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Supporting Information for

All-Natural Hydrogel Electrolytes by A Universal Strategy for Supercapacitors

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| | Film | Bulk | Ionic |
|------------|-----------|---------------|-----------------------|
| ССТ | thickness | resistance | conductivity |
| | (mm) | $R_b(\Omega)$ | (S cm ⁻¹) |
| TA-0 % | 0.680 | 3.798 | 1.05×10 ⁻² |
| TA-2.0 % | 0.630 | 1.614 | 2.30×10 ⁻² |
| TA-4.0 % | 0.530 | 1.837 | 1.70×10 ⁻² |
| TA-6.0 % | 0.538 | 1.960 | 1.62×10 ⁻² |
| TA-8.0 % | 0.506 | 2.080 | 1.43×10 ⁻² |
| TA-10.0 % | 0.562 | 2.999 | 1.10×10 ⁻² |
| NaCl-1.0 % | 0.550 | 3.146 | 1.03×10 ⁻² |
| NaCl-2.0 % | 0.541 | 2.780 | 1.15×10-2 |
| NaCl-3.0 % | 0.523 | 2.375 | 1.30×10 ⁻² |
| NaCl-4.0 % | 0.506 | 2.080 | 1.43×10 ⁻² |
| NaCl-5.0 % | 0.563 | 2.624 | 1.26×10 ⁻² |

Table S1 The influences of different variable on membrane properties of hydrogel electrolyte



Figure S1. tensile σ - ε curves of the CCT hydrogel electrolyte membranes.



Figure S2. Electrochemical performances of the CCT hydrogel electrolyte membranes: a) The CV curves of a supercapacitor at different scanning rates; b) The GCD curves of the supercapacitor at the current densities of 0.2-1 A g^{-1} ; c) ragone plots; d) CV curves at 20 mV s^{-1} under different potential windows; e) GCD curves at 0.5 A g^{-1} under different potential windows; f) Capacitance retention of a supercapacitor after 200 charging and discharging cycles.



Figure S3. Electrochemical performances of the CCT hydrogel electrolyte membrane at the potential window of 0-2 V: a) CV curves at different scan rates, and b) GCD curves at different current densities



Figure S4. Electrochemical performances and Physical picture of the CCT hydrogel electrolyte membranes: a) The CV curves of CCT gel-based supercapacitors at different scanning rates; b) The GCD curves of the supercapacitor at the current densities of 0.3-1.2 A g^{-1} ; c) Capacitance retention at different potential windows; d) Physical picture of CCT gel electrolyte membrane before and after being tested under potential window of 0-1.2 V, and e) under potential window of 0-1.8 V



Figure S5. *a-c)* Physical photos of CCT gel-based supercapacitors at different bending angles. d) CV curves of supercapacitor at 20 mV s⁻¹, and e) GCD curves at 0.5 A g⁻¹ bending at different angles