

# Supporting Information

## Cyclopenta[*c*]thiophene oligomers based solution processable D-A copolymers and their application as FET materials

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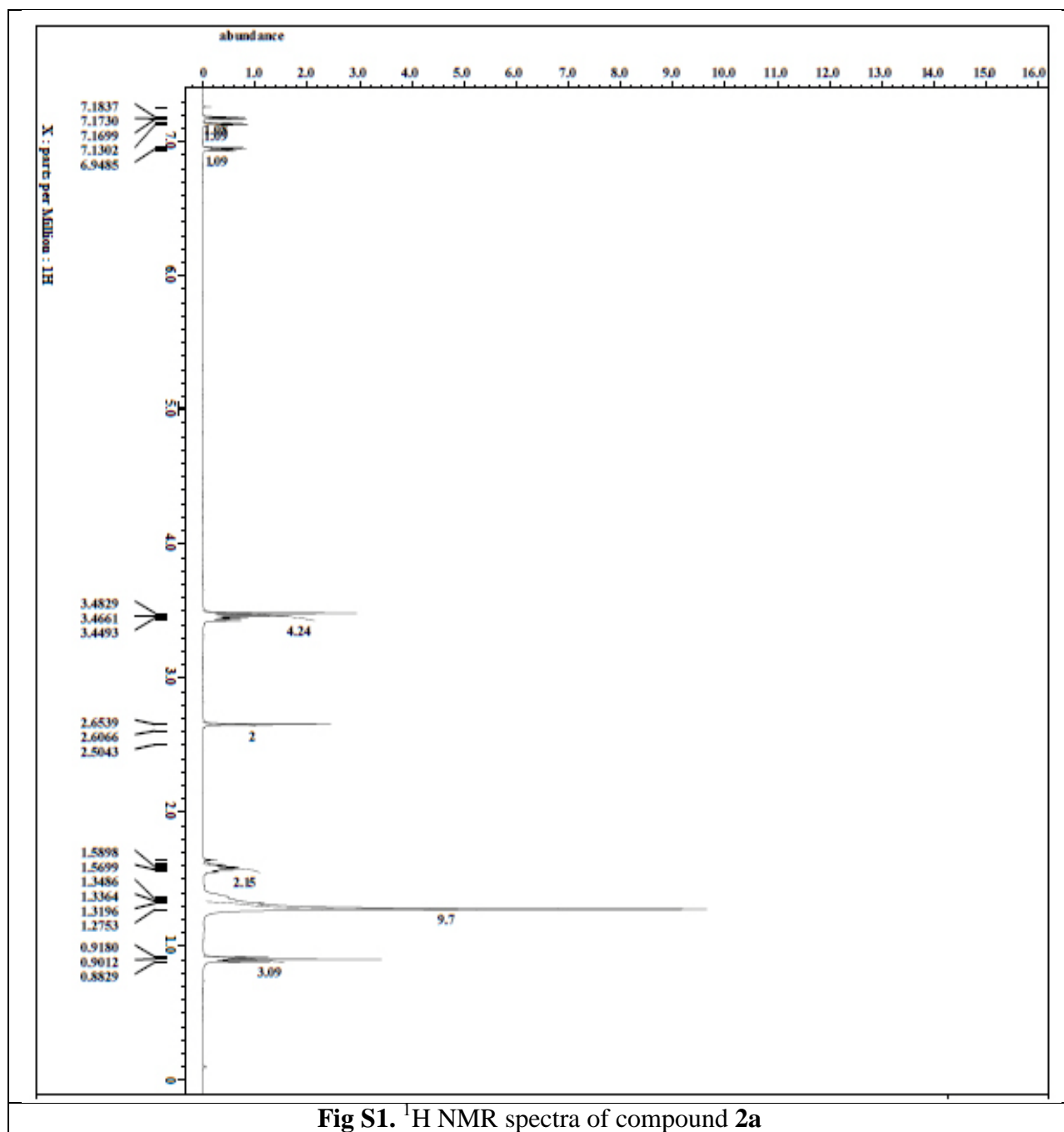
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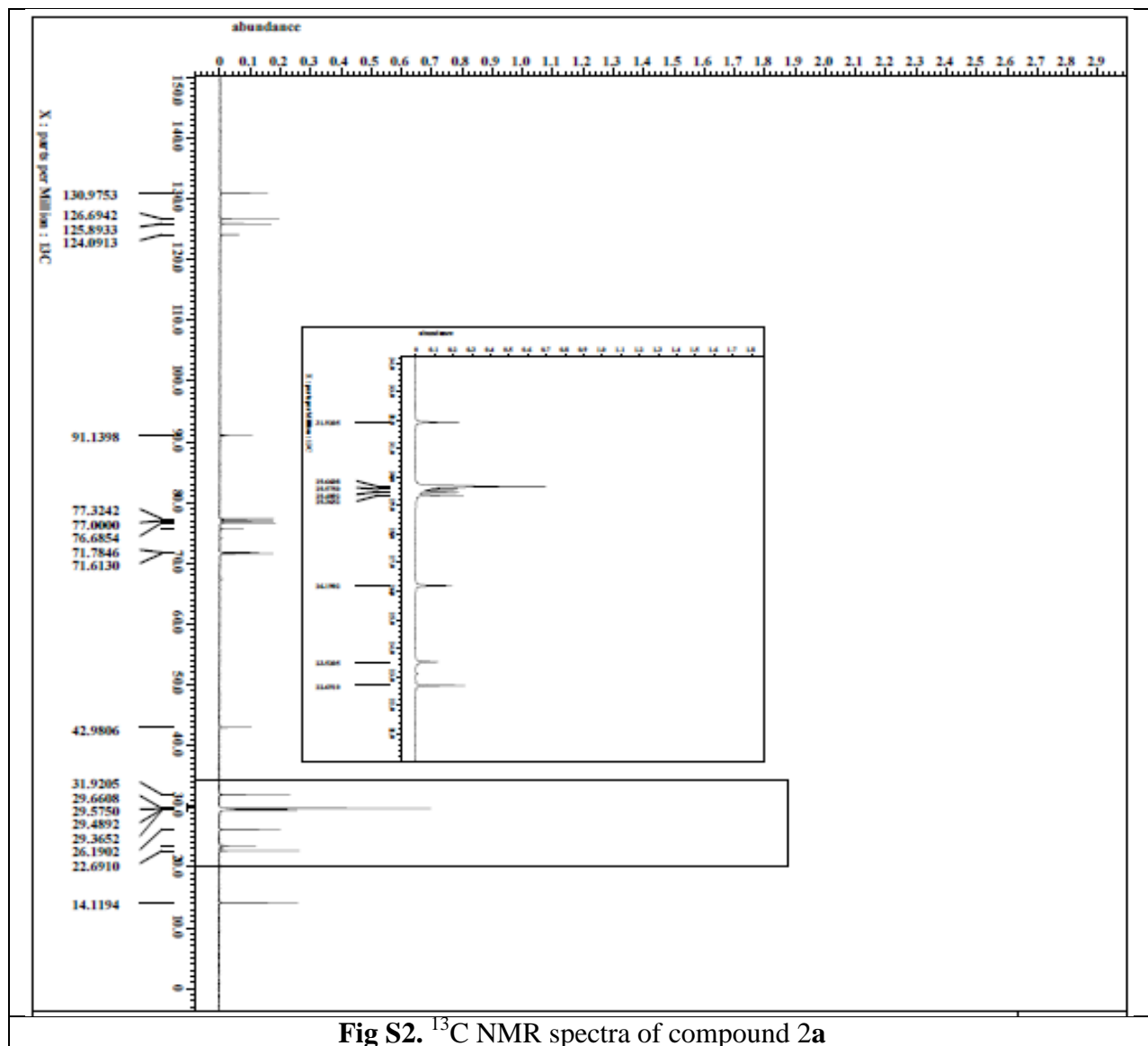
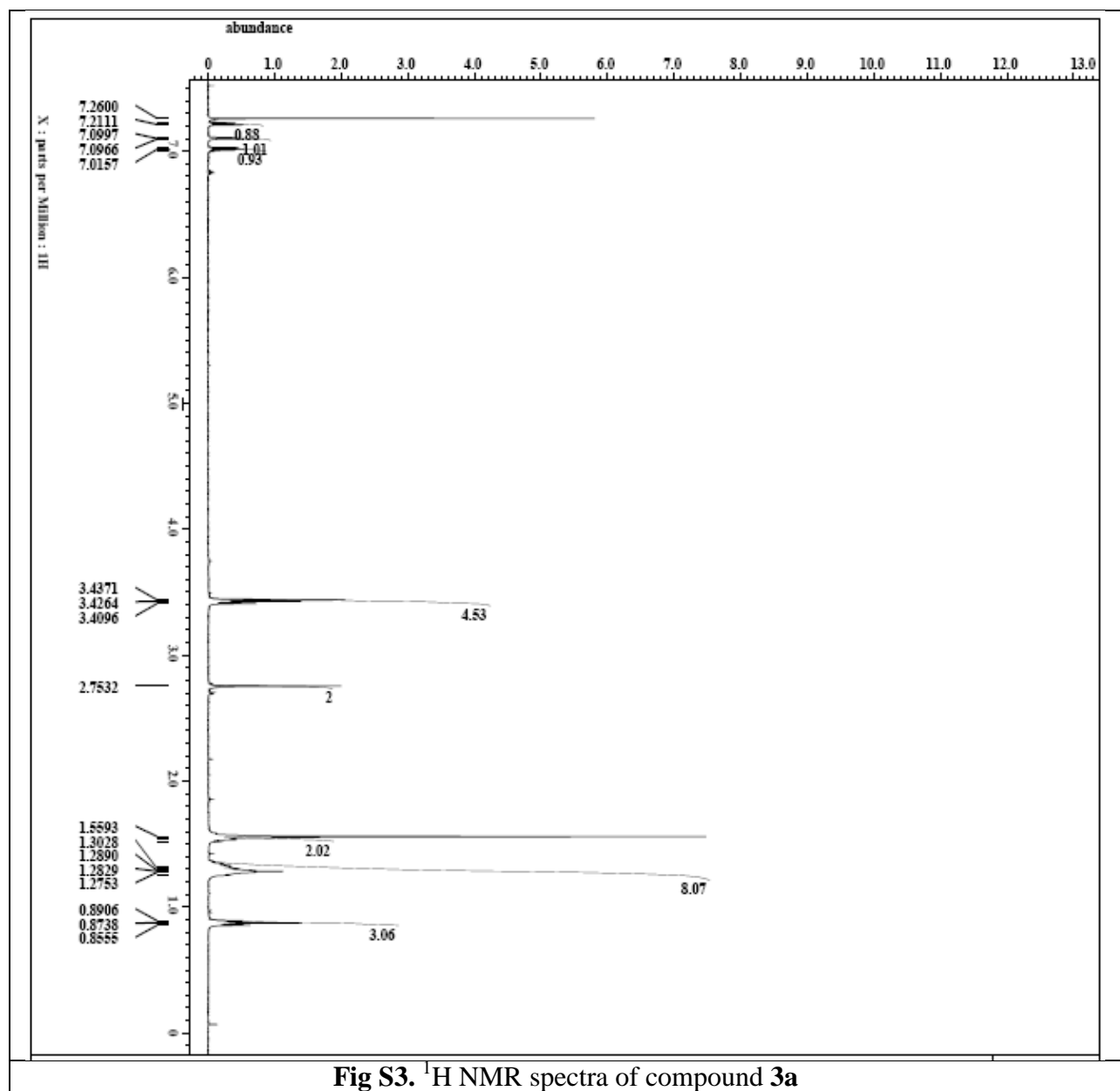
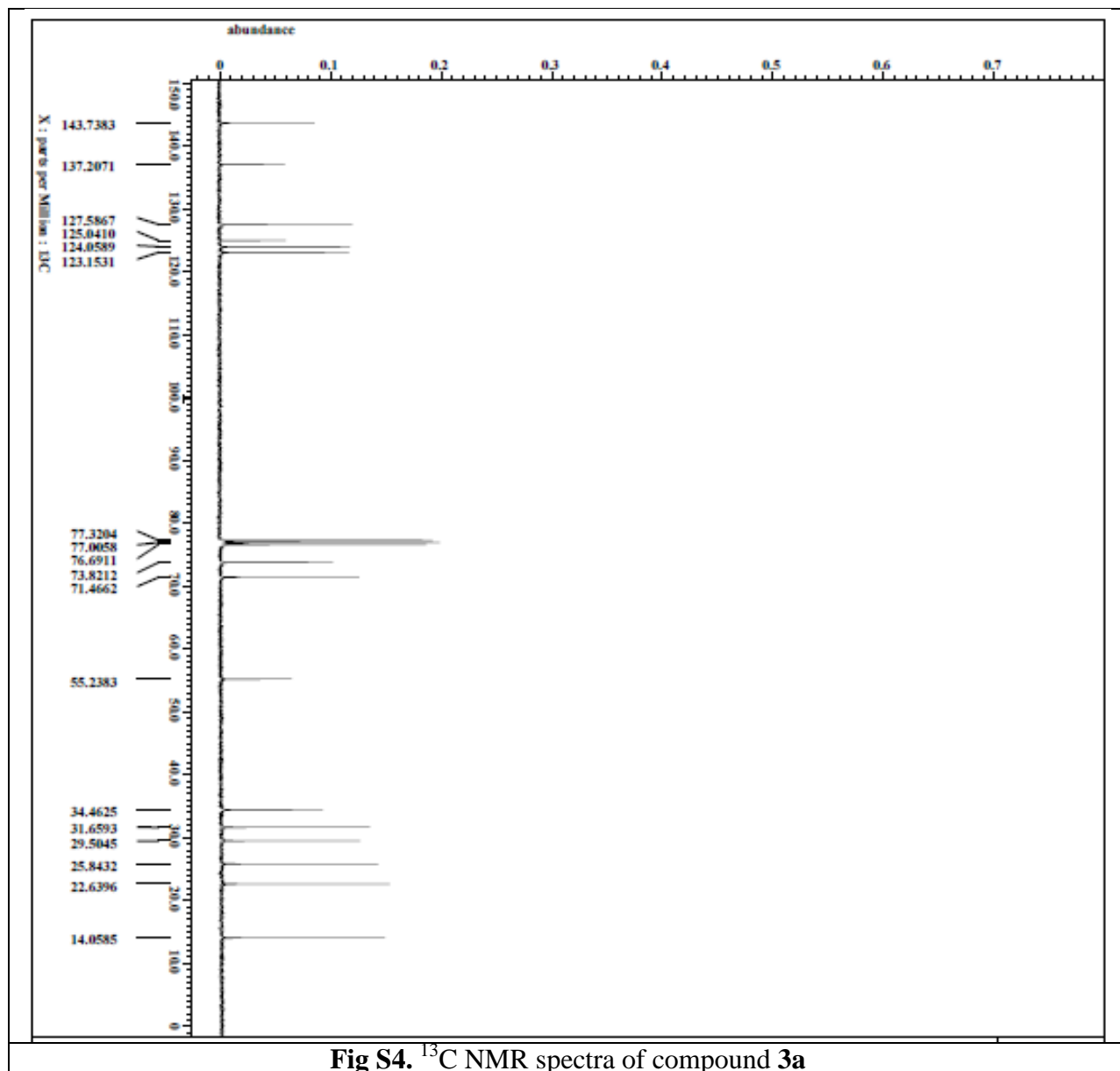
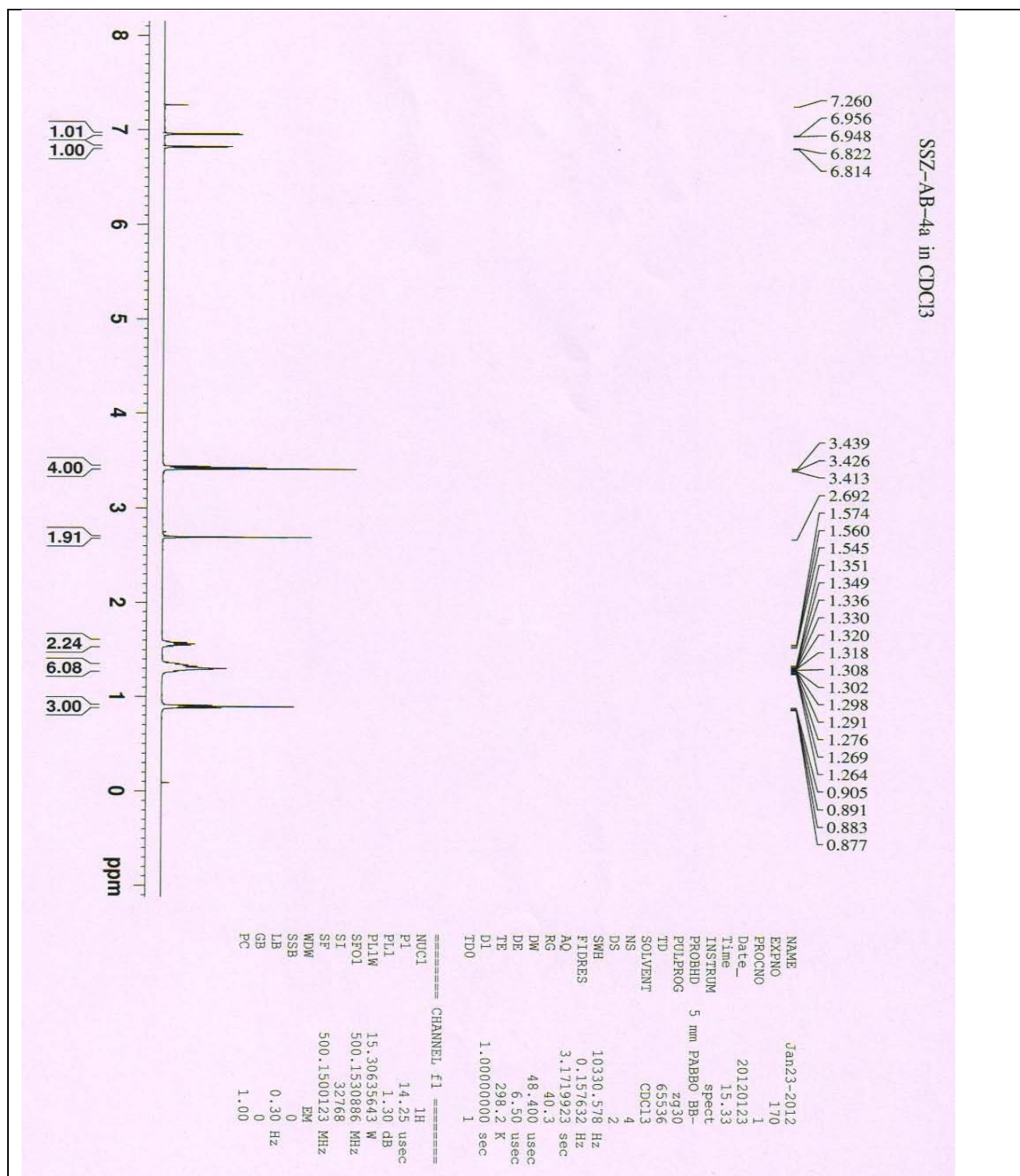


Fig S2.  $^{13}\text{C}$  NMR spectra of compound 2a





**Fig S4.**  $^{13}\text{C}$  NMR spectra of compound **3a**



**Fig S5.** <sup>1</sup>H NMR spectra of compound **4a**

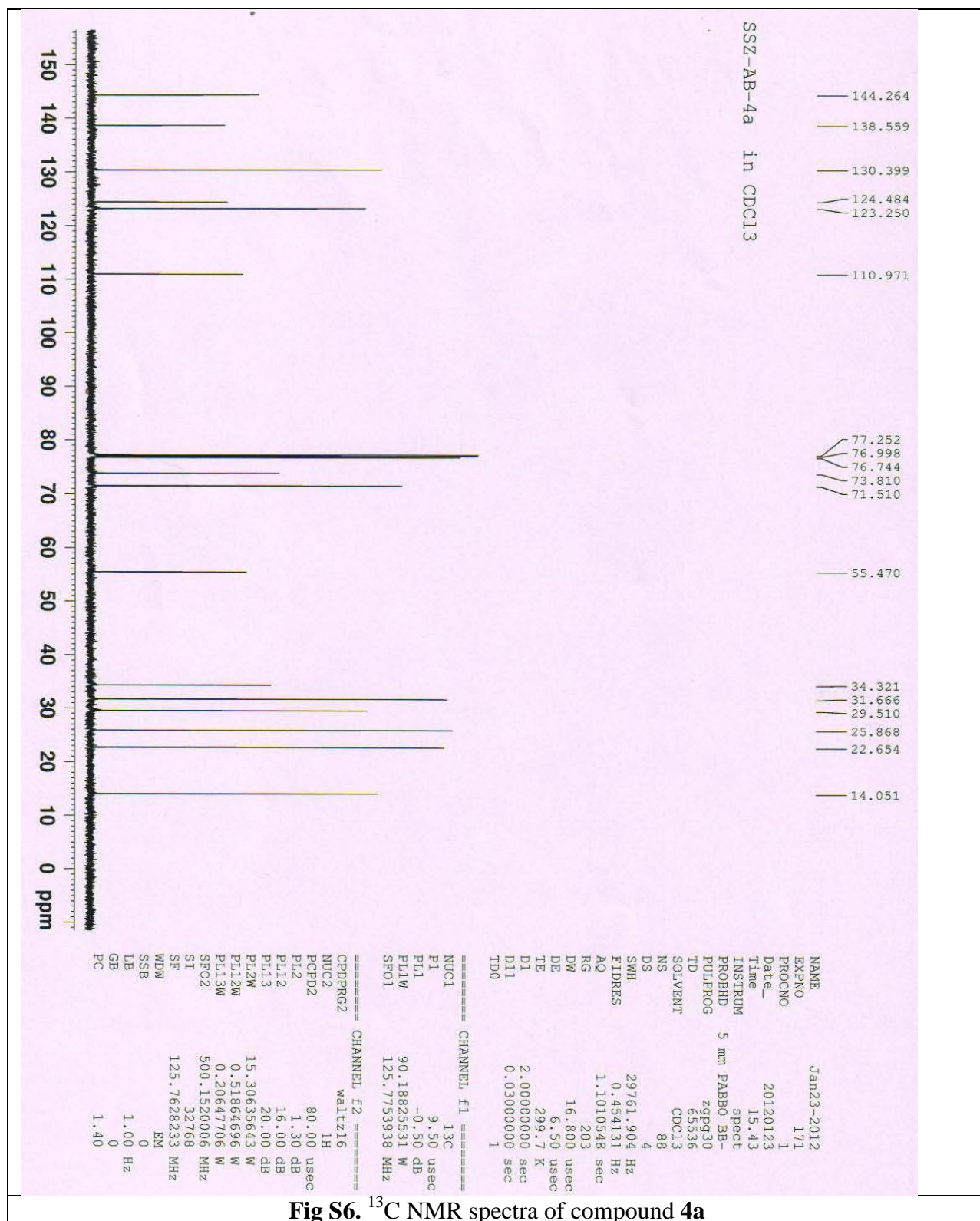
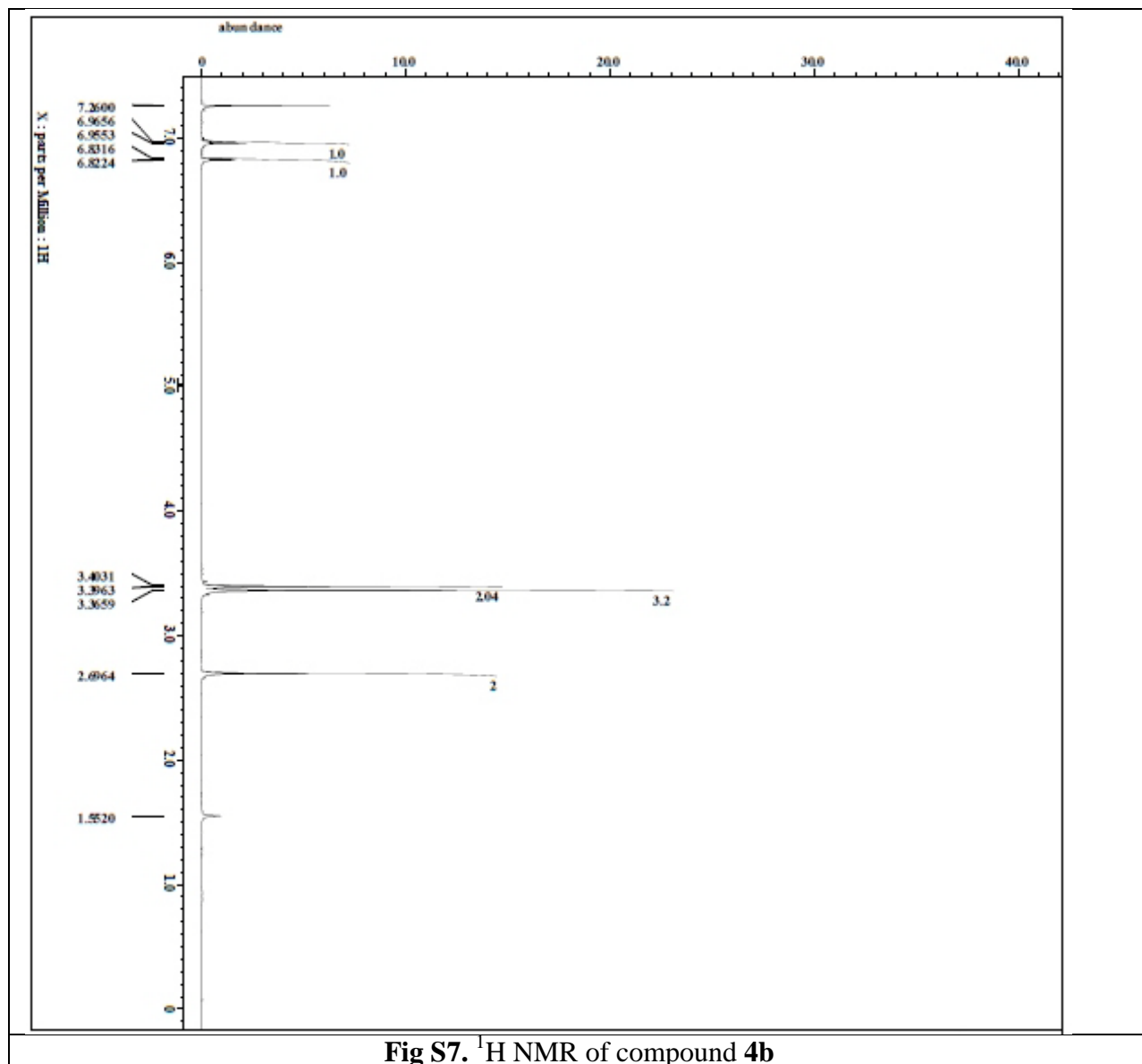
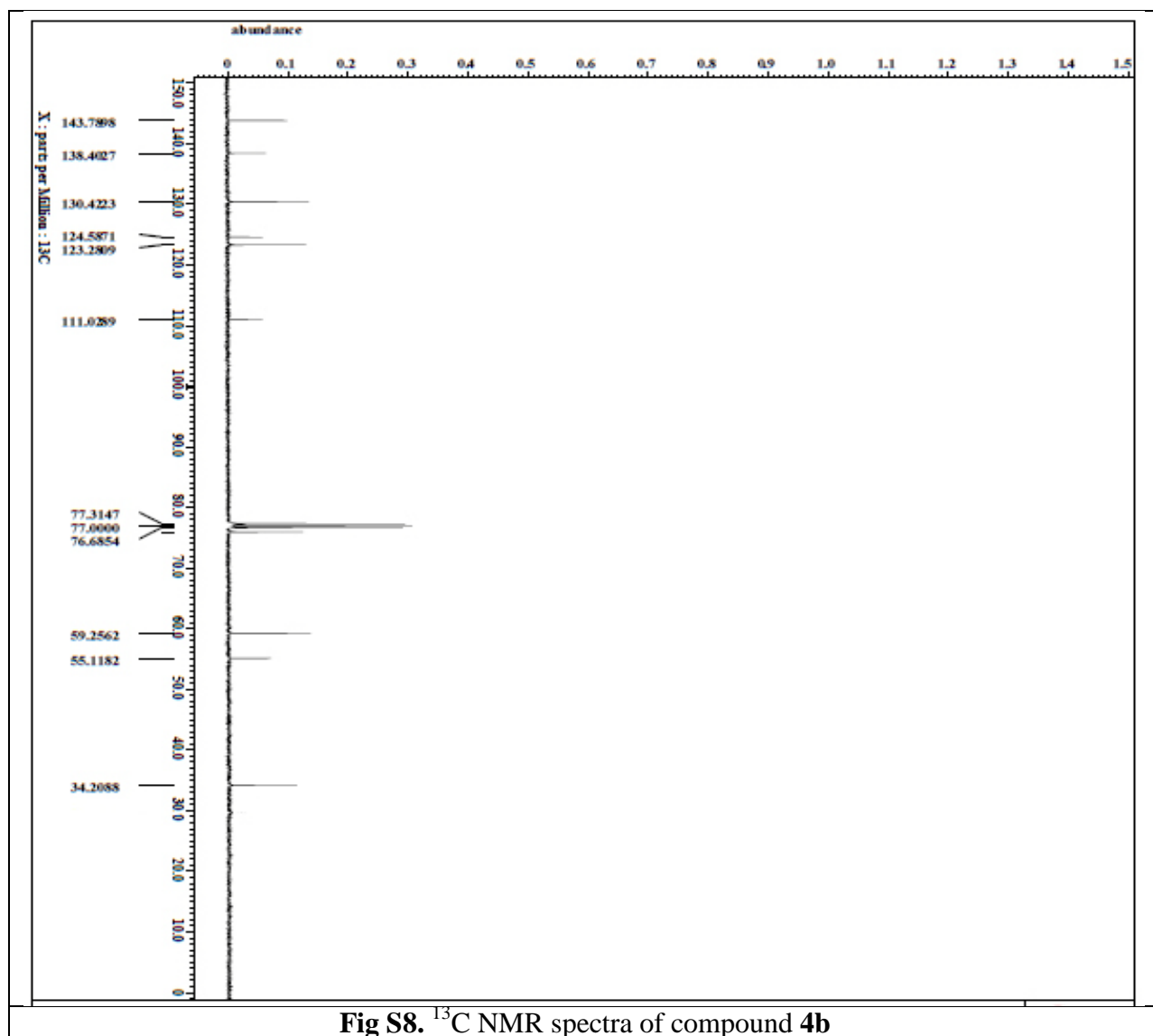


Fig S6. <sup>13</sup>C NMR spectra of compound 4a

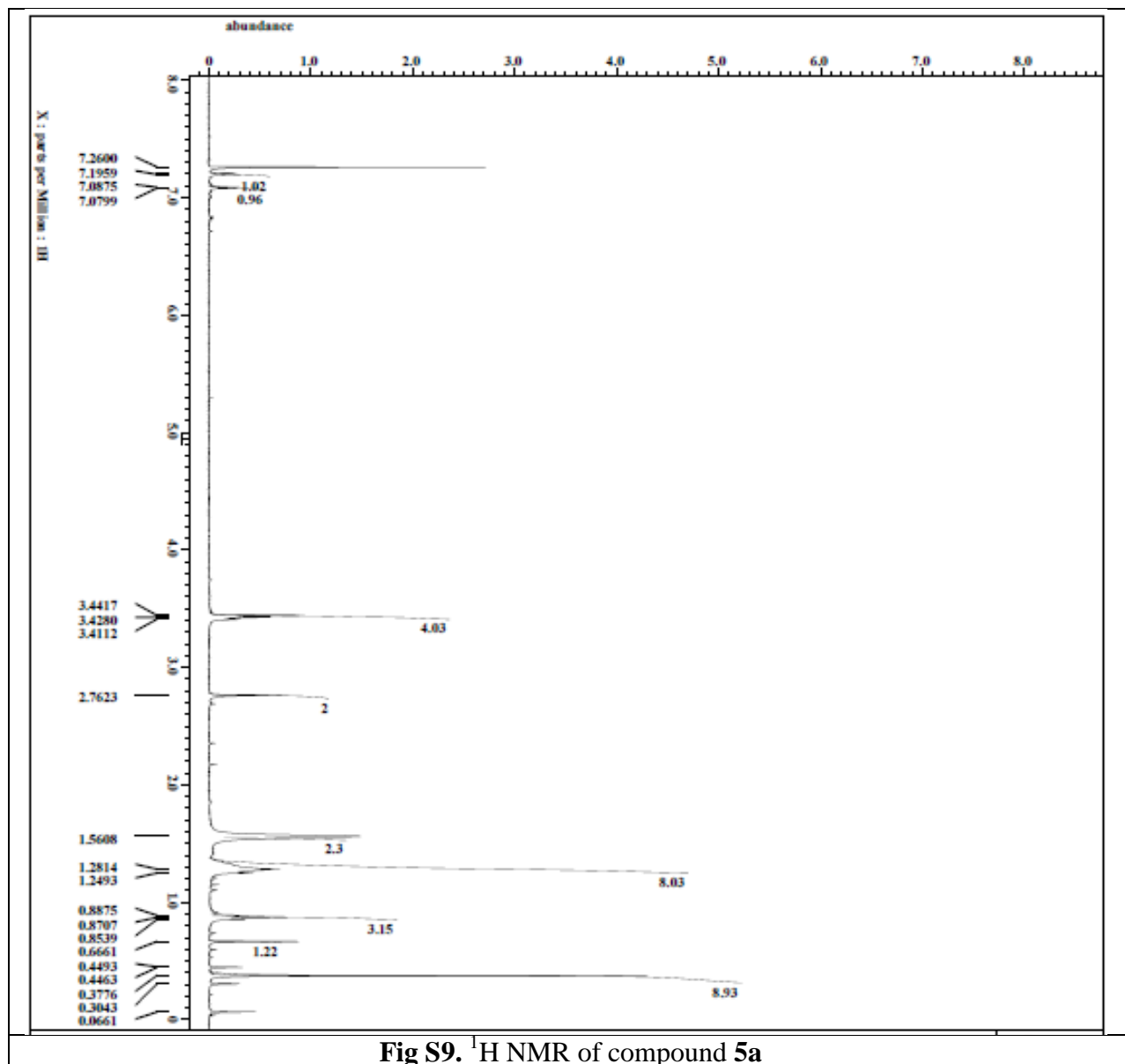




**Fig S7.** <sup>1</sup>H NMR of compound **4b**



**Fig S8.**  $^{13}\text{C}$  NMR spectra of compound **4b**



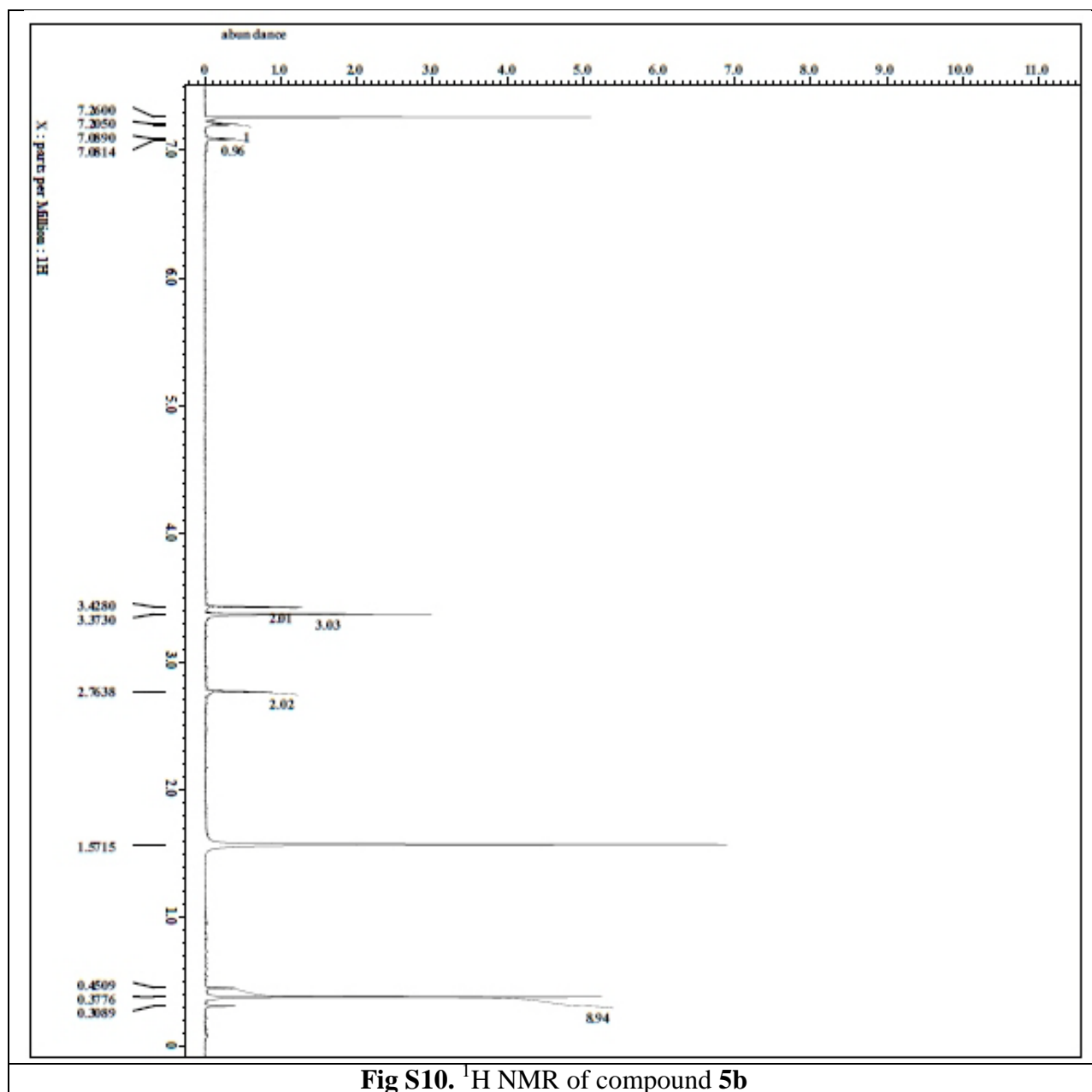


Fig S10. <sup>1</sup>H NMR of compound 5b

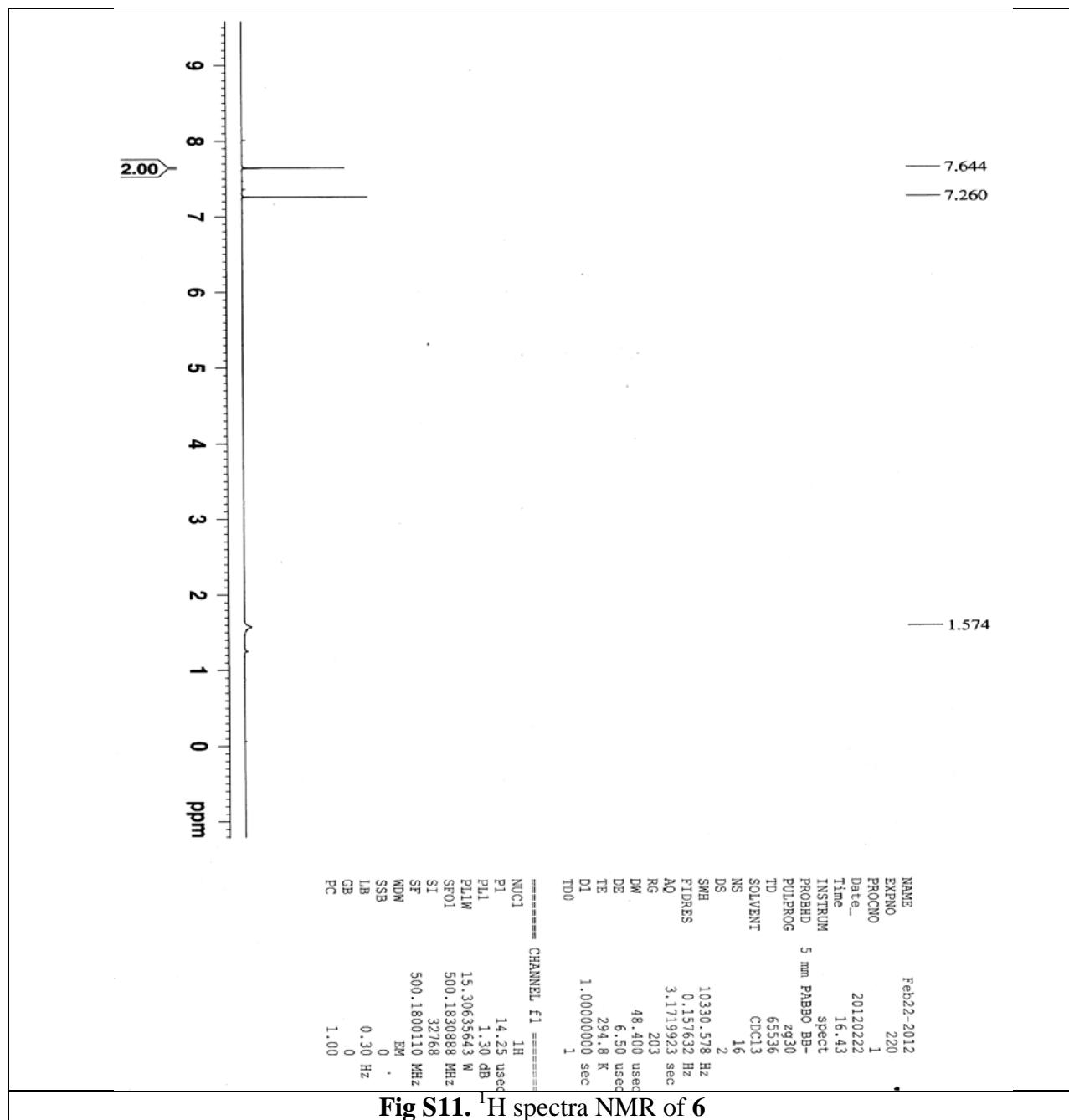
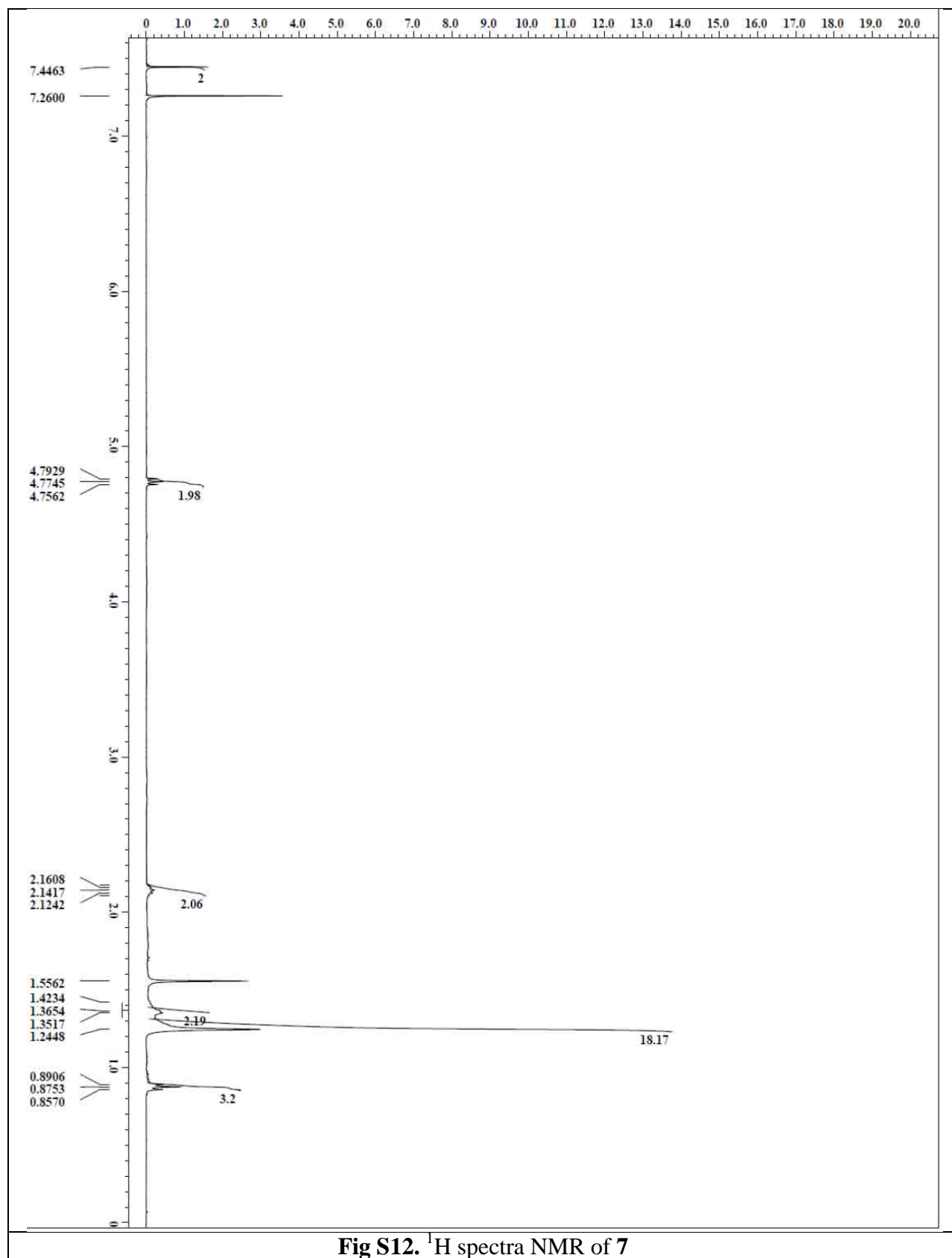
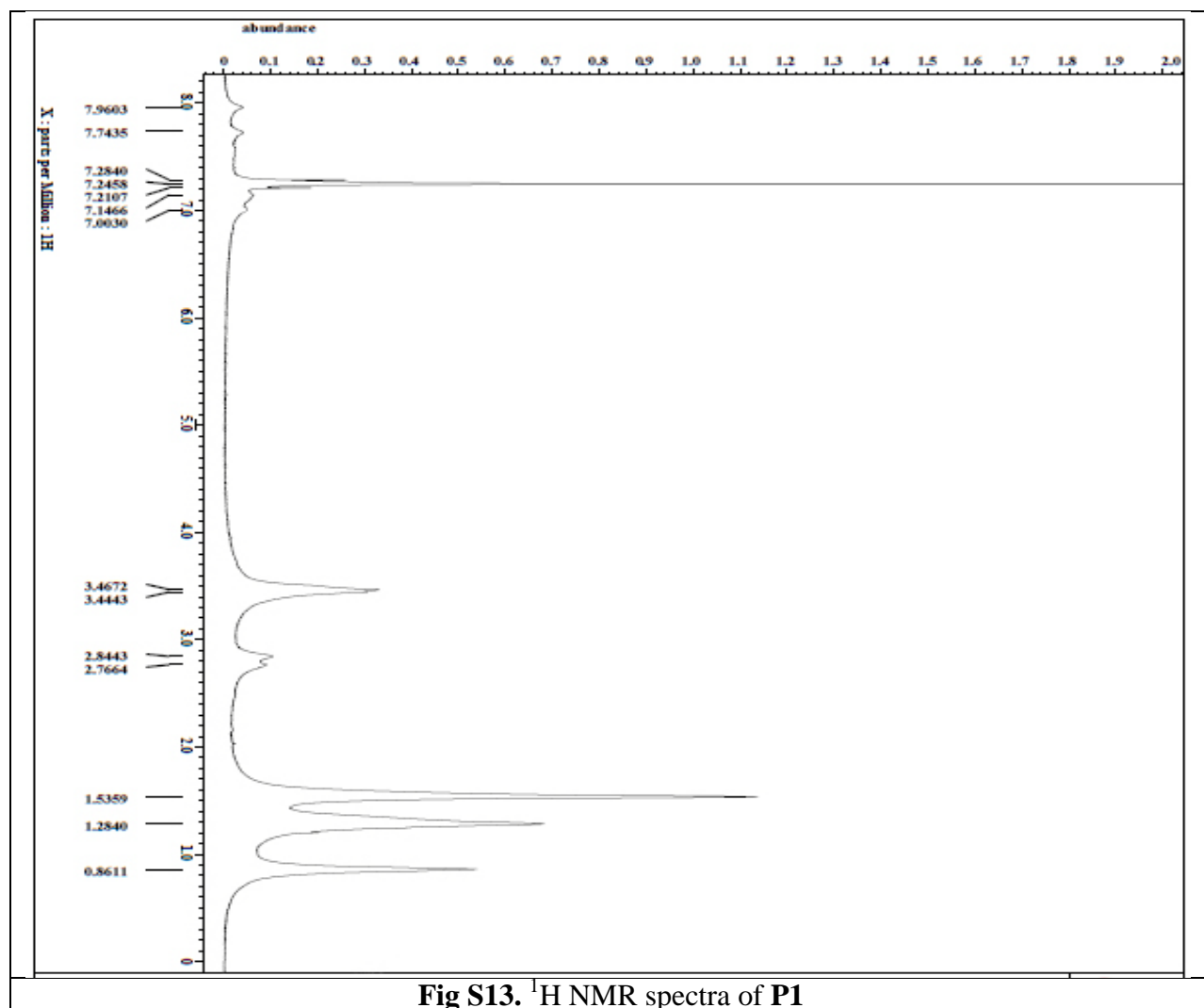


Fig S11. <sup>1</sup>H spectra NMR of 6





**Fig S13.** <sup>1</sup>H NMR spectra of P1

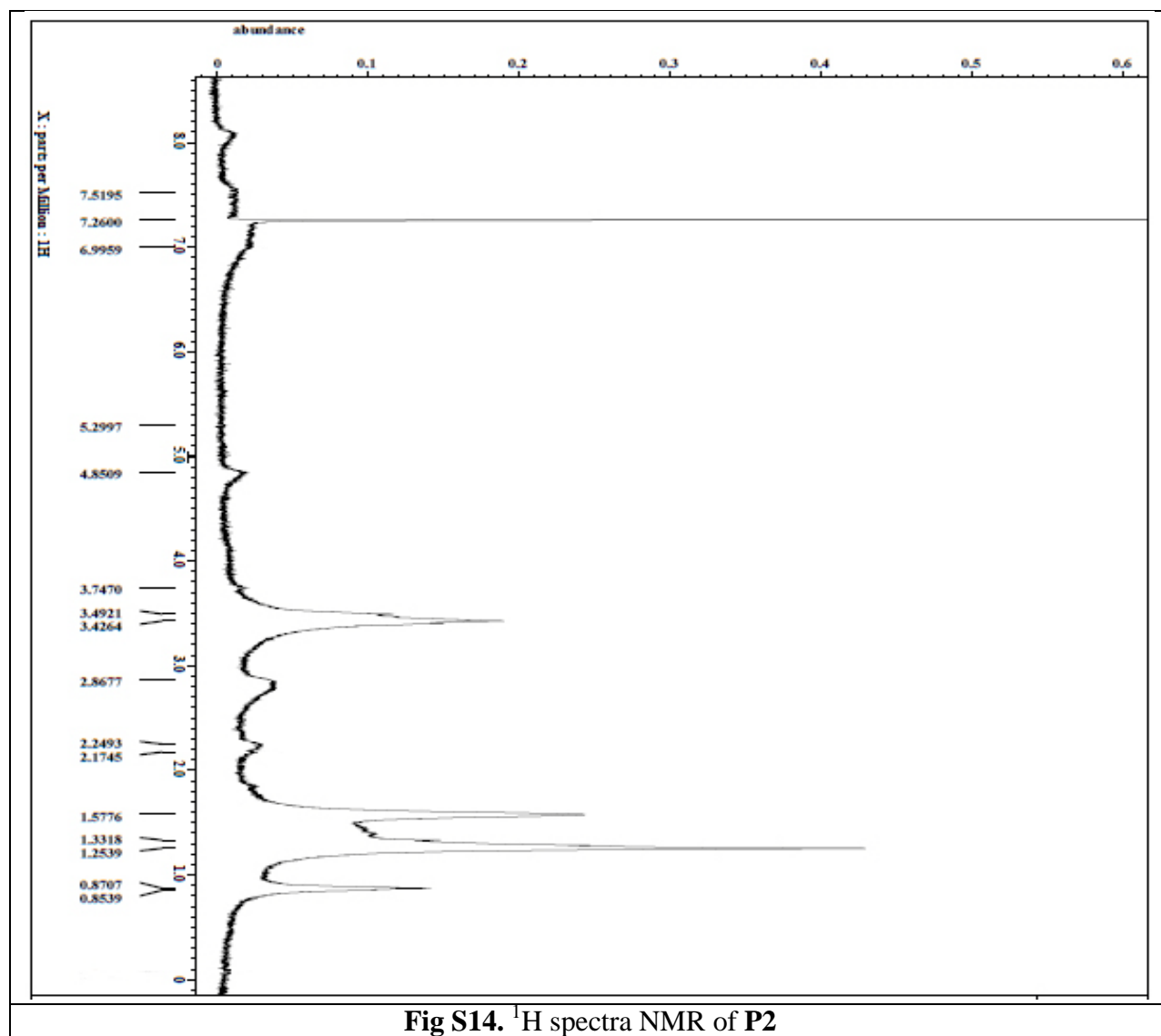
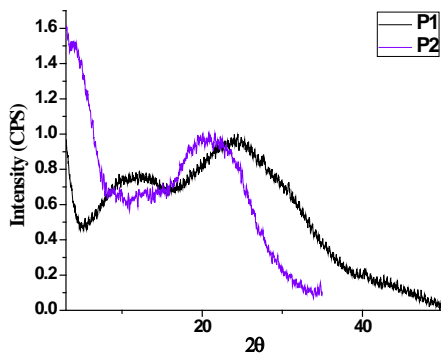


Fig S14.  $^1\text{H}$  spectra NMR of **P2**

## PXRD

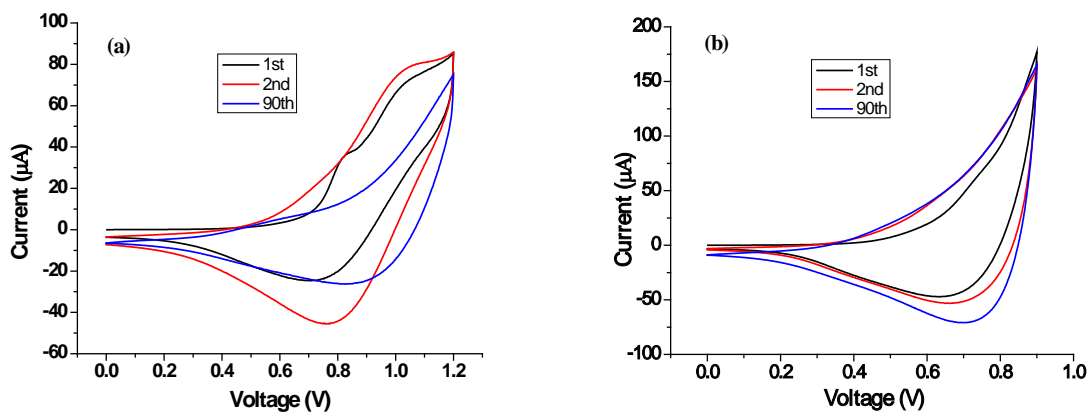
The PXRD patterns (Fig. 4) for both the polymers were obtained after annealing their drop cast films (from chloroform solution) at 150 °C. Bragg reflection peaks were observed around  $2\theta \approx 12^\circ$  and  $24^\circ$  for **P1** and  $21^\circ$  for **P2**. For **P1** the peak at  $2\theta \approx 12^\circ$  is too broad to be concluded as a result of side-chain ordering but the peaks at  $2\theta \approx 24^\circ$  and  $21^\circ$ , respectively for **P1** and **P2** could be attributed to  $\pi$ -stacking between the polymer chains. The broader angle peaks ( $2\theta \sim 24^\circ$  and  $21^\circ$ ) corresponds to the  $\pi$ -stacking distances of  $\sim 3.7 \text{ \AA}$  and  $\sim 4.3 \text{ \AA}$ . So the compounds have semi crystalline nature as they did not exhibit any  $T_g$  or crystallisation during DSC between 25-250 °C but possess  $\pi$ -stacking.





**Fig S15.** PXRD for **P1** and **P2**.

**P1** film was cycled 90 times between 0.0 and +1.2 V (Figure 15a) and **P2** film was cycled 90 times between 0.0 and +0.9 V (Figure 15a). The total charge decrease between the initial and 90th cycle was significant for **P1**, however, **P2** showed minor change in the total charge. It indicates a better stability of **P2** than **P1** during the redox cycles.



**Fig S16.** The CV of (a) **P1** and (b) **P2** in TBAPC at their 1<sup>st</sup>, 2<sup>nd</sup> and 90<sup>th</sup> cycle using TBAPC as electrolyte for **P1** for **P2**.