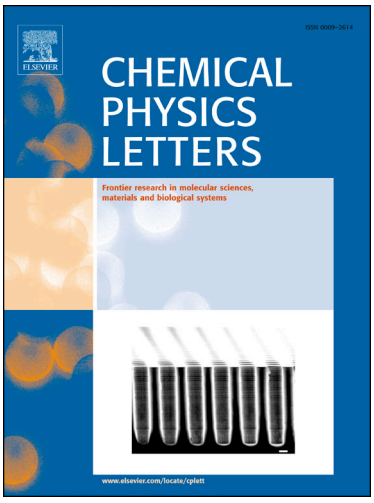

Research paper

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$W_{18}O_{49}$ nanorods: Controlled preparation, structural refinement, and electric conductivity

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ABSTRACT

This paper reports on the controlled synthesis of $W_{18}O_{49}$ nanorods using pyrolysis-reduction process through tuning both H_2 gas flow and heating temperature. The results suggest that $W_{18}O_{49}$ nanorods will grow well when calcined at 650 °C for 2 h at 10 l/h H_2 gas flow rate. Using GSAS software the fitted lattice parameters of obtained $W_{18}O_{49}$ are given, that is, a: 18.340 Å, b: 3.788 Å, c: 14.025 Å, β: 115.168°, by the Rietveld refining X-ray diffraction pattern. The result of sheet resistance measurement of samples indicates that pure $W_{18}O_{49}$ nanorods exhibit a resistivity as low as 0.068 Ω·cm.

Keywords: $W_{18}O_{49}$ nanorods; Controlled preparation; Refinement; Electric conductivity

1. Introduction

$W_{18}O_{49}$ with a monoclinic structure (P2/m) consists of the distorted WO_6 octahedra interconnecting in a corner-sharing way, which makes $W_{18}O_{49}$ readily form one-dimensional (1D) topography [1]. $W_{18}O_{49}$ is n-type semiconductor with a band gap (E_g) of 2.6 ~ 2.8 eV [2].

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