Electronic supplementary information

Anisotropic, porous hydrogels templated by lyotropic chromonic liquid crystals

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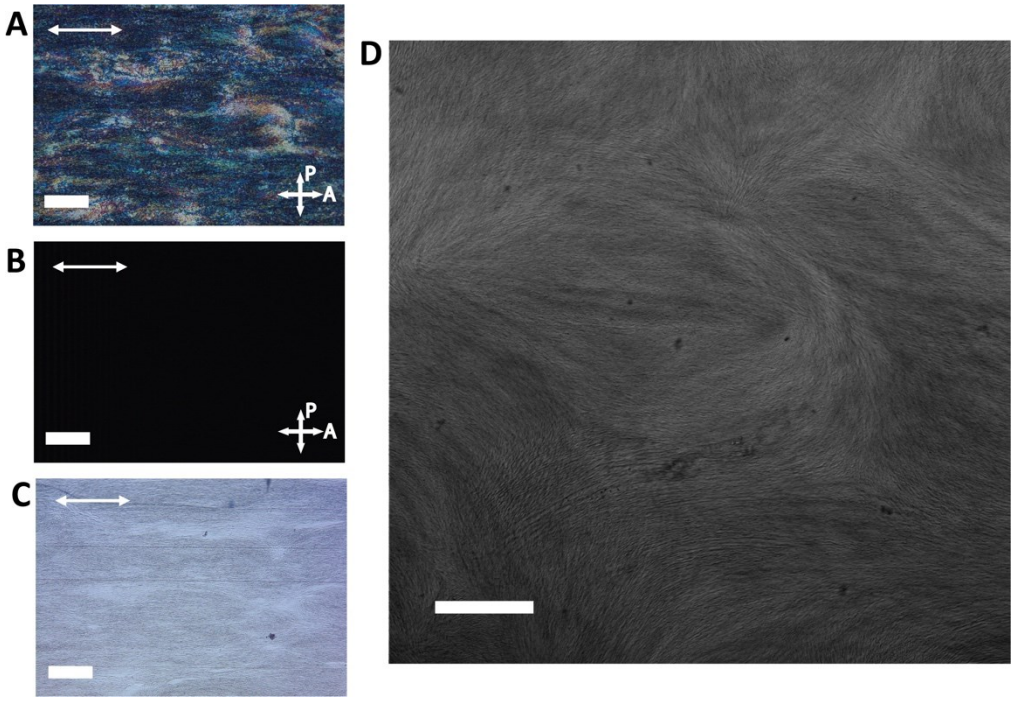

Fig. S1 POM images of the hydrogels after polymerization. (A) Birefringence indicating the presence of DSCG. (B) After soaking in water for 3 hours, no birefringence is observed indicating the removal of DSCG. (C) The image of hydrogel morphology after the removal of DSCG without polarizers. (Scale bars 200 µm) Arrows in the top left corner of the images depict the direction of rubbing. (D) Confocal image of a polydomain PAAm substrate (grey) (Scale bar 100 µm).

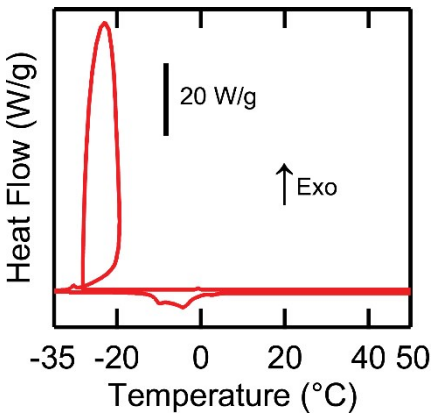

Fig. S2 DSC of 18% DSCG, 9% AAm solution from -35 °C to 50 °C. The large exothermic event on cooling is associated with freezing of the solution.

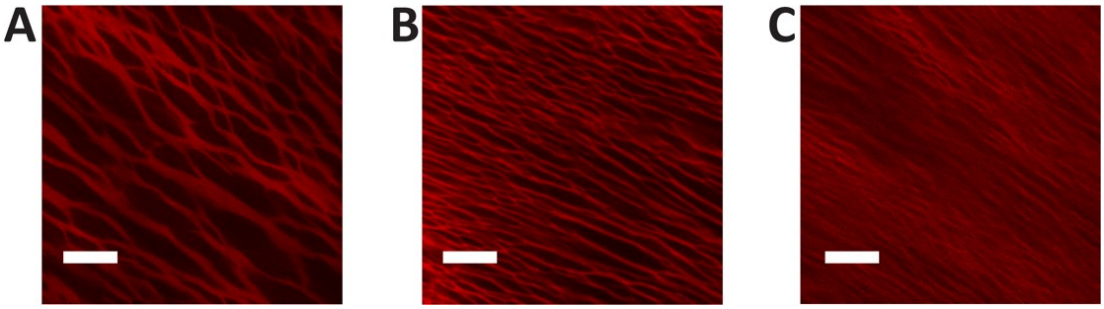

Fig. S3 Confocal images of the hydrogels polymerized in the O phase with (A) 0.1 wt%, (B) 0.3 wt%, and (C) 0.5 wt% crosslinker. (Scale bars 20 µm)

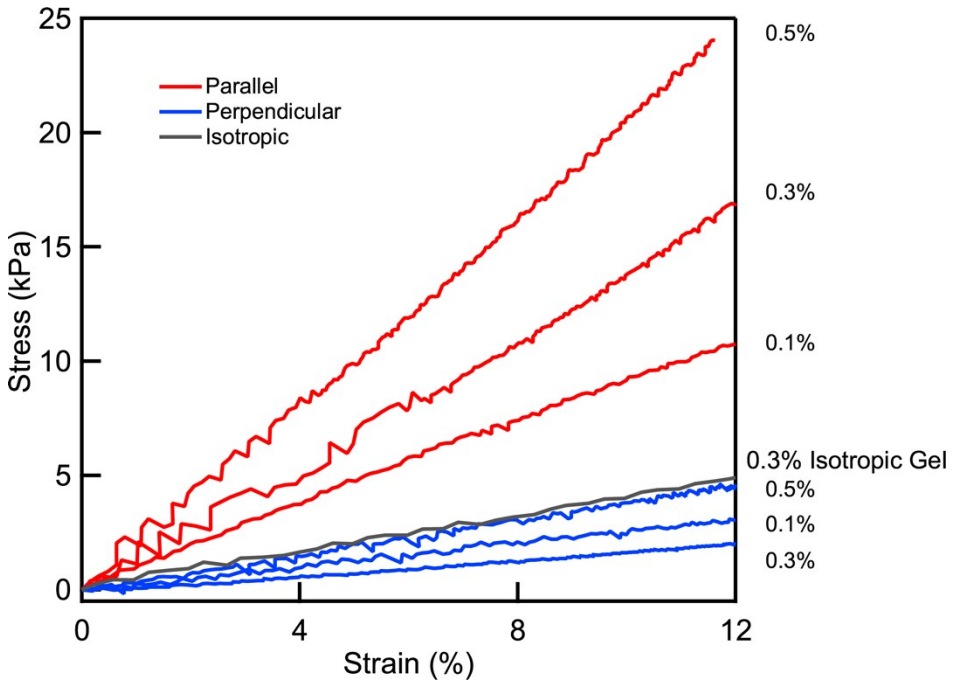

Fig. S4 Stress-strain curves of hydrogels with controlled crosslink density measured along and perpendicular to the rubbing axis, with a 0.3wt% isotropic PAAm hydrogel as a control.

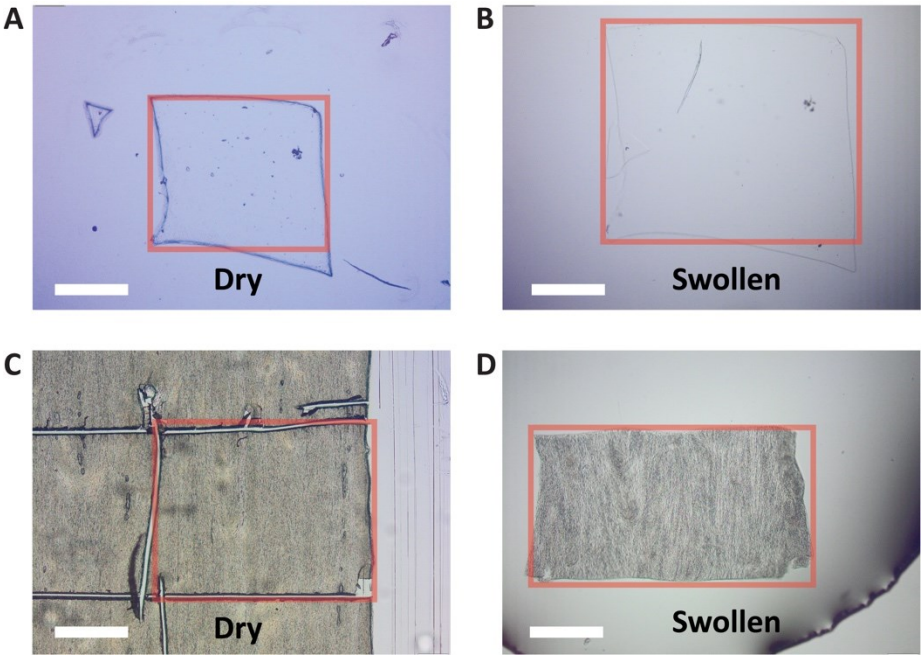

Fig. S5 Isotropic PAAm hydrogel dimensional change with 0.3 wt% crosslinker at (A) dry state and (B) swollen state. Anisotropic PAAm hydrogel dimensional change with 0.3 wt% crosslinker at (C) dry state and (D) swollen state. (Scale bars 500 μm)

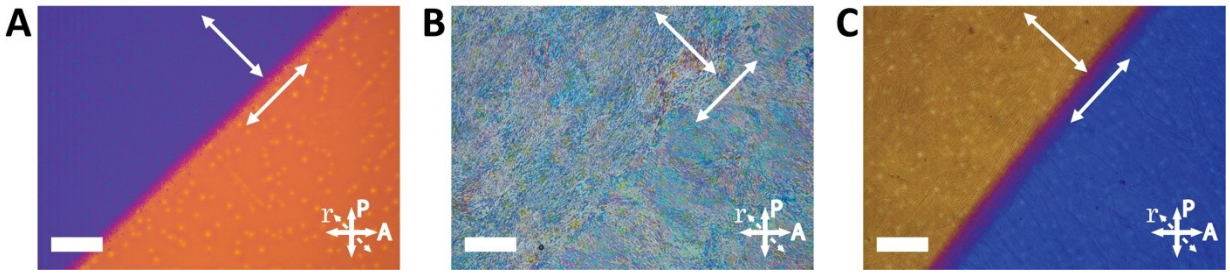

Fig. S6 Hydrogels oriented by photo-patterning. (A) POM image of patterned RM257 layers before infilling of the chromonic solution. (B) POM image of hydrogel and RM257 layers after polymerization. (C) POM image of hydrogel and RM257 layers after soaking in water overnight. The birefringence associated with DSCG is removed but the birefringence associated with the RM257 remains, indicating that the RM257 layer remains adhered. Arrows in the top right of the images depict the alignment of RM257 layers. Dotted arrows indicate the direction of an inserted quarter waveplate to distinguish perpendicular states. (Scale bars 200 µm)

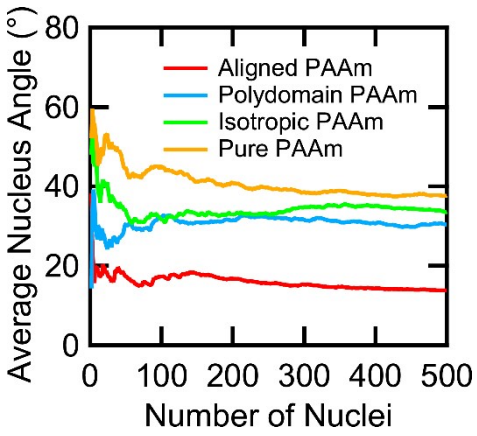

Fig. S7 Average nucleus angle as a function of nuclei number indicating the sample size is sufficient to observe typical behavior.

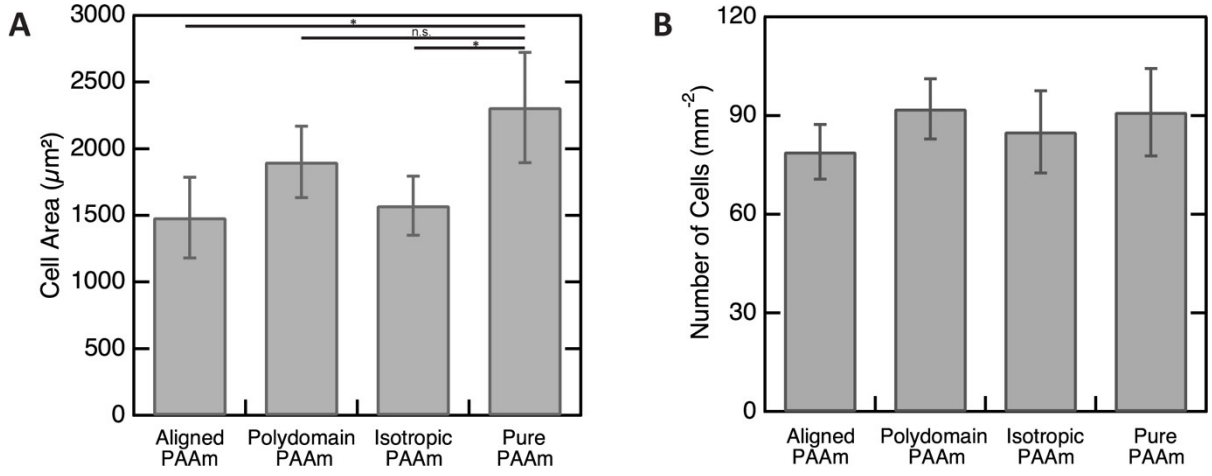

Fig. S8 (A) Cell area on different PAAm substrates (*, $P < 0.05$). (B) The average number of cells on each type of substrate over an area of 1 mm^2.