Supplementary Information

An Approach to Unsymmetrical 3,3′-Diindolylmethanes through Pd-Catalyzed Cascade Heck Cyclization of Allenamides and *o*-Ethynylanilines

Songjin Guo,† Jiayi Chen,† Mingjun Yi, Liuli Dong, Aijun Lin,* and Hequan Yao*

State Key Laboratory of Natural Medicines (SKLNM) and Department of Medicinal Chemistry, School of Pharmacy, China Pharmaceutical University, Nanjing 210009, P. R. China

*E-mail: ajlin@cpu.edu.cn.

*E-mail: hyao@cpu.edu.cn, cpuhyao@126.com.

CONTENT

1. General Information

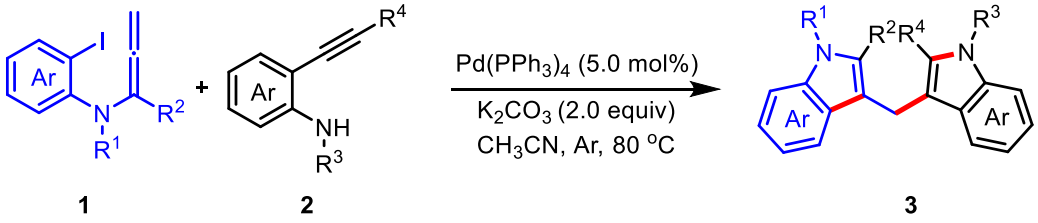
Unless otherwise noted, all chemicals were purchased from commercial suppliers (Adamas, Energy and Aladdin, etc.) and used without further purification. ^{1}H and ^{13}C NMR spectra were collected on BRUKER AV-300 (300 and 400 MHz) spectrometer using $CDCl_3$ as solvent. Chemical shifts of ^{1}H NMR were recorded in parts per million (ppm, δ) relative to tetramethylsilane (δ = 0.00 ppm) with the solvent resonance as the internal standard ($CDCl_3$: δ = 7.26 ppm). Data are reported as follows: chemical shift in ppm (δ), multiplicity (s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet), coupling constant (Hz) and integration. Chemical shifts of ^{13}C NMR were reported in ppm with the solvent as the internal standard ($CDCl_3$: δ = 77.0 ppm). High Resolution Mass measurement was performed on Agilent QTOF 6520 mass spectrometer with electron spray ionization (ESI) as the ion source. Melting point (m. p.) was measured on a microscopic melting point apparatus. Flash column chromatography was carried out using commercially available 200-300 mesh under pressure unless otherwise indicated. Gradient flash chromatography was conducted eluting with PE/EA, they are listed as volume/volume ratios.

2. General Procedure for the Preparation of Starting Materials

Substituted allenamides **1** were synthesized from the corresponding *o*-haloanilines and propargyl bromide.[1] *o*-Alkynylanilines **2** were prepared following the reported procedure (Sonogashira coupling of the corresponding 2-iodoanilines and alkynes followed by *N*-tosylation).[2] All of the NMR spectroscopy were in full accordance with the data in the literatures.

3. General Experimental Procedures

Scheme S1. General Experimental Procedures

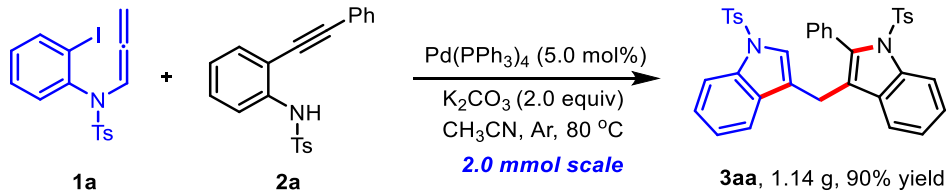


1 **2** **3**

A sealed tube was charged with substituted allenamides **1** (0.1 mmol, 1.0 equiv), *o*-ethynylanilines **2** (0.11 mmol, 1.1 equiv), $Pd(PPh_3)_4$ (5.8 mg, 5.0 mol%), K_2CO_3 (27.6 mg, 2.0 equiv) in CH_3CN (2.0 mL). Under an argon atmosphere, the reaction mixture was stirred at 80 °C for 24 h. Then the mixture was cooled to room temperature. Saturated ammonium chloride solution was added to the reaction mixture and extracted with EtOAc. The combined organic phase was washed with saturated brine and dried over Na_2SO_4. The solvent was evaporated, and the residue was purified by flash chromatography on silica gel (petroleum ether/ethyl acetate) to afford the corresponding products **3**.

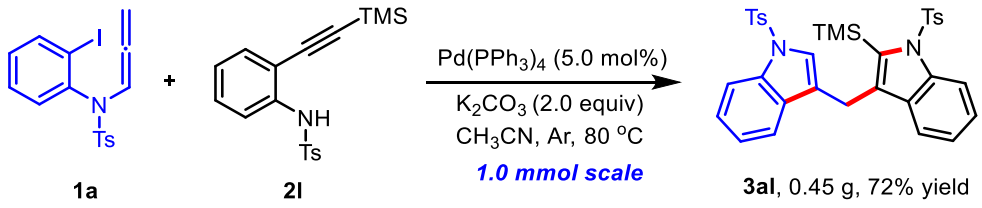
4. Scale-up Experiments and Synthetic Transformations of 3aa and 3al

Scheme S2. Scale-up (2.0 mmol) Experiment of 3aa



A sealed tube was charged with *N*-(2-iodophenyl)-4-methyl-*N*-(propa-1,2-dien-1-yl) benzenesulfonamide **1a** (2.0 mmol, 1.0 equiv), 4-methyl-*N*-(2-(phenylethynyl)phenyl) benzenesulfonamide **2a** (2.2 mmol, 1.1 equiv), $Pd(PPh_3)_4$ (115.6 mg, 5.0 mol%), K_2CO_3 (552.0 mg, 2.0 equiv) and CH_3CN (40.0 mL). Under an argon atmosphere, the reaction mixture was stirred at 80 °C for 48 h. Then the mixture was cooled to room temperature. Saturated ammonium chloride solution was added to the reaction mixture and extracted with EtOAc. The combined organic phase was washed with saturated brine and dried over Na_2SO_4. The solvent was evaporated, and the residue was purified by flash chromatography on silica gel (petroleum ether/ethyl acetate = 100:1 to 5:1) to afford the corresponding product **3aa** (1.14 g, 90% yield). When the reaction was carried out in the round-bottomed flash, the product **3aa** was obtained in 96% yield (1.21 g).

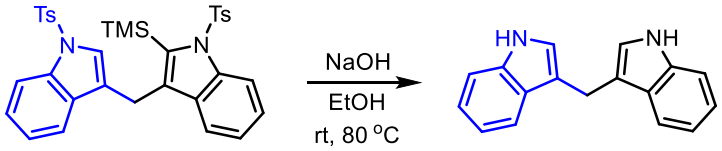
Scheme S3. Scale-up (1.0 mmol) Experiment of 3al



A sealed tube was charged with *N*-(2-iodophenyl)-4-methyl-*N*-(propa-1,2-dien-1-yl) benzenesulfonamide **1a** (1.0 mmol, 1.0 equiv), 4-methyl-*N*-(2-((trimethylsilyl)ethynyl)phenyl) benzenesulfonamide **2l** (1.1 mmol, 1.1 equiv), $Pd(PPh_3)_4$ (57.8 mg, 5.0 mol%), K_2CO_3 (276.0 mg, 2.0 equiv) in CH_3CN (20.0 mL). Under an argon atmosphere, the reaction mixture was stirred at 80 °C for 24 h. Then the mixture was cooled to room temperature. Saturated ammonium chloride solution was added to the reaction mixture and extracted with EtOAc. The combined organic

phase was washed with saturated brine and dried over Na_2SO_4. The solvent was evaporated, and the residue was purified by flash chromatography on silica gel (petroleum ether/ethyl acetate = 100:1 to 5:1) to afford the corresponding product **3al** (0.45 g, 72% yield).

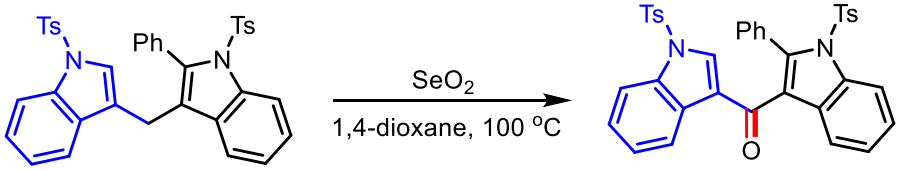
Scheme S4. Synthetic Transformation (3al to 8[3])



3al **8**, 77% yield

A sealed tube was charged with **3al** (0.1 mmol, 1.0 equiv), NaOH (0.6 mmol, 6.0 equiv) and EtOH (1.0 mL). The reaction mixture was stirred at 80 °C for 18 h. Then the saturated ammonium chloride solution was added to the reaction mixture and extracted with EtOAc. The combined organic phase was washed with saturated brine and dried over Na_2SO_4. The solvent was evaporated, and the residue was purified by flash chromatography on silica gel (petroleum ether/ethyl acetate = 50:1 to 5:1) to afford the corresponding product **8** (18.9 mg, 77% yield). When the reaction was carried out in the round-bottomed flash, the product **8** was obtained in 84% yield.

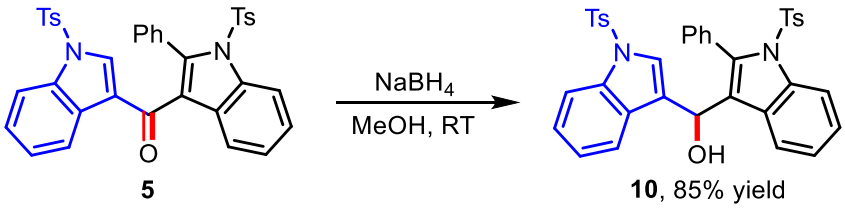
Scheme S5. Synthetic Transformation (3aa to 9[4])



3aa **9**, 93% yield

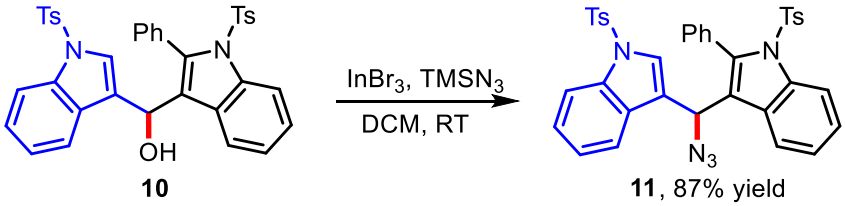
A sealed tube was charged with **3aa** (0.05 mmol, 1.0 equiv), SeO_2 (1.0 mmol, 20.0 equiv) and 1,4-dioxane (3.0 mL). The reaction mixture was stirred at 100 °C for 72 h. Then the mixture was cooled to room temperature. Saturated ammonium chloride solution was added to the reaction mixture and extracted with EtOAc. The combined organic phase was washed with saturated brine and dried over Na_2SO_4. The solvent was evaporated, and the residue was purified by flash chromatography on silica gel (petroleum ether/ethyl acetate = 100:1 to 5:1) to afford the corresponding product **9** (30.0 mg, 93% yield). When the reaction was carried out in the round-bottomed flash, the product **9** was obtained in 78% yield.

Scheme S6. Synthetic Transformation (3aa to 10[5])



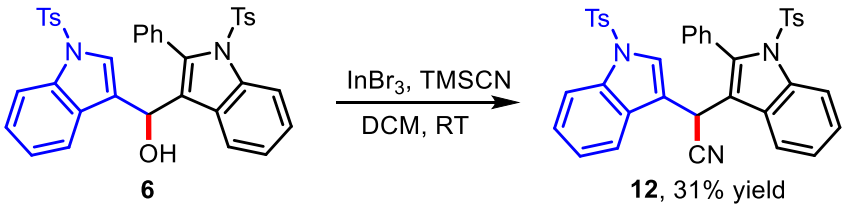
A sealed tube was charged with **5** (0.05 mmol, 1.0 equiv) and MeOH (1.0 mL). The reaction mixture was cooled to -0 °C and $NaBH_4$ (0.1 mmol, 2.0 equiv) was added. The reaction mixture was allowed to warm to room temperature and stirred for 16 h. Then the saturated ammonium chloride solution was added to the reaction mixture and extracted with EtOAc. The combined organic phase was washed with saturated brine and dried over Na_2SO_4. The solvent was evaporated, and the residue was purified by flash chromatography on silica gel (petroleum ether/ethyl acetate = 20:1 to 2:1) to afford the corresponding product **10** (27.5 mg, 85% yield). When the reaction was carried out in the round-bottomed flash, the product **10** was obtained in 77% yield.

Scheme S7. Synthetic Transformation (10 to 11[6])



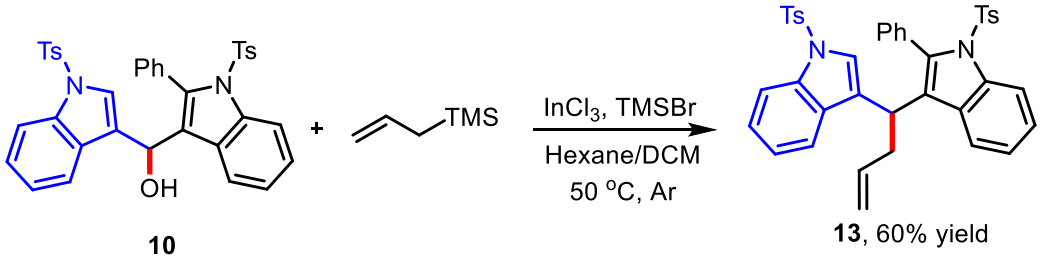
A sealed tube was charged with **10** (0.05 mmol, 1.0 equiv), $InBr_3$ (0.01 mmol, 0.2 equiv), $TMSN_3$ (0.15 mmol, 3.0 equiv) and DCM (0.4 mL). The reaction mixture was stirred at room temperature for 11 h. Then the saturated ammonium chloride solution was added to the reaction mixture and extracted with EtOAc. The combined organic phase was washed with saturated brine and dried over Na_2SO_4. The solvent was evaporated, and the residue was purified by flash chromatography on silica gel (petroleum ether/ethyl acetate = 100:1 to 5:1) to afford the corresponding product **11** (29.3 mg, 87% yield). When the reaction was carried out in the round-bottomed flash, the product **11** was obtained in 77% yield.

Scheme S8. Synthetic Transformation (10 to 12[7])



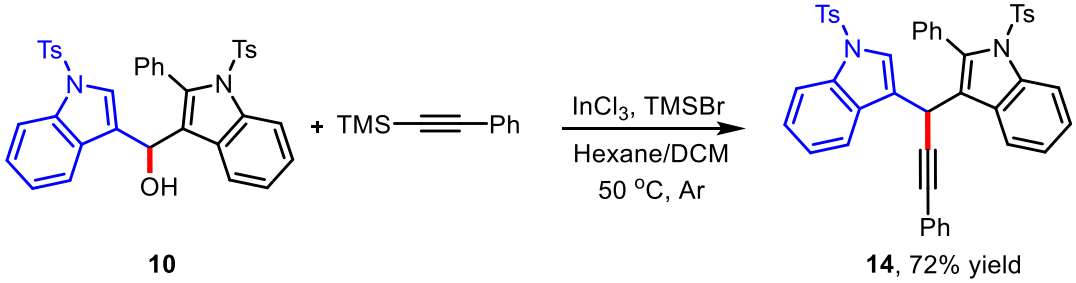
A sealed tube was charged with **10** (0.05 mmol, 1.0 equiv), $InBr_3$ (0.01 mmol, 0.2 equiv), TMSCN (0.15 mmol, 3.0 equiv) and DCM (0.4 mL). The reaction mixture was stirred at room temperature for 5 h. Then the saturated ammonium chloride solution was added to the reaction mixture and extracted with EtOAc. The combined organic phase was washed with saturated brine and dried over Na_2SO_4. The solvent was evaporated, and the residue was purified by flash chromatography on silica gel (petroleum ether/ethyl acetate = 100:1 to 5:1) to afford the corresponding product **12** (10.1 mg, 31% yield). When the reaction was carried out in the round-bottomed flash, the product **12** was obtained in 40% yield.

Scheme S9. Synthetic Transformation (10 to 13[8])



A sealed tube was charged with **10** (0.05 mmol, 1.0 equiv), $InCl_3$ (0.01 mmol, 0.2 equiv), TMSBr (0.01 mmol, 0.2 equiv) and allyltrimethylsilane (0.2 mmol, 4.0 equiv) in Hexane/DCM (3:2, 1.0 mL). Under an argon atmosphere, the reaction mixture was stirred at 50 °C for 2 h. Then the mixture was cooled to room temperature. Saturated ammonium chloride solution was added to the reaction mixture and extracted with EtOAc. The combined organic phase was washed with saturated brine and dried over Na_2SO_4. The solvent was evaporated, and the residue was purified by flash chromatography on silica gel (petroleum ether/ethyl acetate = 100:1 to 5:1) to afford the corresponding product **13** (20.1 mg, 60% yield).

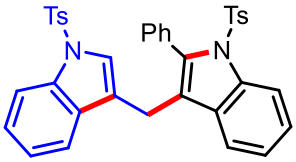
Scheme S10. Synthetic Transformation (10 to 14[8])



10 **14**, 72% yield

A sealed tube was charged with **10** (0.05 mmol, 1.0 equiv), $InCl_3$ (0.01 mmol, 0.2 equiv), TMSBr (0.03 mmol, 0.6 equiv) and trimethyl(phenylethynyl)silane (0.2 mmol, 4.0 equiv) in Hexane/DCM (3:2, 1.0 mL). Under an argon atmosphere, the reaction mixture was stirred at 50 °C for 4 h. Then the mixture was cooled to room temperature. Saturated ammonium chloride solution was added to the reaction mixture and extracted with EtOAc. The combined organic phase was washed with saturated brine and dried over Na_2SO_4. The solvent was evaporated, and the residue was purified by flash chromatography on silica gel (petroleum ether/ethyl acetate = 100:1 to 5:1) to afford the corresponding product **14** (26.2 mg,72% yield).

5. Characterization of the Products



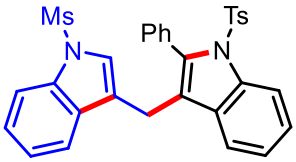
2-phenyl-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3aa):

61.2 mg, 97% yield; light yellow solid, **m. p.** 192–193 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.40 (d, *J* = 8.4 Hz, 1H), 7.95 (d, *J* = 8.2 Hz, 1H), 7.39 – 7.27 (m, 12H), 7.18 – 7.03 (m, 7H), 6.55 (s, 1H), 3.77 (s, 2H), 2.34 (s, 3H), 2.33 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 145.3, 144.6, 138.3, 137.9, 135.5, 134.7, 134.3, 130.8, 130.8, 130.6, 129.6, 129.4, 128.8, 127.5, 126.5, 125.1, 124.9, 124.1, 123.6, 123.3, 122.1, 120.8, 119.4, 119.2, 116.9, 114.0, 21.6, 21.5, 20.7 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{37}H_{30}N_2O_4S_2 + NH_4]^+$ 648.1985, found 648.1981.



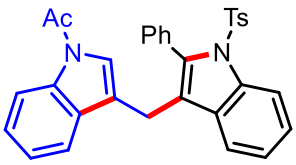
3-((1-(methylsulfonyl)-1*H*-indol-3-yl)methyl)-2-phenyl-1-tosyl-1*H*-indole (3ba):

43.2 mg, 78% yield; light yellow solid, **m. p.** 162–163 °C (PE/EA = 5:1, R_f = 0.4).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.37 (d, *J* = 8.4 Hz, 1H), 7.86 (d, *J* = 8.2 Hz, 1H), 7.44 – 7.32 (m, 8H), 7.30 – 7.18 (m, 5H), 7.12 – 7.09 (m, 2H), 6.50 (s, 1H), 3.86 (s, 2H), 2.90 (s, 3H), 2.33 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 145.0, 138.2, 137.8, 135.4, 134.5, 130.9, 130.9, 130.8, 130.4, 129.4, 128.8, 127.6, 126.5, 125.2, 125.1, 124.2, 123.4, 123.0, 121.3, 120.6, 119.6, 119.2, 116.8, 113.2, 40.2, 21.5, 20.6 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{31}H_{26}N_2O_4S_2 + NH_4]^+$ 572.1672, found 572.1674.



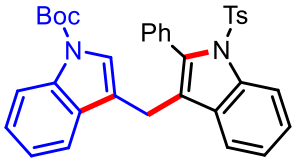
1-(3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indol-1-yl)ethan-1-one (3ca):

19.0 mg, 37% yield; light yellow solid, **m. p.** 185–186 °C (PE/EA = 10:1, R_f = 0.5).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.40 – 8.34 (m, 2H), 7.43 – 7.30 (m, 11H), 7.25 – 7.17 (m, 2H), 7.09 (d, *J* = 8.1 Hz, 2H), 6.46 (s, 1H), 3.85 (s, 2H), 2.31 (s, 3H), 2.30 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 168.0, 144.5, 137.9, 137.5, 135.9, 135.1, 131.0, 130.8, 130.1, 129.2, 128.8, 127.6, 126.9, 125.4, 125.2, 124.2, 123.4, 122.2, 121.1, 120.8, 119.4, 118.7, 116.5, 23.8, 21.5, 20.5 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{32}H_{26}N_2O_3S + NH_4]^+$ 536.2002, found 536.2011.



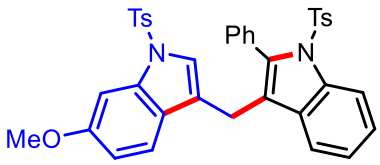
***tert*-butyl 3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole-1-carboxylate (3da):**

51.0 mg, 88% yield; light yellow solid, **m. p.** 129–130 °C (PE/EA = 20:1, R_f = 0.3).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.35 (d, J = 8.4 Hz, 1H), 7.99 (d, J = 8.1 Hz, 1H), 7.41 – 7.25 (m, 11H), 7.19 – 7.09 (m, 4H), 6.77 (s, 1H), 3.83 (s, 2H), 2.33 (s, 3H), 1.63 (s, 9H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 149.7, 144.7, 137.9, 137.7, 135.1, 134.6, 131.1, 130.9, 130.3, 129.4, 128.6, 127.5, 126.5, 125.0, 124.3, 124.2, 123.1, 122.3, 121.4, 119.6, 119.1, 118.8, 116.6, 115.1, 83.5, 28.2, 21.5, 20.6 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{35}H_{32}N_2O_4S + NH_4]^+$ 594.2421, found 594.2424.



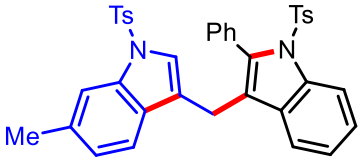
6-methoxy-3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1-tosyl-1*H*-indole (3ea):

53.0 mg, 80% yield; light yellow solid, **m. p.** 109–110 °C (PE/EA = 10:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.39 (d, *J* = 8.4 Hz, 1H), 7.49 (d, *J* = 2.2 Hz, 1H), 7.42 – 7.1 (m, 10H), 7.17 – 7.02 (m, 7H), 6.78 (dd, *J* = 8.6, 2.3 Hz, 1H), 6.45 (s, 1H), 3.85 (s, 3H), 3.72 (s, 2H), 2.35 (s, 3H), 2.32 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 158.2, 145.3, 144.6, 138.2, 137.9, 136.6, 134.7, 134.3, 130.9, 130.9, 130.8, 129.6, 129.4, 128.7, 127.5, 126.5, 126.4, 125.1, 124.4, 124.1, 122.3, 122.2, 121.0, 119.7, 119.4, 116.9, 112.3, 98.3, 55.7, 21.6, 21.5, 20.8 ppm.

HRMS (ESI) *m/z* Calcd for $[C_{38}H_{32}N_2O_5S_2 + H]^+$ 661.1825, found 661.1832.



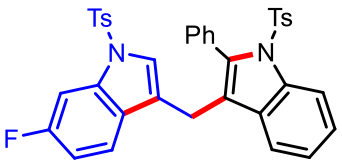
6-methyl-3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1-tosyl-1*H*-indole (3fa):

55.0 mg, 85% yield; light yellow solid, **m. p.** 143–144 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.39 (d, *J* = 8.4 Hz, 1H), 7.76 (s, 1H), 7.45 – 7.31 (m, 10H), 7.19 – 6.97 (m, 8H), 6.49 (s, 1H), 3.74 (s, 2H), 2.44 (s, 3H), 2.34 (s, 3H), 2.32 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 145.2, 144.5, 138.2, 137.9, 135.9, 135.1, 134.8, 134.3, 130.9, 130.9, 130.8, 129.6, 129.4, 128.7, 128.3, 127.5, 126.5, 126.4, 125.1, 124.8, 124.1, 122.9, 122.0, 121.0, 119.4, 118.8, 116.8, 114.0, 21.8, 21.5, 21.5, 20.7 ppm.

HRMS (ESI) *m/z* Calcd for $[C_{38}H_{32}N_2O_4S_2 + NH_4]^+$ 662.2142, found 662.2147.



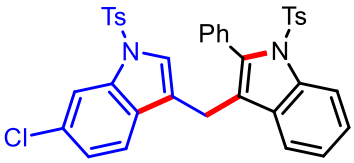
6-fluoro-3-((2-phenyl-1-tosyl-1H-indol-3-yl)methyl)-1-tosyl-1H-indole (3ga):

60.0 mg, 92% yield; light yellow solid, **m. p.** 184–185 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.40 (d, *J* = 8.4 Hz, 1H), 7.67 (dd, *J* = 9.7, 2.3 Hz, 1H), 7.44 – 7.31 (m, 10H), 7.21 – 7.11 (m, 6H), 7.05 – 7.02 (m, 1H), 6.90 (td, *J* = 9.0, 2.3 Hz, 1H), 6.56 (s, 1H), 3.74 (s, 2H), 2.36 (s, 3H), 2.32 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 161.0 (d, $J_{C\text{-}F}$ = 241.0 Hz), 145.3, 144.9, 138.3, 137.8, 135.8, 135.6, 134.5, 134.4, 130.8, 130.7, 129.7, 129.4, 128.8, 127.6, 126.8, 126.5, 125.2, 124.1, 123.8 (d, $J_{C\text{-}F}$ = 3.8 Hz), 121.8, 120.6, 120.1, 120.0 (d, $J_{C\text{-}F}$ = 9.7 Hz), 116.8, 111.7 (d, $J_{C\text{-}F}$ = 23.9 Hz), 101.5, 101.1, 21.55, 20.7 ppm.

HRMS (ESI) *m/z* Calcd for $[C_{37}H_{29}FN_2O_4S_2 + NH_4]^+$ 666.1891, found 666.1893.



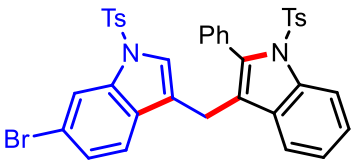
6-chloro-3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1-tosyl-1*H*-indole (3ha):

53.0 mg, 80% yield; light yellow solid, **m. p.** 173–174 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.39 (d, *J* = 8.4 Hz, 1H), 7.96 (s, 1H), 7.42 – 7.31 (m, 10H), 7.18 – 7.09 (m, 7H), 7.02 (d, *J* = 7.7 Hz, 1H), 6.58 (s, 1H), 3.74 (s, 2H), 2.36 (s, 3H), 2.33 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 145.3, 145.0, 138.3, 137.9, 135.8, 134.6, 134.5, 131.0, 130.8, 130.7, 129.8, 129.4, 129.0, 128.8, 127.6, 126.5, 125.2, 124.1, 123.9, 121.8, 120.5, 120.0, 119.2, 116.9, 114.1, 21.6, 20.6 ppm.

HRMS (ESI) *m/z* Calcd for $[C_{37}H_{29}ClN_2O_4S_2 + NH_4]^+$ 682.1596, found 682.1603.



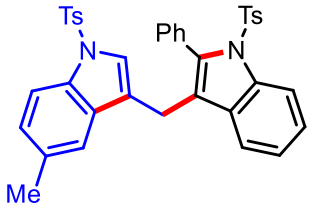
6-bromo-3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1-tosyl-1*H*-indole (3ia):

50.0 mg, 70% yield; light yellow solid, **m. p.** 136–137 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.39 (d, *J* = 8.4 Hz, 1H), 8.12 (s, 1H), 7.42 – 7.31 (m, 10H), 7.27 – 7.24 (m, 1H), 7.17 – 7.10 (m, 6H), 7.02 (d, *J* = 7.7 Hz, 1H), 6.57 (s, 1H), 3.74 (s, 2H), 2.37 (s, 3H), 2.33 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 145.3, 145.0, 138.3, 137.9, 136.1, 134.6, 134.5, 130.8, 130.7, 129.8, 129.4, 129.4, 128.9, 127.6, 126.6, 126.6, 126.5, 125.2, 124.1, 124.1, 121.8, 120.5, 120.4, 119.2, 118.6, 117.0, 116.9, 21.6, 20.6 ppm.

HRMS (ESI) *m/z* Calcd for $[C_{37}H_{29}BrN_2O_4S_2 + NH_4]^+$ 726.1090, found 726.1094.



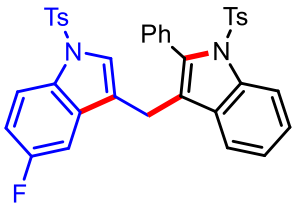
5-methyl-3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1-tosyl-1*H*-indole (3ja):

47.3 mg, 73% yield; light yellow solid, **m. p.** 198–199 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.39 (d, *J* = 8.4 Hz, 1H), 7.82 (d, *J* = 9.1 Hz, 1H), 7.42 – 7.31 (m, 10H), 7.18 – 7.04 (m, 8H), 6.50 (s, 1H), 3.73 (s, 2H), 2.35 (s, 3H), 2.34 (s, 3H), 2.33 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 145.3, 144.5, 138.3, 138.0, 134.8, 134.4, 133.8, 133.0, 130.9, 130.8, 129.6, 129.4, 128.8, 127.6, 126.5, 126.3, 125.1, 124.1, 123.7, 122.1, 120.9, 119.4, 119.2, 116.9, 113.7, 21.6, 21.5, 21.2, 20.7 ppm.

HRMS (ESI) *m/z* Calcd for $[C_{38}H_{32}N_2O_4S_2 + NH_4]^+$ 662.2142, found 662.2140.



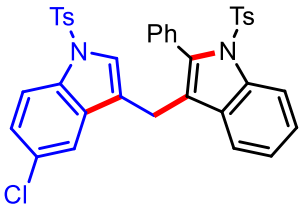
5-fluoro-3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1-tosyl-1*H*-indole (3ka):

57.0 mg, 88% yield; light yellow solid, **m. p.** 177–178 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.40 (d, *J* = 8.4 Hz, 1H), 7.88 (dd, *J* = 9.0, 4.4 Hz, 1H), 7.45 – 7.31 (m, 10H), 7.19 – 6.89 (m, 8H), 6.63 (s, 1H), 3.72 (s, 2H), 2.35 (s, 3H), 2.32 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 159.6 (d, $J_{C\text{-}F}$ = 239.6 Hz), 145.3, 144.9, 138.3, 137.9, 134.5, 131.8, 131.7, 131.6, 130.8, 130.8, 130.6, 129.7, 129.4, 128.9, 127.6, 126.5, 126.5, 125.3, 125.2, 124.1, 122.0 (d, $J_{C\text{-}F}$ = 4.0 Hz), 120.4, 119.3, 116.9, 115.2, 115.0, 112.9 (d, $J_{C\text{-}F}$ = 25.2 Hz), 105.0 (d, $J_{C\text{-}F}$ = 24.1 Hz), 21.6, 20.7 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{37}H_{29}FN_2O_4S_2 + NH_4]^+$ 666.1891, found 666.1895.



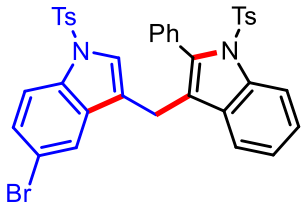
5-chloro-3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1-tosyl-1*H*-indole (3la):

55.3 mg, 83% yield; light yellow solid, **m. p.** 184–185 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.40 (d, *J* = 8.4 Hz, 1H), 7.85 (d, *J* = 8.4 Hz, 1H), 7.46 – 7.32 (m, 10H), 7.24 – 7.04 (m, 8H), 6.61 (s, 1H), 3.72 (s, 2H), 2.35 (s, 3H), 2.32 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 145.3, 145.0, 138.3, 137.8, 134.5, 134.5, 133.9, 131.8, 130.8, 130.7, 130.6, 129.7, 129.4, 129.2, 128.9, 127.6, 126.5, 126.5, 125.2, 125.2, 125.0, 124.1, 121.6, 120.3, 119.2, 119.1, 116.8, 115.0, 21.6, 20.5 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{37}H_{29}ClN_2O_4S_2 + NH_4]^+$ 682.1596, found 682.1595.



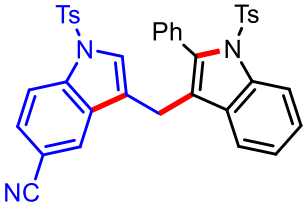
5-bromo-3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1-tosyl-1*H*-indole (3ma):

59.3 mg, 84% yield; light yellow solid, **m. p.** 194–195 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.40 (d, *J* = 8.4 Hz, 1H), 7.80 (d, *J* = 8.7 Hz, 1H), 7.45 – 7.32 (m, 12H), 7.19 – 7.04 (m, 6H), 6.59 (s, 1H), 3.72 (s, 2H), 2.35 (s, 3H), 2.32 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 145.2, 145.0, 138.3, 137.8, 134.5, 134.4, 134.2, 132.3, 130.8, 130.7, 130.5, 129.7, 129.4, 128.9, 127.8, 127.6, 126.5, 126.5, 125.2, 124.8, 124.1, 122.1, 121.4, 120.2, 119.2, 116.9, 116.8, 115.4, 21.6, 20.5 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{37}H_{29}BrN_2O_4S_2 + NH_4]^+$ 726.1090, found 726.1090.



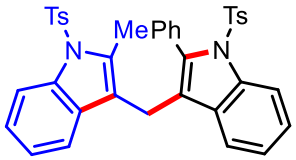
3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1-tosyl-1*H*-indole-5-carbonitrile (3na):

64.1 mg, 98% yield; light yellow solid, **m. p.** 184–185 °C (PE/EA = 5:1, R_f = 0.4).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.40 (d, *J* = 8.4 Hz, 1H), 8.02 – 7.99 (m, 1H), 7.52 – 7.30 (m, 12H), 7.22 – 7.09 (m, 6H), 6.79 (s, 1H), 3.80 (s, 2H), 2.37 (s, 3H), 2.33 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 145.5, 145.2, 138.3, 137.7, 137.0, 134.6, 134.3, 130.8, 130.6, 130.4, 130.2, 129.9, 129.4, 129.0, 127.8, 127.7, 126.5, 126.5, 125.6, 125.3, 124.3, 124.1, 121.4, 119.8, 119.0, 116.7, 114.6, 106.8, 21.6, 20.3 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{38}H_{29}N_3O_4S_2 + NH_4]^+$ 673.1938, found 673.1938.



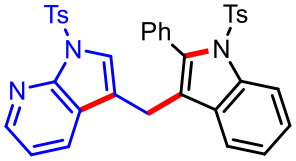
2-methyl-3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1-tosyl-1*H*-indole (3oa):

50.0 mg, 78% yield; white solid, **m. p.** 103–104 °C (PE/EA = 10:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.30 (d, *J* = 8.4 Hz, 1H), 8.12 (d, *J* = 8.4 Hz, 1H), 7.49 (d, *J* = 8.3 Hz, 2H), 7.41 – 7.34 (m, 3H), 7.29 – 7.27 (m, 5H), 7.19 – 7.13 (m, 1H), 7.11 (d, *J* = 8.2 Hz, 2H), 7.05 (d, *J* = 8.1 Hz, 2H), 6.97 – 6.87 (m, 4H), 3.77 (s, 2H), 2.33 (s, 3H), 2.31 (s, 3H), 2.27 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 144.5, 144.5, 137.2, 137.1, 136.3, 136.2, 135.2, 133.1, 131.3, 131.0, 130.5, 130.2, 129.7, 129.3, 128.7, 127.5, 126.7, 126.1, 124.8, 123.8, 123.7, 123.2, 120.9, 119.3, 118.5, 117.7, 116.1, 114.6, 21.5, 20.5, 12.7 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{38}H_{32}N_2O_4S_2 + Na]^+$ 667.1696, found 667.1691.



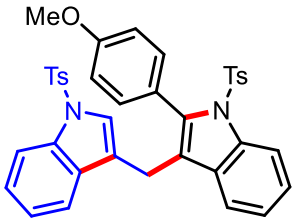
3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1-tosyl-1*H*-pyrrolo[2,3-b]pyridine (3pa):

58.0 mg, 92% yield; light yellow solid, **m. p.** 159–160 °C (PE/EA = 5:1, R_f = 0.3).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.40 – 8.36 (m, 2H), 7.82 (d, *J* = 8.4 Hz, 2H), 7.50 (dd, *J* = 7.9, 1.5 Hz, 1H), 7.43 – 7.30 (m, 8H), 7.24 – 7.13 (m, 6H), 7.07 – 7.02 (m, 1H), 6.84 (s, 1H), 3.80 (s, 2H), 2.36 (s, 3H), 2.34 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 147.6, 145.2, 145.0, 144.9, 138.2, 137.7, 135.2, 134.5, 130.9, 130.8, 130.6, 129.5, 129.4, 128.8, 127.7, 127.6, 127.6, 126.5, 125.3, 124.2, 123.3, 122.7, 120.2, 119.2, 118.6, 118.00, 116.7, 21.6, 20.7 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{36}H_{29}N_3O_4S_2 + H]^+$ 632.1672, found 632.1674.



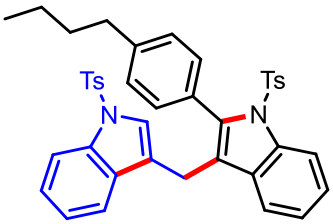
2-(4-methoxyphenyl)-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3ab):

64.8 mg, 98% yield; light yellow solid, **m. p.** 201–202 °C (PE/EA = 10:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.39 (d, *J* = 8.3 Hz, 1H), 7.95 (d, *J* = 8.2 Hz, 1H), 7.42 – 7.25 (m, 9H), 7.19 – 7.01 (m, 7H), 6.91 – 6.86 (m, 2H), 6.54 (s, 1H), 3.84 (s, 3H), 3.76 (s, 2H), 2.34 (s, 3H), 2.33 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 159.9, 145.2, 144.6, 138.2, 137.8, 135.5, 134.7, 134.5, 132.1, 130.9, 130.6, 129.6, 129.4, 126.5, 126.5, 124.9, 124.0, 123.6, 123.2, 122.9, 122.2, 120.2, 119.2, 114.0, 113.0, 55.2, 21.6, 21.5, 20.7 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{38}H_{32}N_2O_5S_2 + NH_4]^+$ 678.2091, found 678.2084.



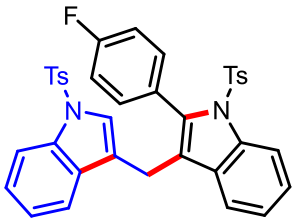
2-(4-butylphenyl)-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3ac):

65.0 mg, 95% yield; light yellow solid, **m. p.** 158–159 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.38 (d, *J* = 8.4 Hz, 1H), 7.95 (d, *J* = 8.2 Hz, 1H), 7.41 – 7.25 (m, 9H), 7.18 – 7.01 (m, 9H), 6.56 (s, 1H), 3.77 (s, 2H), 2.67 (t, *J* = 7.8 Hz, 2H), 2.35 (s, 3H), 2.33 (s, 3H), 1.70 – 1.60 (m, 2H), 1.46 – 1.34 (m, 2H), 0.95 (t, *J* = 7.3 Hz, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 145.2, 144.6, 143.6, 138.6, 137.9, 135.6, 134.8, 134.5, 130.9, 130.7, 129.6, 129.4, 128.0, 127.6, 126.6, 126.5, 125.0, 124.9, 124.0, 123.7, 123.2, 122.3, 120.5, 119.3, 119.2, 116.9, 114.0, 35.5, 33.3, 22.5, 21.5, 20.8, 14.0 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{41}H_{38}N_2O_4S_2 + NH_4]^+$ 704.2611, found 704.2617.



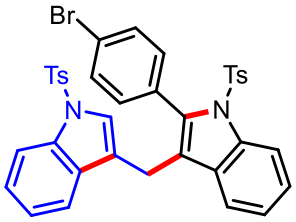
2-(4-fluorophenyl)-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3ad):

54.0 mg, 83% yield; light yellow solid, **m. p.** 188–189 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.34 (dd, *J* = 9.1, 4.5 Hz, 1H), 7.98 (d, *J* = 8.3 Hz, 1H), 7.42 – 7.29 (m, 8H), 7.22 – 7.08 (m, 9H), 6.66 (dd, *J* = 8.5, 2.5 Hz, 1H), 6.52 (s, 1H), 3.77 (s, 2H), 2.35 (s, 3H), 2.33 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 160.0 (d, $J_{C\text{-}F}$ = 240.3 Hz), 145.5, 144.9, 135.7, 135.2, 134.5, 134.3, 133.9, 133.9, 131.9, 131.8, 130.5, 130.4, 130.4, 129.7, 129.5, 126.4, 126.4, 126.3, 125.1, 124.6, 123.4, 123.4, 121.7, 120.6 (d, $J_{C\text{-}F}$ = 3.9 Hz), 119.2, 118.0, 117.9, 114.1, 113.0 (d, $J_{C\text{-}F}$ = 24.8 Hz), 105.1, 104.8, 21.6, 21.5, 20.9 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{37}H_{29}FN_2O_4S_2 + Na]^+$ 671.1445, found 671.1453.



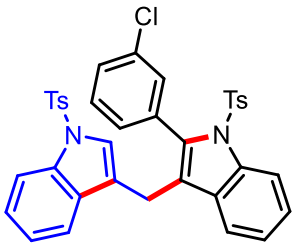
2-(4-bromophenyl)-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3ae):

50.4 mg, 71% yield; light yellow solid, **m. p.** 215–216 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.39 (d, *J* = 8.4 Hz, 1H), 7.96 (d, *J* = 8.1 Hz, 1H), 7.49 – 7.39 (m, 5H), 7.33 – 7.28 (m, 4H), 7.24 – 7.05 (m, 9H), 6.50 (s, 1H), 3.75 (s, 2H), 2.35 (s, 3H), 2.34 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 145.5, 144.7, 138.0, 137.0, 135.5, 134.8, 134.2, 132.2, 130.8, 130.8, 130.4, 129.8, 129.6, 129.5, 126.5, 126.4, 125.5, 125.1, 124.3, 123.5, 123.3, 123.2, 121.9, 121.4, 119.5, 119.1, 116.9, 114.0, 21.6, 21.5, 20.7 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{37}H_{29}BrN_2O_4S_2 + NH_4]^+$ 726.1090, found 726.1085.



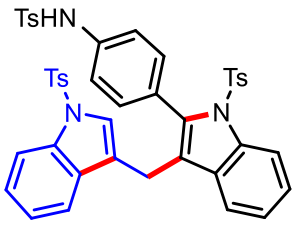
2-(3-chlorophenyl)-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3af):

37.6 mg, 57% yield; light yellow solid, **m. p.** 177–178 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.39 (d, *J* = 8.4 Hz, 1H), 7.94 (d, *J* = 8.1 Hz, 1H), 7.44 – 7.24 (m, 11H), 7.20 – 7.06 (m, 7H), 6.57 (s, 1H), 3.77 (s, 2H), 2.34 (s, 6H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 145.5, 144.7, 137.9, 136.5, 135.5, 134.7, 134.4, 133.5, 132.6, 130.7, 130.5, 130.5, 129.7, 129.5, 129.0, 128.9, 128.9, 126.5, 125.5, 125.0, 124.2, 123.5, 123.3, 121.6, 121.5, 119.6, 119.2, 116.8, 114.0, 21.6, 21.5, 20.6 ppm.

HRMS (ESI) *m/z* Calcd for $[C_{37}H_{29}ClN_2O_4S_2 + NH_4]^+$ 682.1596, found 682.1596.



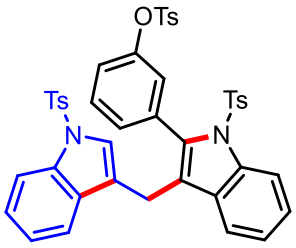
4-methyl-*N*-(4-(1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indol-2-yl)phenyl)benzenesulfonamide (3ag):

62.0 mg, 78% yield; white solid, **m. p.** 175–176 °C (PE/EA = 2:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.37 (d, *J* = 8.4 Hz, 1H), 7.95 (d, *J* = 8.2 Hz, 1H), 7.70 (d, *J* = 8.3 Hz, 2H), 7.41 – 7.37 (m, 3H), 7.33 – 7.27 (m, 3H), 7.22 – 7.16 (m, 7H), 7.15 – 7.03 (m, 8H), 6.51 (s, 1H), 3.70 (s, 2H), 2.34 (s, 3H), 2.32 (s, 3H), 2.31 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 145.4, 144.8, 144.1, 137.9, 137.3, 137.2, 135.9, 135.5, 134.6, 134.4, 131.8, 130.7, 130.5, 129.7, 129.6, 129.4, 127.4, 127.2, 126.5, 126.4, 125.3, 125.0, 124.2, 123.5, 123.3, 121.9, 120.8, 120.1, 119.4, 119.1, 116.8, 114.0, 21.6, 21.5, 21.5, 20.6 ppm.

HRMS (ESI) *m/z* Calcd for $[C_{44}H_{37}N_3O_6S_3 + H]^+$ 800.1917, found 800.1921.



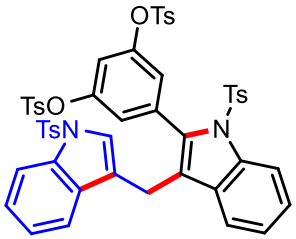
3-(1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indol-2-yl)phenyl 4-methylbenzenesulfonate (3ah):

70.0 mg, 88% yield; light yellow solid, **m. p.** 192–193 °C (PE/EA = 5:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.34 (d, *J* = 8.4 Hz, 1H), 7.93 (d, *J* = 8.5 Hz, 1H), 7.66 (d, *J* = 8.2 Hz, 2H), 7.47 – 7.36 (m, 5H), 7.33 – 7.26 (m, 4H), 7.23 – 7.11 (m, 9H), 7.05 (d, *J* = 7.7 Hz, 1H), 6.95 (d, *J* = 7.9 Hz, 1H), 6.56 (s, 1H), 3.74 (s, 2H), 2.36 (s, 3H), 2.32 (s, 6H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 148.9, 145.5, 144.8, 137.8, 136.3, 135.4, 134.7, 133.9, 132.9, 132.0, 130.7, 130.4, 130.0, 129.8, 129.7, 129.6, 128.7, 128.4, 126.6, 126.5, 125.5, 124.9, 124.3, 123.5, 123.3, 122.5, 121.9, 121.2, 119.6, 119.2, 116.8, 113.9, 21.6, 21.6, 21.5, 20.5 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{44}H_{36}N_2O_7S_3 + Na]^+$ 823.1577, found 823.1590.



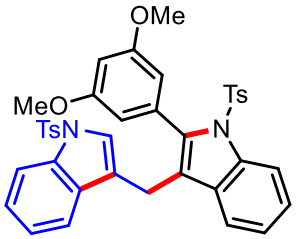
5-(1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indol-2-yl)-1,3-phenylene bis(4-methylbenz-enesulfonate) (3ai):

84.0 mg, 87% yield; light yellow solid, **m. p.** 192–193 °C (PE/EA = 5:1, R_f = 0.1).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.28 (d, *J* = 8.4 Hz, 1H), 7.93 (d, *J* = 8.1 Hz, 1H), 7.64 (d, *J* = 8.2 Hz, 4H), 7.48 (d, *J* = 8.2 Hz, 2H), 7.42 – 7.36 (m, 3H), 7.32 – 7.16 (m, 11H), 7.12 – 7.02 (m, 4H), 6.69 (t, *J* = 2.0 Hz, 1H), 6.54 (s, 1H), 3.70 (s, 2H), 2.39 (s, 6H), 2.33 (s, 6H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 149.0, 145.9, 145.7, 144.9, 137.8, 135.3, 134.8, 134.7, 134.0, 133.5, 131.4, 130.5, 130.3, 130.1, 129.8, 129.7, 128.4, 126.6, 126.5, 125.8, 125.0, 124.5, 123.3, 122.7, 120.7, 119.9, 119.1, 117.4, 116.7, 113.8, 21.7, 21.6, 21.5, 20.4 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{51}H_{42}N_2O_{10}S_4 + Na]^+$ 993.1614, found 993.1606.



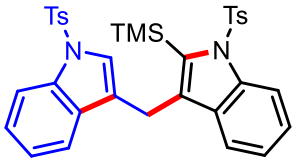
2-(3,5-dimethoxyphenyl)-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3aj):

66.4 mg, 96% yield; light yellow solid, **m. p.** 197–198 °C (PE/EA = 10:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.38 (d, *J* = 8.4 Hz, 1H), 7.92 (d, *J* = 8.2 Hz, 1H), 7.43 – 7.24 (m, 7H), 7.18 – 7.05 (m, 7H), 6.61 (s, 1H), 6.51 (s, 3H), 3.82 (s, 2H), 3.70 (s, 6H), 2.32 (s, 6H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 159.8, 145.2, 144.6, 138.0, 137.9, 135.4, 134.8, 134.4, 132.6, 130.7, 130.6, 129.6, 129.4, 126.6, 126.5, 125.2, 124.9, 124.1, 123.6, 123.2, 121.9, 120.9, 119.4, 119.2, 116.8, 113.9, 109.1, 101.0, 55.2, 21.5, 21.5, 20.7 ppm.

HRMS (ESI) *m/z* Calcd for $[C_{39}H_{34}N_2O_6S_2 + H]^+$ 691.1931, found 691.1936.



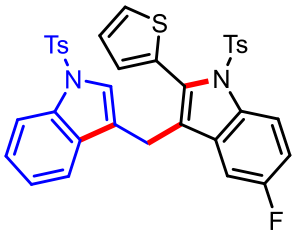
1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-2-(trimethylsilyl)-1*H*-indole (3al):

46.0 mg, 73% yield; light yellow solid, **m. p.** 196–197 °C (PE/EA = 40:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.05 – 7.97 (m, 2H), 7.54 – 7.52 (m, 3H), 7.43 (d, *J* = 8.3 Hz, 2H), 7.34 (t, *J* = 7.7 Hz, 1H), 7.28 – 7.23 (m, 2H), 7.16 (d, *J* = 8.2 Hz, 2H), 7.07 – 6.98 (m, 4H), 6.72 (s, 1H), 4.14 (s, 2H), 2.31 (s, 3H), 2.26 (s, 3H), 0.48 (s, 9H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 144.6, 144.5, 139.6, 139.4, 135.5, 134.9, 134.7, 133.8, 132.3, 130.5, 129.6, 129.5, 126.5, 126.3, 125.4, 125.0, 123.8, 123.5, 123.3, 122.5, 119.4, 119.1, 115.6, 114.0, 22.0, 21.5, 21.5, 2.3 ppm.

HRMS (ESI) *m/z* Calcd for $[C_{34}H_{34}N_2O_4S_2Si + Na]^+$ 649.1621, found 649.1628.



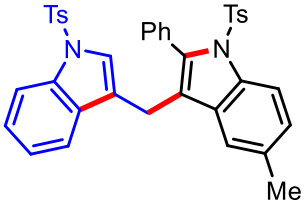
5-fluoro-2-(thiophen-2-yl)-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3am):

54.5 mg, 83% yield; light yellow solid, **m. p.** 209–210 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.40 (d, *J* = 8.4 Hz, 1H), 7.95 (d, *J* = 8.2 Hz, 1H), 7.42 – 7.38 (m, 3H), 7.32 – 7.27 (m, 6H), 7.19 – 7.01 (m, 9H), 6.54 (s, 1H), 3.75 (s, 2H), 2.34 (s, 3H), 2.33 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 162.9 (d, $J_{C\text{-}F}$ = 225.2 Hz), 145.4, 144.7, 137.9, 137.1, 135.5, 134.7, 134.4, 132.6 (d, $J_{C\text{-}F}$ = 8.3 Hz), 130.7, 130.5, 129.6, 129.5, 126.8 (d, $J_{C\text{-}F}$ = 3.4 Hz), 126.5, 126.4, 125.3, 125.0, 124.2, 123.5, 123.3, 121.9, 121.0, 119.3 (d, $J_{C\text{-}F}$ = 19.3 Hz), 116.8, 114.9, 114.6, 114.0, 21.6, 21.5, 20.7 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{35}H_{27}FN_2O_4S_3 + Na]^+$ 677.1009, found 677.1014.



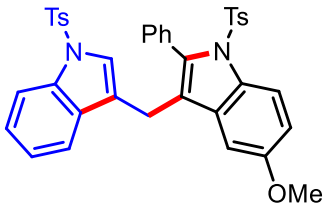
5-methyl-2-phenyl-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3an):

49.4 mg, 77% yield; yellow solid, **m. p.** 143–144 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.26 (d, *J* = 8.5 Hz, 1H), 7.96 (d, *J* = 8.3 Hz, 1H), 7.44 – 7.28 (m, 11H), 7.23 – 7.09 (m, 6H), 6.87 (s, 1H), 6.53 (s, 1H), 3.74 (s, 2H), 2.34 (s, 3H), 2.32 (s, 3H), 2.31 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 145.2, 144.6, 138.4, 136.1, 135.5, 134.8, 134.3, 133.9, 131.2, 131.0, 130.7, 130.6, 129.6, 129.4, 128.7, 127.5, 126.6, 126.5, 124.9, 123.5, 123.2, 122.1, 120.7, 119.2, 119.2, 116.6, 113.9, 21.6, 21.5, 21.3, 20.7 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{38}H_{32}N_2O_4S_2 + NH_4]^+$ 662.2142, found 662.2145.



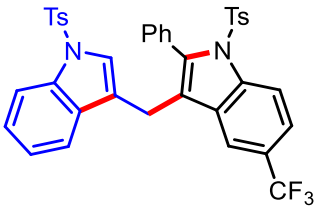
5-methoxy-2-phenyl-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3ao):

35.2 mg, 53% yield; light yellow solid, **m. p.** 187–188 °C (PE/EA = 10:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.28 (d, *J* = 9.1 Hz, 1H), 7.96 (d, *J* = 8.3 Hz, 1H), 7.44 – 7.28 (m, 11H), 7.21 – 7.17 (m, 3H), 7.07 (d, *J* = 8.1 Hz, 2H), 6.99 (dd, *J* = 9.1, 2.4 Hz, 1H), 6.53 (s, 1H), 6.41 (d, *J* = 2.3 Hz, 1H), 3.74 (s, 2H), 3.55 (s, 3H), 2.33 (s, 6H) ppm

^{13}C NMR (75 MHz, $CDCl_3$) δ 157.0, 145.3, 144.7, 139.2, 135.5, 134.7, 132.1, 132.3, 132.1, 130.9, 130.7, 130.6, 129.6, 129.4, 128.7, 127.6, 126.5, 126.5, 125.0, 123.6, 123.3, 122.0, 121.1, 119.1, 118.0, 114.0, 113.5, 101.9, 54.3, 21.6, 21.5, 20.7 ppm.

HRMS (ESI) *m/z* Calcd for $[C_{38}H_{32}N_2O_5S_2 + Na]^+$ 683.1645, found 683.1654.



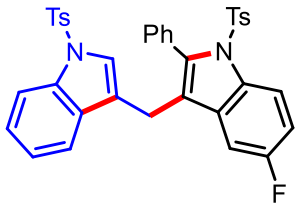
2-phenyl-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-5-(trifluoromethyl)-1*H*-indole (3ap):

54.2 mg, 78% yield; light yellow solid, **m. p.** 197–198 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.53 (d, *J* = 8.8 Hz, 1H), 7.95 (d, *J* = 8.2 Hz, 1H), 7.66 (dd, *J* = 8.9, 1.4 Hz, 1H), 7.46 – 7.29 (m, 12H), 7.21 – 7.11 (m, 5H), 6.55 (s, 1H), 3.80 (s, 2H), 2.36 (s, 3H), 2.33 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 145.8, 145.0, 140.0, 139.4, 135.4, 134.6, 134.4, 130.9, 130.5, 130.3, 130.0, 129.7, 129.7, 129.2, 127.7, 126.5, 126.4, 125.1, 123.2, 123.2, 121.9 (q, $J_{C\text{-}F}$ = 3.4 Hz), 121.4, 120.1, 119.2, 117.1, 116.5 (q, $J_{C\text{-}F}$ = 4.1 Hz), 113.9, 21.6, 21.4, 20.6 ppm.

HRMS (ESI) *m/z* Calcd for $[C_{38}H_{29}F_3N_2O_4S_2 + Na]^+$ 721.1413, found 721.1411.



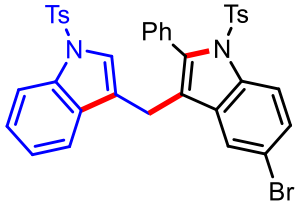
5-fluoro-2-phenyl-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3aq):

46.5 mg, 72% yield; white solid, **m. p.** 177–178 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.35 (dd, *J* = 9.1, 4.5 Hz, 1H), 7.98 (d, *J* = 8.9 Hz, 1H), 7.45 – 7.35 (m, 7H), 7.32 – 7.28 (m, 4H), 7.21 – 7.08 (m, 6H), 6.62 (dd, *J* = 8.5, 2.5 Hz, 1H), 6.52 (s, 1H), 3.73 (s, 2H), 2.36 (s, 3H), 2.33 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 160.0 (d, $J_{C\text{-}F}$ = 240.2 Hz), 145.6, 144.9, 140.2, 135.6, 134.5, 134.1, 134.1, 134.1, 132.1 (d, $J_{C\text{-}F}$ = 9.5 Hz), 130.7, 130.5, 130.4, 129.7, 129.5, 129.0, 127.6, 126.5, 126.4, 125.1, 123.6, 123.3, 121.7, 120.5 (d, $J_{C\text{-}F}$ = 3.8 Hz), 119.1, 118.2 (d, $J_{C\text{-}F}$ = 9.1 Hz), 114.1, 112.9 (d, $J_{C\text{-}F}$ = 24.9 Hz), 105.1 (d, $J_{C\text{-}F}$ = 23.8 Hz), 21.6, 21.5, 20.8 ppm.

HRMS (ESI) *m/z* Calcd for $[C_{37}H_{29}FN_2O_4S_2 + Na]^+$ 671.1445, found 671.1450.



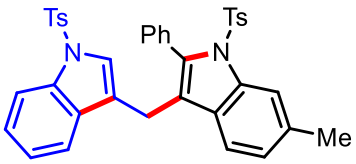
5-bromo-2-phenyl-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3ar):

64.3 mg, 91% yield; light yellow solid, **m. p.** 164–165 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.29 (d, *J* = 8.9 Hz, 1H), 7.95 (d, *J* = 8.4 Hz, 1H), 7.50 (dd, *J* = 8.9, 1.9 Hz, 1H), 7.44 – 7.29 (m, 11H), 7.21 – 7.15 (m, 6H), 6.52 (s, 1H), 3.73 (s, 2H), 2.36 (s, 3H), 2.34 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 145.7, 144.8, 139.7, 136.7, 135.5, 134.6, 134.2, 132.7, 130.8, 130.4, 130.2, 129.8, 129.6, 129.1, 128.0, 127.6, 126.5, 126.5, 125.1, 123.4, 123.3, 121.9, 121.6, 119.8, 119.2, 118.4, 117.7, 114.0, 21.6, 21.6, 20.6 ppm.

HRMS (ESI) *m/z* Calcd for $[C_{37}H_{29}BrN_2O_4S_2 + NH_4]^+$ 726.1090, found 726.1105.



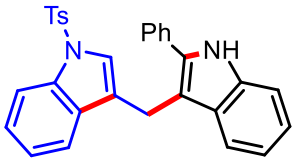
6-methyl-2-phenyl-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3as):

32.0 mg, 50% yield; white solid, **m. p.** 193–194 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.22 (s, 1H), 7.94 (d, *J* = 8.2 Hz, 1H), 7.44 – 7.26 (m, 11H), 7.18 – 7.09 (m, 5H), 6.99 – 6.92 (m, 2H), 6.56 (s, 1H), 3.73 (s, 2H), 2.56 (s, 3H), 2.35 (s, 3H), 2.34 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 145.2, 144.6, 138.4, 137.6, 135.5, 135.3, 134.8, 134.5, 131.0, 130.8, 130.6, 129.6, 129.4, 128.6, 128.6, 127.5, 126.5, 126.5, 125.5, 124.9, 123.6, 123.2, 122.2, 120.8, 119.2, 119.0, 117.0, 114.0, 22.1, 21.6, 21.5, 20.8 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{38}H_{32}N_2O_4S_2 + NH_4]^+$ 662.2142, found 662.2144.



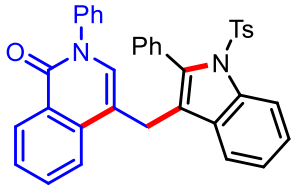
2-phenyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3au):

24.0 mg, 50% yield; light yellow solid, **m. p.** 188–189 °C (PE/EA = 10:1, R_f = 0.3).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.22 (s, 1H), 8.00 (d, *J* = 8.2 Hz, 1H), 7.56 (d, *J* = 8.4 Hz, 2H), 7.51 – 7.29 (m, 9H), 7.26 – 7.20 (m, 2H), 7.13 (d, *J* = 8.0 Hz, 2H), 7.08 – 7.02 (m, 2H), 4.19 (s, 2H), 2.33 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 144.5, 136.1, 135.8, 135.3, 134.9, 132.7, 131.0, 129.6, 129.1, 128.9, 127.8, 127.7, 126.7, 124.7, 124.3, 123.4, 123.2, 122.5, 119.7, 119.5, 119.3, 114.0, 111.0, 109.1, 21.5, 20.8 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{30}H_{24}N_2O_2S + Na]^+$ 499.1451, found 499.1454.



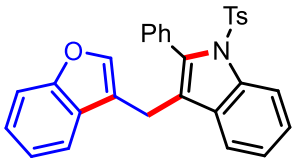
2-phenyl-4-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)isoquinolin-1(2*H*)-one (5):

52.2 mg, 90% yield; light yellow solid, **m. p.** 200–201 °C (PE/EA = 5:1, R_f = 0.1).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.48 (d, *J* = 7.2 Hz, 1H), 8.34 (d, *J* = 8.4 Hz, 1H), 7.66 – 7.48 (m, 3H), 7.43 – 7.29 (m, 9H), 7.23 – 7.13 (m, 6H), 6.75 (d, *J* = 8.2 Hz, 2H), 6.42 (s, 1H), 3.90 (s, 2H), 2.17 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 161.4, 144.5, 141.2, 138.7, 137.5, 136.5, 135.2, 132.5, 130.9, 130.5, 130.4, 130.0, 129.1, 128.9, 128.7, 127.8, 127.5, 127.1, 126.5, 126.3, 126.2, 125.3, 124.1, 122.4, 119.4, 119.2, 116.4, 113.4, 24.5, 21.5 ppm.

HRMS (ESI) *m/z* Calcd for $[C_{37}H_{28}N_2O_3S + H]^+$ 581.1893, found 581.1898.



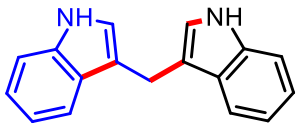
3-(benzofuran-3-ylmethyl)-2-phenyl-1-tosyl-1*H*-indole (7):

20.6 mg, 43% yield; white solid, **m. p.** 180–181 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.37 (d, *J* = 8.4 Hz, 1H), 7.43 – 7.34 (m, 7H), 7.31 – 7.24 (m, 5H), 7.22 – 7.07 (m, 4H), 6.46 (s, 1H), 3.81 (s, 2H), 2.36 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 155.4, 144.7, 141.9, 138.0, 137.9, 134.5, 131.2, 131.0, 130.8, 129.2, 128.7, 127.6, 126.8, 125.2, 124.4, 124.3, 122.4, 121.4, 119.5, 119.4, 118.9, 117.0, 111.4, 21.5, 19.4 ppm.

HRMS (ESI) *m/z* Calcd for $[C_{30}H_{23}NO_3S + Na]^+$ 500.1291, found 500.1288.

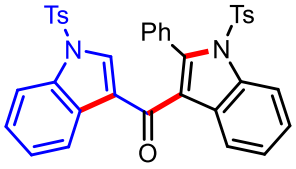


di(1H-indol-3-yl)methane (8):[9]

18.9 mg, 77% yield; reddish-brown solid (PE/EA = 10:1, R_f = 0.2).

^{1}H NMR (300 MHz, DMSO) δ 10.74 (s, 2H), 7.52 (d, *J* = 7.9 Hz, 2H), 7.32 (d, *J* = 8.0 Hz, 2H), 7.13 (d, *J* = 2.2 Hz, 2H), 7.06 – 7.00 (m, 2H), 6.94 – 6.89 (m, 2H), 4.13 (s, 2H) ppm.

^{13}C NMR (75 MHz, DMSO) δ 136.8, 127.6, 123.2, 121.2, 119.1, 118.5, 114.6, 111.8, 21.4 ppm.



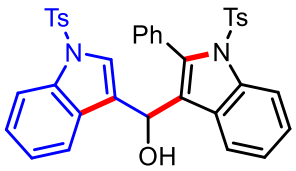
(2-phenyl-1-tosyl-1*H*-indol-3-yl)(1-tosyl-1*H*-indol-3-yl)methanone (9):

30.0 mg, 93% yield; yellow solid, **m. p.** 143–144 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.45 (d, *J* = 8.5 Hz, 1H), 8.20 – 8.14 (m, 1H), 7.77 – 7.72 (m, 1H), 7.62 – 7.56 (m, 4H), 7.50 – 7.44 (m, 1H), 7.40 – 7.37 (m, 2H), 7.35 – 7.29 (m, 2H), 7.28 – 7.18 (m, 8H), 7.06 (d, *J* = 8.1 Hz, 2H), 2.36 (s, 3H), 2.31 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 186.7, 145.8, 145.3, 141.1, 137.0, 134.7, 134.5, 134.5, 134.3, 131.8, 130.1, 129.9, 129.5, 129.3, 128.9, 127.4, 127.4, 127.1, 126.9, 125.8, 125.6, 124.8, 124.6, 124.3, 122.6, 120.8, 120.5, 116.3, 112.8, 21.6, 21.5 ppm.

HRMS (ESI) *m/z* Calcd for $[C_{37}H_{28}N_2O_5S_2 + H]^+$ 645.1512, found 645.1514.



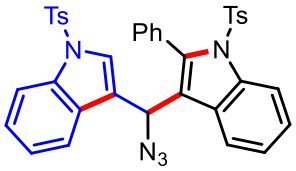
(2-phenyl-1-tosyl-1*H*-indol-3-yl)(1-tosyl-1*H*-indol-3-yl)methanol (10):

27.5 mg, 85% yield; white solid, **m. p.** 193–194 °C (PE/EA = 5:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.39 (d, *J* = 8.7 Hz, 1H), 7.94 (d, *J* = 8.3 Hz, 1H), 7.54 (d, *J* = 8.2 Hz, 2H), 7.45 – 7.04 (m, 17H), 6.99 (s, 1H), 5.86 (s, 1H), 2.35 (s, 3H), 2.34 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 145.3, 144.9, 138.2, 137.9, 135.7, 134.9, 134.8, 130.1, 129.8, 129.5, 129.3, 129.1, 128.5, 127.6, 126.7, 126.6, 125.2, 124.9, 124.4, 123.9, 123.3, 123.3, 121.3, 120.6, 116.5, 113.8, 63.7, 21.6, 21.6 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{37}H_{30}N_2O_5S_2 + Na]^+$ 669.1488, found 669.1467.



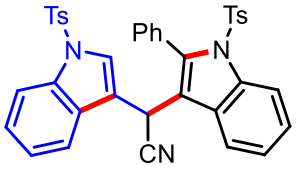
3-(azido(1-tosyl-1*H*-indol-3-yl)methyl)-2-phenyl-1-tosyl-1*H*-indole (11):

29.3 mg, 87% yield; white solid, **m. p.** 216–217 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.38 (d, *J* = 8.5 Hz, 1H), 7.93 (d, *J* = 8.4 Hz, 1H), 7.61 (d, *J* = 8.3 Hz, 2H), 7.49 – 7.00 (m, 18H), 5.76 (d, *J* = 1.5 Hz, 1H), 2.35 (s, 3H), 2.34 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 145.3, 145.1, 139.8, 137.6, 135.5, 134.9, 134.8, 129.8, 129.5, 128.5, 127.9, 127.8, 126.7, 126.6, 125.5, 125.0, 124.5, 124.0, 123.3, 120.7, 120.4, 120.0, 118.8, 116.3, 113.8, 54.8, 21.6, 21.6 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{37}H_{29}N_5O_4S_2 + Na]^+$ 694.1553, found 694.1562.



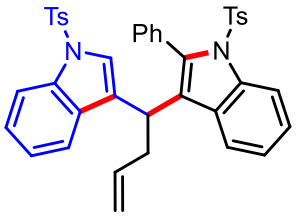
2-(2-phenyl-1-tosyl-1*H*-indol-3-yl)-2-(1-tosyl-1*H*-indol-3-yl)acetonitrile (12):

10.1 mg, 31% yield; light yellow solid, **m. p.** 205–206 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.41 (d, *J* = 8.6 Hz, 1H), 7.95 (d, *J* = 8.4 Hz, 1H), 7.60 (d, *J* = 8.3 Hz, 2H), 7.53 – 7.27 (m, 10H), 7.22 – 7.09 (m, 8H), 5.09 (d, *J* = 1.4 Hz, 1H), 2.37 (s, 3H), 2.36 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 145.5, 145.3, 139.0, 137.3, 135.4, 134.9, 134.7, 130.0, 129.9, 129.7, 129.2, 128.1, 128.0, 127.5, 126.8, 126.6, 125.8, 125.5, 124.8, 124.3, 123.7, 119.6, 119.4, 117.5, 116.4, 115.9, 114.5, 113.9, 25.8, 21.6, 21.6 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{38}H_{29}N_3O_4S_2 + NH_4]^+$ 673.1938, found 673.1933.



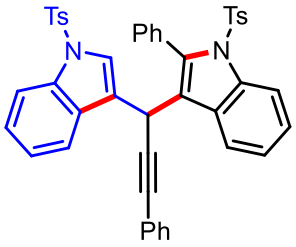
2-phenyl-1-tosyl-3-(1-(1-tosyl-1*H*-indol-3-yl)but-3-en-1-yl)-1*H*-indole (13):

20.1 mg, 60% yield; white solid, **m. p.** 220–221 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.32 (d, *J* = 8.4 Hz, 1H), 7.88 (d, *J* = 8.3 Hz, 1H), 7.65 (d, *J* = 8.2 Hz, 2H), 7.42 (s, 4H), 7.32 – 7.27 (m, 5H), 7.22 – 7.01 (m, 7H), 6.87 (t, *J* = 7.5 Hz, 1H), 6.77 (d, *J* = 7.8 Hz, 1H), 5.45 – 5.29 (m, 1H), 4.87 – 4.79 (m, 2H), 4.17 – 4.11 (m, 1H), 2.95 – 2.74 (m, 2H), 2.34 (s, 3H), 2.33 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 144.8, 144.6, 137.8, 137.5, 135.7, 135.3, 135.1, 135.1, 131.1, 130.3, 129.8, 129.4, 129.2, 128.9, 127.5, 126.7, 126.6, 124.8, 124.6, 124.5, 123.6, 123.6, 123.0, 122.9, 120.3, 120.0, 116.8, 116.5, 113.6, 37.3, 33.5, 21.6 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{40}H_{34}N_2O_4S_2 + NH_4]^+$ 688.2298, found 688.2300.



2-phenyl-3-(3-phenyl-1-(1-tosyl-1*H*-indol-3-yl)prop-2-yn-1-yl)-1-tosyl-1*H*-indole (14):

26.2 mg, 72% yield; light yellow solid, **m. p.** 105–106 °C (PE/EA = 20:1, R_f = 0.2).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.38 (d, *J* = 8.4 Hz, 1H), 7.92 (d, *J* = 8.3 Hz, 1H), 7.57 – 7.45 (m, 6H), 7.40 – 7.22 (m, 12H), 7.18 – 7.04 (m, 7H), 5.18 (d, *J* = 1.5 Hz, 1H), 2.35 (s, 3H), 2.31 (s, 3H) ppm.

^{13}C NMR (75 MHz, $CDCl_3$) δ 145.1, 144.8, 137.8, 137.5, 135.7, 135.0, 135.0, 131.6, 130.3, 129.8, 129.8, 129.4, 129.4, 129.3, 129.2, 129.0, 128.2, 127.7, 126.7, 126.6, 125.1, 124.8, 124.2, 123.8, 123.2, 122.9, 121.7, 120.8, 120.7, 120.3, 116.5, 113.8, 87.4, 83.5, 26.8, 21.6 ppm.

HRMS (ESI) *m*/*z* Calcd for $[C_{45}H_{34}N_2O_4S_2 + NH_4]^+$ 748.2298, found 748.2298.

6. X-ray Crystallography Data of 3ab

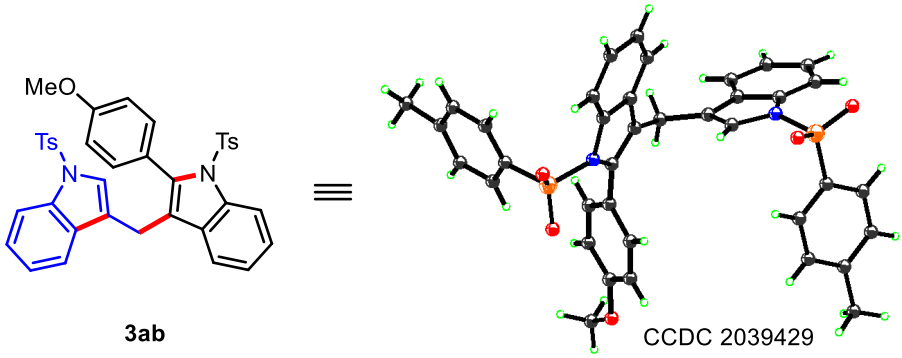


Figure S1. X-ray Crystallography of 3ab

CCDC 2039429 (**3ab**) contains the supplementary crystallographic data. These data can be obtained free of charge from The Cambridge Crystallographic Data Centre via www.ccdc.cam.ac.uk/data_request/cif.

Datablock: 20200612

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Bond precision:  C-C = 0.0031 A          Wavelength=1.54178

Cell:          a=10.9256(5)      b=12.3957(6)      c=13.8847(6)
               alpha=71.510(2)   beta=73.074(2)    gamma=72.150(2)
Temperature:   302 K

                Calculated                Reported
Volume          1657.87(13)               1657.87(14)
Space group     P -1                      P -1
Hall group      -P 1                      -P 1
Moiety formula  C38 H32 N2 O5 S2          C38 H32 N2 O5 S2
Sum formula     C38 H32 N2 O5 S2          C38 H32 N2 O5 S2
Mr              660.78                    660.77
Dx,g cm-3       1.324                     1.324
Z               2                         2
Mu (mm-1)       1.839                     1.839
F000            692.0                     692.0
F000'           695.24
h,k,lmax        13,15,17                  13,15,17
Nref            6555                      6516
Tmin,Tmax       0.754,0.866               0.641,0.754
Tmin'           0.549

Correction method= # Reported T Limits: Tmin=0.641 Tmax=0.754
AbsCorr = MULTI-SCAN

Data completeness= 0.994          Theta(max)= 72.360

R(reflections)= 0.0370( 5207)     wR2(reflections)= 0.1039( 6516)

S = 1.068                 Npar= 428
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The following ALERTS were generated. Each ALERT has the format
      test-name_ALERT_alert-type_alert-level.
Click on the hyperlinks for more details of the test.
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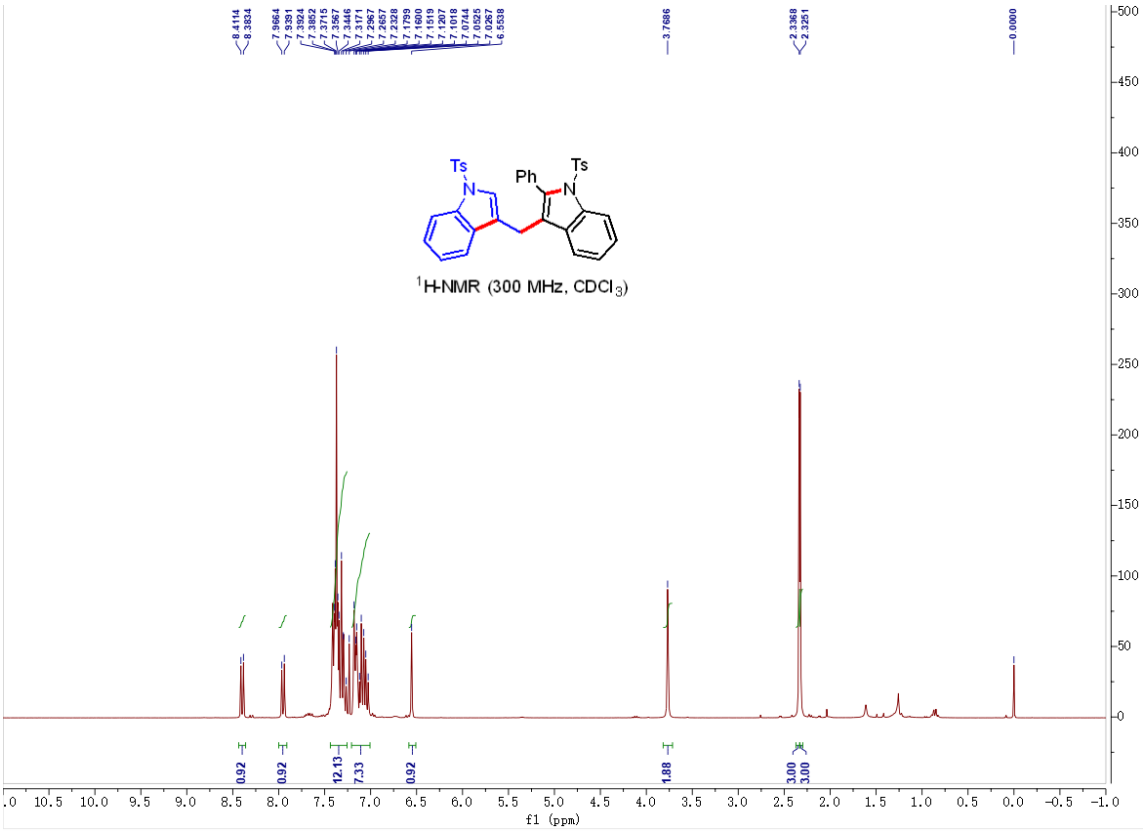
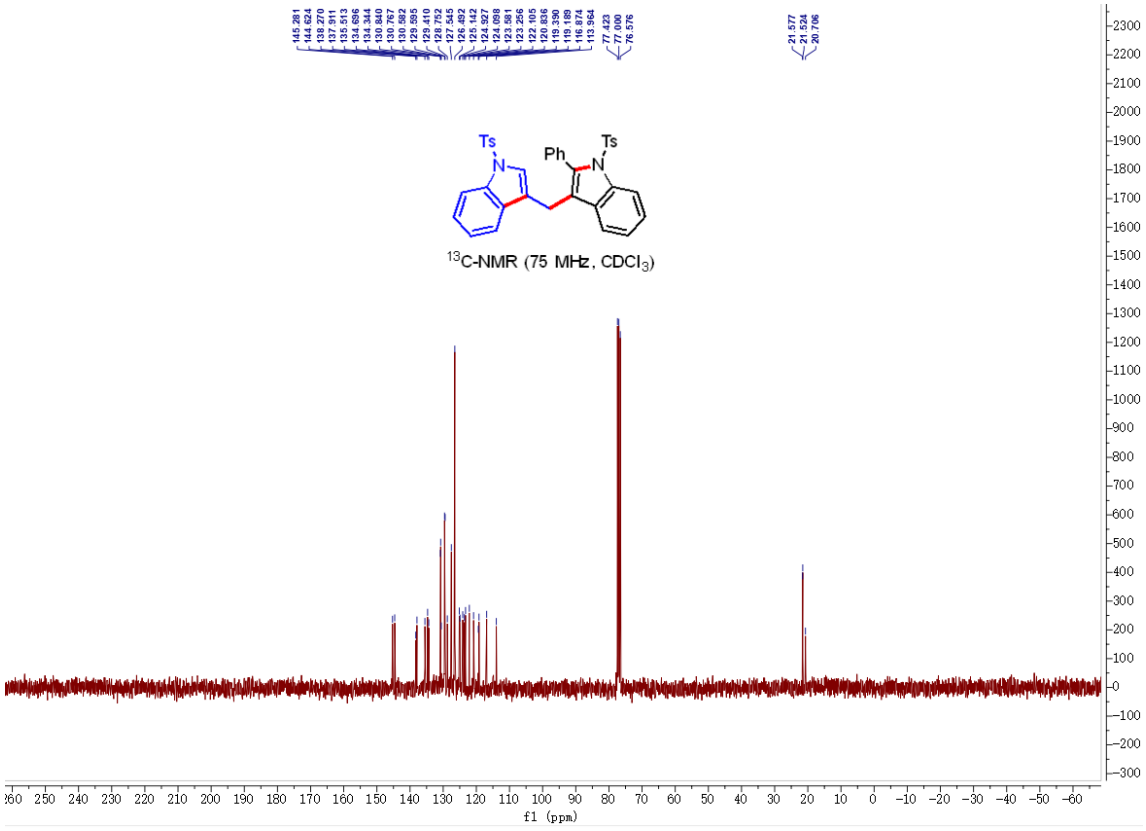
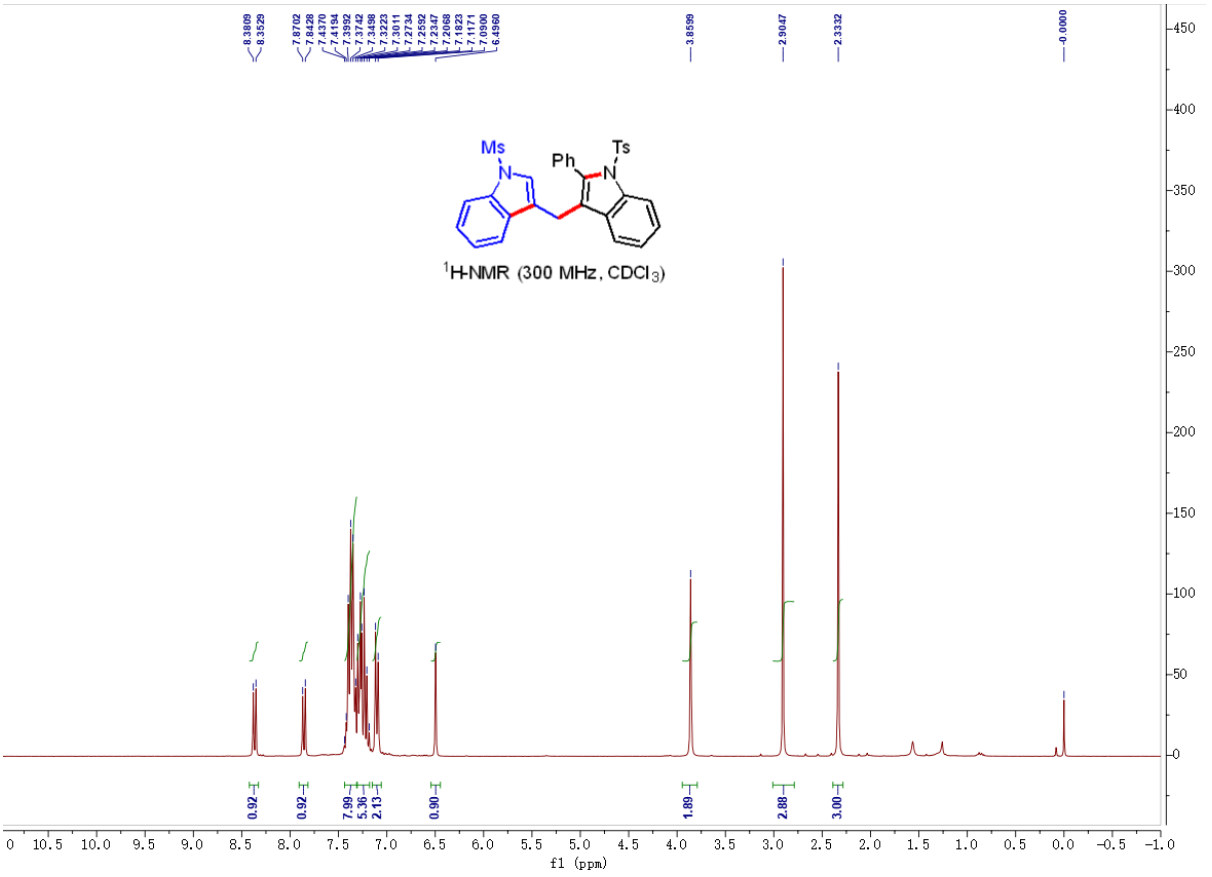
7. ^{1}H and ^{13}C NMR Spectra of Title Compounds

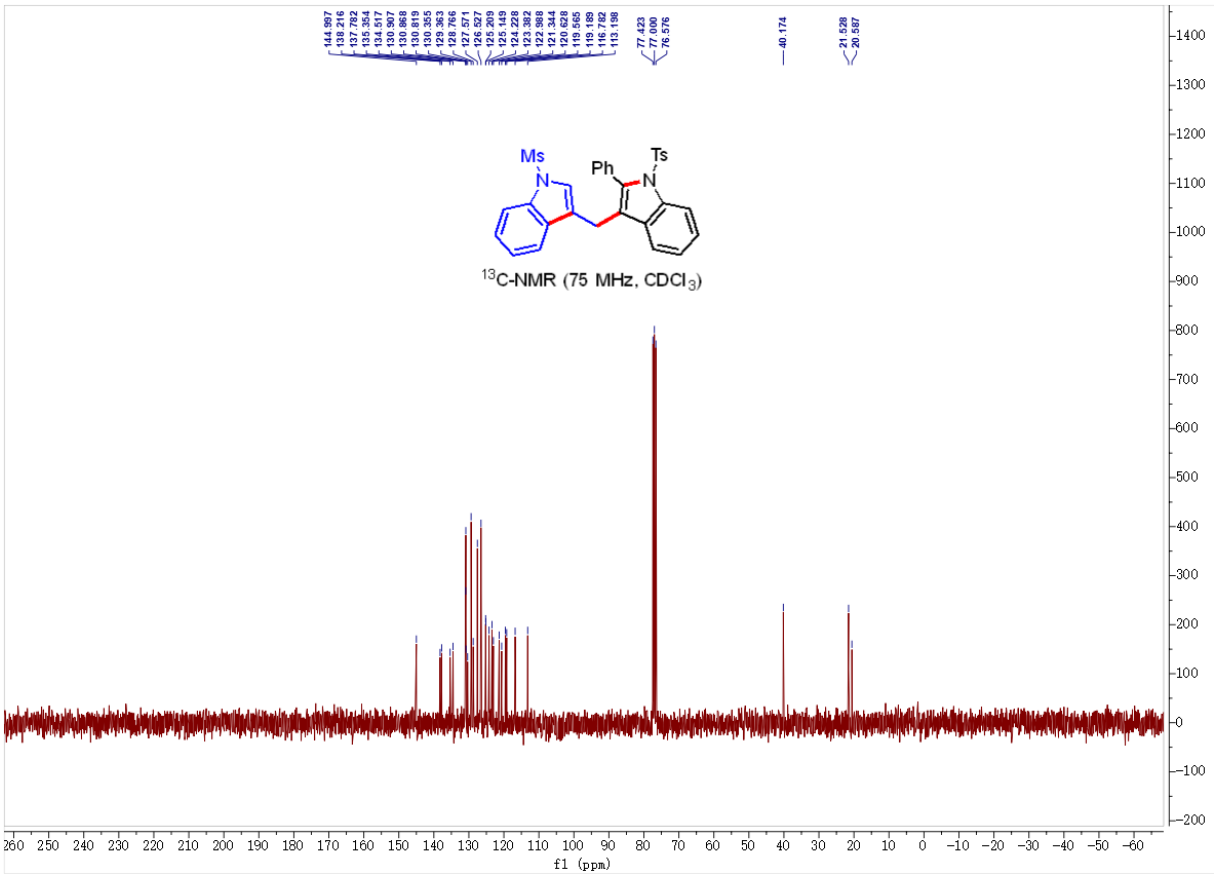
2-phenyl-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3aa):



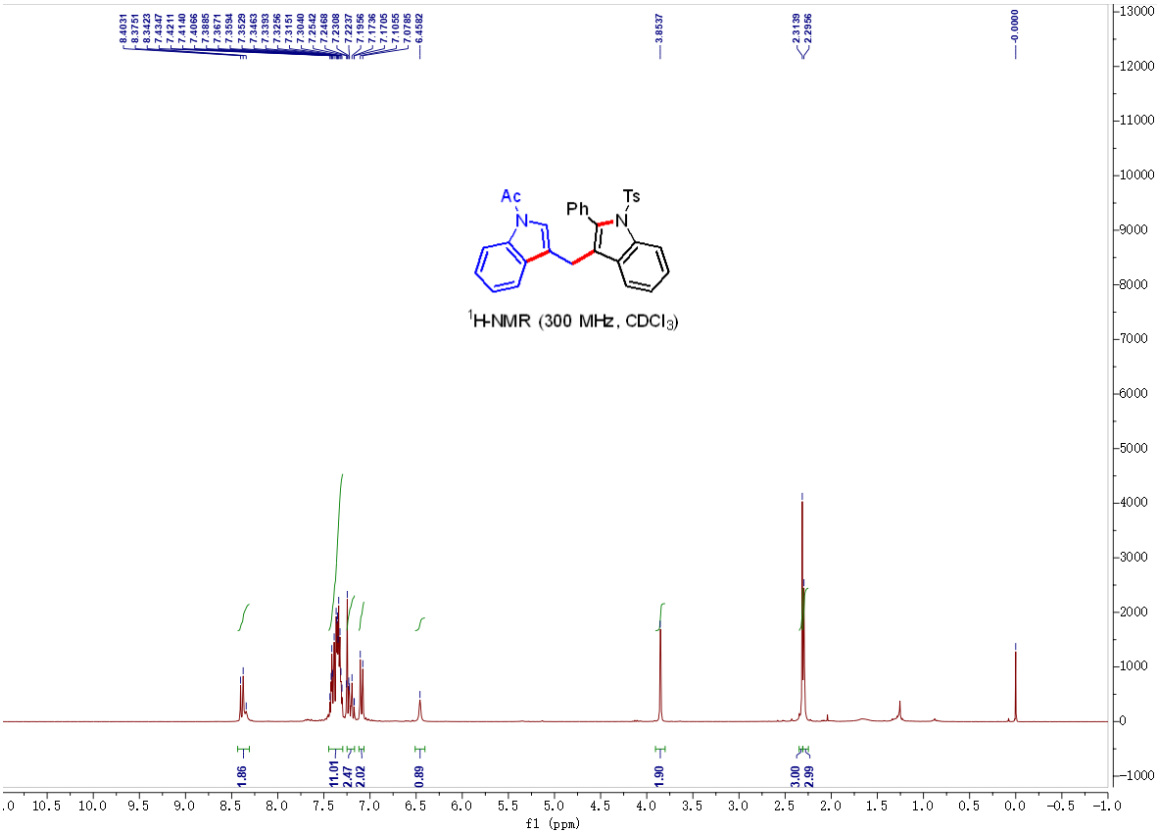


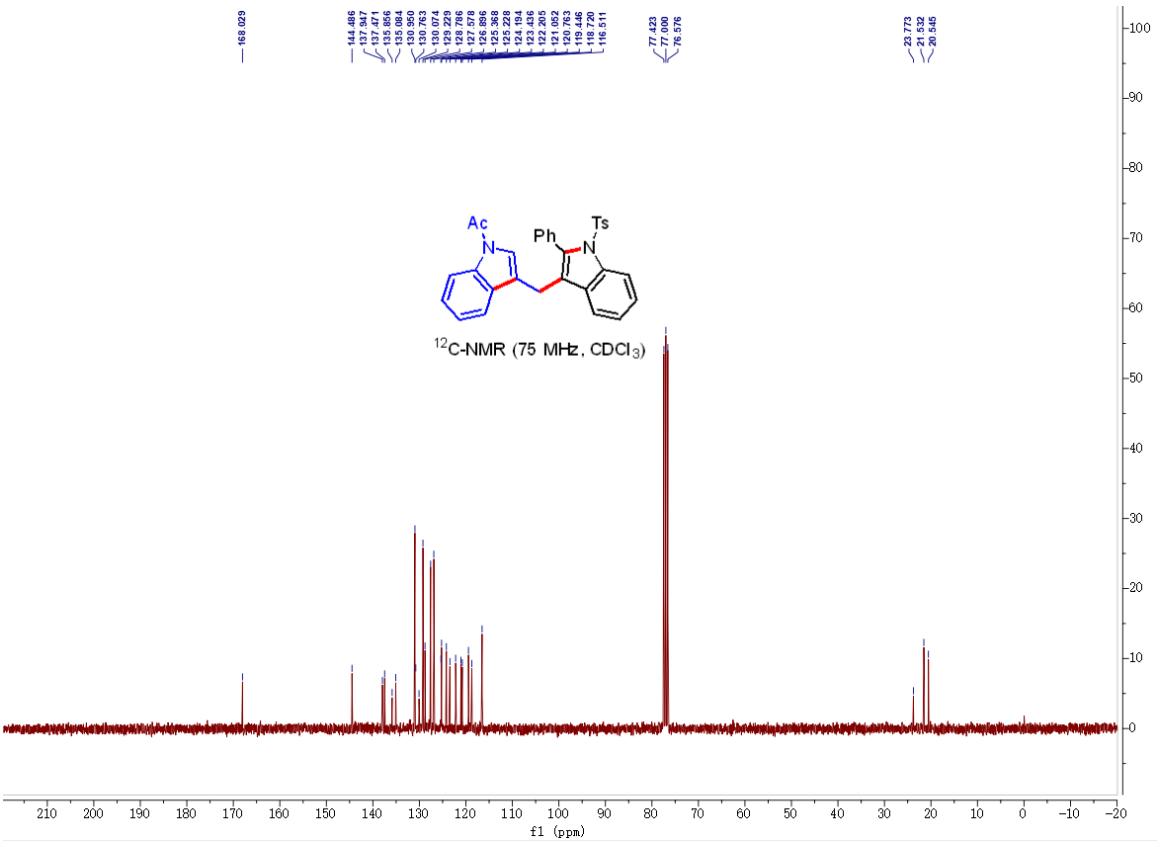
3-((1-(methylsulfonyl)-1*H*-indol-3-yl)methyl)-2-phenyl-1-tosyl-1*H*-indole (3ba):



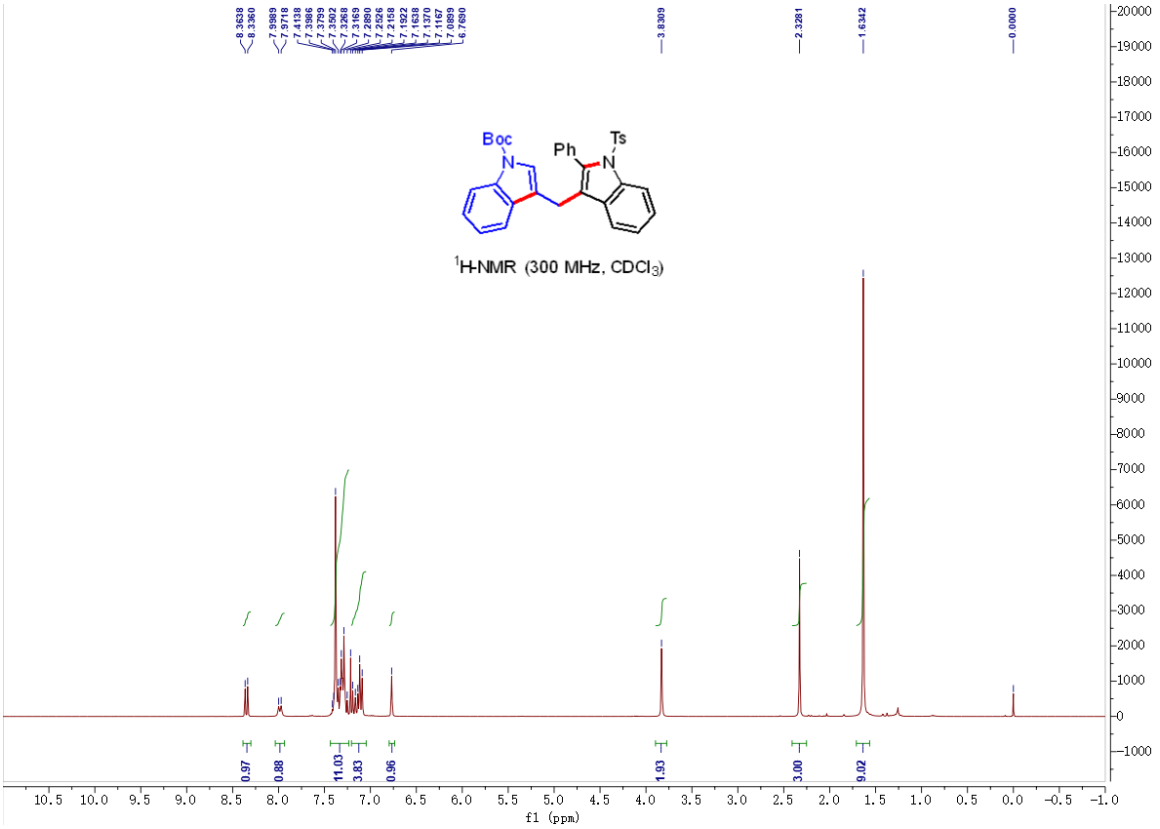


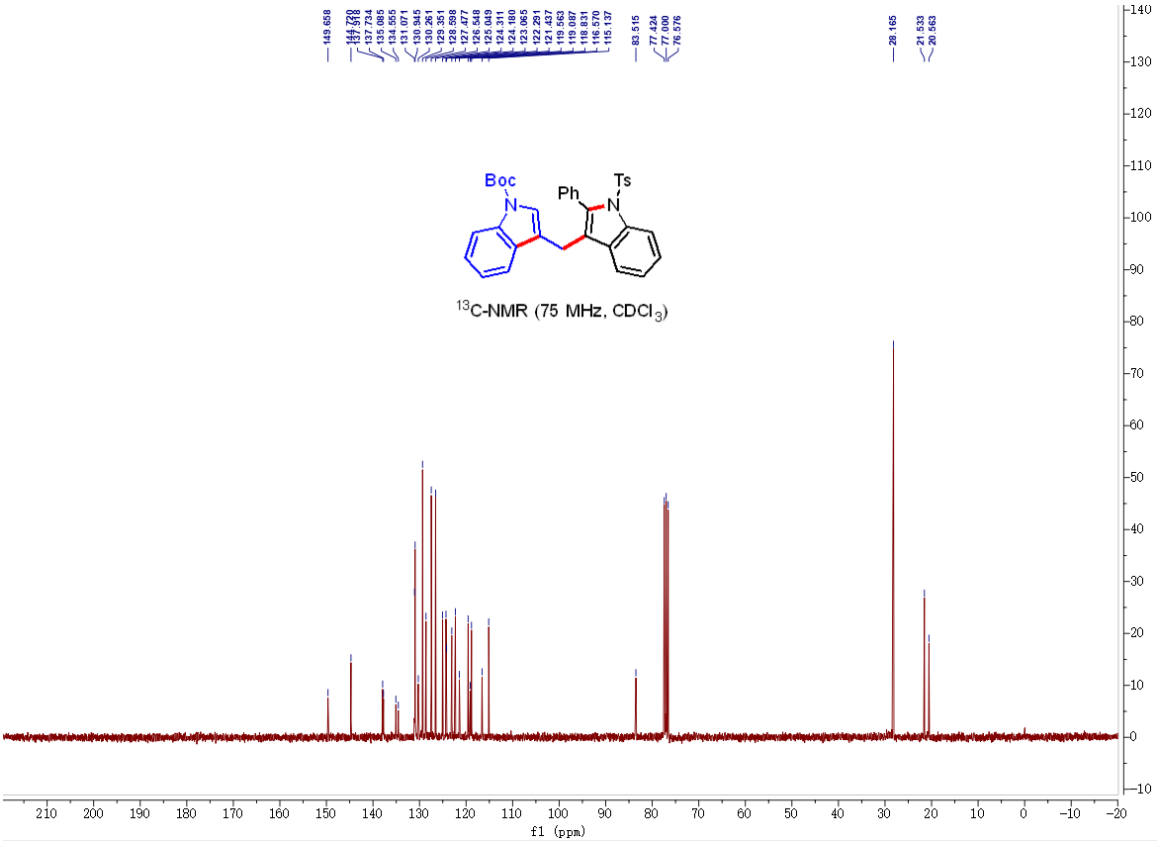
1-(3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indol-1-yl)ethan-1-one (3ca):



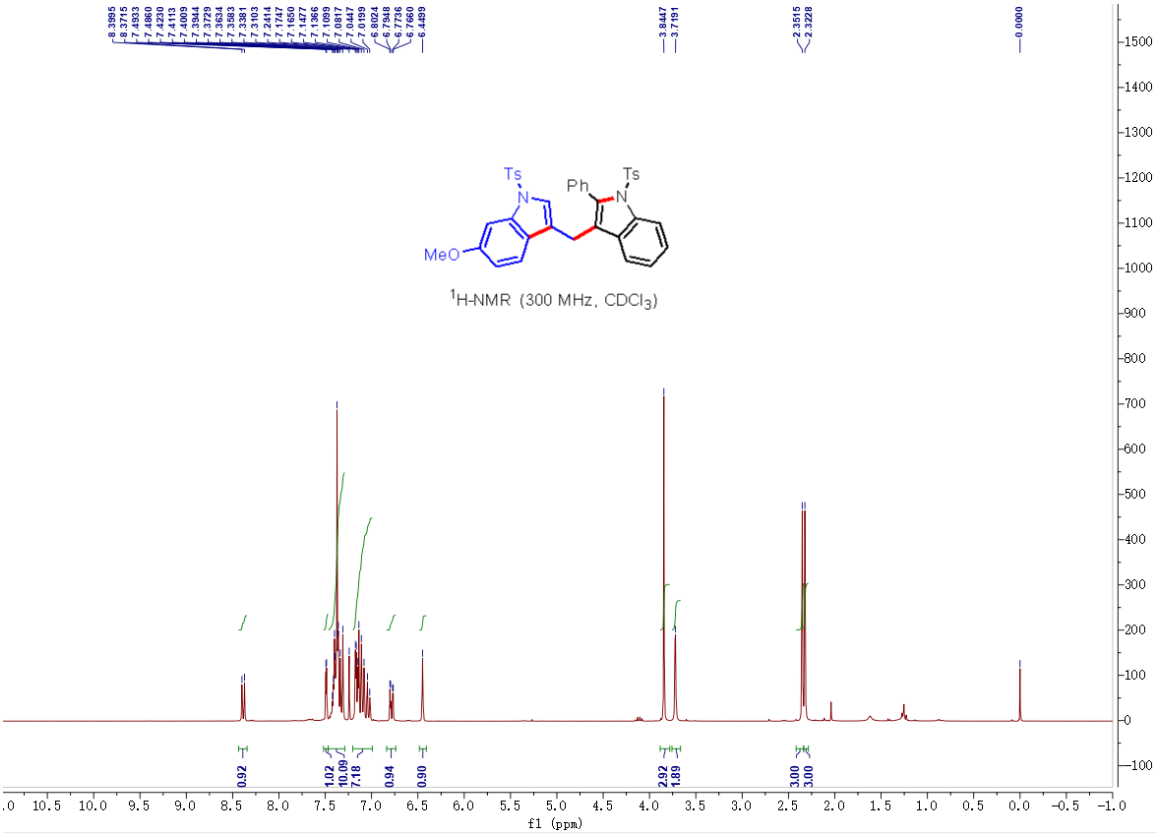


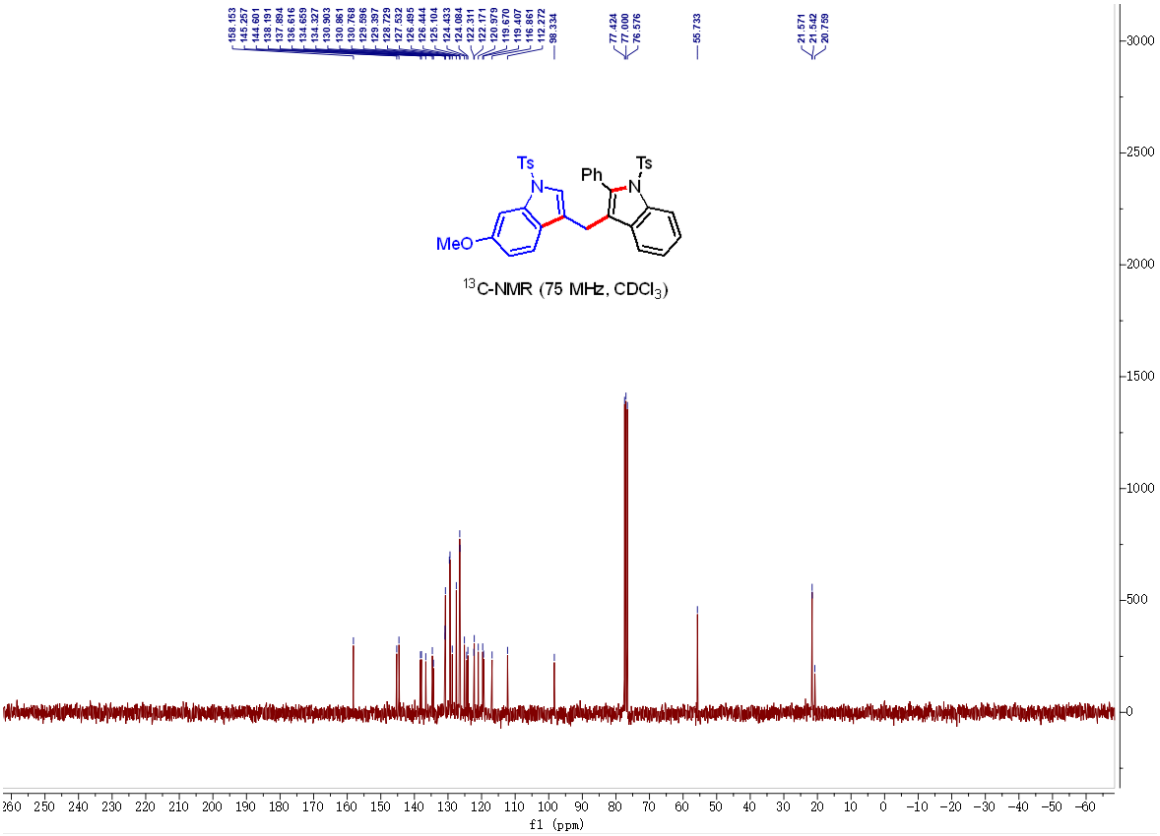
***tert*-butyl 3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole-1-carboxylate (3da):**



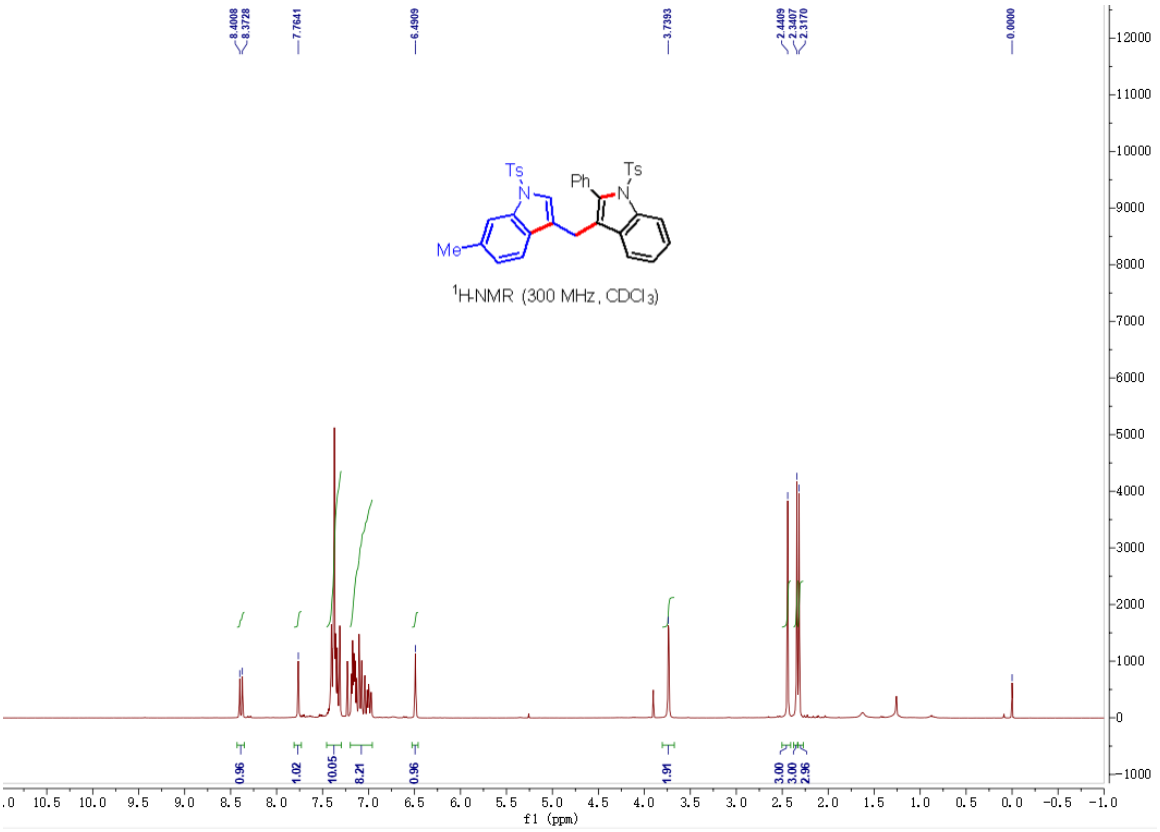


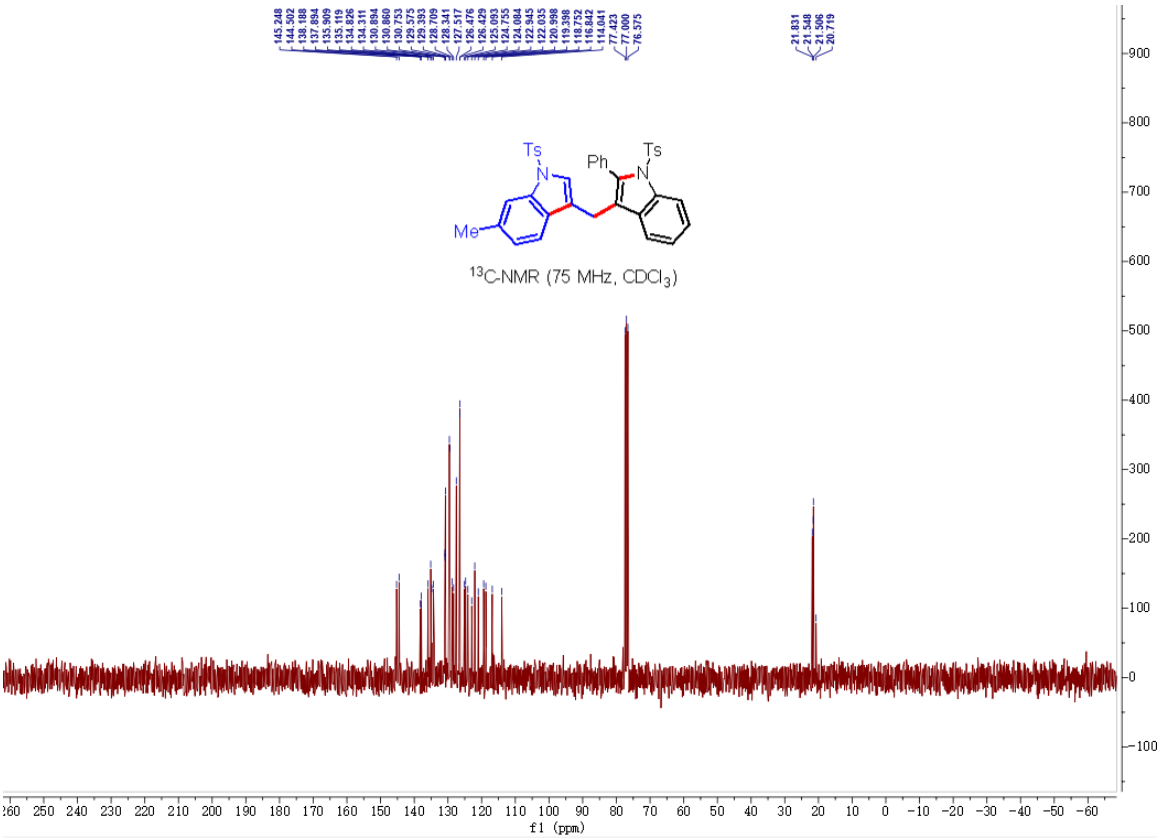
6-methoxy-3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1-tosyl-1*H*-indole (3ea):



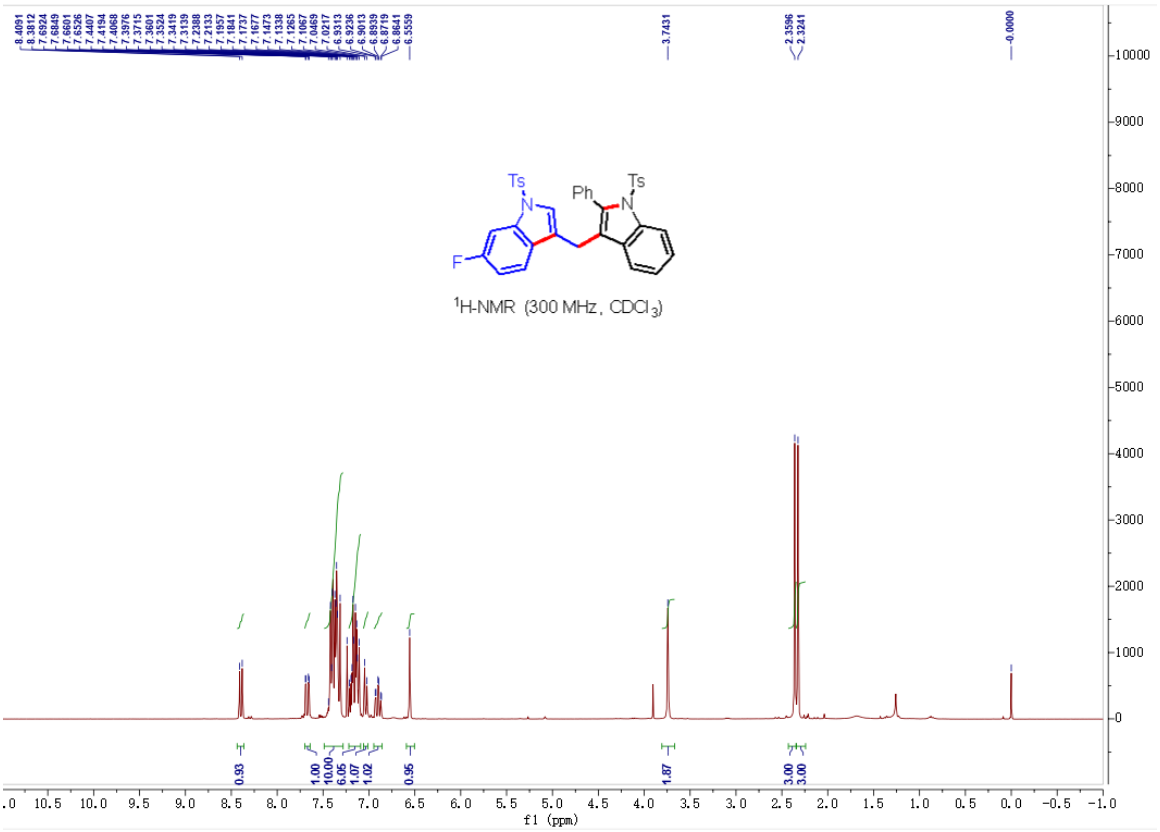


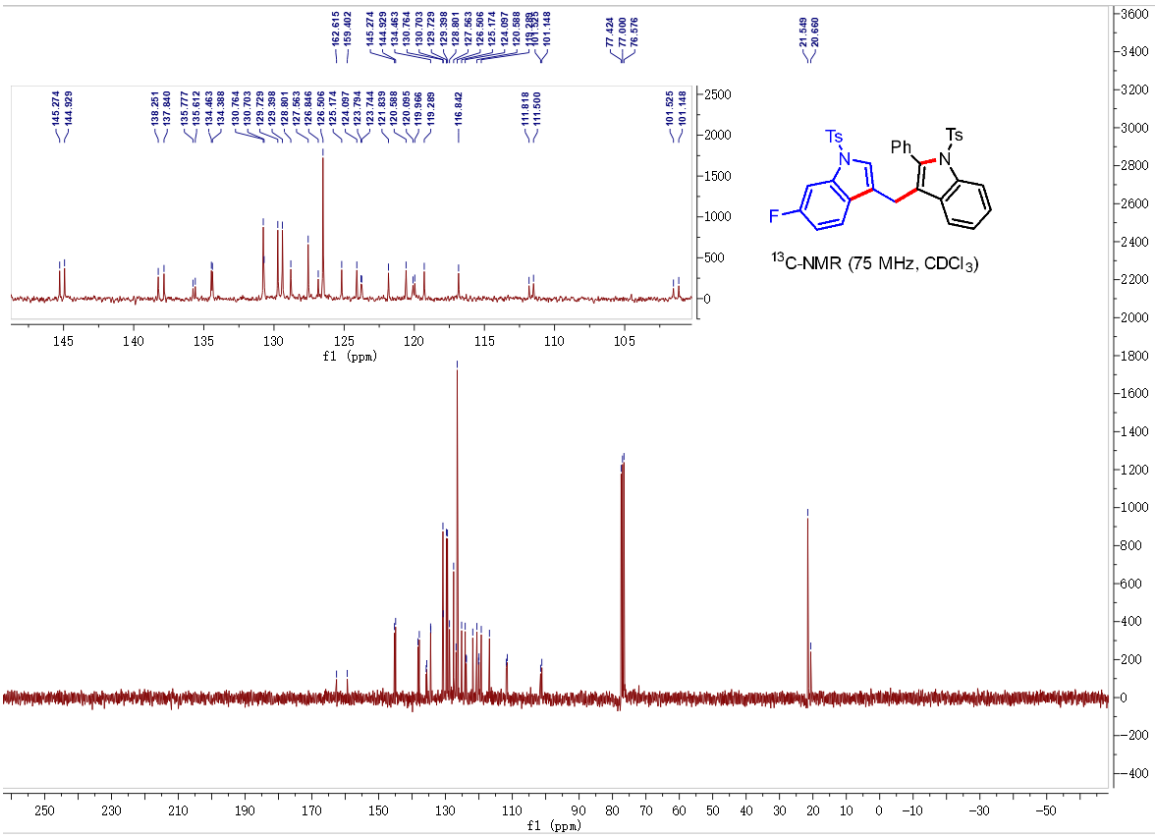
6-methyl-3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1-tosyl-1*H*-indole (3fa):



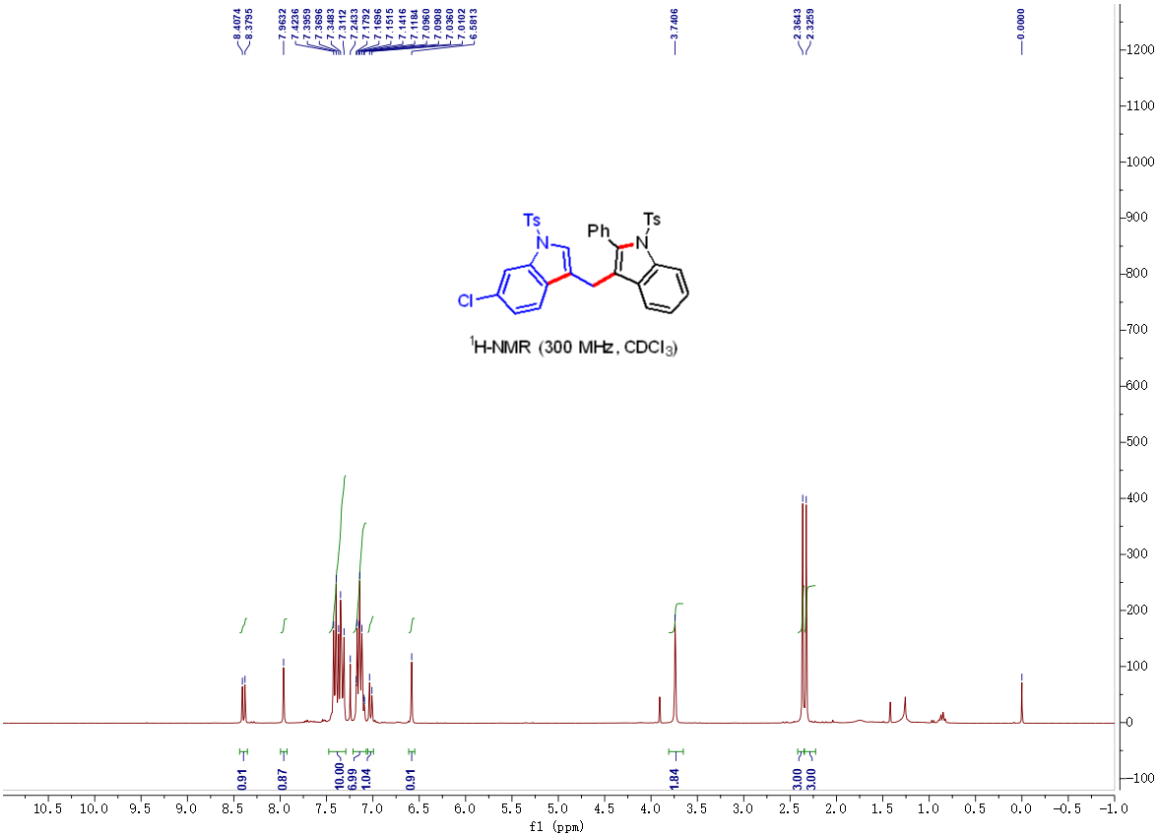


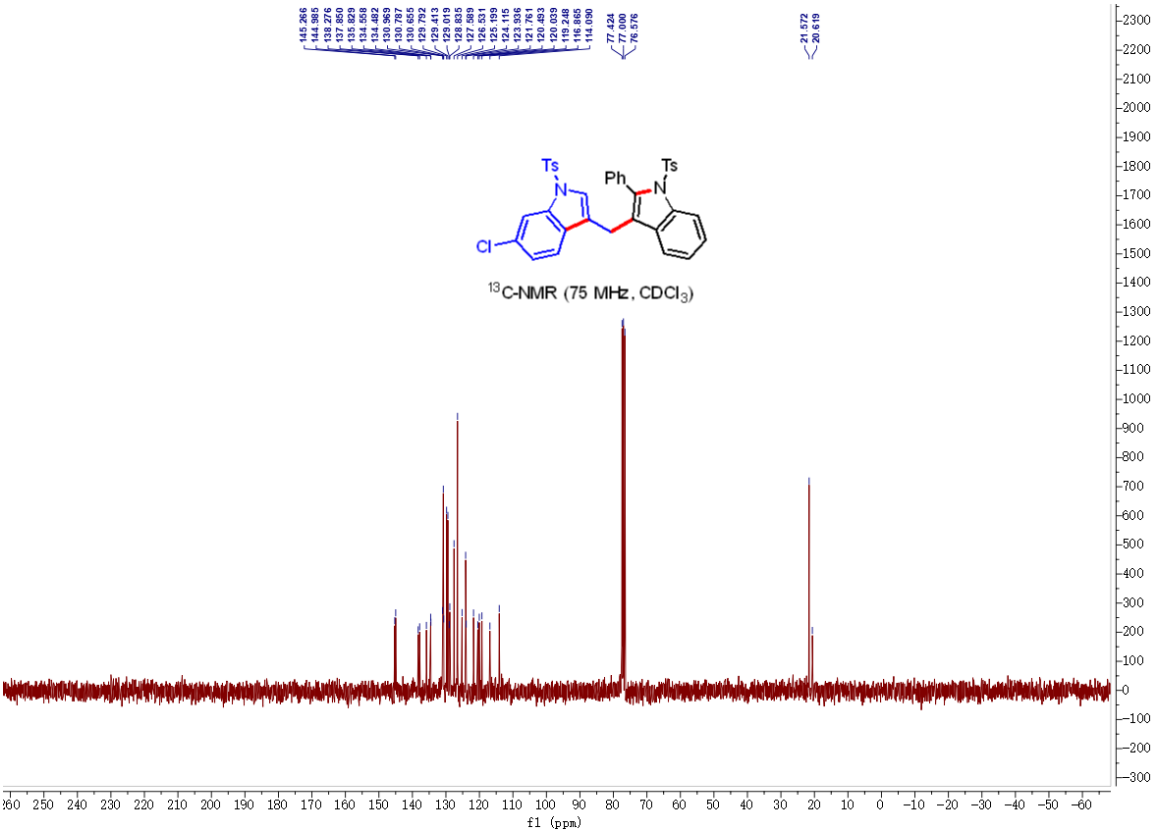
6-fluoro-3-((2-phenyl-1-tosyl-1H-indol-3-yl)methyl)-1-tosyl-1H-indole (3ga):



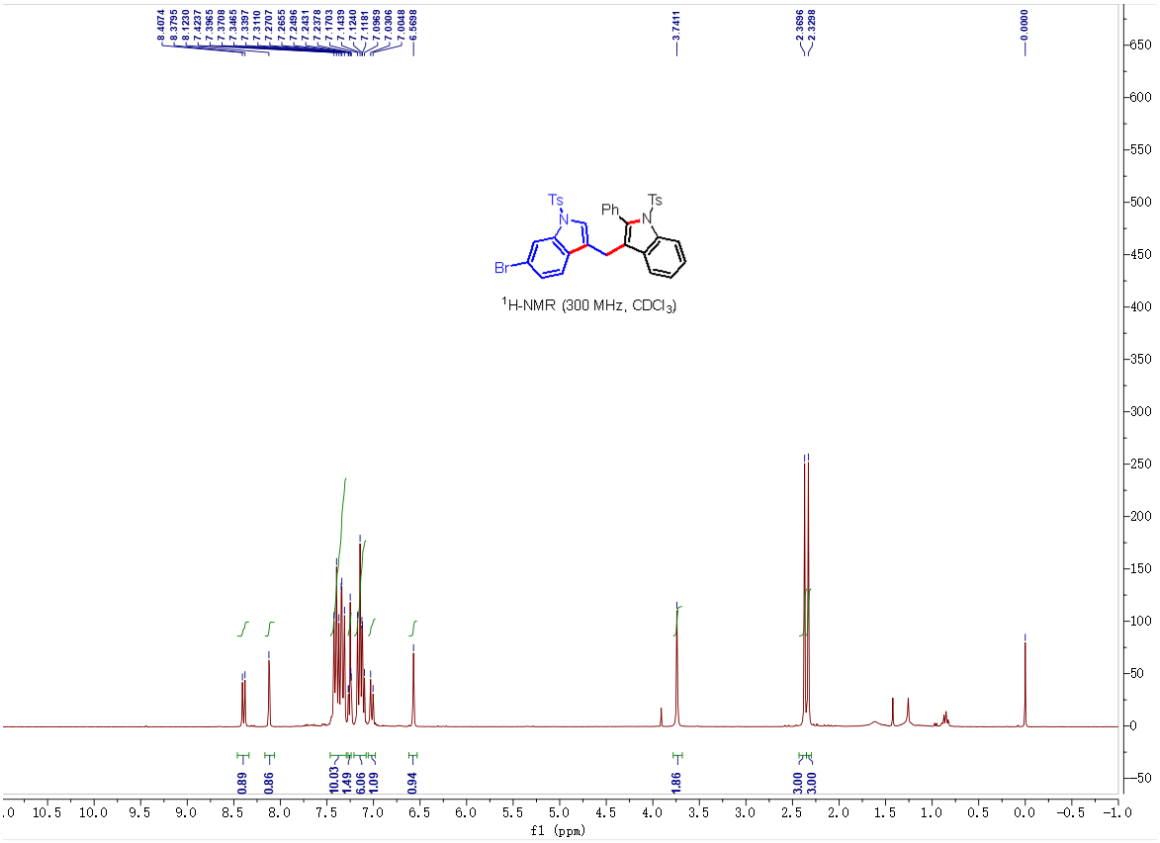


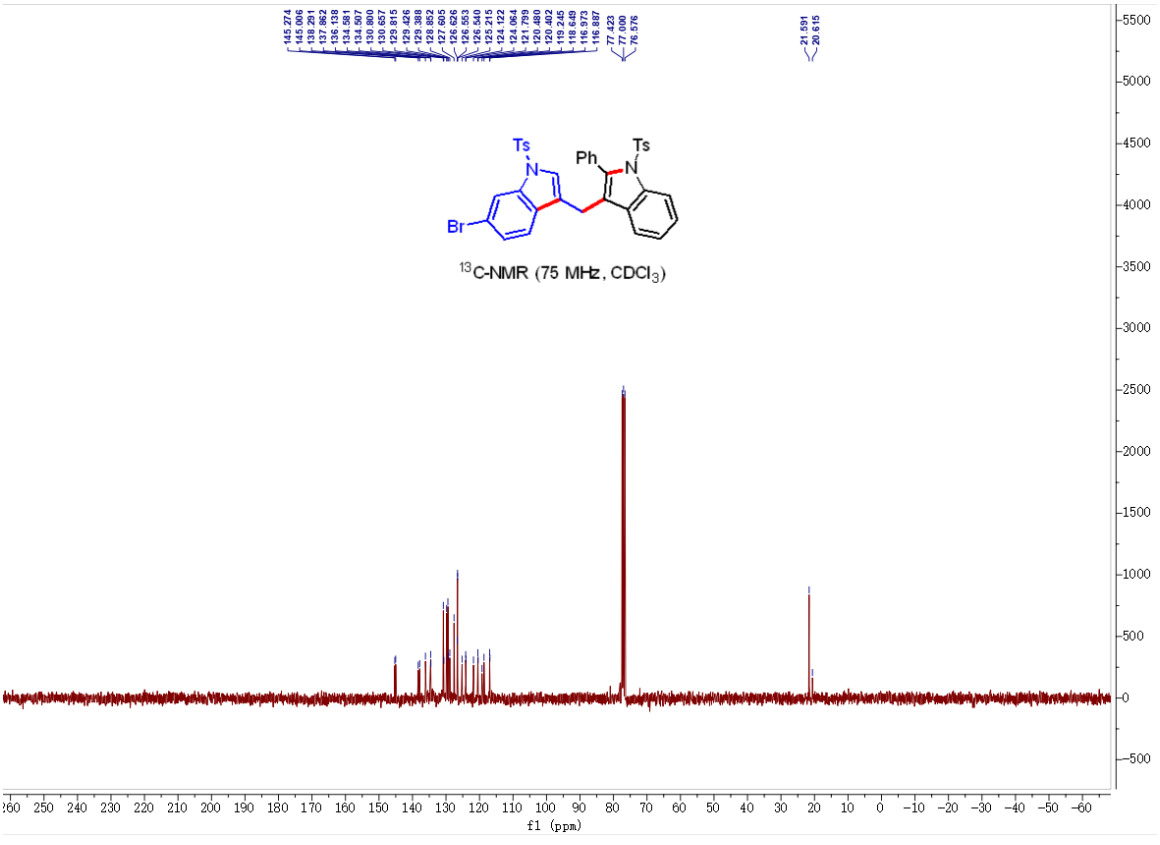
6-chloro-3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1-tosyl-1*H*-indole (3ha):



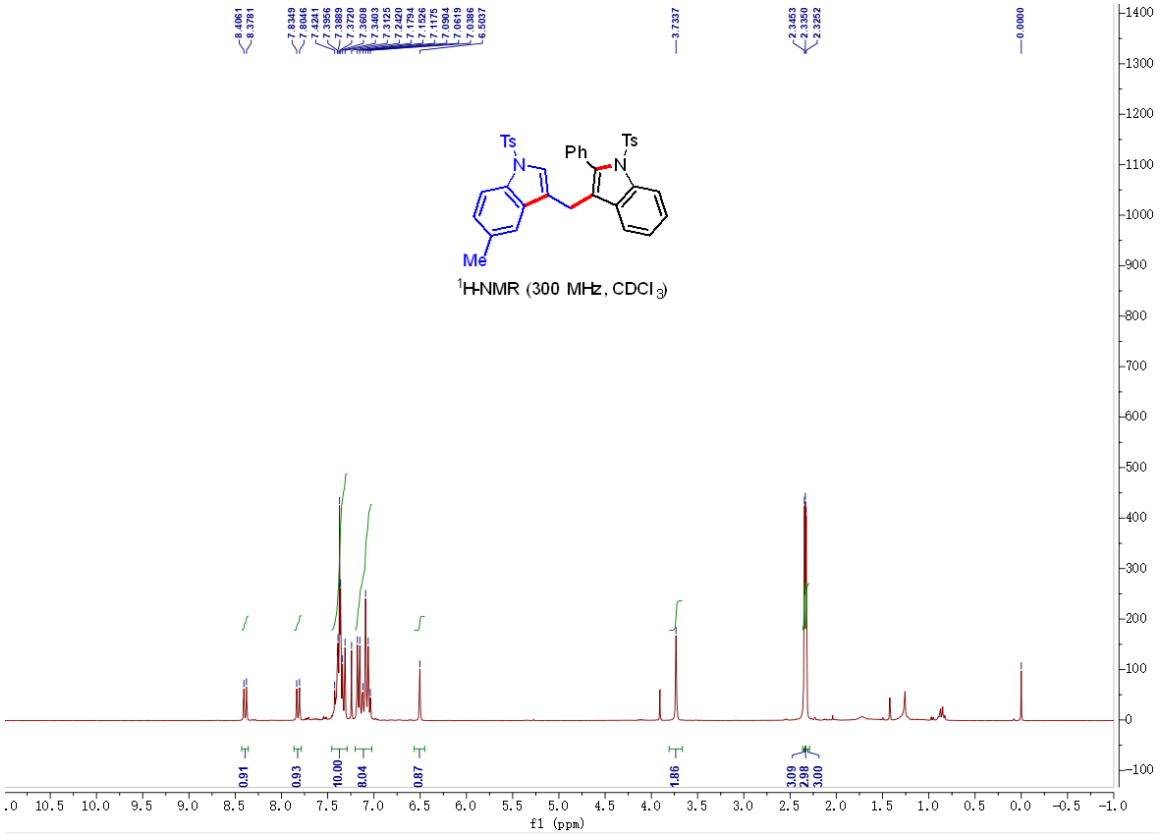


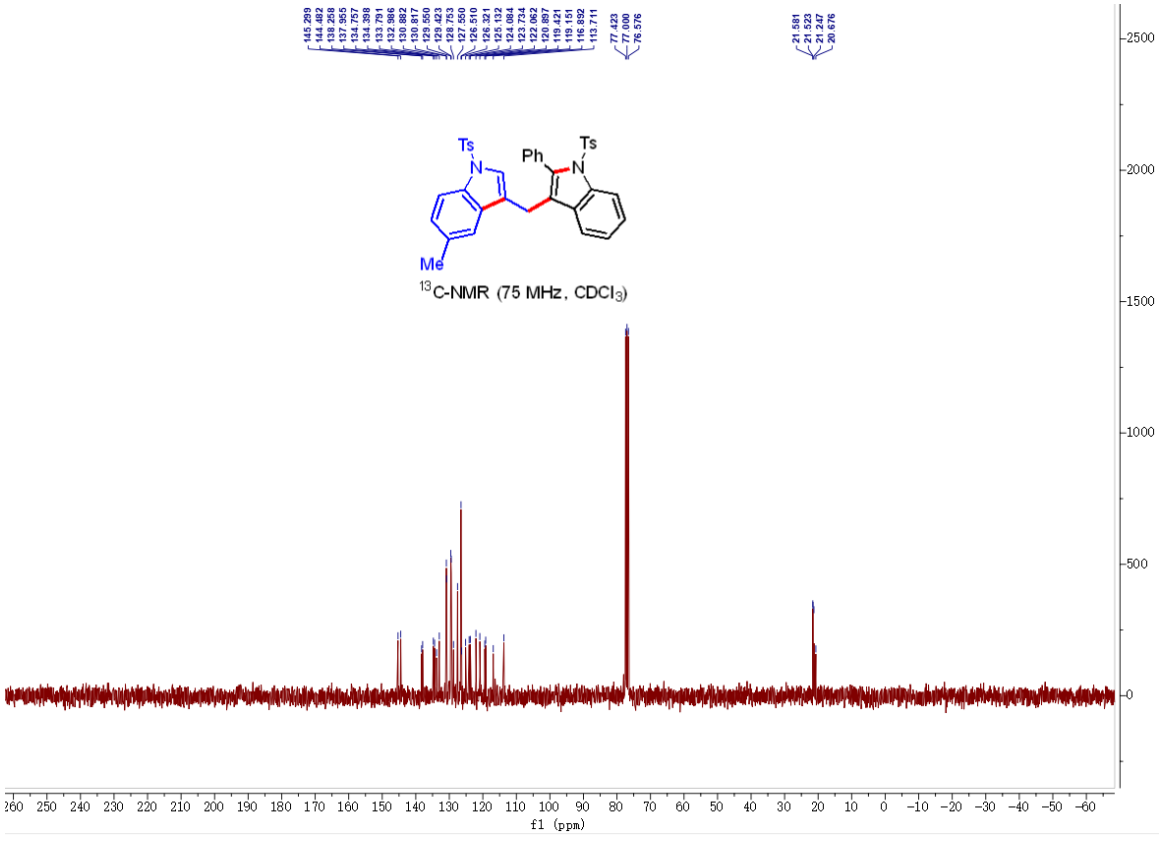
6-bromo-3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1-tosyl-1*H*-indole (3ia):



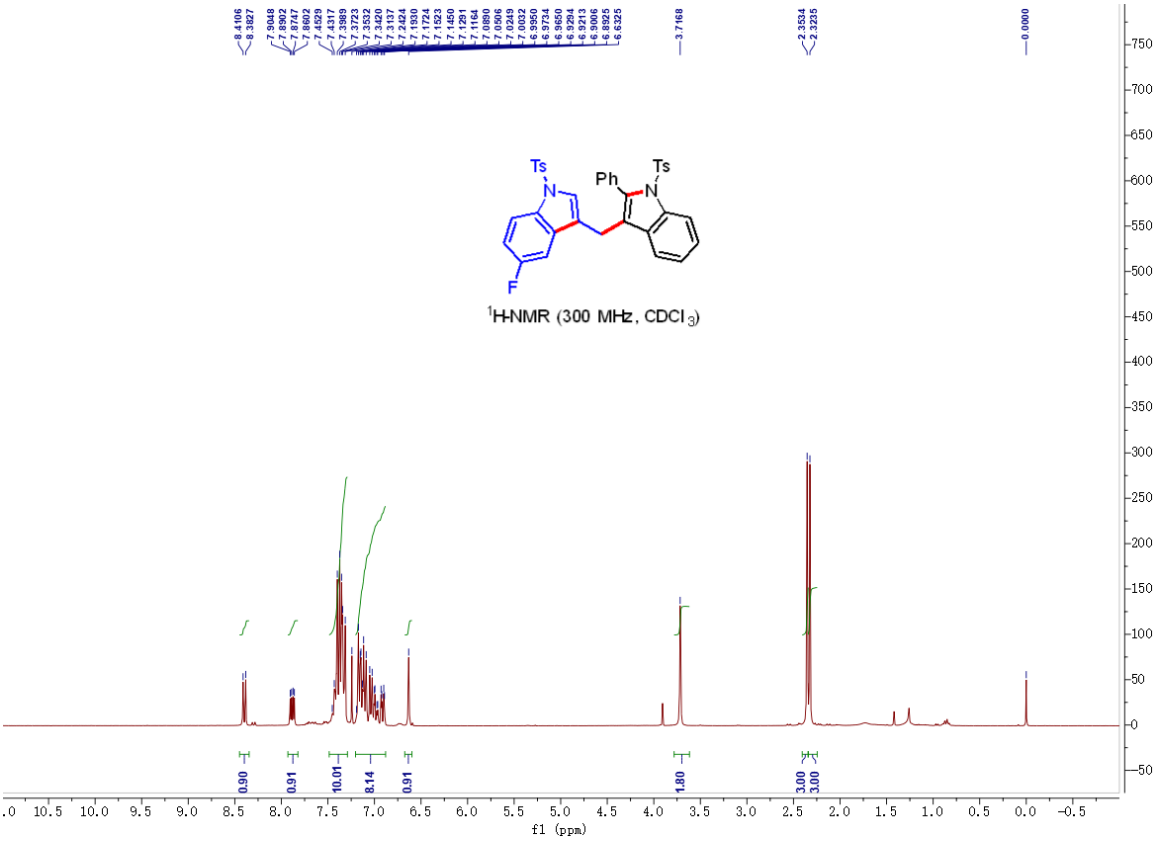


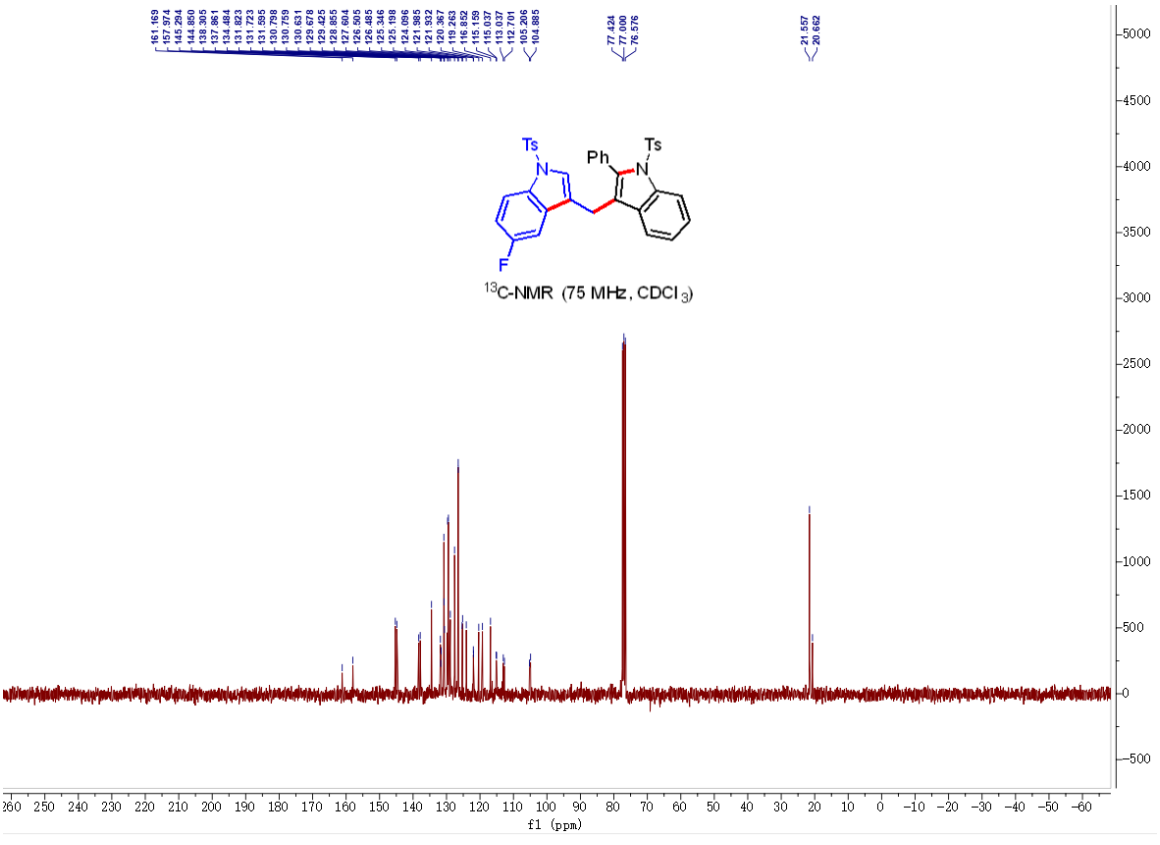
5-methyl-3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1-tosyl-1*H*-indole (3ja):



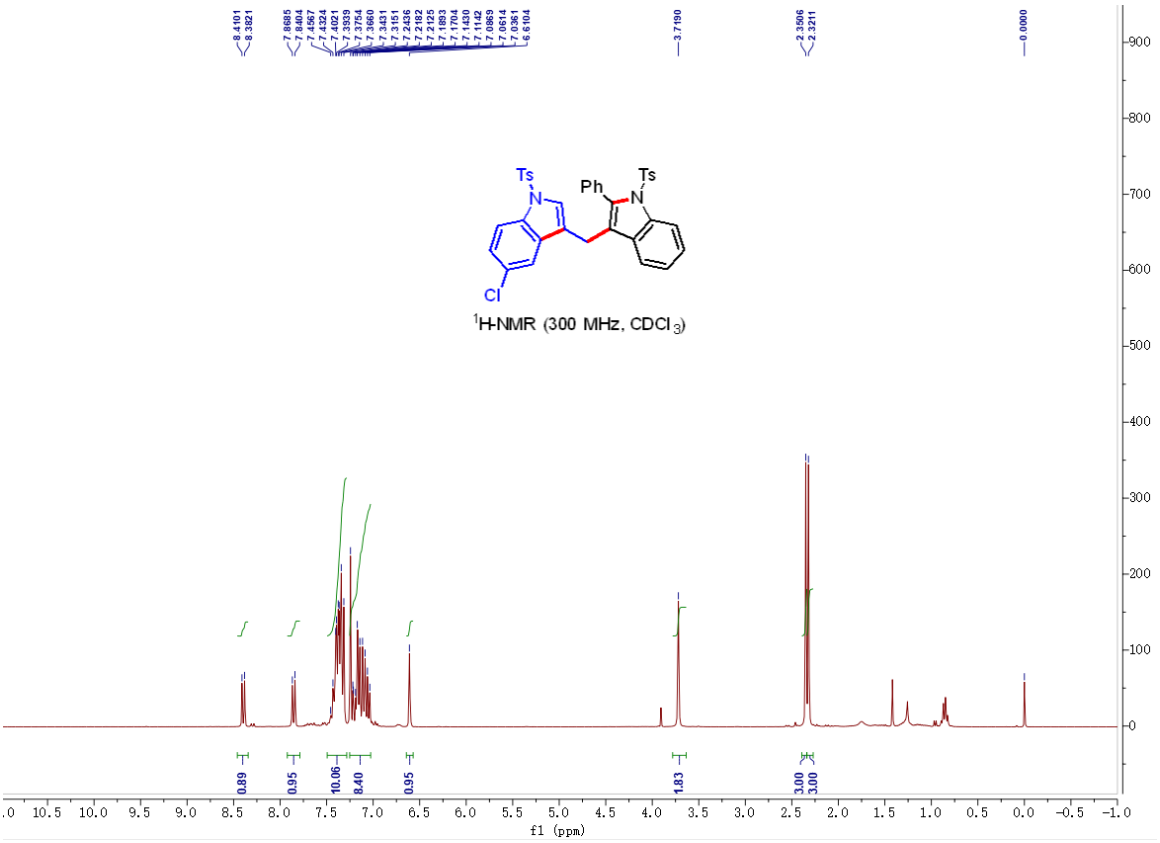


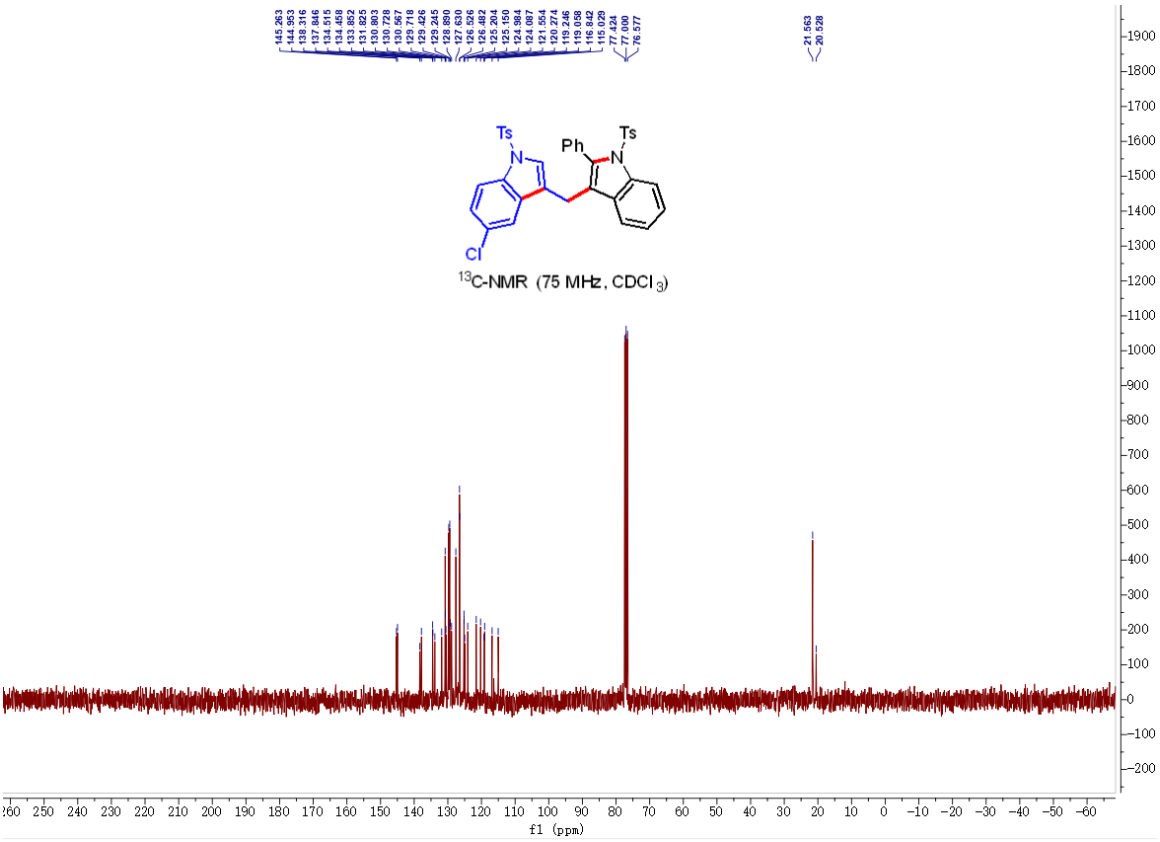
5-fluoro-3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1-tosyl-1*H*-indole (3ka):



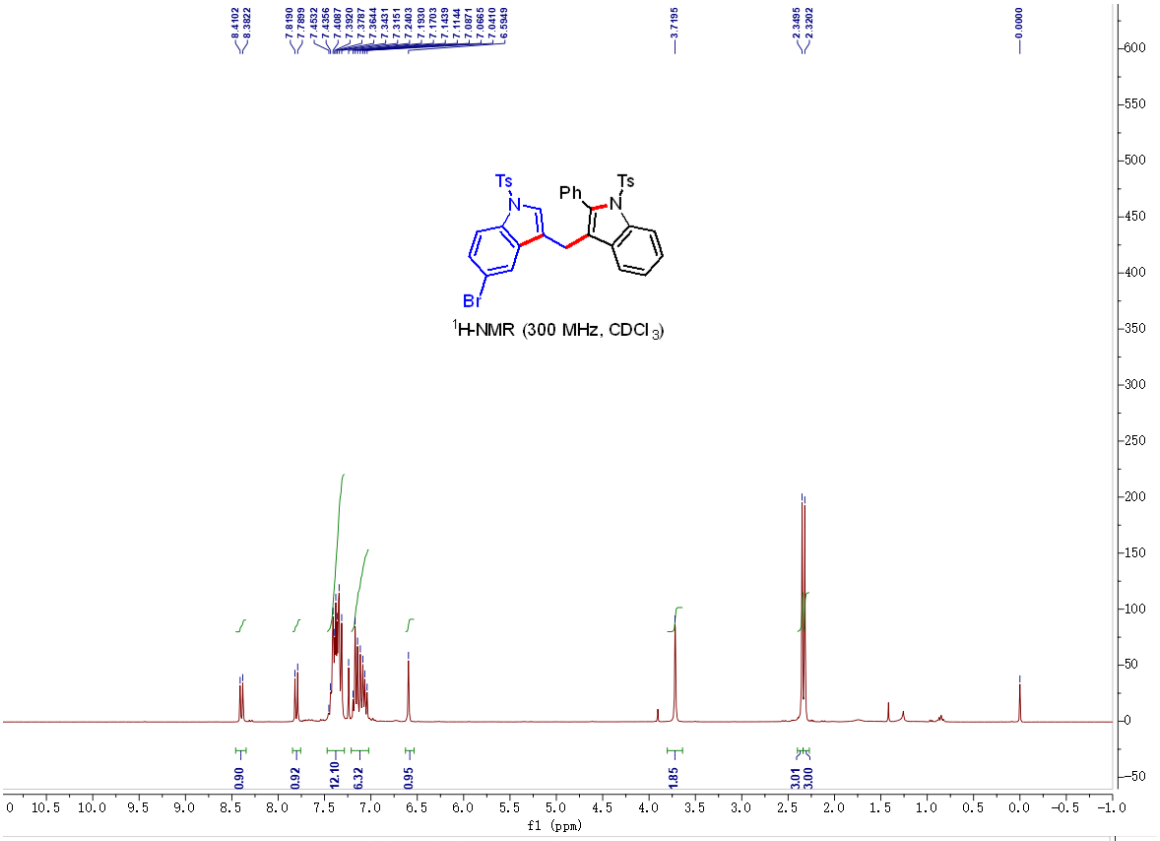


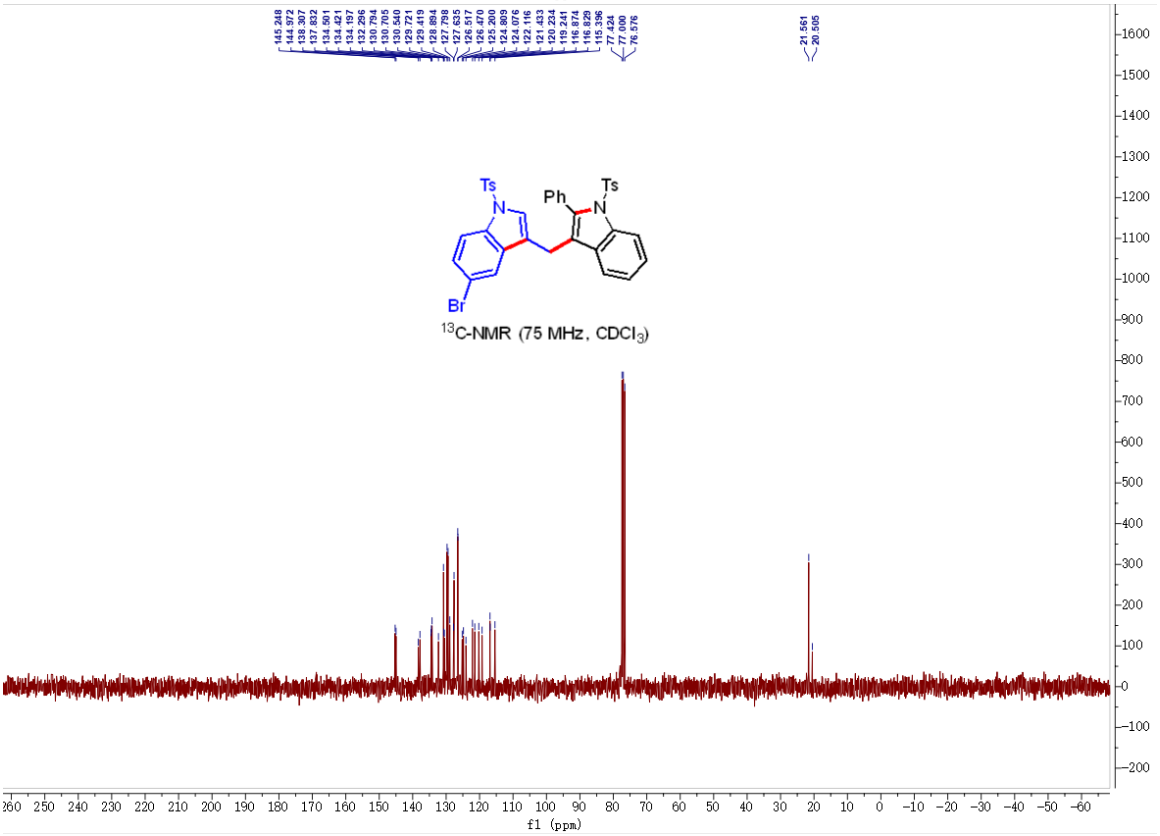
5-chloro-3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1-tosyl-1*H*-indole (3la):



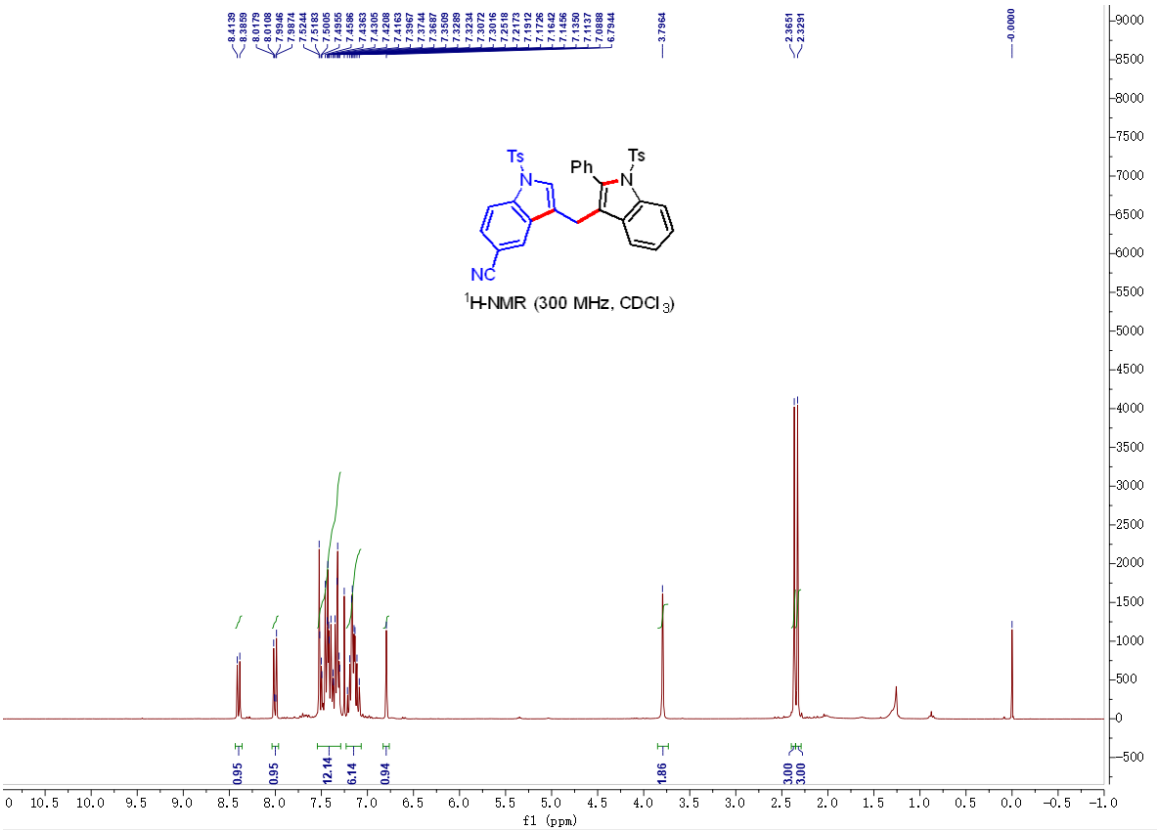


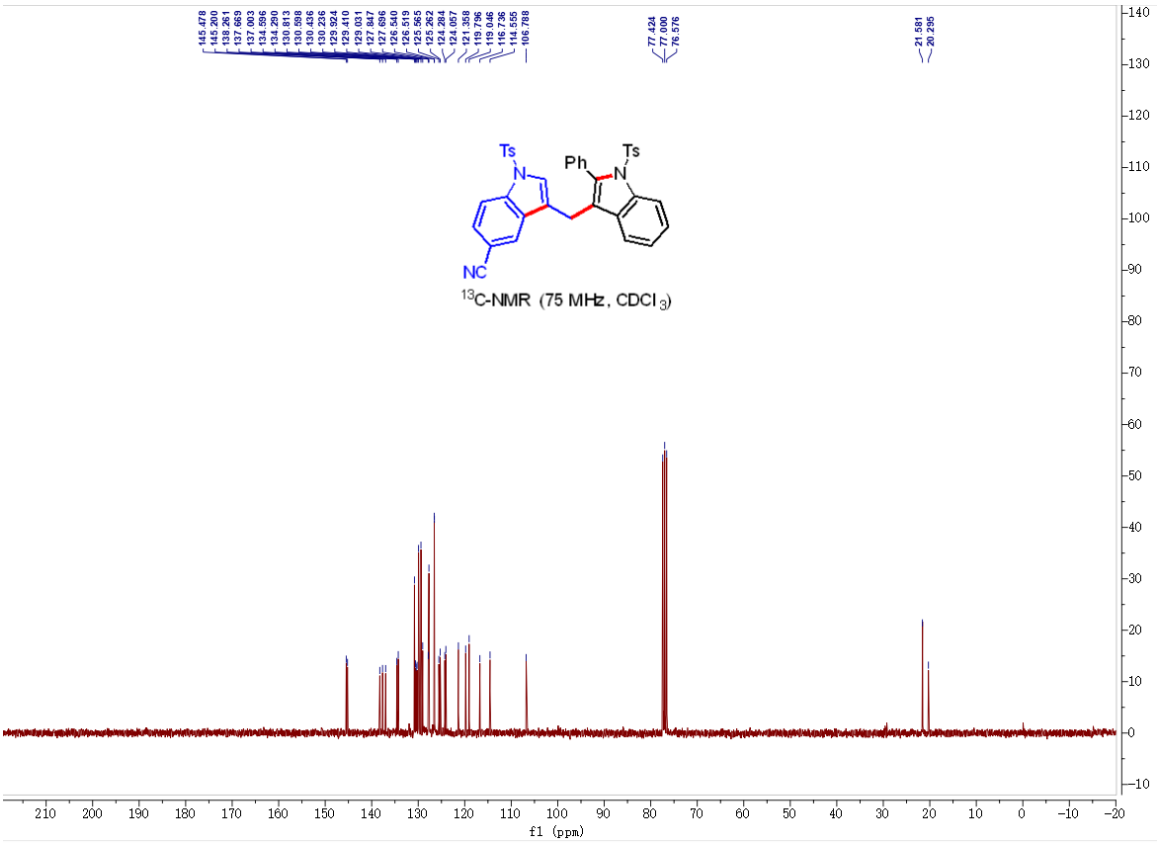
5-bromo-3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1-tosyl-1*H*-indole (3ma):



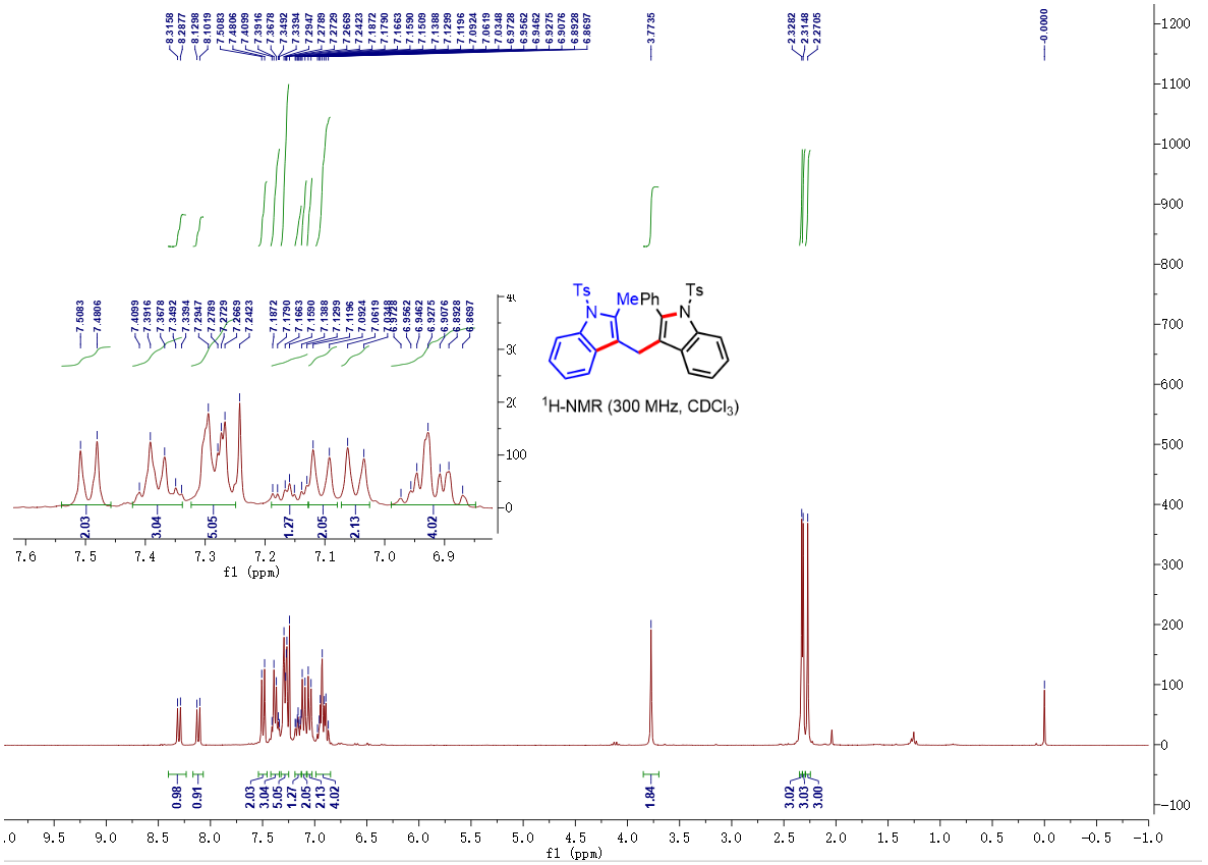


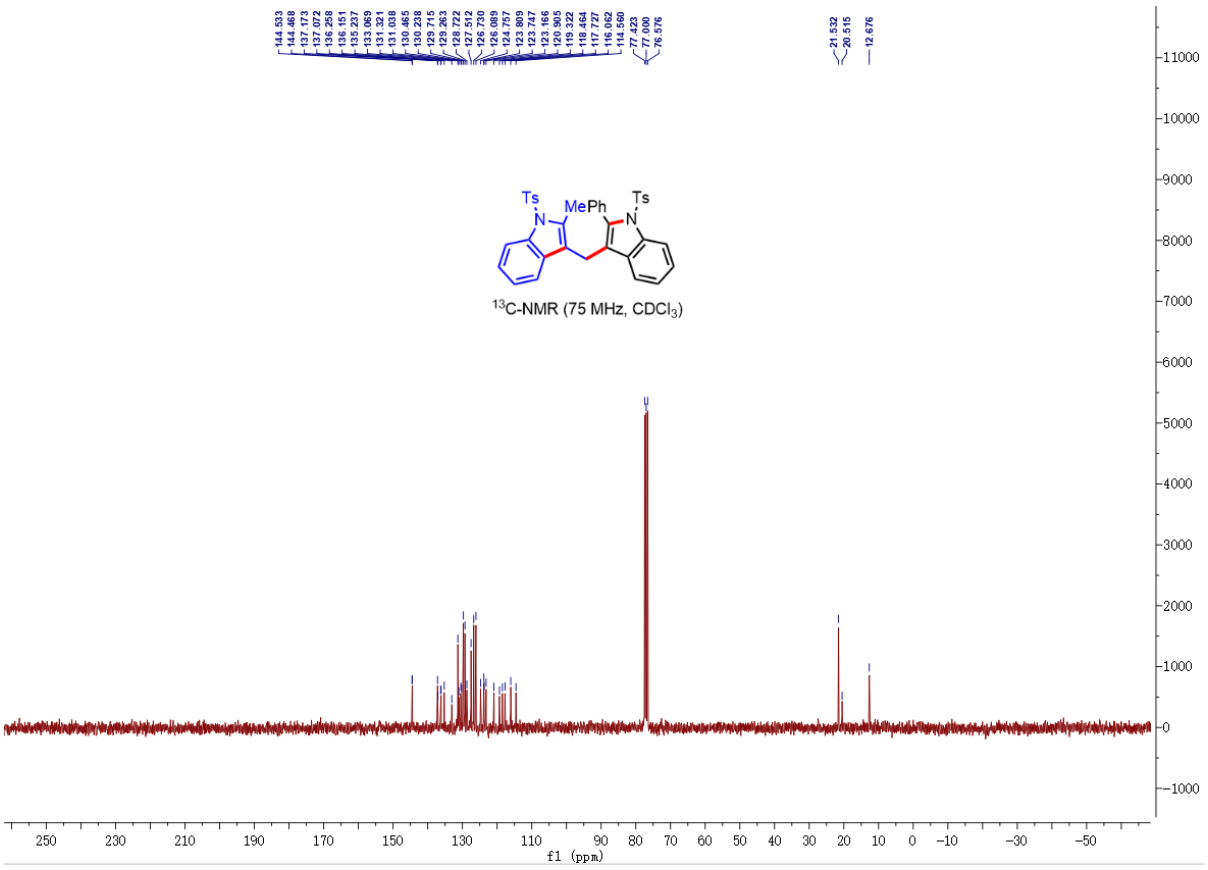
3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1-tosyl-1*H*-indole-5-carbonitrile (3na):



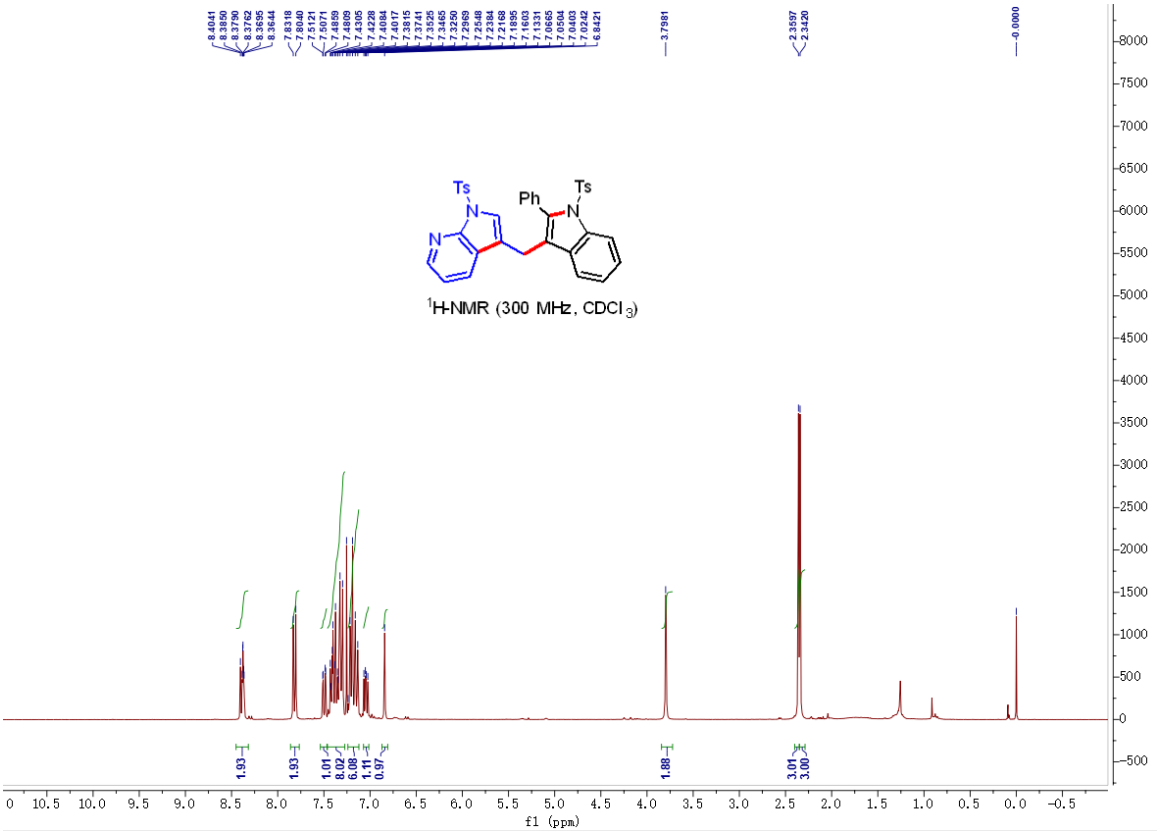


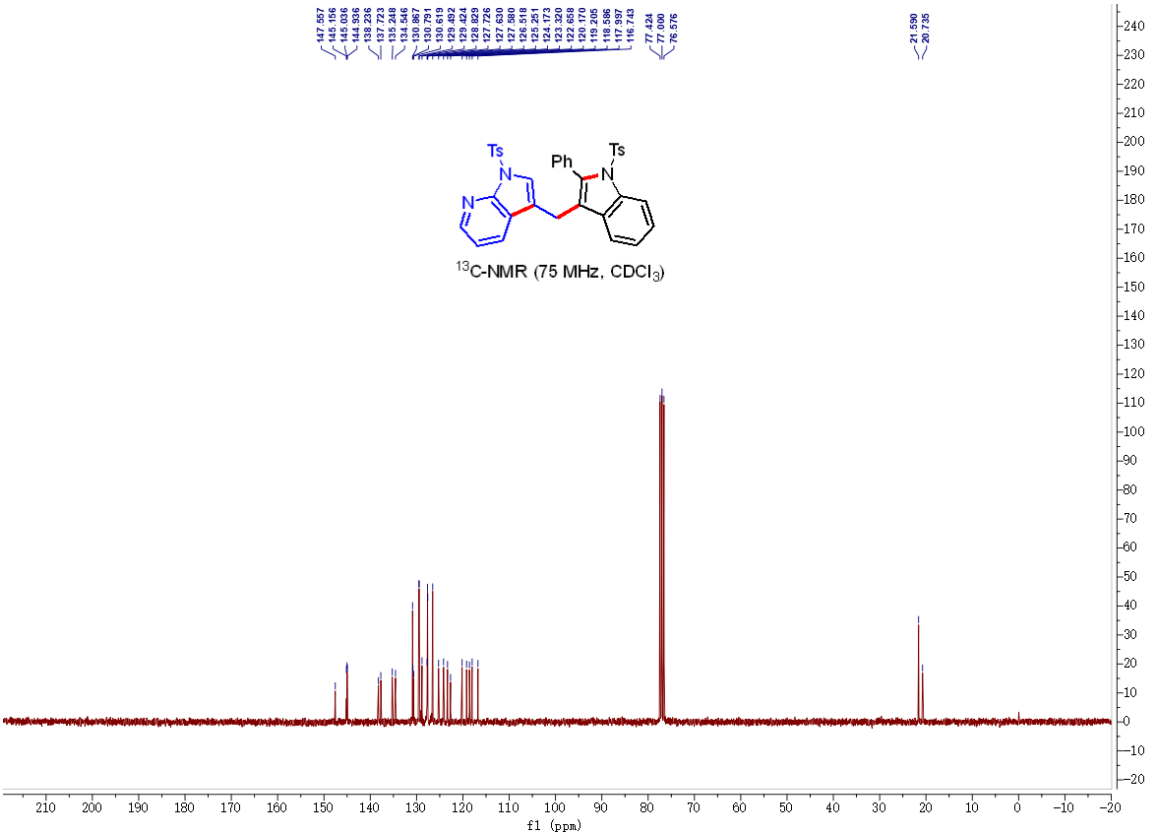
2-methyl-3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1-tosyl-1*H*-indole (3oa):



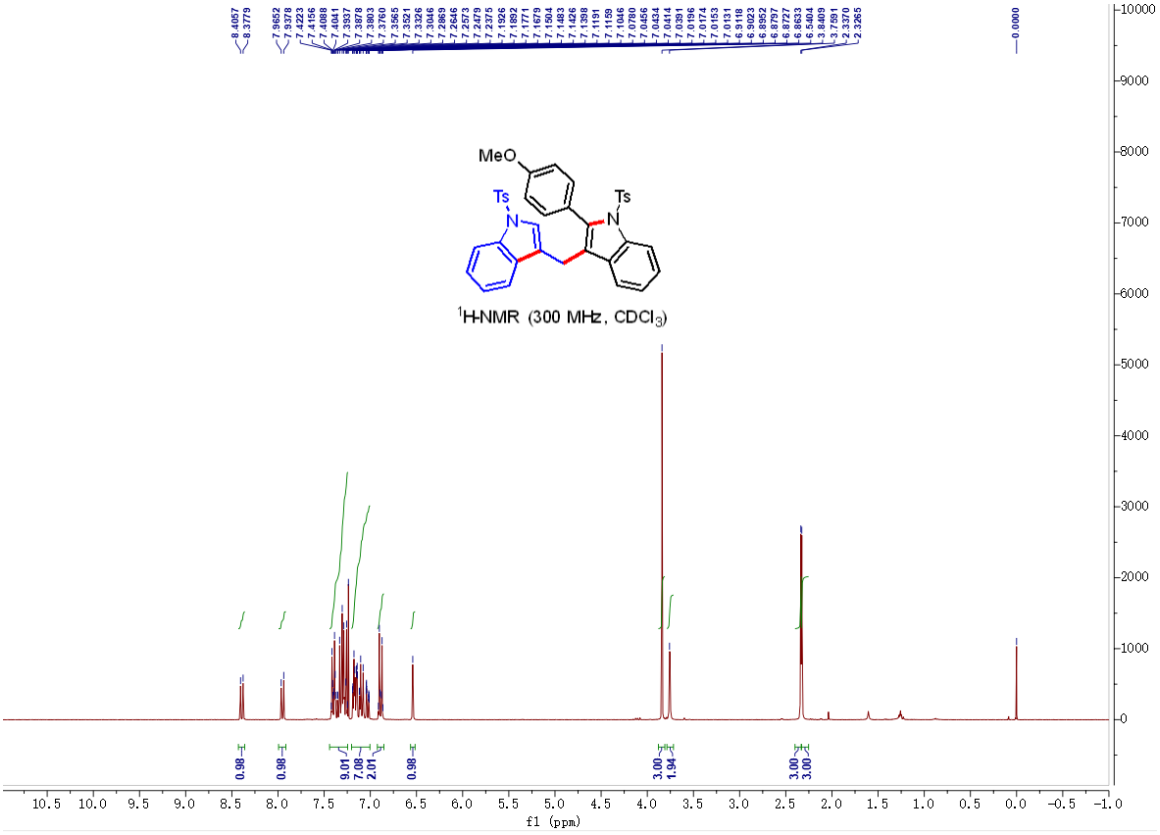


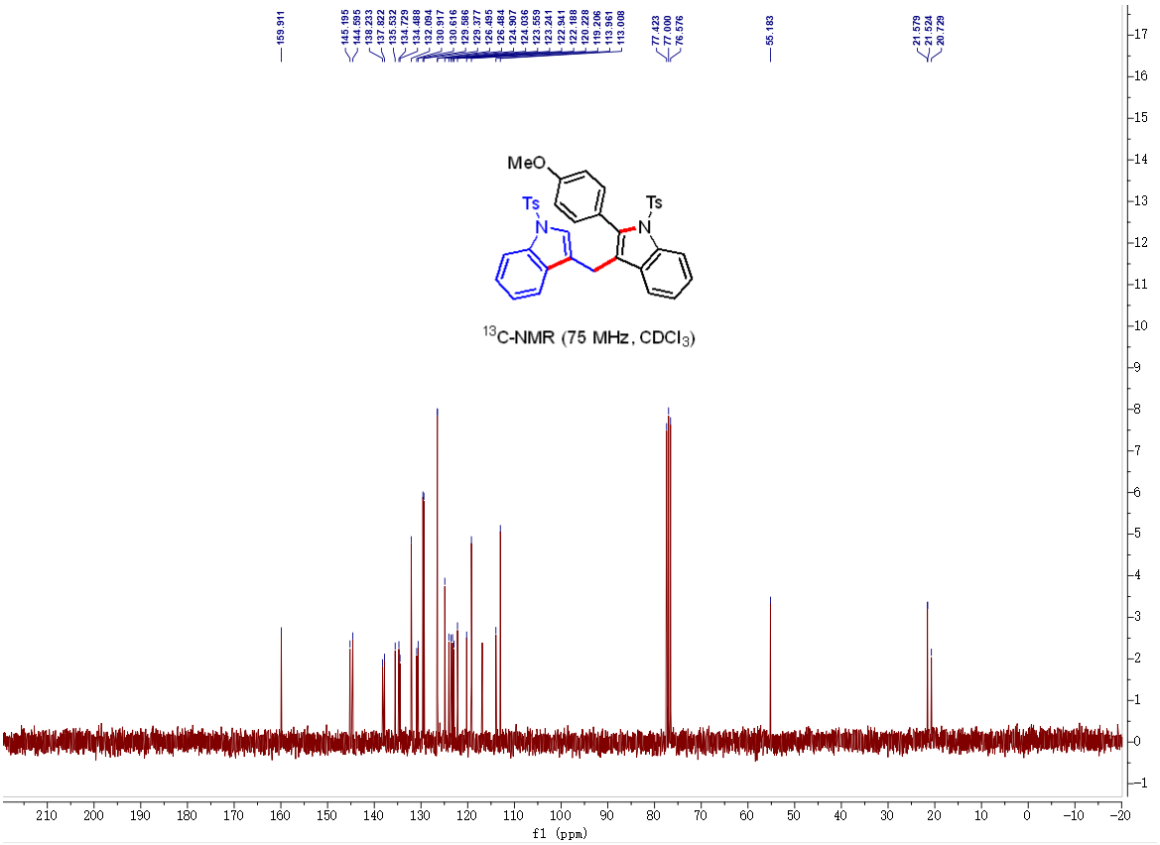
3-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)-1-tosyl-1*H*-pyrrolo[2,3-b]pyridine (3pa):



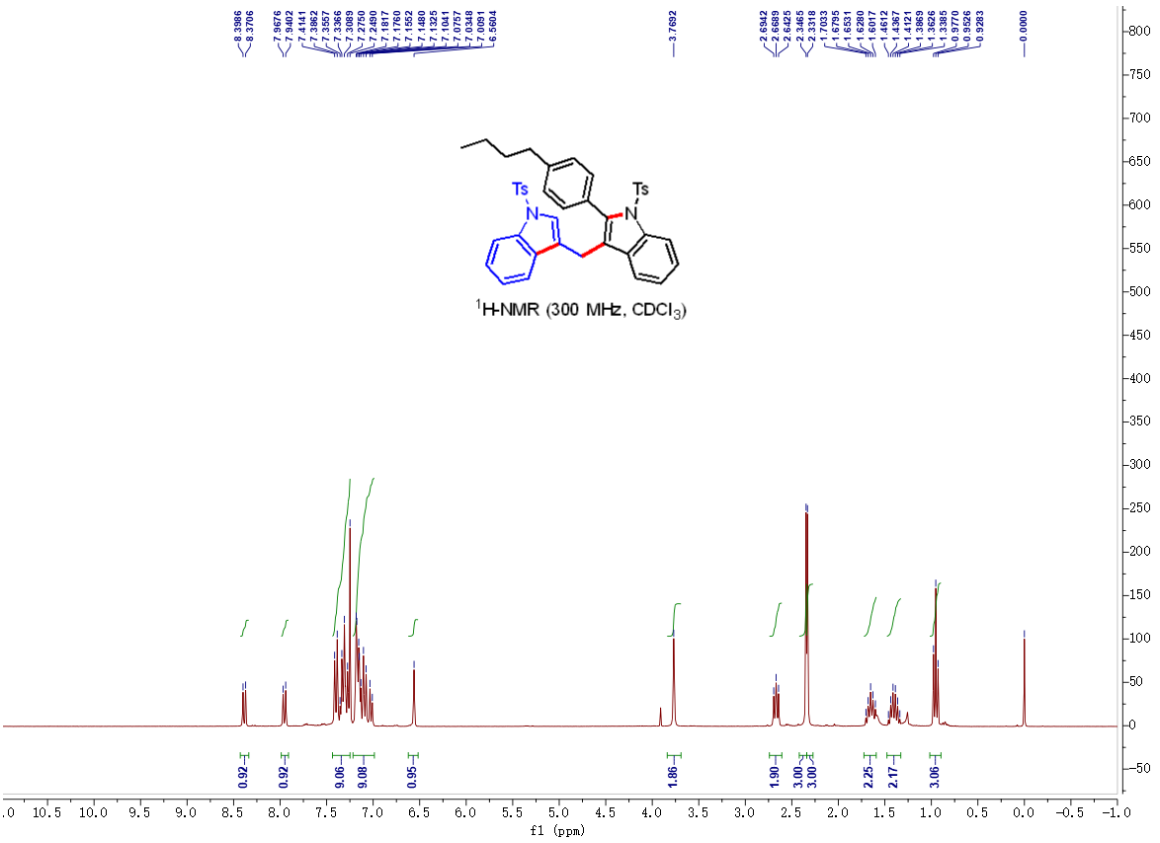


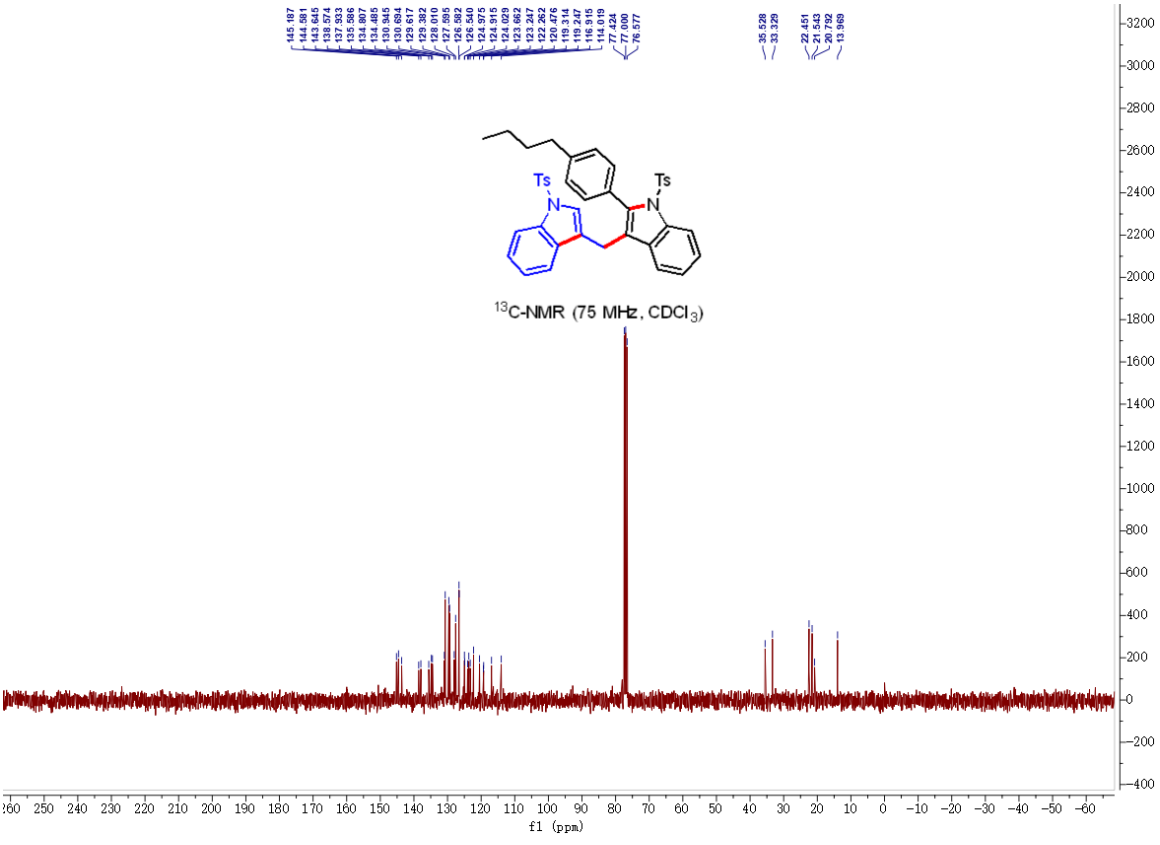
2-(4-methoxyphenyl)-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3ab):



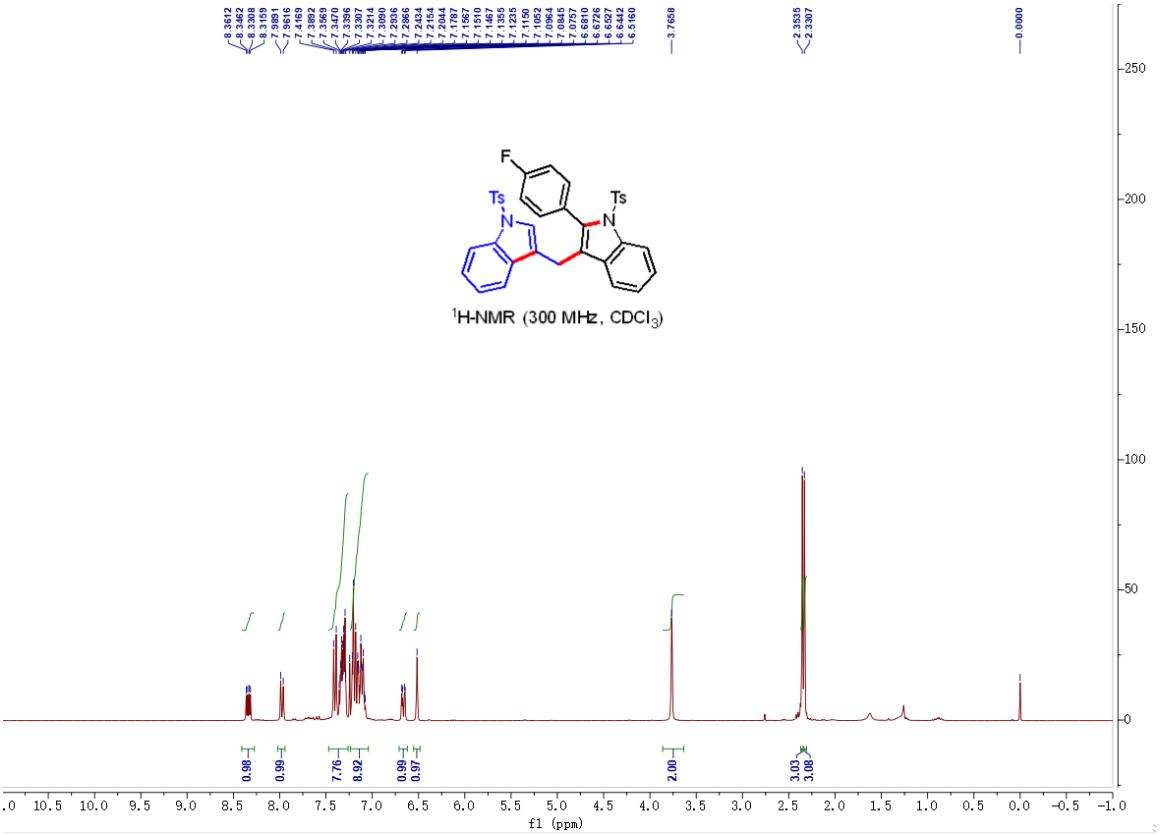


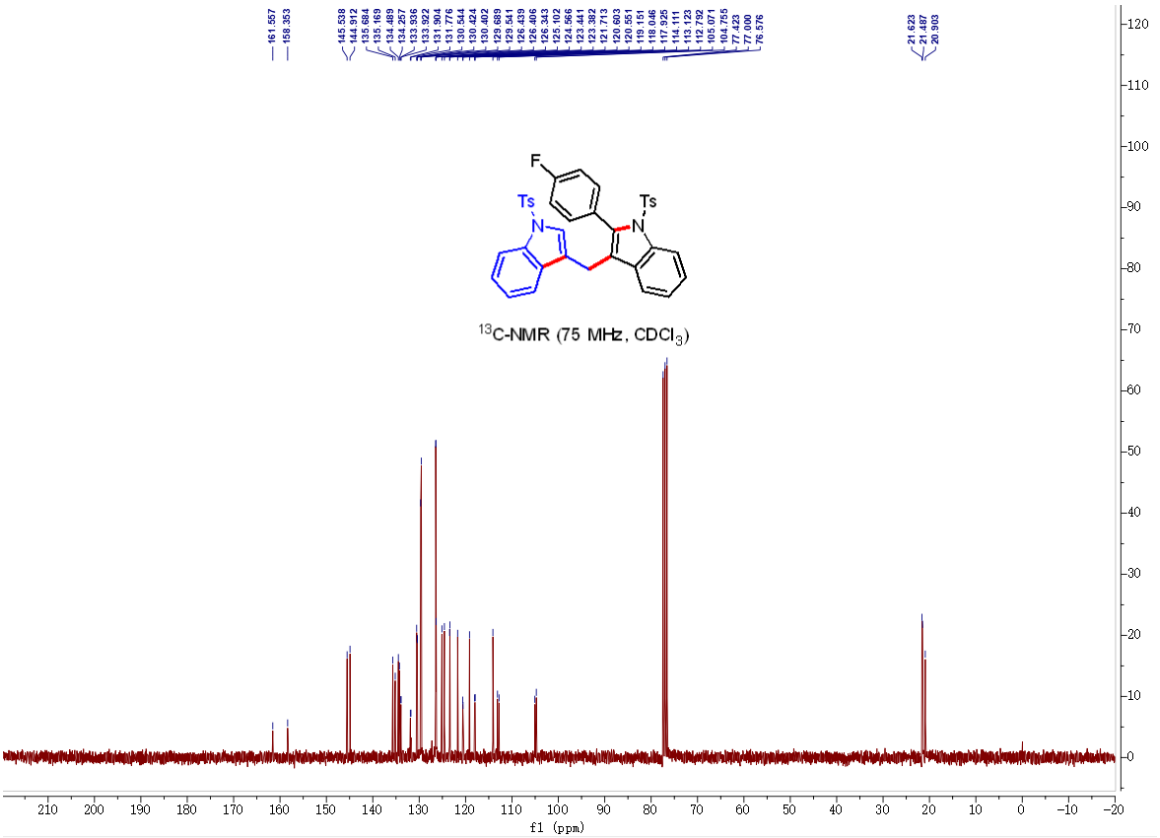
2-(4-butylphenyl)-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3ac):



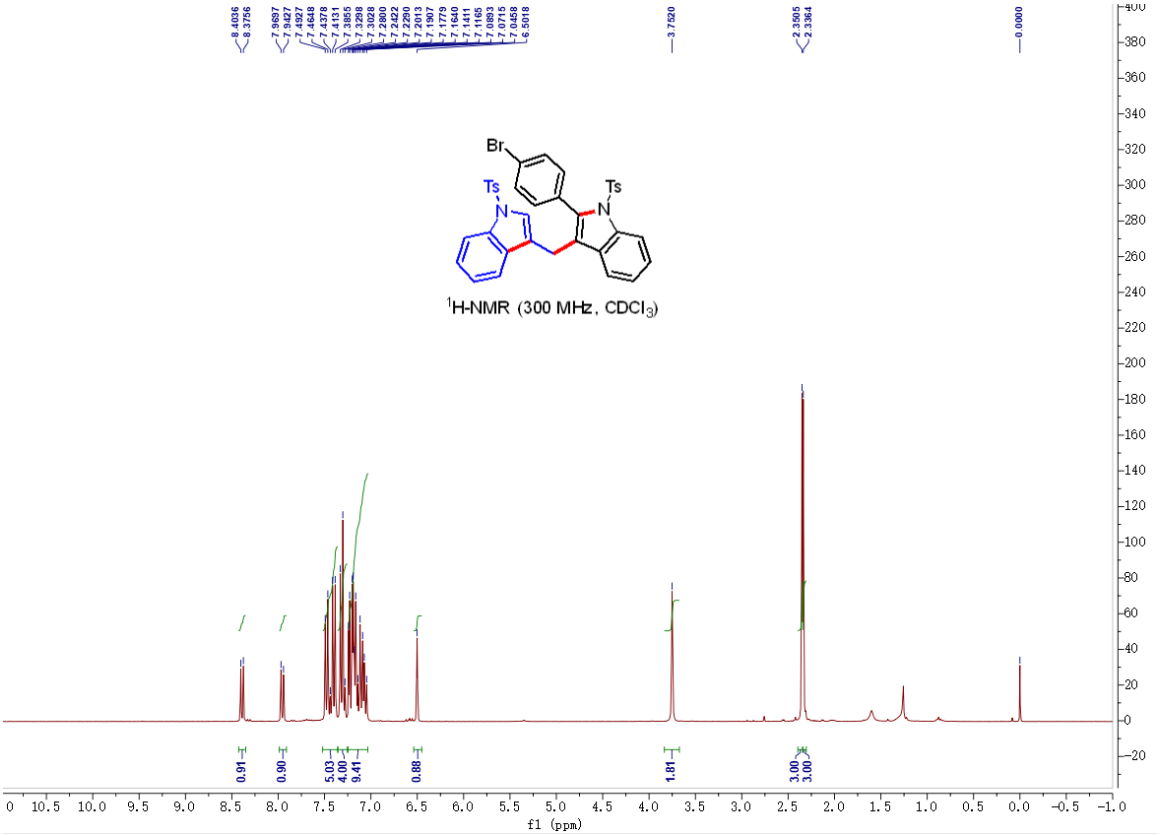


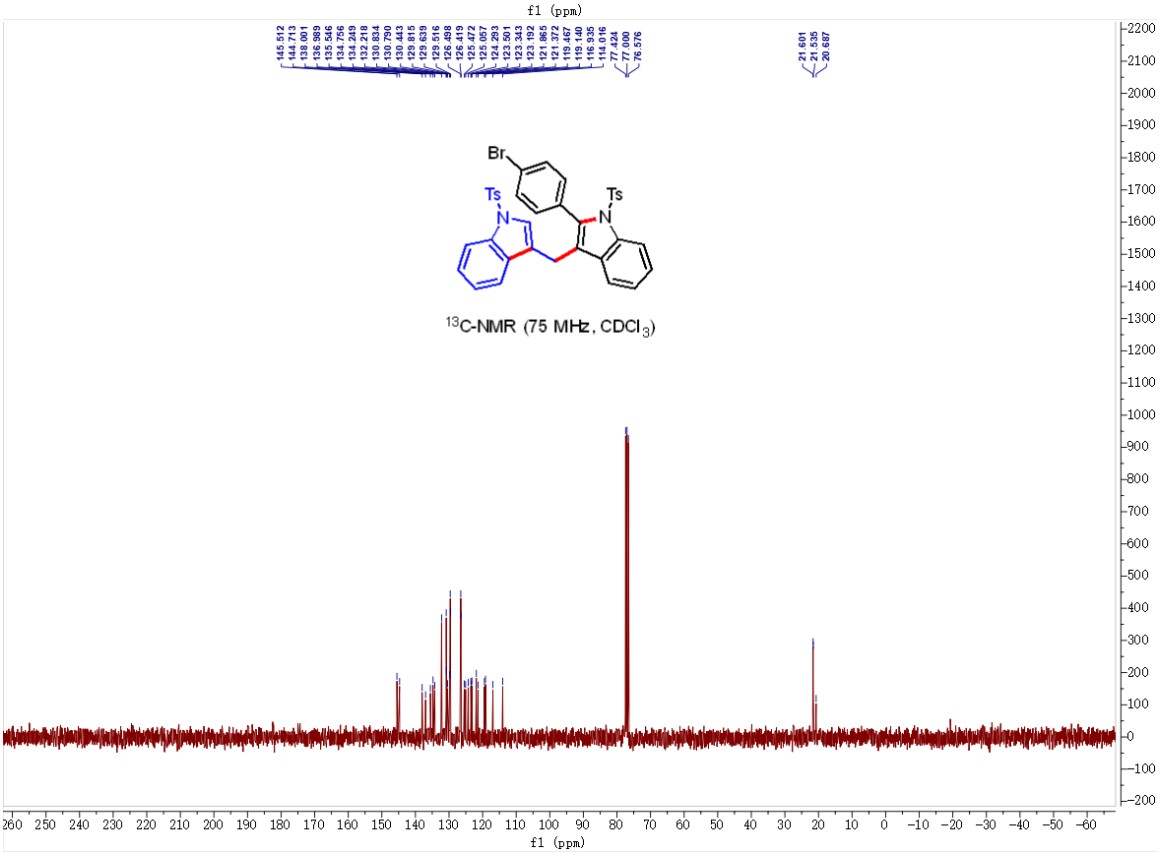
2-(4-fluorophenyl)-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3ad):



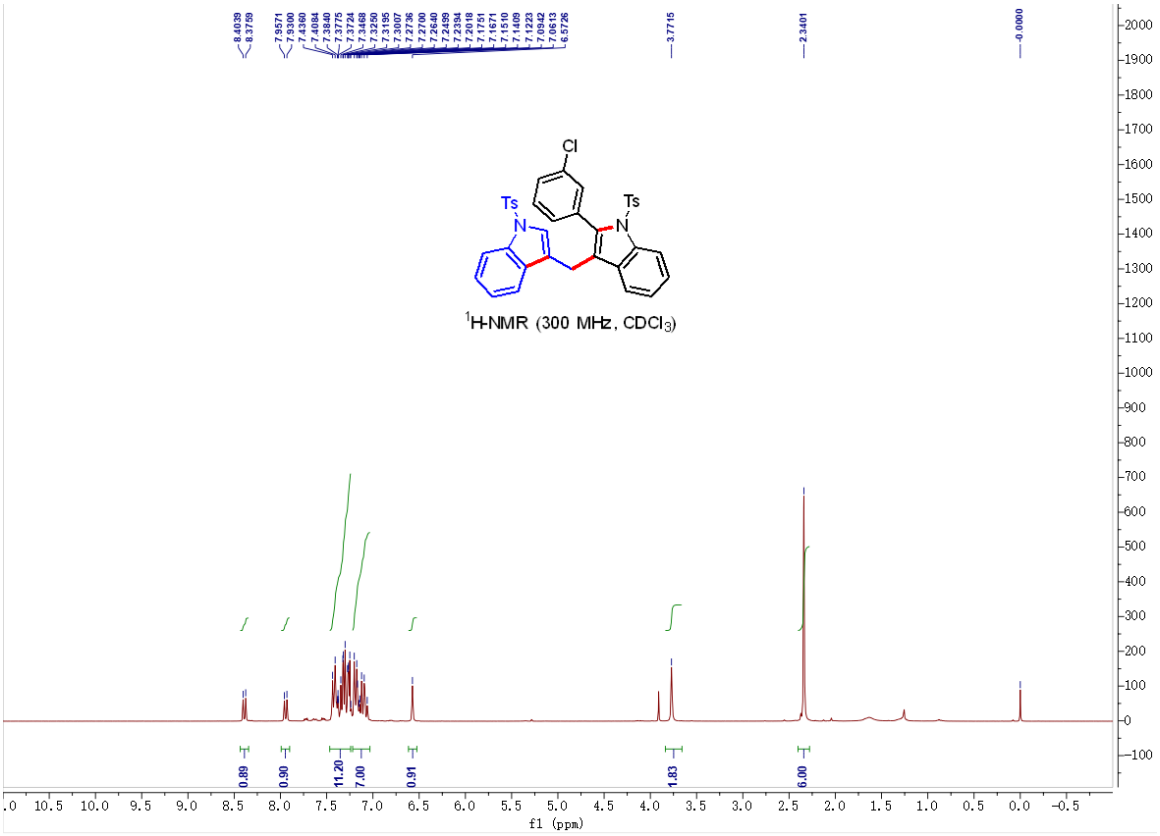


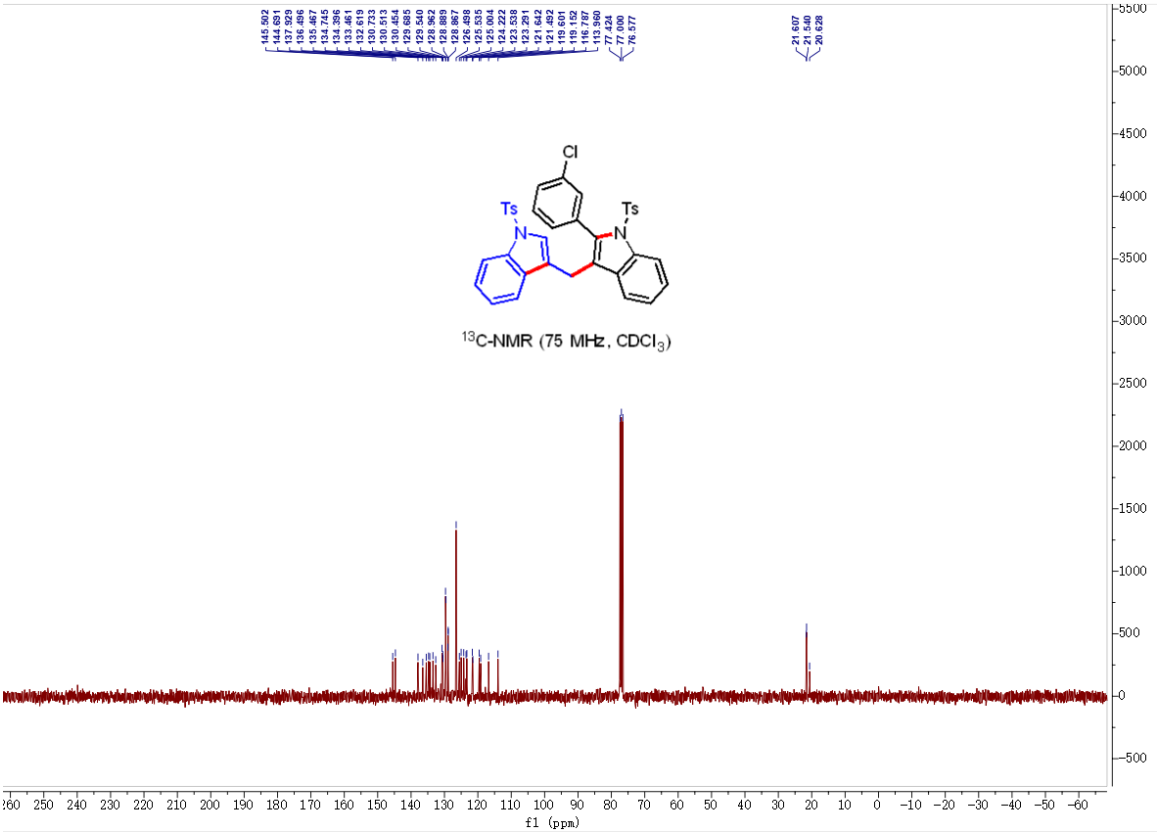
2-(4-bromophenyl)-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3ae):



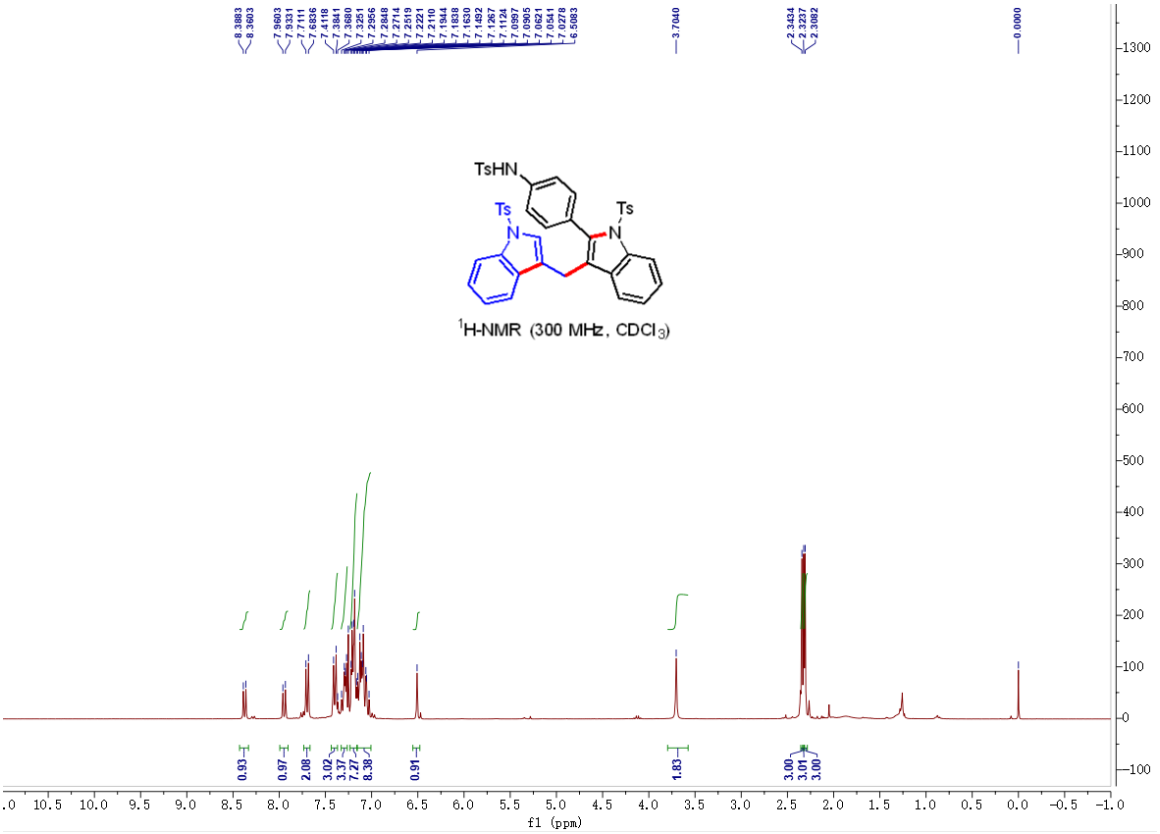


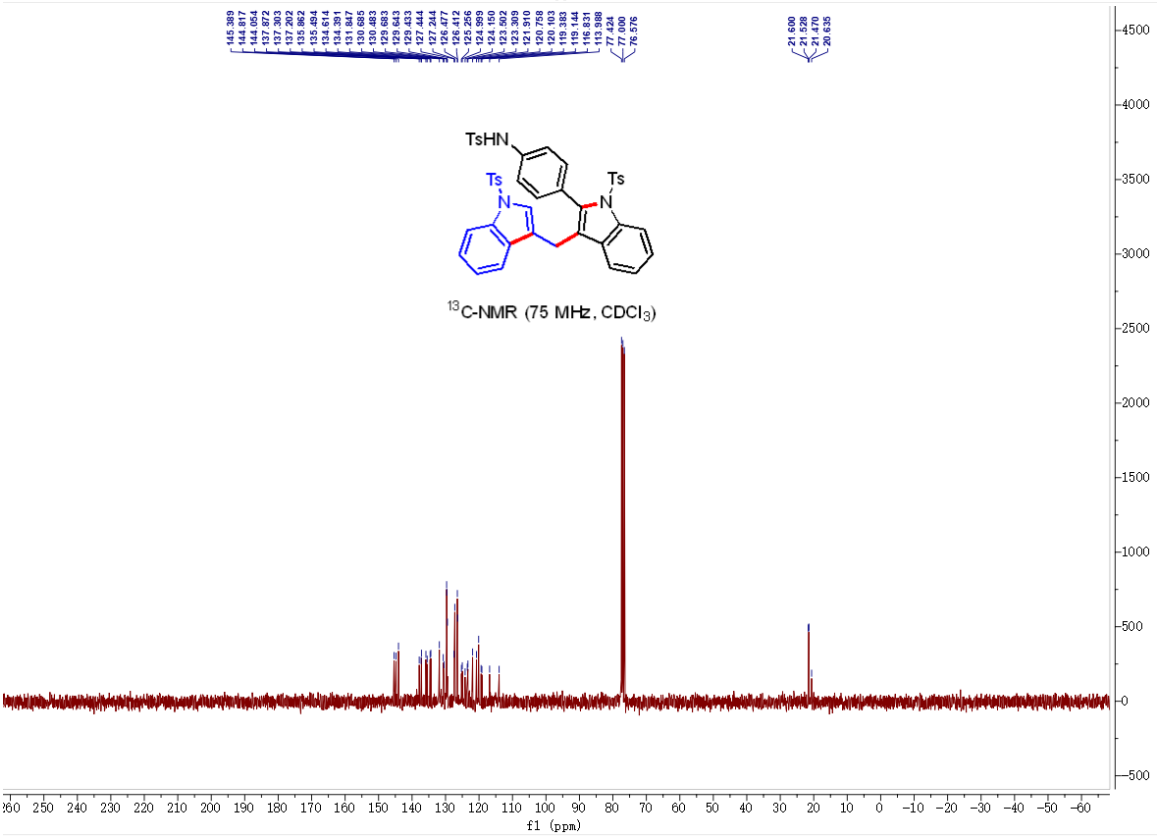
2-(3-chlorophenyl)-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3af):



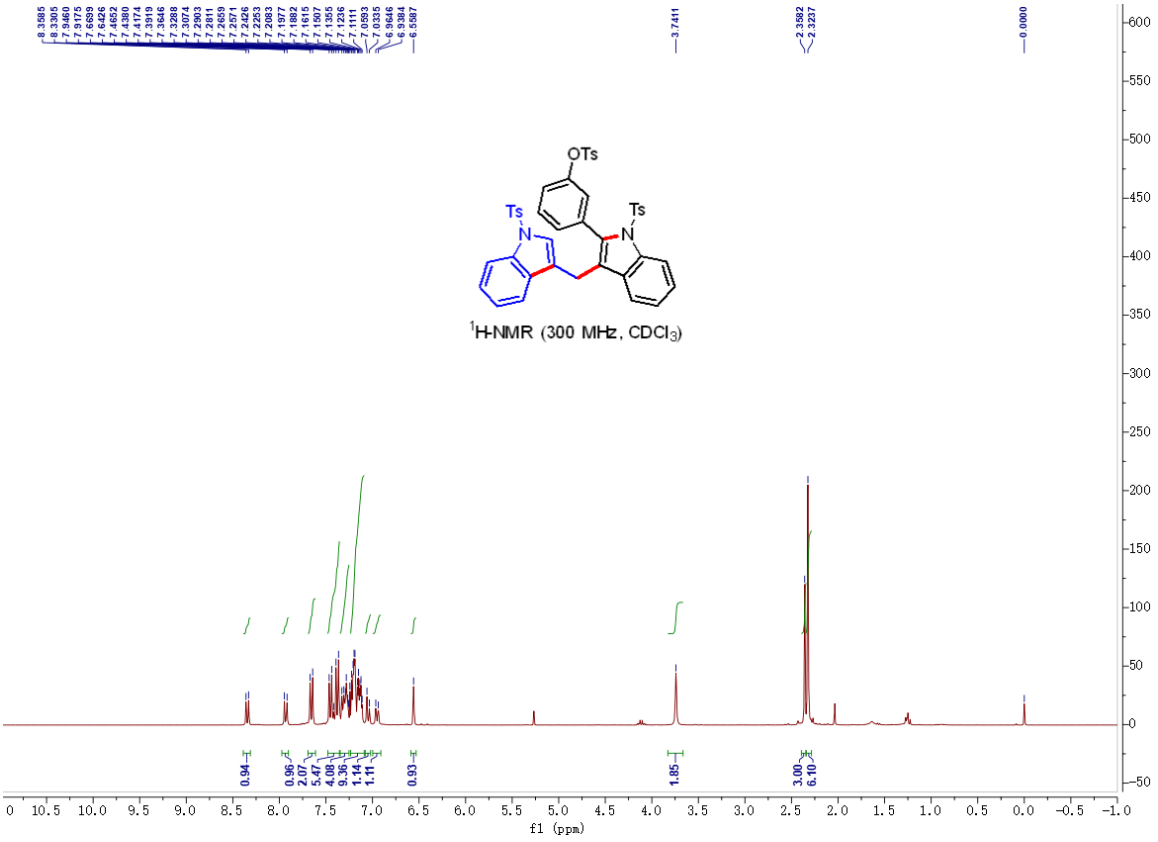


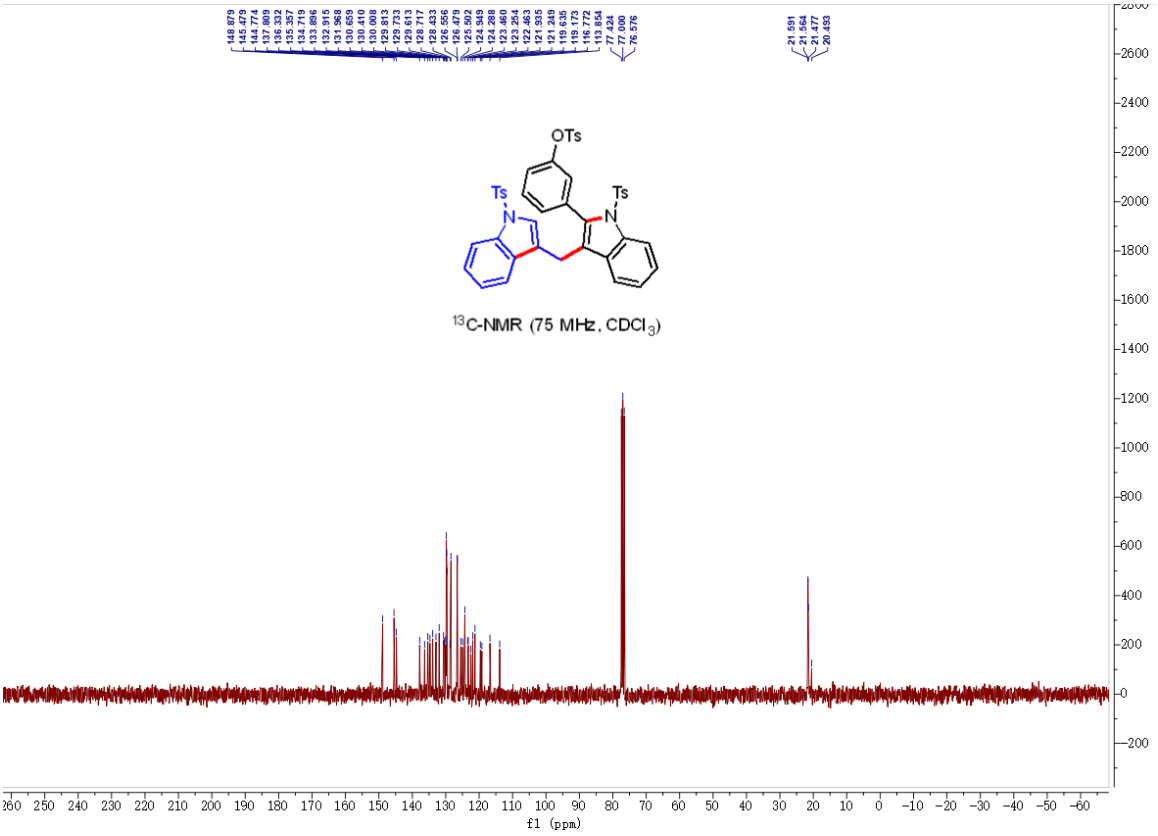
4-methyl-*N*-(4-(1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indol-2-yl)phenyl)benzenesulfonamide (3ag):



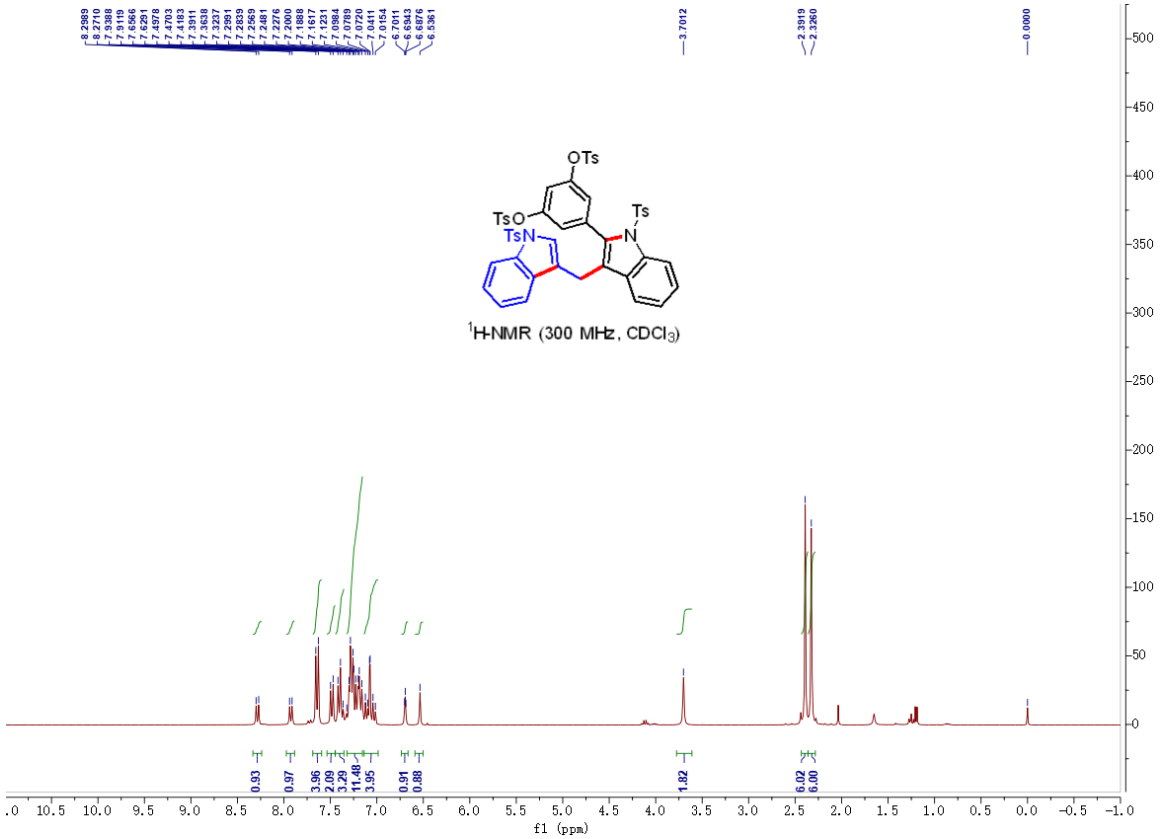


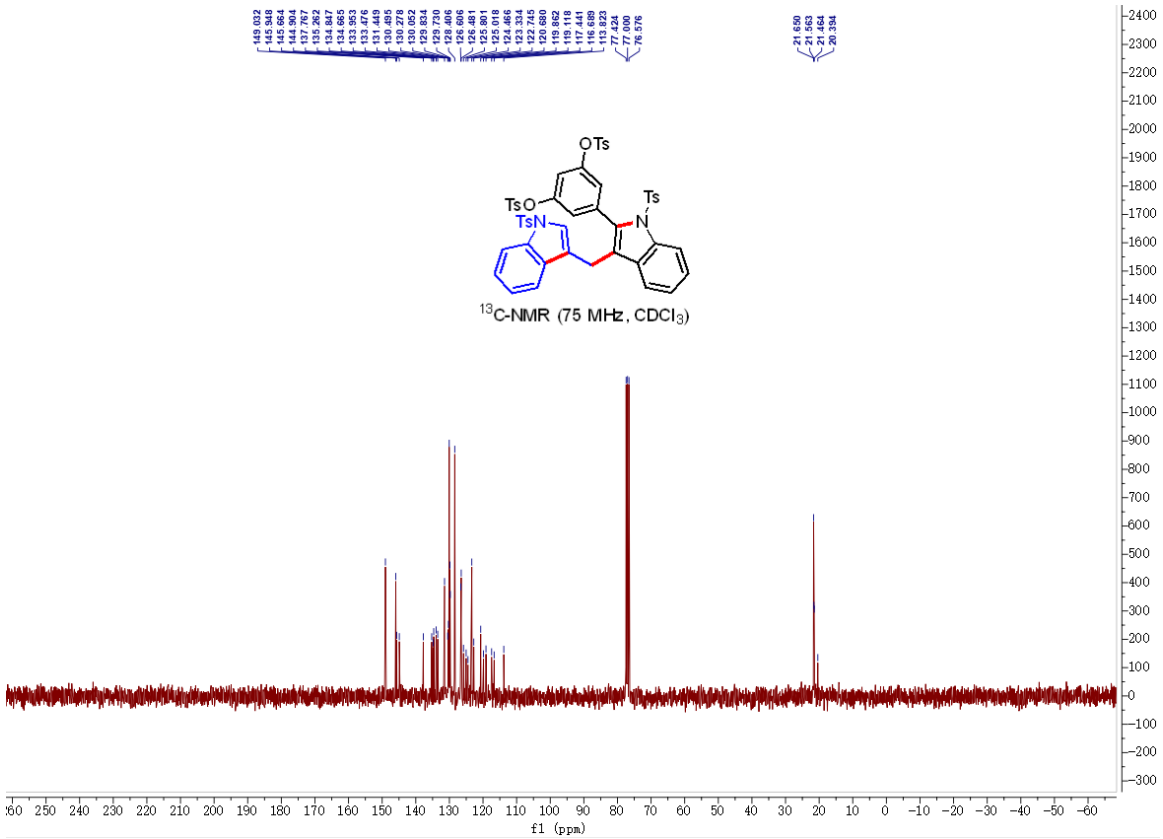
3-(1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indol-2-yl)phenyl 4-methylbenzenesulfonate (3ah):



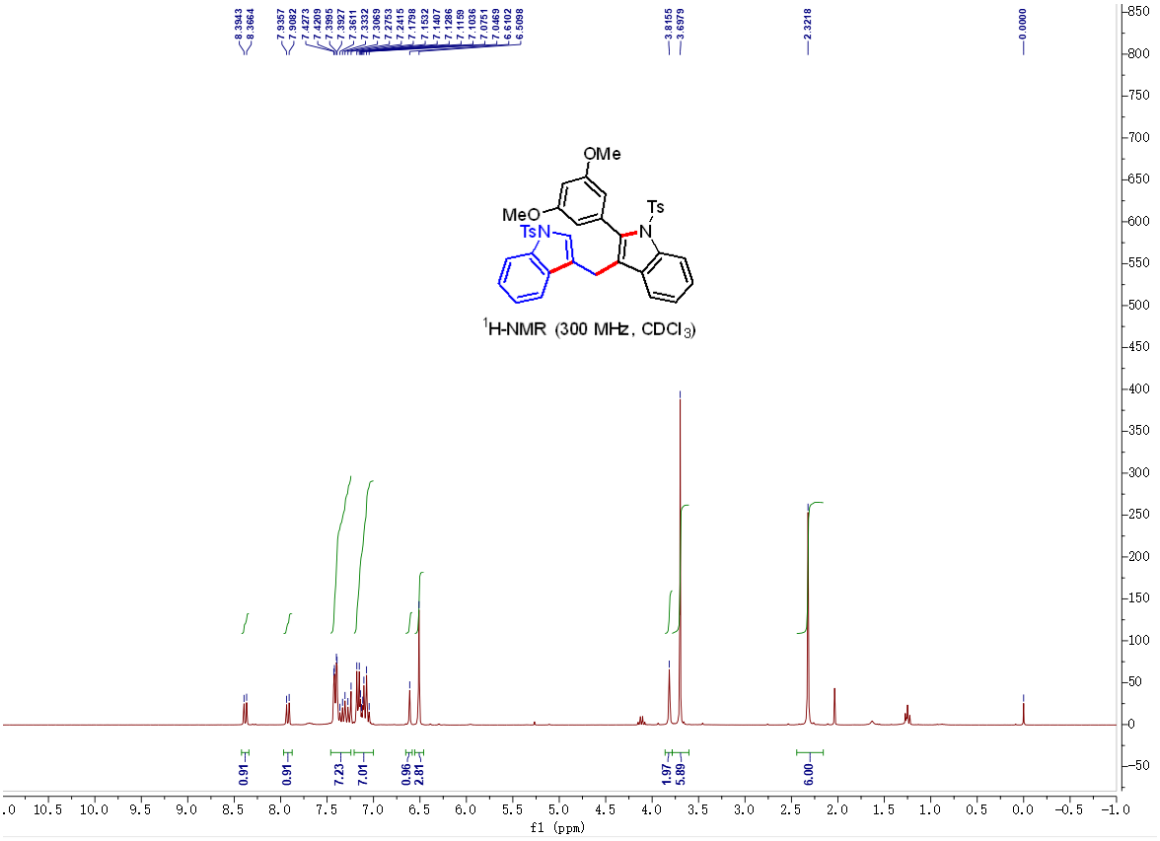


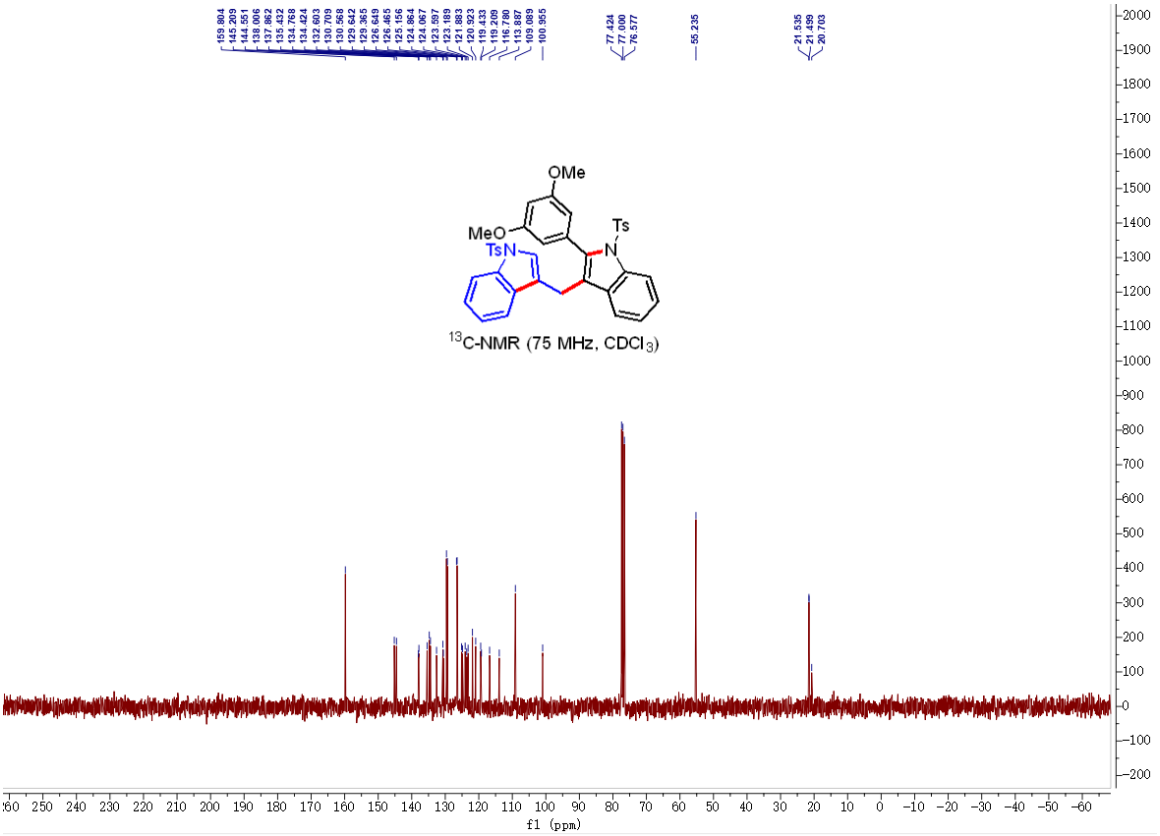
5-(1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indol-2-yl)-1,3-phenylene bis(4-methylbenz-enesulfonate) (3ai):



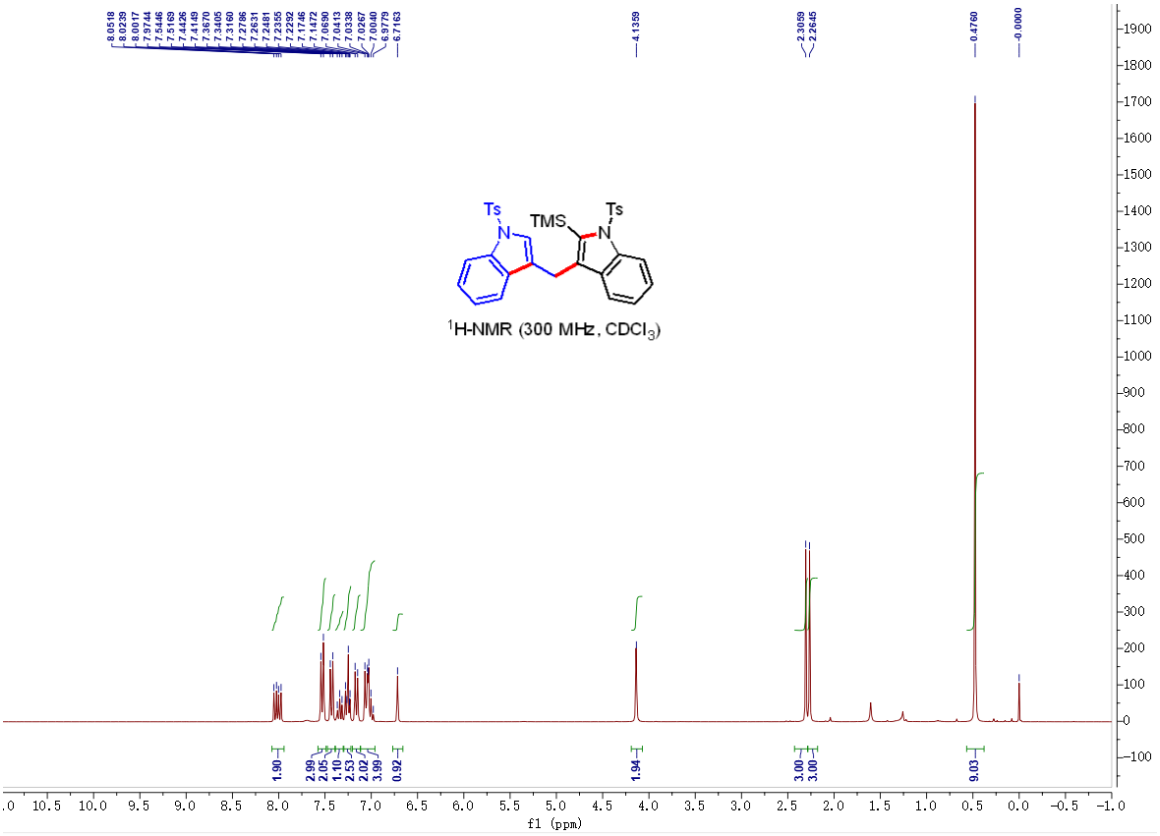


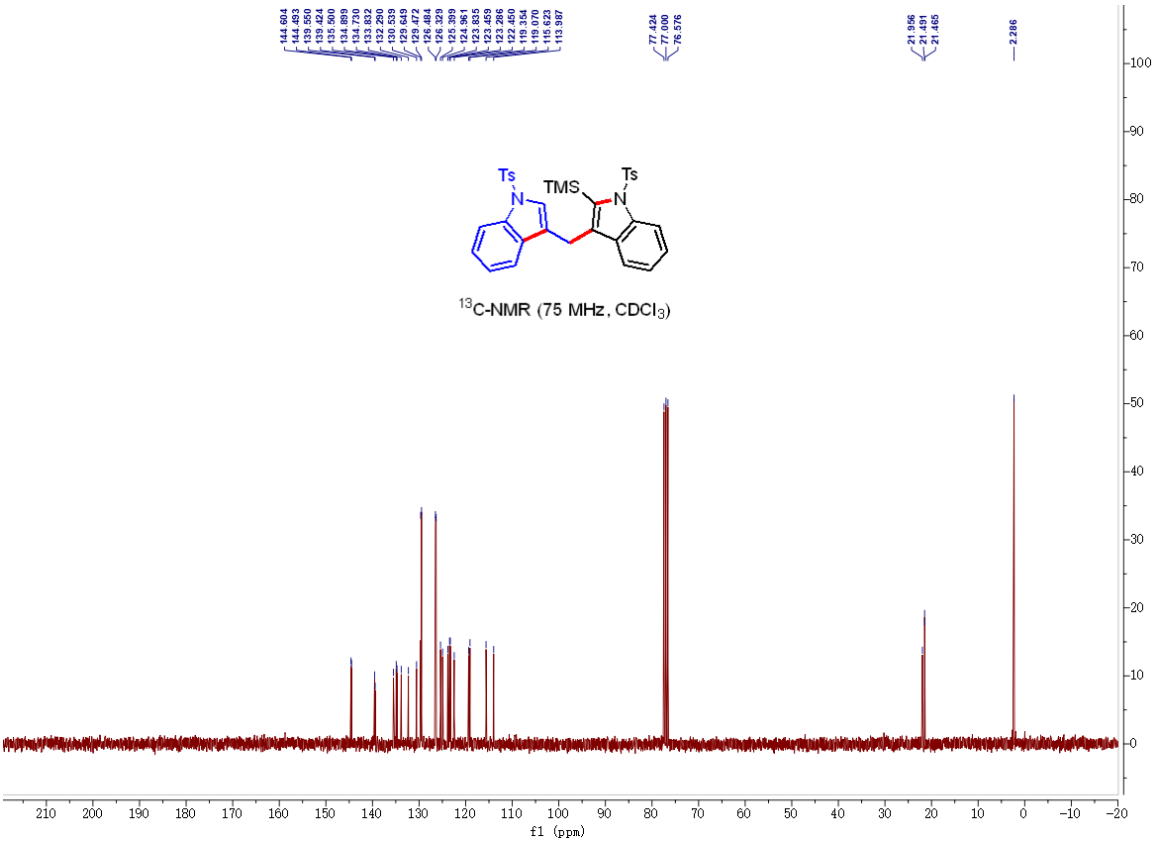
2-(3,5-dimethoxyphenyl)-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3aj):



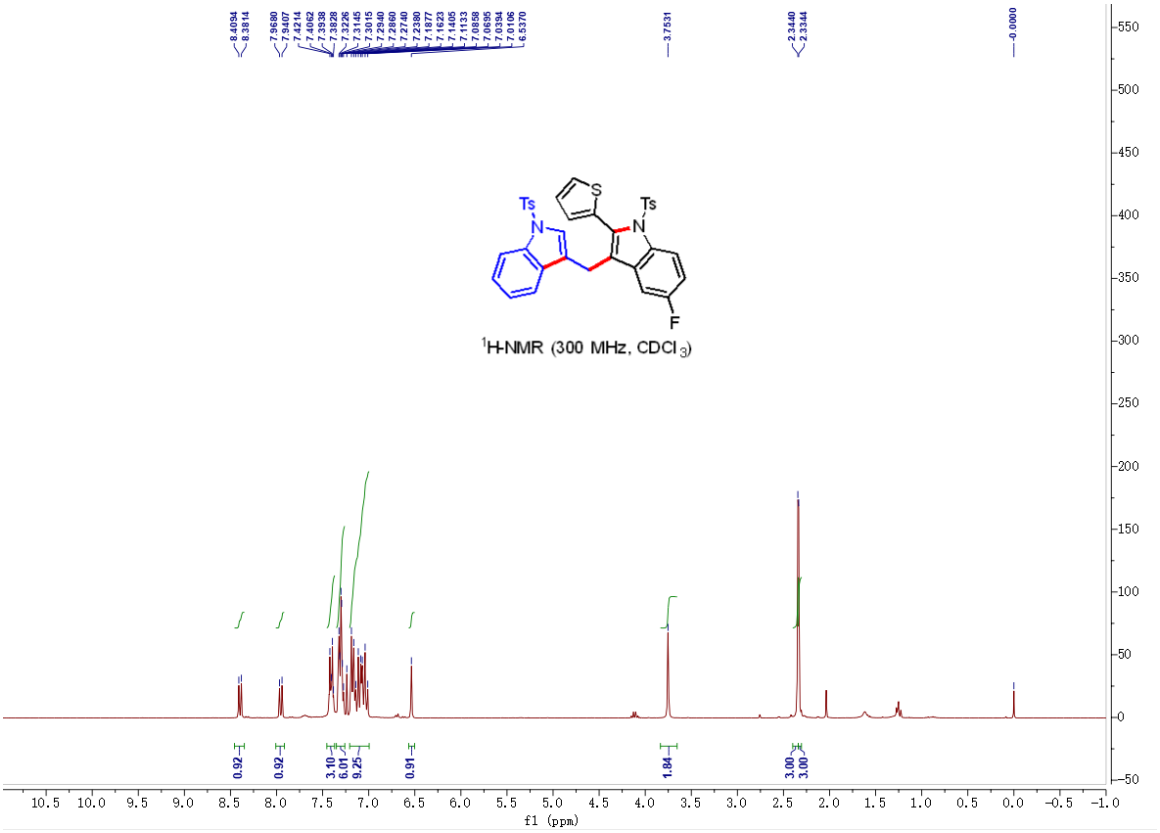


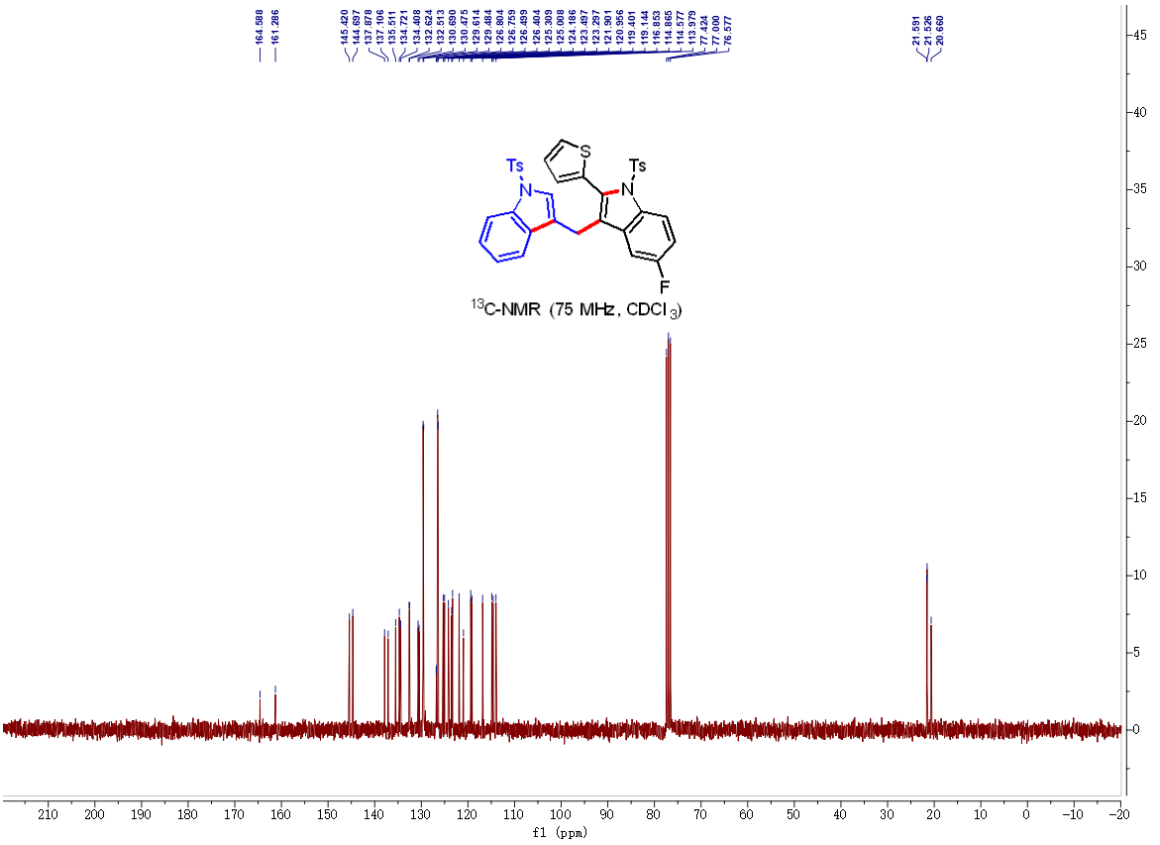
1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-2-(trimethylsilyl)-1*H*-indole (3al):



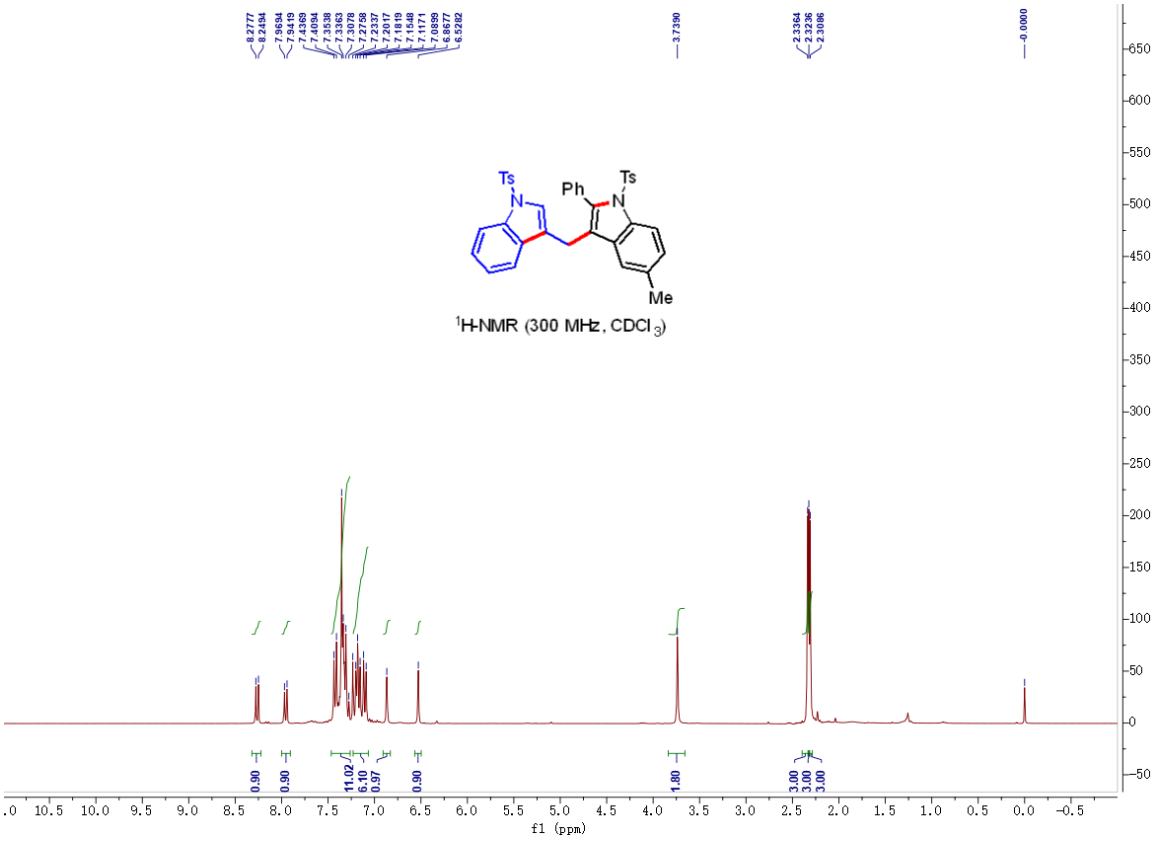


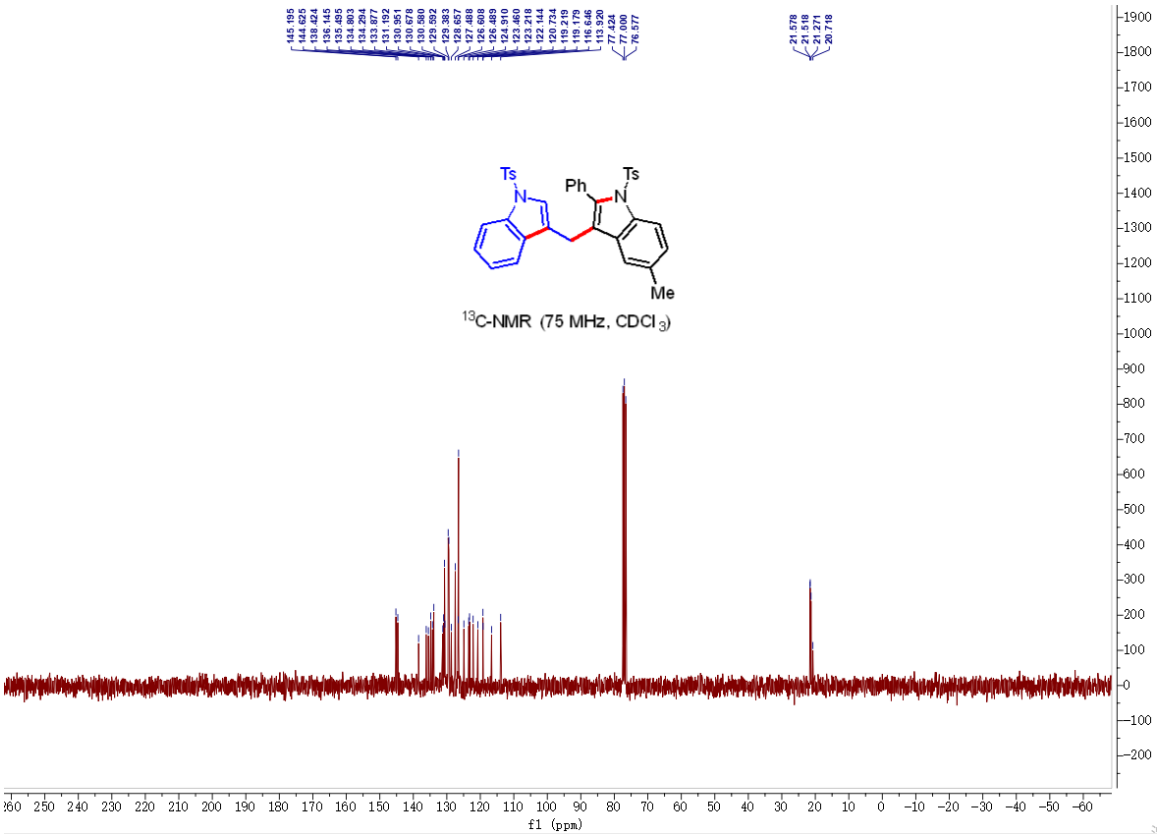
5-fluoro-2-(thiophen-2-yl)-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3am):



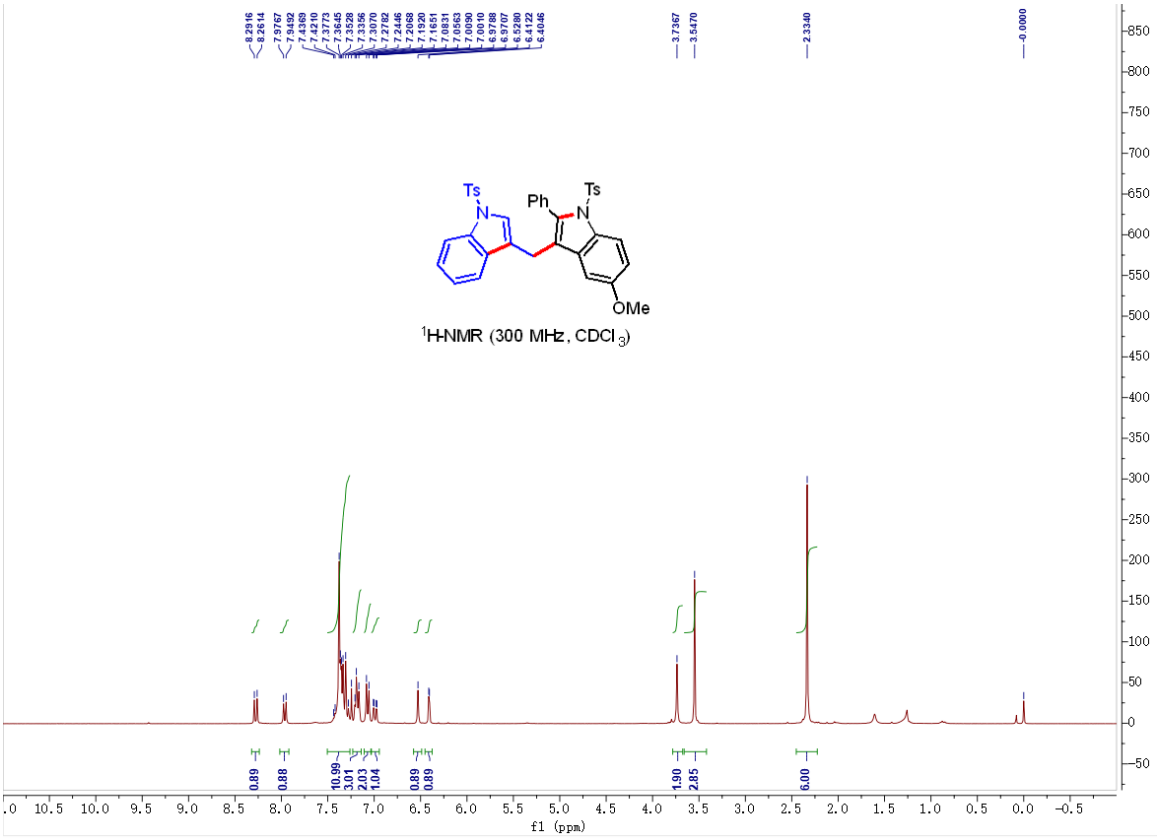


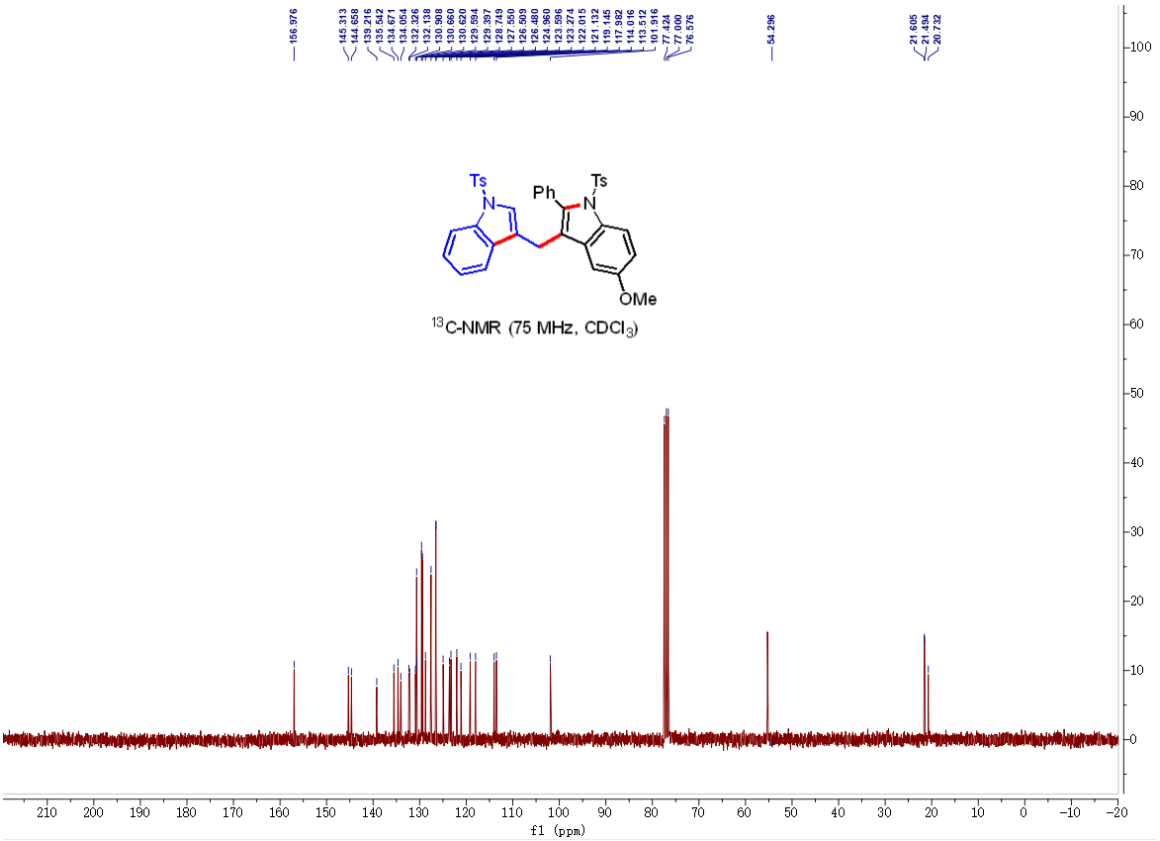
5-methyl-2-phenyl-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3an):



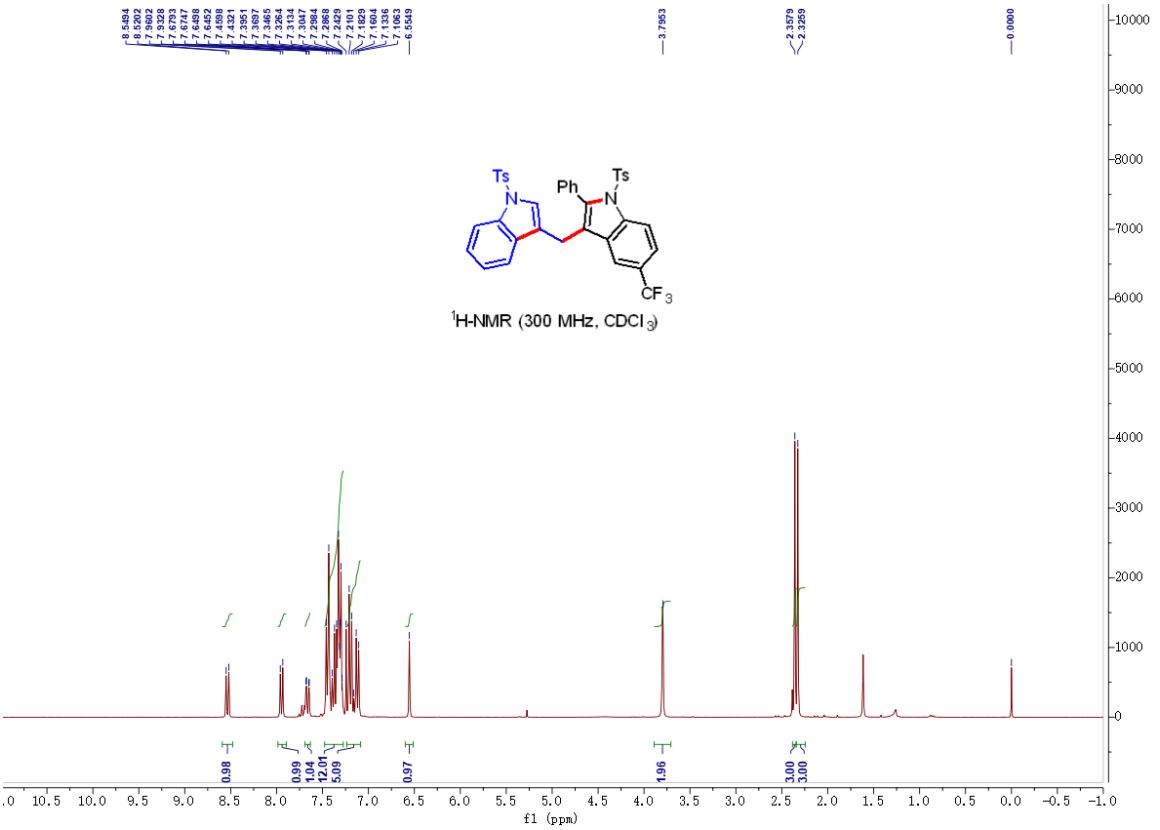


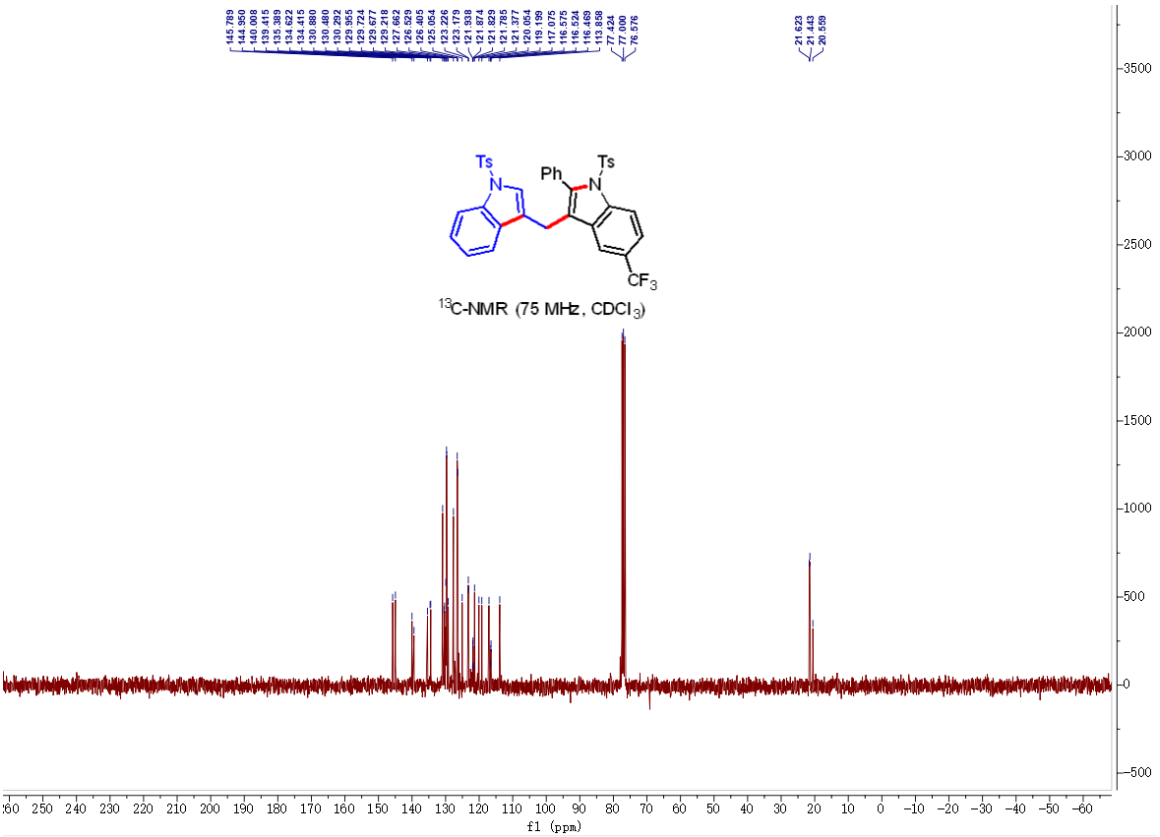
5-methoxy-2-phenyl-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3ao):



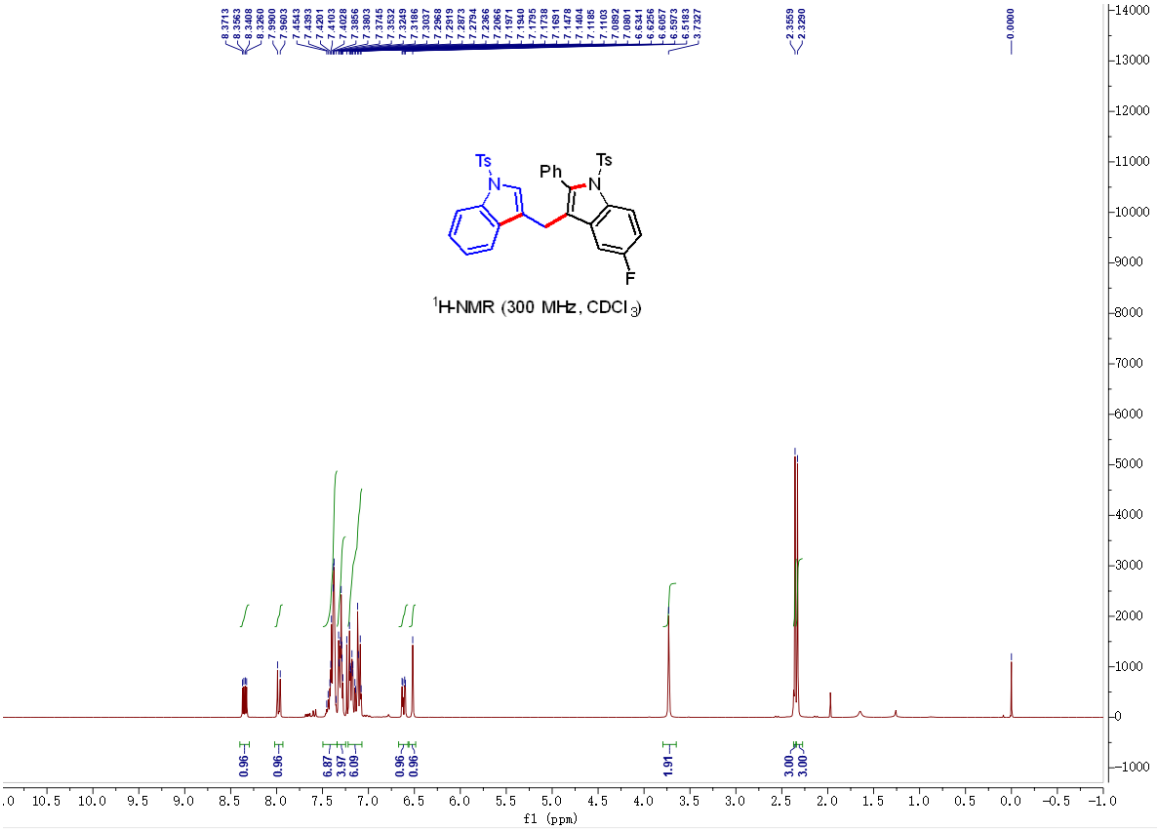


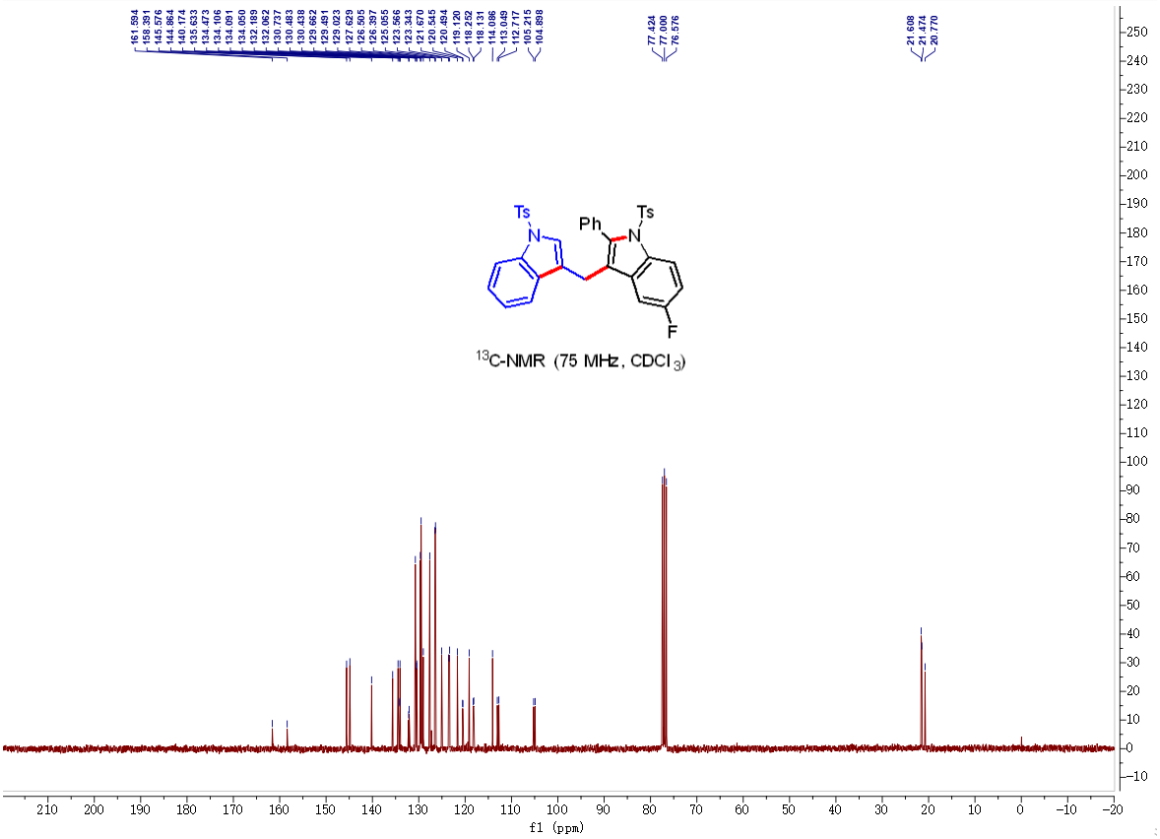
2-phenyl-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-5-(trifluoromethyl)-1*H*-indole (3ap):



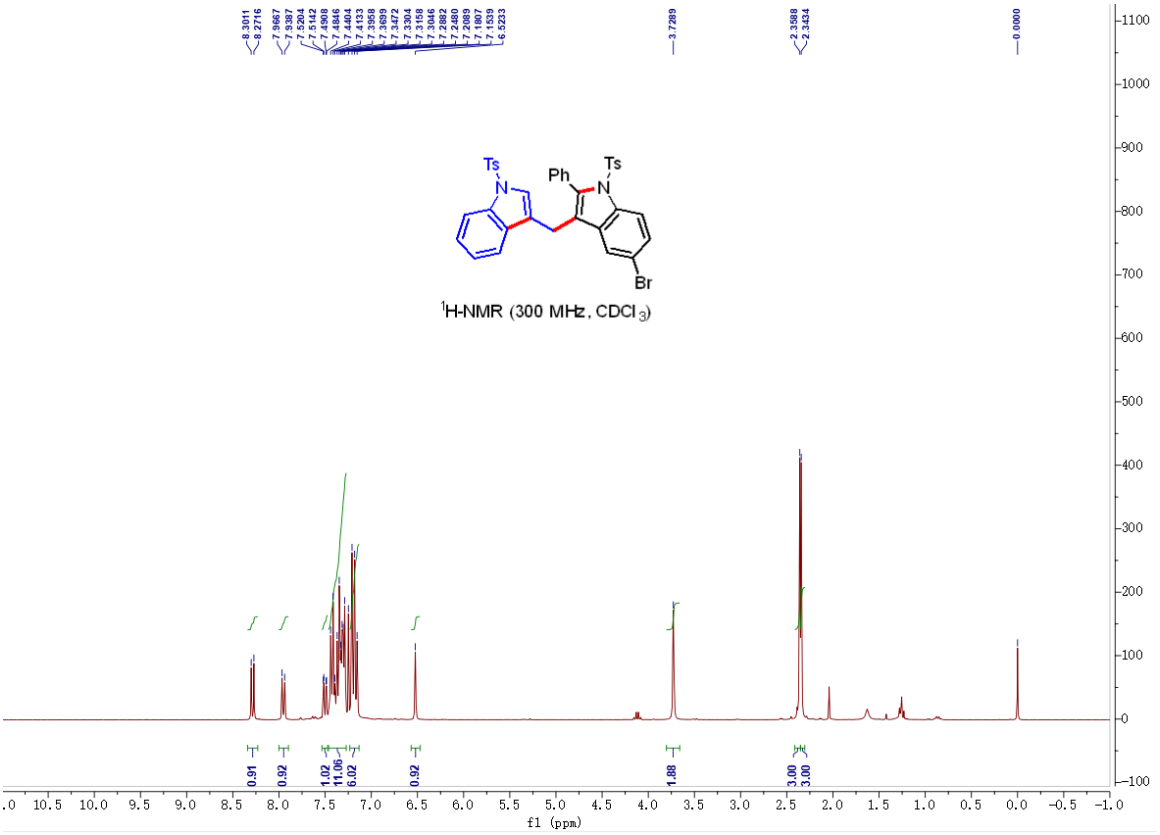


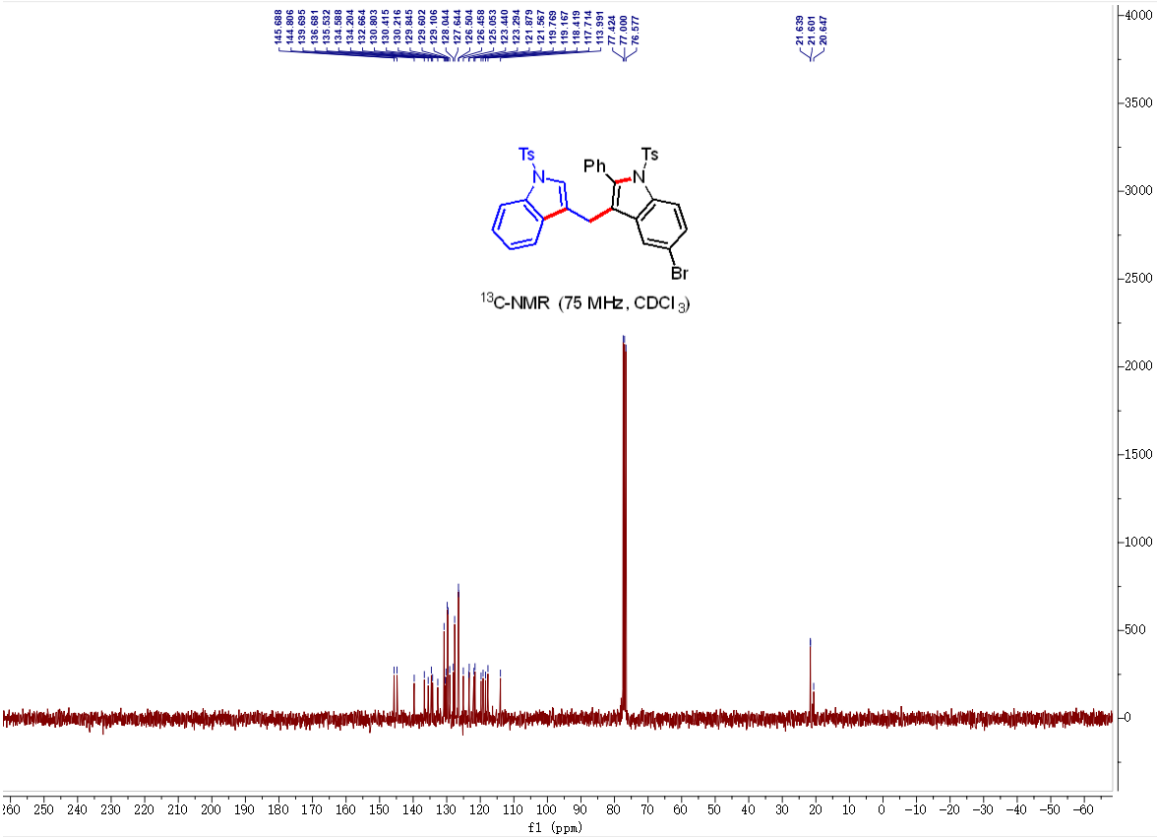
5-fluoro-2-phenyl-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3aq):



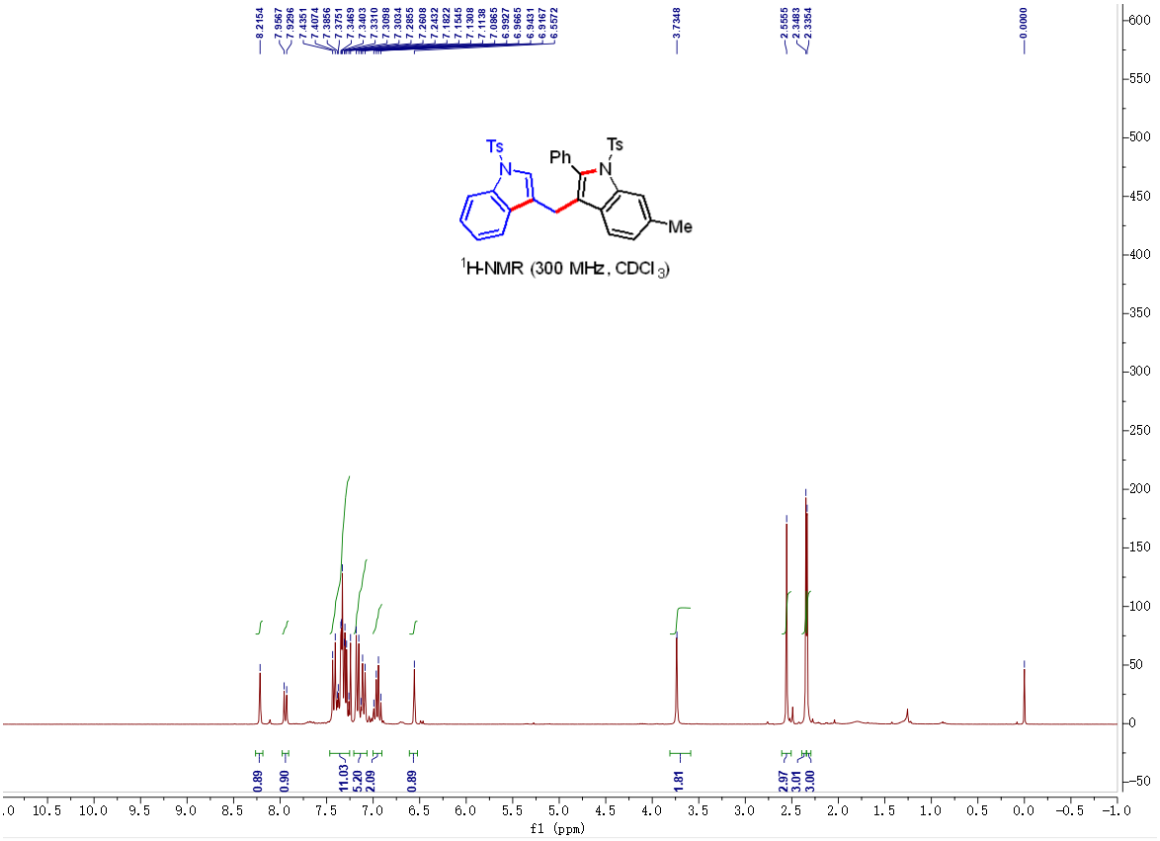


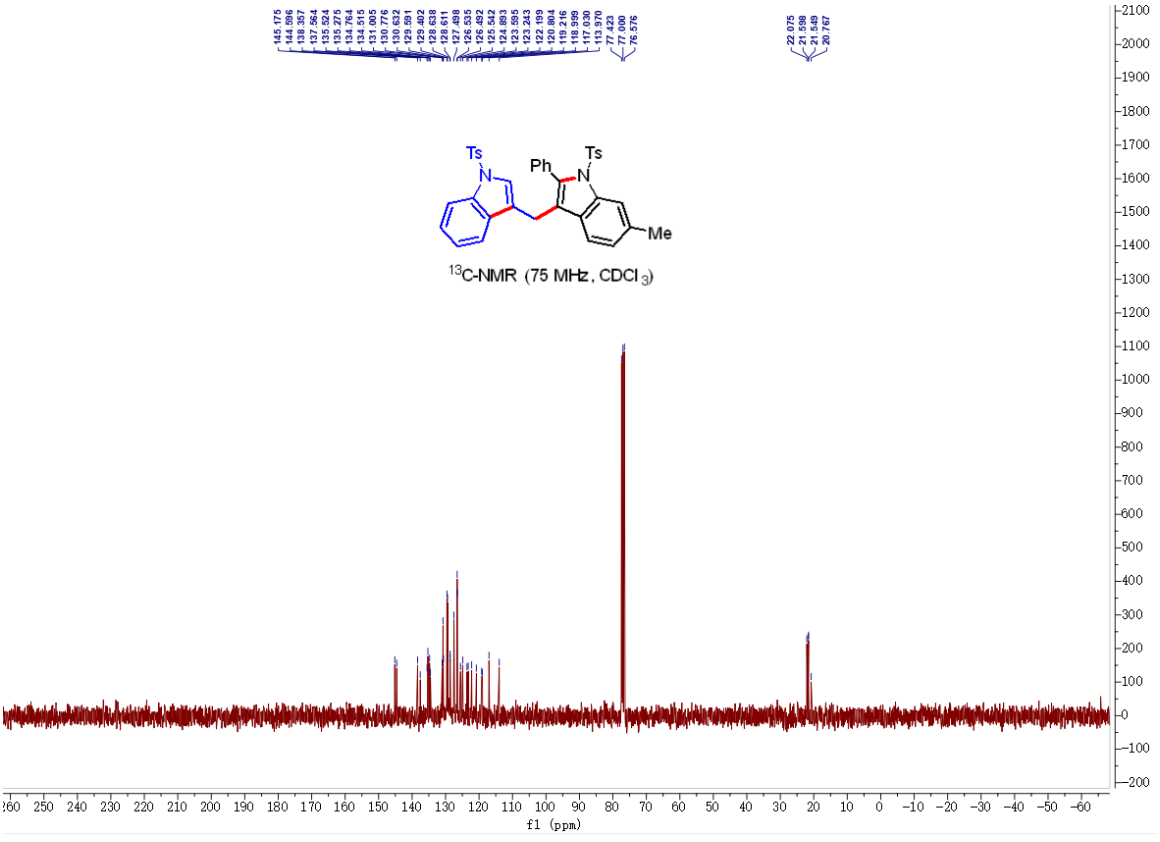
5-bromo-2-phenyl-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3ar):



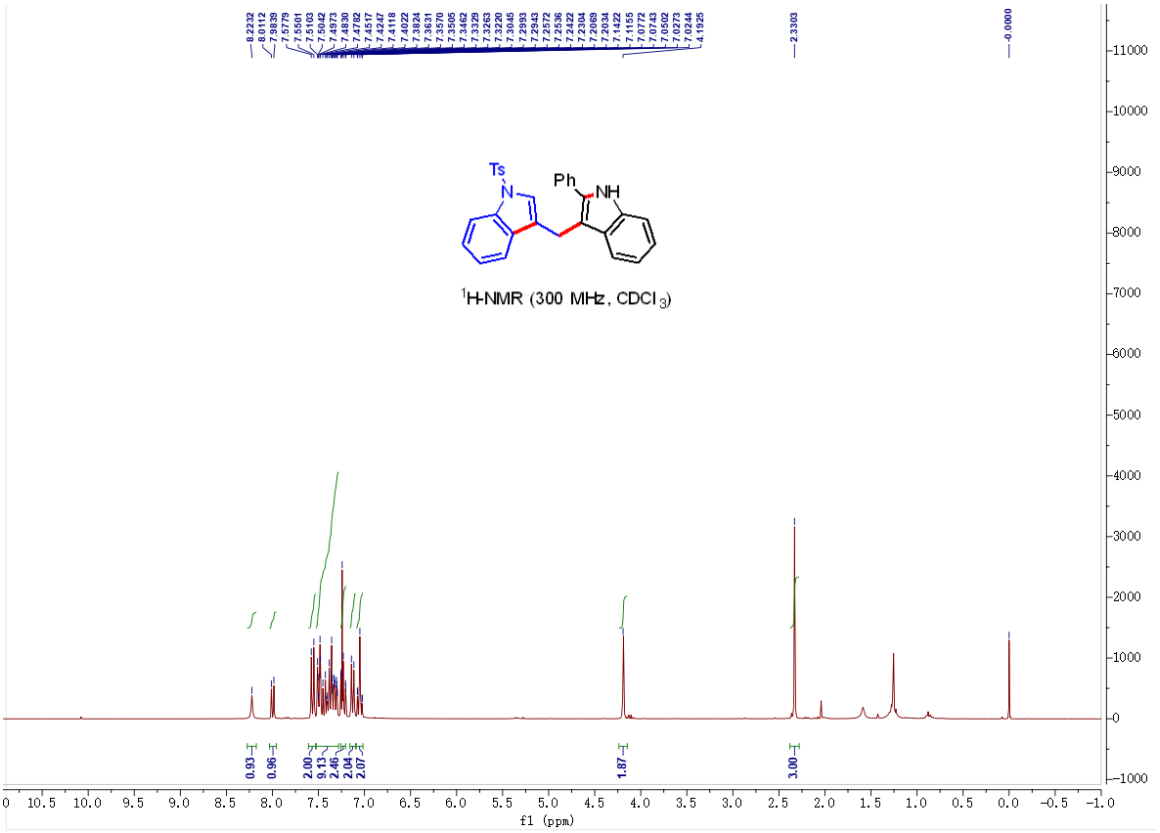


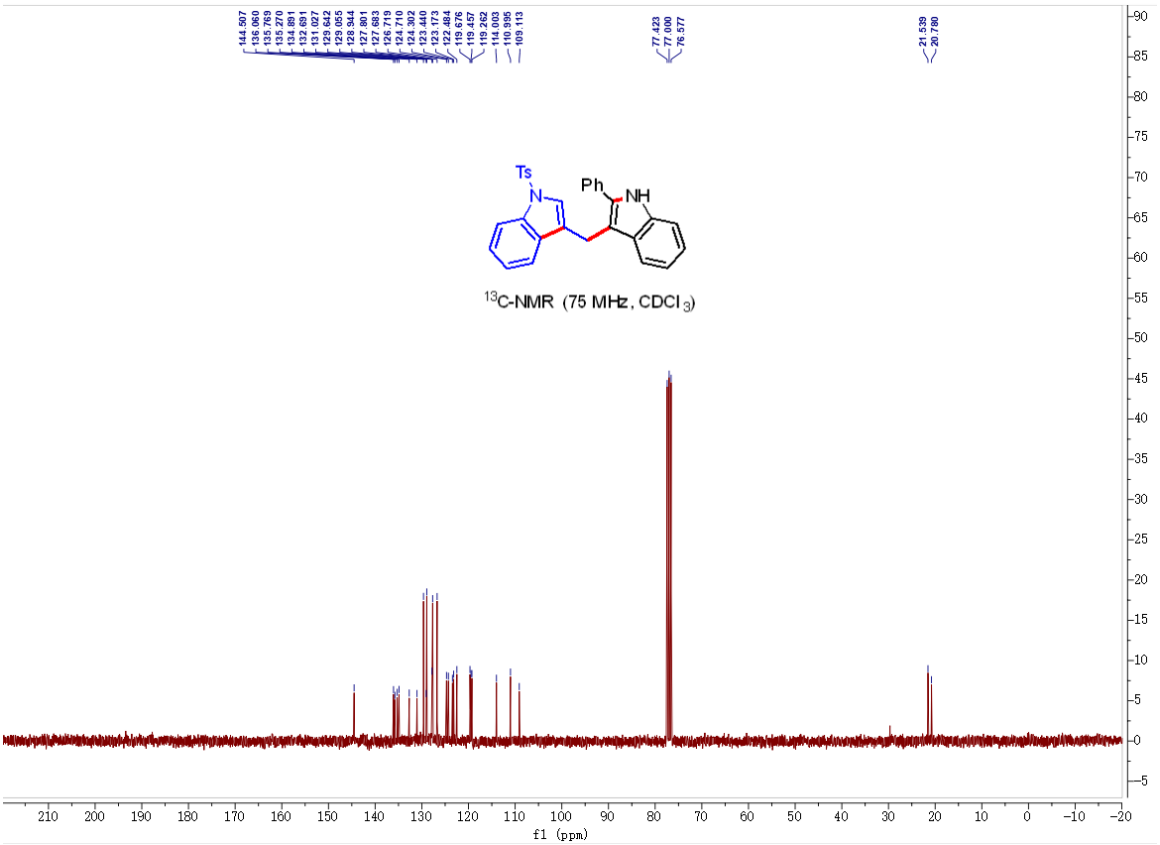
6-methyl-2-phenyl-1-tosyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3as):



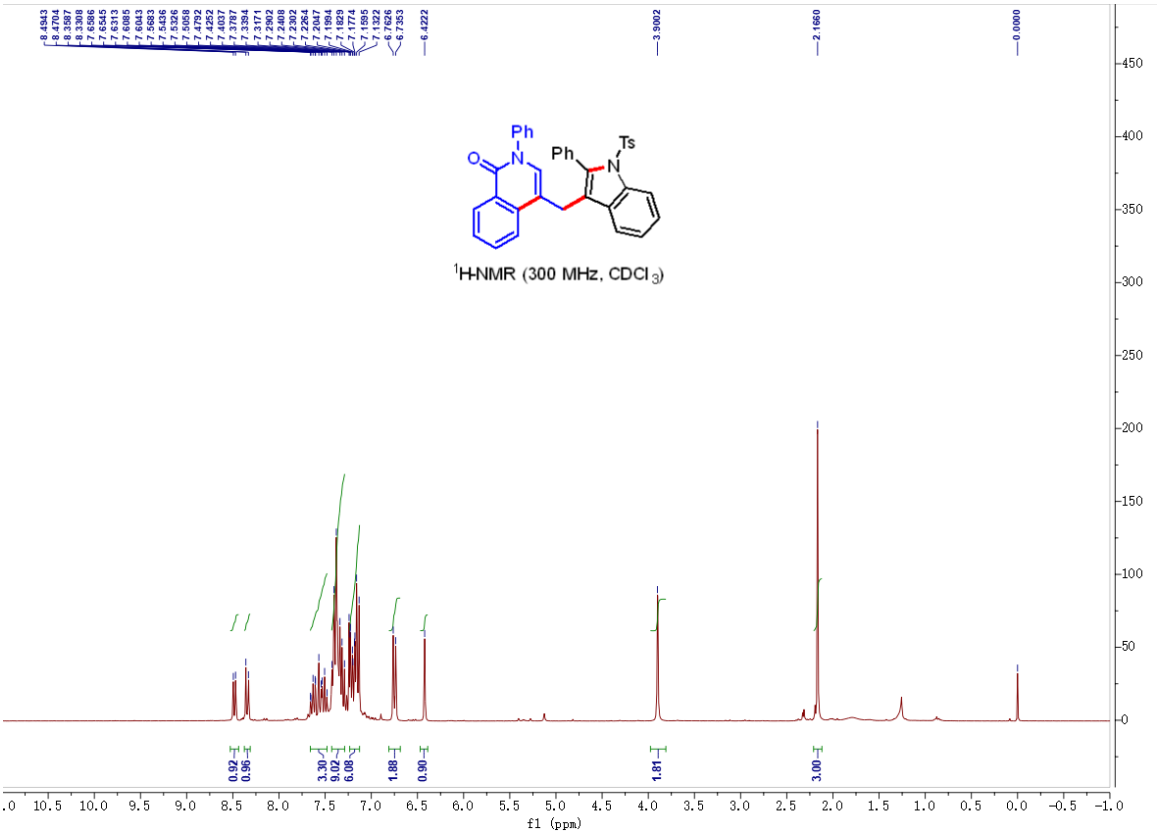


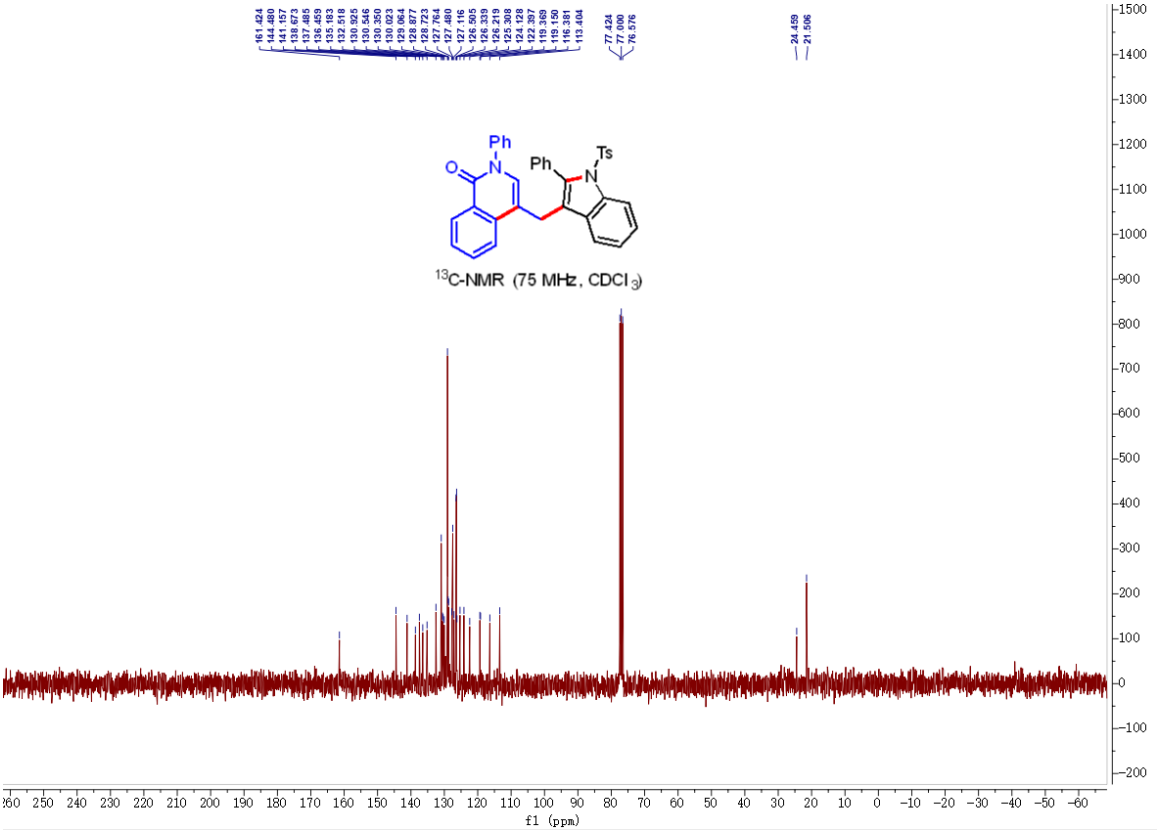
2-phenyl-3-((1-tosyl-1*H*-indol-3-yl)methyl)-1*H*-indole (3au):



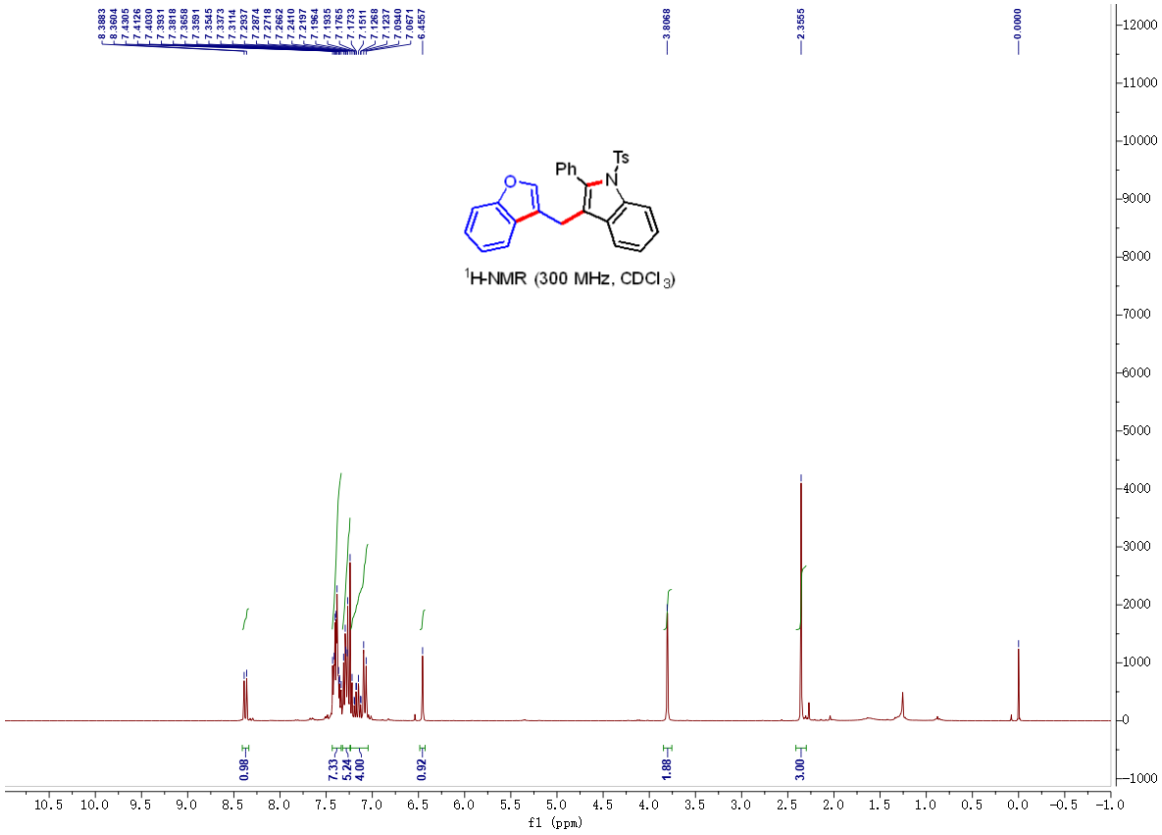


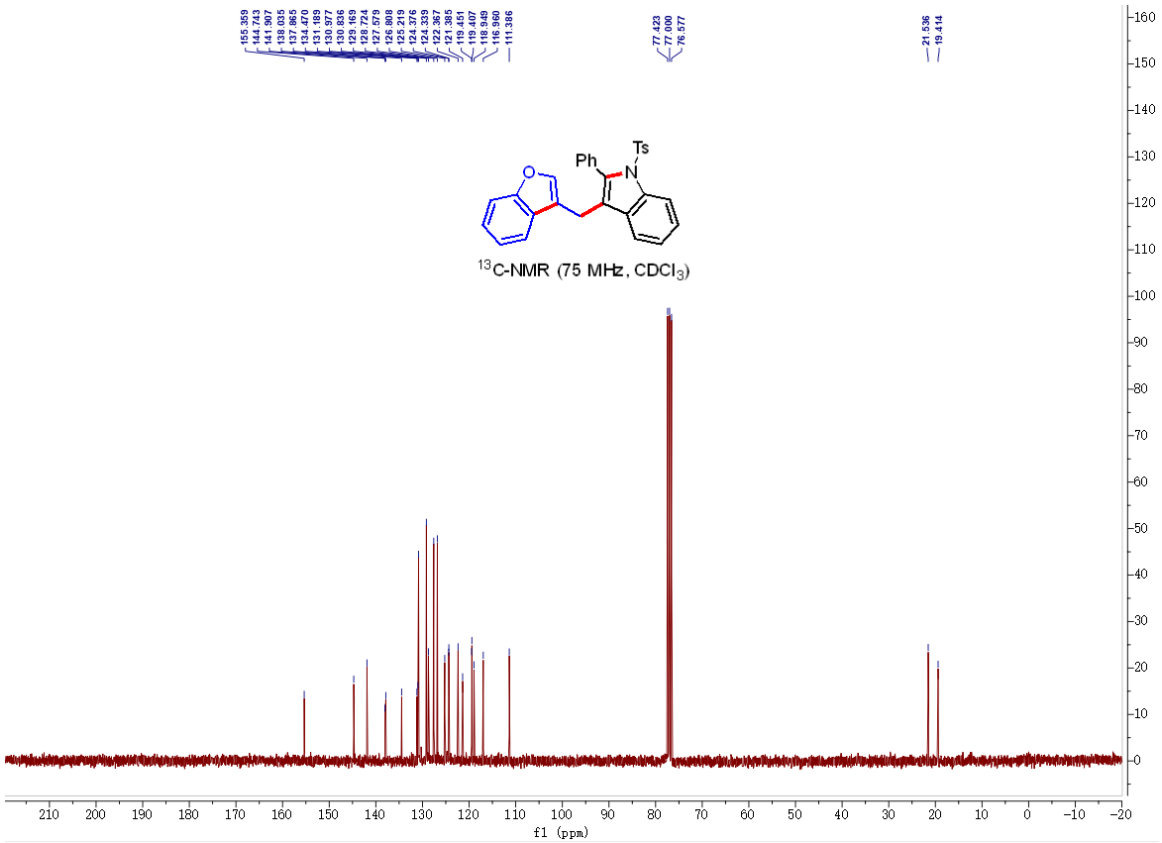
2-phenyl-4-((2-phenyl-1-tosyl-1*H*-indol-3-yl)methyl)isoquinolin-1(2*H*)-one (5):



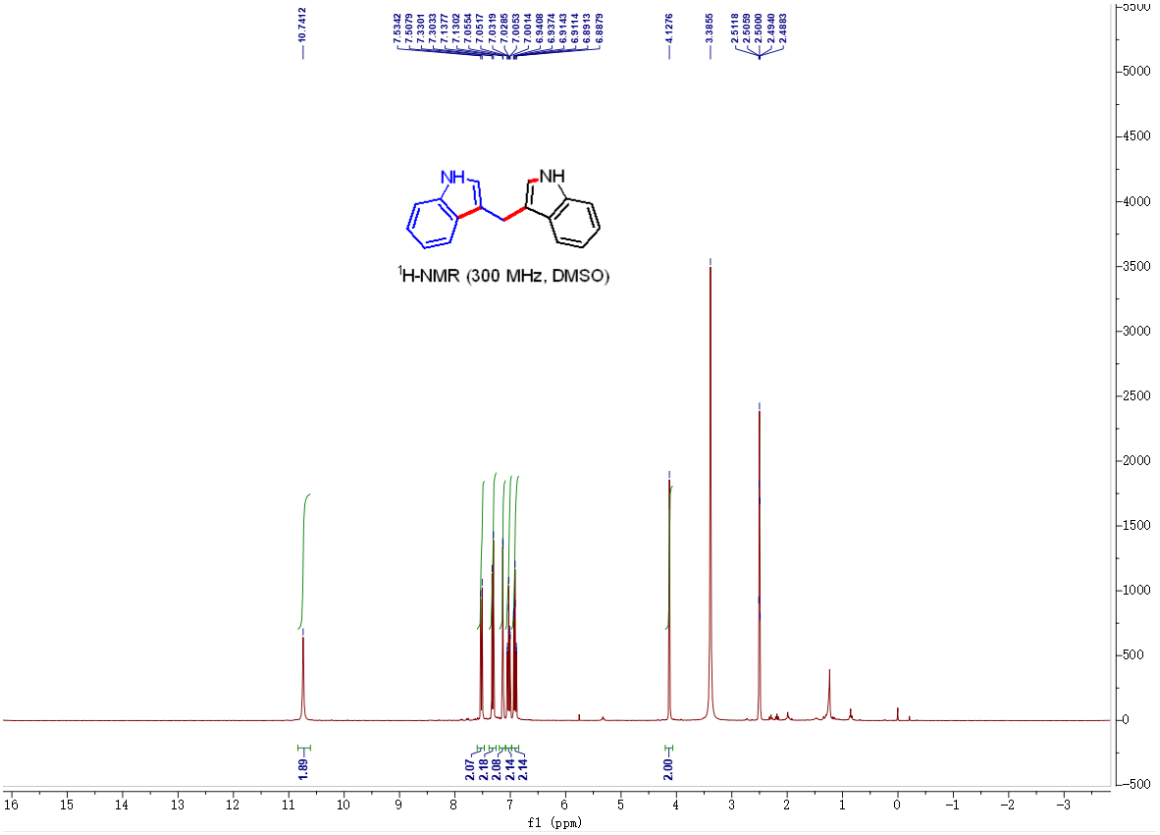


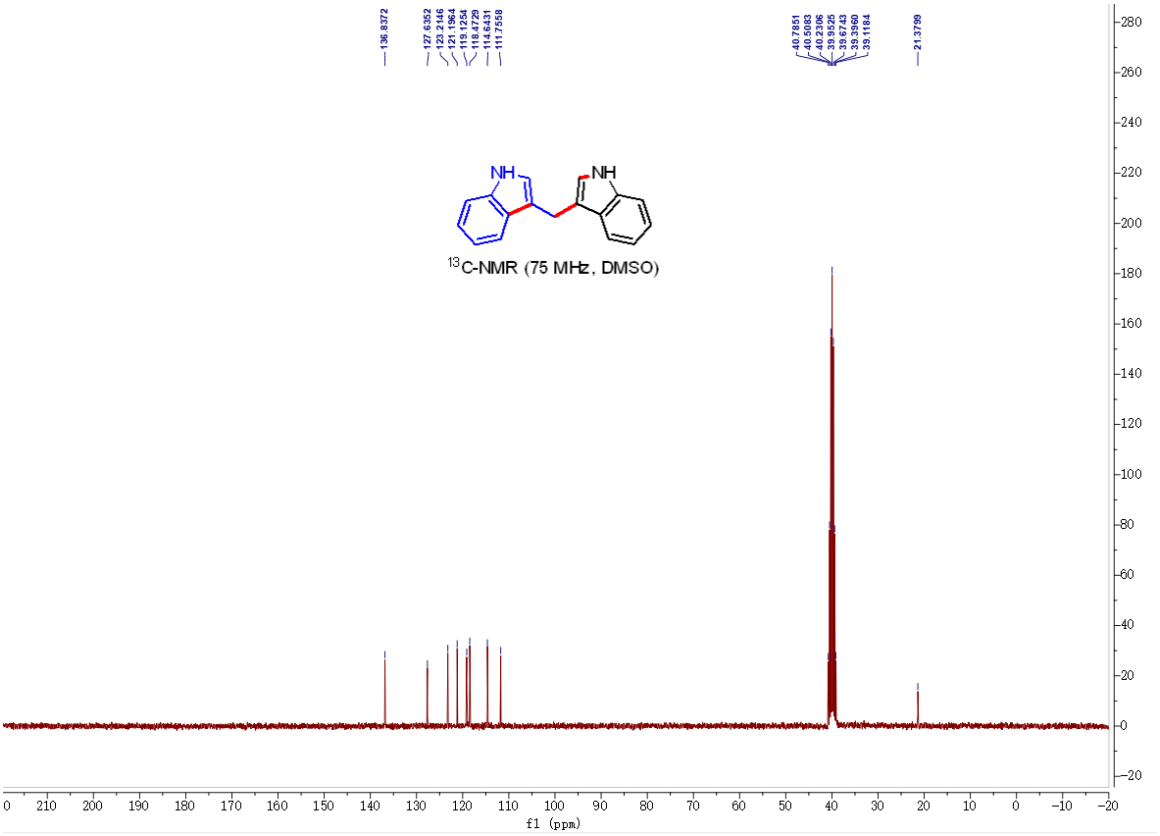
3-(benzofuran-3-ylmethyl)-2-phenyl-1-tosyl-1*H*-indole (7):



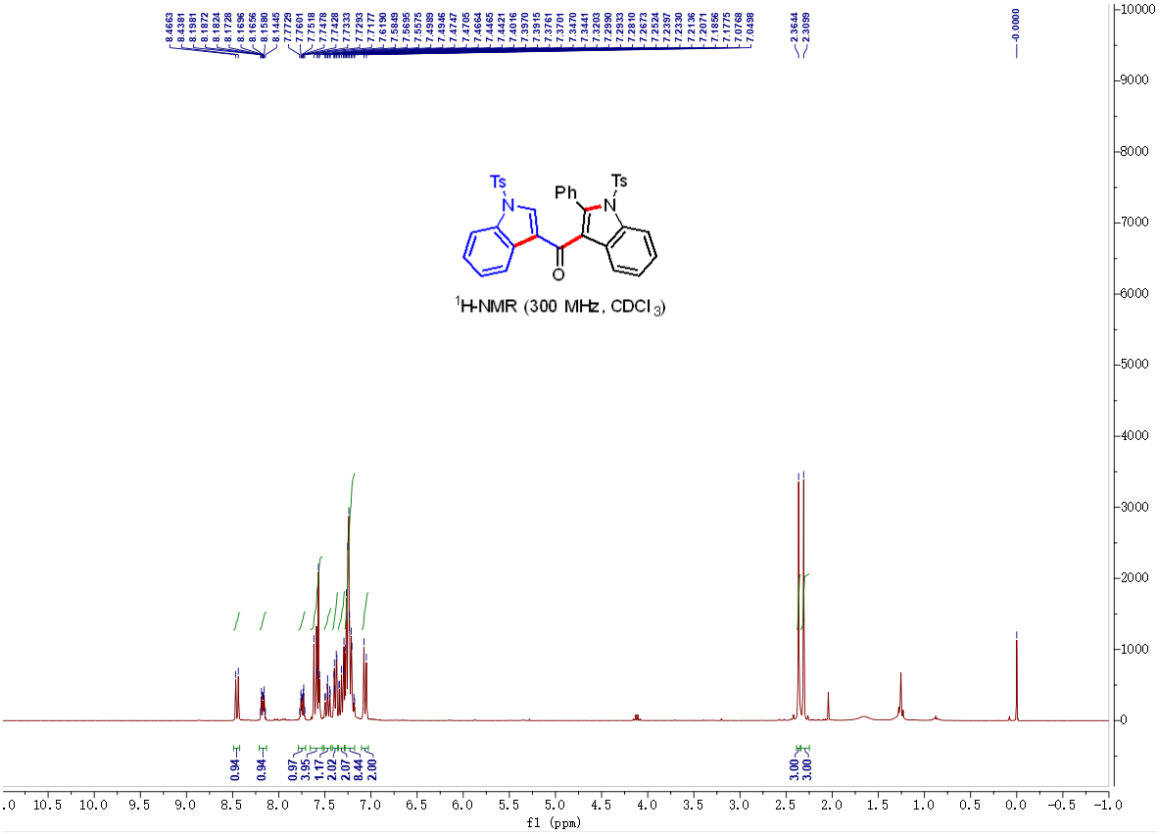


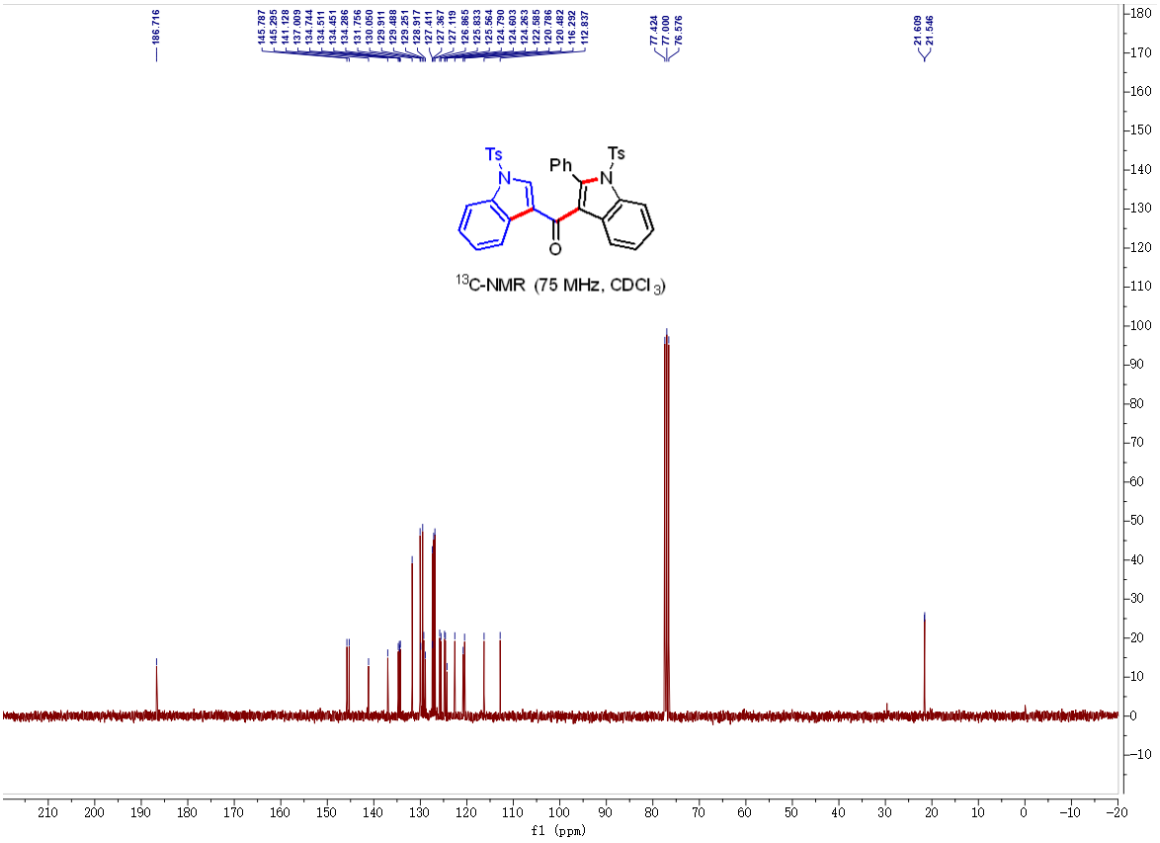
di(1H-indol-3-yl)methane (8):



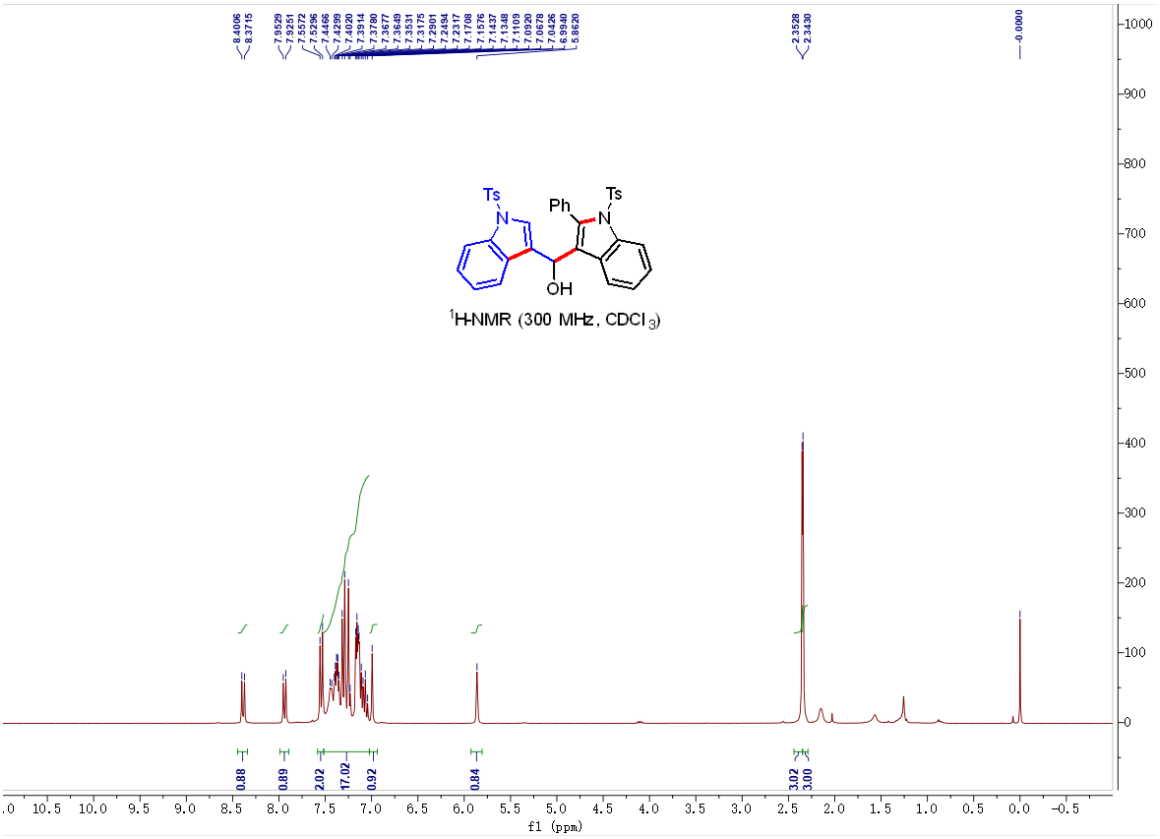


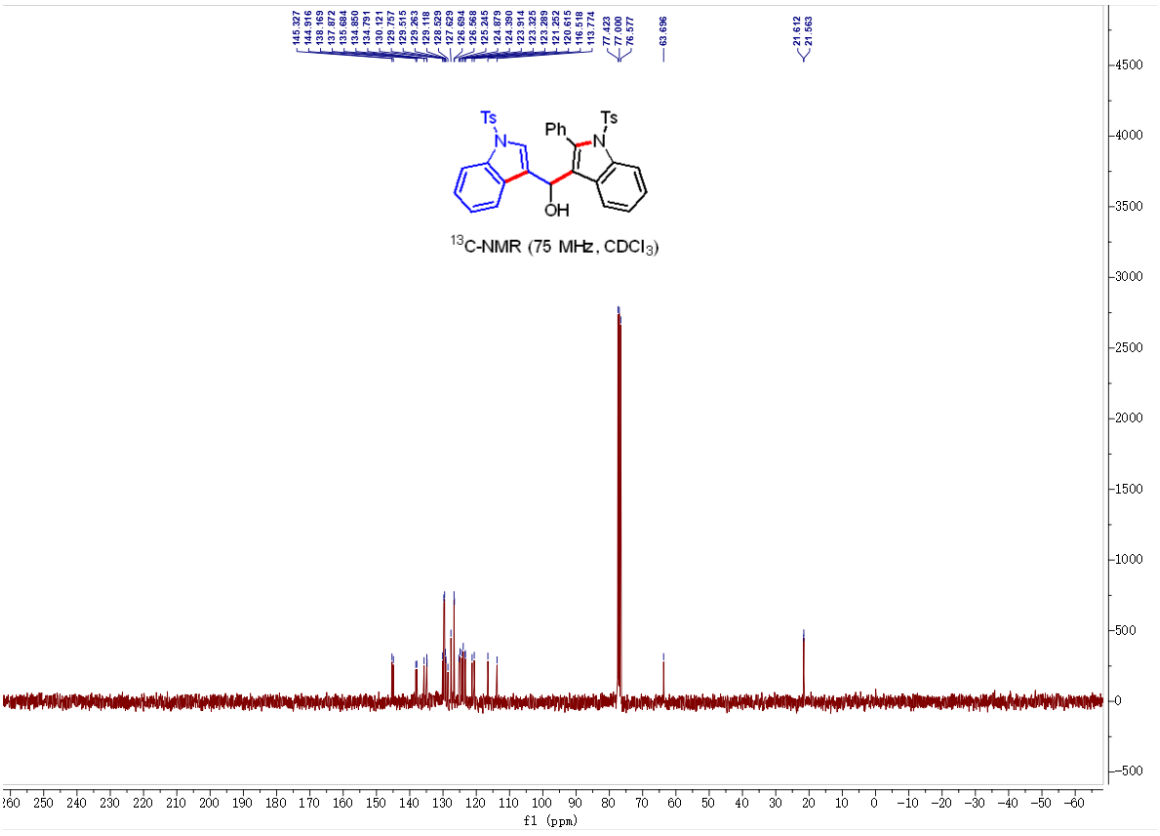
(2-phenyl-1-tosyl-1*H*-indol-3-yl)(1-tosyl-1*H*-indol-3-yl)methanone (9):



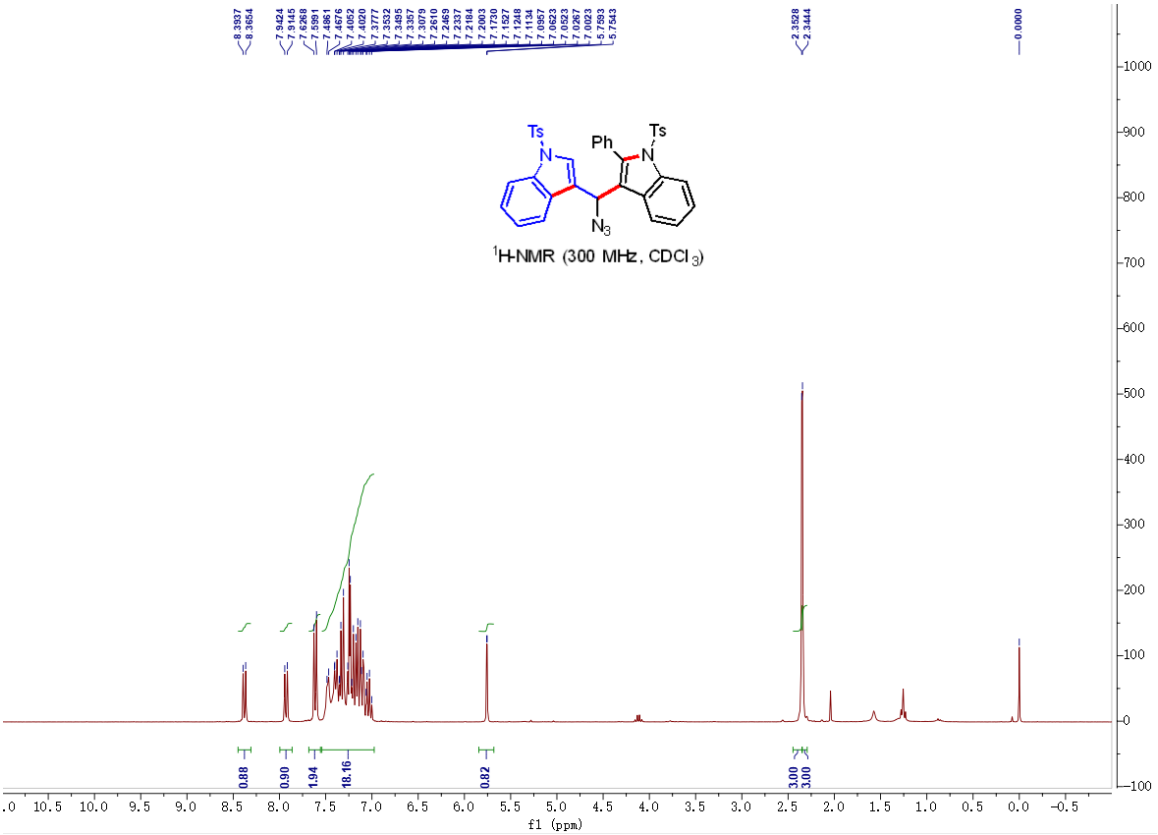


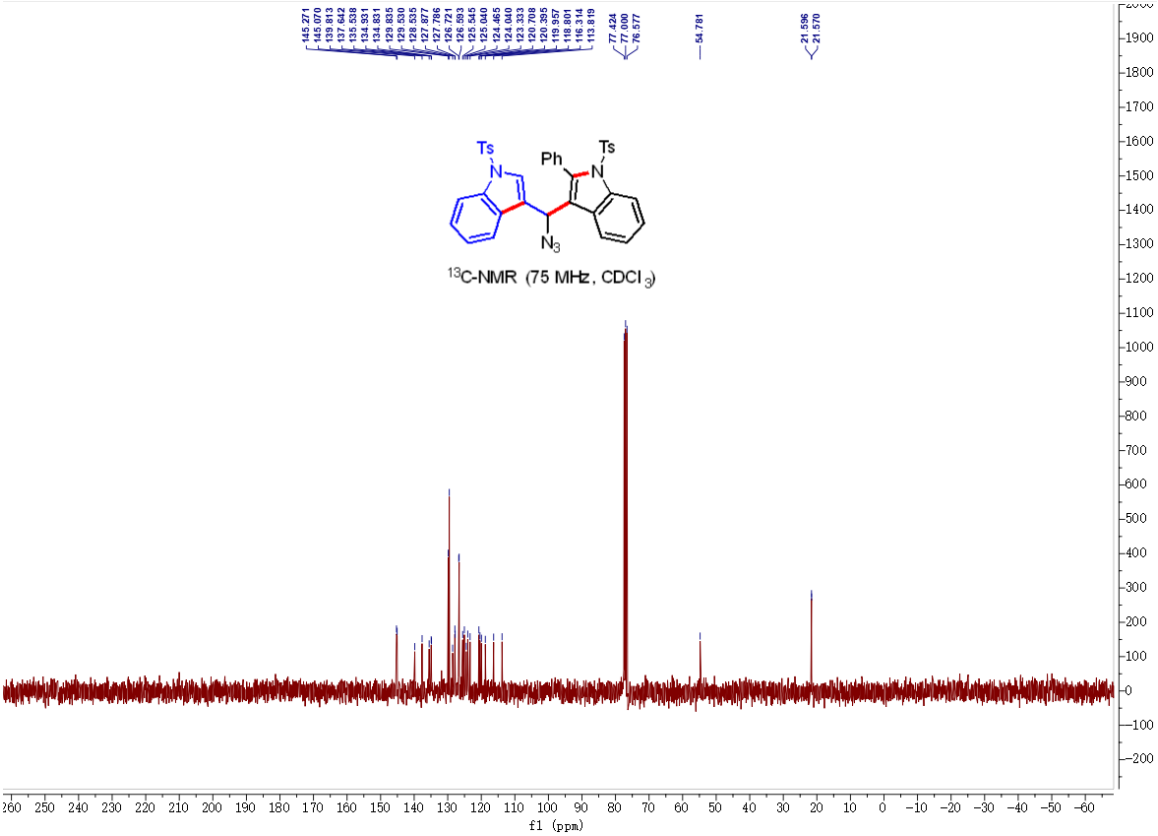
(2-phenyl-1-tosyl-1*H*-indol-3-yl)(1-tosyl-1*H*-indol-3-yl)methanol (10):



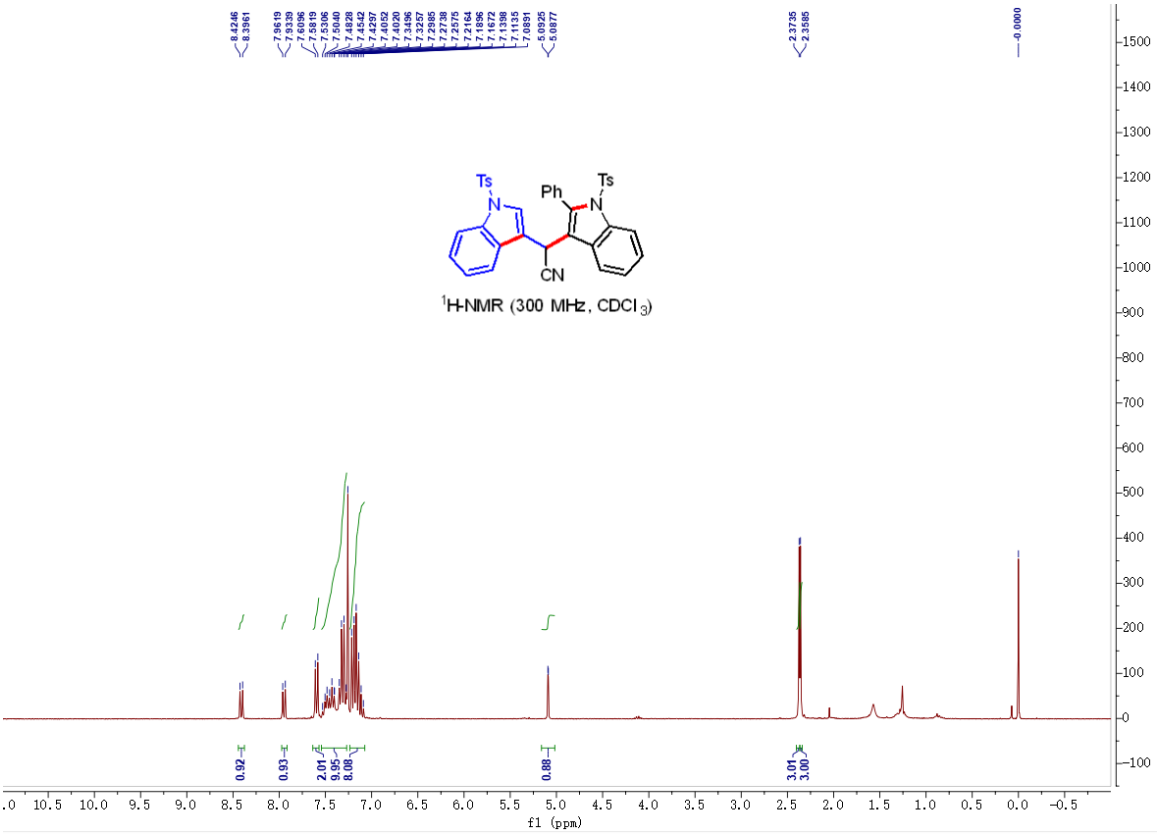


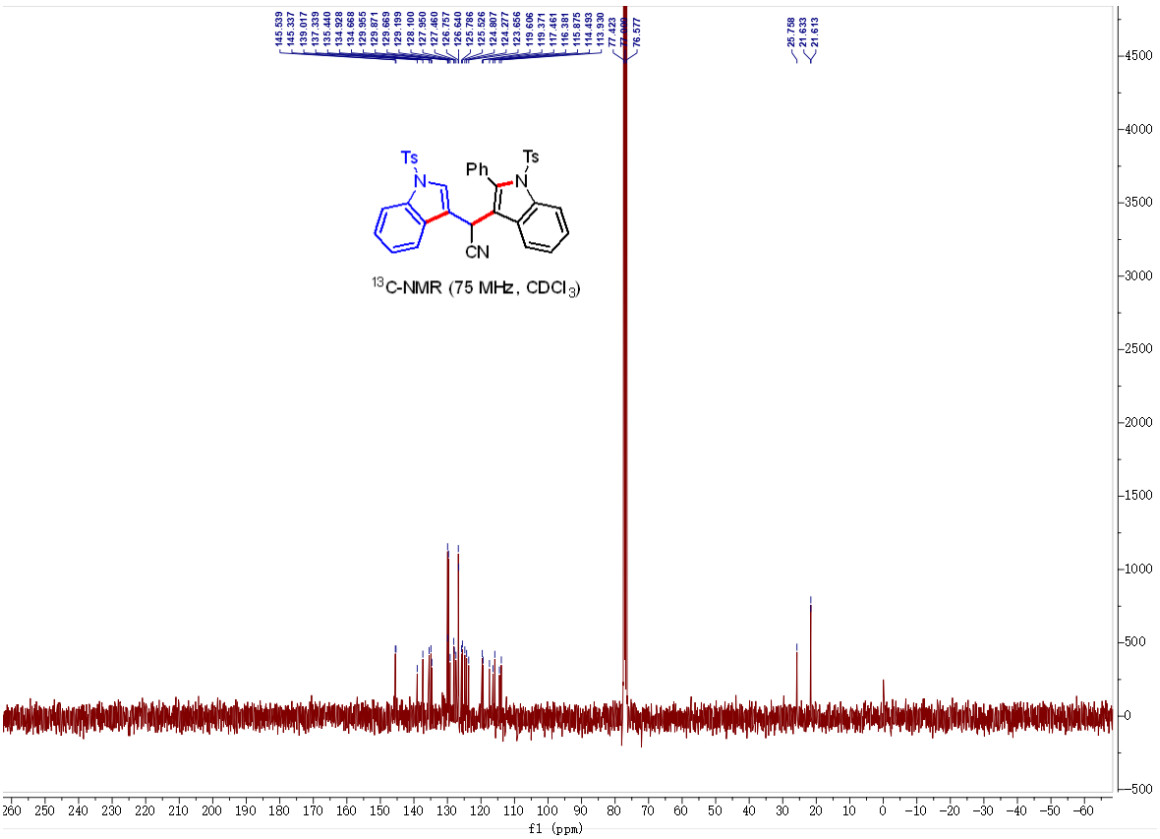
3-(azido(1-tosyl-1*H*-indol-3-yl)methyl)-2-phenyl-1-tosyl-1*H*-indole (11):



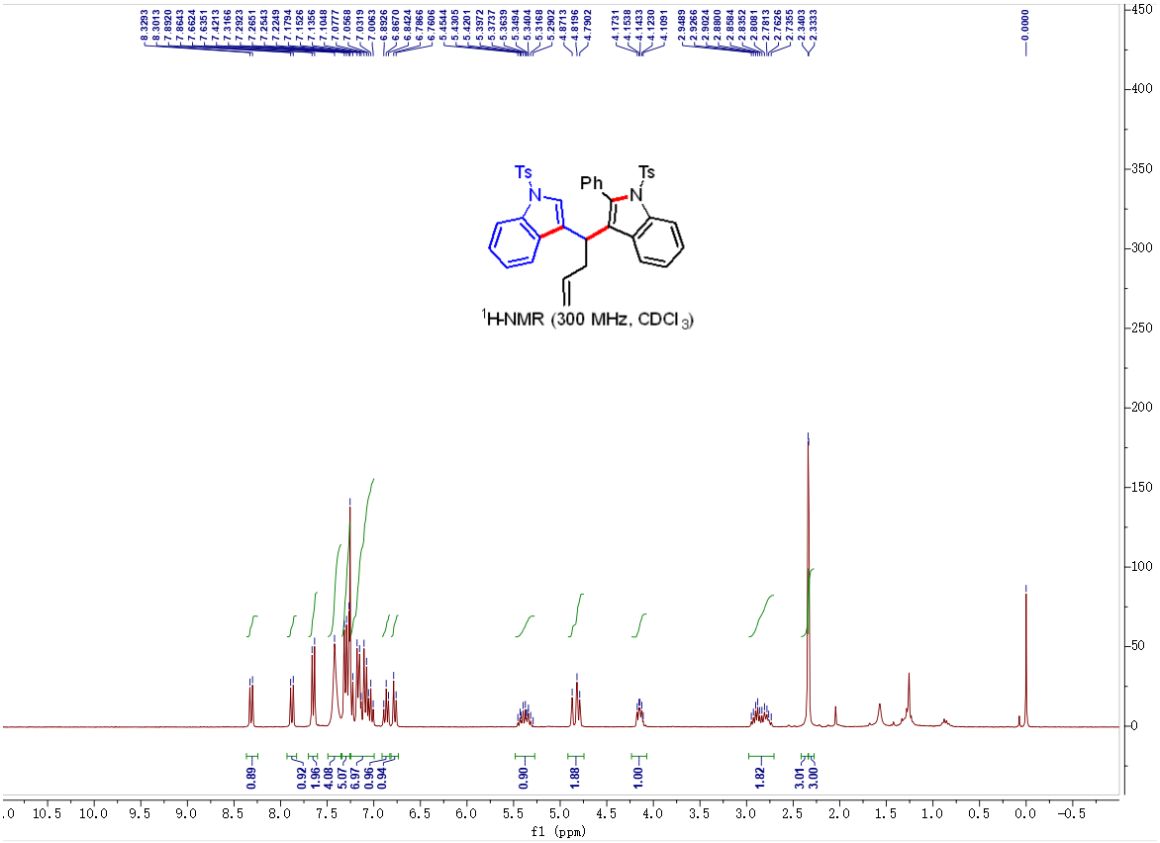


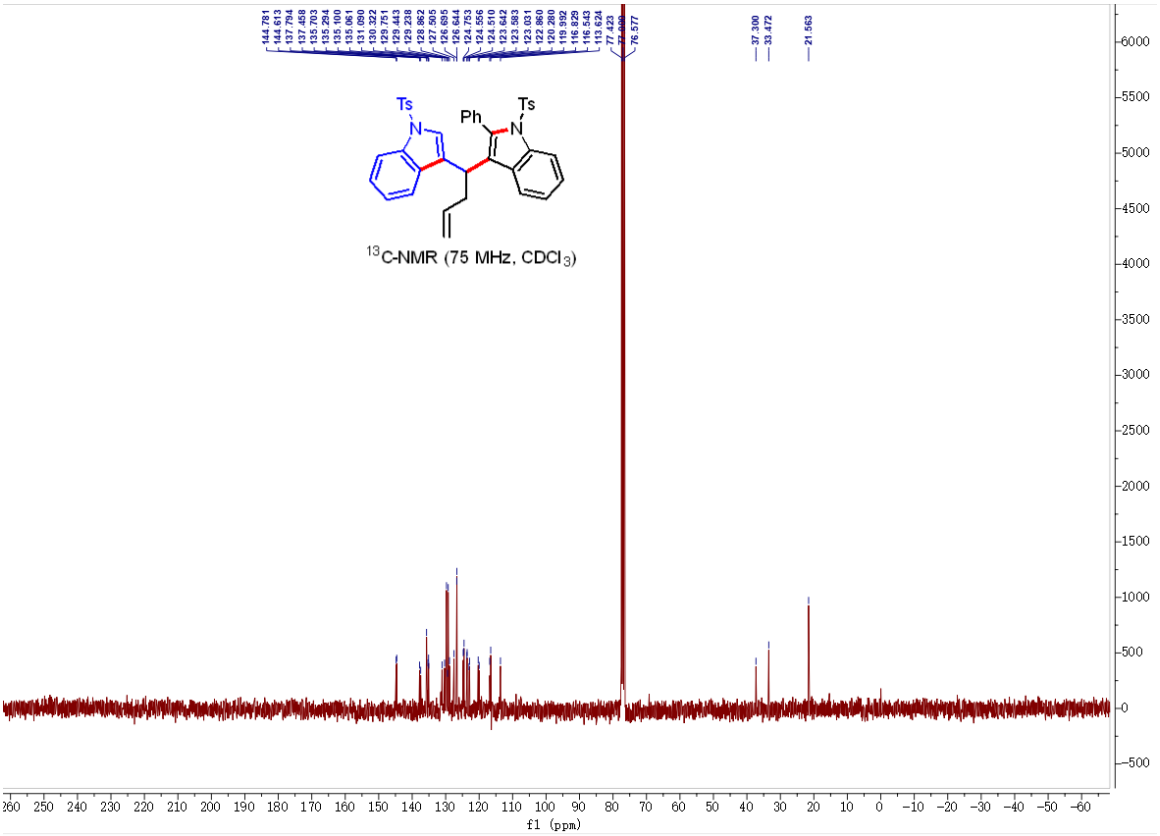
2-(2-phenyl-1-tosyl-1*H*-indol-3-yl)-2-(1-tosyl-1*H*-indol-3-yl)acetonitrile (12):



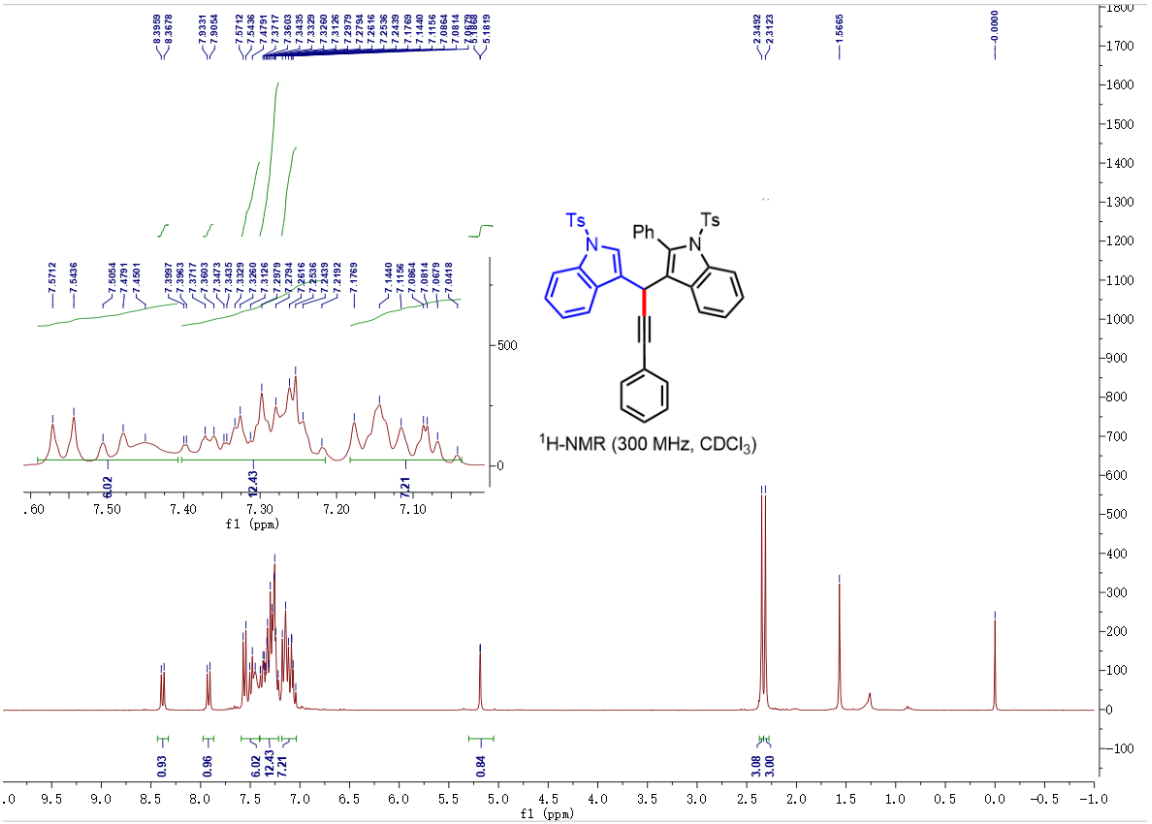


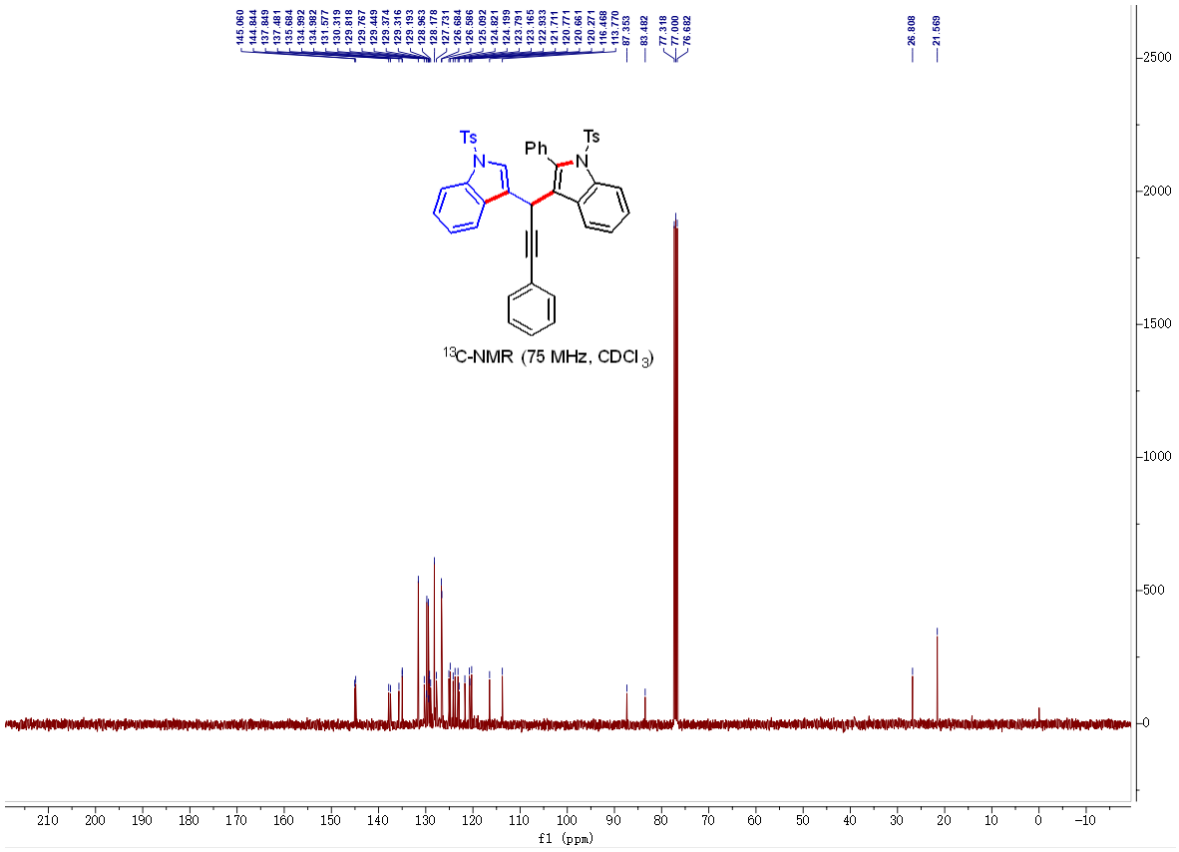
2-phenyl-1-tosyl-3-(1-(1-tosyl-1*H*-indol-3-yl)but-3-en-1-yl)-1*H*-indole (13):





2-phenyl-3-(3-phenyl-1-(1-tosyl-1*H*-indol-3-yl)prop-2-yn-1-yl)-1-tosyl-1*H*-indole (14):





8. References

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