

Electronic Supplementary Information

Photocatalytic C(sp²)-H sulfamoylation of enamides: regio- and stereoselective construction of (*E*)-β-sulfamoyl enamides

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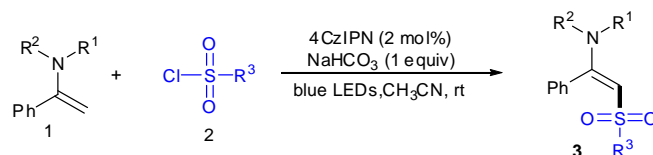
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1. General Considerations

General Information: Unless otherwise noted, all chemicals were purchased and used without further purification. ^1H NMR and ^{13}C NMR spectra were recorded at ambient temperature on a 400 MHz NMR spectrometer (100 MHz for ^{13}C). NMR experiments are reported in δ units, parts per million (ppm), and were referenced to CDCl_3 (δ 7.26 or 77.0) as the internal standard. The coupling constants J are given in Hz. Column chromatography was performed using EM Silica gel 60 (300-400 mesh).

2. General Synthetic Procedures

All Enamides (**1a-1z**, **1aa-1ad**) were prepared according to the previous reports.¹
General procedure for the synthesis of Compounds (3a-3z, 3aa-3an):



Under N_2 , the mixture of enamides **1** (0.2 mmol), sulfonyl chloride **2** (0.4 mmol), 4CzIPN (2 mol%, 3.2 mg), NaHCO_3 (0.2 mmol, 16.8 mg) and CH_3CN (2 mL) were added to a Schlenk tube and sealed. The mixture was stirred at room temperature under 460-465 nm blue LEDs for 16 hours. Then, the solvent was evaporated under reduced pressure, and the residue was purified by silica gel flash column chromatography to obtain the product **3**.

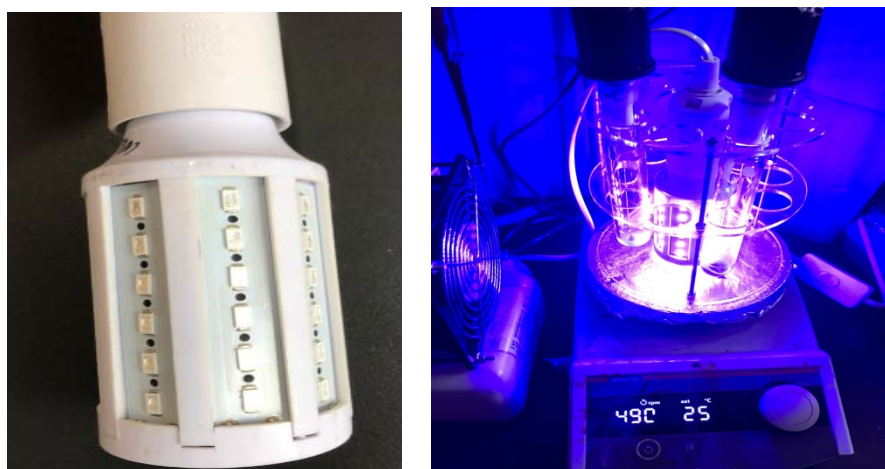


Figure S1. Photoreactor used in this work (20 W blue LEDs, $\lambda_{\text{max}} = 465$ nm).

The Light Source and the Material of the Irradiation Vessel:

The photochemical reaction was carried out under visible light irradiation by a 20W 460-465 nm blue LED at room temperature. This blue LED was purchased from taobao (link: <https://m.tb.cn/h.UHPcb7J?sm=b633d5?tk=5p3fdOWuIMq>). The blue LED's energy peak wavelength is 465 nm, the peak width at half-height is 18.6 nm, and irradiance@20 W is 26.92 mW/cm^2 . The reaction vessel is a borosilicate glass tube. The distance between the tube and lamp is about 1cm, and no filter is applied.

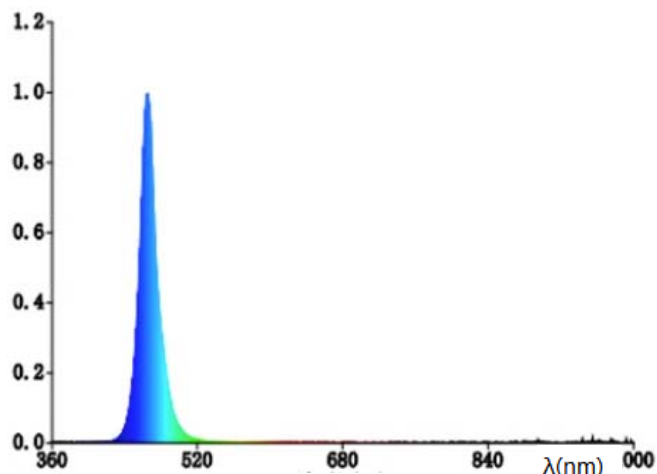
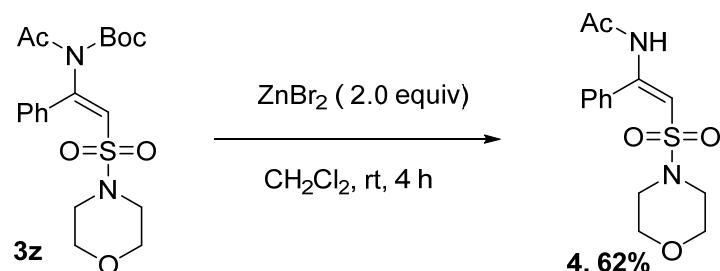


Figure S2. The spectral distribution of 20 W 460-465 nm blue LED

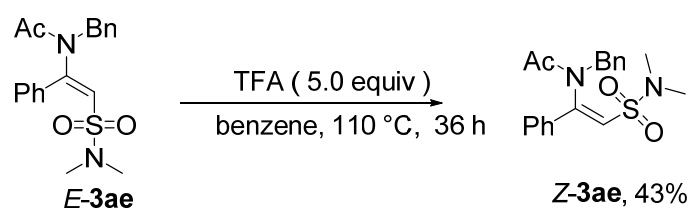
Synthetic applications:

(1) Cleavage of *N*-Boc Protecting Group



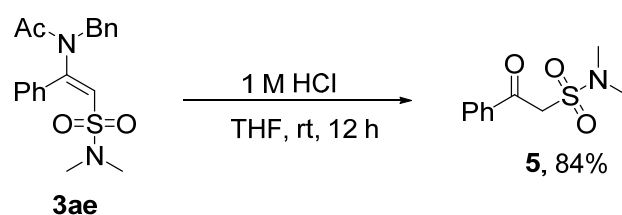
The mixture of **3z** (41.0 mg, 0.1 mmol) and ZnBr_2 (44.4 mg, 0.2 mmol) in CH_2Cl_2 (1.0 mL) was stirred at room temperature for 4 h. The solvent was then removed under vacuum. The residue was purified by flash column chromatography, giving the desired product **4** (19.2 mg, 62% yield).

(2) Conversion of configuration of **3ae**



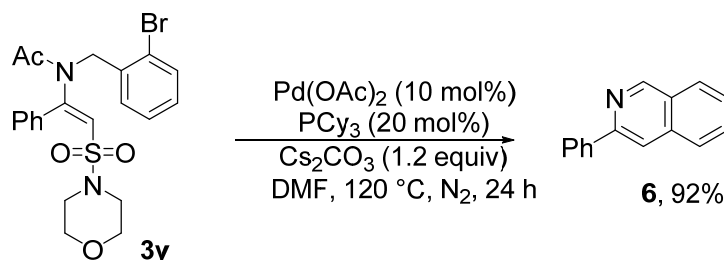
A mixture of *E*-**3ae** (35.8 mg, 0.1 mmol), trifluoroacetic acid (57.0 mg, 0.5 mmol) in dry benzene (2.0 mL) were stirred at 110 °C for 36 h. Upon completion, the solution was concentrated in vacuum and the product was isolated through flash column chromatography to furnish *Z*-**3af** as yellow oil (15.4 mg, 43% yield).

(3) Hydrolysis of **3ae**



3ae (35.8 mg, 0.1 mmol) was dissolved in THF (1.0 mL) and concentrated hydrochloric acid (1 mL) were added sequentially. The mixture was stirred at 50 °C for 12 h. Upon completion, the solution was concentrated in vacuum and the product was isolated through flash column chromatography to give **5** as yellow oil (19.1 mg, 84% yield).

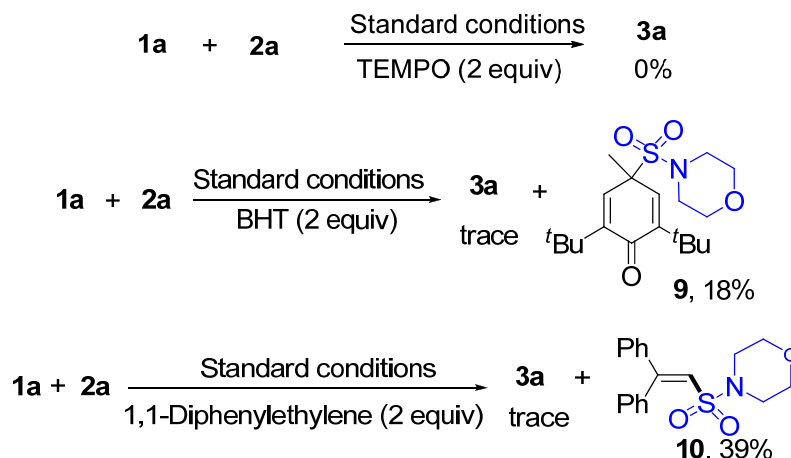
(4) **The palladium-catalyzed cyclization reaction of 3z to access 3-phenylisoquinoline 6**



A mixture of **3y** (48.5 mg, 0.1 mmol), Pd(OAc)₂ (2.3 mg, 10 mol%), tricyclohexylphosphane (5.6 mg, 20 mol%), and Cs₂CO₃ (39.1 mg, 0.12 mmol) in DMF (2.0 mL) were stirred at 120 °C for 24 h. Upon completion, the solution was concentrated in vacuum and the product was isolated through flash column chromatography to give **6** as yellow oil (18.9 mg, 92% yield).

3. Mechanism Studies

3.1 Radical inhibiting experiments



Under N₂, the mixture of enamides **1a** (0.1 mmol), **2a** (2 equiv), 4CzIPN (2 mol%), NaHCO₃ (0.1 mmol), TMEPO (2 equiv) or BHT (2 equiv) or 1,1-diphenylethylene (2 equiv), and CH₃CN (1 mL) were added to a Schlenk tube and sealed. The mixture was stirred at room temperature under 460-465 nm blue LEDs for 16 hours.

Compound 9 (13.3 mg, 18%), ¹H NMR (400 MHz, CDCl₃) δ 6.60 (s, 2H), 3.57 (t, *J* = 4.7 Hz, 4H), 3.16 (t, *J* = 4.7 Hz, 4H), 1.71 (s, 1H), 1.25 (s, 9H); ¹³C NMR (101 MHz, CDCl₃) δ 185.4, 151.1, 135.4, 67.1, 66.4, 48.1, 35.4, 29.3, 22.2. HRMS (ESI) *m/z* calcd for C₁₉H₃₂NO₄S [M+H⁺]: 370.2047, found 370.2052.

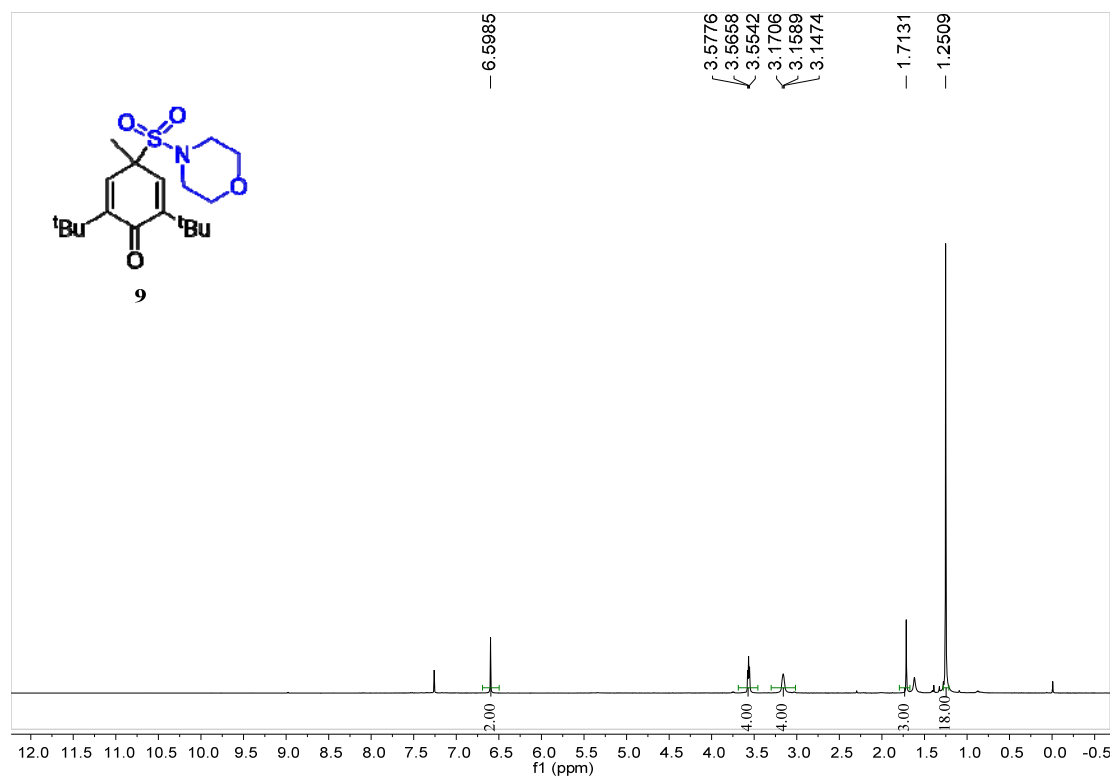


Figure S3. $^1\text{H NMR}$ of the adduct **9** formed by sulfamoyl radical and BHT.

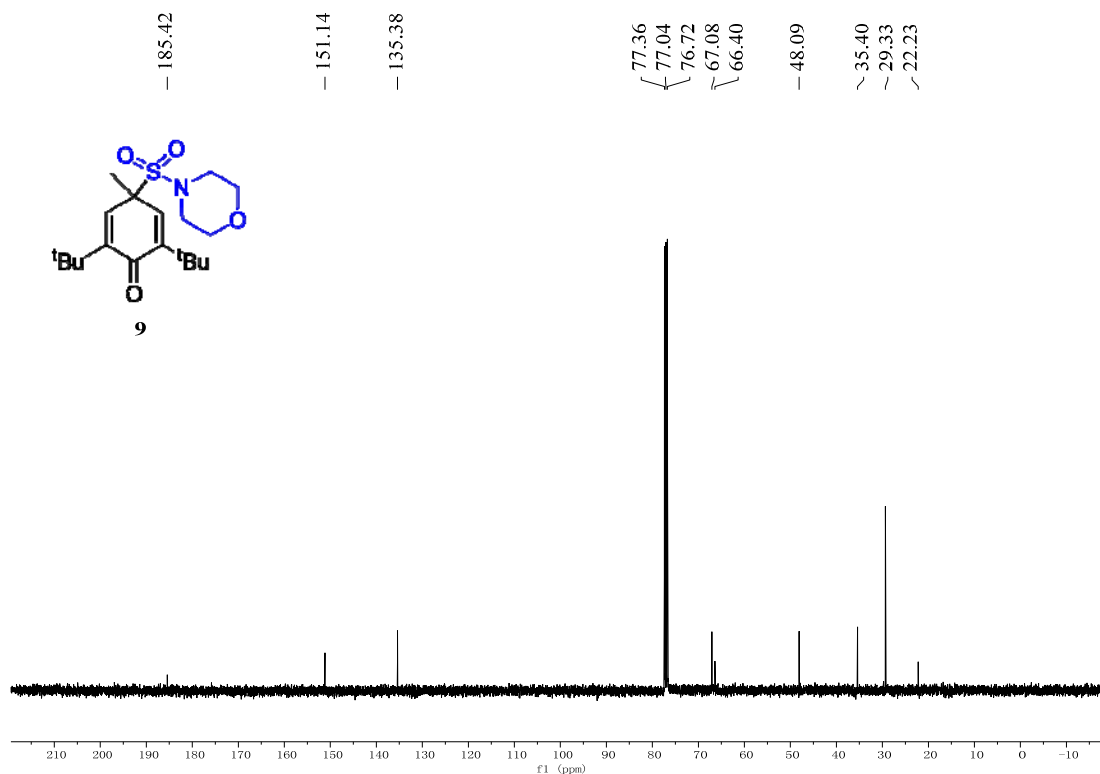


Figure S4. $^{13}\text{C NMR}$ of the adduct **9** formed by sulfamoyl radical and BHT.

Compound 10 (25.7 mg, 39%), $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.42-7.37 (m, 4H), 7.35-7.31 (m, 4H), 7.26-7.23(m, 2H), 6.63 (s, 1H), 3.62 (t, $J = 4.6$ Hz, 4H), 3.08 (t, $J = 4.8$ Hz, 4H); $^{13}\text{C NMR}$ (101 MHz, CDCl_3) δ 155.7, 139.8, 136.4, 130.3, 129.8,

129.2, 128.7, 128.4, 128.0, 121.7, 77.4, 77.1, 76.8, 66.4, 45.5. HRMS (ESI) m/z calcd for $C_{18}H_{20}NO_3S$ $[M+H]^+$: 330.1158, found 330.1155.

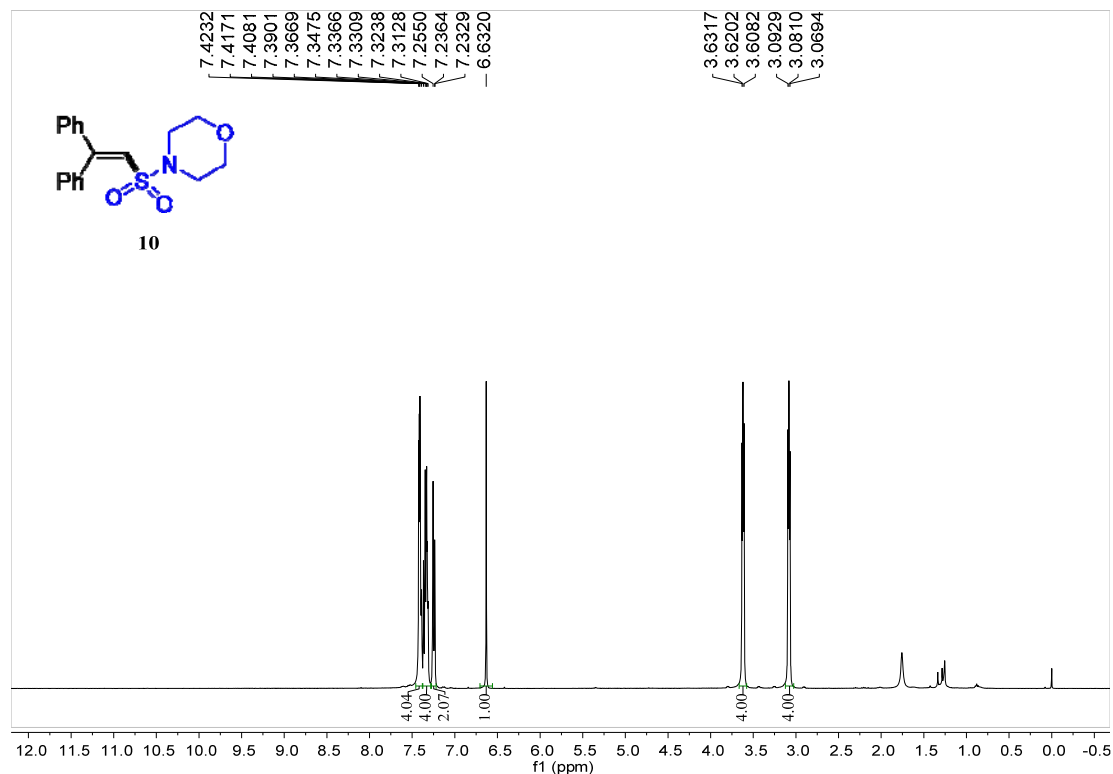


Figure S5. ¹H NMR of the adduct **10** formed by sulfamoyl radical and 1,1-diphenylethylene.

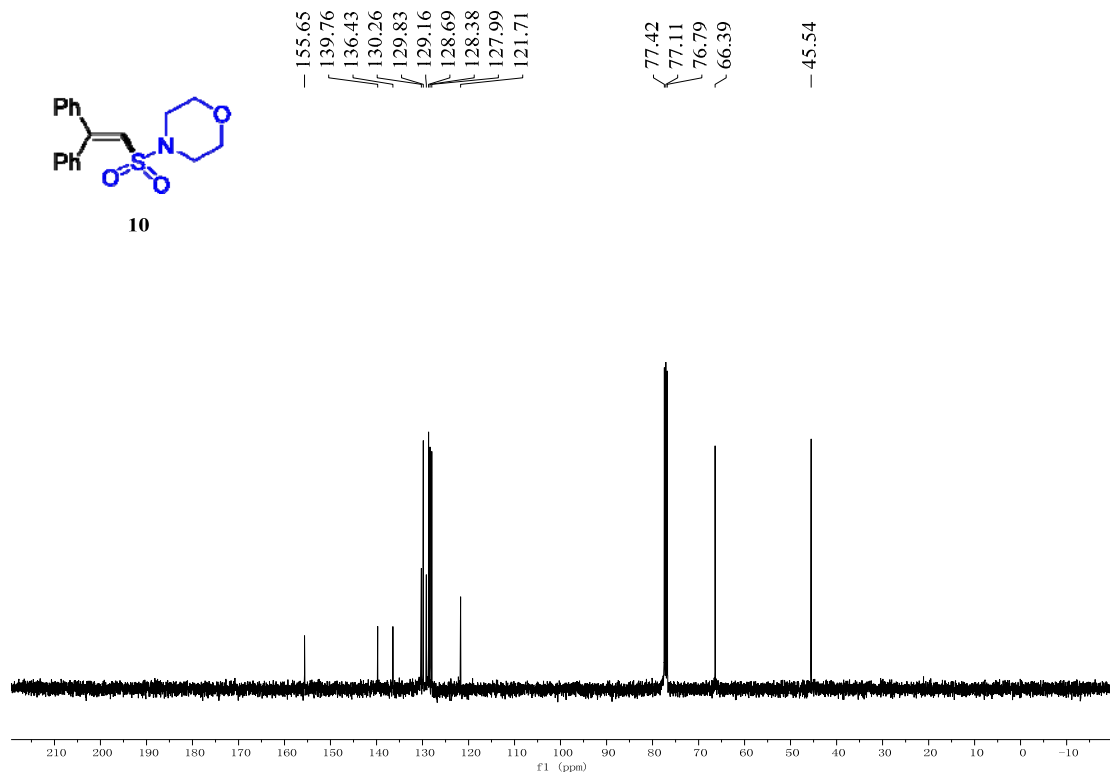


Figure S6. ¹³C NMR of the adduct **10** formed by sulfamoyl radical and 1,1-diphenylethylene.

3.2 Determination of stereochemistry-NOESY experiment of *E*-3a

NOESY-experiment of *E*-3a was performed to confirm the stereoselectivity. It was found that a NOE effect between the olefinic hydrogen (H_A) and the methyl of acetyl group (H_B) was observed, which indicated the *E*-configuration of 3a.

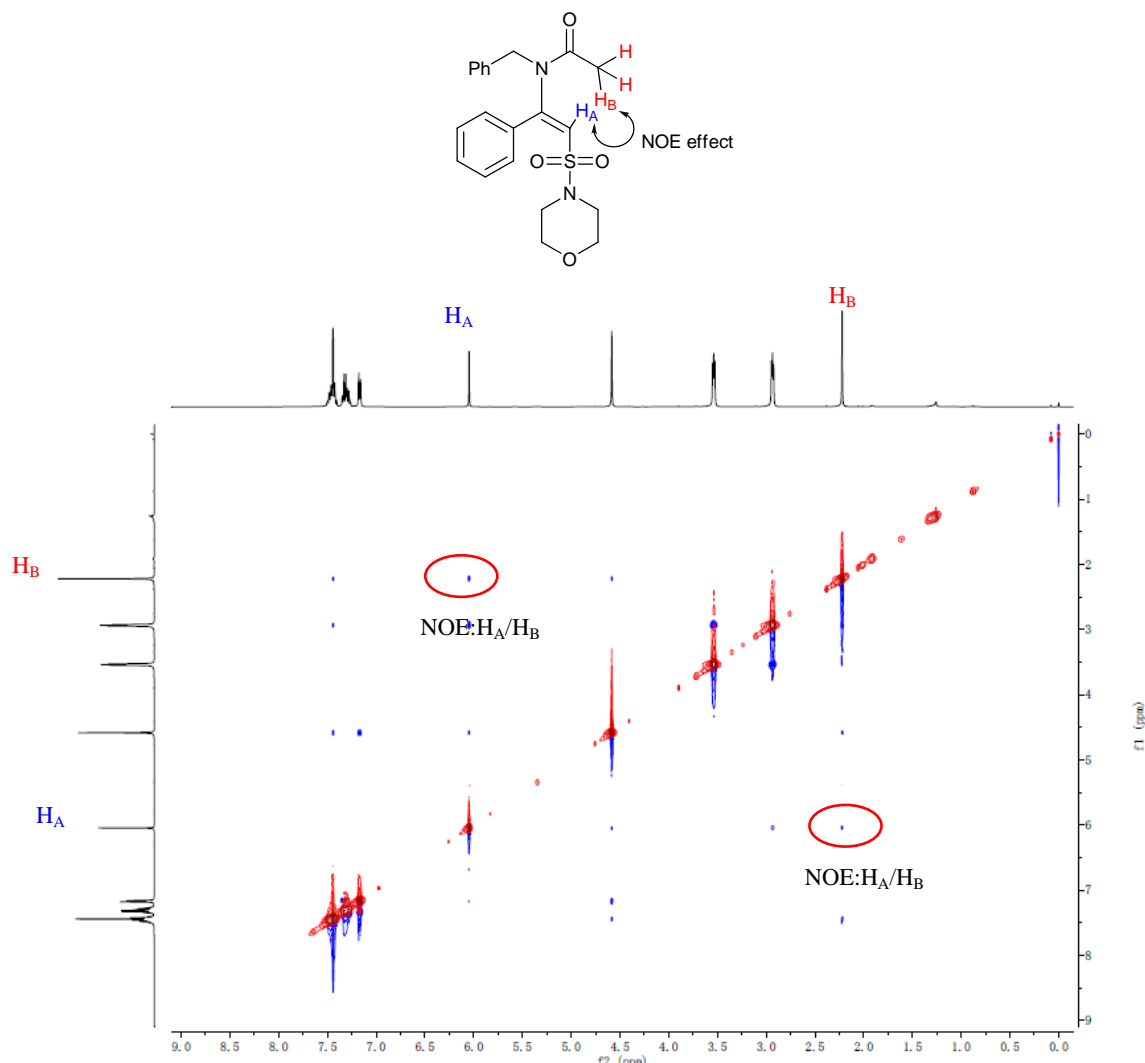


Figure S7. NOESY spectrum of *E*-3a.

3.3 1H NMR evidence for the stereoselectivity

The other products in Tables 2 and 3 exhibited similar 1H NMR signals for their olefinic and benzylic hydrogens as compared to 3a, which should also be *E*-configured. For *Z*-3ae, the chemical shift of the olefinic hydrogen (about 0.2 ppm shifts to the low fields) and the spin splitting of benzylic hydrogens (two doublets for *Z*-isomers vs one broad singlet for *E*-isomers) are distinct from the *E*-3ae (Figure S8 & S9).

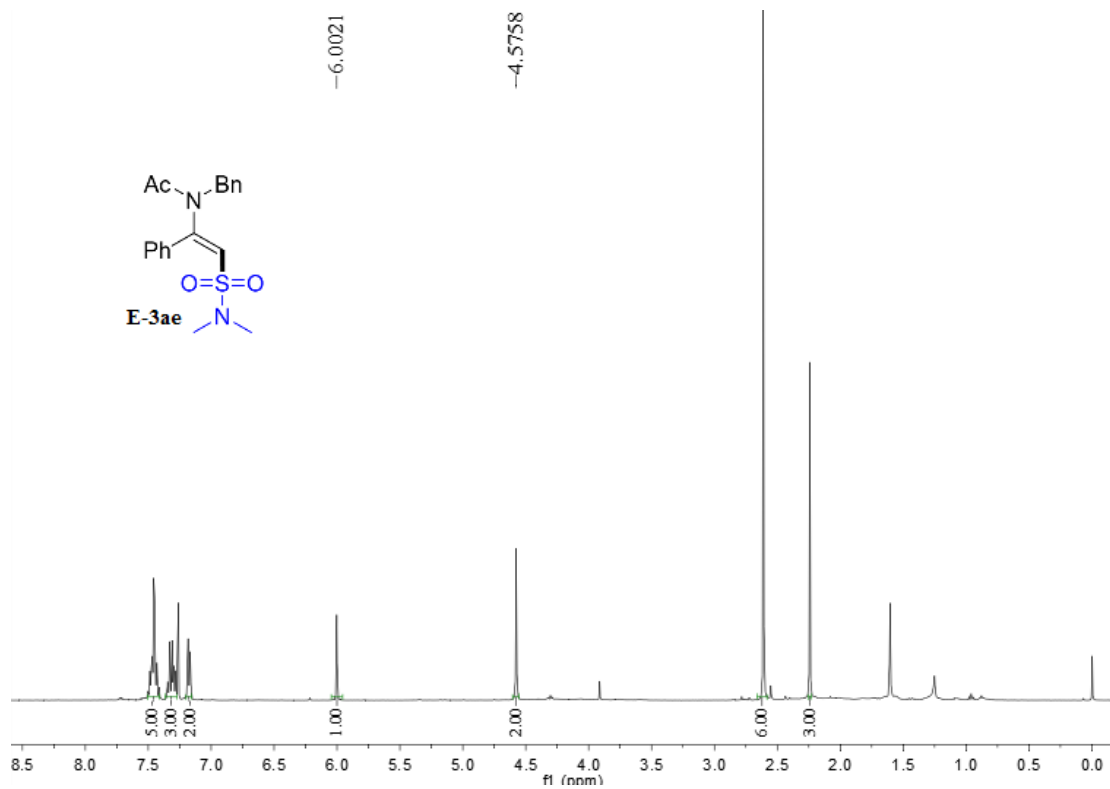


Figure S8. ¹H NMR of **E-3ae**.

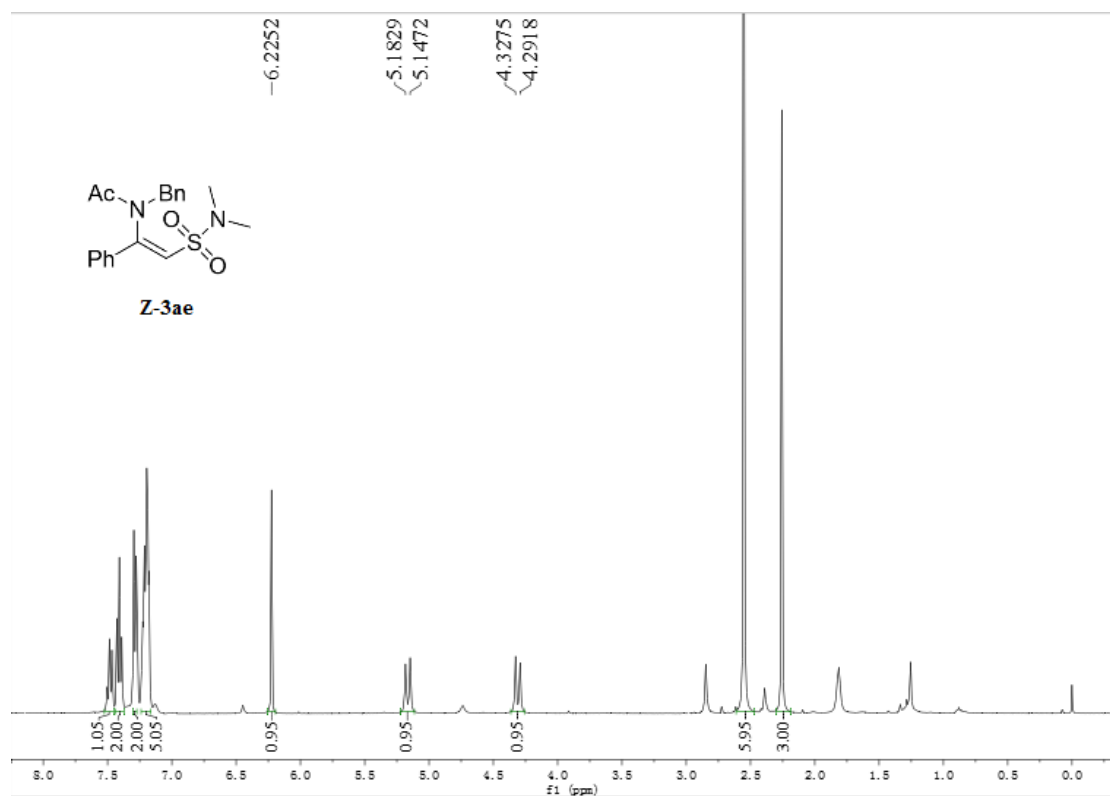
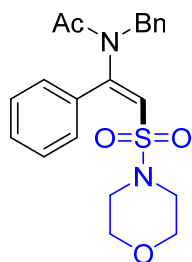
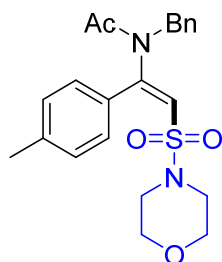


Figure S9. ¹H NMR of **Z-3ae**.

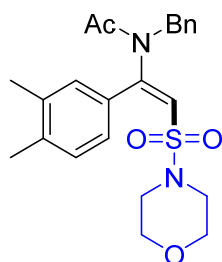
4. Characterization Data for the Products



(E)-N-benzyl-N-(2-(morpholinosulfonyl)-1-phenylvinyl)acetamide (3a), 64.8 mg, 81%), yellow oil; $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.49-7.41 (m, 5H), 7.36-7.27 (m, 3H), 7.18-7.16 (m, 2H), 6.04 (s, 1H), 4.59 (s, 2H), 3.55 (t, $J = 4.7$ Hz, 4H), 2.94 (t, $J = 4.6$ Hz, 4H), 2.23 (s, 3H); $^{13}\text{C NMR}$ (101 MHz, CDCl_3) δ 170.3, 151.3, 136.5, 132.6, 131.2, 129.8, 128.9, 128.5, 128.3, 128.0, 123.0, 66.2, 50.6, 45.4, 23.3. HRMS (ESI) m/z calcd for $\text{C}_{21}\text{H}_{25}\text{N}_2\text{O}_4\text{S}$ [$\text{M}+\text{H}^+$]: 401.1530, found 401.1533.

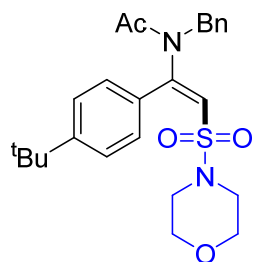


(E)-N-benzyl-N-(2-(morpholinosulfonyl)-1-(p-tolyl)vinyl)acetamide (3b), 54.7 mg, 66%), yellow oil; $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.37-7.29 (m, 5H), 7.24 (d, $J = 7.9$ Hz, 2H), 7.19-7.16 (m, 2H), 5.96 (s, 1H), 4.60 (s, 2H), 3.57 (t, $J = 4.6$ Hz, 4H), 2.95 (t, $J = 4.6$ Hz, 4H), 2.41 (s, 3H), 2.21 (s, 3H); $^{13}\text{C NMR}$ (101 MHz, CDCl_3) δ 170.3, 151.5, 141.8, 136.6, 129.8, 129.7, 129.3, 128.8, 128.3, 127.9, 122.3, 66.2, 50.7, 45.4, 23.3, 21.6. HRMS (ESI) m/z calcd for $\text{C}_{22}\text{H}_{27}\text{N}_2\text{O}_4\text{S}$ [$\text{M}+\text{H}^+$]: 415.1686, found 415.1687.

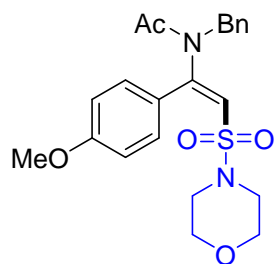


(E)-N-benzyl-N-(1-(3,4-dimethylphenyl)-2-(morpholinosulfonyl)vinyl)acetamide (3c), 55.7 mg, 65%), yellow oil; $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.36-7.28 (m, 3H), 7.25-7.23 (m, 1H), 7.20-7.17 (m, 4H), 5.95 (s, 1H), 4.60 (s, 2H), 3.56 (t, $J = 4.7$ Hz, 4H), 2.95 (t, $J = 4.6$ Hz, 4H), 2.31 (s, 3H), 2.28 (s, 3H), 2.21 (s, 3H); $^{13}\text{C NMR}$ (101 MHz, CDCl_3) δ 170.3, 151.7, 140.6, 137.0, 136.7, 130.5, 130.0, 129.7, 128.8, 128.4,

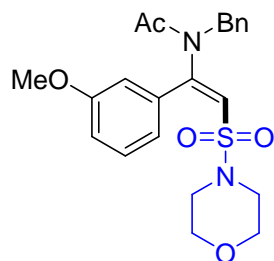
127.9, 127.7, 122.1, 66.2, 50.7, 45.4, 23.3, 20.0, 19.9. HRMS (ESI) m/z calcd for $C_{23}H_{29}N_2O_4S$ $[M+H]^+$: 429.1843, found 429.1838.



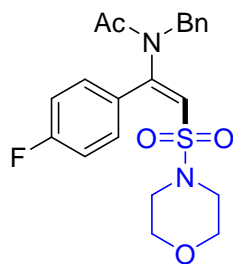
(E)-N-benzyl-N-(1-(4-(tert-butyl)phenyl)-2-(morpholinosulfonyl)vinyl)acetamide (3d), 66.6 mg, 73%), yellow oil; 1H NMR (400 MHz, $CDCl_3$) δ 7.46-7.40 (m, 4H), 7.35-7.29 (m, 3H), 7.20-7.18 (m, 2H), 5.97 (s, 1H), 4.60 (s, 2H), 3.52 (t, $J = 4.7$ Hz, 4H), 2.93 (t, $J = 4.6$ Hz, 4H), 2.20 (s, 3H), 1.34 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.3, 154.9, 151.5, 136.6, 129.7, 129.6, 128.8, 128.5, 127.9, 125.5, 122.6, 66.2, 50.7, 45.4, 35.0, 31.2, 23.3. HRMS (ESI) m/z calcd for $C_{25}H_{33}N_2O_4S$ $[M+H]^+$: 457.2156, found 457.2159.



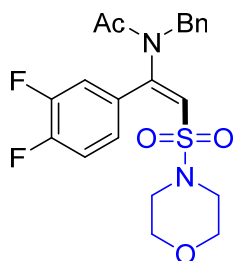
(E)-N-benzyl-N-(1-(4-methoxyphenyl)-2-(morpholinosulfonyl)vinyl)acetamide (3e), 34.5 mg, 40%), yellow oil; 1H NMR (400 MHz, $CDCl_3$) δ 7.44-7.42 (m, 2H), 7.36-7.28 (m, 3H), 7.19-7.17 (m, 2H), 6.95-6.93 (m, 2H), 5.90 (s, 1H), 4.62 (s, 2H), 3.86 (s, 3H), 3.58 (t, $J = 4.7$ Hz, 4H), 2.95 (t, $J = 4.6$ Hz, 4H), 2.19 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.4, 162.0, 151.4, 136.6, 131.6, 128.8, 128.4, 127.9, 124.6, 121.2, 114.0, 66.2, 55.5, 50.9, 45.4, 23.3. HRMS (ESI) m/z calcd for $C_{22}H_{27}N_2O_5S$ $[M+H]^+$: 431.1635, found 431.1630.



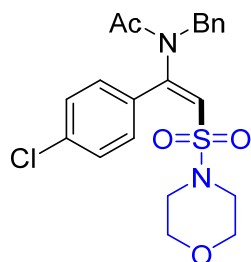
(E)-N-benzyl-N-(1-(3-methoxyphenyl)-2-(morpholinosulfonyl)vinyl)acetamide (3f), 50.8 mg, 59%), yellow oil; 1H NMR (400 MHz, $CDCl_3$) δ 7.37-7.29 (m, 4H), 7.20-7.18 (m, 2H), 7.05-6.98 (m, 3H), 6.04 (s, 1H), 4.61 (s, 2H), 3.80 (s, 3H), 3.56 (t, $J = 4.6$ Hz, 4H), 2.95 (t, $J = 4.6$ Hz, 4H), 2.22 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.3, 159.4, 151.1, 136.6, 133.9, 129.6, 128.8, 128.3, 127.9, 123.2, 122.0, 116.9, 115.3, 66.2, 55.5, 50.7, 45.4, 23.3. HRMS (ESI) m/z calcd for $C_{22}H_{27}N_2O_5S$ $[M+H]^+$: 431.1635, found 431.1631.



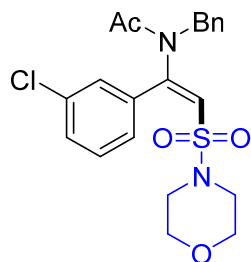
(E)-N-benzyl-N-(1-(4-fluorophenyl)-2-(morpholinosulfonyl)vinyl)acetamide (3g, 58.4 mg, 70%), yellow oil; $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.46-7.43 (m, 2H), 7.36-7.28 (m, 3H), 7.16-7.10 (m, 4H), 6.03 (s, 1H), 4.59 (s, 2H), 3.60 (t, $J = 4.5$ Hz, 4H), 2.97 (t, $J = 4.6$ Hz, 4H), 2.23 (s, 3H); $^{13}\text{C NMR}$ (101 MHz, CDCl_3) δ 170.2, 164.2 (d, $J_{\text{C-F}} = 251.1$ Hz), 150.2, 136.3, 132.0 (d, $J_{\text{C-F}} = 8.7$ Hz), 128.9, 128.6 (d, $J_{\text{C-F}} = 3.4$ Hz), 128.2, 128.0, 122.8, 115.8 (d, $J_{\text{C-F}} = 21.8$ Hz), 66.2, 50.7, 45.4, 23.3. HRMS (ESI) m/z calcd for $\text{C}_{21}\text{H}_{24}\text{FN}_2\text{O}_4\text{S}$ [$\text{M}+\text{H}^+$]: 419.1435, found 419.1437.



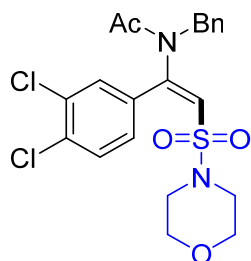
(E)-N-benzyl-N-(1-(3,4-difluorophenyl)-2-(morpholinosulfonyl)vinyl)acetamide (3h, 50.4 mg, 58%), yellow oil; $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.29-7.12 (m, 6H), 7.10-7.06 (m, 2H), 5.98 (s, 1H), 4.50 (s, 2H), 3.55 (t, $J = 4.6$ Hz, 4H), 2.93 (t, $J = 2.9$ Hz, 4H), 2.16 (s, 3H); $^{13}\text{C NMR}$ (101 MHz, CDCl_3) δ 170.1, 151.9 (dd, $J_{\text{C-F}} = 255.6$, 12.6 Hz), 149.9 (dd, $J_{\text{C-F}} = 251.8$, 13.0 Hz), 148.8, 136.1, 129.4 (dd, $J_{\text{C-F}} = 9.9$, 4.5 Hz), 128.9, 128.1, 128.0, 126.7 (dd, $J_{\text{C-F}} = 6.9$, 3.8 Hz), 123.6, 119.0 (d, $J_{\text{C-F}} = 18.5$ Hz), 117.6 (d, $J_{\text{C-F}} = 17.8$ Hz), 66.2, 50.8, 45.4, 23.1. HRMS (ESI) m/z calcd for $\text{C}_{21}\text{H}_{23}\text{F}_2\text{N}_2\text{O}_4\text{S}$ [$\text{M}+\text{H}^+$]: 437.1341, found 437.1346.



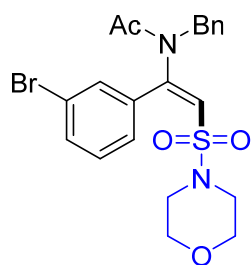
(E)-N-benzyl-N-(1-(4-chlorophenyl)-2-(morpholinosulfonyl)vinyl)acetamide (3i, 95.6 mg, 75%), yellow oil; $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.42-7.27 (m, 7H), 7.16-7.14 (m, 2H), 6.04 (s, 1H), 4.58 (s, 2H), 3.61 (t, $J = 4.6$ Hz, 4H), 2.98 (t, $J = 4.8$ Hz, 4H), 2.23 (s, 3H); $^{13}\text{C NMR}$ (101 MHz, CDCl_3) δ 170.2, 150.0, 137.4, 136.3, 131.2, 131.0, 128.9, 128.8, 128.2, 128.1, 123.2, 66.2, 50.7, 45.4, 23.3. HRMS (ESI) m/z calcd for $\text{C}_{21}\text{H}_{24}\text{ClN}_2\text{O}_4\text{S}$ [$\text{M}+\text{H}^+$]: 435.1140, found 435.1136.



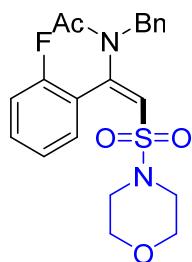
(E)-N-benzyl-N-(1-(3-chlorophenyl)-2-(morpholinosulfonyl)vinyl)acetamide (3j), 73.0 mg, 84%), yellow oil; ^1H NMR (400 MHz, CDCl_3) δ 7.62-7.60 (m, 1H), 7.51 (s, 1H), 7.40-7.29 (m, 5H), 7.16-7.14 (m, 2H), 6.07 (s, 1H), 4.58 (s, 2H), 3.60 (t, $J = 4.6$ Hz, 4H), 2.98 (t, $J = 4.7$ Hz, 4H), 2.25 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3) δ 170.1, 149.4, 136.2, 134.6, 134.0, 132.2, 129.9, 129.0, 128.8, 128.2, 128.1, 123.9, 122.5, 66.2, 50.7, 45.4, 23.3. HRMS (ESI) m/z calcd for $\text{C}_{21}\text{H}_{24}\text{ClN}_2\text{O}_4\text{S}$ [$\text{M}+\text{H}^+$]: 435.1140, found 435.1138.



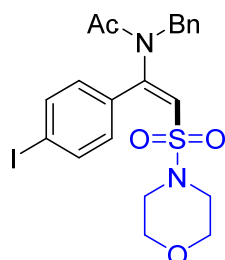
(E)-N-benzyl-N-(1-(3,4-dichlorophenyl)-2-(morpholinosulfonyl)vinyl)acetamide (3k), 60.2 mg, 64%), yellow oil; ^1H NMR (400 MHz, CDCl_3) δ 7.51-7.45 (m, 2H), 7.37-7.27 (m, 4H), 7.15-7.13 (m, 2H), 6.09 (s, 1H), 4.58 (s, 2H), 3.63 (t, $J = 4.3$ Hz, 4H), 3.00 (t, $J = 4.0$, 4H), 2.25 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3) δ 170.1, 148.6, 136.1, 135.4, 132.9, 132.5, 131.2, 130.4, 129.3, 129.0, 128.2, 128.1, 66.2, 50.8, 45.4, 29.7, 23.2. HRMS (ESI) m/z calcd for $\text{C}_{21}\text{H}_{23}\text{Cl}_2\text{N}_2\text{O}_4\text{S}$ [$\text{M}+\text{H}^+$]: 469.0750, found 469.0757.



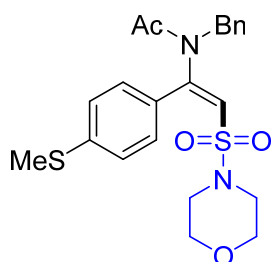
(E)-N-benzyl-N-(1-(3-bromophenyl)-2-(morpholinosulfonyl)vinyl)acetamide (3l), 80.2 mg, 84%), yellow oil; ^1H NMR (400 MHz, CDCl_3) δ 7.48-7.45 (m, 1H), 7.40-7.29 (m, 6H), 7.17-7.14 (m, 2H), 6.07 (s, 1H), 4.58 (s, 2H), 3.60 (t, $J = 4.6$ Hz, 4H), 2.98 (t, $J = 4.7$ Hz, 4H), 2.25 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3) δ 170.1, 149.5, 136.2, 134.5, 134.3, 131.2, 129.7, 129.4, 129.0, 128.3, 128.2, 128.1, 66.2, 50.7, 45.4, 23.2. HRMS (ESI) m/z calcd for $\text{C}_{21}\text{H}_{24}\text{BrN}_2\text{O}_4\text{S}$ [$\text{M}+\text{H}^+$]: 479.0635, found 479.0629.



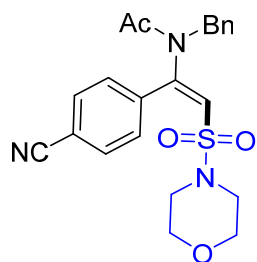
(E)-N-benzyl-N-(1-(2-fluorophenyl)-2-(morpholinosulfonyl)vinyl)acetamide (3m, 57 mg, 56%), yellow oil; $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.40-7.35 (m, 1H), 7.26-7.17 (m, 4H), 7.12-7.01 (m, 4H), 6.08 (s, 1H), 4.48 (s, 2H), 3.55 (t, $J = 4.6$ Hz, 4H), 2.95 (t, $J = 4.7$ Hz, 4H), 2.24 (s, 3H); $^{13}\text{C NMR}$ (101 MHz, CDCl_3) δ 170.2, 160.0 (d, $J_{\text{C-F}} = 248.6$ Hz), 145.6, 136.4, 132.7 (d, $J_{\text{C-F}} = 8.5$ Hz), 132.2 (d, $J_{\text{C-F}} = 2.2$ Hz), 128.8, 127.9, 127.8, 124.4, 124.0 (d, $J_{\text{C-F}} = 3.4$ Hz), 115.9 (d, $J_{\text{C-F}} = 21.2$ Hz), 66.3, 50.0, 45.4, 23.1, 23.0. HRMS (ESI) m/z calcd for $\text{C}_{21}\text{H}_{24}\text{FN}_2\text{O}_4\text{S}$ [$\text{M}+\text{H}^+$]: 419.1435, found 419.1437.



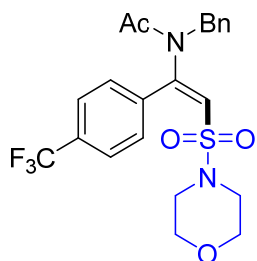
(E)-N-benzyl-N-(1-(4-iodophenyl)-2-(morpholinosulfonyl)vinyl)acetamide (3n, 86.4 mg, 83%), yellow oil; $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.78-7.75 (m, 2H), 7.36-7.28 (m, 3H), 7.18-7.13 (m, 4H), 6.02 (s, 1H), 4.57 (s, 2H), 3.60 (t, $J = 4.6$ Hz, 4H), 2.97 (t, $J = 4.7$ Hz, 4H), 2.22 (s, 3H); $^{13}\text{C NMR}$ (101 MHz, CDCl_3) δ 170.2, 150.2, 137.7, 136.3, 132.1, 131.3, 128.9, 128.2, 128.1, 98.0, 66.2, 50.8, 45.4, 23.3. HRMS (ESI) m/z calcd for $\text{C}_{21}\text{H}_{24}\text{IN}_2\text{O}_4\text{S}$ [$\text{M}+\text{H}^+$]: 527.0496, found 527.0485.



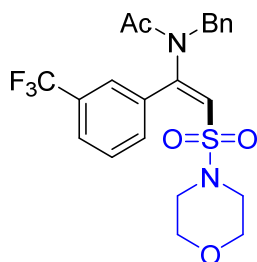
(E)-N-benzyl-N-(1-(4-(methylthio)phenyl)-2-(morpholinosulfonyl)vinyl)acetamide (3o, 45.5 mg, 51%), yellow oil; $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.31-7.29 (m, 2H), 7.26-7.16 (m, 5H), 7.11-7.08 (m, 2H), 5.88 (s, 1H), 4.54 (s, 2H), 3.51 (t, $J = 4.6$ Hz, 4H), 2.89 (t, $J = 4.7$ Hz, 4H), 2.44 (s, 3H), 2.13 (s, 3H); $^{13}\text{C NMR}$ (101 MHz, CDCl_3) δ 170.3, 151.0, 143.6, 136.5, 130.2, 128.9, 128.5, 128.3, 128.0, 125.1, 122.1, 66.2, 50.8, 45.4, 23.3, 14.9. HRMS (ESI) m/z calcd for $\text{C}_{22}\text{H}_{27}\text{N}_2\text{O}_4\text{S}_2$ [$\text{M}+\text{H}^+$]: 447.1407, found 447.1411.



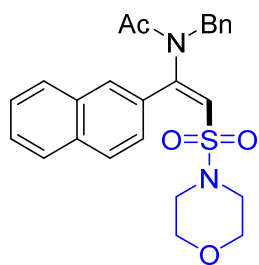
(E)-N-benzyl-N-(1-(4-cyanophenyl)-2-(morpholinosulfonyl)vinyl)acetamide (3p, 61.3 mg, 72%), yellow oil; $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.71 (d, $J = 8.3$ Hz, 2H), 7.51 (d, $J = 8.2$ Hz, 2H), 7.38-7.30 (m, 3H), 7.14-7.12 (m, 2H), 6.17 (s, 1H), 4.57 (s, 2H), 3.64 (t, $J = 4.5$ Hz, 4H), 3.01 (t, $J = 4.8$ Hz, 4H), 2.27 (s, 3H); $^{13}\text{C NMR}$ (101 MHz, CDCl_3) δ 170.2, 148.9, 137.2, 135.9, 132.0, 130.5, 129.1, 128.3, 127.9, 124.2, 118.0, 114.4, 66.2, 51.0, 45.4, 23.2. HRMS (ESI) m/z calcd for $\text{C}_{22}\text{H}_{24}\text{N}_3\text{O}_4\text{S}$ [$\text{M}+\text{H}^+$]: 426.1482, found 426.1479.



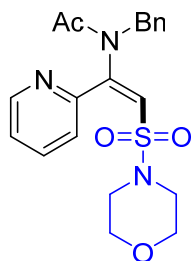
(E)-N-benzyl-N-(2-(morpholinosulfonyl)-1-(4-(trifluoromethyl)phenyl)vinyl)acetamide (3q, 57.8 mg, 62%), yellow oil; $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.67 (d, $J = 8.2$ Hz, 2H), 7.52 (d, $J = 8.0$ Hz, 2H), 7.36-7.27 (m, 3H), 7.14-7.11 (m, 2H), 6.13 (s, 1H), 4.55 (s, 2H), 3.60 (t, $J = 4.6$ Hz, 4H), 2.98 (t, $J = 4.8$ Hz, 4H), 2.25 (s, 3H); $^{13}\text{C NMR}$ (101 MHz, CDCl_3) δ 170.1, 149.5, 136.3, 136.1, 132.9 (q, $J_{\text{C-F}} = 32.7$ Hz), 132.2, 129.0, 128.1, 128.1, 126.3 (q, $J_{\text{C-F}} = 270.9$ Hz), 125.4 (q, $J_{\text{C-F}} = 3.7$ Hz), 66.2, 50.7, 45.4, 23.2. HRMS (ESI) m/z calcd for $\text{C}_{22}\text{H}_{24}\text{F}_3\text{N}_2\text{O}_4\text{S}$ [$\text{M}+\text{H}^+$]: 469.1403, found 469.1409.



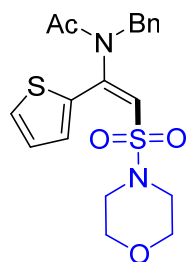
(E)-N-benzyl-N-(2-(morpholinosulfonyl)-1-(3-(trifluoromethyl)phenyl)vinyl)acetamide (3r, 77.4 mg, 83%), yellow oil; $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.72 (d, $J = 7.6$ Hz, 1H), 7.61-7.53 (m, 3H), 7.35-7.29 (m, 3H), 7.15-7.10 (m, 2H), 6.13 (s, 1H), 4.57 (s, 2H), 3.58 (t, $J = 4.6$ Hz, 4H), 2.97 (t, $J = 4.7$ Hz, 4H), 2.26 (s, 3H); $^{13}\text{C NMR}$ (101 MHz, CDCl_3) δ 170.2, 149.4, 136.0, 133.4, 133.2, 131.2, (q, $J_{\text{C-F}} = 32.5$ Hz), 128.9, 128.1, 127.6 (q, $J_{\text{C-F}} = 3.7$ Hz), 126.5 (q, $J_{\text{C-F}} = 3.6$ Hz), 124.1, 123.6 (q, $J_{\text{C-F}} = 269.5$ Hz), 66.2, 50.7, 45.4, 23.2. HRMS (ESI) m/z calcd for $\text{C}_{22}\text{H}_{24}\text{F}_3\text{N}_2\text{O}_4\text{S}$ [$\text{M}+\text{H}^+$]: 469.1403, found 469.1407.



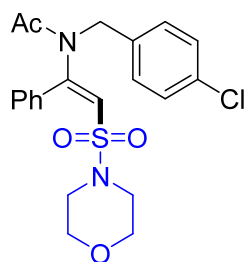
(E)-N-benzyl-N-(2-(morpholinosulfonyl)-1-(naphthalen-2-yl)vinyl)acetamide (3s, 45.1 mg, 50%), yellow oil; ^1H NMR (400 MHz, CDCl_3) δ 7.98 (d, $J = 1.8$ Hz, 1H), 7.91-7.87 (m, 3H), 7.61-7.53 (m, 2H), 7.51-7.48 (m, 1H), 7.37-7.28 (m, 3H), 7.20-7.17 (m, 2H), 6.12 (s, 1H), 4.63 (s, 2H), 3.51 (t, $J = 4.6$ Hz, 4H), 2.95 (t, $J = 4.8$ Hz, 4H), 2.27 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3) δ 170.4, 151.3, 136.5, 134.3, 132.5, 130.7, 129.8, 128.9, 128.8, 128.3, 128.3, 128.0, 128.0, 127.9, 66.2, 50.9, 45.4, 23.4. HRMS (ESI) m/z calcd for $\text{C}_{25}\text{H}_{27}\text{N}_2\text{O}_4\text{S}$ [$\text{M}+\text{H}^+$]: 451.1686, found 451.1692.



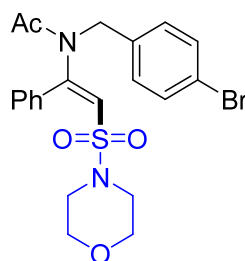
(E)-N-benzyl-N-(2-(morpholinosulfonyl)-1-(pyridin-2-yl)vinyl)acetamide (3t, 67 mg, 83%), colorless oil; ^1H NMR (400 MHz, CDCl_3) δ 8.68-8.66 (m, 1H), 7.75-7.71 (m, 1H), 7.51-7.48 (m, 1H), 7.37-7.28 (m, 4H), 7.24-7.21 (m, 2H), 6.10 (s, 1H), 4.65 (s, 2H), 3.59 (t, $J = 4.6$ Hz, 4H), 2.98 (t, $J = 4.8$ Hz, 4H), 2.24 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3) δ 170.4, 151.3, 150.1, 149.5, 136.5, 136.0, 128.9, 128.2, 127.9, 126.2, 124.8, 124.0, 66.2, 50.7, 45.5, 23.1. HRMS (ESI) m/z calcd for $\text{C}_{20}\text{H}_{24}\text{N}_3\text{O}_4\text{S}$ [$\text{M}+\text{H}^+$]: 402.1482, found 402.1480.



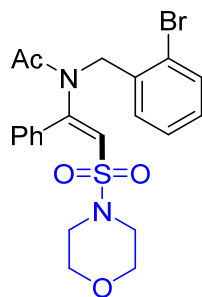
(E)-N-benzyl-N-(2-(morpholinosulfonyl)-1-(thiophen-2-yl)vinyl)acetamide (3u, 48.6 mg, 60%), yellow oil; ^1H NMR (400 MHz, CDCl_3) δ 7.78 (dd, $J = 3.8, 1.2$ Hz, 1H), 7.61-7.60 (m, 1H), 7.35-7.24 (m, 5H), 7.16-7.13 (m, 1H), 5.75 (s, 1H), 4.73 (s, 2H), 3.58 (t, $J = 4.6$ Hz, 4H), 2.90 (t, $J = 4.6$ Hz, 4H), 2.17 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3) δ 169.9, 143.9, 136.6, 135.2, 134.0, 131.4, 129.0, 128.9, 128.5, 128.1, 122.6, 66.1, 50.9, 45.4, 22.6. HRMS (ESI) m/z calcd for $\text{C}_{19}\text{H}_{23}\text{N}_2\text{O}_4\text{S}_2$ [$\text{M}+\text{H}^+$]: 407.1094, found 407.1091.



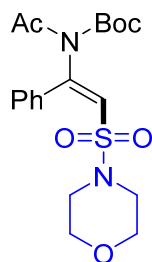
(E)-N-(4-chlorobenzyl)-N-(2-(morpholinosulfonyl)-1-phenylvinyl)acetamide (3w, 72.4 mg, 83%), yellow oil; ^1H NMR (400 MHz, CDCl_3) δ 7.53-7.45 (m, 5H), 7.31-7.27 (m, 2H), 7.11-7.09 (m, 2H), 6.02 (s, 1H), 4.51 (s, 2H), 3.58 (t, $J = 4.5$ Hz, 4H), 2.99 (t, $J = 4.8$ Hz, 4H), 2.27 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3) δ 170.1, 151.1, 134.9, 133.8, 132.3, 131.4, 129.9, 129.8, 129.0, 128.6, 123.4, 66.2, 49.7, 45.4, 23.2. HRMS (ESI) m/z calcd for $\text{C}_{21}\text{H}_{24}\text{ClN}_2\text{O}_4\text{S}$ [$\text{M}+\text{H}^+$]: 435.1140, found 435.1134.



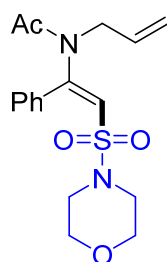
(E)-N-(4-bromobenzyl)-N-(2-(morpholinosulfonyl)-1-phenylvinyl)acetamide (3x, 77.4 mg, 81%), yellow oil; ^1H NMR (400 MHz, CDCl_3) δ 7.54-7.44 (m, 7H), 7.04 (d, $J = 8.4$ Hz, 2H), 6.02 (s, 1H), 4.49 (s, 2H), 3.58 (t, $J = 4.6$ Hz, 4H), 2.99 (t, $J = 4.7$ Hz, 4H), 2.27 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3) δ 170.1, 151.1, 135.4, 132.3, 131.9, 131.4, 130.2, 129.8, 128.6, 123.4, 122.0, 66.2, 49.8, 45.4, 23.2. HRMS (ESI) m/z calcd for $\text{C}_{21}\text{H}_{24}\text{BrN}_2\text{O}_4\text{S}$ [$\text{M}+\text{H}^+$]: 479.0635, found 479.0642.



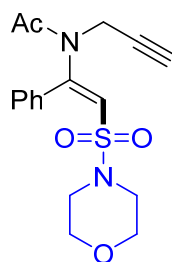
(E)-N-(2-bromobenzyl)-N-(2-(morpholinosulfonyl)-1-phenylvinyl)acetamide (3y, 86.6 mg, 90%), yellow oil; ^1H NMR (400 MHz, CDCl_3) δ 7.55 (dd, $J = 8.0, 1.2$ Hz, 1H), 7.51-7.39 (m, 5H), 7.31-7.27 (m, 1H), 7.19-7.15 (m, 1H), 7.08 (dd, $J = 7.7, 1.6$ Hz, 1H), 6.22 (s, 1H), 4.75 (s, 2H), 3.57 (t, $J = 4.5$ Hz, 4H), 2.97 (t, $J = 4.7$ Hz, 4H), 2.24 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3) δ 170.5, 151.3, 135.2, 133.2, 132.4, 131.2, 129.9, 129.8, 129.5, 128.5, 127.8, 123.3, 122.5, 66.2, 51.3, 45.5, 23.3. HRMS (ESI) m/z calcd for $\text{C}_{21}\text{H}_{24}\text{BrN}_2\text{O}_4\text{S}$ [$\text{M}+\text{H}^+$]: 479.0635, found 479.0639.



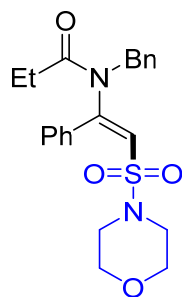
Tert-butyl (*E*)-acetyl(2-(morpholinosulfonyl)-1-phenylvinyl)carbamate (3z, 54 mg, 66%), yellow oil; ^1H NMR (400 MHz, CDCl_3) δ 7.51-7.49 (m, 2H), 7.41-7.37 (m, 3H), 6.29 (s, 1H), 3.54 (t, $J = 4.6$ Hz, 4H), 3.10 (t, $J = 4.8$ Hz, 4H), 2.61 (s, 3H), 1.24 (s, 9H); ^{13}C NMR (101 MHz, CDCl_3) δ 172.9, 151.1, 147.5, 133.9, 130.4, 130.0, 127.7, 126.2, 84.8, 66.2, 45.3, 27.5, 26.4. HRMS (ESI) m/z calcd for $\text{C}_{19}\text{H}_{27}\text{N}_2\text{O}_6\text{S}$ [$\text{M}+\text{H}^+$]: 411.1584, found 411.1581.



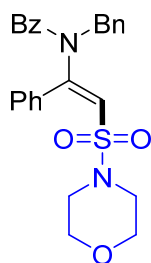
(*E*)-*N*-allyl-*N*-(2-(morpholinosulfonyl)-1-phenylvinyl)acetamide (3aa, 46.2 mg, 66%) yellow oil; ^1H NMR (400 MHz, CDCl_3) δ 7.49-7.43 (m, 5H), 6.29 (s, 1H), 5.82-5.72 (m, 1H), 5.22-5.19 (m, 1H), 5.10-5.05 (m, 1H), 4.00 (dd, $J = 6.0, 1.6$ Hz, 2H), 3.63 (t, $J = 4.6$ Hz, 4H), 3.10 (t, $J = 4.8$ Hz, 4H), 2.17 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3) δ 170.1, 151.7, 132.9, 132.4, 131.1, 129.8, 128.4, 122.1, 118.6, 66.3, 50.6, 45.5, 23.3. HRMS (ESI) m/z calcd for $\text{C}_{17}\text{H}_{23}\text{N}_2\text{O}_4\text{S}$ [$\text{M}+\text{H}^+$]: 351.1373, found 351.1374.



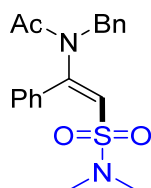
(*E*)-*N*-(2-(morpholinosulfonyl)-1-phenylvinyl)-*N*-(prop-2-yn-1-yl)acetamide (3ab, 56.8 mg, 82%), yellow oil; ^1H NMR (400 MHz, CDCl_3) δ 7.56-7.42 (m, 5H), 6.43 (s, 1H), 4.29 (d, $J = 2.4$ Hz, 2H), 3.64 (t, $J = 4.7$ Hz, 4H), 3.14 (t, $J = 4.6$ Hz, 4H), 2.34 (t, $J = 2.4$ Hz, 1H), 2.11 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3) δ 169.9, 151.2, 132.6, 131.4, 129.9, 128.5, 122.4, 78.2, 73.1, 66.3, 45.6, 37.5, 23.3. HRMS (ESI) m/z calcd for $\text{C}_{17}\text{H}_{21}\text{N}_2\text{O}_4\text{S}$ [$\text{M}+\text{H}^+$]: 349.1217, found 349.1221.



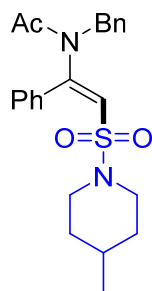
(E)-N-benzyl-N-(2-(morpholinosulfonyl)-1-phenylvinyl)propionamide (3ac, 44 mg, 53%), yellow oil; $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.50-7.40 (m, 5H), 7.36-7.27 (m, 3H), 7.19-7.16 (m, 2H), 6.04 (s, 1H), 4.61 (s, 2H), 3.54 (t, $J = 4.5$ Hz, 4H), 2.93 (t, $J = 4.7$ Hz, 4H), 2.48-2.43 (m, 2H), 1.17 (t, $J = 7.4$ Hz, 3H); $^{13}\text{C NMR}$ (101 MHz, CDCl_3) δ 174.0, 151.1, 136.7, 132.8, 131.1, 129.8, 128.9, 128.5, 128.3, 127.9, 122.7, 66.2, 50.8, 45.4, 28.4, 10.1. HRMS (ESI) m/z calcd for $\text{C}_{22}\text{H}_{27}\text{N}_2\text{O}_4\text{S}$ [$\text{M}+\text{H}^+$]: 415.1686, found 415.1684.



(E)-N-benzyl-N-(2-(morpholinosulfonyl)-1-phenylvinyl)benzamide (3ad, 70.8 mg, 77%), colorless oil; $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.57-7.55 (m, 2H), 7.46-7.44 (m, 2H), 7.40-7.27 (m, 11H), 5.78 (s, 1H), 4.85 (s, 2H), 3.36 (t, $J = 4.7$ Hz, 4H), 2.46 (t, $J = 4.7$ Hz, 4H); $^{13}\text{C NMR}$ (101 MHz, CDCl_3) δ 171.9, 153.1, 136.4, 135.9, 133.0, 131.0, 130.9, 130.2, 128.8, 128.7, 128.6, 128.4, 128.2, 128.0, 66.0, 52.3, 44.8. HRMS (ESI) m/z calcd for $\text{C}_{26}\text{H}_{27}\text{N}_2\text{O}_4\text{S}$ [$\text{M}+\text{H}^+$]: 463.1686, found 463.1691.

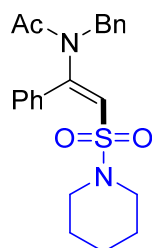


(E)-N-benzyl-N-(2-(N,N-dimethylsulfonyl)-1-phenylvinyl)acetamide (3ae, 53.1 mg, 74%), yellow oil; $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.51-7.41 (m, 5H), 7.35-7.27 (m, 3H), 7.19-7.17 (m, 2H), 6.01 (s, 1H), 4.58 (s, 2H), 2.61 (s, 6H), 2.26-2.24 (m, 3H); $^{13}\text{C NMR}$ (101 MHz, CDCl_3) δ 170.2, 150.7, 136.6, 132.6, 131.1, 129.8, 128.8, 128.5, 128.4, 127.9, 123.1, 50.5, 37.2, 23.2. HRMS (ESI) m/z calcd for $\text{C}_{19}\text{H}_{23}\text{N}_2\text{O}_3\text{S}$ [$\text{M}+\text{H}^+$]: 359.1424, found 359.1423.

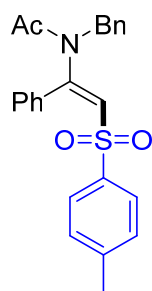


(E)-N-benzyl-N-(2-((4-methylpiperidin-1-yl)sulfonyl)-1-phenylvinyl)acetamide

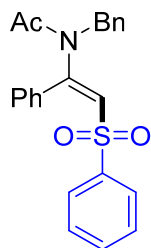
(**3af**, 44.6 mg, 52%), yellow oil; ^1H NMR (400 MHz, CDCl_3) δ 7.49-7.41 (m, 5H), 7.35-7.28 (m, 3H), 7.20-7.16 (m, 2H), 6.00 (s, 1H), 4.57 (s, 2H), 3.51-3.47 (m, 2H), 2.38-2.32 (m, 2H), 2.24 (s, 3H), 1.59-1.54 (m, 2H), 1.35-1.29 (m, 1H), 1.09-0.99 (m, 2H), 0.89 (d, $J = 6.6$ Hz, 3H); ^{13}C NMR (101 MHz, CDCl_3) δ 170.2, 150.2, 136.6, 132.6, 131.0, 129.8, 128.8, 128.4, 127.8, 124.5, 50.4, 45.8, 33.5, 30.2, 23.2, 21.5. HRMS (ESI) m/z calcd for $\text{C}_{23}\text{H}_{29}\text{N}_2\text{O}_3\text{S}$ [$\text{M}+\text{H}^+$]: 413.1893, found 413.1899.



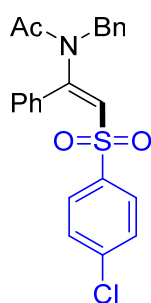
(E)-N-benzyl-N-(1-phenyl-2-(piperidin-1-ylsulfonyl)vinyl)acetamide (**3ag**, 66.2 mg, 83%), yellow oil; ^1H NMR (400 MHz, CDCl_3) δ 7.49-7.41 (m, 5H), 7.35-7.27 (m, 3H), 7.19-7.17 (m, 2H), 5.99 (s, 1H), 4.57 (s, 2H), 2.91 (t, $J = 4.7$ Hz, 4H), 2.25 (s, 3H), 1.50-1.42 (m, 6H); ^{13}C NMR (101 MHz, CDCl_3) δ 170.2, 150.1, 136.6, 132.6, 131.0, 129.8, 128.8, 128.4, 127.8, 124.4, 50.3, 46.3, 25.3, 23.6, 23.1. HRMS (ESI) m/z calcd for $\text{C}_{22}\text{H}_{27}\text{N}_2\text{O}_3\text{S}$ [$\text{M}+\text{H}^+$]: 399.1737, found 399.1732.



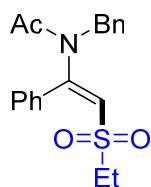
(E)-N-benzyl-N-(1-phenyl-2-tosylvinyl)acetamide (**3ah**, 61.4 mg, 76%),² yellow oil; ^1H NMR (400 MHz, CDCl_3) δ 7.52-7.47 (m, 1H), 7.41-7.29 (m, 7H), 7.26-7.22 (m, 4H), 7.17-7.15 (m, 2H), 7.11-7.06 (m, 2H), 6.20 (s, 1H), 4.49 (s, 2H), 2.38 (s, 3H), 2.00 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3) δ 170.1, 151.4, 144.4, 137.9, 136.3, 132.0, 131.4, 130.2, 129.6, 129.0, 128.7, 128.5, 128.4, 127.8, 127.4, 50.1, 23.1, 21.6.



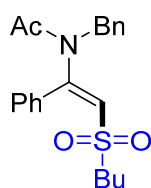
(E)-N-benzyl-N-(1-phenyl-2-(phenylsulfonyl)vinyl)acetamide (3ai, 68.1 mg, 87%),² colorless oil; ¹H NMR (400 MHz, CDCl₃) δ 7.53-7.47 (m, 4H), 7.40-7.31 (m, 6H), 7.28-7.24 (m, 3H), 7.09-7.07 (m, 2H), 6.22 (s, 1H), 4.50 (s, 2H), 2.00 (s, 3H); ¹³C NMR (101 MHz, CDCl₃) δ 170.2, 151.8, 140.8, 136.3, 133.4, 132.0, 131.5, 130.1, 129.0, 128.7, 128.6, 128.5, 128.4, 127.8, 127.3, 50.2, 23.1.



(E)-N-benzyl-N-(2-((4-chlorophenyl)sulfonyl)-1-phenylvinyl)acetamide (3aj, 75.8 mg, 89%),² yellow oil; ¹H NMR (400 MHz, CDCl₃) δ 7.52-7.48 (m, 1H), 7.40-7.36 (m, 4H), 7.32-7.26 (m, 7H), 7.10-7.08 (m, 2H), 6.25 (s, 1H), 4.53 (s, 2H), 2.01 (s, 3H); ¹³C NMR (101 MHz, CDCl₃) δ 170.2, 152.3, 140.0, 139.3, 136.3, 132.1, 131.6, 130.1, 129.2, 128.8, 128.8, 128.5, 128.4, 128.0, 127.9, 50.4, 23.3.

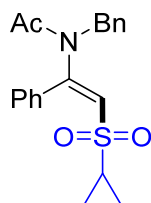


(E)-N-benzyl-N-(2-(cyclopropylsulfonyl)-1-phenylvinyl)acetamide (3ak, 51.4 mg, 75%),² yellow oil, ¹H NMR (400 MHz, CDCl₃) δ 7.52-7.44 (m, 5H), 7.33-7.28 (m, 3H), 7.17-7.15 (m, 2H), 6.10 (s, 1H), 4.60 (s, 2H), 2.78-2.73 (m, 2H), 2.22 (s, 3H), 1.18 (t, *J* = 7.4 Hz, 3H); ¹³C NMR (101 MHz, CDCl₃) δ 170.3, 152.4, 136.4, 132.2, 131.6, 129.8, 128.8, 128.7, 128.3, 127.9, 125.5, 50.6, 49.7, 23.3, 6.8.

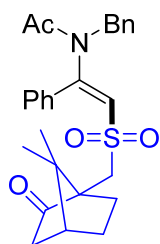


(E)-N-benzyl-N-(2-(butylsulfonyl)-1-phenylvinyl)acetamide (3al, 60.8 mg, 82%), yellow oil; ¹H NMR (400 MHz, CDCl₃) δ 7.55-7.43 (m, 5H), 7.35-7.26 (m, 3H),

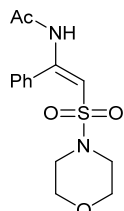
7.19-7.16 (m, 2H), 6.11 (s, 1H), 4.62 (s, 2H), 2.73-2.68 (m, 2H), 2.21 (s, 3H), 1.61-1.53 (m, 2H), 1.32-1.23 (m, 2H), 0.82 (t, $J = 7.3$ Hz, 3H); ^{13}C NMR (101 MHz, CDCl_3) δ 170.3, 152.0, 136.4, 132.3, 131.6, 129.8, 128.8, 128.7, 128.4, 127.9, 126.1, 55.0, 50.6, 24.0, 23.3, 21.5, 13.5. HRMS (ESI) m/z calcd for $\text{C}_{21}\text{H}_{26}\text{NO}_3\text{S}$ [$\text{M}+\text{H}^+$]: 372.1628, found 372.1631.



(E)-N-benzyl-N-(2-(cyclopropylsulfonyl)-1-phenylvinyl)acetamide (3am, 62.2 mg, 88%),² yellow oil; ^1H NMR (400 MHz, CDCl_3) δ 7.55-7.43 (m, 5H), 7.34-7.27 (m, 3H), 7.19-7.16 (m, 2H), 6.21 (s, 1H), 4.59 (s, 2H), 2.25 (s, 3H), 2.18-2.12 (m, 1H), 1.10-1.06 (m, 2H), 0.89-0.84 (m, 2H); ^{13}C NMR (101 MHz, CDCl_3) δ 170.2, 151.3, 136.4, 132.4, 131.6, 130.0, 128.7, 128.6, 128.6, 127.9, 127.5, 50.3, 31.9, 23.1, 5.2.

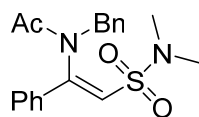


N-benzyl-N-((E)-2-((((1S,4R)-7,7-dimethyl-2-oxobicyclo[2.2.1]heptan-1-yl)methyl)sulfonyl)-1-phenylvinyl)acetamide (3an, 62.2 mg, 67%), yellow oil; ^1H NMR (400 MHz, CDCl_3) δ 7.53-7.42 (m, 5H), 7.33-7.27 (m, 3H), 7.20-7.17 (m, 2H), 6.47 (s, 1H), 4.77 (d, $J = 14.9$ Hz, 1H), 4.55 (d, $J = 15.0$ Hz, 1H), 3.34 (d, $J = 14.8$ Hz, 1H), 2.62 (d, $J = 14.8$ Hz, 1H), 2.39-2.30 (m, 2H), 2.23 (s, 3H), 2.08-2.05 (m, 1H), 1.98-1.95 (m, 1H), 1.89 (d, $J = 18.5$ Hz, 1H), 1.49-1.44 (m, 1H), 1.39-1.33 (m, 1H), 0.95 (s, 3H), 0.73 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3) δ 215.0, 170.5, 151.4, 136.6, 132.6, 131.4, 129.9, 128.7, 128.6, 128.4, 128.2, 127.7, 127.6, 58.7, 52.7, 50.5, 48.4, 42.7, 42.6, 42.3, 27.1, 24.6, 23.3, 19.7, 19.6. HRMS (ESI) m/z calcd for $\text{C}_{27}\text{H}_{32}\text{NO}_4\text{S}$ [$\text{M}+\text{H}^+$]: 466.2047, found 466.2053.

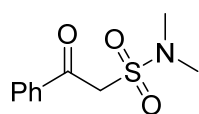


(E)-N-(2-(morpholinylsulfonyl)-1-phenylvinyl)acetamide (4,), yellow oil; ^1H NMR (400 MHz, CDCl_3) δ 7.50 (s, 1H), 7.47-7.39 (m, 5H), 6.97 (s, 1H), 3.66 (t, $J = 4.6$ Hz, 4H), 3.03 (t, $J = 4.7$ Hz, 4H), 2.13 (s, 3H); ^{13}C NMR (101 MHz, CDCl_3) δ 169.5,

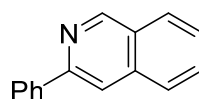
147.1, 134.1, 130.2, 128.8, 128.4, 107.5, 66.2, 45.6, 24.9. HRMS (ESI) m/z calcd for $C_{14}H_{19}N_2O_4S$ [$M+H^+$]: 311.1060, found 311.1058.



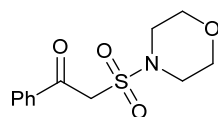
(Z)-N-benzyl-N-(2-(N,N-dimethylsulfamoyl)-1-phenylvinyl)acetamide (Z-3ae), yellow oil; 1H NMR (400 MHz, $CDCl_3$) δ 7.49 (t, $J = 7.3$ Hz, 1H), 7.41 (t, $J = 7.5$ Hz, 2H), 7.30-7.27 (m, 2H), 7.24-7.18 (m, 5H), 6.23 (s, 1H), 5.17 (d, $J = 14.3$ Hz, 1H), 4.31 (d, $J = 14.3$ Hz, 1H), 2.55 (s, 6H), 2.26 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.6, 150.5, 136.3, 135.2, 131.3, 130.6, 129.3, 128.2, 127.7, 127.4, 118.6, 51.0, 37.2, 22.2. HRMS (ESI) m/z calcd for $C_{19}H_{23}N_2O_3S$ [$M+H^+$]: 359.1424, found 359.1423.



N,N-dimethyl-2-oxo-2-phenylethane-1-sulfonamide (5),³ white solid; 1H NMR (400 MHz, $CDCl_3$) δ 8.04 (d, $J = 7.4$ Hz, 2H), 7.64 (d, $J = 7.4$ Hz, 1H), 7.51 (d, $J = 7.9$ Hz, 2H), 4.58 (s, 2H), 2.92 (s, 6H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 189.6, 135.8, 134.4, 129.5, 128.9, 56.5, 38.0.



3-Phenylisoquinoline (6),⁴ yellow oil; 1H NMR (400 MHz, $CDCl_3$) δ 9.35 (s, 1H), 8.14 (d, $J = 7.5$ Hz, 2H), 8.08 (s, 1H), 7.98 (d, $J = 8.2$ Hz, 1H), 7.86 (d, $J = 8.2$ Hz, 1H), 7.69 (d, $J = 7.4$ Hz, 1H), 7.59-7.50 (m, 3H), 7.43 (t, $J = 7.3$ Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 152.5, 151.3, 139.6, 136.7, 130.6, 128.9, 128.6, 127.8, 127.6, 127.1, 127.1, 126.9, 116.6.

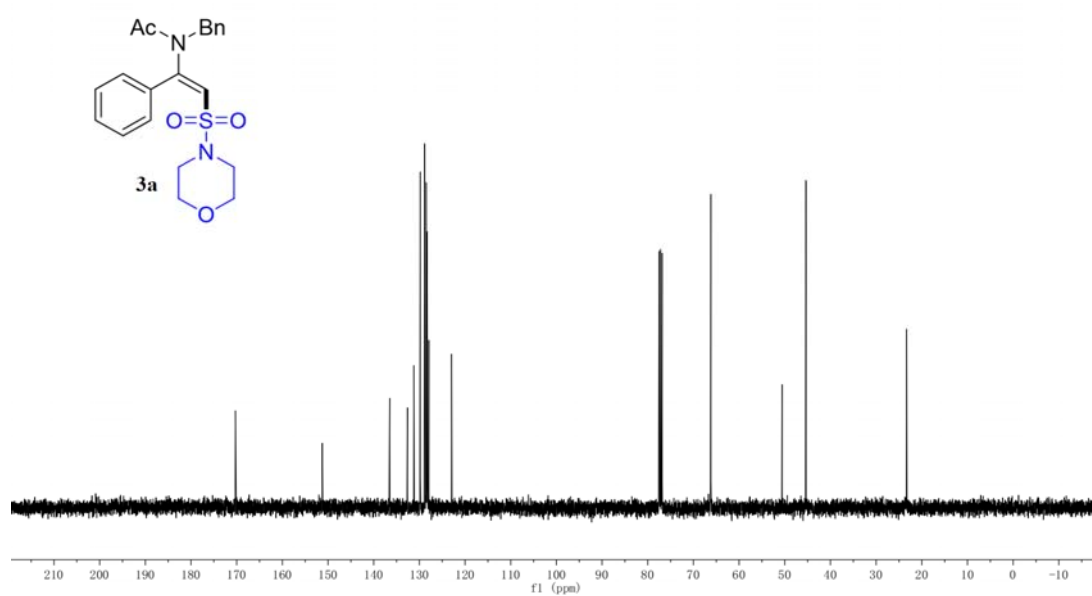
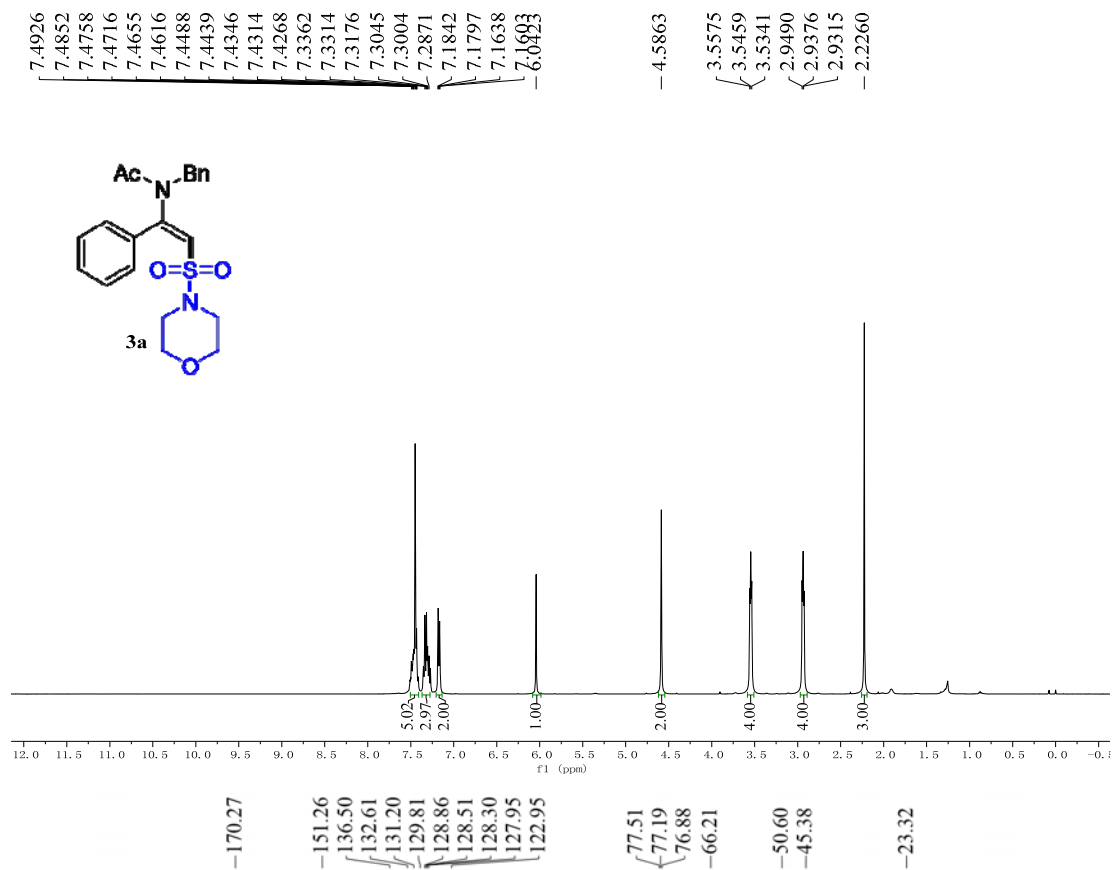


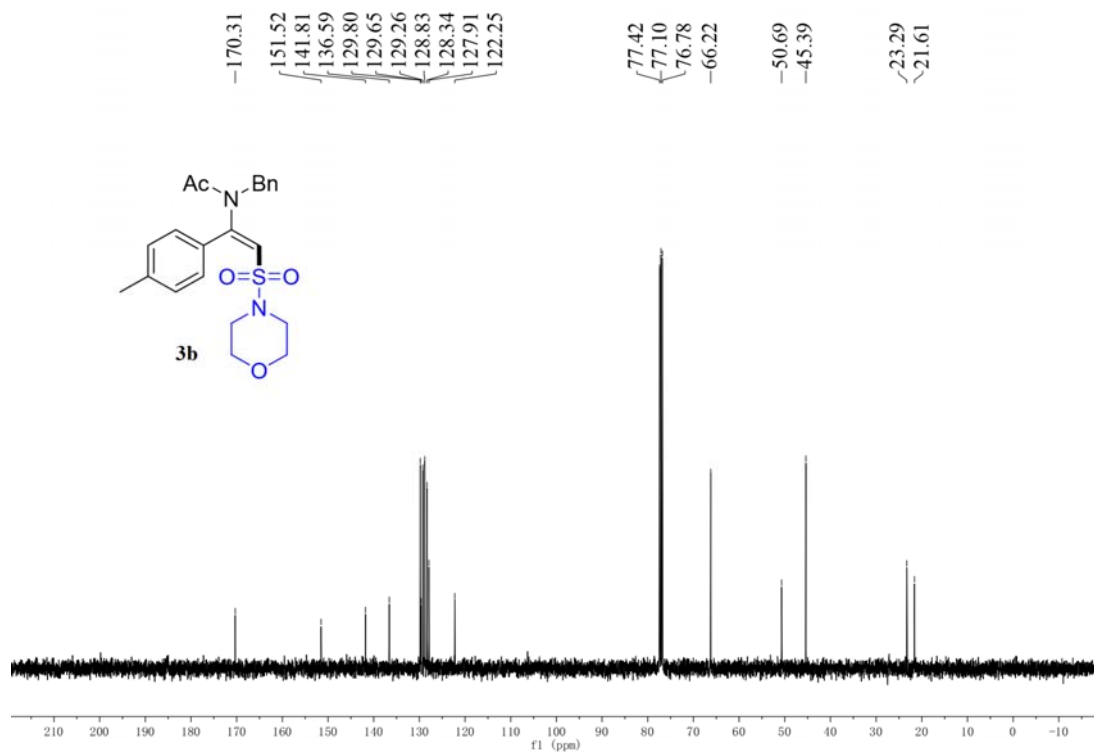
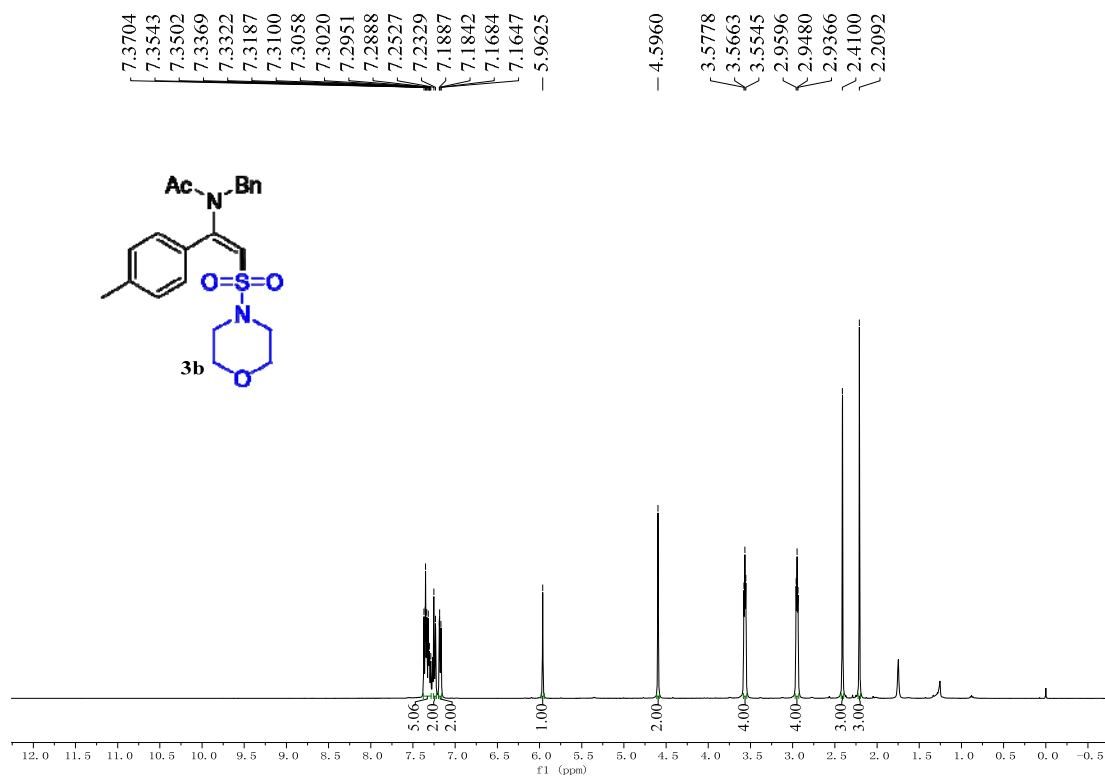
2-(Morpholinosulfonyl)-1-phenylethan-1-one (8) (24.8 mg, 46%),³ white solid; 1H NMR (400 MHz, $CDCl_3$) δ 8.03-7.97 (m, 2H), 7.66-7.61 (m, 1H), 7.53-7.49 (m, 2H), 4.57 (s, 2H), 3.71 (t, $J = 4.6$ Hz, 4H), 3.34 (t, $J = 4.8$ Hz, 4H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 189.1, 135.7, 134.5, 129.4, 129.0, 66.6, 57.2, 46.2.

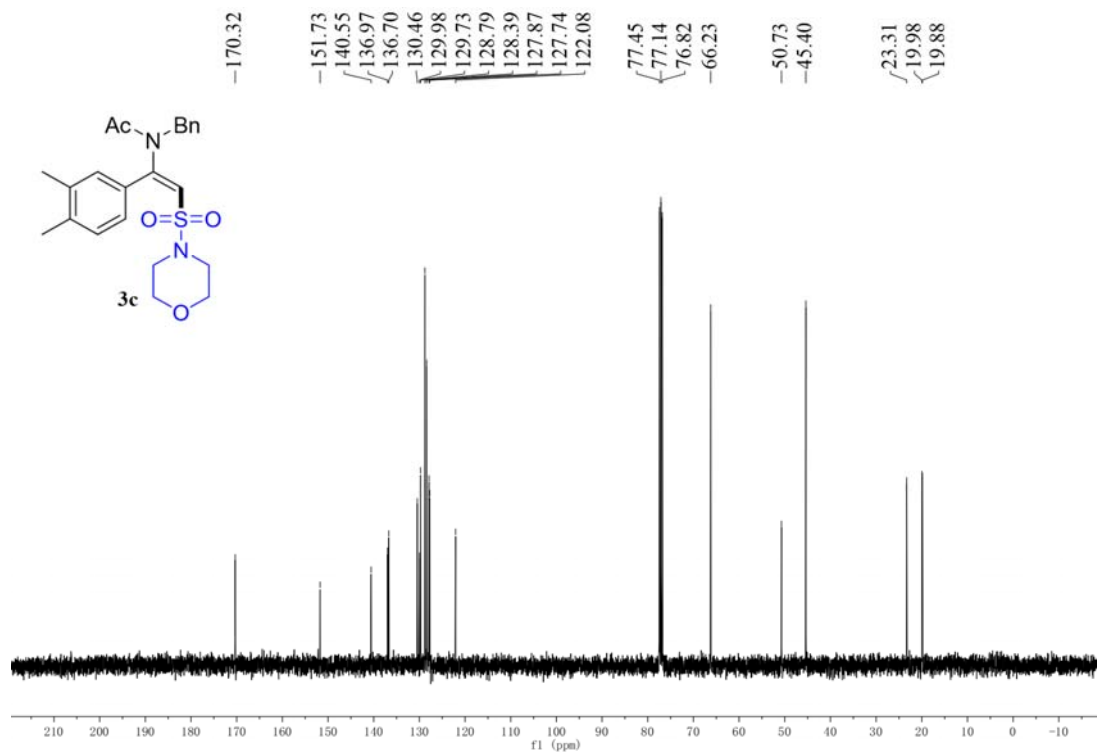
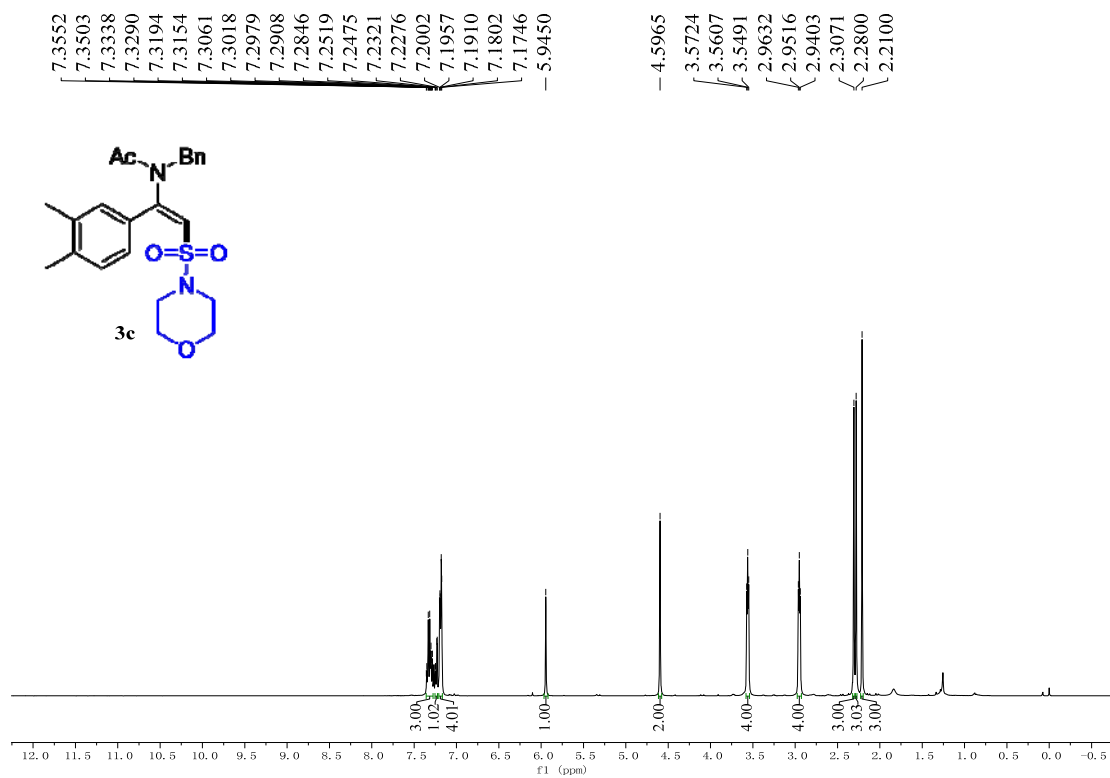
5. References

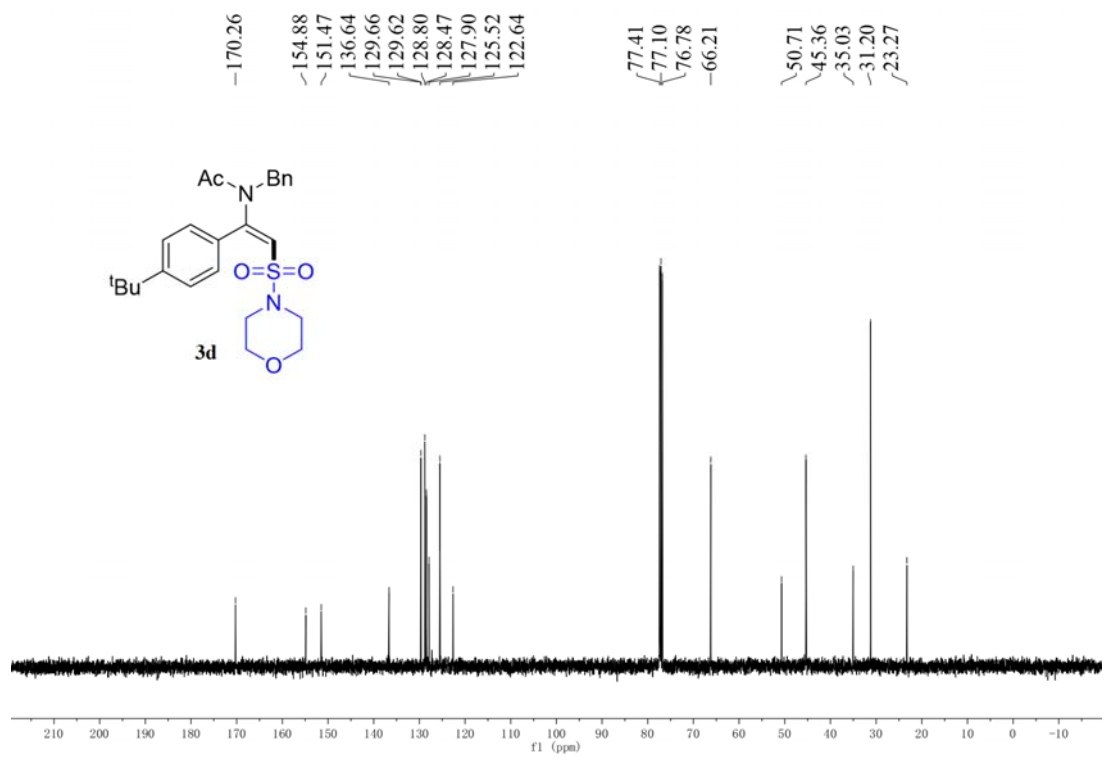
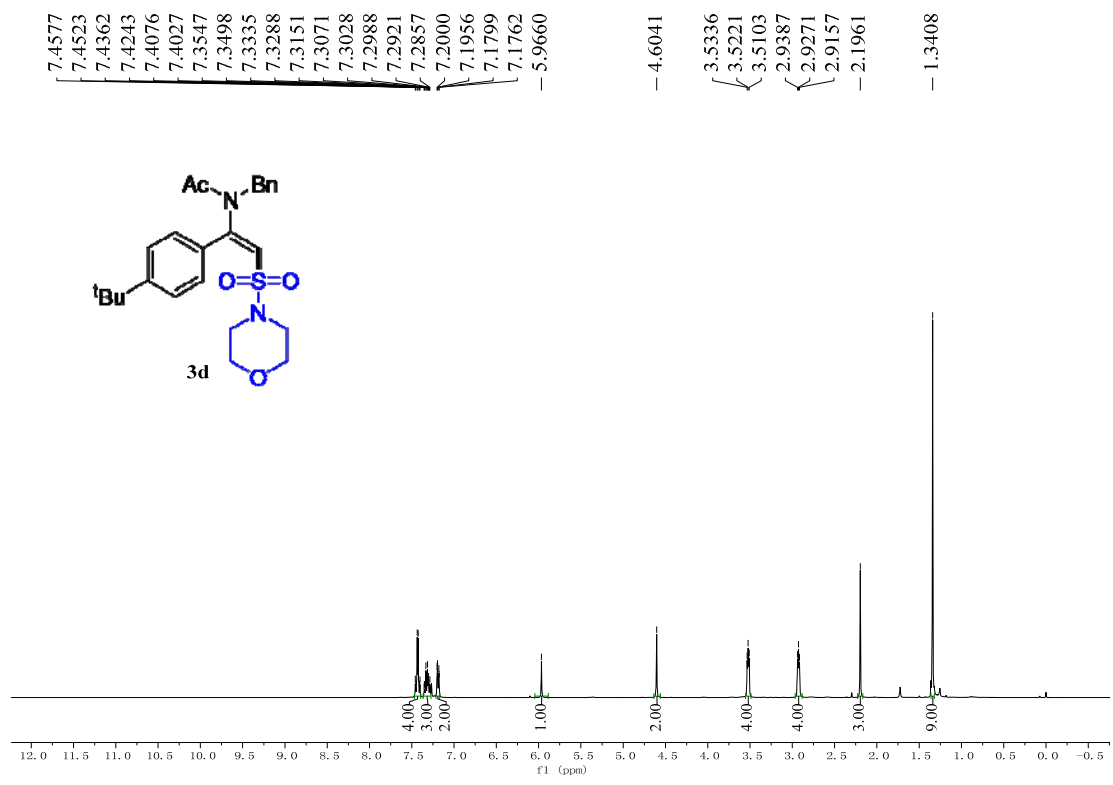
1. K. Tang, Y. Chen, J. Guan, Z. Wang, K. Chen, H. Xiang and H. Yang, *Org. Biomol. Chem.*, 2021, **19**, 7475.
2. Q. Gu, X. Wang, X.Liu, G. Wu, Y. Xie, Y. Shao, Y. Zhao and X. Zeng, *Org. Biomol. Chem.*, 2021, **19**, 8295.
3. Q. Luo, R. Mao, Y. Zhu and Y. Wang, *J. Org. Chem.*, 2019, **84**, 13897.
4. K. Chen, S. Lv, R. Lai, Z. Yang, L. Hai, R. Nie and Y. Wu, *Eur. J. Org. Chem.*, 2022, e202101355.

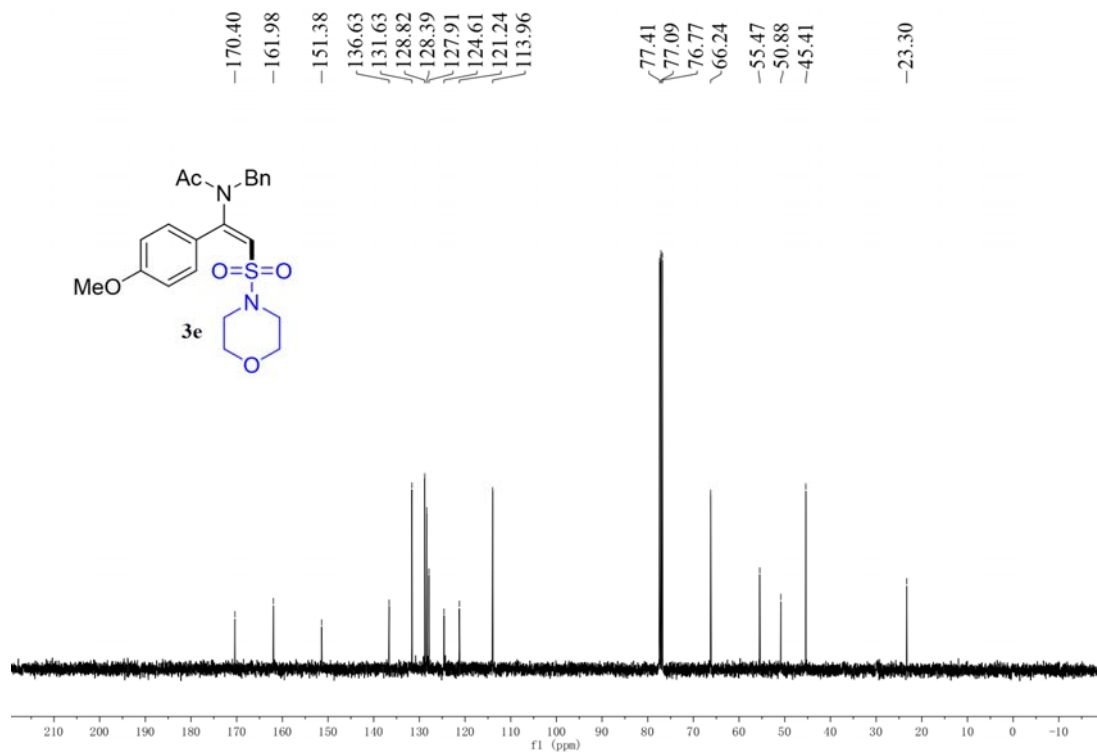
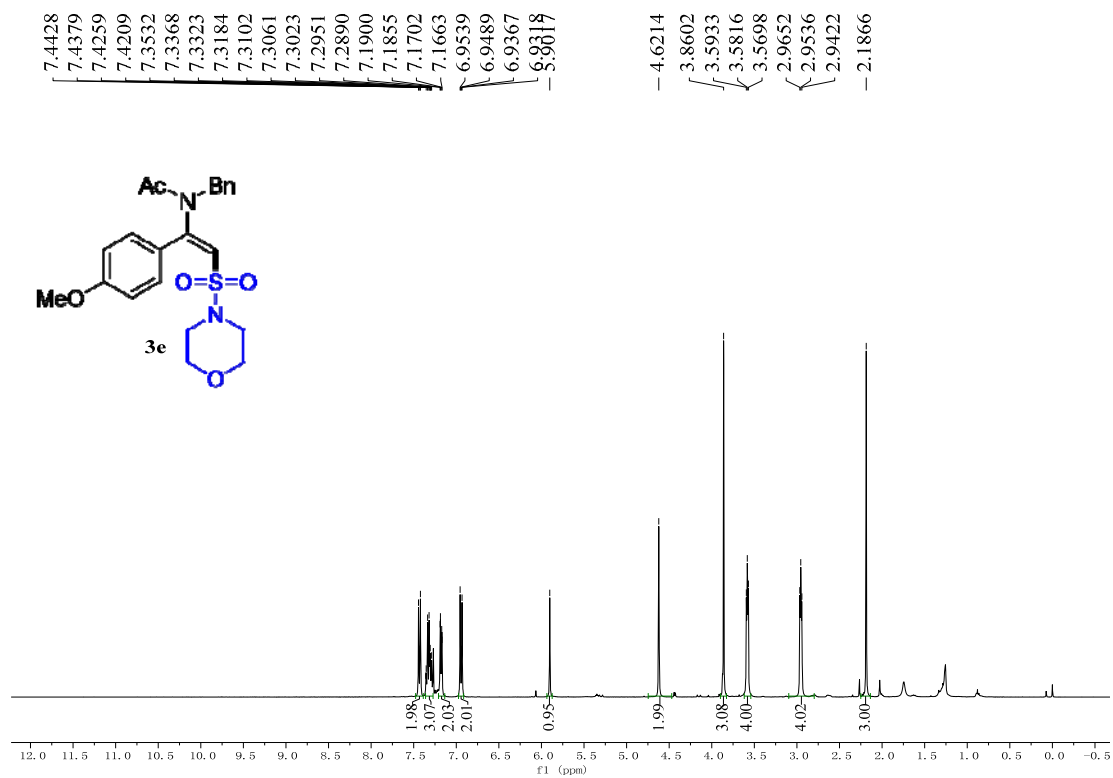
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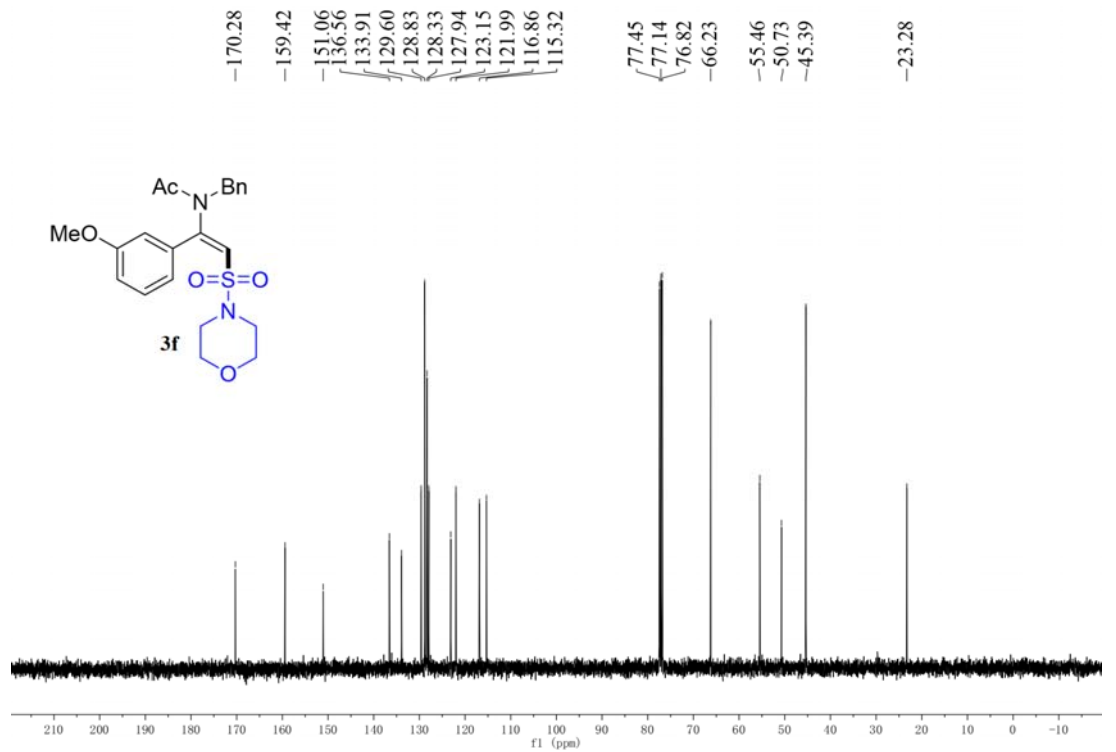
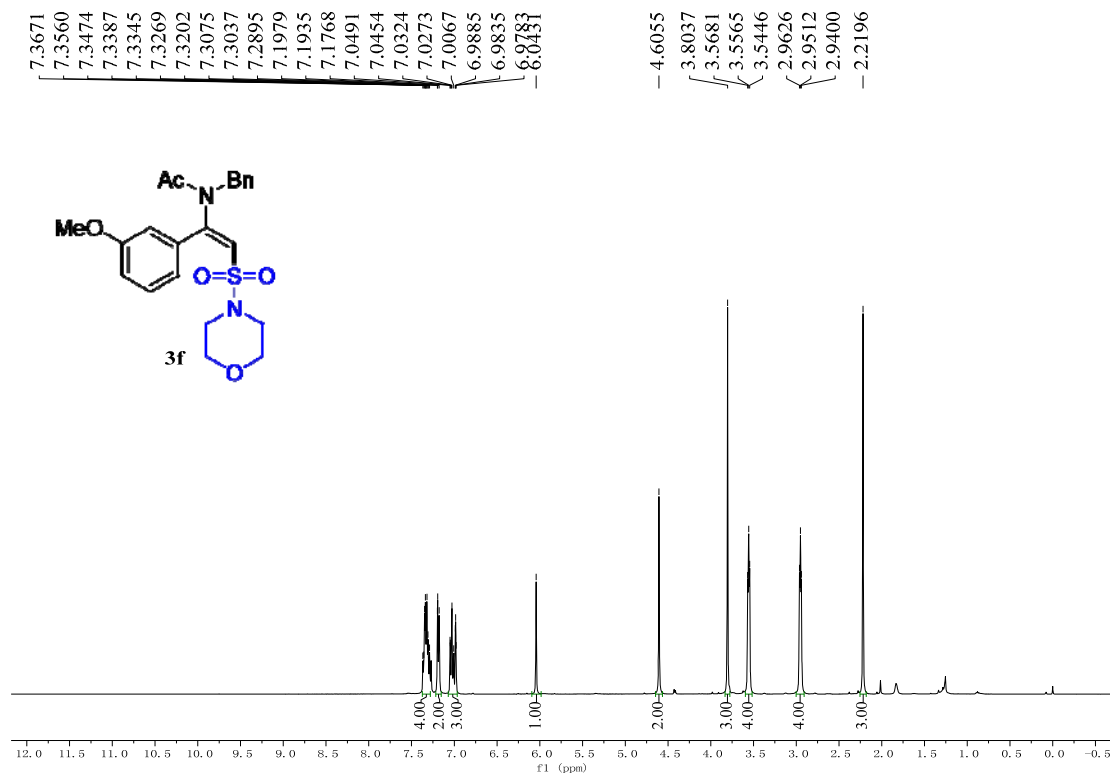


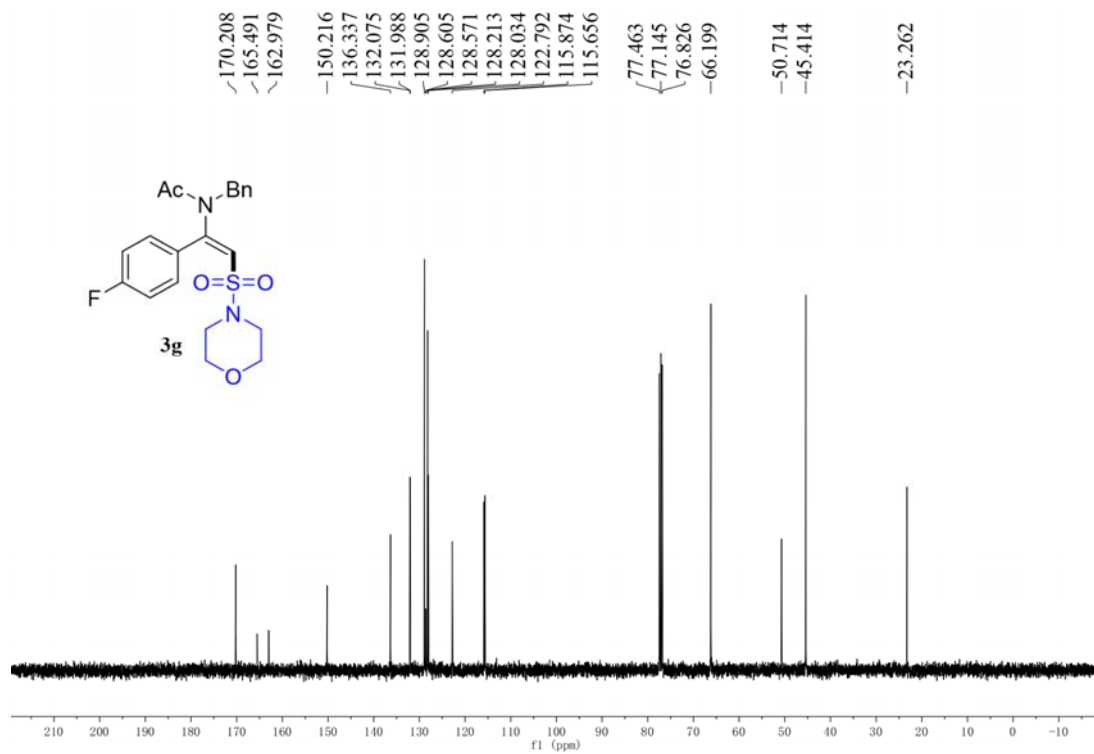
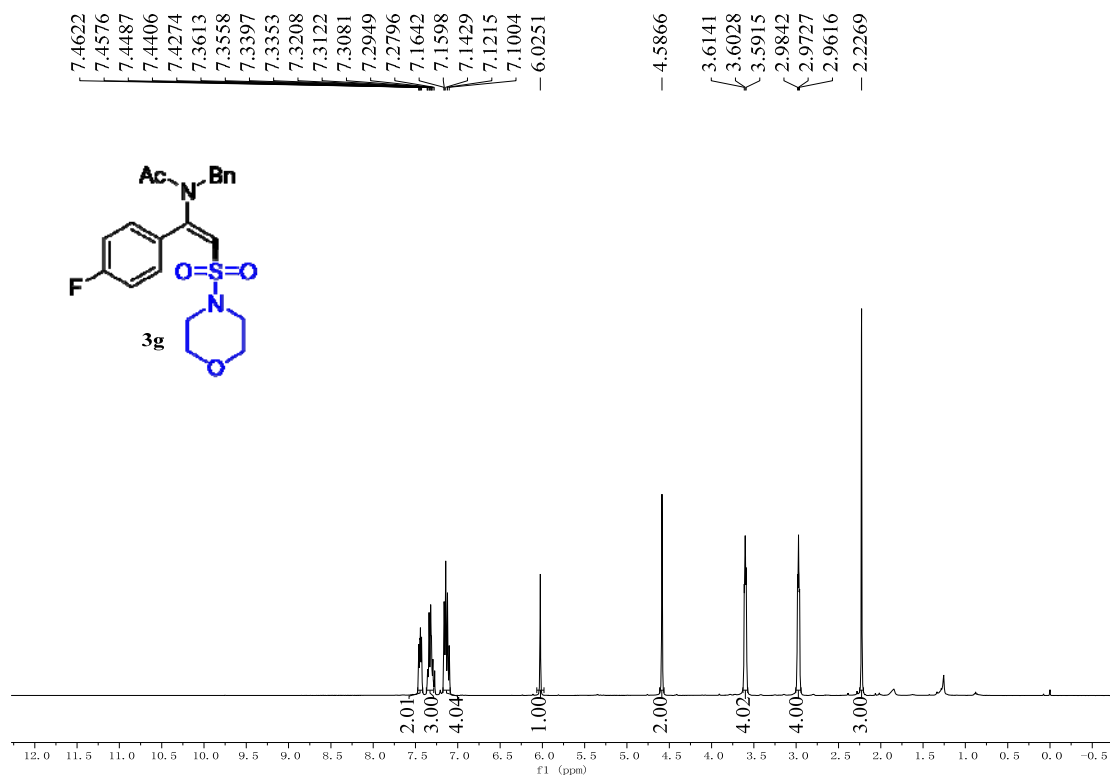


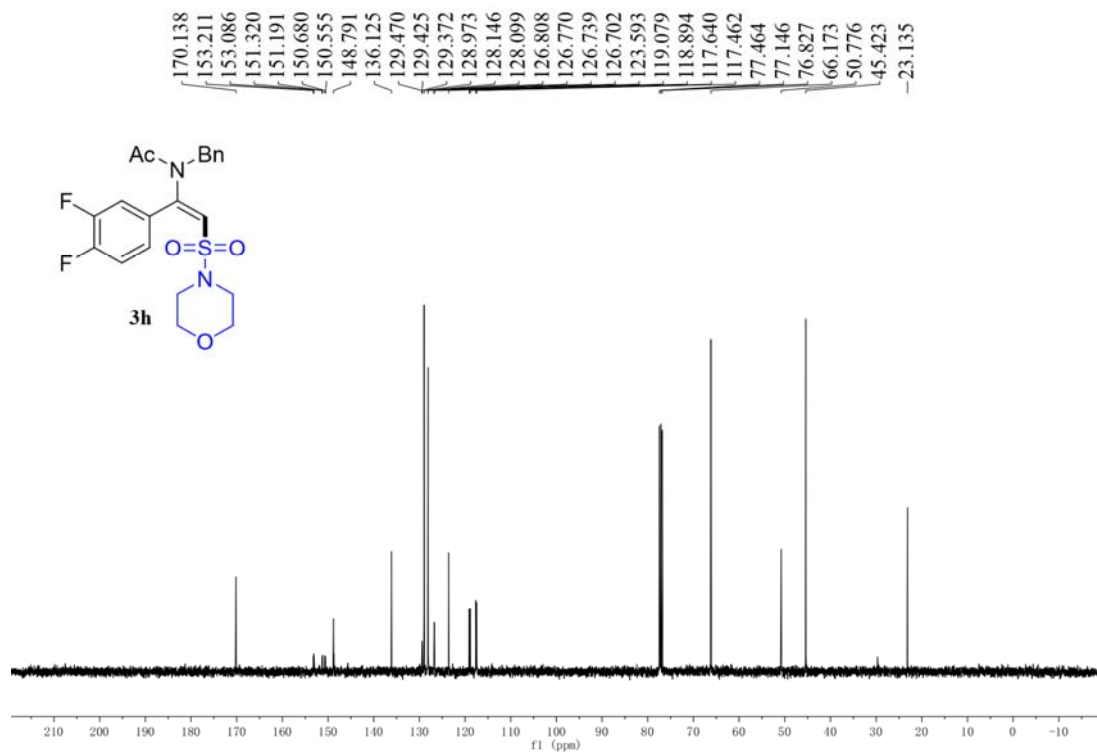
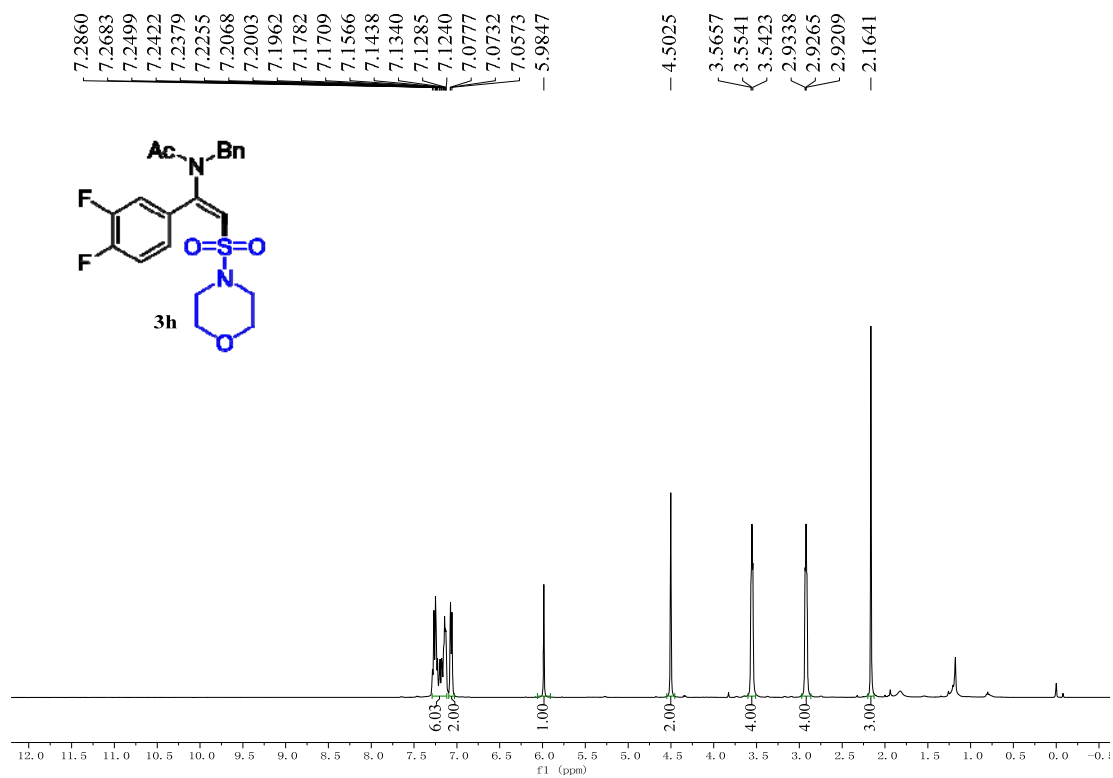


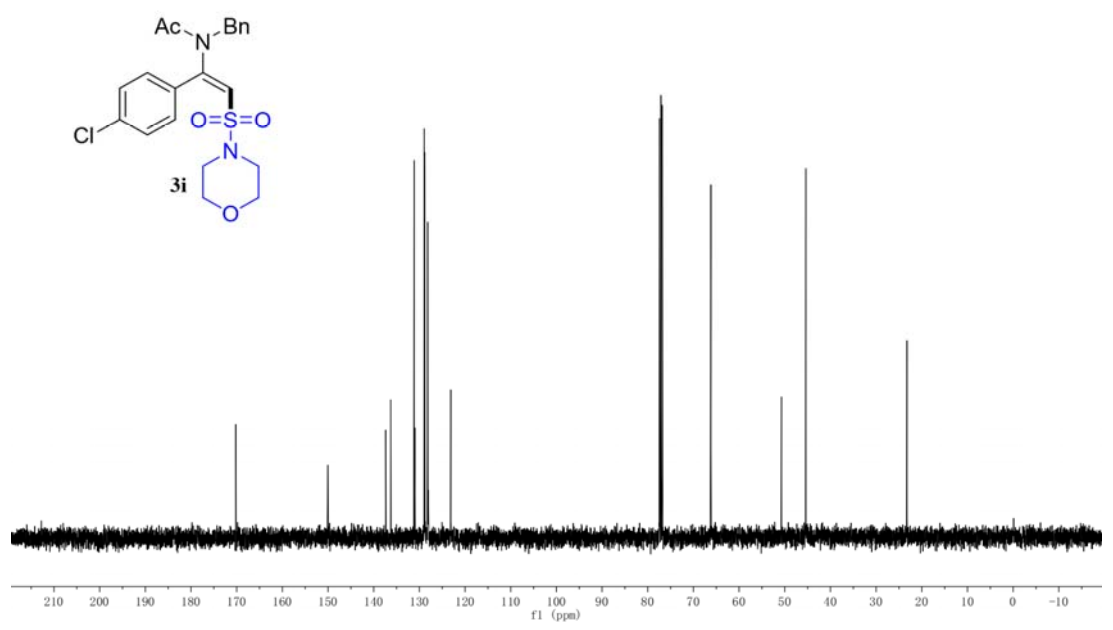
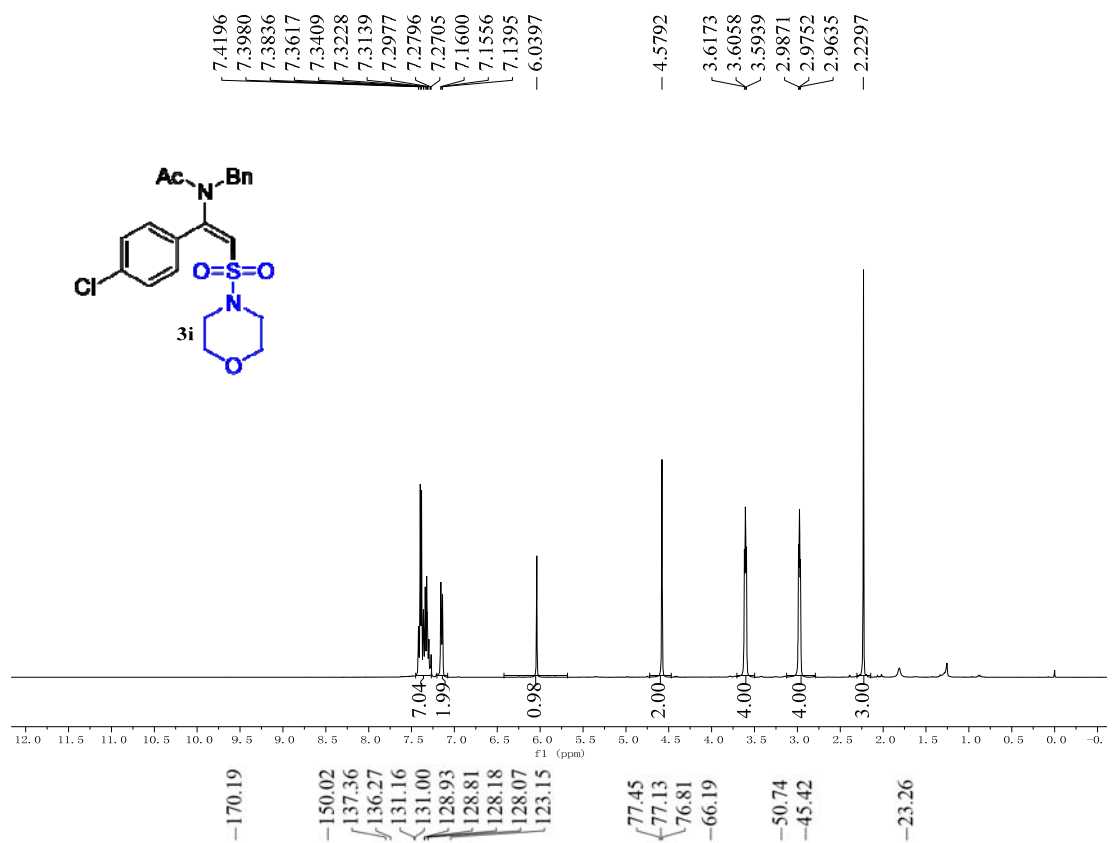


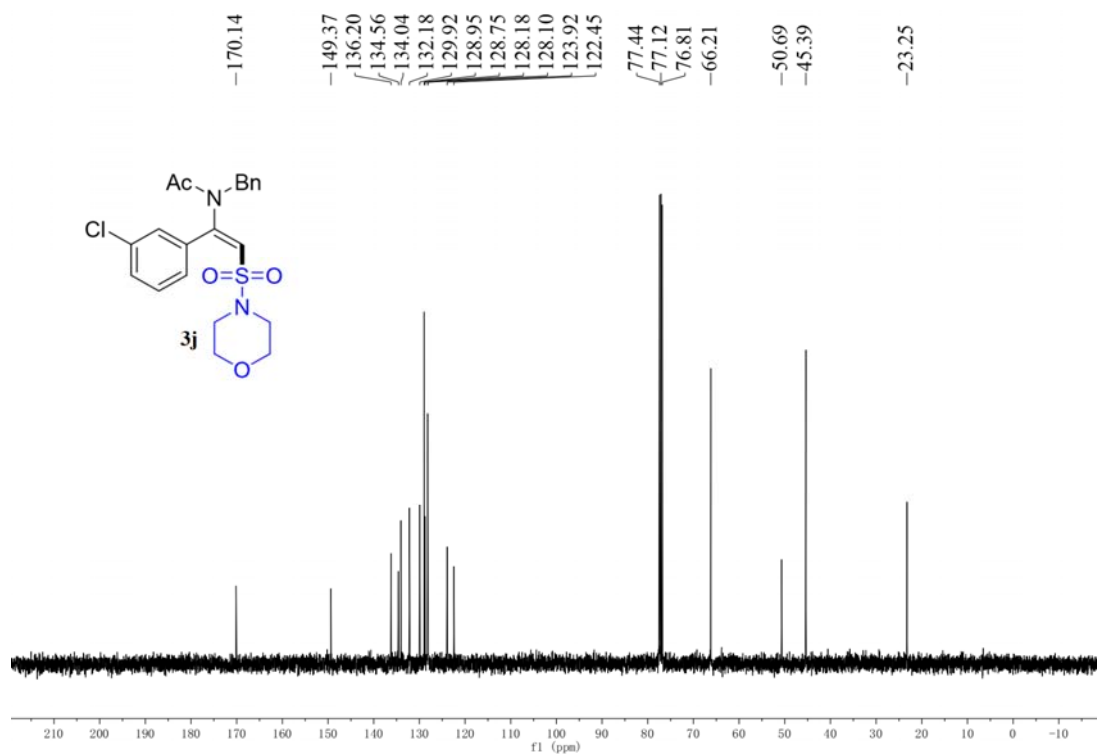
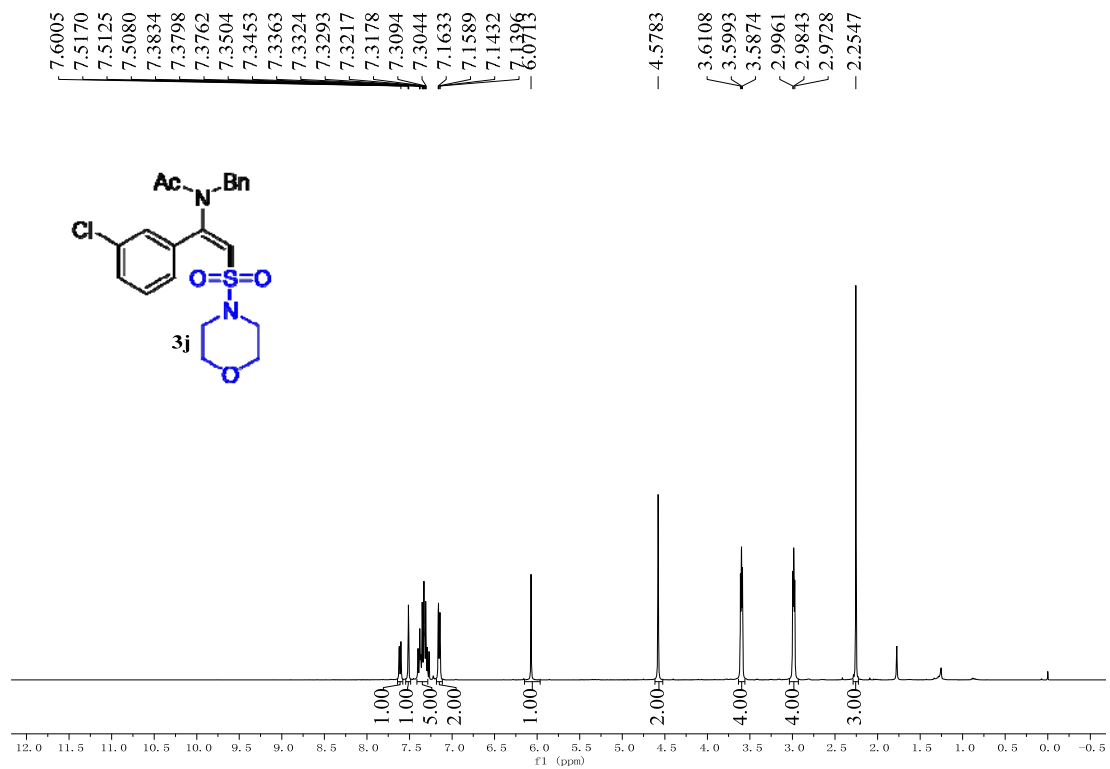


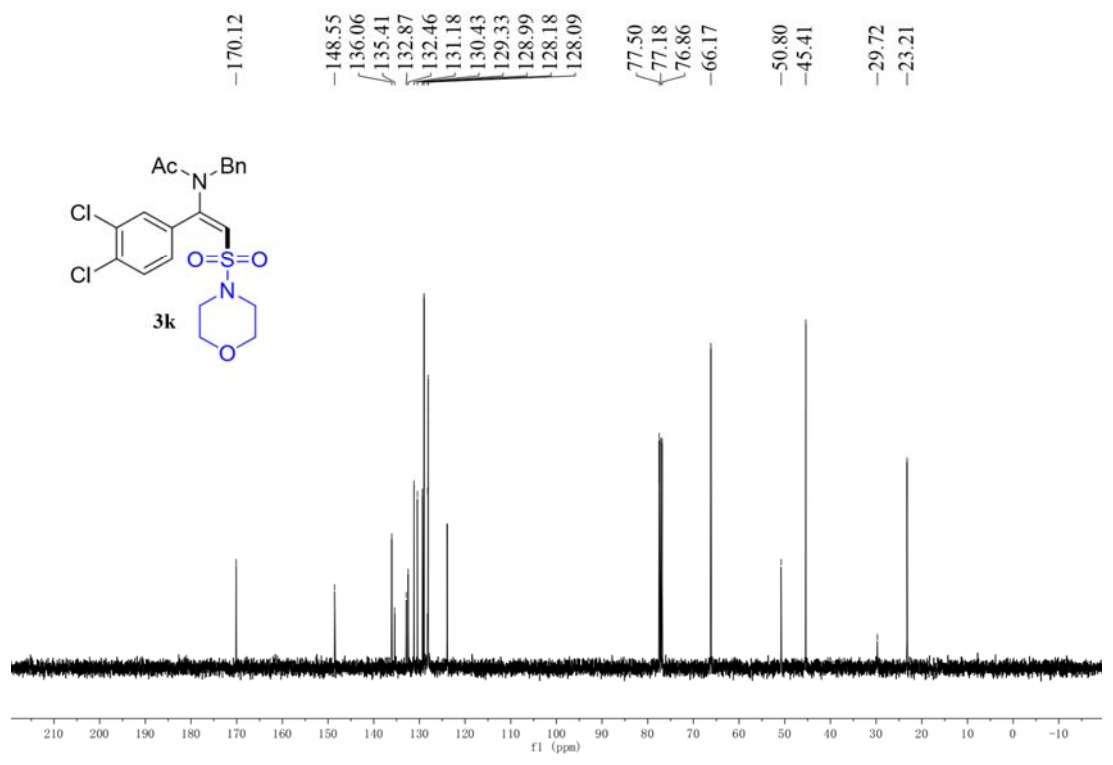
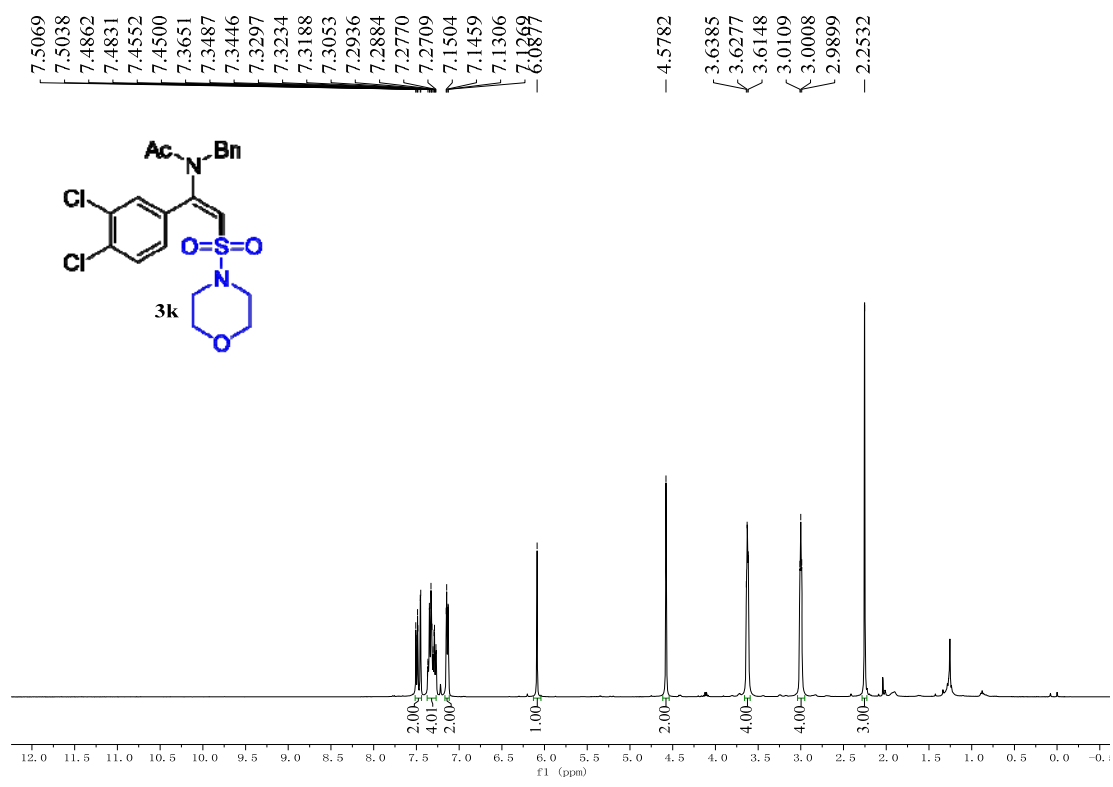


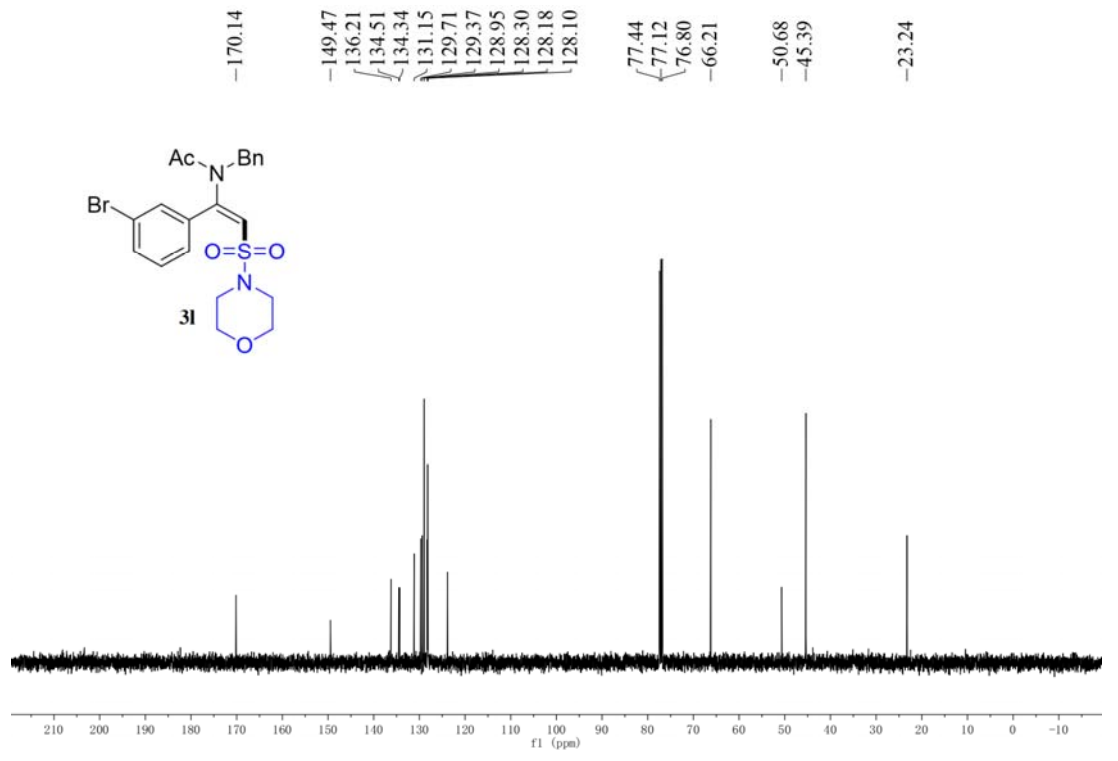
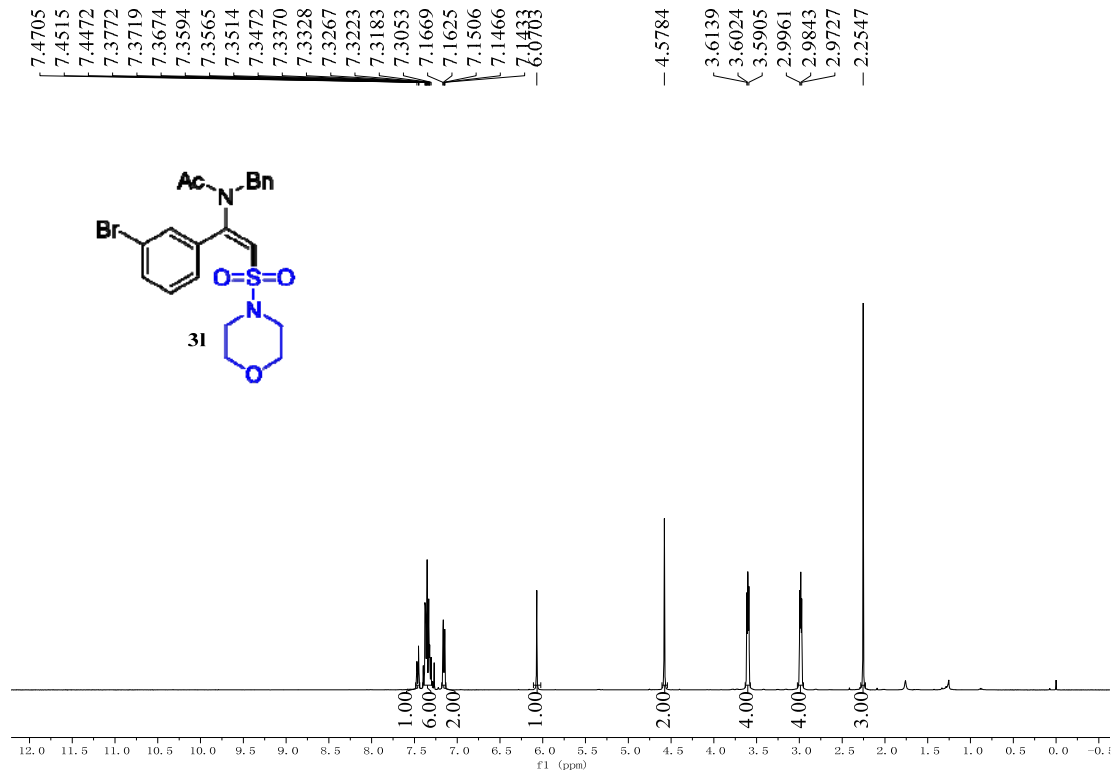


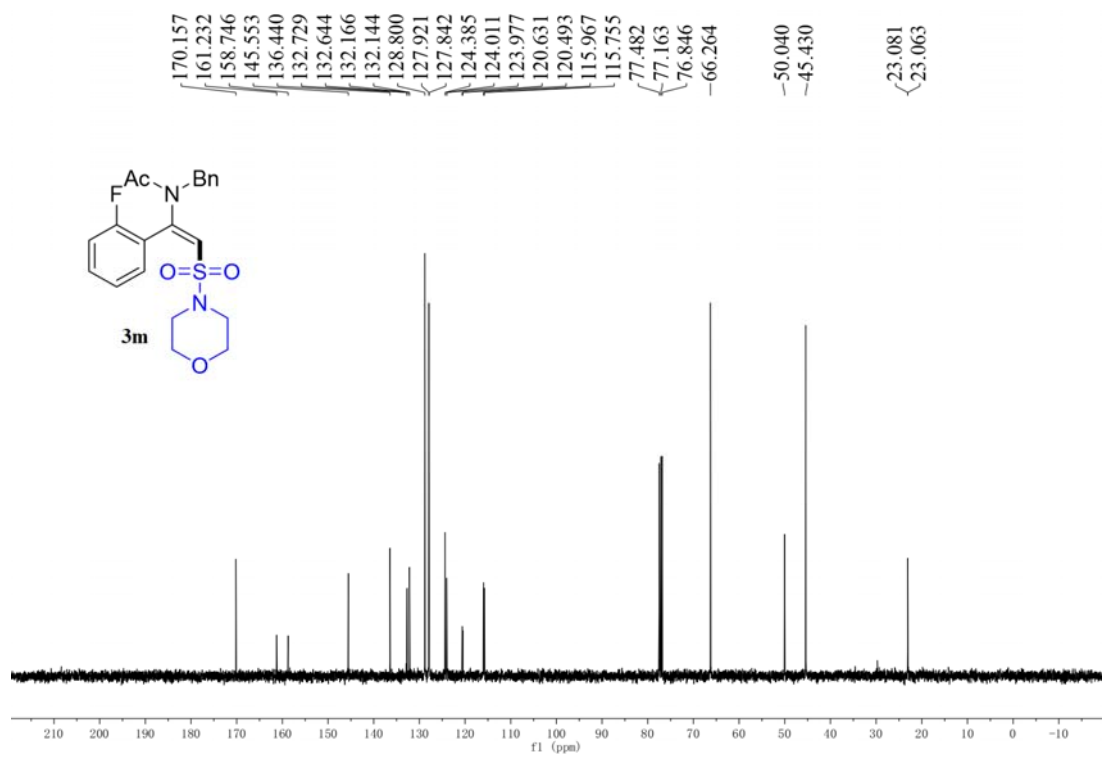
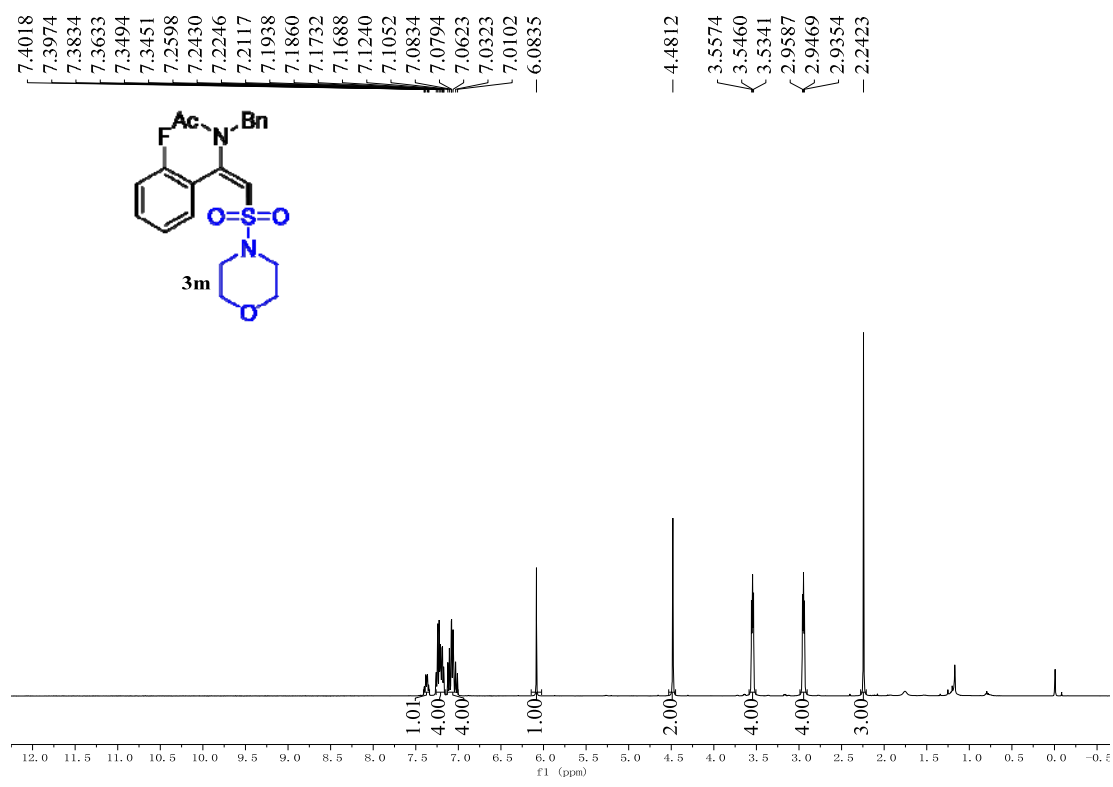


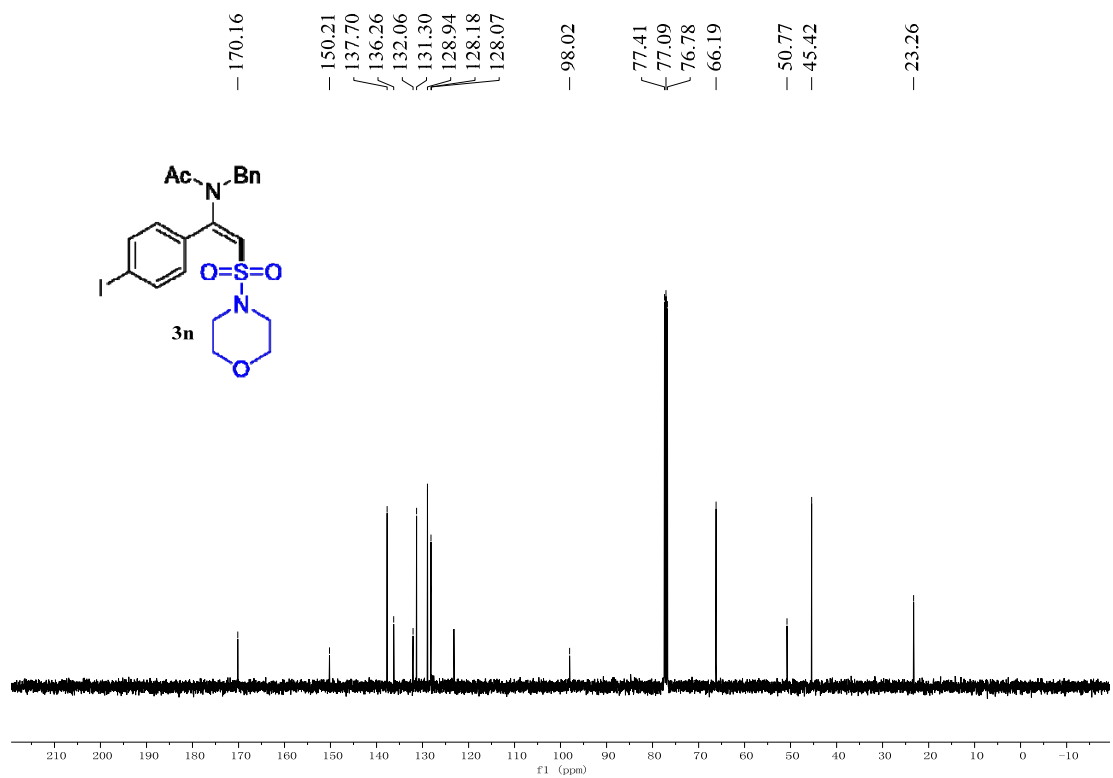
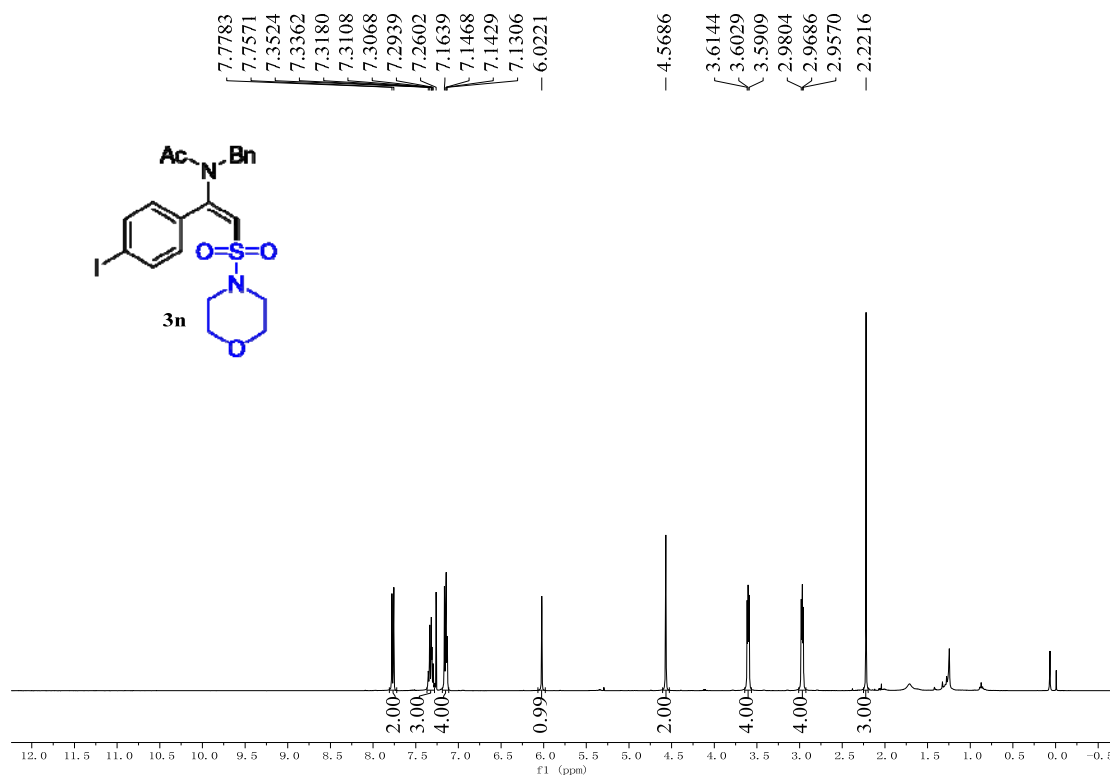


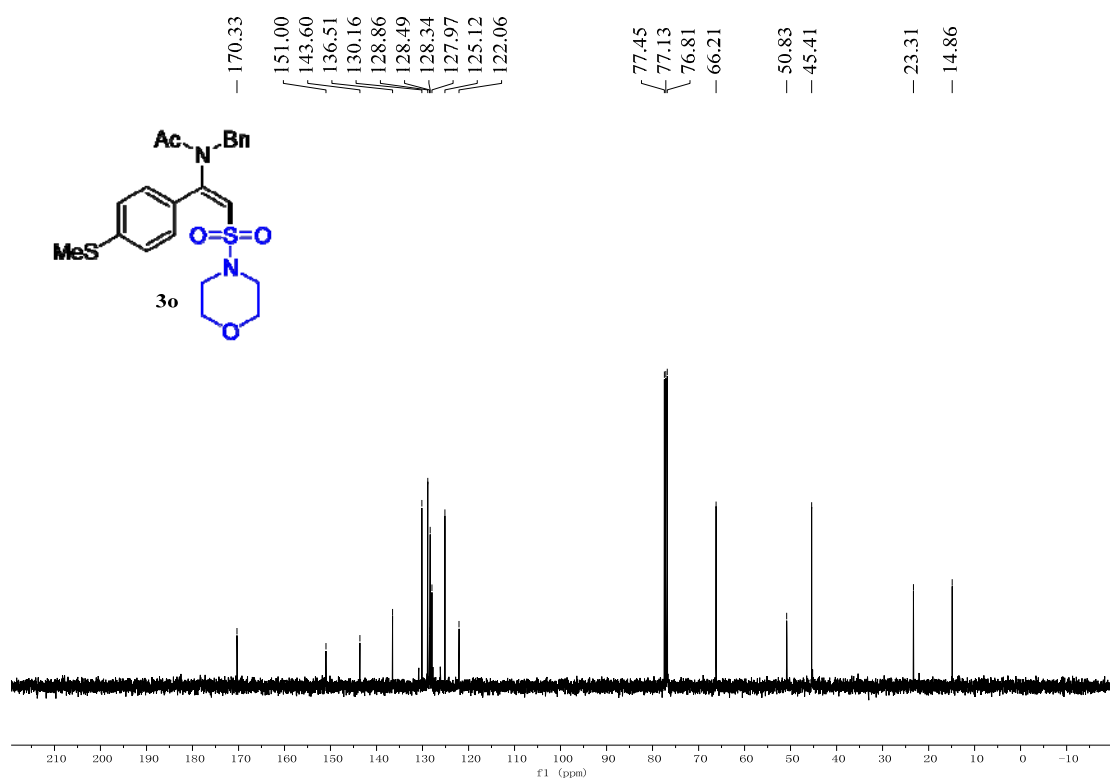
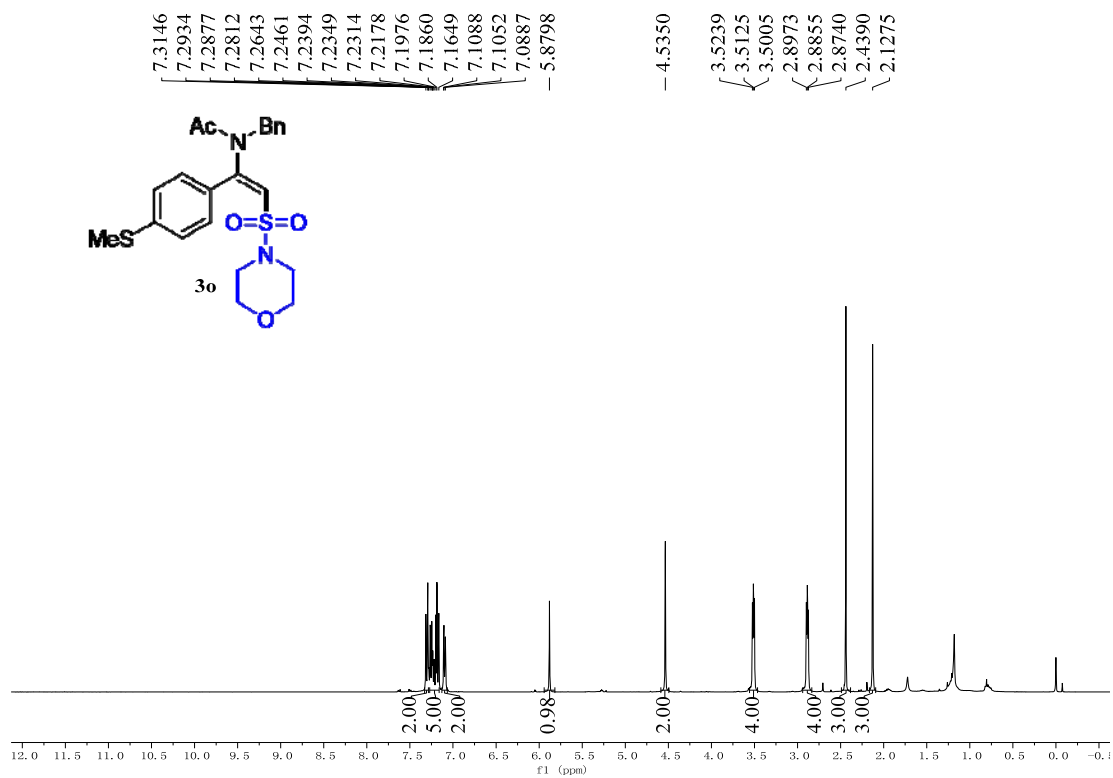


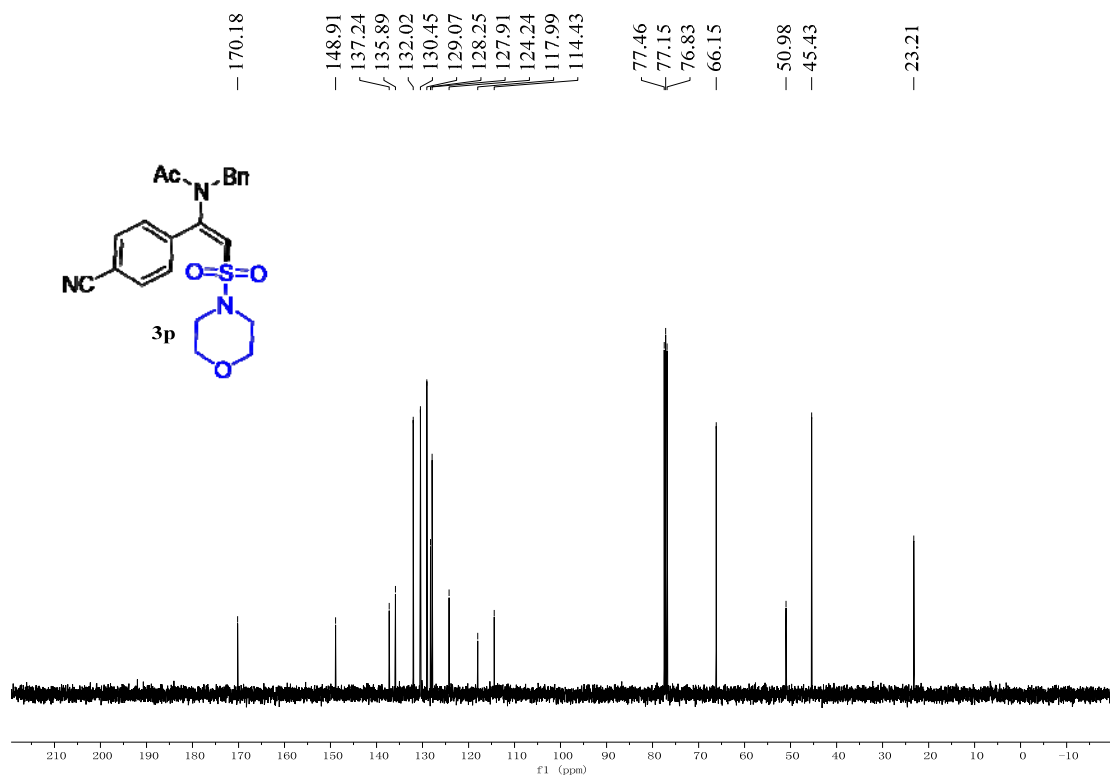
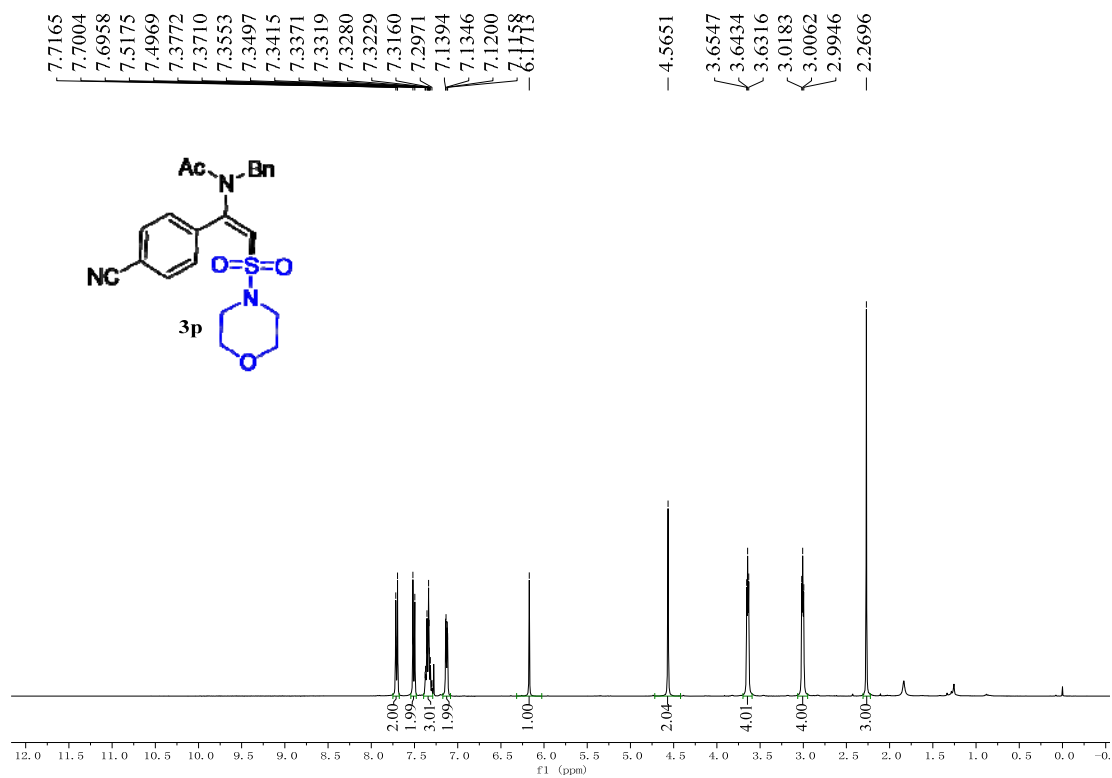


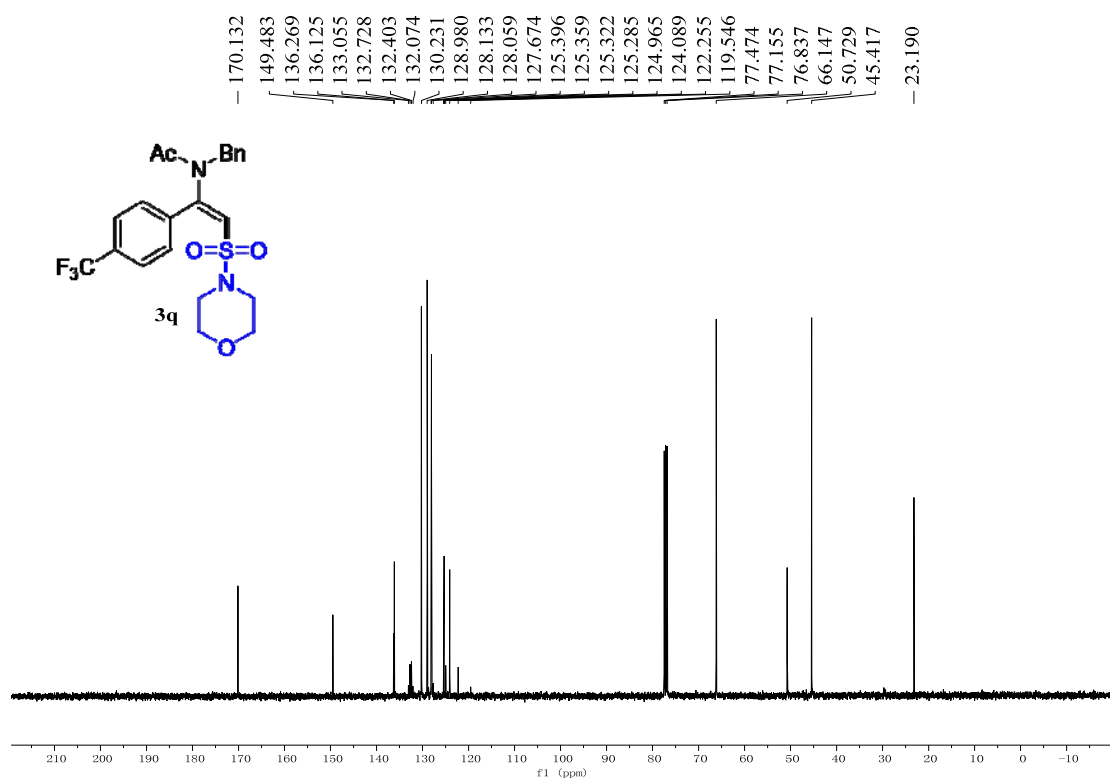
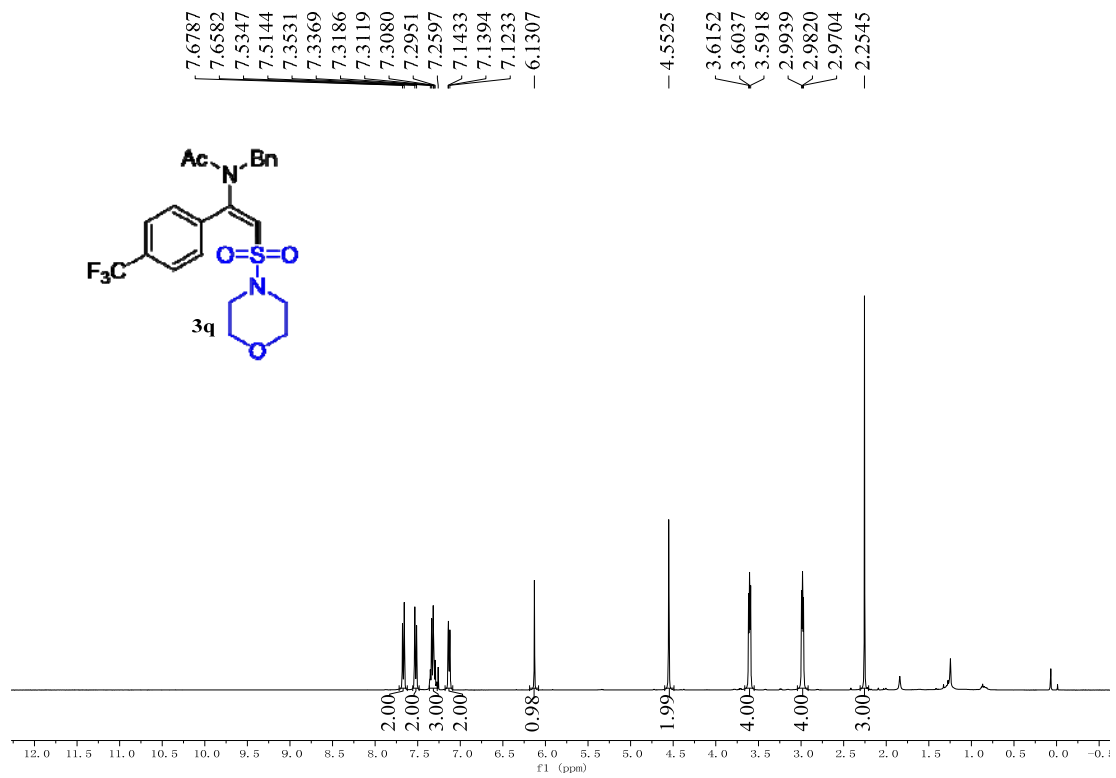


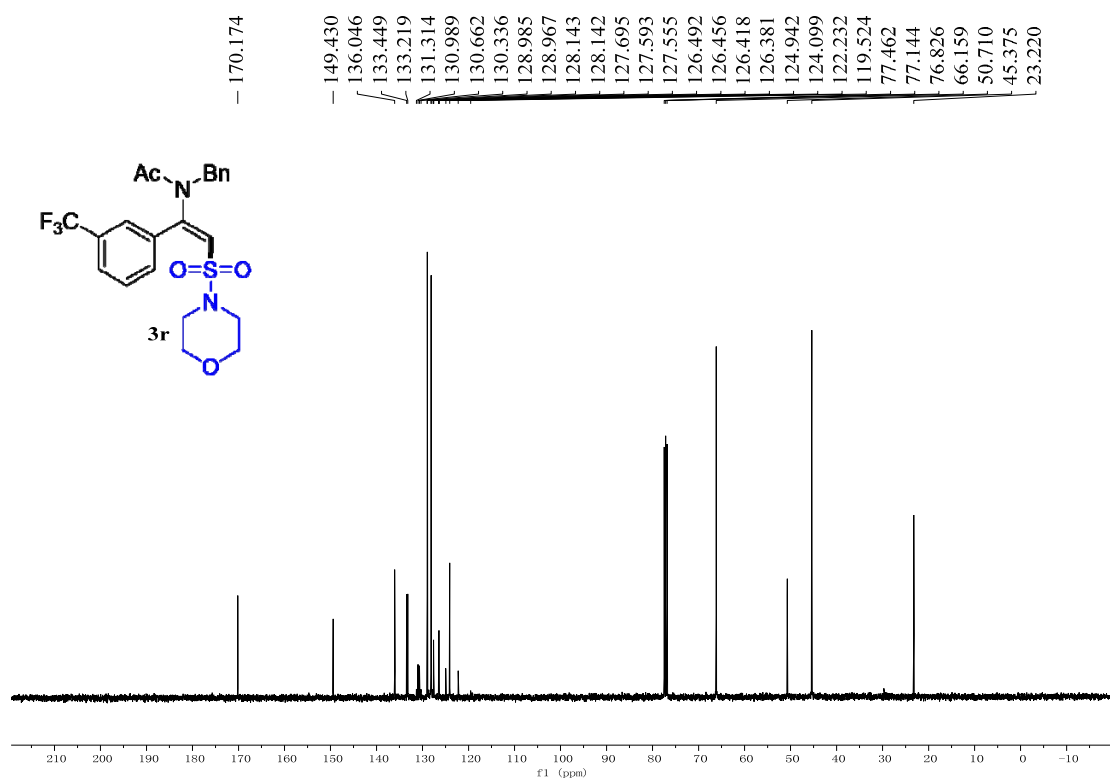
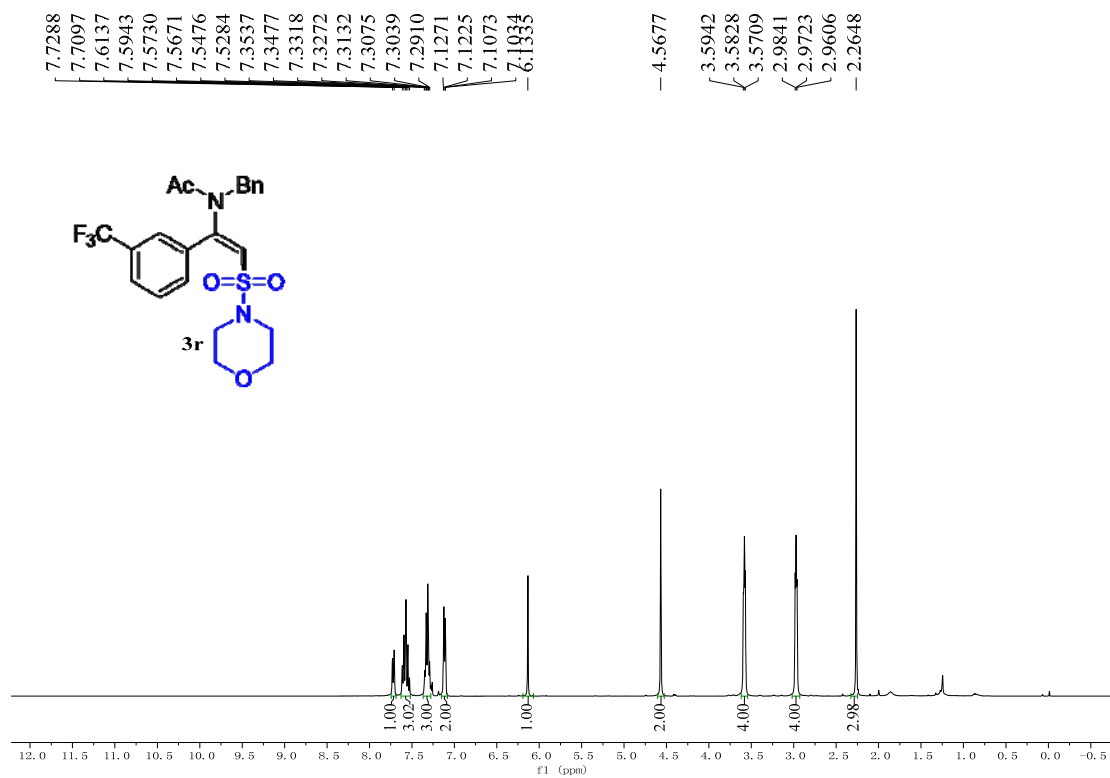


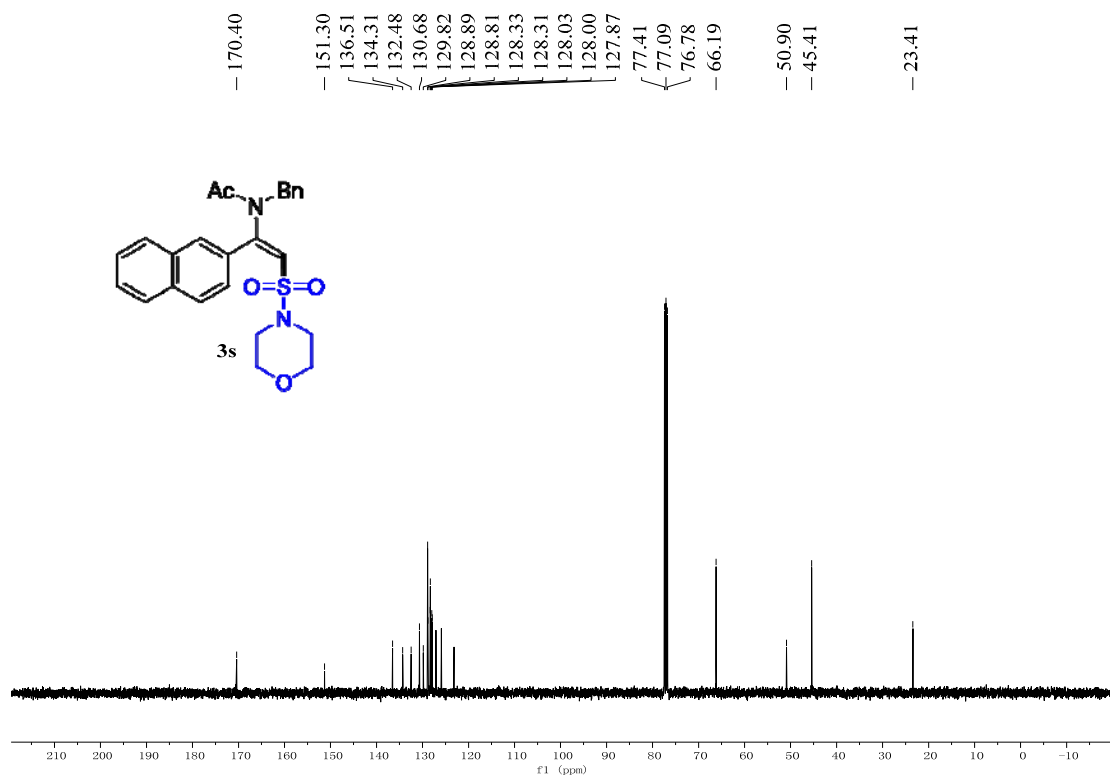
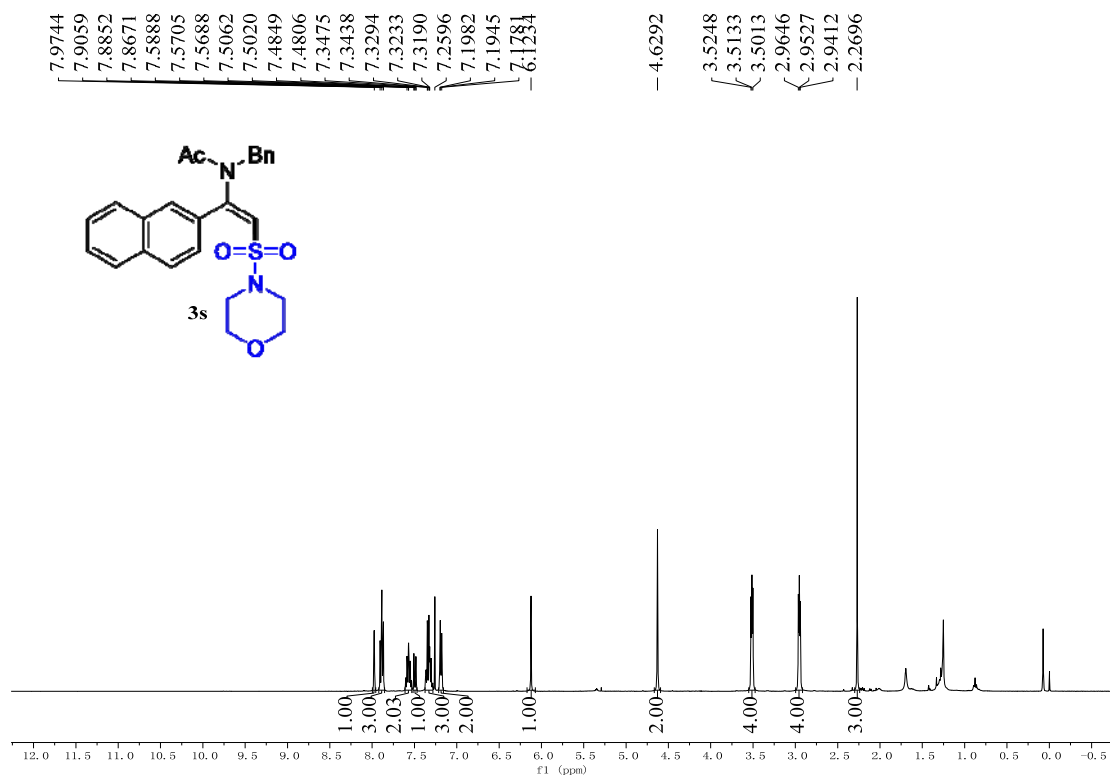


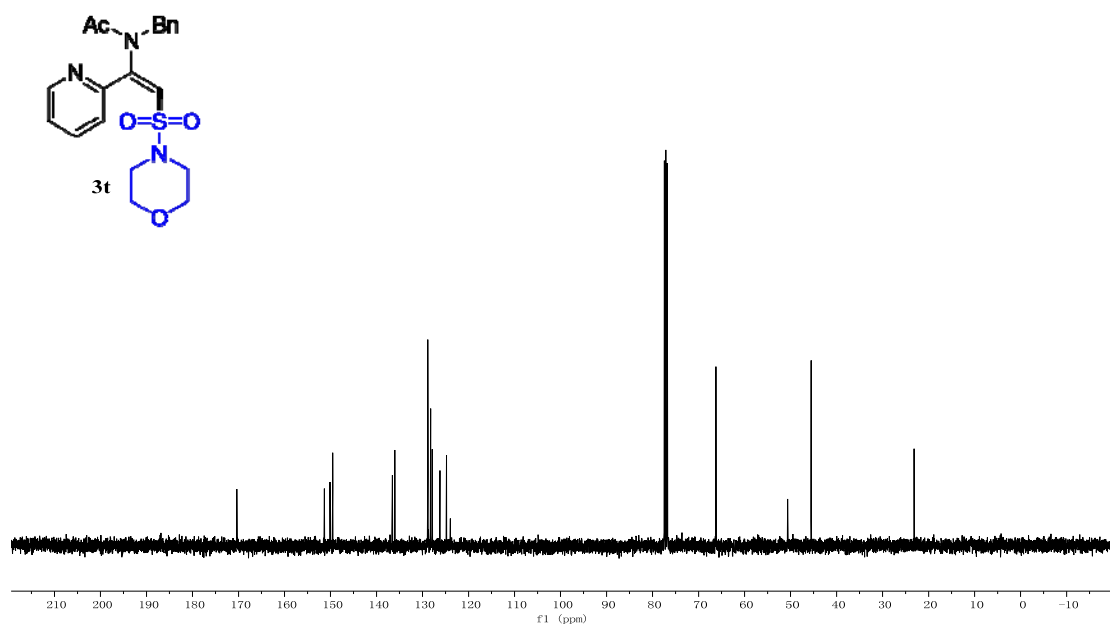
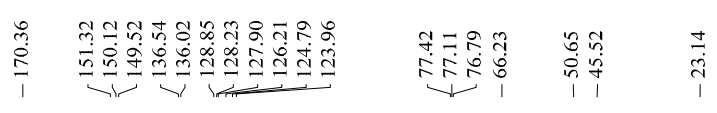
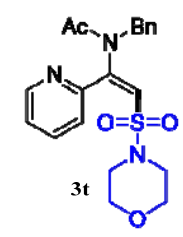
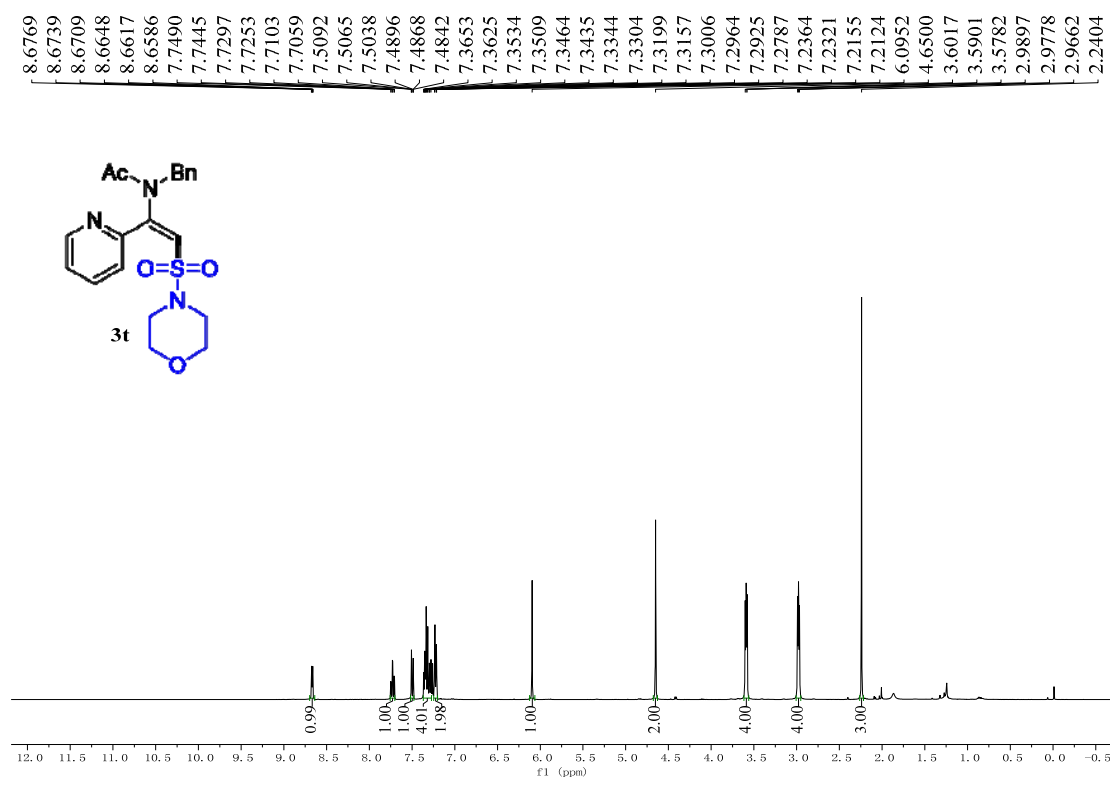


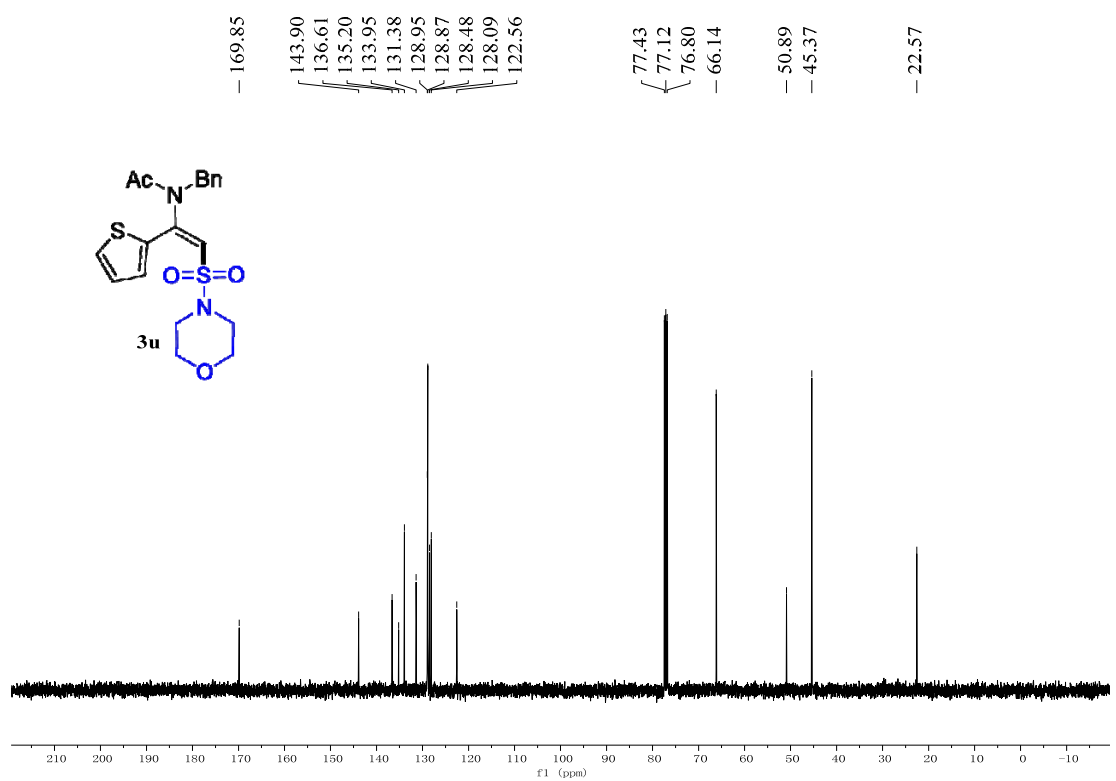
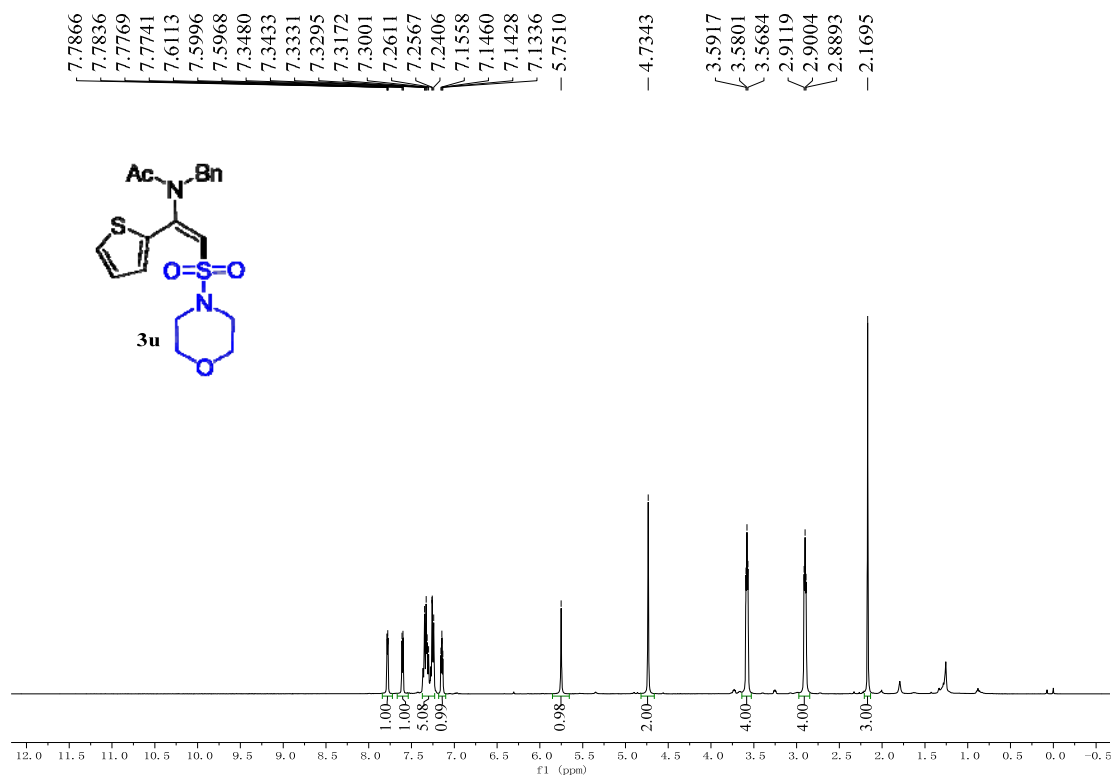


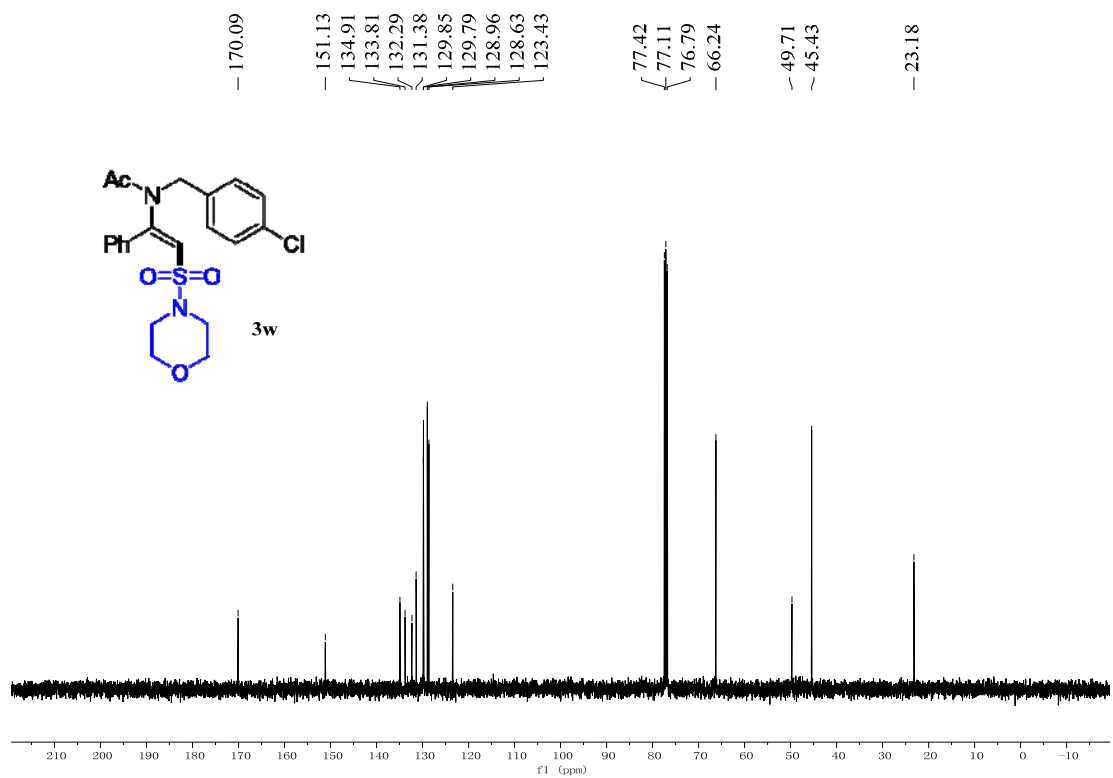
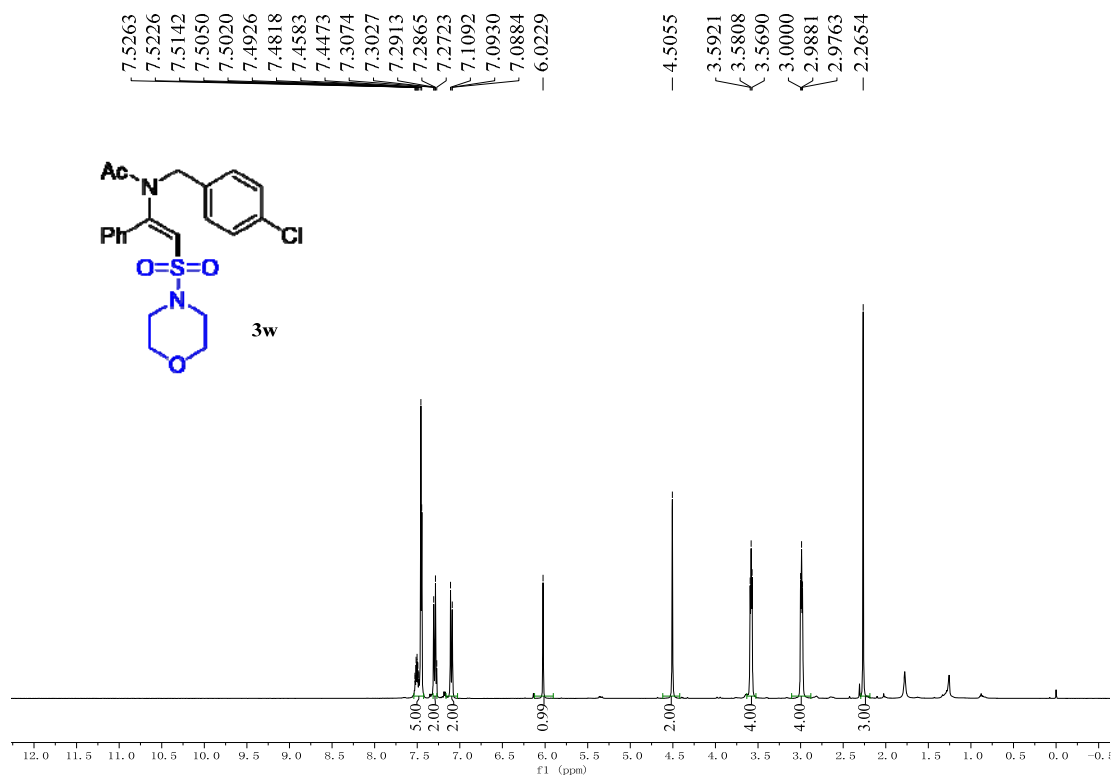


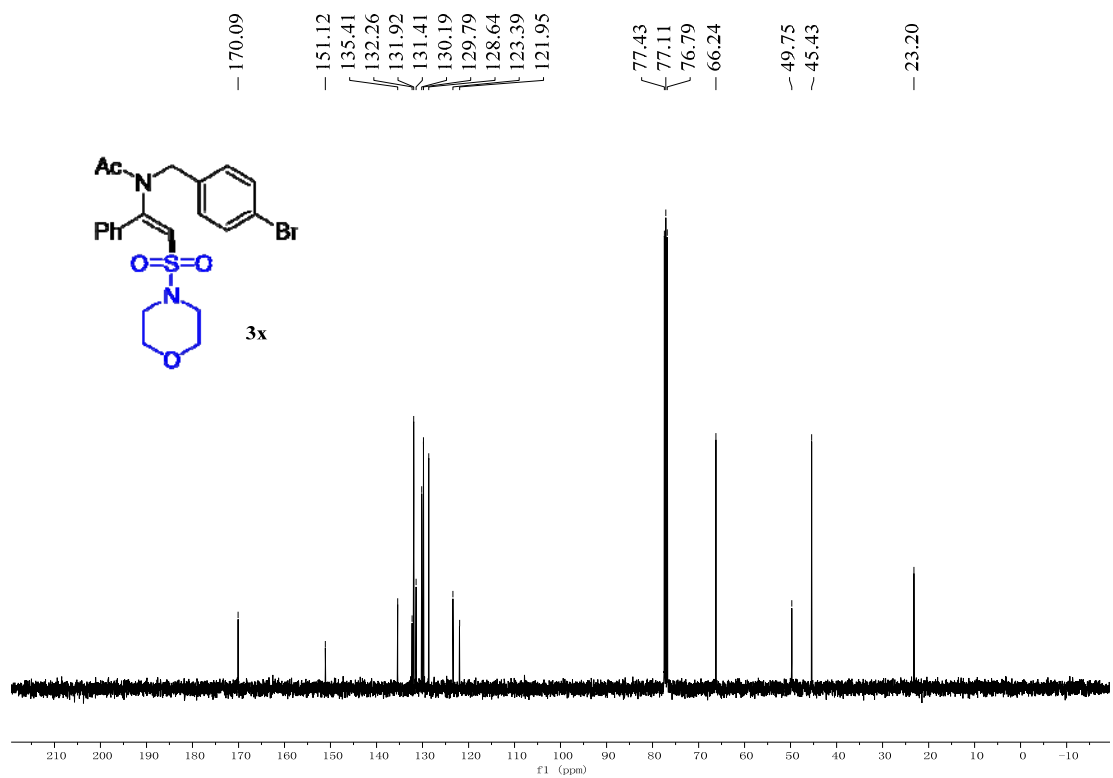
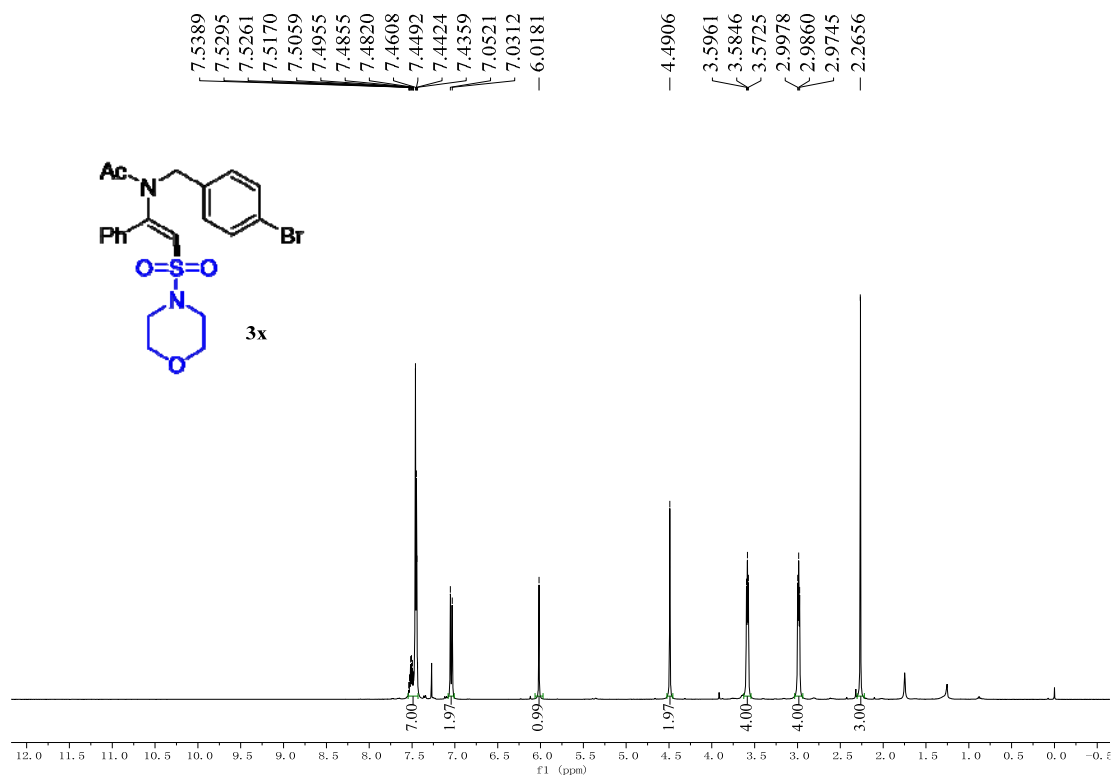


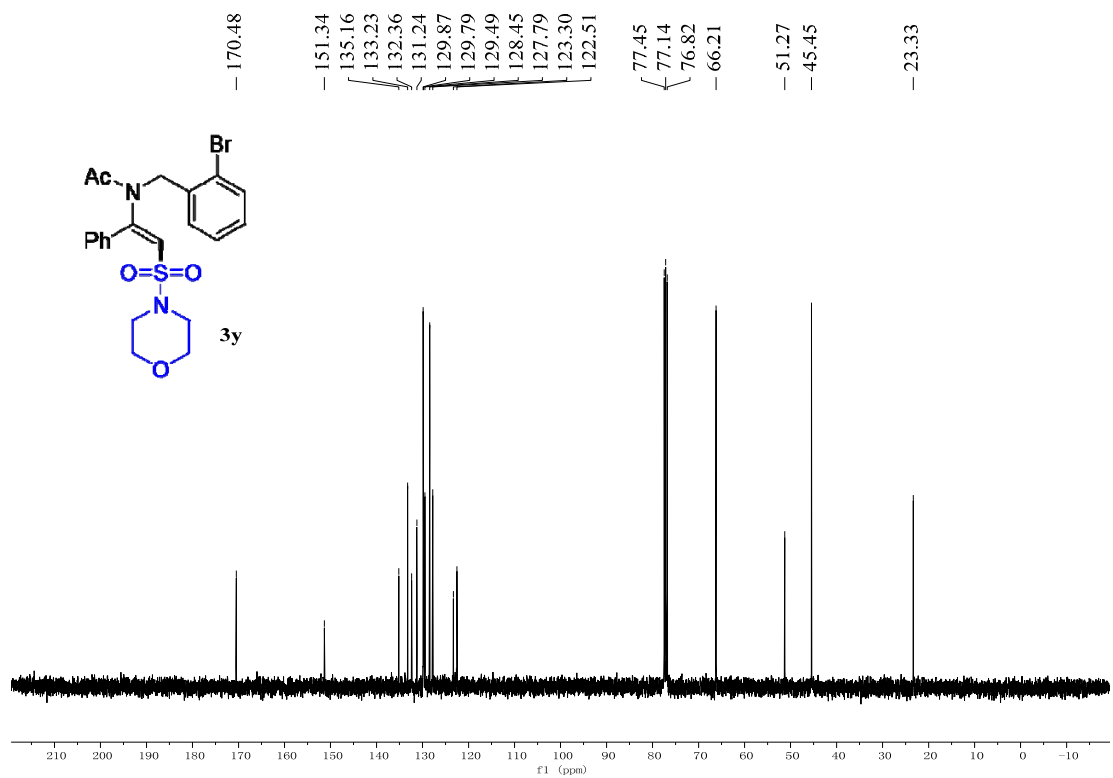
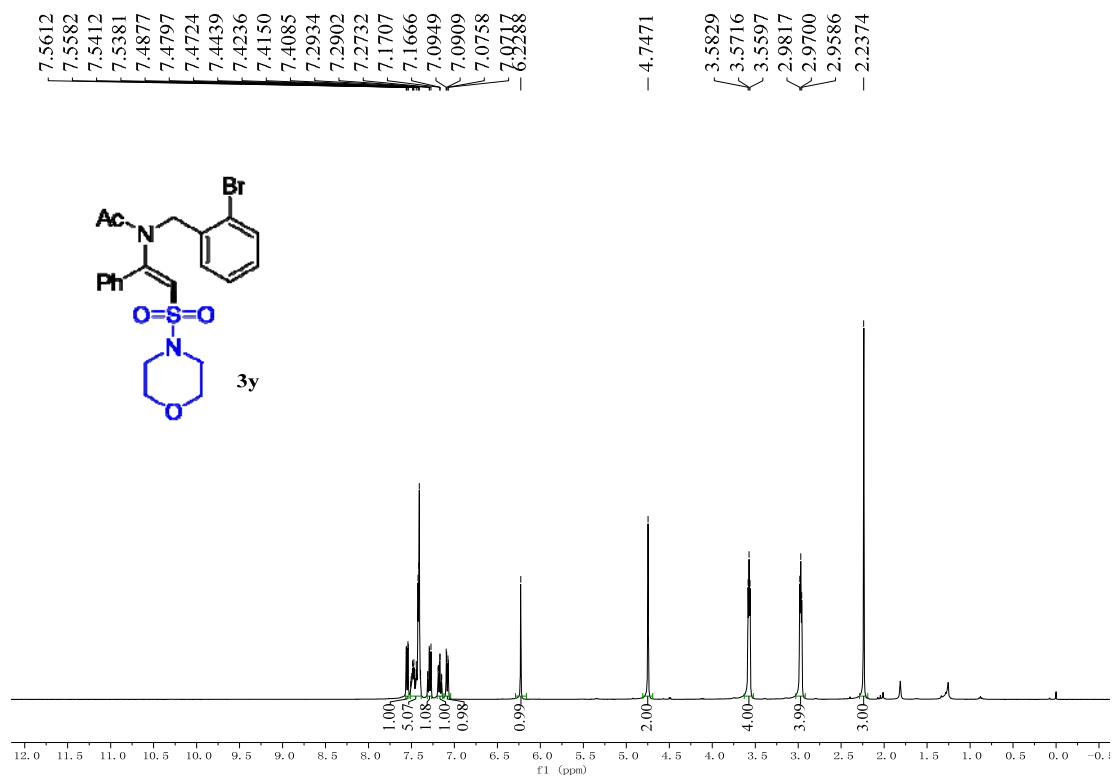


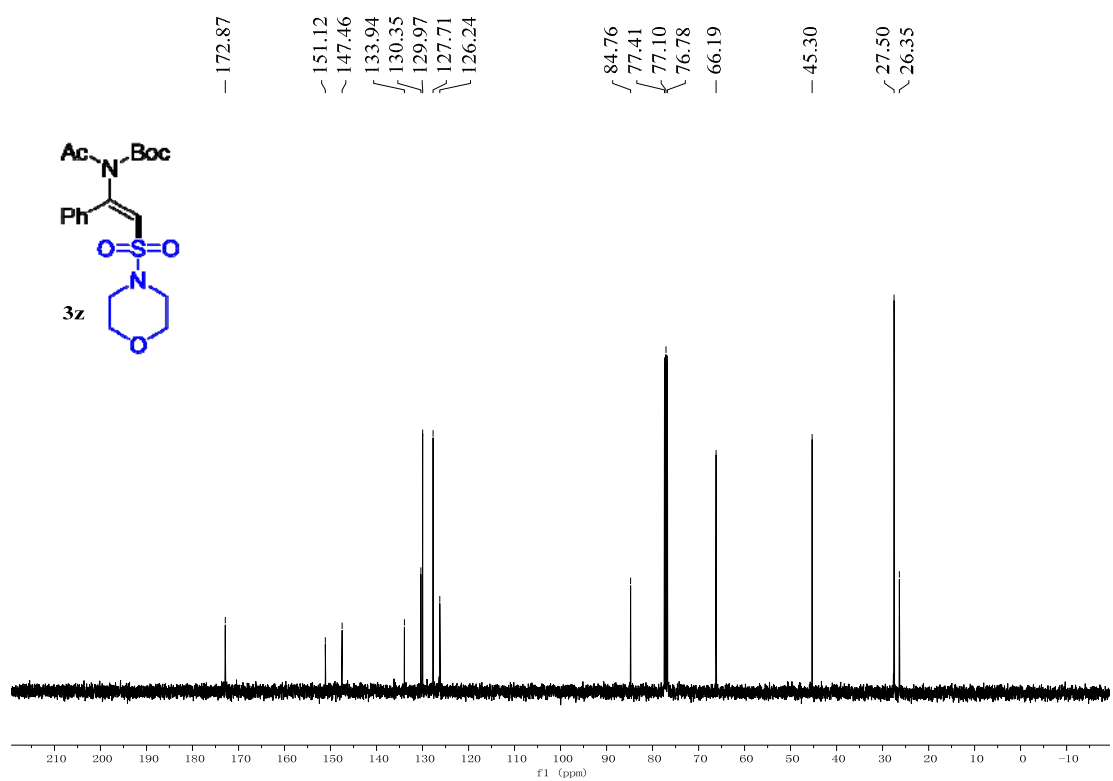
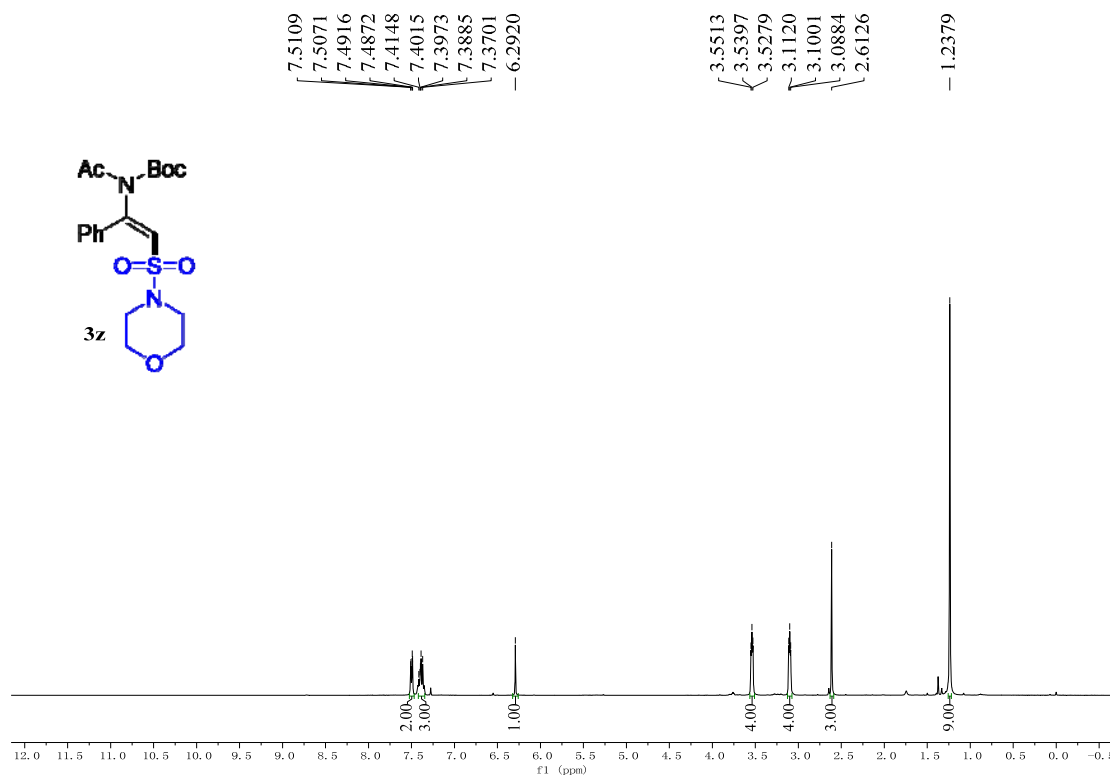


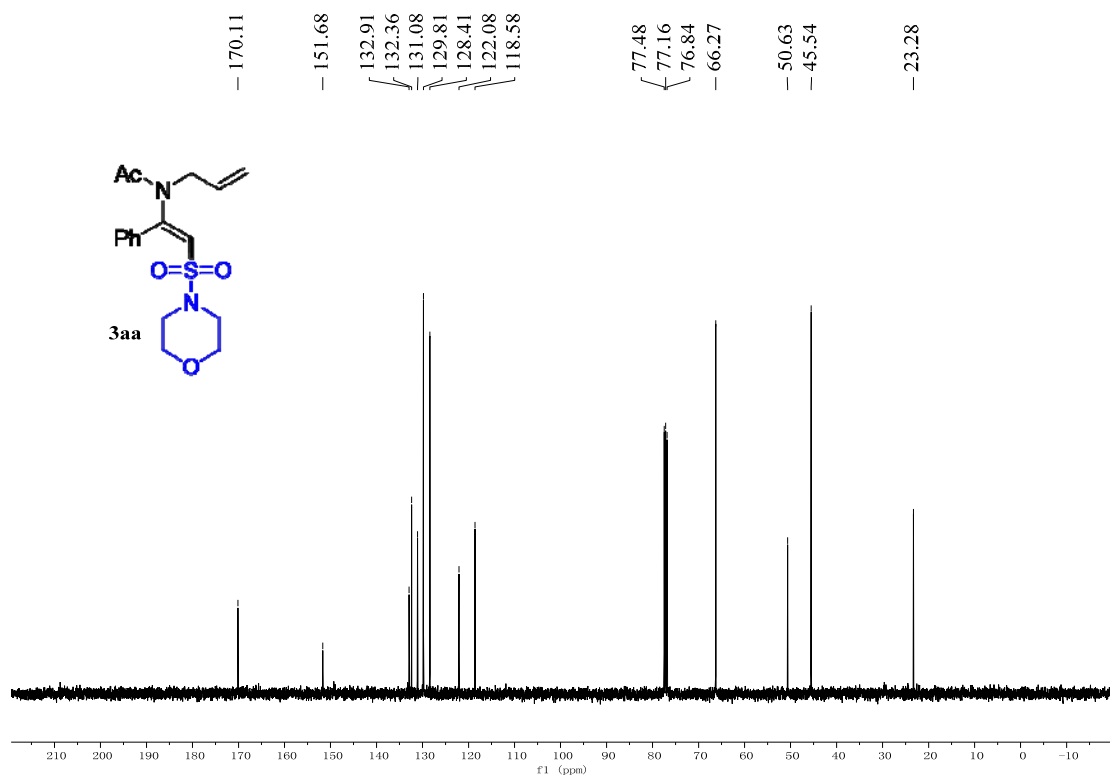
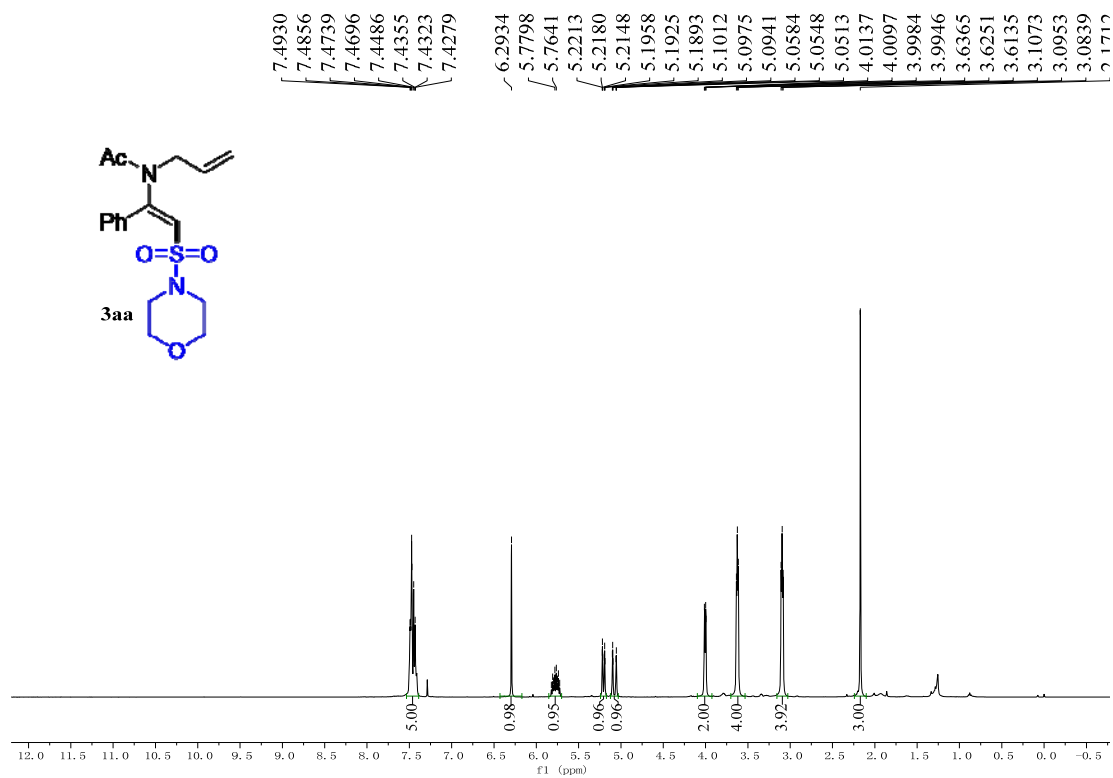


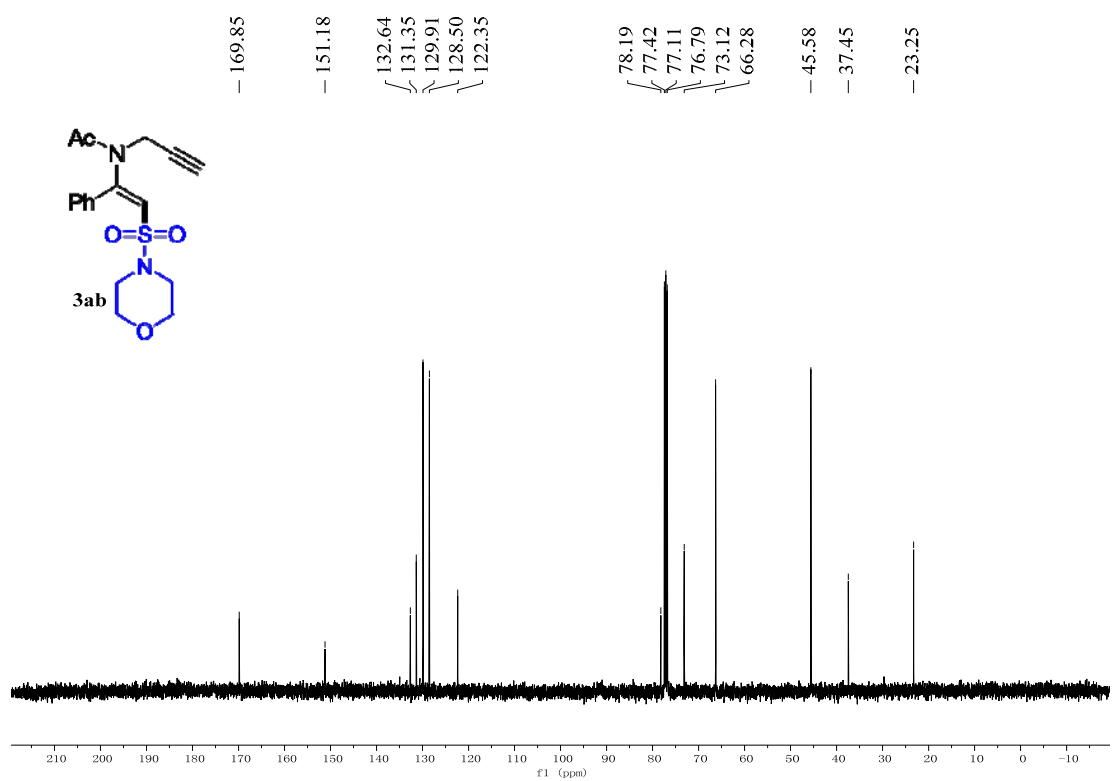
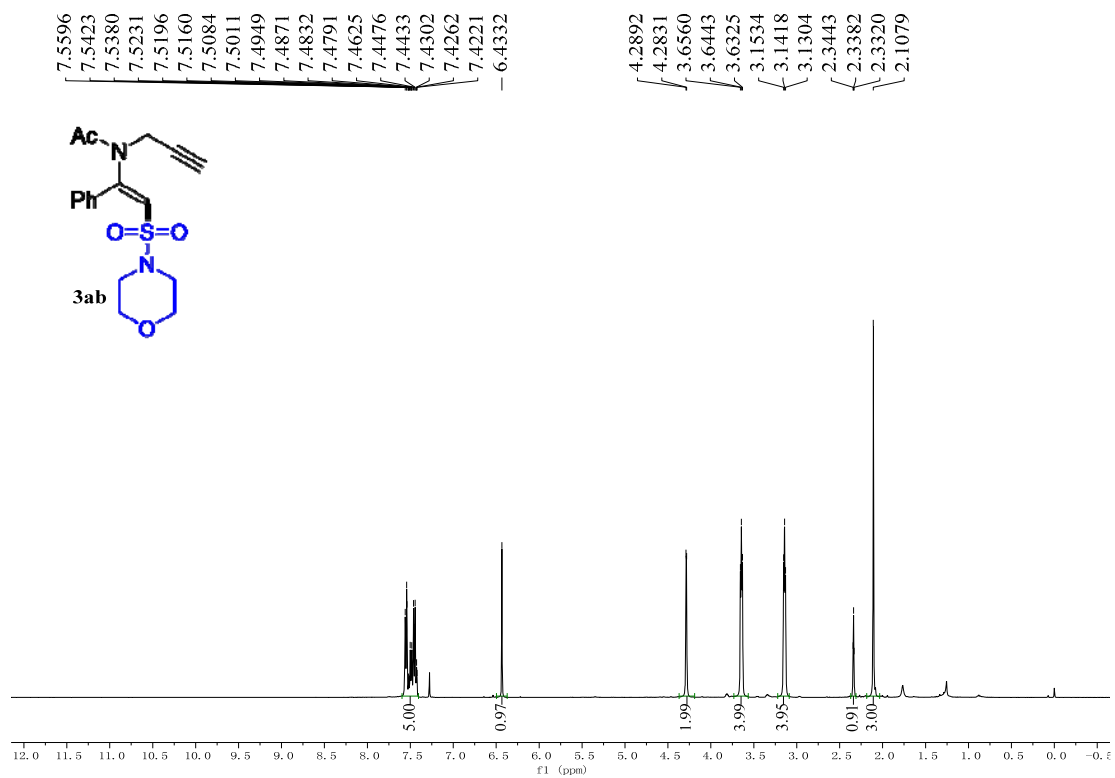


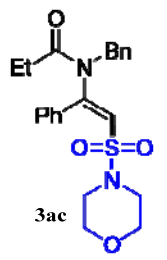
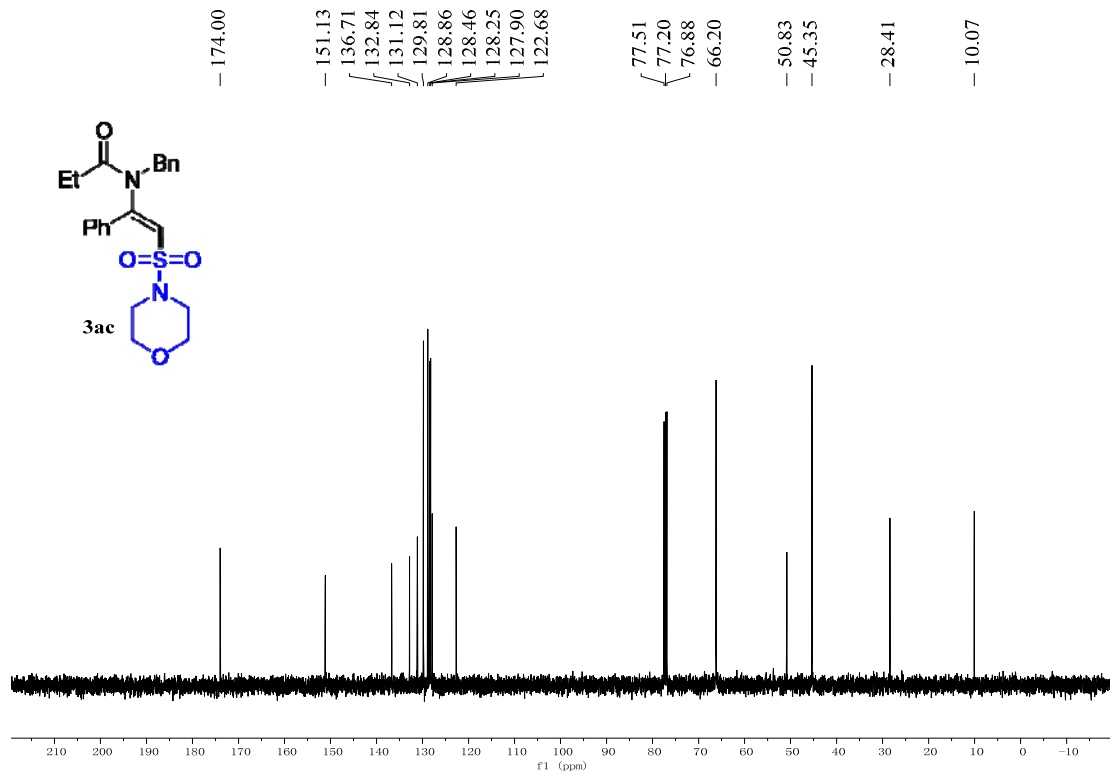
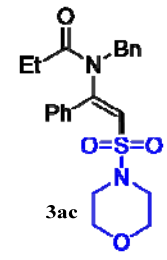
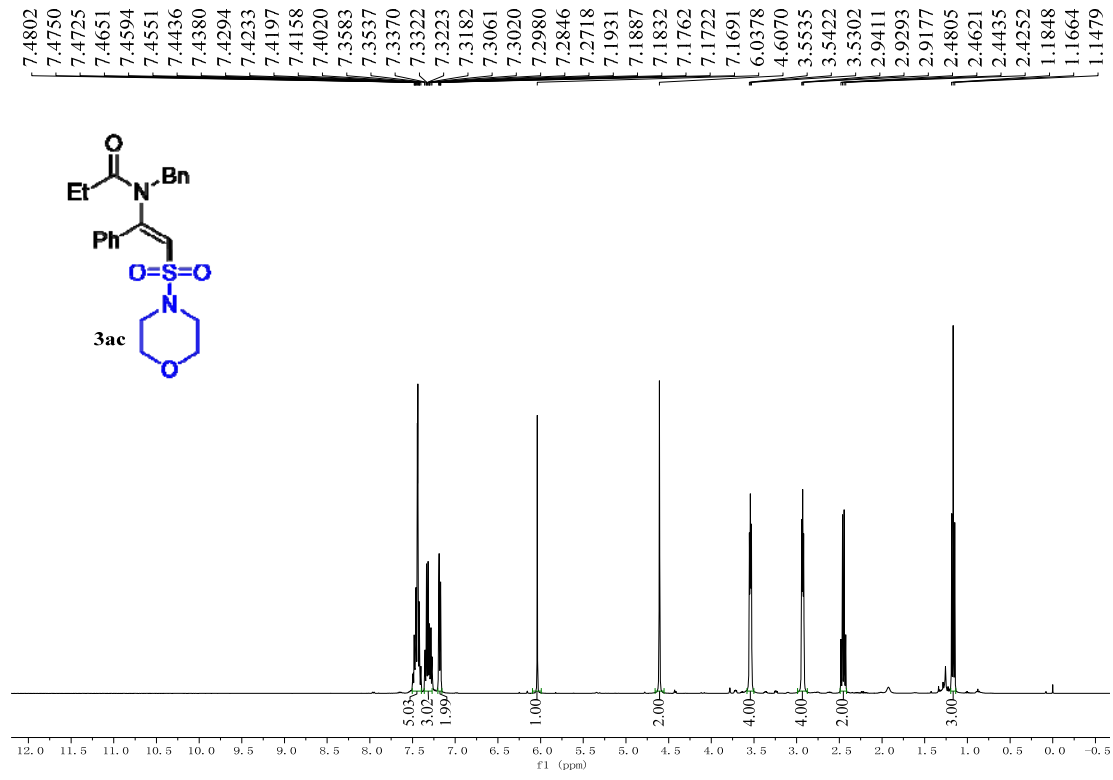


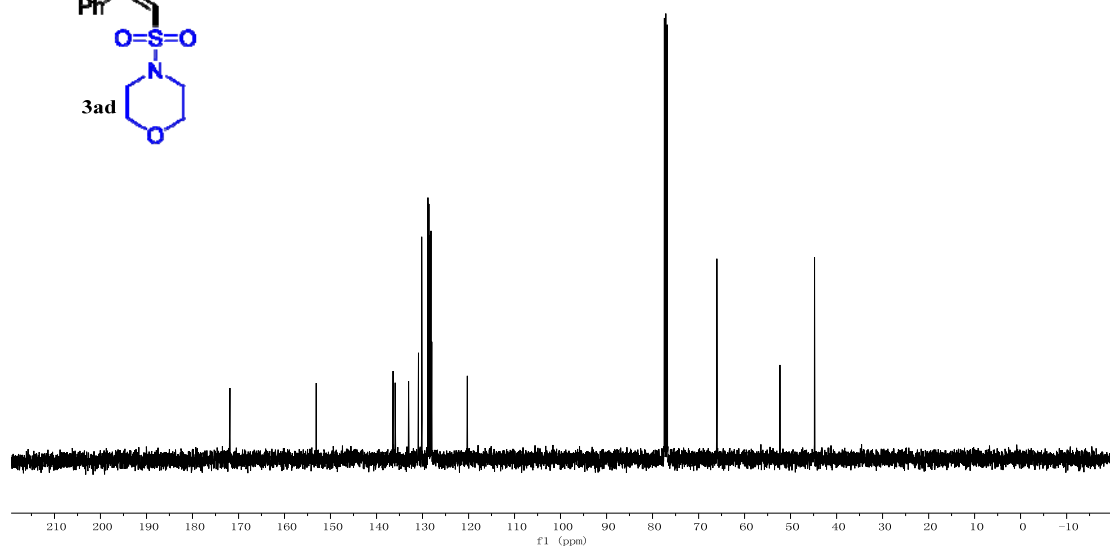
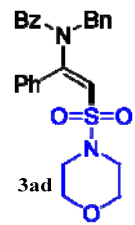
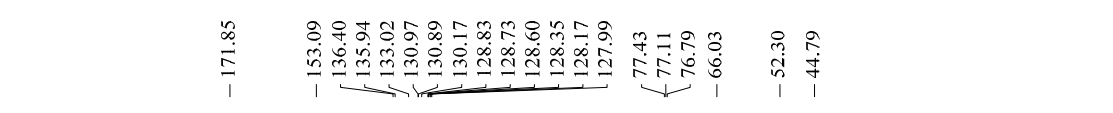
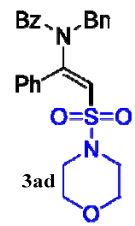
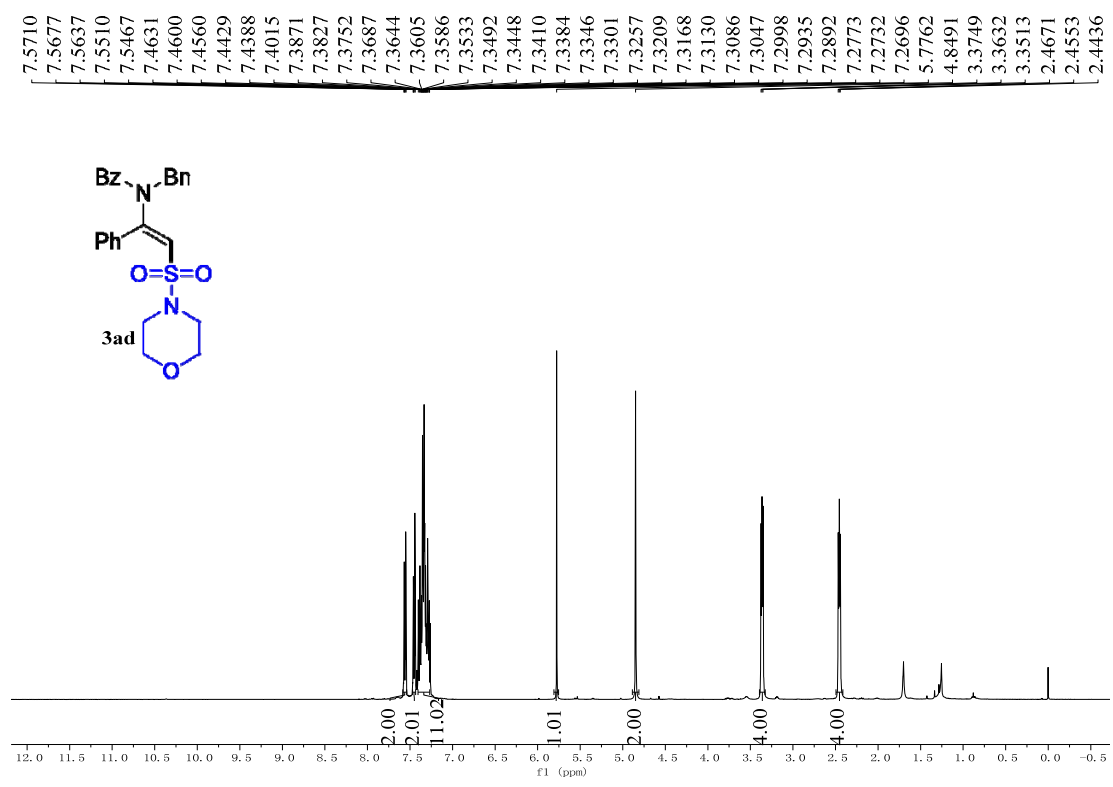


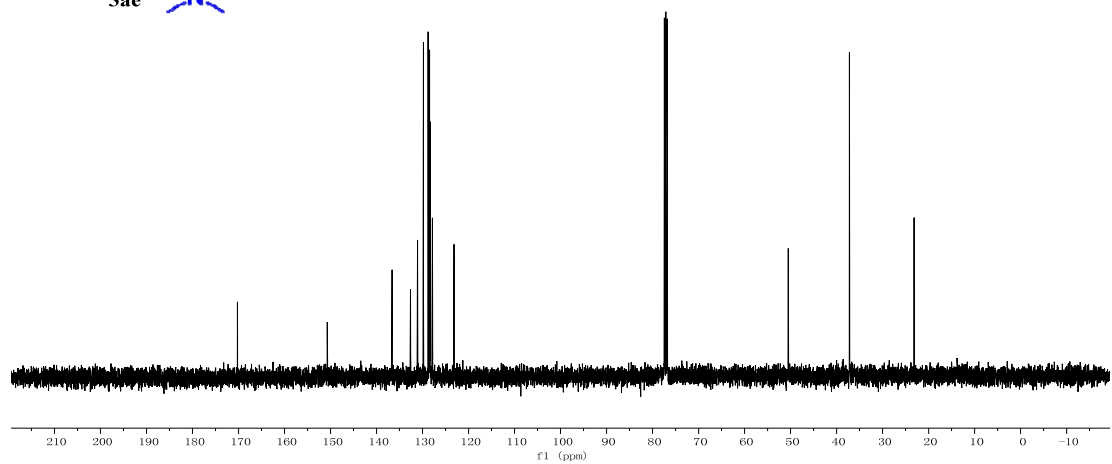
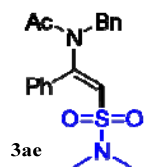
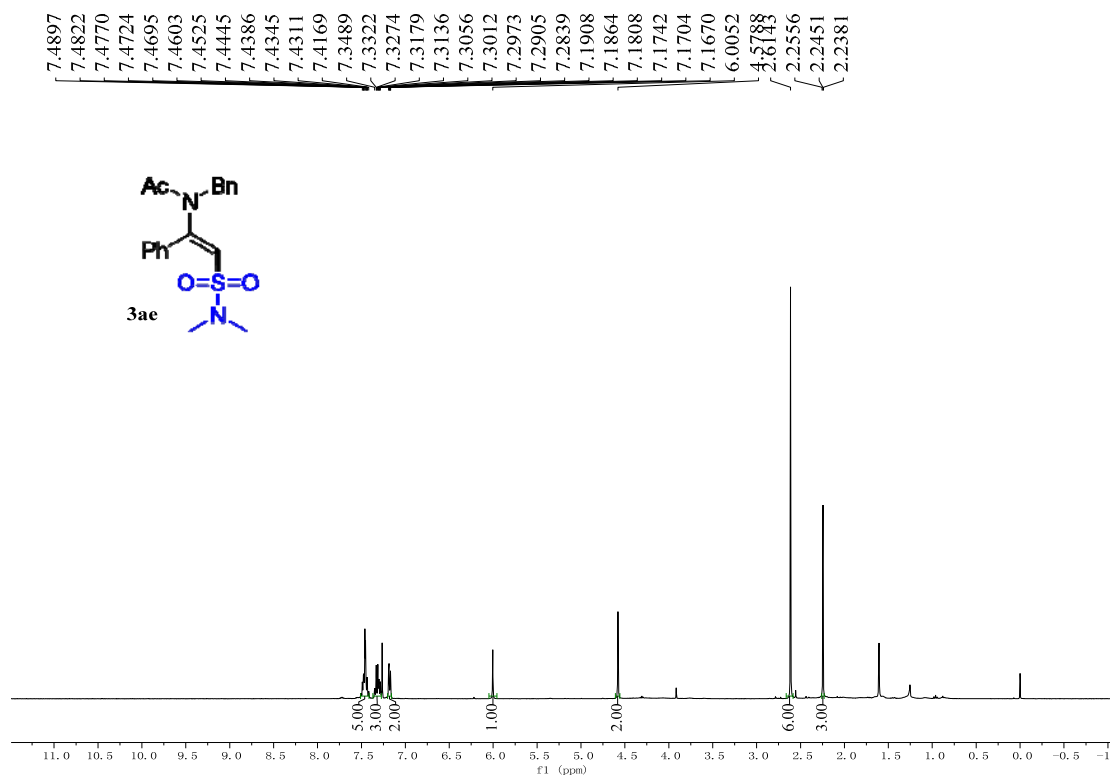


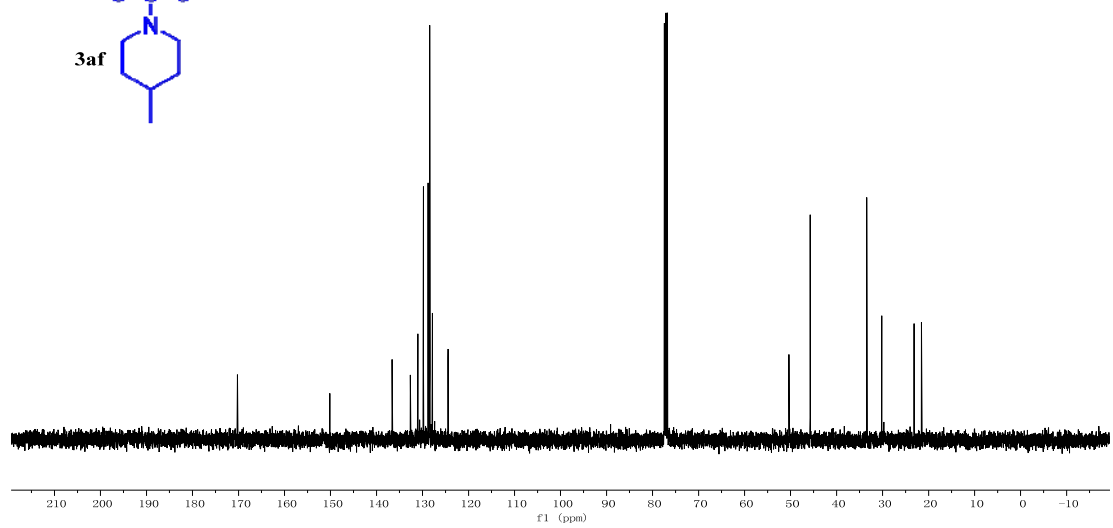
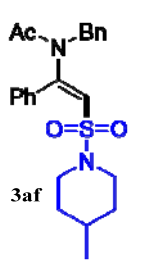
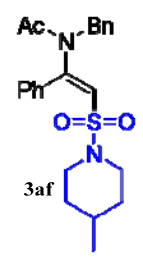
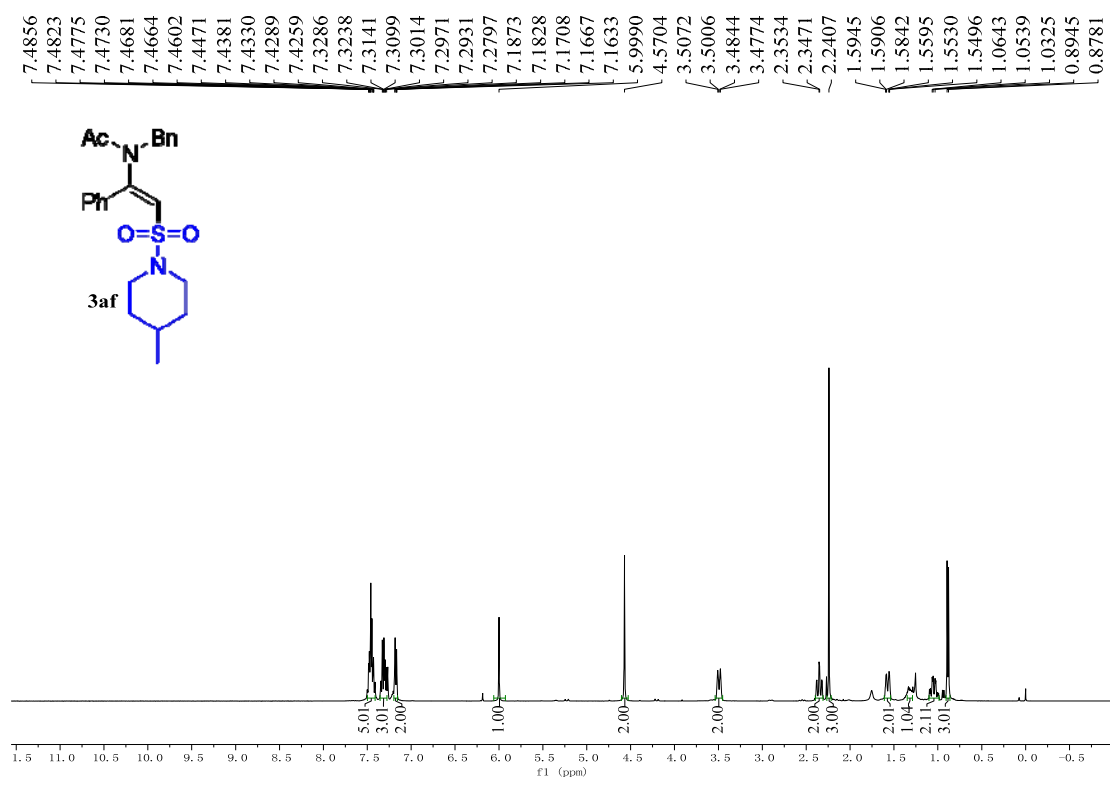


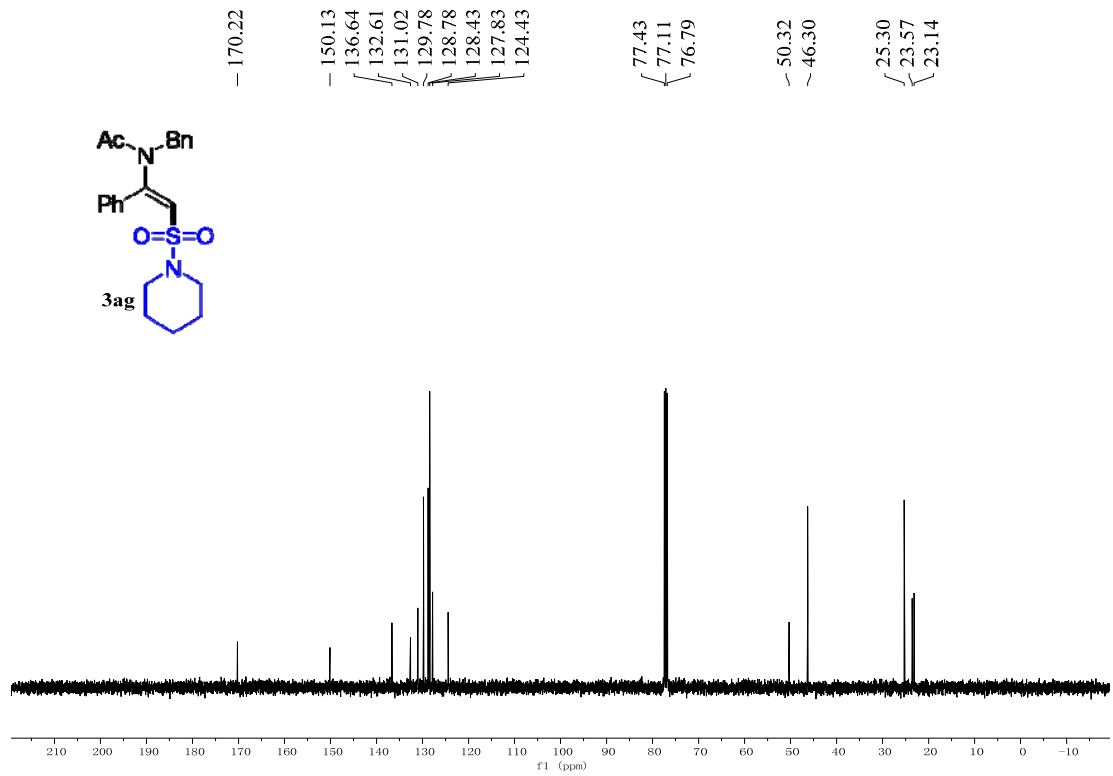
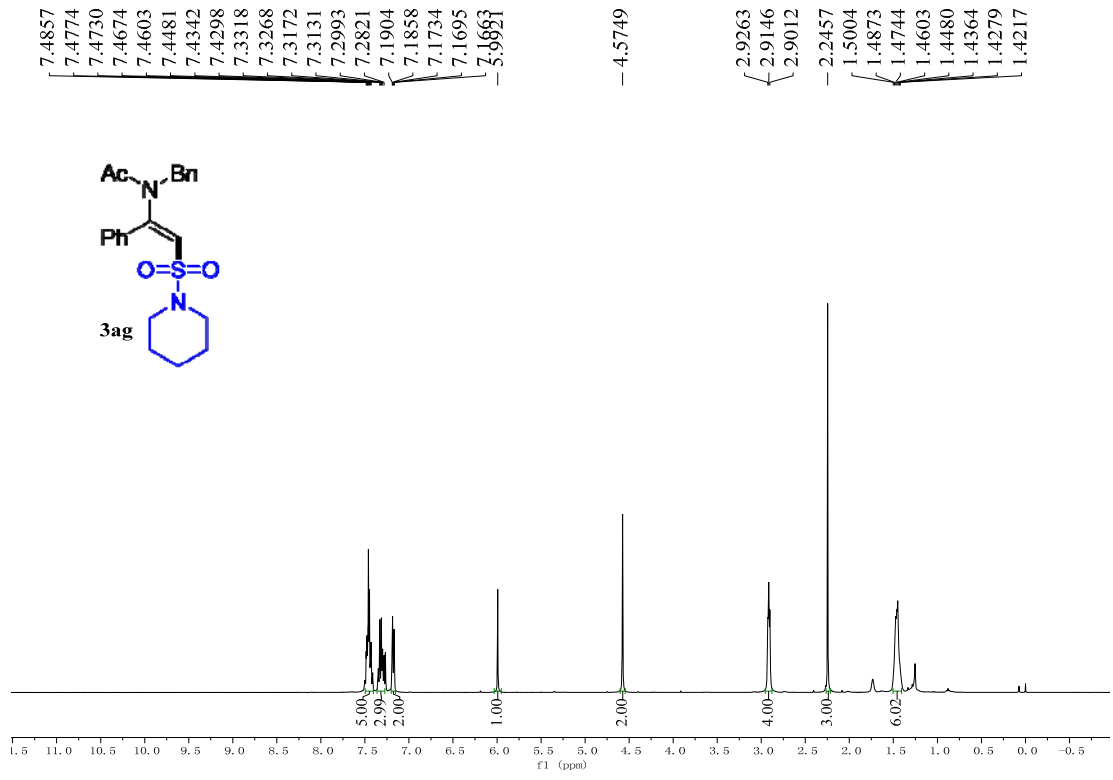


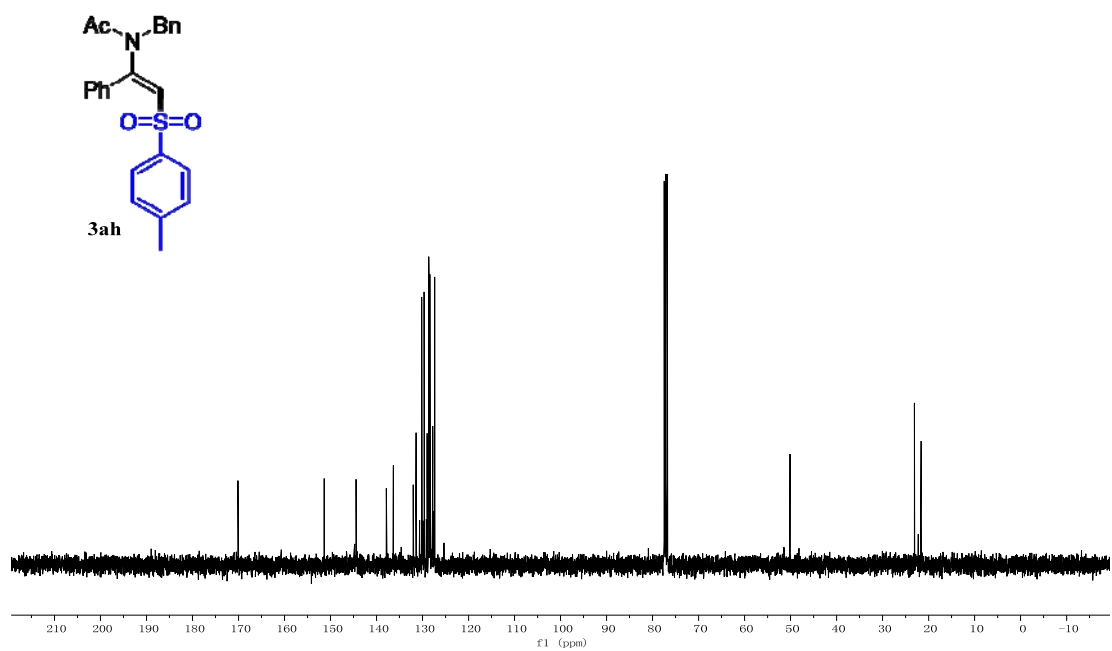
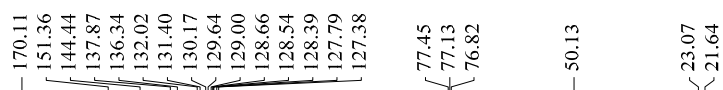
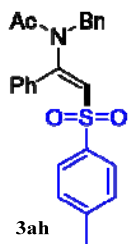
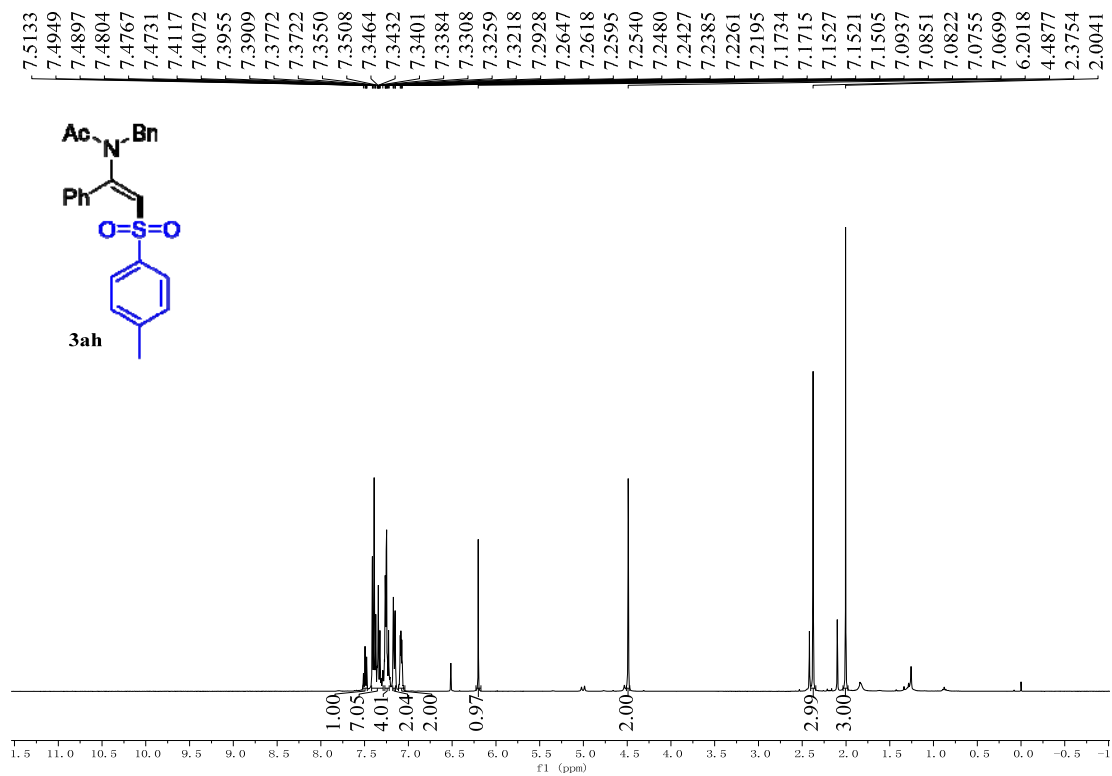


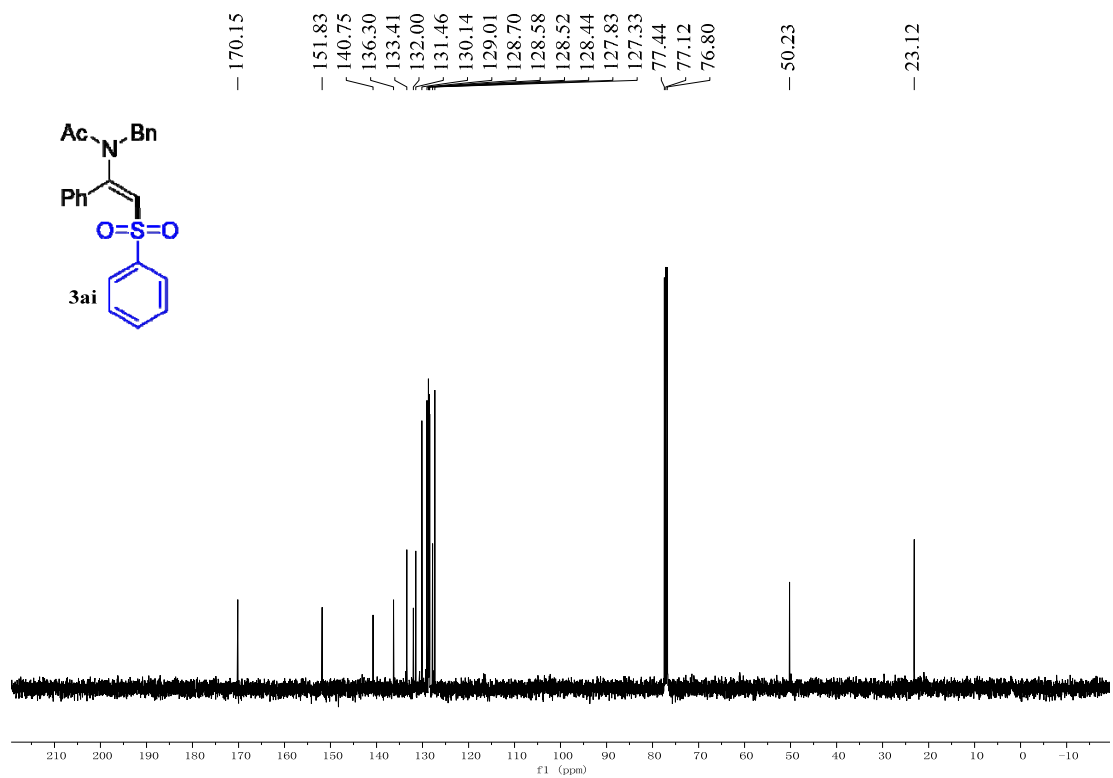
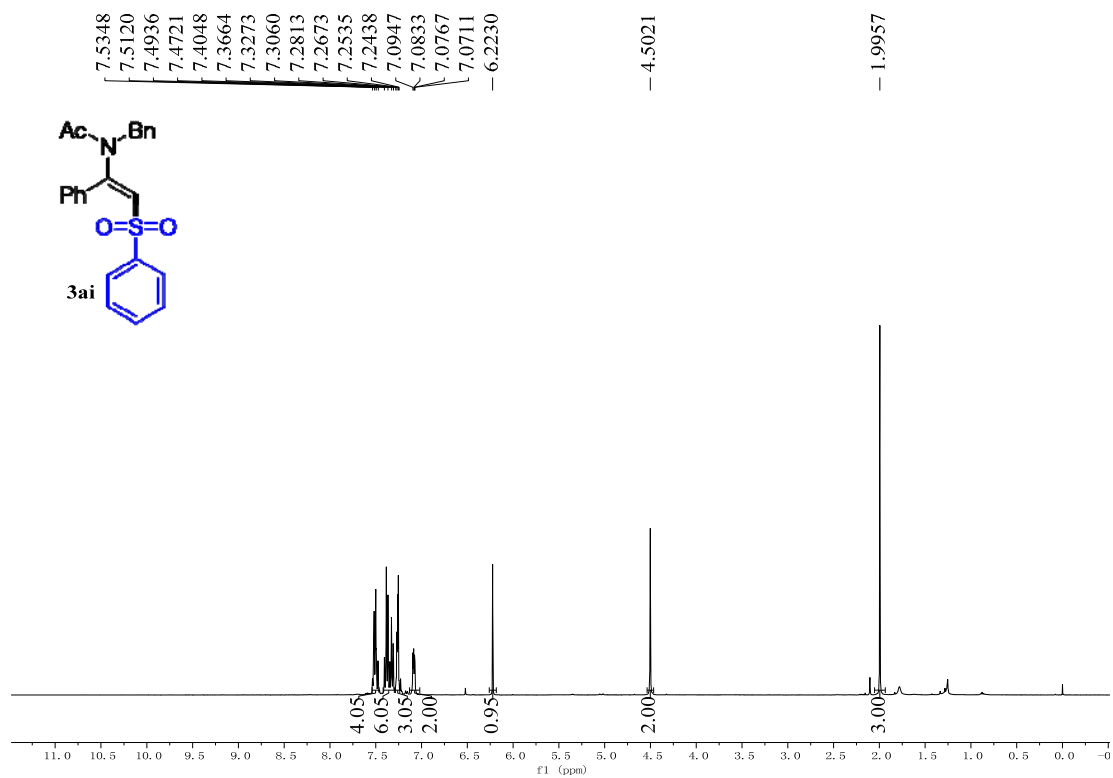


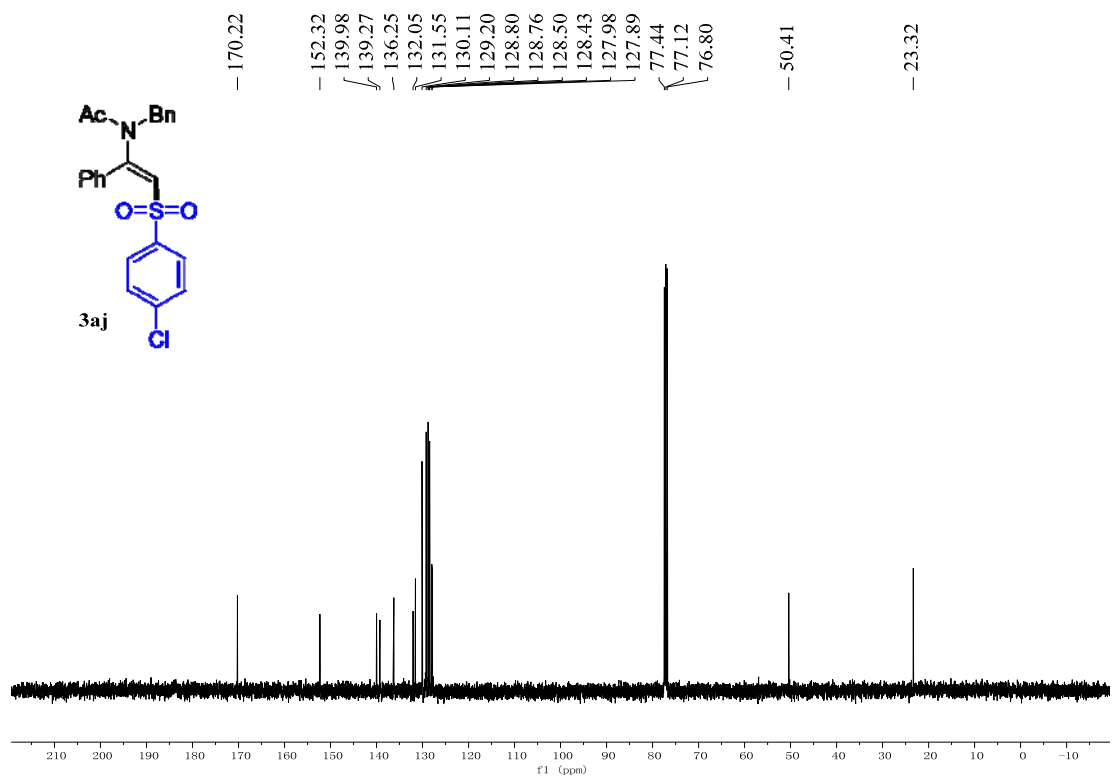
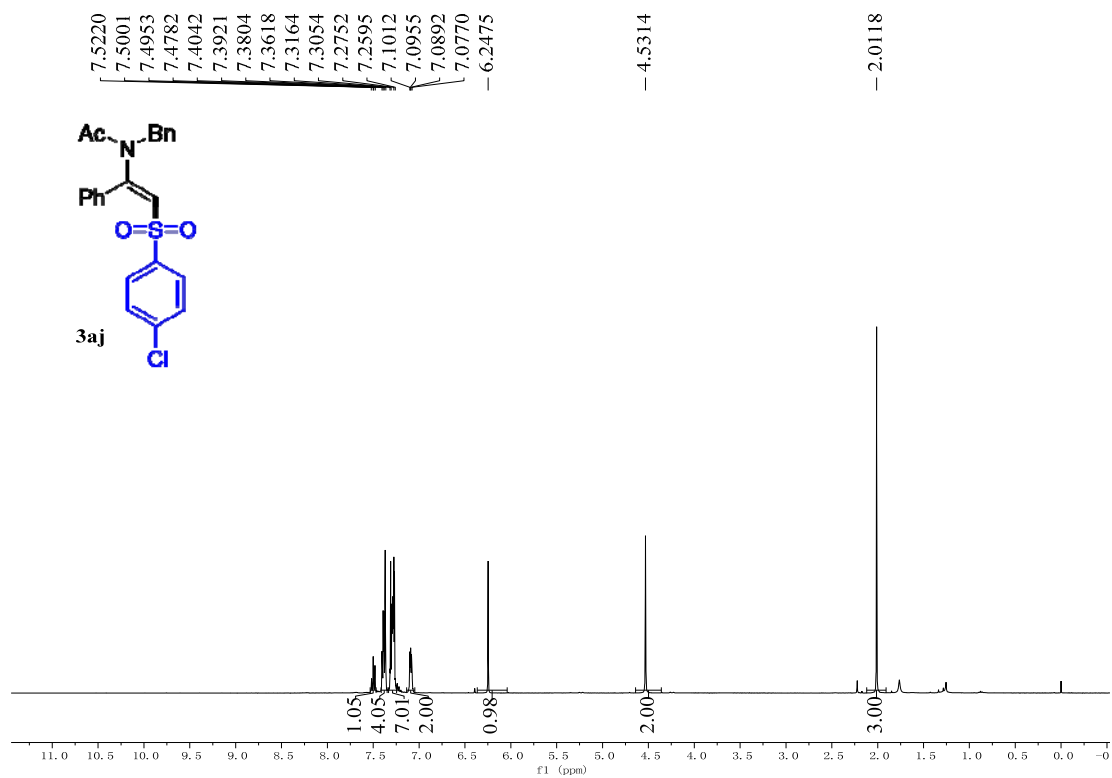


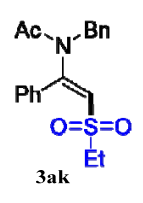
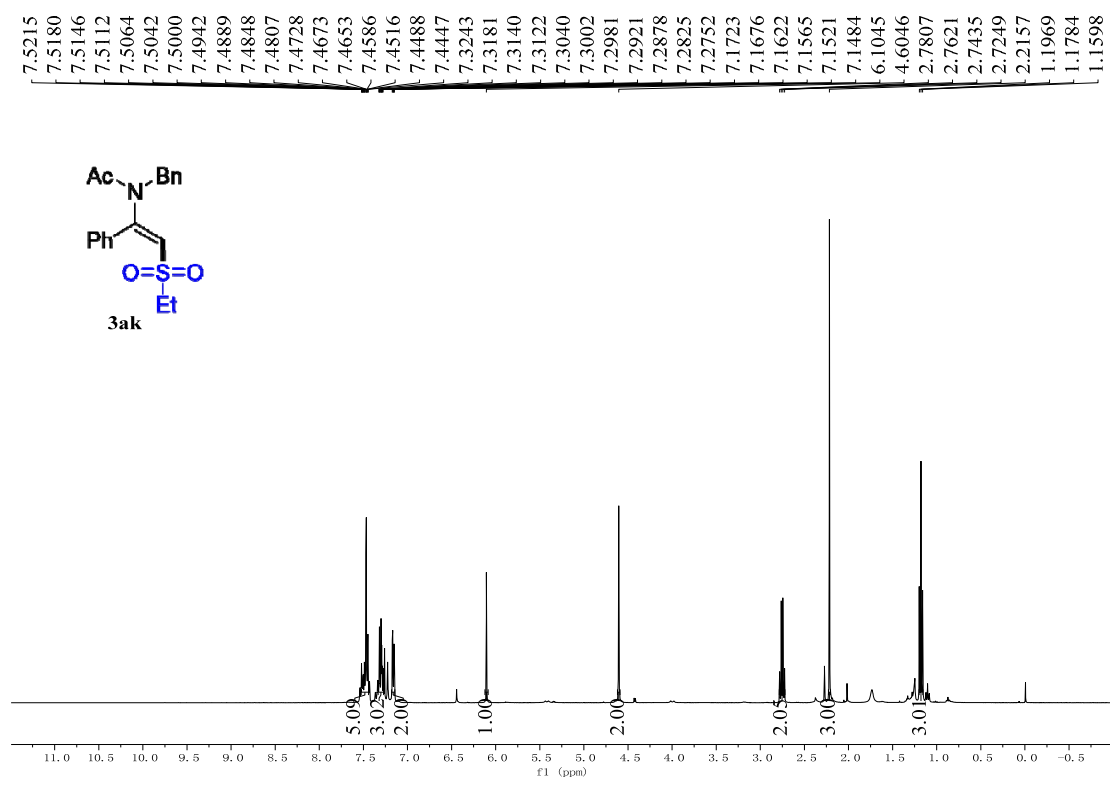




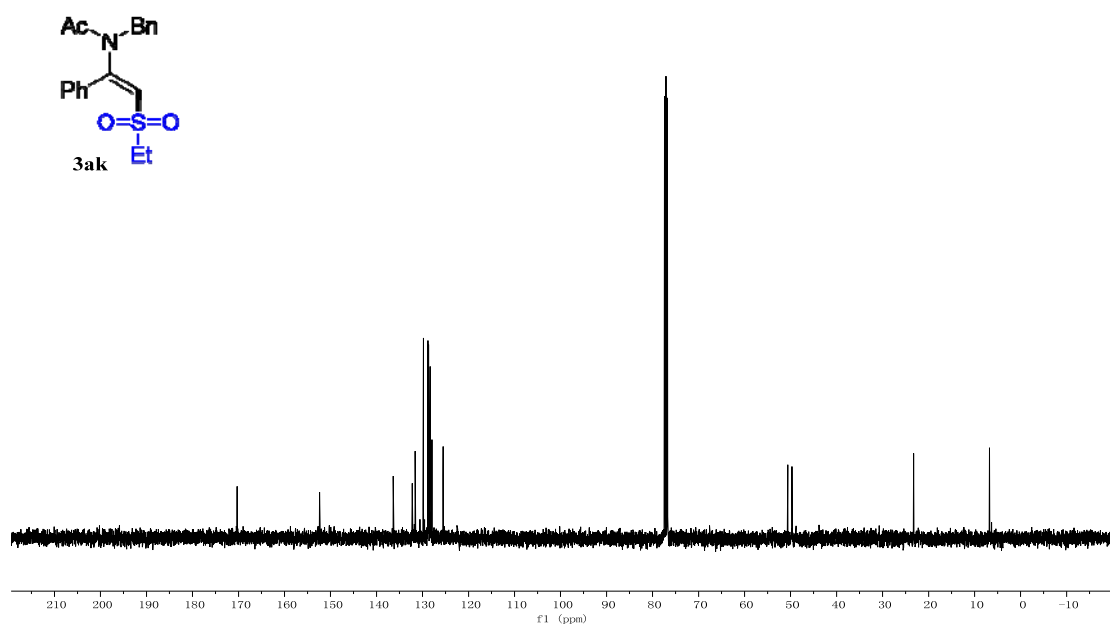


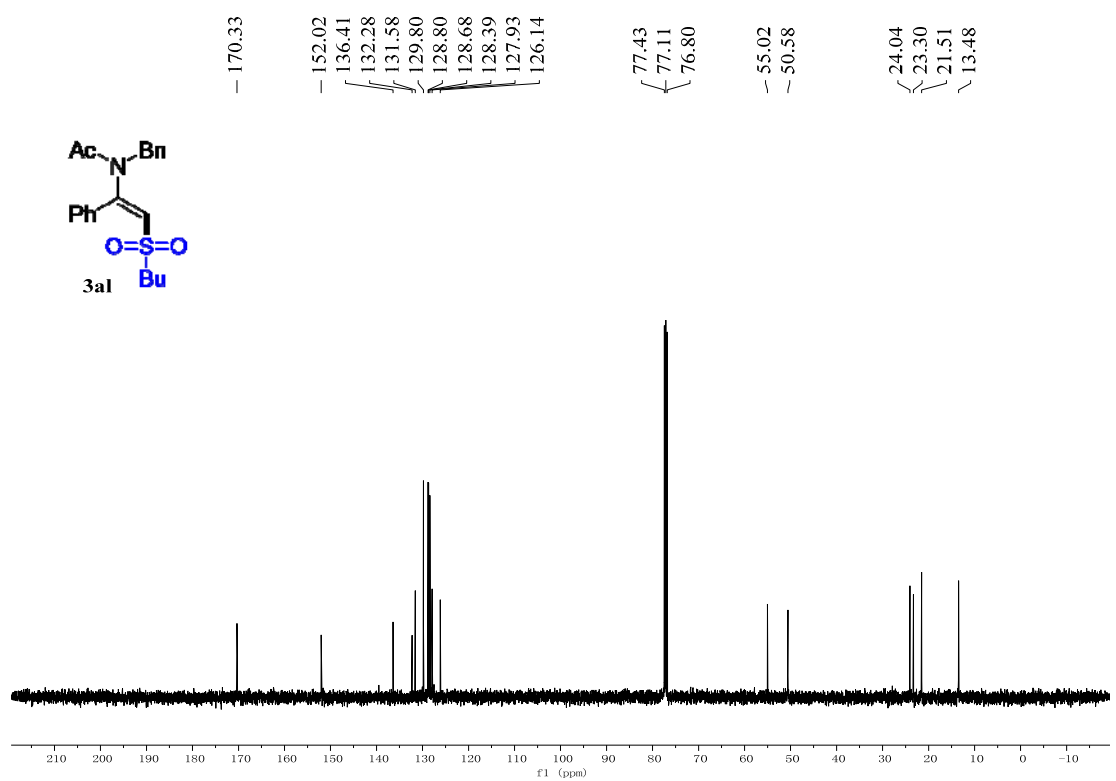
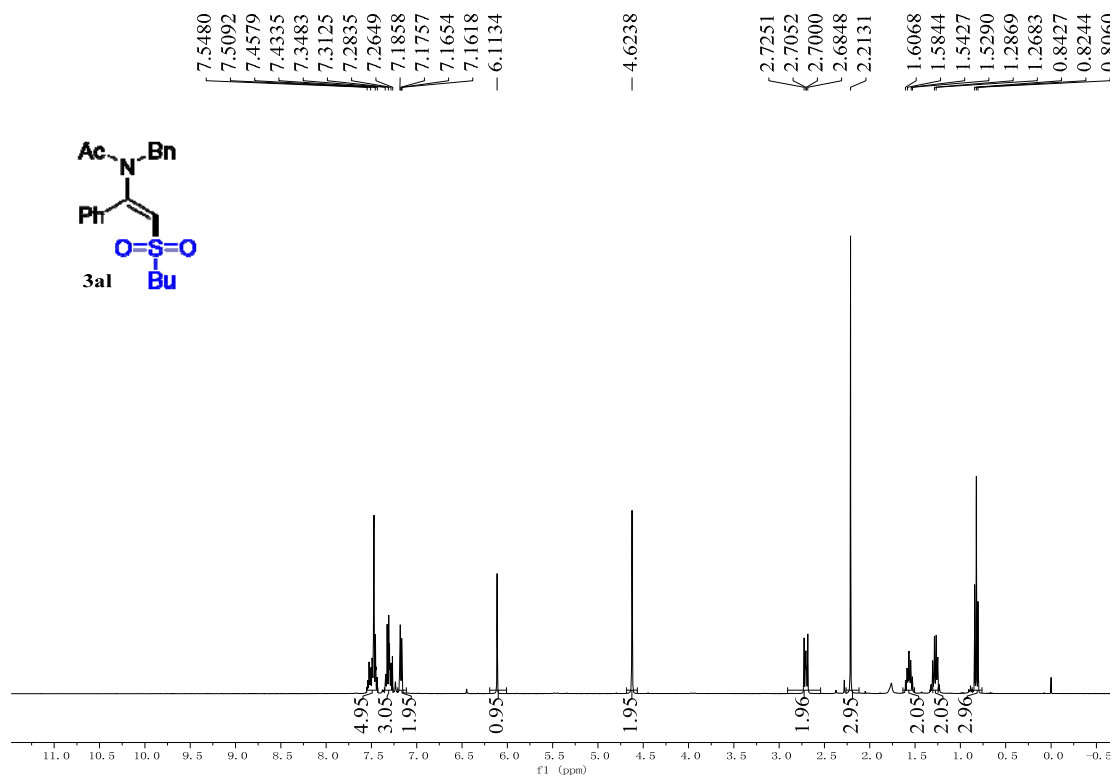


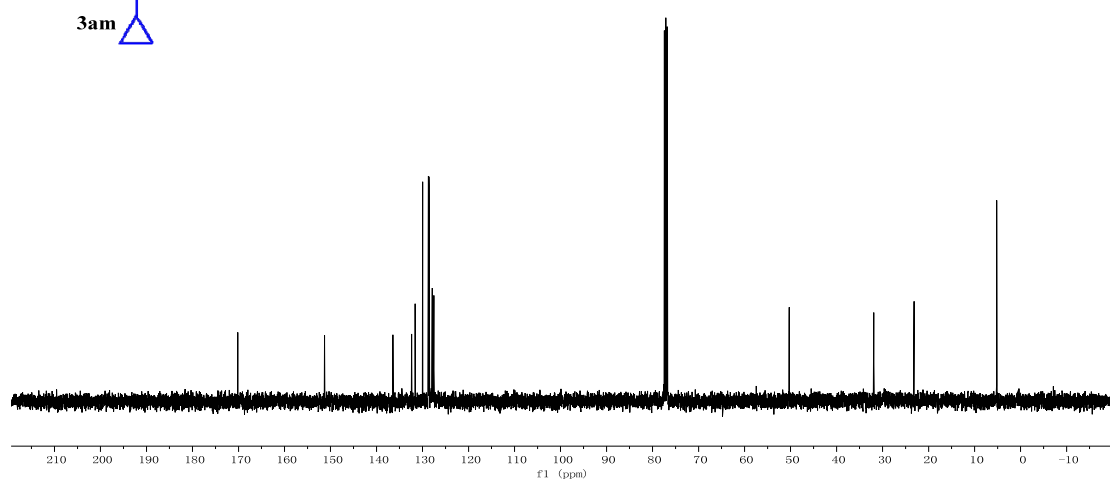
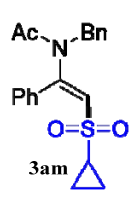
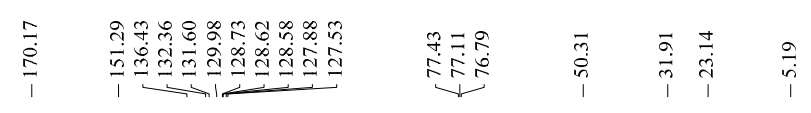
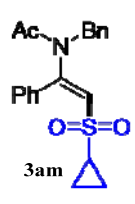
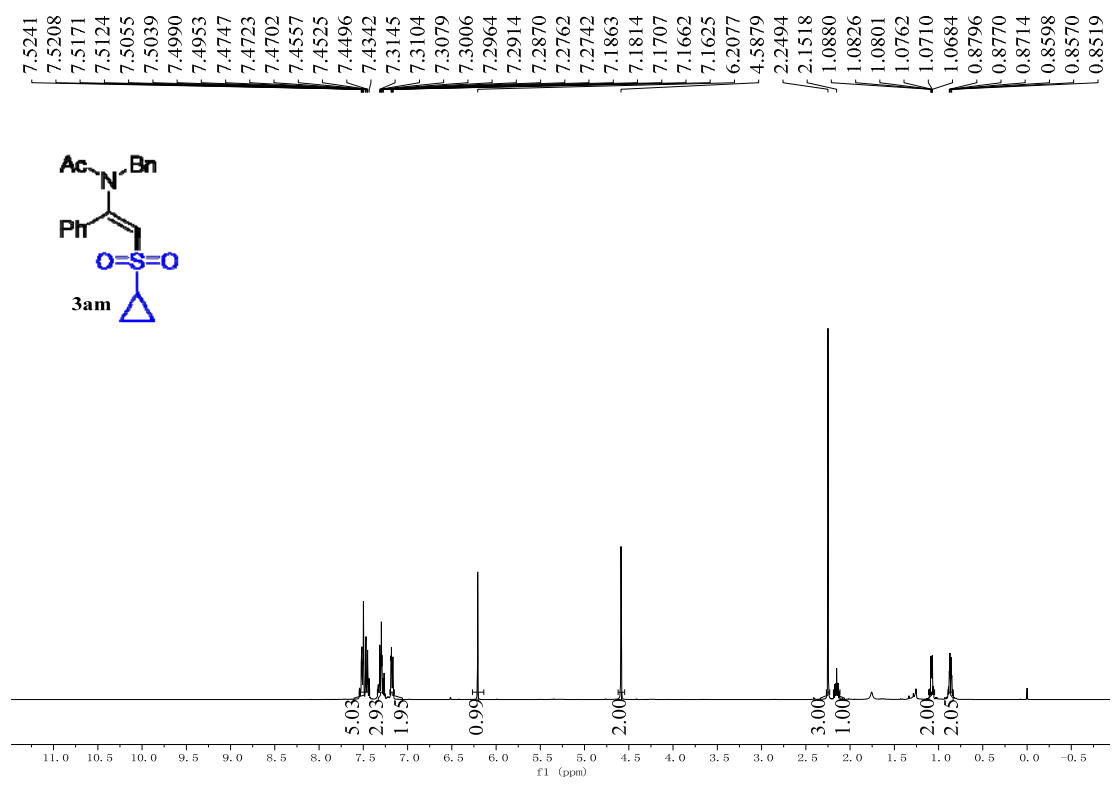




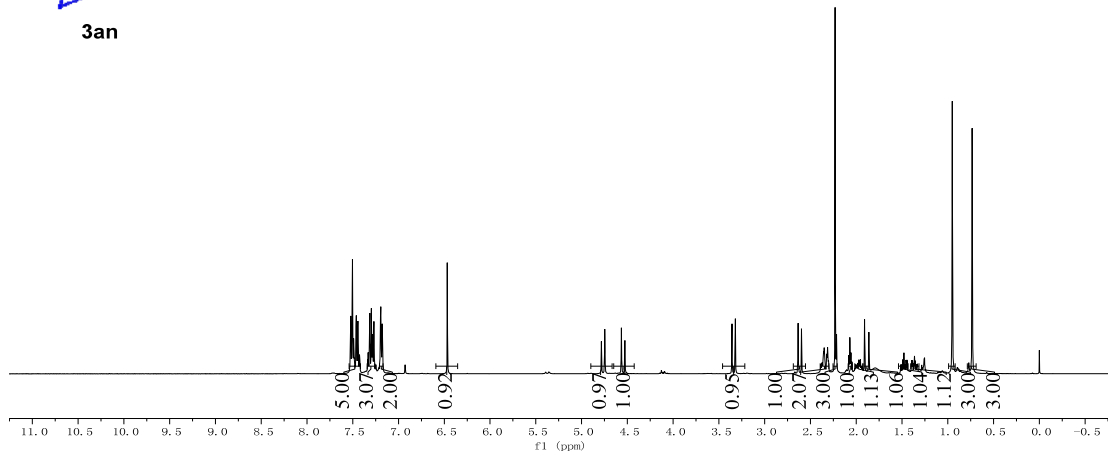
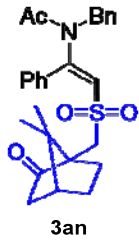
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