Short Communication

Improving the Properties of Lithium Metal Batteries via Constructing of CuO nanowire array on Copper Foil (CuO NWA/Cu) as 3D Current Collector

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Lithium metal batteries (LMBs) are promising energy storage system due to the lowest reduction potential and high specific capacity. However, the uncontrolled growth of Li dendrites during cycling processes might induce the low coulombic efficiency and severe safety hazards. Herein, our work focus on improving the performances of lithium metal batteries by constructing a new 3D current collector decorated with CuO nanowire array (CuO NWA@Cu). As a result, in contrast to the coulombic efficiency (about 90%) and voltage hysteresis (about 100 mV) of planar Cu after 10 cycles, the obtained CuO NWA@Cu has a higher coulombic efficiency (close to 98%) and lower voltage hysteresis (about 50 mV) at the current density of 0.5 mA cm⁻² after 100 cycles. This work provides a simple and scalable method to obtain CuO NWA@Cu 3D anode current collector for dendrite-free and high coulombic efficiency LMBs.

Keywords: Lithium metal batteries; CuO nanowire array; Anode; Coulombic efficiency

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