

Effect of Potassium Hydroxide (KOH) Activation to Porous Carbon Electrode Synthesized from Bamboo Shoots as the of Supercapacitor Electrode

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Carbon powder was prepared from bamboo shoots by chemical activation. The porous carbon powders were activated by potassium hydroxide (KOH) at 400, 500 and 600°C for 2 hrs under argon (Ar) atmosphere with carbon powder (C): KOH ratio of 1:1, 1:2, 1:3 and 1:4 by weight, respectively. The crystal structure, morphological properties and the porosity of carbonaceous powders were investigated by x-ray diffraction (XRD), energy dispersive X-ray spectroscopy (EDX), scanning electron microscope (SEM) and the nitrogen adsorption techniques using Brunauer Emmett Teller (BET). The electrochemical properties of supercapacitor electrode was measured by the charge/discharge (C.D.) measurement and the cyclic voltammetry (CV). The specific capacitance of non-activated carbon has the lowest value of 6.5 F/g owing to its lowest specific surface area (1,324 m² g⁻¹). The specific surface areas of activated carbon were increased to 1,017, 1,162, 1,257 and 1,012 m² g⁻¹ for the C: KOH ratio of 1:1, 1:2, 1:3 and 1:4 by weight, respectively. The specific capacitances of activated carbon electrode were increased to 11.3, 26.6, 50.5 and 40.5 F/g for the C: KOH ratio of 1:1, 1:2, 1:3 and 1:4 by weight, respectively. The C: KOH ratio of 1:3 at 600 °C give the highest specific capacitance value of 50.5 F/g owing to its largest specific surface area (1,257 m² g⁻¹) showing the good candidate for fabricating commercial supercapacitors.

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