

## Supplementary Material

### **A simple and efficient approach for the synthesis of functionalized naphtho[2,1-*b*]furan *via* an one-pot, three-component reaction between Meldrum's acid, arylglyoxals, and $\beta$ -naphthol**

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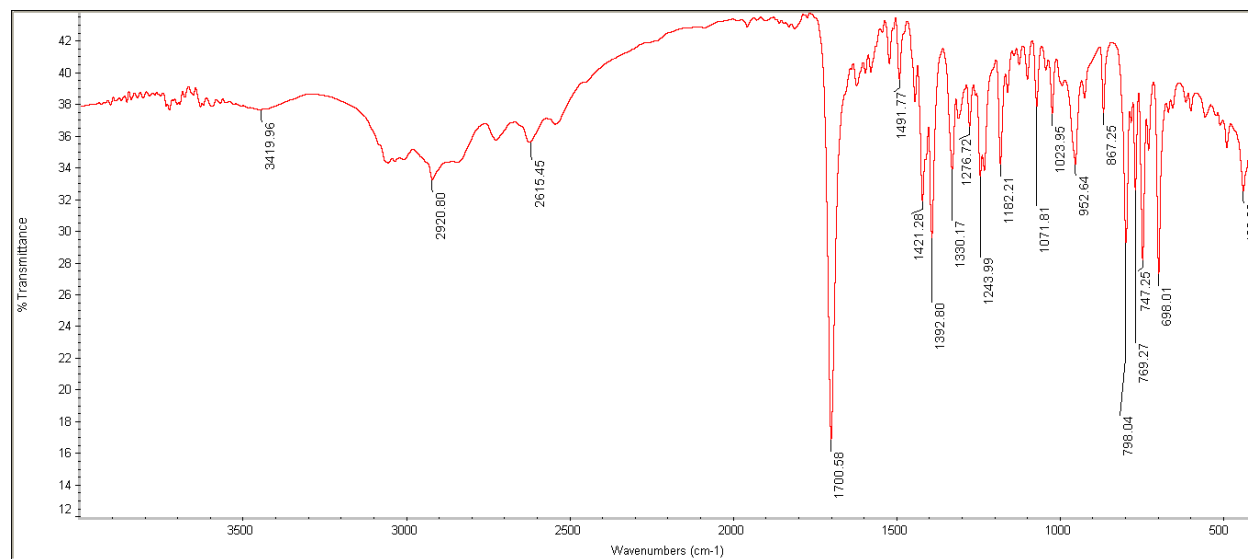
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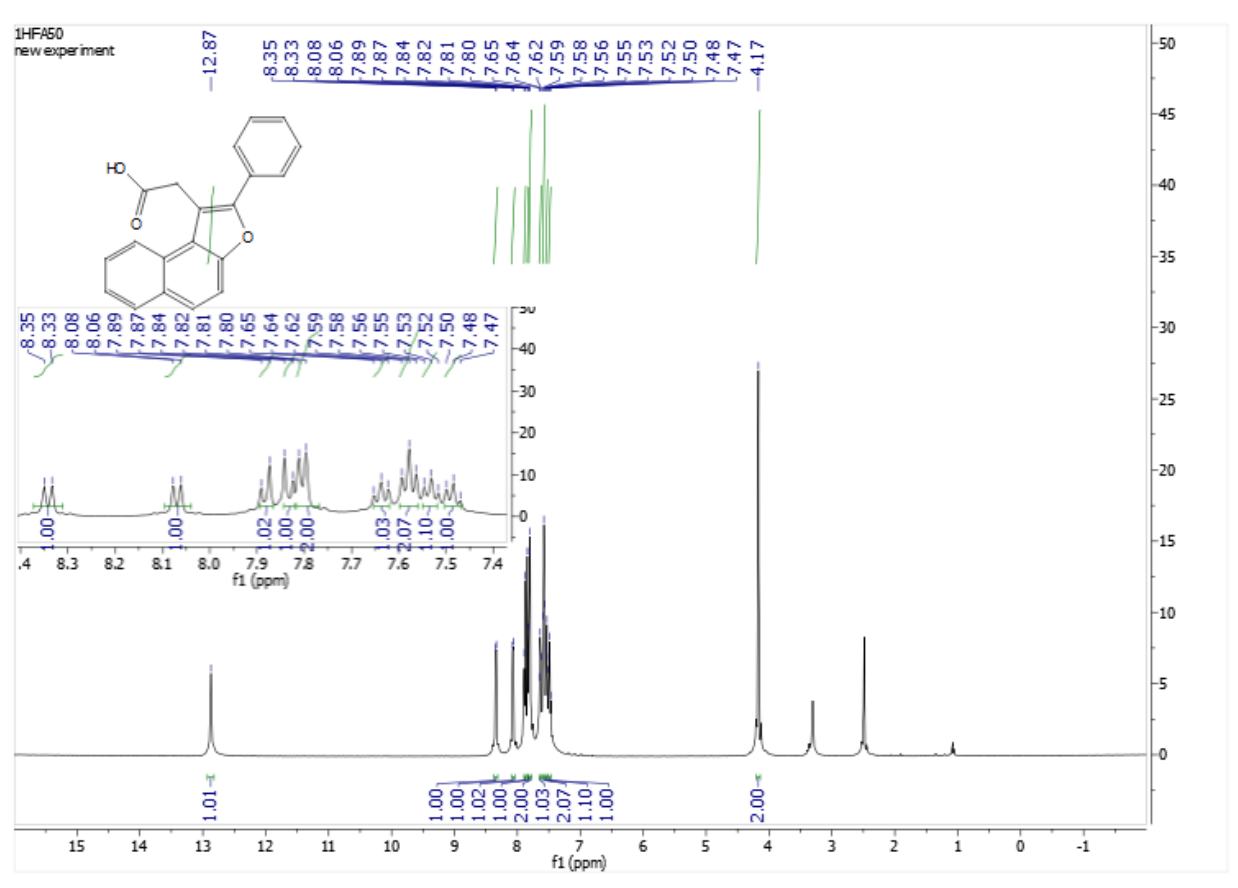
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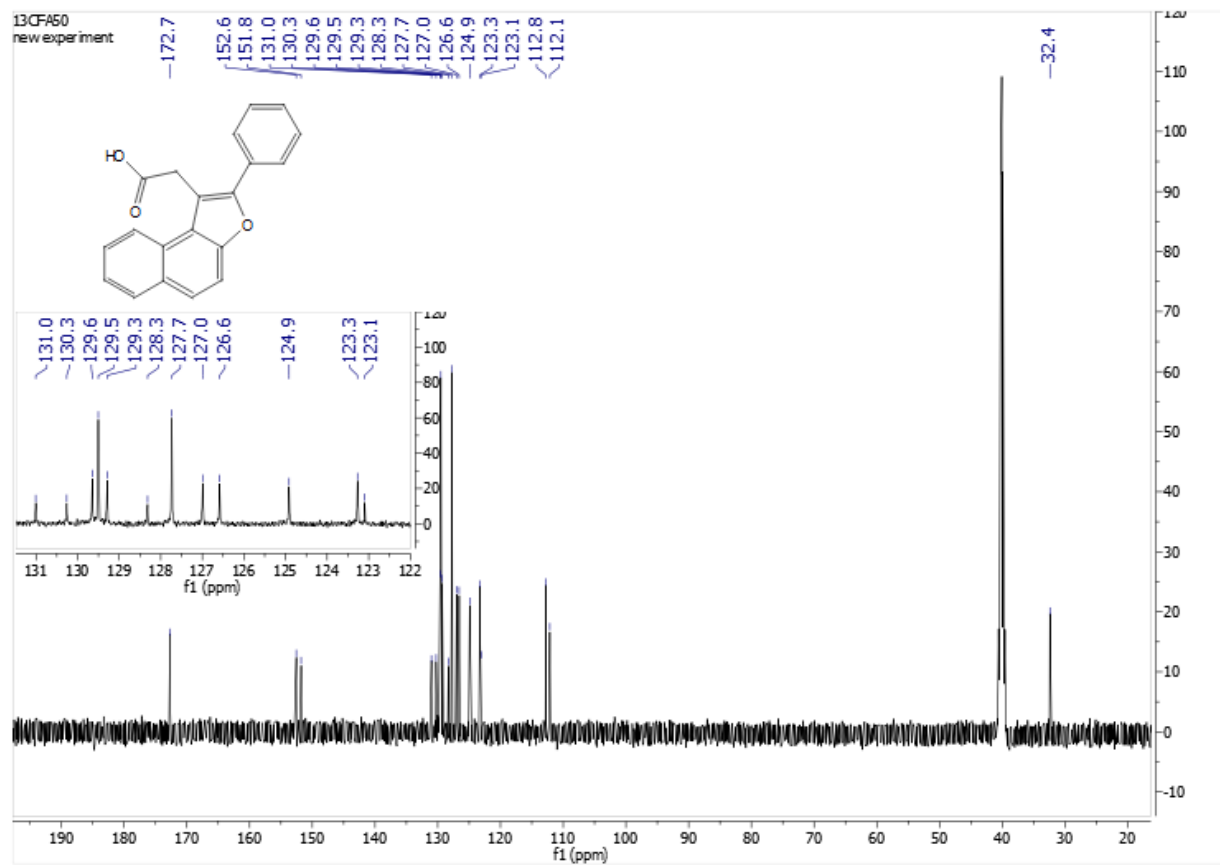
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| IR, $^1\text{H}$ and $^{13}\text{C}$ NMR spectra of compounds <b>4a-j</b> ..... | S2 |
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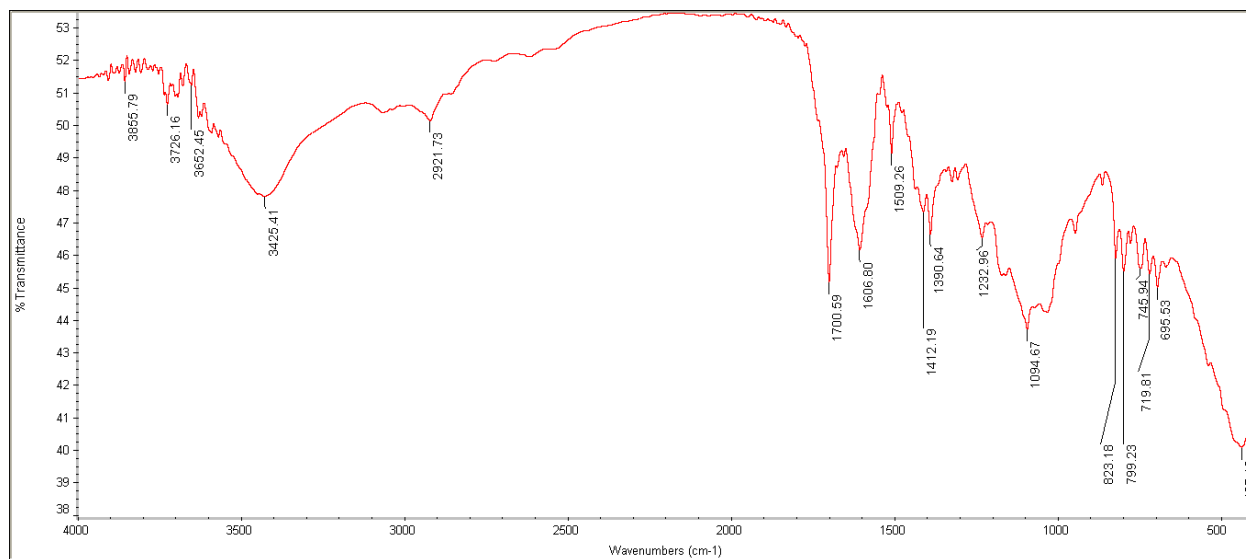
IR  $\nu$ /cm<sup>-1</sup> (KBr) for compound (4a): IR: 3419, 1700 cm<sup>-1</sup>.



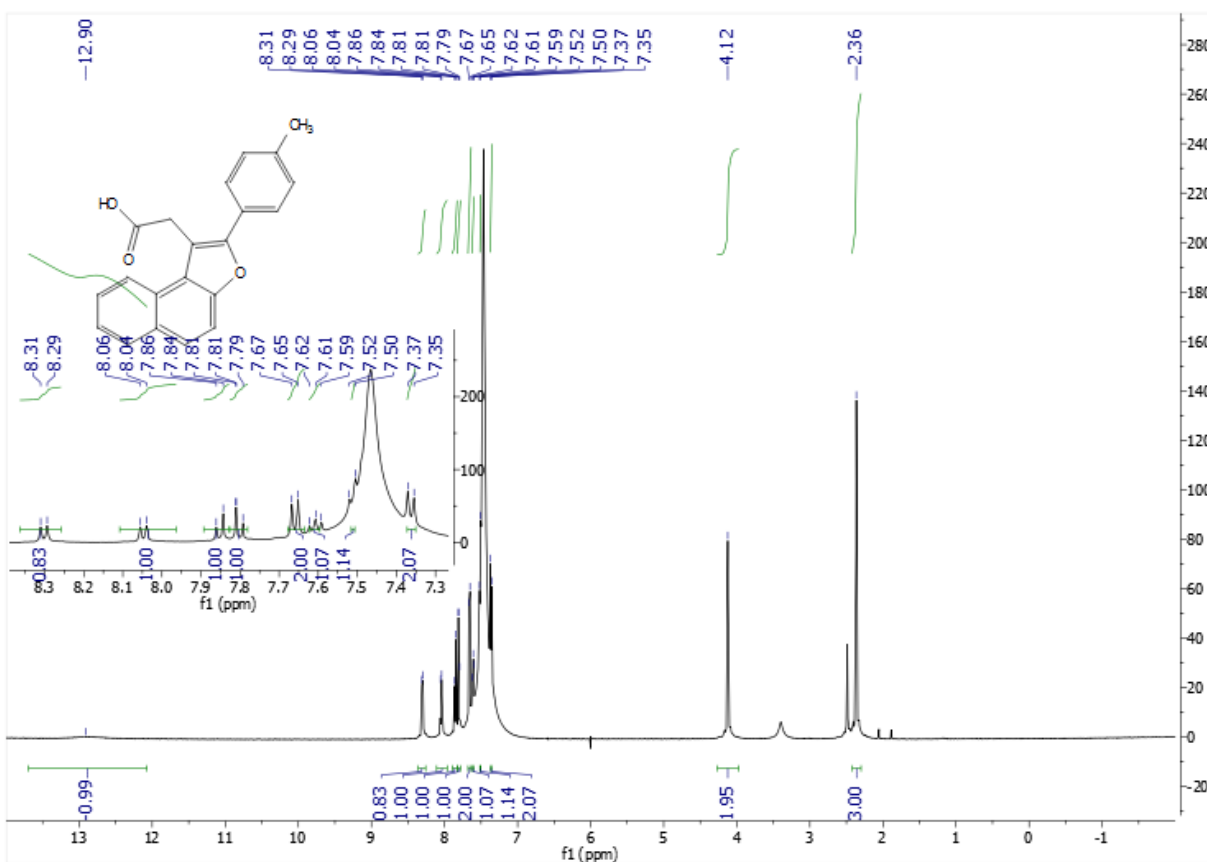
<sup>1</sup>H NMR (500 MHz, DMSO-*d*<sub>6</sub>) for compound (4a): <sup>1</sup>H NMR:  $\delta$  4.17 (s, 2H, CH<sub>2</sub>), 7.48 (t, 1H, *J* 7.5 Hz, ArH), 7.53 (t, 1H, *J* 7.5 Hz, ArH), 7.58 (t, 2H, *J* 8.0 Hz, ArH), 7.64 (t, 1H, *J* 8.0 Hz, ArH), 7.80 (d, 2H, *J* 8.0 Hz, ArH), 7.83 (d, 1H, *J* 9.0 Hz, ArH), 7.88 (d, 1H, *J* 9.0 Hz, ArH), 8.07 (d, 1H, *J* 8.0 Hz, ArH), 8.34 (d, 1H, *J* 8.0 Hz, ArH), 12.87 (bs, 1H, OH) ppm.



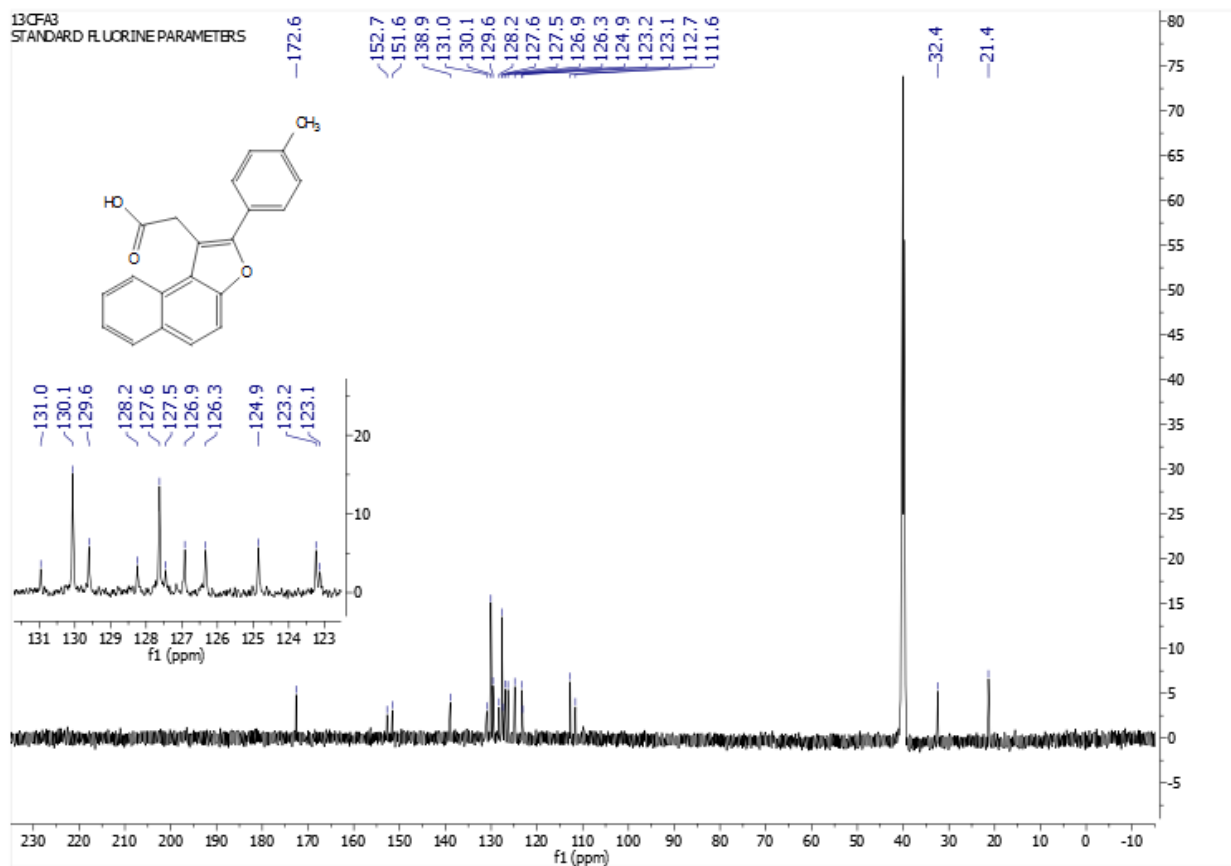
<sup>13</sup>C NMR (125 MHz, DMSO-*d*<sub>6</sub>) for compound (**4a**): <sup>13</sup>C NMR:  $\delta$  32.4, 112.1, 112.7, 123.0, 123.2, 124.9, 126.5, 126.9, 127.7, 128.3, 129.2, 129.5, 129.6, 130.2, 131.0, 151.7, 152.5, 172.6 ppm.



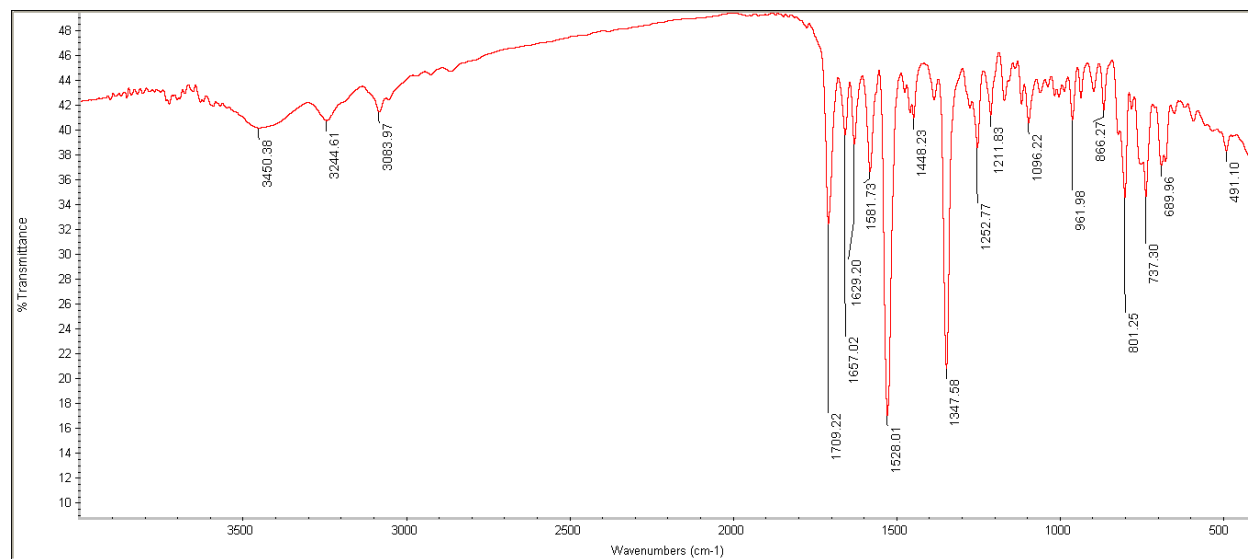
IR  $\nu/\text{cm}^{-1}$  (KBr) for compound **(4b)**: IR: 3425, 1700  $\text{cm}^{-1}$ .



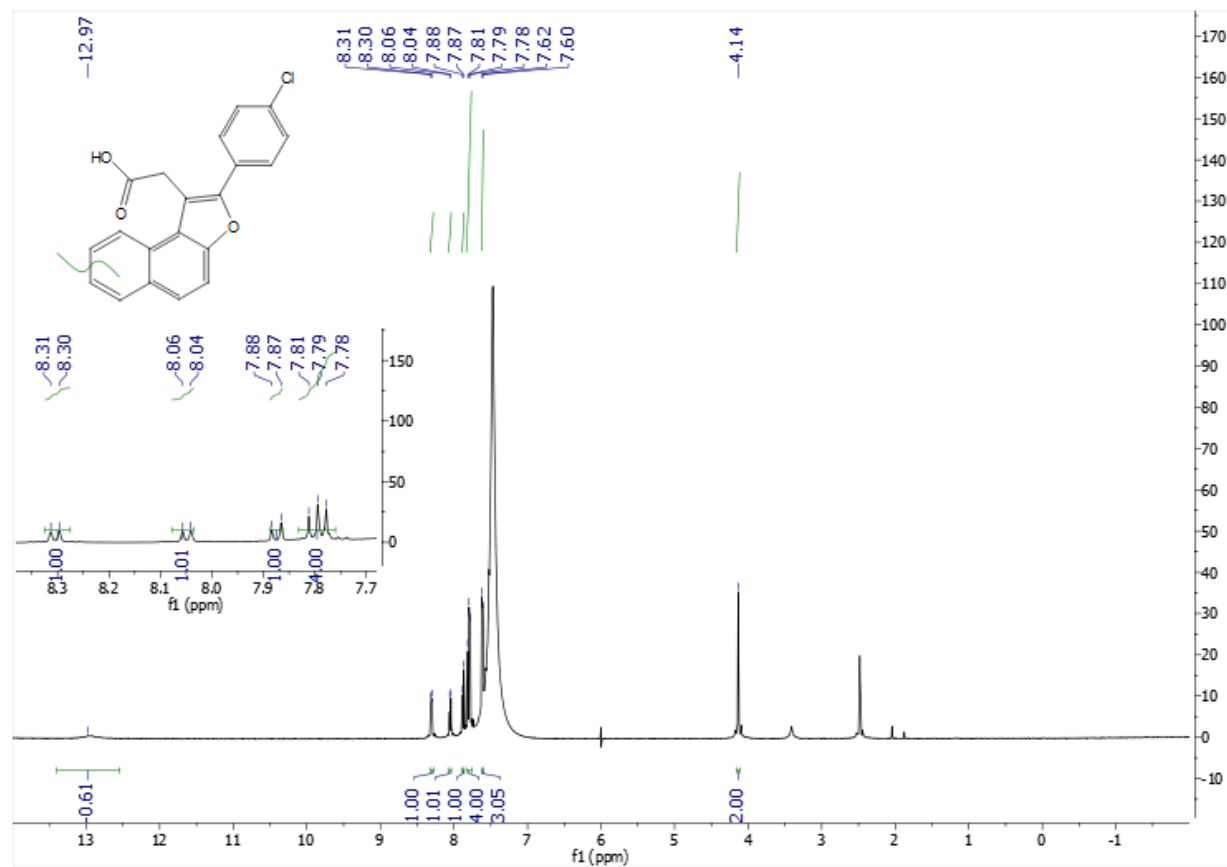
$^1\text{H}$  NMR (500 MHz,  $\text{DMSO}-d_6$ ) for compound **(4b)**:  $^1\text{H}$  NMR:  $\delta$  2.36 (s, 3H,  $\text{CH}_3$ ), 4.12 (s, 2H,  $\text{CH}_2$ ), 7.36 (d, 2H,  $J$  8.0 Hz, ArH), 7.50 (t, 1H,  $J$  8.5 Hz, ArH), 7.61 (t, 1H,  $J$  8.5 Hz, ArH), 7.66 (d, 2H,  $J$  8.0 Hz, ArH), 7.80 (d, 1H,  $J$  8.5 Hz, ArH), 7.85 (d, 1H,  $J$  8.5 Hz, ArH), 8.05 (d, 1H,  $J$  8.5 Hz, ArH), 8.30 (d, 1H,  $J$  8.5 Hz, ArH), 12.90 (bs, 1H, OH) ppm.



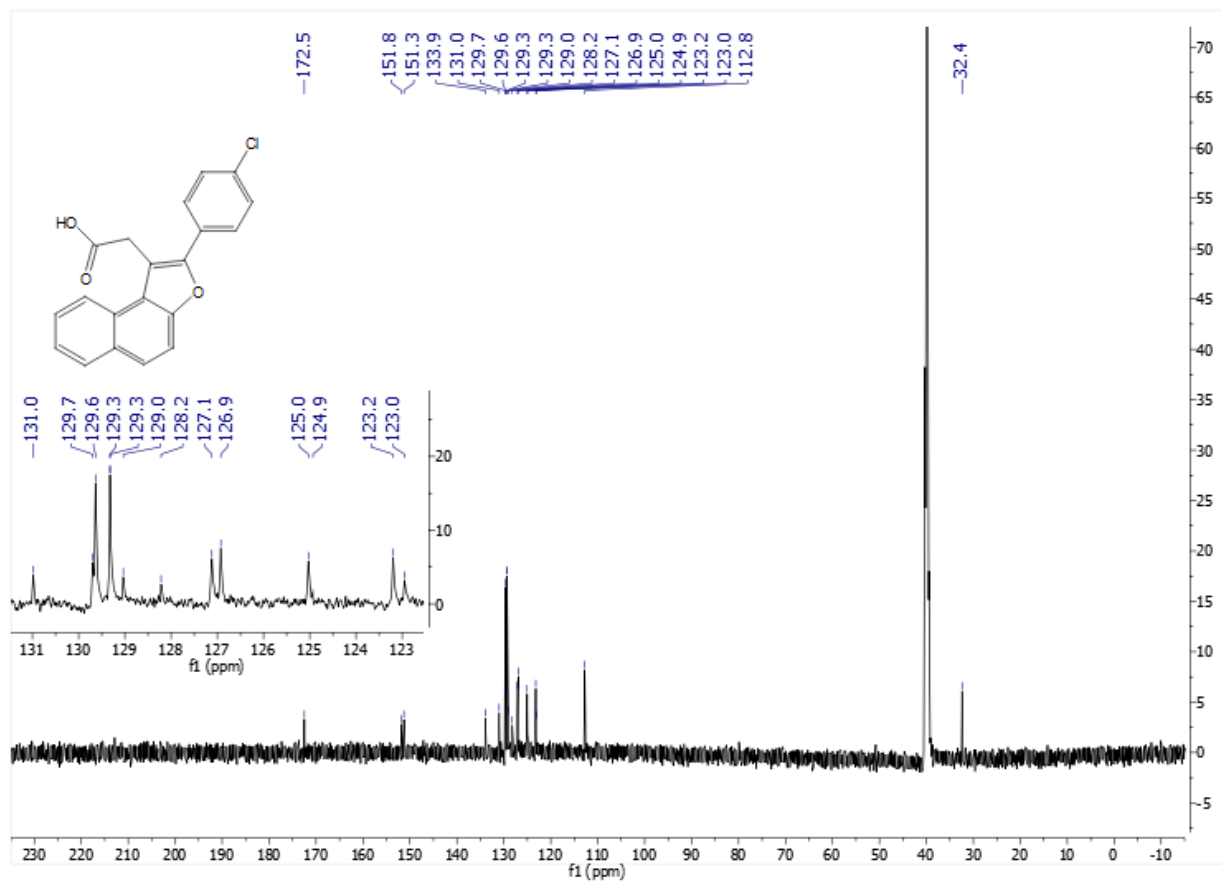
<sup>13</sup>C NMR (125 MHz, DMSO-*d*<sub>6</sub>) for compound **4b**: <sup>13</sup>C NMR:  $\delta$  21.3, 32.4, 111.5, 112.7, 123.1, 123.2, 124.8, 126.3, 126.9, 127.4, 127.6, 128.2, 129.6, 130.0, 130.9, 138.9, 151.5, 152.7, 172.6 ppm.



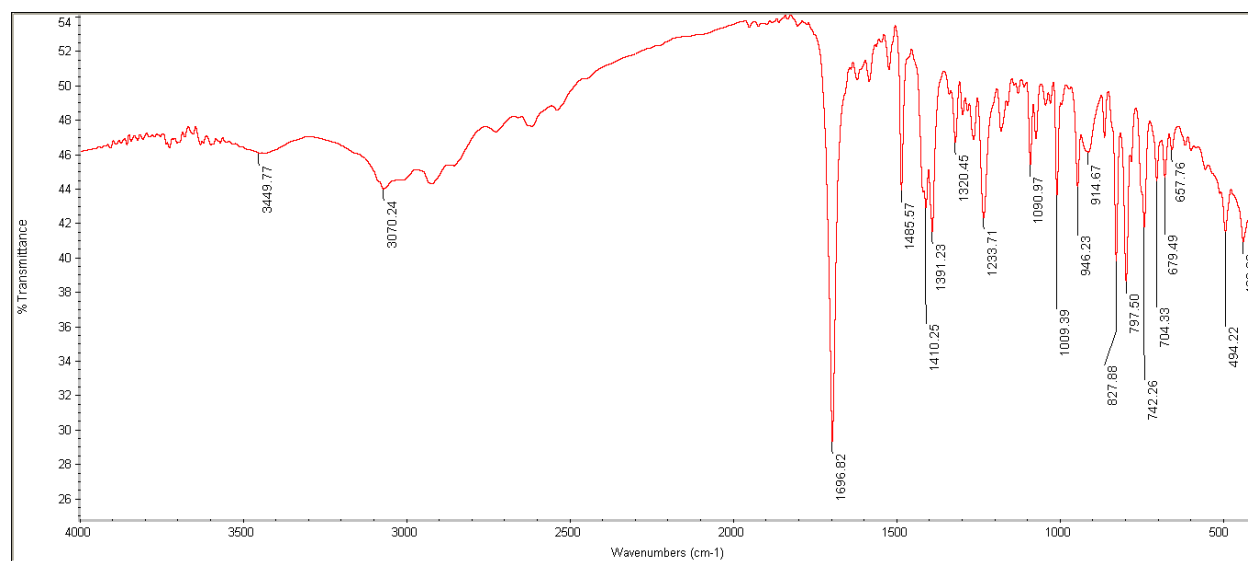
IR  $\nu/\text{cm}^{-1}$  (KBr) for compound (**4c**): IR: 3450, 1709  $\text{cm}^{-1}$ .



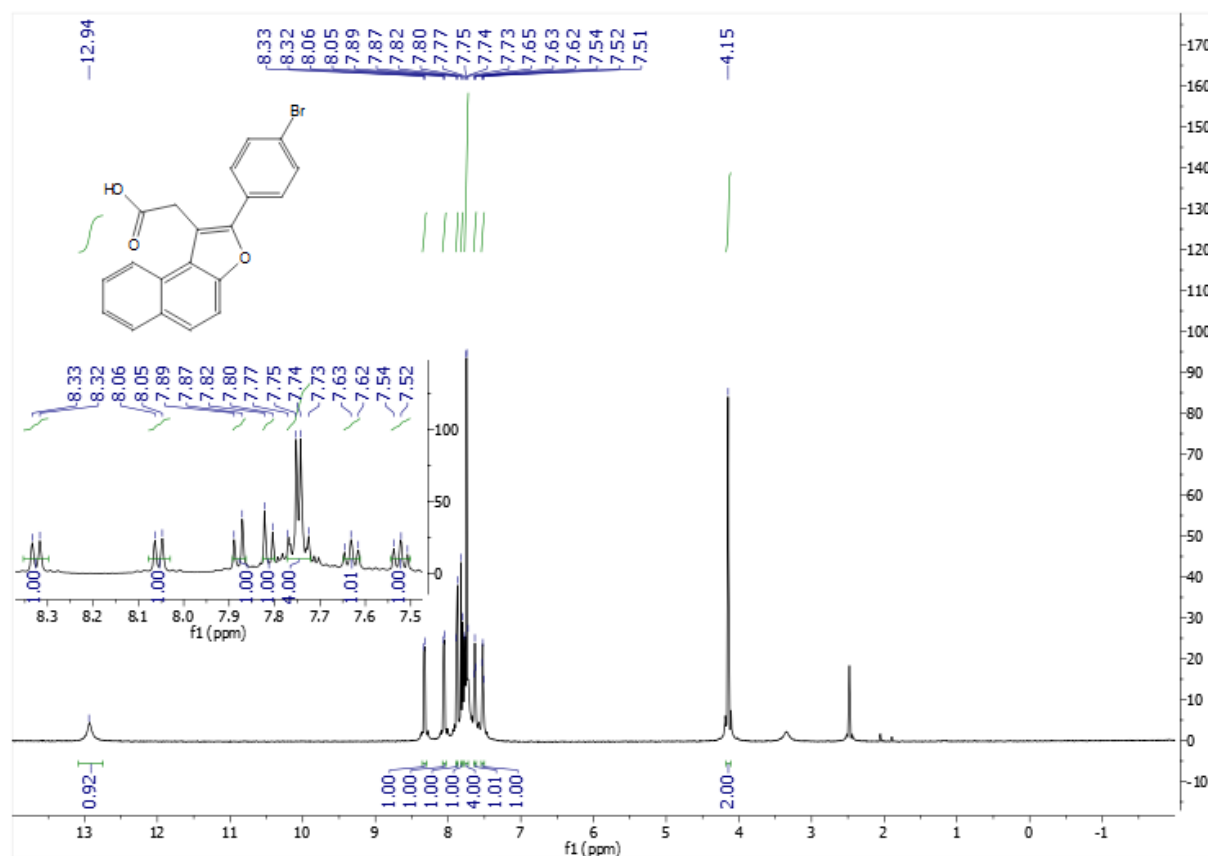
$^1\text{H}$  NMR (500 MHz,  $\text{DMSO}-d_6$ ) for compound (**4c**):  $^1\text{H}$  NMR:  $\delta$  4.14 (s, 2H,  $\text{CH}_2$ ), 7.60-7.62 (m, 3H, ArH), 7.78-7.81 (m, 4H, ArH), 7.87 (d, 1H,  $J$  9.0 Hz, ArH), 8.05 (d, 1H,  $J$  8.0 Hz, ArH), 8.30 (d, 1H,  $J$  8.0 Hz, ArH), 12.94 (bs, 1H, OH) ppm.



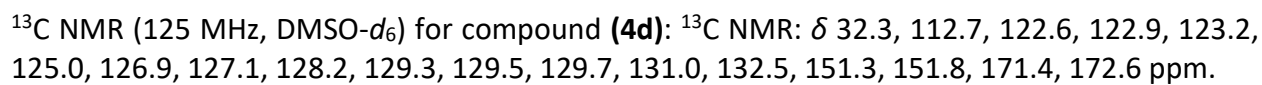
<sup>13</sup>C NMR (125 MHz, DMSO-*d*<sub>6</sub>) for compound (**4c**): <sup>13</sup>C NMR:  $\delta$  32.4, 112.7, 122.9, 123.2, 124.9, 125.0, 126.9, 127.1, 128.2, 129.0, 129.3, 129.6, 129.6, 130.9, 133.9, 151.2, 151.8, 172.4 ppm.

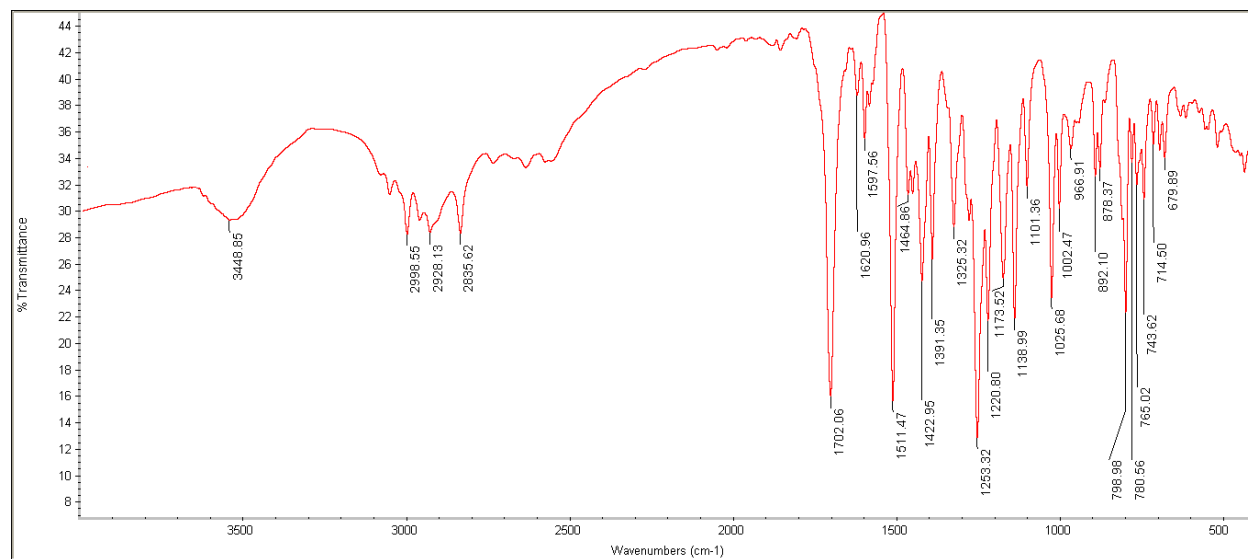


IR  $\nu/\text{cm}^{-1}$  (KBr) for compound (**4d**): IR: 3449, 1696  $\text{cm}^{-1}$ .

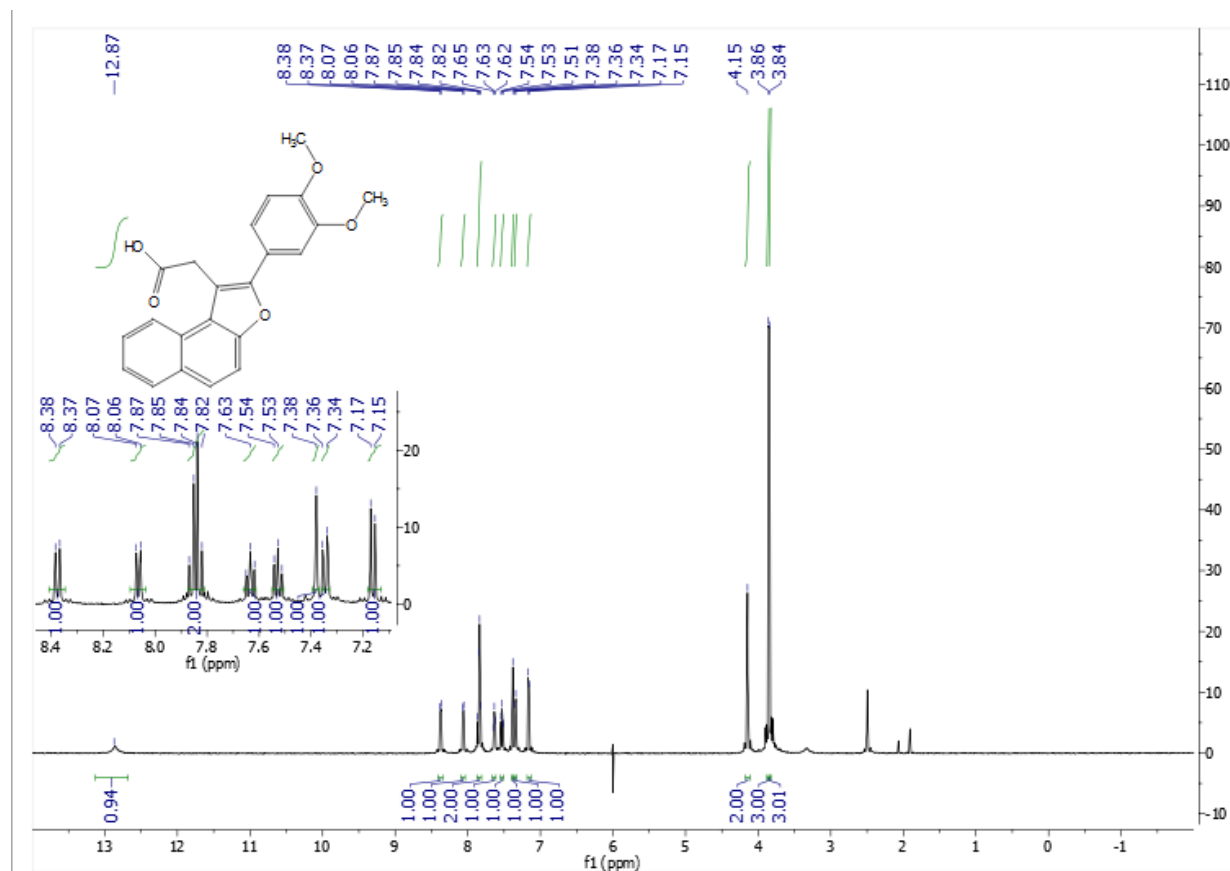


$^1\text{H}$  NMR (500 MHz,  $\text{DMSO}-d_6$ ) for compound (**4d**):  $^1\text{H}$  NMR:  $\delta$  4.15 (s, 2H,  $\text{CH}_2$ ), 7.52 (t, 1H,  $J$  7.0 Hz, ArH), 7.63 (t, 1H,  $J$  7.0 Hz, ArH), 7.73-7.77 (m, 4H, ArH), 7.81 (d, 1H,  $J$  9.0 Hz, ArH), 7.88 (d, 1H,  $J$  9.0 Hz, ArH), 8.05 (d, 1H,  $J$  8.0 Hz, ArH), 8.32 (d, 1H,  $J$  8.0 Hz, ArH), 12.94 (bs, 1H, OH) ppm.

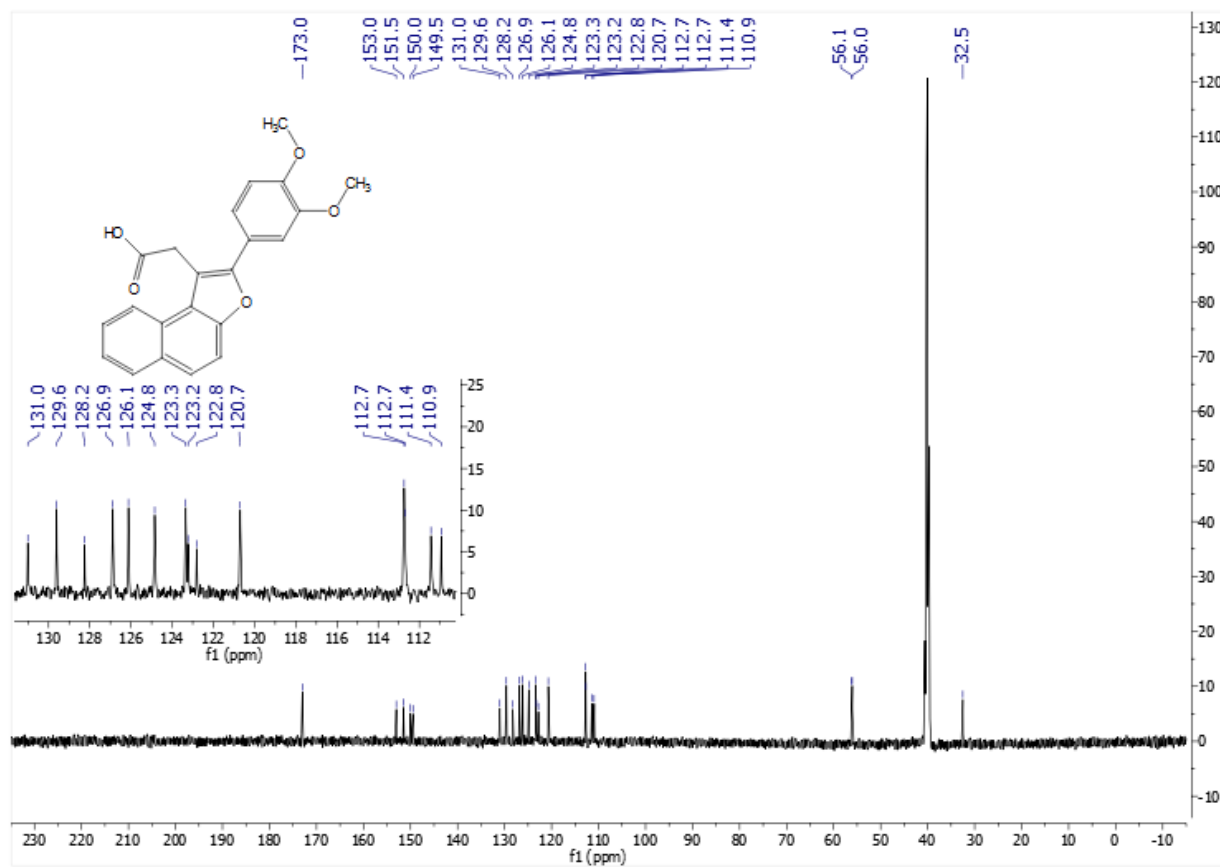




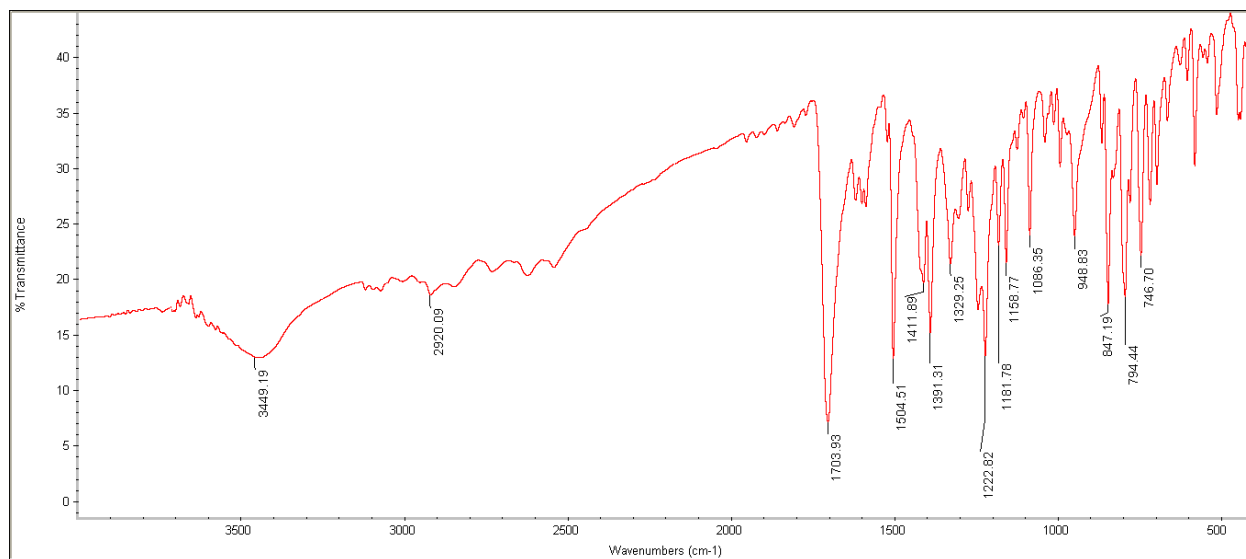
IR  $\nu$ /cm<sup>-1</sup> (KBr) for compound (4e): IR: 3448, 1702 cm<sup>-1</sup>.



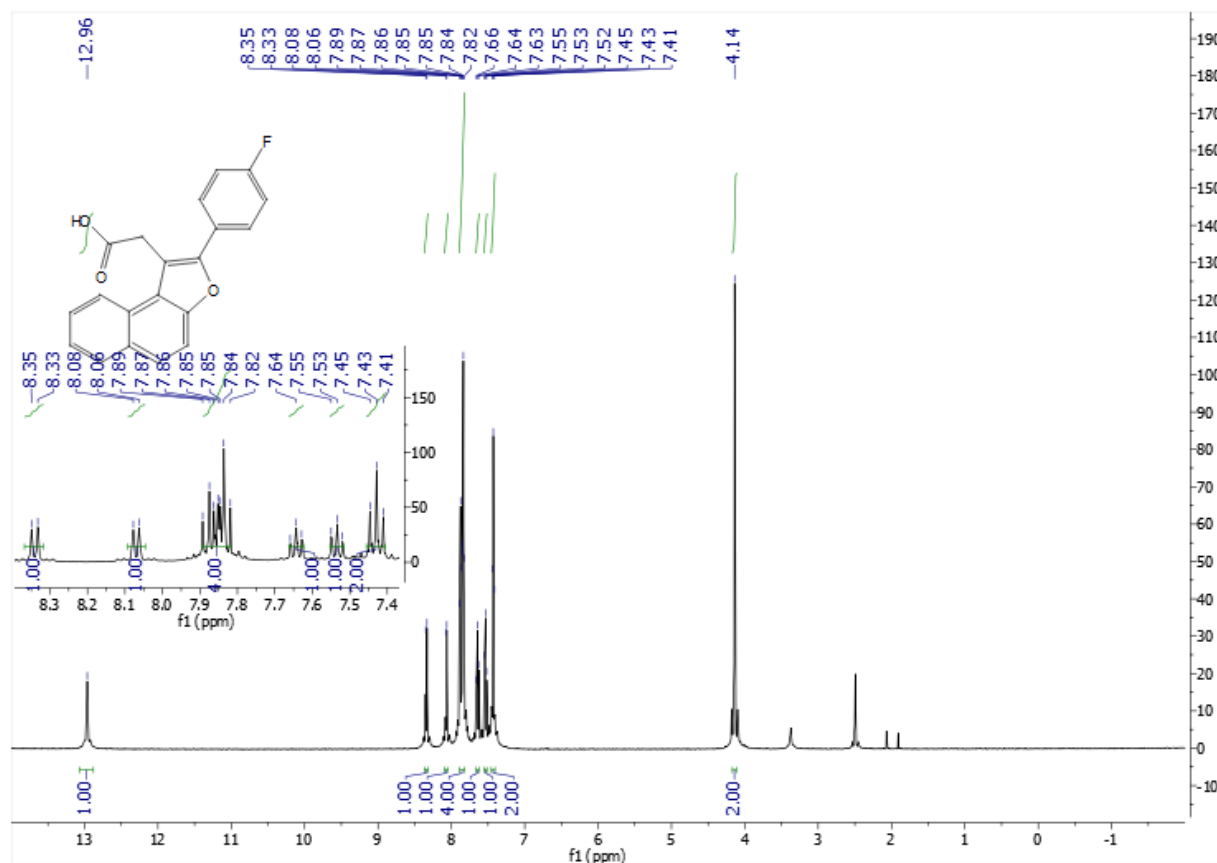
<sup>1</sup>H NMR (500 MHz, DMSO-d<sub>6</sub>) for compound (4e): <sup>1</sup>H NMR:  $\delta$  3.84 (s, 3H, OCH<sub>3</sub>), 3.86 (s, 3H, OCH<sub>3</sub>), 4.15 (s, 2H, CH<sub>2</sub>), 7.16 (d, 1H, *J* 8.5 Hz, ArH), 7.36 (d, 1H, *J* 8.5 Hz, ArH), 7.38 (s, 1H, ArH), 7.53 (t, 1H, *J* 8.0 Hz, ArH), 7.63 (t, 1H, *J* 8.0 Hz, ArH), 7.83 (d, 1H, *J* 9.0 Hz, ArH), 7.86 (d, 1H, *J* 9.0 Hz, ArH), 8.06 (d, 1H, *J* 8.0 Hz, ArH), 8.37 (d, 1H, *J* 8.0 Hz, ArH), 12.87 (bs, 1H, OH) ppm.



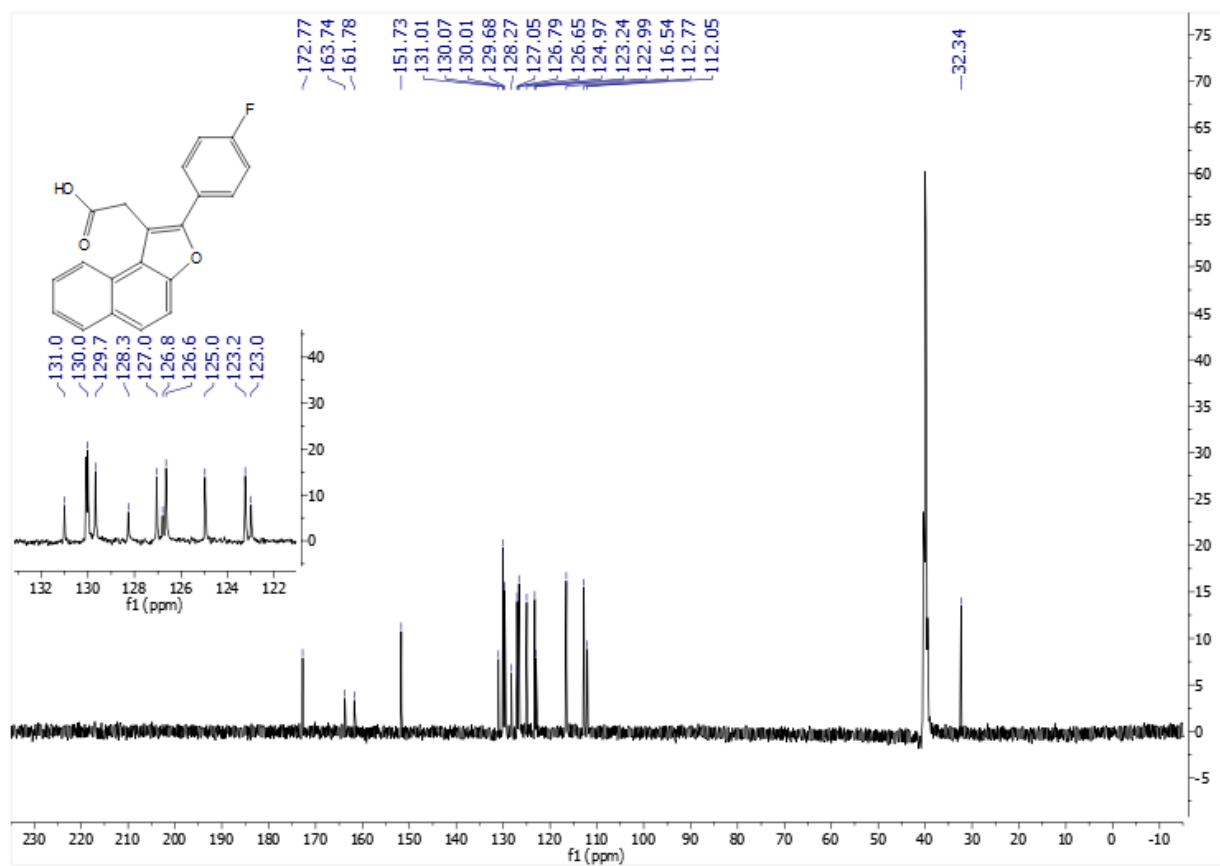
<sup>13</sup>C NMR (125 MHz, DMSO-*d*<sub>6</sub>) for compound **4e**: <sup>13</sup>C NMR:  $\delta$  32.5, 56.0, 56.1, 110.9, 111.4, 112.7, 112.7, 120.7, 122.8, 123.2, 123.3, 124.8, 126.1, 126.8, 128.2, 129.6, 131.0, 149.4, 150.0, 151.4, 153.0, 173.0 ppm.

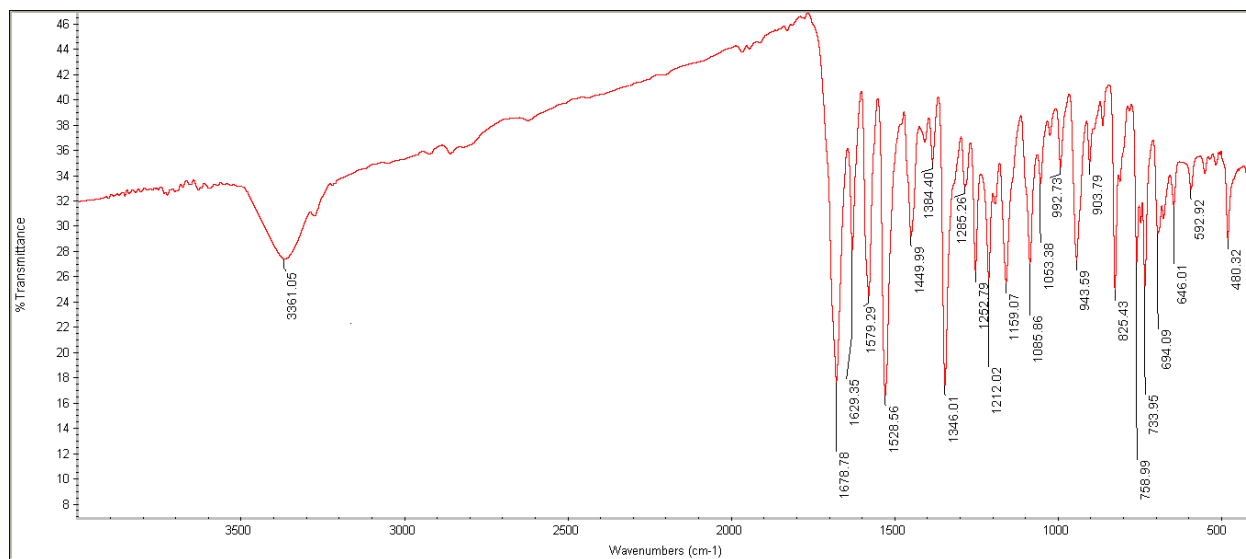


IR  $\nu/\text{cm}^{-1}$  (KBr) for compound (**4f**): IR: 3449, 1703  $\text{cm}^{-1}$ .

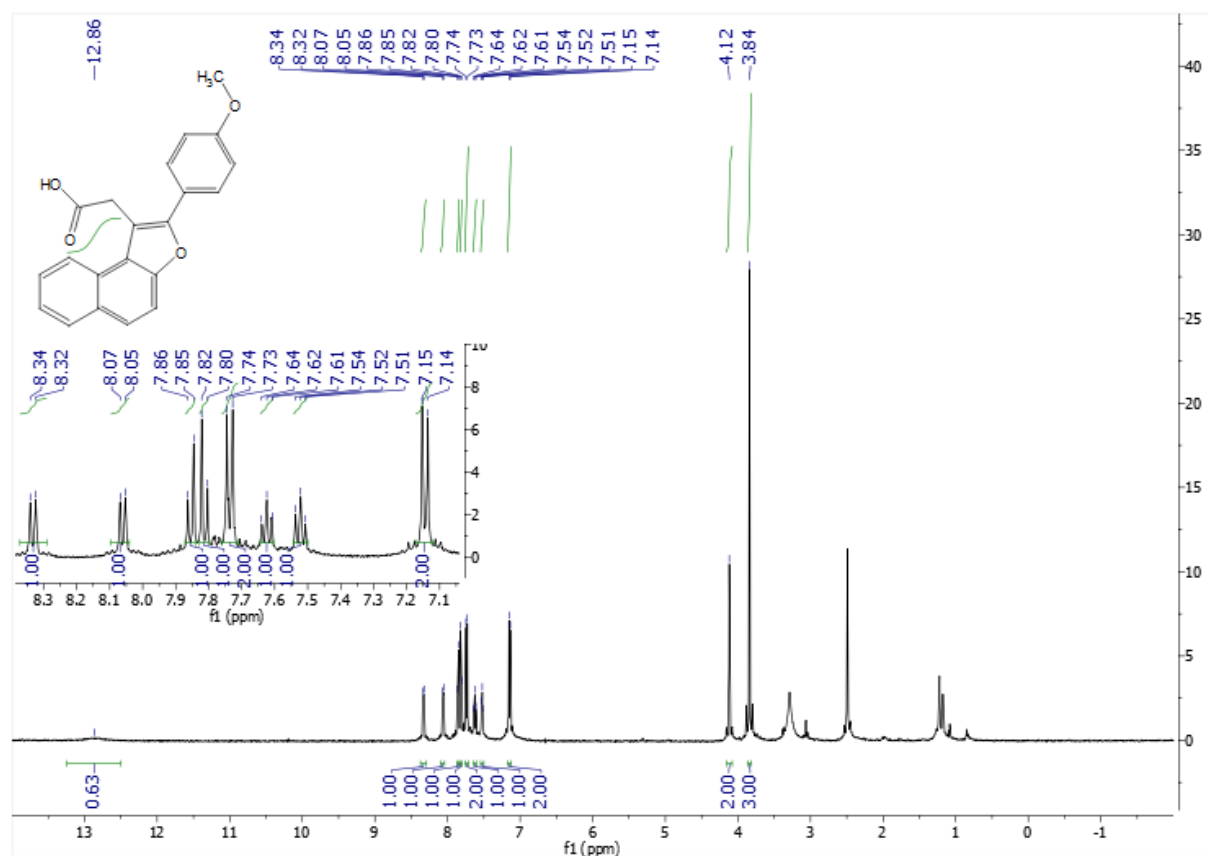


$^1\text{H}$  NMR (500 MHz,  $\text{DMSO}-d_6$ ) for compound (**4f**):  $^1\text{H}$  NMR:  $\delta$  4.14 (s, 2H,  $\text{CH}_2$ ), 7.41-7.45 (m, 2H, ArH), 7.53 (t, 1H,  $J$  7.0 Hz, ArH), 7.64 (t, 1H,  $J$  7.0 Hz, ArH), 7.82-7.89 (m, 4H, ArH), 8.07 (d, 1H,  $J$  8.0 Hz, ArH), 8.34 (d, 1H,  $J$  8.0 Hz, ArH), 12.96 (bs, 1H, OH) ppm.

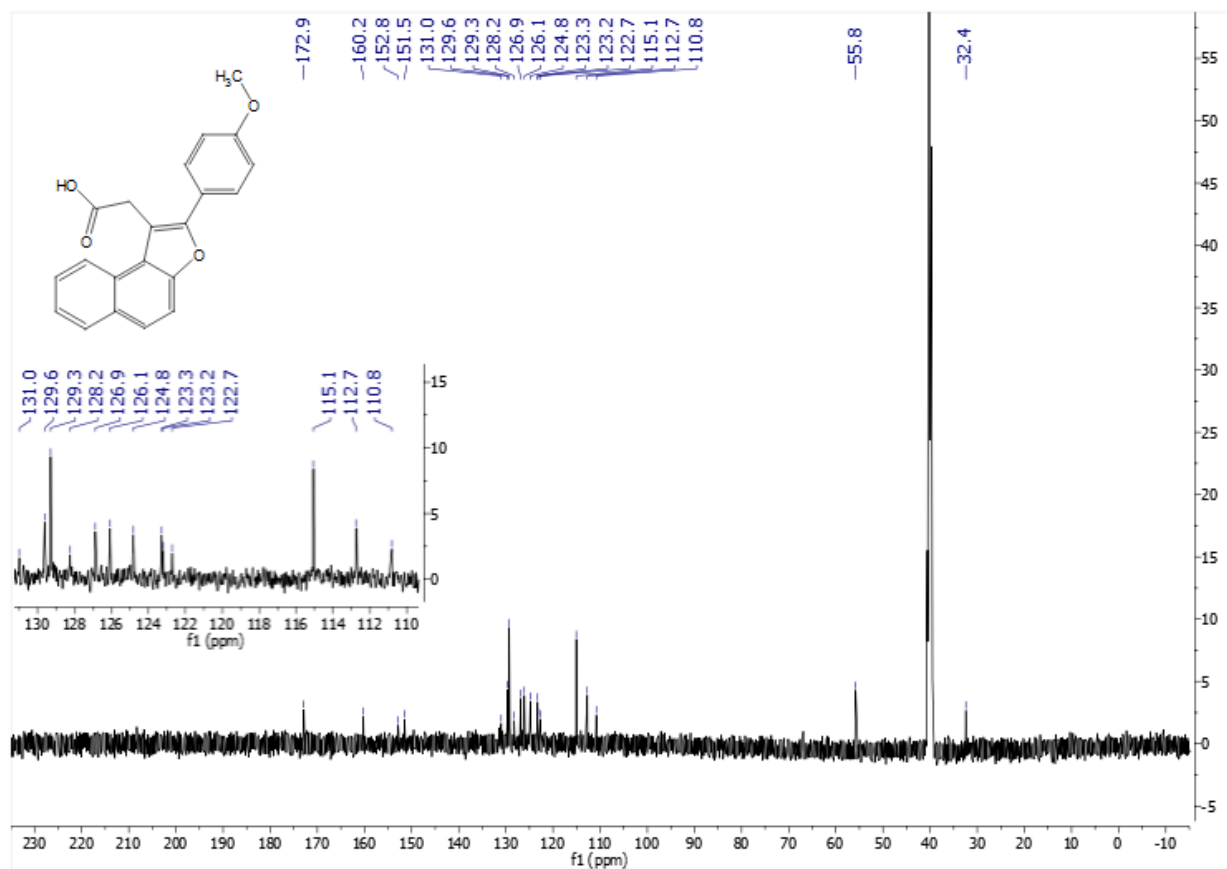




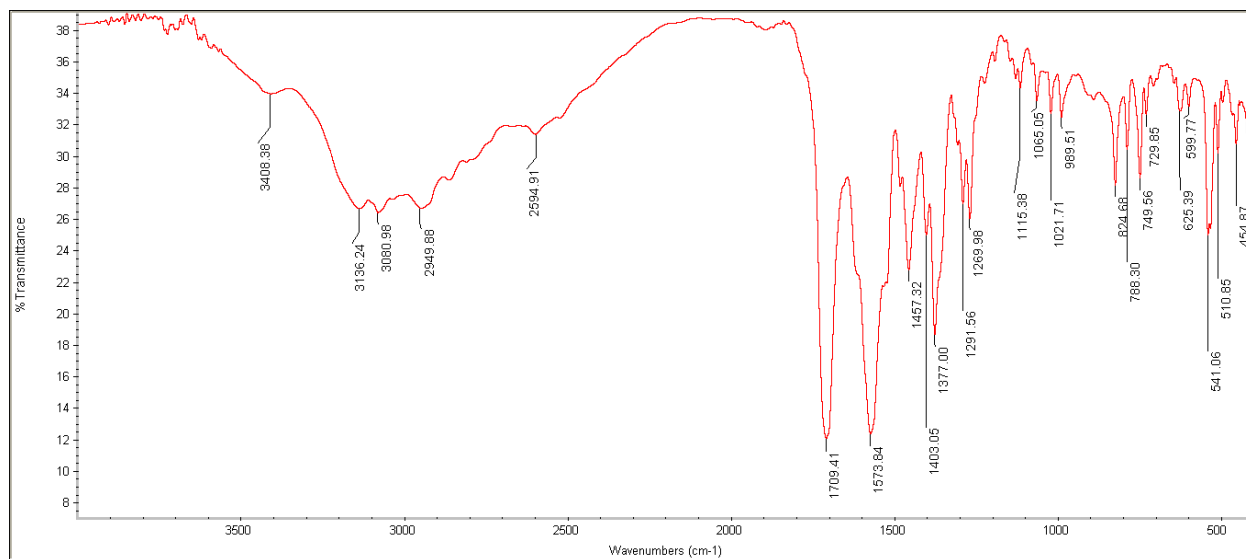
IR  $\nu$ /cm<sup>-1</sup> (KBr) for compound (4g): IR: 3361, 1678 cm<sup>-1</sup>.



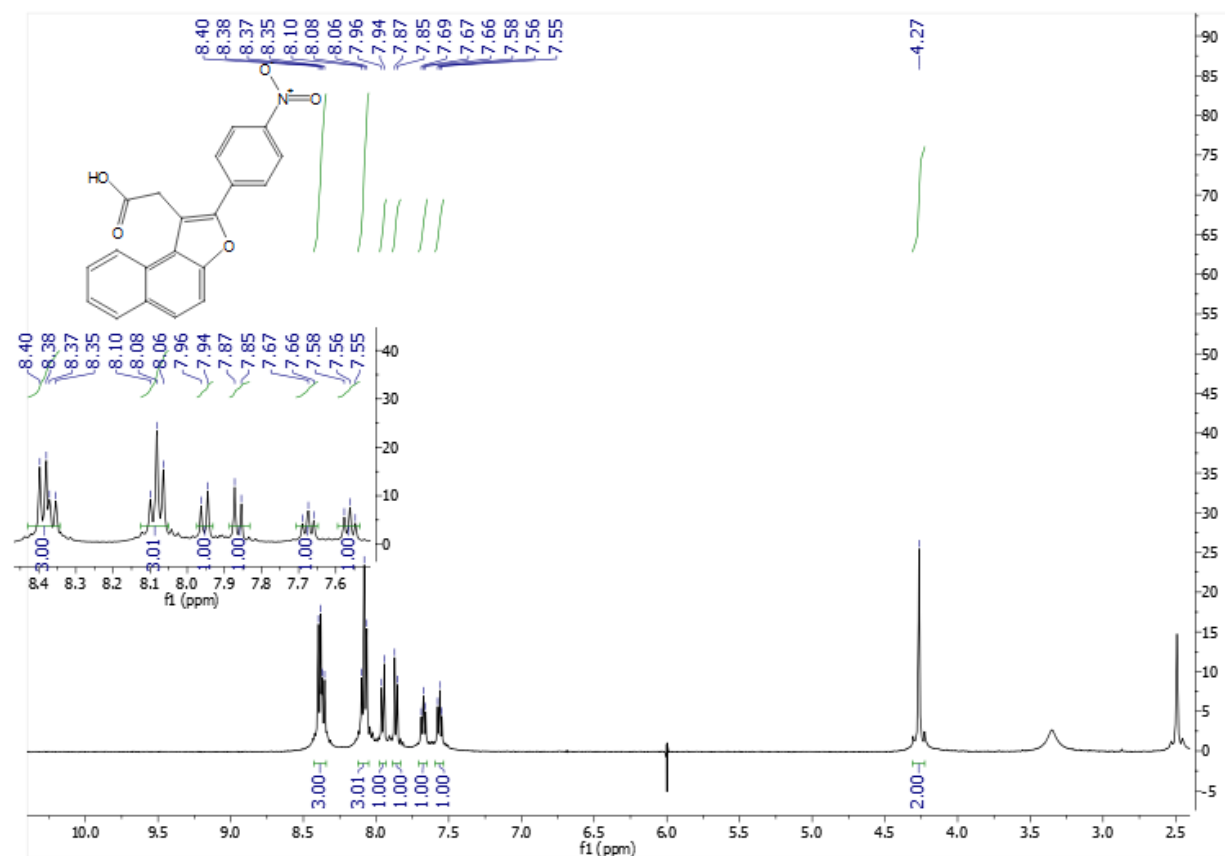
<sup>1</sup>H NMR (500 MHz, DMSO-*d*<sub>6</sub>) for compound (4g): <sup>1</sup>H NMR:  $\delta$  3.84 (s, 3H, OCH<sub>3</sub>), 4.12 (s, 2H, CH<sub>2</sub>), 7.14 (d, 2H, *J* 9.0 Hz, ArH), 7.52 (t, 1H, *J* 7.5 Hz, ArH), 7.62 (t, 1H, *J* 7.5 Hz, ArH), 7.73 (d, 2H, *J* 9.0 Hz, ArH), 7.81 (d, 1H, *J* 9.0 Hz, ArH), 7.85 (d, 1H, *J* 9.0 Hz, ArH), 8.06 (d, 1H, *J* 7.5 Hz, ArH), 8.33 (d, 1H, *J* 7.5 Hz, ArH), 12.86 (bs, 1H, OH) ppm.



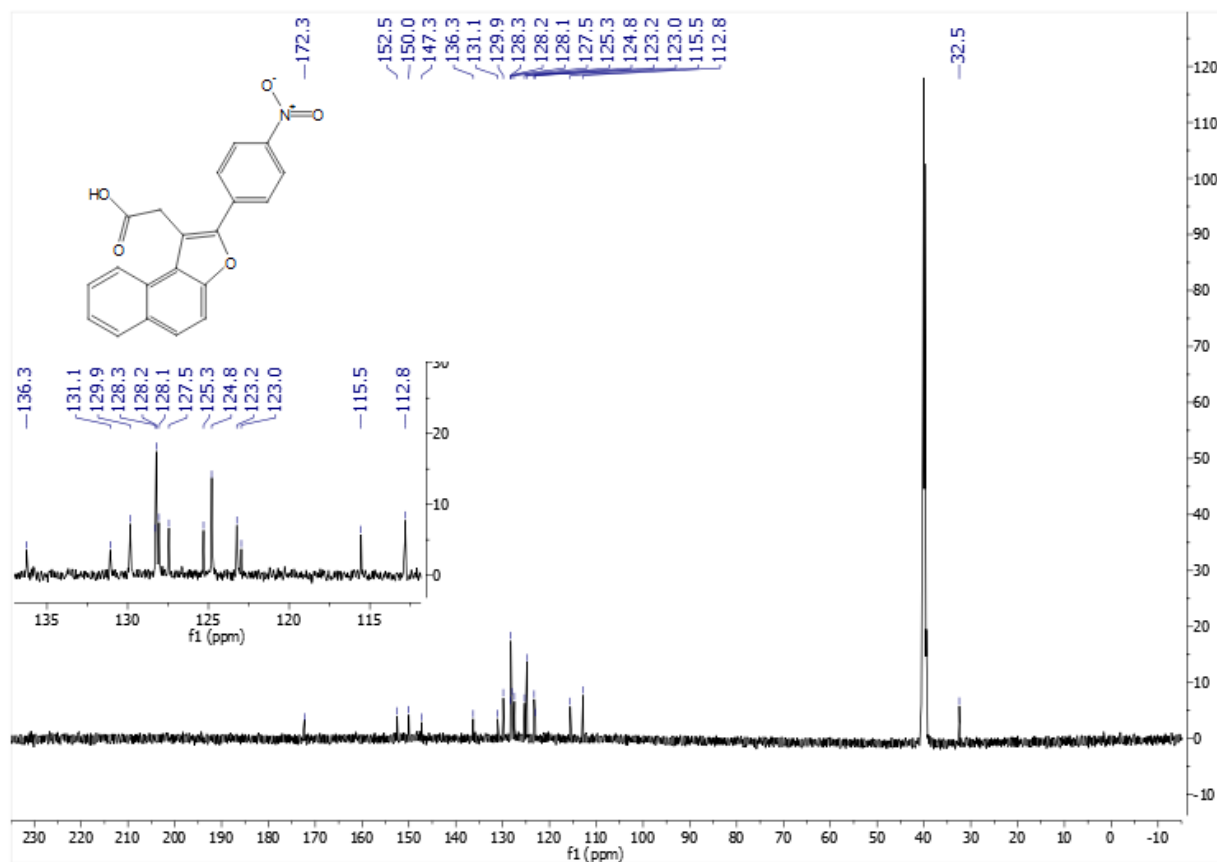
$^{13}\text{C}$  NMR (125 MHz,  $\text{DMSO}-d_6$ ) for compound **4g**:  $^{13}\text{C}$  NMR:  $\delta$  32.4, 55.8, 110.8, 112.7, 115.0, 122.7, 123.2, 123.2, 124.8, 126.0, 126.8, 128.2, 129.2, 129.6, 130.9, 151.4, 152.8, 160.2, 172.8 ppm.



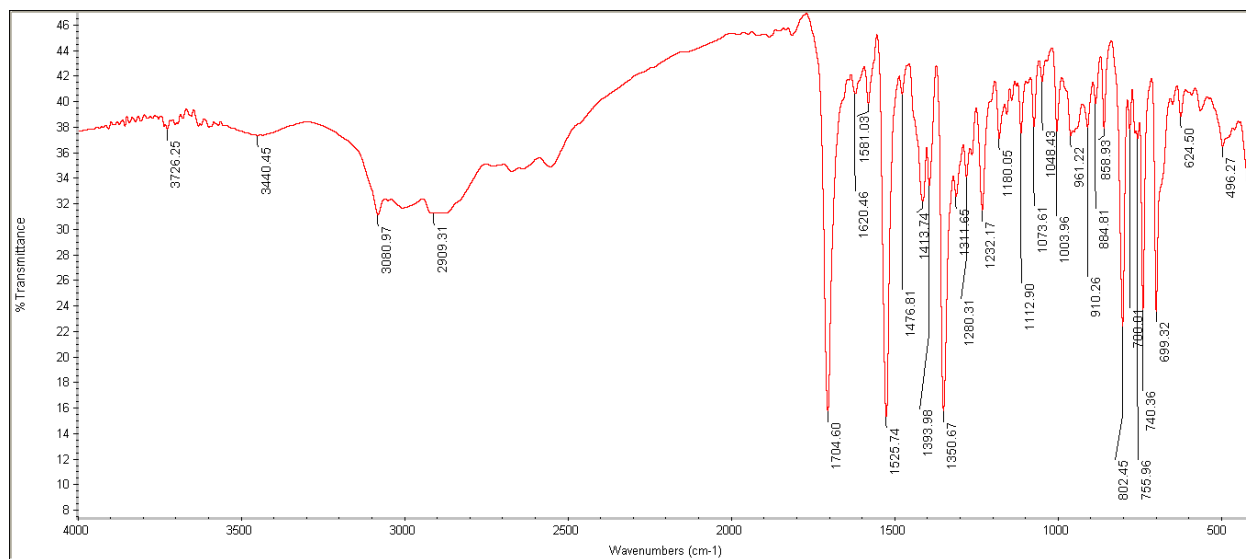
IR  $\nu/\text{cm}^{-1}$  (KBr) for compound (**4h**): IR: 3408, 1709  $\text{cm}^{-1}$ .



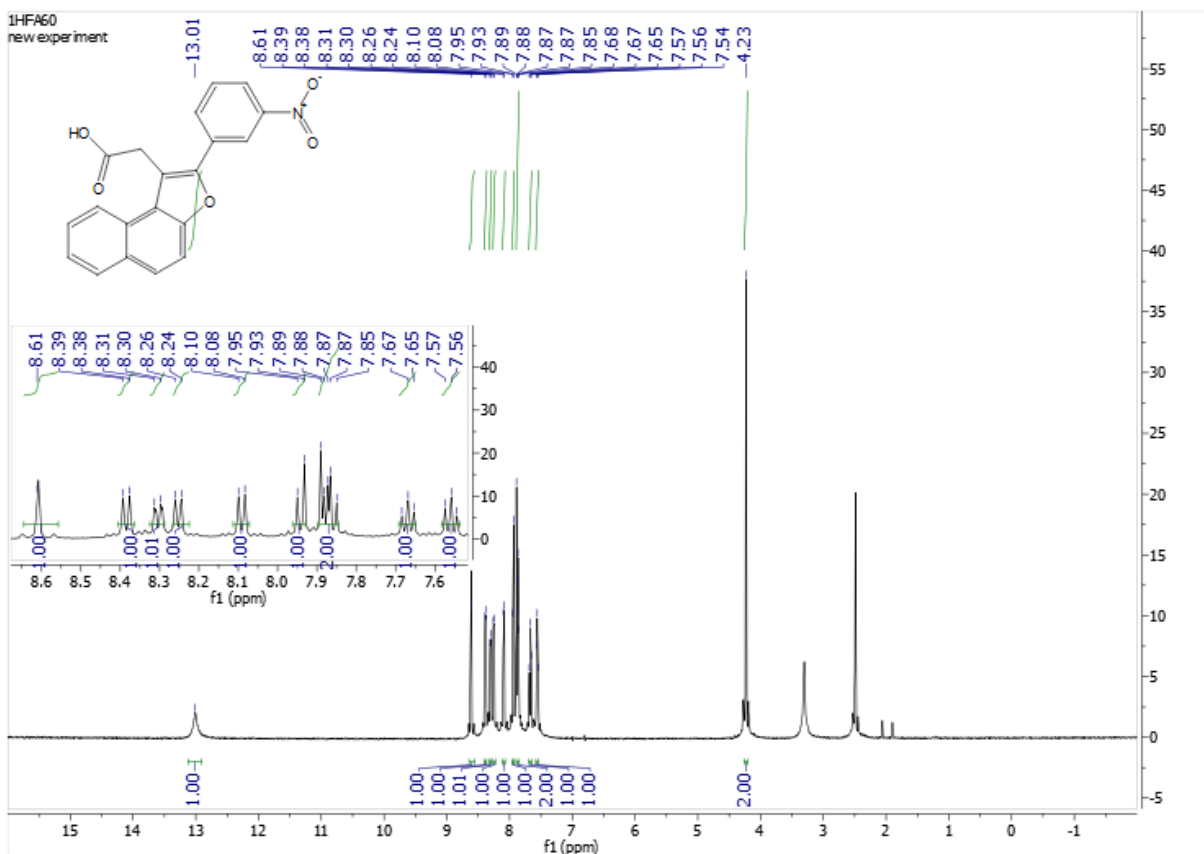
$^1\text{H}$  NMR (500 MHz,  $\text{DMSO}-d_6$ ) for compound (**4h**):  $^1\text{H}$  NMR:  $\delta$  4.27 (s, 2H,  $\text{CH}_2$ ), 7.56 (t, 1H,  $J$  8.0 Hz, ArH), 7.67 (t, 1H,  $J$  8.0 Hz, ArH), 7.86 (d, 1H,  $J$  9.0 Hz, ArH), 7.95 (d, 1H,  $J$  9.0 Hz, ArH), 8.06-8.10 (m, 3H, ArH), 8.35-8.40 (m, 3H, ArH), 13.01 (bs, 1H, OH) ppm.



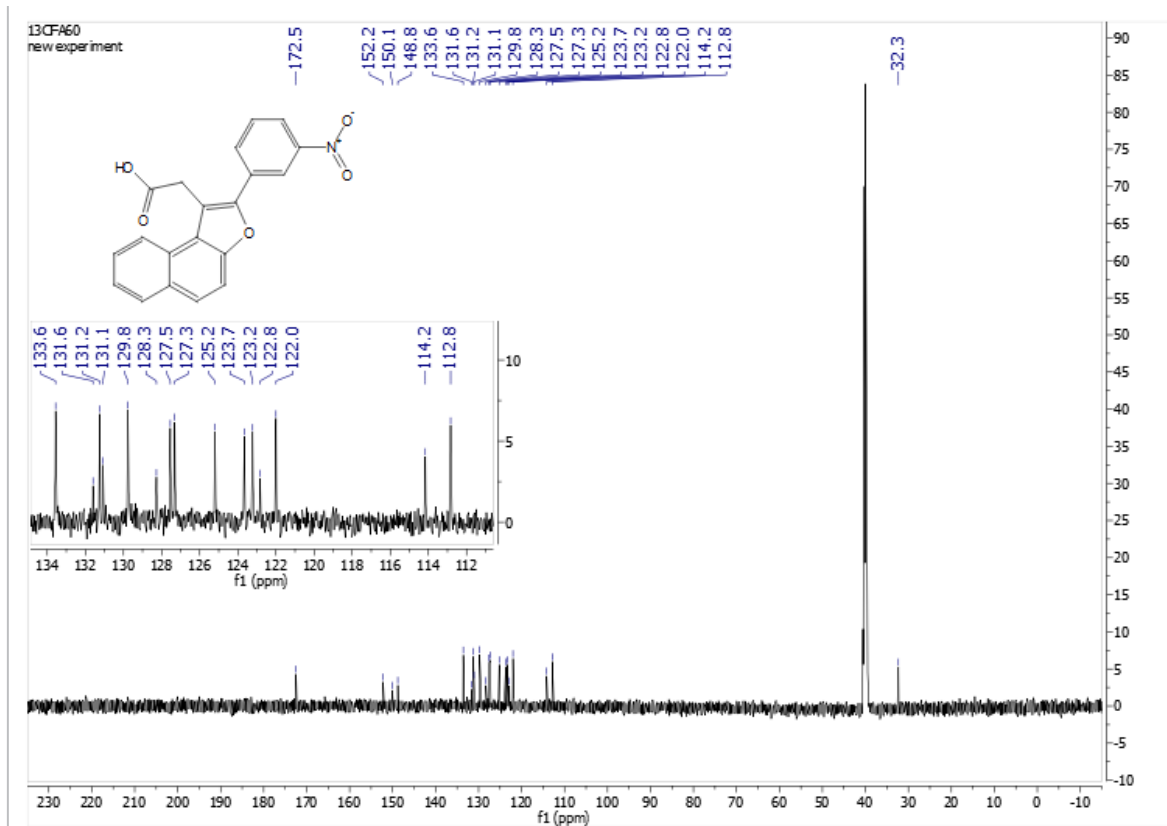
<sup>13</sup>C NMR (125 MHz, DMSO-*d*<sub>6</sub>) for compound (**4h**): <sup>13</sup>C NMR: δ 32.4, 112.8, 115.5, 122.9, 123.2, 124.8, 125.3, 127.4, 128.0, 128.2, 128.2, 129.8, 131.0, 136.2, 147.2, 150.0, 152.5, 172.3 ppm.



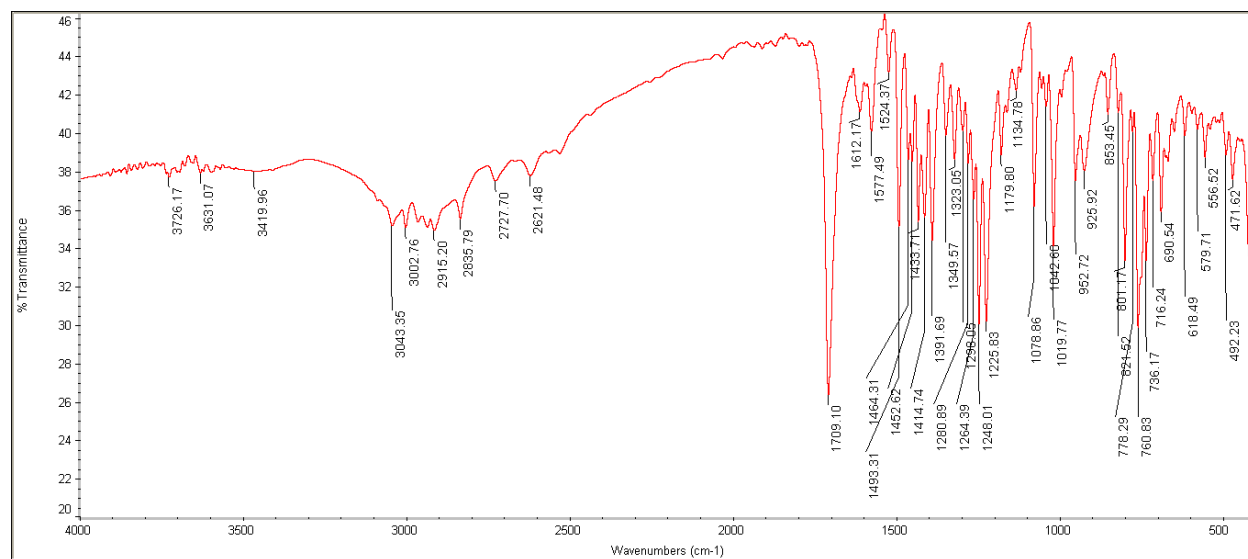
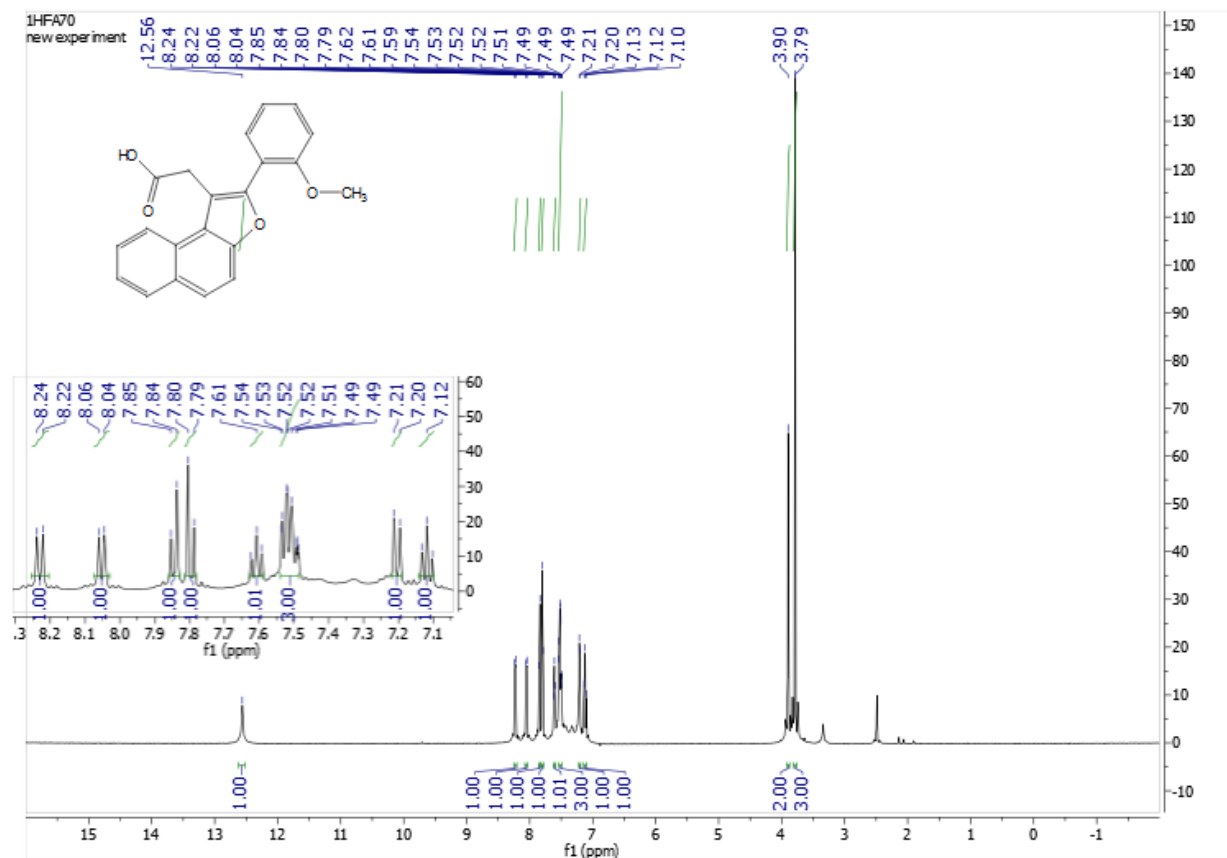
IR  $\nu/\text{cm}^{-1}$  (KBr) for compound (**4i**): IR: 3440, 1704  $\text{cm}^{-1}$ .

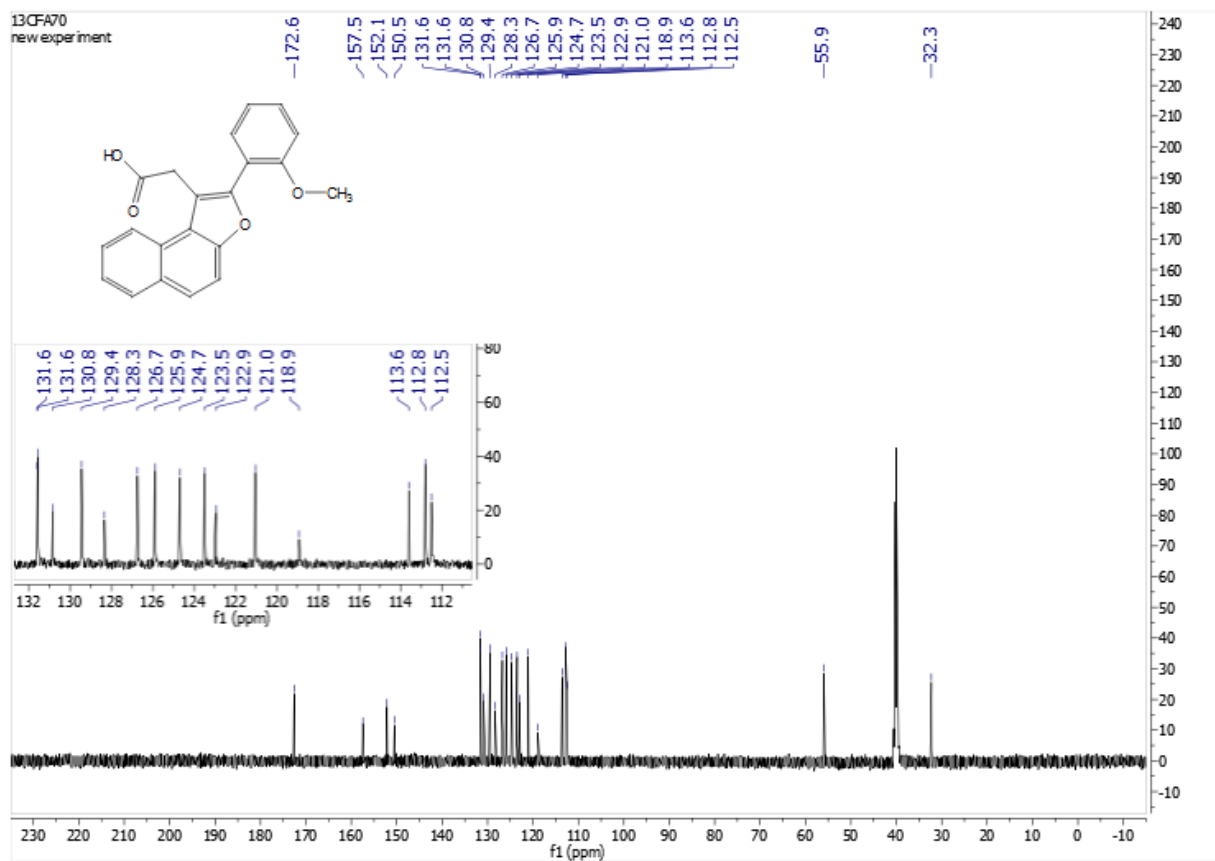


$^1\text{H}$  NMR (500 MHz,  $\text{DMSO}-d_6$ ) for compound (**4i**):  $^1\text{H}$  NMR:  $\delta$  4.23 (s, 2H,  $\text{CH}_2$ ), 7.56 (t, 1H,  $J$  7.5 Hz, ArH), 7.67 (t, 1H,  $J$  7.5 Hz, ArH), 7.85–7.89 (m, 2H, ArH), 7.94 (d, 1H,  $J$  9.0 Hz, ArH), 8.09 (d, 1H,  $J$  8.0 Hz, ArH), 8.25 (d, 1H,  $J$  8.0 Hz, ArH), 7.30 (d, 1H,  $J$  8.0 Hz, ArH), 8.38 (d, 1H,  $J$  8.0 Hz, ArH), 8.61 (s, 1H, ArH), 13.01 (bs, 1H, OH) ppm.



<sup>13</sup>C NMR (125 MHz, DMSO-*d*<sub>6</sub>) for compound (**4i**): <sup>13</sup>C NMR:  $\delta$  32.3, 112.8, 114.1, 122.0, 122.8, 123.2, 123.6, 125.2, 127.3, 127.5, 128.2, 129.7, 131.0, 131.2, 131.6, 133.5, 148.7, 150.0, 152.2, 172.4 ppm.





$^{13}\text{C}$  NMR (125 MHz,  $\text{DMSO}-d_6$ ) for compound (**4j**):  $^{13}\text{C}$  NMR:  $\delta$  32.2, 55.9, 112.5, 112.8, 113.6, 118.9, 121.0, 122.9, 123.5, 124.6, 125.9, 126.7, 128.3, 129.4, 130.8, 131.5, 131.6, 150.5, 152.1, 157.4, 172.6 ppm.