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Lateral Instability of Nanoimprinted Polymer Patterns during Thermal Annealing YIFU DING, Univeristy of Colorado, KYLE ALVINE, Pacific Northwest National Laboratory, HYUNWOOK RO, MANISH KULKARNI, JACK DOUGLAS, CHRISTOPHER SOLES, NIST — Nanoimprint Lithography (NIL) is a promising candidate for next generation lithography. Dense polymer patterns with relatively high aspect ratios can be created using NIL. Upon thermal annealing, the as-imprinted polymer patterns will smooth out due to the surface energy and sometimes residual stress within the patterns. Both effects will predominately drive the pattern decay vertically. Here, we present that under certain patterning conditions, lateral instability of the surface patterns, driven by surface fluctuations, can also become an effective mechanism for reducing the total surface area. The characteristics of the lateral instability were successfully carried out by annealing the patterns under a temperature gradient. We demonstrate that the lateral instability can be controlled by the imprinting conditions, and can be greatly enhanced by the additions of surfactants.

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