Electronic Supplementary Material (ESI) for RSC Advances.

Porous graphene-carbon nanotube hybrid paper as flexible nano-scaffold for polyaniline immobilization and application in all-solid-state supercapacitors†

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Electronic Supplementary Information

Fig. S1 (a) AFM image and (b) corresponding height profile of GO.

Fig. S2 Cross-sectional FESEM images of porous graphene paper at (a) low and (b) high magnifications, respectively.

Fig. S3 Nitrogen sorption isotherms of porous graphene paper.

Fig. S4 FESEM images of the surface of (a, d) p-GC/PANI1, (b, e) p-GC/PANI3, and (c, f) p-GC/PANI5 hybrid papers at (a-c) low and (b-f) high magnifications, respectively.

Fig. S5 TGA curves of p-GC, PANI, p-GC/PANI1, p-GC/PANI3 and p-GC/PANI5 papers (heating rate of 10 °C min^{-1} under a nitrogen atmosphere).

Fig. S6 Thickness effect study. FESEM images of the cross-section of p-GC paper at low magnification with different thicknesses of (a) ~ 11 μm and (b) ~ 19 μm. (c) CV curves of p-GC paper with different thicknesses.

Fig. S7 CV curves of p-GC/PANI3 paper at different scan rates of 10, 20, 50, 100, and 200 mV s^{-1}, respectively.

Fig. S8 Electrochemical characterization of graphene-CNT/PANI hybrid papers with different porous structures: (a) Galvanostatic charge/discharge curves of GC/PANI3, p-0.5-GC/PANI3 and p-GC/PANI3 hybrid papers at a current density of 1 A g^{-1}; (b) C_s of hybrid papers against the total weight of PANI and GC, and C_s of PANI against its own weight.

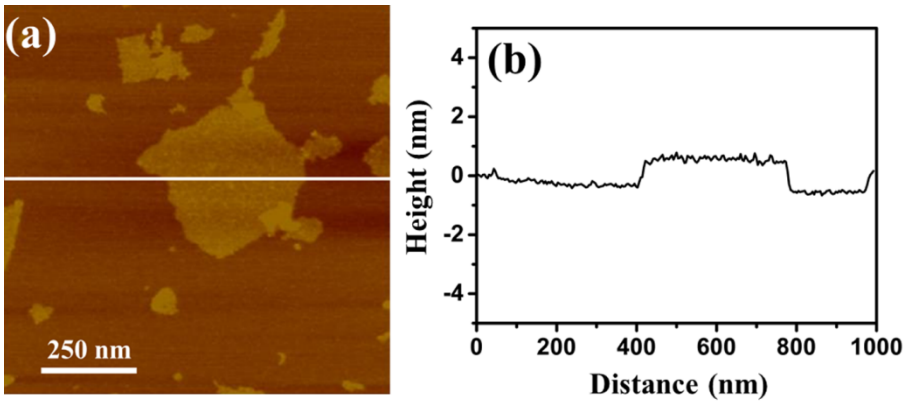

Fig. S1

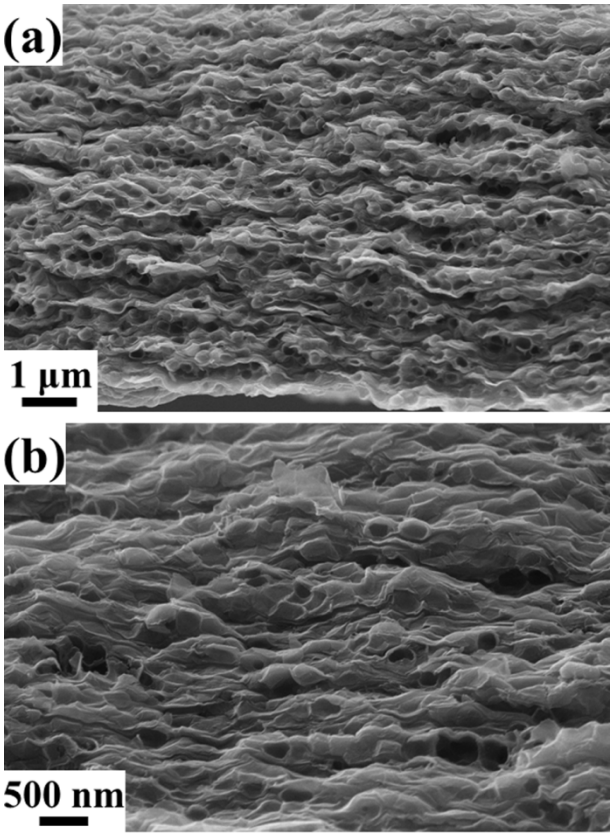

Fig. S2

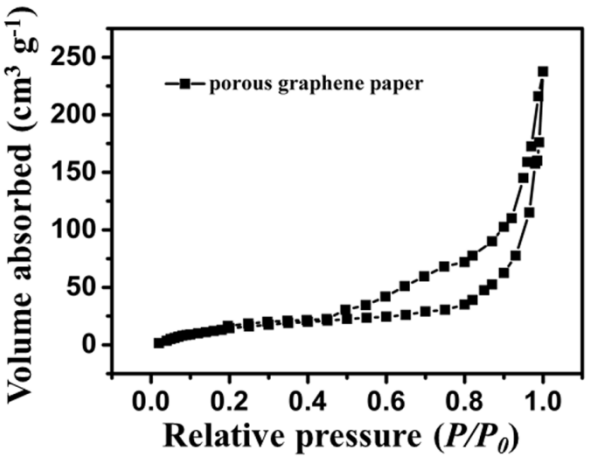
porous graphene paper
Volume absorbed (cm3 g-1)
Relative pressure (P/P0)
0
50
100
150
200
250
0.0
0.2
0.4
0.6
0.8
1.0

Fig. S3

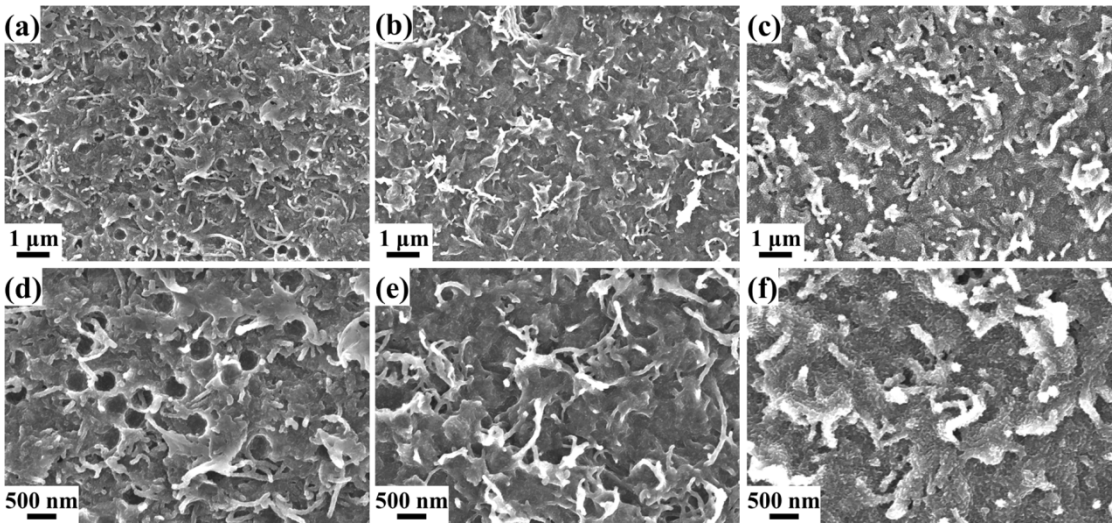

Fig. S4

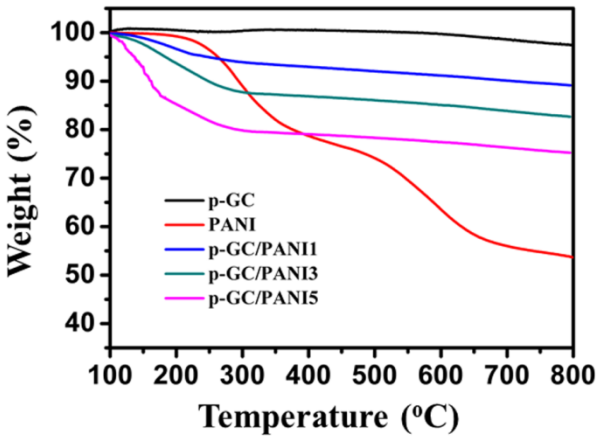
Weight (%)
100
90
80
70
60
50
40
100
200
300
400
500
600
700
800
Temperature (°C)
p-GC
PANI
p-GC/PANI1
p-GC/PANI3
p-GC/PANI5

Fig. S5

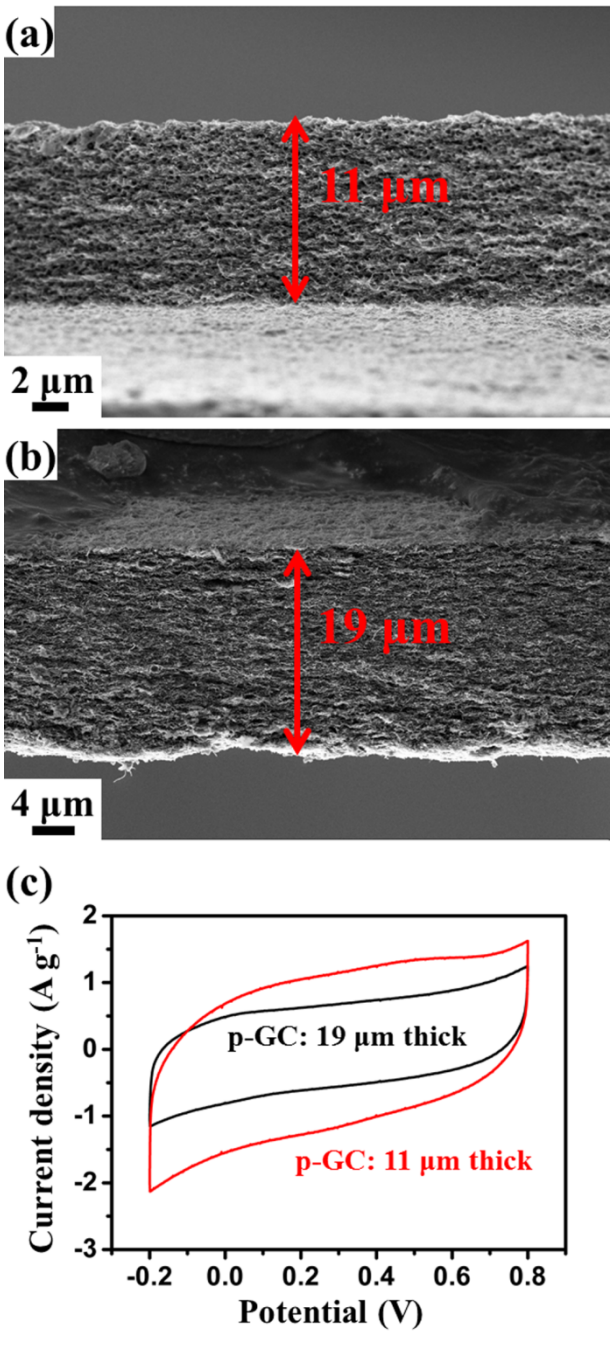
(a)
11 µm
2 µm
(b)
19 µm
4 µm
(c)
Current density (A g-1)
Potential (V)
p-GC: 19 µm thick
p-GC: 11 µm thick
2
1
0
-1
-2
-3
-0.2
0.0
0.2
0.4
0.6
0.8

Fig. S6

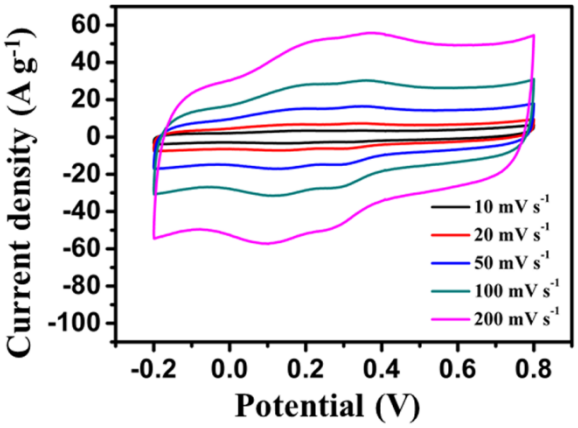
Current density (A g-1)
60
40
20
0
-20
-40
-60
-80
-100
-0.2
0.0
0.2
0.4
0.6
0.8
Potential (V)
10 mV s-1
20 mV s-1
50 mV s-1
100 mV s-1
200 mV s-1

Fig. S7

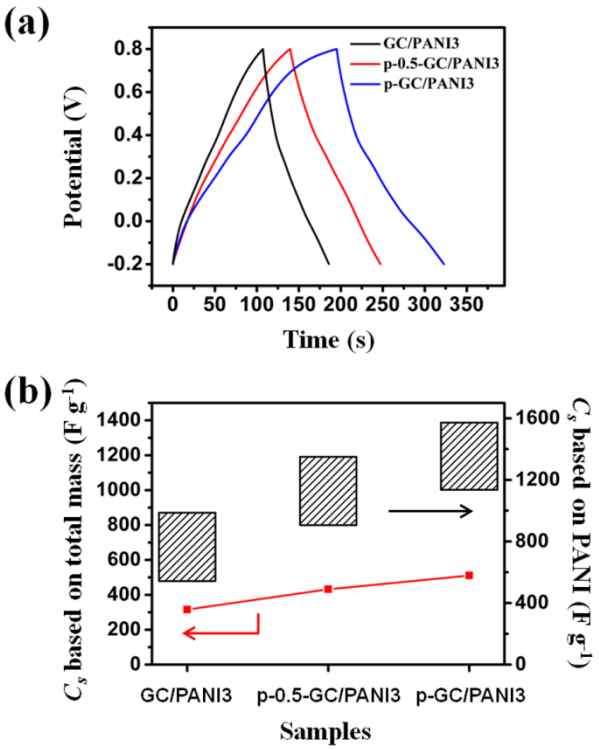
(a)
GC/PANI3
p-0.5-GC/PANI3
p-GC/PANI3
Potential (V)
0.8
0.6
0.4
0.2
0.0
-0.2
0
50
100
150
200
250
300
350
Time (s)
(b)
C_s based on total mass (F g^{-1})
C_s based on PANI (F g^{-1})
1400
1200
1000
800
600
400
200
0
1600
1200
800
400
0
GC/PANI3
p-0.5-GC/PANI3
p-GC/PANI3
Samples

Fig. S8