Electronic Supplementary Material (ESI) for Journal of Materials Chemistry

Electronic Supplementary Information

Centrifugal Electrospinning of Highly-Aligned Polymer Nanofibers over Large Area

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Supplementary Experimental

Polymer Solutions for Electrospinning

For electrospinning chitosan-based nanofibers, a 4 wt% solution is prepared using practical-grade chitosan (Polysciences, Warrington, PA) dissolved in an aqueous solution of 2% acetic acid at room temperature and mixed with 4 wt% polyethylene oxide (PEO) MW 900,000 Da (Aldrich, St. Louis, MO) dissolved in water at a polymer ratio of 80/20. 10 wt% dimethyl sulfoxide (Aldrich) and 0.1 wt% Triton-X 100 (Aldrich) were added to chitosan/PEO solution and the final solution was stirred at room temperature for one hour. The DMSO and triton-X100 were used to increase chitosan concentration by reducing viscosity of polymer solution and thus improve chitosan spinnability. For electrospinning PEO fibers, 6 wt% PEO was dissolved in water at room temperature.

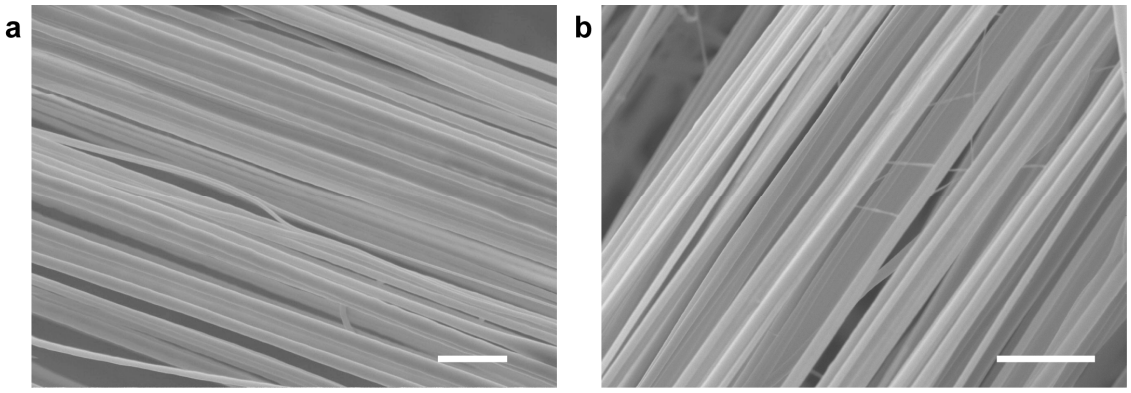
Centrifugal Electrospinning of Chitosan and PEO

Both chitosan and PEO solutions were electrospun using a 23 gauge needle (0.337 mm ID), at 22 kVdc, 300 rpm and a spinneret-electrode distance of 20 cm.

Supplementary Results and Discussion

Fabrication of PEO and chitosan nanofibers

Using the same methodology shown above, we produce well-aligned nanofibers of two additional polymers: PEO (synthetic polymer) and chitosan (natural polymer) with our CE system. The PEO and chitosan nanofibers have an average diameter of 270 nm and 200 nm, respectively (Supplementary Figure 1), and both were produced at 22 kV and 300 rpm, suggesting the potential applicability of the technology to a wide range of polymer systems in producing highly aligned nanofibers.



Supplementary Figure 1. Aligned (a) PEO and (b) chitosan-based nanofibers produced by the CE system. The scale bars represent 2 μm. Both PEO and chitosan nanofibers were produced at 300 rpm of spinneret rotating speed and deposited on a four-inch gap between electrodes.