

## Supporting information

Table of Contents	Page no
1. General Information	S1
2. Experimental Procedures	S1
3. Spectral Data of Synthesized Compounds	S2-S8
4. X-ray Data and Crystal Structures	S7-S8
5. Spectral Copies of Synthesized Compounds	S8-S34

### EXPERIMENTAL SECTION

**General.** Phenylglyoxal and derivatives were synthesized using a reported procedure.<sup>1</sup> pyrrolidin-2-one, 2-naphthol, phenol and 4-hydroxycoumarin, were purchased from Sigma-Aldrich. Catalysts were obtained from TCI. Solvents and silica gel (60–120 mesh) and other common reagents were procured from local suppliers. Thin-layer chromatography (TLC) was carried out on Merck silica gel plates (60 F254). <sup>1</sup>H and <sup>13</sup>C{<sup>1</sup>H} NMR were recorded on a Bruker Ultrashield 500 and 400 MHz or Bruker Ascend 500 MHz instrument. Melting points were measured with a MEPA LABINDIA melting point apparatus. Single-crystal X-ray diffraction data were collected in Bruker D8-Quest diffractometers.

- I. **General experimental procedure for the synthesis of 4, 6 and 8:** A mixture of glyoxal (1), lactam (2) and Ca(OTf)<sub>2</sub>/Bu<sub>4</sub>NPF<sub>6</sub> (10/10 mol%) was heated directly at 100 °C for one hour. After complete conversion of compound 1 (monitored by TLC), phenolic nucleophile (naphthols 3 for 4, phenol 5 for 6 and fluorenol 7 for 8) was added to the above reaction mixture and continued heating as per the time mentioned. After completion of the reaction, monitored by TLC) the crude product was purified by column chromatography (25-30 % EtOAc in petroleum ether) to obtain the pure product 4 or 6 or 8.
- II. **Experimental procedure for the synthesis of (4a):** A mixture of 2-oxo-2-phenylacetaldehyde 1a (0.65 mmol, 100 mg), pyrrolidin-2-one 2 (0.78 mmol, 67 mg), and Ca(OTf)<sub>2</sub>/Bu<sub>4</sub>NPF<sub>6</sub> (22 mg/ 25 mg, 10/10 mol%) and stirred under neat conditions at 100 °C for one hour. After complete conversion of compound 1 (monitored by TLC), 2-naphthol 3a (0.65 mmol, 94 mg) was added to the above reaction mixture and continued stirring for 4 h. After completion of the reaction, the crude product was purified by column chromatography (25-30 % EtOAc in petroleum ether) to obtain the pure product 4a as a white solid in 85% yield.
- III. **Experimental procedure for the synthesis of furocoumarin (10a):** A mixture of 2-oxo-2-phenylacetaldehyde 1a (0.65 mmol, 100 mg), pyrrolidin-2-one 2a (0.78 mmol, 67 mg), and Ca(OTf)<sub>2</sub>/Bu<sub>4</sub>NPF<sub>6</sub> (22 mg/25 mg, 10/10 mol%) and stirred under neat conditions at 100 °C for 1 hour. After complete conversion of compound 1(monitored by TLC), DCE (2 mL) and 4-hydroxycoumarin 9 (0.65 mmol, 106 mg) were added to the above reaction

mixture and refluxed the reaction for 12 h. After completion of the reaction, the reaction mixture was directly absorbed on silica gel and was purified by column chromatography (25-30 % EtOAc in petroleum ether) to obtain the pure product **10a** with 50% yield. Compounds **10a,10b** are reported.<sup>2</sup>

#### IV. Spectral data of new compounds:

*1-(2-Phenylnaphtho[2,1-b]furan-1-yl)pyrrolidin-2-one (4a)*. White solid (182 mg, 85%); mp: 207–209 °C; <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>): δ 8.03 (d, *J* = 8 Hz, 1H), 7.94 (d, *J* = 8 Hz, 1H), 7.84-7.83 (m, 2H), 7.76 (d, *J* = 9 Hz, 1H), 7.67 (d, *J* = 9 Hz, 1H), 7.59-7.56 (m, 1H), 7.51-7.46 (m, 3H), 7.41-7.39 (m, 1H), 3.95-3.91 (m, 1H), 3.76-3.71 (m, 1H), 2.84-2.77 (m, 2H), 2.44-2.36 (m, 2H); <sup>13</sup>C{<sup>1</sup>H}(125 MHz, CDCl<sub>3</sub>) δ 176.0, 151.5, 149.9, 130.9, 129.5, 129.2, 129.0 (2), 127.4, 127.0, 126.5, 125.8, 124.9, 122.0, 120.1, 116.9, 112.6, 49.5, 31.2, 19.4 ppm; (LCMS): *m/z* [M + H]<sup>+</sup>: 328; HRMS (ESI-TOF): *m/z* [M + H]<sup>+</sup> calculated for C<sub>22</sub>H<sub>18</sub>NO<sub>2</sub>: 328.1332; found: 328.1323; IR (film): *v*<sub>max</sub> 1690, 1219, 812, 771 cm<sup>-1</sup>.

*1-(2-(2-Bromophenyl)naphtho[2,1-b]furan-1-yl)pyrrolidin-2-one (4b)*. Following general experimental procedure-I, the product was obtained as white solid (129 mg, 74%); mp: 179–180 °C; <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>): δ 8.04 (d, *J* = 8 Hz, 1H), 7.94 (d, *J* = 8 Hz, 1H), 7.77 (d, *J* = 9 Hz, 1H), 7.73-7.71 (m, 1H), 7.68-7.63 (m, 2H), 7.59-7.56 (m, 1H), 7.50-7.47 (m, 1H), 7.42-7.39 (m, 1H), 7.35-7.37 (m, 1H), 3.87-3.83 (m, 1H), 3.49-3.44 (m, 1H), 2.73-2.66 (m, 1H), 2.57-2.51 (m, 1H), 2.34-2.25 (m, 1H), 2.14-2.08 (m, 1H); <sup>13</sup>C{<sup>1</sup>H}(125 MHz, CDCl<sub>3</sub>) δ 176.2, 152.0, 149.9, 133.4, 132.6, 131.3, 130.9, 130.5, 129.0, 127.5 (2), 127.0, 126.7, 124.9, 123.7, 122.3, 119.3, 119.1, 112.8, 50.1, 31.1, 19.3 ppm; (LCMS): *m/z* [M + H]<sup>+</sup>: 406; HRMS (ESI-TOF): *m/z* [M + H]<sup>+</sup> calculated for C<sub>22</sub>H<sub>17</sub>BrNO<sub>2</sub>: 406.0437; found: 406.0432; IR (film): *v*<sub>max</sub> 1663, 1253, 811, 772, 723 cm<sup>-1</sup>.

*1-(2-(4-Bromophenyl)naphtho[2,1-b]furan-1-yl)pyrrolidin-2-one (4c)*. Following general experimental procedure-I, the product was obtained as white solid (134 mg, 77%); mp: 231–232 °C; <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>): δ 8.01 (d, *J* = 8 Hz, 1H), 7.93 (d, *J* = 8 Hz, 1H), 7.77 (d, *J* = 9 Hz, 1H), 7.69 (d, *J* = 9 Hz, 2H), 7.65 (d, *J* = 9 Hz, 1H), 7.62-7.57 (m, 3H), 7.52-7.49 (m, 1H), 3.97-3.92 (m, 1H), 3.72-3.67 (m, 1H), 2.87-2.72 (m, 2H), 2.51-2.33 (m, 2H); <sup>13</sup>C{<sup>1</sup>H}(125 MHz, CDCl<sub>3</sub>) δ 176.0, 151.6, 148.9, 132.3, 131.0, 129.3, 128.5, 127.4, 127.3, 127.1, 126.9, 125.0, 123.2, 121.9, 120.0, 117.5, 112.6, 49.5, 31.2, 19.5 ppm; (LCMS): *m/z* [M + H]<sup>+</sup>: 406; HRMS (ESI-TOF): *m/z* [M + H]<sup>+</sup> calculated for C<sub>22</sub>H<sub>17</sub>BrNO<sub>2</sub>: 406.0437; found: 406.0435; IR (film): *v*<sub>max</sub> 1685, 1260, 811, 771, 693 cm<sup>-1</sup>.

*1-(2-(4-Chlorophenyl)naphtho[2,1-b]furan-1-yl)pyrrolidin-2-one (4d)*. Following general experimental procedure-I, the product was obtained as white solid (149 mg, 77%); mp: 162–163 °C; <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>): δ 8.01 (d, *J* = 8 Hz, 1H), 7.95 (d, *J* = 8.5 Hz, 1H), 7.78-7.76 (m, 3H), 7.66 (d, *J* = 8.5 Hz, 1H), 7.60-7.57 (m, 1H), 7.52-7.49 (m, 1H), 7.47-7.44 (m, 2H), 3.97-3.93 (m, 1H), 3.73-3.68 (m, 1H), 2.88-2.73 (m, 2H), 2.53-2.32 (m, 2H); <sup>13</sup>C{<sup>1</sup>H}(125 MHz, CDCl<sub>3</sub>) δ 176.0, 151.5, 148.8, 134.8, 130.9, 130.2, 129.3, 129.2, 129.1, 128.0, 127.3, 127.1, 127.0, 126.8, 125.0, 121.9, 120.0, 117.3, 112.5, 49.4, 31.2, 19.4 ppm; (LCMS): *m/z* [M + H]<sup>+</sup>: 362; HRMS (ESI-TOF): *m/z* [M + H]<sup>+</sup> calculated for C<sub>22</sub>H<sub>17</sub>ClNO<sub>2</sub>: 362.0948; found: 362.0947; IR (film): *v*<sub>max</sub> 1696, 1586, 1457, 1274, 815, 772, 619 cm<sup>-1</sup>.

*1-(2-(4-Fluorophenyl)naphtho[2,1-b]furan-1-yl)pyrrolidin-2-one (4e)*. Following general experimental procedure-I, the product was obtained as white solid (166 mg, 82%); mp: 202–203 °C; <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>): δ 8.01 (d, *J* = 8.5 Hz, 1H), 7.94 (d, *J* = 8 Hz, 1H), 7.82–7.79 (m, 2H), 7.75 (d, *J* = 9 Hz, 1H), 7.65 (d, *J* = 9 Hz, 1H), 7.59–7.56 (m, 2H), 7.49 (t, *J* = 8 Hz, 1H), 7.17 (t, *J* = 10.5 Hz, 1H), 3.95–3.91 (m, 1H), 3.71–3.66 (m, 1H), 2.87–2.72 (m, 2H), 2.50–2.30 (m, 2H); <sup>13</sup>C{<sup>1</sup>H}(100 MHz, CDCl<sub>3</sub>) δ 176.1, 164.3, 161.8, 151.4, 149.2, 130.9, 129.2, 127.9, 127.8, 127.4, 127.0, 126.6, 124.9, 121.9, 120.0, 116.3, 116.1, 112.6, 49.5, 31.2, 19.4 ppm; (LCMS): *m/z* [M + H]<sup>+</sup>: 346; HRMS (ESI-TOF): *m/z* [M + H]<sup>+</sup> calculated for C<sub>22</sub>H<sub>17</sub>FNO<sub>2</sub>: 346.1243; found: 346.1242

*1-(2-(4-Methoxyphenyl)naphtho[2,1-b]furan-1-yl)pyrrolidin-2-one (4f)*. Following general experimental procedure-I, the product was obtained as white solid (156 mg, 80%); mp: 210–211 °C; <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>): δ 8.01 (d, *J* = 8.4 Hz, 1H), 7.93 (d, *J* = 8 Hz, 1H), 7.77–7.71 (m, 3H), 7.64 (d, *J* = 8.8 Hz, 1H), 7.56 (t, *J* = 7.2 Hz, 1H), 7.49–7.46 (m, 1H), 7.01–6.99 (m, 2H), 3.94–3.90 (m, 1H), 3.86 (s, 3H), 3.73–3.68 (m, 1H), 2.88–2.71 (m, 2H), 2.48–2.32 (m, 2H); <sup>13</sup>C{<sup>1</sup>H}(100 MHz, CDCl<sub>3</sub>) δ 176.2, 160.2, 151.1, 150.1, 130.9, 129.1, 127.4, 127.3, 126.8, 126.0, 124.7, 122.2, 122.0, 120.2, 115.5, 114.5, 112.5, 55.4, 49.5, 31.3, 19.4 ppm; (LCMS): *m/z* [M + H]<sup>+</sup>: 358; HRMS (ESI-TOF): *m/z* [M + H]<sup>+</sup> calculated for C<sub>23</sub>H<sub>20</sub>NO<sub>3</sub>: 358.1443; found: 358.1442; IR (film): *v*<sub>max</sub> 1687, 1251, 828, 811, 729 cm<sup>-1</sup>.

*1-(7-Bromo-2-phenylnaphtho[2,1-b]furan-1-yl)pyrrolidin-2-one (4g)*. Following general experimental procedure-I, the product was obtained as white solid (216 mg, 81%); mp: 186–187 °C; <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>): δ 8.10 (d, *J* = 2 Hz, 1H), 7.88 (d, *J* = 8.5 Hz, 1H), 7.82–7.81 (m, 2H), 7.70–7.64 (m, 3H), 7.50–7.47 (m, 2H), 7.42–7.40 (m, 1H), 3.90–3.85 (m, 1H), 3.75–3.70 (m, 1H), 2.81–2.76 (m, 2H), 2.44–2.36 (m, 2H); <sup>13</sup>C{<sup>1</sup>H}(125 MHz, CDCl<sub>3</sub>) δ 176.1, 151.5, 150.4, 132.2, 131.2, 130.1, 129.3, 129.2, 129.1, 125.9, 125.9, 125.5, 123.6, 120.3, 118.6, 116.7, 113.8, 49.4, 31.2, 19.5 ppm; (LCMS): *m/z* [M + Na]<sup>+</sup>: 427; HRMS (ESI-TOF): *m/z* [M + H]<sup>+</sup> calculated for C<sub>22</sub>H<sub>17</sub>BrNO<sub>2</sub>: 406.0443; found: 406.0441; IR (film): *v*<sub>max</sub> 1681, 1576, 1254, 892, 799, 636 cm<sup>-1</sup>.

*1-(7-Bromo-2-(p-tolyl)naphtho[2,1-b]furan-1-yl)pyrrolidin-2-one (4h)*. Following general experimental procedure-I, the product was obtained as white solid (184 mg, 73%); mp: 195–196 °C; <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>): δ 8.07 (d, *J* = 2 Hz, 1H), 7.87 (d, *J* = 9 Hz, 1H), 7.70–7.66 (m, 2H), 7.64–7.62 (m, 3H), 7.29–7.25 (m, 2H), 3.85–3.84 (m, 1H), 3.72–3.70 (m, 1H), 2.80–2.75 (m, 2H), 2.44 (s, 3H), 2.43–2.32 (m, 2H); <sup>13</sup>C{<sup>1</sup>H}(100 MHz, CDCl<sub>3</sub>) δ 176.0, 151.2, 150.7, 139.4, 132.2, 131.1, 130.0, 129.8, 126.5, 125.8, 125.8, 125.1, 123.6, 120.3, 118.4, 116.1, 113.7, 49.3, 31.2, 21.5, 19.4 ppm; (LCMS): *m/z* [M + H]<sup>+</sup>: 320; HRMS (ESI-TOF): *m/z* [M + Na]<sup>+</sup> calculated for C<sub>23</sub>H<sub>18</sub>BrNO<sub>2</sub>Na: 442.0419; found: 442.0422.

*1-(7-Bromo-2-(4-chlorophenyl)naphtho[2,1-b]furan-1-yl)pyrrolidin-2-one (4i)*. Following general experimental procedure-I, the product was obtained as white solid (188 mg, 80%); mp: 208–209 °C; <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>): δ 8.31 (s, 1H), 7.94 (d, *J* = 9 Hz, 1H), 7.90–7.85 (m, 2H), 7.81–7.75 (m, 3H), 7.57 (d, *J* = 8 Hz, 2H), 3.90–3.86 (m, 1H), 3.74–3.69 (m, 1H), 2.78–2.64 (m, 2H), 2.46–2.37 (m, 2H); <sup>13</sup>C{<sup>1</sup>H}(125 MHz, CDCl<sub>3</sub>) δ 176.1, 151.4,

150.4, 132.2, 131.2, 130.1, 129.2 (2), 129.1, 129.0, 125.8 (2), 125.4, 123.6, 120.3, 118.5, 116.7, 113.7, 49.4, 31.2, 19.4 ppm; (LCMS):  $m/z$   $[M + H]^+$ : 439; HRMS (ESI-TOF):  $m/z$   $[M + H]^+$  calculated for  $C_{22}H_{16}BrClNO_2$ : 440.0053; found: 440.0057.

*1-(2-Isopropyl)naphtho[2,1-b]furan-1-ylpyrrolidin-2-one* (**4j**). Following general experimental procedure-I, the product was obtained as white solid (211 mg, 85%); mp: 220–221 °C;  $^1H$  NMR (500 MHz,  $CDCl_3$ ):  $\delta$  7.95–7.90 (m, 2H), 7.66 (d,  $J = 9$  Hz, 1H), 7.59–7.57 (m, 1H), 7.52 (t,  $J = 7$  Hz, 1H), 7.44 (t,  $J = 8$  Hz, 1H), 4.04–3.99 (m, 1H), 3.70–3.65 (m, 1H), 3.14–3.08 (m, 1H), 2.79–2.65 (m, 2H), 2.47–2.34 (m, 2H), 1.40 (d,  $J = 6.5$  Hz, 3H), 1.36 (d,  $J = 7$  Hz, 3H);  $^{13}C$  { $^1H$ } (100 MHz,  $CDCl_3$ )  $\delta$  175.7, 158.8, 151.2, 130.7, 129.0, 127.3, 126.6, 125.0, 124.5, 122.1, 119.4, 115.0, 112.6, 51.0, 31.1, 26.7, 21.1, 20.8, 19.2 ppm; (LCMS):  $m/z$   $[M + Na]^+$ : 315; HRMS (ESI-TOF):  $m/z$   $[M + H]^+$  calculated for  $C_{19}H_{20}NO_2$ : 294.1488; found: 294.1480; IR (film):  $\nu_{max}$  1689, 1432, 1216, 1048, 803, 770, 663  $cm^{-1}$ .

*1-(7-Bromo-2-cyclopropyl)naphtho[2,1-b]furan-1-ylpyrrolidin-2-one* (**4k**). Following general experimental procedure-I, the product was obtained as white solid (232 mg, 73%); mp: 145–146 °C;  $^1H$  NMR (500 MHz,  $CDCl_3$ ):  $\delta$  8.01 (d,  $J = 2$  Hz, 1H), 7.79 (d,  $J = 8.5$  Hz, 1H), 7.59–7.57 (m, 1H), 7.52–7.48 (m, 2H), 3.93–3.90 (m, 1H), 3.80–3.77 (m, 1H), 2.74–2.68 (m, 2H), 2.38–2.35 (m, 2H), 1.98–1.95 (m, 1H), 1.20–1.18 (m, 1H), 1.06–1.02 (m, 3H);  $^{13}C$  { $^1H$ } (125 MHz,  $CDCl_3$ )  $\delta$  175.8, 155.0, 150.3, 131.9, 130.8, 129.6, 125.2, 123.8, 123.7, 119.9, 118.1, 116.4, 113.4, 50.6, 31.0, 19.2, 7.6, 7.5, 6.9.2 ppm; (LCMS):  $m/z$   $[M + Na]^+$ : 370; HRMS (ESI-TOF):  $m/z$   $[M + H]^+$  calculated for  $C_{19}H_{17}BrNO_2$ : 370.0442; found: 370.0444.

*1-(2-Phenyl)naphtho[2,1-b]furan-1-ylazepan-2-one* (**4l**). Following general experimental procedure-I, the product was obtained as white solid (170 mg, 73%); mp: 210–211 °C;  $^1H$  NMR (500 MHz,  $CDCl_3$ ):  $\delta$  8.16 (d,  $J = 8$  Hz, 1H), 7.93 (d,  $J = 8$  Hz, 1H), 7.82 (d,  $J = 7.5$  Hz, 2H), 7.74 (d,  $J = 9$  Hz, 1H), 7.65 (d,  $J = 8.5$  Hz, 1H), 7.58–7.55 (m, 1H), 7.49–7.46 (m, 3H), 7.39 (t,  $J = 7.5$  Hz, 1H), 3.88–3.83 (m, 1H), 3.70–3.65 (m, 1H), 3.01–2.92 (m, 2H), 2.10–2.05 (m, 1H), 2.00–1.94 (m, 1H), 1.89–1.80 (m, 4H);  $^{13}C$  { $^1H$ } (100 MHz,  $CDCl_3$ )  $\delta$  177.2, 151.4, 148.9, 130.9, 129.7, 129.1, 128.9, 128.8, 128.4, 127.5, 126.9, 126.7, 126.4, 124.7, 123.6, 122.3, 119.7, 112.7, 54.2, 38.1, 30.3, 28.8, 23.0 ppm; (LCMS):  $m/z$   $[M + H]^+$ : 356; HRMS (ESI-TOF):  $m/z$   $[M + Na]^+$  calculated for  $C_{24}H_{21}NO_2Na$ : 378.1470; found: 378.1476.

*1-(2-(4-Bromophenyl)naphtho[2,1-b]furan-1-yl)azepan-2-one* (**4m**). Following general experimental procedure-I, the product was obtained as white solid (131 mg, 70%); mp: 207–208 °C;  $^1H$  NMR (400 MHz,  $CDCl_3$ ):  $\delta$  8.13 (d,  $J = 8$  Hz, 1H), 7.94 (d,  $J = 7.2$  Hz, 1H), 7.75 (d,  $J = 9.2$  Hz, 1H), 7.72–7.70 (m, 2H), 7.65–7.61 (m, 2H), 7.60–7.56 (m, 2H), 7.51–7.47 (m, 1H), 3.91–3.85 (m, 1H), 3.68–3.62 (m, 1H), 3.02–2.90 (m, 2H), 2.13–2.05 (m, 1H), 1.95–1.79 (m, 4H), 1.57–1.51 (m, 1H);  $^{13}C$  { $^1H$ } (100 MHz,  $CDCl_3$ )  $\delta$  177.1, 151.5, 147.8, 132.0, 130.9, 129.2, 128.6, 128.3, 127.4, 126.8, 126.8, 124.9, 123.9, 123.1, 122.2, 119.6, 112.6, 54.1, 38.1, 30.3, 28.9, 23 ppm; (LCMS):  $m/z$   $[M + H]^+$ : 434; HRMS (ESI-TOF):  $m/z$   $[M + H]^+$  calculated for  $C_{24}H_{21}BrNO_2$ : 434.0756; found: 434.0754; IR (film):  $\nu_{max}$  1644, 1481, 1218, 829, 772, 722  $cm^{-1}$ .

*1-(2-(4-Chlorophenyl)naphtho[2,1-b]furan-1-yl)azepan-2-one (4n)*. Following general experimental procedure-I, the product was obtained as white solid (142 mg, 68%); mp: 205–206 °C; <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>): δ 8.13 (d, *J* = 8.4 Hz, 1H), 7.93 (d, *J* = 8 Hz, 1H), 7.79–7.74 (m, 3H), 7.63 (d, *J* = 9.2 Hz, 1H), 7.60–7.56 (m, 1H), 7.51–7.48 (m, 1H), 7.47–7.44 (m, 2H), 3.90–3.84 (m, 1H), 3.67–3.62 (m, 1H), 3.02–2.90 (m, 2H), 2.13–2.04 (m, 1H), 1.94–1.89 (m, 2H), 1.86–1.76 (m, 2H), 1.56–1.47 (m, 1H); <sup>13</sup>C{<sup>1</sup>H}(100 MHz, CDCl<sub>3</sub>) δ 177.1, 151.5, 147.8, 134.8, 130.9, 129.2, 129.1, 128.2, 128.1, 127.4, 126.8, 124.8, 123.8, 122.2, 119.6, 112.6, 54.1, 38.1, 30.3, 28.9, 23.0 ppm; (LCMS): *m/z* [M + H]<sup>+</sup>: 390; HRMS (ESI-TOF): *m/z* [M + H]<sup>+</sup> calculated for C<sub>24</sub>H<sub>21</sub>ClNO<sub>2</sub>: 390.1261; found: 390.1260

*1-(5-Methoxy-2-phenylbenzofuran-3-yl)pyrrolidin-2-one (6a)*. Following general experimental procedure-I, the product was obtained as white solid (161 mg, 80%); mp: 159–160 °C; <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>): δ 7.78 (t, *J* = 1.5 Hz, 2H), 7.45 (t, *J* = 7.5 Hz, 2H), 7.39 (t, *J* = 9 Hz, 2H), 6.93–6.91 (m, 1H), 6.82 (d, *J* = 2.5 Hz, 1H), 3.85 (s, 3H), 3.71 (t, *J* = 6.5 Hz, 2H), 2.70 (t, *J* = 8.0 Hz, 2H), 2.33–2.29 (m, 2H); <sup>13</sup>C{<sup>1</sup>H}(125 MHz, CDCl<sub>3</sub>) δ 175.6, 156.4, 150.4, 148.3, 129.7, 129.1, 128.9, 126.7, 126.0, 116.0, 114.2, 112.4, 101.4, 56.1, 49.1, 31.1, 19.5 ppm; (LCMS): *m/z* [M + Na]<sup>+</sup>: 330; HRMS (ESI-TOF): *m/z* [M + H]<sup>+</sup> calculated for C<sub>19</sub>H<sub>18</sub>NO<sub>3</sub>: 308.1281; found: 308.1280.

*1-(2-(4-Chlorophenyl)-5-methoxybenzofuran-3-yl)pyrrolidin-2-one (6b)*. Following general experimental procedure-I, the product was obtained as white solid (139 mg, 76%); mp: 165–166 °C; <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>): δ 7.70–7.69 (m, 2H), 7.43–7.38 (m, 3H), 6.94–6.92 (m, 1H), 6.81 (d, *J* = 2.5 Hz, 1H), 3.84 (s, 3H), 3.70 (t, *J* = 7.0 Hz, 2H), 2.69 (t, *J* = 8.0 Hz, 2H), 2.33–2.29 (m, 2H); <sup>13</sup>C{<sup>1</sup>H}(125 MHz, CDCl<sub>3</sub>) δ 175.5, 156.4, 149.3, 148.3, 134.9, 129.2, 128.1, 127.2, 126.5, 116.3, 114.4, 112.4, 101.4, 56.0, 49.1, 31.0, 19.4 ppm; (LCMS): *m/z* [M + Na]<sup>+</sup>: 363; HRMS (ESI-TOF): *m/z* [M + H]<sup>+</sup> calculated for C<sub>19</sub>H<sub>17</sub>ClNO<sub>3</sub>: 342.0891; found: 342.0885; IR (film): *v*<sub>max</sub> 1690, 1452, 1222, 847, 779, 640 cm<sup>-1</sup>.

*1-(2,5-Diphenylbenzofuran-3-yl) pyrrolidin-2-one (6c)*. Following general experimental procedure-I, the product was obtained as white solid (190 mg, 82%); mp: 178–179 °C; <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>): δ 7.82–7.80 (m, 2H), 7.62–7.60 (m, 2H), 7.58–7.53 (m, 3H), 7.49–7.43 (m, 4H), 7.41–7.38 (m, 1H), 7.36–7.33 (m, 1H), 3.74 (t, *J* = 6.5 Hz, 2H), 2.71 (t, *J* = 6.5 Hz, 2H), 2.34–2.28 (m, 2H); <sup>13</sup>C{<sup>1</sup>H}(125 MHz, CDCl<sub>3</sub>) δ 175.7, 153.0, 150.3, 141.5, 137.2, 129.5, 129.2, 129.0, 128.8, 127.7, 127.1, 126.7, 126.2, 125.0, 117.7, 116.1, 112.0, 49.2, 31.1, 19.5 ppm; (LCMS): *m/z* [M + H]<sup>+</sup>: 354; HRMS (ESI-TOF): *m/z* [M + H]<sup>+</sup> calculated for C<sub>24</sub>H<sub>20</sub>NO<sub>2</sub>: 354.1488; found: 354.1481; IR (film): *v*<sub>max</sub> 2359, 1685, 1466, 1260, 811, 763, 650 cm<sup>-1</sup>.

*1-(4,10-Dimethyl-2,5,5-triphenyl-5H-fluoreno[3,2-b]furan-3-yl)pyrrolidin-2-one (8a)*. Following general experimental procedure-I, the product was obtained as white solid (300 mg, 84%); mp: 296–297 °C; <sup>1</sup>H NMR (CDCl<sub>3</sub>, 500 MHz): δ 7.96 (d, *J* = 7.5 Hz, 1H), 7.82 (d, *J* = 1 Hz, 2H), 7.49 (t, *J* = 7 Hz, 2H), 7.42 (d, *J* = 7.5 Hz, 1H), 7.37–7.33 (m, 7H), 7.28–7.20 (m, 7H), 3.64–3.60 (m, 2H), 2.96 (s, 3H), 2.62–2.52 (m, 2H), 2.20–2.17 (m, 2H), 2.08 (s, 2H) ppm; <sup>13</sup>C NMR (CDCl<sub>3</sub>, 125 MHz): 176.5, 155.5, 153.1, 150.7, 145.8, 143.3, 142.2, 140.7, 136.8, 129.7, 129.3, 129.0 (2), 128.1, 127.9, 127.4, 127.3, 126.6, 126.3, 125.9, 125.5, 125.2, 124.5, 122.8, 116.5, 115.0, 64.6, 50.5, 31.1, 19.1, 14.7, 12.4 ppm; (LCMS): *m/z* [M + H]<sup>+</sup>:

546; HRMS (ESI-TOF):  $m/z$   $[M + H]^+$  calculated for  $C_{39}H_{32}NO_2$ : 546.2427; found: 546.2424; IR (film):  $\nu_{max}$  2936, 1692, 1491, 1220, 835, 764, 643  $cm^{-1}$ .

*1-(2-(4-Bromophenyl)-4,10-dimethyl-5,5-diphenyl-5H-fluoreno[3,2-b]furan-3-yl)pyrrolidin-2-one (8b)*. Following general experimental procedure-I, the product was obtained as white solid (220 mg, 81%); mp: 297–298 °C;  $^1H$  NMR ( $CDCl_3$ , 500 MHz):  $\delta$  7.95 (d,  $J = 8$  Hz, 1H), 7.65 (d,  $J = 8.5$  Hz 2H), 7.59 (d,  $J = 8.5$  Hz 2H), 7.33-7.29 (m, 6H), 7.22-7.16 (m, 7H), 3.60-3.54 (m, 2H), 2.92 (s, 3H), 2.60-2.47 (m, 2H), 2.18-2.15 (m, 2H), 2.05 (s, 3H) ppm;  $^{13}C$  NMR ( $CDCl_3$ , 125 MHz): 176.5, 155.5, 153.3, 149.8, 146.0, 143.3, 142.2, 140.6, 137.2, 132.3, 129.3, 129.0, 128.7, 128.2, 127.9, 127.5, 127.4(2), 126.7, 126.4, 125.6, 125.4, 124.4, 123.3, 122.9, 117.1, 115.1, 64.7, 50.6, 31.1, 19.2, 14.7, 12.4 ppm; (LCMS):  $m/z$   $[M + H]^+$ : 624; HRMS (ESI-TOF):  $m/z$   $[M + H]^+$  calculated for  $C_{39}H_{31}BrNO_2$ : 624.1538; found: 624.1534; IR (film):  $\nu_{max}$  2922, 1686, 1484, 1339, 832, 771, 686  $cm^{-1}$ .

*1-(4,10-Dimethyl-5,5-diphenyl-2-(p-tolyl)-5H-fluoreno[3,2-b]furan-3-yl)pyrrolidin-2-one (8c)*. Following general experimental procedure-I, the product was obtained as white solid (285 mg, 85%); mp: 291–292 °C;  $^1H$  NMR ( $CDCl_3$ , 400 MHz):  $\delta$  7.94 (d,  $J = 7.6$  Hz, 1H), 7.67 (d,  $J = 8$  Hz 2H), 7.35-7.29 (m, 6H), 7.27-7.25 (m, 2H), 7.22-7.16 (m, 7H), 3.59-3.55 (m, 2H), 2.93 (s, 3H), 2.58-2.48 (m, 2H), 2.40 (s, 3H), 2.16-2.12 (m, 2H), 2.05 (s, 3H) ppm;  $^{13}C$  NMR ( $CDCl_3$ , 100 MHz): 176.6, 155.5, 153.0, 151.1, 145.7, 143.4, 142.3, 140.8, 139.2, 136.6, 129.8, 129.3, 129.0, 128.2, 127.9, 127.3(2), 126.9, 126.6, 126.3, 125.9, 125.6, 125.1, 124.7, 122.8, 115.9, 114.9, 64.6, 50.6, 31.1, 21.6, 19.2, 14.7, 12.4 ppm; (LCMS):  $m/z$   $[M + H]^+$ : 560; HRMS (ESI-TOF):  $m/z$   $[M + H]^+$  calculated for  $C_{40}H_{34}NO_2$ : 560.2584; found: 560.2577; IR (film):  $\nu_{max}$  2919, 1686, 1448, 1287, 840, 722, 650  $cm^{-1}$ .

*1-(5-(4-Chlorophenyl)-4,10-dimethyl-2,5-diphenyl-5H-fluoreno[3,2-b]furan-3-yl)pyrrolidin-2-one (8d)*. Following general experimental procedure-I, the product was obtained as white solid (288 mg, 76%); mp: 266–267 °C;  $^1H$  NMR ( $CDCl_3$ , 400 MHz):  $\delta$  7.95 (d,  $J = 8$  Hz, 1H), 7.80 (d,  $J = 0.8$  Hz 2H), 7.48-7.44 (m, 2H), 7.40 (d,  $J = 7.2$  Hz 1H) 7.32-7.30 (m, 2H), 7.29-7.24 (m, 3H), 7.23-7.21 (m, 2H), 7.20-7.16 (m, 5H), 3.61-3.58 (m, 2H), 2.93 (s, 3H), 2.60-2.49 (m, 2H), 2.19-2.15 (m, 2H), 2.05 (s, 3H) ppm;  $^{13}C$  NMR ( $CDCl_3$ , 125 MHz): 176.6, 155.5, 153.2, 150.8, 145.8, 143.3, 142.2, 140.7, 136.8, 129.7, 129.3, 129.1(2), 129.0, 128.2, 127.9, 127.4, 127.3, 126.7, 126.4, 125.9, 125.6, 125.2, 124.6, 122.9, 116.5, 115.0, 64.6, 50.6, 31.1, 19.2, 14.7, 12.4 ppm; (LCMS):  $m/z$   $[M + H]^+$ : 580; HRMS (ESI-TOF):  $m/z$   $[M + H]^+$  calculated for  $C_{39}H_{31}ClNO_2$ : 580.2043; found: 580.2039

*1-(5-(4-Chlorophenyl)-4, 10-dimethyl-5-phenyl-2-(p-tolyl)-5H-fluoreno[3,2-b]furan-3-yl)pyrrolidin-2-one (8e)*. Following general experimental procedure-I, the product was obtained as white solid (278 mg, 78%); mp: 288–289 °C;  $^1H$  NMR ( $CDCl_3$ , 500 MHz):  $\delta$  7.94 (d,  $J = 7.5$  Hz, 1H), 7.68 (t,  $J = 7$  Hz 2H), 7.34-7.27 (m, 5H), 7.25-7.16 (m, 9H), 3.60-3.56 (m, 2H), 2.92 (s, 3H), 2.61-2.55 (m, 1H), 2.52-2.45 (m, 1H), 2.40(s, 3H) 2.18-2.13 (m, 2H), 2.04 (s, 3H) ppm;  $^{13}C$  NMR ( $CDCl_3$ , 100 MHz): 176.6, 154.9, 153.0, 151.2(2), 145.2, 142.8, 142.1, 141.8, 141.0, 140.7, 139.3, 136.4, 132.5, 132.1, 130.7, 130.4, 129.8, 129.1, 128.8, 128.2, 128.1, 127.5, 127.4, 126.8, 126.5, 125.9, 125.4, 124.9, 124.7, 122.9, 115.8, 115.1, 64.1, 50.5, 31.1, 21.6, 19.2, 14.7, 12.4 ppm; (LCMS):  $m/z$   $[M + H]^+$ : 594; HRMS (ESI-TOF):

$m/z$   $[M + H]^+$  calculated for  $C_{40}H_{33}ClNO_2$ : 594.2210; found: 594.2214; IR (film):  $\nu_{max}$  2918, 1691, 1450, 1220, 820, 772, 644  $cm^{-1}$ .

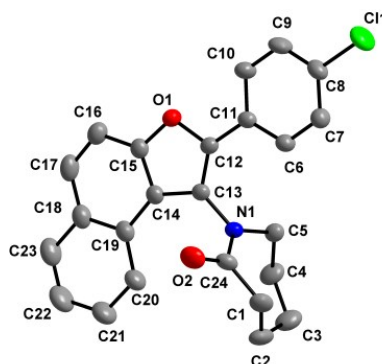
*1-(4,7,10-Trimethyl-2,5,5-triphenyl-5H-fluoreno[3,2-b]furan-3-yl)pyrrolidin-2-one* (**8f**). Following general experimental procedure-I, the product was obtained as white solid (308 mg, 84%); mp: 293–294 °C;  $^1H$  NMR ( $CDCl_3$ , 500 MHz):  $\delta$  7.94 (d,  $J=7.5$  Hz, 1H), 7.68 (d,  $J=8.5$  Hz 2H), 7.34-7.30 (m, 5H), 7.27-7.25 (m, 3H), 7.21-7.16 (m, 7H), 3.60-3.56 (m, 2H), 2.93 (s, 3H), 2.60-2.55 (m, 1H), 2.52-2.46 (m, 1H), 2.40 (s, 3H), 2.18-2.14 (m, 2H), 2.05 (s, 3H) ppm;  $^{13}C$  NMR ( $CDCl_3$ , 125 MHz): 176.6, 155.5, 153.0, 151.1, 145.7, 143.4, 142.3, 140.8, 139.2, 136.6, 129.8, 129.3, 129.0, 128.2, 127.9, 127.3(2), 126.9, 125.9, 125.5, 125.1, 124.6, 124.7, 122.8, 115.9, 114.9, 64.5, 50.5, 31.1, 21.5, 19.1, 14.7, 12.4 ppm; (LCMS):  $m/z$   $[M + H]^+$ : 560; HRMS (ESI-TOF):  $m/z$   $[M + Na]^+$  calculated for  $C_{40}H_{33}NO_2Na$ : 582.2409; found: 582.2407; IR (film):  $\nu_{max}$  2919, 1686, 1490, 1220, 820, 772, 645  $cm^{-1}$ .

## References:

1. H. A. Riley and A. R. Gray, *Org. Synth.*, 1935, **15**, 67.
2. V. N. Babu, A. Murugan, N. Katta, S. Devatha, and D. S. Sharada, *J. Org. Chem.*, 2019, **84**, 6631

## Data for Single X-Ray Crystal Structure **4n**.

Vapor diffusion crystallization method was used for crystal growth for **4n** Where compound was dissolved in chloroform by heating to make saturated solution in small vial is placed in closed bottle with other solvent as *n*-hexane.



**Figure S1.** ORTEP representation of compound **4n** and thermal ellipsoids are drawn with 50% probability.

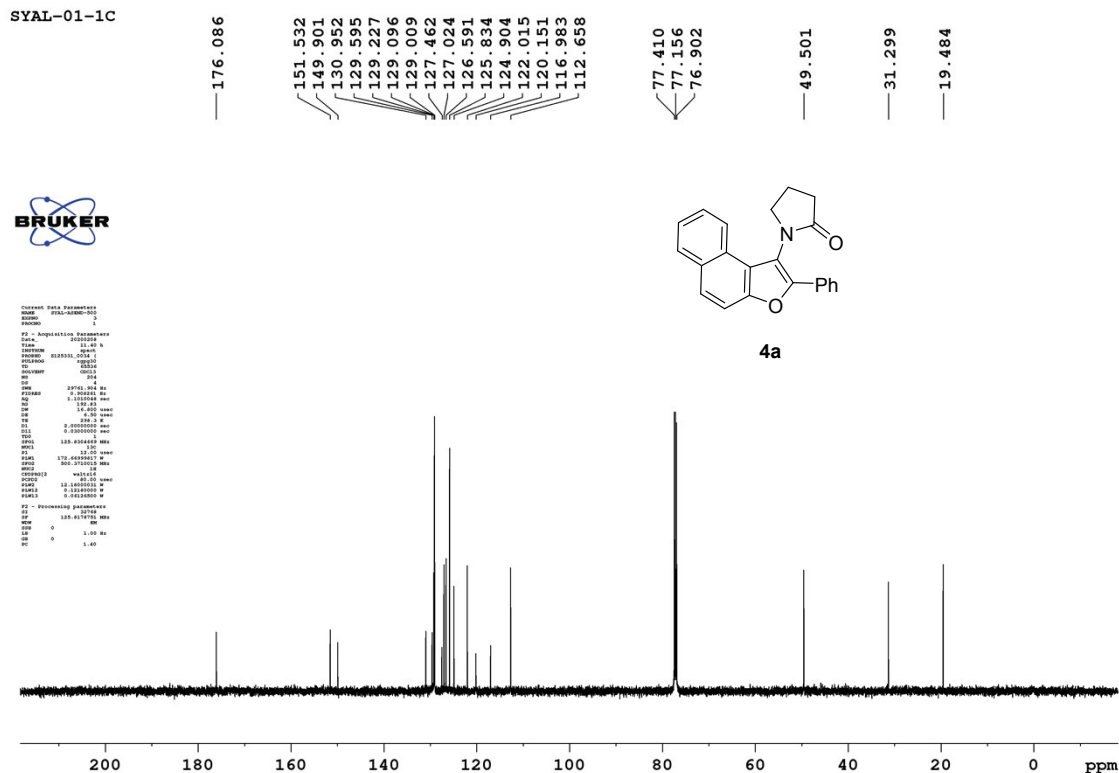
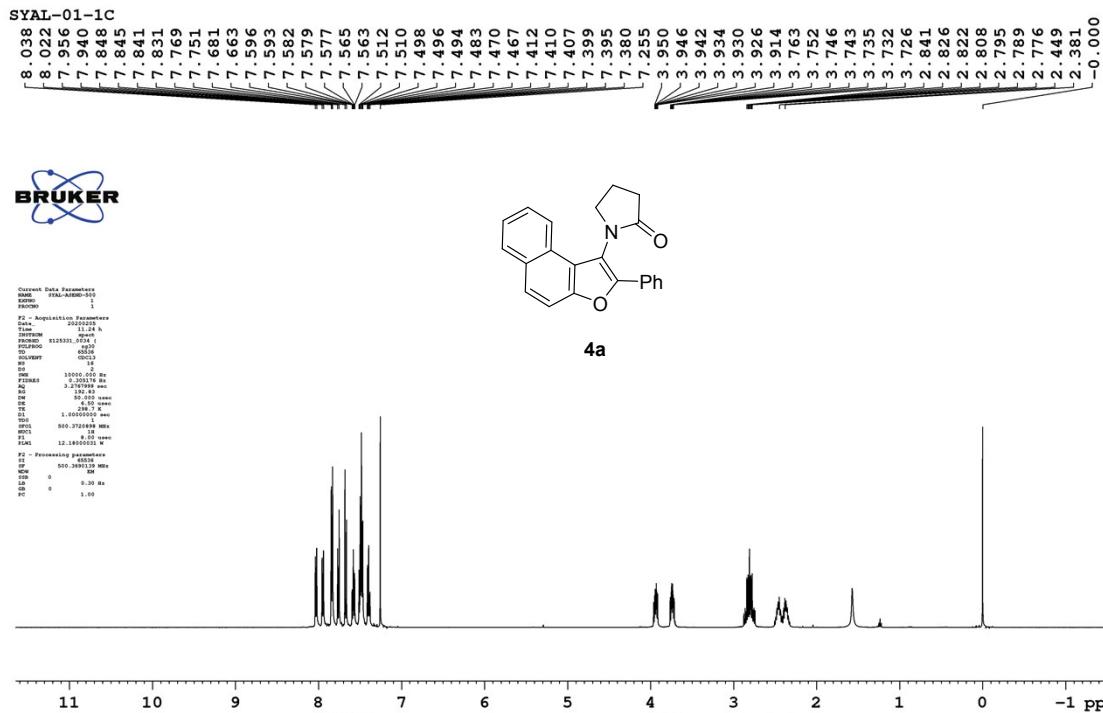
## Crystal data and structure refinement for **4n**.

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Formula weight	389.86

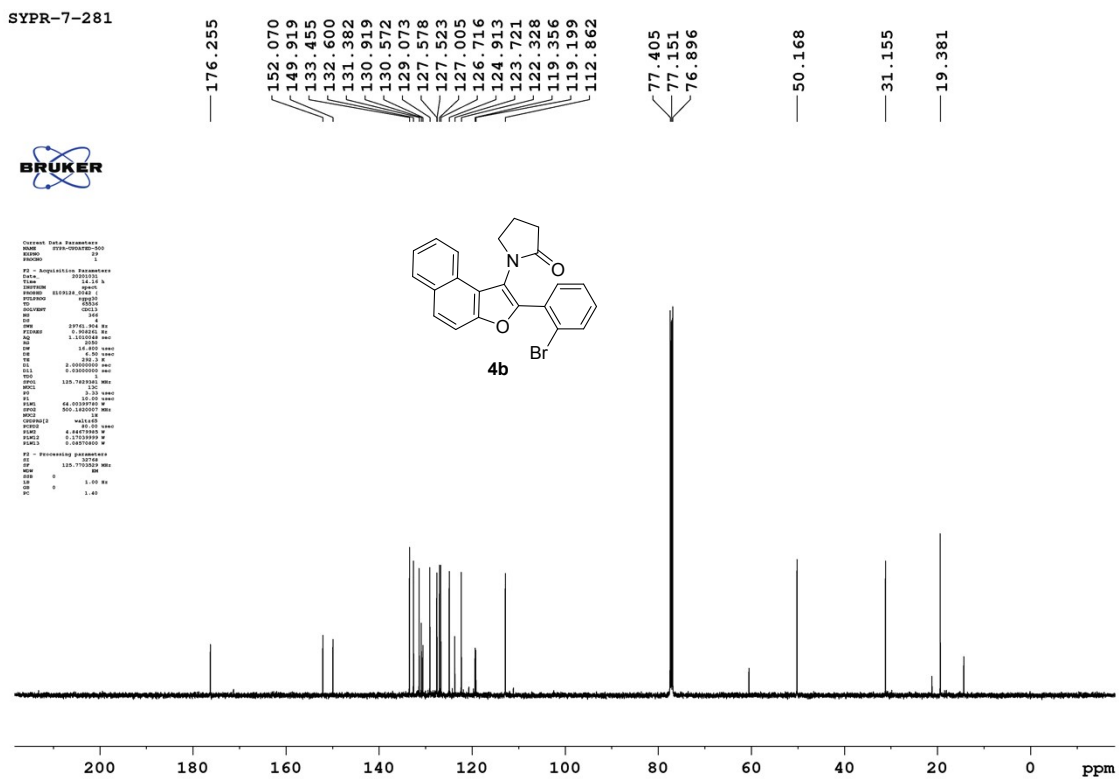
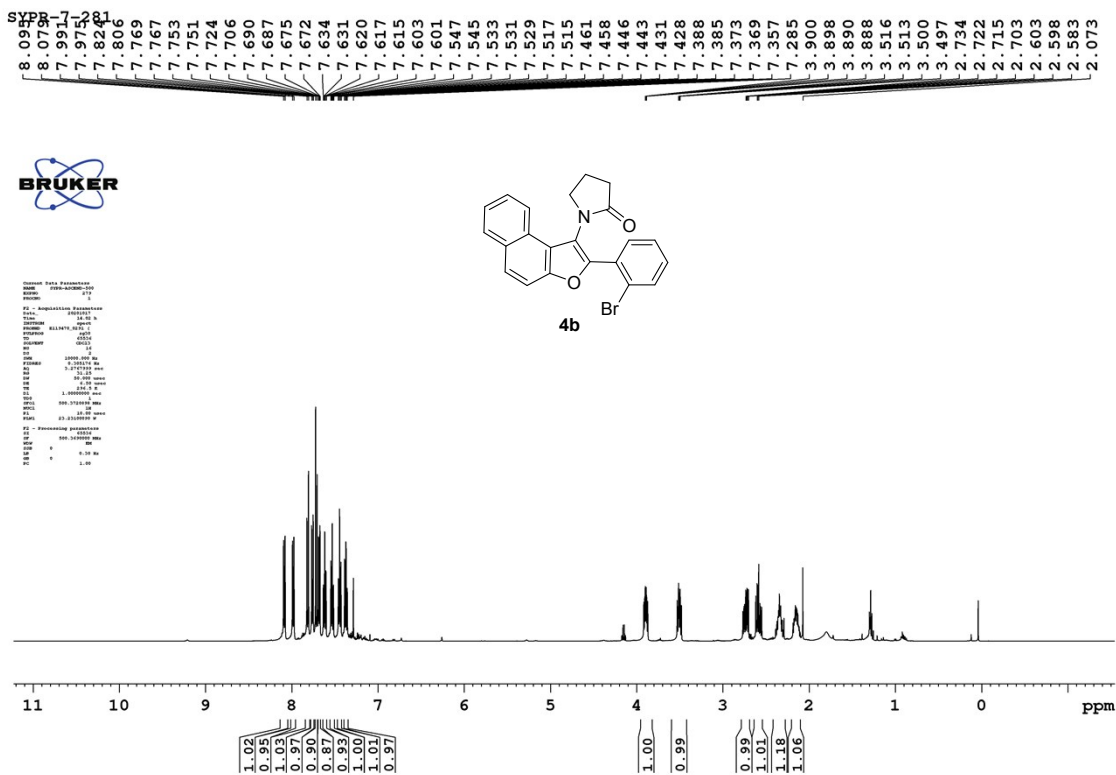
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Wavelength	0.71073 Å
Crystal system	'Monoclinic'
Space group	P 1 21/c 1
Unit cell dimensions	a = 12. 2034(4) Å $\alpha$ = 90.00. b = 8. 3948 (3) Å $\beta$ = 91.400 (3). c = 19. 2731(6) Å $\gamma$ = 90.00.
Volume	1973. 85 (11)
Z	4
Density (calculated)	1.312 Mg/m <sup>3</sup>
Absorption coefficient	0.213 mm <sup>-1</sup>
F(000)	816.0
Crystal size	0.24 x 0.20 x 0.16 mm <sup>3</sup>
Theta range for data collection	2.11 to 25.00 °.
Index ranges	-14<=h<=14,-9<=k<=9,-22<=l<=22
Reflections collected	18149
Independent reflections	8017 [R(int) = 0.0503]
restraints / parameters	1 / 798
Goodness-of-fit on F <sup>2</sup>	1.067
Final R indices [I>2sigma(I)]	R1 = 0.0665, wR2 = 0.1254
R indices (all data)	R1 = 0.0436, wR2 = 0.1113

<sup>1</sup>H and <sup>13</sup>C{<sup>1</sup>H} spectra of **4a**

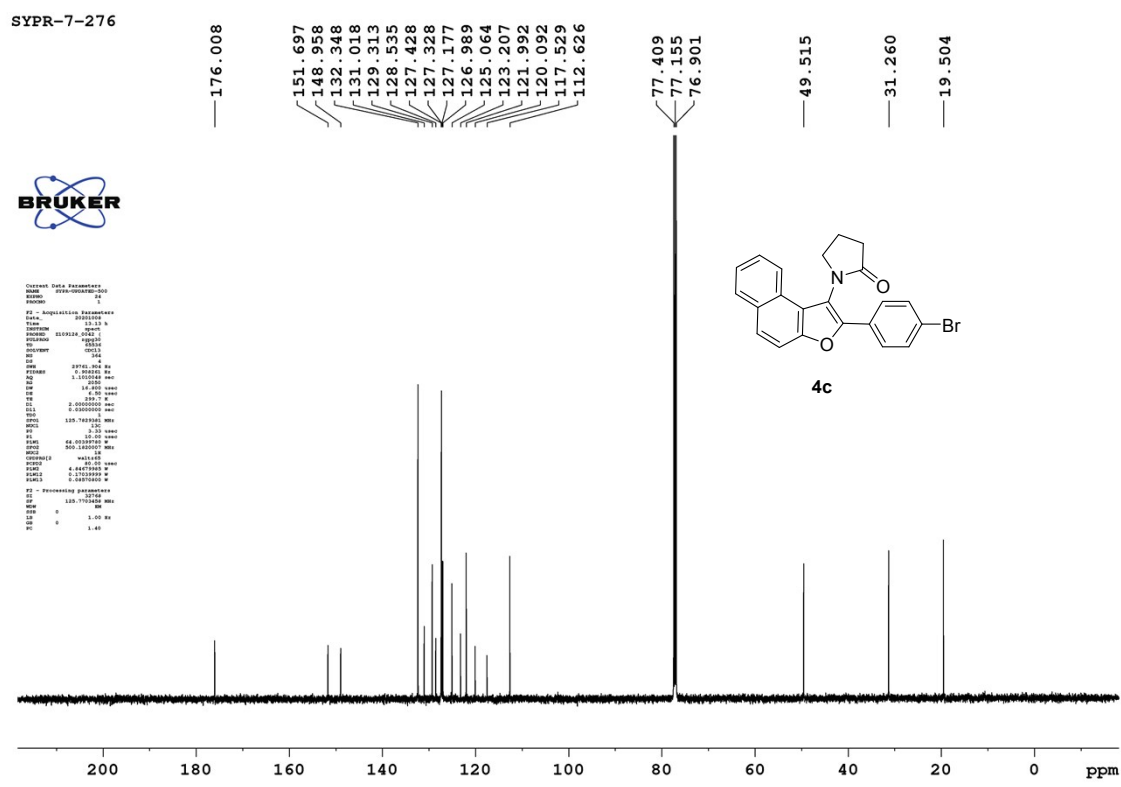
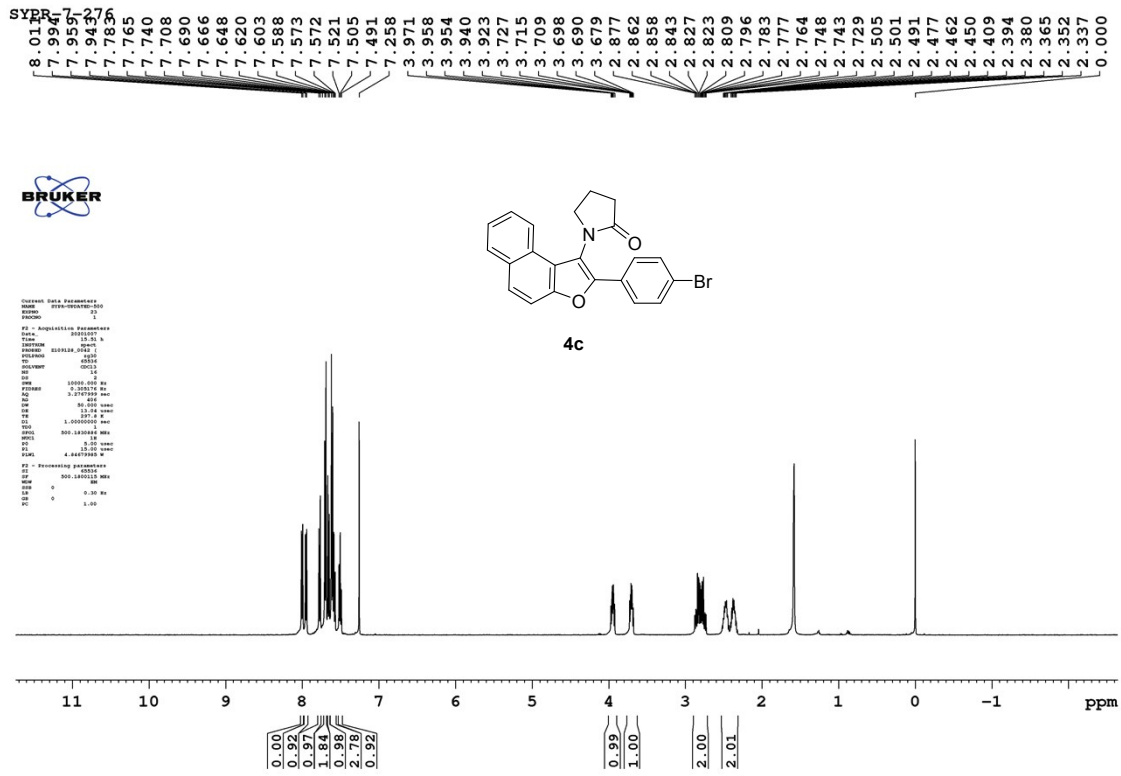




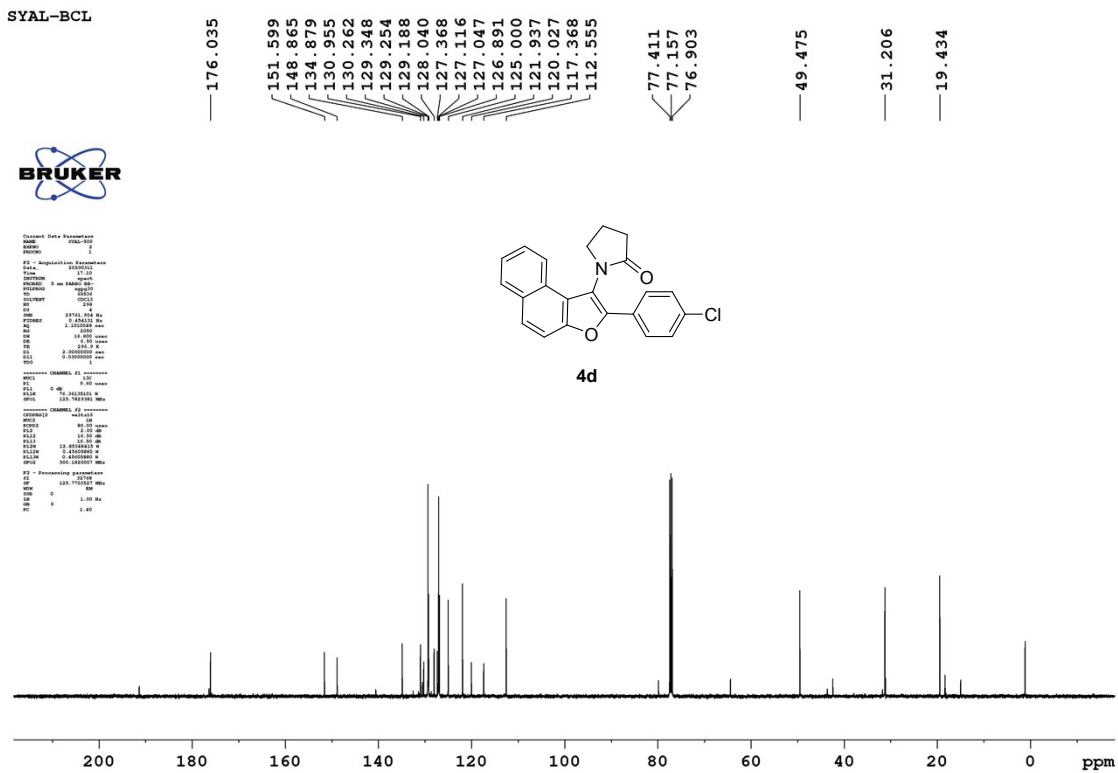
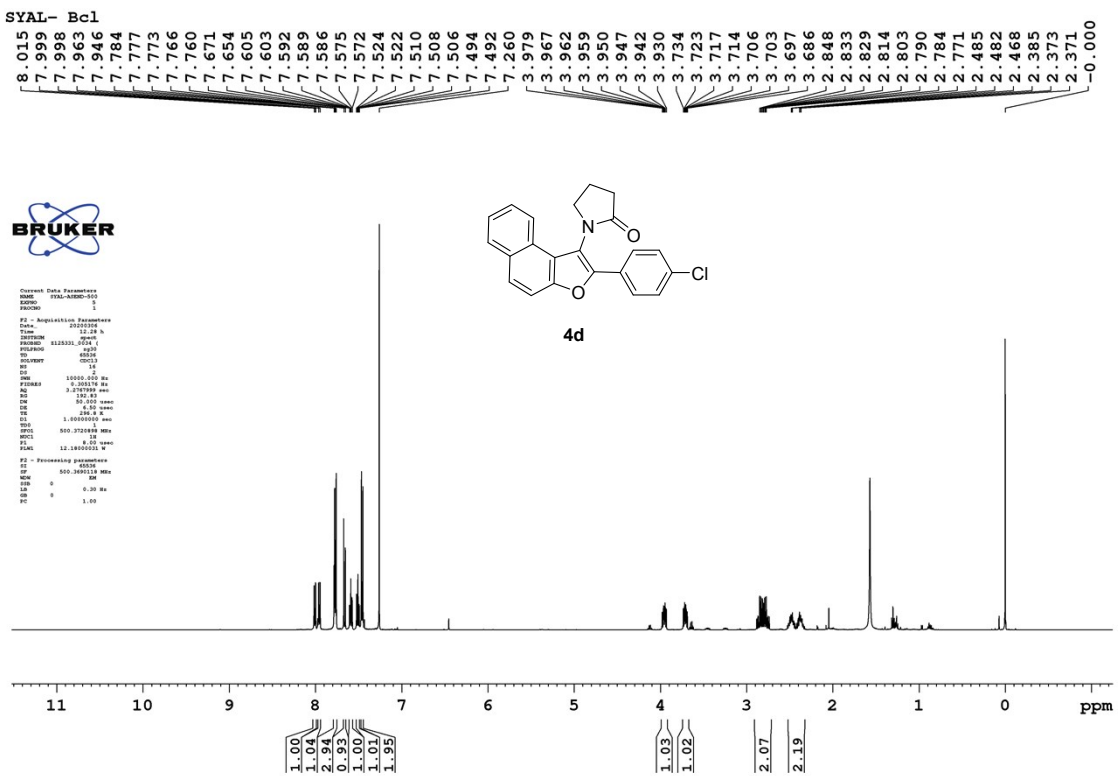
<sup>1</sup>H and <sup>13</sup>C{<sup>1</sup>H} spectra of **4b**



$^1\text{H}$  and  $^{13}\text{C}\{^1\text{H}\}$  spectra of 4c



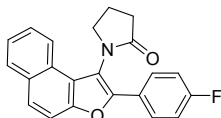
<sup>1</sup>H and <sup>13</sup>C{<sup>1</sup>H} spectra of **4d**



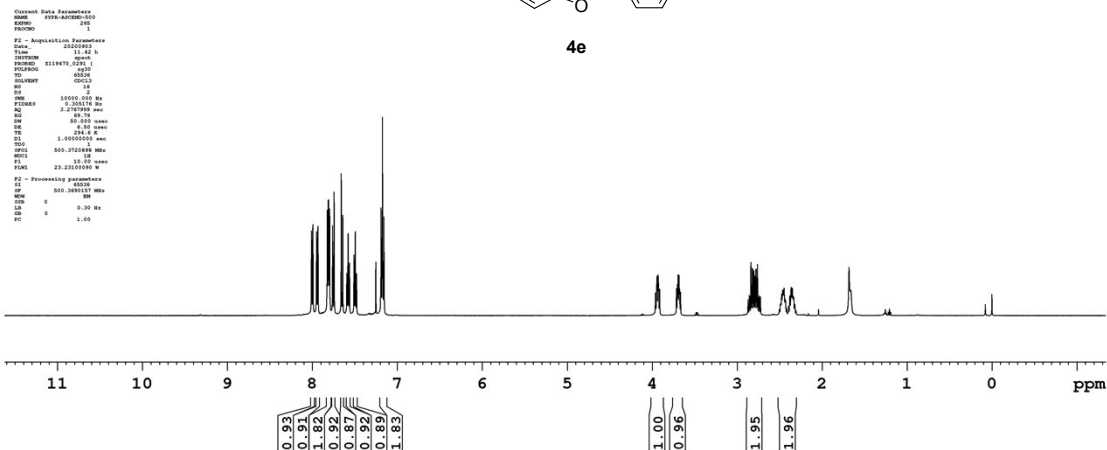
<sup>1</sup>H and <sup>13</sup>C{<sup>1</sup>H} spectra of 4e

SYPR-7-253

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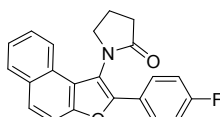


4e

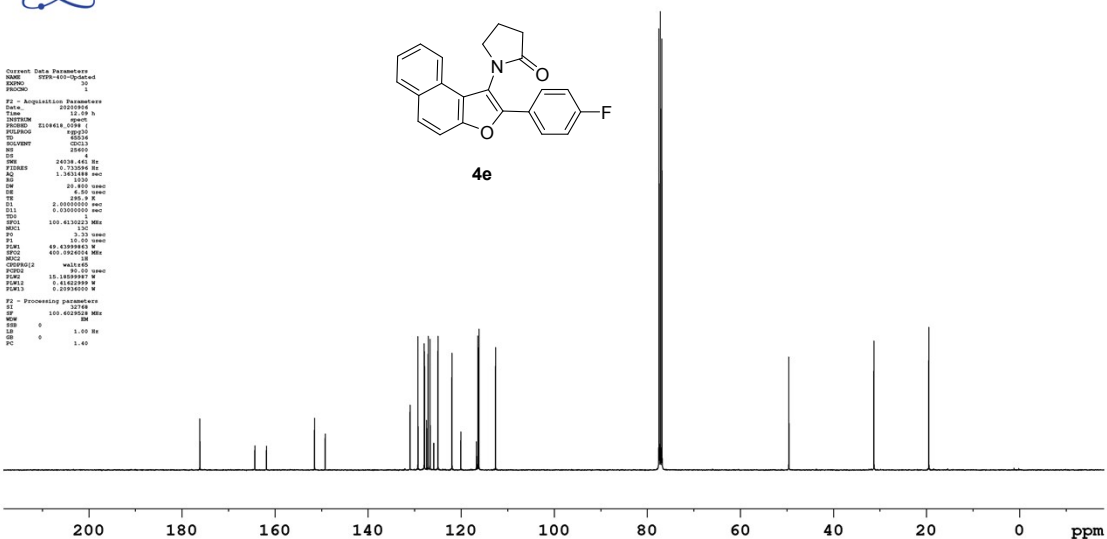


SYPR-7-253

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4e



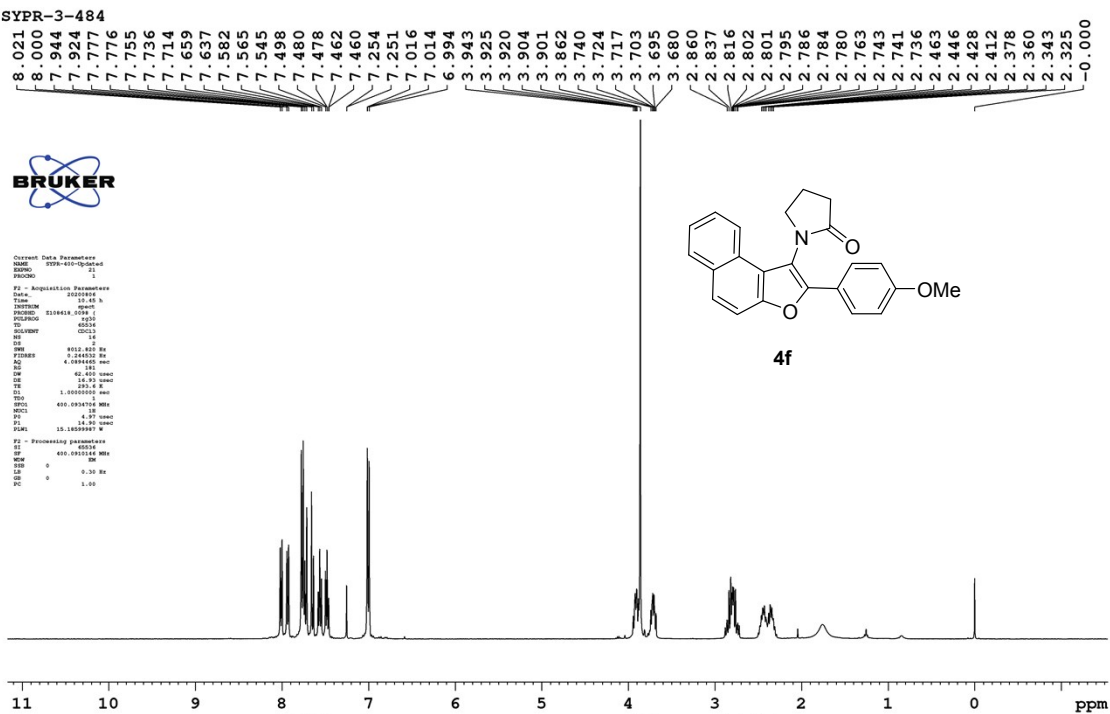
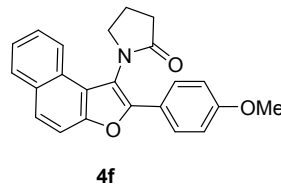
<sup>1</sup>H and <sup>13</sup>C{<sup>1</sup>H} spectra of 4f

SYPR-3-484



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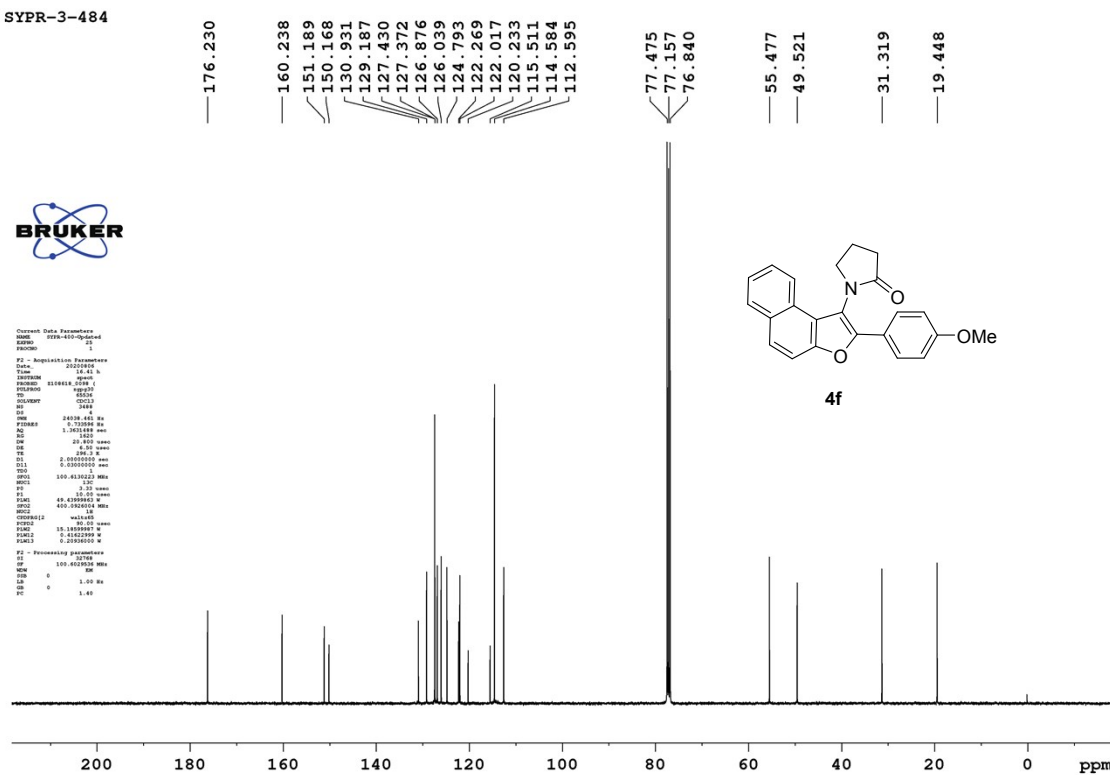
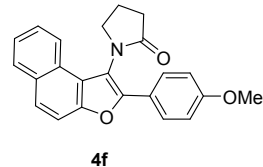


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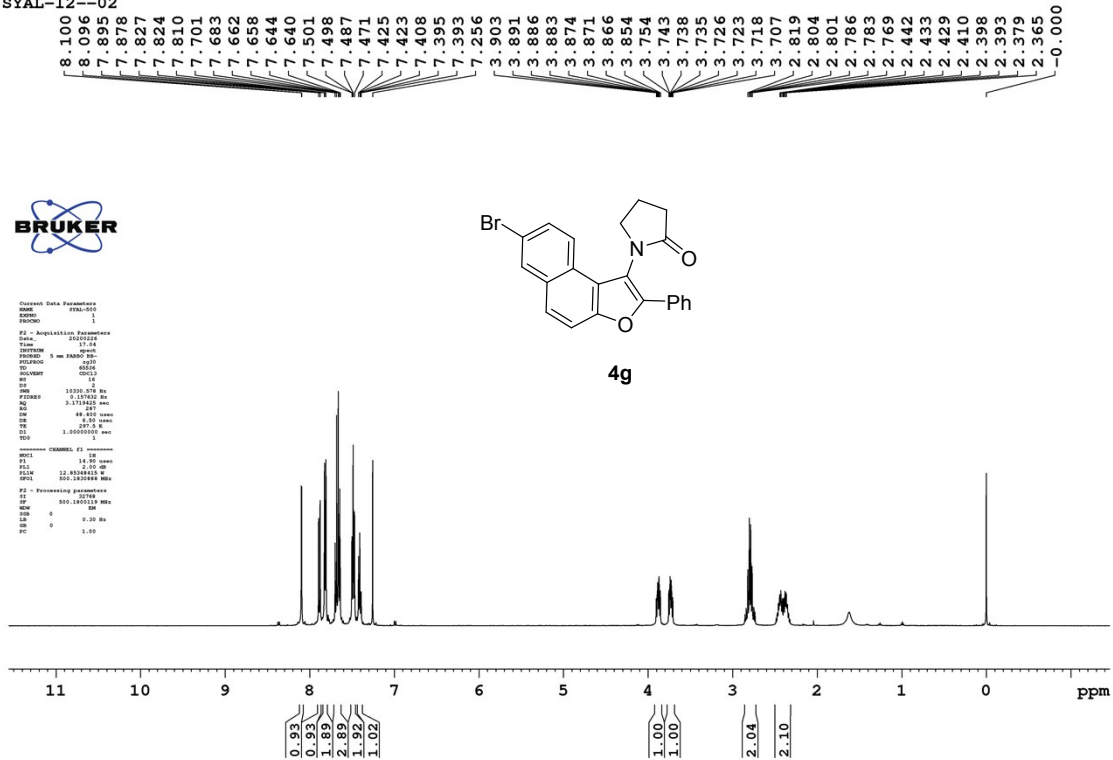
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GB: 0
PC: 1.00
  
```

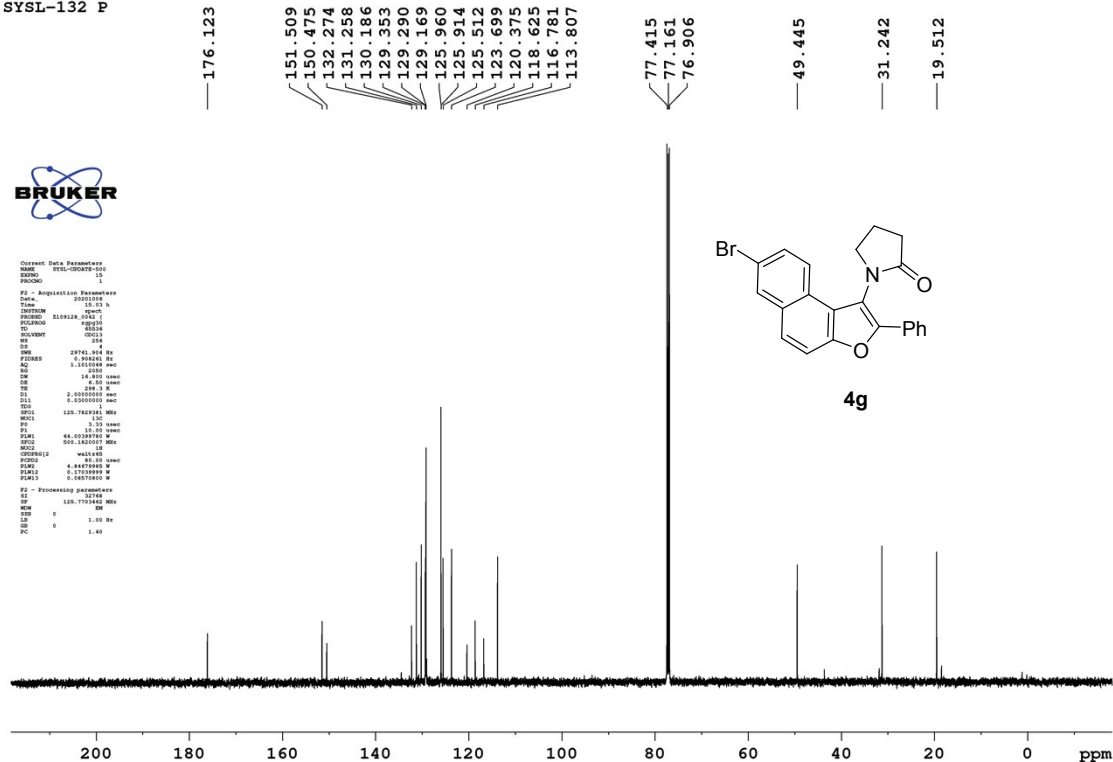


$^1\text{H}$  and  $^{13}\text{C}\{^1\text{H}\}$  spectra of 4g

SYAL-12--02



SYSL-132 P



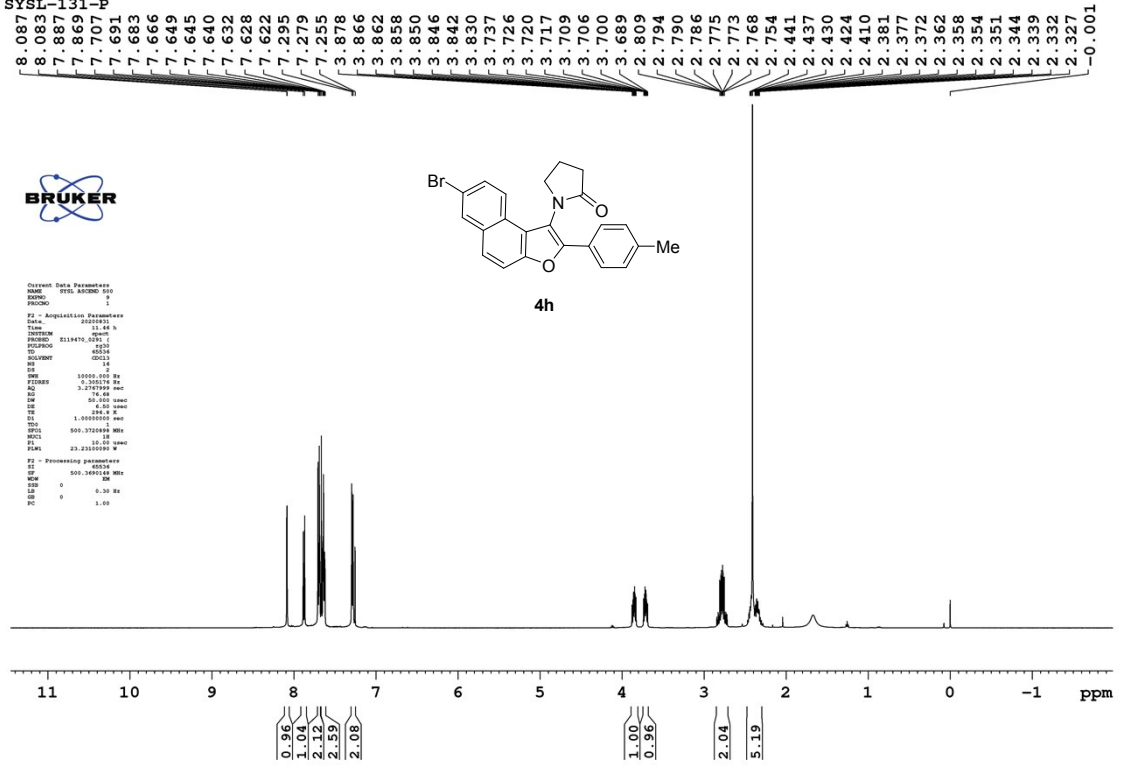
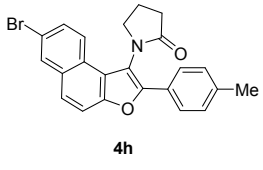
<sup>1</sup>H and <sup>13</sup>C{<sup>1</sup>H} spectra of 4h

SYSL-131-P



```

Current Data Parameters
NAME: SYSL-131-P
PROCNO: 1
F2 - Acquisition Parameters
Date_: 20200401
Time: 11:49
INSTRUM: spect
PROBHD: 5mm 1
PULPROG: zgpg30
SOLVENT: CDCl3
NS: 1024
DS: 4
SWH: 10000.000 Hz
FREQ0: 125.76198 MHz
AQ: 1.777399 sec
RG: 655
DE: 1.9000000
TE: 300.2 K
NUC1: 13C
NUC2: 13C
SFO1: 100.628159 MHz
SFO2: 100.628159 MHz
PC: 23.2310190
F2 - Processing parameters
SI: 32768
SF: 100.628159 MHz
WDW: EM
SSB: 0
LB: 0.30 Hz
GB: 0
PC: 1.40
  
```

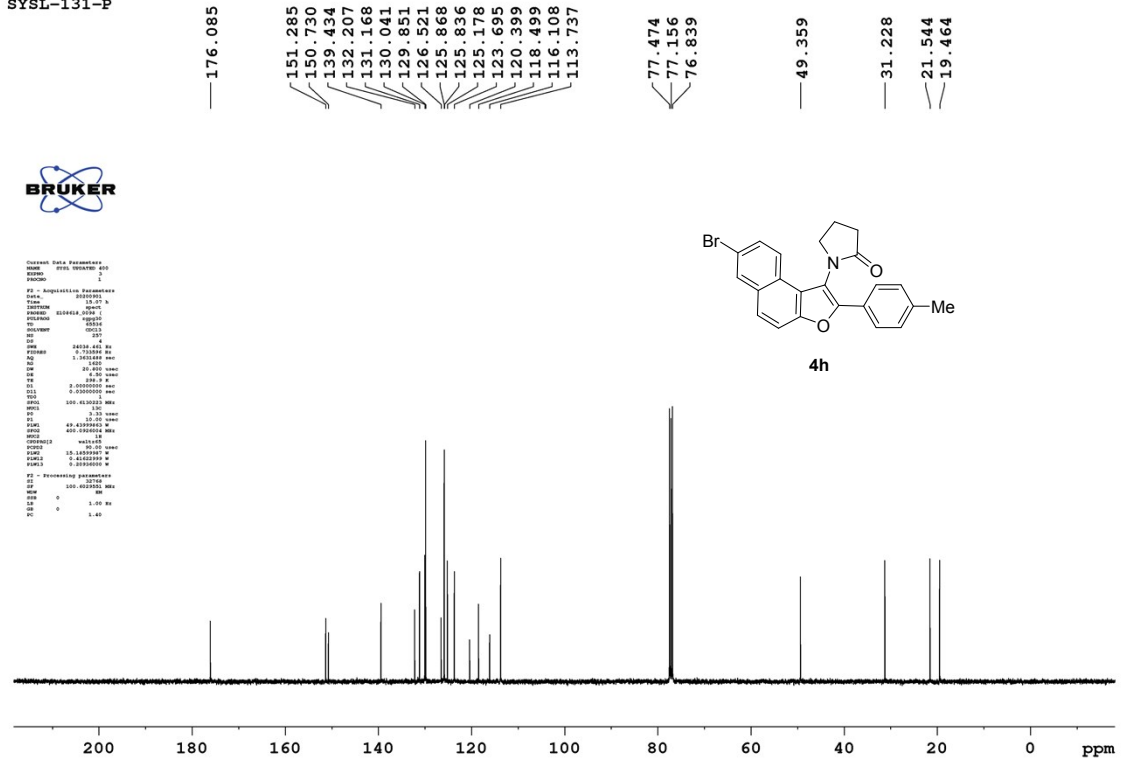
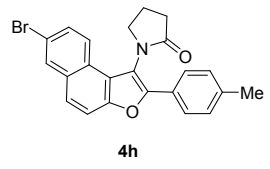


SYSL-131-P



```

Current Data Parameters
NAME: SYSL-131-P
PROCNO: 1
F2 - Acquisition Parameters
Date_: 20200401
Time: 11:49
INSTRUM: spect
PROBHD: 5mm 1
PULPROG: zgpg30
SOLVENT: CDCl3
NS: 1024
DS: 4
SWH: 10000.000 Hz
FREQ0: 125.76198 MHz
AQ: 1.777399 sec
RG: 655
DE: 1.9000000
TE: 300.2 K
NUC1: 13C
NUC2: 13C
SFO1: 100.628159 MHz
SFO2: 100.628159 MHz
PC: 23.2310190
F2 - Processing parameters
SI: 32768
SF: 100.628159 MHz
WDW: EM
SSB: 0
LB: 0.30 Hz
GB: 0
PC: 1.40
  
```





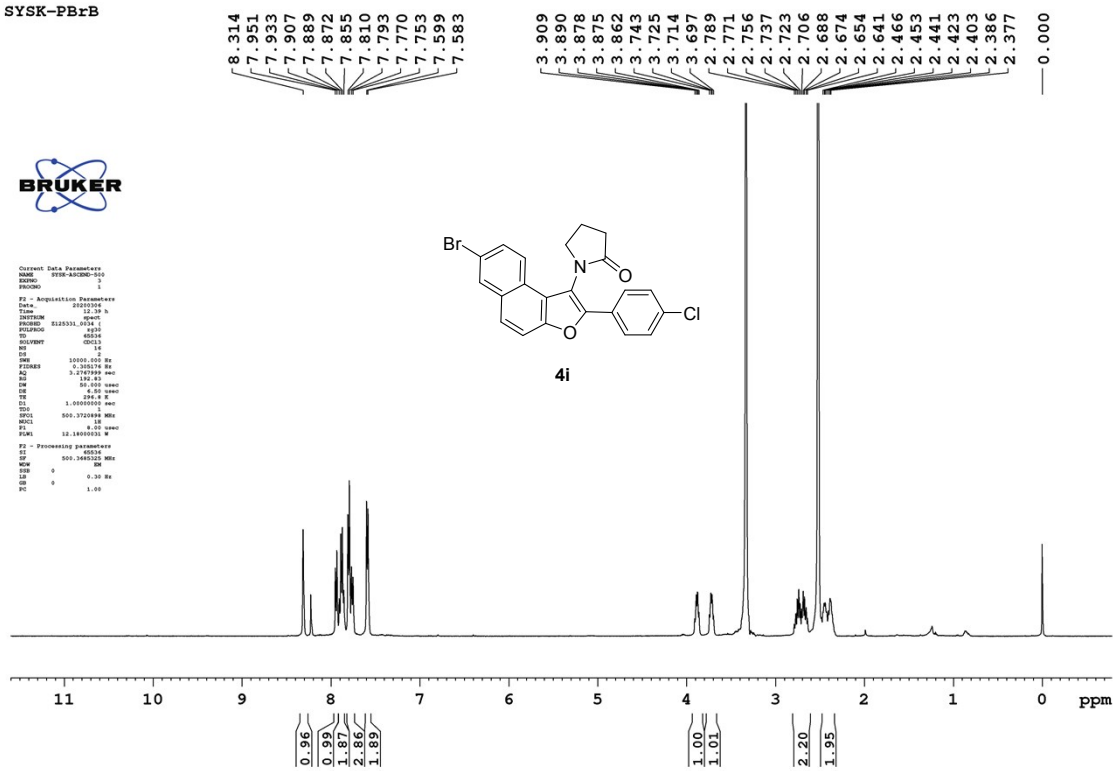
# <sup>1</sup>H and <sup>13</sup>C{<sup>1</sup>H} spectra of 4i

SYSK-PBrB



```

Current Data Parameters
NAME  SYSK-PBrB-91
PROCNO  1
F2 - Acquisition Parameters
Date_   20220204
Time    12:39 h
INSTRUM  spect
PROBHD  519231_0191
PULPROG  zgpg30
TD       65536
SOLVENT  CDCl3
NS       16
DS       4
SWH      10002.000 Hz
F2RES    0.280276 Hz
AQ        182.45
RG        512.000
WDW      EM
SSB      0.000000
LB        0.30
GB        0.000000
PC        1.00
SFO      500.1320995 MHz
NUC1     13
NUC2     1
NUC3     0
PC1      12.1845000 W
F2 - Processing parameters
SI       32768
SF       500.1320995 MHz
WDW      EM
SSB      0
LB        0.30 Hz
GB        0
PC        1.00
    
```

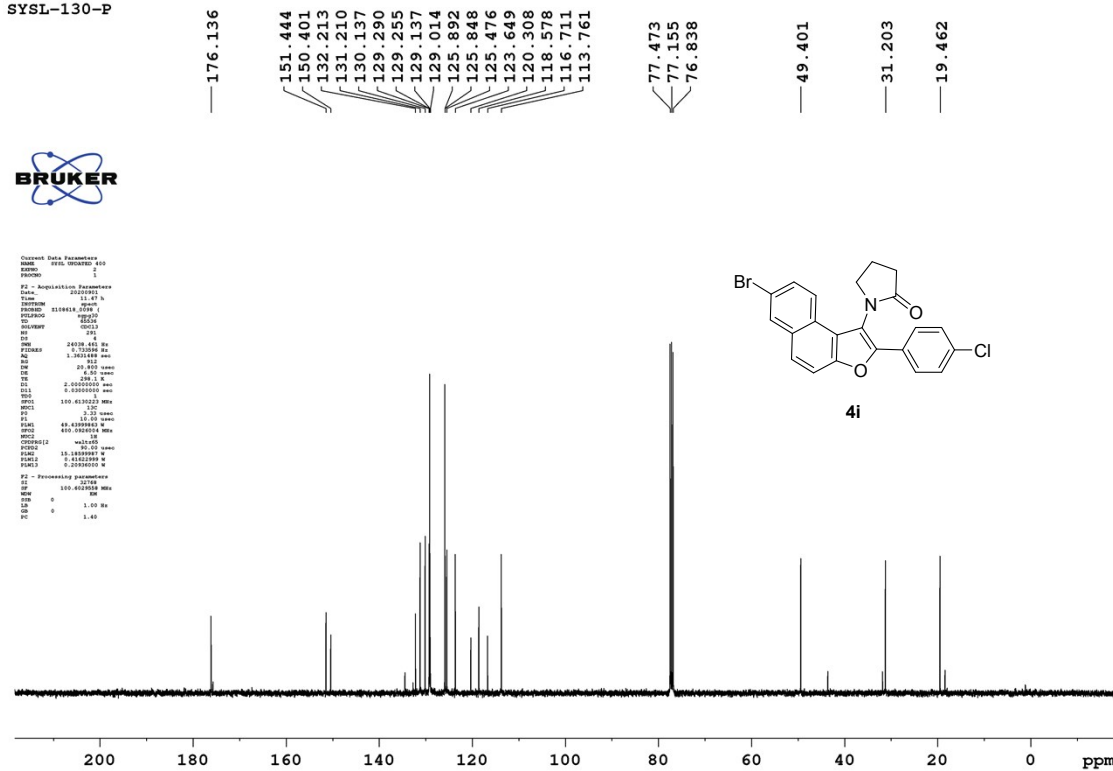


SYSL-130-P

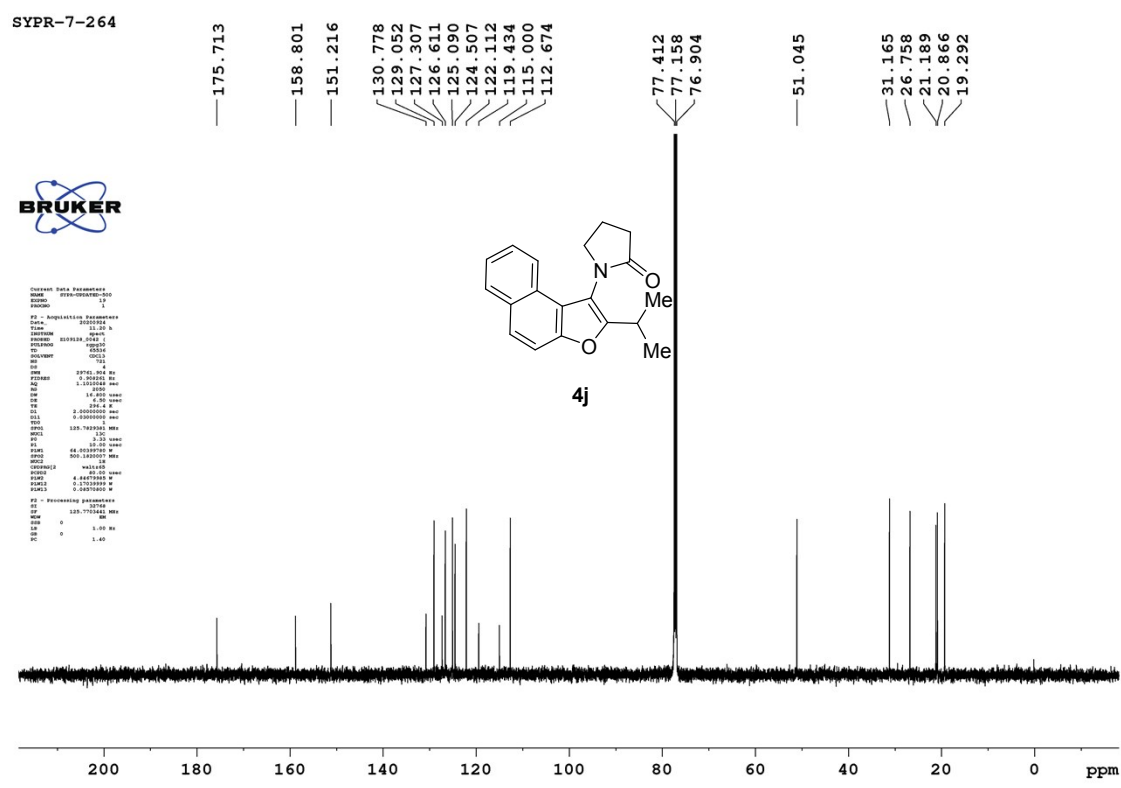
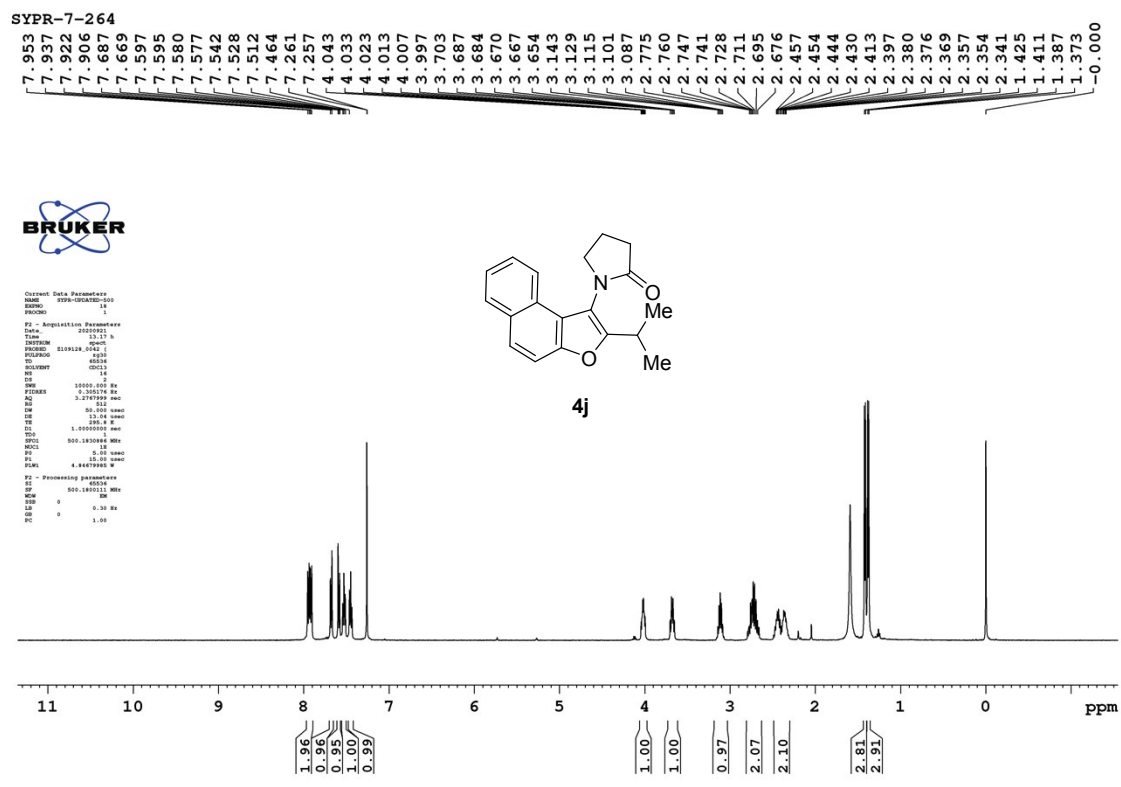


```

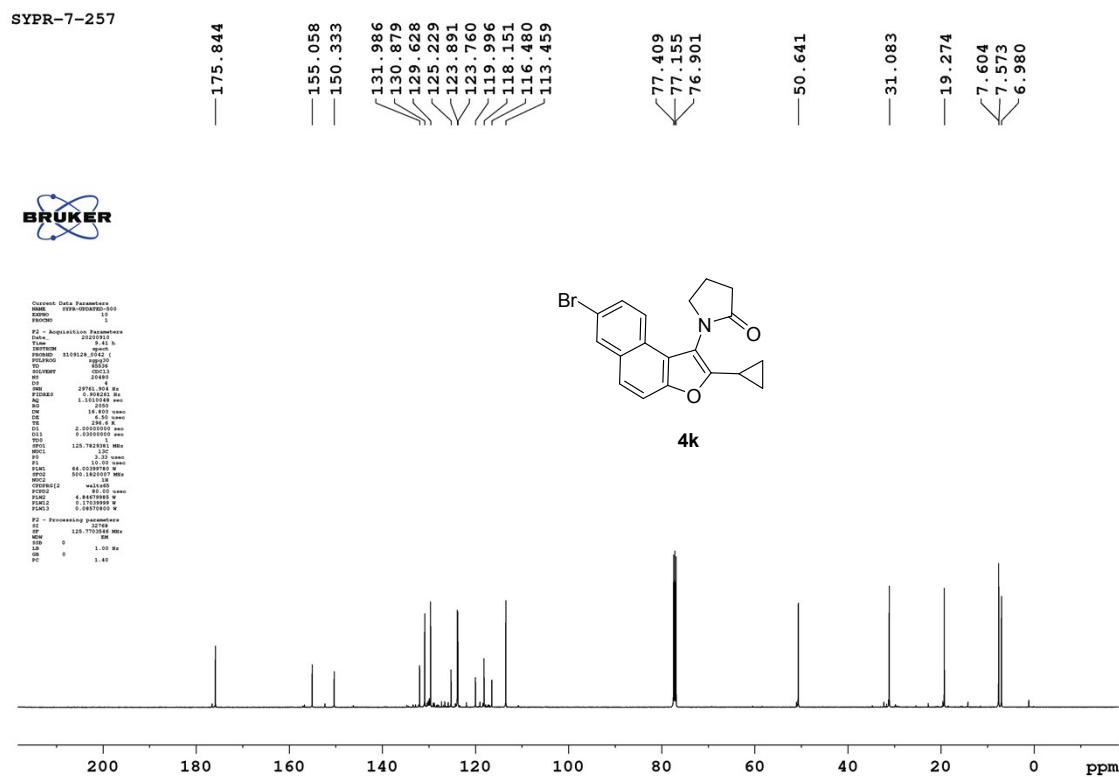
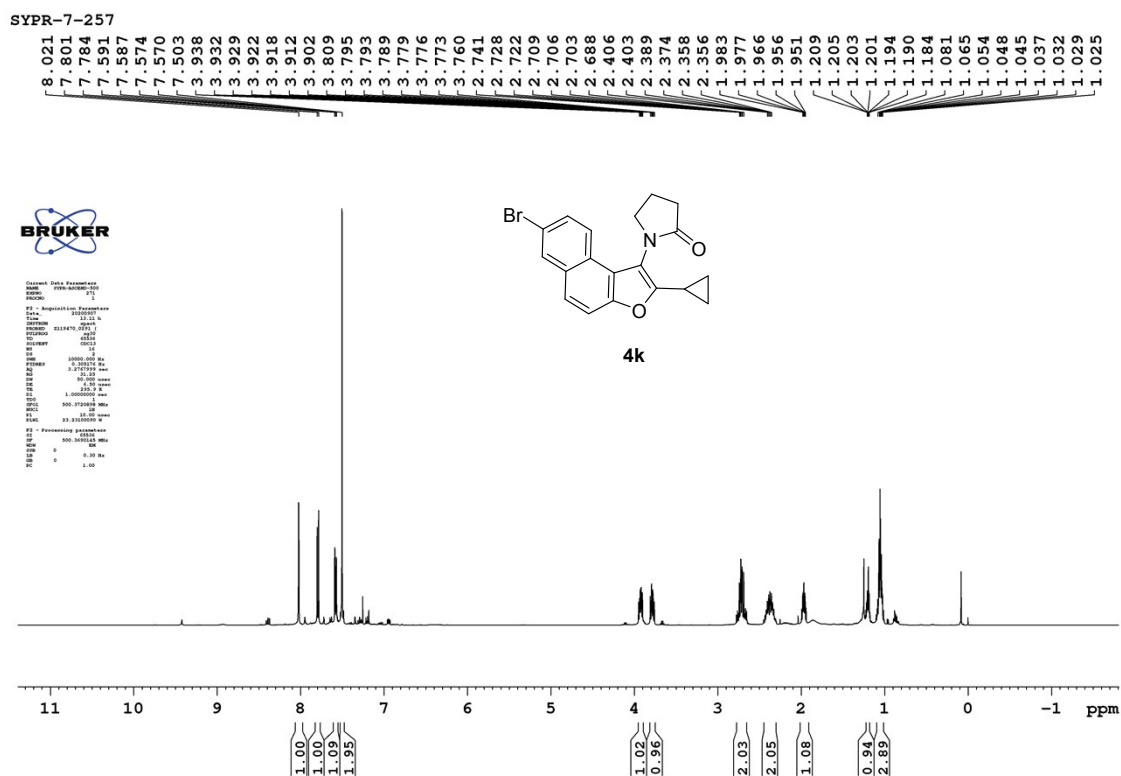
Current Data Parameters
NAME  SYSL-130-P-40
PROCNO  2
F2 - Acquisition Parameters
Date_   20220202
Time    11:47 h
INSTRUM  spect
PROBHD  519418_0191
PULPROG  zgpg30
TD       65536
SOLVENT  CDCl3
NS       16
DS       4
SWH      10002.000 Hz
F2RES    0.280276 Hz
AQ        182.45
RG        512.000
WDW      EM
SSB      0.000000
LB        0.30
GB        0.000000
PC        1.00
SFO      500.1320995 MHz
NUC1     13
NUC2     1
NUC3     0
PC1      12.1845000 W
F2 - Processing parameters
SI       32768
SF       500.1320995 MHz
WDW      EM
SSB      0
LB        0.30 Hz
GB        0
PC        1.00
    
```



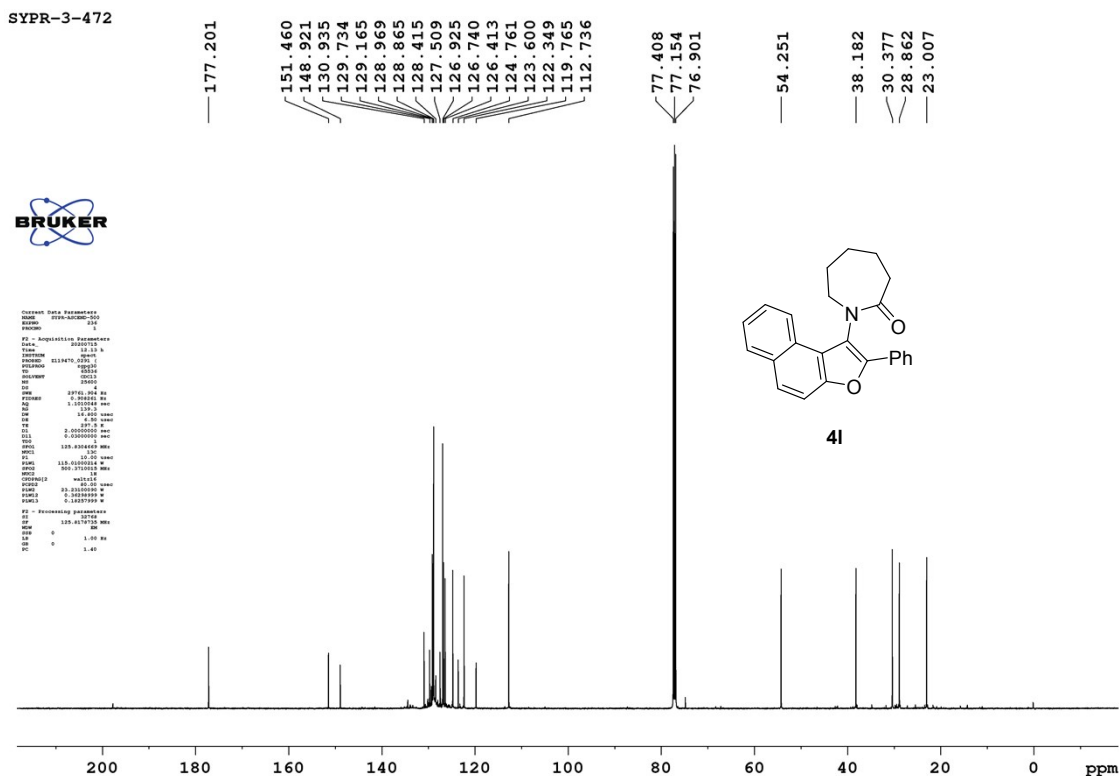
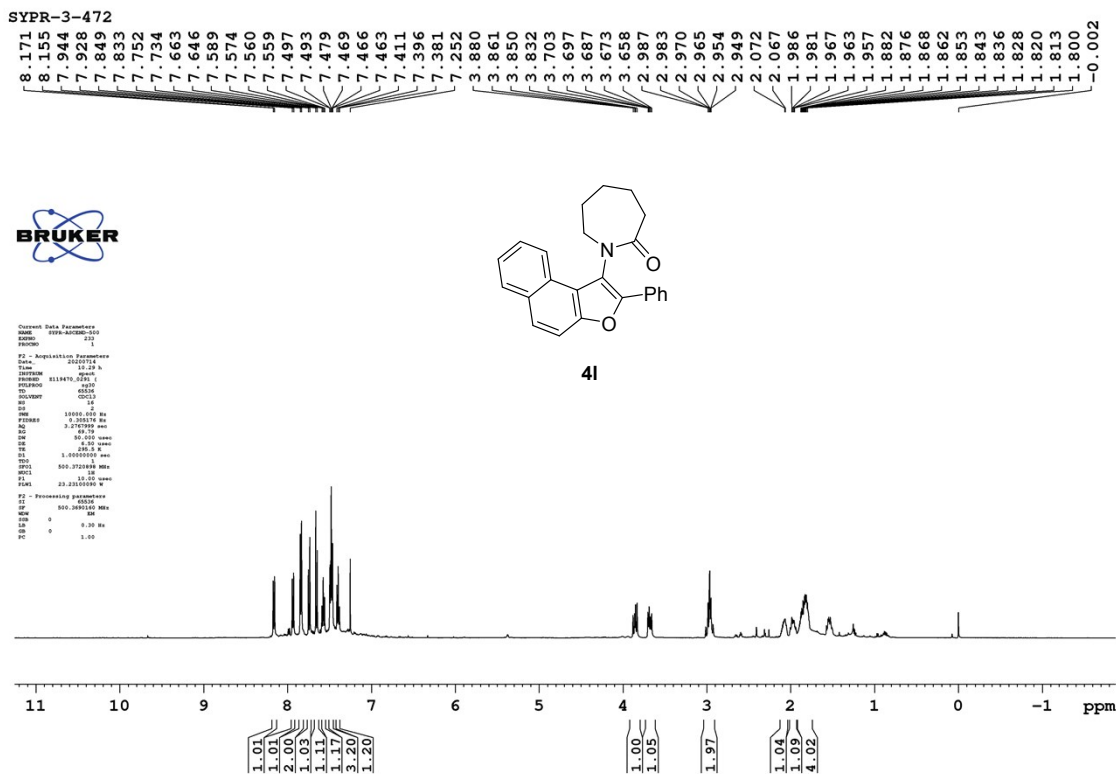
<sup>1</sup>H and <sup>13</sup>C{<sup>1</sup>H} spectra of 4j



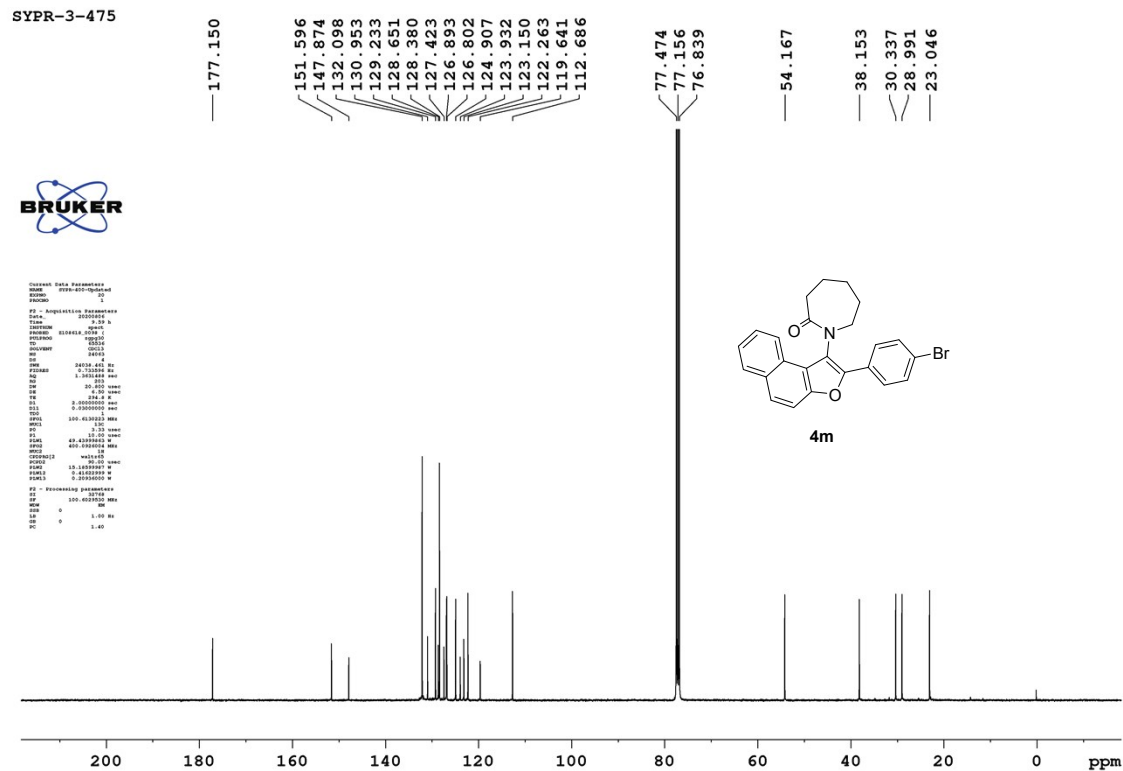
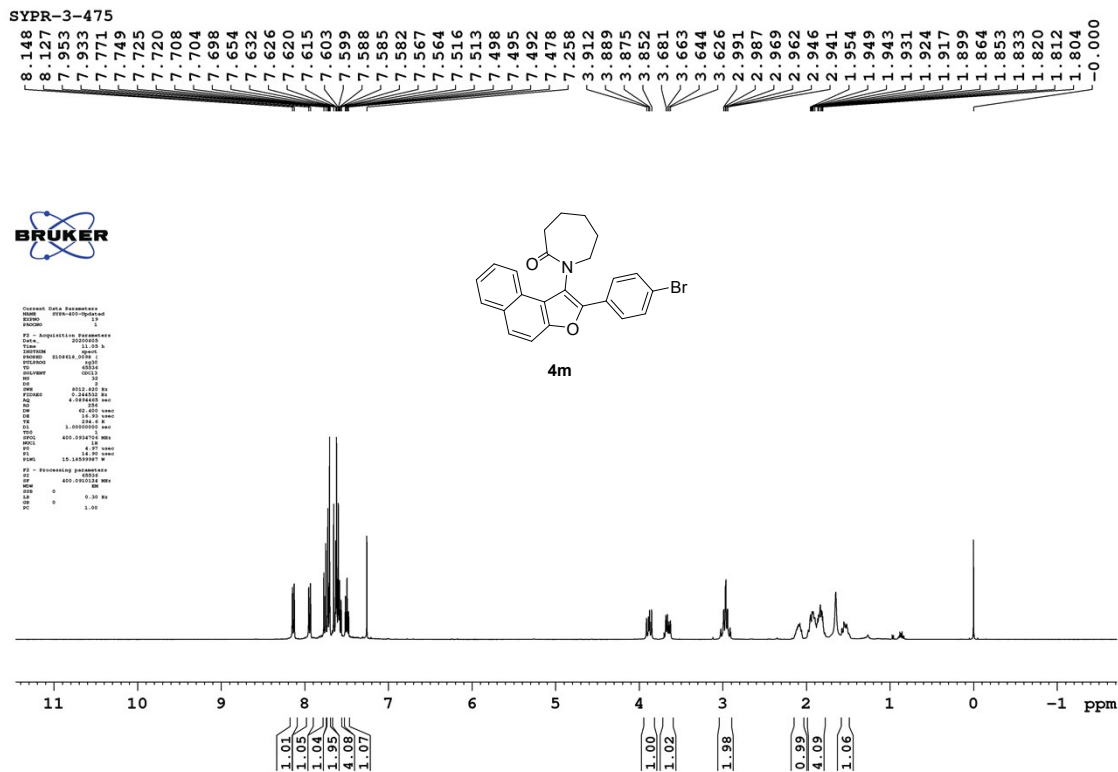
# $^1\text{H}$ and $^{13}\text{C}\{^1\text{H}\}$ spectra of 4k



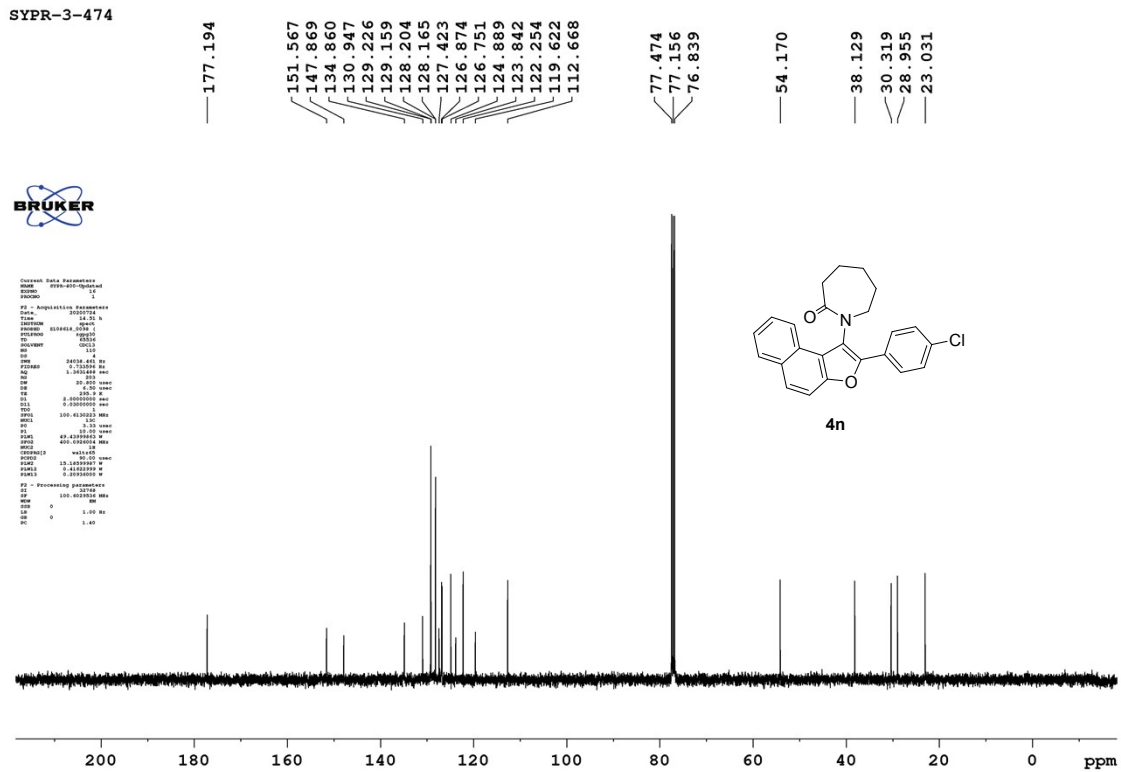
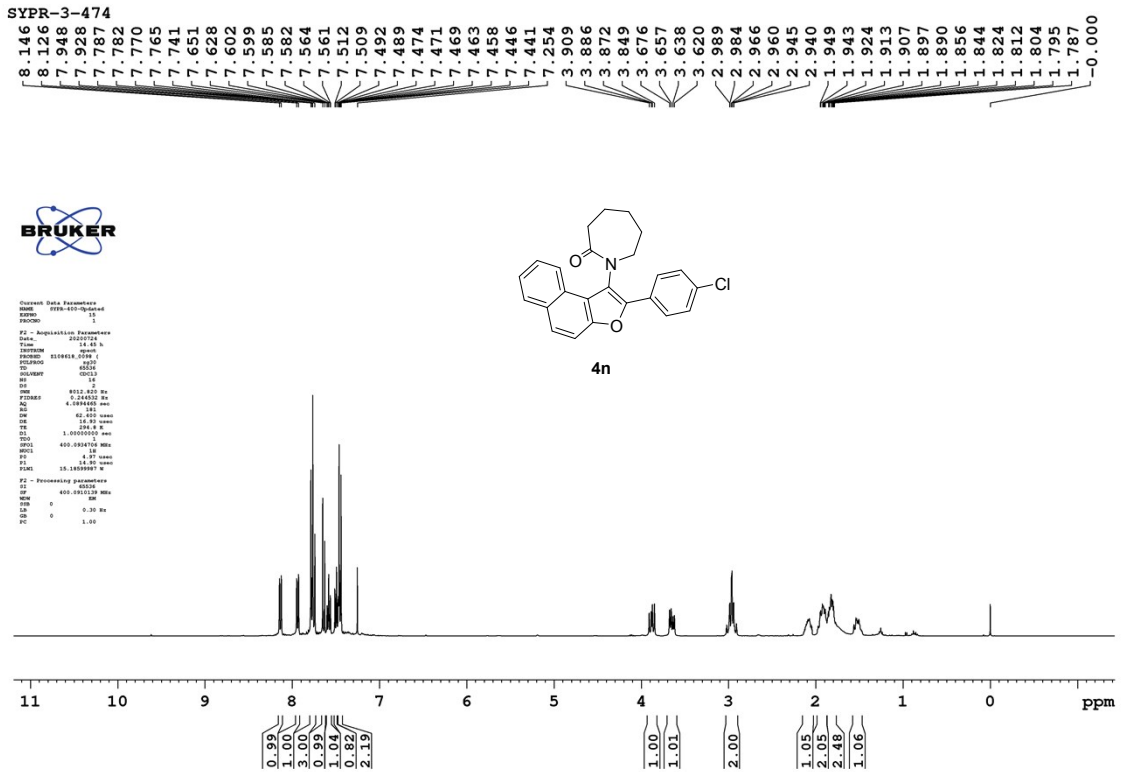
$^1\text{H}$  and  $^{13}\text{C}\{^1\text{H}\}$  spectra of **4l**



# <sup>1</sup>H and <sup>13</sup>C{<sup>1</sup>H} spectra of 4m

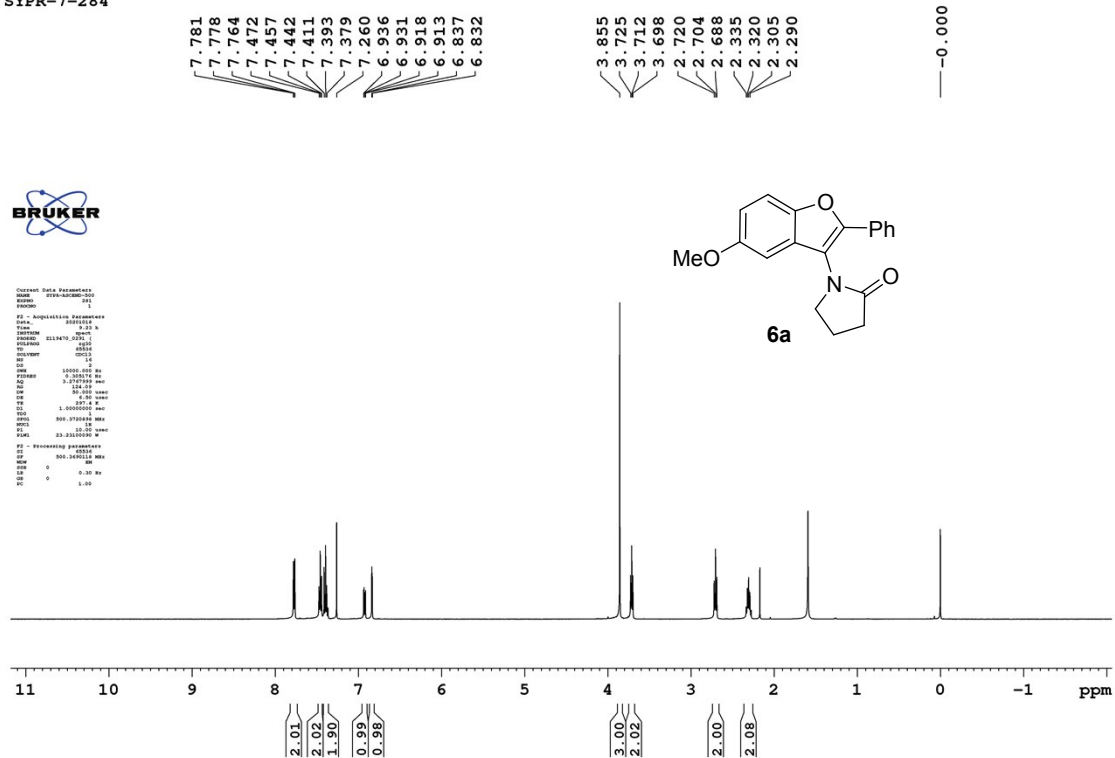


$^1\text{H}$  and  $^{13}\text{C}\{^1\text{H}\}$  spectra of **4n**

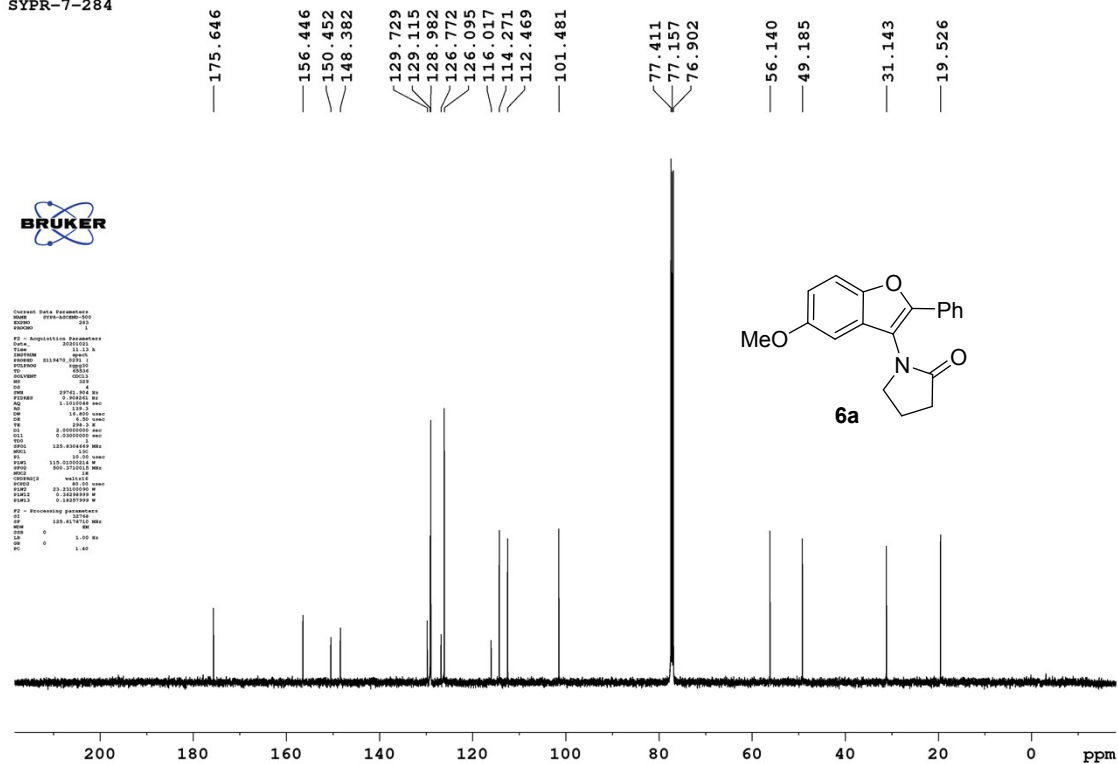


# $^1\text{H}$ and $^{13}\text{C}\{^1\text{H}\}$ spectra of 6a

SYPR-7-284



SYPR-7-284



# <sup>1</sup>H and <sup>13</sup>C{<sup>1</sup>H} spectra of **6b**

SYPR-7-288

7.708  
7.704  
7.695  
7.690  
7.433  
7.429  
7.419  
7.415  
7.400  
7.382  
7.262  
6.943  
6.938  
6.925  
6.920  
6.824  
6.819

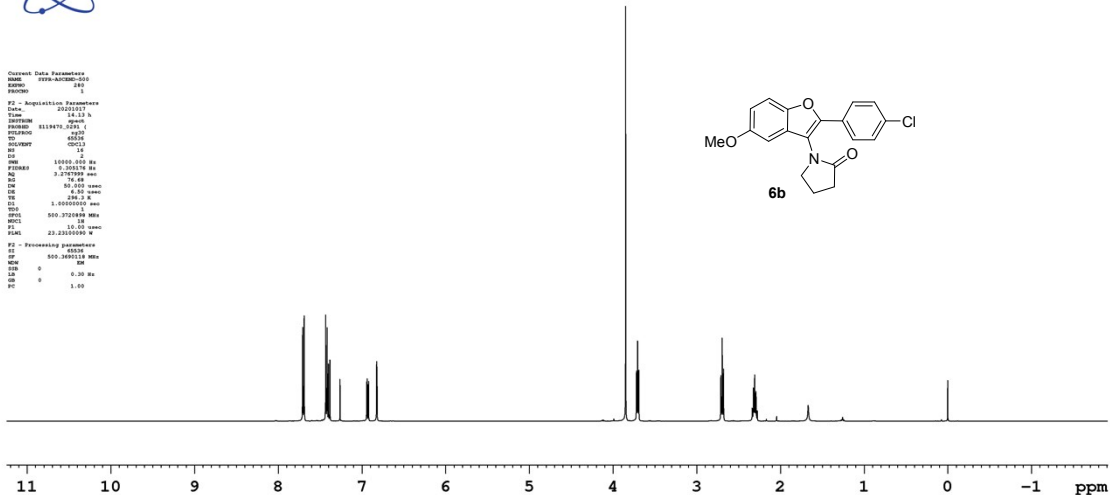
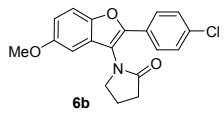
3.848  
3.720  
3.706  
3.692  
2.712  
2.696  
2.679  
2.336  
2.322  
2.306  
2.291

0.000



```

Current Data Parameters
NAME: SYPR-7-288-001
PROCNO: 1
F2 - Acquisition Parameters
Date_: 20121111
Time: 01:13
INSTRUM: spect
PROBHD: 5mm
PULPROG: zgpg30
AQ: 4.0236
RG: 655
SFO: 500.136260
FIDRES: 0.0013
AQRES: 0.01
SOLVENT: dms
NS: 1
DS: 4
SWH: 10000.000 Hz
F2FREQ: 5.000176 MHz
NUC1: 13C
NUC2: 1H
DE: 16.00
DM: 50.000 mm
TE: 300.2 K
TD: 65536
AQ: 3.999999999 sec
RG: 655
SFO: 500.136260 MHz
PULPROG: zgpg30
PC: 16.00
PCPGM: 16.00
PCAL: 23.2300000 W
F2 - Processing parameters
Date_: 20121111
Time: 01:13
INSTRUM: spect
PROBHD: 5mm
PULPROG: zgpg30
AQ: 4.0236
RG: 655
SFO: 500.136260 MHz
FIDRES: 0.0013
AQRES: 0.01
SOLVENT: dms
NS: 1
DS: 4
SWH: 10000.000 Hz
F2FREQ: 5.000176 MHz
NUC1: 13C
NUC2: 1H
DE: 16.00
DM: 50.000 mm
TE: 300.2 K
TD: 65536
AQ: 3.999999999 sec
RG: 655
SFO: 500.136260 MHz
PULPROG: zgpg30
PC: 16.00
PCPGM: 16.00
PCAL: 23.2300000 W
  
```



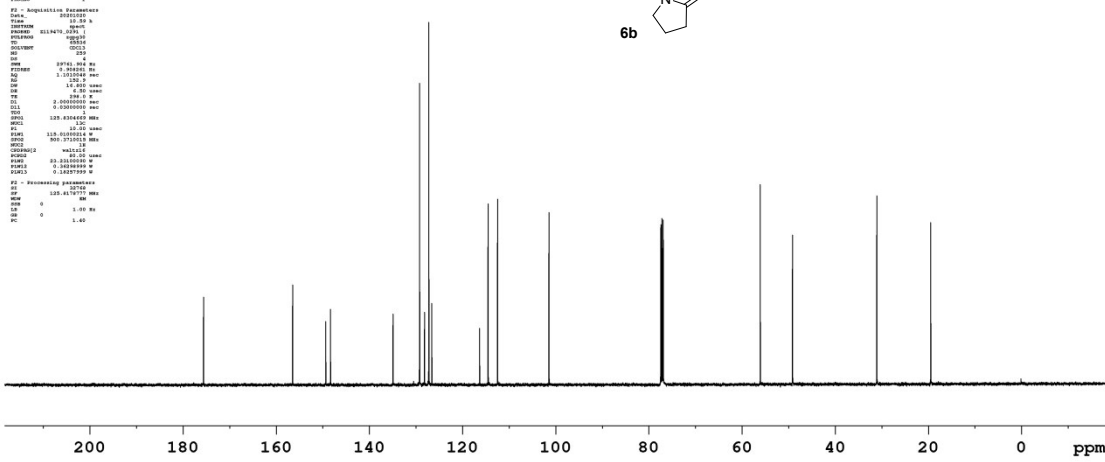
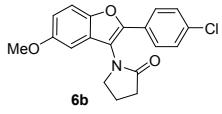
SYPR-7-288

175.592  
156.471  
149.353  
148.334  
134.920  
129.209  
128.142  
127.233  
126.585  
116.326  
114.493  
112.457  
101.420  
77.412  
77.158  
76.904  
56.070  
49.143  
31.042  
19.467



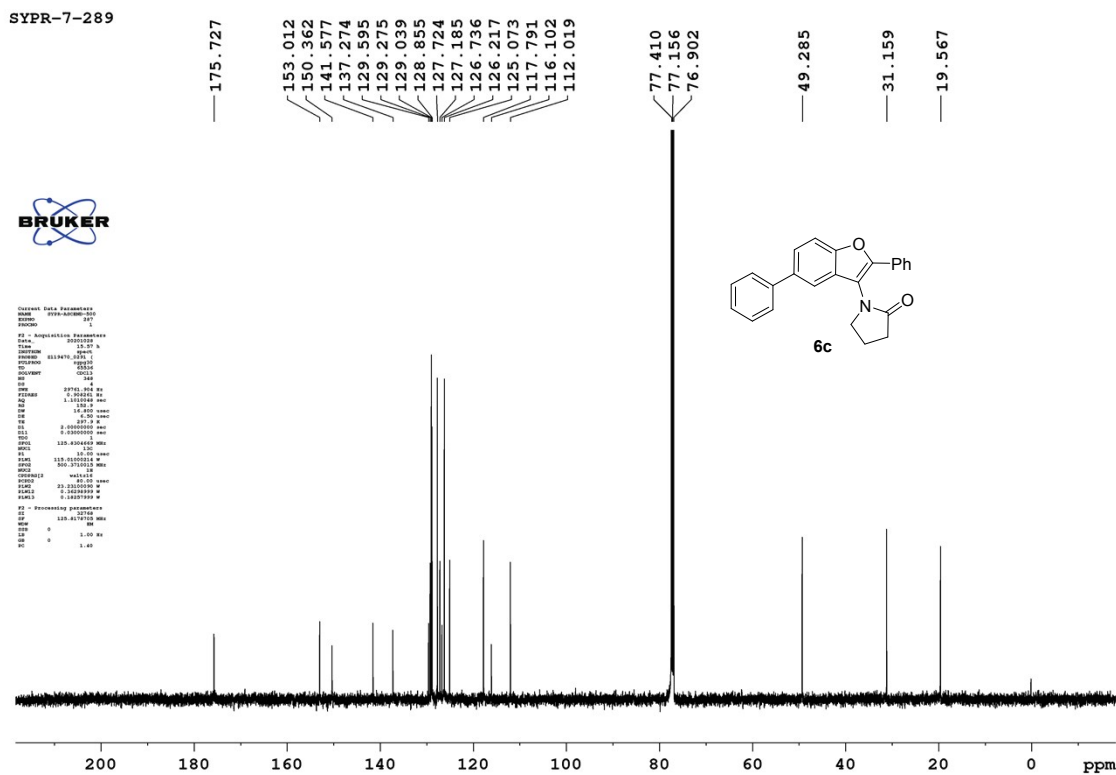
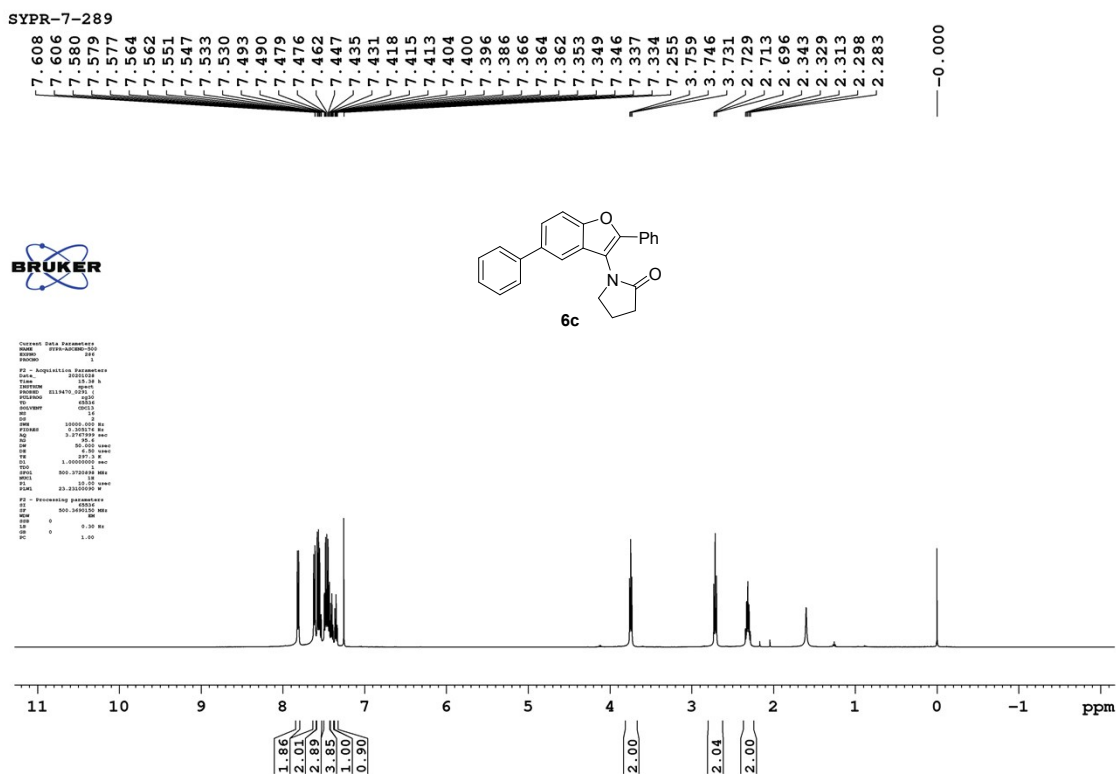
```

Current Data Parameters
NAME: SYPR-7-288-001
PROCNO: 1
F2 - Acquisition Parameters
Date_: 20121111
Time: 01:13
INSTRUM: spect
PROBHD: 5mm
PULPROG: zgpg30
AQ: 4.0236
RG: 655
SFO: 500.136260
FIDRES: 0.0013
AQRES: 0.01
SOLVENT: dms
NS: 1
DS: 4
SWH: 10000.000 Hz
F2FREQ: 5.000176 MHz
NUC1: 13C
NUC2: 1H
DE: 16.00
DM: 50.000 mm
TE: 300.2 K
TD: 65536
AQ: 3.999999999 sec
RG: 655
SFO: 500.136260 MHz
PULPROG: zgpg30
PC: 16.00
PCPGM: 16.00
PCAL: 23.2300000 W
F2 - Processing parameters
Date_: 20121111
Time: 01:13
INSTRUM: spect
PROBHD: 5mm
PULPROG: zgpg30
AQ: 4.0236
RG: 655
SFO: 500.136260 MHz
FIDRES: 0.0013
AQRES: 0.01
SOLVENT: dms
NS: 1
DS: 4
SWH: 10000.000 Hz
F2FREQ: 5.000176 MHz
NUC1: 13C
NUC2: 1H
DE: 16.00
DM: 50.000 mm
TE: 300.2 K
TD: 65536
AQ: 3.999999999 sec
RG: 655
SFO: 500.136260 MHz
PULPROG: zgpg30
PC: 16.00
PCPGM: 16.00
PCAL: 23.2300000 W
  
```



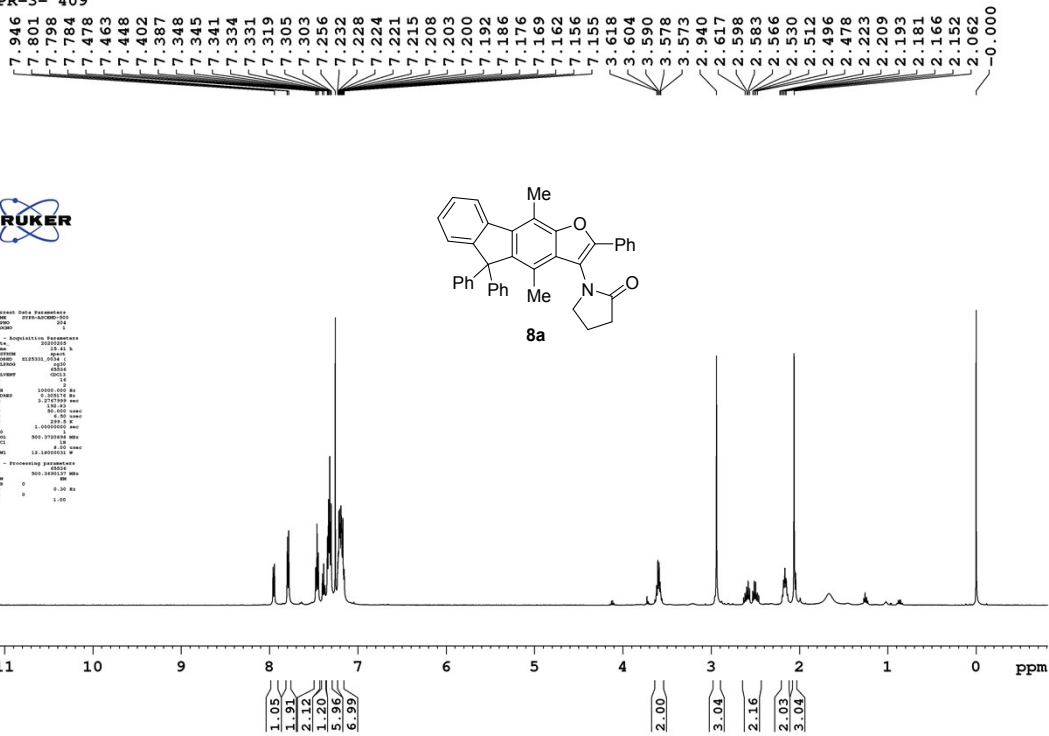


# $^1\text{H}$ and $^{13}\text{C}\{^1\text{H}\}$ spectra of **6c**

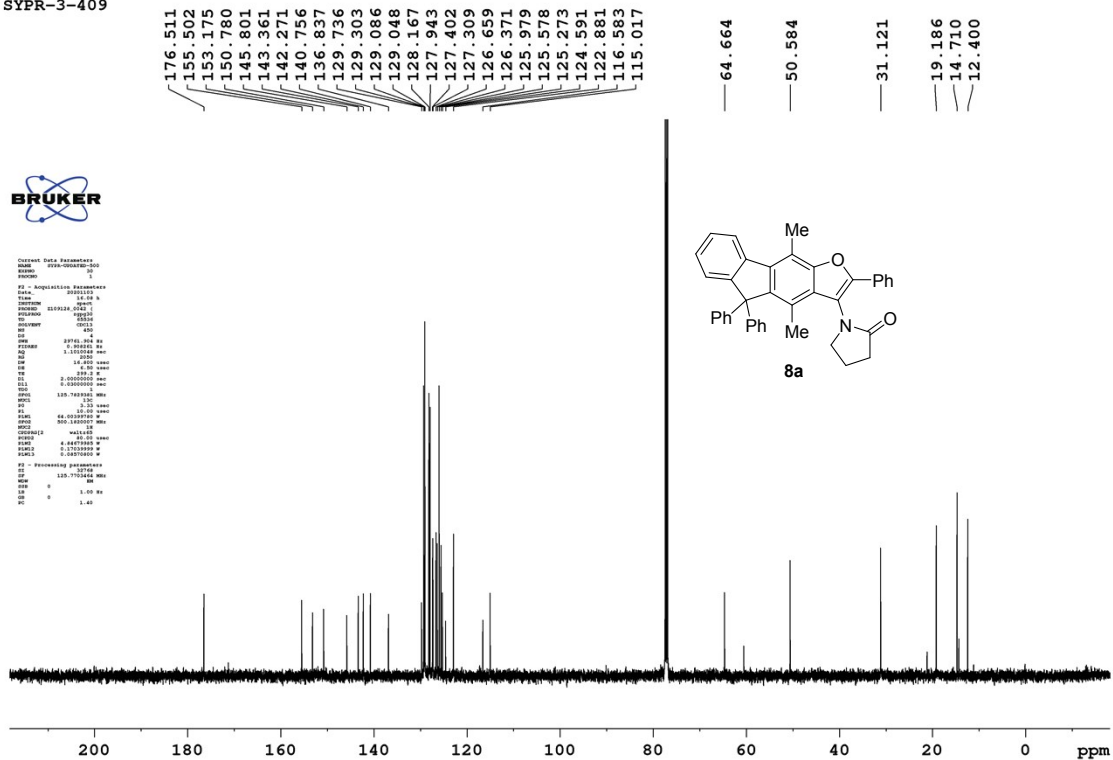


$^1\text{H}$  and  $^{13}\text{C}\{^1\text{H}\}$  spectra of **8a**

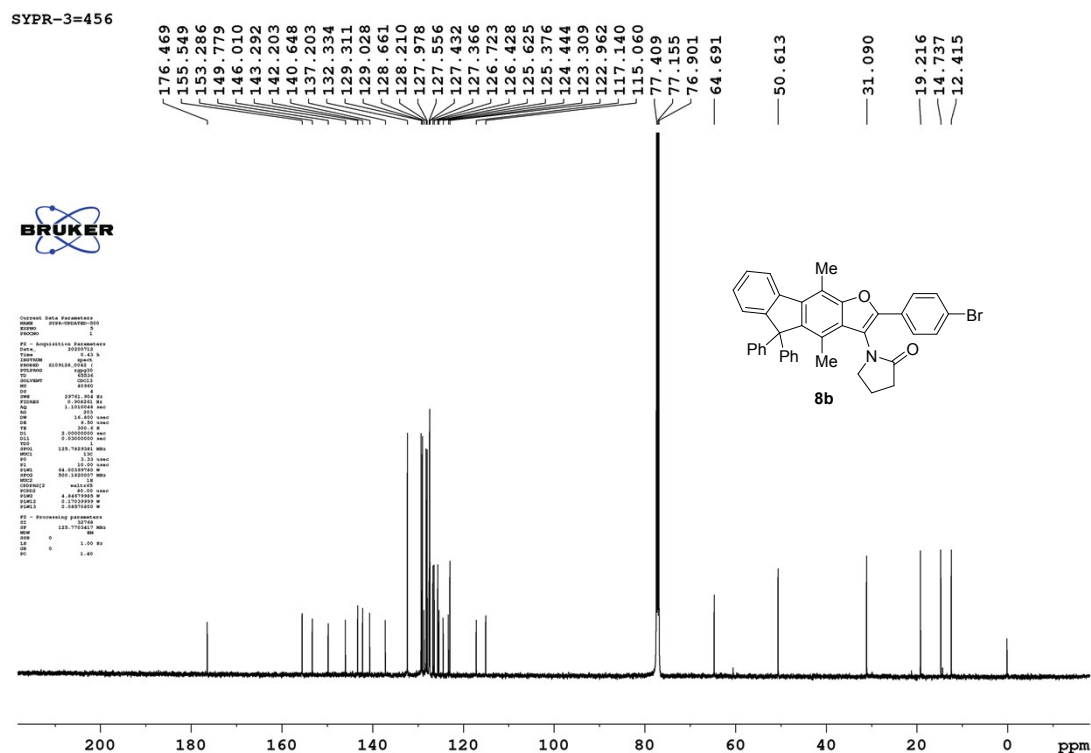
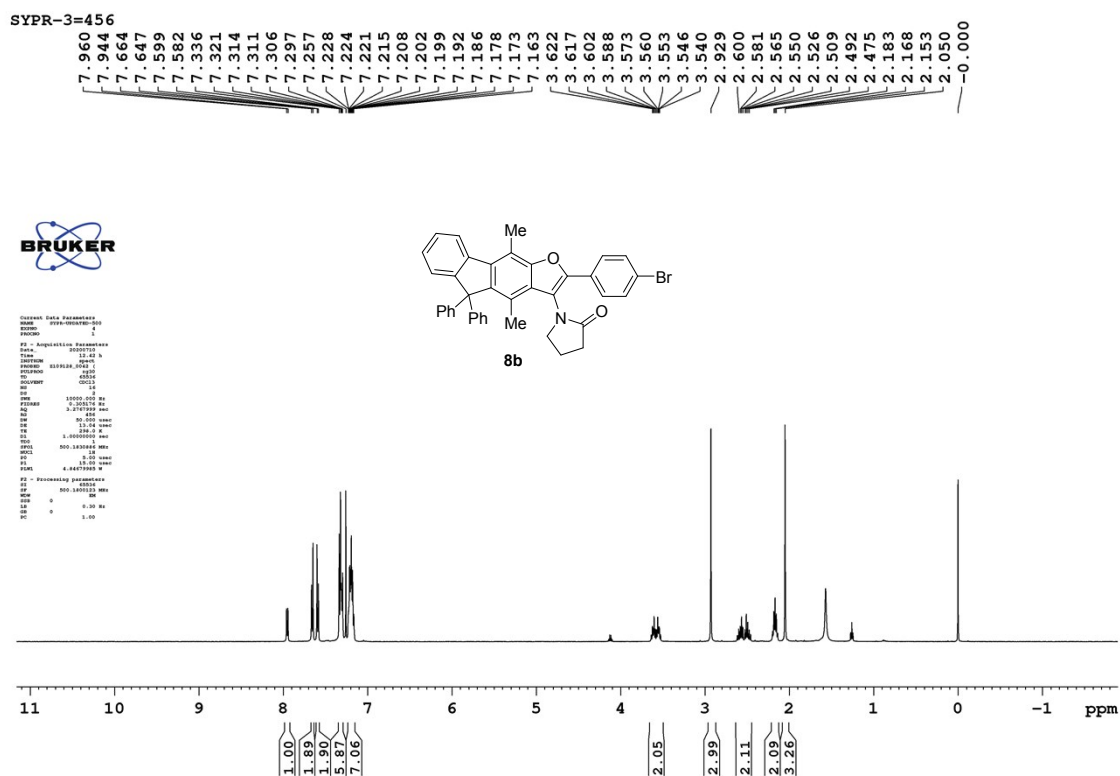
SYPR-3- 409



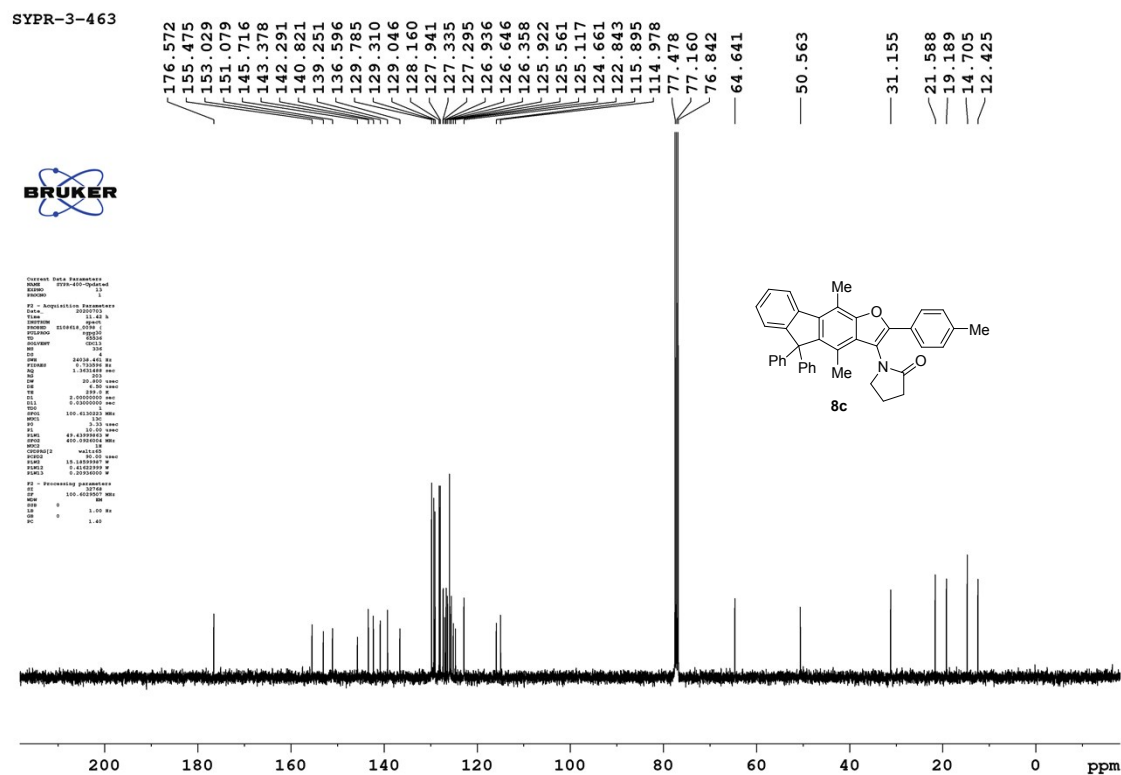
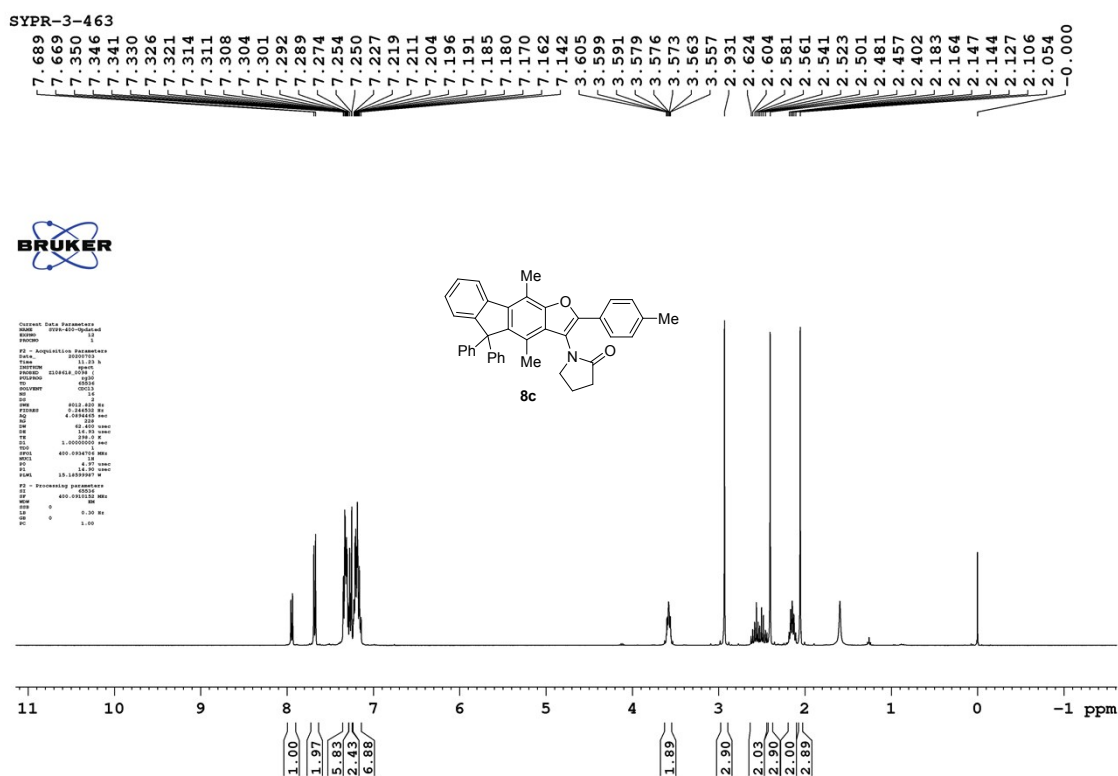
SYPR-3-409



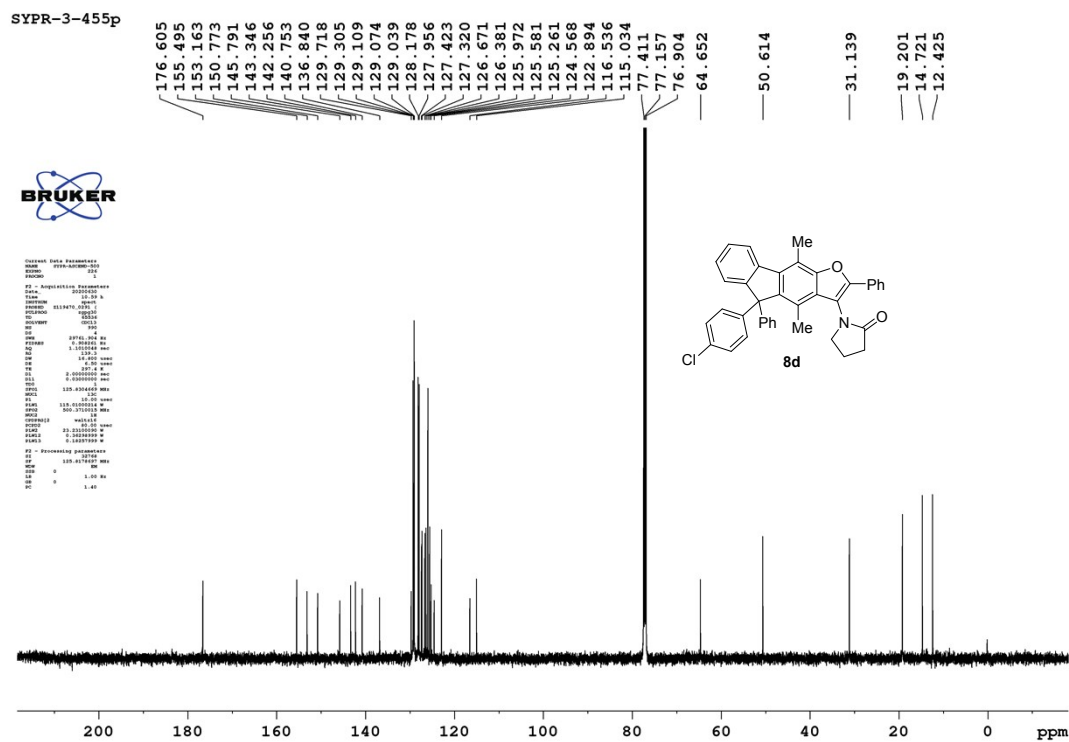
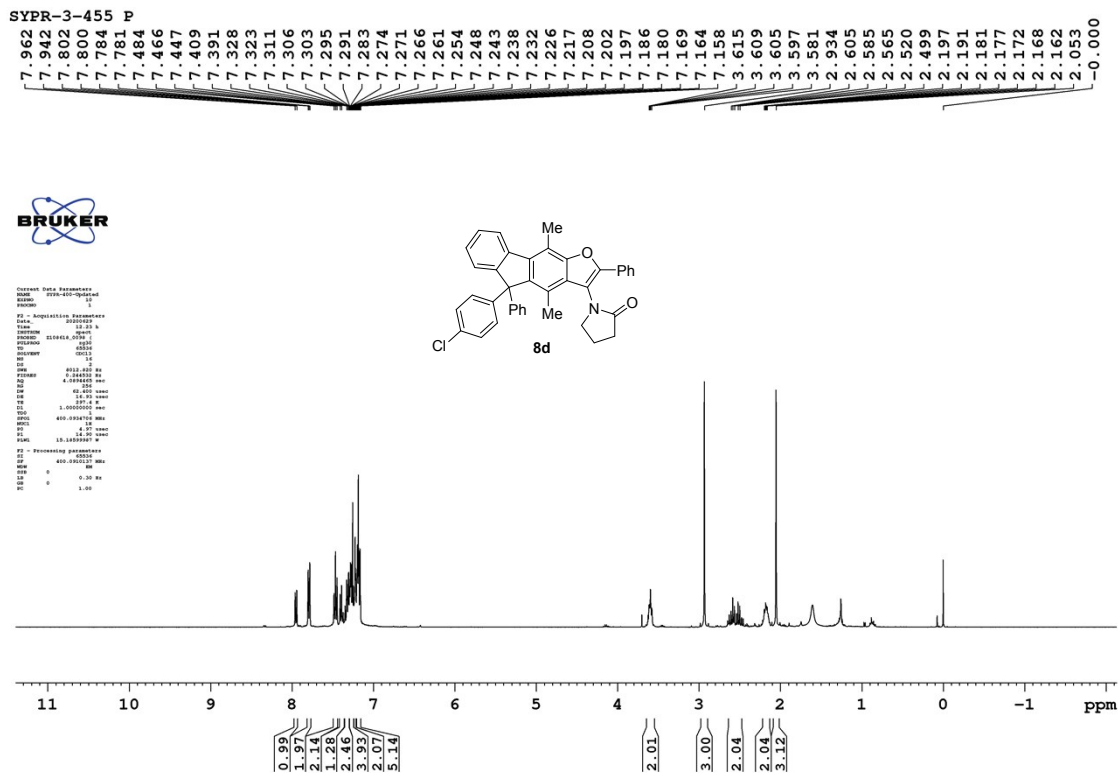
# $^1\text{H}$ and $^{13}\text{C}\{^1\text{H}\}$ spectra of **8b**



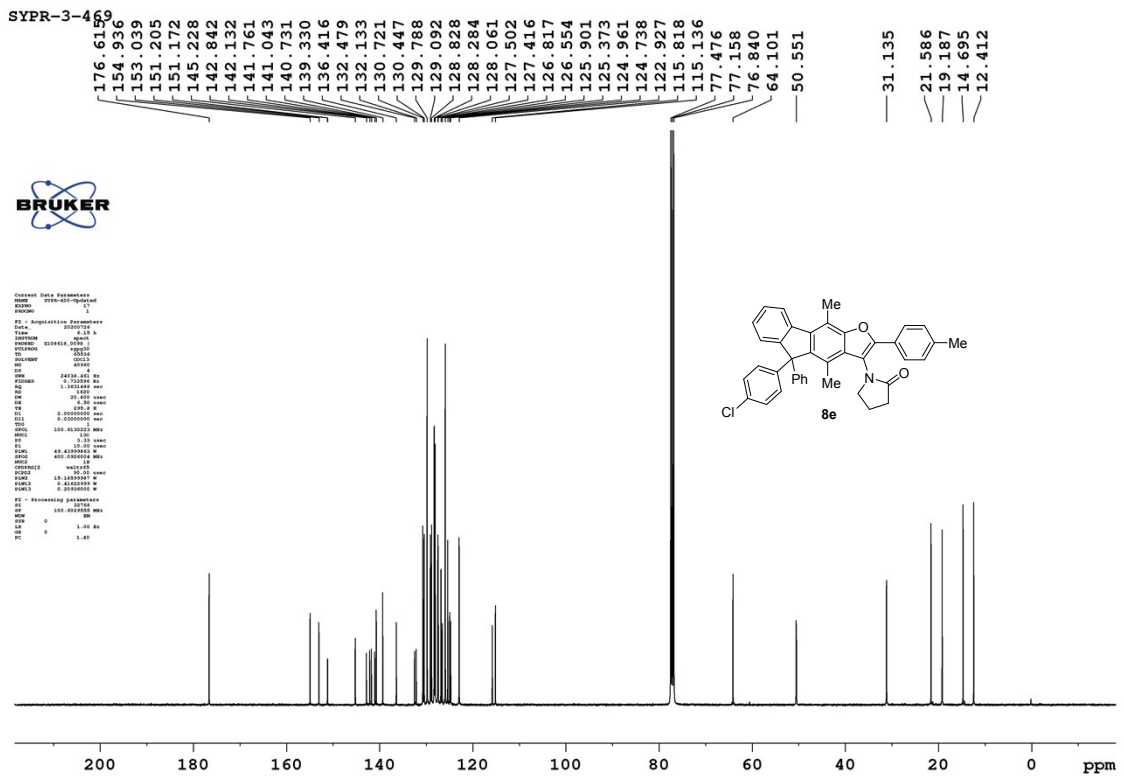
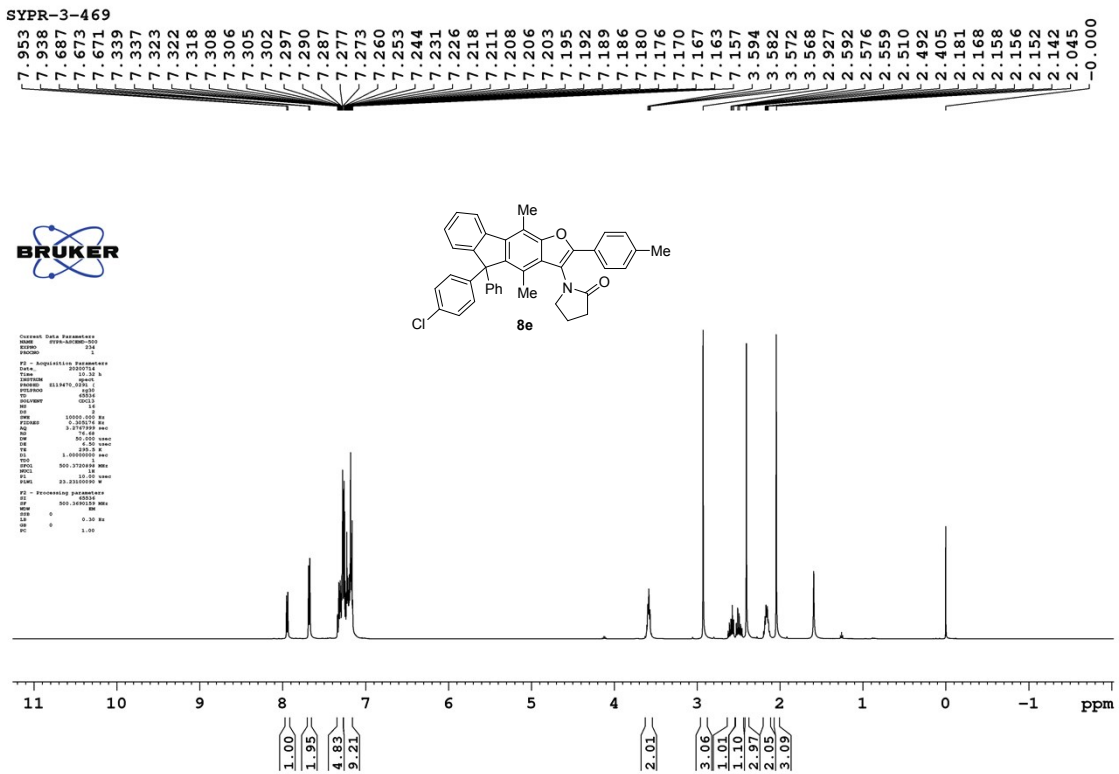
# <sup>1</sup>H and <sup>13</sup>C{<sup>1</sup>H} spectra of 8c



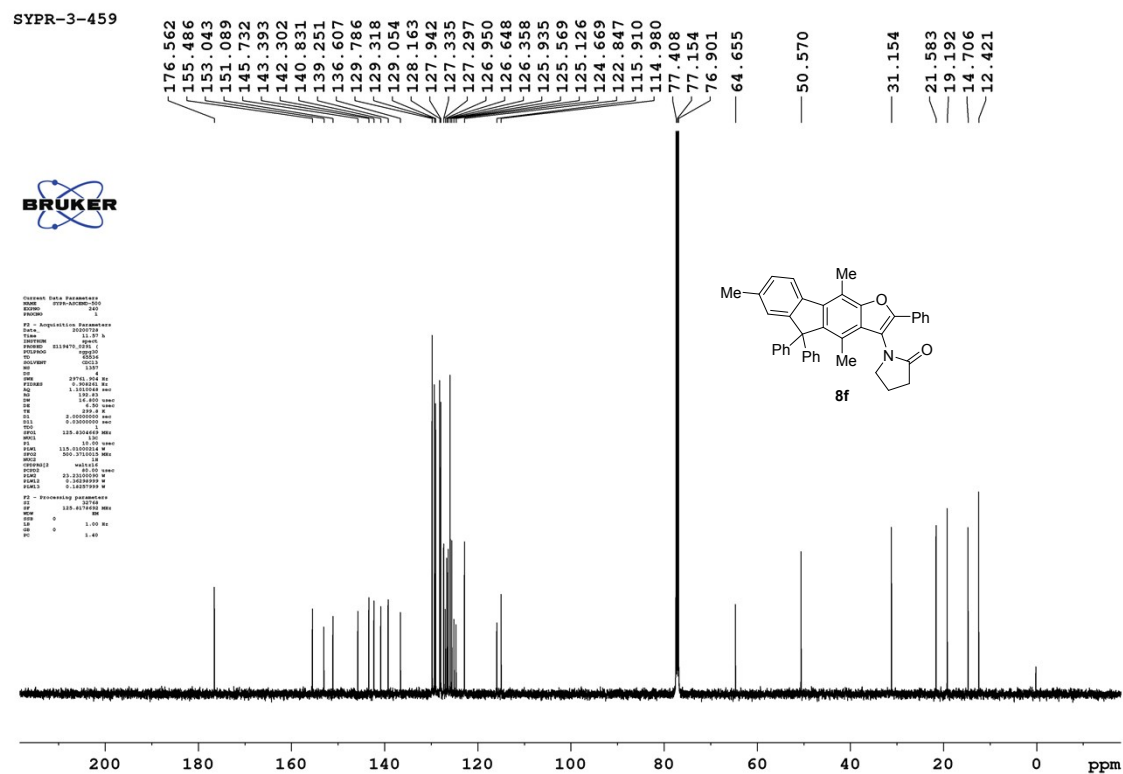
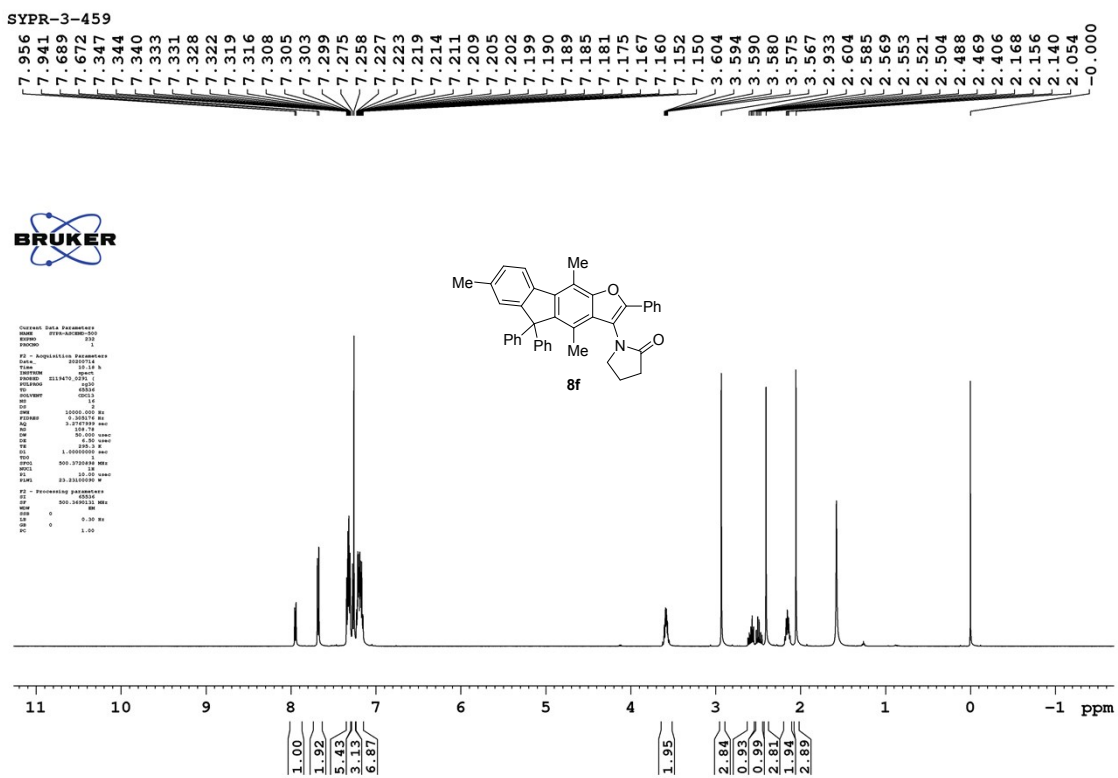
$^1\text{H}$  and  $^{13}\text{C}\{^1\text{H}\}$  spectra of **8d**



$^1\text{H}$  and  $^{13}\text{C}\{^1\text{H}\}$  spectra of **8e**



# $^1\text{H}$ and $^{13}\text{C}\{^1\text{H}\}$ spectra of **8f**



SYPR-7-Acyl

7.867  
7.865  
7.855  
7.851  
7.848  
7.640  
7.638  
7.635  
7.626  
7.623  
7.620  
7.611  
7.608  
7.606  
7.517  
7.514  
7.502  
7.501  
7.489  
7.486

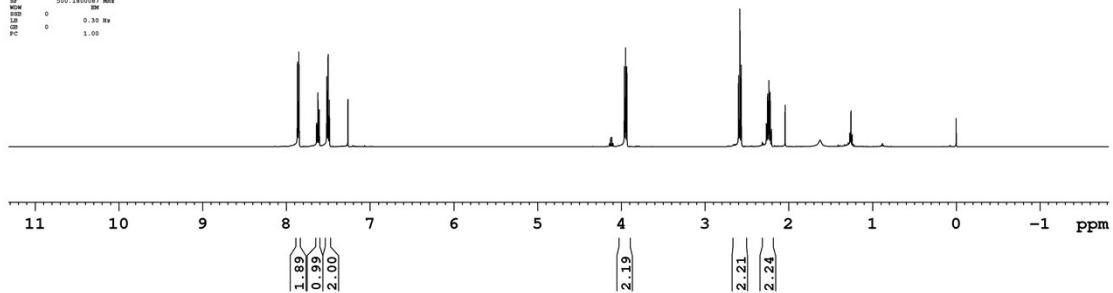
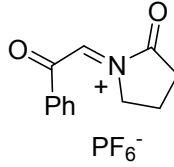
3.962  
3.948  
3.933  
2.599  
2.583  
2.567  
2.267  
2.252  
2.237  
2.222  
2.206

-0.000



```

Current Data Parameters
NAME: SYPR-7-ACYL
EXPNO: 1
PROCNO: 1
F2 - Acquisition Parameters
Date_: 20121208
Time: 17:31 h
INSTRUM: spect
PROBHD: 1H129128.0042
PULPROG: zgpg30
TD: 65536
SOLVENT: DMS
NS: 16
DS: 4
FIDRES: 0.300176 Hz
AQ: 3.2767999 sec
RG: 128
DM: 50.000 usec
DE: 13.00 usec
DT: 297.2 K
DQ: 1.00000000 sec
SFO1: 500.183086 MHz
NUC1: 1H
P1: 12.00 usec
PC: 4.845100 usec
F2 - Processing parameters
SI: 32768
SF: 500.183086 MHz
WDW: EM
SSB: 0
LB: 0.30 Hz
GB: 0
PC: 1.00
    
```



SYPR-7-ACYL

188.902

175.812

167.349

134.470

132.751

129.293

129.026

77.458

77.141

76.823

43.584

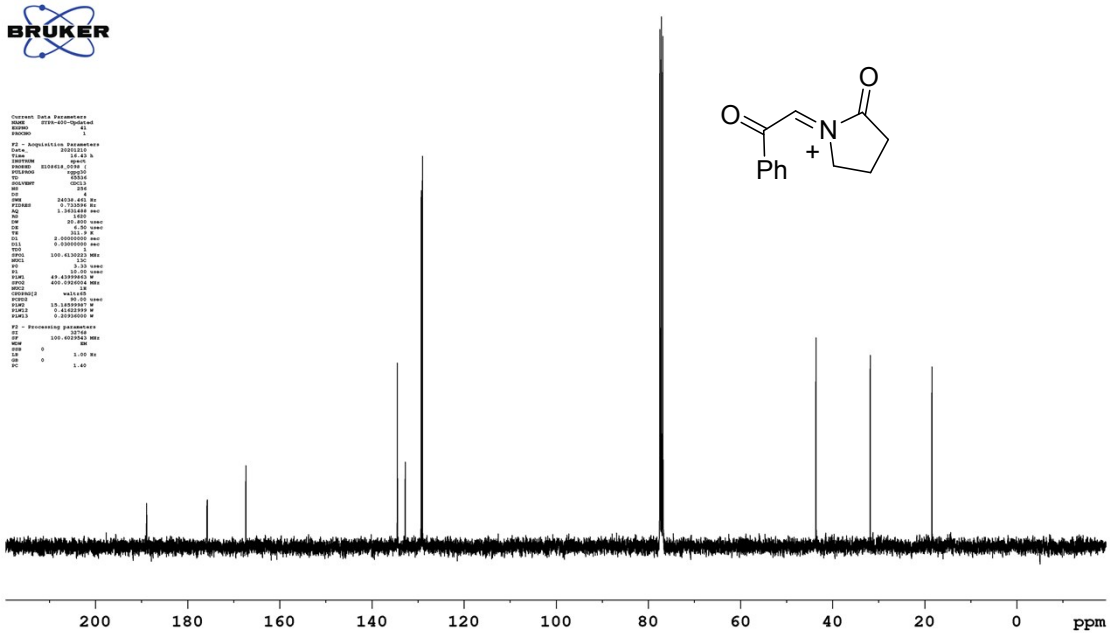
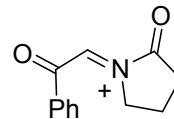
31.814

18.405



```

Current Data Parameters
NAME: SYPR-7-ACYL
EXPNO: 1
PROCNO: 1
F2 - Acquisition Parameters
Date_: 20121208
Time: 17:31 h
INSTRUM: spect
PROBHD: 1H129128.0042
PULPROG: zgpg30
TD: 65536
SOLVENT: DMS
NS: 16
DS: 4
FIDRES: 0.300176 Hz
AQ: 3.2767999 sec
RG: 128
DM: 50.000 usec
DE: 13.00 usec
DT: 297.2 K
DQ: 1.00000000 sec
SFO1: 500.183086 MHz
NUC1: 1H
P1: 12.00 usec
PC: 4.845100 usec
F2 - Processing parameters
SI: 32768
SF: 500.183086 MHz
WDW: EM
SSB: 0
LB: 0.30 Hz
GB: 0
PC: 1.00
    
```

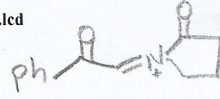




# LCMS-8040 DATA REPORT SHIMADZU

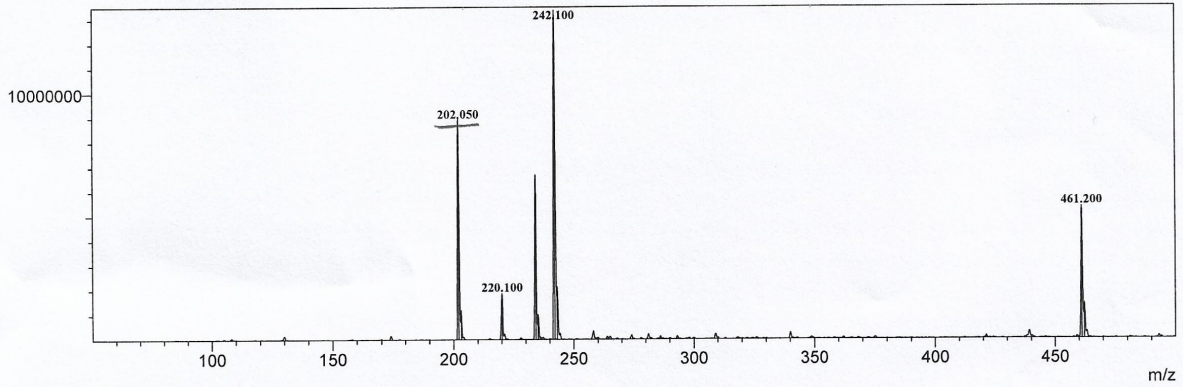
Sample Name : SYPR-7-N ACRYL  
 Injection Volume : 1  
 Method File : 170919-MASTER METHOD-Q1.lcm  
 Data File : D:\LCMS8040\YSR\SYPR\09122020-SYPR-7-NACYL-ESI-001.lcd

Sample Information

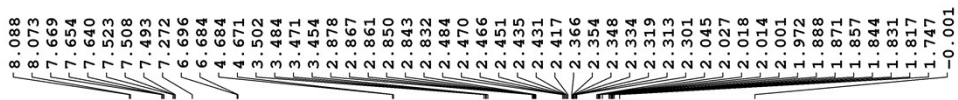


Exact Mass: 202.0868  
 202.050

R. Time:----(Scan#:----)  
 MassPeaks:9 BasePeak:242.100(13376555)  
 Spectrum Mode:Averaged 0.194-0.495(55-139)  
 BG Mode:Averaged 0.602-0.624(169-175) Polarity:Positive Segment 1 - Event 1

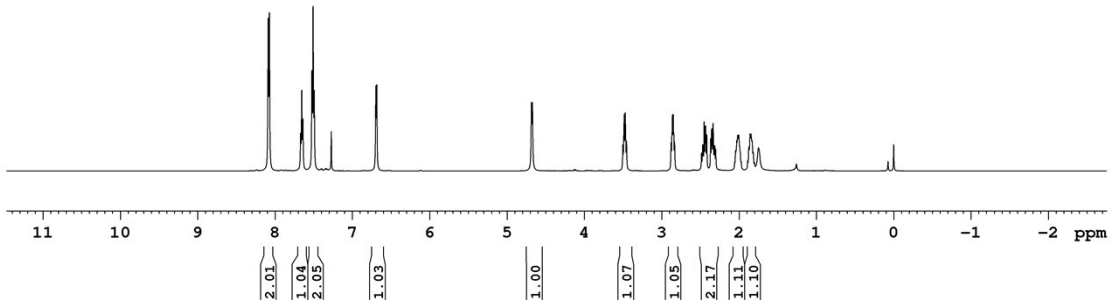
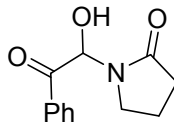


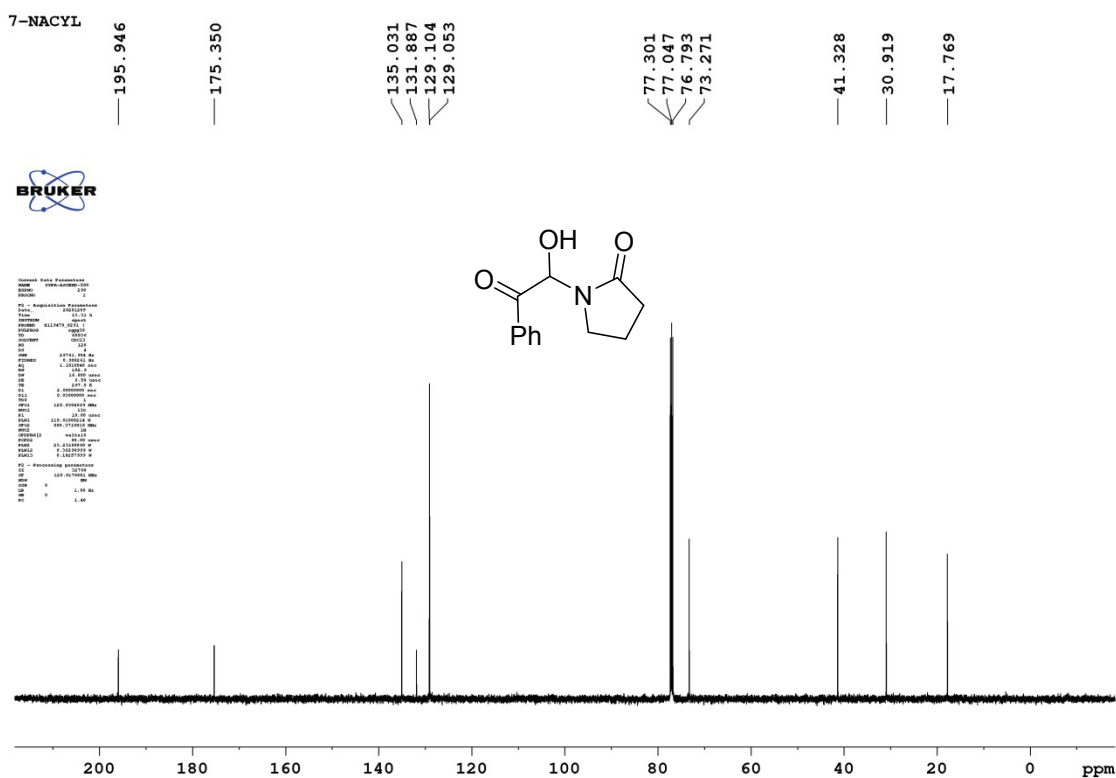
7-NACYL



```

Current Data Parameters
NAME: 170919-001-001
EXPNO: 1
PROCNO: 1
F2 - Acquisition Parameters
Date_: 20200912
Time: 09:27
INSTRUM: spect
PROBHD: 51MMQNP1H1
PULPROG: zgpg30
SOLVENT: acd
AQ: 0.0213
RG: 16
SI: 32768
SF: 500.136461
WDW: EM
SSB: 0
LB: 3.00
GB: 0
PC: 1.00
F2 - Processing parameters
SI: 32768
SF: 500.136461
WDW: EM
SSB: 0
LB: 3.00
GB: 0
PC: 1.00
    
```

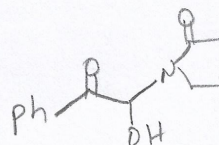




## LCMS-8040 DATA REPORT SHIMADZU

Sample Name  
Injection Volume  
Method File  
Data File

Sample Information  
: SYPR-7-HYDROXY  
: 1  
: 170919-MASTER METHOD-Q1.lcm  
: D:\LCMS8040\YSR\SYPR\10122020-SYPR-7-HYDROXY-ESI-001.lcd



R. Time: ----(Scan#: ----)  
Mass Peaks: 8 BasePeak: 242.100(16884375)  
Spectrum Mode: Averaged 0.172-0.394(49-111)  
BG Mode: Averaged 1.003-1.054(281-295) Polarity: Positive Segment 1 - Event 1

Exact Mass: 219.0895  
Na<sup>+</sup>: 242.0793

