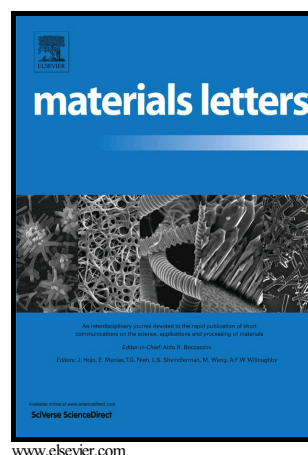


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Simple fabrication of free-standing ZnO/graphene/carbon nanotube composite anode for lithium-ion batteries

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Abstract

A three-dimensional ZnO/graphene/CNT (carbon nanotube) composite was prepared by a one-step sol-gel synthetic technique followed by vacuum-assisted filtration. High resolution transmission electron microscopy revealed the formation of highly-dispersed ZnO nanoparticles, uniformly laid on the crumpled graphene sheets and CNT. The as-prepared ZnO/graphene/CNT composite exhibited excellent cyclability and rate capability when used as anode for lithium ion batteries, affording 620 mAh g⁻¹ stable reversible discharge capacity after 100 cycles at 100 mA g⁻¹. The unique composite structure provided a large surface area and highly conductive network which maintains good electronic contact between particles, suppresses ZnO aggregation during the charge/discharge processes, and accommodates the large volume changes of ZnO upon cycling.

Keywords: Lithium ion battery, Anode, ZnO/graphene/CNT composite, Free-standing, Nanoparticles,

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