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Structure and optical properties of nanocrystalline NiO thin film synthesized by sol-gel spin-coating method
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Abstract

NiO thin film was prepared by sol-gel spin-coating method. This thin film annealed at $T = 600$ °C. The structure of NiO thin film was investigated by means of X-ray diffraction (XRD) technique and scanning electron microscopy (SEM). The optical properties of the deposited film were characterized from the analysis of the experimentally recorded transmittance and reflectance data in the spectral wavelength range of 300-800 nm. The values of some important parameters of the studied films are determined, such as refractive index (n), extinction coefficient (k), optical absorption coefficient (α) and band energy gap (E_g). According to the analysis of dispersion curves, it has been found that the dispersion data obeyed the single oscillator of the Wemple-DiDomenico model, from which the dispersion parameters and high-frequency dielectric constant were determined. In such work, from the transmission spectra, the dielectric constant (ϵ_{∞}), the third-order optical nonlinear susceptibility $\chi(3)$, volume energy loss function (VELF) and surface energy loss function (SELF) were determined. © 2009 Elsevier B.V. All rights reserved.

Author Keywords

NiO; Optical properties; Sol-gel; Spin coating; Structure

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