Supporting information for

Activated Carbon Derived from Rice Husks Enhanced by Methylene Blue and Gamma Irradiation for Supercapacitor Applications

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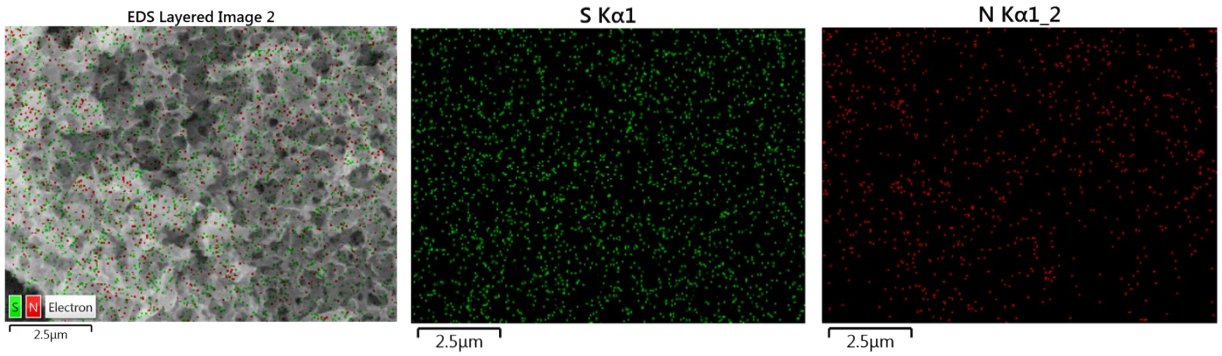

Fig. 1s. SEM-EDX images of GAC

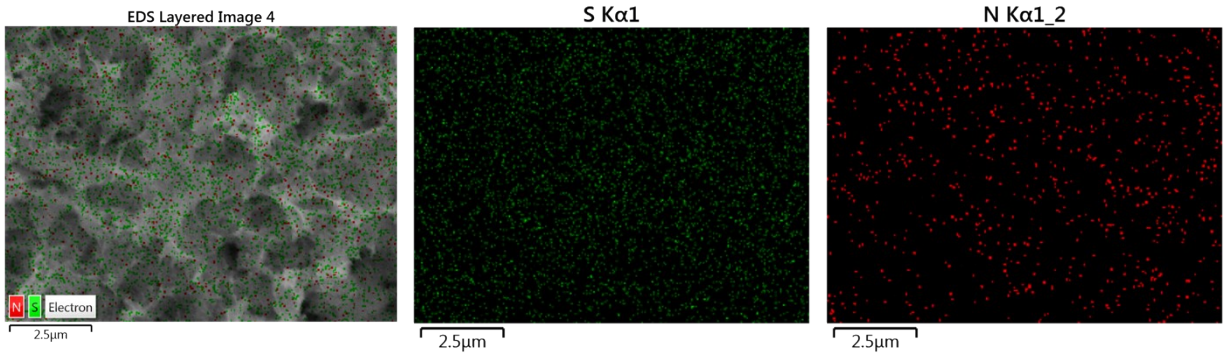

Fig. 2s. SEM-EDX images of GAC-Stir

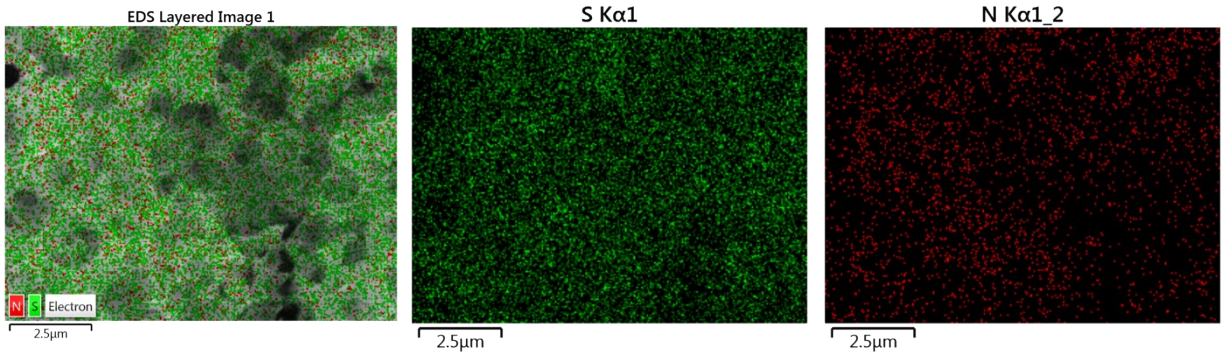

Fig. 3s. SEM-EDX images of GAC-Hdt

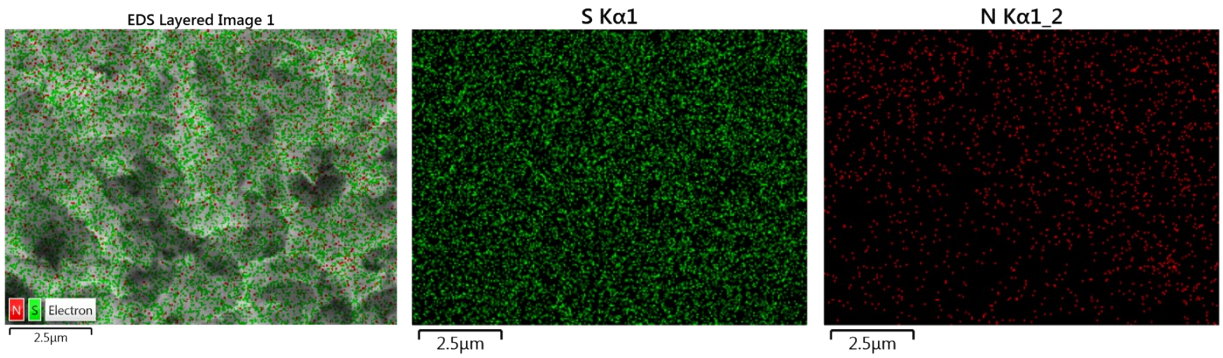

Fig. 4s. SEM-EDX images of GAC-25

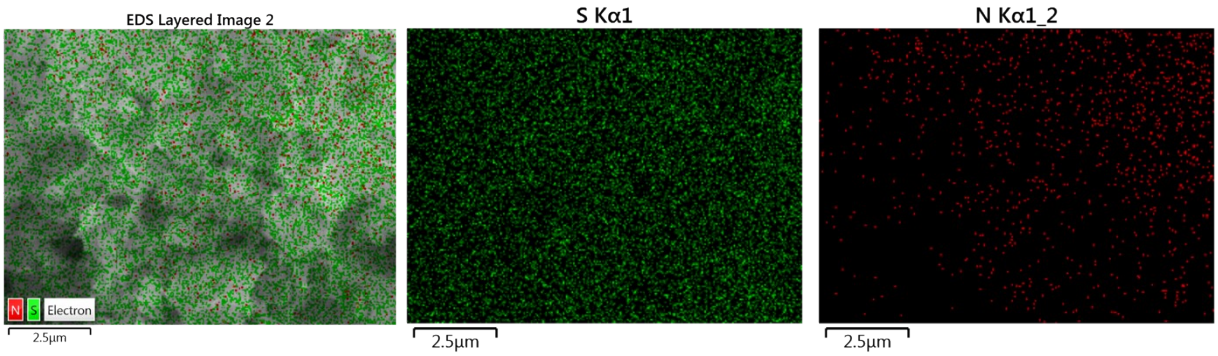

Fig. 5s. SEM-EDX images of GAC-50

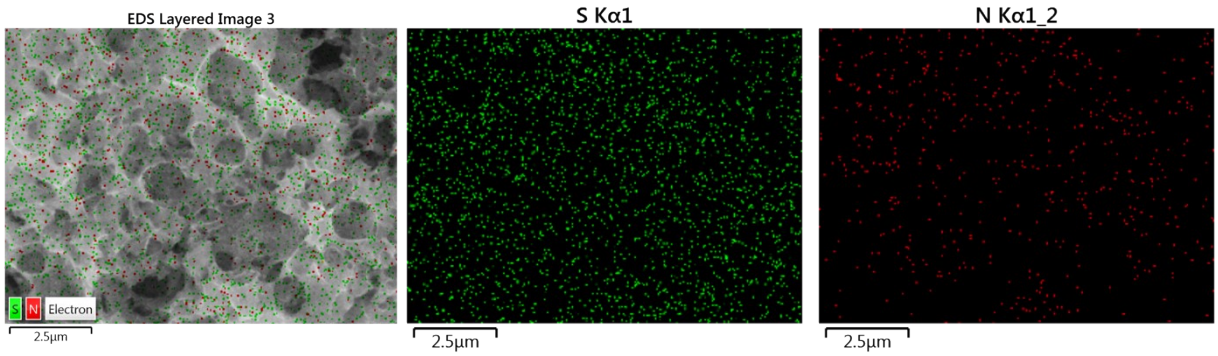

Fig. 6s. SEM-EDX images of GAC-100

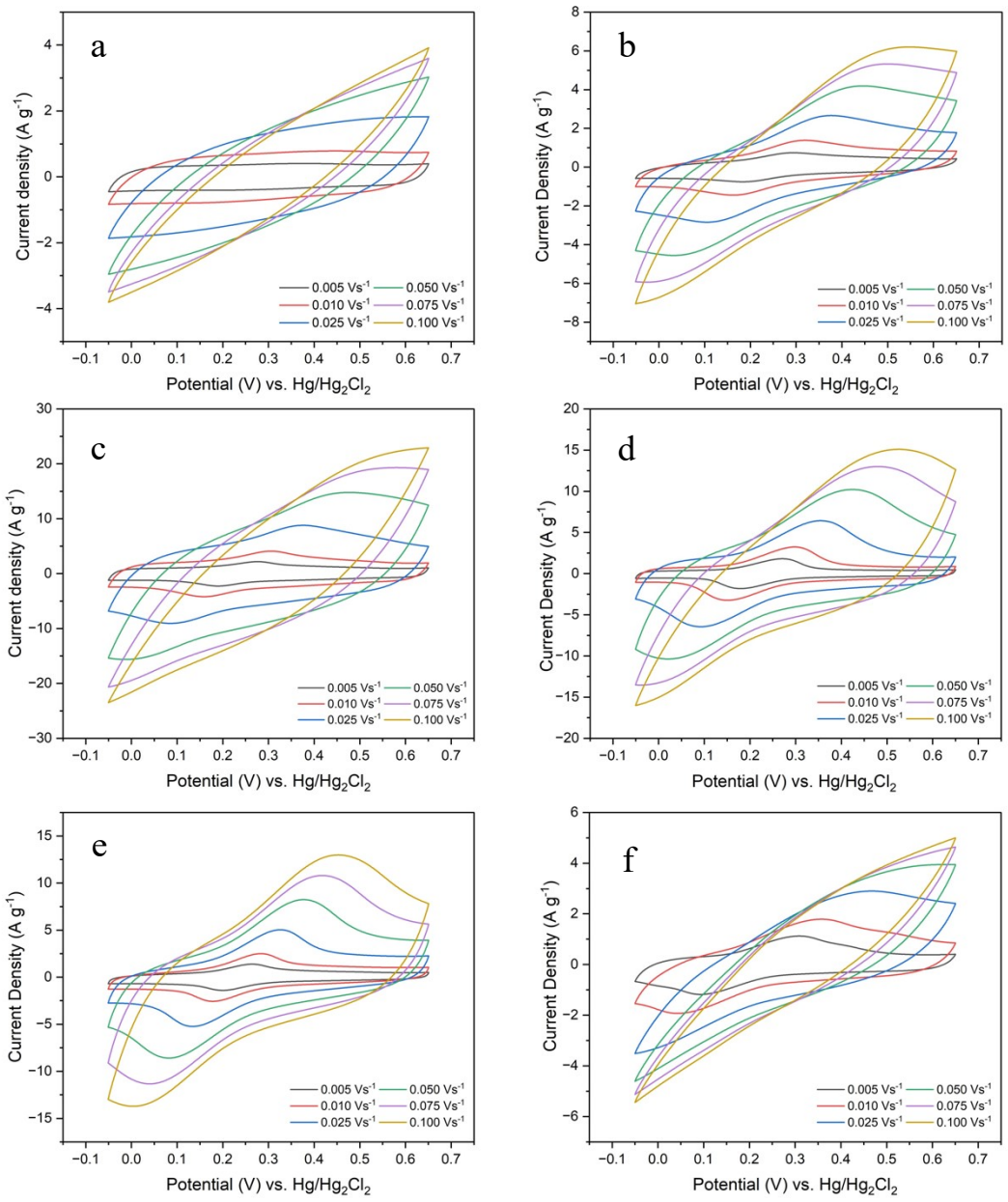

Fig. 7s. CV graph at different scan rate of 5 mV s^{-1}, 10 mV s^{-1}, 25 mV s^{-1}, 50 mV s^{-1}, 75 mV s^{-1}, 100 mV s^{-1} (a) GAC, (b) GAC_Stir, (c) GAC_Hdt, (d) GAC_25, (e) GAC_50, (f) GAC_100

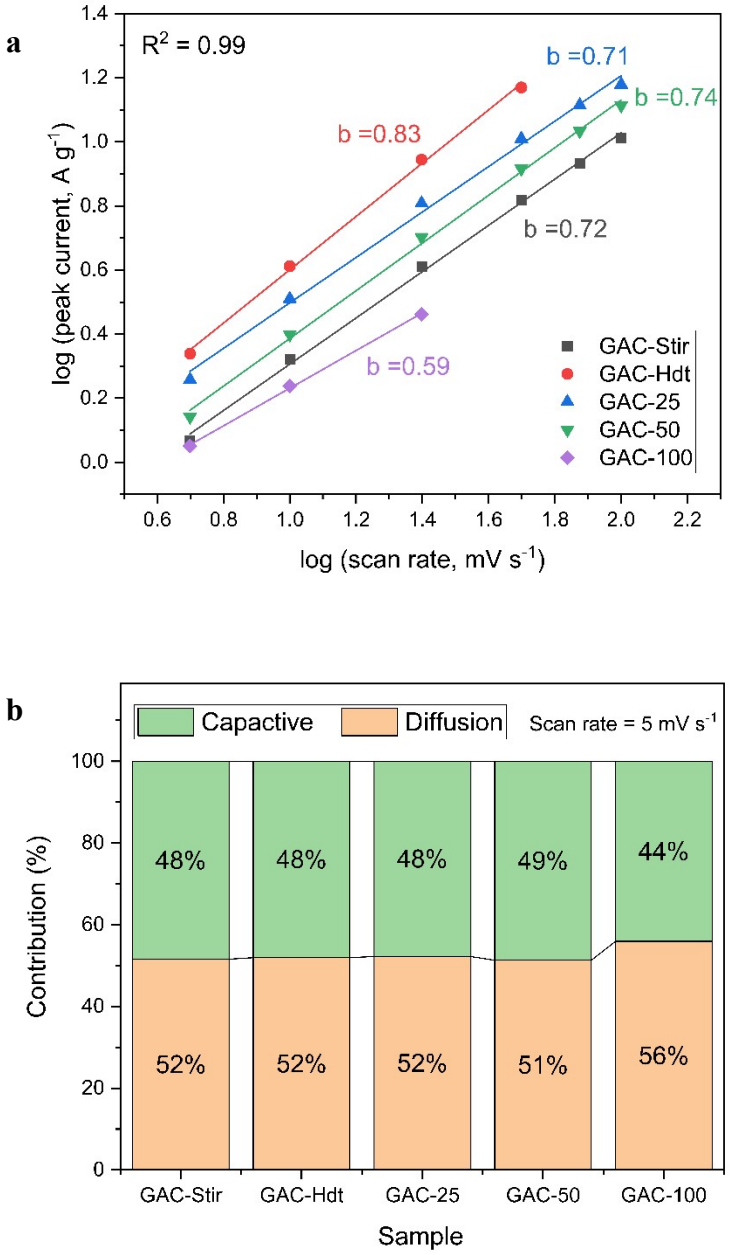

Fig. 8s. Comparison of (a) electrochemical kinetic: log (peak current) versus log (scan rate) (b is the slop of the linear fit), and (b) contribution ratio of capacitive control and diffusion control

The electrochemical properties of the samples were subsequently assessed via kinetic calculations. The charge storage mechanism of these electrodes was analyzed concerning the peak current (i) and scan rate (v) following logarithmic processing of the CV curves, as illustrated below. In this instance, a and b are derived via linear regression.

$$I = av^b \qquad \text{eq. 1s}$$

The energy storage technique is determined by the b value: a value of 0.5 indicates diffusion control, whereas a value of 1 signifies surface capacitance control. The data presented in Fig. 8s (a) suggest that all electrodes function as hybrid charge storage devices, demonstrating pseudocapacitive features. To analyze the capacitance contribution of the electrode more thoroughly, we then calculate the capacitance contribution rate of the electrode samples at a scan rate of 5 mV s-1 using the equation provided below.

$$i(V) = N_1V + N_2V^{1/2} \qquad \text{eq. 2s}$$

Where N_1V denotes the contribution of capacitive control, while $N_2V^{1/2}$ signifies the contribution of diffusion control. The relative proportions of these contributions at varying scanning rate are depicted in Fig 8s(b).