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1. Materials and Methods:

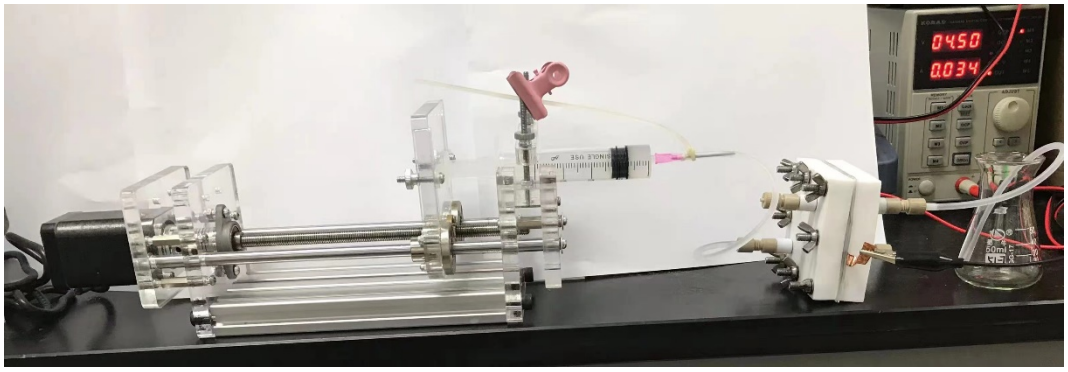
All commercially available reagents were used without any further purification. Ananlytical grade solvents were bought from Energy Chemical Co., LTD. The reactions were carried out under constant electro current condition (10 mA) (otherwise noted), an ambient atmosphere, magnetically stirred, and monitored by thin layer chromatography (TLC), visualized by fluorescence quenching under UV light. Flash chromatography was performed on silica gel (200-300 mesh). Cyclic voltammograms were recorded on a CHI 660E potentiostat. The instrument for electrolysis is dual display potentiostat (DJS-292B) (made in China). The Both anode electrode and cathode electrode are platinum plate electrodes (10 mm×10 mm×0.1 mm or 30 mm×30 mm×0.1 mm). All deuterated solvents were purchased from Meryer (Shanghai) chemical technology Co., LTD. NMR spectra were recorded on a Bruker Ascend 300 spectrometer operating at 300MHz for ^{1}H acquisitions, 75 MHz for ^{13}C acquisitions and 282 MHz for ^{19}F acquisitions. Chemical shifts were referenced to the residual proton solvent peaks (^{1}H: $CDCl_3$, δ7.26; $(CD_3)_2SO$, δ 2.50), solvent ^{13}C signals ($CDCl_3$, δ 77.16; $(CD_3)_2SO$, δ39.52), $PhCF_3$ (^{19}F, δ –63.3 relative to $CFCl_3$). Signals are listed in ppm, and multiplicity identified as s = singlet, br = broad, d = doublet, t = triplet, q = quartet, m = multiplet; coupling constants in Hz; integration. High-resolution mass spectra were obtained using Agilent LC-UV-TOFmass spectrometer. Yields refer to purified and spectroscopically pure compounds.

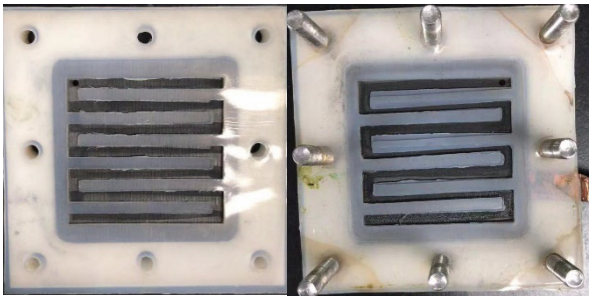
2. Information for reaction set up:

2.1. Small scale reaction:

2.2. Large scale reaction:

2.3. Electrochemical continueous-flow reactor:





3. Mechanistic studies

3.1. Cyclic voltametry studies:

Cyclic voltametry studies: Cyclic voltammograms were recorded on a CHI 660E potentiostat. The cyclic voltammograms of compounds**1a,2a** and **3a**were recorded in an electrolyte of nBu$_4$NBF$_4$ (0.1 M) in HFIP/DCM (1:1) using a Pt working electrode (diameter, 2 mm), a Pt wire auxiliary electrode and a SCE reference electrode under N_2(Figure S1-S4). The scan rate is 100 mV/s. (T = 20 °C, c = 0.001M).The oxidation onset of **1a** and **2a** shows at 1.10 V and 1.05 V vs SCE respectively.

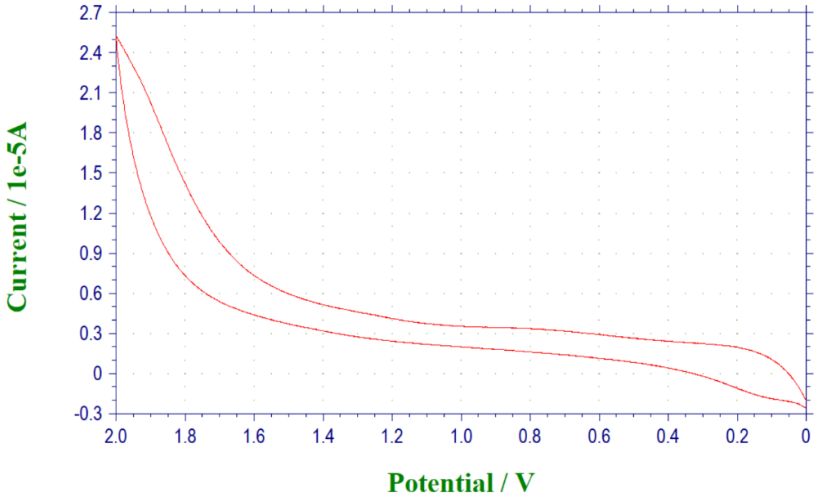


Figure S1 CV of compounds **black**

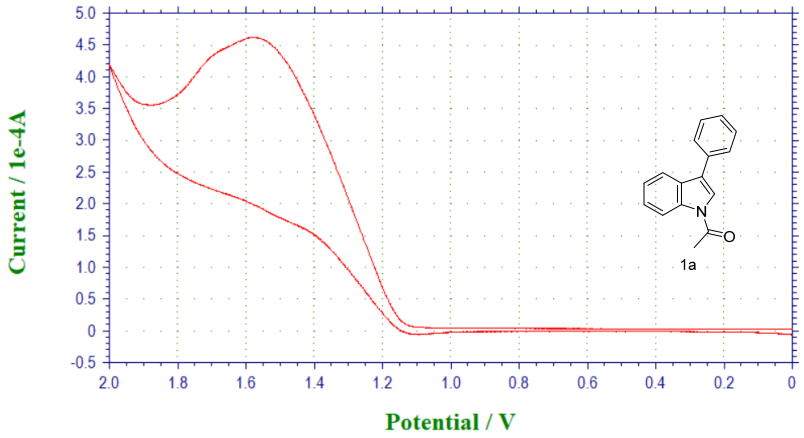


Figure S2. CV of compound**1a**

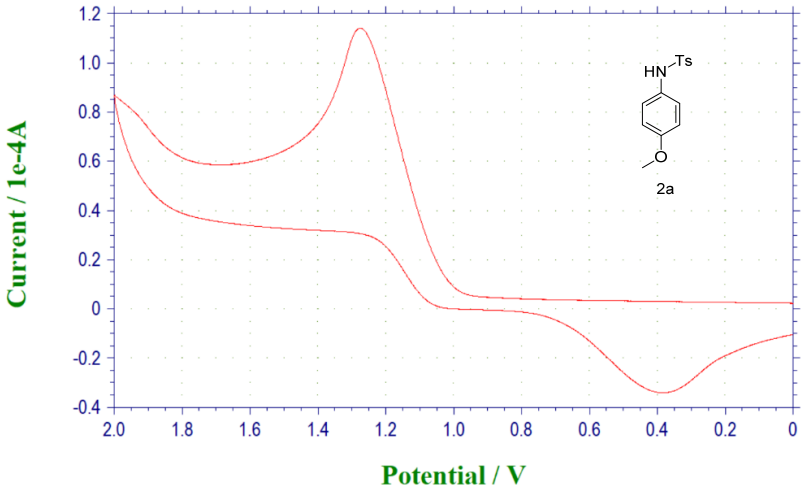


Figure S3.CV of compound**2a**

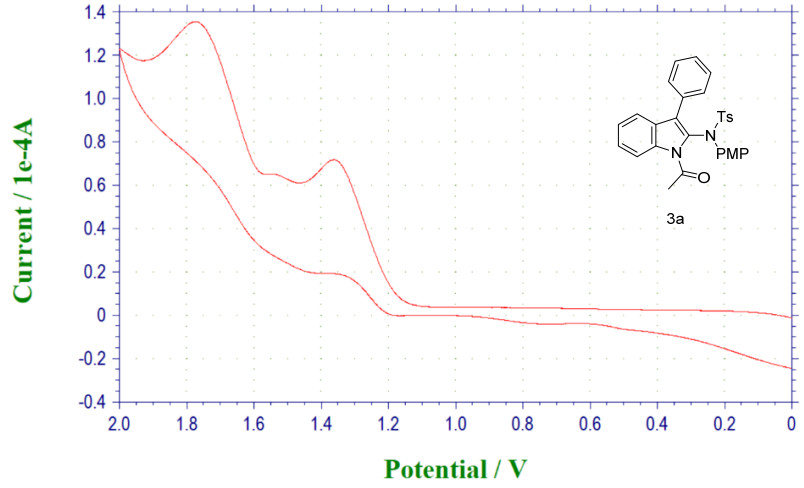
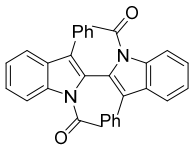


Figure S4.CV of compound**3a**

3.2. The isolation and characterization of byproduct from the reaction mixture

1,1'-(3,3'-Diphenyl-1*H*,1'*H*-[2,2'-biindole]-1,1'-diyl)bis(ethan-1-one) (13)



13

White solid (8 mg, 2 % yield, R_f = 0.74 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ):8.32 (d, *J*= 8.2 Hz, 2H), 7.55 (d, *J*= 7.5 Hz, 2H), 7.45 (t, *J*= 7.3 Hz, 2H), 7.30 (t, *J*= 7.5 Hz, 2H), 7.19 (s,6H), 6.92 (d, *J*= 5.6 Hz, 4H), 2.44 (s,6H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 169.8, 136.7, 132.4, 129.1, 128.8, 128.5, 127.4, 126.6, 126.2, 124.0, 120.6, 116.5, 25.8. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{32}H_{25}N_2O_2^+$([M+H]$^+$),469.1911,found,469.1910.

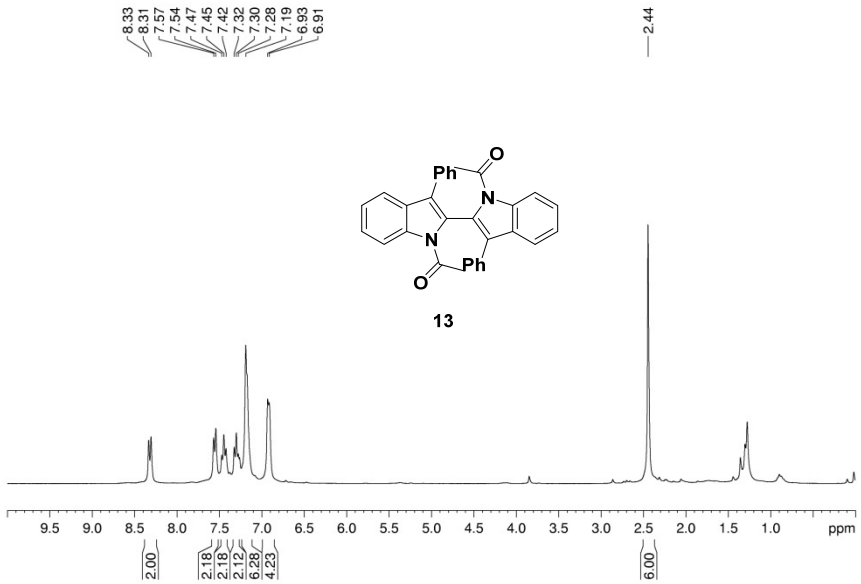


Figure S5. 1H NMR spectrum of**13**

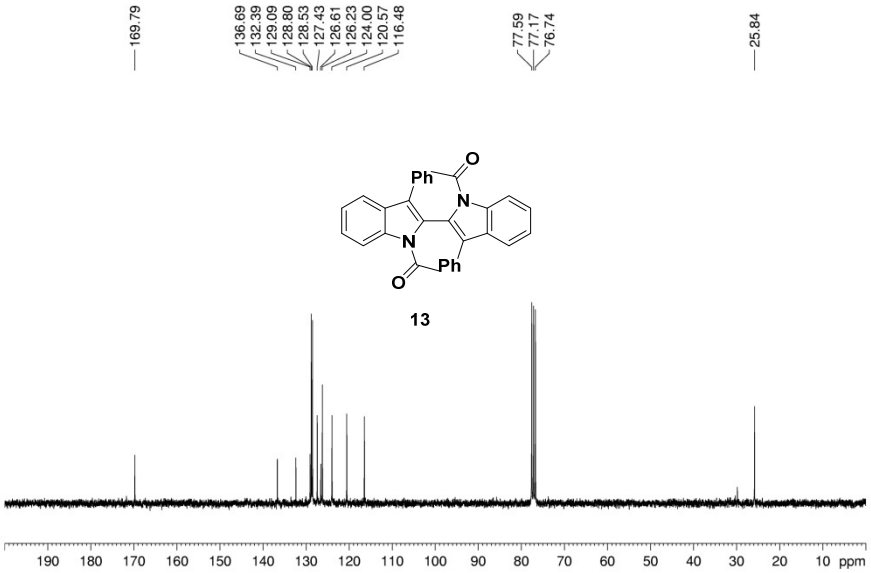
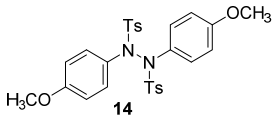


Figure S6.^{13}C NMR spectrum of**13**

***N,N′*-Bis(4-methoxyphenyl)-4-methyl-*N′*-tosylbenzenesulfonohydrazide (14)**



14

White solid (11 mg, 2 % yield, R_f = 0.64 (petroleum ether/ethyl acetate = 2 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ):7.58-7.52 (m,4H), 7.45 (d, *J*= 8.1 Hz, 2H), 7.25 (d, *J*= 7.8 Hz, 2H), 7.09 (d, *J*= 7.9 Hz, 2H), 6.94 (d, *J*= 8.9 Hz, 2H), 6.79 (dd, *J*= 9.0, 2.6 Hz, 1H), 6.67 (d, *J*= 8.9 Hz, 2H), 6.36 (d, *J*= 2.5 Hz, 1H), 3.76 (s,3H), 3.60 (s,3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 158.8, 156.5, 144.6, 143.7, 136.8, 135.6, 132.9, 132.8, 129.7, 129.6, 128.9, 128.7, 128.3, 127.2, 123.2, 115.4, 114.5, 114.4, 55.5, 55.5, 21.7, 21.6.Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{28}H_{29}N_2O_6S_2^+$ ([M +H]$^+$), 553.1462, found, 553.1462.

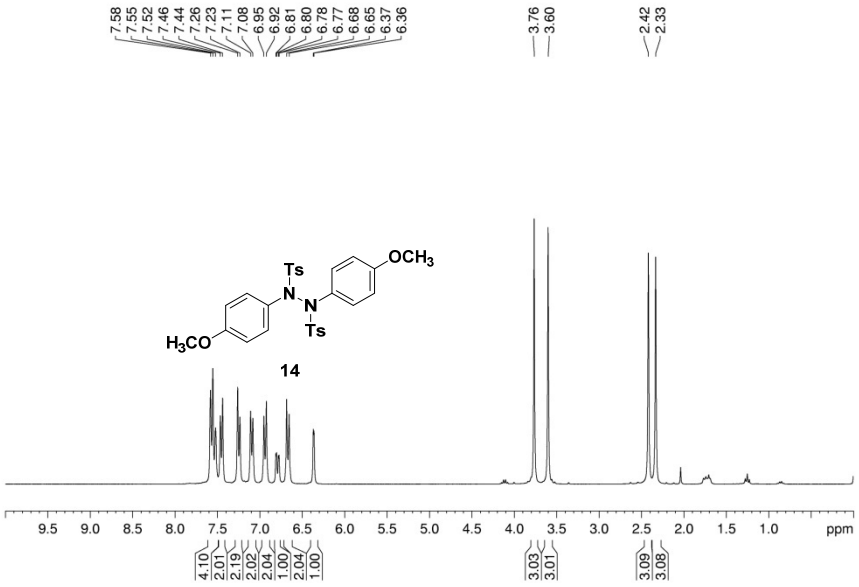


Figure S7.^{1}H NMR spectrum of**14**

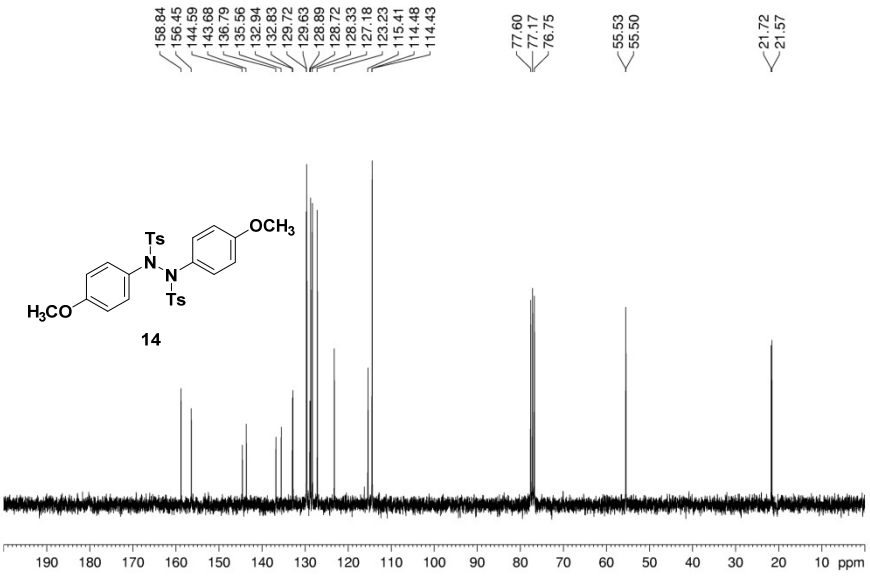


Figure S8.^{13}C NMR spectrum of**14**

3.3. Radical trapping experiments

When triethyl phosphate was added to the standard reaction, the reaction was inhibited. The adduct **15** was formed and detected by HRMS, which indicated that the indole radical species may formed during the electro chemical transformation.

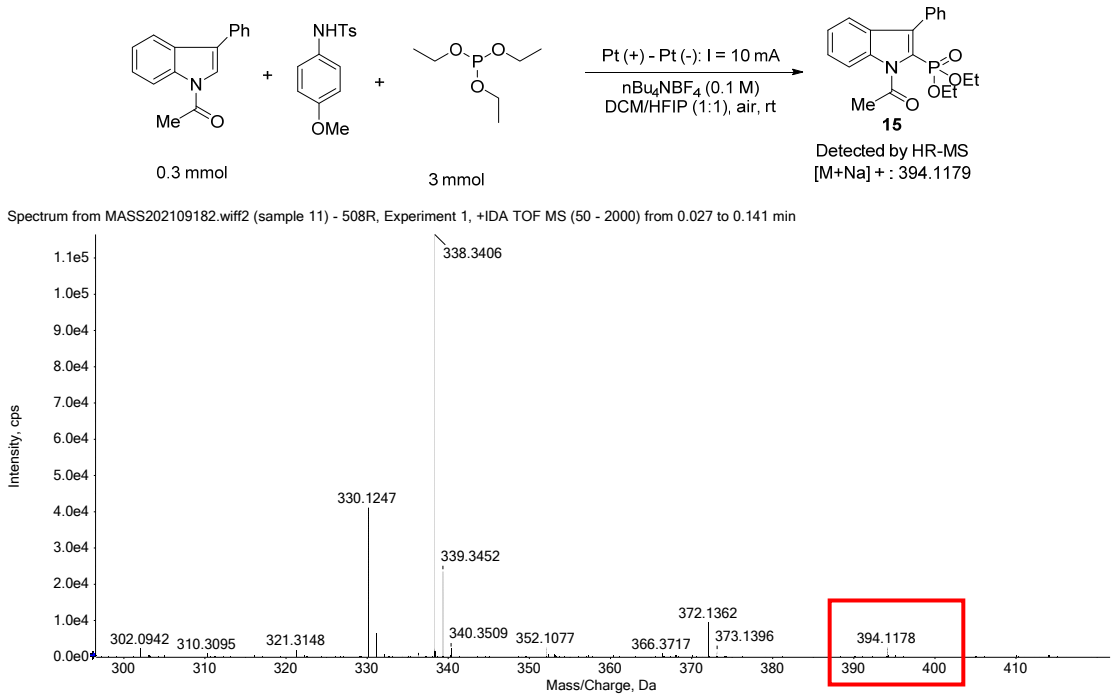
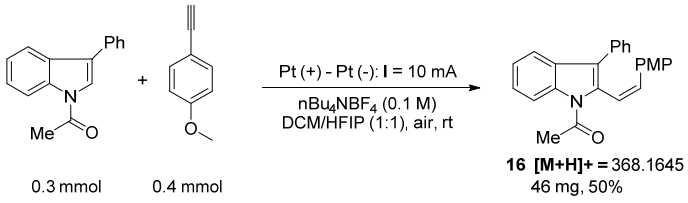


Figure S9. HRMS spectrum of **15**

Another radical trapping reaction was also carried out. When we mixed alkyne with indole under standard condition, a coupling product **16** was isolated in 50%. Compound **16** was characterized by ^{1}H-NMR, ^{13}C-NMR and HRMS. The results indicated that an indole radical species may formed under the standard condition, then the radical was trapped by the alkyne to give conpound **16**.



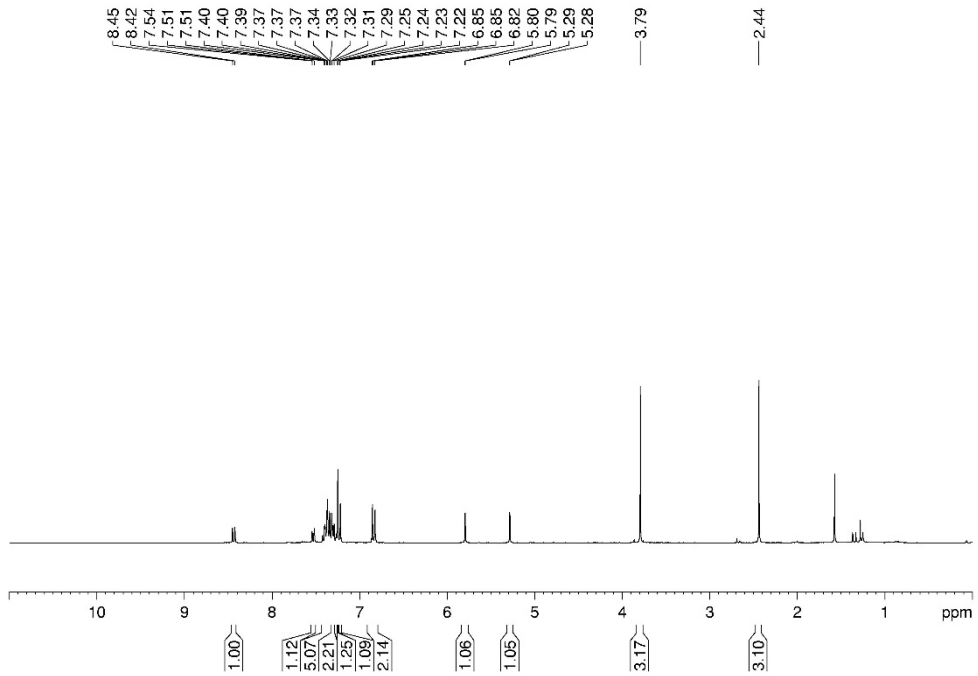


Figure S10. ^{1}H NMR spectrum of **16**

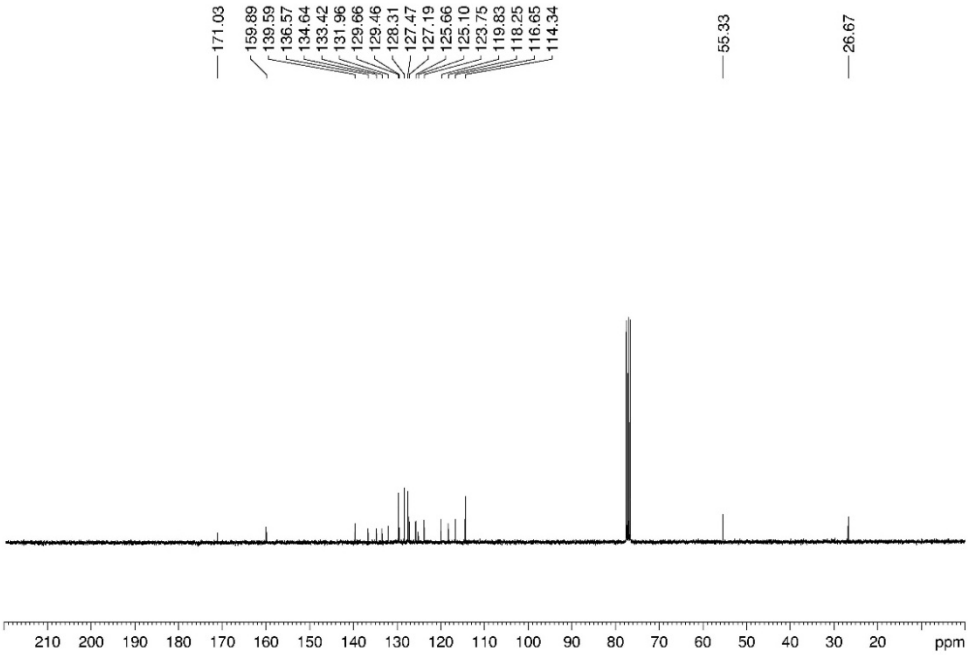


Figure S11. ^{13}C NMR spectrum of **16**

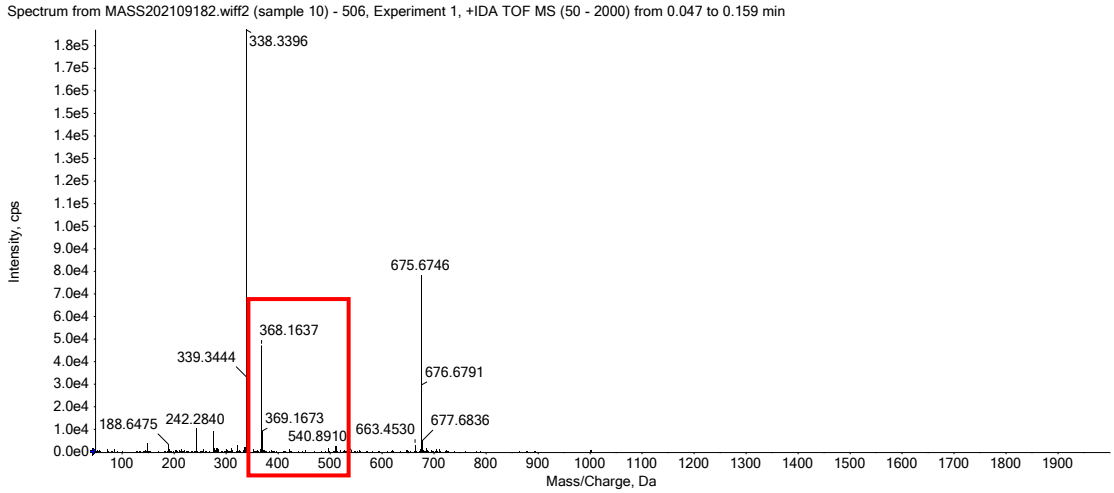
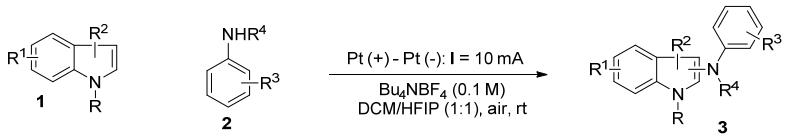


Figure S12. HRMS spectrum of of **16**

4. Procedure for C-N construction

4.1 Genaral Procedure for C-N construction

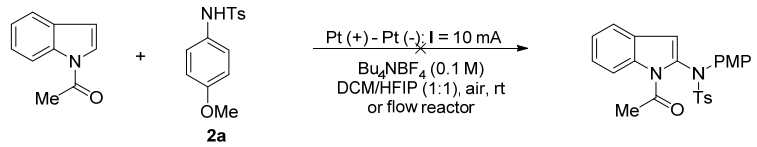


A solution of indols or other heteroarenes(**1**) (1.0mmol), aniline derivatives (**2**) (1.2 mmol) and Bu_4NBF_4(0.1M) in HFIP/DCM = 1/1 (10.0mL, 0.1M of **1**) was stirred at rt under air in a self-made plastic reactor which was equipped with platinum plate electrodes (1.5 cm×1.5 cm×0.1 mm) as both the anode and cathode. The reaction mixture was stirred and electrolyzed at a constant current of 10 mAuntile the disappearance of **1** (TLC plate under UV lamp). Electrochemical continueous-flow reactor was applied for 0.2 mL/min at a constant current of 10 mA.The reaction mixture was directly concentrated *in vacuo*. The residue was purified by chromatography on silica gel, eluting with Petroleum ether (PE):EtOAc (EA), to afford pure product.

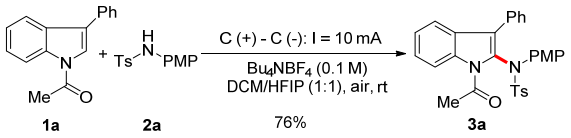
4.2 Other related reaction condition test for C-N construction

The reaction activity of indole substrate without any substituent was also tested. We tried acyl protected indole to react with **2a** under standard condition or using a flow reactor. However, the reaction goes to dark when the current was applied immediately and some insoluble brown solid was formed and stick to anode. No desired product was isolated.

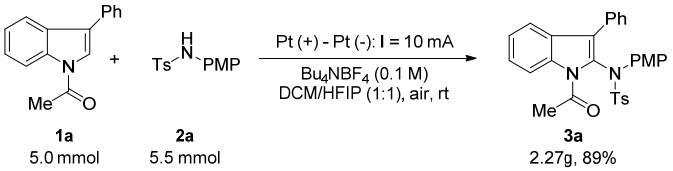
The reaction did not work under current condition:



The electro chemical amination were also carried out by using graphite anode and cathode under 10 mA constant current condition. Finally, we got 76% yield of desired product, which shows lower reaction efficiency comparing with the standard condition.



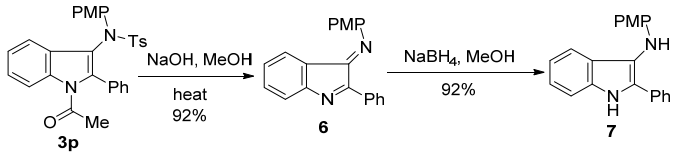
5. Procedure for Gram Scale Synthesis



A solution of 1-(3-phenyl-1*H*-indol-1-yl)ethan-1-one (1a) (1.18g,5 mmol), *N*-(4-methoxyphenyl)-4-methylbenzenesulfonamide (**2a**) (1.52g, 5.5 mmol) and nBu_4NBF_4 (1.65g, 0.1M) in HFIP/DCM = 1/1 (50.0mL) was stirred at rt under air atmosphere in a sealed electrolytic cell which was equipped with platinum electrodes (30 mm×30 mm×0.1 mm) as both the anode and cathode. A balloon was connected to the electrolytic cell for collecting H_2. The reaction mixture was stirred and electrolyzed at a constant current of 10 mAuntile the disappearance of **1a** (detected by TLC plate). The reaction mixture was directly concentrated *in vacuo*. The residue was purified by chromatography on silica gel, eluting with Petroleum ether:EtOAc, to afford pure the title product as white solid (2.27g, 89%).

6. Product Transformation

6.1 Further transformation product of **3p**



(*Z*)-*N*-(4-Methoxyphenyl)-2-phenyl-3H-indol-3-imine (6)[1]

A mixture of **3p** (0.2 mmol, 102 mg), NaOH (1.20 mmol, 48 mg) and MeOH(10.0 mL) was added to a 25 mL round-bottomed flask. The reaction was heated to 50 ^{o}C for 10 min. After cooling to room temperature, the reaction was diluted with water, extracted with DCM for 3 times. The combined organic layers were dried over Na_2SO_4, filtered and evaporated to give a residue, which was purified by flash column chromatography on neutron Al_2O_3 with DCM/MeOH = 25: 1 as eluent to give a brown solid in 92% yield (57 mg).NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ): 8.42-8.39 (m, 2H), 7.52-7.49 (m, 4H), 7.37 (t, *J* = 7.5 Hz, 1H), 7.05-6.87 (m, 6H), 3.88 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 166.9, 164.0, 158.1, 158.0, 143.5, 133.2, 132.5, 131.1, 130.3, 128.5, 127.0, 125.5, 121.8, 121.6, 120.2, 114.7, 55.7. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{21}H_{17}N_2O^+$ ($[M+H]^+$), 313.1335, found,313.1337.

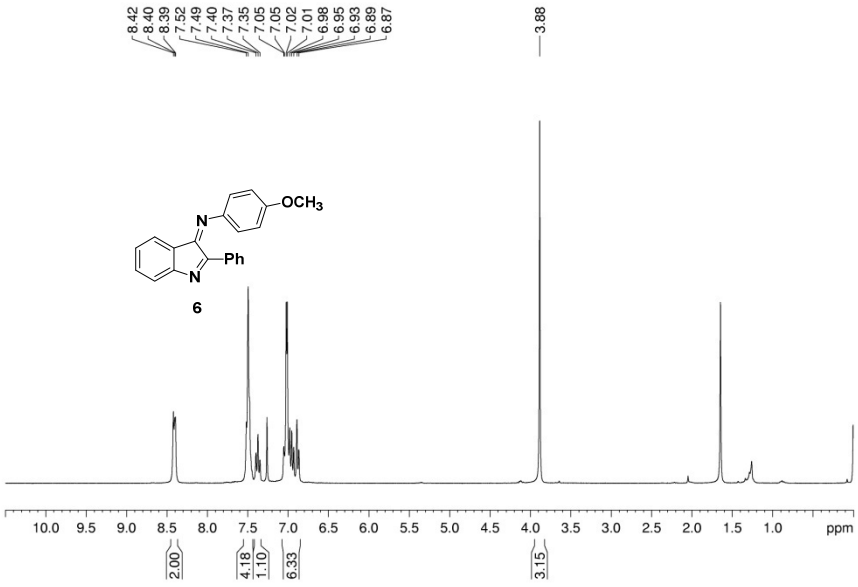


Figure S13.^{1}H NMR spectrum of **6**

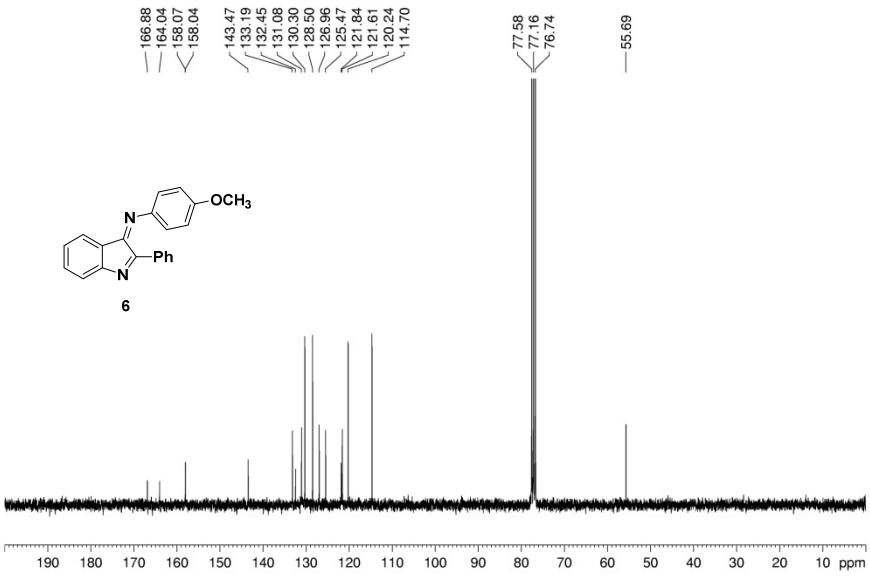


Figure S14.^{13}C NMR spectrum of **6**

N-(4-methoxyphenyl)-2-phenyl-1H-indol-3-amine (7)[2]

A mixture of **6** (0.16 mmol, 50 mg), $NaBH_4$ (0.32 mmol, 12mg) and MeOH (10.0 mL) was mixed in a 25 mL round-bottomed flask. The reaction was stirred at room temperature for 2h, along with the disappearance of compound **6** (monitored by TLC). The reaction was concentrated to give a residue which was suspended in H2O and extracted with EtOAc for 3 times. The combined organic layers were dried over Na_2SO_4, filtered and evaporated to give a compound **7** as a yellow solid in 92% yield (46 mg). NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ): 8.13 (s, 1H), 7.70 (d, *J*= 7.2 Hz, 1H), 7.46-7.31 (m, 5H), 7.26 (t, *J*= 7.6 Hz, 1H), 7.12 (t, *J*= 7.1 Hz, 1H), 6.81 (d, *J*= 8.8 Hz, 2H), 6.71 (d, *J*= 8.8 Hz, 1H), 5.12 (s, 1H), 3.78 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 152.6, 141.9, 135.0, 131.8, 129.1, 127.8, 126.7, 123.0, 120.1, 119.2, 116.3, 115.0, 111.3, 55.9.Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{21}H_{19}N_2O^+$([M +H]$^+$), 315.1492, found,315.1496.

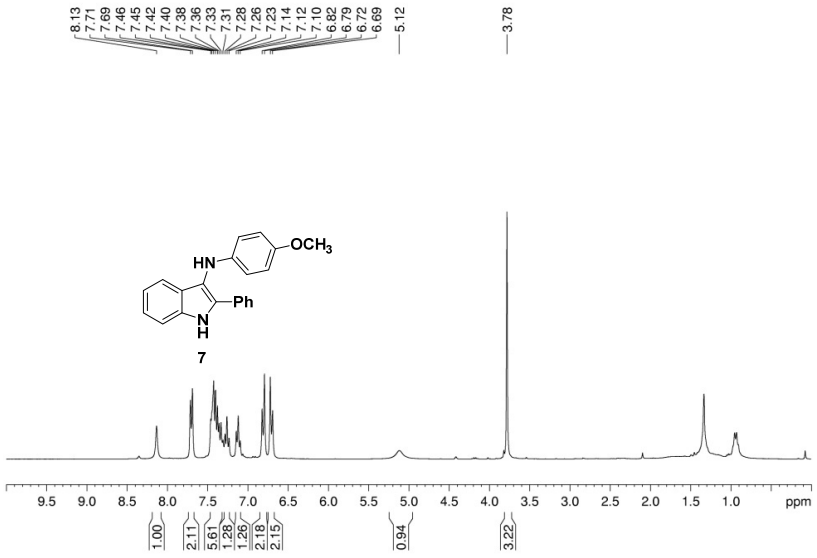


Figure S15.^{1}H NMR spectrum of **7**

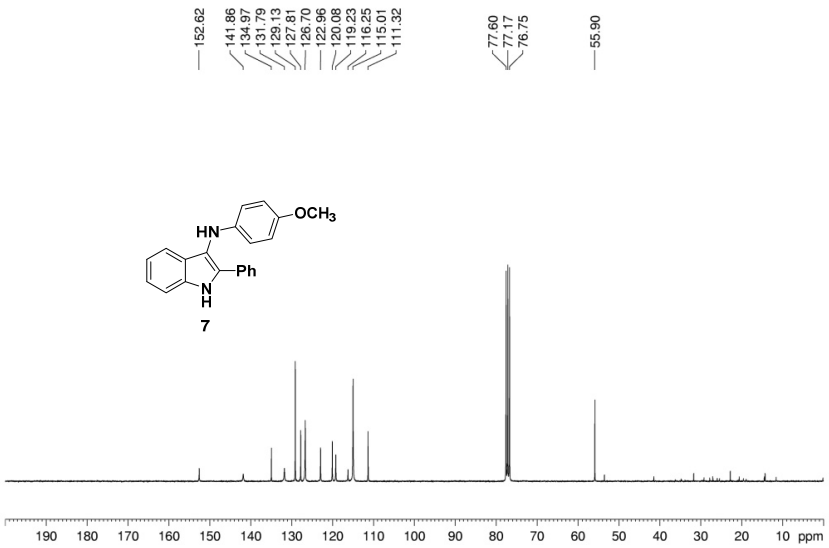
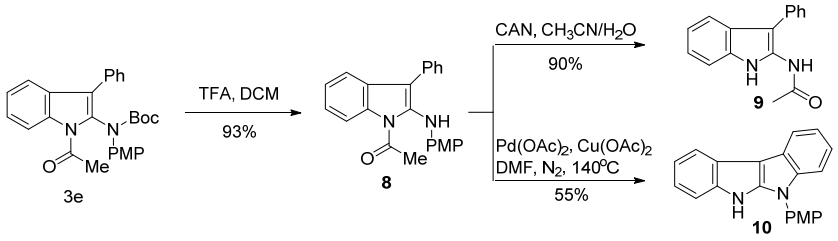


Figure S16.^{13}C NMR spectrum of **7**

6.2Further transformation product of **3e**



1-(2-((4-Methoxyphenyl)amino)-3-phenyl-1*H*-indol-1-yl)ethan-1-one (8)[3]

Boc-protected **3e** (0.5 mmol, 228 mg) was dissolved in DCM (5 mL). TFA (3.0 mL) was then added to the reaction mixture and the reaction was stirred at room temperature for 30 min. Later, the reaction mixture was concentrated to give a redidue which was disolved in DCM again and washed with a satrurated aqueous solution of Na_2CO_3 and dried over Na_2SO_4. The organic phase was concentrated to give a brown solid in 93% yield (165 mg). NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 8.16 (d, *J*= 7.3 Hz, 1H), 7.62-7.59 (m, 1H), 7.40 (d, *J*= 7.1 Hz, 2H), 7.35-7.24 (m, 5H), 6.73-6.62 (m, 5H), 3.73 (s,3H), 2.71 (s,3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 171.7, 154.4, 137.9, 135.2, 133.7, 132.8, 129.2, 129.0, 128.7, 127.1, 124.0, 123.9, 118.7, 117.6, 115.8, 114.8, 111.9, 55.7, 27.0. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{23}H_{21}N_2O_2^+$ ([M +H]$^+$), 357.1598, found,357.1601.

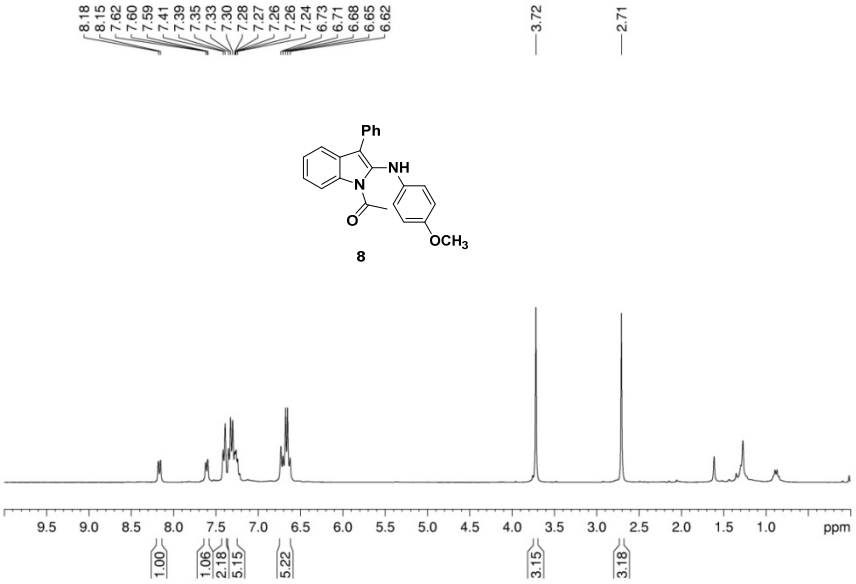


Figure S17.[1]H NMR spectrum of**8**

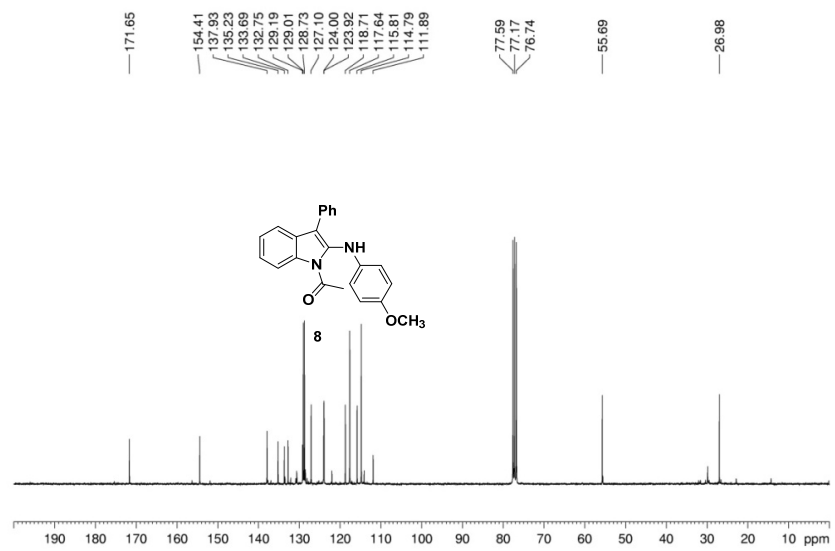


Figure S18.[13]C NMR spectrum of **8**

N-(3-Phenyl-1*H*-indol-2-yl)acetamide (9)[4]

To a solution of compound **8** (0.2 mmol, 71 mg) in MeCN/H_2O = 5/1 (15.0 mL) was added ceric ammonium nitrate (CAN) (0.6 mmol, 322 mg). The reaction mixture was stirred at 0 ^oC for 2h. The reaction soluvtion was then quenchend with adding 1 M HCl solution. The mixture was concentrated and dissolved in DCM. The mixture was extracted by DCM for 3 times. The organic layer was with a satrurated aqueous solution of $NaHCO_3$ and dried over Na_2SO_4. The pure product **9** was obtained by flash column chromatography on silica gel (PE/EtOAc = 2:1 as eluent) in 90% yield (45 mg). NMR Spectroscopy: ^1H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 8.70 (s,1H), 7.89 (d, *J*= 7.5 Hz, 2H), 7.61-7.51 (m, 2H), 7.51-7.40 (m, 4H), 7.35 (d, *J*= 7.7 Hz, 1H),

5.39 (s,1H), 2.08(s,3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 195.7, 174.8, 155.0, 137.9, 137.7, 136.8, 133.5, 131.9, 130.6, 130.3, 128.5, 128.4, 26.4.Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{16}H_{15}N_2O^+$ ([M +H]$^+$), 251.1179, found,251.1179.

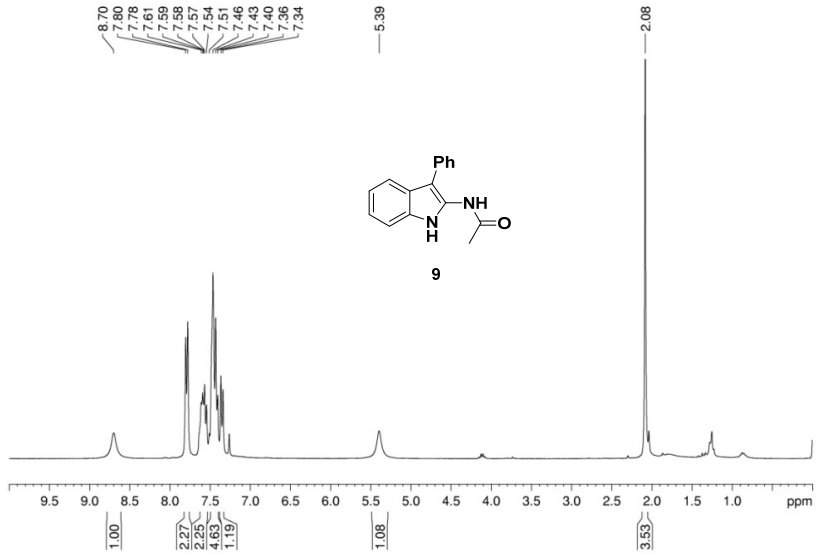


Figure S17.^{1}H NMR spectrum of **9**

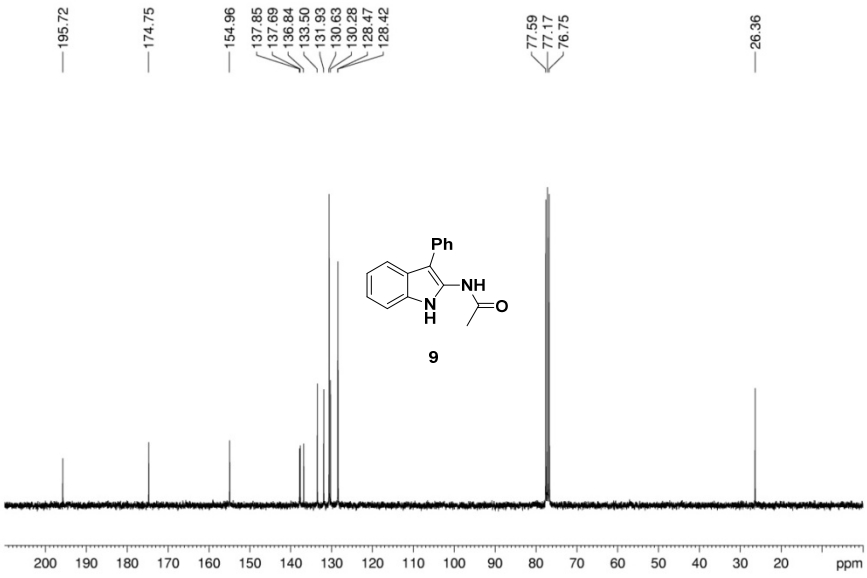


Figure S20.^{13}C NMR spectrum of **9**

5-(4-Methoxyphenyl)-5,10-dihydroindolo[3,2-*b*]indole (10)[5]

The solid of compound **8** (71 mg, 0.2 mmol), $Pd(OAc)_2$ (9.0 mg, 0.04 mmol), and $Cu(OAc)_2$ (180 mg, 1.0 mmol) were mixed in DMF (10 mL). The mixtrure was degassed via Freeze-Pump-Thaw. The solution was heated at 140 ^{o}C for 3h. After cooling to rt, the reaction mixture was filtered over a pad of celite. The organic phase was concentrated and purified by silica-gel column chromatography to afford compound **10** as a light yellow solid (31 mg, 55%).NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 8.02 (s, 1H), 7.93 (t, *J*= 6.9 Hz, 2H), 7.53 (d, *J*= 8.7 Hz,

2H), 7.43-7.37 (m, 2H), 7.33-7.26 (m, 3H), 7.20-7.10 (m, 4H), 3.91 (s,3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 158.9, 144.3, 139.5, 138.1, 130.0, 126.5, 123.0, 122.6, 121.0, 120.9, 120.3, 120.3, 118.7, 118.7, 115.5, 111.6, 110.4, 101.5, 55.8. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{21}H_{17}N_2O^+$ ([M +H]$^+$), 313.1335, found,313.1332.

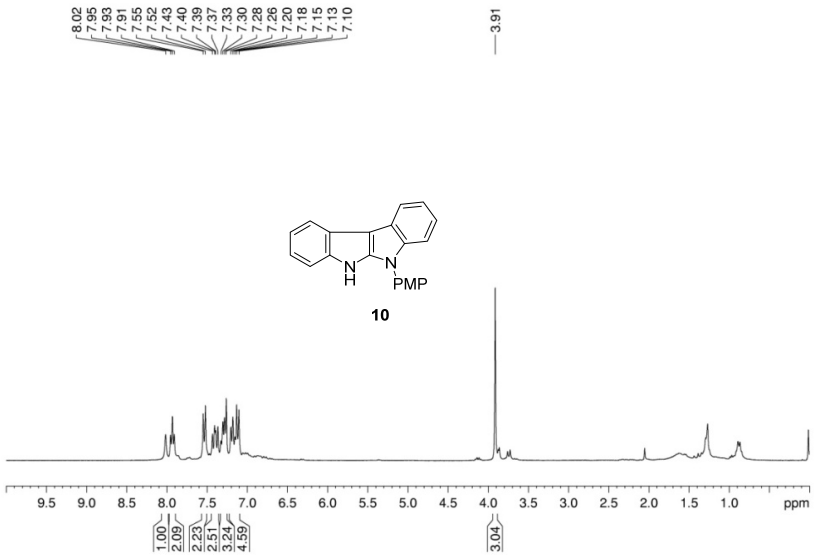


Figure S21. ^{1}H NMR spectrum of **10**

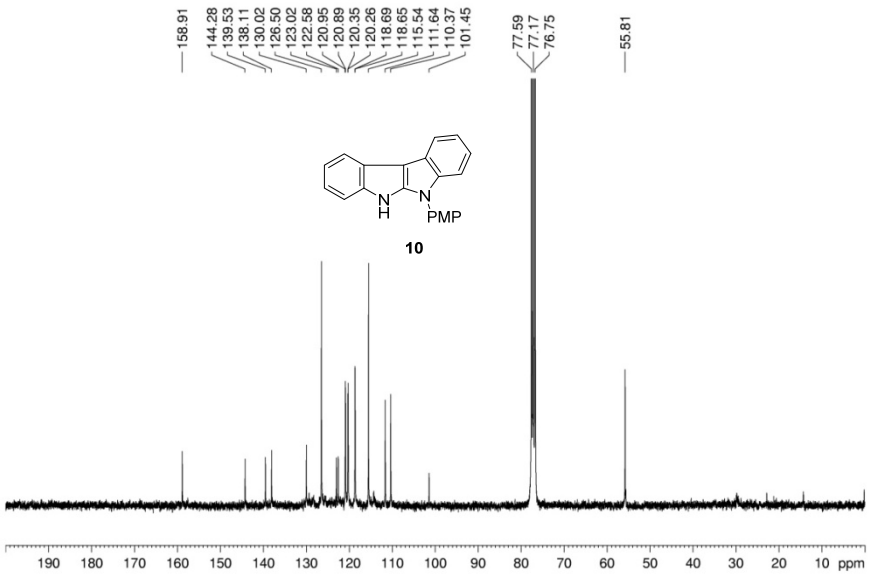
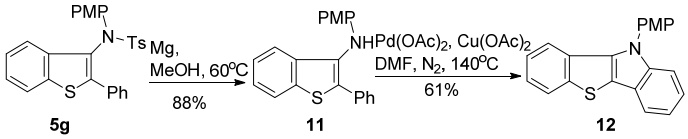


Figure S22.^{13}C NMR spectrum of **10**

6.3Further transformation product of **5g**



***N*-(4-Methoxyphenyl)-2-phenylbenzo[*b*]thiophen-3-amine (11)**[7]

To a solution of 5g(0.2 mmol, 97 mg) in MeOH (15 mL, 0.013 M) was added Mg (6 mmol, 30 eq.). The reaction was stirring at 60 ^{o}C for 3h and the reaction was monitored by TLC plate. After cooling to rt, the resulting mixture was filtered through a pad of Celite which was washed with DCM. The combined organic layer was washed with brine, dried over anhydrous $MgSO_4$, and concentrated in vacuo to give a residue which was purified by column chromatography on silica gel to afford the corresponding product **11** as a brown solid in 88% yield(58 mg).NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 7.84 (d, *J*= 7.5 Hz, 1H), 7.63 (d, *J*= 6.9 Hz, 2H), 7.54 (d, *J*= 7.3 Hz, 1H), 7.44-7.28 (m, 5H), 6.83-6.71 (m, 4H), 5.46 (s, 1H), 3.78 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 153.5, 140.0, 137.2, 137.1, 133.5, 132.3, 130.6, 129.1, 128.6, 128.2, 124.9, 124.3, 122.8, 122.7, 116.6, 114.9, 55.7. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{21}H_{18}NOS^{+}$ ($[M+H]^{+}$), 332.1104, found, 332.1107.

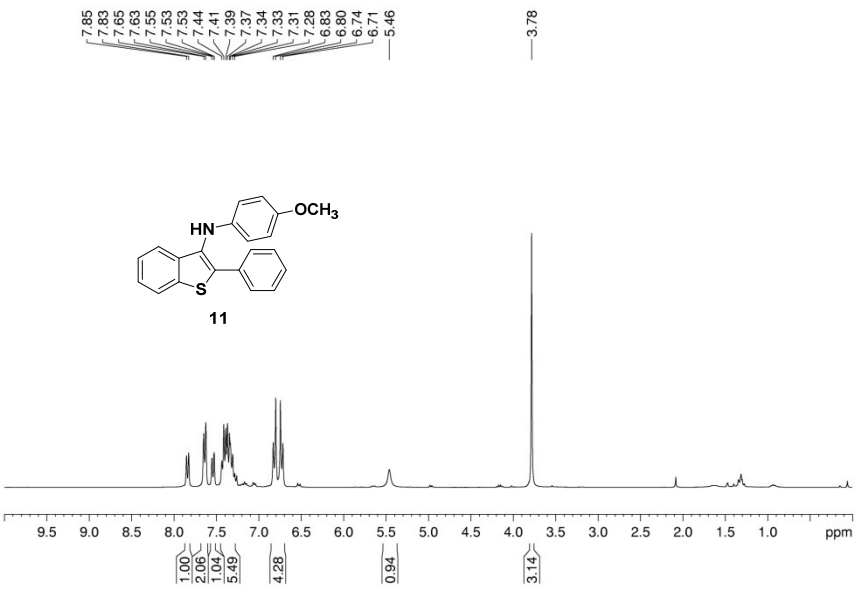


Figure S23.^{1}H NMR spectrum of **11**

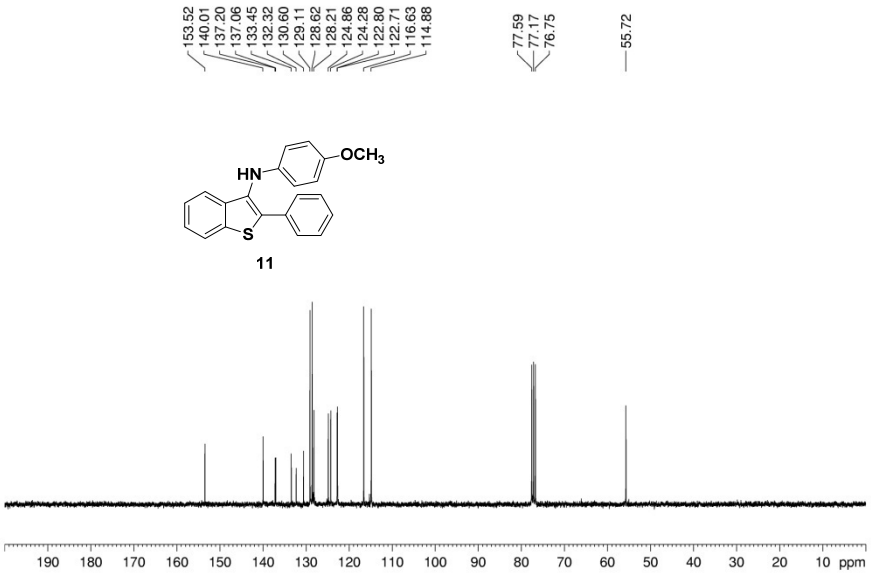


Figure S24.^{13}C NMR spectrum of **11**

10-(4-Methoxyphenyl)-10*H*-benzo[4,5]thieno[3,2-*b*]indole (12)[5-6]

The solid of compound9 (33 mg, 0.1 mmol), $Pd(OAc)_2$ (4.5 mg, 0.02 mmol), and $Cu(OAc)_2$ (90 mg, 0.5 mmol) were mixed in DMF (5 mL). The mixtrure was degassed via Freeze-Pump-Thaw. The solution was heated at 140 ^{o}C for 3h. After cooling to rt, the reaction mixture was filtered over a pad of celite. The organic phase was concentrated and purified by silica-gel column chromatography to afford compound 12 as a lightyellow solid (20 mg, 61%).NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 7.90 (d, *J*= 7.8 Hz, 1H), 7.85-7.83 (m, 1H), 7.50 (d, *J*= 8.7 Hz, 2H), 7.32-7.20 (m, 6H), 7.14 (d, *J*= 8.7 Hz, 2H), 3.96 (s,3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 159.6, 143.3, 143.0, 138.1, 130.7, 129.2, 127.0, 124.5, 124.1, 124.1, 123.4, 122.1, 120.6, 120.4, 119.4, 116.3, 115.0, 111.1, 55.8. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{21}H_{16}NOS^{+}$ ($[M+H]^{+}$), 330.0947, found,330.0947.

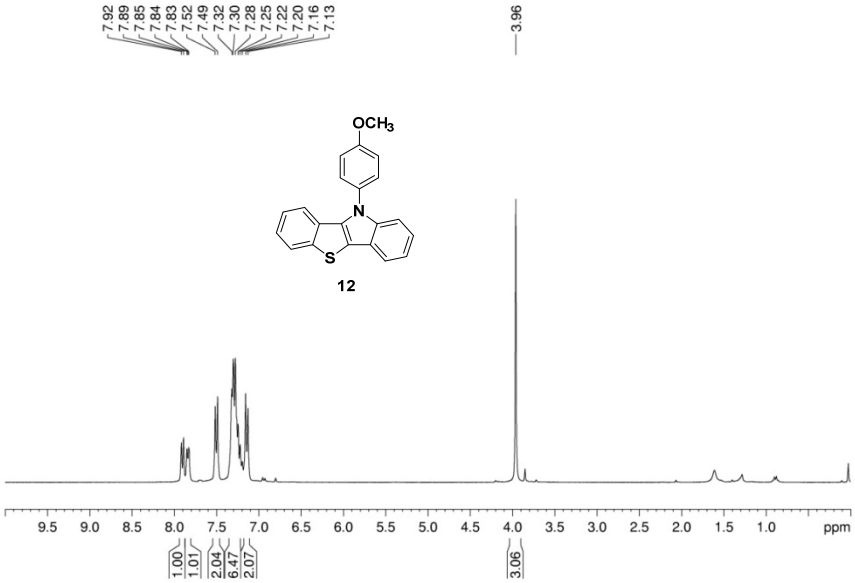


Figure S25.[1]H NMR spectrum of **12**

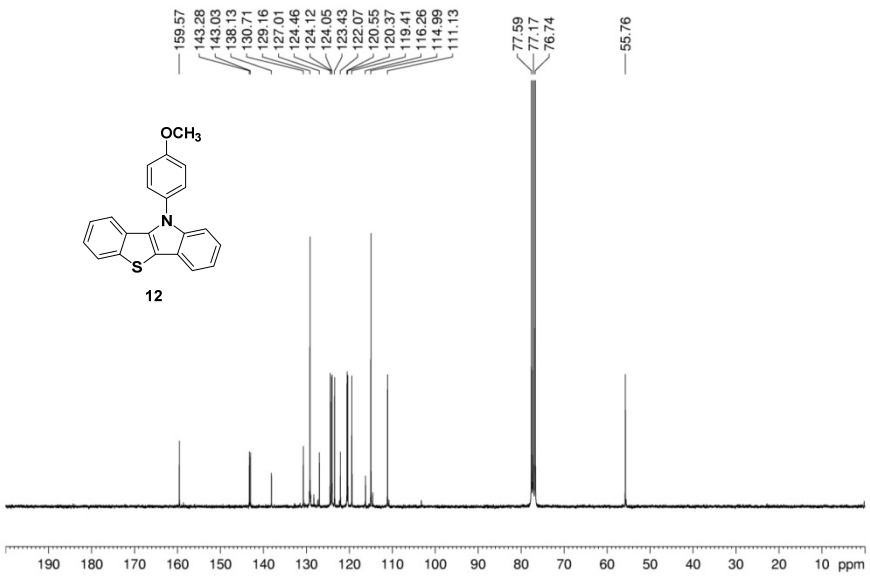


Figure S26.[13]C NMR spectrum of **12**

7. Referrences

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2) L. Bouyazza, J.-C. Lancelot, S. Rault, M. Robba, M. A. Quermonne, *J. Heterocyclic Chem*. **1991**, *28*, 373-377.
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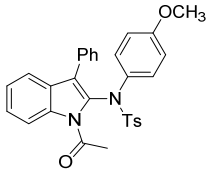
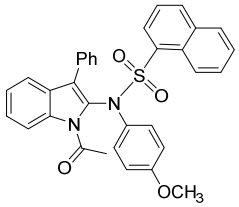
8. Characterization of Product

_N_-(1-acetyl-3-phenyl-1_H_-indol-2-yl)-_N_-(4-methoxyphenyl)-4-methylbenzenesulfonamide (3a)



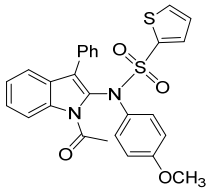
White solid (490 mg, 96 % yield, R_f = 0.68 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ):8.28 (d, *J*=8.4Hz, 1H), 7.49-7.42 (m,2H),7.36 (d, *J*=8.3Hz, 2H), 7.30-7.25 (m, 2H), 7.23-7.18 (m, 2H), 7.14-7.09 (m, 2H), 7.06-7.03 (m, 2H),6.95 (d, *J*=6.8Hz, 2H), 6.81-6.78 (m, 2H), 3.78 (s, 3H), 2.86 (s, 3H), 2.32 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 170.5, 156.9, 143.9, 136.6, 136.0, 135.0, 131.5, 129.8, 129.3, 128.9, 128.4, 127.9, 127.7, 126.5, 123.6,122.8, 122.5, 120.6, 116.3, 114.6, 55.6, 27.0, 21.7. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{30}H_{26}NaN_2O_4S^+$ ([M +Na]$^+$), 533.1505, found, 533.1515.

_N_-(1-acetyl-3-phenyl-1_H_-indol-2-yl)-_N_-(4-methoxyphenyl)naphthalene-1-sulfonamide (3b)



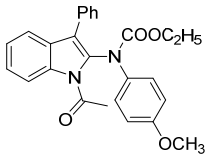
White solid (464 mg, 85 % yield, R_f = 0.66 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ):8.29 (d, *J*= 8.4 Hz, 1H),8.10 (s, 1H), 7.77 (t, *J*= 8.7 Hz, 2H), 7.64-7.52 (m, 3H), 7.45 (d, *J*= 7.9 Hz, 3H), 7.34-7.26 (m, 3H), 6.97-6.95 (m, 2H), 6.85-6.82 (m, 5H),3.79 (s, 3H), 2.91 (s, 3H).^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 170.5, 157.0, 136.6, 136.1, 135.0, 135.0, 131.8, 131.1, 129.7, 129.5, 129.1, 128.9, 128.8, 128.2, 127.9, 127.8, 127.6, 127.3, 126.5, 123.6, 123.0, 122.6, 122.5, 120.7, 116.2, 114.5, 55.6, 27.0. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{33}H_{27}N_2O_4S^+$ ([M +H]$^+$), 547.1686, found,547.1685.

_N_-(1-acetyl-3-phenyl-1_H_-indol-2-yl)-_N_-(4-methoxyphenyl)thiophene-2-sulfonamide (3c)



White solid (436 mg, 87 % yield, R_f = 0.57 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ):8.27 (d, *J*= 8.3 Hz, 1H), 7.48-7.43 (m, 2H), 7.38-7.37 (m, 1H), 7.33-7.26 (m, 3H), 7.23-7.15 (m, 3H), 7.09 (d, *J*= 6.4 Hz, 3H), 6.83 (d, *J*= 9.1 Hz, 2H), 6.75 (t, *J*= 4.8 Hz, 1H),3.79 (s, 3H), 2.84 (s, 3H).^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 170.3, 157.1, 139.5, 135.4, 135.0, 134.0, 132.9, 131.4, 129.8, 128.5, 128.4, 128.0, 128.0, 127.2, 126.6, 123.7, 123.0, 122.9, 120.7, 116.3, 114.6, 55.6, 26.9. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{27}H_{23}N_2O_4S_2^+$ ([M +H]$^+$), 503.1094, found, 503.1094.

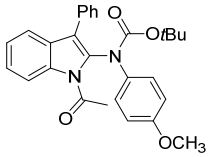
Ethyl (1-acetyl-3-phenyl-1H-indol-2-yl)(4-methoxyphenyl)carbamate (3d)



White solid (359 mg, 84 % yield, R_f = 0.59 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ):8.42 (d, *J*= 8.3 Hz, 1H), 7.65 (d, *J*= 7.7 Hz, 1H), 7.48-7.31 (m, 7H), 7.11 (d, *J*= 7.9 Hz, 2H), 6.76 (d, *J*= 8.9 Hz, 2H), 4.22 (q, *J*= 6.8 Hz, 2H),3.73 (s, 3H), 2.68 (s, 3H), 1.17 (t, *J*= 6.9 Hz, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 169.4, 157.1, 154.7, 134.8, 134.2, 131.7, 130.9, 128.9, 128.7, 128.5, 128.0, 127.7, 127.4, 126.1, 124.2, 123.9, 120.5, 120.5, 120.1, 116.7, 114.1, 62.9, 55.4, 25.9, 14.5. Mass Spectrometry: HRMS (ESI-TOF) (m/z):

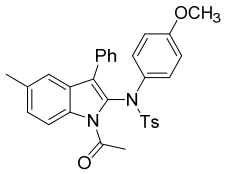
calcd for $C_{26}H_{25}N_2O_4S^+$ ([M +H]$^+$), 429.1809, found, 429.1813.

Tert-butyl (1-acetyl-3-phenyl-1*H*-indol-2-yl)(4-methoxyphenyl)carbamate (3e)



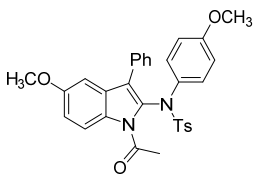
White solid (396 mg, 83 % yield, R_f = 0.74 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ):8.45 (d, *J*= 8.3 Hz, 1H), 7.66 (d, *J*= 7.6 Hz, 1H), 7.50-7.30 (m, 7H), 7.12 (d, *J*= 7.5 Hz, 2H), 6.76 (d, *J*= 8.8 Hz, 2H),3.74 (s, 3H), 2.66 (s, 3H), 1.32 (s,9H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 169.6, 156.8, 153.1, 134.9, 134.4, 132.0, 128.9, 128.7, 127.9, 127.6, 126.0, 123.9, 120.2, 120.0, 116.8, 114.1, 82.6, 55.5, 28.0, 25.8. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{28}H_{28}N_2NaO_4^+$ ([M +Na]$^+$), 479.1941, found, 479.1955.

***N*-(1-acetyl-5-methyl-3-phenyl-1*H*-indol-2-yl)-*N*-(4-methoxyphenyl)-4-methylben zenesulfonamide (3f)**



White solid (471 mg, 90 % yield, R_f = 0.66 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ):8.22 (d, *J*=8.6 Hz, 1H), 7.38 (d, *J*=8.0 Hz, 2H), 7.30-7.26 (m, 5H), 7.15 (t, *J*= 7.5 Hz, 2H), 7.07 (d, *J*= 7.5 Hz, 2H), 6.95 (d, *J*=8.2 Hz, 2H), 6.83 (d, *J*= 9.0 Hz, 2H), 3.78 (s, 3H), 2.88 (s, 3H), 2.42 (s, 3H), 2.32 (s, 3H).^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ):170.2, 156.7, 143.8, 136.5, 136.0, 133.2, 133.2, 131.5, 129.7, 129.2, 128.7, 128.3, 127.9, 127.8, 127.7, 127.6, 122.5, 122.3, 120.2, 116.1, 114.5, 55.5, 26.8, 21.5, 21.4.Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{31}H_{29}N_2O_4S^+$ ([M +H]$^+$), 525.1843, found, 525.1836.

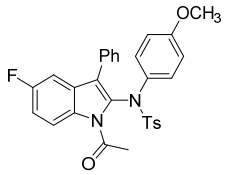
***N*-(1-acetyl-5-methoxy-3-phenyl-1*H*-indol-2-yl)-*N*-(4-methoxyphenyl)-4-methylbe nzenesulfonamide (3g)**



White solid (496 mg, 92 % yield, R_f = 0.60 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ):8.26 (d, *J*= 9.2 Hz, 1H), 7.34 (d, *J*= 8.1 Hz, 2H), 7.26-7.19 (m, 3H), 7.15-7.04 (m, 5H),6.93 (d, *J*=9.3 Hz, 2H),6.82 (d, *J*=9.0 Hz, 2H),3.78 (s, 6H), 2.83 (s, 3H), 2.31 (s, 3H).^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ):170.1, 156.8, 156.5, 143.9, 136.5, 136.0, 131.5, 129.8, 129.6, 129.3, 129.0, 128.7, 128.5, 127.8, 127.7, 122.5, 122.3, 117.7, 115.3, 114.6, 102.7, 55.8, 55.6,

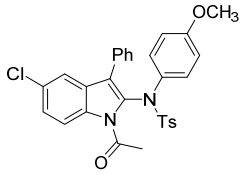
26.7, 21.6.Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{31}H_{29}N_2O_5S^+$ ([M +H]$^+$), 541.1792, found, 541.1802.

_N_-(1-acetyl-5-fluoro-3-phenyl-1_H_-indol-2-yl)-_N_-(4-methoxyphenyl)-4-methylbenzenesulfonamide (3h)



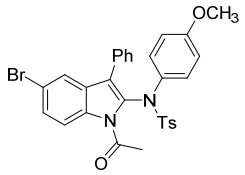
White solid (475 mg, 90 % yield, R_f = 0.62 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ):8.34 (q, *J*=9.0, 4.6 Hz, 1H), 7.33 (d, *J*=8.3 Hz, 2H), 7.24 (d, *J*= 9.1 Hz, 2H), 7.20-7.08 (m, 5H), 7.01 (d, *J*= 7.2 Hz, 2H), 6.93 (d, *J*= 8.2 Hz, 2H), 6.83 (d, *J*= 9.2 Hz, 2H), 3.78 (s, 3H), 2.85 (s, 3H), 2.32 (s, 3H).^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ):170.3, 159.7 (d, *J*=900.8 Hz),156.8, 144.1, 136.3, 135.9, 131.5, 131.1, 129.8, 129.5, 129.4, 128.9, 128.8, 128.6, 127.9, 127.8, 122.1, 118.1 (d, *J*=32.4 Hz),114.7, 114.6, 114.3, 105.9 (d, *J*=90.4 Hz),55.6, 26.7, 21.6.^{19}F NMR (282 MHz, $CDCl_3$, 25 ºC, δ):-118.7 (td, *J* = 8.6, 4.3 HZ).Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{30}H_{26}FN_2O_4S^+$ ([M +H]$^+$), 529.1592, found, 529.1588.

_N_-(1-acetyl-5-chloro-3-phenyl-1_H_-indol-2-yl)-_N_-(4-methoxyphenyl)-4-methylbenzenesulfonamide (3i)



White solid (495 mg, 91 % yield, R_f = 0.68 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ):8.28 (d, *J*=8.9 Hz, 1H), 7.44-7.37 (m,2H),7.33 (d, *J*=8.3 Hz, 2H), 7.26-7.19 (m, 3H), 7.11 (t, *J*=7.7 Hz, 2H), 7.01-6.98 (m, 2H),6.94 (d, *J*=8.2 Hz, 2H), 6.83-6.80 (m, 2H),3.78 (s, 3H), 2.85 (s, 3H), 2.32 (s, 3H).^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ):170.2, 156.8, 144.1, 136.1, 135.7, 133.2, 130.7, 129.6, 129.5, 129.3, 129.3, 129.0, 128.5, 127.8, 127.7, 126.5, 122.3, 121.6, 119.9, 117.7, 114.6, 55.5, 26.7, 21.5.Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{30}H_{26}ClN_2O_4S^+$ ([M +H]$^+$), 545.1296, found, 545.1290.

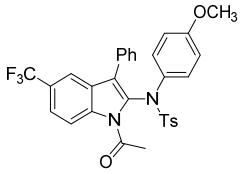
_N_-(1-acetyl-5-bromo-3-phenyl-1_H_-indol-2-yl)-_N_-(4-methoxyphenyl)-4-methylbenzenesulfonamide (3j)



White solid (495 mg, 91 % yield, R_f = 0.68 (petroleum ether/ethyl acetate = 5 : 1

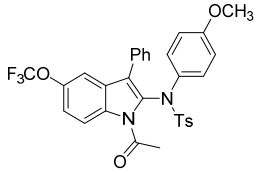
(v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ):8.22 (d, *J*=8.9 Hz, 1H), 7.58-7.51 (m,2H),7.33 (d, *J*=8.3 Hz, 2H), 7.26-7.19 (m, 3H), 7.11 (t, *J*=7.7 Hz, 2H), 7.00-6.93 (m, 4H),6.83-6.80 (m, 2H),3.78 (s, 3H), 2.85 (s, 3H), 2.32 (s, 3H).^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ):170.3, 156.9, 144.1, 136.3, 135.7, 133.7, 130.8, 129.6, 129.6, 129.4, 129.3, 128.6, 127.9, 127.8, 123.0, 122.4, 121.6, 118.0, 117.0, 114.7, 55.6, 26.8, 21.6.Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{30}H_{26}BrN_2O_4S^+$ ([M +H]$^+$), 589.0791, found, 589.0800.

_N_-(1-acetyl-3-phenyl-5-(trifluoromethyl)-1_H_-indol-2-yl)-_N_-(4-methoxyphenyl)-4-methylbenzenesulfonamide (3k)



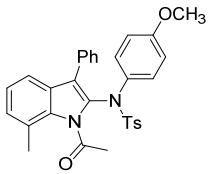
White solid (497 mg, 86 % yield, R_f = 0.57 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ):8.44 (d, *J*=8.8 Hz, 1H), 7.77 (s,1H),7.70 (d, *J*=8.9 Hz, 1H),7.37 (d, *J*=8.3 Hz, 2H),7.27-7.24 (m, 3H), 7.16 (t, *J*=7.7 Hz, 2H), 7.04-6.96 (m, 4H),6.85-6.82 (m, 2H),3.78 (s, 3H), 2.93 (s, 3H), 2.33 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ):170.5, 157.0, 144.2, 136.4, 136.1, 135.6, 130.6, 130.4, 129.6, 129.4, 128.6, 128.0, 127.8, 127.5, 126.4, 126.0, 125.6, 122.9 (q, *J* = 3.4 Hz), 122.8, 122.6, 122.2, 117.9 (q, *J* = 4.1 Hz), 116.7, 114.6, 55.5, 26.8, 21.5.^{19}F NMR (282 MHz, $CDCl_3$, 25 ºC, δ):-61.2 (s).Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{31}H_{26}F_3N_2O_4S^+$ ([M +H]$^+$), 579.1560, found, 579.1525.

_N_-(1-acetyl-3-phenyl-5-(trifluoromethoxy)-1_H_-indol-2-yl)-_N_-(4-methoxyphenyl)-4-methylbenzenesulfonamide (3l)



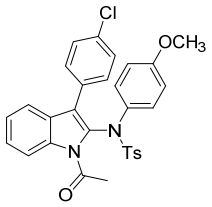
White solid (493 mg, 83 % yield, R_f = 0.54 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ):8.41 (d, *J*= 9.2 Hz, 1H), 7.38-7.33 (m, 4H), 7.29-7.22 (m, 3H), 7.14 (t, *J*= 7.7 Hz, 2H), 7.03 (d, *J*= 7.2 Hz, 2H), 6.96 (d, *J*= 8.2 Hz, 2H), 6.85 (d, *J*= 9.2 Hz, 2H),3.79 (s, 3H), 2.90 (s, 3H), 2.33 (s, 3H).^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ):170.3, 156.9, 145.5 (d, *J* =1.5 Hz), 144.2, 136.2, 135.7, 133.2, 130.7, 130.1, 129.5, 129.4, 128.6, 128.5, 128.0, 127.7, 122.4, 122.2, 122.1, 119.9, 119.0, 117.8, 114.7, 112.9, 55.5, 26.7, 21.5.^{19}F NMR (282 MHz, $CDCl_3$, 25ºC, δ):-57.9(s).Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{31}H_{26}F_3N_2O_5S^+$ ([M +H]$^+$), 595.1509, found, 595.1525.

_N_-(1-acetyl-7-methyl-3-phenyl-1_H_-indol-2-yl)-_N_-(4-methoxyphenyl)-4-methylbenzenesulfonamide (3m)



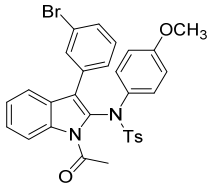
White solid (461 mg, 88 % yield, R_f = 0.64 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ):7.40-7.34 (m, 3H),7.26-7.18 (m, 9H), 6.98 (d, *J*=8.0Hz, 2H), 6.76 (d, *J*=8.9Hz, 2H),3.76 (s, 3H), 2.77 (s, 3H), 2.49 (s, 3H), 2.33 (s, 3H).^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ):173.1, 157.5, 143.8, 136.6, 135.5, 134.8, 132.1, 130.1, 130.0, 129.2, 128.4, 128.4, 128.1, 127.6, 124.1, 123.3, 120.9, 118.6, 114.4, 55.6, 28.6, 21.7, 20.6. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{31}H_{29}N_2O_4S^+$ ([M +H]$^+$), 525.1843, found, 525.1840.

_N_-(1-acetyl-3-(4-chlorophenyl)-1_H_-indol-2-yl)-_N_-(4-methoxyphenyl)-4-methylbenzenesulfonamide (3n)



White solid (479 mg, 88 % yield, R_f = 0.68 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ):8.36 (d, *J*= 8.3 Hz, 1H), 7.50-7.44 (m, 2H), 7.38 (d, *J*= 8.2 Hz, 2H), 7.34-7.26 (m, 3H), 7.07-6.98 (m, 6H), 6.87 (d, *J*= 9.1 Hz, 2H),3.79 (s, 3H), 2.87 (s, 3H), 2.38 (s, 3H).^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 170.3, 156.7, 144.3, 136.6, 136.0, 135.1, 133.9, 130.8, 129.9, 129.3, 128.8, 128.5, 127.4, 127.2, 126.7, 123.8, 121.9, 121.0, 120.2, 116.6, 114.8, 55.5, 26.8, 21.6. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{30}H_{26}ClN_2O_4S^+$ ([M +H]$^+$), 545.1296, found, 595.1306.

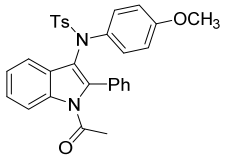
_N_-(1-acetyl-3-(3-bromophenyl)-1_H_-indol-2-yl)-_N_-(4-methoxyphenyl)-4-methylbenzenesulfonamide (3o)



White solid (479 mg, 85 % yield, R_f = 0.66 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 8.41 (d,*J*=8.4 Hz,1H), 7.49-7.44 (m,4H),7.31-7.25 (m, 4H), 7.08-7.02 (m, 3H), 6.94 (t, *J*=7.7 Hz, 1H), 6.87 (t, *J*=8.8 Hz, 3H), 3.78 (s, 3H), 2.91 (s, 3H), 2.36 (s, 3H).^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ):170.5, 156.9, 144.3, 136.3, 136.1, 134.9, 133.4, 132.5, 130.4, 129.7, 129.5, 129.3, 128.2, 127.5, 127.2, 126.6, 123.7, 122.5, 122.3, 120.3, 120.1,

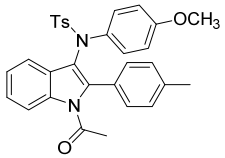
116.3, 114.7, 55.5, 26.8, 21.7.Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{30}H_{26}BrN_2O_4S^+$ ([M +H]$^+$), 589.0791, found, 589.0800.

_N_-(1-acetyl-2-phenyl-1_H_-indol-3-yl)-_N_-(4-methoxyphenyl)-4-methylbenzenesulfonamide (3p)



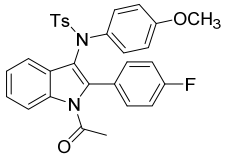
White solid (504 mg, 92 % yield, R_f = 0.62 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ):8.41 (d, *J*= 8.4 Hz,1H), 7.49-7.44 (m, 4H), 7.31-7.25 (m, 4H), 7.08-7.02 (m, 3H), 6.94 (t, *J*= 7.7 Hz, 1H), 6.87 (t, *J*= 8.8 Hz, 3H), 3.78 (s, 3H), 2.91 (s, 3H), 2.36 (s, 3H).^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ):171.3, 158.8, 143.8, 138.4, 137.7, 135.7, 133.6, 131.5, 130.7,129.6, 129.5, 128.8, 128.2, 127.0, 125.8, 124.0, 123.5, 119.3, 116.7, 114.0, 55.4, 27.9, 21.8.Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{30}H_{27}N_2O_4S^+$ ([M +H]$^+$), 511.1686, found,511.1683.

_N_-(1-acetyl-2-(p-tolyl)-1_H_-indol-3-yl)-_N_-(4-methoxyphenyl)-4-methylbenzenesulfonamide (3q)



White solid (462 mg, 88 % yield, R_f = 0.66 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ):8.40 (d, *J*=8.3, 1H), 7.51 (d, *J*=8.1 Hz, 2H), 7.36-7.11 (m,9H), 6.78 (d, *J*=8.9 Hz, 2H), 6.60 (d, *J*=8.9 Hz, 2H), 3.70 (s, 3H), 2.47 (s, 3H), 2.45 (s, 3H), 1.97 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ):171.5, 158.8, 143.8, 139.6, 138.7, 137.8, 135.6, 133.7, 130.5, 129.6, 129.5, 128.4, 128.2, 127.0, 125.7, 123.9, 123.2, 119.2, 116.6, 114.0, 55.4, 27.9, 21.8, 21.7.Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{31}H_{28}N_2NaO_4S^+$ ([M +H]$^+$), 547.1662, found,547.1659.

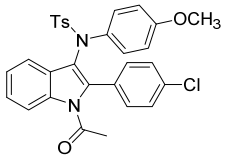
_N_-(1-acetyl-2-(4-fluorophenyl)-1_H_-indol-3-yl)-_N_-(4-methoxyphenyl)-4-methylbenzenesulfonamide (3r)



White solid (432 mg, 82 % yield, R_f = 0.64 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ):8.39 (d, *J*=8.3 Hz, 1H),7.52 (d, *J*= 8.1 Hz,2H),7.36 (t, *J*= 7.4 Hz,3H), 7.26-7.18 (m, 6H),7.08 (d, *J*=7.7 Hz,1H), 6.77 (d, *J*=8.5 Hz,2H), 6.61 (d, *J*=8.6 Hz,2H),3.72 (s, 3H), 2.47 (s, 3H), 1.99 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 171.0, 163.6 (d, *J* = 248 Hz), 158.9,

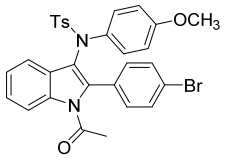
144.0, 137.7, 137.3, 135.7, 133.6, 132.7, 132.6, 129.6, 129.4, 128.3, 127.6, 127.5, 126.9, 125.99, 124.1, 123.9, 119.4, 116.7, 116.2, 115.9, 114.2, 55.5, 28.0, 21.8. ^{19}F NMR (282 MHz, $CDCl_3$, 25 ºC, δ):-110.6- -110.7 (m).Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{30}H_{26}FN_2O_4S^+$ ([M +H]$^+$), 529.1592, found,529.1590.

_N_-(1-acetyl-2-(4-chlorophenyl)-1_H_-indol-3-yl)-_N_-(4-methoxyphenyl)-4-methylbenzenesulfonamide (3s)



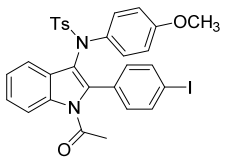
White solid (452 mg, 83 % yield, R_f = 0.61 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ):8.39 (d, *J*=8.4 Hz, 1H), 7.52-7.46 (m, 5H), 7.36 (t, *J*= 7.3 Hz, 1H), 7.26-7.18 (m, 3H),7.09 (d, *J*=7.7 Hz,2H), 6.80 (d, *J*=8.9 Hz,2H), 6.63 (d, *J*=8.9 Hz,2H),3.72 (s, 3H), 2.47 (s, 3H), 2.01 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ):170.9, 158.9, 144.0, 137.6, 137.1, 135.9, 135.7, 133.5, 131.9, 130.0, 129.6, 129.3, 129.1, 128.2, 126.8, 126.1, 124.1, 123.9, 119.4, 116.6, 114.2, 55.5, 28.1, 21.8.Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{30}H_{26}ClN_2O_4S^+$ ([M +H]$^+$), 545.1296, found,545.1290.

_N_-(1-acetyl-2-(4-bromophenyl)-1_H_-indol-3-yl)-_N_-(4-methoxyphenyl)-4-methylbenzenesulfonamide (3t)



White solid (476 mg, 81 % yield, R_f = 0.66 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ):8.38 (d, *J*=8.4 Hz, 1H), 7.62 (d, *J*=8.0 Hz, 2H), 7.50 (d, *J*=8.1 Hz, 2H), 7.36 (t, *J*=7.3 Hz, 2H), 7.26-7.18 (m, 4H), 7.09 (d, *J*=7.1 Hz, 1H), 6.81 (d, *J*=8.9 Hz, 2H), 6.64 (d, *J*=8.9 Hz, 2H),3.72 (s, 3H), 2.47 (s, 3H), 2.02 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 170.9, 158.9, 144.0, 137.6, 137.1, 135.7, 133.6, 132.2, 132.1, 130.5, 129.6, 129.3, 128.2, 126.8, 126.1, 124.1, 123.9, 119.5, 116.6, 114.2, 55.5, 28.1, 21.8. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{30}H_{26}BrN_2O_4S^+$ ([M +H]$^+$), 589.0791, found,589.0784.

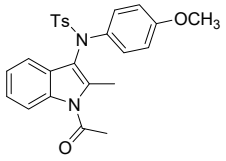
_N_-(1-acetyl-2-(4-iodophenyl)-1_H_-indol-3-yl)-_N_-(4-methoxyphenyl)-4-methylbenzenesulfonamide (3u)



White solid (535 mg, 84 % yield, R_f = 0.60 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ):8.36 (d, *J*=8.4 Hz, 1H), 7.82 (d, *J*=8.1 Hz, 2H), 7.49 (d, *J*=8.1 Hz, 2H), 7.36 (t, *J*=7.3 Hz, 1H), 7.25-7.18

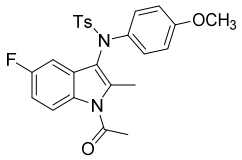
(m, 4H), 7.10 (d, *J*=7.7 Hz, 2H), 6.81 (d, *J*=8.9 Hz, 2H), 6.63 (d, *J*=8.9 Hz, 2H),3.72 (s, 3H), 2.47 (s, 3H), 2.01 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 170.9, 158.8, 144.0, 138.0, 137.6, 135.8, 133.6, 132.3, 131.1, 129.6, 129.3, 128.2, 126.9, 126.1, 124.1, 123.8, 119.5, 116.6, 114.2, 99.9, 55.5, 28.1, 21.8. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{30}H_{26}IN_2O_4S^+$ ([M +H]$^+$), 637.0652, found,637.0648.

_N_-(1-acetyl-2-methyl-1_H_-indol-3-yl)-_N_-(4-methoxyphenyl)-4-methylbenzenesulfonamide (3v)



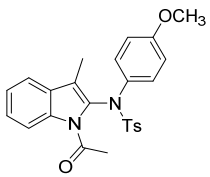
White solid (403 mg, 90 % yield, R_f = 0.58 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ):8.00 (d, *J*=8.3Hz, 1H), 7.63 (d, *J*=8.1Hz, 2H), 7.33 (d, *J*=8.9Hz, 2H), 7.25 (d, *J*=8.0Hz, 3H), 6.79 (d, *J*=8.9Hz, 2H), 3.72 (s, 3H), 2.69 (s, 3H), 2.61 (s, 3H), 2.43 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 170.4, 158.5, 143.9, 138.0, 137.2, 134.5, 134.1, 129.7, 128.4, 127.8, 127.4, 124.4, 123,4, 122.5, 118.6, 115.5, 114.4, 55.4, 27.6, 21.6, 14.5. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{25}H_{25}N_2O_4S^+$ ([M + H]$^+$), 449.1530, found,449.1526.

_N_-(1-acetyl-5-fluoro-2-methyl-1_H_-indol-3-yl)-_N_-(4-methoxyphenyl)-4-methylbenzenesulfonamide (3w)



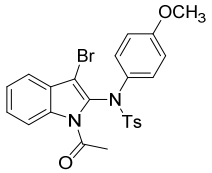
White solid (410 mg, 88 % yield, R_f = 0.50 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$,25ºC,δ):8.04 (dd, *J*=9.1, 4.3Hz, 1H), 7.43 (d, *J*=8.0Hz, 2H), 7.28 (t, *J*=8.0Hz, 4H),6.97-6.93 (m,1H), 6.81 (d, *J*=8.8Hz, 2H), 6.60 (d, *J*=8.4Hz, 1H), 3.76 (s, 3H), 2.69 (s, 3H), 2.63 (s, 3H), 2.46 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 170.2, 159.5 (d, *J* = 239.6 Hz), 158.7, 144.3, 138.7, 137.8, 133.9, 131.0, 129.8, 128.5, 128.4, 127.9, 122.3 (d, *J* = 3.7 Hz), 117.1 (d, *J* = 8.9 Hz), 114.6, 112.1 (d, *J* = 24.6 Hz), 104.2 (d, *J* = 24.6 Hz), 55.5, 27.4, 21.7, 14.7. ^{19}F NMR (282 MHz, $CDCl_3$, 25 ºC, δ): -119.3 (q, *J* = 4.0 Hz). Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{25}H_{24}FN_2O_4S^+$ ([M + H]$^+$), 467.1435, found,467.1430.

_N_-(1-acetyl-3-methyl-1_H_-indol-2-yl)-_N_-(4-methoxyphenyl)-4-methylbenzenesulfonamide (3x)



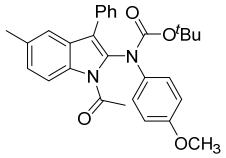
White solid (413 mg, 92 % yield, R_f = 0.64 (petroleum ether/ethyl acetate = 5: 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 8.29 (d, *J*=8.3Hz, 1H), 7.63 (d, *J*=8.2Hz, 2H), 7.44-7.35 (m,4H), 7.28-7.23 (m, 3H), 6.81 (d, *J*=9.1Hz, 2H), 3.75 (s, 3H), 2.75 (s, 3H), 2.40 (s, 3H), 1.66 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 169.9, 157.5, 144.8, 136.8, 135.1, 133.9, 129.9, 129.7, 128.3, 128.1, 126.5, 123.9, 123.3, 119.2, 118.4, 116.8, 114.6, 55.6, 26.8, 21.8, 9.6. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{25}H_{25}N_2O_4S^+$ ([M + H]$^+$), 449.1530, found,449.1525.

_N_-(1-acetyl-3-bromo-1_H_-indol-2-yl)-_N_-(4-methoxyphenyl)-4-methylbenzenesulfonamide (3y)



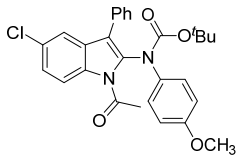
Red solid (446 mg, 87 % yield, R_f = 0.66 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 8.25 (d, *J*=8.4Hz, 1H), 7.71 (d, *J*=8.2Hz, 2H), 7.53 (d, *J*=9.1Hz, 3H), 7.46 (t, *J*=8.4Hz, 1H), 7.35 (t, *J*=7.6Hz, 1H), 7.27 (d, *J*=7.7Hz, 2H), 6.85 (d, *J*=9.1Hz, 2H),3.78 (s, 3H), 2.90 (s, 3H), 2.43 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 169.7, 158.1, 144.8, 137.1, 134.2, 133.1, 131.7, 129.7, 128.6, 127.4, 126.7, 125.4, 124.1, 120.1, 116.4, 114.6, 102.3, 55.57, 26.9, 21.8.Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{24}H_{21}BrN_2NaO_4S^+$ ([M +Na]$^+$), 535.0298, found,535.0296.

Tert-butyl-(1-acetyl-5-methyl-3-phenyl-1H-indol-2-yl)(4-methoxyphenyl)carbamate (3z)



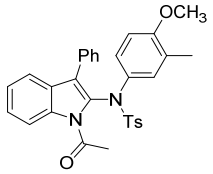
White solid (380 mg, 81 % yield, R_f = 0.63 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ):8.32 (d, *J*= 8.2 Hz, 1H), 7.45-7.35 (m, 6H), 7.25 (d, *J*= 7.8 Hz, 1H), 7.10 (s, 2H), 6.75 (d, *J*= 7.9 Hz, 2H),3.74 (s, 3H), 2.63 (s, 3H), 2.45 (s, 3H), 1.30 (s,9H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 169.4, 156.8, 153.1, 134.5, 133.6, 133.1, 132.2, 131.0, 128.9, 128.8, 127.8, 127.2, 123.9, 120.0, 119.8, 116.6, 114.1, 82.6, 55.5, 28.0, 25.8, 21.5. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{29}H_{30}N_2NaO_4^+$ ([M +Na]$^+$), 493.2098, found, 493.2114.

Tert-butyl-(1-acetyl-5-chloro-3-phenyl-1_H_-indol-2-yl)(4-methoxyphenyl)carbamate (3aa)



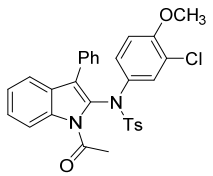
White solid (388 mg,79 % yield, R_f = 0.62 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ):8.39 (d, *J*= 8.6 Hz, 1H), 7.59 (s,1H), 7.42-7.36 (m, 6H), 7.07 (s, 2H), 6.76 (d, *J*= 7.7 Hz, 2H),3.75 (s, 3H), 2.63 (s, 3H), 1.30 (s,9H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 169.5, 156.9, 152.9, 134.2, 133.2, 132.0, 131.4, 129.7, 129.1, 128.9, 128.6, 128.2, 126.1, 123.9, 119.5, 118.2, 114.2, 82.9, 55.6, 28.0, 25.7. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{28}H_{27}ClN_2NaO_4^+$ ([M +Na]$^+$), 513.1552, found, 513.1564.

_N_-(1-acetyl-3-phenyl-1_H_-indol-2-yl)-_N_-(4-methoxy-3-methylphenyl)-4-methylbenzenesulfonamide (3ab)



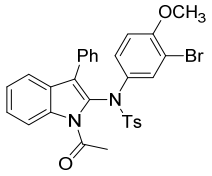
White solid (434 mg, 83 % yield, R_f = 0.53 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 8.34 (d, *J*=8.4 Hz, 1H), 7.53-7.44 (m, 2H), 7.38 (d, *J*=8.2 Hz, 2H), 7.31-7.21 (m, 2H), 7.16-7.07 (m, 6H), 6.96 (d, *J*=8.0 Hz, 2H), 6.72 (d, *J*=8.9 Hz, 2H), 3.80 (s, 3H), 2.90 (s, 3H), 2.33 (s, 3H), 2.15 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 170.5, 155.1, 143.8, 136.6, 135.3, 135.0, 131.5, 129.7, 129.2, 128.9, 128.4, 127.8, 127.6, 127.6, 126.4, 123.9, 123.5, 122.4, 120.5, 119.8, 116.3, 110.3, 55.5, 26.9, 21.6, 16.6. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{31}H_{29}N_2O_4S^+$ ([M +H]$^+$), 525.1843, found,525.1852.

_N_-(1-acetyl-3-phenyl-1_H_-indol-2-yl)-_N_-(3-chloro-4-methoxyphenyl)-4-methylbenzenesulfonamide (3ac)



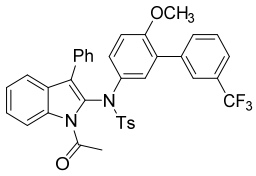
White solid (435 mg, 80 % yield, R_f = 0.54 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 8.18 (d, *J*=8.4 Hz, 1H), 7.51-7.44 (m, 2H), 7.39-7.37 (m, 3H), 7.31-7.23 (m, 2H), 7.19-7.14 (m, 3H), 7.05 (d, *J*=7.2 Hz, 2H), 6.99 (d, *J*=8.0 Hz, 2H), 6.79 (d, *J*=9.1 Hz, 1H), 3.86 (s, 3H), 2.86 (s, 3H), 2.34 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 170.3, 152.7, 144.2, 136.2, 136.0, 134.7, 131.2, 129.7, 129.4, 128.5, 127.9, 127.9, 127.8, 126.5, 124.3, 123.6, 122.8, 122.8, 121.7, 120.8, 115.8, 112.1, 56.3, 27.1, 21.6. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{30}H_{26}ClN_2O_4S^+$ ([M +H]$^+$), 545.1296, found,545.1307.

***N*-(1-acetyl-3-phenyl-1*H*-indol-2-yl)-*N*-(3-bromo-4-methoxyphenyl)-4-methylbenzenesulfonamide (3ad)**



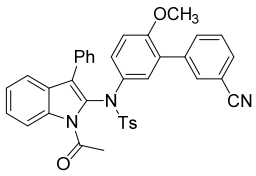
White solid (476 mg, 81 % yield, R_f = 0.52 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 8.16 (d, *J*=8.4 Hz, 1H), 7.50-7.43 (m, 3H), 7.37 (d, *J*=8.2 Hz, 2H), 7.30-7.14 (m, 5H), 7.06-6.99 (m, 4H), 6.75 (d, *J*=9.0 Hz, 1H), 3.85 (s, 3H), 2.86 (s, 3H), 2.34 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 170.3, 153.7, 144.2, 136.2, 134.7, 131.3, 129.8, 129.4, 128.6, 128.5, 128.0, 127.9, 127.8, 127.5, 126.5, 123.6, 122.9, 122.7, 120.8, 115.8, 111.9, 111.8, 56.5, 27.2, 21.7. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{30}H_{26}BrN_2O_4S^+$ ($[M+H]^+$), 589.0791, found,589.0796.

***N*-(1-acetyl-3-phenyl-1*H*-indol-2-yl)-*N*-(6-methoxy-3'-(trifluoromethyl)-[1,1'-biphenyl]-3-yl)-4-methylbenzenesulfonamide (3ae)**



White solid (536 mg, 82 % yield, R_f = 0.61 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 8.17 (d, *J*=8.4 Hz, 1H), 7.62-7.58 (m, 3H), 7.53-7.44 (m, 5H), 7.33-7.28 (m, 2H), 7.23-7.11 (m, 6H), 7.06 (d, *J*=8.2 Hz, 2H), 6.89 (d, *J*=9.0 Hz, 1H), 3.80 (s, 3H), 2.94 (s, 3H), 2.38 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 170.4, 154.2, 144.2, 138.4, 136.5, 135.8, 134.6, 132.9, 131.5, 129.9, 129.4, 129.2, 128.5, 128.4, 128.2, 128.0, 127.9, 126.3, 126.2, 126.2, 125.6, 124.3, 124.0, 124.0, 123.5, 122.6, 120.7, 115.6, 111.9, 55.9, 27.2, 21.6. ^{19}F NMR (282 MHz, $CDCl_3$, 25 ºC, δ): -62.4 (s).Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{37}H_{30}F_3N_2O_4S^+$ ($[M+H]^+$), 655.1873, found,655.1885.

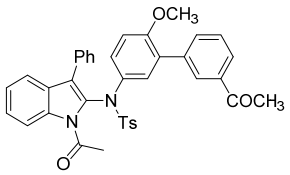
***N*-(1-acetyl-3-phenyl-1*H*-indol-2-yl)-*N*-(3'-cyano-6-methoxy-[1,1'-biphenyl]-3-yl)-4-methylbenzenesulfonamide (3af)**



Yellow solid (513 mg, 84 % yield, R_f = 0.65 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 8.08 (d, *J*=8.4 Hz, 1H), 7.60-7.57 (m, 3H), 7.48-7.41 (m, 5H), 7.32-7.13 (m, 8H), 7.06 (d, *J*=8.0 Hz, 2H),

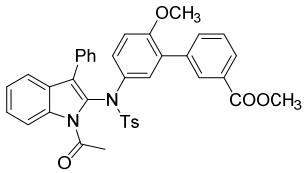
6.85 (d, *J*=9.0 Hz, 1H), 3.78 (s, 3H), 2.90 (s, 3H), 2.38 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 170.4, 154.2, 144.3, 138.9, 136.5, 135.7, 134.5, 134.0, 133.1, 131.5, 130.0, 129.2, 129.0, 128.5, 128.5, 128.2, 128.0, 127.9, 126.3, 126.0, 125.1, 123.5, 122.8, 120.8, 119.1, 115.4, 112.3, 111.8, 55.9, 27.3, 21.7. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{37}H_{30}N_3O_4S^+$ ([M +H]$^+$), 612.1952, found,612.1961.

_N_-(1-acetyl-3-phenyl-1_H_-indol-2-yl)-_N_-(3'-acetyl-6-methoxy-[1,1'-biphenyl]-3-yl)-4-methylbenzenesulfonamide (3ag)



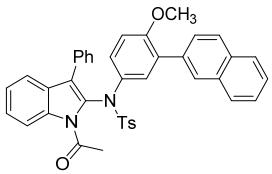
White solid (540 mg, 86 % yield, R_f = 0.67 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ): 8.19 (d, *J*=8.4 Hz, 1H), 7.98 (s, 1H), 7.90 (d, *J*=7.7 Hz, 1H), 7.57 (d, *J*=7.6 Hz, 1H), 7.48 (d, *J*=7.7 Hz, 2H), 7.42 (t, *J*=6.9 Hz, 3H), 7.29-7.10 (m, 8H), 7.02 (d, *J*=8.0 Hz, 2H), 6.87 (d, *J*=8.8 Hz, 1H), 3.78 (s, 3H), 2.90 (s, 3H), 2.61 (s, 3H), 2.35 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 198.2, 170.4, 154.0, 144.1, 138.2, 137.1, 136.4, 135.9, 134.8, 134.2, 131.5, 130.1, 129.9, 129.7, 129.5, 129.4, 129.0, 128.7, 128.5, 128.1, 127.9, 127.8, 127.4, 126.4, 124.9, 123.5, 122.7, 120.7, 115.9, 111.9, 55.9, 27.1, 26.8, 21.6. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{38}H_{33}N_2O_5S^+$ ([M +H]$^+$), 629.2105, found,629.2112.

Methyl-5'-((_N_-(1-acetyl-3-phenyl-1_H_-indol-2-yl)-4-methylphenyl)sulfonamido)-2'-methoxy-[1,1'-biphenyl]-3-carboxylate (3ah)



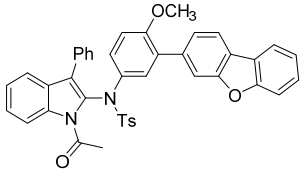
White solid (541 mg, 84 % yield, R_f = 0.63 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 8.20 (d, *J*=8.4 Hz, 1H), 8.08 (s, 1H), 8.00 (d, *J*=7.7 Hz, 1H), 7.56 (d, *J*=7.7 Hz, 1H), 7.50-7.40 (m, 5H), 7.29-7.10 (m, 8H), 7.02 (d, *J*=8.0 Hz, 2H), 6.86 (d, *J*=8.9 Hz, 1H), 3.94 (s, 3H), 3.78 (s, 3H), 2.91 (s, 3H), 2.35 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 170.4, 167.1, 154.1, 144.1, 138.0, 136.4, 135.8, 134.8, 134.1, 131.5, 130.7, 130.1, 129.9, 129.7, 129.4, 129.0, 128.6, 128.5, 128.4, 128.3, 128.1, 127.9, 127.8, 126.4, 124.9, 123.8, 123.5, 123.5, 122.7, 120.7, 115.9, 111.8, 55.9, 55.3, 27.1, 21.6. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{38}H_{33}N_2O_6S^+$ ([M +H]$^+$), 645.2054, found,645.2061.

_N_-(1-acetyl-3-phenyl-1_H_-indol-2-yl)-_N_-(4-methoxy-3-(naphthalen-2-yl)phenyl)-4-methylbenzenesulfonamide (3ai)



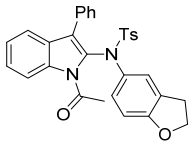
White solid (496 mg, 78 % yield, R_f = 0.60 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 8.23 (d, *J*=8.4 Hz, 1H), 7.86-7.80 (m, 4H), 7.57-7.40 (m, 9H), 7.27-7.15 (m, 6H), 7.00 (d, *J*=7.9 Hz, 2H), 6.90 (d, *J*=9.0 Hz, 1H), 3.81 (s, 3H), 2.94 (s, 3H), 2.35 (s, 3H).^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 170.5, 154.3, 144.0, 136.6, 136.1, 135.4, 134.9, 133.4, 132.7, 131.6, 131.3, 129.9, 129.8, 129.4, 129.4, 129.1, 128.5, 128.5, 128.3, 128.3, 128.2, 128.1, 127.9, 127.9, 127.8, 127.7, 127.4, 126.4, 126.2, 125.1, 123.5, 122.7, 122.6, 120.7, 116.0, 111.9, 56.0, 27.1, 21.7. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{40}H_{33}N_2O_4S^+$ ([M +H]$^+$), 637.2156, found,637.2164.

_N_-(1-Acetyl-3-phenyl-1_H_-indol-2-yl)-_N_-(3-(dibenzo[b,d]furan-3-yl)-4-methoxyph enyl)-4-methylbenzenesulfonamide (3aj)



White solid (540 mg, 80 % yield, R_f = 0.64 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 8.34 (d, *J*=8.4 Hz, 1H), 7.94 (t, *J*=7.9 Hz, 2H), 7.62 (d, *J*=3.0 Hz, 1H), 7.52 (t, *J*=7.6 Hz, 2H), 7.46-7.26 (m, 10H), 7.15 (s, 5H), 7.00 (d, *J*=9.1 Hz, 1H), 6.92 (d, *J*=8.2 Hz, 2H), 3.81 (s, 3H), 2.97 (s, 3H), 2.31 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 170.6, 156.1, 154.3, 153.7, 143.9, 136.7, 136.2, 135.2, 131.6, 130.5, 129.9, 129.4, 129.0, 128.8, 128.4, 127.92, 127.8, 127.6, 127.1, 126.5, 126.0, 124.8, 124.6, 124.4, 123.6, 122.8, 122.5, 122.0, 121.9, 120.7, 120.6, 120.1, 116.5, 112.2, 111.7, 56.1, 27.0, 21.6. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{43}H_{33}N_2O_4S^+$ ([M +H]$^+$), 677.2105, found,677.2113.

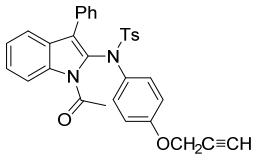
_N_-(1-Acetyl-3-phenyl-1_H_-indol-2-yl)-_N_-(2,3-dihydrobenzofuran-5-yl)-4-methylbe nzenesulfonamide (3ak)



White solid (478 mg, 82 % yield, R_f = 0.50 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ):8.19 (d, *J*= 8.4 Hz, 1H), 7.47-7.44 (m, 4H), 7.29-7.22 (m, 2H), 7.18-7.07 (m, 5H), 7.01-6.96 (m, 3H), 6.01 (d, *J*=8.7 Hz, 1H), 4.55 (t, *J*= 8.7 Hz, 2H), 3.11 (t, *J*= 8.6 Hz, 2H), 2.89 (s, 3H), 2.34 (s,3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 170.5, 157.8, 143.8, 136.6, 135.5,

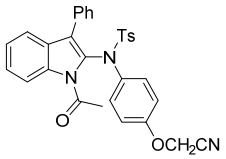
134.7, 131.5, 129.9, 129.4, 129.2, 128.3, 128.2, 128.0, 127.7, 126.3, 123.4, 122.7, 122.34, 120.6, 120.0, 115.8, 109.3, 71.7, 30.0, 27.1, 21.6. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{31}H_{27}N_2O_4S^+$ ([M +H]$^+$), 523.1686, found,523.1681.

_N_-(1-Acetyl-3-phenyl-1_H_-indol-2-yl)-4-methyl-_N_-(4-(prop-2-yn-1-yloxy)phenyl)benzenesulfonamide (3al)



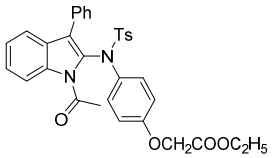
White solid (453 mg, 85 % yield, R_f = 0.56 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ):8.28 (d, *J*= 8.4 Hz, 1H), 7.50-7.43 (m, 2H), 7.36 (d, *J*= 8.2 Hz, 2H), 7.30-7.18 (m, 4H), 7.11 (t, *J*= 7.6 Hz, 2H), 7.03 (d, *J*= 7.4 Hz, 2H), 6.95 (d, *J*= 8.1 Hz, 2H), 6.89 (d, *J*= 9.1 Hz, 2H), 4.66-4.65 (m, 2H), 2.86 (s, 3H), 2.53 (s,1H), 2.32 (s,3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ):170.5, 154.82 144.0, 136.9, 136.5, 135.0, 131.5, 129.7, 129.4, 128.7, 128.4, 127.9, 127.7, 126.5, 123.6, 122.6, 122.5, 120.6, 116.3, 115.7, 78.4, 76.0, 56.3, 27.0, 21.6. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{32}H_{27}N_2O_4S^+$ ([M +H]$^+$), 535.1686, found,535.1680.

_N_-(1-Acetyl-3-phenyl-1_H_-indol-2-yl)-_N_-(4-(cyanomethoxy)phenyl)-4-methylbenzenesulfonamide (3am)



White solid (463 mg, 83 % yield, R_f = 0.48 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ):8.23 (d, *J*= 8.4 Hz, 1H), 7.51-7.44 (m, 2H), 7.36 (d, *J*= 8.1 Hz, 2H), 7.31-7.26 (m, 3H), 7.20 (d, *J*= 7.2 Hz, 1H), 7.13 (d, *J*= 7.5 Hz, 2H), 7.02-6.95 (m, 4H), 6.89 (d, *J*= 9.0 Hz, 2H), 4.73 (s, 2H), 2.85 (s, 3H), 2.32 (s,3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 170.3, 153.6, 144.2, 138.3, 136.3, 135.0, 131.3, 129.7, 129.5, 128.5, 127.9, 127.8, 126.6, 123.7, 122.9, 122.7, 120.8, 116.1, 115.9, 115.0, 54.0, 27.0, 21.6. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{31}H_{25}N_3NaO_4S^+$ ([M +Na]$^+$), 558.1458, found,558.1465.

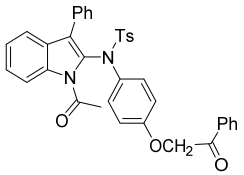
Ethyl-2-(4-((_N_-(1-acetyl-3-phenyl-1_H_-indol-2-yl)-4-methylphenyl)sulfonamido)phenoxy)acetate (3an)



White solid (466 mg, 80 % yield, R_f = 0.42 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ):8.27 (d, *J*= 8.4 Hz, 1H), 7.49-7.43 (m, 2H), 7.35 (d, *J*= 8.2 Hz, 2H), 7.30-7.18 (m, 4H), 7.11 (t, *J*= 7.5 Hz,

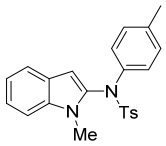
2H), 7.02 (d, *J*= 7.2 Hz, 2H), 6.94 (d, *J*=8.0Hz, 2H), 6.81 (d, *J*= 9.2 Hz, 2H), 4.58 (s, 2H), 4.6 (q, *J*= 7.1 Hz, 2H), 2.85 (s, 3H), 2.32 (s,3H), 1.29 (t, *J*= 7.1 Hz, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 170.4, 168.8, 155.1, 144.0, 137.0, 136.4, 135.0, 131.4, 129.7, 129.4, 128.7, 127.9, 127.7, 126.6, 123.6, 122.7, 122.6, 120.7, 116.3, 115.5, 65.8, 61.6, 27.0, 21.6, 14.3. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{33}H_{31}N_2O_6S^+$ ([M +H]$^+$), 583.1897, found,583.1893.

_N_-(1-Acetyl-3-phenyl-1_H_-indol-2-yl)-4-methyl-_N_-(4-(2-oxo-2-phenylethoxy)phenyl)benzenesulfonamide (3ao)



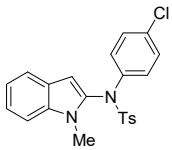
White solid (478 mg, 78 % yield, R_f = 0.42 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ):8.28 (d, *J*= 8.4 Hz, 1H), 7.97 (d, *J*= 7.4 Hz, 2H), 7.16 (t, *J*= 7.3 Hz, 1H), 7.51-7.42 (m, 4H), 7.34 (d, *J*= 8.1 Hz, 2H), 7.29-7.18 (m, 4H), 7.11 (t, *J*= 7.5 Hz, 2H), 7.02 (d, *J*= 7.2 Hz, 2H), 6.93 (d, *J*= 8.0 Hz, 2H), 6.85 (d, *J*= 9.0 Hz, 2H),5.25 (s, 2H), 2.85 (s, 3H), 2.31 (s,3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ):194.3, 170.4, 155.3, 144.0, 136.9, 136.4, 135.0, 134.5, 131.3, 129.7, 129.3, 129.0, 128.6, 128.4, 128.1, 127.8, 127.7, 126.5, 123.6, 122.6, 122.5, 120.6, 116.2, 115.7, 71.1, 26.9, 21.6. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{37}H_{31}N_2O_5S^+$ ([M +H]$^+$), 615.1948, found,615.1958.

4-Methyl-_N_-(1-methyl-3-phenyl-1H-indol-2-yl)-_N_-(p-tolyl)benzenesulfonamide（3ap）



Light yellow solid (89 mg, 23 % yield, R_f= 0.41 (petroleum ether/ethyl acetate = 5: 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ): 7.63-7.57 (m,3H), 7.34-7.28 (t,*J*=9.0Hz, 6H), 7.18-7.14 (t, *J*=6.0Hz, 3H), 3.82 (s,3H), 2.50 (s, 3H), 2.37 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 144.2, 137.8, 137.7, 135.5, 135.0, 134.8, 129.9, 129.5, 128.5, 127.8, 125.9, 122.7, 121.0, 119.9, 109.9, 99.5, 29.1, 21.7, 21.1. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{23}H_{23}N_2O_2S^+$ ([M +H]$^+$), 391.1475, found,391.1486.

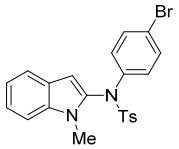
N-(4-chlorophenyl)-4-methyl-N-(1-methyl-1H-indol-2-yl)benzenesulfonamide（3aq）



Light yellow solid (86 mg, 21% yield, R_f= 0.41 (petroleum ether/ethyl acetate = 5 :

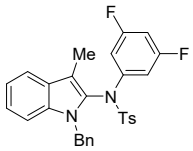
1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ): 7.60-7.55 (t,*J*=7.5Hz,3H), 7.39-7.28 (m, 8H), 7.16-7.11 (t, *J*=7.5Hz, 3H), 6.16 (s,1H), 3.77 (s, 3H), 2.49 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 144.6, 139.9, 135.2, 135.1, 134.1, 133.5, 129.7, 129.4, 128.9, 128.5, 125.8, 123.0, 121.1, 120.2, 110.0, 99.9, 29.2, 21.8. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{22}H_{20}ClN_2O_2S^+$([M +H]$^+$), 411.0929, found,411.0915.

N-(4-chlorophenyl)-4-methyl-N-(1-methyl-1H-indol-2-yl)benzenesulfonamide（3ar）



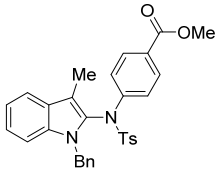
Light yellow solid (104 mg, 23% yield, R_f= 0.45 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ): 7.60-7.55 (t,*J*=9.0Hz, 3H), 7.48-7.45 (d,*J*=9.0Hz, 2H), 7.35-7.26 (m, 6H), 7.17-7.11 (m,1H), 3.77(s, 3H), 2.50 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 144.6, 139.5, 135.3, 135.1, 134.0, 132.4, 129.7, 129.12, 128., 125.8, 123.0, 121.5, 121.2, 120.2, 110.1, 100.0, 29.2, 21.9. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{22}H_{20}BrN_2O_2S^+$ ([M +H]$^+$), 455.0423, found,455.0411.

N-(3,5-difluorophenyl)-4-methyl-N-(1-methyl-1H-indol-2-yl)benzenesulfonamide（3as）



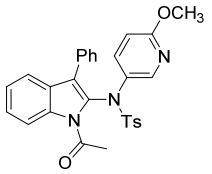
Light yellow solid (230 mg, 46% yield, R_f = 0.43 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ): 7.77-7.74 (d,*J*=9.0Hz, 2H), 7.65-7.62 (d,*J*=9.0Hz, 1H), 7.36-7.21 (m, 5H), 7.18-7.12 (m,3H), 6.95-6.90 (t,*J*=9.0Hz, 7.5H), 6.76-6.74 (d, *J*=6.0Hz, 2H), 6.52-6.42 (t,*J*=6.0Hz, 1H), 2.49(s, 3H), 1.92-1.89(d,*J*=6.0Hz, 3H) . ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 164.5, 164.3, 161.2, 161.0, 145.3, 145.1, 143.3, 143.2, 143.0, 142.9, 137.1, 137.4, 136.2, 135.9, 135.4, 135.3, 130.1, 130.0, 129.6, 129.1, 128.8, 128.5, 128.2, 127.3, 127.2, 126.9, 126.7, 126.6, 124.1, 123.9, 120.0, 119.9, 119.8, 110.8, 110.7, 110.6, 110.6, 106.6, 106.5, 106.4, 106.3, 106.2, 106.10, 105.8, 105.7, 101.2, 100.9, 100.5, 47.0, 21.8, 9.3. ^{19}F NMR (75 MHz, $CDCl_3$, 25 ºC,δ): -108.5, -91.5.Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{29}H_{25}F_2N_2O_2S^+$ ([M +H]$^+$), 503.1599, found,503.1613.

Methyl4-((4-methyl-N-(1-methyl-1H-indol-2-yl)phenyl)sulfonamido)benzoate（3at）



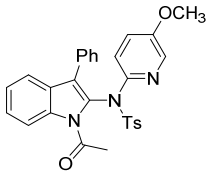
Light yellow solid (162mg, 31% yield, R_f = 0.51 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ): 7.81-7.72 (m,4H), 7.62-7.60 (d,*J*=6.0Hz, 1H), 7.32 (s, 2H),7.27-7.23 (t, *J*=7.5Hz, 3H),7.20-7.11 (m, 5H), 6.94-6.93 (d, *J*=3.0Hz, *2*H), 3.89 (s, 3H) , 2.47 (s, 3H) , 1.91 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 166.4, 145.0, 144.9, 137.2, 136.6, 135,2, 130,5, 130.1, 130.0, 128.5, 128.3, 127.2, 126.9, 126.9, 126.7, 123.7, 122.7, 119.8, 119.7, 110.9, 110.4, 52.3, 46.9, 21.8, 9.3. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{31}H_{29}N_2O_4S^+$ ($[M+H]^+$), 525.1843, found,525.1867.

_N_-(1-acetyl-3-phenyl-1_H_-indol-2-yl)-_N_-(6-methoxypyridin-3-yl)-4-methylbenzene sulfonamide (3au)



White solid (454 mg, 89 % yield, R_f = 0.56 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 8.03-8.00 (m,2H),7.56-7.52 (m,1H), 7.43 (t, *J*=9.2Hz, 4H), 7.28-7.16 (m,4H), 7.05 (t, *J*=5.7Hz, 4H), 7.43 (d, *J*=9.0Hz, 4H),3.88 (s, 3H), 2.88 (s, 3H), 2.35 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 170.2, 161.7, 144.2, 142.1, 136.3, 134.8, 134.4, 133.4, 131.2, 129.9, 129.5, 129.0, 128.5, 128.1, 128.0, 127.9, 126.4, 123.5, 122.8, 120.9, 115.2, 110.9, 53.8, 27.3, 21.7. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{29}H_{26}N_3O_4S^+$ ($[M+H]^+$), 512.1639, found,512.1669.

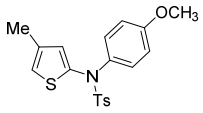
_N_-(1-acetyl-3-phenyl-1_H_-indol-2-yl)-_N_-(5-methoxypyridin-2-yl)-4-methylbenzene sulfonamide (3av)



White solid (444 mg, 87 % yield, R_f = 0.54 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 8.45 (d, *J*= 8.5 Hz, 1H), 8.04 (d, *J*= 2.7 Hz, 1H), 7.50 (t, *J*= 8.1 Hz, 1H),7.43 (d, *J*=8.1 Hz, 1H), 7.26-7.18 (m, 2H), 7.12-7.00 (m, 4H), 6.91-6.83 (m, 4H),3.83 (s, 3H), 2.81 (s, 3H), 2.28 (s, 3H).^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 170.7, 152.8, 149.1, 144.0, 136.5, 135.7, 134.1, 131.5, 129.8, 129.4, 129.0, 128.8, 128.4, 127.7, 127.6, 127.5, 126.7, 124.4, 123.7, 122.7, 120.48, 117.02, 113.97, 56.10, 26.43, 21.63.Mass Spectrometry: HRMS

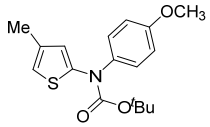
(ESI-TOF) (m/z): calcd for $C_{29}H_{26}N_3O_4S^+$ ([M +H]$^+$), 512.1639, found,512.1668.

_N_-(4-methoxyphenyl)-4-methyl-_N_-(3-methylthiophen-2-yl)benzenesulfonamide (5a)



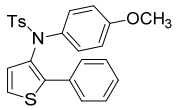
White solid (320 mg, 86 % yield, R_f = 0.66 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 7.66 (d, *J*=9.0 Hz, 1H), 7.46 (d, *J*=8.1 Hz, 2H), 7.24 (d, *J*=5.1 Hz, 1H), 7.16 (d, *J*=8.0 Hz, 2H), 6.91-6.87 (m, 2H), 6.66 (d, *J*=2.7 Hz, 2H), 6.51 (s, 1H), 3.75 (s, 3H), 2.37 (s, 3H), 1.85 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 156.4, 143.9, 136.6, 136.1, 131.2, 130.3, 129.6, 128.7, 127.3, 126.9, 125.7, 122.7, 117.0, 115.1, 55.6, 21.7, 14.1. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{19}H_{19}NNaO_3S_2^+$ ([M +Na]$^+$), 396.0699, found, 396.0716.

Tert-butyl (4-methoxyphenyl)(3-methylthiophen-2-yl)carbamate (5b)



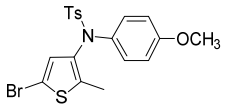
White solid (252 mg, 79 % yield, R_f = 0.54 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ):7.96 (d, *J*= 8.1 Hz, 1H), 7.32 (d, *J*= 5.0 Hz, 1H), 6.98-6.90 (m, 2H), 6.79 (d, *J*= 2.7 Hz, 1H), 6.26 (s,1H),3.79 (s, 3H), 2.09 (s, 3H), 1.47 (s,9H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 155.1, 153.3, 136.0, 132.7, 130.4, 125.5, 124.8, 121.6, 116.8, 114.8, 80.4, 55.7, 28.5, 14.4. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{17}H_{21}NNaO_3S^+$ ([M +Na]$^+$), 342.1134, found, 342.1140.

_N_-(4-methoxyphenyl)-4-methyl-_N_-(2-phenylthiophen-3-yl)benzenesulfonamide (5c)



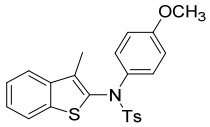
White solid (366 mg, 84 % yield, R_f = 0.70 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ):7.63 (d, *J*= 8.2 Hz, 2H), 7.49 (d, *J*= 7.1 Hz, 2H),7.36-7.28 (m, 5H), 7.21 (d, *J*= 8.9 Hz, 2H), 7.04 (d, *J*= 3.9 Hz, 1H), 6.88-6.82 (m, 3H), 3.86 (s, 3H), 2.45 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 159.6, 144.2, 143.2, 142.3, 135.8, 134.1, 134.0, 130.0, 129.7, 129.0, 128.4, 127.9, 125.7, 125.6, 121.3, 114.7, 55.6, 21.8. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{24}H_{22}NO_3S_2^+$ ([M +H]$^+$), 436.1036, found, 436.1042.

***N*-(5-Bromo-2-methylthiophen-3-yl)-*N*-(4-methoxyphenyl)-4-methylbenzenesulfonamide (5d)**



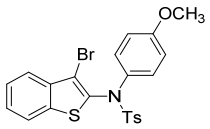
White solid (389 mg, 86 % yield, R_f = 0.68 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 7.54 (d, *J*=8.2 Hz, 2H), 7.28 (d, *J*=8.0 Hz, 2H), 7.12 (d, *J*=8.9 Hz, 1H), 6.81 (d, *J*=8.9 Hz, 2H),6.66 (s, 1H), 3.78 (s, 3H), 2.45 (s, 3H), 2.32 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 158.9, 144.0, 140.3, 136.6, 134.7, 133.4, 129.7, 129.4, 128.5, 128.0, 114.5, 107.4, 55.6, 21.7, 12.9. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{19}H_{18}BrNNaO_3S_2^+$ ([M +Na]$^+$), 473.9804, found, 473.9815.

***N*-(4-methoxyphenyl)-4-methyl-*N*-(3-methylbenzo[*b*]thiophen-2-yl)benzenesulfonamide (5e)**



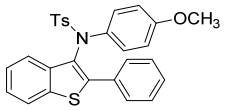
White solid (342 mg, 81 % yield, R_f = 0.60 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 7.68-7.65 (m, 4H), 7.36-7.28 (m, 6H), 6.85 (d, *J*=8.9 Hz, 2H), 3.78 (s, 3H), 2.46 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 159.2, 144.2, 138.0, 137.7, 136.8, 136.0, 133.5, 132.4, 130.0, 129.5, 128.7, 125.5, 124.4, 122.9, 122.4, 114.5, 55.5, 21.7, 11.9. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{23}H_{22}NO_3S_2^+$ ([M +H]$^+$), 424.1036, found, 424.1045.

***N*-(3-bromobenzo[*b*]thiophen-2-yl)-*N*-(4-methoxyphenyl)-4-methylbenzenesulfonamide (5f)**



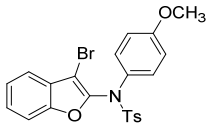
White solid (340 mg, 70 % yield, R_f = 0.66 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ):7.79-7.76 (m, 1H), 7.69 (d, *J*= 8.0 Hz, 1H), 7.42-7.36 (m, 4H), 7.30 (d, *J*= 8.0 Hz, 2H), 6.84 (d, *J*= 8.9 Hz, 2H), 3.78 (s,3H), 2.46 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 159.6, 144.5, 137.8, 136.9, 136.0, 135.9, 132.5, 130.7, 129.7, 128.8, 126.7, 125.5, 124.3, 122.7, 114.6, 110.9, 55.6, 21.9. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{18}H_{17}BrNO_3S_2^+$ ([M +H]$^+$), 487.9984, found, 487.9986.

***N*-(4-methoxyphenyl)-4-methyl-*N*-(2-phenylbenzo[b]thiophen-3-yl)benzenesulfonamide (5g)**



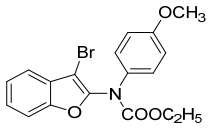
White solid (403 mg, 83 % yield, R_f = 0.62 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ):7.78 (d, *J*= 7.8 Hz, 1H), 7.60-7.58 (m, 3H), 7.51 (d, *J*= 8.1 Hz, 2H), 7.39-7.33 (m, 5H), 7.16 (d, *J*= 7.9 Hz, 2H), 7.02 (d, *J*= 8.9 Hz, 2H), 6.66 (d, *J*= 8.9 Hz, 2H),3.71 (s, 3H), 2.42 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 158.2, 143.8, 143.9, 137.9, 137.7, 136.8, 134.3, 132.6, 129.8, 129.4, 129.0, 128.6, 128.2, 127.5, 125.0, 125.0, 123.1, 122.7, 114.3, 55.5, 21.7. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{28}H_{24}NO_3S_2^+$ ([M +H]$^+$), 486.1192, found, 486.1190.

_N_-(3-Bromobenzofuran-2-yl)-_N_-(4-methoxyphenyl)-4-methylbenzenesulfonamide (5h)



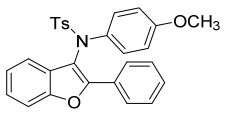
White solid (342 mg, 81 % yield, R_f = 0.60 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 7.71 (d, *J*=8.1 Hz, 2H), 7.50 (d, *J*=7.7 Hz, 1H), 7.44-7.29 (m, 7H), 6.82 (d, *J*=8.8 Hz, 2H), 3.77 (s, 3H), 2.46 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 159.9, 151.7, 145.8, 144.5, 135.9, 130.9, 130.6, 129.6, 128.6, 127.7, 126.5, 123.7, 120.5, 114.5, 111.8, 96.8, 55.5, 21.8. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{22}H_{19}BrNO_4S^+$ ([M +H]$^+$), 473.0213, found, 472.0220.

Ethyl (3-bromobenzofuran-2-yl)(4-methoxyphenyl)carbamate (5i)



White solid (392 mg, 85 % yield, R_f = 0.64 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ):7.52 (d, *J*= 6.5 Hz, 1H), 7.45-7.29 (m, 5H), 6.91 (d, *J*= 8.9 Hz, 2H), 4.29 (q, *J*= 7.1 Hz, 2H), 3.79 (s,3H), 1.27 (q, *J*= 7.1 Hz, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 171.7, 154.4, 137.9, 135.2, 133.7, 132.8, 129.2, 129.0, 128.7, 127.1, 124.0, 123.9, 118.7, 117.6, 115.8, 114.8, 111.9, 55.7, 27.0.Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{18}H_{17}BrNO_4^+$ ([M +H]$^+$), 390.0335, found, 390.0328.

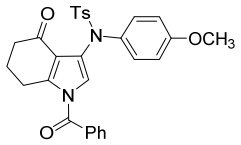
_N_-(4-methoxyphenyl)-4-methyl-_N_-(2-phenylbenzofuran-3-yl)benzenesulfonamide (5j)



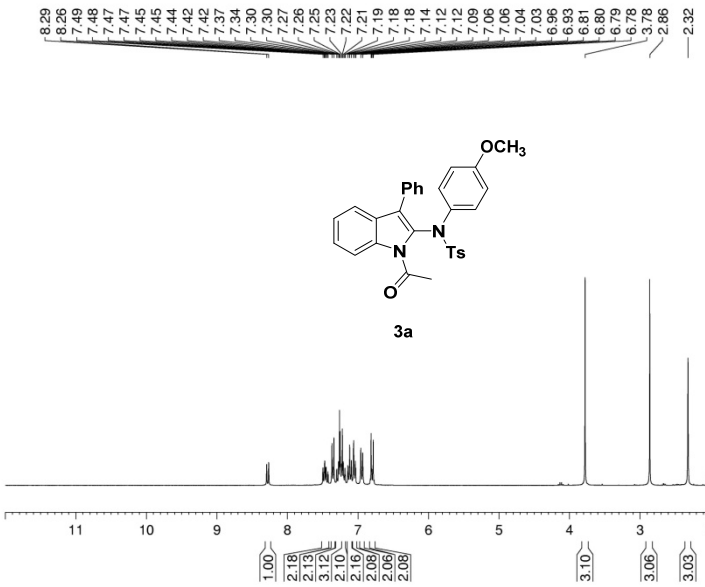
White solid (404 mg, 86 % yield, R_f = 0.68 (petroleum ether/ethyl acetate = 5 : 1

(v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25 ºC, δ):8.10 (d, *J*= 7.0 Hz, 2H), 7.62 (d, *J*= 8.0 Hz, 2H), 7.51-7.37 (m, 6H), 7.31-7.21 (m, 3H), 7.13 (t, *J*= 7.4 Hz, 1H), 6.99 (d, *J*= 7.6 Hz, 1H), 6.76 (d, *J*= 8.9 Hz, 2H), 3.73 (s, 3H), 2.44 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ):158.6, 153.3, 153.1, 144.2, 137.5, 134.2, 129.6, 129.5, 129.0, 128.7, 128.4, 127.8, 127.6, 127.0, 125.0, 123.3, 120.3, 118.7, 114.5, 111.9, 55.1, 21.7. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{28}H_{24}NO_4S^+$ ($[M+H]^+$), 470.1421, found, 470.1418.

_N_-(1-benzoyl-4-oxo-4,5,6,7-tetrahydro-1_H_-indol-3-yl)-_N_-(4-methoxyphenyl)-4-methylbenzenesulfonamide (5k)



White solid (401 mg, 78 % yield, R_f = 0.63 (petroleum ether/ethyl acetate = 5 : 1 (v/v));NMR Spectroscopy: ^{1}H NMR (300 MHz, $CDCl_3$, 25ºC,δ): 7.76 (d, *J*=7.3 Hz, 2H), 7.66 (t, *J*=7.4 Hz, 1H), 7.48 (t, *J*=7.7 Hz, 2H), 7.35 (d, *J*=8.2 Hz, 2H), 7.21 (d, *J*=8.1 Hz, 2H), 6.90 (d, *J*=8.9 Hz, 2H), 6.72 (d, *J*=9.0 Hz, 2H), 6.33 (s, 1H), 3.77 (s, 3H), 2.54-2.46 (m, 4H), 2.41 (s, 3H), 2.04 (s, 2H). ^{13}C NMR (75 MHz, $CDCl_3$, 25 ºC, δ): 194.6, 168.6, 159.2, 144.5, 143.5, 134.4, 133.8, 132.2, 131.1, 130.7, 129.9, 129.6, 128.4, 127.4, 125.9, 120.7, 116.0, 113.9, 106.3, 55.6, 37.7, 23.9, 23.8, 21.7. Mass Spectrometry: HRMS (ESI-TOF) (m/z): calcd for $C_{29}H_{27}N_2O_4S^+$ ($[M+H]^+$), 515.1635, found,515.1633.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7.21
7.19
7.18
7.18
7.14
7.12
7.12
7.09
7.06
7.06
7.04
7.03
6.96
6.93
6.81
6.80
6.79
6.78
3.78
2.86
2.32
OCH3
Ph
N
N
Ts
O
3a
11
10
9
8
7
6
5
4
3
2
1
ppm
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2.16
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2.06
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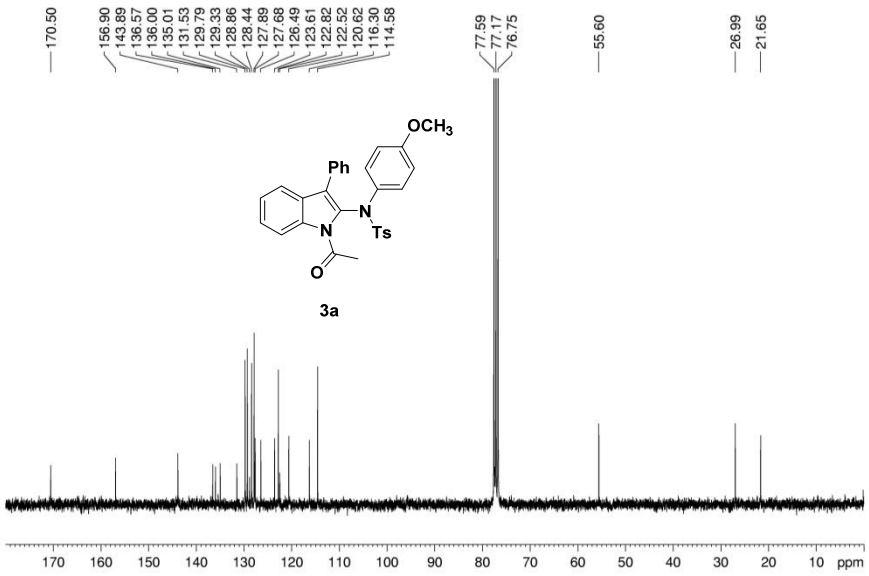
3.06
3.03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126.49
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21.65
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Ph
N
N
Ts
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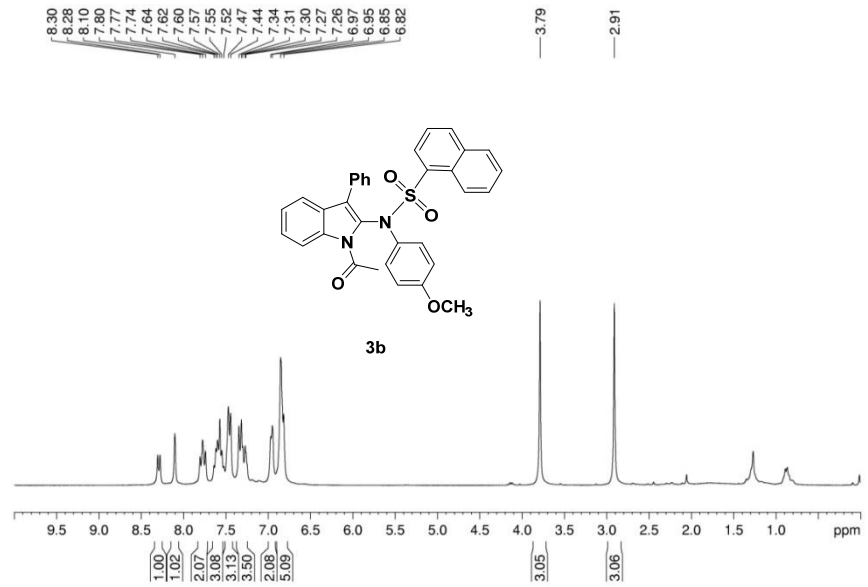
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7.44
7.34
7.31
7.30
7.27
7.26
6.97
6.95
6.85
6.82
3.79
2.91
Ph
O
S
O
N
N
O
OCH3
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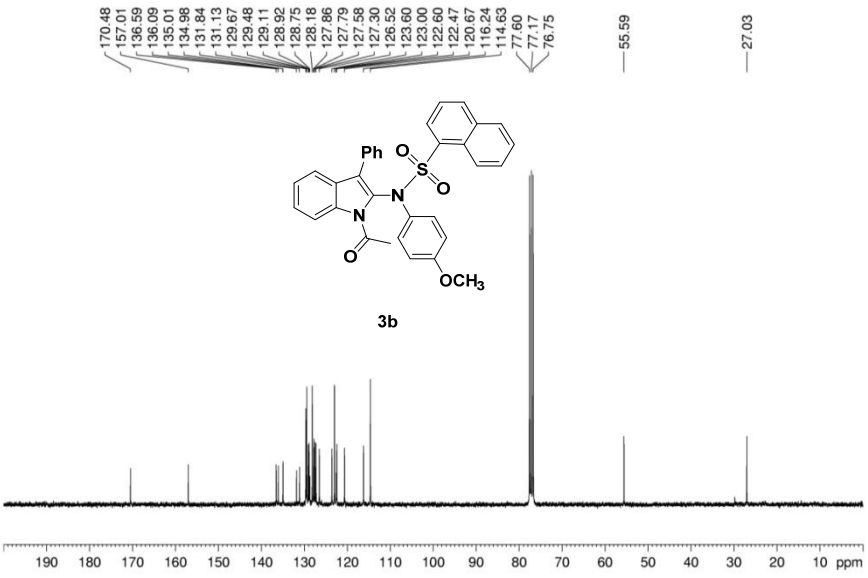
1.02
2.07
3.08
3.13
3.50
2.08
5.09
3.05
3.06

3b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134.98
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131.13
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129.48
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128.92
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120.67
116.24
114.63
77.60
77.17
76.75
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Ph
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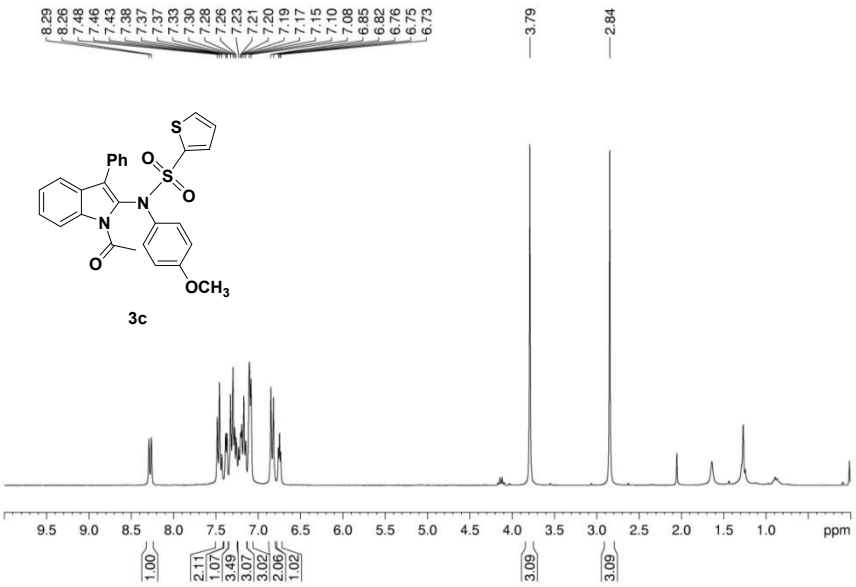
3b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7.26
7.23
7.21
7.20
7.19
7.17
7.15
7.10
7.08
6.85
6.82
6.76
6.75
6.73
3.79
2.84
Ph
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O
OCH3
3c
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
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2.11
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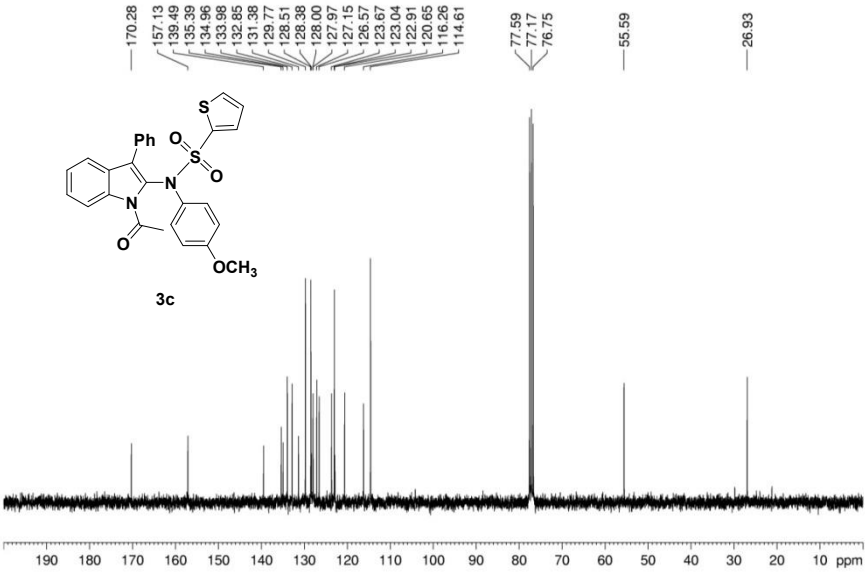
3.49
3.07
3.02
2.06
1.02
3.09
3.09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128.38
128.00
127.97
127.15
126.57
123.67
123.04
122.91
120.65
116.26
114.61
77.59
77.17
76.75
55.59
26.93
Ph
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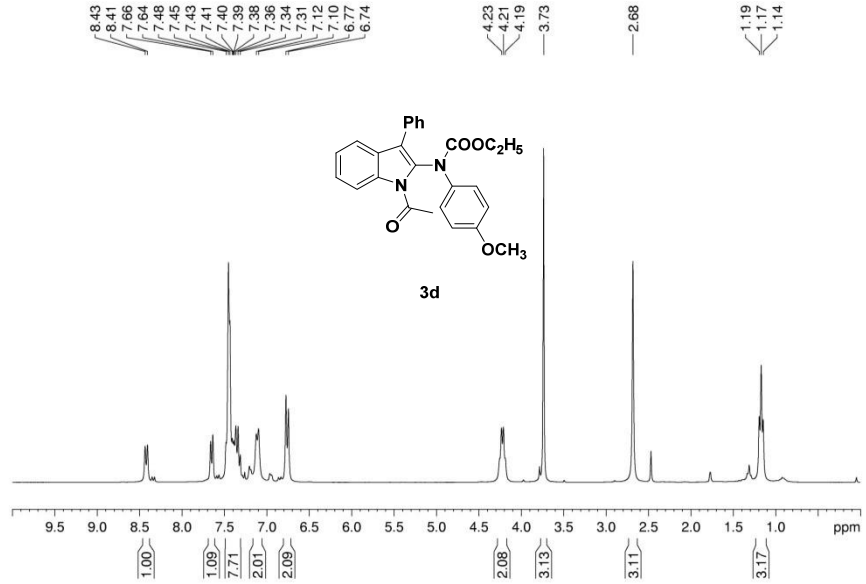
S
O
N
N
O
OCH3
3c
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


8.43
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7.48
7.45
7.43
7.41
7.40
7.39
7.38
7.36
7.34
7.31
7.12
7.10
6.77
6.74
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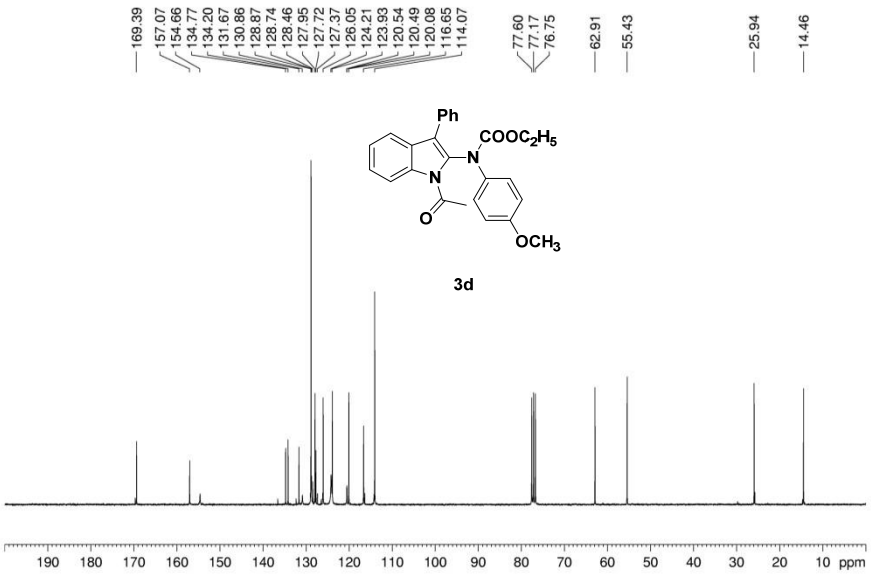
4.21
4.19
3.73
2.68
1.19
1.17
1.14
Ph
COOC2H5
N
N
O
OCH3
3d
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
1.09
7.71
2.01
2.09
2.08
3.13
3.11
3.17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128.87
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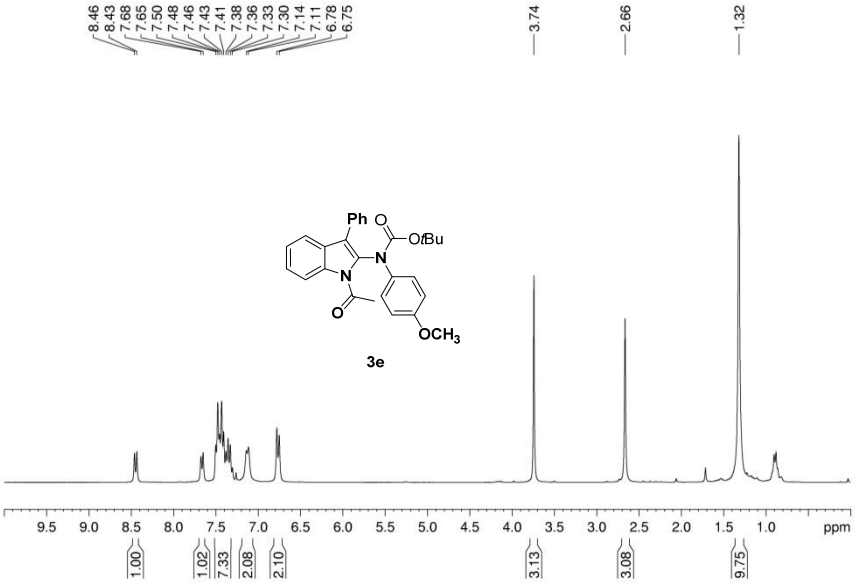
128.46
127.95
127.72
127.37
126.05
124.21
123.93
120.54
120.49
120.08
116.65
114.07
77.60
77.17
76.75
62.91
55.43
25.94
14.46
Ph
COOC2H5
N
N
O
OCH3
3d
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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7.46
7.43
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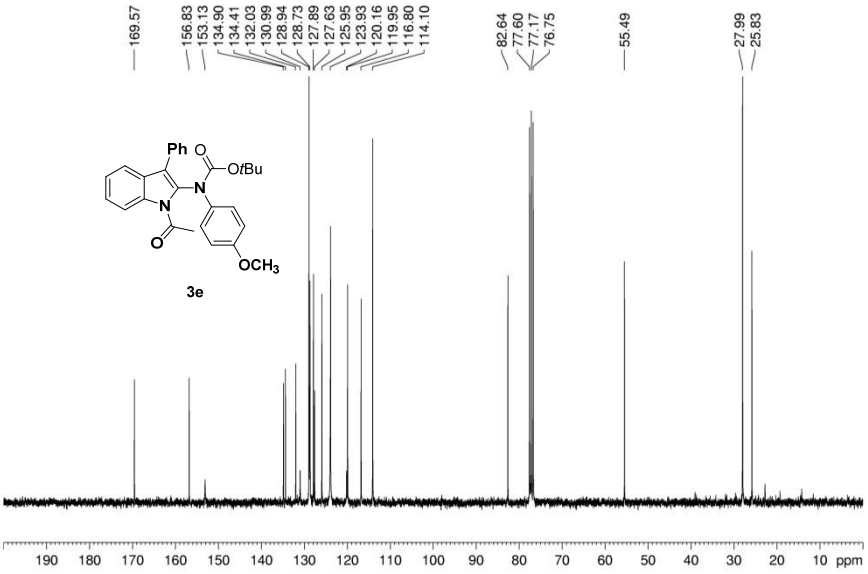
7.38
7.36
7.33
7.30
7.14
7.11
6.78
6.75
3.74
2.66
1.32
Ph
O
OtBu
N
N
O
OCH3
3e
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
1.02
7.33
2.08
2.10
3.13
3.08
9.75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132.03
130.99
128.94
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127.89
127.63
125.95
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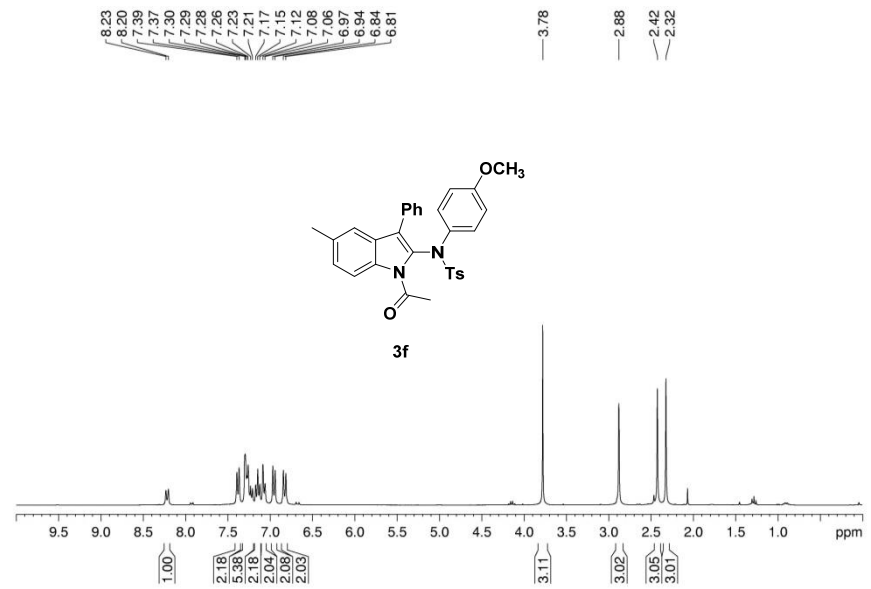
120.16
119.95
116.80
114.10
82.64
77.60
77.17
76.75
55.49
27.99
25.83
Ph
O
OtBu
N
N
O
OCH3
3e
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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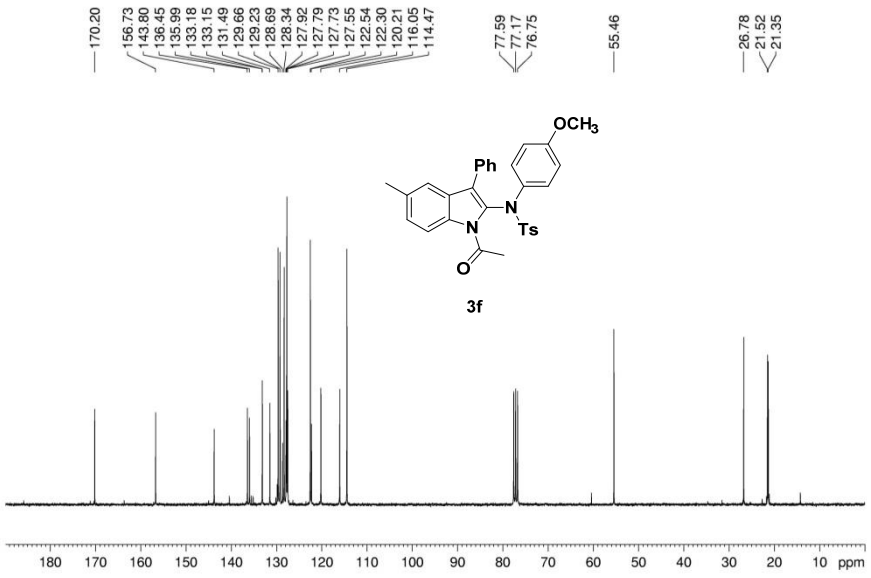
7.26
7.23
7.21
7.17
7.15
7.12
7.08
7.06
6.97
6.94
6.84
6.81
3.78
2.88
2.42
2.32
OCH3
Ph
N
Ts
N
O
3f
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
2.18
5.38
2.18
2.04
2.08
2.03
3.11
3.02
3.05
3.01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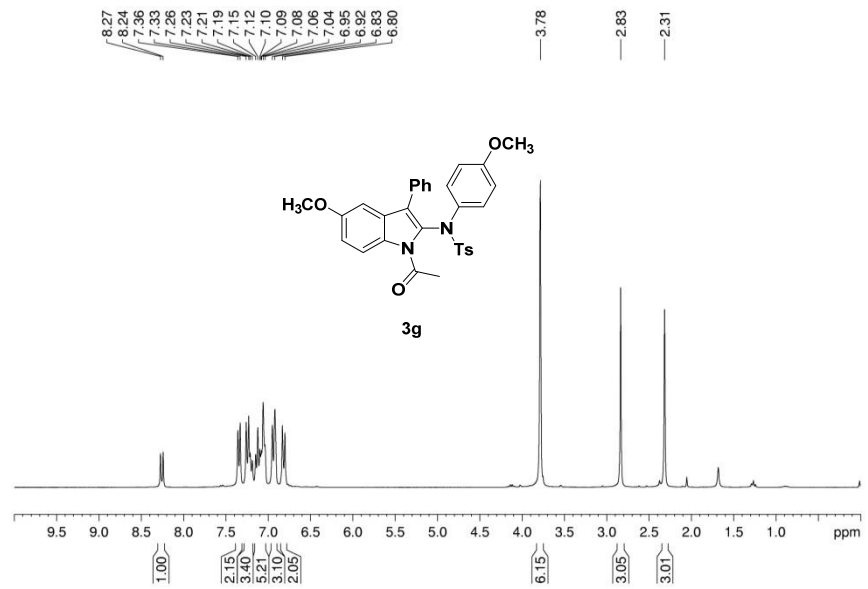
131.49
129.66
129.23
128.69
128.34
127.92
127.79
127.73
127.55
122.54
122.30
120.21
116.05
114.47
77.59
77.17
76.75
55.46
26.78
21.52
21.35
OCH3
Ph
N
Ts
N
O
3f
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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8.24
7.36
7.33
7.26
7.23
7.21
7.19
7.15
7.12
7.10
7.09
7.08
7.06
7.04
6.95
6.92
6.83
6.80
3.78
2.83
2.31
OCH3
Ph
H3CO
N
Ts
N
O
3g
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
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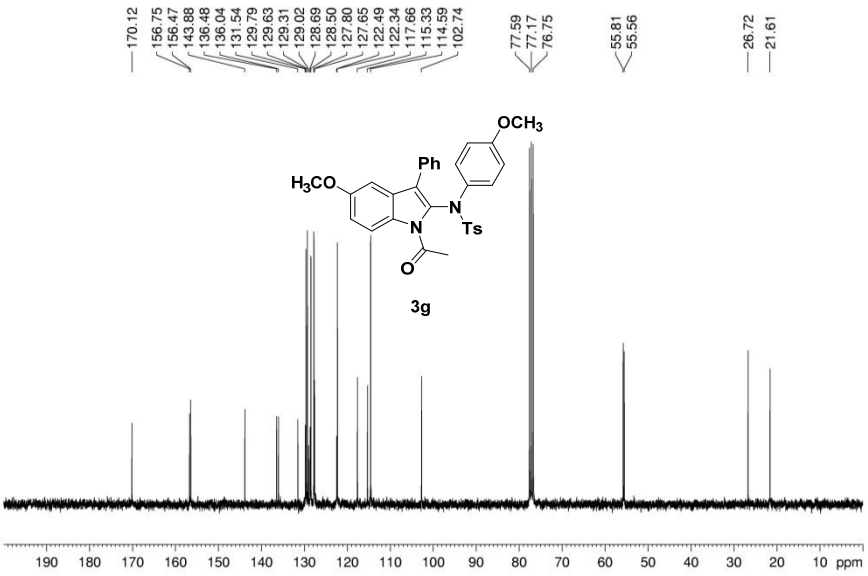
3.40
5.21
3.10
2.05
6.15
3.05
3.01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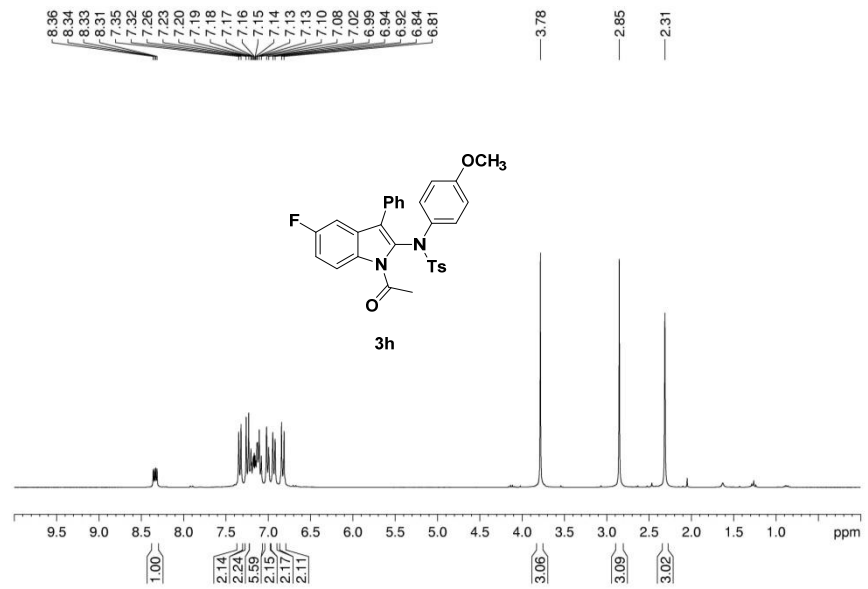
131.54
129.79
129.63
129.31
129.02
128.69
128.50
127.80
127.65
122.49
122.34
117.66
115.33
114.59
102.74
77.59
77.17
76.75
55.81
55.56
26.72
21.61
OCH3
Ph
H3CO
N
Ts
N
O
3g
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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8.34
8.33
8.31
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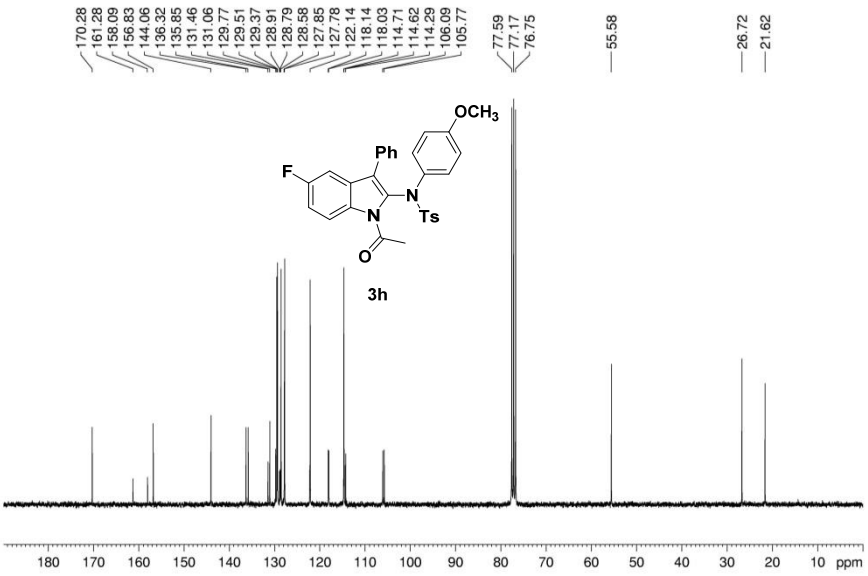
7.32
7.26
7.23
7.20
7.19
7.18
7.17
7.16
7.15
7.14
7.13
7.13
7.10
7.08
7.02
6.99
6.94
6.92
6.84
6.81
3.78
2.85
2.31
OCH3
Ph
F
N
Ts
N
O
3h
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
2.14
2.24
5.59
2.15
2.17
2.11
3.06
3.09
3.02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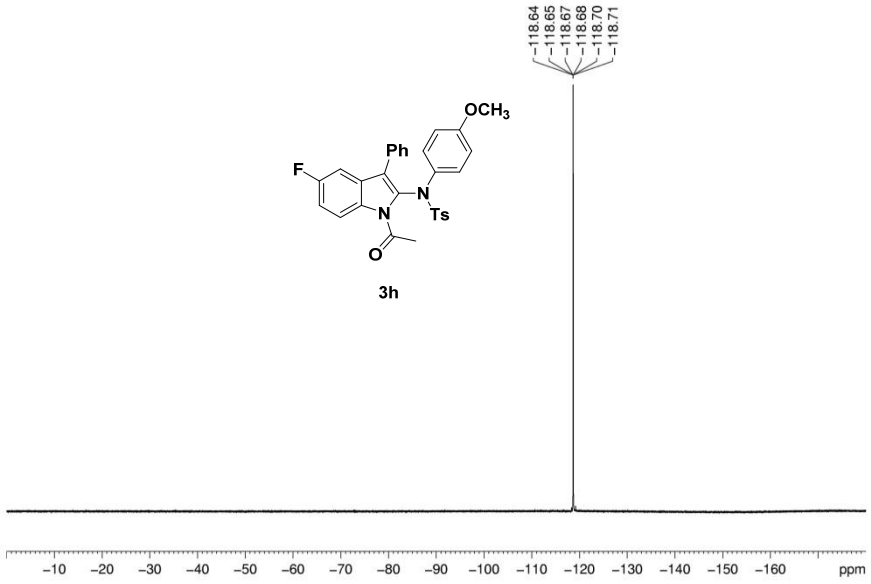
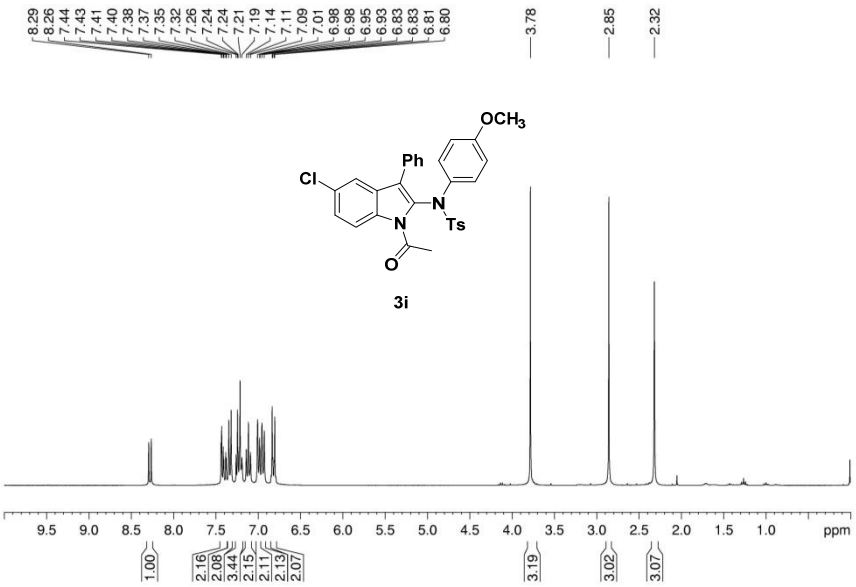
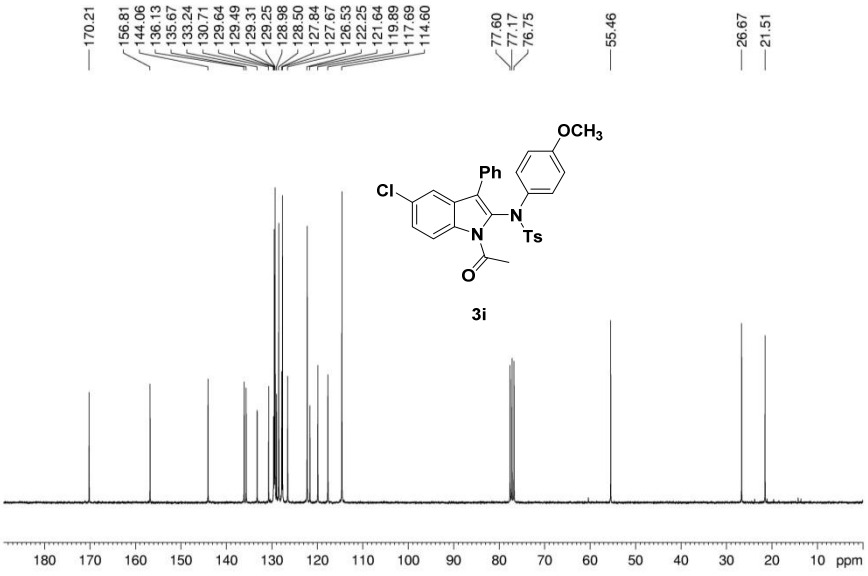
161.28
158.09
156.83
144.06
136.32
135.85
131.46
131.06
129.77
129.51
129.37
128.91
128.79
128.58
127.85
127.78
122.14
118.14
118.03
114.71
114.62
114.29
106.09
105.77
77.59
77.17
76.75
55.58
26.72
21.62
OCH3
Ph
F
N
Ts
N
O
3h
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


−118.64
−118.65
−118.67
−118.68
−118.70
−118.71
OCH3
Ph
F
N
Ts
N
O
3h
−10
−20
−30
−40
−50
−60
−70
−80
−90
−100
−110
−120
−130
−140
−150
−160
ppm


8.29
8.26
7.44
7.43
7.41
7.40
7.38
7.37
7.35
7.32
7.26
7.24
7.24
7.21
7.19
7.14
7.11
7.09
7.01
6.98
6.98
6.95
6.93
6.83
6.83
6.81
6.80
3.78
2.85
2.32
OCH3
Ph
Cl
N
Ts
N
O
3i
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
2.16
2.08
3.44
2.15
2.11
2.13
2.07
3.19
3.02
3.07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156.81
144.06
136.13
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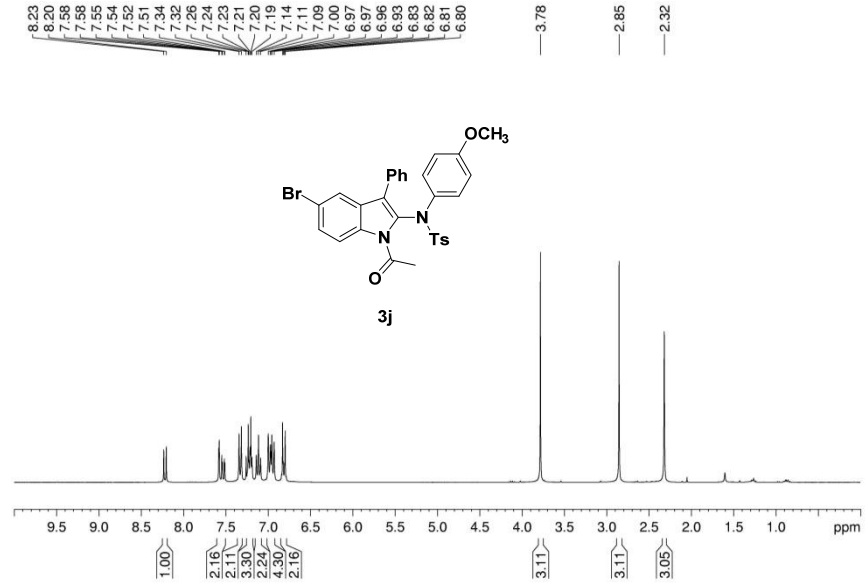
133.24
130.71
129.64
129.49
129.31
129.25
128.98
128.50
127.84
127.67
126.53
122.25
121.64
119.89
117.69
114.60
77.60
77.17
76.75
55.46
26.67
21.51
OCH3
Ph
Cl
N
Ts
N
O
3i
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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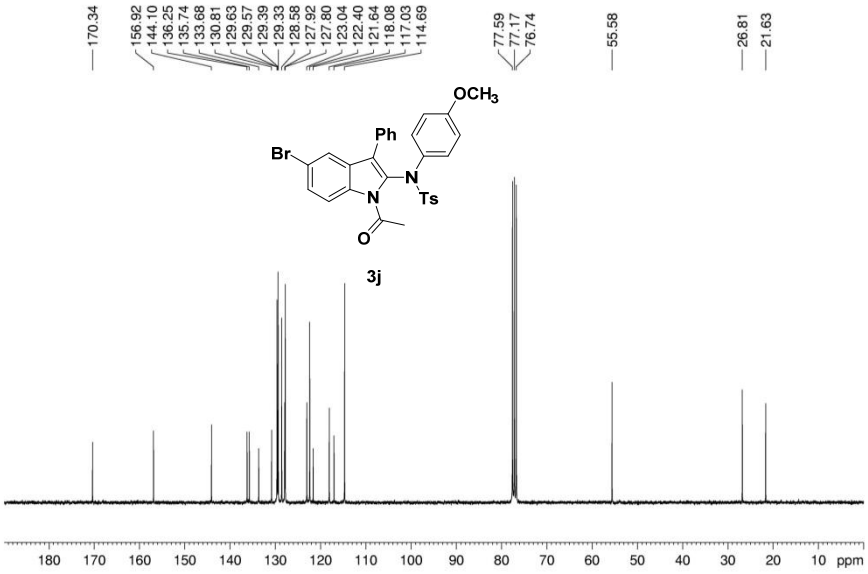
8.20
7.58
7.58
7.55
7.54
7.52
7.51
7.34
7.32
7.26
7.24
7.23
7.21
7.20
7.19
7.14
7.11
7.09
7.00
6.97
6.97
6.96
6.93
6.83
6.82
6.81
6.80
3.78
2.85
2.32
OCH3
Ph
Br
N
Ts
N
O
3j
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
2.16
2.11
3.30
2.24
4.30
2.16
3.11
3.11
3.05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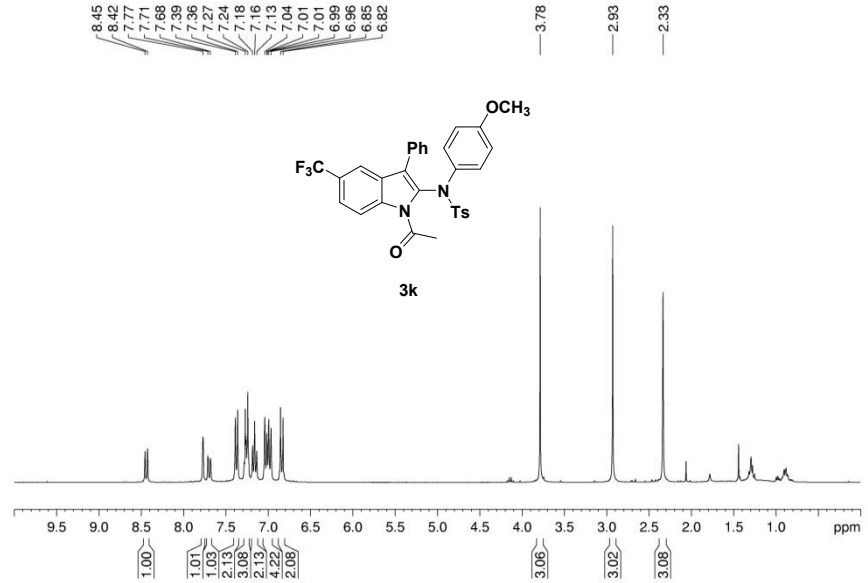
129.63
129.57
129.39
129.33
128.58
127.92
127.80
123.04
122.40
121.64
118.08
117.03
114.69
77.59
77.17
76.74
55.58
26.81
21.63
OCH3
Ph
Br
N
Ts
N
O
3j
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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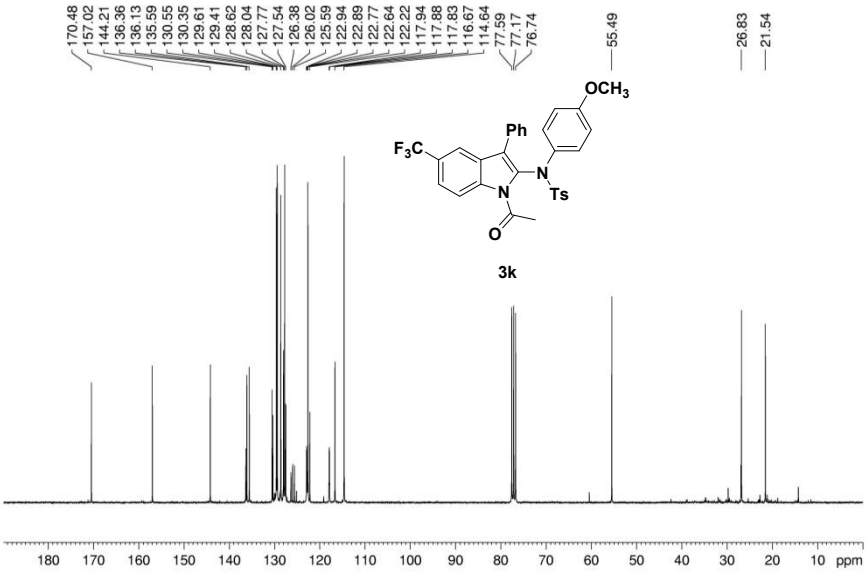
8.42
7.77
7.71
7.68
7.39
7.36
7.27
7.24
7.18
7.16
7.13
7.04
7.01
7.01
6.99
6.96
6.85
6.82
3.78
2.93
2.33
OCH3
Ph
F3C
N
Ts
N
O
3k
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
1.01
1.03
2.13
3.08
2.13
4.22
2.08
3.06
3.02
3.08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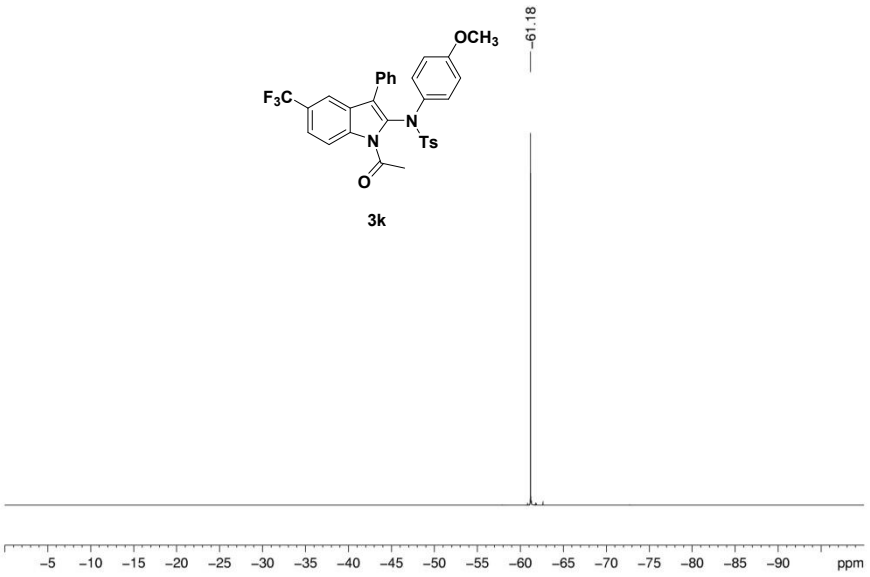
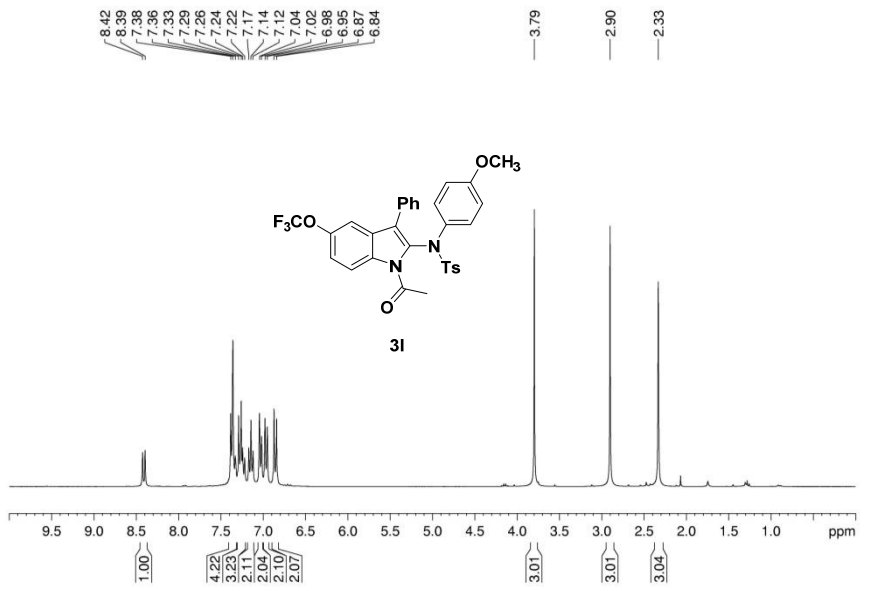
130.35
129.61
129.41
128.62
128.04
127.77
127.54
126.38
126.02
125.59
122.94
122.89
122.77
122.64
122.22
117.94
117.88
117.83
116.67
114.64
77.59
77.17
76.74
55.49
26.83
21.54
OCH3
Ph
F3C
N
Ts
N
O
3k
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


OCH3
61.18
Ph
F3C
N
Ts
N
O
3k
−5 −10 −15 −20 −25 −30 −35 −40 −45 −50 −55 −60 −65 −70 −75 −80 −85 −90 ppm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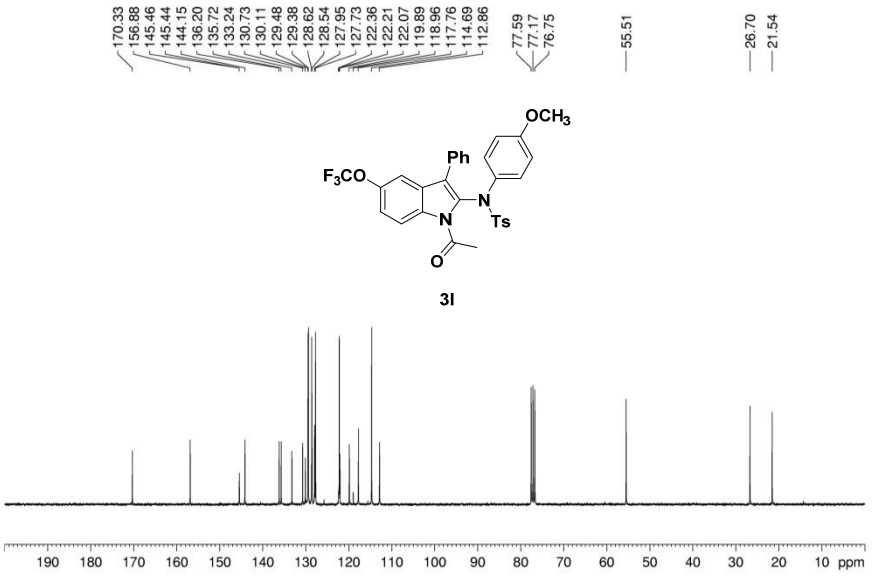
8.39
7.38
7.36
7.33
7.29
7.26
7.24
7.22
7.17
7.14
7.12
7.04
7.02
6.98
6.95
6.87
6.84
3.79
2.90
2.33
OCH3
Ph
F3CO
N
Ts
N
O
3l
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
4.22
3.23
2.11
2.04
2.10
2.07
3.01
3.01
3.04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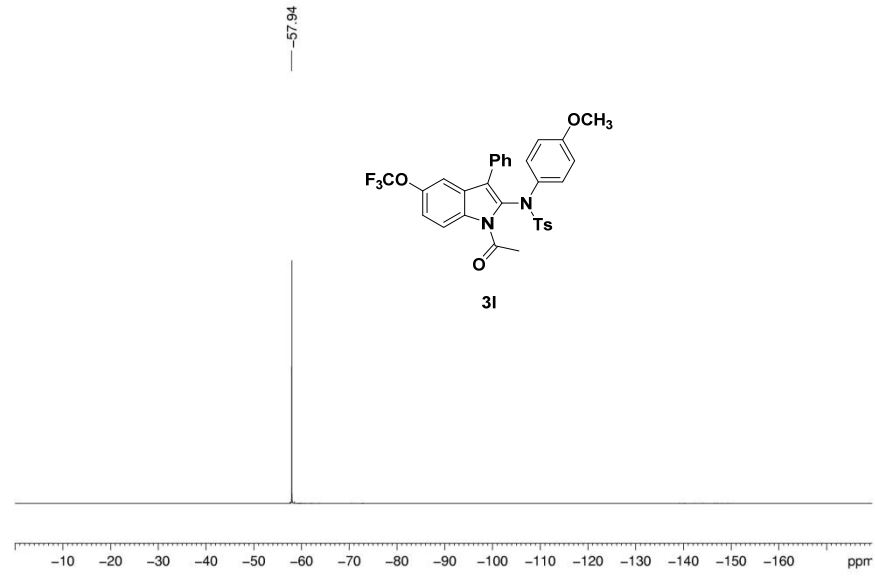
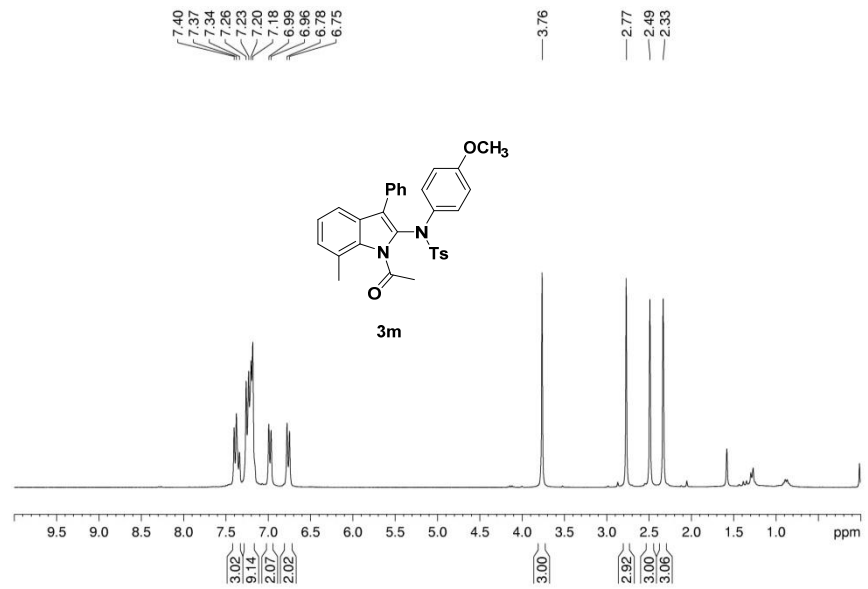
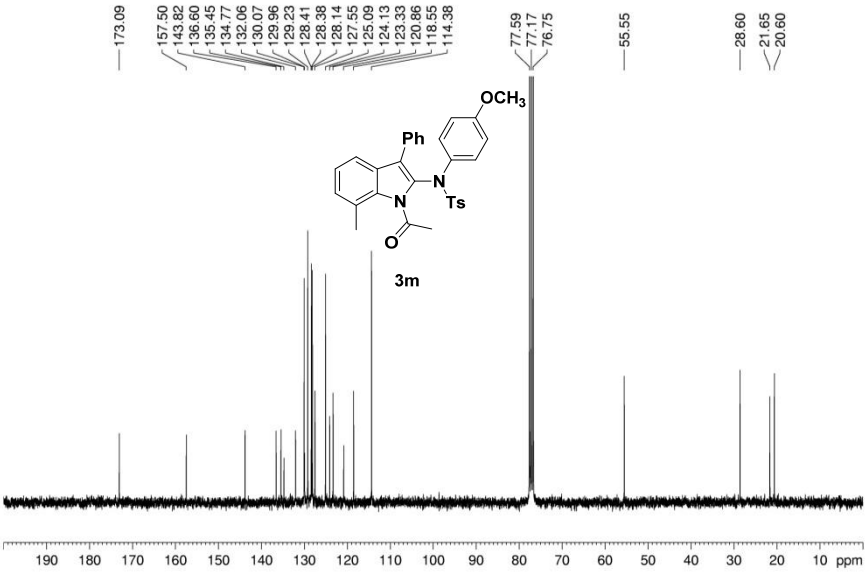
156.88
145.46
145.44
144.15
136.20
135.72
133.24
130.73
130.11
129.48
129.38
128.62
128.54
127.95
127.73
122.36
122.21
122.07
119.89
118.96
117.76
114.69
112.86
77.59
77.17
76.75
55.51
26.70
21.54
OCH3
Ph
F3CO
N
N
Ts
O
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

3l


-57.94
OCH3
Ph
F3CO
N
N
Ts
O
−10 −20 −30 −40 −50 −60 −70 −80 −90 −100 −110 −120 −130 −140 −150 −160 ppm

3l


7.40
7.37
7.34
7.26
7.23
7.20
7.18
6.99
6.96
6.78
6.75
3.76
2.77
2.49
2.33
OCH3
Ph
N
Ts
N
O
3m
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
3.02
9.14
2.07
2.02
3.00
2.92
3.00
3.06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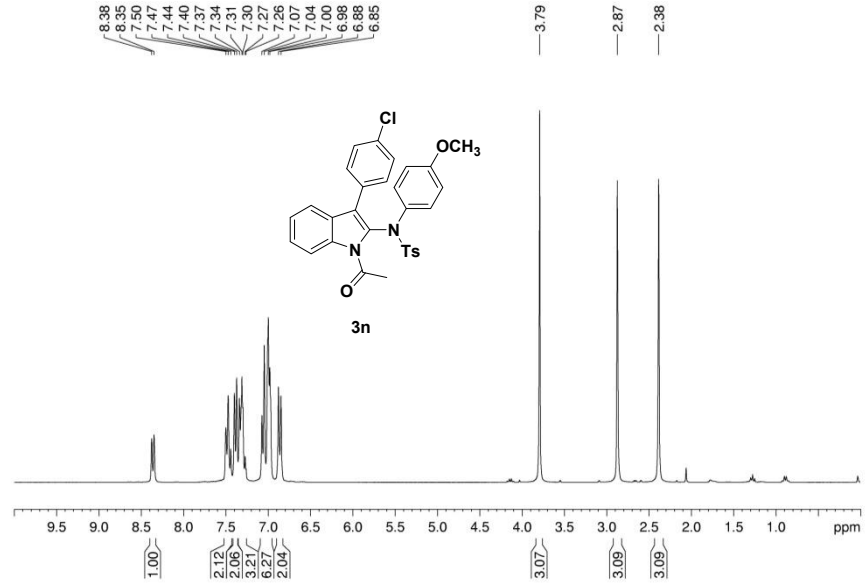
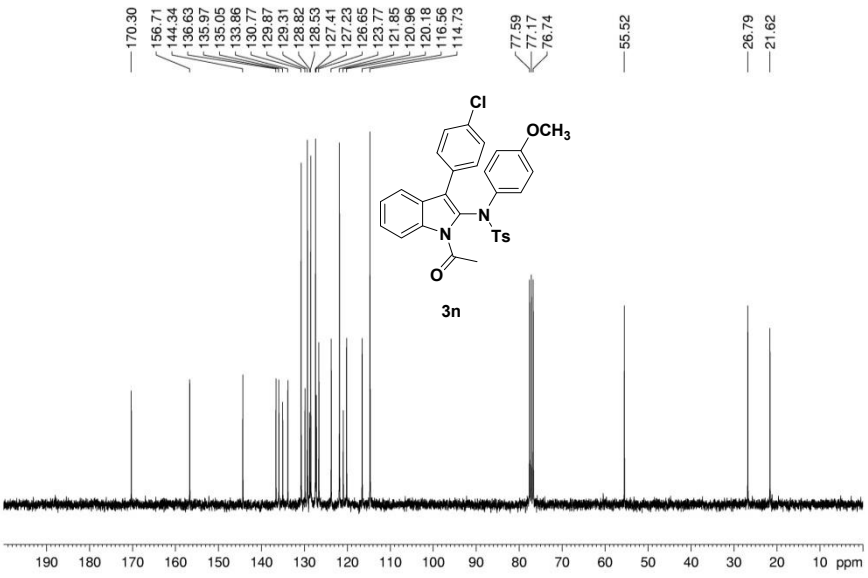
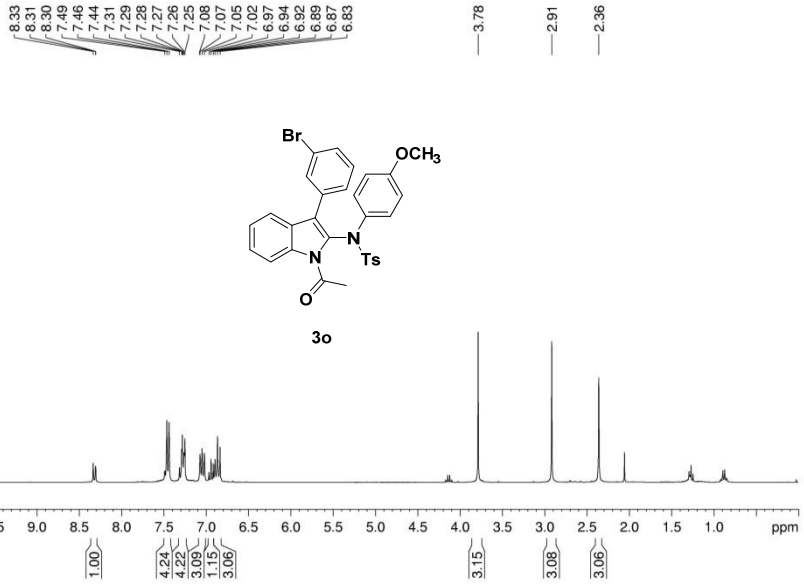
157.50
143.82
136.60
135.45
134.77
132.06
130.07
129.96
129.23
128.41
128.38
128.14
127.55
125.09
124.13
123.33
120.86
118.55
114.38
77.59
77.17
76.75
55.55
28.60
21.65
20.60
OCH3
Ph
N
Ts
N
O
3m
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


8.38
8.35
7.50
7.47
7.44
7.40
7.37
7.34
7.31
7.30
7.27
7.26
7.07
7.04
7.00
6.98
6.88
6.85
3.79
2.87
2.38
Cl
OCH3
N
Ts
N
O
3n
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
2.12
2.06
3.21
6.27
2.04
3.07
3.09
3.09


170.30
156.71
144.34
136.63
135.97
135.05
133.86
130.77
129.87
129.31
128.82
128.53
127.41
127.23
126.65
123.77
121.85
120.96
120.18
116.56
114.73
77.59
77.17
76.74
55.52
26.79
21.62
Cl
OCH3
N
Ts
N
O
3n
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


8.33
8.31
8.30
7.49
7.46
7.44
7.31
7.29
7.28
7.27
7.26
7.25
7.08
7.07
7.05
7.02
6.97
6.94
6.92
6.89
6.87
6.83
3.78
2.91
2.36
Br
OCH3
N
Ts
N
O
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
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3.06
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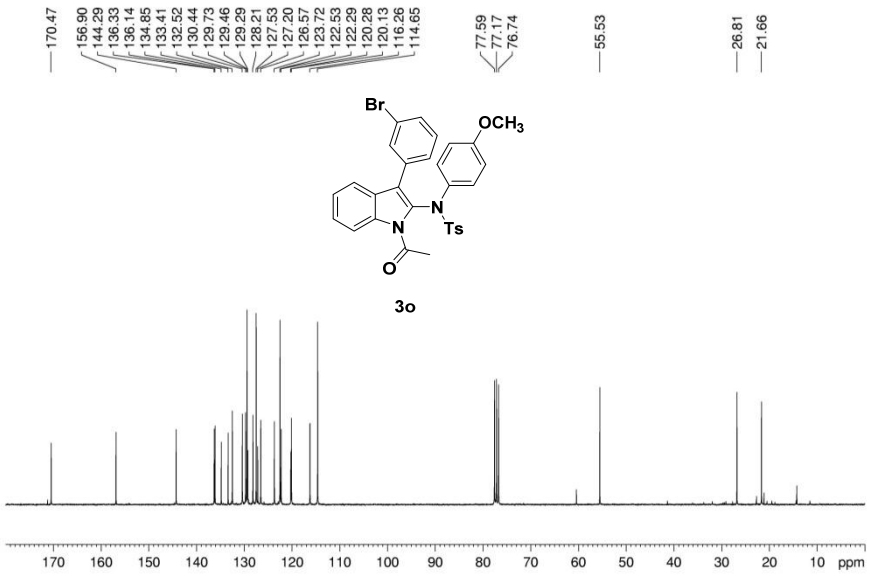
3.08
3.06

3o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127.53
127.20
126.57
123.72
122.53
122.29
120.28
120.13
116.26
114.65
77.59
77.17
76.74
55.53
26.81
21.66
Br
OCH3
N
Ts
N
O
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120
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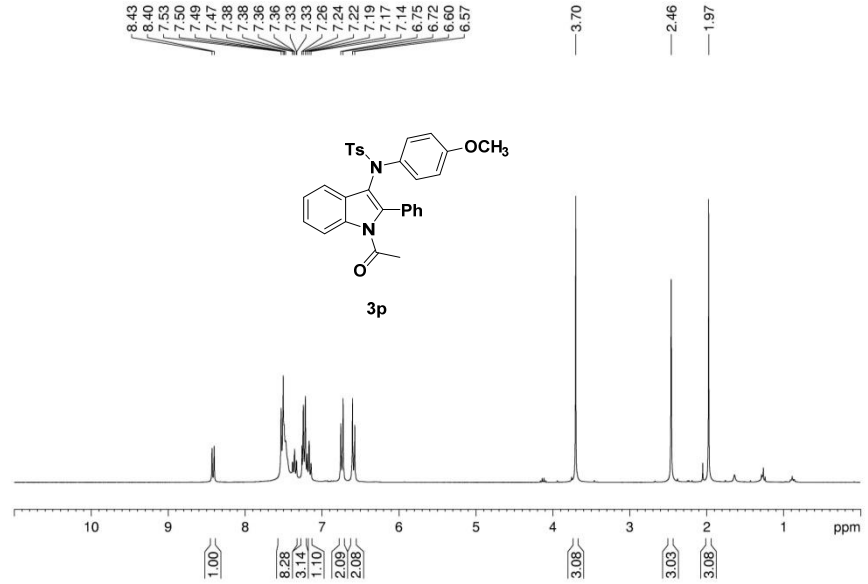
ppm

3o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7.33
7.33
7.26
7.24
7.22
7.19
7.17
7.14
6.75
6.72
6.60
6.57
3.70
2.46
1.97
Ts
N
OCH3
Ph
N
O
3p
10
9
8
7
6
5
4
3
2
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ppm
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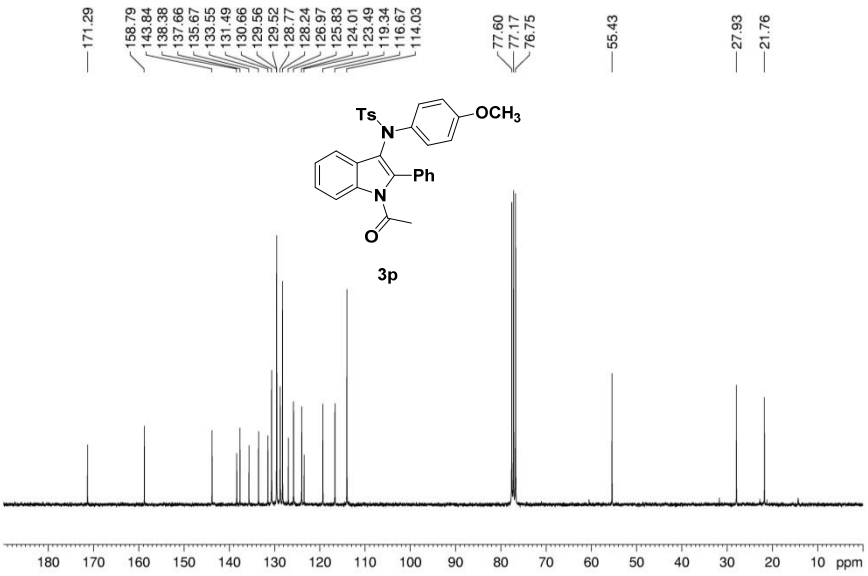
2.09
2.08
3.08
3.03
3.08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128.24
126.97
125.83
124.01
123.49
119.34
116.67
114.03
77.60
77.17
76.75
55.43
27.93
21.76
Ts
N
OCH3
Ph
N
O
3p
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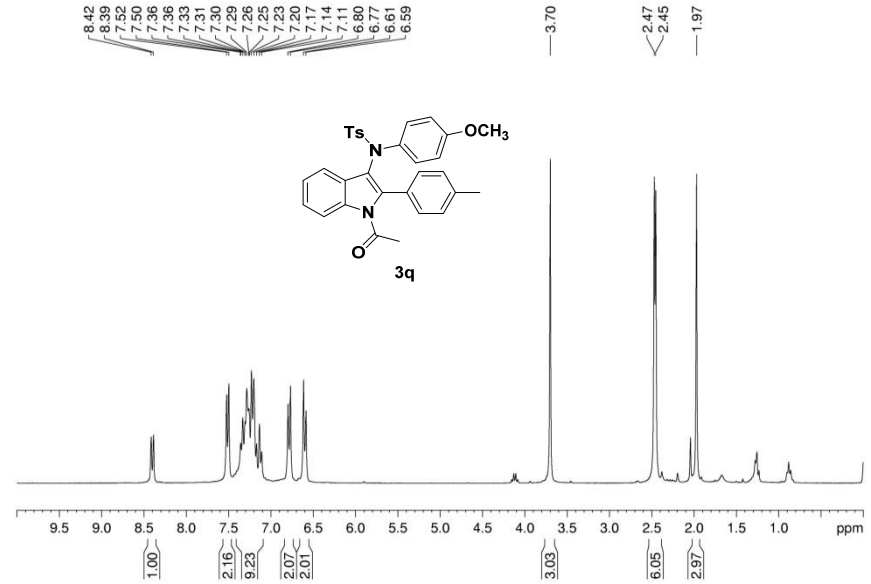
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm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7.52
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7.33
7.31
7.30
7.29
7.26
7.25
7.23
7.20
7.17
7.14
7.11
6.80
6.77
6.61
6.59
3.70
2.47
2.45
1.97
Ts
N
OCH3
N
O
3q
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
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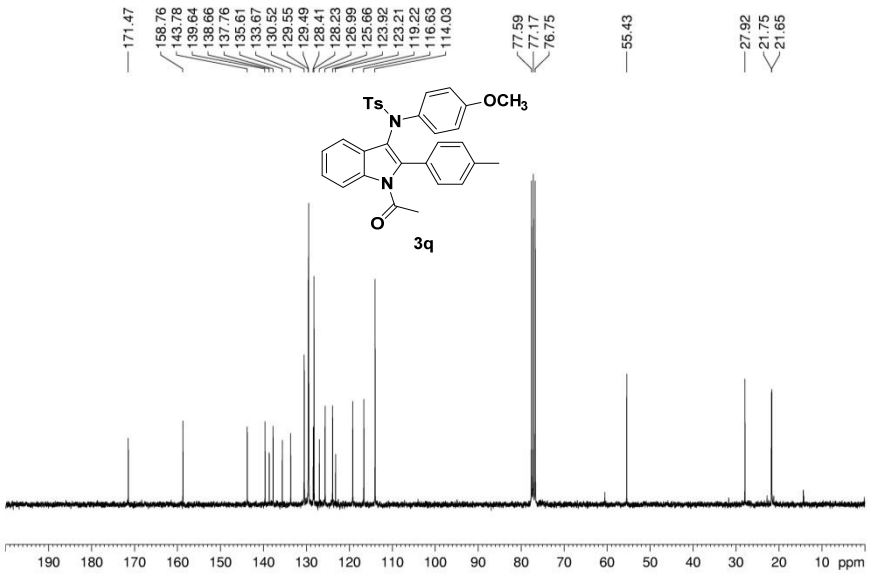
9.23
2.07
2.01
3.03
6.05
2.97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129.55
129.49
128.41
128.23
126.99
125.66
123.92
123.21
119.22
116.63
114.03
77.59
77.17
76.75
55.43
27.92
21.75
21.65
Ts
N
OCH3
N
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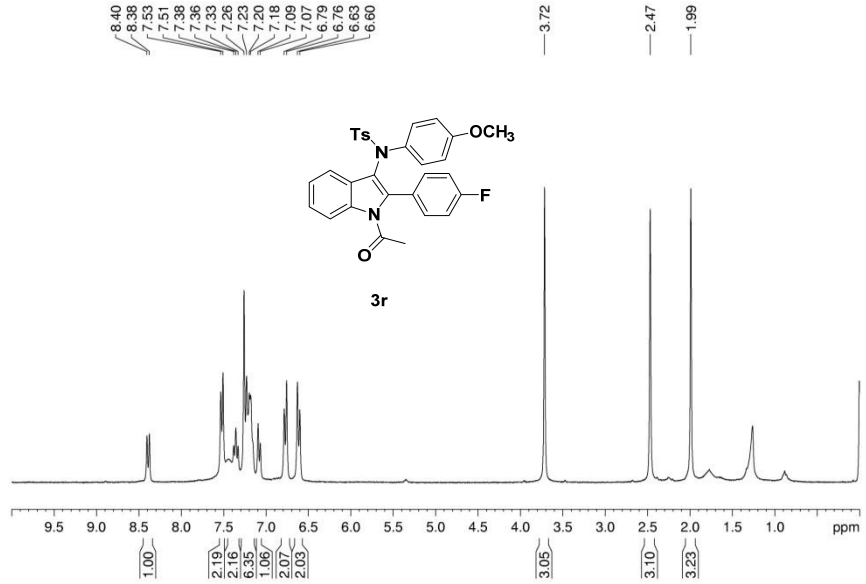
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7.53
7.51
7.38
7.36
7.33
7.26
7.23
7.20
7.18
7.09
7.07
6.79
6.76
6.63
6.60
3.72
2.47
1.99
Ts
N
OCH3
F
N
O
3r
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
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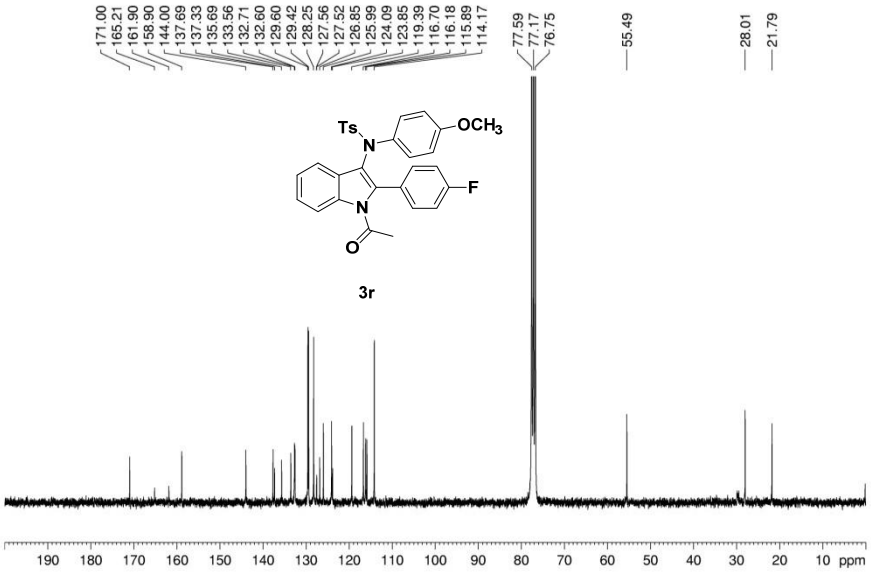
2.19
2.16
6.35
1.06
2.07
2.03
3.05
3.10
3.23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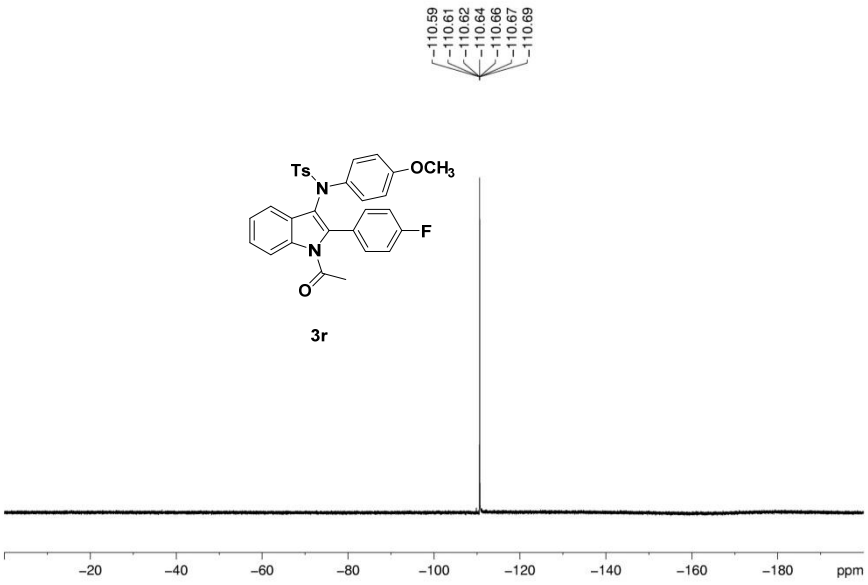
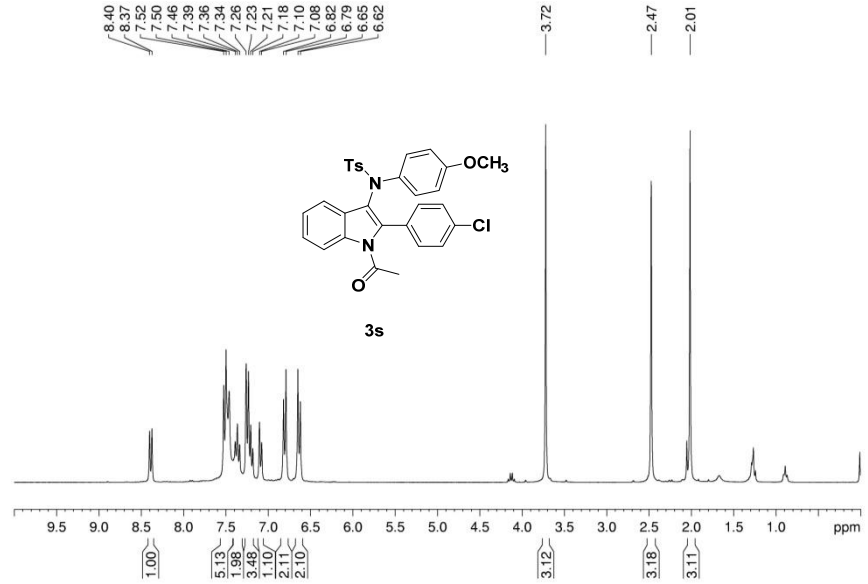
165.21
161.90
158.90
144.00
137.69
137.33
135.69
133.56
132.71
132.60
129.60
129.42
128.25
127.56
127.52
126.85
125.99
124.09
123.85
119.39
116.70
116.18
115.89
114.17
77.59
77.17
76.75
55.49
28.01
21.79
Ts
N
OCH3
F
N
O
3r
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


-110.59
-110.61
-110.62
-110.64
-110.66
-110.67
-110.69
Ts
N
OCH3
F
N
O
3r
-20
-40
-60
-80
-100
-120
-140
-160
-180
ppm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8.37
7.52
7.50
7.46
7.39
7.36
7.34
7.26
7.23
7.21
7.18
7.10
7.08
6.82
6.79
6.65
6.62
3.72
2.47
2.01
Ts
N
OCH3
Cl
N
O
3s
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
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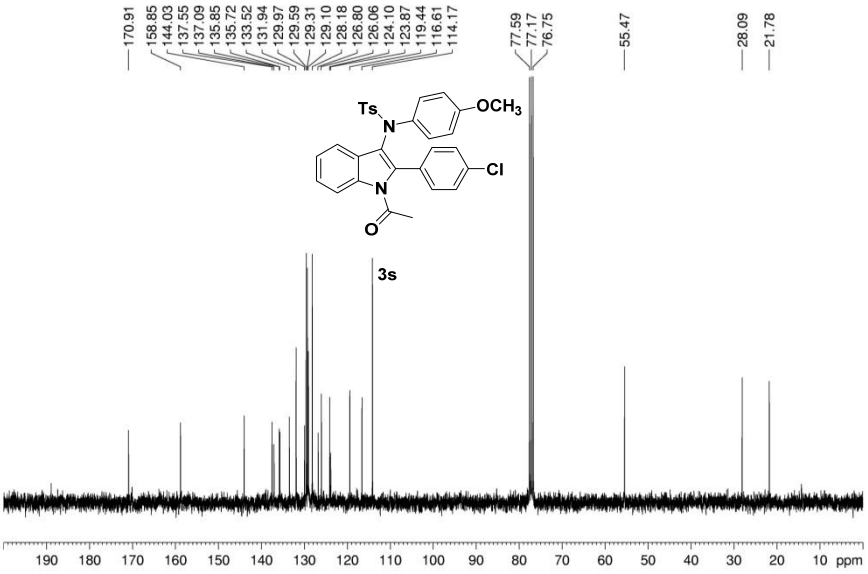
5.13
1.98
3.48
1.10
2.11
2.10
3.12
3.18
3.11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158.85
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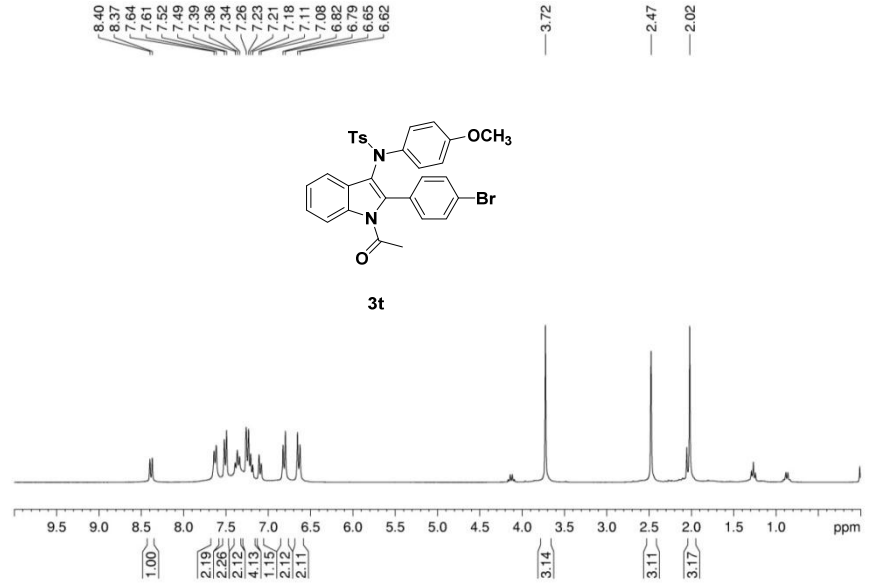
129.10
128.18
126.80
126.06
124.10
123.87
119.44
116.61
114.17
77.59
77.17
76.75
55.47
28.09
21.78
Ts
N
OCH3
Cl
N
O
3s
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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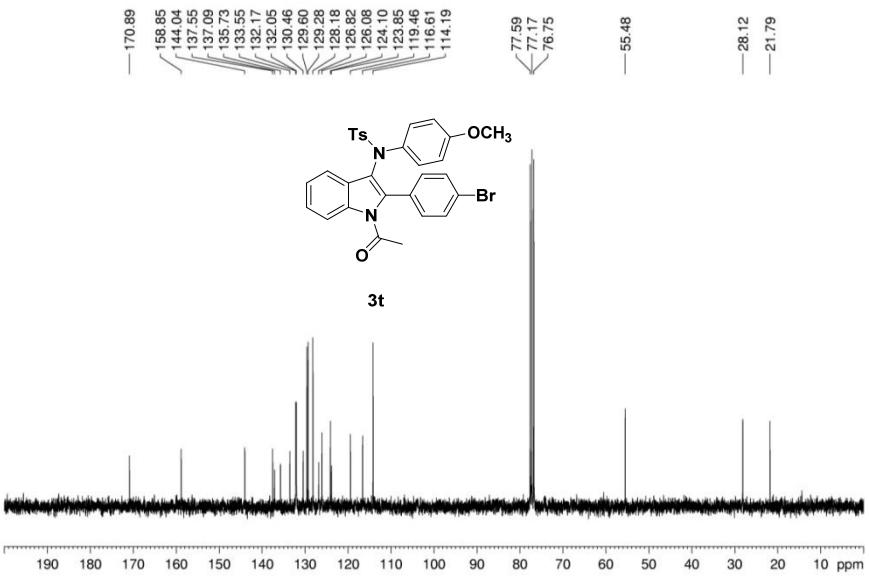
8.37
7.64
7.61
7.52
7.49
7.39
7.36
7.34
7.26
7.23
7.21
7.18
7.11
7.08
6.82
6.79
6.65
6.62
3.72
2.47
2.02
Ts
N
OCH3
Br
N
O
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
2.19
2.26
2.12
4.13
1.15
2.12
2.11
3.14
3.11
3.17

3t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135.73
133.55
132.17
132.05
130.46
129.60
129.28
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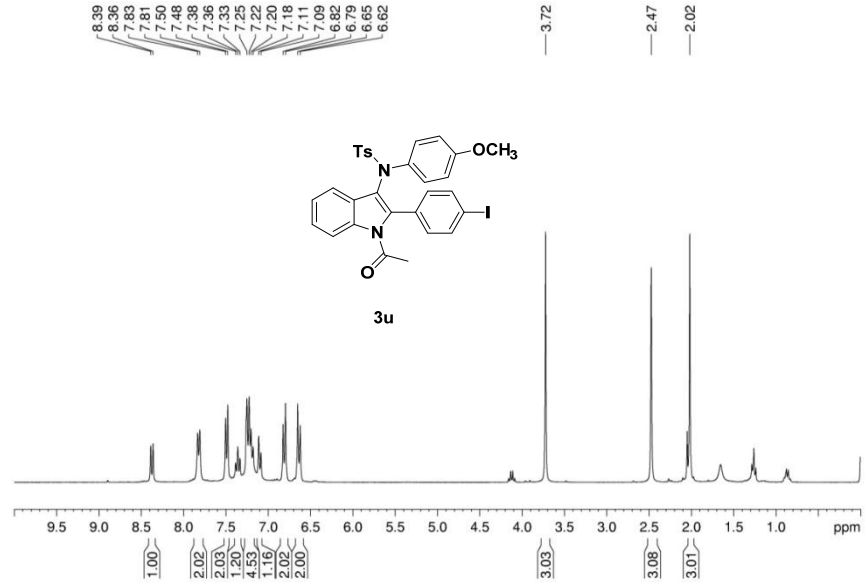
126.82
126.08
124.10
123.85
119.46
116.61
114.19
77.59
77.17
76.75
55.48
28.12
21.79
Ts
N
OCH3
Br
N
O
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

3t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8.36
7.83
7.81
7.50
7.48
7.38
7.36
7.33
7.25
7.22
7.20
7.18
7.11
7.09
6.82
6.79
6.65
6.62
3.72
2.47
2.02
Ts
N
OCH3
I
N
O
3u
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
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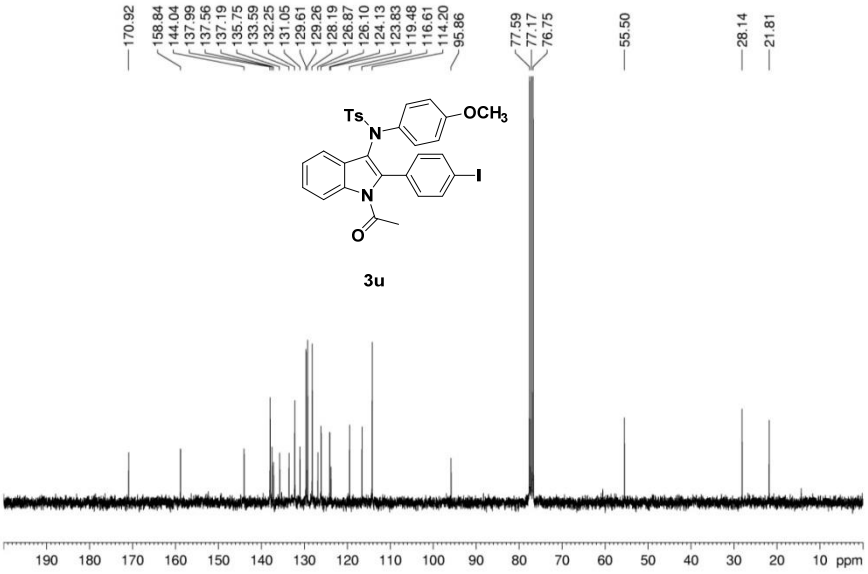
2.02
2.03
1.20
4.53
1.16
2.02
2.00
3.03
3.08
3.01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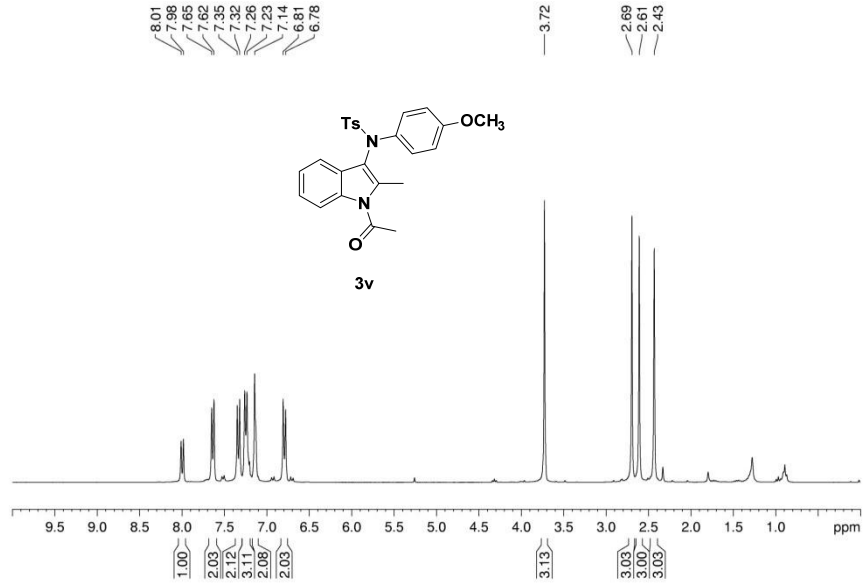
131.05
129.61
129.26
128.19
126.87
126.10
124.13
123.83
119.48
116.61
114.20
95.86
77.59
77.17
76.75
55.50
28.14
21.81
Ts
N
OCH3
I
N
O
3u
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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7.98
7.65
7.62
7.35
7.32
7.26
7.23
7.14
6.81
6.78
3.72
2.69
2.61
2.43
Ts
N
OCH3
N
O
3v
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
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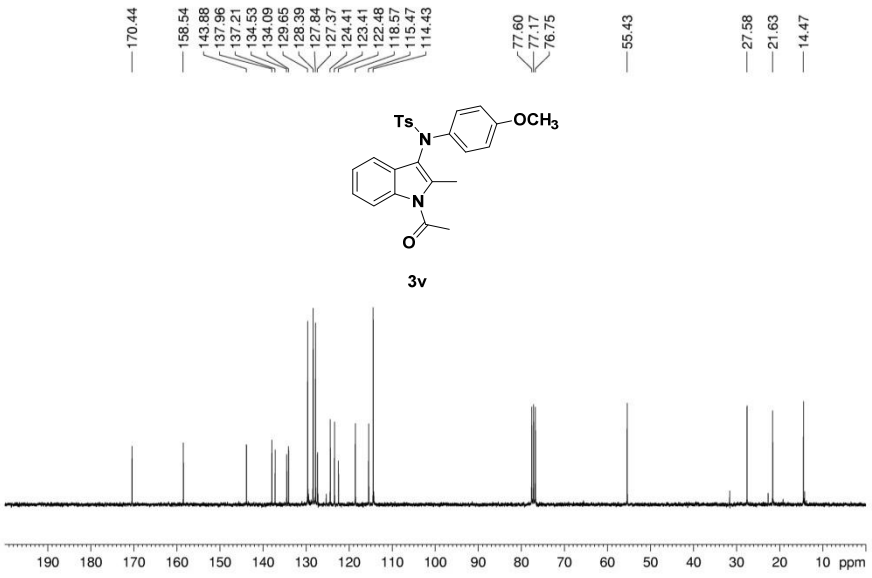
2.08
2.03
3.13
3.03
3.00
3.03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129.65
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127.84
127.37
124.41
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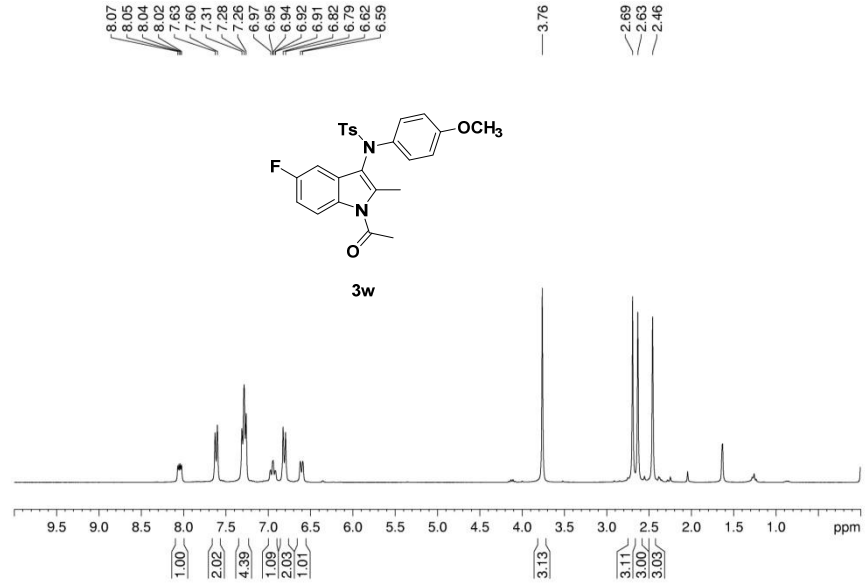
122.48
118.57
115.47
114.43
77.60
77.17
76.75
55.43
27.58
21.63
14.47
Ts
N
OCH3
N
O
3v
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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8.05
8.04
8.02
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7.60
7.31
7.28
7.26
6.97
6.95
6.94
6.92
6.91
6.82
6.79
6.62
6.59
3.76
2.69
2.63
2.46
Ts
N
OCH3
F
N
O
3w
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
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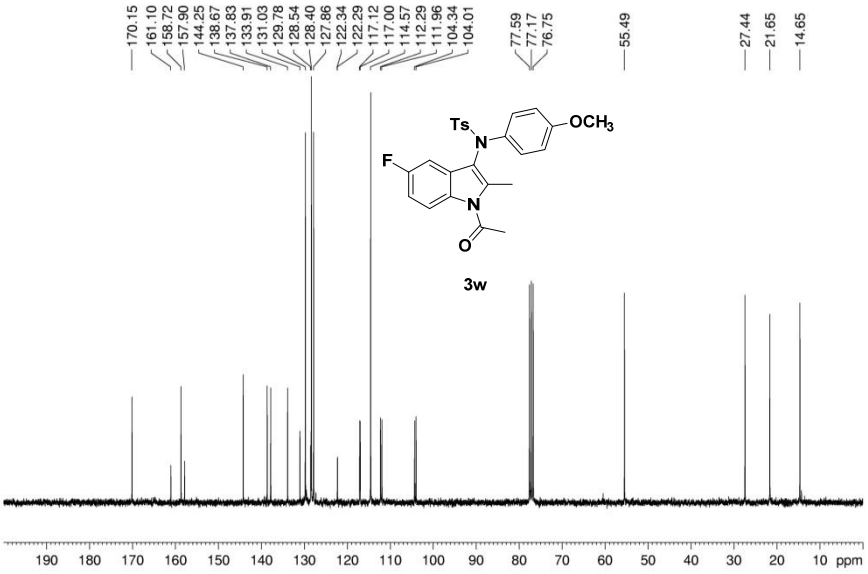
2.03
1.01
3.13
3.11
3.00
3.03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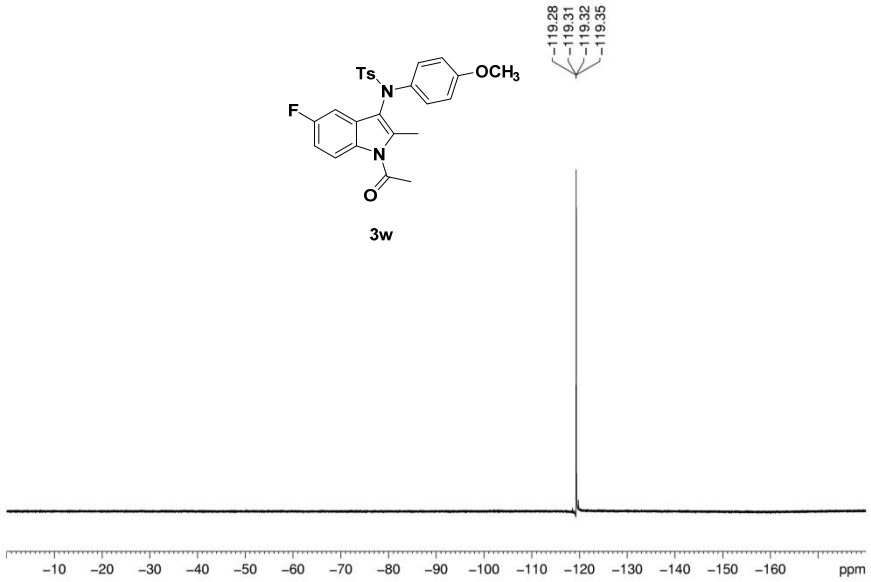
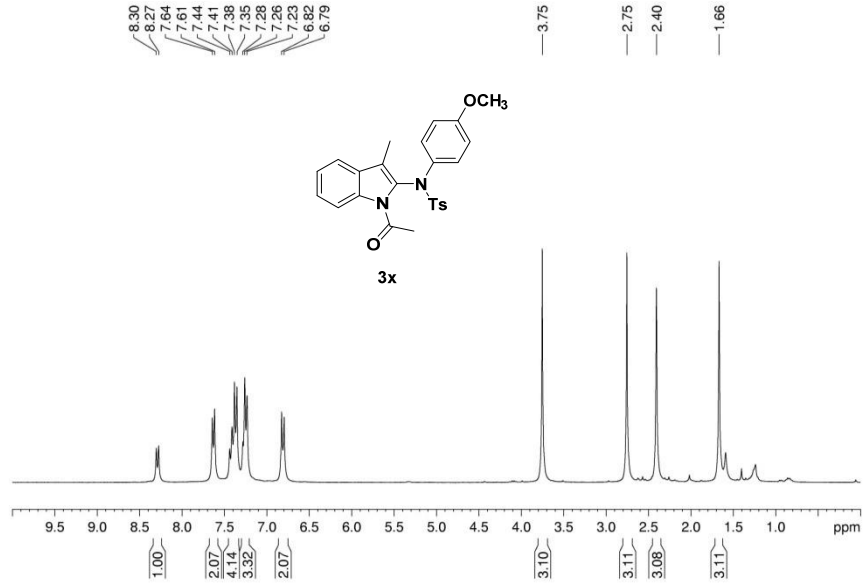
161.10
158.72
157.90
144.25
138.67
137.83
133.91
131.03
129.78
128.54
128.40
127.86
122.34
122.29
117.12
117.00
114.57
112.29
111.96
104.34
104.01
77.59
77.17
76.75
55.49
27.44
21.65
14.65
Ts
N
OCH3
F
N
O
3w
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


119.28
119.31
119.32
119.35
Ts
N
OCH3
F
N
O
3w
−10
−20
−30
−40
−50
−60
−70
−80
−90
−100
−110
−120
−130
−140
−150
−160
ppm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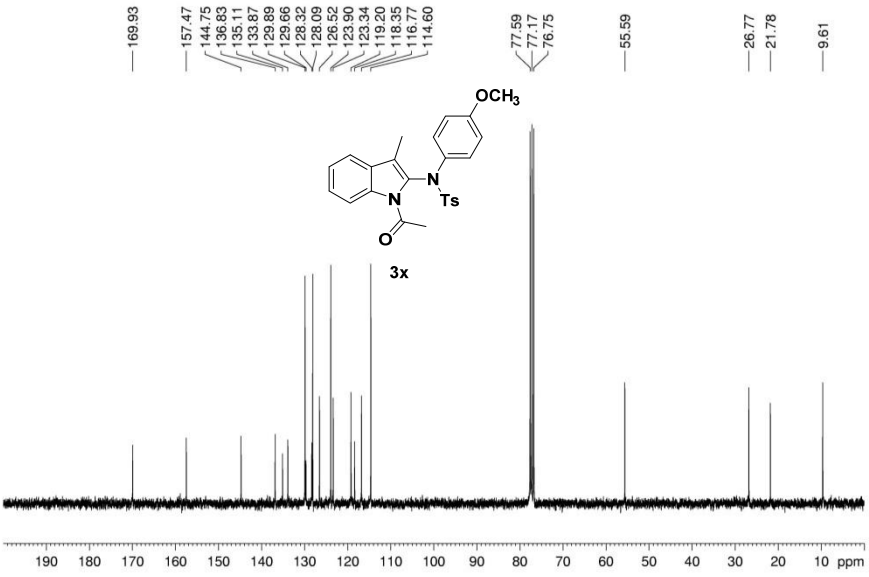
8.27
7.64
7.61
7.44
7.41
7.38
7.35
7.28
7.26
7.23
6.82
6.79
3.75
2.75
2.40
1.66
OCH3
N
Ts
N
O
3x
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
2.07
4.14
3.32
2.07
3.10
3.11
3.08
3.11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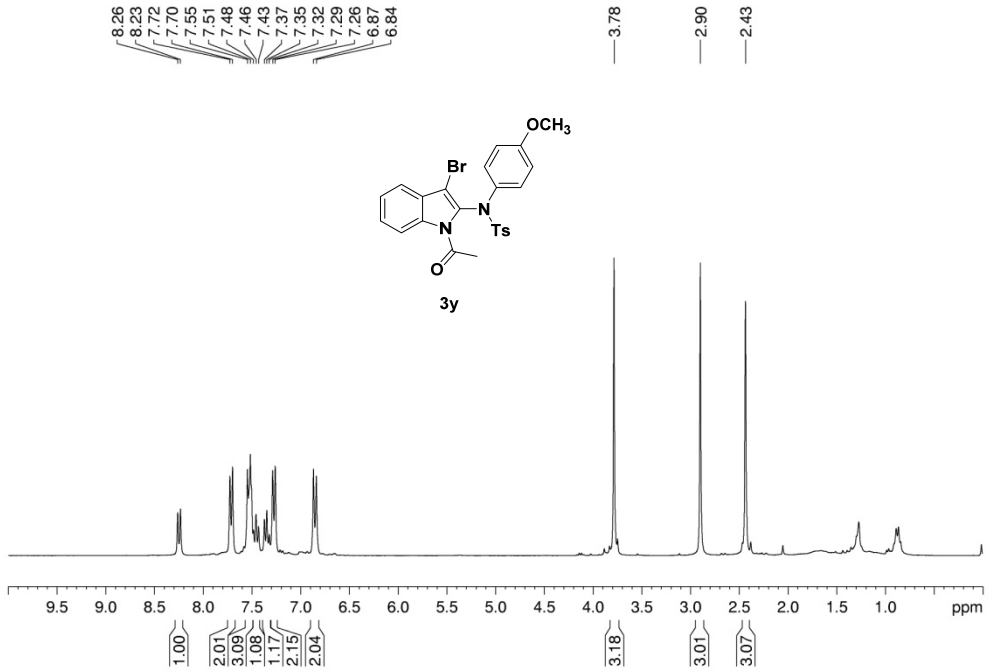
129.89
129.66
128.32
128.09
126.52
123.90
123.34
119.20
118.35
116.77
114.60
77.59
77.17
76.75
55.59
26.77
21.78
9.61
OCH3
N
Ts
N
O
3x
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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8.23
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7.70
7.55
7.51
7.48
7.46
7.43
7.37
7.35
7.32
7.29
7.26
6.87
6.84
3.78
2.90
2.43
OCH3
Br
N
Ts
N
O
3y
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
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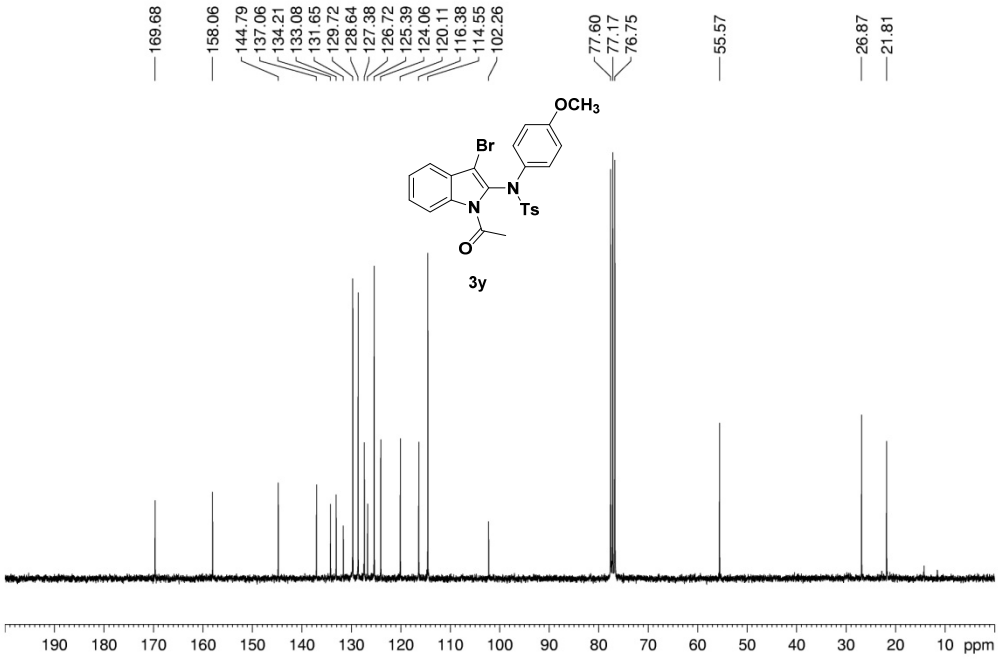
2.01
3.09
1.08
1.17
2.15
2.04
3.18
3.01
3.07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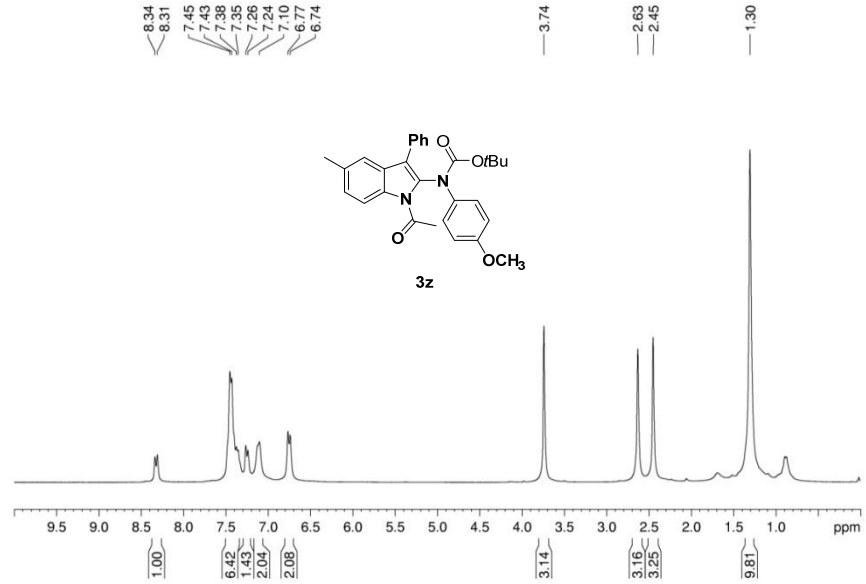
137.06
134.21
133.08
131.65
129.72
128.64
127.38
126.72
125.39
124.06
120.11
116.38
114.55
102.26
77.60
77.17
76.75
55.57
26.87
21.81
OCH3
Br
N
Ts
N
O
3y
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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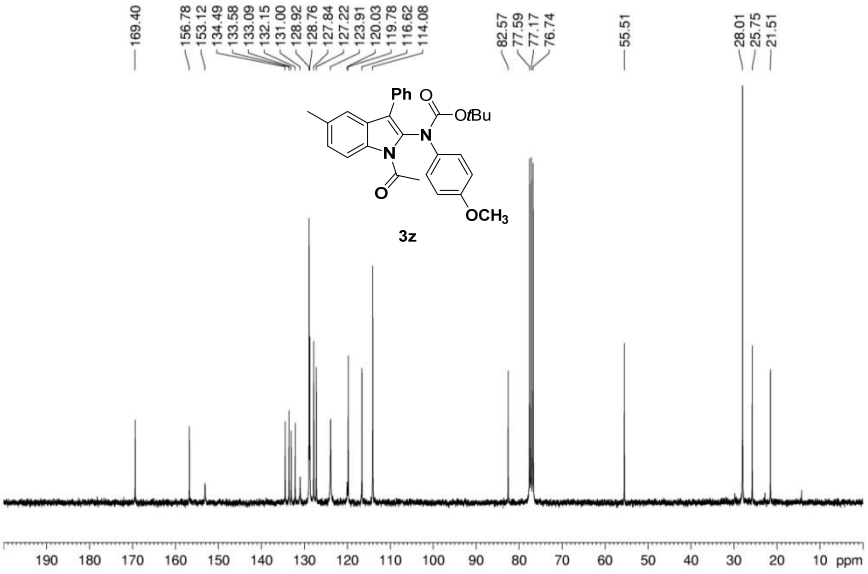
7.43
7.38
7.35
7.26
7.24
7.10
6.77
6.74
3.74
2.63
2.45
1.30
Ph
O
OtBu
N
N
O
OCH3
3z
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
6.42
1.43
2.04
2.08
3.14
3.16
3.25
9.81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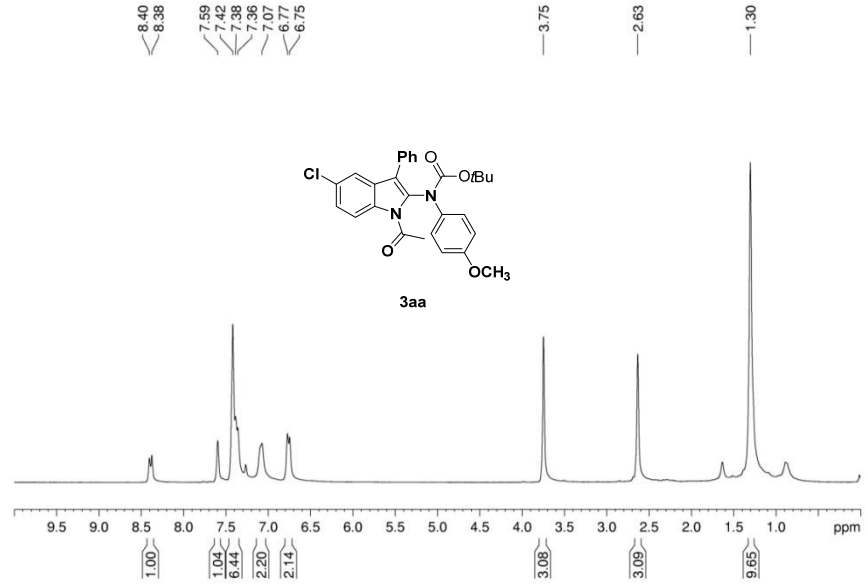
156.78
153.12
134.49
133.58
133.09
132.15
131.00
128.92
128.76
127.84
127.22
123.91
120.03
119.78
116.62
114.08
82.57
77.59
77.17
76.74
55.51
28.01
25.75
21.51
Ph
O
OtBu
N
N
O
OCH3
3z
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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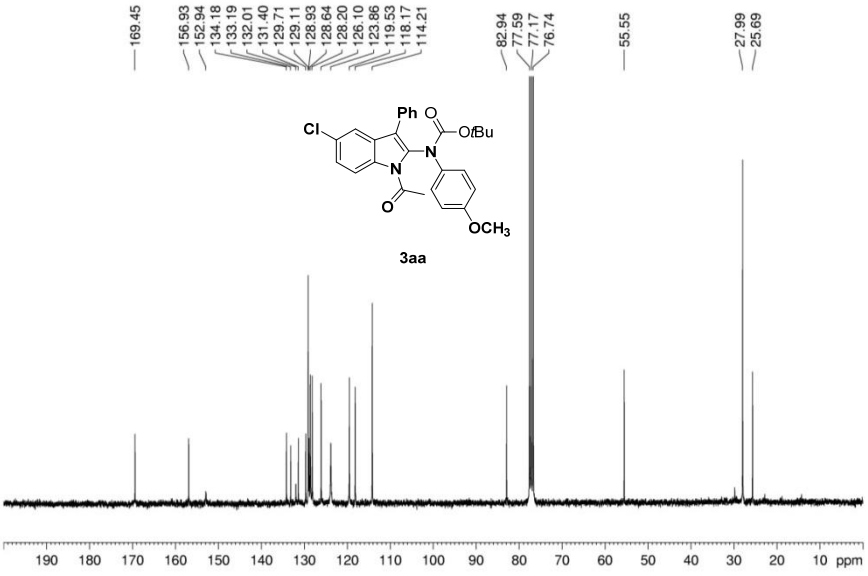
8.38
7.59
7.42
7.38
7.36
7.07
6.77
6.75
3.75
2.63
1.30
Ph
O
OtBu
Cl
N
N
O
OCH3
3aa
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
1.04
6.44
2.20
2.14
3.08
3.09
9.65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156.93
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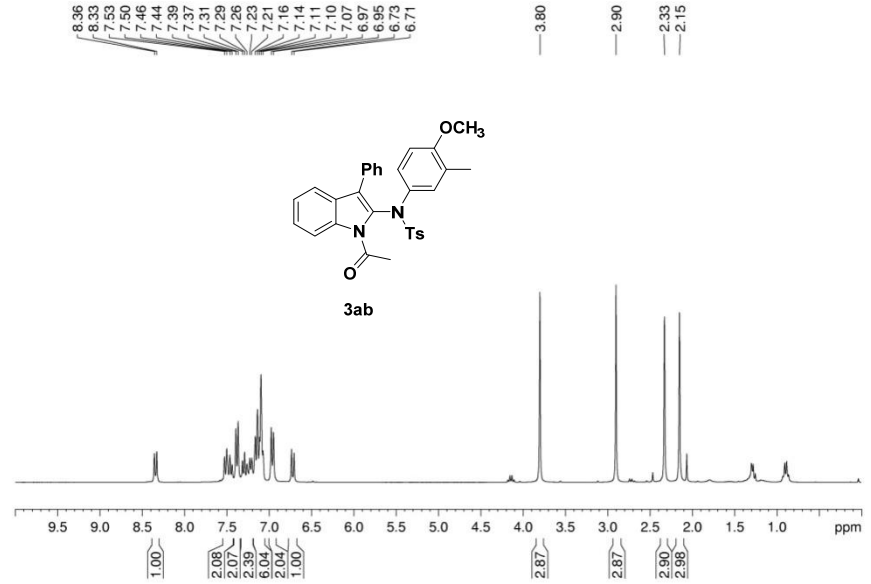
134.18
133.19
132.01
131.40
129.71
129.11
128.93
128.64
128.20
126.10
123.86
119.53
118.17
114.21
82.94
77.59
77.17
76.74
55.55
27.99
25.69
Ph
O
OtBu
Cl
N
N
O
OCH3
3aa
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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8.33
7.53
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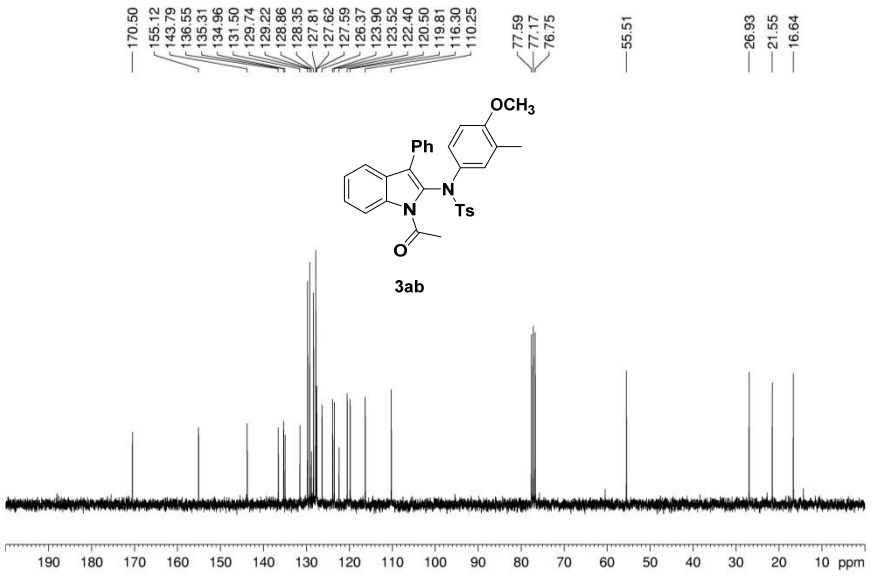
7.37
7.31
7.29
7.26
7.23
7.21
7.16
7.14
7.11
7.10
7.07
6.97
6.95
6.73
6.71
3.80
2.90
2.33
2.15
OCH3
Ph
N
Ts
N
O
3ab
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
2.08
2.07
2.39
6.04
2.04
1.00
2.87
2.87
2.90
2.98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155.12
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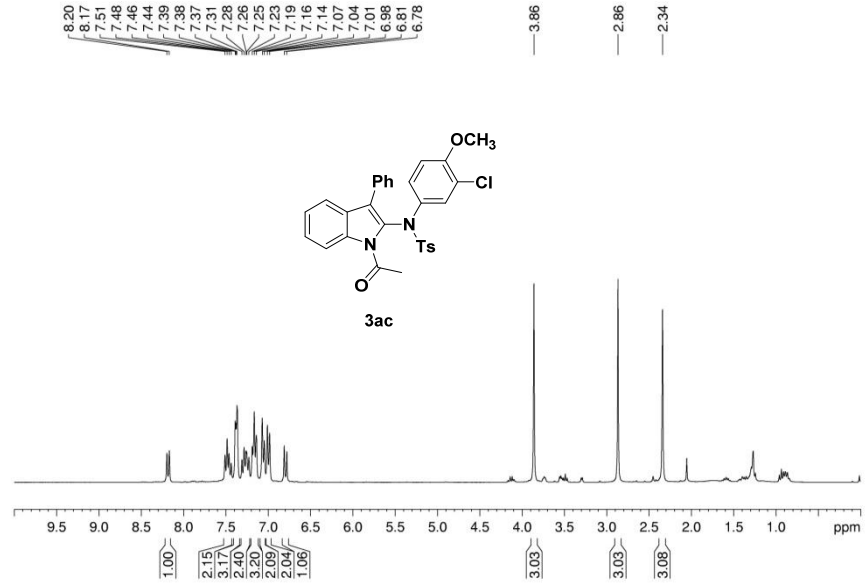
134.96
131.50
129.74
129.22
128.86
128.35
127.81
127.62
127.59
126.37
123.90
123.52
122.40
120.50
119.81
116.30
110.25
77.59
77.17
76.75
55.51
26.93
21.55
16.64
OCH3
Ph
N
Ts
N
O
3ab
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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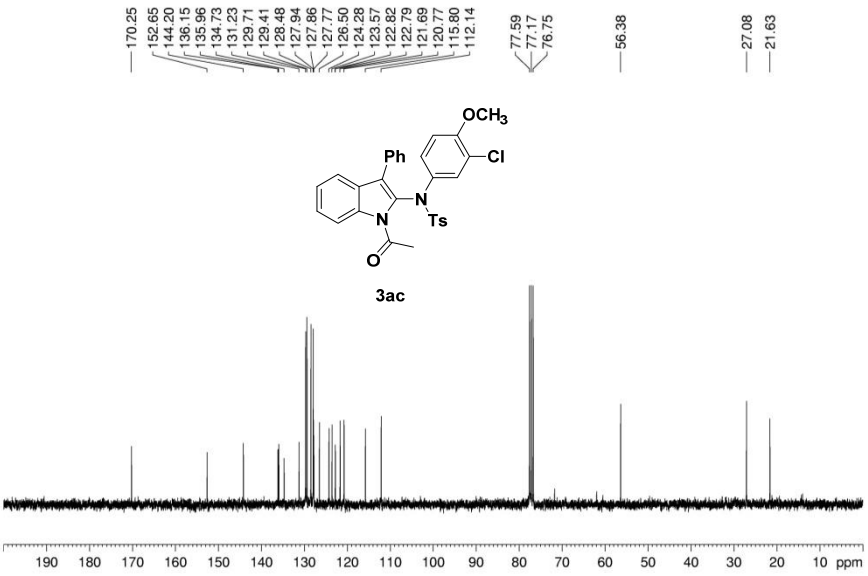
8.17
7.51
7.48
7.46
7.44
7.39
7.38
7.37
7.31
7.28
7.26
7.25
7.23
7.19
7.16
7.14
7.07
7.04
7.01
6.98
6.81
6.78
3.86
2.86
2.34
OCH3
Cl
Ph
N
Ts
N
O
3ac
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
2.15
3.17
2.40
3.20
2.09
2.04
1.06
3.03
3.03
3.08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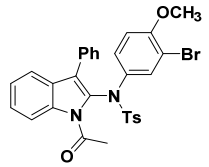
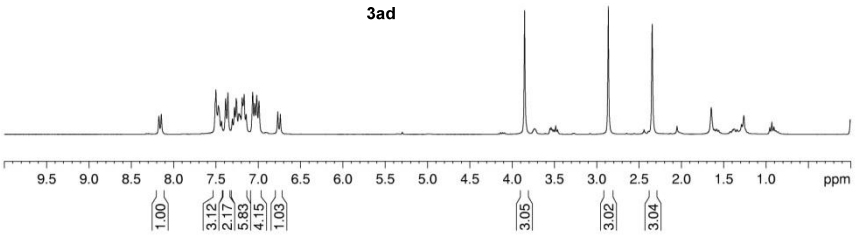
152.65
144.20
136.15
135.96
134.73
131.23
129.71
129.41
128.48
127.94
127.86
127.77
126.50
124.28
123.57
122.82
122.79
121.69
120.77
115.80
112.14
77.59
77.17
76.75
56.38
27.08
21.63
OCH3
Cl
Ph
N
Ts
N
O
3ac
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


8.17
8.14
7.50
7.47
7.46
7.43
7.38
7.36
7.30
7.28
7.26
7.23
7.22
7.21
7.19
7.18
7.17
7.14
7.06
7.04
7.02
6.99
6.77
6.74
3.85
2.86
2.34


OCH3
Ph
Br
N
Ts
N
O

3ad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9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
ppm
1.00
3.12
2.17
5.83
4.15
1.03
3.05
3.02
3.04


170.30
153.65
144.22
136.18
134.71
131.26
129.78
129.42
128.59
128.50
128.03
127.91
127.83
127.52
126.50
123.57
122.89
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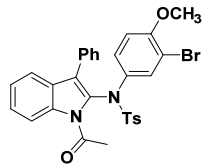
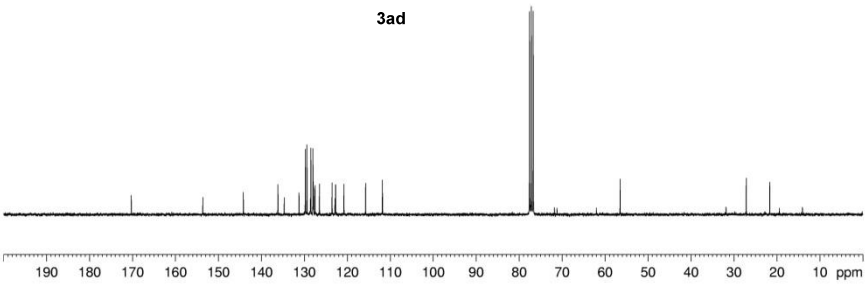
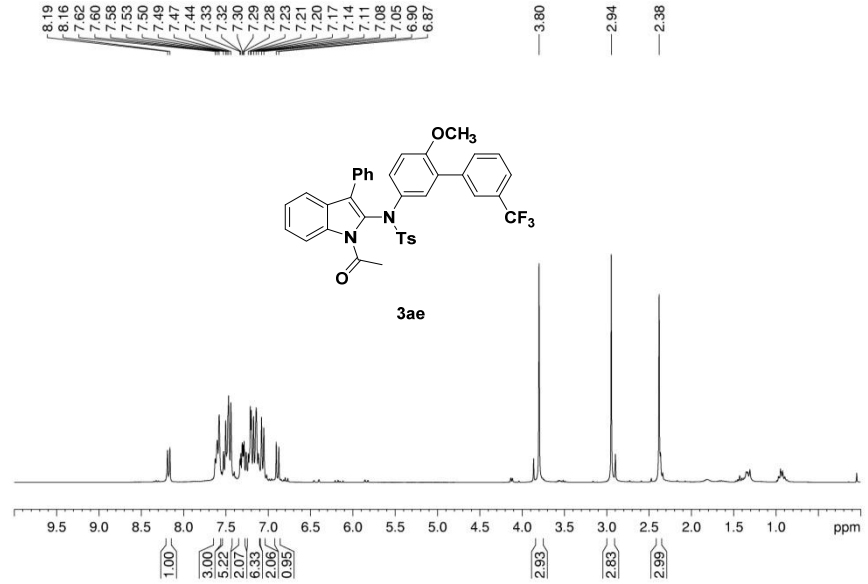
120.81
115.76
111.85
111.80
77.59
77.17
76.75
56.52
27.15
21.68


OCH3
Ph
Br
N
Ts
N
O

3ad


190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10 ppm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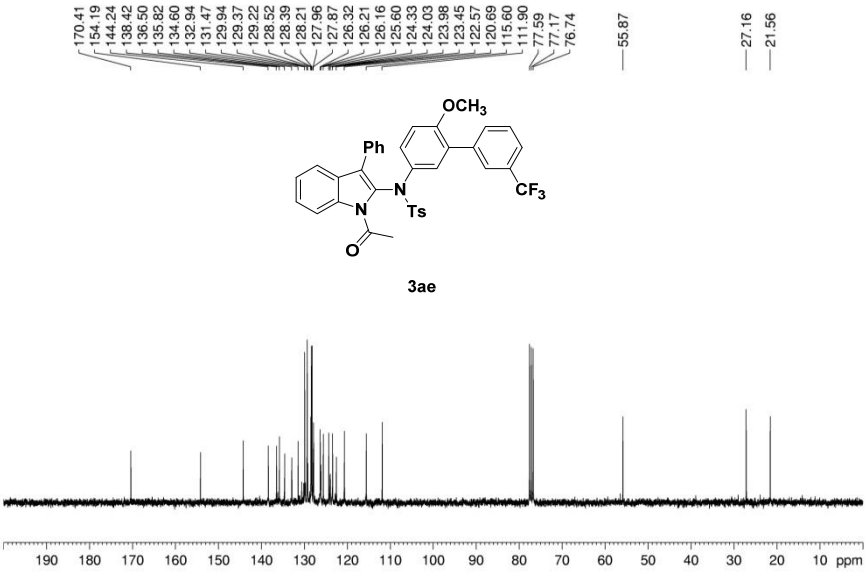
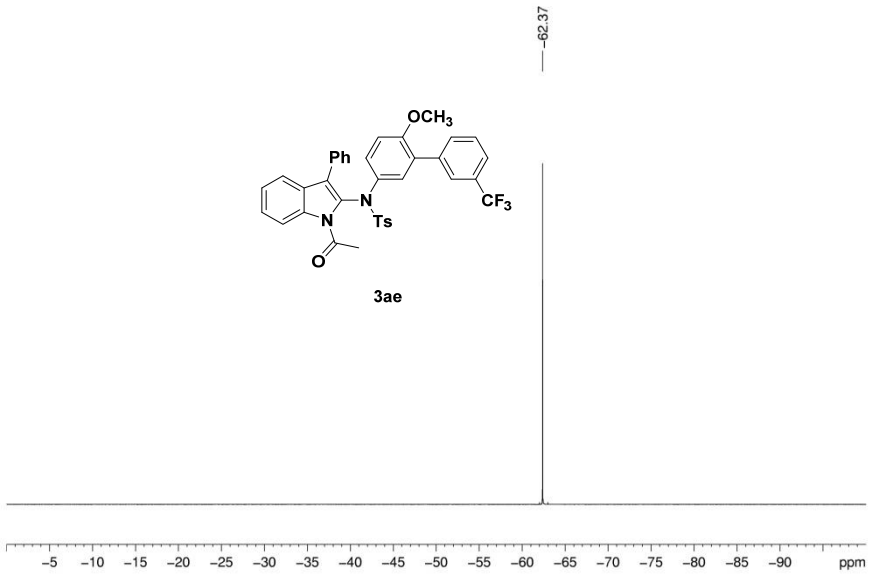
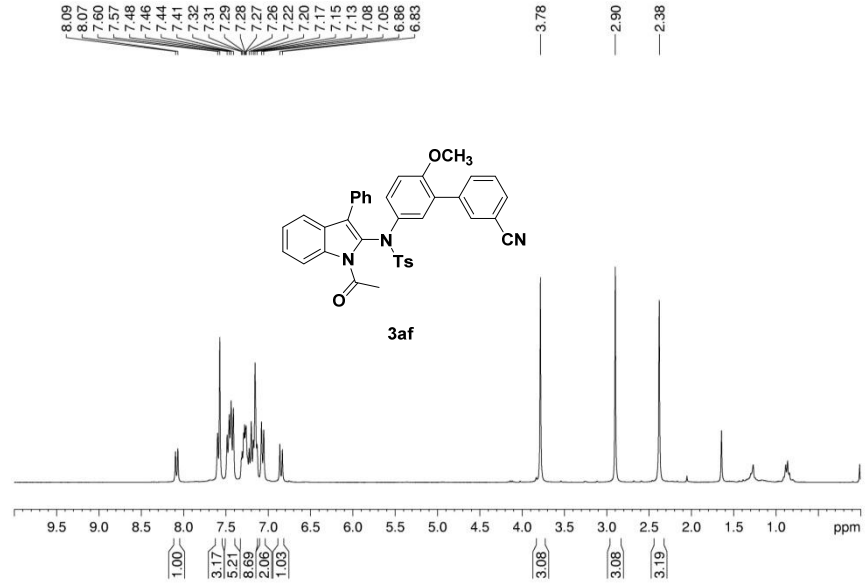
8.16
7.62
7.60
7.58
7.53
7.50
7.49
7.47
7.44
7.33
7.32
7.30
7.29
7.28
7.23
7.21
7.20
7.17
7.14
7.11
7.08
7.05
6.90
6.87
3.80
2.94
2.38
OCH3
Ph
CF3
N
Ts
O
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
3.00
5.22
2.07
6.33
2.06
0.95
2.93
2.83
2.99

3ae


170.41
154.19
144.24
138.42
136.50
135.82
134.60
132.94
131.47
129.94
129.37
129.22
128.52
128.39
128.21
127.96
127.87
126.32
126.21
126.16
125.60
124.33
124.03
123.98
123.45
122.57
120.69
115.60
111.90
77.59
77.17
76.74
55.87
27.16
21.56
OCH3
Ph
CF3
N
Ts
O
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

3ae


−62.37
OCH3
Ph
N
Ts
N
O
CF3
3ae
−5 −10 −15 −20 −25 −30 −35 −40 −45 −50 −55 −60 −65 −70 −75 −80 −85 −90 ppm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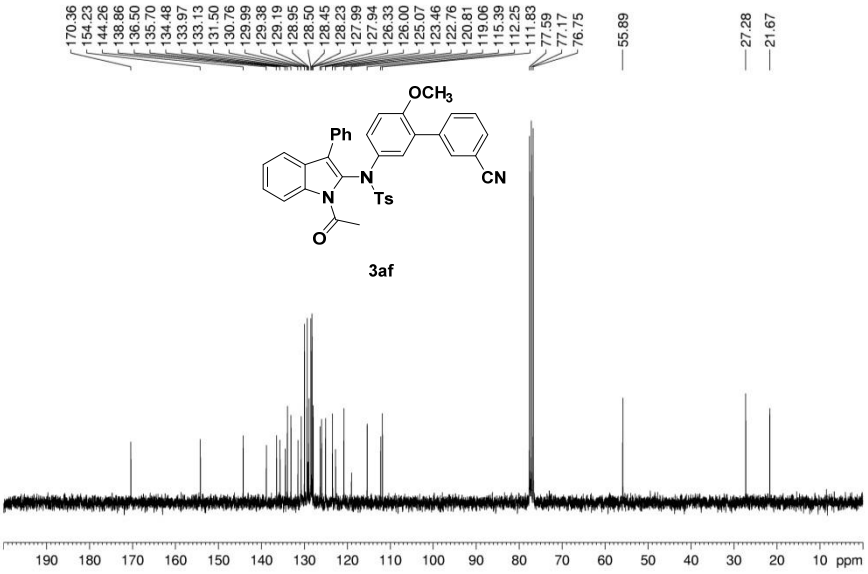
8.07
7.60
7.57
7.48
7.46
7.44
7.41
7.32
7.31
7.29
7.28
7.27
7.26
7.22
7.20
7.17
7.15
7.13
7.08
7.05
6.86
6.83
3.78
2.90
2.38
OCH3
Ph
N
Ts
CN
O
3af
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
3.17
5.21
8.69
2.06
1.03
3.08
3.08
3.19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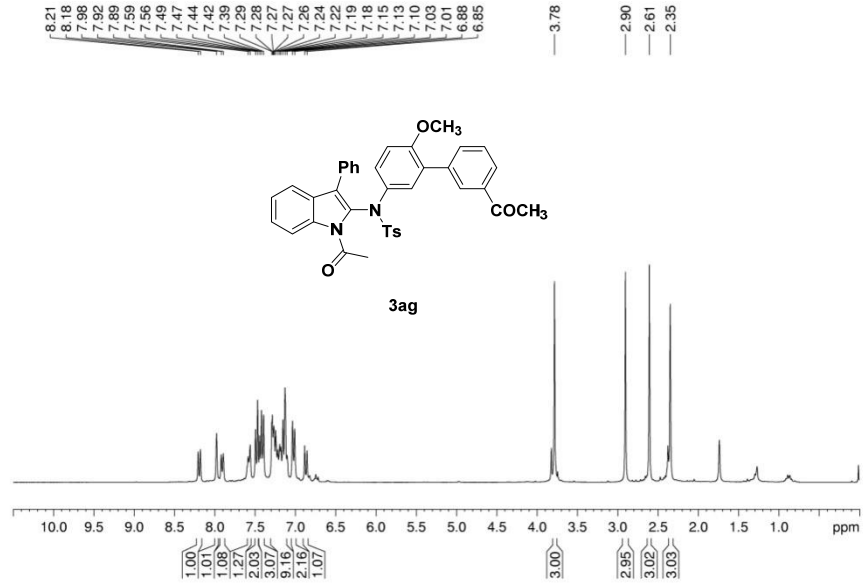
154.23
144.26
138.86
136.50
135.70
134.48
133.97
133.13
131.50
130.76
129.99
129.38
129.19
128.95
128.50
128.45
128.23
127.99
127.94
126.33
126.00
125.07
123.46
122.76
120.81
119.06
115.39
112.25
111.83
77.59
77.17
76.75
55.89
27.28
21.67
OCH3
Ph
N
Ts
CN
O
3af
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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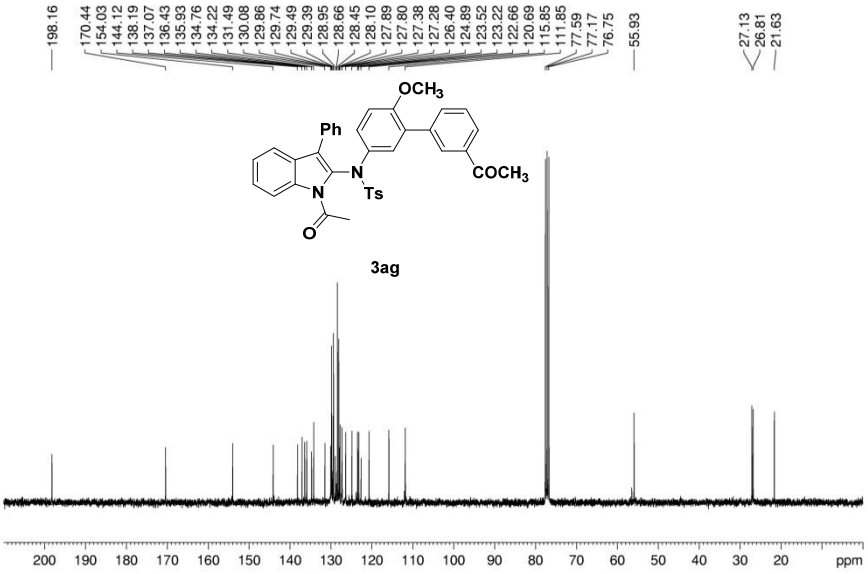
7.92
7.89
7.59
7.56
7.49
7.47
7.44
7.42
7.39
7.29
7.28
7.27
7.27
7.26
7.24
7.22
7.19
7.18
7.15
7.13
7.10
7.03
7.01
6.88
6.85
3.78
2.90
2.61
2.35
OCH3
Ph
N
Ts
N
O
COCH3
3ag
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
1.01
1.08
1.27
2.03
3.07
9.16
2.16
1.07
3.00
2.95
3.02
3.03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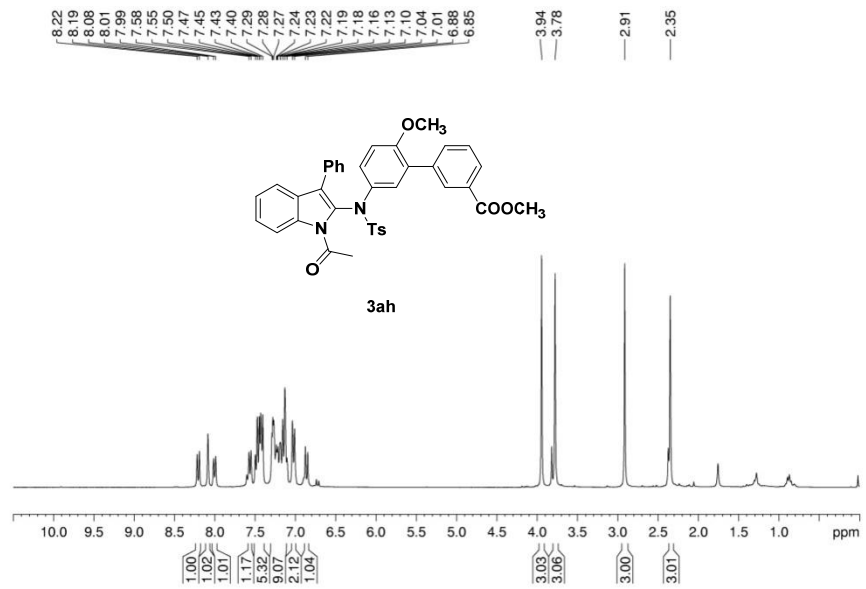
144.12
138.19
137.07
136.43
135.93
134.76
134.22
131.49
130.08
129.86
129.74
129.49
129.39
128.95
128.66
128.45
128.10
127.89
127.80
127.38
127.28
126.40
124.89
123.52
123.22
122.66
120.69
115.85
111.85
77.59
77.17
76.75
55.93
27.13
26.81
21.63
OCH3
Ph
N
Ts
N
O
COCH3
3ag
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 ppm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8.19
8.08
8.01
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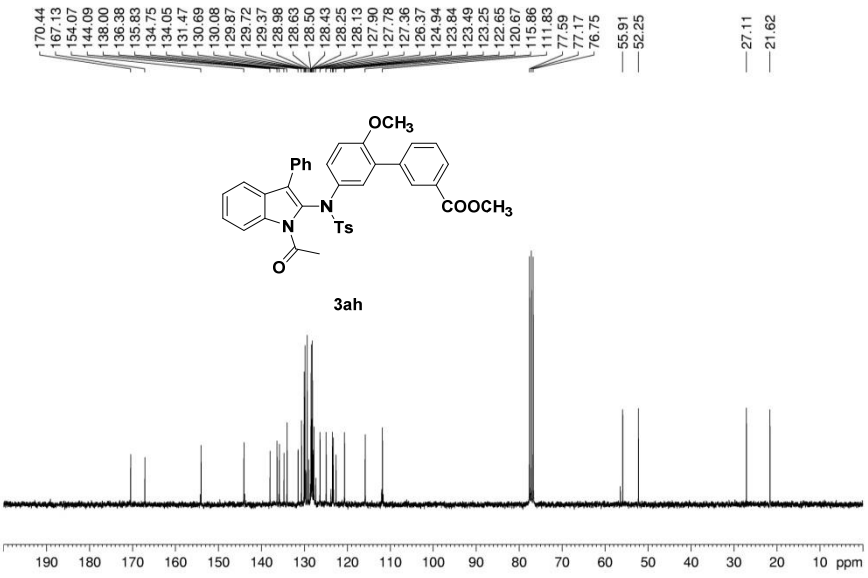
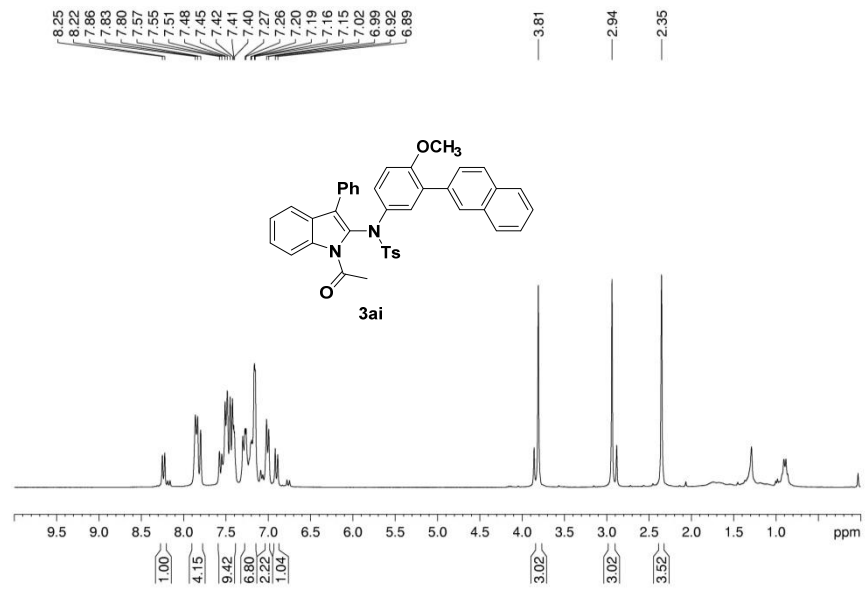
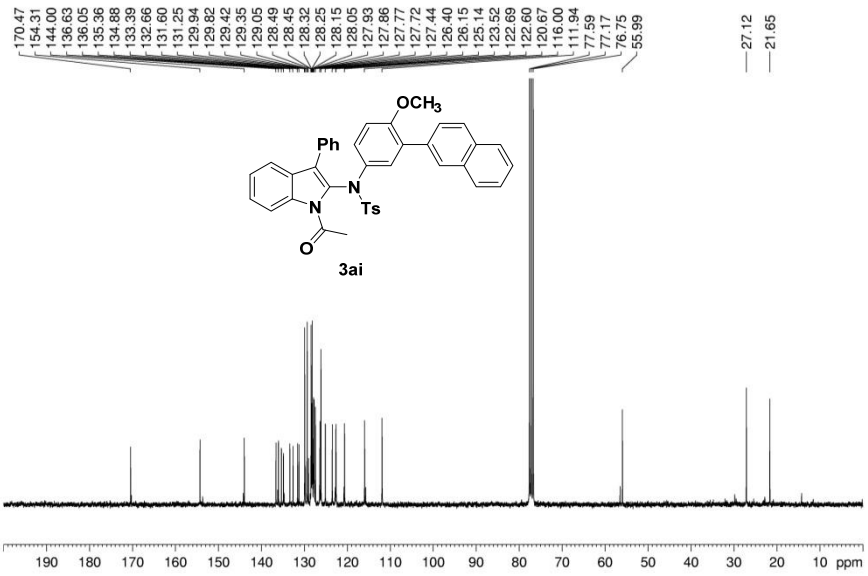
7.58
7.55
7.50
7.47
7.45
7.43
7.40
7.29
7.28
7.27
7.24
7.23
7.22
7.19
7.18
7.16
7.13
7.10
7.04
7.01
6.88
6.85
3.94
3.78
2.91
2.35
OCH3
Ph
N
Ts
N
O
COOCH3
3ah
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
1.02
1.01
1.17
5.32
9.07
2.12
1.04
3.03
3.06
3.00
3.01


170.44
167.13
154.07
144.09
138.00
136.38
135.83
134.75
134.05
131.47
130.69
130.08
129.87
129.72
129.37
128.98
128.63
128.50
128.43
128.25
128.13
127.90
127.78
127.36
126.37
124.94
123.84
123.49
123.25
122.65
120.67
115.86
111.83
77.59
77.17
76.75
55.91
52.25
27.11
21.62
OCH3
Ph
N
Ts
N
O
COOCH3
3ah
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


8.25
8.22
7.86
7.83
7.80
7.57
7.55
7.51
7.48
7.45
7.42
7.41
7.40
7.27
7.26
7.20
7.19
7.16
7.15
7.02
6.99
6.92
6.89
3.81
2.94
2.35
OCH3
Ph
N
Ts
N
O
3ai
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
4.15
9.42
6.80
2.22
1.04
3.02
3.02
3.52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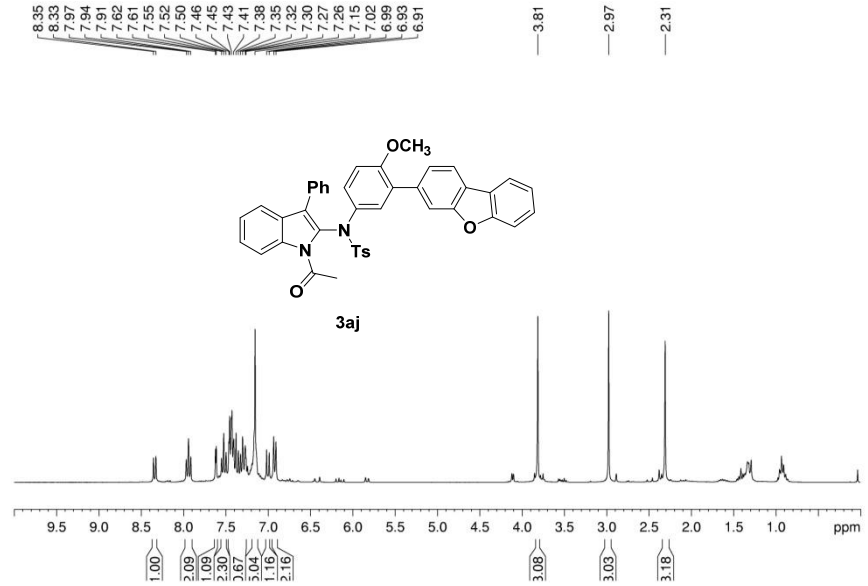
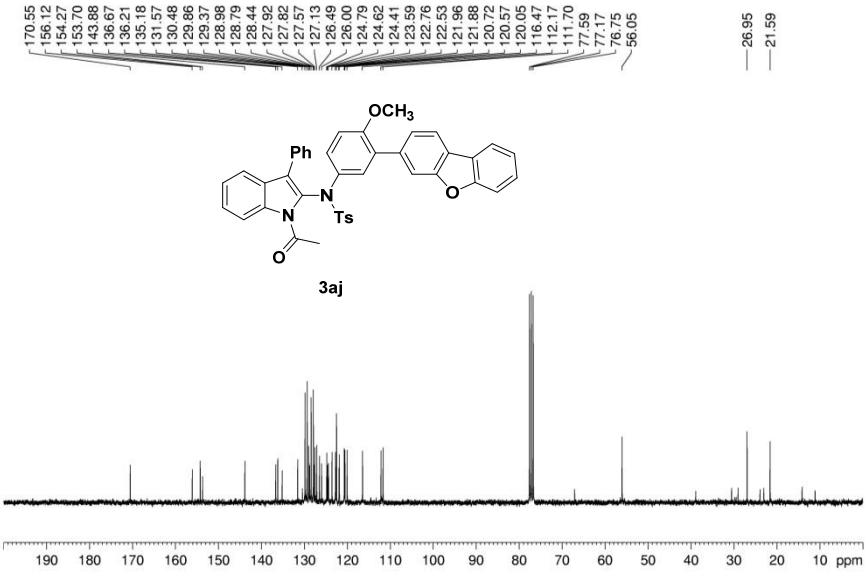
154.31
144.00
136.63
136.05
135.36
134.88
133.39
132.66
131.60
131.25
129.94
129.82
129.42
129.35
129.05
128.49
128.45
128.32
128.25
128.15
128.05
127.93
127.86
127.77
127.72
127.44
126.40
126.15
125.14
123.52
122.69
122.60
120.67
116.00
111.94
77.59
77.17
76.75
55.99
27.12
21.65
OCH3
Ph
N
Ts
N
O
3ai
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


8.35
8.33
7.97
7.94
7.91
7.82
7.61
7.55
7.52
7.50
7.46
7.45
7.43
7.41
7.38
7.35
7.32
7.30
7.27
7.26
7.15
7.02
6.99
6.93
6.91
3.81
2.97
2.31
OCH3
Ph
N
Ts
N
O
O
3aj
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
2.09
1.09
2.30
0.67
5.04
1.16
2.16
3.08
3.03
3.18


170.55
156.12
154.27
153.70
143.88
136.67
136.21
135.18
131.57
130.48
129.86
129.37
128.98
128.79
128.44
127.92
127.82
127.57
127.13
126.49
126.00
124.79
124.62
124.41
123.59
122.76
122.53
121.96
121.88
120.72
120.57
120.05
116.47
112.17
111.70
77.59
77.17
76.75
56.05
26.95
21.59
OCH3
Ph
N
Ts
N
O
O
3aj
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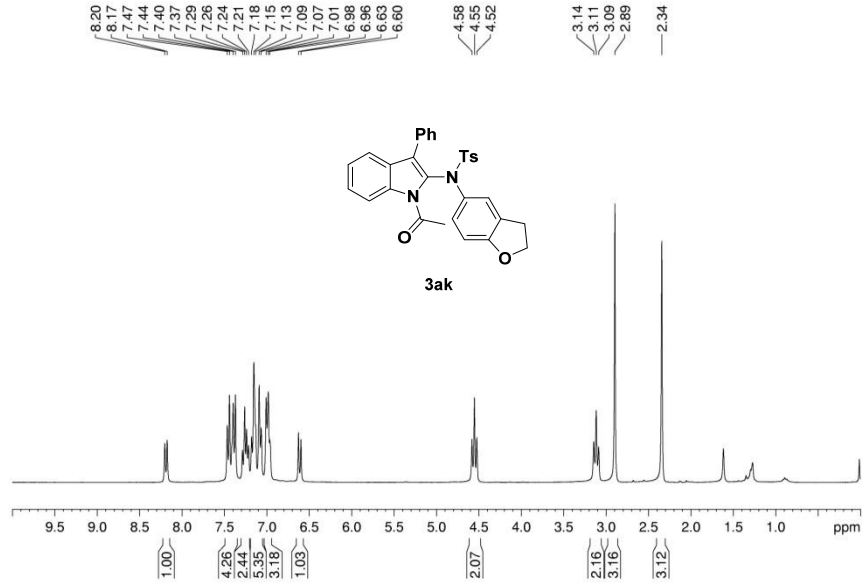
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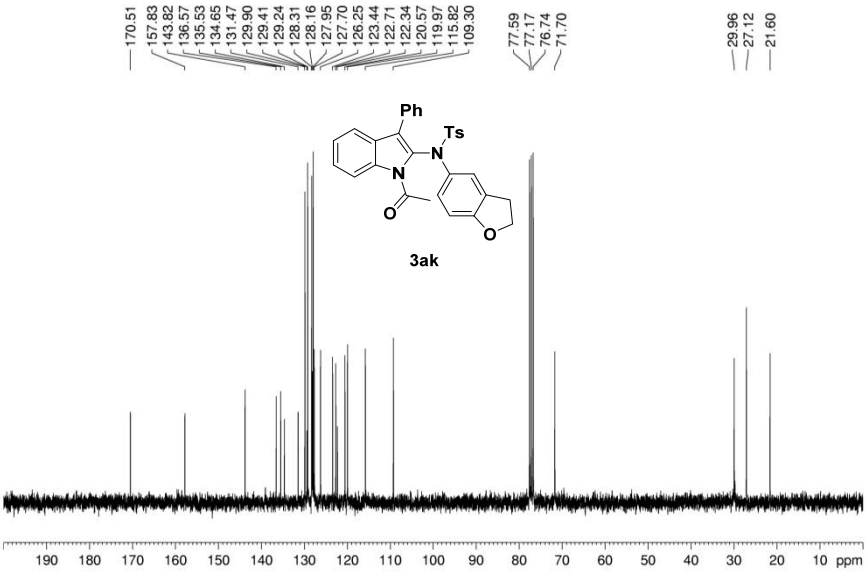
7.37
7.29
7.26
7.24
7.21
7.18
7.15
7.13
7.09
7.07
7.01
6.98
6.96
6.63
6.60
4.58
4.55
4.52
3.14
3.11
3.09
2.89
2.34
Ph
Ts
N
N
O
O
3ak
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
4.26
2.44
5.35
3.18
1.03
2.07
2.16
3.16
3.12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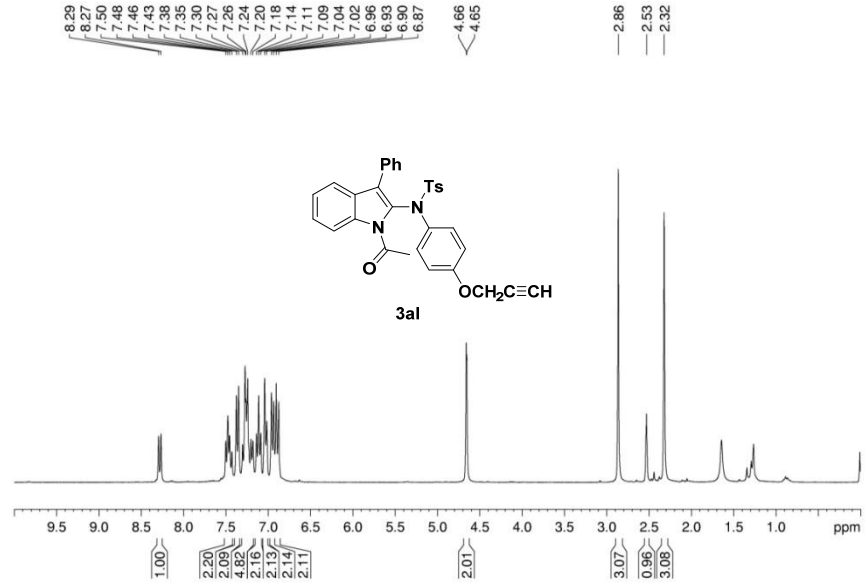
129.41
129.24
128.31
128.16
127.95
127.70
126.25
123.44
122.71
122.34
120.57
119.97
115.82
109.30
77.59
77.17
76.74
71.70
29.96
27.12
21.60
Ph
Ts
N
N
O
O
3ak
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


8.29
8.27
7.50
7.48
7.46
7.43
7.38
7.35
7.30
7.27
7.26
7.24
7.20
7.18
7.14
7.11
7.09
7.04
7.02
6.96
6.93
6.90
6.87
4.66
4.65
2.86
2.53
2.32
Ph
Ts
N
N
O
OCH2C≡CH
3al
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
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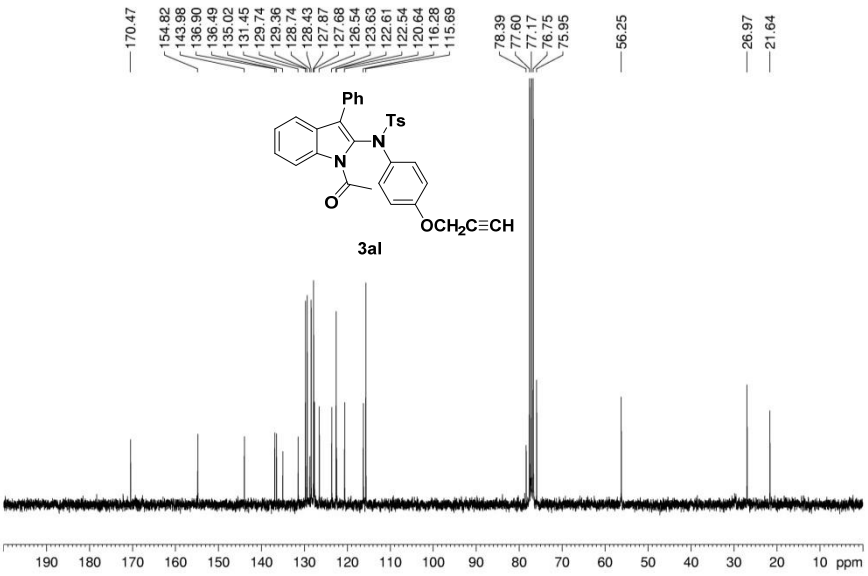
2.09
4.82
2.16
2.13
2.14
2.11
2.01
3.07
0.96
3.08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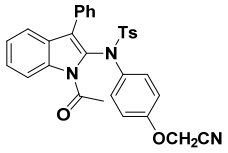
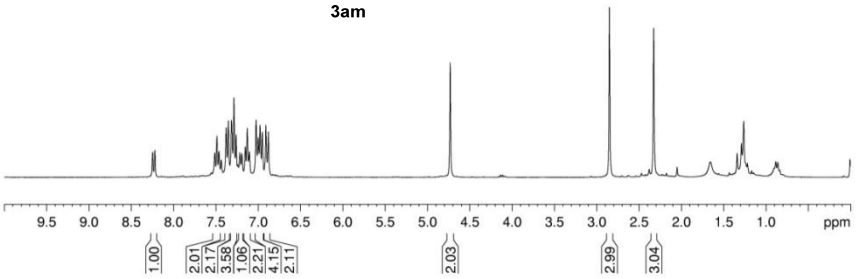
154.82
143.98
136.90
136.49
135.02
131.45
129.74
129.36
128.74
128.43
127.87
127.68
126.54
123.63
122.61
122.54
120.64
116.28
115.69
78.39
77.60
77.17
76.75
75.95
56.25
26.97
21.64
Ph
Ts
N
N
O
OCH2C≡CH
3al
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


8.25
8.22
7.51
7.49
7.46
7.44
7.38
7.35
7.31
7.29
7.26
7.22
7.19
7.15
7.13
7.10
7.02
7.00
6.98
6.95
6.91
6.88
4.73
2.85
2.32


Ph
Ts
N
N
O
OCH2CN

3am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8.5
8.0
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7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
ppm
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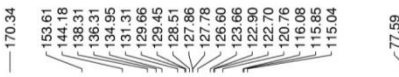
2.01
2.17
3.58
1.06
2.21
4.15
2.11
2.03
2.99
3.04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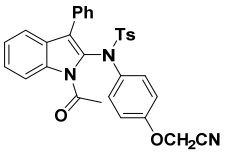
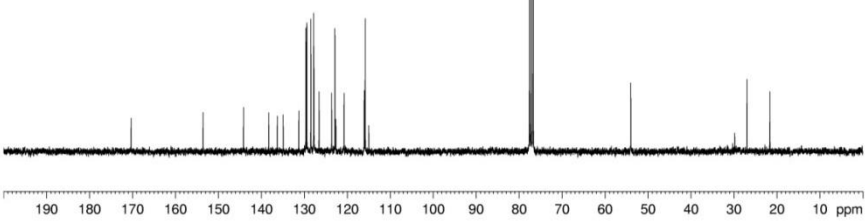
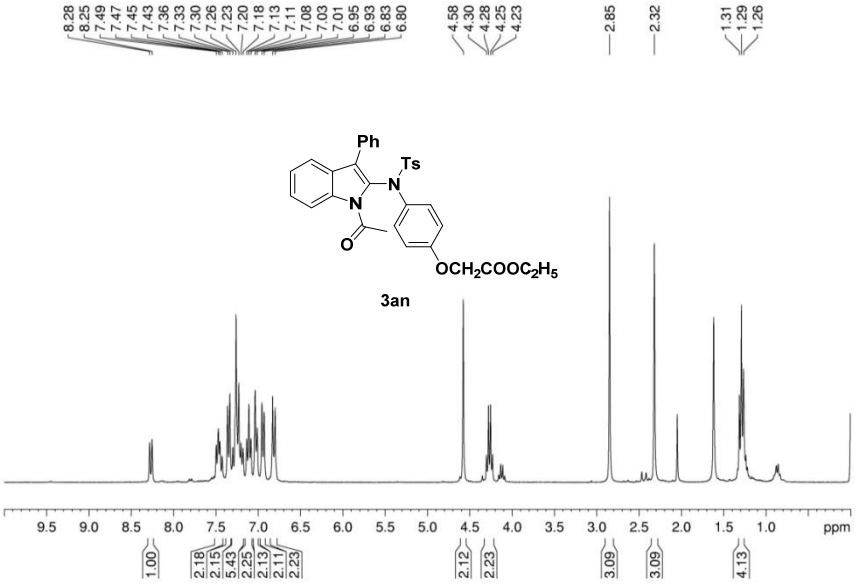
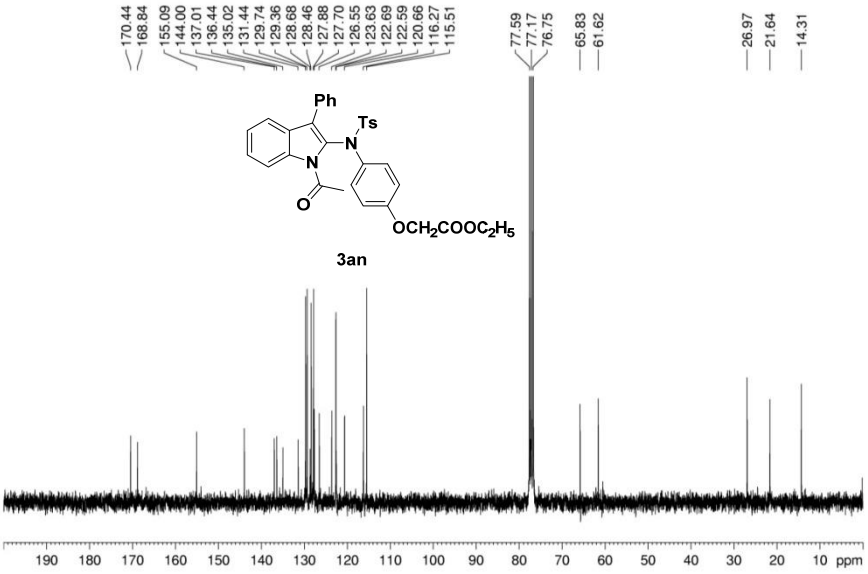
153.61
144.18
138.31
136.31
134.95
131.31
129.66
129.45
128.51
127.86
127.78
126.60
123.66
122.90
122.70
120.76
116.08
115.85
115.04
77.59
77.17
76.75
54.00
26.98
21.64


Ph
Ts
N
N
O
OCH2CN

3am


190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10 ppm


8.28
8.25
7.49
7.47
7.45
7.43
7.36
7.33
7.30
7.26
7.23
7.20
7.18
7.13
7.11
7.08
7.03
7.01
6.95
6.93
6.83
6.80
4.58
4.30
4.28
4.25
4.23
2.85
2.32
1.31
1.29
1.26
Ph
Ts
N
N
O
OCH2COOC2H5
3an
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
2.18
2.15
5.43
2.25
2.13
2.11
2.23
2.12
2.23
3.09
3.09
4.13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168.84
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135.02
131.44
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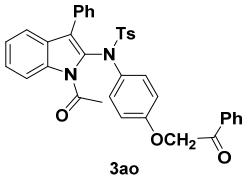
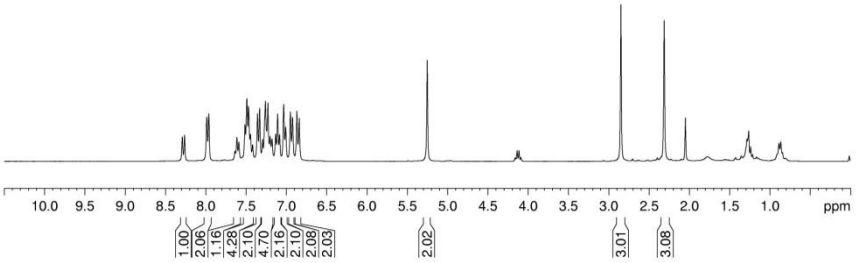
128.46
127.88
127.70
126.55
123.63
122.69
122.59
120.66
116.27
115.51
77.59
77.17
76.75
65.83
61.62
26.97
21.64
14.31
Ph
Ts
N
N
O
OCH2COOC2H5
3an
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


8.29
8.26
7.99
7.96
7.64
7.61
7.59
7.51
7.49
7.47
7.45
7.42
7.36
7.33
7.29
7.26
7.23
7.20
7.18
7.13
7.11
7.08
7.03
7.01
6.95
6.92
6.87
6.84
5.25
2.85
2.31


Ph
Ts
N
N
O
OCH2
Ph
O

3ao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1.00
2.06
1.16
4.28
2.10
4.70
2.16
2.10
2.08
2.03
2.02
3.01
3.08


194.29
170.40
155.25
143.97
136.87
136.37
134.96
134.46
134.11
131.34
129.67
129.33
128.98
128.63
128.42
128.14
127.79
127.65
126.48
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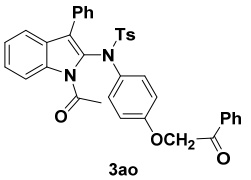
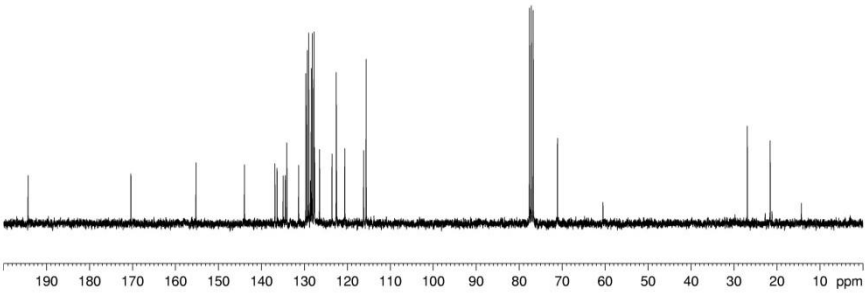
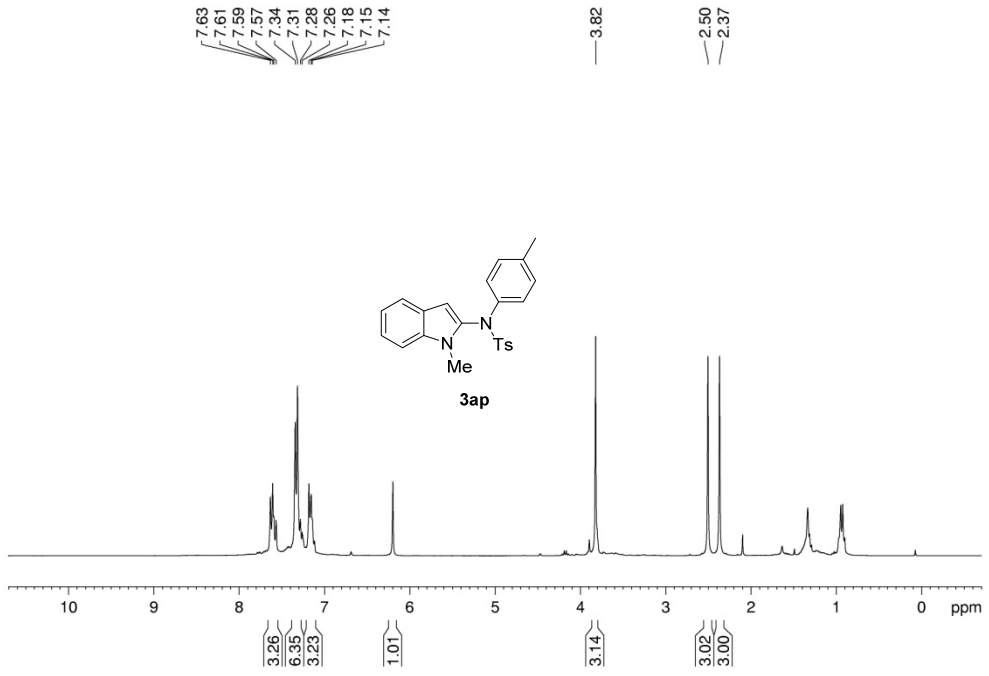
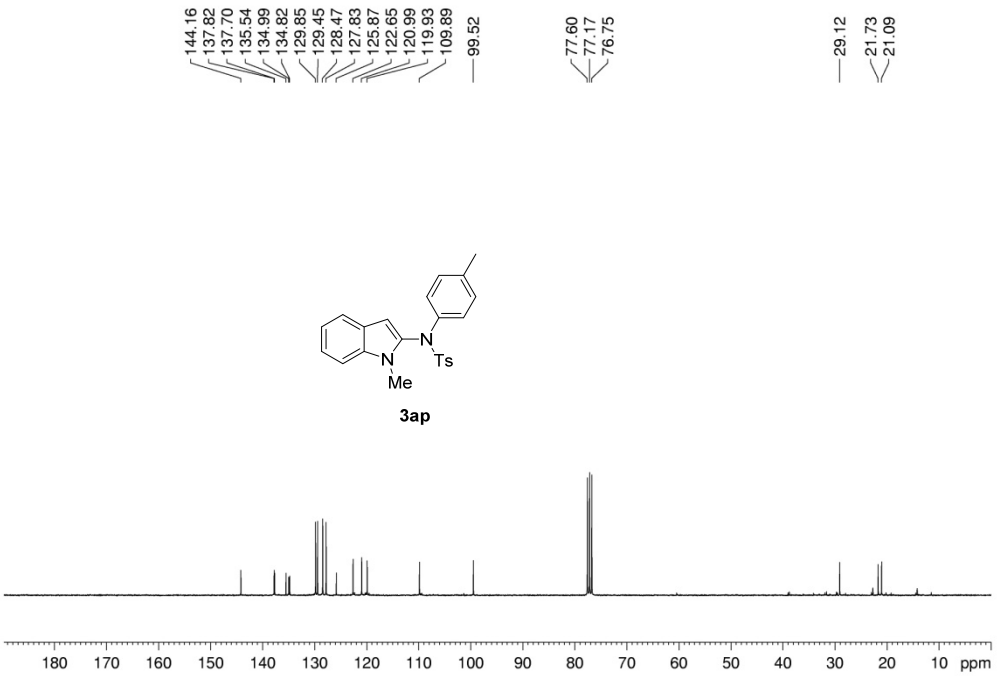
77.59
77.17
76.75
71.08
26.90
21.58


Ph
Ts
N
N
O
OCH2
Ph
O

3ao


190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


7.63
7.61
7.59
7.57
7.34
7.31
7.28
7.26
7.18
7.15
7.14
3.82
2.50
2.37
N
Ts
N
Me
3ap
10
9
8
7
6
5
4
3
2
1
0
ppm
3.26
6.35
3.23
1.01
3.14
3.02
3.00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137.70
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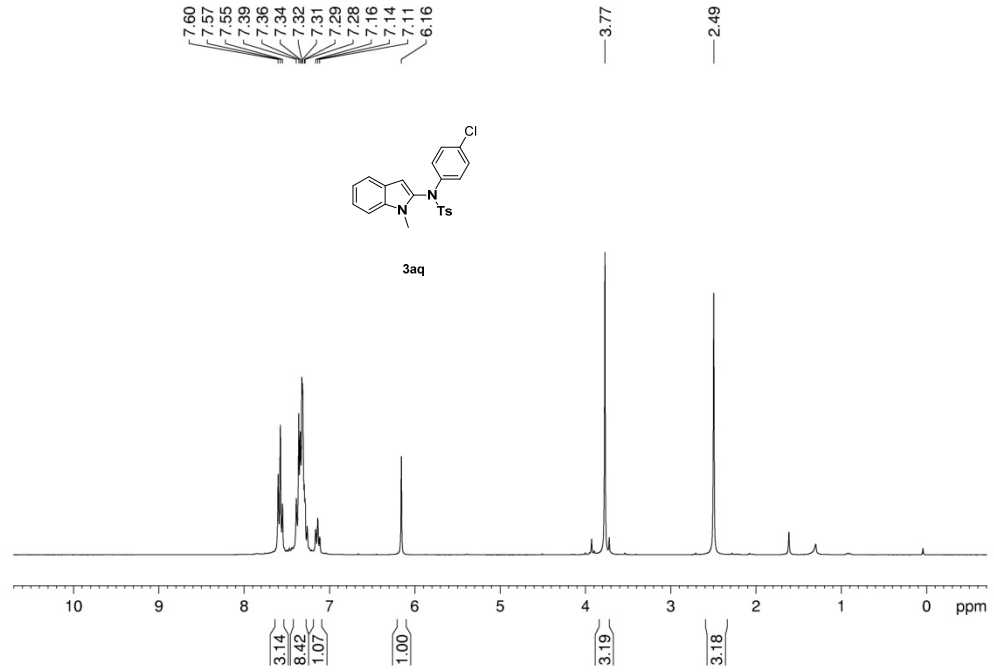
134.82
129.85
129.45
128.47
127.83
125.87
122.65
120.99
119.93
109.89
99.52
77.60
77.17
76.75
29.12
21.73
21.09
N
Ts
N
Me
3ap
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm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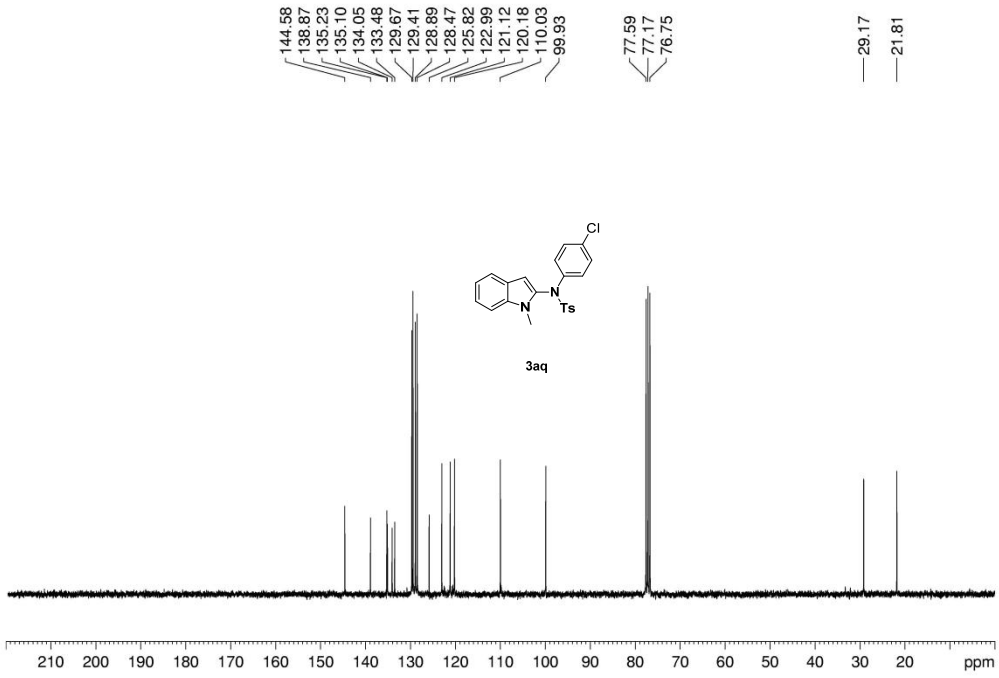
7.57
7.55
7.39
7.36
7.34
7.32
7.31
7.29
7.28
7.16
7.14
7.11
6.16
3.77
2.49
Cl
N
Ts
3aq
10
9
8
7
6
5
4
3
2
1
0
ppm
3.14
8.42
1.07
1.00
3.19
3.18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135.10
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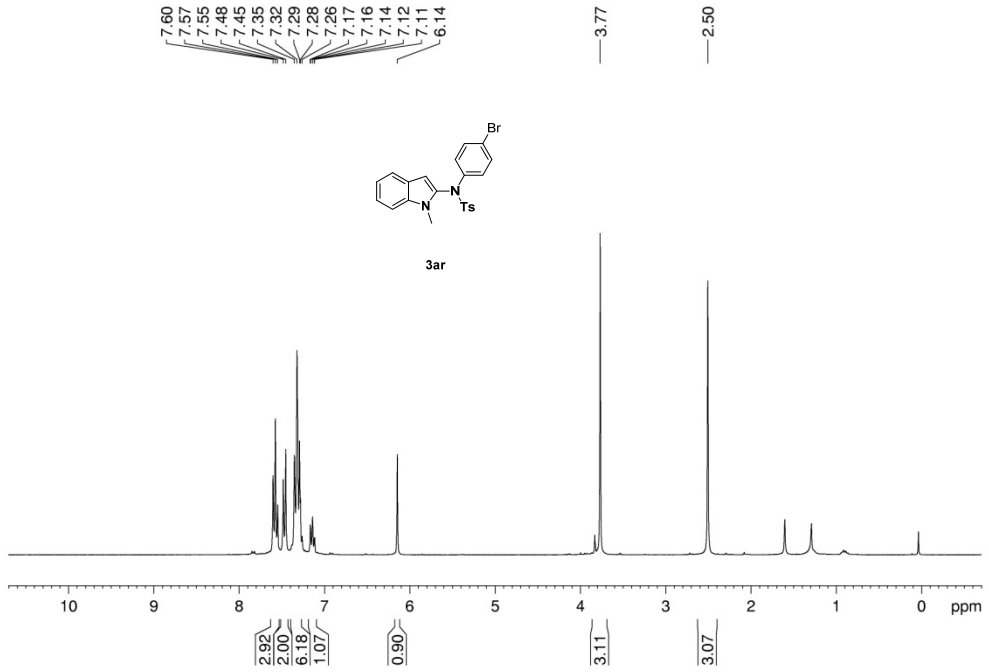
129.67
129.41
128.89
128.47
125.82
122.99
121.12
120.18
110.03
99.93
77.59
77.17
76.75
29.17
21.81
Cl
N
Ts
3aq
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
ppm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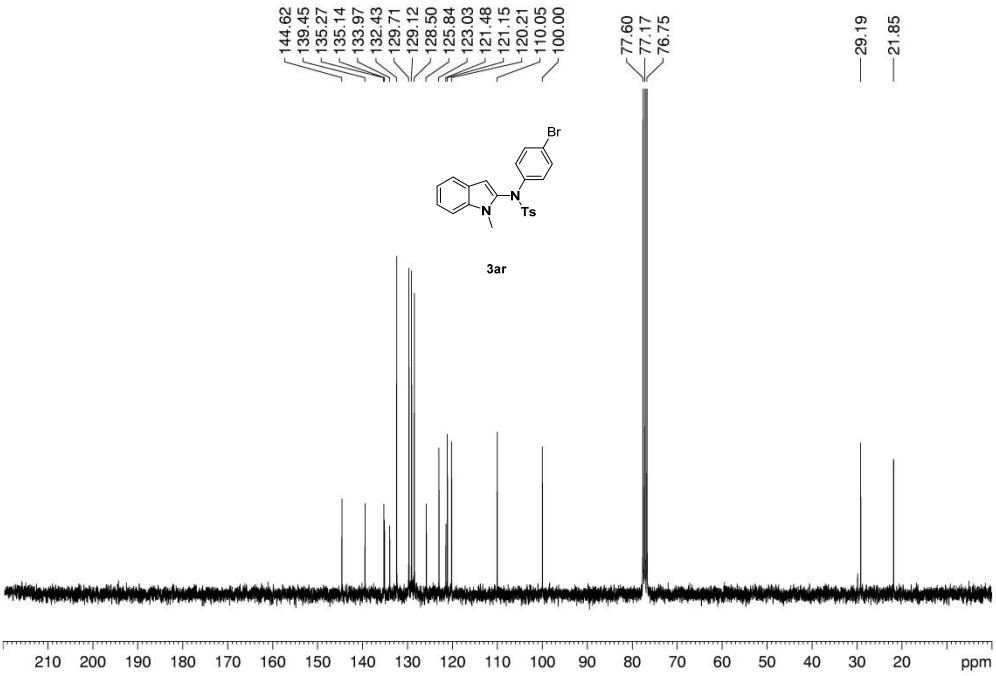
7.57
7.55
7.48
7.45
7.35
7.32
7.29
7.28
7.26
7.17
7.16
7.14
7.12
7.11
6.14
3.77
2.50
Br
N
Ts
N
3ar
10
9
8
7
6
5
4
3
2
1
0
ppm
2.92
2.00
6.18
1.07
0.90
3.11
3.07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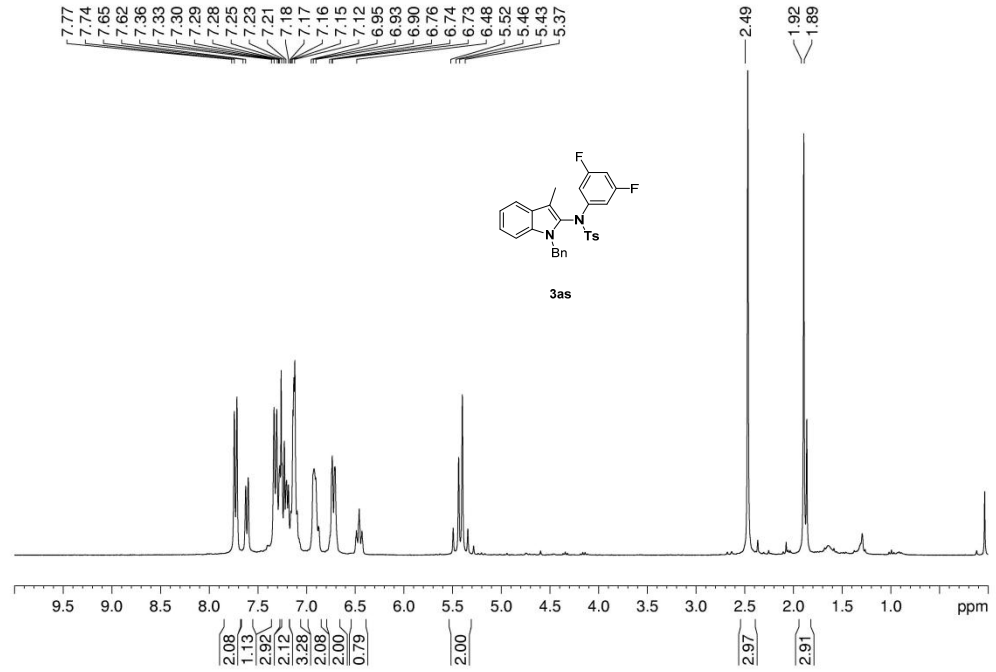
129.12
128.50
125.84
123.03
121.48
121.15
120.21
110.05
100.00
77.60
77.17
76.75
29.19
21.85
Br
N
Ts
N
3ar
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
ppm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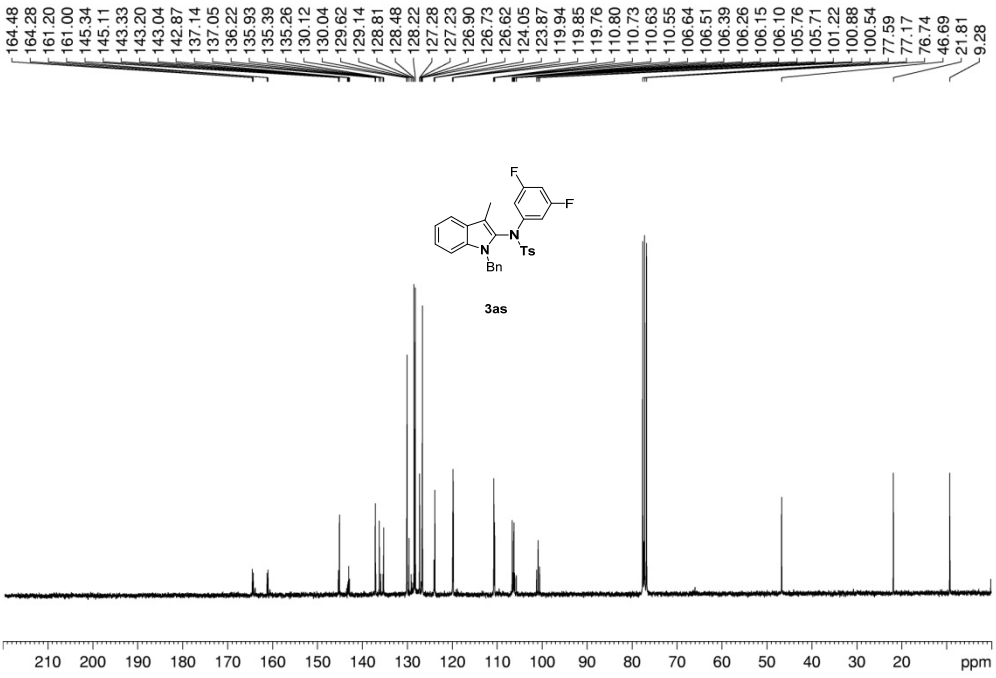
7.33
7.30
7.29
7.28
7.25
7.23
7.21
7.18
7.17
7.16
7.15
7.12
6.95
6.93
6.90
6.76
6.74
6.73
6.48
5.52
5.46
5.43
5.37
2.49
1.92
1.89
F
F
N
Ts
N
Bn
3as
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
2.08
1.13
2.92
2.12
3.28
2.08
2.00
0.79
2.00
2.97
2.91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145.11
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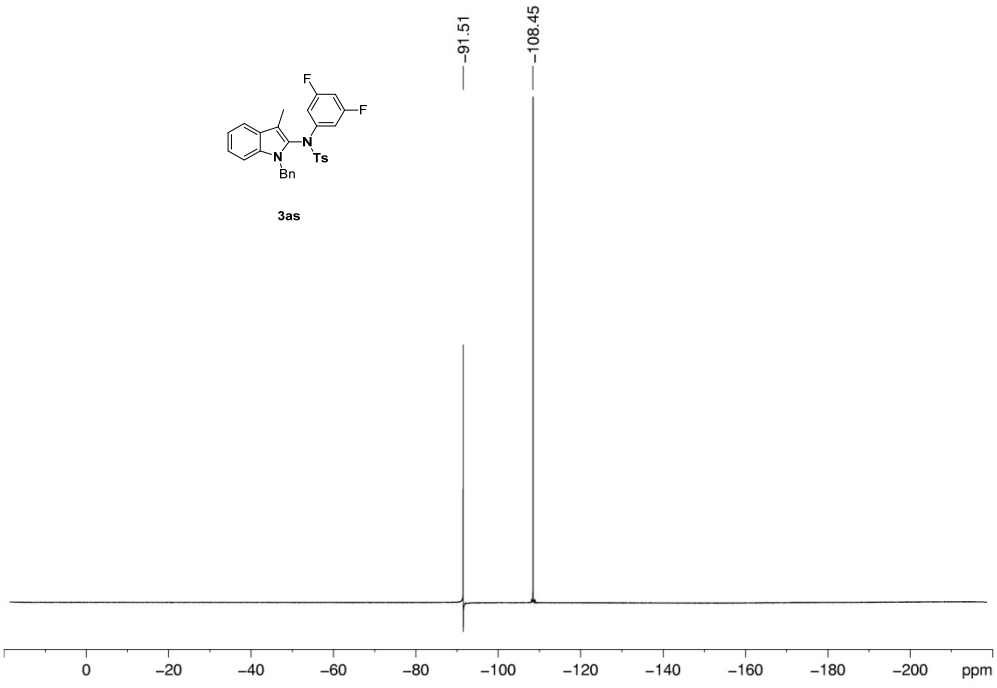
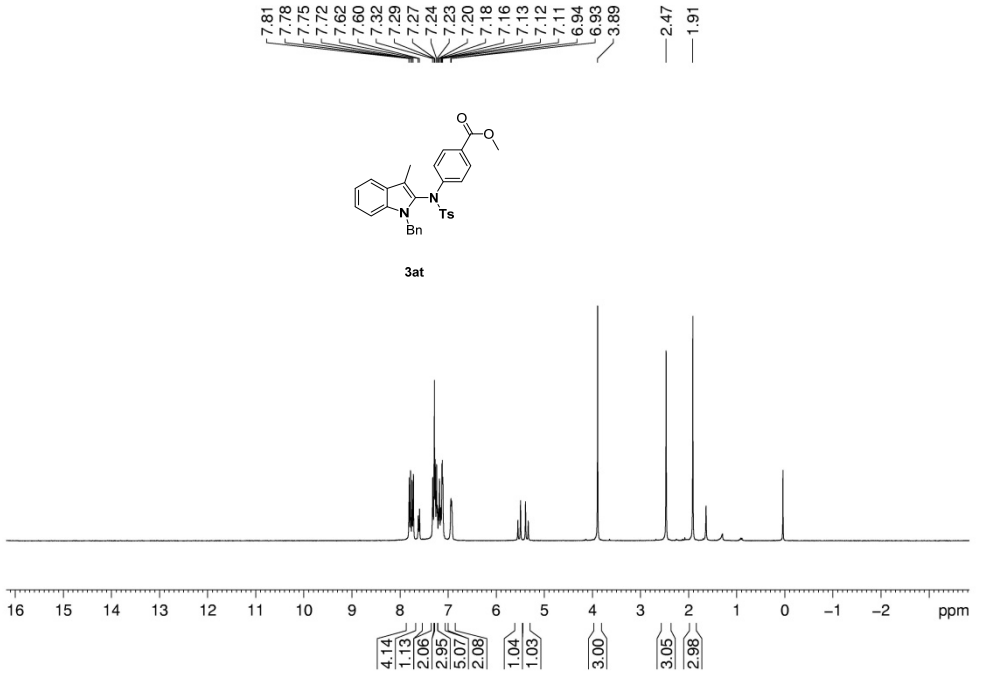
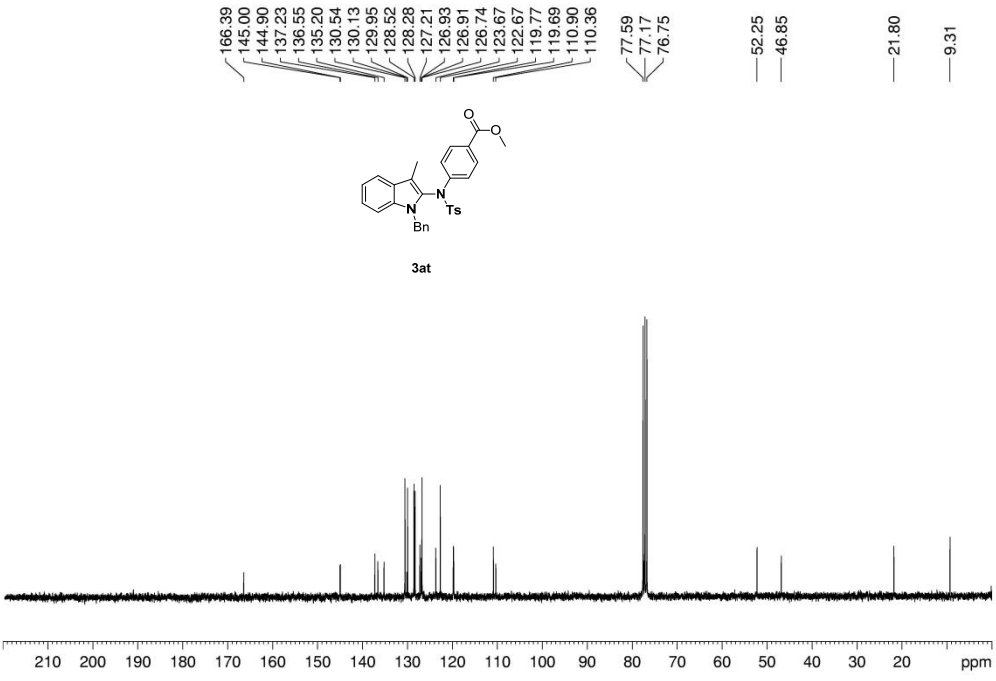
143.20
143.04
142.87
137.14
137.05
136.22
135.93
135.39
135.26
130.12
130.04
129.62
129.14
128.81
128.48
128.22
127.28
127.23
126.90
126.73
126.62
124.05
123.87
119.94
119.85
119.76
110.80
110.73
110.63
110.55
106.64
106.51
106.39
106.26
106.15
106.10
105.76
105.71
101.22
100.88
100.54
77.59
77.17
76.74
46.69
21.81
9.28
F
F
N
Ts
N
Bn
3as
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 ppm


−91.51
−108.45
F
F
N
Ts
N
Bn
3as
0
−20
−40
−60
−80
−100
−120
−140
−160
−180
−200
ppm


7.81
7.78
7.75
7.72
7.62
7.60
7.32
7.29
7.27
7.24
7.23
7.20
7.18
7.16
7.13
7.12
7.11
6.94
6.93
3.89
2.47
1.91
O
O
N
Ts
N
Bn
16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 −1 −2 ppm
4.14
1.13
2.06
2.95
5.07
2.08
1.04
1.03
3.00
3.05
2.98

3at


166.39
145.00
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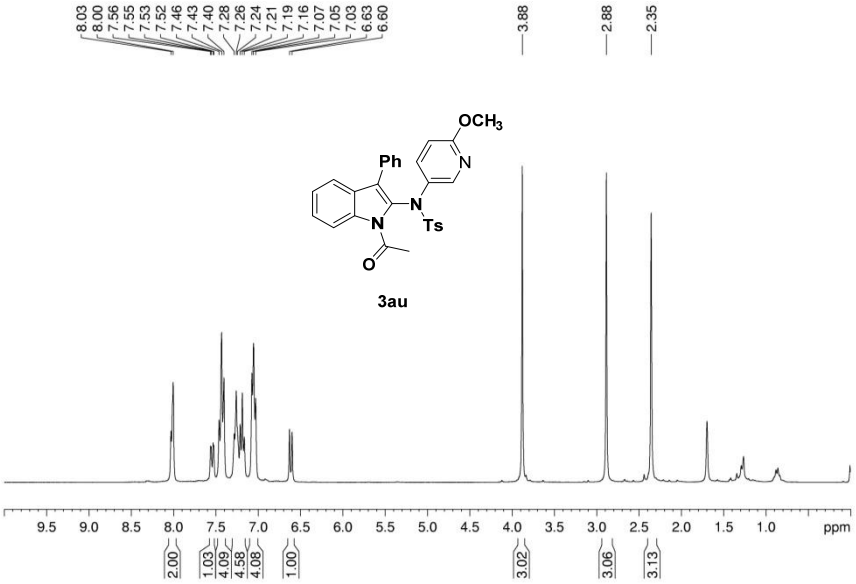
137.23
136.55
135.20
130.54
130.13
129.95
128.52
128.28
127.21
126.93
126.91
126.74
123.67
122.67
119.77
119.69
110.90
110.36
77.59
77.17
76.75
52.25
46.85
21.80
9.31
O
O
N
Ts
N
Bn
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 ppm

3at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8.00
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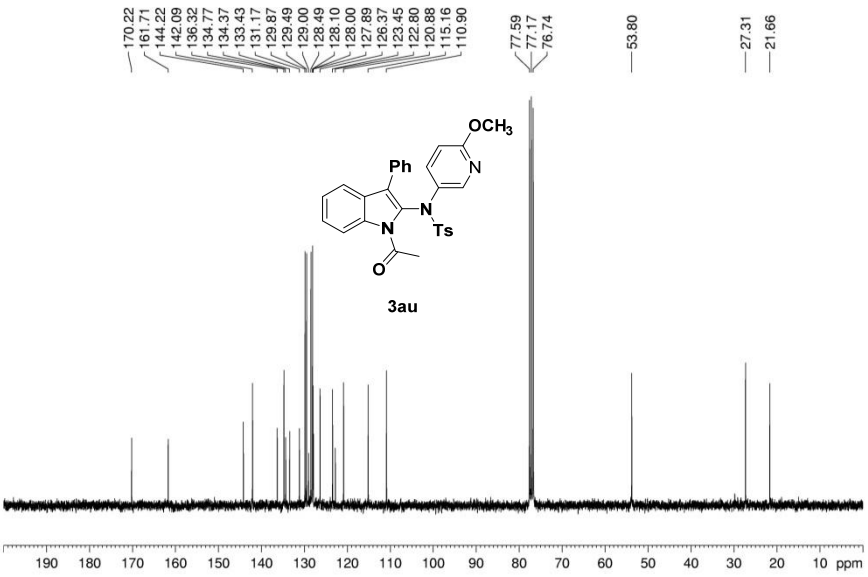
7.28
7.26
7.24
7.21
7.19
7.16
7.07
7.05
7.03
6.63
6.60
3.88
2.88
2.35
OCH3
Ph
N
N
Ts
N
O
3au
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
2.00
1.03
4.09
4.58
4.08
1.00
3.02
3.06
3.13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133.43
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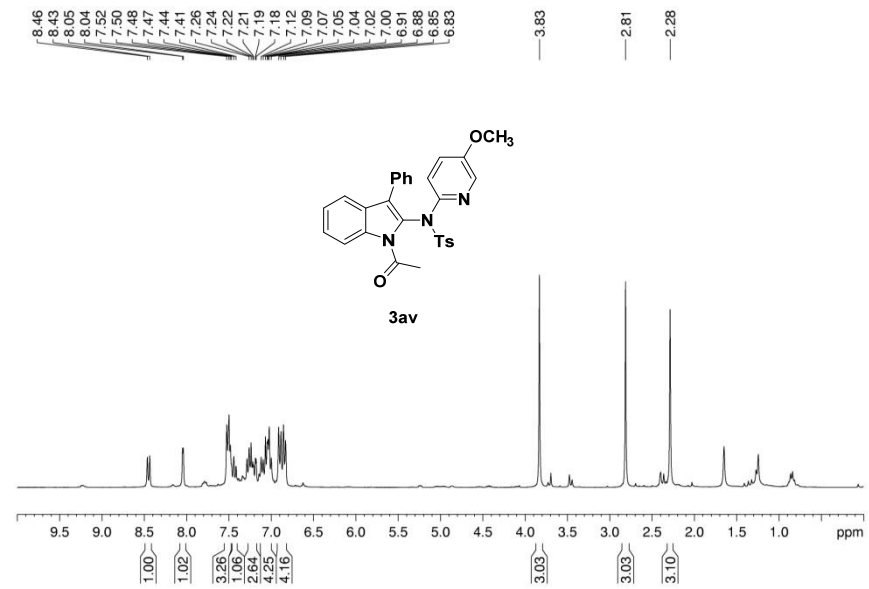
129.49
129.00
128.49
128.10
128.00
127.89
126.37
123.45
122.80
120.88
115.16
110.90
77.59
77.17
76.74
53.80
27.31
21.66
OCH3
Ph
N
N
Ts
N
O
3au
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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8.43
8.05
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7.50
7.48
7.47
7.44
7.41
7.26
7.24
7.22
7.21
7.19
7.18
7.12
7.09
7.07
7.05
7.04
7.02
7.00
6.91
6.88
6.85
6.83
3.83
2.81
2.28
OCH3
Ph
N
N
Ts
N
O
3av
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
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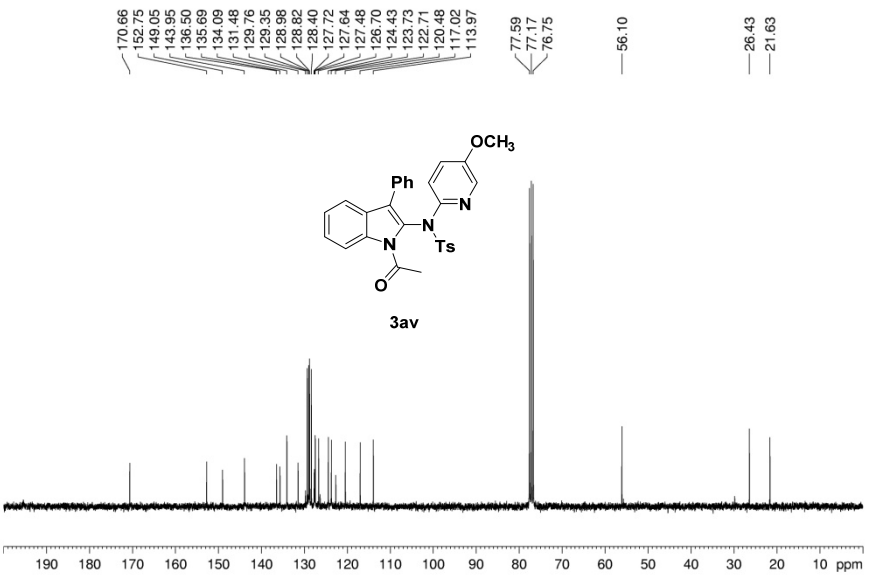
1.02
3.26
1.06
2.64
4.25
4.16
3.03
3.03
3.10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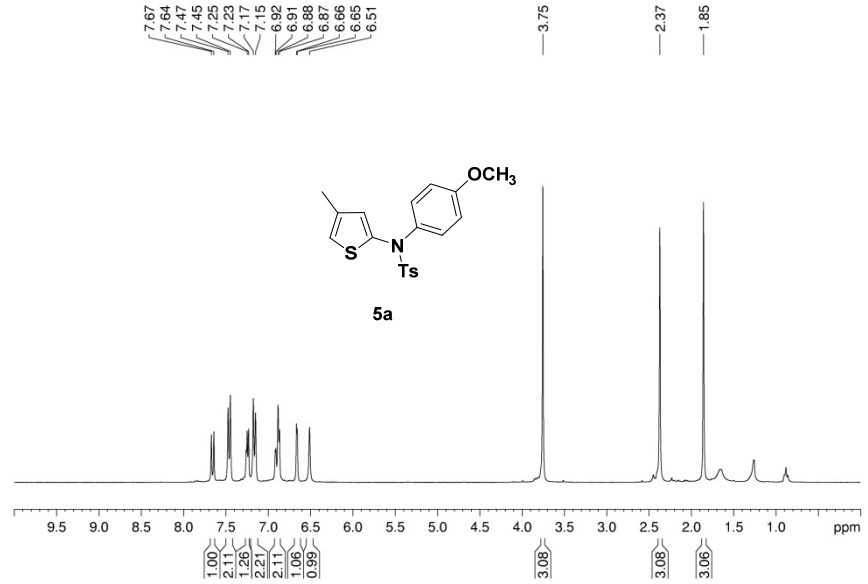
152.75
149.05
143.95
136.50
135.69
134.09
131.48
129.76
129.35
128.98
128.82
128.40
127.72
127.64
127.48
126.70
124.43
123.73
122.71
120.48
117.02
113.97
77.59
77.17
76.75
56.10
26.43
21.63
OCH3
Ph
N
N
Ts
N
O
3av
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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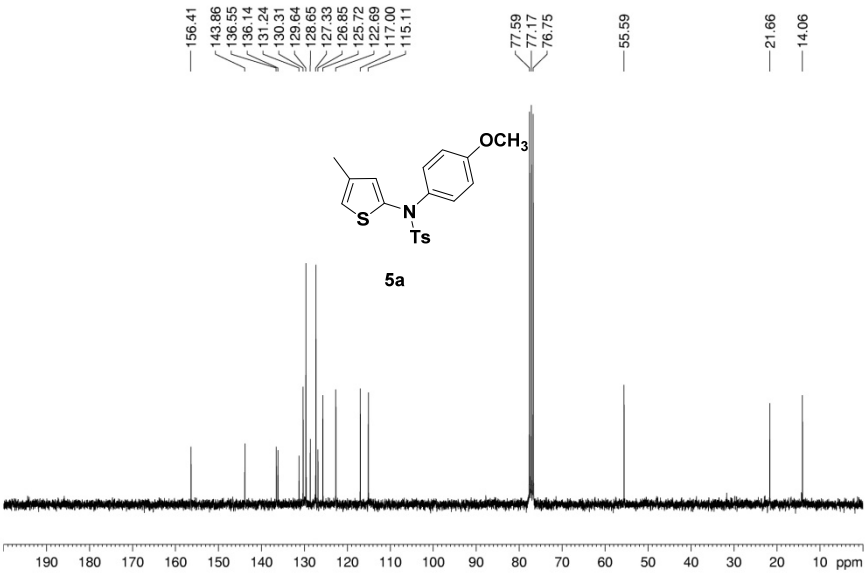
7.15
6.92
6.91
6.88
6.87
6.66
6.65
6.51
3.75
2.37
1.85
OCH3
S
N
Ts
5a
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
2.11
1.26
2.21
2.11
1.06
0.99
3.08
3.08
3.06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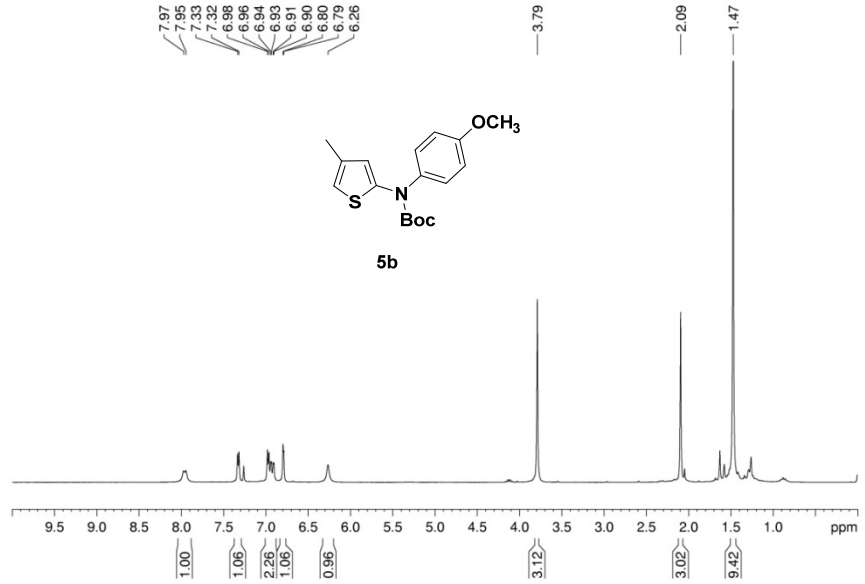
136.55
136.14
131.24
130.31
129.64
128.65
127.33
126.85
125.72
122.69
117.00
115.11
77.59
77.17
76.75
55.59
21.66
14.06
OCH3
S
N
Ts
5a
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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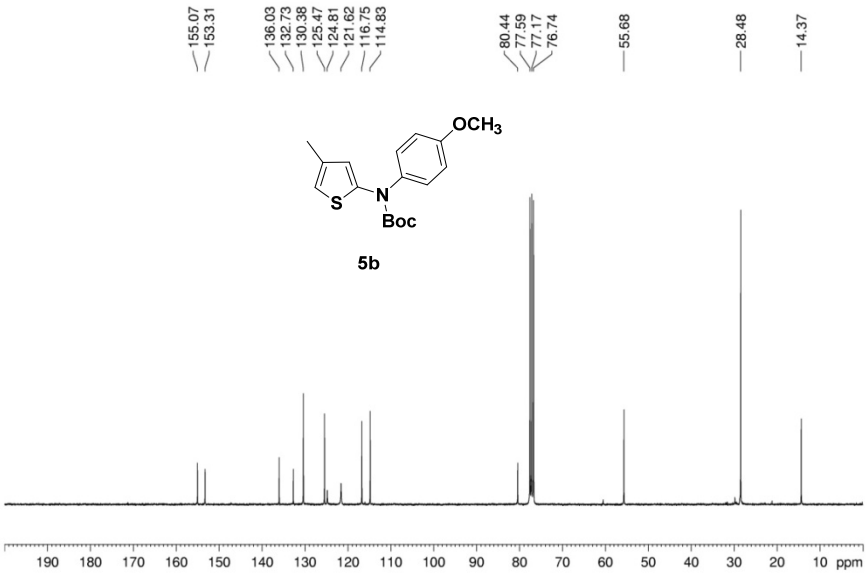
7.95
7.33
7.32
6.98
6.96
6.94
6.93
6.91
6.90
6.80
6.79
6.26
3.79
2.09
1.47
OCH3
S
N
Boc
5b
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
1.06
2.26
1.06
0.96
3.12
3.02
9.42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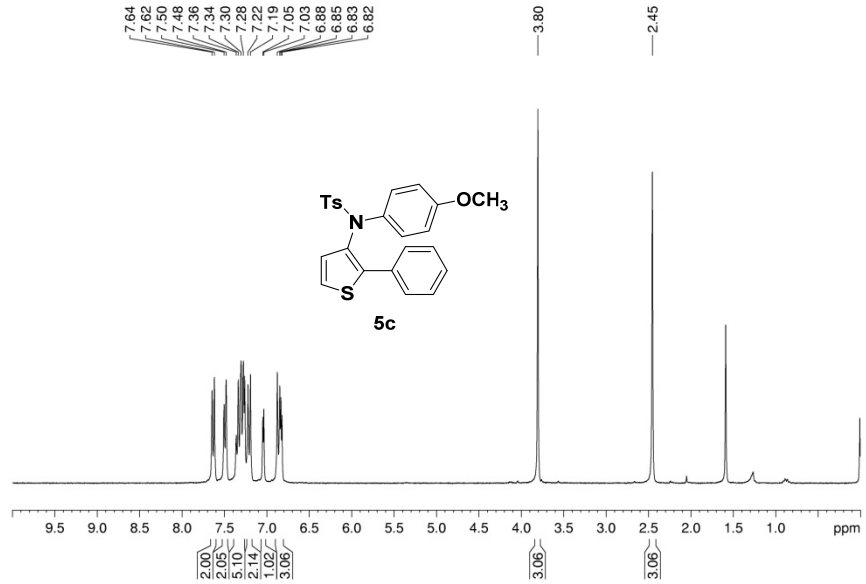
153.31
136.03
132.73
130.38
125.47
124.81
121.62
116.75
114.83
80.44
77.59
77.17
76.74
55.68
28.48
14.37
OCH3
S
N
Boc
5b
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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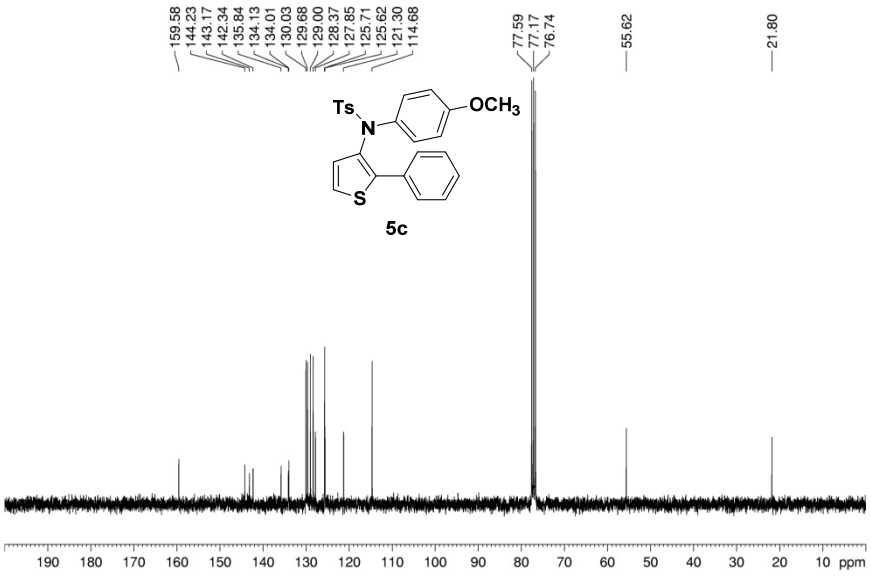
7.62
7.50
7.48
7.36
7.34
7.30
7.28
7.22
7.19
7.05
7.03
6.88
6.85
6.83
6.82
3.80
2.45
Ts
N
OCH3
S
5c
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
2.00
2.05
5.10
2.14
1.02
3.06
3.06
3.06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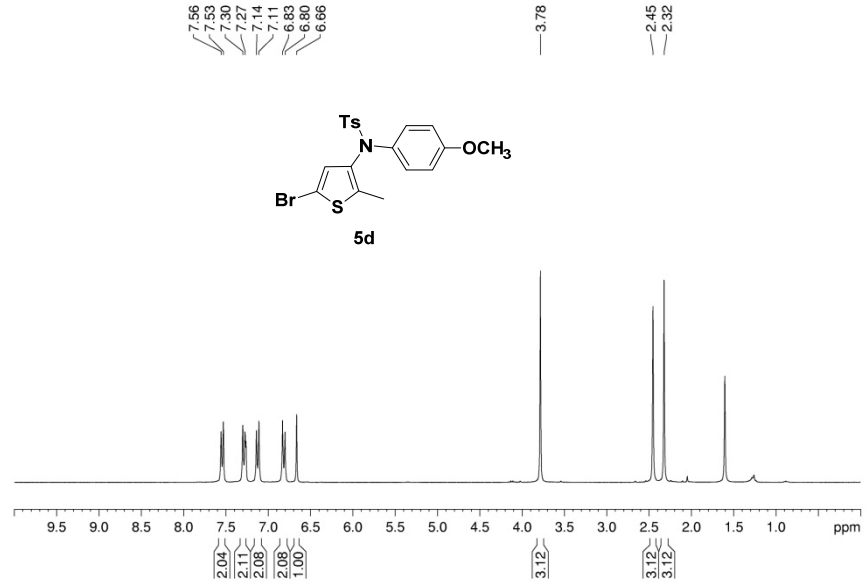
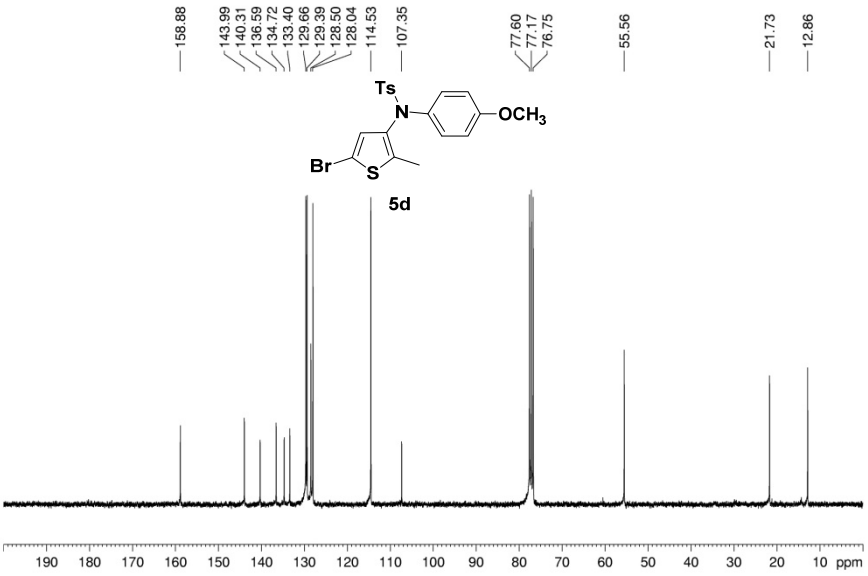
144.23
143.17
142.34
135.84
134.13
134.01
130.03
129.68
129.00
128.37
127.85
125.71
125.62
121.30
114.68
77.59
77.17
76.74
55.62
21.80
Ts
N
OCH3
S
5c
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


7.56
7.53
7.30
7.27
7.14
7.11
6.83
6.80
6.66
3.78
2.45
2.32
Ts
N
OCH3
Br
S
5d
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
2.04
2.11
2.08
2.08
1.00
3.12
3.12
3.12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143.99
140.31
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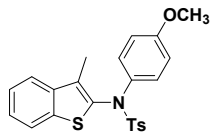
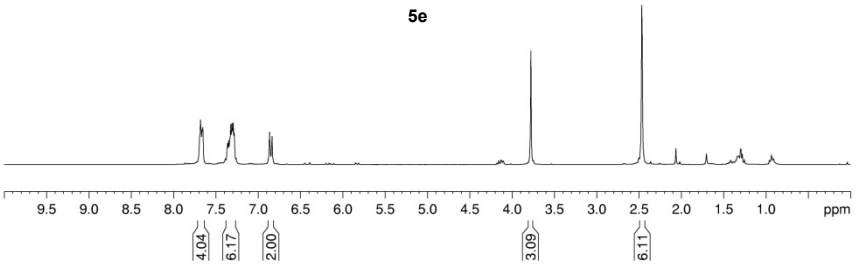
134.72
133.40
129.66
129.39
128.50
128.04
114.53
107.35
77.60
77.17
76.75
55.56
21.73
12.86
Ts
N
OCH3
Br
S
5d
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


7.68
7.66
7.65
7.36
7.35
7.33
7.32
7.31
7.29
7.28
6.86
6.83


3.78
2.46

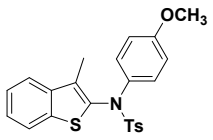

OCH3
N
S
Ts

5e

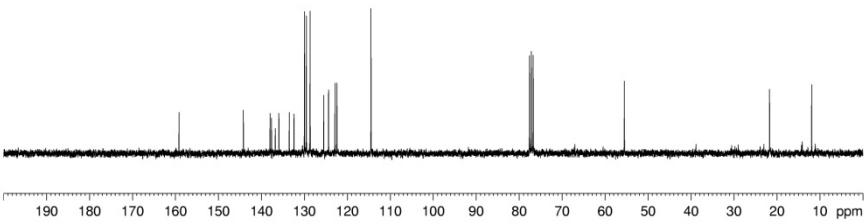

9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
4.04
6.17
2.00
3.09
6.11


159.20
144.21
138.01
137.67
136.79
135.95
133.53
132.43
130.00
129.54
128.68
125.49
124.39
122.88
122.44
114.51


77.59
77.17
76.75
55.51
21.73
11.92


OCH3
N
S
Ts

5e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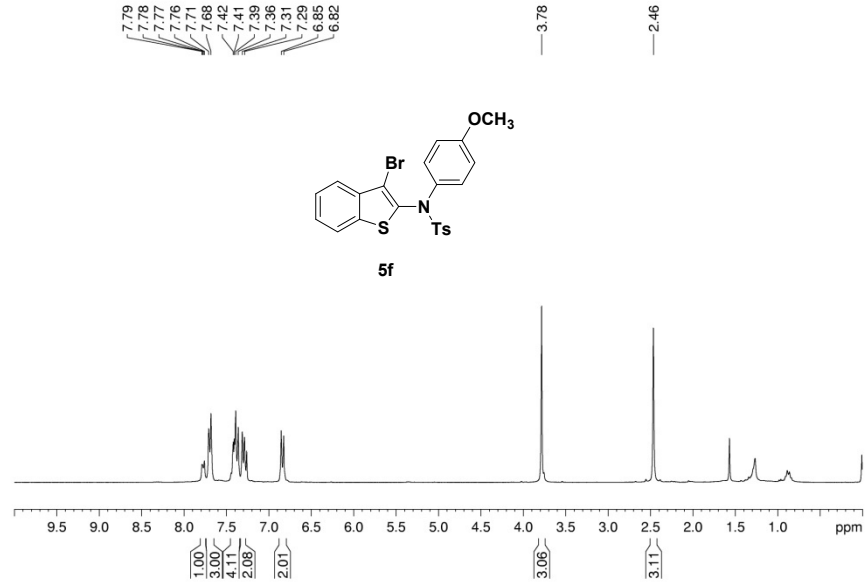
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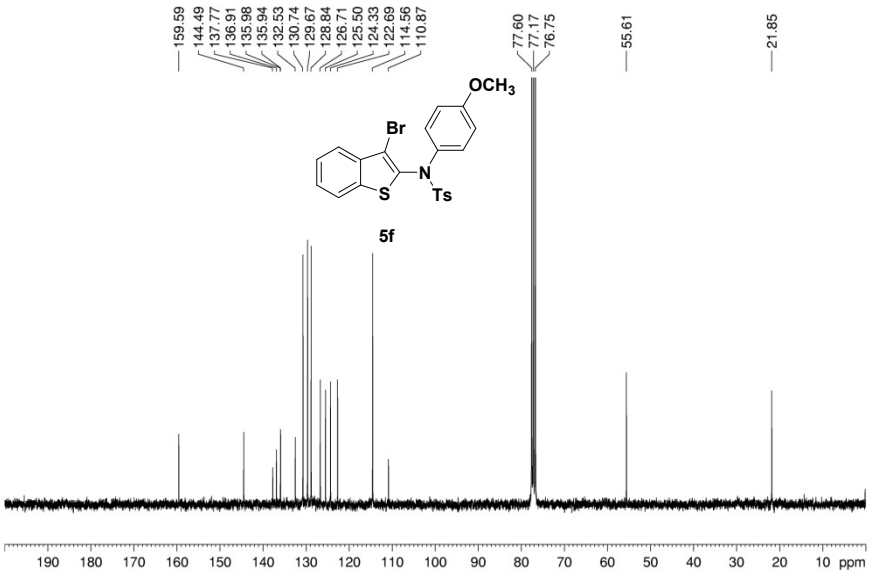
7.78
7.77
7.76
7.71
7.68
7.42
7.41
7.39
7.36
7.31
7.29
6.85
6.82
3.78
2.46
OCH3
Br
N
S
Ts
5f
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
3.00
4.11
2.08
2.01
3.06
3.11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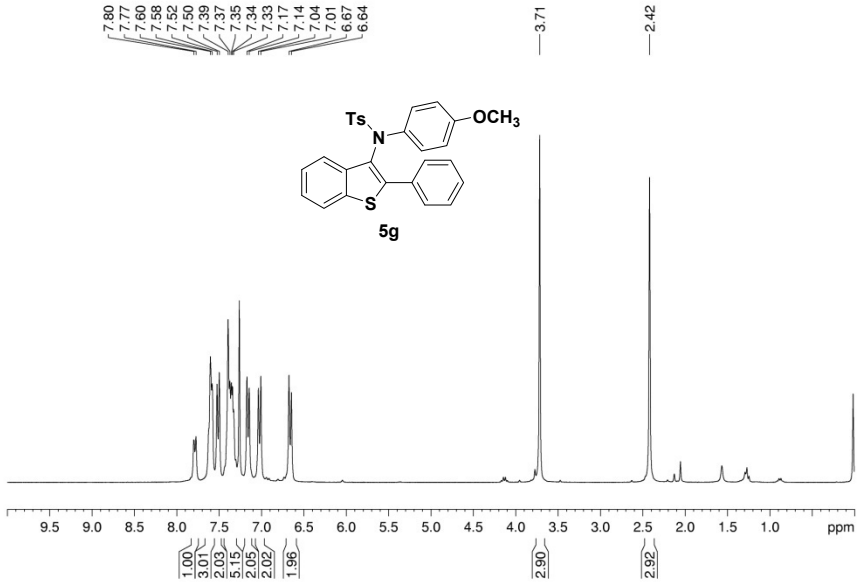
144.49
137.77
136.91
135.98
135.94
132.53
130.74
129.67
128.84
126.71
125.50
124.33
122.69
114.56
110.87
77.60
77.17
76.75
55.61
21.85
OCH3
Br
N
S
Ts
5f
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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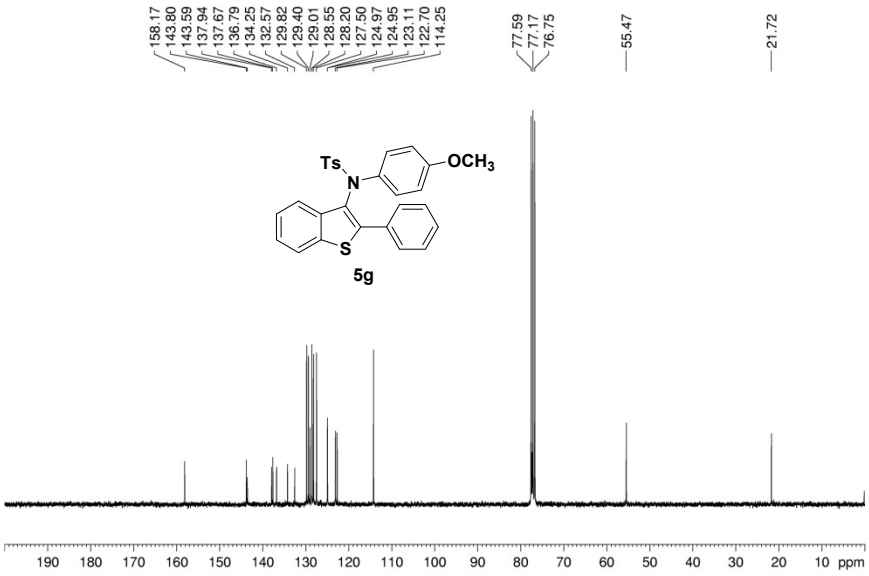
7.77
7.60
7.58
7.52
7.50
7.39
7.37
7.35
7.34
7.33
7.17
7.14
7.04
7.01
6.67
6.64
3.71
2.42
Ts
N
OCH3
S
5g
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
3.01
2.03
5.15
2.05
2.02
1.96
2.90
2.92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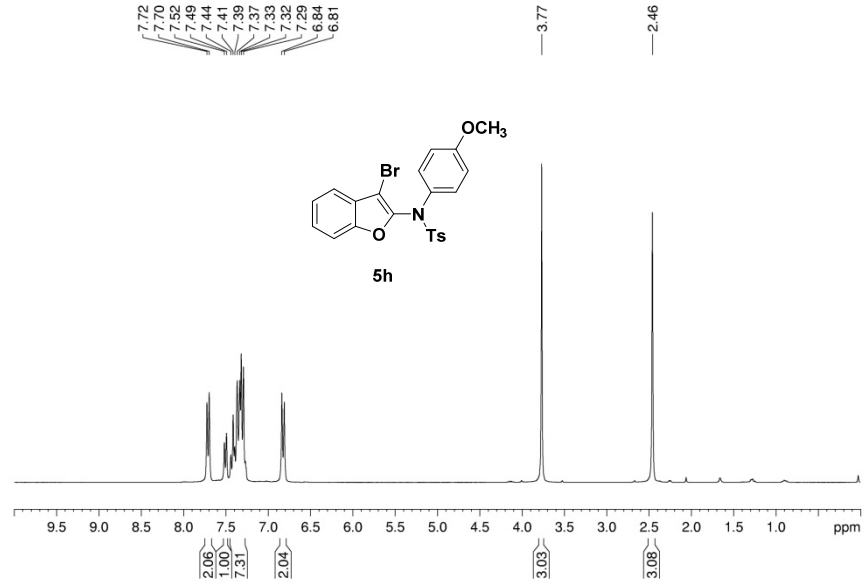
143.80
143.59
137.94
137.67
136.79
134.25
132.57
129.82
129.40
129.01
128.55
128.20
127.50
124.97
124.95
123.11
122.70
114.25
77.59
77.17
76.75
55.47
21.72
Ts
N
OCH3
S
5g
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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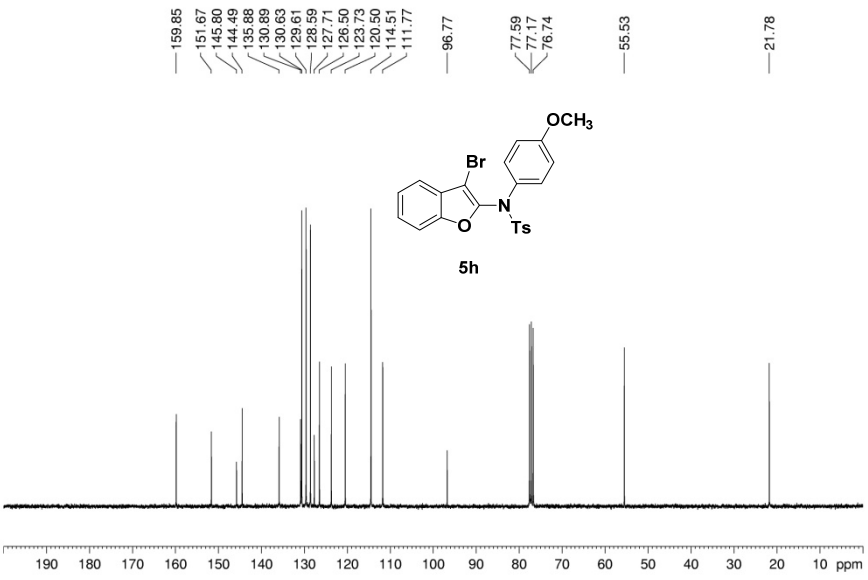
7.70
7.52
7.49
7.44
7.41
7.39
7.37
7.33
7.32
7.29
6.84
6.81
3.77
2.46
OCH3
Br
N
O
Ts
5h
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
2.06
1.00
7.31
2.04
3.03
3.08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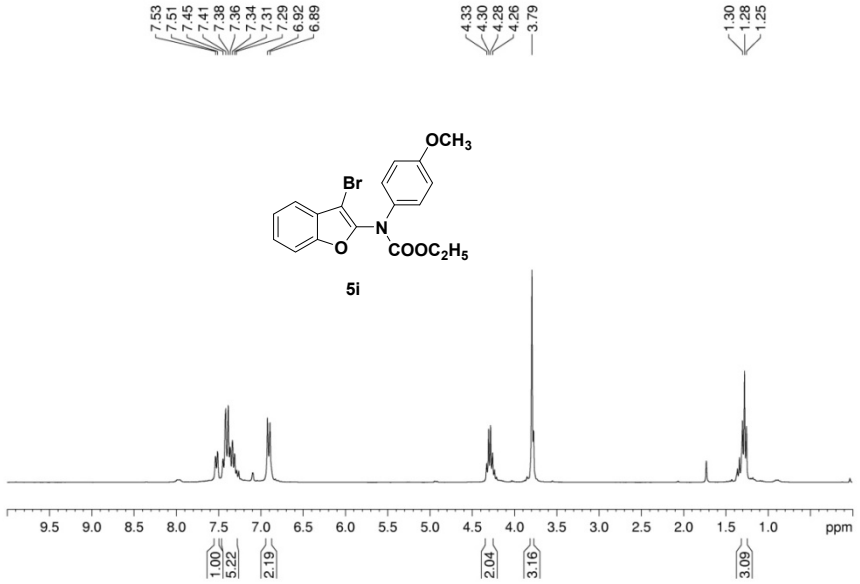
145.80
144.49
135.88
130.89
130.63
129.61
128.59
127.71
126.50
123.73
120.50
114.51
111.77
96.77
77.59
77.17
76.74
55.53
21.78
OCH3
Br
N
O
Ts
5h
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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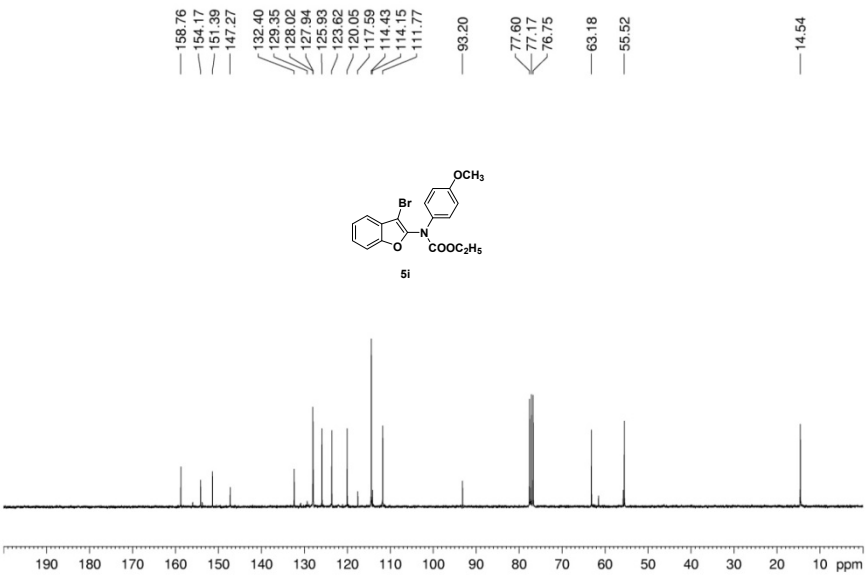
7.51
7.45
7.41
7.38
7.36
7.34
7.31
7.29
6.92
6.89
4.33
4.30
4.28
4.26
3.79
1.30
1.28
1.25
OCH3
Br
N
O
COOC2H5
5i
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.00
5.22
2.19
2.04
3.16
3.09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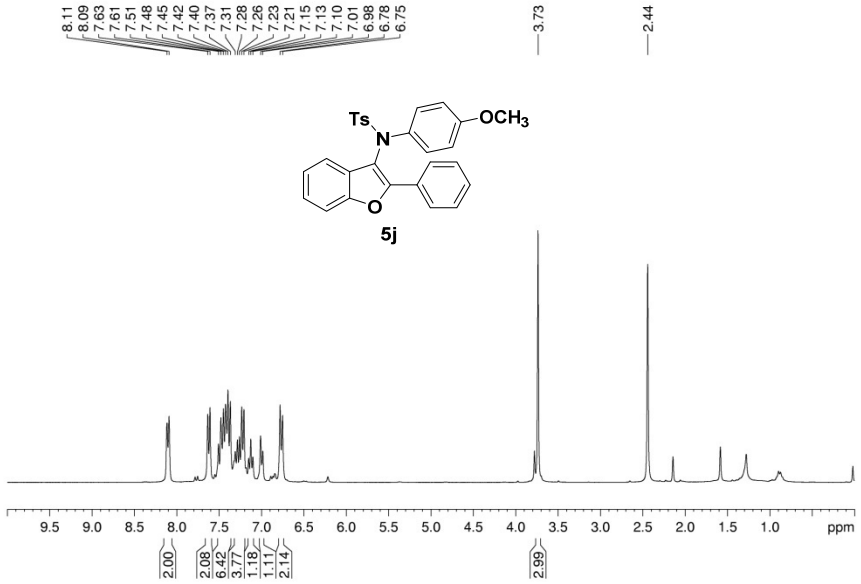
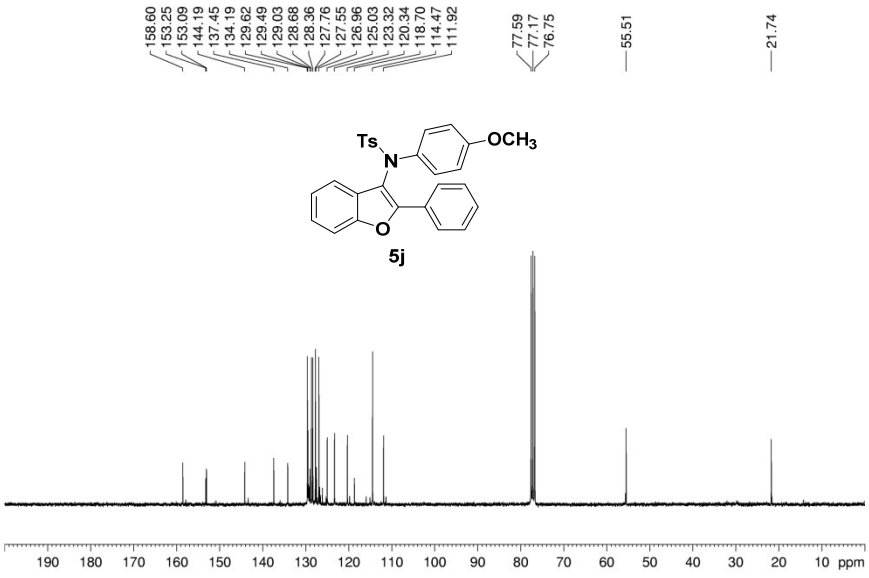
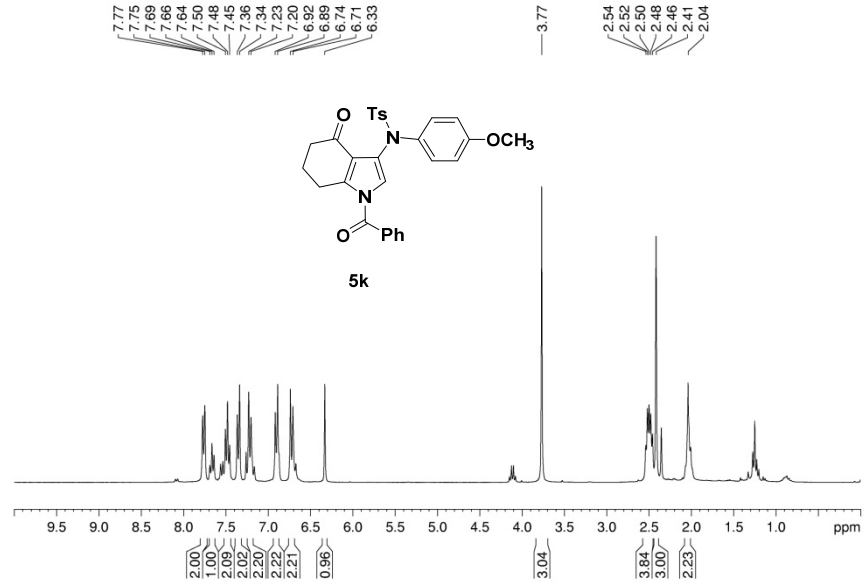
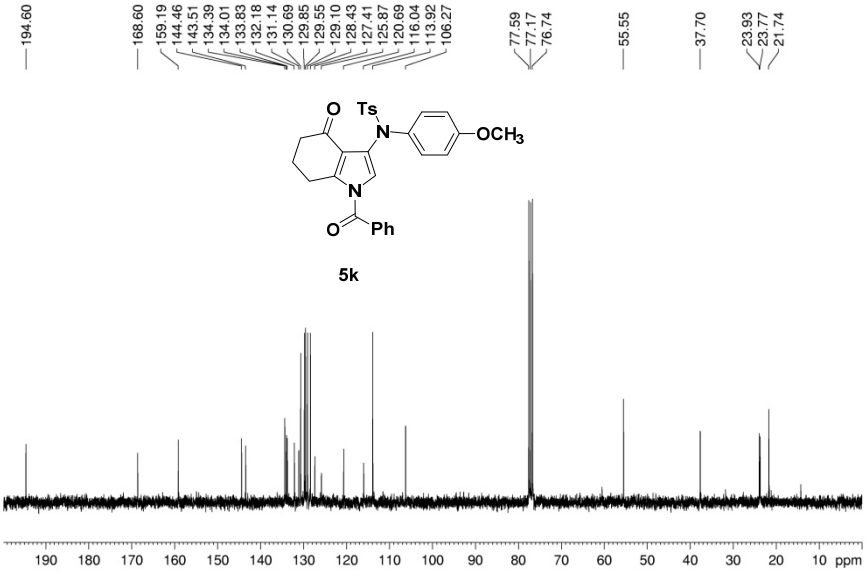
154.17
151.39
147.27
132.40
129.35
128.02
127.94
125.93
123.62
120.05
117.59
114.43
114.15
111.77
93.20
77.60
77.17
76.75
63.18
55.52
14.54
OCH3
Br
N
O
COOC2H5
5i
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


8.11
8.09
7.63
7.61
7.51
7.48
7.45
7.42
7.40
7.37
7.31
7.28
7.26
7.23
7.21
7.15
7.13
7.10
7.01
6.98
6.78
6.75
3.73
2.44
Ts
N
OCH3
O
5j
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
2.00
2.08
6.42
3.77
1.18
1.11
2.14
2.99


158.60
153.25
153.09
144.19
137.45
134.19
129.62
129.49
129.03
128.68
128.36
127.76
127.55
126.96
125.03
123.32
120.34
118.70
114.47
111.92
77.59
77.17
76.75
55.51
21.74
Ts
N
OCH3
O
5j
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


7.77
7.75
7.69
7.66
7.64
7.50
7.48
7.45
7.36
7.34
7.23
7.20
6.92
6.89
6.74
6.71
6.33
3.77
2.54
2.52
2.50
2.48
2.46
2.41
2.04
O
Ts
N
OCH3
N
O
Ph
5k
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
2.00
1.00
2.09
2.02
2.20
2.22
2.21
0.96
3.04
3.84
3.00
2.23


194.60
168.60
159.19
144.46
143.51
134.39
134.01
133.83
132.18
131.14
130.69
129.85
129.55
129.10
128.43
127.41
125.87
120.69
116.04
113.92
106.27
77.59
77.17
76.74
55.55
37.70
23.93
23.77
21.74
O
Ts
N
OCH3
N
O
Ph
5k
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm