Supplementary Information:

Nanoscopic Mechanical Anisotropy in Hydrogel Surfaces.

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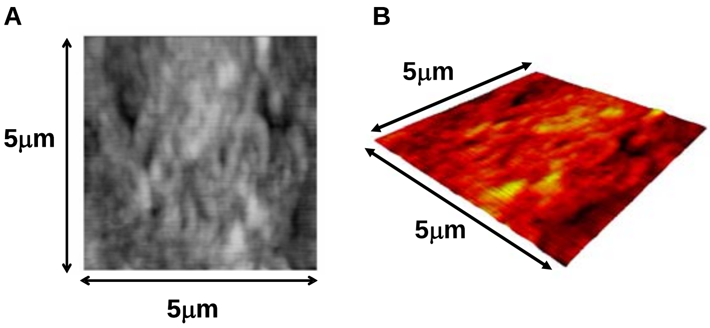

Figure S1. Topographic profile of the surface of Poly (vinyl pyrrolidone) hydrogel using Atomic force microscopy imagining in liquid. A) 2D image and B) 3D image.

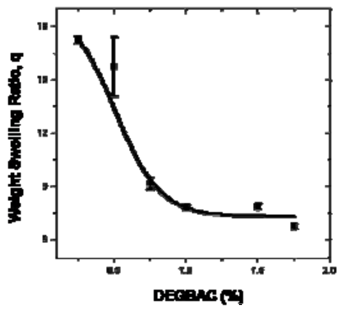

Figure S2. Weight Swelling Ratio (q) of Poly (vinyl pyrrolidinone) hydrogels.

Weigh Swelling Ratio. Samples of poly (vinyl pyrrolidinone) hydrogels (PVP) (0.25, 0.5, 0.75. 1.0, 1.5 and 1.75 %) were dried to a constant weight in a laminar flow hood at room temperature. Pre-weighted dry hydrogel samples (approximately 590mg) were placed in glass vials containing a solution of Phosphate buffer saline (pH=7.4) at 37 ± 2° C. Swelling ratio was determined gravimetrically, for this purpose samples were removed from the buffer solution and dried superficially at regular intervals of time before being weighted. The weight-swelling ratio (q) for all the samples is equal to swollen weight divided by the dry weight of the polymer sample. [1]

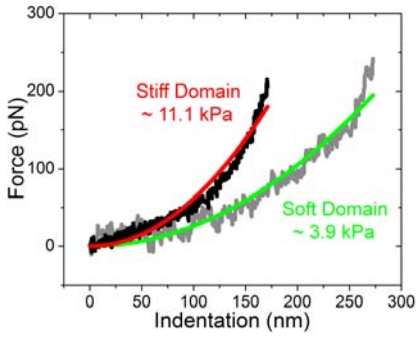

Figure S3 – Representative indentations of a 0.5% DEGBAC gels from soft (gray) and stiff regions (black). Hertz model fit[2] was was used to determine the elasticity, either soft (green) or stiff (red), of these regions.

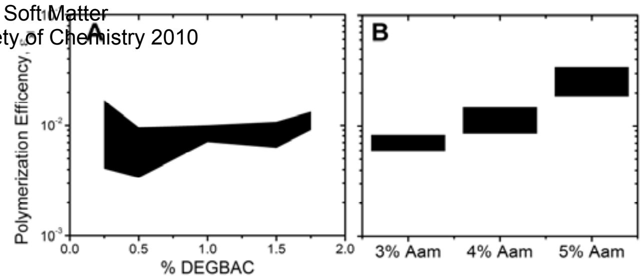

Figure S4 – Efficiency of crosslinker polymerization, ε_{xl}, as a function of DEGBAC crosslinker, was determined for PVP hydrogels (A) using rubber elasticity theory.[3] Polymerization efficiency was also determined for PAam hydrogels (B) used in Figure 5. Black bars indicate the total range of crosslinking efficiencies measured.

1. S. K. Vakkalanka and N. A. Peppas, *Polym. Bull.*, 1996, **36**.
2. M. Radmacher, M. Fritz and P. K. Hansma, *Biophys. J.,* 1995, **69**, 264-270.
3. P. J. Flory, *Principles of Polymer Chemistry*, Cornell University Press., 1953.