Supporting Information

Cavity Shape Transformation During Peeling on Elastic Microchannel-Patterned Substrates Filled with a Viscous Liquid

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We present additional data on the peel tests carried out with a fixed channel width and varying island areas.

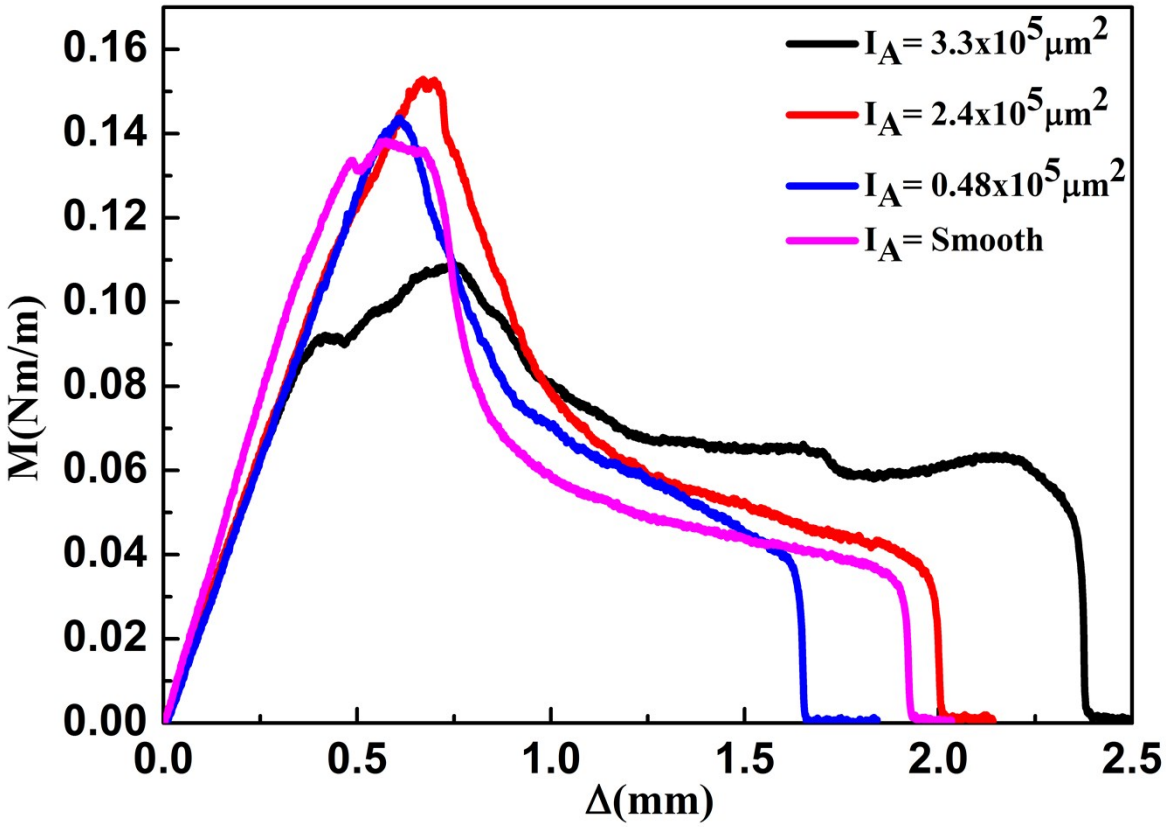

Figure S1. **Torque-Displacement (M-Δ)** curves for liquid filled microchannel PDMS substrates with a fixed channel width of 70 μm (C_W<K^{-1}) and various island areas, that is0.48×10^5 μm^2, 2.4×10^5 μm^2 and 3.3×10^{5}μm^2. Curve 1 represents theM-Δ curve for a smooth bilayer. The depth of the microchannels was kept at 35 μm.

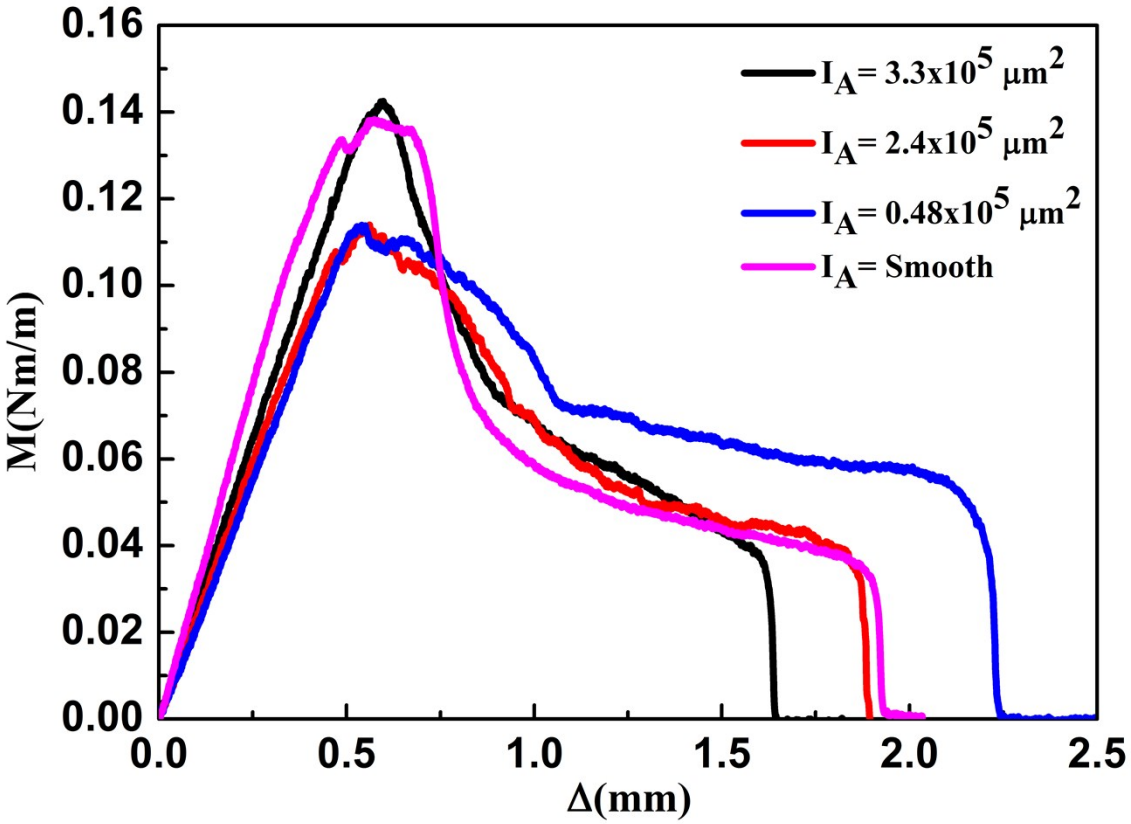

Figure S2. **Torque-Displacement (M-Δ)** curves for liquid filled microchannel PDMS substrates with a fixed channel width of 320 μm (C_W>K^{-1}) and various island areas, that is 0.48×10^5 μm^2, 2.4×10^5 μm^2 and 3.3×10^5 μm^2. Curve 1 represents the M-Δ curve for a smooth bilayer. The depth of the microchannels was kept constant at 35 μm.

For a channel width of less than K^{-1} (C_W=70 μm) and varying island area, where capillary confinement is high, the plateau of (M-Δ*)* curves and extent of detachment as shown in Figure S1 is governed by the elastic contribution of the interface to the peel force and the crack arresting effect. When the island area in channels with a width less than K^{-1} is increased, the elastic contribution increases, leading to an increase in the extent of detachment. For channel widths above the characteristic decay length K^{-1} (C_W=320 μm) as evident in Figure S2, the effect of crack arresting is diminished, and the plateau and the extent of detachment is controlled by viscous dissipation at the interface. For these combinations of channel width-island area, the effective viscous dissipation at the contact interface decreases as island area is increased, leading to a shortening of the plateau region.