Electrochemical Properties of Deactivated CuO\textsubscript{x}/Active Carbon Catalyst

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Low-cost and high-performance electrodes are desired for energy storage devices such as lithium-ion (Li-ion) batteries. In this work, CuO\textsubscript{x}/active carbon (CuO\textsubscript{x}/AC), originated from the deactivated catalyst for synthesizing dimethyl carbonate (DMC), was characterized as Li-ion battery anodes. Various copper valences (Cu\textsuperscript{0}, Cu\textsuperscript{+} and Cu\textsuperscript{2+}) exist on the surface and inside of the nanoparticle catalyst. After simple heat-treatment, the sample exhibits a storage capacity of 621.3 mAh\textsuperscript{-1} after 100 cycles at a current density of 100 mA\textsuperscript{-1}, which changes to 359.6 mAh\textsuperscript{-1} at a high current density of 1 A\textsuperscript{-1} after 500 cycles. This excellent behaviour can be ascribed to synergetic effect of CuO\textsubscript{x} nanoparticles/actived carbon support and CuO/Cu\textsubscript{2}O, which can synergistically strengthen the intrinsic properties of each component. Additionally, functional groups on AC surface can promote Li-ion storage performance. This work shows good electrochemical properties and potential application of CuO\textsubscript{x}/AC deactivated catalyst as Li-ion battery anodes.

Keywords: recycle utilization; CuO\textsubscript{x}/active carbon; deactivated catalysts; lithium-ion battery anodes

FULL TEXT

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