

## Supporting information

### **Biaxially Extended Quaterthiophene- Thiophene and –Selenophene**

#### **Conjugated Polymers for Optoelectronic Device Applications**

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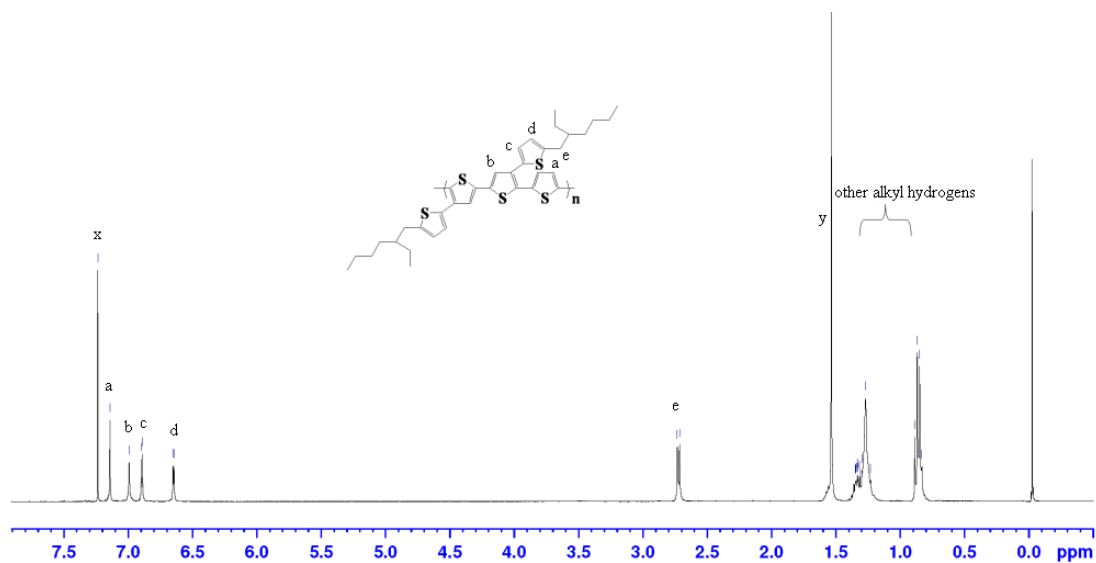
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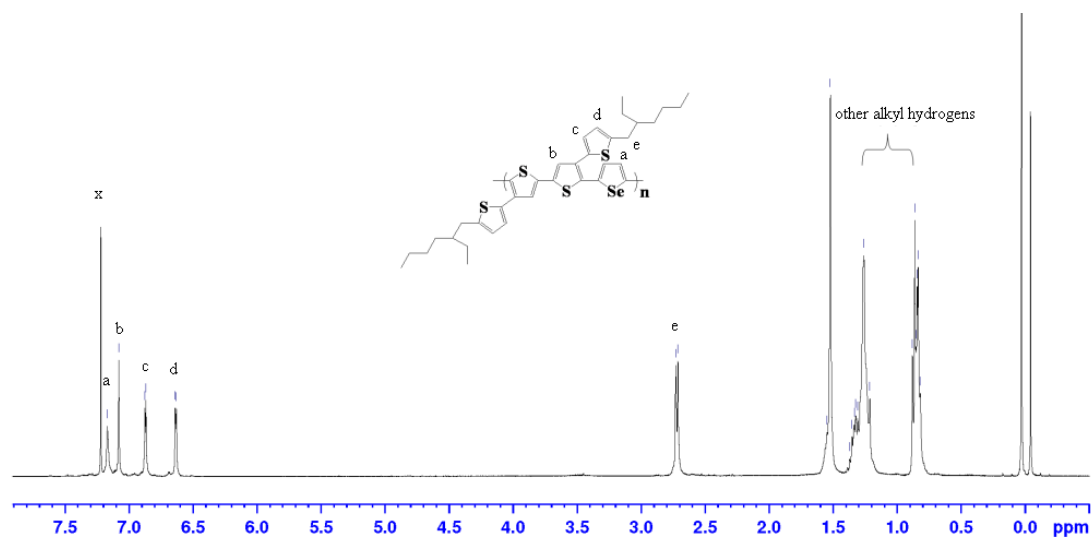
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**Table S1.** Torsional angles of the 4T-based polymers estimated from Gaussian 03.

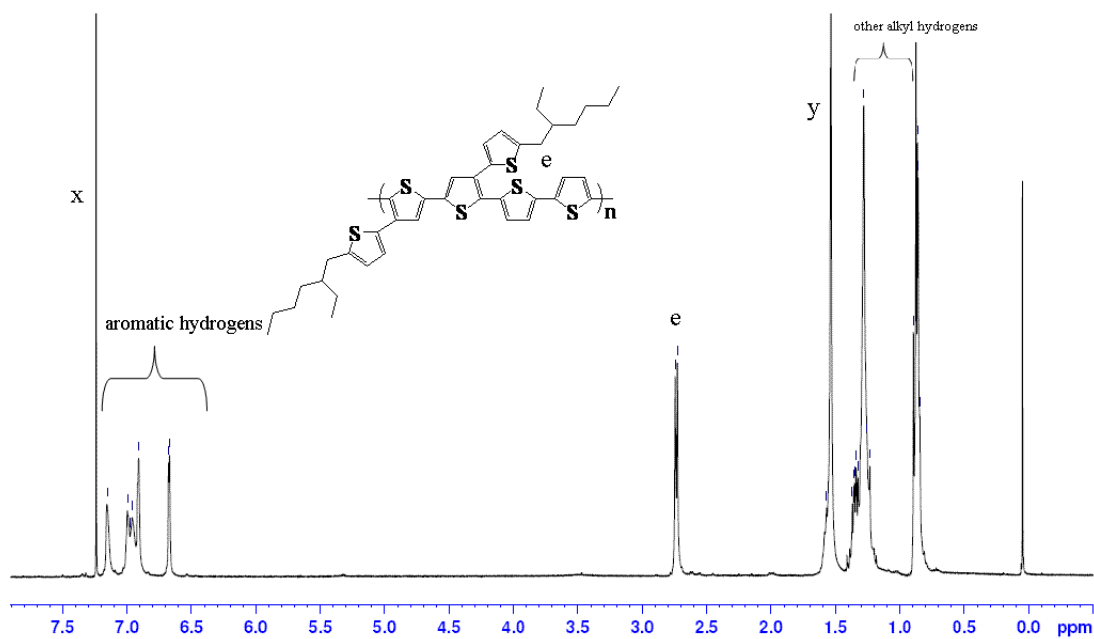
	$\theta_\alpha$ ( $^\circ$ )	$\theta_\beta$ ( $^\circ$ )	$\theta_\gamma$ ( $^\circ$ )	$\theta_\omega$ ( $^\circ$ )
<b>P4T</b>	84	18	13	-
<b>P4TT</b>	38	41	16	-
<b>P4T2T</b>	36	44	8	7
<b>P4TSe</b>	16	65	19	-
<b>P4T2Se</b>	3	85	3	0.1



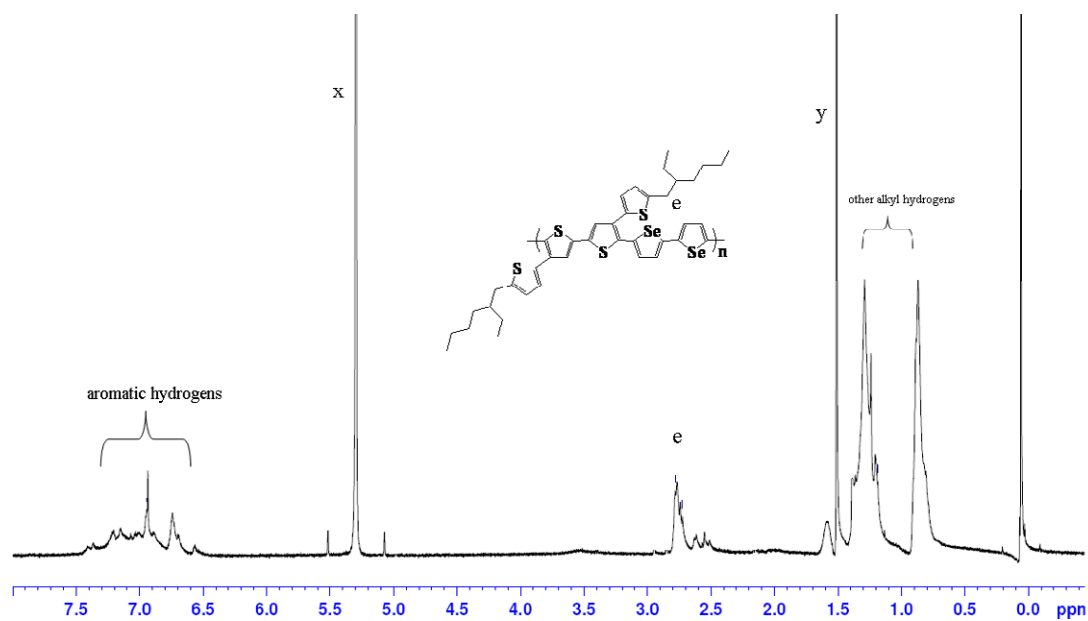
**Figure S1.** <sup>1</sup>H-NMR Spectrum of P4TT in CDCl<sub>3</sub>.(x: CDCl<sub>3</sub>, y: H<sub>2</sub>O)



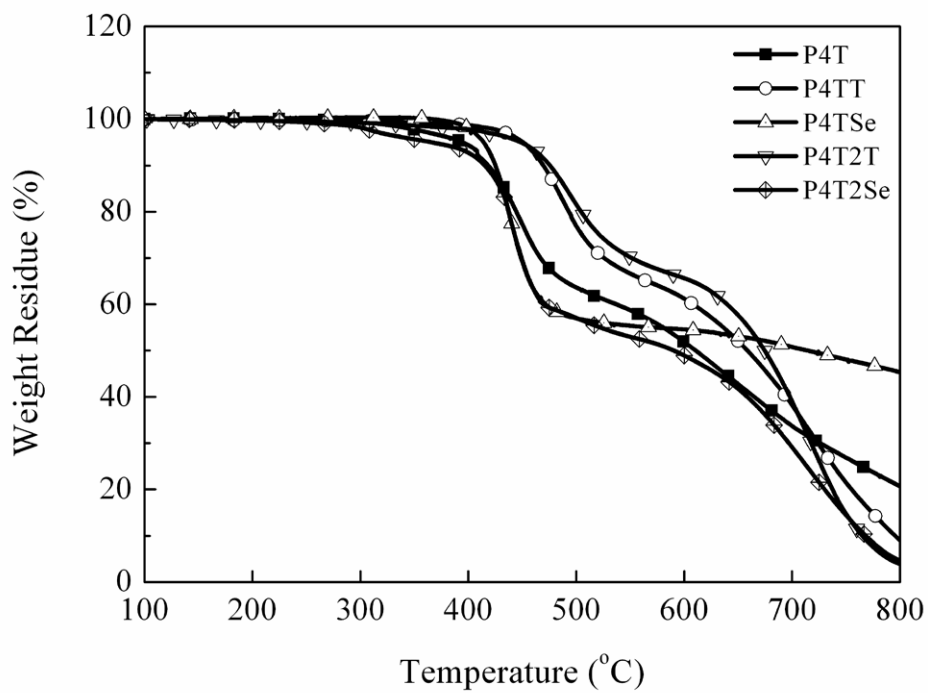
**Figure S2.** <sup>1</sup>H-NMR Spectrum of P4TSe in CDCl<sub>3</sub>.(x: CDCl<sub>3</sub>, y: H<sub>2</sub>O)



**Figure S3.**  $^1\text{H-NMR}$  Spectrum of P4T2T in  $\text{CDCl}_3$ . (x:  $\text{CDCl}_3$ , y:  $\text{H}_2\text{O}$ )



**Figure S4.**  $^1\text{H-NMR}$  Spectrum of P4T2Se in  $\text{CD}_2\text{Cl}_2$ . (x:  $\text{CD}_2\text{Cl}_2$ , y:  $\text{H}_2\text{O}$ )



**Figure S5.** TGA curves of the **4T**-based conjugated polymers.