Electronic Supplementary Material (ESI) for RSC Advances.


# Hierarchical S-doped Porous Carbon Derived from By-products Lignin for High-Performance Supercapacitors

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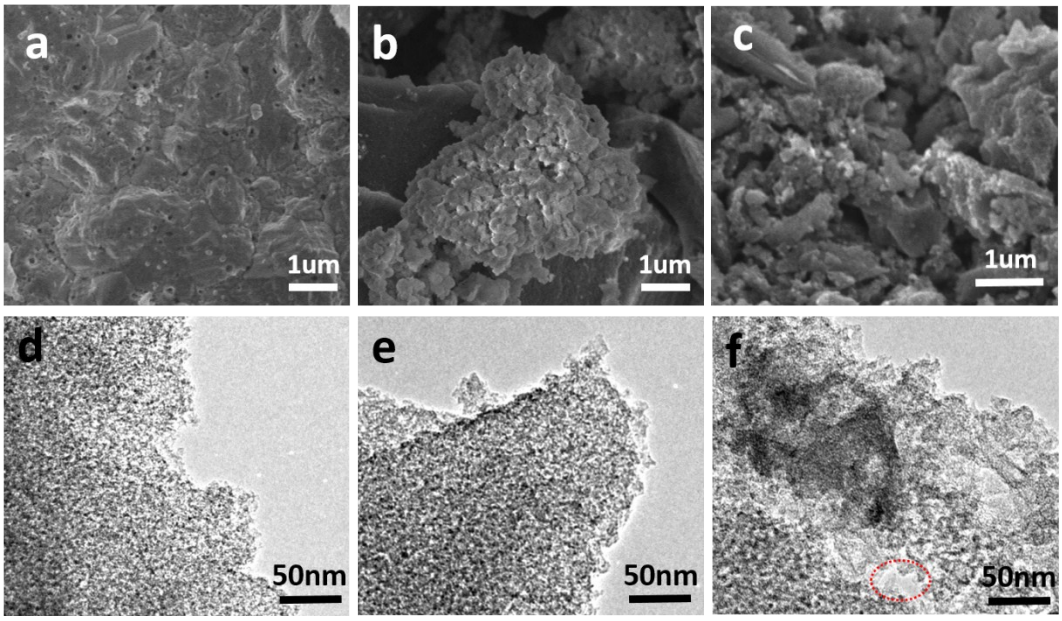


Figure S1. (a) FE-SEM image of PC-S-900. (b) FE-SEM image of S-PC-L-700. (c) FE-SEM image of S-PC-L-800 (d) FE-TEM image of PC-S-900. (e) FE-TEM image of S-PC-L-700. (f) FE-TEM image of S-PC-L-800.

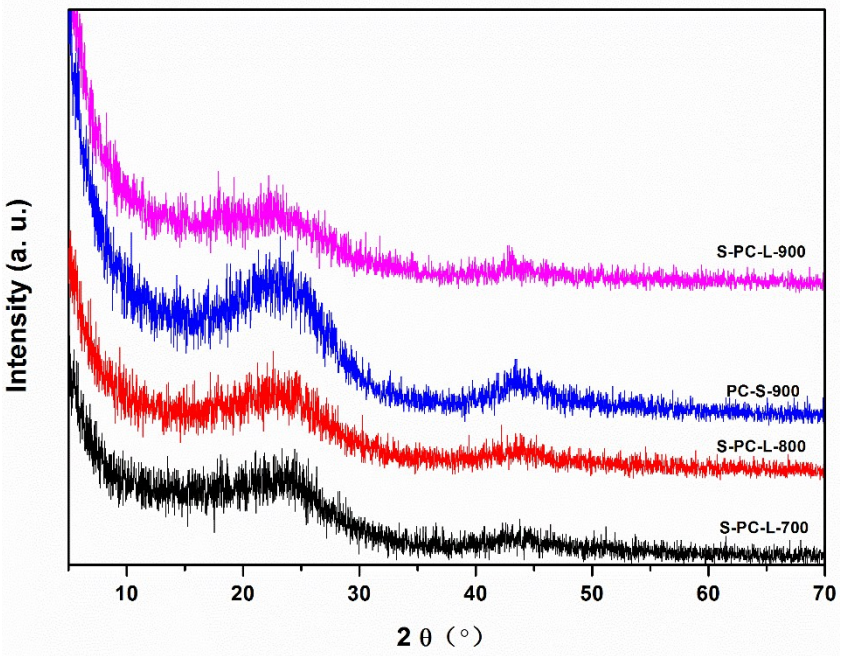


Figure S2. XRD patterns of samples.

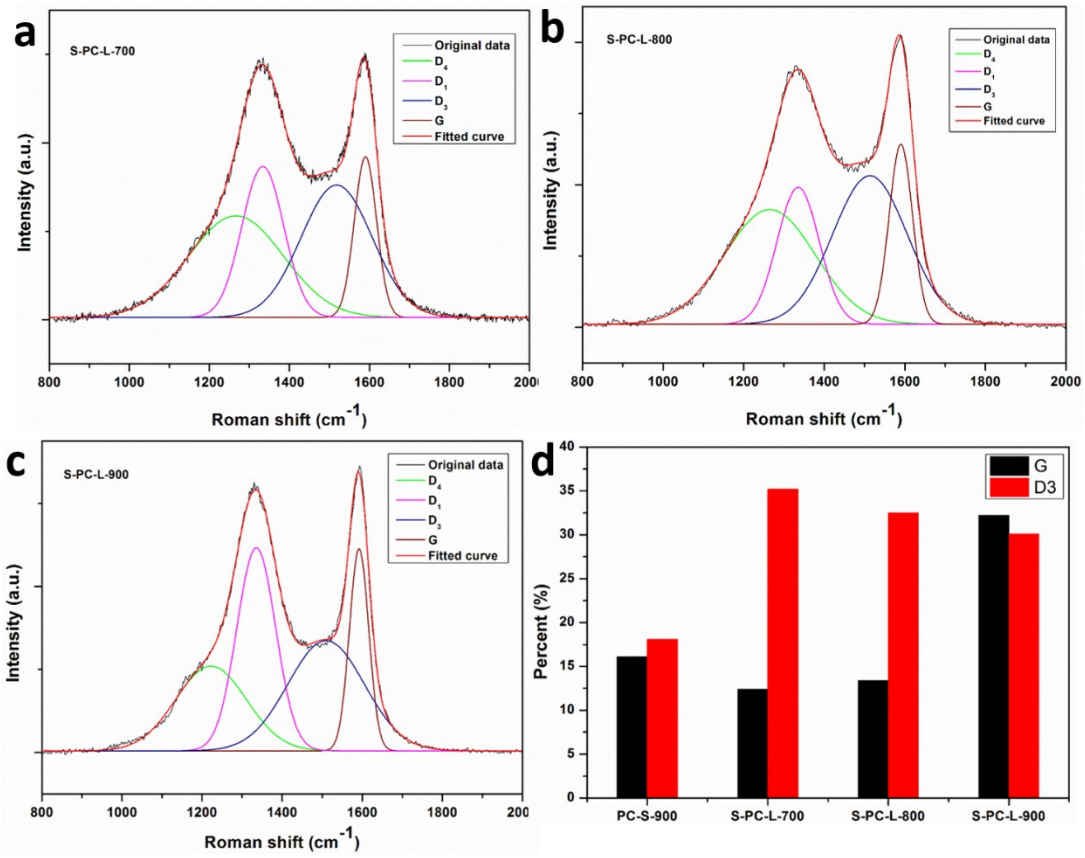


Figure S3. (a) Raman spectra of (a) S-PC-L-700, (b) S-PC-L-800, (c) S-PC-L-900, and (d) percent of amorphous and ideal graphitic carbon.

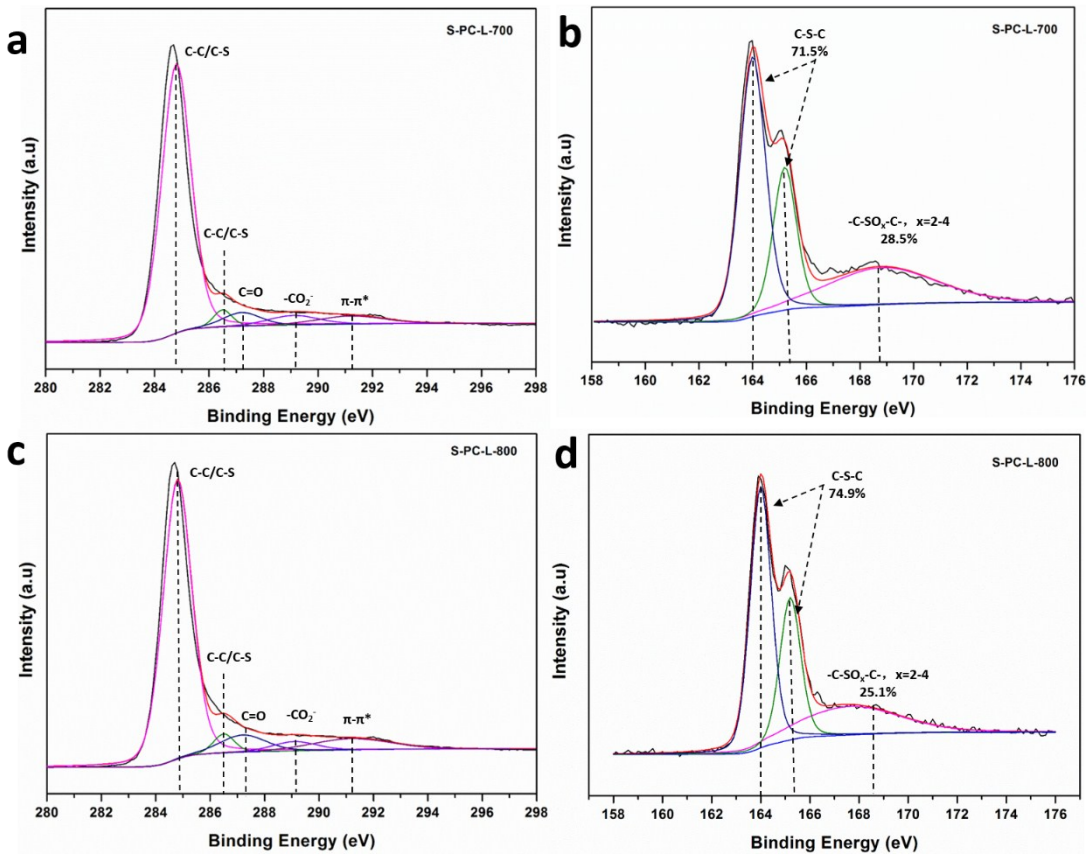


Figure S4. (a) High resolution XPS spectra of C 1s (a) and S 2p (b) of S-PC-L-700, C 1s (c) and S 2p (d) of S-PC-L-800.

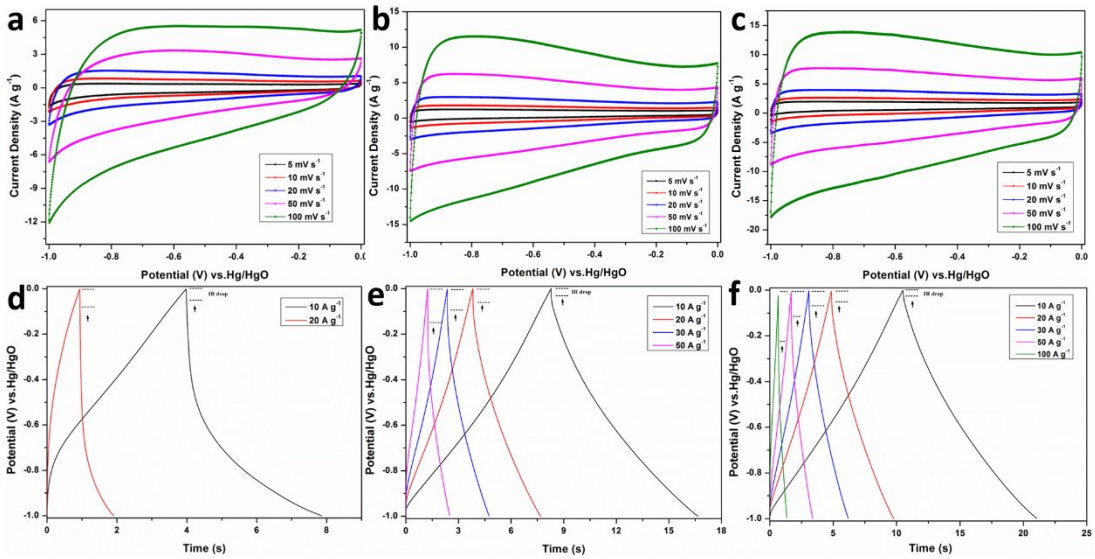


Figure S5. The CV curves of the (a) S-PC-L-700, (b) S-PC-L-800 and (c) PC-S-900 at various scan rates. The galvanostatic charge-dicharge curves of (d) S-PC-L-700, (e) S-PC-L-800 and (f) PC-S-900 at various current densities.

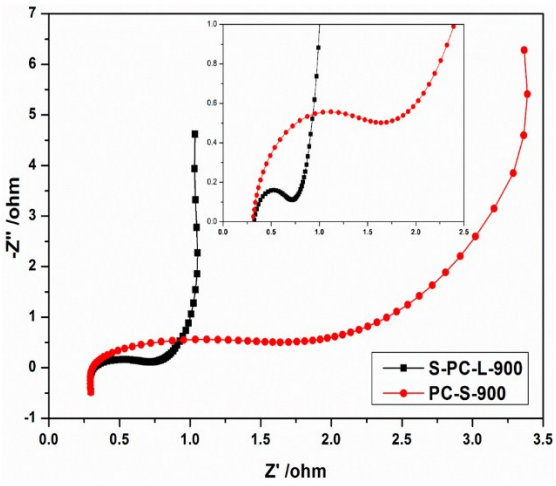


Figure S6. Nyquist plots of PC-S-900 and S-PC-L-900.

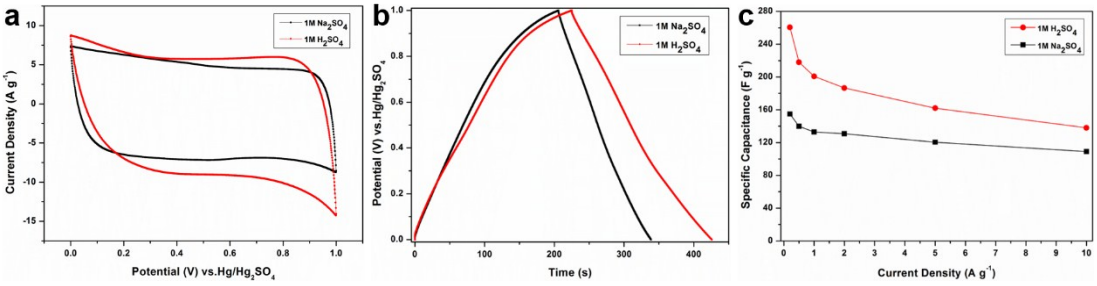


Figure S7. Electrochemical performance of the S-PC-L-900 in 1 M $H_2SO_4$ and $Na_2SO_4$ aqueous electrolyte in a three-electrode system. (a) CV curves at 50 mV $s^{-1}$, (b) galvanostatic charge–discharge curves at 1 A $g^{-1}$, (c) specific capacitance at various current densities.

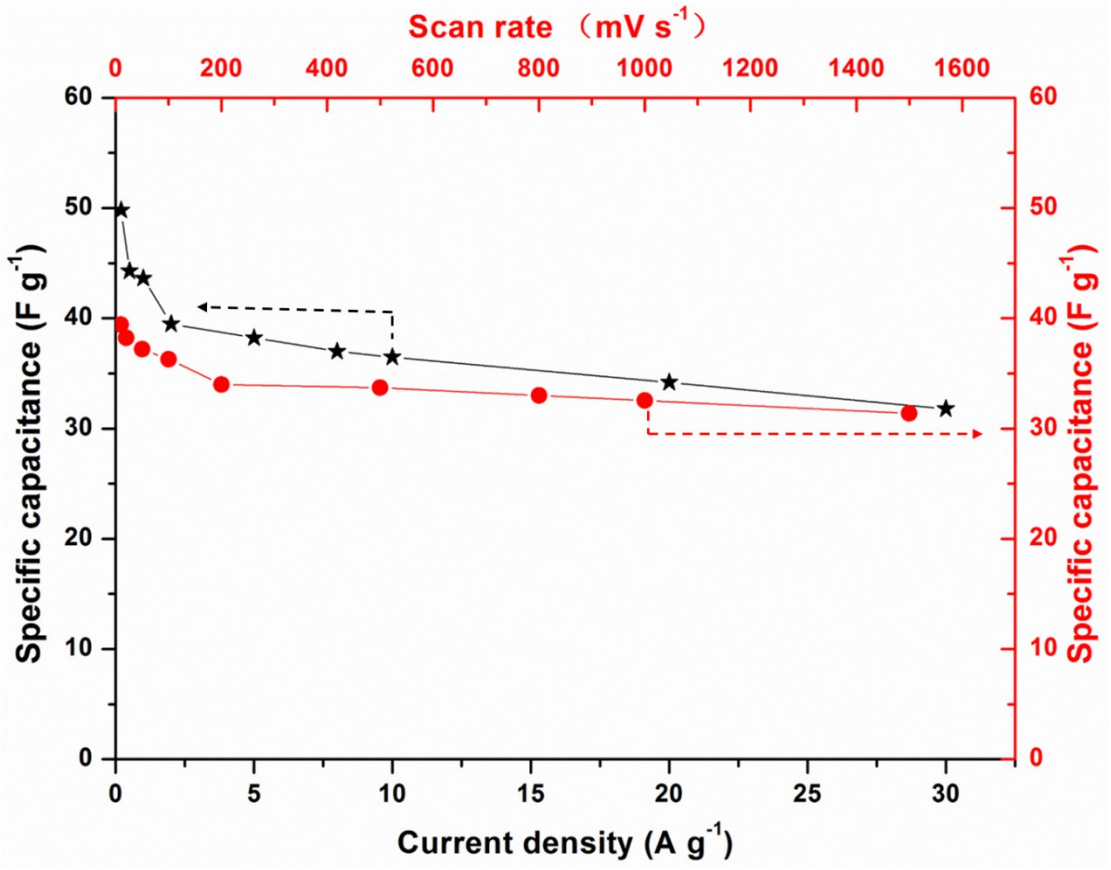


Figure S8. Specific capacitance of S-PC-L-900 symmetric supercapacitor calculated from cyclic voltammetry curves and GCD curves.