Hierarchical porous carbon nanofibrous membranes with enhanced shape

memory property for effective adsorption of proteins

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Support information

Calculation of fractal dimension

The fractal dimension (D) was calculated by following FHH equation:

$$\ln(V/V_{mono}) = A[\ln\ln(P_0/P)] + constant$$

where V is the amount of N_2 adsorbed at each equilibrium pressure, P; V_{mono} is the adsorbed amount of monolayer coverage; and P_0 is the saturation pressure. By which a plot of $\ln(V/V_{mono})$ versus $\ln(\ln(P_0/P))$ shows a linear trend could be reconstructed, and the slope A could be used to calculate D utilizing the expression: $A = D - 3$, which was according to the dominant forces of liquid-gas surface tension at high coverage.
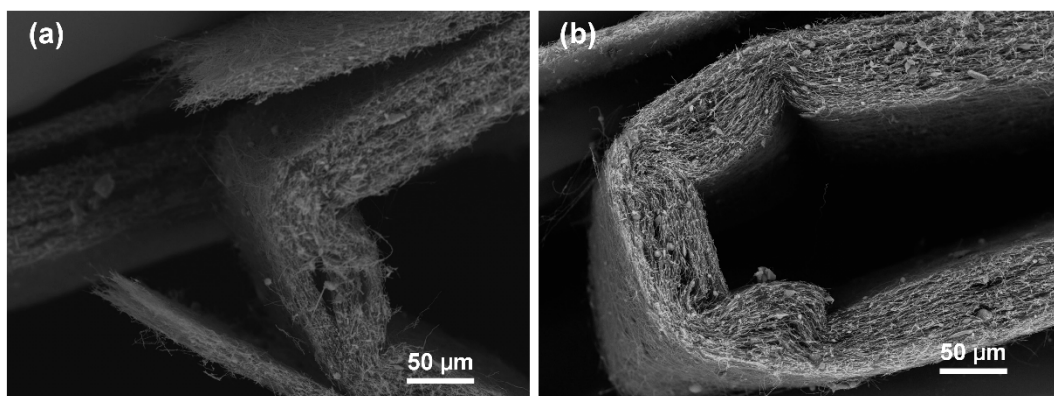

Fig. S1 SEM images of (a) pristine CNF membrane showing the cracking, and (b) $SiO_2@CNF-20$ membrane with intact structure under deformation.
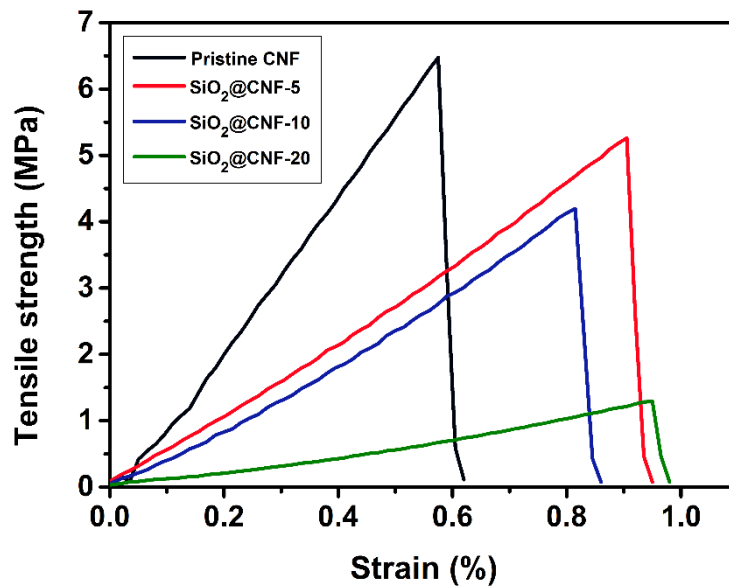
Fig. S2 Tensile curves of CNF membranes derived from precursor fibers with different SiO$_2$ nanoparticles contents.
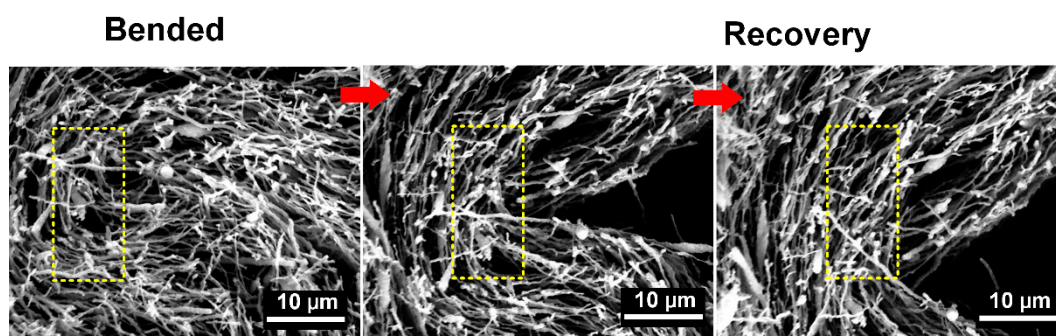

Fig. S3 In-situ SEM images of SiO$_2$@CNF-20 membrane showing the robust mechanical stability of single fiber under different deformations.
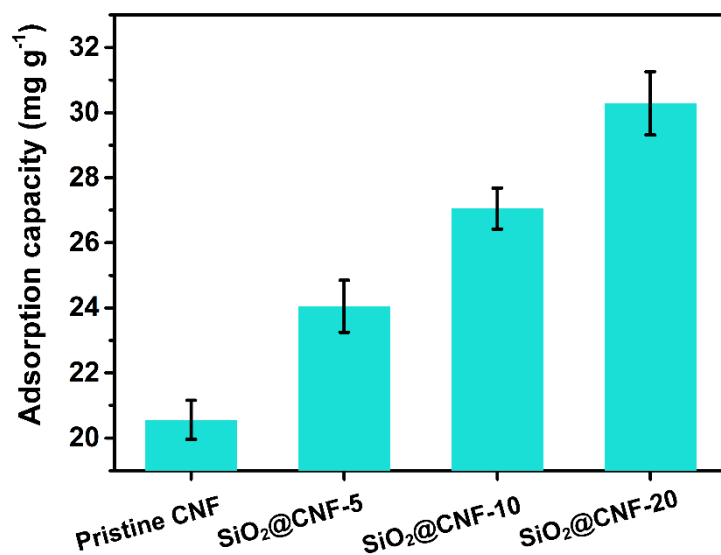
Fig. S4 BSA adsorption capacity of CNFs membranes derived from precursor fibers with different SiO_2 nanoparticles contents.