Short Communication

Perforated Active Carbon and Pre-Lithiated Graphite Electrodes for High Performance Hybrid Lithium-ion Capacitors

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Lithium-ion capacitors are kinds of advanced energy storage systems, which possess performance of lithium-ion battery and electrical double layer capacitor. In this work, we have developed a new method to realize the pre-lithiation of graphite anode and fabricated lithium-ion hybrid capacitors with two cathodes including capacitor cathode (activated carbon) and battery cathode (LiCO_2). The electrochemical performances indicate that the open-circuit voltage of the hybrid lithium-ion capacitor is nearly 0 V before the pre-lithiation. Finally, the voltage that rising with the process of pre-lithiation is up to 3.8 V. Meanwhile, the voltage of graphite electrode decreases from 3 V to 0 V vs Li/Li^+ . The electrochemical results indicate that the capacitance of the hybrid lithium-ion capacitor decreased less than 1% after 300 cycles.

Keywords: Lithium-ion hybrid capacitor; Pre-lithiation; LiCO_2 ; Activated carbon; Graphite

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