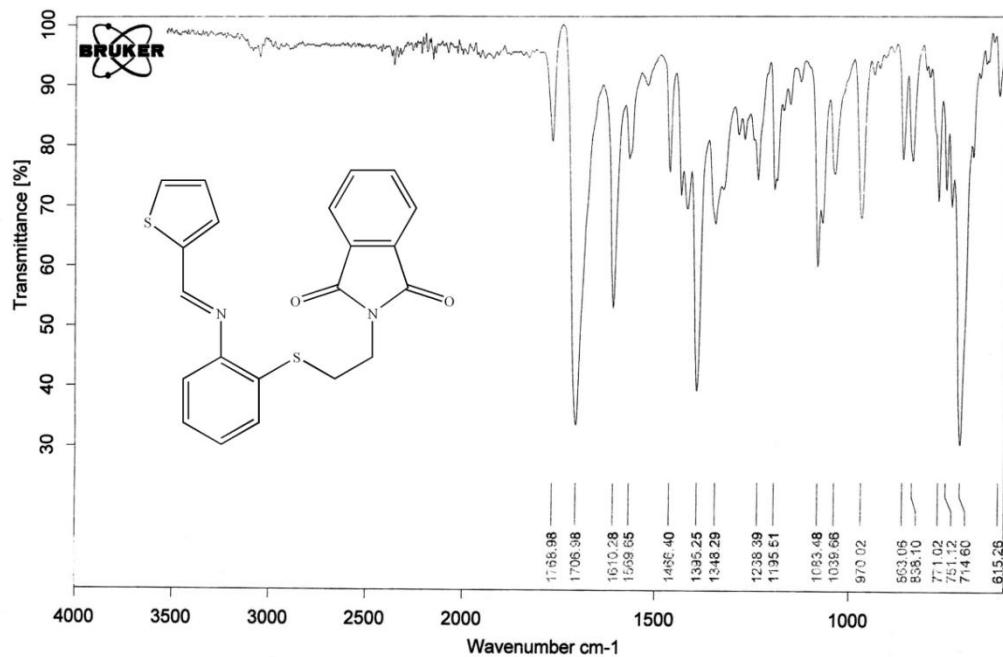


## Supplementary Information

### Synthesis and Characterization of a New Unsymmetrical Potentially Pentadentate Schiff Base Ligand and Related Complexes with Manganese(II), Nickel(II), Copper(II), Zinc(II) and Cadmium(II)

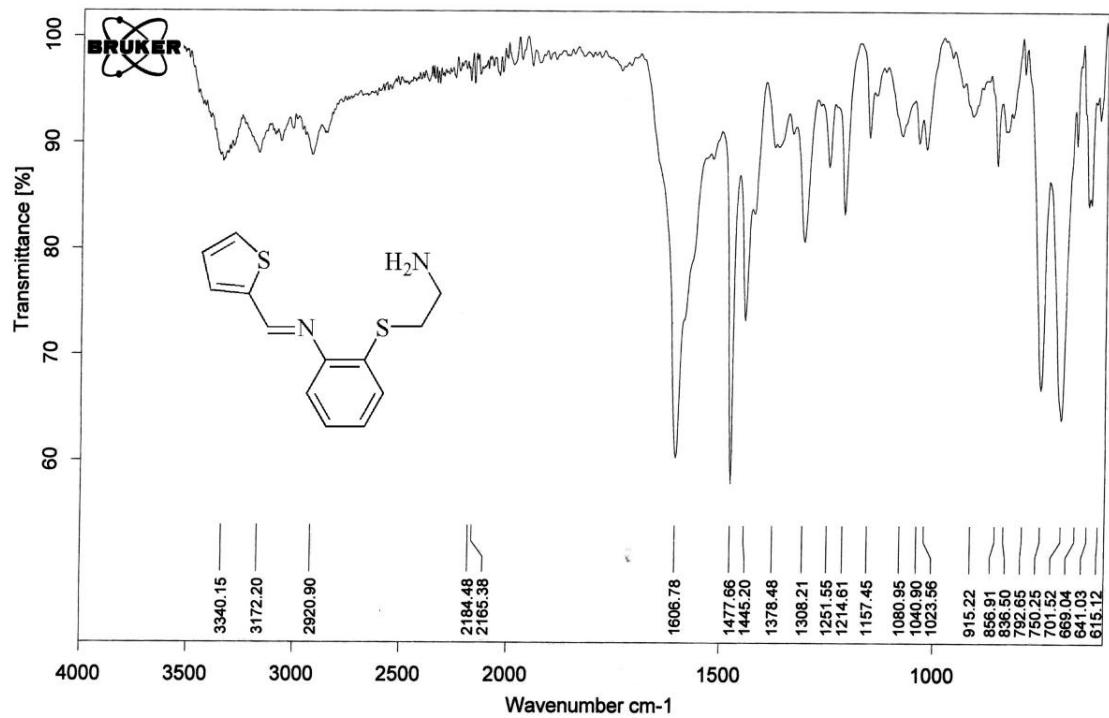
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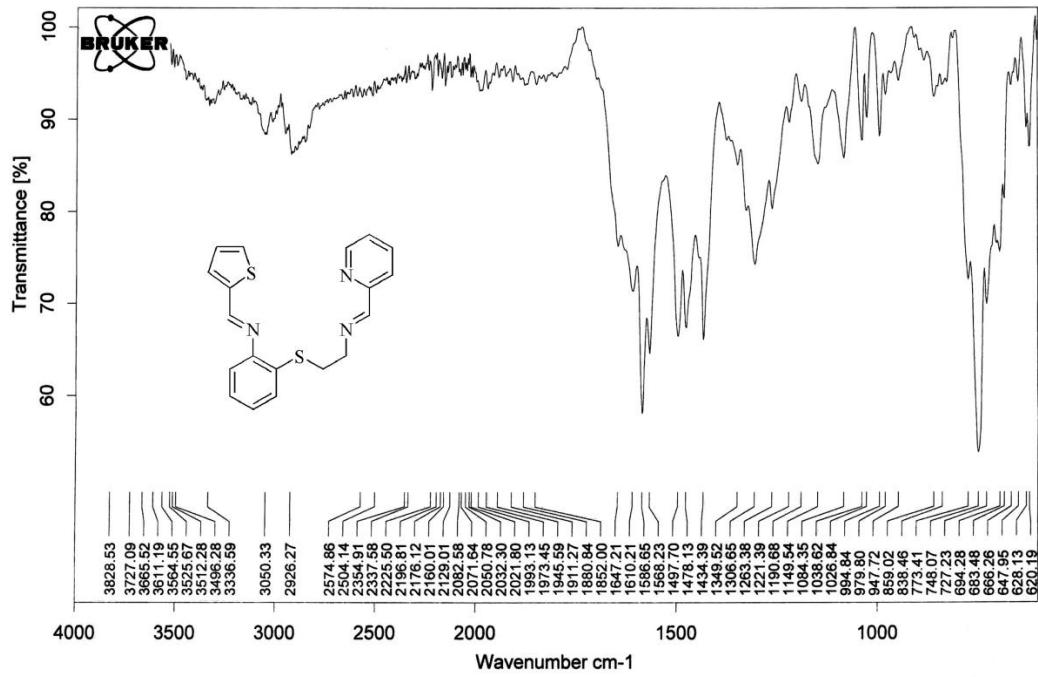


**Figure S1.** IR spectrum (ATR) of 2-(2-(2-((thiophene-2-yl)methyleneamino)phenylthio)ethyl) isoindoline-1,3-dione.

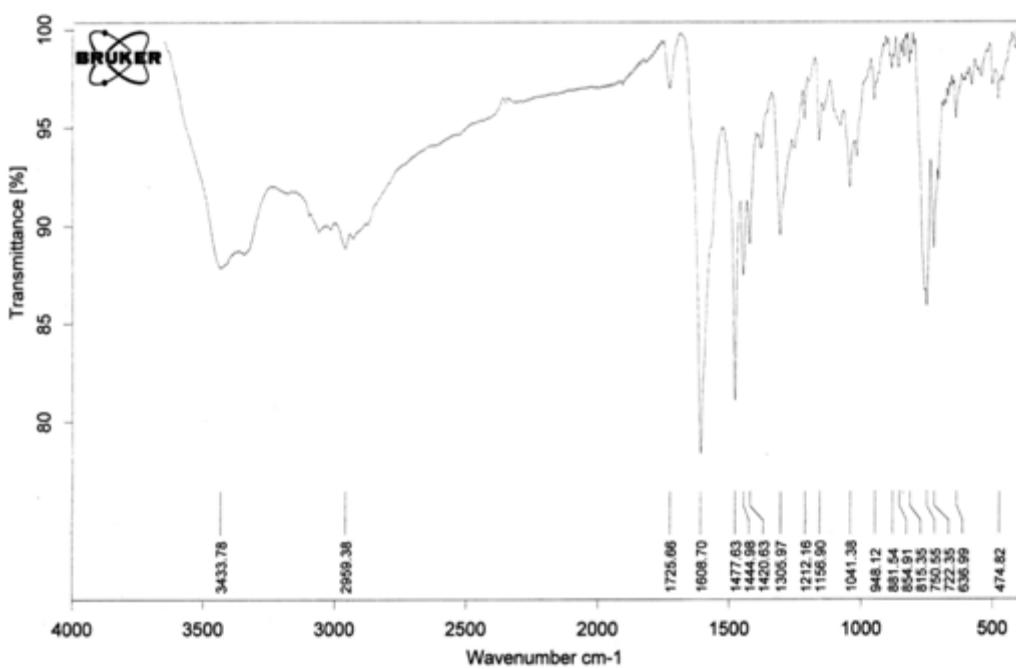
\*e-mail: aadehghani@yazd.ac.ir



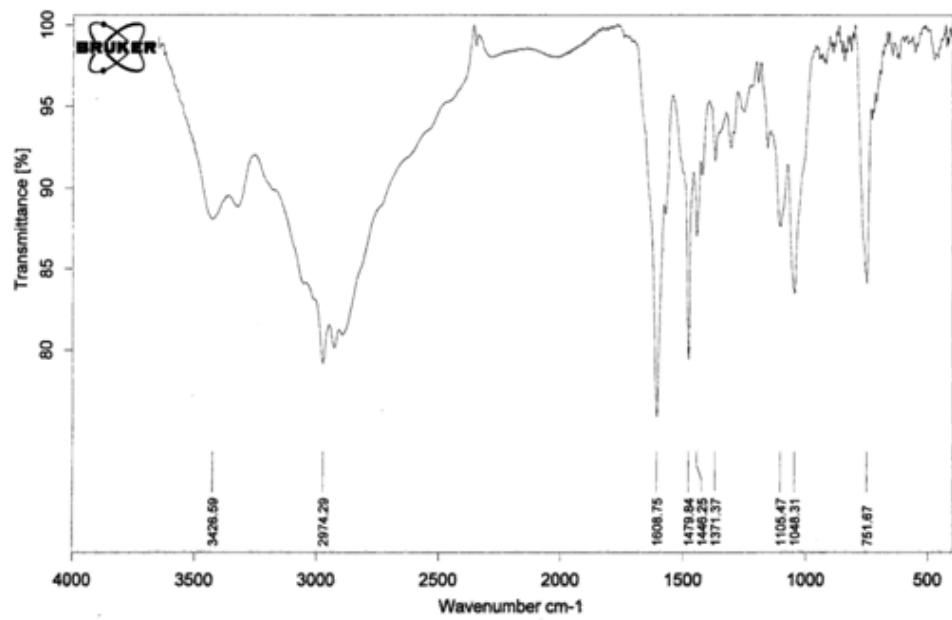
**Figure S2.** IR spectrum (ATR) of 2-(2-aminoethylthio)-N-(thiophene-2-ylmethylene)aniline.



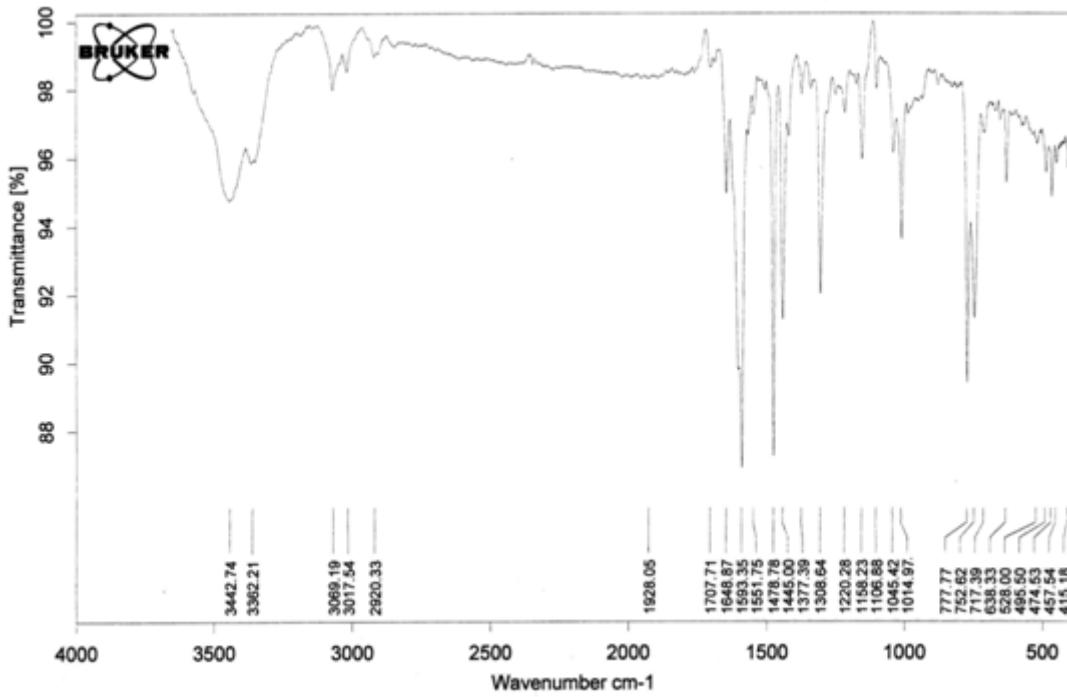
**Figure S3.** IR spectrum (ATR) of 2-(2-(pyridine-2-ylmethyleneamino)ethylthio)-N-(thiophene-2-ylmethylene)aniline (L).



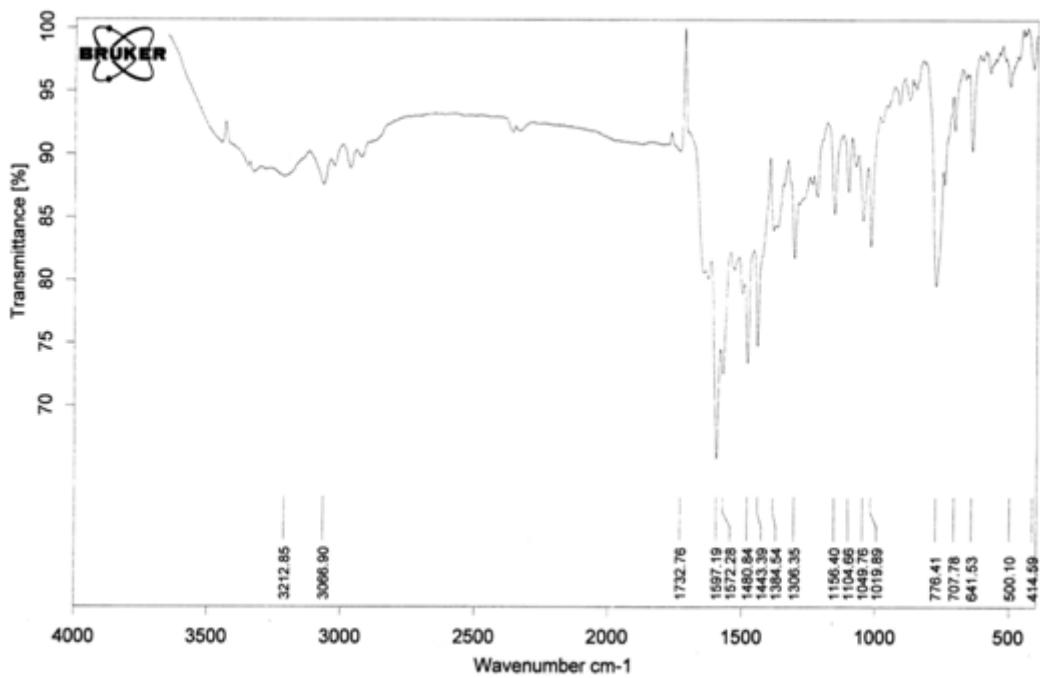
**Figure S4.** IR spectrum (ATR) of  $[\text{MnL}]\text{Cl}_2 \cdot \text{EtOH}$ .



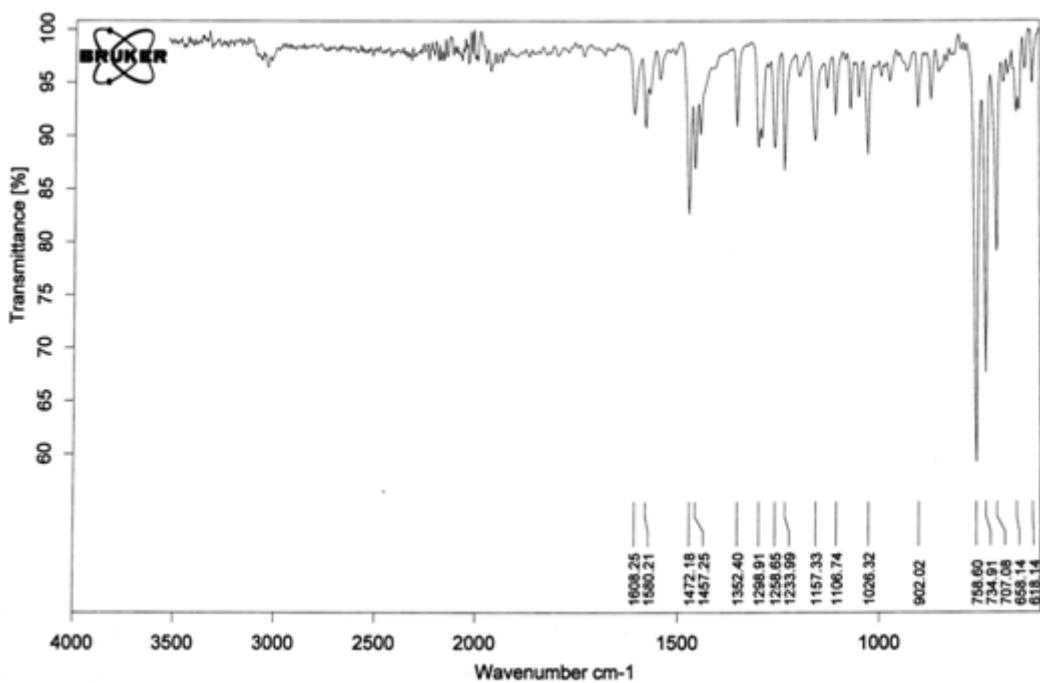
**Figure S5.** IR spectrum (ATR) of  $[\text{CuL}]\text{Cl}_2 \cdot \text{CuCl}_2$ .



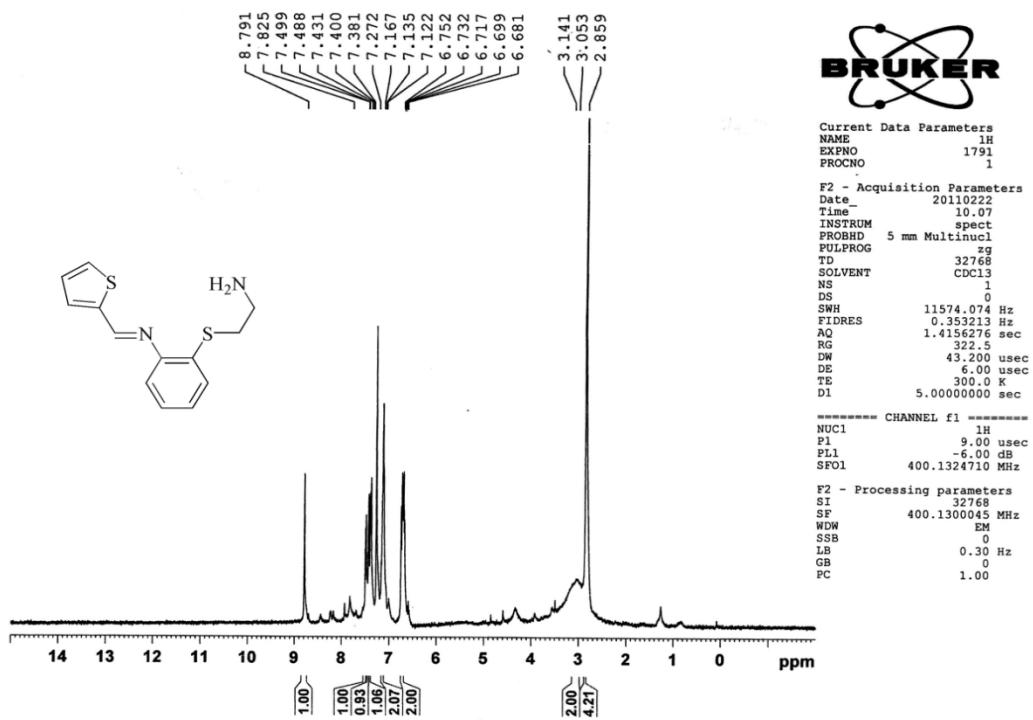
**Figure S6.** IR spectrum (ATR) of  $[CdL]Cl_2 \cdot H_2O$ .



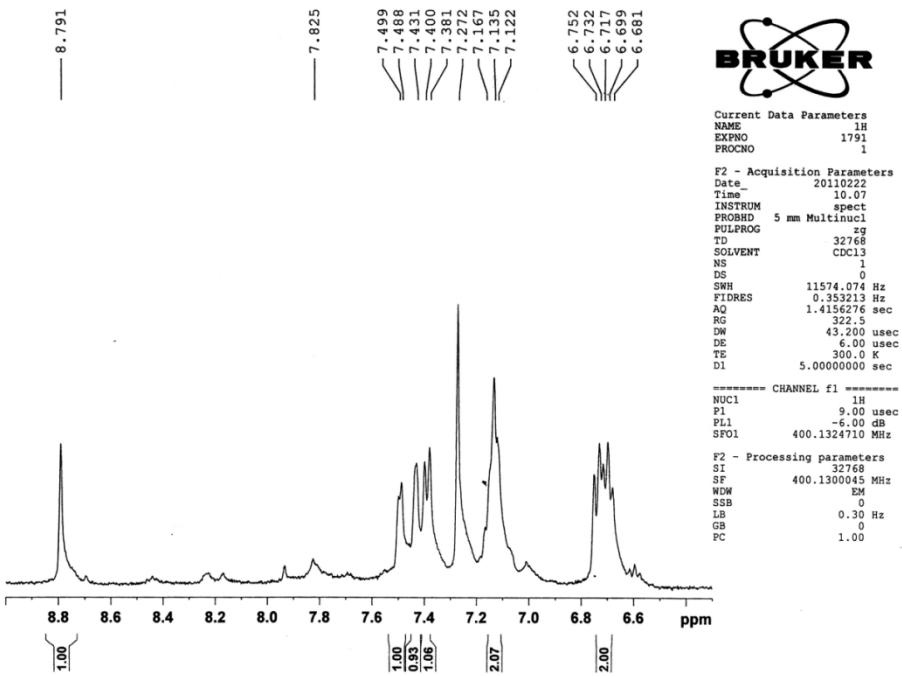
**Figure S7.** IR spectrum (ATR) of  $[ZnL]Cl_2 \cdot 1.5H_2O$ .



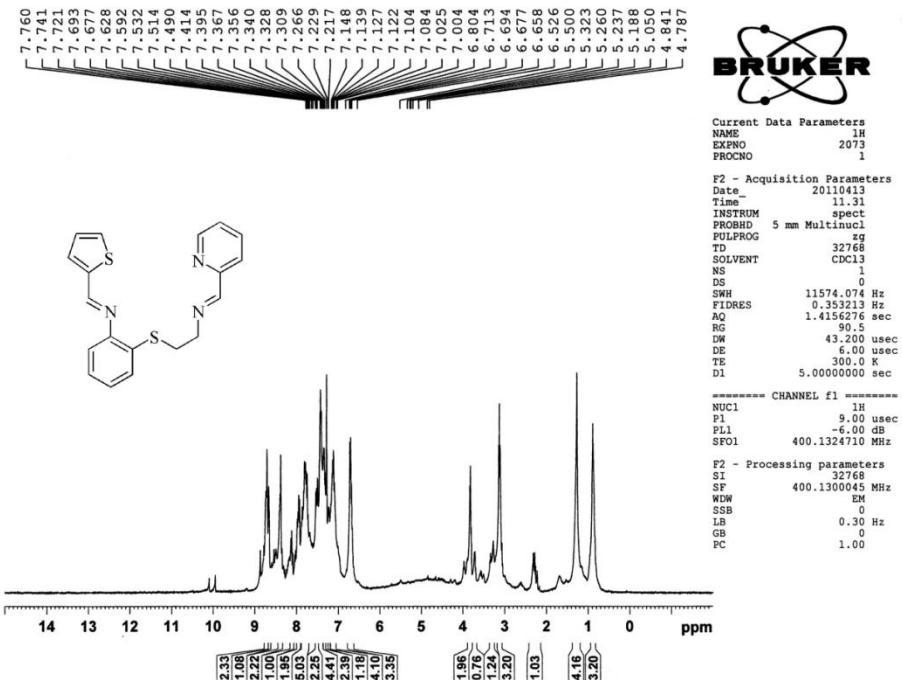
**Figure S8.** IR spectrum (ATR) of  $[\text{NiL}]\text{Cl}_2$ .



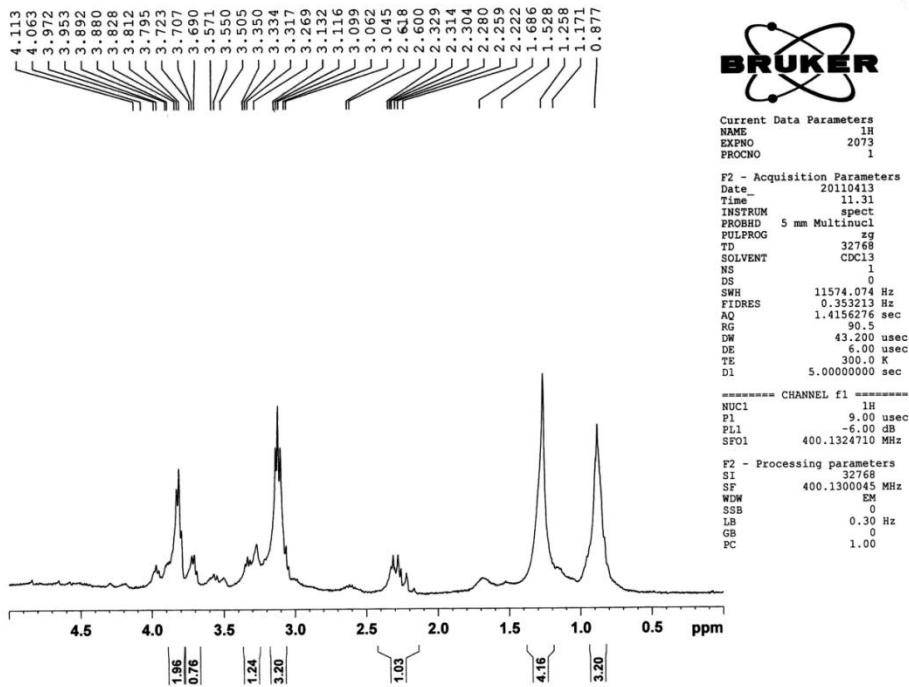
**Figure S9.**  $^1\text{H}$  NMR spectrum (400.1 MHz,  $\text{CDCl}_3$ ) of 2-(2-aminoethylthio)- $N$ -(thiophene-2-ylmethylene)aniline.



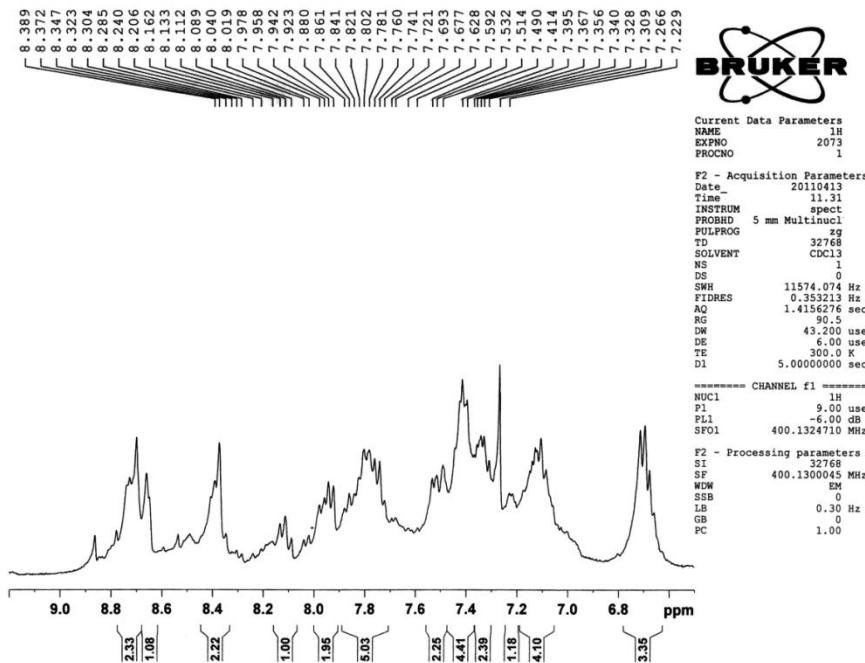
**Figure S10.** Aromatic expanded region of the <sup>1</sup>H NMR spectrum (400.1 MHz, CDCl<sub>3</sub>) of 2-(2-aminoethylthio)-N-(thiophene-2-ylmethylene)aniline.



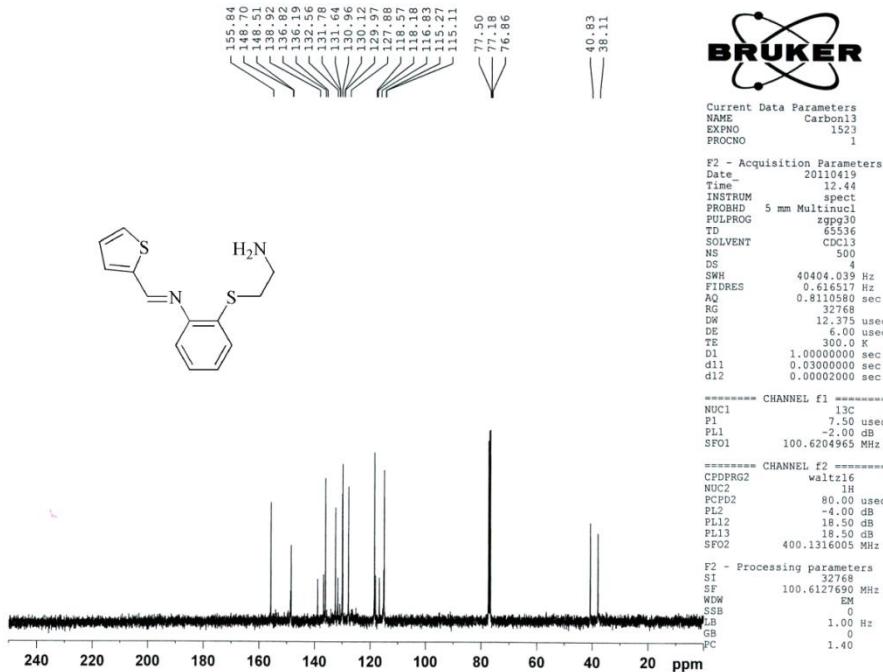
**Figure S11.** <sup>1</sup>H NMR spectrum (400.1 MHz, CDCl<sub>3</sub>) of 2-(2-(pyridine-2-ylmethylenamino) ethylthio)-N-(thiophene-2-ylmethylene)aniline (L).



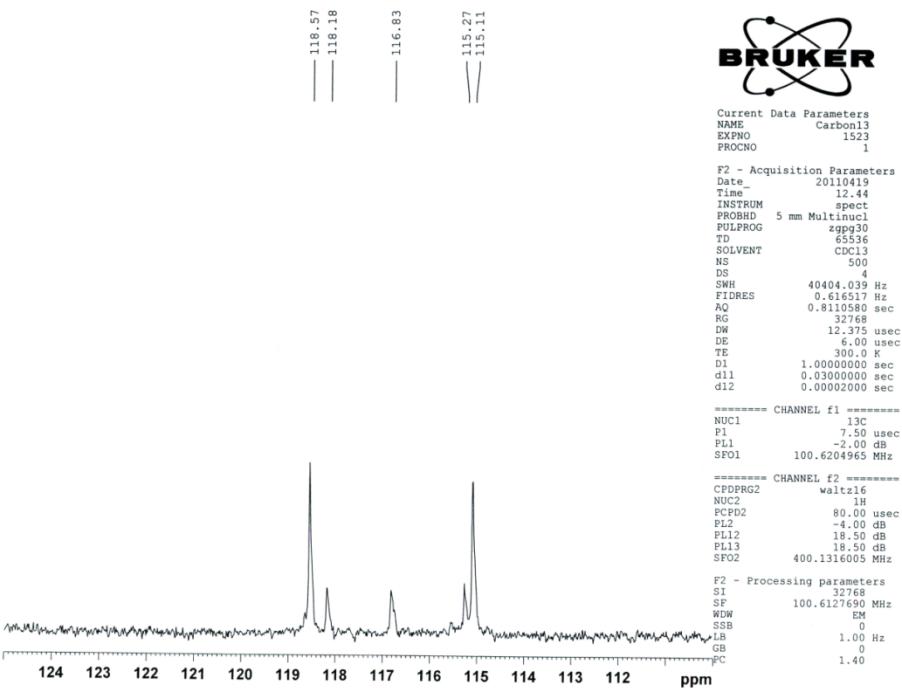
**Figure S12.** Aliphatic expanded region of the  $^1\text{H}$  NMR spectrum (400.1 MHz,  $\text{CDCl}_3$ ) of 2-(2-(pyridine-2-ylmethyleneamino) ethylthio)- $N$ -(thiophene-2-ylmethylene)aniline (L).



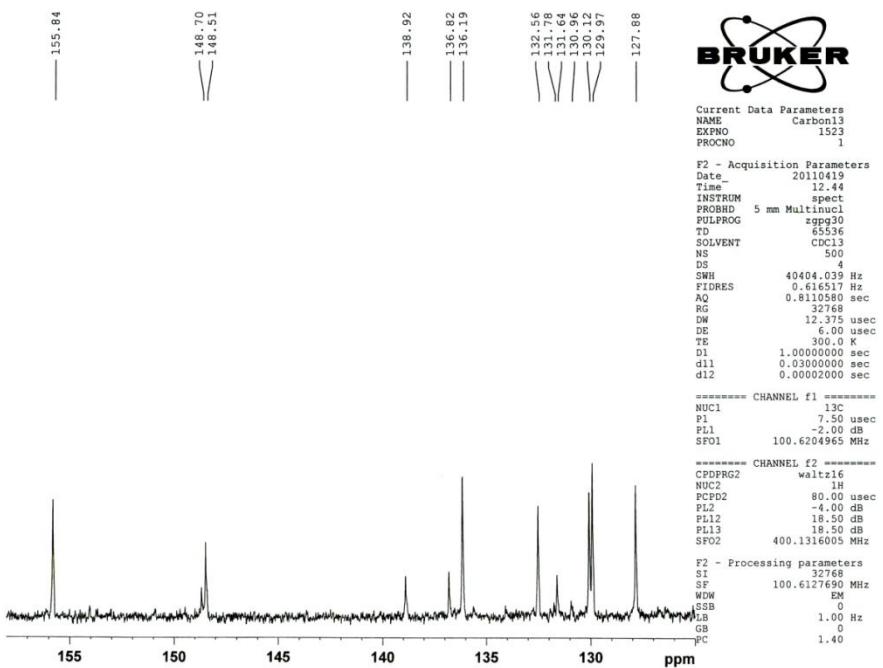
**Figure S13.** Aromatic expanded region of the  $^1\text{H}$  NMR spectrum (400.1 MHz,  $\text{CDCl}_3$ ) of 2-(2-(pyridine-2-ylmethyleneamino) ethylthio)- $N$ -(thiophene-2-ylmethylene)aniline (L).



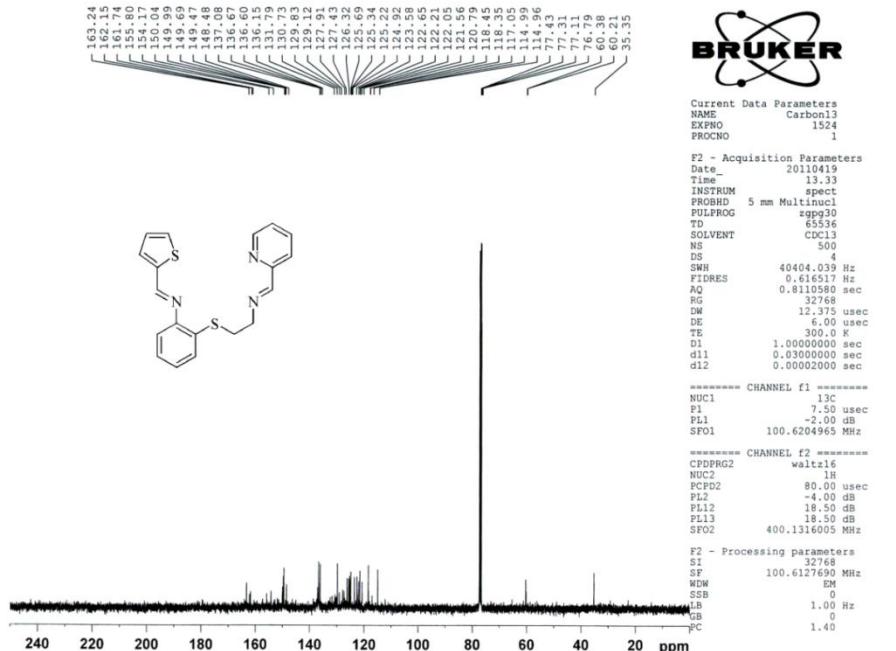
**Figure S14.**  $^{13}\text{C}$  NMR spectrum (400.1 MHz,  $\text{CDCl}_3$ ) of 2-(2-aminoethylthio)-*N*-(thiophene-2-ylmethylene)aniline.



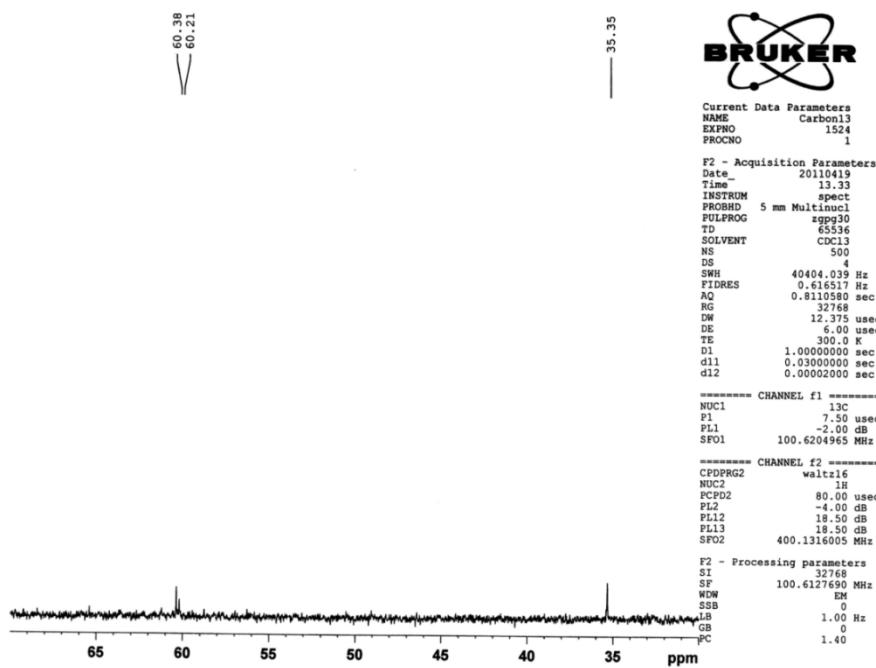
**Figure S15.** Expanded region (112 to 124 ppm) of the  $^{13}\text{C}$  NMR spectrum (400.1 MHz,  $\text{CDCl}_3$ ) of 2-(2-aminoethylthio)-*N*-(thiophene-2-ylmethylene)aniline.



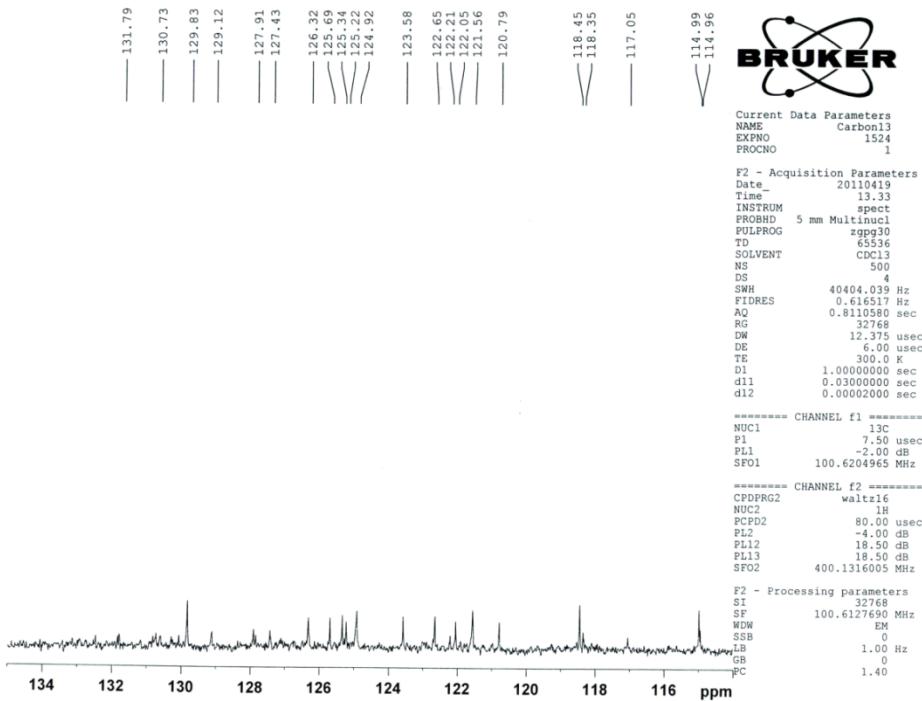
**Figure S16.** Expanded region (125 to 153 ppm) of the  $^{13}\text{C}$  NMR spectrum (400.1 MHz,  $\text{CDCl}_3$ ) of 2-(2-aminoethylthio)- $N$ -(thiophene-2-ylmethylene)aniline.



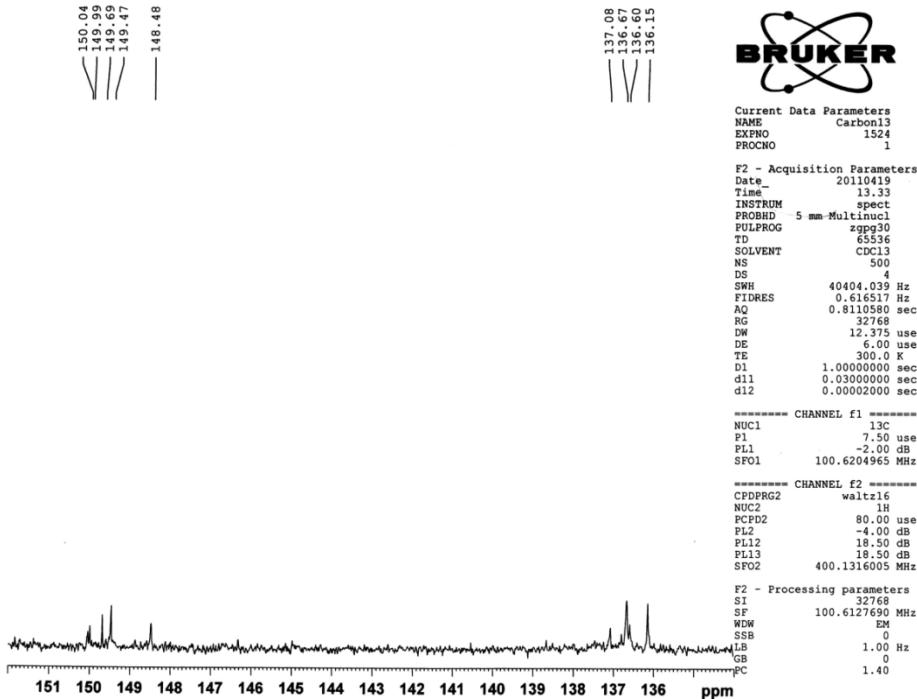
**Figure S17.**  $^{13}\text{C}$  NMR spectrum (400.1 MHz,  $\text{CDCl}_3$ ) of 2-(2-(pyridine-2-ylmethylenamino) ethylthio)- $N$ -(thiophene-2-ylmethylene)aniline (L).



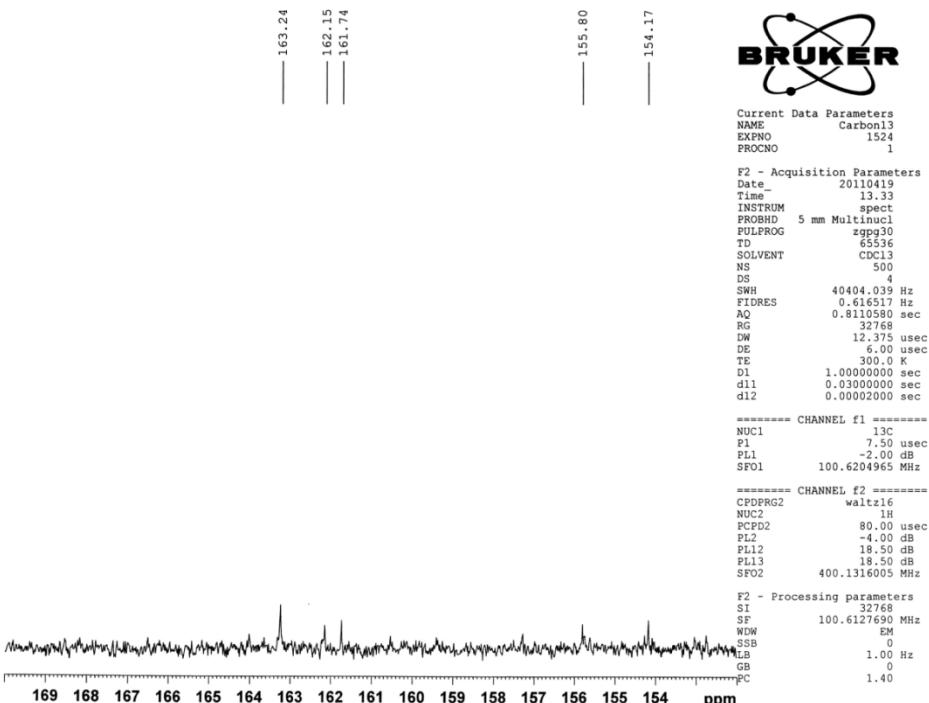
**Figure S18.** Expanded region (30 to 70 ppm) of the  $^{13}\text{C}$  NMR spectrum (400.1 MHz,  $\text{CDCl}_3$ ) of 2-(2-(pyridine-2-ylmethyleneamino) ethylthio)- $N$ -(thiophene-2-ylmethylene)aniline (L).



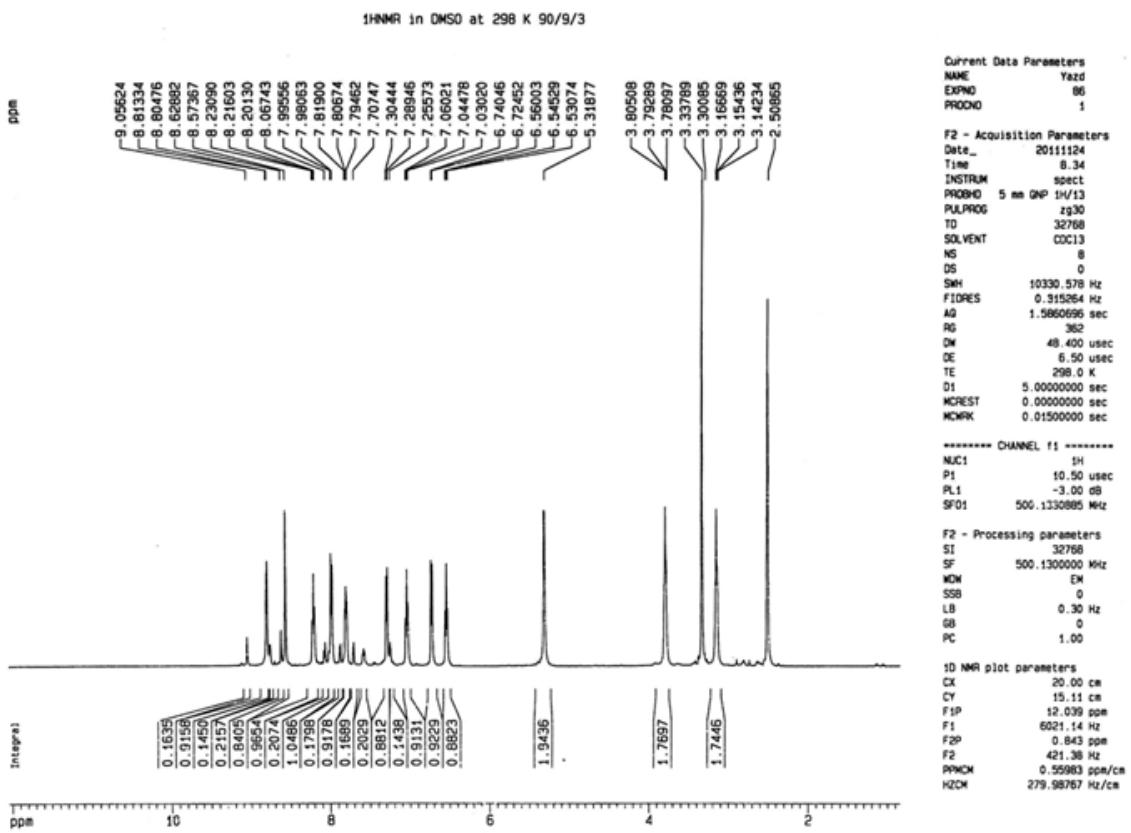
**Figure S19.** Expanded region (114 to 134 ppm) of the  $^{13}\text{C}$  NMR spectrum (400.1 MHz,  $\text{CDCl}_3$ ) of 2-(2-(pyridine-2-ylmethyleneamino) ethylthio)- $N$ -(thiophene-2-ylmethylene)aniline (L).



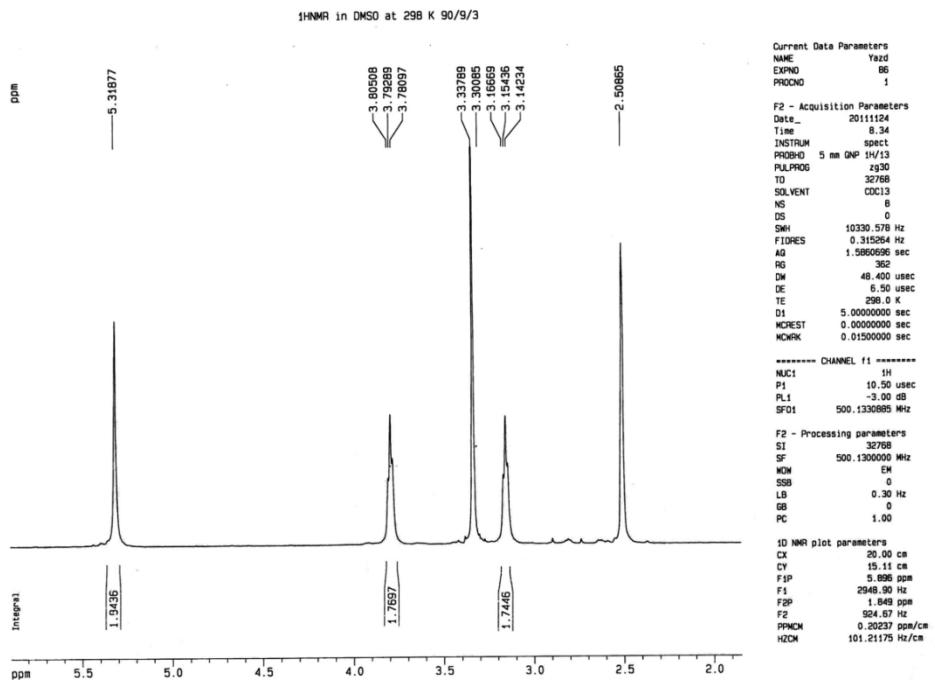
**Figure S20.** Expanded region (135 to 152 ppm) of the  $^{13}\text{C}$  NMR spectrum (400.1 MHz,  $\text{CDCl}_3$ ) of 2-(2-(pyridine-2-ylmethyleneamino) ethylthio)- $N$ -(thiophene-2-ylmethylene)aniline (L).



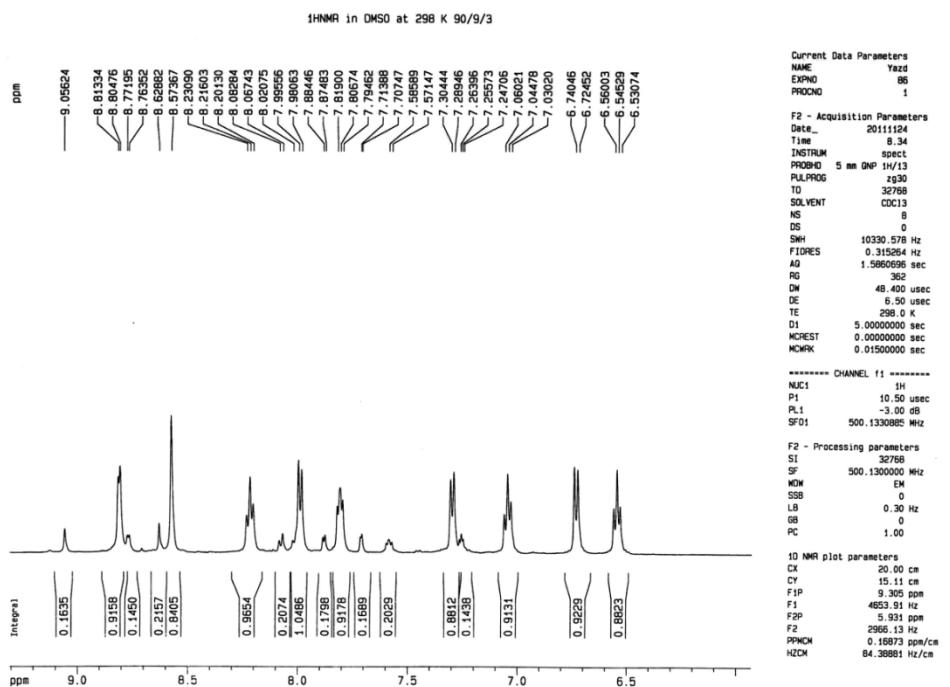
**Figure S21.** Expanded region (152 to 170 ppm) of the  $^{13}\text{C}$  NMR spectrum (400.1 MHz,  $\text{CDCl}_3$ ) of 2-(2-(pyridine-2-ylmethyleneamino) ethylthio)- $N$ -(thiophene-2-ylmethylene)aniline (L).



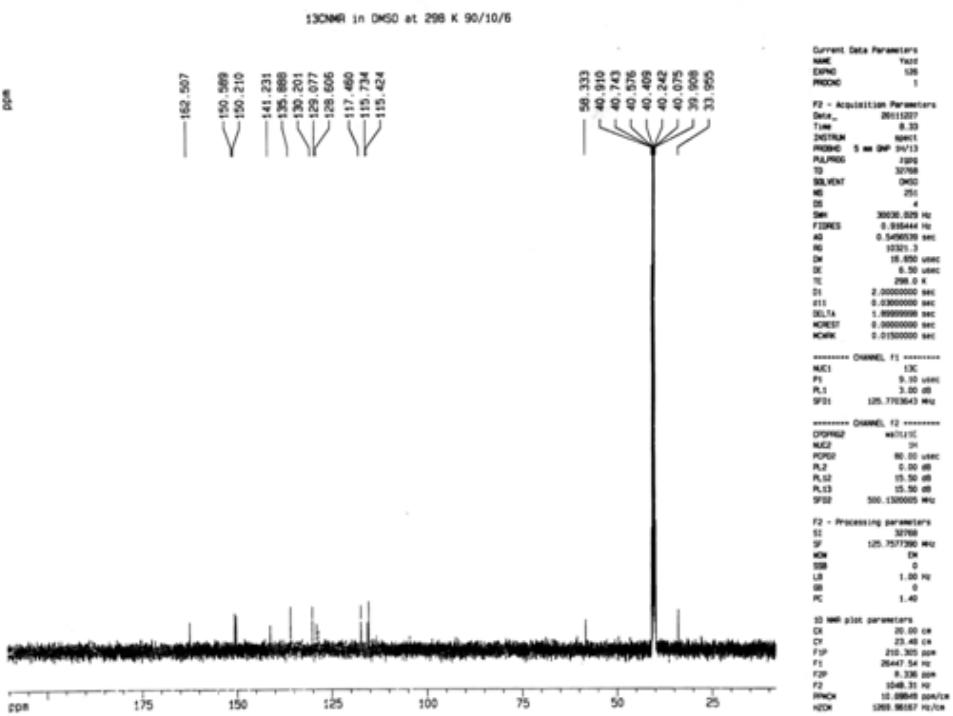
**Figure S22.** <sup>1</sup>H NMR spectrum (500.1 MHz, DMSO-*d*<sub>6</sub>) of [CdL]Cl<sub>2</sub>·H<sub>2</sub>O.



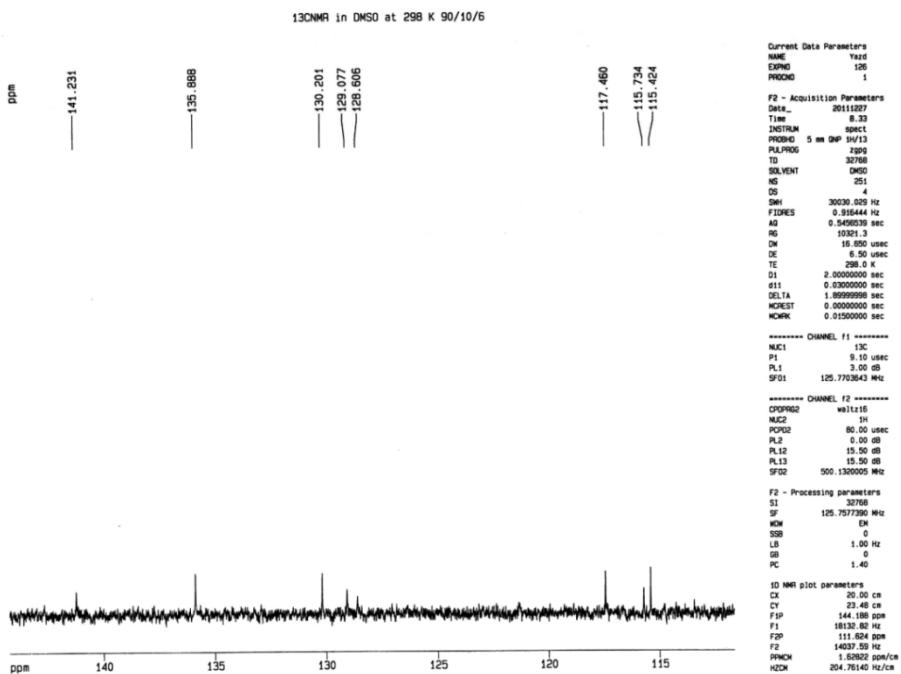
**Figure S23.** Aliphatic expanded region of the <sup>1</sup>H NMR spectrum (500.1 MHz, DMSO-*d*<sub>6</sub>) of [CdL]Cl<sub>2</sub>·H<sub>2</sub>O.



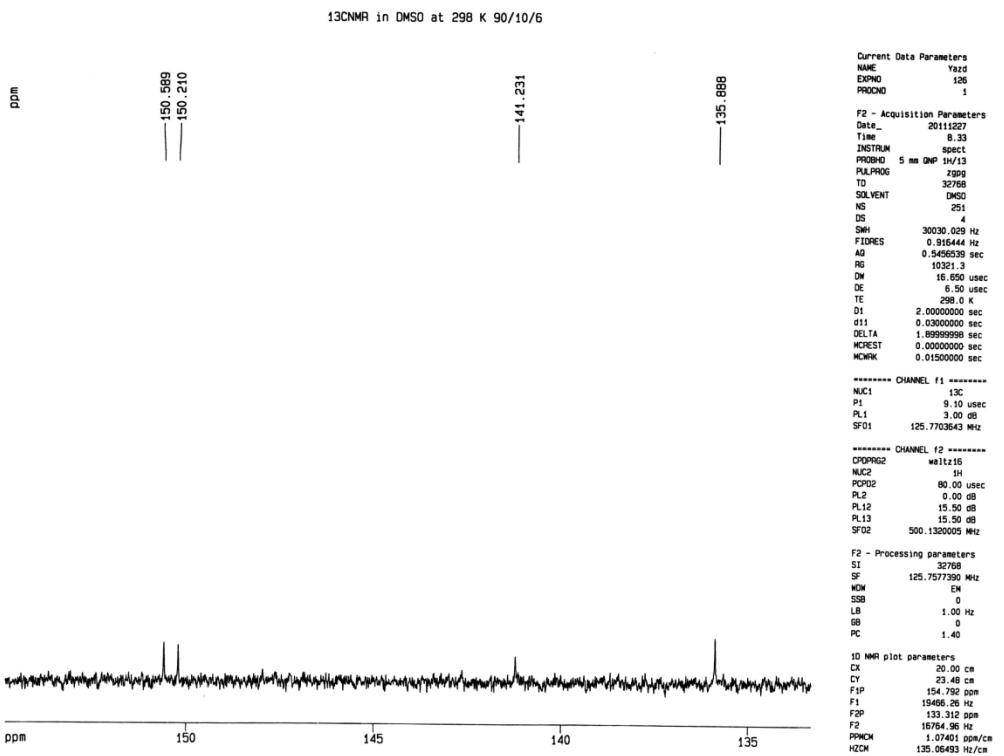
**Figure S24.** Aromatic expanded region of the <sup>1</sup>H NMR spectrum (500.1 MHz, DMSO-*d*<sub>6</sub>) of [CdL]Cl<sub>2</sub>·H<sub>2</sub>O.



**Figure S25.**  $^{13}\text{C}$  NMR spectrum (500.1 MHz,  $\text{DMSO}-d_6$ ) of  $[\text{CdL}]\text{Cl}_2\cdot\text{H}_2\text{O}$ .



**Figure S26.** Expanded region (115 to 145 ppm) of the  $^{13}\text{C}$  NMR spectrum (500.1 MHz,  $\text{DMSO}-d_6$ ) of  $[\text{CdL}]\text{Cl}_2\cdot\text{H}_2\text{O}$ .



**Figure S27.** Expanded region (135 to 155 ppm) of the <sup>13</sup>C NMR spectrum (500.1 MHz, DMSO-*d*<sub>6</sub>) of [CdL]Cl<sub>2</sub>·H<sub>2</sub>O.