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Nano-patterned elastic polymer SOYEUN PARK, Department of Physics, Texas Tech University, DAVE KAHN, Department of Chemical Engineering, WOLFGANG FREY, Department of Biomedical Engineering, The University of Texas at Austin — Polymers grown by surface-initiated polymerization have received increasing attention due to the ability to control chain length and achieve high-density grafting, which are both needed in a variety of chemical to biomedical applications, including the stabilization of colloids and the fabrication of cell adhesion-promoting surfaces for tissue engineering scaffolds. Interestingly, surface-grafted polymers on nanoislands have fundamentally unique properties due to the confinement effects. Growing polymers on homogeneous or micro-patterned surface with well-controlled length has been achieved successfully. However, the polymer growth in nano-scale patterns with well controlled length and lateral size has been challenging. By combining a surface-initiated polymerization, self-assembly, and nano-sphere lithography, we successfully developed a unique technique to grow polymers on a nano-patterned substrate. With this technique, we were able to fabricate polymer brushes with high grafting densities and the well controlled polymer length on laterally confined nano-islands. The polymer nano-islands were characterized, and the elastic properties of the nano-patterned polymer gel were investigated using AFM 2D-force spectroscopy.

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