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Nano-pillars created from the surface-grafted crosslinked polymer chains SOYEUN PARK, DIPIKA PATEL, FERNANDO MONJARAZ, Texas Tech University, WOLFGANG FREY, The University of Texas at Austin, TEXAS TECH UNIVERSITY, DEPARTMENT OF PHYSICS TEAM, THE UNIVERSITY OF TEXAS AT AUSTIN, DEPARTMENT OF BIOMEDICAL ENGINEERING COLLABORATION — Nano-patterned polymer chains with the controlled mechanical properties are widely applicable to biological and chemical studies. We synthesized linear and crosslinked polymer chains grafted onto micro/nano-patterned substrates by developing a series of unique bottom-up fabrication steps based on the iniferter-driven quasi-living polymerization. We incorporated conventional photolithography and nanosphere lithography. The AFM study provides insight into the influence of the addition of the crosslinker on the configurative, kinetic, mechanical, and wetting properties of polymer chains grafted onto micro/nano-patterns. We found that the addition of crosslinker successfully converts the mushroom-like configuration of nanopatterned polymer chains into the well-standing brush like polymer chains, i.e, soft nano-pillars. By analyzing the AFM force-distance curves obtained in the two-dimensional array and lateral force images, we found that the shear moduli of the obtained soft nano-pillar can be adjusted by varying the concentration of crosslinkers.

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