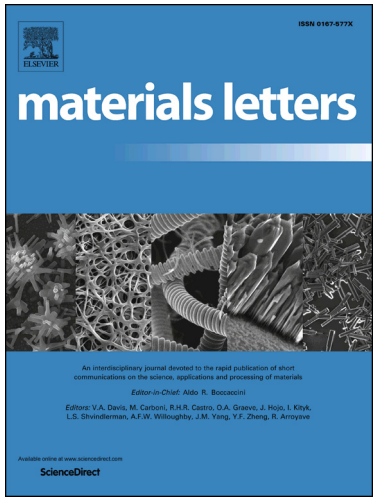

Interconnected quasi-nanospheres of $SnO_2/TiO_2/C$ with gap spaces for improved lithium storage

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Interconnected quasi-nanospheres of $SnO_2/TiO_2/C$ with gap spaces for improved lithium storage

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Abstract: Herein, by combining the advantages of SnO_2, TiO_2 and carbon elaborately, we present a stable nanostructure of SnO_2-based composite. As a promising anode for lithium-ion batteries (LIBs), it delivers a high capacity of 642.5 mAh g^{-1} after even 450 cycles, exhibiting outstanding lithium storage performance. This work provides a facile and effective method for addressing the undesirable volume variation issue of SnO_2 anodes.

Keywords: Crystal structure; Functional; Tin dioxide; Anode; Lithium-ion batteries

1. Introduction

Due to its high specific capacity and safe working potential, SnO_2 anode currently gains extensive attention. However, its practical application in lithium-ion batteries (LIBs) still suffers from a tremendous challenge [1]. The large volume variation of SnO_2 happened during cycling can easily cause the solid electrolyte interface (SEI) layer broken and expose the generated fresh surface of active materials to electrolyte, resulting in continuous growth of the SEI layer. Moreover, Sn nanoparticles derived from reduction of SnO_2 are easily aggregated to larger particles, which causes electrode fracture and loss of electrical contact during battery cycles [2, 3]. Taken together, severe capacity decay is often observed in SnO_2 electrodes [4]. Therefore, the fatal issues of large volume variation and aggregation need to be well addressed.