Nitrogen-doped reduced graphene oxide-polyaniline composite materials: Hydrothermal treatment, characterisation and supercapacitive properties

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Supplementary Information

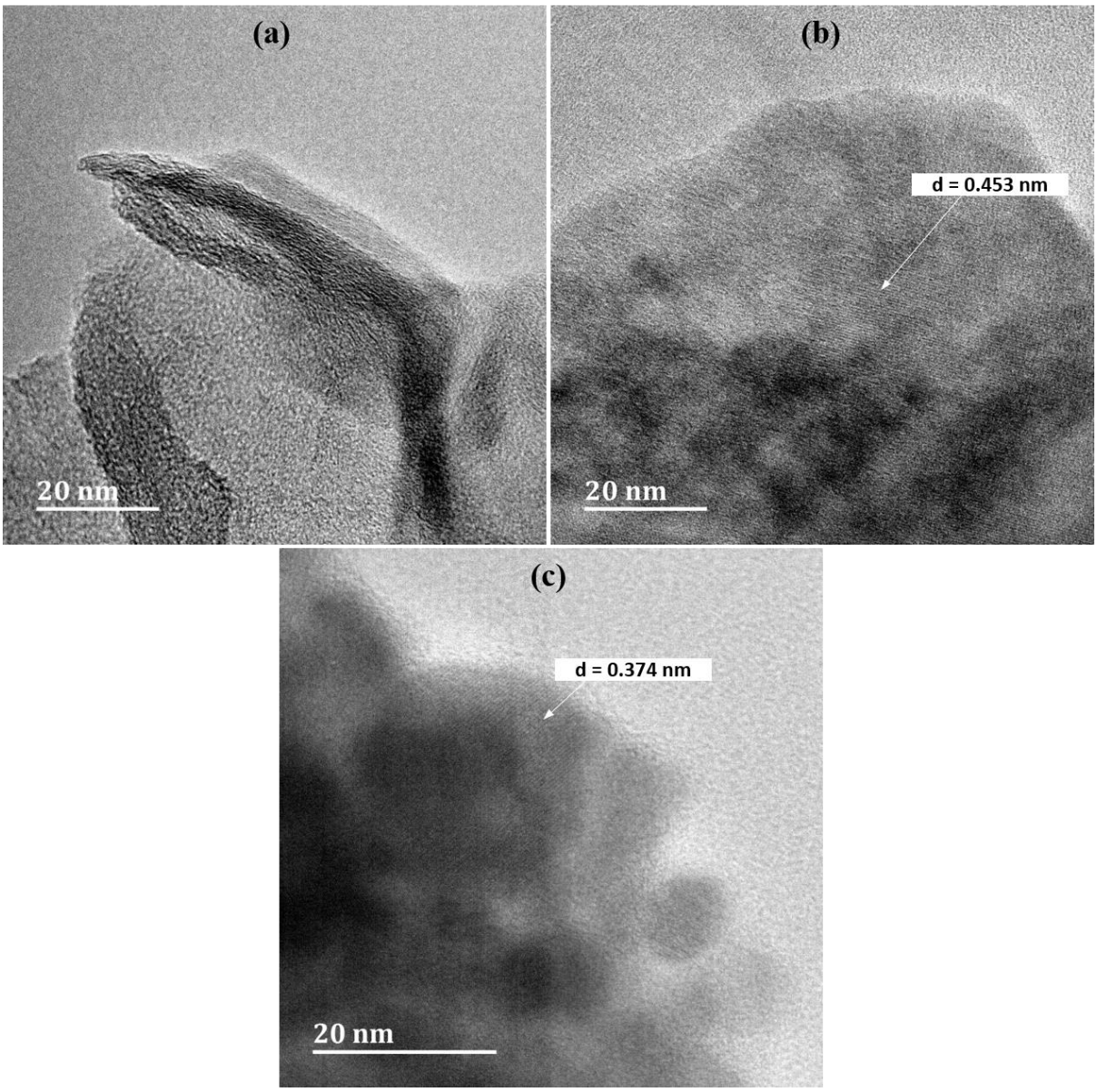

Fig. S1 Representative HRTEM micrograph showing (a) wrinkling in NRGO samples (U190) (b) lattice spacing of GO and (c) lattice spacing in NRGO samples (U130)

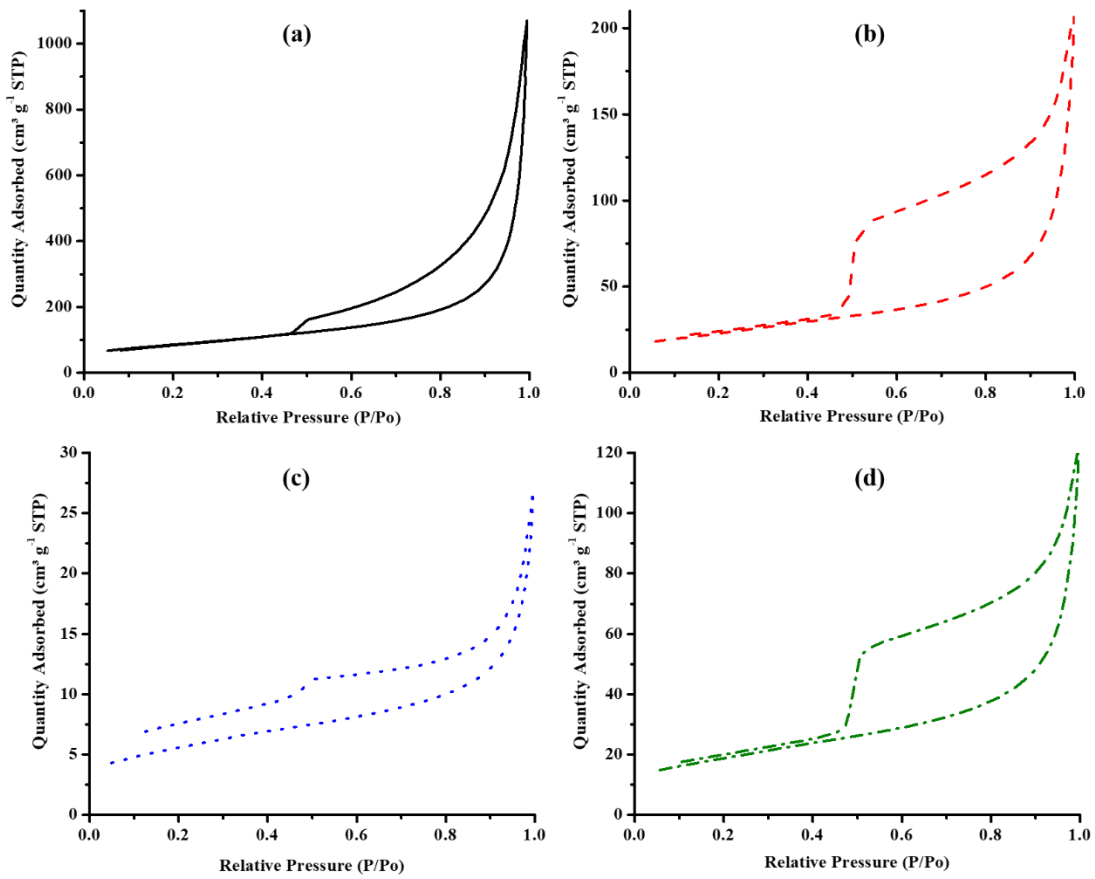

Fig. S2 Nitrogen adsorption-desorption isotherms for (a) GO, (b) U70, (c) U130 and (d) U190

Table S1 Elemental and X-ray photoelectron spectroscopy analyses of treated GO

Sample	Elemental composition				X-ray photoelectron spectroscopy			
	C (%)	H (%)	N (%)	S (%)	C1s (%)	N1s (%)	O1s (%)	S2p (%)
GO	58.00	1.40	0.00	0.33	70.31	0.39	28.34	0.59
U70	54.62	2.94	3.46	0.32	72.70	2.70	24.45	0.14
U130	56.67	2.68	2.52	0.32	72.72	1.73	25.40	0.15
U190	55.07	2.75	6.89	0.21	83.50	6.74	9.76	0.00

Table S2 Energy and power density from galvanostatic charge curve cycles at 0.1 A g^{-1}

Sample	Energy density (Wh kg^{-1})	Power density (W kg^{-1})
GO	0.1736	625
U70	5.0926	833
U130	11.574	41667
U190	0.868	104

Table S3 Percentage C_s boost at varied PANI wt.% and *v* from CV in K_2SO_4

PANI wt.%	Control Material	Percentage C_s boost at different scan speeds (%)			
		5 mV s^{-1}	25 mV s^{-1}	50 mV s^{-1}	100 mV s^{-1}
5	**U130**	981	1340	14032	11823
	PANI	4749	479	641	634
10	**U130**	419	843	2336	2257
	PANI	2027	289	107	121
20	**U130**	15	307	2344	2441
	PANI	73	105	134	131
50	**U130**	820	150	1676	1680
	PANI	3970	51	77	90
80	**U130**	113	205	1600	1522
	PANI	549	70	73	82

Table S4 Percentage C_s boost at varied PANI wt.% and *v* from CV in KOH

PANI wt.%	Control Material	Percentage C_s boost at different scan speeds (%)			
		5 mV s^{-1}	25 mV s^{-1}	50 mV s^{-1}	100 mV s^{-1}
5	**U130**	31	2000	1924	1673
	PANI	1.42	515	1043	944
10	**U130**	17733	3936	2308	1694
	PANI	804	1012	1248	956
20	**U130**	3855	1538	1710	1484
	PANI	175	396	924	838
50	**U130**	1977	226	163	151
	PANI	90	92	93	91
80	**U130**	2148	246	175	167
	PANI	97	63	95	94

Table S5 The gradient (value of b) of the plot of log *i* vs log *v* for studied samples

Sample	K_2SO_4 electrolyte	KOH electrolyte
GO	0.58	-
U70	1.08	-
U130	1.31	-
U190	0.60	-

U130-PANI composites

PANI wt.%	K_2SO_4 electrolyte	KOH electrolyte
0 (U130)	1.31	0.51
5	0.30	0.38
10	0.38	0.37
20	0.34	0.30
50	0.47	0.18
80	0.35	0.17
100 (PANI)	0.39	0.22