Electronic Supplementary Material (ESI) for RSC Advances.

Three dimensional iron oxide/graphene aerogel hybrids as all-solid-state flexible supercapacitor electrodes

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Additional figures

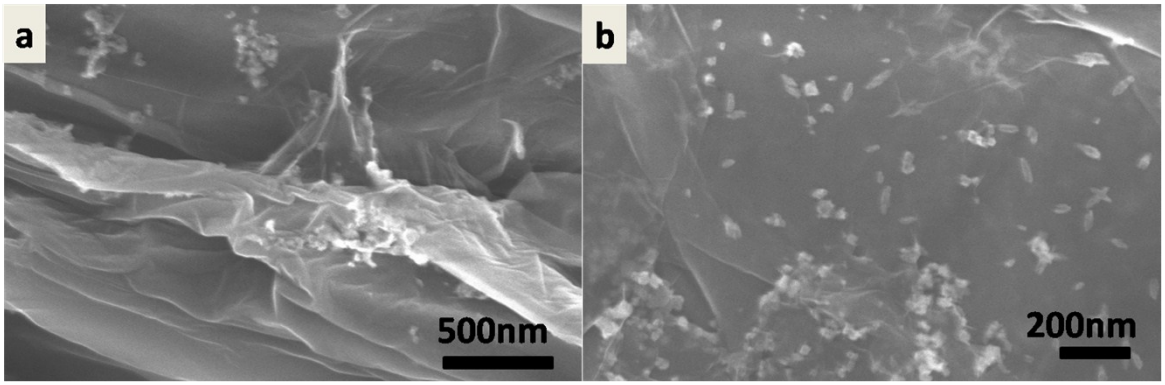

Figure S1. (a-b) SEM images of the Fe_2O_3/G.

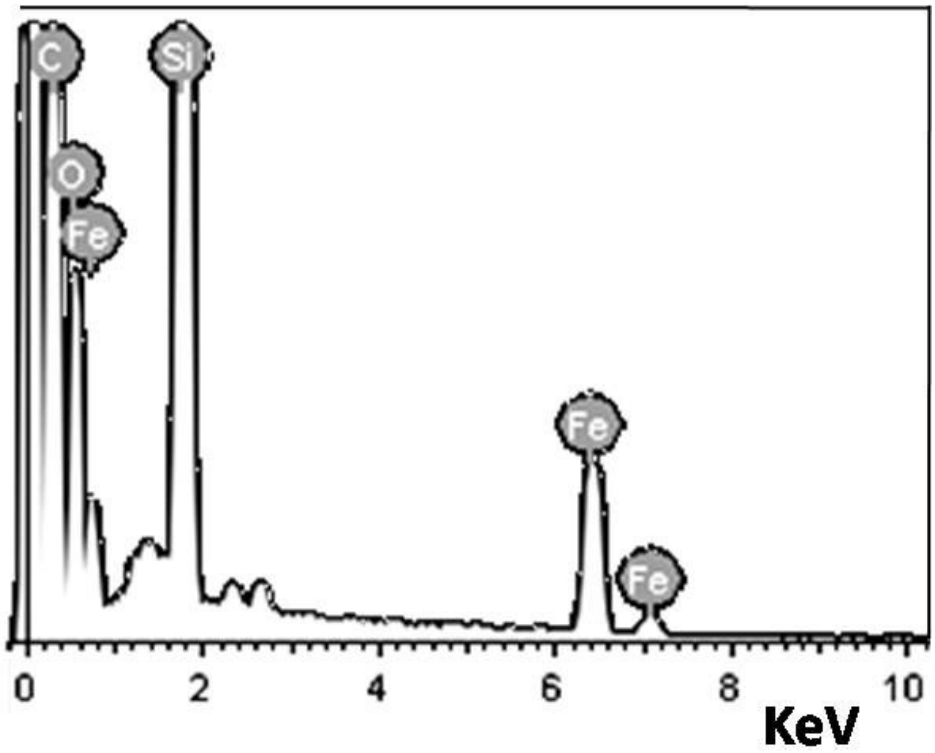

Figure S2. EDS spectra of the Fe_2O_3/GA composite.

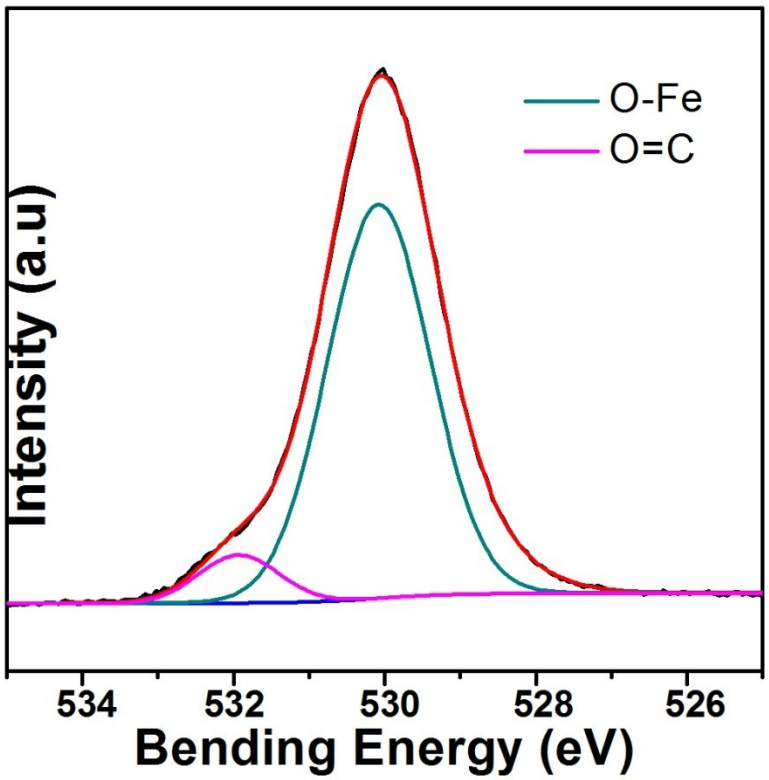

Figure S3. High-resolution core level 1s spectrum of O

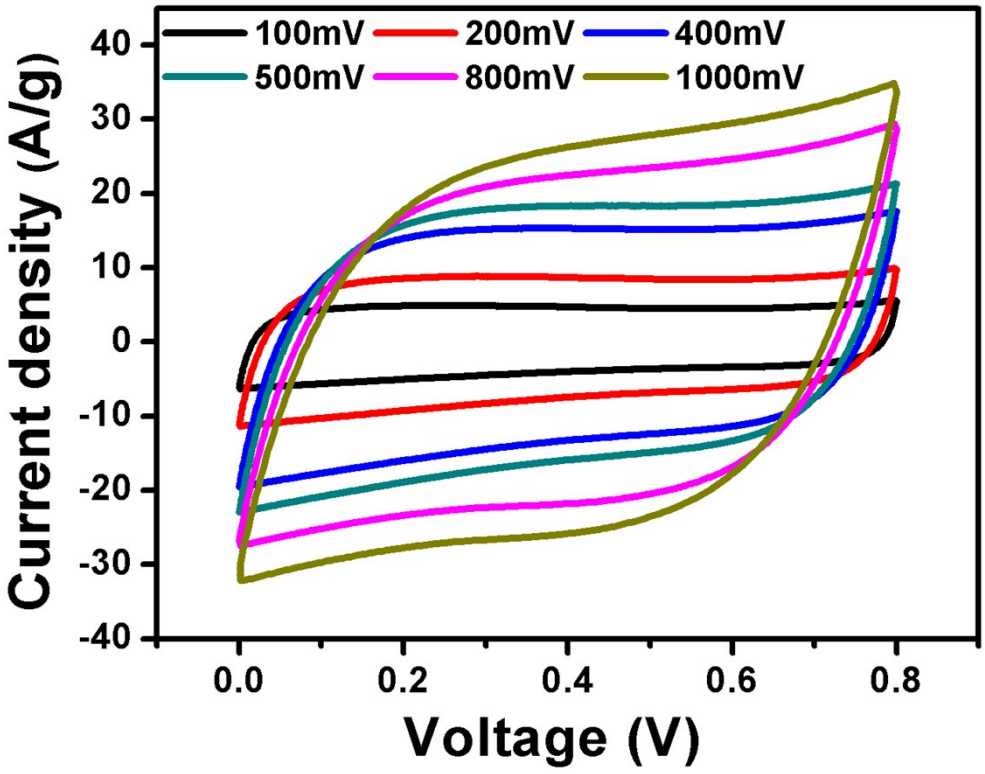

Figure S4. CV curves of the Fe_2O_3/GA SC at different scan rates

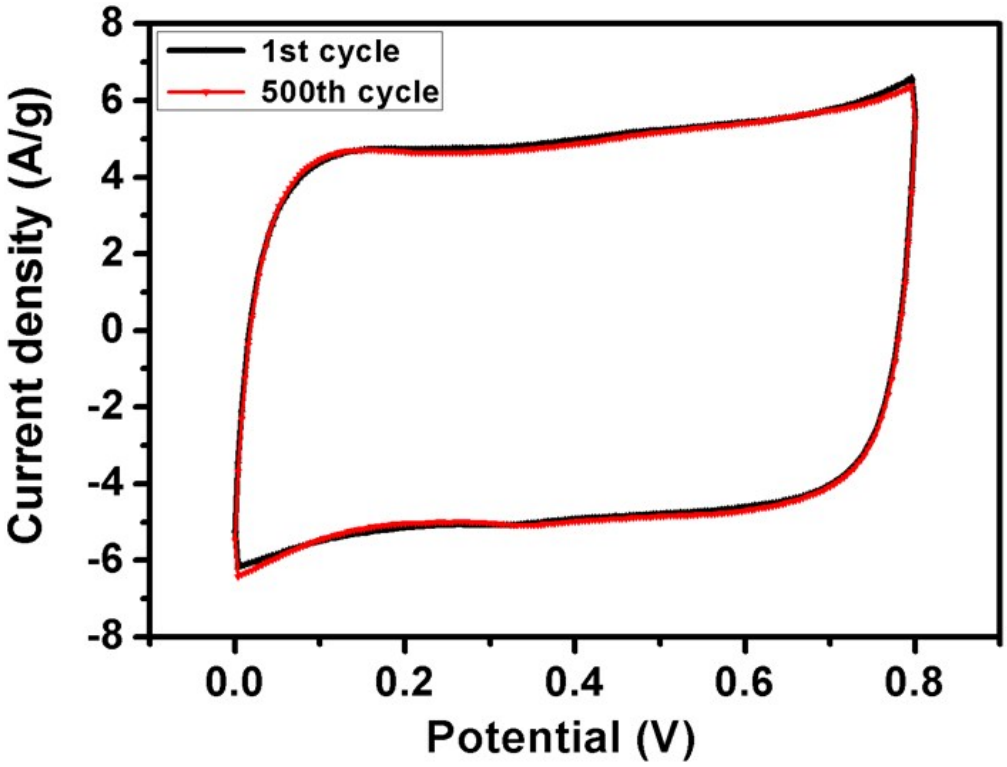

Figure S5. Stability representing CV curves of the Fe_2O_3/GA Flat SC device at 100 mV/s

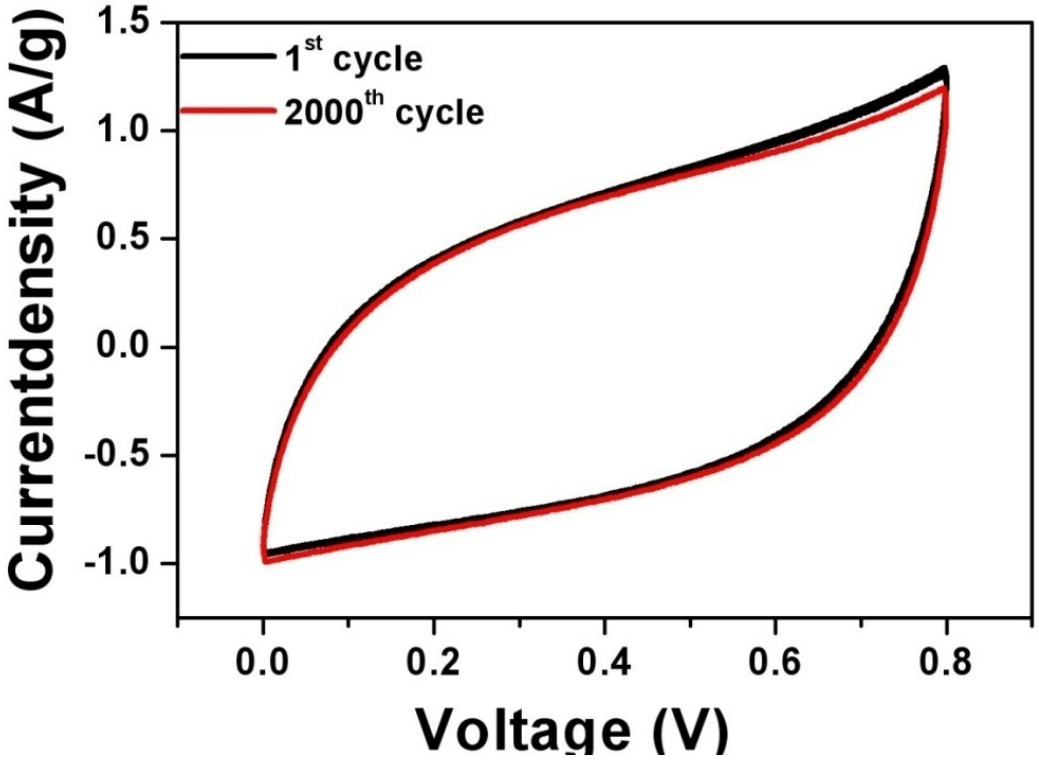

Figure S6. CV curves of the Fe_2O_3/GA 90^o bent SC device at 20 mV/s

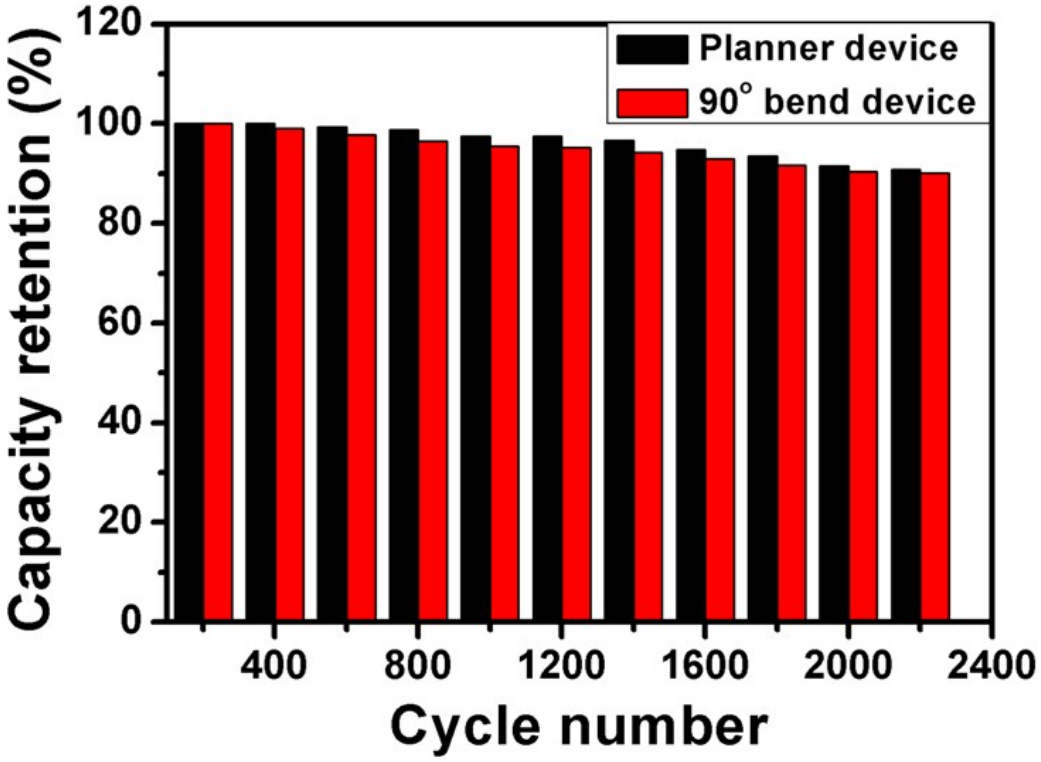

Figure S7. Capacitance retention of Fe_2O_3/GA Flat and Bent SC devices over 2200 cycles at 3 A/g

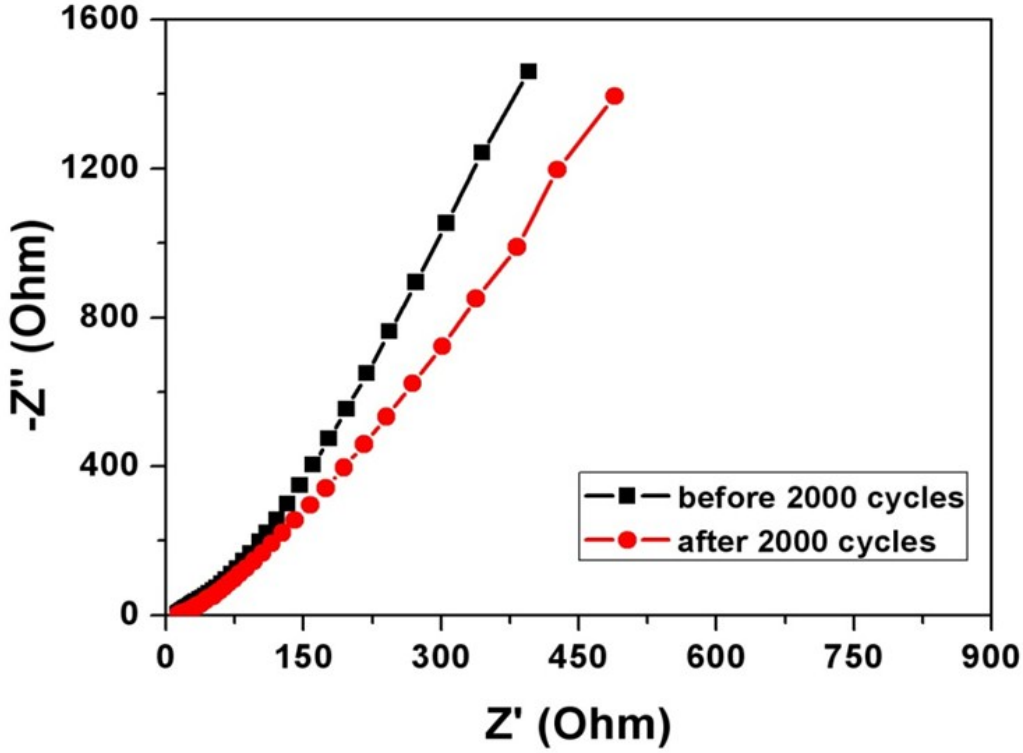

Figure S8. Nyquist plots of Fe_2O_3/GA 90^o bent SC device

Table S1. Electrochemical properties of various Fe_2O_3, Fe_3O_4 and graphene based composite materials.

Material	**Highest Specific capacitance F/g**	**Current density (A/g)**	**cycle life (F/g)**	**reference**
Fe_3O_4 /rGO	216.7 F/g	0.5 A	195.1F/g (73.2% capacity retention) after 3000charge/ discharge cycles at 0.5 A	1
GS/Fe_3O_4	368 F/g	0.5 A	245 F/g (108% capacity retention) after 1000 charge/ discharge cycles at 5 A	2
α-Fe_2O_3 mesocrystals/graphene	306.9 F/g	3 A	196.7F/g (100% capacity retention) after 2000 charge/ discharge cycles at 5A	3
Porous α-Fe_2O_3 /graphene	343.7 F/g	3 A	174.5 F/g (95.8% capacity retention) after 50000 charge /discharge cycles at 10 A	4
a-Fe_2O_3/carbon nanotube sponges	296.3 F/g	5 mV/s	85 F/g (80% capacity retention) after 1000 charge /discharge cycles at 100 mV/s	5
hybrid Fe_3O_4@FLG/PEDOT:PSS multilayers	153 F/g	0.1 A	46 F/g (114% capacity retention) after 3500 cycles charge/discharge cycles at 1 A	6
3D-KSPC/Fe_3O_4 -DCN	285.4 F/g	1A	220.5 F/g (104% capacity retention) after 5000 charge /discharge cycles at 2 A	7

3D graphene/ Fe_3O_4 architectures (GFAs)	211.4 F/g	1A	126.6 F/g (90.5% capacity retention) at 20 A after 2000 charge/discharge cycles.	8
Fe_2O_3/GA composite	81.3 F/g	1A	62.7 F/g at 10 A	9
RGO-Fe_3O_4	236 F/g	1A	229 F/g (90.5% capacity retention) at 1 A after 500 charge/discharge cycles	10
AC/FeO composites	167.6 F/g	2A	158 F/g (94% capacity retention) at 2 A g^{-1} after 2000 charge/ discharge cycles.	11
graphene/porous Fe_2O_3 nanocomposite	252.4 F/g	0.5A	~86 F/g (78.0% capacitance retention) after 1000 charge/ discharge cycles at 10A	12
GF -CNT@Fe_2O_3	212 F/g	1.6A	~135F/g (95.4% capacitance retention) after 50000 charge/ discharge cycles at 7A	13
Three dimensional (3D) Iron Oxide (Fe_2O_3)/ graphene aerogel (GA)	440 F/g	0.45A	297 F/g (90.5% of capacitance retention) after 2200 cycles at 3A	This work

References

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