

## Supporting Information for

### Brønsted Acid-Catalyzed Enantioselective Friedländer Condensations: Achiral Amine Promoter Plays Crucial Role in the Stereocontrol

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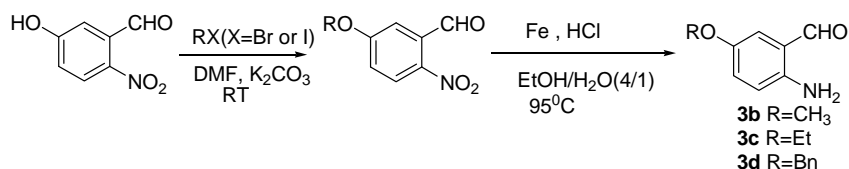
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**General data:** NMR spectra were recorded on a Bruker-400 MHz spectrometer. Melting points were determined on a digital melting point apparatus and temperatures were uncorrected. Optical rotations were determined at 589 nm (sodium D line) by using a Perkin-Elmer-343 polarimeter. HRMS (Bio TOF Q) spectra were recorded on P-SIMS-Gly of Bruker Daltonics Inc. Infrared spectra were recorded on a Nicolet MX-1E FT-IR spectrometer. HPLC analysis was performed on Waters-Breeze (2487 Dual  $\lambda$  Absorbance Detector and 1525 Binary HPLC Pump, UV detection monitored at 254 nm or 205 nm) and Agilent 1200 series instrument (auto and multiple wavelength detectors). Chiralpak AD, OD and IA columns were purchased from Daicel Chemical Industries. Toluene was dried over Na and distilled prior to use. Petroleum ether, ethyl acetate and dichloromethane for the column chromatography were distilled before use. The relative and absolute configurations of **5aa** and **5ha** were assigned by comparing with the known products.<sup>1</sup>

**Materials:** Compounds **3a**, **3e-3i** were prepared according to the methods reported previously.<sup>2-5</sup> 4-Substituted cyclohexanones **4a**, **4b** and **4c** were purchased from Alfa and Aldrich and used directly without further purification. **4d-4f** were prepared according to literature methods<sup>6</sup>.

#### Preparation of 2-amino-benzaldehyde derivatives (**3b-3d**):



### **2-amino-5-methoxybenzaldehyde (3b)**

5-Hydroxy-2-nitrobenzaldehyde (334 mg, 2 mmol), K<sub>2</sub>CO<sub>3</sub> (303mg, 2.2 mmol) and CH<sub>3</sub>I (0.2 mL, 3 mmol) were dissolved in DMF (10 mL) at room temperature and stirred for an additional 12 h. The reaction mixture was diluted with water (20 mL) and extracted with EtOAc (3 x 10 mL). The organic layer was washed with saturated brine (2 x 10 mL), dried over anhydrous MgSO<sub>4</sub>, and concentrated under reduced pressure. The residue was purified by column chromatography to give the 5-methoxy-2-nitrobenzaldehyde as a solid in 99% yield. (Flash column chromatography eluent, ethyl acetate / petroleum ether = 1/20).

5-methoxy-2-nitrobenzaldehyde (181 mg, 1 mmol), iron powder (560 mg, 10 mmol), and conc. HCl (2 drops), were added to a mixture of EtOH and H<sub>2</sub>O (4:1, 5 mL). The mixture was heated at reflux for 2 h and then cooled down to RT. Subsequently, it was filtered, diluted with water (10 mL) and extracted with EtOAc (3 x 10 mL). The organic layer was washed with saturated NaHCO<sub>3</sub> (2 x 10 mL) and H<sub>2</sub>O (2 x 10 mL), dried over anhydrous Na<sub>2</sub>SO<sub>4</sub>, and then concentrated under reduced pressure. The residue was purified by column chromatography to give **3b** as a solid in 60% yield. (Flash column chromatography eluent, ethyl acetate / petroleum ether = 1/20)

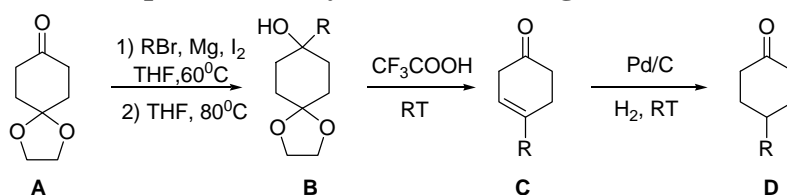
### **2-amino-5-ethoxybenzaldehyde (3c):**

Starting with 5-hydroxy-2-nitrobenzaldehyde and ethyl bromide, the reaction was carried out in analogy to the preparation of **3b**. (yield: 65%, two steps) <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ (ppm) 9.83 (s, 1H), 7.02-6.97 (m, 2H), 6.62 (d, *J* = 8.8 Hz, 1H), 5.81 (s, 2H), 4.00 (q, *J* = 7.0 Hz, 2H), 1.40 (t, *J* = 7.0 Hz, 3H); <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) 193.5, 150.1, 144.7, 125.2, 118.6, 118.1, 117.6, 64.4, 14.9; IR (KBr): 3457, 3349, 2987, 2908, 1692, 1604, 1555, 1486, 1231, 1143, 1035, 820, 751; APCI FTMS exact mass calcd for (C<sub>9</sub>H<sub>11</sub>NO<sub>2</sub>)<sup>+</sup> requires *m/z* 166.0868, found *m/z* 166.0860.

### **2-amino-5-(benzyloxy)benzaldehyde (3d):**

Starting with 5-hydroxy-2-nitrobenzaldehyde and benzyl bromide, the reaction was carried out in analogy to the preparation of **3b**. (yield: 58%, two steps) <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ (ppm) 9.82 (s, 1H), 7.44-7.31 (m, 5H), 7.08-7.04 (m, 2H), 6.62 (d, *J* = 7.5 Hz, 1H), 5.84 (s, 2H), 5.03 (s, 2H); <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) 193.5, 149.9, 145.0, 137.0, 128.6, 128.6, 128.1, 127.6, 127.0, 125.5, 118.7, 118.5, 117.7, 71.1; IR (KBr): 3461, 3332, 1664, 1569, 1549, 1477, 1227, 1170, 1005, 805, 747, 697; APCI FTMS exact mass calcd for (C<sub>14</sub>H<sub>13</sub>NO<sub>2</sub>)<sup>+</sup> requires *m/z* 228.1024, found *m/z* 228.1013.

### General Procedure for Preparation of Cyclohexanones (4g, 4h):



Magnesium powder (79 mg, 3.3 mmol) and I<sub>2</sub> (20 mg) were added to a solution of RBr (3 mmol) in dry THF (30 mL). The mixture was stirred vigorously and heated carefully until the reaction initiated, and then the reaction mixture was stirred at 60 °C until almost all magnesium powder had disappeared. After the mixture was cooled down to room temperature, 1,4-cyclohexandionethylenketale **A** (471 mg, 3 mmol) in anhydrous THF (20 mL) was added dropwise and the resulting solution was refluxed for 36 h. The reaction was quenched by adding saturated NH<sub>4</sub>Cl (50 mL) and extracted with EtOAc (3 x 50 mL). The organic layers were washed with saturated brine (2 x 10 mL) and dried over anhydrous Na<sub>2</sub>SO<sub>4</sub>. The solvent was evaporated and the residue was purified by column chromatography to give the title compound **C** as a solid (Flash column chromatography eluent, ethyl acetate / petroleum ether = 1/20).

**B** (2 mmol) was treated with trifluoroacetic acid (10 mL) and stirred at room temperature for 10-30 min. The mixture was then poured to a solution of saturated NaHCO<sub>3</sub> (20 mL) and extracted with dichloromethane. The organic layer was washed with brine (20 mL) and dried over Na<sub>2</sub>SO<sub>4</sub>, and then the solvent was evaporated. The purification of the crude product by flash chromatography gave the title compound **C** as a solid (Flash column chromatography eluent, ethyl acetate / petroleum ether = 1/20).

Palladium on carbon (Pd/C, 40 mg) and **C** (1 mmol) was dissolved in ethyl acetate (15 mL). The mixture was stirred under hydrogen atmosphere at room temperature for 3-6 h. After the catalyst was filtered and the solvent was evaporated, the crude product was purified by flash chromatography to give the title compound **D** as a solid (Flash column chromatography eluent, ethyl acetate / petroleum ether = 1/20).

**4-(biphenyl-4-yl)cyclohexanone (4g):** (yield: 63%, three steps) <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ (ppm) 7.59-7.54 (m, 4H), 7.45-7.40 (m, 2H), 7.35-7.30 (m, 3H), 3.11-3.03 (m, 1H), 2.55-2.51 (m, 4H), 2.29-2.23 (m, 2H), 2.03-1.93 (m, 2H); <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) 211.1, 143.9, 140.8, 139.6, 128.8, 127.3, 127.2, 127.1, 127.0, 42.4, 41.4, 34.0; IR (KBr): 3035, 2927, 2849, 1692, 1417, 1329,

1172, 810, 770, 672, 505; APCI FTMS exact mass calcd for  $(C_{18}H_{218}O)^+$  requires  $m/z$  251.1436, found  $m/z$  251.1430.

**4-(naphthalen-2-yl)cyclohexanone (4h):** (yield: 81%, three steps)  $^1H$  NMR (400 MHz,  $CDCl_3$ )  $\delta$  (ppm) 7.82-7.79 (m, 3H), 7.68 (s, 1H), 7.49-7.42 (m, 2H), 7.39 (dd,  $J = 8.5, 1.8$  Hz, 1H), 3.23-3.16 (m, 1H), 2.58-2.53 (m, 4H), 2.34-2.29 (m, 2H), 2.11-2.00 (m, 2H);  $^{13}C$  NMR (100 MHz,  $CDCl_3$ ) 211.1, 142.2, 133.6, 132.4, 128.2, 127.6, 126.2, 125.6, 124.8, 42.9, 41.4, 33.9; IR (KBr): 3035, 2977, 2868, 1721, 1320, 1172, 820, 731, 486; APCI FTMS exact mass calcd for  $(C_{16}H_{16}O)^+$  requires  $m/z$  225.1280, found  $m/z$  225.1272.

#### General Procedure for the Enantioselective Friedländer Condensations:

**3** (0.1 mmol), 2-naphthylamine (0.25 mmol) and  $MgSO_4$  (200 mg) were mixed in toluene (1 mL) at room temperature and stirred for 2 h, then the catalyst **1b** (0.01 mmol) was added and stirred for 0.5 h. After cooling down to 0 °C, ketone (0.2 mmol) in toluene (1 mL) was added via a syringe for 1 h. The reaction mixture was stirred at this temperature until the reaction was complete (monitored by TLC, 3-7 days). Then the reaction mixture was filtered to remove  $MgSO_4$ , and the solid powder was washed with ethyl acetate (5.0 mL). The resultant solution was quenched with saturated aqueous  $NaHCO_3$  (5 mL) and the aqueous layer was extracted with ethyl acetate (2 x 10 mL). The combined organic layers were dried over anhydrous  $Na_2SO_4$ . After evaporation under the reduced pressure, the residue was purified through flash column chromatography on silica gel (Flash column chromatography eluent, dichloromethane 200 mL, and then petroleum ether / ethyl acetate = 4/1) to yield pure product.

**2-phenyl-1,2,3,4-tetrahydroacridine (5aa):** yellow oil, yield: 83%; (Flash column chromatography eluent, dichloromethane 200 mL, and then petroleum ether / ethyl acetate = 4/1);  $^1H$  NMR (400 MHz,  $CDCl_3$ )  $\delta$  (ppm) 8.00 (d,  $J = 8.5$  Hz, 1H), 7.80 (s, 1H), 7.70 (d,  $J = 8.2$  Hz, 1H), 7.64-7.60 (m, 1H), 7.46-7.42 (m, 1H), 7.37-7.23 (m, 5H), 3.37-3.19 (m, 3H), 3.15-3.06 (m, 2H), 2.35-2.29 (m, 1H), 2.19-2.08 (m, 1H);  $^{13}C$  NMR (100 MHz,  $CDCl_3$ ) 158.5, 146.8, 145.7, 135.1, 130.3, 128.8, 128.7, 128.4, 127.2, 127.0, 126.8, 126.5, 125.7, 40.4, 37.4, 33.6, 30.5; IR (KBr) 3027, 2929, 1601, 1492, 1415, 751, 700; Enantiomeric excess: 93%, determined by HPLC (Daicel Chirapak OD-H, hexane / isopropanol = 90/10, flow rate 1.0 mL/min,  $T = 30$  °C, 254 nm):  $t_R = 11.71$  min (minor),  $t_R = 12.68$  min (major);  $[\alpha]_D^{20} = +40.6$  ( $c$  1.0,  $CHCl_3$ ). APCI FTMS exact mass calcd for  $(C_{20}H_{19}NO)^+$  requires  $m/z$  259.1361, found  $m/z$  259.1335.

**7-methoxy-2-phenyl-1,2,3,4-tetrahydroacridine (5ba):** white solid, mp 106-108 °C, yield: 86%; (Flash column chromatography eluent, dichloromethane 200 mL, and then petroleum ether / ethyl acetate = 4/1); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ (ppm) 7.89 (d, *J* = 9.2 Hz, 1H), 7.73 (s, 1H), 7.37-7.25 (m, 6H), 6.98 (d, *J* = 2.8 Hz, 1H), 3.91 (s, 3H), 3.33-3.07 (m, 5H), 2.35-2.29 (m, 1H), 2.19-2.11 (m, 1H); <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) 157.2, 155.8, 145.8, 143.0, 134.0, 130.6, 129.8, 128.6, 128.0, 126.8, 126.5, 121.5, 104.5, 55.5, 40.5, 37.4, 33.3, 30.6; IR (KBr): 3030, 2929, 1597, 1503, 1388, 1213, 1025, 823, 702, 594; Enantiomeric excess: 87%, determined by HPLC (Daicel Chirapak OD-H, hexane / isopropanol = 80/20, flow rate 1.0 mL/min, T = 30 °C, 254 nm ): t<sub>R</sub> = 10.76 min (minor), t<sub>R</sub> = 13.50 min (major); [α]<sub>D</sub><sup>20</sup> = +59.5 (*c* 1.0, CDCl<sub>3</sub>); APCI FTMS exact mass calcd for (C<sub>20</sub>H<sub>19</sub>NO)<sup>+</sup> requires *m/z* 290.1545, found *m/z* 290.1535.

**7-ethoxy-2-phenyl-1,2,3,4-tetrahydroacridine (5ca):** yellow oil, yield: 66%; (Flash column chromatography eluent, dichloromethane 200 mL, and then petroleum ether / ethyl acetate = 4/1); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ (ppm) 7.89 (d, *J* = 9.2 Hz, 1H), 7.72 (s, 1H), 7.38-7.30 (m, 5H), 7.28-7.24 (m, 1H), 6.97 (d, *J* = 2.7 Hz, 1H), 4.13 (q, *J* = 7.0 Hz, 2H), 3.33-3.07 (m, 5H), 2.34-2.30 (m, 1H), 2.19-2.09 (m, 1H), 1.48 (t, *J* = 7.0 Hz, 3H); <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) 156.6, 155.6, 145.8, 142.9, 134.0, 130.5, 129.8, 128.6, 128.0, 126.8, 126.5, 121.8, 105.2, 63.7, 40.5, 37.4, 33.3, 30.6, 14.8; IR (KBr): IR(KBr): 3035, 2908, 1604, 1358, 1231, 1104, 1045, 820, 741, 691; Enantiomeric excess: 92%, determined by HPLC (Daicel Chirapak OD-H, hexane / isopropanol = 80/20, flow rate 1.0 mL/min, T = 30 °C, 254 nm ): t<sub>R</sub> = 9.65 min (minor), t<sub>R</sub> = 11.17 min (major); [α]<sub>D</sub><sup>20</sup> = +39.5 (*c* 1.0, CHCl<sub>3</sub>); APCI FTMS exact mass calcd for (C<sub>21</sub>H<sub>21</sub>NO)<sup>+</sup> requires *m/z* 304.1701, found *m/z* 304.1690.

**7-(benzyloxy)-2-phenyl-1,2,3,4-tetrahydroacridine (5da):** yellow solid, mp 135-136 °C, yield: 66%; (Flash column chromatography eluent, dichloromethane 200 mL, and then petroleum ether / ethyl acetate = 4/1); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ (ppm) 7.92 (d, *J* = 9.2Hz, 1H), 7.72 (s, 1H), 7.49-7.47 (m, 2H), 7.43-7.30 (m, 8H), 7.28-7.23 (m, 1H), 7.07 (d, *J* = 2.8Hz, 1H), 5.17 (s, 2H), 3.34-3.07 (m, 5H), 2.35-2.29 (m, 1H), 2.19-2.09 (m, 1H); <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) 156.4, 155.9, 145.8, 143.0, 136.7, 130.6, 129.9, 128.7, 128.6, 128.1, 128.0, 127.5, 126.8, 121.9, 105.9, 70.3, 40.5, 37.4, 33.3, 30.6; IR (KBr): 3035, 2957, 1633, 1486, 1437, 1398, 1221, 1153, 1035, 810, 751, 682; Enantiomeric excess: 95%, determined by HPLC (Daicel Chirapak IA-H, hexane / isopropanol = 85/15, flow rate 1.0 mL/min, T = 30 °C, 254 nm ): t<sub>R</sub> = 44.56 min (minor), t<sub>R</sub> = 49.60

min (major);  $[\alpha]_D^{20} = +30.1$  (*c* 1.0, CHCl<sub>3</sub>); APCI FTMS exact mass calcd for (C<sub>26</sub>H<sub>23</sub>NO)<sup>+</sup> requires *m/z* 366.1858, found *m/z* 366.1846.

**7-fluoro-2-phenyl-1,2,3,4-tetrahydroacridine (5ea):** colourless oil, yield: 71%; (Flash column chromatography eluent, dichloromethane 200 mL, and then petroleum ether / ethyl acetate = 4/1); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ (ppm) 7.97 (dd, *J* = 9.2 Hz, *J* = 5.3 Hz, 1H), 7.74 (s, 1H), 7.40-7.33 (m, 3H), 7.31-7.23 (m, 4H), 3.34-3.05 (m, 5H), 2.34-2.29 (m, 1H), 2.17-2.08 (m, 1H); <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) 161.3, 158.8, 157.8 (d, *J*<sub>C-F</sub> = 2.8 Hz), 145.5, 143.9, 134.4 (d, *J*<sub>C-F</sub> = 5.4 Hz), 131.3, 130.8 (d, *J*<sub>C-F</sub> = 9.1 Hz), 128.7, 127.6 (d, *J*<sub>C-F</sub> = 9.8 Hz), 126.8, 126.6, 118.9 (d, *J*<sub>C-F</sub> = 25.6 Hz), 109.8 (d, *J*<sub>C-F</sub> = 21.4 Hz), 40.3, 37.3, 33.5, 30.4; IR (KBr): 2917, 1633, 1506, 1437, 1212, 1123, 820, 772; Enantiomeric excess: 84%, determined by HPLC (Daicel Chirapak OD-H, hexane / isopropanol = 80/20, flow rate 1.0 mL/min, T = 30 °C, 254 nm ): *t*<sub>R</sub> = 14.99 min (minor), *t*<sub>R</sub> = 16.41 min (major);  $[\alpha]_D^{20} = +8.4$  (*c* 1.0, CHCl<sub>3</sub>); APCI FTMS exact mass calcd for (C<sub>19</sub>H<sub>16</sub>FN)<sup>+</sup> requires *m/z* 278.1345, found *m/z* 278.1338.

**6,7-dimethoxy-2-phenyl-1,2,3,4-tetrahydroacridine (5fa):** yellow solid, mp 172-173 °C, yield: 50%; (Flash column chromatography eluent, dichloromethane 200 mL, and then petroleum ether / ethyl acetate = 4/1); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ (ppm) 7.61 (s, 1H), 7.30-7.23 (m, 5H), 7.20-7.16 (m, 1H), 6.89 (s, 1H), 3.94 (s, 3H), 3.92 (s, 3H), 3.24-2.98 (m, 5H), 2.26-2.21 (m, 1H), 2.12-2.01 (m, 1H); <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) 155.8, 152.0, 149.3, 145.9, 143.7, 133.7, 128.6, 128.3, 126.8, 126.4, 122.5, 107.2, 104.5, 56.1, 56.0, 40.6, 37.3, 33.3, 30.6; IR (KBr) 2966, 2938, 1574, 1496, 1388, 1280, 1202, 1133, 1015, 869, 761, 691; Enantiomeric excess: 90%, determined by HPLC (Daicel Chirapak OD-H, hexane / isopropanol = 80/20, flow rate 1.0 mL/min, T = 30 °C, 254 nm ): *t*<sub>R</sub> = 12.30 min (minor), *t*<sub>R</sub> = 15.62 min (major);  $[\alpha]_D^{20} = +40.6$  (*c* 1.0, CHCl<sub>3</sub>); APCI-FTMS exact mass calcd for (C<sub>21</sub>H<sub>21</sub>NO<sub>2</sub>)<sup>+</sup> requires *m/z* 320.1651, found *m/z* 320.1639.

**8-phenyl-6,7,8,9-tetrahydro-[1,3]dioxolo[4,5-b]acridine (5ga):** white solid, mp 160-161 °C, yield: 55%; (Flash column chromatography eluent, dichloromethane 200 mL, and then petroleum ether / ethyl acetate = 4/1); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ (ppm) 7.65 (s, 1H), 7.37-7.30 (m, 5H), 7.26-7.23 (m, 1H), 6.96 (s, 2H), 3.29-3.04 (m, 5H), 2.33-2.28 (m, 1H), 2.18-2.07 (m, 1H); <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) 155.8, 150.2, 147.2, 145.9, 144.9, 134.3, 128.6, 128.4, 126.8, 126.4, 123.9, 105.0, 102.0, 101.5, 40.5, 37.1, 33.3, 30.5; IR (KBr): 3035, 2917, 1623, 1616, 1496, 1394, 1246, 1198, 1039, 938, 866; Enantiomeric excess: 94%, determined by HPLC (Daicel Chirapak OD-H, hexane / isopropanol = 80/20, flow rate 1.0 mL/min, T = 30 °C, 254 nm ): *t*<sub>R</sub> = 15.72 min

(minor),  $t_R = 24.02$  min (major);  $[\alpha]_D^{20} = +48.2$  (*c* 1.0, CHCl<sub>3</sub>); APCI FTMS exact mass calcd for (C<sub>20</sub>H<sub>17</sub>NO<sub>2</sub>)<sup>+</sup> requires *m/z* 304.1338, found *m/z* 304.1326.

**6-chloro-2-phenyl-1,2,3,4-tetrahydroacridine (5ha):** white solid, mp 90-92 °C, yield: 94%; (Flash column chromatography eluent, dichloromethane 200 mL, and then petroleum ether / ethyl acetate = 4/1); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ (ppm) 8.00 (d, *J* = 1.9 Hz, 1H), 7.82 (s, 1H), 7.65 (d, *J* = 8.7 Hz, 1H), 7.41 (dd, *J* = 8.7 Hz, *J* = 1.9 Hz, 1H), 7.38-7.34 (m, 2H), 7.32-7.30 (m, 2H), 7.28-7.24 (m, 1H), 3.36-3.30 (m, 1H), 3.27-3.08 (m, 4H), 2.37-2.31 (m, 1H), 2.22-2.10 (m, 1H); <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) 159.7, 147.1, 145.5, 134.9, 134.4, 130.7, 128.7, 128.2, 127.5, 126.8, 126.8, 126.8, 126.6, 125.5, 40.3, 37.3, 33.6, 30.4; IR (KBr): 3028, 2929, 1615, 1484, 1413, 1068, 764, 699; Enantiomeric excess: 87%, determined by HPLC (Daicel Chirapak OD-H, hexane / isopropanol = 95/5, flow rate 1.0 mL/min, T = 30 °C, 254 nm ):  $t_R = 18.88$  min (minor),  $t_R = 21.67$  min (major);  $[\alpha]_D^{20} = +48.0$  (*c* 1.0, CDCl<sub>3</sub>).

**7-methyl-2-phenyl-1,2,3,4-tetrahydroacridine (5ia):** colourless oil, yield: 94%; (Flash column chromatography eluent, dichloromethane 200 mL, and then petroleum ether / ethyl acetate = 4/1); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ (ppm) 7.89 (d, *J* = 8.3 Hz, 1H), 7.74 (s, 1H), 7.47-7.44 (m, 2H), 7.37-7.30 (m, 4H), 7.27-7.23 (m, 1H), 3.35-3.07 (m, 5H), 2.51 (s, 3H), 2.35-2.29 (m, 1H), 2.20-2.09 (m, 1H); <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) 157.4, 145.8, 145.5, 134.5, 131.1, 130.3, 128.6, 128.1, 127.2, 126.8, 126.5, 125.8, 40.5, 27.4, 33.5, 30.5, 21.6; IR (KBr): 3045, 2917, 2388, 1604, 1525, 1447, 388, 829, 761, 702; Enantiomeric excess: 95%, determined by HPLC (Daicel Chirapak OD-H, hexane / isopropanol = 80/20, flow rate 1.0 mL/min, T = 30 °C, 254 nm ):  $t_R = 9.46$  min (minor),  $t_R = 12.80$  min (major);  $[\alpha]_D^{20} = +48.1$  (*c* 1.0, CHCl<sub>3</sub>); APCI FTMS exact mass calcd for (C<sub>20</sub>H<sub>19</sub>N)<sup>+</sup> requires *m/z* 274.1596, found *m/z* 274.1586.

**2,7-dimethyl-1,2,3,4-tetrahydroacridine (5ib):** white solid, mp 100-103 °C, yield: 70%; (Flash column chromatography eluent, dichloromethane 200 mL, and then petroleum ether / ethyl acetate = 4/1); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ (ppm) 7.86 (d, *J* = 8.4 Hz, 1H), 7.68 (s, 1H), 7.44-7.41 (m, 2H), 3.23-3.17 (m, 1H), 3.12-2.98 (m, 2H), 2.61-2.55 (m, 1H), 2.49 (s, 3H), 2.09-1.95 (m, 2H), 1.65-1.55 (m, 1H), 1.12 (d, *J* = 6.6 Hz, 3H); <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) 158.0, 145.3, 135.2, 134.3, 130.8, 130.5, 128.0, 127.2, 125.7, 37.9, 33.0, 31.5, 29.2, 21.7, 21.5; IR (KBr): 2949, 2914, 2860, 1610, 1496, 1455, 1372, 937, 813; Enantiomeric excess: 87%, determined by HPLC (Daicel Chirapak OD-H, hexane / isopropanol = 80/20, flow rate 1.0 mL/min, T = 30 °C, 254 nm ):

$t_R = 4.55$  min (minor),  $t_R = 7.02$  min (major);  $[\alpha]_D^{20} = +81.6$  ( $c$  1.0,  $\text{CHCl}_3$ ); APCI FTMS exact mass calcd for  $(\text{C}_{15}\text{H}_{17}\text{N})^+$  requires  $m/z$  212.1439, found  $m/z$  212.1431.

**2-ethyl-7-methyl-1,2,3,4-tetrahydroacridine (5ic):** colourless oil, yield: 73%; (Flash column chromatography eluent, dichloromethane 200 mL, and then petroleum ether / ethyl acetate = 4/1);  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  (ppm) 7.86 (d,  $J = 8.4$  Hz, 1H), 7.70 (s, 1H), 7.44-7.41 (m, 2H), 3.24-3.17 (m, 1H), 3.10-3.01 (m, 2H), 2.61-2.55 (m, 1H), 2.49 (s, 3H), 2.15-2.10 (m, 1H), 1.78-1.69 (m, 1H), 1.62-1.52 (m, 1H), 1.49-1.42 (m, 2H), 1.02 (t,  $J = 7.4$  Hz, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) 158.3, 145.3, 135.2, 134.4, 130.8, 130.6, 128.0, 127.2, 125.7, 35.8, 35.6, 33.0, 29.1, 28.9, 21.5, 11.6; IR (KBr): 2976, 2917, 1604, 1496, 1437, 1369, 1153, 918, 820, 613; Enantiomeric excess: 88%, determined by HPLC (Daicel Chirapak OD-H, hexane / isopropanol = 80/20, flow rate 1.0 mL/min,  $T = 30$  °C, 254 nm ):  $t_R = 4.52$  min (minor),  $t_R = 6.65$  min (major);  $[\alpha]_D^{20} = +68.0$  ( $c$  1.0,  $\text{CHCl}_3$ ); APCI-FTMS exact mass calcd for  $(\text{C}_{16}\text{H}_{19}\text{N})^+$  requires  $m/z$  226.1596, found  $m/z$  226.1587.

**7-methyl-2-p-tolyl-1,2,3,4-tetrahydroacridine (5id):** colourless oil, yield: 93%; (Flash column chromatography eluent, dichloromethane 200 mL, and then petroleum ether / ethyl acetate = 4/1);  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  (ppm) 7.89 (d,  $J = 8.3$  Hz, 1H), 7.74 (s, 1H), 7.47-7.44 (m, 2H), 7.22-7.15 (m, 4H), 3.35-3.17 (m, 3H), 3.13-3.04 (m, 2H), 2.51 (s, 3H), 2.35 (s, 3H), 2.33-2.27 (m, 1H), 2.19-2.07 (m, 1H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) 157.5, 145.5, 142.8, 136.0, 125.4, 134.5, 131.0, 130.3, 129.3, 128.1, 127.2, 126.7, 125.8, 40.1, 37.5, 33.6, 30.7, 21.6, 21.0; IR (KBr): 3016, 2938, 1599, 1492, 1423, 1370, 927, 820, 538; Enantiomeric excess: 93%, determined by HPLC (Daicel Chirapak OD-H, hexane / isopropanol = 80/20, flow rate 1.0 mL/min,  $T = 30$  °C, 254 nm ):  $t_R = 6.54$  min (minor),  $t_R = 8.41$  min (major);  $[\alpha]_D^{20} = +40.0$  ( $c$  1.0,  $\text{CHCl}_3$ ); APCI FTMS exact mass calcd for  $(\text{C}_{21}\text{H}_{21}\text{N})^+$  requires  $m/z$  228.1752, found  $m/z$  228.1741.

**2-(4-methoxyphenyl)-7-methyl-1,2,3,4-tetrahydroacridine (5ie):** colourless oil, yield: 79%; (Flash column chromatography eluent, dichloromethane 200 mL, and then petroleum ether / ethyl acetate = 4/1);  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  (ppm) 7.89 (d,  $J = 8.3$  Hz, 1H), 7.73 (s, 1H), 7.47-7.44 (m, 2H), 7.25-7.21 (m, 2H), 6.91-6.88 (m, 2H), 3.81 (s, 3H), 3.33-3.17 (m, 3H), 3.11-3.03 (m, 2H), 2.51 (s, 3H), 2.32-2.27 (m, 1H), 2.15-2.05 (m, 1H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) 158.2, 157.5, 145.4, 137.9, 135.4, 134.4, 131.0, 130.3, 128.0, 127.7, 127.2, 125.8, 114.0, 55.3, 39.6, 37.6, 33.5, 30.8, 21.5; IR (KBr): 3025, 2917, 1702, 1594, 1525, 1417, 1202, 1172, 1055, 829, 564; Enantiomeric excess: 93%, determined by HPLC (Daicel Chirapak OD-H, hexane / isopropanol =



80/20, flow rate 1.0 mL/min, T = 30 °C, 254 nm ):  $t_R = 7.82$  min (minor),  $t_R = 11.48$  min (major);  $[\alpha]_D^{20} = +30.0$  ( $c$  1.0,  $\text{CHCl}_3$ ); APCI FTMS exact mass calcd for  $(\text{C}_{21}\text{H}_{21}\text{NO})^+$  requires  $m/z$  304.1701, found  $m/z$  304.1690.

**2-(4-chlorophenyl)-7-methyl-1,2,3,4-tetrahydroacridine (5if):** colourless oil, yield: 80%; (Flash column chromatography eluent, dichloromethane 200 mL, and then petroleum ether / ethyl acetate = 4/1);  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  (ppm) 7.89 (d,  $J = 9.2$  Hz, 1H), 7.74 (s, 1H), 7.48-7.45 (m, 2H), 7.33-7.30 (m, 2H), 7.25-7.22 (m, 2H), 3.34-3.03 (m, 5H), 2.51 (s, 3H), 2.33-2.27 (m, 1H), 2.16-2.06 (m, 1H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) 157.1, 145.5, 144.2, 135.5, 134.5, 132.1, 131.2, 129.8, 128.7, 128.2, 128.0, 127.2, 125.8, 39.9, 37.3, 33.4, 30.5, 21.5; IR (KBr): 3025, 2917, 1614, 1477, 1378, 1085, 1005, 875, 820, 721 Enantiomeric excess: 95%, determined by HPLC (Daicel Chirapak OD-H, hexane / isopropanol = 80/20, flow rate 1.0 mL/min, T = 30 °C, 254 nm ):  $t_R = 8.34$  min (minor),  $t_R = 15.71$  min (major);  $[\alpha]_D^{20} = +33.1$  ( $c$  1.0,  $\text{CHCl}_3$ ); APCI-FTMS exact mass calcd for  $(\text{C}_{20}\text{H}_{18}\text{ClN})^+$  requires  $m/z$  308.1206, found  $m/z$  308.1195.

**2-(biphenyl-4-yl)-7-methyl-1,2,3,4-tetrahydroacridine (5ig):** white solid, mp 160-162 °C, yield: 99%; (Flash column chromatography eluent, dichloromethane 200 mL, and then petroleum ether / ethyl acetate = 4/1);  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  (ppm) 7.90 (d,  $J = 8.4$  Hz, 1H), 7.77 (s, 1H), 7.62-7.58 (m, 4H), 7.48-7.32 (m, 7H), 3.38-3.12 (m, 5H), 2.52 (s, 3H), 2.40-2.34 (m, 1H), 2.24-2.14 (m, 1H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) 157.4, 145.5, 144.9, 141.0, 139.5, 135.4, 134.5, 131.1, 130.2, 128.8, 128.1, 127.4, 127.3, 127.2, 127.2, 127.1, 125.8, 40.2, 37.4, 33.5, 30.6, 21.6; IR (KBr): 3045, 2927, 1614, 1477, 1398, 839, 741, 691; Enantiomeric excess: 93%, determined by HPLC (Daicel Chirapak OD-H, hexane / isopropanol = 80/20, flow rate 1.0 mL/min, T = 30 °C, 254 nm ):  $t_R = 10.27$  min (minor),  $t_R = 13.89$  min (major);  $[\alpha]_D^{20} = +12.2$  ( $c$  1.0,  $\text{CHCl}_3$ ); APCI FTMS exact mass calcd for  $(\text{C}_{26}\text{H}_{23}\text{N})^+$  requires  $m/z$  350.1909, found  $m/z$  350.1895.

**7-methyl-2-(naphthalen-2-yl)-1,2,3,4-tetrahydroacridine (5ih):** colourless oil, yield: 99%; (Flash column chromatography eluent, dichloromethane 200 mL, and then petroleum ether / ethyl acetate = 4/1);  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  (ppm) 7.91 (d,  $J = 8.4$  Hz, 1H), 7.85-7.74 (m, 5H), 7.50-7.43 (m, 5H), 3.40-3.18 (m, 5H), 2.52 (s, 3H), 2.45-2.38 (m, 1H), 2.30-2.19 (m, 1H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) 157.4, 145.5, 143.2, 135.4, 133.6, 132.4, 131.1, 130.2, 128.2, 128.1, 127.7, 127.6, 127.2, 126.1, 125.8, 125.7, 125.4, 124.9, 40.6, 37.3, 33.6, 30.5, 21.5; IR (KBr): 3055, 2917, 1594, 1486, 1420, 1358, 810, 741; Enantiomeric excess: 94%, determined by HPLC (Daicel Chirapak OD-H, hexane / isopropanol = 80/20, flow rate 1.0 mL/min, T = 30 °C, 254 nm ):  $t_R =$

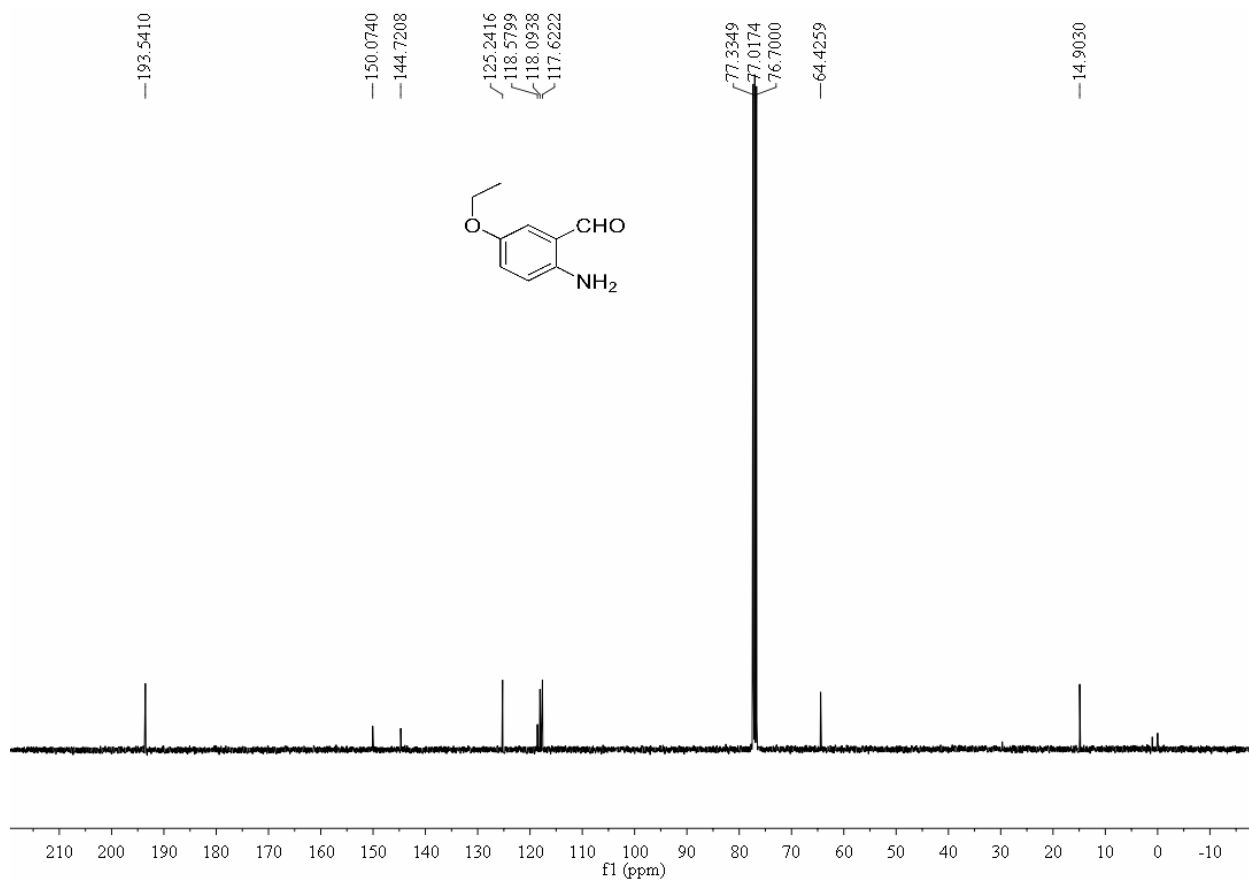
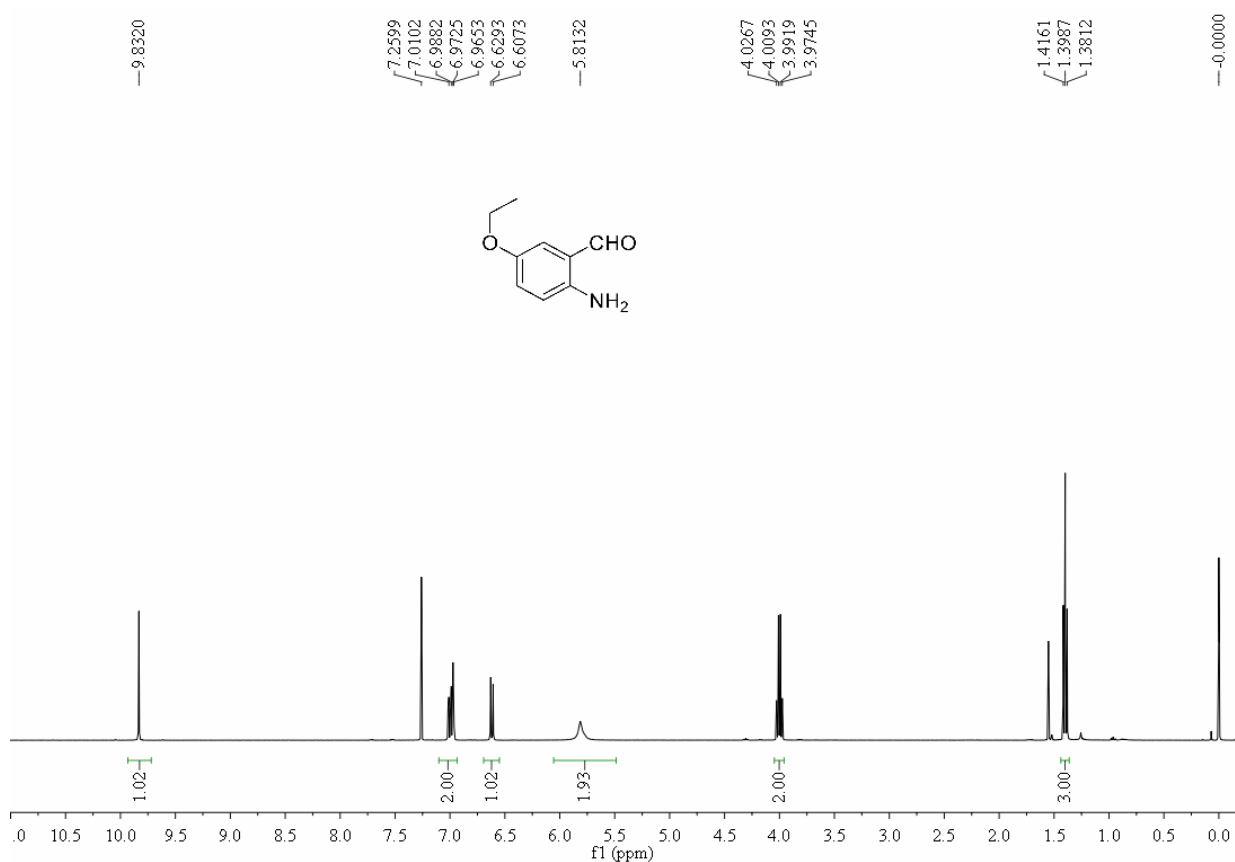
17.37 min (minor),  $t_R = 20.45$  min (major);  $[\alpha]_D^{20} = +16.0$  ( $c$  1.0,  $\text{CHCl}_3$ ); APCI FTMS exact mass calcd for  $(\text{C}_{24}\text{H}_{21}\text{N})^+$  requires  $m/z$  324.1752, found  $m/z$  324.1741.

#### References:

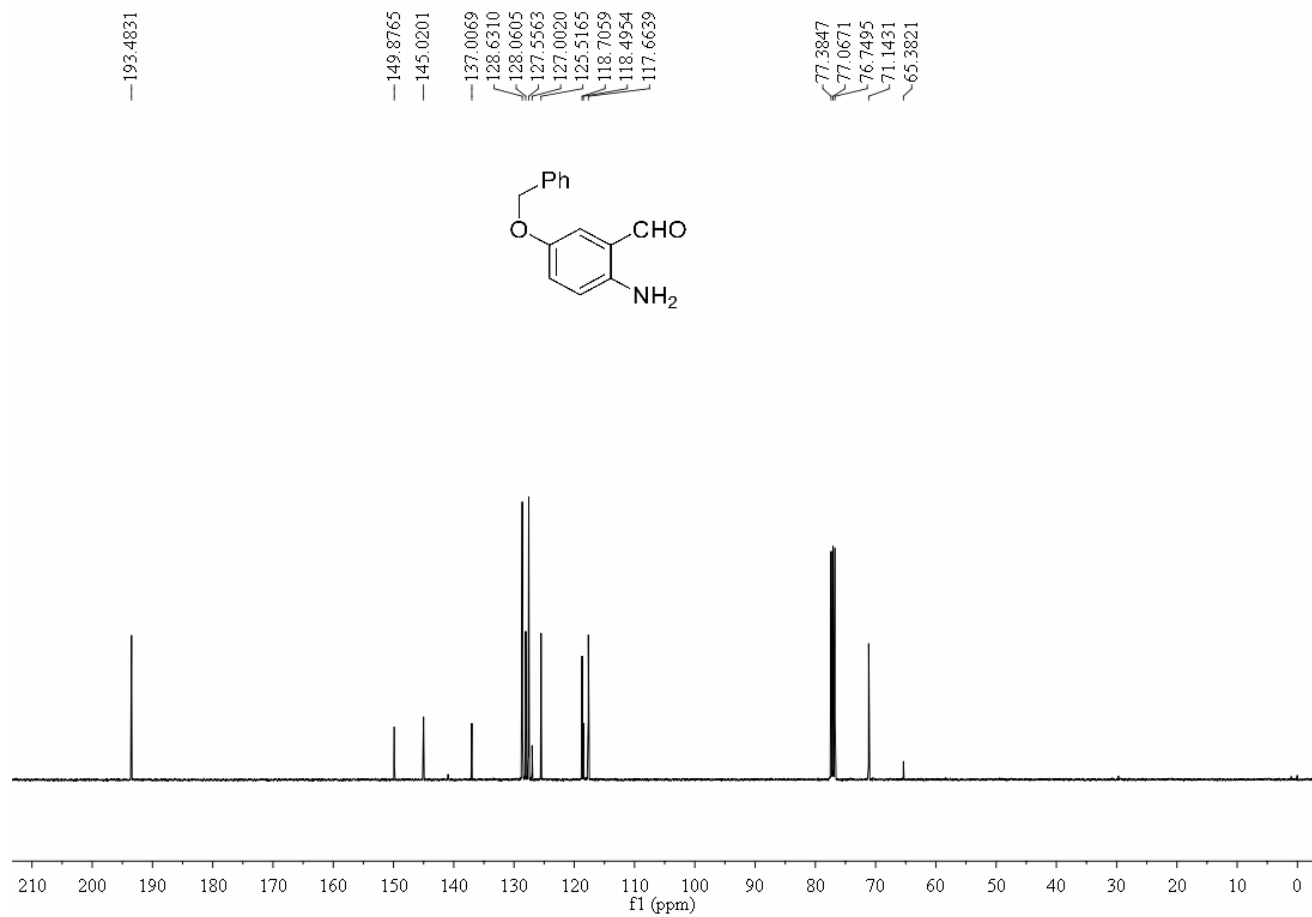
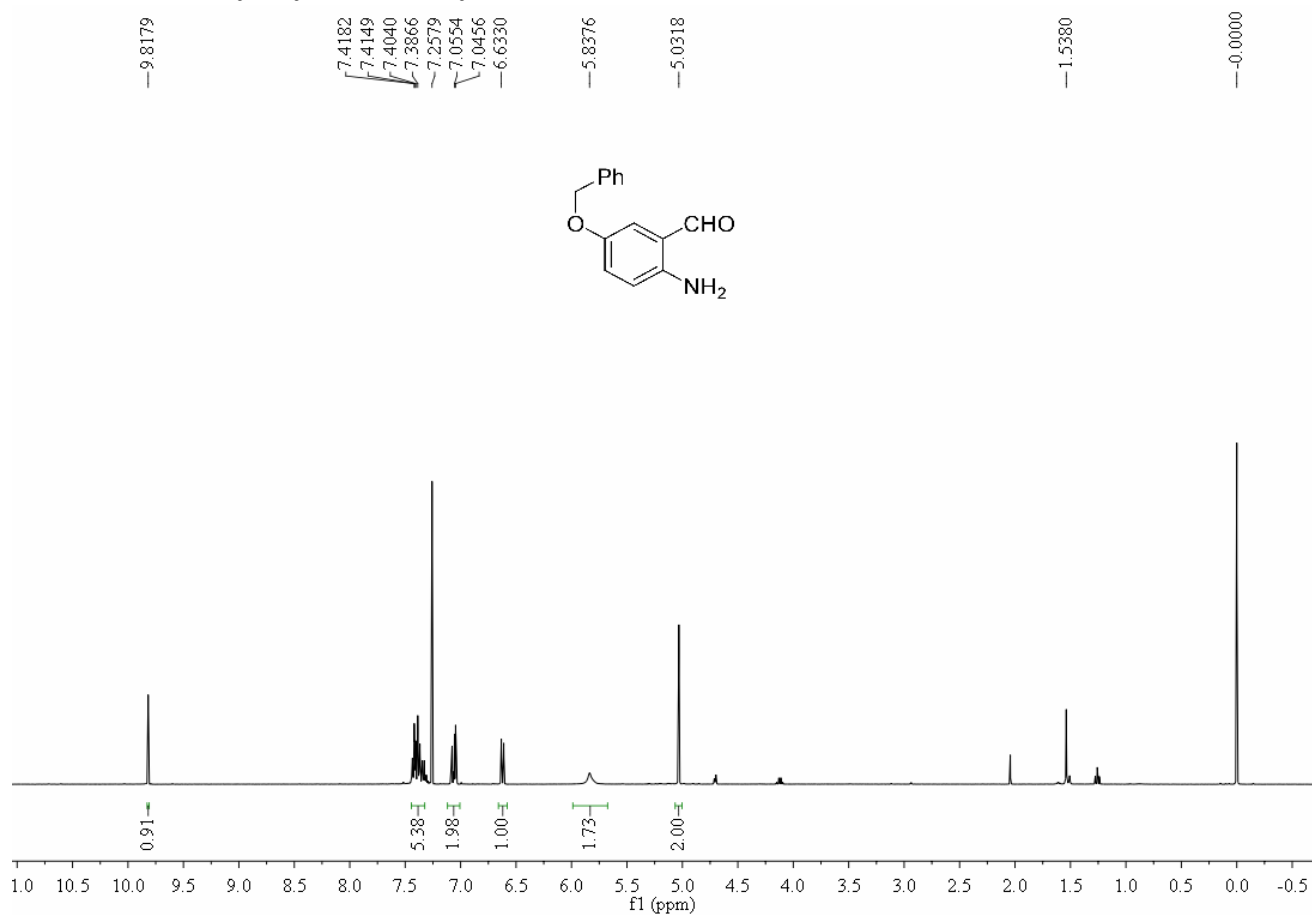
1. Li, L.; Seidel, D. *Org. Lett.* **2010**, *12*, 5064-5067.
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6. Friese, A.; Katja, H. M.; Zündorf, I.; Thomas, W.; Theodor, D.; and Dannhardt, G.. *J. Med. Chem.* **2002**, *45*, 1535-1542.

## NMR and HPLC Spectra

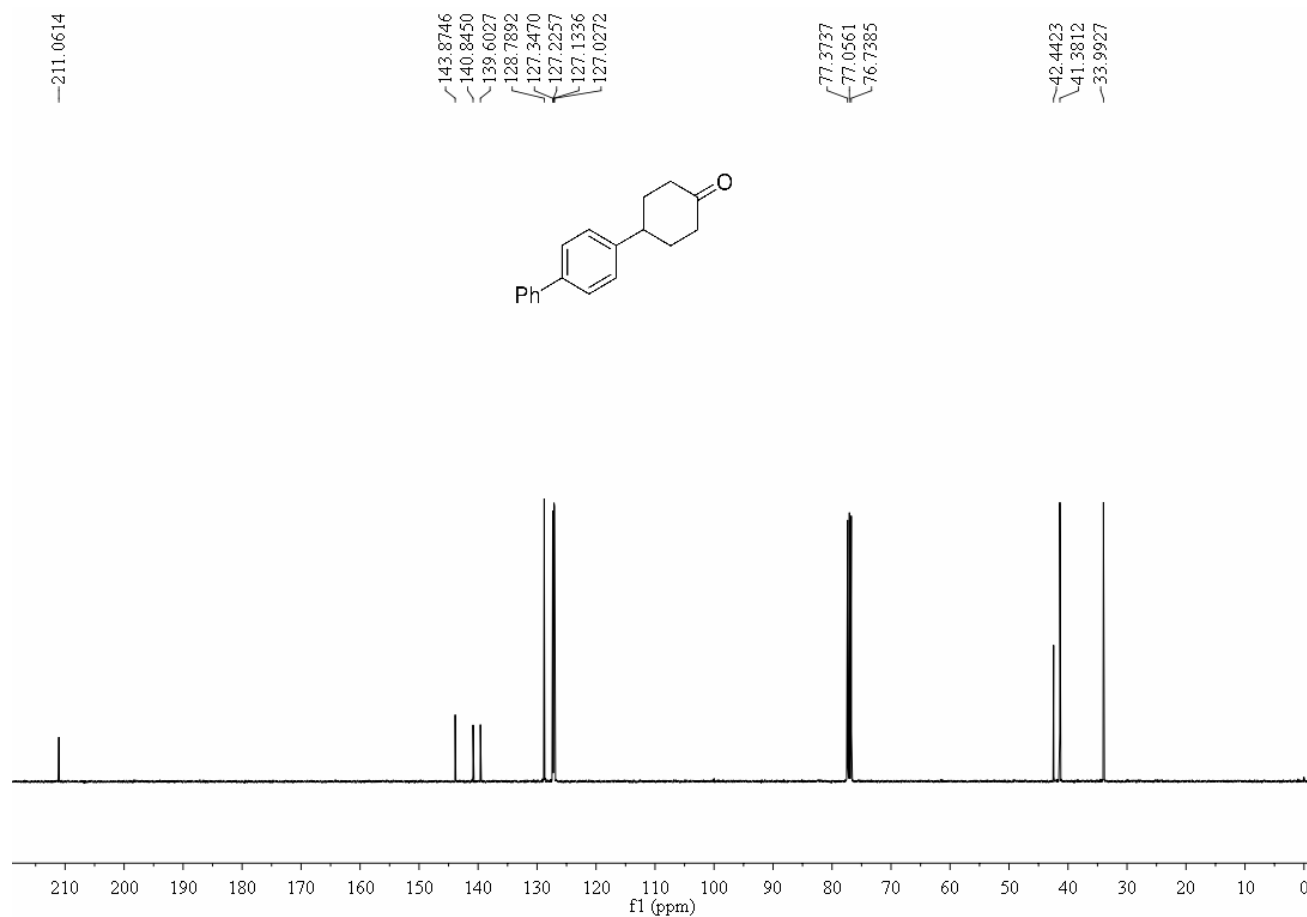
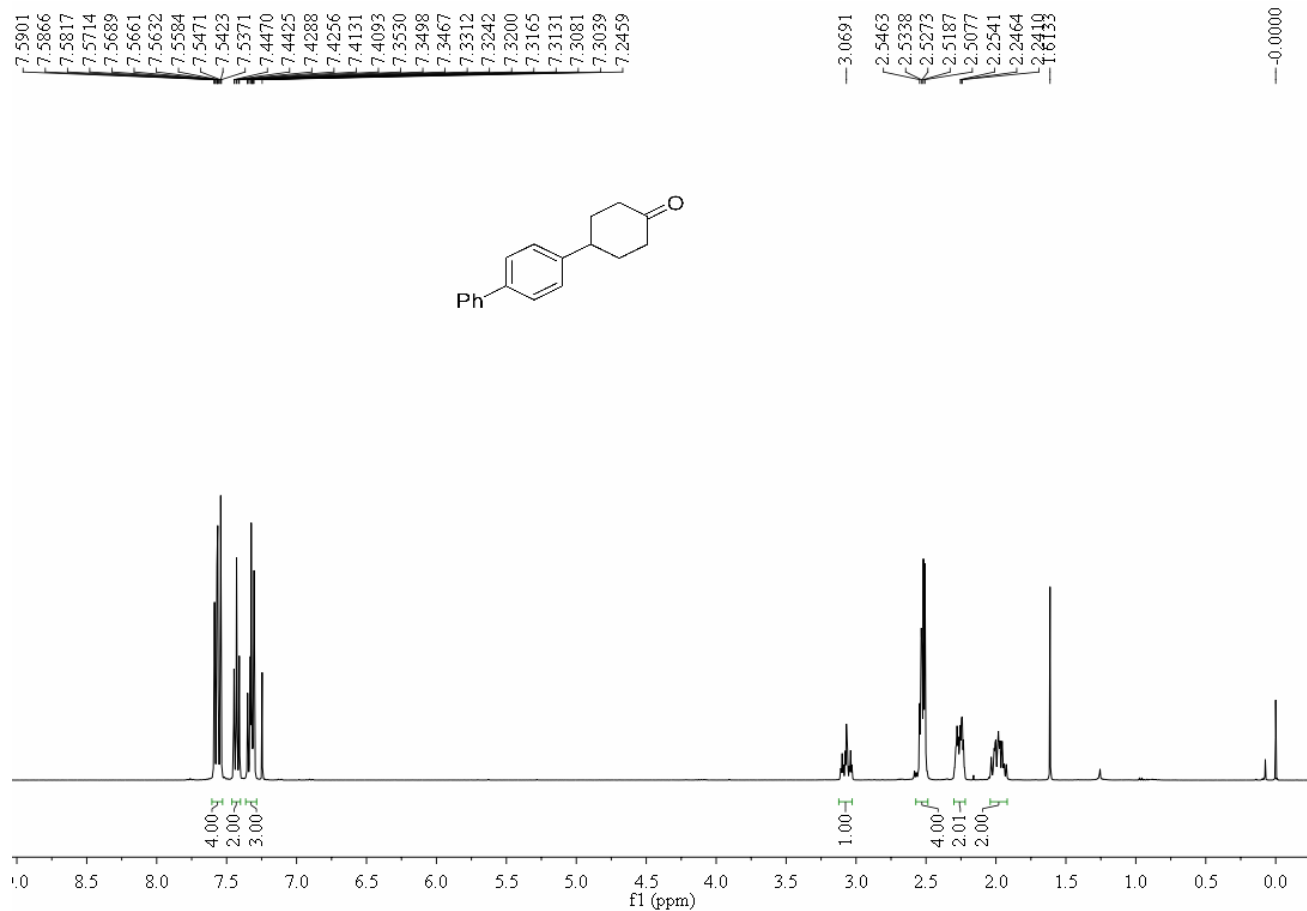
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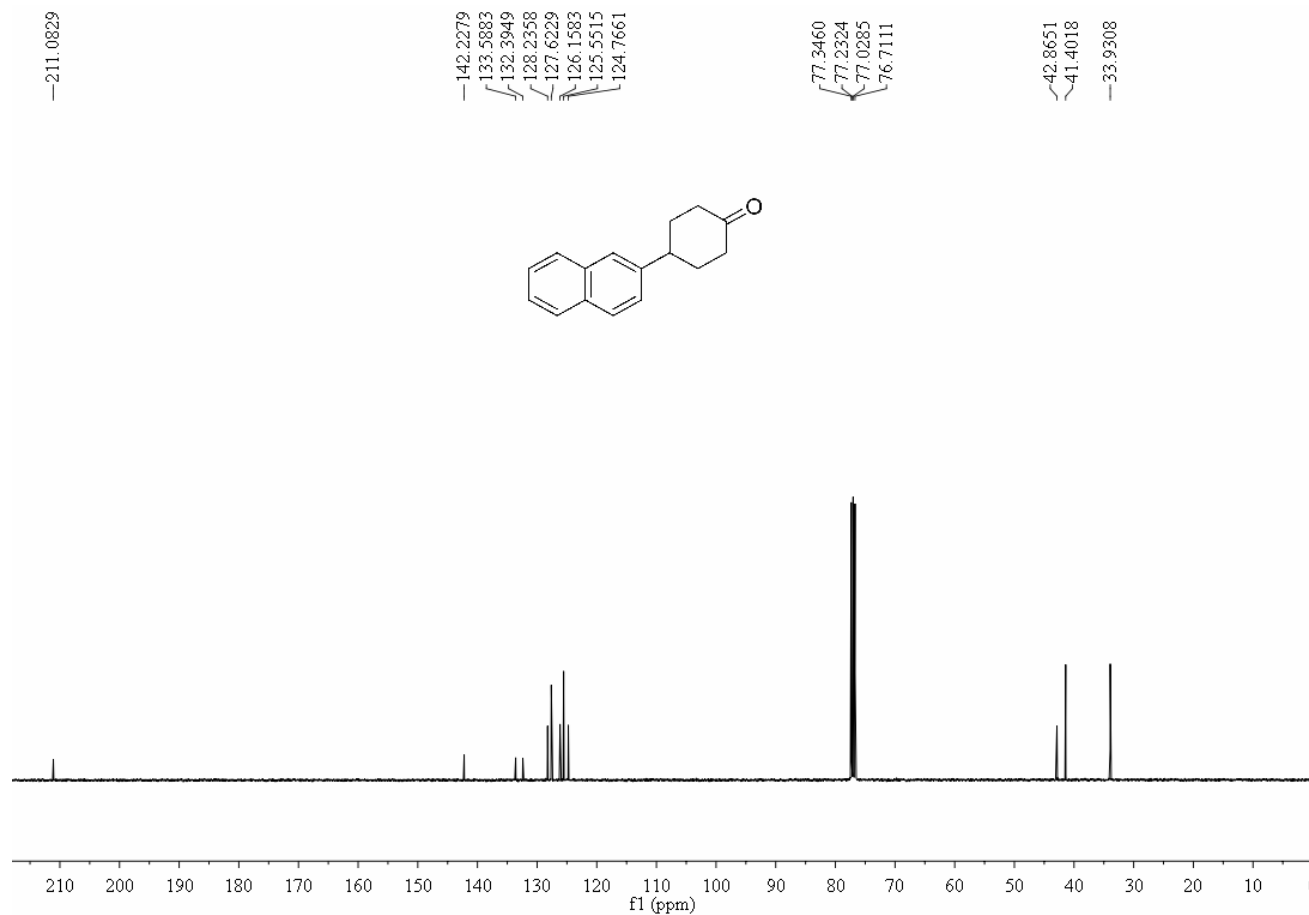
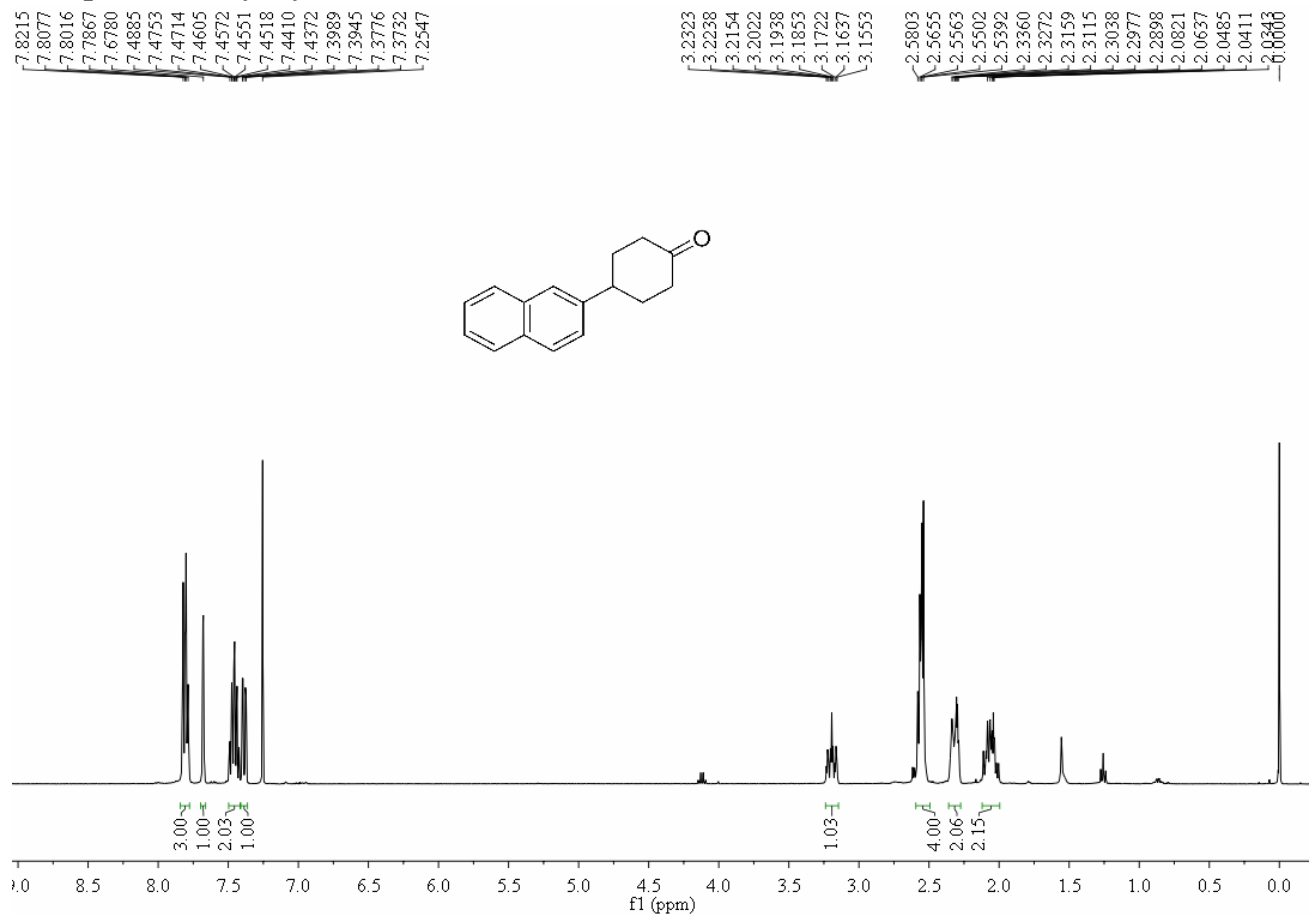
### 2-amino-5-(benzyloxy)benzaldehyde (3d)



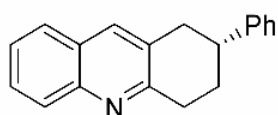
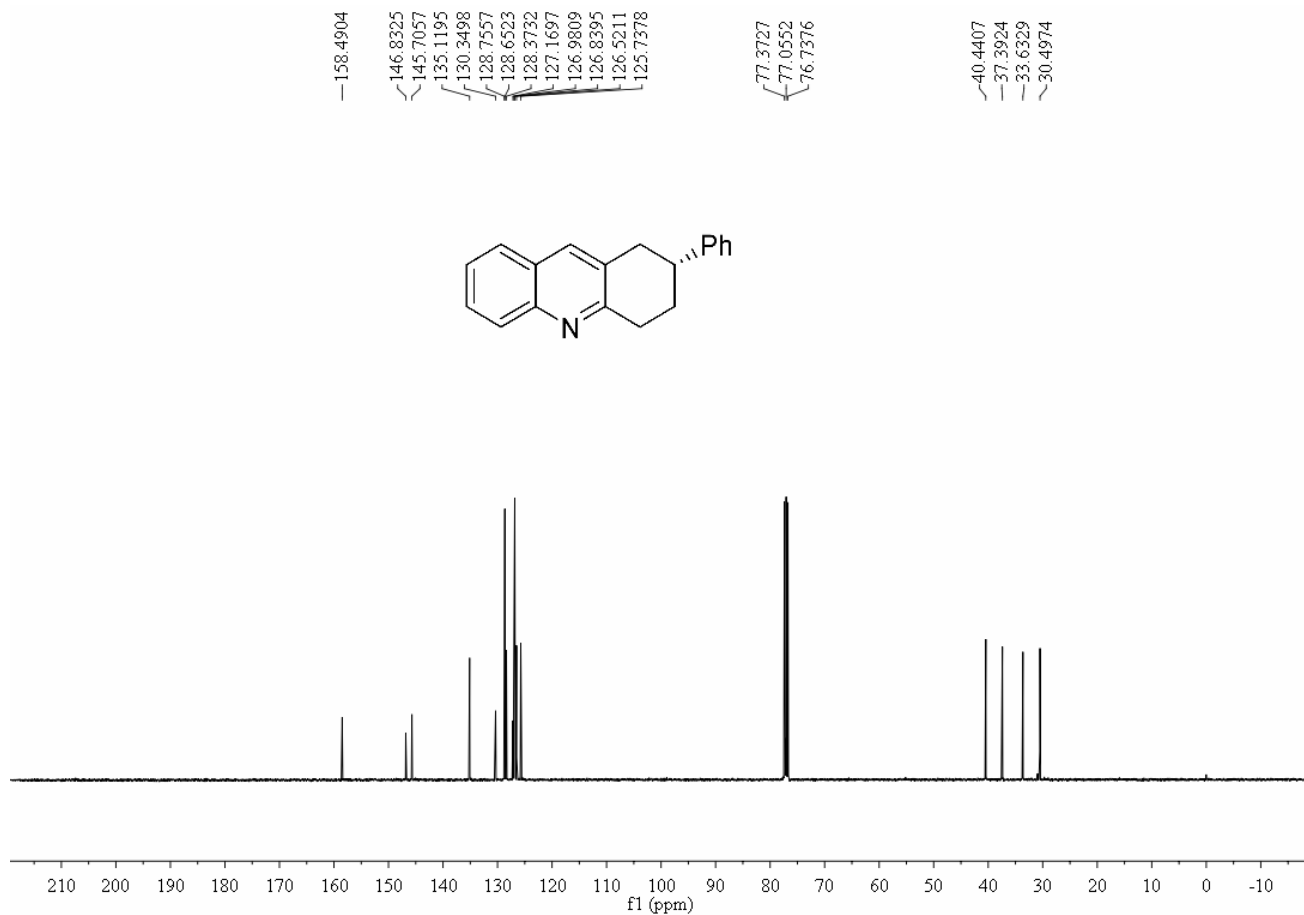
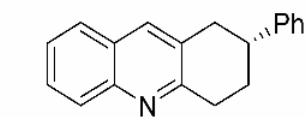
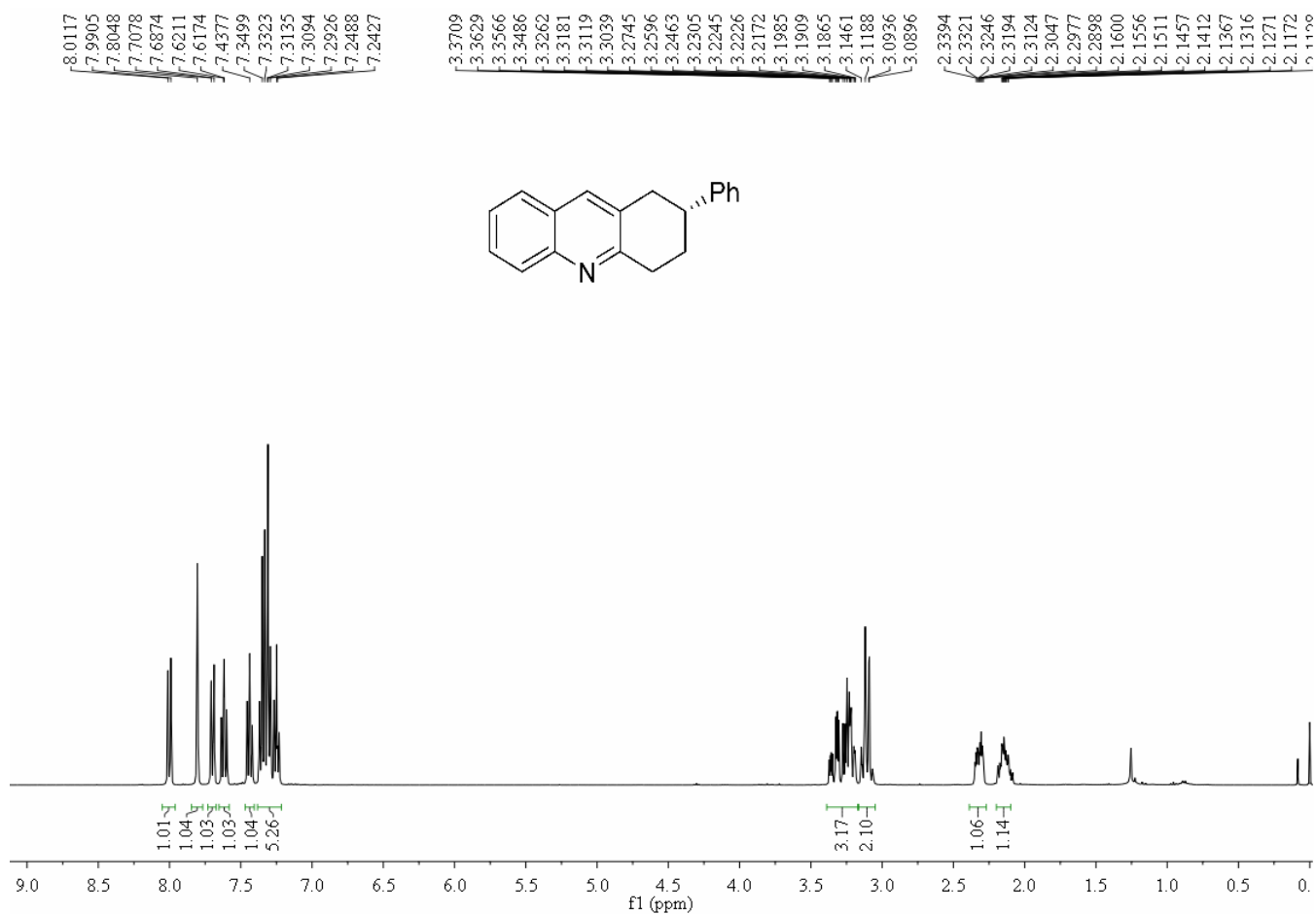
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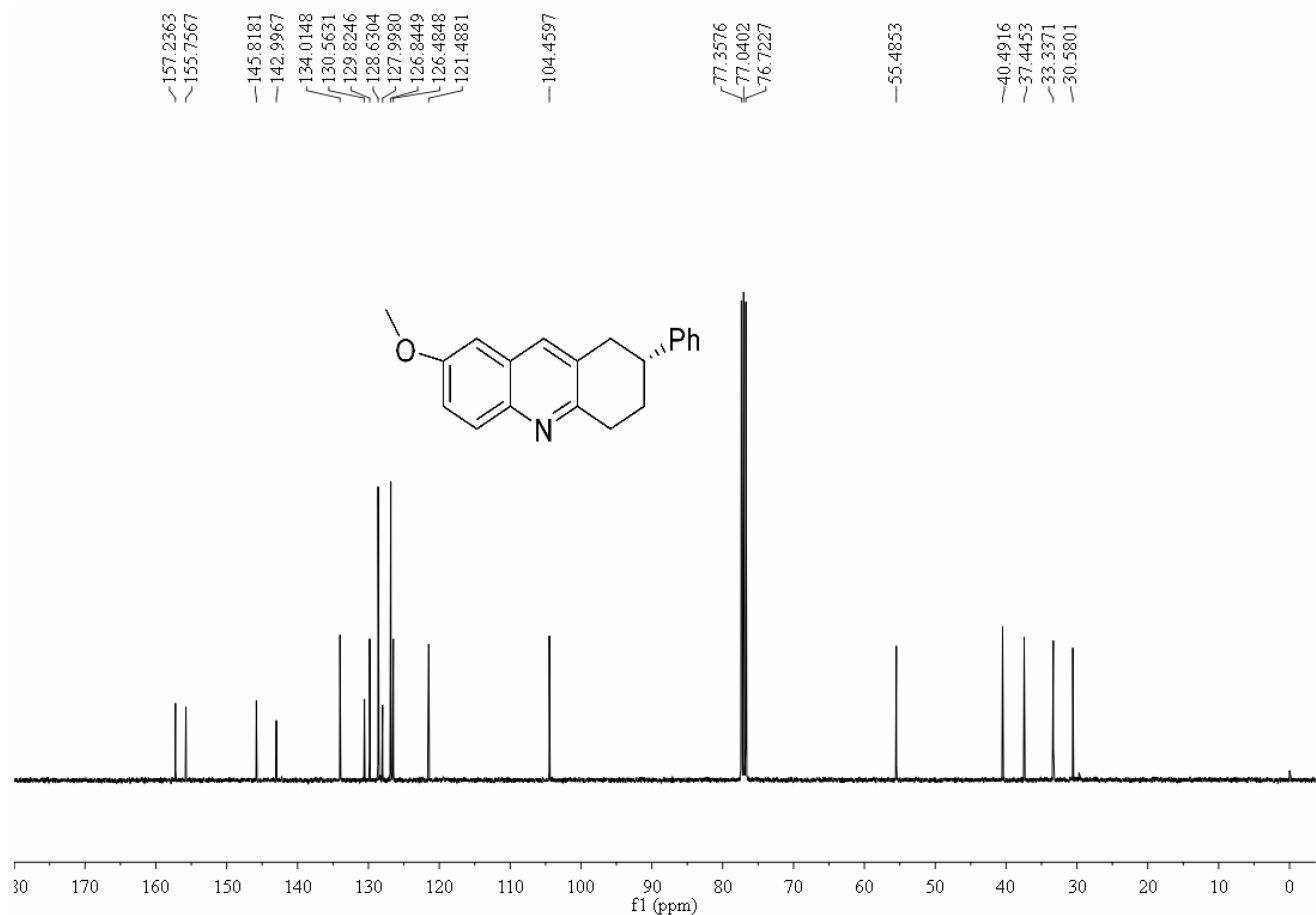
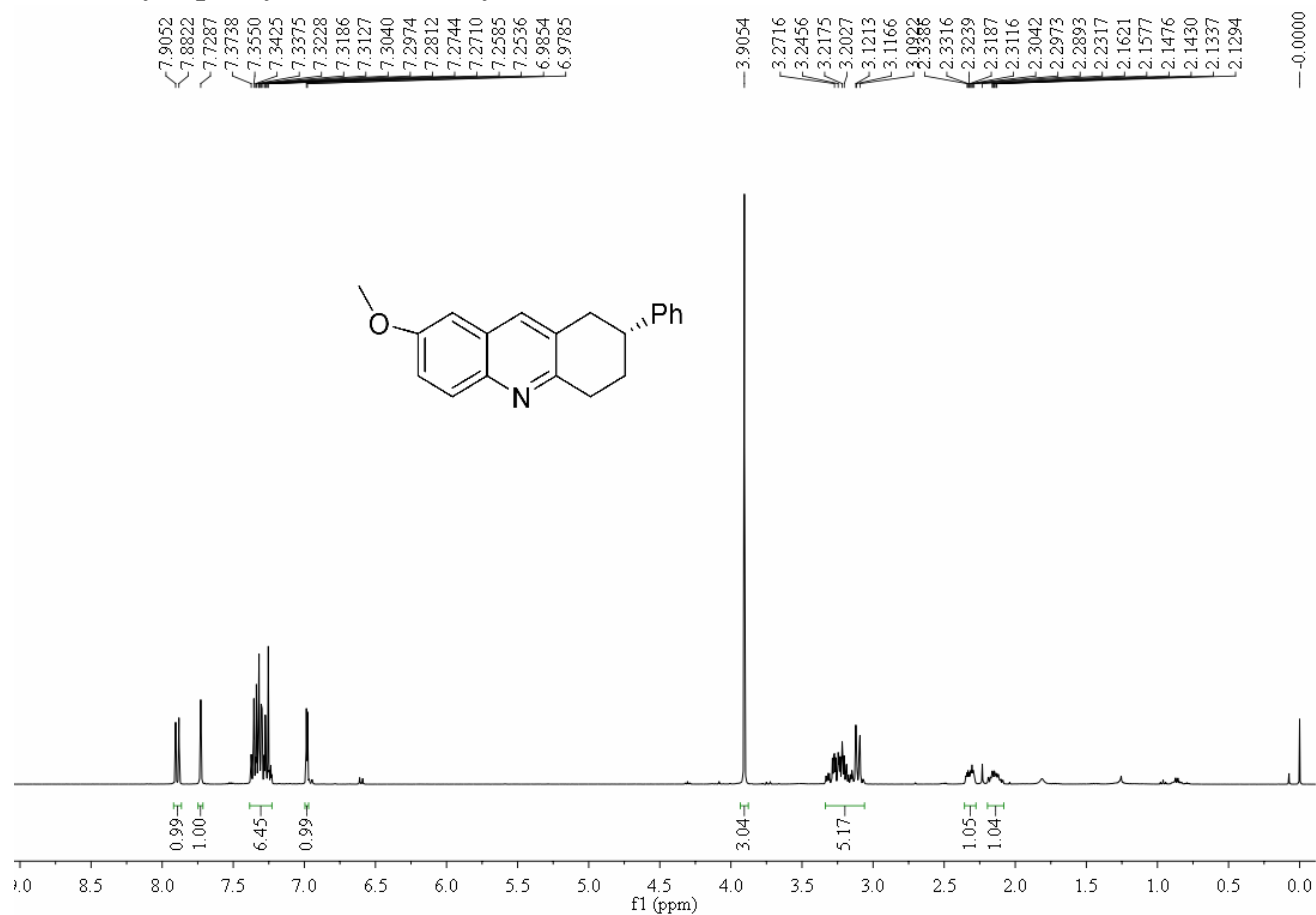
### 4-(naphthalen-2-yl)cyclohexanone (4h)



## 2-phenyl-1,2,3,4-tetrahydroacridine (5aa)



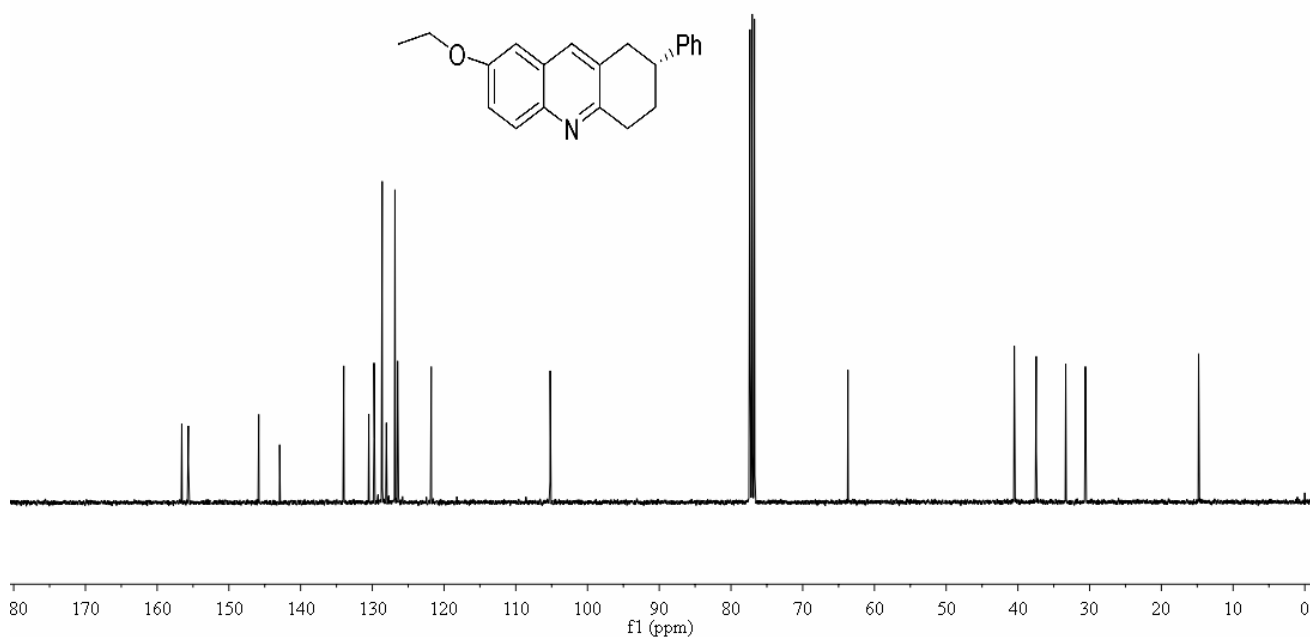
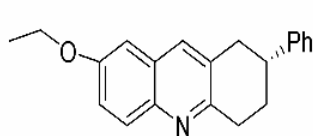
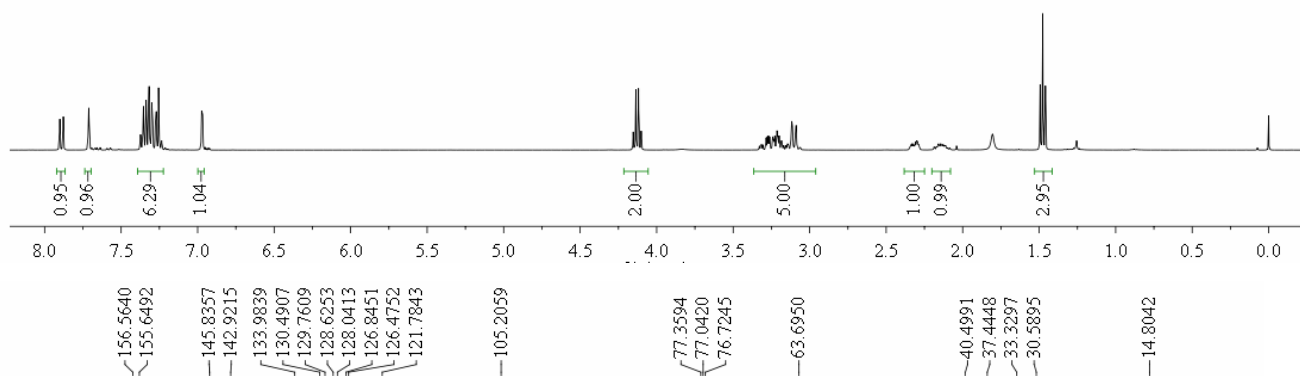
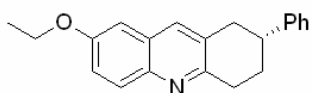
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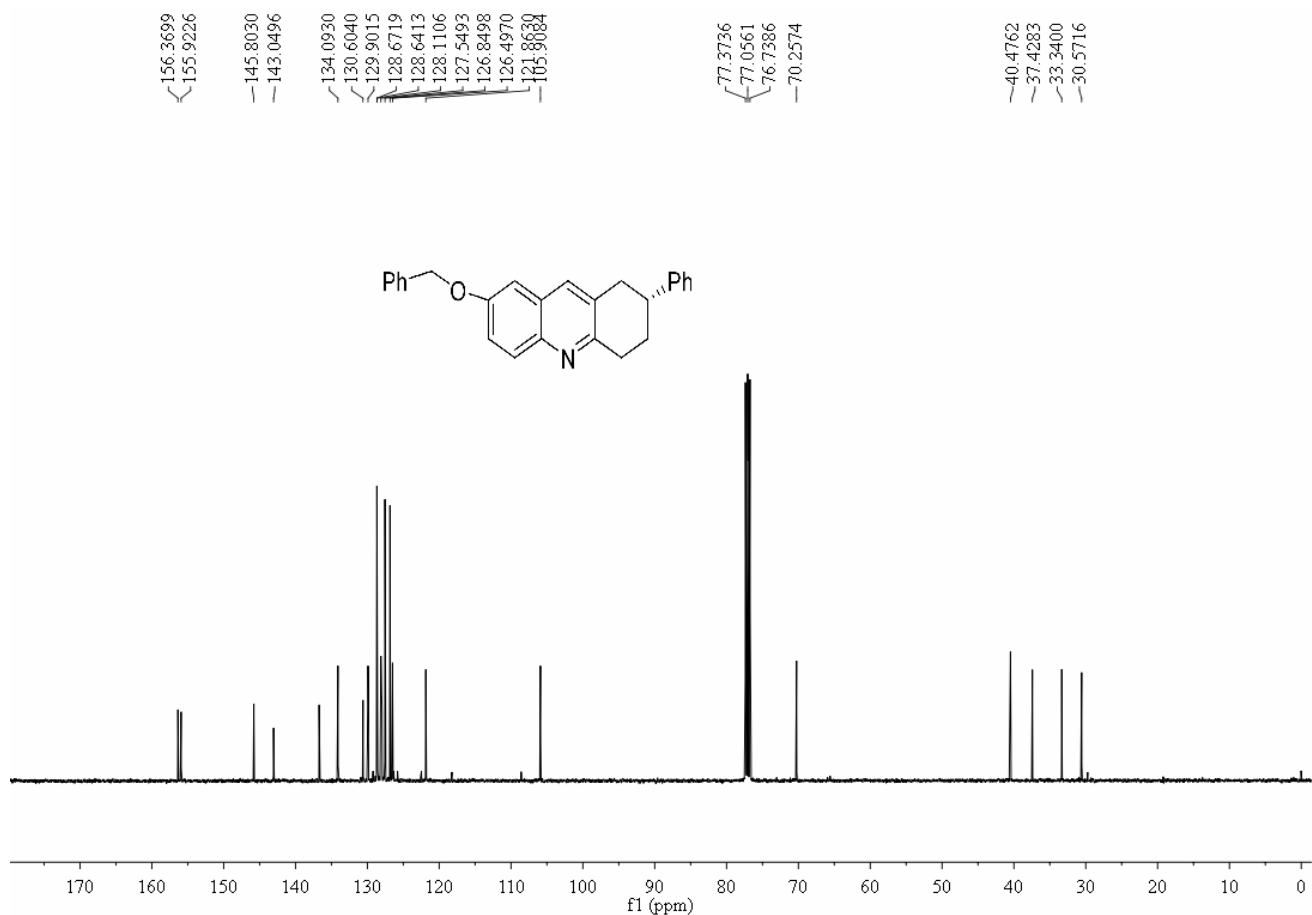
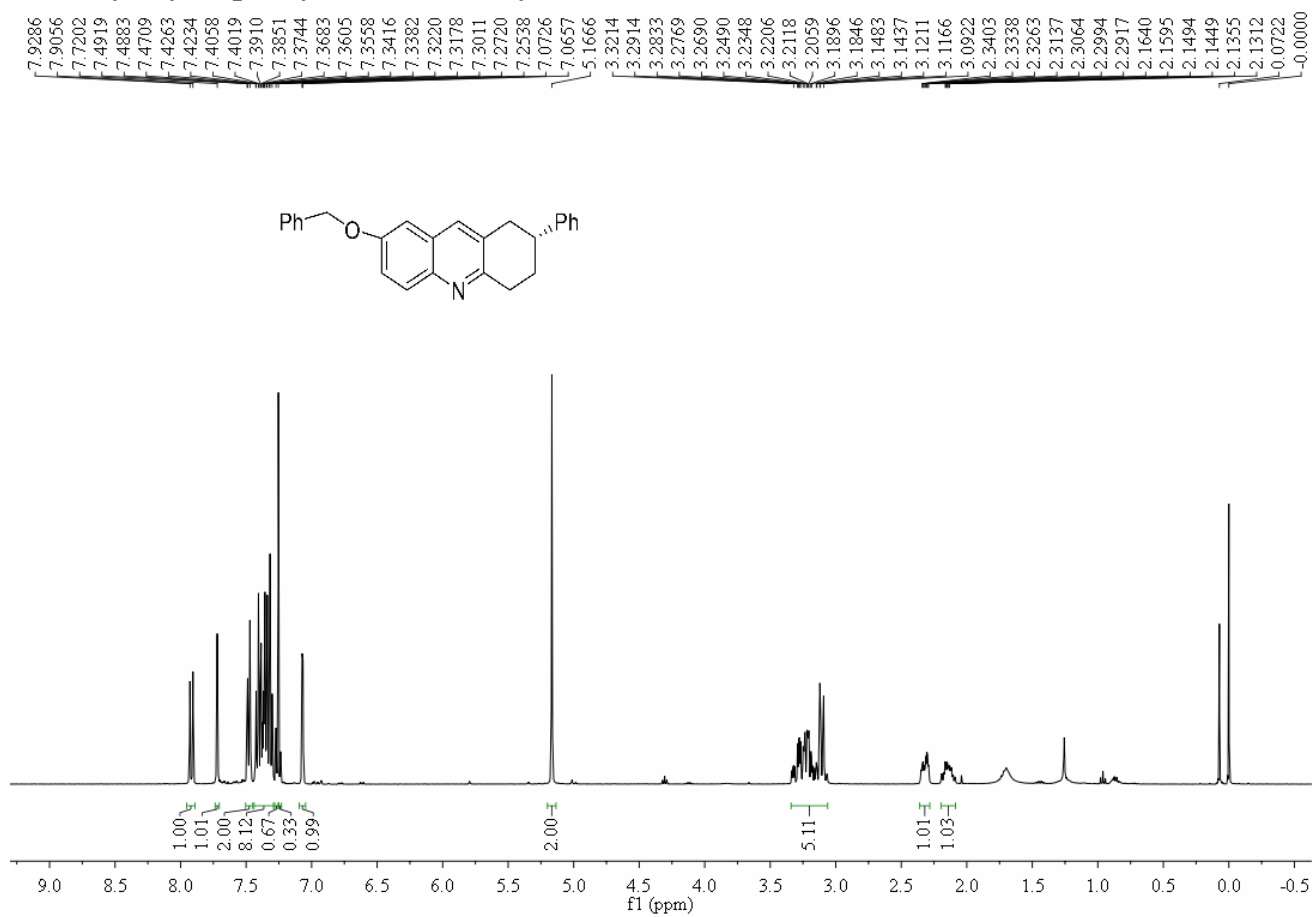


### 7-ethoxy-2-phenyl-1,2,3,4-tetrahydroacridine (5ca)

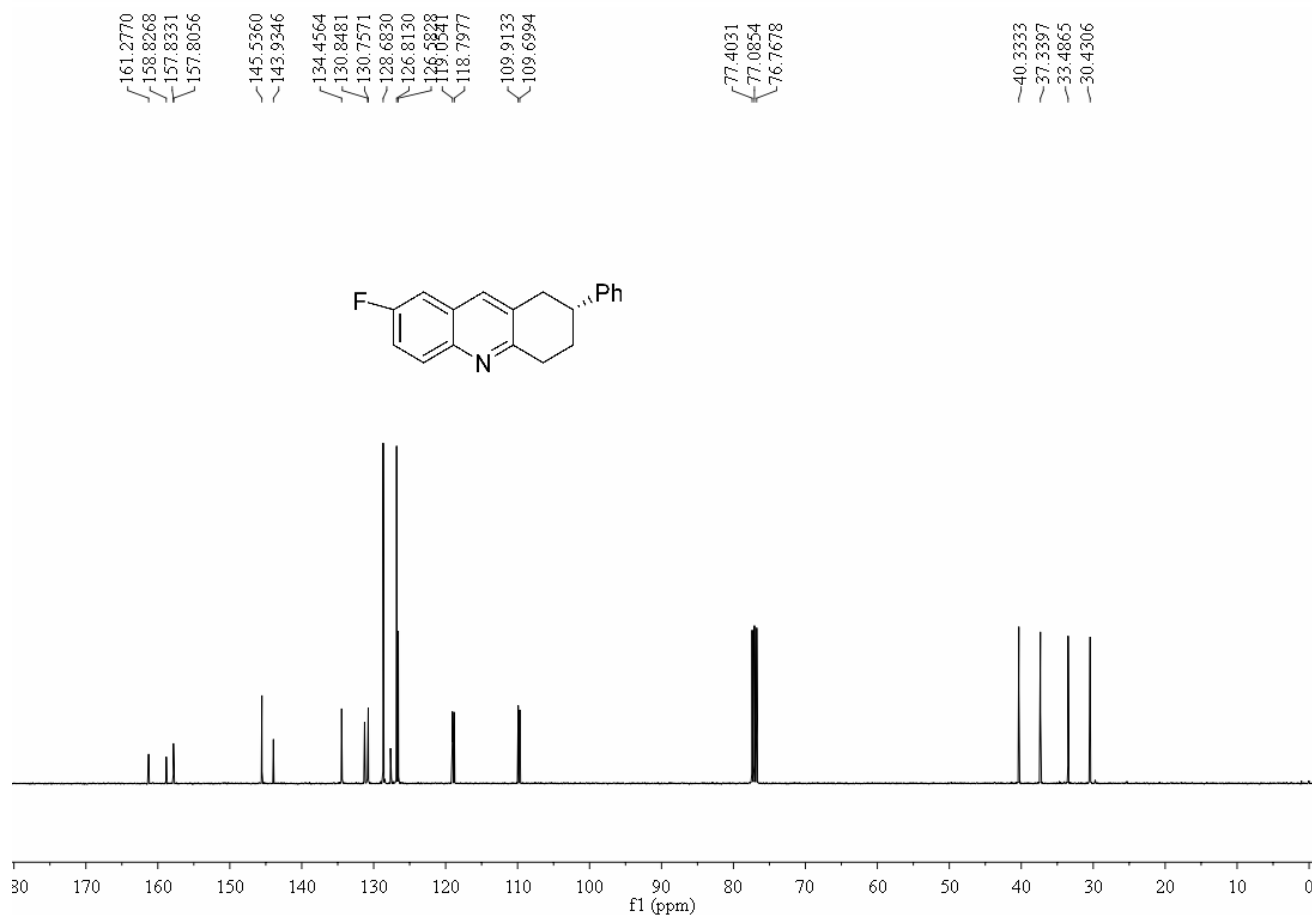
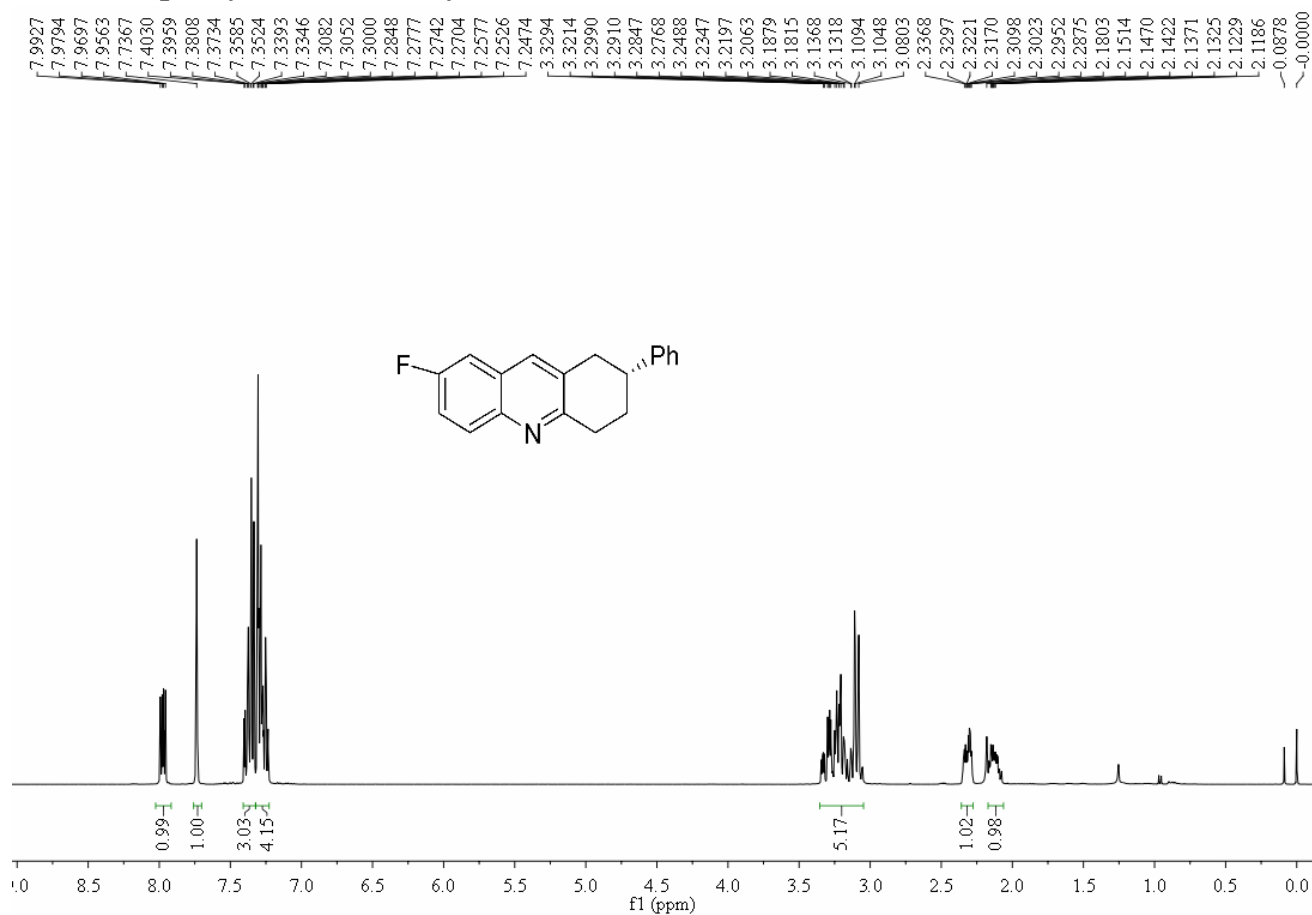
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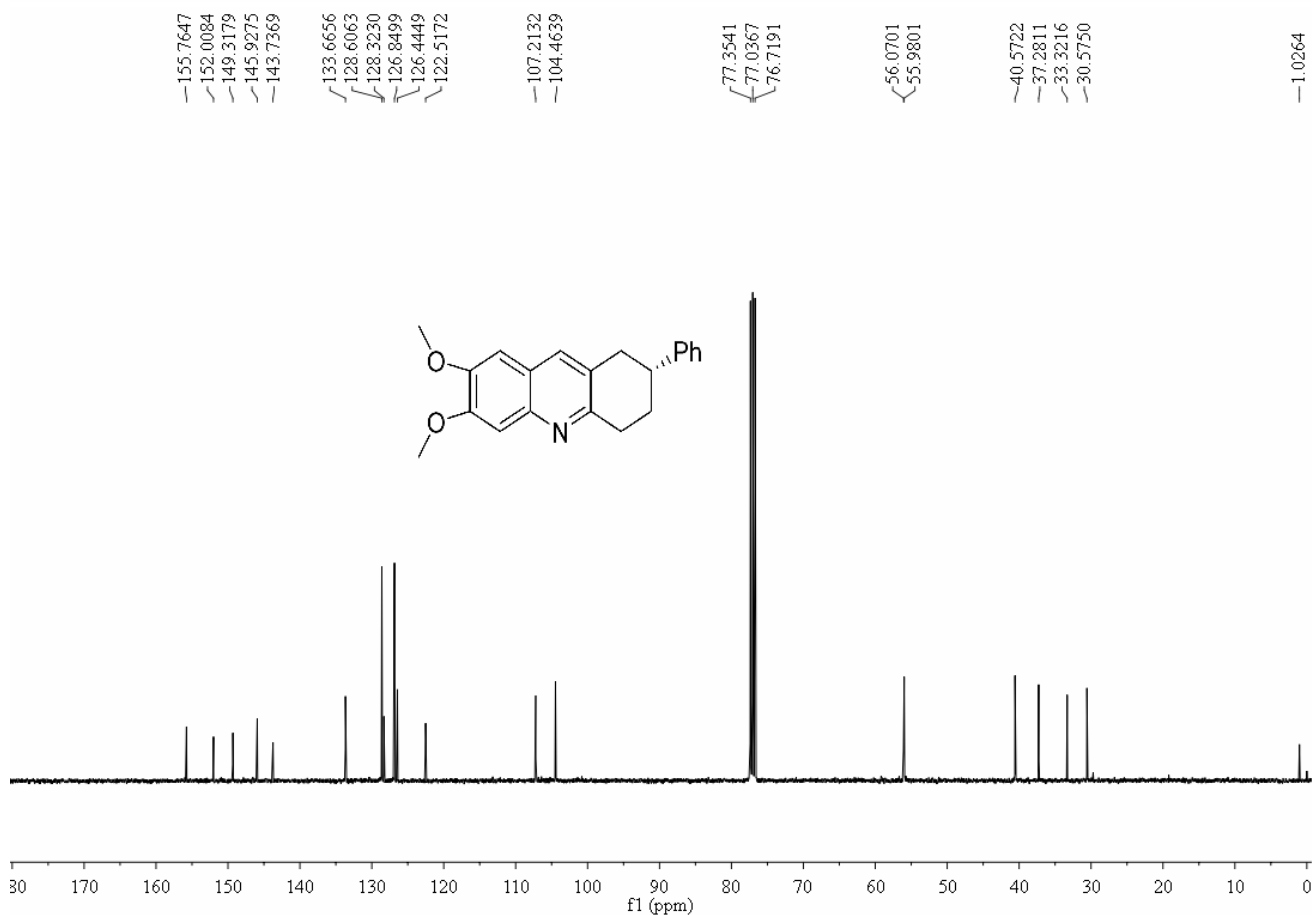
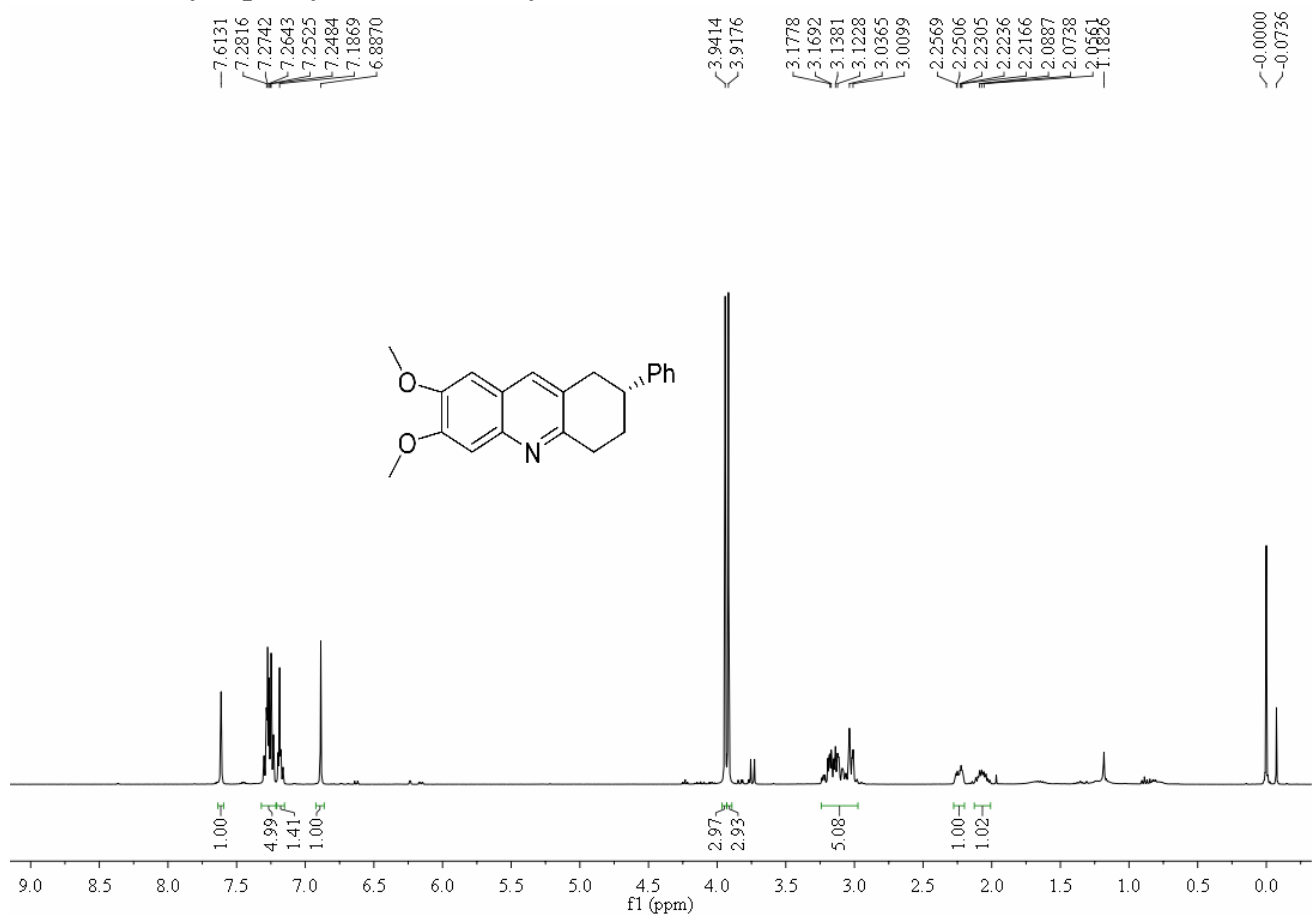
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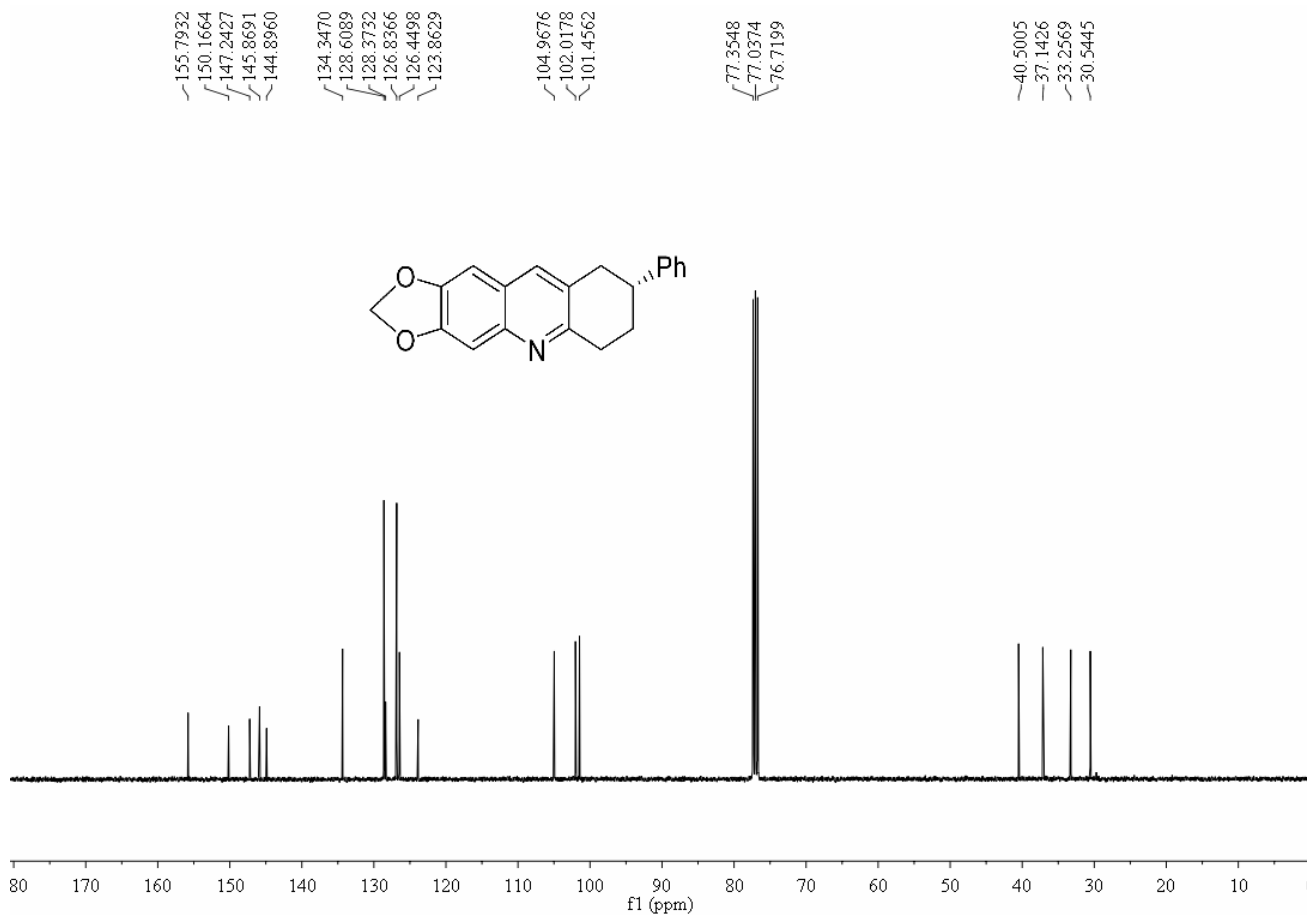
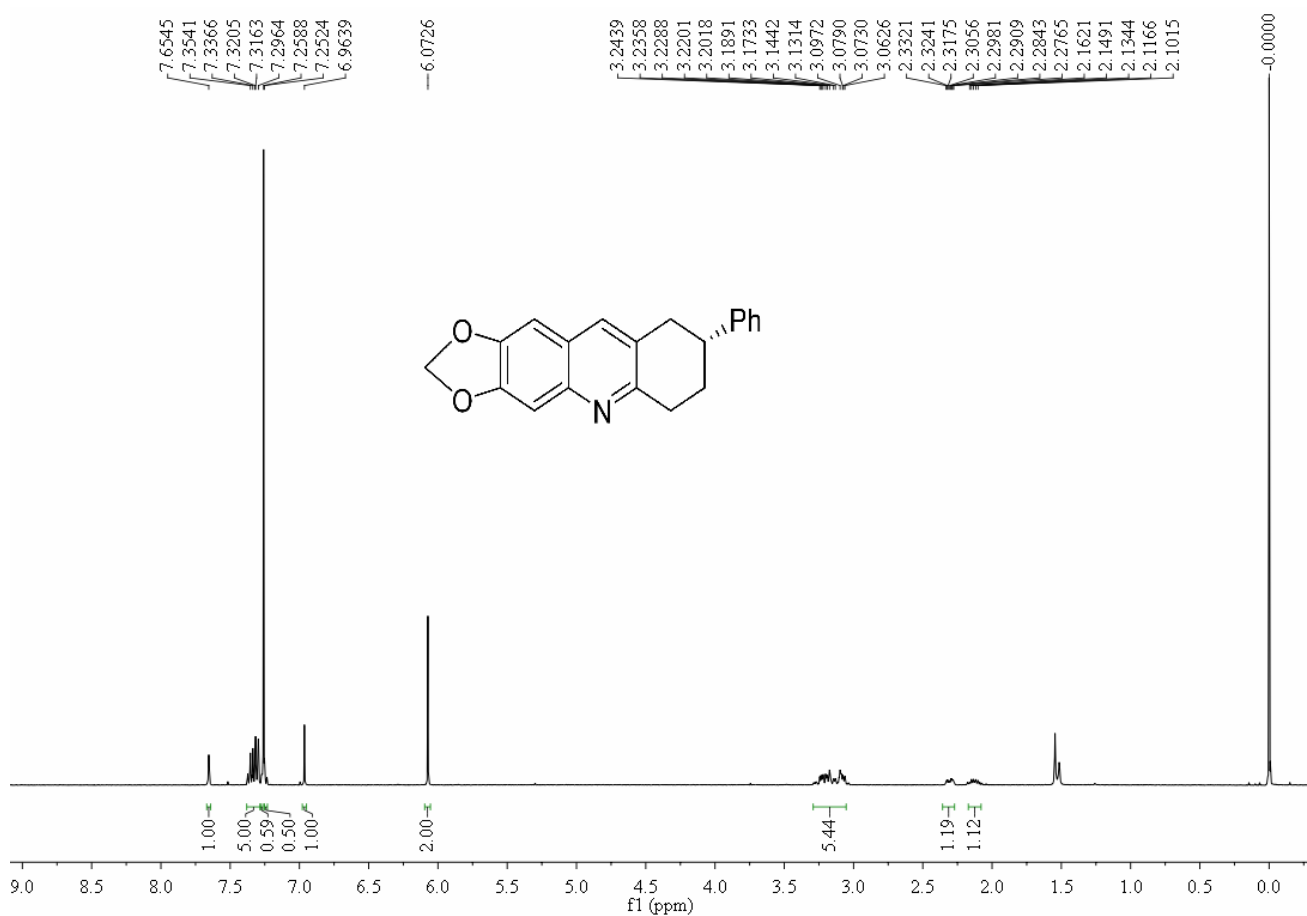
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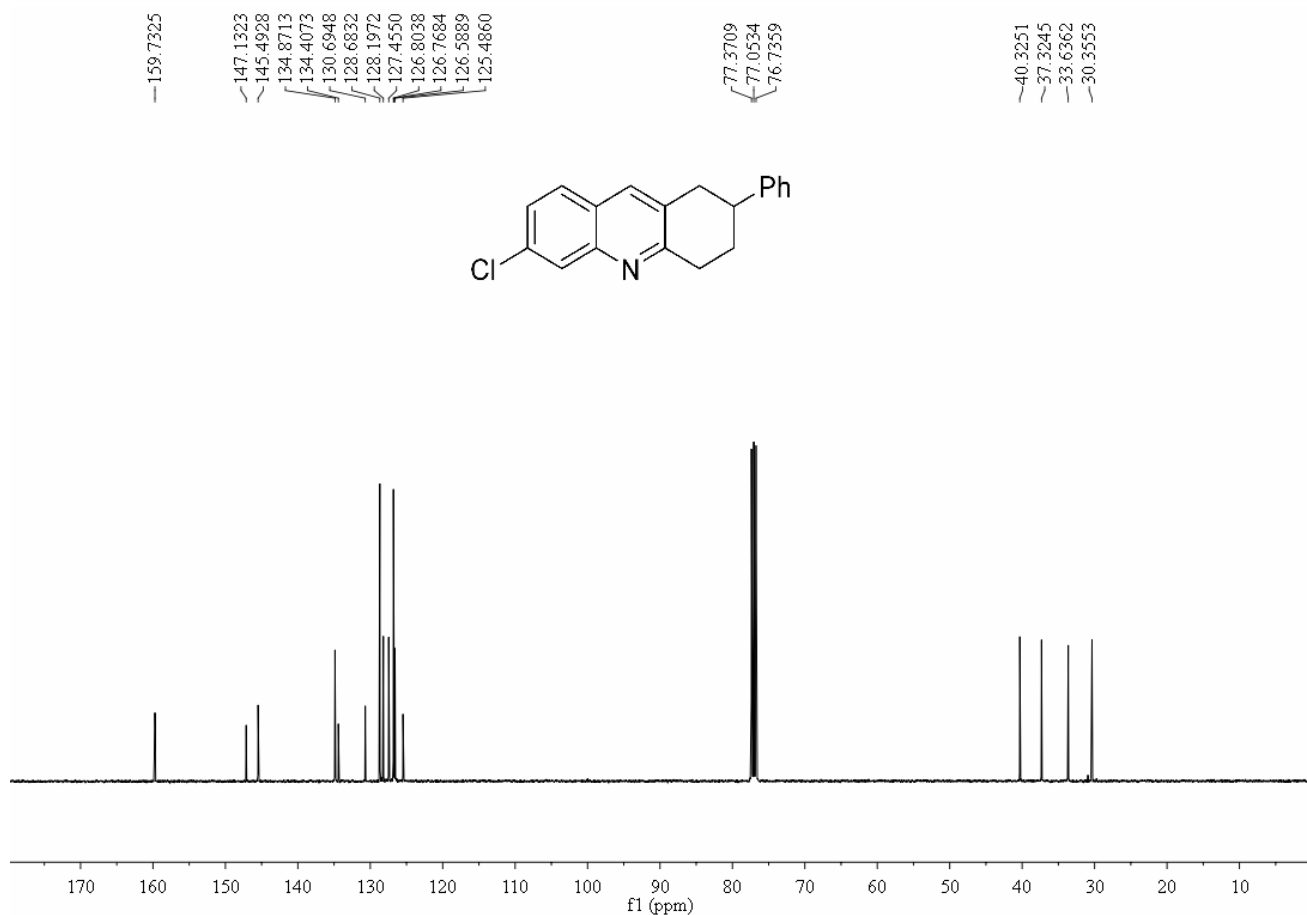
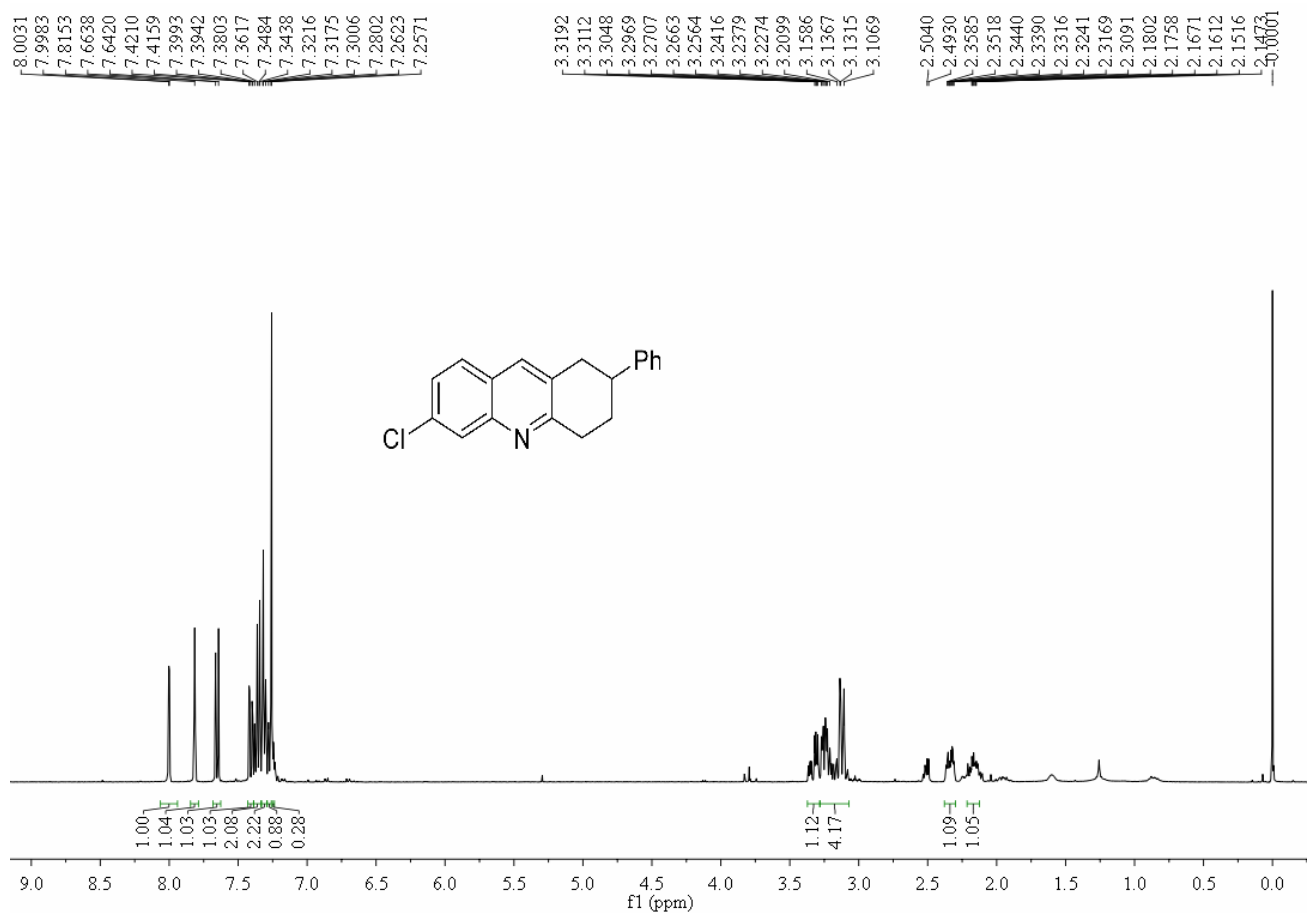
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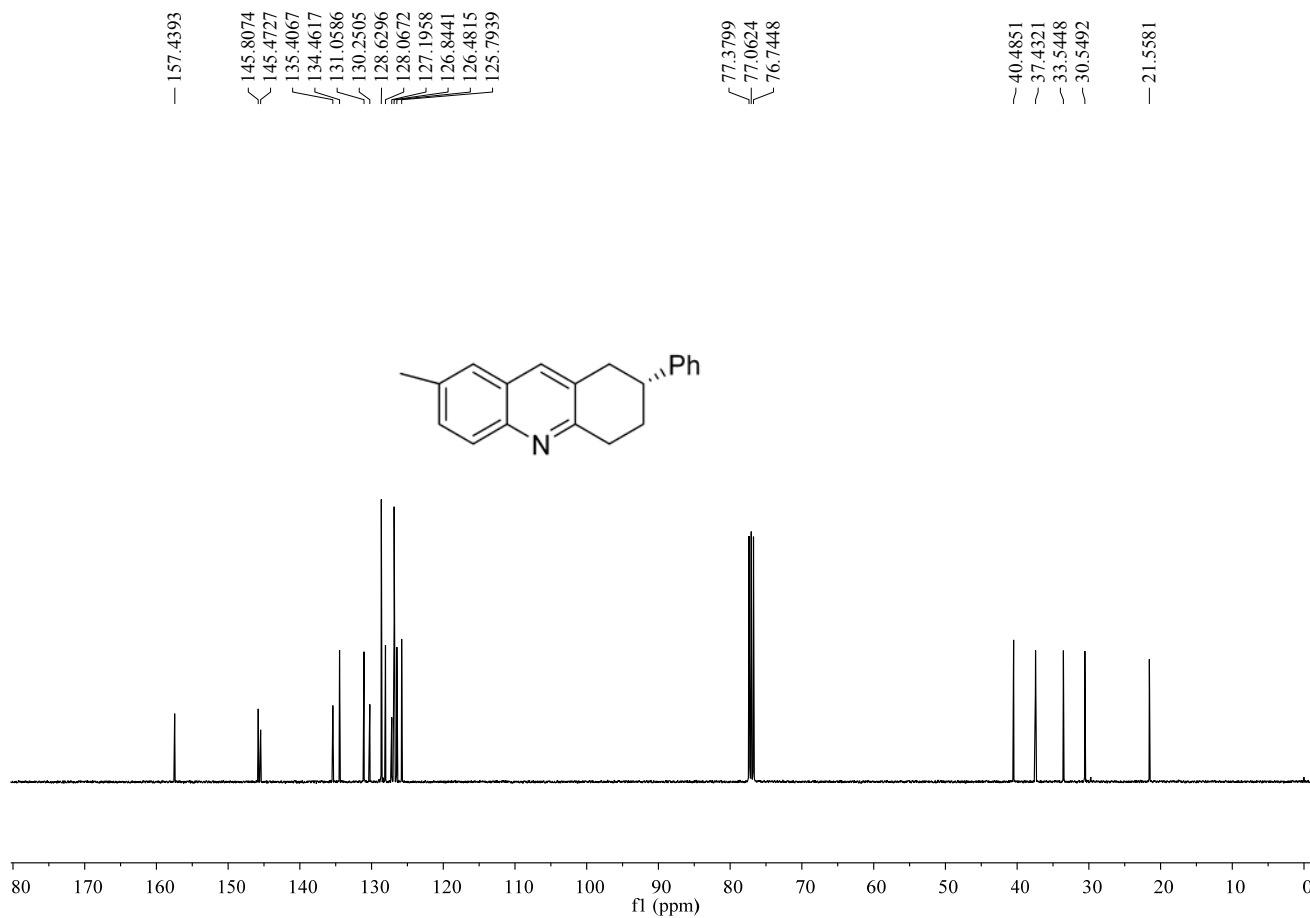
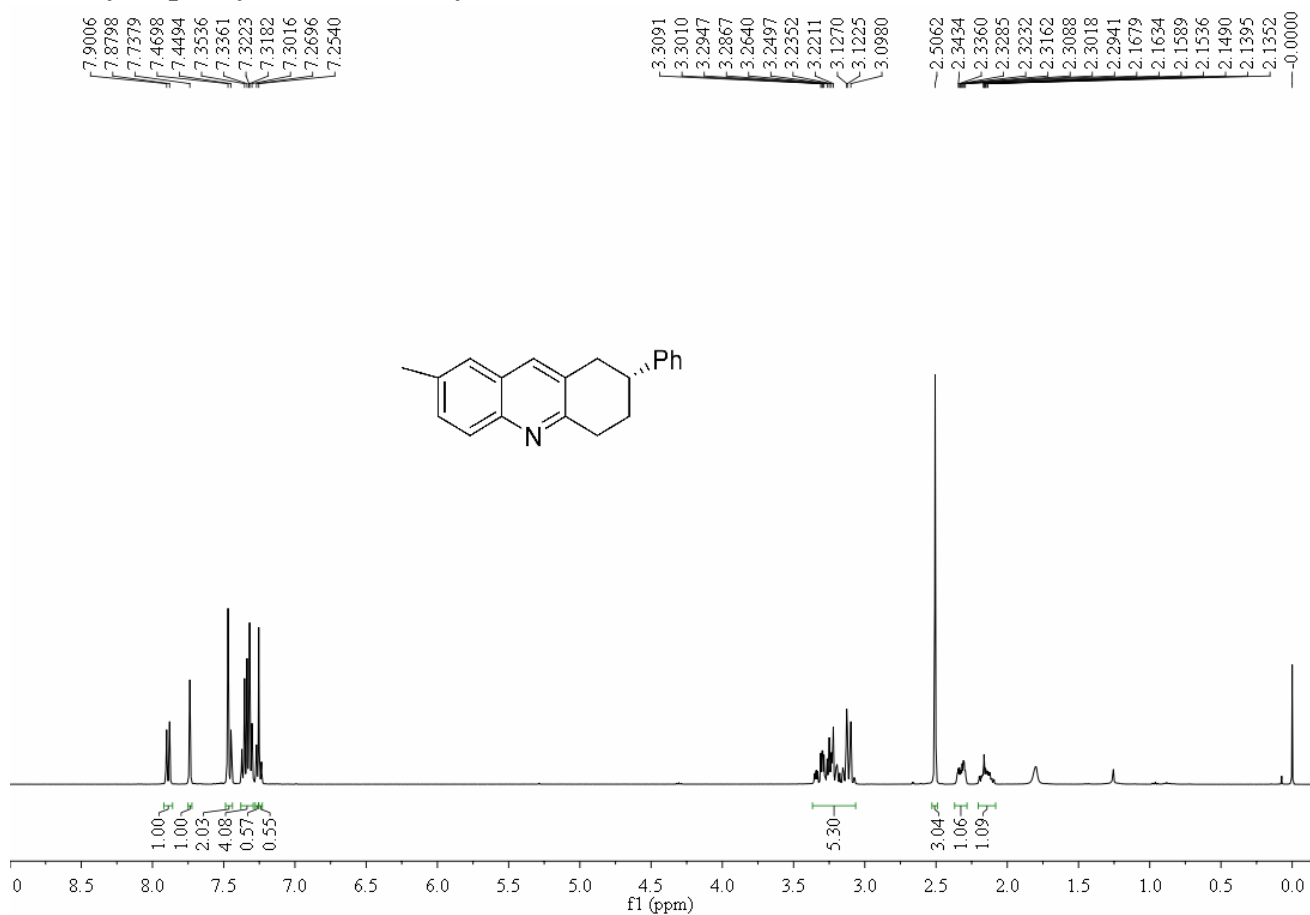
### 8-phenyl-6,7,8,9-tetrahydro-[1,3]dioxolo[4,5-b]acridine (5ga)



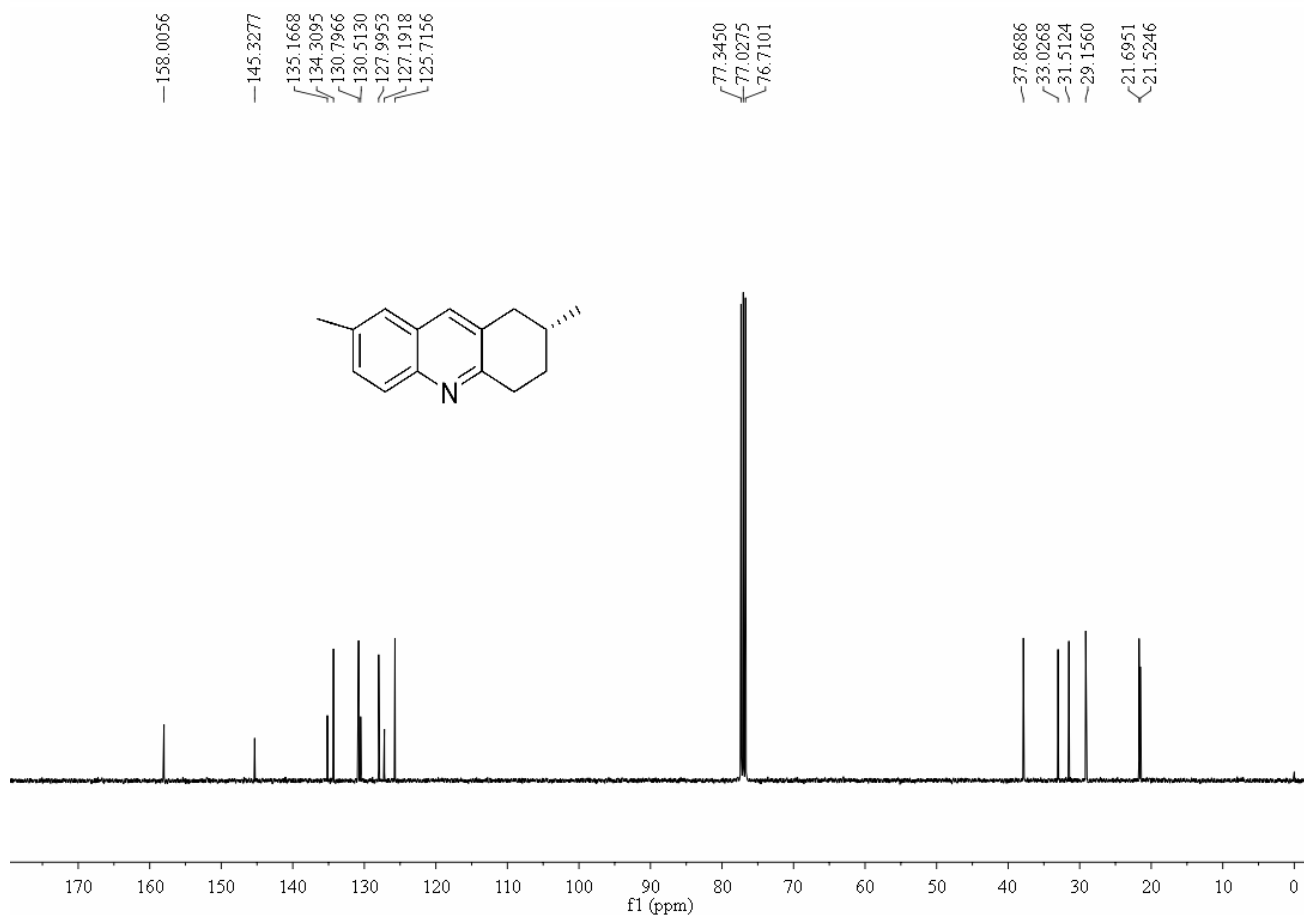
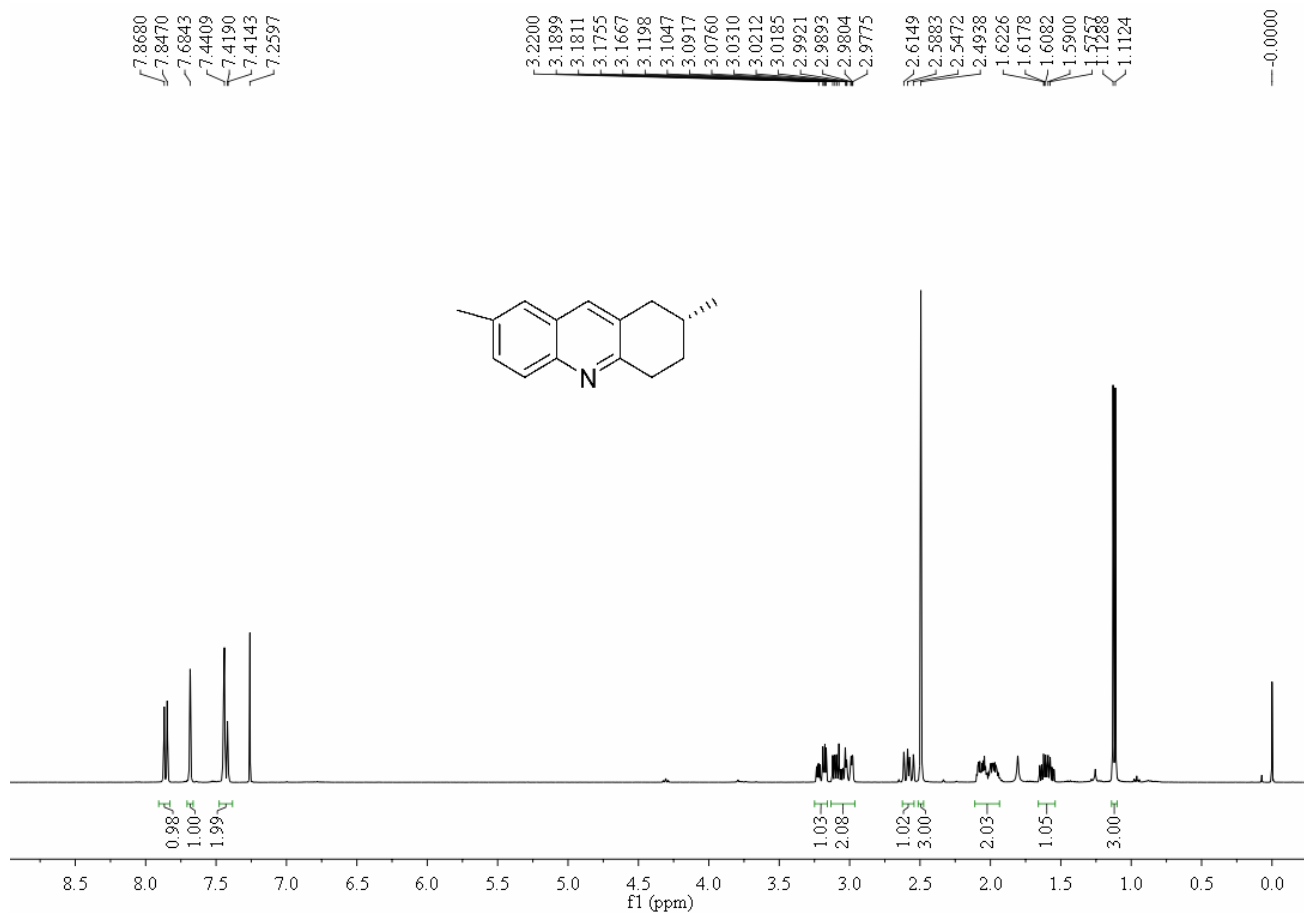
### 6-chloro-2-phenyl-1,2,3,4-tetrahydroacridine (5ha)



### 7-methyl-2-phenyl-1,2,3,4-tetrahydroacridine (5ia)

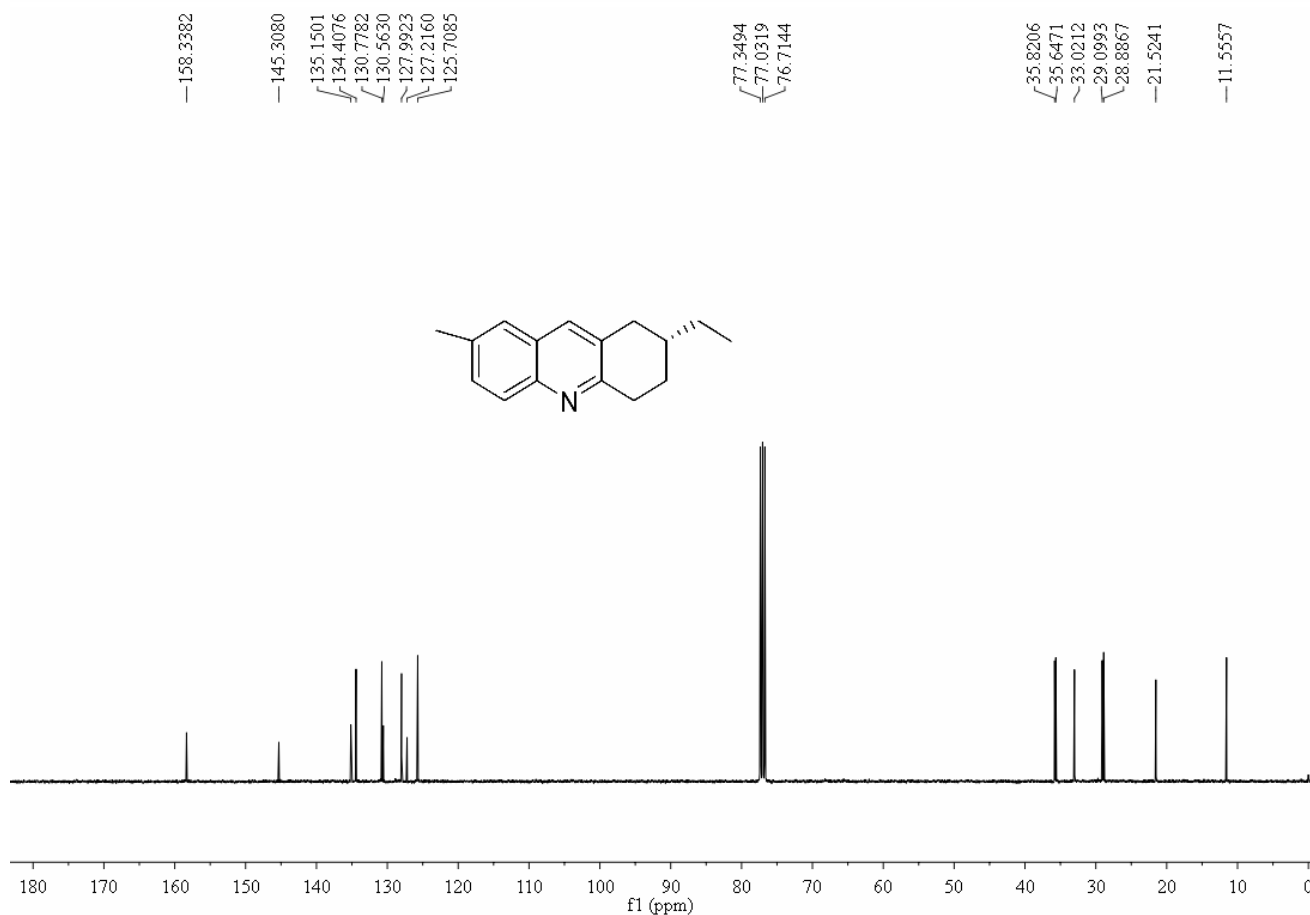
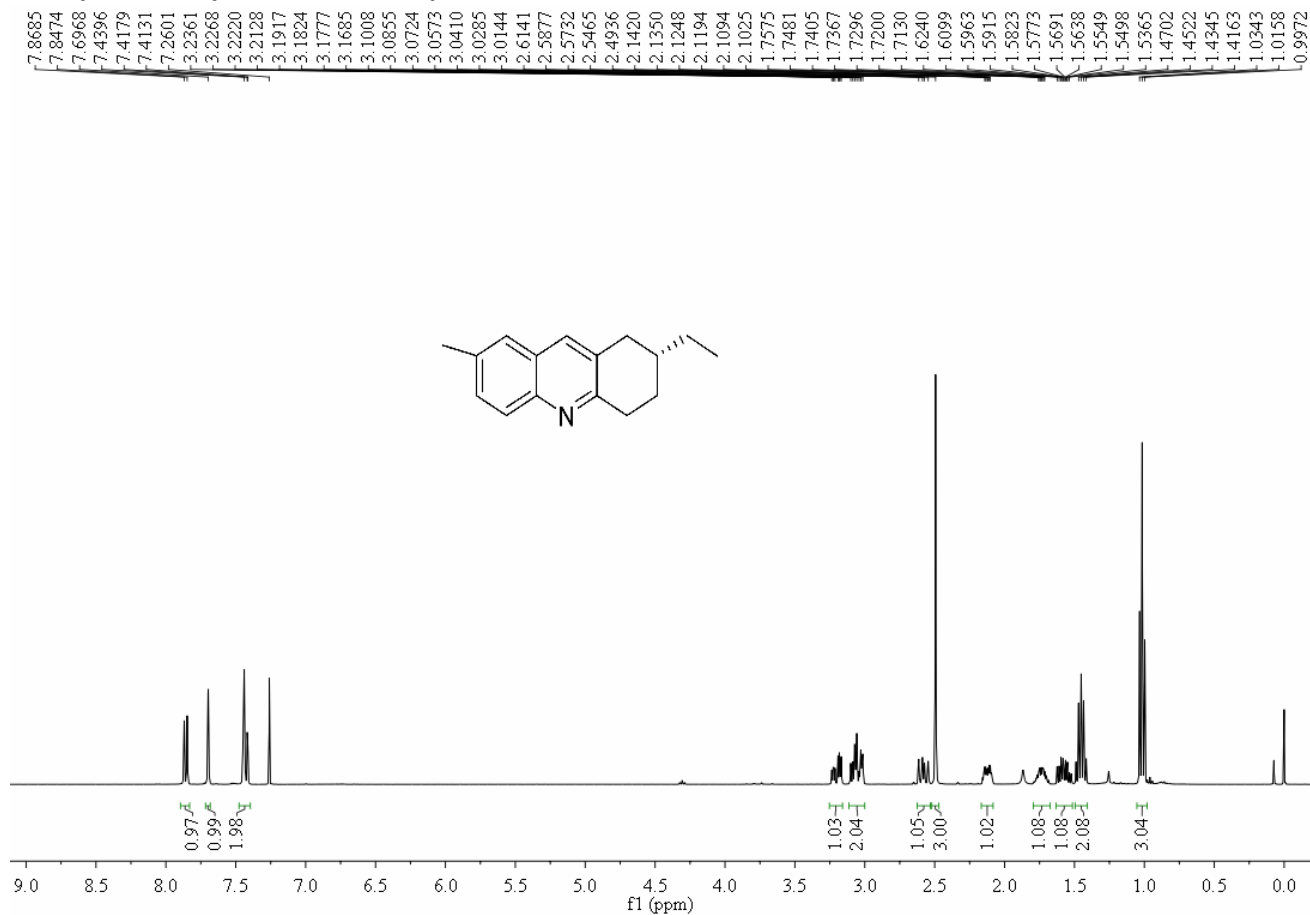


### 2,7-dimethyl-1,2,3,4-tetrahydroacridine (5ib)

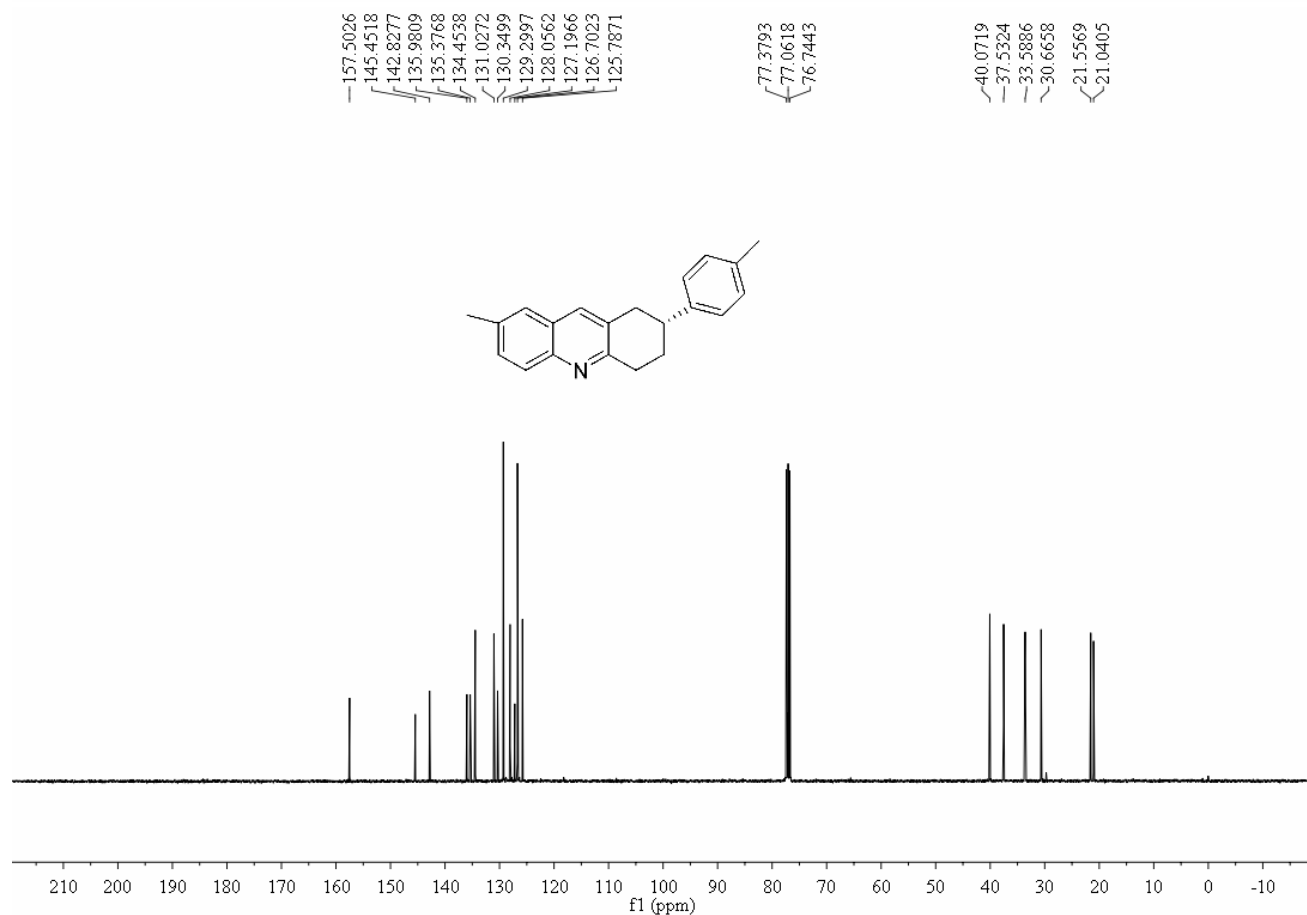
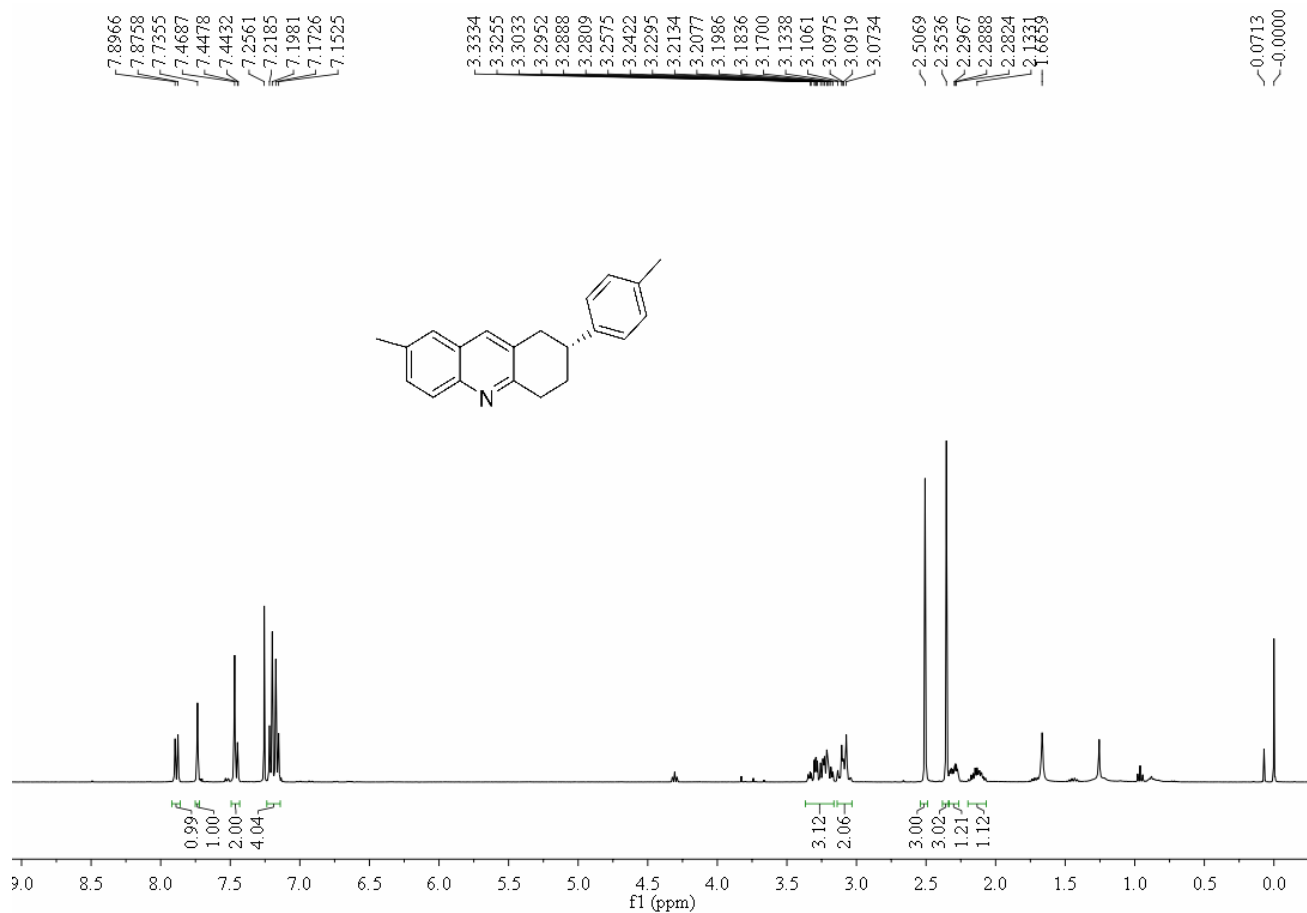




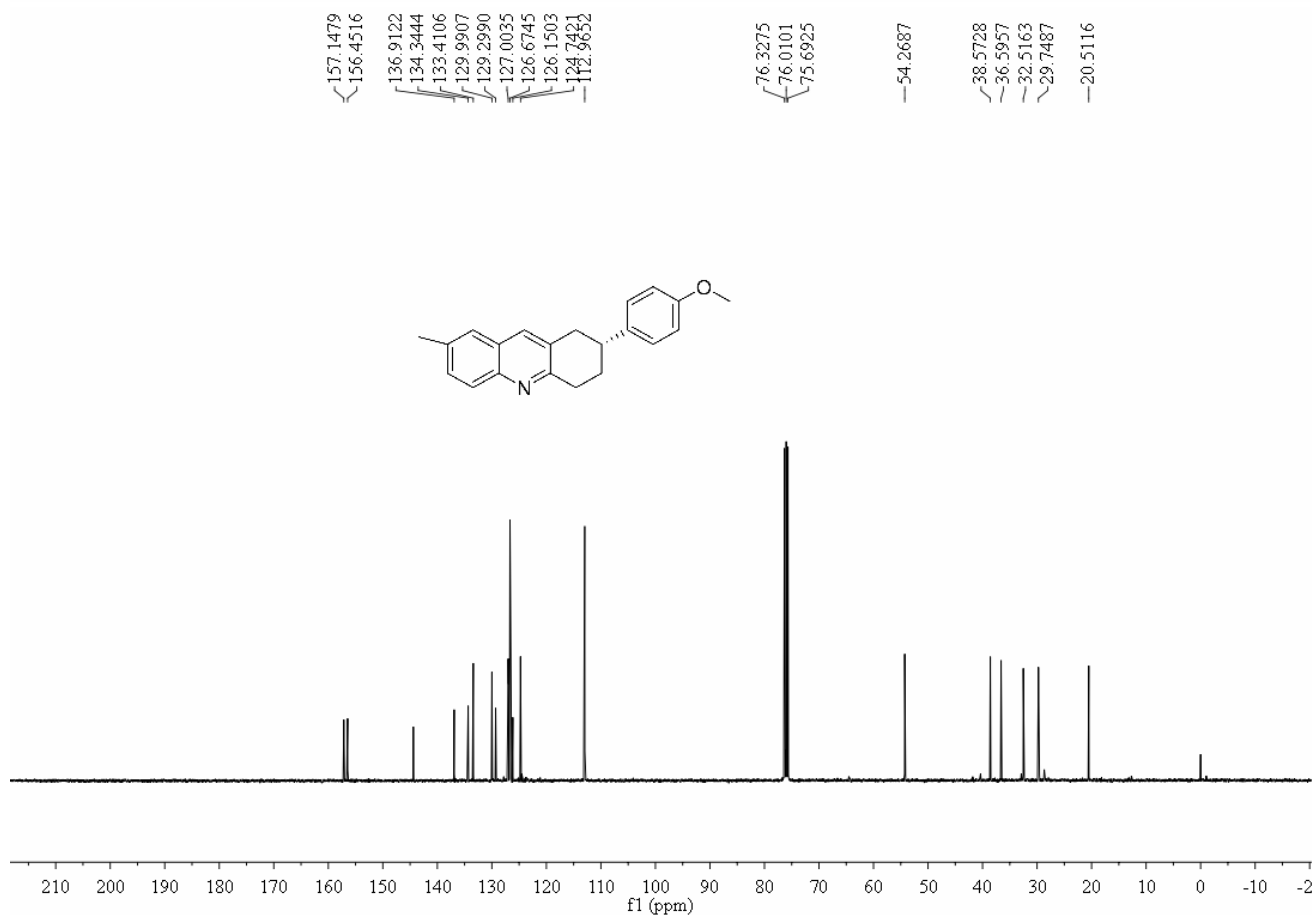
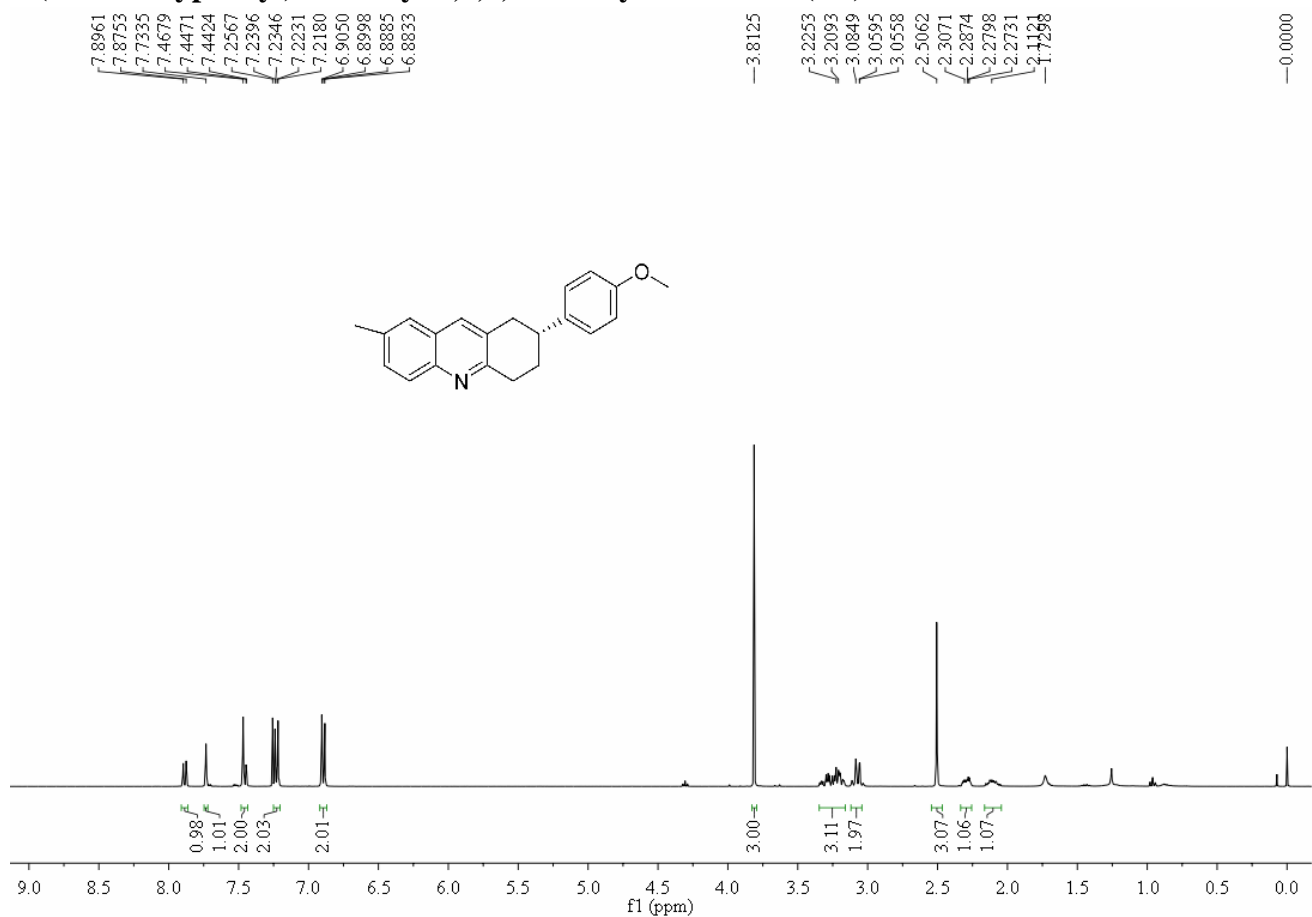
### 2-ethyl-7-methyl-1,2,3,4-tetrahydroacridine (5ic)



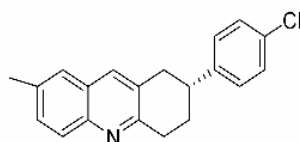
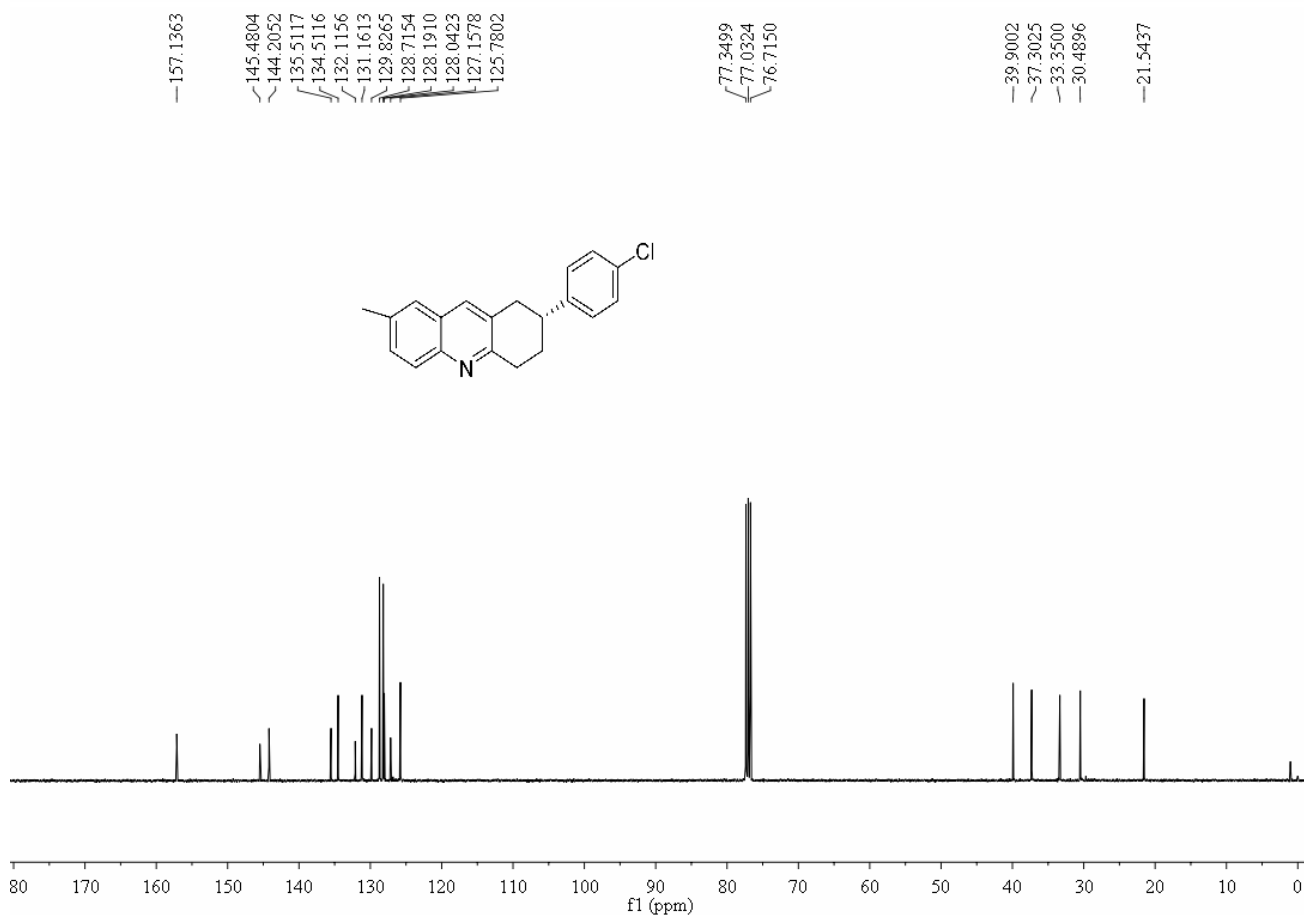
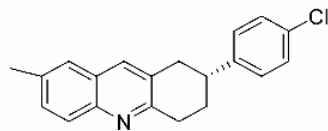
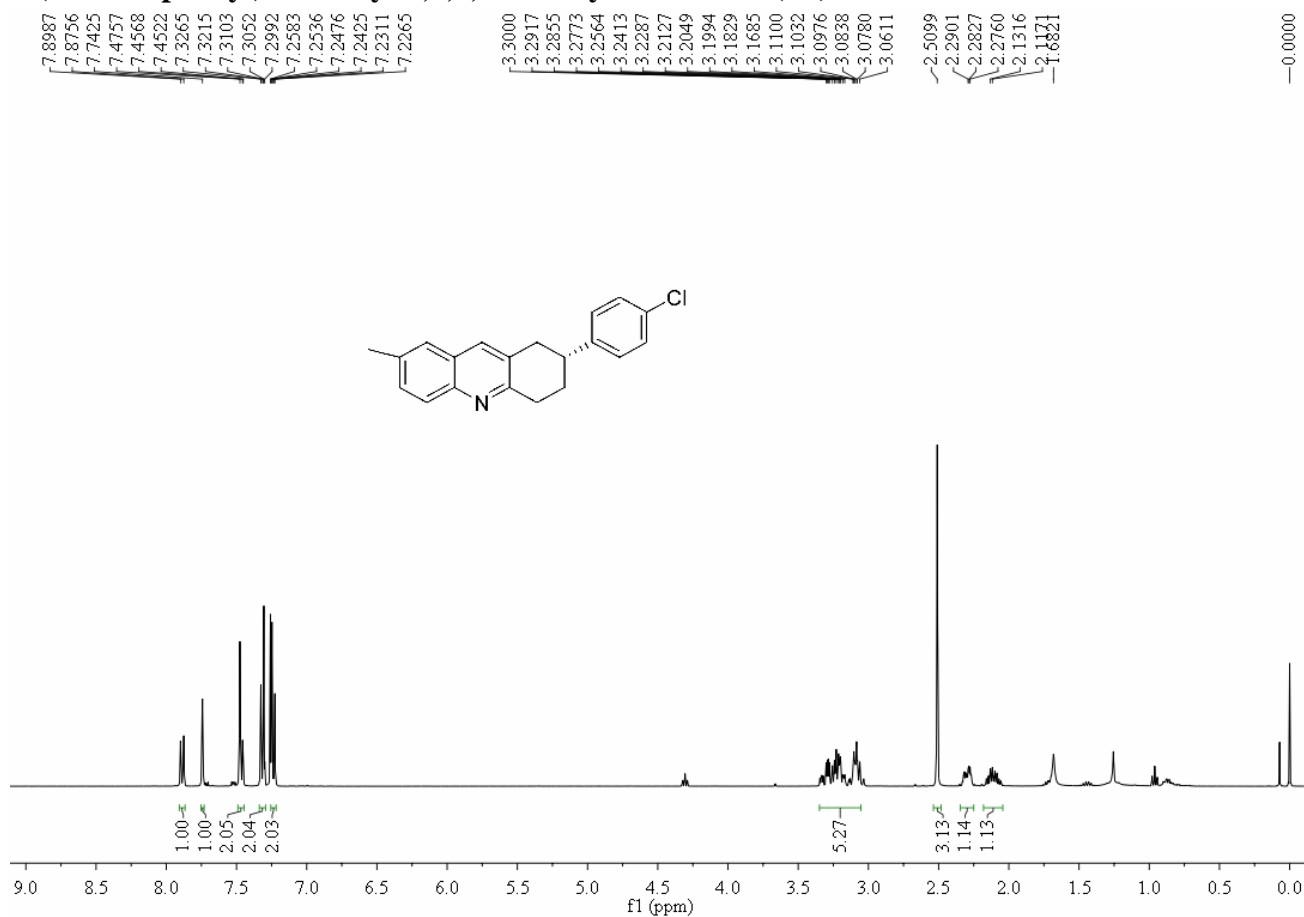
### 7-methyl-2-p-tolyl-1,2,3,4-tetrahydroacridine (5id)



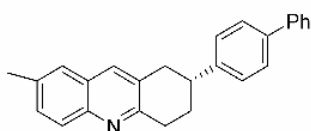
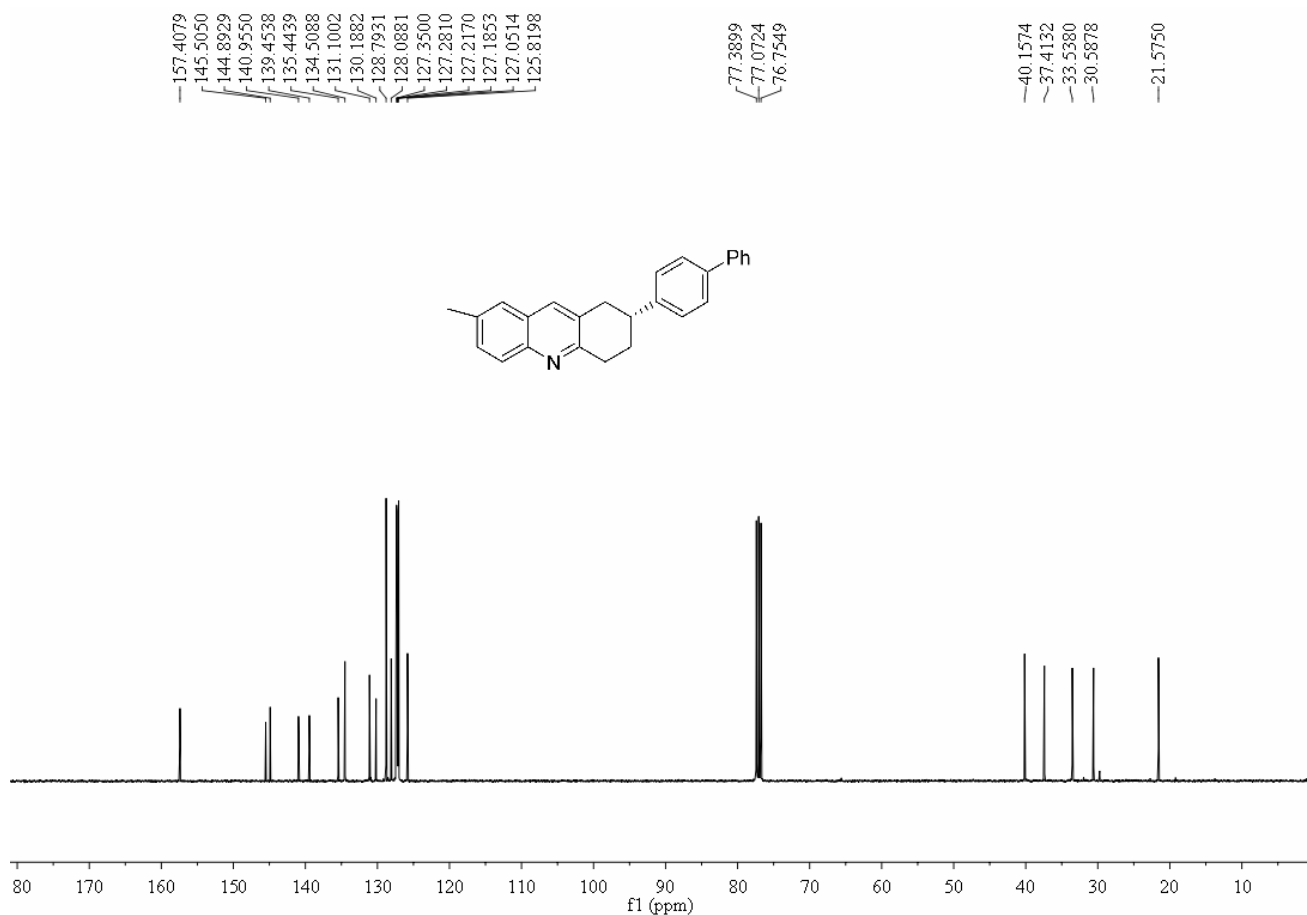
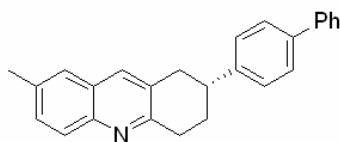
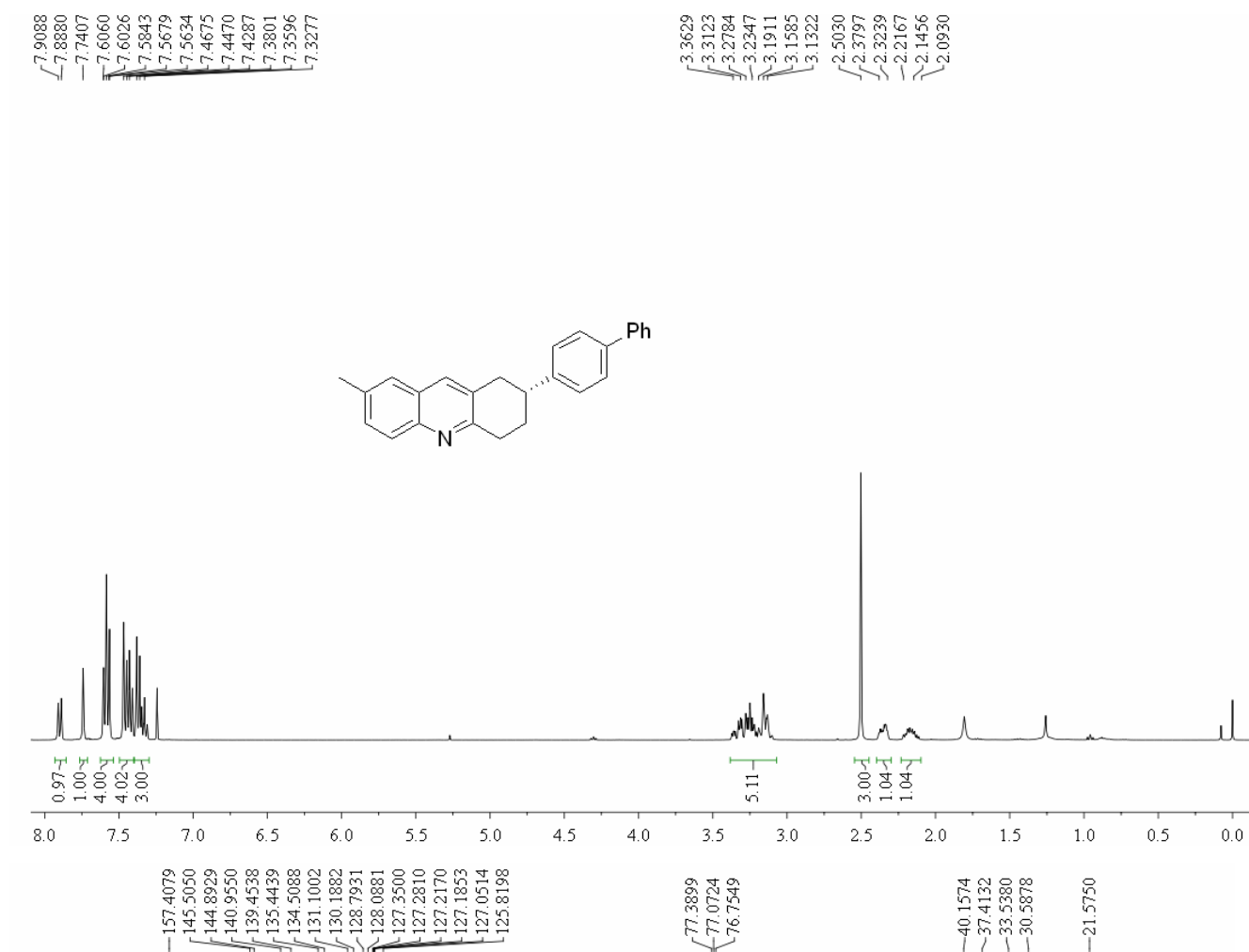
### 2-(4-methoxyphenyl)-7-methyl-1,2,3,4-tetrahydroacridine (5ie)



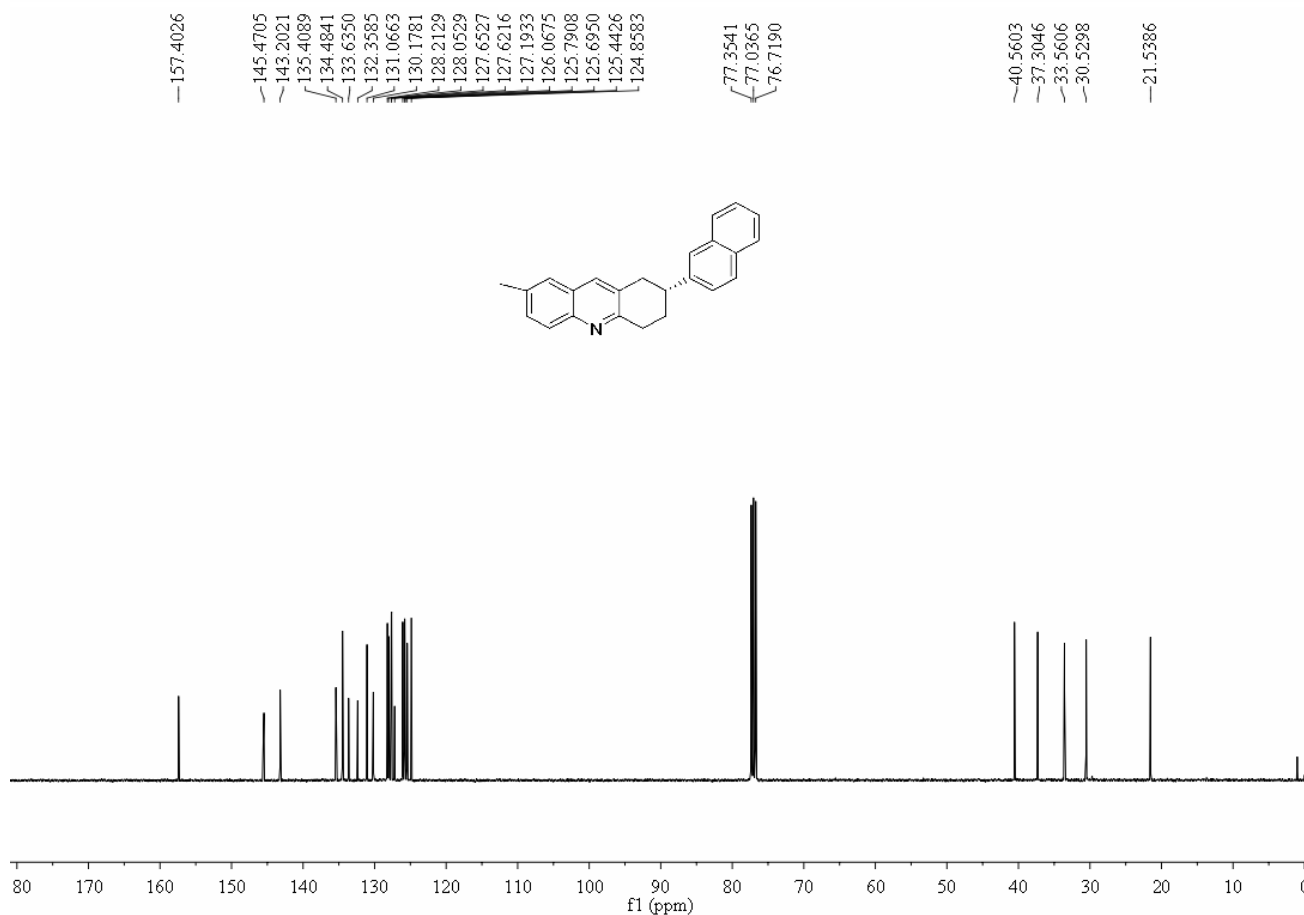
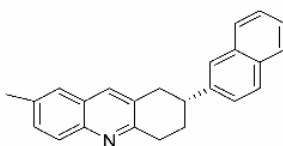
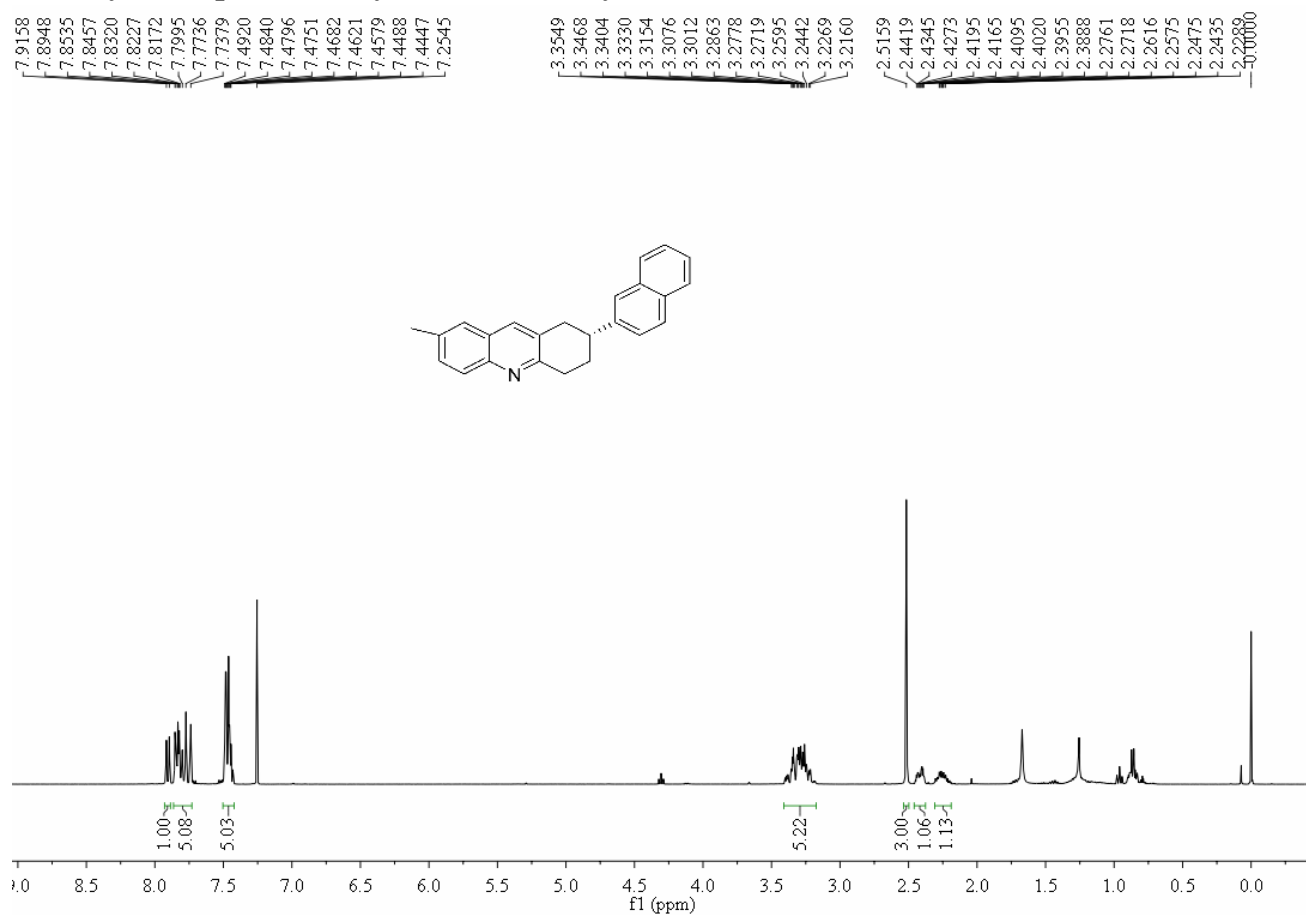
### 2-(4-chlorophenyl)-7-methyl-1,2,3,4-tetrahydroacridine (5if)



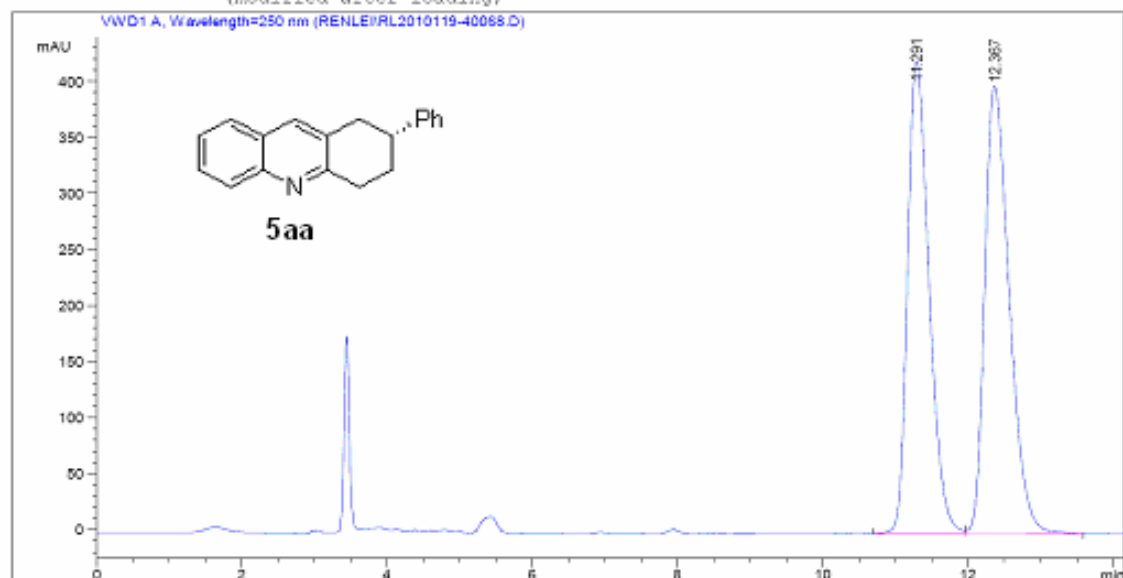
### 2-(biphenyl-4-yl)-7-methyl-1,2,3,4-tetrahydroacridine (5ig)



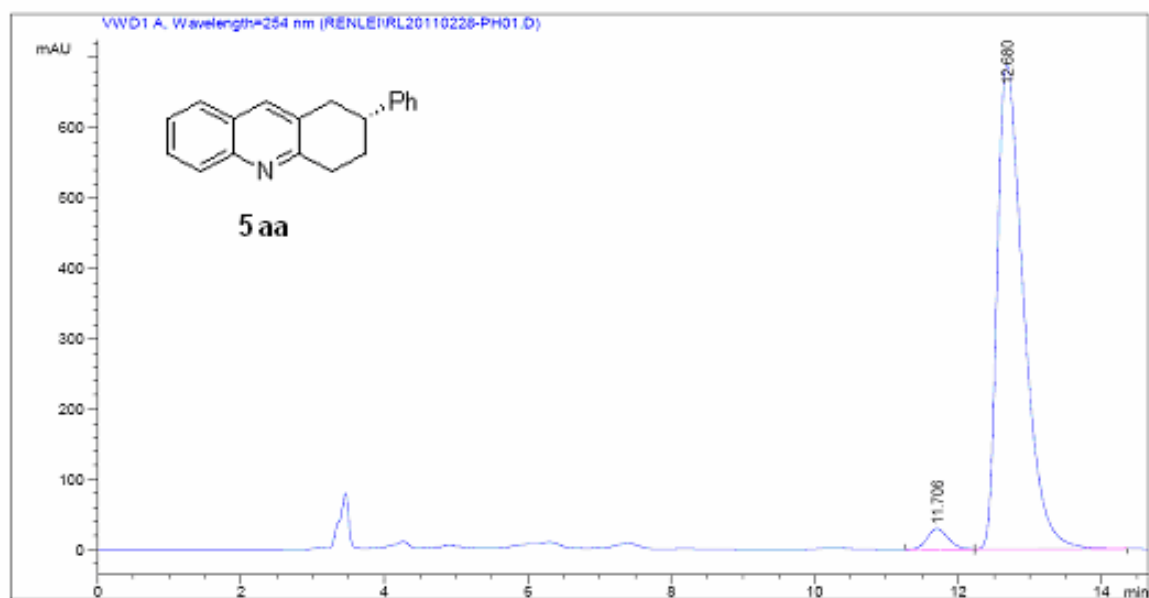
### 7-methyl-2-(naphthalen-2-yl)-1,2,3,4-tetrahydroacridine (5ih)



Acq. Operator : wq  
Acq. Instrument : Instrument 1 Location : Vial 1  
Injection Date : 11/24/2010 4:10:41 PM  
Acq. Method : F:\CHEM32\1\METHODS\RENLEI\100254.M  
Last changed : 11/24/2010 4:09:12 PM by wq  
Analysis Method : F:\CHEM32\1\METHODS\ZWQ\300254.M  
Last changed : 3/25/2011 11:18:02 AM by zwq  
(modified after loading)

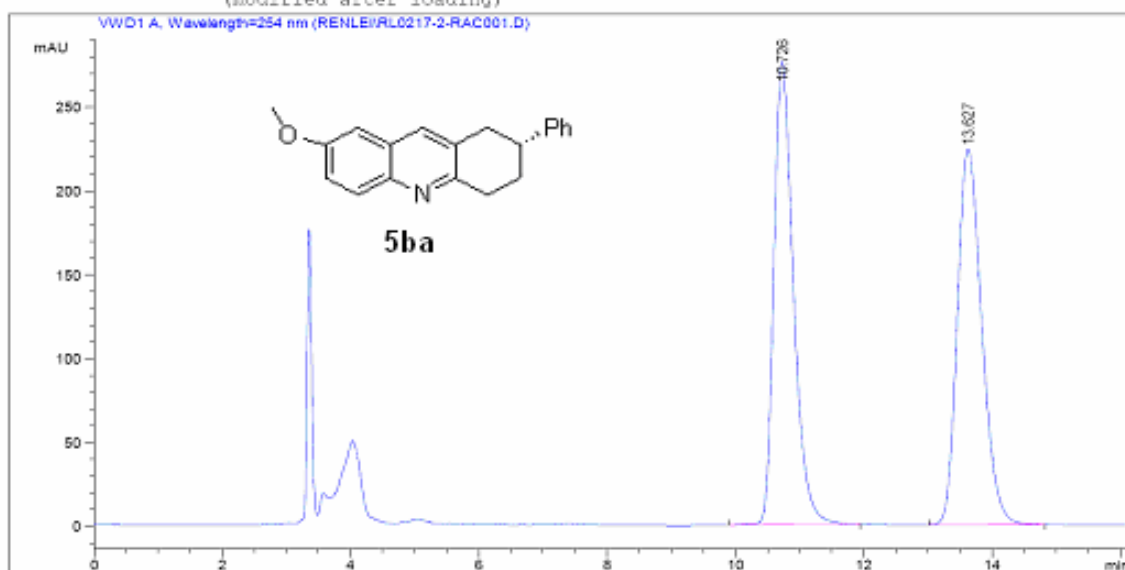


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	11.291	VV	0.3186	8669.91699	421.49979	48.1206
2	12.367	VB	0.3606	9347.15430	399.16061	51.8794

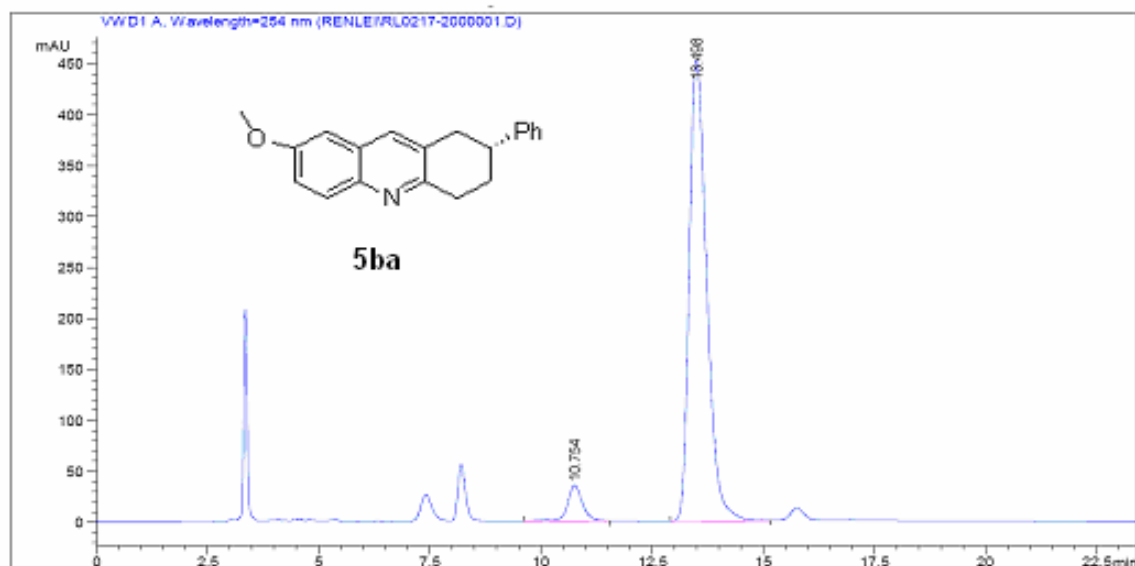


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	11.706	BV	0.3129	594.37024	29.41905	3.2782
2	12.680	VB	0.3886	1.75367e4	689.24451	96.7218

Acq. Operator : RENLEI  
 Acq. Instrument : Instrument 1 Location : Vial 1  
 Injection Date : 3/26/2011 2:33:12 PM  
 Acq. Method : F:\CHEM32\1\METHODS\RENLEI\208254.M  
 Last changed : 2/21/2011 11:13:25 AM by ARExit  
 Analysis Method : F:\CHEM32\1\METHODS\ZWQ\308254.M  
 Last changed : 3/26/2011 2:51:37 PM by RENLEI  
 (modified after loading)



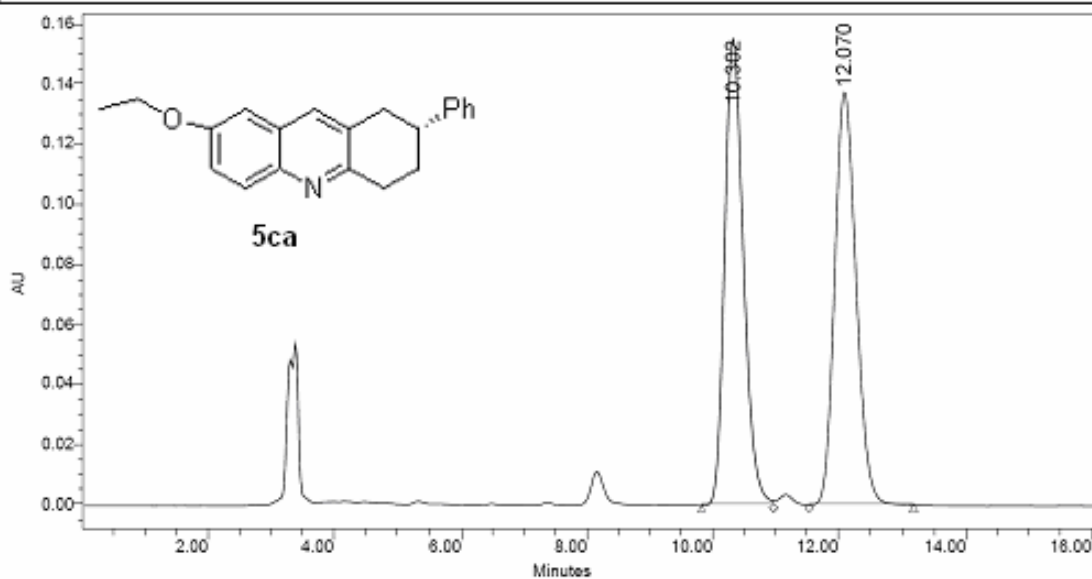
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	10.726	BB	0.3264	5856.28906	275.73465	49.6902
2	13.627	BB	0.4108	5929.31006	223.96414	50.3098



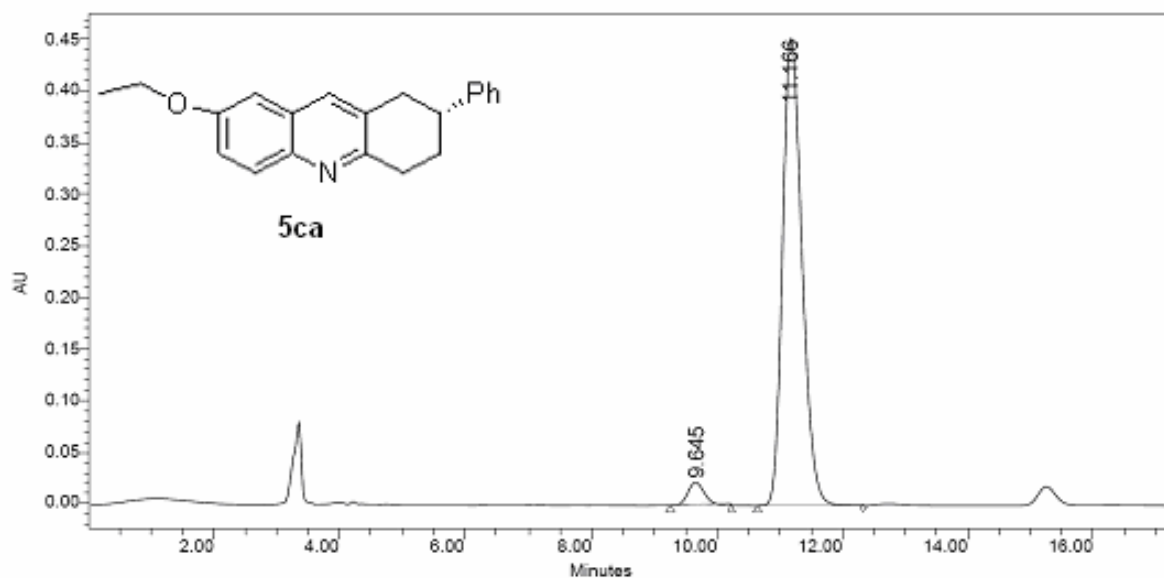
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	10.754	BB	0.3539	828.75641	34.93535	6.3264
2	13.498	BB	0.4202	1.22713e4	451.89020	93.6736



Sample Name:	DLRL20110224-1-OD20%	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	3/2/2011 8:45:56 AM
Vial:	1	Acq. Method:	20%254
Injection #:	1	Date Processed:	3/24/2011 9:37:14 AM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	100.00 Minutes	Sample Set Name:	

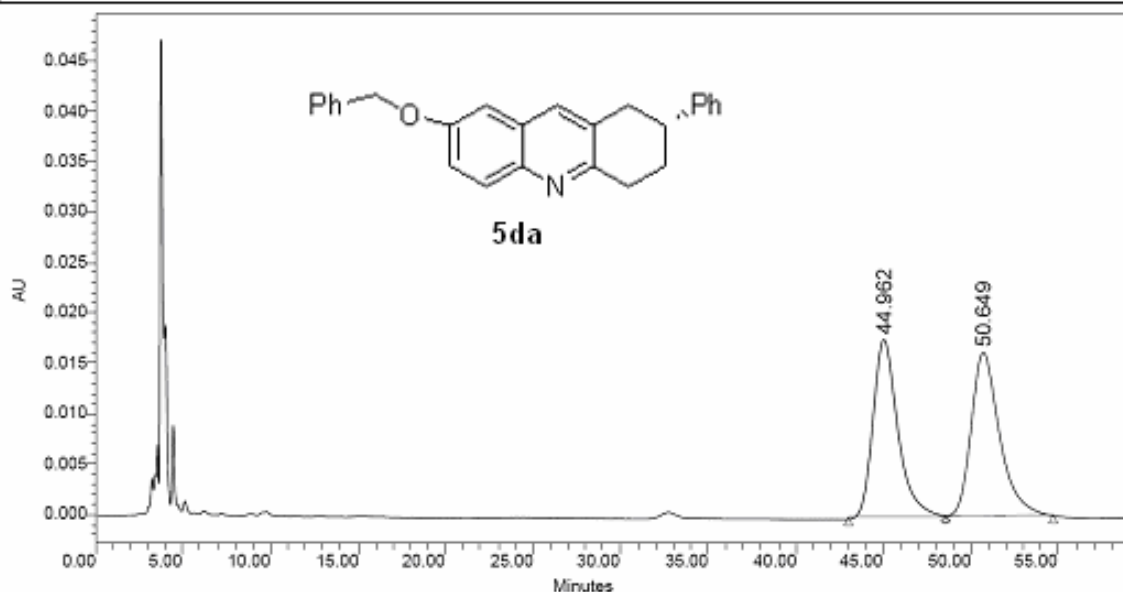


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	10.302	3210779	49.81	155230	53.04
2	12.070	3235448	50.19	137409	46.96

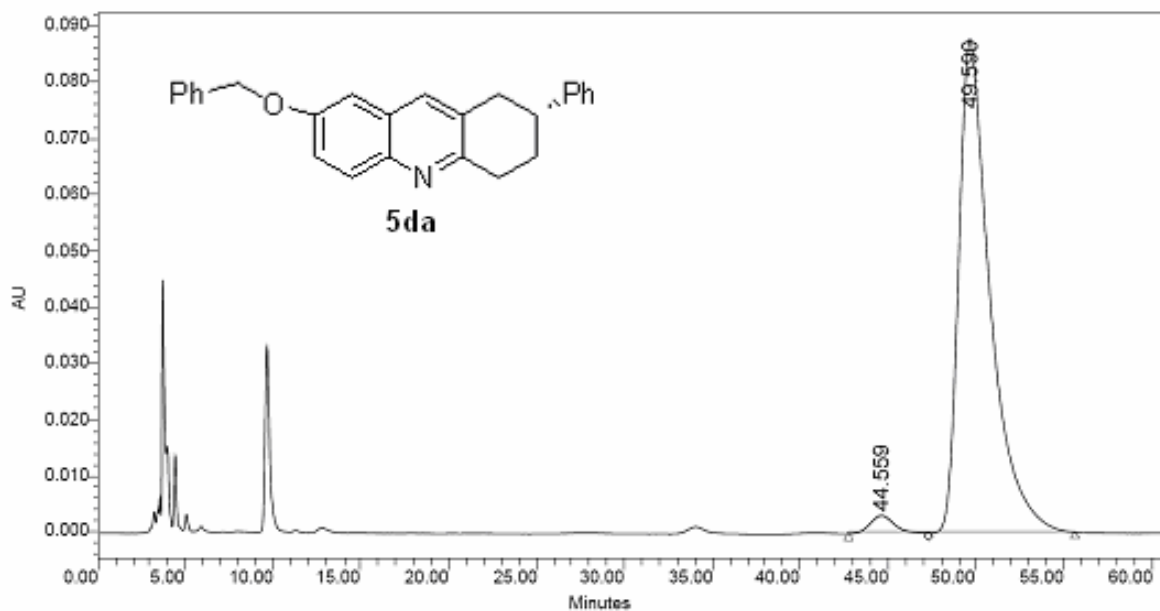


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	9.645	412454	4.08	22488	4.73
2	11.166	9699691	95.92	452501	95.27

Sample Name:	DLRL20110223-2-IA15%	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	3/3/2011 11:13:56 AM
Vial:	1	Acq. Method:	15% 254
Injection #:	3	Date Processed:	3/24/2011 9:35:45 AM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	100.00 Minutes	Sample Set Name:	

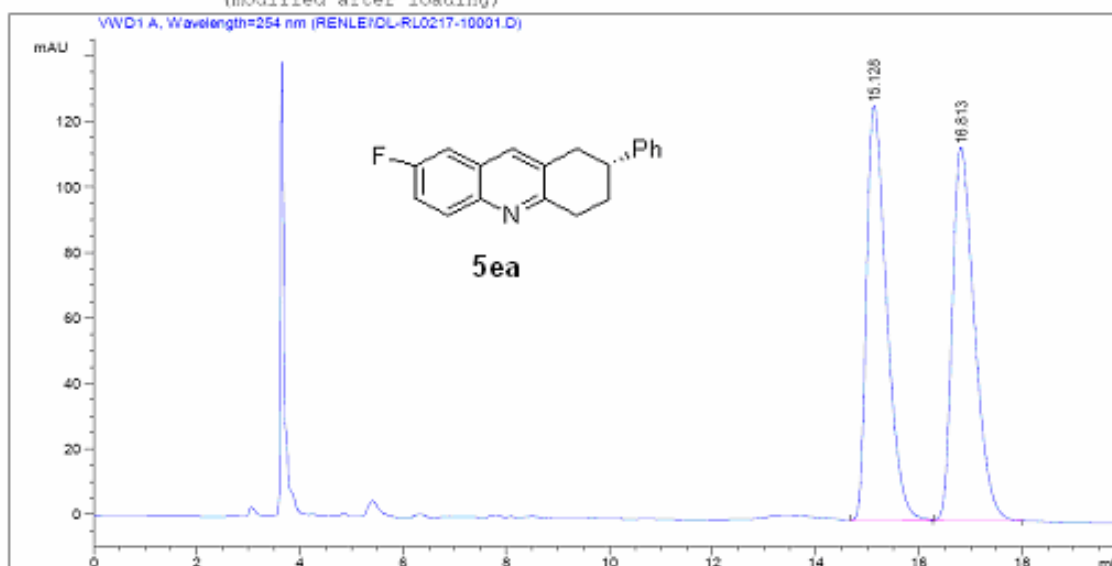


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	44.962	1773788	48.78	17727	52.07
2	50.649	1862210	51.22	16316	47.93

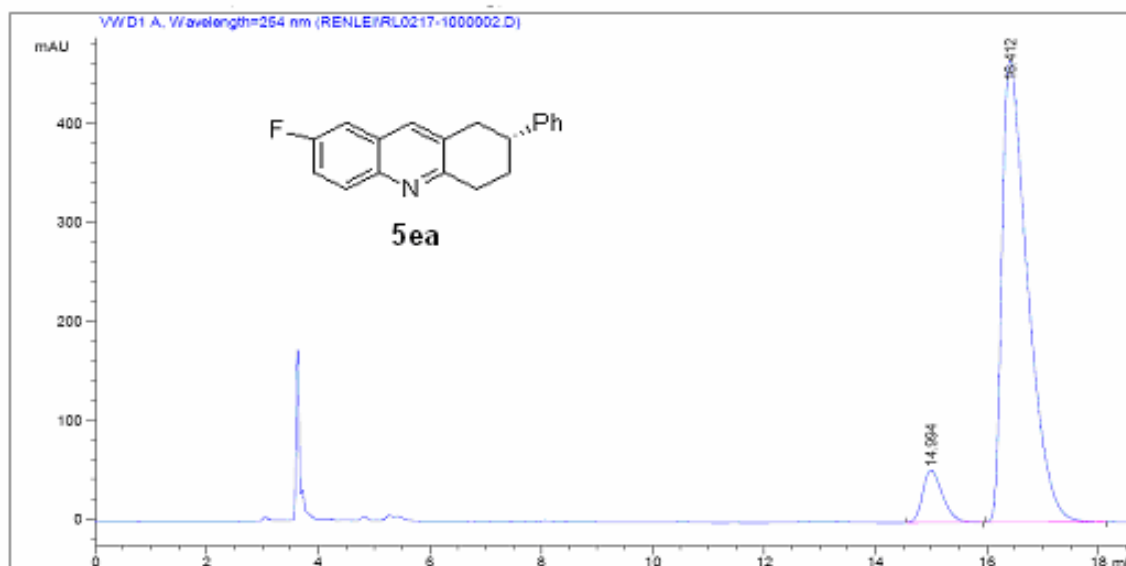


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	44.559	303324	2.71	3161	3.48
2	49.590	10881103	97.29	87716	96.52

Acq. Operator : RENLEI  
 Acq. Instrument : Instrument 1 Location : Vial 1  
 Injection Date : 2/23/2011 8:39:50 PM  
 Acq. Method : F:\CHEM32\1\METHODS\RENLEI\50254.M  
 Last changed : 2/23/2011 8:31:48 PM by zwq  
 Analysis Method : F:\CHEM32\1\METHODS\ZWQ\300254.M  
 Last changed : 3/24/2011 10:00:23 AM by zwq  
 (modified after loading)

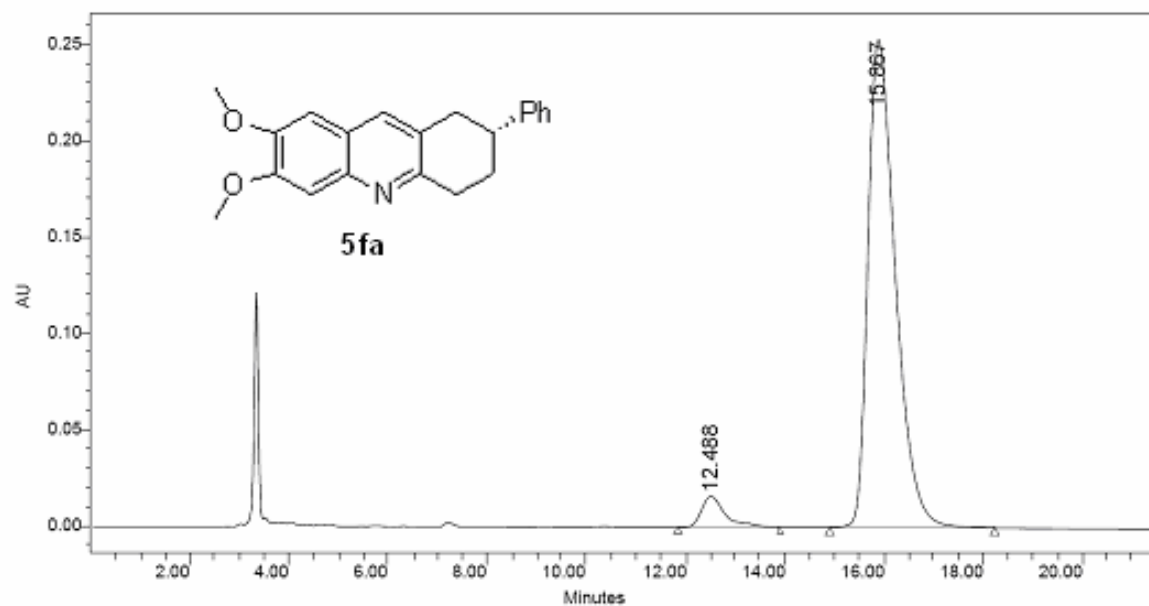
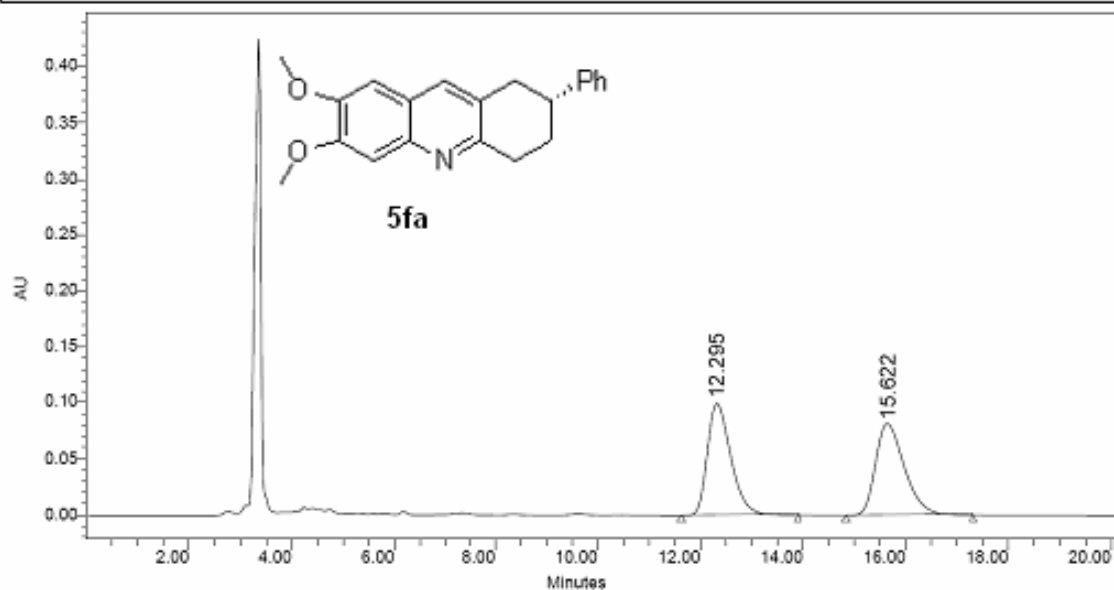


Peak #	RetTime [min]	Type	Width [min]	Area mAU	Height [mAU]	Area %
1	15.128	VB	0.4108	3408.58398	126.37786	50.0860
2	16.813	BB	0.4587	3396.88525	113.87966	49.9140



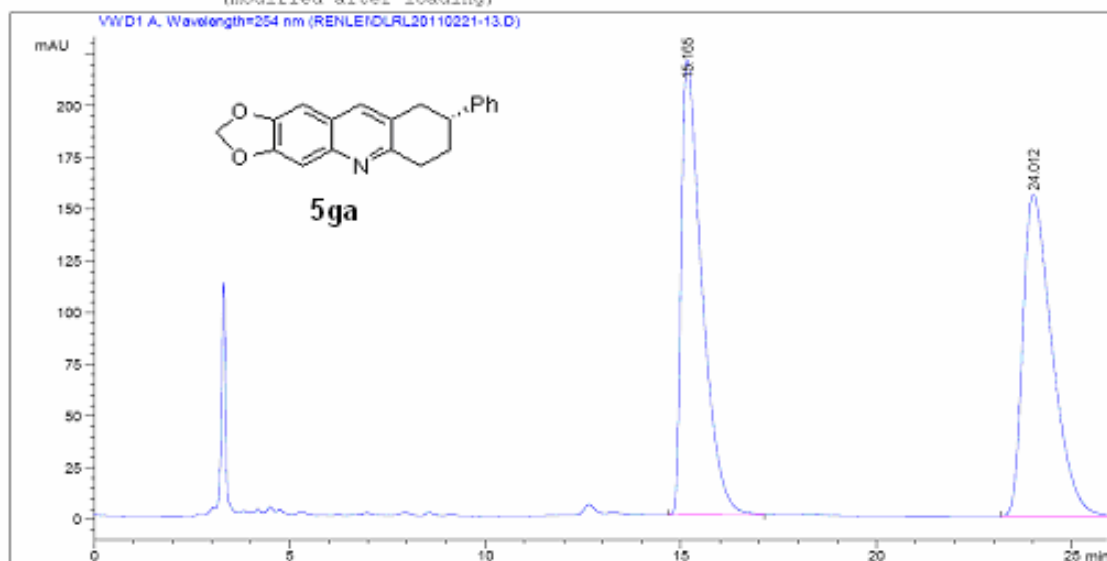
Peak #	RetTime [min]	Type	Width [min]	Area mAU	Height [mAU]	Area %
1	14.994	BB	0.3835	1302.25427	52.58776	8.0131
2	16.412	BB	0.4804	1.49493e4	466.16827	91.9869

Sample Name:	RL0212-1-RAC	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	3/25/2011 10:59:29 AM
Vial:	1	Acq. Method:	20% 254
Injection #:	1	Date Processed:	3/25/2011 11:22:47 AM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	100.00 Minutes	Sample Set Name:	

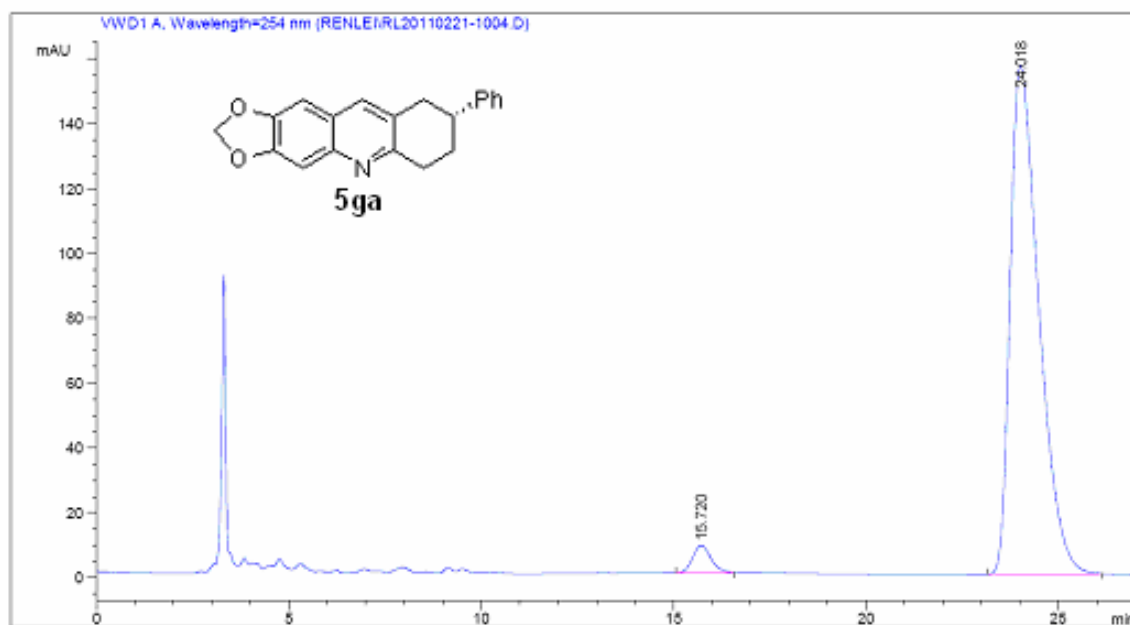


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	12.488	537600	5.22	16140	6.00
2	15.867	9755637	94.78	253079	94.00

Acq. Operator : RENLEI  
 Acq. Instrument : Instrument 1 Location : Vial 1  
 Injection Date : 2/28/2011 7:42:19 PM  
 Acq. Method : F:\CHEM32\1\METHODS\RENLEI\20@254.M  
 Last changed : 2/21/2011 11:13:25 AM by ARexit  
 Analysis Method : F:\CHEM32\1\METHODS\ZWQ\30@254.M  
 Last changed : 3/24/2011 10:00:23 AM by zwq  
 (modified after loading)

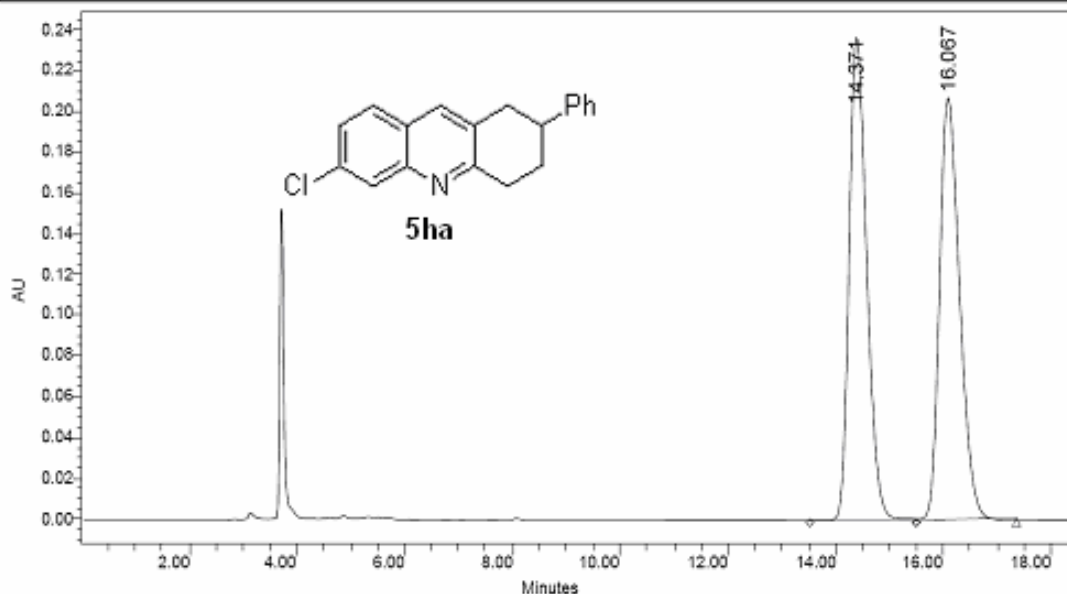


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	15.720	BB	0.4996	272.64041	8.39757	3.2473
2	24.018	BB	0.7891	8123.17920	156.86584	96.7527

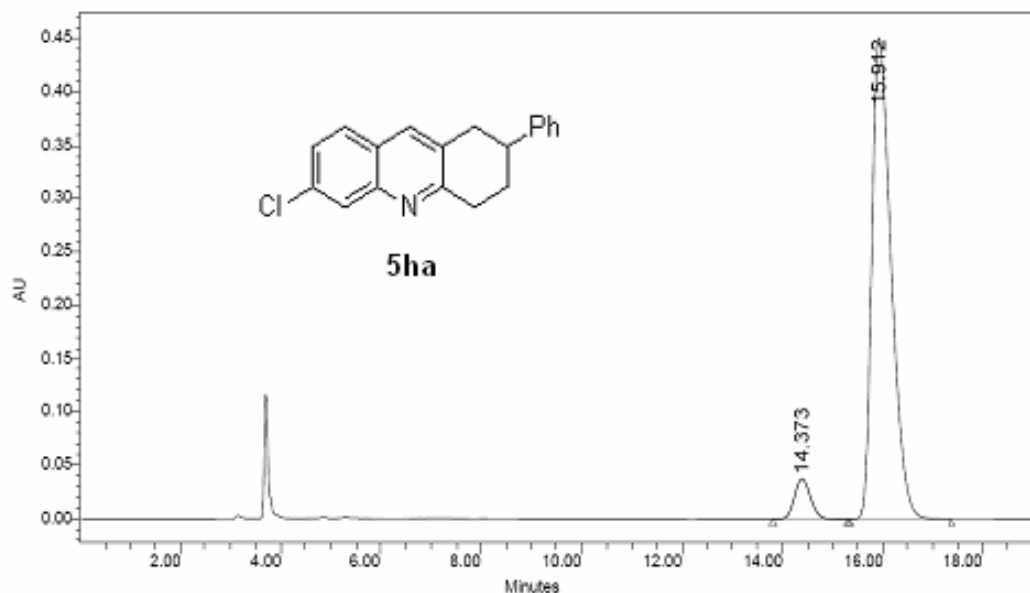


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	15.720	BB	0.4996	272.64041	8.39757	3.2473
2	24.018	BB	0.7891	8123.17920	156.86584	96.7527

Sample Name:	DLRL0215-4	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	3/26/2011 2:09:28 PM
Vial:	1	Acq. Method:	5%254
Injection #:	3	Date Processed:	3/26/2011 2:28:55 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	100.00 Minutes	Sample Set Name:	

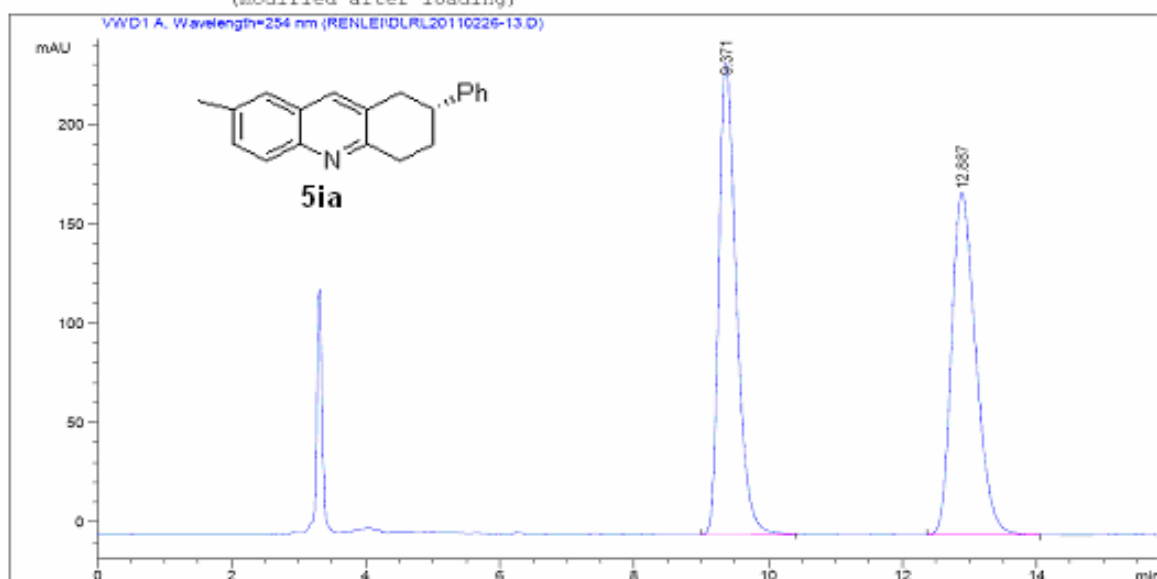


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	14.371	5353737	49.89	236867	53.34
2	16.067	5377695	50.11	207209	46.66

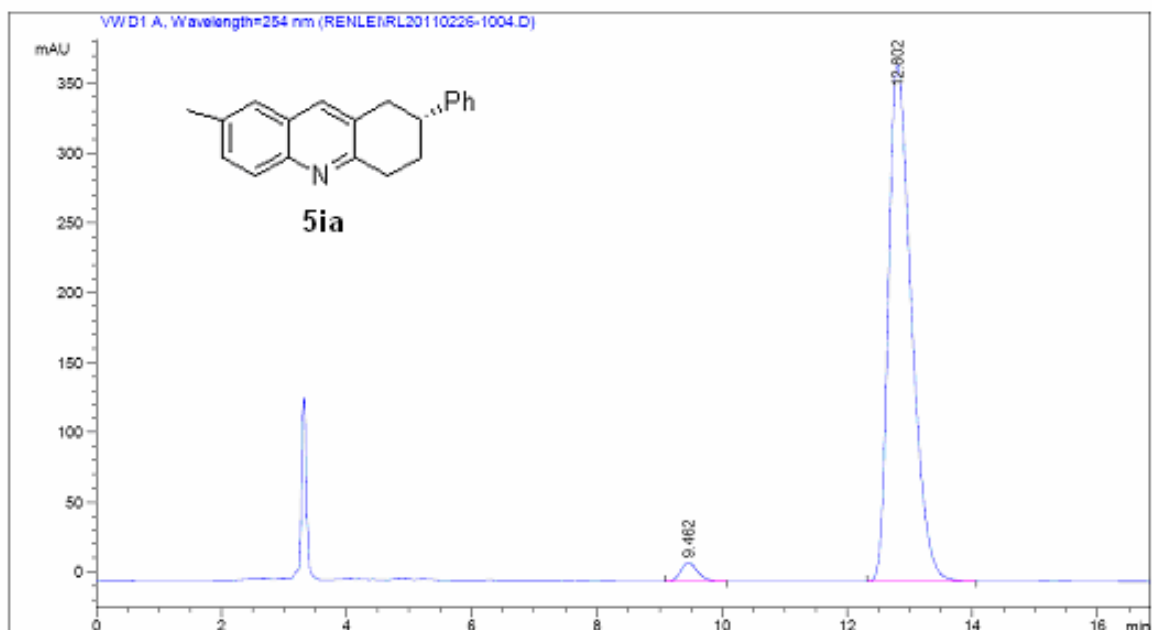


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	14.373	842660	6.55	38052	7.77
2	15.912	12021169	93.45	451425	92.23

Acq. Operator : RENLEI  
 Acq. Instrument : Instrument 1 Location : Vial 1  
 Injection Date : 3/4/2011 7:52:35 PM  
 Acq. Method : F:\CHEM32\1\METHODS\RENLEI\20@254.M  
 Last changed : 3/4/2011 7:51:23 PM by RENLEI  
 Analysis Method : F:\CHEM32\1\METHODS\ZWQ\30@254.M  
 Last changed : 3/24/2011 10:00:23 AM by zwq  
 (modified after loading)

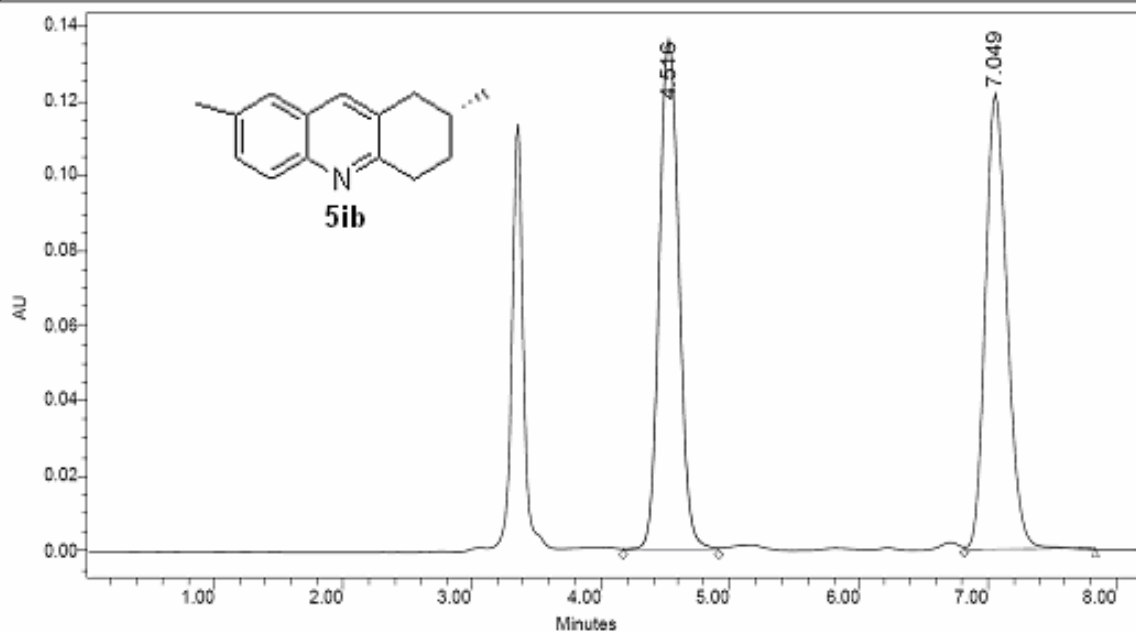


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	9.371	BB	0.2768	4294.48242	237.09158	49.8932
2	12.887	BB	0.3873	4312.86719	171.90503	50.1068

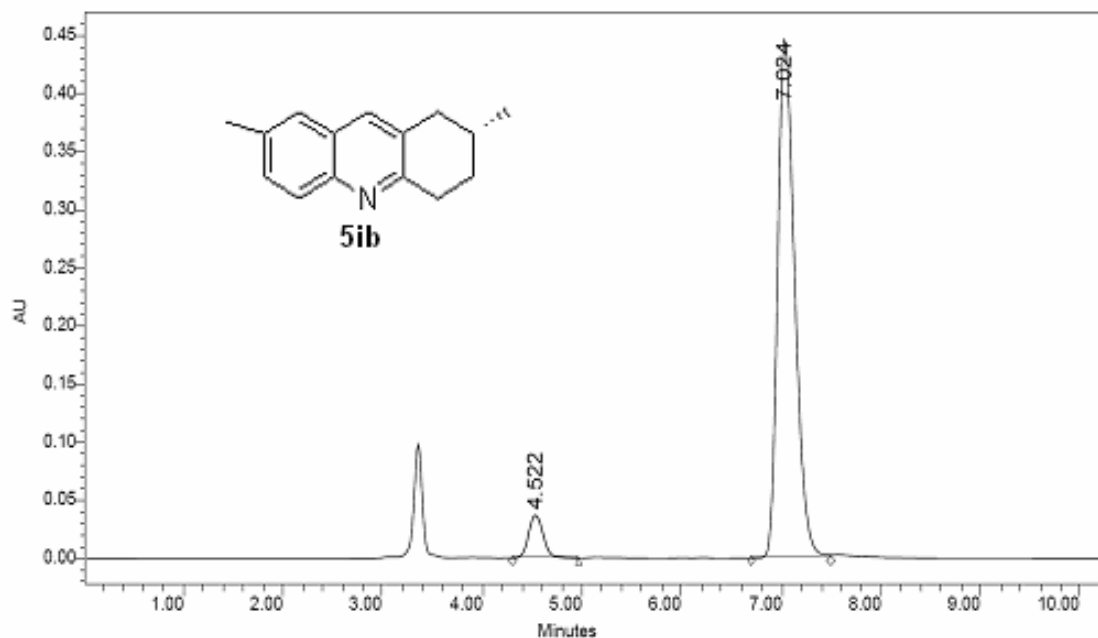


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	9.462	BB	0.2820	248.10915	13.46043	2.5724
2	12.802	BB	0.3897	9396.96973	369.75275	97.4276

Sample Name:	RL20110306-2-RAC-OD	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	3/10/2011 1:07:51 PM
Vial:	1	Acq. Method:	20%254
Injection #:	6	Date Processed:	3/24/2011 9:48:29 AM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	100.00 Minutes	Sample Set Name:	



	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	4.516	1465242	50.56	136482	52.87
2	7.049	1432521	49.44	121665	47.13

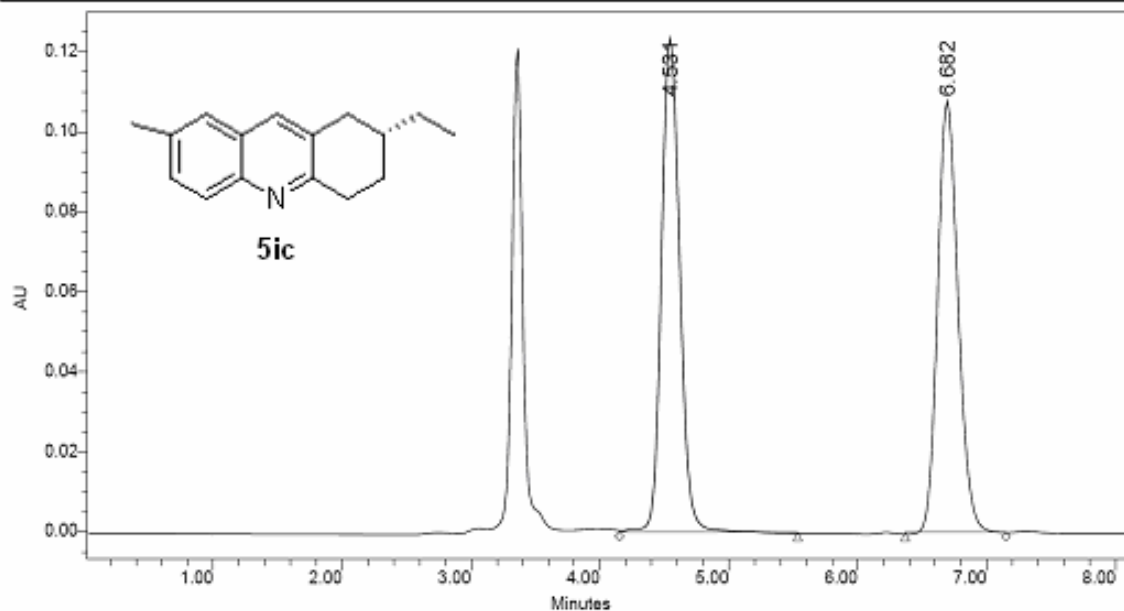


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	4.522	378714	6.65	37064	7.64
2	7.024	5317246	93.35	448231	92.36

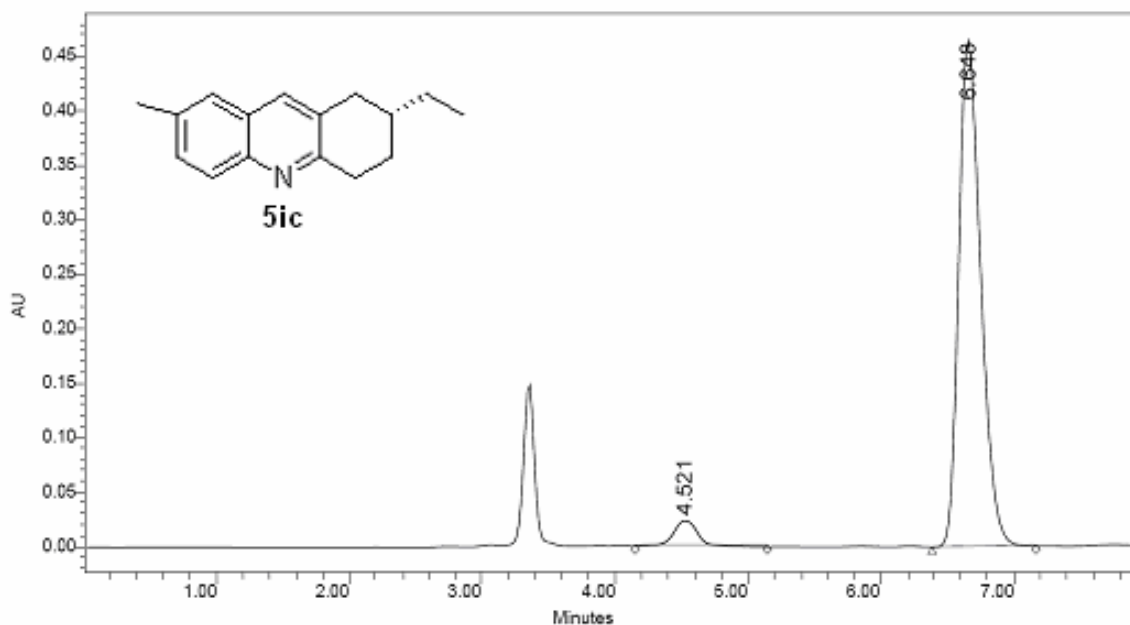


Sample Name: RL20110306-1-RAC-OD  
 Sample Type: Unknown  
 Vial: 1  
 Injection #: 4  
 Injection Volume: 20.00 ul  
 Run Time: 100.00 Minutes

Acquired By: System  
 Date Acquired: 3/10/2011 12:48:50 PM  
 Acq. Method: 20%254  
 Date Processed: 3/24/2011 9:45:52 AM  
 Channel Name: 2487Channel 1  
 Sample Set Name:



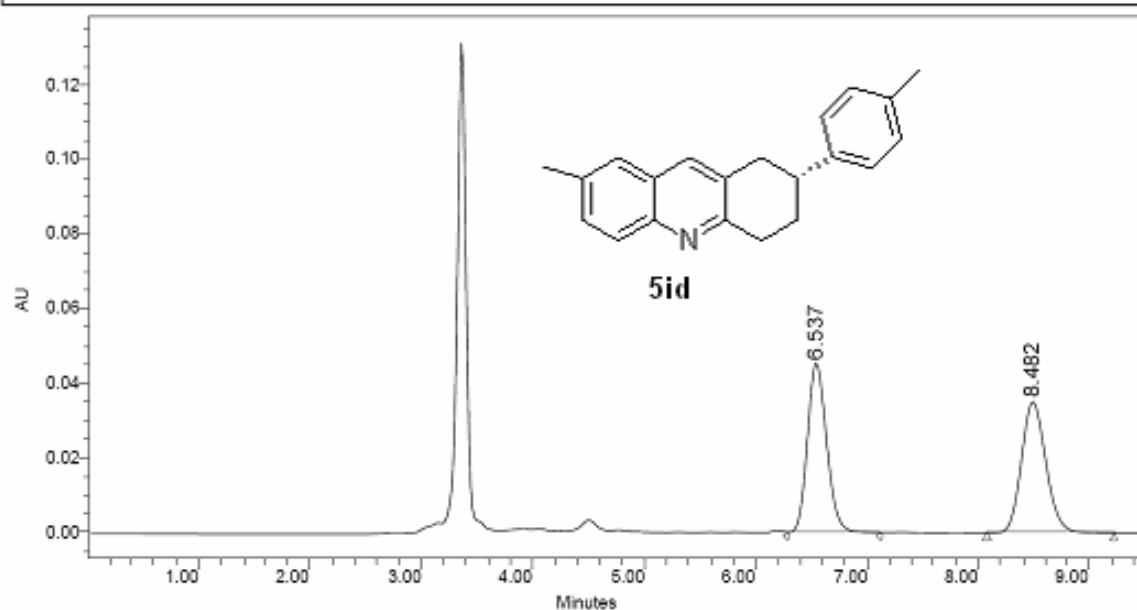
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	4.531	1246514	50.92	123501	53.39
2	6.682	1201361	49.08	107800	46.61



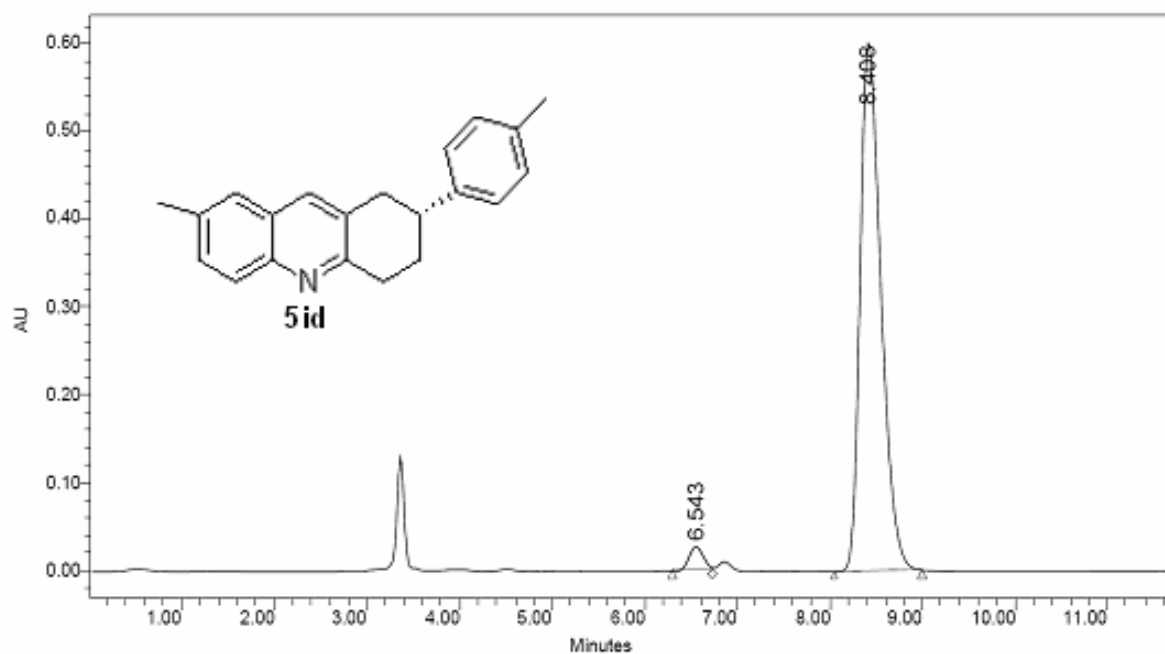
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	4.521	331523	5.81	24184	4.94
2	6.648	5374850	94.19	465600	95.06

Sample Name: RL20110311-1-R  
Sample Type: Unknown  
Vial: 1  
Injection #: 9  
Injection Volume: 20.00 ul  
Run Time: 100.00 Minutes

Acquired By: System  
Date Acquired: 3/17/2011 9:03:00 PM  
Acq. Method: 20%254  
Date Processed: 3/24/2011 9:53:08 AM  
Channel Name: 2487Channel 1  
Sample Set Name:



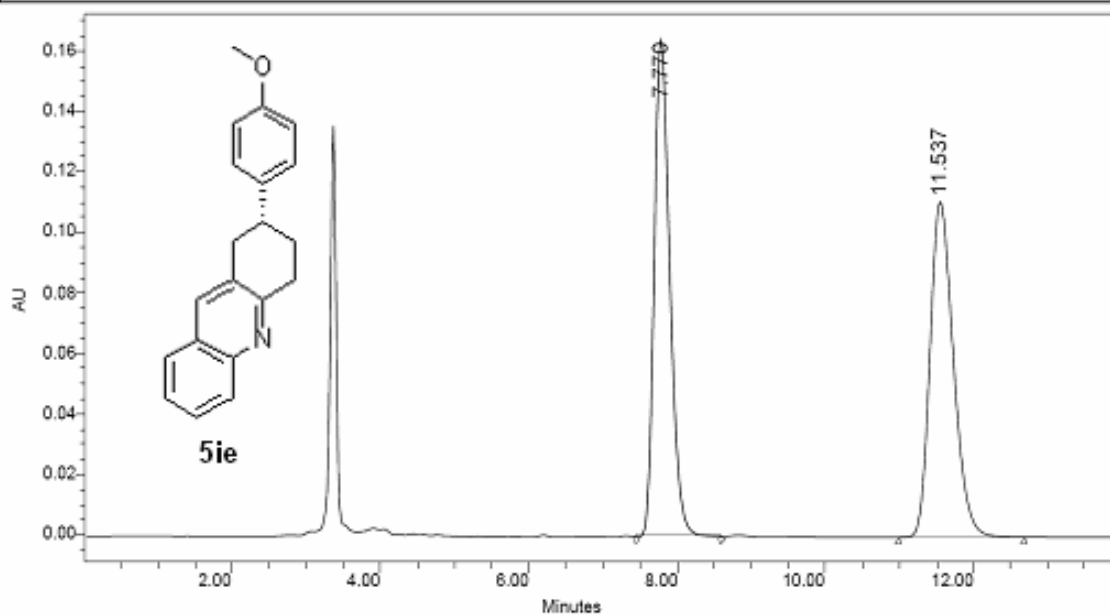
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	6.537	552587	50.55	45617	56.44
2	8.482	540563	49.45	35207	43.56



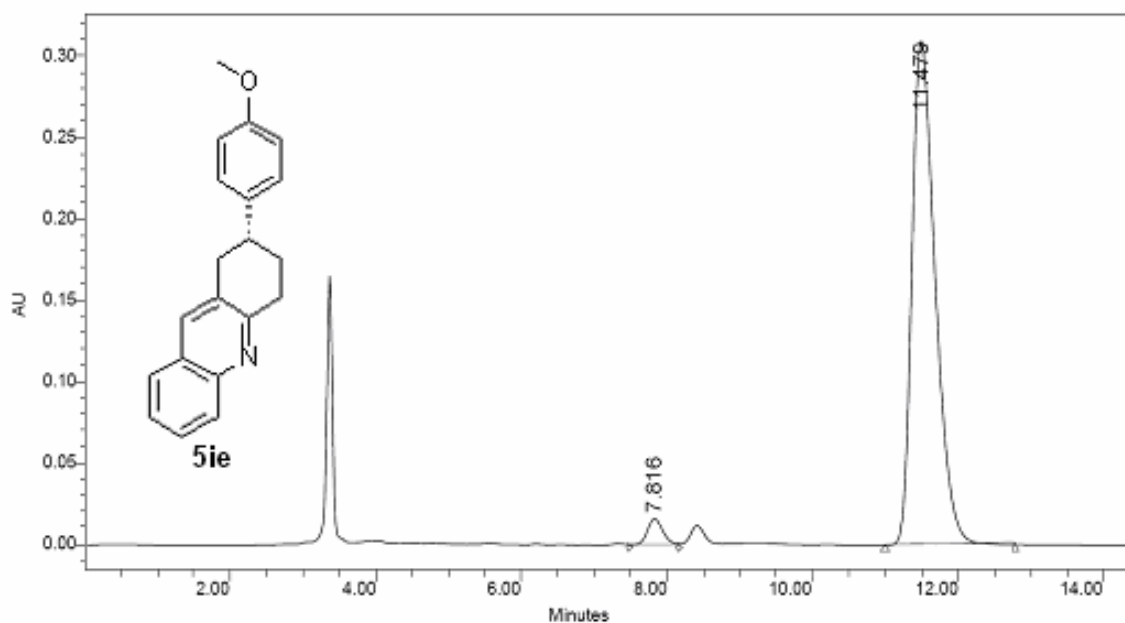
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	6.543	320983	3.30	28090	4.45
2	8.408	9410789	96.70	602966	95.55

Sample Name: RL20110314-1-RAC  
Sample Type: Unknown  
Vial: 1  
Injection #: 7  
Injection Volume: 20.00 ul  
Run Time: 100.00 Minutes

Acquired By: System  
Date Acquired: 3/17/2011 8:31:47 PM  
Acq. Method: 20%254  
Date Processed: 3/24/2011 9:59:37 AM  
Channel Name: 2487Channel 1  
Sample Set Name:



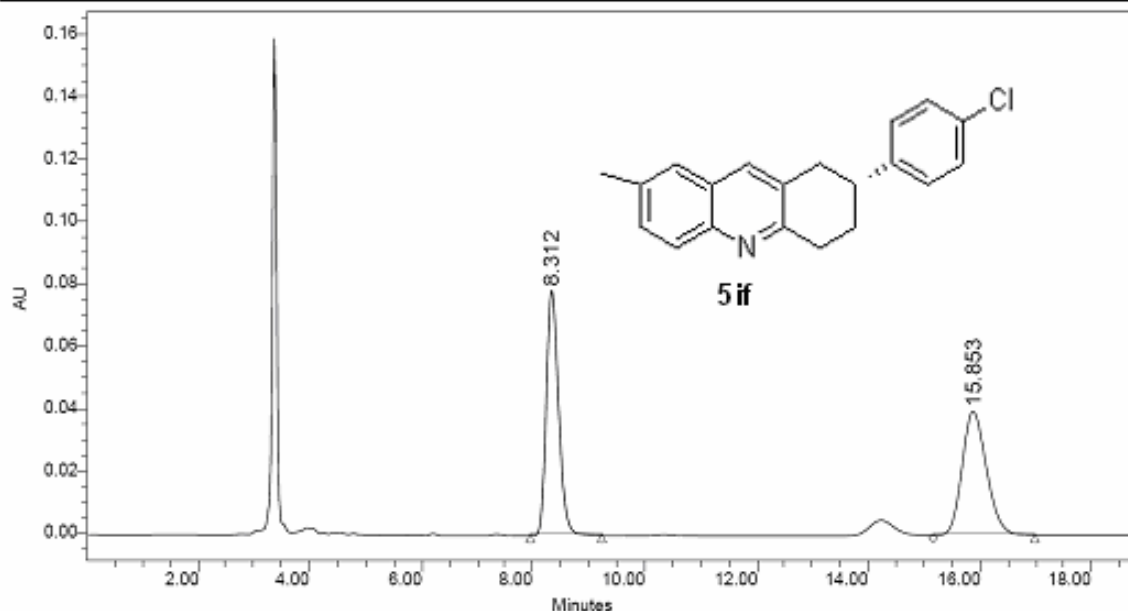
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	7.770	2416731	49.92	164249	59.71
2	11.537	2424279	50.08	110818	40.29



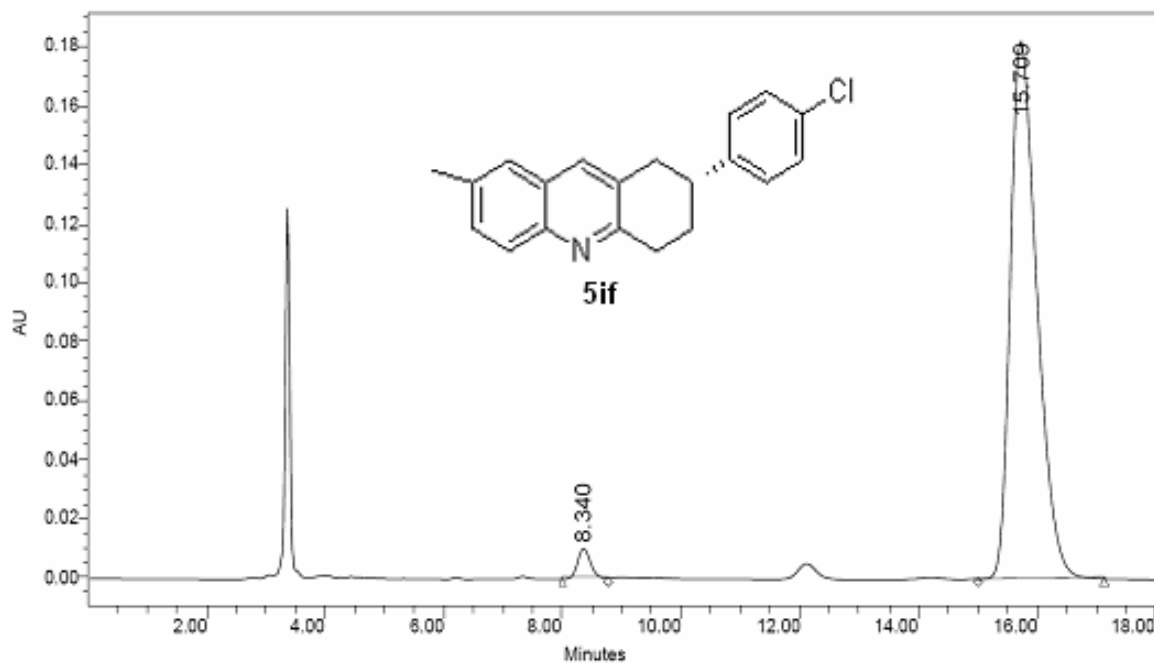
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	7.816	236909	3.33	16118	4.94
2	11.479	6885923	96.67	309881	95.06

Sample Name: RL20110313-1-RAC  
Sample Type: Unknown  
Vial: 1  
Injection #: 5  
Injection Volume: 20.00 ul  
Run Time: 100.00 Minutes

Acquired By: System  
Date Acquired: 3/17/2011 7:51:58 PM  
Acq. Method: 20%254  
Date Processed: 3/24/2011 9:57:31 AM  
Channel Name: 2487Channel 1  
Sample Set Name:

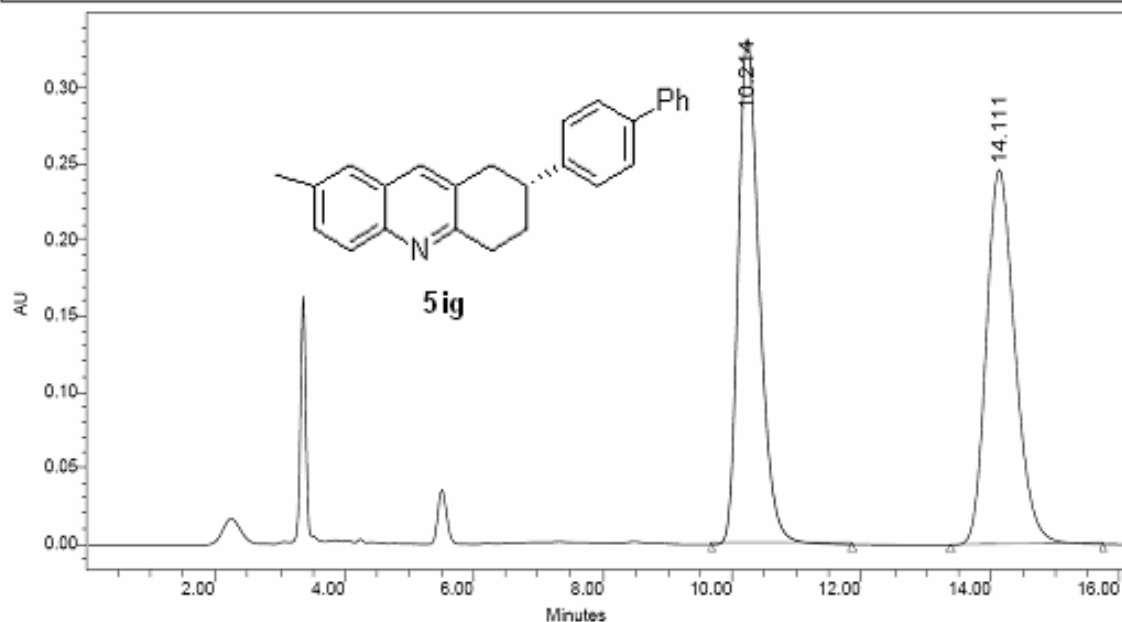


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	8.312	1200378	49.88	78395	66.40
2	15.853	1206383	50.12	39666	33.60

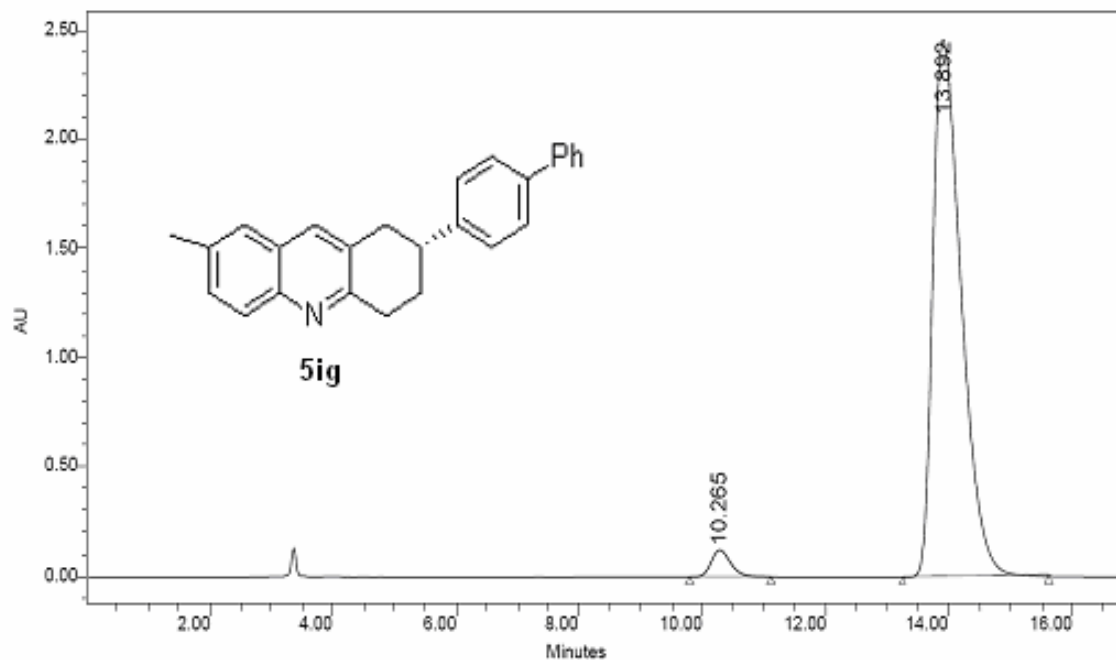


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	8.340	152266	2.61	10191	5.29
2	15.709	5682861	97.39	182511	94.71

Sample Name:	RL20110311-2-RAC	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	3/17/2011 7:16:16 PM
Vial:	1	Acq. Method:	20%254
Injection #:	3	Date Processed:	3/24/2011 9:55:27 AM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	100.00 Minutes	Sample Set Name:	

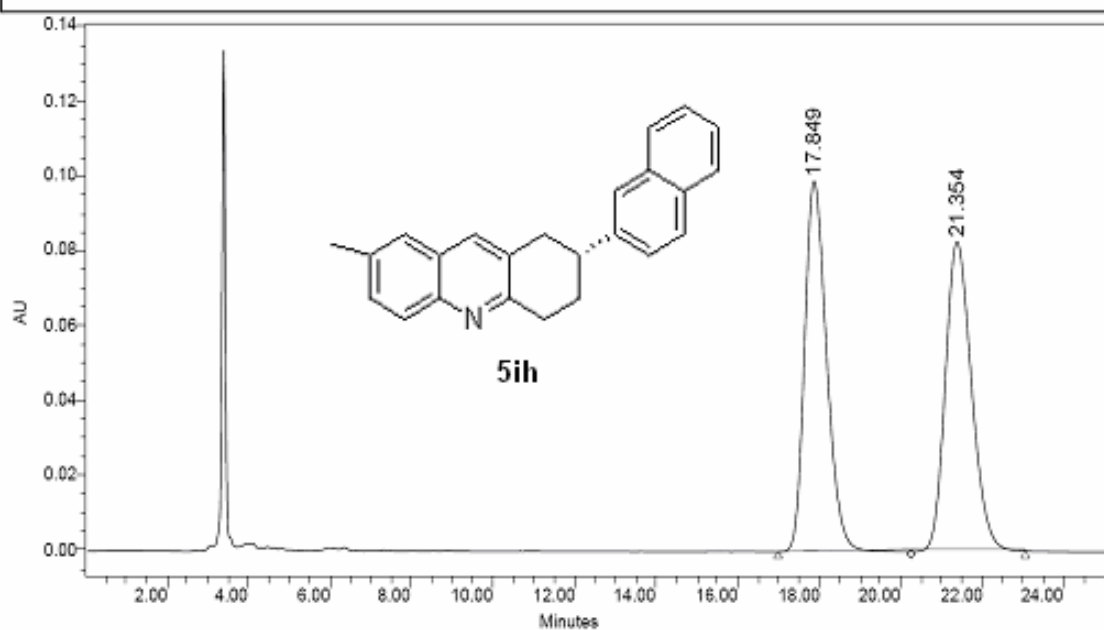


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	10.214	7613835	50.02	332497	57.39
2	14.111	7607813	49.98	246850	42.61

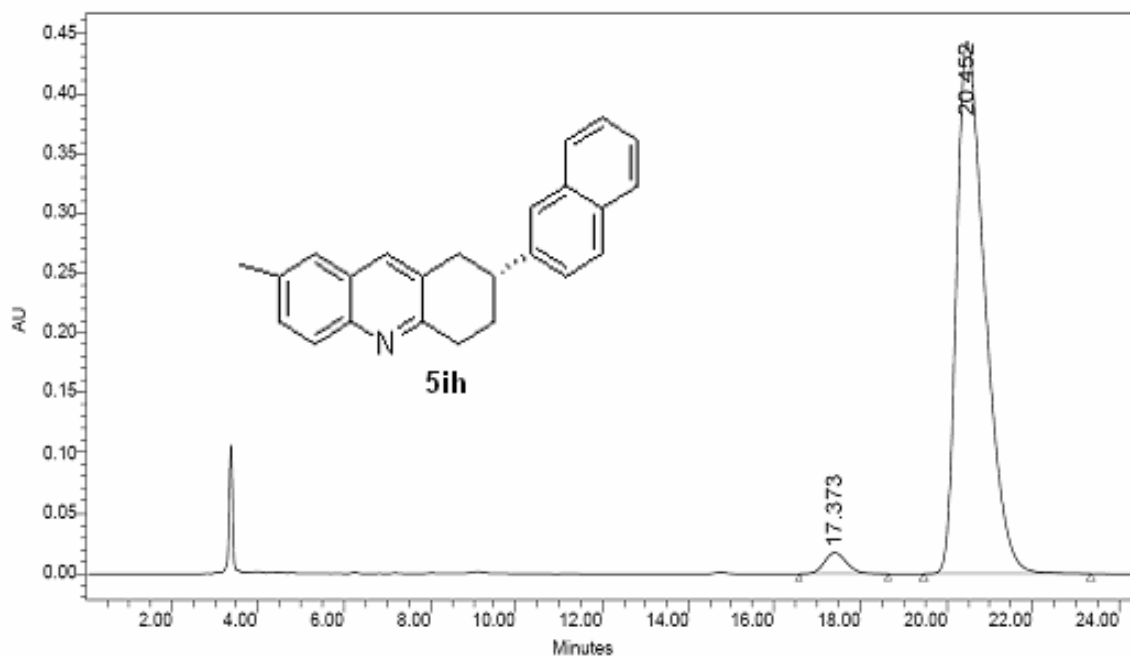


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	10.265	2688925	3.30	122804	4.75
2	13.892	78787445	96.70	2459875	95.25

Sample Name:	RL20110310-1-RAC	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	3/16/2011 3:22:47 PM
Vial:	1	Acq. Method:	20%254
Injection #:	1	Date Processed:	3/24/2011 9:50:54 AM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	100.00 Minutes	Sample Set Name:	



	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	17.849	3704908	50.11	98959	54.47
2	21.354	3689076	49.89	82709	45.53



	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	17.373	629373	3.01	17621	3.82
2	20.452	20301715	96.99	443749	96.18