

## supplementary materials

# Enhanced Energy Density for P-Doped Hierarchically Porous Carbon-Based Symmetric Supercapacitor with High Operation Potential in Aqueous H<sub>2</sub>SO<sub>4</sub> Electrolyte

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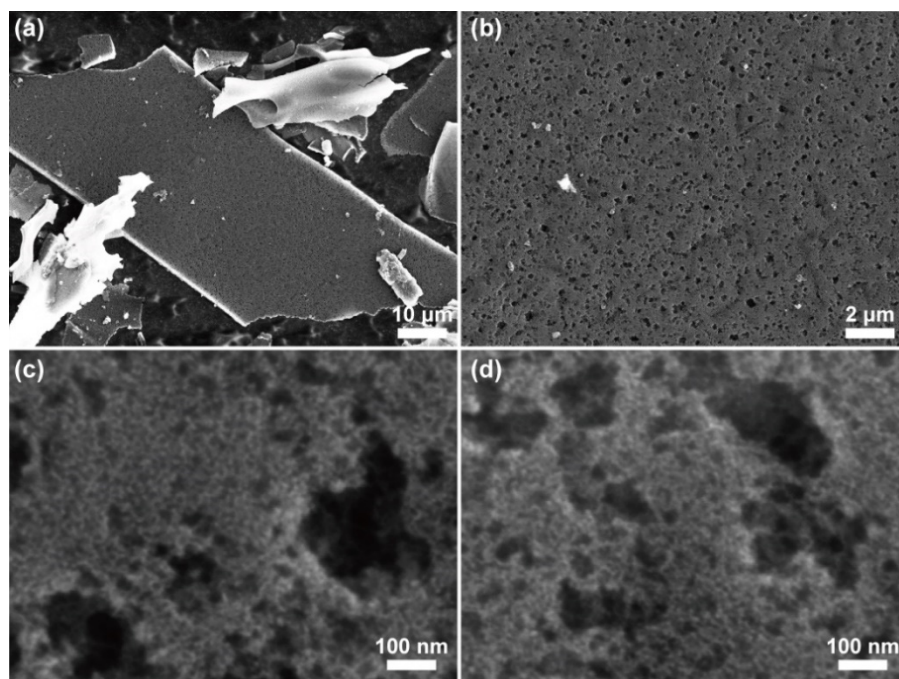


Figure S1. SEM images for HPC6.

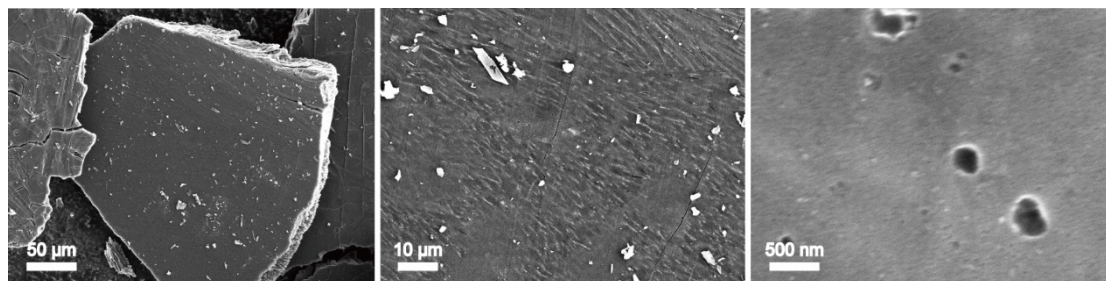


Figure S2. SEM images for C8.

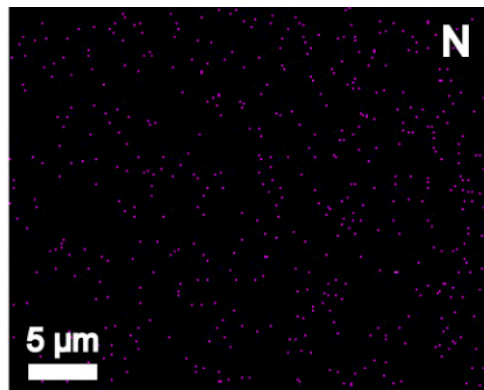


Figure S3. EDS element mapping of nitrogen for HPC8.

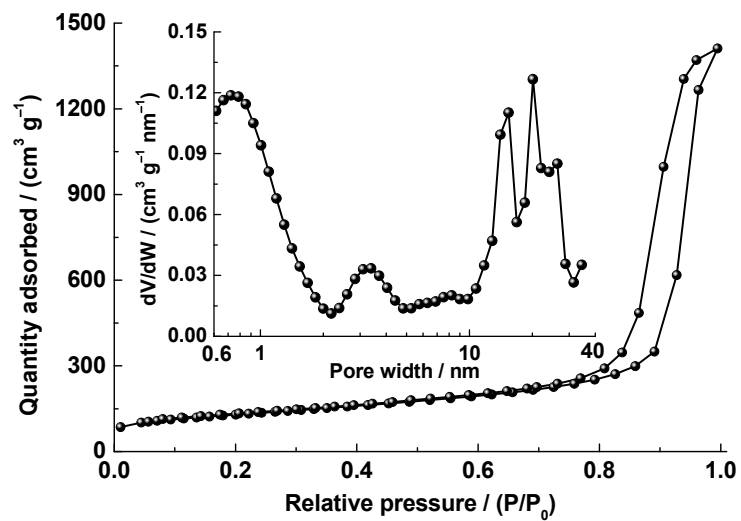


Figure S4. Nitrogen sorption isotherm and QSDFT pore size distribution (inset) for C8.

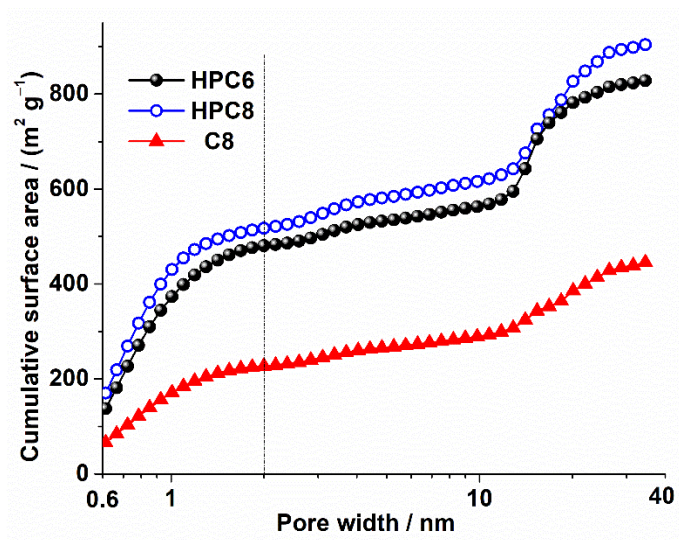


Figure S5. Cumulative surface areas derived from QSDFT method for C8 and HPCs.

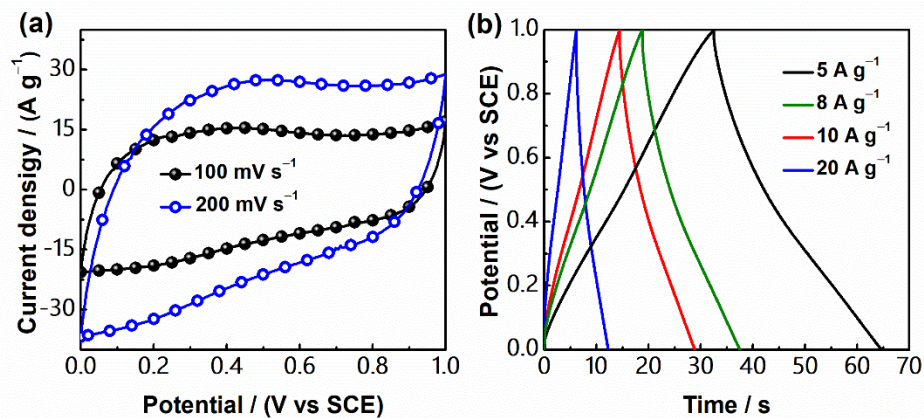


Figure S6. Supercapacitive performance for HPC8 in 1 M H<sub>2</sub>SO<sub>4</sub> electrolyte with a three-electrode system: (a) CV curves at different scan rates, (b) GCD curve at different current densities.

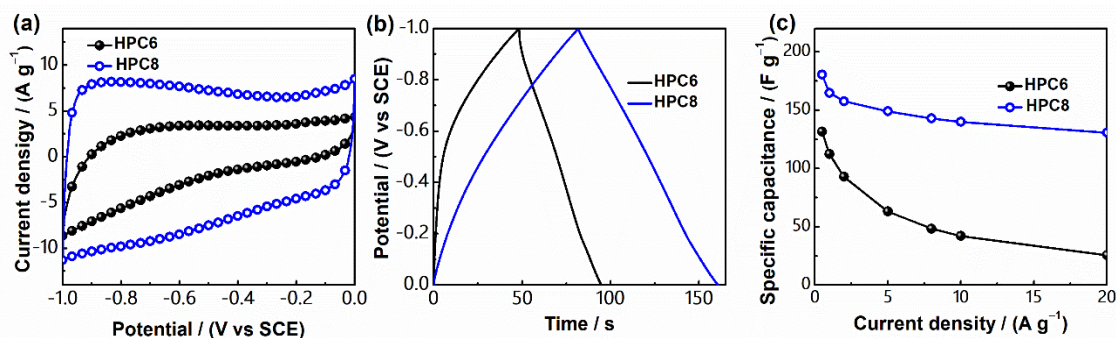


Figure S7. Supercapacitive performance for HPCs in 6 M KOH electrolyte with a three-electrode system: (a) CV curves at a scan rate of 50 mV s<sup>-1</sup>, (b) GCD curve at a current density of 2 A g<sup>-1</sup>, (c) specific capacitances at different current densities.

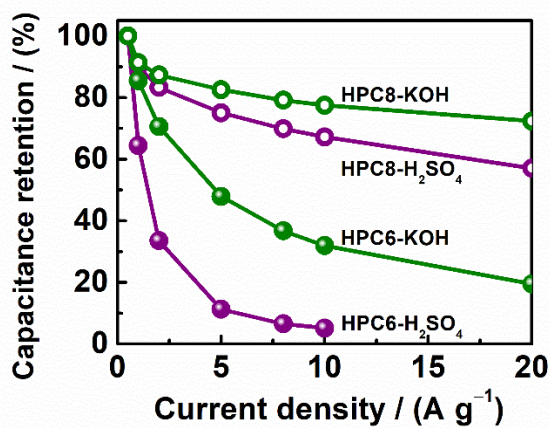


Figure S8. Capacitance retention ratio for HPCs in KOH and H<sub>2</sub>SO<sub>4</sub> electrolytes.

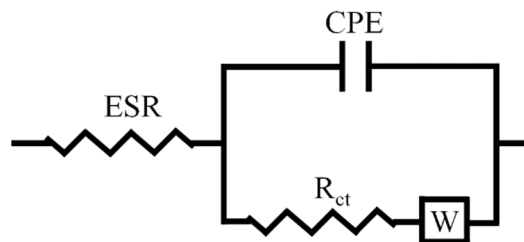


Figure S9. The equivalent circuit for HPC8 in H<sub>2</sub>SO<sub>4</sub> electrolyte.



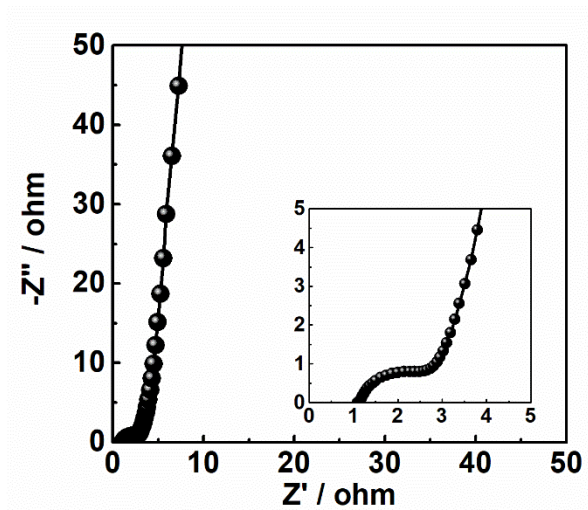


Figure S10. Nyquist plot for HPC8-based symmetric supercapacitor.

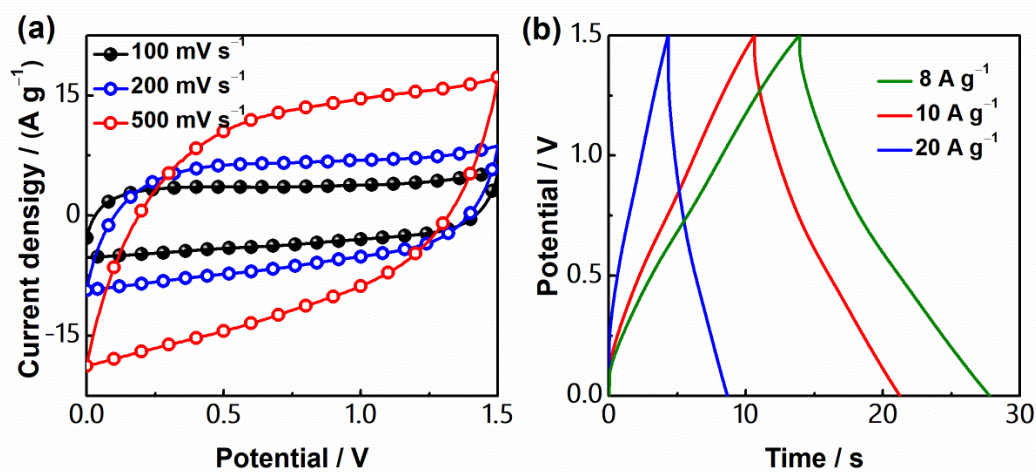


Figure S11. Supercapacitive performance for HPC8-based symmetric supercapacitor: (a) CV curves at different scan rates, (b) GCD curves at different current densities.

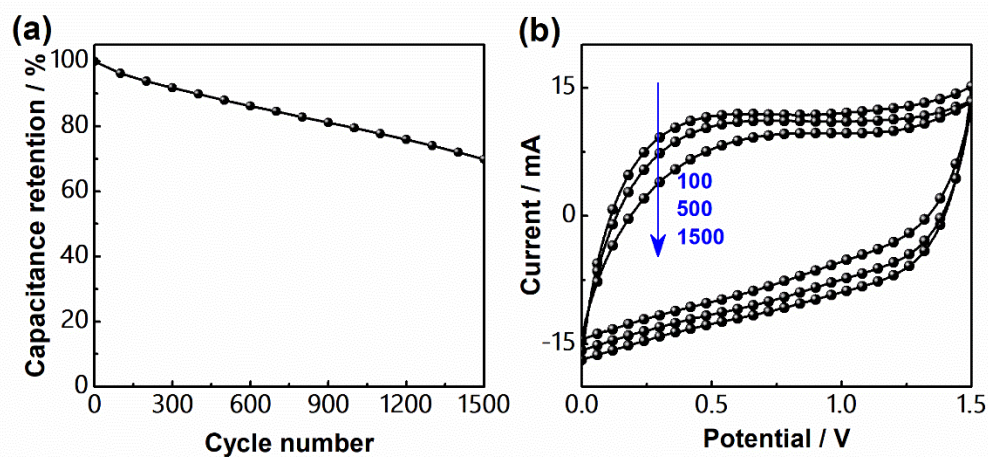


Figure S12. (a) Cyclic stability for HPC8-based symmetric supercapacitor, (b) CV curves (inset) at different cycles.

Table S1. The fitted resistances for HPCs in  $\text{H}_2\text{SO}_4$  electrolyte.

Sample	ESR	$R_{ct}$	$Z_{w}$
		[ $\Omega$ ]	
HPC8	0.51	1.5	1.5