TiO₂/Sunflower Seed Shell-derived Carbon Micro Fiber Hybrids as Promising Anode Materials for Sodium-ion Batteries

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TiO₂/sunflower seed shell-derived carbon micro fiber hybrids have been synthesized via a facile hydrothermal method followed by annealing process. The resulting structure does not vary after carbon micro fibers (CMFs) introduced. The composites consist of CMFs with a diameter of about 4 μm and some TiO₂ nanoparticles attached on the surface of CMFs. The obtained material has been used as anode for sodium-ion battery. The results of the electrochemical tests showed that TiO₂/CMFs electrode delivered a superior reversible capacity of 214 mAh g⁻¹ after 100 cycles at 30 mA g⁻¹, which is a dramatic improvement compared with commercial TiO₂ electrode. Remarkably, TiO₂/CMFs electrode still showed an excellent long-term cycling after 500 cycles at 500 mA g⁻¹. The good electrochemical properties of TiO₂/CMFs hybrids can be ascribed to the addition of CMFs, which can not only offer the efficient pathway for ion diffusion and electron transportation, but also provide an excellent contacting with the current collector.

Keywords: Sodium-ion battery, Carbon micro fiber, TiO₂, Sunflower seed shell, Anode

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