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Supporting Information

Bio-polysaccharide Electrolyte Gated Photoelectric Synergic Coupled Oxide Neuromorphic Transistor with Pavlovian Activities

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S1. Fourier transform infrared (FTIR) characterization and Atomic force microscopy (AFM) characterization

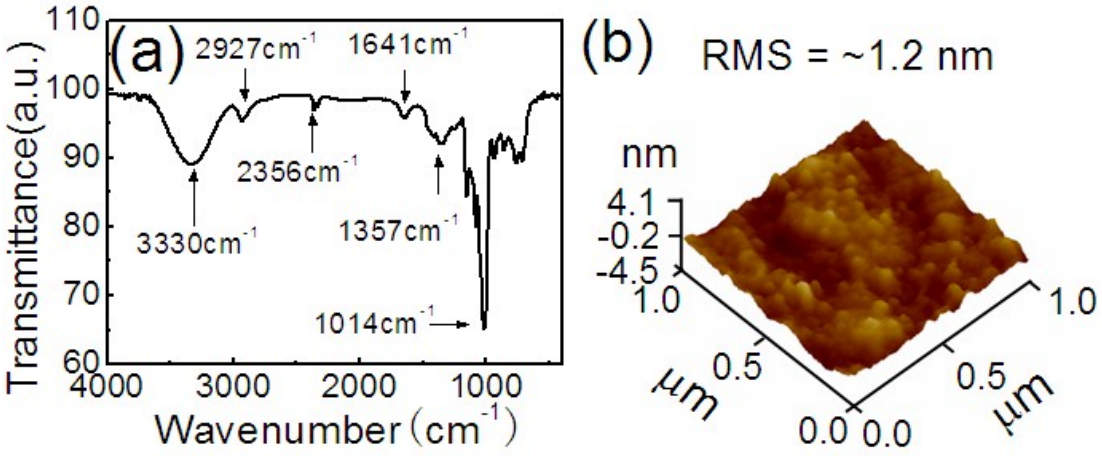

Figure S1 (a)Fourier transform infrared (FTIR) spectrum of the starch based electrolyte on glass substrate. (b) AFM surface morphology of as obtained starch film.

S2. Decomposition of starch gated IGZO neuromorphic transistors in DI water.

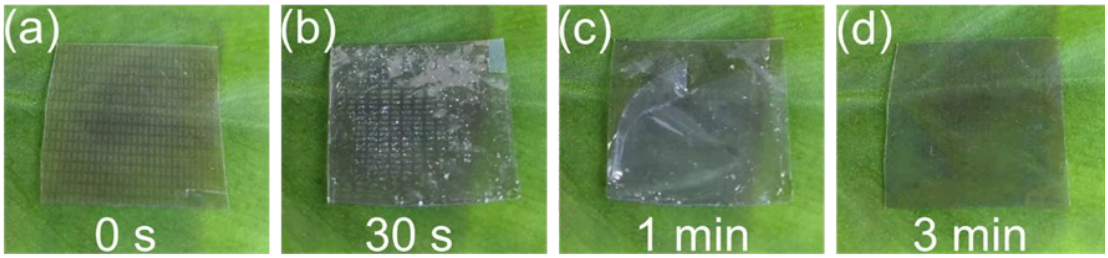

Figure S2 Decomposition of starch gated IGZO neuromorphic transistors after dropping in deionized water for different times of (a) 0 s, (b) 30 s, (c) 1 min and (d) 3 min.

S3. Effects of light illumination on electric-double-layer effect and impedance spectroscopy

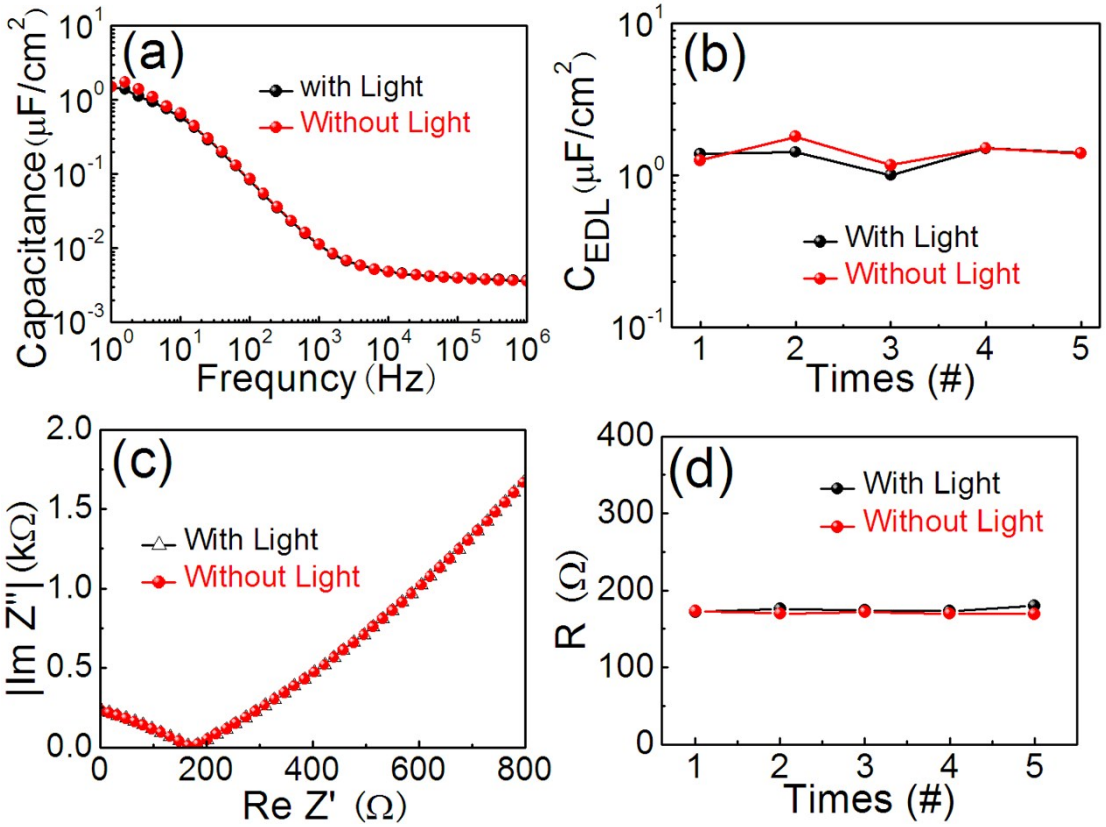

Figure S3. (a) Frequency dependent specific capacitance of the starch-based electrolyte film with and without light illumination. Light wavelength: 400 nm. Light intensity: ~3.5mW/cm^2. (b) EDL capacitance (C_{EDL}) of the starch-based electrolyte film tested for five times with and without light illumination. (c) Impedance spectroscopy data of the starch-based electrolyte film with and without light illumination. (d) R value of the starch-based electrolyte film with and without light illumination.

S4. Fitting of decayed conductance and the obtained fitting parameters.

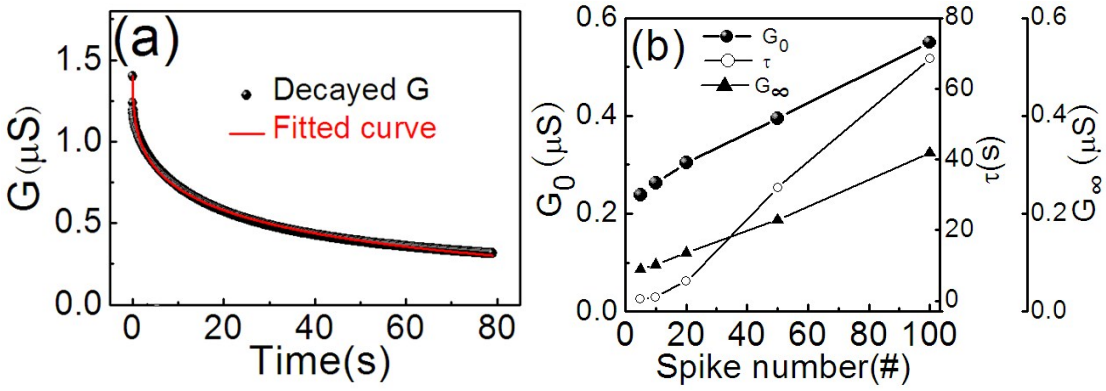

Figure S4 (a) A typical fitted channel conductance decay curve. (b) Spike number

dependent G_0, τ and G_∞ values. Conductance was fitted with a relation: $G=(G_0-G_\infty)\cdot\exp[-(t/\tau)^\beta]+G_\infty$.