

Supporting Information

A Full Transparent High-Performance Flexible Phototransistor with Ultra-short Channel Length

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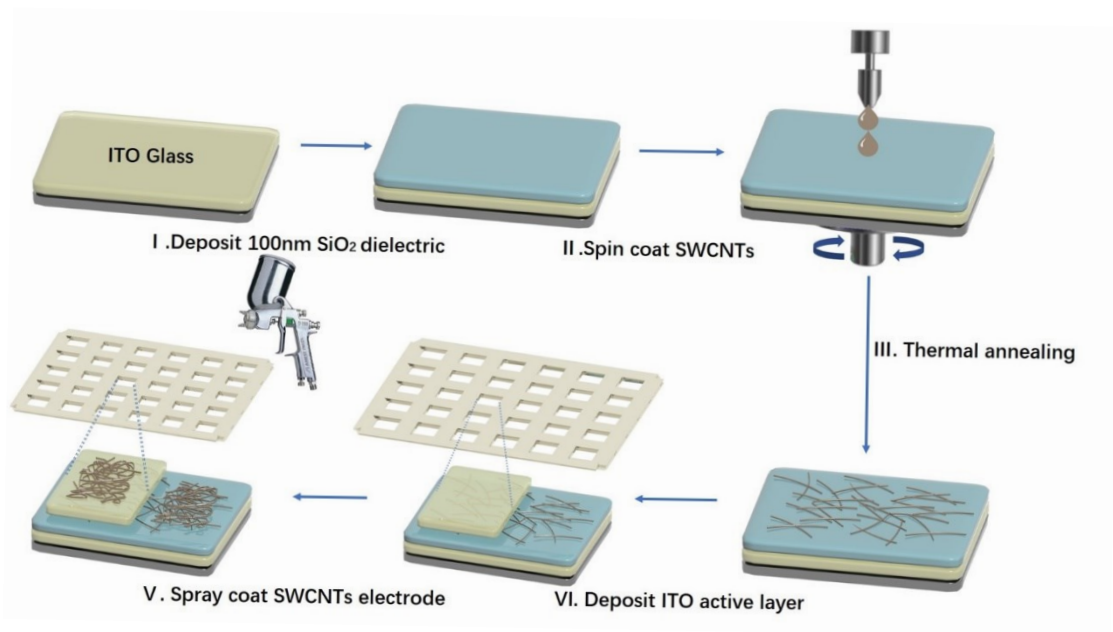


Fig. S1 The fabrication process of a transparent vertical phototransistor on a transparent ITO substrate.

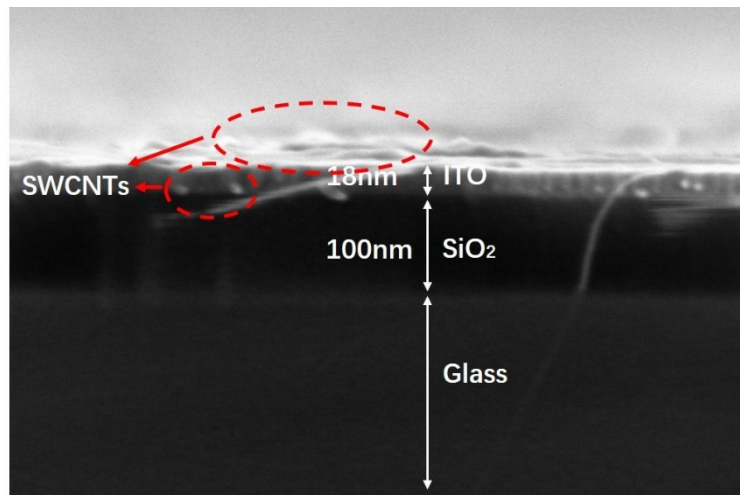


Fig. S2 The cross-sectional scanning electron microscopy (SEM) image of the vertical transparent UV photodetector. Clearly illustrating five layers of the vertical stack. The SWCNTs reticulate source electrode is highlighted by dash line.

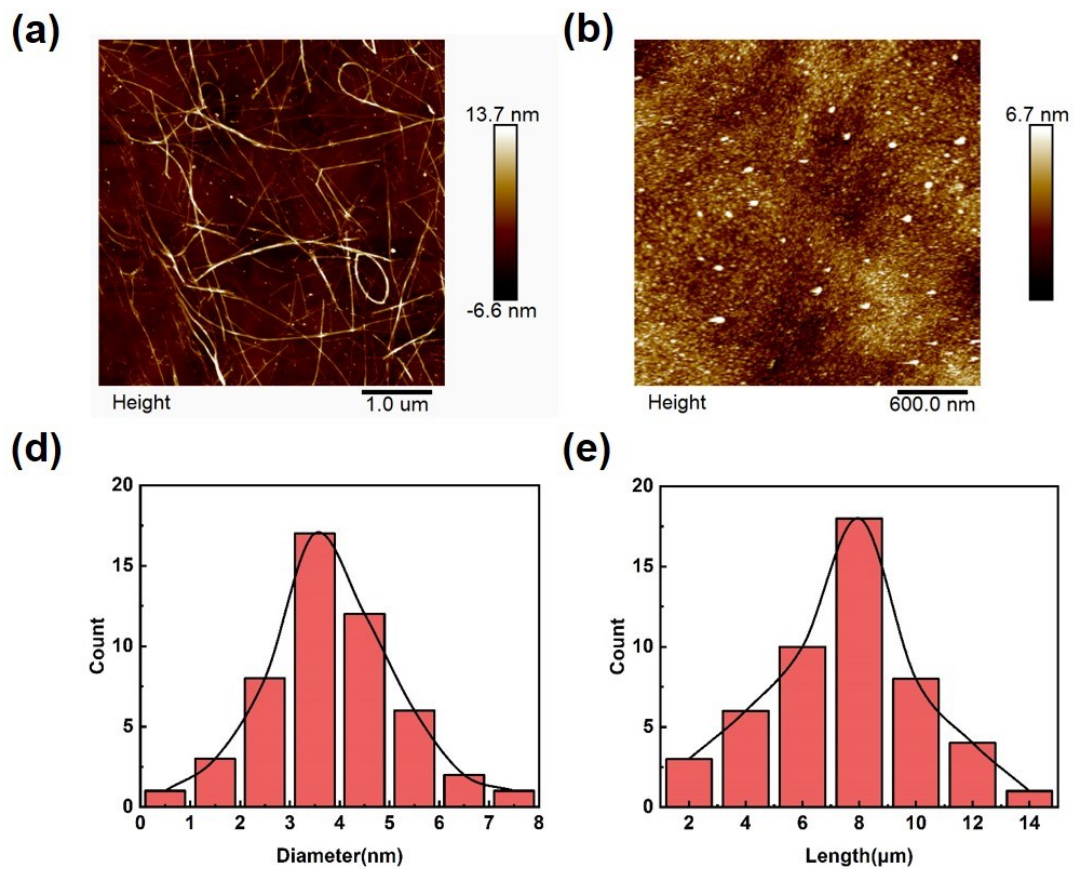


Fig. S3 a) The surface morphologies of spin-coated SWCNTs reticulate source. b) The surface morphologies of the sputtering ITO film. c) The statistical distribution for the diameter dimension of SWCNTs, showing an average diameter of 3.84 nm. d) The statistical distribution for the length dimension of SWCNTs, showing an average length size of 7.52 μm.

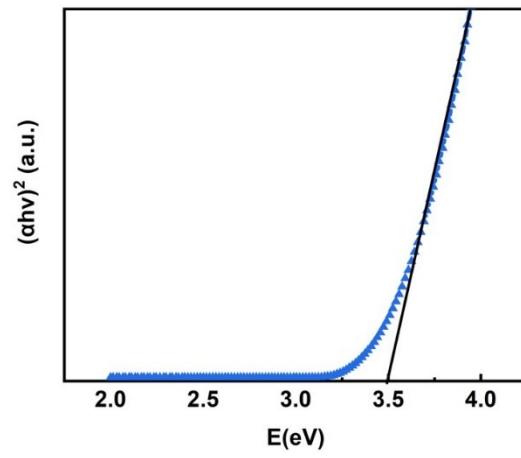


Fig. S4 The optical band gap of ITO was determined to be approximately 3.5 eV.

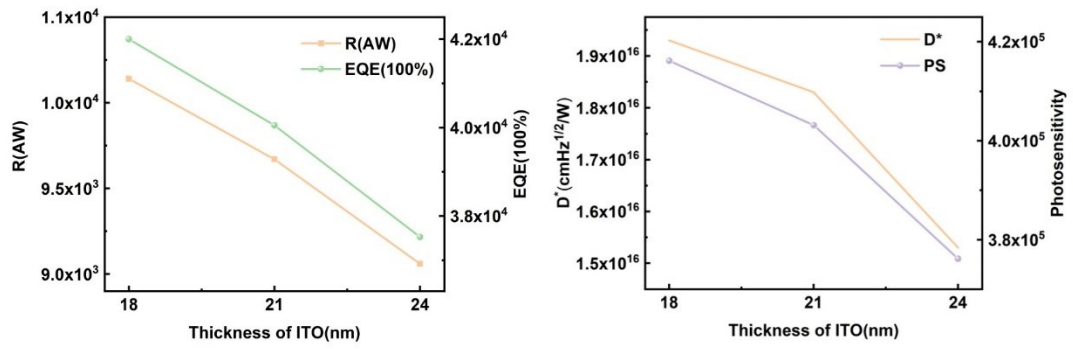


Fig. S5 (a) The photoresponsivity and EQE of the transparent vertical photodetector as a function of different thicknesses of the ITO films under UV illumination. (b) The detectivity and photosensitivity of the transparent vertical photodetector as a function of different thicknesses of the ITO films under UV illumination.

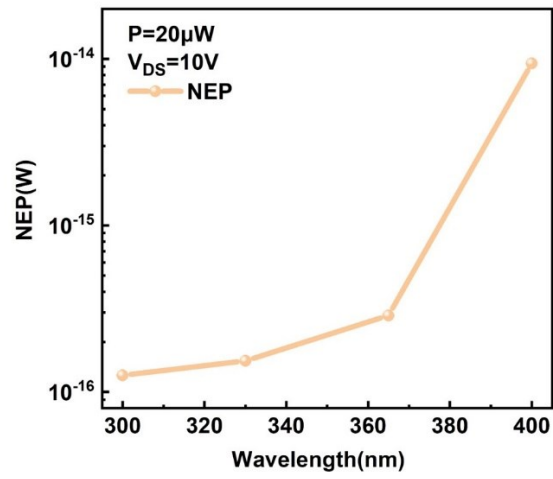


Fig. S6 The NEP of the transparent vertical photodetector as a function of different wavelength of UV illumination.

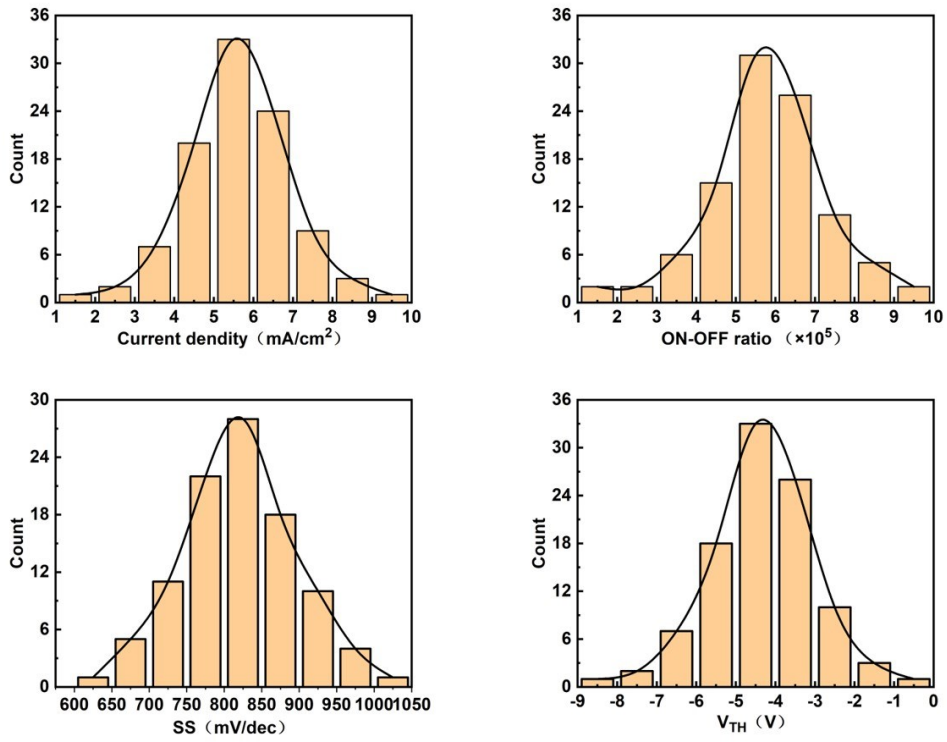


Fig. S7 (a) Histograms of the current density for 100 novel transparent vertical photodetector. (b) Histograms of the ON-OFF ratio for 100 transparent vertical photodetector. (c) Histograms of the SS for 100 transparent vertical photodetector. (d) Histograms of the V_{TH} for 100 transparent vertical photodetector.