

Supporting Information

Part 1: Raman spectra of EDSA carbon nanotubes

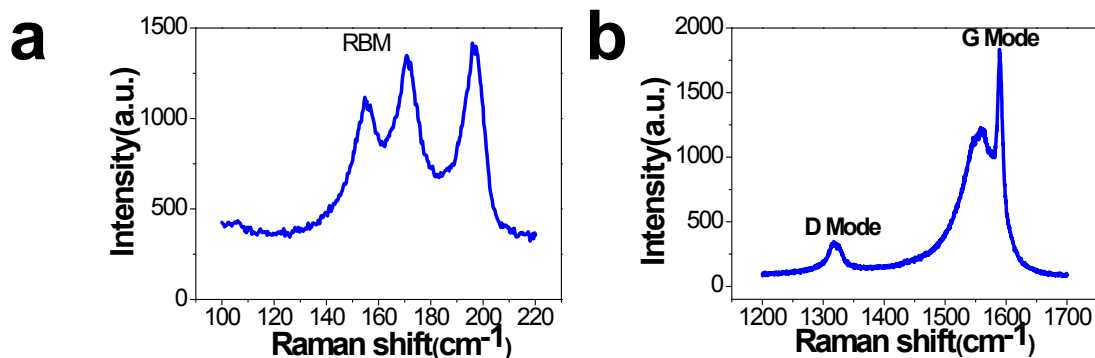


Figure S1. a) RBM peak of the Raman spectrum. b) D peak and G peak of the Raman spectrum.

Part 2: CNT IR imager system

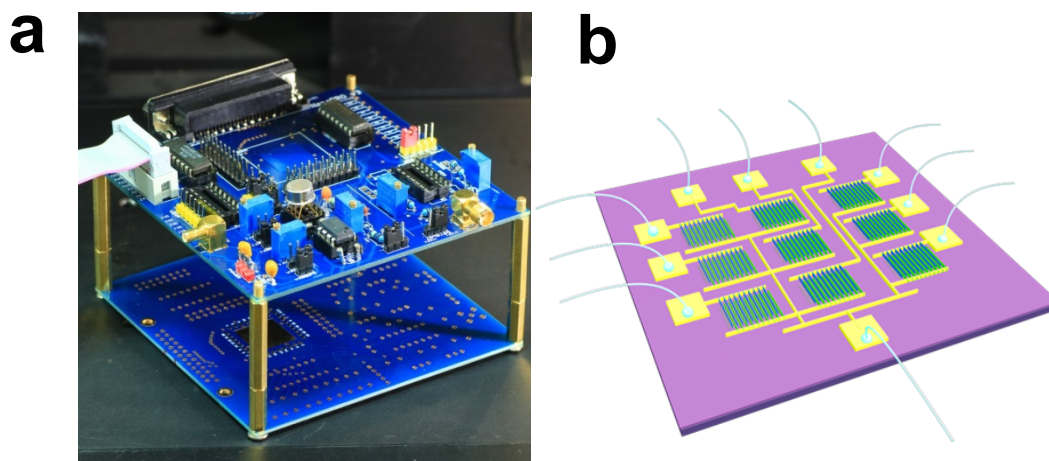


Figure S2. a) Optical image of the back side of the system platform. b) The sketch of an imager consisting of 3×3 arrays of CNT detector.

Part 3: Mobility of Pd- S-CNTs-Pd TFT devices

Channel length(μm)	Calculated as ref 1(cm ² /V·s)	Calculated as ref 2(cm ² /V·s)
0.5	25.2	20.5
1	73.8	60.1
1.5	80.8	65.8
2	60.9	49.7
5	73.3	59.5

Table S1. Table of the mobility of devices calculated through the methods shown in reference 26, 39 respectively. In ref 26, the author calculated the mobility of devices without considering the tube-tube interaction, so the value of the mobility was higher than the actual value. After considering the tube-tube interaction, we calculate the mobility of our devices through the method in ref 36.

Part 4: Stability of our device under intense light

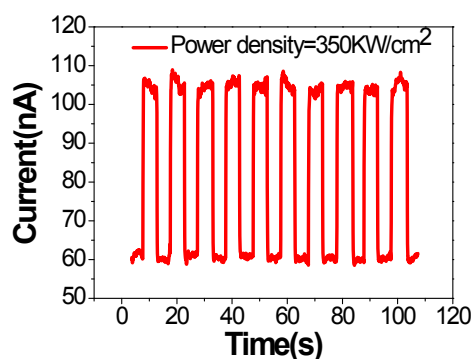


Figure S3. Stability of the asymmetric device under illumination of high intensity light ($\lambda=785$ nm) with the power density up to 350 kW/cm² in ten switching cycles.

Part 5: Absorbance spectroscopy

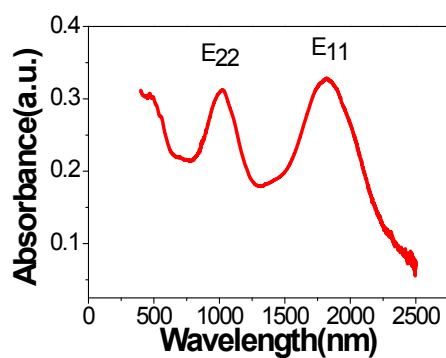


Figure S4. The absorbance spectroscopy of the EDSA carbon nanotubes and two peaks correspond to the E₁₁ and E₂₂ absorption respectively.

Part 6: Photoelectric property statistics of devices with $L_c=1$ μm .

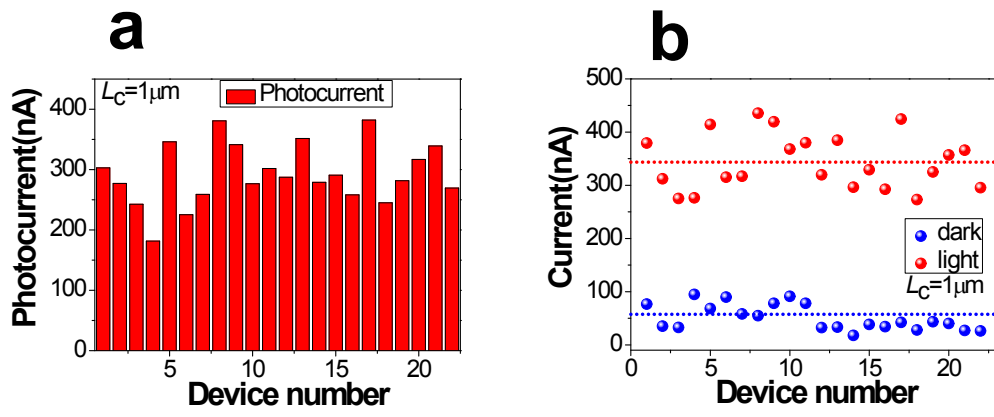


Figure S5. The photocurrent and dark current of 22 devices for $L_c = 1 \mu\text{m}$.