

Synthesis and characterization of structural and optical properties of SnO₂ nanotubes by sol-gel method and using alumina template

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Abstract: SnO₂ nanotubes have been synthesized via sol-gel template method using alumina membrane. Synthesis parameters, such as sol preparation conditions, the required time of immersion and annealing conditions, were optimized to obtain the SnO₂ nanotubes with well defined composition. Transmission electron microscopy (TEM) and X-ray diffraction techniques have been used to investigate the structure and morphology of SnO₂ nanotubes. TEM image showed that the nanotubes have been obtained. The diameter of the obtained nanotubes were approximately 200 nm, were consistent by the pore size of alumina template. The optical transmittance and absorption spectra show that the nanotubes are semi-transparent against visible spectra whereas they absorb the ultraviolet waves. The optical bandgap were measured (3.56 eV) very close to that of the bulk materials.

Keywords: *SnO₂ nanotubes; alumina template; sol-gel.*

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