Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information

A Flexible and High-Performance All-solid-state Supercapacitor Device Based on Ni_3S_2 Nanosheets Coated ITO Nanowire Arrays on Carbon Fabrics

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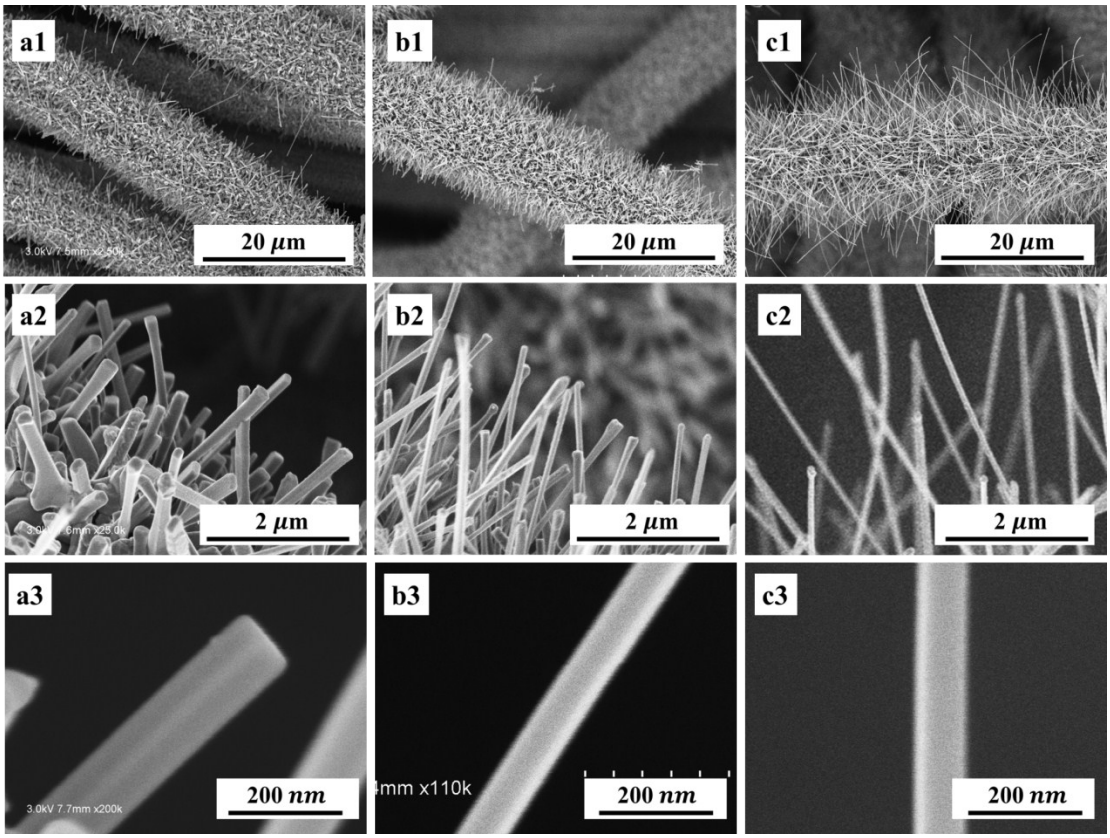

Fig. S1 SEM images of L1 (a1, a2, a3), L2 (b1, b2, b3), L3 (c1, c2, c3) in three different magnifications.

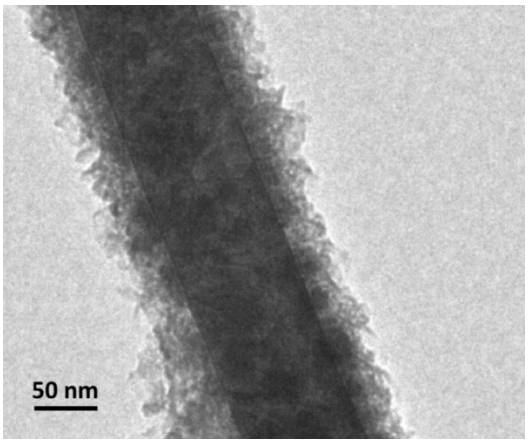

Fig. S2 The HR-TEM of the Ni_3S_2 coated ITO nanowires.

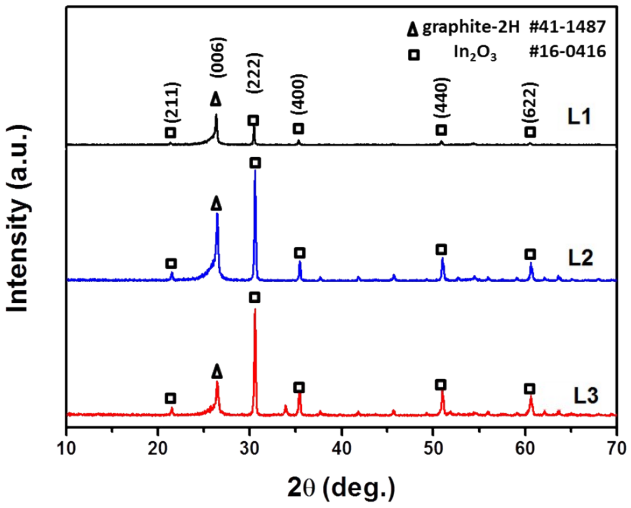

Fig. S3 XRD patterns of L1, L2, L3.

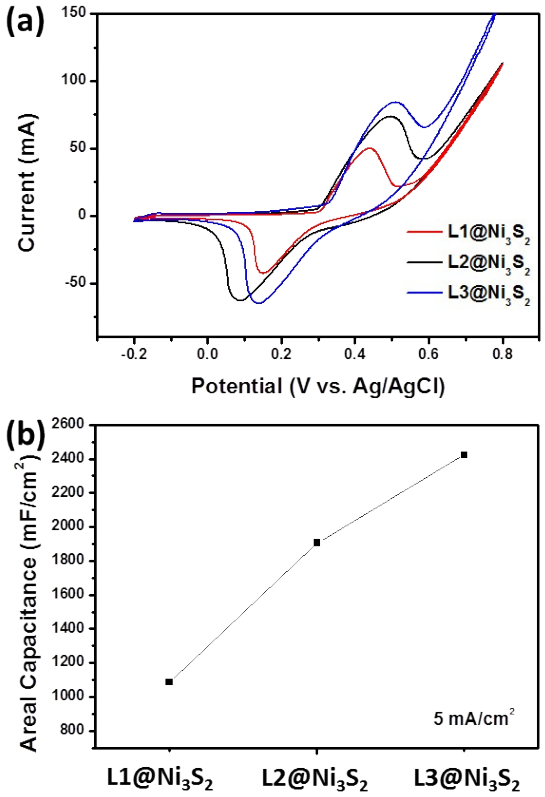

Fig. S4 (a) CV curves of L1@Ni_3S_2, L2@Ni_3S_2 and L3@Ni_3S_2 with the scan rate of 10mV s^{-1}. (b) The areal capacitances of L1@Ni_3S_2, L2@Ni_3S_2 and L3@Ni_3S_2 at 5mA cm^{-2}.

Table S1 The mass of ITO, Ni_3S_2 and the mass ratio (Ni_3S_2/ITO) of the CF@ITO@Ni_3S_2 with different electrodeposition cycles based on L2 samples. The areal capacitances, Gravimetric capacitance based on Ni_3S_2 mass and Gravimetric capacitancebased on Ni_3S_2/ITO mass of the CF@ITO@Ni_3S_2 with different electrodeposition cycles based on L2 samples.

CF@ITO@Ni_3S_2	ITO (mg cm^{-2})	Ni_3S_2 (mg cm^{-2})	Ni_3S_2/ ITO mass ratio	Areal capacitance (F cm^{-2})	Gravimetric capacitance based on Ni_3S_2 (F g^{-1})	Gravimetric capacitance based on Ni_3S_2/ITO (F g^{-1})
1 cyc	2.90	0.77	0.266	978.60	1270.90	266.89
2 cyc	2.90	0.96	0.331	1790.40	1865.00	464.39
3 cyc	2.90	1.60	0.552	2505.40	1565.88	557.45
4 cyc	2.90	2.22	0.766	2829.00	1274.32	553.05
5 cyc	2.90	4.12	1.421	3846.40	933.59	548.02

Table S2 The mass of Ni_3S_2 and the areal capacitances, Gravimetric capacitance based on Ni_3S_2 for CF@Ni_3S_2 electrodes with different electrodeposition cycles.

CF@Ni_3S_2	Ni_3S_2 (mg cm^{-2})	Areal capacitance (mF cm^{-2})	Gravimetric capacitance based on Ni_3S_2 (F g^{-1})
1 cycle	0.15	95.00	633.33
2 cycle	0.42	355.00	845.23
3 cycle	1.07	744.00	695.33

Table S3 The fitted parameters of the EIS data.

	Rs (Ω)	Rct (Ω)	Q1 (F)	n1	Q2 (F)	n2
CF@ITO@Ni_3S_2-1cyc	0.4036	1.668	0.001963	0.5159	0.0251	0.9192
CF@ITO@ Ni_3S_2-2cyc	0.3949	2.036	0.000929	0.5568	0.5576	0.8116
CF@ITO@ Ni_3S_2-3cyc	0.2566	2.026	0.001406	0.4812	0.6142	0.7634
CF@ITO@ Ni_3S_2-4cyc	0.5987	1.434	0.006358	0.4146	0.9015	0.7962
CF@ITO@ Ni_3S_2-5cyc	0.6344	1.715	0.004585	0.4479	0.9997	0.6741
CF@ Ni_3S_2-1cyc	0.8057	0.267	0.000886	0.7955	0.0694	0.8868
CF@ Ni_3S_2-3cyc	0.9092	0.318	0.004693	0.5427	0.1315	0.8631
CF@ Ni_3S_2-5cyc	0.9155	0.273	0.003719	0.6074	0.3764	0.7566

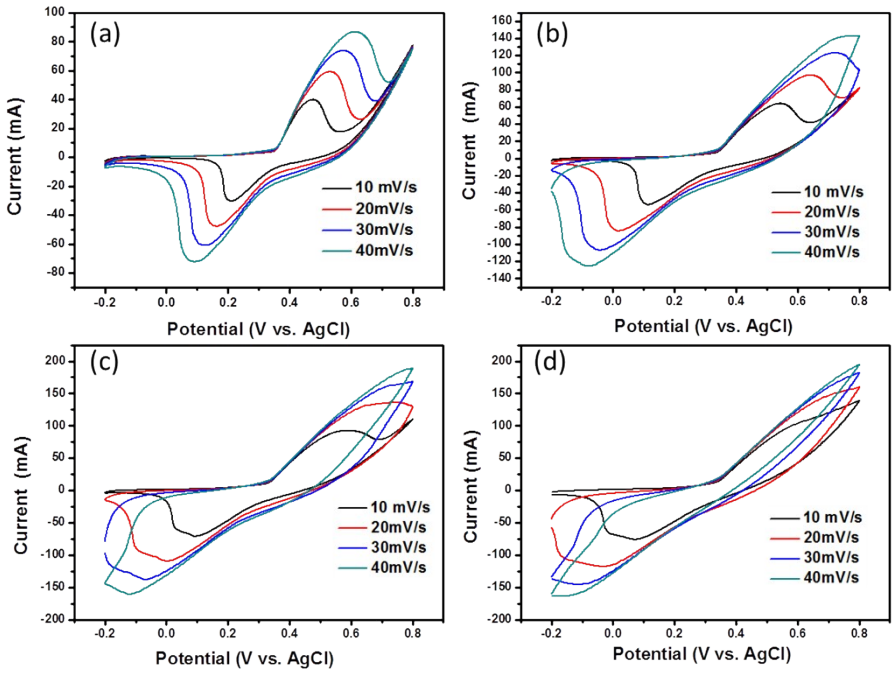

Fig. S5 (a) CV curves as a function of different scan rate for the CF@ITO@Ni_3S_2 electrodes electrodeposited with 1, 3, 4, 5 cycles.

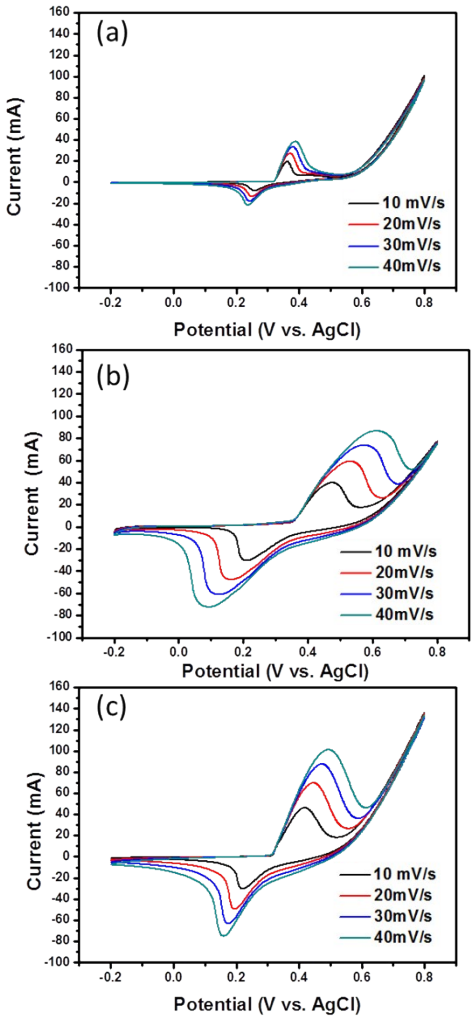

Fig. S6 CV curves as a function of different scan rate for the CF @Ni_3S_2 electrodes electrodeposited with 1, 3, 5 cycles.

Table S4 The Gravimetric capacitance based on Ni_3S_2 for all samples with L2 as a function of different current densities.

Current density (mA cm^{-2})	Gravimetric capacitance based on Ni_3S_2 (F g^{-1})							
	CF@Ni_3S_2-1cyc	CF@Ni_3S_2 -3cyc	CF@Ni_3S_2 -5cyc	CF@ITO @Ni_3S_2 -1cyc	CF@ITO@ Ni_3S_2 -2cyc	CF@ITO@ Ni_3S_2 -3cyc	CF@ITO@ Ni_3S_2 -4cyc	CF@ITO@ Ni_3S_2 -5cyc
2	693.33	902.40	823.38	1239.25	1727.99	1514.10	1267.49	960.44
5	633.33	852.00	697.08	1266.42	1865.00	1563.65	1276.24	980.00
8	586.67	801.60	679.09	1253.95	1749.06	1544.81	1201.81	950.49
10	560.00	784.81	671.60	1212.59	1700.05	1502.74	1162.29	933.69
20	504.00	700.80	592.89	1154.35	1599.80	1419.48	1072.96	864.10
30	452.00	619.20	528.43	1084.73	1518.05	1318.88	959.01	777.98
40	--	576.00	479.71	1038.40	1430.01	1256.22	828.63	--

50	--	552.00	430.99	960.24	1372.00	1174.58	--	--

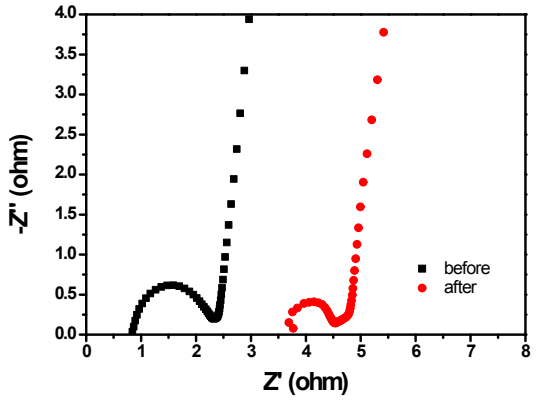

Fig. S7 The EIS curves of the CF@ITO@Ni_3S_2 electrodes before and after the cyclic stability.

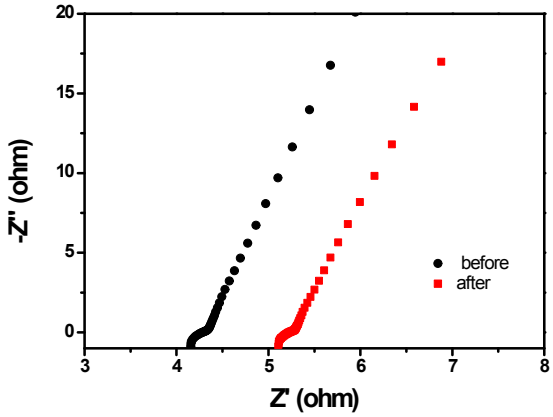

Fig. S8 The EIS curves of the CF@ITO@Ni_3S_2 symmetric device before and after the cyclic stability.

Table S5 The fitted parameters of the EIS data for the CF@ITO@Ni_3S_2 electrode and symmetric device before and after cyclic stability.

	Rs (ohm)	Rct (ohm)	Q1 (F)	n1	Q2（F）	n2
Electrode before cyclic stability	0.88	1.41	4.7E-6	0.92	0.0030	0.88
Electrode after cyclic stability	3.67	1.01	1.7E-5	0.79	0.0020	0.88
Device before cyclic stability	4.32	6730	8.4E-4	0.97	0.018	0.92
Device after cyclic stability	5.27	1079	1.4E-3	0.95	0.015	1.3