Electronic Supplementary Material (ESI) for ChemComm.

Supporting Information for

An Approach to Spirooxindoles *via* Palladium-Catalyzed Remote C–H Activation and Dual Alkylation with CH_2Br_2

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Table of Contents

1. General Information

All the solvents were purified by distillation prior to use. Unless otherwise noted, the other commercial chemicals were used without further purification. ^{1}H NMR and ^{13}C NMR spectra were recorded on Bruker ARX400. High resolution mass spectra were measured on Bruker MicroTOF II ESI-TOF mass spectrometer. NMR spectra were recorded in $CDCl_3$. ^{1}H NMR spectra were referenced to residual $CHCl_3$ at 7.26 ppm, and ^{13}C NMR spectra were referenced to the central peak of $CDCl_3$ at 77.16 ppm. Chemical shifts (δ) are reported in ppm, and coupling constants (*J*) are in Hertz (Hz). Multiplicities are reported using the following abbreviations: s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet.

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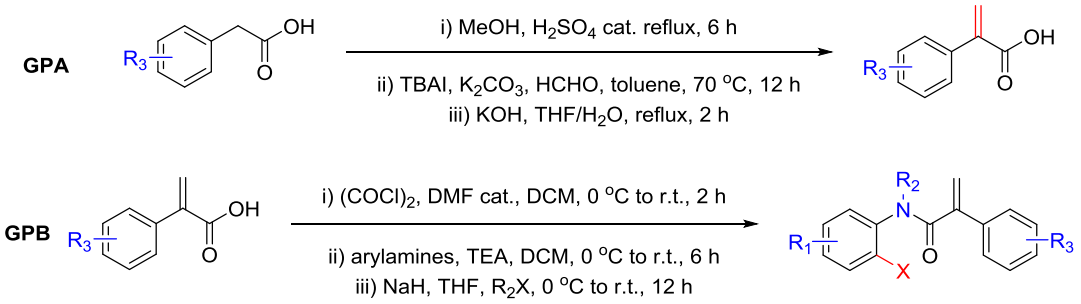
2. General Procedures for the Synthesis of Acrylamide Substrates[1,2]



General procedures A (GPA):

Step i: A 50 mL round bottom flask equipped with a stir bar was charged with 2-phenylacetic acid derivatives (20 mmol, 1.0 equiv.), concentrated sulfuric acid (3 drops), and methanol (20 mL), the mixture was heated to reflux for 6 hours. After that, the reaction mixture was allowed to cool down to room temperature. After the methanol was removed by rotary evaporation, the residue was diluted with ethyl acetate and treated with saturated sodium bicarbonate solution and brine. The organic layer was dried over anhydrous sodium sulfate and concentrated *in vacuo* to afford the corresponding methyl 2-phenylacetate derivatives.

Step ii: To a solution of prepared methyl 2-phenylacetate derivatives in anhydrous toluene (20 mL), potassium carbonate (5.53 g, 40 mmol, 2.0 equiv.), tetrabutylammonium iodide (2.95 g, 8 mmol, 0.4 equiv.), and polyformaldehyde (1.21 g, 40 mmol, 2.0 equiv.) were added. The reaction mixture was heated at 70 °C for 12 h, quenched with water, and extracted with ethyl acetate. The combined organic layers were dried over anhydrous sodium sulfate and concentrated *in vacuo.* The residue was purified on silica gel column chromatography by using PE/EA as the eluent to afford methyl 2-phenylacrylate derivatives.

Step iii: To a solution of prepared methyl 2-phenylacrylate derivatives in THF (10 mL), a solution

[1] Y. Cao, H. Zhao, D. Zhang-Negrerie, Y. Du and K. Zhao, *Adv. Synth. Catal.*, 2016, **358**, 3610.
[2] H. Yoon, A. Lossouarn, F. Landau and M. Lautens, *Org. Lett.*, 2016, **18**, 6324.

of potassium hydrate (4.49 g, 80 mmol, 4.0 equiv.) in water (10 mL) was added. The reaction mixture was heated at reflux for 2 hours and then cooled to 0 ^{o}C. Addition of concentrated hydrochloric acid resulted in precipitation of a white solid, which was extracted with dichloromethane. The organic layer was dried over anhydrous sodium sulfate and concentrated *in vacuo* to afford 2-phenylacrylic acid derivatives, which was used directly in the next step.

General procedures B (GPB):

Step i: A solution of 2-phenylacrylic acid derivatives (10 mmol, 1.0 equiv.) and DMF (2 drops) in dichloromethane (10 mL) was prepared and cooled to 0 ℃. A solution of oxalyl chloride (1.14 mL, 12 mmol, 1.2 equiv.) in dichloromethane (5 mL) was added dropwise. The reaction was allowed to warm to room temperature and stirred for 2 hours. The acyl chloride was concentrated *in vacuo* and redissolved in dichloromethane (5 mL).

Step ii: A solution of the 2-iodoaniline derivatives (10 mmol, 1.0 equiv.) and triethylamine (2.09 mL, 15 mmol, 1.5 equiv.) was prepared in dichloromethane (10 mL) and cooled to 0 ℃. The acyl chloride solution was added dropwise into the vessel containing the 2-iodoaniline derivatives. The reaction was allowed to warm to room temperature and stirred for 6 hours. The reaction was quenched with a saturated sodium bicarbonate solution and extracted with ethyl acetate. The combined organic layer was treated with brine, dried over anhydrous sodium sulfate and concentrated *in vacuo* to afford unsubstituted acrylamide prducts. The residue was purified on silica gel column chromatography by using PE/EA as the eluent to afford unsubstituted acrylamide derivatives.

Step iii: A solution of unsubstituted acrylamide in THF (10 mL) was prepared and cooled to 0 ℃. NaH (60 wt. %, 800 mg, 20 mmol, 2.0 equiv.) was added to the solution and the mixture was stirred for 30 minutes before adding R_2X (20 mmol, 2.0 equiv.) dropwise. The reaction was allowed to warm at room temperature after 10 minutes and was stirred for 12 hours. The reaction was quenched with saturated ammonium chloride solution and extracted with ethyl acetate. The combined organic layer was treated with brine, dried over anhydrous sodium sulfate and concentrated *in vacuo*. The residue was purified on silica gel column chromatography by using PE/EA as the eluent to afford the desired *N*-substituted acrylamide derivatives.

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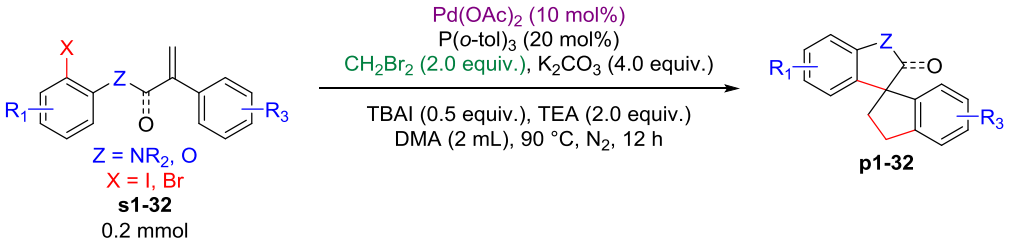
3. General Procedures for the Synthesis of Spirooxindole Products



A 35 mL Schlenk tube equipped with a stir bar was charged with *N*-substituted acrylamide substrates (0.2 mmol, 1.0 equiv.), palladium acetate (4.5 mg, 0.02 mmol, 10 mol%),

tri(*o*-tolyl)phosphine (12.2 mg, 0.04 mmol, 20 mol%), potassium carbonate (110 mg, 0.8 mmol, 4.0 equiv.), tetrabutylammonium iodide (37 mg, 0.1 mmol, 0.5 equiv.), triethylamine (56 μL, 0.4 mmol, 2.0 equiv.), dibromomethane (28 μL, 0.4 mmol, 2.0 equiv.), and DMA (2 mL) in air. The tube was sealed with a Teflon® high pressure valve, evacuated and backfilled with N_2 (5 times). After the reaction mixture was stirred in a preheated oil bath (90 ℃) for 12 h, it was allowed to cool down to room temperature. The reaction mixture was diluted with ethyl acetate (20 mL) and treated with brine (twice). The organic layer was dried over anhydrous sodium sulfate and concentrated *in vacuo*. The residue was purified on preparative thin layer chromatography (PTLC) to give the desired spirooxindole products.

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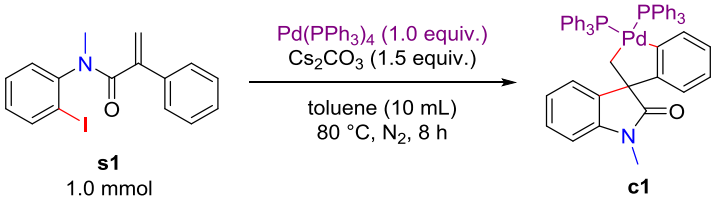
4. Preliminary Mechanistic Studies[2]

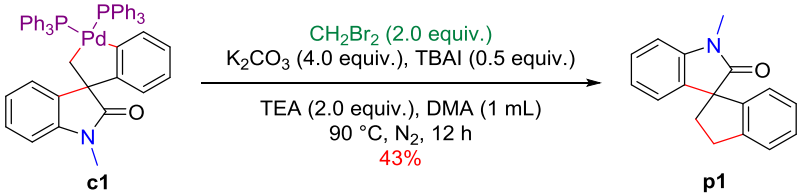


s1
1.0 mmol

c1

Note: *DCM and $CDCl_3$ were passed through a plug of basic alumina prior to use.*

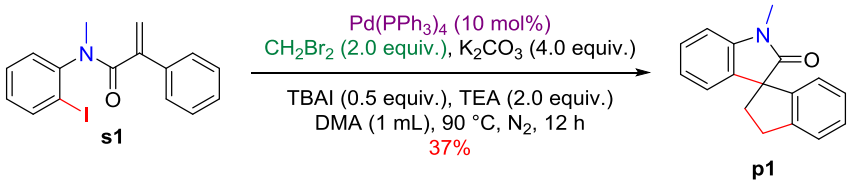
A 35 mL Schlenk tube equipped with a stir bar was charged with *N*-(2-iodophenyl)-*N*-methyl-2-phenylacrylamide (**s1**) (363 mg, 1.0 mmol, 1.0 equiv.), tetrakis(triphenylphosphine)palladium (1155 mg, 1.0 mmol, 1.0 equiv.), and cesium carbonate (489 mg, 1.5 mmol, 1.5 equiv.). The tube was sealed with a rubber stopper, evacuated and backfilled with N_2 (5 times). After toluene (10 mL) was injected *via* syringe, the reaction mixture was moved into a preheated oil bath at 80 ℃ for 8 hours. The reaction mixture was cooled to room temperature. Once cooled, the reaction was passed through a nylon filter using dichloromethane and concentrated *in vacuo*. Once solidified, hexane was used to triturate the compound. The mixture was passed through suction funnel and the collected solid was redissolved in dichloromethane and concentrated *in vacuo*. The palladacycle (**c1**) then recrystallized in ether and hexane to obtain a pale yellow solid (50 % isolated yield). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.65 – 7.49 (m, 7H), 7.31 – 7.16 (m, 13H), 7.15 – 7.08 (m, 6H), 7.08 – 7.02 (m, 6H), 6.99 (t, *J* = 7.5 Hz, 1H), 6.87 – 6.76 (m, 2H), 6.63 (t, *J* = 7.2 Hz, 1H), 6.41 (d, *J* = 7.6 Hz, 1H), 6.34 (t, *J* = 7.4 Hz, 1H), 3.24 (s, 3H), 2.18 – 2.00 (m, 2H). **^{31}P NMR (162 MHz, $CDCl_3$)** δ 25.17 (dd, *J* = 139.4, 22.8 Hz). The data are identical to literature: H. Yoon, A. Lossouarn, F. Landau and M. Lautens, *Org. Lett.*, 2016, **18**, 6324.



c1 **p1**

A 35 mL Schlenk tube equipped with a stir bar was charged with palladacycle (**c1**) (86.6 mg, 0.1 mmol, 1.0 equiv.), potassium carbonate (55 mg, 0.4 mmol, 4.0 equiv.), tetrabutylammonium iodide (18.5 mg, 0.05 mmol, 0.5 equiv.), triethylamine (28 μL, 0.2 mmol, 2.0 equiv.),

dibromomethane (14 μL, 0.2 mmol, 2.0 equiv.), and DMA (1 mL) in air. The tube was sealed with a Teflon® high pressure valve, evacuated and backfilled with N_2 (5 times). After the reaction mixture was stirred in a preheated oil bath (90 ℃) for 12 h, it was allowed to cool down to room temperature. The reaction mixture was diluted with ethyl acetate (10 mL) and treated with brine (twice). The organic layer was dried over anhydrous sodium sulfate and concentrated *in vacuo*. The residue was purified on preparative thin layer chromatography (PTLC) to give the desired spirooxindole product (**p1**) in 43% yield.



A 35 mL Schlenk tube equipped with a stir bar was charged with *N*-substituted acrylamide substrates (**s1**) (36.3 mg, 0.1 mmol, 1.0 equiv.), tetrakis(triphenylphosphine)palladium (11.6 mg, 0.01 mmol, 10 mol%), potassium carbonate (55 mg, 0.4 mmol, 4.0 equiv.), tetrabutylammonium iodide (18.5 mg, 0.05 mmol, 0.5 equiv.), triethylamine (28 μL, 0.2 mmol, 2.0 equiv.), dibromomethane (14 μL, 0.2 mmol, 2.0 equiv.), and DMA (1 mL) in air. The tube was sealed with a Teflon® high pressure valve, evacuated and backfilled with N_2 (5 times). After the reaction mixture was stirred in a preheated oil bath (90 ℃) for 12 h, it was allowed to cool down to room temperature. The reaction mixture was diluted with ethyl acetate (10 mL) and treated with brine (twice). The organic layer was dried over anhydrous sodium sulfate and concentrated *in vacuo*. The residue was purified on preparative thin layer chromatography (PTLC) to give the desired spirooxindole product (**p1**) in 37% yield.

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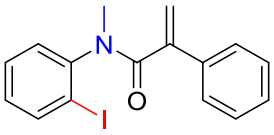
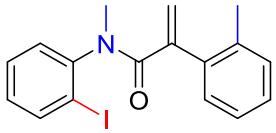
5. Characterization of Substrates

N-(2-Iodophenyl)-*N*-methyl-2-phenylacrylamide (**s1**)



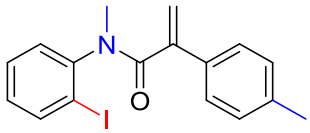
The title compound was prepared in line with method **GPB**, purified on flash column chromatography using PE/EA (5:1 v:v) as the eluent, and was obtained as a light yellow solid in an overall yield of 57%. Two rotamers were observed in a 8.2:1 ratio. The major rotamer is reported below. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.74 (dd, *J* = 7.9, 1.0 Hz, 1H), 7.25 – 7.17 (m, 3H), 7.17 – 7.08 (m, 2H), 7.03 (ddd, *J* = 7.7, 1.1 Hz, 1H), 6.87 (ddd, *J* = 7.7, 1.3 Hz, 1H), 6.75 (dd, *J* = 7.8, 1.2 Hz, 1H), 5.63 (s, 1H), 5.35 (s, 1H), 3.29 (s, 3H). The data are identical to literature: H. Yoon, A. Lossouarn, F. Landau and M. Lautens, *Org. Lett.*, 2016, **18**, 6324.

N-(2-Iodophenyl)-*N*-methyl-2-(*o*-tolyl)acrylamide (**s2**)



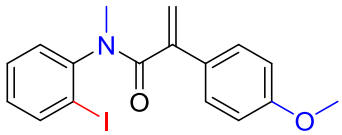
The title compound was prepared in line with method **GPA** and **GPB**, purified on flash column chromatography using PE/EA (4:1 v:v) as the eluent, and was obtained as a light yellow solid in an overall yield of 39%. **^{1}H NMR (400 MHz, CDCl$_3$)** δ 7.63 (d, *J* = 7.8 Hz, 1H), 7.05 – 6.94 (m, 3H), 6.85 – 6.75 (m, 2H), 6.67 (d, *J* = 7.7 Hz, 1H), 6.46 (d, *J* = 7.6 Hz, 1H), 6.05 (s, 1H), 5.28 (s, 1H), 3.21 (s, 3H), 2.08 (s, 3H). The data are identical to literature: H. Yoon, A. Lossouarn, F. Landau and M. Lautens, *Org. Lett.*, 2016, **18**, 6324.

N-(2-Iodophenyl)-*N*-methyl-2-(*p*-tolyl)acrylamide (**s3**)



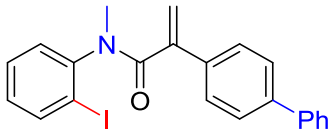
The title compound was prepared in line with method **GPA** and **GPB**, purified on flash column chromatography using PE/EA (4:1 v:v) as the eluent, and was obtained as a light yellow solid in an overall yield of 26%. Two rotamers were observed in a 6.1:1 ratio. The major rotamer is reported below. **^{1}H NMR (400 MHz, CDCl$_3$)** δ 7.75 (d, *J* = 7.7 Hz, 1H), 7.08 – 7.00 (m, 5H), 6.88 (t, *J* = 7.6 Hz, 1H), 6.77 (d, *J* = 7.8 Hz, 1H), 5.54 (s, 1H), 5.31 (s, 1H), 3.29 (s, 3H), 2.31 (s, 3H); **^{13}C NMR (101 MHz, CDCl$_3$)** δ 170.59, 145.66, 145.43, 139.95, 137.98, 134.20, 129.87, 129.25, 129.13, 128.90, 126.11, 116.28, 99.34, 36.43, 21.30; **HRMS (ESI-TOF)** m/z: calculated for $C_{17}H_{16}INNaO^+$: 400.0169 $(M + Na)^+$, found: 400.0166.

N-(2-Iodophenyl)-2-(4-methoxyphenyl)-*N*-methylacrylamide (**s4**)



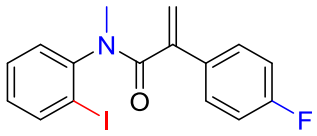
The title compound was prepared in line with method **GPA** and **GPB**, purified on flash column chromatography using PE/EA (3:1 v:v) as the eluent, and was obtained as a yellow oil in an overall yield of 13%. Two rotamers were observed in a 5.0:1 ratio. The major rotamer is reported below. **^{1}H NMR (400 MHz, CDCl$_3$)** δ 7.76 (dd, *J* = 7.9, 1.1 Hz, 1H), 7.12 – 7.02 (m, 3H), 6.88 (ddd, *J* = 7.8, 7.8, 1.4 Hz, 1H), 6.82 – 6.72 (m, 3H), 5.49 (s, 1H), 5.25 (s, 1H), 3.79 (s, 3H), 3.29 (s, 3H). The data are identical to literature: H. Yoon, A. Lossouarn, F. Landau and M. Lautens, *Org. Lett.*, 2016, **18**, 6324.

2-([1,1'-Biphenyl]-4-yl)-*N*-(2-iodophenyl)-*N*-methylacrylamide (**s5**)



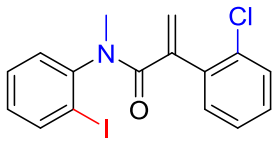
The title compound was prepared in line with method **GPA** and **GPB**, purified on flash column chromatography using PE/EA (4:1 v:v) as the eluent, and was obtained as a yellow oil in an overall yield of 6%. Two rotamers were observed in a 6.3:1 ratio. The major rotamer is reported below. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.76 (dd, *J* = 7.9, 1.1 Hz, 1H), 7.58 (d, *J* = 7.2 Hz, 2H), 7.51 – 7.41 (m, 4H), 7.35 (t, *J* = 7.4 Hz, 1H), 7.22 (d, *J* = 8.3 Hz, 2H), 7.05 (ddd, *J* = 7.7, 7.7, 1.3 Hz, 1H), 6.88 (ddd, *J* = 7.8, 7.8, 1.5 Hz, 1H), 6.82 (dd, *J* = 7.8, 1.3 Hz, 1H), 5.64 (s, 1H), 5.41 (s, 1H), 3.32 (s, 3H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 170.41, 145.62, 145.28, 140.85, 140.64, 140.05, 136.05, 129.94, 129.32, 128.98, 128.95, 127.59, 127.14, 127.08, 126.74, 117.46, 99.34, 36.55; **HRMS (ESI-TOF)** m/z: calculated for $C_{22}H_{18}INNaO^+$: 462.0325 $(M + Na)^+$, found: 462.0324.

2-(4-Fluorophenyl)-*N*-(2-iodophenyl)-*N*-methylacrylamide (**s6**)



The title compound was prepared in line with method **GPA** and **GPB**, purified on flash column chromatography using PE/EA (4:1 v:v) as the eluent, and was obtained as a light yellow solid in an overall yield of 15%. Two rotamers were observed in a 7.8:1 ratio. The major rotamer is reported below. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.74 (dd, *J* = 7.9, 0.8 Hz, 1H), 7.13 – 7.05 (m, 3H), 6.94 – 6.84 (m, 3H), 6.77 (dd, *J* = 7.8, 1.1 Hz, 1H), 5.60 (s, 1H), 5.29 (s, 1H), 3.28 (s, 3H). The data are identical to literature: H. Yoon, A. Lossouarn, F. Landau and M. Lautens, *Org. Lett.*, 2016, **18**, 6324.

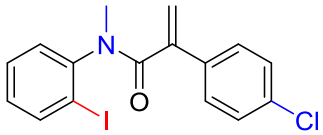
2-(2-Chlorophenyl)-*N*-(2-iodophenyl)-*N*-methylacrylamide (**s7**)



The title compound was prepared in line with method **GPA** and **GPB**, purified on flash column chromatography using PE/EA (4:1 v:v) as the eluent, and was obtained as a light yellow solid in an overall yield of 8%. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.64 (d, *J* = 7.8 Hz, 1H), 7.19 (d, *J* = 8.0 Hz, 1H), 7.04 (t, *J* = 7.6 Hz, 1H), 6.95 (t, *J* = 7.5 Hz, 1H), 6.85 (t, *J* = 7.7 Hz, 1H), 6.83 – 6.73 (m, 2H), 6.56 (d, *J* = 7.5 Hz, 1H), 6.19 (s, 1H), 5.48 (s, 1H), 3.25 (s, 3H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 169.13, 145.22, 145.19, 144.70, 139.87, 137.03, 132.56, 129.92, 129.50, 129.16, 129.02,

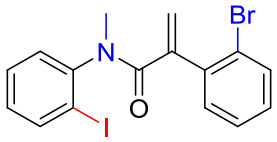
128.75, 127.22, 126.79, 98.99, 37.29; **HRMS (ESI-TOF)** m/z: calculated for $C_{16}H_{13}ClINNaO^+$: 419.9623 $(M + Na)^+$, found: 419.9624.

2-(4-Chlorophenyl)-*N*-(2-iodophenyl)-*N*-methylacrylamide (s**8**)



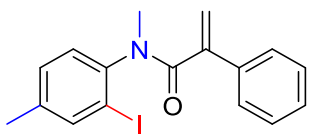
The title compound was prepared in line with method **GPA** and **GPB**, purified on flash column chromatography using PE/EA (4:1 v:v) as the eluent, and was obtained as a light yellow solid in an overall yield of 10%. Two rotamers were observed in a 11.1:1 ratio. The major rotamer is reported below. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.76 (dd, *J* = 7.9, 1.1 Hz, 1H), 7.19 (d, *J* = 8.5 Hz, 2H), 7.11 – 7.04 (m, 3H), 6.90 (ddd, *J* = 7.8, 7.8, 1.4 Hz, 1H), 6.77 (dd, *J* = 7.8, 1.3 Hz, 1H), 5.62 (s, 1H), 5.33 (s, 1H), 3.29 (s, 3H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 169.97, 149.82, 145.48, 144.66, 140.15, 134.09, 129.89, 129.47, 129.03, 128.66, 127.65, 118.15, 99.32, 36.53; **HRMS (ESI-TOF)** m/z: calculated for $C_{16}H_{13}ClINNaO^+$: 419.9623 $(M + Na)^+$, found: 419.9630.

2-(2-Bromophenyl)-*N*-(2-iodophenyl)-*N*-methylacrylamide (**s9**)



The title compound was prepared in line with method **GPA** and **GPB**, purified on flash column chromatography using PE/EA (4:1 v:v) as the eluent, and was obtained as a light yellow solid in an overall yield of 26%. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.64 (d, *J* = 7.7 Hz, 1H), 7.38 (d, *J* = 7.8 Hz, 1H), 6.99 – 6.90 (m, 2H), 6.87 (t, *J* = 7.4 Hz, 1H), 6.84 – 6.74 (m, 2H), 6.52 (dd, *J* = 7.5, 1.2 Hz, 1H), 6.23 (s, 1H), 5.49 (s, 1H), 3.25 (s, 3H). The data are identical to literature: H. Yoon, A. Lossouarn, F. Landau and M. Lautens, *Org. Lett.*, 2016, **18**, 6324.

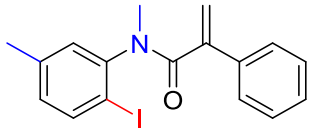
N-(2-Iodo-4-methylphenyl)-*N*-methyl-2-phenylacrylamide (**s10**)



The title compound was prepared in line with method **GPB**, purified on flash column chromatography using PE/EA (5:1 v:v) as the eluent, and was obtained as a clear yellow oil in an overall yield of 82%. Two rotamers were observed in a 6.3:1 ratio. The major rotamer is reported below. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.57 (s, 1H), 7.25 – 7.19 (m, 3H), 7.18 – 7.12 (m, 2H),

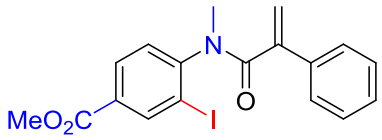
6.81 (d, *J* = 7.9 Hz, 1H), 6.61 (d, *J* = 8.0 Hz, 1H), 5.59 (s, 1H), 5.35 (s, 1H), 3.27 (s, 3H), 2.23 (s, 3H). The data are identical to literature: H. Yoon, A. Lossouarn, F. Landau and M. Lautens, *Org. Lett.*, 2016, **18**, 6324.

N-(2-Iodo-5-methylphenyl)-*N*-methyl-2-phenylacrylamide (**s11**)



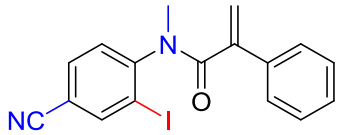
The title compound was prepared in line with method **GPB**, purified on flash column chromatography using PE/EA (4:1 v:v) as the eluent, and was obtained as a light yellow solid in an overall yield of 71%. Two rotamers were observed in a 5.9:1 ratio. The major rotamer is reported below. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.59 (d, *J* = 8.1 Hz, 1H), 7.24 – 7.18 (m, 3H), 7.13 – 7.05 (m, 2H), 6.68 (d, *J* = 6.8 Hz, 1H), 6.45 (s, 1H), 5.64 (s, 1H), 5.31 (s, 1H), 3.26 (s, 3H), 1.96 (s, 3H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 170.41, 146.11, 145.05, 139.42, 139.29, 137.56, 130.99, 130.26, 128.36, 127.97, 126.31, 117.49, 95.15, 36.33, 20.58; **HRMS (ESI-TOF)** m/z: calculated for $C_{17}H_{16}INNaO^+$: 400.0169 $(M + Na)^+$, found: 400.0161.

Methyl 3-iodo-4-(*N*-methyl-2-phenylacrylamido)benzoate (**s12**)



The title compound was prepared in line with method **GPB**, purified on flash column chromatography using PE/EA (2:1 v:v) as the eluent, and was obtained as a light yellow solid in an overall yield of 21%. Two rotamers were observed in a 6.7:1 ratio. The major rotamer is reported below. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 8.39 (s, 1H), 7.67 (d, *J* = 8.2 Hz, 1H), 7.25 – 7.16 (m, 3H), 7.15 – 7.06 (m, 2H), 6.81 (d, *J* = 8.2 Hz, 1H), 5.61 (s, 1H), 5.36 (s, 1H), 3.88 (s, 5H), 3.28 (s, 3H). The data are identical to literature: H. Yoon, A. Lossouarn, F. Landau and M. Lautens, *Org. Lett.*, 2016, **18**, 6324.

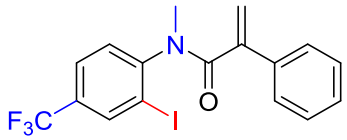
N-(4-Cyano-2-iodophenyl)-*N*-methyl-2-phenylacrylamide (**s13**)



The title compound was prepared in line with method **GPB**, purified on flash column chromatography using PE/EA (2:1 v:v) as the eluent, and was obtained as a light yellow solid in

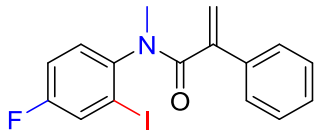
an overall yield of 48%. Two rotamers were observed in a 5.5:1 ratio. The major rotamer is reported below. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.99 (s, 1H), 7.30 (dd, *J* = 8.1, 1.2 Hz, 1H), 7.25 – 7.18 (m, 3H), 7.13 – 7.03 (m, 2H), 6.83 (d, *J* = 8.1 Hz, 1H), 5.66 (s, 1H), 5.40 (s, 1H), 3.28 (s, 3H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 169.76, 149.79, 145.52, 143.26, 136.57, 132.34, 130.44, 128.70, 128.48, 126.18, 119.07, 116.40, 113.00, 99.51, 36.32; **HRMS (ESI-TOF)** m/z: calculated for $C_{17}H_{13}IN_2NaO^+$: 410.9965 $(M + Na)^+$, found: 410.9967.

N-(2-Iodo-4-(trifluoromethyl)phenyl)-*N*-methyl-2-phenylacrylamide (**s14**)



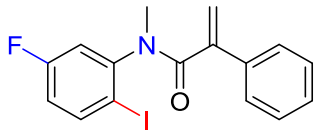
The title compound was prepared in line with method **GPB**, purified on flash column chromatography using PE/EA (4:1 v:v) as the eluent, and was obtained as a clear yellow oil in an overall yield of 69%. Two rotamers were observed in a 4.9:1 ratio. The major rotamer is reported below. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.96 (s, 1H), 7.31 – 7.26 (m, 1H), 7.25 – 7.14 (m, 3H), 7.13 – 7.02 (m, 2H), 6.84 (d, *J* = 8.2 Hz, 1H), 5.68 (s, 1H), 5.39 (s, 1H), 3.30 (s, 3H). The data are identical to literature: H. Yoon, A. Lossouarn, F. Landau and M. Lautens, *Org. Lett.*, 2016, **18**, 6324.

N-(4-Fluoro-2-iodophenyl)-*N*-methyl-2-phenylacrylamide (**s15**)



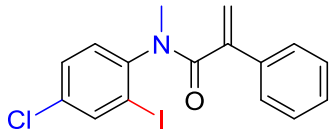
The title compound was prepared in line with method **GPB**, purified on flash column chromatography using PE/EA (3:1 v:v) as the eluent, and was obtained as a light yellow solid in an overall yield of 80%. Two rotamers were observed in a 6.7:1 ratio. The major rotamer is reported below. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.44 (dd, *J* = 7.7, 2.6 Hz, 1H), 7.25 – 7.18 (m, 3H), 7.14 – 7.06 (m, 2H), 6.75 – 6.63 (m, 2H), 5.64 (s, 1H), 5.36 (s, 1H), 3.26 (s, 3H). The data are identical to literature: H. Yoon, A. Lossouarn, F. Landau and M. Lautens, *Org. Lett.*, 2016, **18**, 6324.

N-(5-Fluoro-2-iodophenyl)-*N*-methyl-2-phenylacrylamide (**s16**)



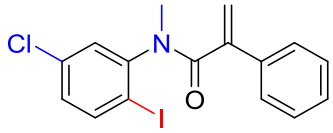
The title compound was prepared in line with method **GPB**, purified on flash column chromatography using PE/EA (3:1 v:v) as the eluent, and was obtained as a light yellow solid in an overall yield of 84%. Two rotamers were observed in a 5.3:1 ratio. The major rotamer is reported below. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.66 (dd, *J* = 8.7, 6.0 Hz, 1H), 7.26 – 7.19 (m, 3H), 7.16 – 7.08 (m, 2H), 6.66 (ddd, *J* = 8.5, 8.5, 2.8 Hz, 1H), 6.47 (dd, *J* = 9.1, 2.8 Hz, 1H), 5.67 (s, 1H), 5.39 (s, 1H), 3.27 (s, 3H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 170.12, 162.65 (d, *J* = 250.2 Hz), 146.81 (d, *J* = 9.7 Hz), 145.74, 140.57 (d, *J* = 8.5 Hz), 136.96, 128.58, 128.31, 126.22, 118.36, 117.65 (d, *J* = 22.7 Hz), 116.93 (d, *J* = 21.7 Hz), 92.68, 36.37; **HRMS (ESI-TOF)** m/z: calculated for $C_{16}H_{13}FINNaO^+$: 403.9918 $(M + Na)^+$, found: 403.9914.

N-(4-Chloro-2-iodophenyl)-*N*-methyl-2-phenylacrylamide (**s17**)



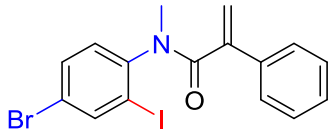
The title compound was prepared in line with method **GPB**, purified on flash column chromatography using PE/EA (3:1 v:v) as the eluent, and was obtained as a clear yellow oil in an overall yield of 84%. Two rotamers were observed in a 7.2:1 ratio. The major rotamer is reported below. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.72 (d, *J* = 2.2 Hz, 1H), 7.26 – 7.19 (m, 3H), 7.16 – 7.07 (m, 2H), 6.99 (dd, *J* = 8.4, 2.3 Hz, 1H), 6.64 (d, *J* = 8.4 Hz, 1H), 5.63 (s, 1H), 5.38 (s, 1H), 3.26 (s, 3H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 170.32, 145.71, 144.29, 139.26, 136.94, 134.08, 130.40, 129.02, 128.58, 128.31, 126.23, 117.96, 99.67, 36.44; **HRMS (ESI-TOF)** m/z: calculated for $C_{16}H_{13}ClINNaO^+$: 419.9623 $(M + Na)^+$, found: 419.9623.

N-(5-Chloro-2-iodophenyl)-*N*-methyl-2-phenylacrylamide (**s18**)



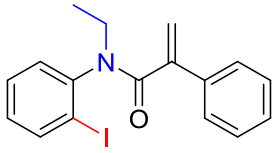
The title compound was prepared in line with method **GPB**, purified on flash column chromatography using PE/EA (5:1 v:v) as the eluent, and was obtained as a light yellow solid in an overall yield of 48%. Two rotamers were observed in a 6.1:1 ratio. The major rotamer is reported below. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.62 (d, *J* = 8.5 Hz, 1H), 7.26 – 7.17 (m, 3H), 7.11 – 7.03 (m, 2H), 6.85 (dd, *J* = 8.5, 2.3 Hz, 1H), 6.66 (d, *J* = 2.3 Hz, 1H), 5.67 (s, 1H), 5.36 (s, 1H), 3.25 (s, 3H). The data are identical to literature: H. Yoon, A. Lossouarn, F. Landau and M. Lautens, *Org. Lett.*, 2016, **18**, 6324.

N-(4-Bromo-2-iodophenyl)-*N*-methyl-2-phenylacrylamide (**s19**)



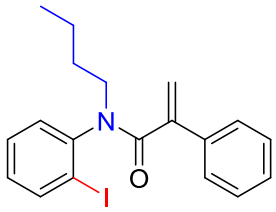
The title compound was prepared in line with method **GPB**, purified on flash column chromatography using PE/EA (5:1 v:v) as the eluent, and was obtained as a light yellow solid in an overall yield of 84%. Two rotamers were observed in a 7.3:1 ratio. The major rotamer is reported below. **^{1}H NMR (400 MHz, CDCl$_3$)** δ 7.87 (d, *J* = 2.0 Hz, 1H), 7.26 – 7.20 (m, 3H), 7.15 – 7.09 (m, 3H), 6.58 (d, *J* = 8.4 Hz, 1H), 5.62 (s, 1H), 5.38 (s, 1H), 3.26 (s, 3H). The data are identical to literature: H. Yoon, A. Lossouarn, F. Landau and M. Lautens, *Org. Lett.*, 2016, **18**, 6324.

N-Ethyl-*N*-(2-iodophenyl)-2-phenylacrylamide (**s20**)



The title compound was prepared in line with method **GPB**, purified on flash column chromatography using PE/EA (10:1 v:v) as the eluent, and was obtained as a light yellow solid in an overall yield of 55%. **^{1}H NMR (400 MHz, CDCl$_3$)** δ 7.77 (dd, *J* = 7.9, 0.9 Hz, 1H), 7.25 – 7.18 (m, 3H), 7.17 – 7.11 (m, 2H), 7.01 (td, *J* = 7.6, 0.9 Hz, 1H), 6.88 (td, *J* = 7.7, 1.3 Hz, 1H), 6.67 (dd, *J* = 7.8, 1.2 Hz, 1H), 4.47 – 4.34 (m, 1H), 3.27 – 3.14 (m, 1H), 1.17 (t, *J* = 7.1 Hz, 3H). The data are identical to literature: D. D. Vachhani, H. H. Butani, N. Sharma, U. C. Bhoya, A. K. Shah and E. V. Van der Eycken, *Chem. Commun.*, 2015, **51**, 14862.

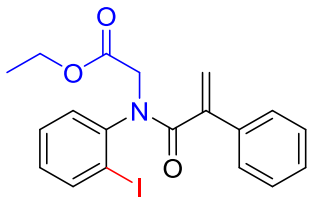
N-Butyl-*N*-(2-iodophenyl)-2-phenylacrylamide (**s21**)



The title compound was prepared in line with method **GPB**, purified on flash column chromatography using PE/EA (10:1 v:v) as the eluent, and was obtained as a light yellow solid in an overall yield of 63%. Two rotamers were observed in a 5.6:1 ratio. The major rotamer is reported below. **^{1}H NMR (400 MHz, CDCl$_3$)** δ 7.77 (dd, *J* = 7.9, 1.1 Hz, 1H), 7.26 – 7.19 (m, 3H), 7.17 – 7.09 (m, 2H), 7.00 (ddd, *J* = 7.7, 7.7, 1.2 Hz, 1H), 6.88 (ddd, *J* = 7.7, 7.7, 1.4 Hz, 1H), 6.65 (dd, *J* = 7.8, 1.3 Hz, 1H), 5.57 (s, 1H), 5.30 (s, 1H), 4.41 – 4.29 (m, 1H), 3.16 – 3.03 (m, 1H), 1.52 – 1.18 (m, 4H), 0.92 (t, *J* = 7.1 Hz, 3H). The data are identical to literature: D. D. Vachhani, H. H.

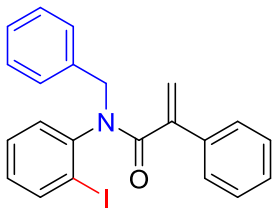
Butani, N. Sharma, U. C. Bhoya, A. K. Shah and E. V. Van der Eycken, *Chem. Commun.*, 2015, **51**, 14862.

Ethyl *N*-(2-iodophenyl)-*N*-(2-phenylacryloyl)glycinate (**s22**)



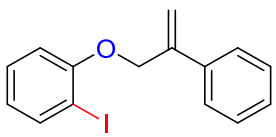
The title compound was prepared in line with method **GPB**, purified on flash column chromatography using PE/EA (5:1 v:v) as the eluent, and was obtained as a light yellow solid in an overall yield of 61%. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.75 (d, *J* = 7.9 Hz, 1H), 7.25 (dt, *J* = 8.4, 3.2 Hz, 6H), 7.10 – 7.01 (ddd, *J* = 7.8, 7.8, 1.0 Hz, 1H), 6.89 (ddd, *J* = 7.9, 7.9, 1.3 Hz, 1H), 5.56 (s, 1H), 5.44 (s, 1H), 5.12 (d, *J* = 17.3 Hz, 1H), 4.32 – 4.15 (m, 2H), 3.75 (d, *J* = 17.3 Hz, 1H), 1.30 (t, *J* = 7.1 Hz, 3H). The data are identical to literature: H. Yoon, A. Lossouarn, F. Landau and M. Lautens, *Org. Lett.*, 2016, **18**, 6324.

N-Benzyl-*N*-(2-iodophenyl)-2-phenylacrylamide (**s23**)



The title compound was prepared in line with method **GPB**, purified on flash column chromatography using PE/EA (10:1 v:v) as the eluent, and was obtained as a light yellow solid in an overall yield of 58%. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.77 (dd, *J* = 7.6, 1.4 Hz, 1H), 7.29 – 7.22 (m, 5H), 7.21 – 7.15 (m, 3H), 7.13 – 7.06 (m, 2H), 6.86 – 6.75 (m, 2H), 6.13 (dd, *J* = 7.6, 1.6 Hz, 1H), 5.83 (d, *J* = 14.2 Hz, 1H), 5.64 (s, 1H), 5.33 (s, 1H), 4.06 (d, *J* = 14.2 Hz, 1H). The data are identical to literature: H. Yoon, A. Lossouarn, F. Landau and M. Lautens, *Org. Lett.*, 2016, **18**, 6324.

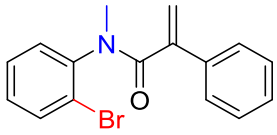
1-Iodo-2-((2-phenylallyl)oxy)benzene (s26)



The title compound was prepared in line with literature (*J. Am. Chem. Soc.*, 2011, **133**, 1778.),

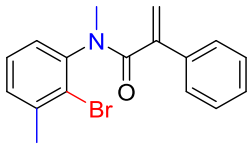
purified on flash column chromatography using PE/EA (10:1 v:v) as the eluent, and was obtained as a clear yellow oil in an overall yield of 47%. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.80 (dd, *J* = 7.7, 1.1 Hz, 1H), 7.50 (d, *J* = 7.1 Hz, 2H), 7.42 – 7.27 (m, 4H), 6.88 (d, *J* = 8.2 Hz, 1H), 6.74 (t, *J* = 7.6 Hz, 1H), 5.64 (d, *J* = 3.2 Hz, 2H), 4.95 (s, 2H). The data are identical to literature: S. G. Newman and M. Lautens, *J. Am. Chem. Soc.*, 2011, **133**, 1778.

N-(2-Bromophenyl)-*N*-methyl-2-phenylacrylamide (**s27**)



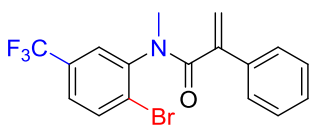
The title compound was prepared in line with method **GPB**, purified on flash column chromatography using PE/EA (5:1 v:v) as the eluent, and was obtained as a light yellow solid in an overall yield of 68%. Two rotamers were observed in a 8.8:1 ratio. The major rotamer is reported below. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.51 (dd, *J* = 7.5, 1.8 Hz, 1H), 7.29 – 7.23 (m, 3H), 7.21 – 7.15 (m, 2H), 7.12 – 7.03 (m, 2H), 6.85 (dd, *J* = 7.3, 2.0 Hz, 1H), 5.60 (s, 1H), 5.40 (s, 1H), 3.35 (s, 3H). The data are identical to literature: M. Pérez-Gómez, S. Hernández-Ponte, D. Bautista and J.-A. García-López, *Chem. Commun.*, 2017, **53**, 2842.

N-(2-Bromo-3-methylphenyl)-*N*-methyl-2-phenylacrylamide (**s28**)



The title compound was prepared in line with method **GPB**, purified on flash column chromatography using PE/EA (5:1 v:v) as the eluent, and was obtained as a clear yellow oil in an overall yield of 23%. Two rotamers were observed in a 6.6:1 ratio. The major rotamer is reported below. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.24 – 7.18 (m, 3H), 7.16 – 7.11 (m, 2H), 7.05 (d, *J* = 7.4 Hz, 1H), 6.91 (t, *J* = 7.7 Hz, 1H), 6.64 (d, *J* = 7.7 Hz, 1H), 5.52 (s, 1H), 5.33 (s, 1H), 3.30 (s, 3H), 2.34 (s, 3H). The data are identical to literature: T. Piou, A. Bunescu, Q. Wang, L. Neuville and J. Zhu, *Angew. Chem. Int. Ed.*, 2013, **52**, 12385.

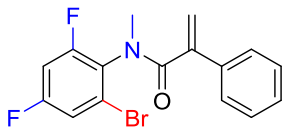
N-(2-Bromo-5-(trifluoromethyl)phenyl)-*N*-methyl-2-phenylacrylamide (**s29**)



The title compound was prepared in line with method **GPB**, purified on flash column chromatography using PE/EA (5:1 v:v) as the eluent, and was obtained as a light yellow solid in

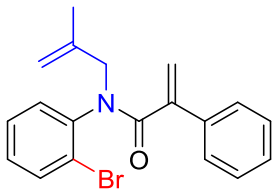
an overall yield of 71%. Two rotamers were observed in a 8.6:1 ratio. The major rotamer is reported below. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.57 (d, *J* = 8.3 Hz, 1H), 7.29 – 7.24 (m, 1H), 7.22 – 7.13 (m, 3H), 7.06 – 6.99 (m, 2H), 6.95 (s, 1H), 5.65 (s, 1H), 5.37 (s, 1H), 3.30 (s, 3H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 170.36, 145.99, 142.69, 136.74, 134.20, 130.64 (q, *J* = 33.4 Hz), 128.58, 128.42, 127.81 (q, *J* = 3.5 Hz), 127.51, 125.99, 125.84 (q, *J* = 3.6 Hz), 122.96 (q, *J* = 272.7 Hz), 118.60, 36.01; **HRMS (ESI-TOF)** m/z: calculated for $C_{17}H_{13}BrF_3NNaO^+$: 406.0025 $(M + Na)^+$, found: 406.0035.

N-(2-Bromo-4,6-difluorophenyl)-*N*-methyl-2-phenylacrylamide (**s30**)



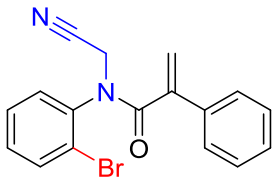
The title compound was prepared in line with method **GPB**, purified on flash column chromatography using PE/EA (5:1 v:v) as the eluent, and was obtained as a light yellow solid in an overall yield of 75%. Two rotamers were observed in a 4:1 ratio. The major rotamer is reported below. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.24 – 7.16 (m, 3H), 7.10 (dd, *J* = 7.4, 1.5 Hz, 2H), 7.05 – 6.99 (m, 1H), 6.58 (td, *J* = 9.0, 2.7 Hz, 1H), 5.63 (s, 1H), 5.39 (s, 1H), 3.24 (s, 3H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 170.72, 161.78 (d, *J* = 241.7 Hz), 159.25 (d, *J* = 241.9 Hz), 145.43, 136.15, 129.05, 128.32, 126.22, 118.70, 116.42 (d, *J* = 3.6 Hz), 116.17 (d, *J* = 3.8 Hz), 115.26, 104.23 (dd, *J* = 25.8, 25.5 Hz), 35.30; **HRMS (ESI-TOF)** m/z: calculated for $C_{16}H_{12}BrF_2NNaO^+$: 373.9963 $(M + Na)^+$, found: 373.9964.

N-(2-Bromophenyl)-*N*-(2-methylallyl)-2-phenylacrylamide (s**31**)



The title compound was prepared in line with method **GPB**, purified on flash column chromatography using PE/EA (10:1 v:v) as the eluent, and was obtained as a clear yellow oil in an overall yield of 54%. Two rotamers were observed in a 13:1 ratio. The major rotamer is reported below. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.54 (dd, *J* = 8.0, 1.1 Hz, 1H), 7.30 – 7.23 (m, 3H), 7.21 – 7.15 (m, 2H), 7.09 (ddd, *J* = 7.8, 7.8, 1.5 Hz, 1H), 6.99 (ddd, *J* = 7.7, 7.7, 1.2 Hz, 1H), 6.67 (dd, *J* = 7.8, 1.4 Hz, 1H), 5.59 (s, 1H), 5.35 (s, 1H), 5.16 (d, *J* = 14.8 Hz, 1H), 4.85 (s, 1H), 4.74 (s, 1H), 3.62 (d, *J* = 14.8 Hz, 1H), 1.87 (s, 3H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 170.30, 145.98, 140.37, 140.27, 137.15, 133.51, 131.96, 129.32, 128.44, 128.13, 127.41, 126.12, 123.65, 116.64, 114.39, 53.41, 20.95; **HRMS (ESI-TOF)** m/z: calculated for $C_{19}H_{18}BrNNaO^+$: 378.0464 $(M + Na)^+$, found: 378.0454.

N-(2-Bromophenyl)-*N*-(cyanomethyl)-2-phenylacrylamide (**s32**)



The title compound was prepared in line with method **GPB**, purified on flash column chromatography using PE/EA (4:1 v:v) as the eluent, and was obtained as a light yellow solid in an overall yield of 46%. **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.49 (dd, *J* = 7.5, 1.6 Hz, 1H), 7.26 – 7.18 (m, 3H), 7.18 – 7.04 (m, 4H), 6.97 (dd, *J* = 7.4, 1.8 Hz, 1H), 5.64 (s, 1H), 5.46 (s, 1H), 5.23 (d, *J* = 17.2 Hz, 1H), 4.10 (d, *J* = 17.2 Hz, 1H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 170.25, 144.08, 138.62, 135.94, 133.78, 131.38, 130.62, 128.60, 128.50, 126.14, 122.94, 119.29, 115.06, 35.90; **HRMS (ESI-TOF)** m/z: calculated for $C_{17}H_{13}BrN_2NaO^+$: 363.0103 $(M + Na)^+$, found: 363.0099.

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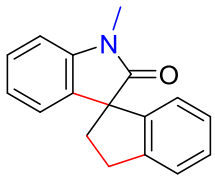
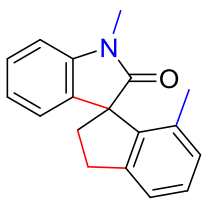
6. Characterization of Products.

1'-Methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p1**)



Purified by PTLC using DCM (R_f = 0.43) as the eluent to give the title compound as a viscous clear oil (for **s1**: 44 mg, 90%; for **s27** 45 mg, 91%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.36 (d, *J* = 7.5 Hz, 1H), 7.34 – 7.28 (m, 1H), 7.23 (t, *J* = 7.5 Hz, 1H), 7.11 – 7.00 (m, 3H), 6.91 (d, *J* = 7.8 Hz, 1H), 6.67 (d, *J* = 7.6 Hz, 1H), 3.52 – 3.39 (m, 1H), 3.30 – 3.16 (m, 4H), 2.74 – 2.63 (m, 1H), 2.46 – 2.35 (m, 1H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 179.70, 145.13, 144.22, 143.69, 134.78, 128.25, 128.04, 126.99, 125.11, 123.49, 123.45, 123.01, 108.06, 60.33, 38.04, 31.86, 26.52; **HRMS (ESI-TOF)** m/z: calculated for $C_{17}H_{15}NNaO^+$: 272.1046 $(M + Na)^+$, found: 272.1050.

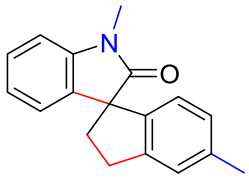
1',7-Dimethyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p2**)



Purified by PTLC using DCM (R_f = 0.40) as the eluent to give the title compound as a viscous

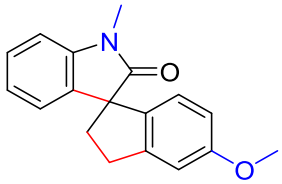
clear oil (50 mg, 94%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.29 (ddd, *J* = 7.7, 7.7, 1.8 Hz, 1H), 7.19 (d, *J* = 7.3 Hz, 1H), 7.14 (t, *J* = 7.4 Hz, 1H), 7.04 – 6.94 (m, 2H), 6.90 (d, *J* = 7.8 Hz, 1H), 6.87 (d, *J* = 7.2 Hz, 1H), 3.32 (s, 3H), 3.27 (t, *J* = 7.3 Hz, 2H), 2.76 – 2.63 (m, 1H), 2.35 – 2.24 (m, 1H), 1.65 (s, 3H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 179.58, 145.48, 143.03, 141.85, 134.36, 134.02, 128.83, 128.41, 128.09, 123.31, 122.97, 122.56, 108.01, 60.34, 39.00, 31.82, 26.58, 17.83; **HRMS (ESI-TOF)** m/z: calculated for $C_{18}H_{17}NNaO^+$: 286.1202 $(M + Na)^+$, found: 286.1203.

1',5-Dimethyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p3**)



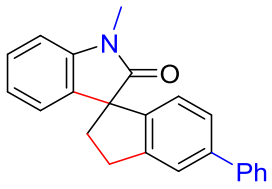
Purified by PTLC using DCM (R_f = 0.42) as the eluent to give the title compound as a viscous clear oil (45 mg, 86%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.29 (ddd, *J* = 7.7, 7.7, 1.7 Hz, 1H), 7.18 (s, 1H), 7.07 – 6.99 (m, 2H), 6.90 (d, *J* = 7.8 Hz, 2H), 6.55 (d, *J* = 7.7 Hz, 1H), 3.47 – 3.36 (m, 1H), 3.26 (s, 3H), 3.21 – 3.12 (m, 1H), 2.71 – 2.63 (m, 1H), 2.44 – 2.35 (m, 1H), 2.33 (s, 3H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 179.87, 145.30, 143.72, 141.30, 137.87, 134.87, 128.17, 127.86, 125.81, 123.46, 123.12, 122.98, 108.01, 59.98, 38.25, 31.73, 26.50, 21.48; **HRMS (ESI-TOF)** m/z: calculated for $C_{18}H_{17}NNaO^+$: 286.1202 $(M + Na)^+$, found: 286.1204.

5-Methoxy-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p4**)



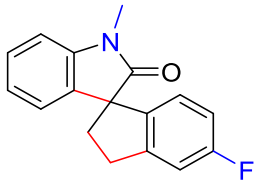
Purified by PTLC using DCM (R_f = 0.30) as the eluent to give the title compound as a viscous clear oil (46 mg, 83%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.29 (ddd, *J* = 7.7, 7.7, 1.8 Hz, 1H), 7.09 – 7.00 (m, 2H), 6.92 – 6.85 (m, 2H), 6.63 (dd, *J* = 8.4, 2.2 Hz, 1H), 6.56 (d, *J* = 8.4 Hz, 1H), 3.78 (s, 3H), 3.48 – 3.36 (m, 1H), 3.25 (s, 3H), 3.22 – 3.11 (m, 1H), 2.72 – 2.61 (m, 1H), 2.46 – 2.36 (m, 1H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 179.97, 160.00, 146.84, 143.68, 136.28, 134.89, 128.18, 124.12, 123.45, 122.99, 113.29, 110.21, 108.02, 59.59, 55.55, 38.58, 31.97, 26.50; **HRMS (ESI-TOF)** m/z: calculated for $C_{18}H_{17}NNaO_2^+$: 302.1151 $(M + Na)^+$, found: 302.1155.

1'-Methyl-5-phenyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p5**)



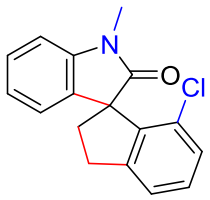
Purified by PTLC using DCM (R_f = 0.68) as the eluent to give the title compound as a viscous clear oil (55 mg, 85%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.61 – 7.53 (m, 3H), 7.42 (t, *J* = 7.5 Hz, 2H), 7.37 – 7.28 (m, 3H), 7.11 (d, *J* = 6.6 Hz, 1H), 7.05 (t, *J* = 7.4 Hz, 1H), 6.93 (d, *J* = 7.8 Hz, 1H), 6.74 (d, *J* = 7.9 Hz, 1H), 3.59 – 3.47 (m, 1H), 3.33 – 3.22 (m, 4H), 2.79 – 2.69 (m, 1H), 2.53 – 2.42 (m, 1H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 179.69, 145.82, 143.74, 143.35, 141.46, 141.45, 134.64, 128.80, 128.33, 127.38, 127.27, 126.33, 124.00, 123.68, 123.55, 123.08, 108.12, 60.08, 38.27, 31.88, 26.56; **HRMS (ESI-TOF)** m/z: calculated for $C_{23}H_{19}NNaO^+$: 348.1359 $(M + Na)^+$, found: 348.1361.

5-Fluoro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p6**)



Purified by PTLC using DCM (R_f = 0.70) as the eluent to give the title compound as a viscous clear oil (49 mg, 91%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.31 (dt, *J* = 8.0, 4.4 Hz, 1H), 7.07 – 7.01 (m, 3H), 6.91 (d, *J* = 7.8 Hz, 1H), 6.77 (td, *J* = 8.8, 2.2 Hz, 1H), 6.60 (dd, *J* = 8.3, 5.1 Hz, 1H), 3.50 – 3.38 (m, 1H), 3.26 (s, 3H), 3.22 – 3.13 (m, 1H), 2.75 – 2.66 (m, 1H), 2.49 – 2.38 (m, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 179.49, 163.08 (d, *J* = 245.2 Hz), 147.55 (d, *J* = 8.4 Hz), 143.67, 139.74 (d, *J* = 2.4 Hz), 134.39, 128.44, 124.63 (d, *J* = 9.2 Hz), 123.45, 123.12, 114.11 (d, *J* = 23.0 Hz), 112.13 (d, *J* = 22.4 Hz), 108.17, 59.53, 38.59, 31.81 (d, *J* = 2.0 Hz), 26.54; **HRMS (ESI-TOF)** m/z: calculated for $C_{17}H_{14}FNNaO^+$: 290.0952 $(M + Na)^+$, found: 290.0947.

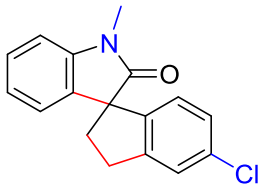
7-Chloro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p7**)



Purified by PTLC using DCM (R_f = 0.63) as the eluent to give the title compound as a viscous clear oil (54 mg, 95%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.30 (ddd, *J* = 7.7, 7.7, 1.2 Hz, 1H), 7.25 (d, *J* = 8.6 Hz, 1H), 7.19 (t, *J* = 7.6 Hz, 1H), 7.07 (d, *J* = 7.8 Hz, 1H), 6.99 (ddd, *J* = 7.4, 7.4, 0.4 Hz, 1H), 6.94 (d, *J* = 7.2 Hz, 1H), 6.90 (d, *J* = 7.8 Hz, 1H), 3.36 – 3.26 (m, 5H), 2.82 – 2.69 (m,

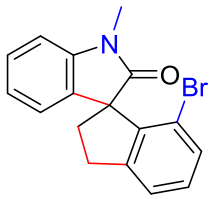
1H), 2.38 – 2.28 (m, 1H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 178.57, 147.74, 143.52, 141.30, 133.18, 130.64, 129.79, 128.34, 127.89, 123.43, 122.96, 122.80, 108.13, 60.42, 38.39, 32.18, 26.74; **HRMS (ESI-TOF)** m/z: calculated for $C_{17}H_{14}ClNNaO^+$: 306.0656 $(M + Na)^+$, found: 306.0665.

5-Chloro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p8**)



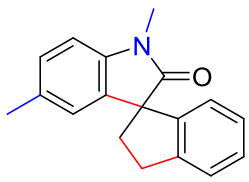
Purified by PTLC using DCM (R_f = 0.77) as the eluent to give the title compound as a viscous clear oil (55 mg, 97%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.38 – 7.28 (m, 2H), 7.08 – 7.01 (m, 3H), 6.91 (d, *J* = 7.8 Hz, 1H), 6.58 (d, *J* = 8.1 Hz, 1H), 3.49 – 3.38 (m, 1H), 3.26 (s, 3H), 3.22 – 3.11 (m, 1H), 2.74 – 2.64 (m, 1H), 2.47 – 2.37 (m, 1H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 179.22, 147.20, 143.69, 142.76, 134.13, 133.91, 128.52, 127.26, 125.38, 124.59, 123.45, 123.15, 108.21, 59.73, 38.26, 31.68, 26.56; **HRMS (ESI-TOF)** m/z: calculated for $C_{17}H_{14}ClNNaO^+$: 306.0656 $(M + Na)^+$, found: 306.0655.

7-Bromo-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p9**)



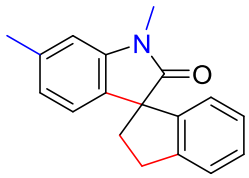
Purified by PTLC using DCM (R_f = 0.63) as the eluent to give the title compound as a viscous clear oil (25 mg, 39%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.36 (d, *J* = 7.5 Hz, 1H), 7.33 – 7.28 (m, 1H), 7.23 (t, *J* = 7.5 Hz, 1H), 7.11 – 7.02 (m, 2H), 6.91 (d, *J* = 7.8 Hz, 1H), 6.67 (d, *J* = 7.6 Hz, 1H), 3.51 – 3.41 (m, 1H), 3.31 – 3.17 (m, 4H), 2.73 – 2.64 (m, 1H), 2.46 – 2.36 (m, 1H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 179.70, 145.13, 144.24, 143.70, 134.79, 128.25, 128.03, 127.00, 125.10, 123.49, 123.45, 123.00, 108.05, 60.34, 38.04, 31.87, 26.52; **HRMS (ESI-TOF)** m/z: calculated for $C_{17}H_{14}BrNNaO^+$: 350.0151 $(M + Na)^+$, found: 350.0160.

1',5'-Dimethyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p10**)



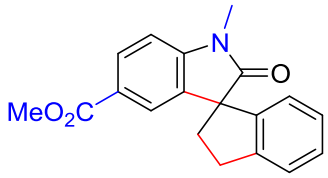
Purified by PTLC using DCM (R_f = 0.57) as the eluent to give the title compound as a viscous clear oil (45 mg, 85%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.36 (d, *J* = 7.5 Hz, 1H), 7.23 (t, *J* = 7.2 Hz, 1H), 7.13 – 7.05 (m, 2H), 6.87 (s, 1H), 6.80 (d, *J* = 7.9 Hz, 1H), 6.68 (d, *J* = 7.6 Hz, 1H), 3.50 – 3.39 (m, 1H), 3.28 – 3.17 (m, 4H), 2.73 – 2.63 (m, 1H), 2.45 – 2.33 (m, 1H), 2.28 (s, 3H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 179.69, 145.12, 144.41, 141.28, 134.86, 132.56, 128.46, 127.98, 126.98, 125.08, 124.29, 123.50, 107.79, 60.41, 38.01, 31.89, 26.55, 21.20; **HRMS (ESI-TOF)** m/z: calculated for $C_{18}H_{17}NNaO^+$: 286.1202 $(M + Na)^+$, found: 286.1196.

1',6'-Dimethyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p11**)



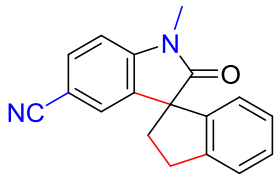
Purified by PTLC using DCM (R_f = 0.57) as the eluent to give the title compound as a white solid (46 mg, 88%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.35 (d, *J* = 7.5 Hz, 1H), 7.22 (t, *J* = 7.2 Hz, 1H), 7.07 (t, *J* = 7.4 Hz, 1H), 6.93 (d, *J* = 7.5 Hz, 1H), 6.84 (d, *J* = 7.5 Hz, 1H), 6.74 (s, 1H), 6.67 (d, *J* = 7.6 Hz, 1H), 3.50 – 3.38 (m, 1H), 3.28 – 3.15 (m, 4H), 2.72 – 2.61 (m, 1H), 2.45 – 2.34 (m, 4H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 180.03, 145.11, 144.41, 143.80, 138.40, 131.87, 127.96, 126.97, 125.08, 123.46, 123.44, 123.22, 109.02, 60.14, 38.10, 31.83, 26.49, 21.94; **HRMS (ESI-TOF)** m/z: calculated for $C_{18}H_{17}NNaO^+$: 286.1202 $(M + Na)^+$, found: 286.1194.

Methyl 1'-methyl-2'-oxo-2,3-dihydrospiro[indene-1,3'-indoline]-5'-carboxylate (**p12**)



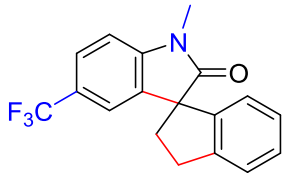
Purified by PTLC using DCM (R_f = 0.58) as the eluent to give the title compound as a yellow solid (45 mg, 74%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 8.06 (dd, *J* = 8.2, 1.5 Hz, 1H), 7.71 (d, *J* = 1.2 Hz, 1H), 7.37 (d, *J* = 7.5 Hz, 1H), 7.30 – 7.21 (m, 1H), 7.08 (t, *J* = 7.5 Hz, 1H), 6.94 (d, *J* = 8.2 Hz, 1H), 6.63 (d, *J* = 7.6 Hz, 1H), 3.85 (s, 3H), 3.51 – 3.39 (m, 1H), 3.35 – 3.20 (m, 4H), 2.73 – 2.63 (m, 1H), 2.50 – 2.39 (m, 1H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 179.94, 166.92, 147.82, 145.16, 143.46, 134.72, 131.07, 128.31, 127.12, 125.27, 125.00, 124.81, 123.36, 107.68, 60.05, 52.11, 37.98, 31.84, 26.74; **HRMS (ESI-TOF)** m/z: calculated for $C_{19}H_{17}NNaO_3^+$: 330.1101 $(M + Na)^+$, found: 330.1091.

1'-Methyl-2'-oxo-2,3-dihydrospiro[indene-1,3'-indoline]-5'-carbonitrile (**p13**)



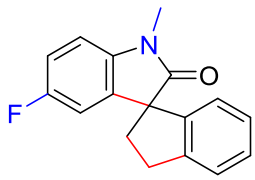
Purified by PTLC using DCM (R_f = 0.60) as the eluent to give the title compound as a viscous clear oil (41 mg, 75%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.63 (dd, *J* = 8.1, 1.5 Hz, 1H), 7.38 (d, *J* = 7.6 Hz, 1H), 7.30 – 7.24 (m, 2H), 7.10 (t, *J* = 7.5 Hz, 1H), 6.97 (d, *J* = 8.1 Hz, 1H), 6.62 (d, *J* = 7.6 Hz, 1H), 3.50 – 3.40 (m, 1H), 3.32 – 3.19 (m, 4H), 2.74 – 2.64 (m, 1H), 2.45 – 2.35 (m, 1H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 179.29, 147.51, 145.04, 142.75, 135.77, 133.64, 128.66, 127.31, 126.93, 125.44, 123.23, 119.20, 108.54, 106.14, 59.89, 38.11, 31.77, 26.79; **HRMS (ESI-TOF)** m/z: calculated for $C_{18}H_{14}N_2NaO^+$: 297.0998 $(M + Na)^+$, found: 297.0989.

1'-Methyl-5'-(trifluoromethyl)-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p14**)



Purified by PTLC using DCM (R_f = 0.80) as the eluent to give the title compound as a viscous clear oil (50 mg, 78%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.59 (d, *J* = 8.1 Hz, 1H), 7.38 (d, *J* = 7.5 Hz, 1H), 7.30 – 7.23 (m, 2H), 7.10 (t, *J* = 7.4 Hz, 1H), 6.98 (d, *J* = 8.2 Hz, 1H), 6.64 (d, *J* = 7.6 Hz, 1H), 3.53 – 3.41 (m, 1H), 3.33 – 3.19 (m, 4H), 2.75 – 2.64 (m, 1H), 2.49 – 2.37 (m, 1H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 179.58, 146.73, 145.18, 143.21, 135.25, 128.46, 127.22, 126.14 (q, *J* = 4.0 Hz), 125.34, 125.32 (q, *J* = 33.1 Hz), 124.47 (q, *J* = 271.1 Hz), 123.37, 120.59 (q, *J* = 3.6 Hz), 107.86, 60.17, 38.10, 31.82, 26.74; **HRMS (ESI-TOF)** m/z: calculated for $C_{18}H_{14}F_3NNaO^+$: 340.0920 $(M + Na)^+$, found: 340.0926.

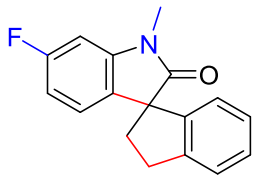
5'-Fluoro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p15**)



Purified by PTLC using DCM (R_f = 0.60) as the eluent to give the title compound as a viscous clear oil (40 mg, 74%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.36 (d, *J* = 7.5 Hz, 1H), 7.24 (t, *J* = 7.5 Hz, 1H), 7.09 (t, *J* = 7.4 Hz, 1H), 6.99 (ddd, *J* = 9.0, 9.0, 2.5 Hz, 1H), 6.86 – 6.76 (m, 2H), 6.66 (d, *J* = 7.6 Hz, 1H), 3.50 – 3.39 (m, 1H), 3.28 – 3.16 (m, 4H), 2.74 – 2.65 (m, 1H), 2.43 – 2.34 (m, 1H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 179.39, 159.66 (d, *J* = 240.7 Hz), 145.06, 143.63, 139.58 (d,

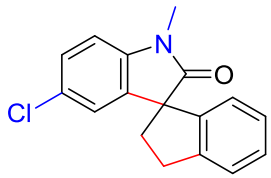
J = 1.7 Hz), 136.34 (d, *J* = 7.9 Hz), 128.30, 127.12, 125.24, 123.39, 114.44 (d, *J* = 23.5 Hz), 111.65 (d, *J* = 24.7 Hz), 108.50 (d, *J* = 8.1 Hz), 60.69, 38.01, 31.82, 26.69; **HRMS (ESI-TOF)** m/z: calculated for $C_{17}H_{14}FNNaO^+$: 290.0952 $(M + Na)^+$, found: 290.0950.

6'-Fluoro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p16**)



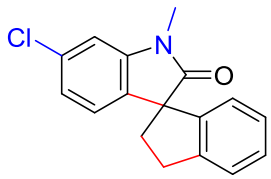
Purified by PTLC using DCM (R_f = 0.72) as the eluent to give the title compound as a white solid (50 mg, 93%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.35 (d, *J* = 7.5 Hz, 1H), 7.23 (t, *J* = 7.5 Hz, 1H), 7.08 (t, *J* = 7.4 Hz, 1H), 6.97 (dd, *J* = 8.1, 5.4 Hz, 1H), 6.74 – 6.61 (m, 3H), 3.50 – 3.39 (m, 1H), 3.27 – 3.14 (m, 4H), 2.72 – 2.61 (m, 1H), 2.42 – 2.31 (m, 1H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 179.96, 163.19 (d, *J* = 244.8 Hz), 145.19 (d, *J* = 11.5 Hz), 145.07, 143.89, 129.95 (d, *J* = 2.9 Hz), 128.19, 127.06, 125.19, 124.49 (d, *J* = 9.7 Hz), 123.35, 108.95 (d, *J* = 22.3 Hz), 96.93 (d, *J* = 27.6 Hz), 59.88, 38.13, 31.75, 26.65; **HRMS (ESI-TOF)** m/z: calculated for $C_{17}H_{14}FNNaO^+$: 290.0952 $(M + Na)^+$, found: 290.0953.

5'-Chloro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p17**)



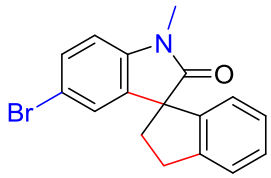
Purified by PTLC using DCM (R_f = 0.67) as the eluent to give the title compound as a viscous clear oil (43 mg, 76%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.36 (d, *J* = 7.5 Hz, 1H), 7.29 – 7.21 (m, 2H), 7.09 (t, *J* = 7.4 Hz, 1H), 7.01 (d, *J* = 2.0 Hz, 1H), 6.82 (d, *J* = 8.3 Hz, 1H), 6.67 (d, *J* = 7.6 Hz, 1H), 3.49 – 3.38 (m, 1H), 3.27 – 3.16 (m, 4H), 2.73 – 2.64 (m, 1H), 2.43 – 2.34 (m, 1H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 179.23, 145.06, 143.49, 142.21, 136.41, 128.34, 128.33, 128.19, 127.16, 125.25, 124.03, 123.41, 109.02, 60.44, 38.01, 31.83, 26.67; **HRMS (ESI-TOF)** m/z: calculated for $C_{17}H_{14}ClNNaO^+$: 306.0656 $(M + Na)^+$, found: 306.0662.

6'-Chloro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p18**)



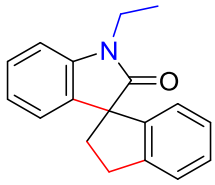
Purified by PTLC using DCM (R_f = 0.73) as the eluent to give the title compound as a white solid (50 mg, 88%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.35 (d, *J* = 7.5 Hz, 1H), 7.23 (t, *J* = 7.5 Hz, 1H), 7.08 (t, *J* = 7.5 Hz, 1H), 7.02 – 6.89 (m, 3H), 6.65 (d, *J* = 7.6 Hz, 1H), 3.50 – 3.39 (m, 1H), 3.28 – 3.14 (m, 4H), 2.73 – 2.62 (m, 1H), 2.42 – 2.32 (m, 1H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 179.58, 145.08, 144.91, 143.64, 134.01, 133.05, 128.26, 127.11, 125.21, 124.43, 123.36, 122.80, 108.83, 59.97, 38.05, 31.79, 26.64; **HRMS (ESI-TOF)** m/z: calculated for $C_{17}H_{14}ClNNaO^+$: 306.0656 $(M + Na)^+$, found: 306.0663.

5'-Bromo-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p19**)



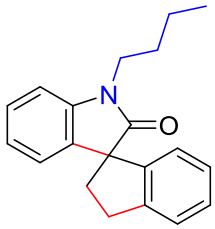
Purified by PTLC using DCM (R_f = 0.67) as the eluent to give the title compound as a viscous clear oil (49 mg, 73%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.42 (dd, *J* = 8.3, 1.9 Hz, 1H), 7.36 (d, *J* = 7.5 Hz, 1H), 7.24 (t, *J* = 7.5 Hz, 1H), 7.14 (d, *J* = 1.8 Hz, 1H), 7.10 (t, *J* = 7.4 Hz, 1H), 6.78 (d, *J* = 8.3 Hz, 1H), 6.67 (d, *J* = 7.6 Hz, 1H), 3.50 – 3.36 (m, 1H), 3.27 – 3.16 (m, 4H), 2.72 – 2.62 (m, 1H), 2.45 – 2.33 (m, 1H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 179.11, 145.06, 143.46, 142.70, 136.78, 131.11, 128.35, 127.16, 126.75, 125.26, 123.43, 115.61, 109.54, 60.39, 38.02, 31.82, 26.65; **HRMS (ESI-TOF)** m/z: calculated for $C_{17}H_{14}BrNNaO^+$: 350.0151 $(M + Na)^+$, found: 350.0157.

1'-Ethyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p20**)



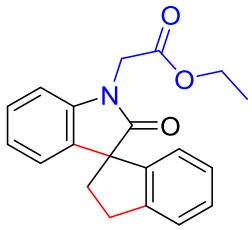
Purified by PTLC using DCM (R_f = 0.67) as the eluent to give the title compound as a viscous clear oil (50 mg, 94%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.36 (d, *J* = 7.5 Hz, 1H), 7.29 (t, *J* = 8.1 Hz, 1H), 7.22 (t, *J* = 7.4 Hz, 1H), 7.12 – 6.98 (m, 3H), 6.93 (d, *J* = 7.8 Hz, 1H), 6.65 (d, *J* = 7.6 Hz, 1H), 3.91 – 3.73 (m, 2H), 3.53 – 3.39 (m, 1H), 3.28 – 3.16 (m, 1H), 2.75 – 2.64 (m, 1H), 2.49 – 2.35 (m, 1H), 1.32 (t, *J* = 7.2 Hz, 3H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 179.26, 145.08, 144.39, 142.72, 135.08, 128.17, 128.00, 127.01, 125.09, 123.67, 123.30, 122.76, 108.21, 60.25, 37.82, 34.86, 31.89, 12.91; **HRMS (ESI-TOF)** m/z: calculated for $C_{18}H_{17}NNaO^+$: 286.1202 $(M + Na)^+$, found: 286.1200.

1'-Butyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p21**)



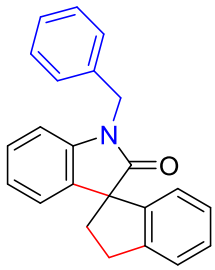
Purified by PTLC using DCM (R_f = 0.77) as the eluent to give the title compound as a viscous clear oil (56 mg, 96%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.35 (t, *J* = 7.4 Hz, 1H), 7.29 (t, *J* = 7.5 Hz, 1H), 7.22 (t, *J* = 7.4 Hz, 1H), 7.12 – 6.98 (m, 3H), 6.92 (d, *J* = 7.8 Hz, 1H), 6.65 (d, *J* = 7.6 Hz, 1H), 3.86 – 3.64 (m, 2H), 3.53 – 3.39 (m, 1H), 3.28 – 3.14 (m, 1H), 2.74 – 2.63 (m, 1H), 2.48 – 2.35 (m, 1H), 1.81 – 1.66 (m, 2H), 1.48 – 1.35 (m, 2H), 0.97 (t, *J* = 7.4 Hz, 3H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 179.58, 145.13, 144.44, 143.14, 135.00, 128.14, 127.99, 127.01, 125.10, 123.64, 123.32, 122.72, 108.35, 60.25, 39.89, 37.97, 31.89, 29.70, 20.27, 13.92; **HRMS (ESI-TOF)** m/z: calculated for $C_{20}H_{21}NNaO^+$: 314.1515 $(M + Na)^+$, found: 314.1511.

Ethyl 2-(2'-oxo-2,3-dihydrospiro[indene-1,3'-indolin]-1'-yl)acetate (**p22**)



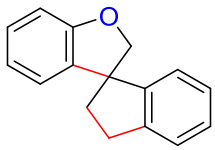
Purified by PTLC using DCM (R_f = 0.60) as the eluent to give the title compound as a viscous clear oil (64 mg, 99%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.36 (d, *J* = 7.5 Hz, 1H), 7.28 (dd, *J* = 7.7, 1.5 Hz, 1H), 7.23 (t, *J* = 7.5 Hz, 1H), 7.13 – 7.00 (m, 3H), 6.79 (d, *J* = 7.7 Hz, 2H), 4.61 (d, *J* = 17.6 Hz, 1H), 4.42 (d, *J* = 17.5 Hz, 1H), 4.23 (q, *J* = 7.1 Hz, 2H), 3.52 – 3.37 (m, 1H), 3.32 – 3.18 (m, 1H), 2.80 – 2.69 (m, 1H), 2.51 – 2.40 (m, 1H), 1.28 (t, *J* = 7.1 Hz, 3H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 179.70, 167.77, 144.90, 144.20, 142.23, 134.57, 128.22, 128.11, 127.13, 125.04, 123.70, 123.37, 108.04, 61.89, 60.21, 41.51, 37.80, 31.91, 14.26; **HRMS (ESI-TOF)** m/z: calculated for $C_{20}H_{19}NNaO_3^+$: 344.1257 $(M + Na)^+$, found: 344.1257.

1'-Benzyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p23**)



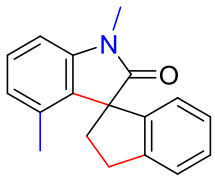
Purified by PTLC using DCM (R_f = 0.83) as the eluent to give the title compound as a viscous clear oil (65 mg, 99%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.39 (d, *J* = 7.5 Hz, 1H), 7.36 – 7.32 (m, 4H), 7.31 – 7.23 (m, 2H), 7.18 (t, *J* = 7.7 Hz, 1H), 7.10 (t, *J* = 7.5 Hz, 1H), 7.06 (d, *J* = 6.8 Hz, 1H), 6.99 (t, *J* = 7.4 Hz, 1H), 6.79 (d, *J* = 7.8 Hz, 1H), 6.69 (d, *J* = 7.6 Hz, 1H), 5.05 (d, *J* = 15.6 Hz, 1H), 4.87 (d, *J* = 15.6 Hz, 1H), 3.58 – 3.44 (m, 1H), 3.31 – 3.17 (m, 1H), 2.84 – 2.70 (m, 1H), 2.54 – 2.42 (m, 1H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 179.77, 145.19, 144.32, 142.79, 136.24, 134.72, 128.93, 128.17, 128.11, 127.73, 127.42, 127.08, 125.18, 123.60, 123.42, 123.04, 109.12, 60.30, 43.91, 38.15, 31.91; **HRMS (ESI-TOF)** m/z: calculated for $C_{23}H_{19}NNaO^+$: 348.1359 $(M + Na)^+$, found: 348.1356.

2',3'-Dihydro-2H-spiro[benzofuran-3,1'-indene] (**p26**)



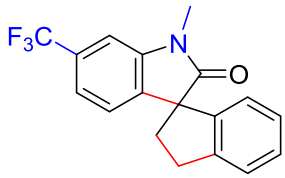
Purified by PTLC using PE (R_f = 0.58) as the eluent to give the title compound as a viscous clear oil (16 mg, 35%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.28 (d, *J* = 7.1 Hz, 1H), 7.25 – 7.13 (m, 3H), 7.05 (d, *J* = 7.3 Hz, 1H), 6.95 (d, *J* = 7.3 Hz, 1H), 6.91 – 6.81 (m, 2H), 4.58 (d, *J* = 8.8 Hz, 1H), 4.46 (d, *J* = 8.8 Hz, 1H), 3.15 – 2.94 (m, 2H), 2.48 – 2.30 (m, 2H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 160.02, 147.43, 143.55, 134.83, 128.58, 127.58, 127.33, 124.61, 123.95, 123.69, 121.26, 109.75, 83.65, 58.49, 41.04, 30.80; **HRMS (ESI-TOF)** m/z: calculated for $C_{16}H_{14}NaO^+$: 245.0937 $(M + Na)^+$, found: 245.0943.

1',4'-Dimethyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p28**)



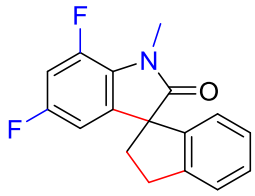
Purified by PTLC using DCM (R_f = 0.55) as the eluent to give the title compound as a viscous clear oil (32 mg, 60%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.34 (d, *J* = 7.5 Hz, 1H), 7.22 (t, *J* = 7.8 Hz, 2H), 7.06 (t, *J* = 7.4 Hz, 1H), 6.82 (d, *J* = 7.8 Hz, 1H), 6.75 (d, *J* = 7.8 Hz, 1H), 6.64 (d, *J* = 7.6 Hz, 1H), 3.62 – 3.49 (m, 1H), 3.26 – 3.13 (m, 4H), 2.62 – 2.53 (m, 2H), 1.91 (s, 3H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 179.95, 145.40, 144.28, 142.33, 134.74, 131.48, 128.20, 128.00, 126.93, 125.30, 125.19, 123.30, 105.73, 60.59, 34.65, 31.99, 26.55, 17.82; **HRMS (ESI-TOF)** m/z: calculated for $C_{18}H_{17}NNaO^+$: 286.1202 $(M + Na)^+$, found: 286.1201.

1'-Methyl-6'-(trifluoromethyl)-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p29**)



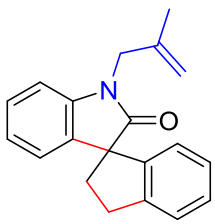
Purified by PTLC using DCM (R_f = 0.77) as the eluent to give the title compound as a white solid (59 mg, 93%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.37 (d, *J* = 7.5 Hz, 1H), 7.31 (d, *J* = 7.8 Hz, 1H), 7.25 (t, *J* = 7.1 Hz, 1H), 7.17 – 7.04 (m, 3H), 6.65 (d, *J* = 7.6 Hz, 1H), 3.54 – 3.40 (m, 1H), 3.30 (s, 3H), 3.27 – 3.17 (m, 1H), 2.76 – 2.65 (m, 1H), 2.47 – 2.36 (m, 1H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 179.30, 145.14, 144.31, 143.29, 138.56, 130.80 (q, *J* = 32.0 Hz), 128.43, 127.21, 125.30, 124.16 (q, *J* = 272.2 Hz), 123.72, 123.38, 120.13 (q, *J* = 4.0 Hz), 104.84 (q, *J* = 3.7 Hz), 60.24, 38.05, 31.86, 26.71; **HRMS (ESI-TOF)** m/z: calculated for $C_{18}H_{14}F_3NNaO^+$: 340.0920 $(M + Na)^+$, found: 340.0930.

5',7'-Difluoro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p30**)



Purified by PTLC using DCM (R_f = 0.81) as the eluent to give the title compound as a viscous clear oil (47 mg, 82%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.36 (d, *J* = 7.6 Hz, 1H), 7.25 (t, *J* = 7.1 Hz, 1H), 7.11 (t, *J* = 7.5 Hz, 1H), 6.79 (ddd, *J* = 11.4, 9.3, 2.3 Hz, 1H), 6.69 (d, *J* = 7.6 Hz, 1H), 6.60 (dd, *J* = 7.3, 1.9 Hz, 1H), 3.49 – 3.39 (m, 4H), 3.25 – 3.14 (m, 1H), 2.75 – 2.64 (m, 1H), 2.42 – 2.31 (m, 1H); **^{13}C NMR (101 MHz, $CDCl_3$)** δ 178.98, 158.74 (dd, *J* = 244.3, 10.0 Hz), 146.91 (dd, *J* = 246.5, 12.0 Hz), 144.96, 143.25, 138.38 (dd, *J* = 8.9, 4.1 Hz), 128.50, 127.24, 126.42 (dd, *J* = 8.4, 3.1 Hz), 125.32, 123.36, 107.50 (dd, *J* = 24.2, 3.7 Hz), 104.15 (dd, *J* = 26.9, 23.4 Hz), 60.96, 38.27, 31.77, 28.97 (d, *J* = 5.5 Hz); **HRMS (ESI-TOF)** m/z: calculated for $C_{17}H_{13}F_2NNaO^+$: 308.0857 $(M + Na)^+$, found: 308.0859.

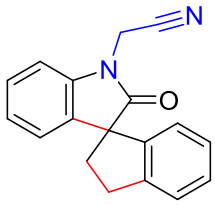
1'-(2-Methylallyl)-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p31**)



Purified by PTLC using DCM (R_f = 0.81) as the eluent to give the title compound as a viscous clear oil (41 mg, 71%). **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.36 (d, *J* = 7.5 Hz, 1H), 7.29 – 7.20 (m,

2H), 7.11 – 6.98 (m, 3H), 6.89 (d, *J* = 7.8 Hz, 1H), 6.67 (d, *J* = 7.6 Hz, 1H), 4.95 (d, *J* = 16.1 Hz, 2H), 4.39 (d, *J* = 16.1 Hz, 1H), 4.23 (d, *J* = 16.1 Hz, 1H), 3.54 – 3.41 (m, 1H), 3.27 – 3.16 (m, 1H), 2.75 – 2.64 (m, 1H), 2.48 – 2.38 (m, 1H), 1.76 (s, 3H); **^{13}C NMR (101 MHz, CDCl$_3$)** δ 179.54, 145.23, 144.32, 143.09, 139.40, 134.58, 128.17, 128.08, 127.05, 125.17, 123.56, 123.41, 122.97, 112.68, 109.14, 60.23, 45.98, 38.32, 31.89, 20.04; **HRMS (ESI-TOF)** m/z: calculated for $C_{20}H_{19}NNaO^+$: 312.1359 $(M + Na)^+$, found: 312.1358.

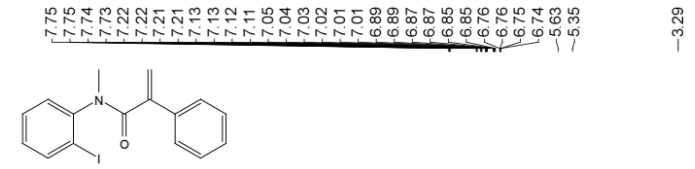
2-(2'-Oxo-2,3-dihydrospiro[indene-1,3'-indolin]-1'-yl)acetonitrile (**p32**)

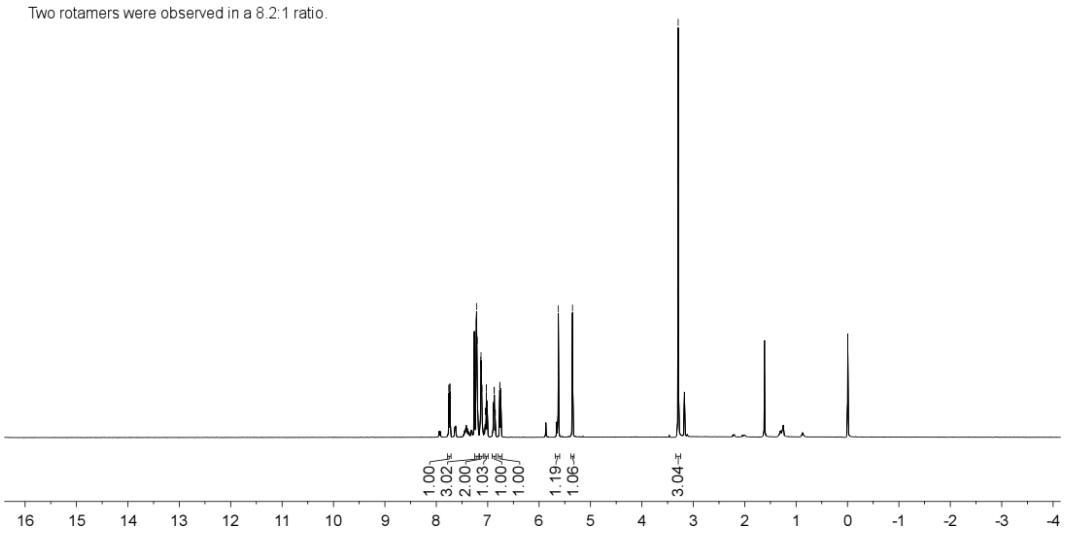


Purified by PTLC using DCM (R_f = 0.68) as the eluent to give the title compound as a viscous clear oil (43 mg, 78%). **^{1}H NMR (400 MHz, CDCl$_3$)** δ 7.42 – 7.34 (m, 2H), 7.29 – 7.23 (m, 1H), 7.17 – 7.05 (m, 4H), 6.66 (d, *J* = 7.6 Hz, 1H), 4.68 (s, 2H), 3.53 – 3.40 (m, 1H), 3.29 – 3.17 (m, 1H), 2.75 – 2.65 (m, 1H), 2.52 – 2.39 (m, 1H); **^{13}C NMR (101 MHz, CDCl$_3$)** δ 178.65, 145.04, 143.33, 140.30, 134.10, 128.72, 128.50, 127.24, 125.29, 124.44, 124.16, 123.49, 113.98, 108.45, 60.10, 38.23, 31.78, 27.90; **HRMS (ESI-TOF)** m/z: calculated for $C_{18}H_{14}N_2NaO^+$: 297.0998 $(M + Na)^+$, found: 297.1001.

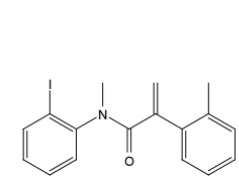
7. Copies of NMR Spectra

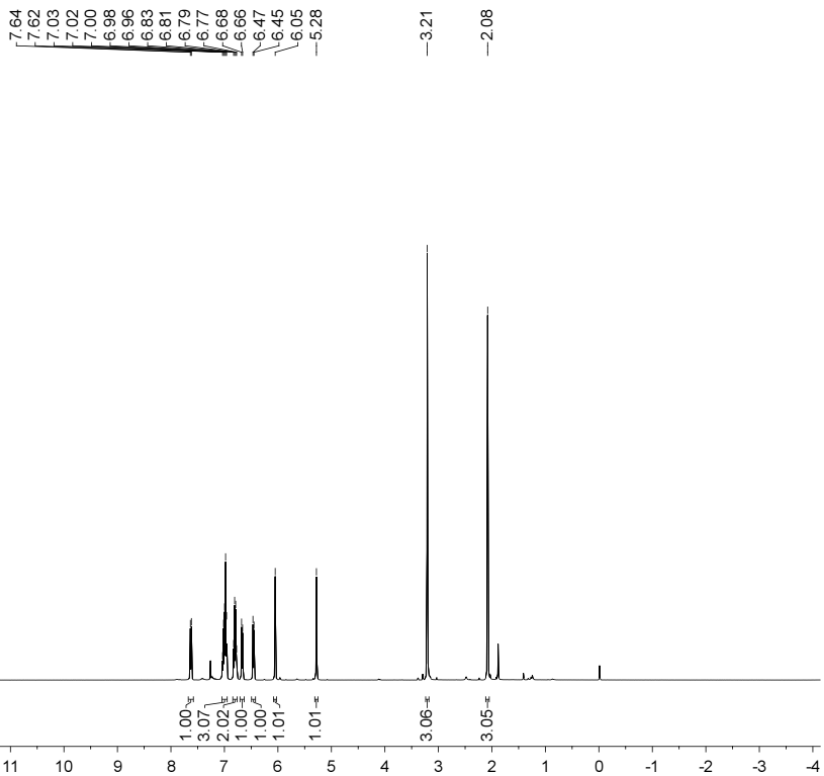
^{1}H NMR for *N*-(2-iodophenyl)-*N*-methyl-2-phenylacrylamide (**s1**)



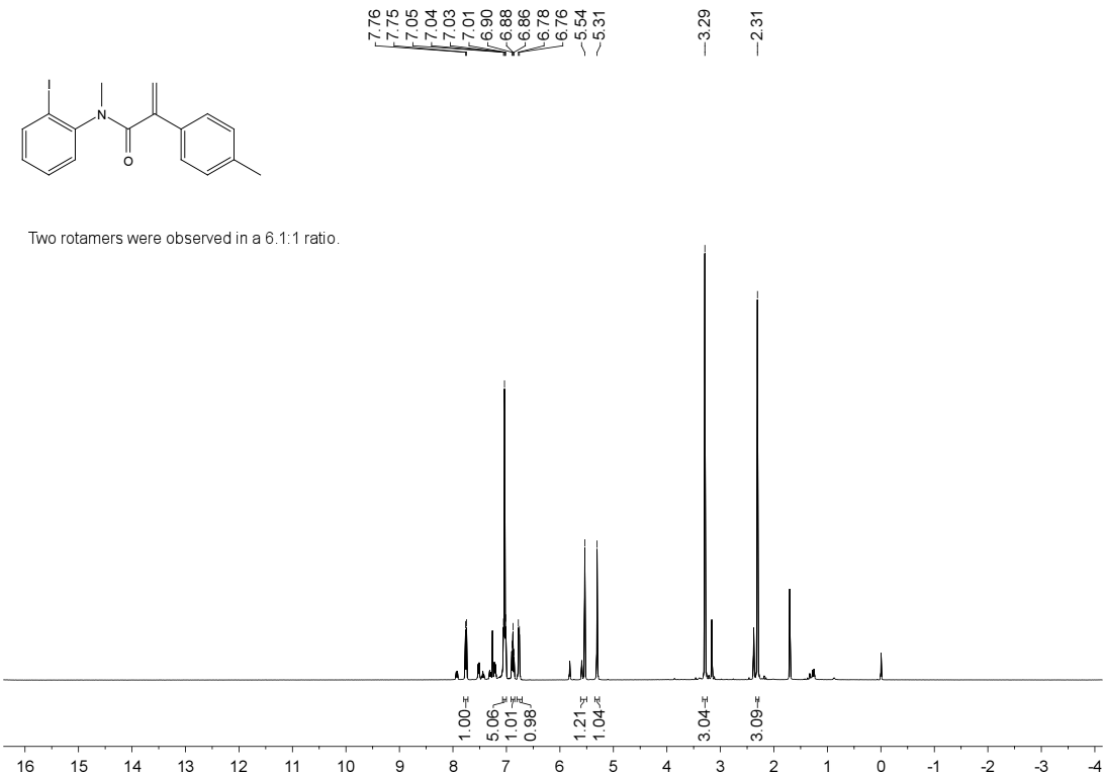


^{1}H NMR for *N*-(2-iodophenyl)-*N*-methyl-2-(*o*-tolyl)acrylamide (**s2**)

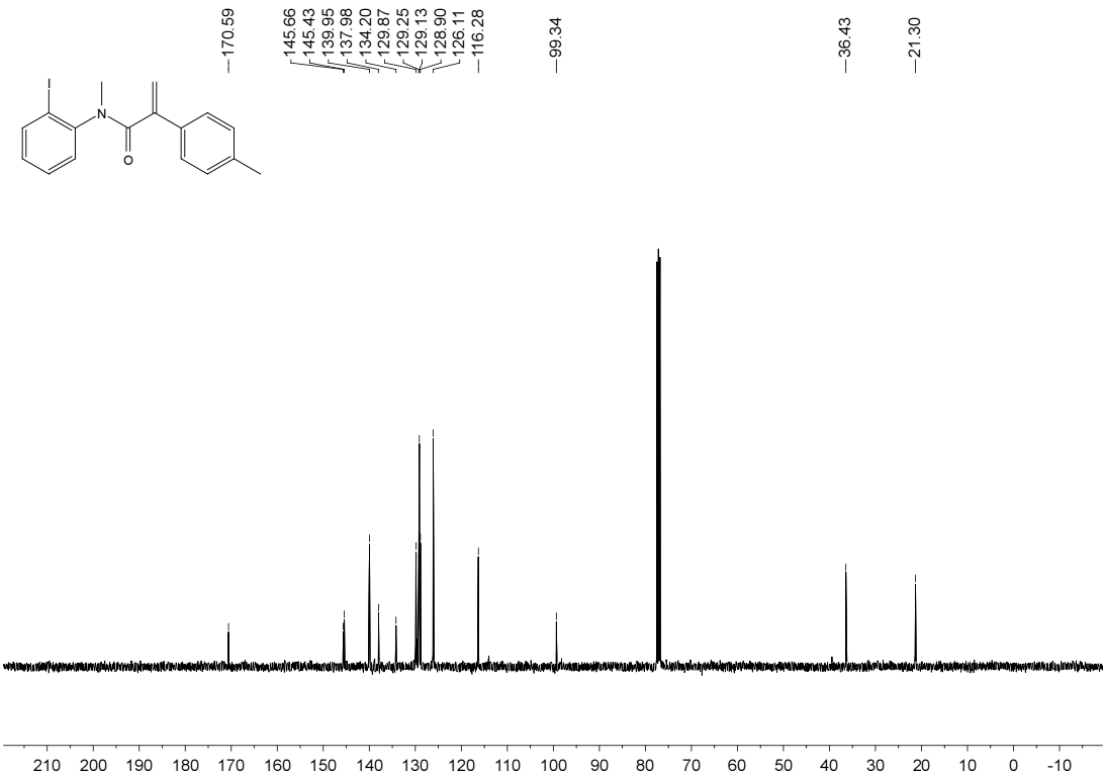




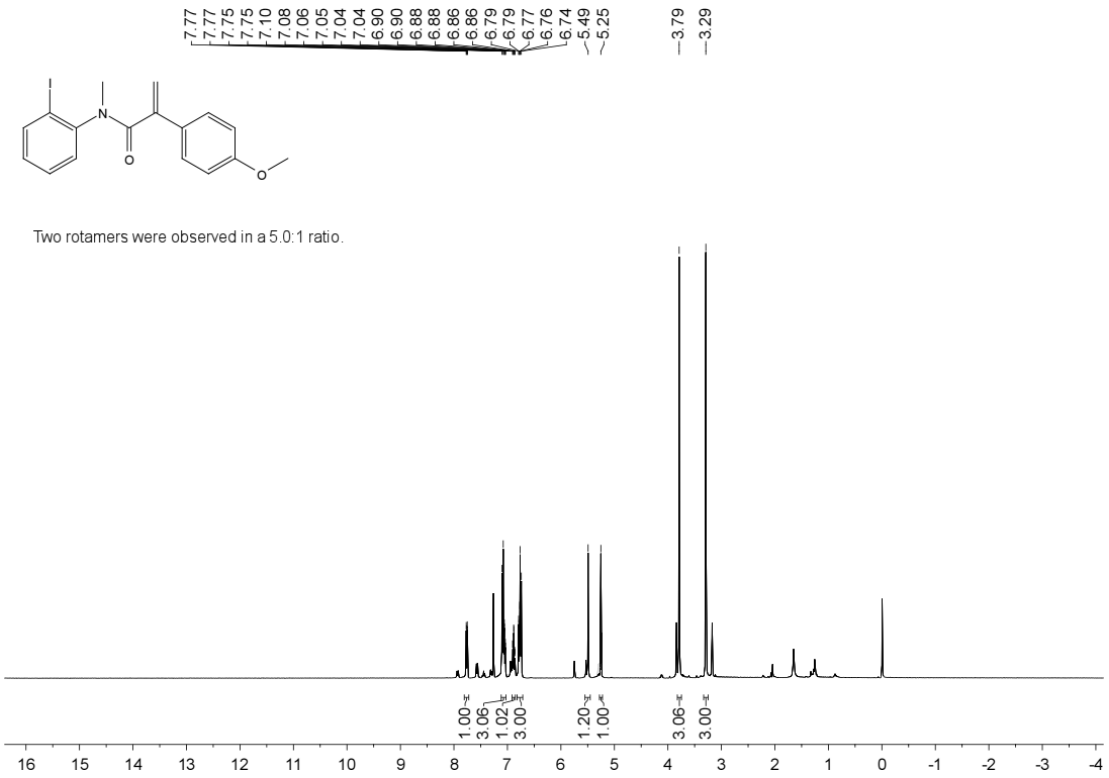
^{1}H NMR for *N*-(2-iodophenyl)-*N*-methyl-2-(*p*-tolyl)acrylamide (**s3**)



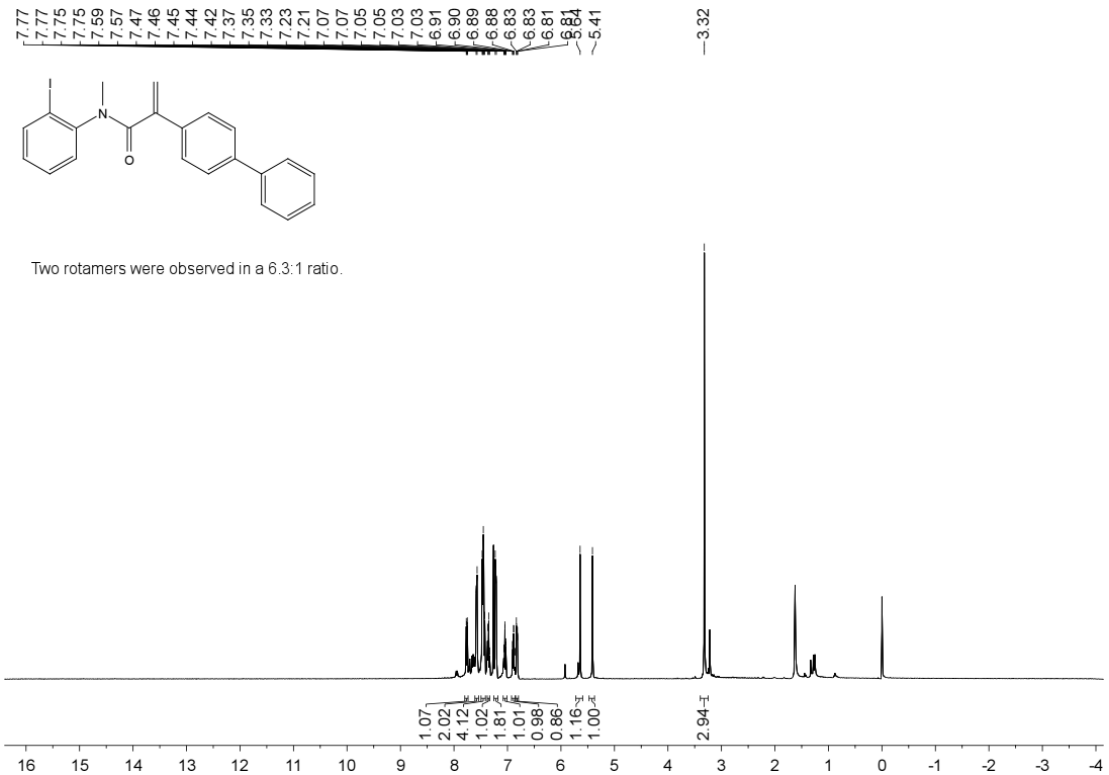
^{13}C NMR for *N*-(2-iodophenyl)-*N*-methyl-2-(*p*-tolyl)acrylamide (**s3**)



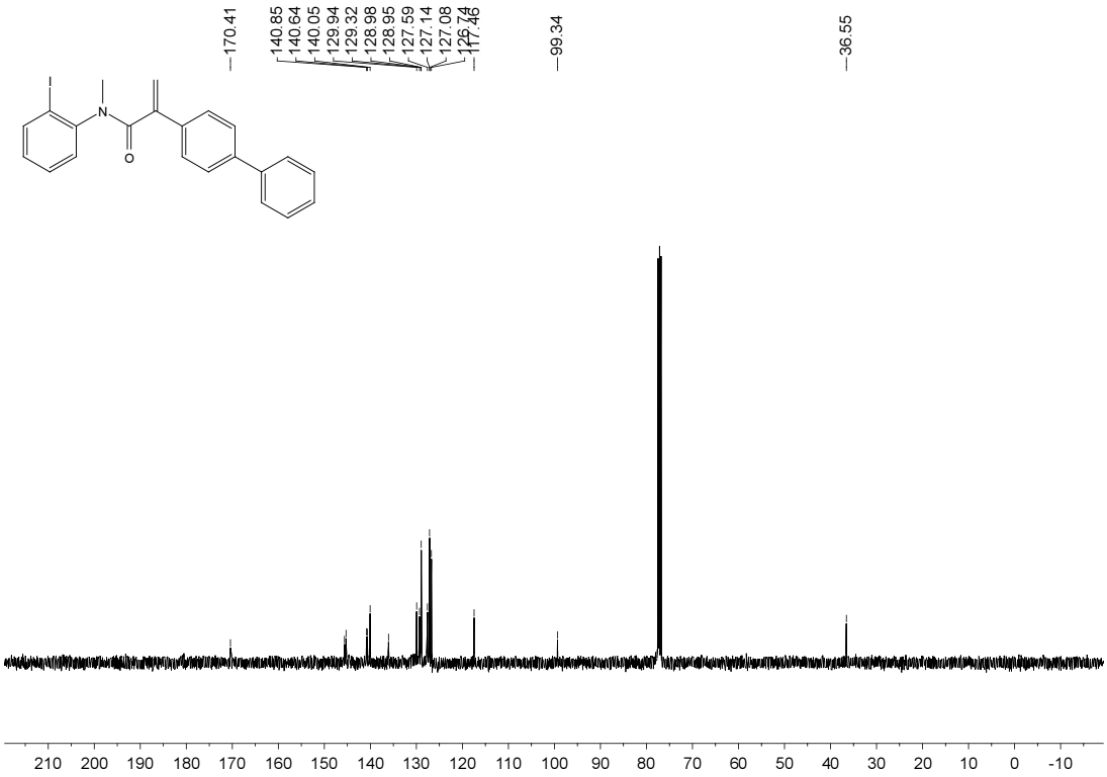
^{1}H NMR for *N*-(2-iodophenyl)-2-(4-methoxyphenyl)-*N*-methylacrylamide (**s4**)



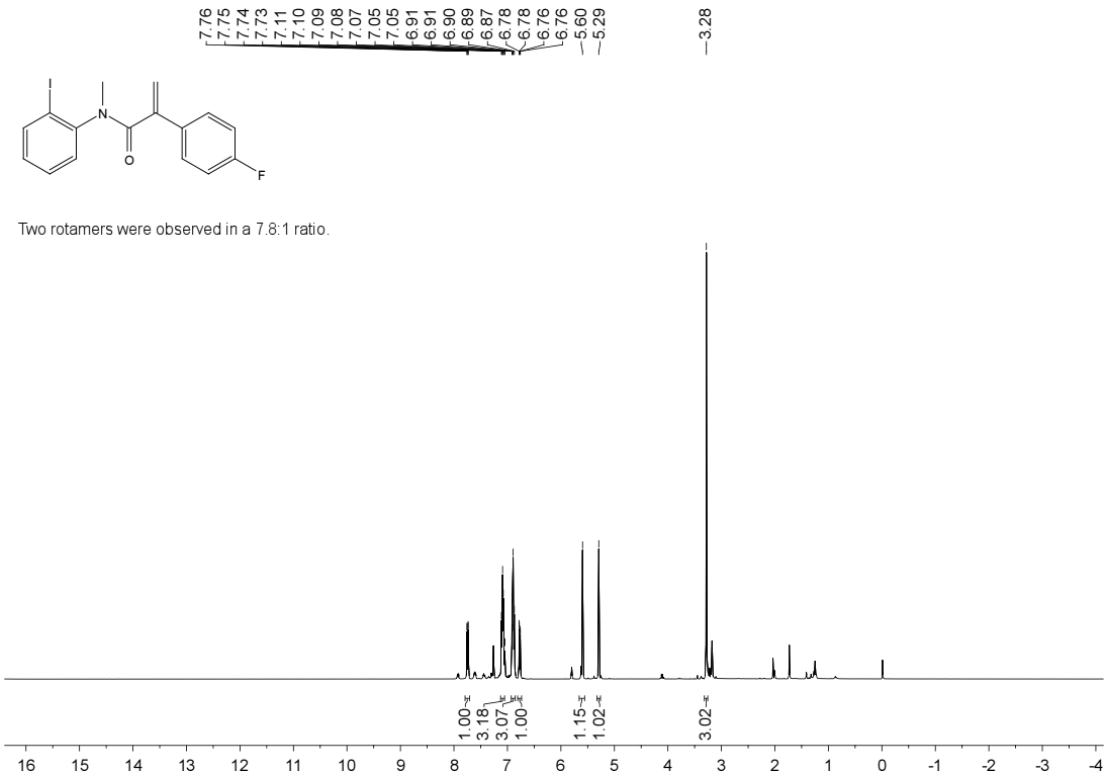
^{1}H NMR for 2-([1,1'-biphenyl]-4-yl)-*N*-(2-iodophenyl)-*N*-methylacrylamide (**s5**)



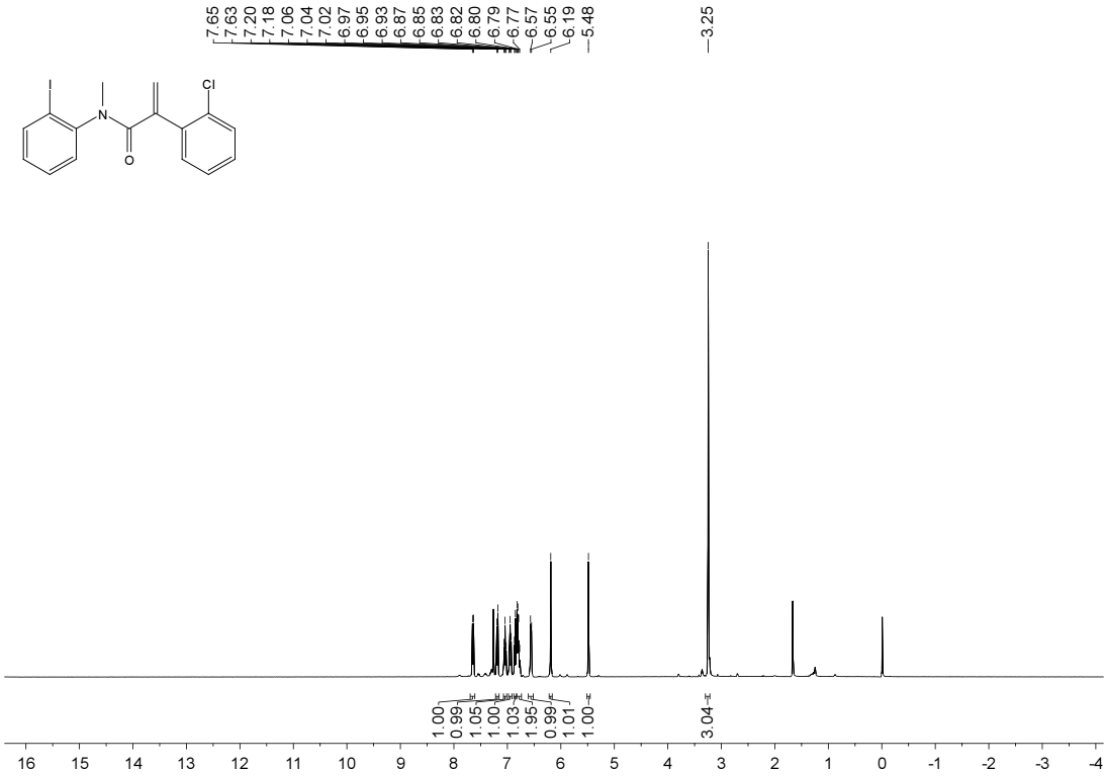
^{13}C NMR for 2-([1,1'-biphenyl]-4-yl)-*N*-(2-iodophenyl)-*N*-methylacrylamide (**s5**)



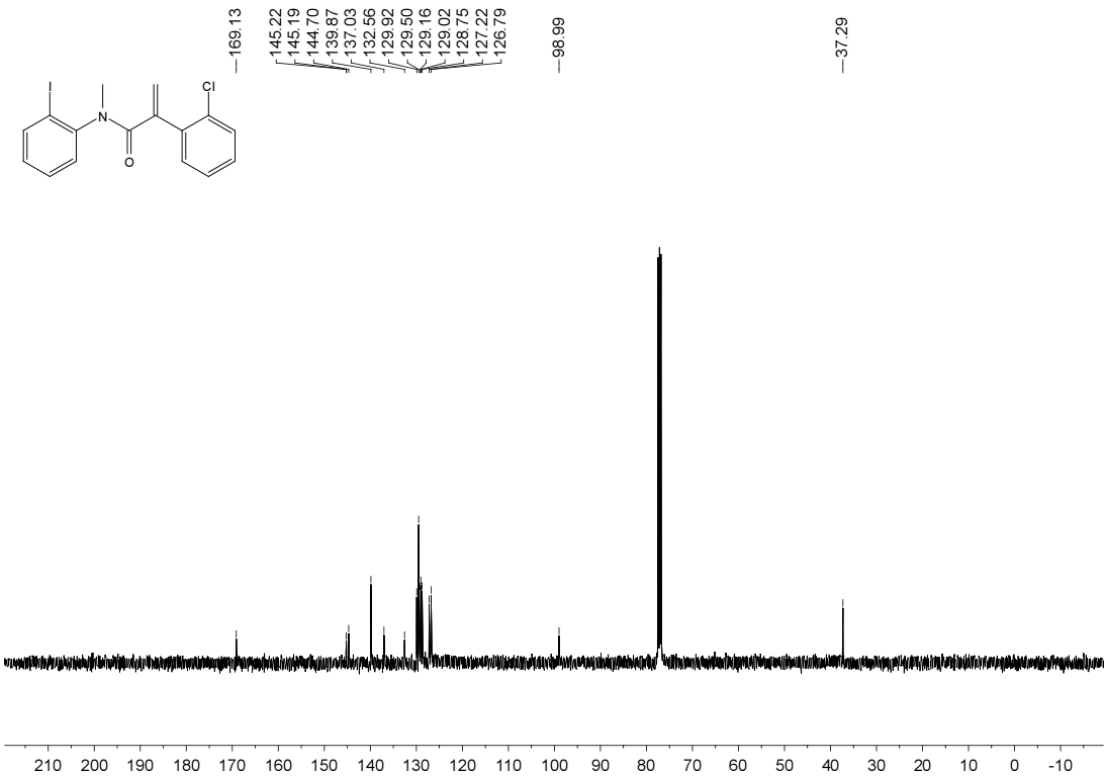
^{1}H NMR for 2-(4-fluorophenyl)-*N*-(2-iodophenyl)-*N*-methylacrylamide (**s6**)



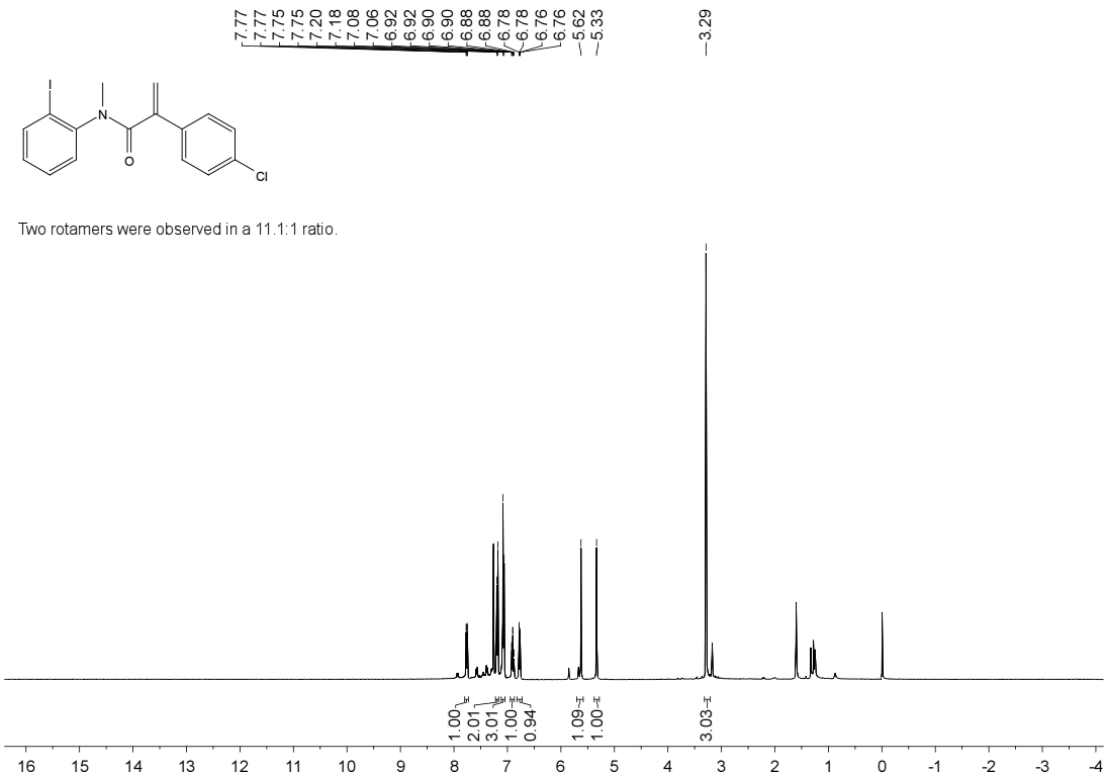
^{1}H NMR for 2-(2-chlorophenyl)-*N*-(2-iodophenyl)-*N*-methylacrylamide (**s7**)



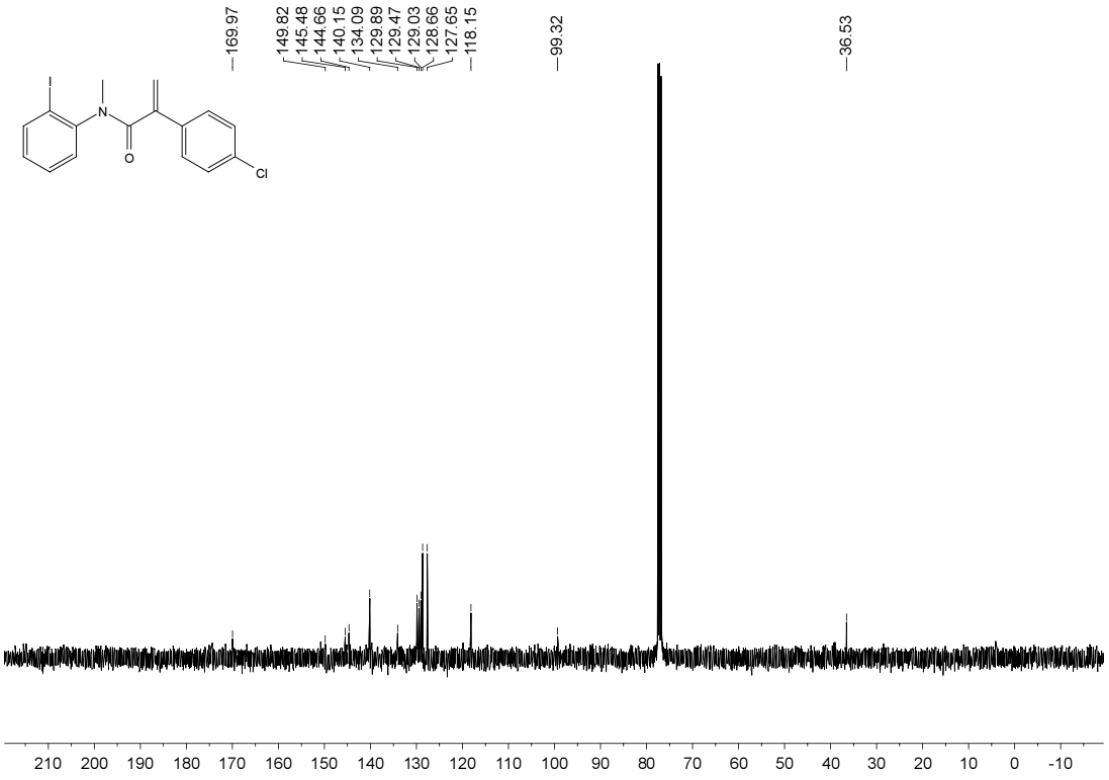
^{13}C NMR for 2-(2-chlorophenyl)-*N*-(2-iodophenyl)-*N*-methylacrylamide (**s7**)



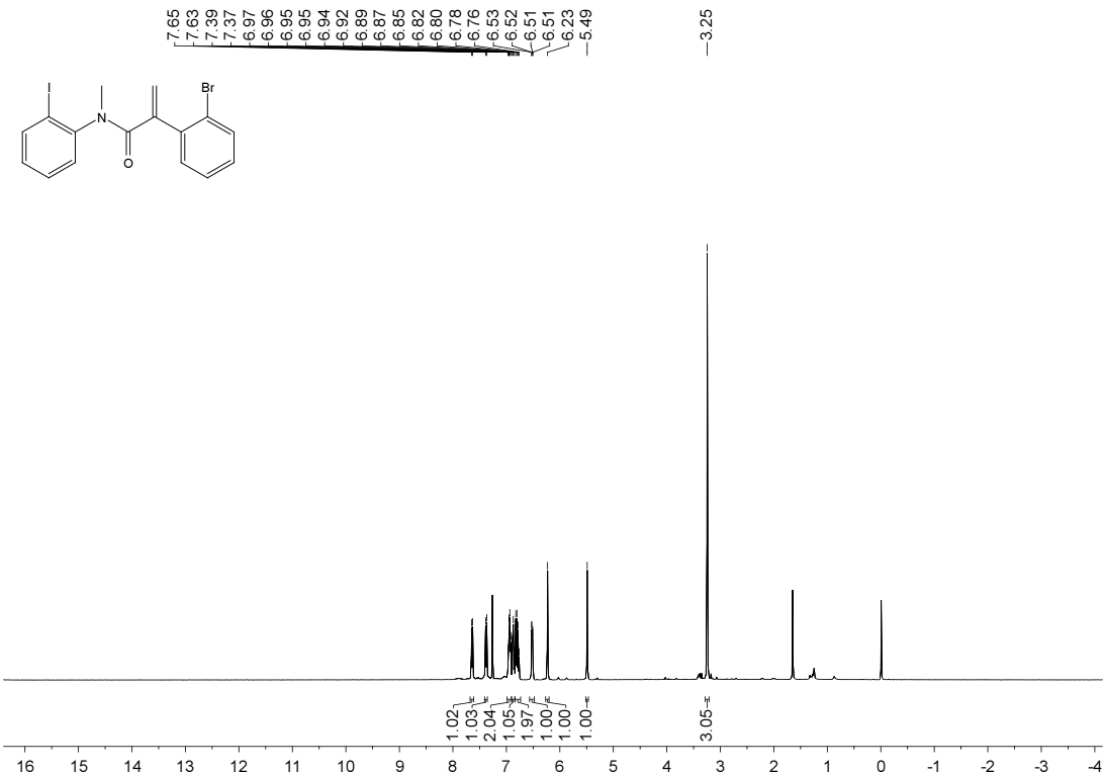
^{1}H NMR for 2-(4-chlorophenyl)-*N*-(2-iodophenyl)-*N*-methylacrylamide (s**8**)



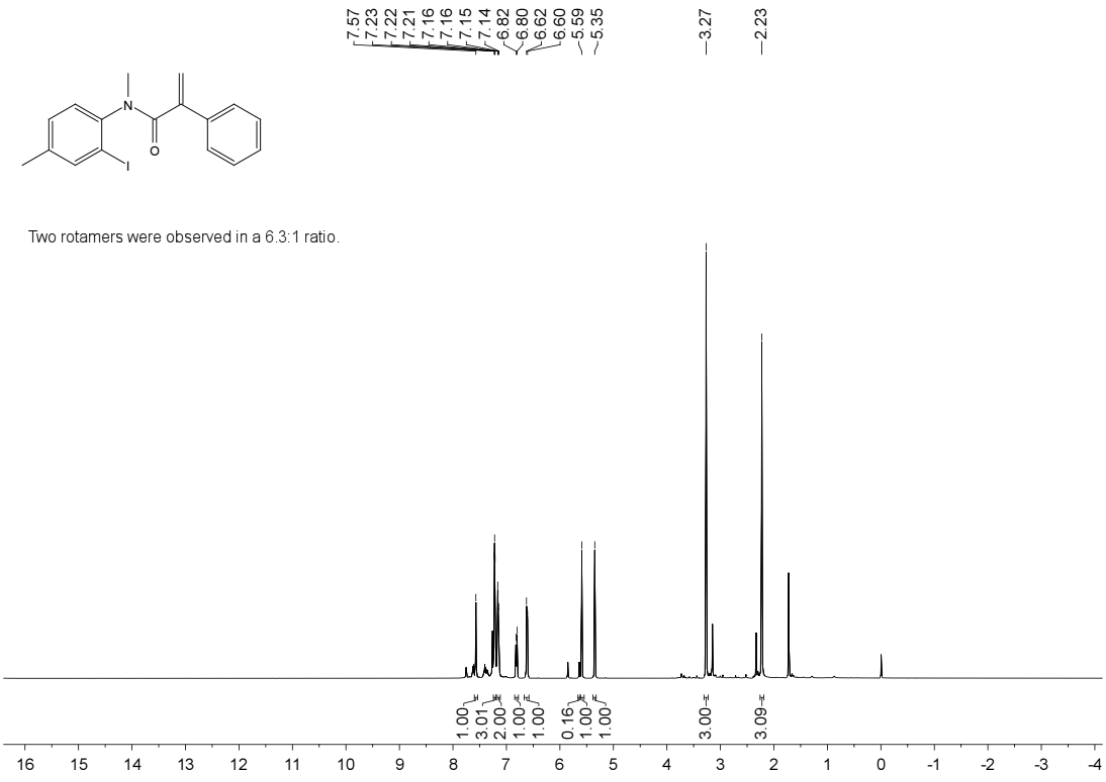
^{13}C NMR for 2-(4-chlorophenyl)-*N*-(2-iodophenyl)-*N*-methylacrylamide (s**8**)



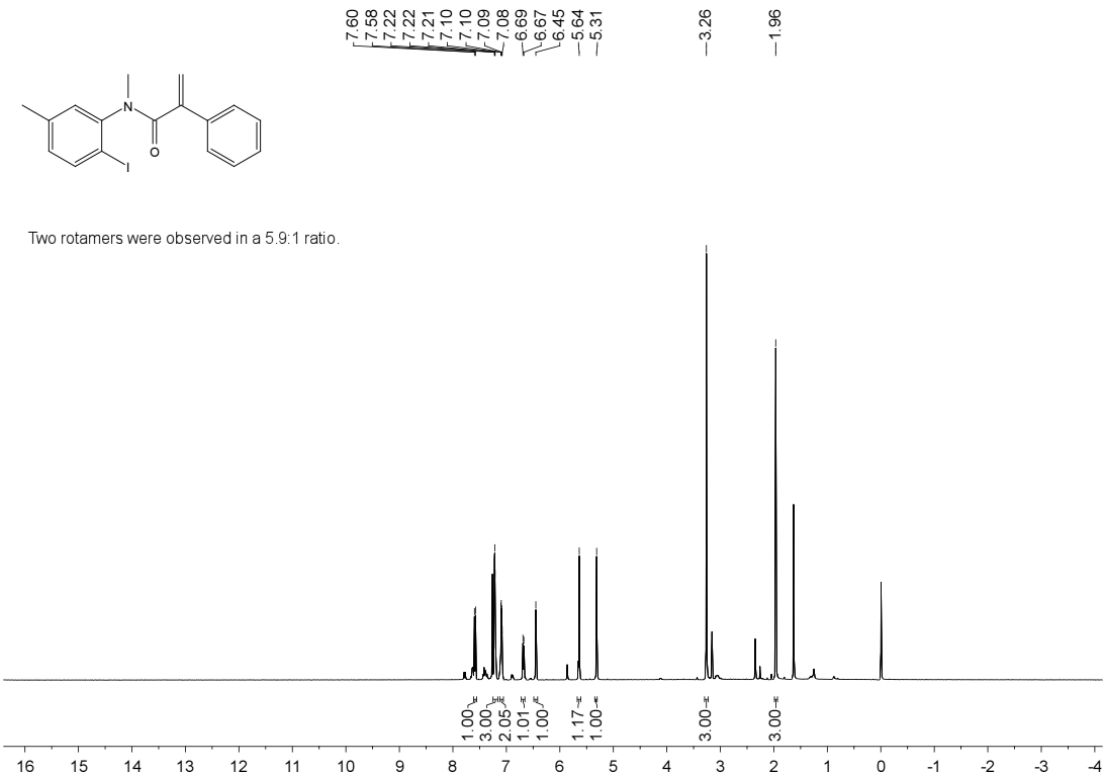
^{1}H NMR for 2-(2-bromophenyl)-*N*-(2-iodophenyl)-*N*-methylacrylamide (**s9**)



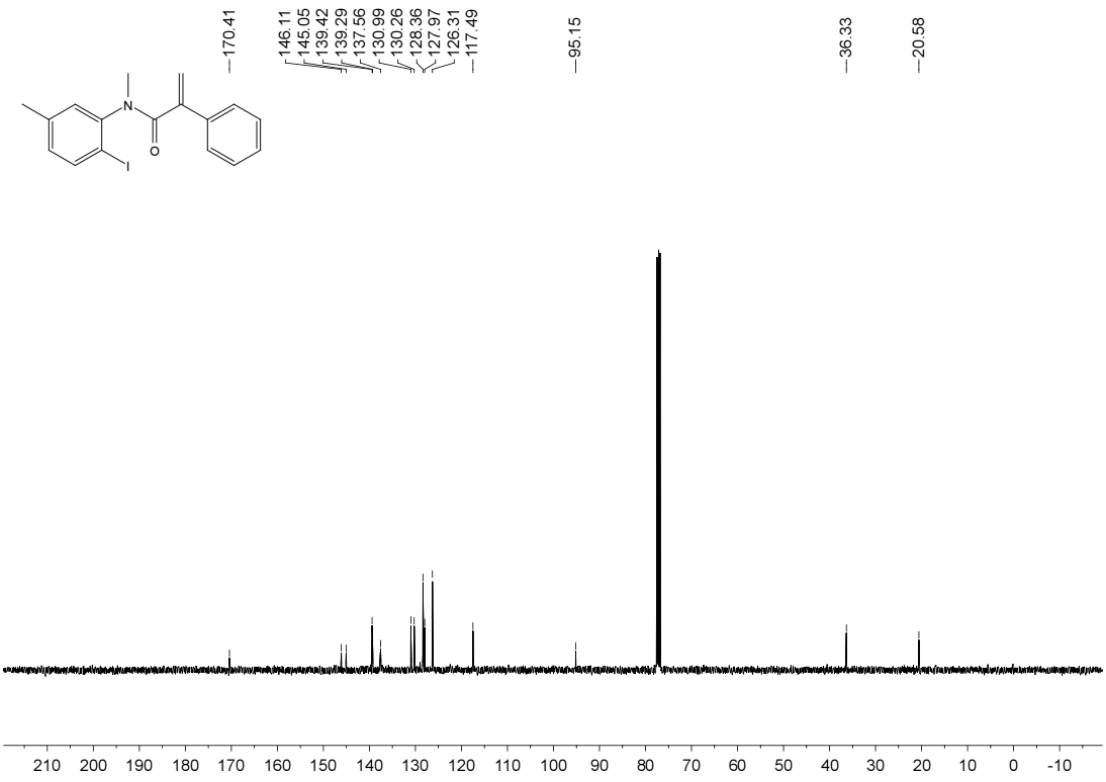
^{1}H NMR for *N*-(2-iodo-4-methylphenyl)-*N*-methyl-2-phenylacrylamide (**s10**)



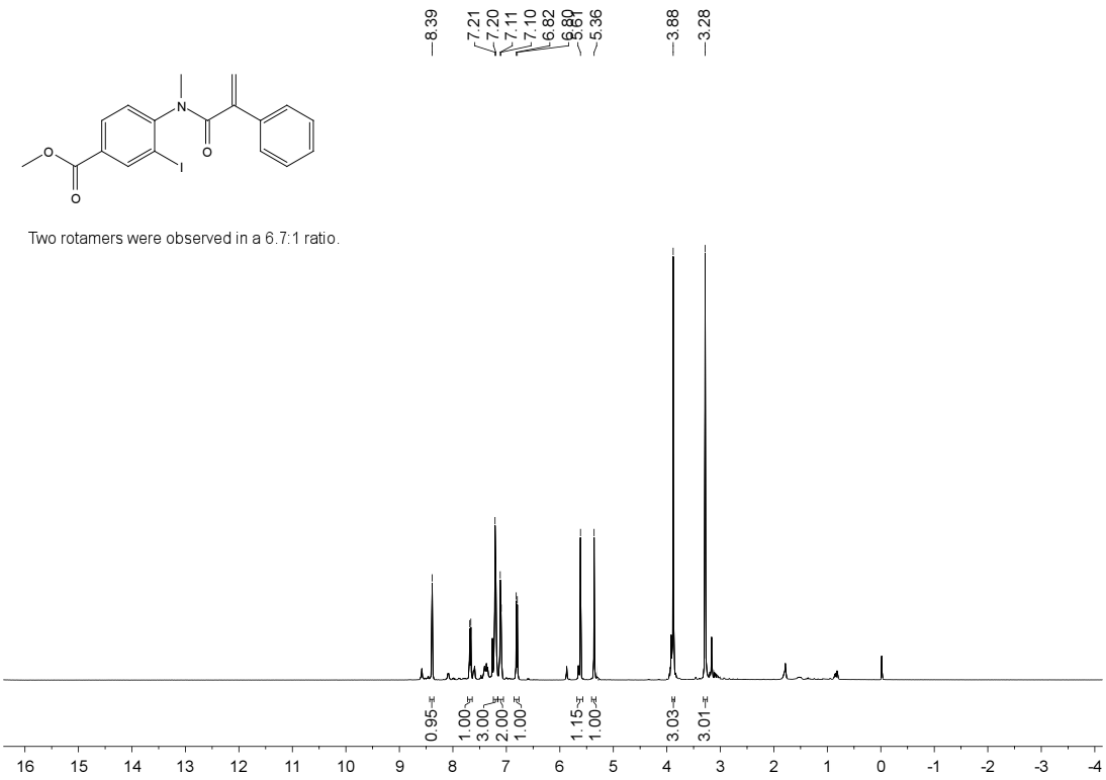
^{1}H NMR for *N*-(2-iodo-5-methylphenyl)-*N*-methyl-2-phenylacrylamide (**s11**)



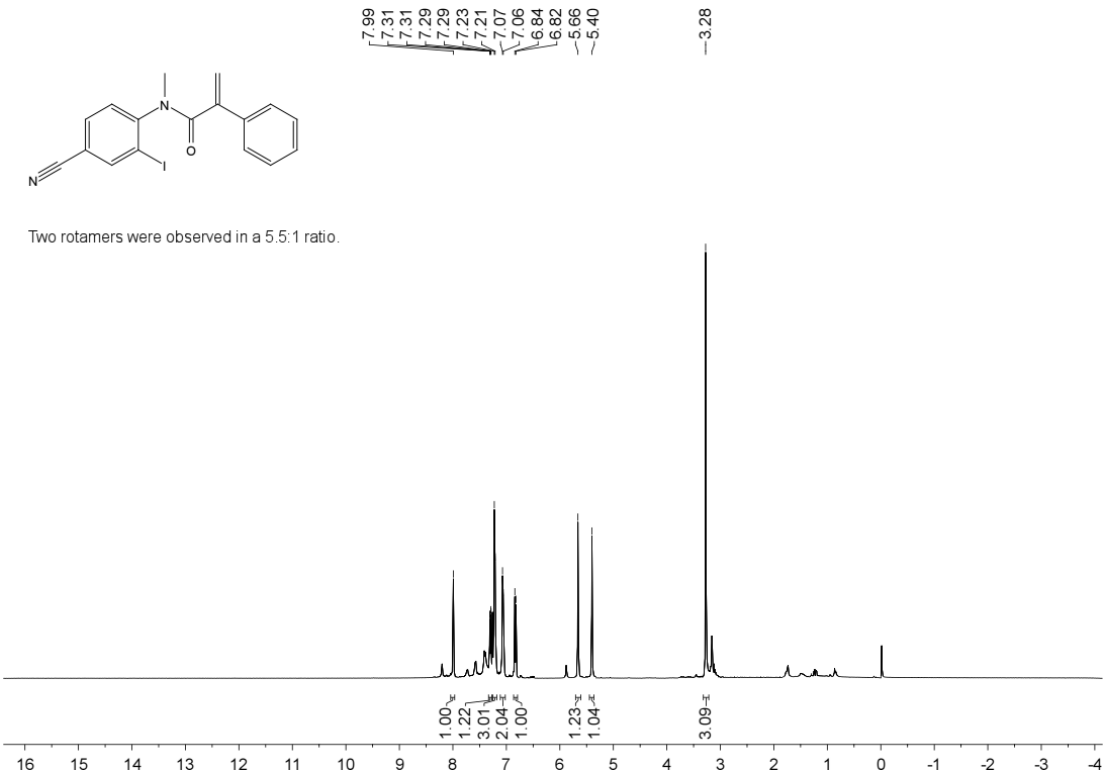
^{13}C NMR for *N*-(2-iodo-5-methylphenyl)-*N*-methyl-2-phenylacrylamide (**s11**)



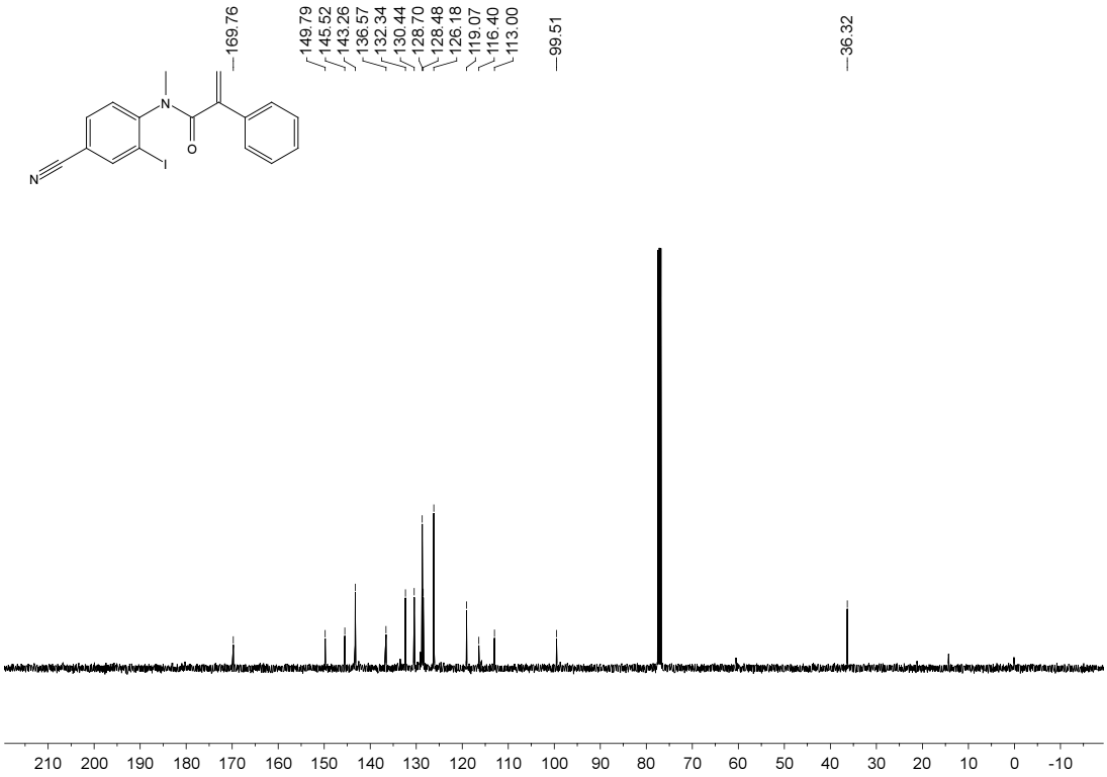
^{1}H NMR for methyl 3-iodo-4-(*N*-methyl-2-phenylacrylamido)benzoate (**s12**)



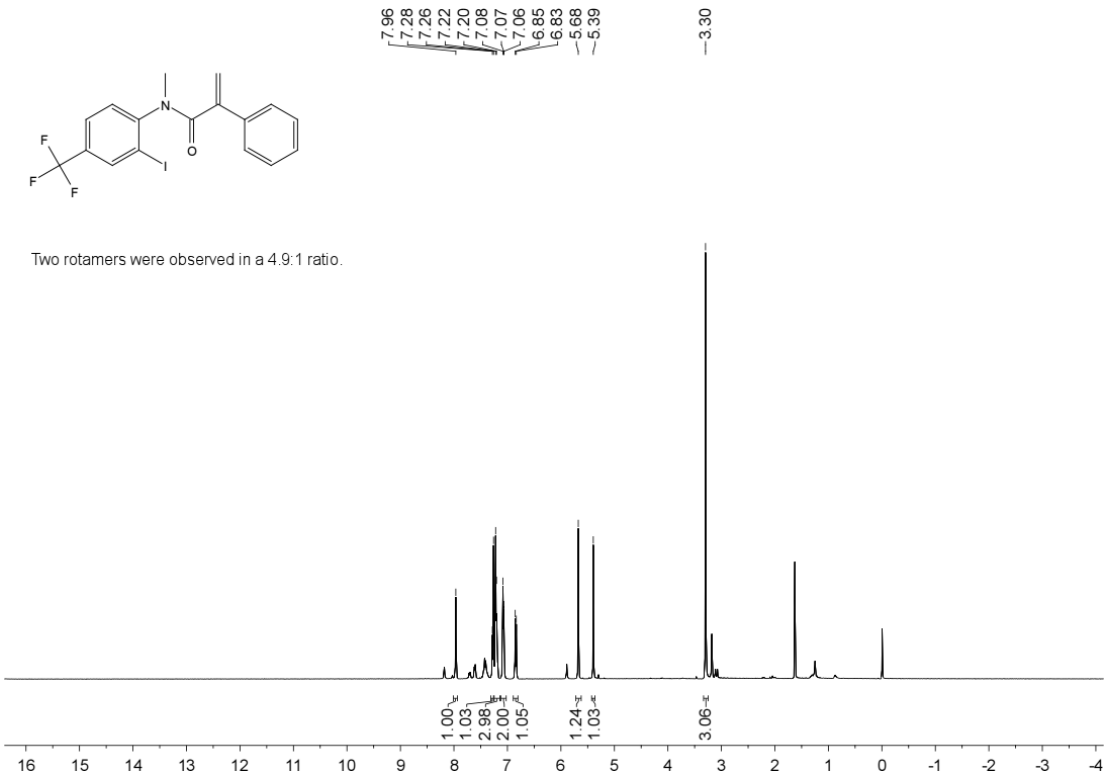
^{1}H NMR for *N*-(4-cyano-2-iodophenyl)-*N*-methyl-2-phenylacrylamide (**s13**)



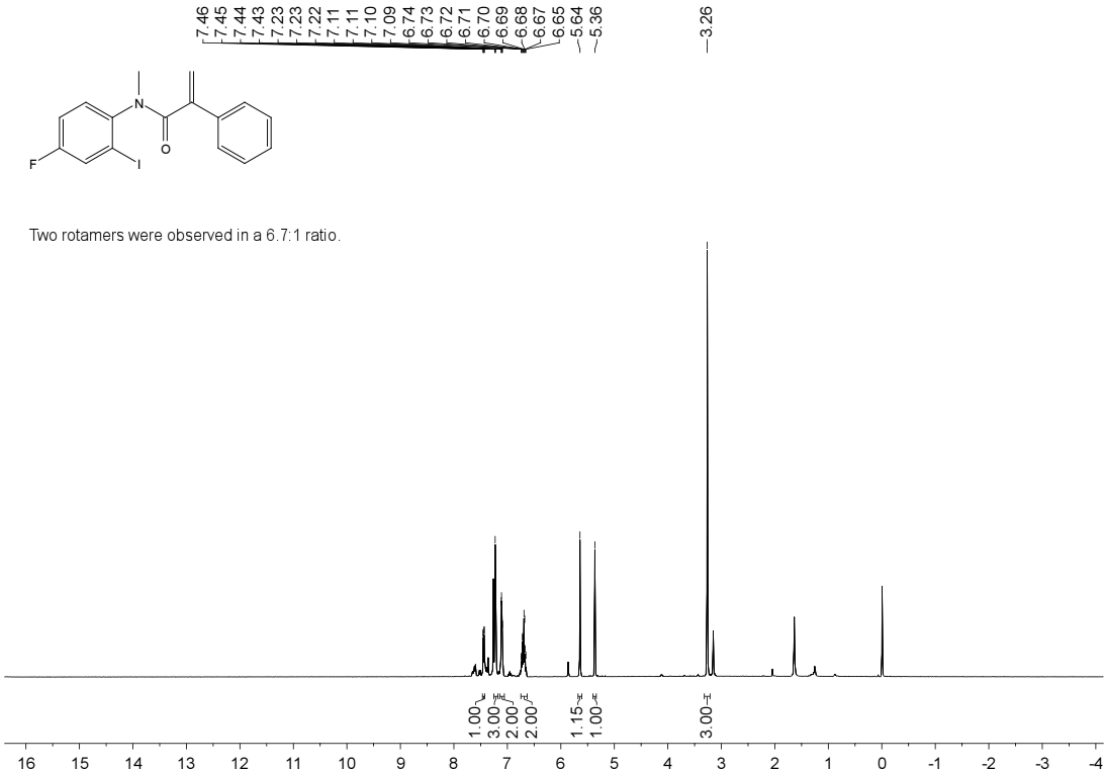
^{13}C NMR for *N*-(4-cyano-2-iodophenyl)-*N*-methyl-2-phenylacrylamide (**s13**)



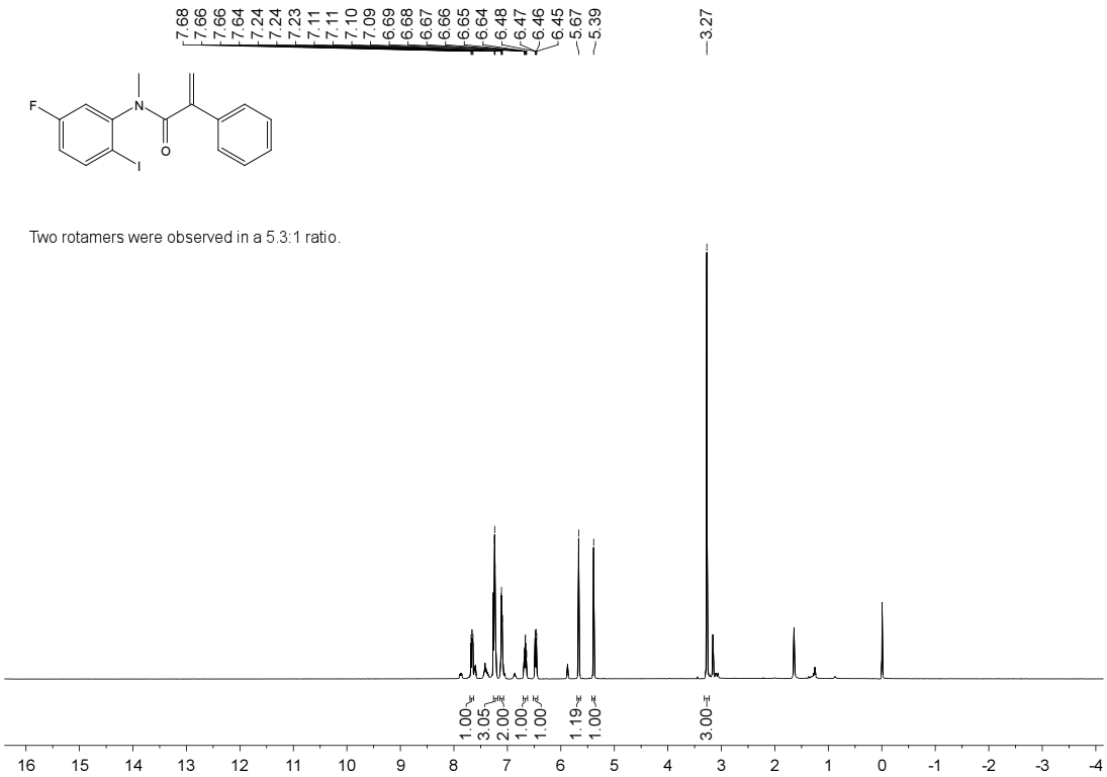
^{1}H NMR for *N*-(2-iodo-4-(trifluoromethyl)phenyl)-*N*-methyl-2-phenylacrylamide (**s14**)



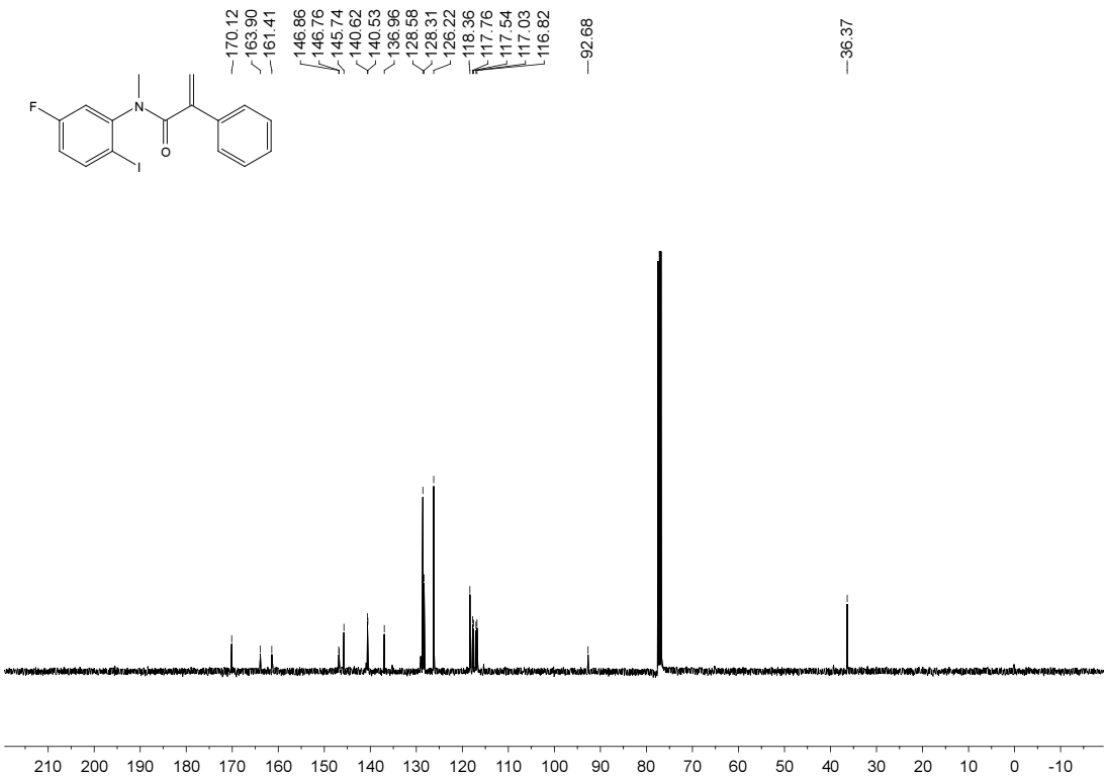
^{1}H NMR for *N*-(4-fluoro-2-iodophenyl)-*N*-methyl-2-phenylacrylamide (**s15**)



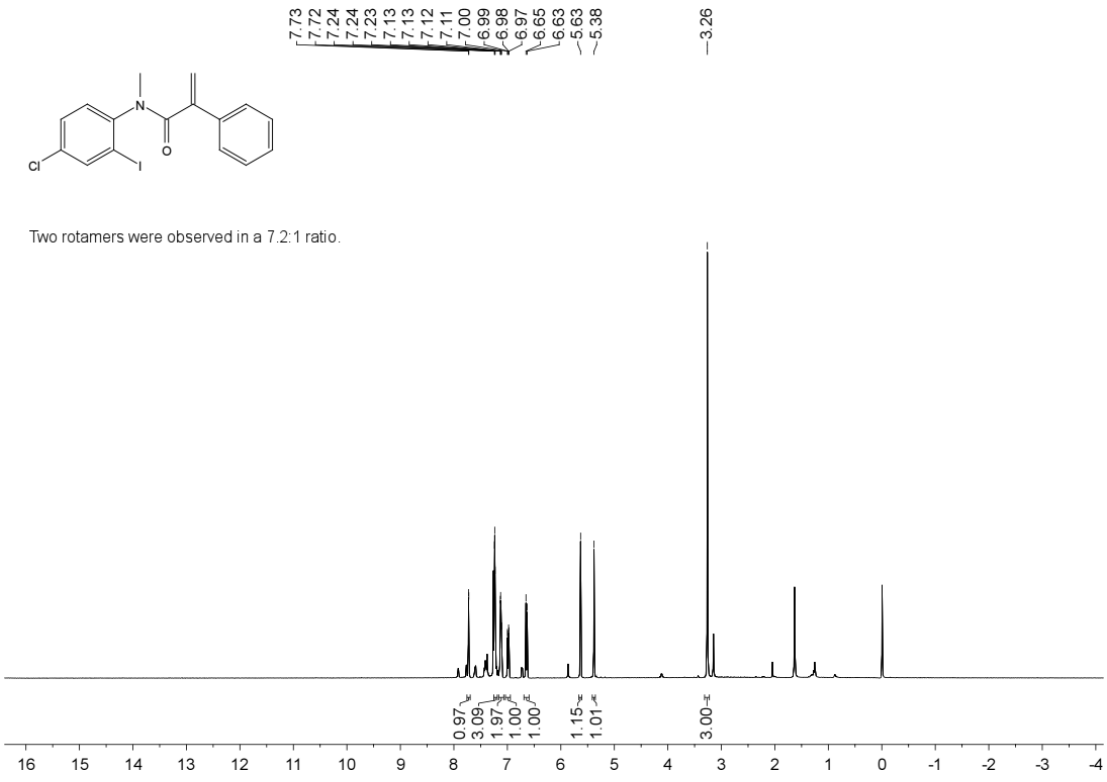
^{1}H NMR for *N*-(5-fluoro-2-iodophenyl)-*N*-methyl-2-phenylacrylamide (**s16**)



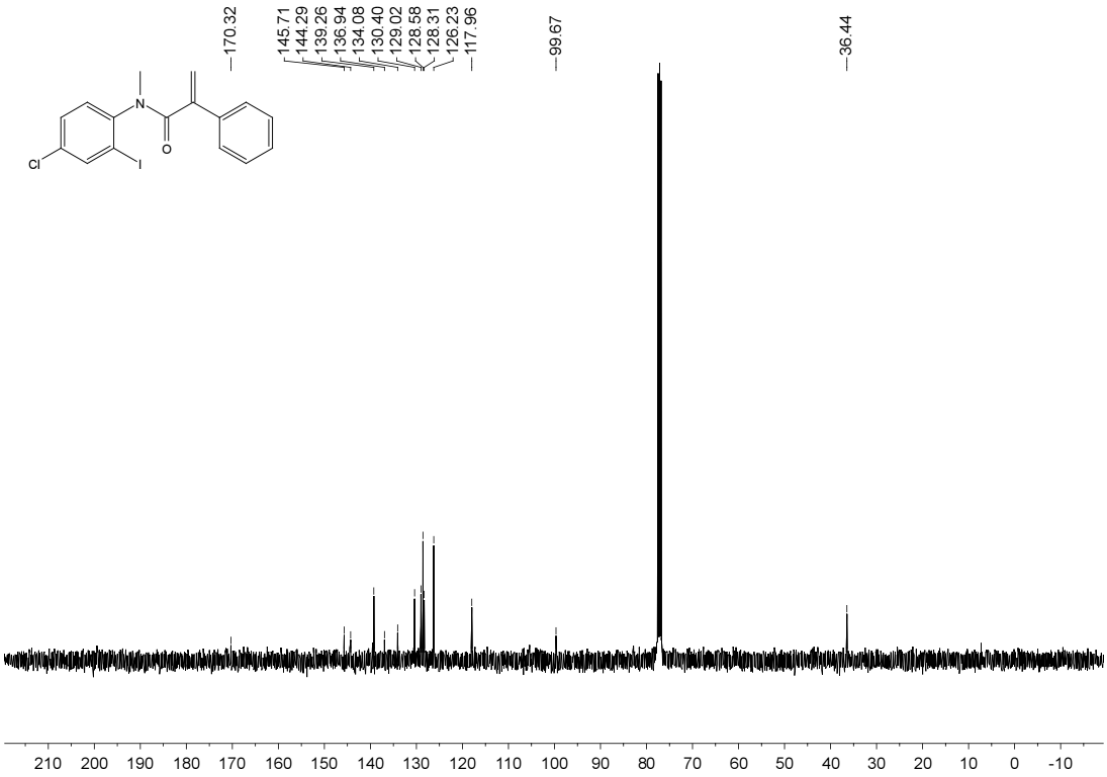
^{13}C NMR for *N*-(5-fluoro-2-iodophenyl)-*N*-methyl-2-phenylacrylamide (**s16**)



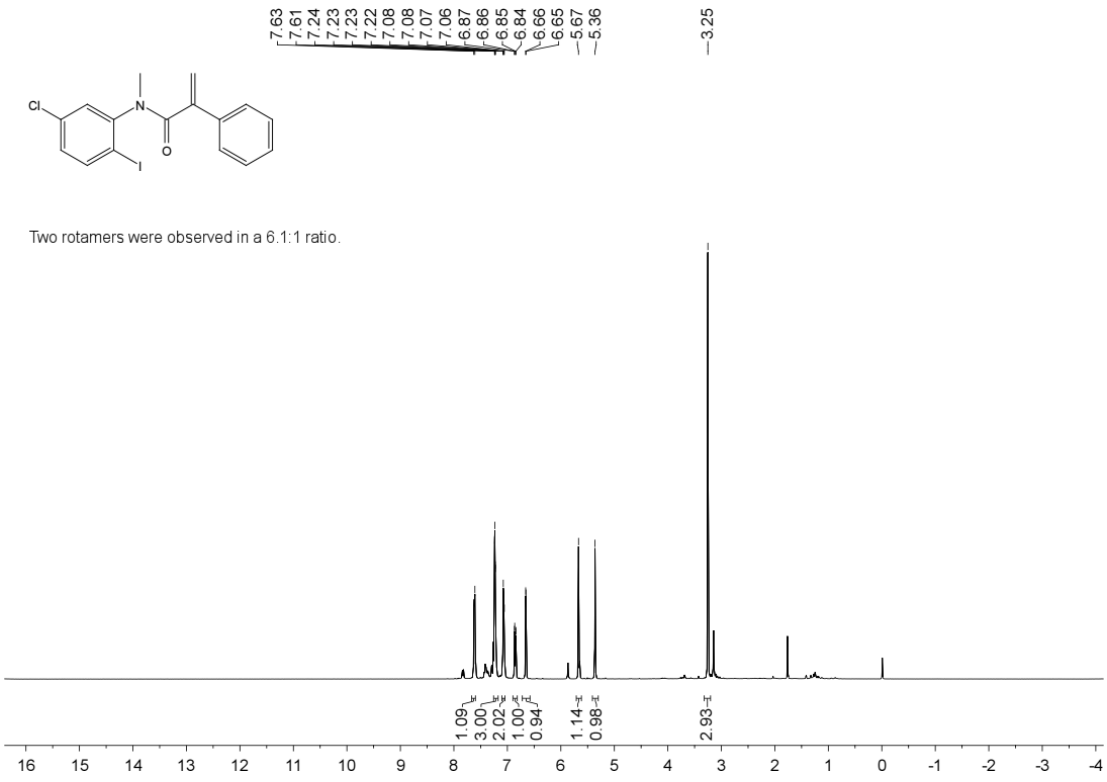
^{1}H NMR for *N*-(4-chloro-2-iodophenyl)-*N*-methyl-2-phenylacrylamide (**s17**)



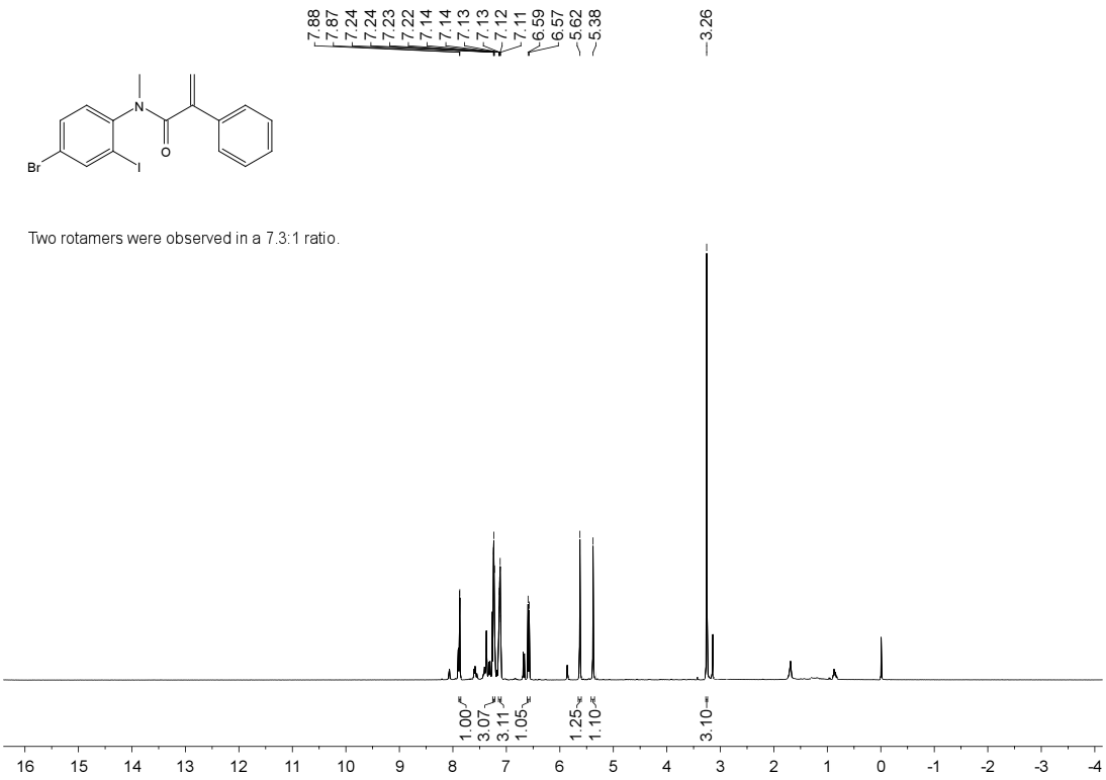
^{13}C NMR for *N*-(4-chloro-2-iodophenyl)-*N*-methyl-2-phenylacrylamide (**s17**)



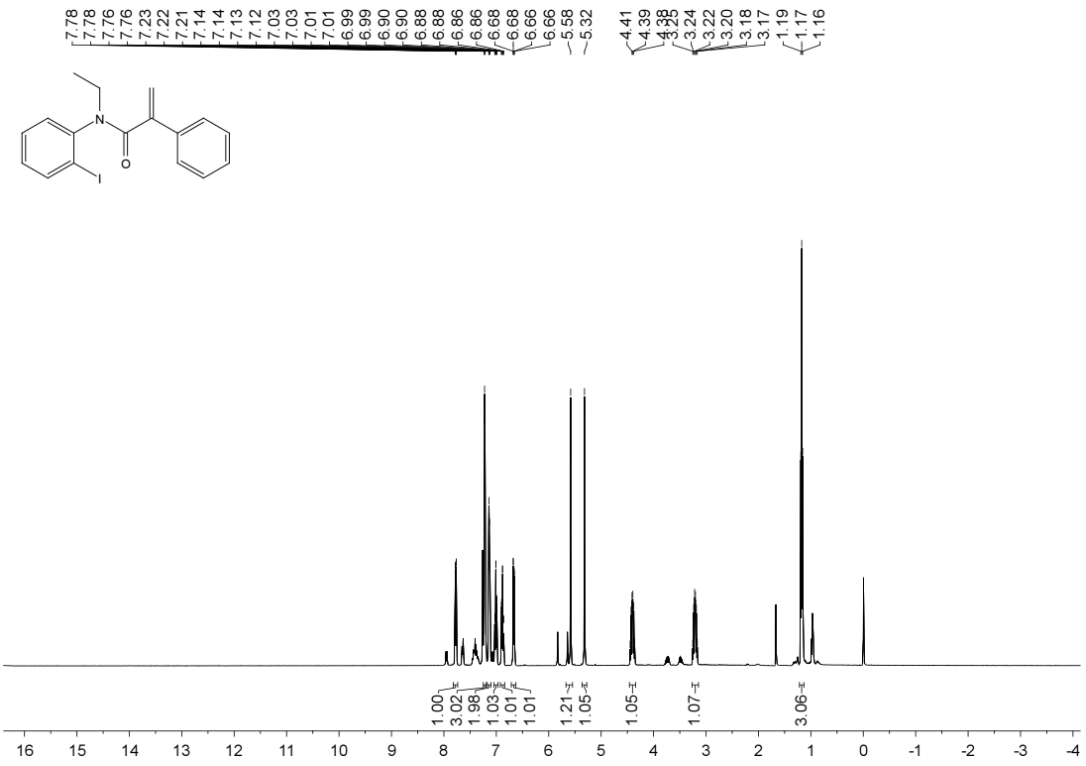
^{1}H NMR for *N*-(5-chloro-2-iodophenyl)-*N*-methyl-2-phenylacrylamide (**s18**)



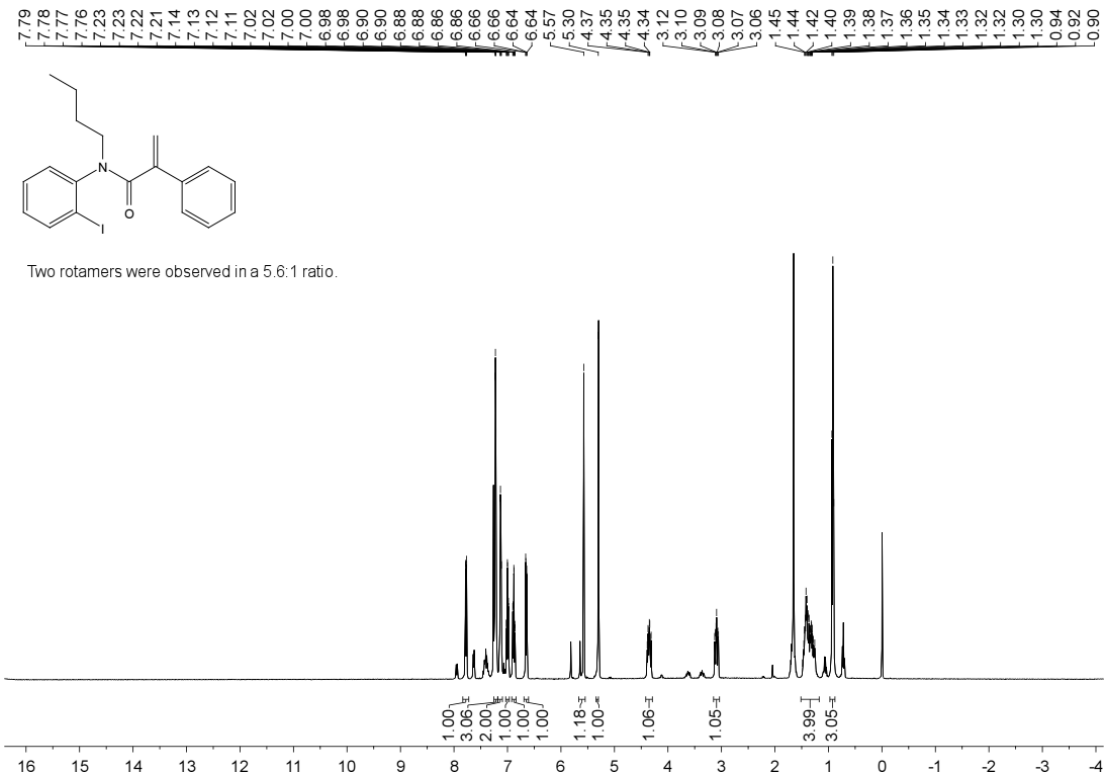
^{1}H NMR for *N*-(4-bromo-2-iodophenyl)-*N*-methyl-2-phenylacrylamide (**s19**)



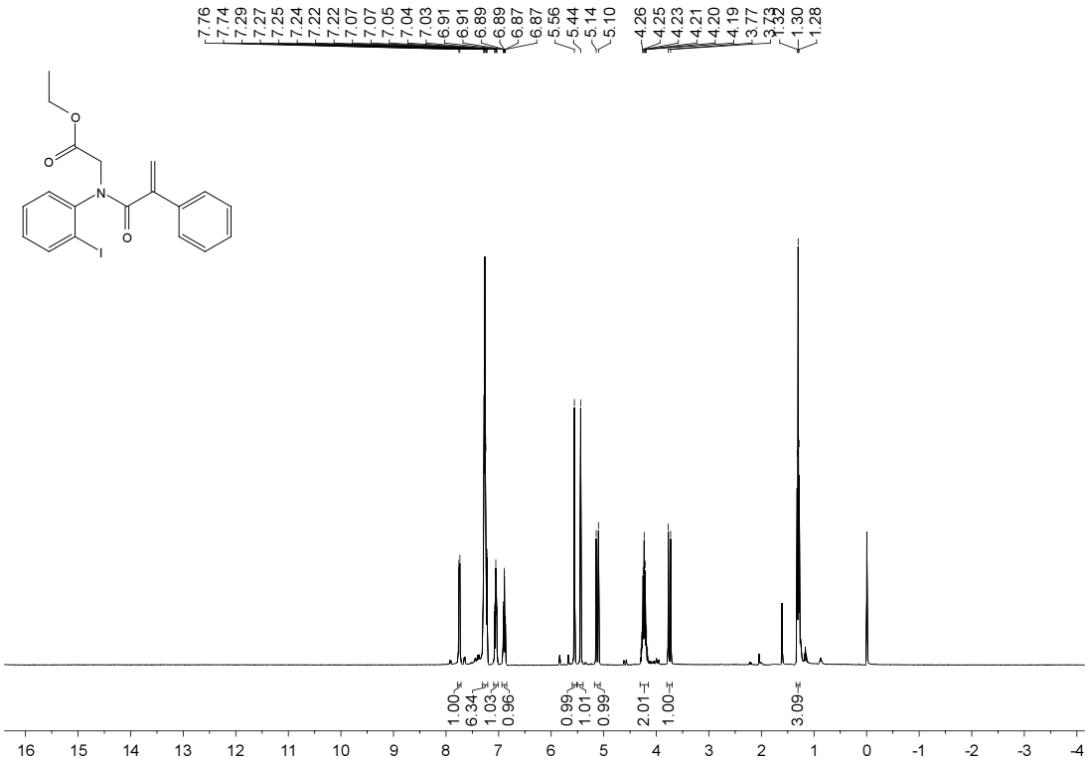
^{1}H NMR for *N*-ethyl-*N*-(2-iodophenyl)-2-phenylacrylamide (**s20**)



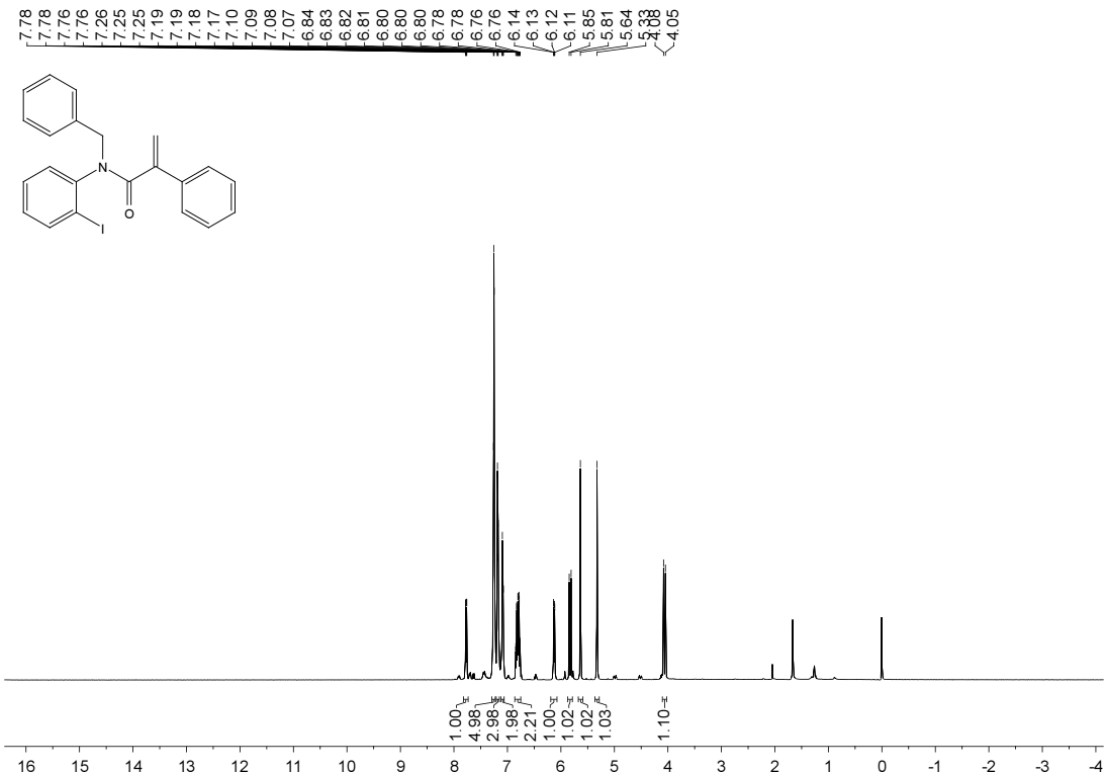
^{1}H NMR for *N*-butyl-*N*-(2-iodophenyl)-2-phenylacrylamide (**s21**)



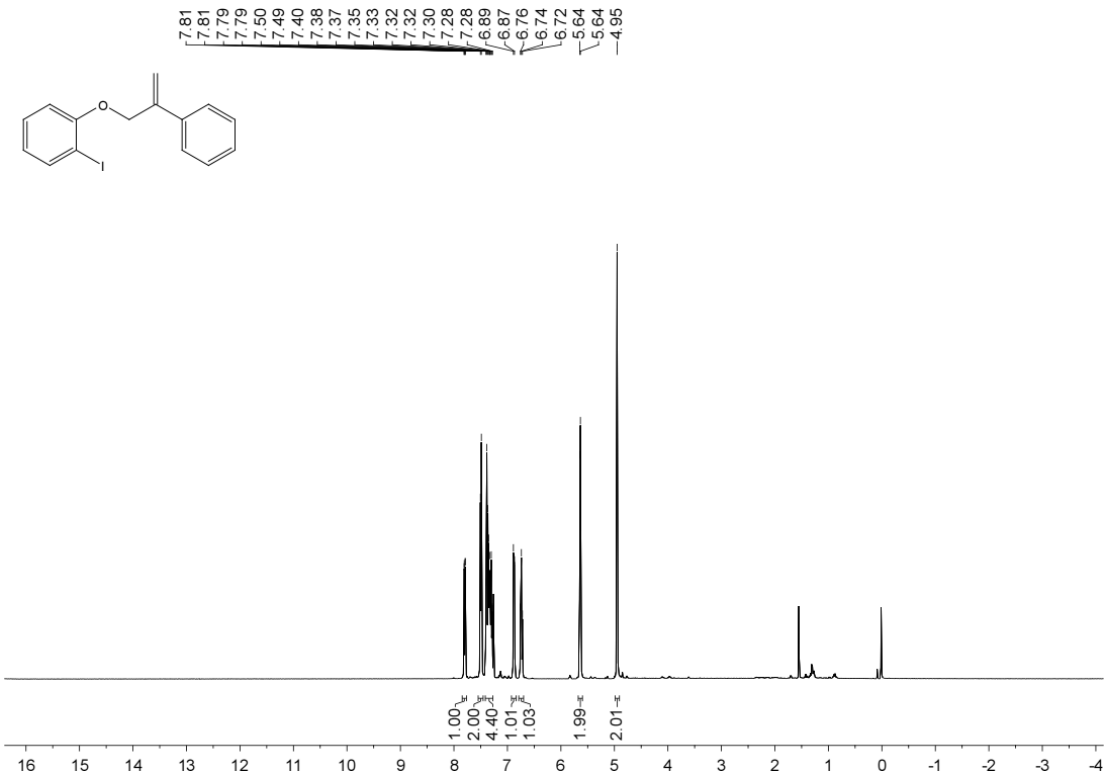
^{1}H NMR for ethyl *N*-(2-iodophenyl)-*N*-(2-phenylacryloyl)glycinate (**s22**)



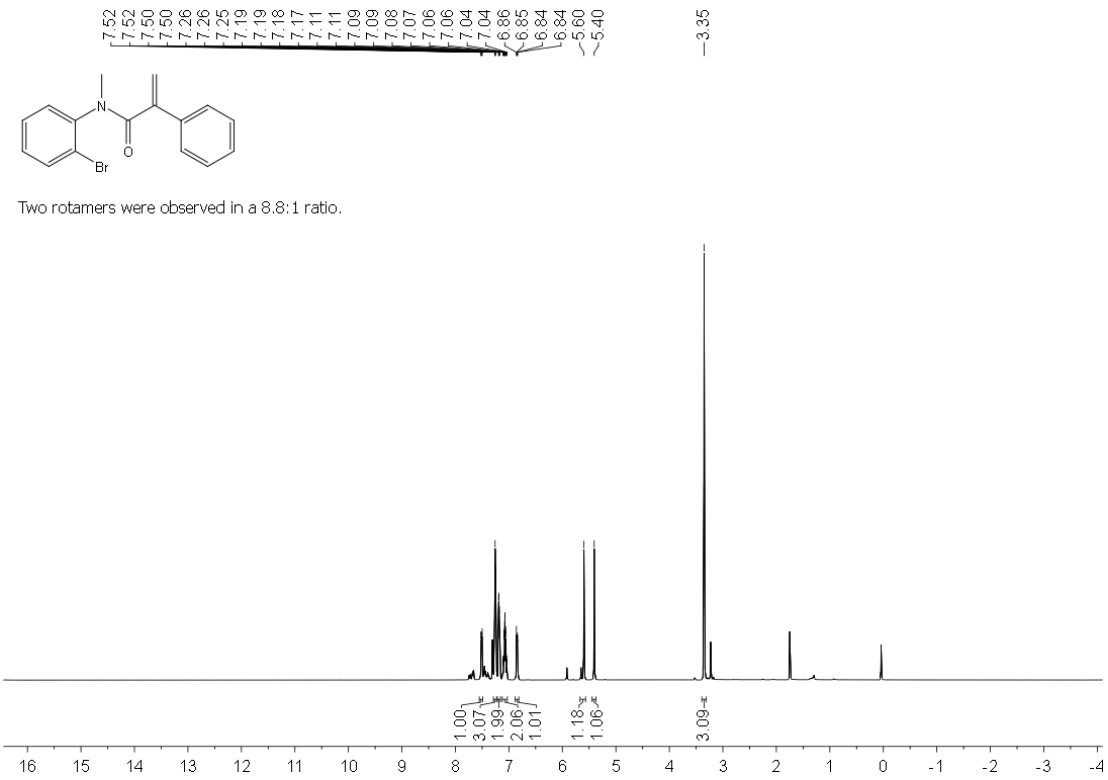
^{1}H NMR for *N*-benzyl-*N*-(2-iodophenyl)-2-phenylacrylamide (**s23**)



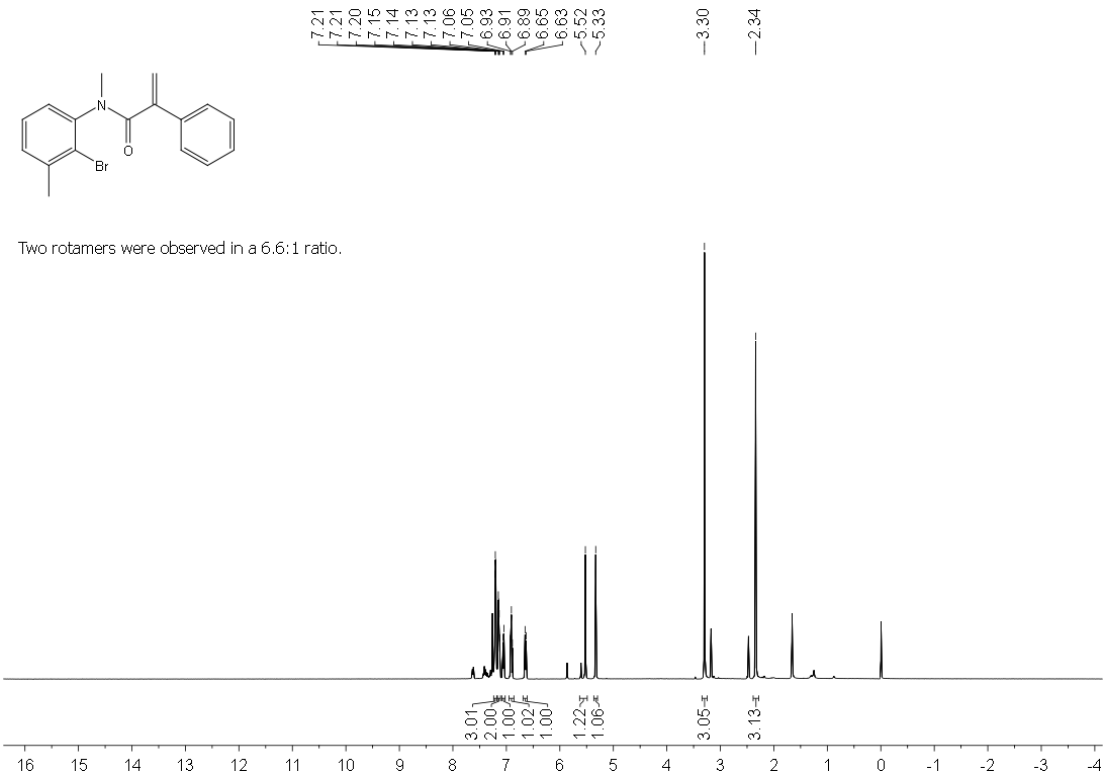
^{1}H NMR for 1-iodo-2-((2-phenylallyl)oxy)benzene (**s26**)



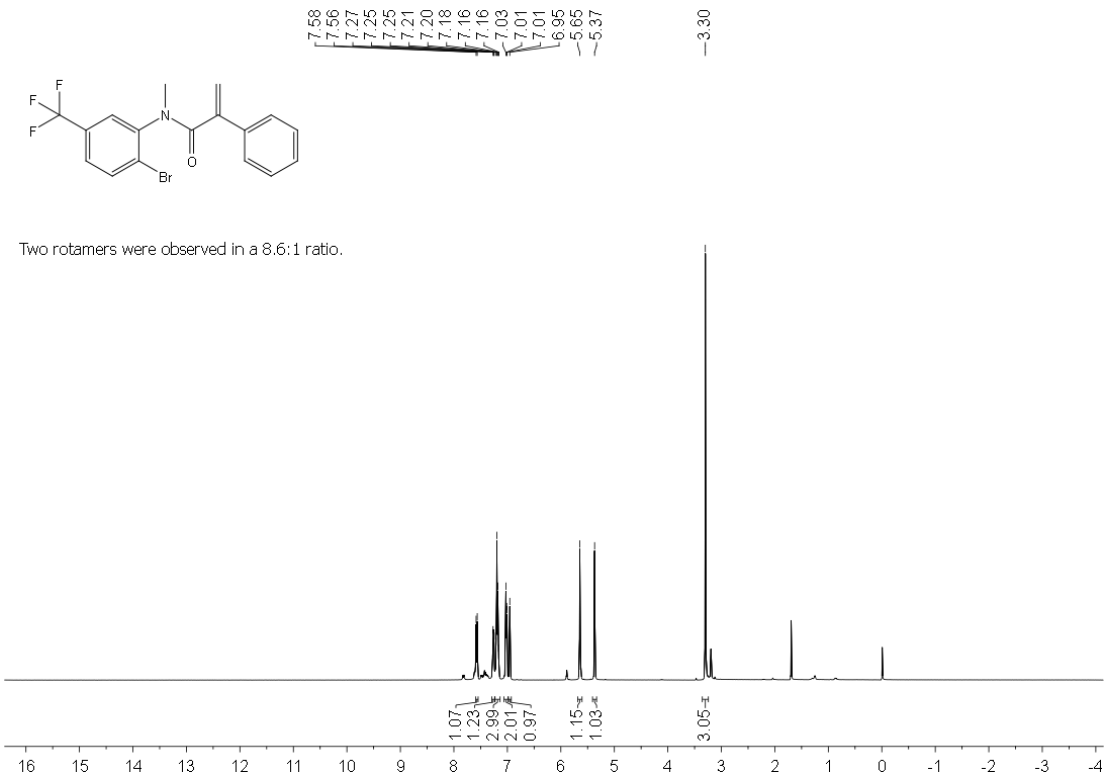
^{1}H NMR for *N*-(2-bromophenyl)-*N*-methyl-2-phenylacrylamide (**s27**)



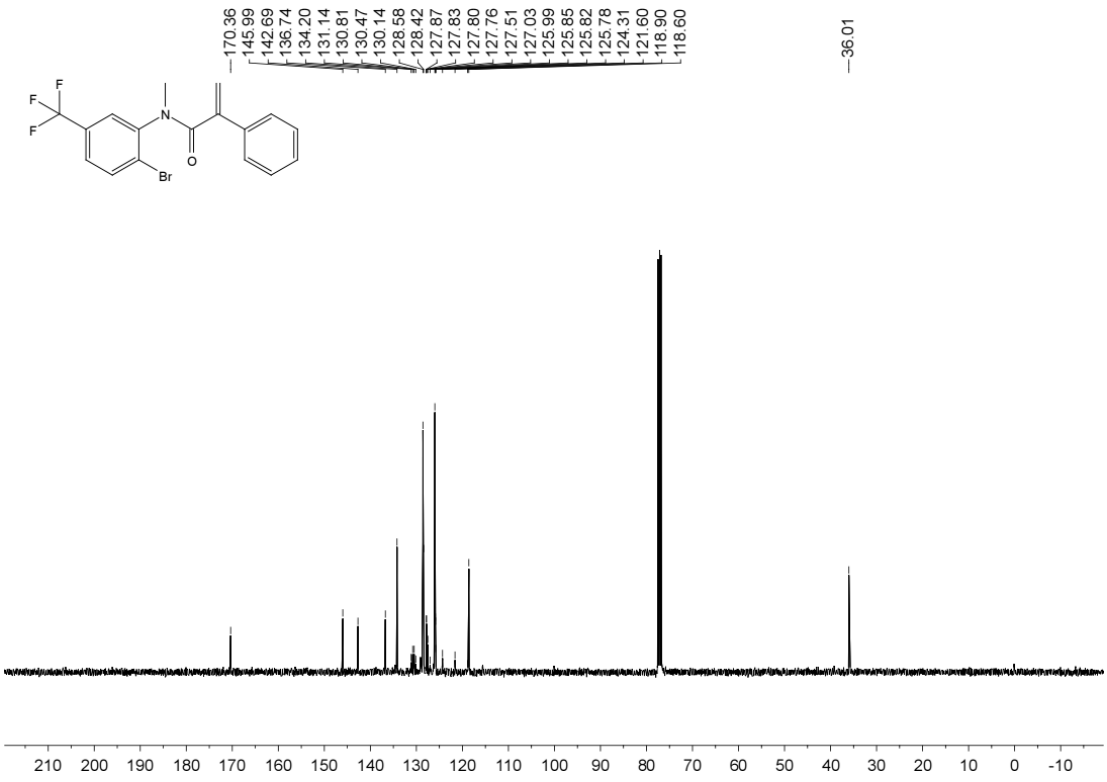
^{1}H NMR for *N*-(2-bromo-3-methylphenyl)-*N*-methyl-2-phenylacrylamide (**s28**)



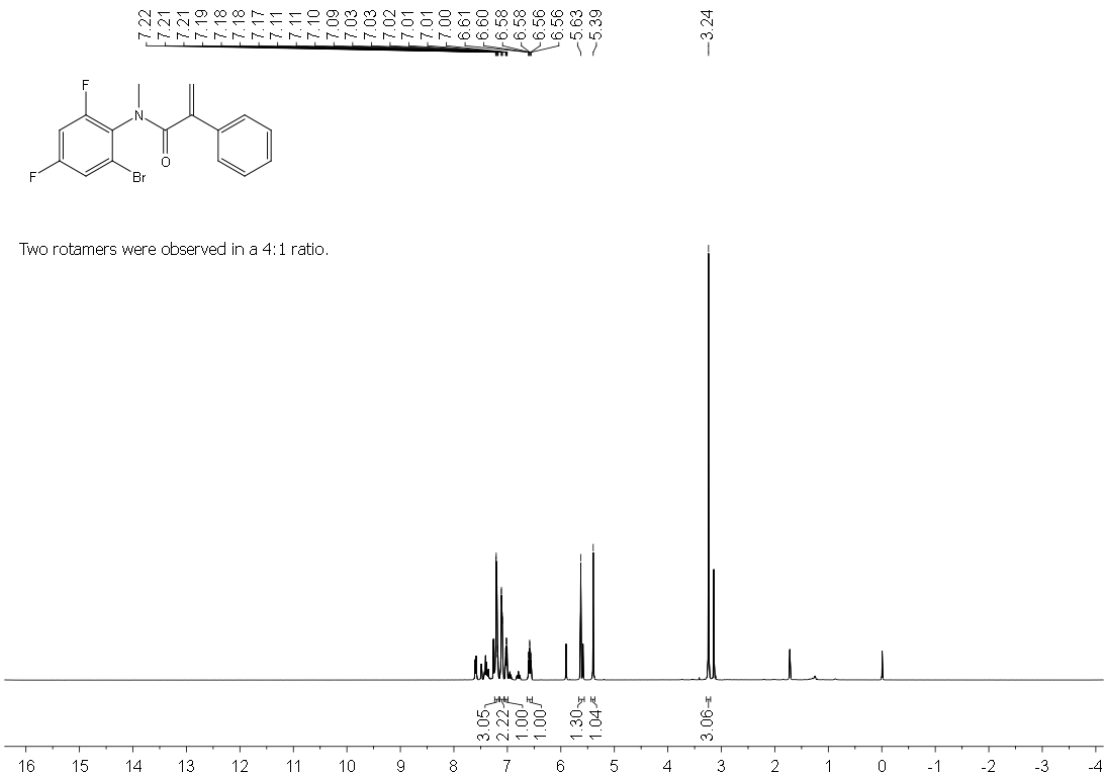
^{1}H NMR for *N*-(2-bromo-5-(trifluoromethyl)phenyl)-*N*-methyl-2-phenylacrylamide (**s29**)



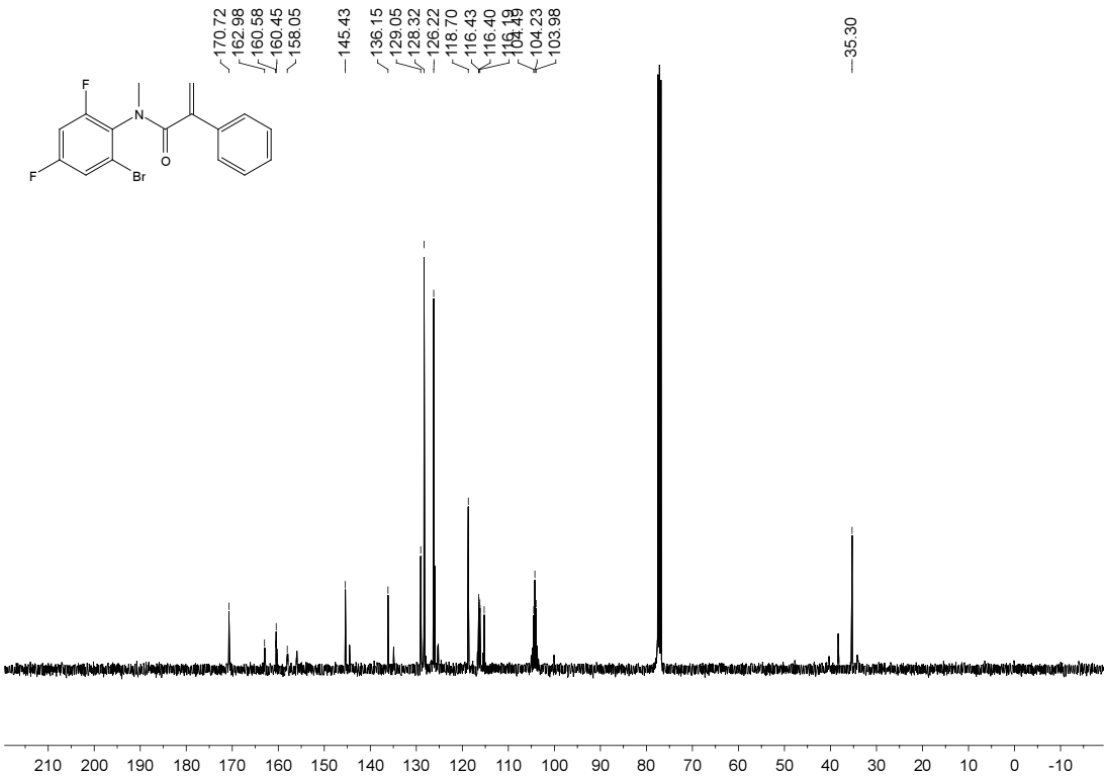
^{13}C NMR for *N*-(2-bromo-5-(trifluoromethyl)phenyl)-*N*-methyl-2-phenylacrylamide (**s29**)



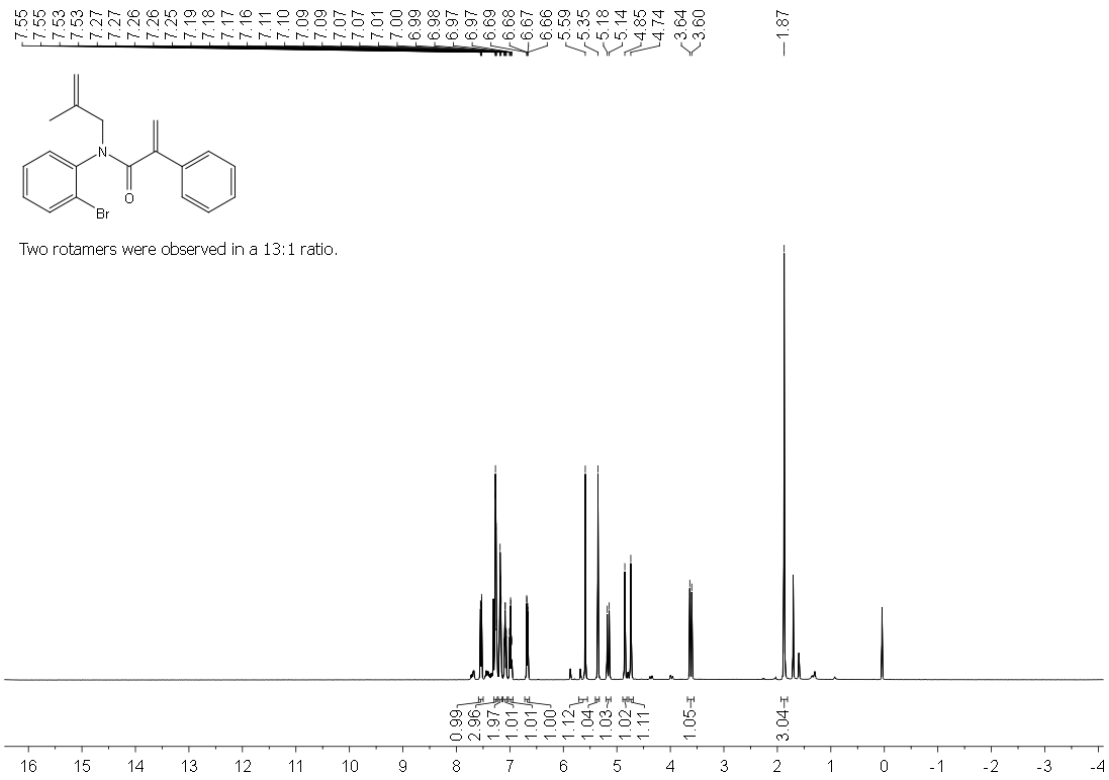
^{1}H NMR for *N*-(2-bromo-4,6-difluorophenyl)-*N*-methyl-2-phenylacrylamide (**s30**)



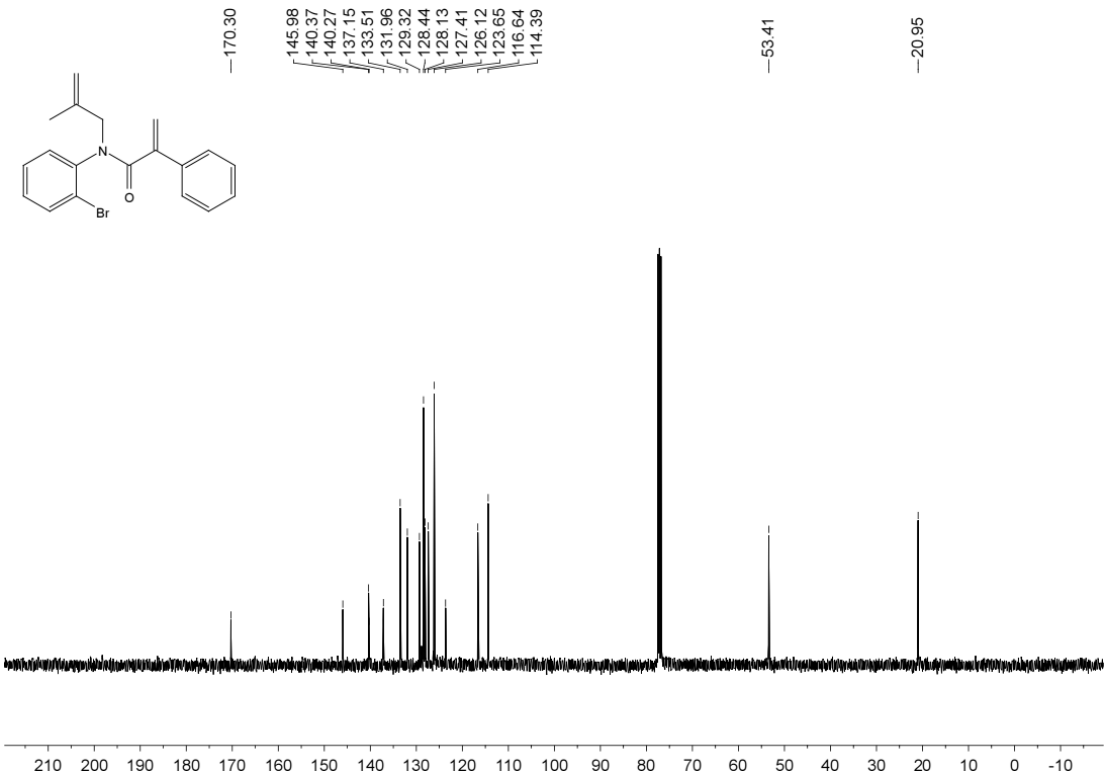
^{13}C NMR for *N*-(2-bromo-4,6-difluorophenyl)-*N*-methyl-2-phenylacrylamide (**s30**)



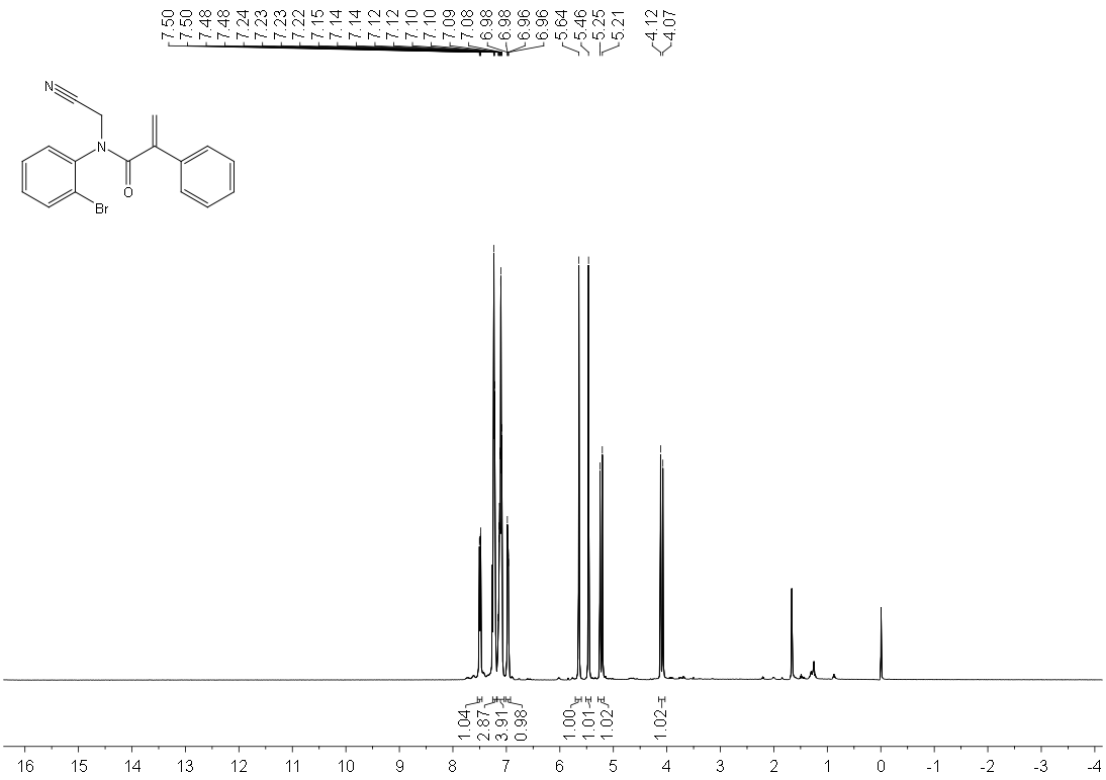
^{1}H NMR for *N*-(2-bromophenyl)-*N*-(2-methylallyl)-2-phenylacrylamide (s**31**)



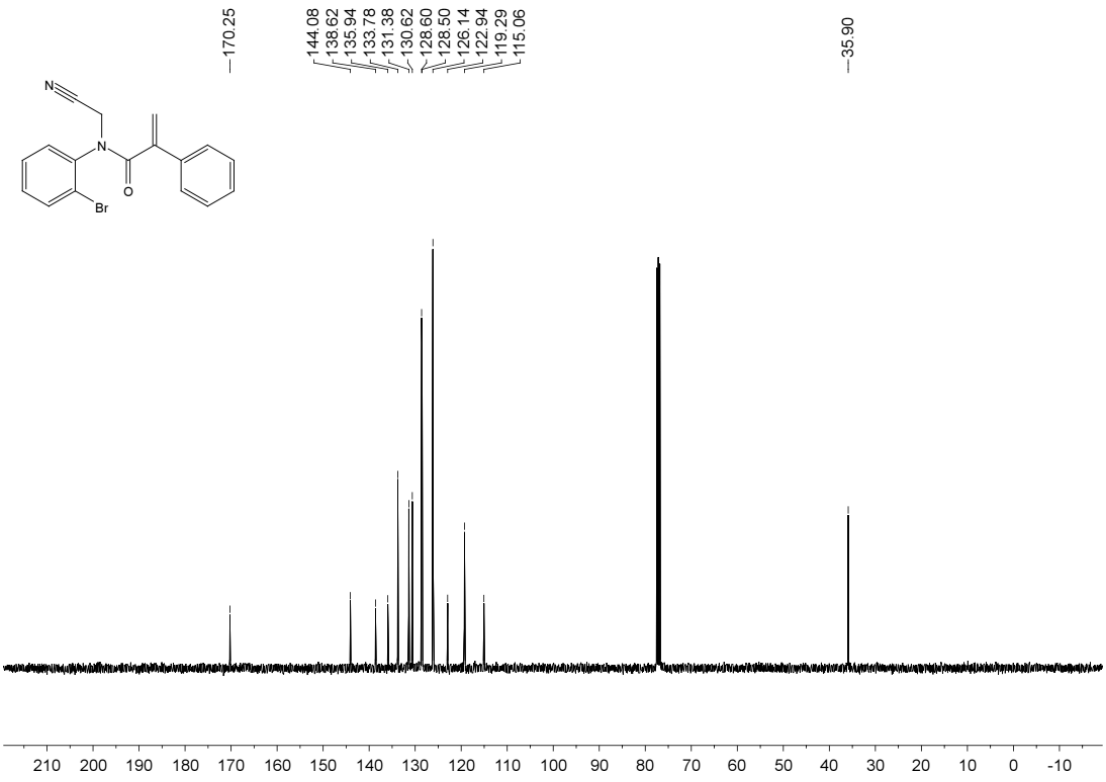
^{13}C NMR for *N*-(2-bromophenyl)-*N*-(2-methylallyl)-2-phenylacrylamide (s**31**)



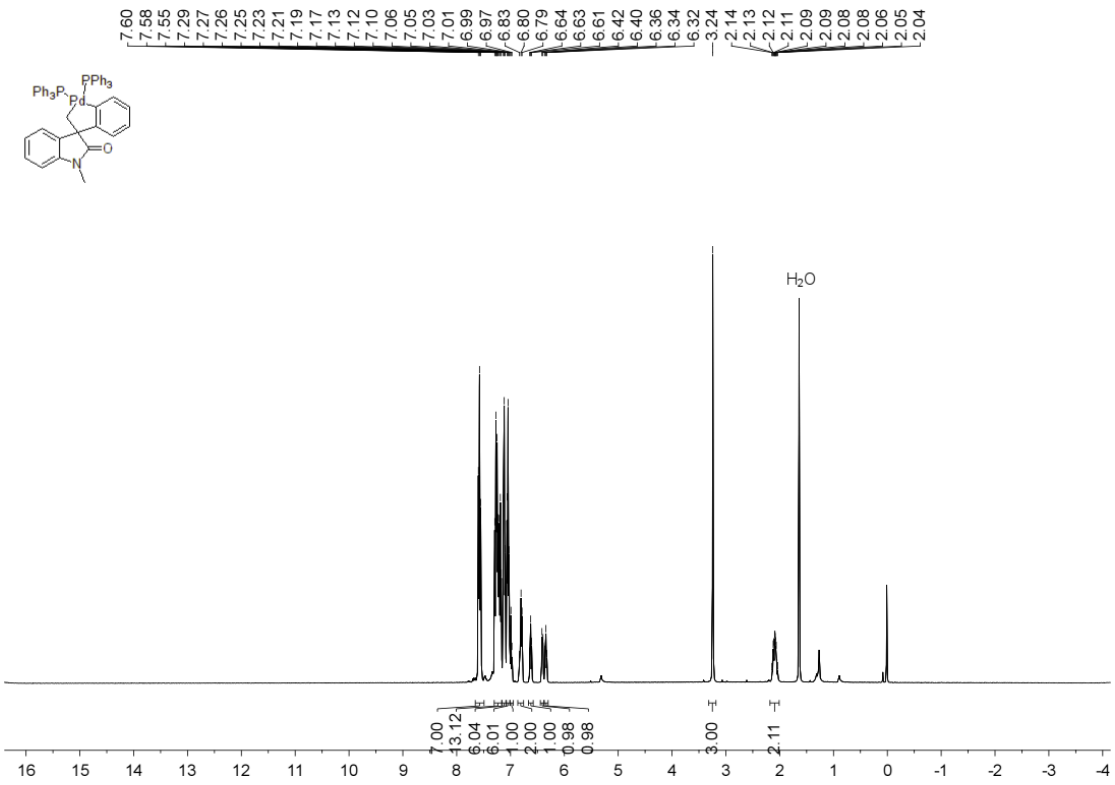
^{1}H NMR for *N*-(2-bromophenyl)-*N*-(cyanomethyl)-2-phenylacrylamide (**s32**)



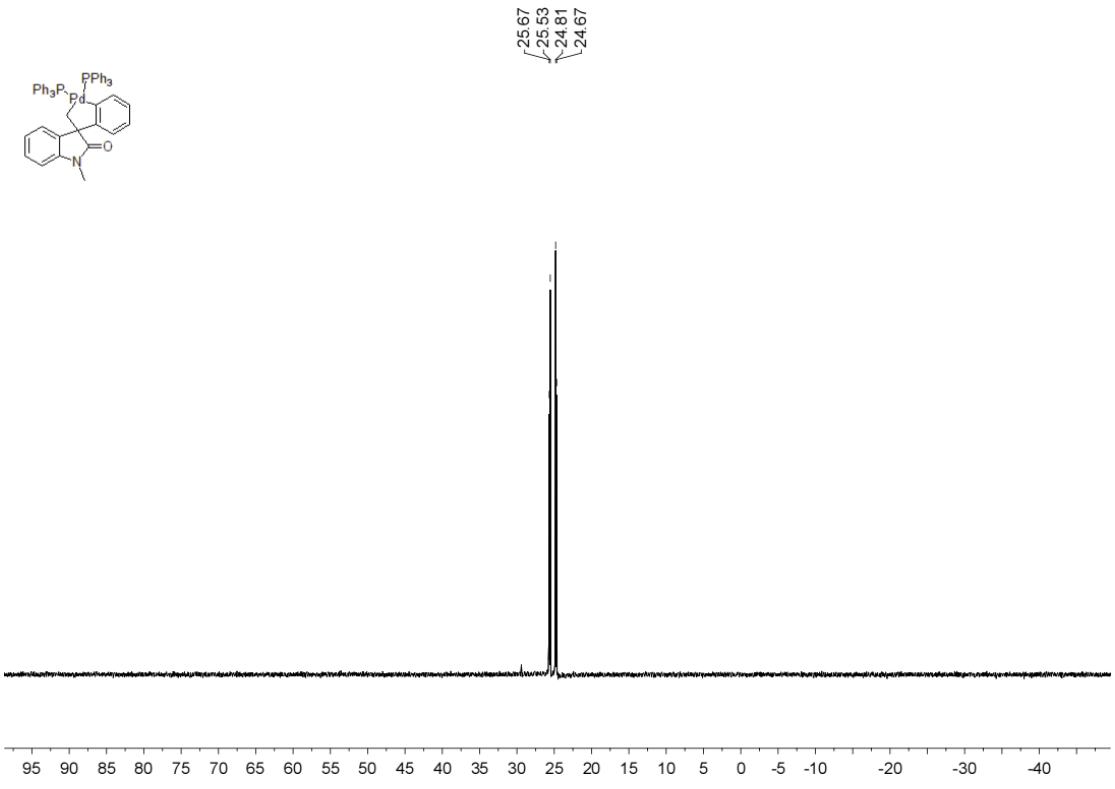
^{13}C NMR for *N*-(2-bromophenyl)-*N*-(cyanomethyl)-2-phenylacrylamide (**s32**)



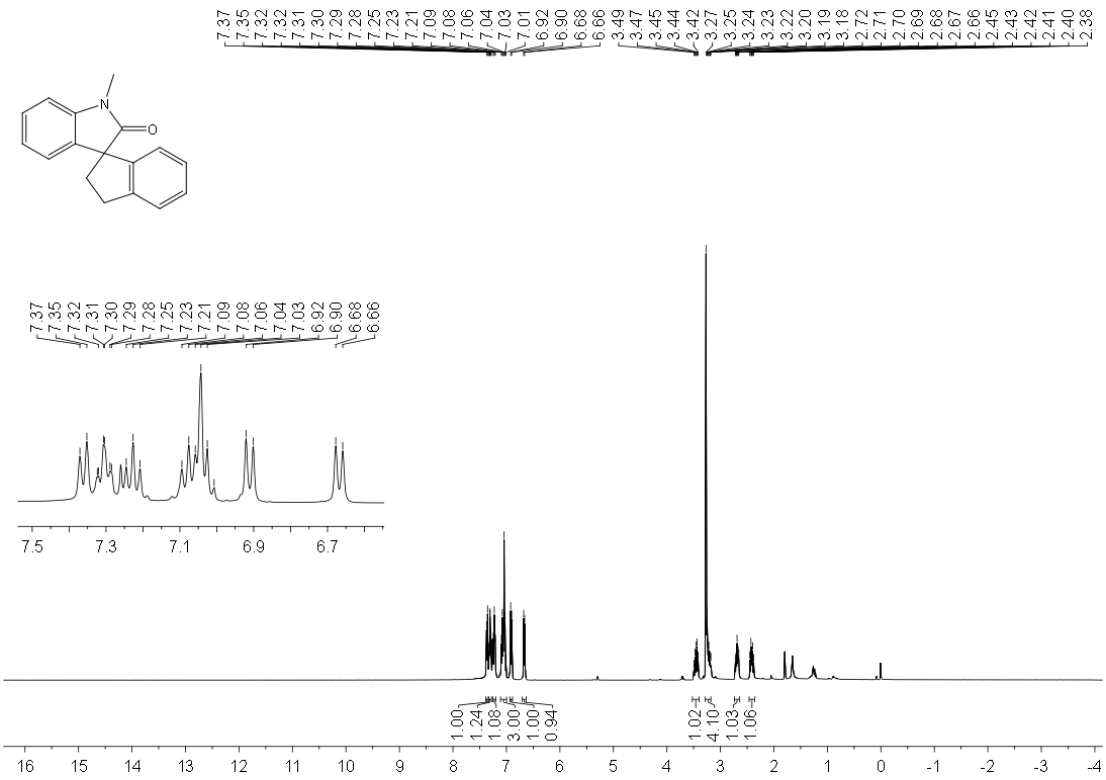
^{1}H NMR for palladacycle (**c1**)



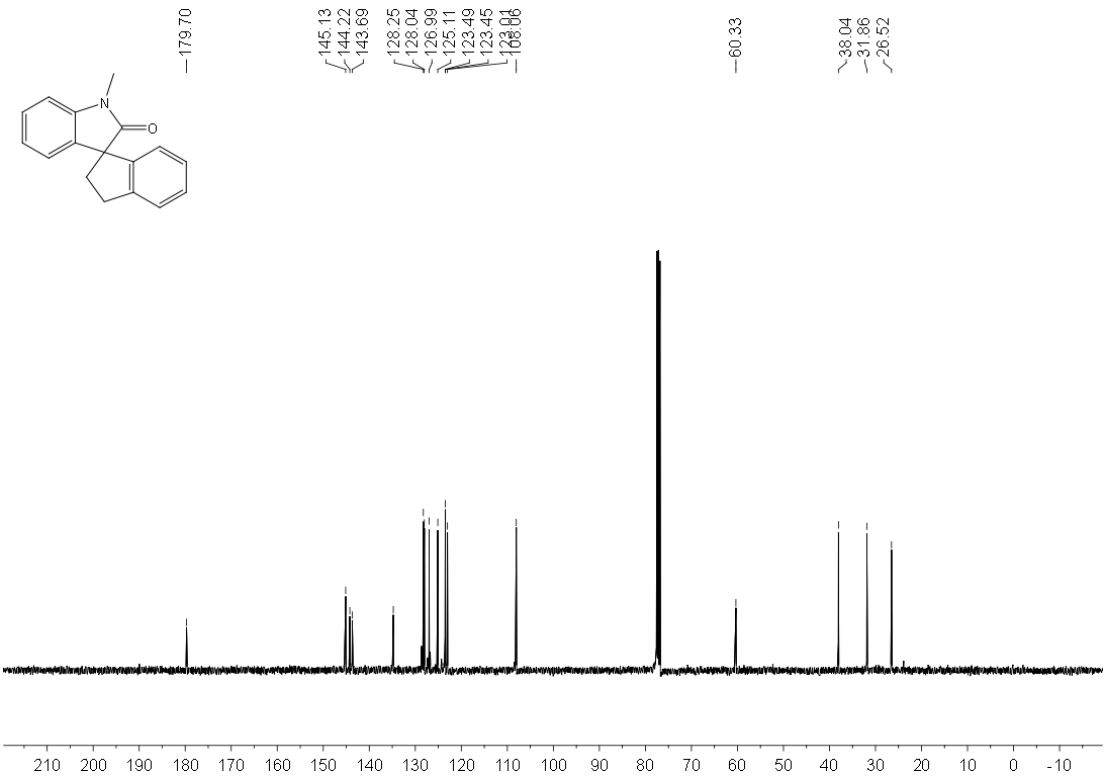
^{31}P NMR for palladacycle (**c1**)



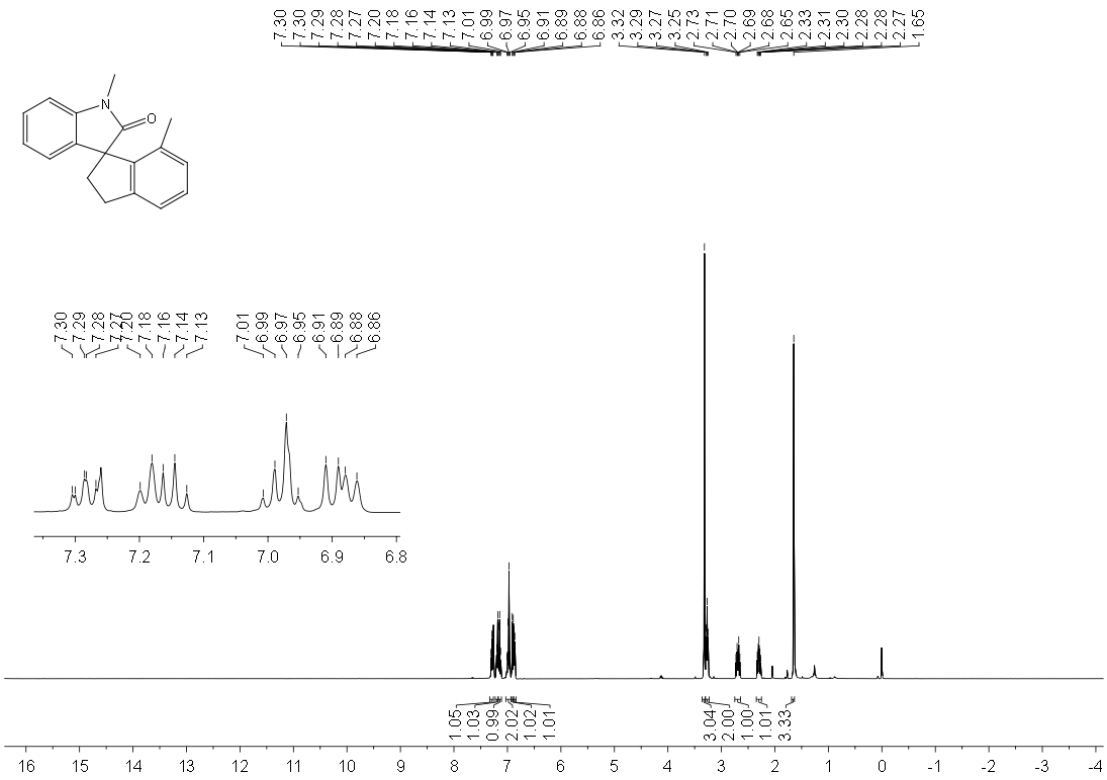
^{1}H NMR for 1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p1**)



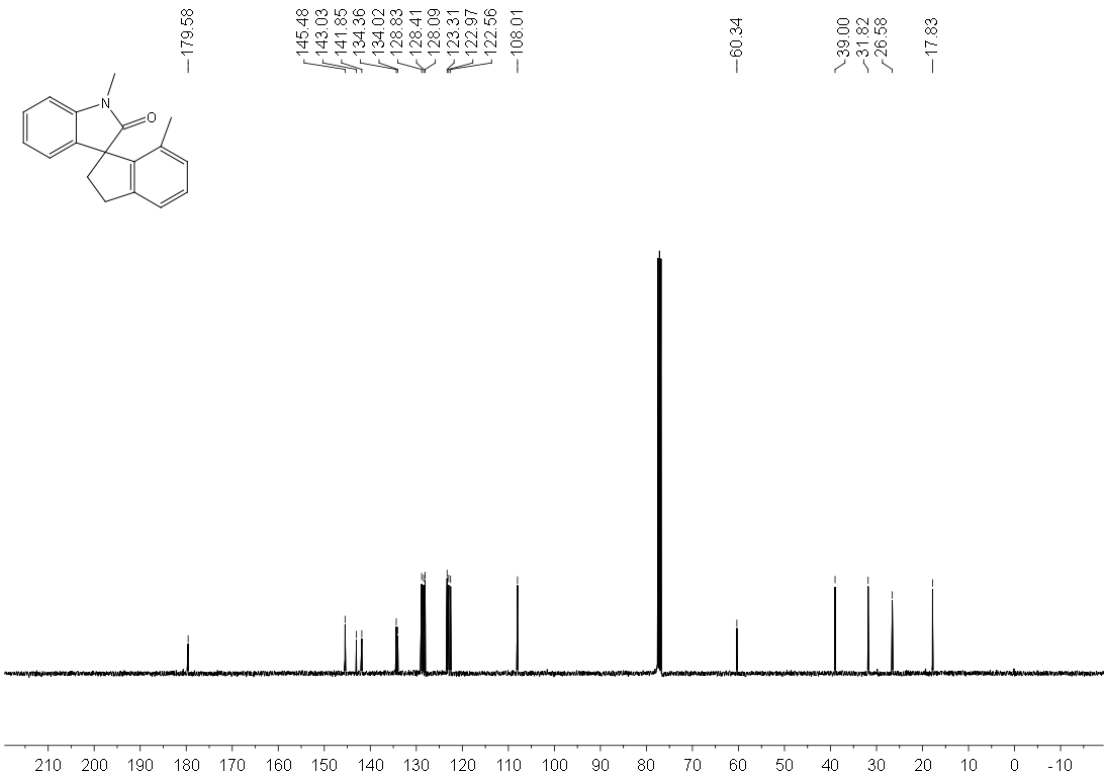
^{13}C NMR for 1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p1**)



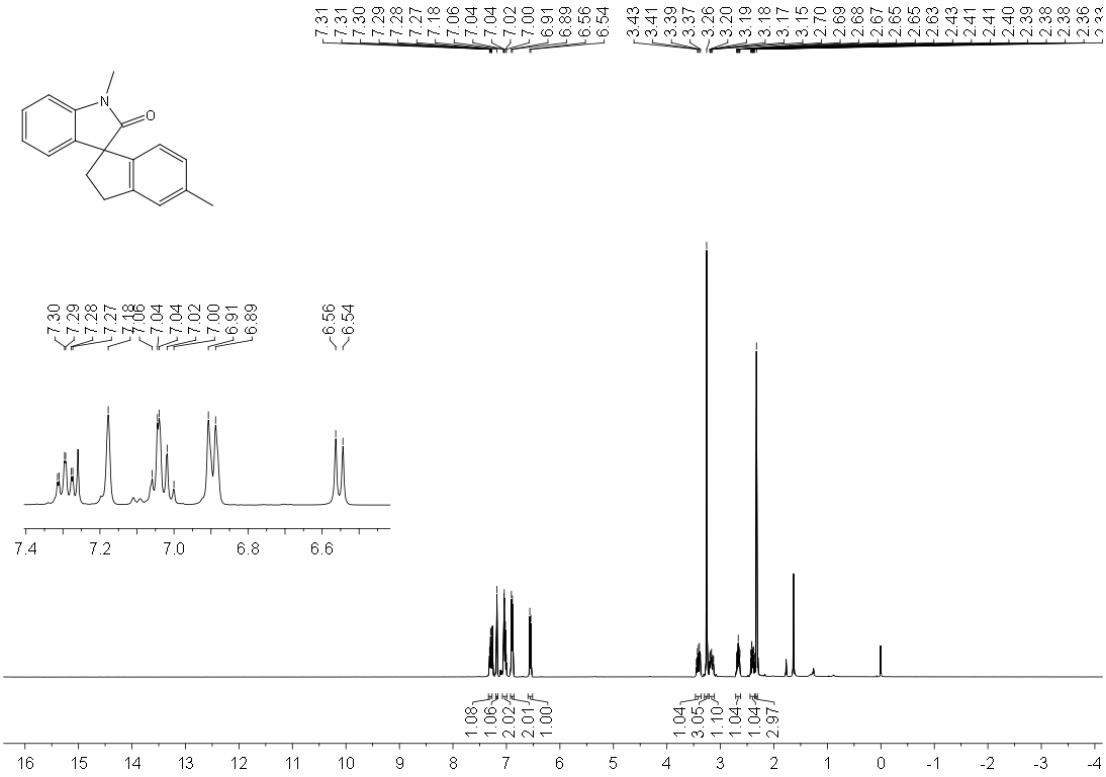
^{1}H NMR for 1',7-dimethyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p2**)



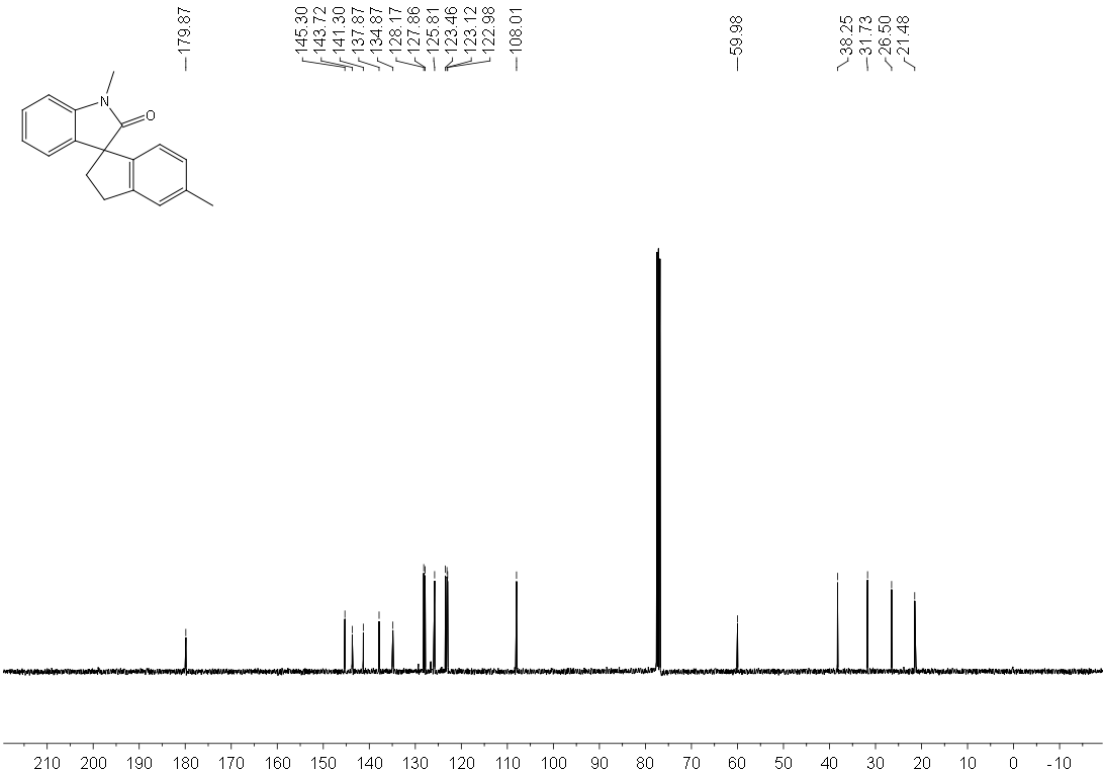
^{13}C NMR for 1',7-dimethyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p2**)



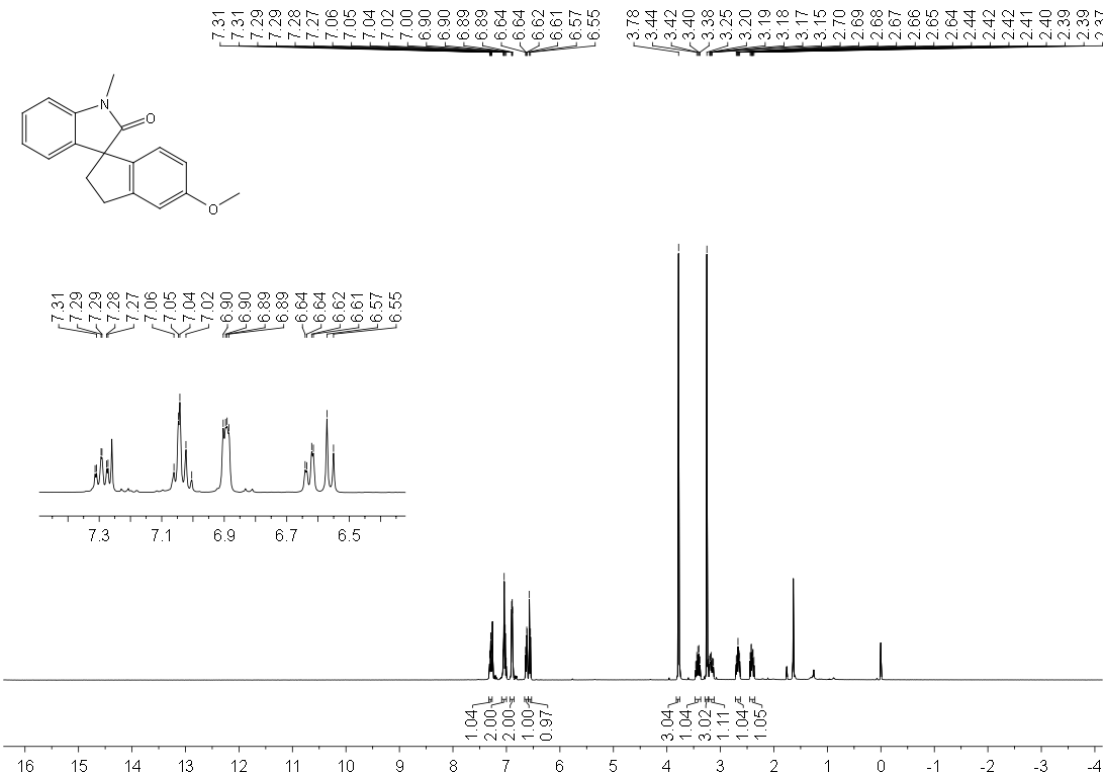
^{1}H NMR for 1',5-dimethyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p3**)



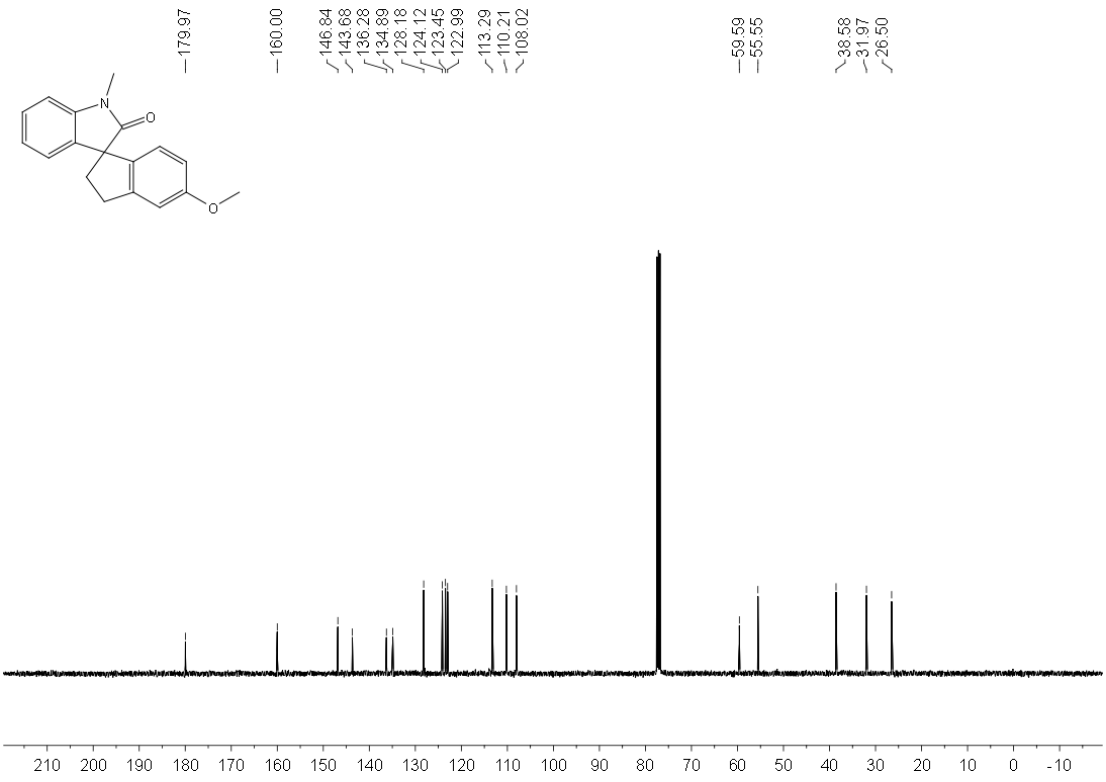
^{13}C NMR for 1',5-dimethyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p3**)



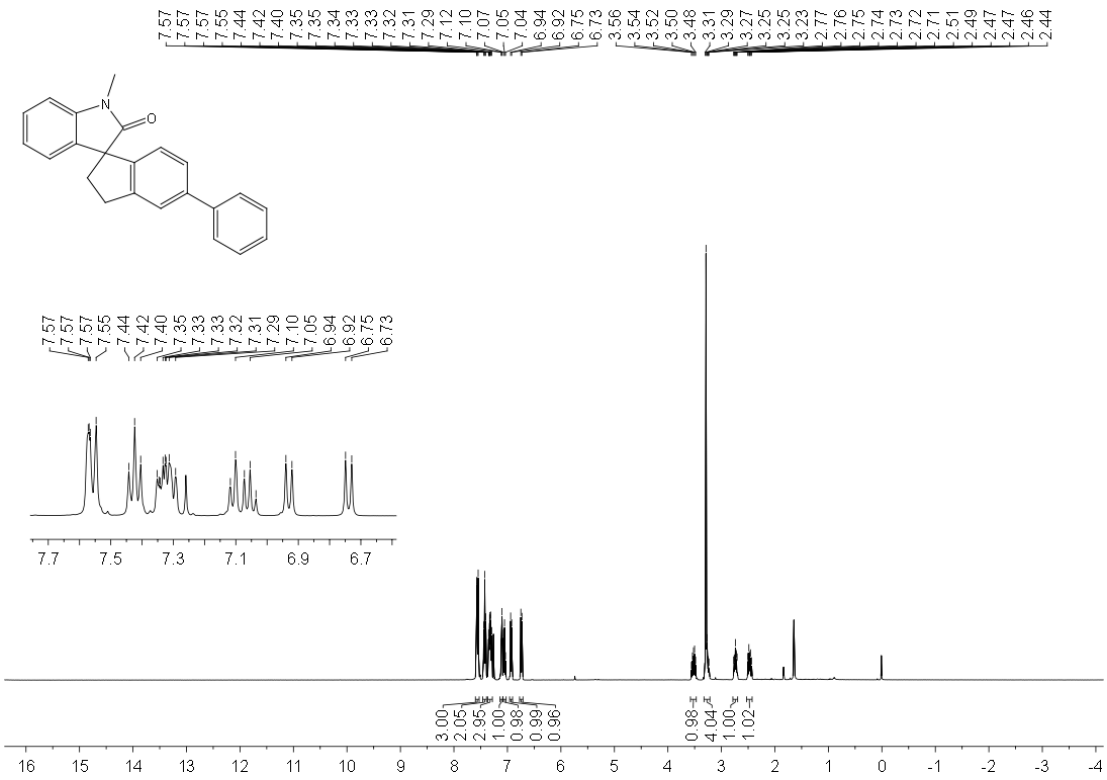
^{1}H NMR for 5-methoxy-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p4**)



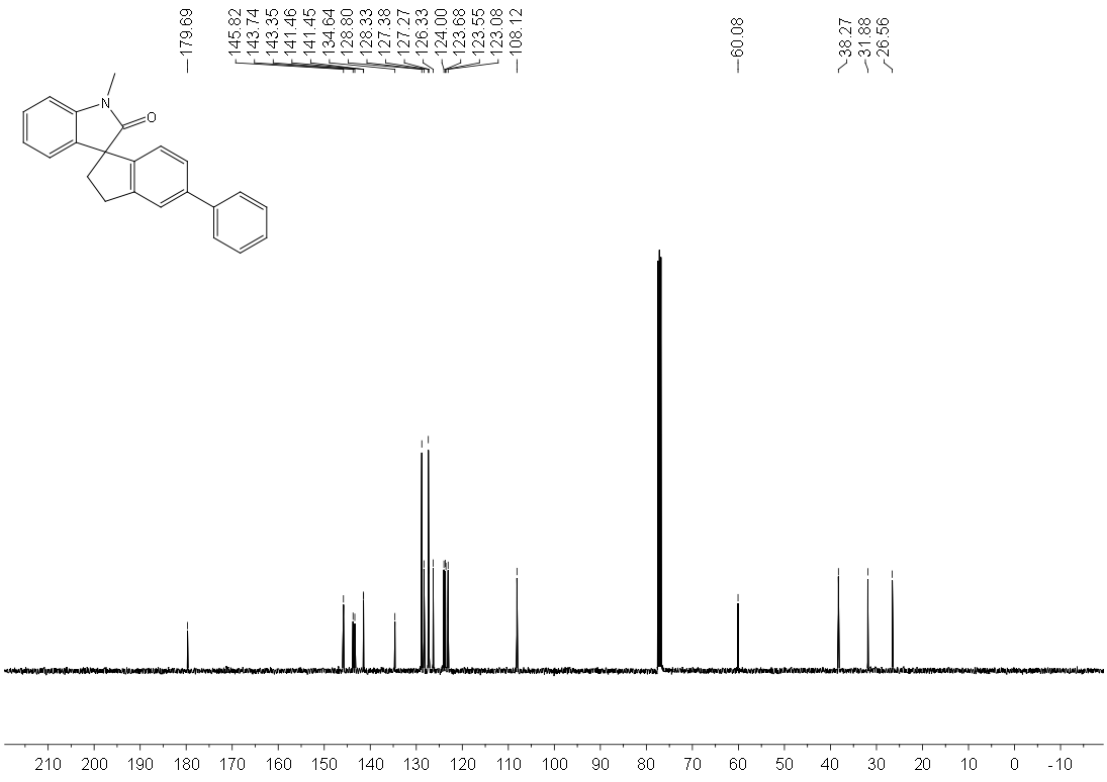
^{13}C NMR for 5-methoxy-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p4**)



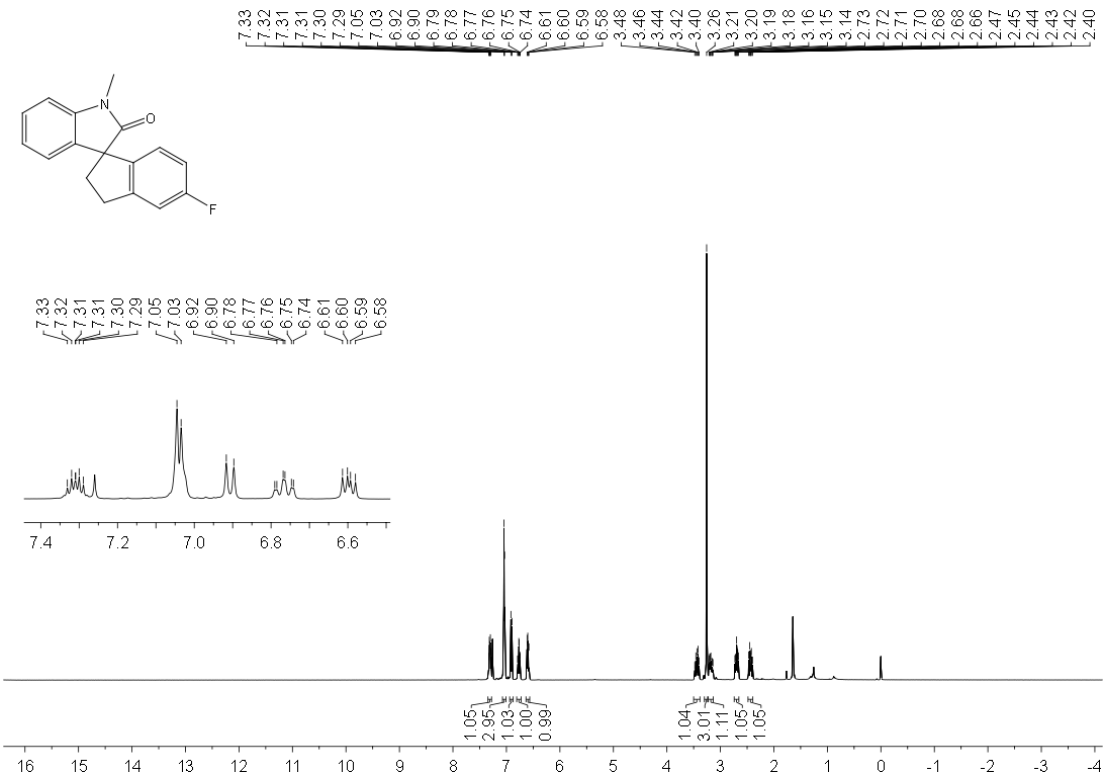
^{1}H NMR for 1'-methyl-5-phenyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p5**)



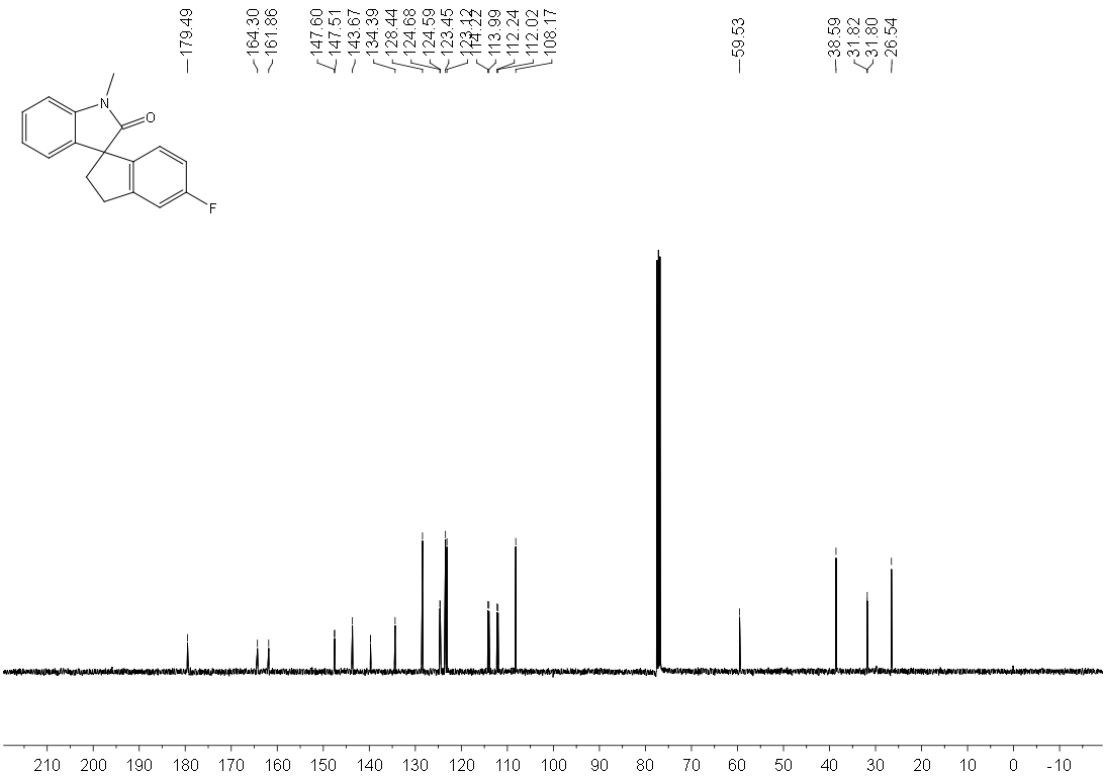
^{13}C NMR for 1'-methyl-5-phenyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p5**)



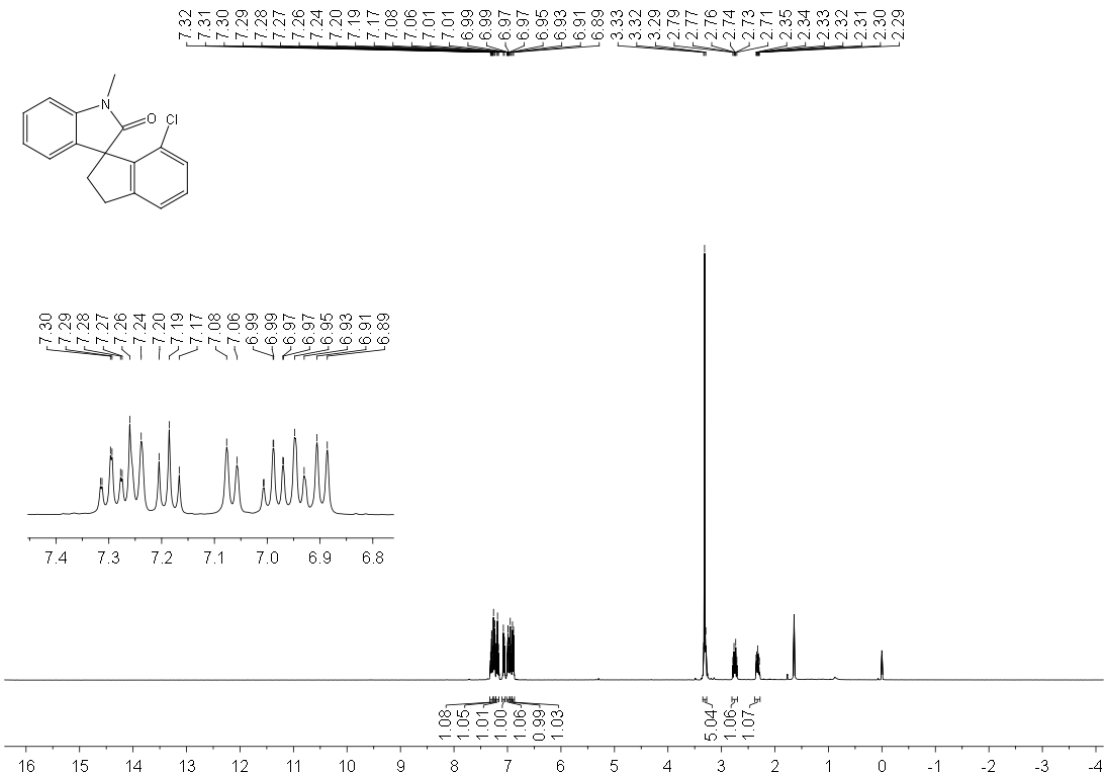
^{1}H NMR for 5-fluoro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p6**)



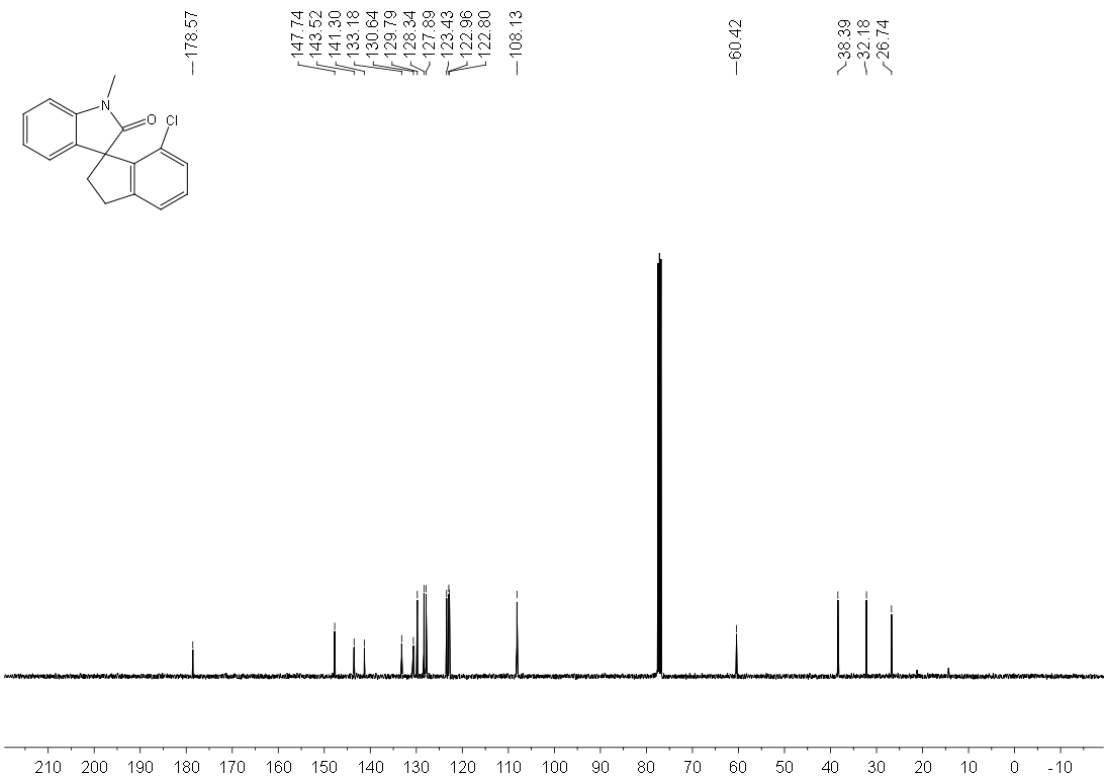
^{13}C NMR for 5-fluoro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p6**)



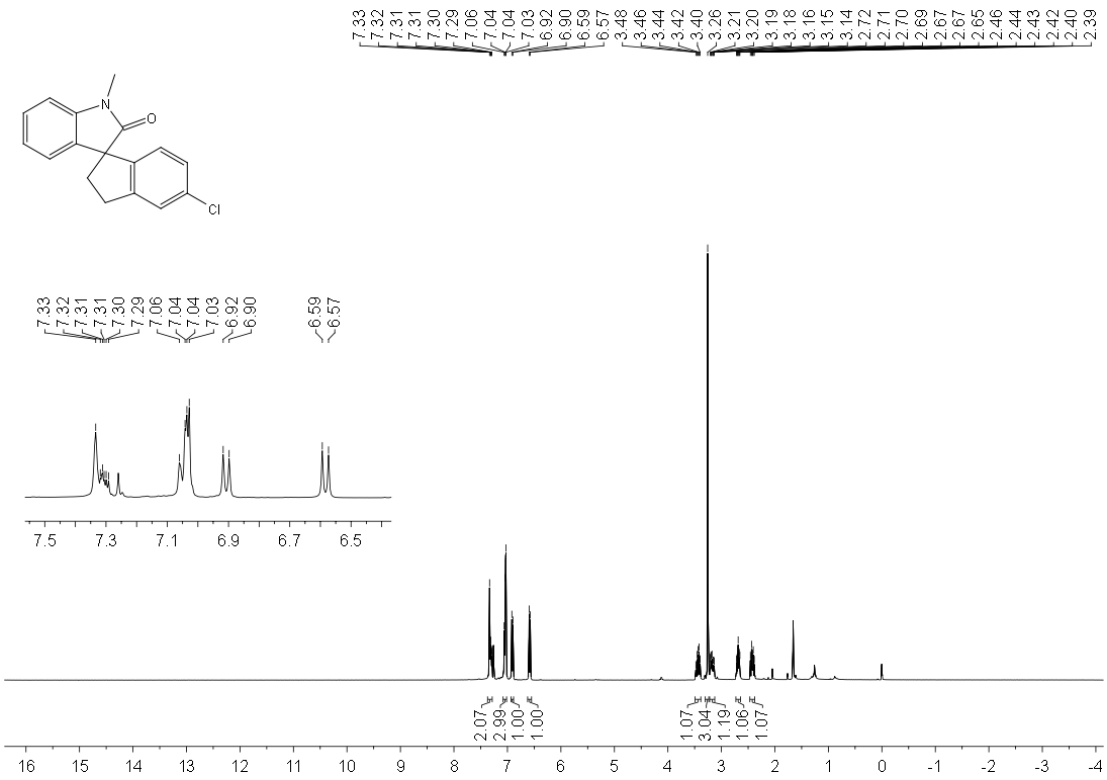
^{1}H NMR for 7-chloro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p7**)



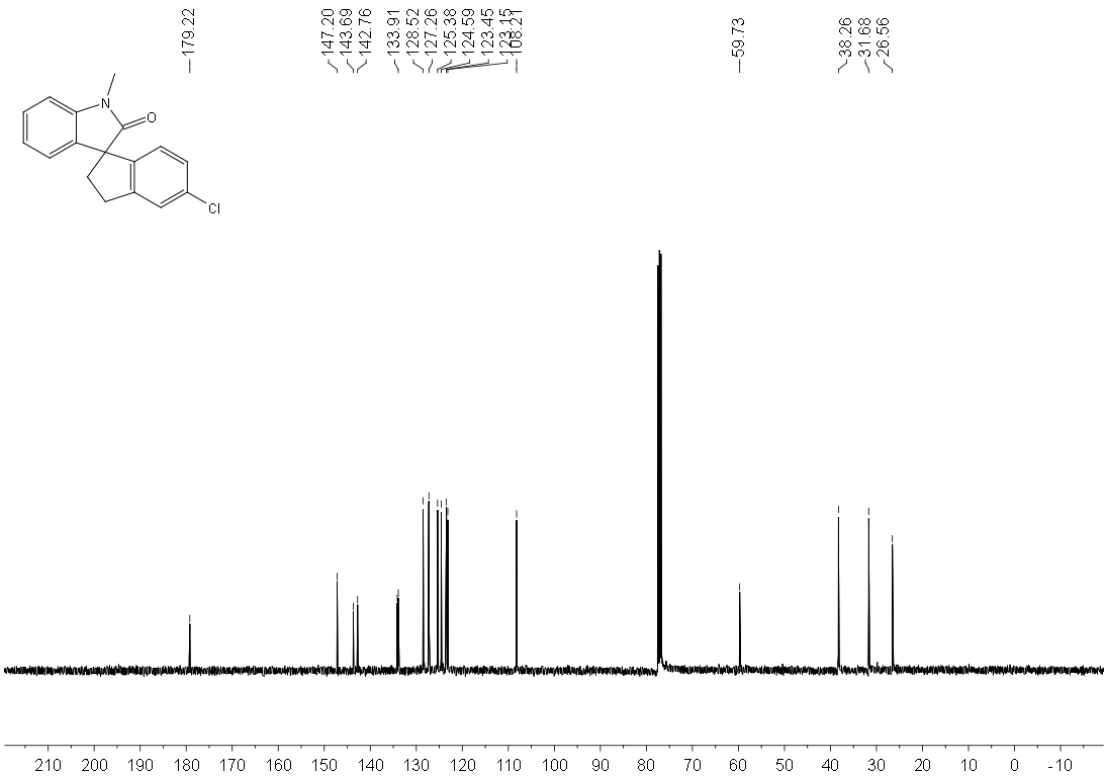
^{13}C NMR for 7-chloro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p7**)



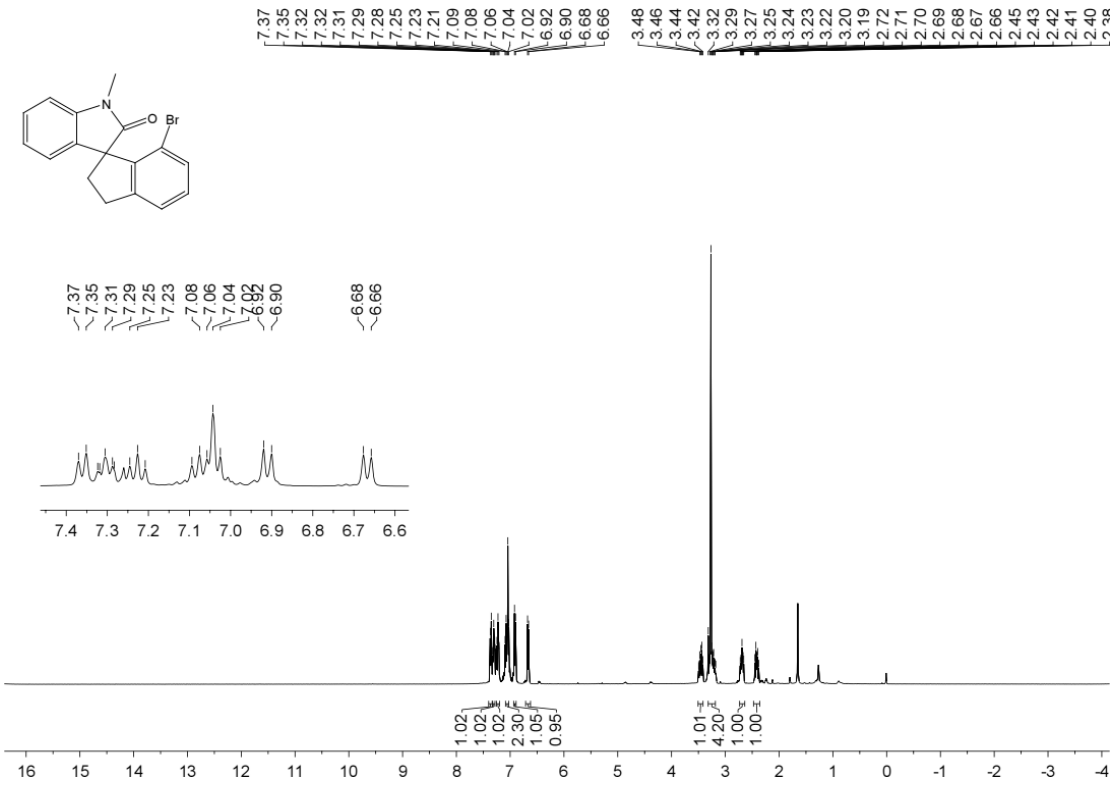
^{1}H NMR for 5-chloro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p8**)



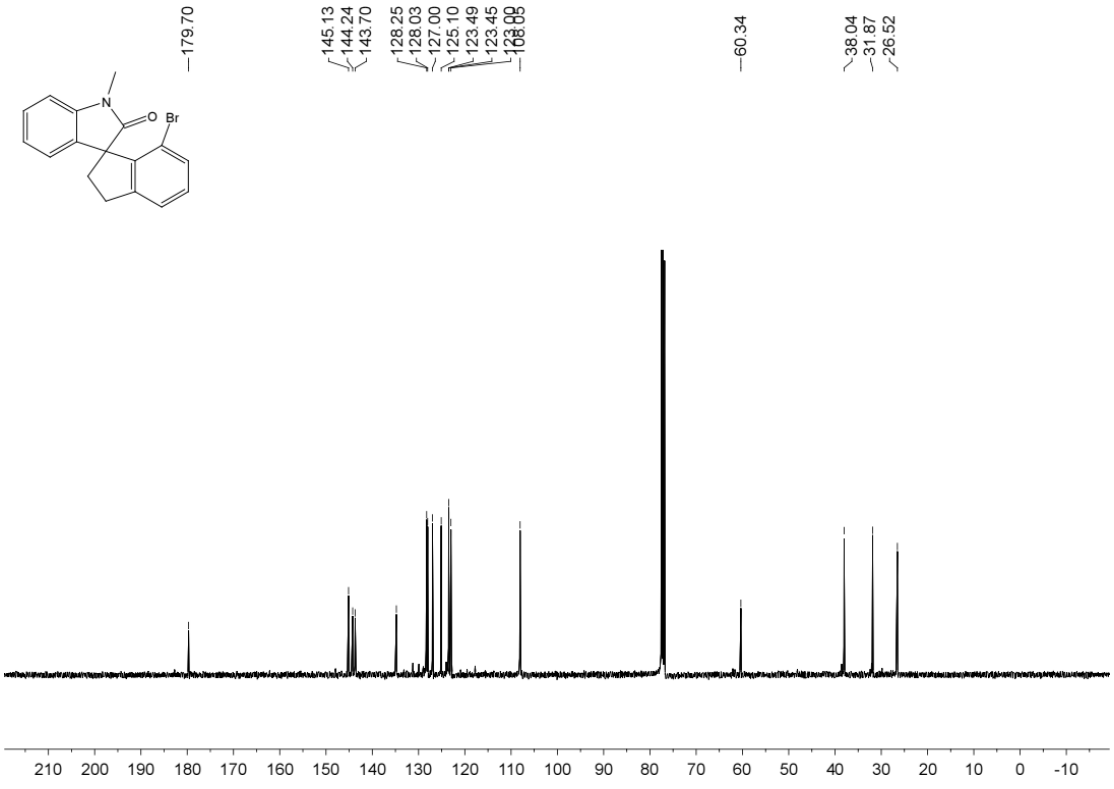
^{13}C NMR for 5-chloro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p8**)



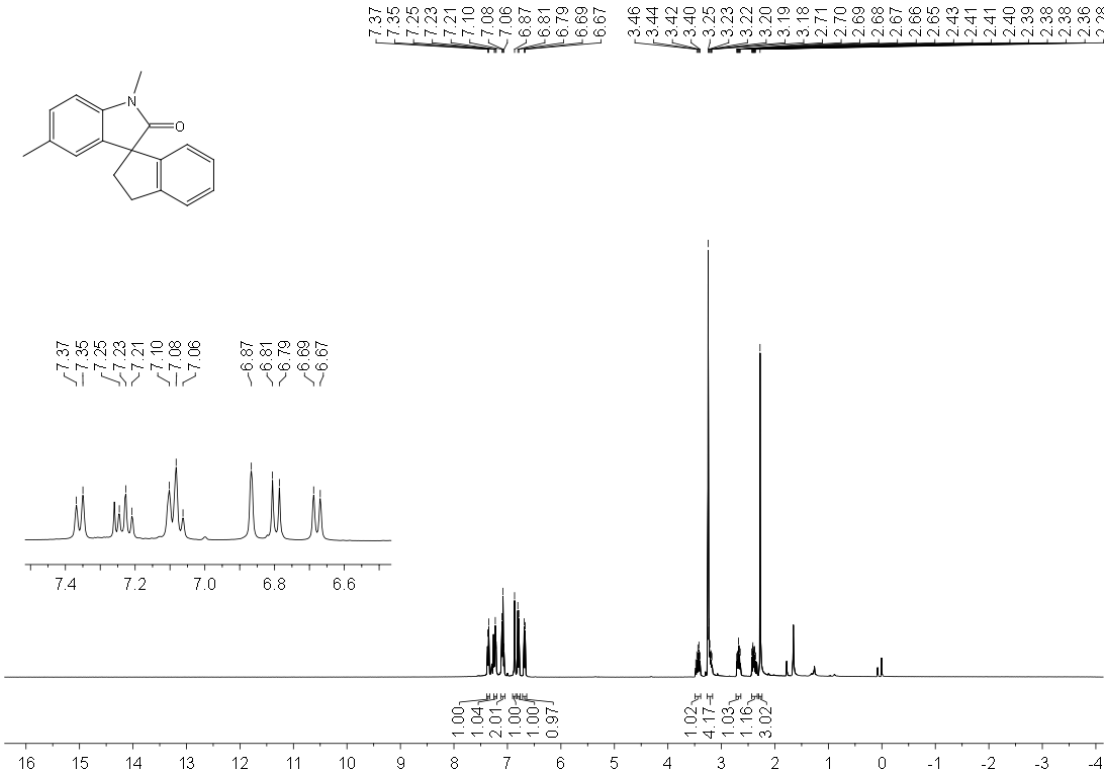
^{1}H NMR for 7-bromo-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p9**)



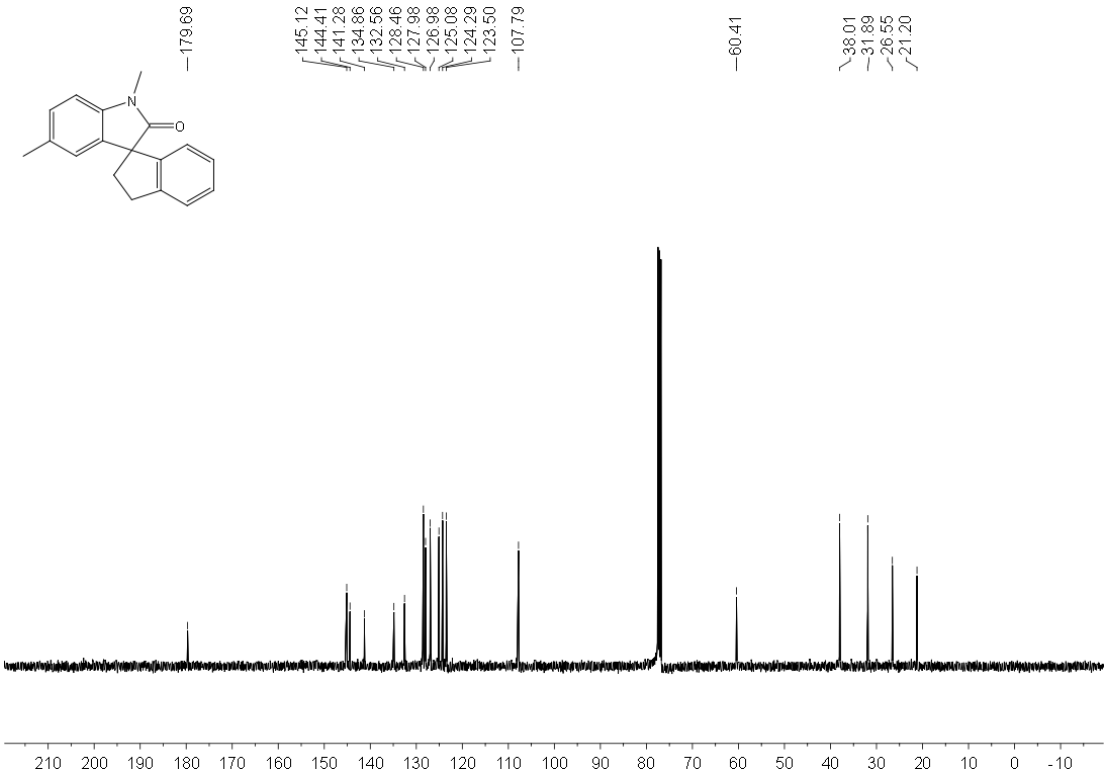
^{13}C NMR for 7-bromo-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p9**)



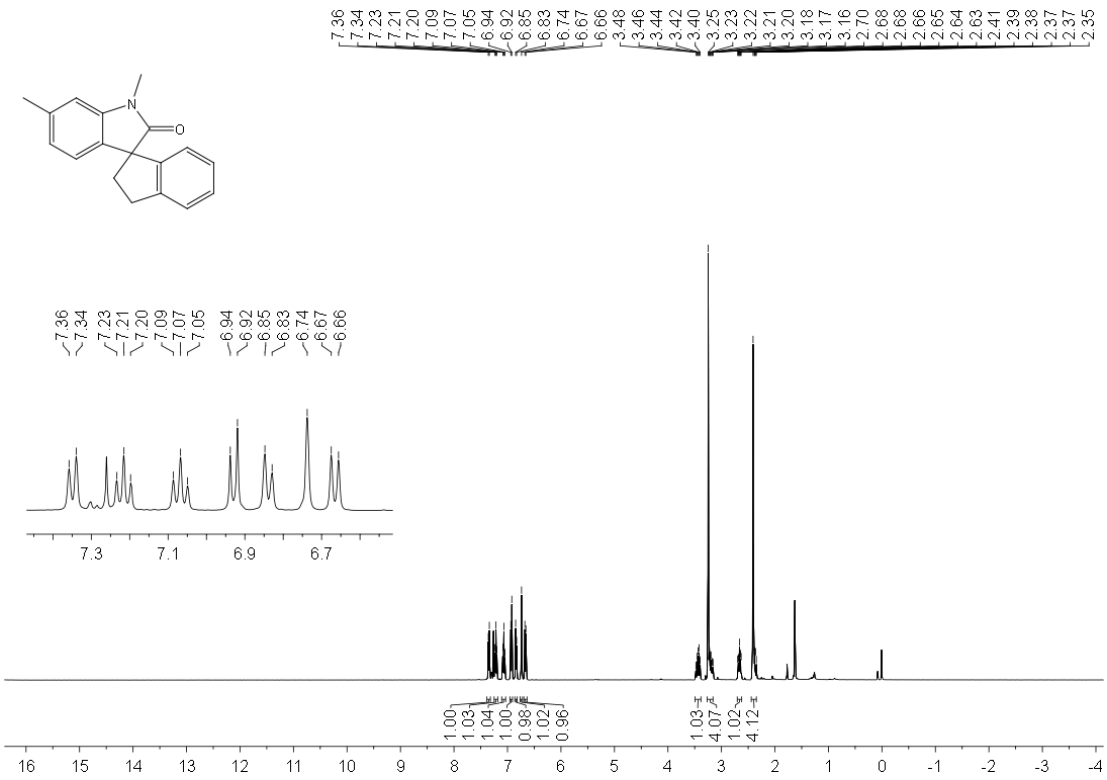
^{1}H NMR for 1',5'-dimethyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p10**)



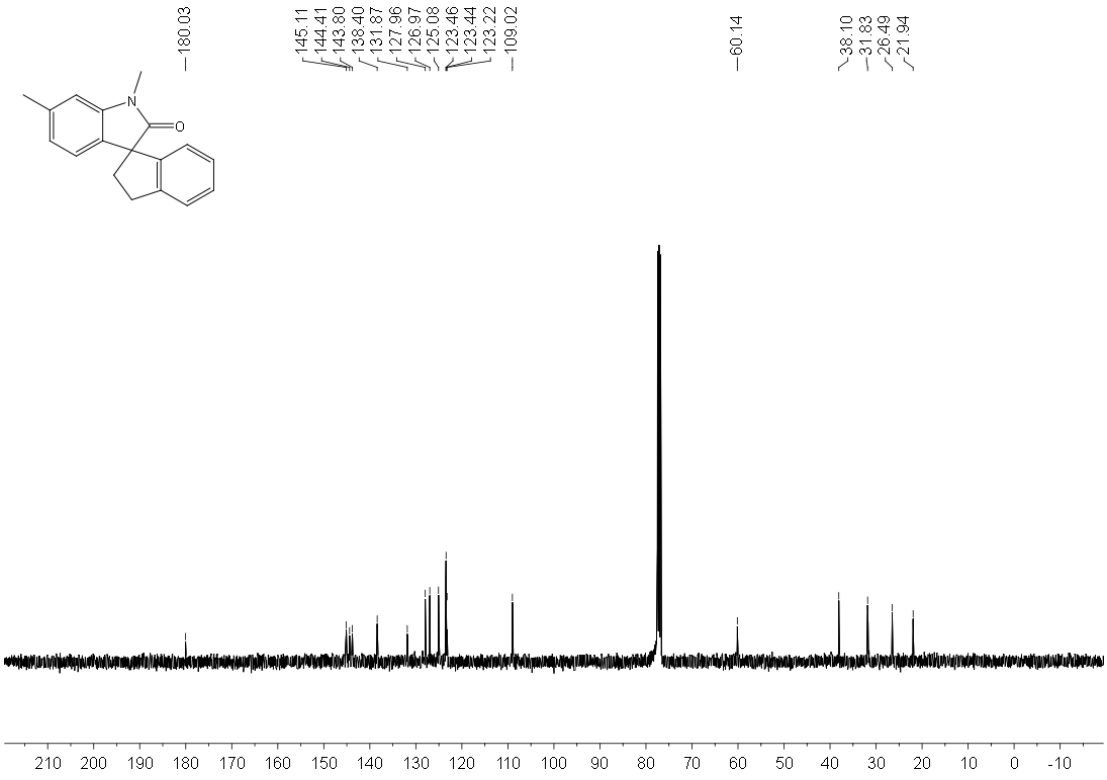
^{13}C NMR for 1',5'-dimethyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p10**)



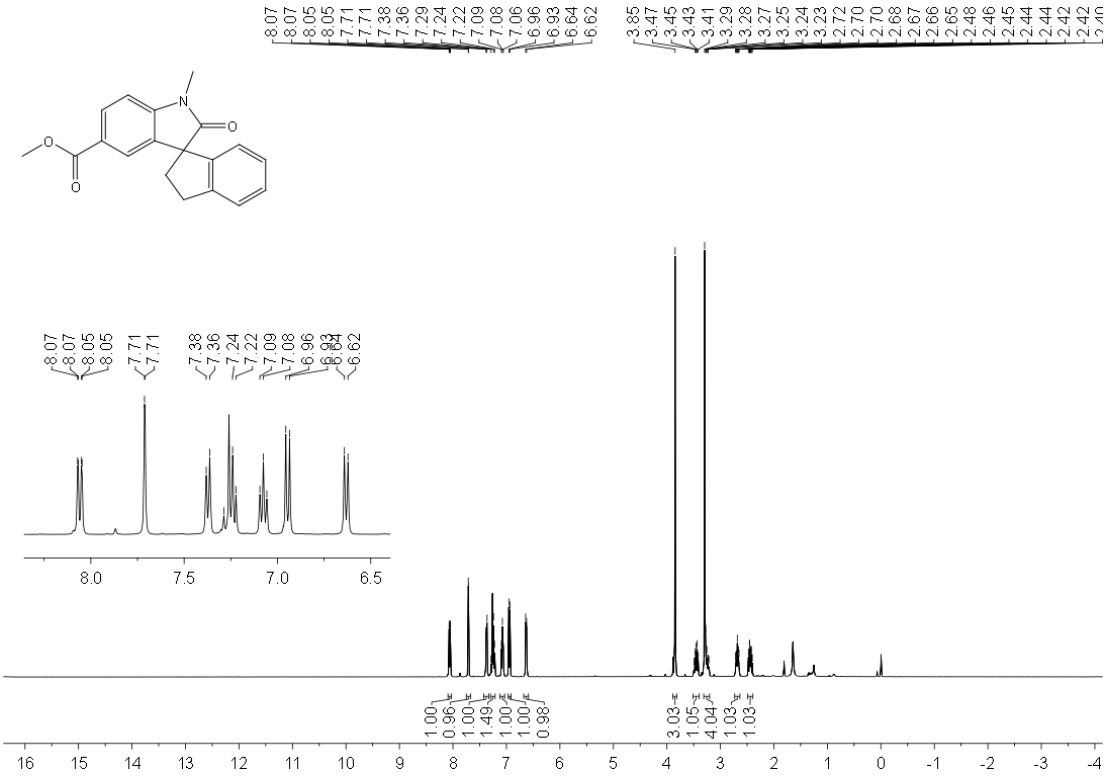
^{1}H NMR for 1',6'-dimethyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p11**)



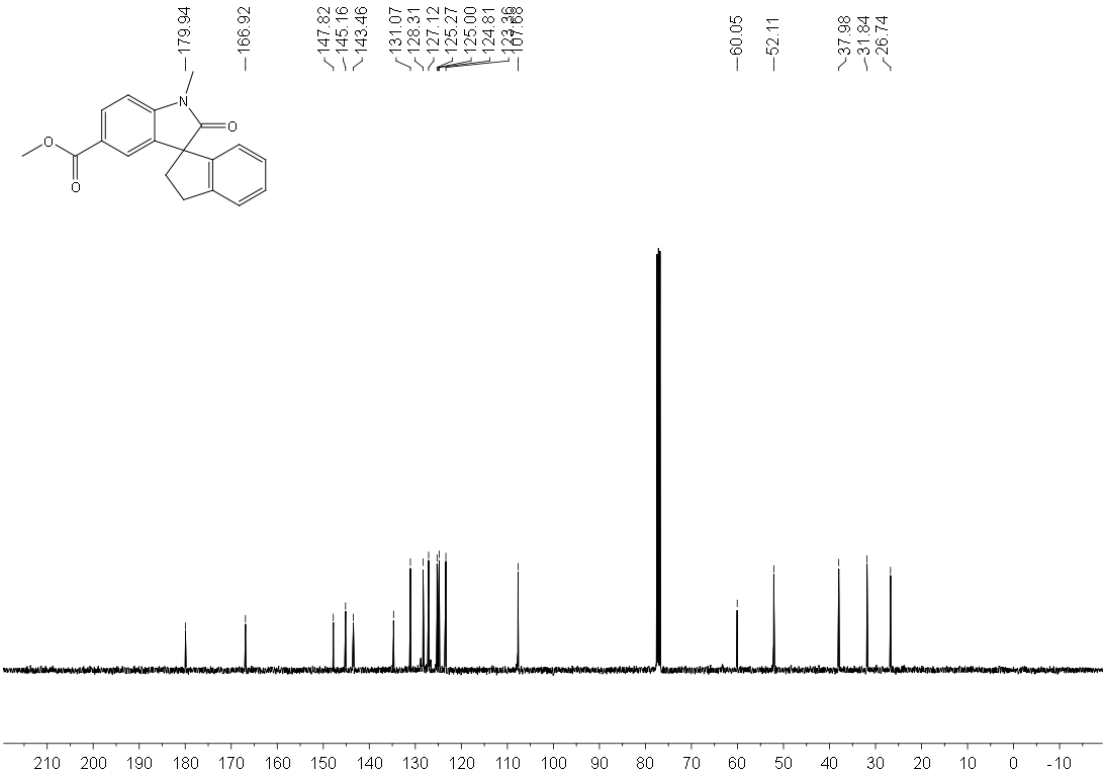
^{13}C NMR for 1',6'-dimethyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p11**)



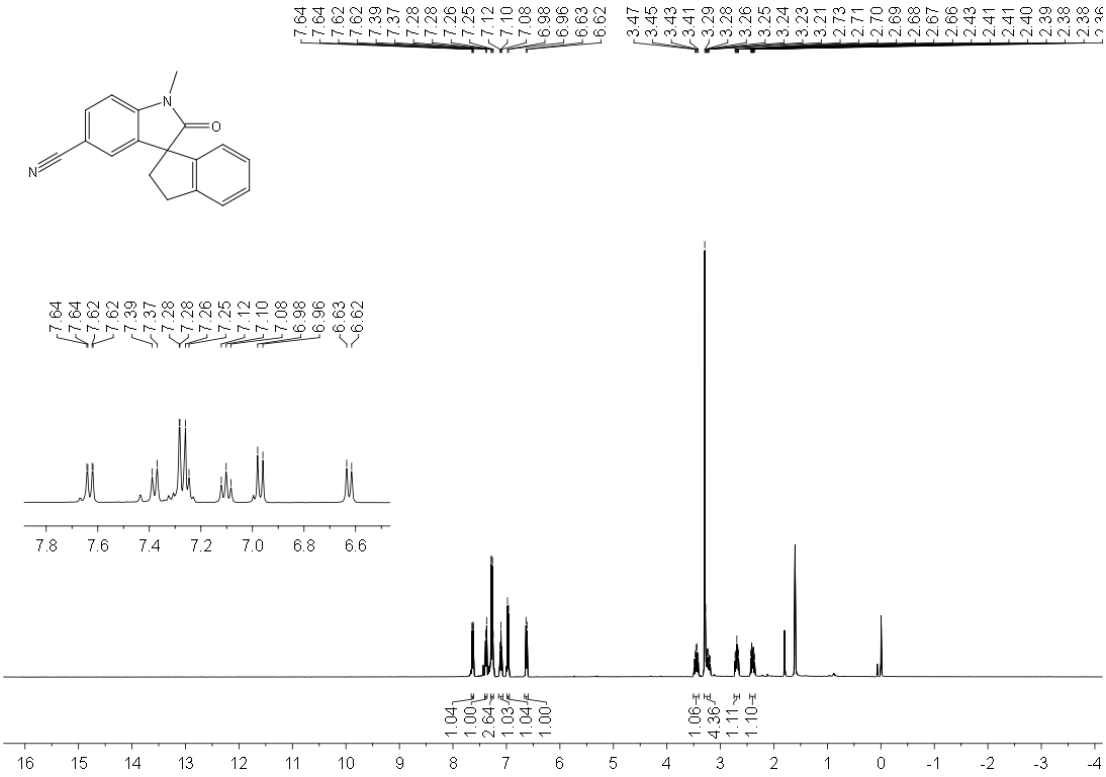
^{1}H NMR for methyl 1'-methyl-2'-oxo-2,3-dihydrospiro[indene-1,3'-indoline]-5'-carboxylate (**p12**)



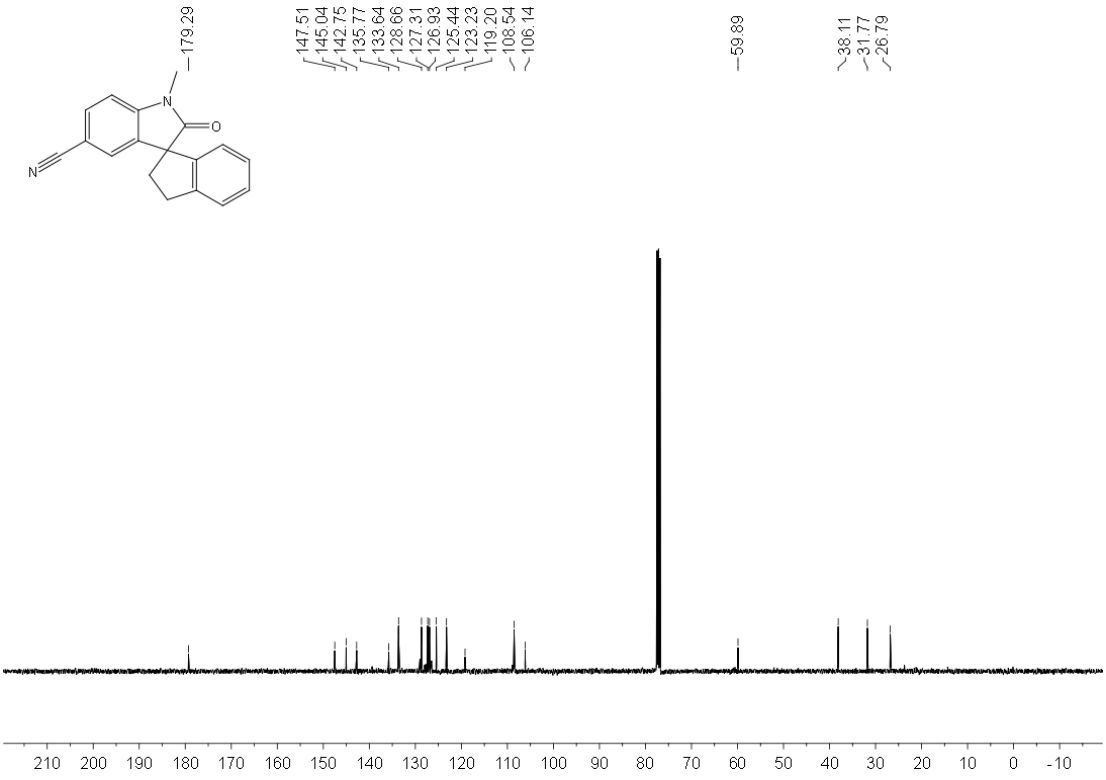
^{13}CNMR for methyl 1'-methyl-2'-oxo-2,3-dihydrospiro[indene-1,3'-indoline]-5'-carboxylate (**p12**)



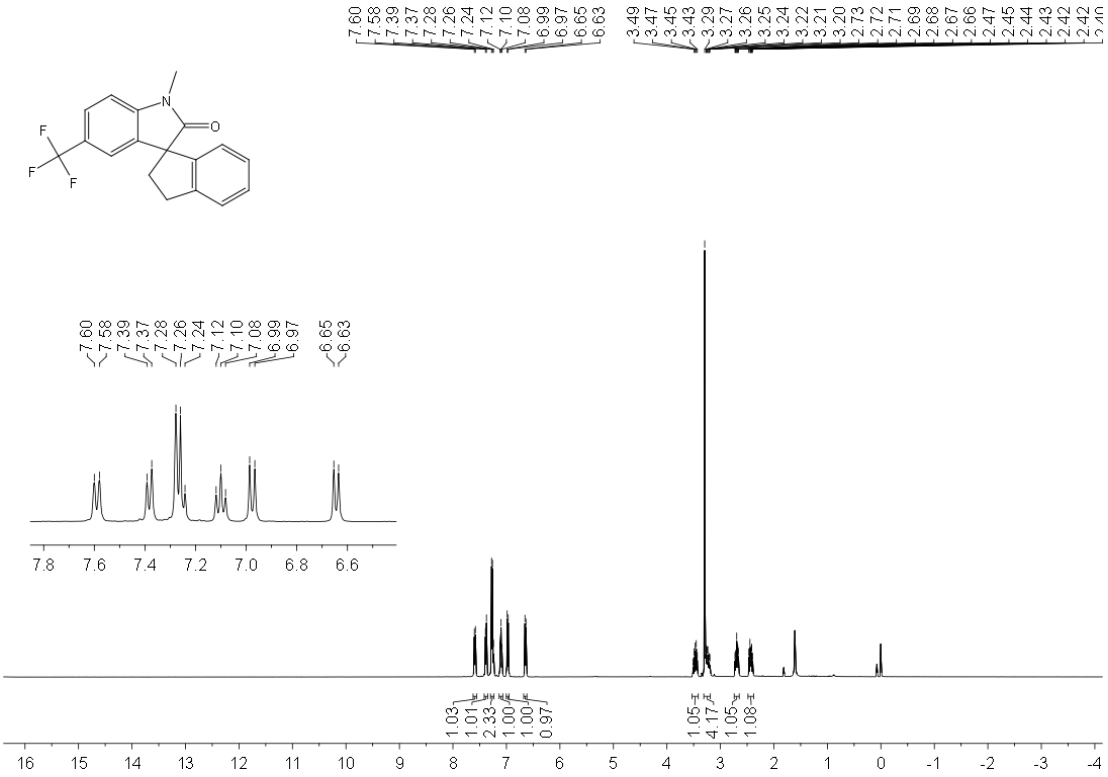
^{1}H NMR for 1'-methyl-2'-oxo-2,3-dihydrospiro[indene-1,3'-indoline]-5'-carbonitrile (**p13**)



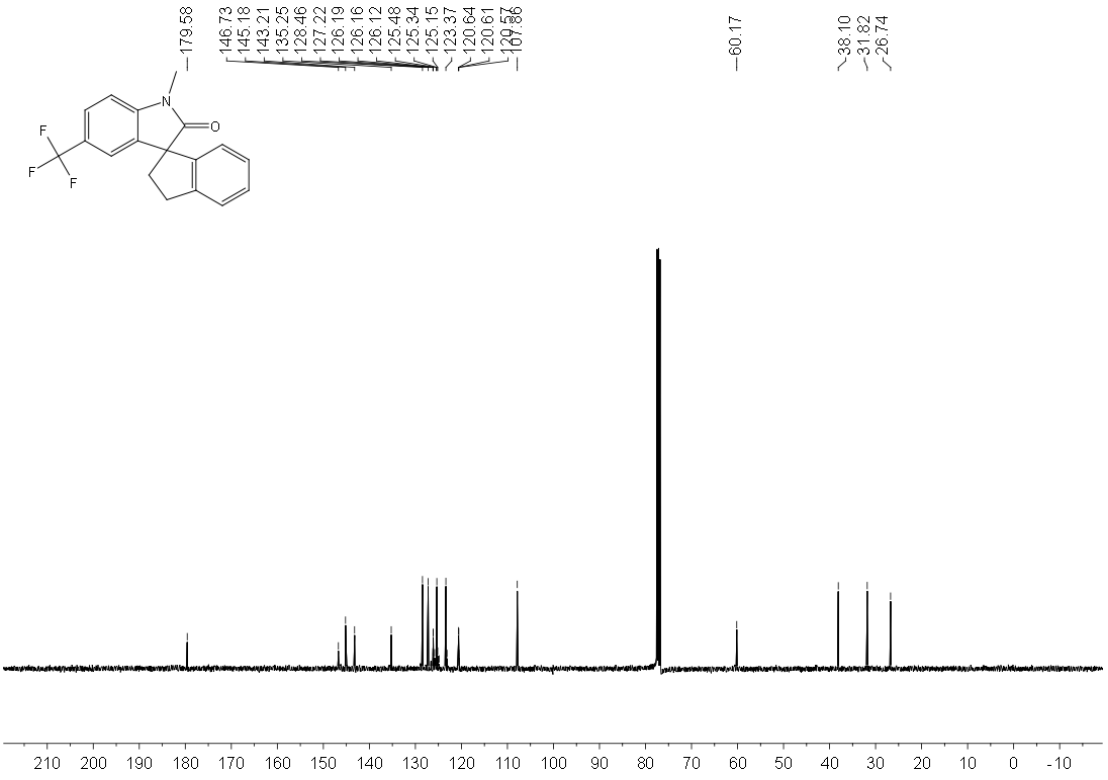
^{13}C NMR for 1'-methyl-2'-oxo-2,3-dihydrospiro[indene-1,3'-indoline]-5'-carbonitrile (**p13**)



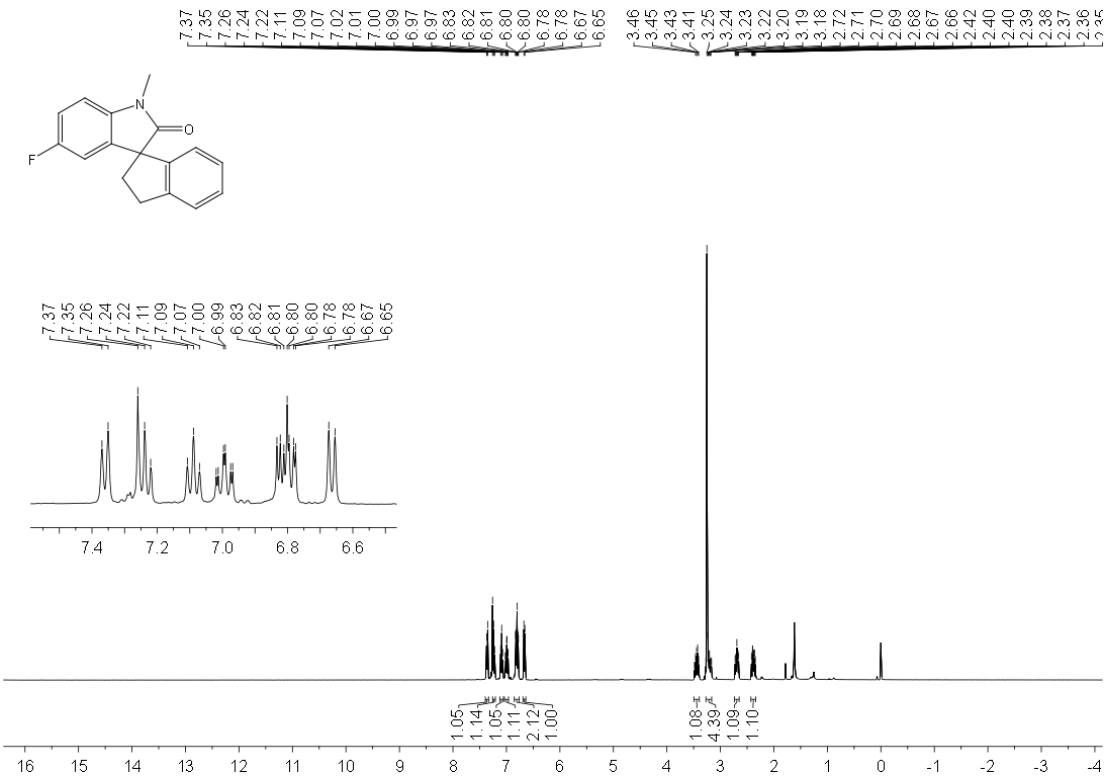
^{1}H NMR for 1'-methyl-5'-(trifluoromethyl)-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p14**)



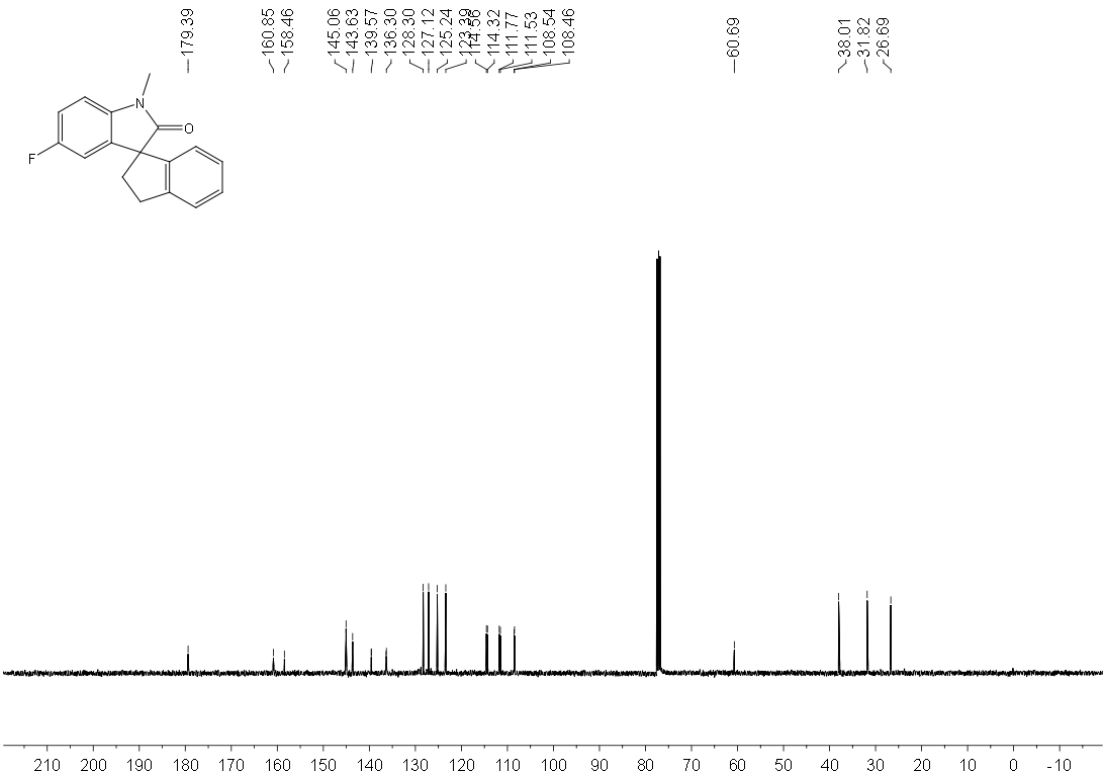
^{13}C NMR for 1'-methyl-5'-(trifluoromethyl)-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p14**)



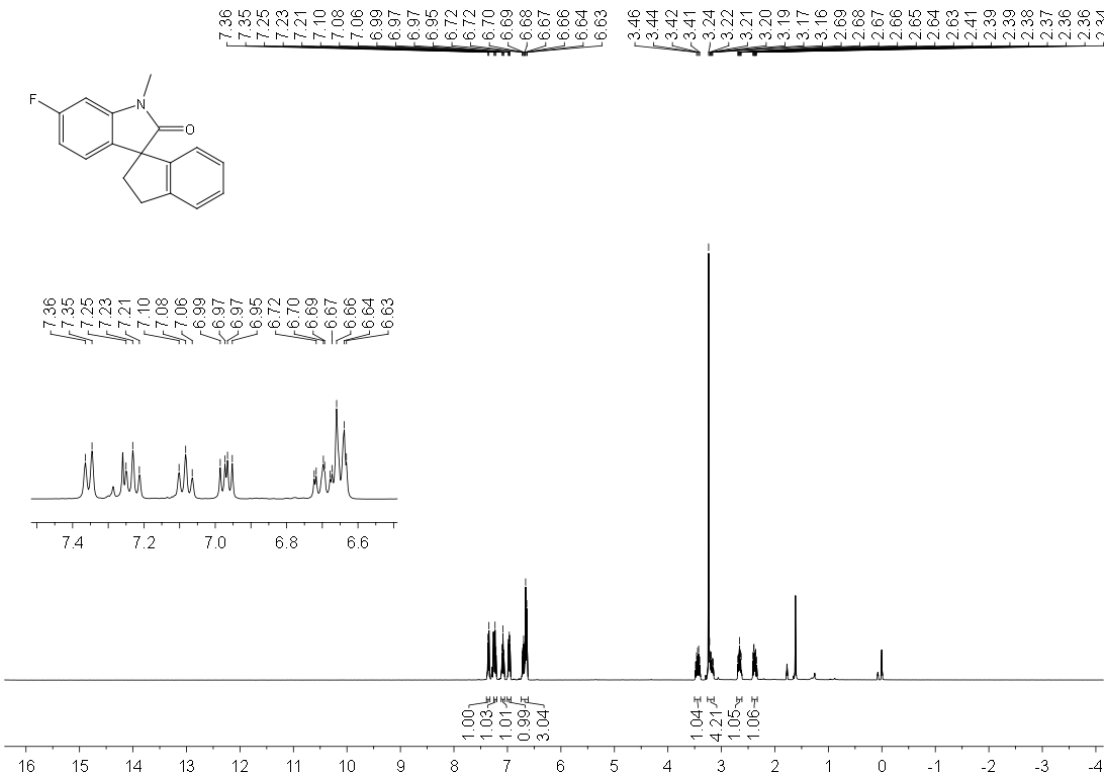
^{1}H NMR for 5'-fluoro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p15**)



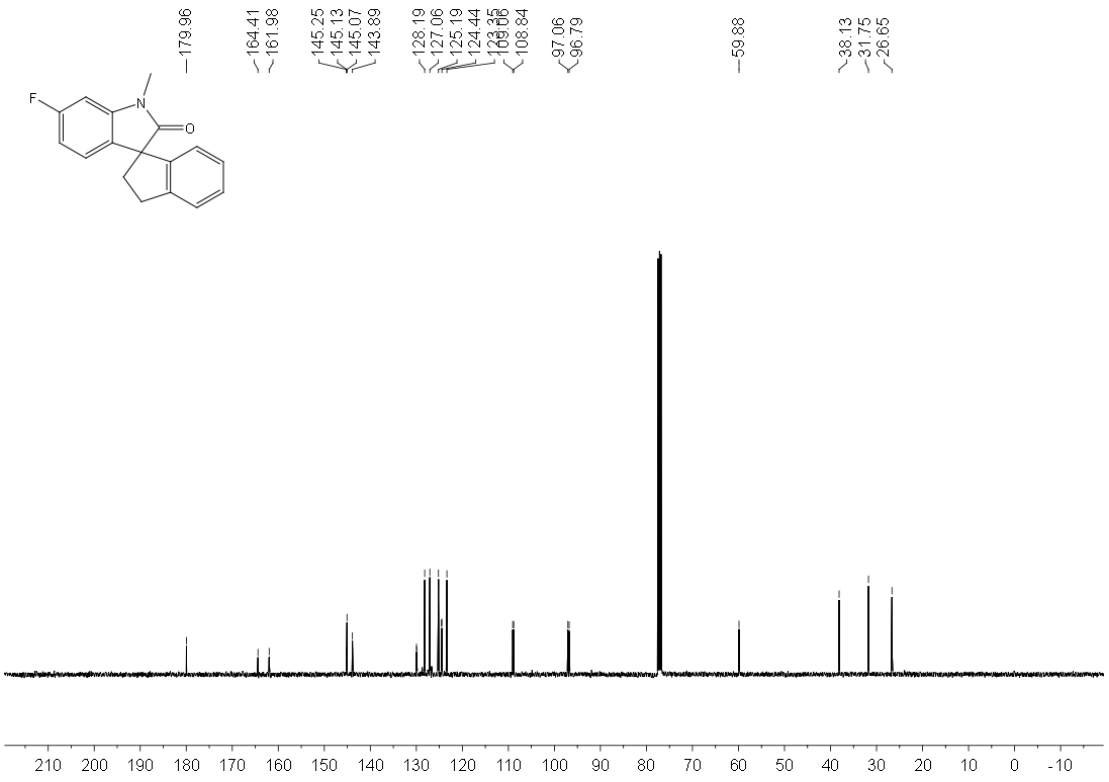
^{13}C NMR for 5'-fluoro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p15**)



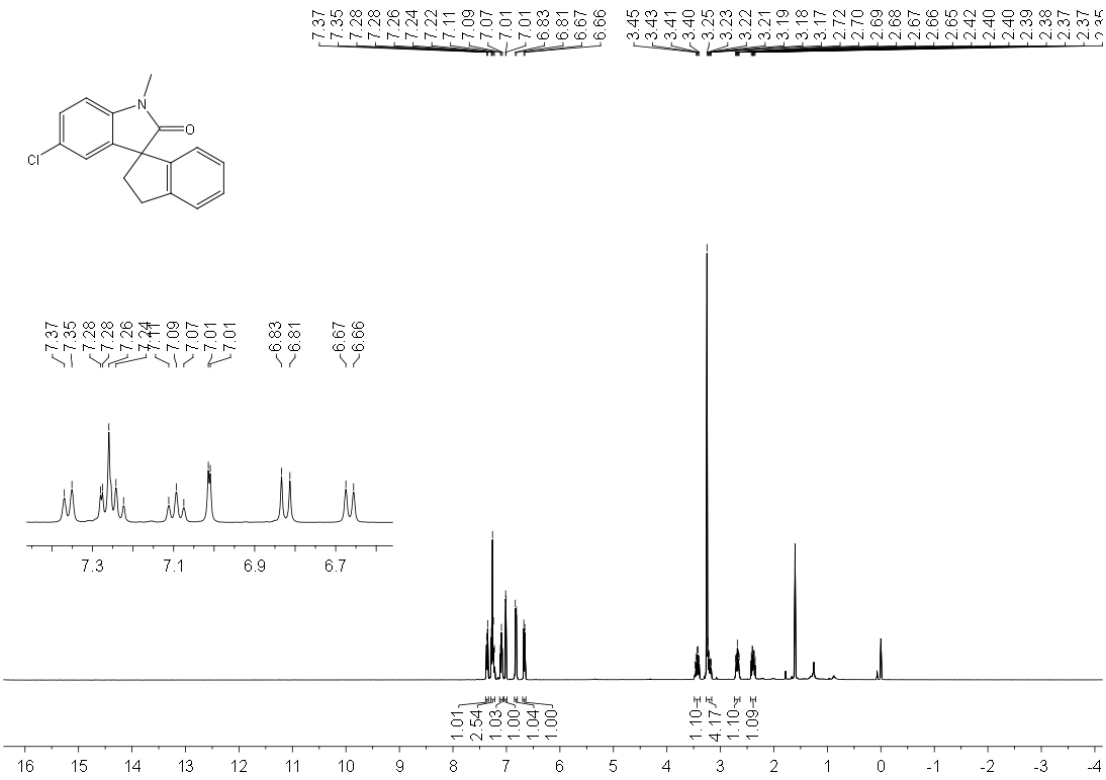
^{1}H NMR for 6'-fluoro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p16**)



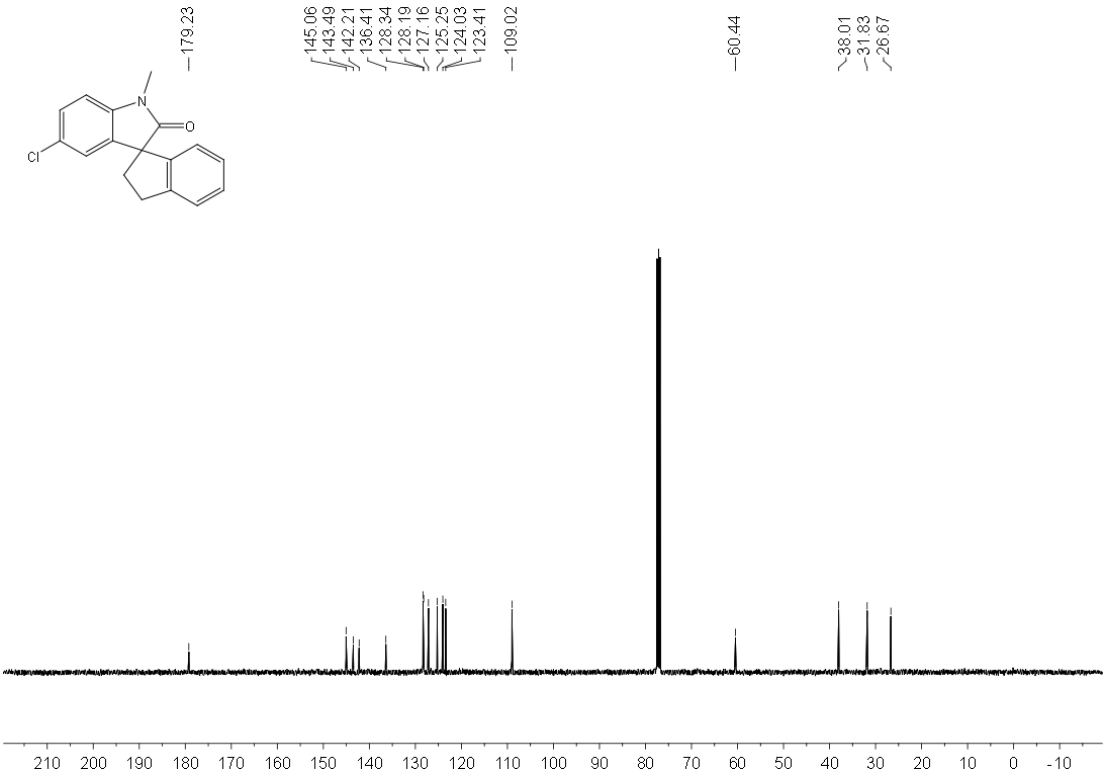
^{13}C NMR for 6'-fluoro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p16**)



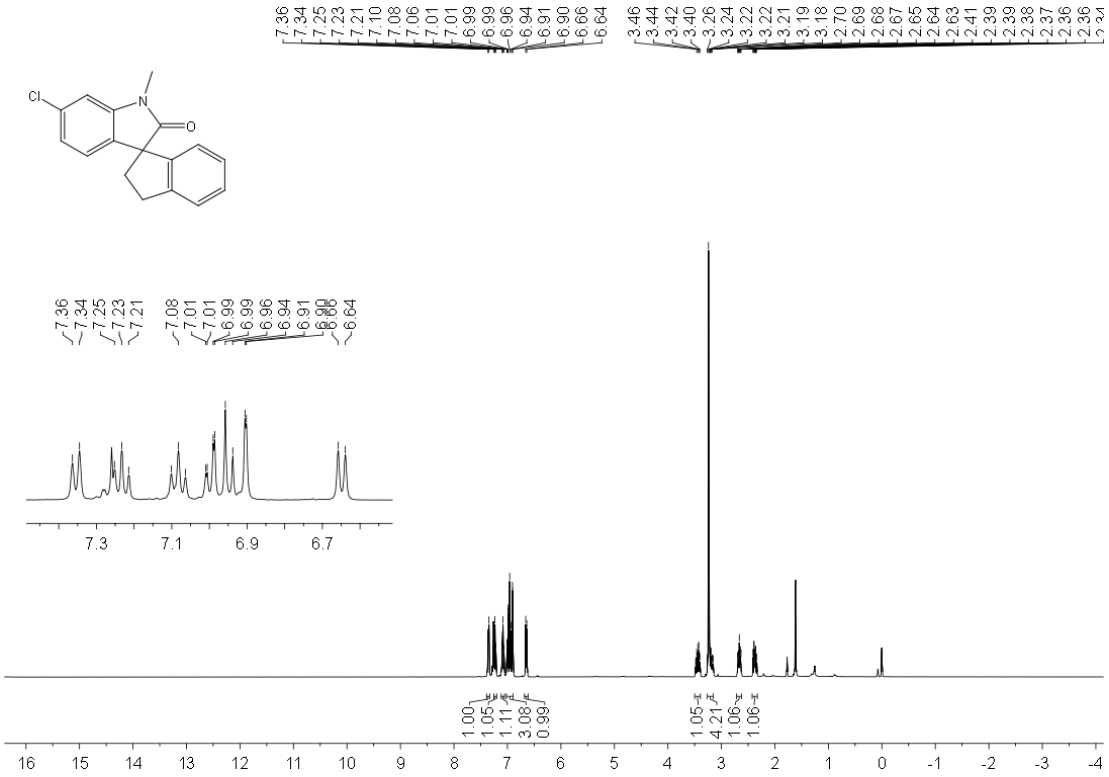
^{1}H NMR for 5'-chloro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p17**)



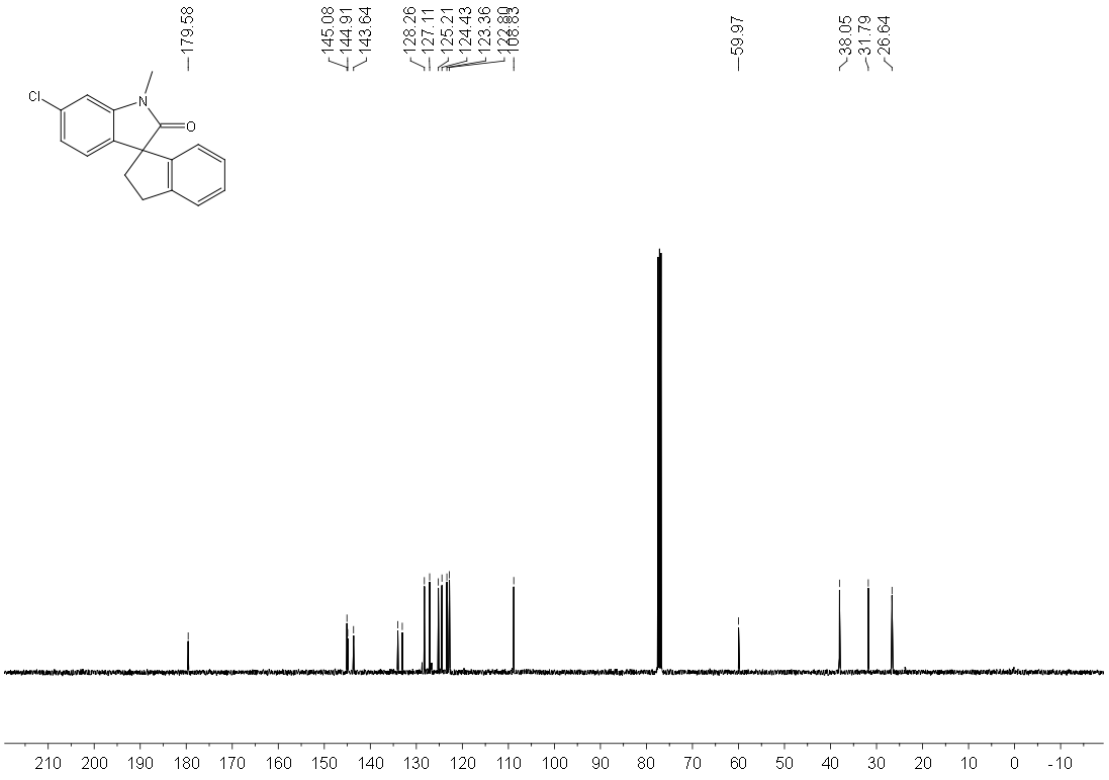
^{13}C NMR for 5'-chloro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p17**)



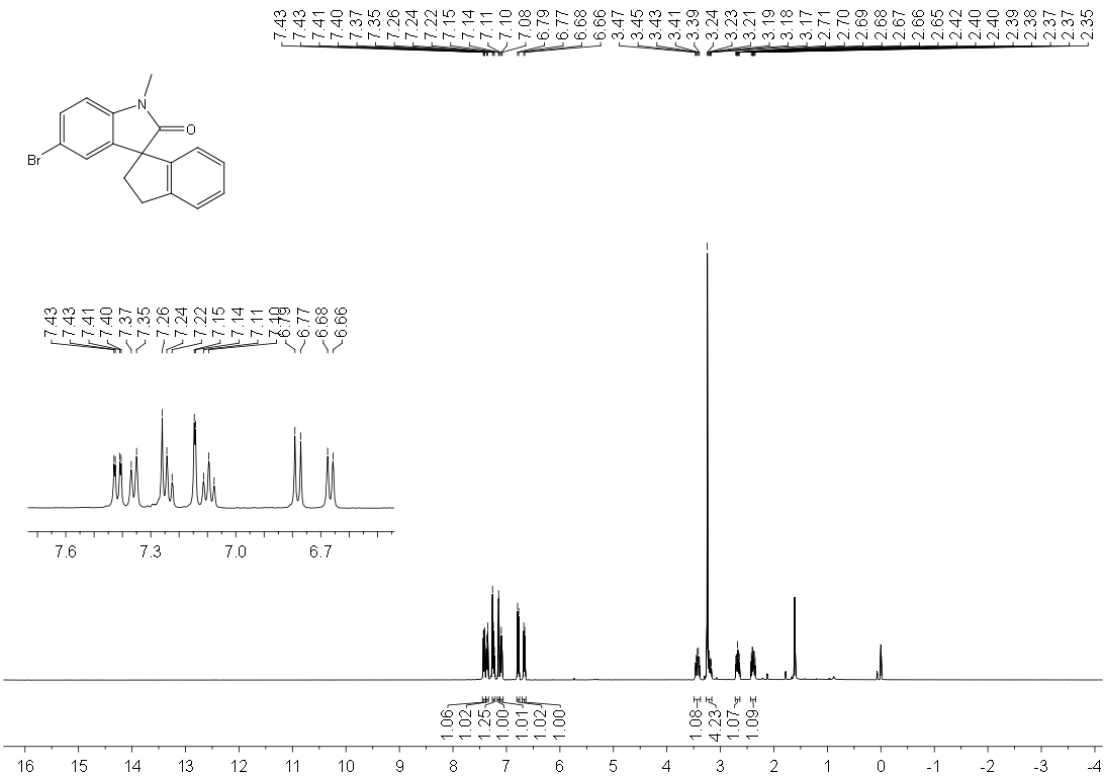
^{1}H NMR for 6'-chloro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p18**)



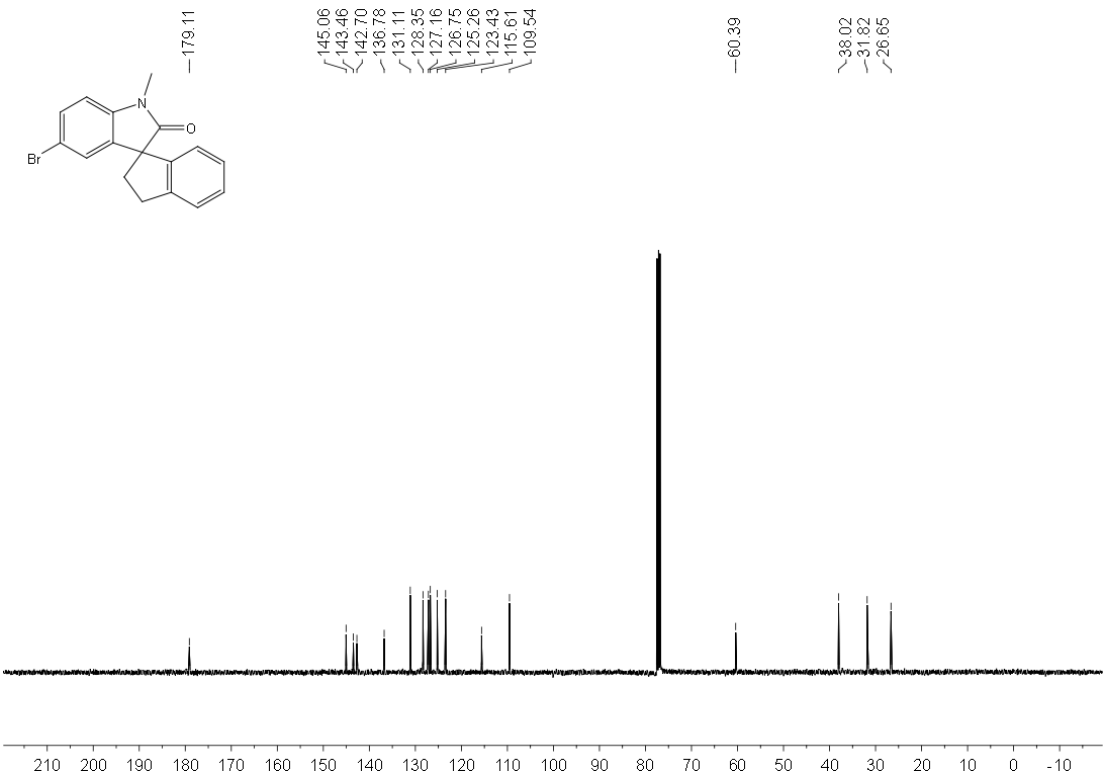
^{13}C NMR for 6'-chloro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p18**)



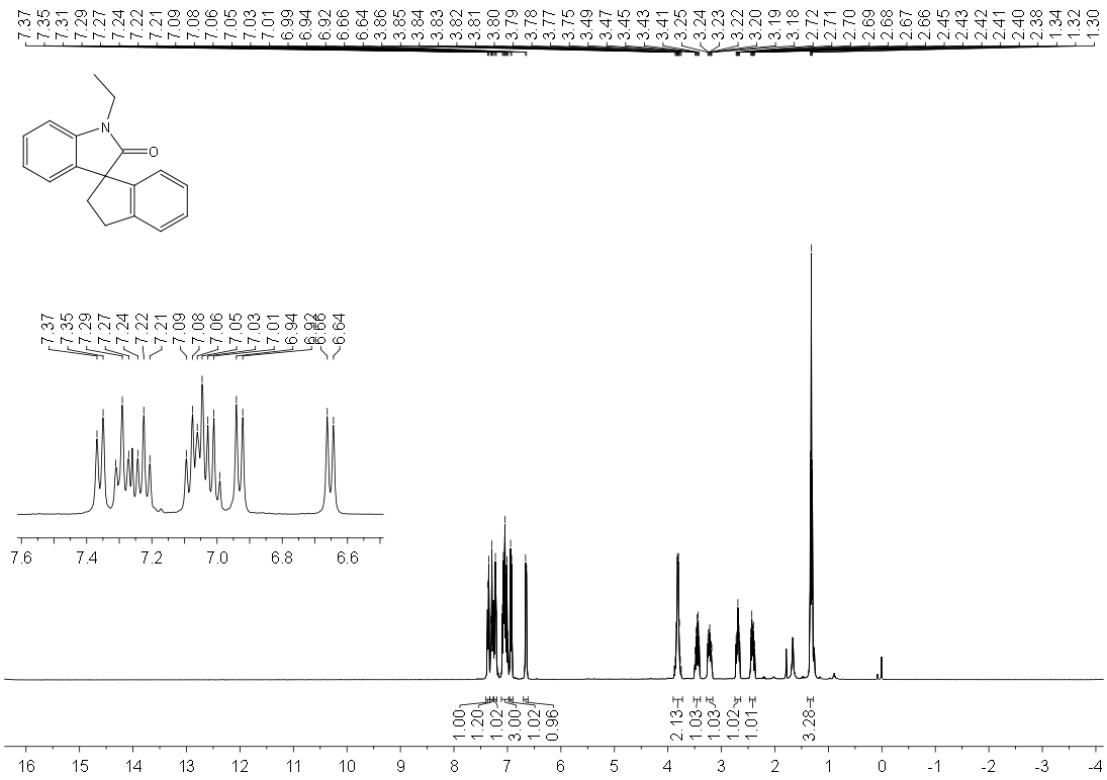
^{1}H NMR for 5'-bromo-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p19**)



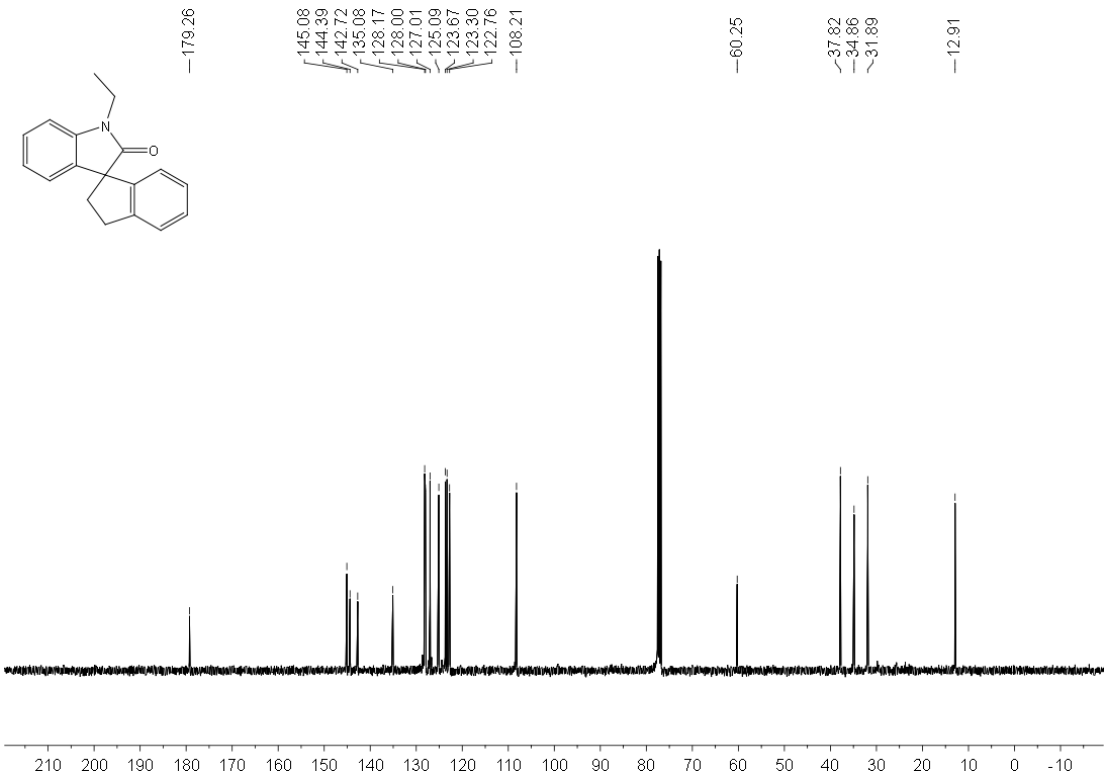
^{13}C NMR for 5'-bromo-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p19**)



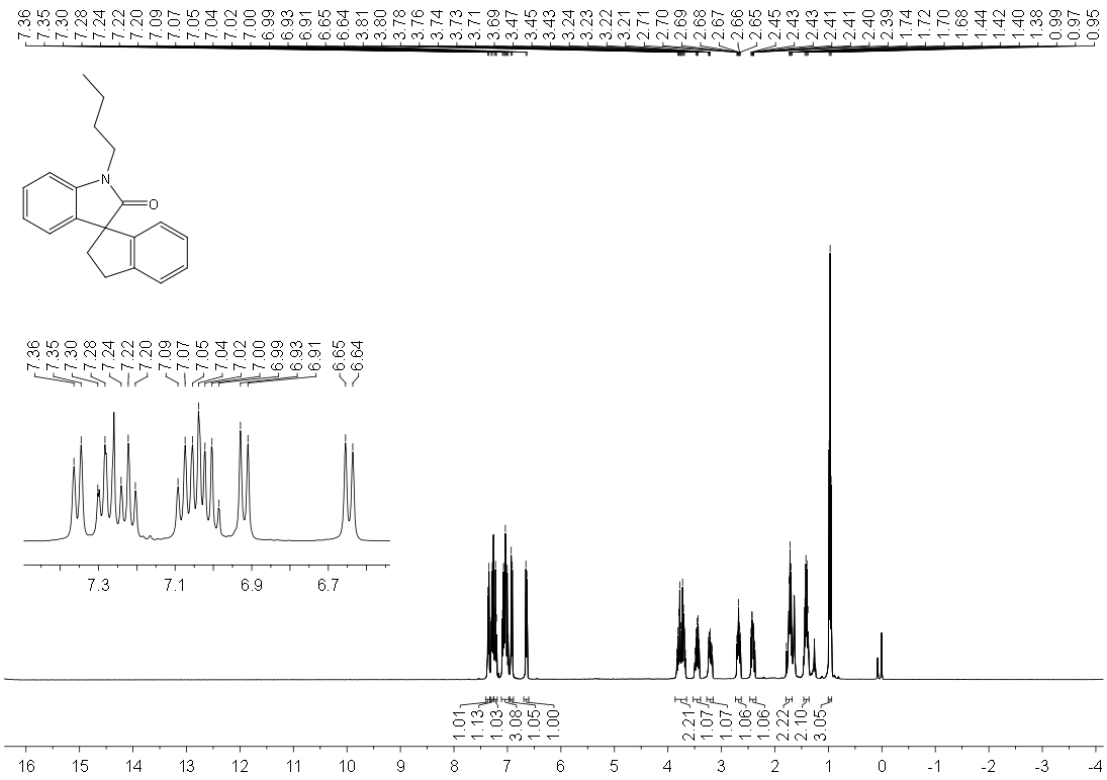
^{1}H NMR for 1'-ethyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p20**)



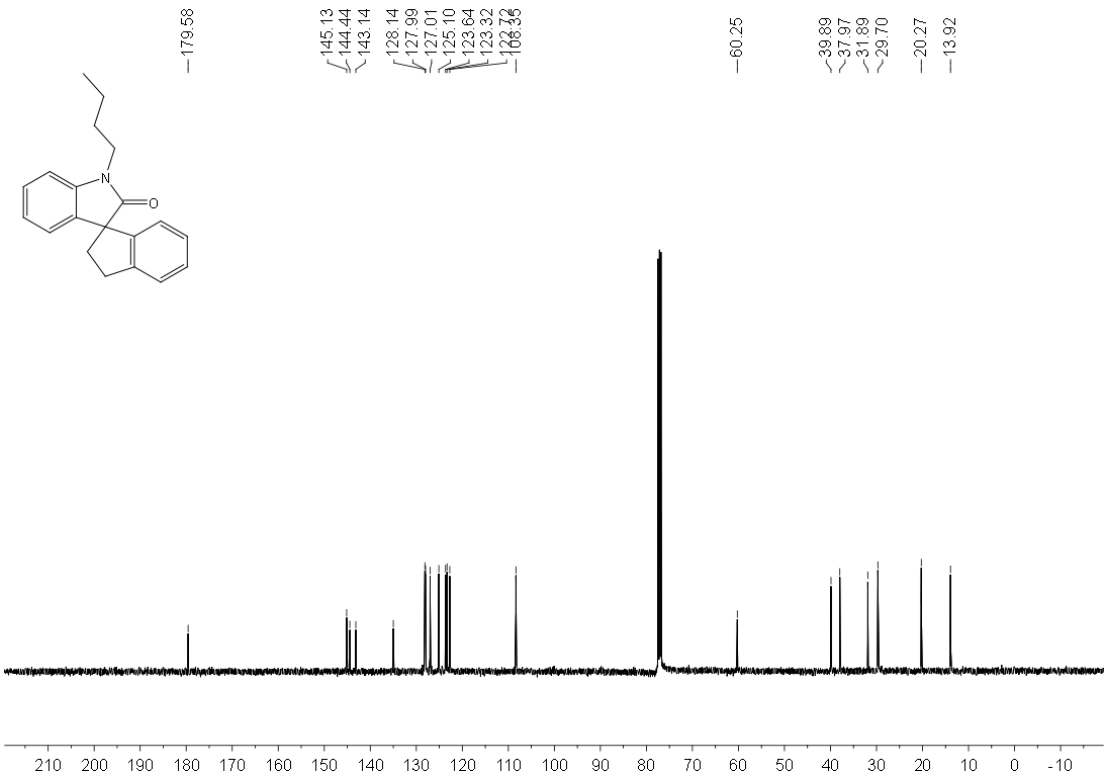
^{13}C NMR for 1'-ethyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p20**)



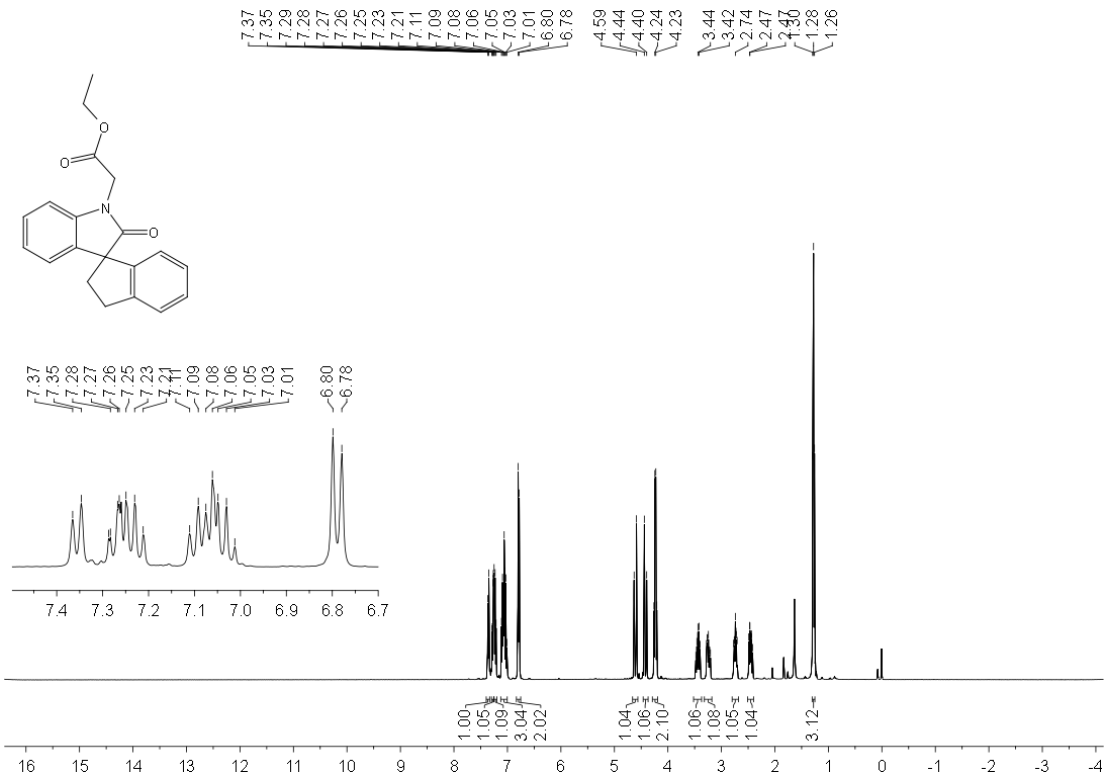
^{1}H NMR for 1'-butyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p21**)



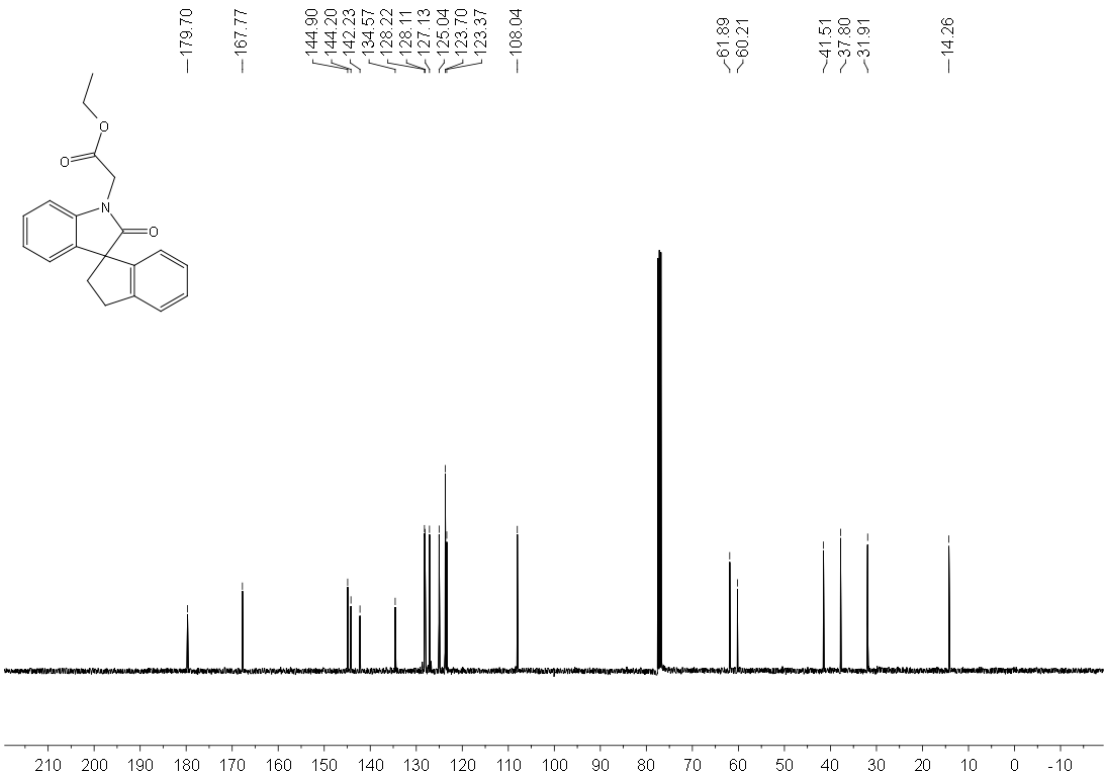
^{13}C NMR for 1'-butyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p21**)



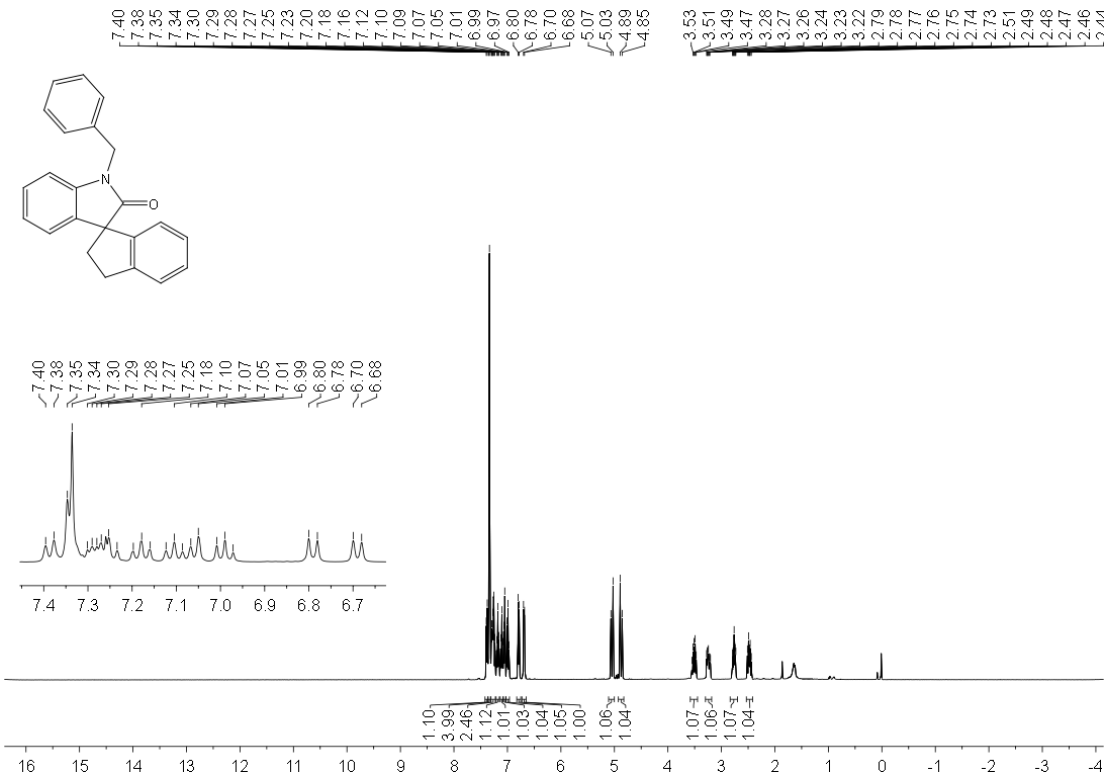
^{1}H NMR for ethyl 2-(2'-oxo-2,3-dihydrospiro[indene-1,3'-indolin]-1'-yl)acetate (**p22**)



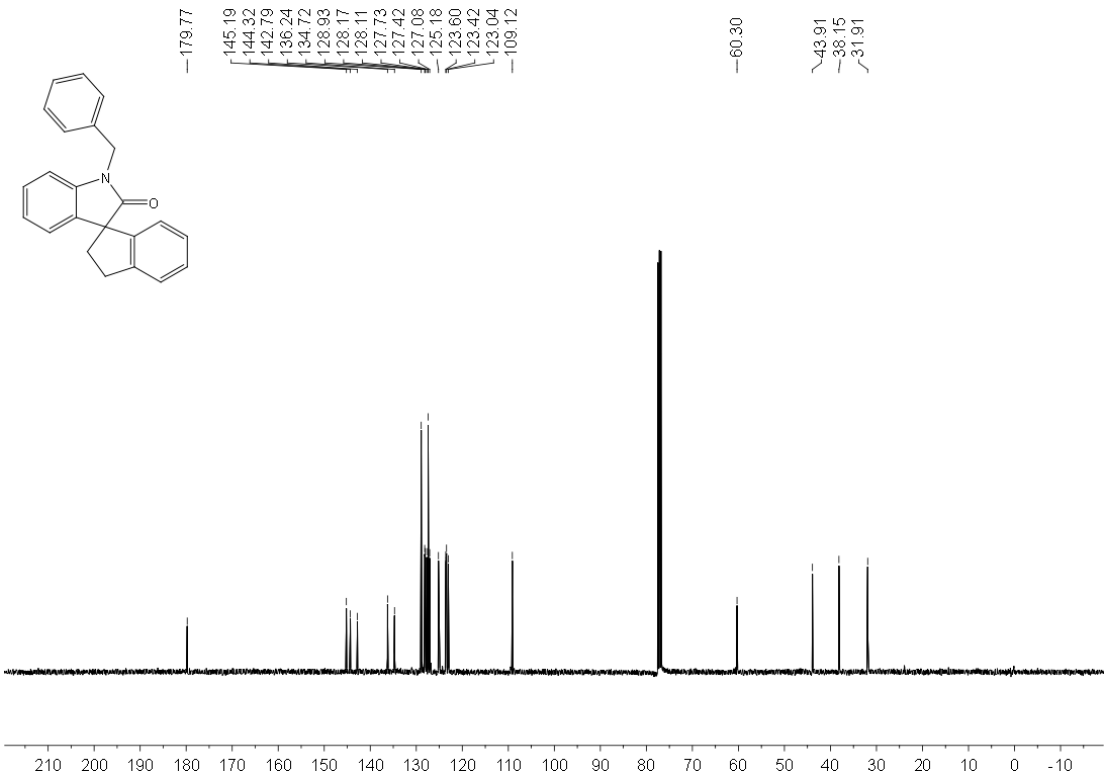
^{13}C NMR for ethyl 2-(2'-oxo-2,3-dihydrospiro[indene-1,3'-indolin]-1'-yl)acetate (**p22**)



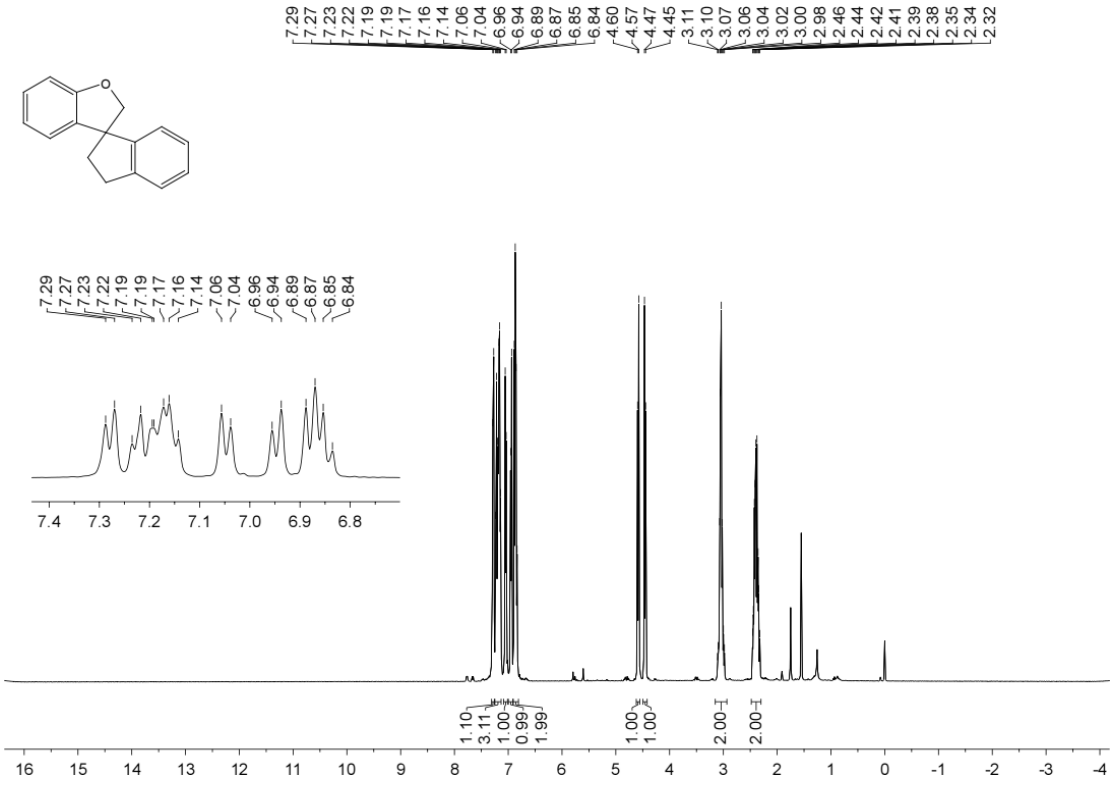
^{1}H NMR for 1'-benzyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p23**)



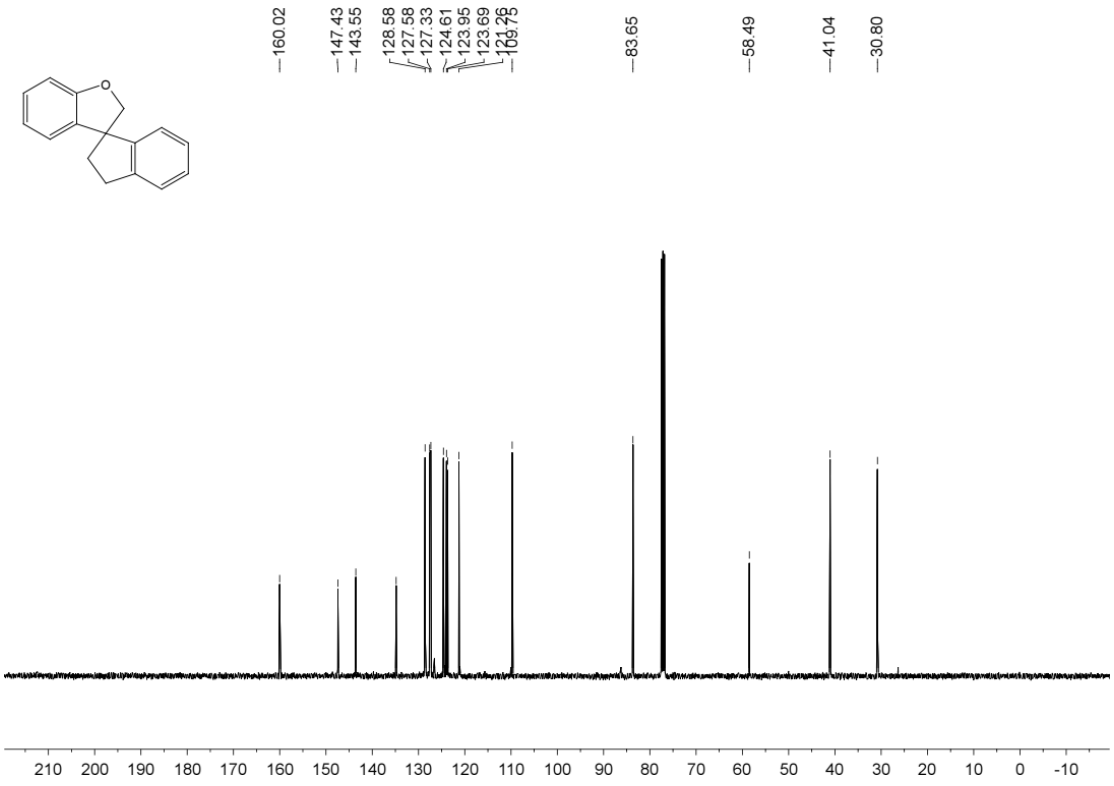
^{13}C NMR for 1'-benzyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p23**)



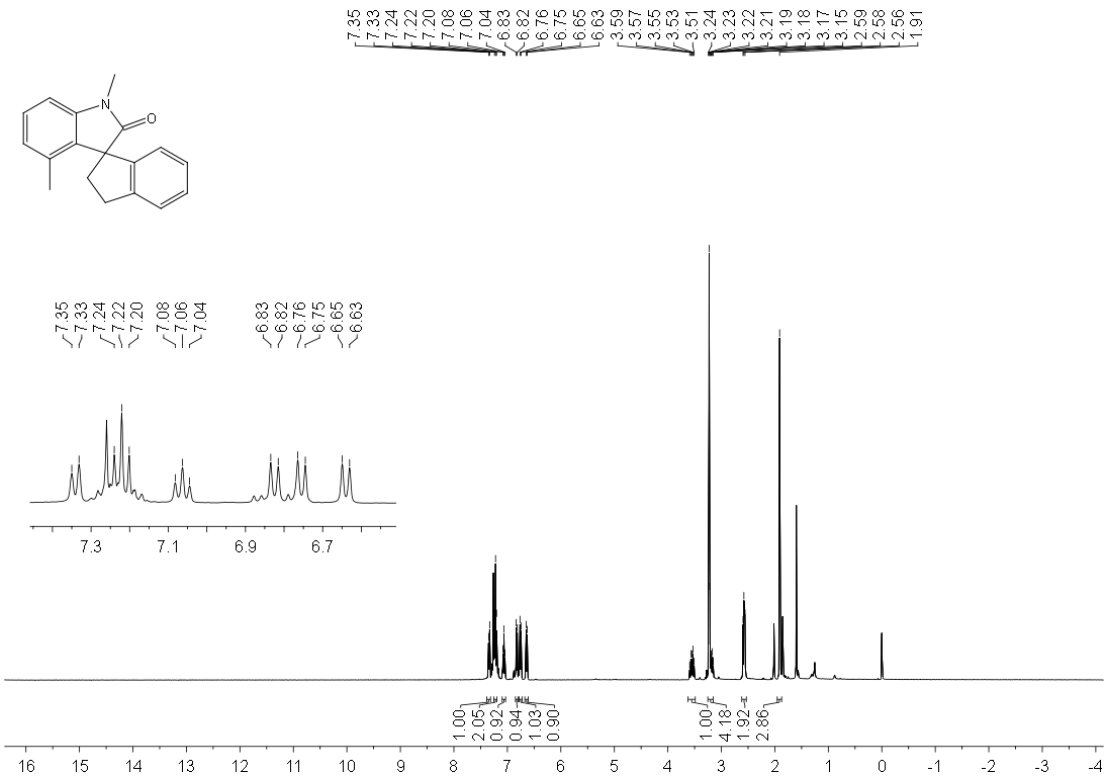
^{1}H NMR for 2',3'-dihydro-2H-spiro[benzofuran-3,1'-indene] (**p26**)



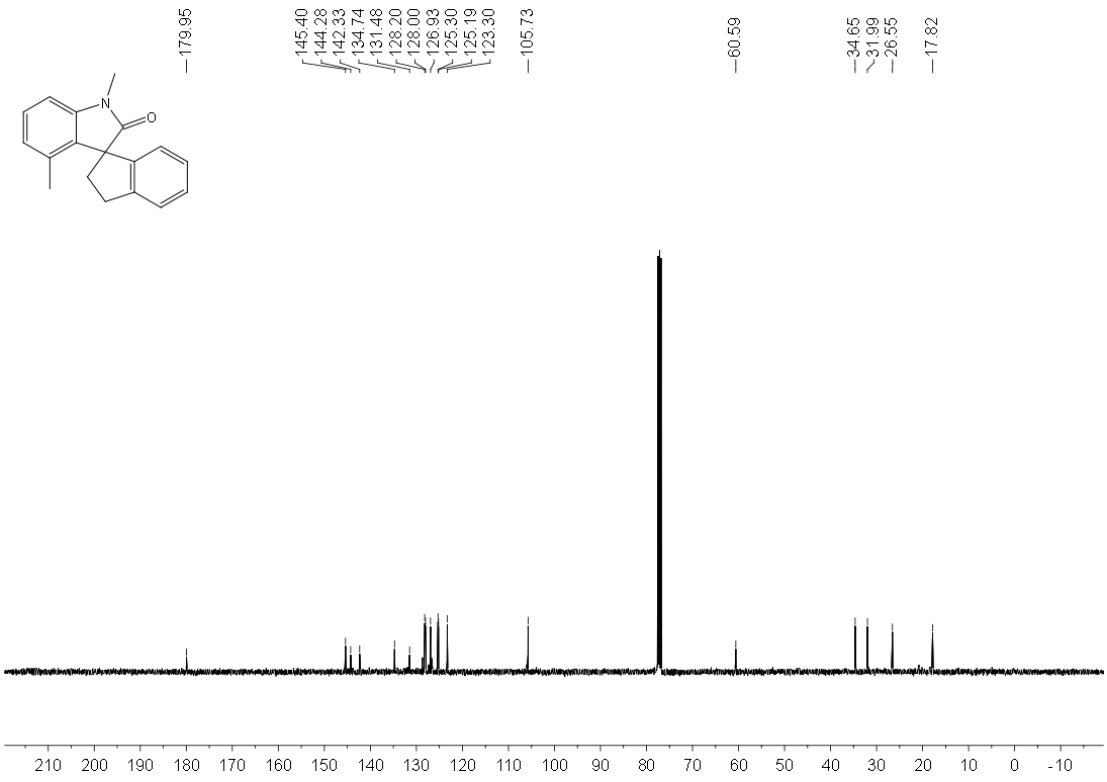
^{13}C NMR for 2',3'-dihydro-2H-spiro[benzofuran-3,1'-indene] (**p26**)



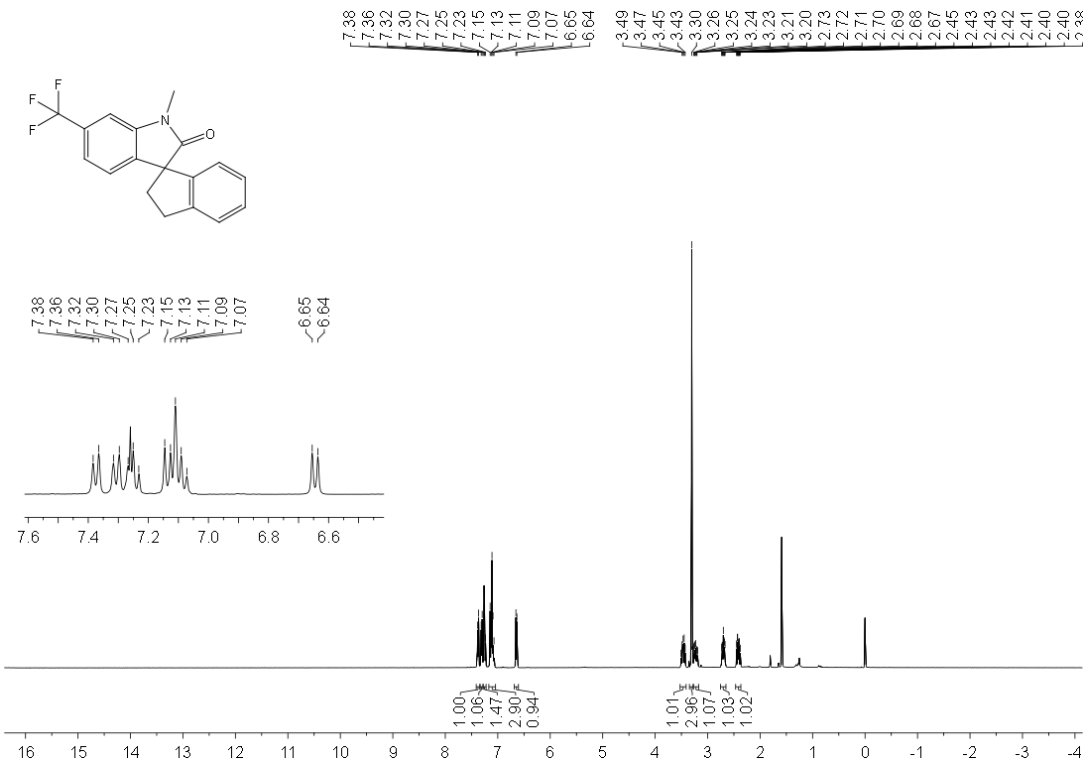
^{1}H NMR for 1',4'-dimethyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p28**)



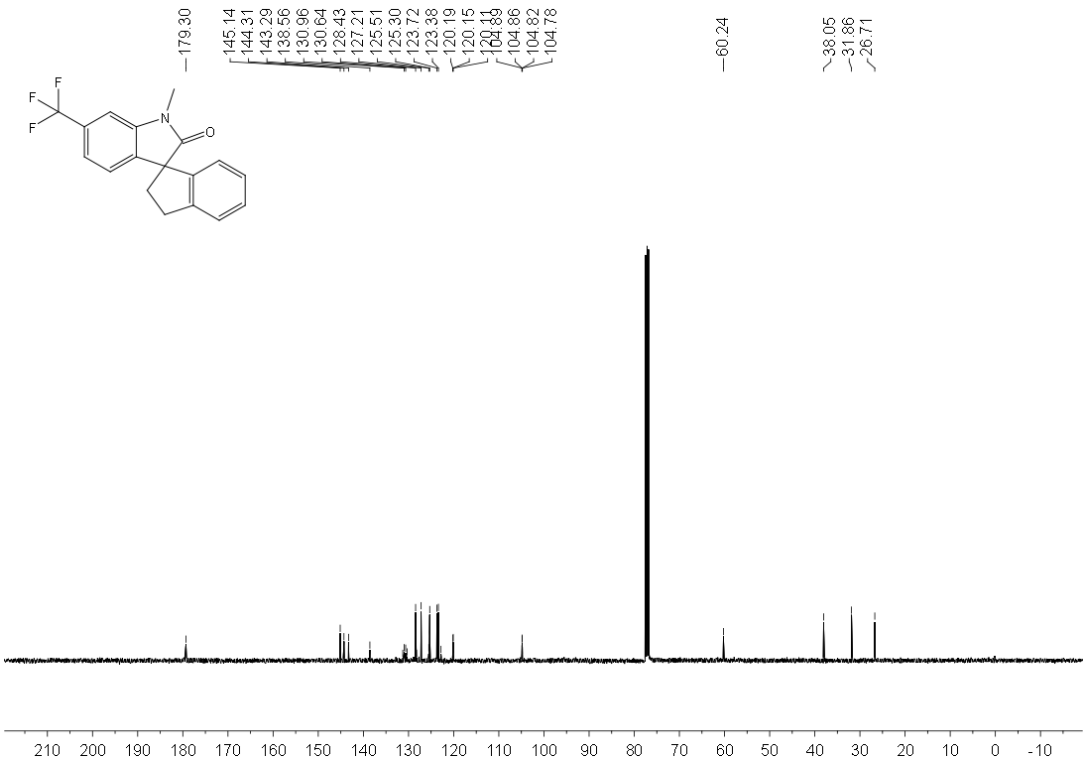
^{13}C NMR for 1',4'-dimethyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p28**)



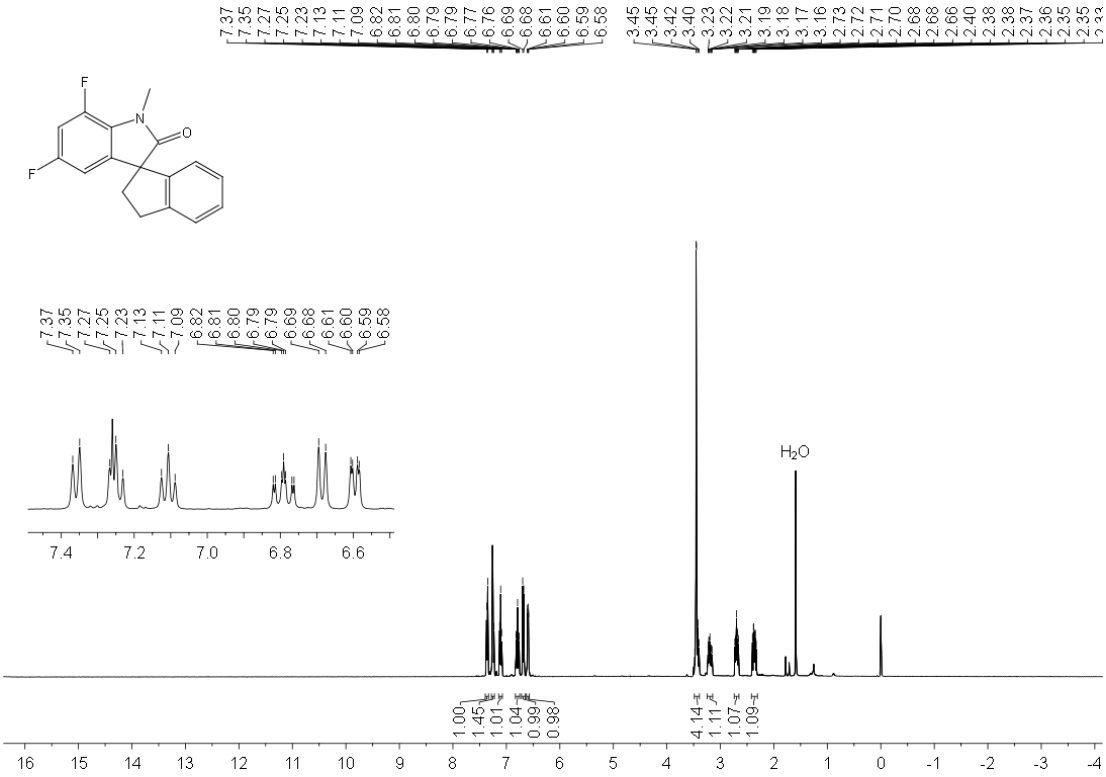
^{1}H NMR for 1'-methyl-6'-(trifluoromethyl)-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p29**)



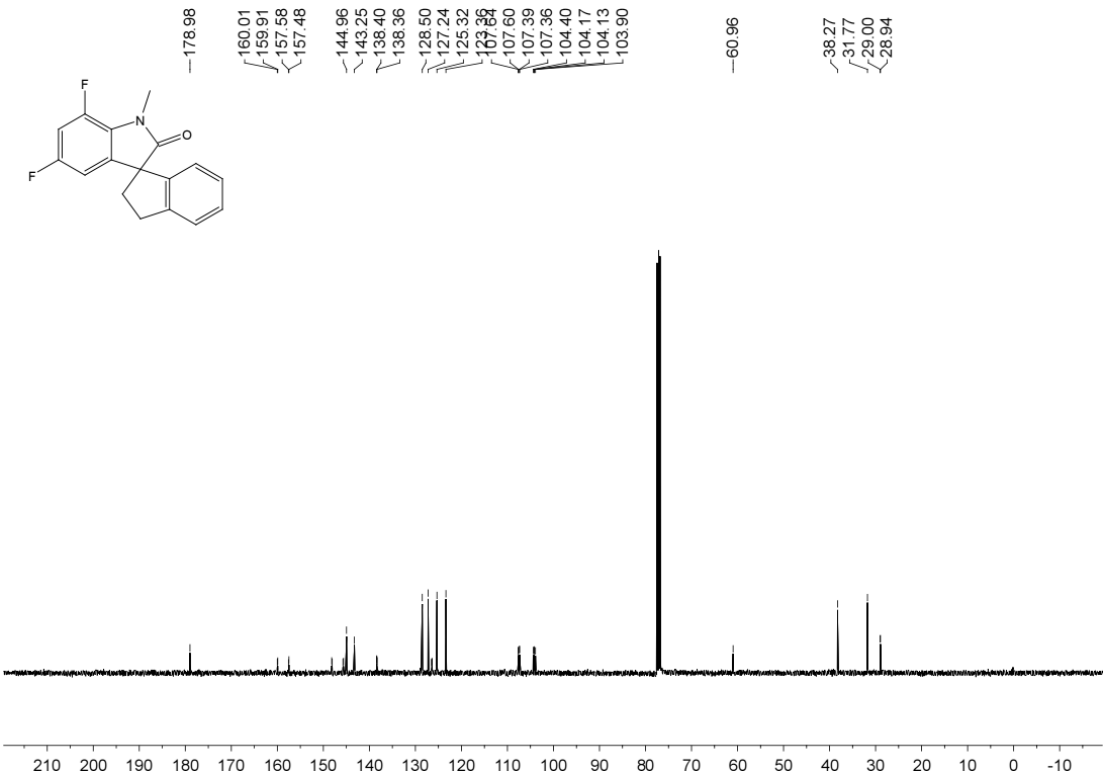
^{13}C NMR for 1'-methyl-6'-(trifluoromethyl)-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p29**)



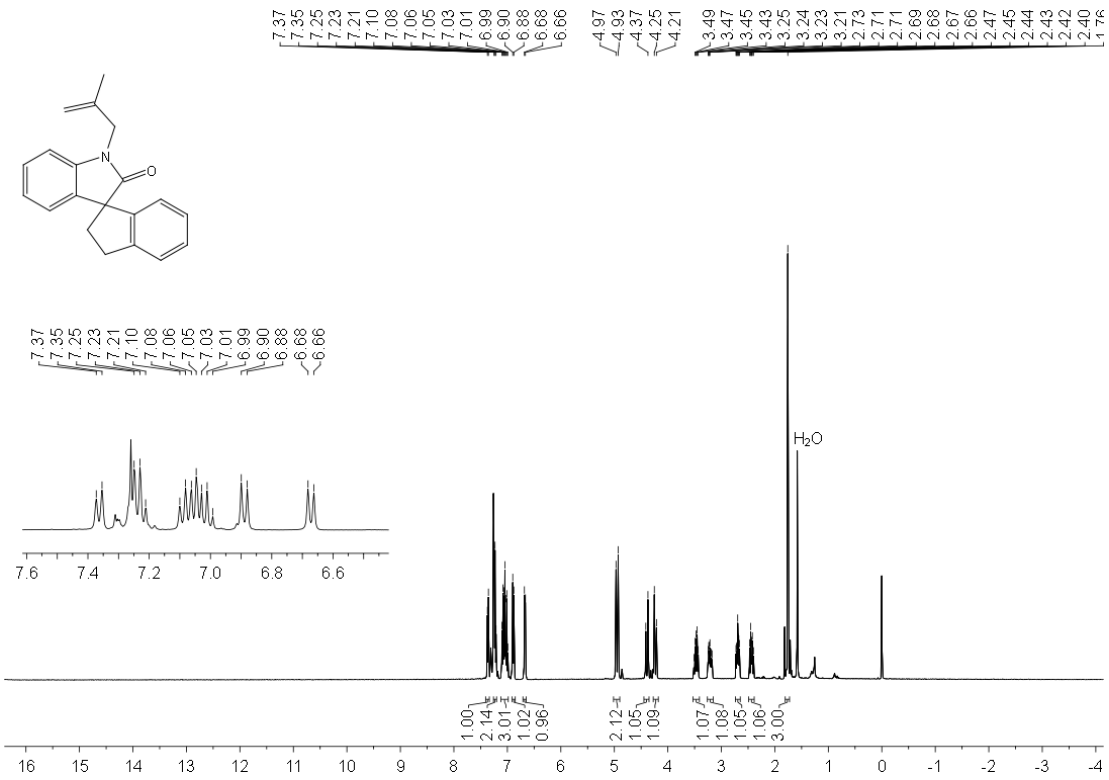
^{1}H NMR for 5',7'-difluoro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p30**)



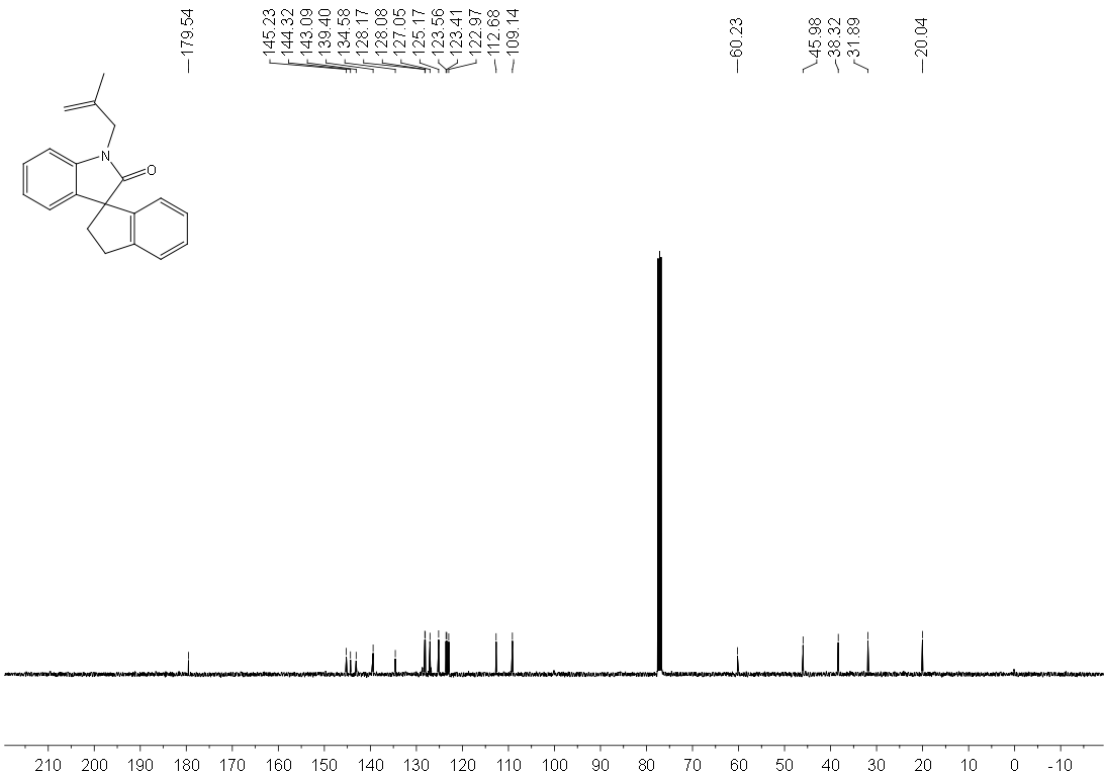
^{13}C NMR for 5',7'-difluoro-1'-methyl-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p30**)



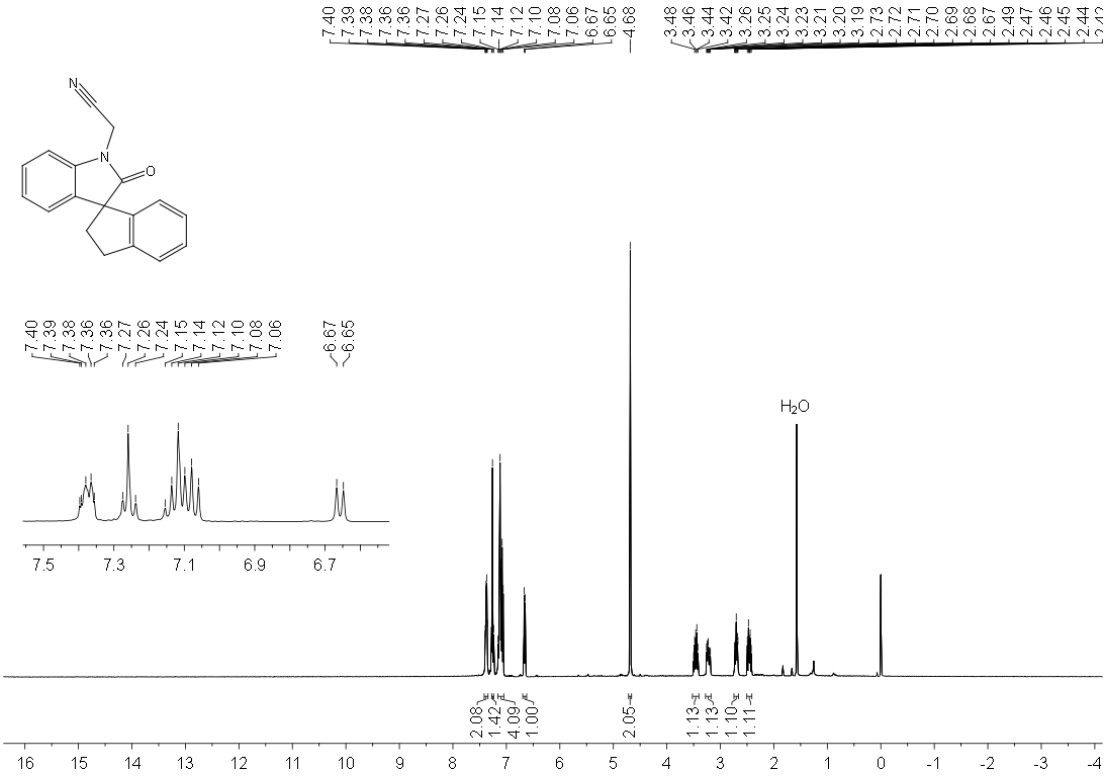
^{1}H NMR for 1'-(2-methylallyl)-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p31**)



^{13}C NMR for 1'-(2-methylallyl)-2,3-dihydrospiro[indene-1,3'-indolin]-2'-one (**p31**)



^{1}H NMR for 2-(2'-oxo-2,3-dihydrospiro[indene-1,3'-indolin]-1'-yl)acetonitrile (**p32**)



^{13}C NMR for 2-(2'-oxo-2,3-dihydrospiro[indene-1,3'-indolin]-1'-yl)acetonitrile (**p32**)