

Graphitic Porous Carbon Derived from Waste Coffee Sludge for Energy Storage

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We report the use of graphitic porous carbon materials that have been derived from waste coffee sludge for developing an energy storage electrode based on a hydrothermal procedure. The coffee sludge is primarily composed of cellulose-based materials with many, which are considered good precursors for the fabrication of functionalized carbon materials. We recycled the coffee slurry into hydrated carbon via sequential hydrothermal carbonization (HTC) as an activation process at a relatively low temperature range (180°C~230°C). The porous and graphitic nature of carbonaceous materials facilitates electron accumulation for capacitive reactions. After the activation process, the activated hydrochar (AHC) has high surface area ($\sim 1067 \text{ m}^2 \text{ g}^{-1}$). Also, it gives easy pathways for ion and electron transport, which provides a higher electrochemical performance as an EDLC electrode. As a result, the specific capacitance of the AHC based supercapacitors was 140 F g^{-1} . The cycle stability of the AHC electrode demonstrated a good cyclic performance over 1500 cycles at current density of 0.3 A g^{-1} .