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The Structural Change Depending on the Buckling Direction and Alignment of Block Copolymer Thin Films DOKYEONG KWON, HYO SEON SUH, KOOKHEON CHAR, Seoul National University — Buckling of thin films on elastomeric substrates such as polydimethylsiloxane (PDMS) is the well-known phenomenon in buckling instability originating from the moduli mismatch between a substrate and a thin film placed at the top. Recently, many studies on the microstructure created by the buckling have been reported but most of the work has employed either metal or semiconductor thin films and few studies utilized block copolymer (BCP) thin films as the top layer. Here, we present the buckling of oriented BCP thin films placed on top of PDMS substrates, resulting in hierarchical structures combining nanostructured BCP with microstructured buckling. Buckling instability was induced by applying a mechanical stress to the BCP-PDMS bilayer. Due to the buckling of BCP thin films, we observed the structural change of the films depending on the alignment of BCP domains with respect to the buckled direction of a substrate, which could give us insights on the buckling of mechanically heterogeneous films. This work could even be extended to a new patterning technique, utilizing both BCP thin film lithography and the microscale patterning induced by buckling.

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