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Viscoelastic Properties of Nanoimprinted Polymers CHRISTOPHER SOLES, NIST, YIFU DING, University of Colorado, HYUNWOOK RO, NIST, KYLE ALVINE, Pacific Northwest National Laboratory , JING ZHOU, JACK DOUGLAS, NIST — Nanoimprint Lithography (NIL) is a versatile nanopatterning technique, combining high patterning resolution with low cost. In the thermal embossing form of NIL, a supported thin polymer film is transferred into surface patterns under controlled thermo-mechanical environments. Intuitively, the polymer chains within the as-imprinted patterns will display strongly non-equilibrium characteristics. Here we present systematic measurements of the viscoelastic properties of the nanoimprinted polymers by controlled thermal annealing experiments. In particular, a combinatorial approach was used for the experiments where a temperature gradient was applied for the annealing. The effective viscoelastic properties of the patterns were extracted by analyze the pattern decay along the temperature gradient. The viscoelastic properties of the imprinted patterns were greatly influenced by the patterning conditions.

Yifu Ding
Univeristy of Colorado

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