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Supporting Information

Conductive Regenerated Silk Fibroin-Based Hydrogels with High Strength and Toughness

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Equivalent contribution

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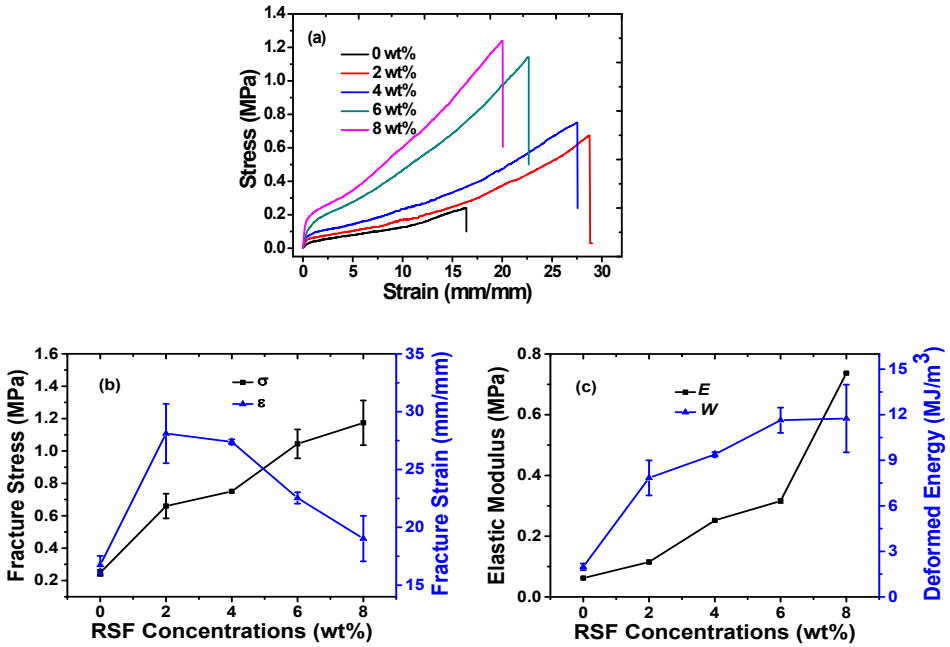

Figure S1. Effect of RSF concentrations on the tensile properties of RSF/HPAAm DN gel: (a) Tensile stress-strain curves of RSF/HPAAm DN gel at different RSF concentrations; (b) Fracture stress and fracture strain, and (c) elastic modulus and work of extension of DN gel as a function of RSF concentrations.

Table S1: Effect of RSF concentrations on the tearing energy of RSF/HPAAm DN gels.

RSF Concentrations (wt%)	Tearing energy (J/m^2)
0	309±7
2	719±25
4	1054±28
6	1318±42
8	1769±112

Table S2: Effect of RSF concentrations on the mechanical properties of RSF/HPAAm DN gels.

RSF Concentrations (wt%)	σ_f (MPa)	ε_f (mm/mm)	E (MPa)	W (MJ/m^3)
0	0.25±0.02	16.75±0.78	0.062±0.002	1.98±0.217
2	0.66±0.08	28.11±2.57	0.115±0.006	7.84±1.154
4	0.75±0	27.39±0.22	0.252±0.001	9.39±0.155
6	1.04±0.09	22.54±0.49	0.316±0.007	11.64±0.83
8	1.17±0.14	19.03±1.97	0.737±0.002	11.75±2.23

Table S3: The hysteresis energies of the different fresh RSF/HPAAm DN gel at a series of different maximum strains (λ_{max})

λ	U_{hys} (MJ/m^3)
2	0.12
3	0.33
4	0.56
6	1.08
8	1.64
11	3.40
14	5.21
17	7.91

Table S4: The elastic modulus and hysteresis energies of the same RSF/HPAAm DN gel at a series of different maximum strains (λ_{max})

λ	*E* (MPa)	Softness (%)
2	0.737	0
3	0.328	55
4	0.164	78
6	0.142	81
8	0.072	90
11	0.060	92
14	0.051	93
17	0.046	94

Table S5: Effect of recovery times on elastic modulus (*E*) and energy dissipation (U_{hys}) at λ=8 at room temperature.

t (min)	E_t (MPa)	E_t/E_f (%)	$U_{hys,t}$ (MJ/m^3)	$U_{hys,t}/U_{hys,f}$ (%)
First loading	0.737		1.73	
0	0.06	8	0.57	33
1	0.093	13	1.05	61
3	0.098	13	1.14	66
5	0.116	19	1.08	63
10	0.177	24	1.27	74
30	0.219	23	1.36	78

Table S6: Effect of recovery times on elastic modulus (*E*) and energy dissipation (U_{hys}) at λ=8 at 80 ^{o}C.

t (min)	E_t (MPa)	E_t/E_f (%)	$U_{hys,t}$ (MJ/m^3)	$U_{hys,t}/U_{hys,f}$ (%)
First loading	0.737		1.73	
1	0.198	27	1.32	76
3	0.418	57	1.45	84
5	0.453	61	1.39	80
10	0.429	58	1.42	82
30	0.553	75	1.47	85