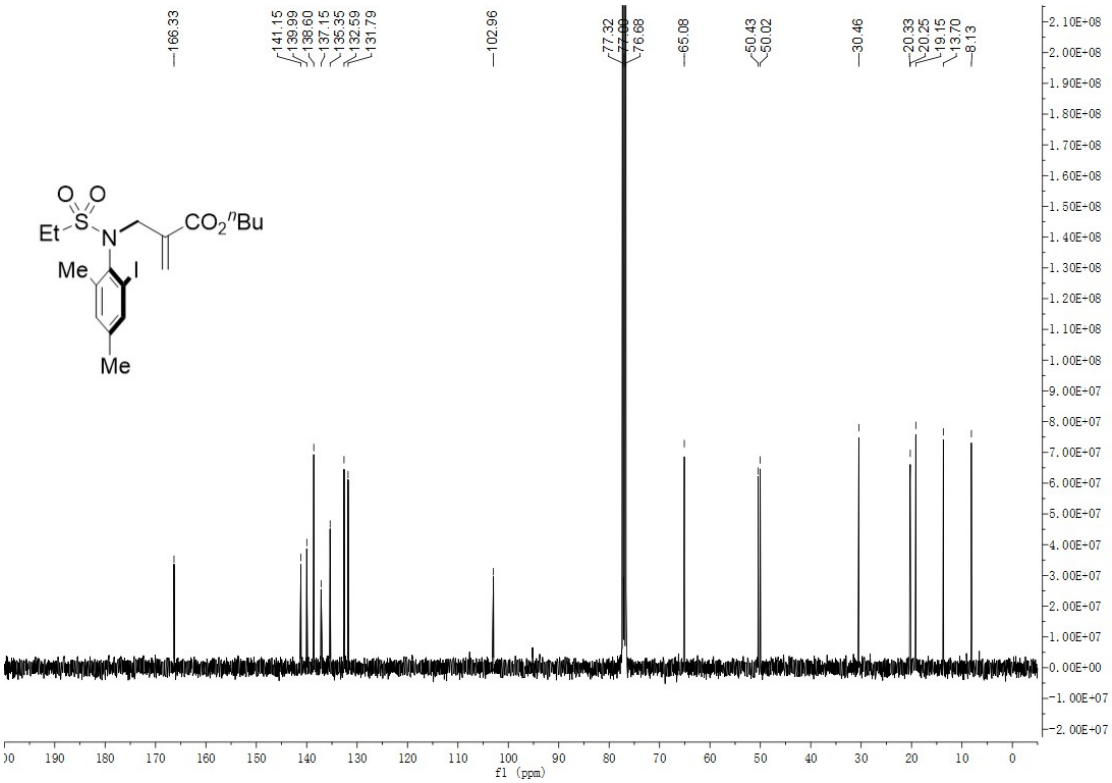
Compound **5l**


7.54
7.26
7.03
6.22
5.45
4.72
4.69
4.17
4.15
4.13
4.12
4.11
3.40
2.37
2.24
1.62
1.60
1.58
1.38
1.36
0.94
0.93
0.91
1.00
1.02
1.06
1.06
1.08
3.04
3.14
3.29
3.08
2.15
2.06
2.96
f1 (ppm)

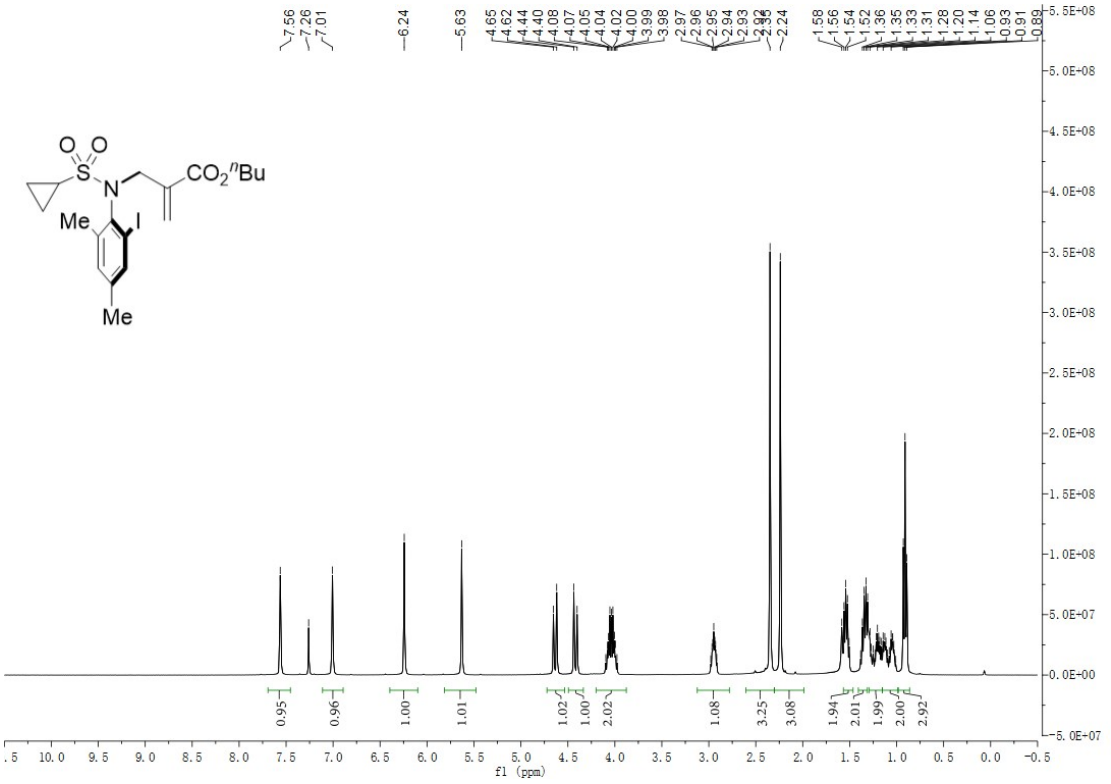

166.34
140.89
140.09
138.59
137.24
135.18
132.58
131.67
103.06
77.32
77.00
76.68
65.14
50.46
42.83
30.49
20.35
20.10
19.16
13.69
f1 (ppm)

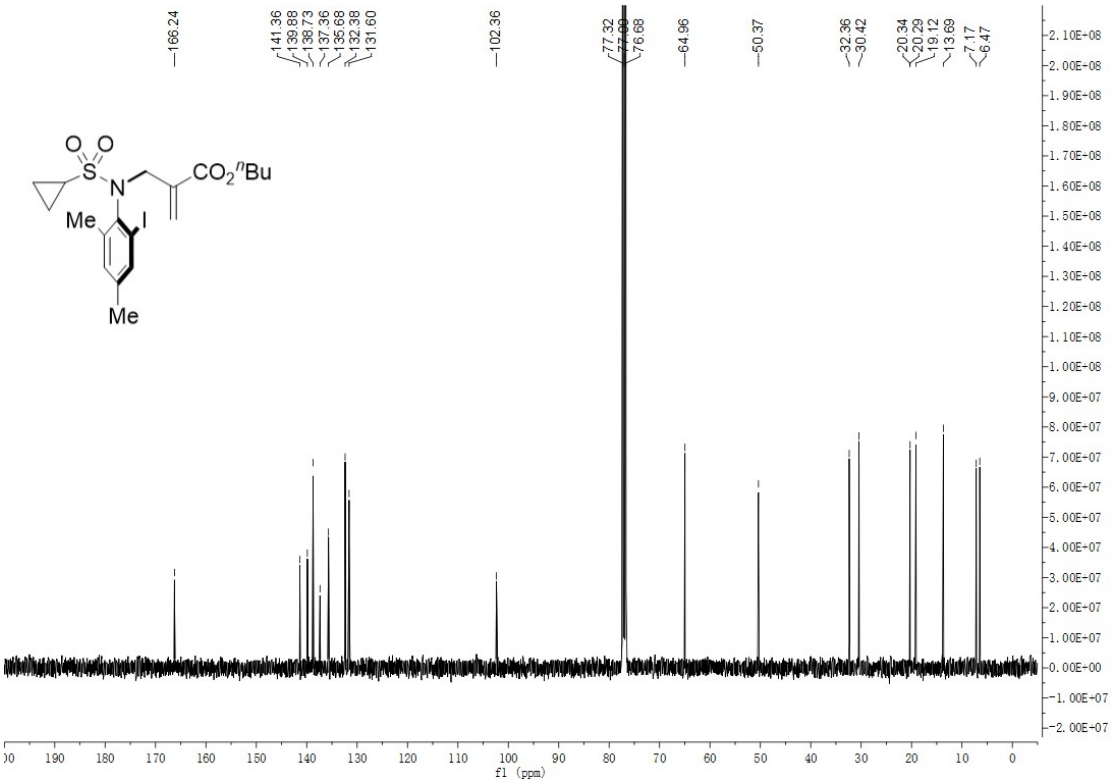
Compound **5m**


7.54
7.26
7.03
6.22
5.49
4.71
4.67
4.21
4.17
4.09
4.07
3.64
3.62
3.61
3.59
3.57
3.55
3.54
3.52
2.38
2.24
1.60
1.58
1.49
1.47
1.46
0.94
0.92
0.90
0.99
0.94
1.00
0.98
0.99
1.04
1.98
2.06
3.09
2.97
2.20
2.92
1.91
3.00
f1 (ppm)

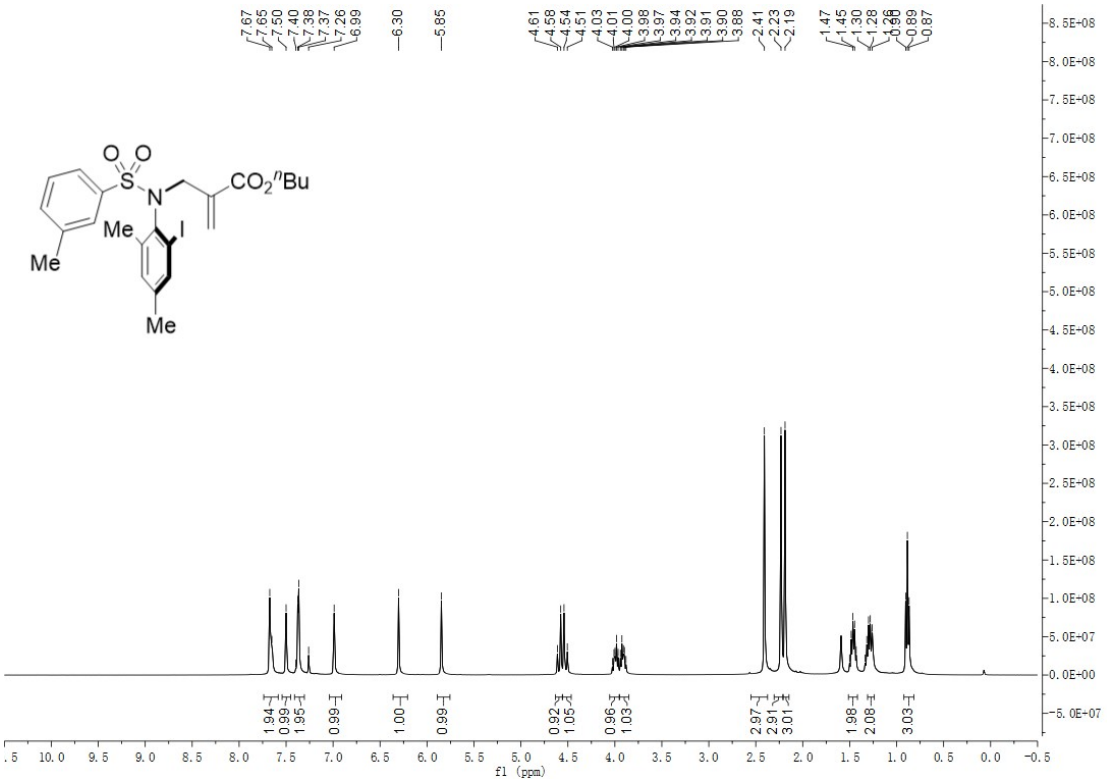

166.33
141.15
139.99
138.60
137.15
135.35
132.59
131.79
102.96
77.32
77.00
76.68
65.08
50.43
50.02
30.46
20.33
20.25
19.15
13.70
8.13
f1 (ppm)

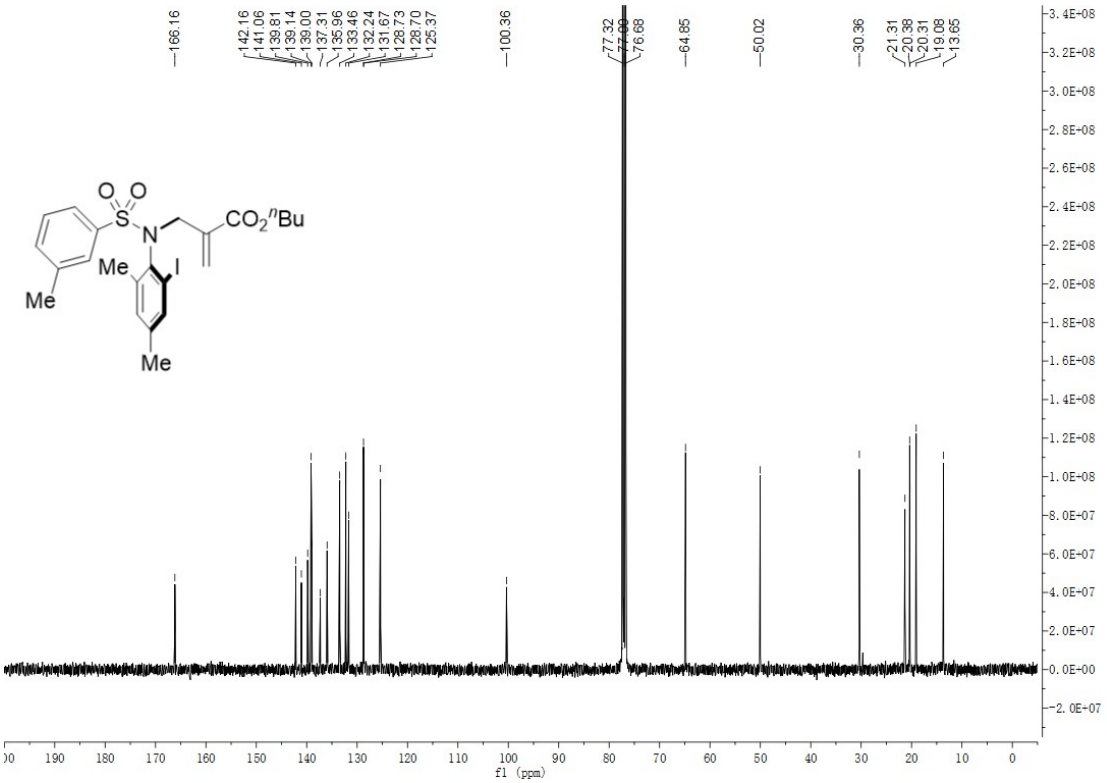
Compound **5n**


7.56
7.26
7.01
6.24
5.63
4.65
4.62
4.44
4.40
4.08
4.07
4.05
4.04
4.02
4.00
3.99
3.98
2.97
2.96
2.95
2.94
2.93
2.24
1.58
1.56
1.54
1.52
1.36
1.35
1.33
1.31
1.28
1.20
1.14
1.06
0.93
0.91
0.89
0.95
0.96
1.00
1.01
1.02
1.00
2.02
1.08
3.25
3.08
1.94
2.01
1.99
2.00
2.92
f1 (ppm)
O
O
S
N
CO2nBu
Me
I
Me

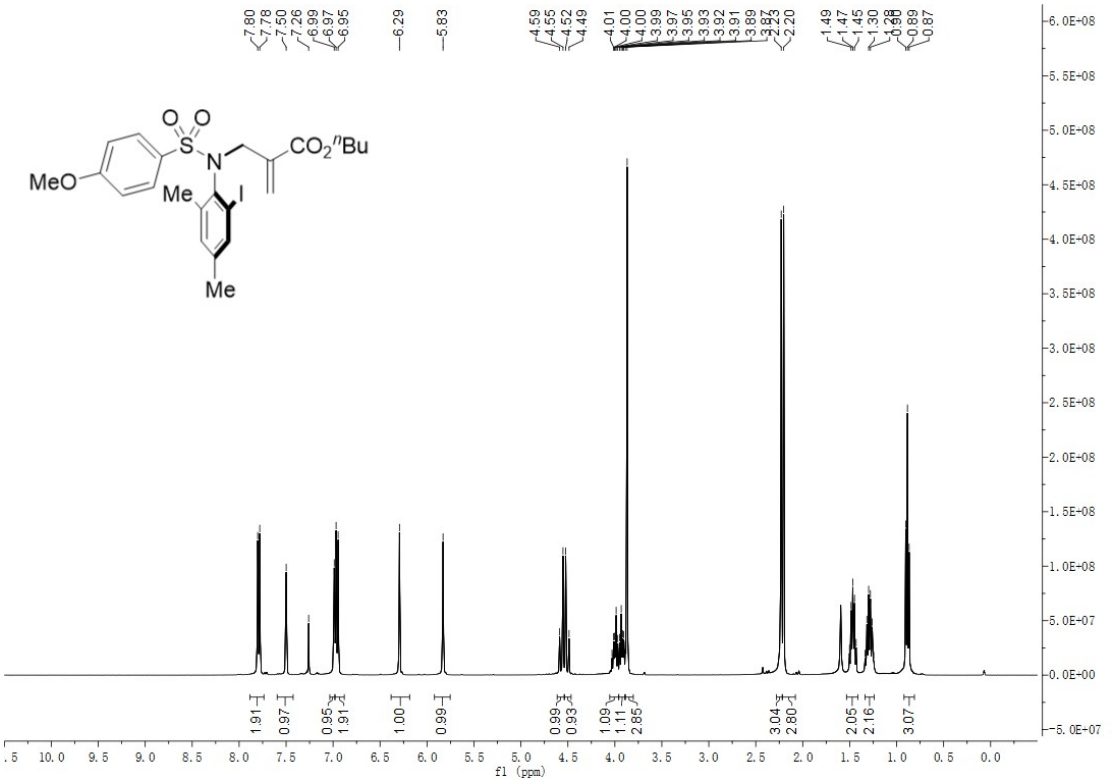

166.24
141.36
139.88
138.73
137.36
135.68
132.38
131.60
102.36
77.32
77.00
76.68
64.96
50.37
32.36
30.42
20.34
20.29
19.12
13.69
7.17
6.47
f1 (ppm)
O
O
S
N
CO2nBu
Me
I
Me

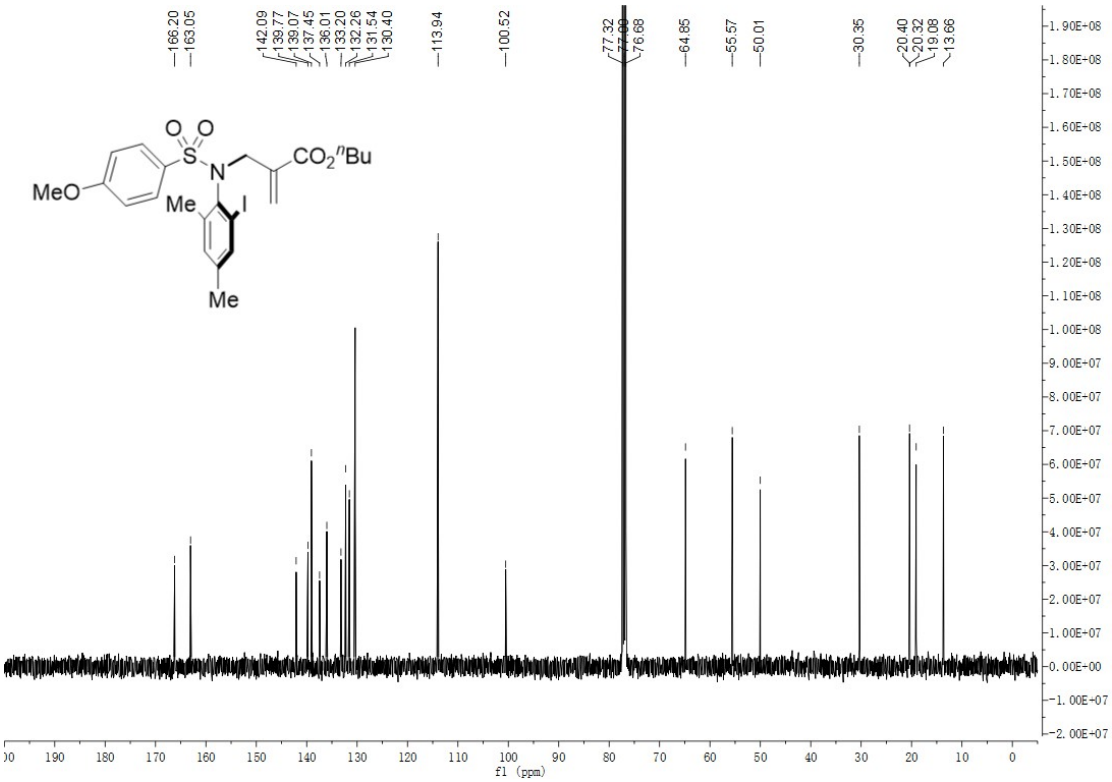
Compound **5o**


7.67
7.65
7.50
7.40
7.38
7.37
7.26
6.99
6.30
5.85
4.61
4.58
4.54
4.51
4.03
4.01
4.00
3.98
3.97
3.94
3.92
3.91
3.90
3.88
2.41
2.23
2.19
1.47
1.45
1.30
1.28
1.26
0.89
0.87
O
O
S
N
CO2nBu
Me
I
Me
Me
1.94
0.99
1.95
0.99
1.00
0.99
0.92
1.05
0.96
1.03
2.97
2.91
3.01
1.98
2.08
3.03
f1 (ppm)

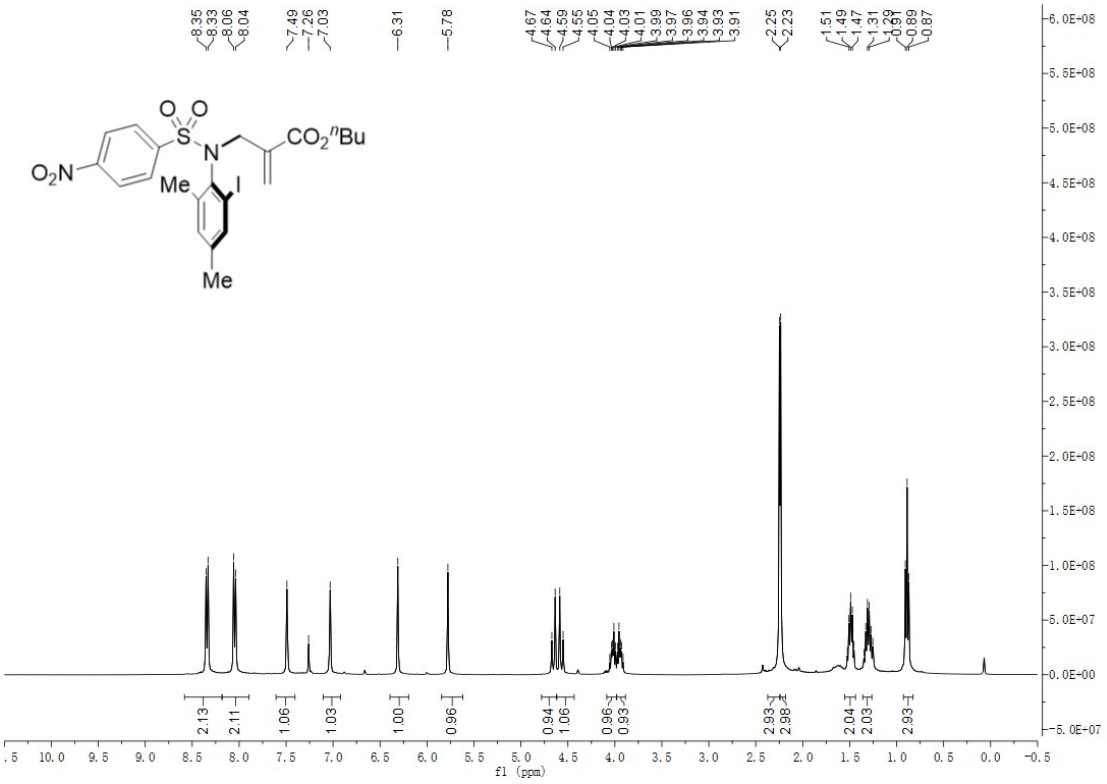

166.16
142.16
141.06
139.81
139.14
139.00
137.31
135.96
133.46
132.24
131.67
128.73
128.70
125.37
100.36
77.32
77.00
76.68
64.85
50.02
30.36
21.31
20.38
20.31
19.08
13.65
O
O
S
N
CO2nBu
Me
I
Me
Me
f1 (ppm)

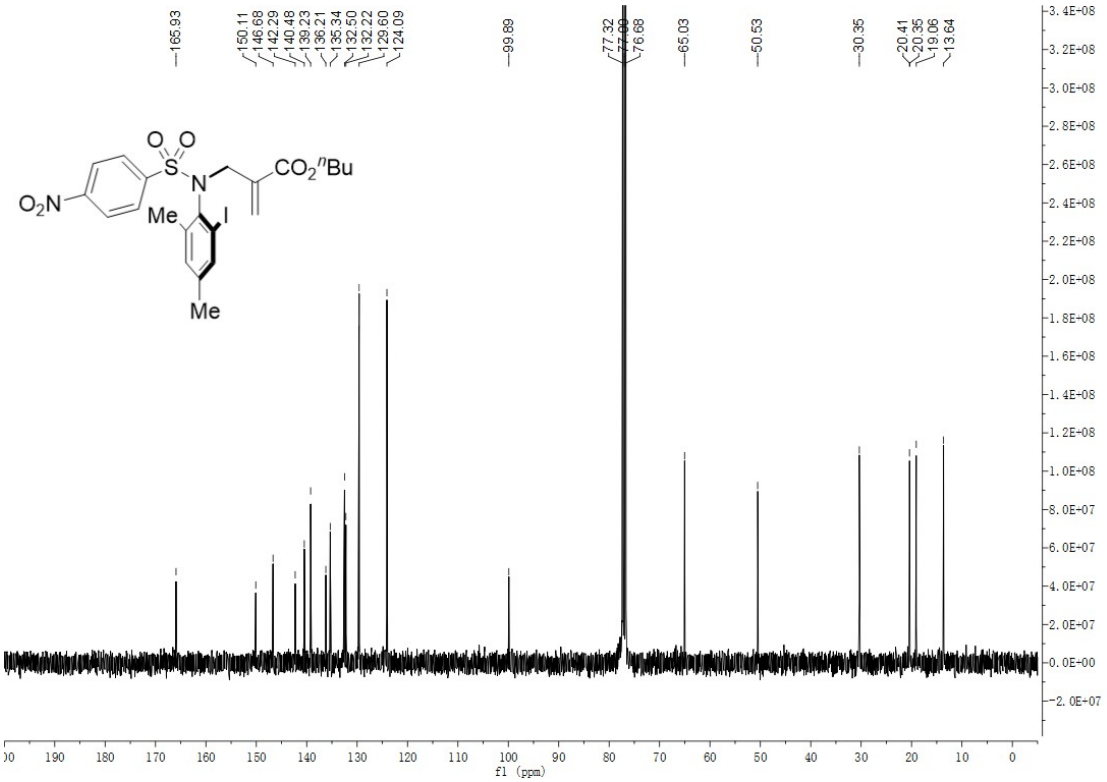
Compound **5p**



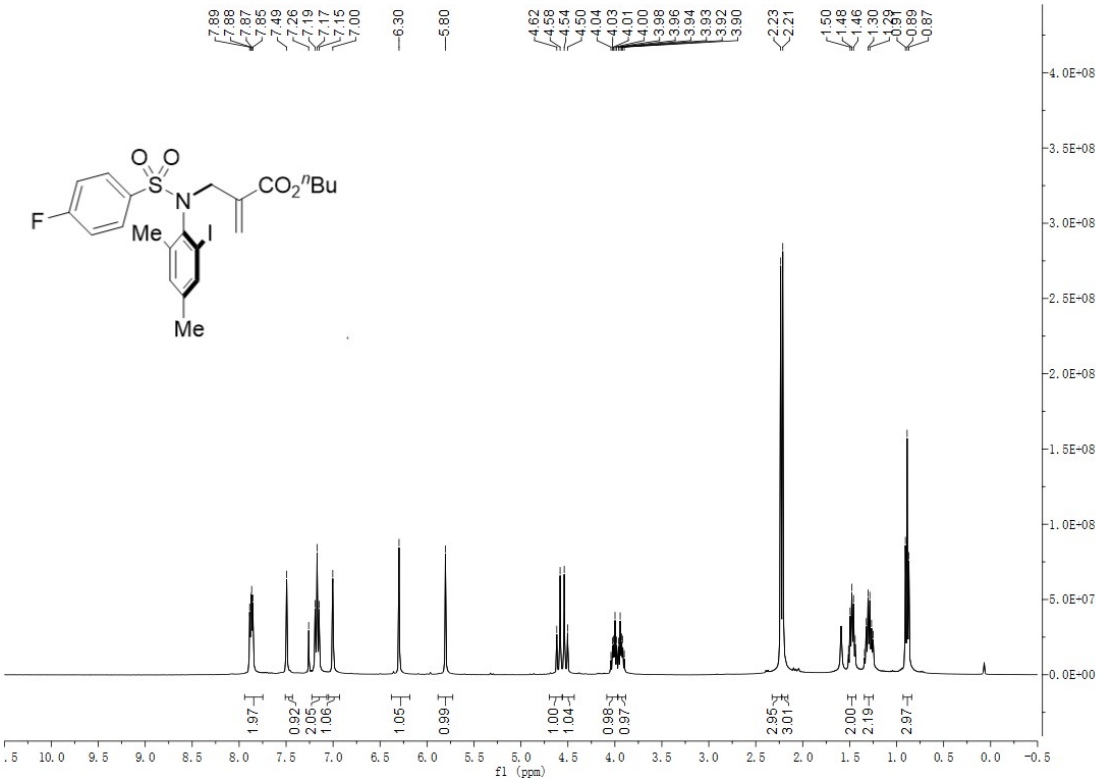


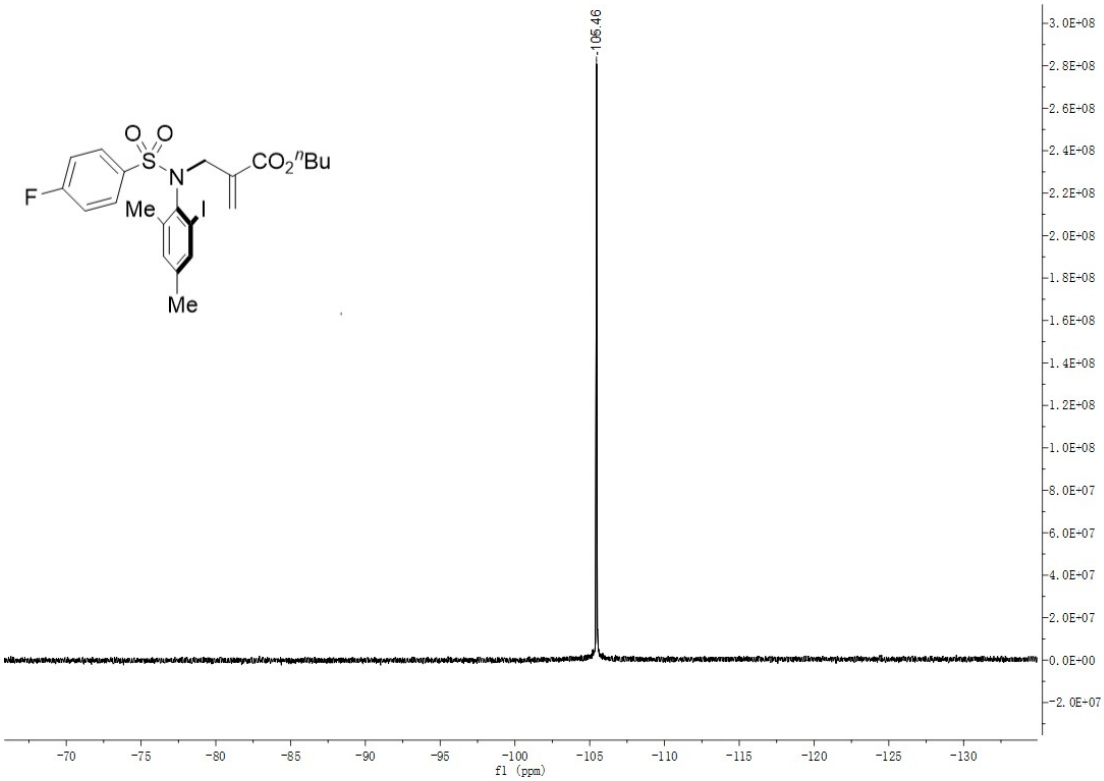
Compound **5q**

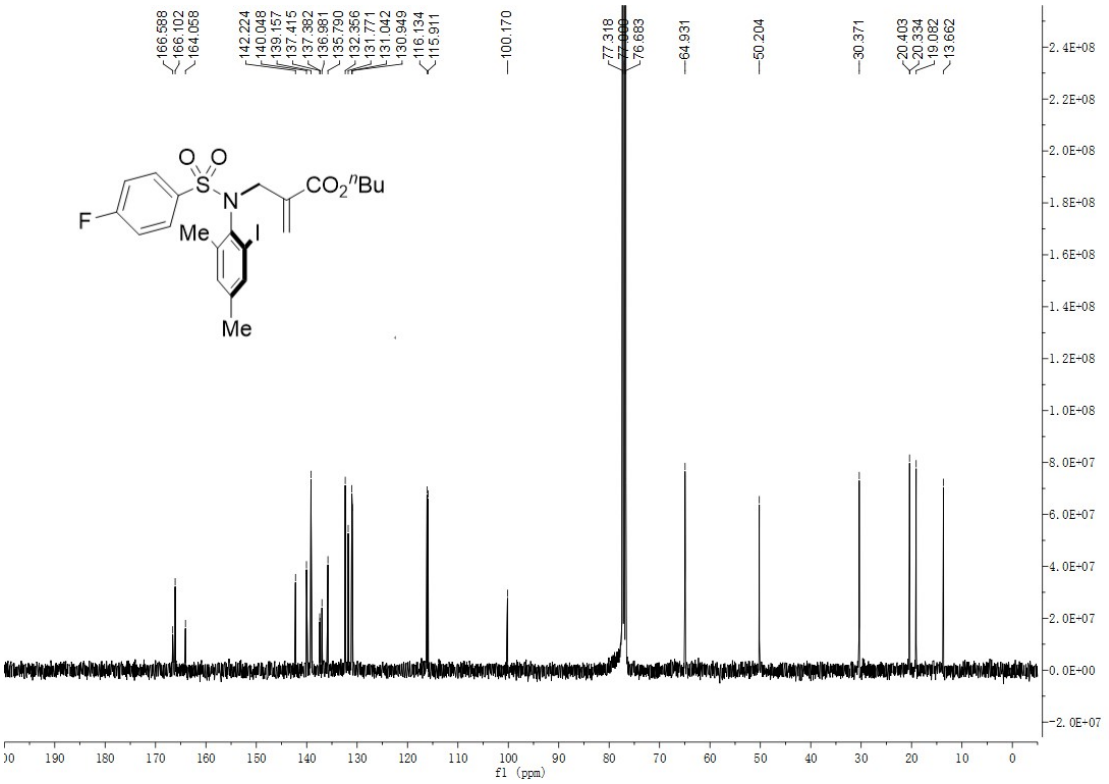

8.35
8.33
8.06
8.04
7.49
7.26
7.03
6.31
5.78
4.67
4.64
4.59
4.55
4.05
4.04
4.03
4.01
3.99
3.97
3.96
3.94
3.93
3.91
2.25
2.23
1.51
1.49
1.47
1.31
1.29
0.91
0.89
0.87
O2N
CO2nBu
Me
I
Me
2.13
2.11
1.06
1.03
1.00
0.96
0.94
1.06
0.96
0.93
2.93
2.98
2.04
2.03
2.93
f1 (ppm)


165.93
150.11
146.68
142.29
140.48
139.23
136.21
135.34
132.50
132.22
129.60
124.09
99.89
77.32
77.00
76.68
65.03
50.53
30.35
20.41
20.35
19.06
13.64
O2N
CO2nBu
Me
I
Me
f1 (ppm)

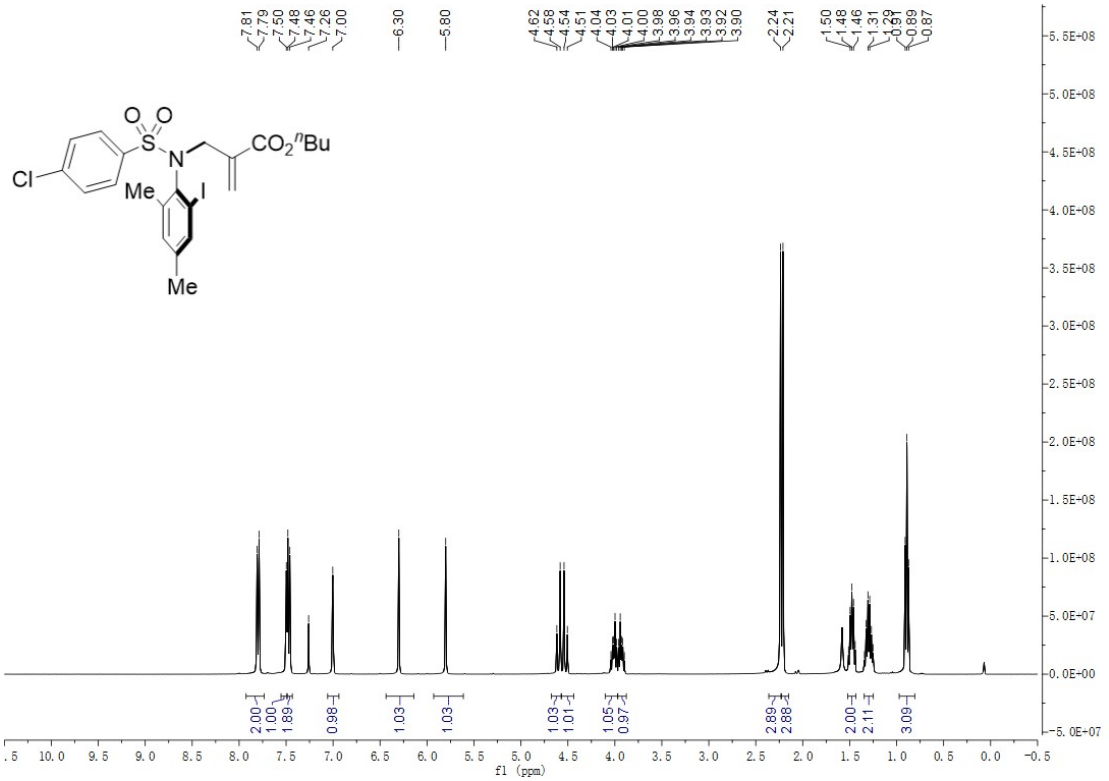
Compound **5r**

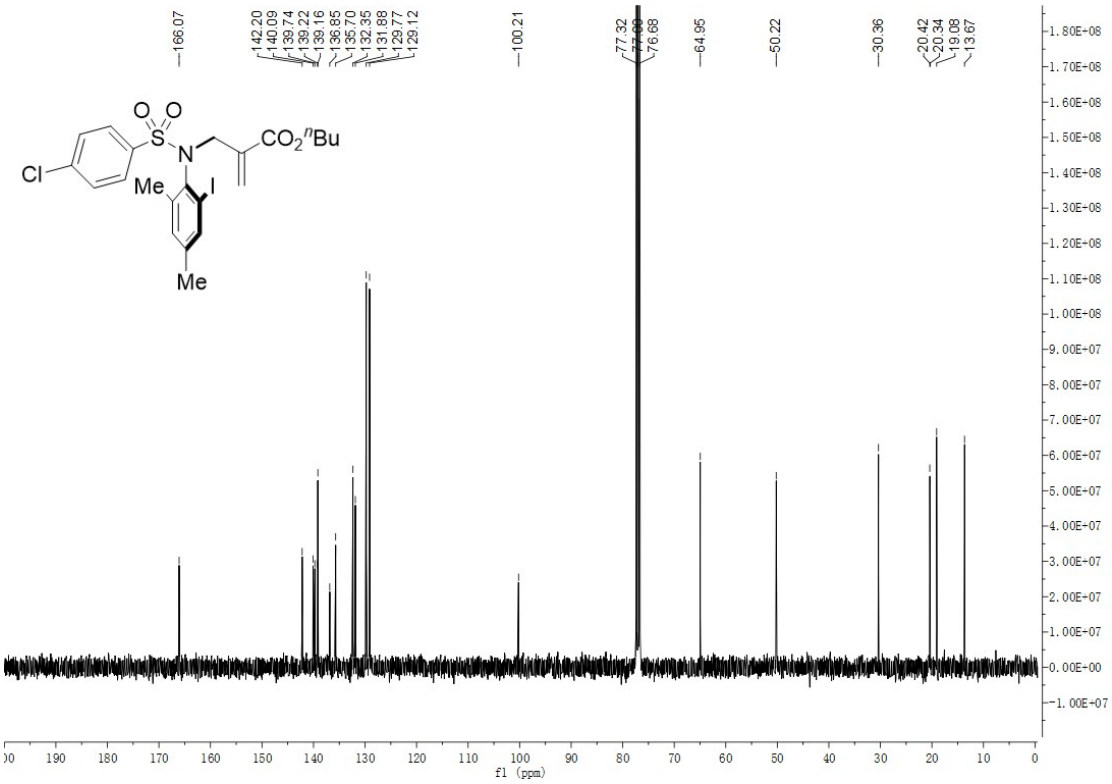

7.89
7.88
7.87
7.85
7.49
7.26
7.19
7.17
7.15
7.00
6.30
5.80
4.62
4.58
4.54
4.50
4.04
4.03
4.01
4.00
3.98
3.96
3.94
3.93
3.92
3.90
2.23
2.21
1.50
1.48
1.46
1.30
1.29
0.91
0.89
0.87
O
O
S
N
CO2nBu
F
Me
I
Me
1.97
0.92
2.05
1.06
1.05
0.99
1.00
1.04
0.98
0.97
2.95
3.01
2.00
2.19
2.97
f1 (ppm)


-105.46
O
O
S
N
CO2nBu
F
Me
I
Me
f1 (ppm)

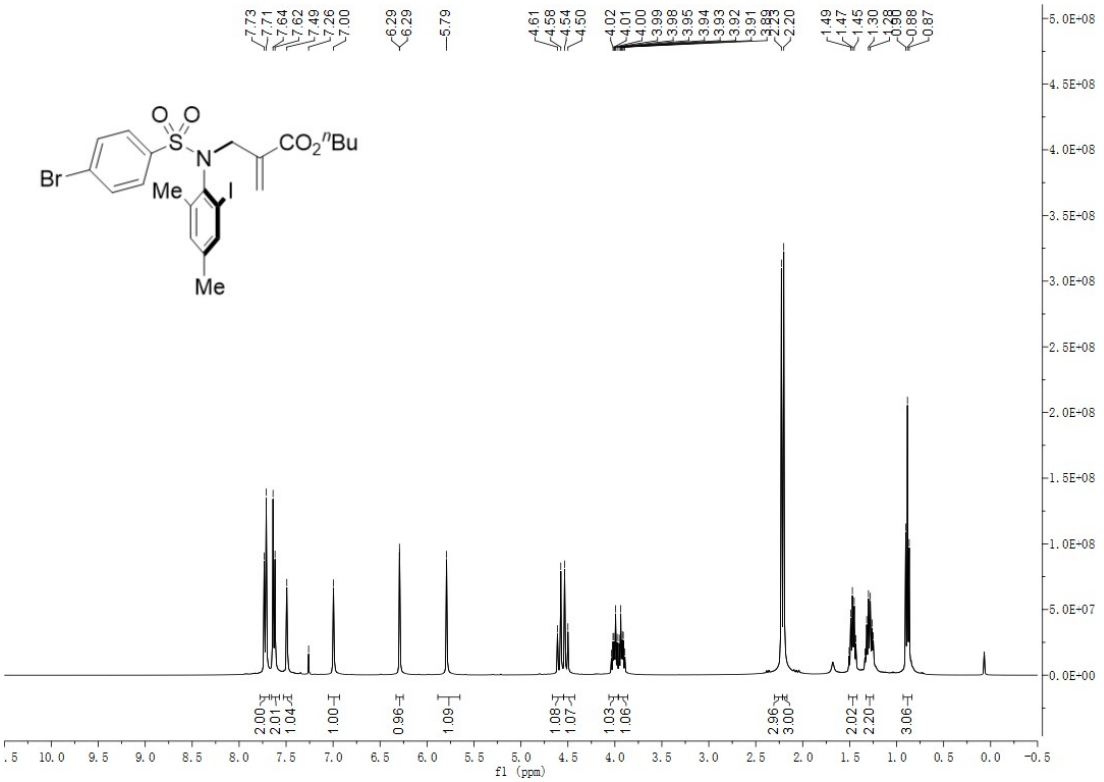

166.588
166.102
164.058
142.224
140.048
139.157
137.415
137.382
136.981
135.790
132.356
131.771
131.042
130.949
116.134
115.911
100.170
77.318
77.000
76.683
64.931
50.204
30.371
20.403
20.334
19.082
13.662
O
O
S
N
CO2nBu
F
Me
I
Me
f1 (ppm)

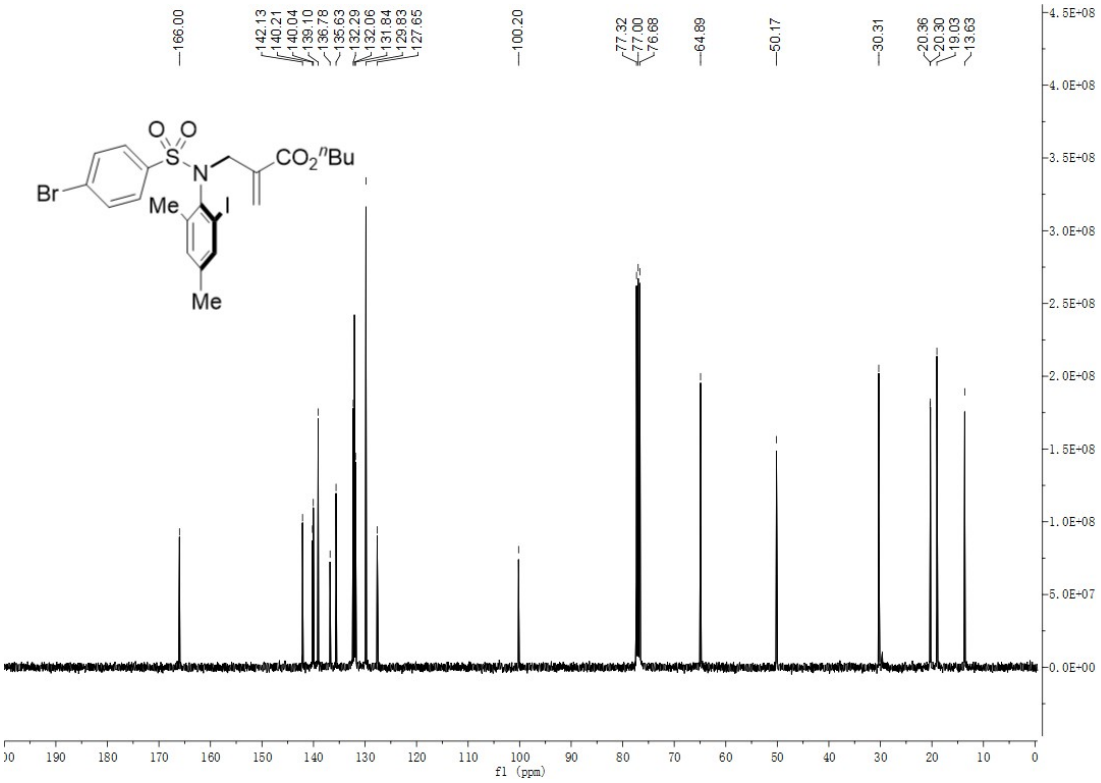
Compound **5s**


7.81
7.79
7.50
7.48
7.46
7.26
7.00
6.30
5.80
4.62
4.58
4.54
4.51
4.04
4.03
4.01
4.00
3.98
3.96
3.94
3.93
3.92
3.90
2.24
2.21
1.50
1.48
1.46
1.31
0.89
0.87
2.00
1.00
1.89
0.98
1.03
1.03
1.03
1.01
1.05
0.97
2.89
2.88
2.00
2.11
3.09
O
O
S
N
CO2nBu
Cl
Me
I
Me
f1 (ppm)

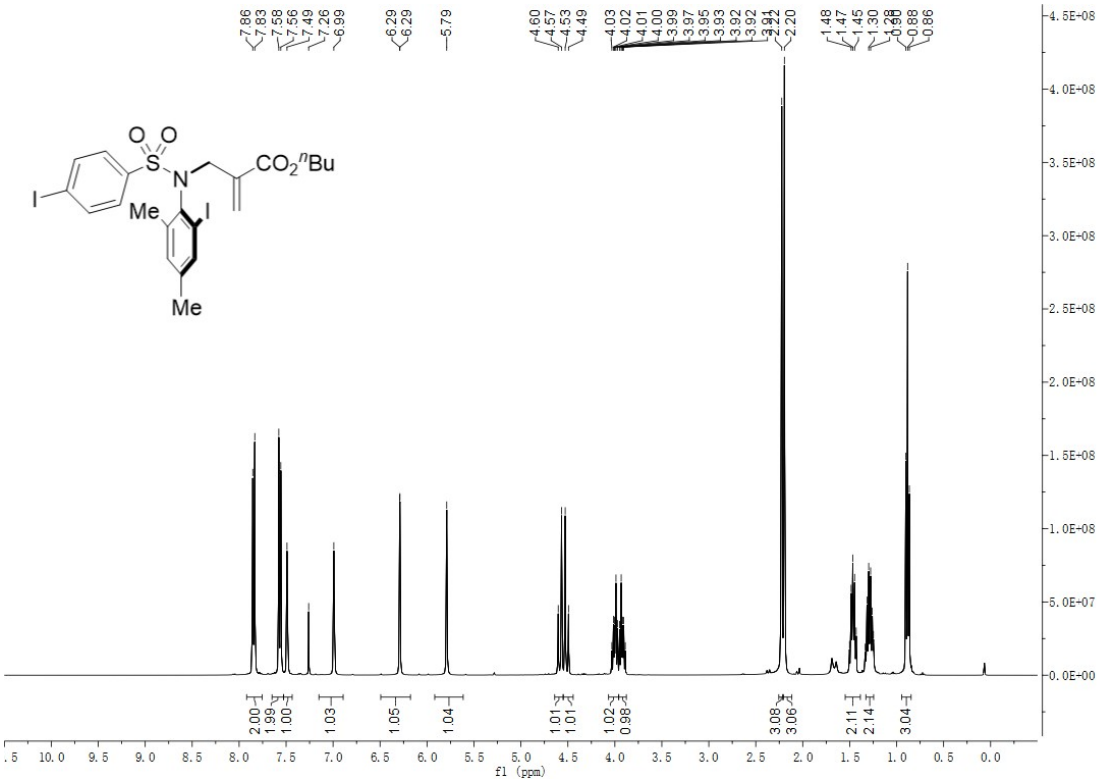

166.07
142.20
140.09
139.74
139.22
139.16
136.85
135.70
132.35
131.88
129.77
129.12
100.21
77.32
77.00
76.68
64.95
50.22
30.36
20.42
20.34
19.08
13.67
Cl
O
O
S
N
CO2nBu
Me
I
Me
f1 (ppm)

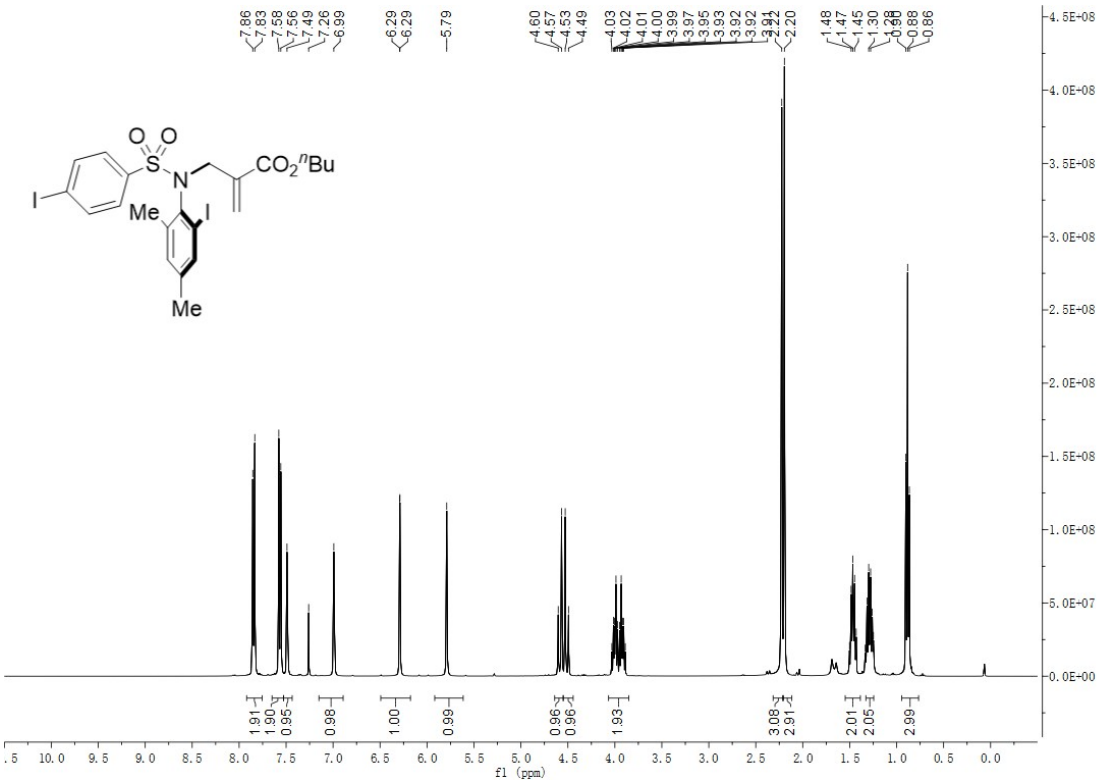
Compound **5t**


7.73
7.71
7.64
7.62
7.49
7.26
7.00
6.29
6.29
5.79
4.61
4.58
4.54
4.50
4.02
4.01
4.00
3.99
3.98
3.95
3.94
3.93
3.92
3.91
3.89
3.23
2.20
1.49
1.47
1.45
1.30
1.28
0.89
0.87
Br
O
O
S
N
CO2nBu
Me
I
Me
2.00
2.01
1.04
1.00
0.96
1.09
1.08
1.07
1.03
1.06
2.96
3.00
2.02
2.20
3.06
f1 (ppm)

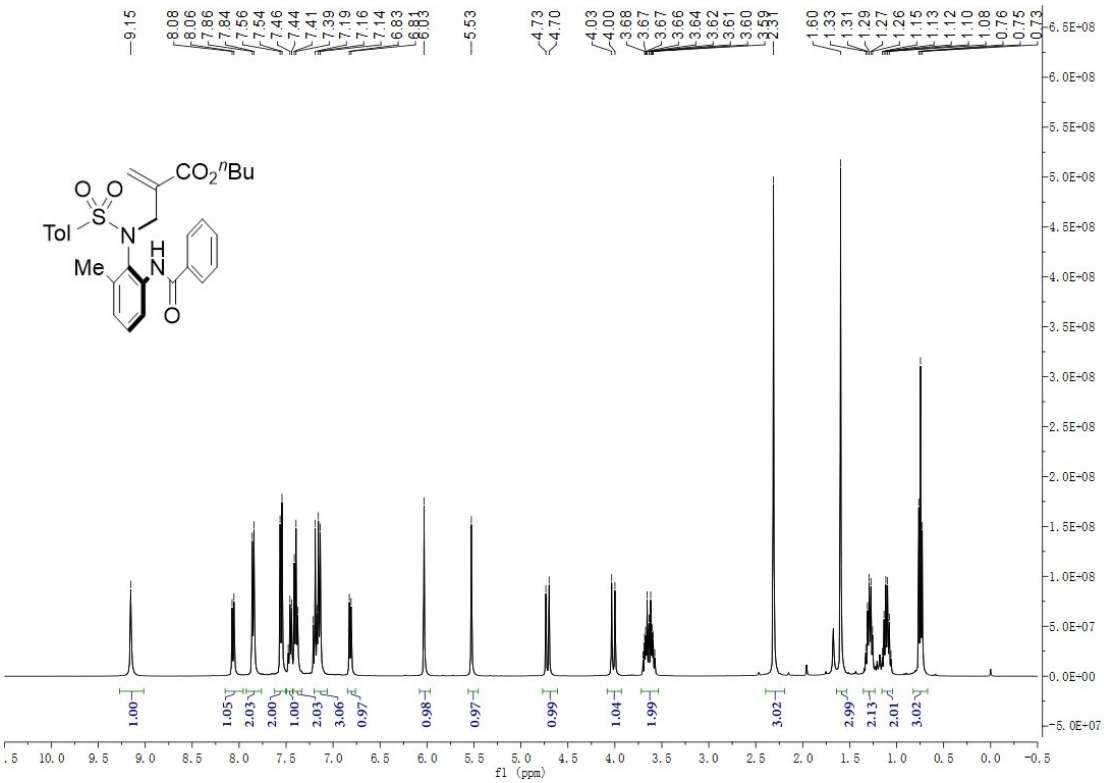

166.00
142.13
140.21
140.04
139.10
136.78
135.63
132.29
132.06
131.84
129.83
127.65
100.20
77.32
77.00
76.68
64.89
50.17
30.31
20.36
20.30
19.03
13.63
Br
Me
I
Me
CO2nBu
f1 (ppm)

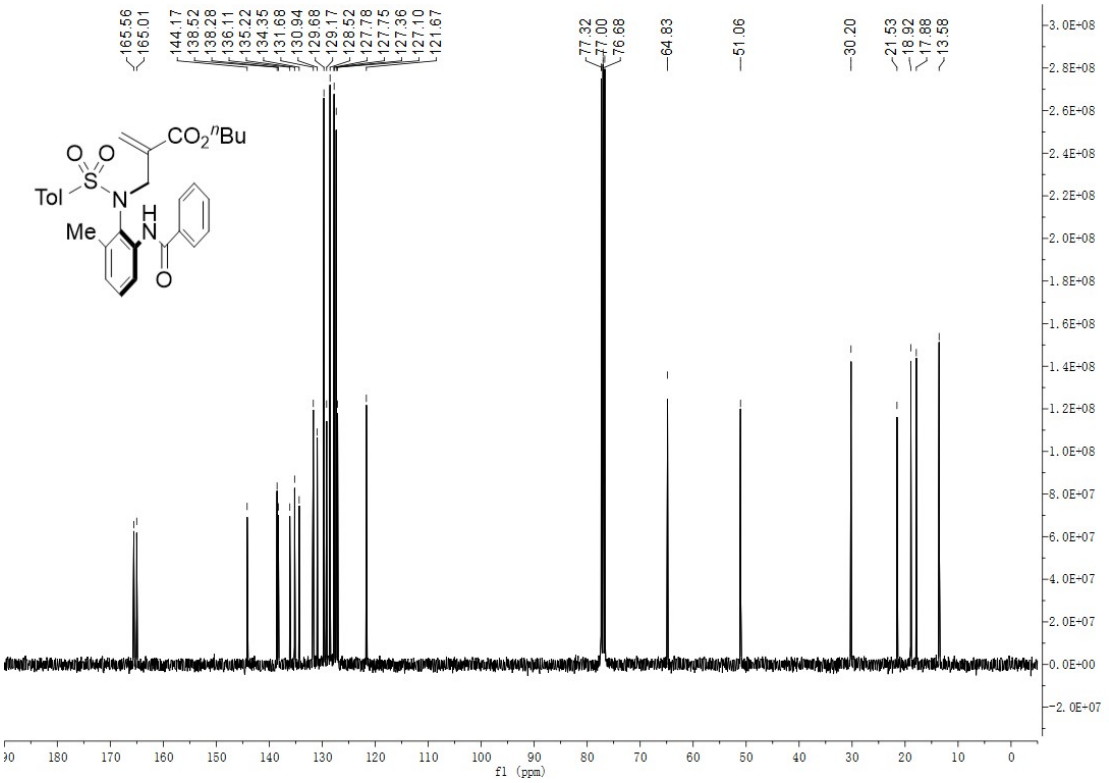
Compound **5u**


7.86
7.83
7.58
7.56
7.49
7.26
6.99
6.29
6.29
5.79
4.60
4.57
4.53
4.49
4.03
4.02
4.01
4.00
3.99
3.97
3.95
3.93
3.92
3.92
3.91
2.22
2.20
1.48
1.47
1.45
1.30
0.88
0.86
I
Me
I
Me
CO2nBu
2.00
1.99
1.00
1.03
1.05
1.04
1.01
1.01
1.02
0.98
3.08
3.06
2.11
2.14
3.04
f1 (ppm)

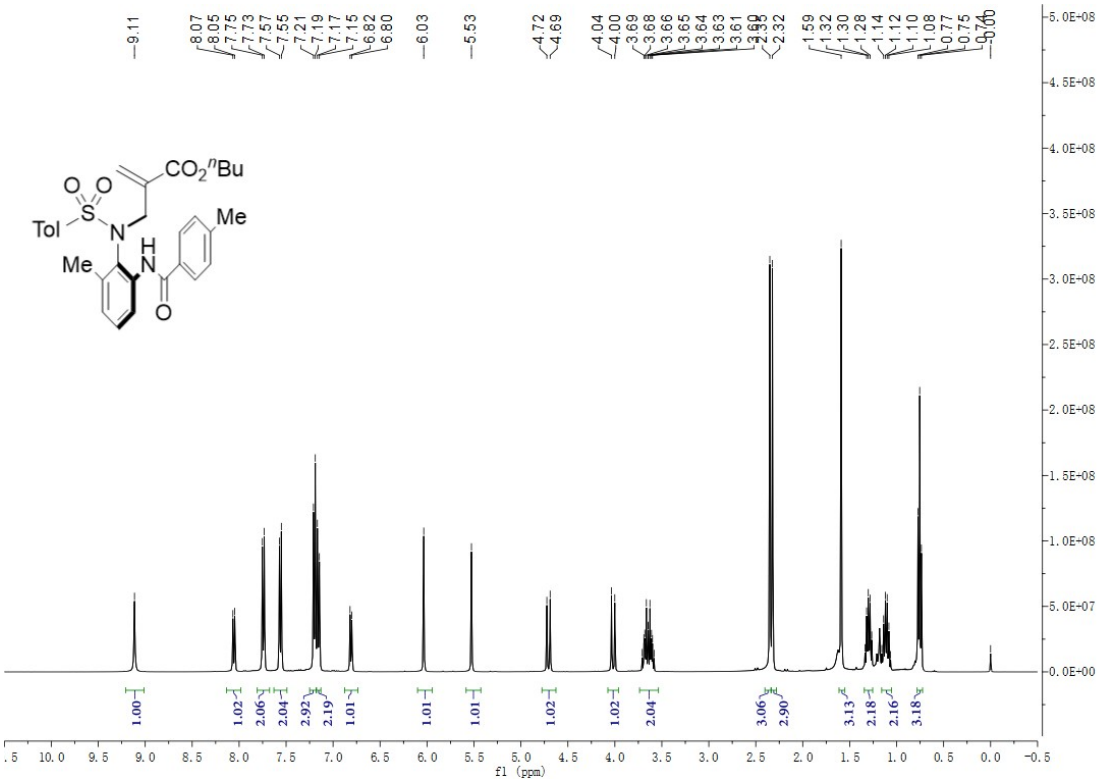

7.86
7.83
7.58
7.56
7.49
7.26
6.99
6.29
6.29
5.79
4.60
4.57
4.53
4.49
4.03
4.02
4.01
4.00
3.99
3.97
3.95
3.93
3.92
3.92
3.91
2.22
2.20
1.48
1.47
1.45
1.30
1.28
0.88
0.86
O
O
S
N
CO2nBu
I
Me
I
Me
1.91
1.90
0.95
0.98
1.00
0.99
0.96
0.96
1.93
3.08
2.91
2.01
2.05
2.99
f1 (ppm)

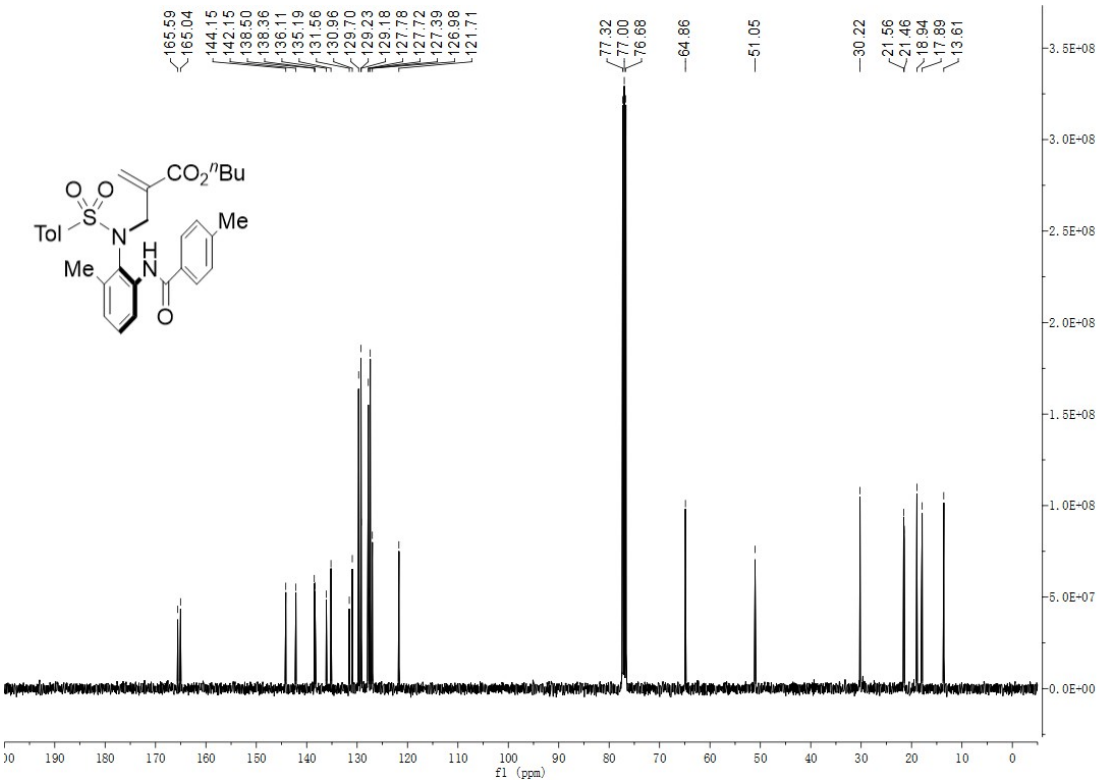
Compound **7a**


9.15
8.08
8.06
7.86
7.84
7.56
7.54
7.46
7.44
7.41
7.39
7.19
7.16
7.14
6.83
6.81
6.80
5.53
4.73
4.70
4.03
4.00
3.68
3.67
3.67
3.66
3.64
3.62
3.61
3.60
3.59
2.31
1.60
1.33
1.31
1.29
1.27
1.26
1.15
1.13
1.12
1.10
1.08
0.76
0.75
0.73
CO2nBu
O
O
S
N
Tol
Me
H
N
O
1.00
1.05
2.03
2.00
1.00
2.03
3.06
0.97
0.98
0.97
0.99
1.04
1.99
3.02
2.99
2.13
2.01
3.02
f1 (ppm)

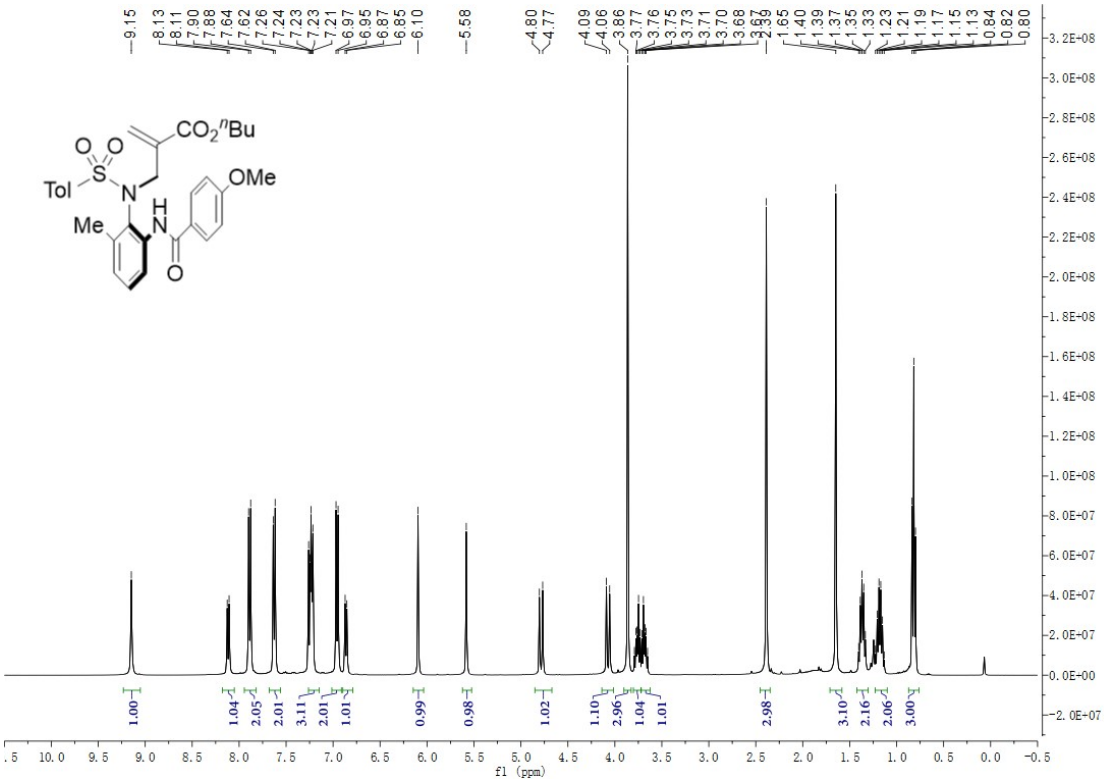

165.56
165.01
144.17
138.52
138.28
136.11
135.22
134.35
131.68
130.94
129.68
129.17
128.52
127.78
127.75
127.36
127.10
121.67
77.32
77.00
76.68
64.83
51.06
30.20
21.53
18.92
17.88
13.58
CO2nBu
Tol
Me
f1 (ppm)

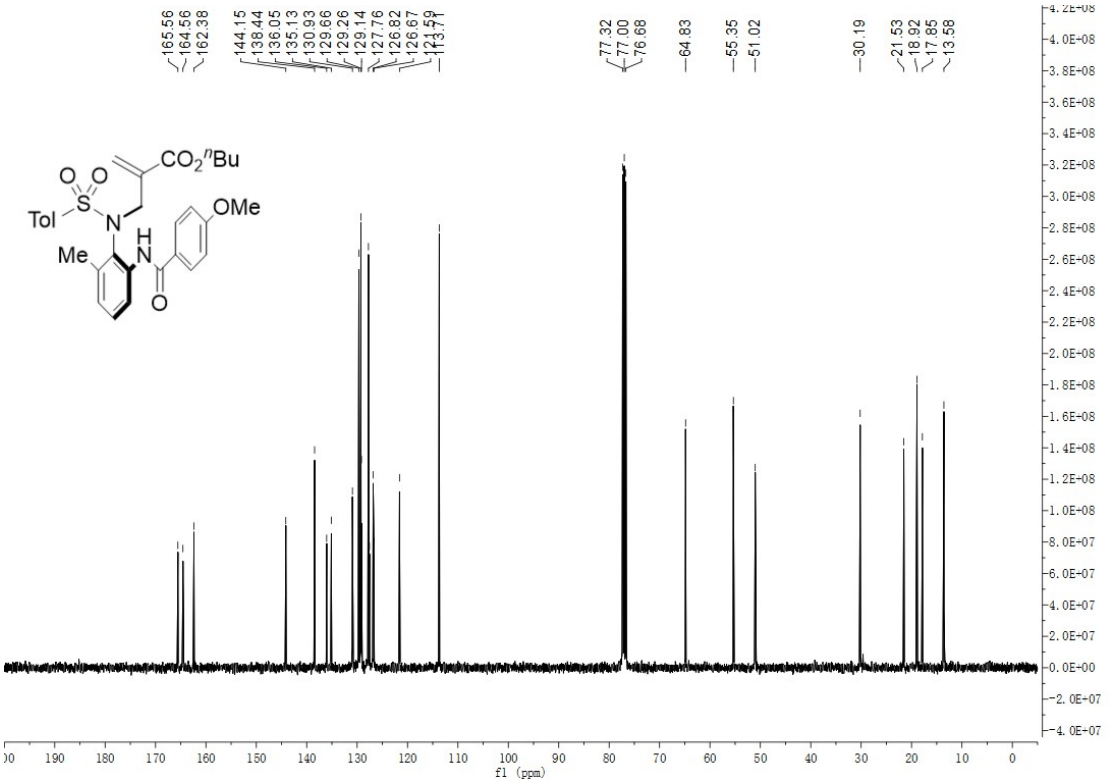
Compound **7b**


9.11
8.07
8.05
7.75
7.73
7.57
7.55
7.21
7.19
7.17
7.15
6.82
6.80
6.03
5.53
4.72
4.69
4.04
4.00
3.69
3.68
3.66
3.65
3.64
3.63
3.61
2.38
2.32
1.59
1.32
1.30
1.28
1.14
1.12
1.10
1.08
0.77
0.75
0.74
0.06
CO2nBu
Tol
Me
Me
1.00
1.02
2.06
2.04
2.92
2.19
1.01
1.01
1.01
1.02
1.02
2.04
3.06
2.90
3.13
2.18
2.16
3.18
f1 (ppm)

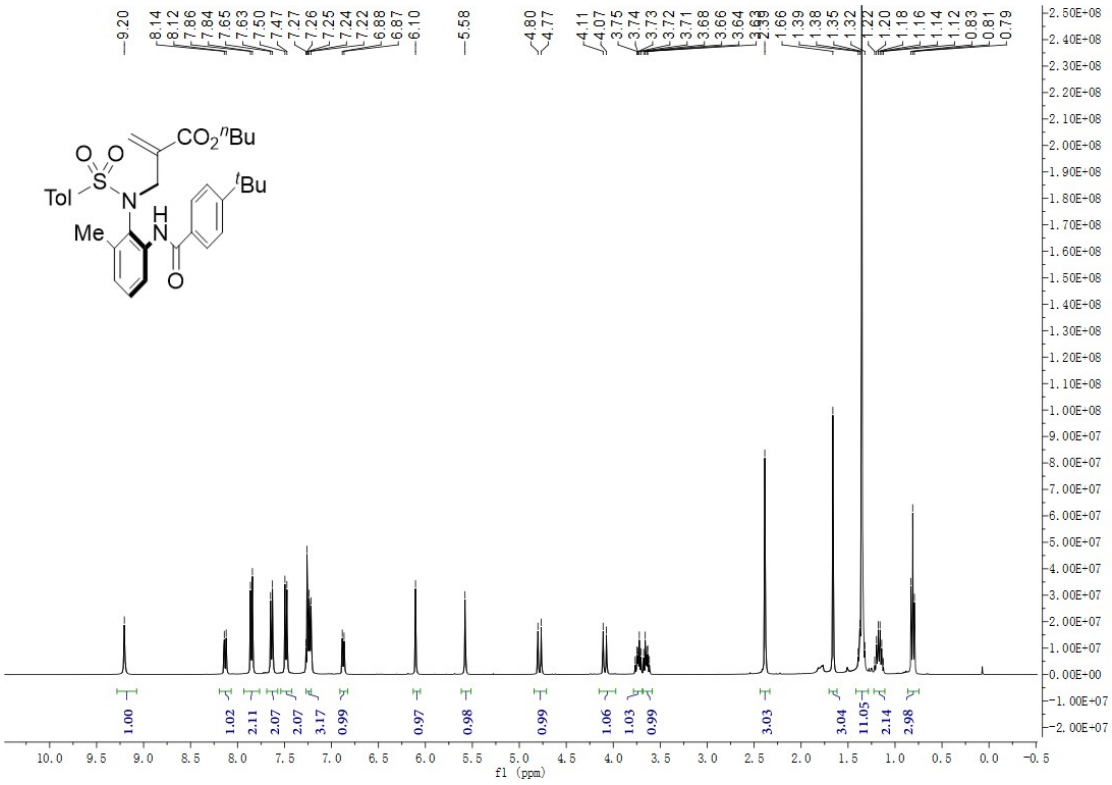

165.59
165.04
144.15
142.15
138.50
138.36
136.11
135.19
131.56
130.96
129.70
129.23
129.18
127.78
127.72
127.39
126.98
121.71
77.32
77.00
76.68
64.86
51.05
30.22
21.56
21.46
18.94
17.89
13.61
CO2nBu
Tol
Me
Me
f1 (ppm)

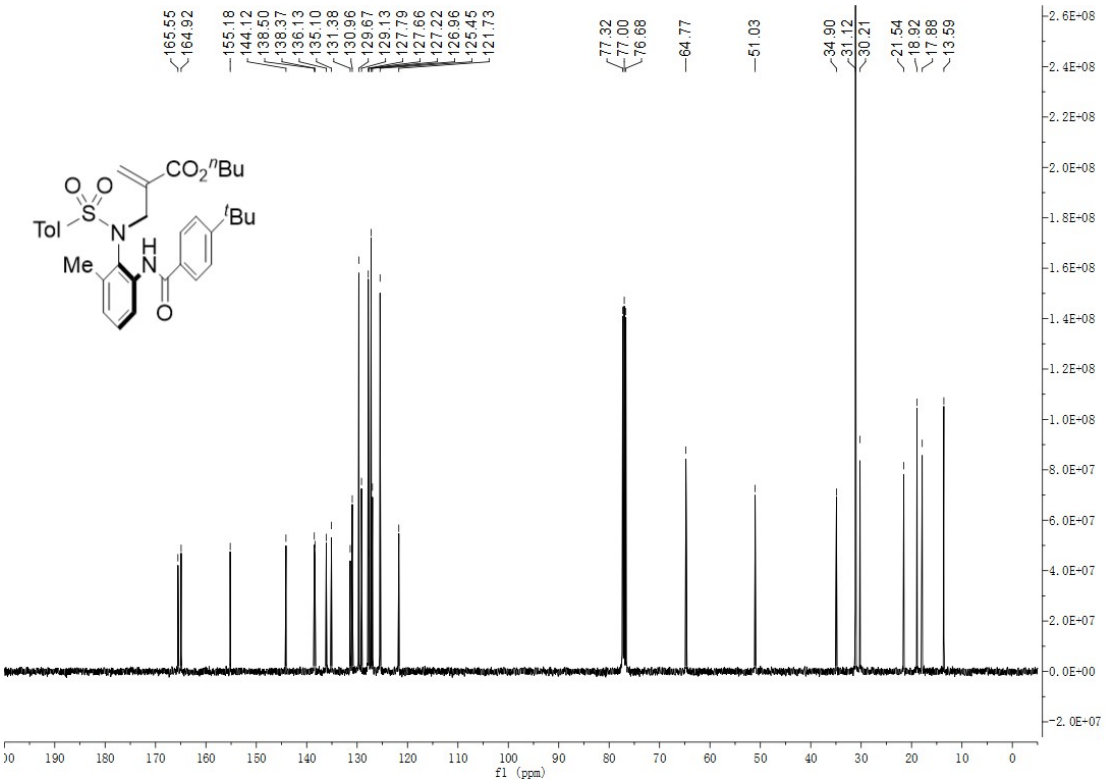
Compound **7c**


9.15
8.13
8.11
7.90
7.88
7.64
7.62
7.26
7.24
7.23
7.23
7.21
6.97
6.95
6.87
6.85
6.10
5.58
4.80
4.77
4.09
4.06
3.86
3.77
3.76
3.75
3.73
3.71
3.70
3.68
3.67
2.30
1.65
1.40
1.39
1.37
1.35
1.33
1.23
1.21
1.19
1.17
1.15
1.13
0.84
0.82
0.80
CO2nBu
Tol
OMe
Me
1.00
1.04
2.05
2.01
3.11
2.01
1.01
0.99
0.98
1.02
1.10
2.96
1.04
1.01
2.98
3.10
2.16
2.06
3.00
f1 (ppm)

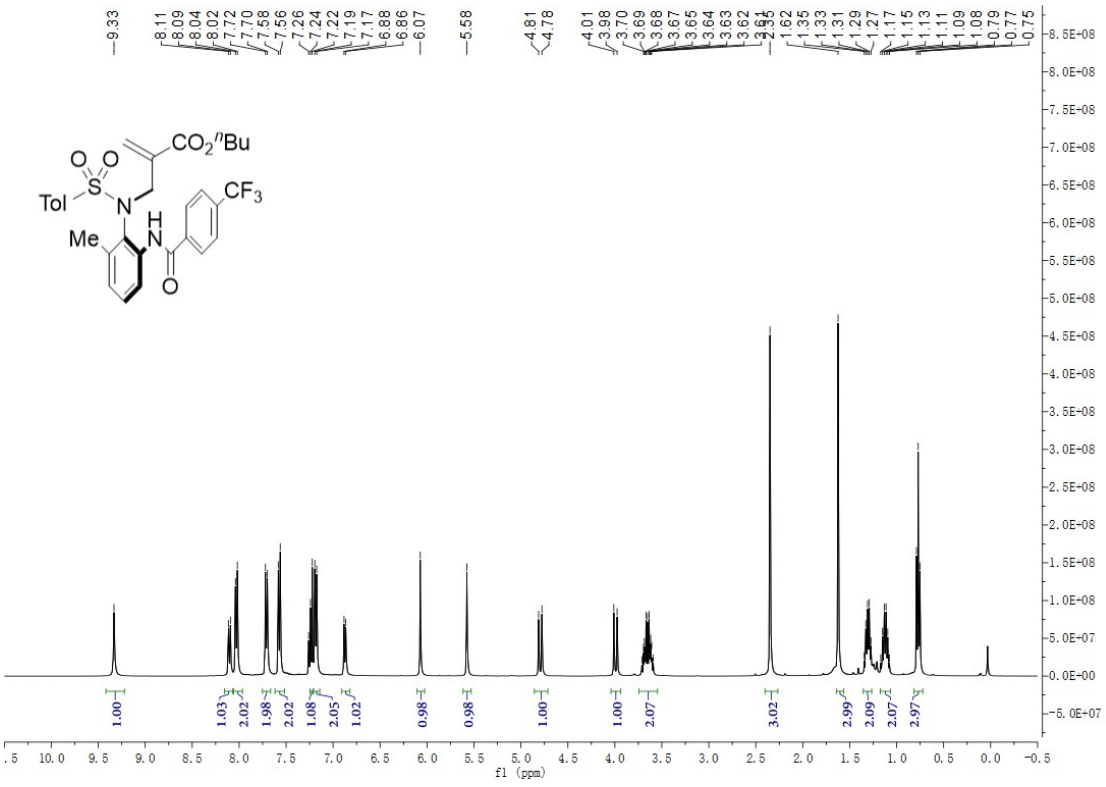

165.56
164.56
162.38
144.15
138.44
136.05
135.13
130.93
129.66
129.26
129.14
127.76
126.82
126.67
121.59
113.71
77.32
77.00
76.68
64.83
55.35
51.02
30.19
21.53
18.92
17.85
13.58
CO2nBu
Tol
S
O
O
N
Me
H
N
O
OMe
f1 (ppm)

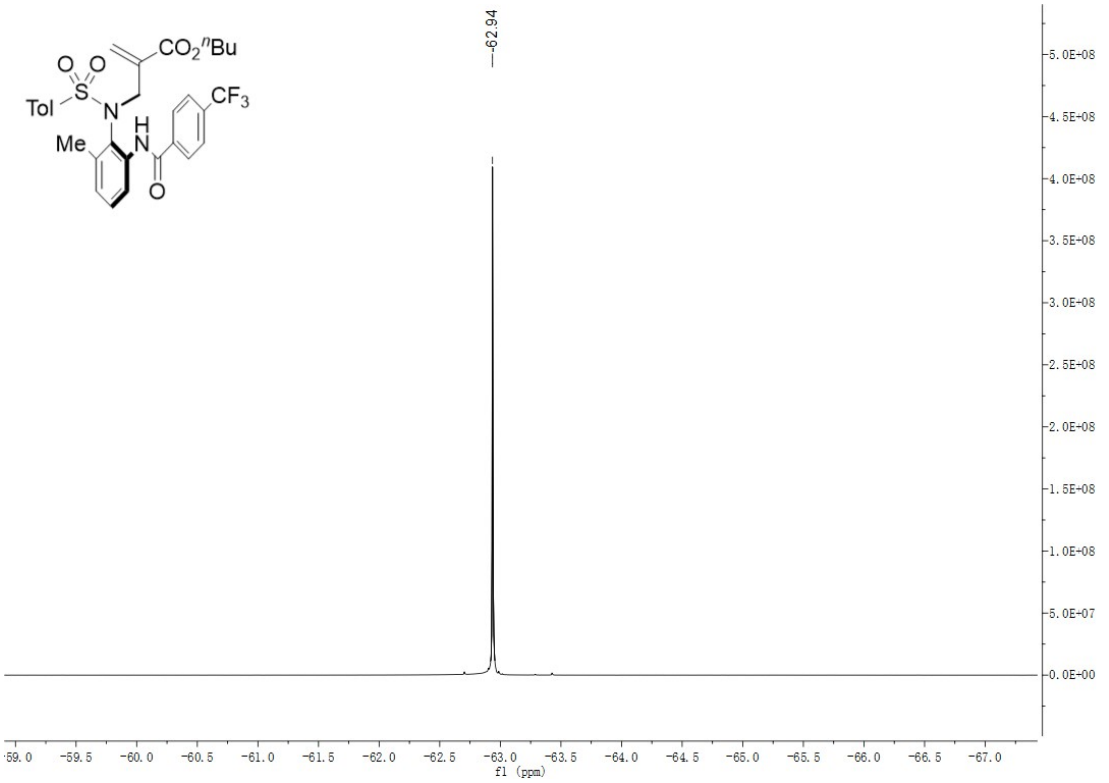
Compound **7d**

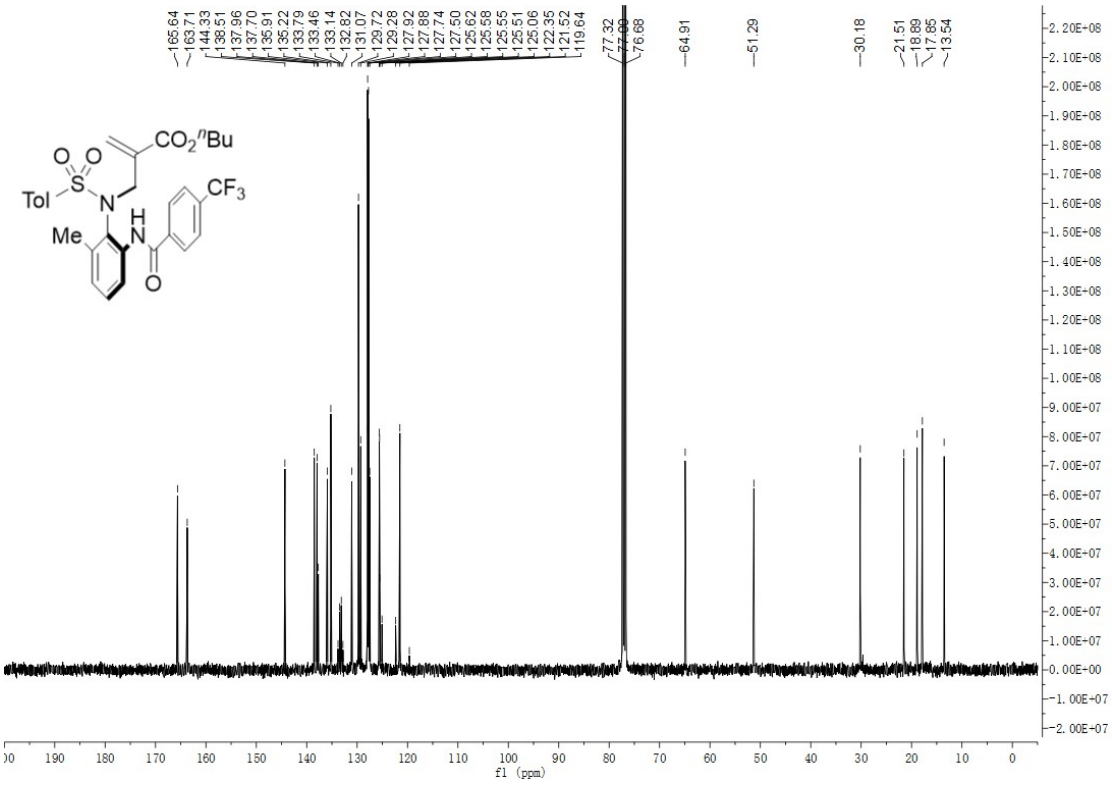

9.20
8.14
8.12
7.86
7.84
7.65
7.63
7.50
7.47
7.27
7.26
7.25
7.24
7.22
6.88
6.87
6.10
5.58
4.80
4.77
4.11
4.07
3.75
3.74
3.73
3.72
3.71
3.68
3.66
3.64
2.33
1.66
1.39
1.38
1.35
1.32
1.22
1.20
1.18
1.16
1.14
1.12
0.83
0.81
0.79
CO2nBu
Tol
S
O
O
N
Me
H
N
O
tBu
1.00
1.02
2.11
2.07
2.07
3.17
0.99
0.97
0.98
0.99
1.06
1.03
0.99
3.03
3.04
11.05
2.14
2.98
f1 (ppm)


165.55
164.92
155.18
144.12
138.50
138.37
136.13
135.10
131.38
130.96
129.67
129.13
127.79
127.66
127.22
126.96
125.45
121.73
77.32
77.00
76.68
64.77
51.03
34.90
31.12
30.21
21.54
18.92
17.88
13.59
CO2nBu
Tol
tBu
Me
H
N
O
f1 (ppm)

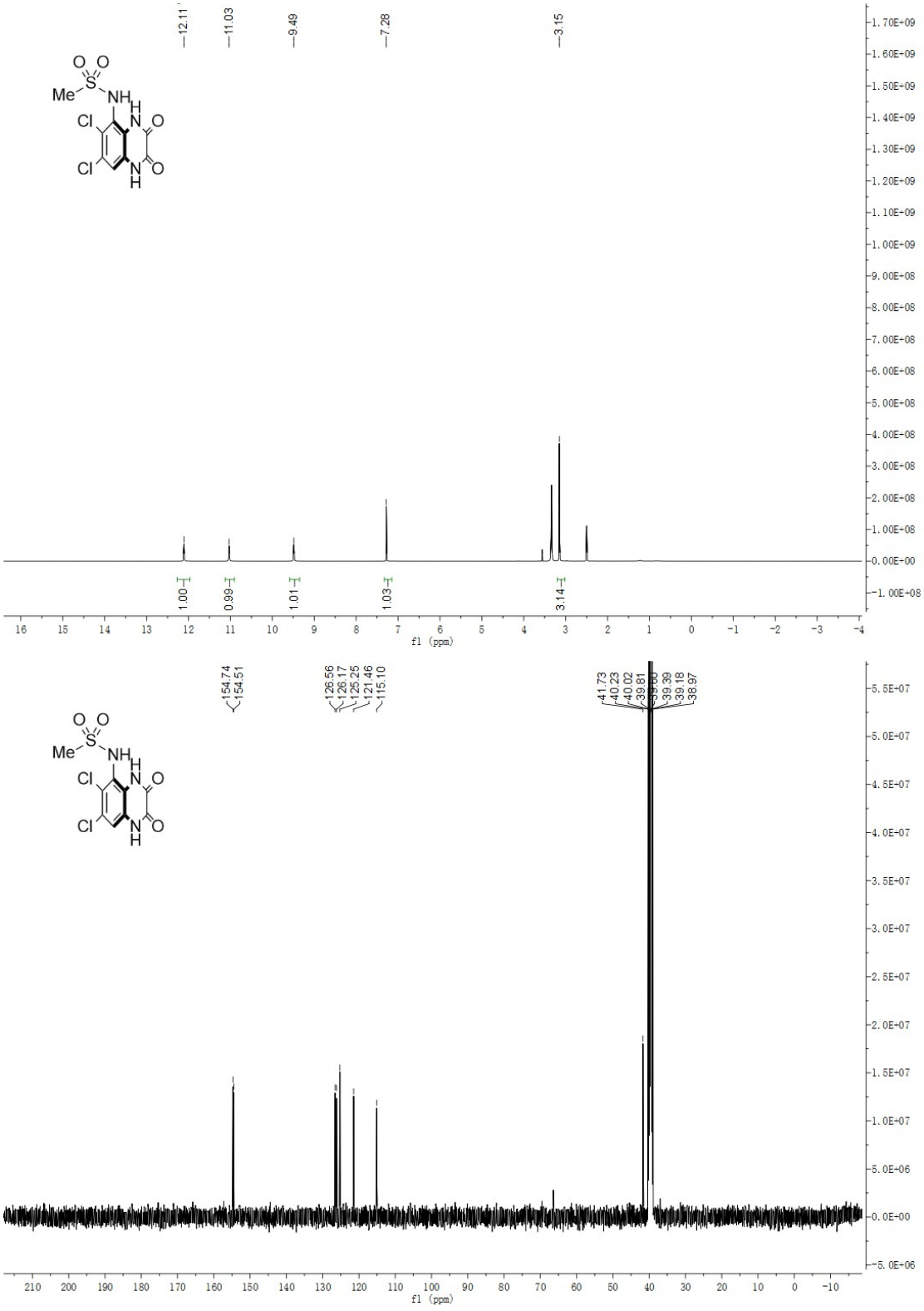
Compound **7e**


9.33
8.11
8.09
8.04
8.02
7.72
7.70
7.58
7.56
7.26
7.24
7.22
7.19
7.17
6.88
6.86
6.07
5.58
4.81
4.78
4.01
3.98
3.70
3.69
3.68
3.67
3.65
3.64
3.63
3.62
1.62
1.35
1.33
1.31
1.29
1.27
1.17
1.15
1.13
1.11
1.09
1.08
0.79
0.77
0.75
CO2nBu
Tol
CF3
Me
H
N
O
1.00
1.03
2.02
1.98
2.02
1.08
2.05
1.02
0.98
0.98
1.00
1.00
2.07
3.02
2.99
2.09
2.07
2.97
f1 (ppm)

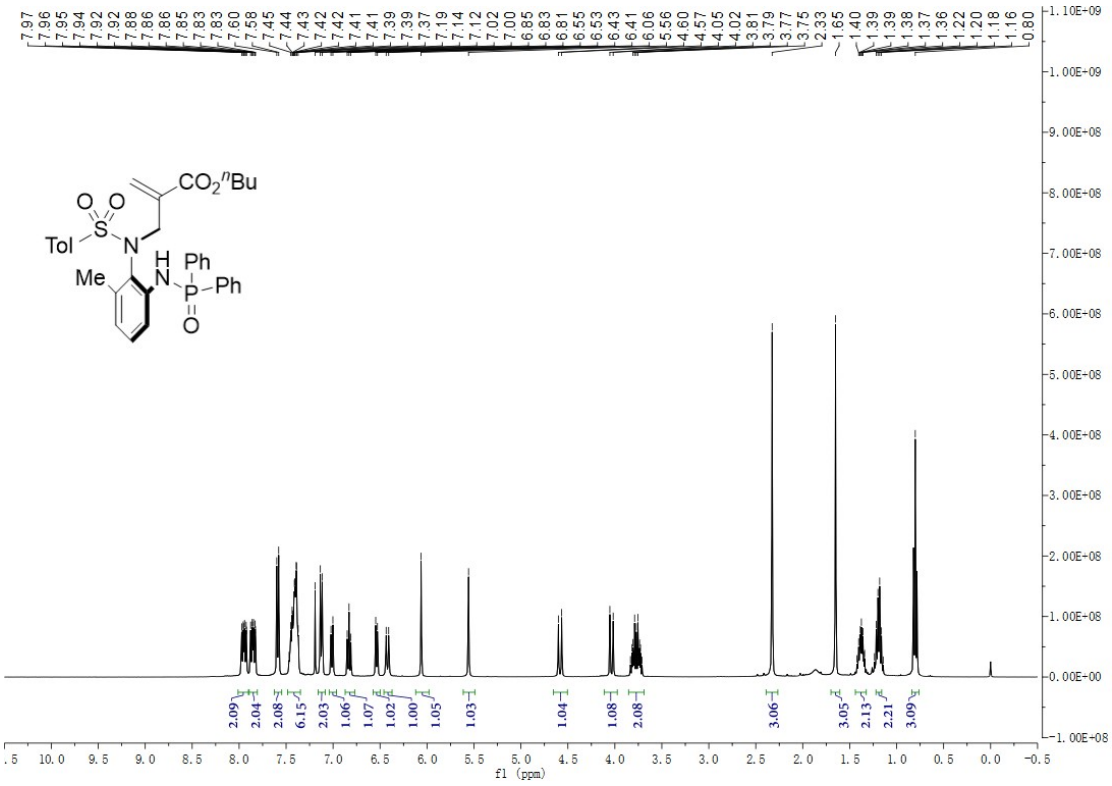

CO2nBu
O
O
S
Tol
N
Me
H
N
O
CF3
-62.94
5.0E+08
4.5E+08
4.0E+08
3.5E+08
3.0E+08
2.5E+08
2.0E+08
1.5E+08
1.0E+08
5.0E+07
0.0E+00
-59.0
-59.5
-60.0
-60.5
-61.0
-61.5
-62.0
-62.5
-63.0
-63.5
-64.0
-64.5
-65.0
-65.5
-66.0
-66.5
-67.0
f1 (ppm)

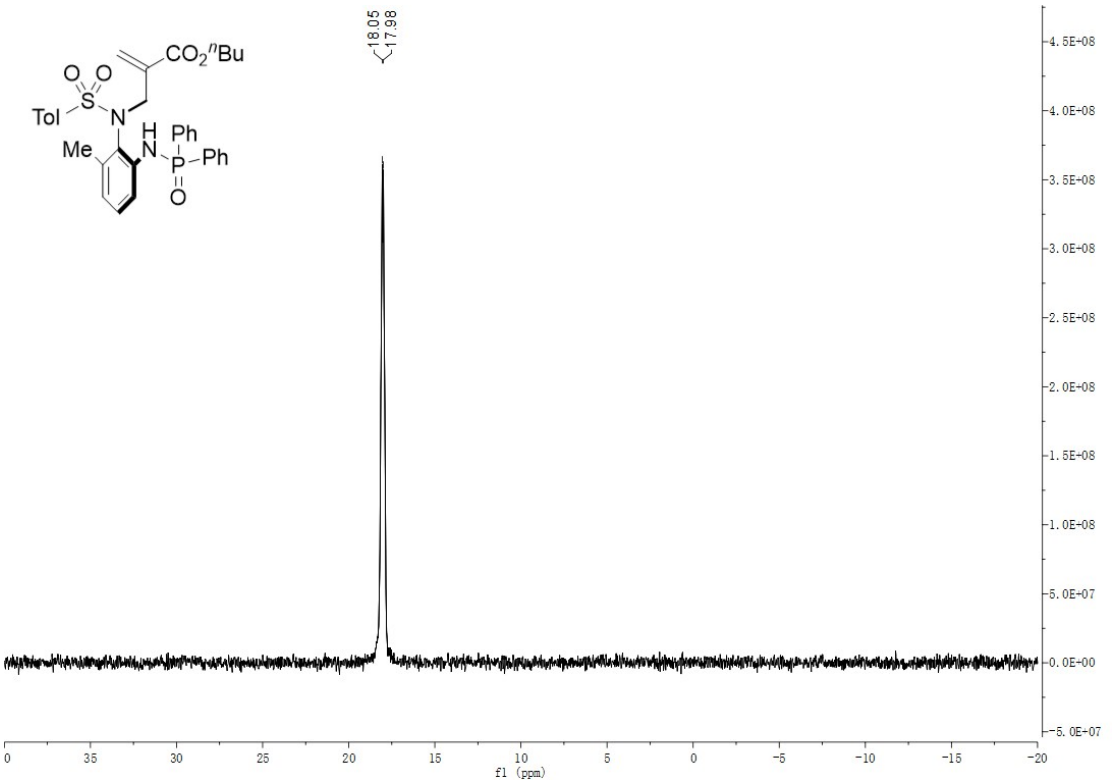

165.64
163.71
144.33
138.51
137.96
137.70
135.91
135.22
133.79
133.46
133.14
132.82
131.07
129.72
129.28
127.92
127.88
127.74
127.50
125.62
125.58
125.55
125.51
125.06
122.35
121.52
119.64
77.32
77.00
76.68
64.91
51.29
30.18
21.51
18.89
17.85
13.54
CO2nBu
O
O
S
Tol
N
Me
H
N
O
CF3
2.20E+08
2.10E+08
2.00E+08
1.90E+08
1.80E+08
1.70E+08
1.60E+08
1.50E+08
1.40E+08
1.30E+08
1.20E+08
1.10E+08
1.00E+08
9.00E+07
8.00E+07
7.00E+07
6.00E+07
5.00E+07
4.00E+07
3.00E+07
2.00E+07
1.00E+07
0.00E+00
-1.00E+07
-2.00E+07
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

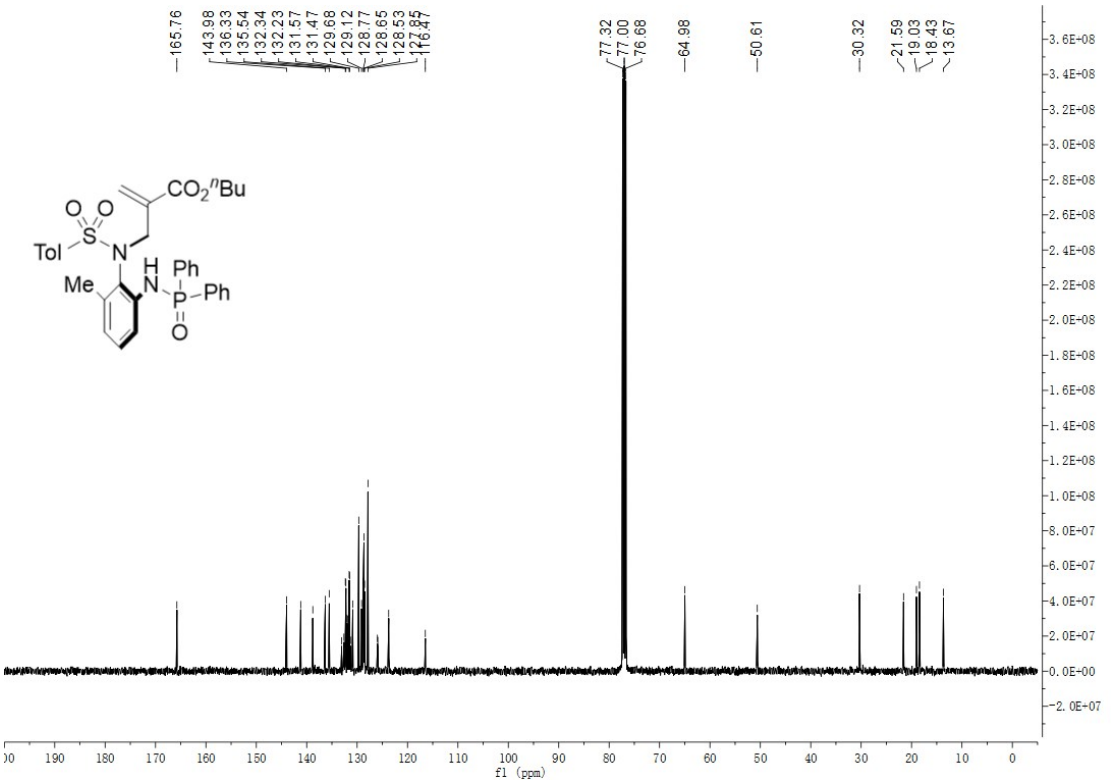
Compound **6f**


12.11
11.03
9.49
7.28
3.15
1.00
0.99
1.01
1.03
3.14
f1 (ppm)
154.74
154.51
126.56
126.17
125.25
121.46
115.10
41.73
40.23
40.02
39.81
39.60
39.39
39.18
38.97
f1 (ppm)

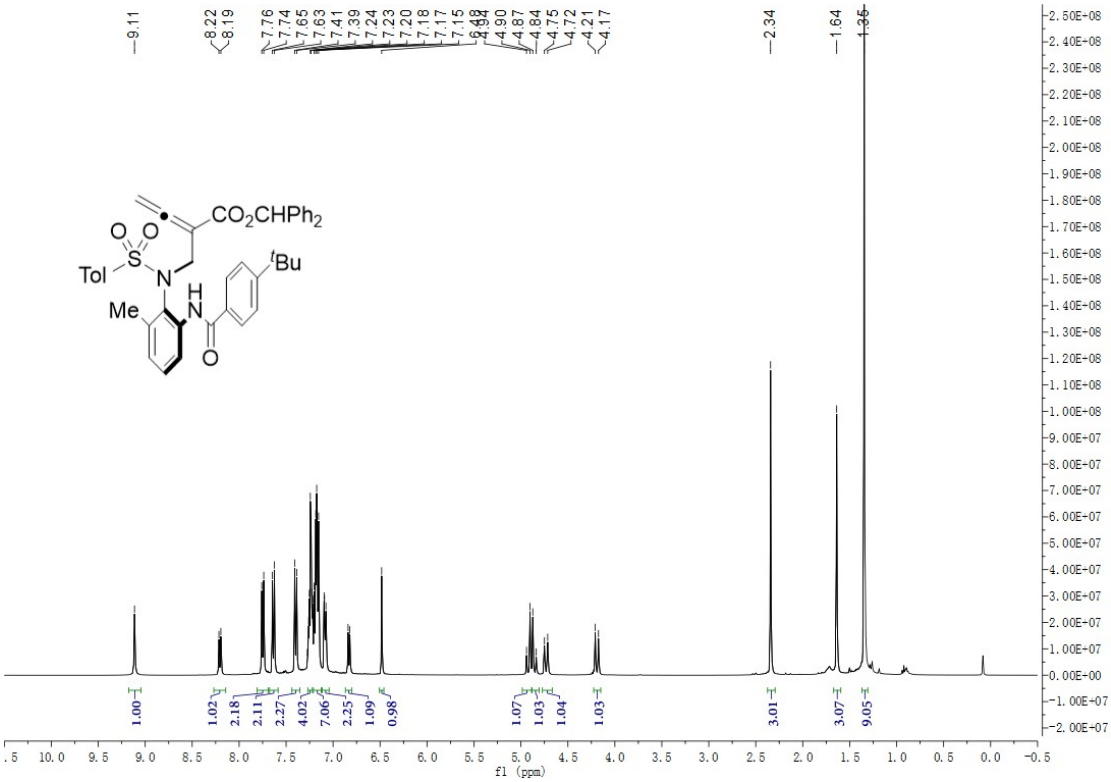
Compound **7g**

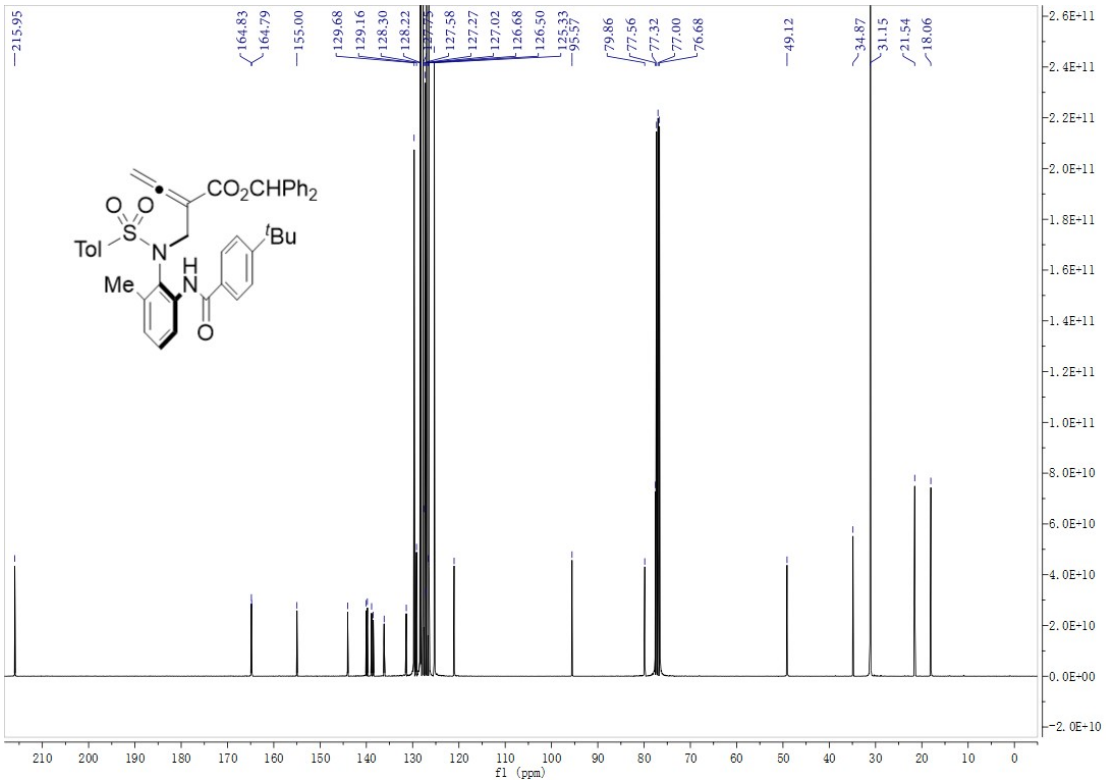

7.97 7.96 7.95 7.94 7.92 7.92 7.88 7.86 7.86 7.85 7.83 7.83 7.60 7.58 7.45 7.44 7.43 7.42 7.42 7.41 7.41 7.39 7.39 7.37 7.19 7.14 7.12 7.02 7.00 6.85 6.83 6.81 6.55 6.53 6.43 6.41 6.06 5.56 4.60 4.57 4.05 4.02 3.81 3.79 3.77 3.75 2.33 1.65 1.40 1.39 1.39 1.38 1.37 1.36 1.22 1.20 1.18 1.16 0.80
CO2nBu
Tol
Me
Ph
Ph
2.09 2.04 2.08 6.15 2.03 1.06 1.07 1.02 1.00 1.05 1.03 1.04 1.08 2.08 3.06 3.05 2.13 2.21 3.09
f1 (ppm)


18.05
17.98
CO2nBu
Tol
Me
Ph
Ph
f1 (ppm)

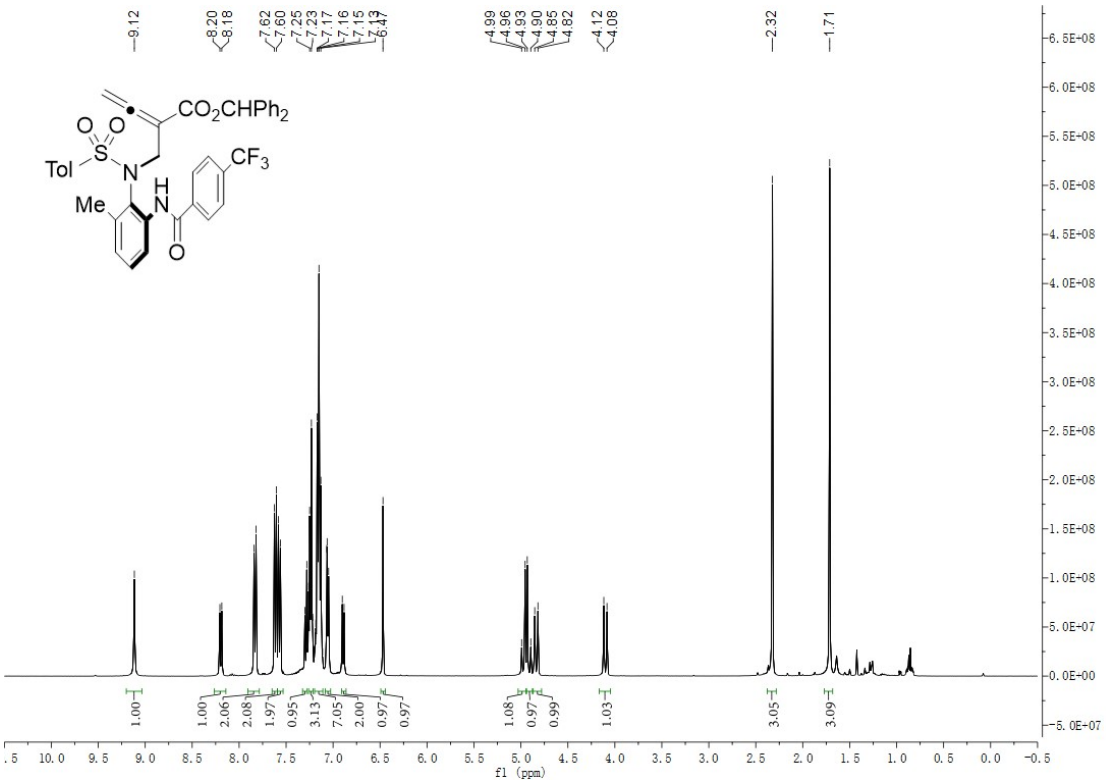

165.76
143.98
136.33
135.54
132.34
132.23
131.57
131.47
129.68
129.12
128.77
128.65
128.53
127.85
116.47
77.32
77.00
76.68
64.98
50.61
30.32
21.59
19.03
18.43
13.67
CO2nBu
Tol
Me
Ph
Ph
f1 (ppm)

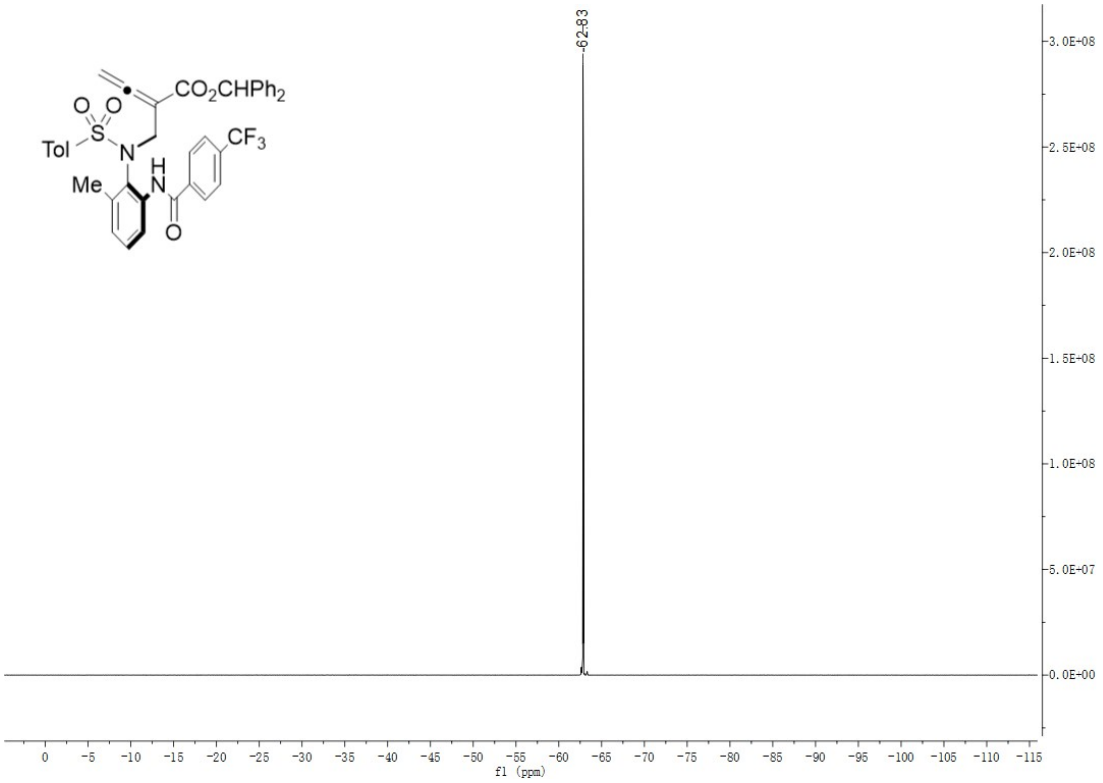
Compound **7h**

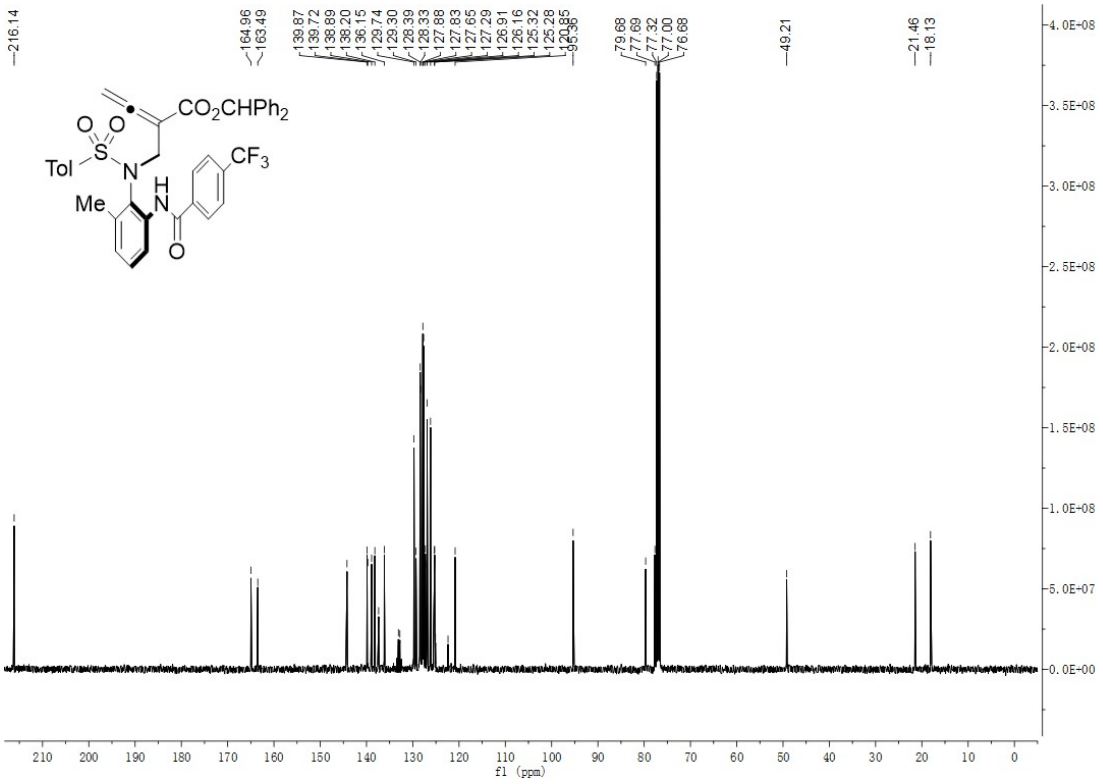

9.11
8.22
8.19
7.76
7.74
7.65
7.63
7.41
7.39
7.24
7.23
7.20
7.18
7.17
7.15
4.90
4.87
4.84
4.75
4.72
4.21
4.17
2.34
1.64
1.36
CO2CHPh2
Tol
Me
tBu
1.00
1.02
2.18
2.11
2.27
4.02
7.06
2.25
1.09
0.98
1.07
1.03
1.04
1.03
3.01
3.07
9.05
f1 (ppm)


215.95
164.83
164.79
155.00
129.68
129.16
128.30
128.22
127.58
127.27
127.02
126.68
126.50
125.33
95.57
79.86
77.56
77.32
77.00
76.68
49.12
34.87
31.15
21.54
18.06
CO2CHPh2
Tol
S
O
O
N
H
N
O
Me
tBu
f1 (ppm)

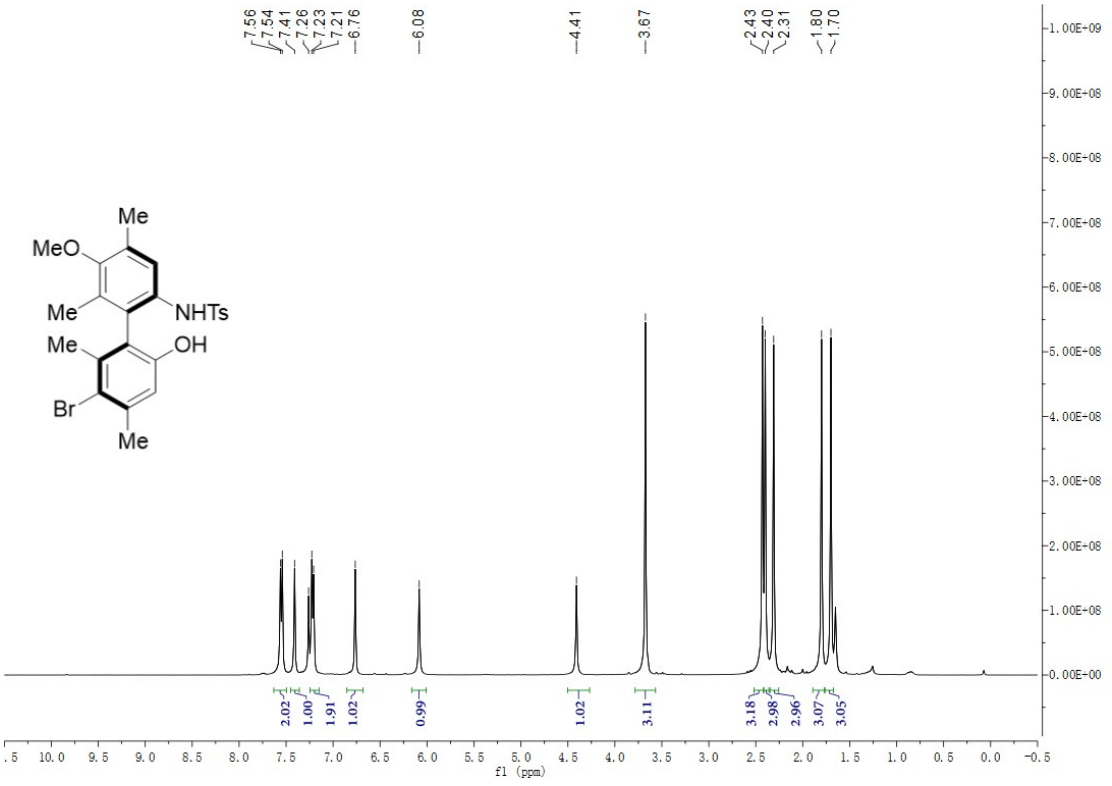
Compound **7i**

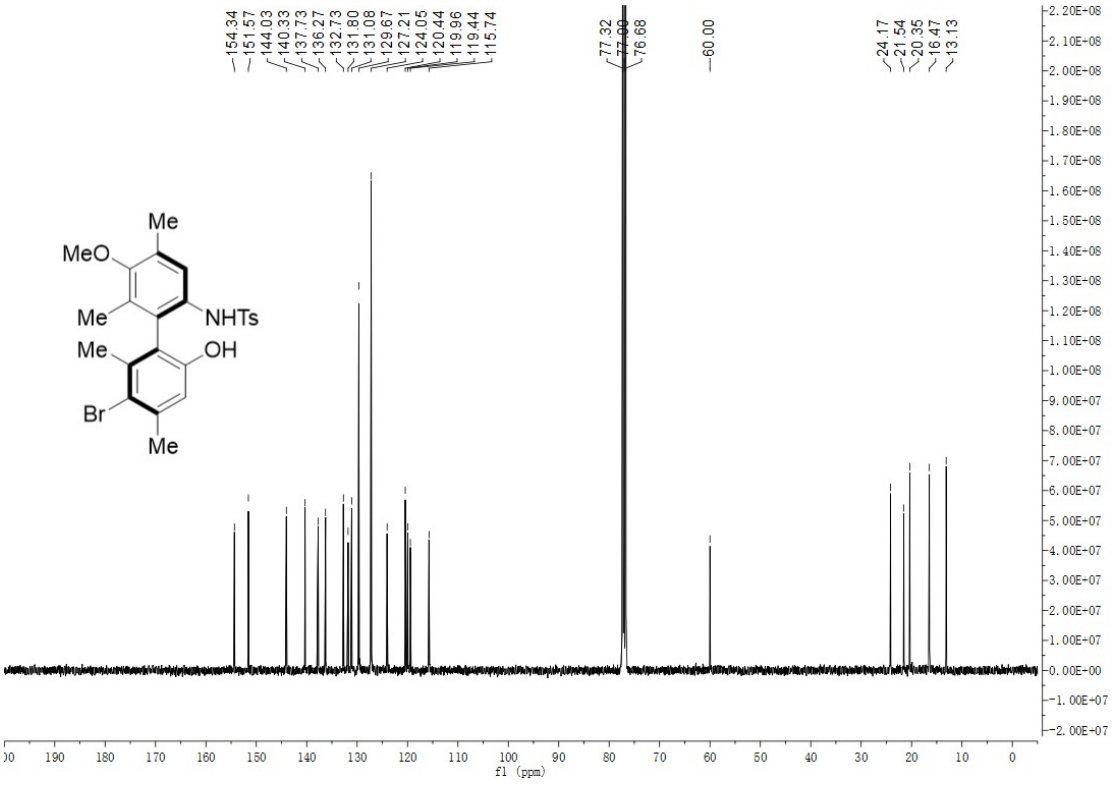

9.12
8.20
8.18
7.62
7.60
7.25
7.23
7.17
7.16
7.15
7.13
6.47
4.99
4.96
4.93
4.90
4.85
4.82
4.12
4.08
2.32
1.71
CO2CHPh2
Tol
S
O
O
N
H
N
O
Me
CF3
1.00
1.00
2.06
2.08
1.97
0.95
3.13
7.05
2.00
0.97
0.97
1.08
0.97
0.99
1.03
3.05
3.09
f1 (ppm)


-62.83
CO2CHPh2
Tol
CF3
Me
f1 (ppm)

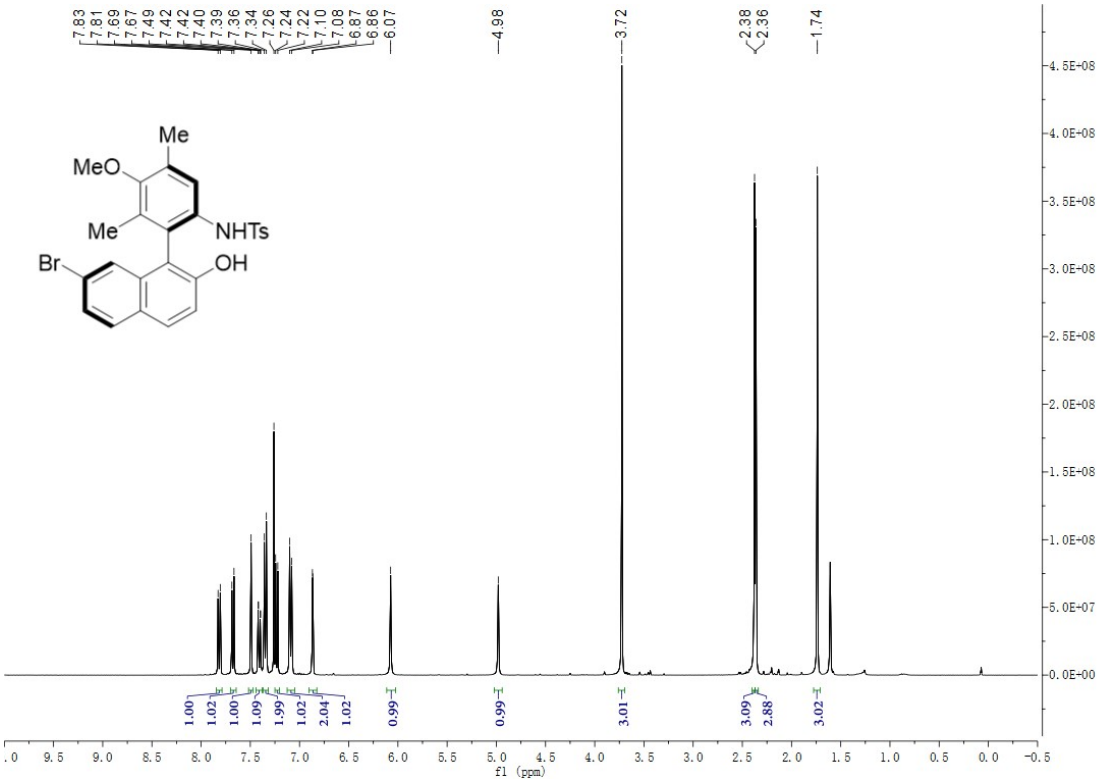

216.14
164.96
163.49
139.87
139.72
138.89
138.20
136.15
129.74
129.30
128.39
128.33
127.88
127.83
127.65
127.29
126.91
126.16
125.32
125.28
120.85
93.38
79.68
77.69
77.32
77.00
76.68
49.21
21.46
18.13
CO2CHPh2
Tol
CF3
Me
f1 (ppm)

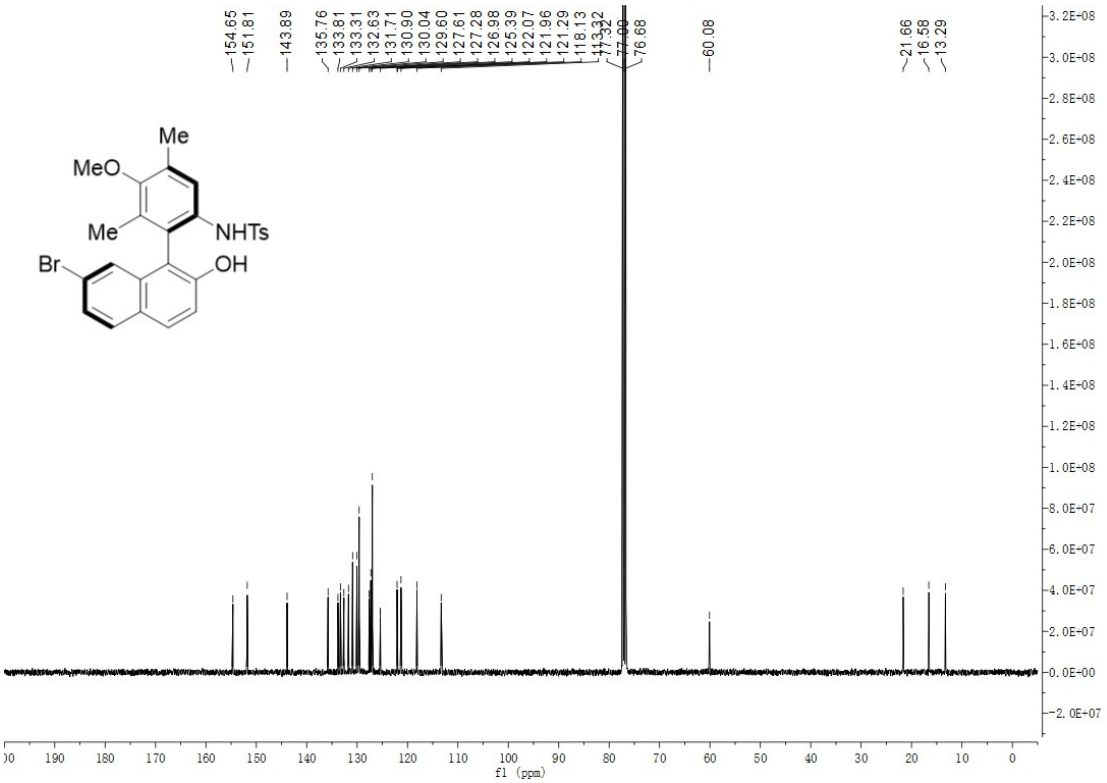
Compound **8a**


7.56
7.54
7.41
7.26
7.23
7.21
6.76
6.08
4.41
3.67
2.43
2.40
2.31
1.80
1.70
Me
MeO
Me
NHTs
Me
OH
Br
Me
2.02
1.00
1.91
1.02
0.99
1.02
3.11
3.18
2.98
2.96
3.07
3.05
f1 (ppm)

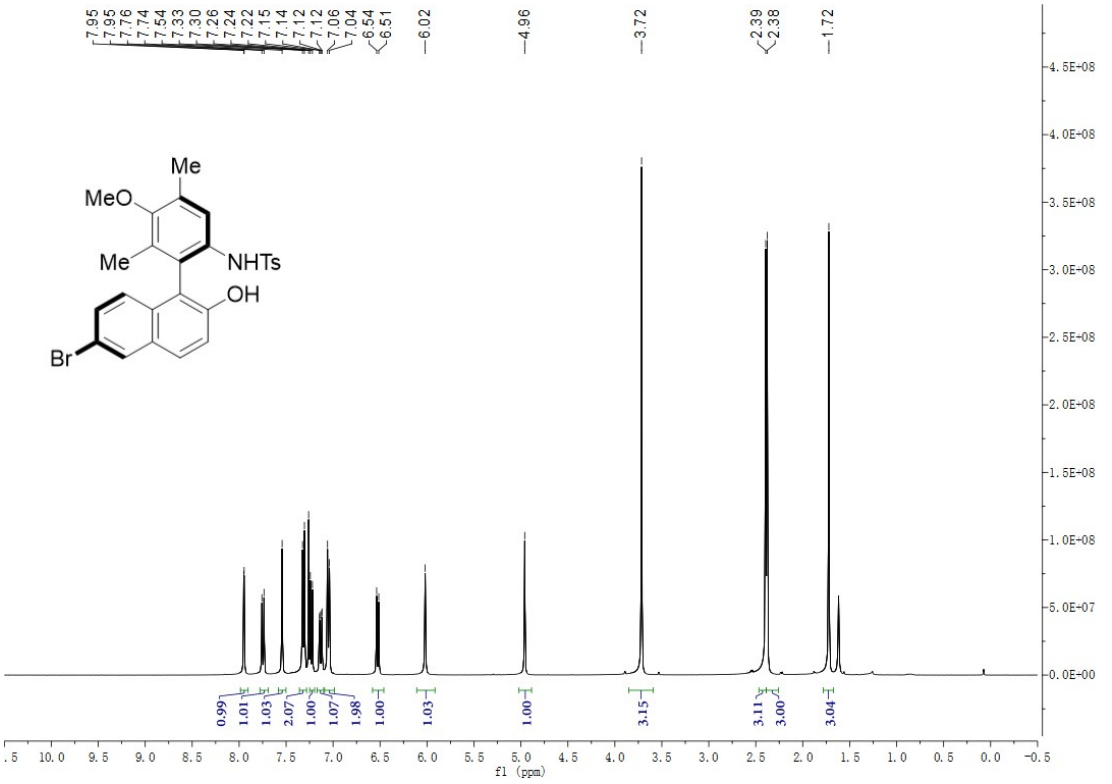

154.34
151.57
144.03
140.33
137.73
136.27
132.73
131.80
131.08
129.67
127.21
124.05
120.44
119.96
119.44
115.74
77.32
77.00
76.68
60.00
24.17
21.54
20.35
16.47
13.13
Me
MeO
Me
NHTs
Me
OH
Br
Me
f1 (ppm)

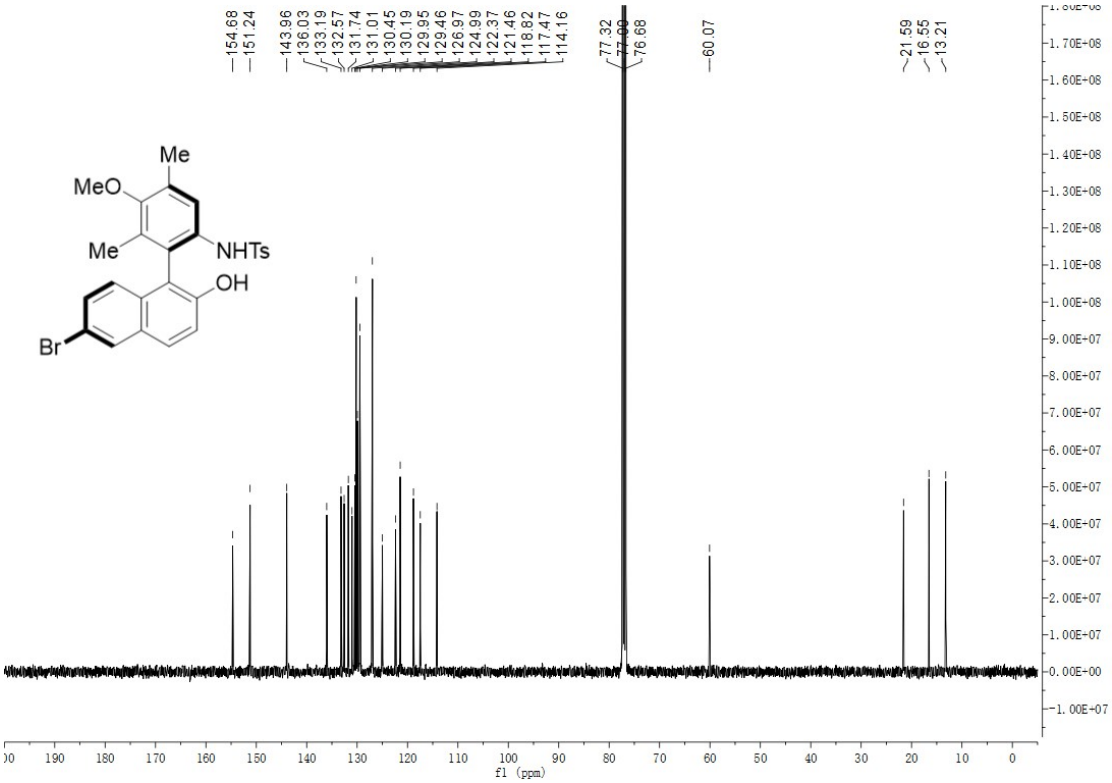
Compound **8b**


7.83
7.81
7.69
7.67
7.49
7.42
7.42
7.40
7.39
7.36
7.34
7.26
7.24
7.22
7.10
7.08
6.87
6.86
6.07
4.98
3.72
2.38
2.36
1.74
Me
MeO
Me
NHTs
Br
OH
1.00
1.02
1.00
1.09
1.99
1.02
2.04
1.02
0.99
0.99
3.01
3.09
2.88
3.02
f1 (ppm)

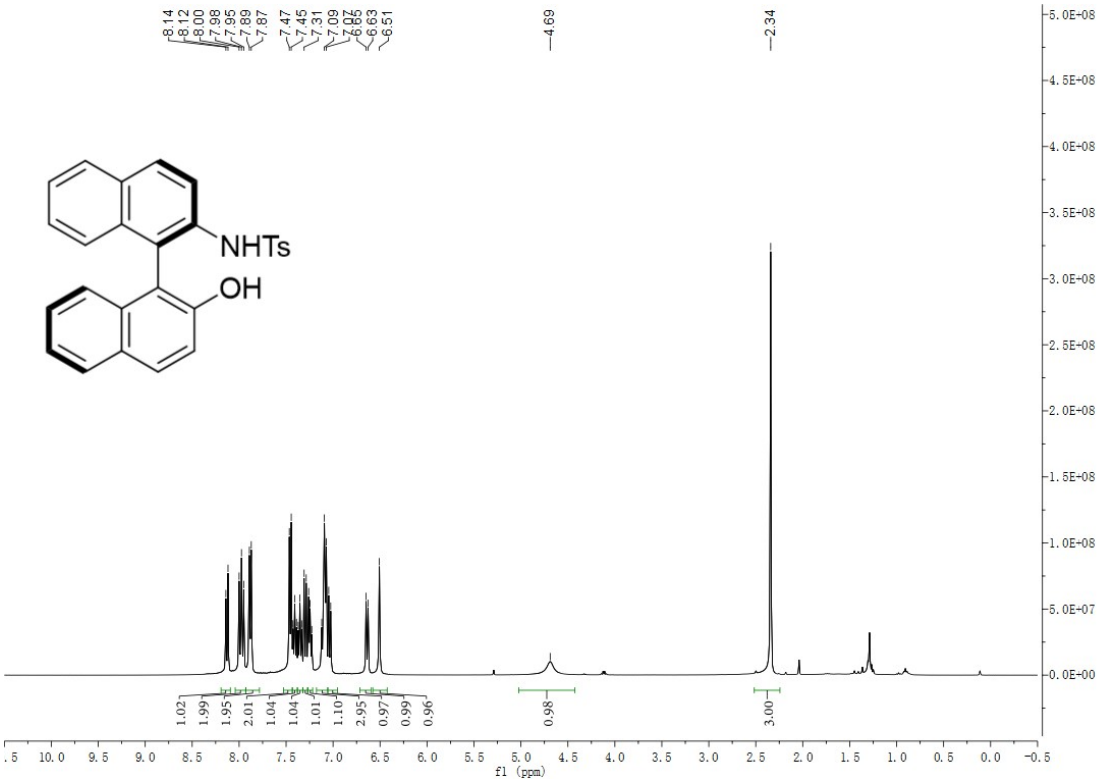

154.65
151.81
143.89
135.76
133.81
133.31
132.63
131.71
130.90
130.04
129.60
127.61
127.28
126.98
125.39
122.07
121.96
121.29
118.13
77.32
77.00
76.68
60.08
21.66
16.58
13.29
Me
MeO
Me
NHTs
Br
OH
f1 (ppm)

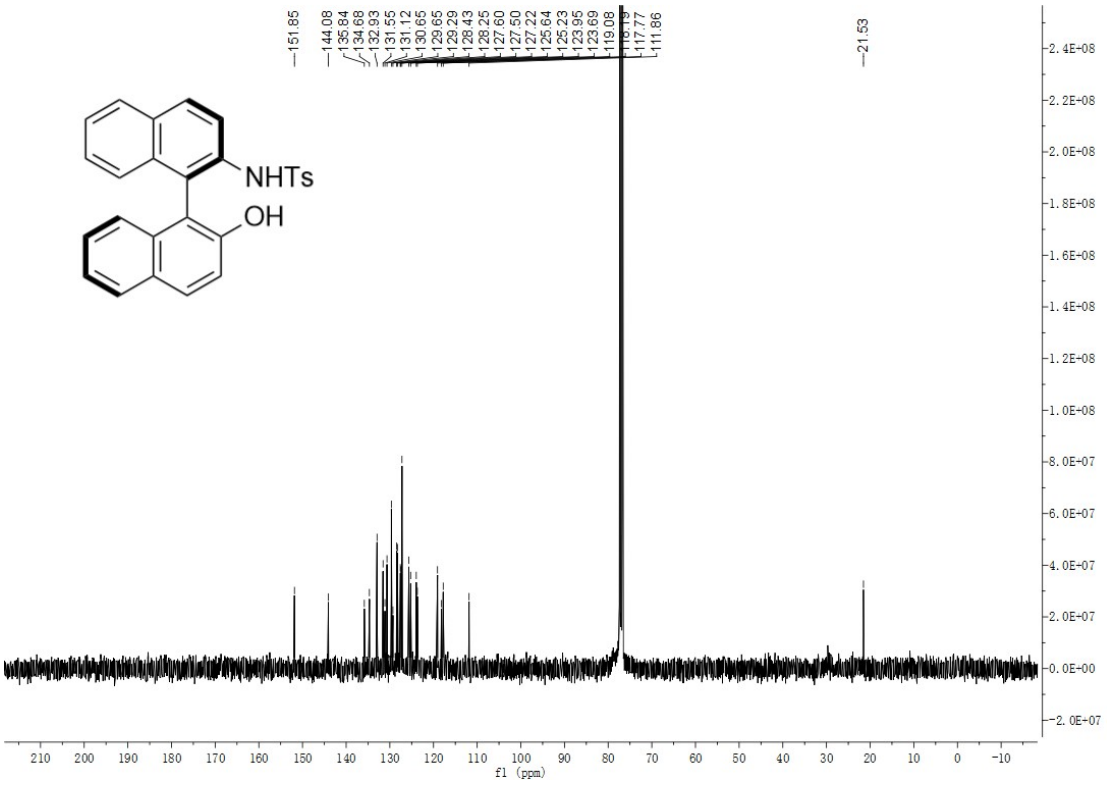
Compound **8c**



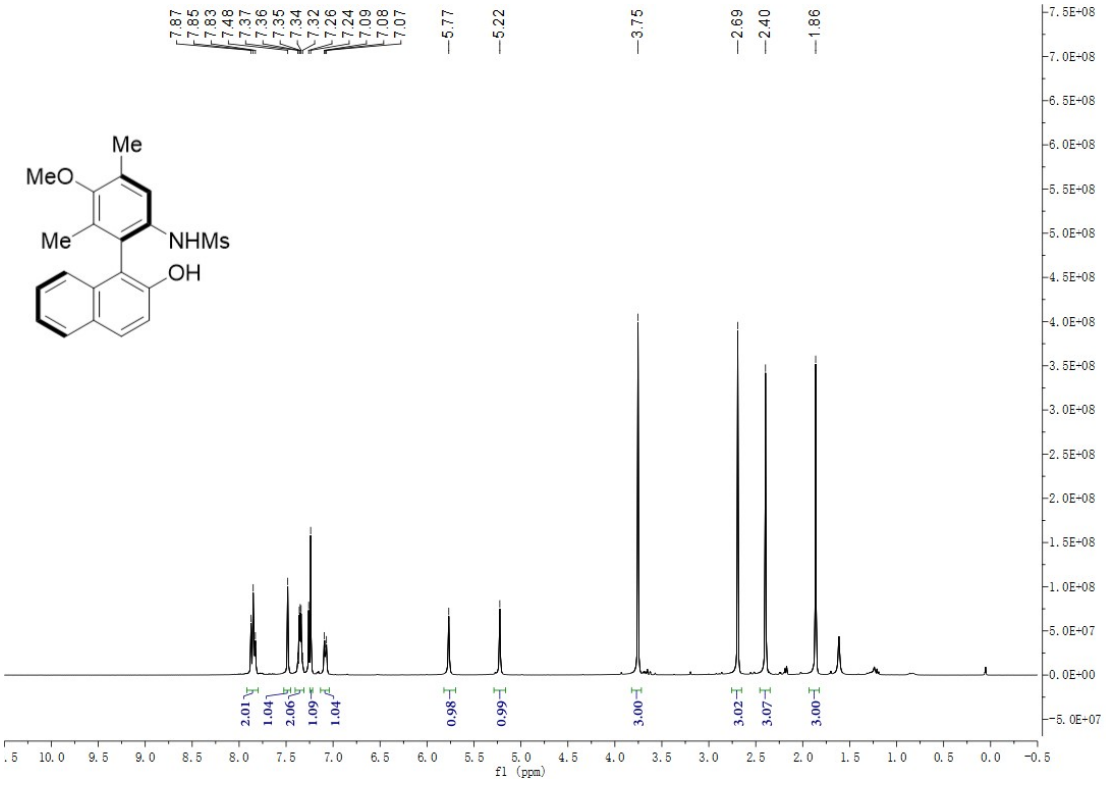


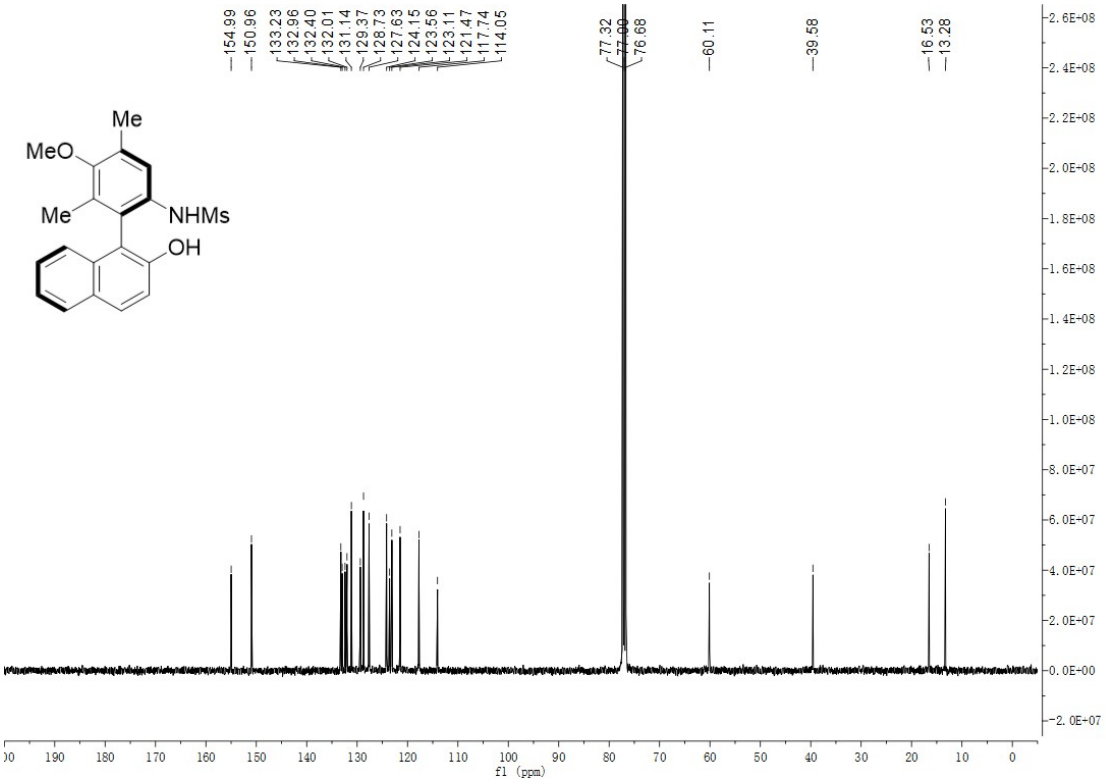
Compound **8d**


8.14
8.12
8.00
7.98
7.95
7.89
7.87
7.47
7.45
7.31
7.09
7.07
6.65
6.63
6.51
4.69
2.34
NHTs
OH
1.02
1.99
1.95
2.01
1.04
1.04
1.01
1.10
2.95
0.97
0.99
0.96
0.98
3.00
f1 (ppm)

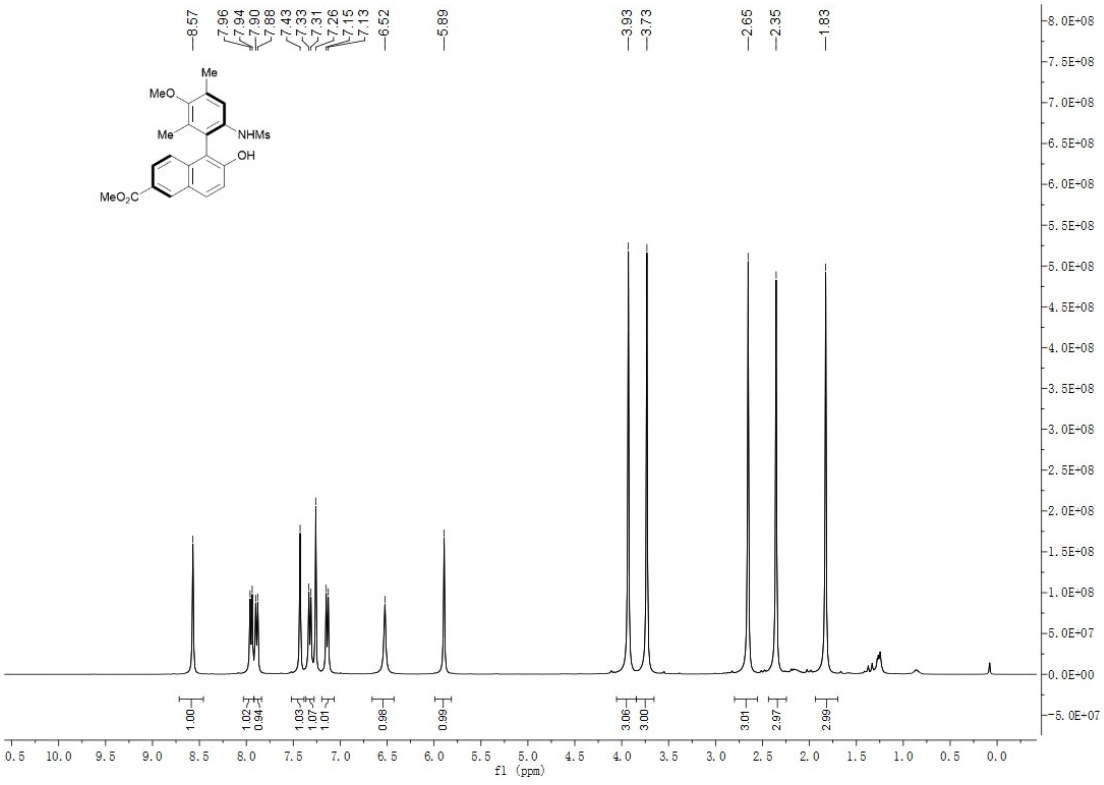

151.85
144.08
135.84
134.68
132.93
131.55
131.12
130.65
129.65
129.29
128.43
128.25
127.60
127.50
127.22
125.64
125.23
123.95
123.69
119.08
117.77
111.86
21.53
NHTs
OH
f1 (ppm)

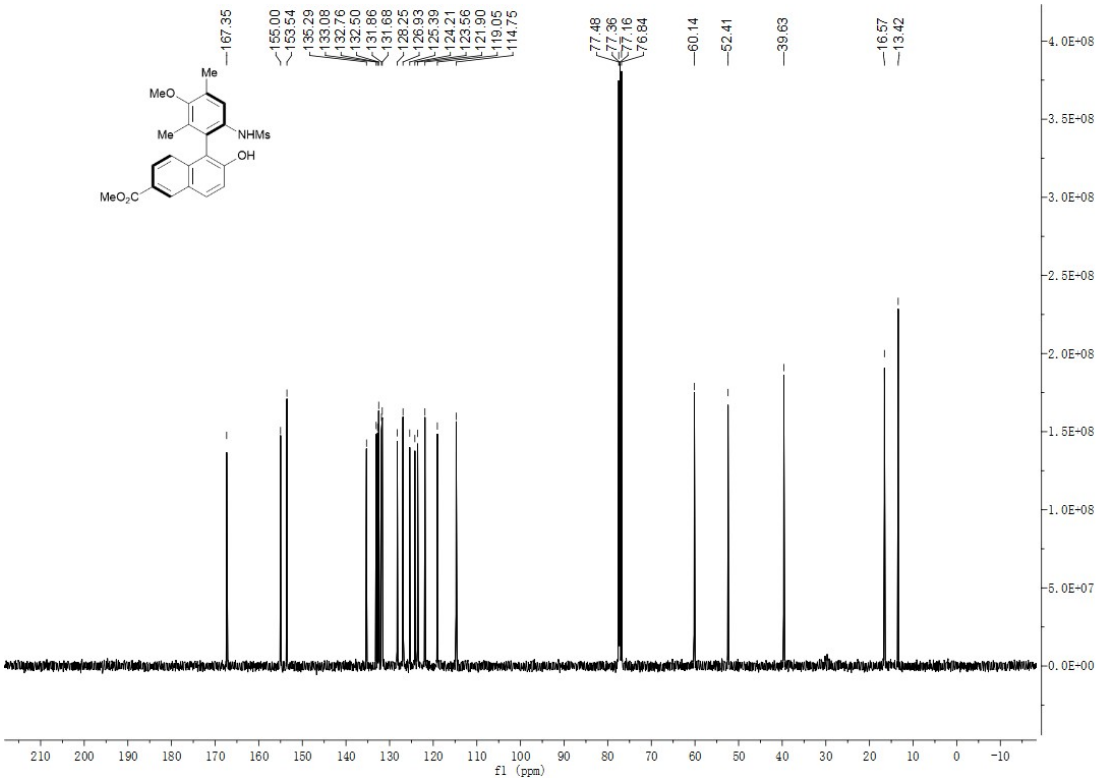
Compound **8e**


7.87
7.85
7.83
7.48
7.37
7.36
7.35
7.34
7.32
7.26
7.24
7.09
7.08
7.07
5.77
5.22
3.75
2.69
2.40
1.86
Me
MeO
Me
NHMs
OH
2.01
1.04
2.06
1.09
1.04
0.98
0.99
3.00
3.02
3.07
3.00
f1 (ppm)

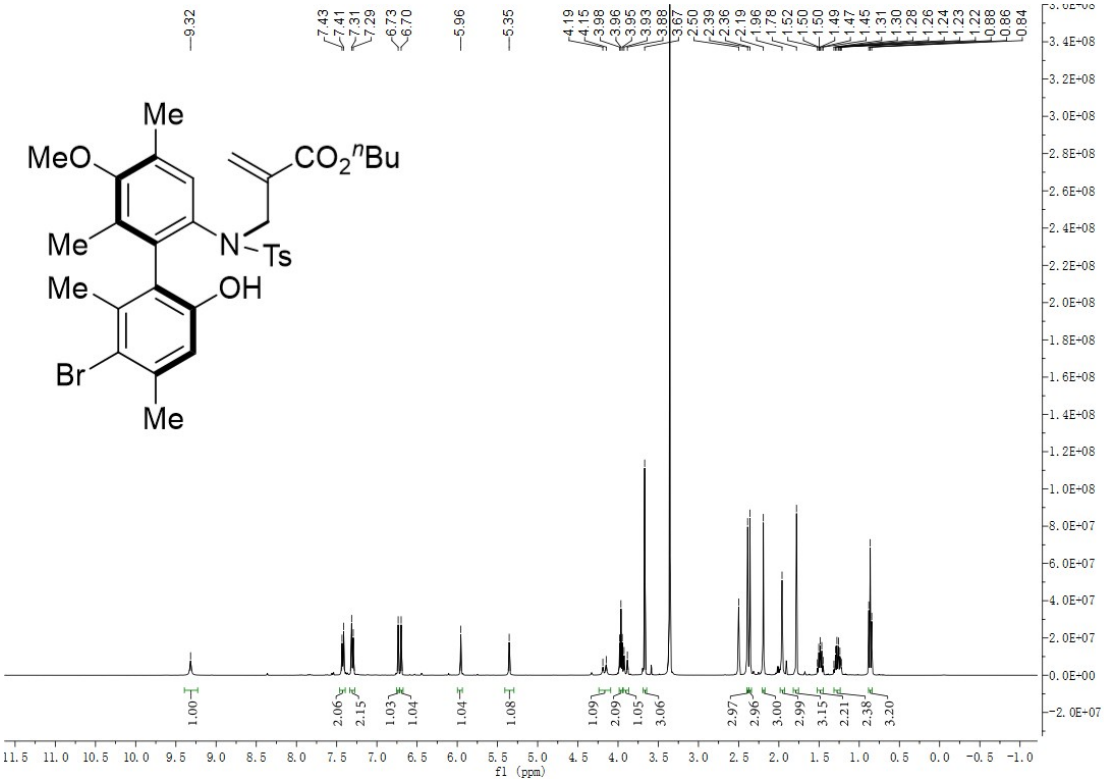

154.99
150.96
133.23
132.96
132.40
132.01
131.14
129.37
128.73
127.63
124.15
123.56
123.11
121.47
117.74
114.05
77.32
77.00
76.68
60.11
39.58
16.53
13.28
Me
MeO
Me
NHMs
OH
f1 (ppm)

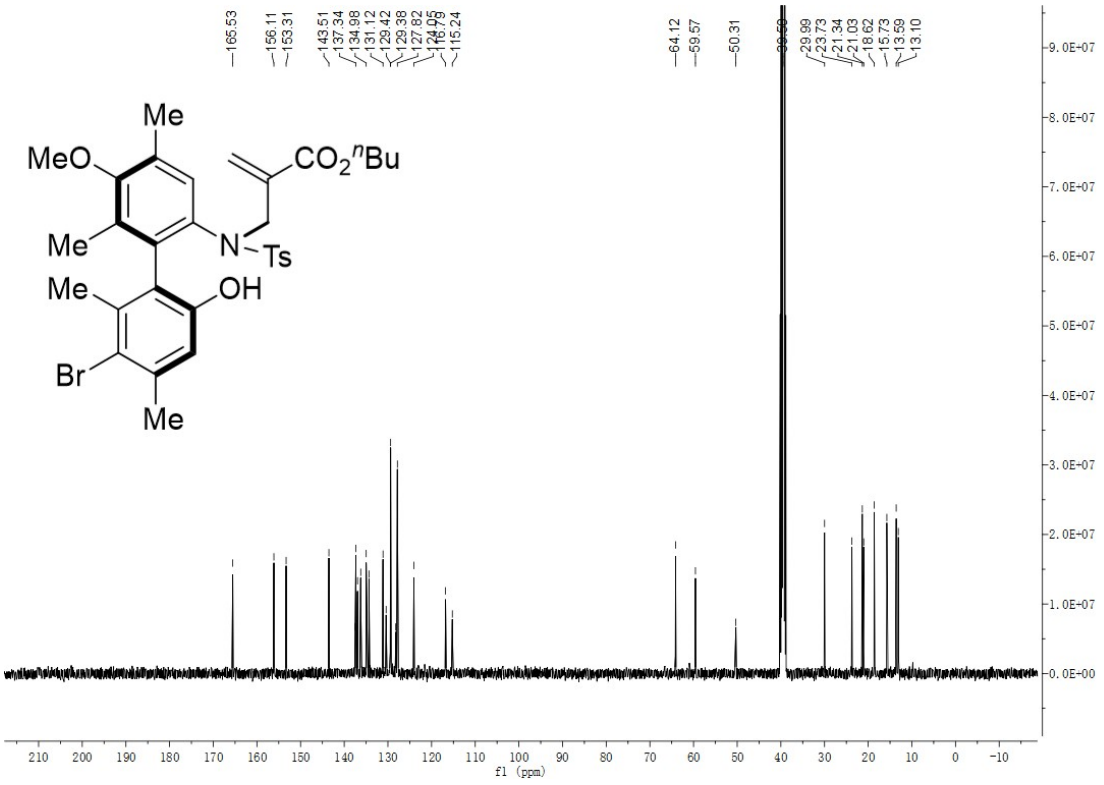
Compound **8f**


8.57
7.96
7.94
7.90
7.88
7.43
7.33
7.31
7.26
7.15
7.13
6.52
5.89
3.93
3.73
2.65
2.35
1.83
Me
MeO
Me
NHMs
OH
MeO2C
1.00
1.02
0.94
1.03
1.07
1.01
0.98
0.99
3.06
3.00
3.01
2.97
2.99
f1 (ppm)

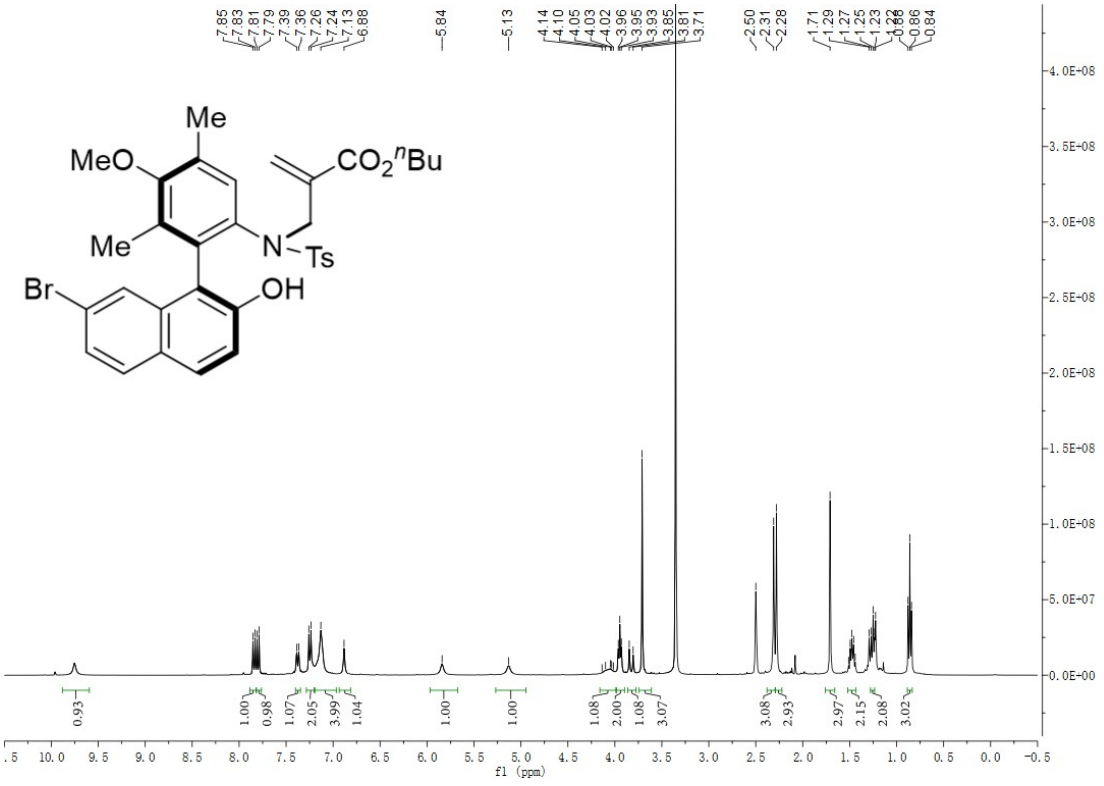

167.35
155.00
153.54
135.29
133.08
132.76
132.50
131.86
131.68
128.25
126.93
125.39
124.21
123.56
121.90
119.05
114.75
77.48
77.36
77.16
76.84
60.14
52.41
39.63
16.57
13.42
Me
MeO
Me
NHMs
OH
MeO2C
f1 (ppm)

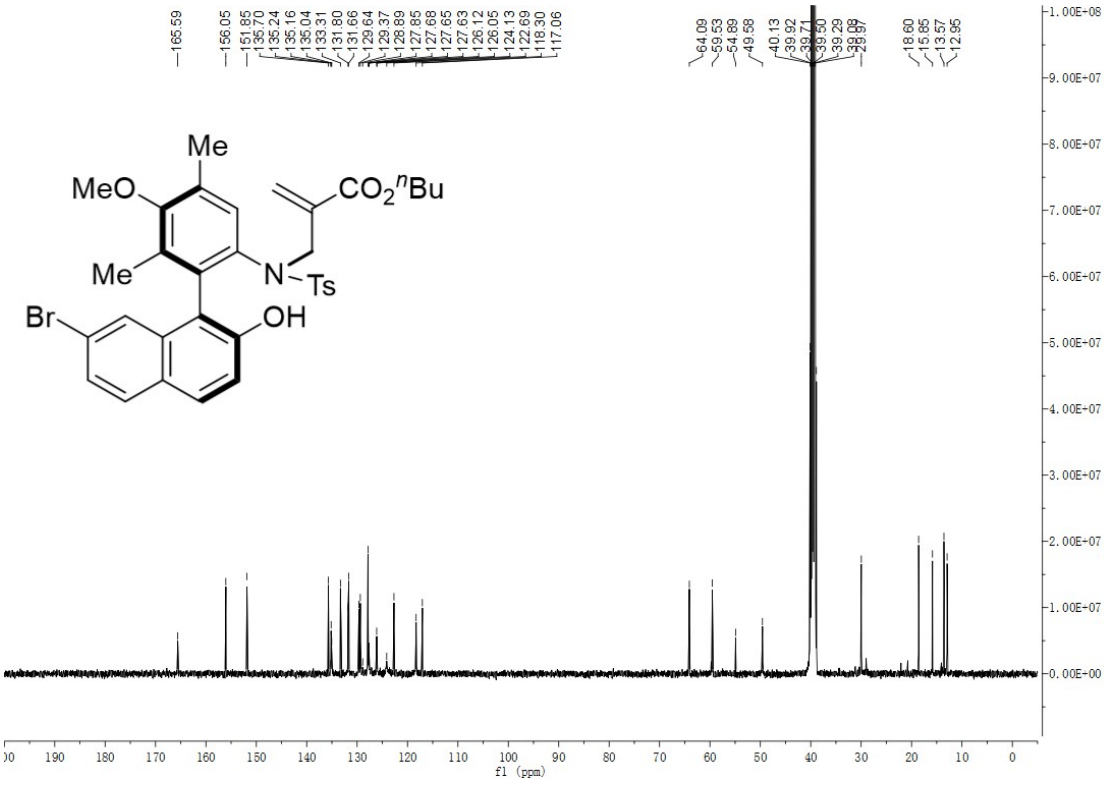
Compound **9a**


Me
MeO
CO2nBu
Me
N
Ts
Me
OH
Br
Me
9.32
7.43
7.41
7.31
7.29
6.73
6.70
5.96
5.35
4.19
4.15
3.98
3.96
3.95
3.93
3.88
3.67
2.50
2.39
2.36
2.19
1.96
1.78
1.52
1.50
1.50
1.49
1.47
1.45
1.31
1.30
1.28
1.26
1.24
1.23
1.22
0.88
0.86
0.84
1.00
2.06
2.15
1.03
1.04
1.04
1.08
1.09
2.09
1.05
3.06
2.97
2.96
3.00
2.99
3.15
2.21
2.38
3.20
f1 (ppm)

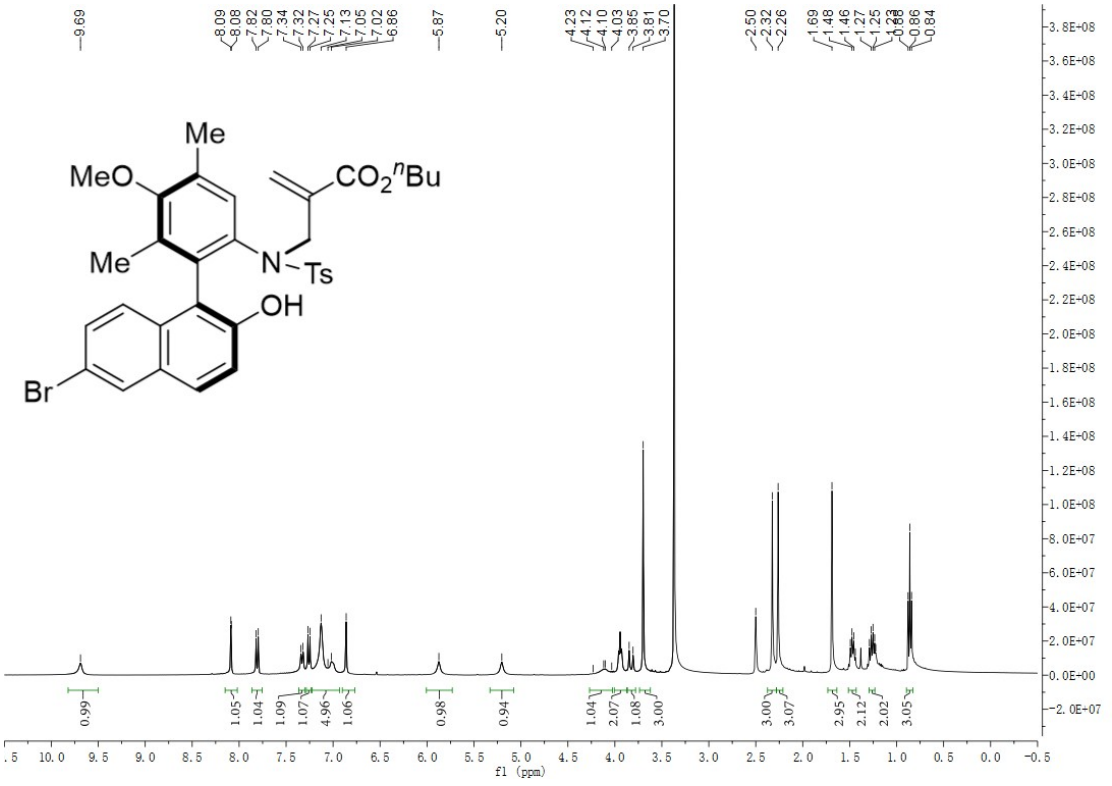

Me
MeO
CO2nBu
Me
N
Ts
Me
OH
Br
Me
165.53
156.11
153.31
143.51
137.34
134.98
131.12
129.42
129.38
127.82
124.05
118.79
115.24
64.12
59.57
50.31
30.59
29.99
23.73
21.34
21.03
18.62
15.73
13.59
13.10
f1 (ppm)

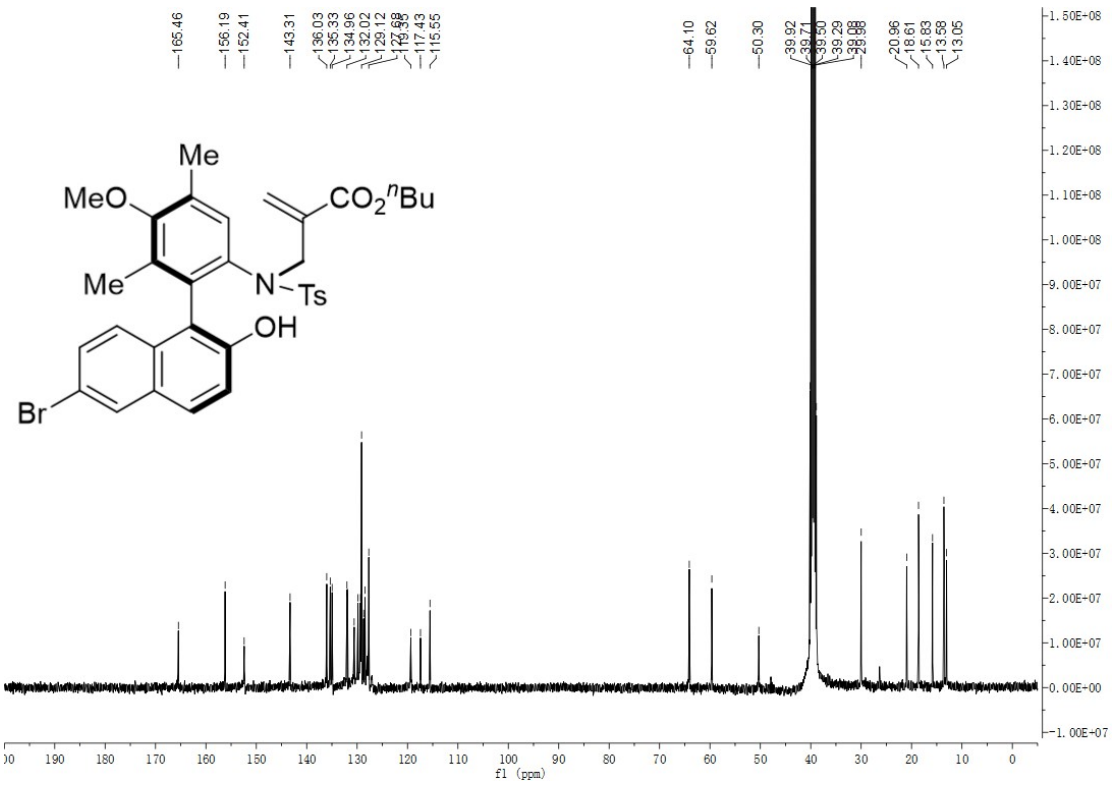
Compound **9b**


Me
MeO
CO2nBu
Me
N
Ts
Br
OH
f1 (ppm)

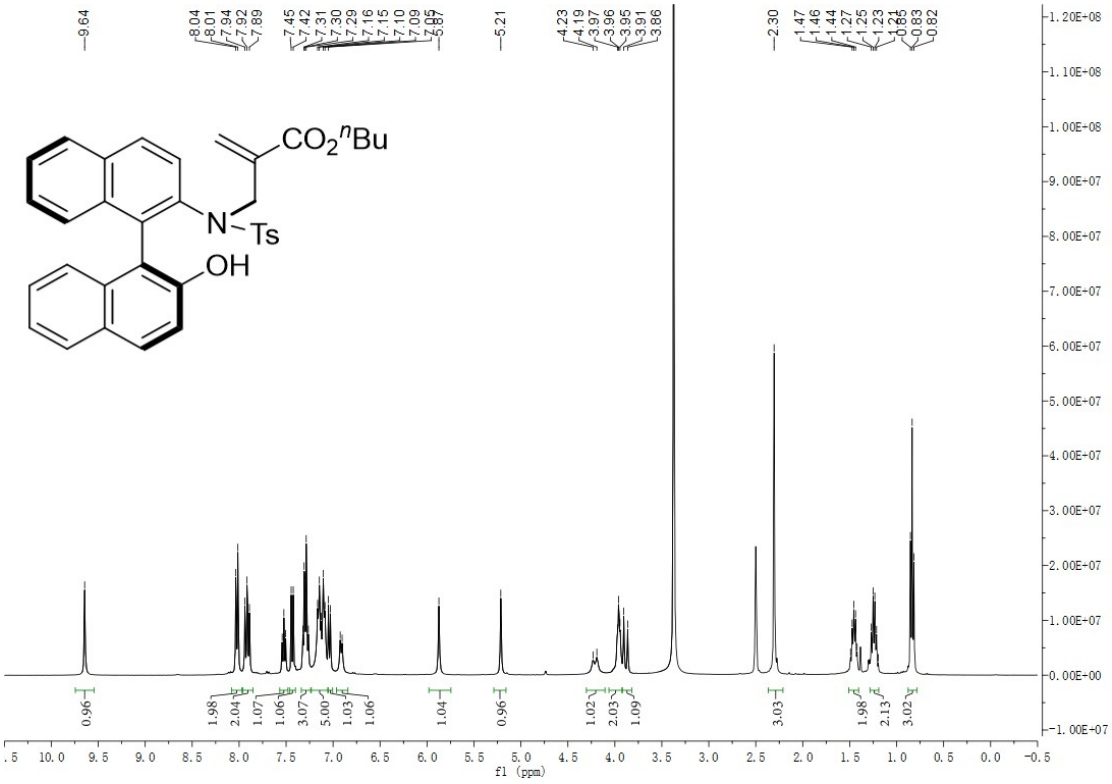

Me
MeO
CO2nBu
Me
N
Ts
Br
OH
f1 (ppm)

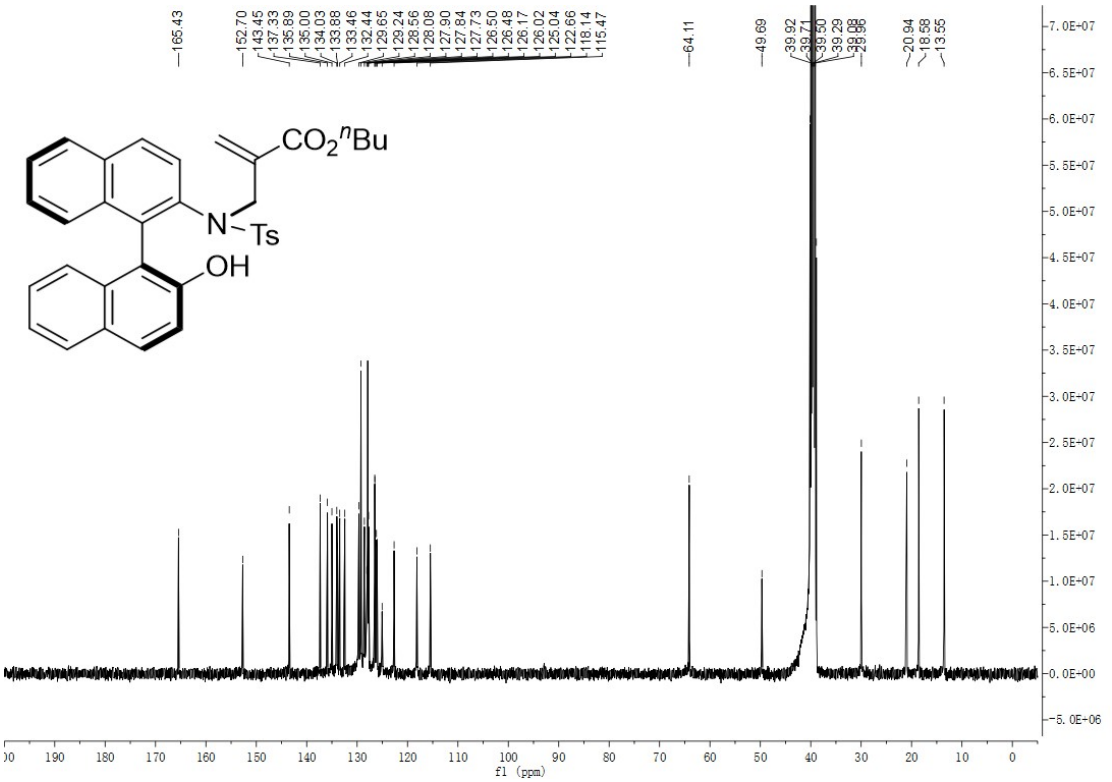
Compound **9c**


Me
MeO
CO2nBu
Me
N
Ts
OH
Br
f1 (ppm)

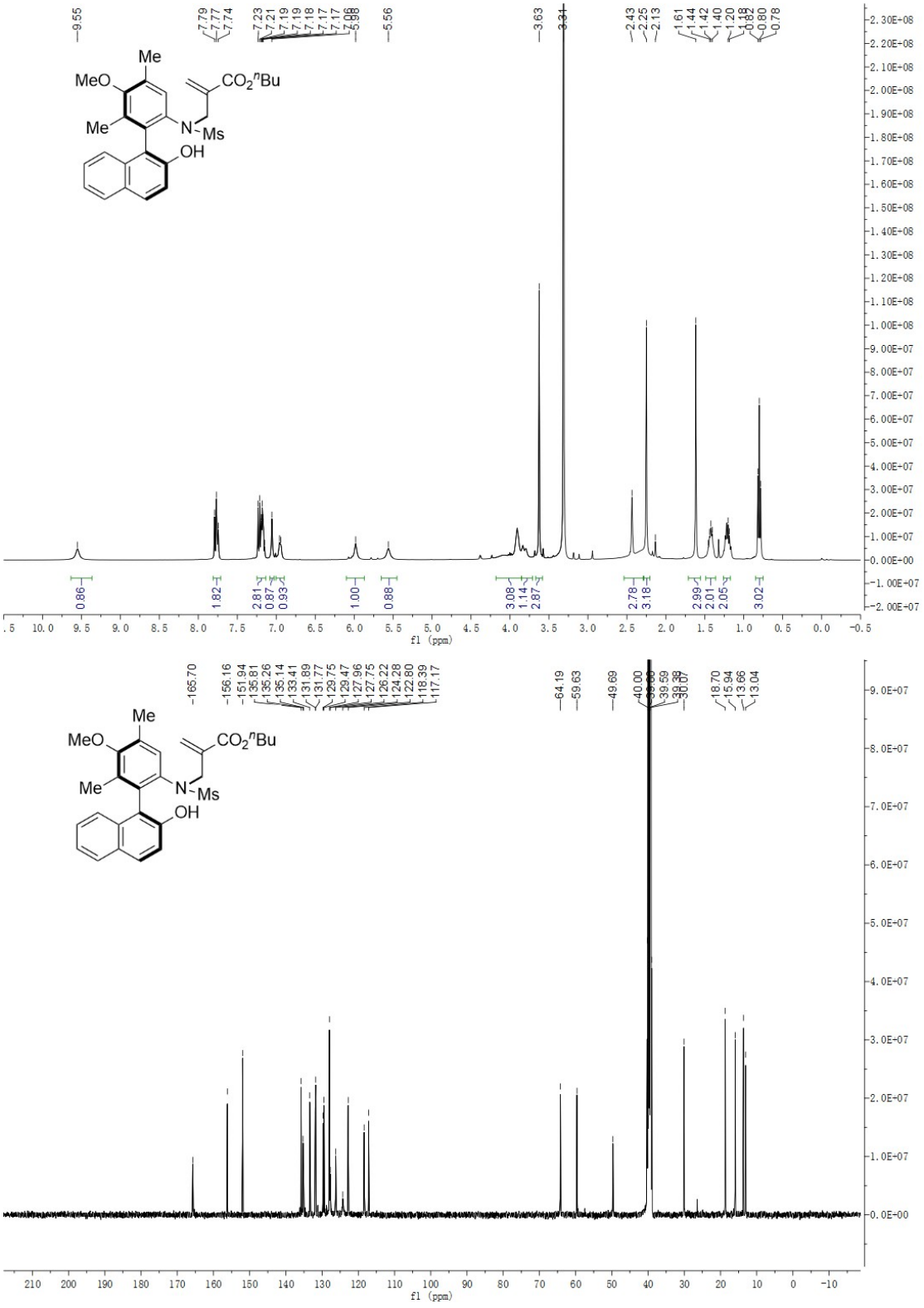

Me
MeO
CO2nBu
Me
N
Ts
OH
Br
f1 (ppm)

Compound **9d**

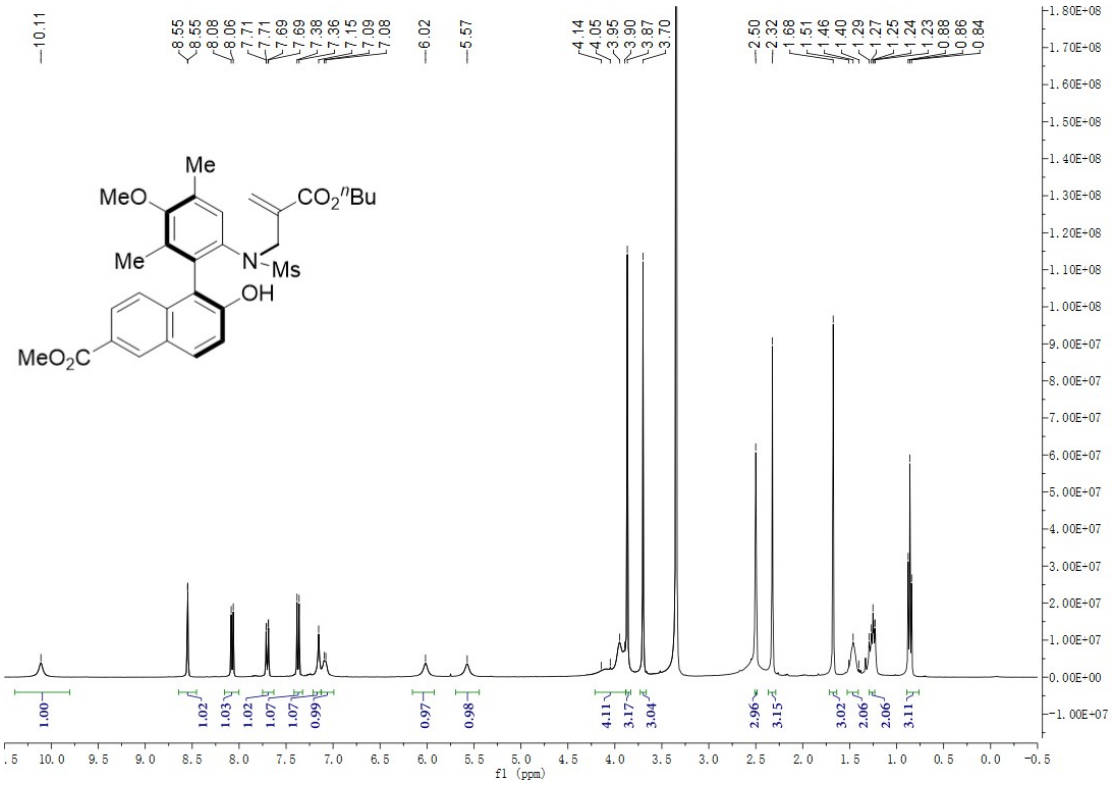

9.64
8.04
8.01
7.94
7.92
7.89
7.45
7.42
7.31
7.30
7.29
7.16
7.15
7.10
7.09
5.87
5.21
4.23
4.19
3.97
3.96
3.95
3.91
3.86
2.30
1.47
1.46
1.44
1.27
1.25
1.23
1.21
0.85
0.83
0.82
CO2nBu
N
Ts
OH
0.96
1.98
2.04
1.07
1.06
3.07
5.00
1.03
1.06
1.04
0.96
1.02
2.03
1.09
3.03
1.98
2.13
3.02
f1 (ppm)

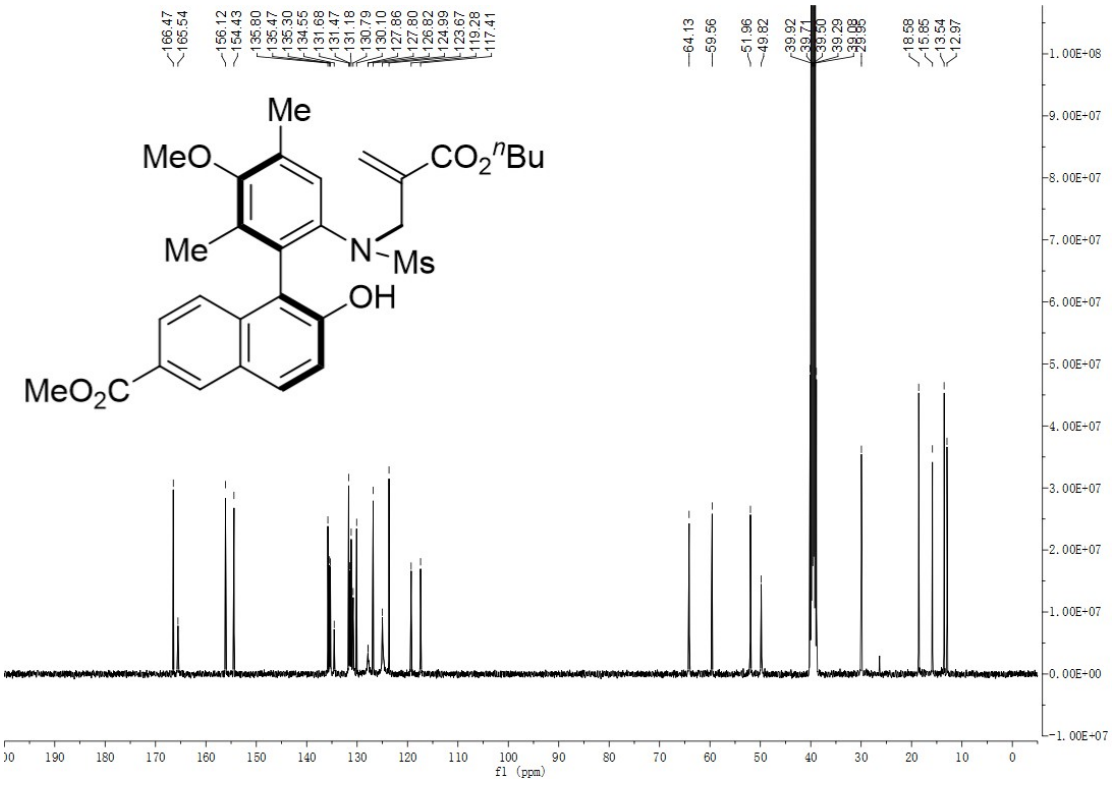

165.43
152.70
143.45
137.33
135.89
135.00
134.03
133.88
133.46
132.44
129.65
129.24
128.56
128.08
127.90
127.84
127.73
126.50
126.48
126.17
126.02
125.04
122.66
118.14
115.47
64.11
49.69
39.92
39.71
39.50
39.29
39.08
38.96
20.94
18.58
13.55
CO2nBu
N
Ts
OH
f1 (ppm)

Compound **9e**

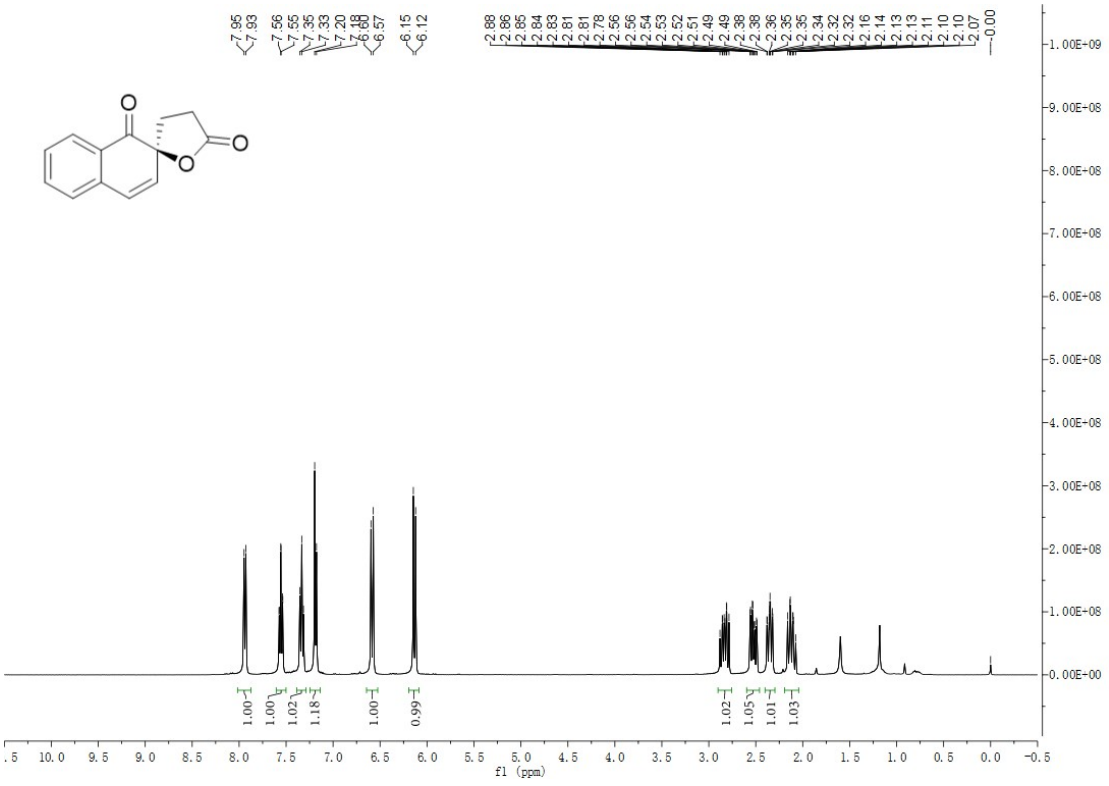


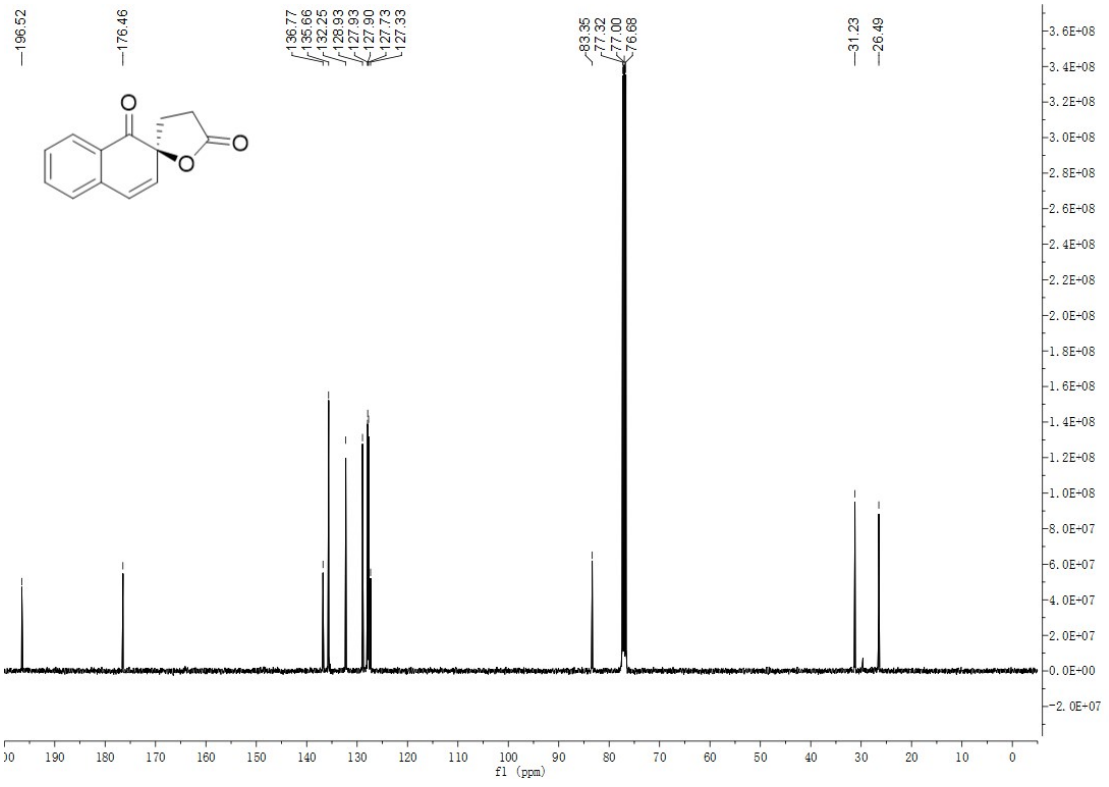
Compound **9f**


Me
MeO
CO2nBu
Me
N
Ms
OH
MeO2C
f1 (ppm)

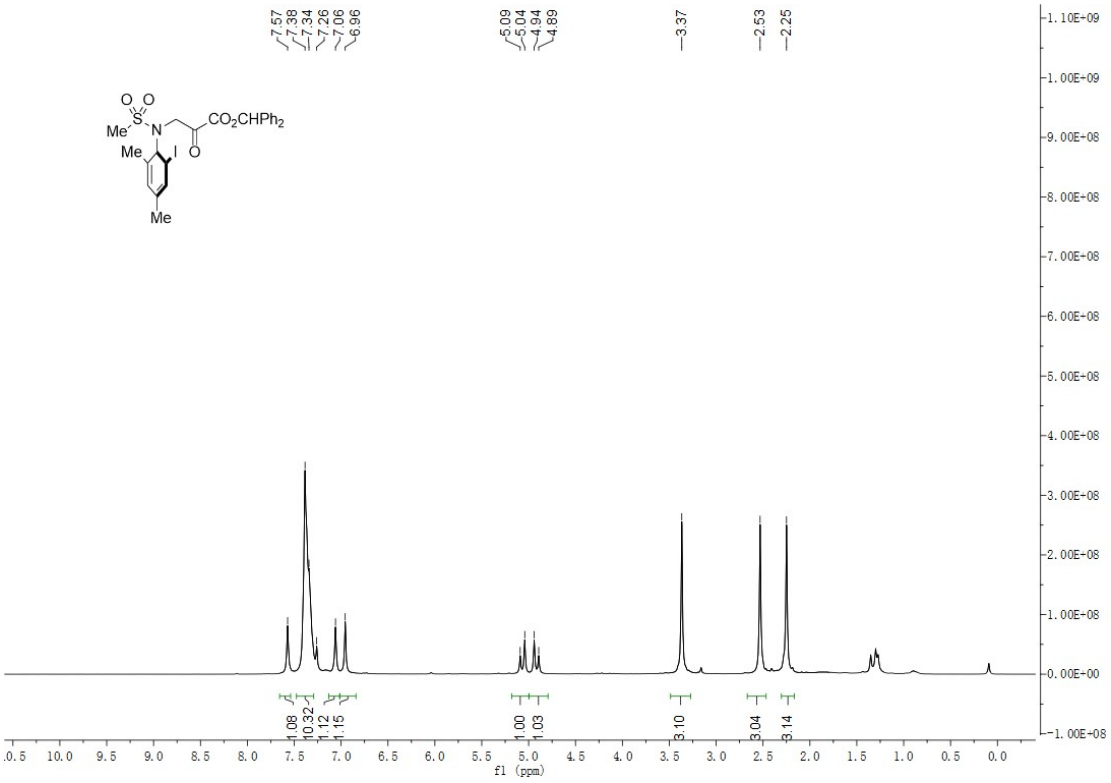

Me
MeO
CO2nBu
Me
N
Ms
OH
MeO2C
f1 (ppm)

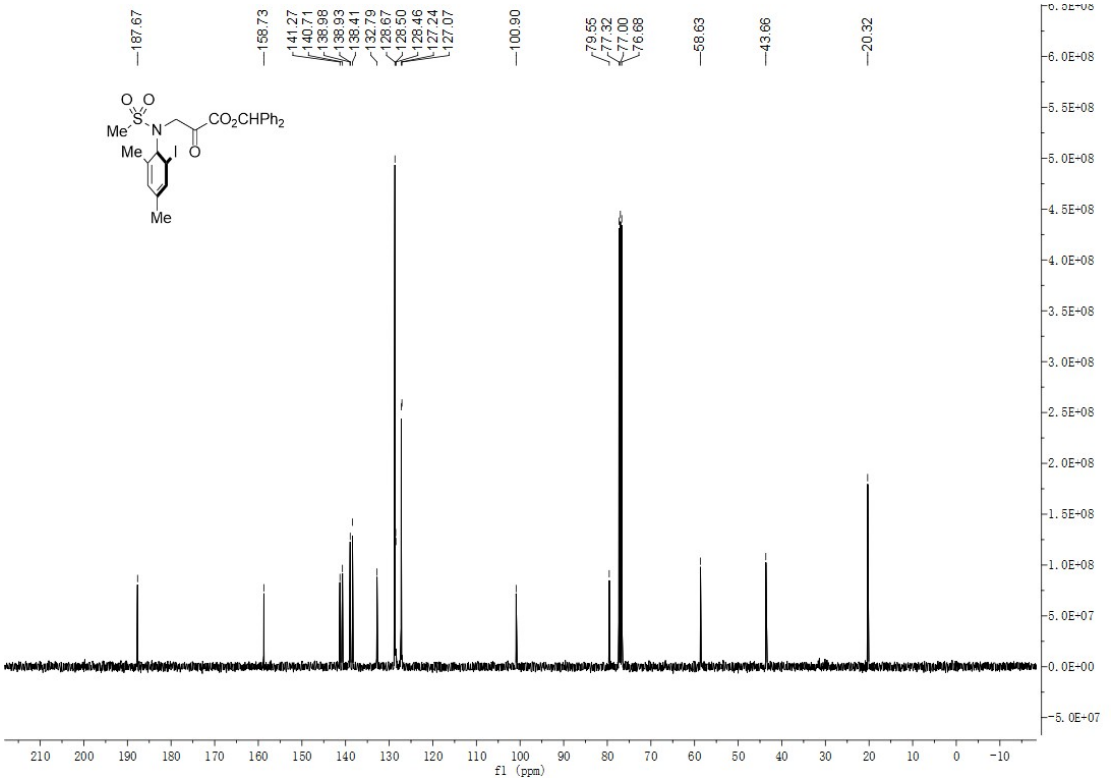
Compound **SI-2**



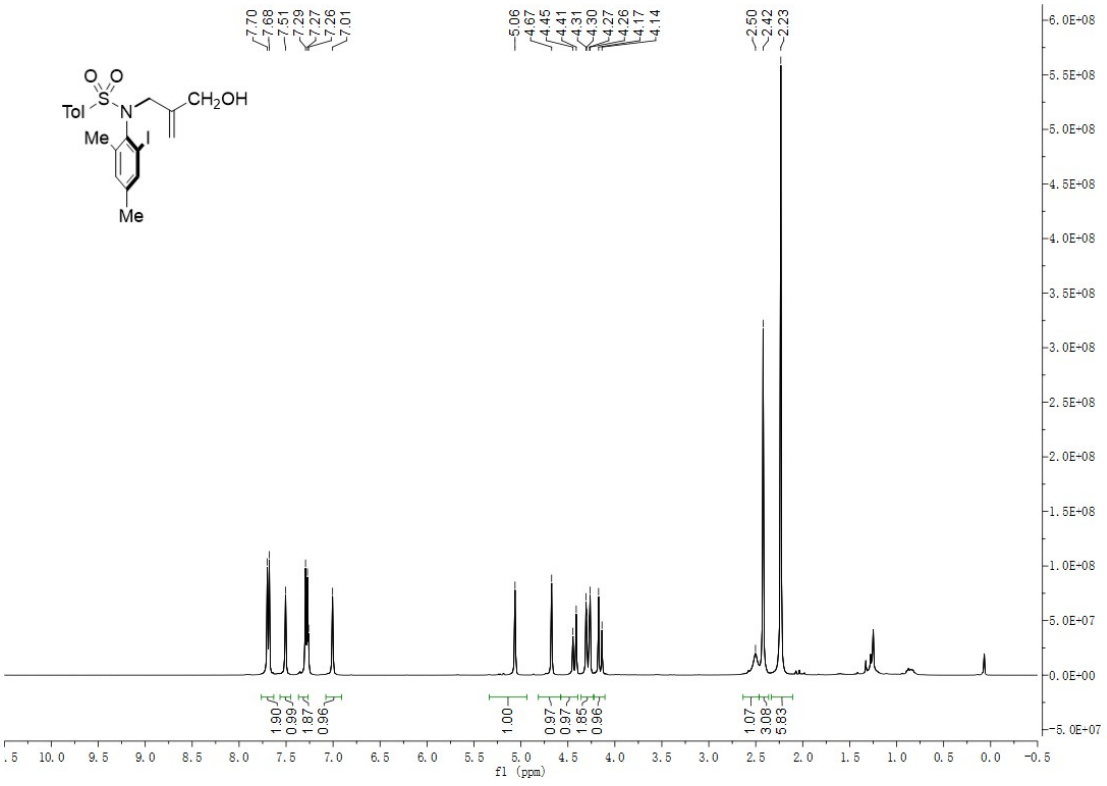


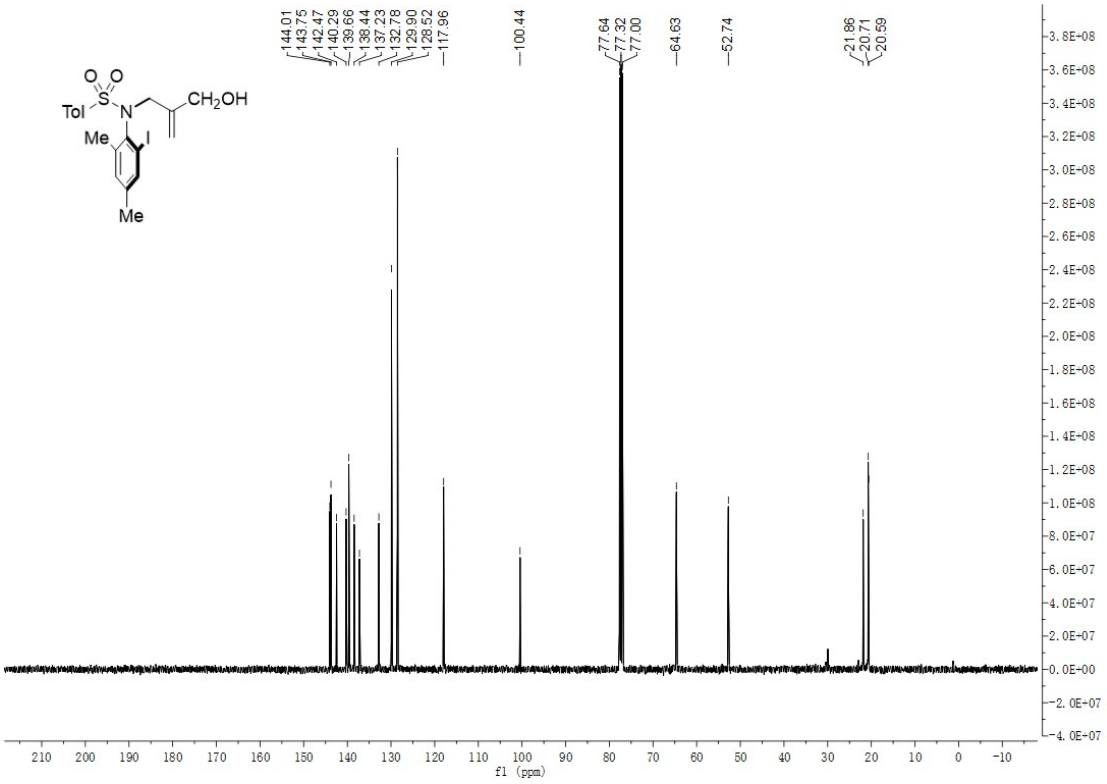
Compound **10**


7.57
7.38
7.34
7.26
7.06
6.96
5.09
5.04
4.94
4.89
3.37
2.53
2.25
1.08
10.32
1.12
1.15
1.00
1.03
3.10
3.04
3.14
f1 (ppm)


187.67
158.73
141.27
140.71
138.98
138.93
138.41
132.79
128.67
128.50
128.46
127.24
127.07
100.90
79.55
77.32
77.00
76.68
58.63
43.66
20.32
f1 (ppm)

Compound **11**


7.70
7.68
7.51
7.29
7.27
7.26
7.01
5.06
4.67
4.45
4.41
4.31
4.30
4.27
4.26
4.17
4.14
2.50
2.42
2.23
Tol
Me
I
Me
CH2OH
1.90
0.99
1.87
0.96
1.00
0.97
0.97
1.85
0.96
1.07
3.08
5.83
f1 (ppm)


144.01
143.75
142.47
140.29
139.66
138.44
137.23
132.78
129.90
128.52
117.96
100.44
77.64
77.32
77.00
64.63
52.74
21.86
20.71
20.59
Tol
Me
I
Me
CH2OH
f1 (ppm)