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Supporting information

Supercapacitor constructed with partially graphitized porous carbons and its performance over a wideworking temperature range

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Figures and tables

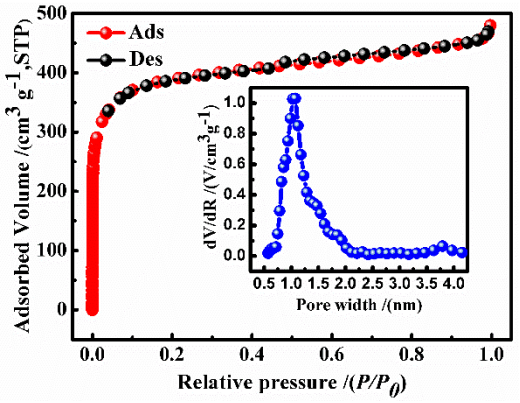

Figure S1 N_2 adsorption isotherm and the obtained pore size distribution (inset) curves of AC.

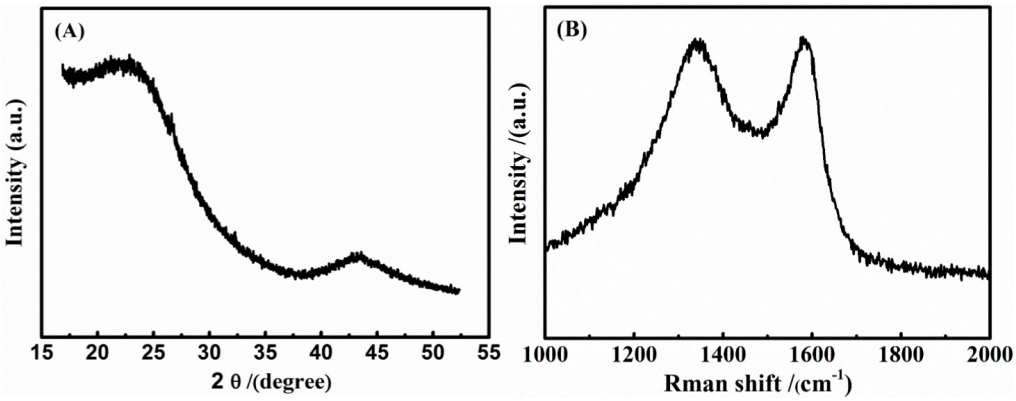

Figure S2 (A) XRD pattern and (B) Raman spectrum of the referenced AC. Very weak XRD pattern and intensive D band in Raman spectrum indicate the amorphous characteristics of AC.

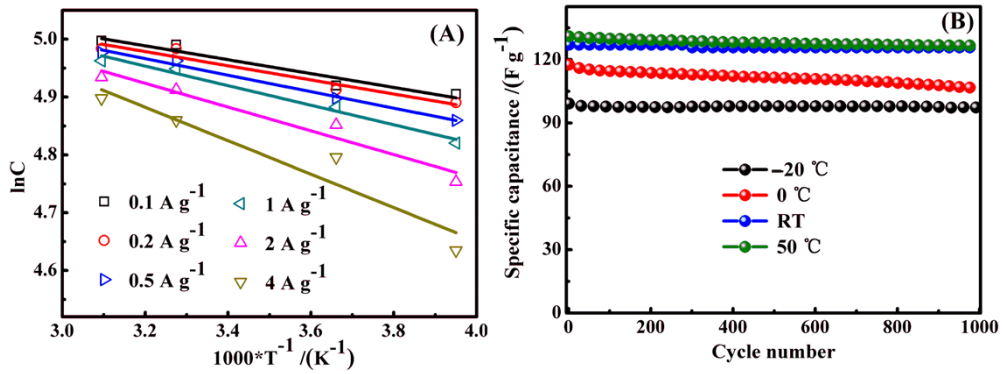

Figure S3 (A) the Arrhenius plot of ln$C$ vs. 1000*T^{-1} at different current densities, and (B) cycling life of a PGPC-based SC measured at 5 A g^{-1}, measured at -20°C, 0°C, RT, 50°C.

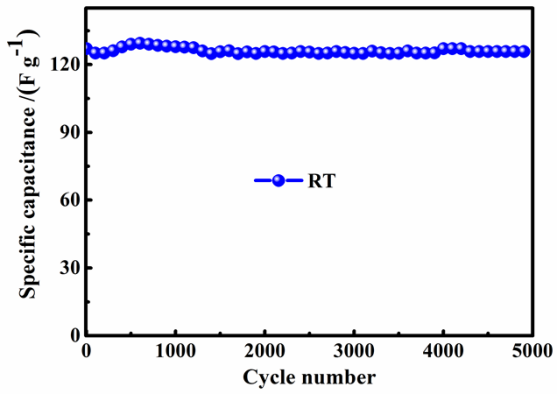

Figure S4 Cycling life of a PGPC-based SC measured at 5 A g^{-1} with 5000 cycles at RT.

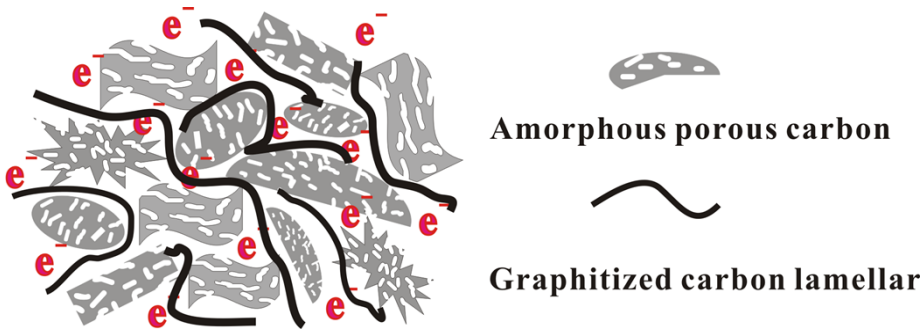

Figure S5 Schematic illustration of the energy storage mechanism of the PGPC electrodes.

Table S1 The values of R_E and R_{ct} of the PGPC- and AC-based SCs measured at different temperatures derived from the EIS Nyquist plots.

T /(°C)		50 °C	RT	0 °C	-20 °C
R_E/(Ω)	PGPC	1.6	2.1	3.1	4.1
	AC	3.4	4.5	6.2	7.7
R_{ct}/(Ω)	PGPC	0.8	1.0	1.3	1.5
	AC	3.3	3.8	5.6	7.5

Table S2 Temperature-dependent capacitive performances of SCs constructed with different electrode materials. All values of specific capacitance and energy density are based on the total mass of active materials.

Electrode materials	Electrolytes	Voltage Window /V	T /°C	Specific capacitance /(F g^{-1})	Current density	Energy density /(Wh kg^{-1})	Power density /(kW kg^{-1})	Reference
Carbon nanotube	1M $TEABF_4$/PC	1.5	25-100	24-30	10-100 A g^{-1}	2.4-4	55	1
Activated GO	Ionic liquids	2.9 or 3.5	-50-80	100-180	1-20 mV/s	/	/	2
Activated carbon fabric	1M $TEABF_4$/PC	4	-40-100	20-90	0.1-1 A g^{-1}	23	0.05-5	3
MnO_2 nanorod	4M KOH	1	-20-20	40-136	0.2-2 A g^{-1}	/	/	4
MnO_2 nanobelt	0.1 M $MnAc_2$	0.8	0-50	52-128	0.2-10 A g^{-1}	/	/	5
MnO_2/carbon	glycol *etc*	0.8	-30	60	0.1-10 A g^{-1}	/	/	6
Graphene	Li_2SO_4	1	-20-45	74-99	1-10 mA/cm^2	2.5-3.4	19-64	7
PGPC	1M Et_4NBF_4/PC	3	-20-50	135-148	0.1-30 A g^{-1}	43-46	9.8-15.7	This work

References

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