Supporting Information

Advanced Mechanical Properties of Amphiphilic Polymer Conetworks through Hierarchical Reinforcement with Peptides and Cellulose Nanocrystals

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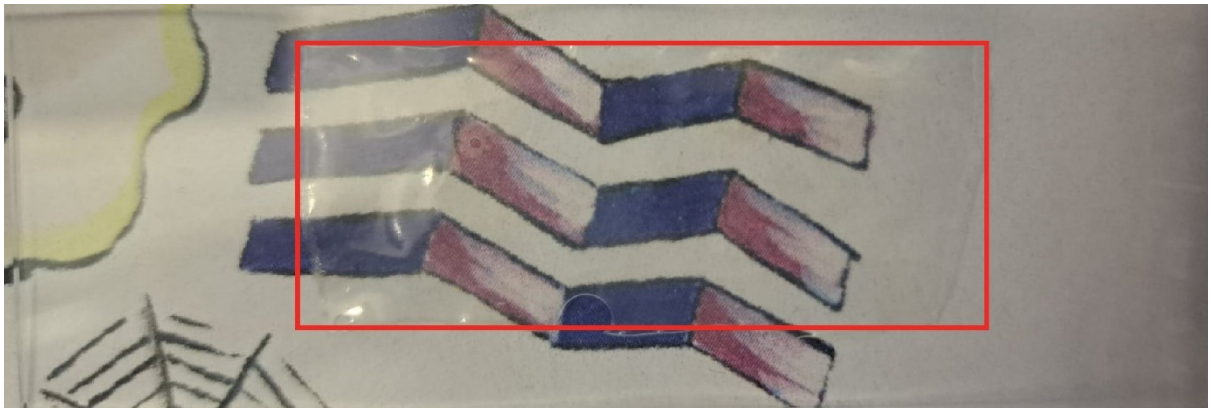

Figure S1. Photograph of PHEA-l-(PBLA$_5$-b-PDMS-b-PBLA$_5$) APCNs HCNC_09 shown in Figure 1E. The red square delimitates the area where the transparent APCNs is located.

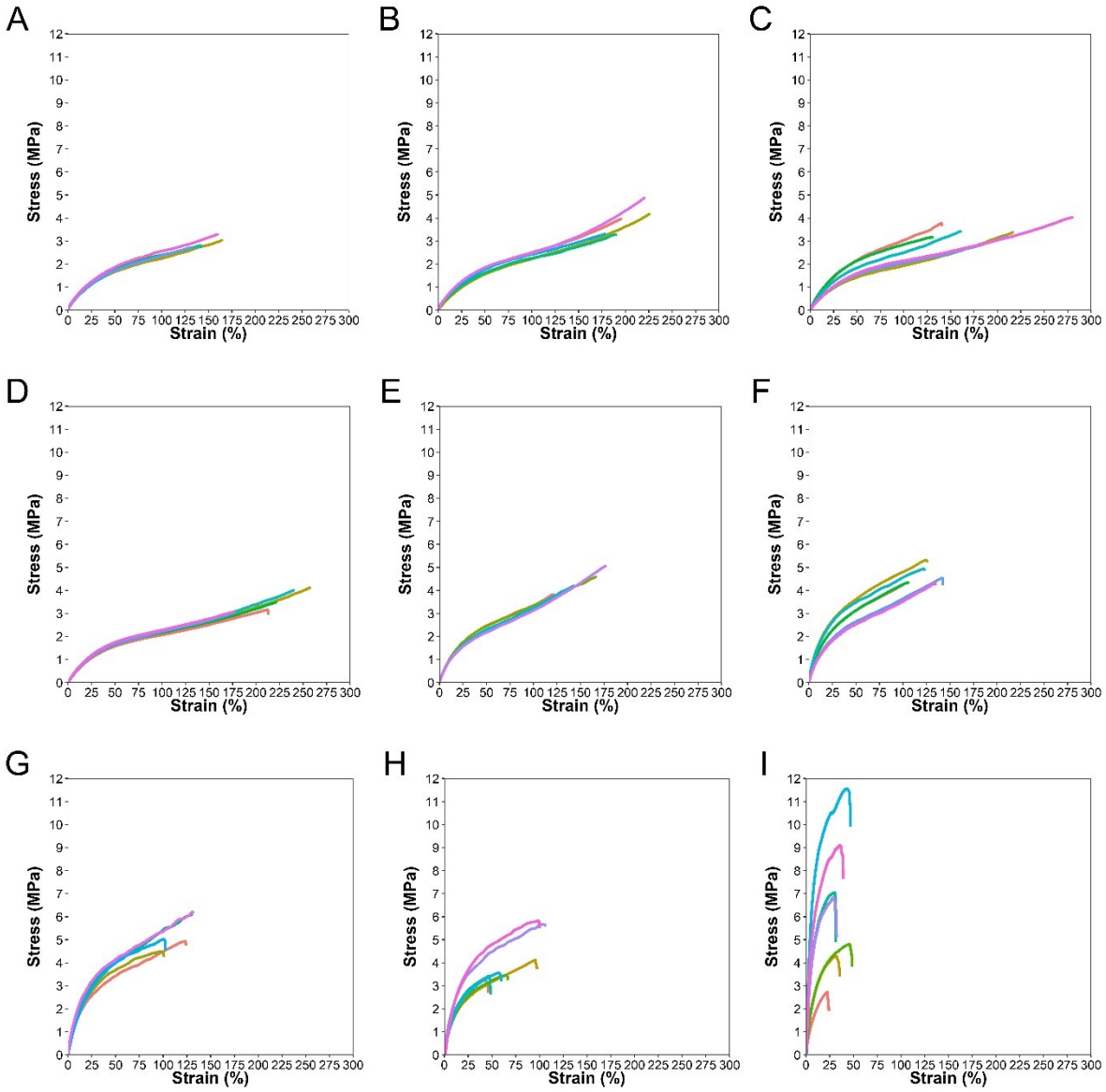

Figure S2. Stress-strain curves for the prepared samples measured in the dry state at room temperature. A) HCNC_00, B) HCNC_01, C) HCNC_03, D) HCHC_06, E) HCNC_09, F) HCNC_12, G) HCNC_15, H) HCNC_18, I) HCNC_22. All samples were measured at 10 mm min^{-1}. *(Mean of n = 6 samples ± SD).*

Table S1. Mechanical test results for the prepared samples measured in the dry state at room temperature. (Mean of n = 6 samples ± SD).

Composition	Stress-at-break (MPa)	Strain-at-break (%)	Young's Modulus (MPa)	Toughness (MJ m^{-3})
00	2.76 ± 0.36	130.92 ± 32.49	2.66 ± 0.12	2.45 ± 0.85
01	3.93 ± 0.66	202.04 ± 20.42	2.70 ± 0.15	4.73 ± 0.88
03	3.50 ± 0.34	189.90 ± 56.75	2.76 ± 0.50	4.18 ± 1.41
06	3.48 ± 0.48	214.34 ± 32.73	2.52 ± 0.08	4.73 ± 1.14
09	4.42 ± 0.53	151.93 ± 24.56	3.62 ± 0.16	4.19 ± 0.99
12	4.61 ± 0.43	122.07 ± 16.07	4.68 ± 0.62	3.83 ± 0.68
15	5.35 ± 0.76	117.78 ± 15.06	5.66 ± 0.45	4.51 ± 1.02
18	4.19 ± 1.10	74.97 ± 25.76	5.54 ± 0.85	2.47 ± 1.45
22	6.63 ± 3.02	36.85 ± 8.72	13.80 ± 5.60	1.98 ± 1.25

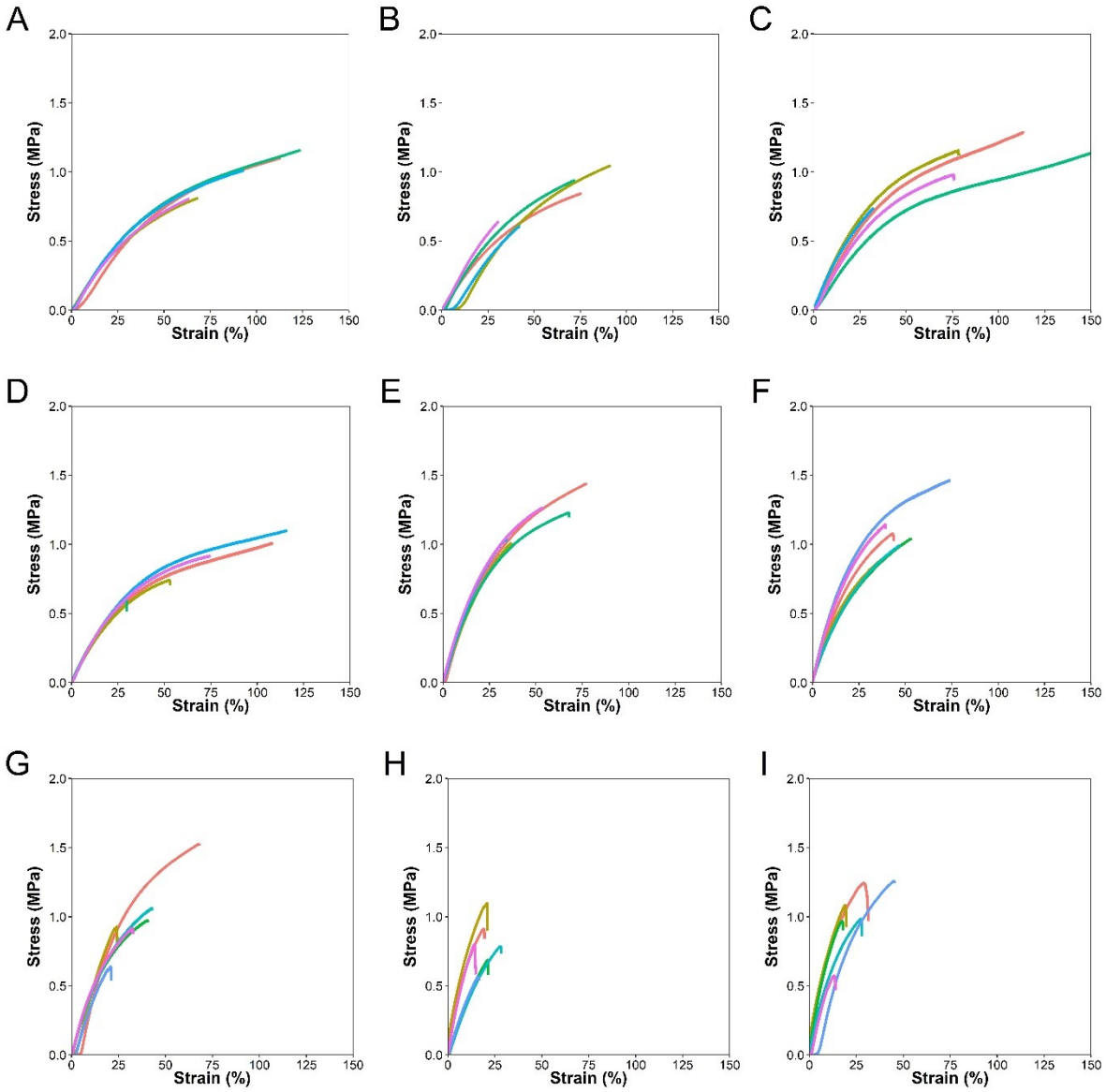

Figure S3. Stress-strain curves for the prepared samples measured in the swollen state in water at room temperature. A) HCNC_00, B) HCNC_01, C) HCNC_03, D) HCHC_06, E) HCNC_09, F) HCNC_12, G) HCNC_15, H) HCNC_18, I) HCNC_22. All samples were measured at 10 mm min^{-1}. (Mean of n = 6 samples ± SD).

Table S2. Mechanical test results for the prepared samples measured in the swollen state in water at room temperature. (Mean of n = 6 samples ± SD).

Composition	Stress-at-break (MPa)	Strain-at-break (%)	Young's Modulus (MPa)	Toughness (MJ m^{-3})
00	0.98 ± 0.16	92.08 ± 26.50	1.21 ± 0.03	0.60 ± 0.28
01	0.81 ± 0.19	62.11 ± 25.06	1.43 ± 0.37	0.31 ± 0.19
03	1.14 ± 0.31	103.55 ± 70.33	1.48 ± 0.46	0.85 ± 0.74
06	0.87 ± 0.20	76.18 ± 36.32	1.32 ± 0.23	0.50 ± 0.33
09	1.20 ± 0.18	53.82 ± 18.83	2.33 ± 0.52	0.44 ± 0.23
12	1.10 ± 0.20	49.12 ± 13.22	2.24 ± 0.32	0.37 ± 0.20
15	1.01 ± 0.29	38.30 ± 16.93	2.59 ± 0.38	0.26 ± 0.21
18	0.81 ± 0.18	20.27 ± 4.74	3.36 ± 0.56	0.10 ± 0.04
22	1.02 ± 0.25	26.04 ± 11.49	3.51 ± 0.89	0.18 ± 0.11

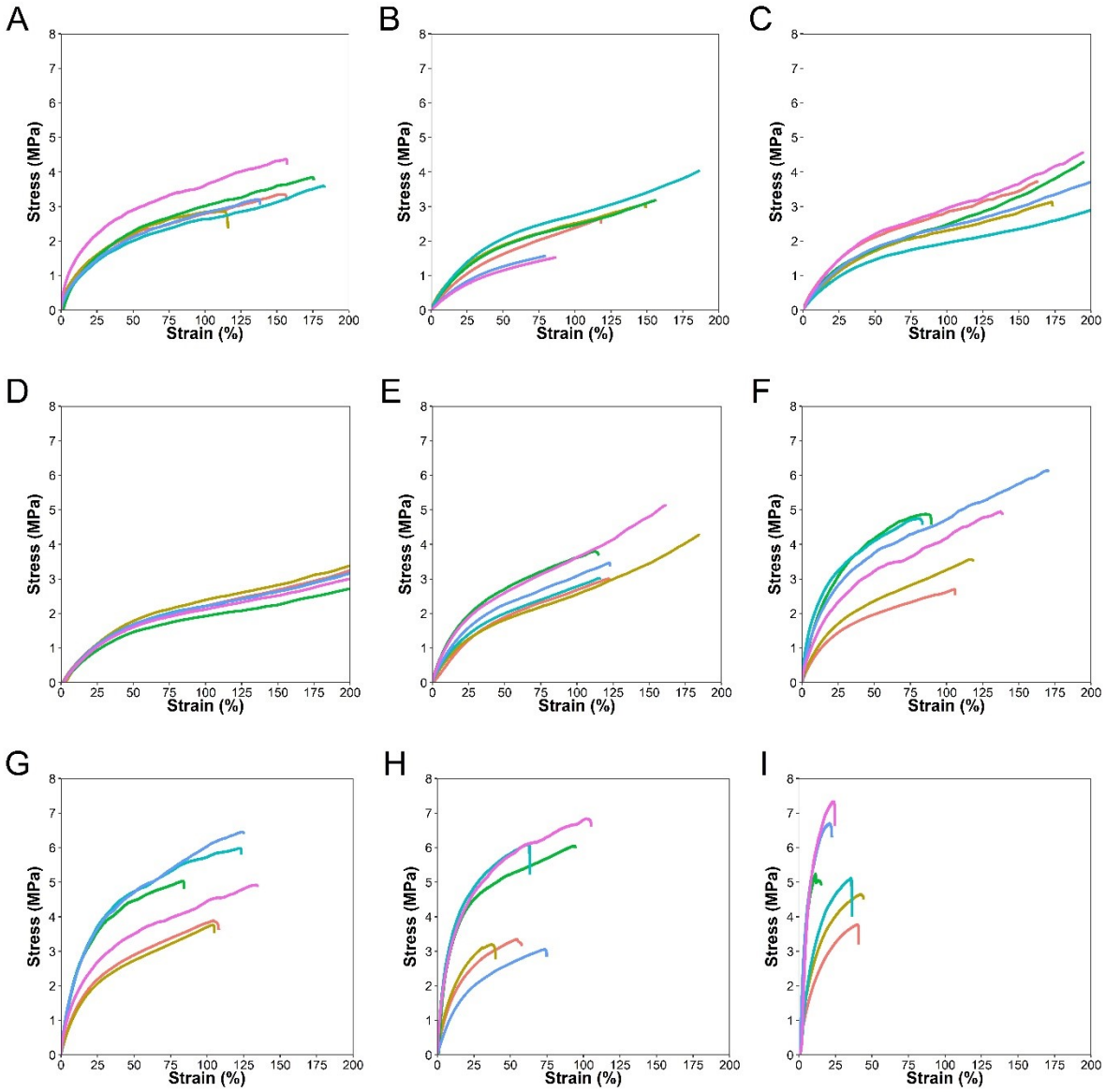

Figure S4. Stress-strain curves for the prepared samples measured in the swollen state in n-hexane at room temperature. A) HCNC_00, B) HCNC_01, C) HCNC_03, D) HCHC_06, E) HCNC_09, F) HCNC_12, G) HCNC_15, H) HCNC_18, I) HCNC_22. All samples were measured at 10 mm min^{-1}.

Table S3. Mechanical test results for the prepared samples measured in the swollen state in n-hexane at room temperature. (Mean of n= 6 samples ± SD).

Composition	Stress-at-break (MPa)	Strain-at-break (%)	Young's Modulus (MPa)	Toughness (MJ m^{-3})
00	3.54 ± 0.53	154.41 ± 24.59	3.42 ± 0.42	3.89 ± 0.96
01	2.67 ± 0.98	129.00 ± 42.02	2.55 ± 0.54	2.44 ± 1.54
03	4.00 ± 0.53	205.02 ± 40.47	2.84 ± 0.40	4.96 ± 1.07
06	3.67 ± 0.25	245.17 ± 10.18	2.51 ± 0.17	5.60 ± 0.42
09	3.78 ± 0.82	137.09 ± 28.99	3.42 ± 0.55	3.35 ± 1.16
12	4.50 ± 1.20	117.77 ± 32.71	4.80 ± 1.26	3.83 ± 1.91
15	5.01 ± 1.08	113.33 ± 18.10	5.58 ± 1.23	4.23 ± 1.42
18	4.77 ± 1.74	72.50 ± 24.18	6.56 ± 1.71	2.85 ± 1.89
22	5.47 ± 1.32	30.66 ± 11.44	19.23 ± 10.80	1.15 ± 0.32