Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Lignocellulosic Biomass-Derived, Graphene Sheet-like Porous Activated Carbon for Electrochemical Supercapacitor and Catechin Sensing

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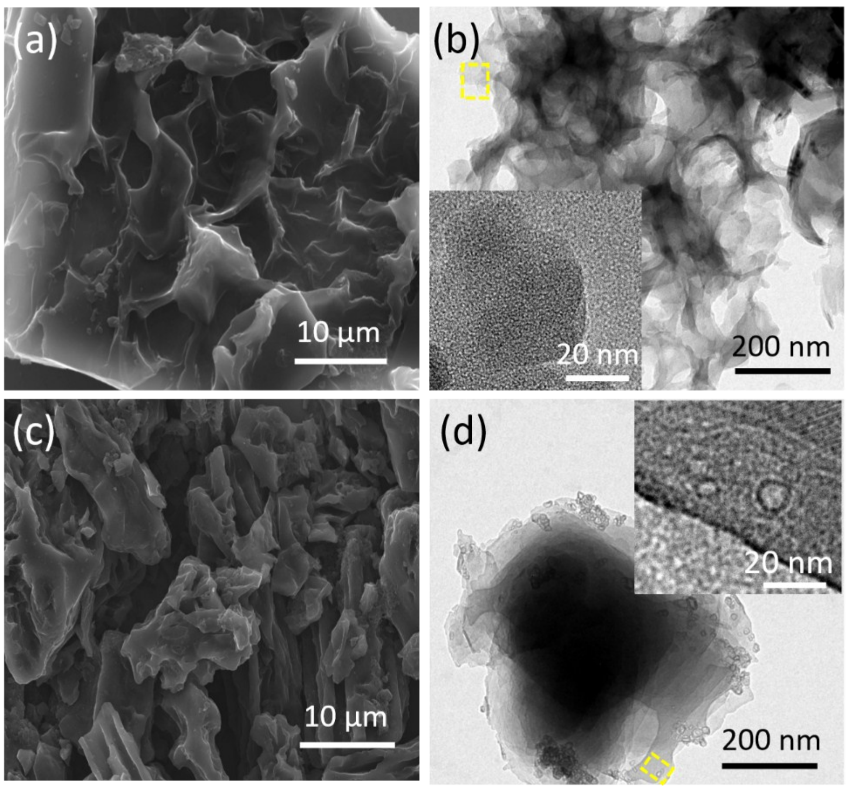

Figure S1. SEM and HR-TEM images of the as-synthesized AC-700 (a and b), and AC-900 (c and d) samples. Inset indicates the corresponding high magnification images.

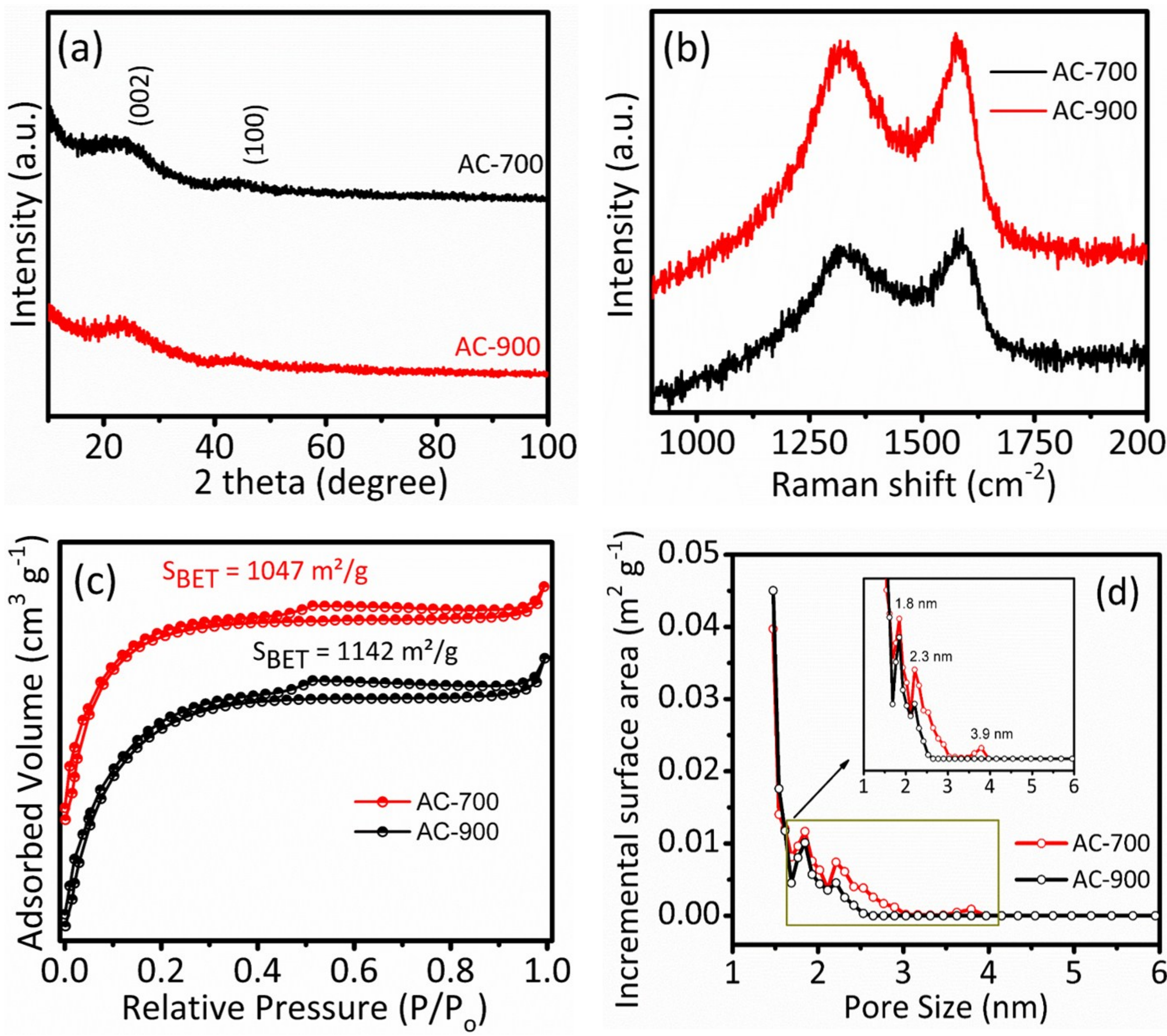

Figure S2. XRD (a), Raman spectroscopy (b), N_2 adsorption/desorption isotherms (c), and Pore size distribution profile studies (d) for as-synthesized AC-700, and AC-900 samples.

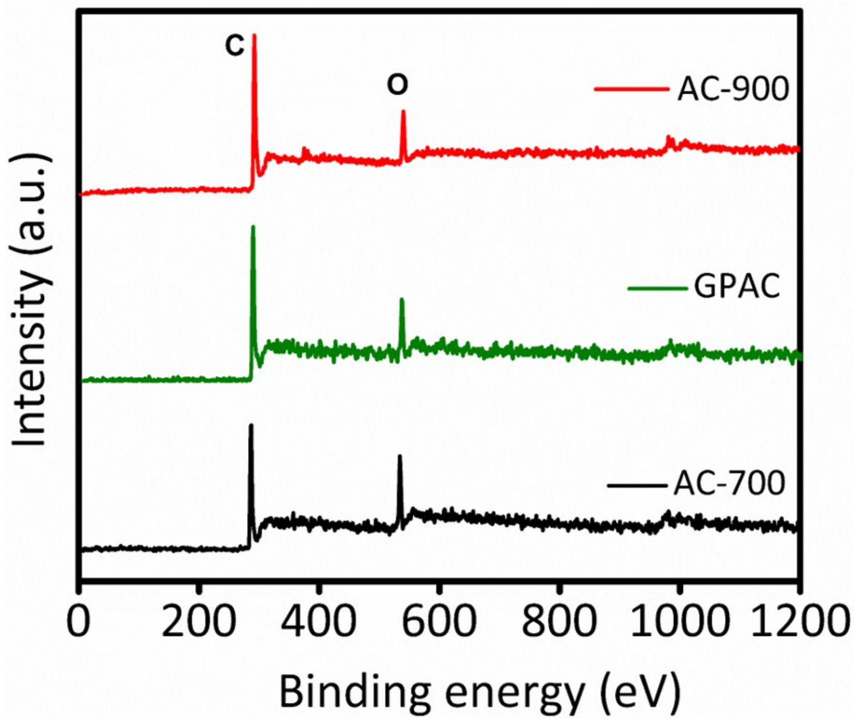

Figure S3. XPS full survey spectra for the as-synthesized AC-700, GPAC, and AC-900 samples.

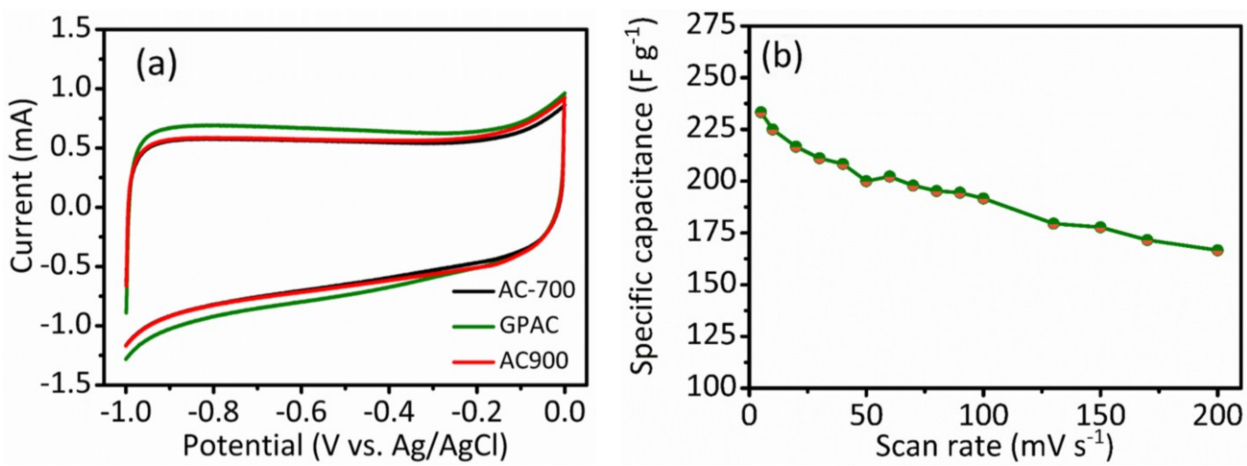

Figure S4. (a) CV curves at fixed scan rate 5 mV s^{-1} for various electrode. (b) GPAC electrode as a function of scan rate *vs* specific capacitance.

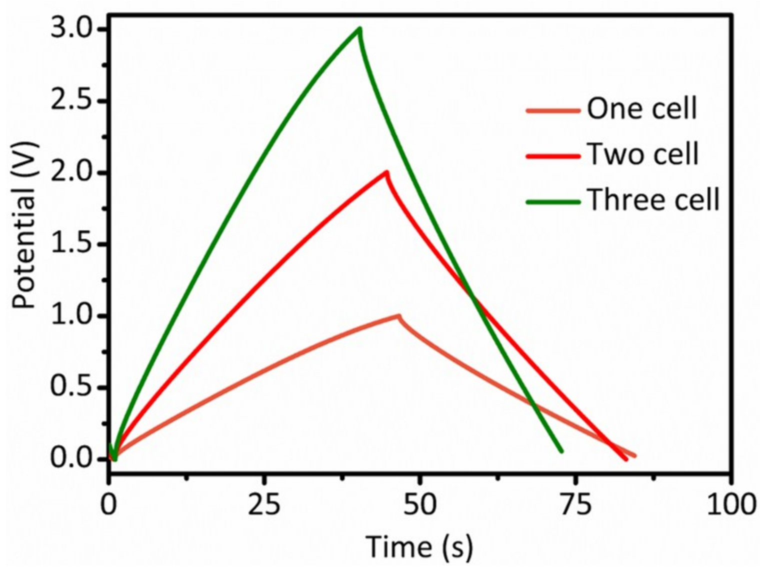

Figure S5. (A) GCD profiles of the solid-state ASC (GPAC/PVA/KOH/GPAC) device at one cell, two cell and three cell device connected in series.

Table S1. Comparison of the specific capacitance value with previously reported biomass-derived carbon in literatures.

Materials	**Electrolyte**	**Specific capacitance (F g^{-1})**	**Ref**
GHAC-900	2.0 M KOH	63	[5]
SPC-1000	1 M Li_2SO_4	121	[9]
ACSB	6 M KOH	202	[37]
EDMCT	6 M KOH	90	[S1]
Carbon$_{s2}$	1 M LiOH	204	[S2]
ZAC-10	1.0 M H_2SO_4	127	[S3]
Coconut kernel	1.0 M H_2SO_4	173	[S4]
sugarcane	0.5 M H_2SO_4	232	[S5]
Rice husk	3 M KCl	210	[S6]
Corn grains	6 M KOH	257	[S7]
GPAC	**2.0 M KOH**	**233**	**This work**

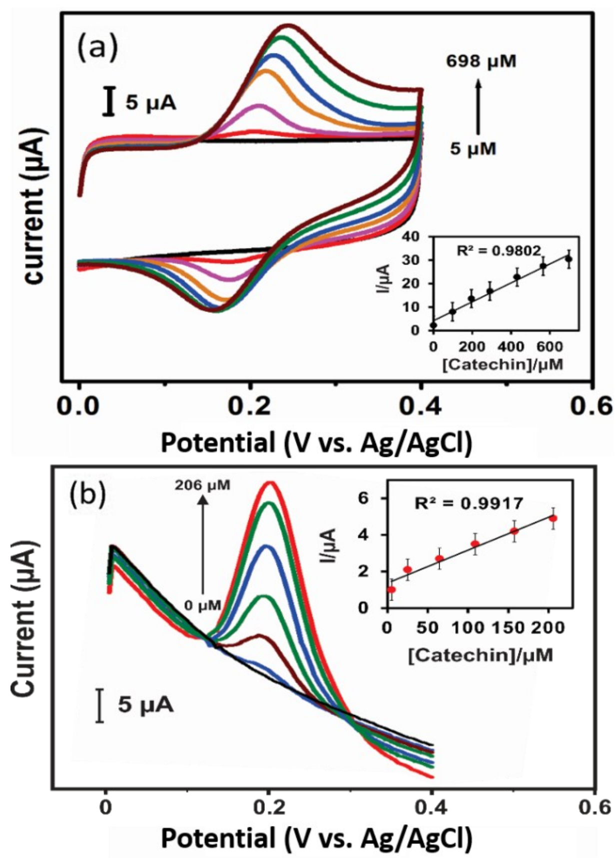

Figure S6. (a) Various CA concentrations from 49 µM to 950 µM. Electrode: GPAC modified GCE. (b) DPV curves of GPAC modified GCE with different concentrations of CA using a standard addition method. Electrolyte: 0.1 M PBS (pH 7.0) solution; scan rate: 50 mV s^{-1}.

Table S2. Comparison of the analytical parameters with previously reported literatures.

Electrode Materials	Linear Range (μM)	Limit of Detection (μM)	Sensitivity (μA/μM.cm^2)	Ref
Pt/MnO_2/f-MWCNT	2-950	0.02	-	[25]
f-MWCNT/YHCF	5–200	0.28	1.311	[26]
Poly-aspartic acid	0.2-30	0.07	-	[40]
MWCNT	0.10-2.69	0.017	-	[41]
Ni(II) complex and thiol on gold electrode	3.31–25.3	0.82	-	[42]
GPAC	**4-368**	**0.67**	**7.2**	**This work**

Reference

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