

Supporting Information for

Direct Patterning of Carbon Nanotube *via* Stamp Contact Printing

Process for Stretchable and Sensitive Sensing devices

Binghao Liang¹, Zian Zhang¹, Wenjun Chen¹, Dongwei Lu¹, Leilei Yang¹, Rongliang Yang¹, Hai Zhu², Zikang Tang³, Xuchun Gui¹, *

¹State Key Laboratory of Optoelectronic Materials and Technologies, School of Electronics and Information Technology, Sun Yat-sen University, Guangzhou 510275, People's Republic of China

²State Key Laboratory of Optoelectronic Materials and Technologies, School of Physics, Sun Yat-Sen University, Guangzhou 510275, People's Republic of China

²Institute of Applied Physics and Materials Engineering, University of Macau, Avenida da Universidade, Taipa, Macau, People's Republic of China

*Corresponding author. E-mail: guixch@mail.sysu.edu.cn (Xuchun Gui)

Supplementary Figures

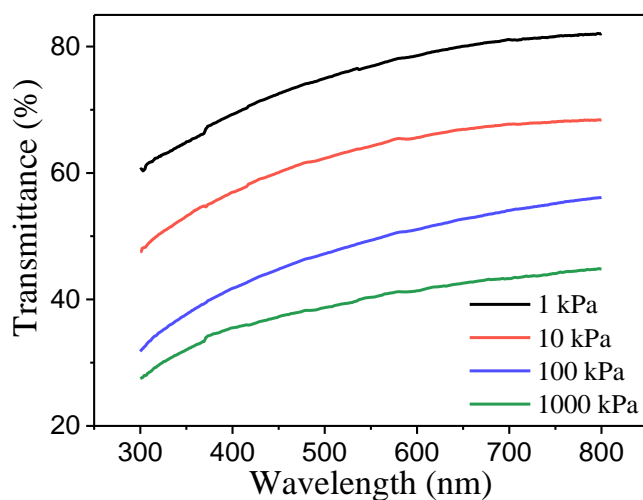


Fig. S1 Transmittance of the CNT films under different stamp pressure

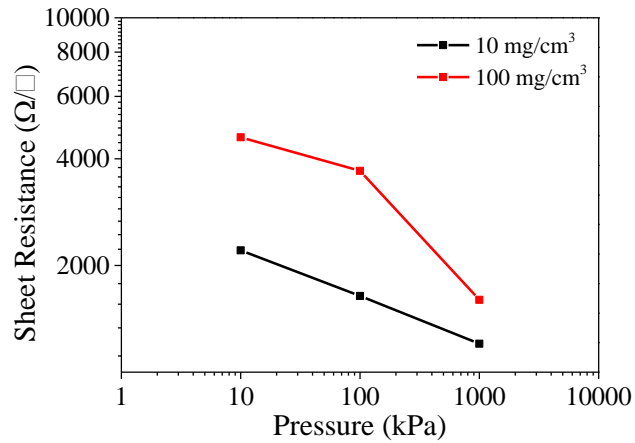


Fig. S2 Sheet resistance of CNT films fabricated using CNT seal with different density

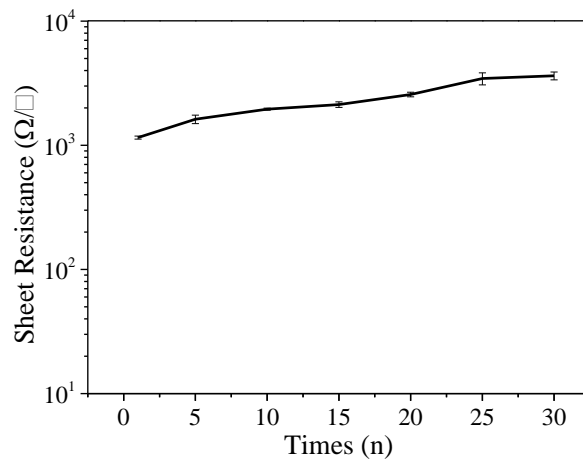


Fig. S3 Sheet resistance of different CNT films fabricated using the same CNT seal

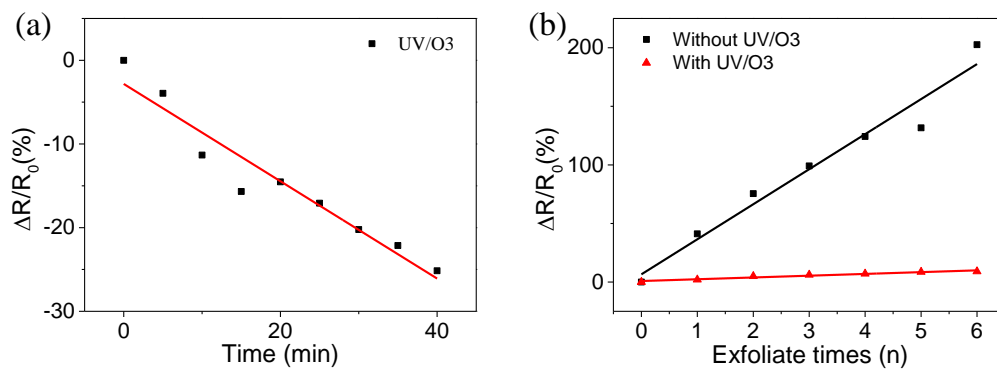


Fig. S4 Influence of UV/O₃ treatment on conductivity of CNT film. (a) Relative resistance changes of the same sample after different times of UV/O₃ treatment. (b) Relative resistance changes of the original CNT film after multiple transfers, in which a fresh Ecoflex covered on the original as-prepared CNT/Ecoflex thin film and peeled off to transfer CNT

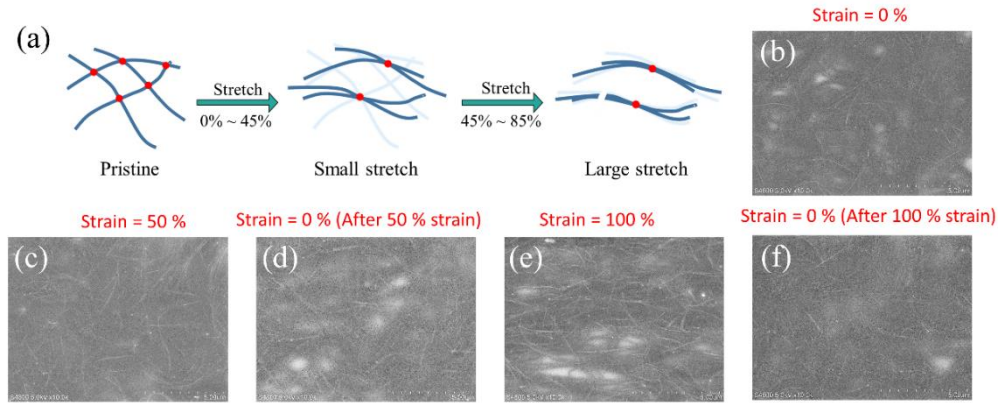


Fig. S5 Schematic and SEM images illustrated the sensing mechanism of the strain sensors. **(a)** Schematic illustration of the sensing mechanism of CNT-based strain sensor. **(b)** SEM image of CNT-based strain sensor before stretch. **(c)** SEM image of CNT-based sensor under stretching strain of 50%. **(d)** SEM image of CNT-based strain sensor released from 50% stretching strain. **(e)** SEM image of CNT-based strain sensor under stretching strain of 50%. **(f)** SEM image of CNT-based strain sensor released from 100% stretching strain

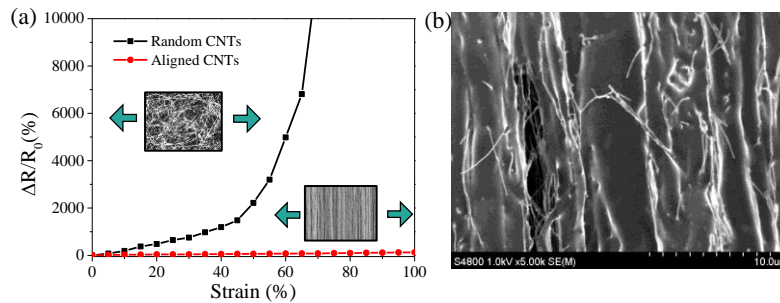


Fig. S6 (a) Comparison of CNT-based strain sensors fabricated by using random CNT seal and aligned CNT seal. **(b)** SEM image of the CNT array on Ecoflex substrate

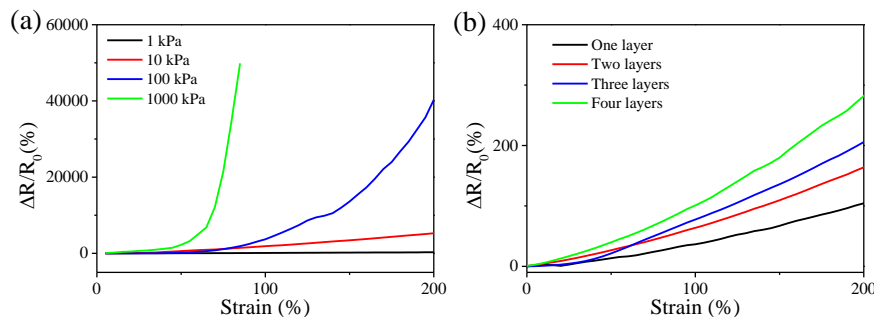


Fig. S7 Electromechanical properties of CNT-based strain sensors. **(a)** Comparison of CNT strain sensor fabricated by different stamp pressure. **(b)** Comparison of CNT strain sensor fabricated by different transfer times

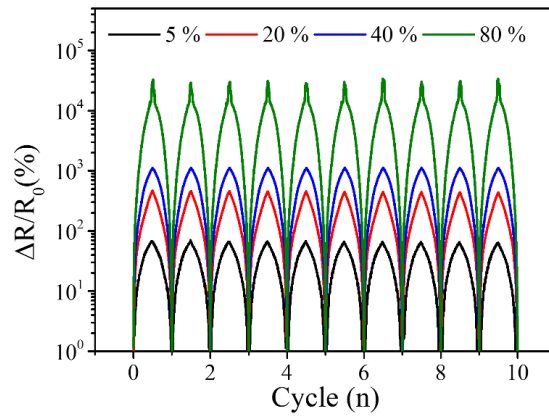


Fig. S8 The difference of relative resistance under different maximum applied strain

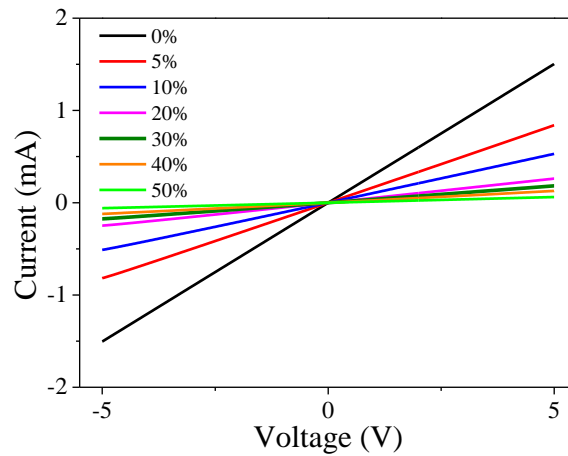


Fig. S9 I/V curves of CNT-based strain sensor under different stretching strain

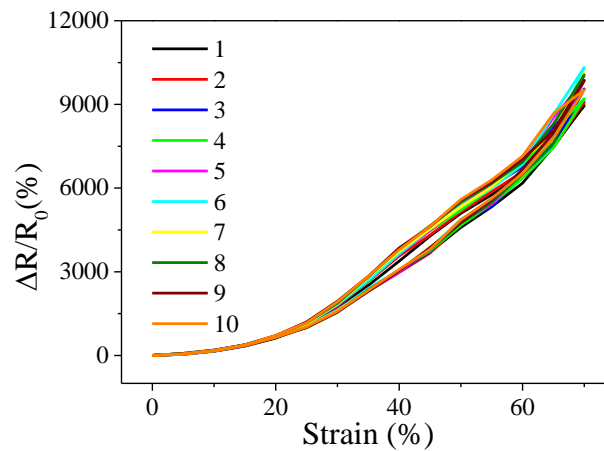


Fig. S10 Repeatability of CNT-based strain sensor for 10 stretching/releasing cycles under 70% applied strain

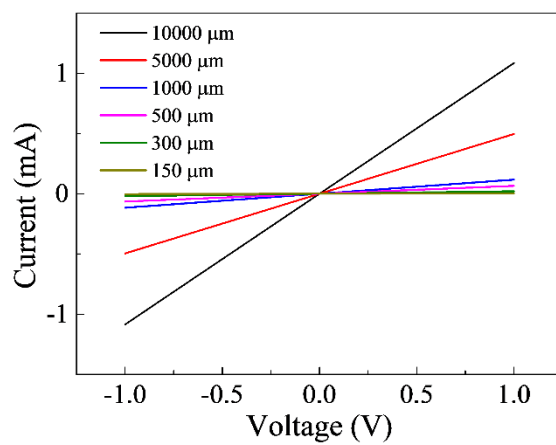


Fig. S11 I/V curves of CNT-based strain sensors with different CNT strips width