Supporting Information

Novel Wood-based All-Solid-State Flexible Supercapacitors Fabricated with Natural Porous Wood Slice and Polypyrrole

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Electrochemical characterization in details

Cyclic voltammograms (CV) measurements were conducted in a voltage range of 0–0.8 V at incremental sweep rates. The galvanostatic charge–discharge (GCD) property was measured at different current densities with cutoff voltage of 0–0.8 V. The electrochemical impedance spectroscopy (EIS) was performed from 0.001 Hz to 10^5 Hz with an amplitude of 0.005V referring to the open circuit potential. The area capacitance of WTSS/PPy electrode was calculated according to $C_S=4(\int IdV)/(vSV)$, and the gravimetric capacitance of WTSS/PPy electrode was calculated according to $C_g=4(\int IdV)/(vmV)$ or $C_g=4I\Delta t/(\Delta Vm)$, where I(A) was the current, v(V s^{-1}) was the voltage sweep rate, V(V) was the cell voltage, m(g) was the total mass of two symmetrical electrodes and S(cm^2) was the geometric area of the supercapacitor. The areal energy E (mWh cm^{-2}) and areal power P (mW cm^{-2}) of the WTSS/PPy fabricated supercapacitor were obtained according to $E=1/4(C_SV^2/2)$ and $P=E/(V/v)$, where C_S, v, and V had been described above.

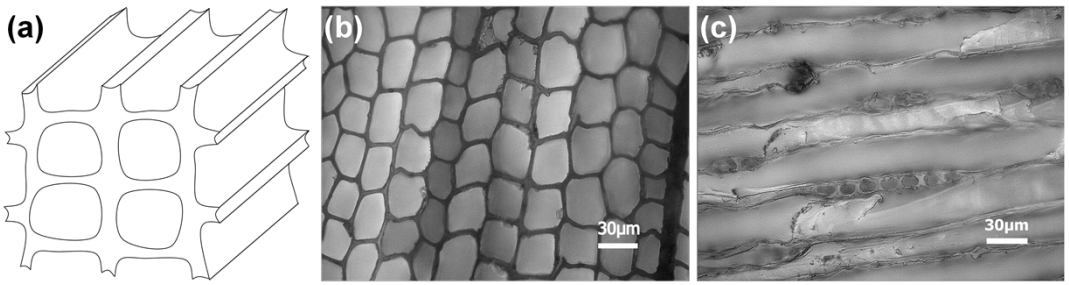

Fig. S1 (a) Schematic diagram of 3D honeycomb porous structure of WTSS. (b) Optical micrographs of wood transverse section. (c) Optical micrographs of wood radial section.

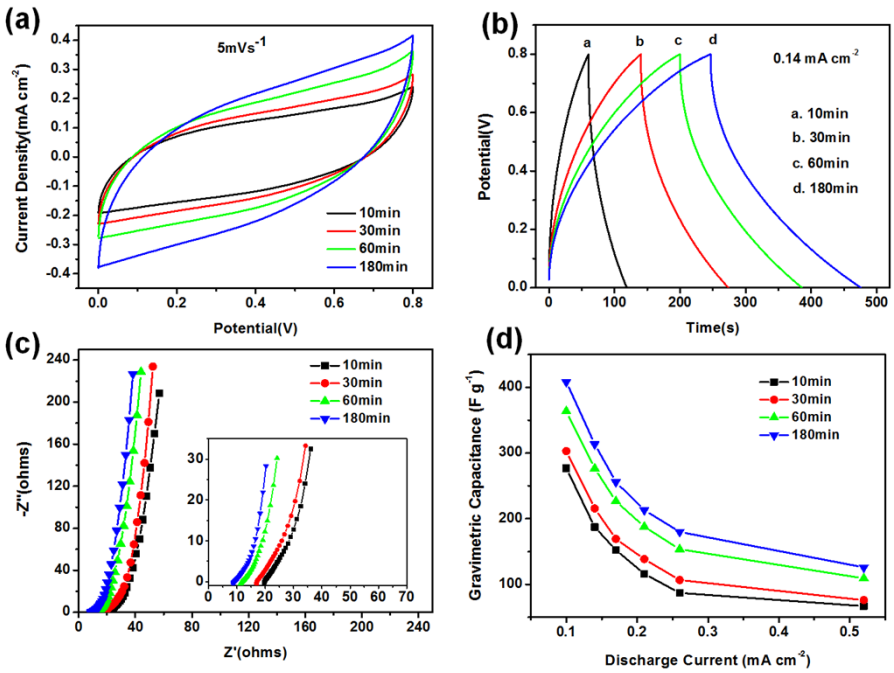

Fig. S2. (a) CV curves of WTSS/PPy electrode with the polymerization times 10, 30, 60 and 180 minutes fabricated supercapacitor at sweep rates of 5 mV s^{-1}. (b) GCD curves of the WTSS/PPy electrode with the polymerization times 10, 30, 60 and 180 minutes fabricated supercapacitor at current density of 0.050mA cm^{-2}. (c) EIS curves of the WTSS/PPy electrode with the polymerization times 10, 30, 60 and 180 minutes fabricated supercapacitor, respectively. The inset of (c) shows an enlarged scale at high frequency. (d) Gravimetric capacitance of the WTSS/PPy electrode with the polymerization times 10, 30, 60 and 180 minutes at different sweep rates.