

# **Stretching of Collapsed Polymers Causes an Enhanced Dissipative Response of PNIPAM Brushes near their LCST**

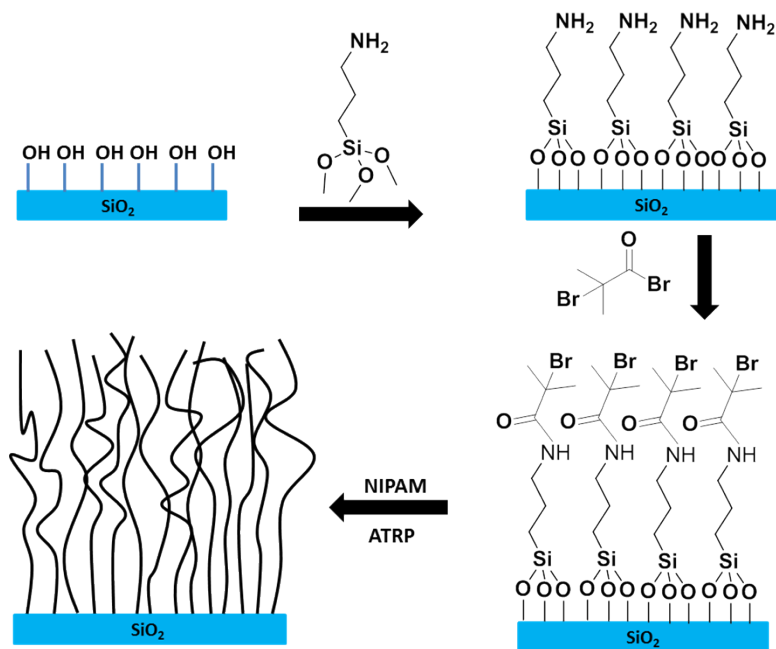
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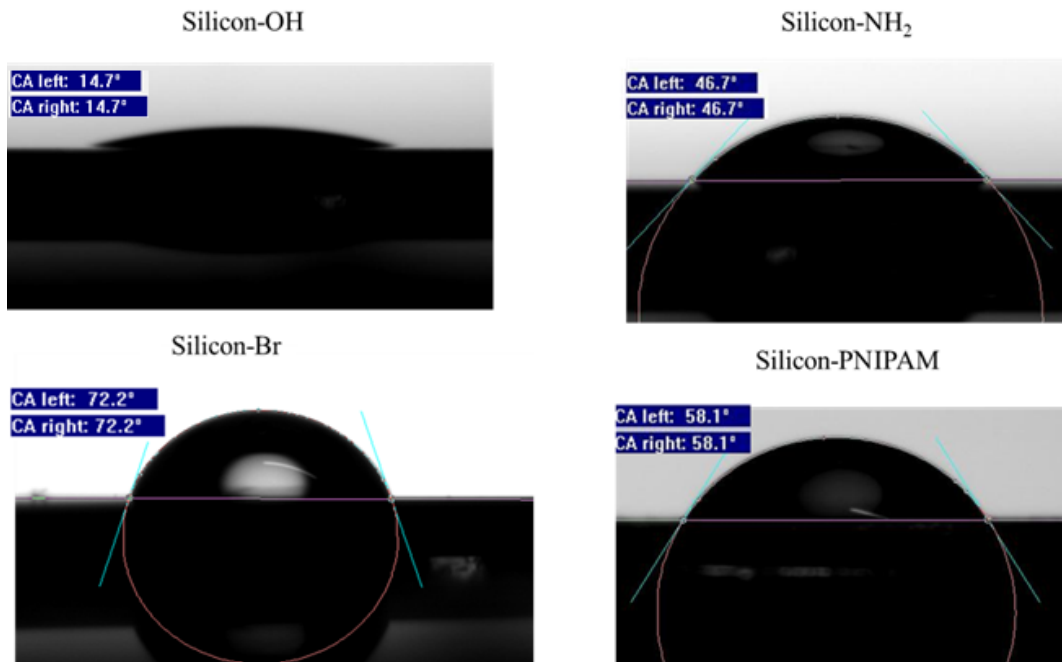
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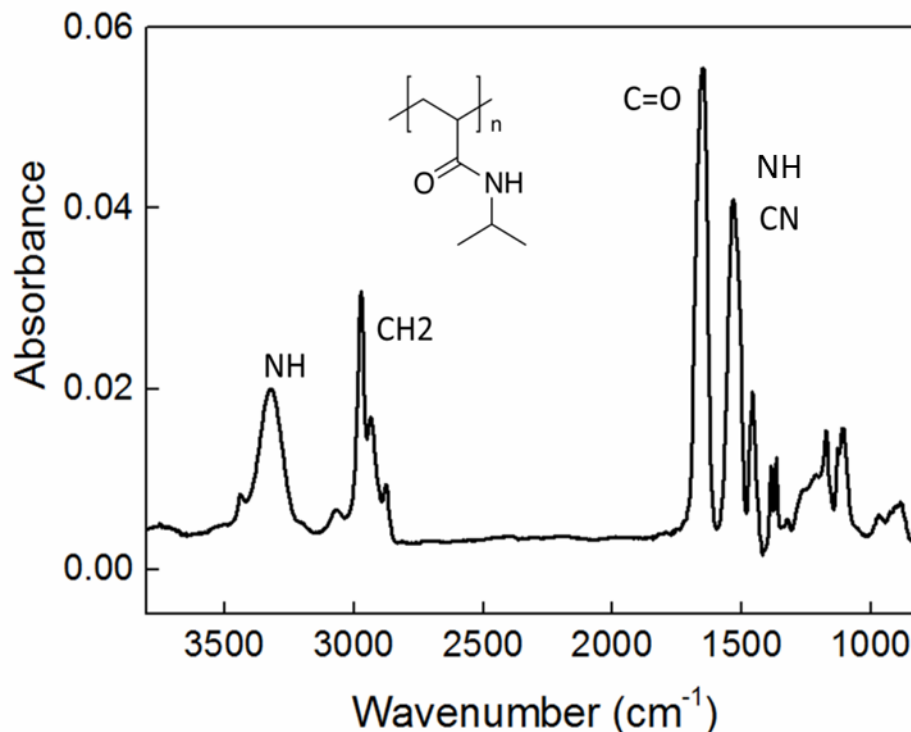
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**Figure S1.** Schematic of synthesis of PNIPAM brush on silicon surface using three steps. Note that only one 2-bromo-2-methylpropionyl bromide molecule can react with each amino group.

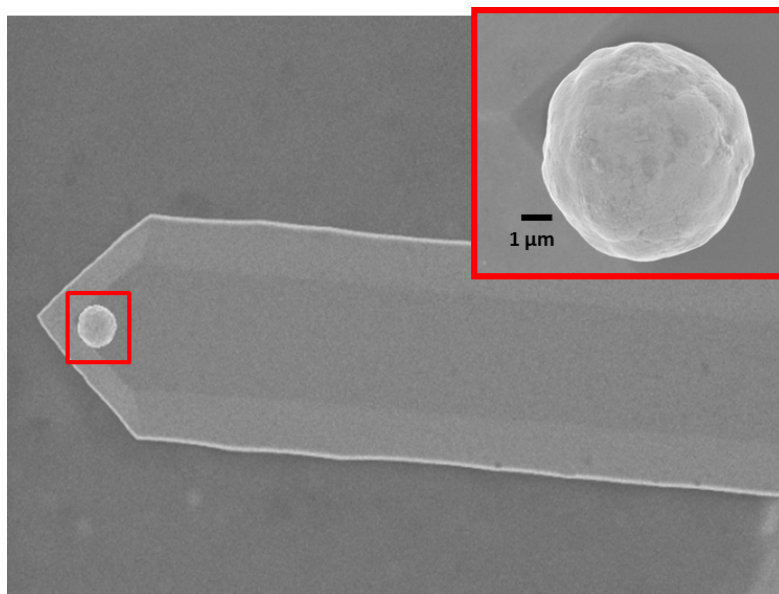


**Figure S2.** Static contact angle of silicon surfaces with various fabrication steps.

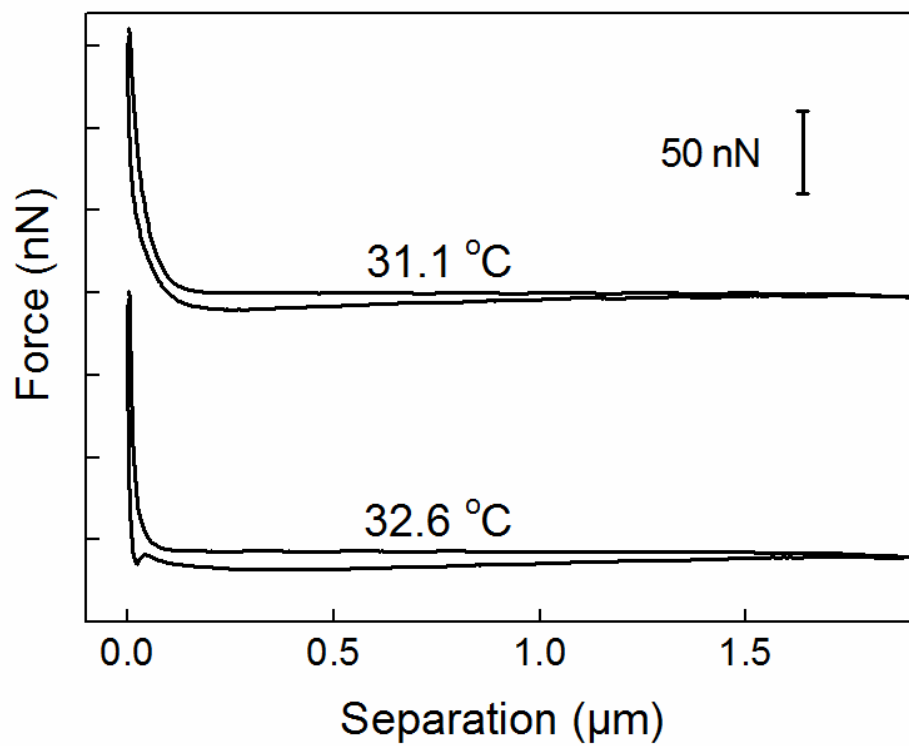


**Figure S3.** FTIR of PNIPAM brushes tethered on silicon surface.

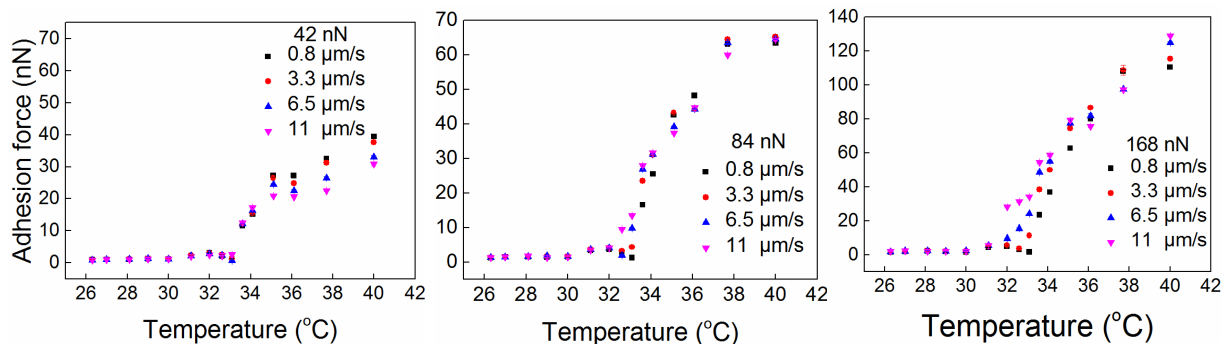
FTIR wavenumbers ( $\text{cm}^{-1}$ ): 3289 (NH stretching vibration), 3078-2874 ( $\text{CH}_2$  stretching vibration), 1635 ( $\text{C}=\text{O}$  stretching vibration), 1535 (amide II), 1458-1386 (CH deformation vibration), 1366-1170 (CN stretching vibration). The characteristic groups of PNIPAM are  $\text{C}=\text{O}$  and  $-\text{CN}-$  appeared at 1635 and 1535  $\text{cm}^{-1}$  respectively, which shows there are PNIPAM brushes grafting on the silicon substrates.



**Figure S4.** SEM image of typical gold colloid cantilever, the diameter is around 6  $\mu\text{m}$  (the scale bar is 1  $\mu\text{m}$ ).



**Figure S5.** Typical force vs separation curves for  $T = 31.1\text{ }^\circ\text{C}$  (top curve) and  $T = 32.6\text{ }^\circ\text{C}$  (bottom curve).



**Figure S6.** Adhesion force as a function of temperature at 4 various velocities (0.8 (square), 3.3 (circle), 6.5 (upward triangle) and 11 (downward triangle)) and 3 different normal loads of 42, 84, 168 nN.