Supplemental Information for:

Plastic deformation, wrinkling, and recovery in microgel multilayers

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Table S1. Microgel Characterization

NIPAm, mol %	AAc, mol %	BIS, mol%	R_H, nm (pH 3.0)[a]	R_H, nm (pH 7.4)[a]
68	30	2	337	629
88	10	2	269	413

[a]Sizes determined via dynamic light scattering, reported at 20 °C in buffer with 15 mM ionic strength

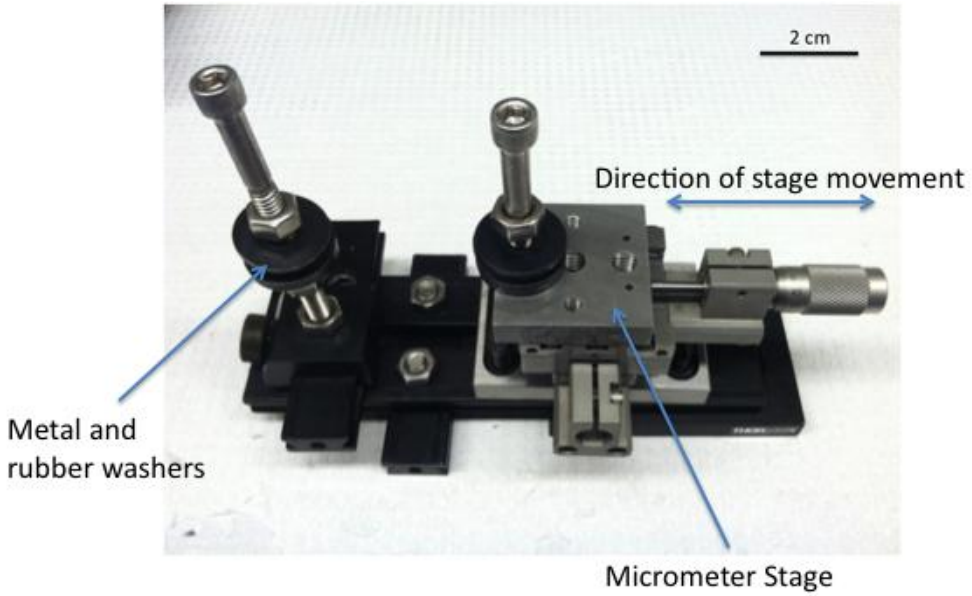

Figure S1. The stretching apparatus used in these experiments. The sample is clamped between glass slides and held in place by rubber washers. One post is stationary while the other is attached to a micrometer-controlled translational stage that allows precise movement.

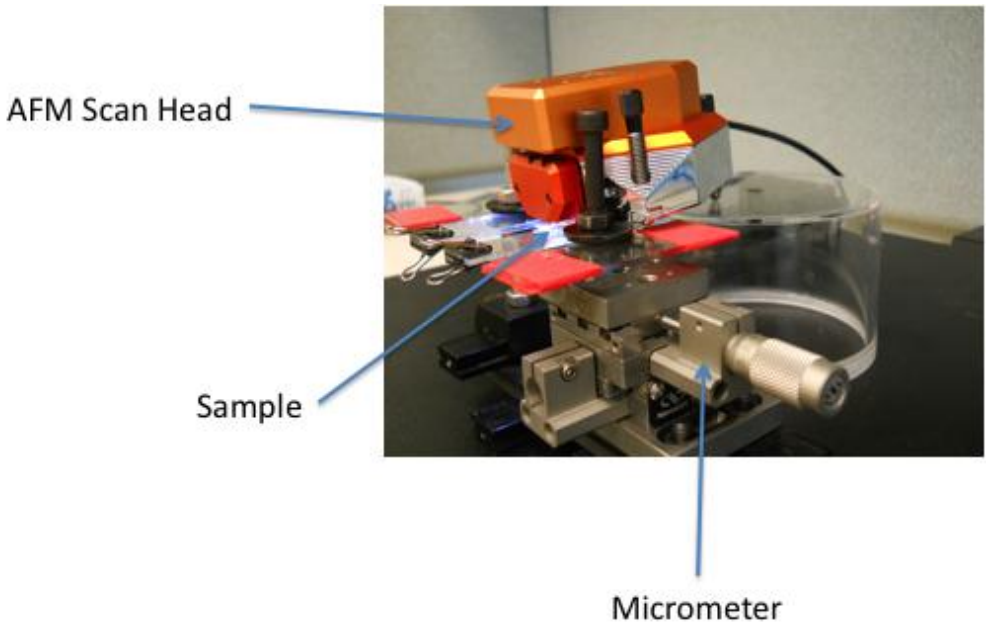

Figure S2. The Nanosurf atop the stretching apparatus during in situ imaging of a stretched film. Critical parts of the setup are labeled. The sample is sandwiched between glass slides which are held together by rubber washers and metal clasps.

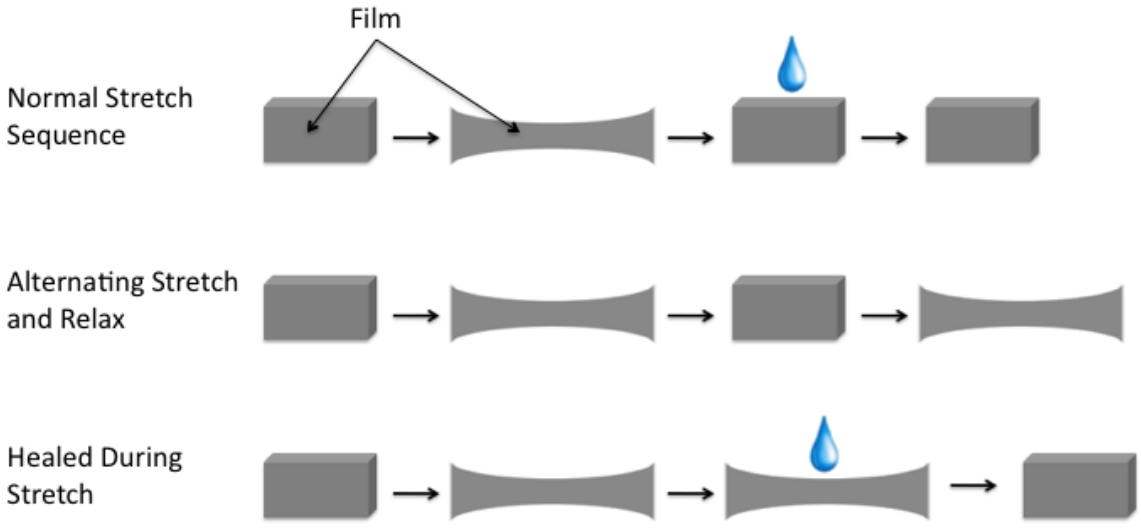

Figure S3. Schematic of stretching sequences used in these experiments. In this figure, the film is on the front face as indicated, and drops represent healing steps.

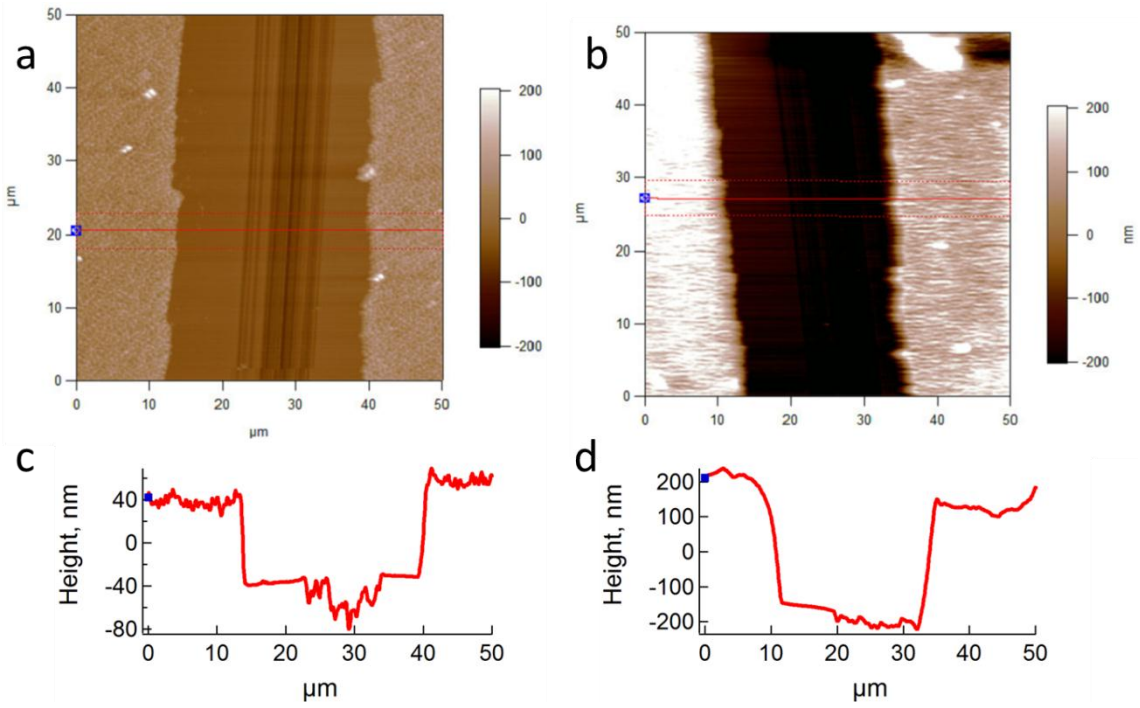

Figure S4. Representative images used to determine film thickness for a) dry films and b) wet films. Scan sizes are 50 µm × 50 µm. The red line and two dashed red lines define the area wherein 50 scan lines are averaged, and depicted in c) and d) for a) & b), respectively. The height difference was determined between the film and glass at three points in each image.

Supplemental Video. An 8-layer 30% AAc microgel film cross-linked with 100-200 kDa PDADMAC undergoing damage via pipette and healing in response to steam.