

Supplementary Information

Table S1 Hydrogel composition

	Laponite Content		DMA Content		DMA:Laponite ^b	
	wt%	mol% ^a	wt%	mol% ^a	g/g	mol/mol
PAAm	0	0	0	0		
L1D0	1	1.3	0	0	0	0
L1D0.5	1	1.3	0.5	2.3	0.5	1.7
L1D1	1	1.3	1	4.5	1	3.4
L2D0	2	2.6	0	0	0	0
L2D0.5	2	2.6	1	4.5	0.5	1.7
L2D1	2	2.6	2	9.0	1	3.4
L2D1.5	2	2.6	3	14	1.5	5.2
L3D0	3	3.9	0	0	0	0
L3D0.5	3	3.9	1.5	6.8	0.5	1.7
L3D1	3	3.9	3	14	1	3.4

^a Relative to the acrylamide monomer in the precursor solution.

^b DMA:Laponite mass and mol ratios in the precursor solution.

Table S2. Statistical analysis of results from compression and rheological testing^a

	Water Content	Compression Testing				Oscillatory Rheometry	
		Peak Stress	Peak Strain	Elastic Modulus	Toughness	Storage Modulus	Loss Modulus
PAAm	A	A	AB	AB	A	A	A
L1D0	A	A	CD	A	A	A	A
L1D0.5	AB	A	AB	BC	AB	—————	—————
L1D1	C	AB	A	C	AB	A	A
L2D0	AB	A	DEF	A	AB	A	A
L2D0.5	C	BC	ABC	D	BC	AB	A
L2D1	E	D	DEF	DE	D	ABC	A
L2D1.5	F	E	F	DEF	E	C	B
L3D0	BC	AB	DE	AB	AB	A	A
L3D0.5	D	C	B	EF	C	—————	—————
L3D1	F	D	EF	F	D	BC	B

^a Level of significance - formulations not linked by the same letter are statistically different.

Table S3 Compression test results of PAAm hydrogel functionalized with DMA (n = 4)^a

	Peak Stress (kPa)	Peak Strain	Elastic Modulus (kPa)	Toughness (kJ/m³)
	Avg(StDev)	Avg(StDev)	Avg(StDev)	Avg(StDev)
PAAm ^b	89.6(13.6)	0.44(0.012)	217(13.5)	16.0(4.77)
DMA Gel ^{b,c}	108(26.4)	0.47(0.090)	165(81.9)	15.6(5.47)

^a Not statistically significant based on student t-test ($\alpha = 0.95$)

^b formulated with 4 mol% of MBAA relative to AAm

^c formulated with 1 wt% of DMA

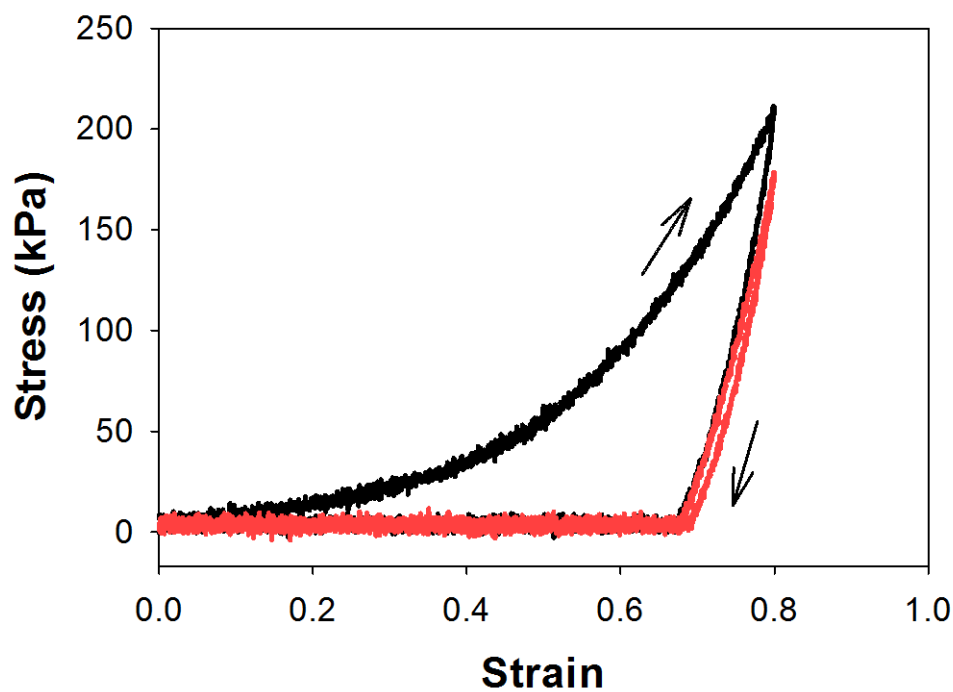


Figure S1. Representative first (black curve) and second (red curve) stress-strain loading cycles for **L2D0** compressed to a strain of 0.8.

Table S4. Cyclic testing of **L2D0** compressed to a strain of 0.8 for the first two cycles

Cycle	Max Stress (kPa)		Hysteresis (kJ/m ³)	
	Avg(StDev)	% Change	Avg(StDev)	% Change
1	197(19.9)	-13%	31.5(2.00)	-91%
2	171(10.3)		2.75(1.24)	