

Supporting Information for

Triblock Copolymer Elastomers with Enhanced Mechanical Properties Synthesized by RAFT Polymerization and Subsequent Quaternization through Incorporation of a Comonomer with Imidazole Groups of about 2.0 Mass Percentage

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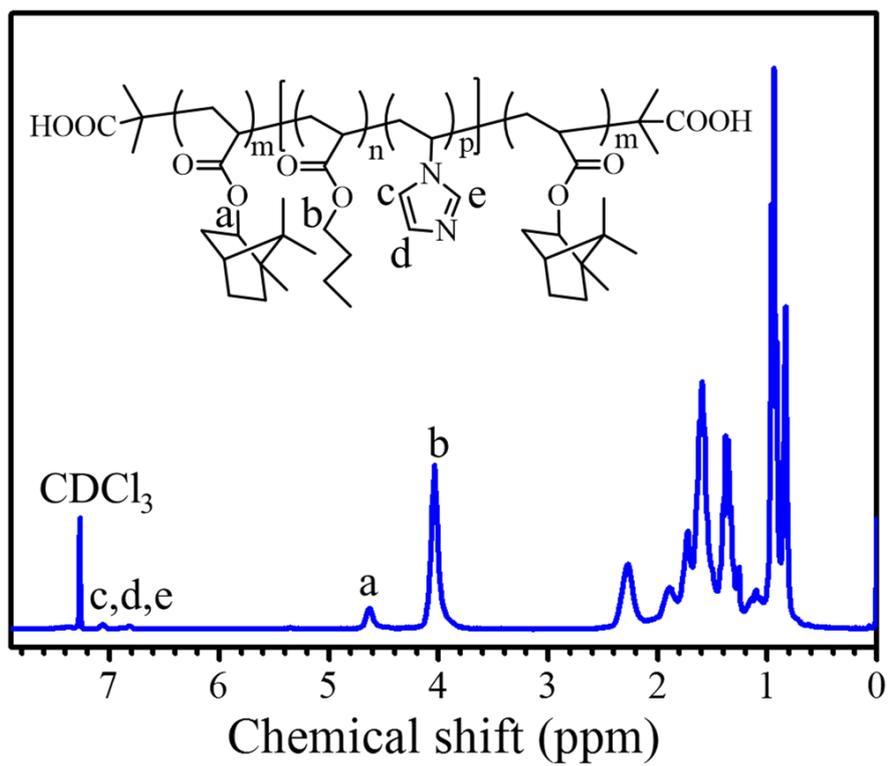


Figure S1. ¹H NMR spectrum for TBCPE1.

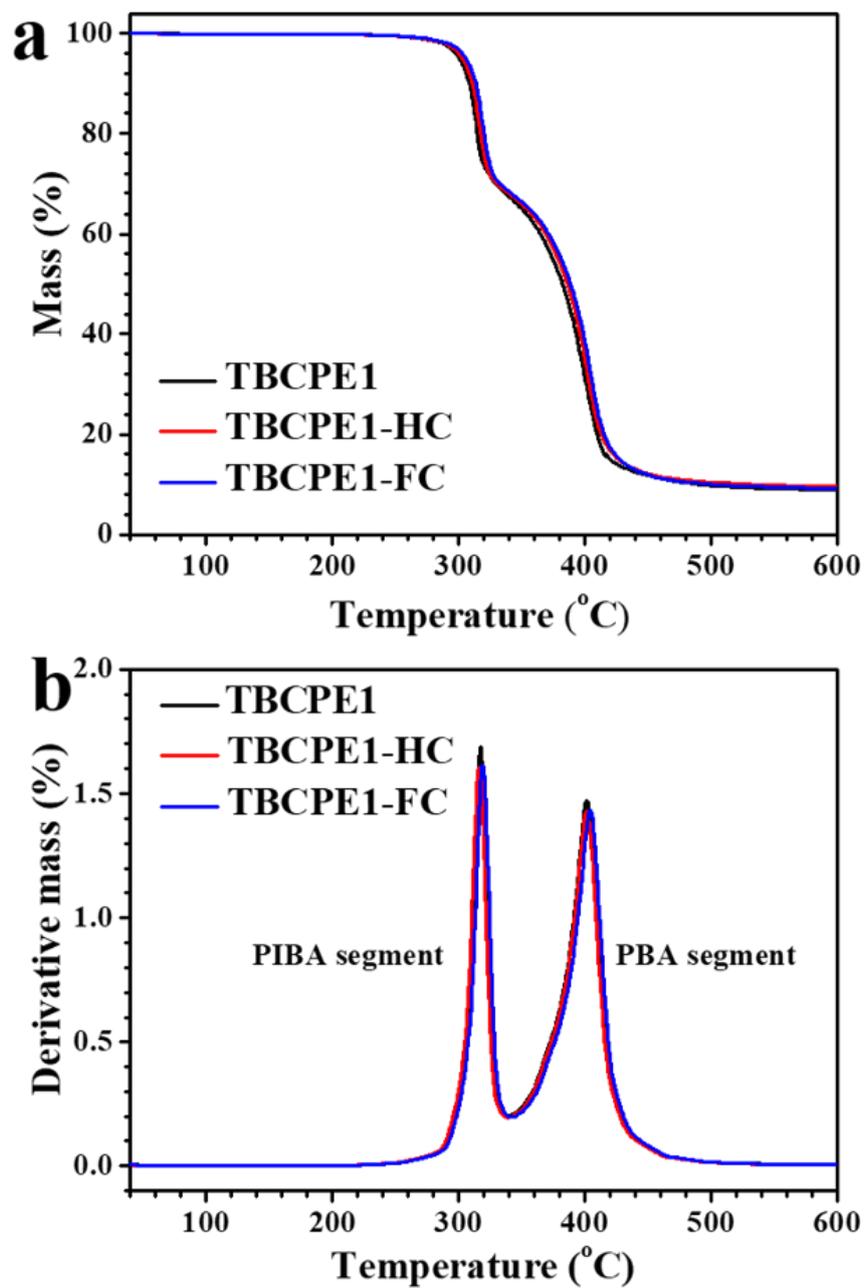


Figure S2. (a) Mass loss curves from TGA measurements and (b) derivative mass loss curves from TGA measurements under a nitrogen atmosphere with a heating rate of 10 °C/min for TBCPE1, TBCPE1-HC and TBCPE1-FC, respectively.

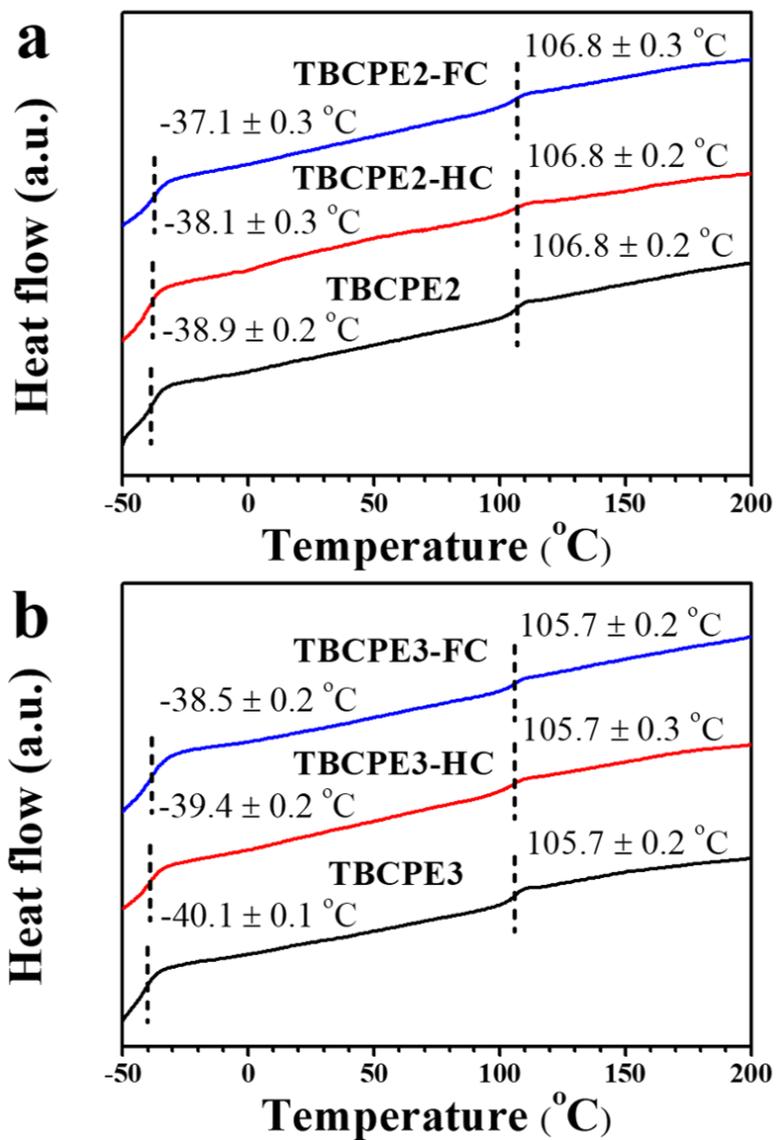


Figure S3. Heat flow curves from DSC measurements under a nitrogen atmosphere with a heating rate of 10 °C/min for (a) TBCPE2, TBCPE2-HC and TBCPE2-FC, and (b) TBCPE3, TBCPE3-HC and TBCPE3-FC.

Table S1. Thermal Properties for TBCPEs and Their Ionically Cross-linked Counterparts

sample code	$T_{\max, \text{PIBA}}$	$T_{\max, \text{P(BA-co-VI)}}$	$T_{\text{g, P(BA-co-VI)}}$	$T_{\text{g, PIBA}}$
	(°C) ^a	(°C) ^a	(°C) ^b	(°C) ^b
TBCPE1	317	402	-37.4±0.2	107.5±0.2
TBCPE1-HC	317	403	-36.2±0.2	107.5±0.3
TBCPE1-FC	316	403	-35.3±0.3	107.5±0.2
TBCPE2	316	394	-38.9±0.2	106.8±0.2
TBCPE2-HC	316	394	-38.1±0.3	106.8±0.2
TBCPE2-FC	314	393	-37.1±0.3	106.8±0.3
TBCPE3	315	397	-40.1±0.1	105.7±0.2
TBCPE3-HC	316	397	-39.4±0.2	105.7±0.3
TBCPE3-FC	314	397	-38.5±0.2	105.7±0.2

^aDetermined from TGA derivative mass loss curves. ^bDetermined from DSC heat flow curves.

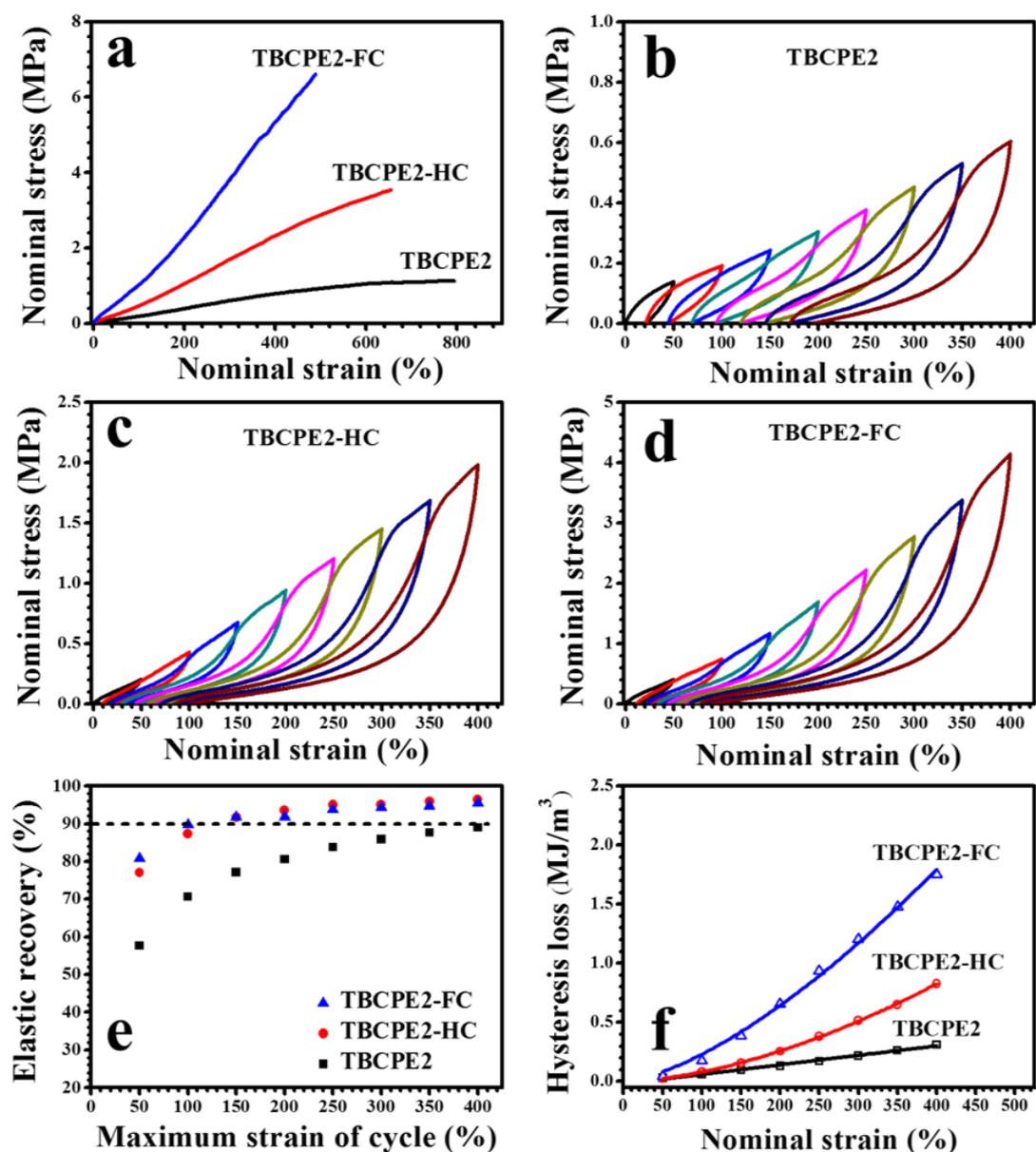


Figure S4. (a) Monotonic nominal stress-strain curves for TBCPE2, TBCPE2-HC and TBCPE2-FC. Cyclic nominal stress-strain curves for (b) TBCPE2, (c) TBCPE2-HC and (d) TBCPE2-FC. Changes of (e) elastic recovery and (f) hysteresis loss with maximum strain during cyclic tensile deformation for TBCPE2, TBCPE2-HC and TBCPE2-FC.

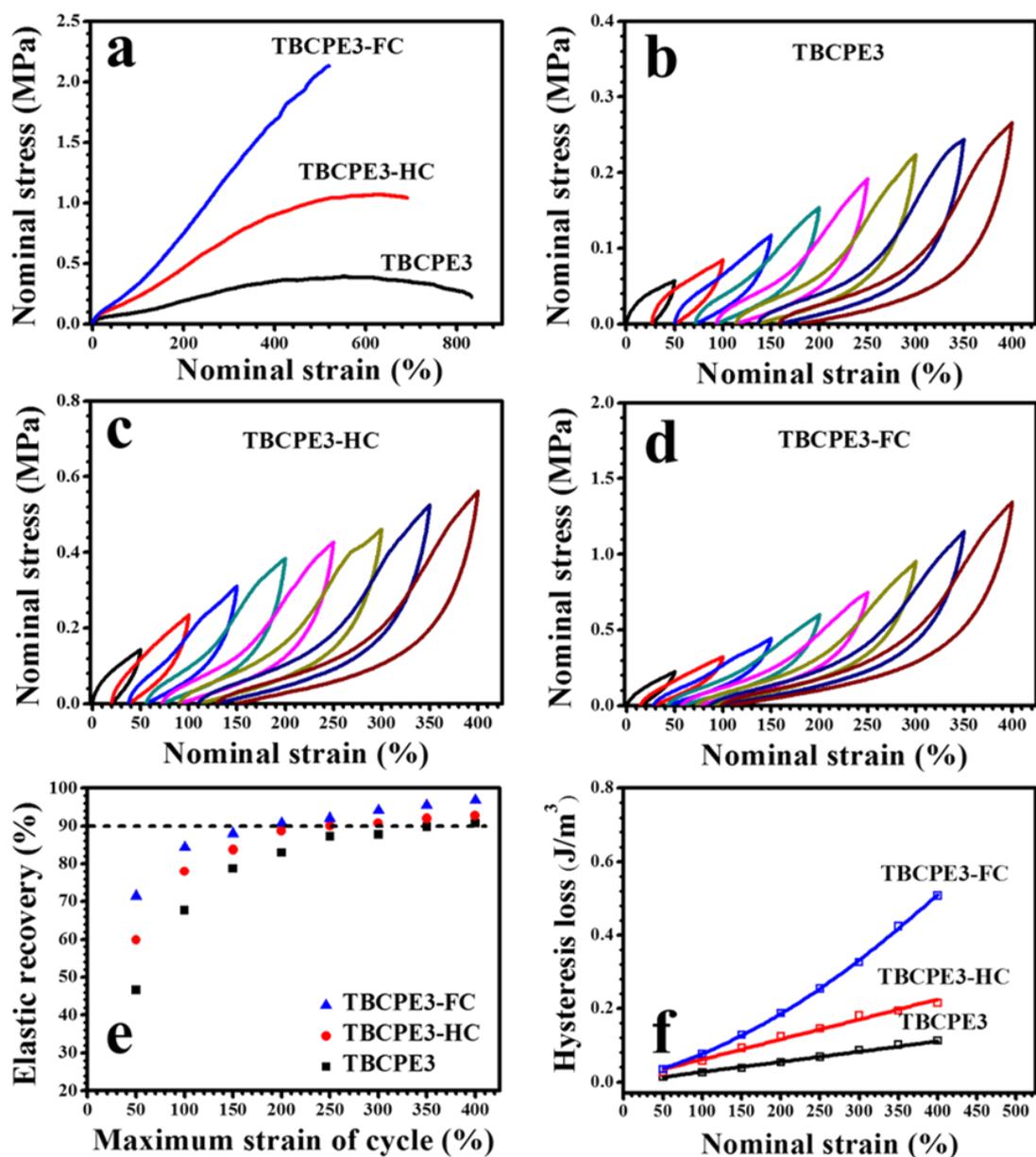


Figure S5. (a) Monotonic nominal stress-strain curves for TBCPE3, TBCPE3-HC and TBCPE3-FC. Cyclic nominal stress-strain curves for (b) TBCPE3, (c) TBCPE3-HC and (d) TBCPE3-FC. Changes of (e) elastic recovery and (f) hysteresis loss with maximum strain during cyclic tensile deformation for TBCPE3, TBCPE3-HC and TBCPE3-FC.

Table S2. Ultimate Tensile Strength, Elongation at Break and Average *ER* for TBCPEs and Their Ionically Cross-linked Counterparts

sample code	ultimate tensile strength (MPa) ^a	elongation at break (%) ^a	average <i>ER</i> (%) ^b
TBCPE1	2.8	804	72
TBCPE1-HC	8.0	678	90
TBCPE1-FC	11.7	501	94
TBCPE2	1.1	793	79
TBCPE2-HC	3.5	655	91
TBCPE2-FC	6.6	489	92
TBCPE3	0.2	833	79
TBCPE3-HC	1.0	691	84
TBCPE3-FC	2.1	519	89

^aObtained from monotonic nominal stress-strain curves. ^bDetermined from step-cyclic nominal stress-strain curves.

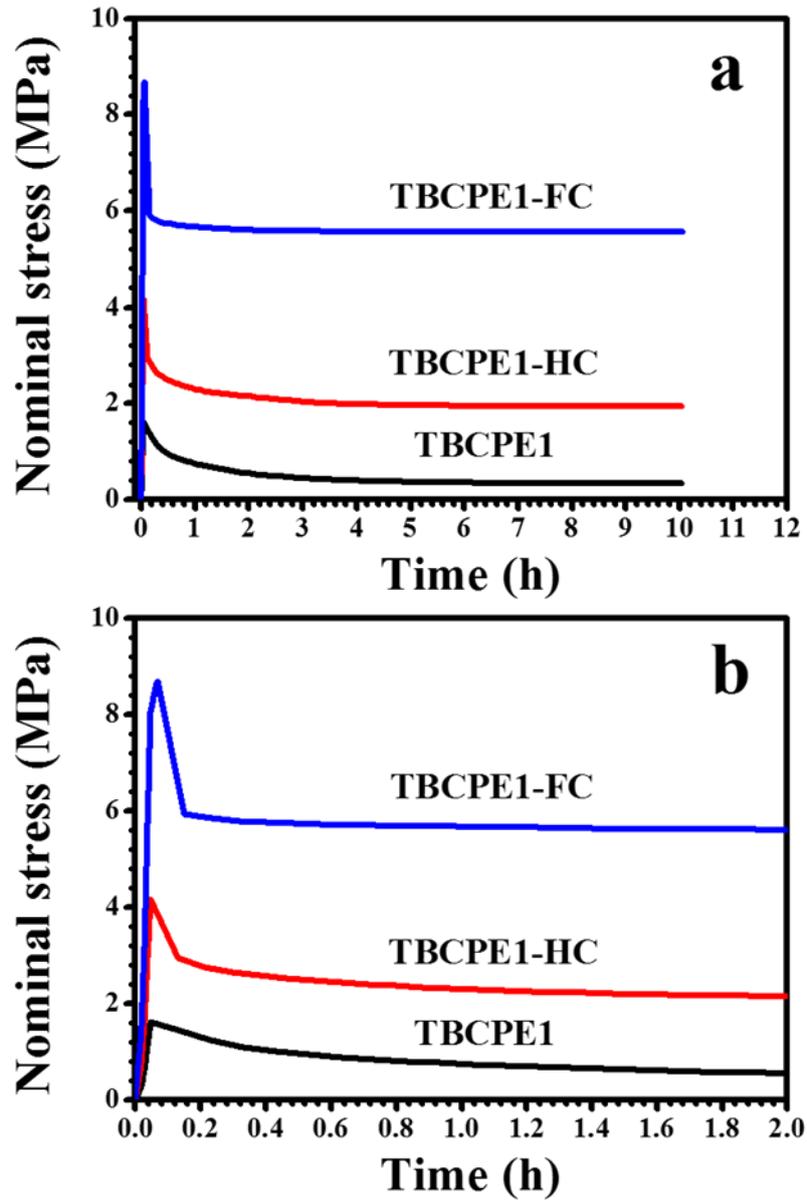


Figure S6. Stress relaxation curves at a fixed strain of 400% in the long period of 10 h (a) and in the initial short period of 2 h (b) for TBCPE1, TBCPE1-HC and TBCPE1-FC.

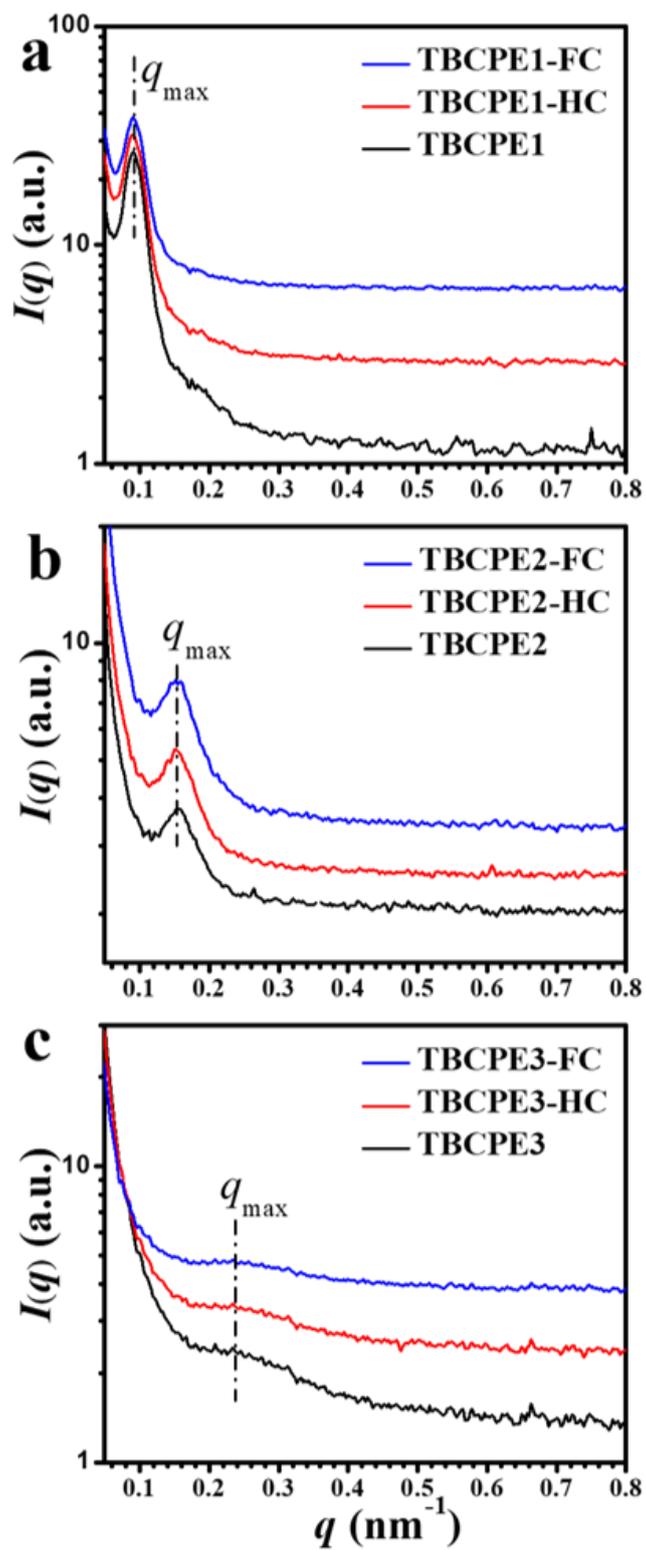


Figure S7. SAXS intensity profiles for (a) TBCPE1, TBCPE1-HC and TBCPE1-FC, (b) TBCPE2, TBCPE2-HC and TBCPE2-FC, and (c) TBCPE3, TBCPE3-HC and TBCPE3-FC.