Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

N/S co-doped coal-based porous carbon spheres as electrode materials for high performance supercapacitors

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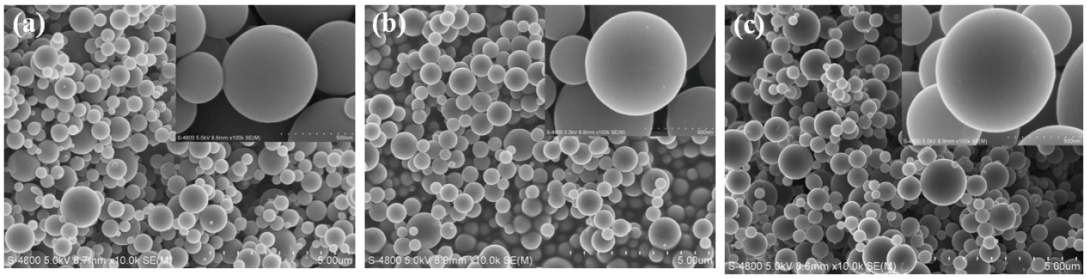

Fig S1. Morphology of samples. (a) SEM image of the PCSs, (b) SEM image of the NSPCSs-1, (c) SEM image of the NSPCSs-5.

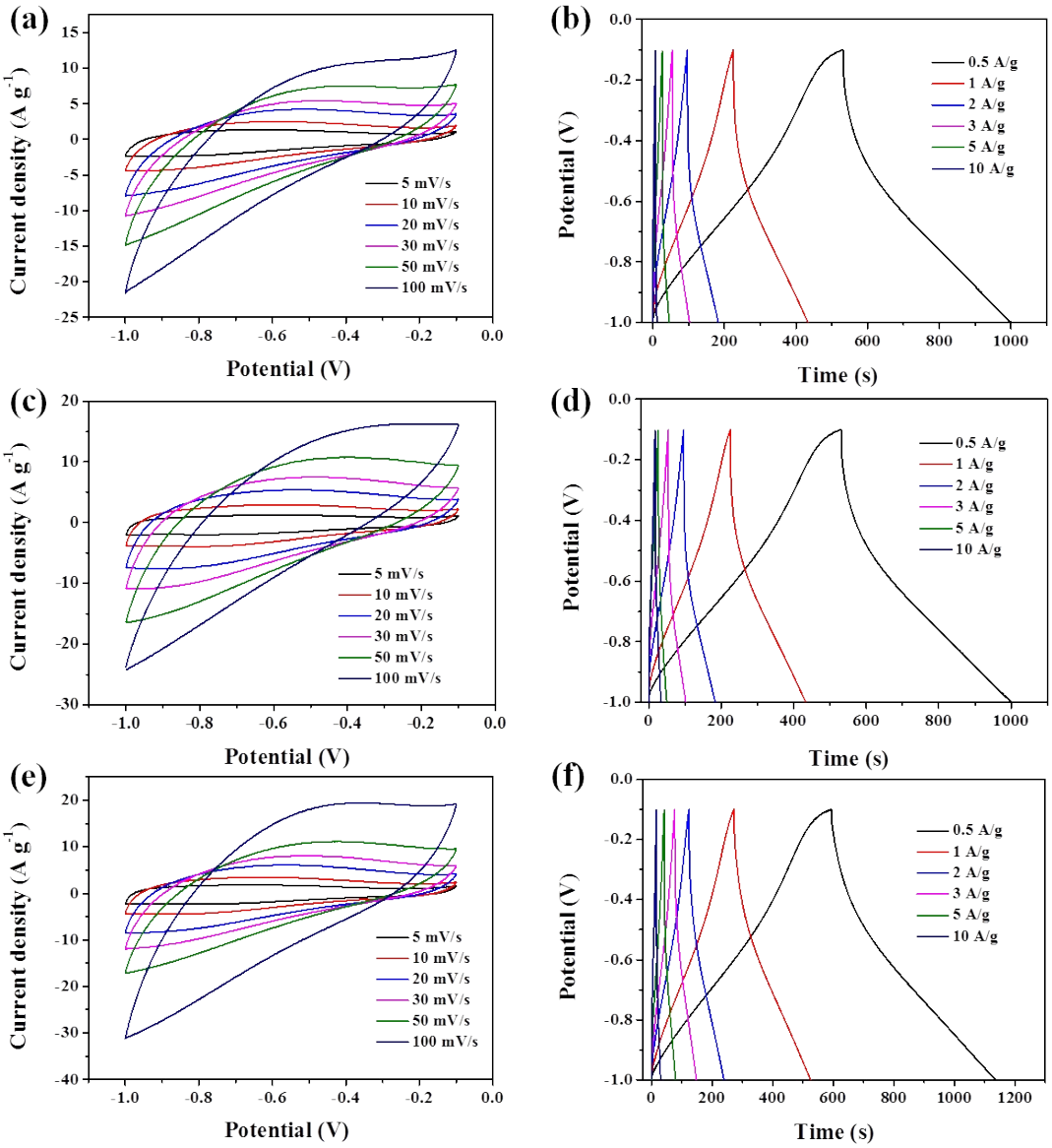

Fig S2. The CV curves at different scan rates (a,c,e) and galvanostatic charge–discharge curves (b,d,f) for the samples. The upper, middle and lower lines are the results of the PCSs, NSPCSs-1 and NSPCSs-5, respectively.

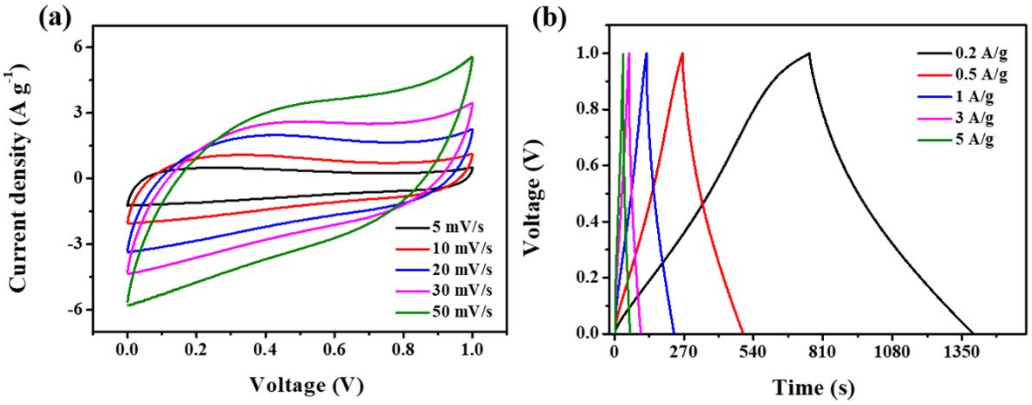

Fig S3. Electrochemical performance of NSPCSs-3 measured in 6 M KOH electrolyte in two electrode system. (a) CV profiles. (b) Galvanostatic charge-discharge profiles.

Table S1. The electrochemical performances of coal-based materials and N/S-doped carbon materials for supercapacitors in 6.0 M KOH.

Electrode materials	**Specific Capacitance ($F\ g^{-1}$)**	**Current Density ($A\ g^{-1}$)**	**Cycle lifetime**	**reference**
Porous carbon (coal)	258	1.0	1000 cycles at 2 $A\ g^{-1}$	Mater. Letters, 2015, 149, 85.
Hierarchical porous carbon nanofibers (coal)	220.3	1.0	20000 cycles at 10 $A\ g^{-1}$	RSC Adv., 2019, 9, 6184
Coal/PAN interconnected carbon nanofibers	259.7	1.0	70000 cycles at A g^{-1}	Electro. Acta., 2016, 194, 239
Coal-derived porous carbon fibers	170.0	1.0	20000 cycles at 2 $A\ g^{-1}$	J. Mater. Chem. A, 2015, 3, 21178
N/S-doped carbon	281.2	1.0	6000 cycles at 1 $A\ g^{-1}$	J. Electrochem. Soc., 2016, 163, 2991.
N/S co-doped hierarchically porous carbon	272	1.0	5000 cycles at 1 $A\ g^{-1}$	J. Power Sources, 2018, 387, 81
Nitrogen/Sulfur-Codoped Hierarchically Porous Carbon Materials	302	1.0	5000 cycles at 1 $A\ g^{-1}$	ACS Appl. Mater. Interfaces 2017, 9, 26088
N/S co-doped coal-based porous carbon spheres	308	1.0	10000 cycles at 1 A g-1	This work