

Electronic supplementary information (ESI)

Morphological Dependence on the Addition of a Soft Middle Block Segment to Rigid POSS- containing Triblock Copolymers for Forming Cylindrical Nanostructures

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Table S1. Summary of Molecular Weight, Molecular Weight Distribution and volume fraction of PMAPOSS in PMMA-*b*-PMAPOSS.

Polymer ^a	M_n (g/mol) ^b	M_w/M_n	PMAPOSS (vol%) ^c	Polymer ^a	M_n (g/mol) ^b	M_w/M_n	PMAPOSS (vol%) ^c
PMMA ₆₀₄ - <i>b</i> -PMAPOSS ₇	65 700	1.04	7	PMMA ₅₇ - <i>b</i> -PMAPOSS ₁₄	18 600	1.05	70
PMMA ₄₅₀ - <i>b</i> -PMAPOSS ₇	51 700	1.06	13	PMMA ₃₄ - <i>b</i> -PMAPOSS ₁₁	11 800	1.07	71
PMMA ₁₇₈ - <i>b</i> -PMAPOSS ₈	23 500	1.07	20	PMMA ₃₅ - <i>b</i> -PMAPOSS ₃₅	12 500	1.11	72
PMMA ₃₂₄ - <i>b</i> -PMAPOSS ₁₅	43 800	1.03	22	PMMA ₃₇ - <i>b</i> -PMAPOSS ₁₃	13 300	1.07	72
PMMA ₁₆₅ - <i>b</i> -PMAPOSS ₇	21 500	1.09	23	PMMA ₅₂ - <i>b</i> -PMAPOSS ₁₆	20 200	1.06	74
PMMA ₂₂₁ - <i>b</i> -PMAPOSS ₁₀	29 900	1.07	26	PMMA ₃₂ - <i>b</i> -PMAPOSS ₁₀	12 800	1.04	75
PMMA ₁₇₁ - <i>b</i> -PMAPOSS ₈	23 500	1.07	27	PMMA ₄₁ - <i>b</i> -PMAPOSS ₁₄	17 000	1.04	76
PMMA ₁₅₉ - <i>b</i> -PMAPOSS ₆	20 200	1.07	30	PMMA ₄₁ - <i>b</i> -PMAPOSS ₁₄	17 000	1.04	76
PMMA ₇₄ - <i>b</i> -PMAPOSS ₆	12 100	1.05	32	PMMA ₅₀ - <i>b</i> -PMAPOSS ₂₅	23 700	1.05	79
PMMA ₁₅₄ - <i>b</i> -PMAPOSS ₅	18 900	1.07	33	PMMA ₂₉ - <i>b</i> -PMAPOSS ₁₆	14 600	1.03	80
PMMA ₇₇ - <i>b</i> -PMAPOSS ₇	13 000	1.05	41	PMMA ₂₇ - <i>b</i> -PMAPOSS ₁₇	15 200	1.05	82
PMMA ₈₁ - <i>b</i> -PMAPOSS ₉	15 000	1.05	46	PMMA ₁₉ - <i>b</i> -PMAPOSS ₁₀	10 900	1.07	83
PMMA ₇₈ - <i>b</i> -PMAPOSS ₁₁	16 000	1.06	51	PMMA ₂₀ - <i>b</i> -PMAPOSS ₁₀	11 700	1.09	83
PMMA ₁₆₂ - <i>b</i> -PMAPOSS ₁₈	32 800	1.06	51	PMMA ₁₇ - <i>b</i> -PMAPOSS ₉	10 500	1.05	84
PMMA ₆₃ - <i>b</i> -PMAPOSS ₉	13 200	1.03	52	PMMA ₁₇ - <i>b</i> -PMAPOSS ₁₀	10 800	1.05	84
PMMA ₈₆ - <i>b</i> -PMAPOSS ₇	15 700	1.04	55	PMMA ₁₈ - <i>b</i> -PMAPOSS ₁₁	12 100	1.05	85
PMMA ₈₈ - <i>b</i> -PMAPOSS ₁₂	20 500	1.07	57	PMMA ₂₂ - <i>b</i> -PMAPOSS ₁₈	15 900	1.06	86
PMMA ₂₇₁ - <i>b</i> -PMAPOSS ₂₇	47 000	1.06	58	PMMA ₁₉ - <i>b</i> -PMAPOSS ₂₀	16 900	1.05	89
PMMA ₅₄ - <i>b</i> -PMAPOSS ₁₀	13 200	1.06	59	PMMA ₁₄ - <i>b</i> -PMAPOSS ₁₉	15 600	1.05	91
PMMA ₆₆ - <i>b</i> -PMAPOSS ₁₄	17 000	1.04	61	PMMA ₁₇ - <i>b</i> -PMAPOSS ₂₂	17 800	1.06	91
PMMA ₄₈ - <i>b</i> -PMAPOSS ₁₁	13 300	1.04	64	PMMA ₁₁ - <i>b</i> -PMAPOSS ₁₇	13 500	1.05	92
PMMA ₁₀₄ - <i>b</i> -PMAPOSS ₂₁	30 000	1.10	66	PMMA ₁₄ - <i>b</i> -PMAPOSS ₂₁	16 900	1.05	92
PMMA ₁₀₈ - <i>b</i> -PMAPOSS ₂₈	31 800	1.05	66	PMMA ₁₂ - <i>b</i> -PMAPOSS ₂₆	20 800	1.05	94
PMMA ₄₀ - <i>b</i> -PMAPOSS ₁₀	12 000	1.05	67				

^a Degree of polymerization was determined from the gel permeation chromatography (GPC) and integration from ¹H NMR spectra. ^b The molecular weight of polymers was determined by GPC. ^c Volume fractions of PMAPOSS calculated from integration from ¹H-NMR spectra.

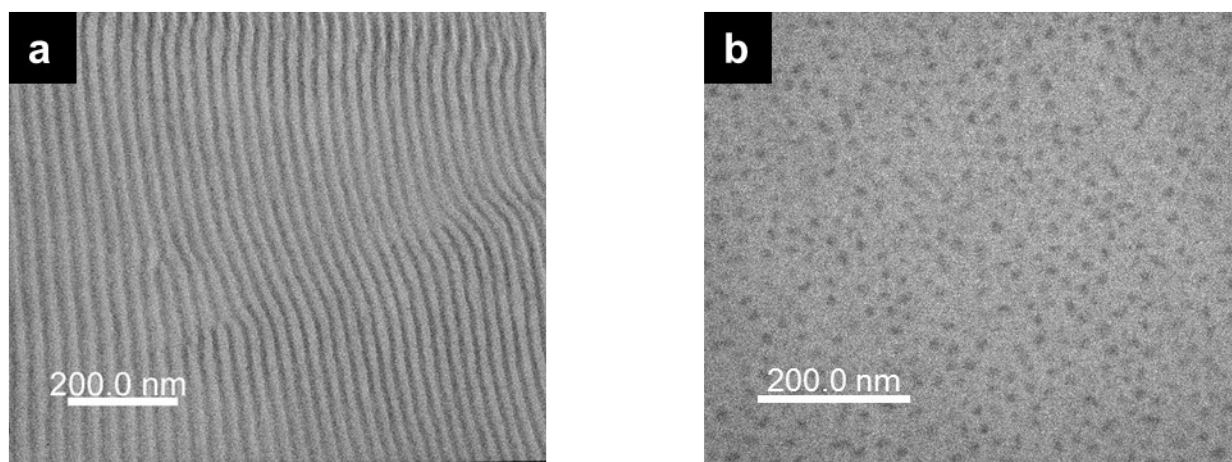


Fig. S1. TEM images of PMMA-*b*-PMAPOSS bulk samples. Volume fractions of PMAPOSS domain are (a) 22 vol% and (b) 7 vol%.

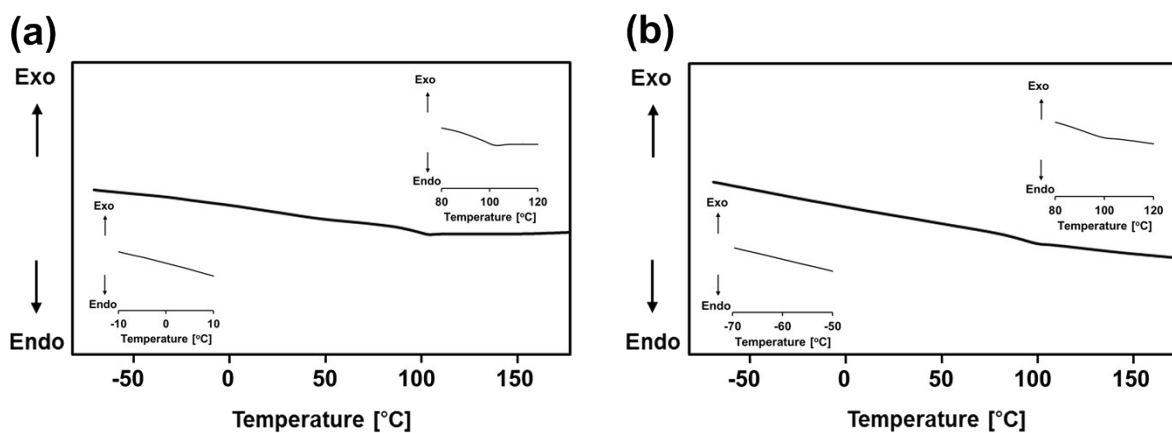


Fig. S2. DSC curves at the heating cycles of (a) PS₂₀₀-*b*-(1,2-*ran*-3,4-PI)₁₃-*b*-PMAPOSS₁₂ and (b) PS₂₆₆-*b*-(1,4-PI)₂₃-*b*-PMAPOSS₁₃.

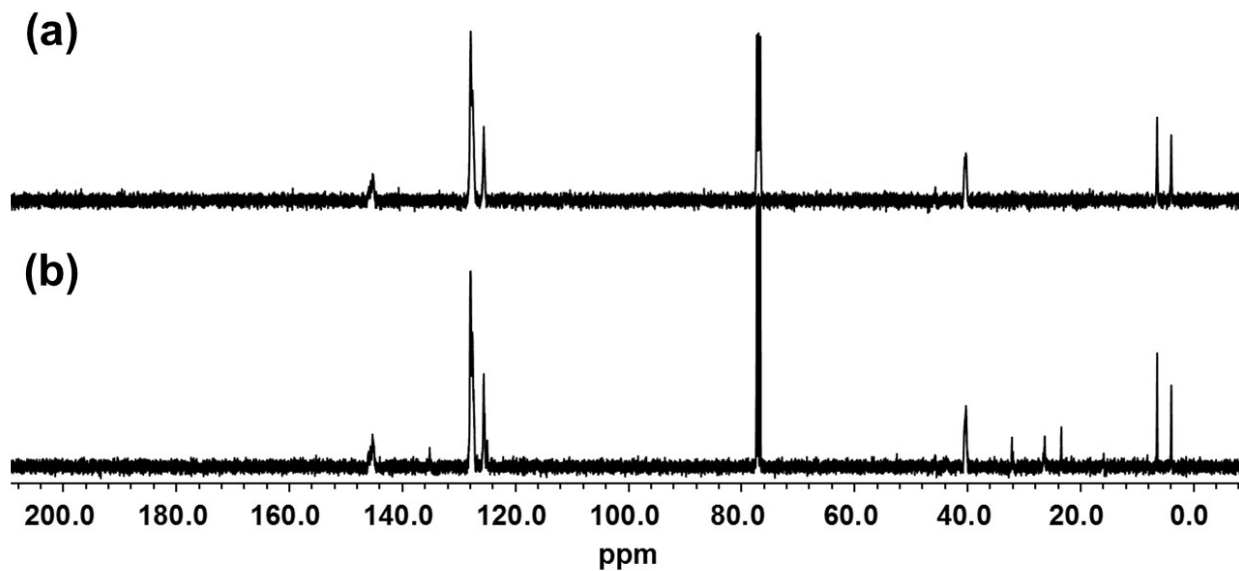


Fig. S3. ¹³C-NMR spectra of (a) PS₂₀₀-*b*-(1,2-*ran*-3,4-PI)₁₃-*b*-PMAPOSS₁₂ and (b) PS₂₆₆-*b*-(1,4-PI)₂₃-*b*-PMAPOSS₁₃.

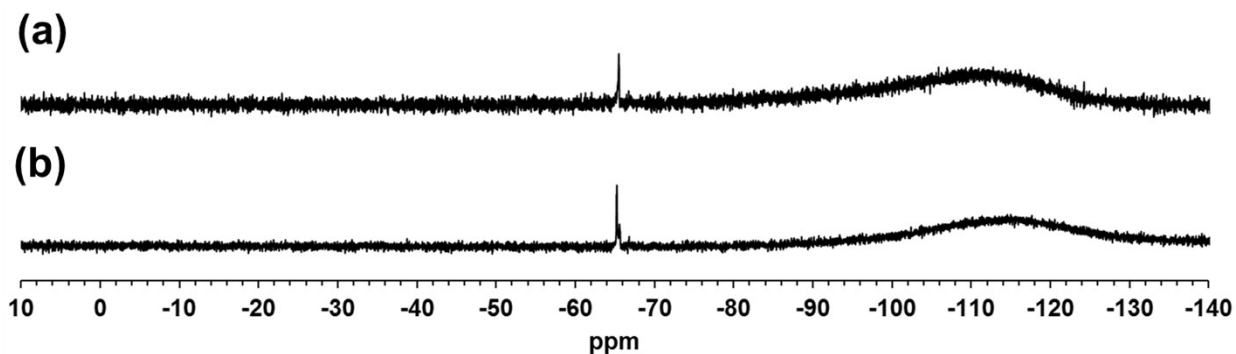


Fig. S4. ²⁹Si-NMR spectra of (a) PS₂₀₀-*b*-(1,2-*ran*-3,4-PI)₁₃-*b*-PMAPOSS₁₂ and (b) PS₂₆₆-*b*-(1,4-PI)₂₃-*b*-PMAPOSS₁₃.

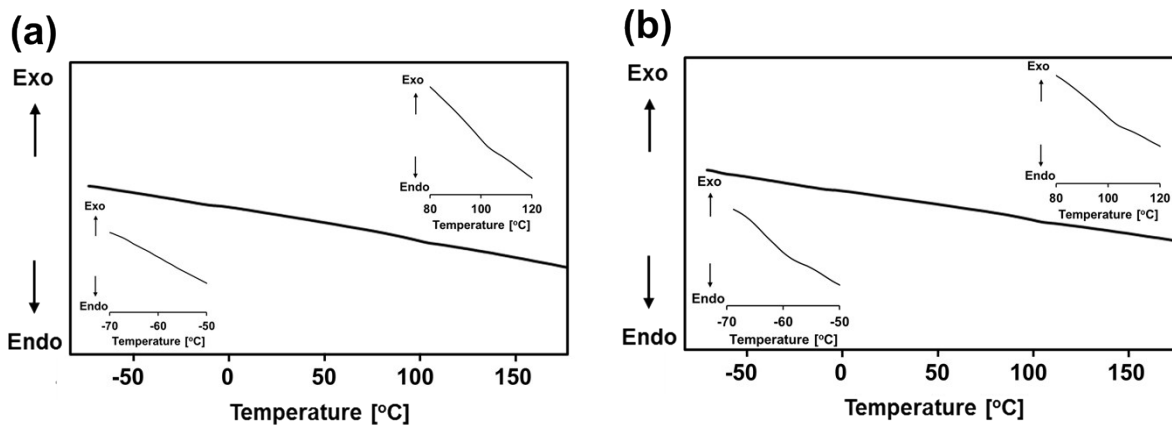


Fig. S5. DSC curves at the heating cycles of (a) PS₃₃₇-*b*-(1,4-PI)₅₉-*b*-PMAPOSS₁₅ and (b) PS₃₃₆-*b*-(1,4-PI)₁₃₁-*b*-PMAPOSS₂₁.