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Supporting Information

NaCl Gradient-Crystalling-Induced Formation of Micro-structured Ribbon-like Graphene Based 3D-Graphene Film for High Performance Flexible/Transparent Supercapacitors

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Calculation method

(1) Specific capacitances derived from galvanostatic charge/discharge tests are calculated from: $C_{specific}=\frac{I}{M\bar{v}}$

Where $C_{specific}$ is specific capacitance for a device in F/g, F/cm^2 or F/cm^3, I is the discharge current in A, and $\bar{v}$ is the slope of the discharge curve after the IR drop.

(2) The electrochemical performance shown in the Ragone plot was measured under the same dynamic condition from the C-V datas. The specific energy density (E) and power density (P) of the device were obtained from the following formula:

$E=\frac{1}{2}\times C_{specific}\times\frac{(\Delta V)^2}{3600}$ $P=\frac{E}{\Delta t}\times 3600$

Where E is the energy density in Wh Kg^{-1} or Wh cm^{-3}), $C_{specific}$ is the mass or volumetric stack capacitance obtained above and ΔV is the discharge voltage range (in V). P is the energy density in WKg^{-1} or W cm^{-3}, Δt is the discharge time (in S).

(3) Equivalent series resistance (ESR (Ω) is the internal resistance of the device) was obtained by the following equation: $ESR=\frac{iR_{drop}}{2I}$

Figure S1：SEM micrograph of the nucleated graphene ribbons on NaCl template after the DC bias and heater turned off (before the growth began).

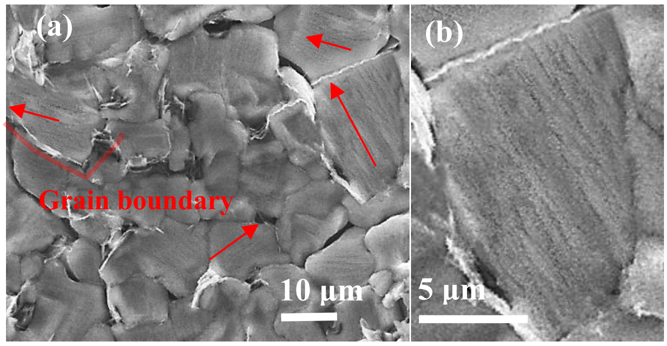

Figure S2: Schematic of the growth directions of the graphene ribbons and the small graphene leaves.

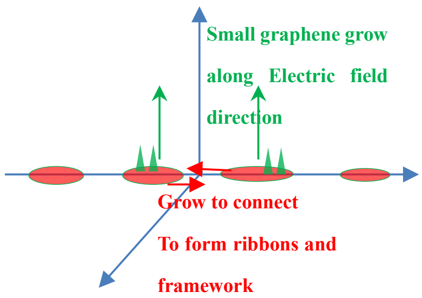

Figure S3: AFM images and a height profile were employed to identify the thickness of the ribbon. The sample applied was taken out of the system before the growth of the small-leave microstructures begin by controlling the growth time.

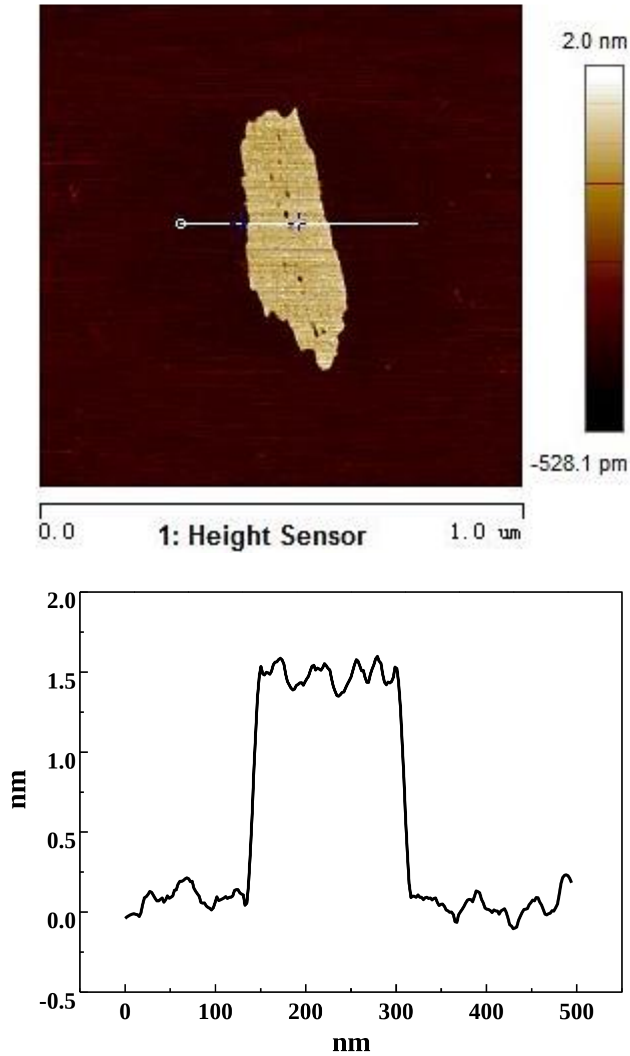

Figure S4: CV curves of the device at different stretching states. The insets are photographs of the RAGR-GF/PDMS at releasing and stretching states.

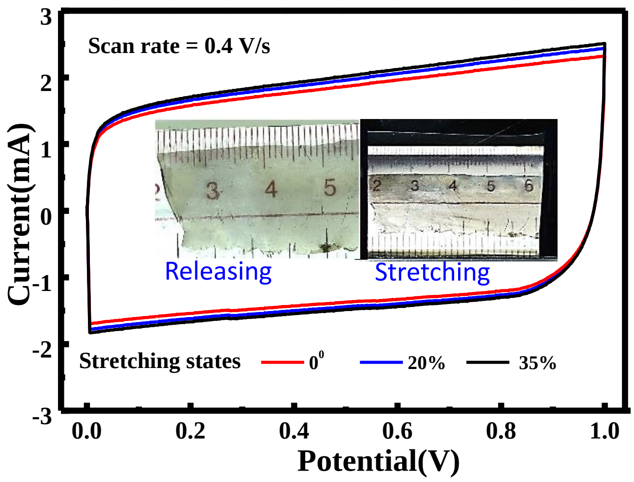

Figure S5: Ragone plot of the device calculated based on RAGR-GF/electrolyte and the total device. The volumetric energies as a function of power density are compared with previously reported flexible transparent supercapacitors.

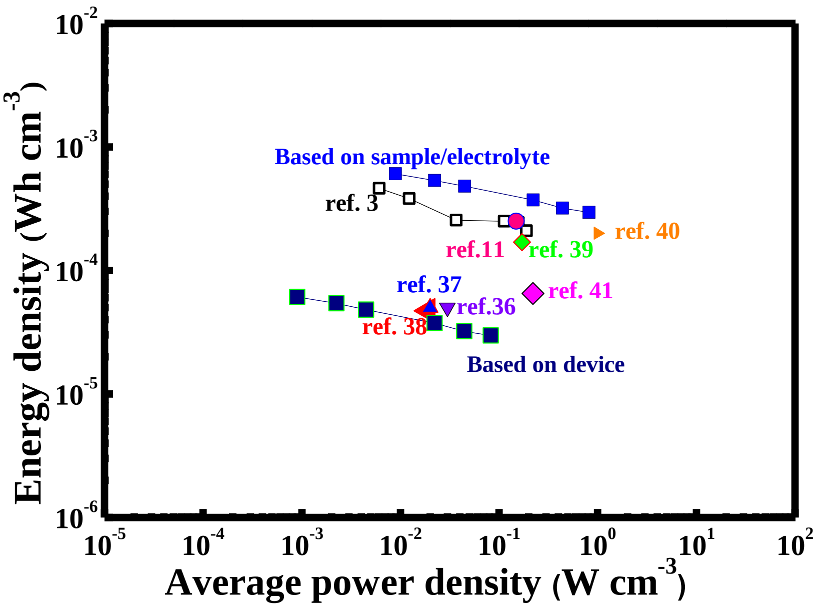

Table S1: Comparison results among transparent/nontransparent supercapacitors.

Material	Transmittance，flexibility	Specific capacitance	Energy density	Power density	Ref.
MWCNT film	*Transparent/flexible (62%)*	146μF/cm2(based on electrode)	12.5Wh/Kg (based on electrode)	13.9KW/Kg (based on electrode materials)	1
PANI&MWCNT	Transparent/flexible（60%）	300F/g (based on electrode)	—	—	2
MWCNT film	*Transparent/flexible (75%)*	7.3F/g (for device)	2.4Wh/Kg (based on electrode)	0.9Kw/Kg (based on electrode)	3
PANI&SWCNT	*Transparent/flexible (55%)*	55F/g (for device)	—	—	4
nano-energied carbon films	*Transparent/flexible (71%)*	409μF/cm2 (for device)	47μWh/cm3 (for electrolyte/material)	19mW/cm^3 (based on electrolyte /)	5
grpahene film	*Transparent/flexible (67%)*	12.4μF/cm2 (for device)	2.94Wh/Kg (based on electrode)	438.6KW/Kg (based on electrode)	6
CVD graphene	*Transparent/stretchable (50-60%)*	5.8μF/cm2 (7.6F/g)	—	—	7
CVD graphene	*Transparent/flexible*	80.7μF/cm2 (for device)	2.5 mWh/cm3(for device)	495W/cm^3 (for device)	8
CVD grapehene	*Transparent/flexible*	80μF/cm2 (for device)	—	—	9
RGO film	*Transparent/flexible*	394μF/cm2 (for device)s	—	—	9
CVD graphene	*Transparent/stretchable*	4.27μF/cm2 (for device)	0.20 nWh/ cm2	36.48 μW/cm^2	10
FFT-GP	*Transparent/flexible (electrode79%)*	3.3mF/cm^2 (for device)	430μWh/cm^3(for electrolyte/material)	190mW/cm^3(for electrolyte/materials)	11
RAGR-GF	*Transparent/flexible (electrode75%)*	4.88 mF/cm^2 (for device)	605μWh/cm^3(for,electrolyte/material)	817.3 mW/cm^3(for electrolyte/materials)	**Our report**
SFT-GF	*Transparent/flexible (device 51.6%)*	4.21 mF/cm^2(for device)	552.3 μWh/cm^3	561.9 mW/cm^3	12
onion-likecarbon	*Nontransparent/flexible*	1.7mF/cm^2 (for device)	10 mWh/cm^3 (for device)	1Kw/cm^3 (for device)	13
Fe_2O_3//MnO_2	*Nontransparent/flexible*	1.5F/cm^3	0.55 mWh/cm^3 (for device)	150 mW/cm^3 (for device)	14
NPG-PPy//NPG-PPy	*Nontransparent/flexible*	30 F/cm^3	2.8 mWh/cm^3 (for device)	56.7 W/cm^3 (for device)	15
MnO2//carbon fiber	*Nontransparent/flexible*	10 F/cm^3	5 mWh/cm^3 (for device)	929 mW/cm^3	16
WO_3@MoO_3//PANI	*Nontransparent/flexible*	216mF/cm^2	1.9 mWh/cm^3(for device)	730 mW/cm^3	17

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