Supporting Information

Graphene Coated Nonwoven Fabrics as Wearable Sensors

*Donghe Du, Pengcheng Li, and Jianyong Ouyang**

Department of Materials Science & Engineering, National University of Singapore, Singapore 117576.

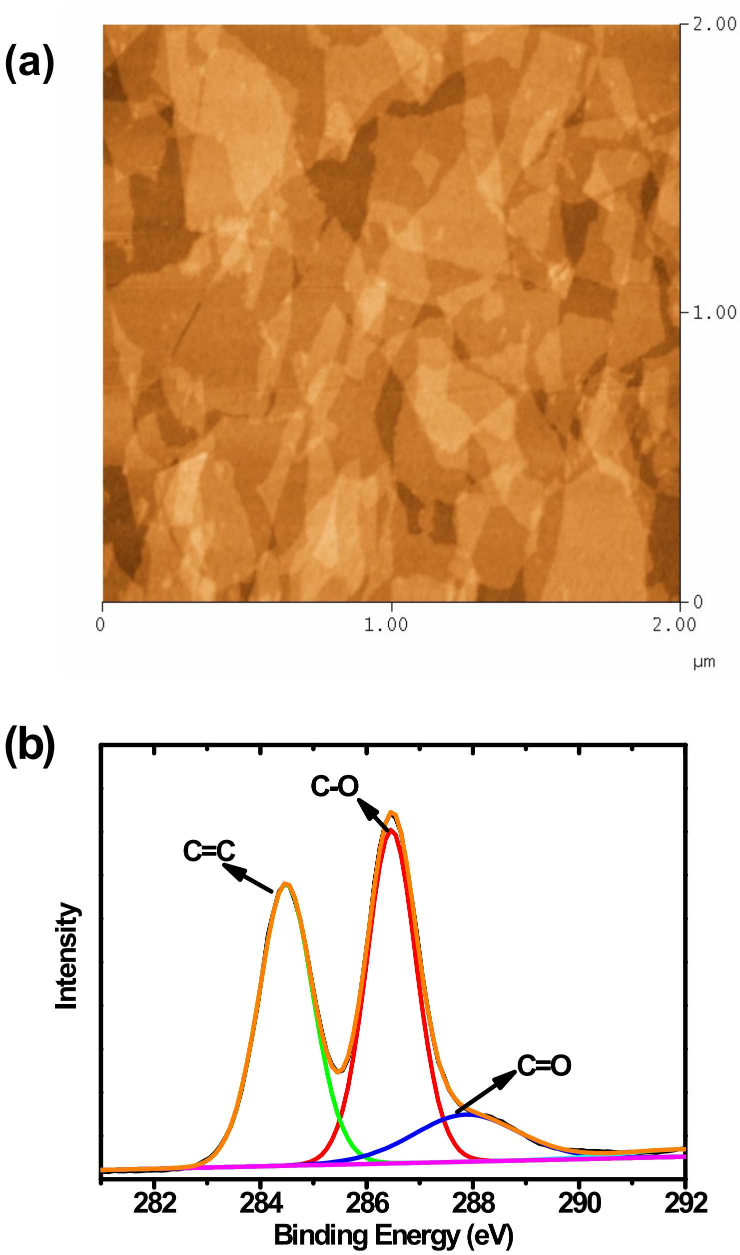


Figure S1. (a) AFM image of GO sheets on a silicon substrate, (b) XPS C1s spectrum of GO.

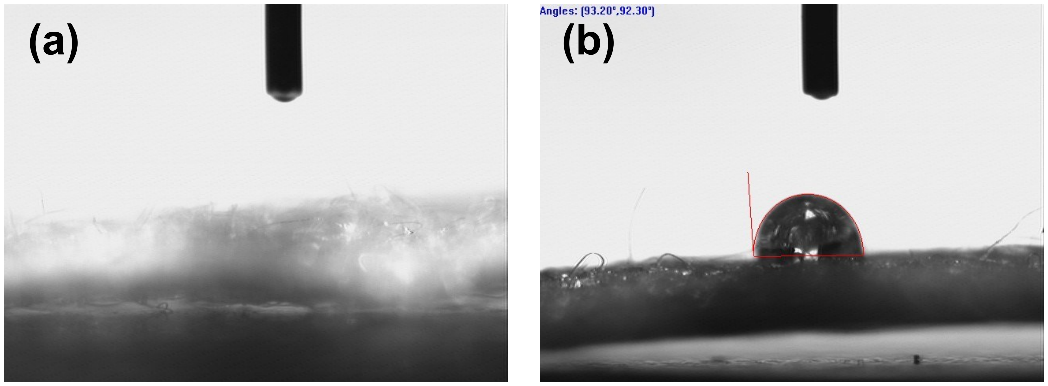


Figure S2. Water drop contact angles on (a) NWF and (b) GNWF.

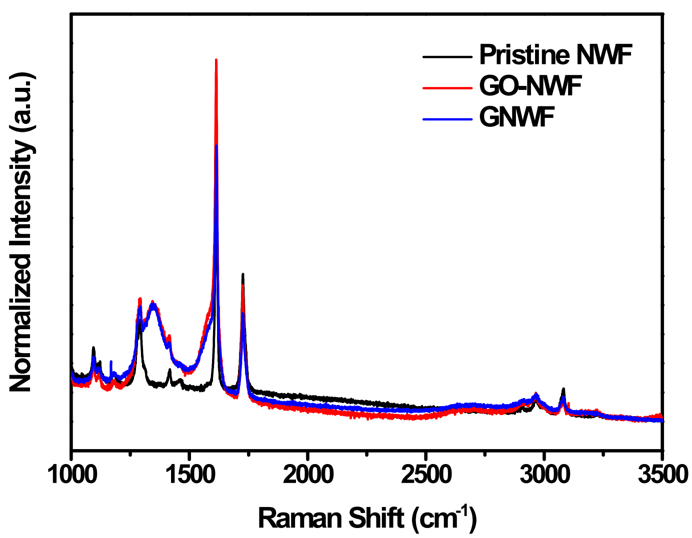


Figure S3. Raman spectra of pristine, GO coated and reduced GO coated NWFs.

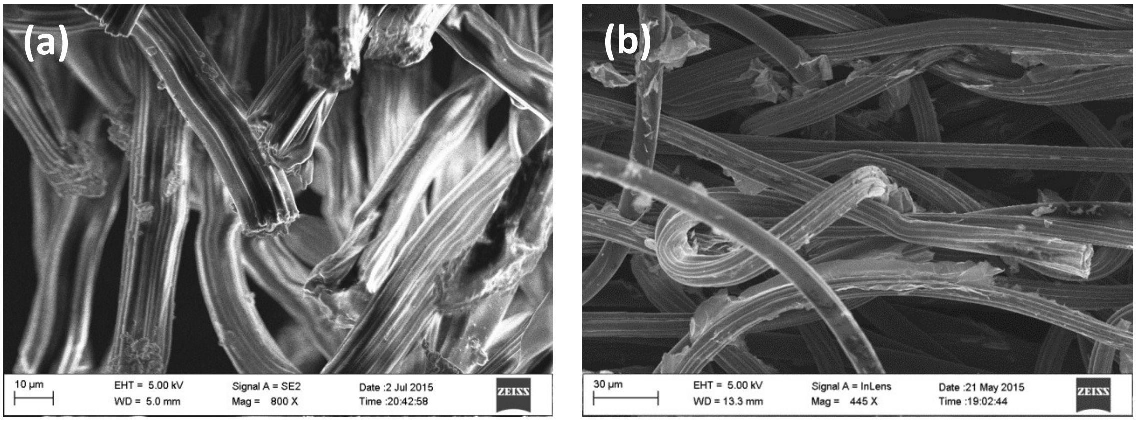


Figure S4. SEM image of (a) pristine NWF and (b) GNWF4 (rGO loading 2.3 wt.%)

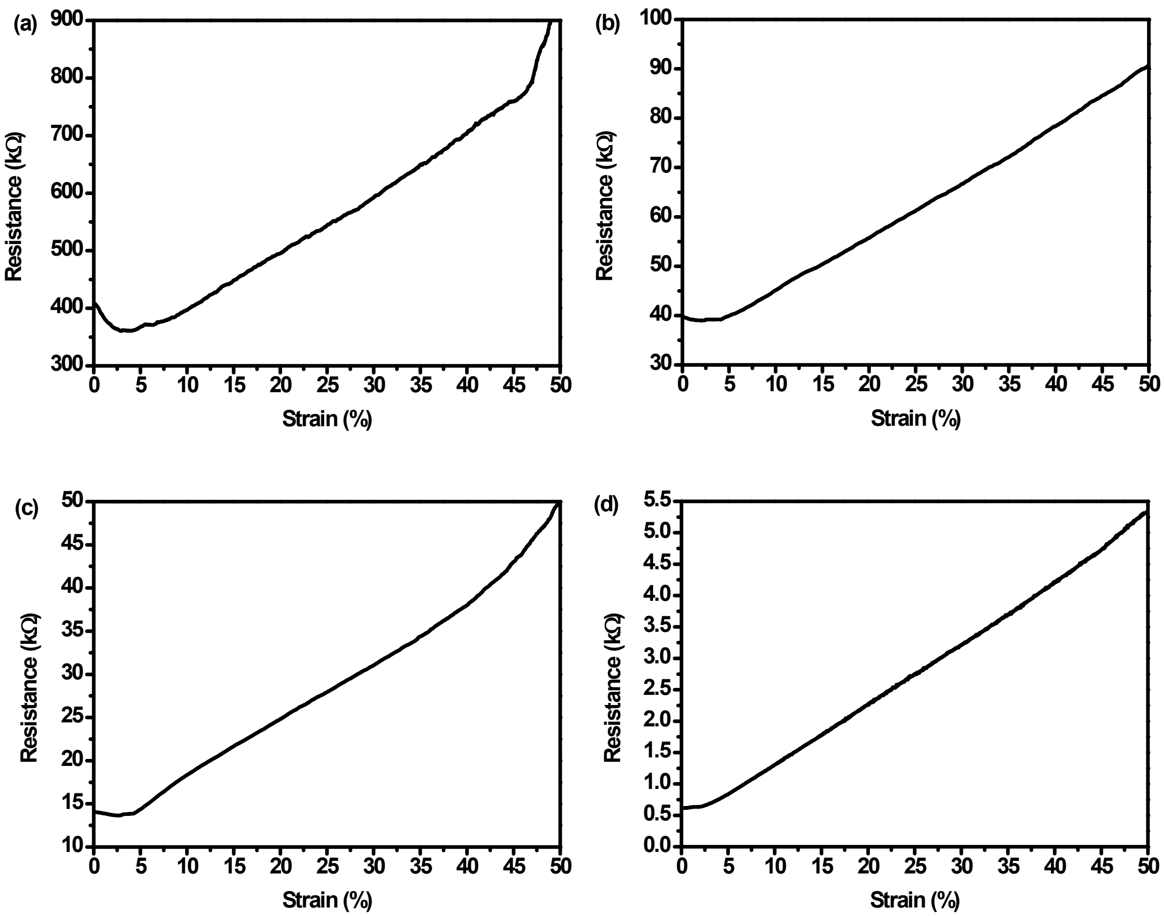


Figure S5. Resistance change of (a) GNWF1, (b) GNWF2, (c) GNWF3 and (d) GNWF4 with applied tensile strain.

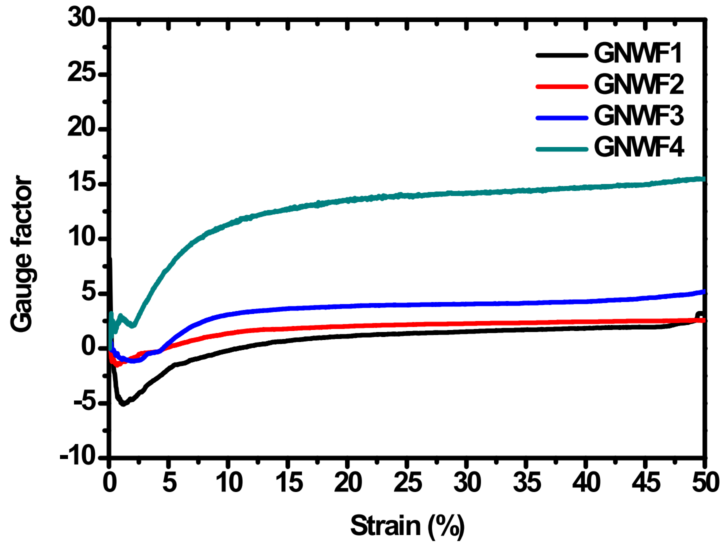
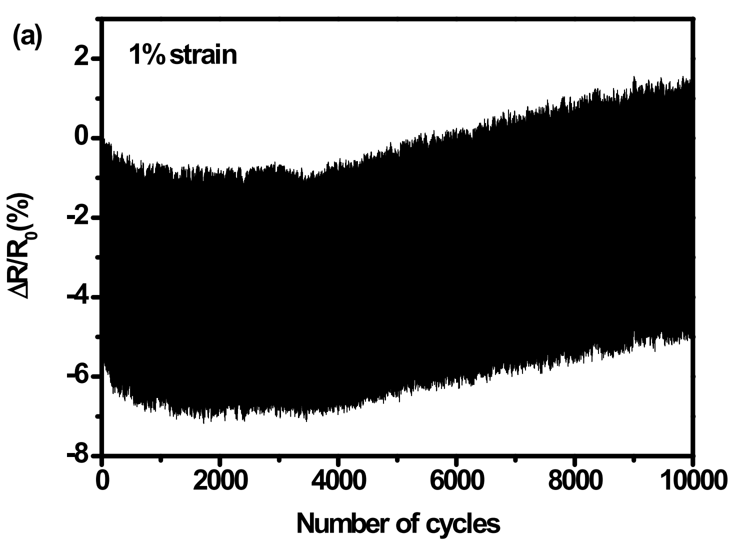


Figure S6. Calculated gauge factor of GNWFs change with strain.



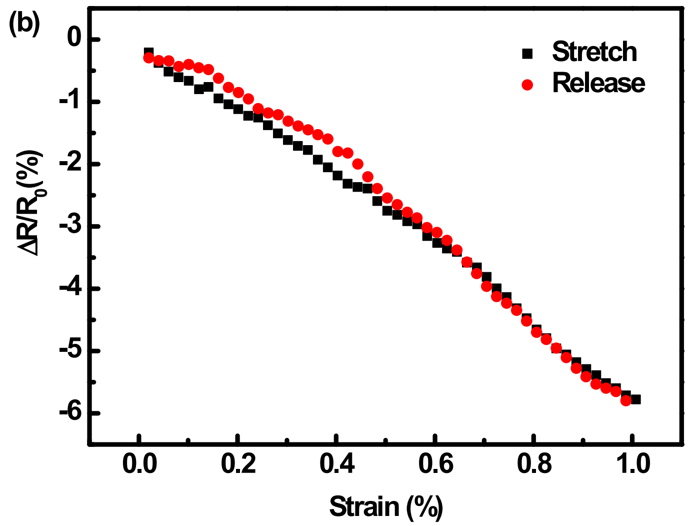
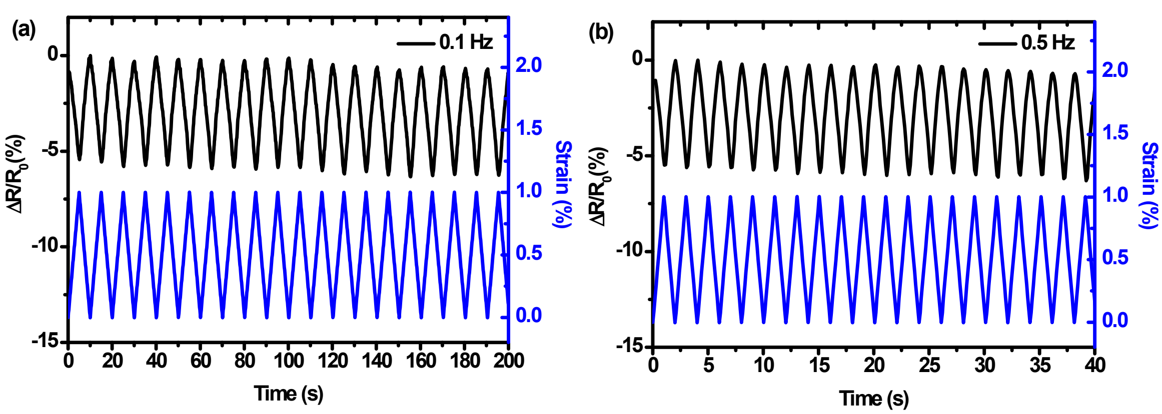


Figure S7. (a) The relative resistance change of GNWF sensor with 1 % strain over 10000 cycles. (b) The relative resistance change of GNWF sensor during stretching and relaxation.

The durability of GNWF sensor was tested in small strain region (1% strain) up to 10,000 cycles. The relative change in resistance of GNWF shows insignificant change which indicates the sensitivity of GNWF can be maintained even after long term usage. However, the overall resistance increases slowly with number of cycles. This can be explained that after large number of stretch and release cycles, the repetitive stress exerted on rGO sheets may induce small cracks and result in higher resistance of GNWF.



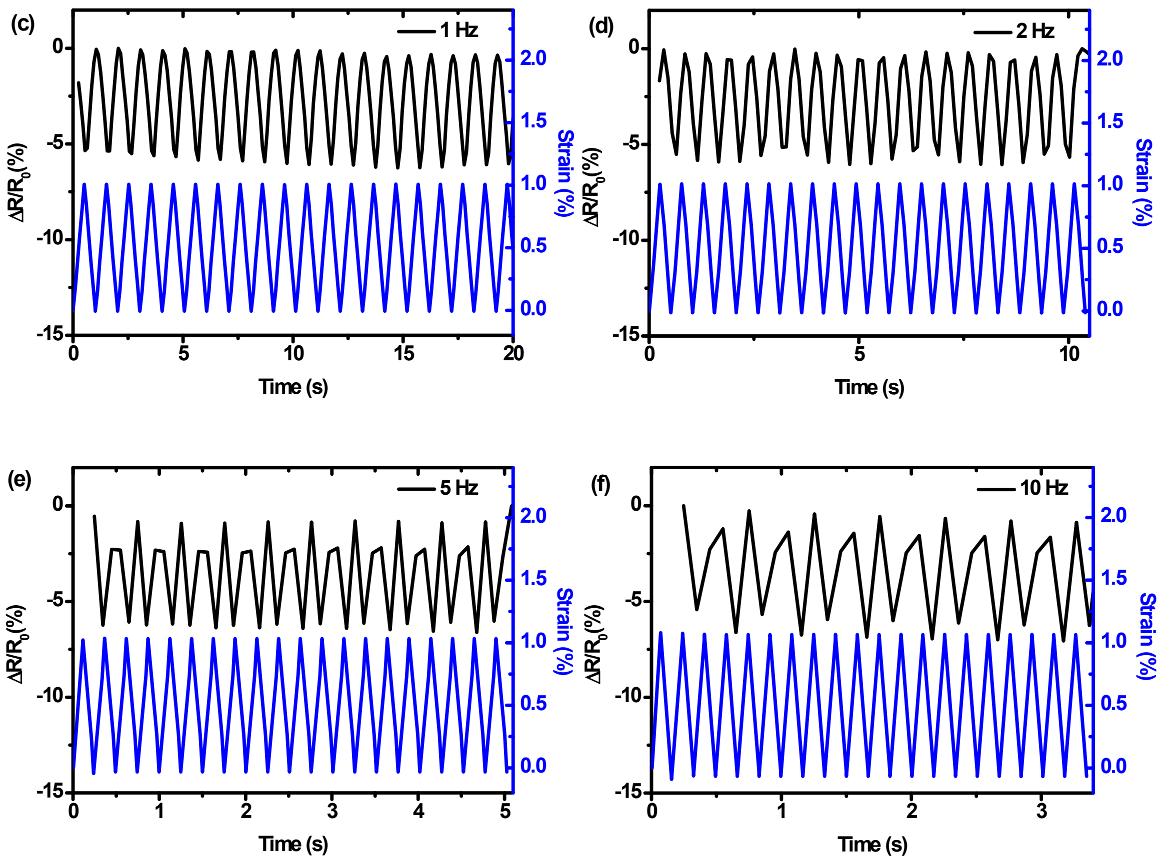


Figure S8. The relative resistance change of GNWF sensor with 1 % strain under various frequencies (a) 0.1 Hz, (b) 0.5 Hz, (c) 1 Hz, (d) 2 Hz, (e) 5 Hz and (f) 10 Hz.

The dynamic responses under various frequencies, 0.1 Hz, 0.5 Hz, 1 Hz, 2 Hz, 5 Hz and 10 Hz, have been tested. As shown in Figure X, the GNWF sensor is able to produce accurate response to the change of strain up to 1 Hz. Starting from 2 Hz, the relative resistance change became slightly unstable. The GNWF sensor would lose some information of the applied pressure at frequency of 5 Hz, yet the number of press-and-release cycle still can be accurately reflected. When frequency increases to 10 Hz, GNWF sensor fails to response to fast strain change.