Supporting Information for

A Catalytic Asymmetric Isatin-involved Povarov Reaction: Diastereo- and Enantioselective Construction of Spiro[indolin-3,2´-quinoline] Scaffold

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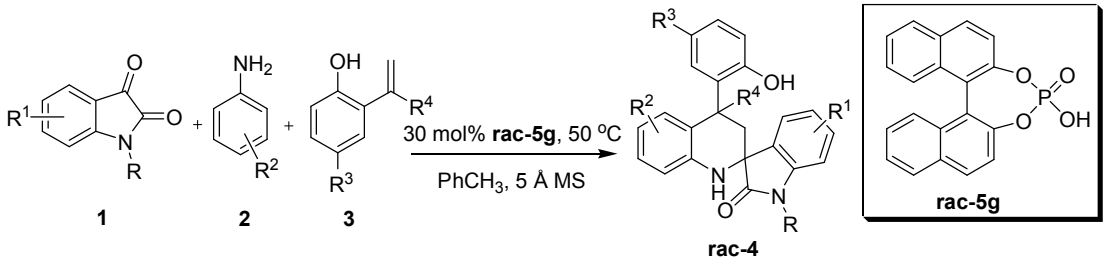
General information: NMR spectra were measured respectively at 400 and 100 MHz, respectively. The solvent used for NMR spectroscopy was $CDCl_3$, using tetramethylsilane as the internal reference. HRMS spectra were recorded on a LTQ-Orbitrap mass spectrometer (ionization mode: ESI+). Enantiomeric excesses (*ee*) were determined by chiral high-performance liquid chromatography (chiral HPLC). The chiral columns used for the determination of enantiomeric excesses by chiral HPLC were Chiralpak IC and IA columns. Optical rotation values were measured with instruments operating at λ = 589 nm, corresponding to the sodium D line at the temperatures indicated. The relative and absolute configurations of **4had** were assigned by the X-ray analysis.

Analytical grade solvents for the column chromatography and commercially available reagents were used as received. Toluene was dried over Na and distilled prior to use. All starting materials commercially available were used directly. Substrates **1a-1d**, **1f-1p** and **3a-3d** were synthesized according to the literature methods.[1] Catalysts **5a-5f** were prepared according to previously described precedures.[2]

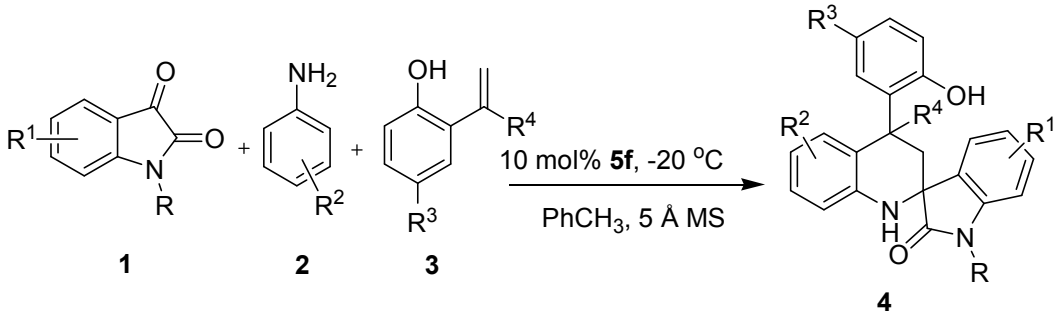
General procedure for the preparation of racemic products:



After a solution of isatin **1** (0.12 mmol), anilines **2** (0.1 mmol), the catalyst **rac-5g** (0.03 mmol), and 5Å molecular sieves (100 mg) in toluene (0.5 mL) was stirred at room temperature for 20 mins, the solution of styrenes **3** (0.36 mmol) in toluene (0.5 mL) was added. After being stirred at 50 ^{o}C for 48 h, the reaction mixture was filtered to remove molecular sieves and the solid powder was washed with ethyl acetate. The resultant solution was concentrated under the reduced pressure to give the residue,

which was purified through flash column chromatography on silica gel to afford pure products.

General procedure for the asymmetric isatin-involved Povarov reaction:



After a solution of isatin **1** (0.12 mmol), anilines **2** (0.1 mmol), the catalyst **5f** (0.01 mmol), and 5Å molecular sieves (100 mg) in toluene (0.5 mL) was stirred at room temperature for 20 mins then cooled to -20 ^{o}C, the solution of styrenes **3** (0.36 mmol) in toluene (0.5 mL) was added. After being stirred at -20 ^{o}C for 84 h, the reaction mixture was filtered to remove molecular sieves and the solid powder was washed with ethyl acetate. The resultant solution was concentrated under the reduced pressure to give the residue, which was purified through flash column chromatography on silica gel to afford pure products. In some cases as indicated in Table 2-3, the reaction temperature was increased to 50 ^{o}C and carbon tetrachloride was utilized as solvent.

1-benzyl-4'-(2-hydroxyphenyl)-6'-methoxy-4'-methyl-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4aaa): dr > 99:1; yield: 99%; colorless sticky oil; $[\alpha]_D^{20}$ = -298.8 (c 0.6, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.33-7.26 (m, 6H), 7.13-7.11 (m, 2H), 6.95 (d, *J* = 7.2 Hz, 1H), 6.89 (td, *J* = 7.6, 1.0 Hz, 2H), 6.76 (dd, *J* = 7.9, 1.2 Hz, 1H), 6.70 (dd, *J* = 8.6, 2.7 Hz, 1H), 6.67 (d, *J* = 7.8 Hz, 1H), 6.62 (dd, *J* = 5.4, 2.6 Hz, 2H), 5.78 (s, 1H), 4.98 (d, *J* = 15.5 Hz, 1H), 4.64 (d, *J* = 15.5 Hz, 1H), 4.05 (s, 1H), 3.66 (s, 3H), 2.96 (d, *J* = 14.8 Hz, 1H), 2.10 (d, *J* = 14.7 Hz, 1H), 1.98 (s, 3H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 179.0, 154.0, 153.7, 141.8, 135.9, 135.4, 135.1, 132.2, 129.2, 128.8, 128.2, 127.7, 127.4, 127.2, 124.3, 122.9, 120.4, 117.9, 116.2, 113.9, 113.7, 108.9, 60.5, 55.6, 44.9, 43.7, 39.6, 29.1; IR (KBr): γ 3375, 3059, 3031, 2928, 2854, 1702, 1609, 1498, 1463, 1444, 1356, 1293, 1261, 1217, 1173, 1125,

934, 904, 852, 809, 751, 698; ESI FTMS exact mass calcd for $(C_{31}H_{28}N_2O_3+H)^+$ requires m/z 477.2178, found m/z 477.2174; Enantiomeric excess: 94%, determined by HPLC (Daicel Chirapak IA, hexane/ isopropanol = 70/ 30, flow rate 1.0 mL/min, T = 30 ^oC, 254 nm): t_R = 7.234 min (minor), t_R = 20.164 min (major).

1-(4-tert-butylbenzyl)-4'-(2-hydroxyphenyl)-6'-methoxy-4'-methyl-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4baa): dr > 99:1; yield: 90%; colorless sticky oil; $[\alpha]_D^{20}$ = -262.5 (c 0.7, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.34-7.31 (m, 3H), 7.24-7.21 (m, 2H), 7.13 (tdd, *J* = 7.8, 3.7, 1.5 Hz, 2H), 6.95 (d, *J* = 7.1 Hz, 1H), 6.88 (m, 2H), 6.76 (dd, *J* = 8.0, 1.2 Hz, 1H), 6.70 (dd, *J* = 8.7, 2.8 Hz, 2H), 6.62 (m, 2H), 5.82 (s, 1H), 4.95 (d, *J* = 15.4 Hz, 1H), 4.61 (d, *J* = 15.4 Hz, 1H), 4.05 (s, 1H), 3.66 (s, 3H), 2.96 (d, *J* = 14.8 Hz, 1H), 2.10 (d, *J* = 14.7 Hz, 1H), 1.98 (s, 3H), 1.29 (s, 9H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 178.9, 154.0, 153.7, 150.6, 142.0, 135.5, 132.9, 129.2, 128.1, 127.2, 127.1, 125.7, 124.2, 122.9, 120.3, 117.9, 116.2, 113.9, 113.7, 109.0, 60.5, 55.6, 44.9, 43.4, 39.5, 34.5, 31.3, 29.1; IR (KBr): γ 3381, 3092, 3057, 2961, 2868, 1699, 1644, 1609, 1499, 1464, 1443, 1364, 1293, 1263, 1217, 1172, 1105, 1043, 933, 807, 751; ESI FTMS exact mass calcd for $(C_{35}H_{36}N_2O_3+H)^+$ requires m/z 533.2804, found m/z 533.2799; Enantiomeric excess: 93%, determined by HPLC (Daicel Chirapak IA, hexane/ isopropanol = 70/ 30, flow rate 1.0 mL/min, T = 30 ^oC, 254 nm): t_R = 6.913 min (minor), t_R = 14.122 min (major).

4'-(2-hydroxyphenyl)-6'-methoxy-4'-methyl-1-(perfluorobenzyl)-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4caa): dr > 99:1; total yield: 99%; colorless sticky oil; $[\alpha]_D^{20}$ = -234.9 (c 0.9, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.33 (dd, *J* = 7.8, 1.0 Hz, 1H), 7.20 (td, *J* = 7.7, 1.2 Hz, 1H), 7.14 (td, *J* = 7.9, 1.5 Hz, 1H), 7.01 (d, *J* = 7.2 Hz, 1H), 6.95 (t, *J* = 7.4 Hz, 1H), 6.88 (td, *J* = 7.8, 1.1 Hz, 1H), 6.76 (dd, *J* = 8.0, 1.1 Hz, 1H), 6.72-6.67 (m, 2H), 6.62-6.59 (m, 2H), 5.73 (s, 1H), 5.14 (d, *J* = 15.4 Hz, 1H), 4.73 (d, *J* = 15.5 Hz, 1H), 4.04 (s, 1H), 3.66 (s, 3H), 2.91 (d, *J* = 14.8 Hz, 1H), 2.03 (d, *J* = 14.8 Hz, 1H), 1.95 (s, 3H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ

(ppm): 178.3, 153.9, 153.8, 140.7, 135.2, 135.1, 132.1, 129.4, 128.8, 128.2, 127.2, 124.6, 123.4, 120.4, 117.9, 116.2, 113.9, 113.7, 107.7, 60.3, 55.6, 44.8, 39.5, 32.0, 29.0; IR (KBr): γ 3384, 3059, 3030, 2926, 2853, 1713, 1649, 1609, 1502, 1465, 1446, 1352, 1218, 1124, 1041, 1002, 808, 752; ESI FTMS exact mass calcd for $(C_{31}H_{23}F_5N_2O_3+H)^+$ requires m/z 567.1707, found m/z 567.1709; Enantiomeric excess: 97%, determined by HPLC (Daicel Chirapak IC, hexane/ isopropanol = 80/ 20, flow rate 1.0 mL/min, T = 30 ^oC, 254 nm): t_R = 6.455 min (minor), t_R = 7.990 min (major).

4'-(2-hydroxyphenyl)-1-isopropyl-6'-methoxy-4'-methyl-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4daa): dr > 99:1; total yield: 41%; colorless sticky oil; $[\alpha]_D^{20}$ = -398.5 (c 0.1, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.32 (dd, *J* = 7.9, 1.4 Hz, 1H), 7.21 (td, *J* = 7.8, 1.4 Hz, 1H), 7.14 (td, *J* = 7.9, 1.6 Hz, 1H), 7.00 (d, *J* = 7.1 Hz, 1H), 6.94-6.86 (m, 3H), 6.77 (dd, *J* = 8.0, 1.3 Hz, 1H), 6.70 (dd, *J* = 8.6, 2.8 Hz, 1H), 6.62-6.59 (m, 2H), 5.78 (s, 1H), 4.57-4.47 (m, 1H), 4.00 (s, 1H), 3.66 (s, 3H), 2.88 (d, *J* = 14.8 Hz, 1H), 2.02 (d, *J* = 14.6 Hz, 1H), 1.94 (s, 3H), 1.46 (dd, *J* = 7.0, 4.0 Hz, 6H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 178.6, 154.0, 153.7, 141.4, 135.6, 135.3, 132.6, 129.0, 128.8, 128.1, 127.1, 124.4, 122.3, 120.3, 117.9, 116.1, 113.8, 113.7, 109.5, 60.2, 55.6, 45.1, 43.8, 39.4, 29.1, 19.5, 19.1; IR (KBr): γ 3360, 3056, 2974, 2932, 2854, 1694, 1606,1500, 1484, 1444, 1355, 1263, 1225, 1154, 1128, 1094, 1044, 809, 753, 700; ESI FTMS exact mass calcd for $(C_{27}H_{28}N_2O_3+H)^+$ requires m/z 429.2178, found m/z 429.2172; Enantiomeric excess: 88%, determined by HPLC (Daicel Chirapak IA, hexane/ isopropanol = 70/ 30, flow rate 1.0 mL/min, T = 30 ^oC, 254 nm): t_R = 4.895 min (minor), t_R = 6.528 min (major).

4'-(2-hydroxyphenyl)-6'-methoxy-4'-methyl-1-phenyl-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4eaa): dr > 99:1; yield: 31%; colorless sticky oil; $[\alpha]_D^{20}$ = -245.2 (c 0.2, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.51-7.48 (m, 2H), 7.43-7.34 (m, 4H), 7.21-7.15 (m, 2H), 7.08 (d, *J* = 7.3 Hz, 1H), 6.99 (t, *J* = 7.5 Hz, 1H), 6.93-6.89 (m, 1H), 6.82-6.79 (m, 2H), 6.71 (dd, *J* = 8.6, 2.7 Hz, 1H), 6.65 (d, *J* =

8.6 Hz, 1H), 6.61 (d, *J* = 2.7 Hz, 1H), 5.78 (s, 1H), 4.17 (s, 1H), 3.67 (s, 3H), 3.02 (d, *J* = 14.8 Hz, 1H), 2.21 (d, *J* = 14.8 Hz, 1H), 1.97 (s, 3H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 178.0, 154.0, 153.8, 142.5, 135.2, 134.3, 131.9, 129.5, 129.2, 128.8, 128.2, 127.9, 127.1, 126.3, 124.6, 123.4, 120.4, 117.9, 116.2, 113.9, 113.7, 109.3, 60.5, 55.6, 45.1, 39.5, 29.2; IR (KBr): γ 3378, 3060, 2924, 2853, 1708, 1607, 1499, 1462, 1445, 1369, 1329, 1293, 1262, 1221, 1102, 1043, 807, 754, 698; ESI FTMS exact mass calcd for $(C_{30}H_{26}N_2O_3+H)^+$ requires m/z 463.2022, found m/z 463.2011; Enantiomeric excess: 90%, determined by HPLC (Daicel Chirapak IA, hexane/ isopropanol = 70/ 30, flow rate 1.0 mL/min, T = 30 ^oC, 254 nm): t_R = 5.69 min (minor), t_R = 8.55 min (major).

1-benzyl-5-chloro-4'-(2-hydroxyphenyl)-6'-methoxy-4'-methyl-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4faa): dr > 99:1; yield: 65%; colorless sticky oil; $[\alpha]_D^{20}$ = -171.8 (c 0.2, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.34-7.29 (m, 2H), 7.27-7.24 (m, 3H), 7.18 (td, *J* = 7.9, 1.6 Hz, 1H), 7.11 (d, *J* = 7.6 Hz, 1H), 7.04 (dd, *J* = 8.3, 2.1 Hz, 1H), 6.90-6.86 (m, 1H), 6.76-6.72 (m, 3H), 6.64 (d, *J* = 8.4 Hz, 1H), 6.55 (d, *J* = 8.3 Hz, 1H), 6.43 (s, 1H), 5.32 (s, 1H), 4.99 (d, *J* = 15.6 Hz, 1H), 4.64 (d, *J* = 15.6 Hz, 1H), 3.96 (s, 1H), 3.71 (s, 3H), 3.04 (d, *J* = 14.4 Hz, 1H), 2.13 (d, *J* = 14.4 Hz, 1H), 1.95 (s, 3H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 179.3, 154.2, 153.6, 140.2, 135.6, 135.4, 134.3, 133.7, 129.1, 128.9, 128.8, 128.5, 128.2, 128.0, 127.8, 127.2, 125.2, 120.7, 117.6, 116.0, 113.8, 113.5, 109.8, 61.3, 55.7, 53.4, 43.9, 40.0, 28.2; IR (KBr): γ 3412, 3069, 3031, 2961, 2924, 2853, 1709, 1698, 1645, 1607, 1478, 1447, 1440, 1340, 1297, 1258, 1216, 1157, 1116, 1078, 1044, 808, 736, 698; ESI FTMS exact mass calcd for $(C_{31}H_{27}ClN_2O_3+H)^+$ requires m/z 511.1788, found m/z 511.1783; Enantiomeric excess: 81%, determined by HPLC (Daicel Chirapak IC, hexane/ isopropanol = 80/ 20, flow rate 1.0 mL/min, T = 30 ^oC, 254 nm): t_R = 7.237 min (minor), t_R = 10.316 min (major).

1-benzyl-6-fluoro-4'-(2-hydroxyphenyl)-6'-methoxy-4'-methyl-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4gaa): dr > 99:1; yield: 76%; colorless sticky

oil; $[\alpha]_D^{20}$ = -240.5 (c 0.4, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.29-7.16 (m, 6H), 7.07 (td, *J* = 7.8, 1.5 Hz, 1H), 6.81 (td, *J* = 7.7, 1.2 Hz, 1H), 6.68-6.63 (m, 3H), 6.58-6.55 (m, 2H), 6.45 (td, *J* = 9.5, 2.3 Hz, 1H), 6.32 (dd, *J* = 8.8, 2.2 Hz, 1H), 5.54 (s, 1H), 4.89 (d, *J* = 15.6 Hz, 1H), 4.55 (d, *J* = 15.6 Hz, 1H), 3.92 (s, 1H), 3.61 (s, 3H), 2.90 (d, *J* = 14.6 Hz, 1H), 2.03 (d, *J* = 14.6 Hz, 1H), 1.89 (s, 3H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 178.3, 162.4 (*J* = 245 Hz), 153.0, 152.7, 142.4, 142.3, 134.3, 133.7, 127.9, 127.2, 126.9, 126.6, 126.4, 126.3, 124.7, 124.6, 119.5, 116.8, 115.1, 112.9, 112.7, 108.0, 107.8, 96.8, 96.5, 59.3, 54.6, 43.7, 42.9, 38.6, 27.8; IR (KBr): γ 3364, 3060, 3031, 2960, 2925, 2854, 1710, 1612, 1497, 1448, 1376, 1344, 1292, 1260, 1218, 1156, 1102, 1039, 937, 904, 833, 806, 737, 699; ESI FTMS exact mass calcd for $(C_{31}H_{27}FN_2O_3+H)^+$ requires m/z 495.2084, found m/z 495.2070; Enantiomeric excess: 96%, determined by HPLC (Daicel Chirapak IC, hexane/ isopropanol = 80/ 20, flow rate 1.0 mL/min, T = 30 ^{o}C, 254 nm): t_R = 6.067 min (minor), t_R = 8.975 min (major).

1-benzyl-6-chloro-4'-(2-hydroxyphenyl)-6'-methoxy-4'-methyl-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4haa): dr > 99:1; yield: 95%; colorless sticky oil; $[\alpha]_D^{20}$ = -241.1 (c 0.7, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.28-7.24 (m, 2H), 7.22-7.17 (m, 3H), 7.09-7.03 (m, 2H), 6.79 (td, *J* = 7.7, 1.1 Hz, 1H), 6.70 (dd, *J* = 8.0, 1.7 Hz, 1H), 6.66-6.61 (m, 2H), 6.60 (d, *J* = 2.7 Hz, 1H), 6.57-6.53 (m, 2H), 6.46 (d, *J* = 7.6 Hz, 1H), 5.55 (s, 1H), 4.88 (d, *J* = 15.6 Hz, 1H), 4.50 (d, *J* = 15.6 Hz, 1H), 3.91 (s, 1H), 3.61 (s, 3H), 2.92 (d, *J* = 14.5 Hz, 1H), 2.02 (d, *J* = 14.5 Hz, 1H), 1.86 (s, 3H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 178.2, 153.0, 152.6, 142.0, 134.4, 134.3, 133.7, 133.3, 129.8, 128.0, 127.9, 127.2, 126.9, 126.7, 126.2, 124.5, 121.6, 119.5, 116.7, 115.0, 112.8, 112.6, 108.4, 59.5, 54.6, 43.4, 42.8, 38.8, 27.5; IR (KBr): γ 3363, 3061, 3029, 2961, 2925, 2853, 1708, 1606,1500, 1440, 1371, 1339, 1261, 1216, 1107, 1076, 1040, 929, 905, 839, 803, 755, 699; ESI FTMS exact mass calcd for $(C_{31}H_{27}ClN_2O_3+H)^+$ requires m/z 511.1788, found m/z 511.1784; Enantiomeric excess: 97%, determined by HPLC (Daicel Chirapak IC, hexane/ isopropanol = 80/ 20,

flow rate 1.0 mL/min, T = 30 ^{o}C, 254 nm): t_R = 6.466 min (minor), t_R = 10.821 min (major).

1-benzyl-6-bromo-4'-(2-hydroxyphenyl)-6'-methoxy-4'-methyl-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4iaa): dr > 99:1; yield: 99%; colorless sticky oil; $[\alpha]_D^{20}$ = -220.2 (c 0.9, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.35-7.24 (m, 5H), 7.16-7.11 (m, 2H), 6.94 (dd, *J* = 8.0, 1.6 Hz, 1H), 6.86 (td, *J* = 7.6, 1.2 Hz, 1H), 6.79 (d, *J* = 1.6 Hz, 1H), 6.73-6.67 (m, 3H), 6.62 (d, *J* = 8.6 Hz, 1H), 6.46 (d, *J* = 7.6 Hz, 1H), 5.59 (s, 1H), 4.95 (d, *J* = 15.6 Hz, 1H), 4.56 (d, *J* = 15.6 Hz, 1H), 3.98 (s, 1H), 3.68 (s, 3H), 2.99 (d, *J* = 14.5 Hz, 1H), 2.10 (d, *J* = 14.5 Hz, 1H), 1.93 (s, 3H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 179.3, 154.2, 153.6, 143.1, 135.5, 135.3, 134.2, 131.5, 129.1, 129.0, 128.2, 127.9, 127.8, 127.3, 126.0, 125.6, 122.5, 120.6, 117.7, 116.1, 113.8, 113.6, 112.1, 60.7, 55.6, 44.2, 43.8, 39.9, 28.4; IR (KBr): γ 3390, 3064, 3031, 2969, 2925, 2854, 1710, 1602, 1498, 1443, 1370, 1293, 1265, 1216, 1111, 1043, 928, 903, 843, 812, 737, 698; ESI FTMS exact mass calcd for $(C_{31}H_{27}BrN_2O_3+H)^+$ requires m/z 555.1283, found m/z 555.1282; Enantiomeric excess: 93%, determined by HPLC (Daicel Chirapak IC, hexane/ isopropanol = 80/ 20, flow rate 1.0 mL/min, T = 30 ^{o}C, 254 nm): t_R = 6.580 min (minor), t_R = 11.024 min (major).

1-benzyl-4'-(2-hydroxyphenyl)-6'-methoxy-4',6-dimethyl-3',4'-dihydro-1'H-spiro [indoline-3,2'-quinolin]-2-one (4jaa): dr > 99:1; yield: 99%; colorless sticky oil; $[\alpha]_D^{20}$ = -338.5 (c 0.5, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.33-7.26 (m, 6H), 7.14 (td, *J* = 7.9, 1.6 Hz, 1H), 6.91-6.84 (m, 2H), 6.77 (dd, *J* = 8.0, 1.2 Hz, 1H), 6.72-6.68 (m, 2H), 6.62-6.60 (m, 2H), 6.50 (s, 1H), 5.84 (s, 1H), 4.98 (d, *J* = 15.6 Hz, 1H), 4.63 (d, *J* = 15.6 Hz, 1H), 4.01 (s, 1H), 3.66 (s, 3H), 2.94 (d, *J* = 14.8 Hz, 1H), 2.24 (s, 3H), 2.08 (d, *J* = 14.8 Hz, 1H), 1.97 (s, 3H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 179.1, 154.0, 153.7, 142.0, 139.5, 136.1, 135.4, 135.2, 129.2, 128.9, 128.8, 128.1, 127.6, 127.3, 127.1, 124.0, 123.5, 120.3, 117.9, 116.1, 113.9, 113.8, 109.7, 60.3, 55.6, 45.1, 43.6, 39.5, 29.2, 21.8; IR (KBr): γ 3363, 3059, 3029, 2960, 2924, 2854, 1699, 1619, 1499, 1445, 1377, 1348, 1292, 1261, 1217, 1151, 1111, 1081, 1042,

934, 808, 753, 698; ESI FTMS exact mass calcd for $(C_{32}H_{30}N_2O_3+H)^+$ requires m/z 491.2335, found m/z 491.2328; Enantiomeric excess: 96%, determined by HPLC (Daicel Chirapak IC, hexane/ isopropanol = 80/ 20, flow rate 1.0 mL/min, T = 30 ^oC, 254 nm): t_R = 8.459 min (minor), t_R = 13.191 min (major).

1-benzyl-7-fluoro-4'-(2-hydroxyphenyl)-6'-methoxy-4'-methyl-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4kaa): dr > 99:1; yield: 99%; colorless sticky oil; $[\alpha]_D^{20}$ = -286.7 (c 0.8, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.35-7.25 (m, 6H), 7.13 (td, *J* = 7.9, 1.6 Hz, 1H), 6.92-6.85 (m, 2H), 6.83-6.78 (m, 1H), 6.74-6.68 (m, 3H), 6.62-6.60 (m, 2H), 5.67 (s, 1H), 5.03 (d, *J* = 15.2 Hz, 1H), 4.88 (d, *J* = 15.3 Hz, 1H), 4.03 (s, 1H), 3.66 (s, 3H), 2.93 (d, *J* = 14.7 Hz, 1H), 2.07 (d, *J* = 14.7 Hz, 1H), 1.95 (s, 3H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 178.9, 154.0, 153.8, 147.1,(*J* = 242 Hz) 137.1, 135.3, 135.2, 134.8, 128.9, 128.6, 128.4, 128.3, 128.2, 127.7, 127.7, 127.6, 127.4, 123.6, 123.5, 120.4, 120.2, 120.2, 117.8, 117.3, 117.1, 116.2, 113.9, 113.7, 60.8, 55.6, 45.3, 44.8, 39.6, 28.9; IR (KBr): γ 3380, 3063, 3032, 2962, 2926, 2854, 1705, 1629, 1600, 1497, 1446, 1349, 1261, 1183, 1104, 1080, 1043, 875, 802, 735, 699; ESI FTMS exact mass calcd for $(C_{31}H_{27}FN_2O_3+H)^+$ requires m/z 495.2084, found m/z 495.2074; Enantiomeric excess: 92%, determined by HPLC (Daicel Chirapak IC, hexane/ isopropanol = 80/ 20, flow rate 1.0 mL/min, T = 30 ^oC, 254 nm): t_R = 5.952 min (minor), t_R = 8.306 min (major).

1-benzyl-7-bromo-4'-(2-hydroxyphenyl)-6'-methoxy-4'-methyl-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4laa): dr > 99:1; yield: 99%; colorless sticky oil; $[\alpha]_D^{20}$ = -256.8 (c 0.6, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.32-7.28 (m, 4H), 7.26-7.20 (m, 3H), 7.14 (td, *J* = 7.8, 1.6 Hz, 1H), 6.94-6.87 (m, 2H), 6.79-6.74 (m, 2H), 6.70 (dd, *J* = 8.6, 2.8 Hz, 1H), 6.63-6.59 (m, 2H), 5.61 (s, 1H), 5.38-5.28 (m, 2H), 4.04 (s, 1H), 3.66 (s, 3H), 2.93 (d, *J* = 14.7 Hz, 1H), 2.08 (d, *J* = 14.7 Hz, 1H), 1.92 (s, 3H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 179.8, 153.9, 153.8, 139.4, 137.5, 135.7, 135.2, 135.0, 134.9, 128.7, 128.6, 128.2, 127.3, 127.2, 126.5, 124.2, 123.6, 120.5, 117.9, 116.2, 113.9, 113.7, 60.1, 55.6, 45.2, 44.2, 39.7, 28.9; IR

(KBr): γ 3360, 3061, 3030, 2961, 2925, 2853, 1708, 1603, 1581, 1499, 1448, 1350, 1262, 1214, 1157, 1112, 1040, 1018, 803, 737, 699; ESI FTMS exact mass calcd for $(C_{31}H_{27}BrN_2O_3+H)^+$ requires m/z 555.1283, found m/z 555.1276; Enantiomeric excess: 93%, determined by HPLC (Daicel Chirapak IC, hexane/ isopropanol = 80/ 20, flow rate 1.0 mL/min, T = 30 ^oC, 254 nm): t_R = 6.752 min (minor), t_R = 11.020 min (major).

1-benzyl-4'-(2-hydroxyphenyl)-6'-methoxy-4'-methyl-7-(trifluoromethyl)-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4maa): dr > 99:1; yield: 89%; colorless sticky oil; $[\alpha]_D^{20}$ = -265.6 (c 0.8, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.50 (dd, *J* = 8.1, 0.8 Hz, 1H), 7.30-7.26 (m, 3H), 7.23-7.20 (m, 1H), 7.17-7.11 (m, 4H), 6.99 (t, *J* = 7.8 Hz, 1H), 6.89 (td, *J* = 7.8, 1.2 Hz, 1H), 6.75-6.69 (m, 2H), 6.63-6.59 (m, 2H), 5.55 (s, 1H), 5.19 (d, *J* = 16.8 Hz, 1H), 5.03 (d, *J* = 16.8 Hz, 1H), 4.03 (s, 1H), 3.65 (s, 3H), 2.96 (d, *J* = 14.7 Hz, 1H), 2.08 (d, *J* = 14.6 Hz, 1H), 1.86 (s, 3H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 180.5, 153.9, 153.8, 140.2, 136.5, 135.2, 135.2, 134.8, 128.7, 128.4, 128.3, 127.8 (*J* = 76.6 Hz), , 127.3 (*J* = 6.0 Hz), 127.0, 125.8, 124.7, 122.4, 122.0, 119.3 (*J* = 268.0 Hz), 116.3, 114.0, 113.7, 112.6 (*J* = 32.6 Hz), 59.0, 55.6, 45.5, 45.5 (*J* = 4.8 Hz), 39.8, 28.8; IR (KBr): γ 3412, 3089, 3065, 3033, 2925, 2854, 1715, 1596, 1499, 1447, 1333, 1296, 1270, 1232, 1157, 1122, 1097, 1042, 843, 802, 749, 698; ESI FTMS exact mass calcd for $(C_{32}H_{27}F_3N_2O_3+H)^+$ requires m/z 545.2052, found m/z 545.2043; Enantiomeric excess: 94%, determined by HPLC (Daicel Chirapak IC, hexane/ isopropanol = 80/ 20, flow rate 1.0 mL/min, T = 30 ^oC, 254 nm): t_R = 4.915 min (minor), t_R = 6.436 min (major).

1-benzyl-4'-(2-hydroxyphenyl)-6'-methoxy-4',7-dimethyl-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4naa): dr > 99:1; yield: 60%; colorless sticky oil; $[\alpha]_D^{20}$ = -252.6 (c 0.2, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.33 (dd, *J* = 7.9, 1.4 Hz, 1H), 7.26-7.23 (m, 2H), 7.20-7.16 (m, 1H), 7.11-7.07 (m, 3H), 6.98 (d, *J* = 6.8 Hz, 1H), 6.87-6.79 (m, 3H), 6.74 (dd, *J* = 8.0, 1.3 Hz, 1H), 6.63 (dd, *J* = 8.7, 2.8

Hz, 1H), 6.56 (d, *J* = 8.6 Hz, 1H), 6.50 (d, *J* = 2.7 Hz, 1H), 5.76 (s, 1H), 5.18 (d, *J* = 16.7 Hz, 1H), 4.92 (d, *J* = 16.7 Hz, 1H), 4.01 (s, 1H), 3.58 (s, 3H), 2.86 (d, *J* = 14.9 Hz, 1H), 2.18 (s, 3H), 2.04 (d, *J* = 14.8 Hz, 1H), 1.90 (s, 3H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 178.7, 152.9, 152.8, 138.9, 136.7, 134.6, 134.3, 132.2, 131.8, 127.8, 127.5, 127.1, 126.2, 125.8, 122.1, 121.1, 119.3, 118.7, 117.0, 115.2, 112.9, 112.8, 58.6, 54.5, 44.8, 43.7, 38.4, 28.4, 17.7; IR (KBr): γ 3357, 3058, 3029, 2961, 2925, 2853, 1697, 1600, 1499, 1445, 1353, 1262, 1224, 1182, 1157, 1101, 1043, 860, 802, 750, 698; ESI FTMS exact mass calcd for $(C_{32}H_{30}N_2O_3+H)^+$ requires m/z 491.2335, found m/z 491.2324; Enantiomeric excess: 94%, determined by HPLC (Daicel Chirapak IC, hexane/ isopropanol = 70/ 30, flow rate 1.0 mL/min, T = 30 ^{o}C, 254 nm): t_R = 6.963 min (minor), t_R = 9.588 min (major).

1-benzyl-5,6-difluoro-4'-(2-hydroxyphenyl)-6'-methoxy-4'-methyl-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4oaa): dr > 99:1; yield: 87%; colorless sticky oil; $[\alpha]_D^{20}$ = -157.1 (c 0.8, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.27-7.15 (m, 5H), 7.07 (td, *J* = 7.9, 1.5 Hz, 1H), 6.93 (d, *J* = 7.5 Hz, 1H), 6.78 (td, *J* = 7.8, 0.9 Hz, 1H), 6.68-6.66 (m, 2H), 6.61 (d, *J* = 7.9 Hz, 1H), 6.57-6.54 (m, 1H), 6.34 (dd, *J* = 10.0, 6.3 Hz, 1H), 6.01 (s, 1H), 5.39 (s, 1H), 4.87 (d, *J* = 15.6 Hz, 1H), 4.48 (d, *J* = 15.6 Hz, 1H), 3.85 (s, 1H), 3.64 (s, 3H), 2.98 (d, *J* = 14.2 Hz, 1H), 2.05 (d, *J* = 14.2 Hz, 1H), 1.85 (s, 3H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 178.7, 153.3, 152.5, 150.7 (*J* = 13.5 Hz), 148.2 (*J* = 14.1 Hz), 146.6 (*J* = 12.8 Hz), 144.2 (*J* = 13.1 Hz), 136.9 (*J* = 7.6 Hz), 134.6, 134.0, 130.1 (*J* = 380.8 Hz), 128.0, 127.4, 127.3, 126.9, 126.2, 118.1 (*J* = 326.1 Hz), 114.9, 113.8, 113.6, 112.7, 112.4, 97.9 (*J* = 22.9 Hz), 60.4, 54.6, 43.0, 42.7, 39.1, 26.7; IR (KBr): γ 3385, 3064,3032, 2925, 2855, 1709, 1624, 1499, 1448, 1399, 1346, 1294, 1270, 1239, 1212, 1168, 1110, 1042, 800, 740, 697; ESI FTMS exact mass calcd for $(C_{31}H_{26}F_2N_2O_3+H)^+$ requires m/z 513.1990, found m/z 513.1988; Enantiomeric excess: 93%, determined by HPLC (Daicel Chirapak IC, hexane/ isopropanol = 80/ 20, flow rate 1.0 mL/min, T = 30 ^{o}C, 254 nm): t_R = 6.345 min (minor), t_R = 8.988 min (major).

7-bromo-1-(4-tert-butylbenzyl)-4'-(2-hydroxyphenyl)-6'-methoxy-4'-methyl-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4paa): dr > 99:1; yield: 63%; colorless sticky oil; $[\alpha]_D^{20}$ = -232.1 (c 0.5, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.33-7.30 (m, 4H), 7.18-7.14 (m, 3H), 6.97 (d, *J* = 7.0 Hz, 1H), 6.90 (td, *J* = 7.7, 1.3 Hz, 1H), 6.78 (t, *J* = 7.8 Hz, 2H), 6.71 (dd, *J* = 8.7, 2.8 Hz, 1H), 6.63 (d, *J* = 8.6 Hz, 1H), 6.59 (d, *J* = 2.7 Hz, 1H), 5.55 (s, 1H), 5.37-5.25 (m, 2H), 4.02 (s, 1H), 3.67 (s, 3H), 2.91 (d, *J* = 14.7 Hz, 1H), 2.08 (d, *J* = 14.7 Hz, 1H), 1.94 (s, 3H), 1.30 (s, 9H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 179.7, 153.8, 150.0, 141.9, 139.5, 135.6, 135.2, 135.1, 134.4, 128.6, 128.2, 127.2, 126.3, 125.4, 124.1, 123.5, 120.5, 117.9, 116.2, 114.0, 113.7, 102.2, 59.9, 55.6, 45.3, 43.9, 39.7, 34.4, 31.3, 29.0; IR (KBr): γ 3416, 2964, 2924, 2855, 1706, 1667, 1644, 1606, 1501, 1449, 1415, 1352, 1268, 1213, 1157, 1112, 1045, 878, 806, 742; ESI FTMS exact mass calcd for $(C_{35}H_{35}BrN_2O_3+H)^+$ requires m/z 611.1909, found m/z 611.1902; Enantiomeric excess: 95%, determined by HPLC (Daicel Chirapak IC, hexane/ isopropanol = 80/ 20, flow rate 1.0 mL/min, T = 30 ^{o}C, 254 nm): t_R = 6.091 min (minor), t_R = 7.138 min (major).

1-benzyl-6'-ethoxy-4'-(2-hydroxyphenyl)-4'-methyl-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4aba): dr > 99:1; yield: 70%; colorless sticky oil; $[\alpha]_D^{20}$ = -306.9 (c 0.4, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.27-7.19 (m, 6H), 7.09-7.03 (m, 2H), 6.92 (d, *J* = 7.2 Hz, 1H), 6.85-6.80 (m, 2H), 6.70 (dd, *J* = 8.0, 1.1 Hz, 1H), 6.64-6.58 (m, 2H), 6.54 (s, 2H), 5.65 (s, 1H), 4.92 (d, *J* = 15.5 Hz, 1H), 4.59 (d, *J* = 15.5 Hz, 1H), 3.97 (s, 1H), 3.80 (s, 2H), 2.87 (d, *J* = 14.8 Hz, 1H), 2.02 (d, *J* = 14.7 Hz, 1H), 1.91 (s, 3H), 1.24 (t, *J* = 7.0 Hz, 3H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 177.9, 153.0, 152.0, 140.8, 134.9, 134.3, 128.1, 127.8, 127.1, 126.6, 126.3, 126.1, 123.2, 121.9, 119.3, 116.9, 115.1, 113.5, 107.9, 62.8, 59.4, 43.9, 42.7, 38.5, 28.1, 13.8; IR (KBr): γ 3412, 3061, 2971, 2925, 1696, 1644, 1610, 1496, 1464, 1358, 1262, 1212, 1154, 1085, 1046, 955, 877, 801, 747, 699; ESI FTMS exact mass calcd for $(C_{32}H_{30}N_2O_3+H)^+$ requires m/z 491.2335, found m/z 491.2321; Enantiomeric excess: 94%, determined by HPLC (Daicel Chirapak IC, hexane/ isopropanol = 80/ 20,

flow rate 1.0 mL/min, T = 30 ^{o}C, 254 nm): t_R = 6.961 min (minor), t_R = 10.914 min (major).

1-benzyl-6-chloro-6'-ethoxy-4'-(2-hydroxyphenyl)-4'-methyl-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4hba): dr > 99:1; yield: 99%; colorless sticky oil; $[\alpha]_D^{20}$ = -262.6 (c 0.8, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.35-7.31 (m, 2H), 7.29-7.25 (m, 3H), 7.18 (d, *J* = 7.8 Hz, 1H), 7.13 (td, *J* = 7.8, 1.6 Hz, 1H), 6.86 (td, *J* = 7.7, 1.2 Hz, 1H), 6.78 (dd, *J* = 8.0, 1.8 Hz, 1H), 6.71 (m, 2H), 6.67 (d, *J* = 2.6 Hz, 1H), 6.64-6.60 (m, 2H), 6.57 (d, *J* = 7.5 Hz, 1H), 5.60 (s, 1H), 4.96 (d, *J* = 15.6 Hz, 1H), 4.57 (d, *J* = 15.6 Hz, 1H), 3.98 (s, 1H), 3.98-3.84 (m, 2H), 2.98 (d, *J* = 14.5 Hz, 1H), 2.09 (d, *J* = 14.5 Hz, 1H), 1.94 (s, 3H), 1.32 (t, *J* = 7.0 Hz, 3H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 178.2, 157.6, 152.9, 148.1, 140.7, 137.2, 134.8, 131.2, 128.4, 128.1, 128.0, 127.8, 127.2, 126.7, 126.5, 126.3, 123.3, 121.9, 120.9, 119.5, 119.0, 118.9, 116.7, 116.0, 115.2, 107.9, 59.7, 43.2, 42.8, 38.7, 27.7; IR (KBr): γ 3369, 3062, 3030, 2974, 2925, 2855, 1709, 1606, 1498, 1441, 1371, 1292, 1249, 1212, 1111, 1076, 1047, 840, 814, 754, 699; ESI FTMS exact mass calcd for $(C_{32}H_{29}ClN_2O_3+H)^+$ requires m/z 525.1945, found m/z 525.1946; Enantiomeric excess: 97%, determined by HPLC (Daicel Chirapak IC, hexane/ isopropanol = 80/ 20, flow rate 1.0 mL/min, T = 30 ^{o}C, 254 nm): t_R = 5.821 min (minor), t_R = 9.522 min (major).

1-benzyl-4'-(2-hydroxyphenyl)-4'-methyl-6'-phenoxy-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4aca): dr > 99:1; yield: 99%; colorless sticky oil; $[\alpha]_D^{20}$ = -223.4 (c 0.5, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.27-7.21 (m, 4H), 7.19-7.15 (m, 4H), 7.08-7.03 (m, 2H), 6.92-6.88 (m, 1H), 6.84-6.74 (m, 7H), 6.67 (dd, *J* = 8.0, 1.2 Hz, 1H), 6.61-6.58 (m, 2H), 5.36 (s, 1H), 4.94 (d, *J* = 15.6 Hz, 1H), 4.59 (d, *J* = 15.6 Hz, 1H), 4.10 (s, 1H), 2.95 (d, *J* = 14.7 Hz, 1H), 2.07 (d, *J* = 14.7 Hz, 1H), 1.88 (s, 3H). ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 178.2, 157.6, 152.9, 148.1, 140.7, 137.2, 134.8, 131.2, 128.4, 128.1, 128.0, 127.8, 127.2, 126.7, 126.5, 126.3, 123.3, 121.9, 120.9, 119.5, 119.0, 118.9, 116.7, 116.0, 115.2, 107.9, 59.7, 43.2, 42.8, 38.7, 27.7; IR (KBr): γ 3352, 3059, 3029, 2957, 2922, 2854, 1695, 1604, 1485, 1453, 1363,

1259, 1214, 1168, 1098, 1077, 1025, 802, 750, 694; ESI FTMS exact mass calcd for $(C_{36}H_{30}N_2O_3+H)^+$ requires m/z 539.2335, found m/z 539.2322; Enantiomeric excess: 91%, determined by HPLC (Daicel Chirapak IC, hexane/ isopropanol = 80/ 20, flow rate 1.0 mL/min, T = 30 ^oC, 254 nm): t_R = 5.592 min (minor), t_R = 7.473 min (major).

1-benzyl-6-chloro-4'-(2-hydroxyphenyl)-4'-methyl-6'-phenoxy-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4hca): dr > 99:1; yield: 99%; colorless solid, m.p. 161-163 ^oC; $[\alpha]_D^{20}$ = -164.8 (c 0.9, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.37-7.34 (m, 2H), 7.31-7.24 (m, 5H), 7.17-7.09 (m, 2H), 6.99 (t, *J* = 7.4 Hz, 1H), 6.93-6.83 (m, 5H), 6.76 (dd, *J* = 8.0, 1.7 Hz, 1H), 6.71-6.65 (m, 3H), 6.42 (d, *J* = 7.5 Hz, 1H), 5.19 (s, 1H), 5.00 (d, *J* = 15.6 Hz, 1H), 4.63 (d, *J* = 15.6 Hz, 1H), 4.09 (s, 1H), 3.06 (d, *J* = 14.4 Hz, 1H), 2.15 (d, *J* = 14.4 Hz, 1H), 1.93 (s, 3H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 179.5, 158.7, 154.0, 149.2, 143.0, 138.2, 135.3, 134.7, 130.9, 129.5, 129.2, 129.0, 128.3, 128.1, 127.9, 127.3, 125.6, 122.6, 122.0, 120.8, 120.0, 119.8, 117.6, 117.1, 116.1, 109.4, 60.8, 44.0, 43.7, 40.0, 28.2; IR (KBr): γ 3374, 3063, 3031, 2922, 2853, 1707, 1605, 1485, 1441, 1371, 1344, 1293, 1221, 1165, 1109, 1075, 1002, 817, 753, 694; ESI FTMS exact mass calcd for $(C_{36}H_{29}ClN_2O_3+H)^+$ requires m/z 573.1945, found m/z 573.1946; Enantiomeric excess: 95%, determined by HPLC (Daicel Chirapak IC, hexane/ isopropanol = 80/ 20, flow rate 1.0 mL/min, T = 30 ^oC, 254 nm): t_R = 4.788 min (minor), t_R = 6.438 min (major).

1-benzyl-6'-fluoro-4'-(2-hydroxyphenyl)-4'-methyl-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4ada): dr > 99:1; yield: 44%; colorless sticky oil; $[\alpha]_D^{20}$ = -176.0 (c 0.2, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.28-7.16 (m, 6H), 7.11-7.04 (m, 2H), 6.85-6.81 (m, 1H), 6.79-6.77 (m, 1H), 6.76-6.72 (m, 2H), 6.70-6.67 (m, 1H), 6.61 (d, *J* = 7.8 Hz, 1H), 6.55 (m, 1H), 5.39 (s, 1H), 4.93 (d, *J* = 15.5 Hz, 1H), 4.60 (d, *J* = 15.5 Hz, 1H), 4.06 (s, 1H), 2.96 (d, *J* = 14.7 Hz, 1H), 2.05 (d, *J* = 14.7 Hz, 1H), 1.90 (s, 3H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 178.0, 156.2 (*J* = 236.0 Hz), 152.9, 140.8, 136.8, 134.8, 133.3, 131.0, 128.5 (*J* = 6.2 Hz), 128.2, 127.8, 127.3, 126.7, 126.4, 126.3, 123.3, 121.9, 119.6, 116.8, 115.0 (*J* = 7.6

Hz), 113.6 (J = 19.0 Hz), 107.9, 59.6, 43.2, 42.8, 38.6, 27.7; IR (KBr): γ 3359, 3060, 3031, 2962, 2922, 2853, 1698, 1608, 1497, 1464, 1446, 1371, 1296, 1261, 1201, 1175, 1151, 1102, 1082, 1022, 938, 803, 754, 699; ESI FTMS exact mass calcd for $(C_{30}H_{25}FN_2O_2+H)^+$ requires m/z 465.1978, found m/z 465.1976; Enantiomeric excess: 78%, determined by HPLC (Daicel Chirapak IC, hexane/ isopropanol = 80/ 20, flow rate 1.0 mL/min, T = 30 °C, 254 nm): t_R = 4.861 min (minor), t_R = 5.823 min (major).

1-benzyl-6-chloro-4'-(2-hydroxy-5-methylphenyl)-6'-methoxy-4'-methyl-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4hab): dr > 99:1; yield: 99%; colorless sticky oil; $[\alpha]_D^{20}$ = -265.8 (c 0.8, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.36-7.25 (m, 5H), 7.02 (s, 1H), 6.93 (dd, J = 8.1, 1.6 Hz, 1H), 6.82 (dd, J = 8.0, 1.7 Hz, 1H), 6.72-6.70 (m, 2H), 6.65-6.61 (m, 4H), 5.39 (s, 1H), 4.96 (d, J = 15.6 Hz, 1H), 4.58 (d, J = 15.6 Hz, 1H), 4.00 (s, 1H), 3.68 (s, 3H), 2.95 (d, J = 14.6 Hz, 1H), 2.26 (s, 3H), 2.06 (d, J = 14.6 Hz, 1H), 1.93 (s, 3H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 179.2, 153.7, 151.7, 143.0, 135.4, 134.7, 134.2, 130.9, 129.5, 129.0, 129.0, 128.6, 128.1, 127.9, 127.3, 125.5, 122.7, 117.6, 116.1, 113.8, 113.7, 109.4, 60.5, 55.6, 44.6, 43.8, 39.7, 28.8, 20.9; IR (KBr): γ 3363, 3069, 3030, 2925, 2855, 1711, 1606, 1497, 1442, 1370, 1341, 1255, 1215, 1182, 1134, 1074, 1040, 814, 736, 700; ESI FTMS exact mass calcd for $(C_{32}H_{29}ClN_2O_3+H)^+$ requires m/z 525.1945, found m/z 525.1936; Enantiomeric excess: 90%, determined by HPLC (Daicel Chirapak IC, hexane/ isopropanol = 80/ 20, flow rate 1.0 mL/min, T = 30 °C, 254 nm): t_R = 6.207 min (minor), t_R = 9.744 min (major).

1-benzyl-6-chloro-4'-(2-hydroxy-5-methoxyphenyl)-6'-methoxy-4'-methyl-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4hac): dr > 99:1; yield: 86%; colorless sticky oil; $[\alpha]_D^{20}$ = -247.9 (c 0.7, $CHCl_3$); ^{1}H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.28-7.18 (m, 5H), 6.77-6.75 (m, 2H), 6.68-6.53 (m, 7H), 5.08 (s, 1H), 4.89 (d, J = 15.6 Hz, 1H), 4.52 (d, J = 15.6 Hz, 1H), 3.93 (s, 1H), 3.65 (s, 3H), 3.60 (s, 3H), 2.90 (d, J = 14.6 Hz, 1H), 1.99 (d, J = 14.6 Hz, 1H), 1.86 (s, 3H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 179.1, 153.7, 153.5, 147.9, 143.0, 136.0, 135.3, 135.3, 134.8,

130.8, 129.0, 128.4, 127.9, 127.3, 125.4, 122.7, 118.3, 116.1, 114.4, 114.1, 113.5, 112.0, 109.4, 60.3, 55.7, 55.6, 44.4, 43.9, 39.9, 28.7; IR (KBr): γ 3364, 3062, 3030, 2927, 2853, 2833, 1712, 1607,1499, 1439, 1421, 1370, 1287, 1213, 1176, 1112, 1041, 811, 737, 699; ESI FTMS exact mass calcd for $(C_{32}H_{29}ClN_2O_4+H)^+$ requires m/z 541.1894, found m/z 541.1890; Enantiomeric excess: 90%, determined by HPLC (Daicel Chirapak IC, hexane/ isopropanol = 80/ 20, flow rate 1.0 mL/min, T = 30 ^oC, 254 nm): t_R = 7.234 min (minor), t_R = 12.239 min (major).

1-benzyl-6-chloro-4'-ethyl-4'-(2-hydroxyphenyl)-6'-methoxy-3',4'-dihydro-1'H-spiro[indoline-3,2'-quinolin]-2-one (4had): dr > 99:1; yield: 87%; colorless solid; m.p. 115-117 ^oC; $[\alpha]_D^{20}$ = -70.9 (c 0.6, $CHCl_3$); ^1H-NMR ($CDCl_3$, 400 MHz) δ (ppm): 7.37-7.28 (m, 5H), 7.16-7.11 (m, 1H), 6.98 (dd, *J* = 7.8, 1.4 Hz, 1H), 6.87-6.84 (m, 1H), 6.77-6.75 (m, 2H), 6.68-6.62 (m, 4H), 6.15 (d, *J* = 8.1 Hz, 1H), 5.08 (s, 1H), 5.00 (d, *J* = 15.6 Hz, 1H), 4.63 (d, *J* = 15.6 Hz, 1H), 3.82 (s, 1H), 3.74 (s, 3H), 2.94 (d, *J* = 14.3 Hz, 1H), 2.64 (dt, *J* = 14.6, 7.3 Hz, 1H), 2.36-2.27 (m, 2H), 0.96 (t, *J* = 7.3 Hz, 3H); ^{13}C-NMR ($CDCl_3$, 100 MHz) δ (ppm): 180.0, 154.5, 153.1, 142.9, 136.5, 135.3, 134.2, 131.9, 131.8, 129.4, 128.9, 128.1, 127.8, 127.4, 127.3, 125.8, 122.5, 120.9, 117.6, 116.2, 114.1, 113.5, 109.3, 61.3, 55.8, 44.3, 44.0, 40.3, 29.7, 10.1; IR (KBr): γ 3371, 3062, 3030, 2960, 2925, 2854, 1708, 1605, 1495, 1443, 1370, 1347, 1261, 1215, 1144, 1103, 1077, 1041, 804, 739, 699; ESI FTMS exact mass calcd for $(C_{32}H_{29}ClN_2O_3+H)^+$ requires m/z 525.1945, found m/z 525.1942; Enantiomeric excess: 89%, determined by HPLC (Daicel Chirapak IC, hexane/ isopropanol = 80/ 20, flow rate 1.0 mL/min, T = 30 ^oC, 254 nm): t_R = 5.355 min (minor), t_R = 7.924 min (major).

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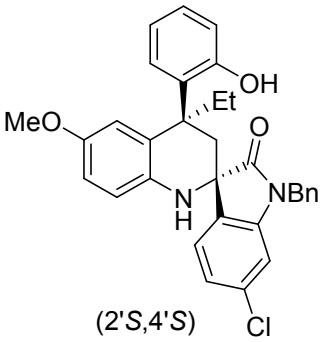

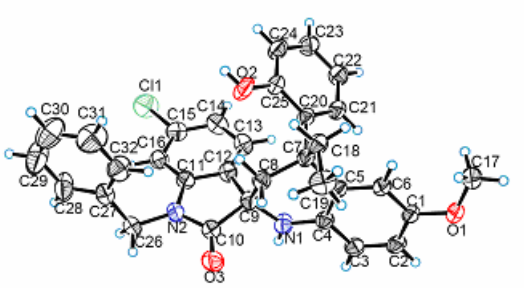

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Crystal system	orthorhombic
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Unit cell dimensions	a = 8.37710(10) Å α =90.00°
	b = 10.2900(2) Å β = 90.00°
	c = 31.1680(4) Å γ = 90.00°
Volume	2686.69(7) Å^3
Z	4
Density (calculated)	1.298 mg/mm^3
F(000)	1104.0
Crystal size	0.37 × 0.32 × 0.31
Theta range for data collection	9.06 to 134.8°
Index ranges	-9 ≤ h ≤ 10, -12 ≤ k ≤ 11, -37 ≤ l ≤ 37
Reflections collected	21252
Independent reflections	4779[R(int) = 0.0238]
Data / restraints / parameters	4779/0/347
Goodness-of-fit on F^2	1.033
Final R indices [I>2σ(I)]	R_1 = 0.0306, wR_2 = 0.0882
R indices (all data)	R_1 = 0.0336, wR_2 = 0.0904
Largest diff. peak and hole	0.15/-0.21

^{1}H and ^{13}C NMR Spectra

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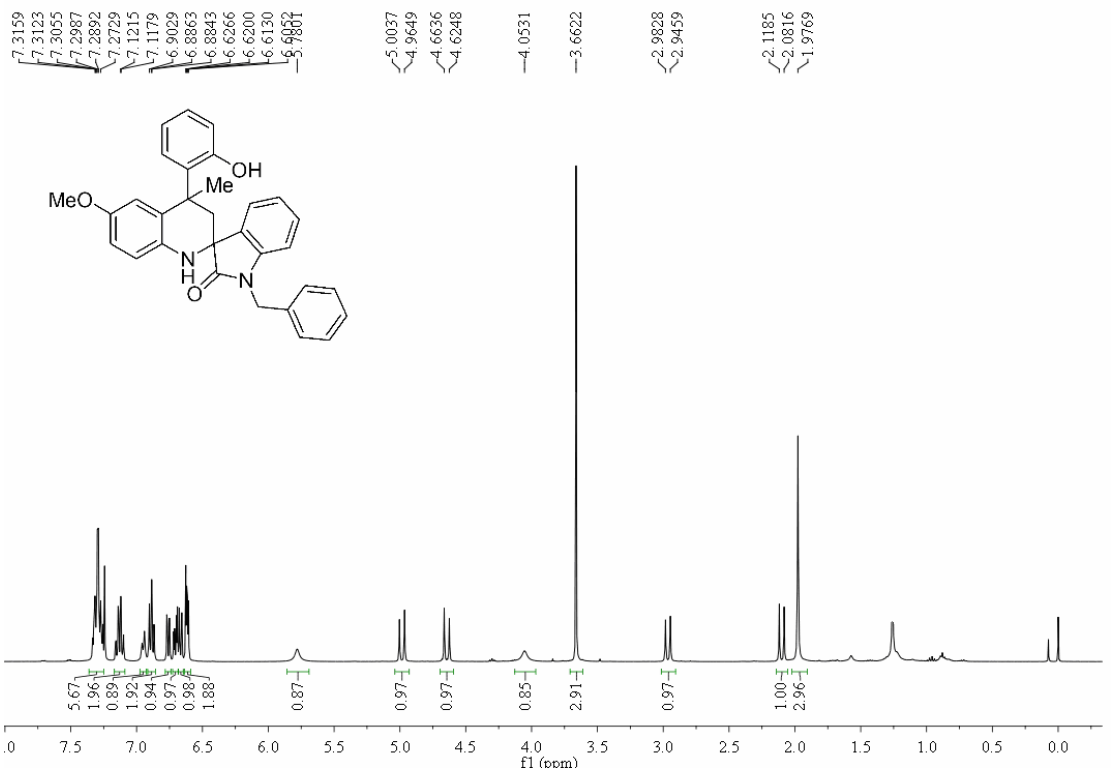

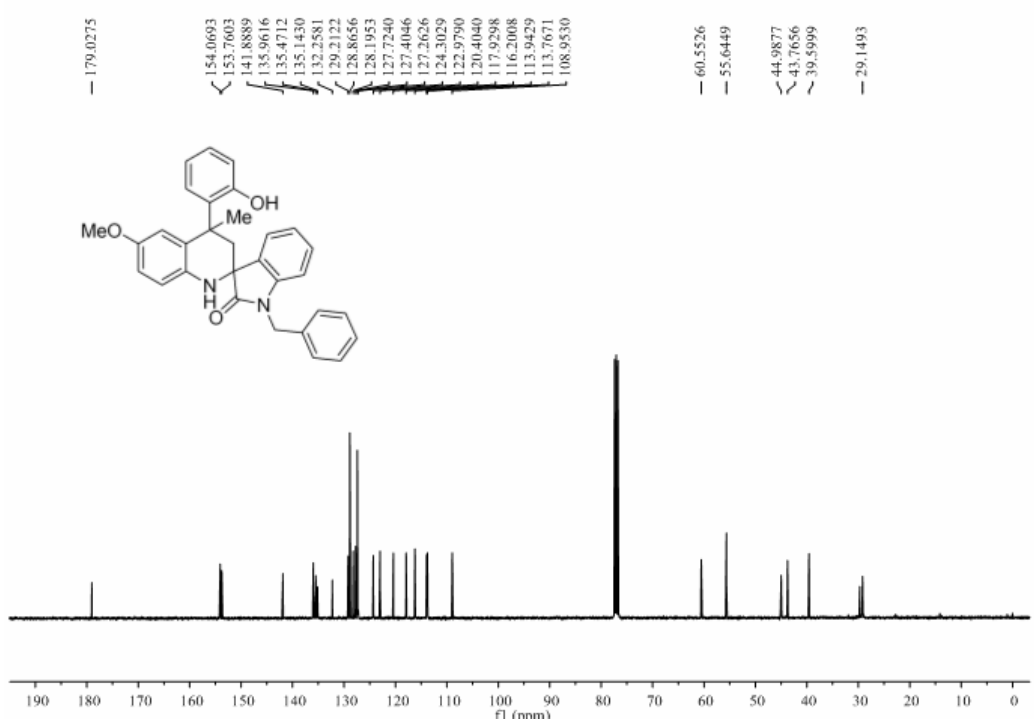

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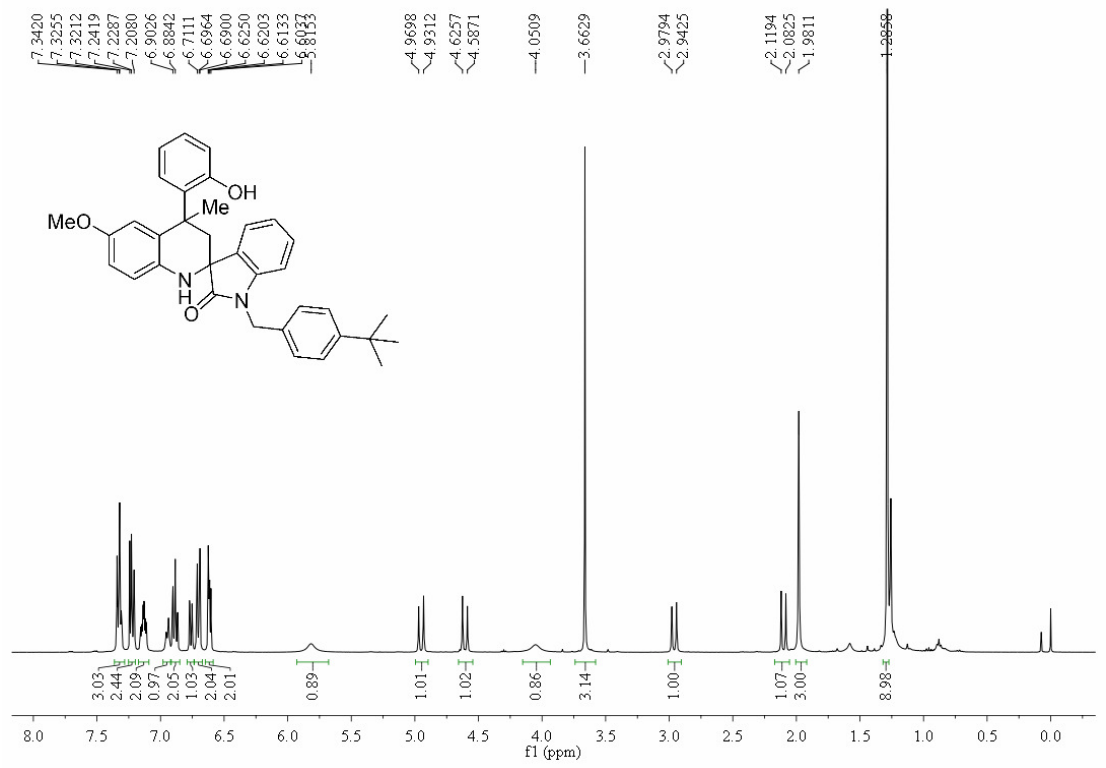
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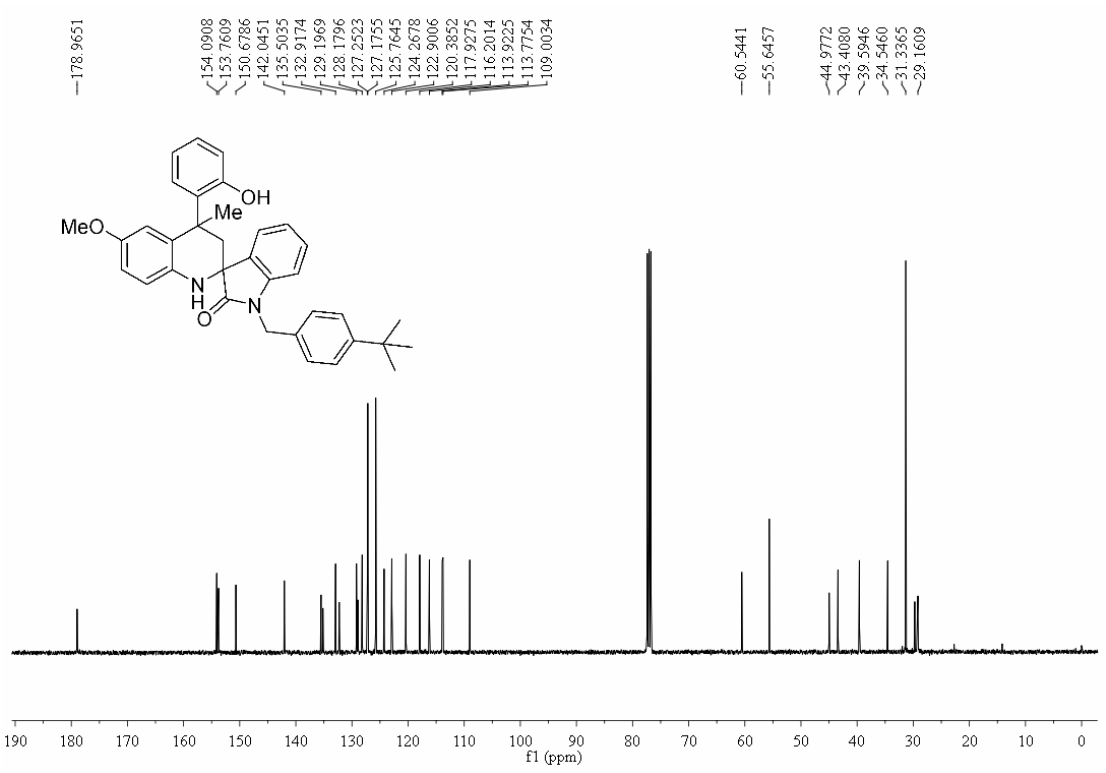
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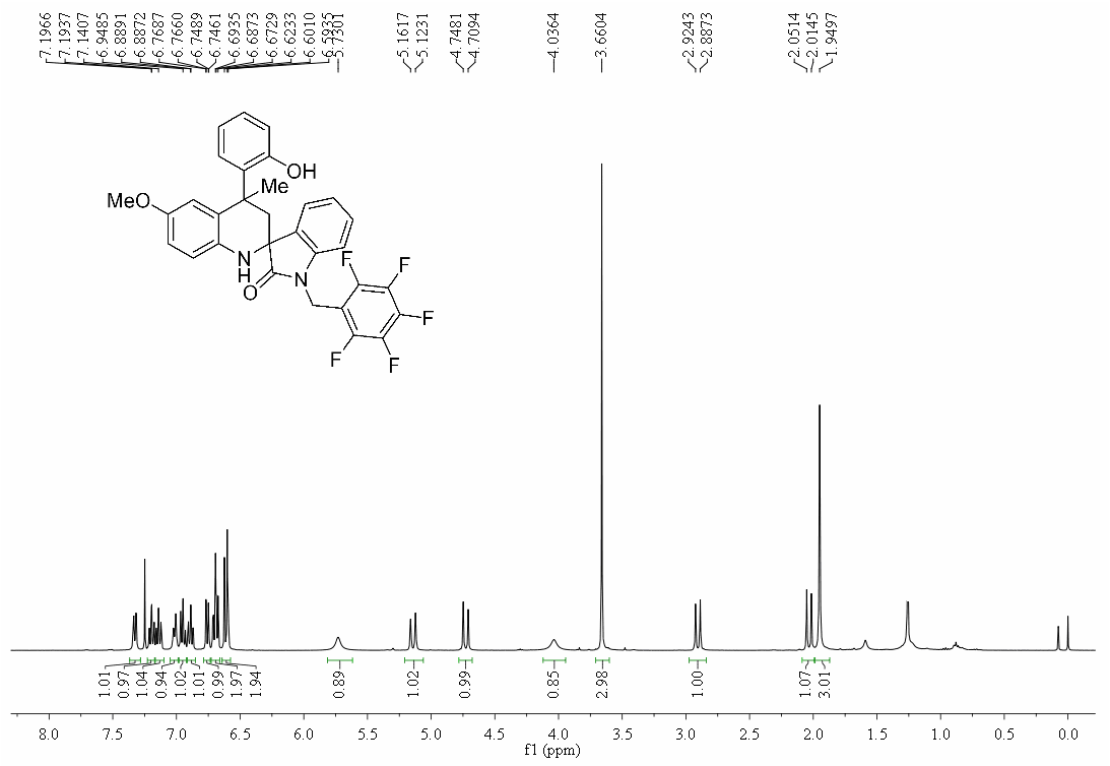
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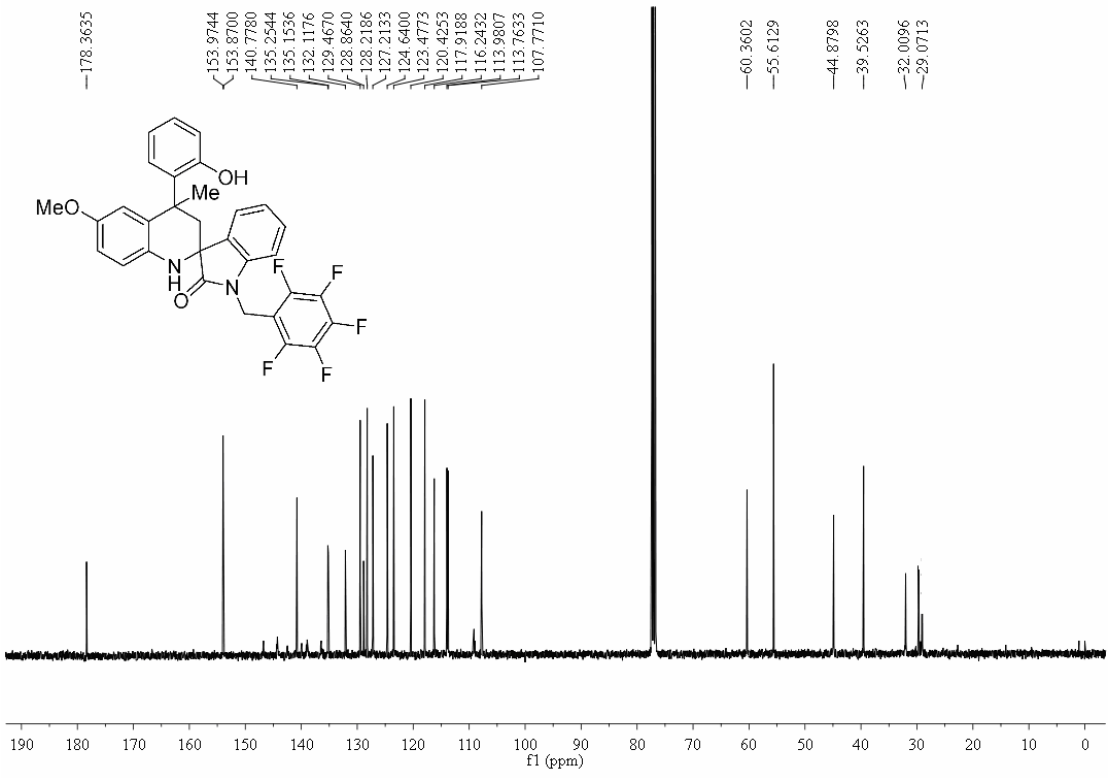
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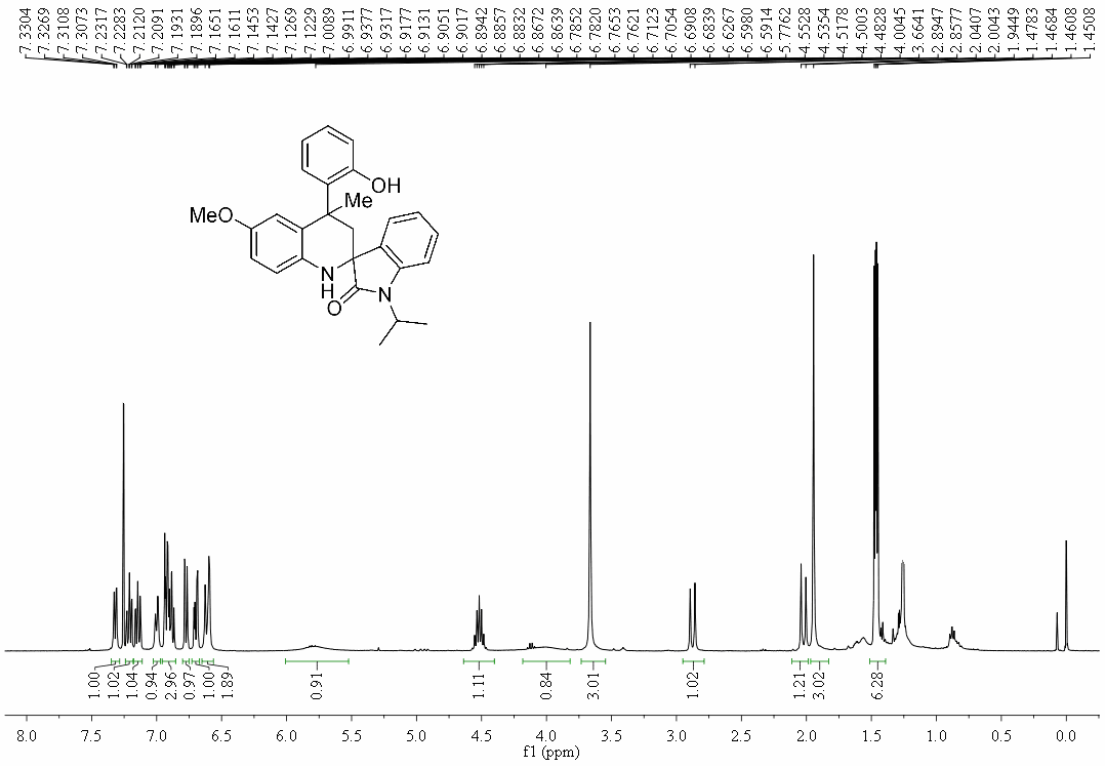

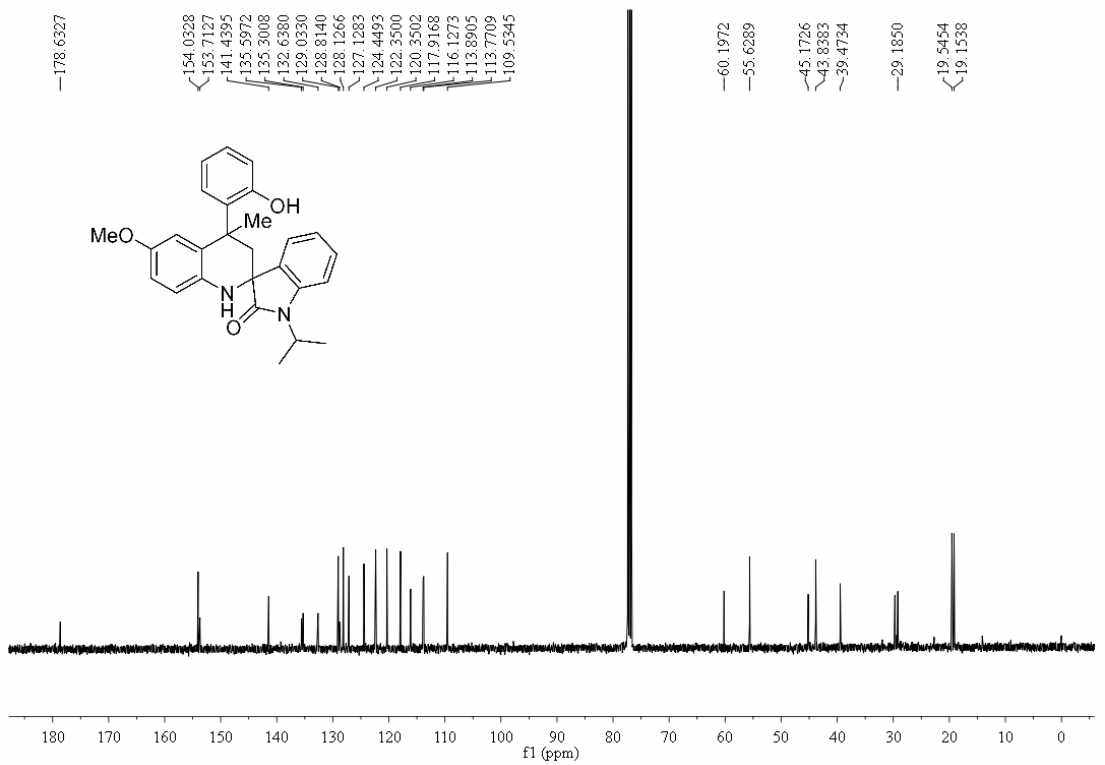

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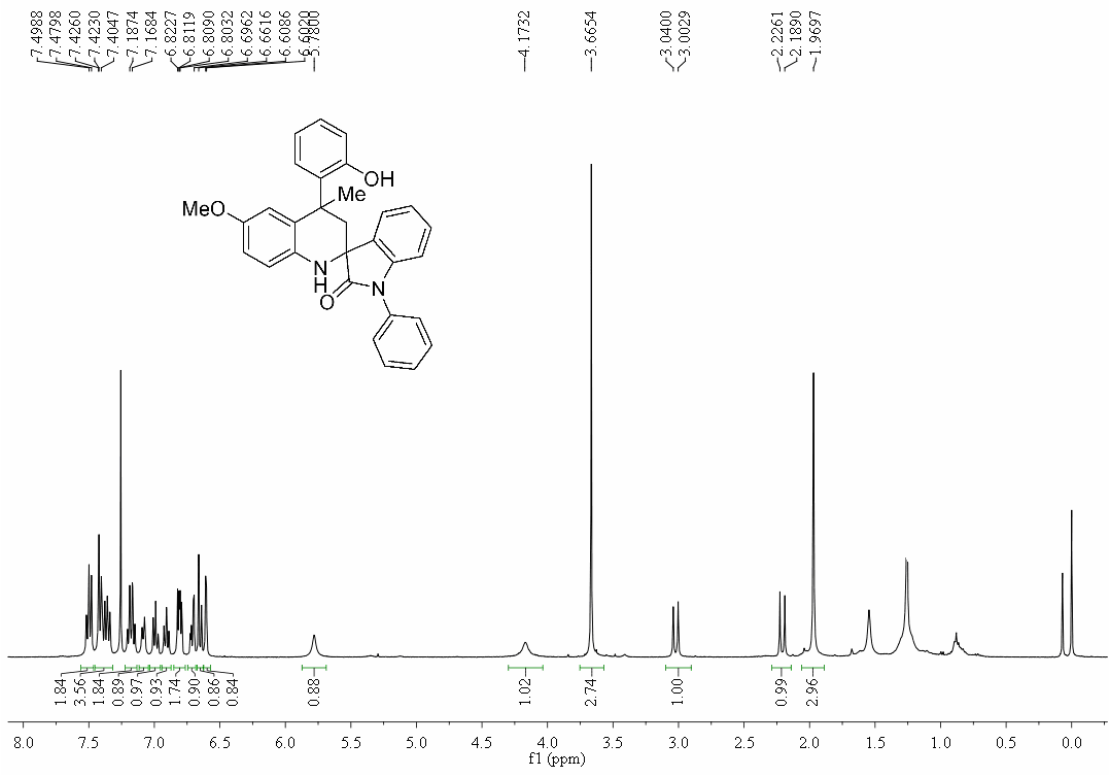
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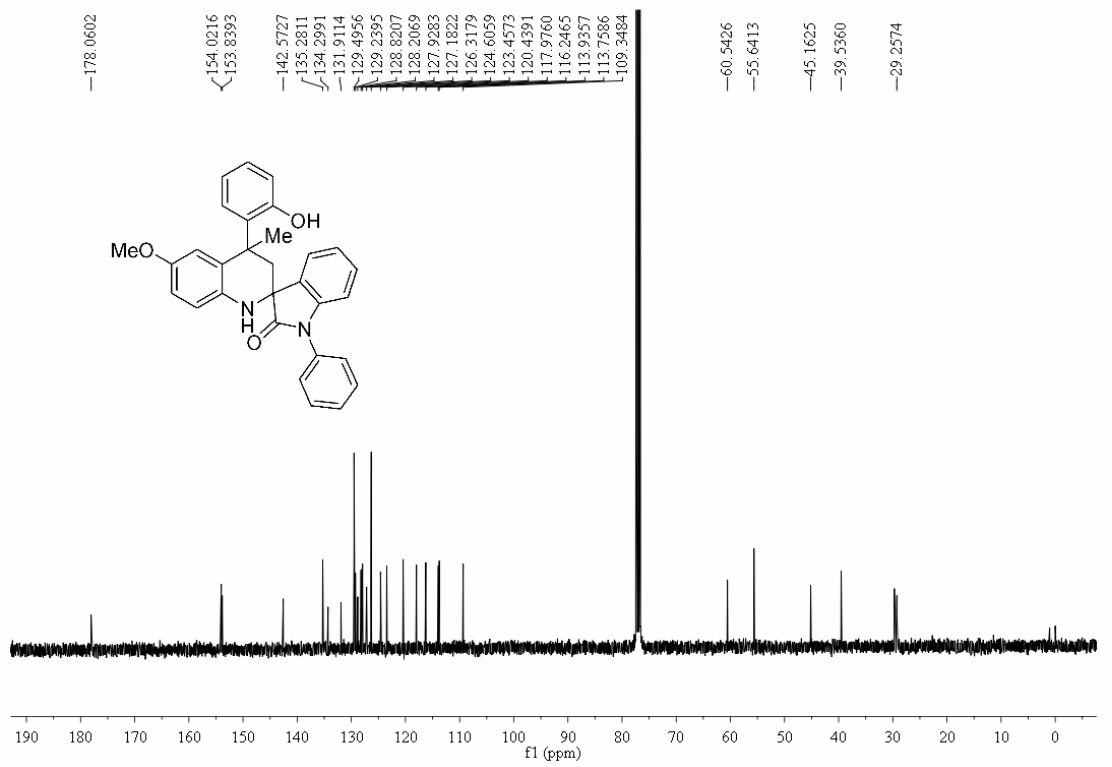
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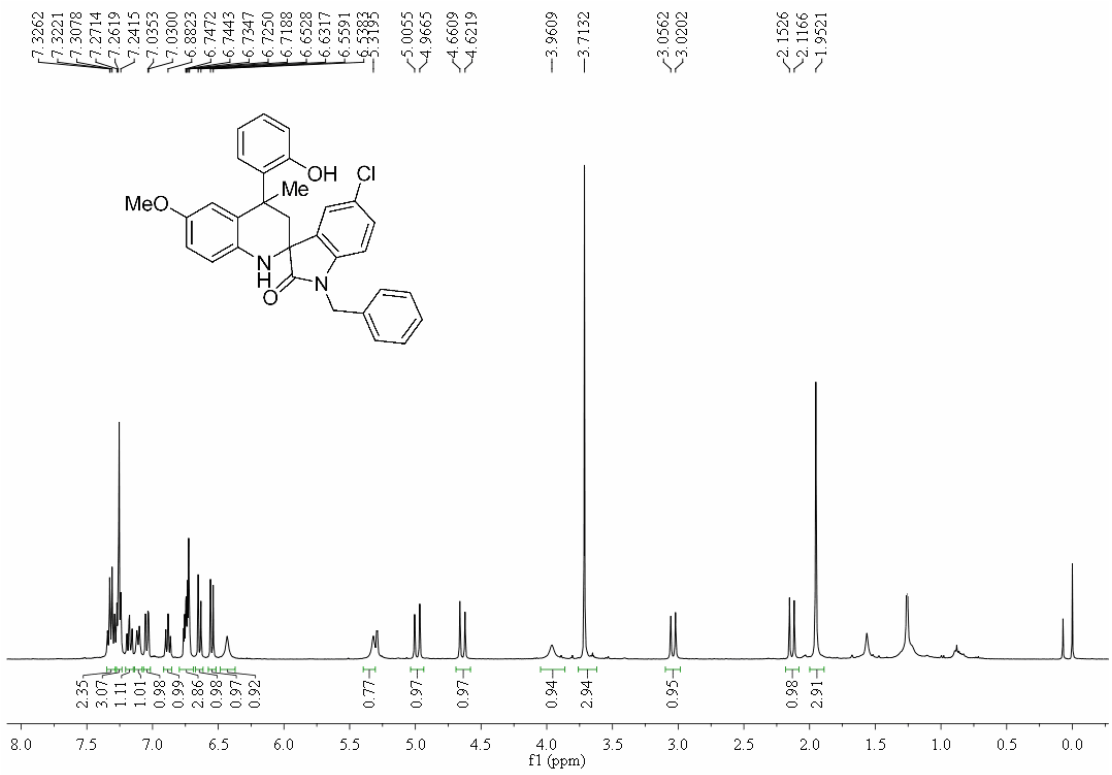
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7.0
6.5
6.0
5.5
5.0
4.5
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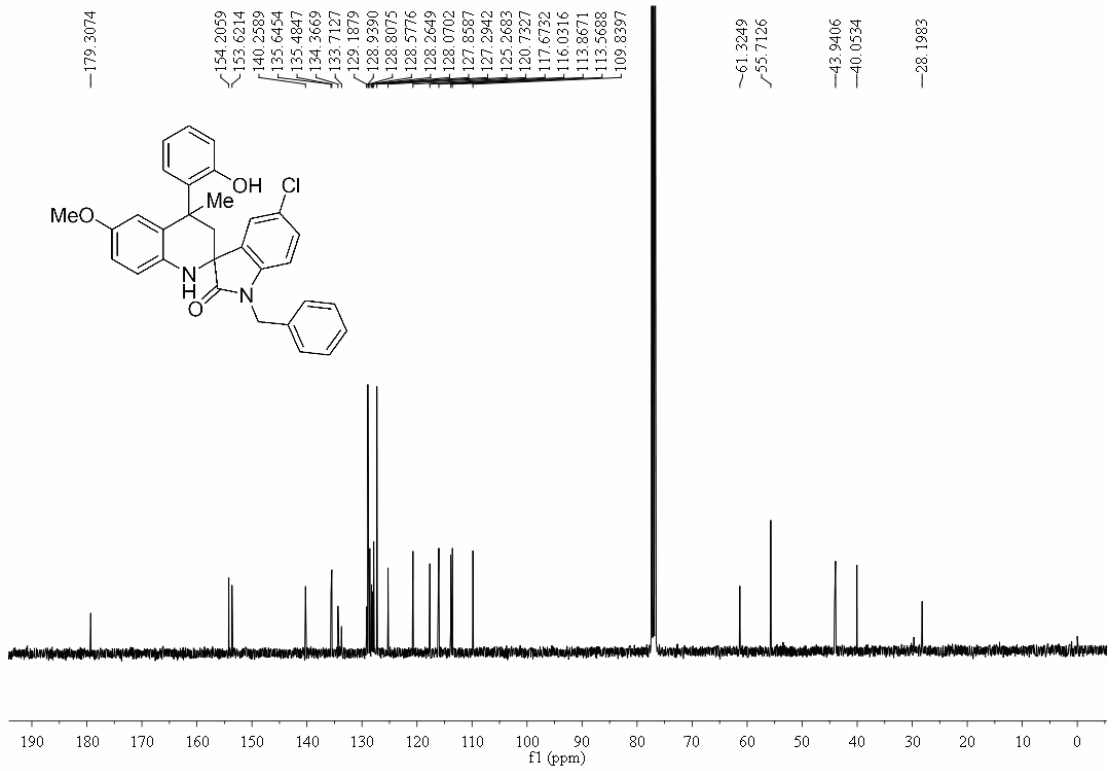
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)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128.8075
128.5776
128.2649
128.0702
127.8587
127.2942
125.2683
120.7327
117.6732
116.0316
113.8671
113.5688
109.8397
61.3249
55.7126
43.9406
40.0534
28.1983
OH
Cl
Me
MeO
N
H
O
N
190
180
170
160
150
140
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120
110
100
90
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70
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50
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30
20
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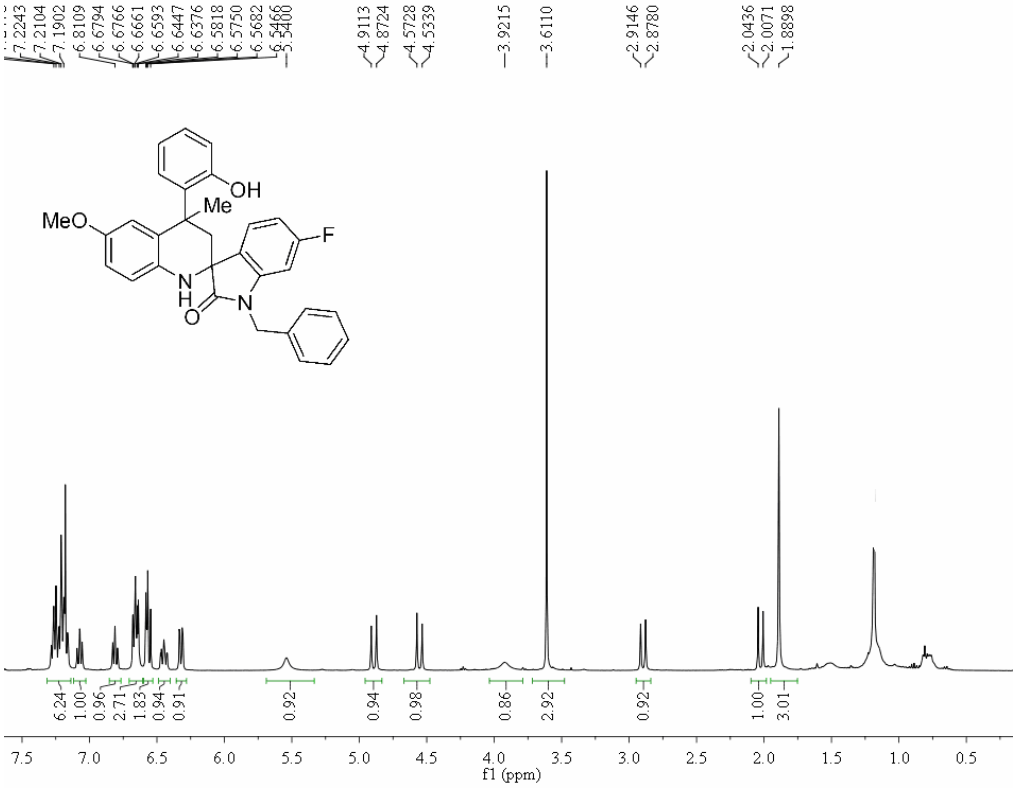
0
f1 (ppm)

4gaa: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6.6661
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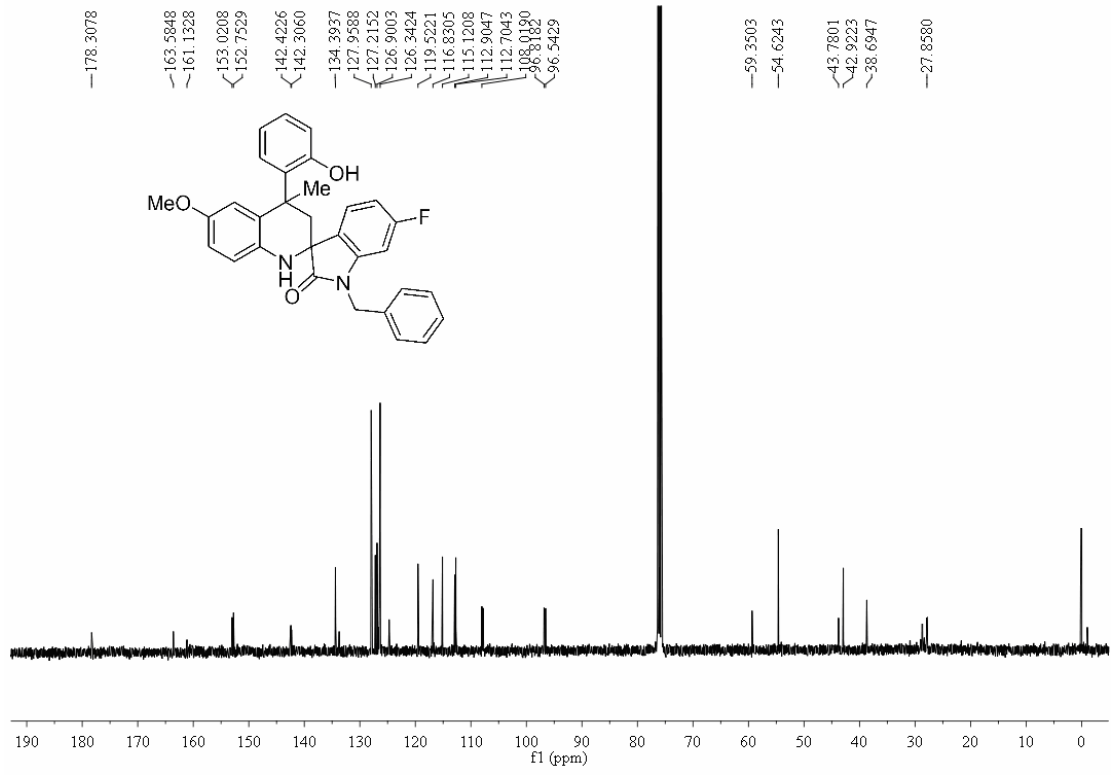
6.6447
6.6376
6.5818
6.5750
6.5682
6.5466
5.5400
4.9113
4.8724
4.5728
4.5339
3.9215
3.6110
2.9146
2.8780
2.0436
2.0071
1.8898
OH
Me
MeO
F
N
H
O
N
6.24
1.00
0.96
2.71
1.83
0.94
0.91
0.92
0.94
0.98
0.86
2.92
0.92
1.00
3.01
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)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126.3424
119.5221
116.8305
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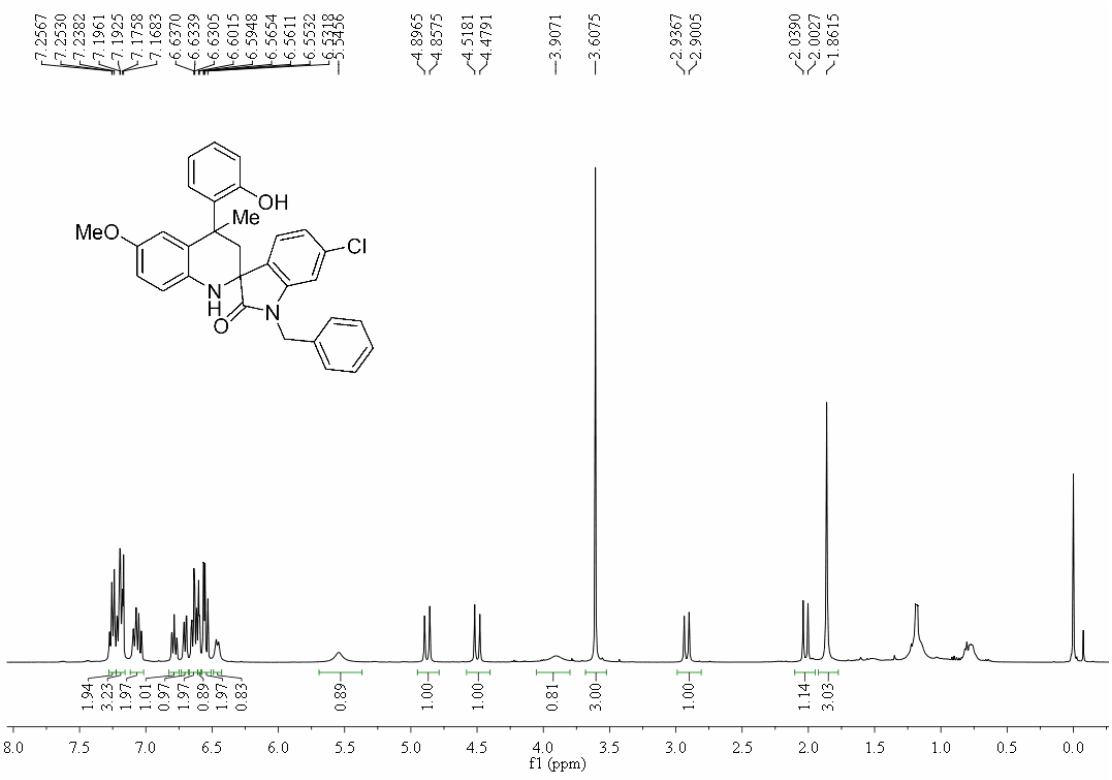
112.9047
112.7043
108.0190
96.8182
96.5429
59.3503
54.6243
43.7801
42.9223
38.6947
27.8580
OH
Me
MeO
F
N
H
O
N
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

4haa: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7.1925
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7.1683
6.6370
6.6339
6.6305
6.6015
6.5948
6.5654
6.5611
6.5532
6.5318
5.5456
4.8965
4.8575
4.5181
4.4791
3.9071
3.6075
2.9367
2.9005
2.0390
2.0027
1.8615
OH
Me
MeO
Cl
N
H
O
N
1.94
3.23
1.97
1.01
0.97
1.97
0.89
1.97
0.83
0.89
1.00
1.00
0.81
3.00
1.00
1.14
3.03
8.0
7.5
7.0
6.5
6.0
5.5
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3.5
3.0
2.5
2.0
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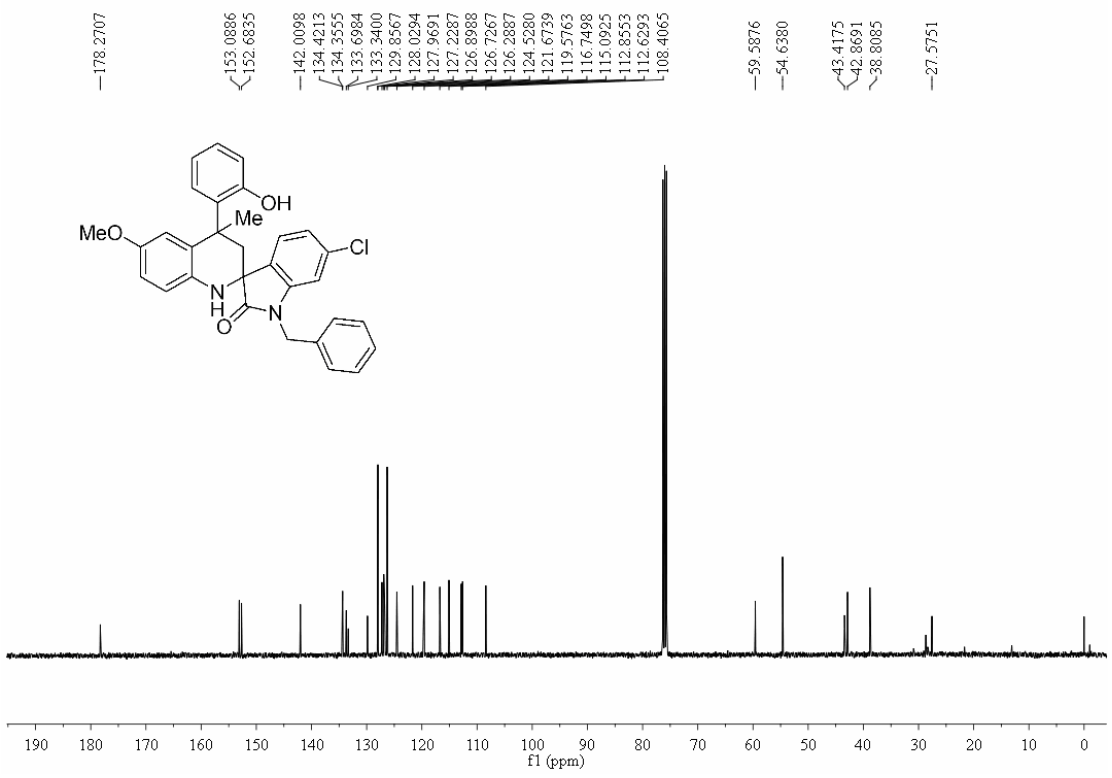
1.0
0.5
0.0
f1 (ppm)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126.8988
126.7267
126.2887
124.5280
121.6739
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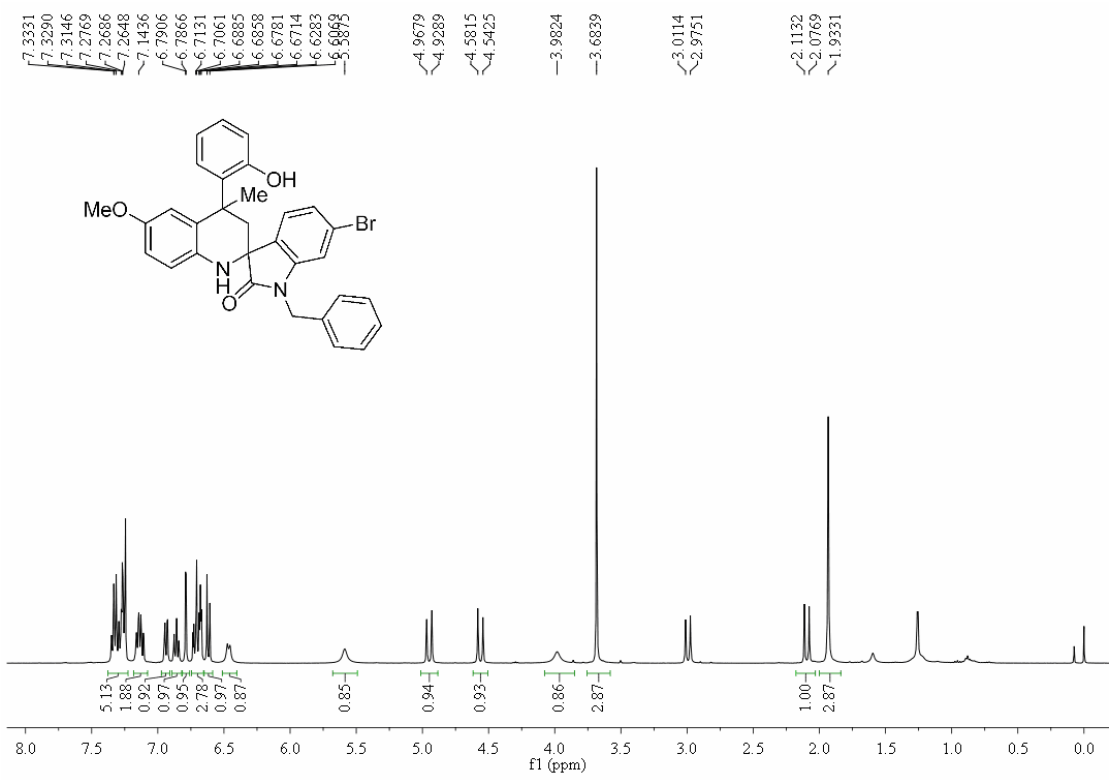
116.7498
115.0925
112.8553
112.6293
108.4065
59.5876
54.6380
43.4175
42.8691
38.8085
27.5751
OH
Me
MeO
Cl
N
H
O
N
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

4iaa: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7.2769
7.2686
7.2648
7.1436
6.7906
6.7866
6.7131
6.7061
6.6885
6.6858
6.6781
6.6714
6.6283
6.6069
5.5845
4.9679
4.9289
4.5815
4.5425
3.9824
3.6839
3.0114
2.9751
2.1132
2.0769
1.9331
OH
Me
MeO
Br
N
H
O
N
5.13
1.88
0.92
0.97
0.95
2.78
0.97
0.87
0.85
0.94
0.93
0.86
2.87
1.00
2.87
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
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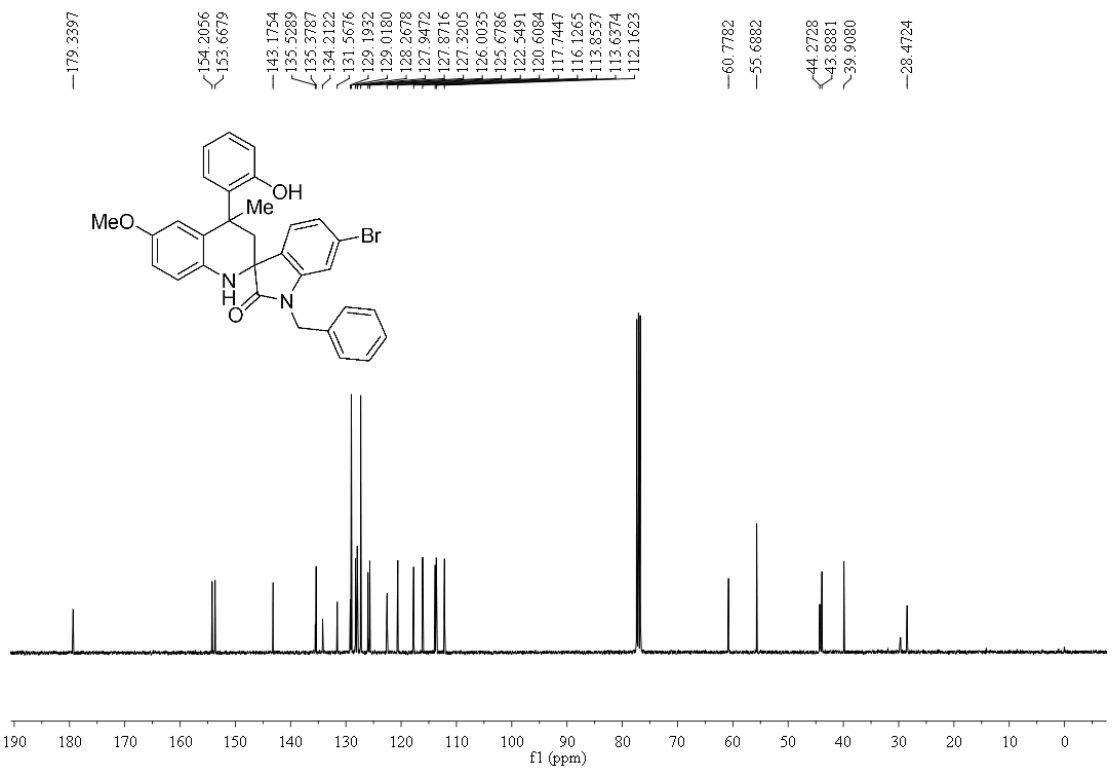
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)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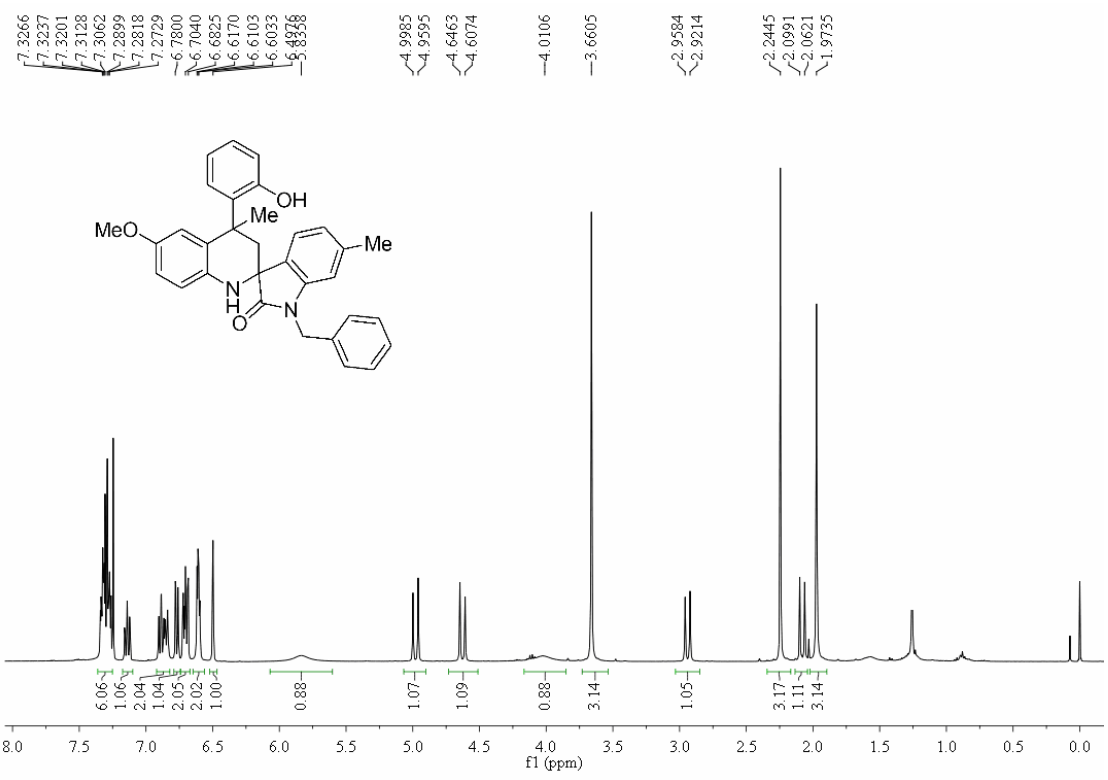
127.8716
127.3205
126.0035
125.6786
122.5491
120.6084
117.7447
116.1265
113.8537
113.6374
112.1623
60.7782
55.6882
44.2728
43.8881
39.9080
28.4724
OH
Me
MeO
Br
N
H
O
N
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

4jaa: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7.3201
7.3128
7.3062
7.2899
7.2818
7.2729
6.7800
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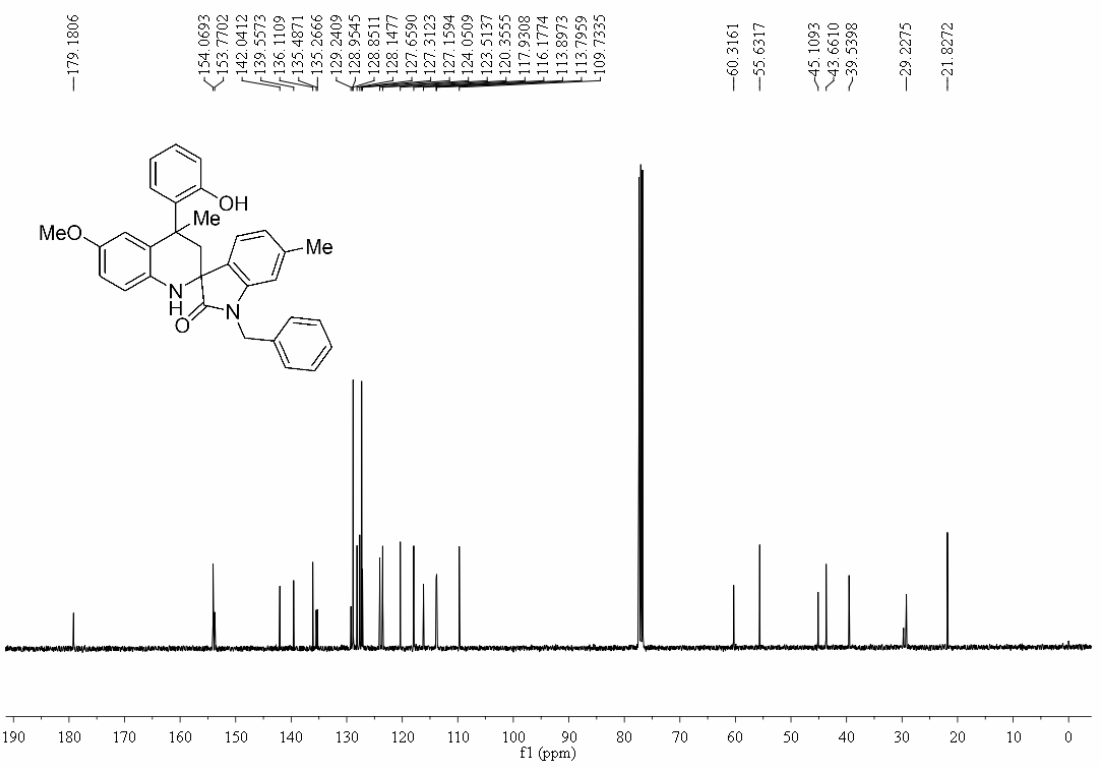
6.6825
6.6170
6.6103
6.6033
5.8358
4.9985
4.9595
4.6463
4.6074
4.0106
3.6605
2.9584
2.9214
2.2445
2.0991
2.0621
1.9735
OH
Me
MeO
Me
N
H
O
N
6.06
1.06
2.04
1.04
2.05
2.02
1.00
0.88
1.07
1.09
0.88
3.14
1.05
3.17
1.11
3.14
f1 (ppm)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135.2666
129.2409
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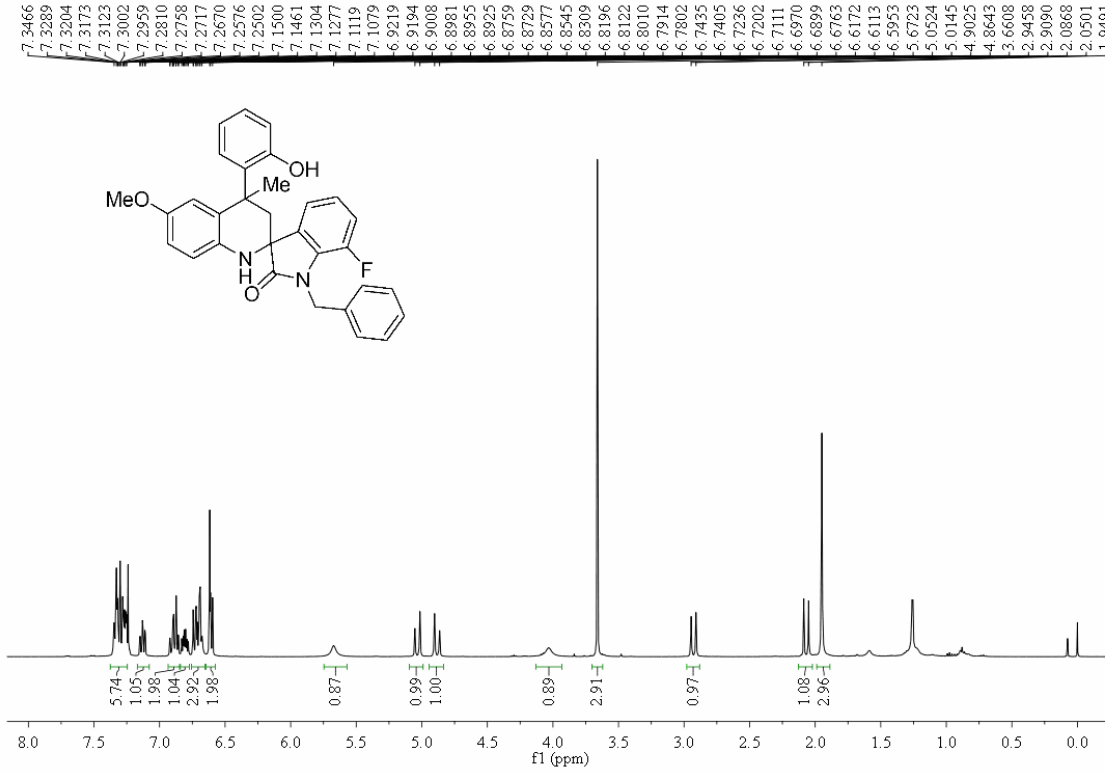
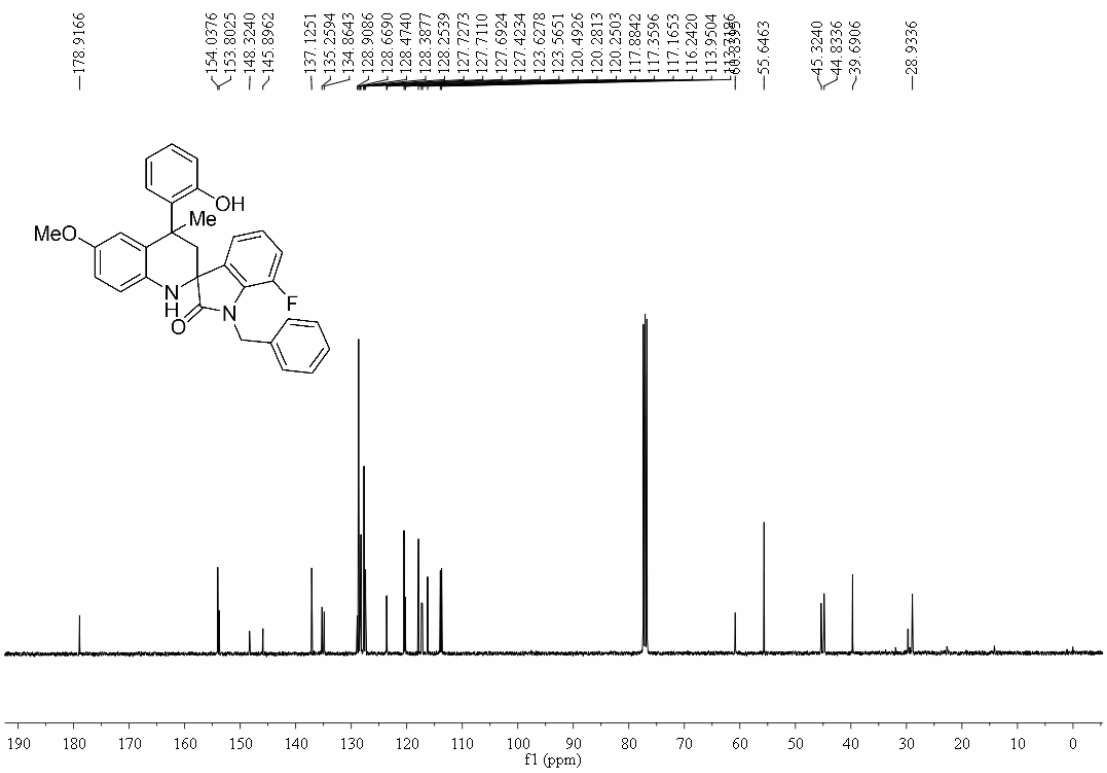
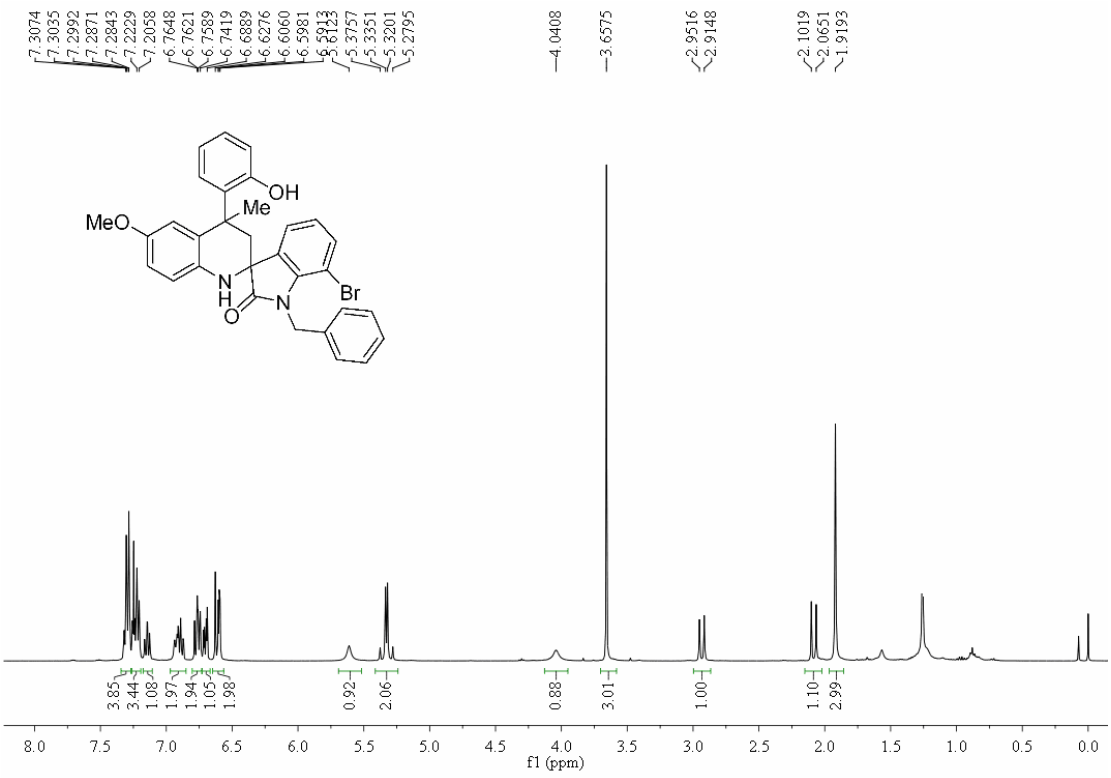
128.8511
128.1477
127.6590
127.3123
127.1594
124.0509
123.5137
120.3555
117.9308
116.1774
113.8973
113.7959
109.7335
60.3161
55.6317
45.1093
43.6610
39.5398
29.2275
21.8272
OH
Me
MeO
Me
N
H
O
N
f1 (ppm)

4kaa:





4laa: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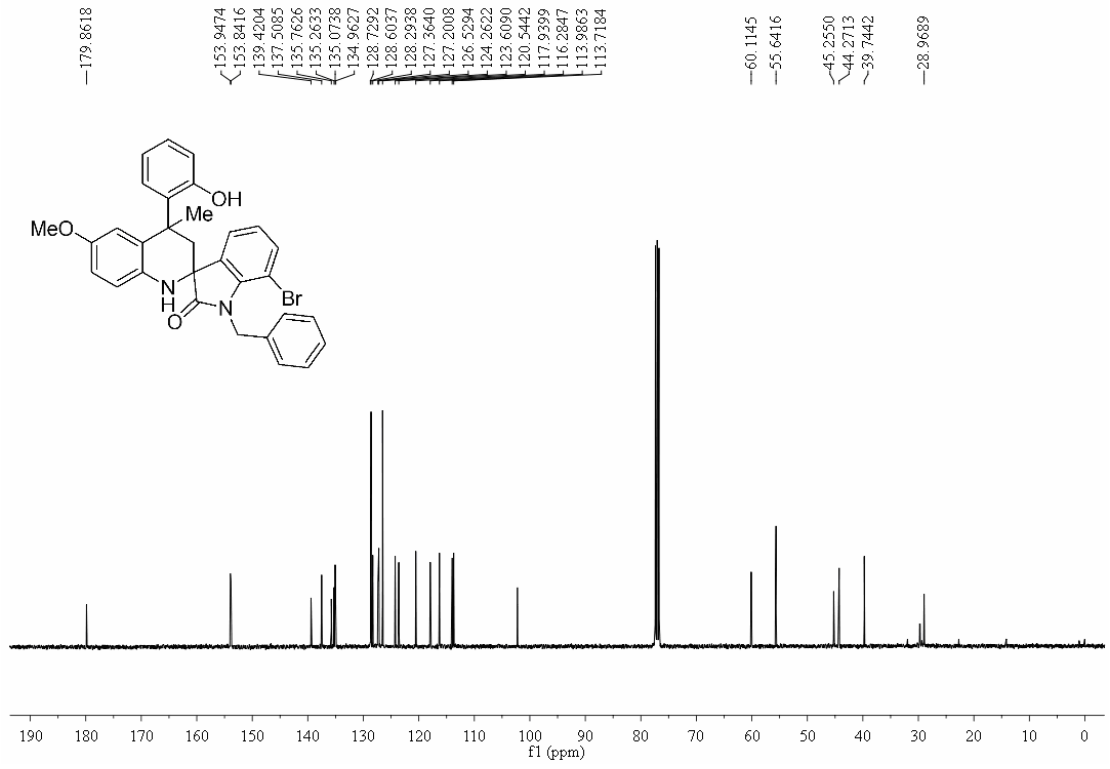
6.6889
6.6276
6.6060
6.5981
5.3757
5.3351
5.3201
5.2795
4.0408
3.6575
2.9516
2.9148
2.1019
2.0651
1.9193
OH
Me
MeO
N
H
O
N
Br
3.85
3.44
1.08
1.97
1.94
1.05
1.98
0.92
2.06
0.88
3.01
1.00
1.10
2.99
f1 (ppm)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128.7292
128.6037
128.2938
127.3640
127.2008
126.5294
124.2622
123.6090
120.5442
117.9399
116.2847
113.9863
113.7184
60.1145
55.6416
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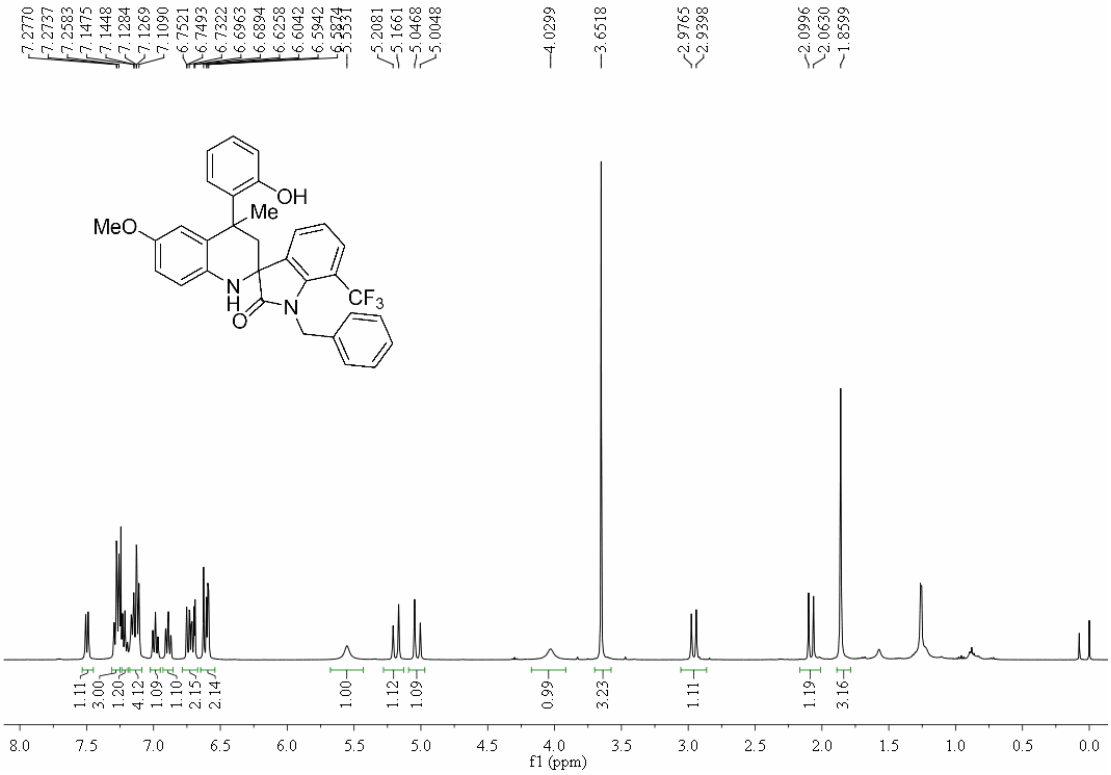
44.2713
39.7442
28.9689
OH
Me
MeO
N
H
O
N
Br
f1 (ppm)

4maa: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7.1269
7.1090
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6.7493
6.7322
6.6963
6.6894
6.6258
6.6042
6.5942
6.5874
6.5831
5.2081
5.1661
5.0468
5.0048
4.0299
3.6518
2.9765
2.9398
2.0996
2.0630
1.8599
OH
Me
MeO
N
H
O
N
CF3
1.11
3.00
1.20
4.12
1.09
1.10
2.15
2.14
1.00
1.12
1.09
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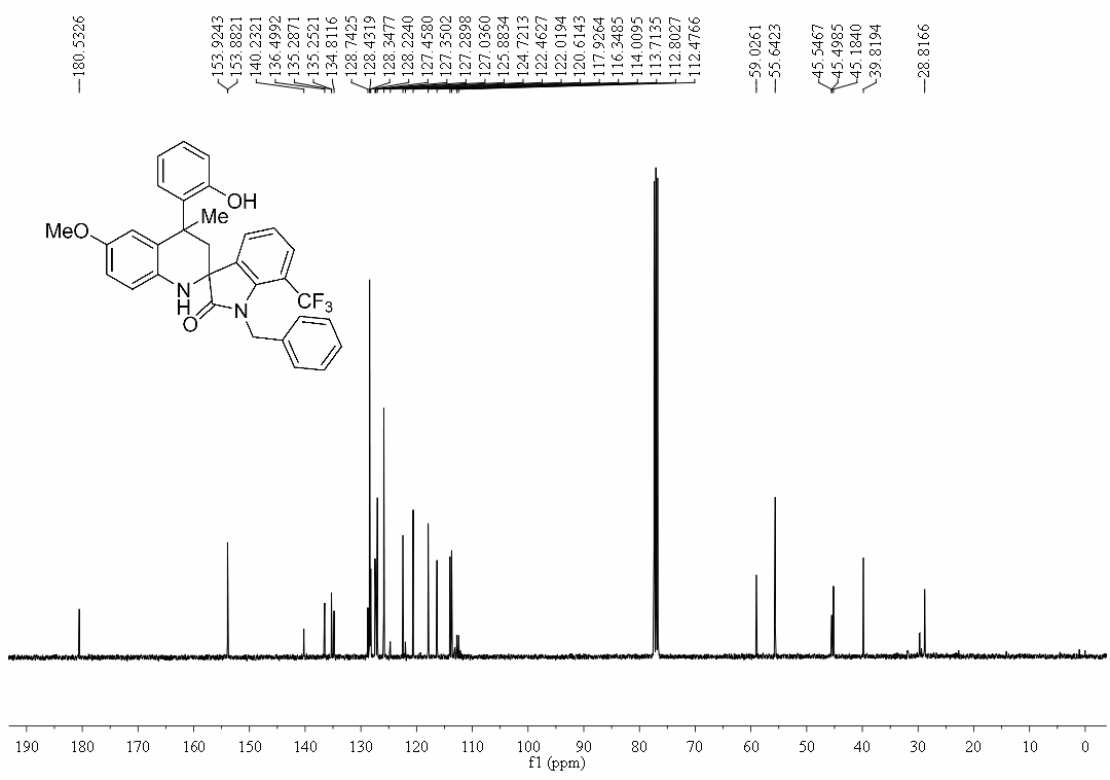
3.23
1.11
1.19
3.16
f1 (ppm)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128.3477
128.2240
127.4580
127.3502
127.2898
127.0360
125.8834
124.7213
122.4627
122.0194
120.6143
117.9264
116.3485
114.0095
113.7135
112.8027
112.4766
59.0261
55.6423
45.5467
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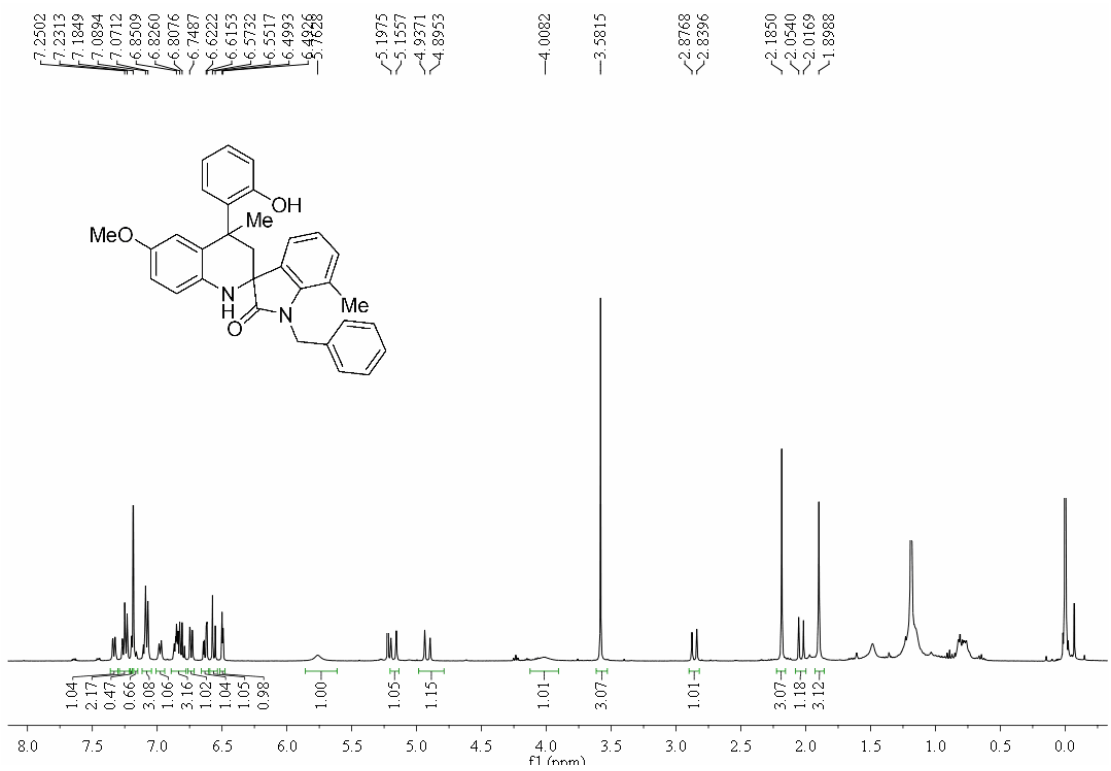
28.8166
OH
Me
MeO
N
H
O
N
CF3
f1 (ppm)

4naa: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6.6153
6.5732
6.5517
6.4993
6.4826
5.7828
5.1975
5.1557
4.9371
4.8953
4.0082
3.5815
2.8768
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2.1850
2.0540
2.0169
1.8988
OH
Me
MeO
N
H
O
N
Me
1.04
2.17
0.47
0.66
3.08
1.06
3.16
1.02
1.04
1.05
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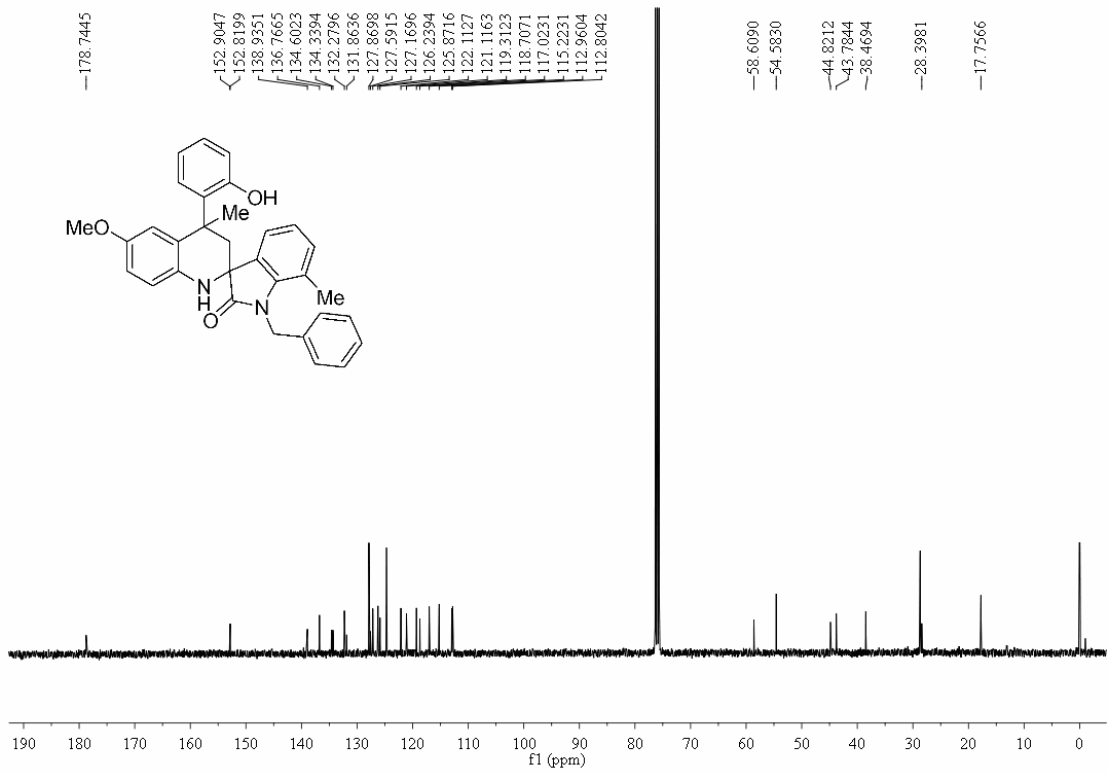
1.05
1.15
1.01
3.07
1.01
3.07
1.18
3.12
f1 (ppm)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127.5915
127.1696
126.2394
125.8716
122.1127
121.1163
119.3123
118.7071
117.0231
115.2231
112.9604
112.8042
58.6090
54.5830
44.8212
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38.4694
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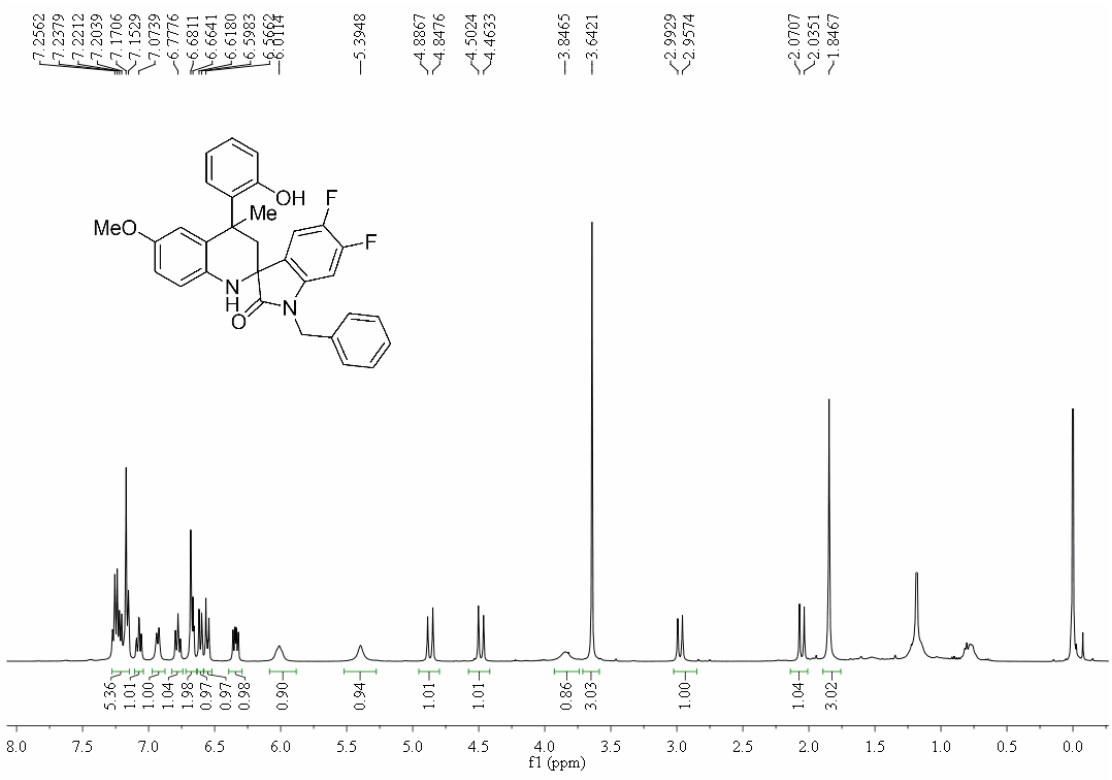
17.7566
OH
Me
MeO
N
H
O
N
Me
f1 (ppm)

4oaa: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6.5983
6.0114
5.3948
4.8867
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4.5024
4.4633
3.8465
3.6421
2.9929
2.9574
2.0707
2.0351
1.8467
OH
Me
MeO
F
F
N
H
O
N
5.36
1.01
1.00
1.04
1.98
0.97
0.97
0.98
0.90
0.94
1.01
1.01
0.86
3.03
1.00
1.04
3.02
8.0
7.5
7.0
6.5
6.0
5.5
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3.5
3.0
2.5
2.0
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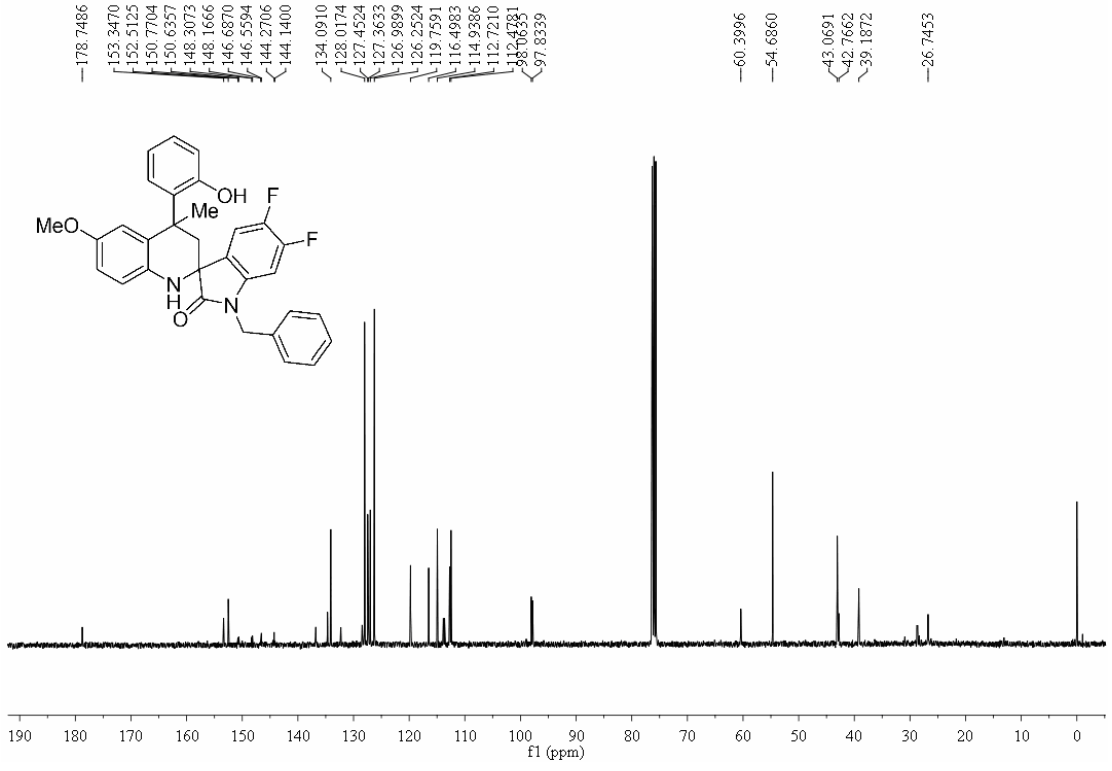
1.0
0.5
0.0
f1 (ppm)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128.0174
127.4524
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126.9899
126.2524
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112.7210
112.4781
98.0635
97.8339
60.3996
54.6860
43.0691
42.7662
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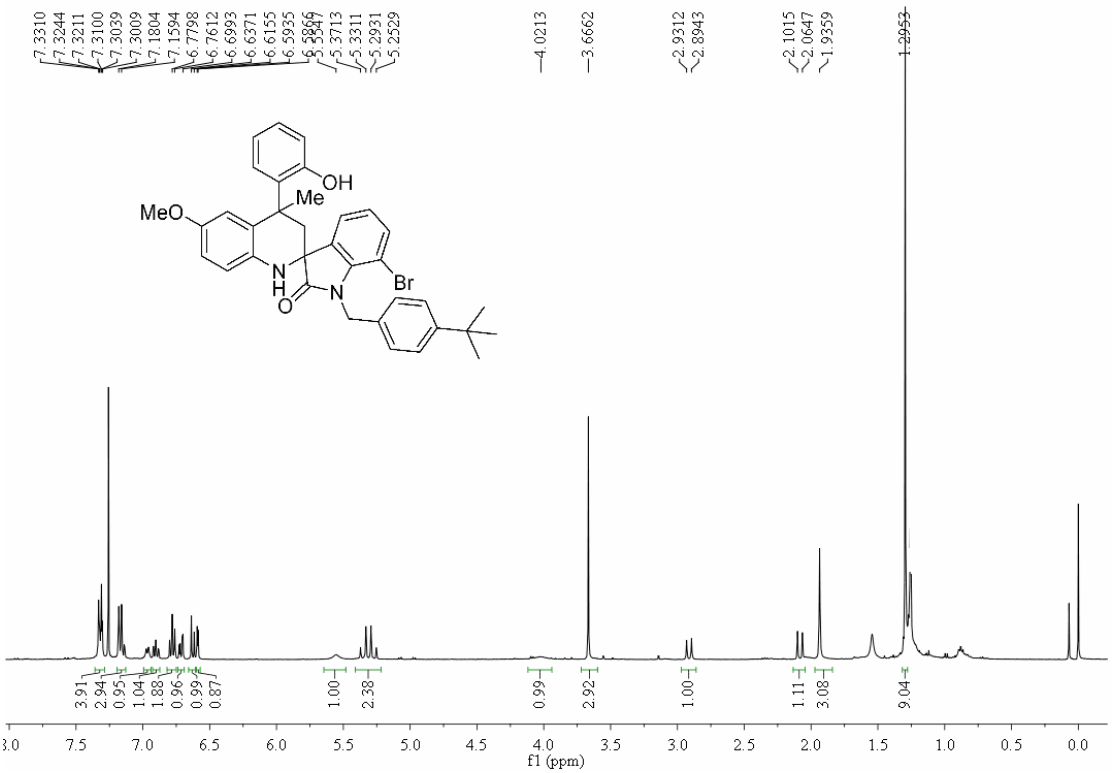
26.7453
OH
Me
MeO
F
F
N
H
O
N
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

4paa: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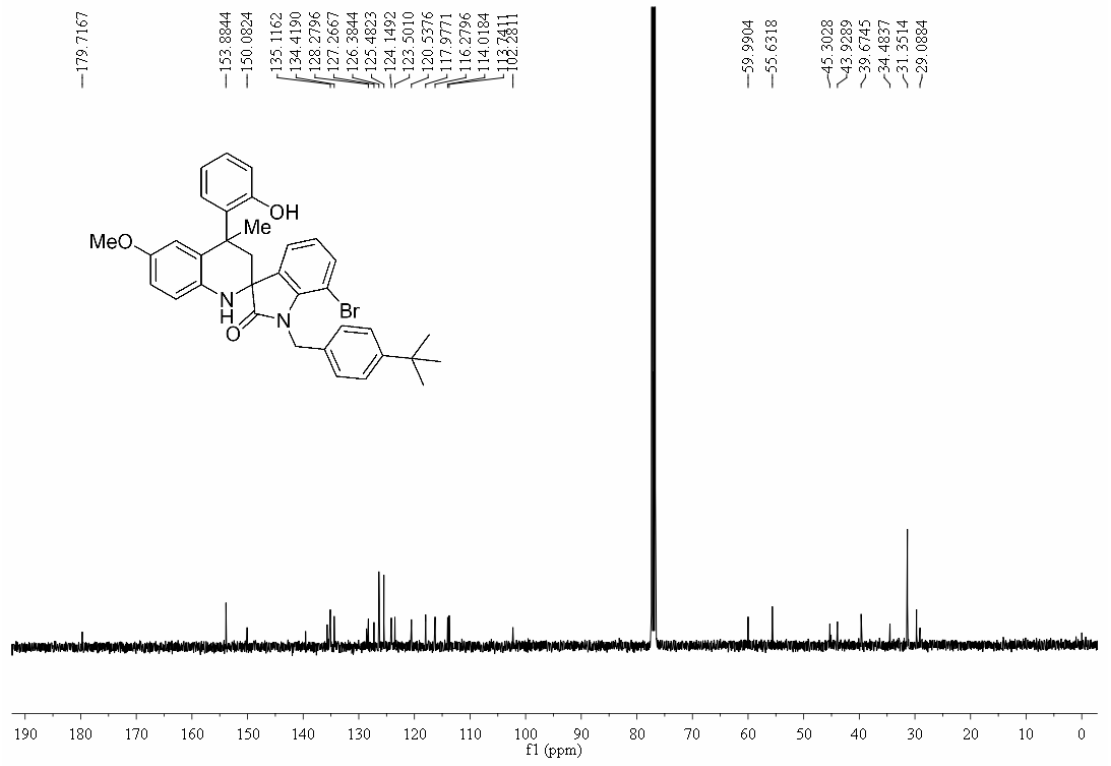
5.5447
5.3713
5.3311
5.2931
5.2529
4.0213
3.6662
2.9312
2.8943
2.1015
2.0647
1.9359
1.2953
OH
Me
MeO
N
H
O
N
Br
3.91
2.94
0.95
1.04
1.88
0.96
0.99
0.87
1.00
2.38
0.99
2.92
1.00
1.11
3.08
9.04
f1 (ppm)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120.5376
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116.2796
114.0184
113.7411
102.2811
59.9904
55.6318
45.3028
43.9289
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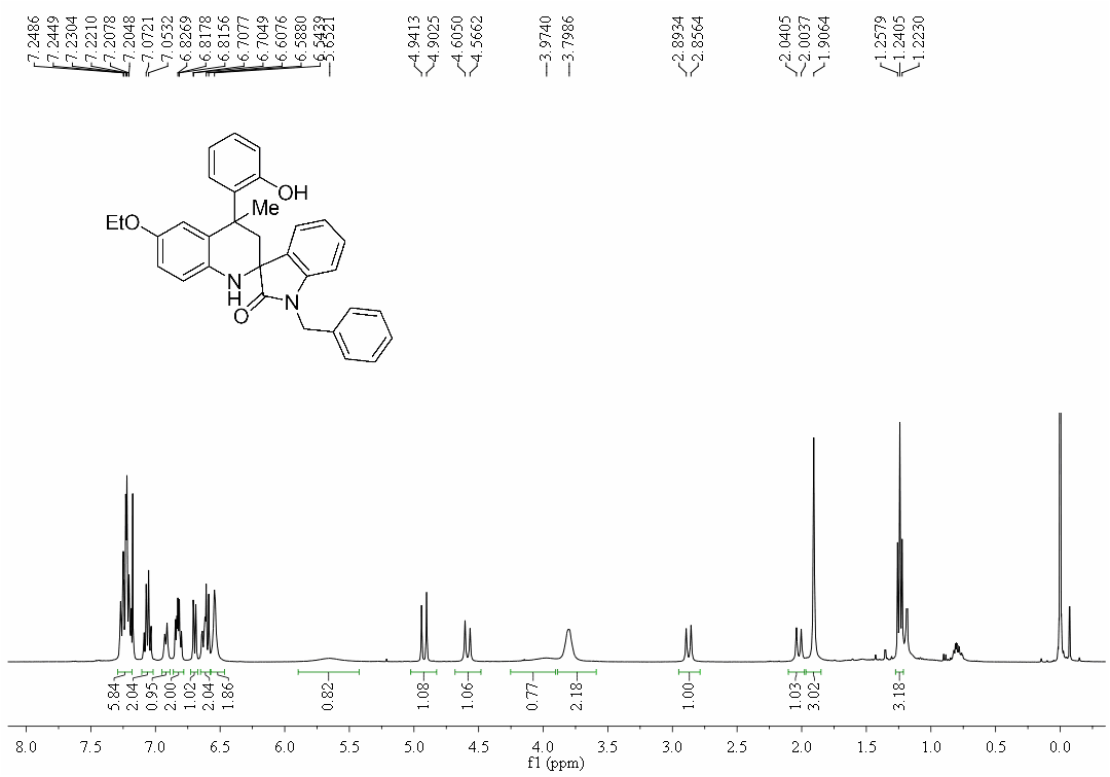
29.0884
OH
Me
MeO
N
H
O
N
Br
f1 (ppm)

4aba: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7.2210
7.2078
7.2048
7.0721
7.0532
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6.8178
6.8156
6.7077
6.7049
6.6076
6.5880
6.5439
6.5321
4.9413
4.9025
4.6050
4.5662
3.9740
3.7986
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2.0037
1.9064
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1.2405
1.2230
OH
Me
EtO
N
H
O
N
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0.95
2.00
1.02
2.04
1.86
0.82
1.08
1.06
0.77
2.18
1.00
1.03
3.02
3.18
8.0
7.5
7.0
6.5
6.0
5.5
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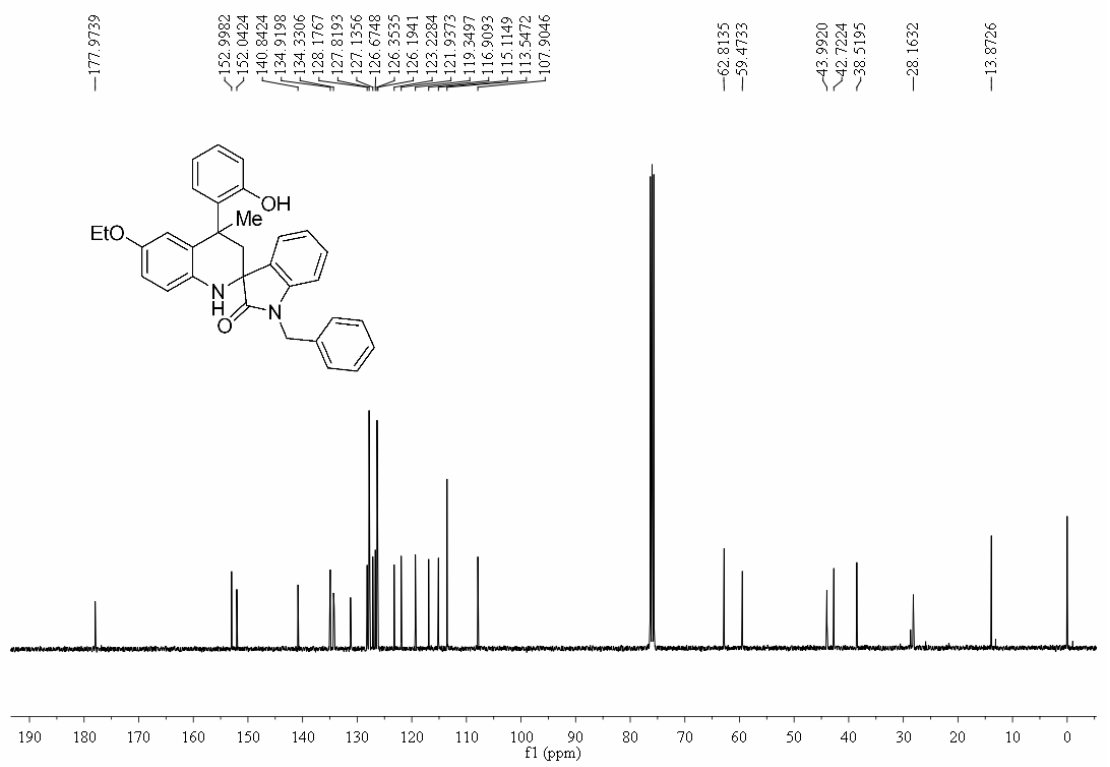
f1 (ppm)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126.1941
123.2284
121.9373
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115.1149
113.5472
107.9046
62.8135
59.4733
43.9920
42.7224
38.5195
28.1632
13.8726
OH
Me
EtO
N
H
O
N
190
180
170
160
150
140
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110
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90
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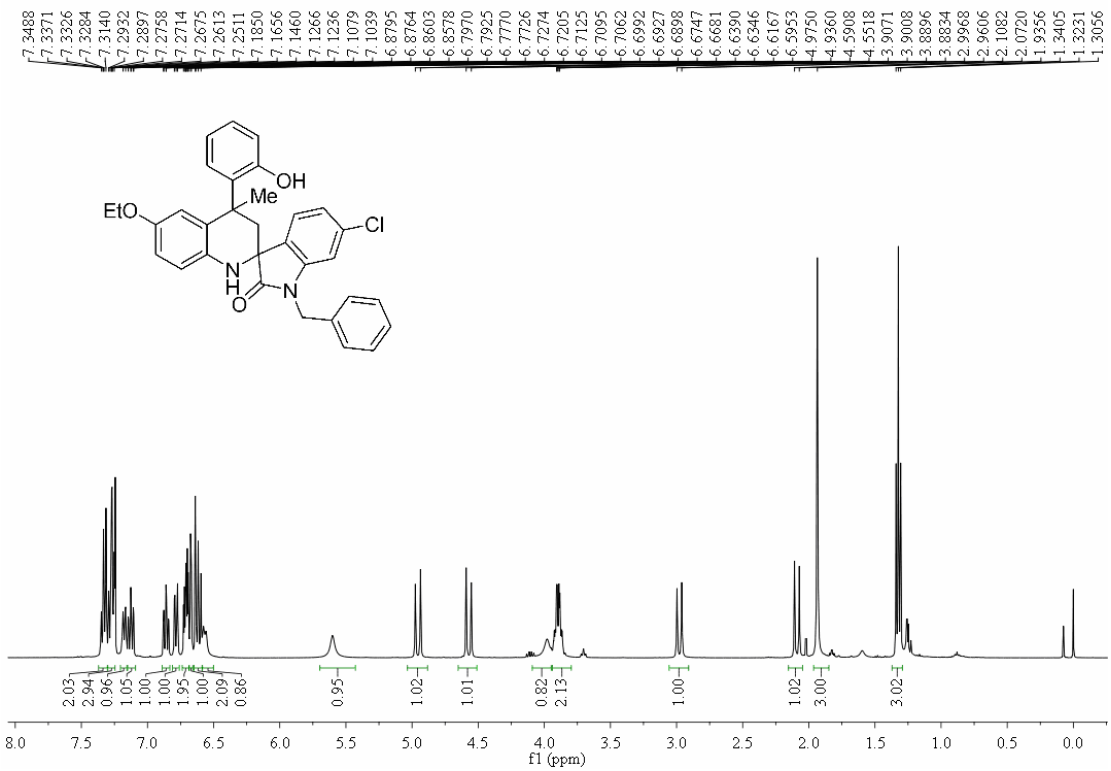
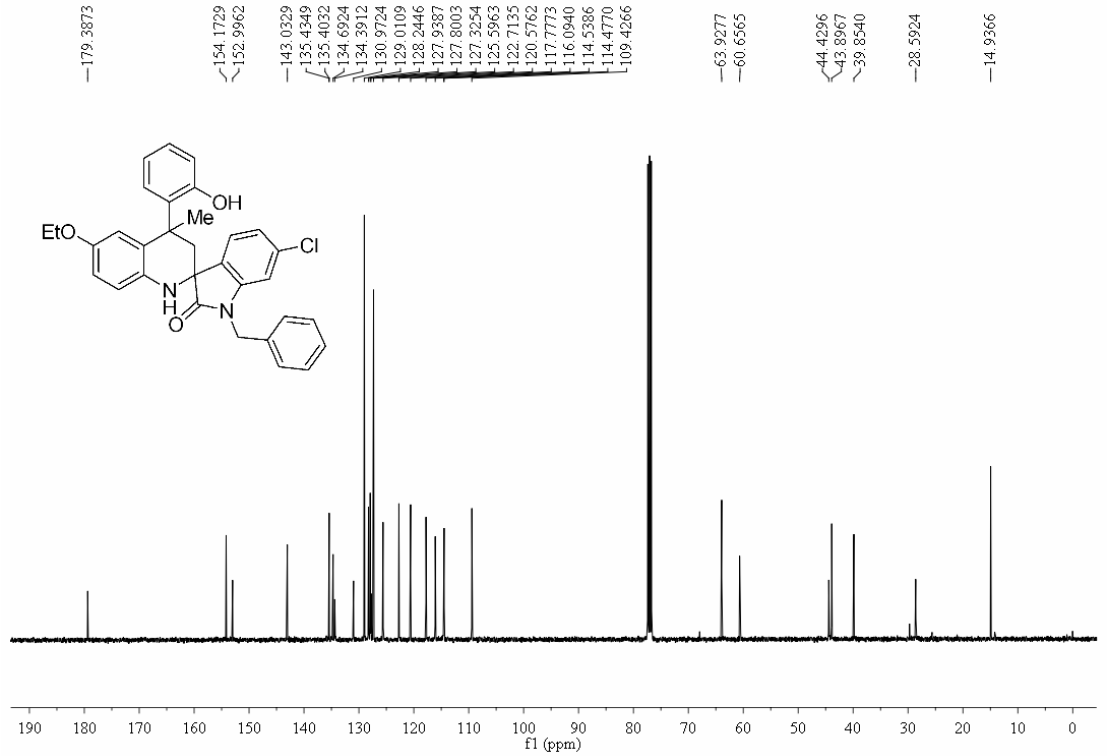
4hba:





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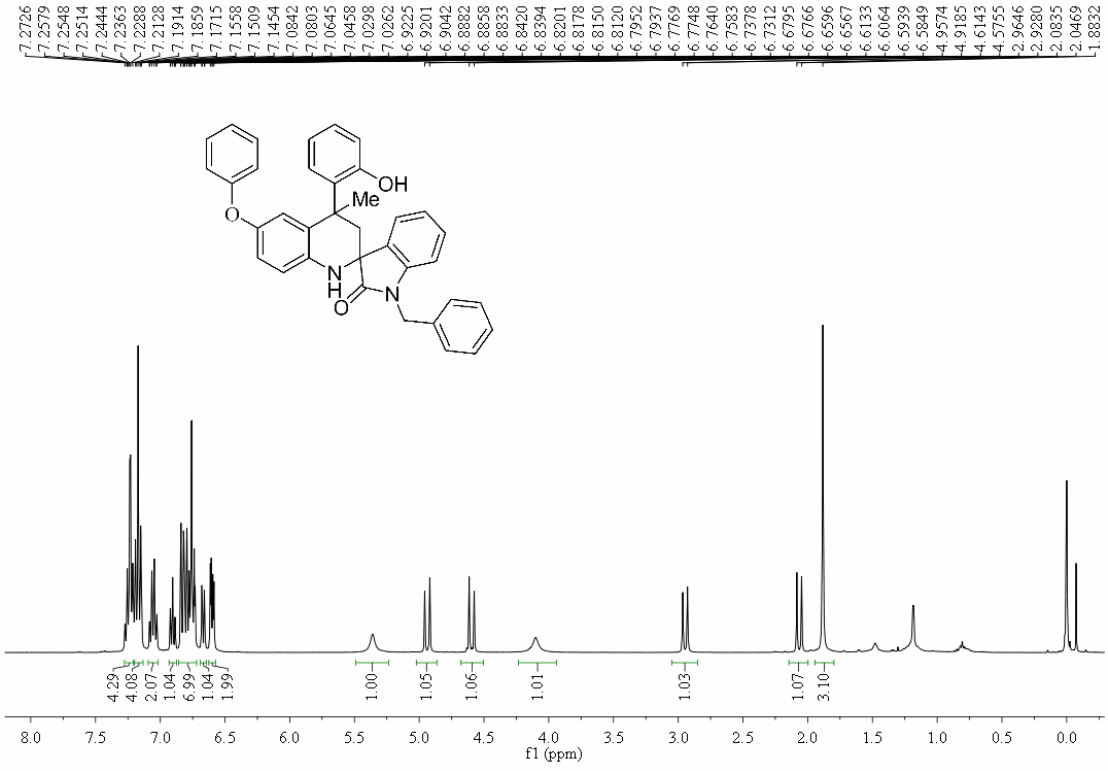
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7.1914
7.1859
7.1715
7.1558
7.1509
7.1454
7.0842
7.0803
7.0645
7.0458
7.0298
7.0262
6.9225
6.9201
6.9042
6.8882
6.8858
6.8833
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6.8201
6.8178
6.8150
6.8120
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6.7937
6.7769
6.7748
6.7640
6.7583
6.7378
6.7312
6.6795
6.6766
6.6596
6.6567
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6.6064
6.5939
6.5849
4.9574
4.9185
4.6143
4.5755
2.9646
2.9280
2.0835
2.0469
1.8832
OH
Me
O
N
H
O
N
4.29
4.08
2.07
1.04
6.99
1.04
1.99
1.00
1.05
1.06
1.01
1.03
1.07
3.10
8.0
7.5
7.0
6.5
6.0
5.5
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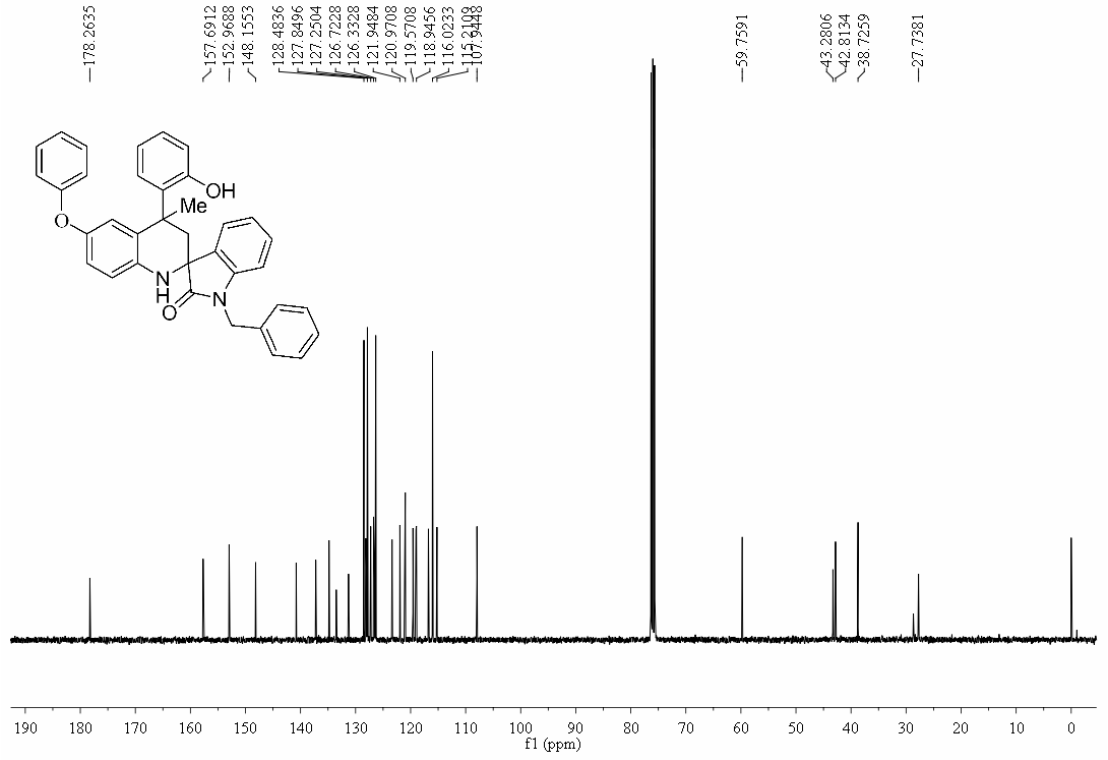
f1 (ppm)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118.9456
116.0233
59.7591
43.2806
42.8134
38.7259
27.7381
OH
Me
O
N
H
O
N
190
180
170
160
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110
100
90
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70
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50
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30
20
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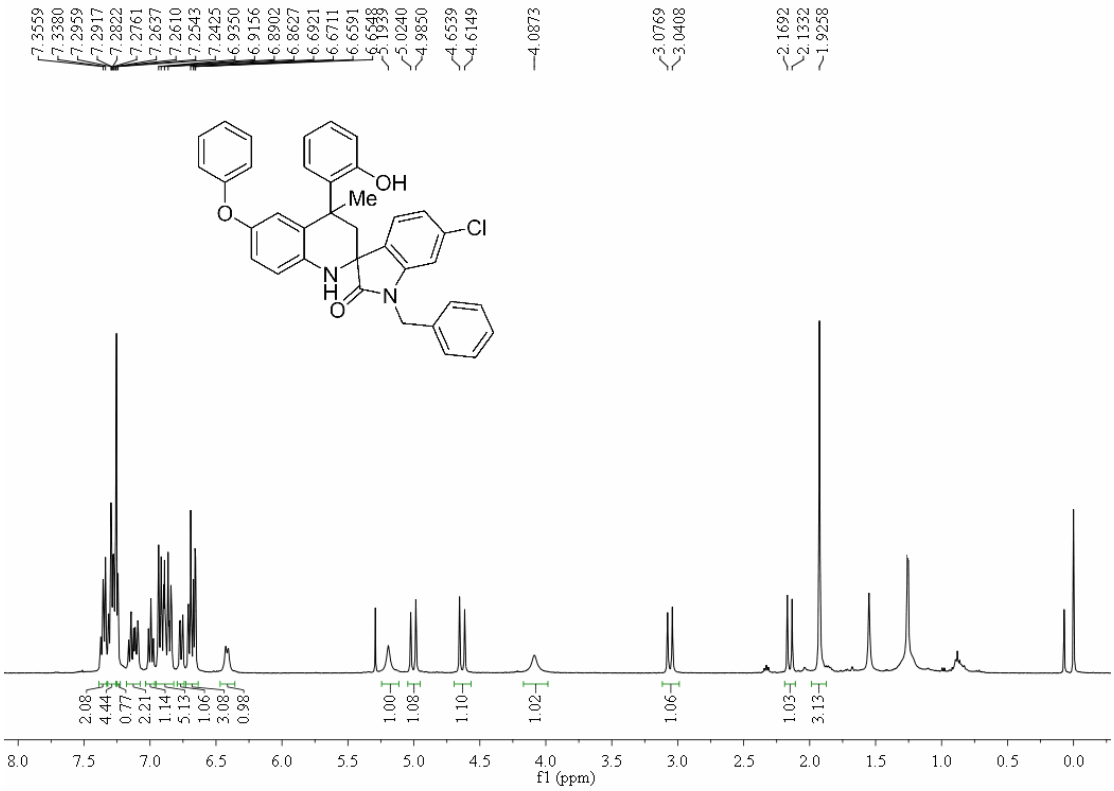
f1 (ppm)

4hca: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7.2610
7.2543
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6.9156
6.8902
6.8627
6.6921
6.6711
6.6591
6.6548
5.1959
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4.6539
4.6149
4.0873
3.0769
3.0408
2.1692
2.1332
1.9258
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Me
O
Cl
N
H
O
N
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4.44
0.77
2.21
1.14
5.13
1.06
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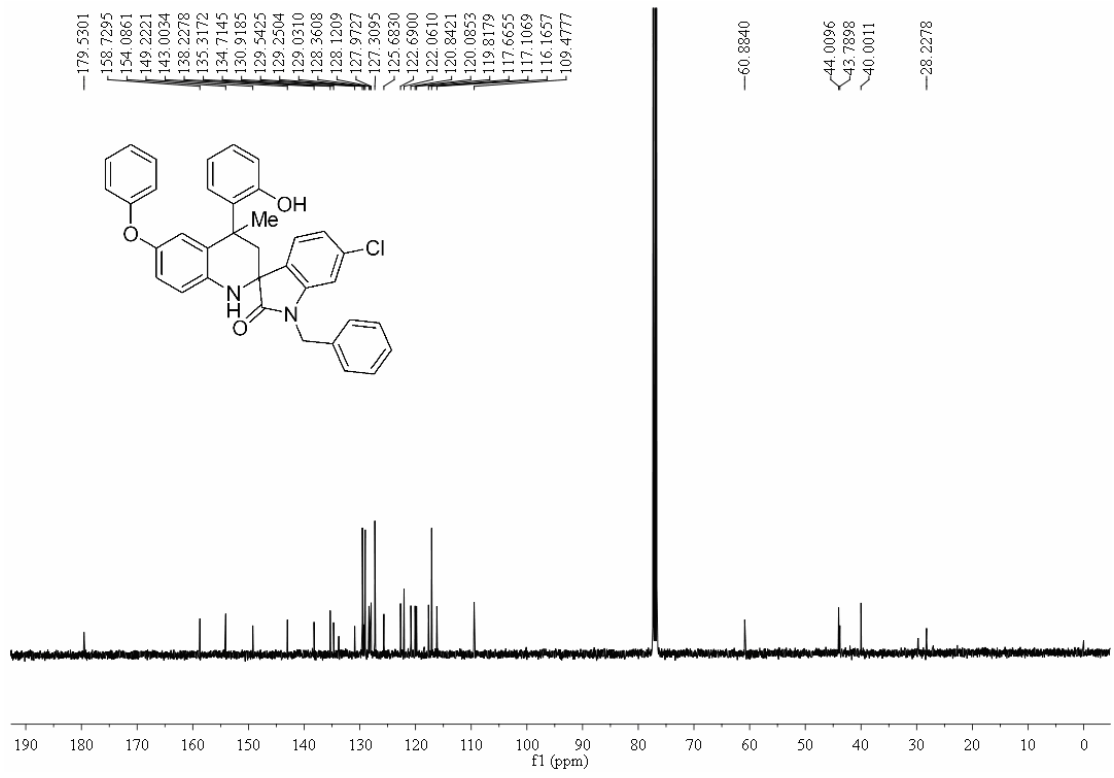
0.98
1.00
1.08
1.10
1.02
1.06
1.03
3.13
f1 (ppm)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129.0310
128.3608
128.1209
127.9727
127.3095
125.6830
122.6900
122.0610
120.8421
120.0853
119.8179
117.6655
117.1069
116.1657
109.4777
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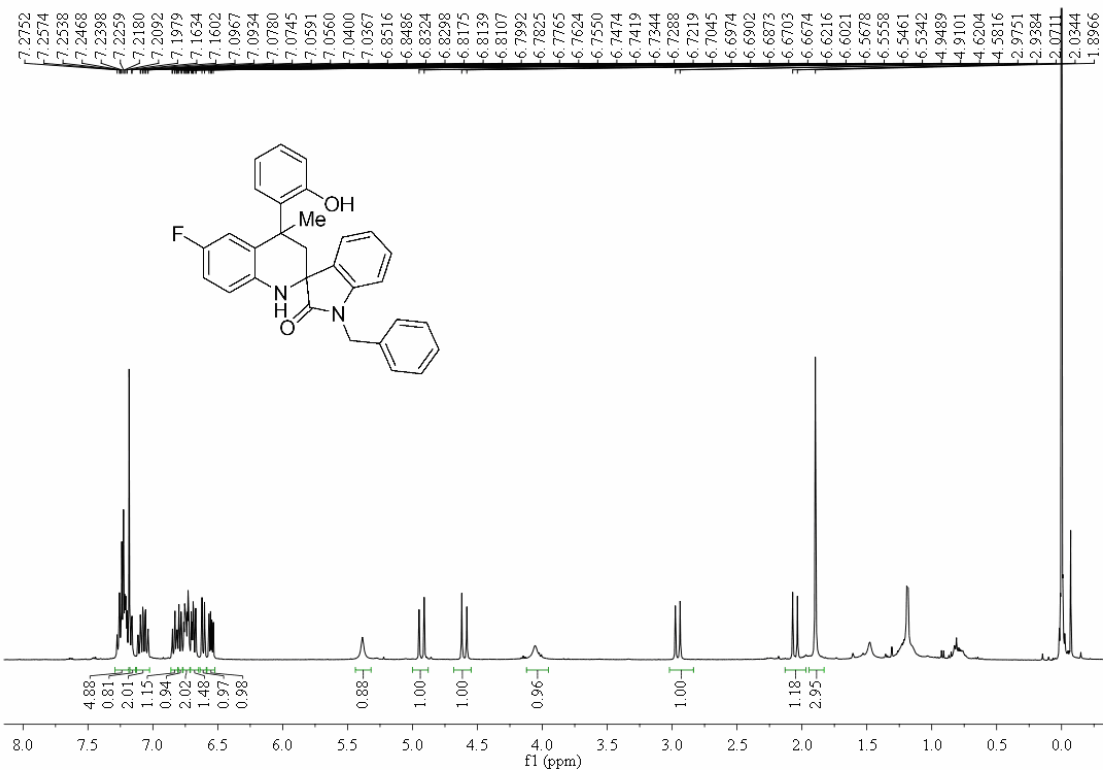
OH
Me
O
Cl
N
H
O
N
f1 (ppm)

4ada: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7.1602
7.0967
7.0934
7.0780
7.0745
7.0591
7.0560
7.0400
7.0367
6.8516
6.8486
6.8324
6.8298
6.8175
6.8139
6.8107
6.7992
6.7825
6.7765
6.7624
6.7550
6.7474
6.7419
6.7344
6.7288
6.7219
6.7045
6.6974
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6.6873
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6.6216
6.6021
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6.5461
6.5342
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4.6204
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2.0711
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Me
F
N
H
O
N
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2.01
1.15
0.94
2.02
1.48
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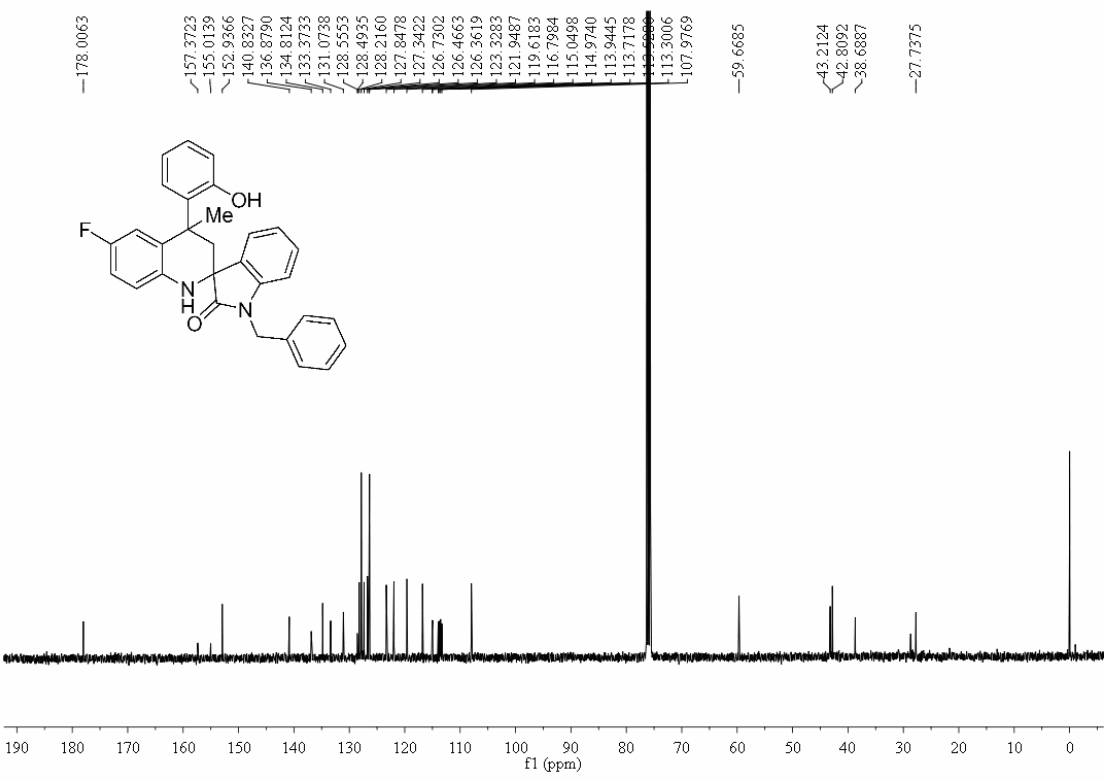
0.98
0.88
1.00
1.00
0.96
1.00
1.18
2.95
f1 (ppm)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128.2160
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127.3422
126.7302
126.4663
126.3619
123.3283
121.9487
119.6183
116.7984
115.0498
114.9740
113.9445
113.7178
113.3006
107.9769
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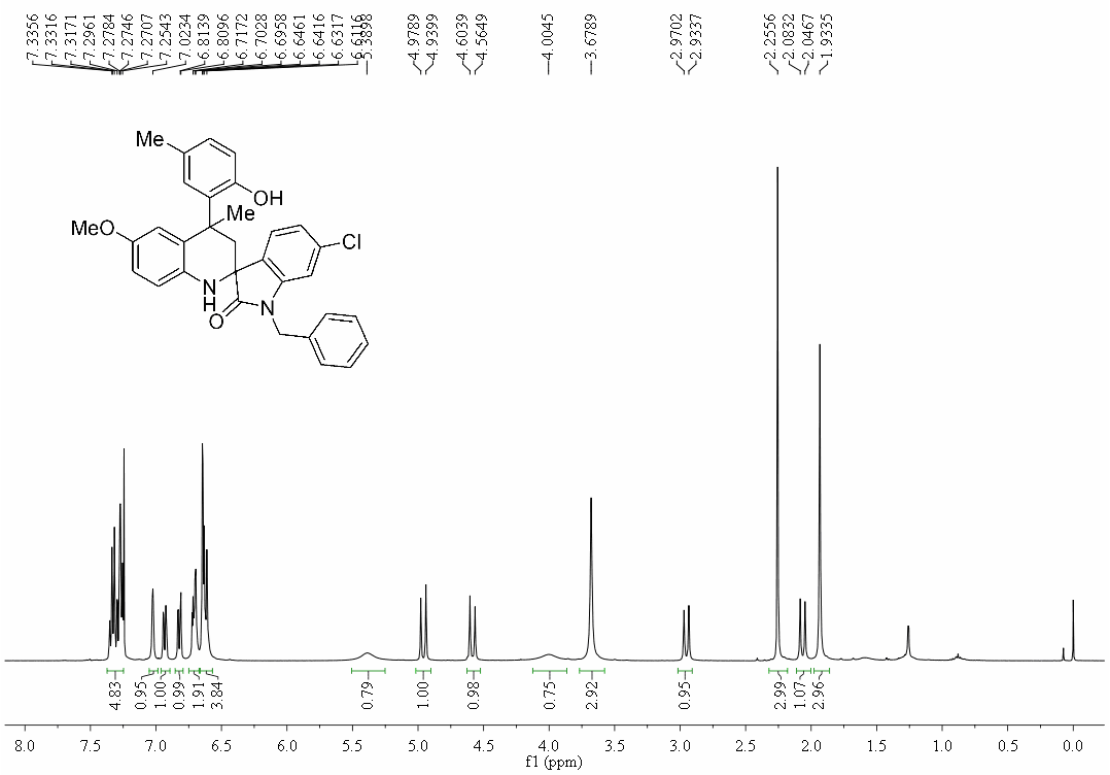
OH
Me
F
N
H
O
N
f1 (ppm)

4hab: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7.2961
7.2784
7.2746
7.2707
7.2543
7.0234
6.8139
6.8096
6.7172
6.7028
6.6958
6.6461
6.6416
6.6317
6.6116
5.5898
4.9789
4.9399
4.6039
4.5649
4.0045
3.6789
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2.2556
2.0832
2.0467
1.9335
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OH
Me
MeO
Cl
N
H
O
N
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1.00
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1.91
3.84
0.79
1.00
0.98
0.75
2.92
0.95
2.99
1.07
2.96
8.0
7.5
7.0
6.5
6.0
5.5
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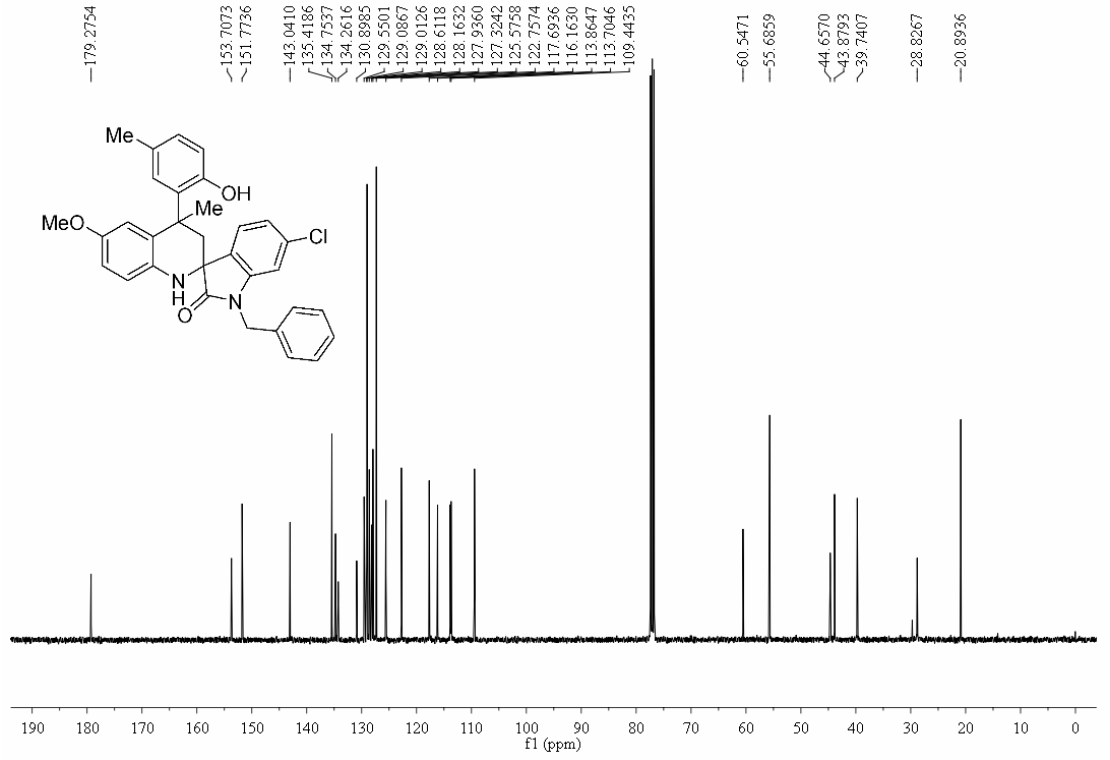
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)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127.3242
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122.7574
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116.1630
113.8647
113.7046
109.4435
60.5471
55.6859
44.6570
43.8793
39.7407
28.8267
20.8936
Me
OH
Me
MeO
Cl
N
H
O
N
190
180
170
160
150
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110
100
90
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70
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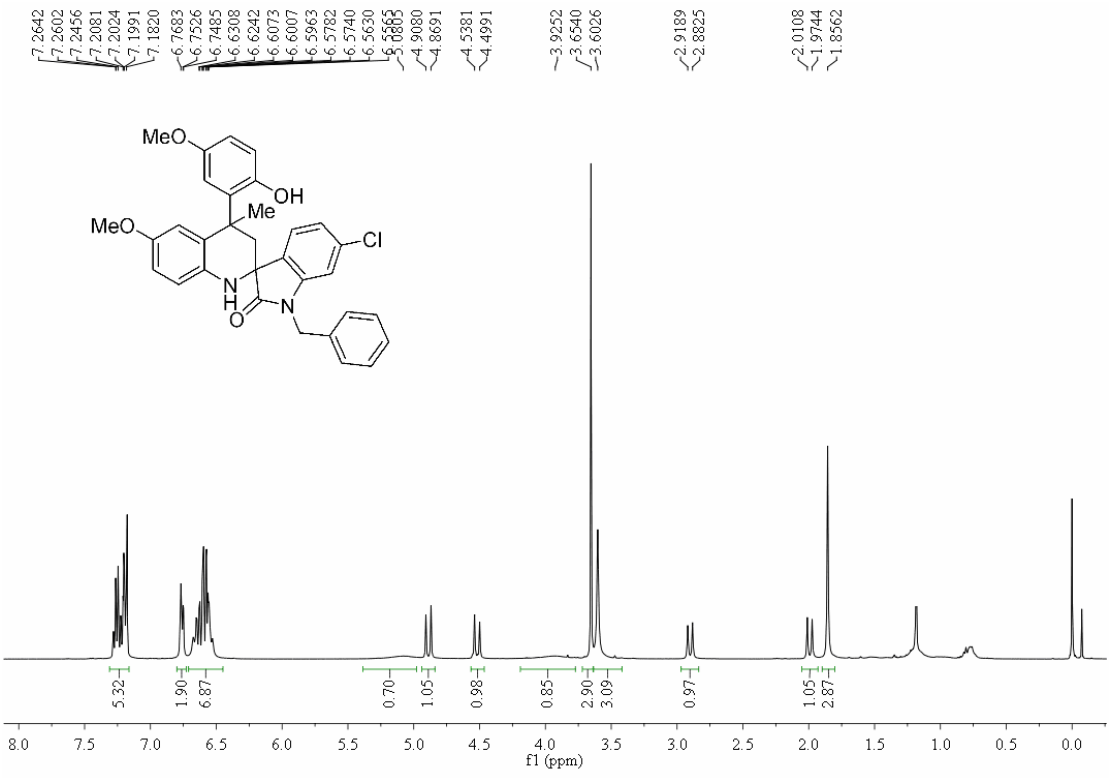
50
40
30
20
10
0
f1 (ppm)

4hac: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6.6242
6.6073
6.6007
6.5963
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6.5740
6.5630
6.5565
5.0805
4.9080
4.8691
4.5381
4.4991
3.9252
3.6540
3.6026
2.9189
2.8825
2.0108
1.9744
1.8562
MeO
OH
Me
MeO
Cl
N
H
O
N
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1.90
6.87
0.70
1.05
0.98
0.85
2.90
3.09
0.97
1.05
2.87
8.0
7.5
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6.5
6.0
5.5
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2.5
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1.0
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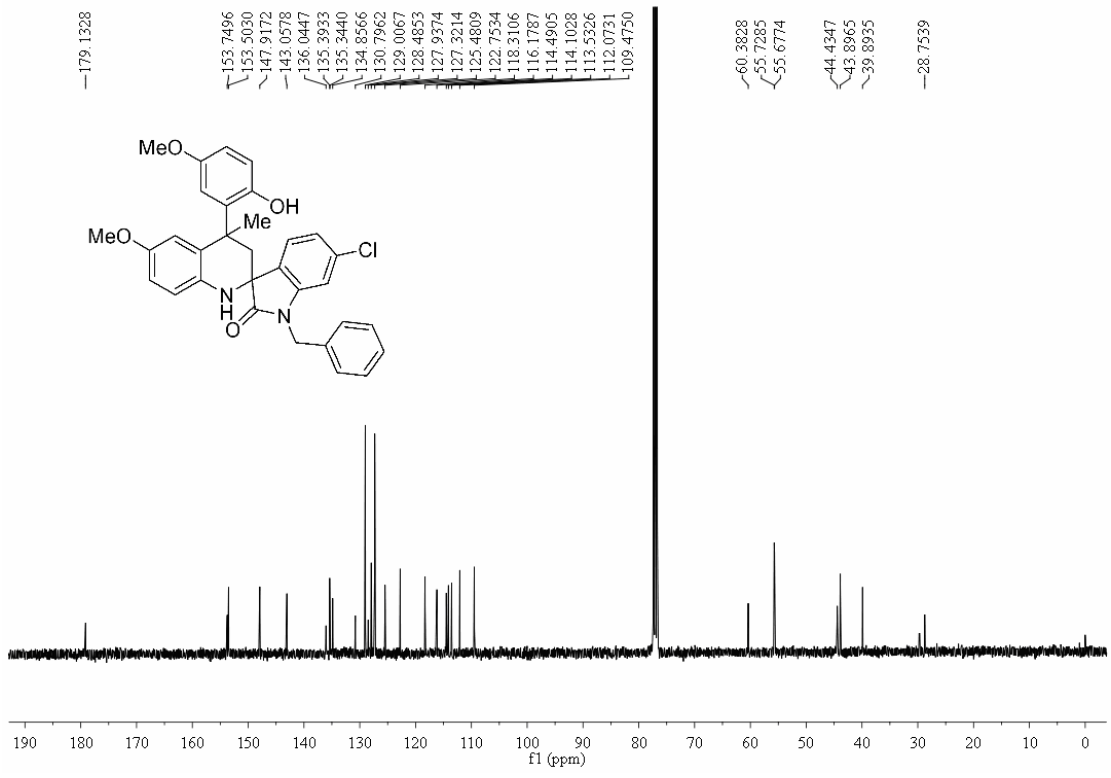
f1 (ppm)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127.9374
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125.4809
122.7534
118.3106
116.1787
114.4905
114.1028
113.5326
112.0731
109.4750
60.3828
55.7285
55.6774
44.4347
43.8965
39.8935
28.7539
MeO
OH
Me
MeO
Cl
N
H
O
N
190
180
170
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150
140
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110
100
90
80
70
60
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40
30
20
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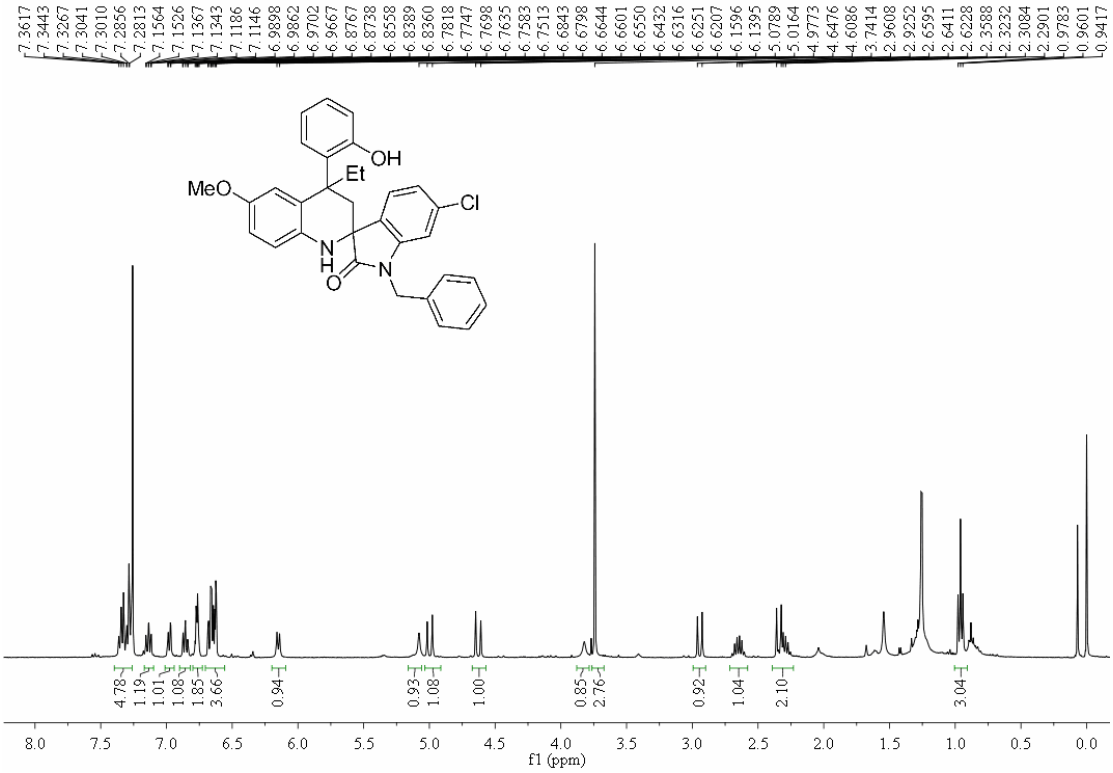
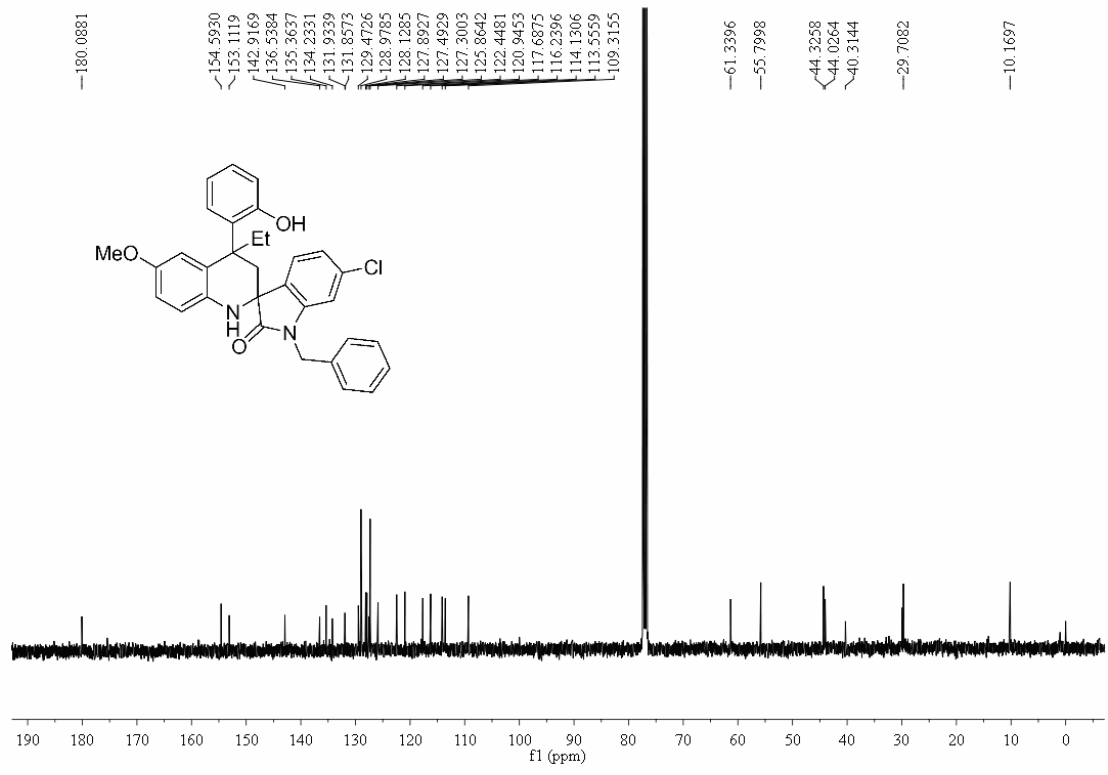
0
f1 (ppm)

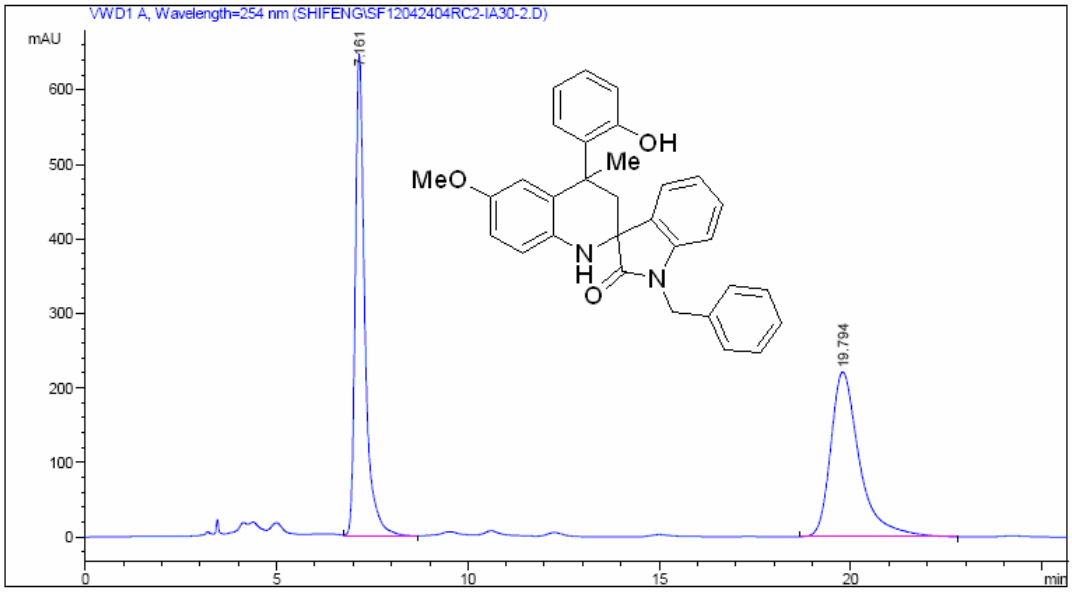
4had:



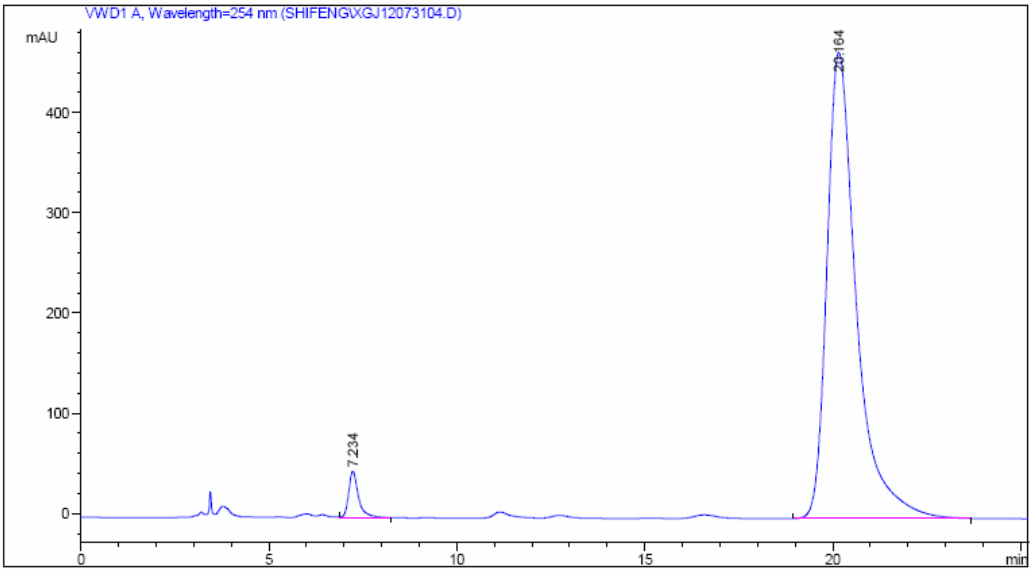


HPLC spectra:

4aaa:

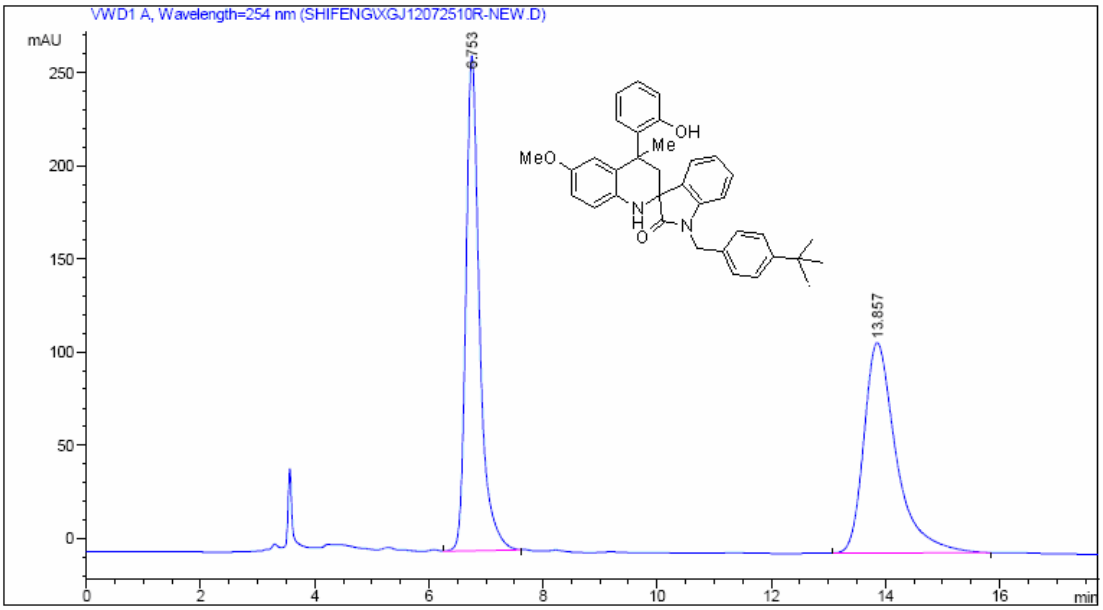


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	7.161	VB	0.2629	1.14227e4	646.67975	49.7243
2	19.794	BB	0.7856	1.15494e4	221.08044	50.2757

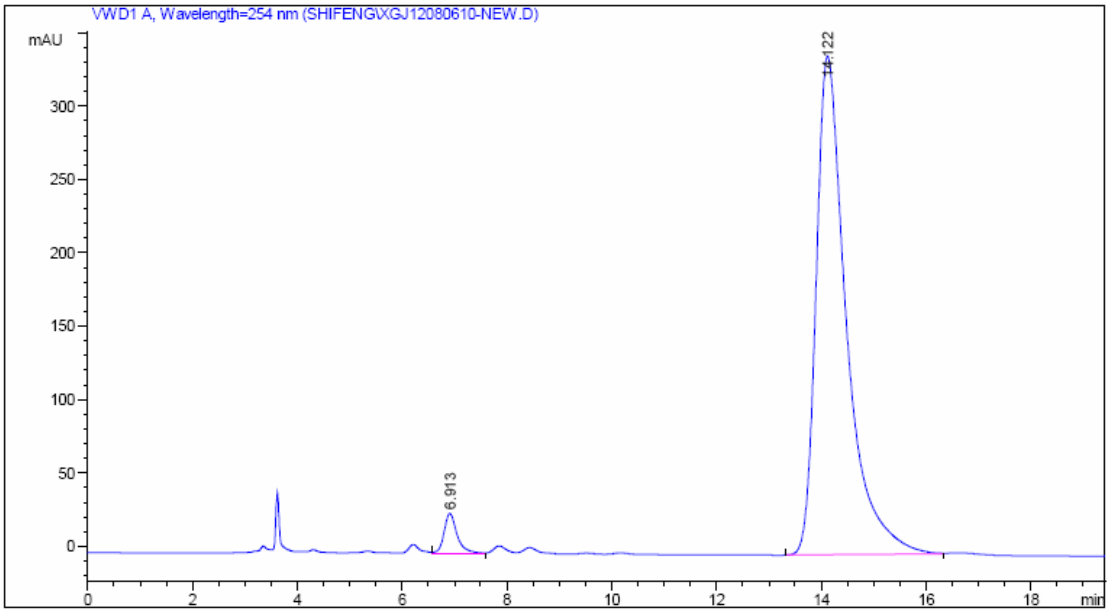


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	7.234	VB	0.2731	848.18585	46.36732	3.2455
2	20.164	BB	0.8153	2.52861e4	464.72803	96.7545

4baa:

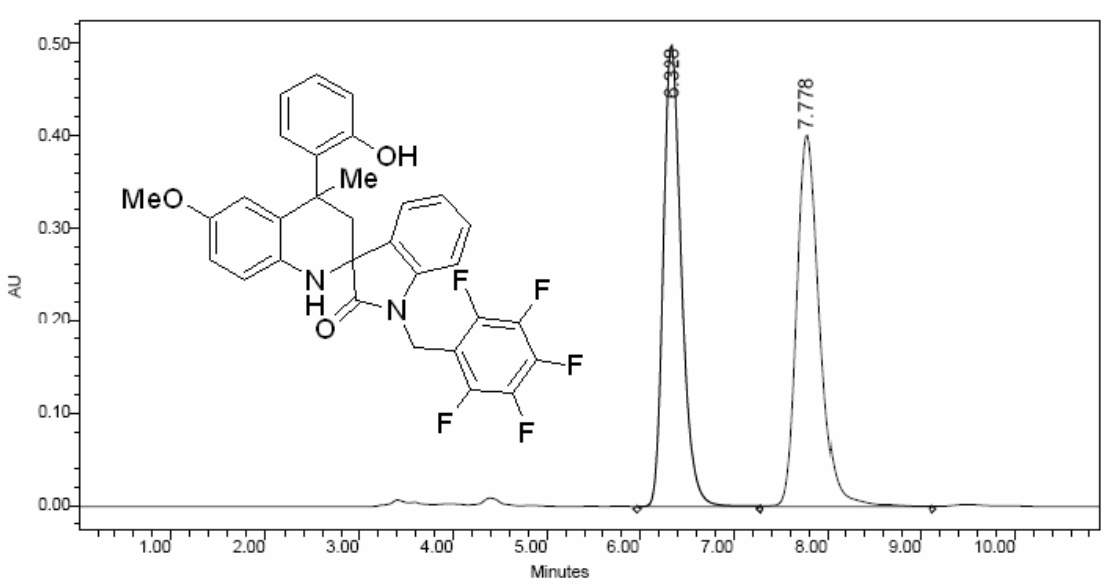


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	6.753	VB	0.2492	4409.60400	265.42545	49.8776
2	13.857	BB	0.5880	4431.24072	112.78421	50.1224

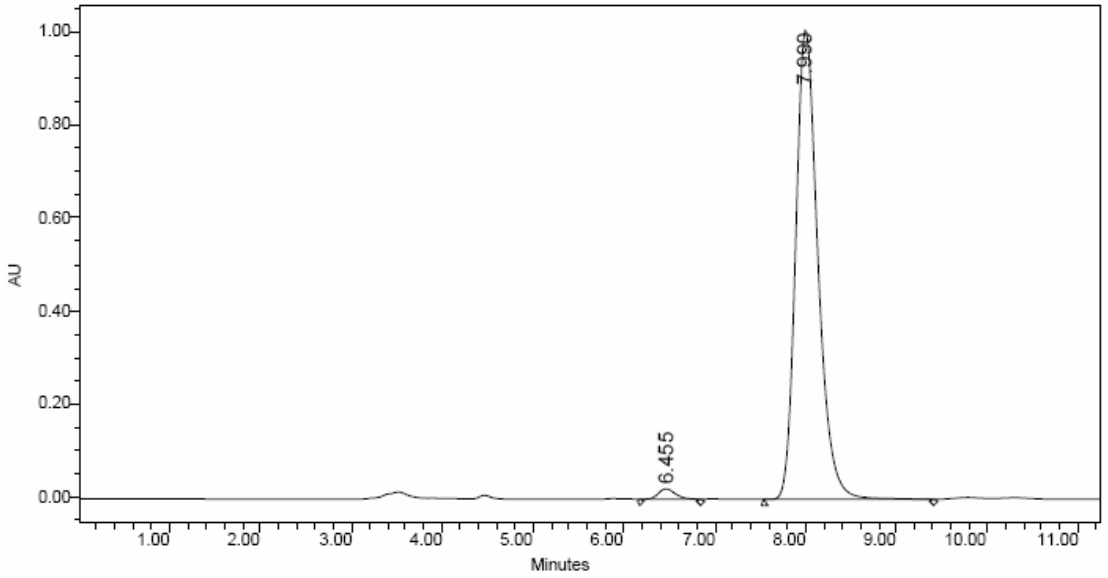


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	6.913	VV	0.2619	480.45935	27.32174	3.4038
2	14.122	BB	0.5949	1.36349e4	339.70682	96.5962

4caa:

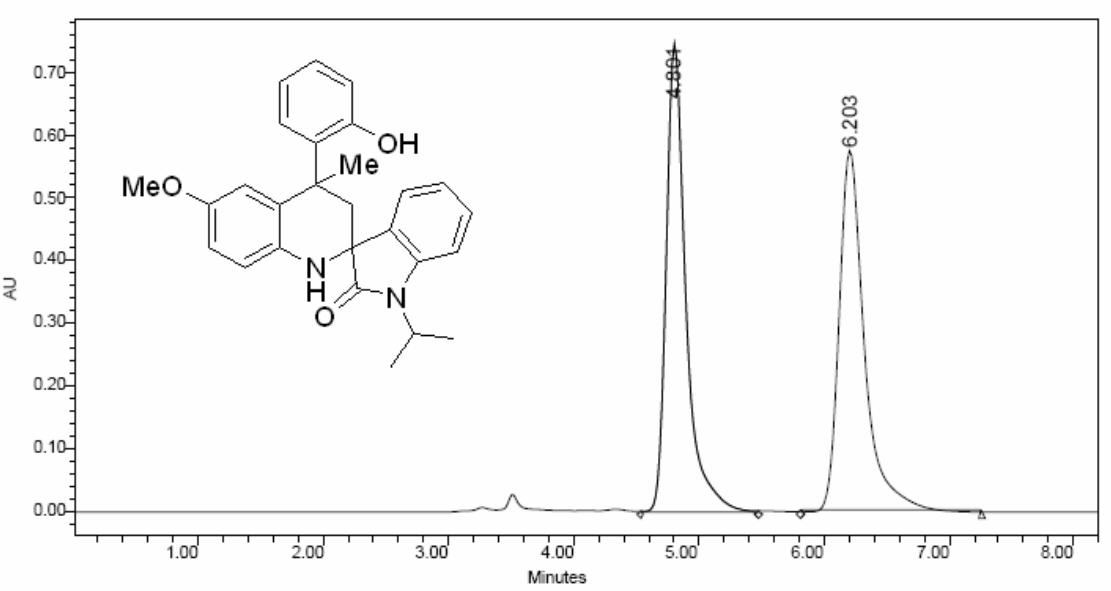


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	6.328	6742959	49.65	500611	55.43
2	7.778	6839331	50.35	402517	44.57

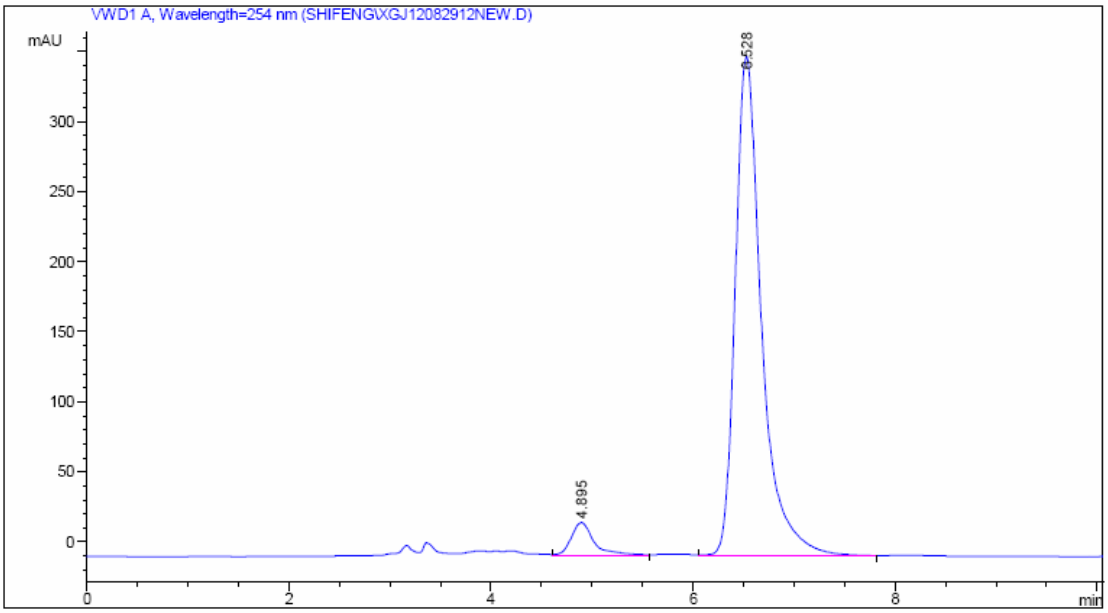


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	6.455	298993	1.71	22423	2.18
2	7.990	17173068	98.29	1008333	97.82

4daa:

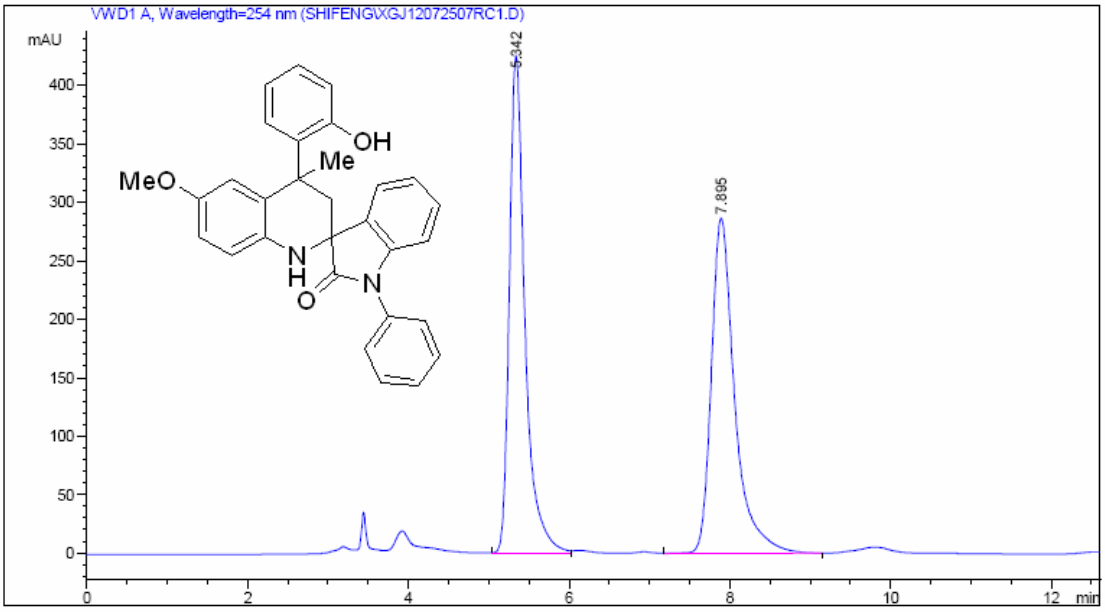


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	4.801	8180791	49.99	747165	56.40
2	6.203	8185383	50.01	577688	43.60

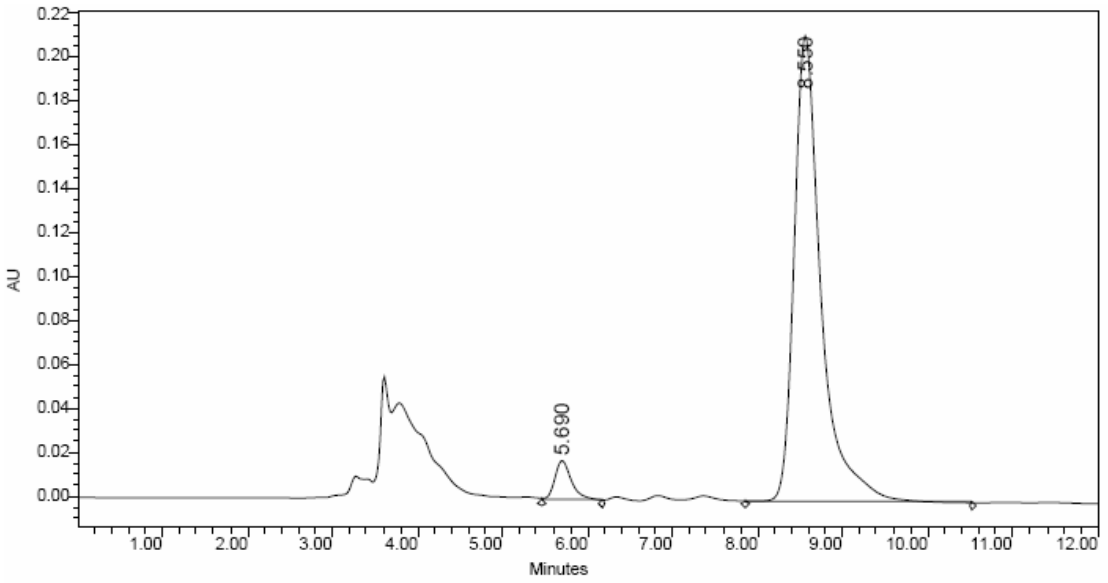


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	4.895	VB	0.2522	413.16541	24.12737	5.9762
2	6.528	VB	0.2738	6500.35254	356.64520	94.0238

4eaa:

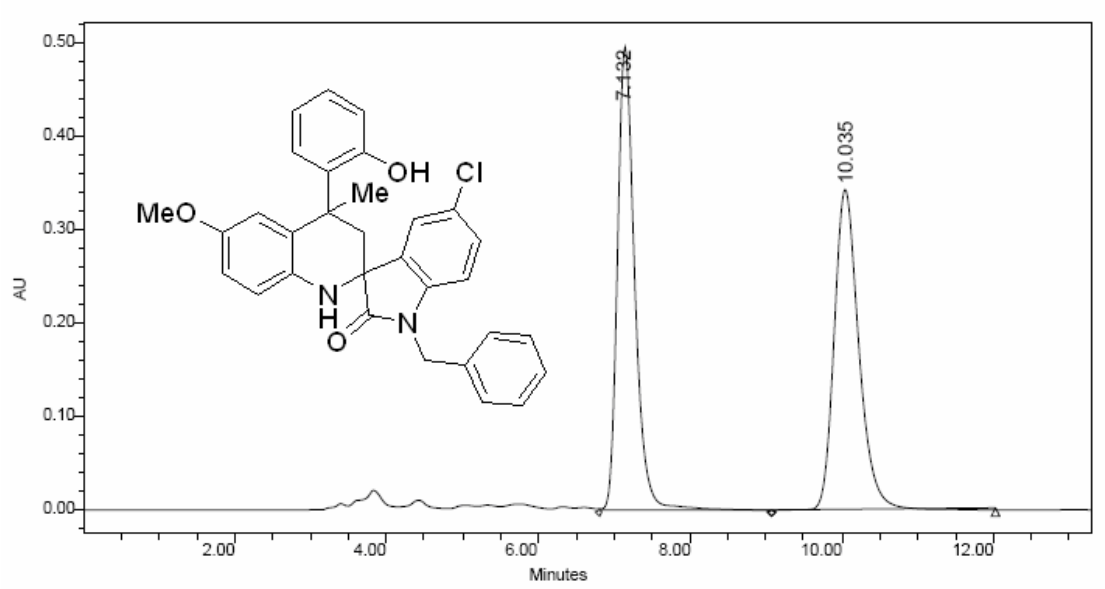


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	5.342	BV	0.2030	5755.00244	425.30197	49.8734
2	7.895	VB	0.3027	5784.21533	286.22736	50.1266

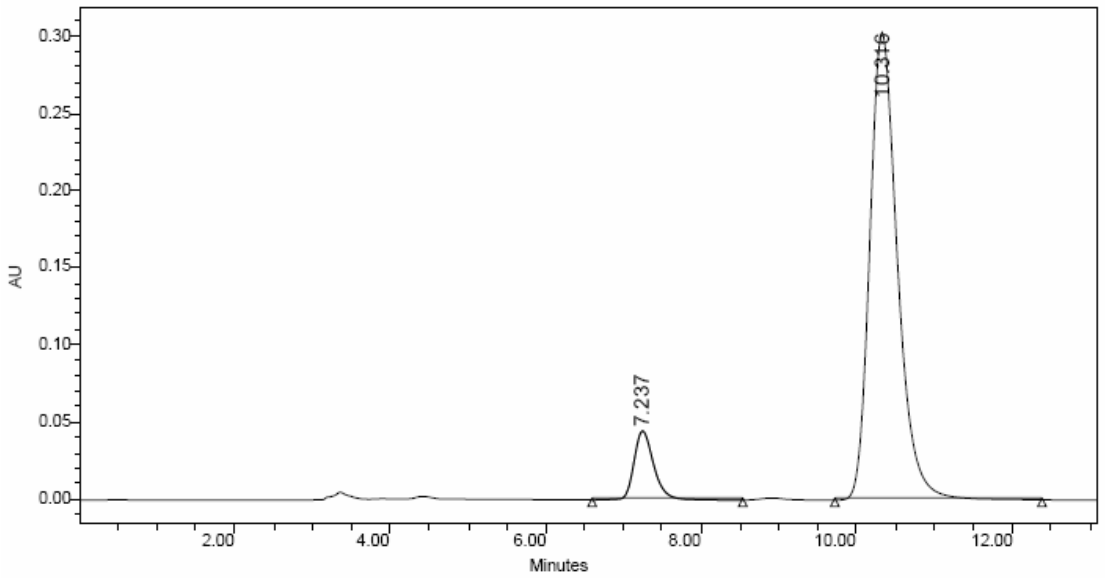


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	5.690	249682	5.04	17989	7.81
2	8.550	4702730	94.96	212361	92.19

4faa :

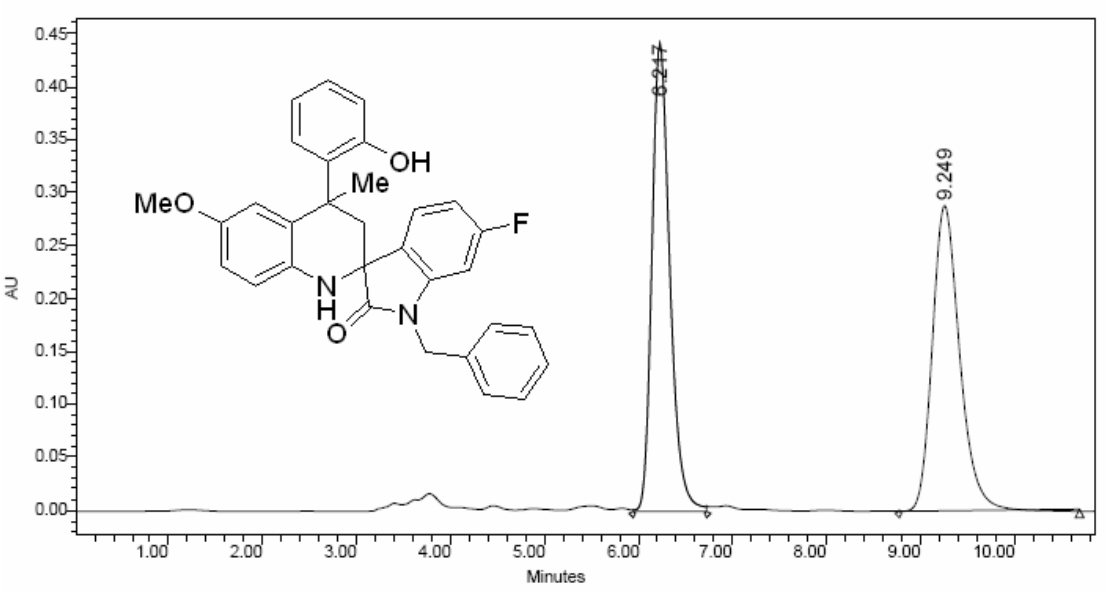


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	7.132	7864621	50.26	496061	59.08
2	10.035	7783909	49.74	343577	40.92

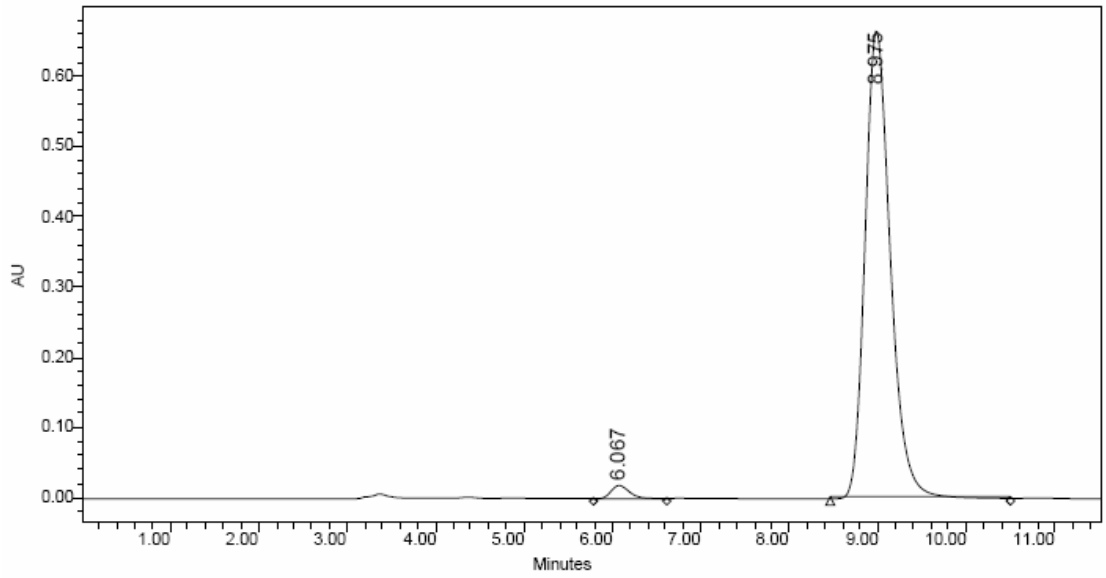


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	7.237	790576	9.52	44694	12.85
2	10.316	7511558	90.48	303050	87.15

4gaa :

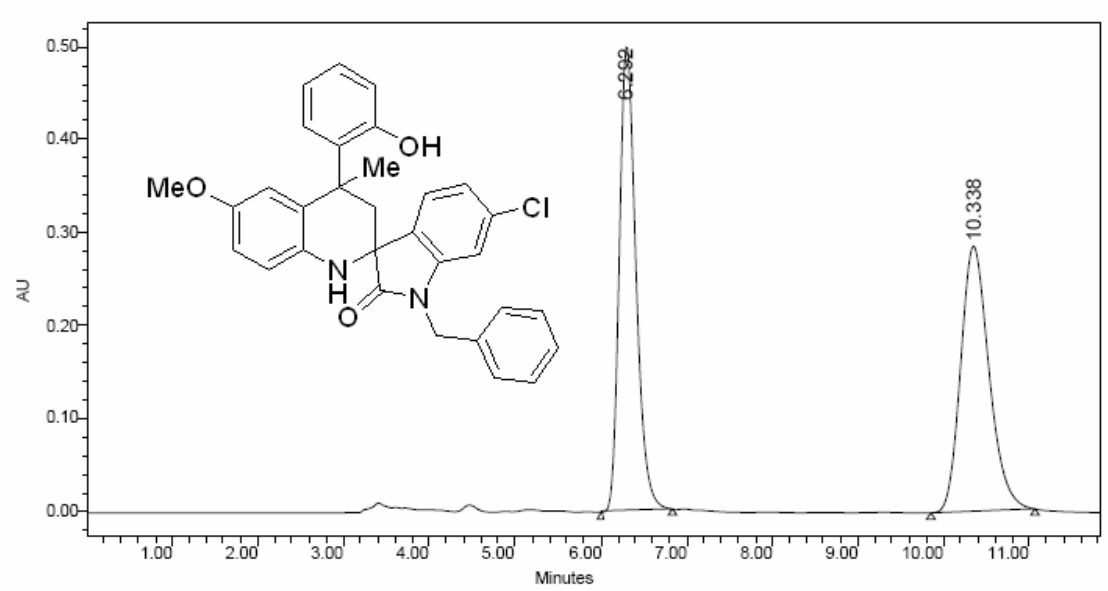


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	6.217	5873225	49.93	441767	60.48
2	9.249	5890138	50.07	288690	39.52

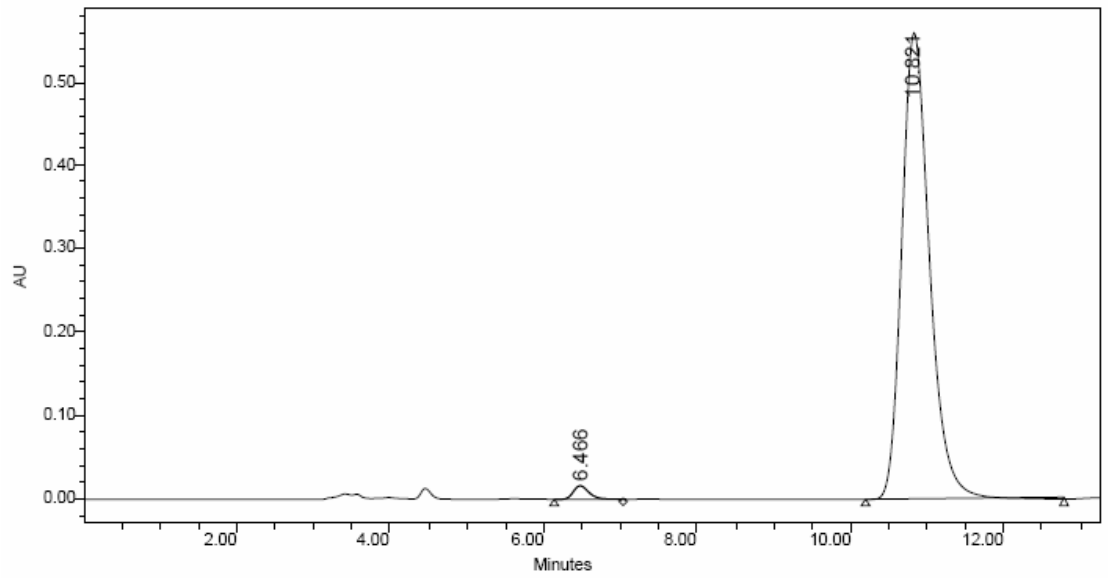


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	6.067	280912	2.07	18859	2.75
2	8.975	13313117	97.93	666514	97.25

4haa :

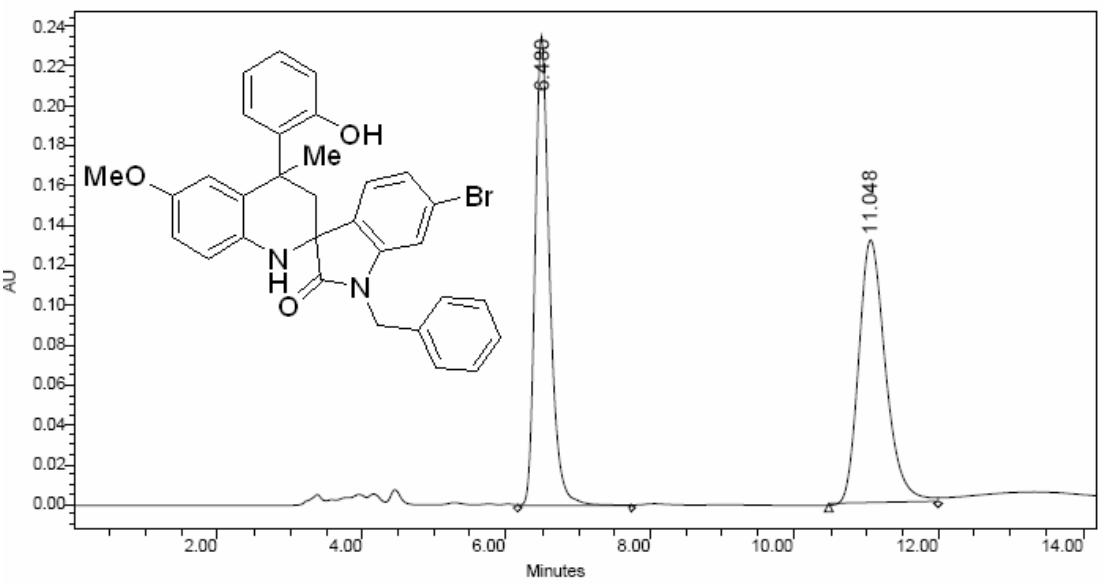


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	6.292	6734540	50.60	501018	63.70
2	10.338	6574040	49.40	285512	36.30

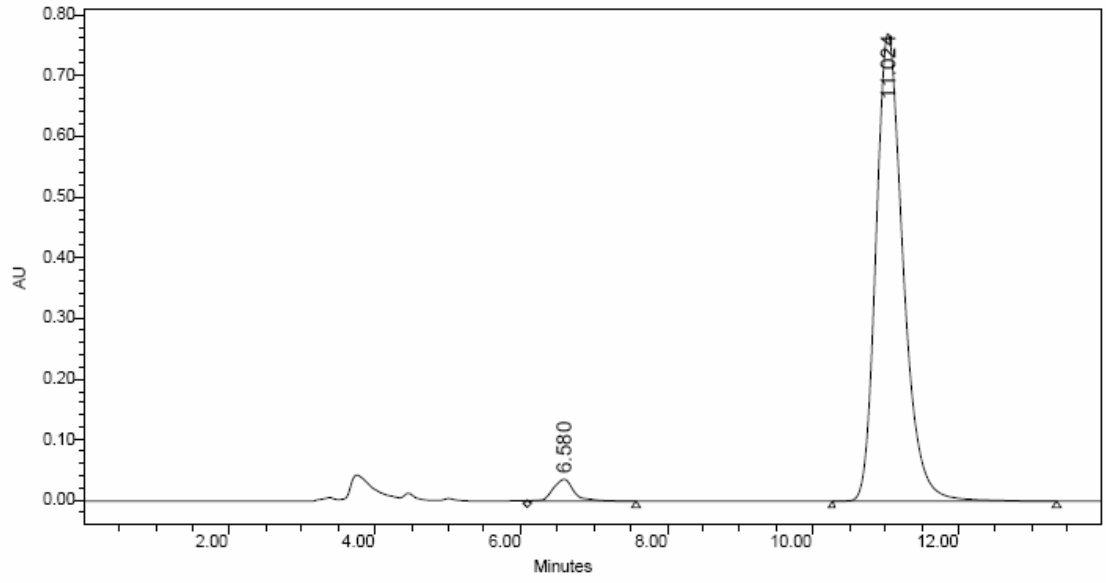


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	6.466	237407	1.65	16361	2.83
2	10.821	14170810	98.35	560888	97.17

4iaa:

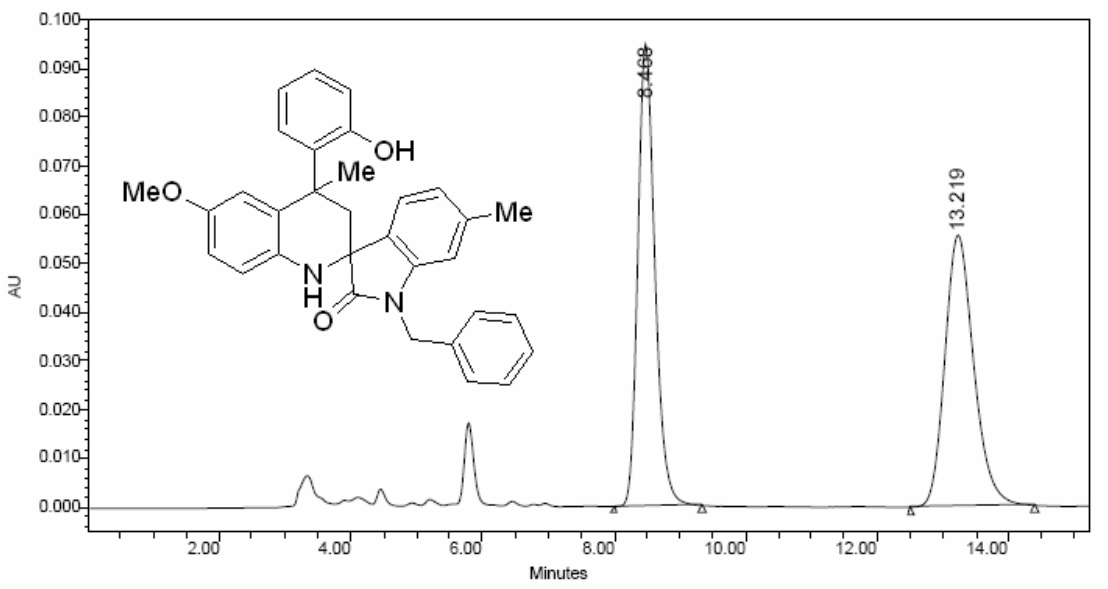


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	6.480	3319922	49.05	235869	64.01
2	11.048	3447835	50.95	132645	35.99

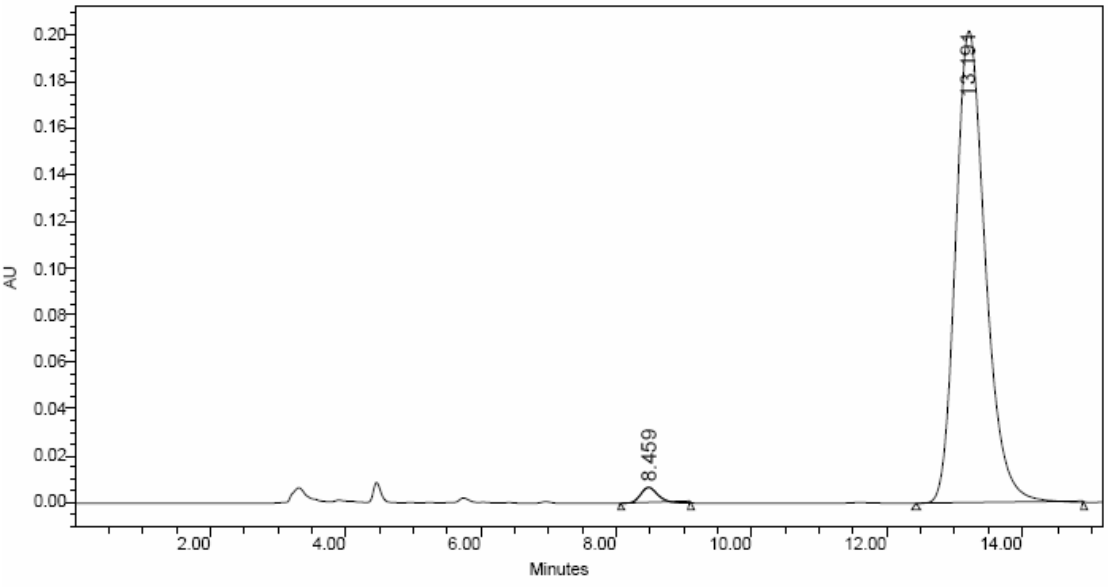


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	6.580	715957	3.47	36074	4.47
2	11.024	19900316	96.53	771004	95.53

4jaa :

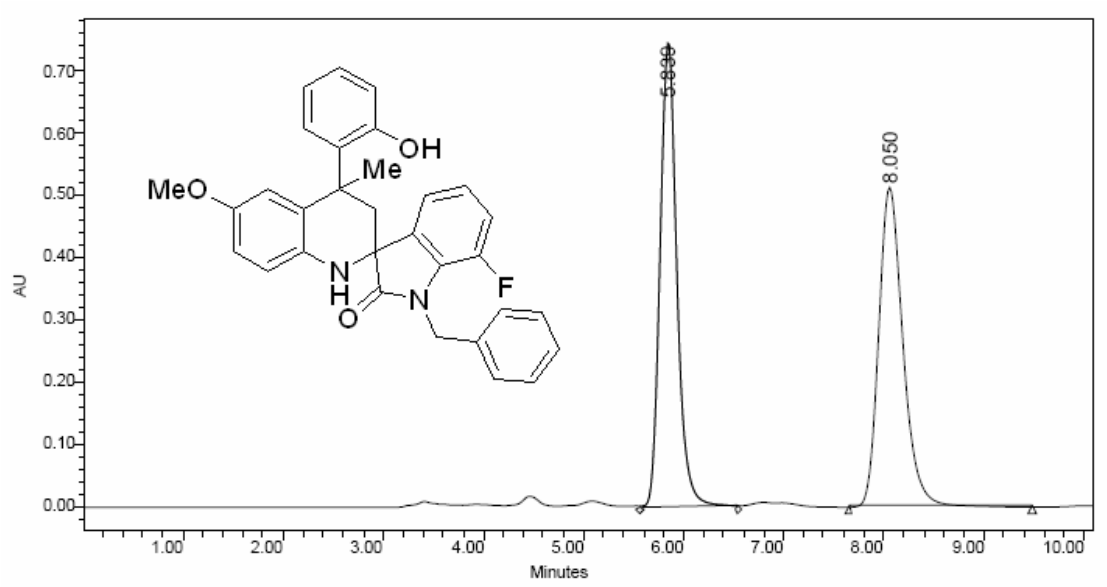


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	8.468	1711105	50.16	94723	63.00
2	13.219	1700112	49.84	55637	37.00

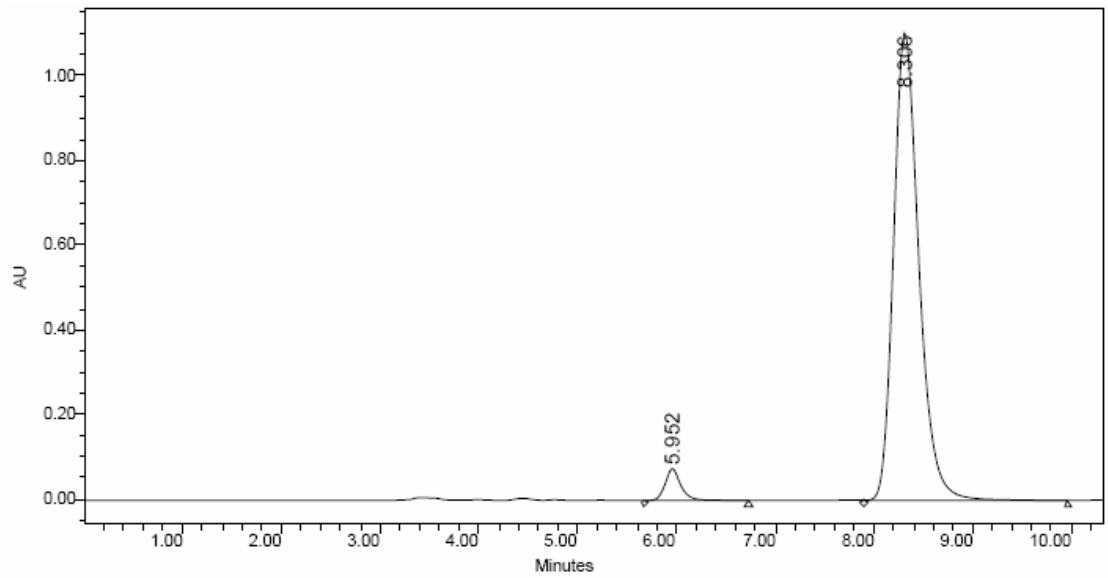


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	8.459	122448	1.94	6741	3.22
2	13.191	6195834	98.06	202431	96.78

4kaa :

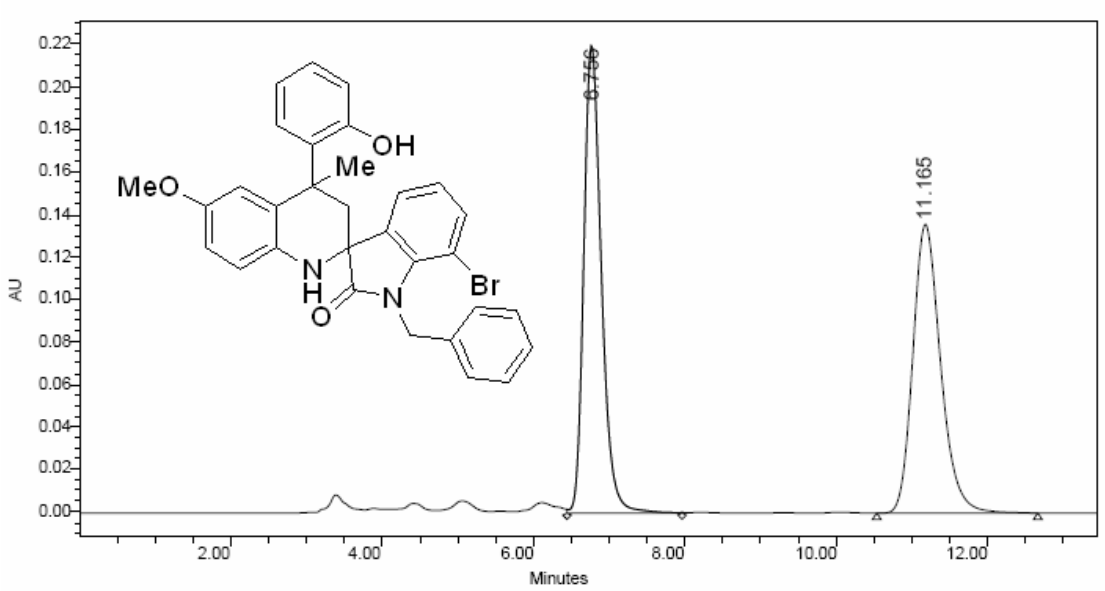


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	5.839	8753948	50.18	748271	59.26
2	8.050	8690981	49.82	514392	40.74

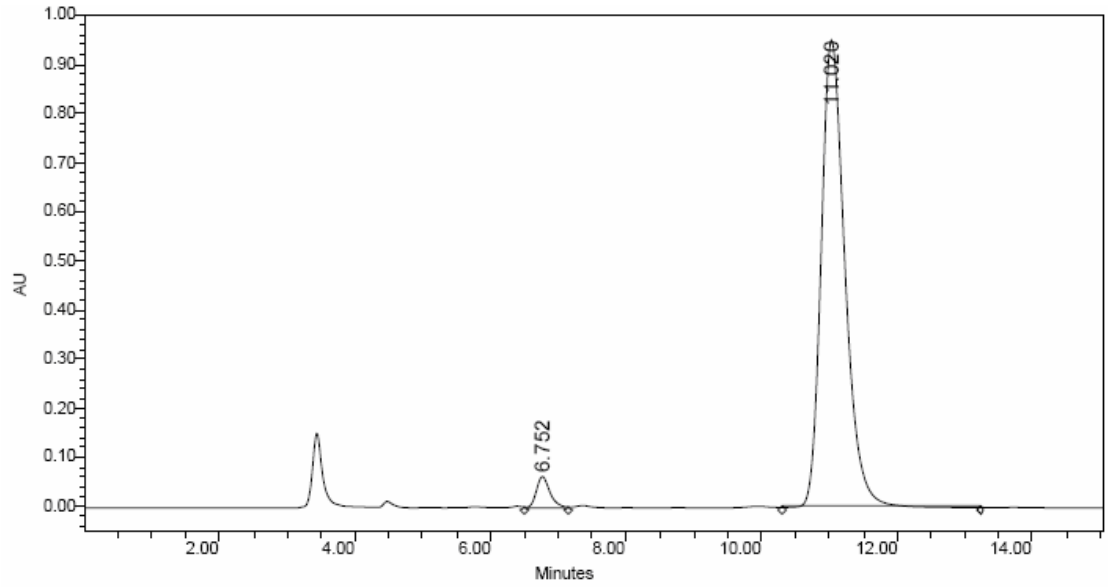


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	5.952	822908	4.02	75150	6.37
2	8.306	19670705	95.98	1104464	93.63

4laa :

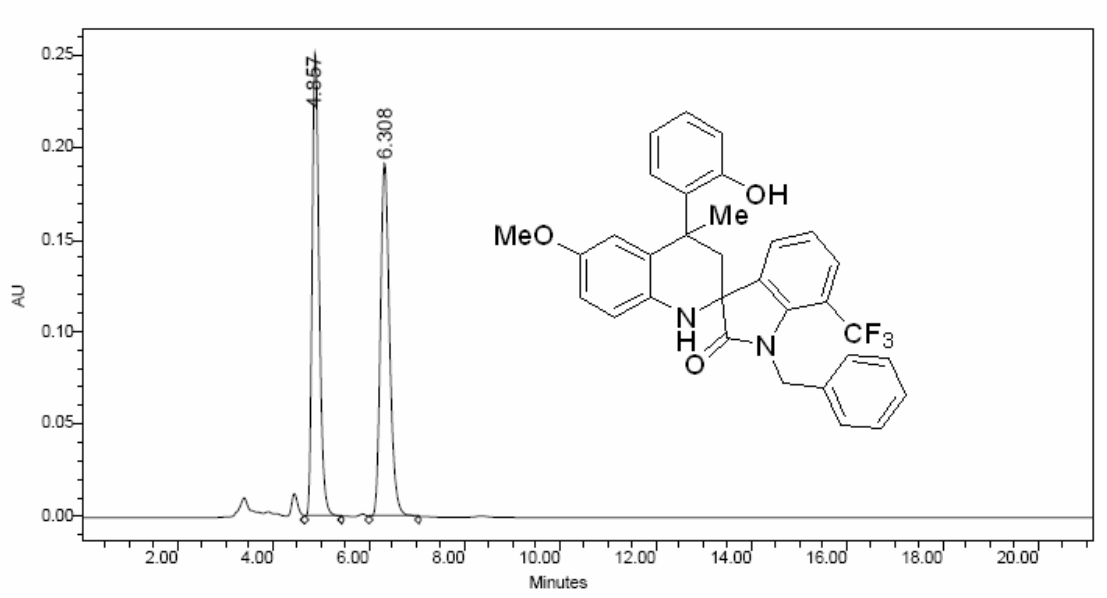


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	6.756	3550394	50.56	220257	61.83
2	11.165	3472259	49.44	135974	38.17

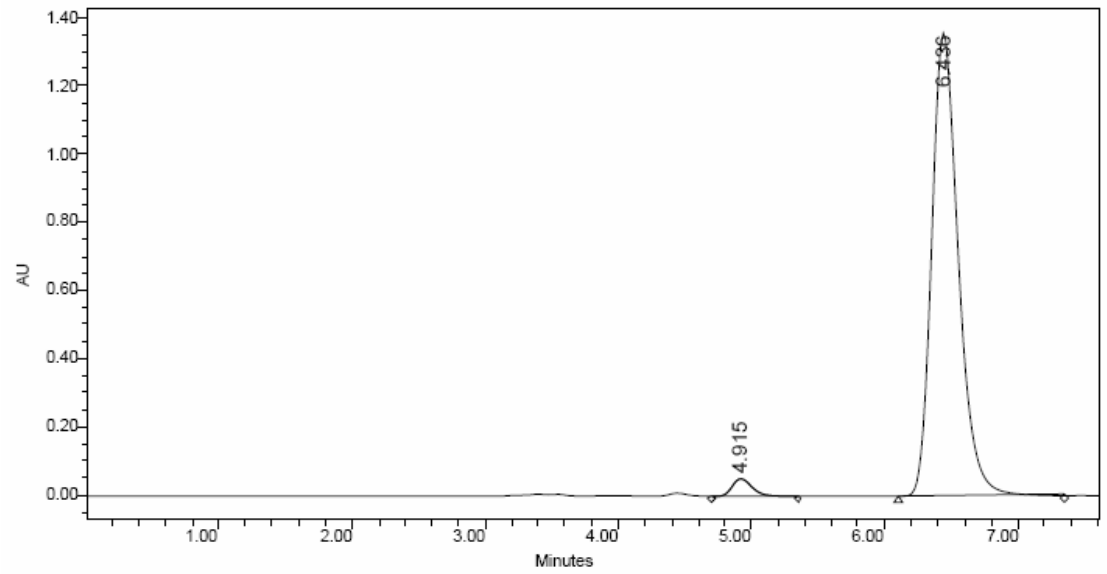


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	6.752	901844	3.72	63850	6.28
2	11.020	23363679	96.28	952215	93.72

4maa :

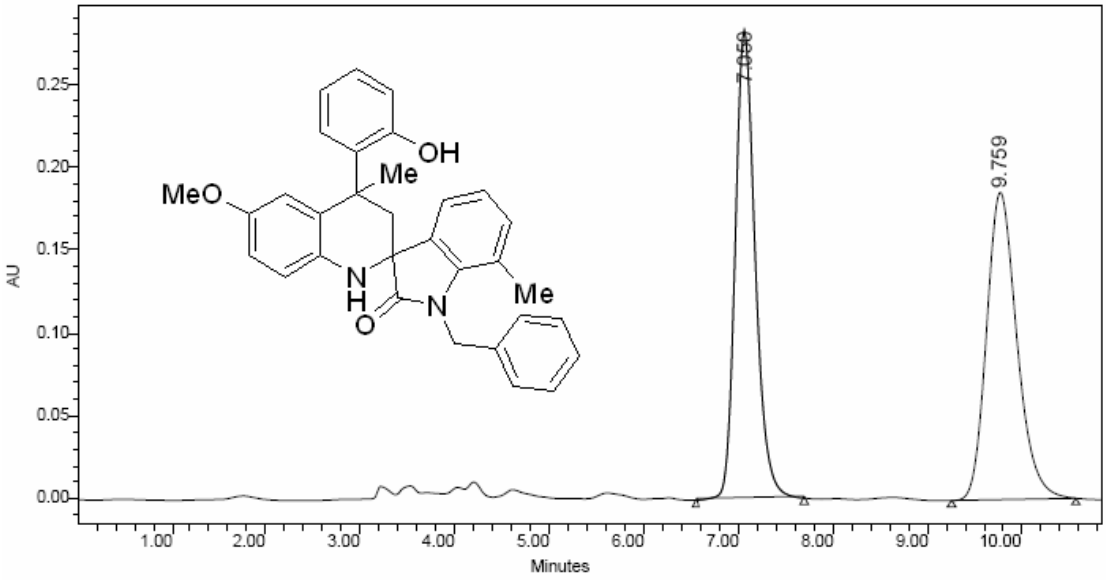


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	4.857	2597097	50.05	252743	56.75
2	6.308	2591597	49.95	192615	43.25

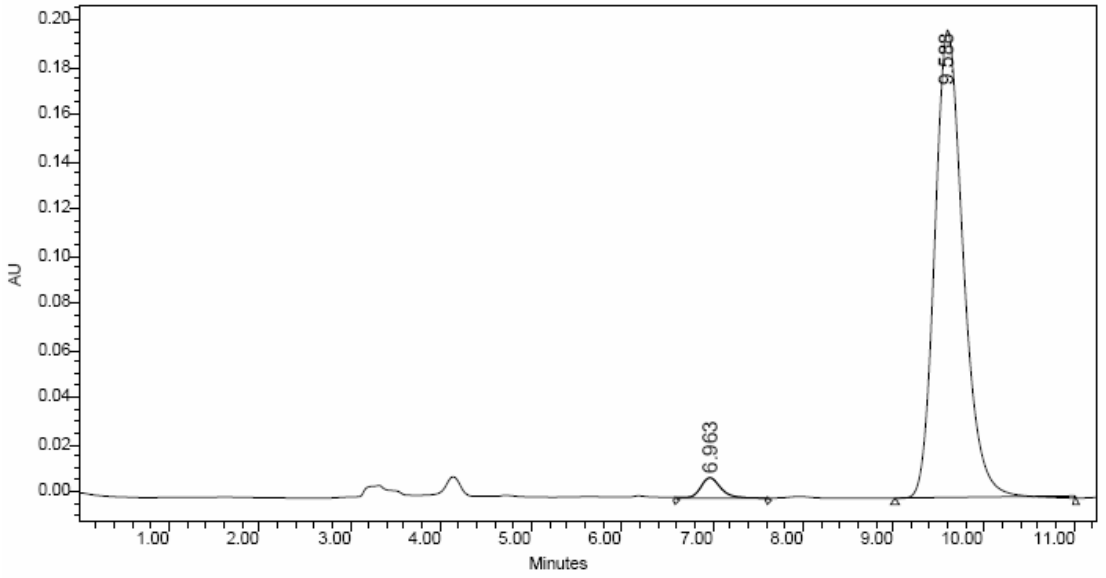


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	4.915	537944	2.77	51368	3.65
2	6.436	18879866	97.23	1357503	96.35

4naa :

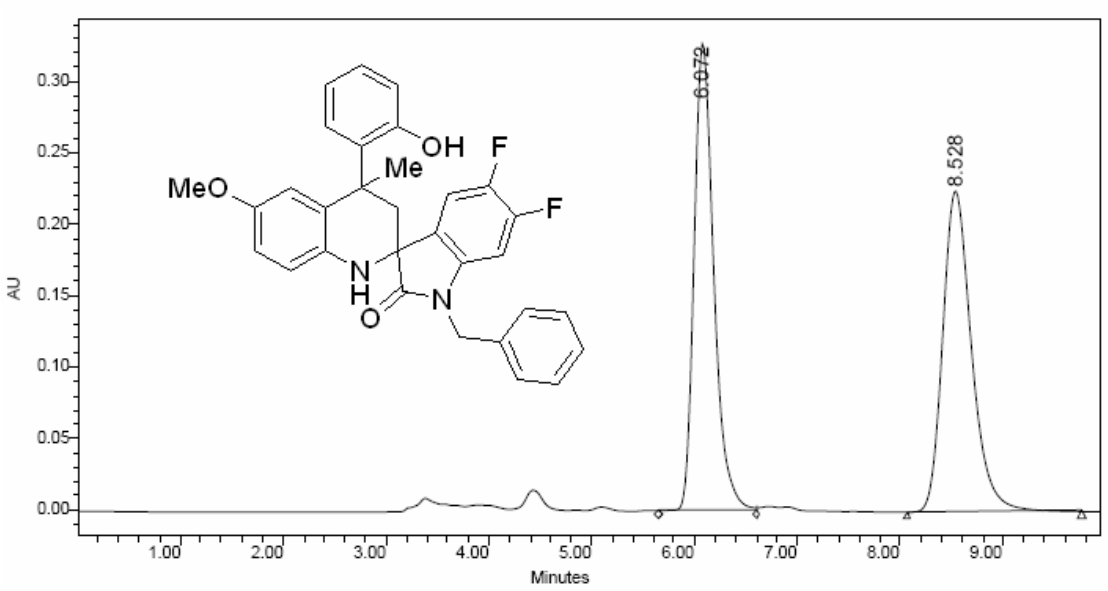


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	7.050	4160161	50.10	282727	60.38
2	9.759	4143628	49.90	185522	39.62

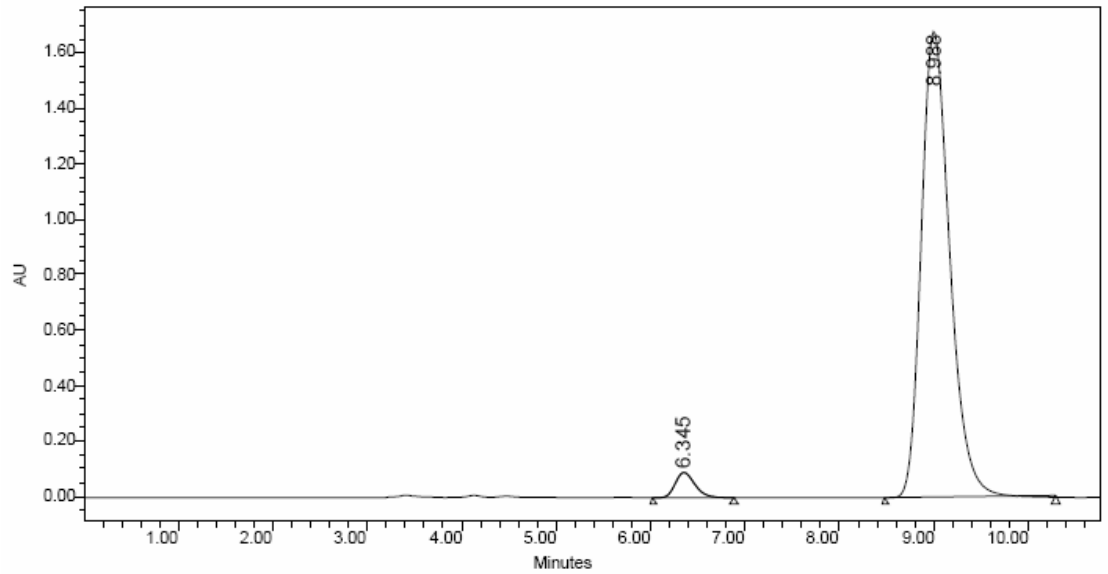


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	6.963	138249	3.08	8688	4.19
2	9.588	4344551	96.92	198440	95.81

4oaa :

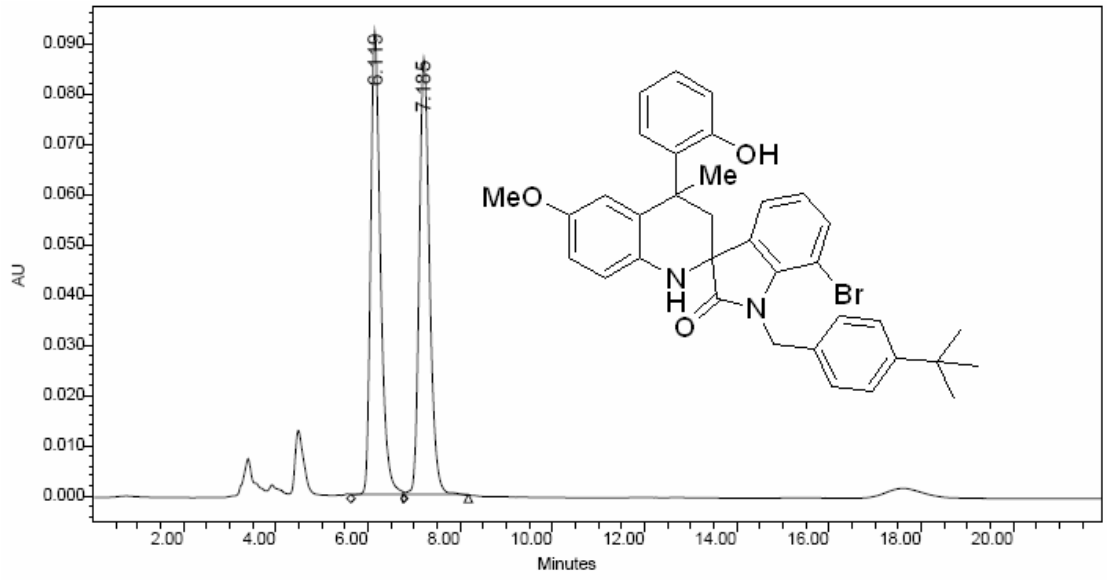


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	6.072	4369887	49.97	327431	59.32
2	8.528	4375065	50.03	224585	40.68

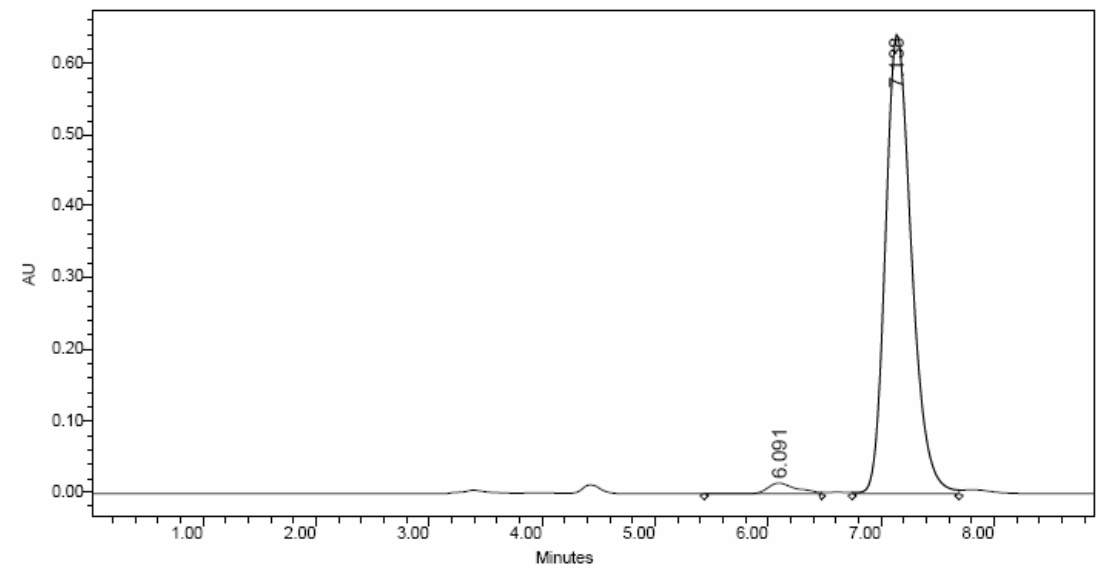


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	6.345	1309441	3.56	90788	5.12
2	8.988	35432731	96.44	1682118	94.88

4paa :

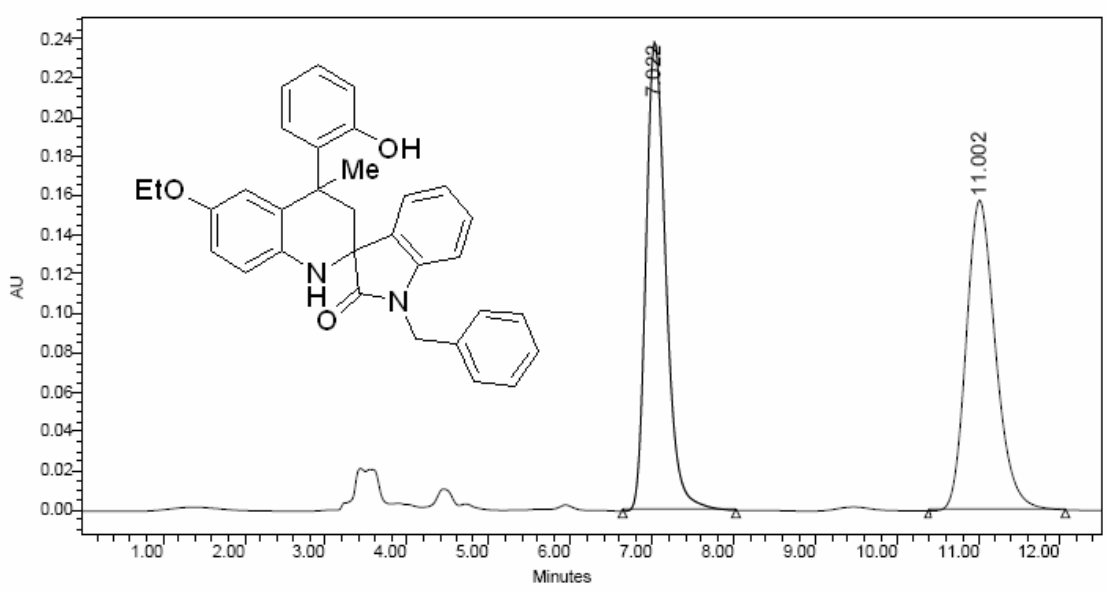


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	6.119	1377200	50.29	92137	51.51
2	7.185	1361143	49.71	86751	48.49

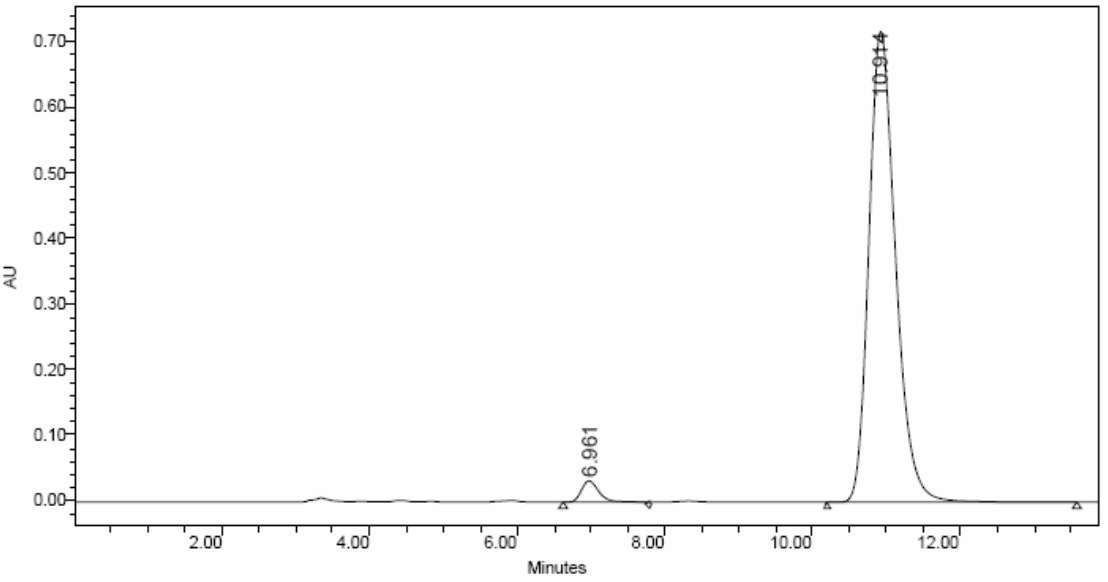


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	6.091	271189	2.56	14965	2.28
2	7.138	10327298	97.44	642131	97.72

4aba :

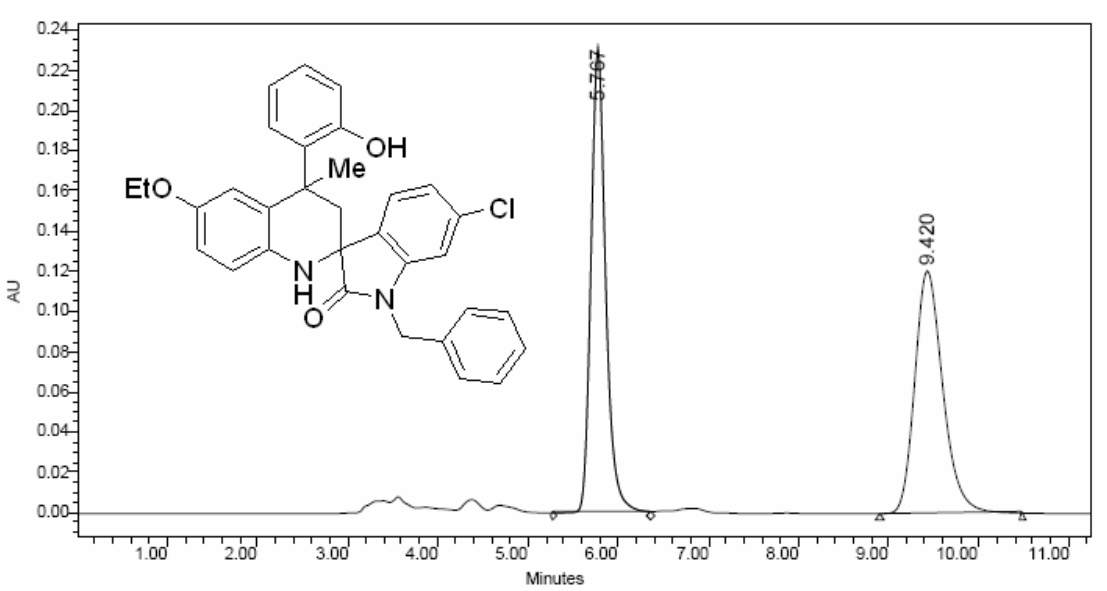


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	7.022	4046748	50.62	238748	60.17
2	11.002	3947958	49.38	158014	39.83

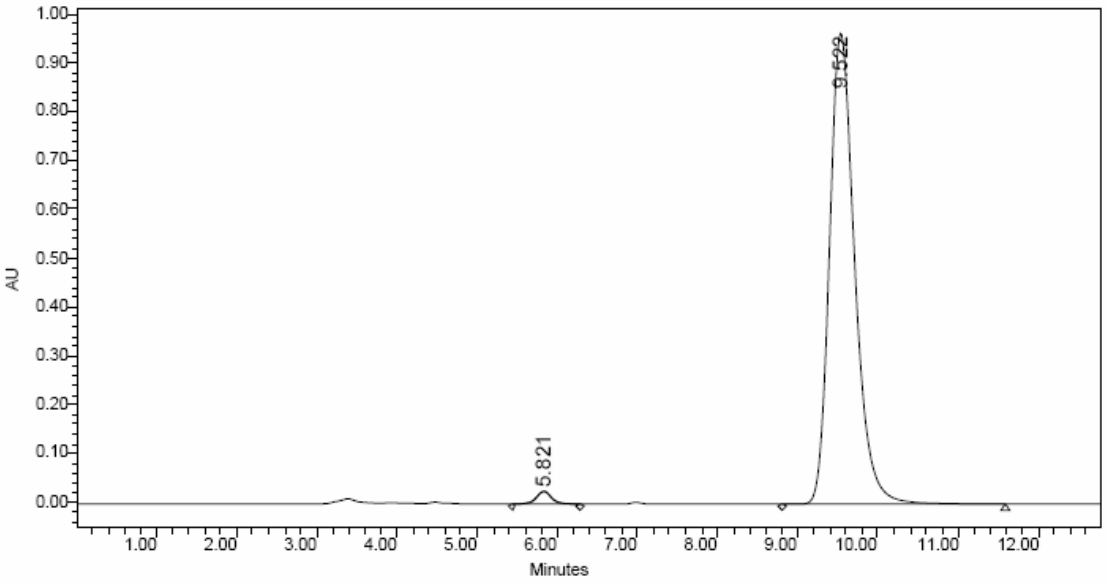


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	6.961	541509	2.91	32700	4.35
2	10.914	18069968	97.09	719353	95.65

4hba:

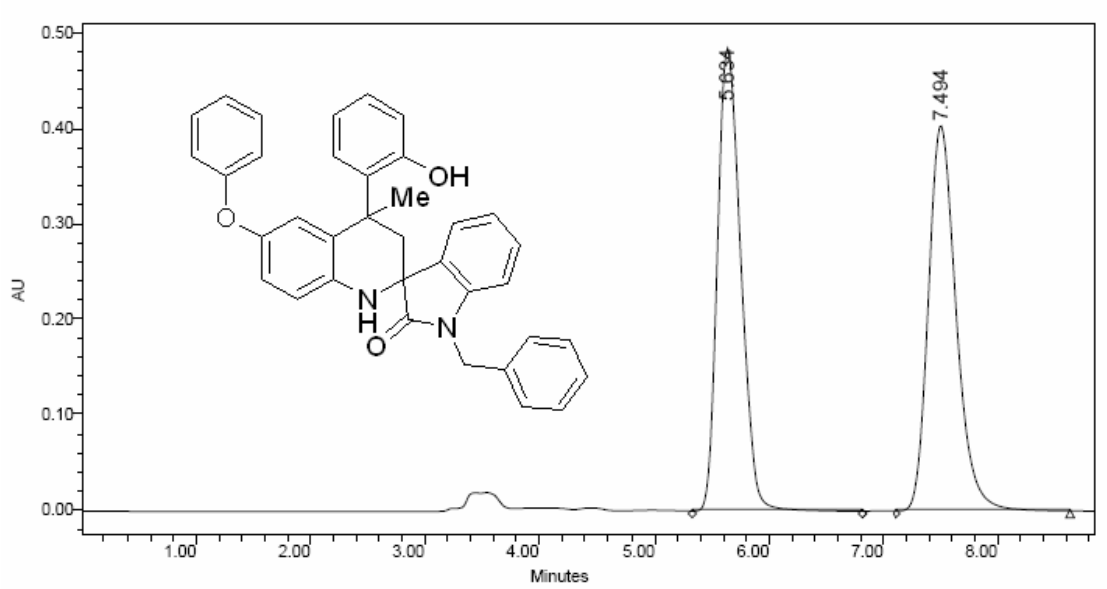


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	5.767	2639508	50.30	230902	65.67
2	9.420	2607779	49.70	120701	34.33

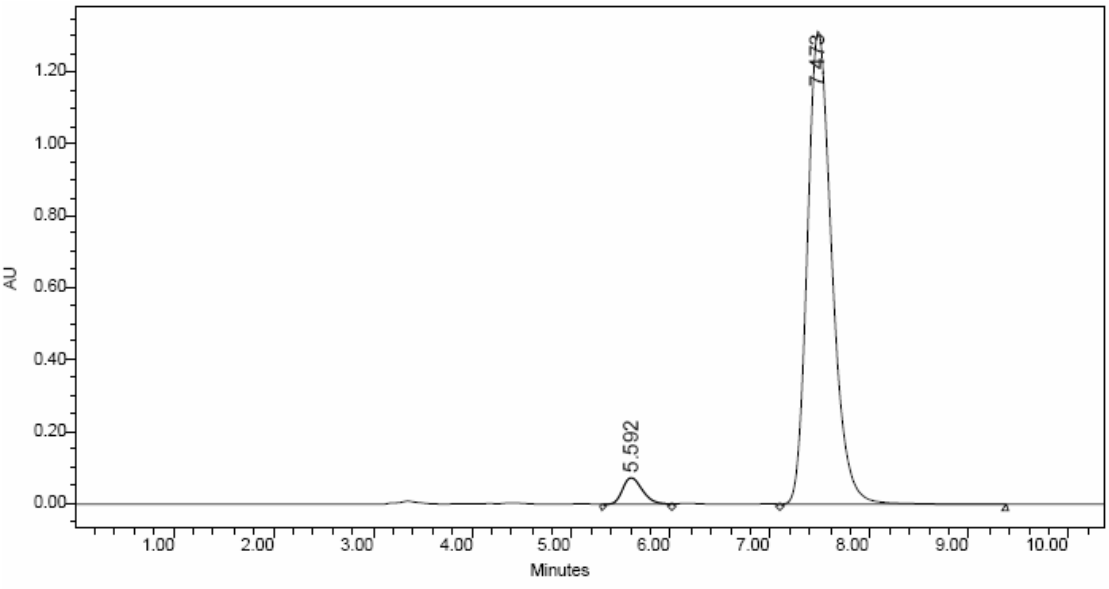


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	5.821	345499	1.61	25792	2.61
2	9.522	21068994	98.39	963837	97.39

4aca:

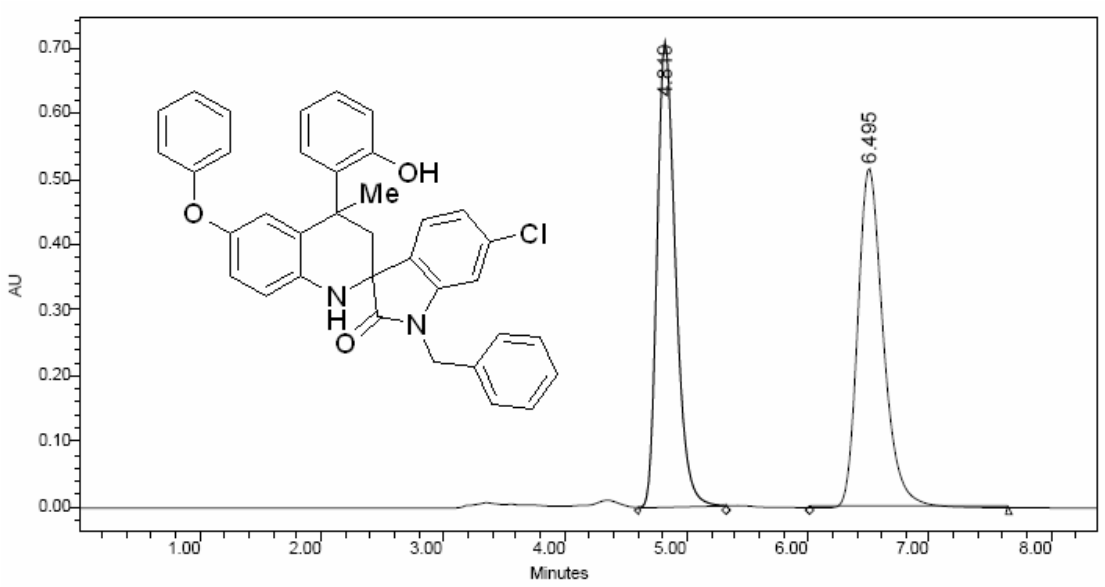


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	5.634	6873249	50.16	485446	54.56
2	7.494	6830161	49.84	404253	45.44

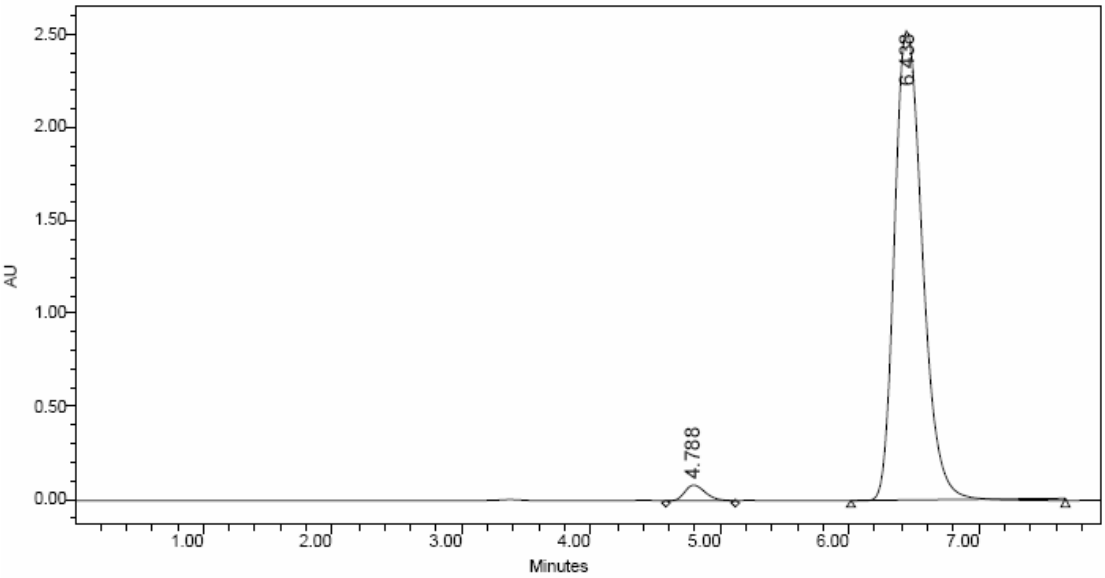


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	5.592	1039137	4.40	74131	5.32
2	7.473	22568345	95.60	1318296	94.68

4hca:

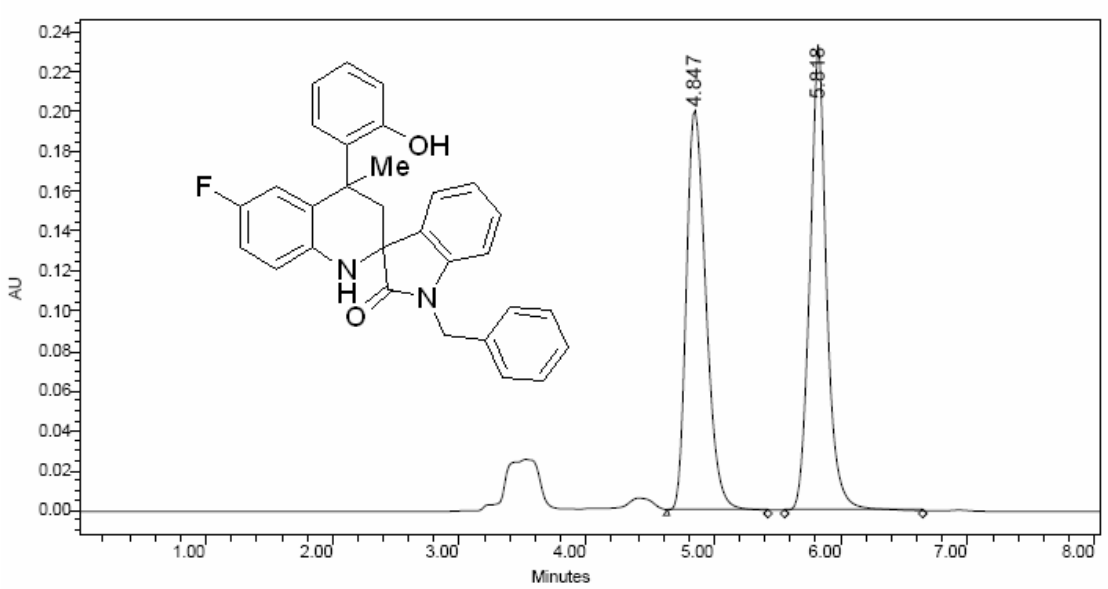


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	4.819	7554550	49.90	709805	57.82
2	6.495	7585606	50.10	517888	42.18

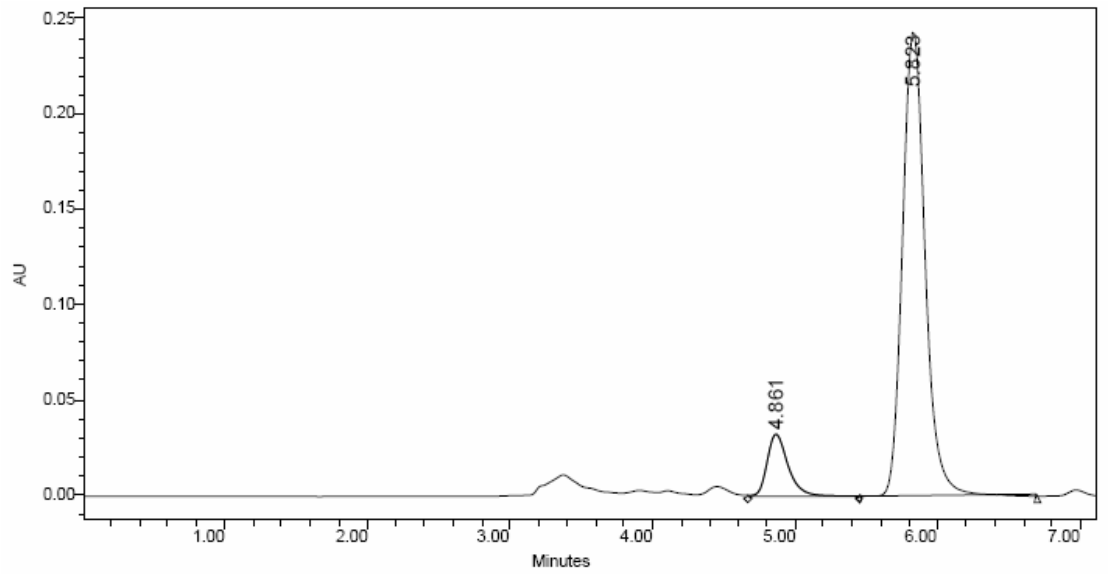


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	4.788	941508	2.41	84709	3.24
2	6.438	38158743	97.59	2531378	96.76

4ada:

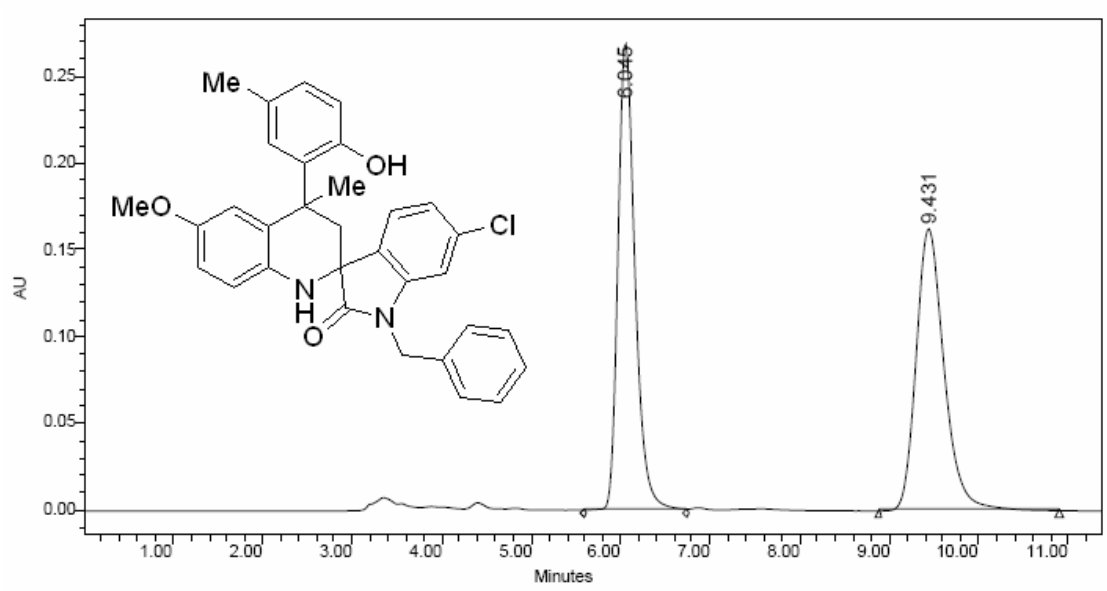


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	4.847	2154148	49.97	200711	46.28
2	5.818	2157148	50.03	232955	53.72

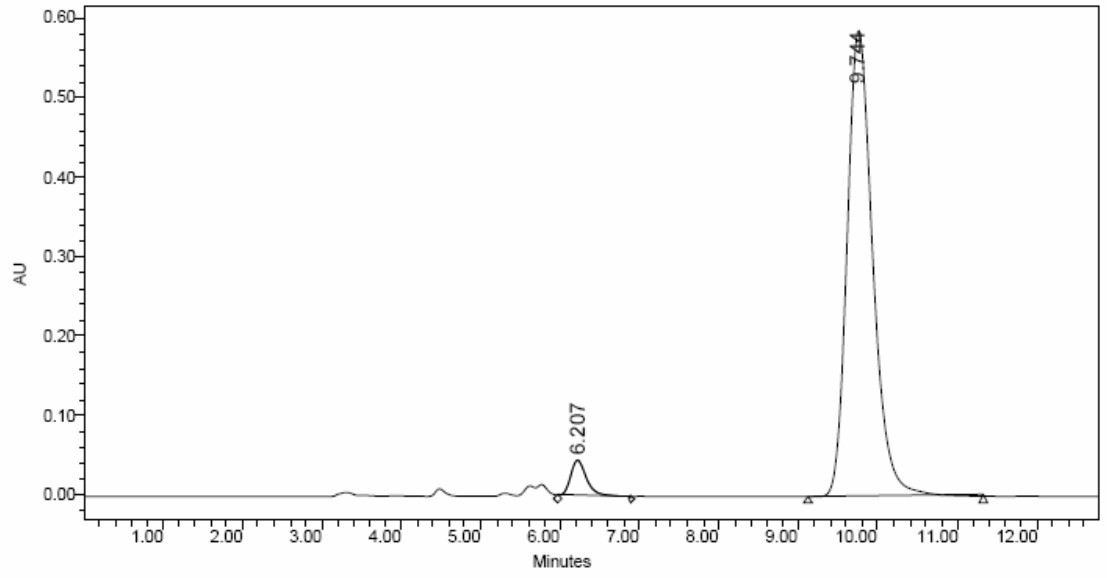


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	4.861	335980	11.05	32637	11.78
2	5.823	2703607	88.95	244405	88.22

4hab:

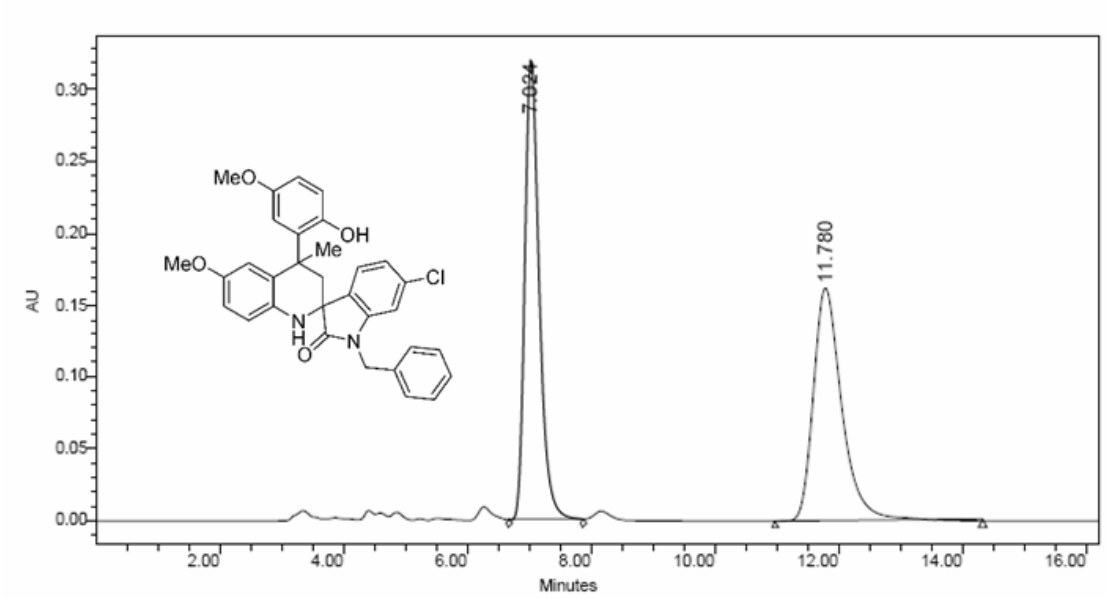


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	6.045	3571171	50.19	269316	62.35
2	9.431	3543925	49.81	162608	37.65

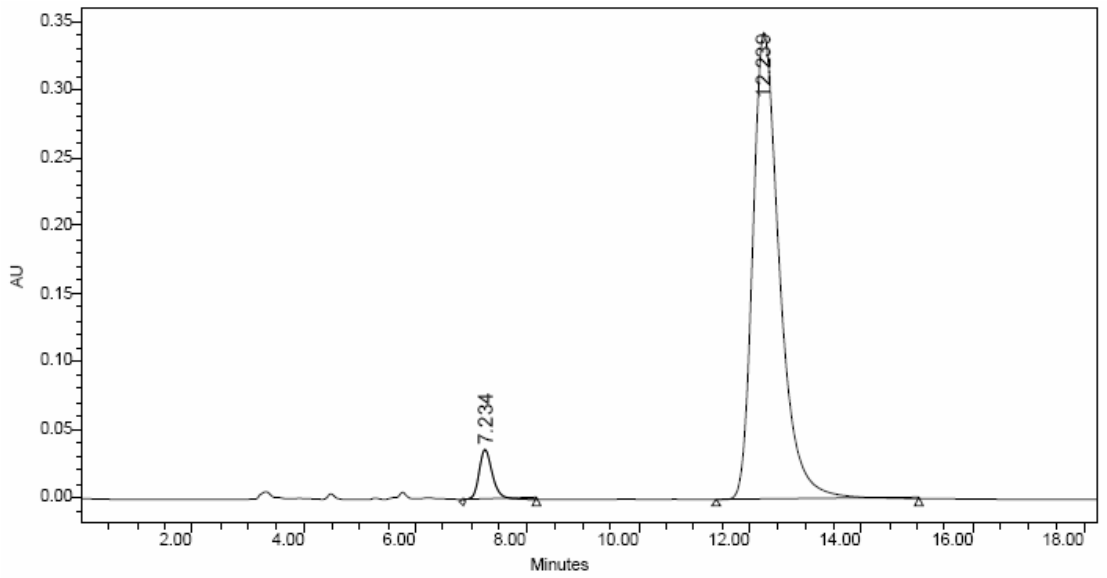


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	6.207	658698	4.76	45712	7.23
2	9.744	13182483	95.24	586948	92.77

4hac:

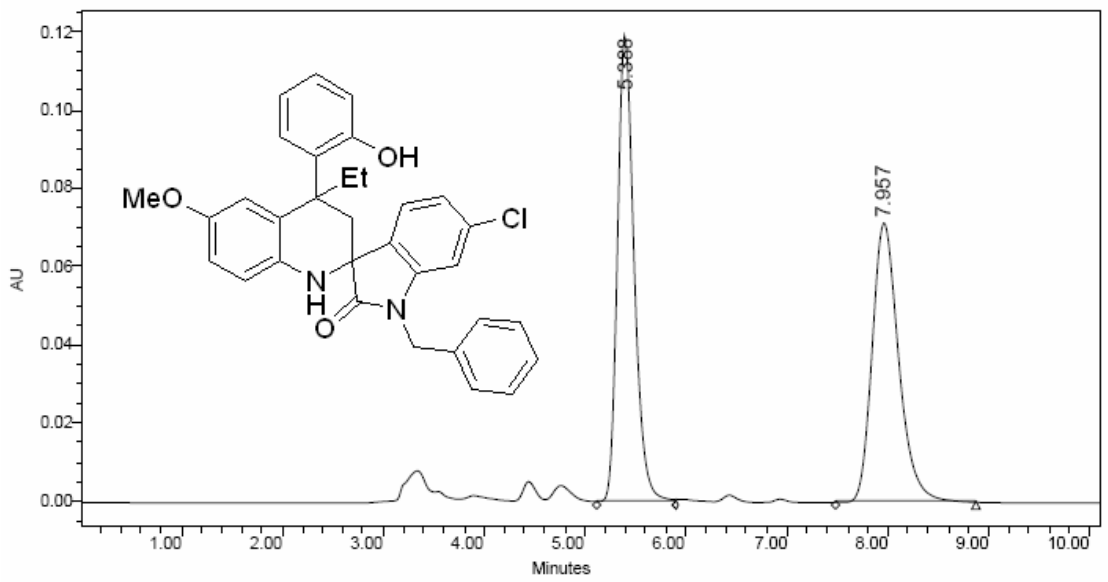


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	7.024	5242311	49.94	322128	66.44
2	11.780	5255537	50.06	162704	33.56

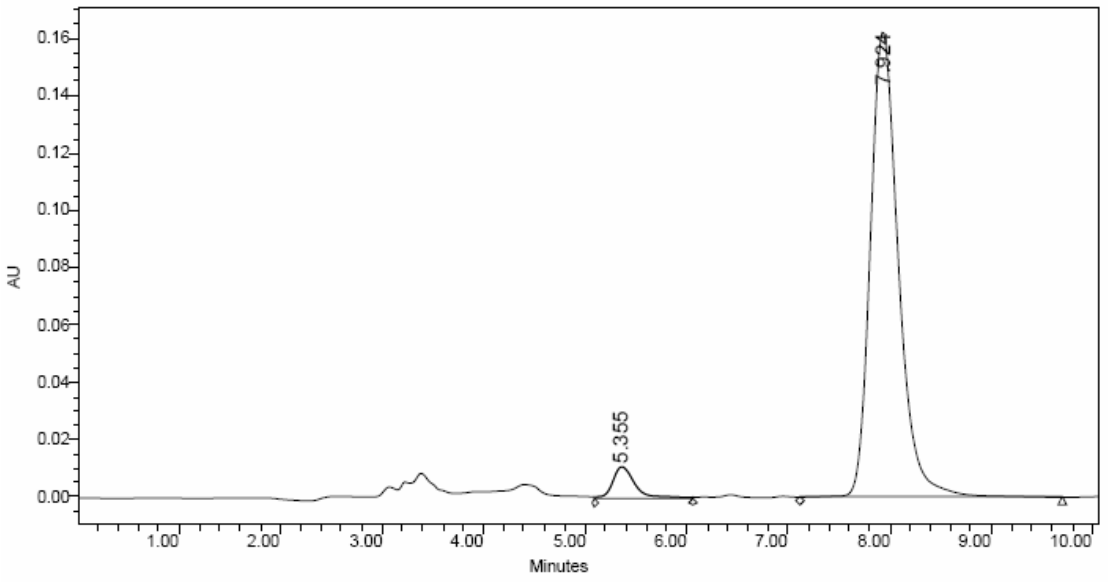


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	7.234	611009	5.05	36576	9.64
2	12.239	11483800	94.95	343010	90.36

4had:



	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	5.388	1381295	51.26	119595	62.56
2	7.957	1313645	48.74	71564	37.44



	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	5.355	190700	5.68	11424	6.56
2	7.924	3167749	94.32	162839	93.44