Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Copper-catalyzed Decarboxylative Stereospecific Amidation of Cinnamic Acids with *N*-Fluorobenzenesulfonimide

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General.

All commercially available reagent grade chemicals were purchased from chemical suppliers and used as received without further purification. ^{1}H NMR and ^{13}C NMR spectra were recorded in $CDCl_3$ on a 500 MHz spectrometer with TMS as internal standard (500 MHz ^{1}H, 125 MHz ^{13}C) at room temperature, the chemical shifts (δ) were expressed in ppm and *J* values were given in Hz. The following abbreviations are used to indicate the multiplicity: singlet (s), doublet (d), triplet (t), quartet (q) and multiplet (m). Column chromatography was performed on silica gel (200-300 mesh). Mass analyses and HRMS were obtained by ESI on a TOF mass analyzer.

General experimental procedures for synthesis of (*E*)- amination products.

A 25 mL Schlenk tube equipped with a magnetic stirring bar was charged with cinnamic acids (0.3 mmol), CuI (19 mg, 0.075 mmol), AIBN (98.4 mmg, 0.6 mmol) and NFSI (113 mg, 0.36 mmol). The tube was evacuated twice and backfilled with nitrogen, and CH_3CN (2 mL) was added into the tube. The tube was sealed and then the mixture was allowed to stir under nitrogen atmosphere at 60 ^{o}C for 24 h. After completion of the reaction, the resulting solution was cooled down to room temperature, and the solvent was removed with the aid of a rotary evaporator. The desired product was obtained by column chromatography on silica gel using petroleum ether/ethyl acetate as eluent.

Crystal preparation and X-ray diffraction analysis of compound 3n

Crystal preparation of compound 3b.

Compound **3a** (20 mg) was dissolved in 6 mL of petroleum ether/ethyl acetate = 3:1, and it was crystallized to give crystal as colorless prisms after the solvent was slowly volatilized in 3 days at room temperature (~ 25 °C).

X-Ray diffraction analysis of compound 3a.

Identification code	sad
Empirical formula	C20 H17 N O4 S2
Formula weight	399.47
Temperature	295(2) K
Wavelength	0.71073 A
Crystal system, space group	Monoclinic, P21/c
Unit cell dimensions	a = 14.0128(17) A alpha = 90 deg.
	b = 8.8244(11) A beta = 112.361(2) deg.
	c = 16.431(2) A gamma = 90 deg.
Volume	1879.0(4) A^3
Z, Calculated density	4, 1.412 Mg/m^3
Absorption coefficient	0.310 mm^-1
F(000)	832
Crystal size	0.38 x 0.26 x 0.20 mm
Theta range for data collection	2.54 to 26.00 deg.
Limiting indices	-16<=h<=17, -10<=k<=10, -20<=l<=17
Reflections collected / unique	11525 / 3687 [R(int) = 0.0401]
Completeness to theta = 26.00	99.9 %
Absorption correction	Semi-empirical from equivalents
Max. and min. transmission	0.9407 and 0.8914
Refinement method	Full-matrix least-squares on F^2
Data / restraints / parameters	3687 / 7 / 244
Goodness-of-fit on F^2	1.046

Final R indices [I>2sigma(I)]	R1 = 0.0621, wR2 = 0.1508
R indices (all data)	R1 = 0.0952, wR2 = 0.1690
Largest diff. peak and hole	1.001 and -0.537 e.A^-3

Table 2. Atomic coordinates (x 10^4) and equivalent isotropic displacement parameters (A^2 x 10^3) for a. U(eq) is defined as one third of the trace of the orthogonalized Uij tens

	x	y	z	U(eq)
C(1)	937(3)	1233(5)	2303(3)	83(1)
C(2)	167(4)	413(6)	2464(3)	101(2)
C(3)	-713(4)	76(5)	1762(4)	101(2)
C(4)	-850(4)	528(6)	948(4)	105(2)
C(5)	-102(4)	1281(6)	809(3)	88(1)
C(6)	800(3)	1642(4)	1461(3)	64(1)
C(7)	1654(4)	2501(5)	1352(4)	97(2)
C(8)	1851(4)	2765(5)	750(4)	100(2)
C(9)	2399(3)	6575(4)	978(2)	54(1)
C(10)	1666(3)	6679(4)	1356(3)	70(1)
C(11)	1872(4)	7626(5)	2072(3)	88(1)
C(12)	2776(4)	8439(5)	2391(3)	85(1)
C(13)	3482(4)	8331(5)	2006(3)	79(1)
C(14)	3303(3)	7393(4)	1292(3)	64(1)
C(15)	3823(2)	2093(4)	-83(2)	49(1)
C(16)	3612(3)	562(4)	-164(2)	57(1)
C(17)	3627(3)	-188(5)	-890(3)	70(1)
C(18)	3847(3)	575(6)	-1520(3)	74(1)
C(19)	4065(3)	2097(6)	-1437(2)	71(1)
C(20)	4060(3)	2878(4)	-706(2)	59(1)
N(1)	2594(2)	3650(3)	579(2)	58(1)

O(1)	4454(2)	4341(3)	1020(2)	68(1)
O(2)	3972(2)	1947(3)	1528(2)	69(1)
O(3)	1083(2)	5152(4)	-351(2)	89(1)
O(4)	2791(2)	5734(3)	-377(2)	82(1)
S(1)	3817(1)	3042(1)	855(1)	53(1)
S(2)	2171(1)	5334(1)	95(1)	64(1)

Table 3. Bond lengths [A] and angles [deg] for a.

C(1)-C(6)	1.370(5)
C(1)-C(2)	1.405(6)
C(1)-H(1)	0.9300
C(2)-C(3)	1.362(6)
C(2)-H(2)	0.9300
C(3)-C(4)	1.338(6)
C(3)-H(3)	0.9300
C(4)-C(5)	1.332(6)
C(4)-H(4)	0.9300
C(5)-C(6)	1.348(5)
C(5)-H(5)	0.9300
C(6)-C(7)	1.484(6)
C(7)-C(8)	1.147(6)
C(7)-H(7)	0.9300
C(8)-N(1)	1.412(5)
C(8)-H(8)	0.9300
C(9)-C(14)	1.377(5)
C(9)-C(10)	1.390(5)
C(9)-S(2)	1.747(4)
C(10)-C(11)	1.381(6)
C(10)-H(10)	0.9300

C(11)-C(12)	1.376(7)
C(11)-H(11)	0.9300
C(12)-C(13)	1.365(6)
C(12)-H(12)	0.9300
C(13)-C(14)	1.377(6)
C(13)-H(13)	0.9300
C(14)-H(14)	0.9300
C(15)-C(20)	1.377(5)
C(15)-C(16)	1.379(5)
C(15)-S(1)	1.758(3)
C(16)-C(17)	1.371(5)
C(16)-H(16)	0.9300
C(17)-C(18)	1.364(6)
C(17)-H(17)	0.9300
C(18)-C(19)	1.372(6)
C(18)-H(18)	0.9300
C(19)-C(20)	1.388(5)
C(19)-H(19)	0.9300
C(20)-H(20)	0.9300
N(1)-S(2)	1.683(3)
N(1)-S(1)	1.685(3)
O(1)-S(1)	1.414(3)
O(2)-S(1)	1.420(2)
O(3)-S(2)	1.427(3)
O(4)-S(2)	1.412(3)
C(6)-C(1)-C(2)	120.2(4)
C(6)-C(1)-H(1)	119.9
C(2)-C(1)-H(1)	119.9
C(3)-C(2)-C(1)	117.7(4)

C(3)-C(2)-H(2)	121.1
C(1)-C(2)-H(2)	121.1
C(4)-C(3)-C(2)	121.4(5)
C(4)-C(3)-H(3)	119.3
C(2)-C(3)-H(3)	119.3
C(5)-C(4)-C(3)	119.8(5)
C(5)-C(4)-H(4)	120.1
C(3)-C(4)-H(4)	120.1
C(4)-C(5)-C(6)	122.8(5)
C(4)-C(5)-H(5)	118.6
C(6)-C(5)-H(5)	118.6
C(5)-C(6)-C(1)	118.0(4)
C(5)-C(6)-C(7)	125.5(5)
C(1)-C(6)-C(7)	116.5(4)
C(8)-C(7)-C(6)	132.6(6)
C(8)-C(7)-H(7)	113.7
C(6)-C(7)-H(7)	113.7
C(7)-C(8)-N(1)	136.1(6)
C(7)-C(8)-H(8)	112.0
N(1)-C(8)-H(8)	112.0
C(14)-C(9)-C(10)	121.8(4)
C(14)-C(9)-S(2)	119.5(3)
C(10)-C(9)-S(2)	118.6(3)
C(11)-C(10)-C(9)	118.1(4)
C(11)-C(10)-H(10)	121.0
C(9)-C(10)-H(10)	121.0
C(12)-C(11)-C(10)	120.3(4)
C(12)-C(11)-H(11)	119.9
C(10)-C(11)-H(11)	119.9

C(13)-C(12)-C(11)	120.8(4)
C(13)-C(12)-H(12)	119.6
C(11)-C(12)-H(12)	119.6
C(12)-C(13)-C(14)	120.5(4)
C(12)-C(13)-H(13)	119.8
C(14)-C(13)-H(13)	119.8
C(9)-C(14)-C(13)	118.6(4)
C(9)-C(14)-H(14)	120.7
C(13)-C(14)-H(14)	120.7
C(20)-C(15)-C(16)	121.7(3)
C(20)-C(15)-S(1)	119.7(3)
C(16)-C(15)-S(1)	118.6(3)
C(17)-C(16)-C(15)	118.9(4)
C(17)-C(16)-H(16)	120.6
C(15)-C(16)-H(16)	120.6
C(18)-C(17)-C(16)	120.3(4)
C(18)-C(17)-H(17)	119.9
C(16)-C(17)-H(17)	119.9
C(17)-C(18)-C(19)	121.0(4)
C(17)-C(18)-H(18)	119.5
C(19)-C(18)-H(18)	119.5
C(18)-C(19)-C(20)	119.8(4)
C(18)-C(19)-H(19)	120.1
C(20)-C(19)-H(19)	120.1
C(15)-C(20)-C(19)	118.4(4)
C(15)-C(20)-H(20)	120.8
C(19)-C(20)-H(20)	120.8
C(8)-N(1)-S(2)	115.4(3)
C(8)-N(1)-S(1)	121.4(3)

S(2)-N(1)-S(1)	123.19(17)
O(1)-S(1)-O(2)	120.24(16)
O(1)-S(1)-N(1)	107.25(15)
O(2)-S(1)-N(1)	105.40(15)
O(1)-S(1)-C(15)	109.87(16)
O(2)-S(1)-C(15)	107.93(16)
N(1)-S(1)-C(15)	105.07(15)
O(4)-S(2)-O(3)	120.43(18)
O(4)-S(2)-N(1)	107.52(16)
O(3)-S(2)-N(1)	104.98(17)
O(4)-S(2)-C(9)	110.02(18)
O(3)-S(2)-C(9)	108.62(18)
N(1)-S(2)-C(9)	103.91(15)

T**able 4.** Anisotropic displacement parameters (A^2 x 10^3) for a. The anisotropic displacement factor exponent takes the form:

-2 pi^2 [h^2 a*^2 U11+ ... + 2 h k a* b* U12]

`	**U11**	**U22**	**U33**	**U23**	**U13**	**U12**
C(1)	61(3)	96(3)	85(3)	-15(3)	20(2)	16(2)
C(2)	105(4)	131(5)	85(3)	42(3)	58(3)	54(4)
C(3)	74(3)	76(3)	169(6)	32(4)	66(4)	6(3)
C(4)	73(3)	99(4)	127(5)	-16(4)	20(3)	-11(3)
C(5)	77(3)	105(4)	77(3)	4(3)	24(2)	17(3)
C(6)	63(2)	49(2)	87(3)	6(2)	39(2)	11(2)
C(7)	97(3)	68(3)	160(5)	12(3)	86(4)	6(2)
C(8)	122(4)	59(3)	166(5)	-8(3)	108(4)	-6(3)
C(9)	56(2)	48(2)	58(2)	13(2)	22(2)	7(2)
C(10)	69(3)	58(2)	93(3)	2(2)	42(2)	3(2)
C(11)	120(4)	62(3)	113(4)	1(3)	78(3)	12(3)
C(12)	121(4)	58(3)	76(3)	-4(2)	39(3)	8(3)

C(13)	80(3)	58(3)	88(3)	0(2)	20(2)	-1(2)
C(14)	62(2)	55(2)	76(3)	7(2)	28(2)	1(2)
C(15)	41(2)	58(2)	45(2)	1(2)	14(1)	0(2)
C(16)	53(2)	61(2)	57(2)	-1(2)	20(2)	-4(2)
C(17)	58(2)	71(3)	74(3)	-18(2)	17(2)	1(2)
C(18)	59(2)	103(4)	55(2)	-23(2)	17(2)	11(2)
C(19)	59(2)	112(4)	48(2)	4(2)	26(2)	7(2)
C(20)	56(2)	70(2)	53(2)	7(2)	23(2)	-1(2)
N(1)	62(2)	56(2)	66(2)	1(2)	35(2)	-2(1)
O(1)	66(2)	65(2)	67(2)	-11(1)	19(1)	-17(1)
O(2)	88(2)	72(2)	47(1)	10(1)	27(1)	5(1)
O(3)	65(2)	105(2)	75(2)	-3(2)	3(1)	5(2)
O(4)	105(2)	88(2)	68(2)	19(2)	48(2)	15(2)
S(1)	59(1)	56(1)	44(1)	0(1)	19(1)	-5(1)
S(2)	67(1)	70(1)	53(1)	6(1)	22(1)	5(1)

Table 5. Hydrogen coordinates (x 10^4) and isotropic displacement parameters (A^2 x 10^3) for a.

	x	**y**	**z**	**U(eq)**
H(1)	1541	1500	2769	99
H(2)	255	110	3030	121
H(3)	-1229	-480	1851	121
H(4)	-1466	317	481	126
H(5)	-207	1569	237	105
H(7)	2122	2903	1875	117
H(8)	1409	2272	247	120
H(10)	1056	6127	1133	84
H(11)	1396	7713	2339	106
H(12)	2909	9071	2875	102
H(13)	4088	8894	2226	94

H(14)	3782	7315	1029	77
H(16)	3463	46	267	69
H(17)	3486	-1221	-954	84
H(18)	3849	57	-2012	89
H(19)	4216	2603	-1870	85
H(20)	4213	3907	-638	71

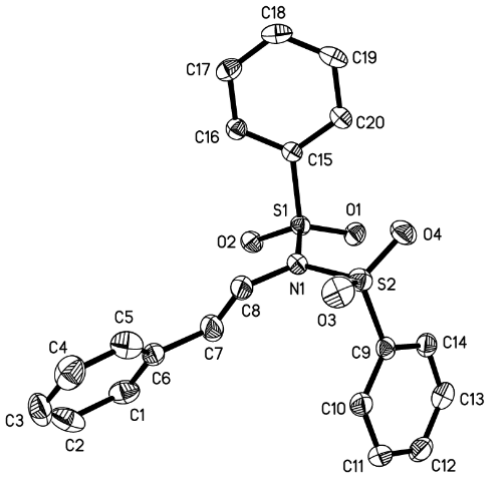


Figure 1. ORTEP drawing of $C_{14}H_{14}O_4S$ with 50% probability ellipsoids, showing the atomic numbering scheme.

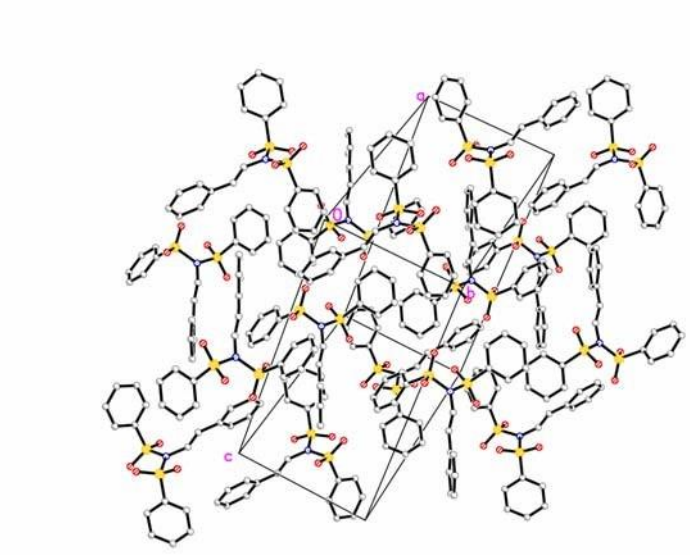
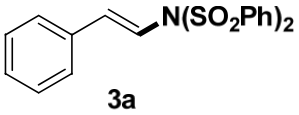
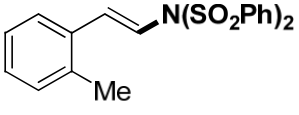


Figure 2. A packing view along the *a* direction



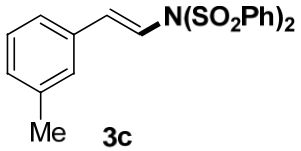
3a

(*E*)-*N*-(phenylsulfonyl)-*N*-styrylbenzenesulfonamide (3a): Compound **3a** was obtained in 76% yield (91 mg) according to the general procedure. Eluent petroleum ether/ethyl acetate (4:1). ^{1}H NMR ($CDCl_3$, 500 MHz, ppm) δ 8.00 (d, 4H, J = 10.0 Hz), 7.69-7.66 (m, 2H), 7.58-7.55 (m, 4H), 7.35 (m, 5H), 6.69 (d, 1H, J = 15.0), 6.52 (d, 1H, J = 15.0). ^{13}C NMR ($CDCl_3$, 100 MHz, ppm) δ 139.5, 139.1, 134.0, 129.4, 129.1, 128.9, 128.2, 127.3, 119.5, 119.1. HRMS m/z calcd. for $C_{20}H_{17}KNO_4S_2$ $[M+K]^+$: 438.0236, found: 438.0239.



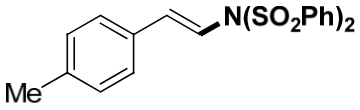
3b

(*E*)-*N*-(2-methylstyryl)-*N*-(phenylsulfonyl)benzenesulfonamide (3b): Compound **3b** was obtained in 71% yield (88 mg) according to the general procedure. Eluent petroleum ether/ethyl acetate (4:1). ^{1}H NMR ($CDCl_3$, 500 MHz, ppm) δ 8.04 (d, 3H, J = 10.0 Hz), 7.72-7.69 (m, 2H), 7.61-7.58 (m, 4H), 7.41 (d, 1H, J = 10.0 Hz), 7.29-7.26 (m, 2H), 7.21 (d, 1H, J = 10.0 Hz), 6.92 (d, 1H, J = 15.0), 6.39 (d, 1H, J = 15.0), 2.26 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz, ppm) δ 139.6, 137.9, 136.6, 134.0, 132.9, 130.5, 129.3, 129.1, 128.2, 126.4, 126.3, 120.4, 19.7. HRMS m/z calcd. for $C_{21}H_{19}NNaO_4S_2$ $[M+Na]^+$: 436.0653, found: 436.0650.

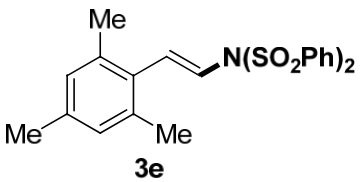


3c

(*E*)-*N*-(3-methylstyryl)-*N*-(phenylsulfonyl)benzenesulfonamide (3c): Compound **3c** was obtained in 74% yield (92 mg) according to the general procedure. Eluent petroleum ether/ethyl acetate (3:1). ^{1}H NMR ($CDCl_3$, 500 MHz, ppm) δ 8.03 (d, 4H, *J* = 10.0 Hz), 7.71-7.68 (m, 2H), 7.60-7.57 (m, 4H), 7.26 (d, 1H, *J* = 10.0 Hz), 7.21-7.18 (m, 3H), 6.92 (d, 1H, *J* = 15.0), 6.55 (d, 1H, *J* = 15.0), 2.38 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz, ppm) δ 139.6, 139.3, 138.5, 134.0, 133.7, 130.2, 129.1, 128.8, 128.2, 127.9, 124.5, 119.2, 21.3. HRMS m/z calcd. for $C_{21}H_{19}NNaO_4S_2$ $[M+Na]^+$: 436.0653, found: 436.0650.

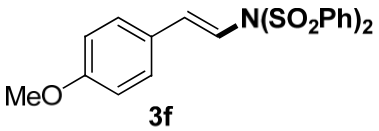


(*E*)-*N*-(3-methylstyryl)-*N*-(phenylsulfonyl)benzenesulfonamide (3d): Compound **3d** was obtained in 87% yield (108 mg) according to the general procedure. Eluent petroleum ether/ethyl acetate (5:1). ^{1}H NMR ($CDCl_3$, 500 MHz, ppm) δ 7.99 (d, 3H, *J* = 10.0 Hz), 7.67 (t, 2H, *J* = 5.0 Hz), 7.57-7.54 (m, 4H), 7.27-7.24 (m, 3H), 7.19-7.15 (m, 2H), 6.63 (d, 1H, *J* = 15.0), 6.46 (d, 1H, *J* = 15.0), 2.36 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz, ppm) δ 139.6, 139.3, 134.0, 130.1, 129.5, 129.1, 128.2, 127.2, 121.4, 119.1, 23.4. HRMS m/z calcd. for $C_{21}H_{19}NNaO_4S_2$ $[M+Na]^+$: 436.0653, found: 436.0650.



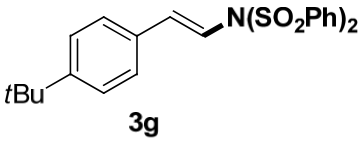
3e

(*E*)-*N*-(phenylsulfonyl)-*N*-(2,4,6-trimethylstyryl)benzenesulfonamide (3e): Compound **3e** was obtained in 54% yield (71 mg) according to the general procedure. Eluent petroleum ether/ethyl acetate (4:1). ^{1}H NMR ($CDCl_3$, 500 MHz, ppm) δ 8.07 (d, 4H, J =5.0 Hz), 7.71-7.68 (m, 2H), 7.61-7.58 (m, 4H), 6.90 (s, 2H), 6.76 (d, 1H, J = 15.0), 6.08 (d, 1H, J = 15.0), 2.30 (s, 9H). ^{13}C NMR ($CDCl_3$, 100 MHz, ppm) δ 139.8, 139.1, 138.0, 136.6, 134.0, 129.7, 129.2, 128.8, 128.2, 123.5, 21.0, 20.8. HRMS m/z calcd. for $C_{23}H_{23}NNaO_4S_2$ $[M+Na]^+$: 464.0966, found: 464.0967.



3f

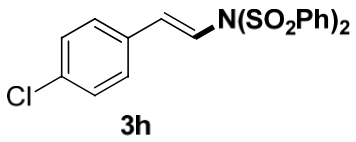
(*E*)-*N*-(4-methoxystyryl)-*N*-(phenylsulfonyl)benzenesulfonamide (3f): Compound **3d** was obtained in 66% yield (85 mg) according to the general procedure. Eluent petroleum ether/ethyl acetate (4:1). ^{1}H NMR ($CDCl_3$, 500 MHz, ppm) δ 8.02 (d, 4H, J = 10.0 Hz), 7.70-7.67 (m, 2H), 7.59-7.56 (m, 4H), 7.32(d, 2H, J = 10.0 Hz), 6.90 (d, 2H, J = 10.0 Hz), 6.63 (d, 1H, J = 15.0), 6.40 (d, 1H, J = 15.0), 3.84 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz, ppm) δ 160.6, 139.6, 139.3, 133.9, 129.1, 128.7, 128.2, 126.3, 117.1, 114.2, 55.4. HRMS m/z calcd. for $C_{21}H_{19}NNaO_5S_2$ $[M+Na]^+$: 452.0602, found: 452.0611.



3g

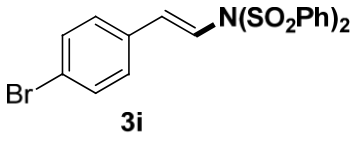
(*E*)-*N*-(4-*tert*-butylstyryl)-*N*-(phenylsulfonyl)benzenesulfonamide (3g): Compound **3g** was obtained in 65% yield (89 mg) according to the general procedure. Eluent petroleum ether/ethyl acetate (4:1). ^{1}H NMR ($CDCl_3$, 500 MHz, ppm) δ 8.03 (d, 4H, J

= 10.0 Hz), 7.71-7.68 (m, 2H), 7.60-7.57 (m, 4H), 7.41(d, 2H, *J* = 10.0 Hz), 7.34 (d, 2H, *J* = 10.0 Hz), 6.69 (d, 1H, *J* = 15.0), 6.53 (d, 1H, *J* = 15.0), 1.35 (s, 9H). ^{13}C NMR ($CDCl_3$, 100 MHz, ppm) δ 152.9, 139.7, 139.2, 134.0, 131.0, 129.1, 128.2, 127.1, 125.8, 118.7, 34.8, 31.2. HRMS m/z calcd. for $C_{24}H_{25}NNaO_4S_2$ $[M+Na]^+$: 478.1123, found: 478.1126.



3h

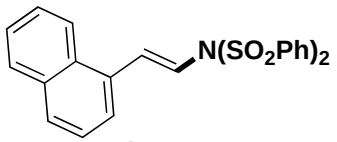
(*E*)-*N*-(4-chlorostyryl)-*N*-(phenylsulfonyl)benzenesulfonamide (3h): Compound **3h** was obtained in 62% yield (80 mg) according to the general procedure. Eluent petroleum ether/ethyl acetate (5:1). ^{1}H NMR ($CDCl_3$, 500 MHz, ppm) δ 7.99 (d, 4H, *J* = 10.0 Hz), 7.70-7.67 (m, 2H), 7.58-7.55 (m, 4H), 7.33-7.27 (m, 4H), 6.66 (d, 1H, *J* = 15.0), 6.52 (d, 1H, *J* = 15.0), 3.84 (s, 3H). ^{13}C NMR ($CDCl_3$, 100 MHz, ppm) δ 139.5, 137.4, 134.1, 129.2, 129.1, 128.4, 128.2, 121.4, 120.1, 119.1. HRMS m/z calcd. for $C_{20}H_{16}ClNNaO_4S_2$ $[M+Na]^+$: 456.0107, found: 456.0108.



3i

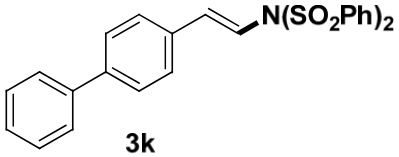
(*E*)-*N*-(4-bromostyryl)-*N*-(phenylsulfonyl)benzenesulfonamide (3i): Compound **3i** was obtained in 59% yield (84 mg) according to the general procedure. Eluent petroleum ether/ethyl acetate (50:1). ^{1}H NMR ($CDCl_3$, 500 MHz, ppm) δ 8.01 (d, 4H, *J* = 10.0 Hz), 7.70 (t, 2H, *J* = 10.0 Hz), 7.60-7.50 (m, 4H), 7.50 (d, 2H, *J* = 10.0 Hz), 7.24 (d, 2H, *J* = 10.0 Hz), 6.66 (d, 1H, *J* = 15.0), 6.55 (d, 1H, *J* = 15.0). ^{13}C NMR ($CDCl_3$, 100 MHz, ppm) δ 139.4, 137.4, 134.1, 132.0, 129.9, 129.2, 128.7, 128.2,

123.5, 120.1. HRMS m/z calcd. for $C_{20}H_{16}BrNNaO_4S_2$ [M+Na]$^+$: 499.9602, found: 499.9601; 501.9577.



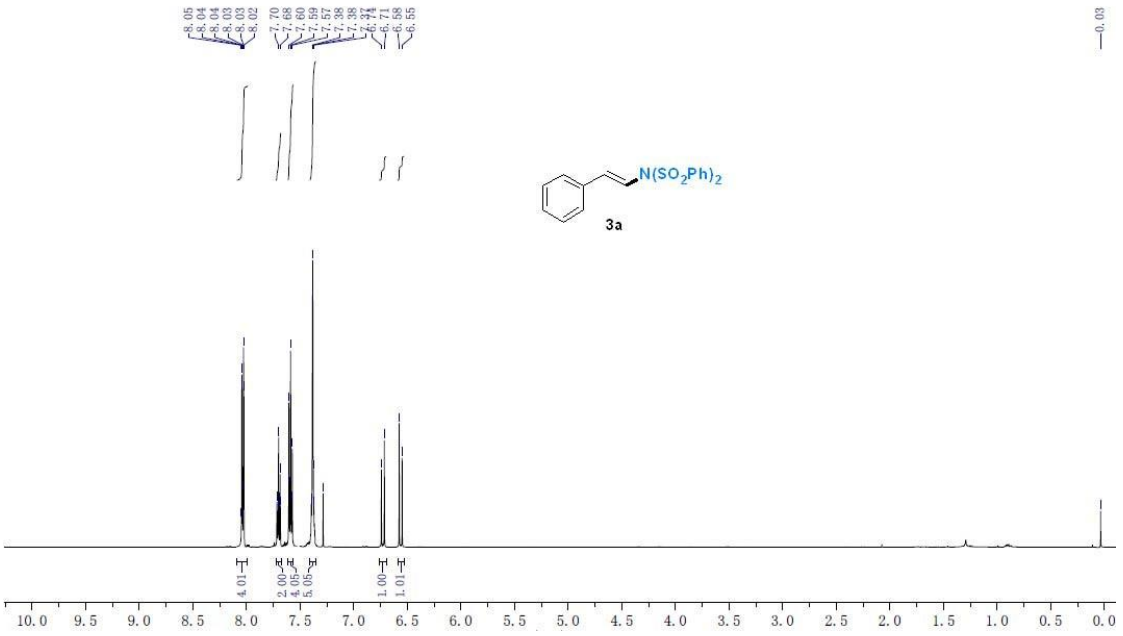
3j

(*E*)-*N*-(2-(naphthalen-1-yl)vinyl)-*N*-(phenylsulfonyl)benzenesulfonamide (3j): Compound **3j** was obtained in 74% yield (100 mg) according to the general procedure. Eluent petroleum ether/ethyl acetate (4:1). ^{1}H NMR ($CDCl_3$, 500 MHz, ppm) δ 8.09 (d, 4H, J = 10.0 Hz), 7.90-7.87 (m, 3H), 7.73-7.70 (m, 2H), 7.62-7.59 (m, 5H), 7.56-7.54 (m, 5H), 7.50-7.46 (m, 5H), 6.56 (d, 1H, J = 15.0). ^{13}C NMR ($CDCl_3$, 100 MHz, ppm) δ 139.6, 137.4, 134.1, 133.6, 131.3, 131.2, 129.7, 129.2, 128.6, 128.3, 126.8, 126.3, 125.5, 124.9, 123.8, 121.7. HRMS m/z calcd. for $C_{24}H_{19}NNaO_4S_2$ [M+Na]$^+$: 472.0653, found: 472.0651.



3k

(*E*)-*N*-(2-(naphthalen-1-yl)vinyl)-*N*-(phenylsulfonyl)benzenesulfonamide (3k): Compound **3k** was obtained in 56% yield (79 mg) according to the general procedure. Eluent petroleum ether/ethyl acetate (5:1). ^{1}H NMR ($CDCl_3$, 500 MHz, ppm) δ 8.05 (d, 4H, J = 10.0 Hz), 7.73-7.70 (m, 1H), 7.61-7.59 (m, 4H), 7.50-7.47 (m, 2H), 7.34 (d, 4H, J = 10.0 Hz), 7.17 (d, 4H, J = 10.0 Hz), 6.75-6.69 (m, 2H), 6.60 (d, 1H, J = 15.0). ^{13}C NMR ($CDCl_3$, 100 MHz, ppm) δ 142.2, 140.2, 139.6, 137.6, 136.7, 134.0, 129.2, 128.9, 128.3, 127.7, 127.5, 127.0, 126.1, 119.3. HRMS m/z calcd. for $C_{26}H_{21}NNaO_4S_2$ [M+H]$^+$: 498.0810, found: 498.0812.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6.55
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2.00
4.05
5.05
1.00
1.01
10.0
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9.0
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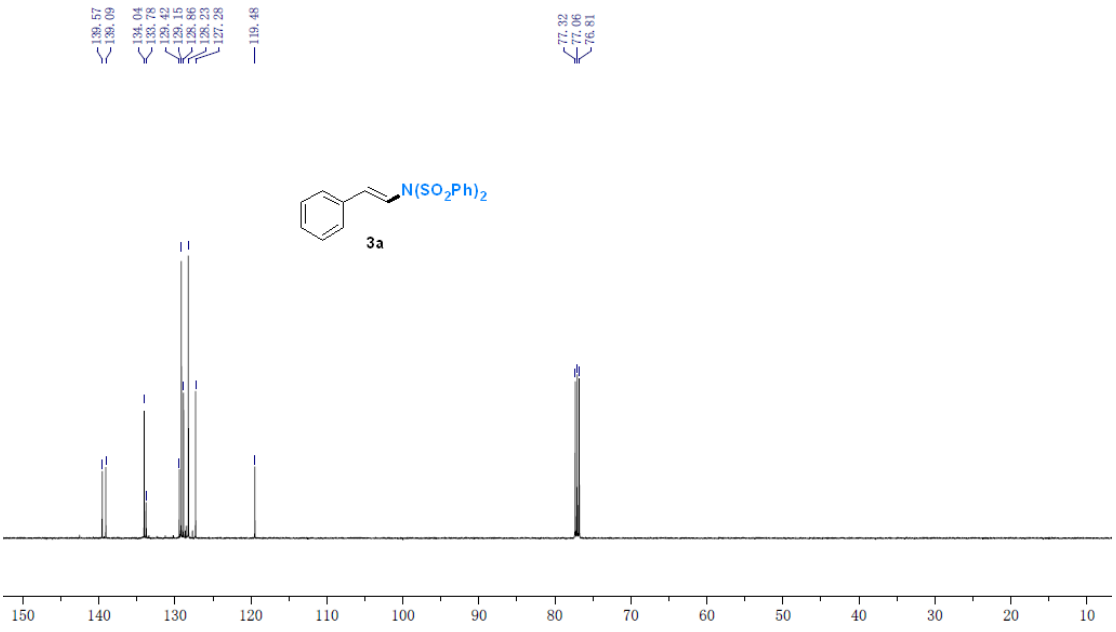
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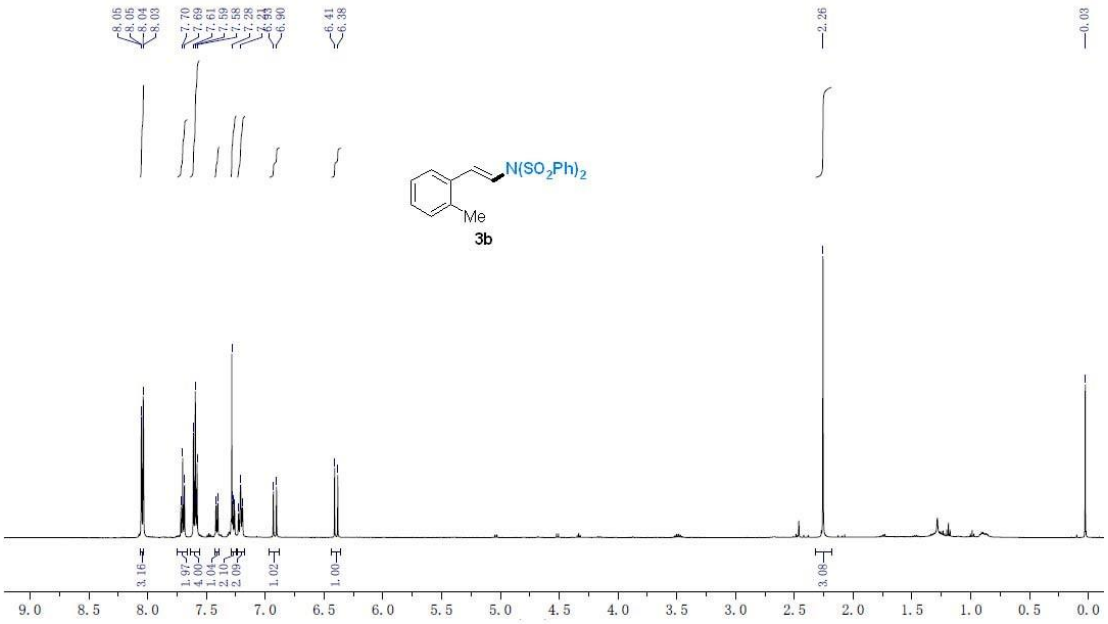
10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6.41
6.38
2.26
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3.16
1.97
4.09
2.10
2.09
1.02
1.00
3.08
9.0
8.5
8.0
7.5
7.0
6.5
6.0
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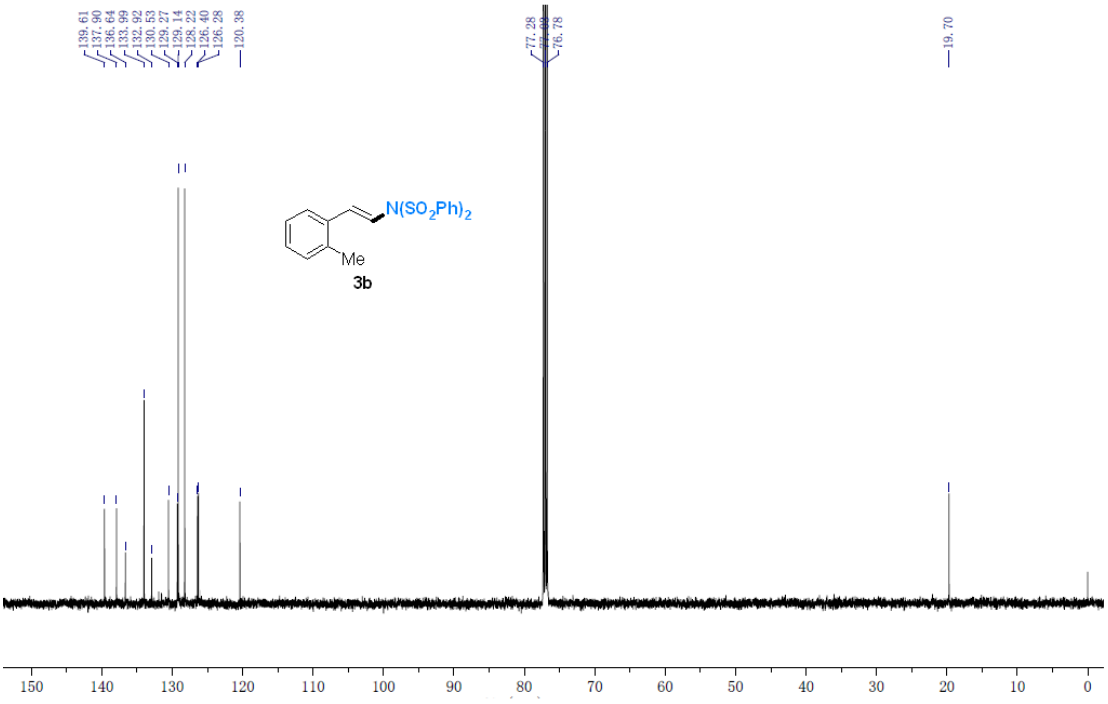
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10
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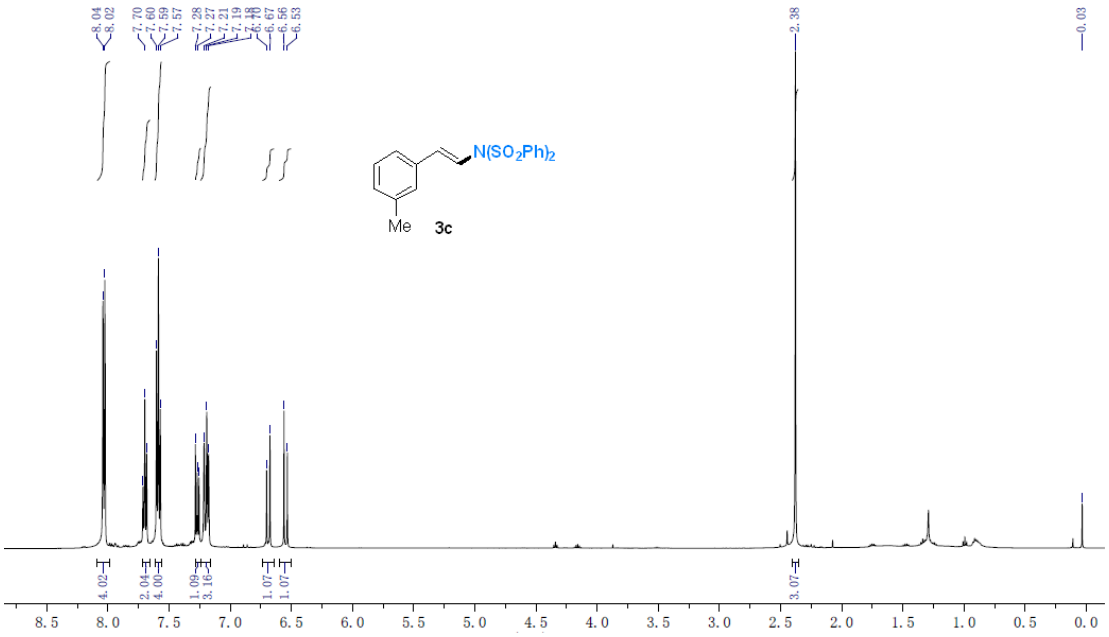
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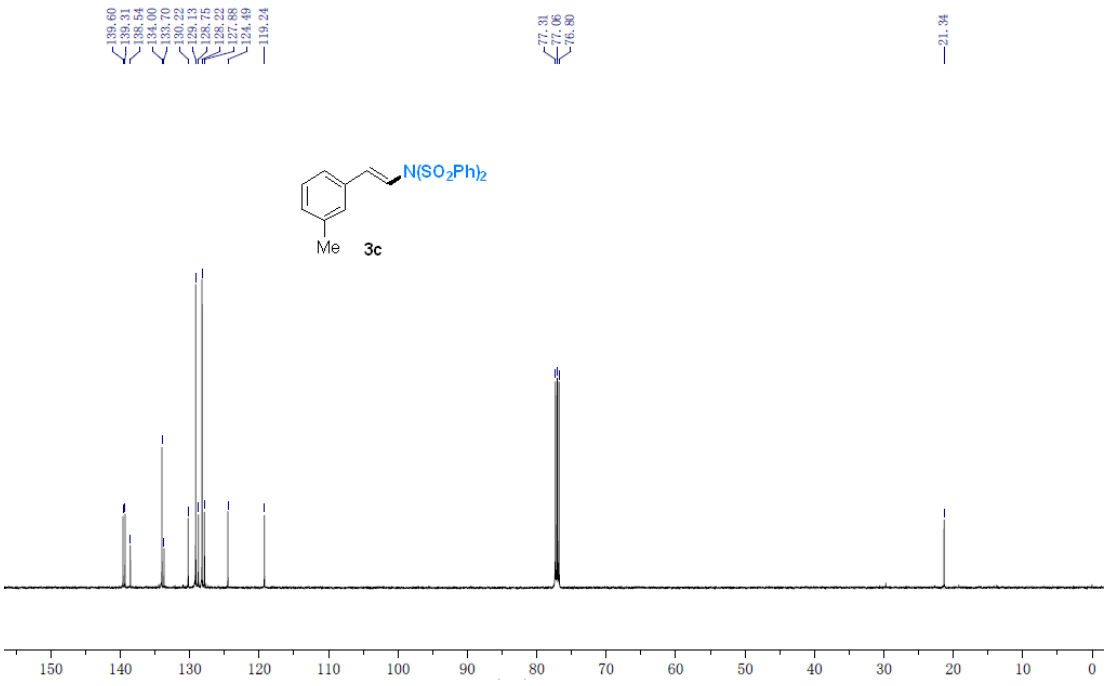
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20
10
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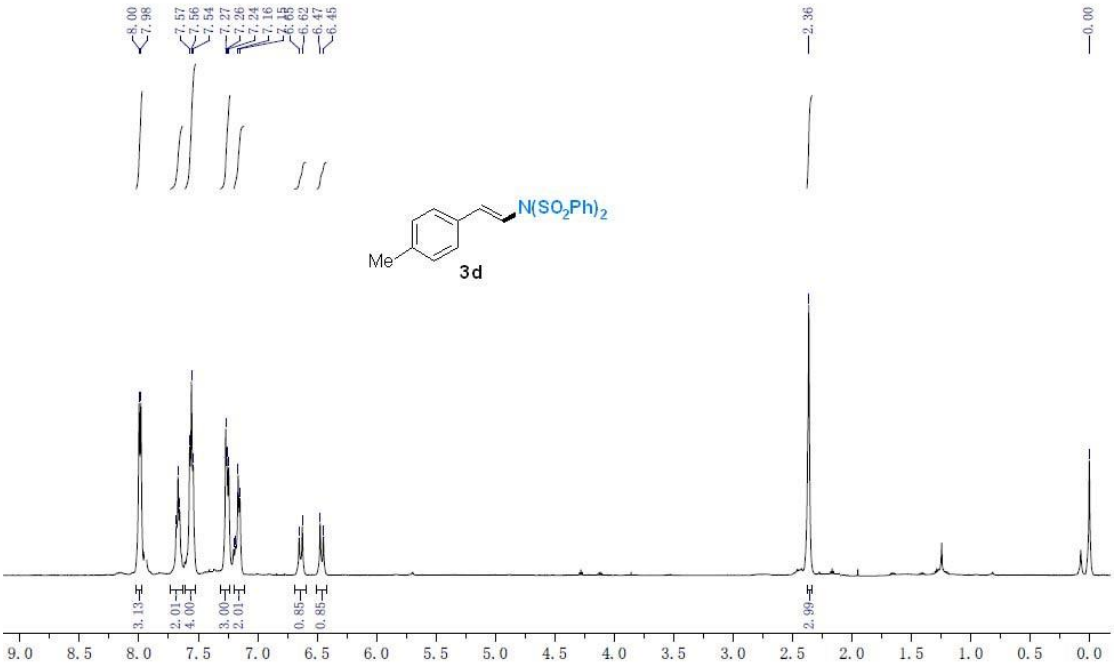
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0.85
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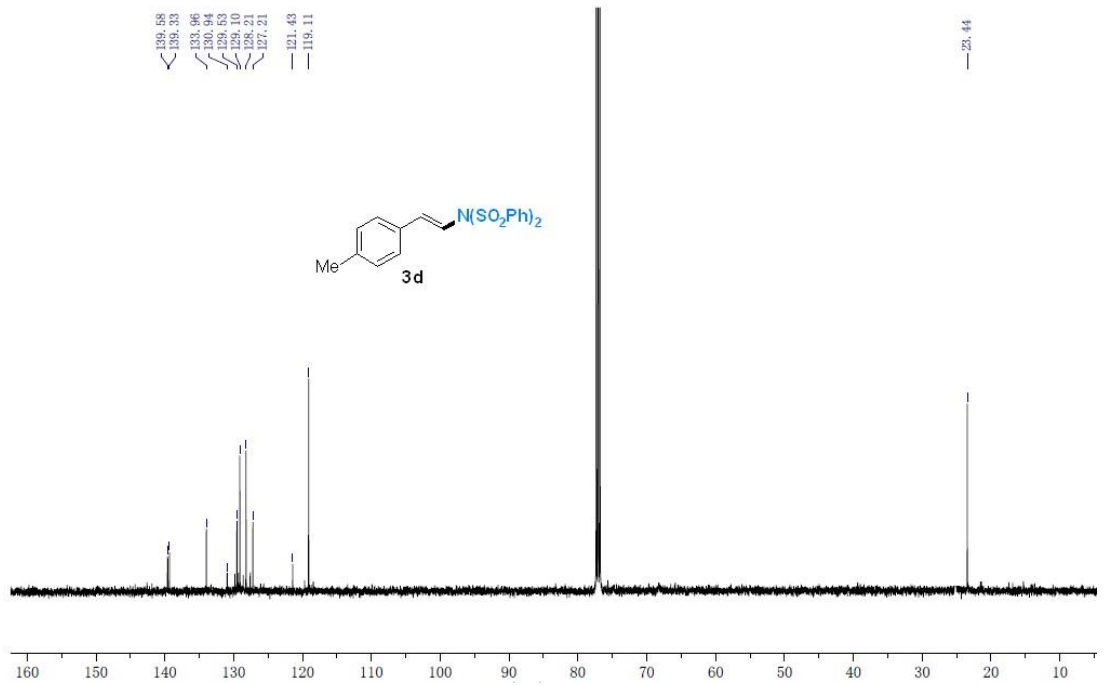
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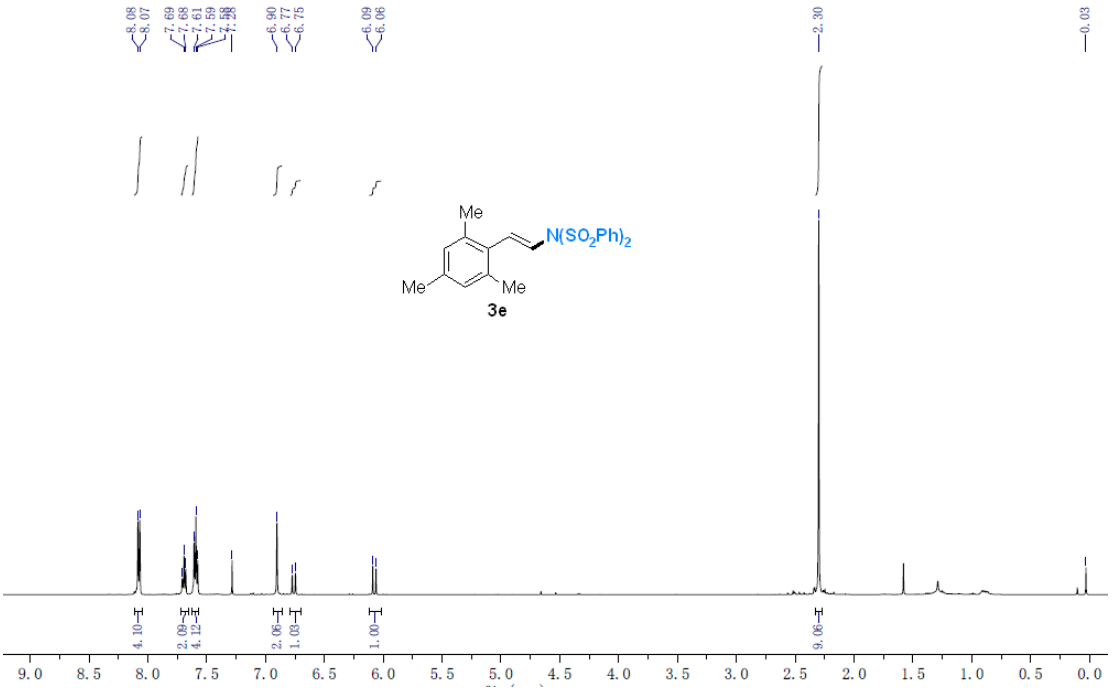
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Me
Me
3e
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1.00
9.06
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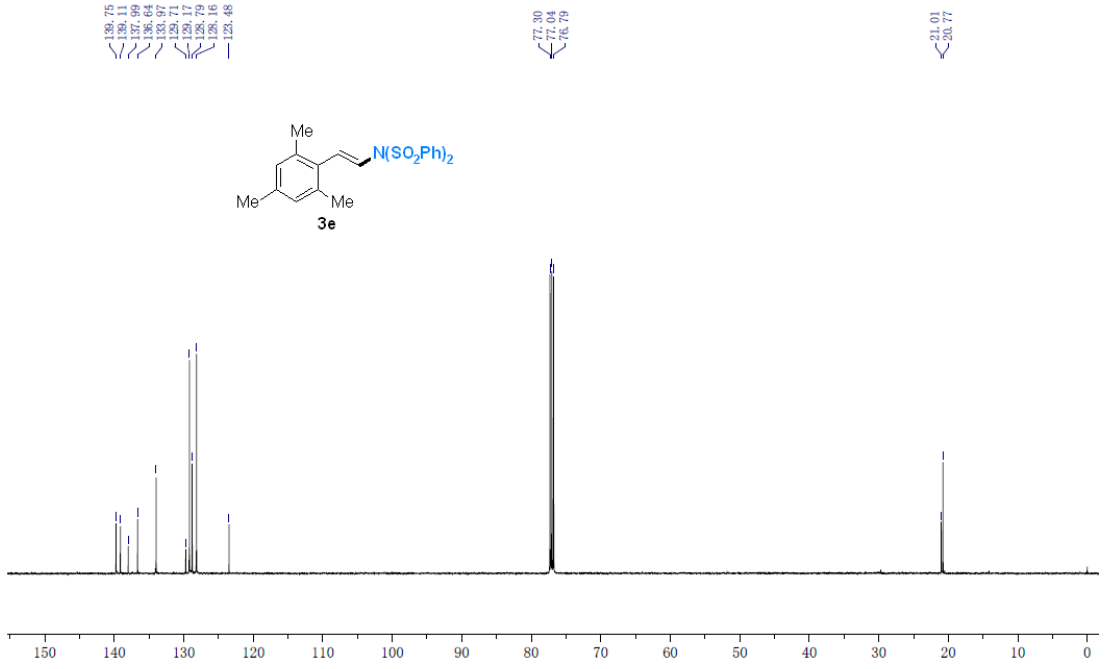
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Me
Me
3e
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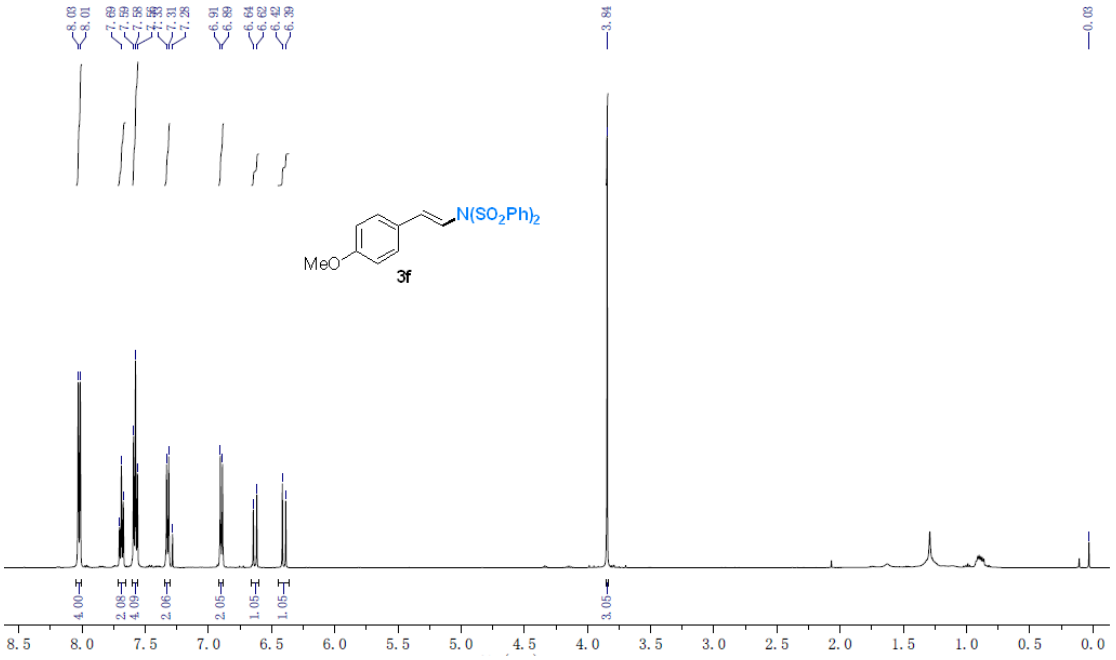
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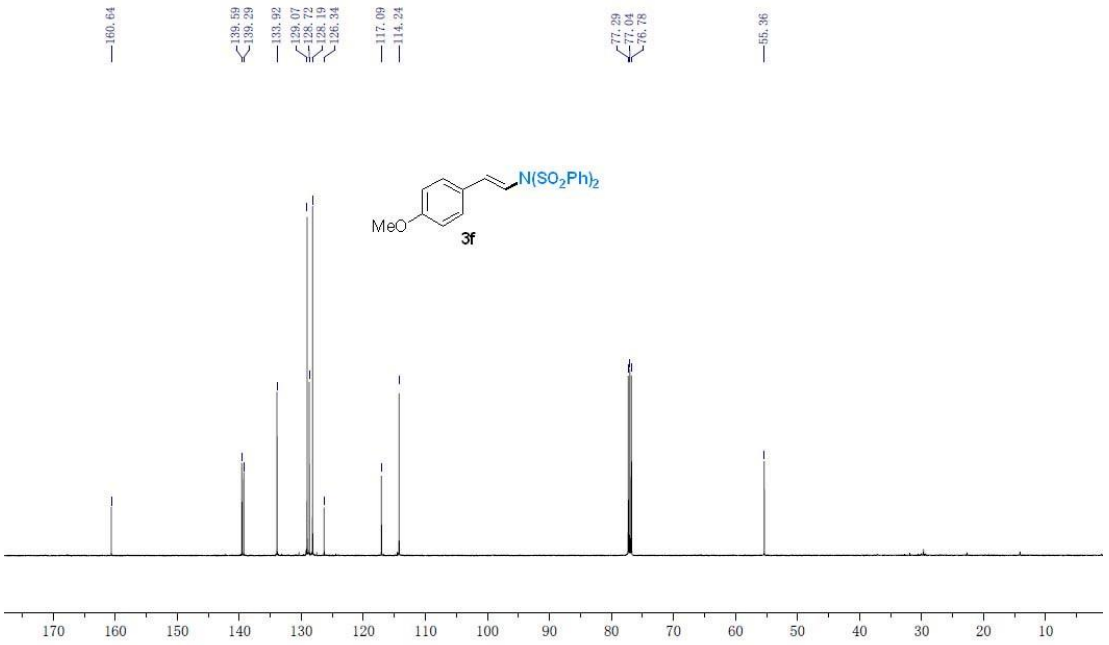
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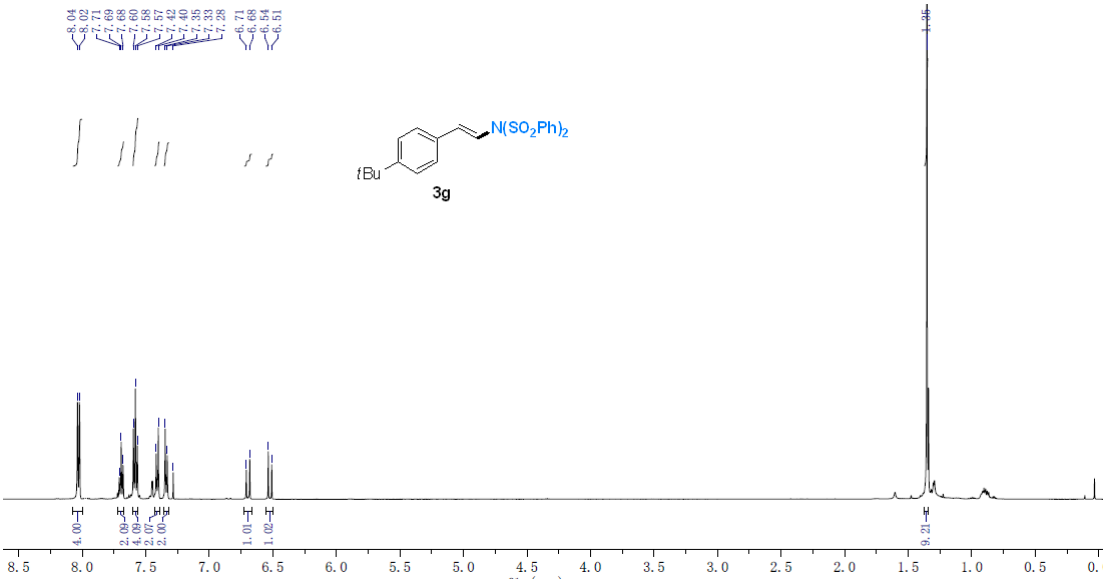
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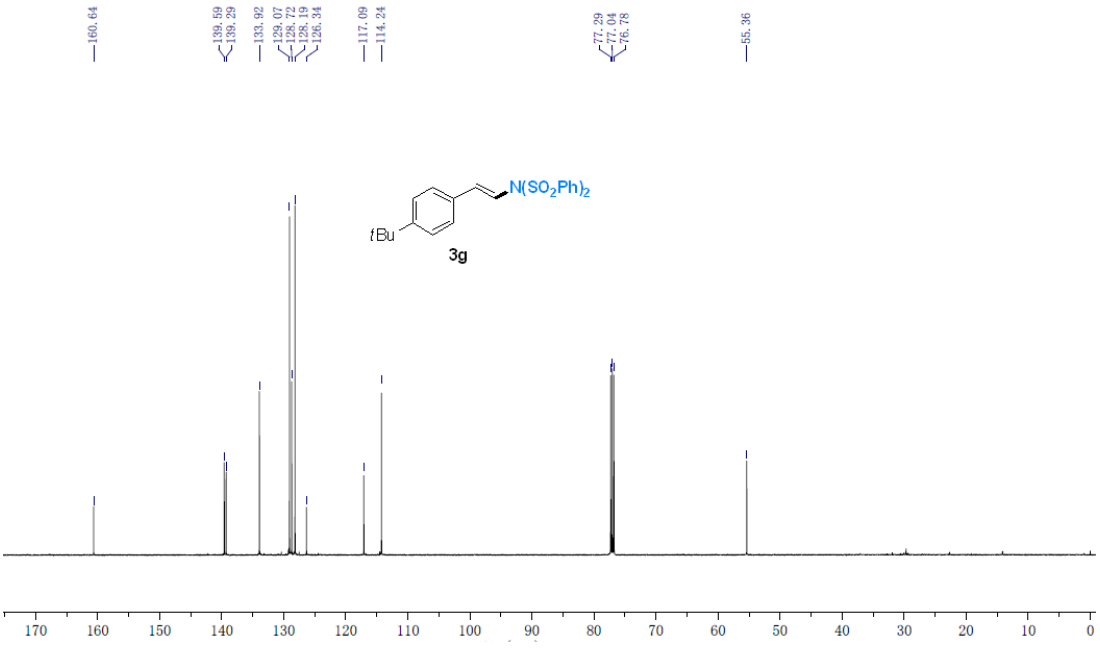
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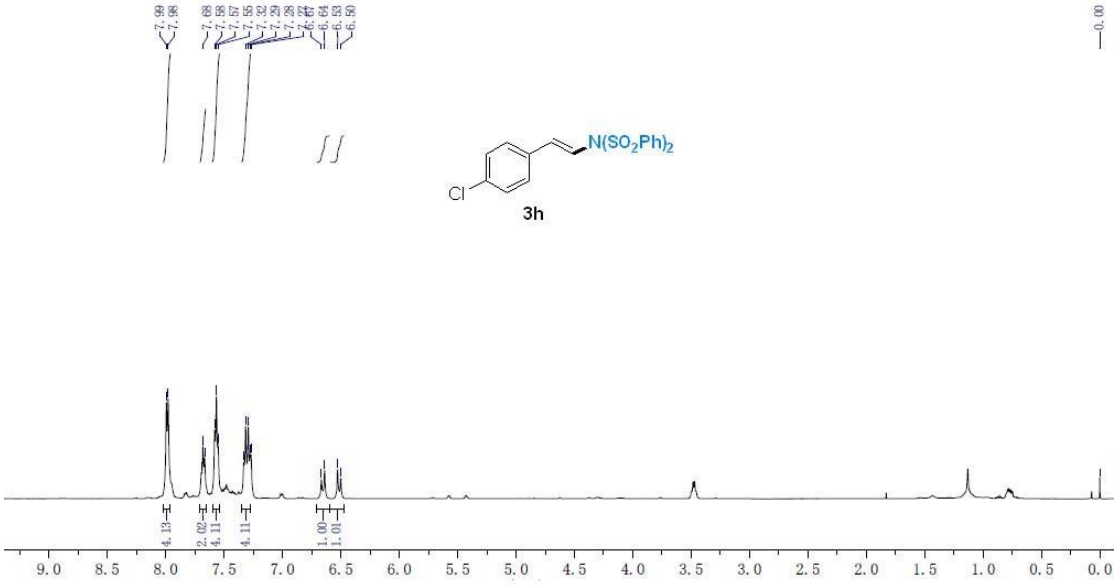
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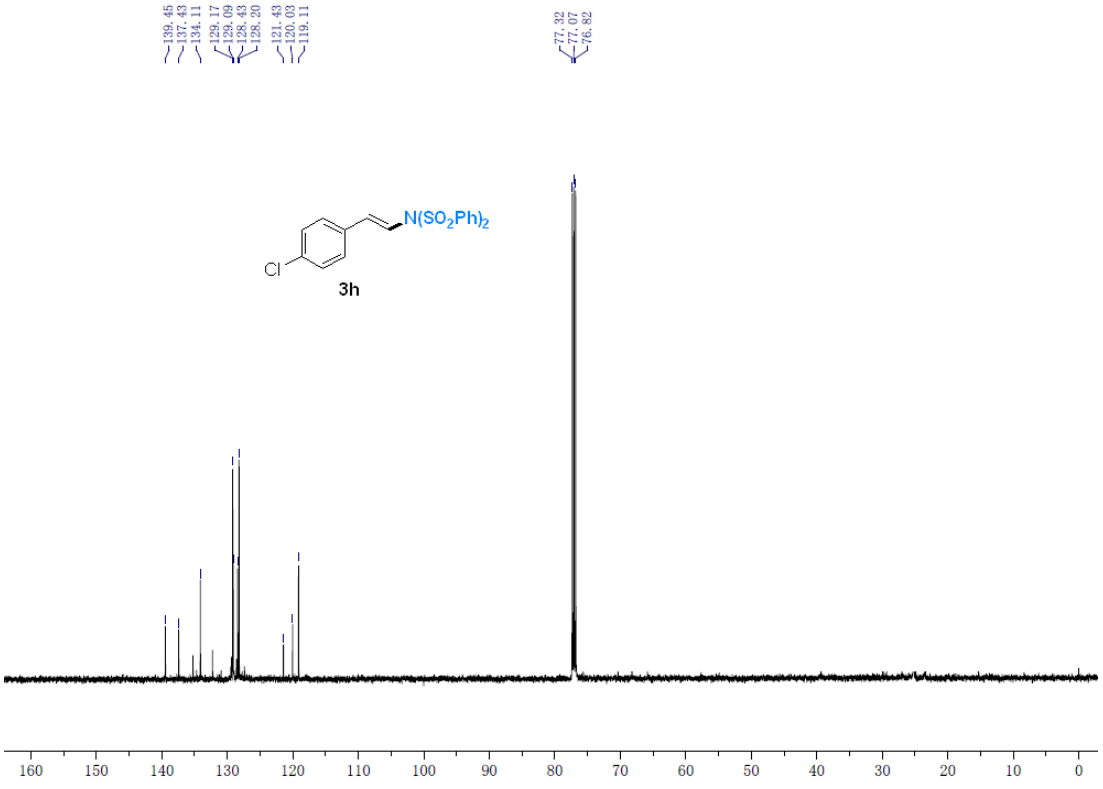
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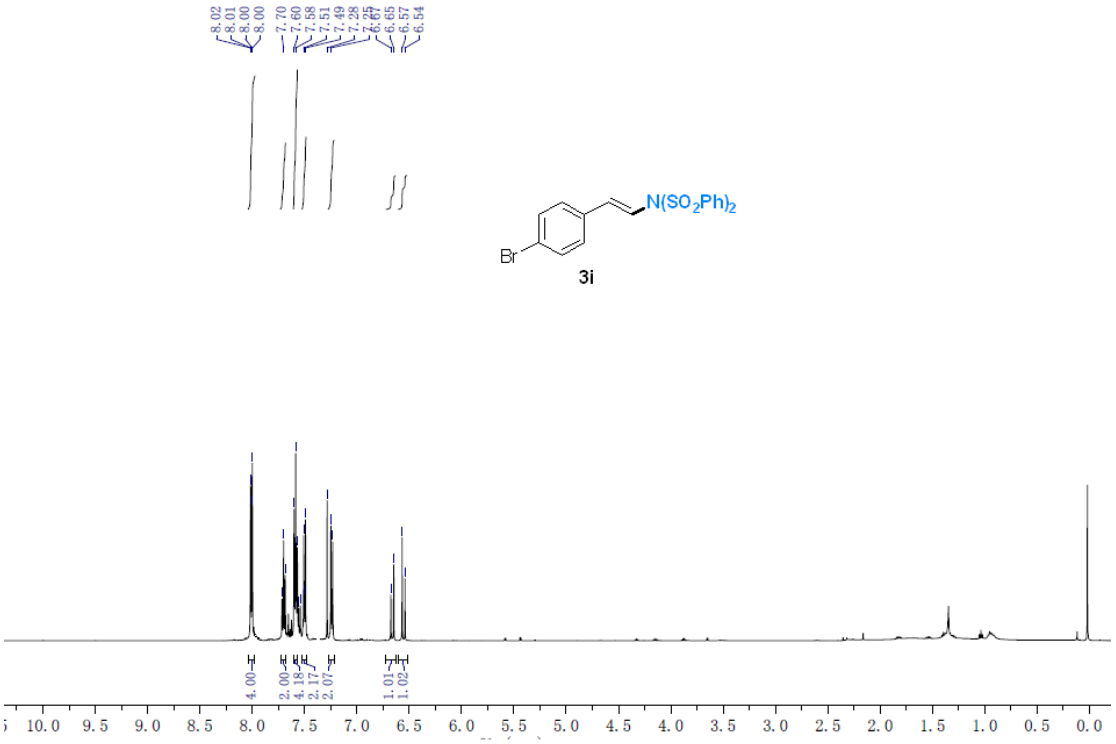
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Br
3i
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2.00
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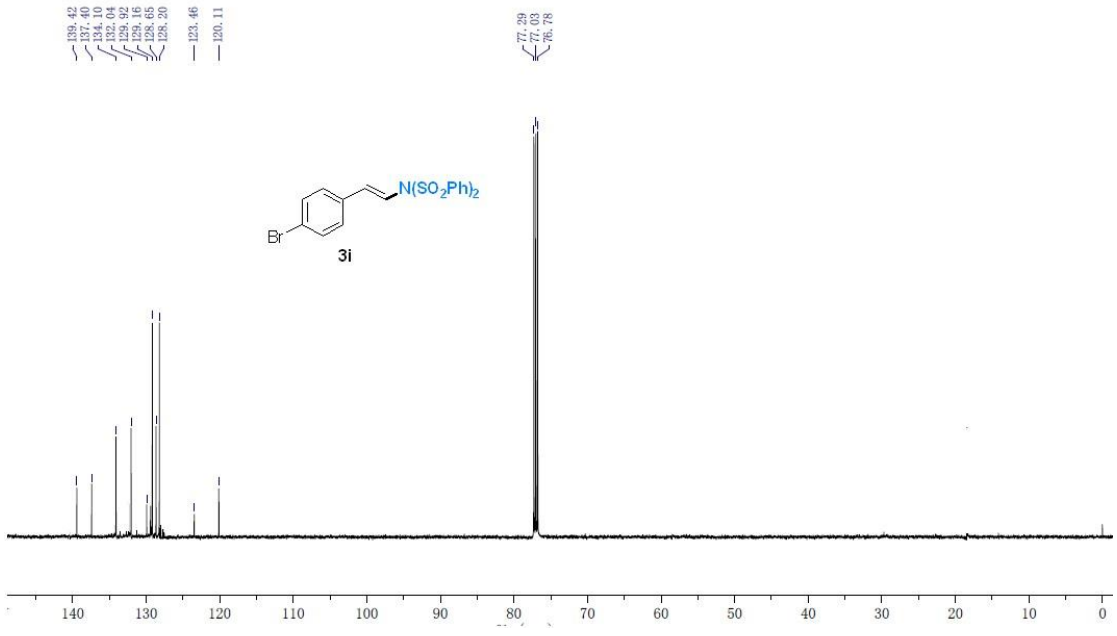
2.17
2.07
1.01
1.02
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0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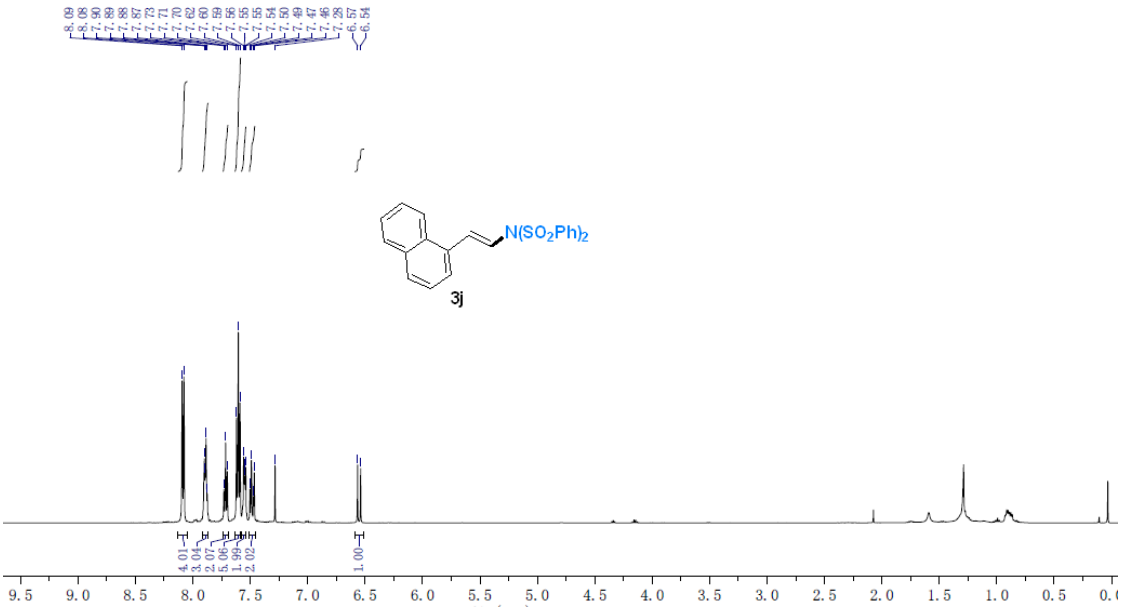
N(SO2Ph)2
Br
3i
140 130 120 110 100 90 80 70 60 50 40 30 20 10 0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8.08
7.90
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7.88
7.87
7.73
7.71
7.70
7.62
7.60
7.59
7.56
7.55
7.54
7.50
7.49
7.47
7.46
7.28
6.57
6.54
N(SO2Ph)2
3j
4.01
3.04
2.07
5.06
1.99
2.02
1.00
9.5
9.0
8.5
8.0
7.5
7.0
6.5
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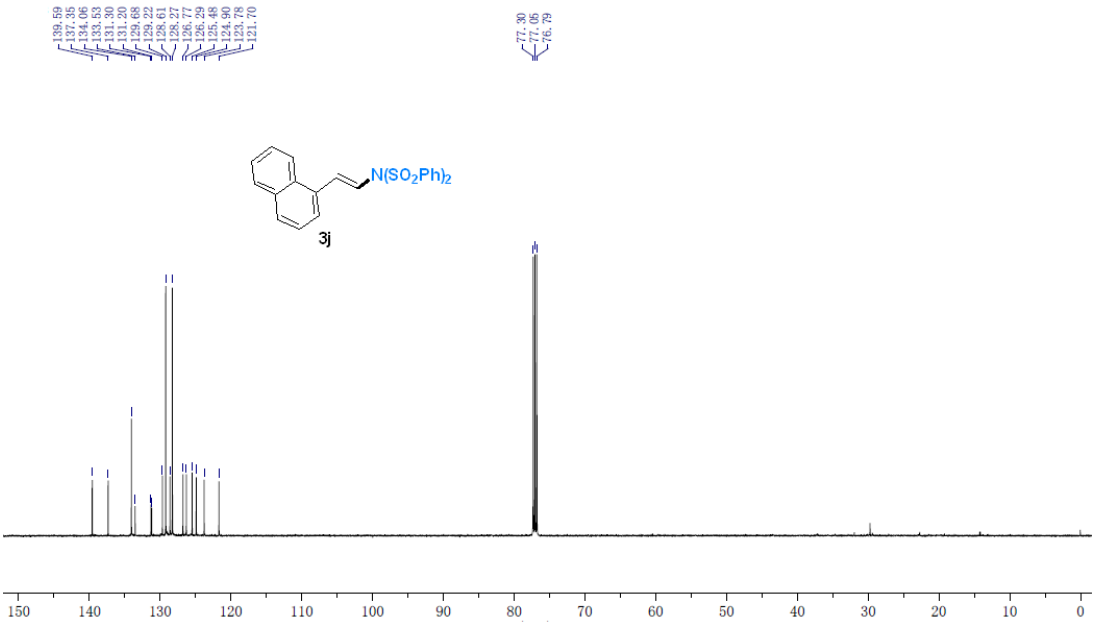
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5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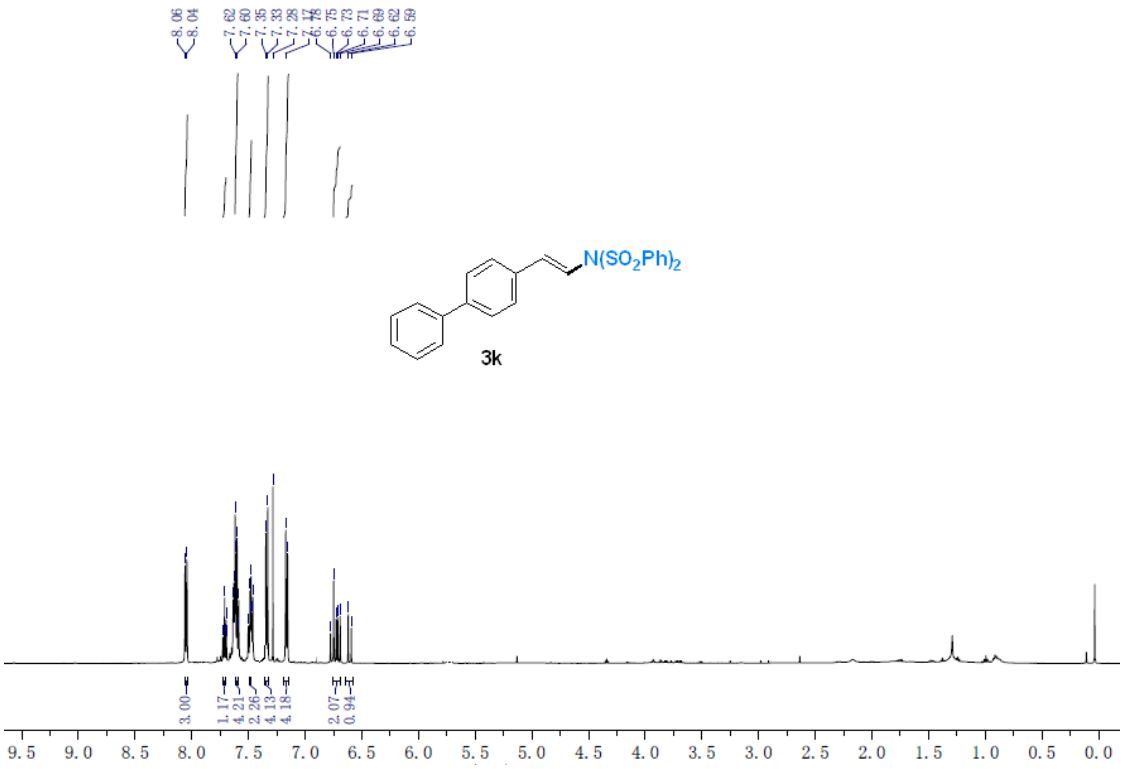
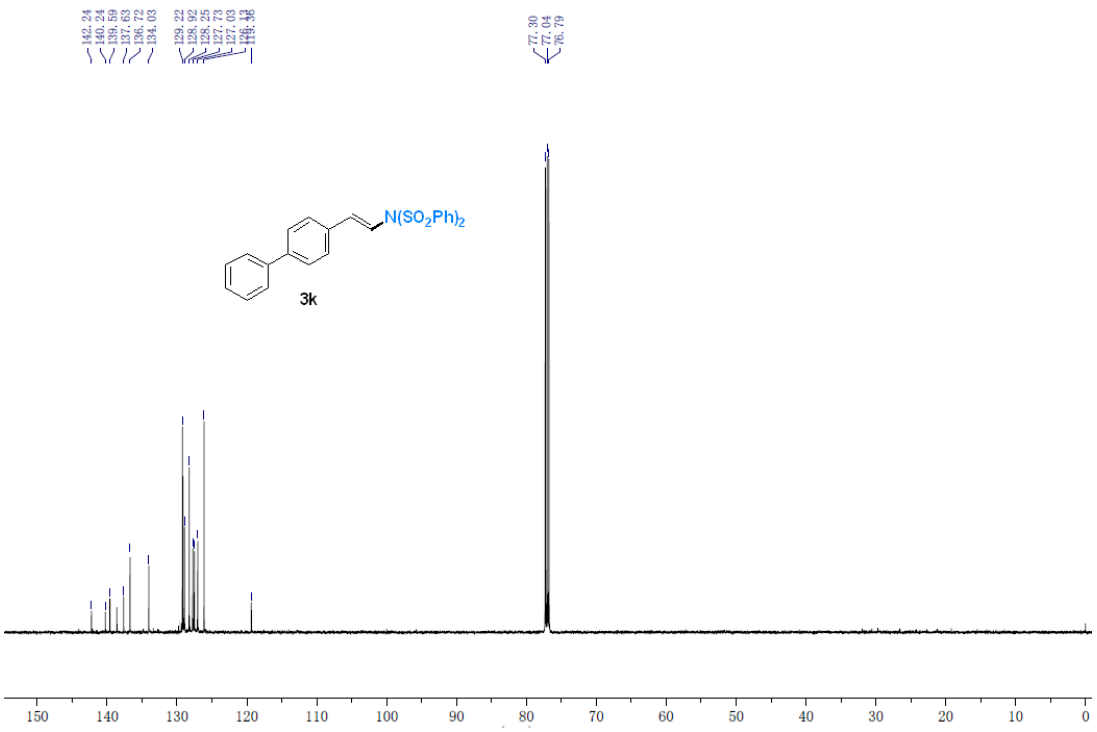
134.06
133.53
131.30
131.20
129.68
129.22
128.61
128.27
126.77
126.29
125.48
124.90
123.78
121.70
77.30
77.05
76.79
N(SO2Ph)2
3j
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0


8.06
8.04
7.62
7.60
7.35
7.33
7.28
7.17
6.75
6.73
6.71
6.69
6.62
6.59
N(SO2Ph)2
3k
3.00
1.17
4.21
2.26
4.13
4.18
2.07
0.94
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0


142.24
140.24
139.59
137.63
136.72
134.03
129.22
128.92
128.25
127.73
127.03
77.30
77.04
76.79
N(SO2Ph)2
3k
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0