

## Supplementary Material

# Convenient multicomponent reaction synthesis of novel pyrano[4,3-*b*]pyran derivatives via a domino reaction under microwave irradiation

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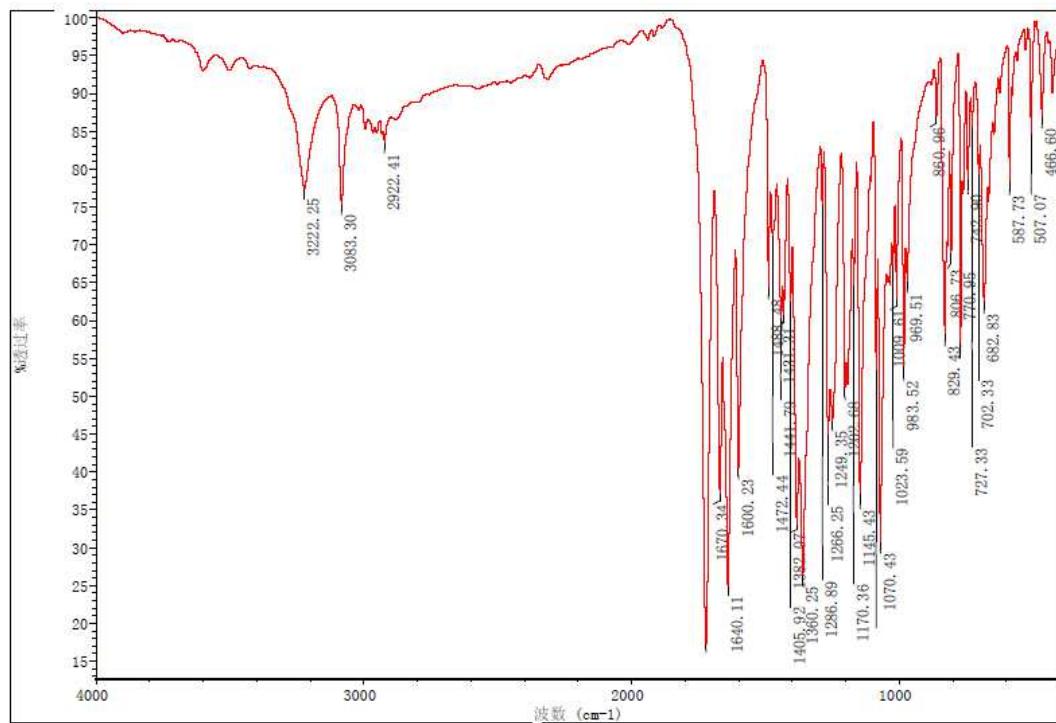
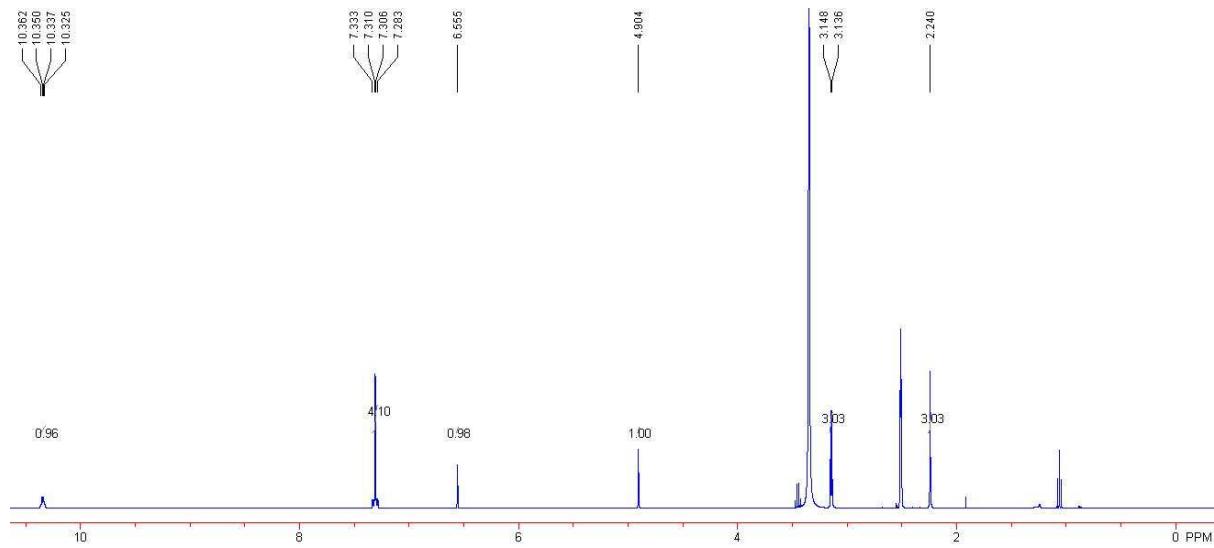
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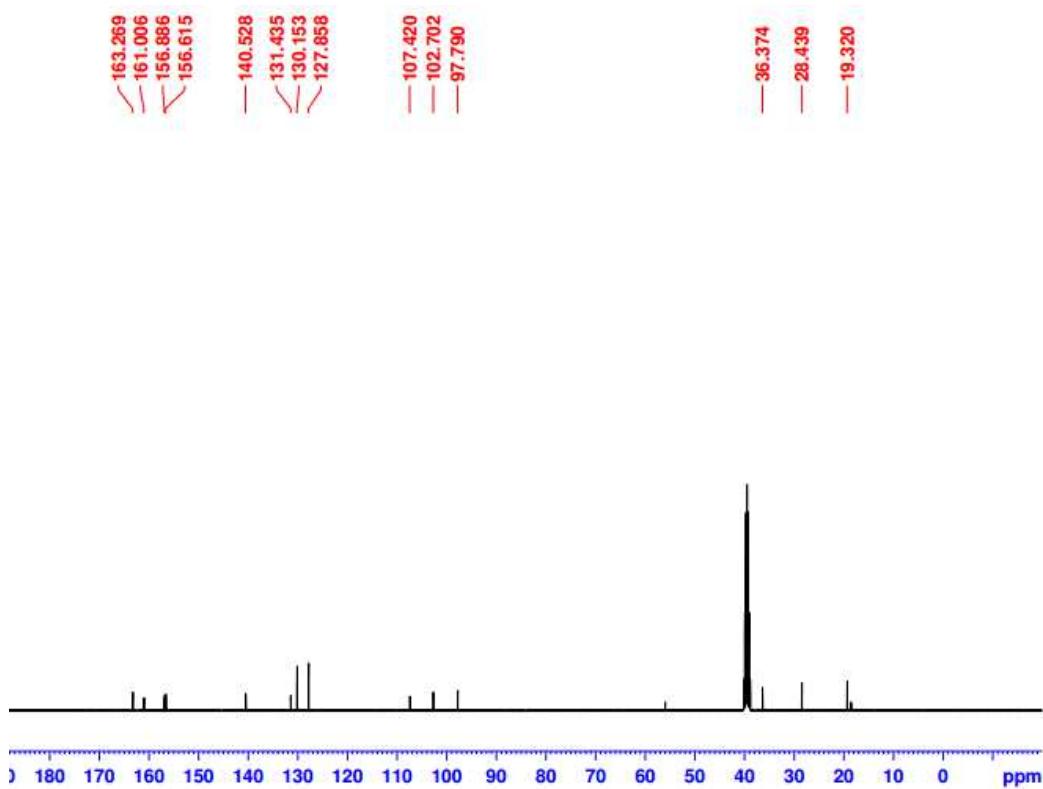
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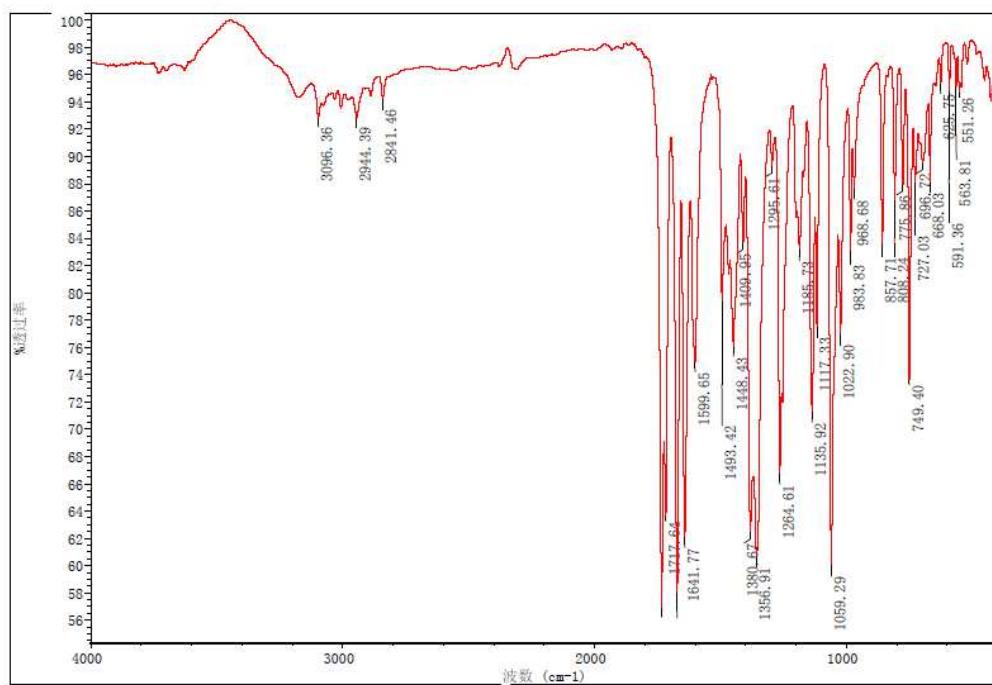
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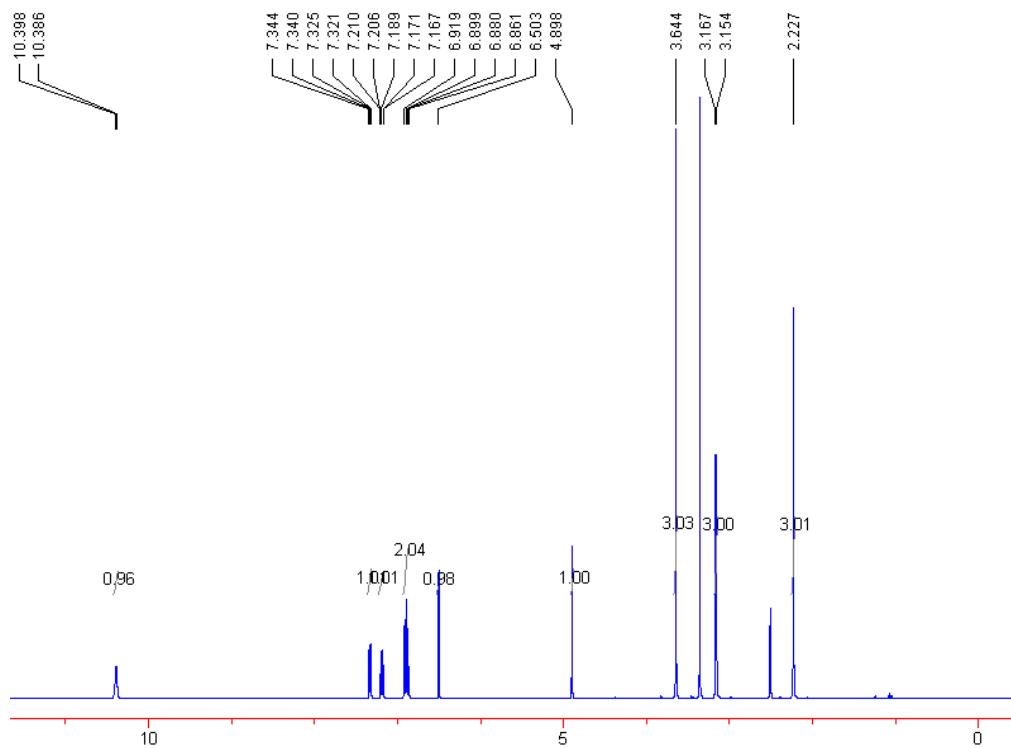
**Figure S1** IR spectrum of compound 4a**Figure S2** <sup>1</sup>H NMR Spectrum (400 MHz, DMSO-d<sub>6</sub>) of Compound 4a



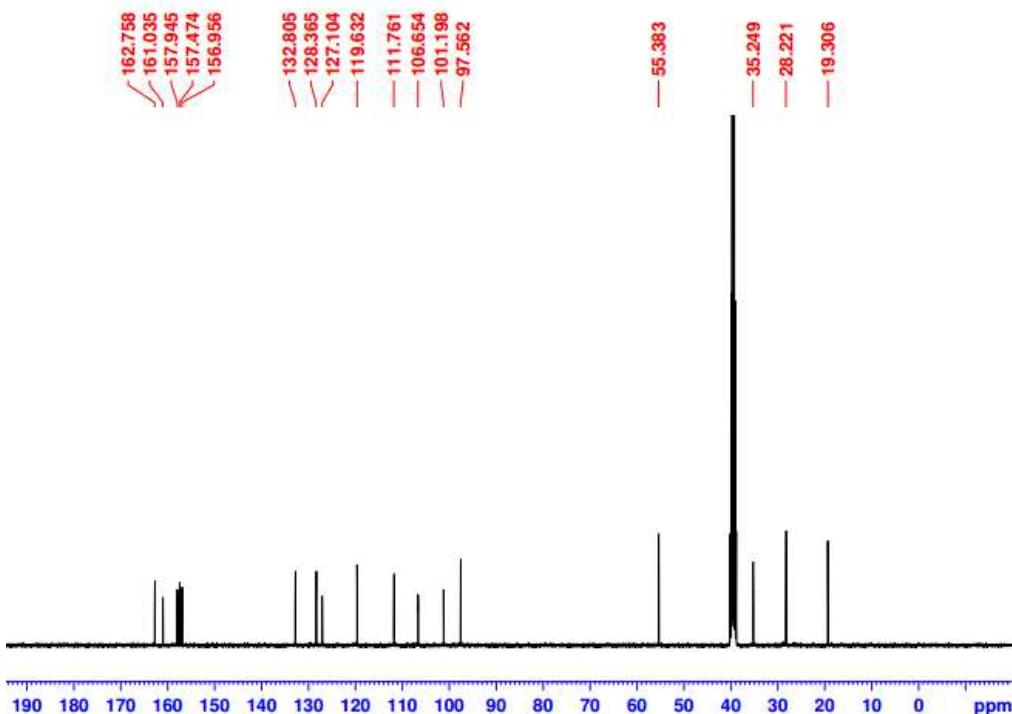
**Figure S3**  $^{13}\text{C}$  NMR Spectrum (100 MHz,  $\text{DMSO}-d_6$ ) of Compound 4a



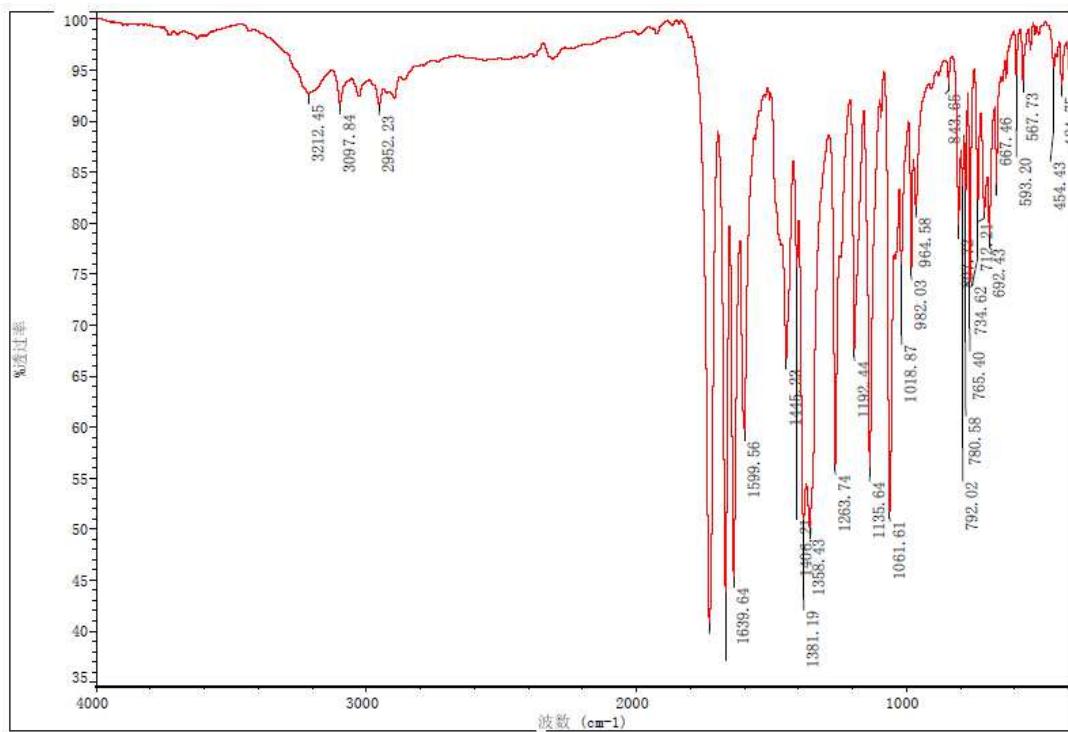
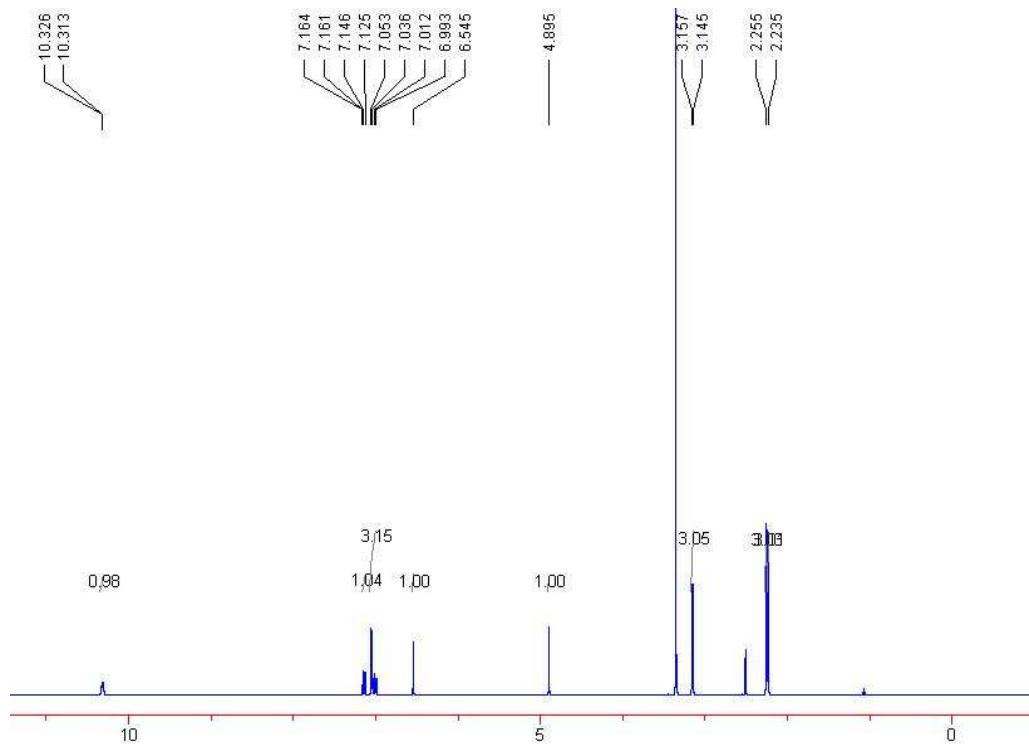
**Figure S4** IR spectrum of compound 4b

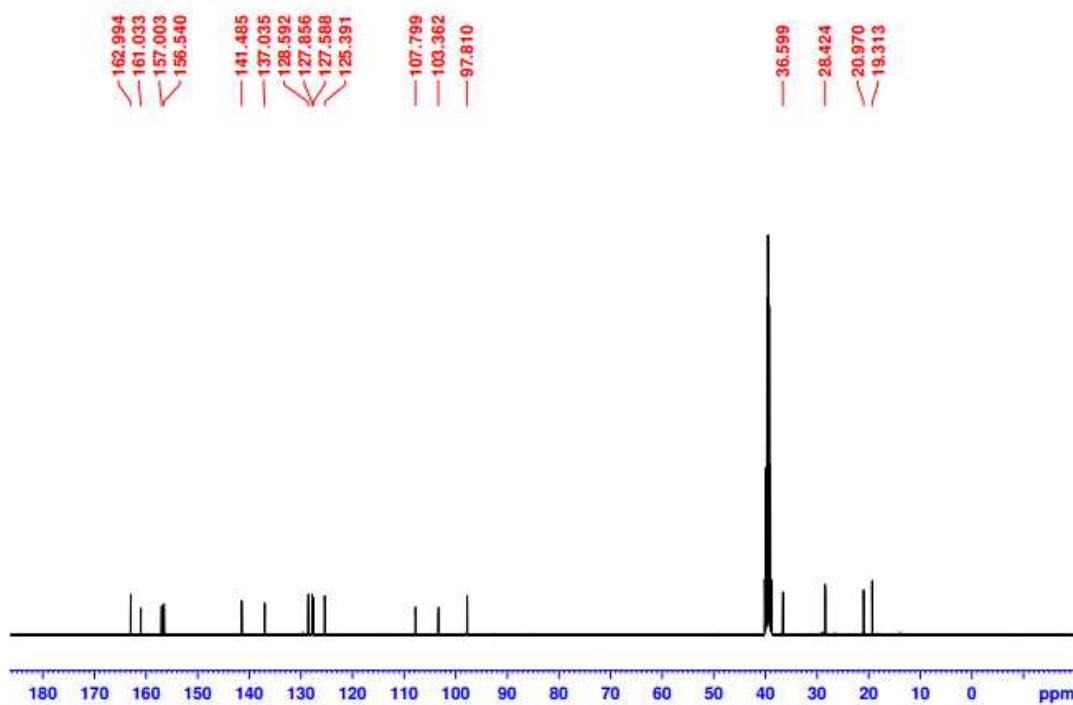


**Figure S5** <sup>1</sup>H NMR Spectrum (400 MHz, DMSO-*d*<sub>6</sub>) of Compound 4b

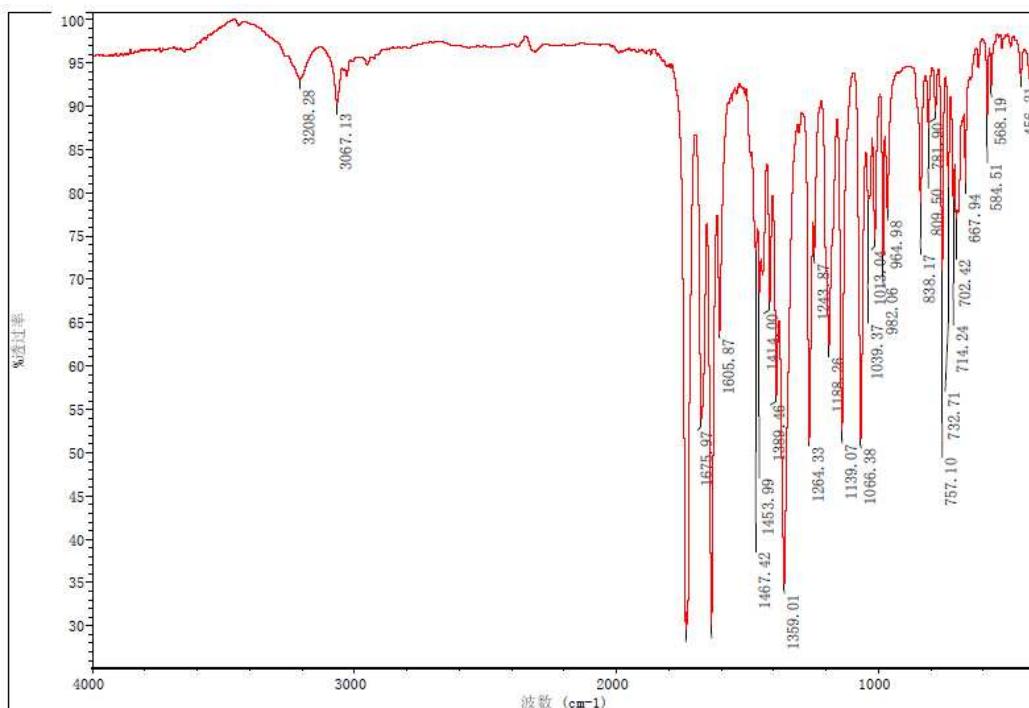


**Figure S6** <sup>13</sup>C NMR Spectrum (100 MHz, DMSO-*d*<sub>6</sub>) of Compound 4b

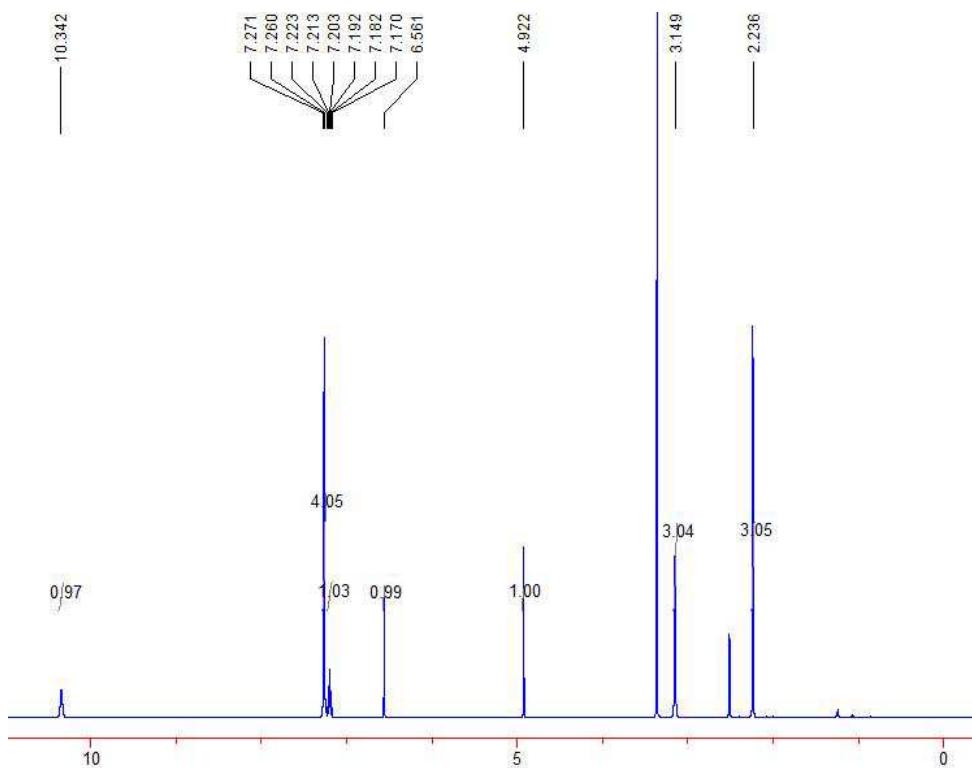
**Figure S7** IR spectrum of compound 4c**Figure S8** <sup>1</sup>H NMR Spectrum (400 MHz, DMSO-*d*<sub>6</sub>) of Compound 4c



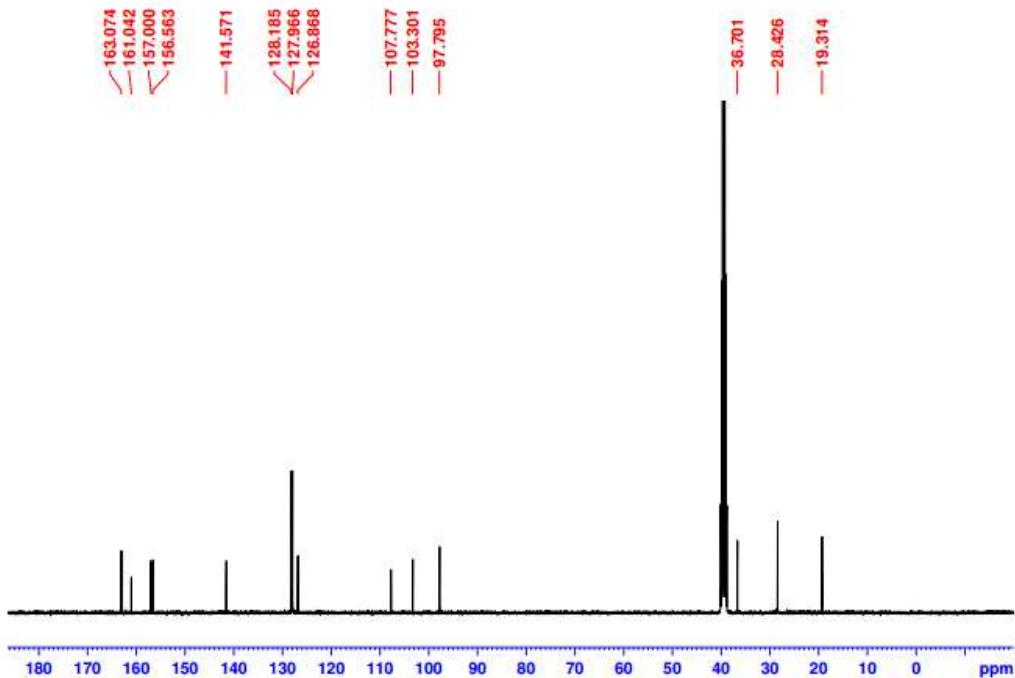
**Figure S9**  $^{13}\text{C}$  NMR Spectrum (100 MHz,  $\text{DMSO}-d_6$ ) of Compound 4c



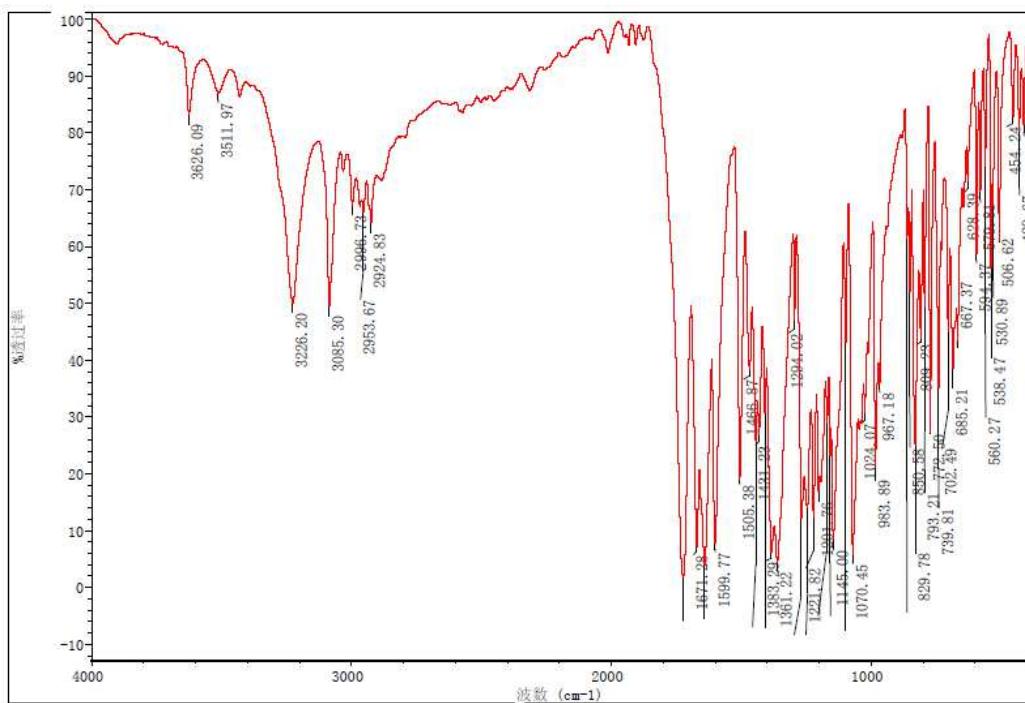
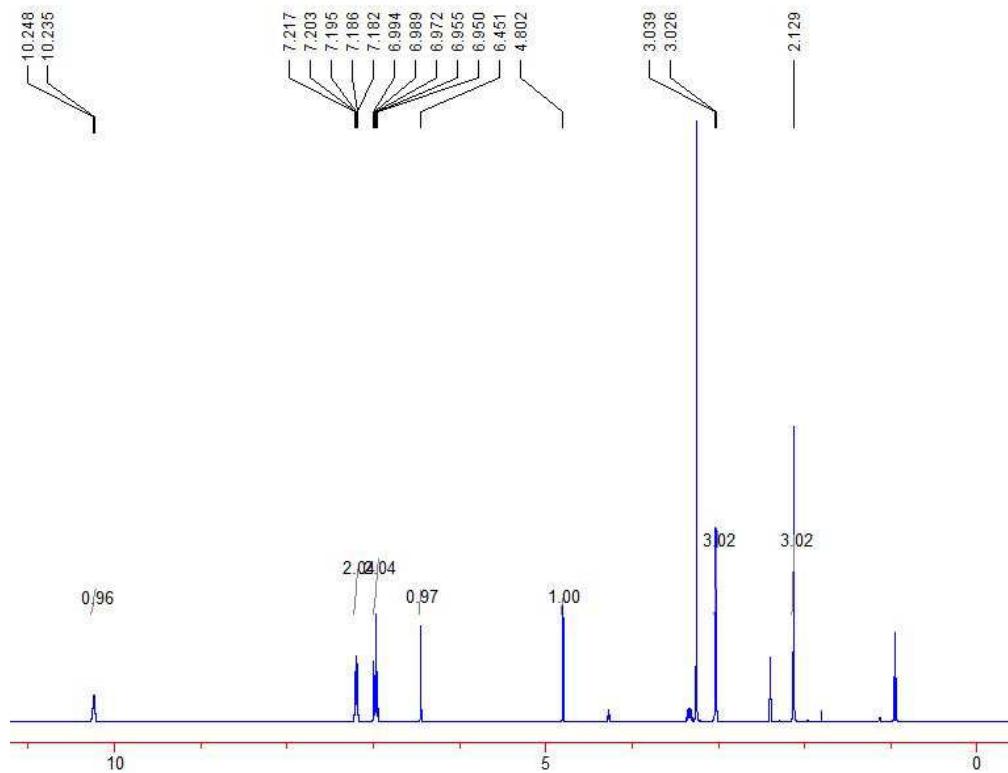
**Figure S10** IR spectrum of compound 4d

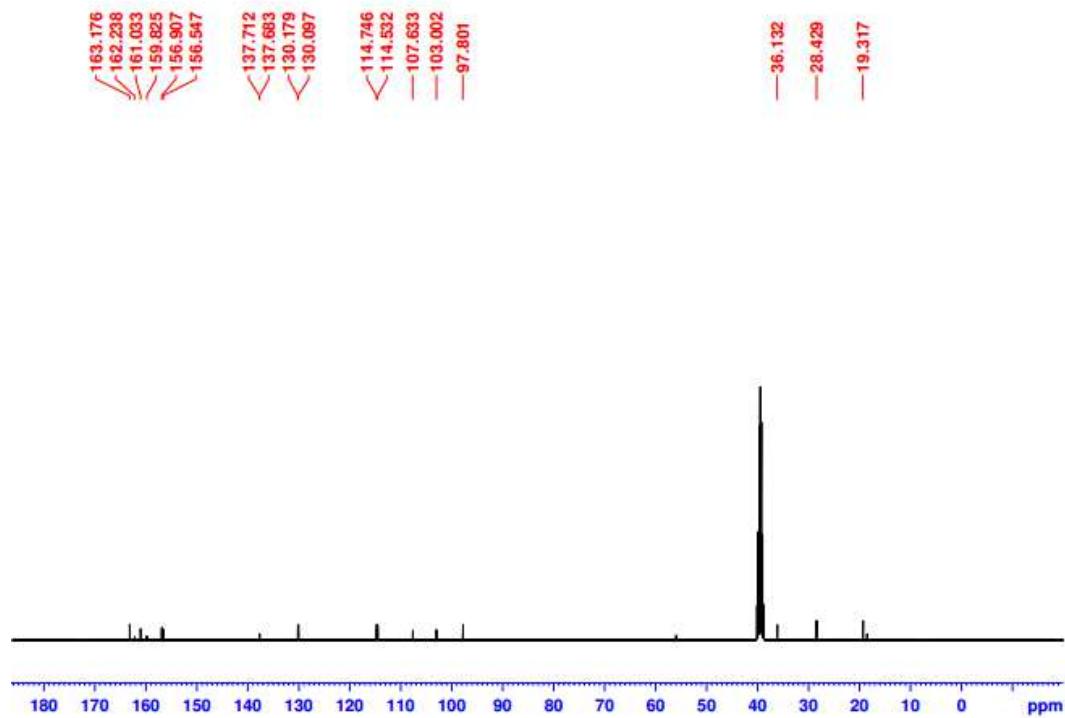


**Figure S11** <sup>1</sup>H NMR Spectrum (400 MHz, DMSO-*d*<sub>6</sub>) of Compound 4d

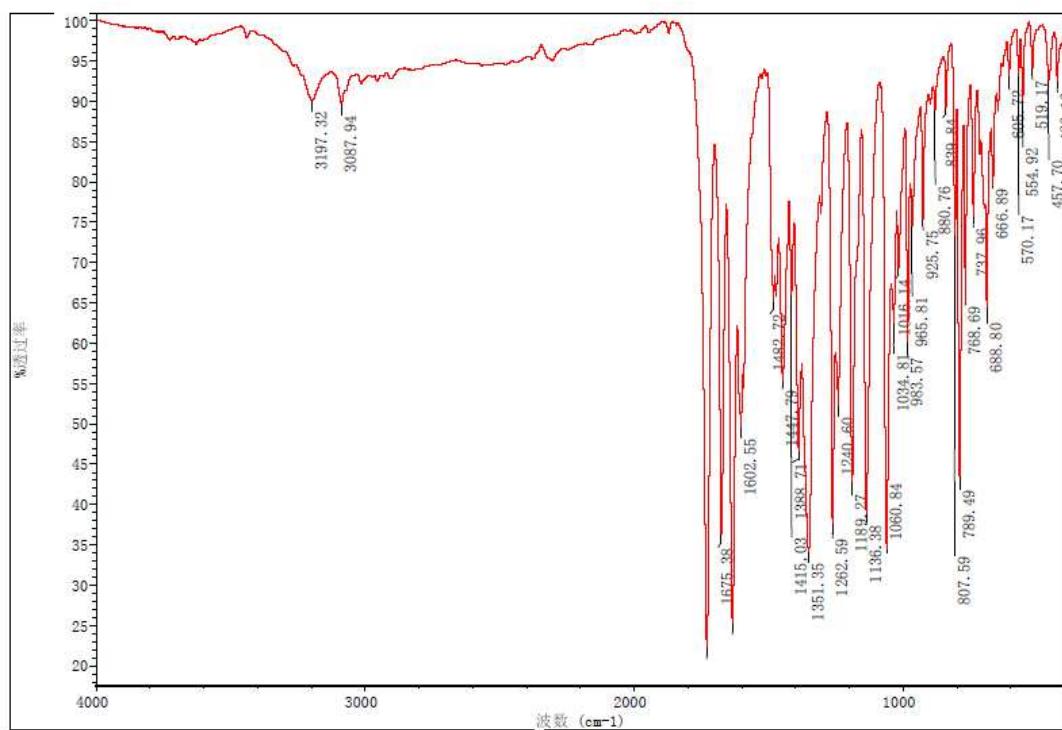


**Figure S12** <sup>13</sup>C NMR Spectrum (100 MHz, DMSO-*d*<sub>6</sub>) of Compound 4d

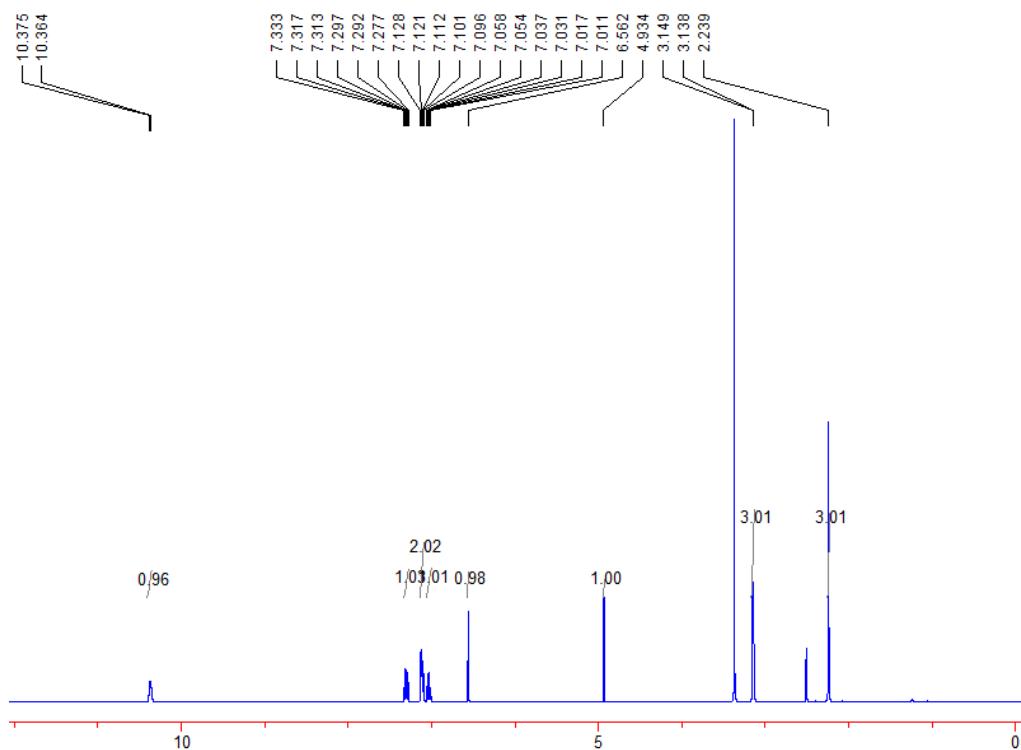
**Figure S13** IR spectrum of compound 4e**Figure S14** <sup>1</sup>H NMR Spectrum (400 MHz, DMSO-*d*<sub>6</sub>) of Compound 4e



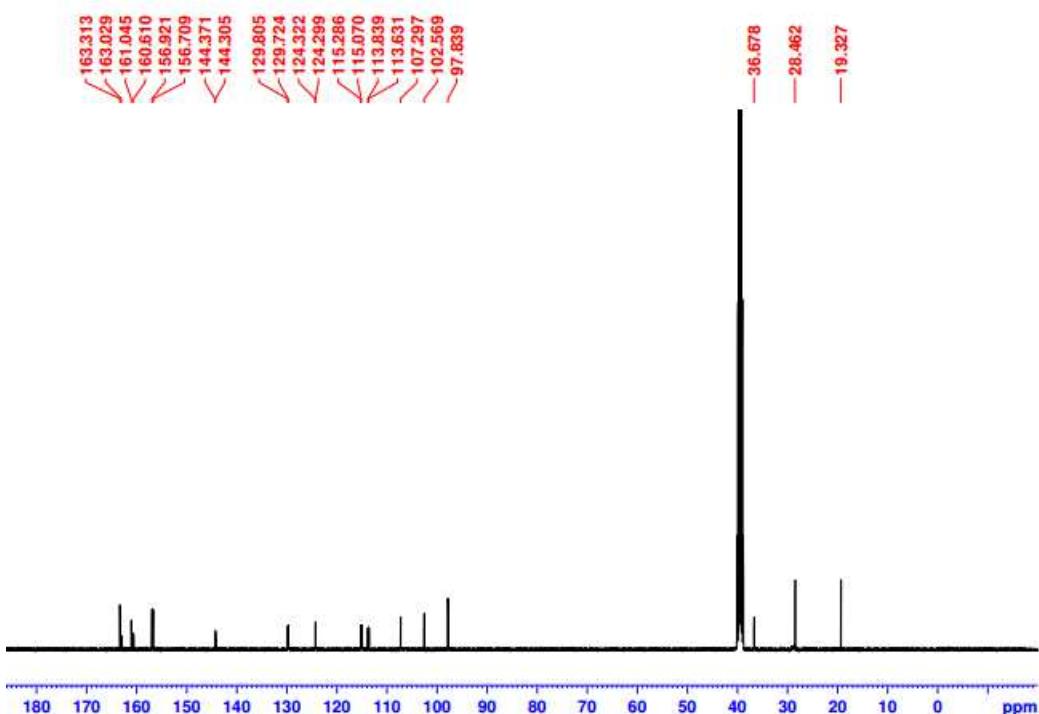
**Figure S15**  $^{13}\text{C}$  NMR Spectrum (100 MHz,  $\text{DMSO}-d_6$ ) of Compound 4e



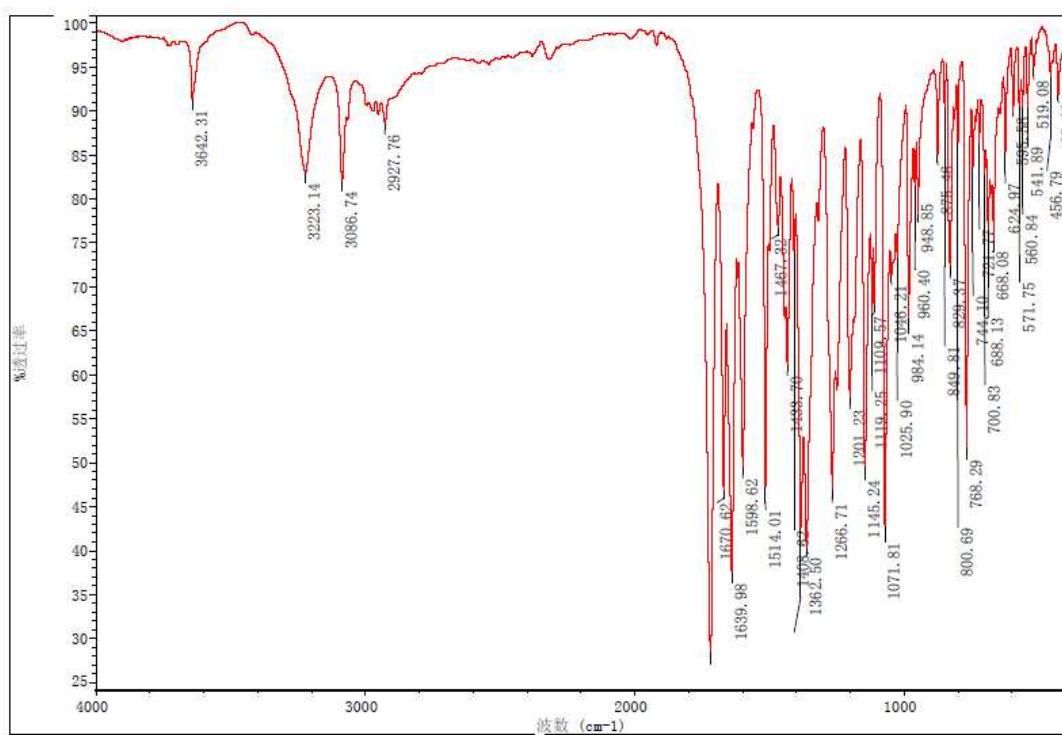
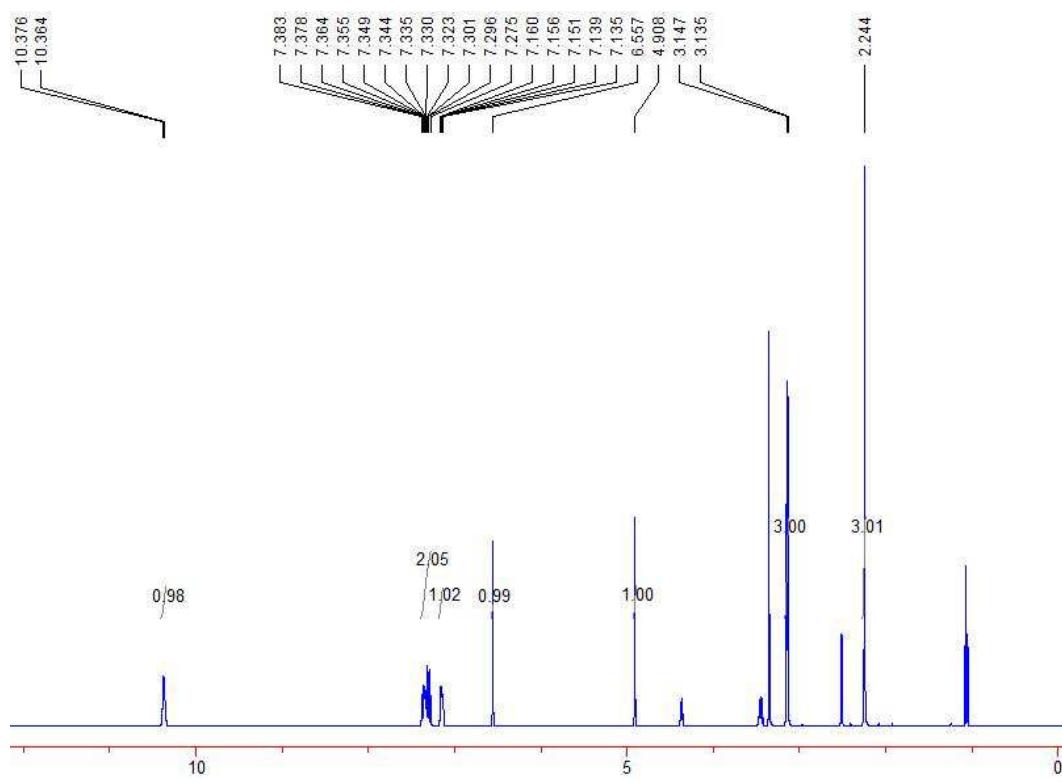
**Figure S16** IR spectrum of compound 4f

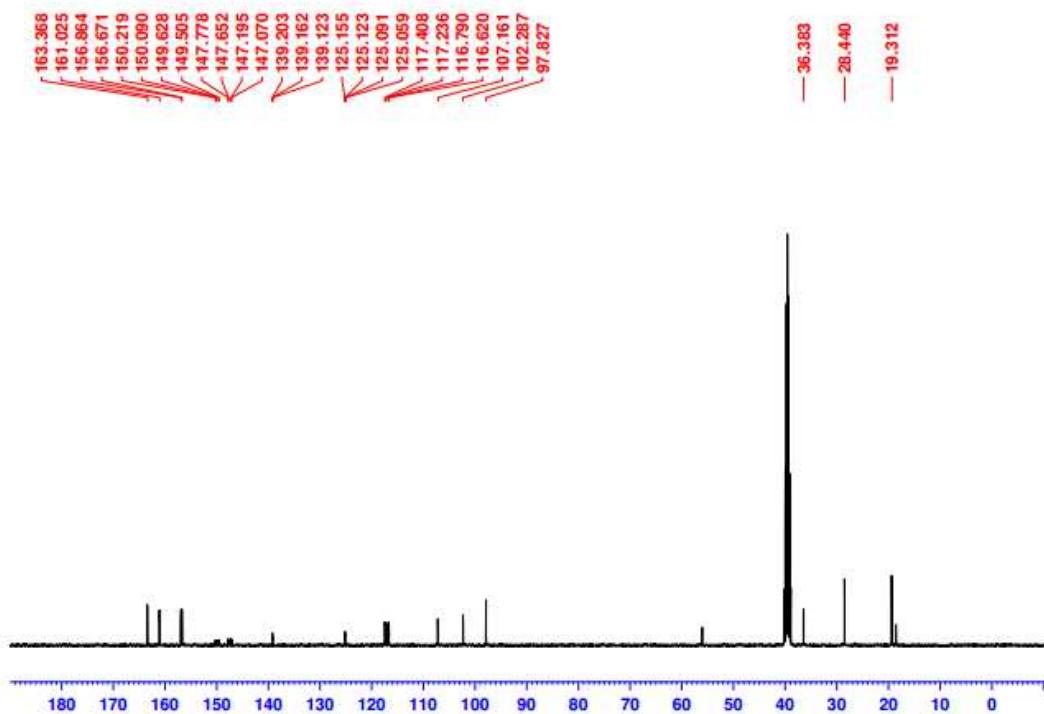


**Figure S17**  $^1\text{H}$  NMR Spectrum (400 MHz,  $\text{DMSO}-d_6$ ) of Compound 4f

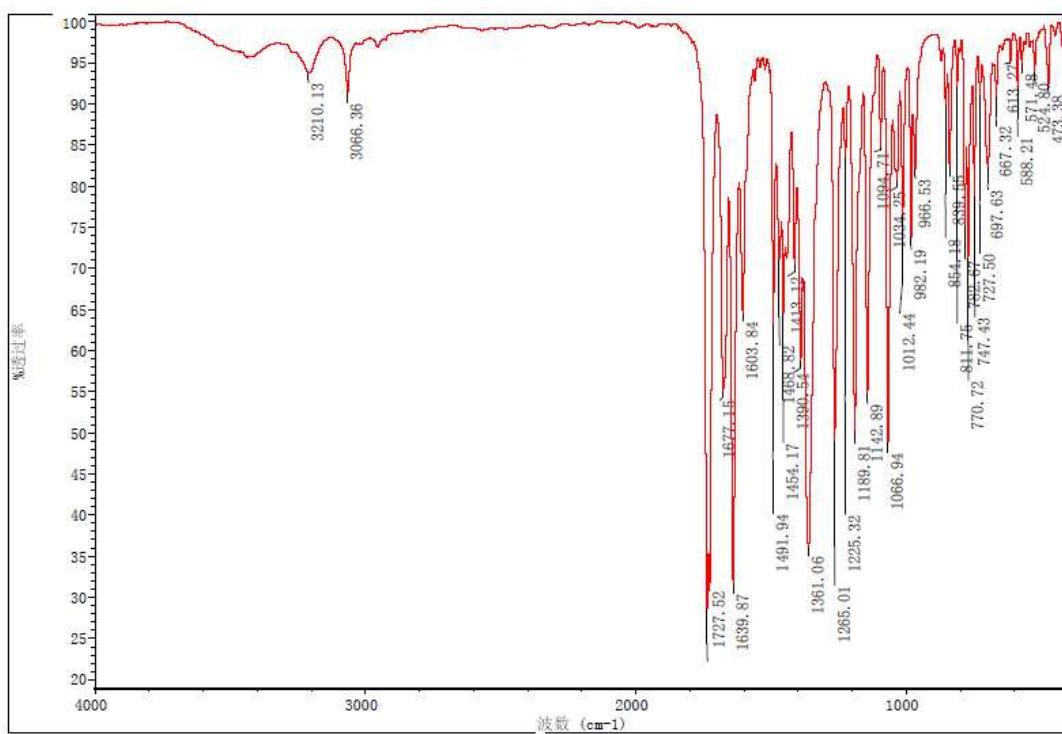


**Figure S18**  $^{13}\text{C}$  NMR Spectrum (100 MHz,  $\text{DMSO}-d_6$ ) of Compound 4f

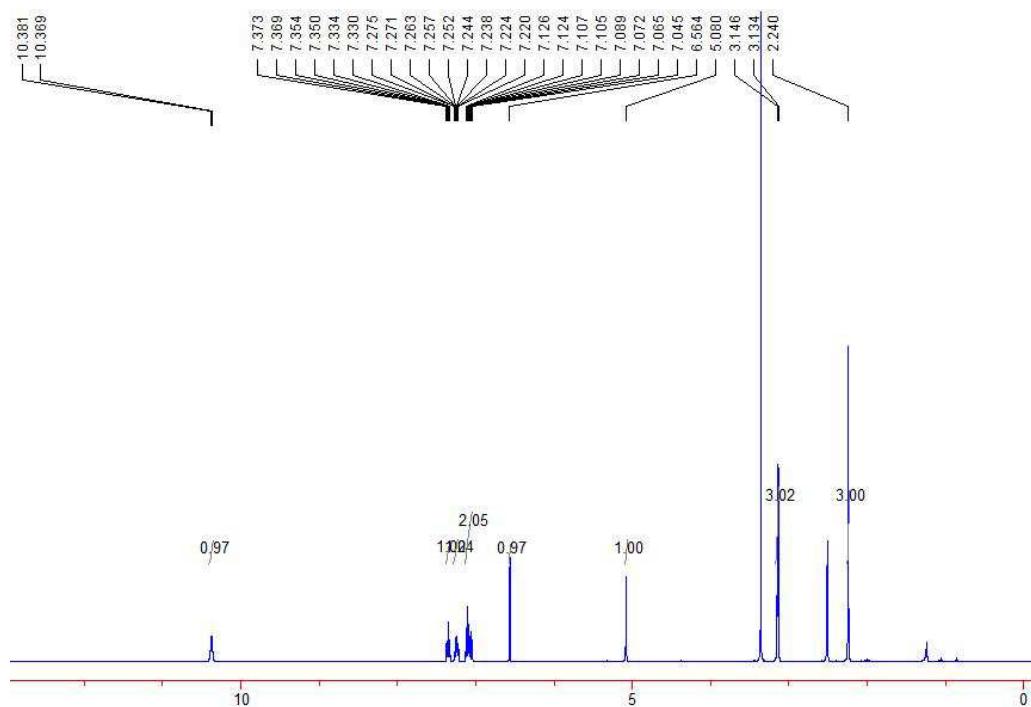
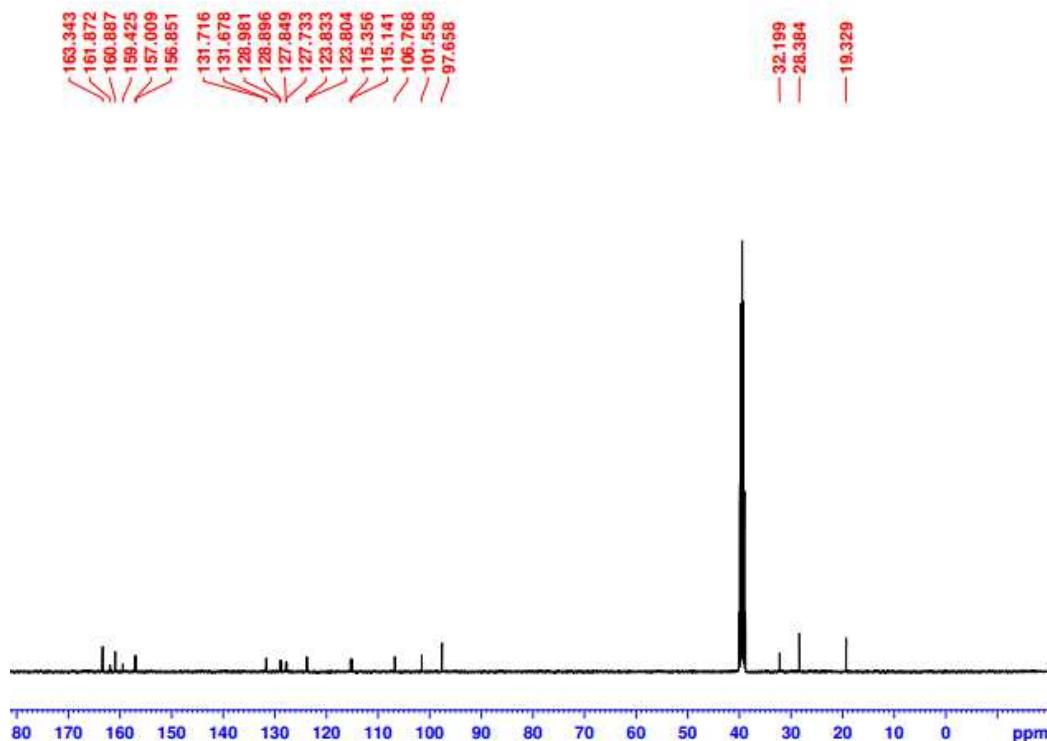
**Figure S19** IR spectrum of compound 4g**Figure S20** <sup>1</sup>H NMR Spectrum (400 MHz, DMSO-d<sub>6</sub>) of Compound 4g

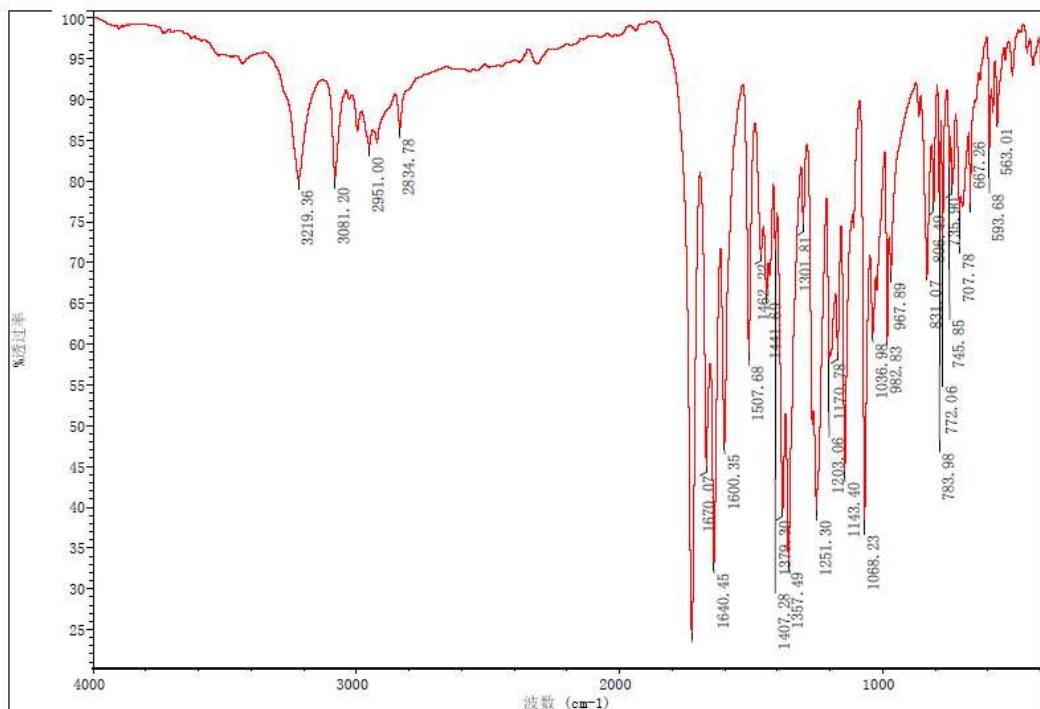
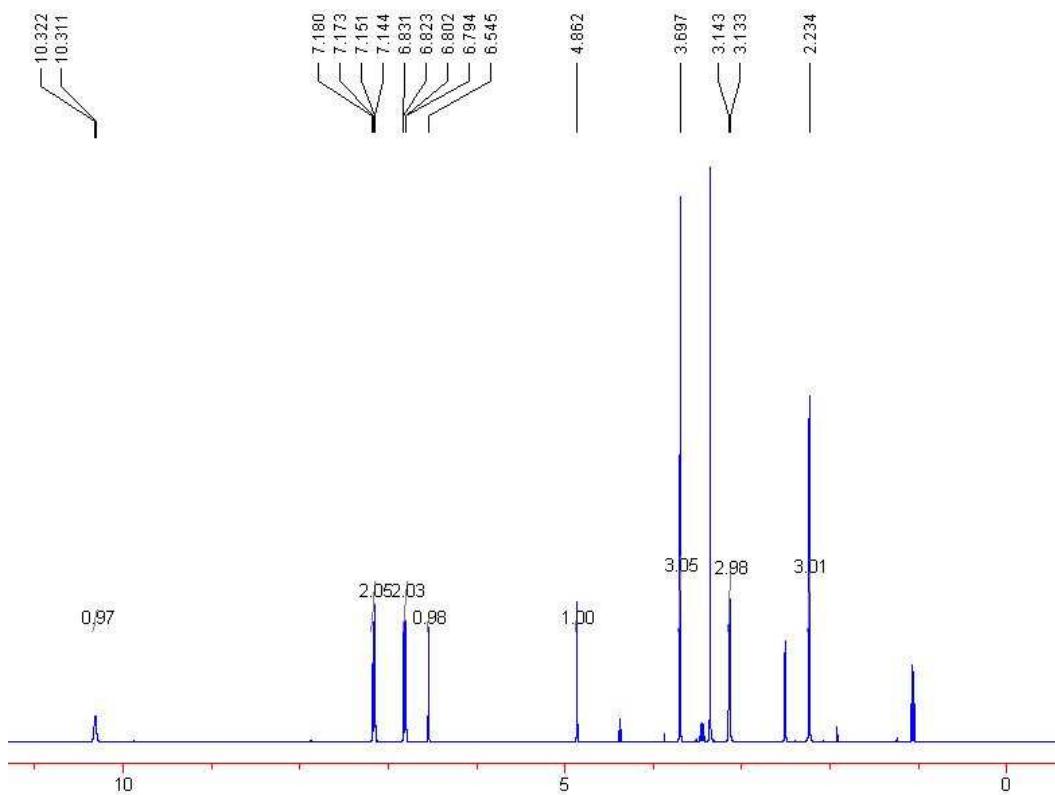


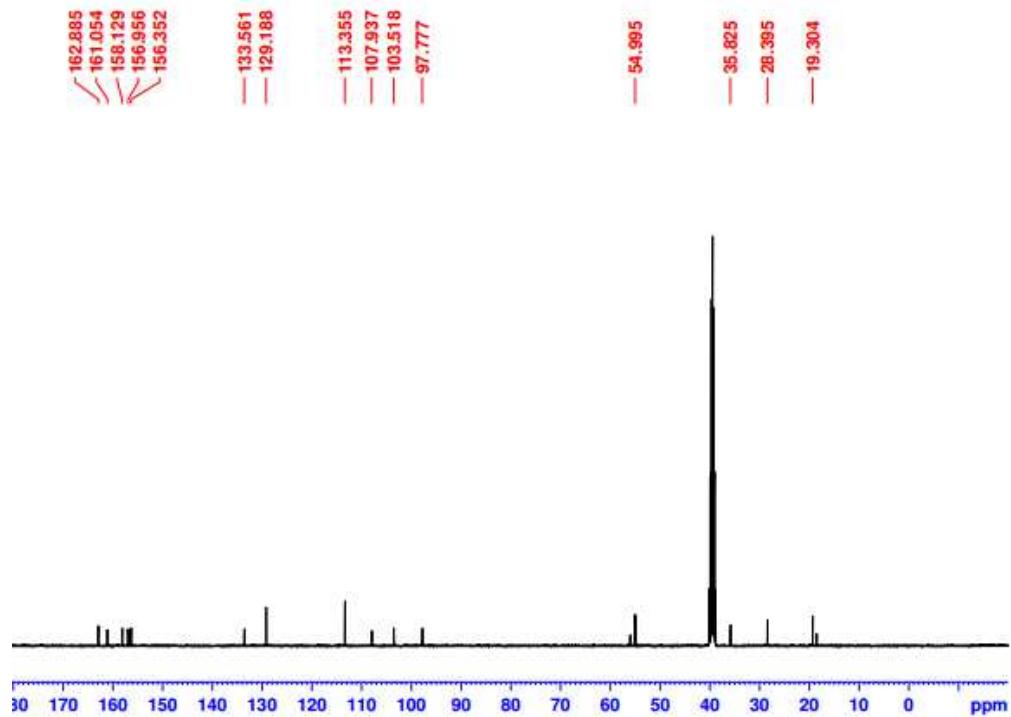
**Figure S21**  $^{13}\text{C}$  NMR Spectrum (100 MHz,  $\text{DMSO}-d_6$ ) of Compound 4g



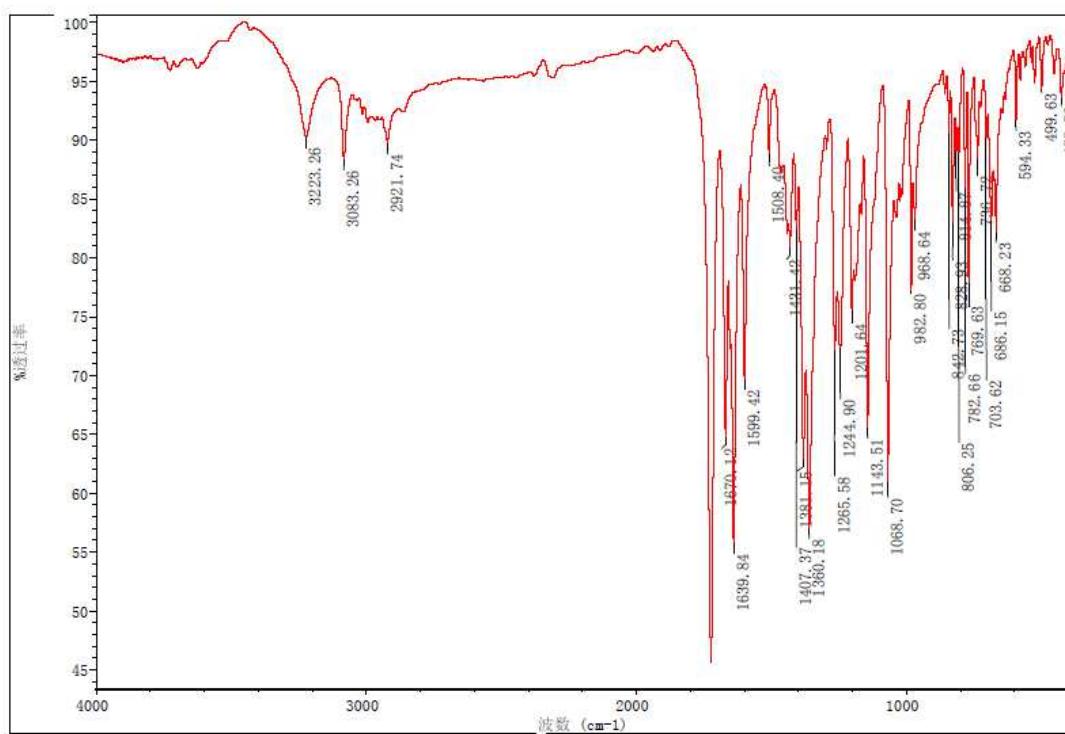
**Figure S22** IR spectrum of compound 4h

**Figure S23** <sup>1</sup>H NMR Spectrum (400 MHz, DMSO-*d*<sub>6</sub>) of Compound 4h**Figure S24** <sup>13</sup>C NMR Spectrum (100 MHz, DMSO-*d*<sub>6</sub>) of Compound 4h

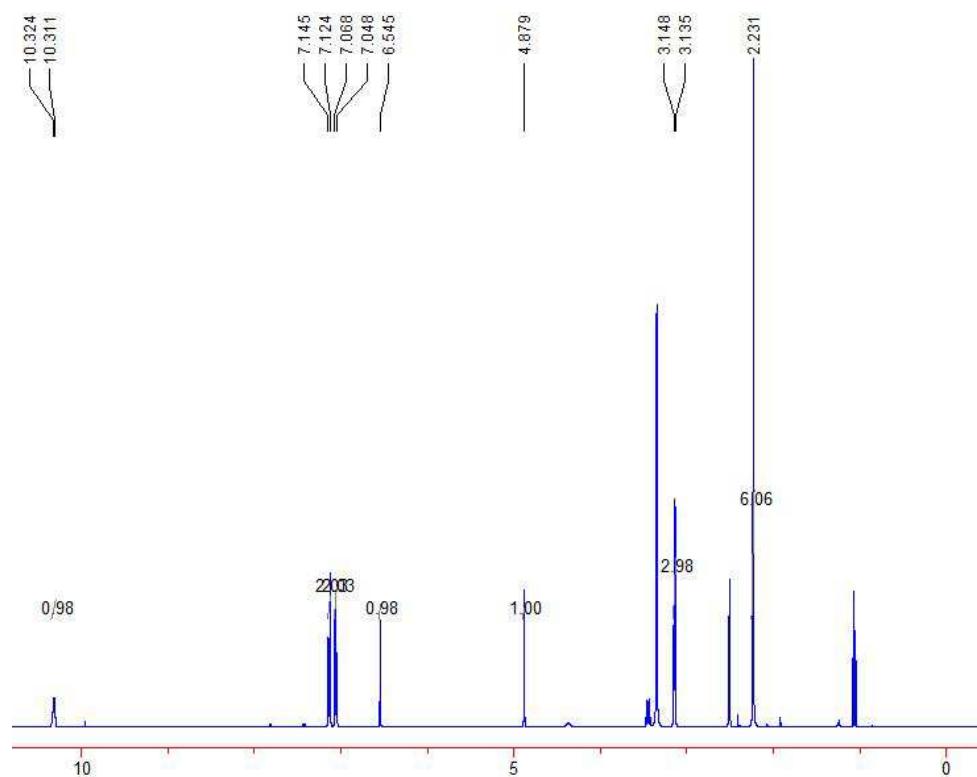
**Figure S25** IR spectrum of compound 4i**Figure S26** <sup>1</sup>H NMR Spectrum (400 MHz, DMSO-*d*<sub>6</sub>) of Compound 4i



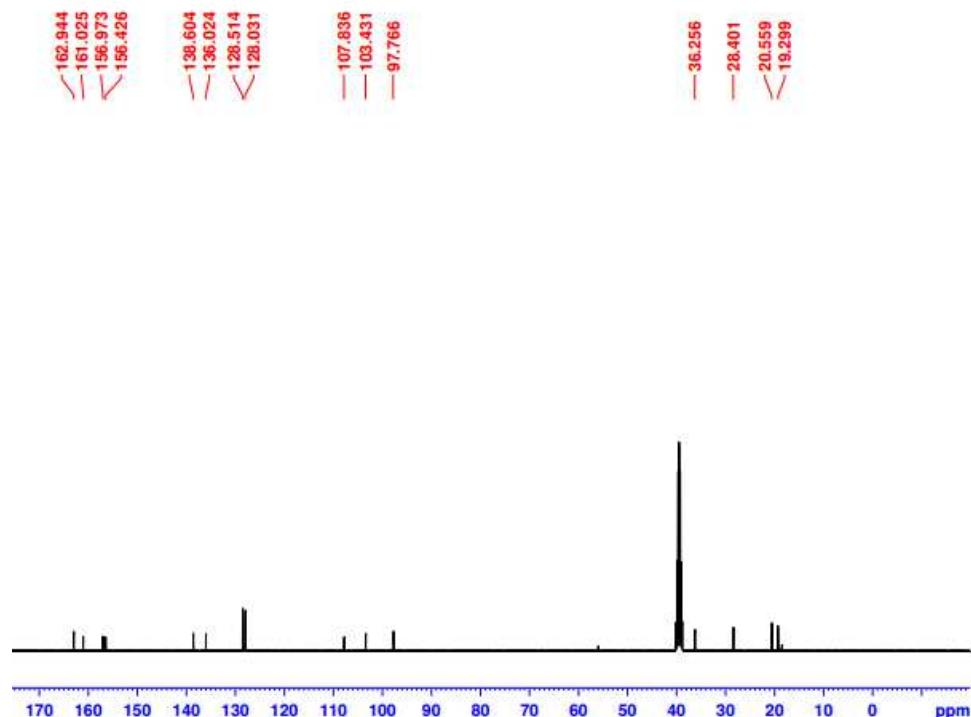
**Figure S27**  $^{13}\text{C}$  NMR Spectrum (100 MHz, DMSO- $d_6$ ) of Compound 4i



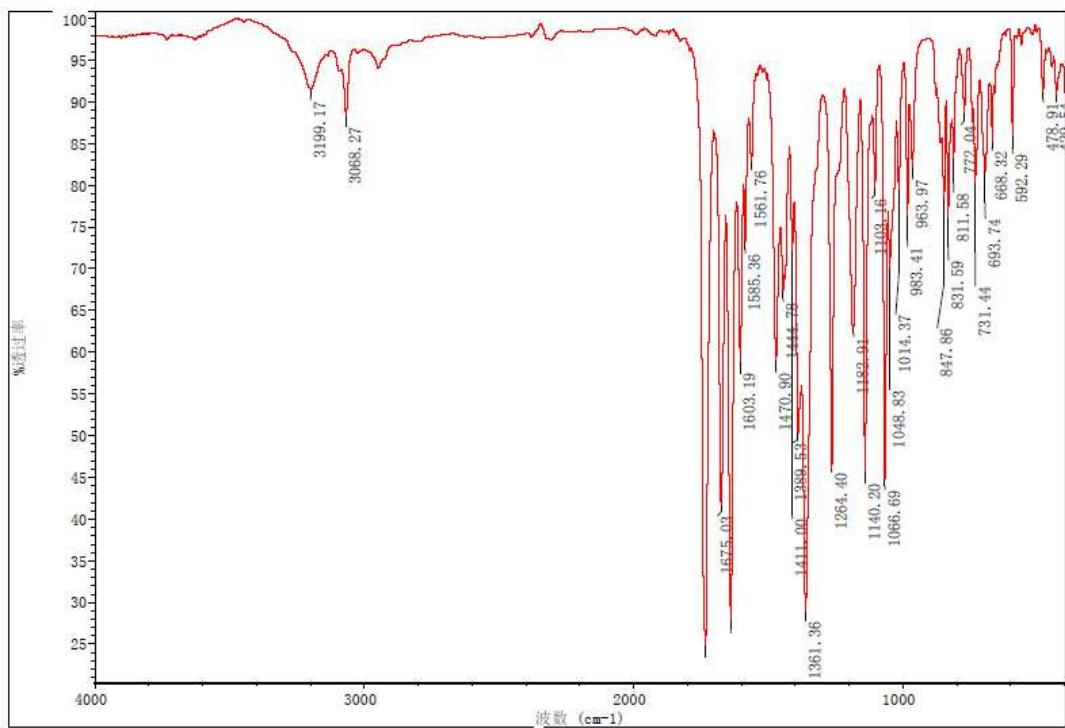
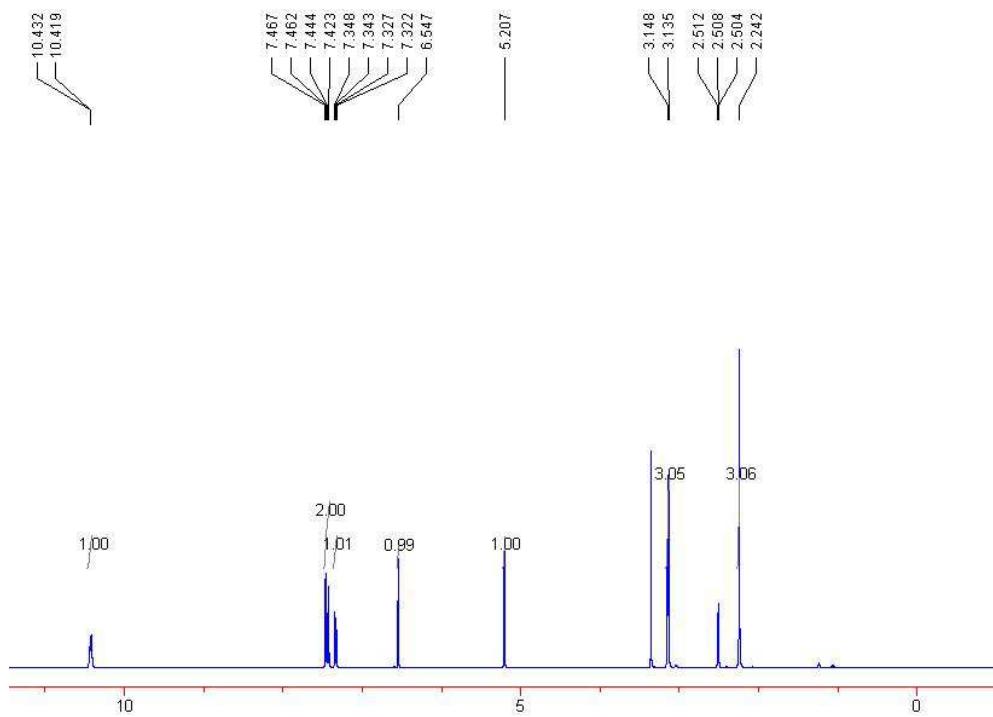
**Figure S28** IR spectrum of compound 4i

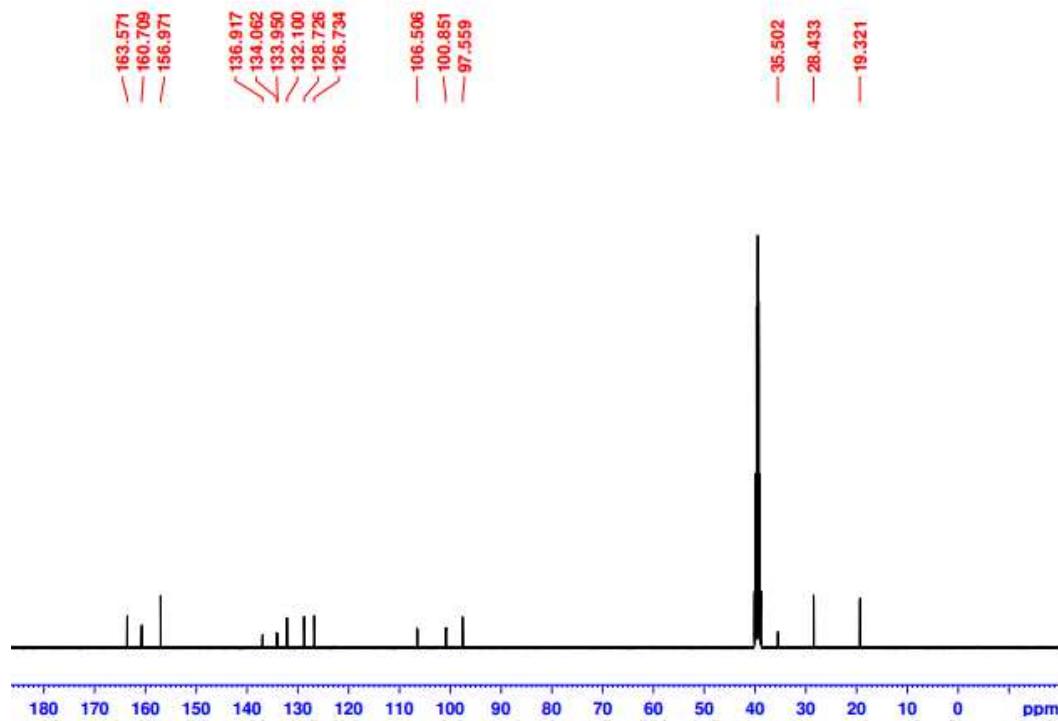


**Figure S29** <sup>1</sup>H NMR Spectrum (400 MHz, DMSO-*d*<sub>6</sub>) of Compound 4j

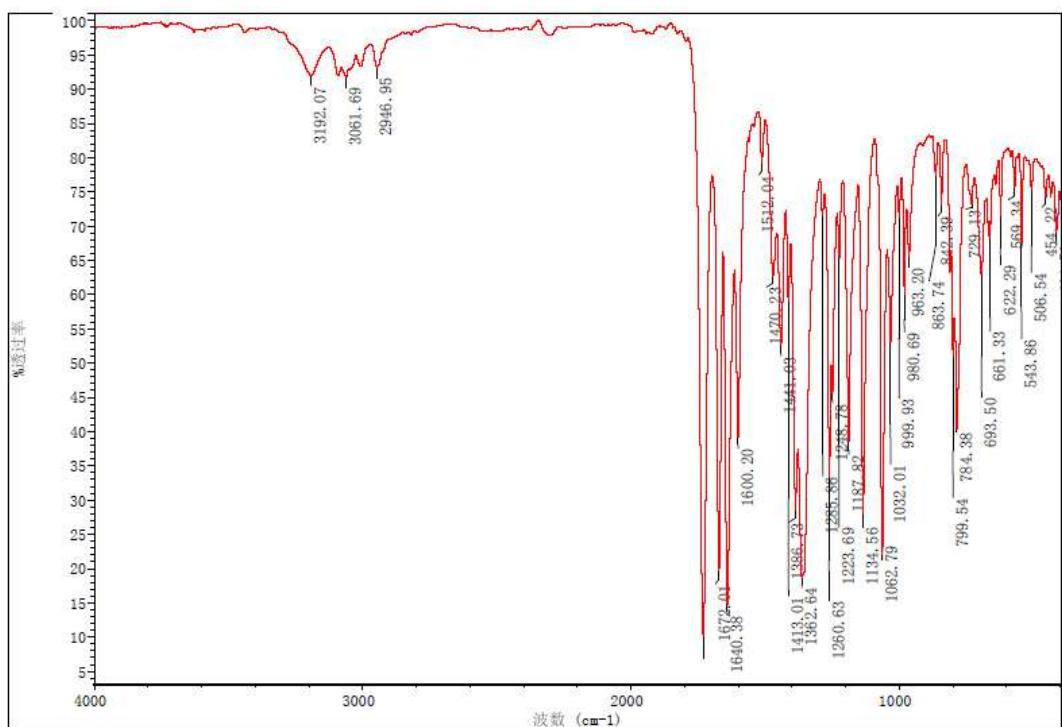


**Figure S30** <sup>13</sup>C NMR Spectrum (100 MHz, DMSO-*d*<sub>6</sub>) of Compound 4j

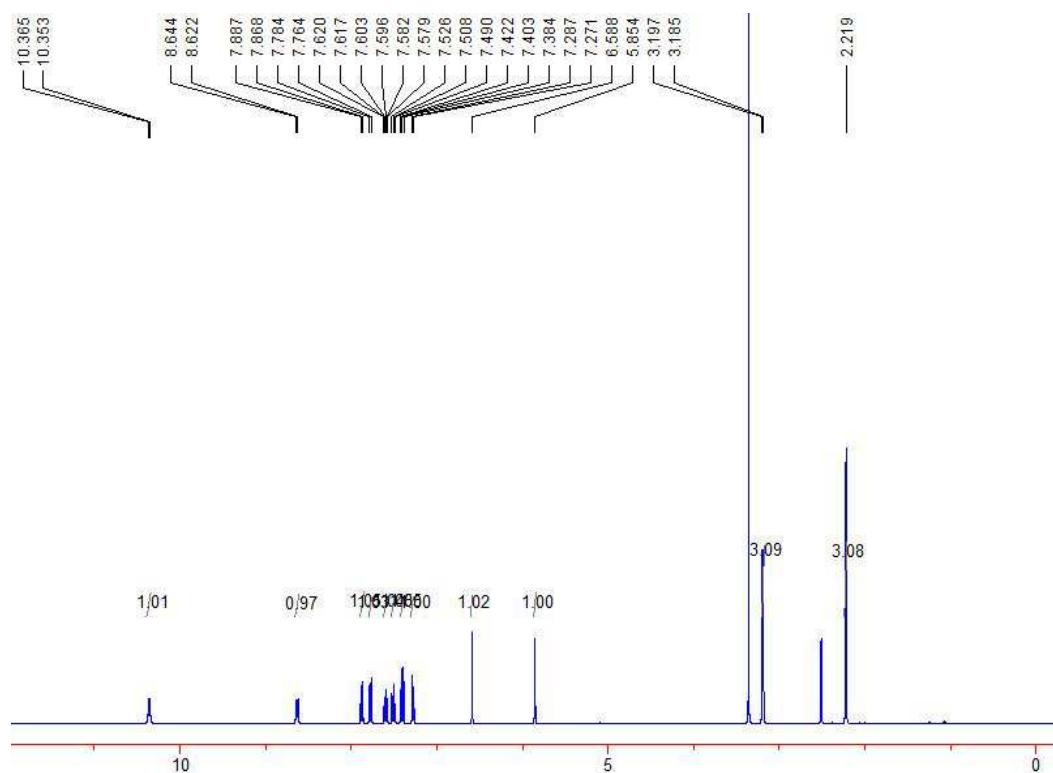
**Figure S31** IR spectrum of compound 4k**Figure S32** <sup>1</sup>H NMR Spectrum (400 MHz, DMSO-d<sub>6</sub>) of Compound 4k



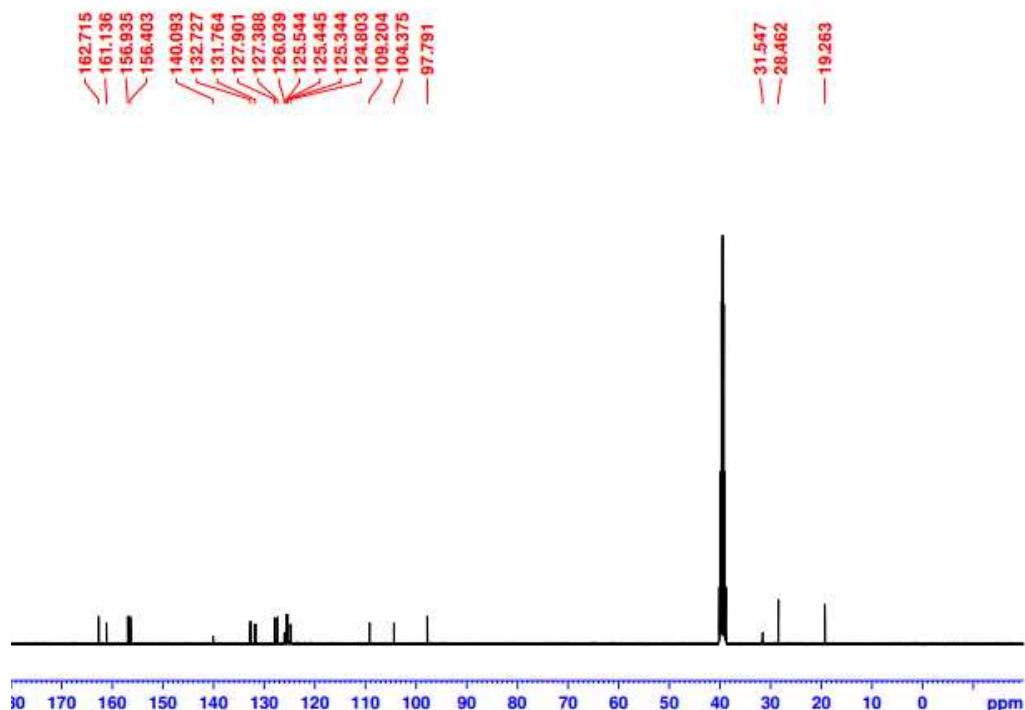
**Figure S33**  $^{13}\text{C}$  NMR Spectrum (100 MHz,  $\text{DMSO}-d_6$ ) of Compound 4k



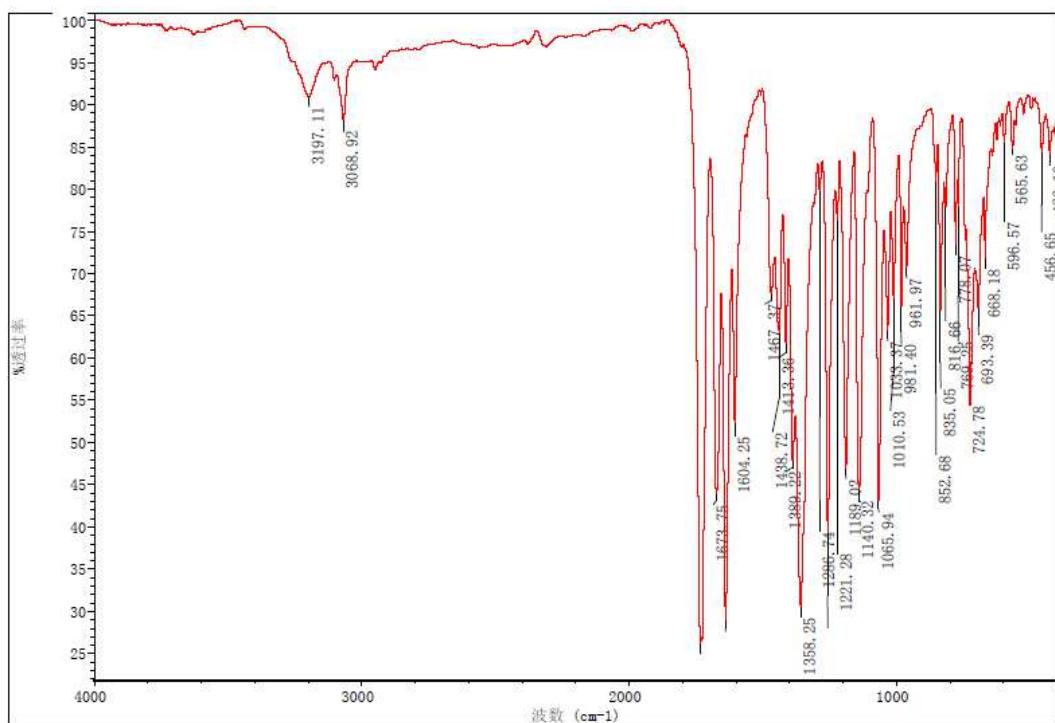
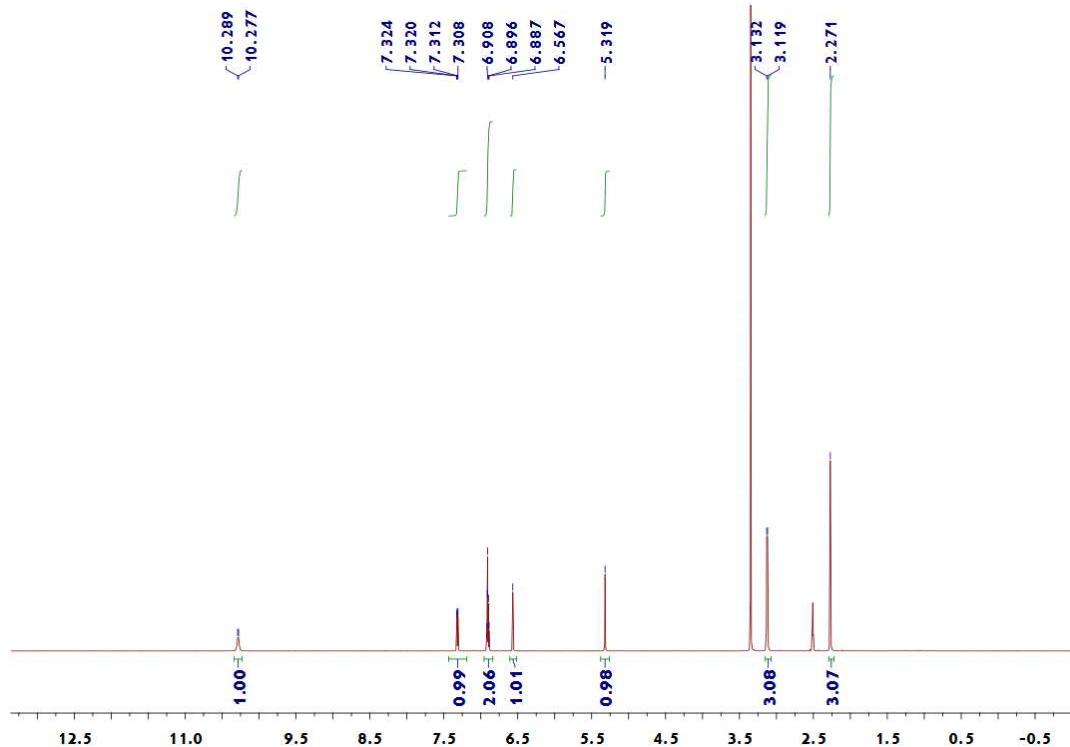
**Figure S34** IR spectrum of compound 4l

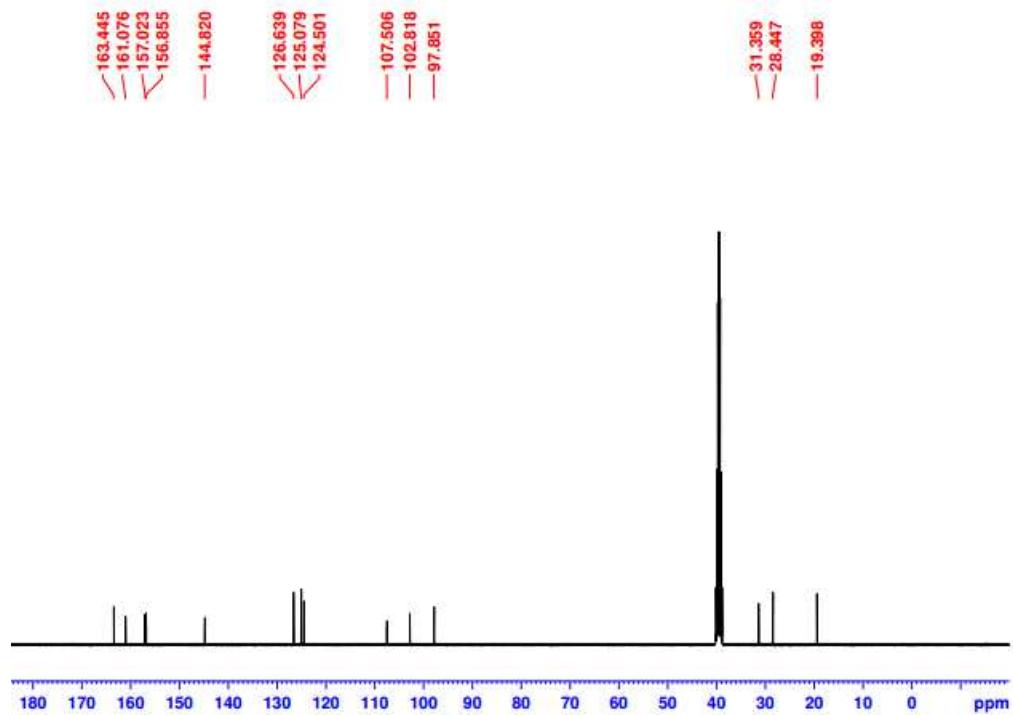


**Figure S35** <sup>1</sup>H NMR Spectrum (400 MHz, DMSO-*d*<sub>6</sub>) of Compound 41

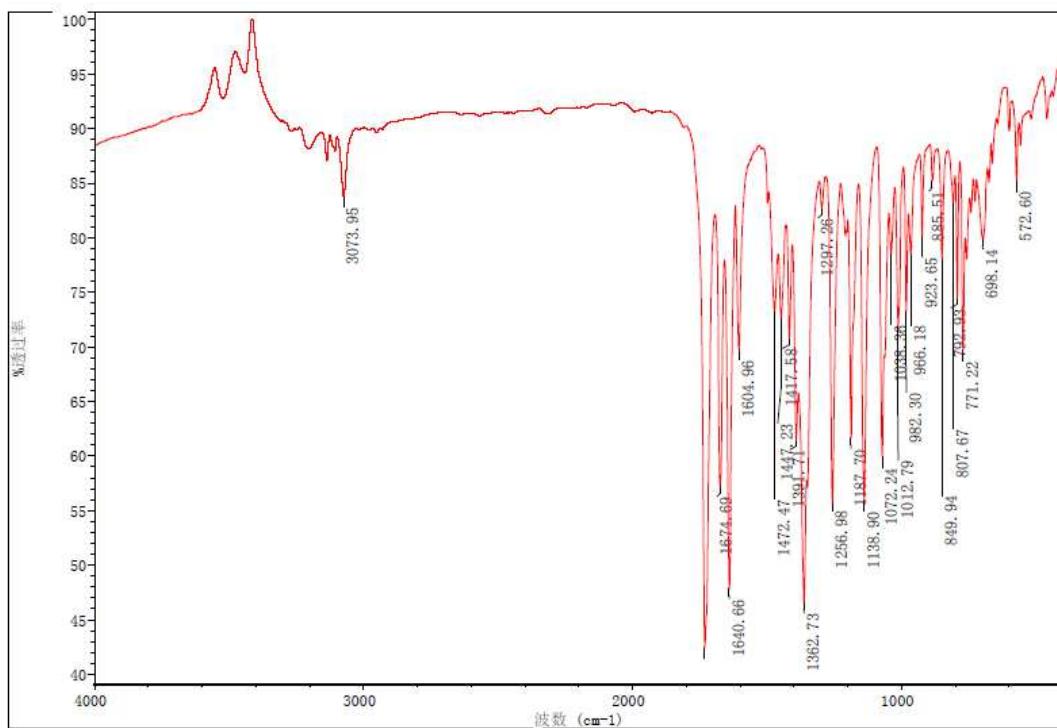


**Figure S36** <sup>13</sup>C NMR Spectrum (100 MHz, DMSO-*d*<sub>6</sub>) of Compound 41

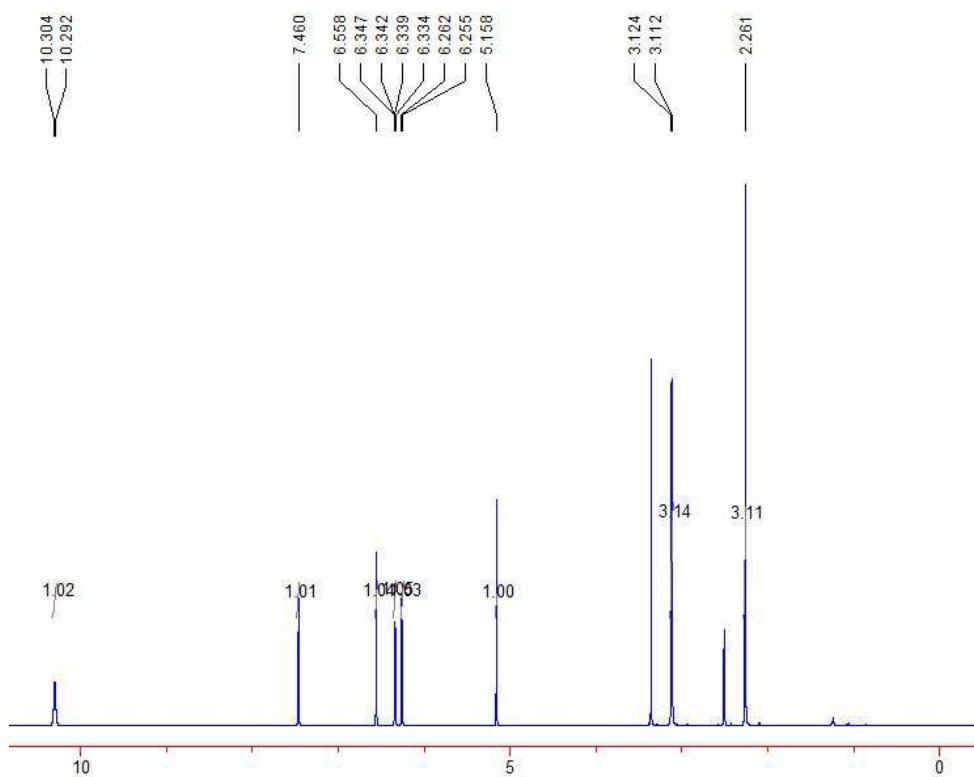
**Figure S37** IR spectrum of compound 4m**Figure S38** <sup>1</sup>H NMR Spectrum (400 MHz, DMSO-*d*<sub>6</sub>) of Compound 4m



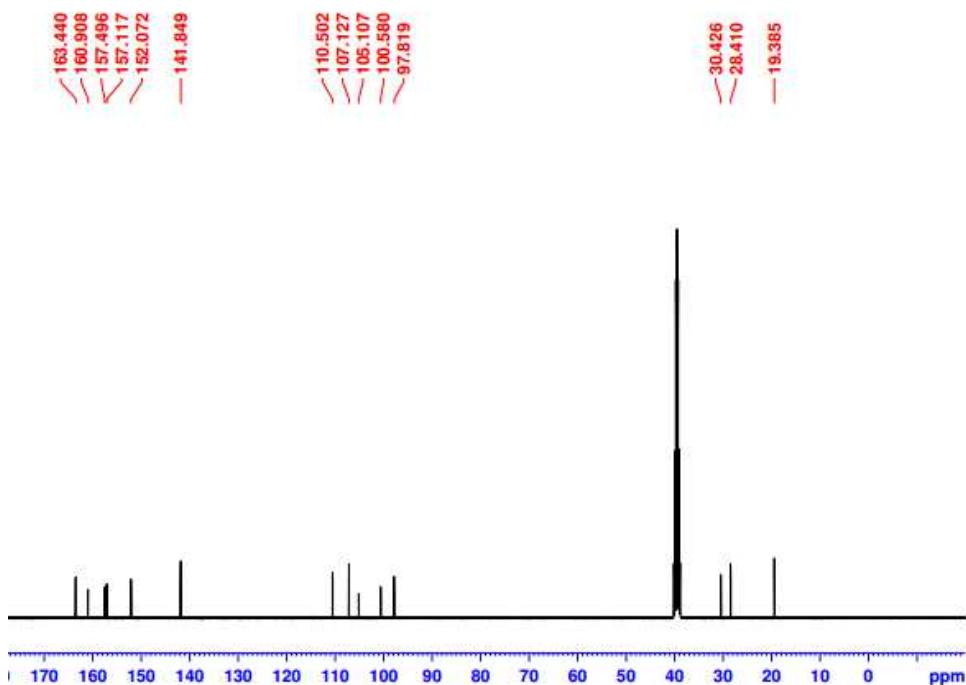
**Figure S39**  $^{13}\text{C}$  NMR Spectrum (100 MHz,  $\text{DMSO}-d_6$ ) of Compound 4m



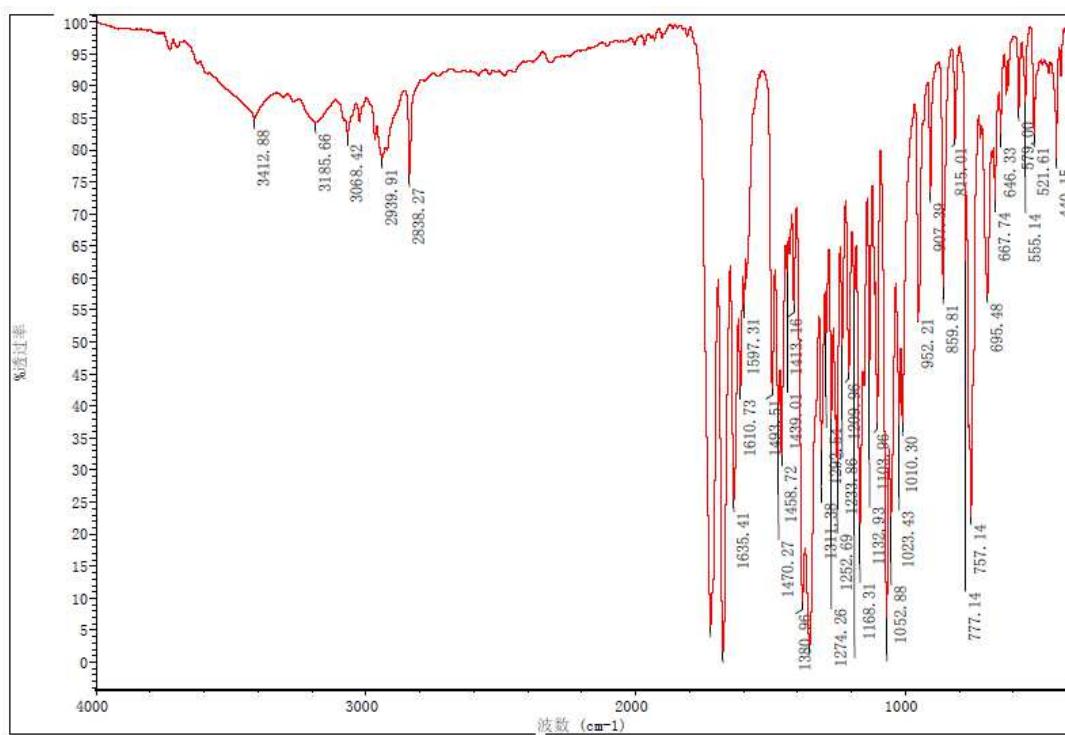
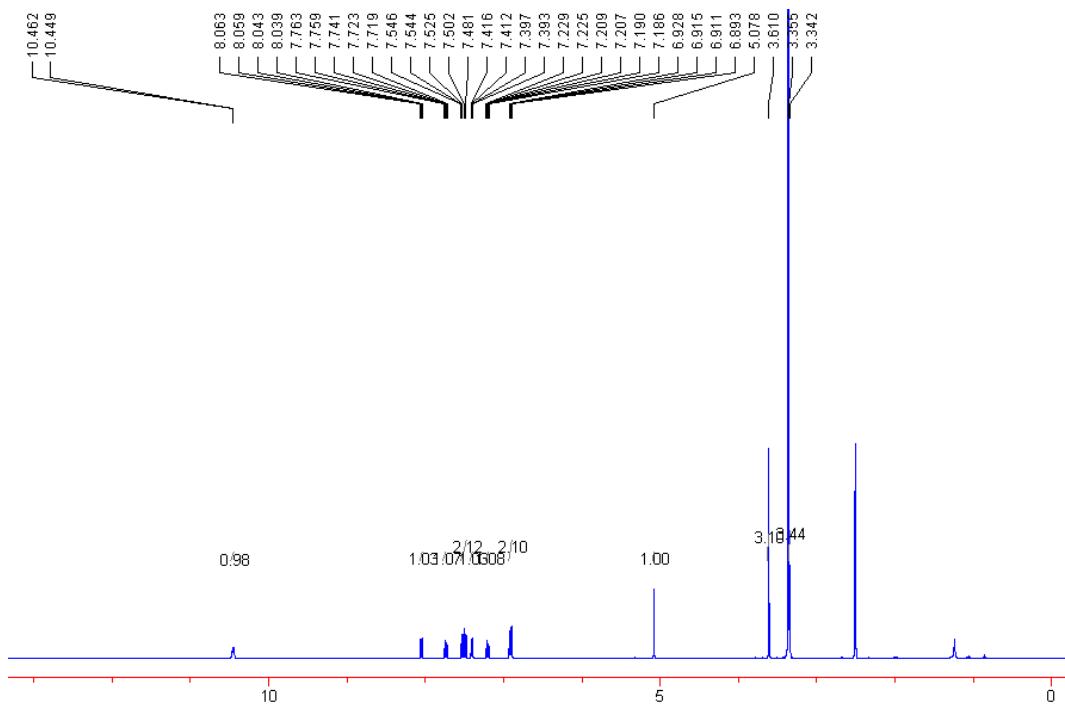
**Figure S40** IR spectrum of compound 4n

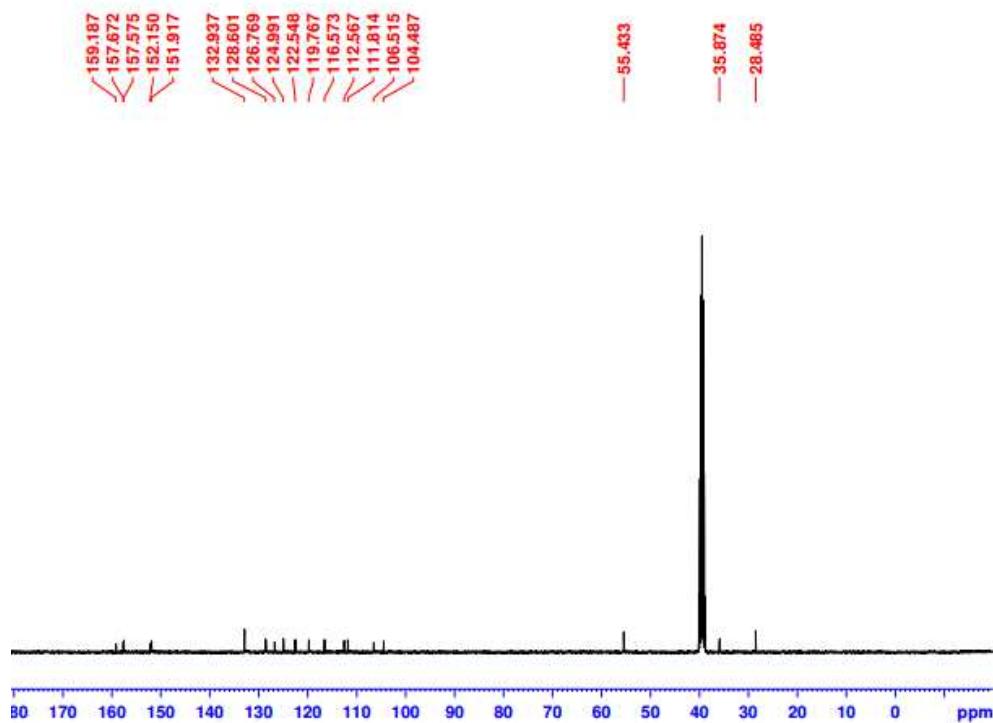


**Figure S41** <sup>1</sup>H NMR Spectrum (400 MHz, DMSO-*d*<sub>6</sub>) of Compound 4n

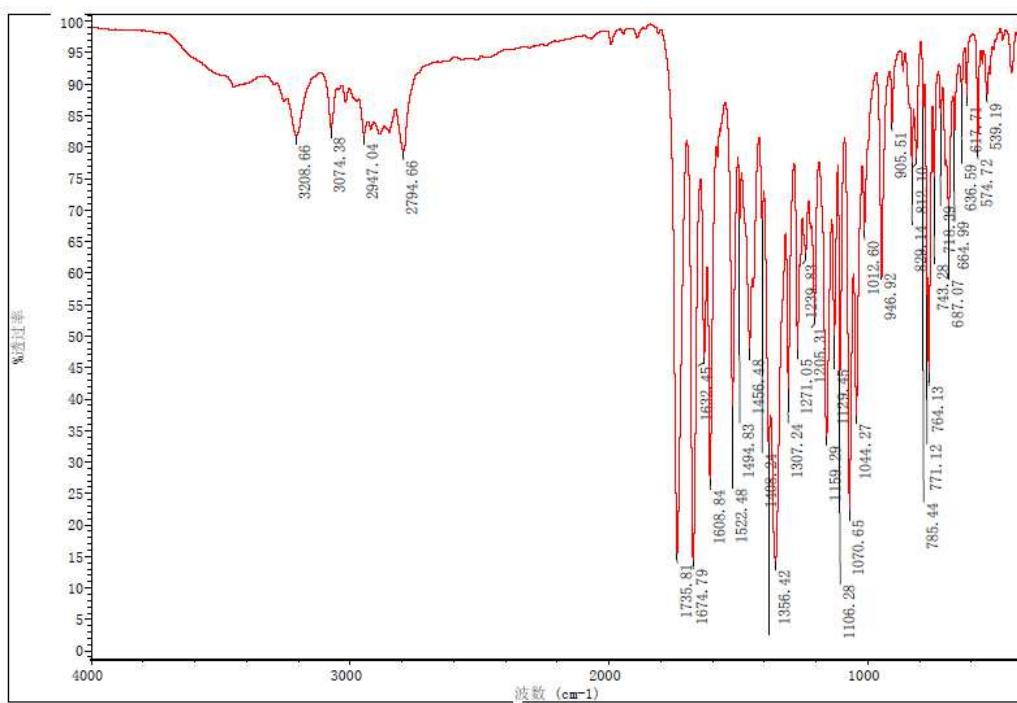


**Figure S42** <sup>13</sup>C NMR Spectrum (100 MHz, DMSO-*d*<sub>6</sub>) of Compound 4n

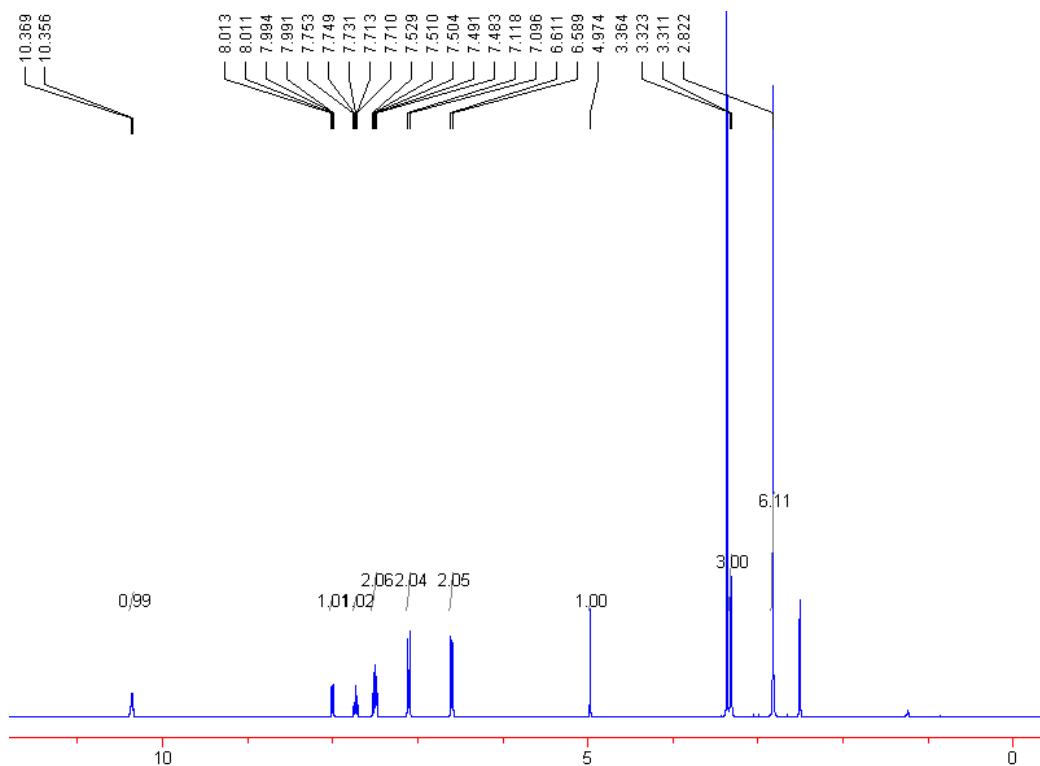
**Figure S43** IR spectrum of compound 6a**Figure S44** <sup>1</sup>H NMR Spectrum (400 MHz, DMSO-*d*<sub>6</sub>) of Compound 6a



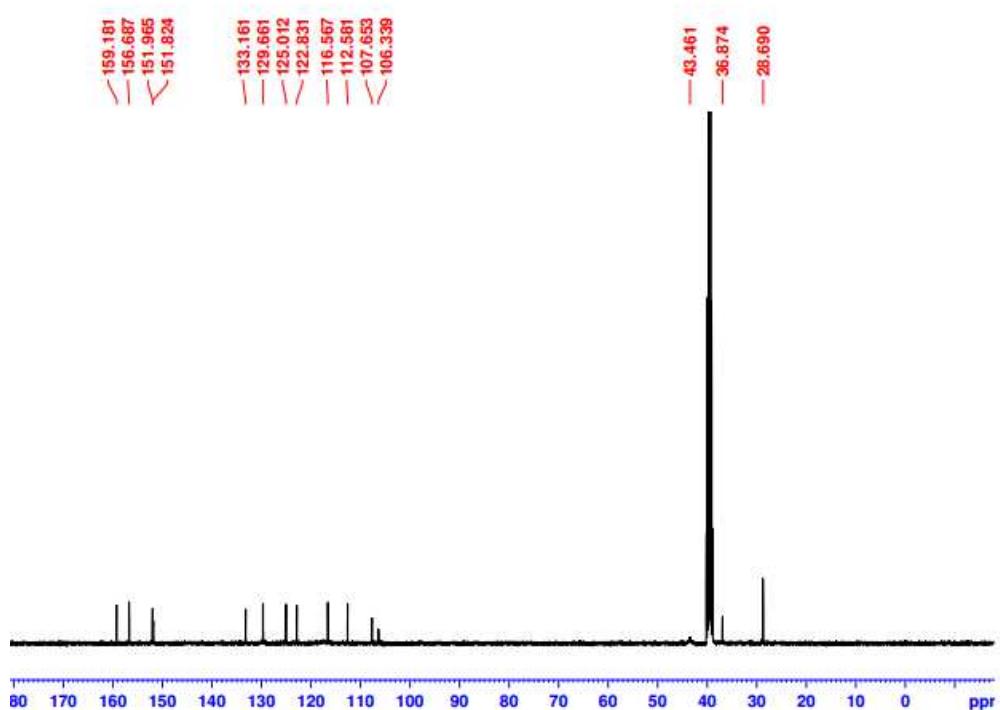
**Figure S45**  $^{13}\text{C}$  NMR Spectrum (100 MHz,  $\text{DMSO}-d_6$ ) of Compound 6a



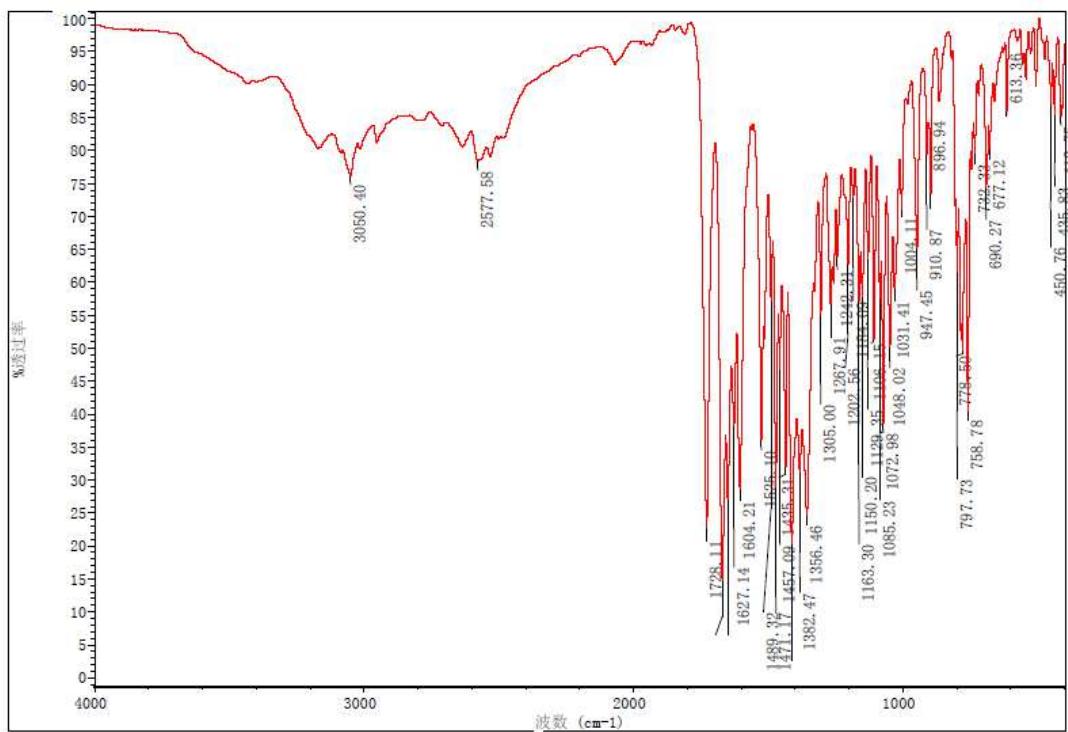
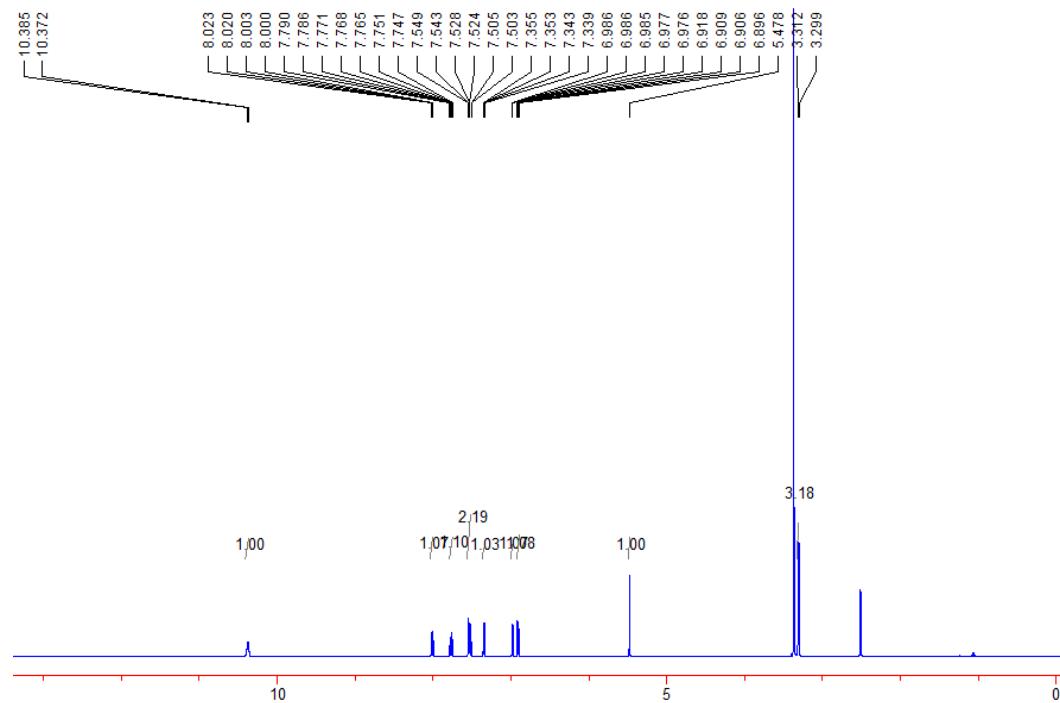
**Figure S46** IR spectrum of compound 6b

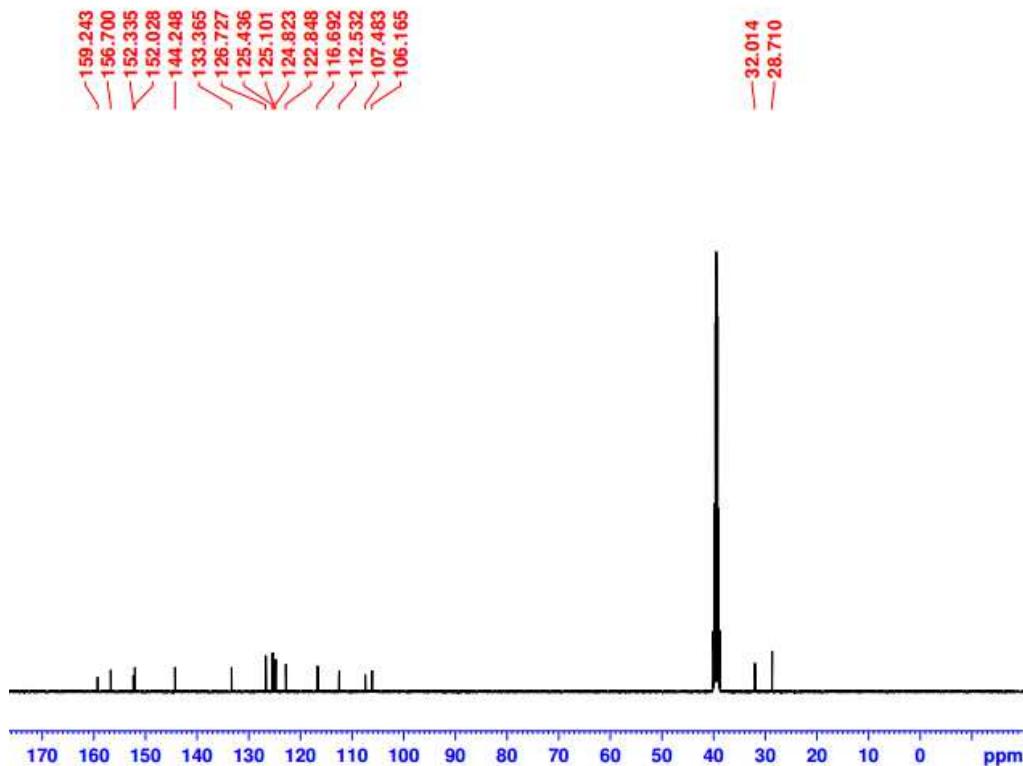


**Figure S47** <sup>1</sup>H NMR Spectrum (400 MHz, DMSO-*d*<sub>6</sub>) of Compound 6b

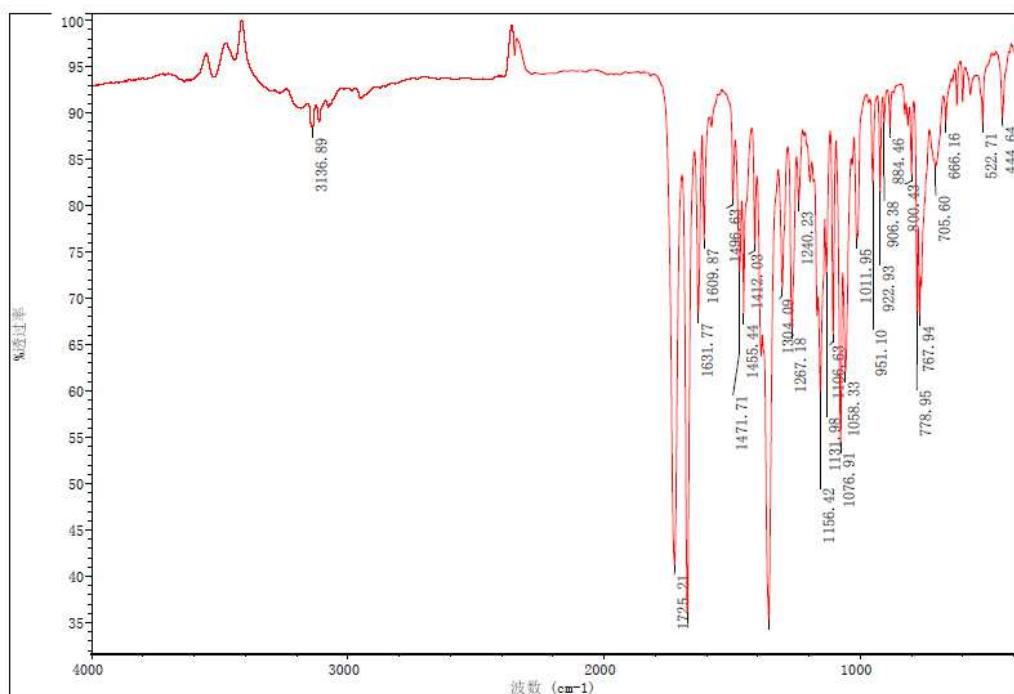


**Figure S48** <sup>13</sup>C NMR Spectrum (100 MHz, DMSO-*d*<sub>6</sub>) of Compound 6b

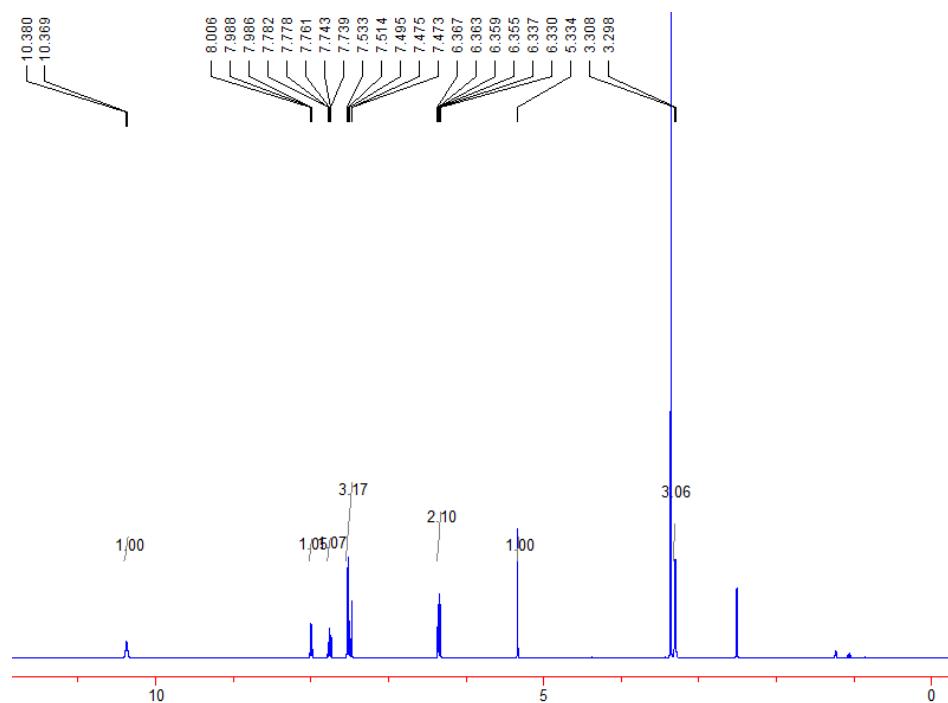
**Figure S49** IR spectrum of compound 6c**Figure S50**  $^1\text{H}$  NMR Spectrum (400 MHz,  $\text{DMSO}-d_6$ ) of Compound 6c



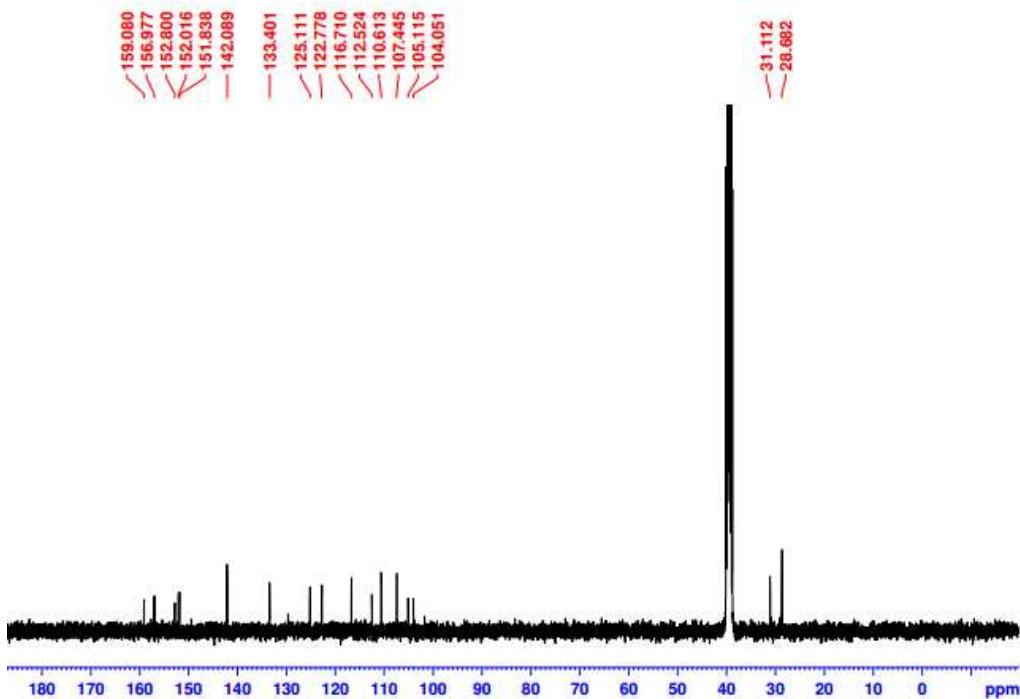
**Figure S51** <sup>13</sup>C NMR Spectrum (100 MHz, DMSO-*d*<sub>6</sub>) of Compound 6c



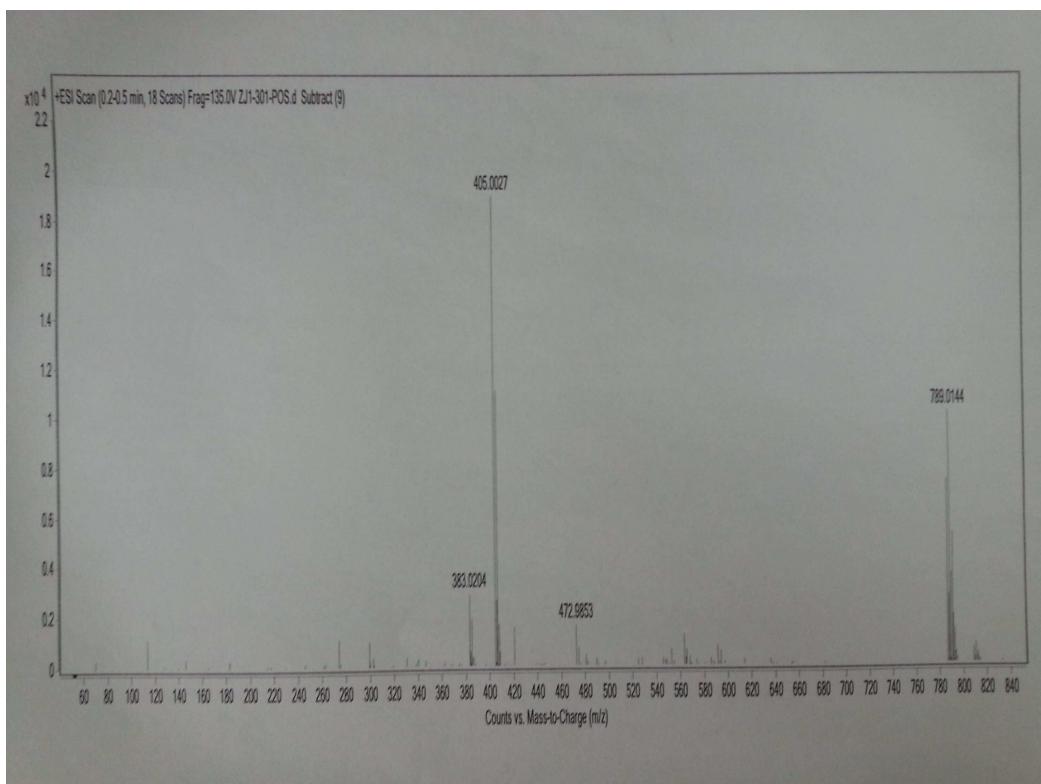
**Figure S52** IR spectrum of compound 6d



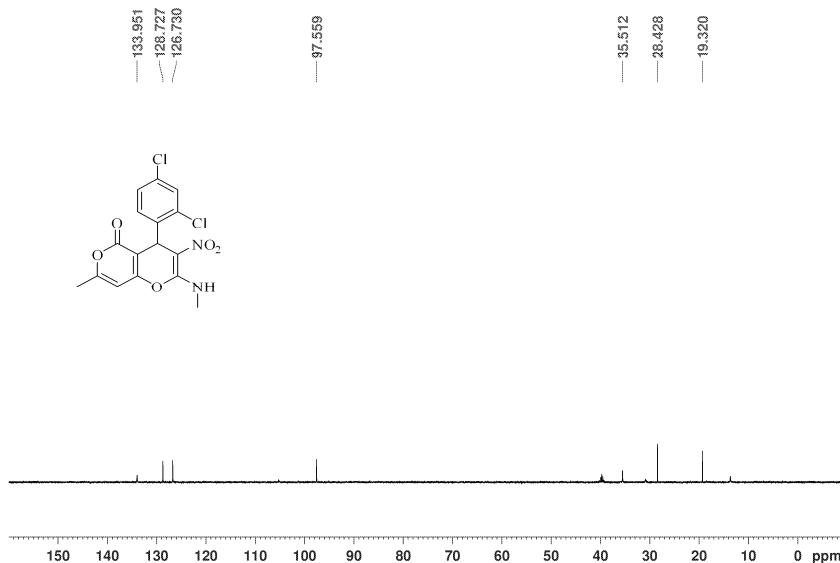
**Figure S53** <sup>1</sup>H NMR Spectrum (400 MHz, DMSO-d<sub>6</sub>) of Compound 6d



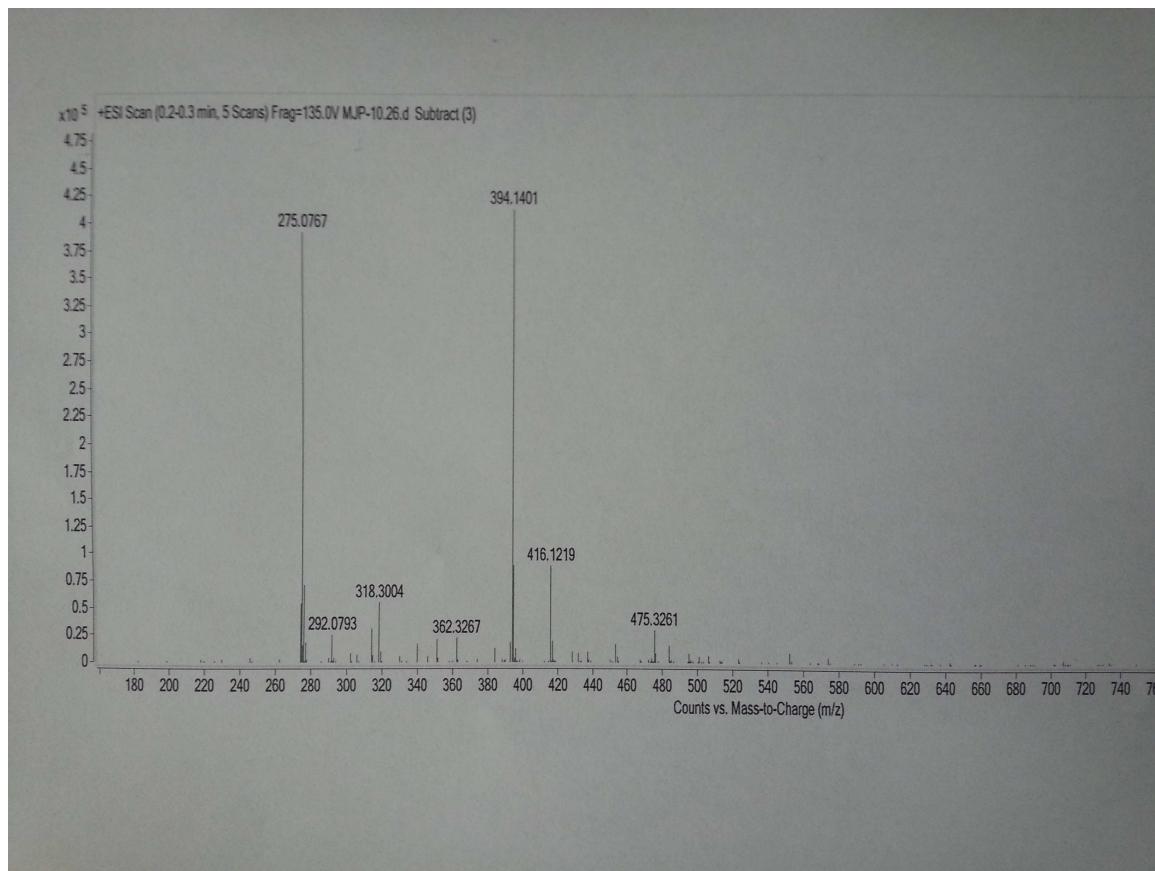
**Figure S54** <sup>13</sup>C NMR Spectrum (100 MHz, DMSO-d<sub>6</sub>) of Compound 6d



**Figure S55** HRMS of Compound 4k



**Figure S56** DEPT 135 Spectrum (100 MHz, DMSO-d<sub>6</sub>) of Compound 4k



**Figure S57** HRMS of Compound 6b