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**Interfaces between Block Copolymer Domains** JAEUP KIM, UNIST, Korea, SEONG-JUN JEONG, University of California, Berkeley, SANG OUK KIM, KAIST, Korea — Block copolymers naturally form nanometer scale structures which repeat their geometry on a larger scale. Such a small scale periodic pattern can be used for various applications such as storage media, nano-circuits and optical filters. However, perfect alignment of block copolymer domains in the macroscopic scale is still a distant dream. The nanostructure formation usually occurs with spontaneously broken symmetry; hence it is easily infected by topological defects which sneak in due to entropic fluctuation and incomplete annealing. Careful annealing can gradually reduce the number of defects, but once kinetically trapped, it is extremely difficult to remove all the defects. One of the main reasons is that the defect finds a locally metastable morphology whose potential depth is large enough to prohibit further morphology evolution. In this work, the domain boundaries between differently oriented lamellar structures in thin film are studied. For the first time, it became possible to quantitatively study the block copolymer morphology in the transitional region, and it was shown that the twisted grain boundary is energetically favorable compared to the T-junction grain boundary. [Nano Letters, **9**, 2300 (2010)]. This theoretical method successfully explained the experimental results.

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