

Figure S1. (a) The schematic illustration of directed self-assembly (DSA) process of a thickness-modulated block copolymer (BCP) thin film inside bare silicon trenches. The cross-sectional SEM images of (b) silicon trenches and (c) & (d) thickness-modulated BCP thin films.

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M_n of BCP	PS- <i>b</i> -PMMA 25k-26k	PS- <i>b</i> -PMMA 44k-45k	PS- <i>b</i> -PMMA 105k-106k
L_0 (nm)	25.4	44.5	109

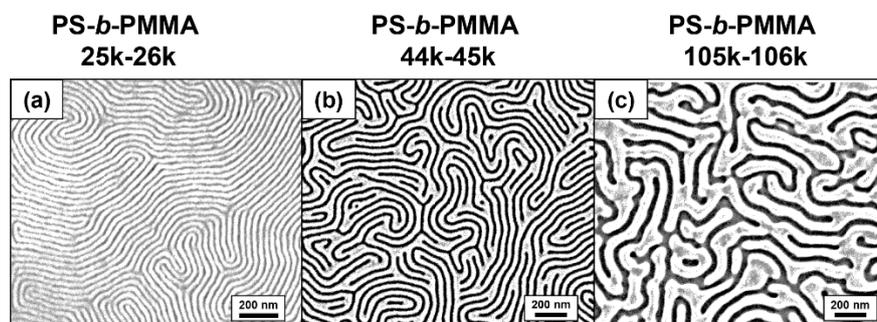


Figure S2. Top view SEM images of lamella-forming PS-*b*-PMMA nanodomains on chemically neutral silicon substrate. (a) 25 kg/mol – 26 kg/mol, (b) 44 kg/mol – 45 kg/mol, and (c) 105 kg/mol – 106 kg/mol.

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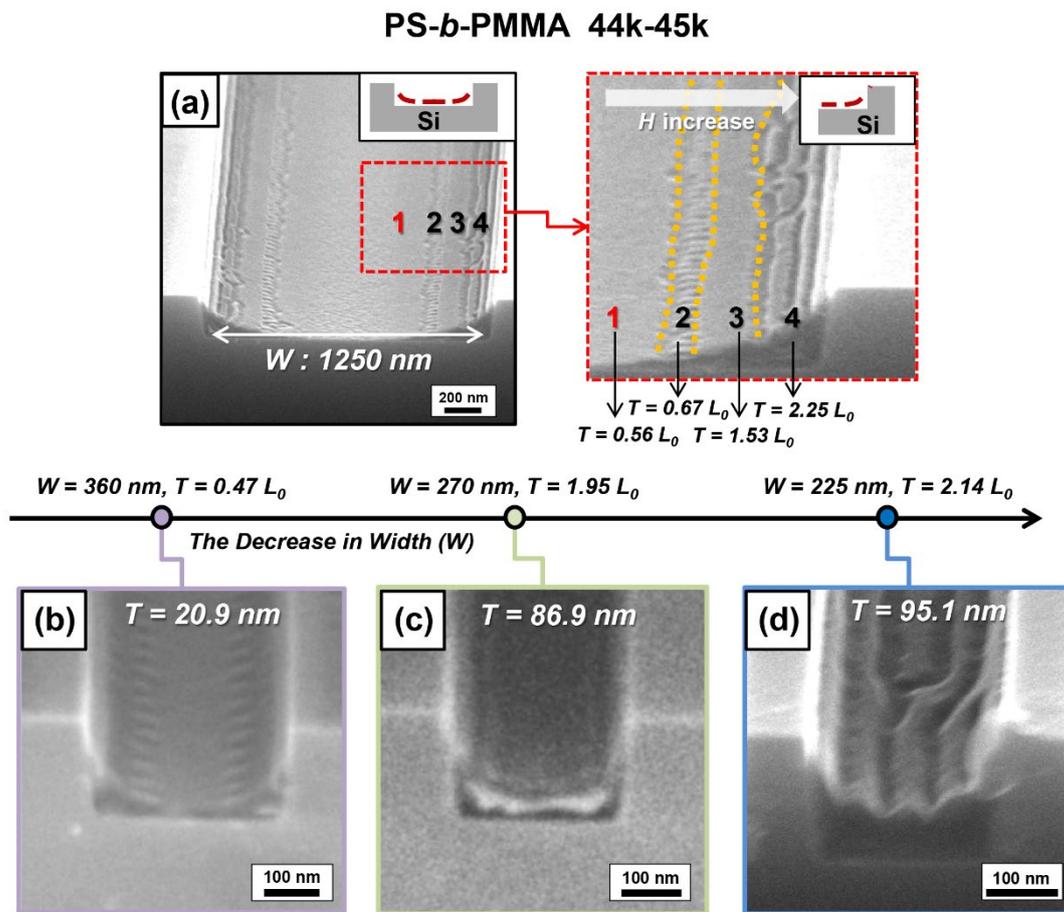


Figure S3. The tilted-view SEM images of PS-*b*-PMMA thin film (44 kg/mol – 45 kg/mol) inside silicon trenches. **(a)** $W = 1250 \text{ nm}$, **(b)** $W = 360 \text{ nm}$, **(c)** $W = 270 \text{ nm}$, and **(d)** $W = 225 \text{ nm}$.

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Table S1. Single/multiple orientations of lamella-forming BCP thin films inside various silicon trenches.

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BCP	W_{Trench} (nm)	T_{BCP} (nm)	Orientation
	$W = 49.21 L_0$	$T = 0.63 L_0$	Multiple
PS-<i>b</i>-PMMA 25k-26k ($L_0 = 25.4$ nm)	$W = 18.9 L_0$	$T = 0.83 L_0$	Multiple
	$W = 10.62 L_0$	$T = 1.47 L_0$	Multiple
	$W = 7.09 L_0$	$T = 1.89 L_0$	Single [L]

	$W = 28.09 L_0$	$T = 0.27 L_0$	Multiple
PS-<i>b</i>-PMMA 44k-45k ($L_0 = 44.5$ nm)	$W = 8.09 L_0$	$T = 0.47 L_0$	Multiple
	$W = 6.07 L_0$	$T = 1.95 L_0$	Multiple
	$W = 4.04 L_0$	$T = 2.14 L_0$	Single [L]

PS-<i>b</i>-SMMA 105k-106k ($L_0 = 109$ nm)	$W = 1.65 L_0$	$T = 0.38 L_0$	Single [L=]
	$W = 1.65 L_0$	$T = 0.44 L_0$	Single [C _⊥]
	$W = 1.65 L_0$	$T = 0.88 L_0$	Single [L]

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