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Supplementary information

Properties of Biomimetic Artificial Spider Silk Fibers Tuned by PostSpin Bath Incubation

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ANOVA Analysis

One-way Analysis of Variance was performed to compare the mechanical properties of the fibers of two groups incubated in the spinning buffer for different times. The parameters used to verify the null hypothesis, i.e. all the data sets come from the same distribution and have the same mean value, were:

$$SSQ_a = \sum_{g=1}^{G} n_g (m_g - m)^2$$

$$SSQ_e = \sum_{g=1}^{G} \sum_{j=1}^{n_g} (x_{gj} - m_g)^2$$

Where G is the number of different samples under consideration, n_g is the number of tests of the same sample, m is the mean value of all the data, m_g is the mean value within the group (i.e., sample)x is the single quantity value. These sums of squares were used to compute the T value

$$T = \frac{\frac{SSQ_a}{G-1}}{\frac{SSQ_e}{n-G}}$$

that has been compared with the ideal value of the Fisher function F with a significance level of 5%. If $T > F$, we reject the null hypothesis and thus we can consider the difference among the data set as significant (i.e., the difference is due to intrinsic differences among the samples and not a consequence of internal variance). This parameter and the two-tailed p-value were computed with the support of Matlab®.

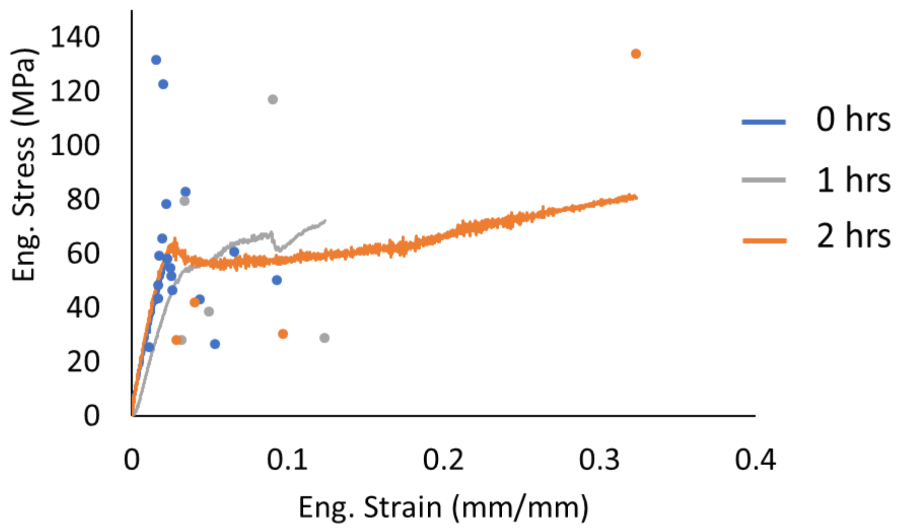

Figure S1. Stress and strain values at failure for all fibers incubated for 0 (blue),1 (grey) and 2h (orange) displayed as dots. Representative stress-strain curves for fibers incubated for 1 or 2 h are also shown. Incubation for ≥1h lead to fibers' stress strain curves displaying a yielding point.

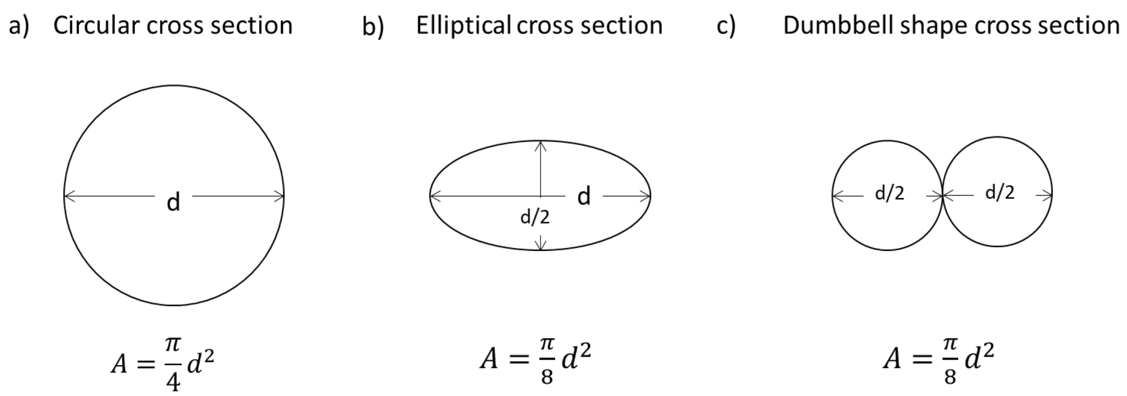

Figure S2. Same diameter but different cross-sectional shape results in a factor 2 difference in calculated cross-sectional area of the fibres. a) Circular shape, b) elliptical and c) dumbbell shape.

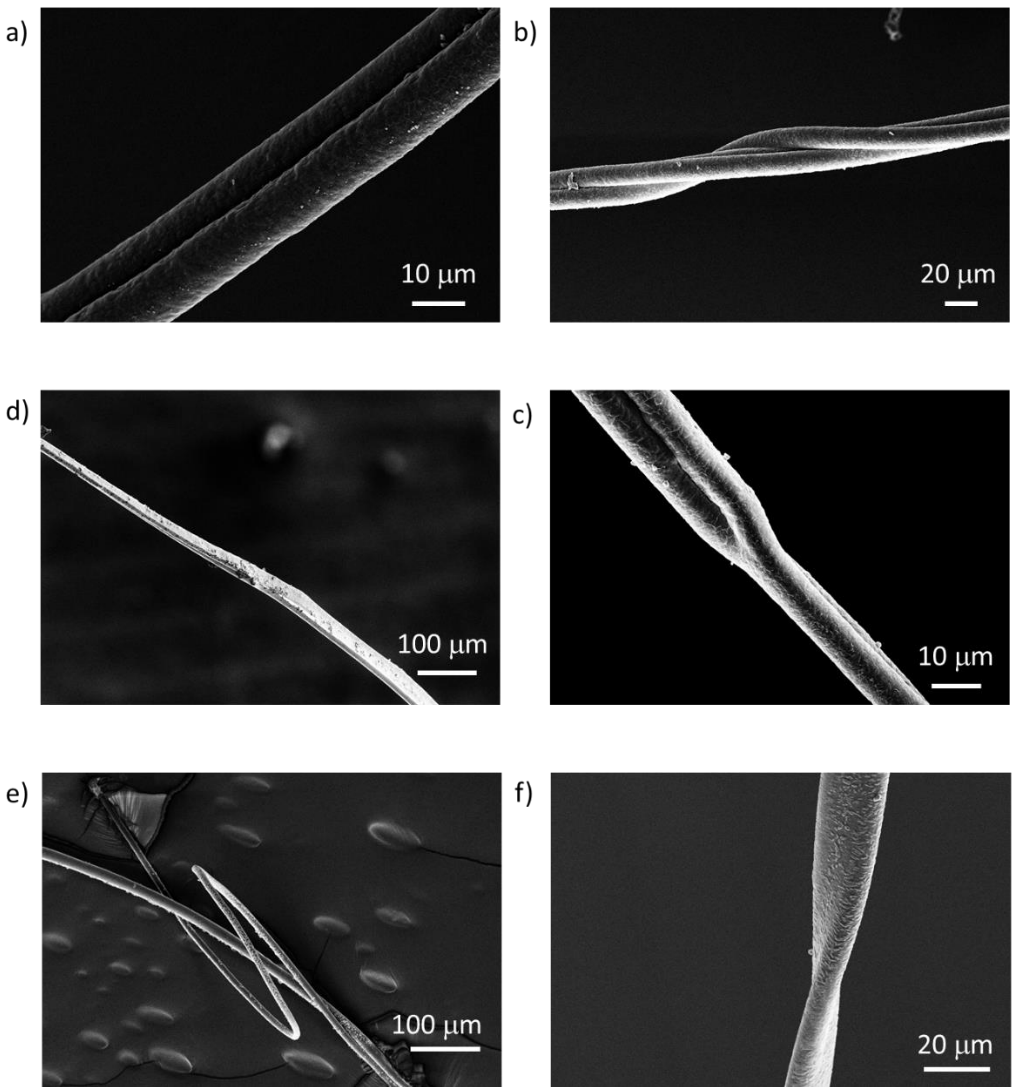

Figure 3. SEM images of fibers with a dumbbell or elliptical cross section shaped cross section.

Table S1. Mechanical properties calculated assuming a circular cross-sectional area and integrity of fibers in aqueous solvents.

Inc. time (h)	Nr. samples	Diameter (m)	Strain at break (mm/mm)	Strength (MPa)	Young's modulus (GPa)	Toughness modulus (MJ/m^3)	Solubility in dH2O	Solubility in PBS
0	17	15 ± 2.4	0.03 ± 0.02	62 ± 29	2.9 ± 2.0	1.0 ± 0.7	YES	YES
1	6	23 ± 10	0.14 ± 0.19	70 ± 44	2.3 ± 1.0	11 ± 20	YES	YES
2	5	15 ± 7	0.37 ± 0.56	80 ± 64	2.4 ± 1.7	40 ± 70	YES	YES
3	8	29 ± 12	0.07 ± 0.05	38 ± 17	1.2 ± 0.5	1.1 ± 0.7	YES	YES
5	29	22 ± 6	0.05 ± 0.04	54 ± 36	1.9 ± 1.0	1.8 ± 2.5	NO	NO
5.5	19	22 ± 11	0.11 ± 0.13	48 ± 28	1.8 ± 1.1	4.9 ± 8.0	NO	NO
6	34	16 ± 8	0.33 ± 0.39	68 ± 30	2.4 ± 1.1	25 ± 34	NO	NO
24	17	15 ± 5	0.15 ± 0.23	58 ± 31	2.3 ± 1.1	11 ± 22	NO	NO
48	10	23 ± 7	0.05 ± 0.03	46 ± 28	2.0 ± 1.3	1.4 ± 1.5	NO	NO