

Supplementary Material (ESI) for RSC Advances

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Microfluidic fabrication of chitosan microfibers with controllable internals from tubular to peapod-like structures

Supplementary Material

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Microfluidic fabrication of controllable chitosan microfibers

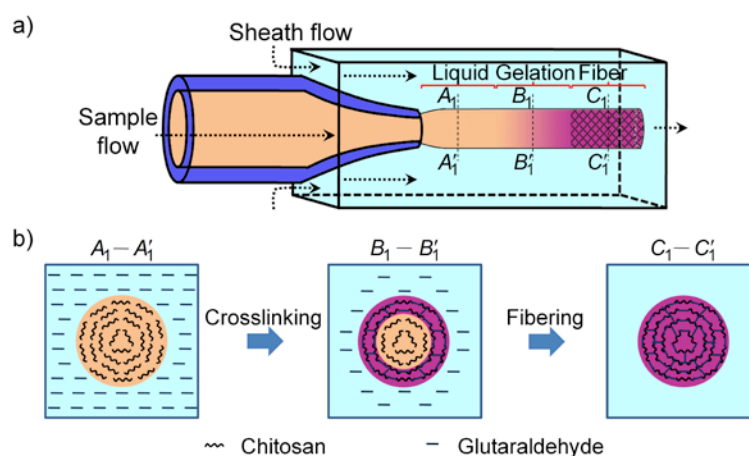


Fig. S1 Schematic diagram of the microfluidic fabrication of solid chitosan microfiber. (a) Microfluidic device for preparing the chitosan microfiber. (b) Different cross-sections of the chitosan microfiber illustrating the crosslinking process.

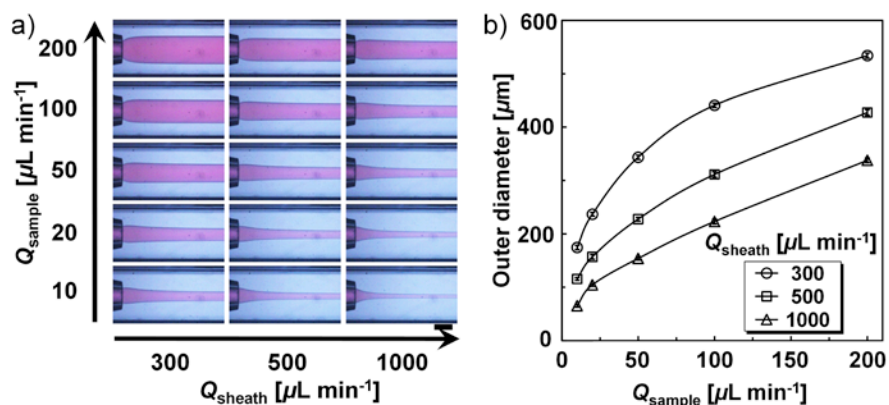


Fig. S2 Structure control of the jet templates by changing flow rates. (a) High-speed snapshots of jet templates under different flow rate conditions. The scale bar is $500 \mu\text{m}$. (b) Effect of Q_{sample} and Q_{sheath} on the diameter of the jet templates.

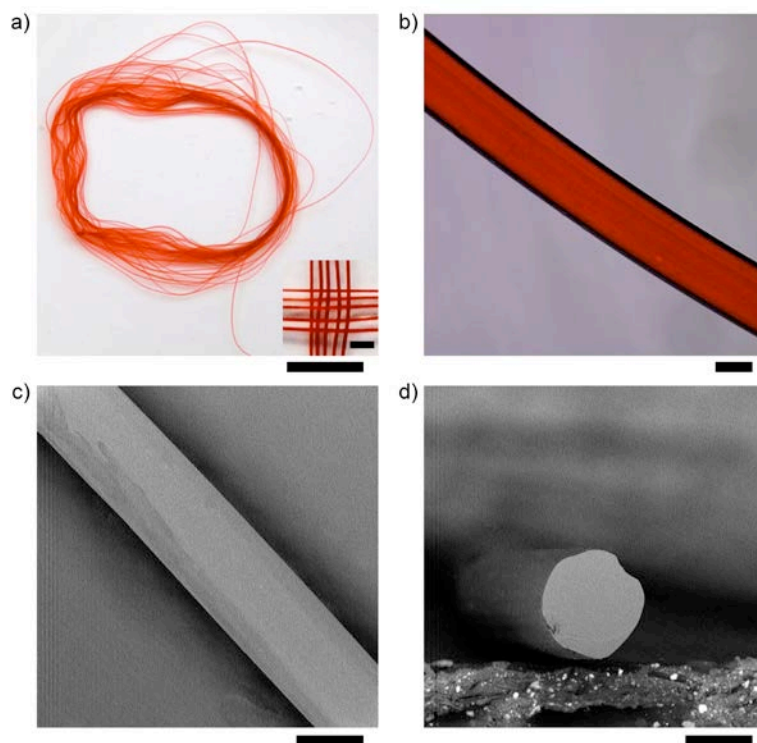


Fig. S3 Morphological characterization of solid chitosan microfibers. (a) Digital photo of the chitosan microfibers dyed with Eosin Y. The scale bar is 1 cm . The insert picture shows a swatch of fabric that is woven from the chitosan microfibers. The scale bar is 1 mm . (b) Optical micrograph of the chitosan microfibers dyed with Eosin Y. The scale bar is $200 \mu\text{m}$. (c,d) SEM images of the outer surface (c) and cross-section (d) of the air-dried solid chitosan microfibers. The scale bars are $100 \mu\text{m}$.

Mechanical property of chitosan microfibers

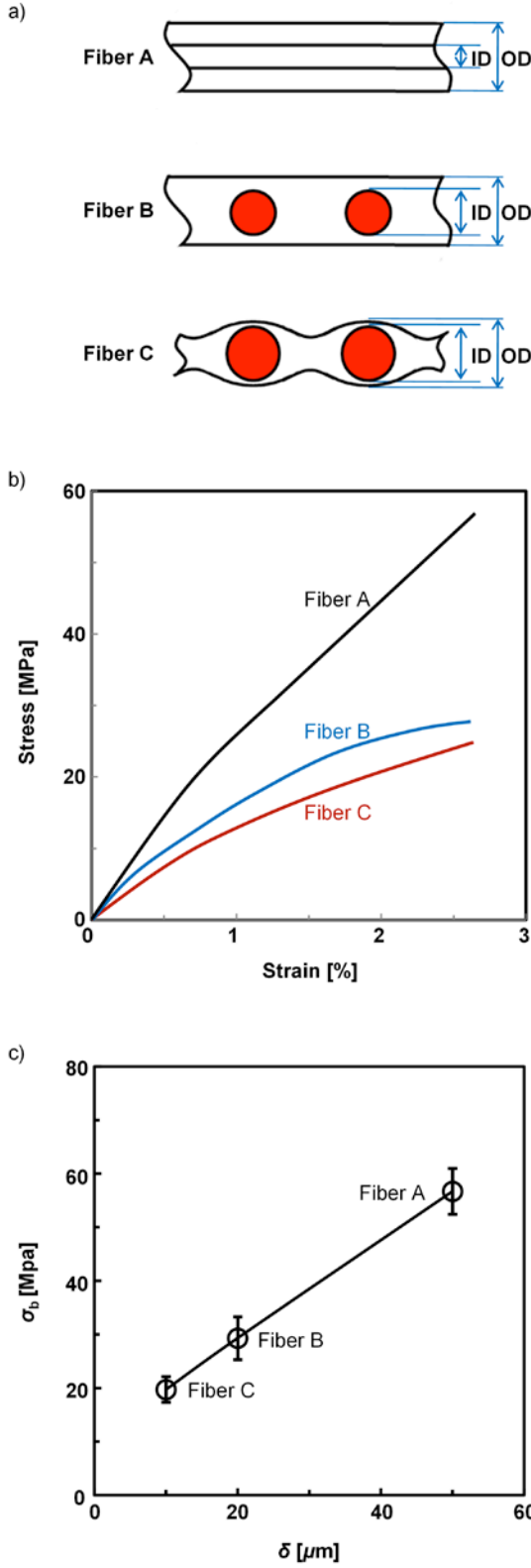


Fig. S4 Mechanical properties of chitosan microfibers. (a) Schematic diagram showing the three types of chitosan microfibers for the mechanical property test. (b) The stress-strain curves of the three types of chitosan microfibers. (c) Effect of shell thickness (δ) on the tensile strength (σ_b) of the chitosan microfibers.

Table. S1 Mechanical properties of three types of chitosan microfibers

Type	δ / μm	σ_b / MPa	ε / %	E / MPa
A	50	56.7 \pm 4.3	2.6 \pm 0.5	2185.4 \pm 295.7
B	20	29.3 \pm 4.0	2.5 \pm 0.4	1362.8 \pm 243.1
C	10	19.7 \pm 2.4	2.6 \pm 0.8	875.7 \pm 127.0

Note: The symbol “ δ ” is the fiber thickness and calculated by $(OD-ID)/2$, “ σ_b ” represents the tensile strength, “ ε ” represents the fracture strain, and “ E ” represents the Young’s modulus.