

Supplementary Information

Electric papers of graphene nanosheet shelled cellulose fibers by dispersion and infiltration as flexible electrodes for energy storages

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Supporting Figures

Figure S1 C1s XPS spectra of the thermally reduced chemically synthesized GNS

Figure S2. Large size GNS/cellulose composite paper

Figure S3 SEM images of the internal GNS shelled cellulose fibers

Figure S4 FTIR of the GNS/cellulose composite paper

Figure S5 Durability of the GNS/cellulose paper in water

Figure S1: C1s XPS spectra of the thermally reduced chemically synthesized GNS

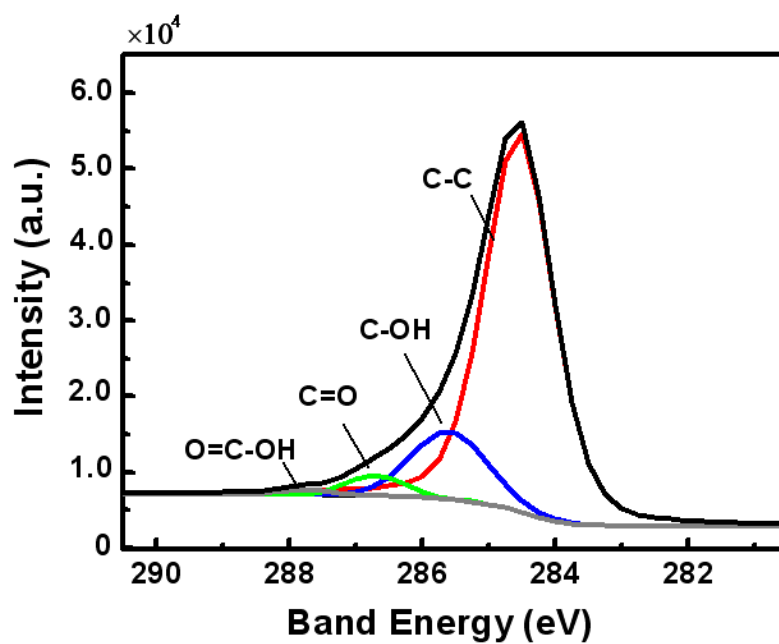


Figure S1. C1s XPS spectra (Kratos Axis Ultra DLD, England) of the thermally reduced chemically synthesized GNS used for the fabrication of the GNS/cellulose composite paper.

Figure S2: A large size GNS/cellulose composite paper



Figure S2. A photograph of a larger size GNS/cellulose composite paper made by the dispersion and infiltration process with a larger infiltrator. The paper has a diameter of about 15 cm and thickness of 160 μm .

Figure S3: SEM images of the internal GNS shelled cellulose fibers

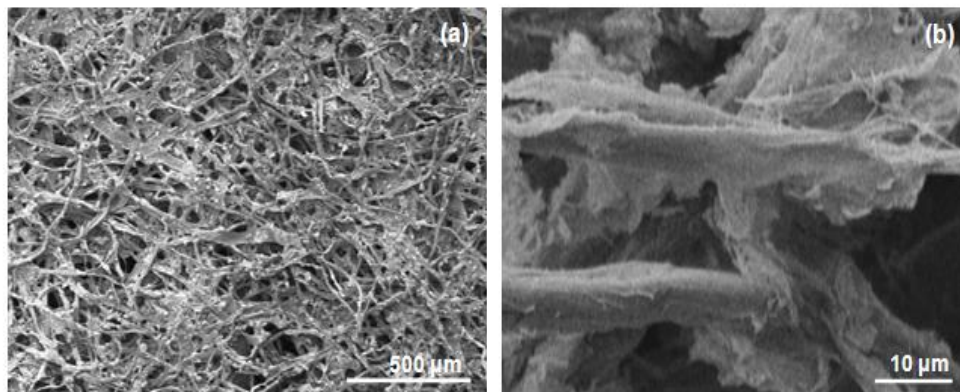


Figure S3. SEM images of the GNS/cellulose composite paper by peeling off the papers revealing the internal structure of the papers showing the homogeneous randomly oriented cellulose fibers (a) coated with GNS nanosheet (b) observed under different magnifications.

Figure S4: FTIR of the GNS/cellulose composite paper

The FTIR spectrum of the composite paper, in Figure S4, shows a broad absorption band around 3400 cm^{-1} and several bands in the region of $900\text{-}1700\text{ cm}^{-1}$. These bands are characteristic for cellulose²², as comparing with the spectrum for the pure cellulose paper. The two absorption bands at 3439 cm^{-1} due to O-H and at 1115 cm^{-1} due to C-O contain the absorption from GNS which has these groups, characteristic for the chemically synthesized GNS.

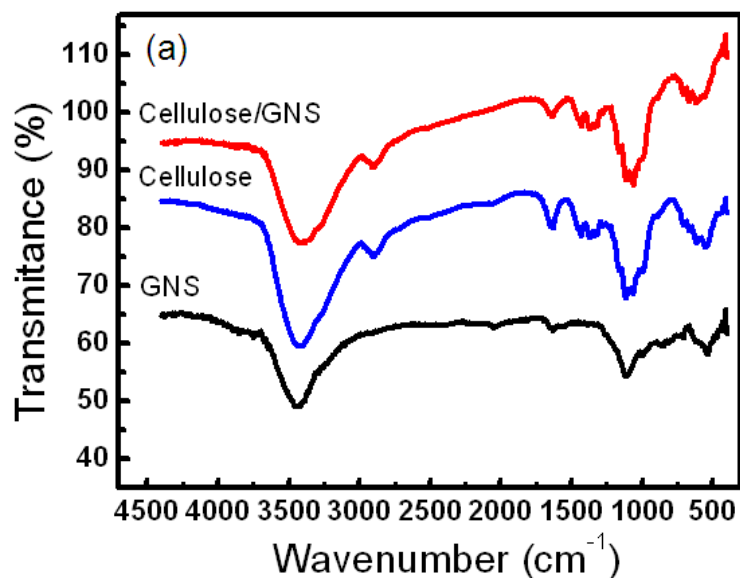


Figure S4. FTIR of the GNS/cellulose composite paper, and a neat cellulose paper and GNS for comparisons.

Figure S5: Durability of the GNS/cellulose paper in water

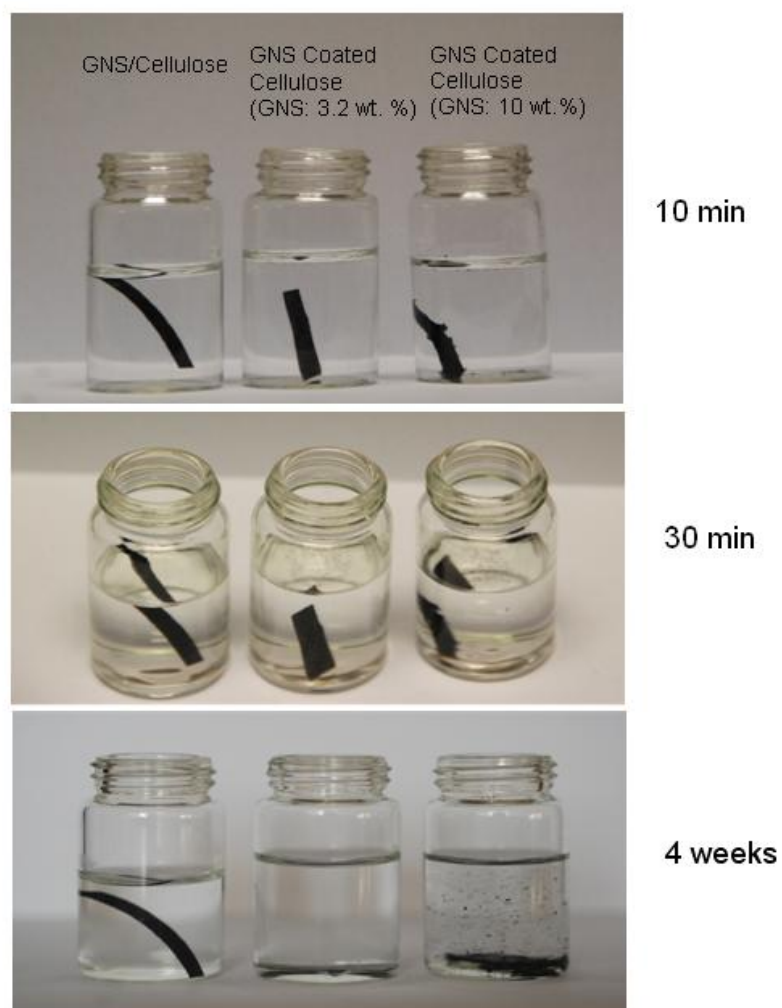


Figure S5. Photographs of the GNS/cellulose composite paper with GNS shelled cellulose fiber by dispersion and infiltration in comparing with the GNS powder coated cellulose paper by direct infiltration showing their durability in water after the different periods of times.