عنوان مقاله:

Recent Progress in Lithium Ion Batteries Based onSilicon Nanowire Anodes

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خلاصه مقاله:

The increasing energy demands and depleting fossil-fuel resources require pollution-free renewable energy sources and energy storage systems. Among these systems, Lithium-ion batteries (LIBs) are currently considered as an effective energy storage device for portable equipment and automotive applications, as well as suitable choice for large-scale energy storage. However, In order to meet the needs of higher energy density and power density in next-generation technology, it is required the development of batteries by applying advanced materials. Anode materials as important components of LIBs are extensively investigated. Silicon is one of the most promising anode materials due to their highcapacity, low discharge voltage, environmental friendliness, and high abundance. The main challenge for the commercial application of silicon anodes, however, is the huge volume change (300%) during lithiation and delithiation processes. This causes cracking and pulverization of the anode, which leads to a loss of electrical contact and eventual rapid capacity fading. One-dimensional (1D) Si nanowires canhelp overcome the above issues. Silicon nanowire anodes offer increasing cycle life and enhancing charging rate performance, due partially to the excellent mechanical properties of nanowires, high surface area, and fast lithium and electron transportation.Here, the most recent advances in lithium ion batteries based on silicon nanowire anodes are summarized. The synthetic routes and electrochemical performance of these materials are described

کلمات کلیدی:

Nanowires, Lithium ion batteries, Silicon, Anode