Double-layer Si/TiO₂NTAs as High Performance Anode for Li-ion Batteries

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In this paper, a novel three-dimensional TiO₂ nanotube arrays (TiO₂NTAs) structure was introduced into a silicon electrode. The TiO₂NTAs acted as both electrochemically active materials and buffers to maintain structural integrity. An initial capacity of 5320 mAh/g was realized, and a The capacity of 1500 mAh/g was maintained after 120 charge/discharge cycles. This good capacity retention benefits from the establishment and maintenance of the excellent structural integrity granted by the introduction of the special TiO₂NTAs. The superior ability of the TiO₂NTAs for stress buffering and space accommodation allows the silicon electrode to maintain lower charge transfer resistance during long cycling.

Keywords: lithium-ion batteries; anode material; silicon; TiO₂ nanotube arrays; cycling stability

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