

Supporting Information

High Strength and Self-Healable Gelatin/Polyacrylamide Double Network Hydrogels

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Table S1. Effect of AAm concentration on the tensile properties of Gelatin/PAAm gels^a.

AM (% w/v)	E (kPa)	σ_f (MPa)	ε_f (mm/mm)	W (MJ/m ³)
15	21.4	0.0623	13.30	0.347
20	41.6	0.1579	24.33	2.157
24	50.7	0.1789	24.85	2.540
30	56.2	0.2102	28.44	3.510
35	81.4	0.2001	30.65	4.581

a: gelatin= 50 mg/mL, MBA/AAm= 0.05 mol%, APS/AAm=0.1 mol%

Table S2. Effect of gelatin concentration on the tensile properties of Gelatin/PAAm gels^a.

gelatin	E (kPa)	σ_f (MPa)	ε_f (mm/mm)	W (MJ/m ³)
0	22.9	0.0377	4.95	0.125
5	28.4	0.0395	5.19	0.133
10	29.1	0.0587	8.63	0.312
15	30.9	0.0968	14.33	0.743
30	32.5	0.1554	20.56	1.655
50	49	0.1834	21.97	2.225

a: AAm=24% w/v, MBA/AAm= 0.05 mol%, APS/AAm=0.14 mol%

Table S3. Effect of MBA concentration on the tensile properties of Gelatin/PAAm gels^a.

MBA/AAm (mol%)	E (kPa)	σ_f (MPa)	ε_f (mm/mm)	W (MJ/m ³)
0	14.2	0.0902	35.38	1.228
0.01	22.4	0.1394	25.19	1.782
0.03	42.5	0.1906	27.15	2.730
0.05	35.2	0.1843	23.03	2.218
0.07	43.4	0.1950	16.23	1.562
0.1	43.1	0.0884	7.31	0.412

a: AAm=24% w/v, gelatin= 50 mg/mL, APS/AAm=0.14 mol%

Table S4. Effect of APS concentration on the tensile properties of Gelatin/PAAm gels^a.

APS/AM (mol%)	E (kPa)	σ_f (MPa)	ε_f (mm/mm)	W (MJ/m ³)
0.01	34.8	0.0663	7.26	0.326
0.03	44.6	0.1491	22.83	2.128
0.05	63.4	0.1971	26.44	3.016
0.10	50.7	0.1789	24.85	2.540
0.14	49.0	0.1846	22.47	2.225

a: AAm=24% w/v, MBA/AAm= 0.05 mol%, gelatin= 50 mg/mL

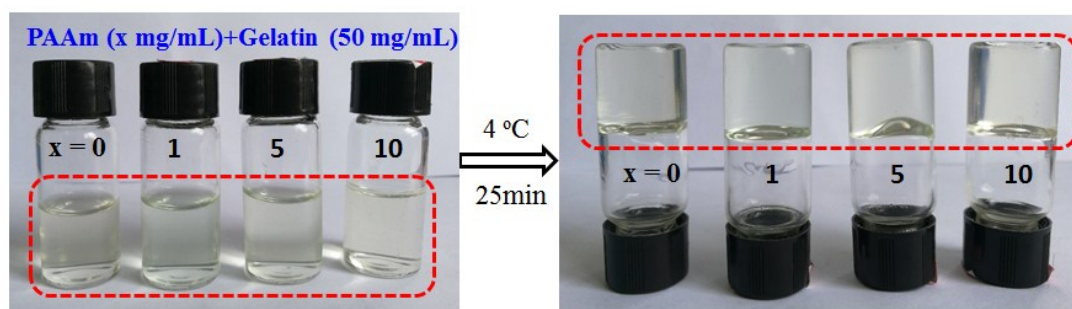


Figure S1. Gelation of gelatin (50 mg/mL) in various PAAm solutions from 60 °C.

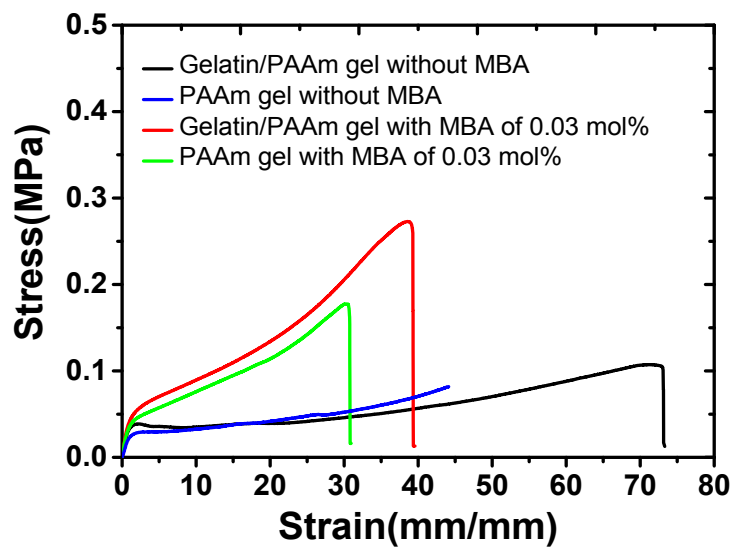


Figure S2. Stress-strain curve of PAAm gel and Gelatin/PAAm gel without MBA, and PAAm gel and Gelatin/PAAm gel with MBA of 0.03 mol%. gelatin of 50 mg/mL, AAm of 35 % (w/v) and APS/AAm of 0.05 mol%.

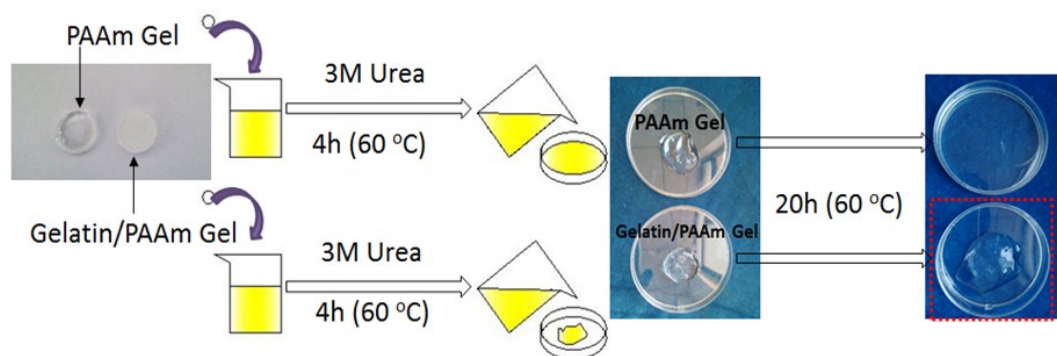


Figure S3. The swelling behavior of PAAm gel and Gelatin/PAAm gel (both of them without chemical crosslinkers) in the 3M urea solution at 60 °C with 4 h and 20 h.

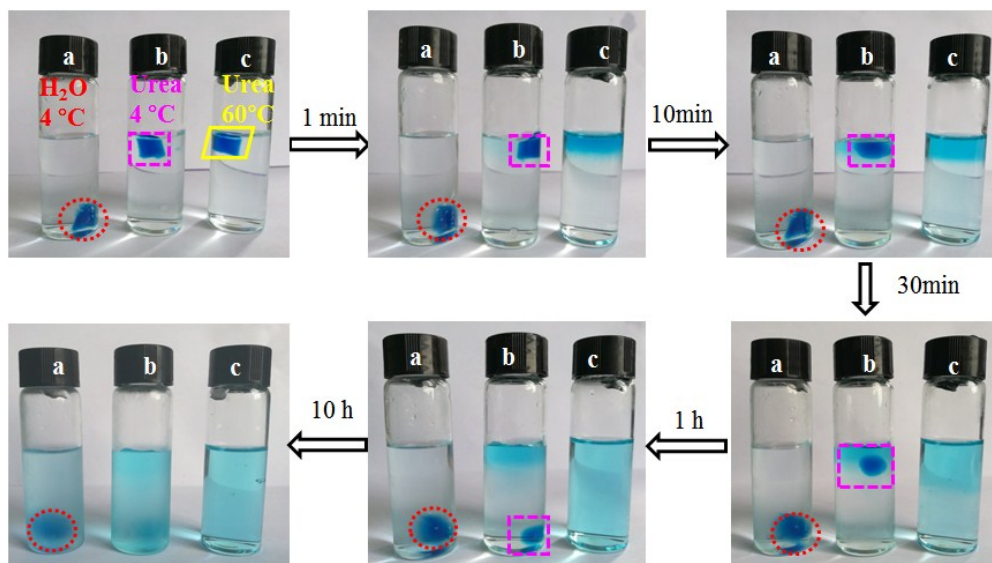


Figure S4. Stability of gelatin gel in various solutions. The concentration of gelatin was 50 mg/mL, and the gelatin gels were dyed by methylene blue. The urea solution was 3 mol/L.

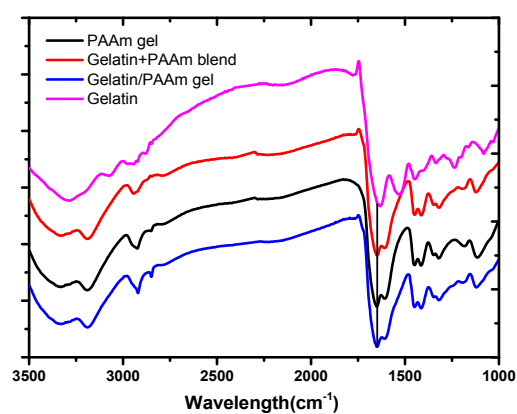


Figure S5. FTIR curves of PAAm gel, Gelatin+PAAm blend, Gelatin/PAAm gel and gelatin

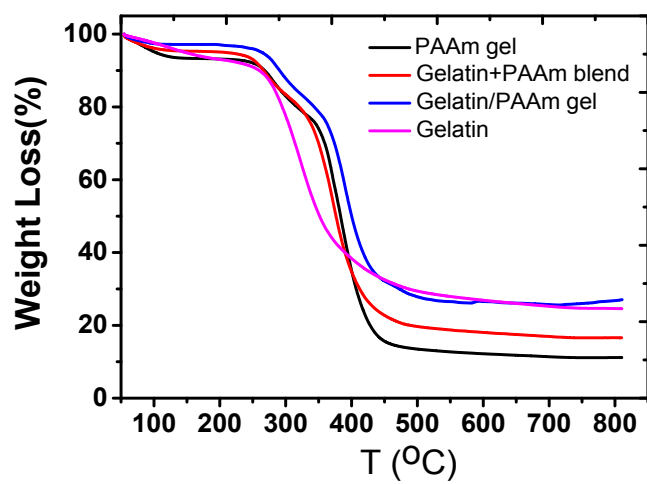


Figure S6. TGA curves of PAAm gel, Gelatin+PAAm blend, Gelatin/PAAm gel and gelatin