Electronic Supplementary Information to

Noncovalent functionalized highly conducting carbon nanotube films with enhanced doping stability via an amide linkage

I-Wen Peter Chen*

Department of Applied Science, National Taitung University, Taitung City 95002, Taiwan

Fig. S1 shows the IR spectra of the pristine SWCNT and cross-linked SWCNT films. The peak at 1670 cm^{-1} can be attributed to the carbonyl stretching mode of the amide group, while the peaks at 1540 cm^{-1} and 3645 cm^{-1} correspond to the bending and stretching of the amide N–H group, respectively.[33] These characteristic peaks demonstrate that the amide groups were formed in the SWCNT films. According to the IR spectra analysis, we hypothesize that individual SWCNTs might be linked using amide linkers to form a 3D cross-linked structure via carbodiimide chemistry. The peaks at 1310 cm^{-1} and 1115 cm^{-1} correlated with the vibration of C–N–C and N–C–O in N-hydroxysuccinimide, respectively.

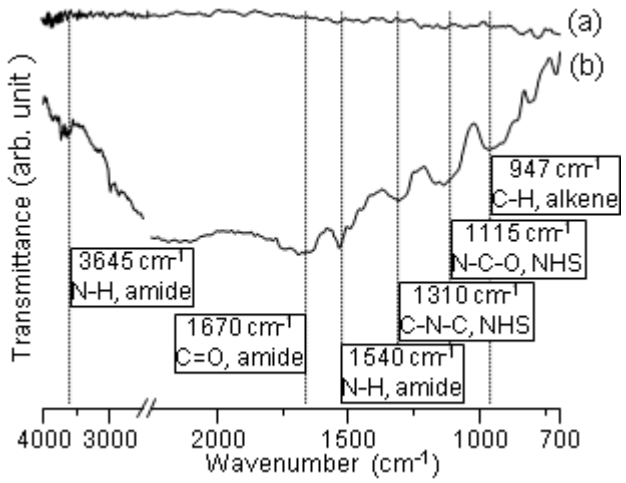

Fig. 1 Transmission FT-IR spectra of (a) pure SWCNT film (b) cross-linked SWCNT films

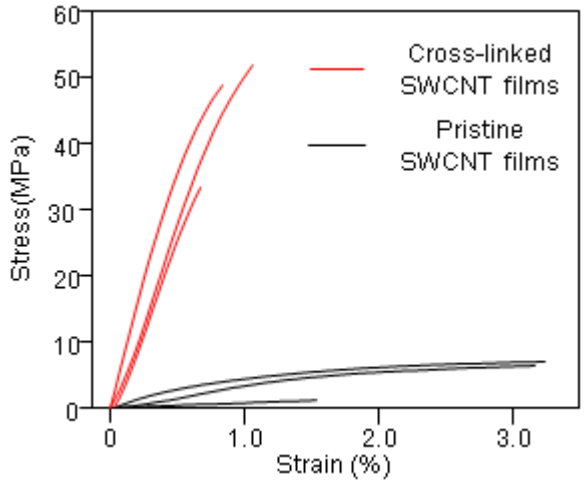

Fig. S2 Tensile stress–strain curves of cross-linked (red line) and pristine (black line) SWCNT film.

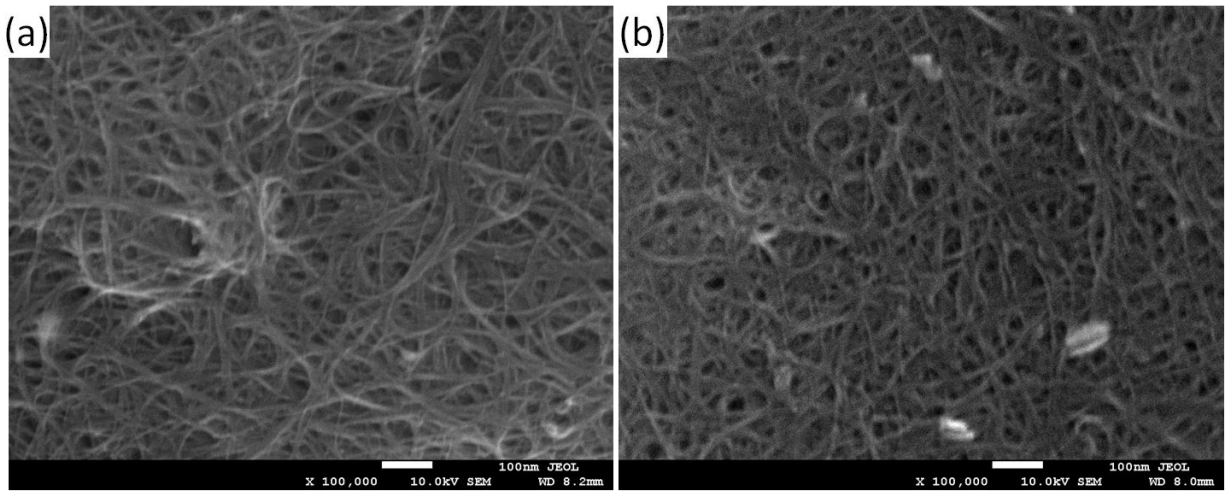

Fig. S3 SEM images of (a) pristine SWCNT film (b) cross-linked SWCNT film.

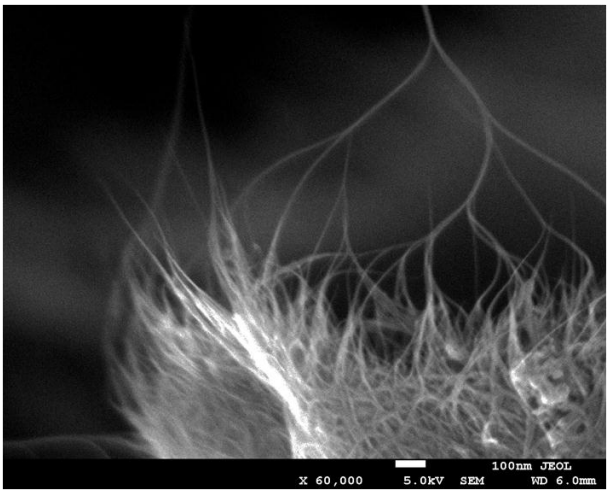

Fig. S4 SEM images of a fracture surface of cross-linked SWCNT film.

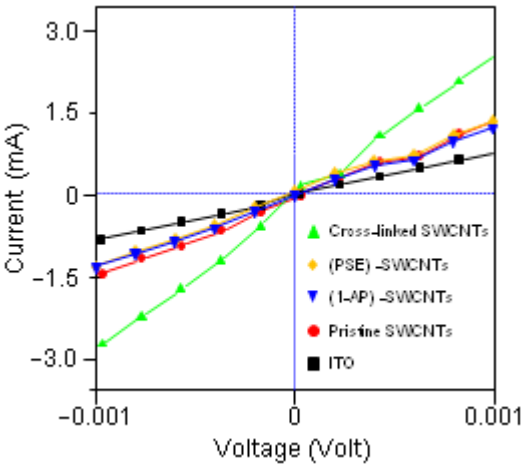

Fig. S5 I–V curves of ITO electrode, pristine SWCNTs film, (1-AP)-SWCNTs film, (PSE)-SWCNTs film and cross-linked SWCNT film.