Vanadium pentoxide nanotubes by eelectrospinning

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ABSTRACT
Nanofibers of vanadium pentoxide (V2O5V2O5) were synthesized by electrospinning a polymeric solution containing vanadium ion and with subsequent sintering. Conventionally, electrospun TNFs were produced by using a co-axial spinneret; however, TNFs in the present study were obtained by manipulating the concentration ratio of the precursor solution, distance, humidity and flow rate during electrospinning using a single spinneret and sintering with time and temperature change. On the basis of this hypothesis, nanofibers could be altered from elongated 1-D nanofibers to nanowires, nanotubes, spheres and flakes respectively. The surface morphology, structure, roughness and the crystal structure were analyzed using Field Emission Scanning Electron Microscopy (FE-SEM), Transmission Electron Microscopy (TEM), and X-ray diffraction (XRD). The current work has demonstrated a case study for energy storage where V2O5V2O5 nanotubes when tested shows the capacitance of 190 Fg^{-1} in 2M KCl electrolyte indicating an example for the energy storage which may be applicable for other electrochemical devices such as Li-ion batteries, fuel cells, hydrogen storage etc.

KEYWORDS:
Electrospinning; Nanotubes; Vanadium Pentoxide

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