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Electronic supplementary information

High surface area porous carbons produced by steam activation of graphene aerogels

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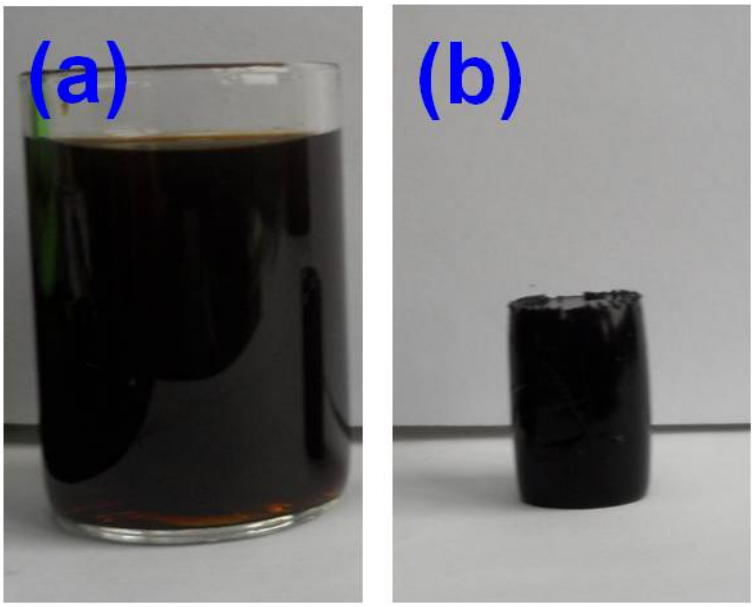
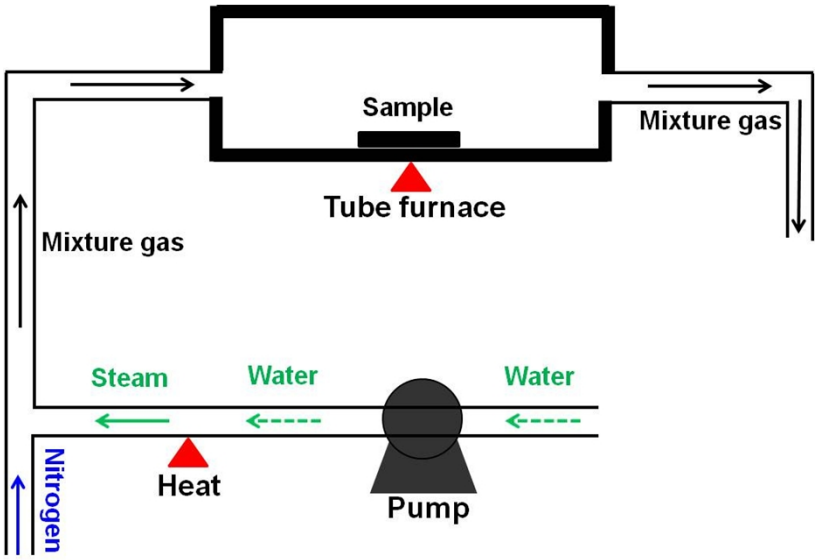


Fig. S1 (a) Digital photos of 20 mL of aqueous GO dispersion (5 mg mL^{-1}) and (b) the obtained graphene hydrogel.



Scheme S1. Schematic diagram of the preparation process of porous carbon through steam activation of graphene aerogel (GA).

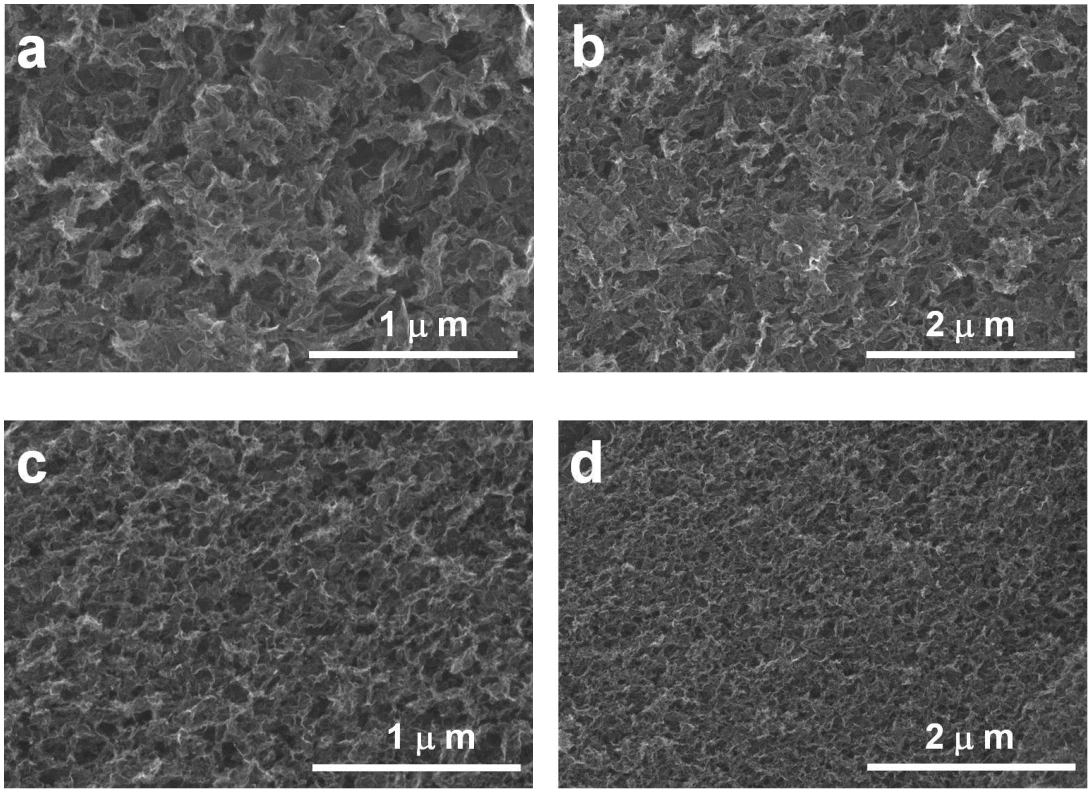


Fig. S2 SEM images of graphene aerogel before (a and b) and after (c and d) steam activation at different magnifications.

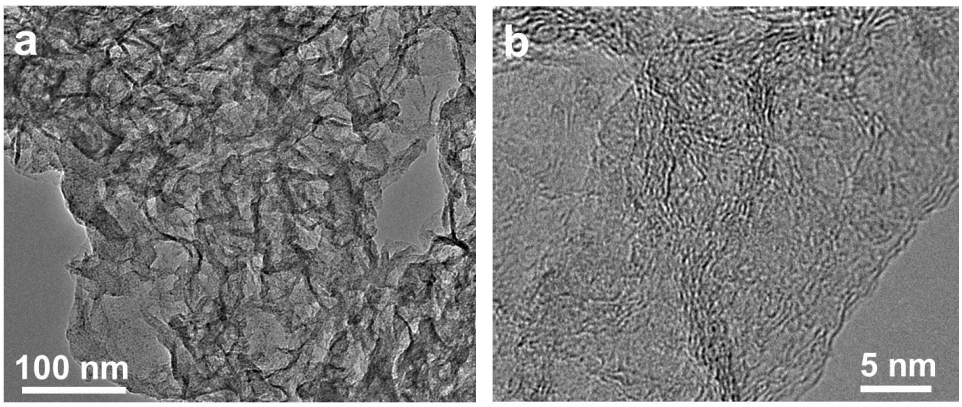


Fig. S3 TEM images of graphene aerogel at low (a) and high (b) magnifications.

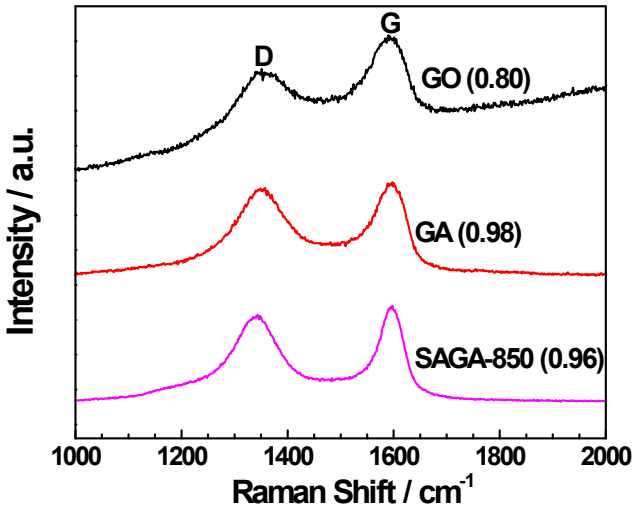


Fig. S4 Raman spectra of graphene oxide (GO), graphene aerogel (GA), and steam activated GA (SAGA-850). Numbers in the bracket represent for the *D*-/*G*- intensity ratio of the samples.

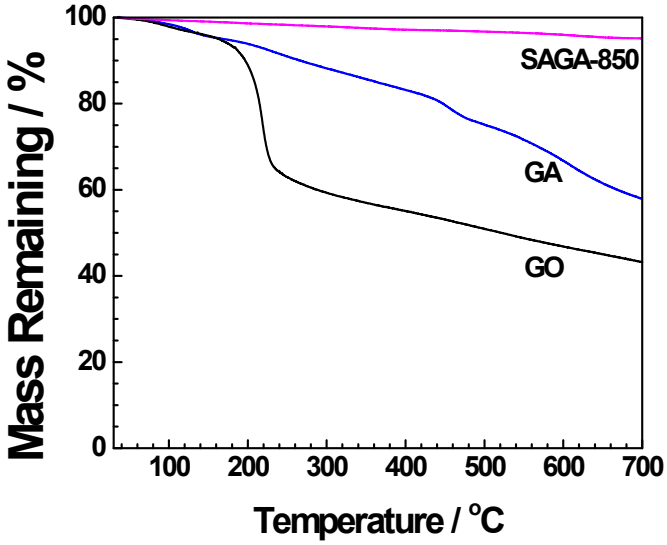


Fig. S5 Thermal gravimetric analysis curves of graphene oxide (GO), graphene aerogel (GA), and steam activated GA (SAGA-850).

Table S1. Porosities and yields by weight of steam activated graphene aerogels (SAGAs) and carbonized GA (CGA-850).

Sample	S_{BET} (m^2 g^{-1})[a]	$S_{Langmuir}$ (m^2 g^{-1})[b]	V_{total} (cm^3 g^{-1})[c]	D_{pore} (nm)[d]	Yield (%)
GA	600	820	1.62	11.2	–
CGA-850	480	660	1.59	12.1	84
SAGA-750	830	1140	2.18	11.9	73
SAGA-800	1030	1410	2.63	11.1	66
SAGA-850	1230	1690	3.67	12.3	48
SAGA-900	1100	1500	3.22	11.9	6

[a] Specific surface area calculated from the nitrogen adsorption isotherm using the BET method. [b] Langmuir specific surface area calculated from the nitrogen adsorption isotherm by application of the Langmuir equation. [c] Pore volume obtained from BJH adsorption cumulative volume of pores. [d] Data obtained from BJH adsorption average pore diameter.

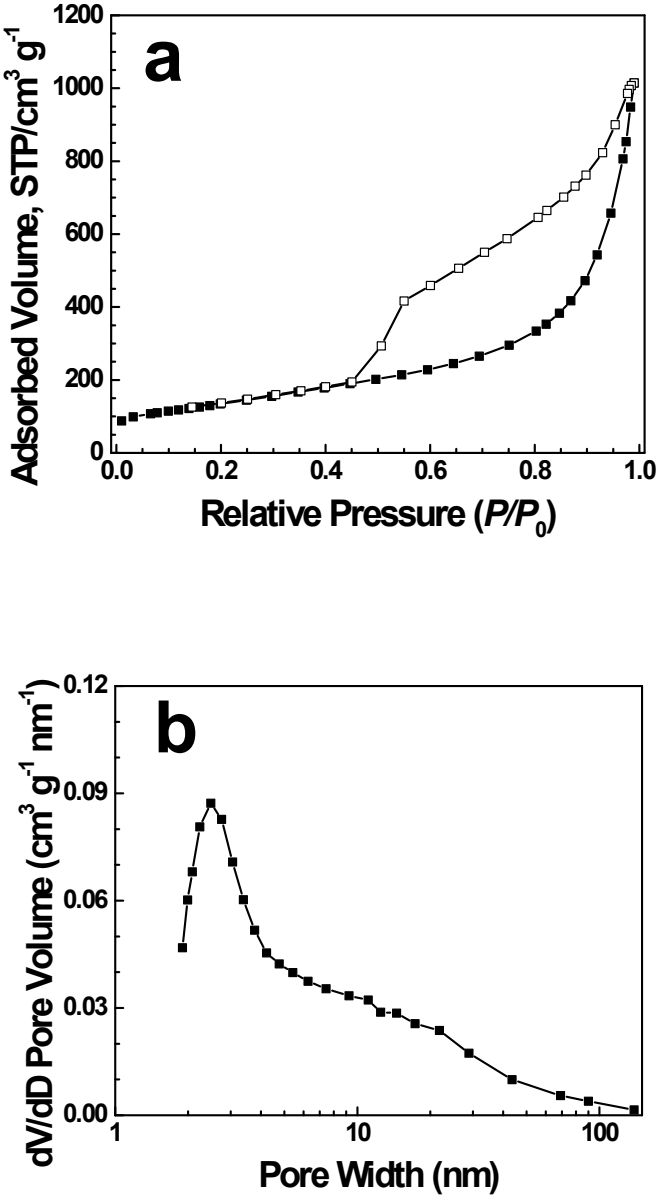


Fig. S6 Nitrogen sorption isotherms at 77 K (a) and Barret−Joyner−Halenda (BJH) adsorption pore size distribution profiles (b) of carbonized graphene aerogel (CGA-850).

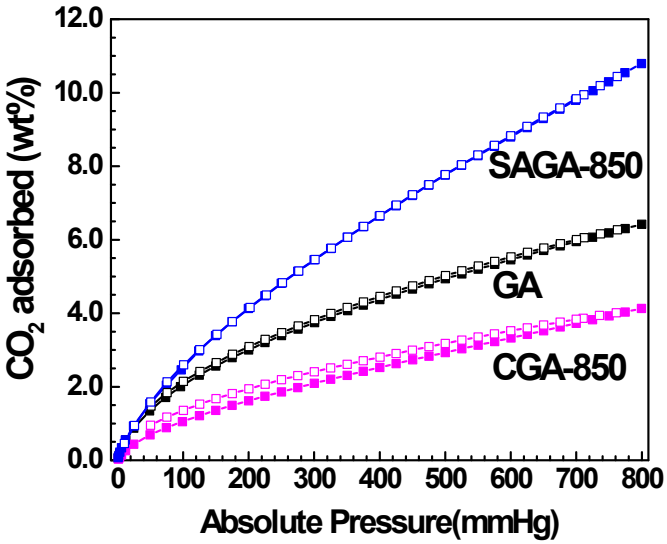


Fig. S7 Carbon dioxide sorption isotherms at 273 K of graphene aerogel (GA), steam activated GA (SAGA-850), and carbonized GA (CGA-850). Solid symbols for adsorption and empty symbols for desorption.