

Supplementary Materials

Stretchable Transparent Light-Emitting Diodes Based on InGaN/GaN Quantum Well Microwires and Carbon Nanotube Films

Verification of Strain-Insensitive SWCNT Contact Properties

Electrical properties of SWCNT contacts were verified for two types of SWCNT application onto PDMS 2 cm long films. The first type was SWCNT contact stripes applied to pre-stretched by 10% (~2 mm), the second type was applied to relaxed (i.e. not pre-stretched) PDMS films. Schematic image shown in Figure S1. The representative results of conductivity verification are shown in Figure S2.

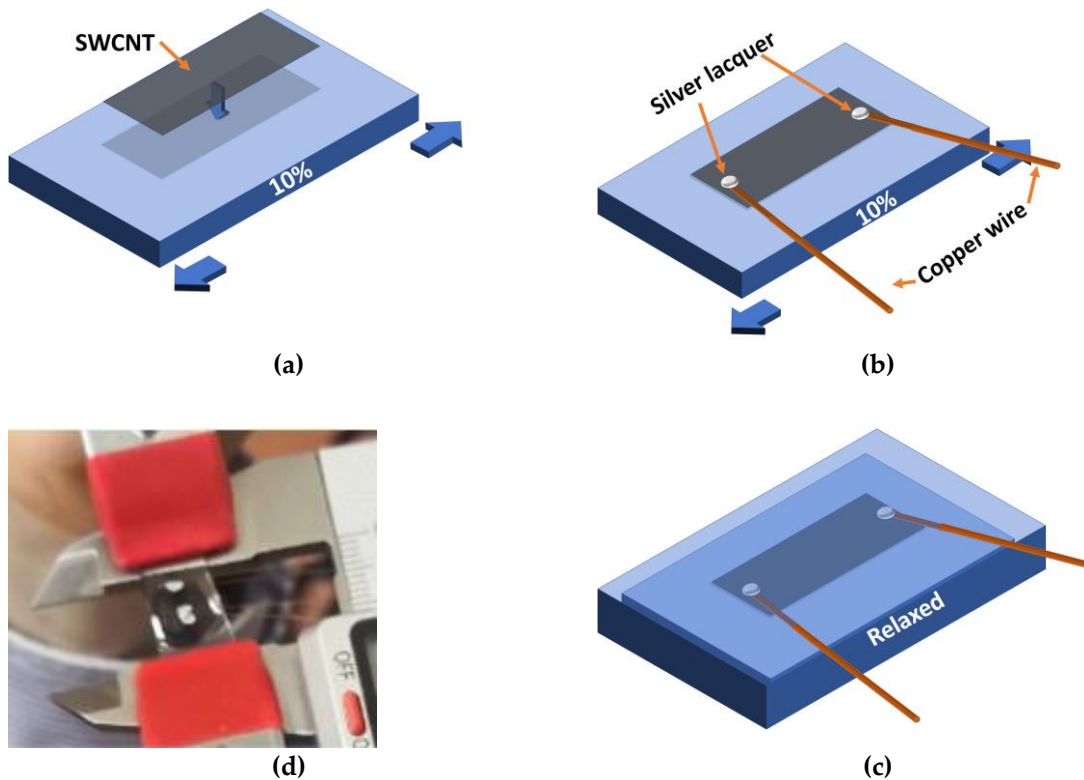


Figure S1. Schematic image of electrical contacting to a PDMS film: (a) application of SWCNT contact pad onto 10% pre-stretched PDMS film, (b) connection to the SWCNT contact pad with copper wires and silver lacquer, (c) relaxed PDMS film with applied contacts buried into PDMS, (d) image of PDMS film with electrical contacts.

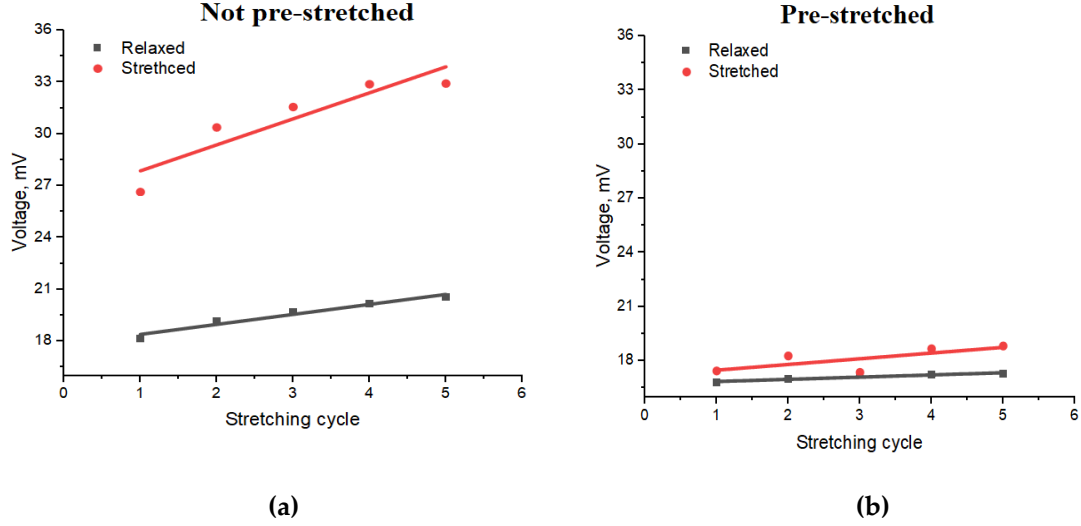


Figure S2. Representative voltage at constant current for (a) a not pre-stretched SWCNT sample and (b) a pre-stretched sample, measured in stretching conditions (red lines) and relaxed state (black lines). Both sample types had similar conductivity in relaxed state, however, in stretching conditions the pre-stretched samples had significantly lower resistivity and degradation due to the stretching.

As it is shown in Figure S1, the voltages of the pre-stretched sample and the not pre-stretched sample are similar in relaxed state, namely it is about 17 and 19 mV, respectively. However, the voltage of the pre-stretched sample changed significantly less than for the not pre-stretched sample, measured in stretching conditions: it is about 18 mV and 30 mV, respectively. Moreover, the pre-stretched sample showed almost no degradation because of stretching (less than 5%), while the not pre-stretched sample had a 20% degradation after 5 stretching cycles.

We conclude that the SWCNT films applied to a pre-stretched PDMS sample retained conductivity in stretching conditions, so the strain-insensitive LED could have increase of the working voltage after stress test mainly due to the SWCNT/MW interface, and not due to the SWCNT film deterioration.