Supplementary Information for

Nitrogen-doped porous carbon as-mediated by a facile solution combustion synthesis for supercapacitor and oxygen reduction electrocatalyst

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Table S1. Summary of the carbon percentage in MgO@C precursors obtained from TG analysis in Figure S5 and production yield of carbon in a unit of g-carbon/g-glycine.

Samples	Carbon percentage in MgO@C (wt%)	Yield (g-carbon/g-glycine)
NPC-n2.5-800	33.28	0.107
NPC-n2.5-900	30.61	0.095
NPC-n2.5-1000	29.66	0.091
NPC-n2.5-1100	29.15	0.088
NPC-n2-900	28.57	0.107
NPC-n2-1000	17.86	0.058
NPC-n3-900	40.92	0.124
NPC-n3-1000	38.81	0.114

Table S2. Summary of the parameters for ORR activities at a rotation speed of 1600 rpm.

Samples	Onset potential (E_{onset} / V vs. RHE)	Half-wave potential ($E_{1/2}$ / V vs. RHE)	Current density at 0.7 V ($I_{0.7}$ / mA cm^{-2})	Limiting current density at 0.2 V (I_{lim} / mA cm^{-2})
NPC-n2.5-800	0.84	0.77	-3.16	-4.40
NPC-n2.5-900	0.92	0.81	-3.88	-4.68
NPC-n2.5-1000	0.92	0.81	-4.29	-4.54
NPC-n2.5-1100	0.92	0.83	-4.06	-3.84
NPC-n2-900	0.93	0.84	-4.20	-4.56
NPC-n3-900	0.92	0.81	-3.60	-3.94
NPC-n2-1000	0.95	0.86	-5.05	-4.80
NPC-n3-1000	0.90	0.81	-4.09	-4.00
KB	0.87	0.76	-2.28	-3.25

Table S3. Summary of the ion transfer number obtained from K-L plots at different potentials.

Samples	0.3 V vs. RHE	0.4 V vs. RHE	0.5 V vs. RHE	0.6 V vs. RHE
NPC-n2.5-800	3.266	3.267	3.203	3.124
NPC-n2.5-900	3.646	3.522	3.444	3.396
NPC-n2.5-1000	3.446	3.515	3.534	3.530
NPC-n2.5-1100	2.640	2.654	2.661	2.707
NPC-n2-900	3.578	3.540	3.442	3.504
NPC-n2-1000	3.638	3.639	3.685	3.726
NPC-n3-900	3.351	3.319	3.288	3.208
NPC-n3-1000	3.340	3.366	3.405	3.464
KB	2.448	1.804	1.513	1.485

Table S4. Summary of the capacitance.

Samples	**BET SSA [m^2 g^{-1}]**	**N content [at%]**	**O content [at%]**	**Capacitance at 1 A g^{-1} [F g^{-1}]**	**Capacitance per surface area at 1 A g^{-1} [F m^{-2}]**
NPC-n2.5-800	*1378*	*12.4*	*13.3*	*191*	*0.139*
NPC-n2.5-900	1336	4.5	11.3	197	0.147
NPC-n2.5-1000	1331	2.1	8.1	161	0.121
NPC-n2.5-1100	1249	0.7	5.2	127	0.102
NPC-n2-900	1958	6.7	11.1	232	0.118
NPC-n2.5-900	1336	4.5	11.3	197	0.147
NPC-n3-900	1030	4.2	11.9	166	0.161
NPC-n2-1000	1838	2.6	7.8	177	0.096
NPC-n2.5-1000	1331	2.1	8.1	161	0.121
NPC-n3-1000	958	2.4	7.9	110	0.115
KB	1330	-	-	87	0.077

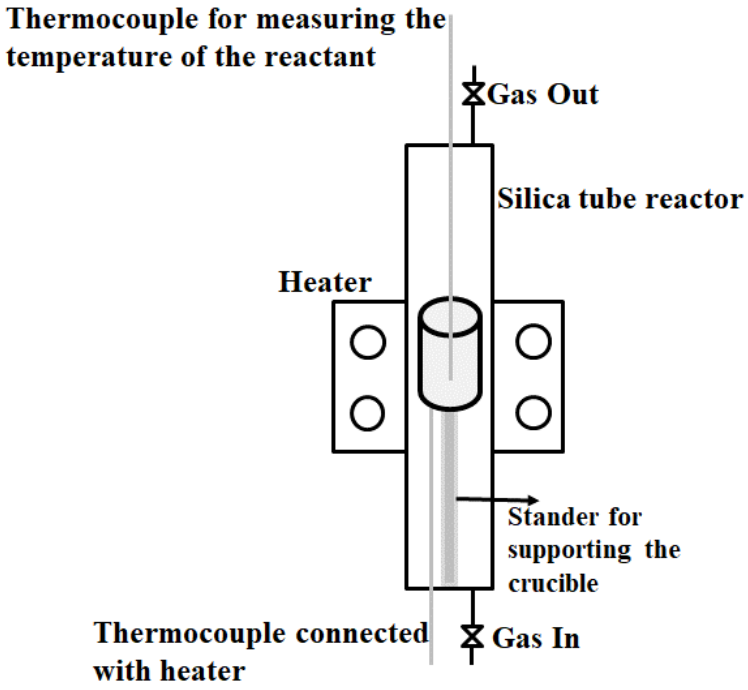

Figure S1. Apparatus setup for the SCS reaction.

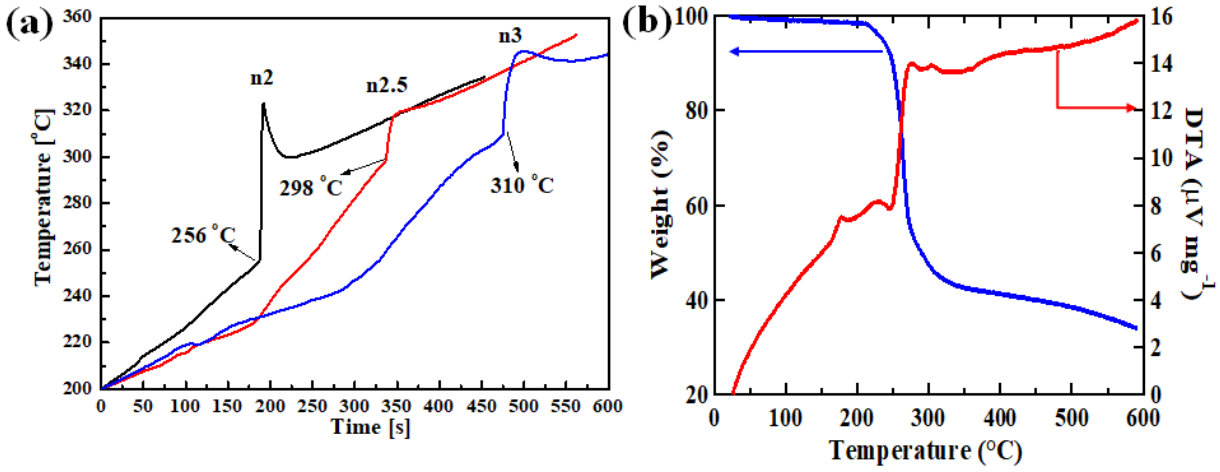

Figure S2. (a) Temperature history of the SCS reaction at different fuel ratios as-monitored by inserting a K-type thermocouple into the reactants. (b) TG-DTA curves for the pyrolysis of the gel precursor under Ar flow.

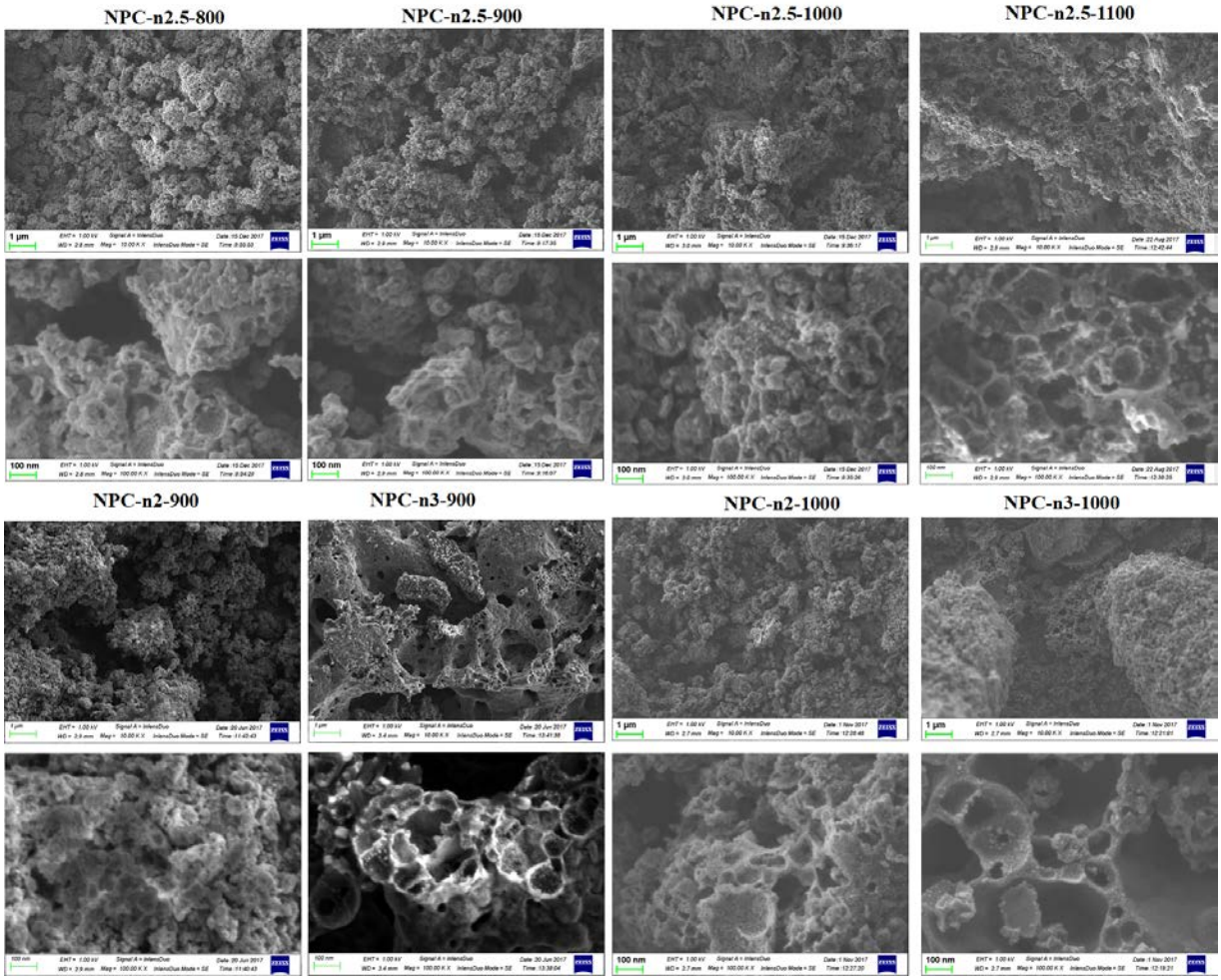

Figure S3. SEM images of the calcined MgO@C composite samples.

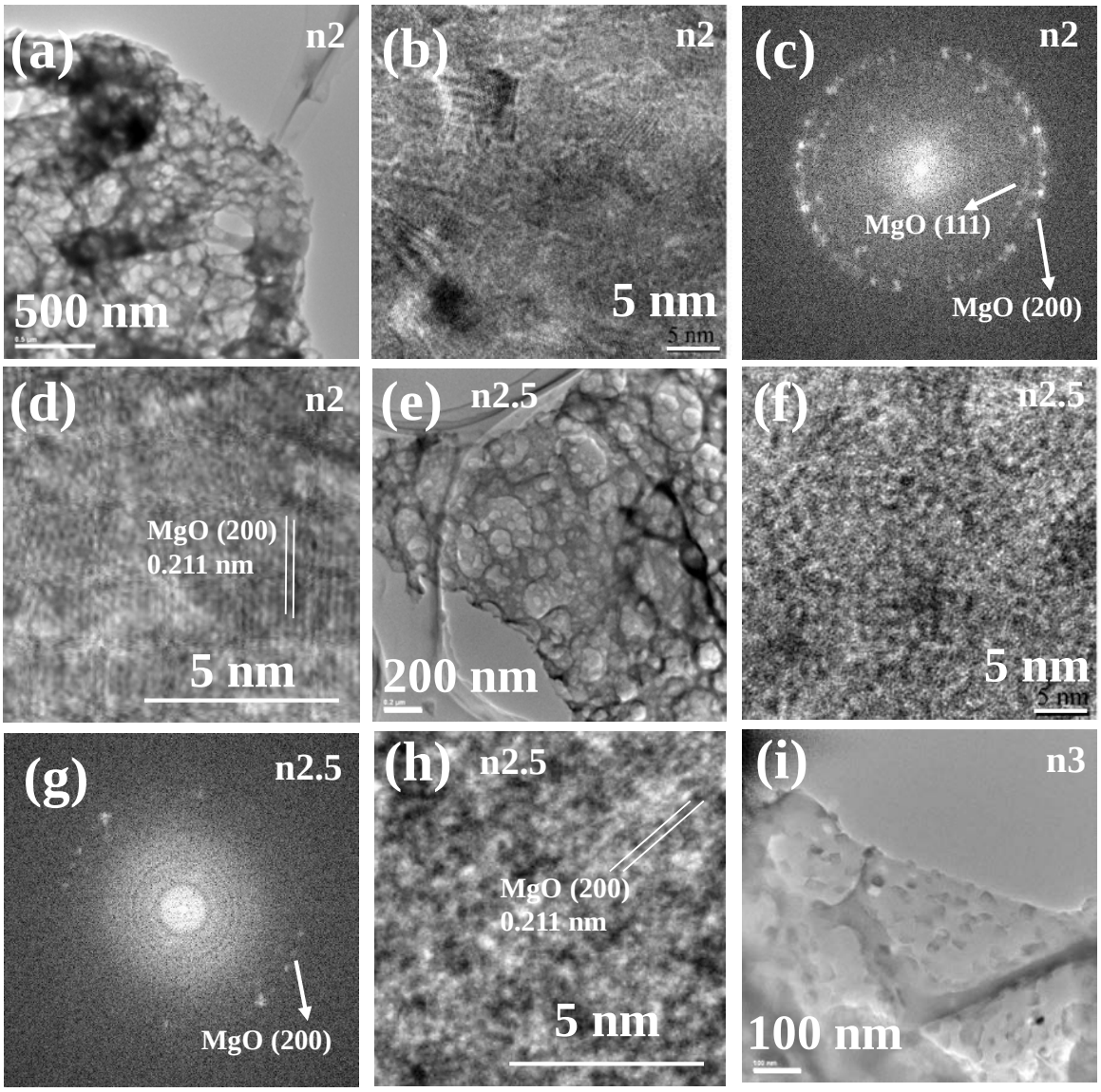

Figure S4. TEM observation of the MgO@C samples after calcination at 800 °C. (a, e, i) show the typical TEM images at a low magnification; (b, d, f, h) show the high resolution TEM images; (c) and (g) show the FFT diffraction patterns from areas (b) and (f) respectively.

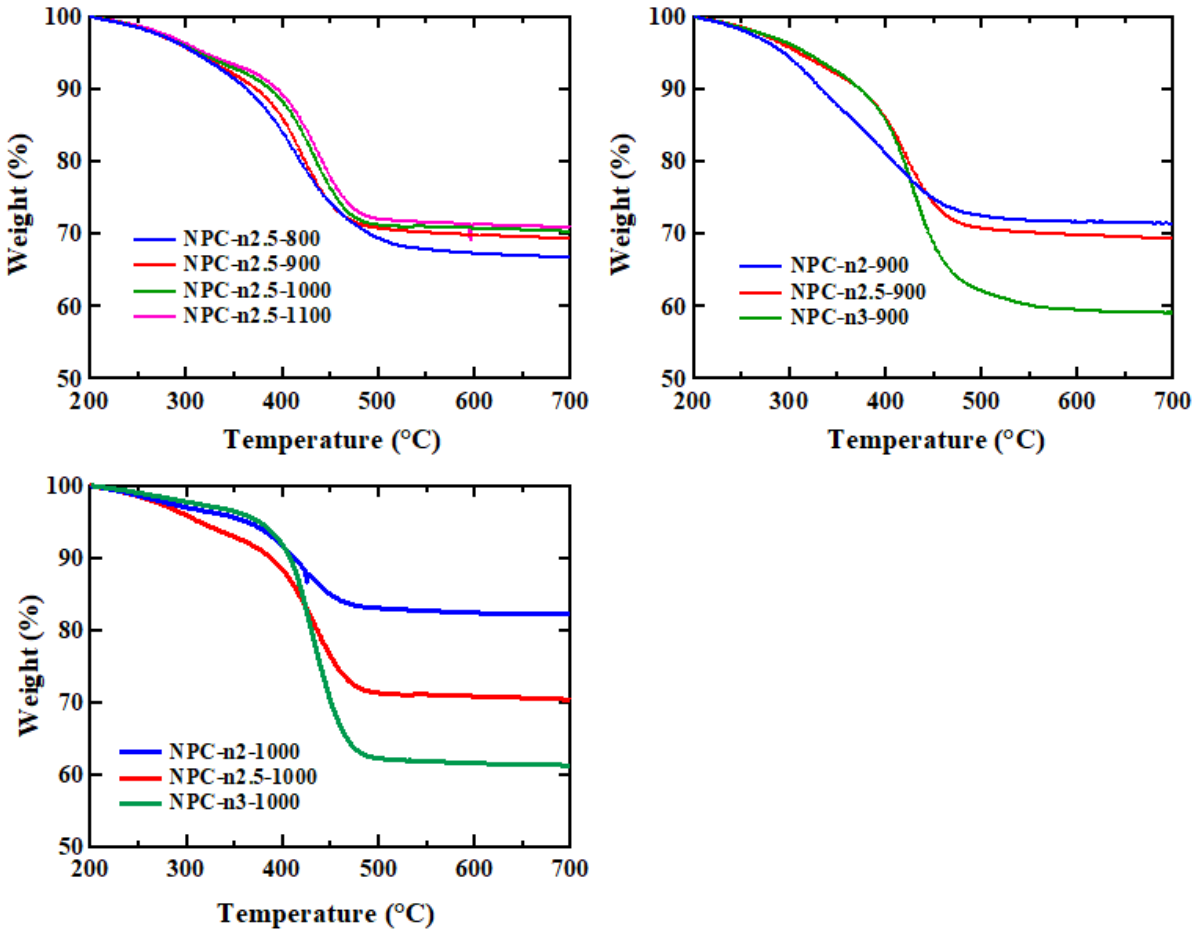

Figure S5. TG curves of the calcined samples under air flow to determine the carbon content in the MgO@C composites.

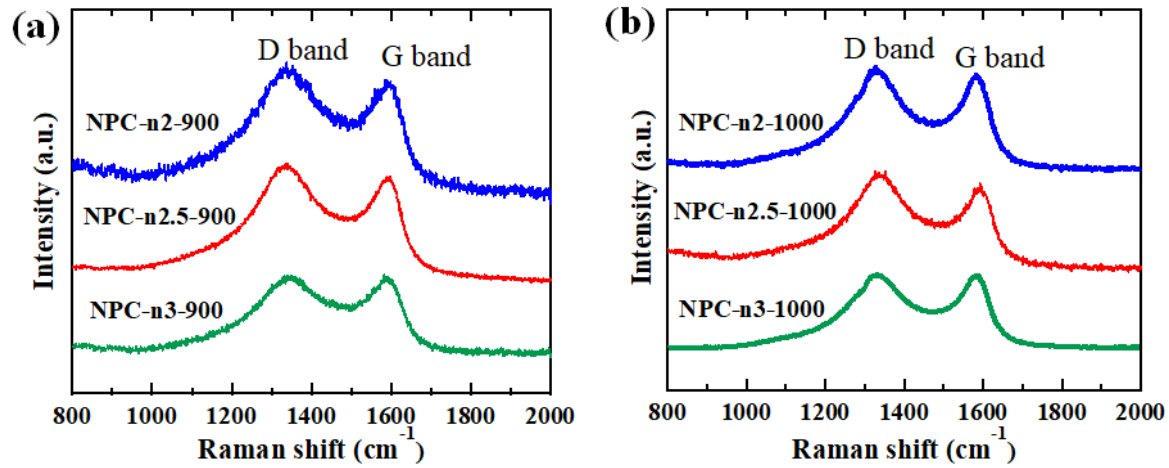

Figure S6-1. Raman spectra for the obtained carbon samples.

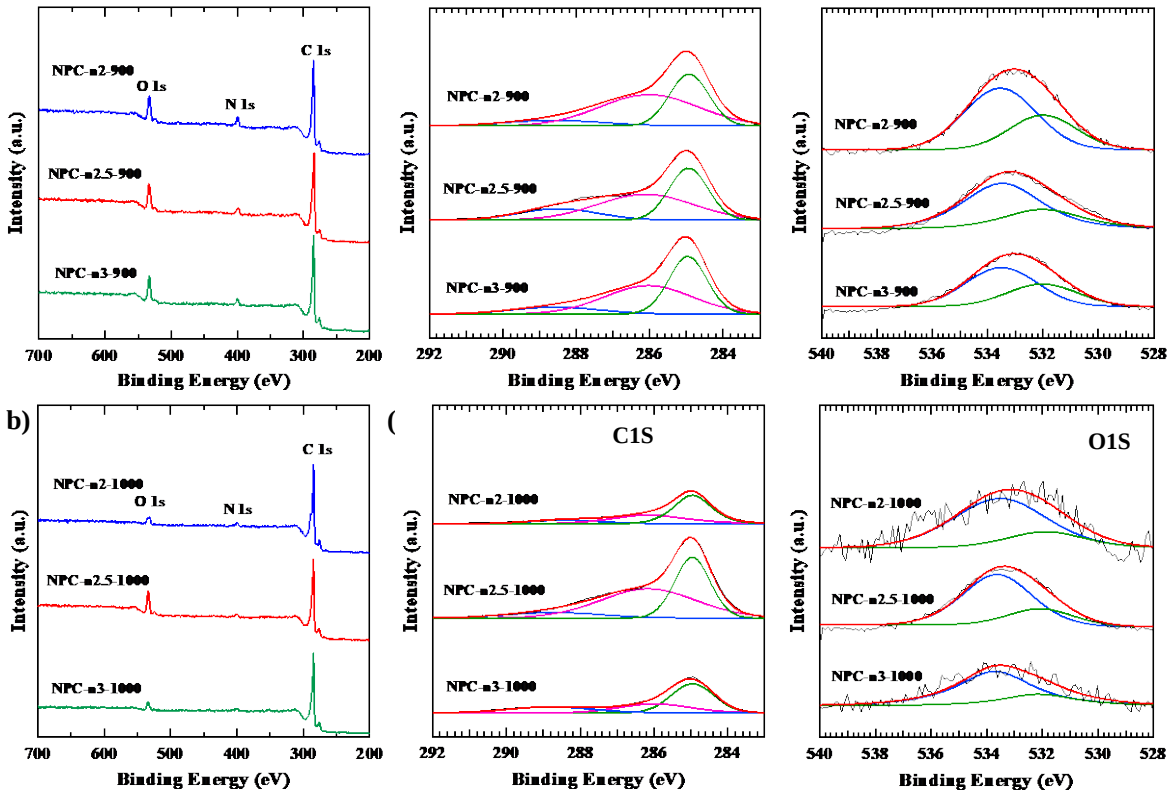

Figure S6-2. XPS spectra for the NPC samples.

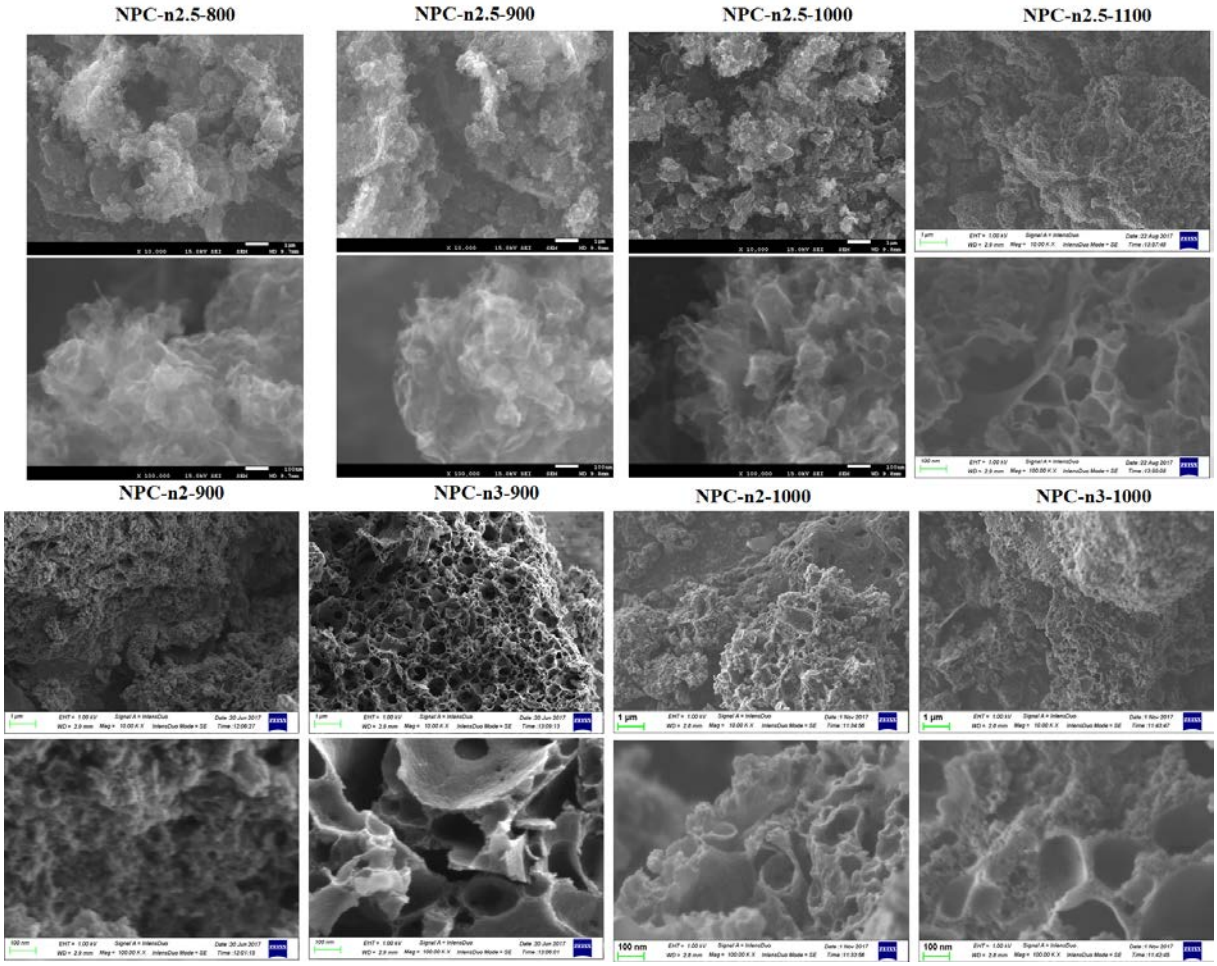

Figure S7. SEM images of the final carbon samples obtained after acid washing.

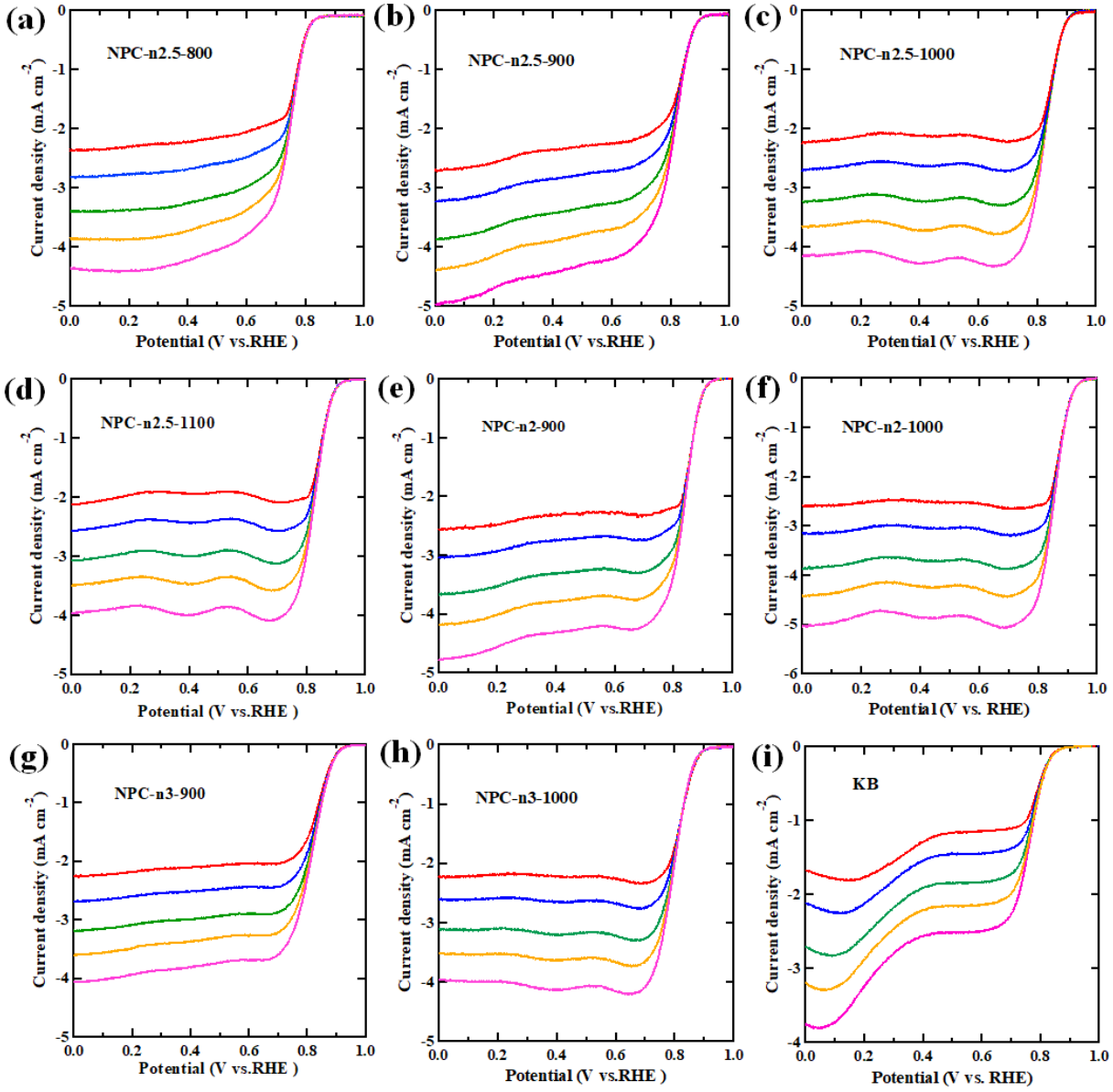

Figure S8. LSV curves of the samples obtained under various rotation speeds.

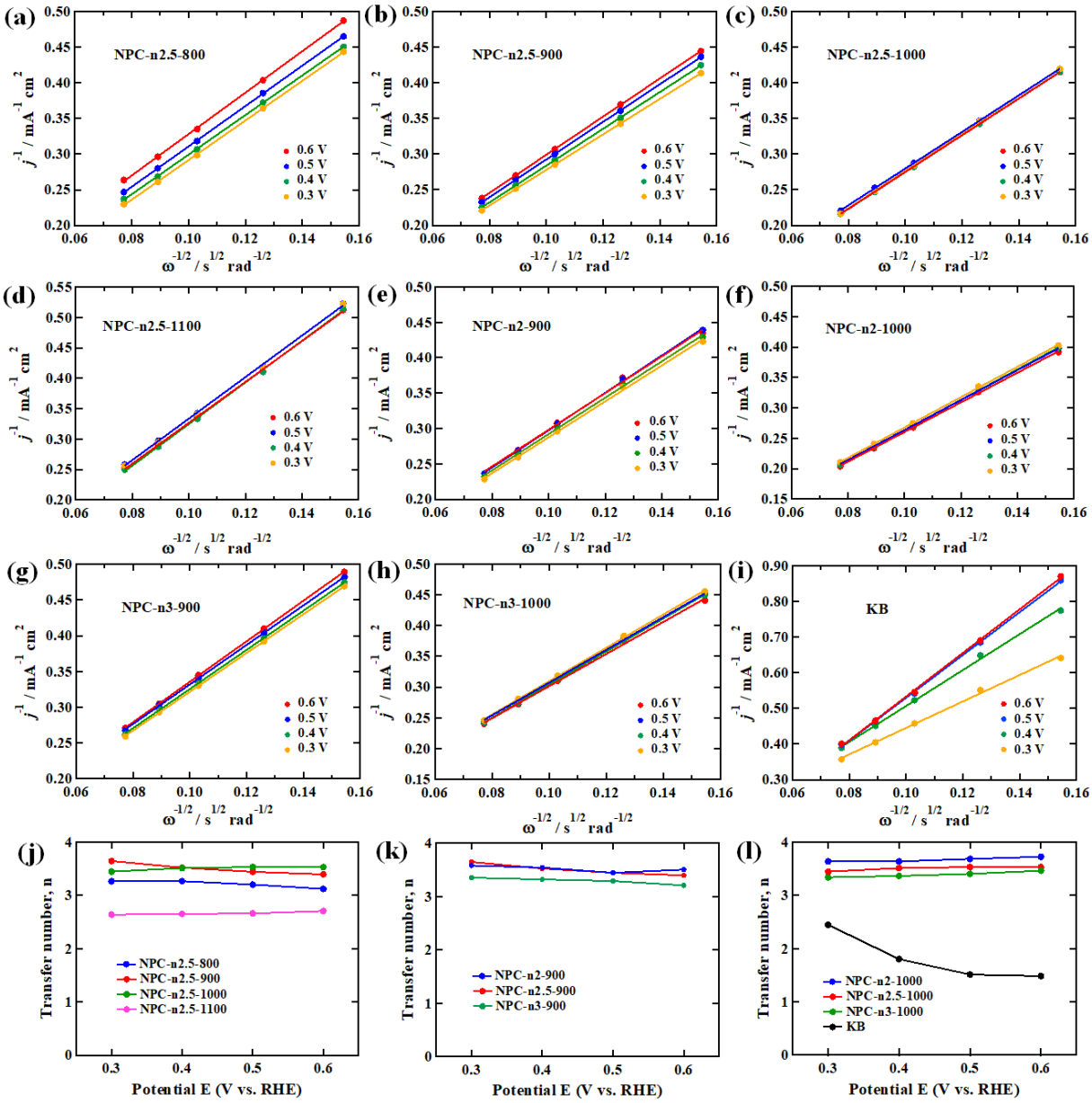

Figure S9. (a-i) K-L plots based on the LSV curves in Figure S8. (j-l) Summary of the ion transfer numbers calculated from K-L plots.

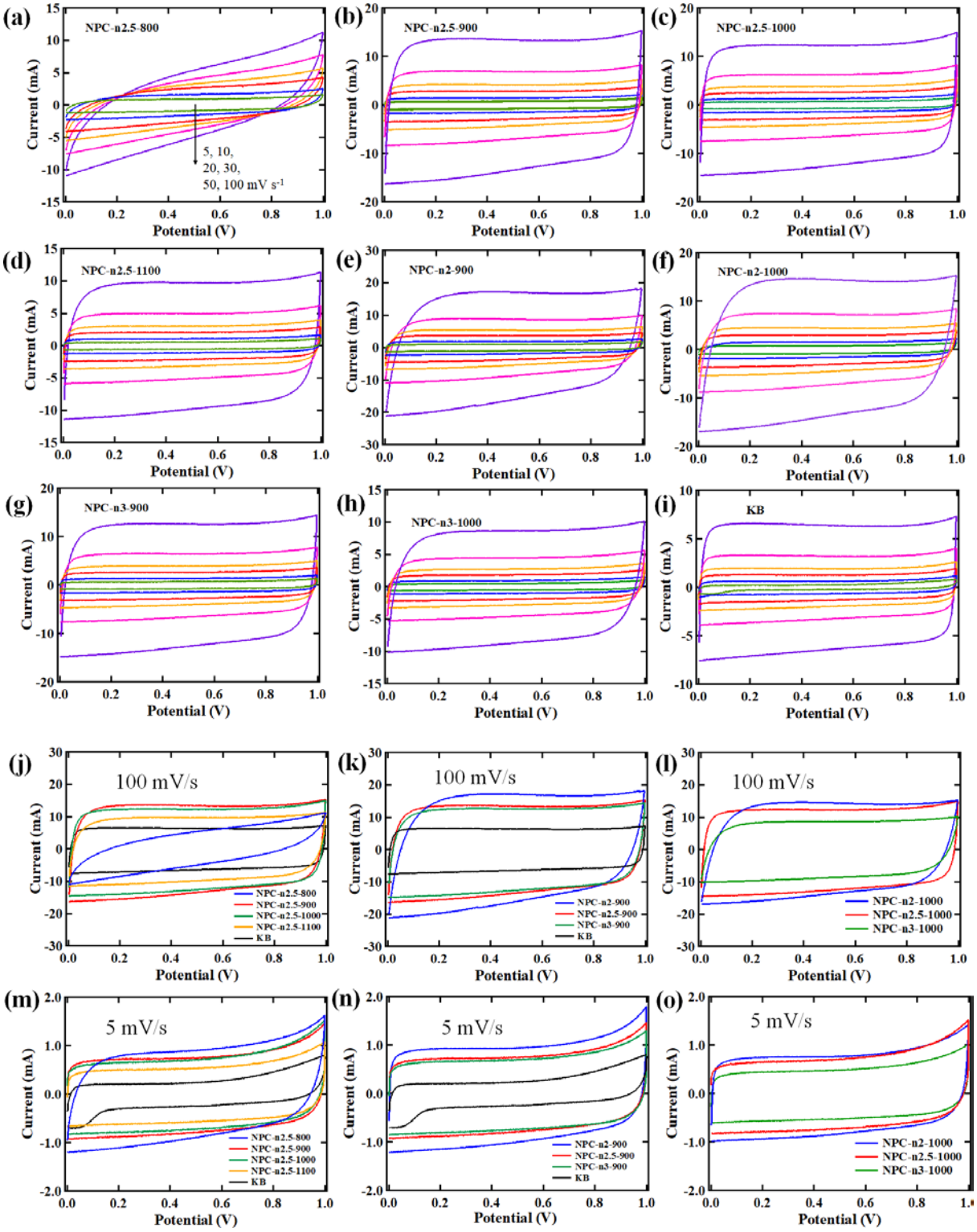

Figure S10. CV curves for the two-electrode supercapacitors based on the NPC carbons.

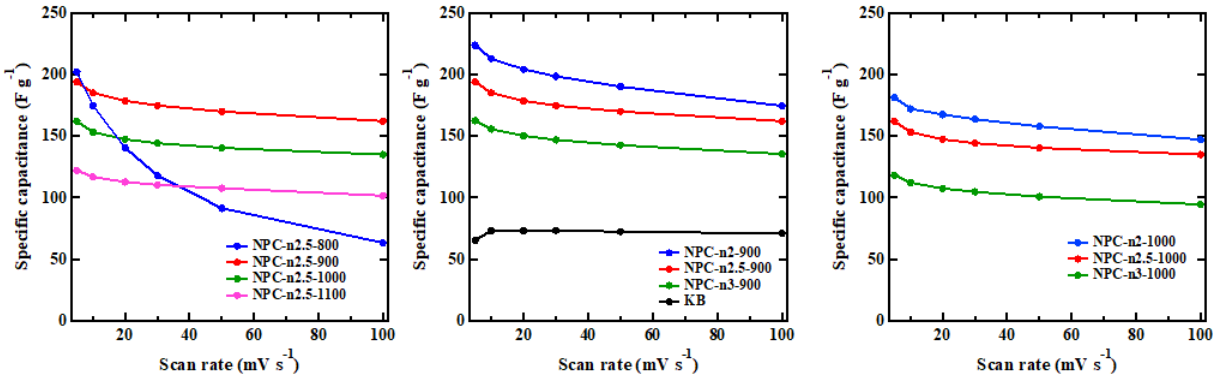

Figure S11. Capacitance as-calculated based on the CV curves in Figure S10.

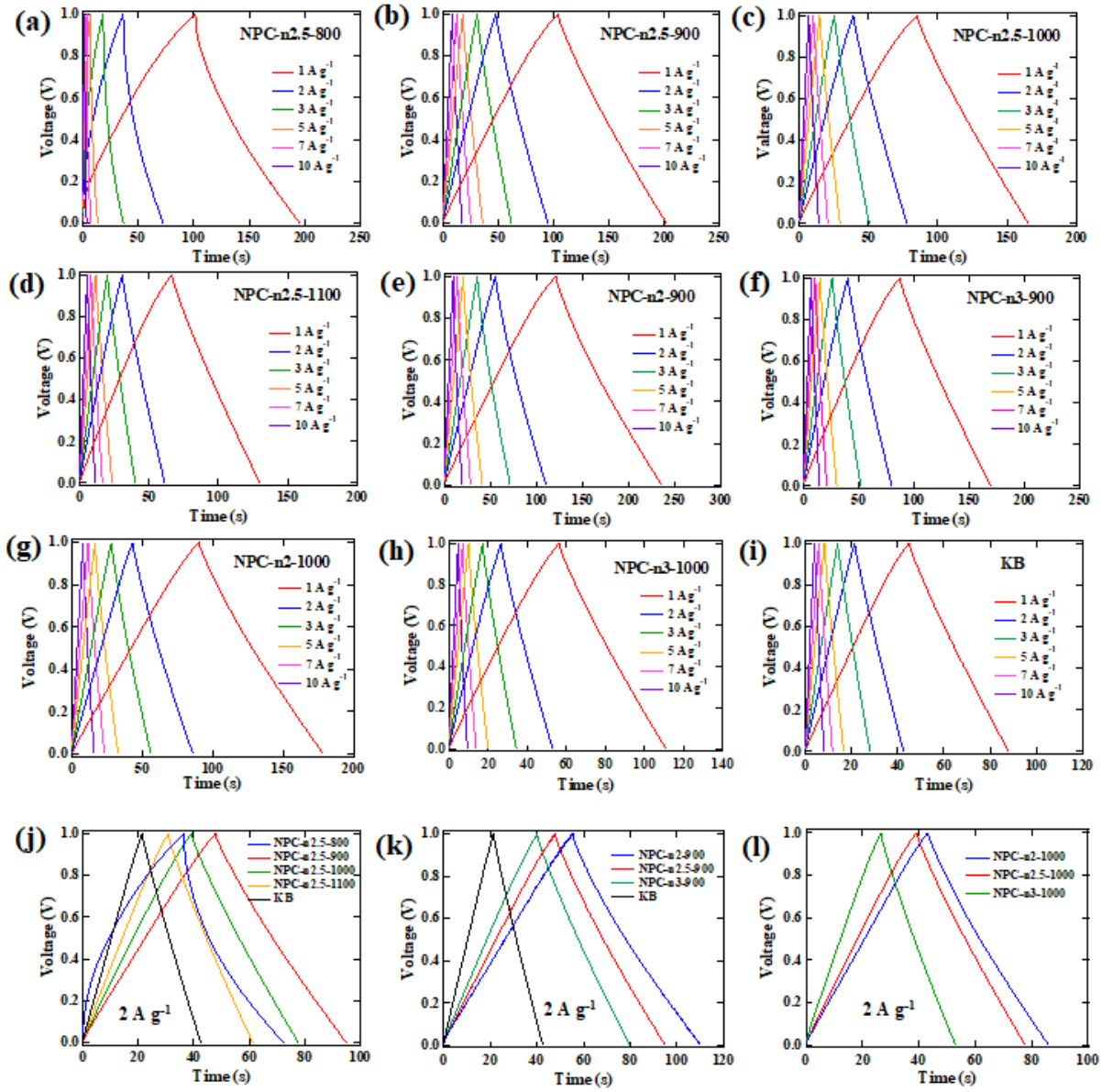

Figure S12. Charge-discharge curves for the two-electrode supercapacitors based on the NPC carbons.