

## Supplementary material

# New Indole-3-Propionic Acid and 5-Methoxy-Indole Carboxylic Acid Derived Hydrazone Hybrids as Multifunctional Neuroprotectors

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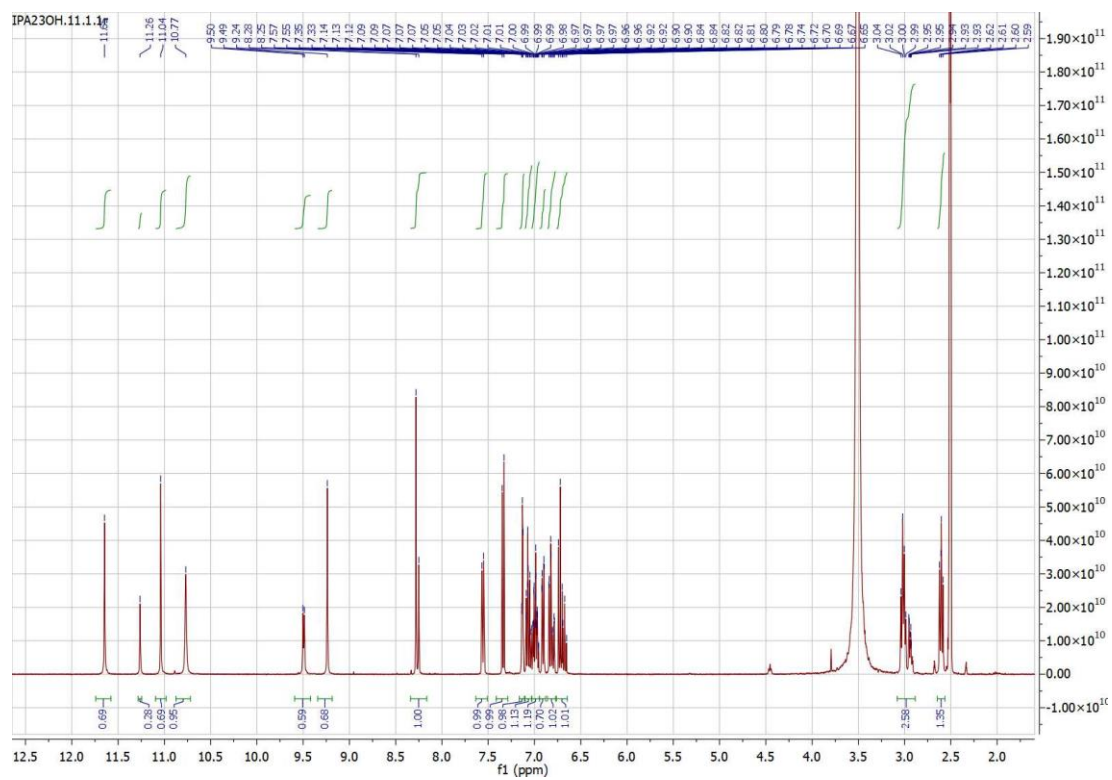


Figure S1.  $^1\text{H}$  NMR spectrum of **2** (400 MHz,  $\text{DMSO-d}_6$ )

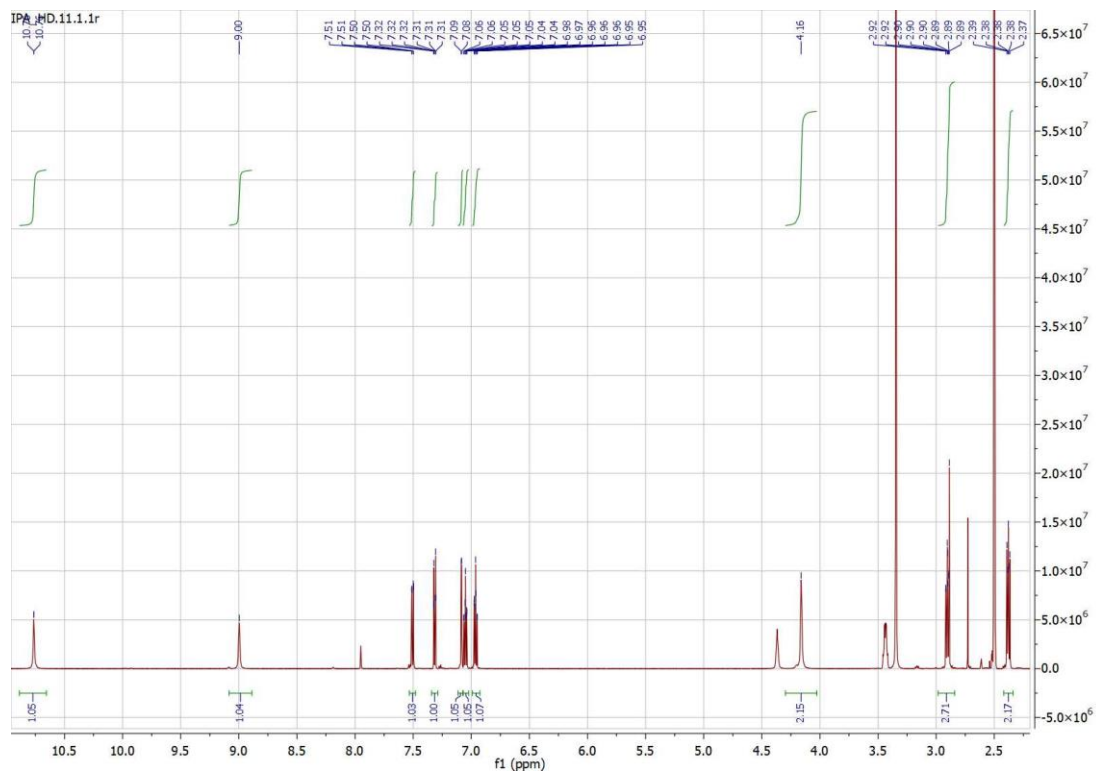


Figure S2.  $^1\text{H}$  NMR spectrum of **(3a)** (400 MHz,  $\text{DMSO-d}_6$ )

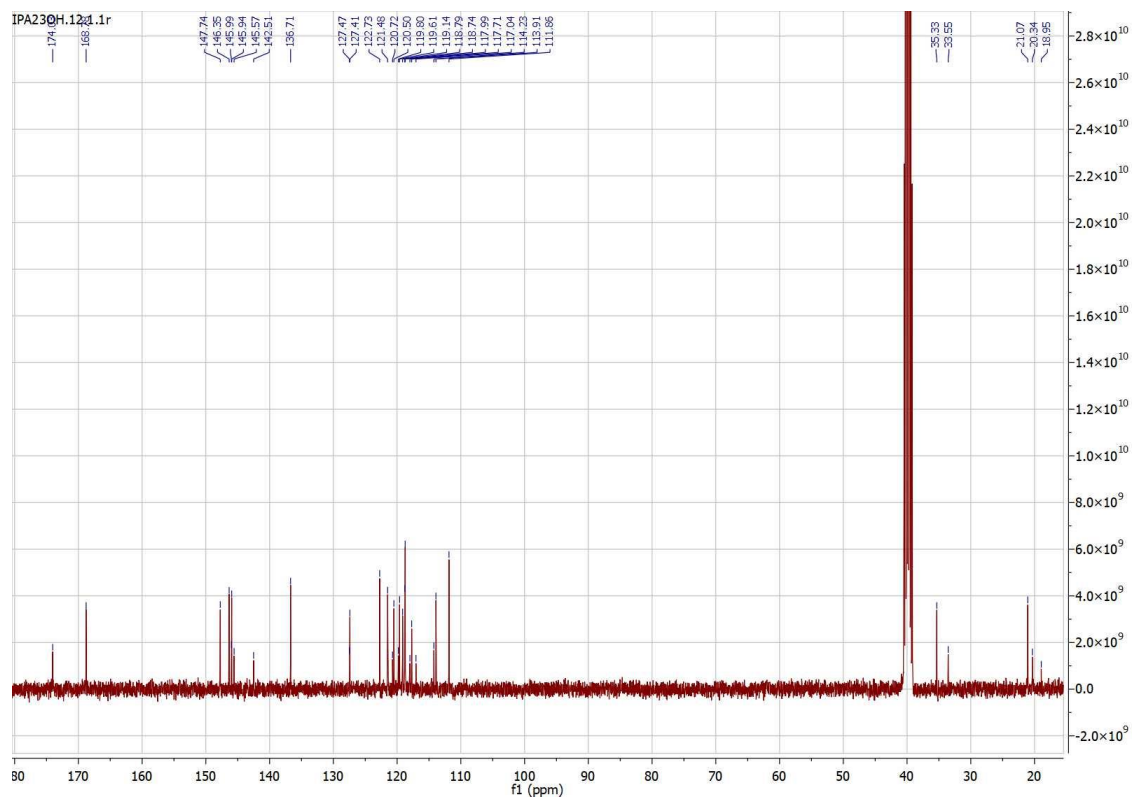


Figure S3.  $^{13}\text{C}$  NMR spectrum of **3a** (151 MHz,  $\text{DMSO-d}_6$ ).

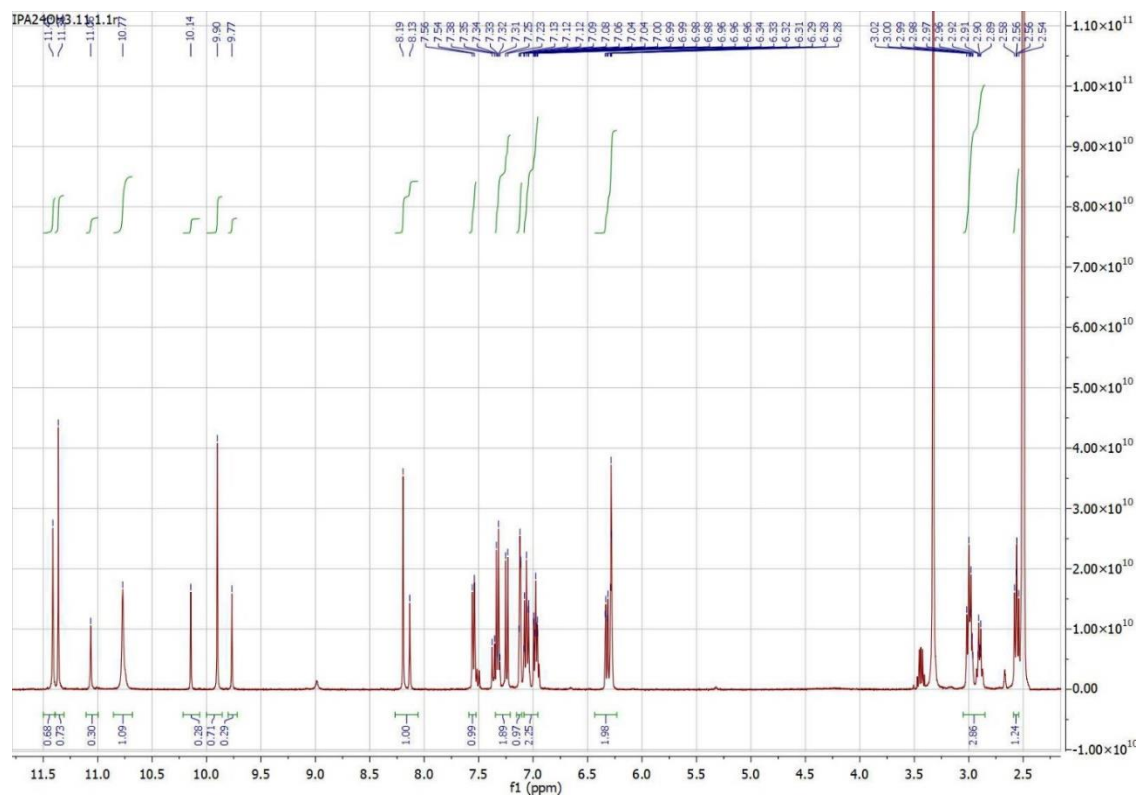
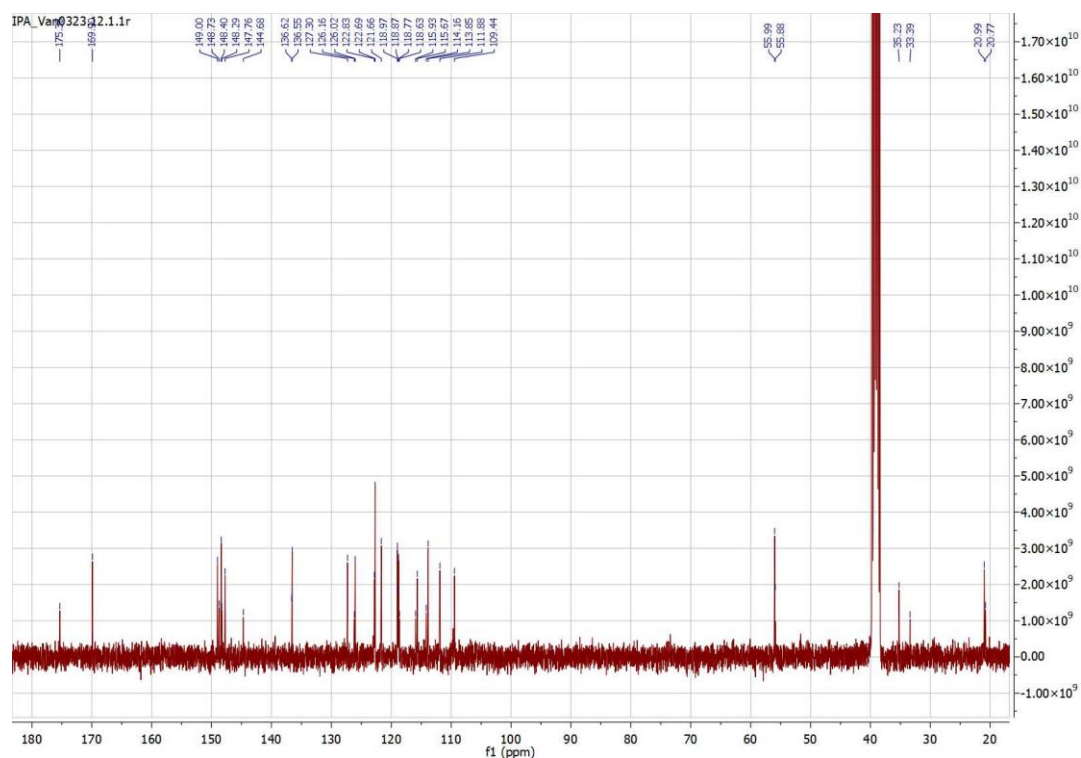
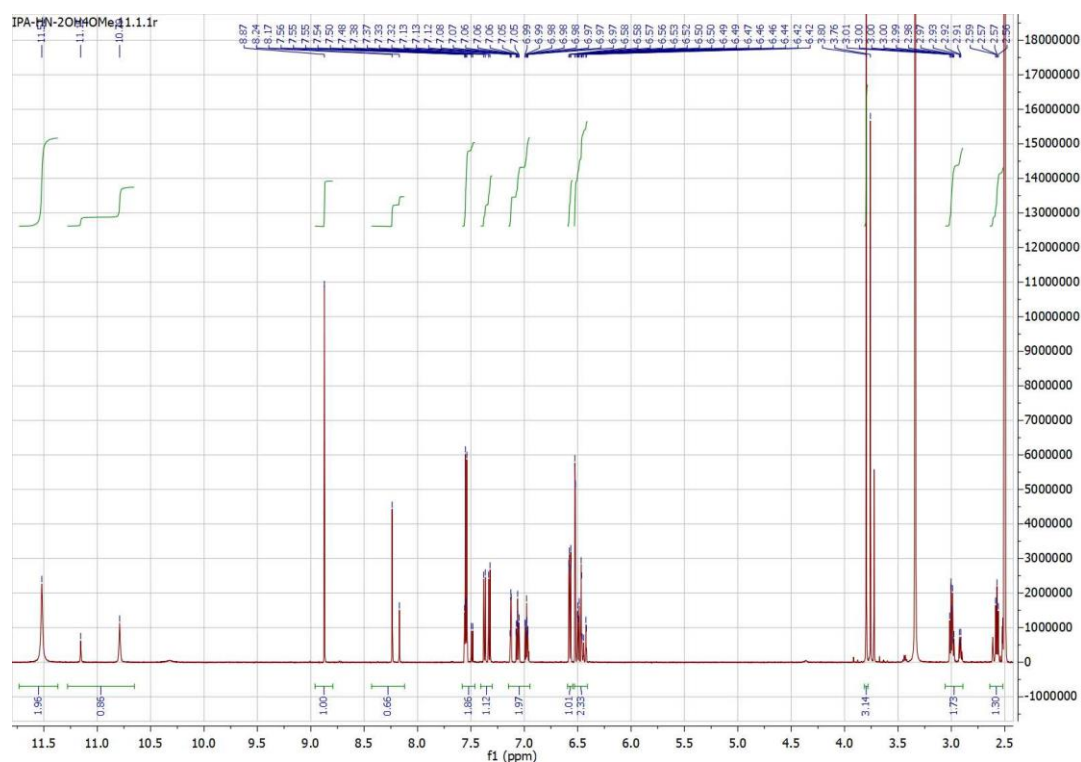


Figure S4.  $^1\text{H}$  NMR spectrum of (**3c**) (600 MHz,  $\text{DMSO-d}_6$ ).





**Figure S7.**  $^{13}\text{C}$  NMR spectrum of **3d** (151 MHz,  $\text{DMSO-d}_6$ ).



**Figure S8.**  $^1\text{H}$  NMR spectrum of (**3e**) (600 MHz,  $\text{DMSO-d}_6$ ).

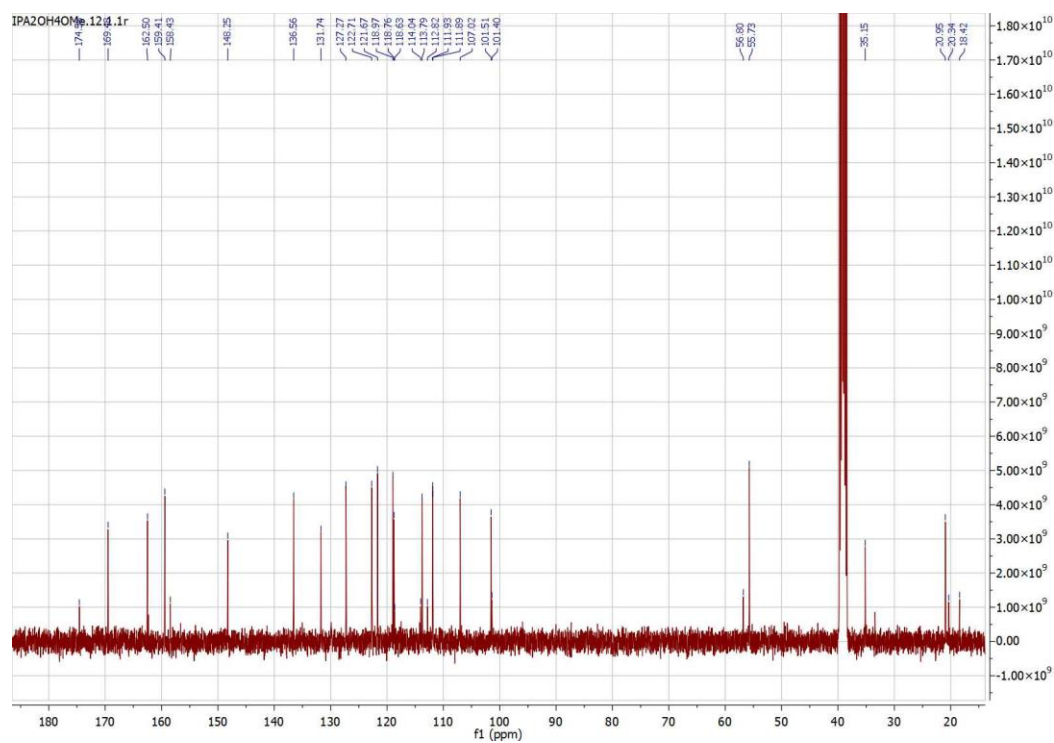


Figure S9.  $^{13}\text{C}$  NMR spectrum of **3e** (151 MHz,  $\text{DMSO-d}_6$ ).

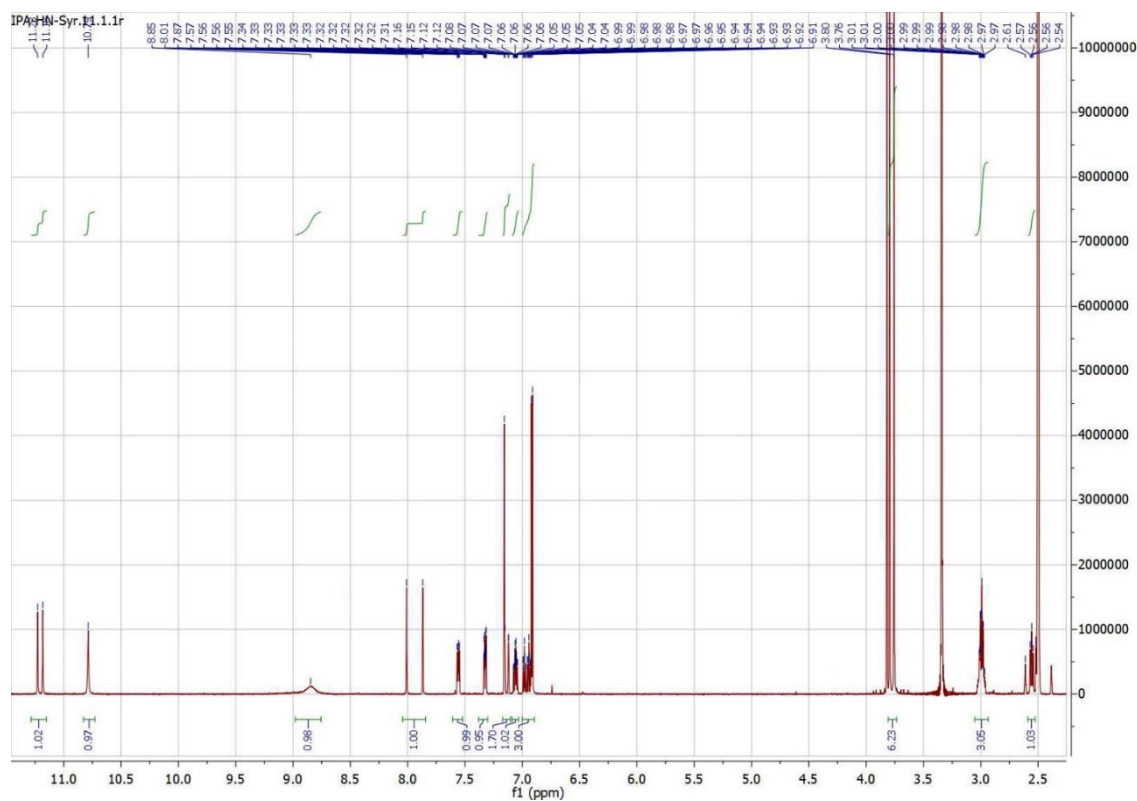
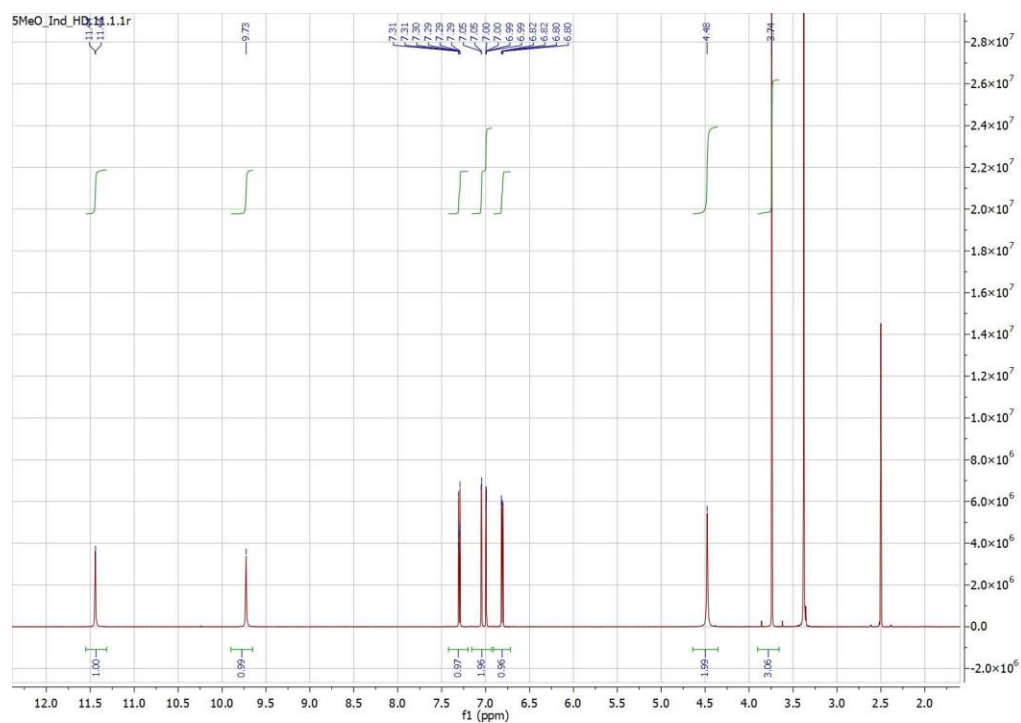
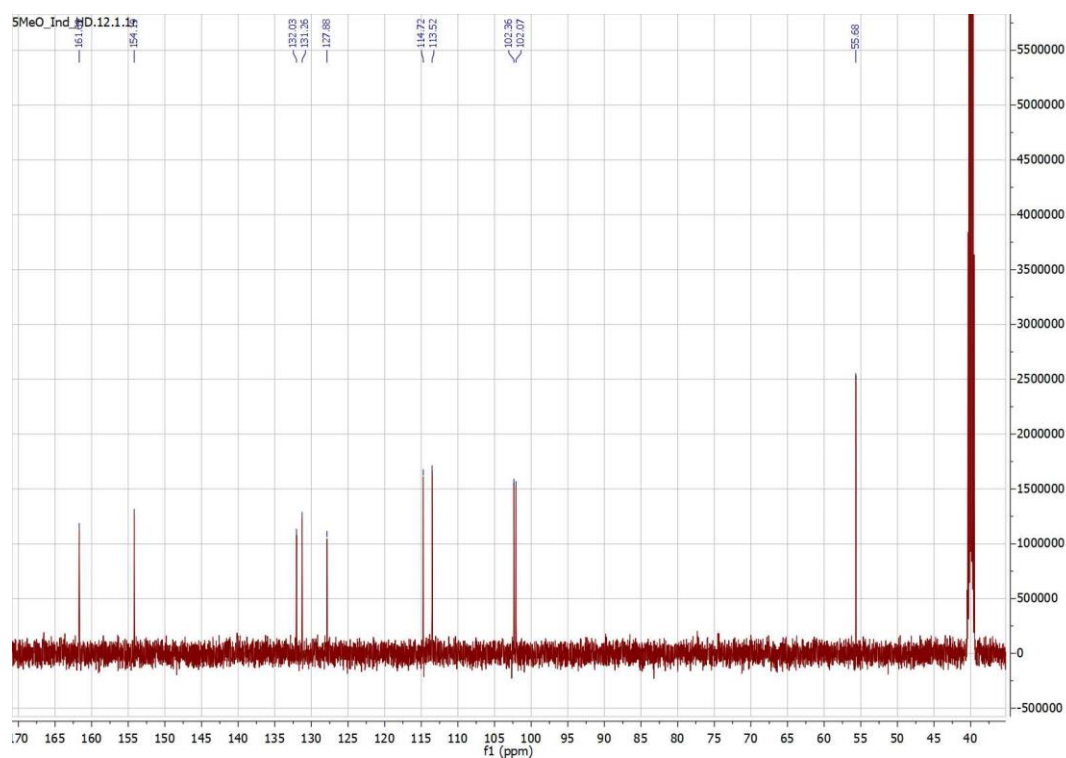


Figure S10.  $^1\text{H}$  NMR spectrum of (**3f**) (600 MHz,  $\text{DMSO-d}_6$ ).

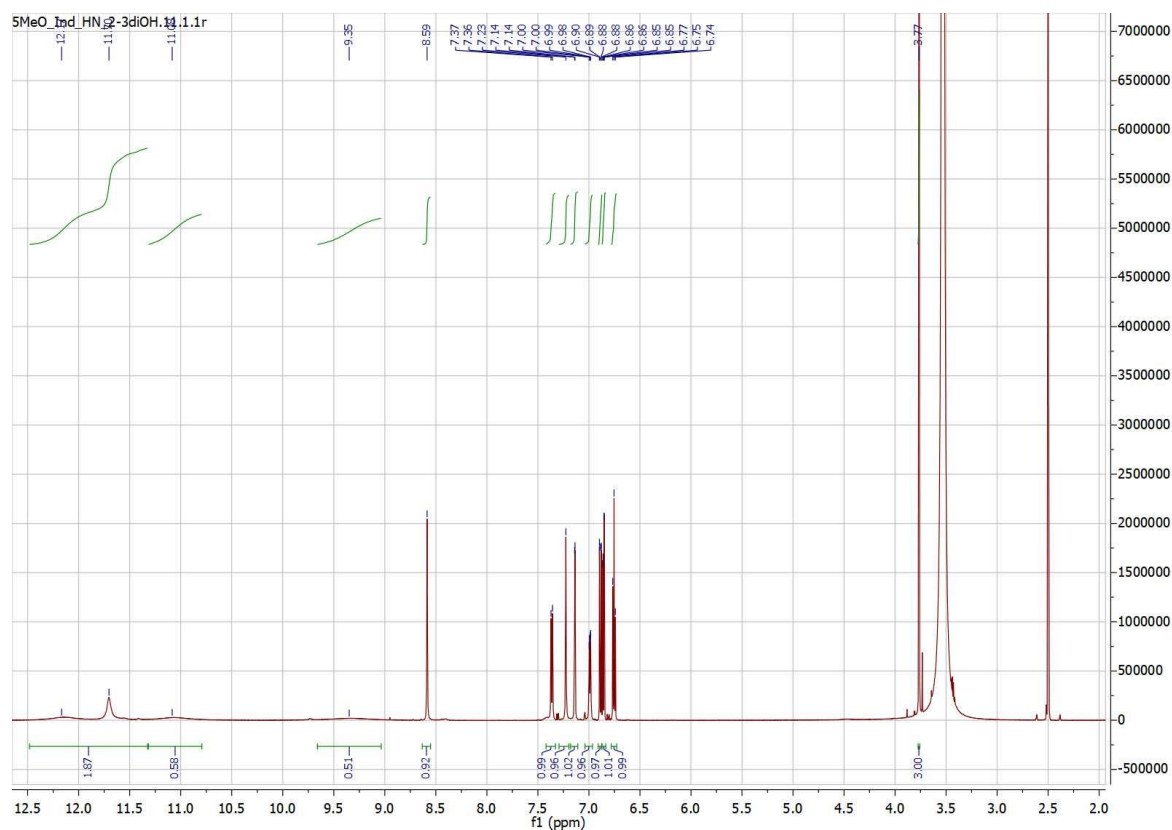


**Figure S11.**  $^1\text{H}$  NMR spectrum of **4** (600 MHz,  $\text{DMSO-d}_6$ )

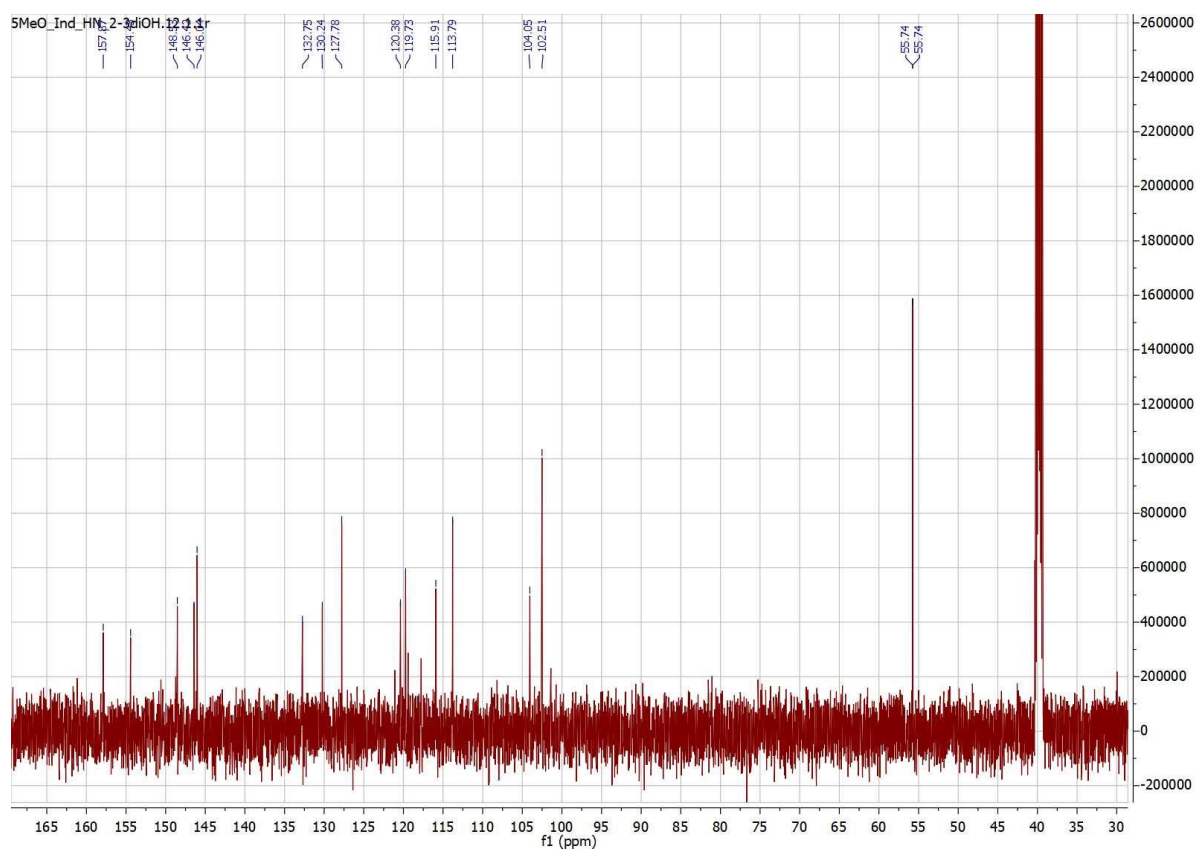


**Figure S12.**  $^{13}\text{C}$  NMR spectrum of **4** (151 MHz,  $\text{DMSO-d}_6$ ).





**Figure S13.**  $^1\text{H}$  NMR spectrum of (5a) (600 MHz, DMSO- $\text{d}_6$ )



**Figure S14.**  $^{13}\text{C}$  NMR spectrum of 5a (151 MHz, DMSO- $\text{d}_6$ ).



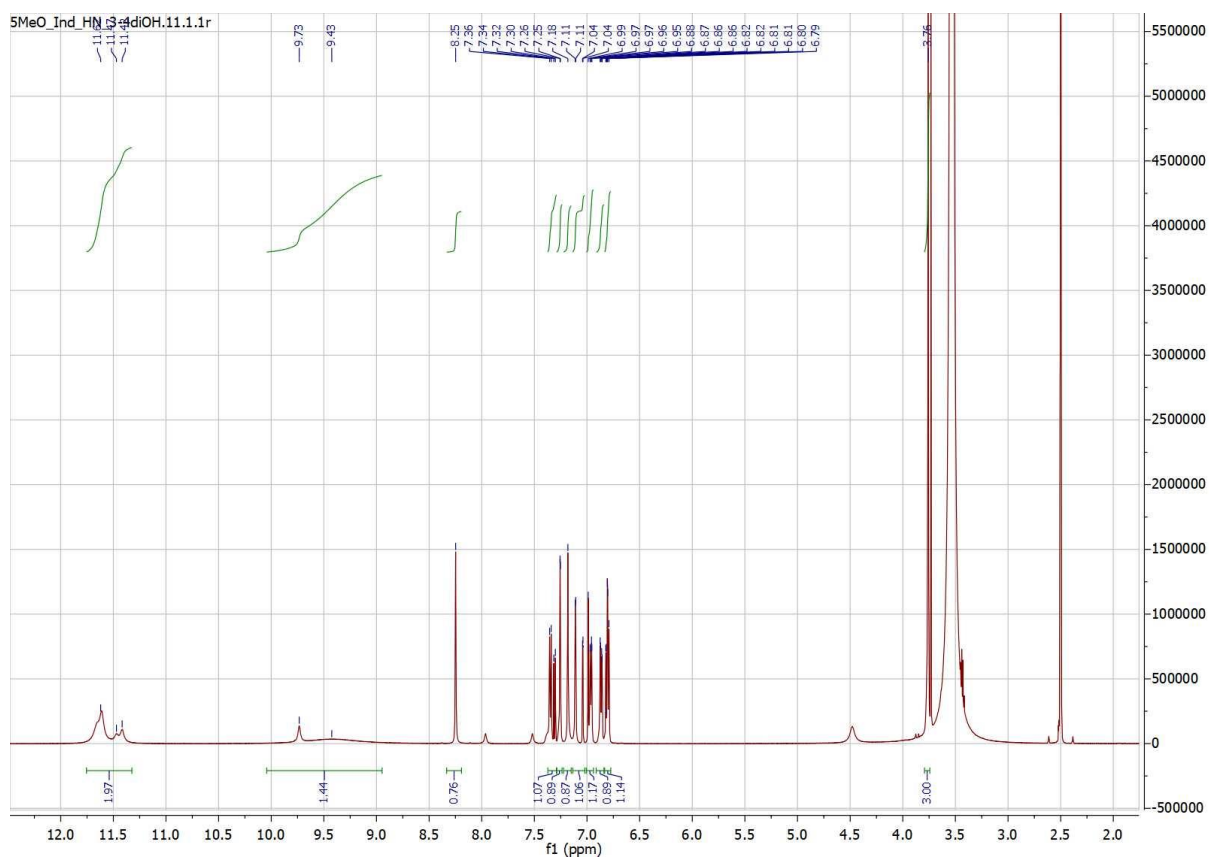


Figure S15.  $^1\text{H}$  NMR spectrum of **5b** (600 MHz,  $\text{DMSO-d}_6$ ).

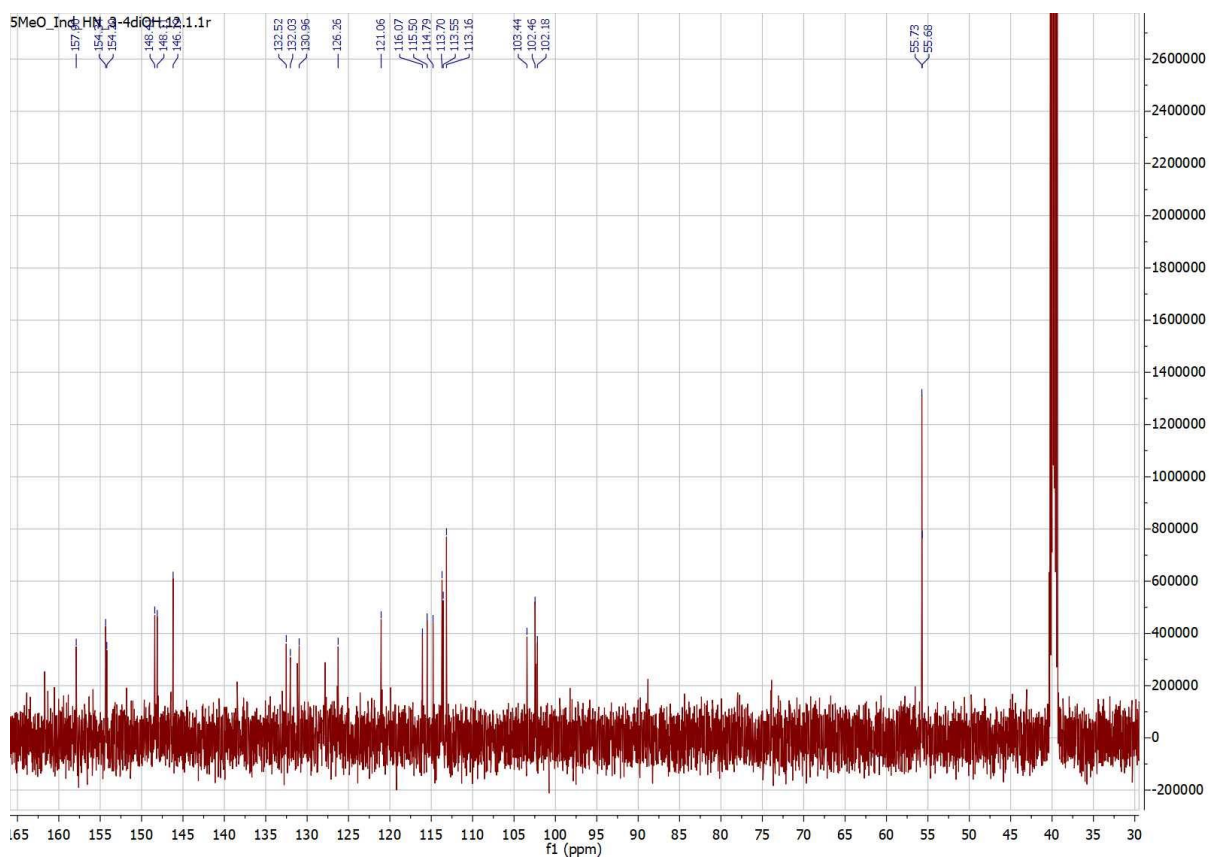


Figure S16.  $^{13}\text{C}$  NMR spectrum of **5b** (151 MHz,  $\text{DMSO-d}_6$ ).

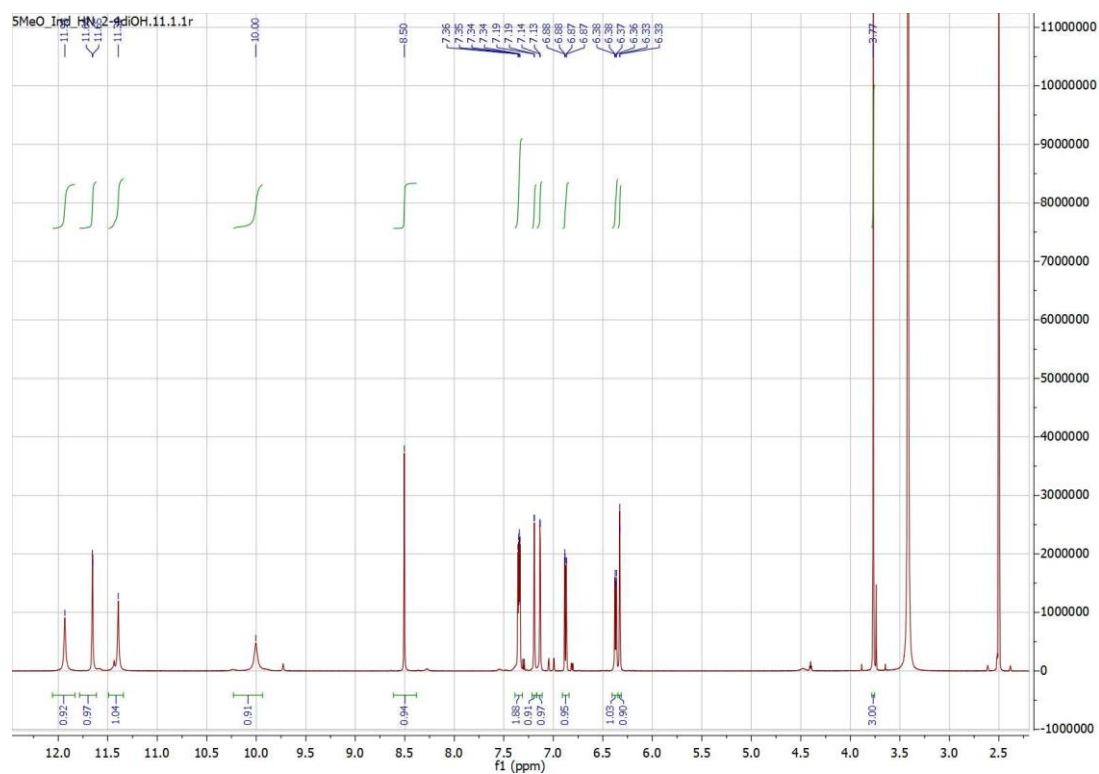


Figure S17.  $^1\text{H}$  NMR spectrum of **5c** (600 MHz,  $\text{DMSO-d}_6$ )

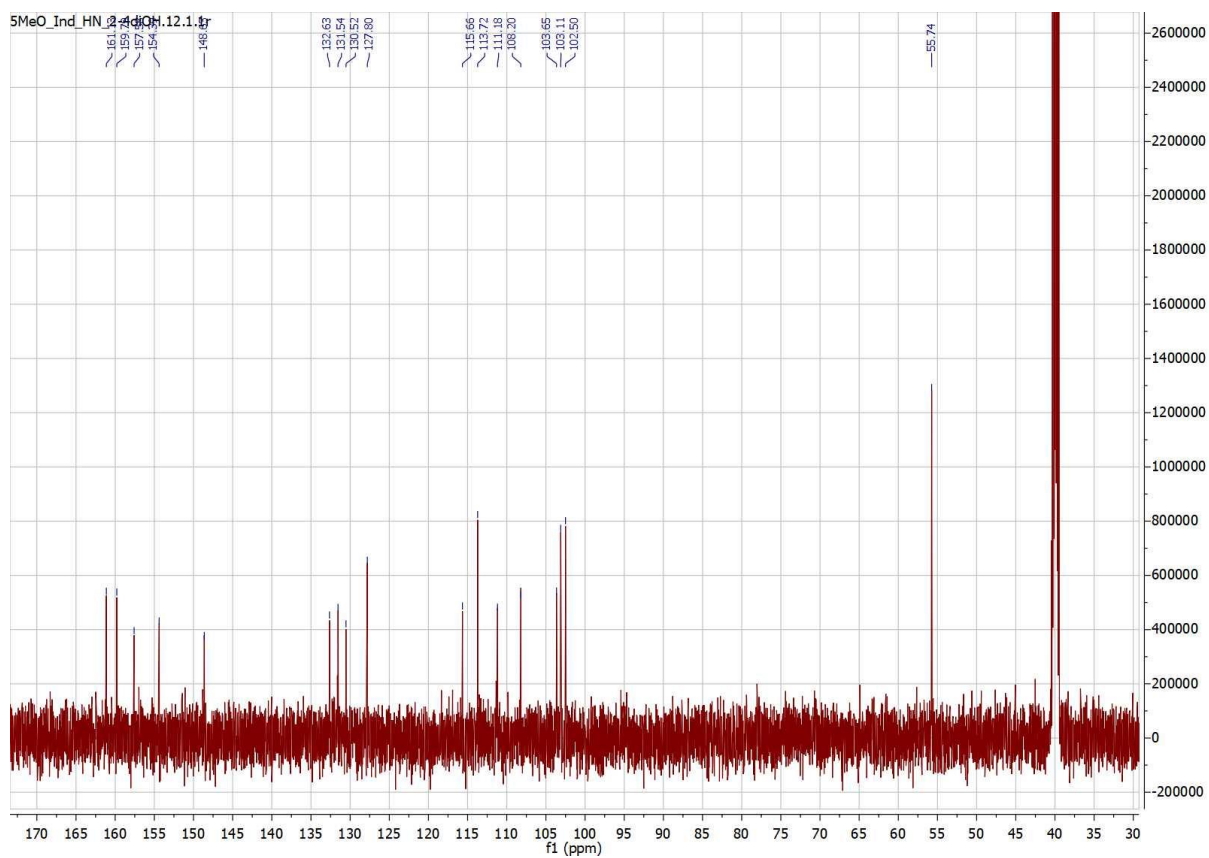


Figure S18.  $^{13}\text{C}$  NMR spectrum of **5c** (151 MHz,  $\text{DMSO-d}_6$ ).

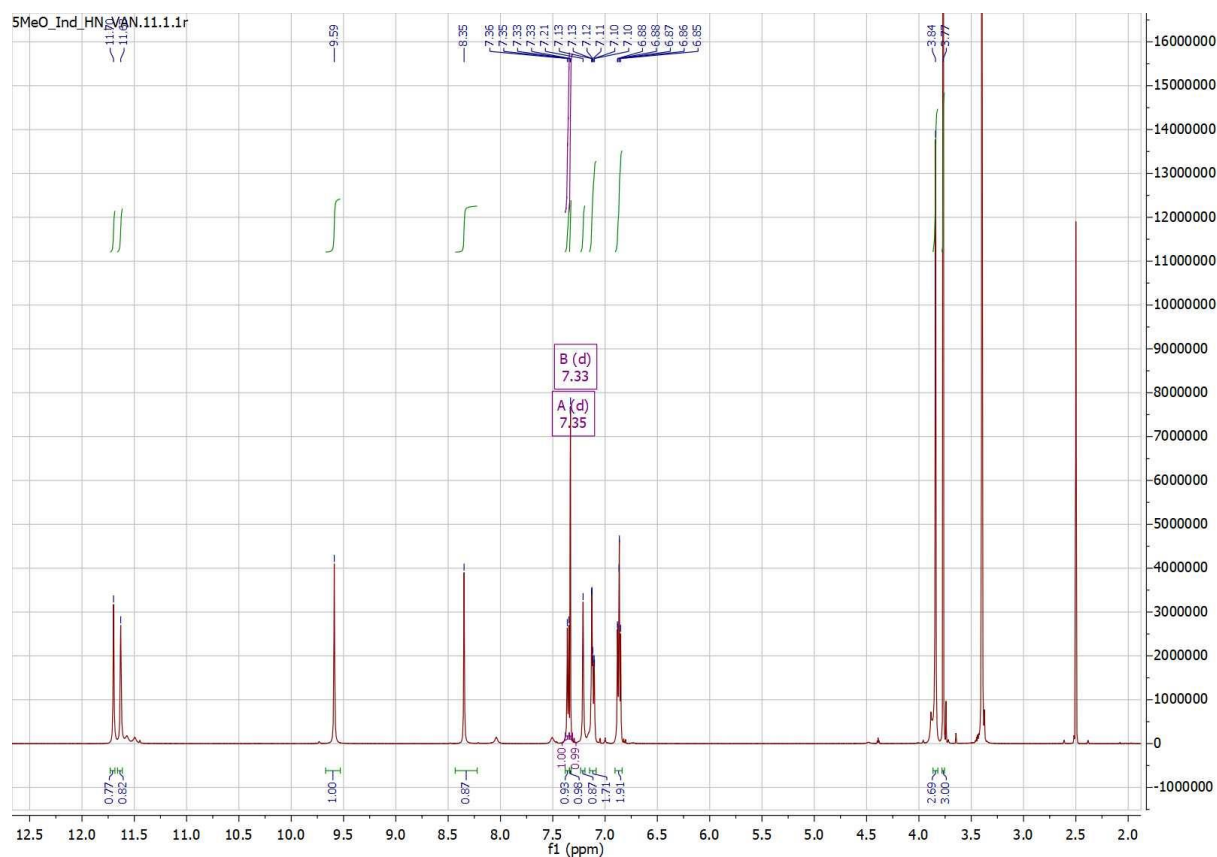


Figure S19.  $^1\text{H}$  NMR spectrum of **5d** (600 MHz,  $\text{DMSO-d}_6$ )

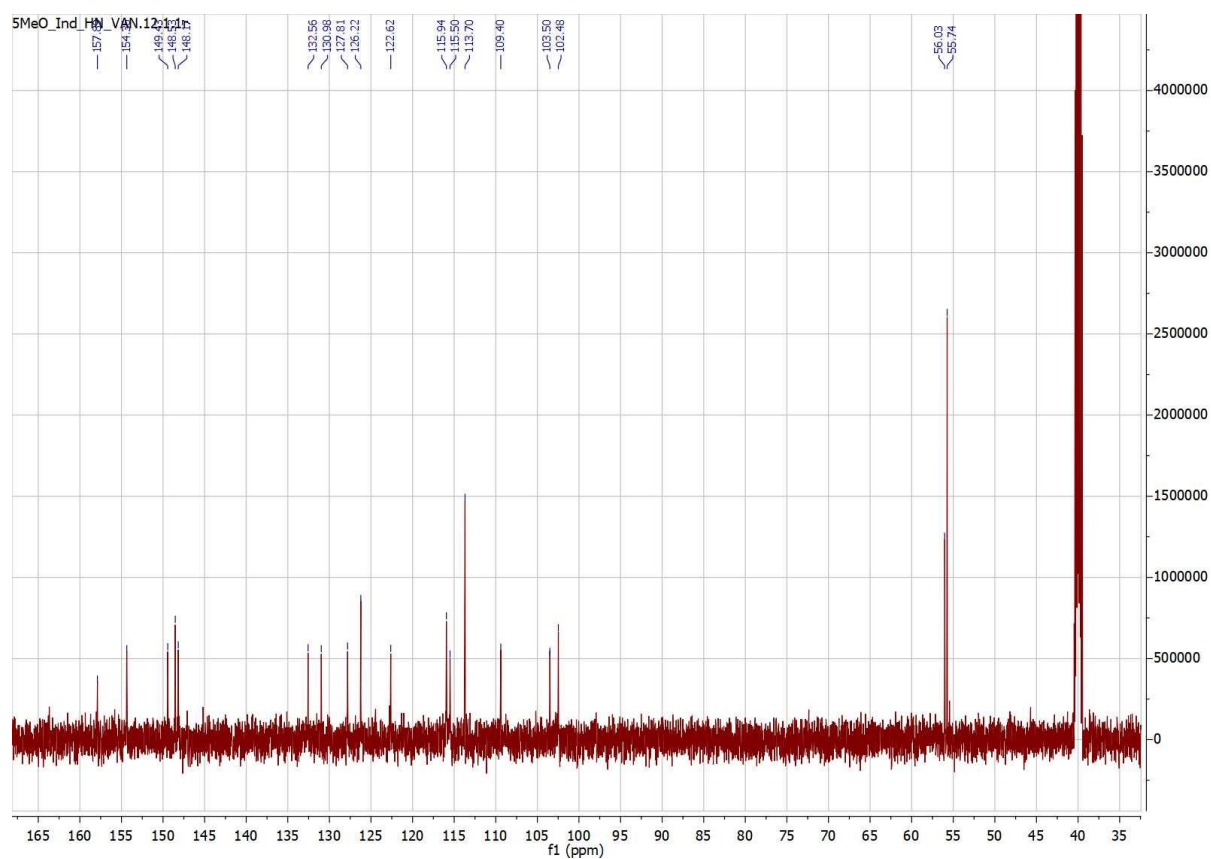


Figure S20.  $^{13}\text{C}$  NMR spectrum of **5d** (151 MHz,  $\text{DMSO-d}_6$ )

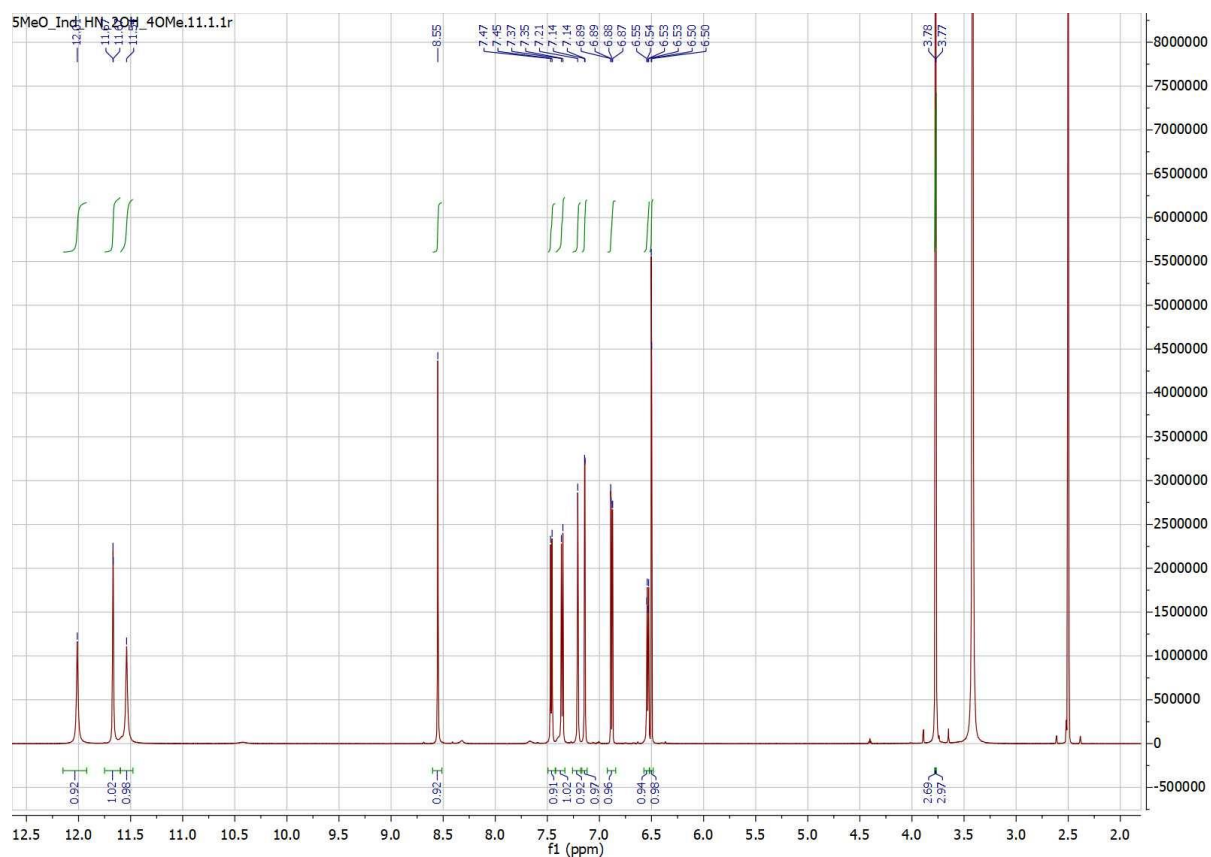


Figure S21.  $^1\text{H}$  NMR spectrum of **5e** (600 MHz,  $\text{DMSO-d}_6$ )

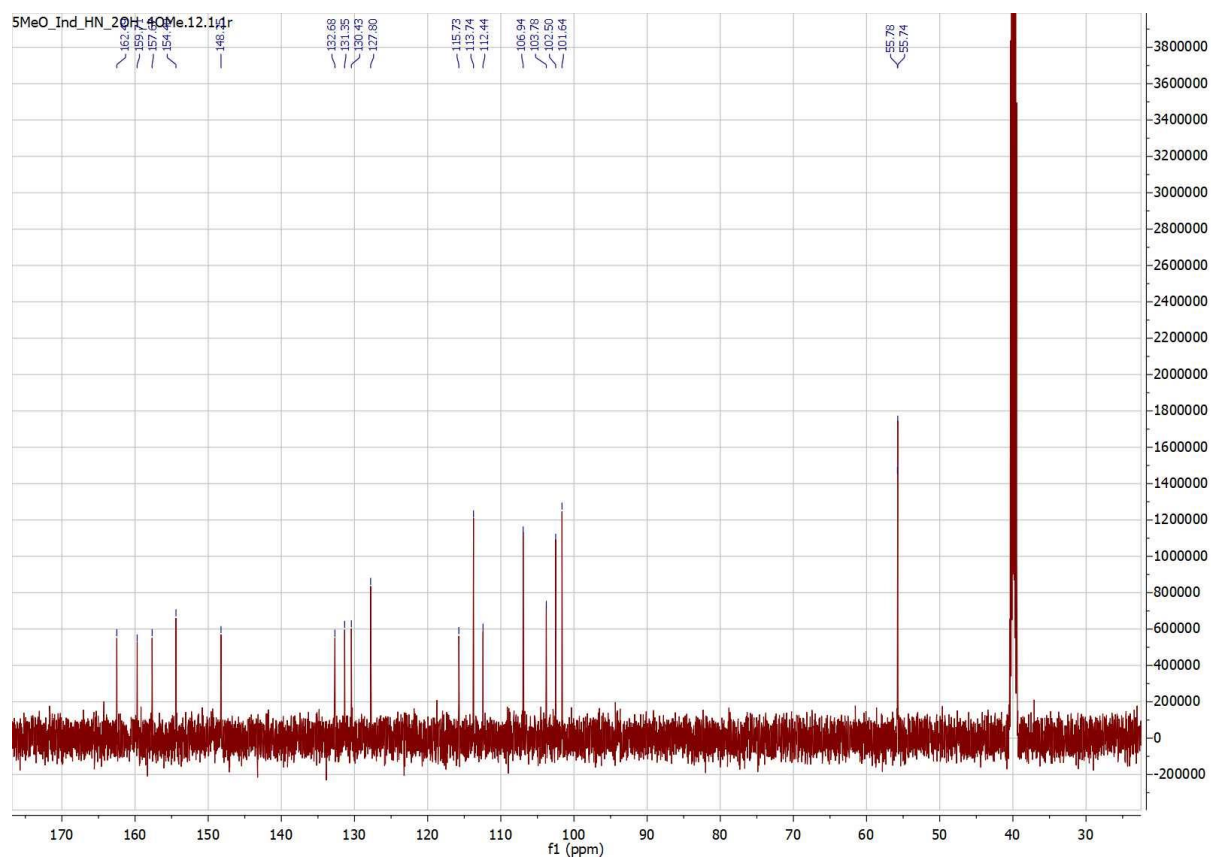


Figure S22.  $^{13}\text{C}$  NMR spectrum of **5e** (151 MHz,  $\text{DMSO-d}_6$ )

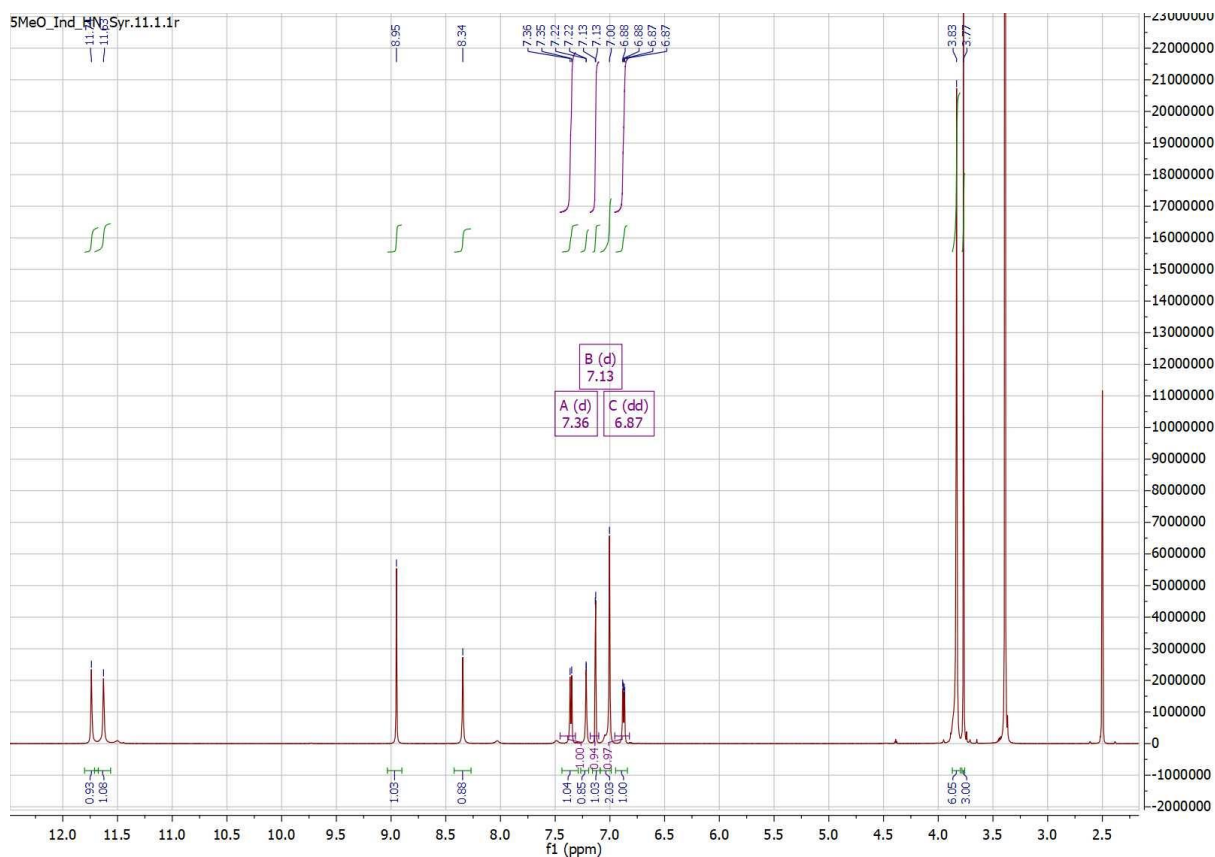


Figure S23.  $^1\text{H}$  NMR spectrum of **5f** (600 MHz, DMSO- $\text{d}_6$ )

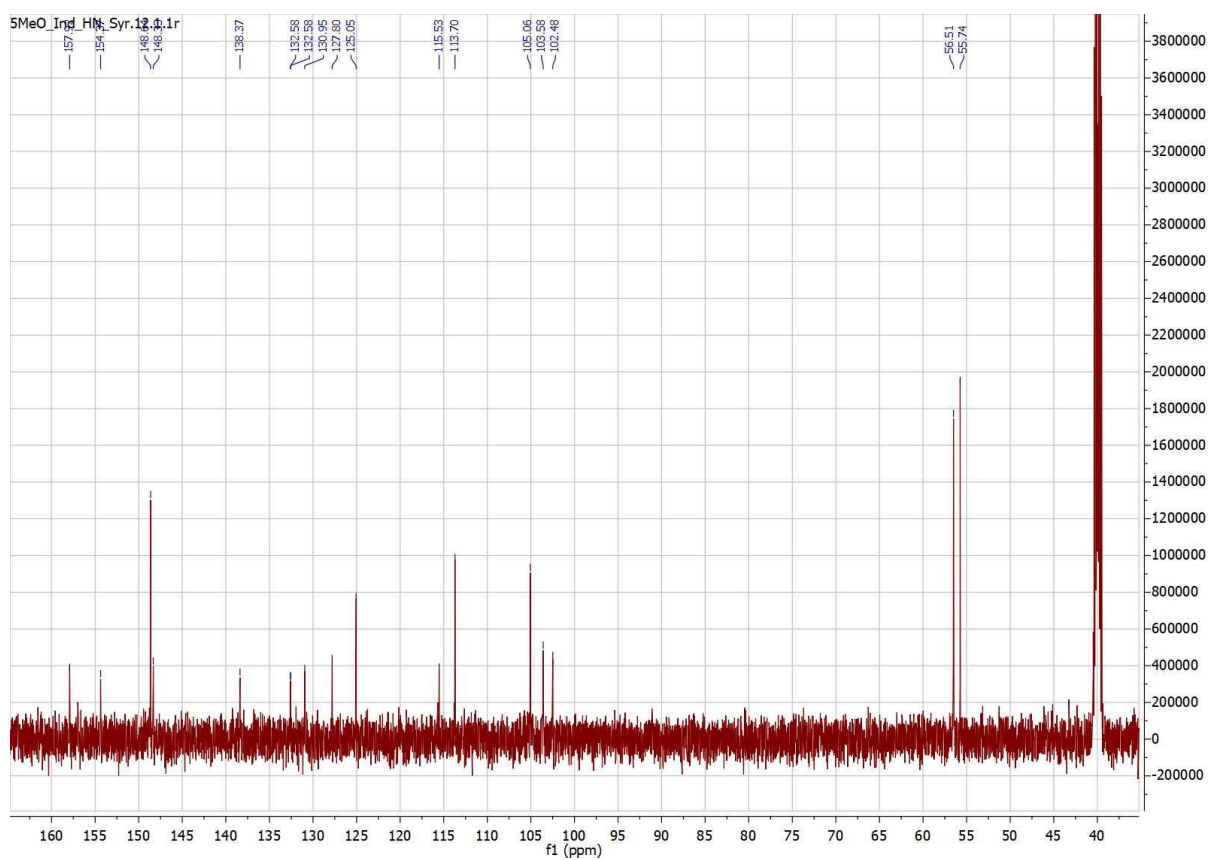


Figure S24.  $^{13}\text{C}$  NMR spectrum of **5f** (151 MHz, DMSO- $\text{d}_6$ )

### 3. IR spectra of the synthesized compounds

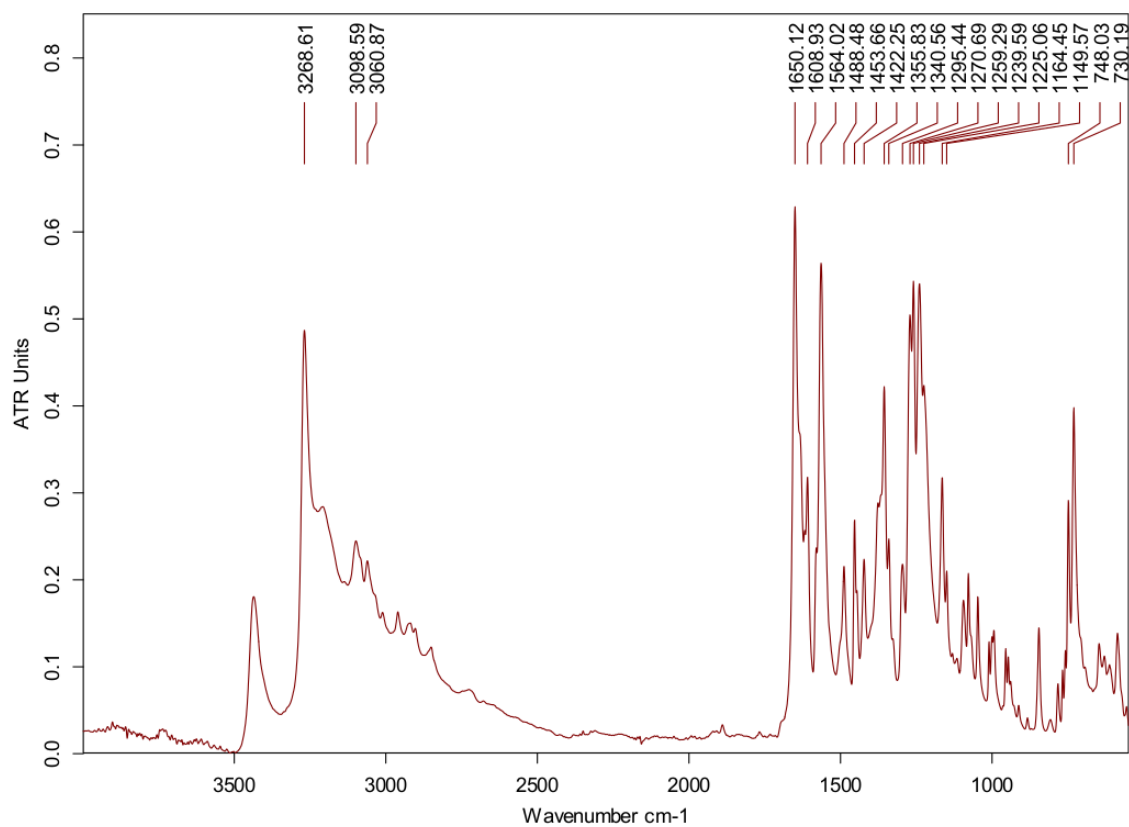


Figure S25. ATR-IR spectrum of 3a

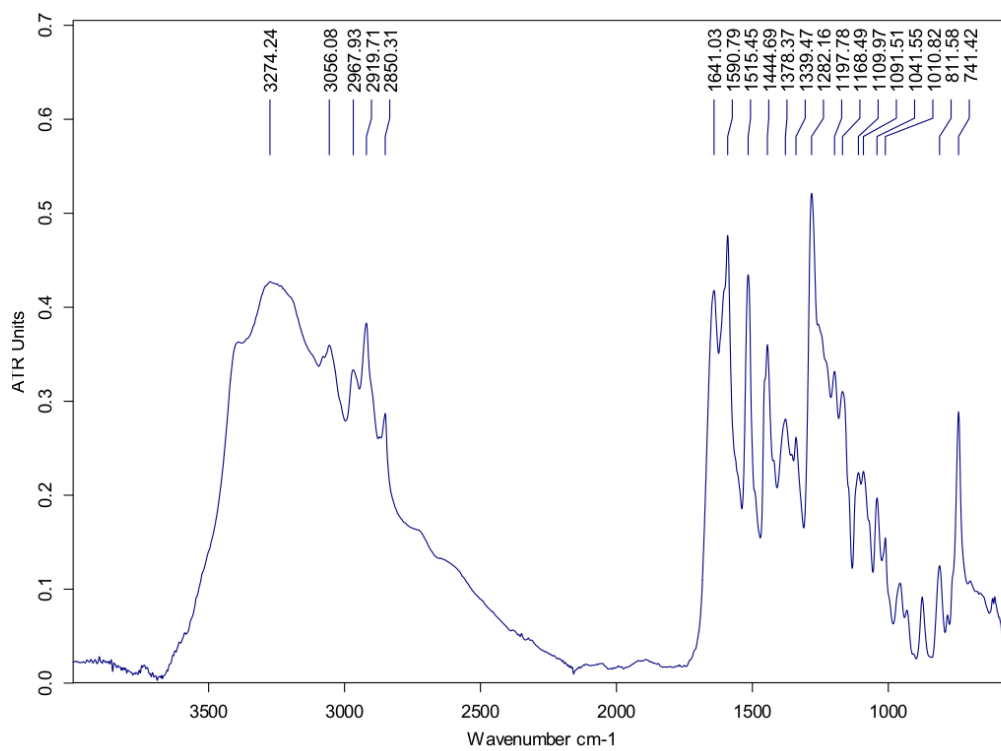
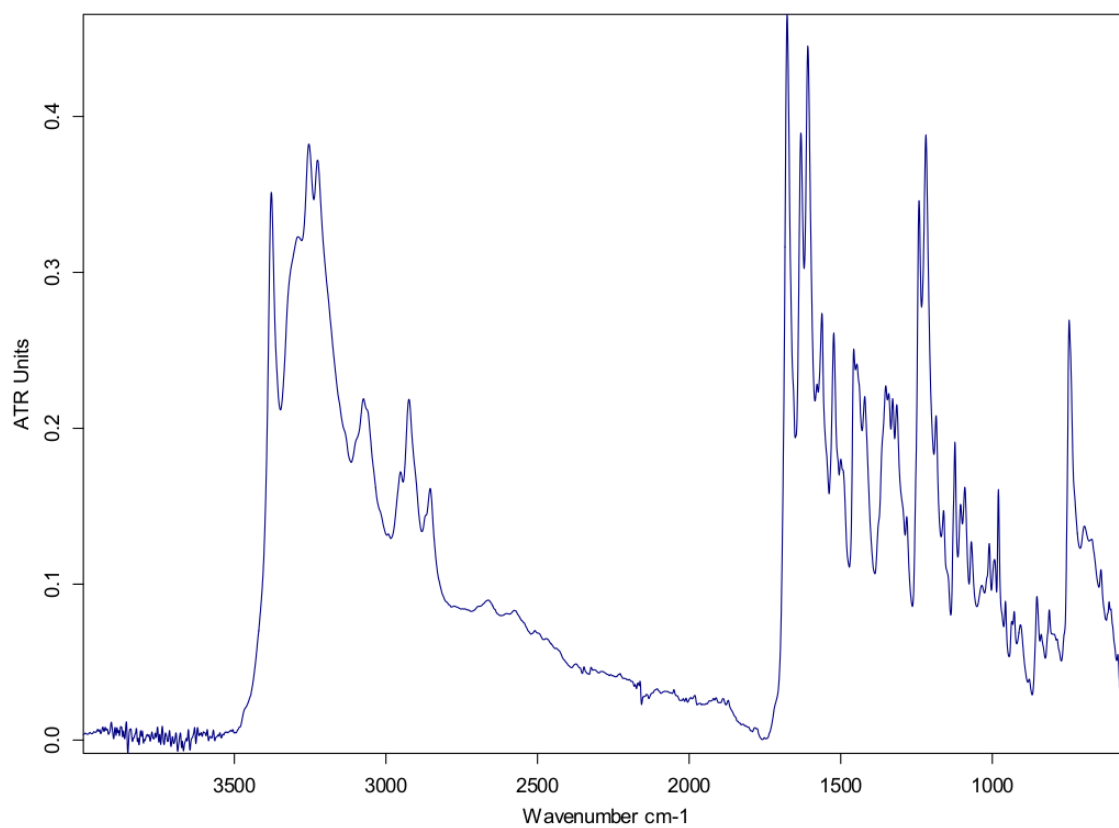
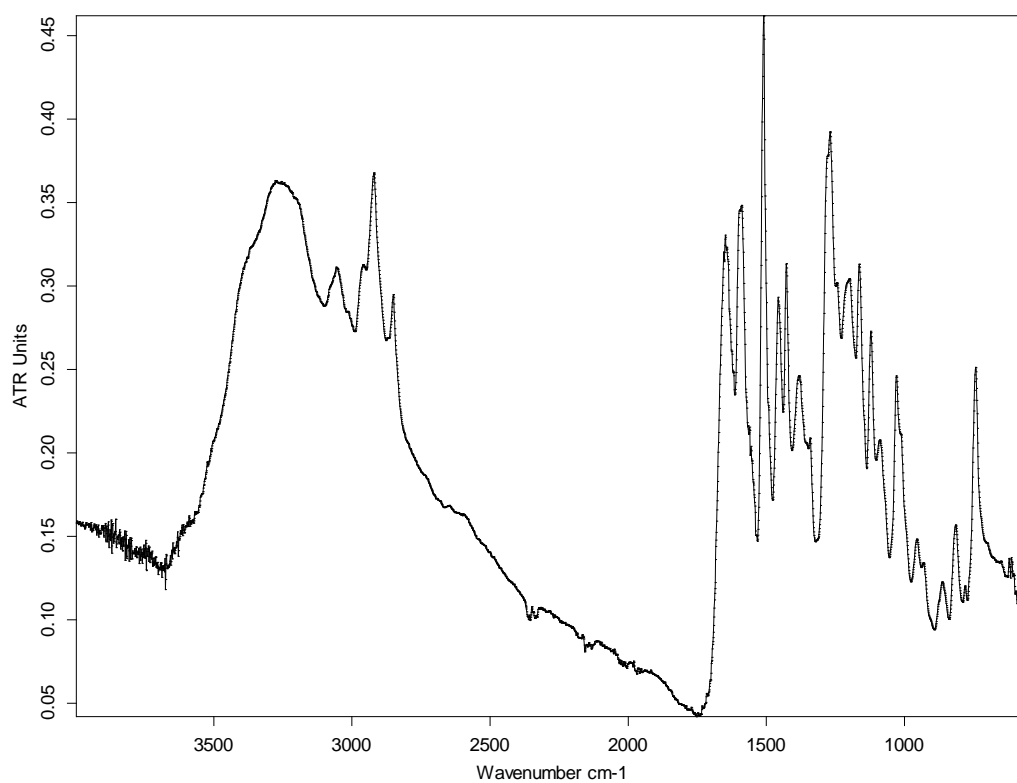


Figure S26. ATR-IR spectrum of 3b

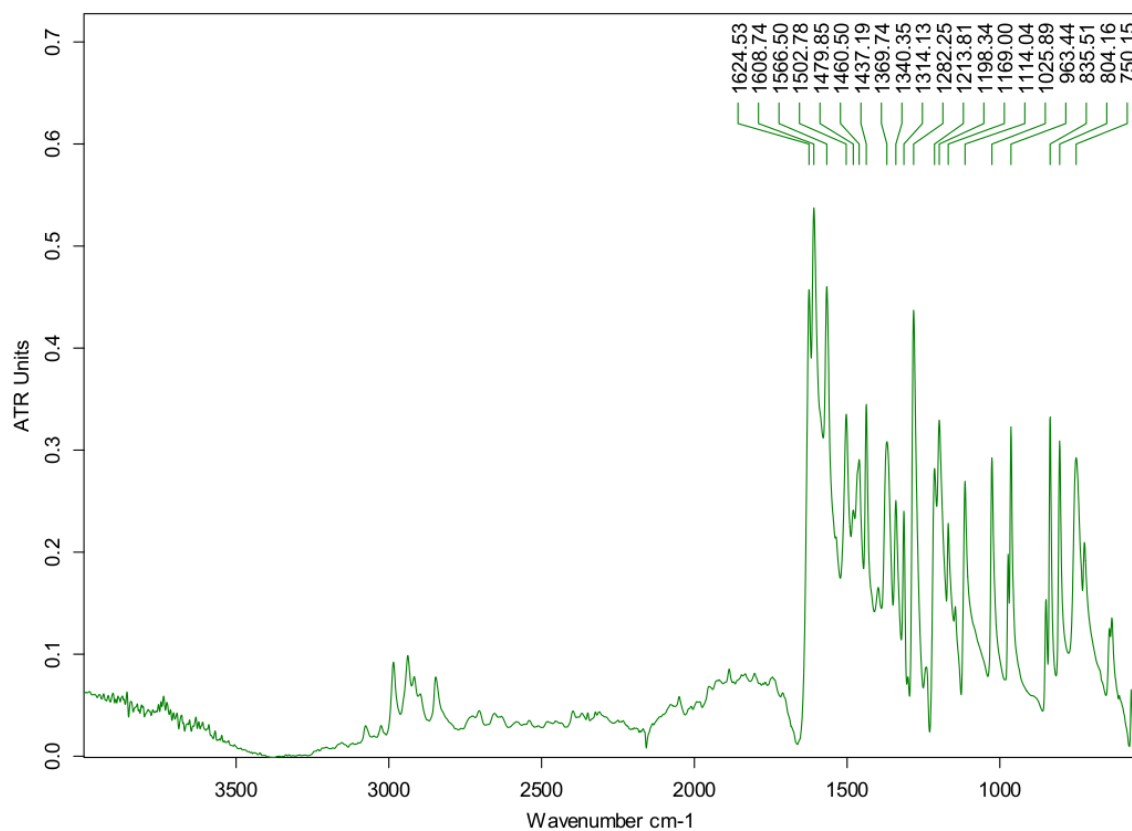




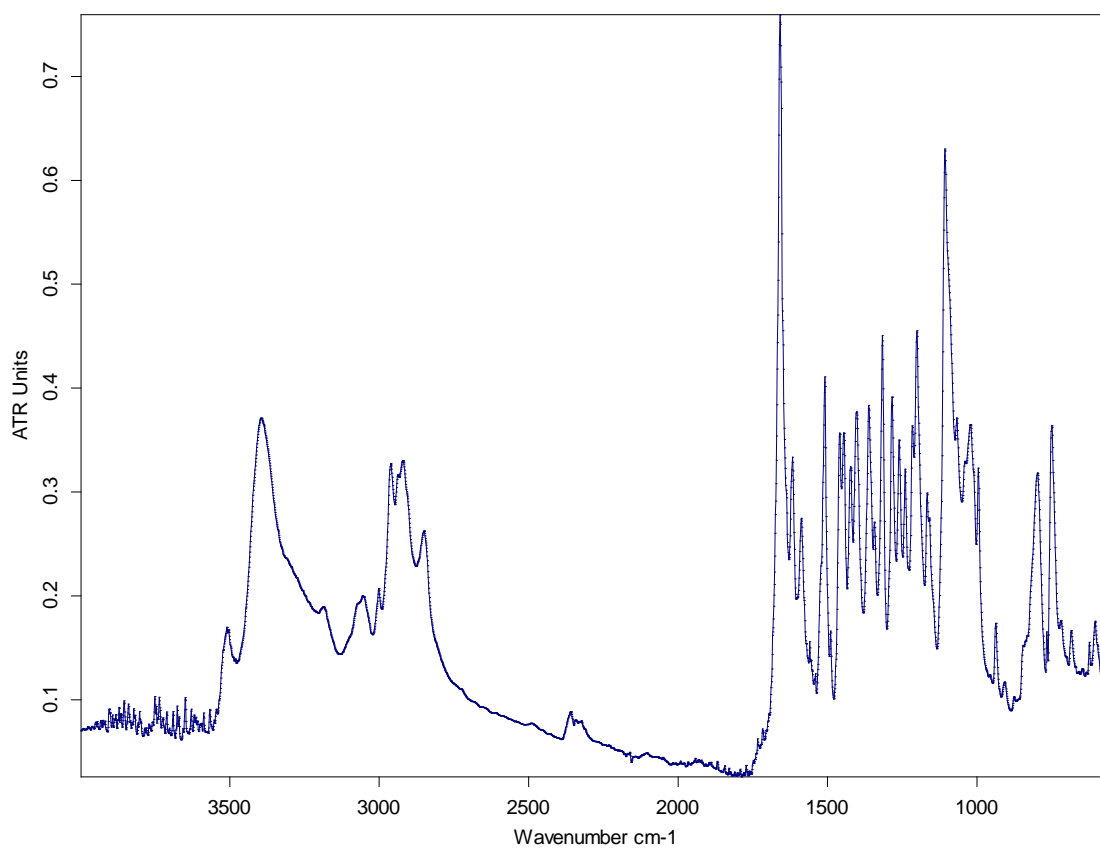
**Figure S27.** ATR-IR spectrum of **3c**



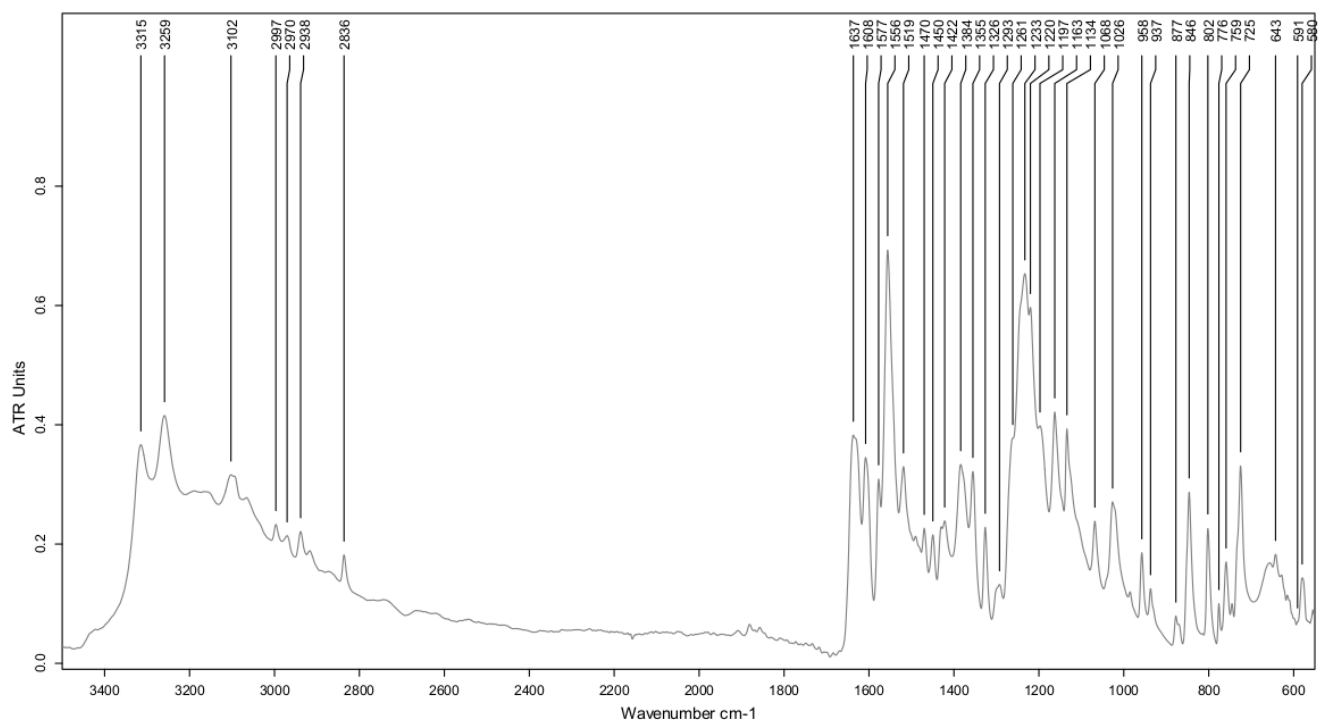
**Figure S28.** ATR-IR spectrum of **3d**



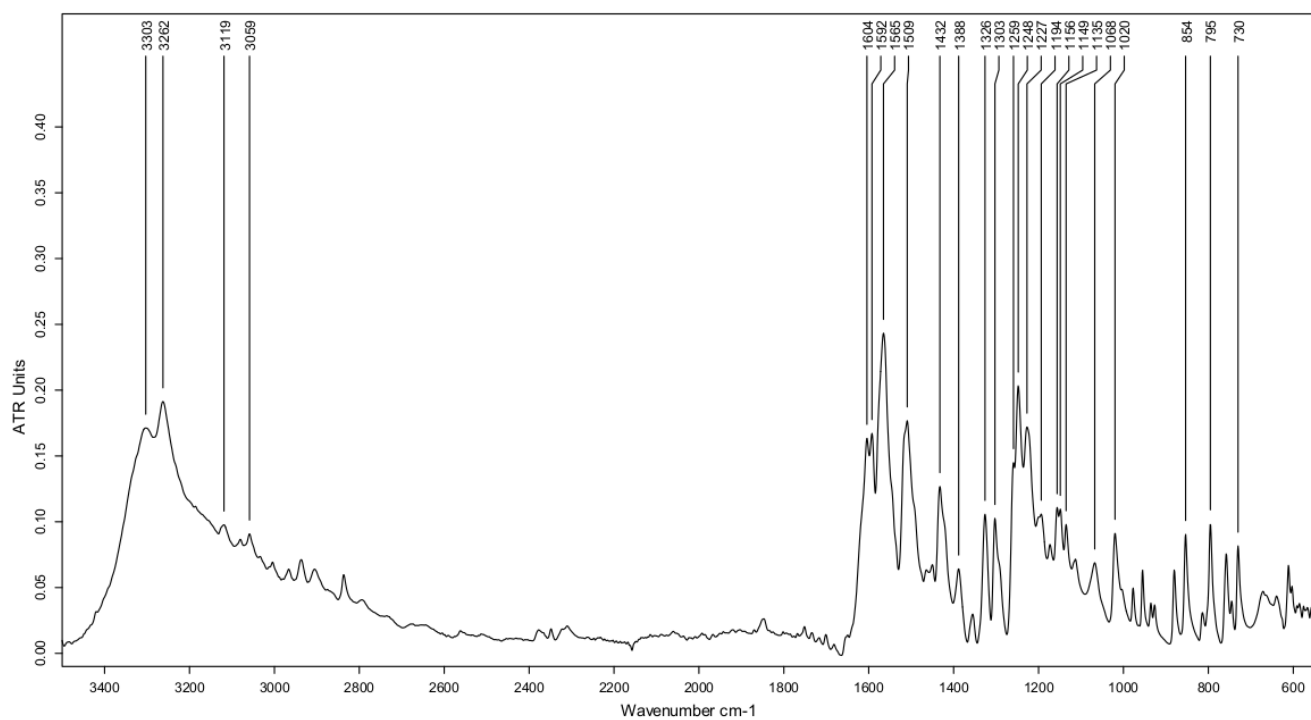
**Figure S29.** ATR-IR spectrum of **3e**



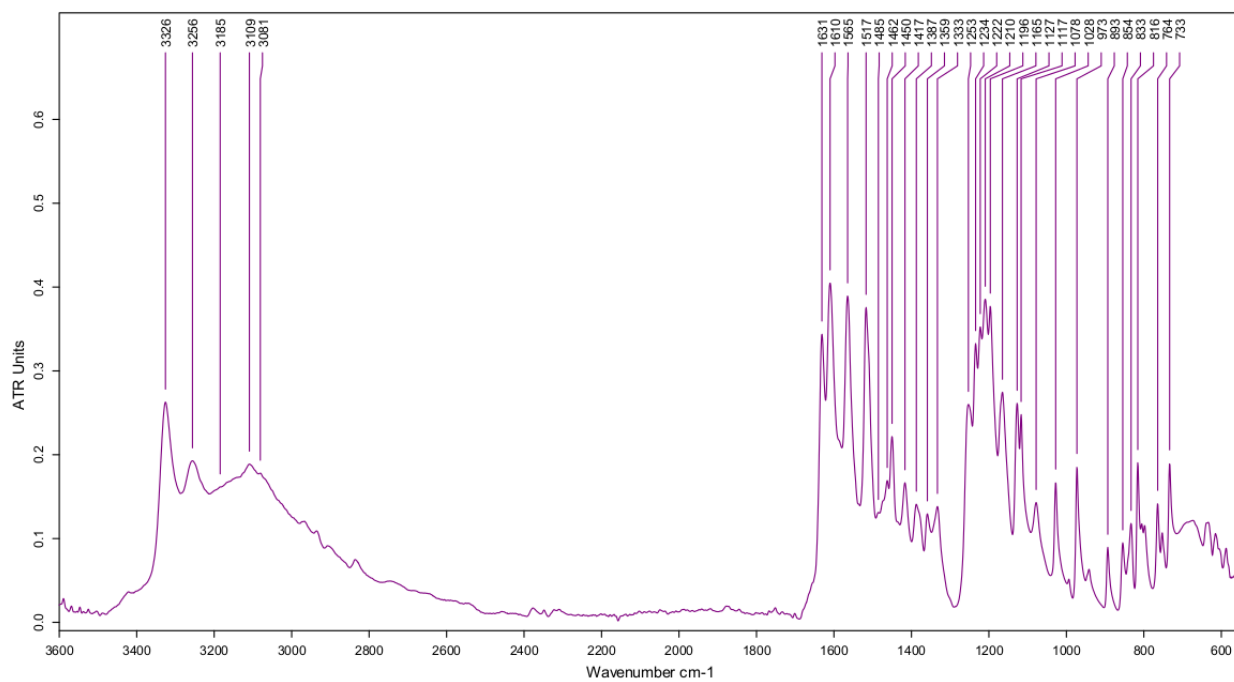
**Figure S30.** ATR-IR spectrum of **3f**



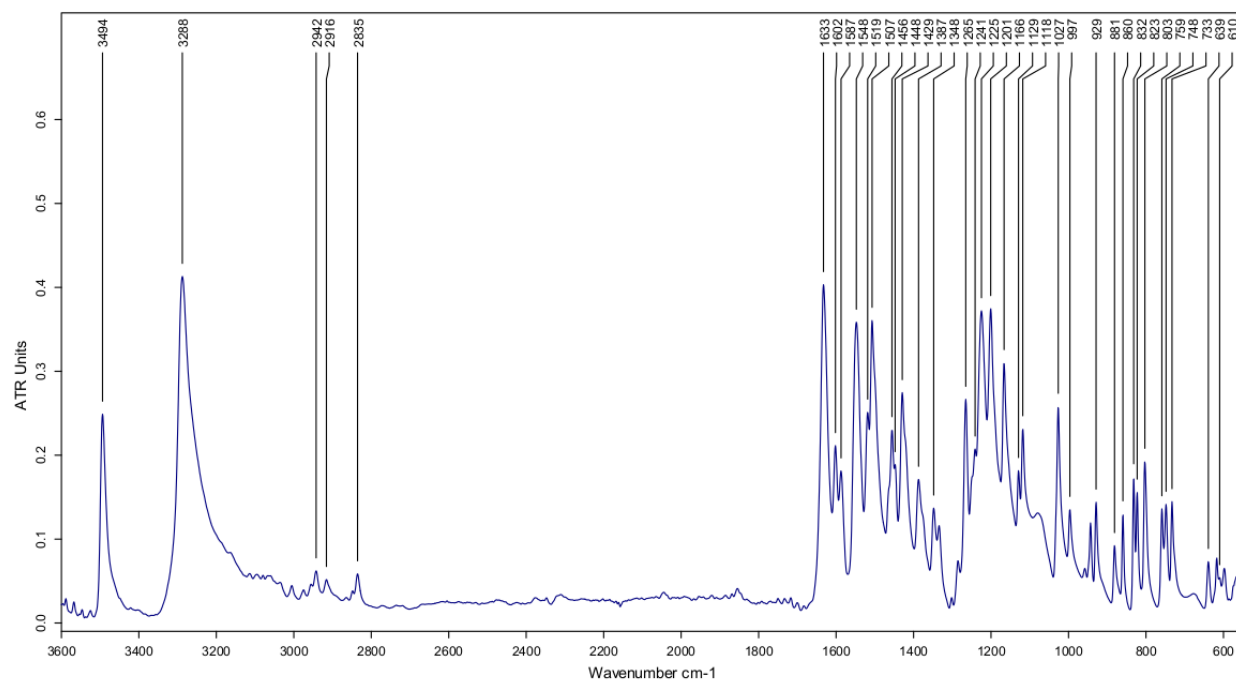
**Figure S31.** ATR-IR spectrum of **5a**



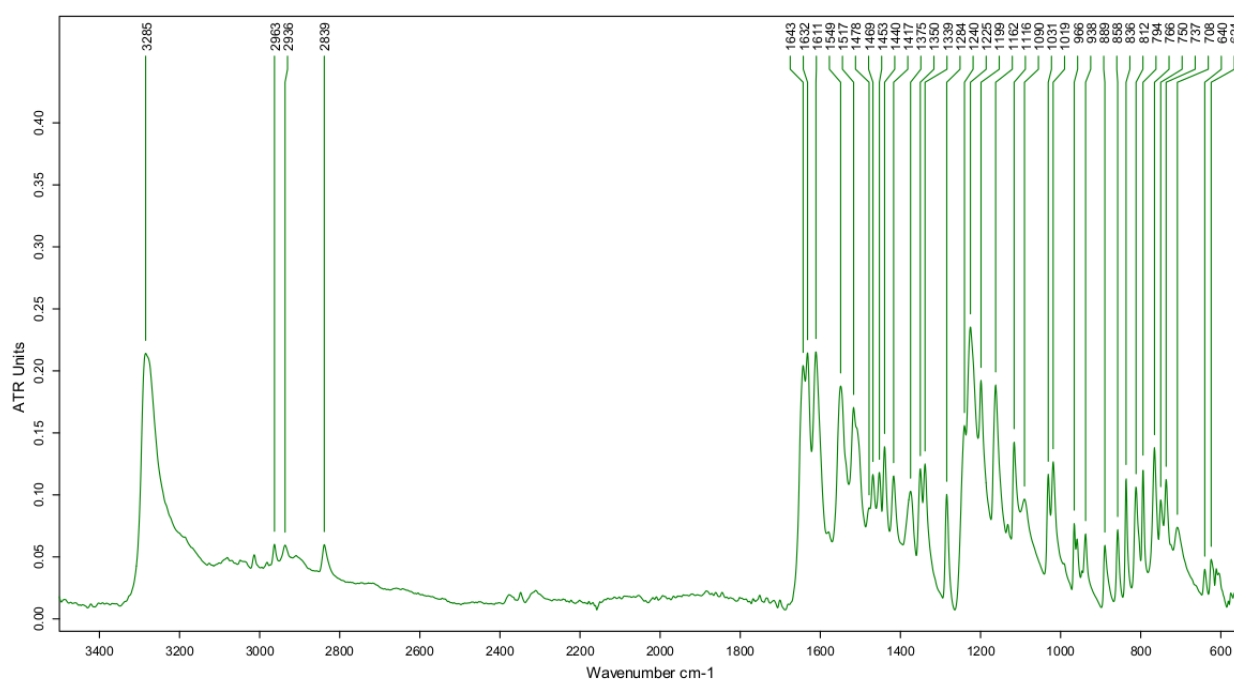
**Figure S32.** ATR-IR spectrum of **5b**



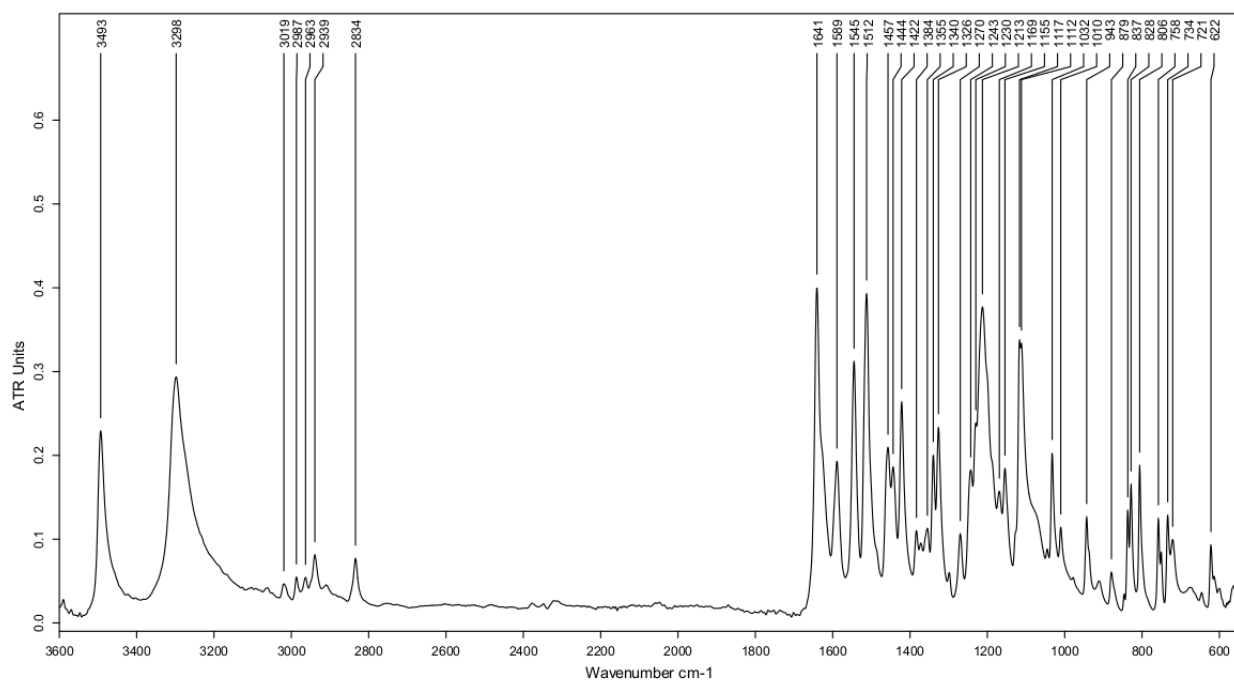
**Figure S33.** ATR-IR spectrum of **5c**



**Figure S34.** ATR-IR spectrum of **5d**

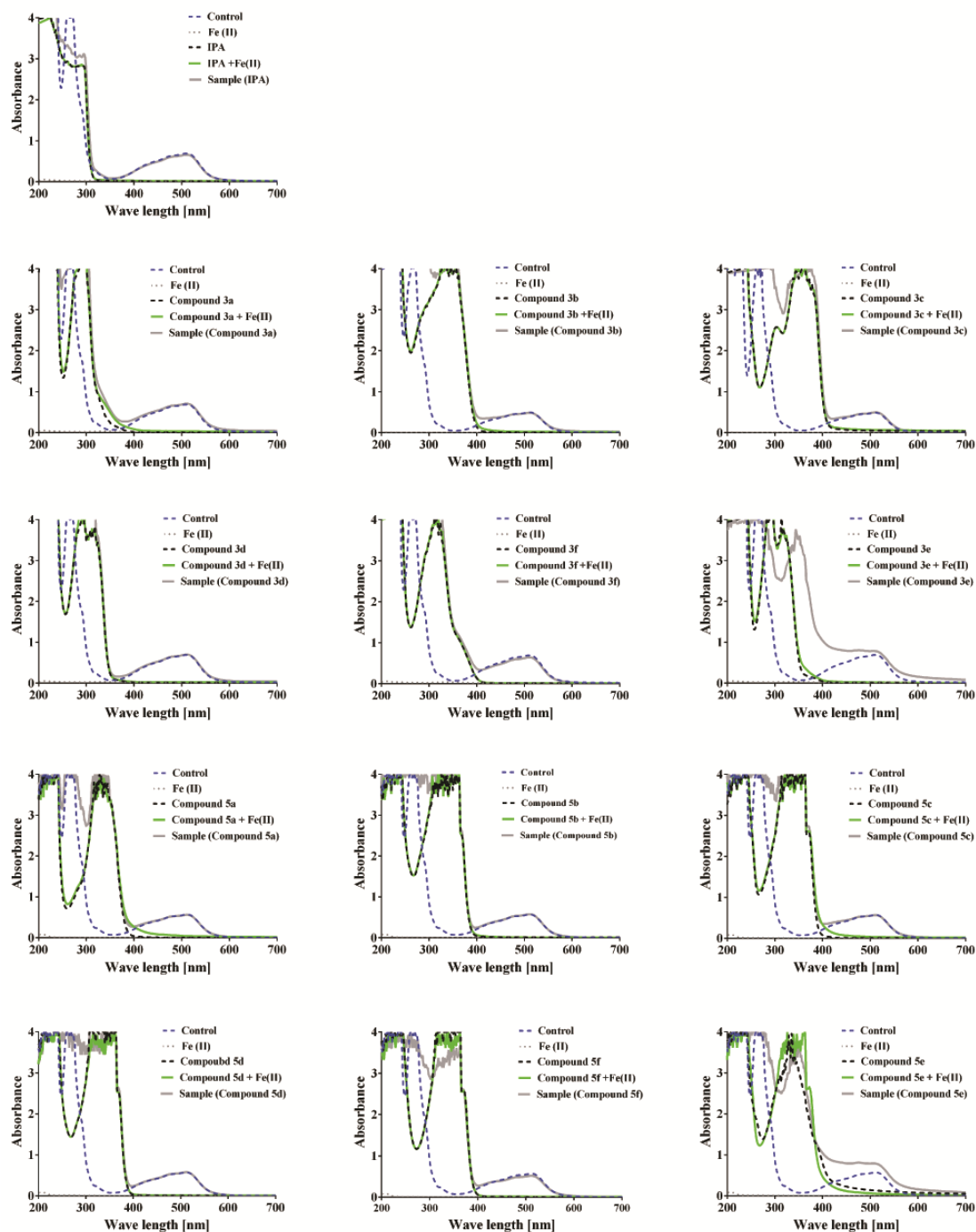


**Figure S35.** ATR-IR spectrum of **5e**



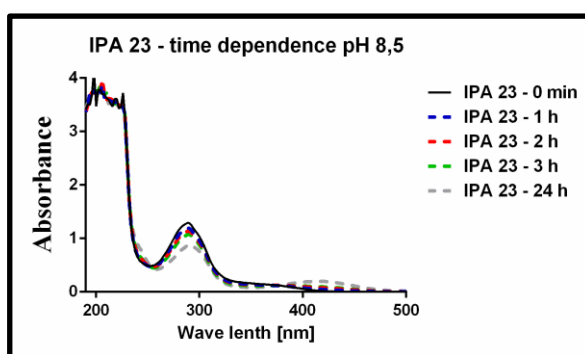
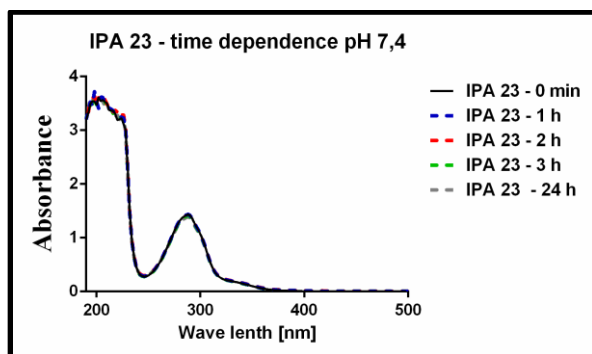
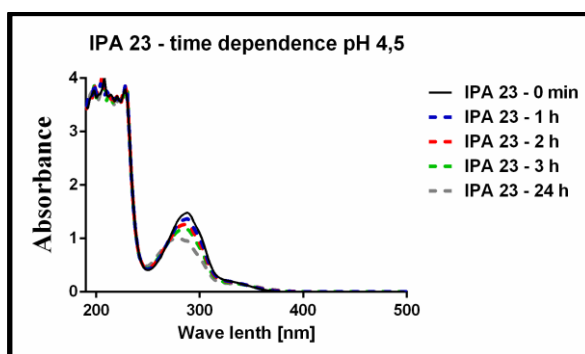
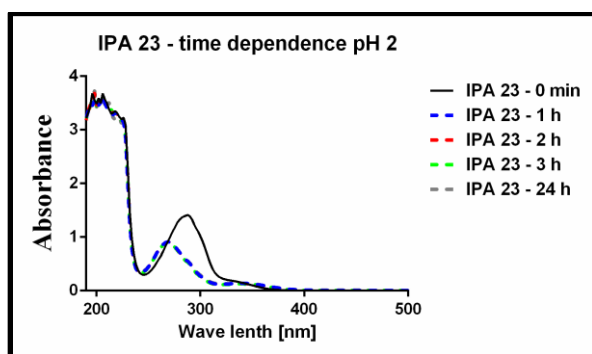
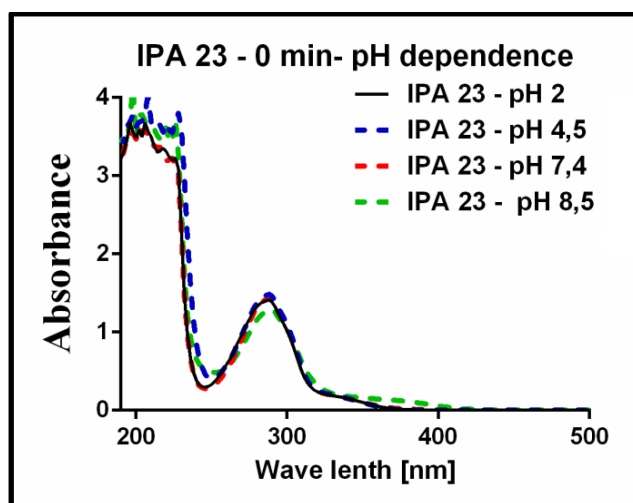
**Figure S36.** ATR-IR spectrum of **5f**

### 3. UV-Vis spectra absorbance spectra of the: Control - standard orange-red Fe(II) – 1,10 Phenanthroline complex; the tested hydrazone compounds

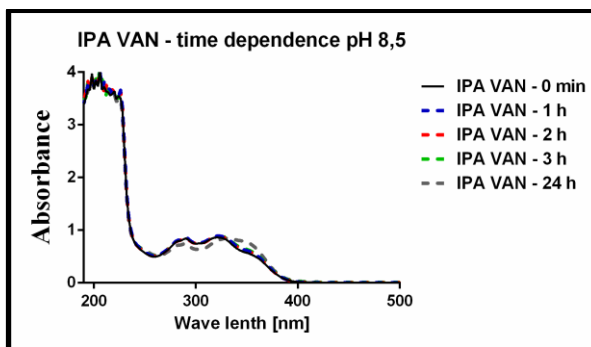
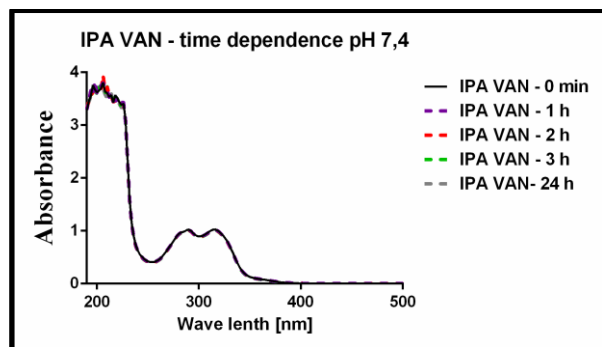
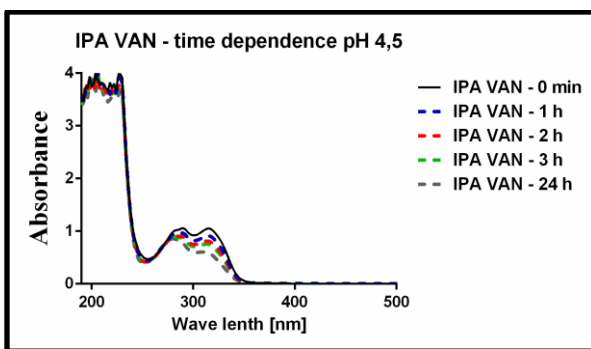
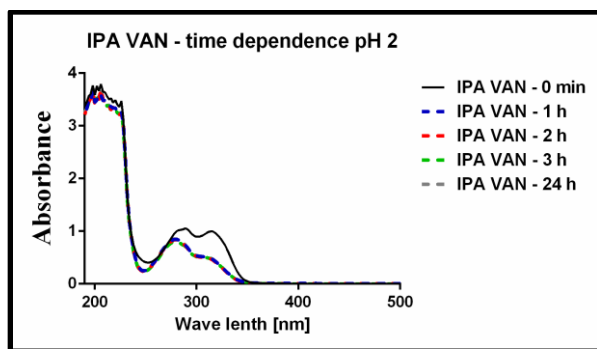
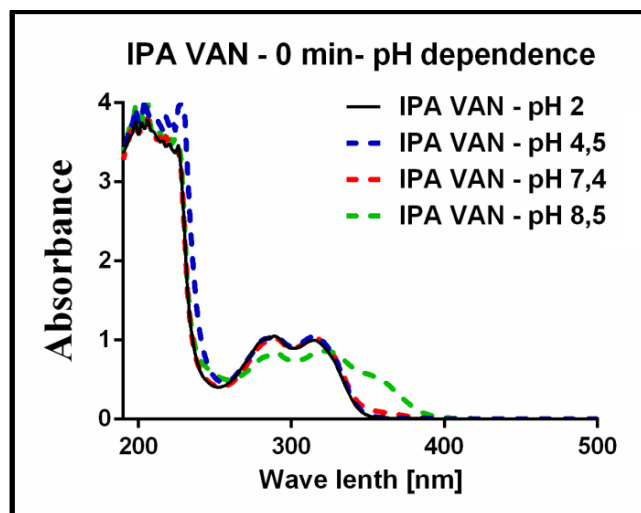


**Figure S37.** UV-Vis spectra absorbance spectra of the: Control - standard orange-red Fe(II) – 1,10 Phenanthroline complex; the tested hydrazone compounds [0.2 mmol/L] alone and in the presence of Fe(II) [0.05 mmol/L]; and the sample solution containing 1,10 phenanthroline [0.2 mmol/L], Fe(II) [0.05 mmol/L] and the hydrazone derivatives [0.2 mmol/L].

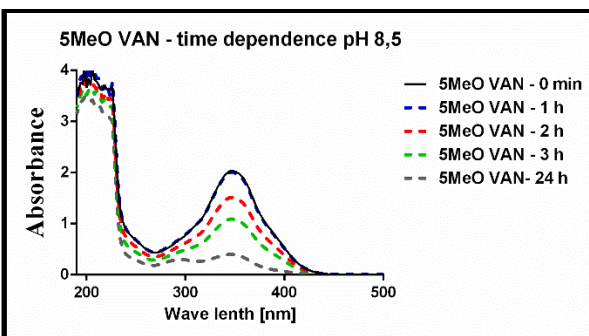
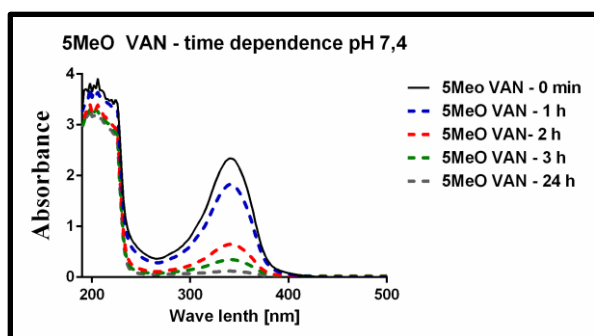
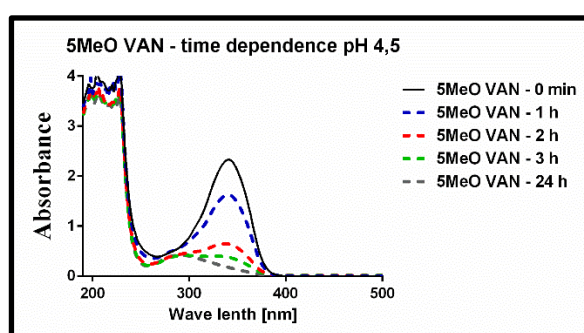
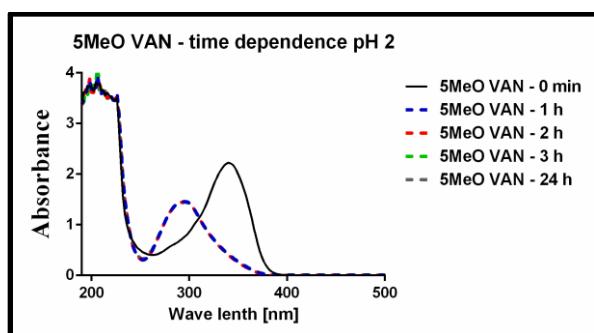
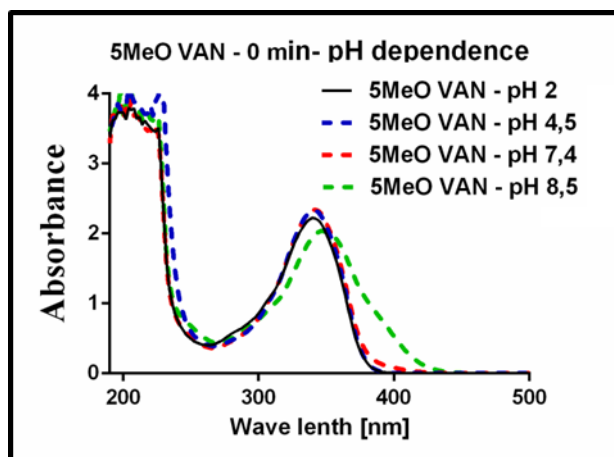




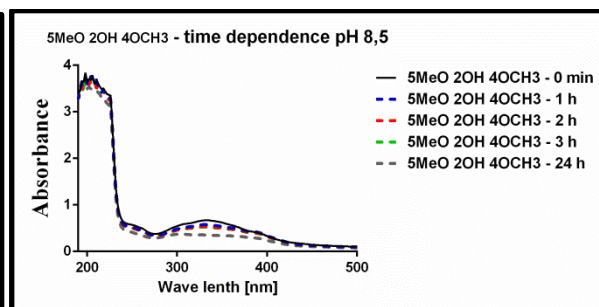
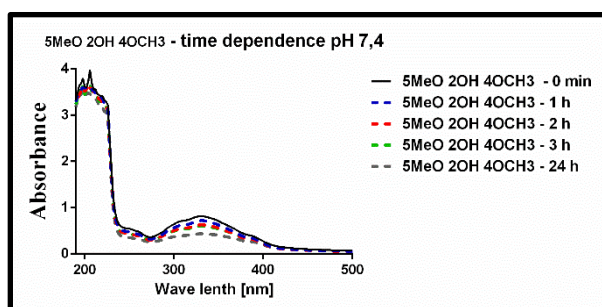
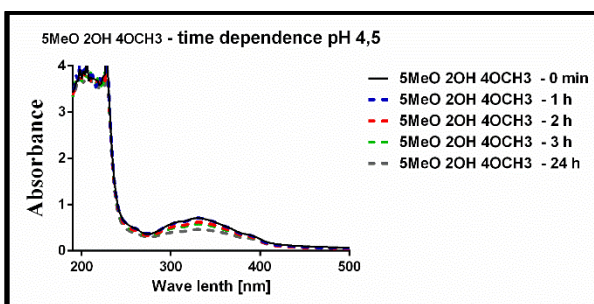
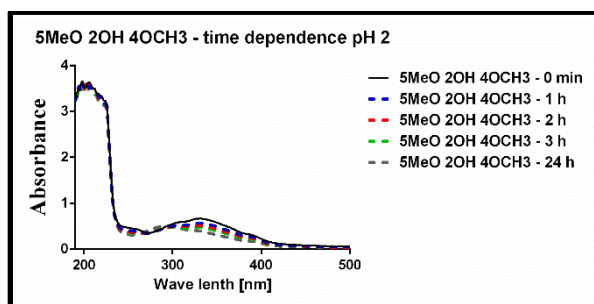
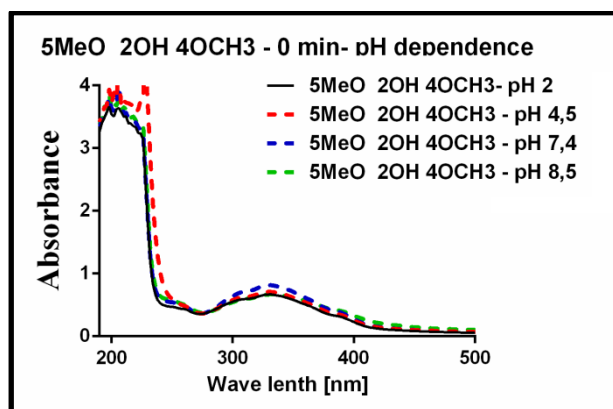
**Figure S38.** UV spectra of **3a** in buffers with pH 2, 4.5, 7.4 and 8.5 measured at the initial point (0 min) and after 1, 2, 3 and 24 h



**Figure S39.** UV spectra of **3d** in buffers with pH 2, 4.5, 7.4 and 8.5 measured at the initial point (0 min) and after 1, 2, 3 and 24 h



**Figure S40.** UV spectra of **5d** in buffers with pH 2, 4.5, 7.4 and 8.5 measured at the initial point (0 min) and after 1, 2, 3 and 24 h



**Figure S41.** UV spectra of **5e** in buffers with pH 2, 4.5, 7.4 and 8.5 measured at the initial point (0 min) and after 1, 2, 3 and 24 h