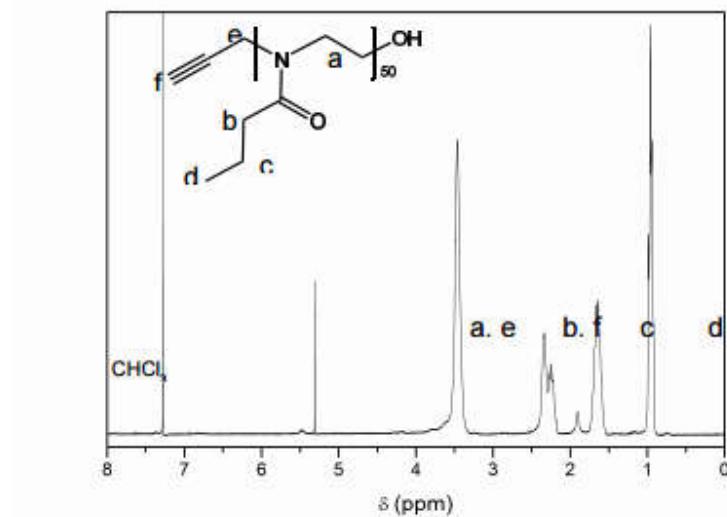


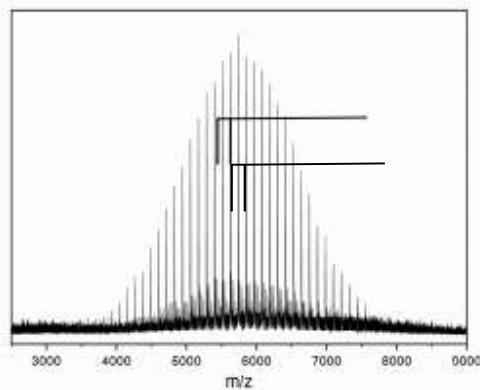
## Supporting Information

### Thermoresponsive Laterally-Branched Polythiophene Derivative as Water-Soluble Temperature Sensor

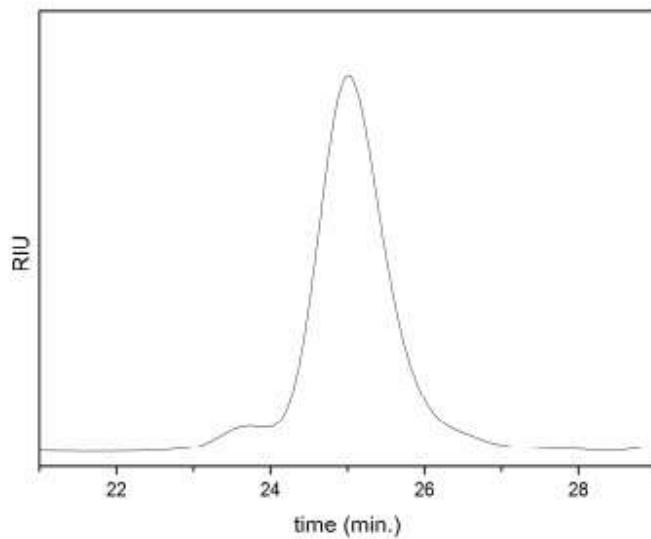
Eddie Wai Chi Chan,<sup>a,b</sup> Paul Baek,<sup>a,b</sup> Victor R. De la Rosa,<sup>c</sup> David Barker,<sup>a</sup> Richard Hoogenboom<sup>c</sup> and Jadranka Travas-Sejdic<sup>\*a,b</sup>



**Figure S1:** <sup>1</sup>H NMR spectrum of propargyl poly(2-nPropyl-2-oxazoline)-OH (**4**)



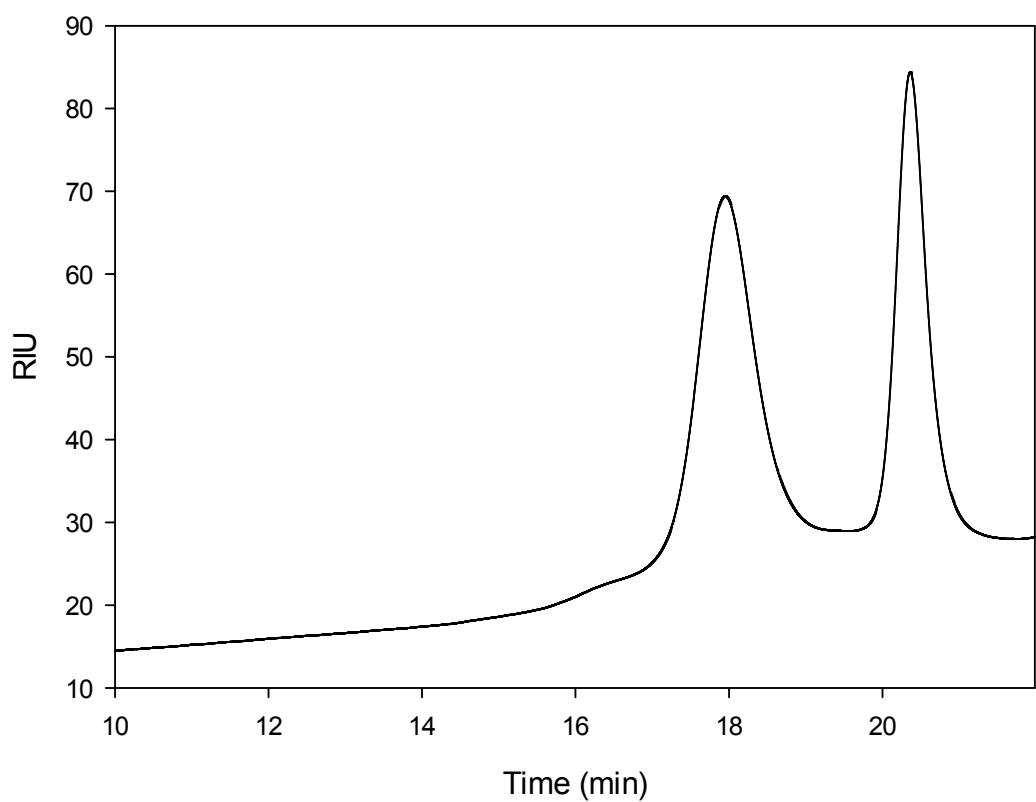
**Figure S2:** MALDI-TOF MS spectra of propargyl poly(2-nPropyl-2-oxazoline)-OH (**4**). Average mass of 5650 g/mol, approximately 50 repeating units. Main distribution: Na<sup>+</sup> adduct. Minor distribution: K<sup>+</sup> adducts.



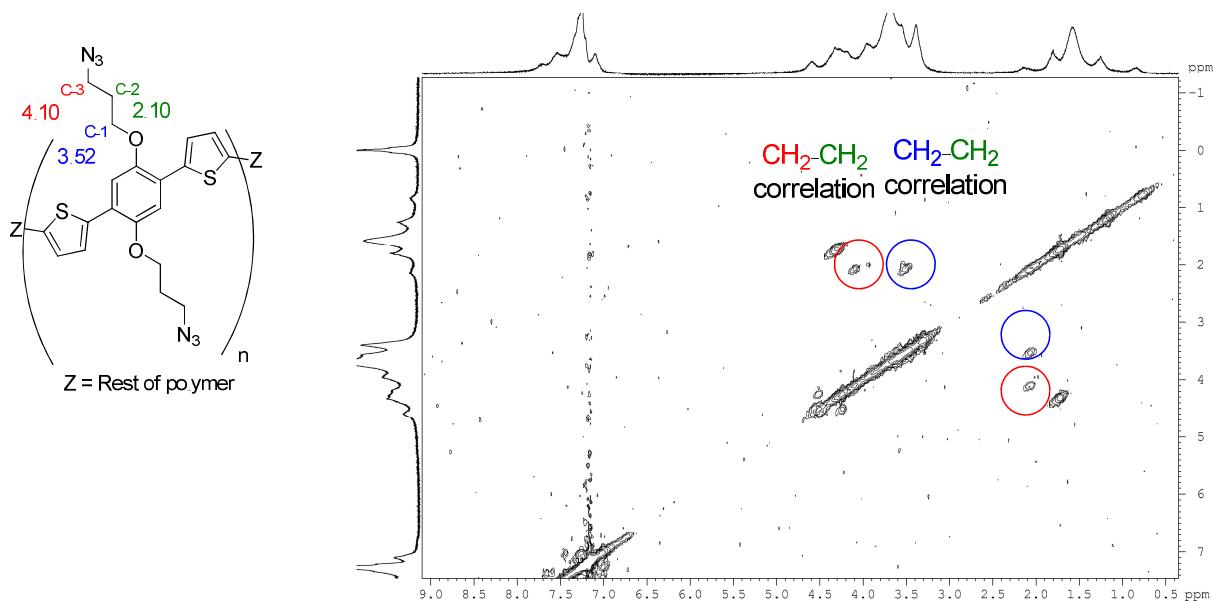
**Figure S3: SEC (DMA) of propargyl poly(2-nPropyl-2-oxazoline)-OH (**4**). PMMA standards. Mn: 8250, M<sub>w</sub>: 8900,  $\bar{D}$ : 1.09**

**Table S1:** SEC results for PThP-*g*-PEGMA (**3**) and *f*-PThP (**5**) determined in DMF calculated against a linear polystyrene calibration.

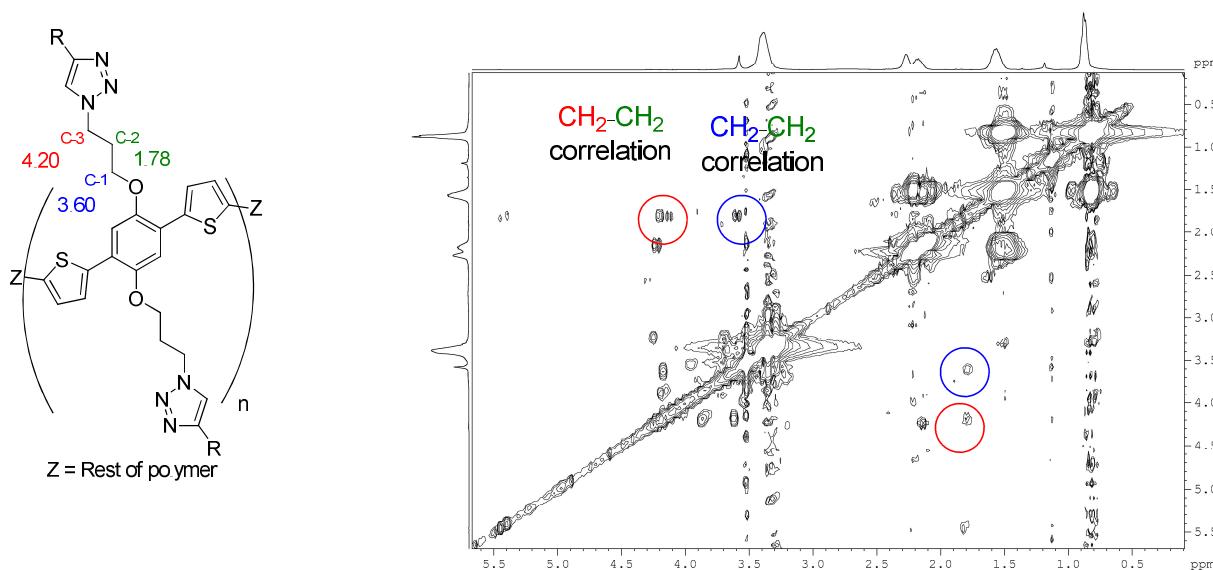
Compound	PThP- <i>g</i> -PEGMA ( <b>3</b> )	<i>f</i> -PThP ( <b>5</b> )
Mn	$1.30 \times 10^4$	$1.26 \times 10^5$
M <sub>w</sub>	$1.47 \times 10^4$	$2.44 \times 10^5$
M <sub>w</sub> /Mn	1.13	1.99



**Figure S4:** SEC trace of PThP-*g*-PEGMA (3)



**Figure S5:** Expansion of COSY spectrum of PThP (**3**), highlighting the presence of cross- between H-2 with H-1 and H-3.



**Figure S6:** Expansion of COSY spectrum of *f*-PThP (**5**), highlighting the shifting of cross- between H-2 with H-1 and H-3 after 'click' reaction.

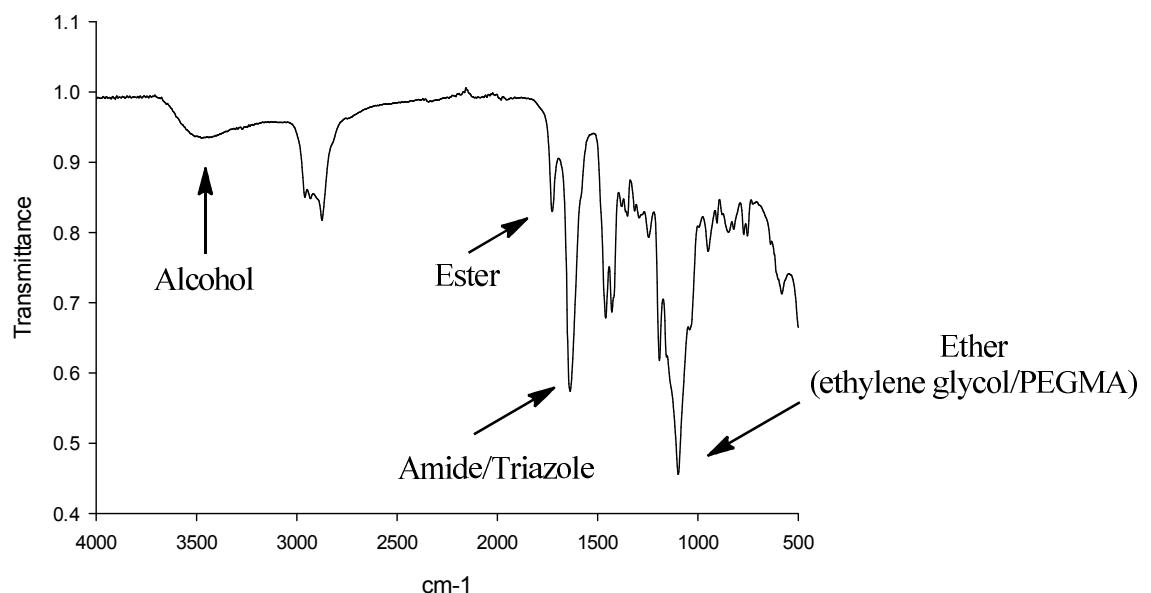
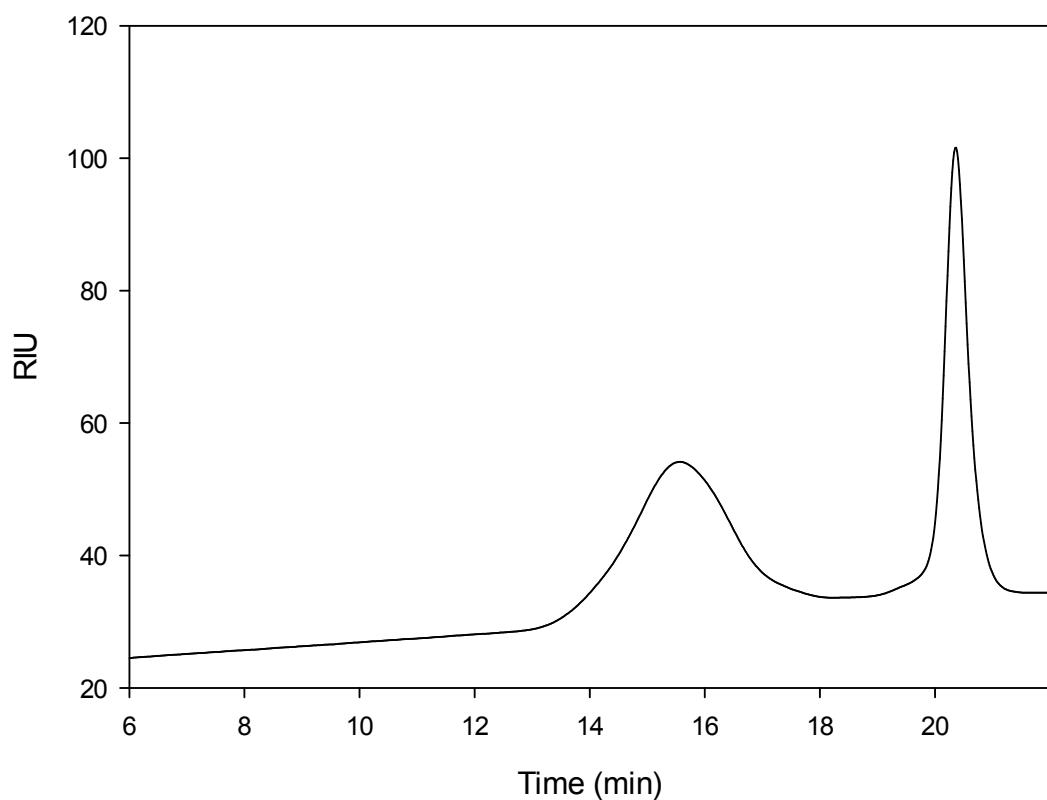


Figure S7: FT-IR spectrum of *f*-PThP (**5**)



**Figure S8:** SEC trace of *f*-PThP (**5**)

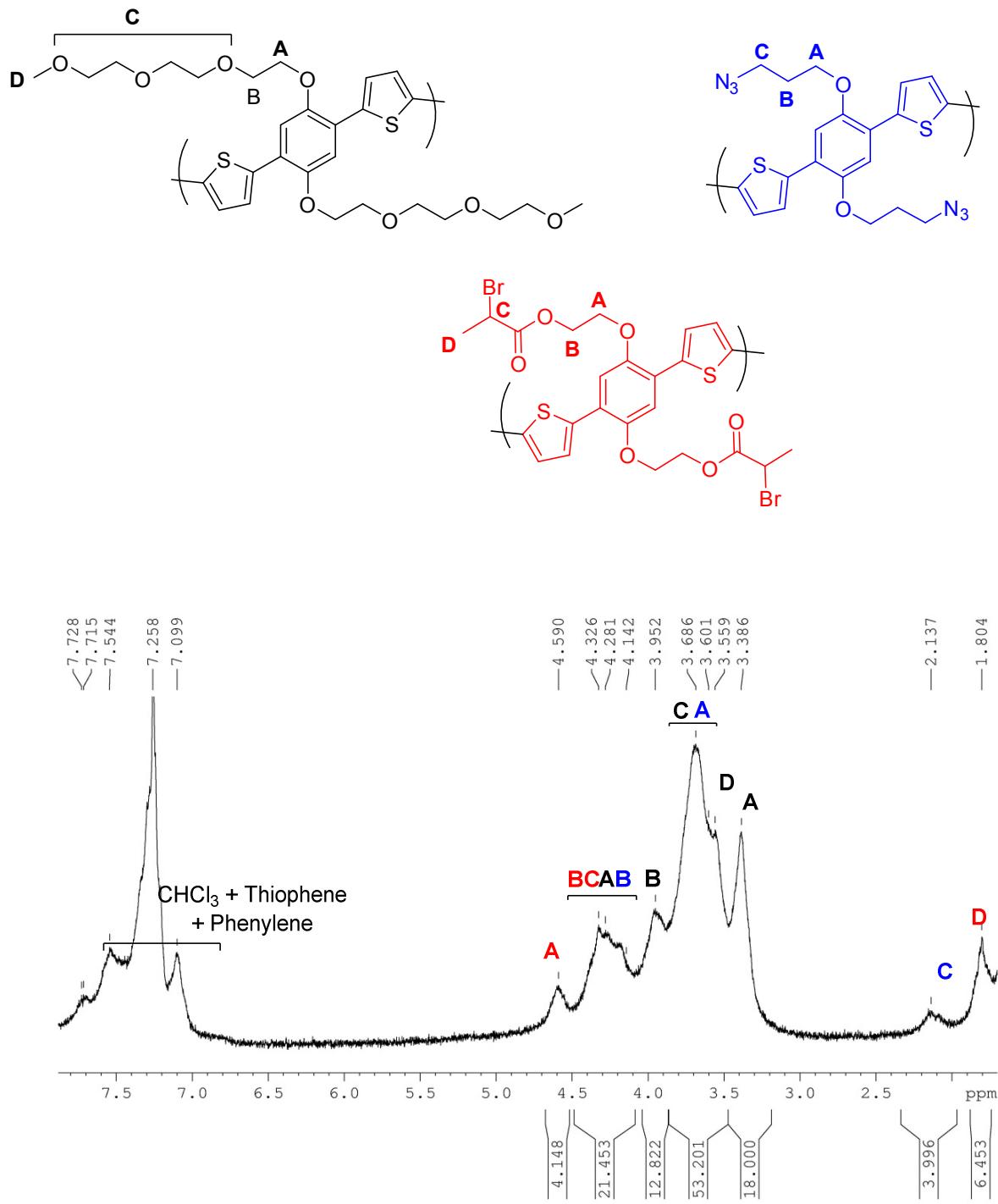
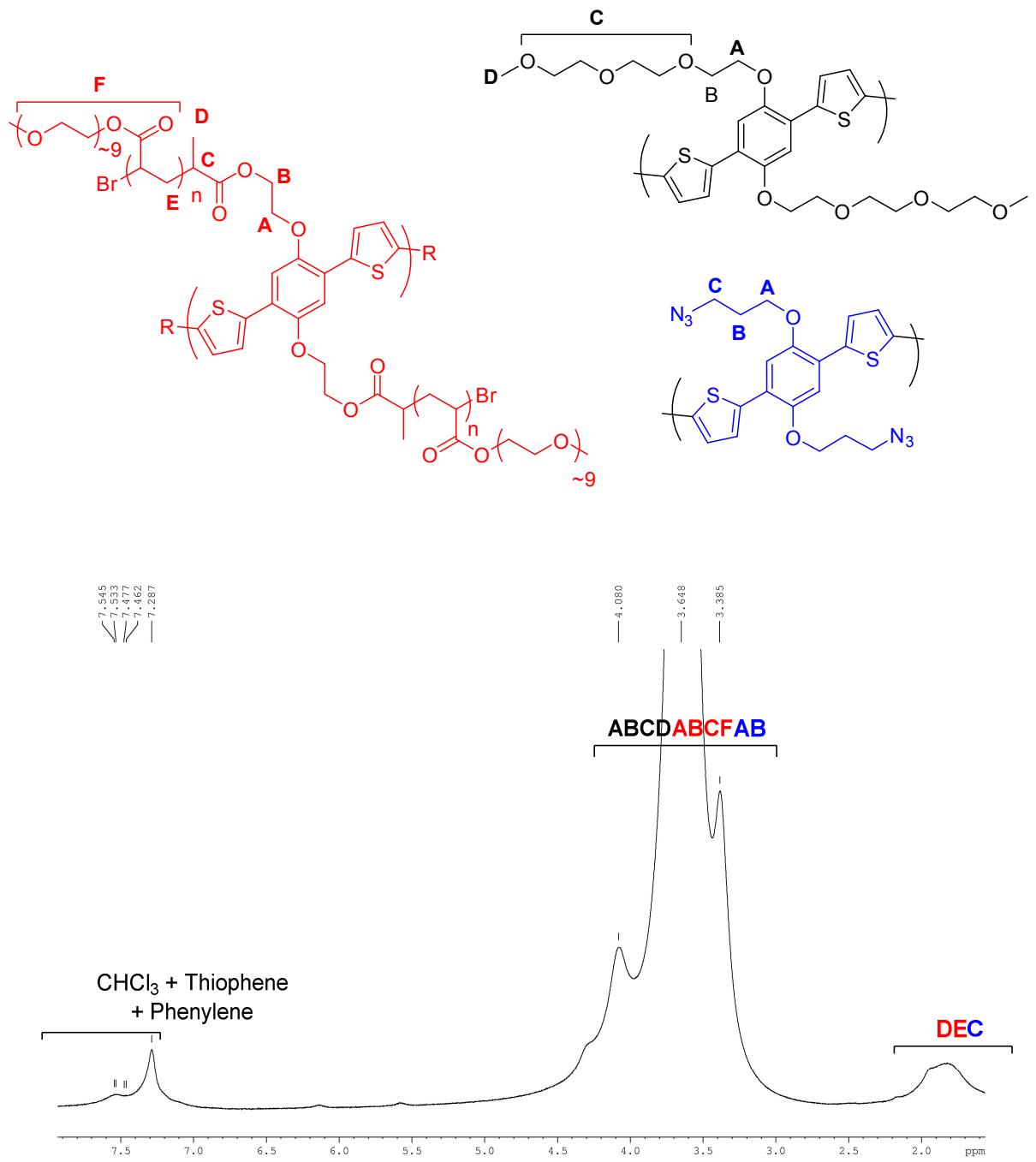
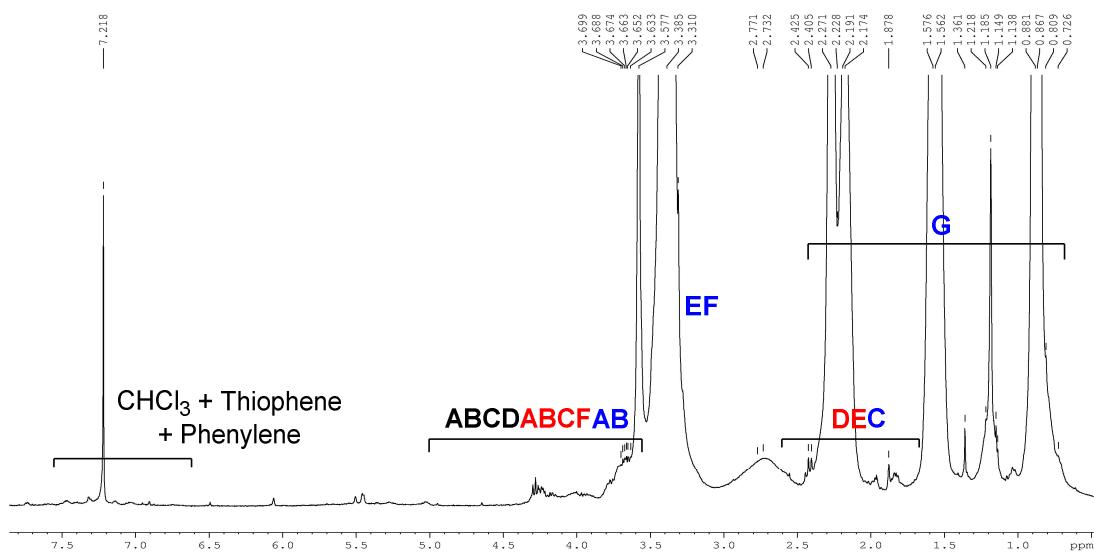
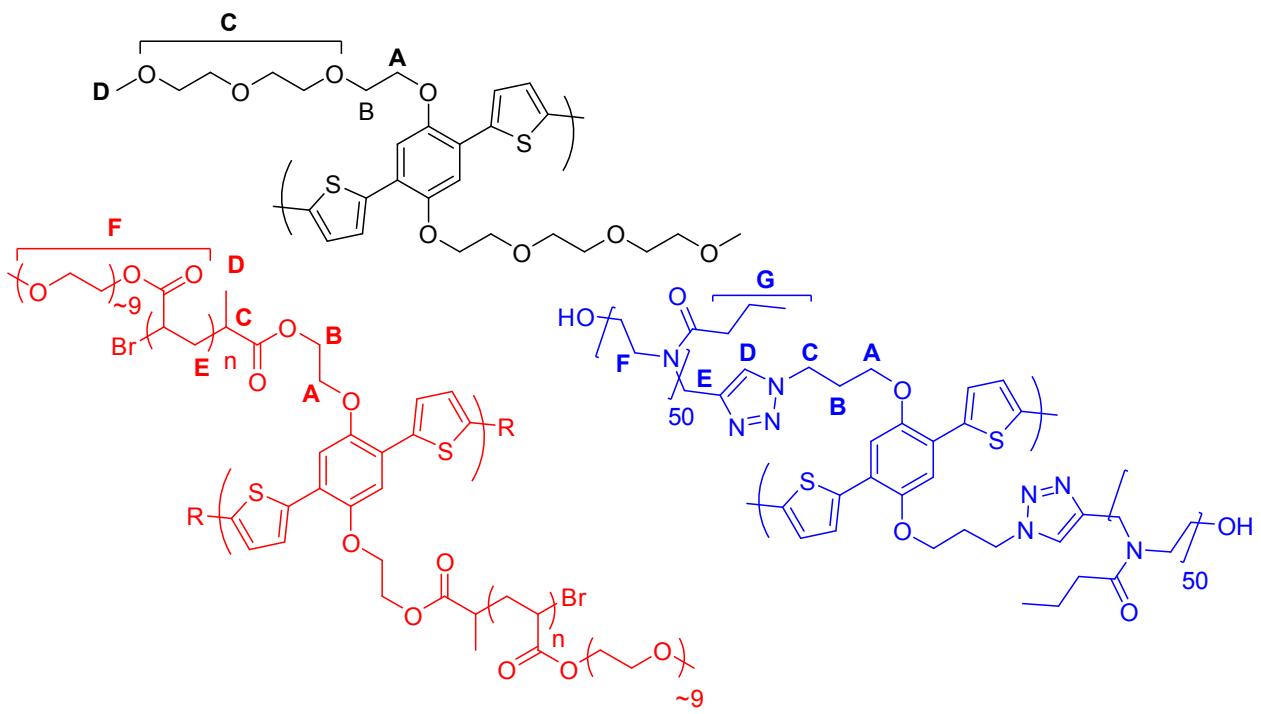


Figure S9:  $^1\text{H}$  NMR spectrum of TTGThP (3)



**Figure S10:** <sup>1</sup>H NMR spectrum of PThP-g-PEGMA (4)



**Figure S11:**  $^1\text{H}$  NMR spectrum of *f*-PThP (5)

**Table S2:** Quantum Yield of PThP (**3**) and (**5**)

Polymer	THF	CHCl <sub>3</sub>	DMF	H <sub>2</sub> O (25 °C)	H <sub>2</sub> O (30 °C)	H <sub>2</sub> O (35 °C)	H <sub>2</sub> O (40 °C)	H <sub>2</sub> O (45 °C)	H <sub>2</sub> O (55 °C)	H <sub>2</sub> O (65 °C)
<i>f</i> -PThP ( <b>5</b> )	0.159	0.111	0.141	0.0292	0.0309	0.0284	0.0191	0.0196	0.0214	0.0211
PThP- <i>g</i> -PEGMA ( <b>3</b> )	0.468	0.488	0.398	0.0706	0.0748	0.0748	0.0750	0.0718	0.0688	0.0656