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The formation of standing cylinders in block copolymer films by irreversibly adsorbed polymer layers on substrates[1] JUN SHANG, NAISHENG JIANG, MAYA ENDOH, TADANORI KOGA, Department of Materials Science and Engineering, Stony Brook University — Block copolymers offer a simple and effective route to produce standing cylindrical nanostructures with regularity on the order of 10-100 nm, the length scale that is desirable for many advanced applications. However, these formations have been especially troublesome due to the fact that preferential interactions between one of the blocks and the surfaces will induce parallel alignment of the cylinders in order to minimize interfacial and surface energy. Here we introduce an alternative simple method utilizing an irreversibly adsorbed polymer layer (a "Guiselin" brush) as a neutral "substrate" formed on solid substrates for the arrangement of standing cylindrical nanostructures. The effect of polymer adsorbed layer on the long range ordering of asymmetric cylinder forming poly(styrene-block-ethylene/butylene-block-styrene) (SEBS) triblock copolymer thin films were investigated by using a combination of grazing incidence small angle x-ray scattering and atomic force microscopy techniques. We found that the SEBS, which forms cylinders lying parallel to the surface when prepared on silicon substrates, show standing cylindrical structures on selected Guiselin brush layers after prolong thermal annealing. The details will be discussed in the presentation.

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