Characterization of the one-dimensional growth of V$_2$O$_5$ nanofibers

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Highly crystalline one dimensional V2O5 nanofibers was synthesized by using a simple and direct hydrothermal technique at 220 °C of 7–24 hrs reaction times. Structural study by powder X-ray diffraction pattern shows that synthesized V2O5 has highly crystalline in nature possessing an orthorhombic phase that have grown along the [010] direction of forming nanofibers (Fig 1). Morphology study by FESEM and TEM of V2O5 further confirm the formation of nanofibers where nanofibers are up to several micrometers long and 20–25 nm thick. The SAED pattern recorded perpendicular to growth axis of the V2O5 nanofibers shows spot pattern which could be attributed to the [001] zone-axis diffraction orthorhombic phase proving the crystalline nature of V2O5 nanofibers. Finally, in a HRTEM image the lattice fringes with a spacing of 4.06 matching to the (101) plane of V2O5 evidently proving information that the nanofiber has grown along the [010] direction, this is also in good agreement with the XRD outcomes.


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