Supplemental Information

Virus adsorption of water-stable quaternized chitosan nanofibers

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1. Characterization of HTCC

FTIR and NMR spectra were taken to confirm the formation of HTCC from chitosan. **Figure S1a** shows that a new peak at 1478 cm^{-1}, representing the C-H bending of trimethylammonium group can be found in HTCC. It should also be noted that the peak at 1590 cm^{-1} in chitosan, which is the N-H bending of the primary amine, disappeared in HTCC due to the change of primary amine in chitosan to secondary amine in HTCC. The evidence of successful introduction of the quaternary ammonium salt group on chitosan backbone is further verified by NMR spectra, shown in **Figure S1b**. A strong peak at 3.1 ppm, assigned to the methyl groups in the quaternary ammonium side chains, appeared in the HTCC.

To compare the fiber formation ability of different HTCC:PVA blend ratios, SEM images were taken of each blend ratio and shown in **Figure S2**. Once the concentration of HTCC rose above 50%, no fibers were able to be formed.

2. Characterization of HTCC Methods

Fourier transform infrared (FTIR) spectra were obtained using a Perkin Elmer Spectrum One FTIR spectrometer (Shelton, CT). Both HTCC crystals and chitosan powder were measured in the solid state. Nuclear magnetic resonance (NMR) spectra were obtained using a Varian 400 MHz NMR wide-bore spectrometer (Santa Clara, CA). HTCC (c = 10 mg/ml) was dissolved in D_2O, and chitosan (c =5 mg/ml) was dissolved in CF_3COOD.

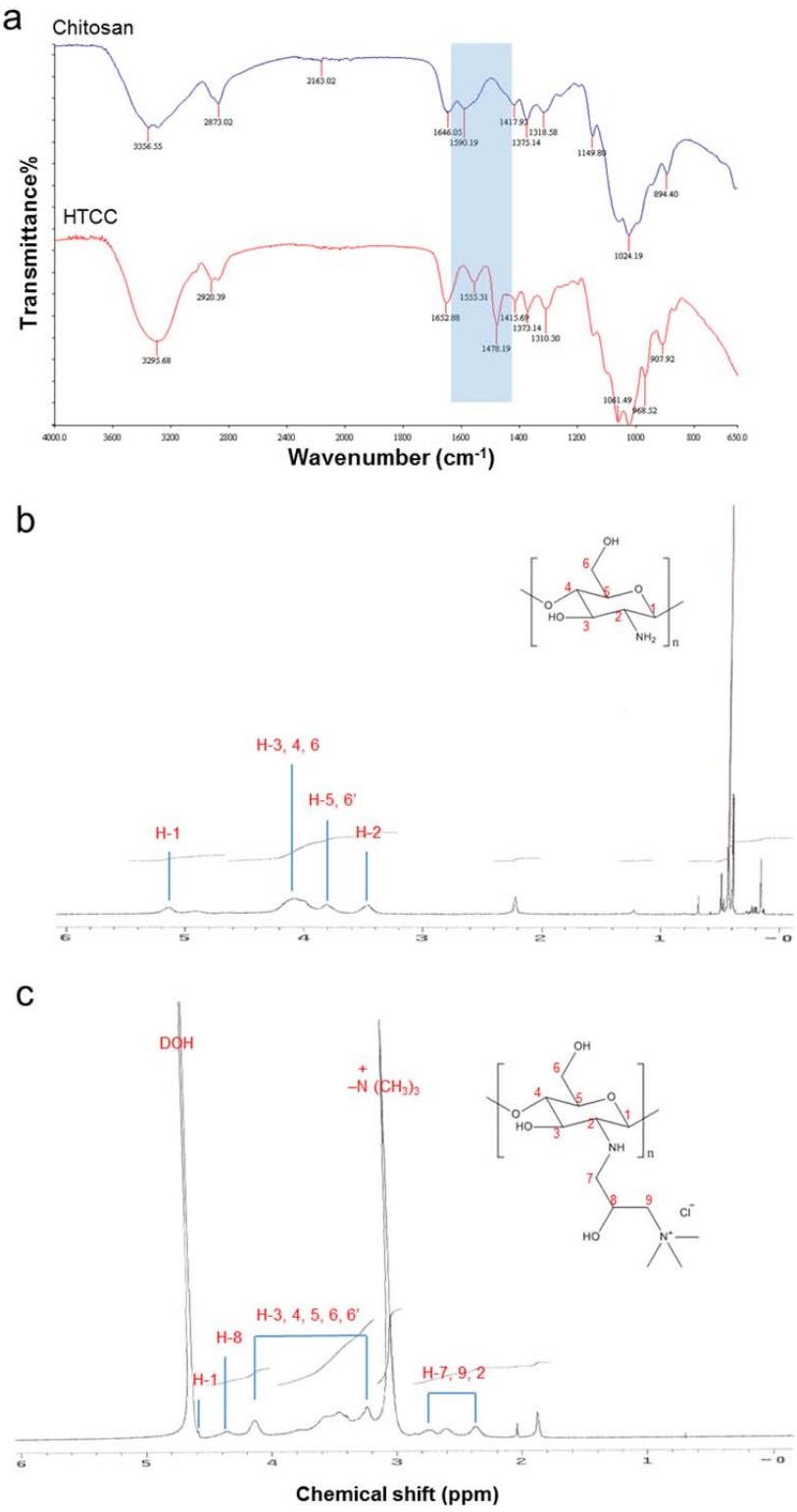

Figure S1: FTIR and NMR of chitosan and HTCC. (a) FTIR of solid chitosan and HTCC, (b) H^1 NMR of chitosan in CF_3COOD, and (c) H^1 NMR of HTCC in D_2O.

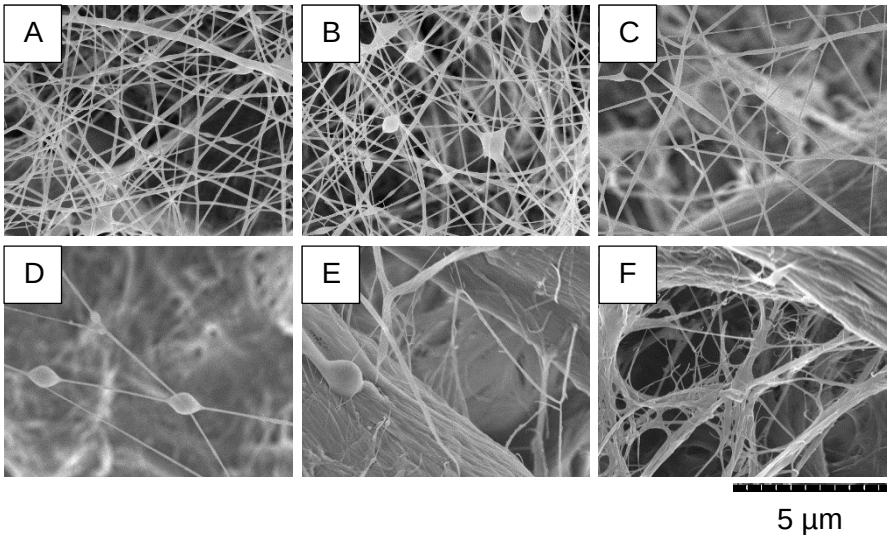

Figure S2: SEM-micrographs of 10% (w/v) HTCC-PVA nanofibers of different compositions. Mass ratios of HTCC: PVA was (A) 3:7, (B) 4:6, (C) 5:5, (D) 6:4, (E) 7:3. (F) blank filter paper.