Pre-lithiated Mesocarbon Microbeads Anode and Bifunctional Cathode for High Performance Hybrid Lithium-Ion Capacitors

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doi: 10.20964/2017.04.59

Received: 30 December 2016 / Accepted: 21 February 2017 / Published: 12 March 2017

Lithium-ion capacitor (LIC) is a hybridization of two types of electrochemical energy storage system, rechargeable battery and electrochemical double layer capacitor. Scientific researchers have made broad research on the LIC in the past decades. In this paper, we used pre-lithiated mesocarbon microbeads anode and bifunctional cathode including 75 wt.% capacitor material (activated carbon (AC)) and 25 wt.% battery material (lithium iron phosphate (LFP)) to prepare hybrid lithium-ion capacitors (LIC (AC+LFP)). The results show that the as-prepared LIC (AC+LFP) hybrid lithium-ion capacitors exhibit better cycle stability and higher rate performance, compared with the LIC (AC) hybrid lithium-ion capacitors, which only employs AC as cathode materials. This improved performance is mainly due to the addition of LFP in the cathode electrode.

Keywords: Hybrid lithium-ion capacitor; Pre-lithiated; AC; MCMB; LFP

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