Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Information

Intrinsically stretchable photonic synaptic transistors for retina-like visual image systems

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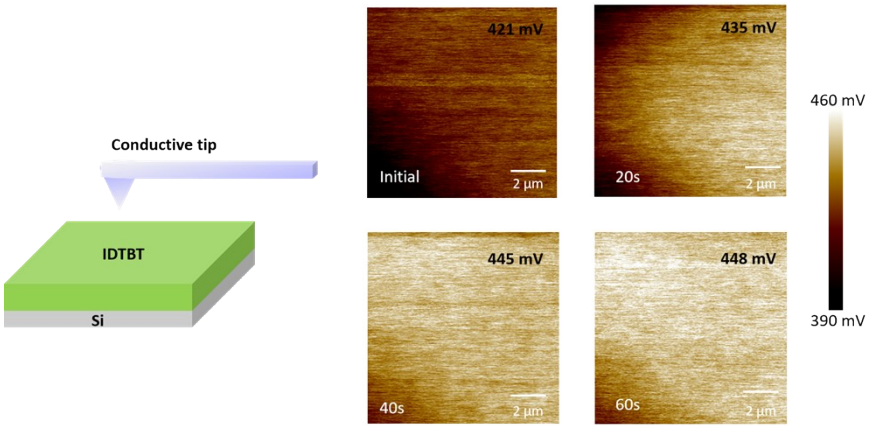

Figure S1. Schematic diagram of IDTBT surface potential measurement process and surface potential of the IDTBT film under 670 nm illumination for different irradiation time by KPFM mode (scale bar, 2 μm).

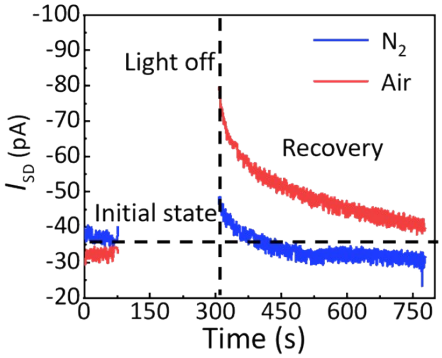

Figure S2. I_{SD} - t curves of IDTBT photonic synaptic transistor measured with V_{SD} = -5 V and V_G = 0 V in nitrogen and in air, respectively.

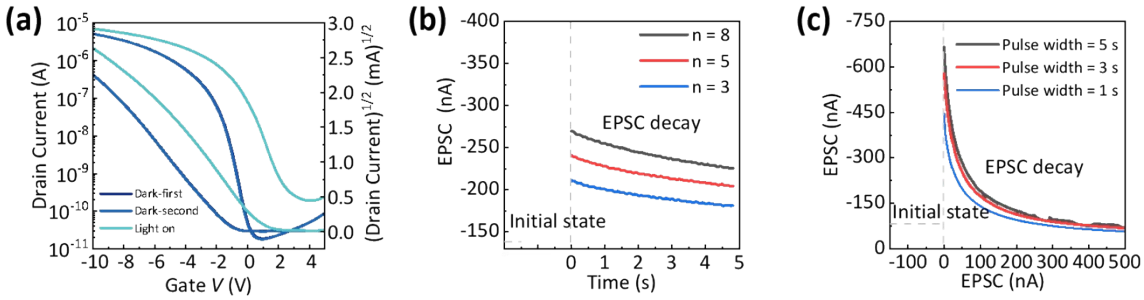

Figure S3. (a)Transfer characteristics curves of the IDTBT OFET. Stability and photo responsivity. (670 nm, 0.53 mW/cm^2, irradiation time: 60 s) (b)The detailed decay time of the excitatory postsynaptic current (EPSC) with the different pulse numbers and (c) widths.

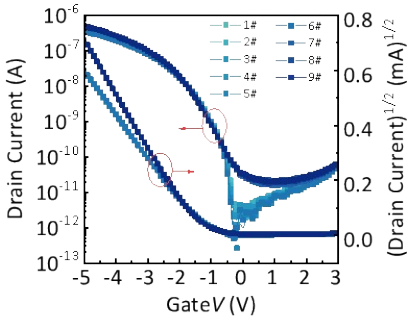

Figure S4. Transfer characteristics curves of every pixel in 3×3 IDTBT transist ors array.

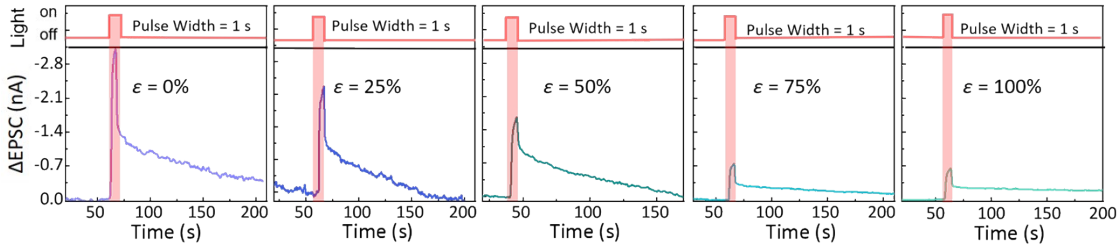

Figure S5. Single light pulse under 670 nm excitation induced EPSC upon IDTBT film under different levels of mechanical strain (pulse width: 1 s, light intensity: 0.53 mW/cm^2)

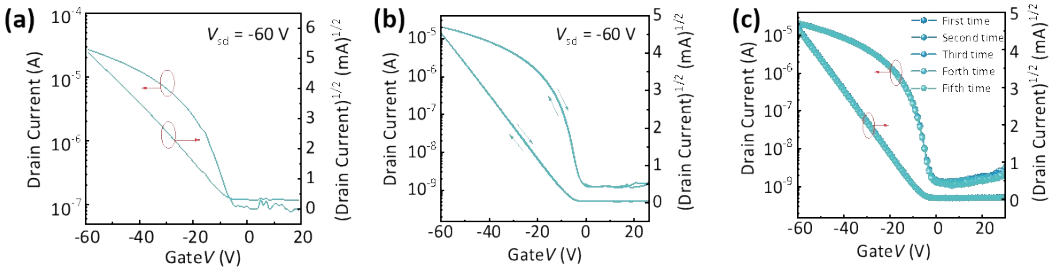

Figure S6. (a)Transfer characteristics curves of stretchable IDTBT transistor. (b)Dual sweep transfer characteristics of stretchable IDTBT transistor with zero hysteresis. (c)Operation stability of the stretchable IDTBT transistor.

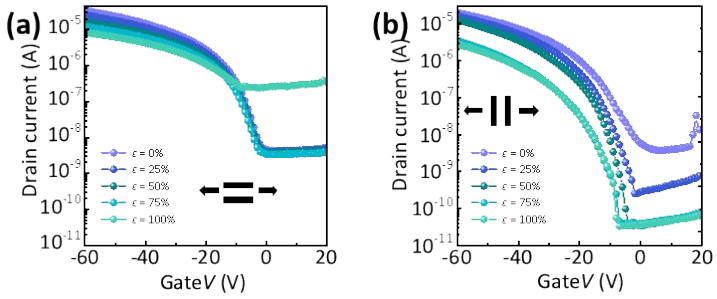

Figure S7. (a,b)Transfer characteristics curves of stretchable IDTBT transistor upon stretched (0%, 25%, 50%, 75%, 100%) perpendicular and along to the channel length direction, respectively.

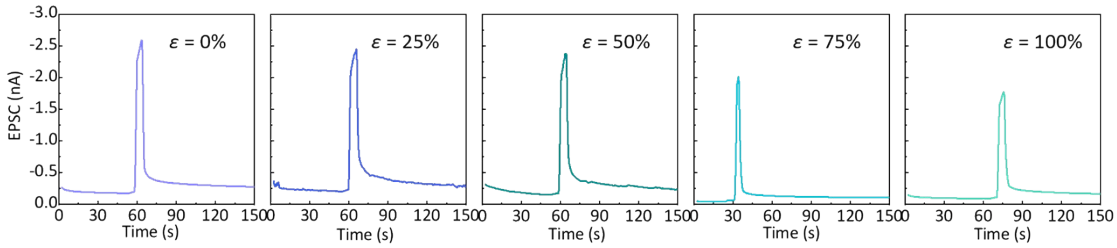

Figure S8. Single light pulse (pulse width: 3 s) induced EPSC of stretchable photonic synaptic transistor upon different strain deformation.

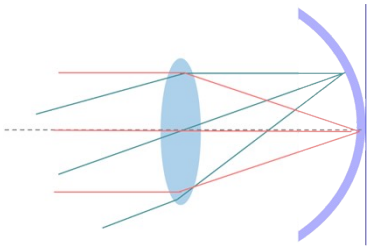

Figure S9. The light focusing effect comparison of the human retina and flat sensors.

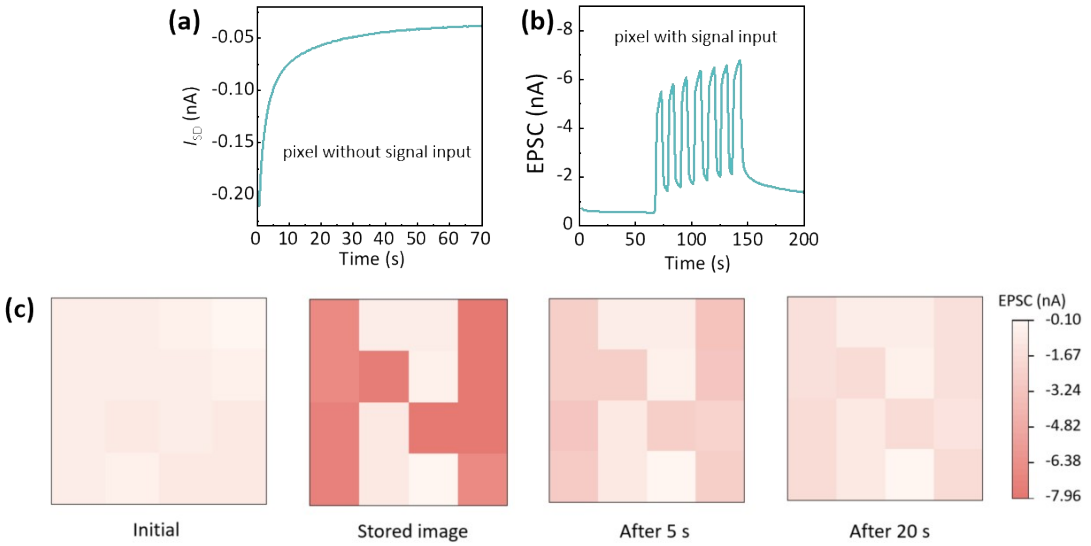

Figure S10. (a,b)Drain current of pixels with and without light signal input in our 4×4 stretchable photonic synaptic transistor array, respectively. (c)The final imaging result of the stretchable photonic synaptic transistor array and memorizing effect.