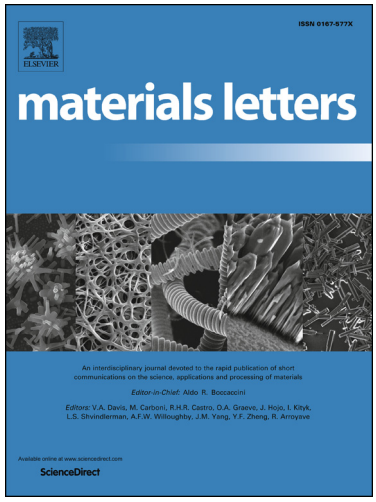


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# Molten salt synthesis of hexagonal tungsten trioxide nanoparticles for lithium-ion battery anode

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*Keywords*: Molten salt synthesis; Tungsten trioxide; Anode; Lithium-ion battery.

Abstract: Hexagonal tungsten trioxide nanoparticles were prepared using ammonium metatungstate hydrate as the precursor by a facile molten salt method. The as-prepared samples were characterized by X-ray diffraction, Fourier-transform infrared spectroscopy, X-ray photoelectron spectropy, Brunauer-Emmett-Teller, Scanning electron microscope and Transmission electron microscope. When applied for lithium-ion battery anode, it delivers 320 mAh $g^{-1}$ delithiation capacities at current density of 100mA $g^{-1}$ after 130 discharge-charge cycles. The results indicate that tungsten trioxide prepared by molten salt method would be a promising anode for Lithium-ion batteries.

## 1. Introduction

Tungsten trioxide has been used in many fields due to its low toxicity and environmental friendliness, such as metal secondary battery [1-3], photocatalysis [4, 5], photoelectrochemical water splitting [6-8] and fuel cell [9]. In recent years, many method have been employed to prepare tungsten trioxide with different structure and morphology. For example, Sim et al. [10] synthesized three kinds of $WO_3$ particles with yolk-shell, hollow and dense structure through spray pyrolysis. Pervez et al. [11] prepared amorphous $WO_3$ mesosponge grown on the substrate of the tungsten anode by electrochemical oxidation method. Duan et al. [12] obtained biconical $WO_3$ mesocrystalline with hexagonal structure via an ionic liquid-assisted hydrothermal reaction. However, the synthesis of hexagonal $WO_3$ nanoparticles in molten