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Table S1. Elemental Composition (wt.%)			
Sample	C%	Н%	O%
C-200 °C	87.05	1.73	11.22
C-240 °C	88.33	1.94	9.73
C-280 °C	84.86	1.93	13.21
RS-240 °C_2	84.98	2.14	12.88
RS-240 °C_3	87.77	1.75	10.48
RS-240 °C_4	88.64	1.49	9.87
$\begin{array}{c} 1.6 \\ 1.4 \\ 1.4 \\ 1.4 \\ 1.0 \\$			

Figure S1. N2 adsorption QSDFT pore size distribution of C-200 °C, C-240 °C and C-280 °C ACs.



Figure S2. CO<sub>2</sub> NLDFT pore size distribution of C-200 °C, C-240 °C and C-280 °C ACs.



Figure S3. Galvanostatic charge/discharge curves for the activated carbons derived from rye straw at a current density of 250 mA  $g^{-1}$  in 0.5 M  $H_2SO_4$ . Three-electrode cell.



Figure S4. Galvanostatic charge/discharge curves for the RS-240 $^{\circ}$ C-3 sample at different current densities in 0.5 M H<sub>2</sub>SO<sub>4</sub>. Three-electrode cell.



Figure S5. Galvanostatic charge/discharge curves for the C-240 $^{\circ}$ C-3 sample at different current densities in 0.5 M H<sub>2</sub>SO<sub>4</sub>. Three-electrode cell.