Electronic Supplementary Information

Flexible Dielectric Papers Based on Biodegradable Cellulose Nanofibers and Carbon Nanotubes for Dielectric Energy Storage

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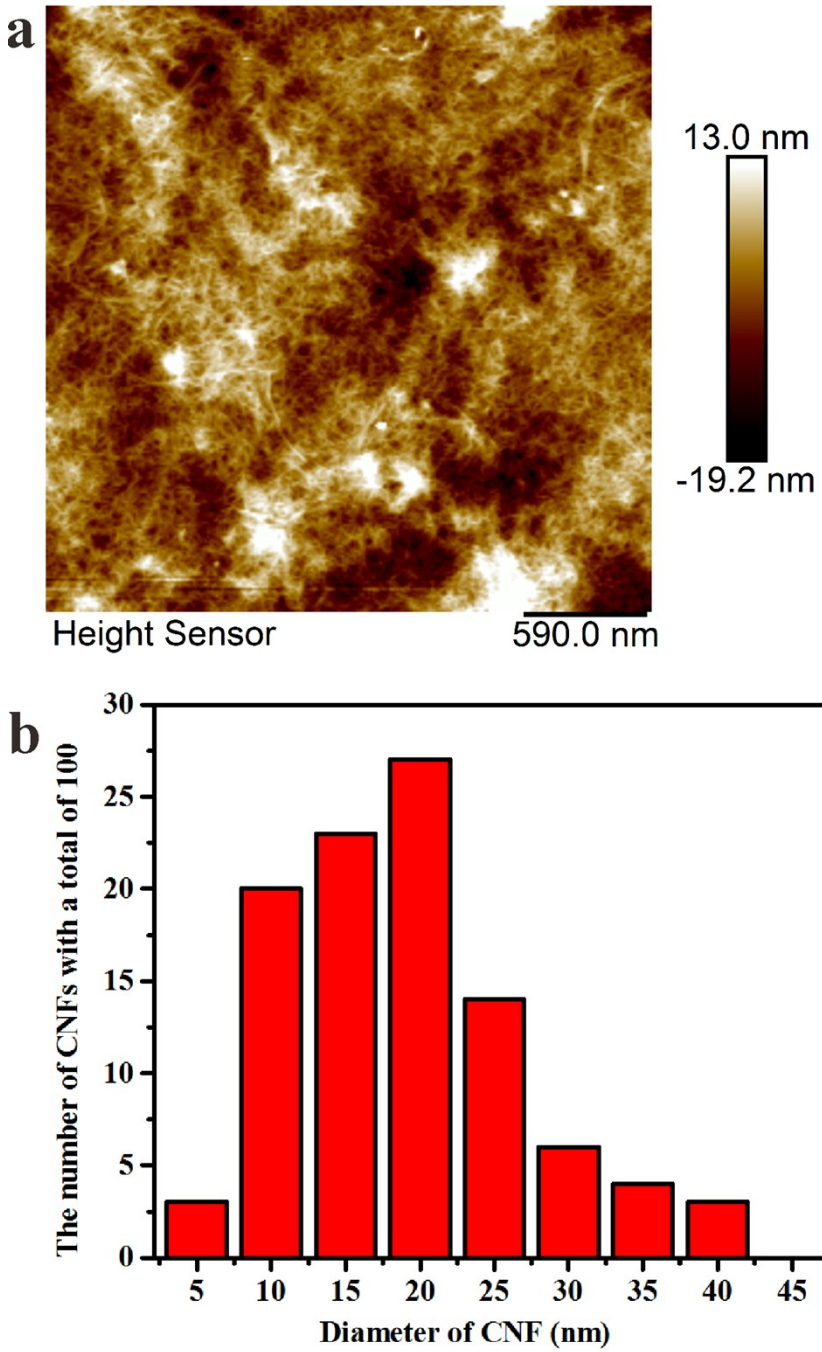

Fig. S1. (a) Atomic force microscopy image of the CNFs. (b) Diameter distribution of the CNFs.

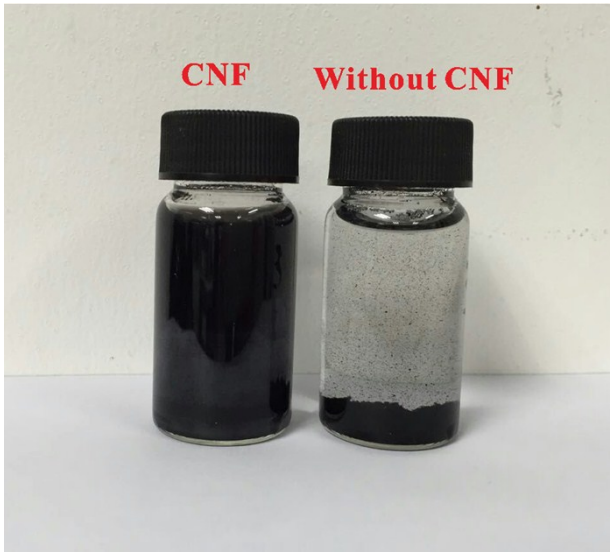

Fig. S2. Optical image of CNF/CNT water solution (left) and CNT water solution (right) after sonication for 24 h.

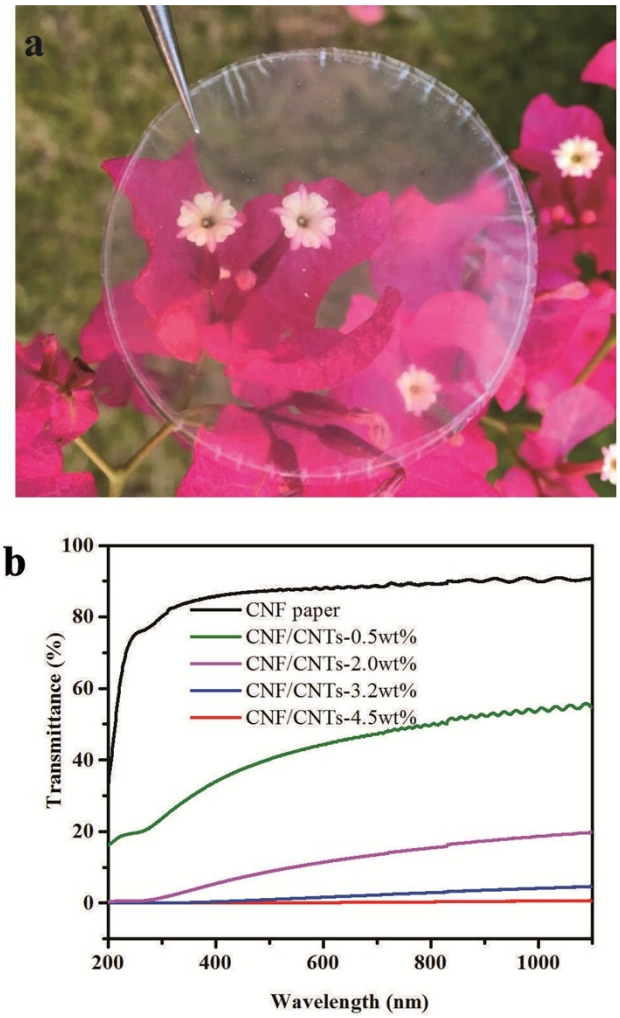

Fig. S3. (a) Optical image of pure CNF paper showing high optical transparency. (b) UV-vis transmittance spectra of the CNF/CNT papers with different CNT loadings.

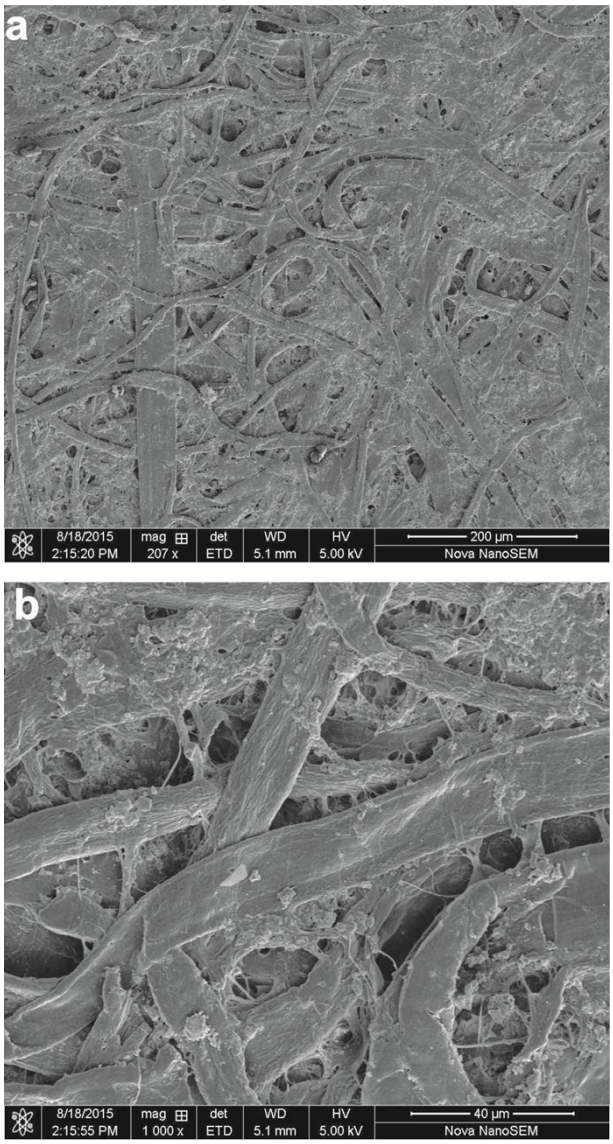

Fig. S4. (a) SEM surface morphological micrograph, and (b) a magnified micrograph of common A4 paper.

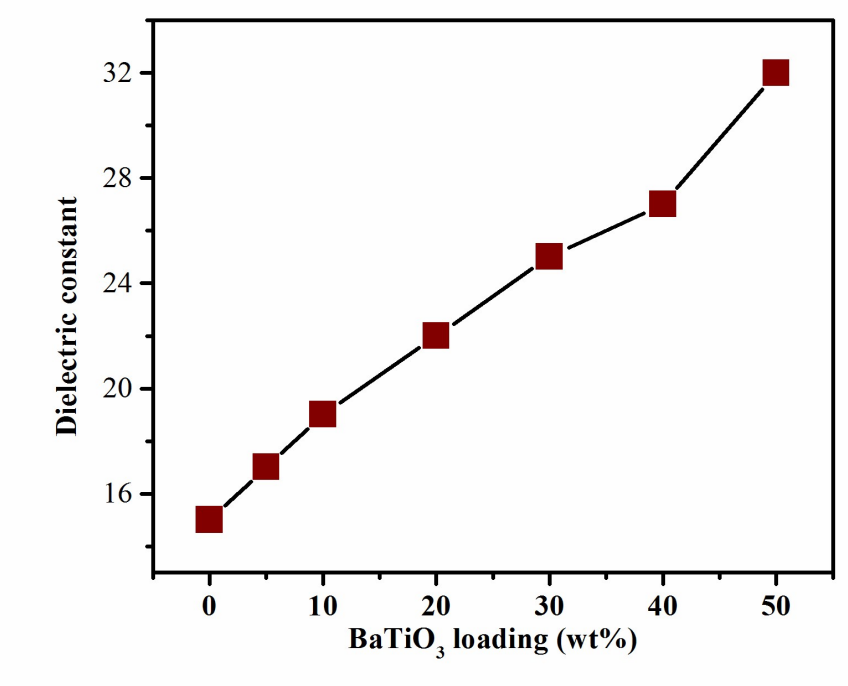

Fig. S5. Dielectric constant of CNF/$BaTiO_3$ paper with different $BaTiO_3$ loadings.

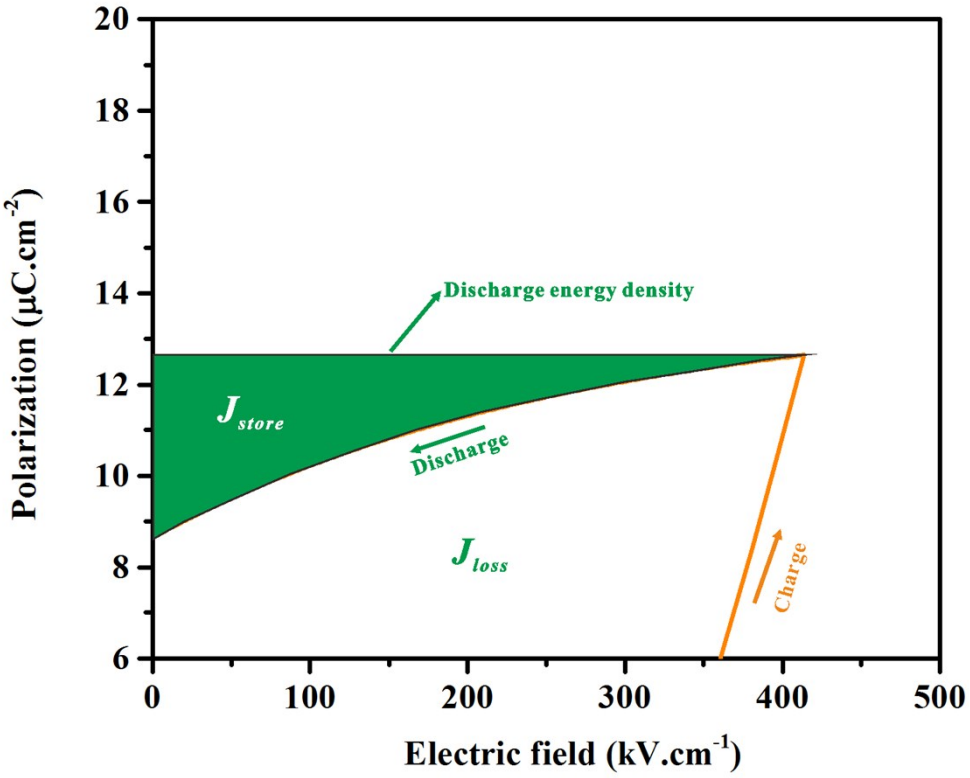

Fig. S6. Schematic *P-E* loop of a dielectric material with the discharged energy density represented by the area colored in green.

The energy efficiency η, can be calculated as

$$\eta = J_{store}/(J_{store}+ J_{loss}) \quad (1)$$

where J_{store} and J_{loss} are energy density and energy loss,respectively, calculated from the D−E loops in Fig. S5.

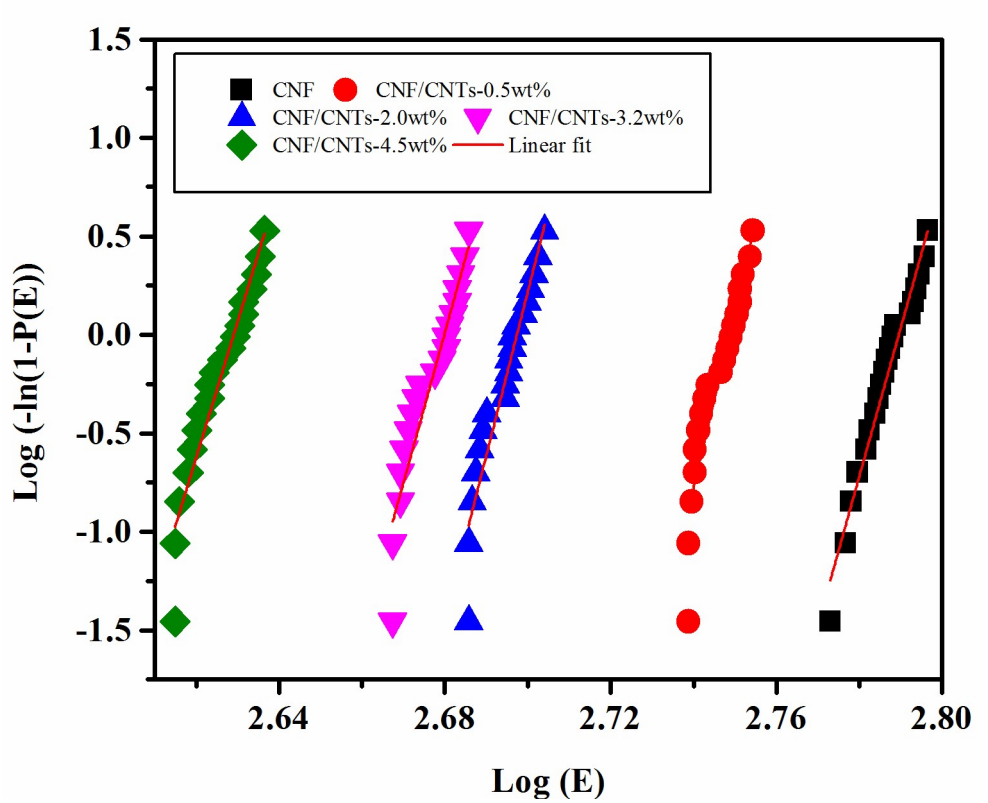

Fig. S7. Linear relationship between log (E) and log (−ln (1−P(E))) to obtain the parameters β and E_b.

Table S1. Mechanical properties of the CNF/CNT papers with different CNT loadings.

samples	tensile Strength (MPa)	Young's modulus (GPa)	elongation (%)
CNF paper	95.0±11	6.0±1.0	2.0±0.7
CNF/CNT–0.5 wt % paper	103.6±15	7.7±0.8	1.5±1.4
CNF/CNT–2.0 wt % paper	116.7±13	8.2±0.7	2.1±0.4
CNF/CNT–3.2 wt % paper	113.3±16	6.3±1.1	3.2±0.5
CNF/CNT–4.5 wt % paper	107.5±12	5.6±0.8	3.3±0.4