Supporting Information

Flexible and Conductive Metallic Paper-based Current Collector with Energy Storage Capability in Supercapacitor Electrodes

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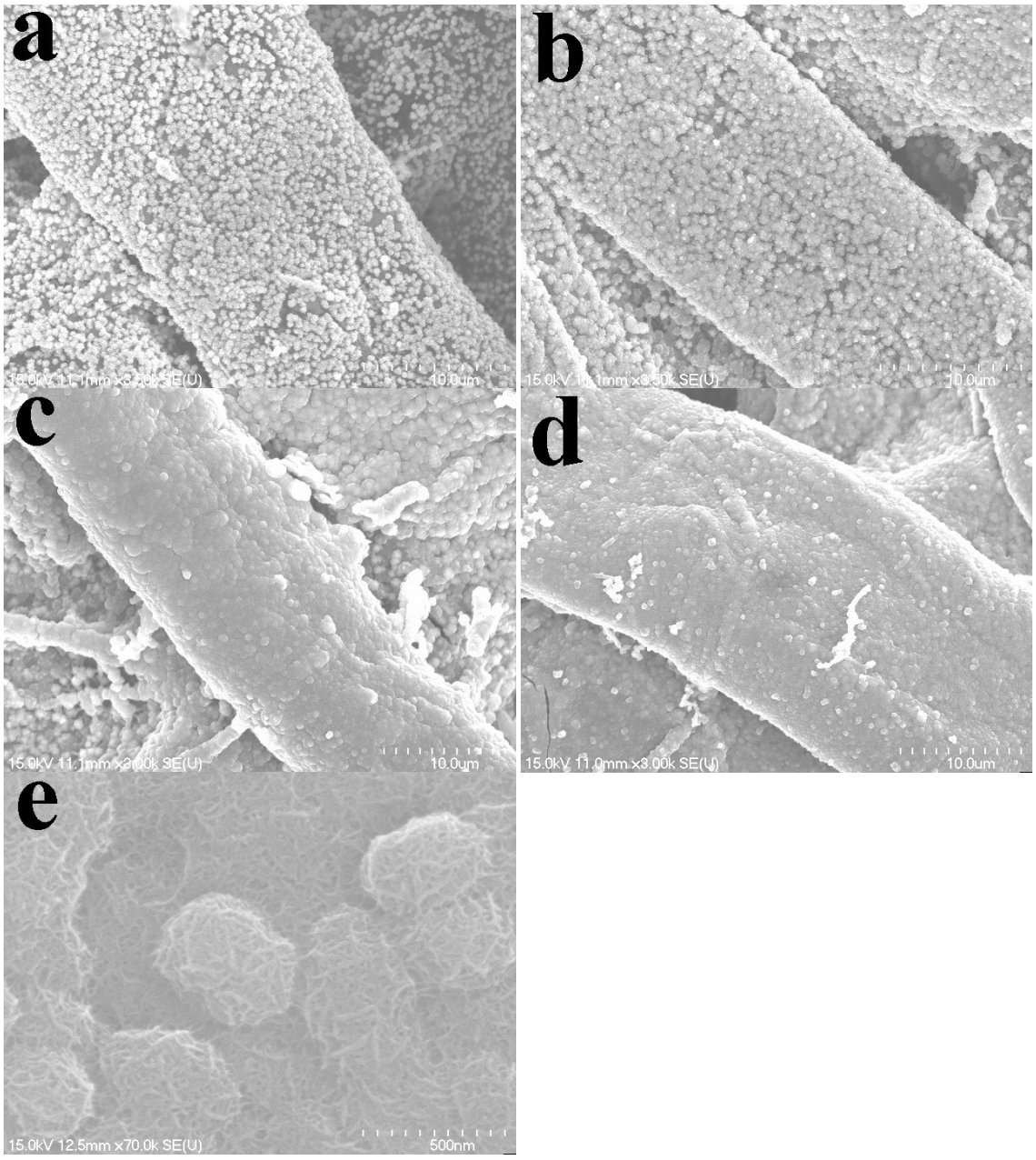

Figure S1. SEMimages of Ni-paper-MnO_2 electrodes with different soaking time: (a) 5 min;(b) 10 min; (c) 20 min; (d) 30 min; (e) 30 min (high magnification).

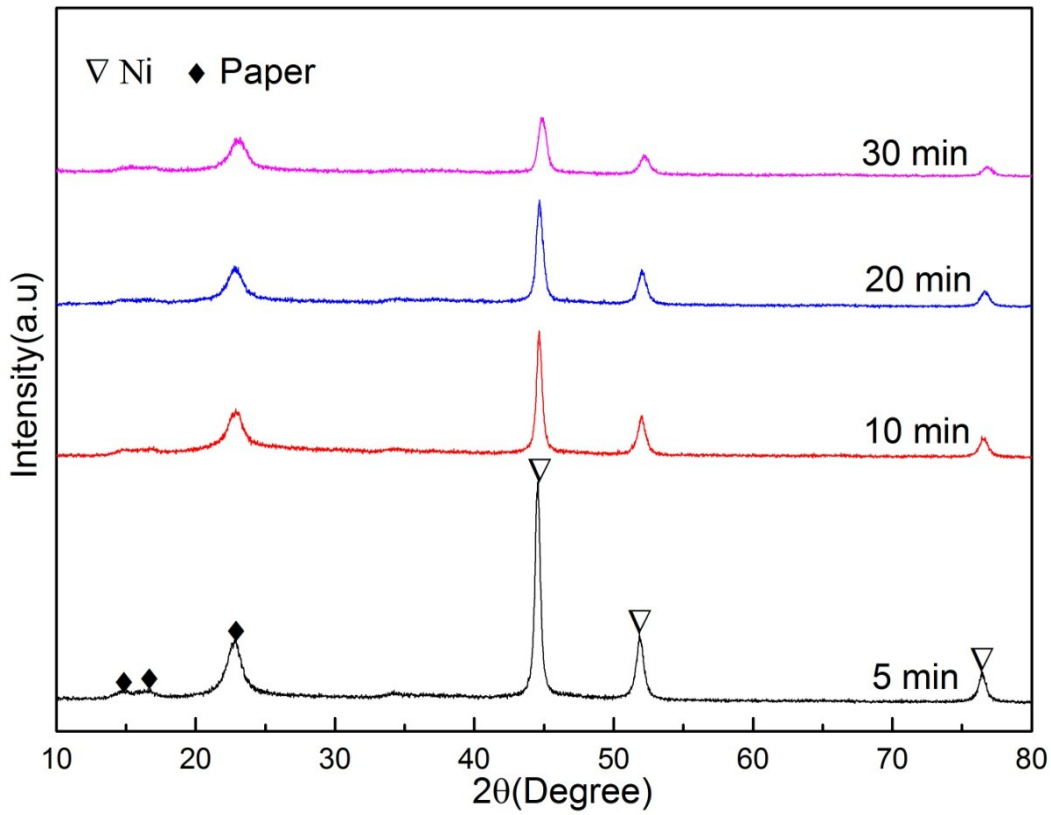

Figure S2. XRD patterns of Ni-paper-MnO_2 electrodes with different soaking time.

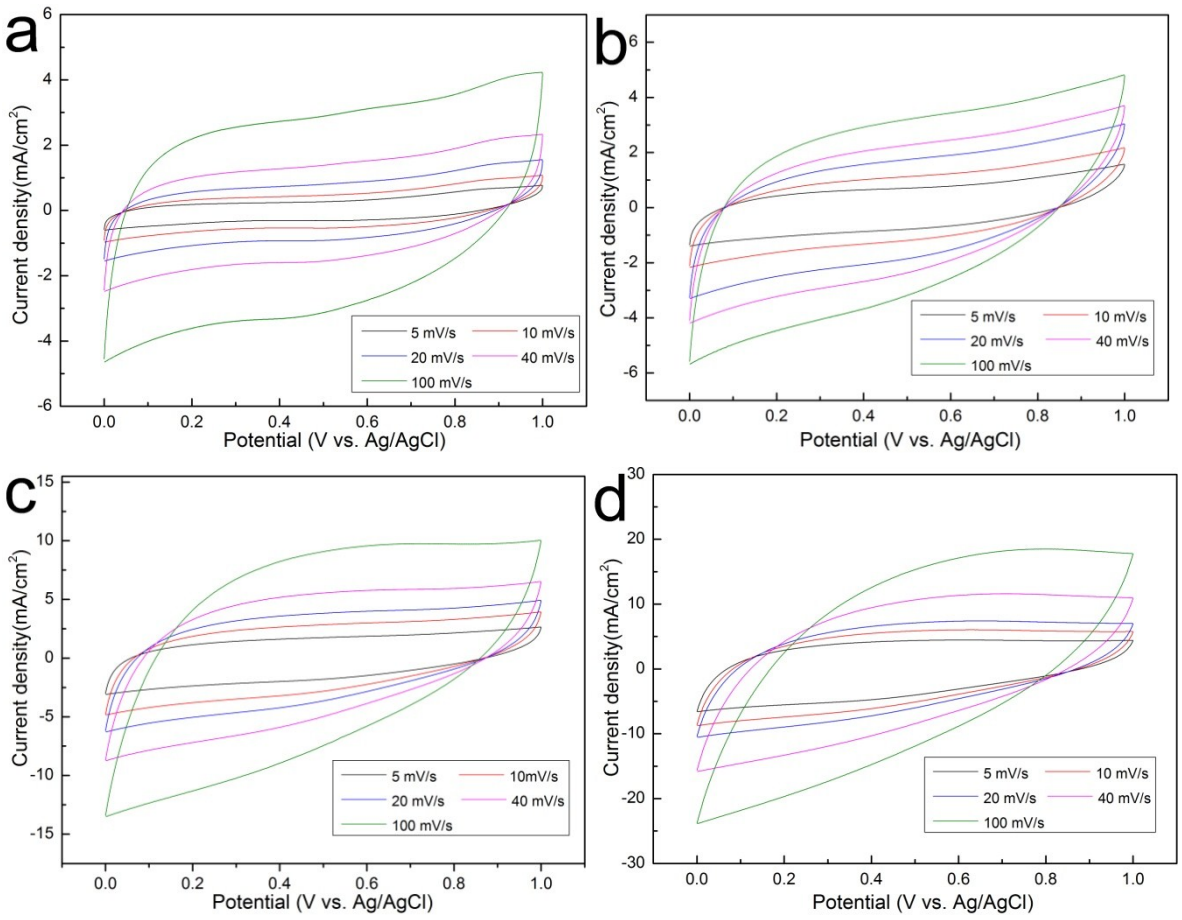

Figure S3. CV carves of Ni-paper-MnO_2 electrodes: (a) Ni-paper-5;(b) Ni-paper-10;(c) Ni-paper-20;(d) Ni-paper-30.

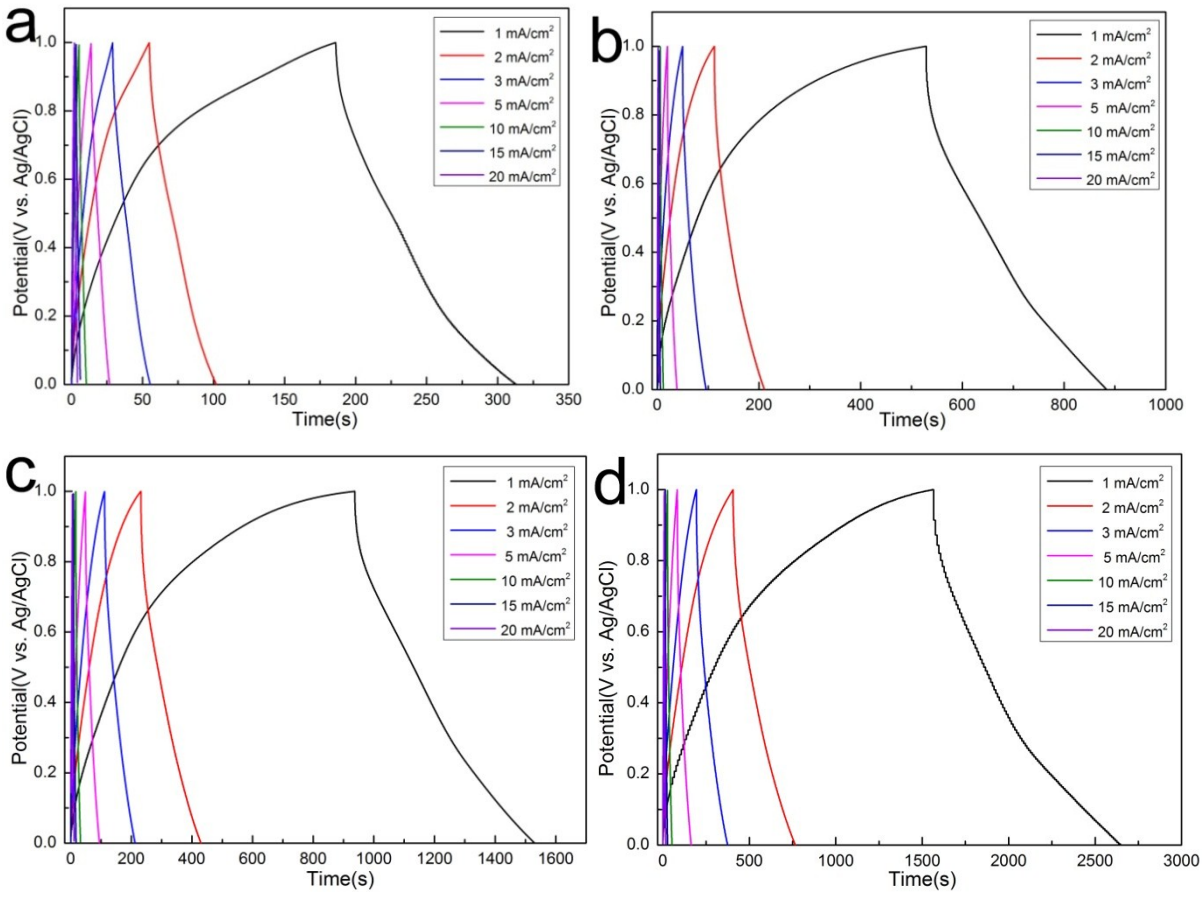

Figure S4. GCD carves of Ni-paper-MnO_2 electrodes: (a) Ni-paper-5;(b) Ni-paper-10;(c) Ni-paper-20;(d) Ni-paper-30.

Table.S1 Comparison of as prepared supercapacitor with some reported supercapacitors.

Materials	Current collector	Electrolyte	Capacitance	Stability (cycles)	Ref.
MnO_2 nanostructure	Graphite foam	1M Na_2SO_4	201 F/g (1A/g)	96.7% (1000)	S1
MnO_2	Graphite fiber	1M Na_2SO_4	245 F/g (1A/g)	80% (1000)	S2
MnO_2 nanowires	PVDF membrance	0.5M Na_2SO_4	118 F/g (200 mV/s)	95.3% (1000)	S3
MnO_2 nanorods	Carbon nanofibers	1M Na_2SO_4	291 F/g (1A/g)	90.9% (5000)	S4
MnO_2 nanoflowers	Graphite paper	6%NH_4HCO_3	368.3 F/g (0.2A/g)	98.4% (3000)	S5
MnO_2 nanosheets	Carbon sphere	1M Na_2SO_4	231 F/g (0.5A/g)	96% (1000)	S6
MnO_2 nanoparticle	3D graphene	1M Na_2SO_4	324 F/g (0.4A/g)	91.1% (5000)	S7
MnO_2/reduced graphene oxide	Ni fibers	1M Na_2SO_4	119.4 mF/cm^2 (0.5mA/cm^2)		S8
MnO_2 nanorods	Porous carbon	6M KOH	196.2 F/g (1A/g)	78.5% (5000)	S9
MnO_2 nanosheets	Carbon fibers	1M Na_2SO_4	115.3 F/g (0.5A/g)	85.6% (2000)	S10
MnO_2	Ni Paper	1M Na_2SO_4	1095 mF/cm^2 (1 mA/cm^2) 352 F/g (0.33 F/g)	73% (2000)	This work

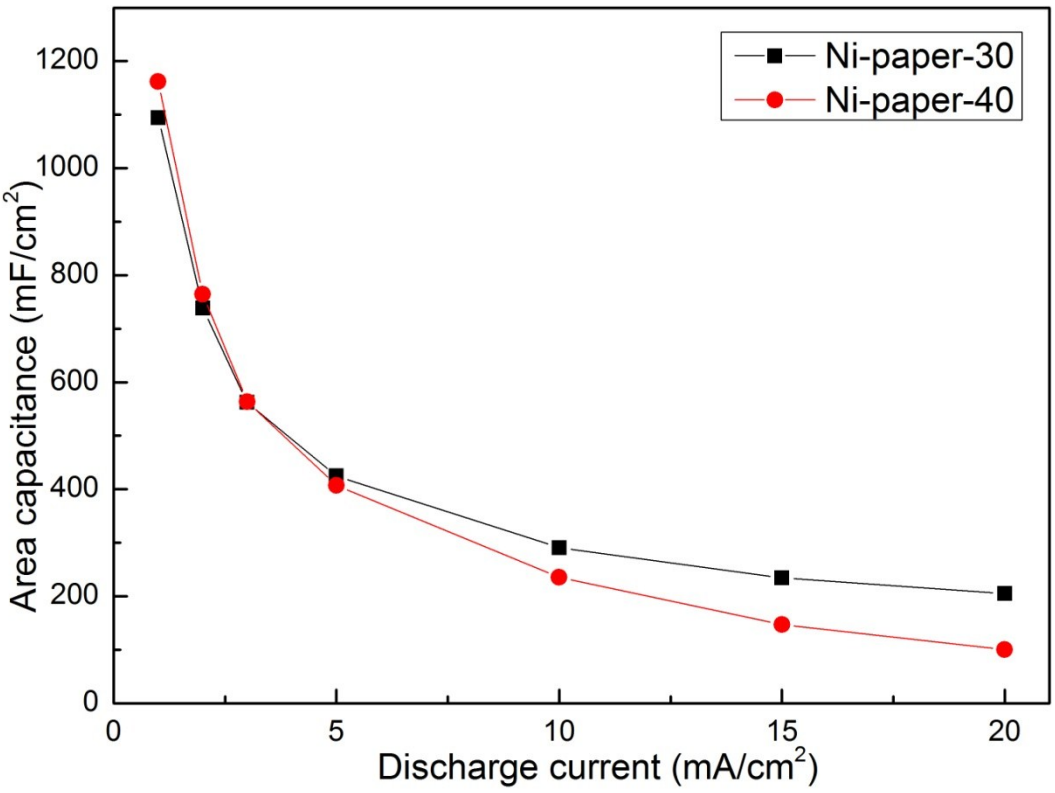

Figure S5. Areal specific capacitance measured at different current densities in the potential range of 0−1.0 V for Ni-paper-30 and Ni-paper-40.

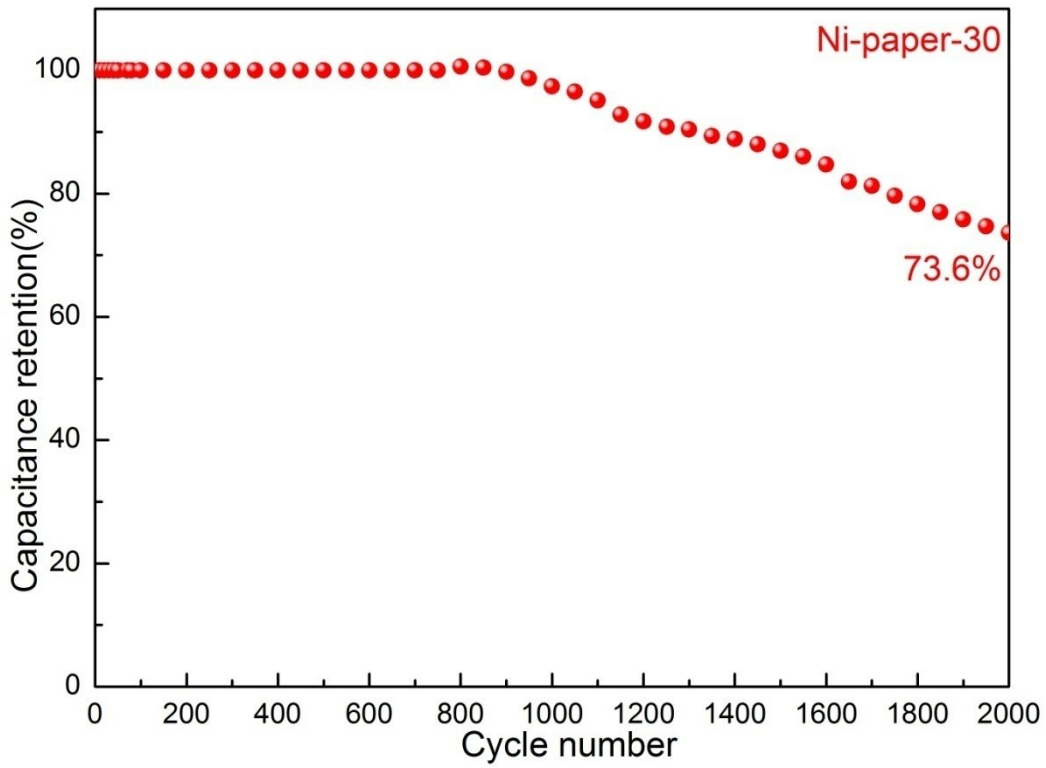

Figure S6. Cycling stability of the Ni-paper-30 at a current density of 10 mA/cm^2.

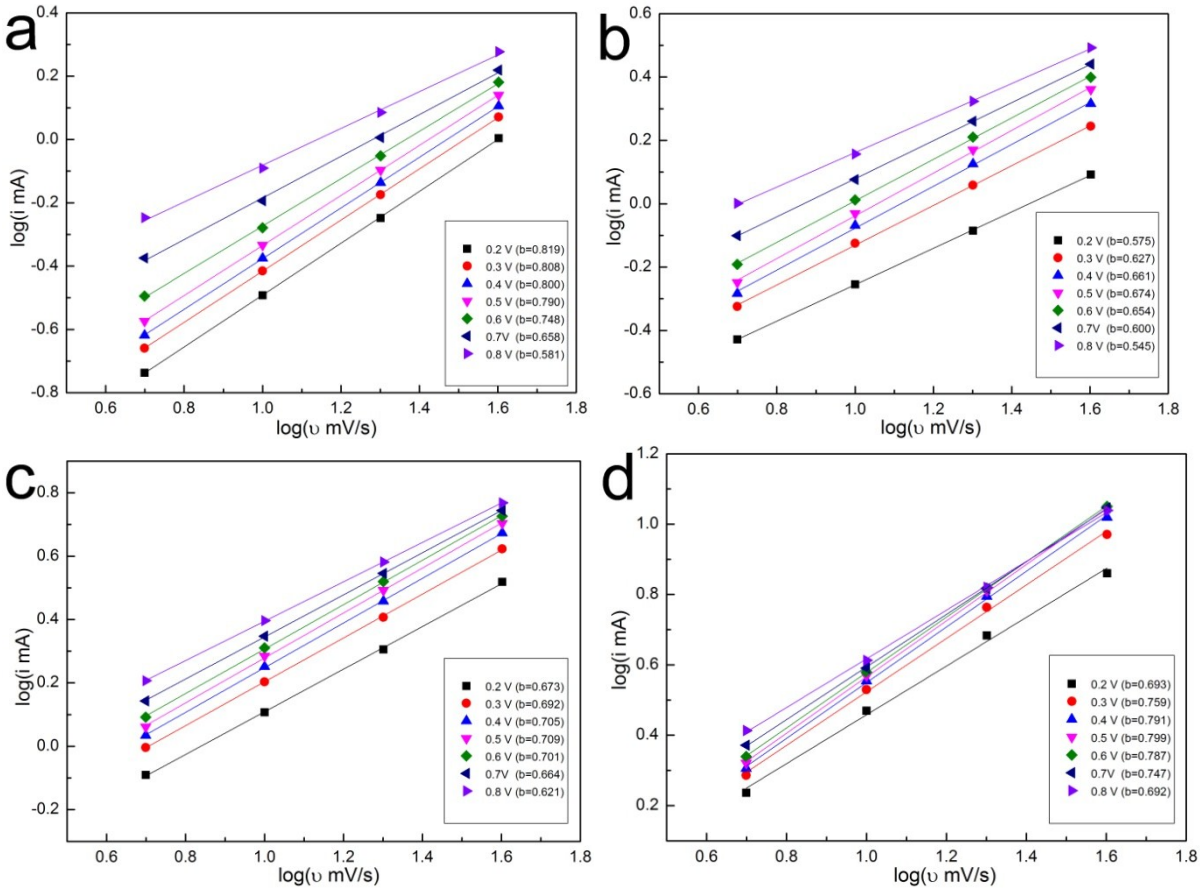

Figure S7. log(i) *vs* log(v) plot of the sample:(a) Ni-paper-5;(b) Ni-paper-10;(c) Ni-paper-20;(d) Ni-paper-30.

The contribution ofthe capacitive charge storage and the diffusioncontrolled insertion processes could be quantitative separated by thefollowing formula:[S11,S12]

$$i(V) = k_1 v + k_2 v^{1/2} \quad (1)$$

$$i(V)/v^{1/2} = k_1 v^{1/2} + k_2 \quad (2)$$

where i(V) is the current at a given voltage, k_1 and k_2 areconstants, and v is the scan rate.$k_1 v$ and $k_2 v^{1/2}$represents the capacitive behaviouranddiffusioncontrolled insertion processes, respectively. k_1 and $k_2$could be obtained by formula (2).

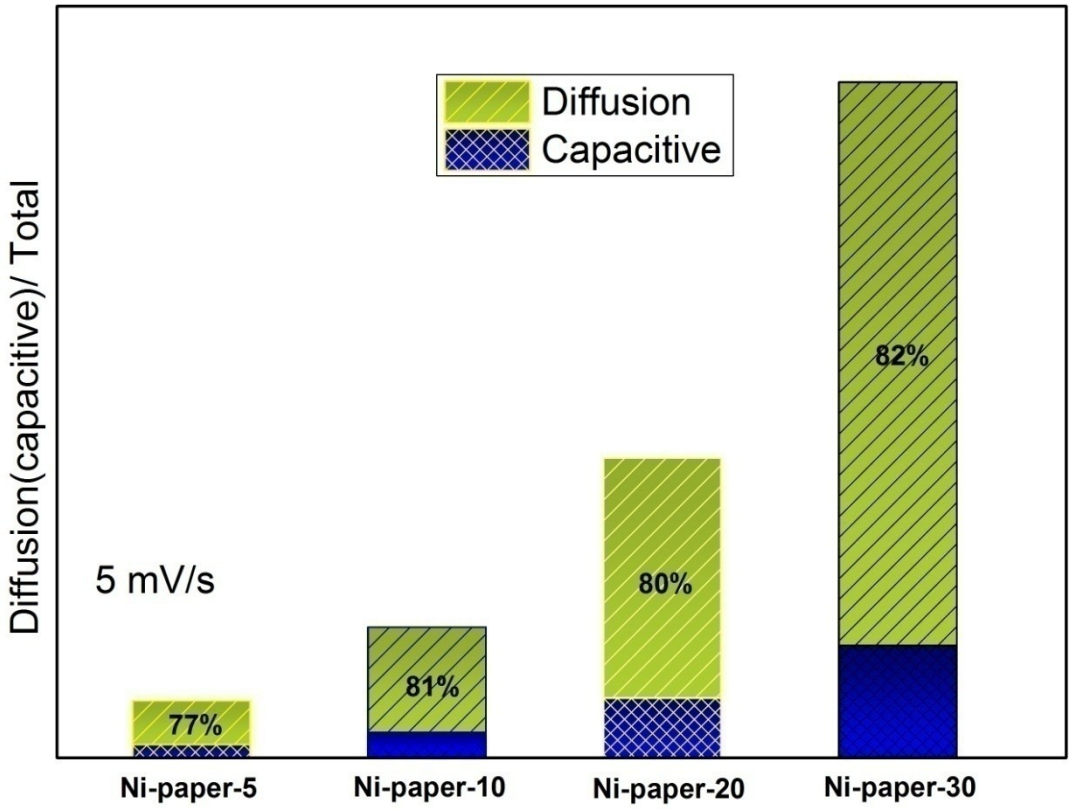

Figure S8. Diffusiveand capacitive capacitance contribution of the samples at a scan rate 5 mV/s.

References

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