Electronic Supplementary information

Carbon-Incorporated Janus-Type Ni_2P/Ni Hollow Spheres for High Performance Hybrid Supercapacitors

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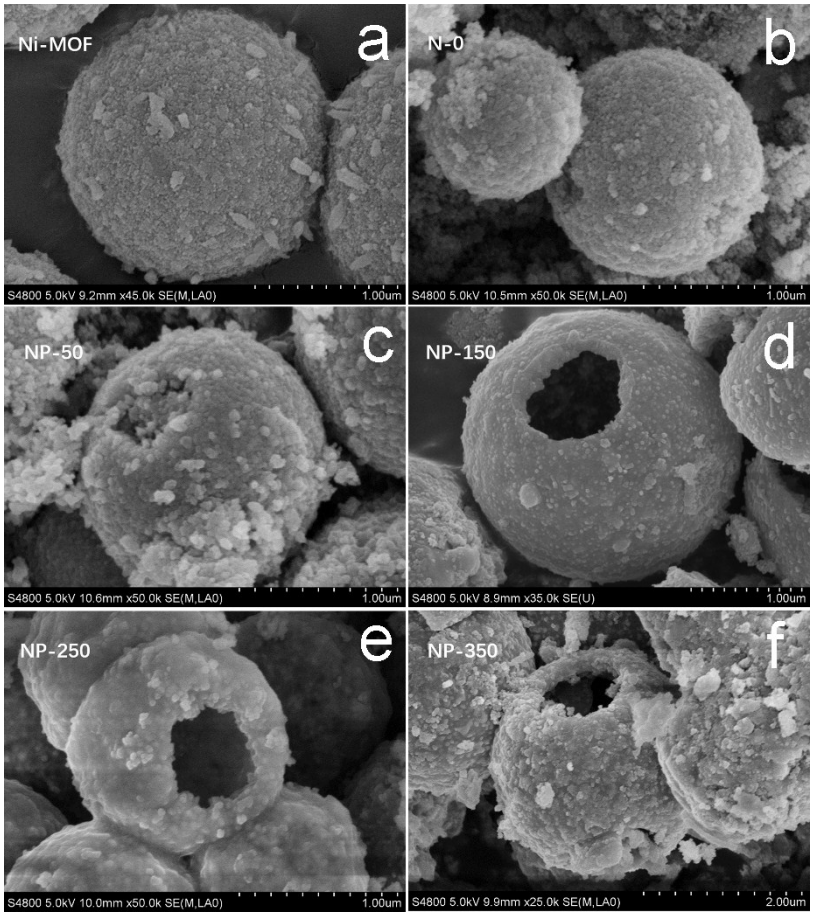

Fig. S1 SEM images of (a) Ni-MOFs, (b) N-0, (c) NP-50, (d) NP-150, (e) NP-250 and (f) NP-350.

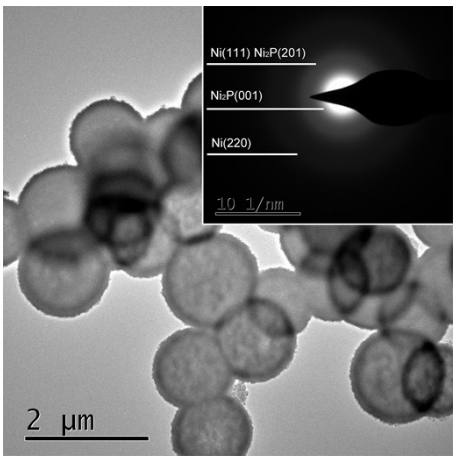

Fig. S2 TEM image of NP-150. Inset is selected-area electron diffraction pattern.

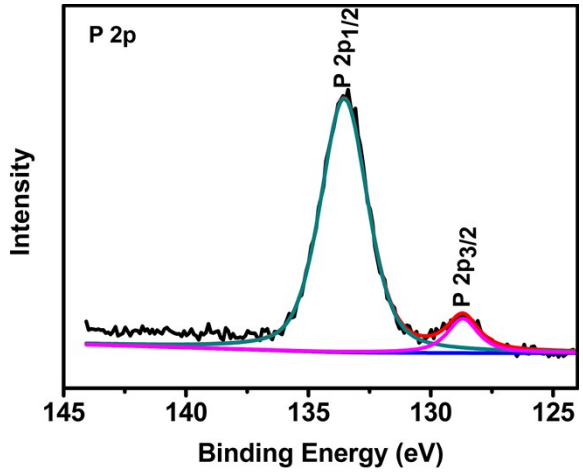

Fig. S3 High-resolution XPS P 2p spectrum of NP-150.

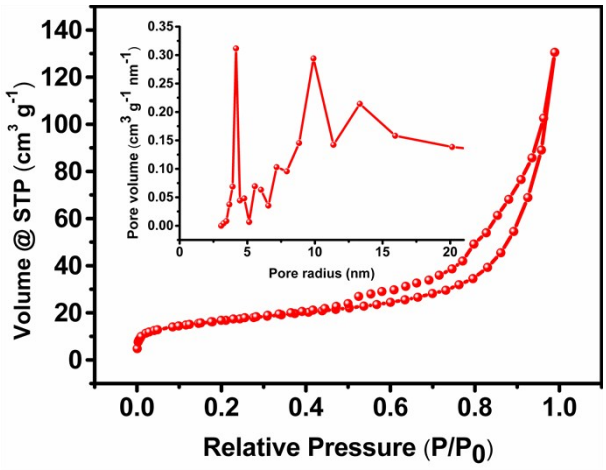

Fig. S4 Nitrogen adsorption–desorption isotherms with corresponding BJH desorption pore size distributions (inset) of NP-150.

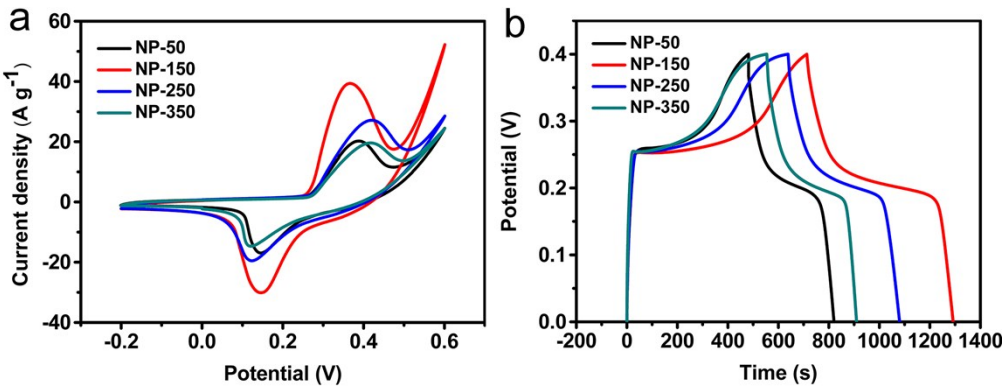

Fig. S5 Electrochemical characteristics of NP-50, NP-150, NP-250 and NP-350: (a) CV curves at a scan rate of 10 mV s^{-1}, (b) GCD curves at a current density of 1 A g^{-1}.

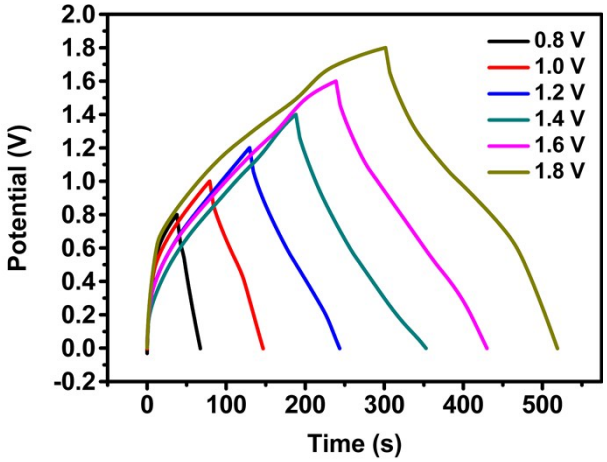

Fig. S6 GCD curves of the HSC device collected at various potential voltages at the current density of 1 A g^{-1}.

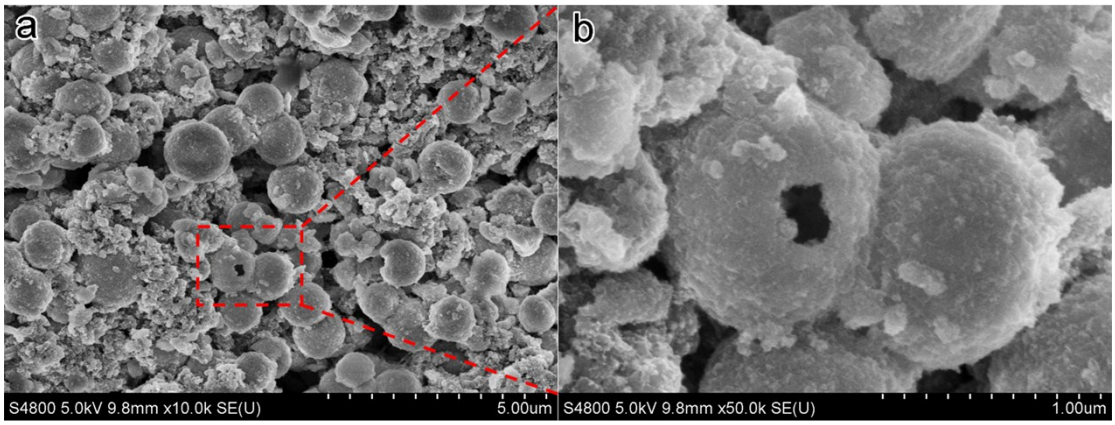

Fig. S7 SEM images of the NP-150 electrode material after 5000 cycles at a current density of 7 A g^{-1}.

Table S1 XPS binding energy and atomic ratio of Ni with different valences in different samples by XPS measurement.

Materials	Ni $2p_{3/2}$ Binding energy(eV)		Atomic ratio	
	Ni^{2+}	Ni^{0+}	Ni^{2+}	Ni^{0+}
NP-50	856.45	852.81	1.00	0.63
NP-150	856.61	852.85	1.00	0.41
NP-250	856.96	582.99	1.00	0.09
NP-350	857.20	853.13	1.00	0.05

Table S2 Comparison of specific capacitances between the hollow Ni_2P/Ni/C spheres in this work, and other transition metal phosphide electrodes reported in the previous literatures (three-electrode system).

Materials	Specific capacitance	Reference
Ni_2P	843.25 F g^{-1} at 1 A g^{-1}	1
amorphous Ni-P	1338.75 F g^{-1} at 1 A g^{-1}	2
Co_2P nanoflowers	416 F g^{-1} at 1 A g^{-1}	3
Co-Ni pyrophosphates	1259 F g^{-1} at 1.5 A g^{-1}	4
CF@NiP_x	817 F cm^{-3} at 2 mA cm^{-2}	5
Ni-coated Ni_2P	1150 F g^{-1} at 2 A g^{-1}	6
Ni-P@$NiCo_2O_4$	1240 F g^{-1} at 1 A g^{-1}	7
NP-150	1449 F g^{-1} at 1 A g^{-1}	this work

References

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