



SiO₂:Zn⁰ THIN FILMS PREPARED BY SOL-GEL ROUTE AND DEPOSITED USING PULSED LASER EVAPORATION: STRUCTURE, MORPHOLOGY, AND OPTICAL AND ELECTRICAL PERFORMANCE

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Abstract

Thin films based on SiO₂ and Zn⁰ were deposited to silicon and quartz substrates by pulse laser assistance with SiO₂:Zn⁰-target, synthesized by sol-gel technology. The peculiarities of structure as well as the electrical and optical properties of films were obtained in correlation with composition of the SiO₂:Zn⁰-target. The frequency dependence of the dielectric permeability (ϵ) of the films SiO₂:Zn⁰ has shown its decrease in the range of 10 kHz – 1 MHz. The analysis of the films absorption spectra in the vision range has given the ground for proposal to consider of formation of capsulated zinc nanoparticles at high Zn⁰ content. It is confirmed by increasing the optical width of the prohibited zone from 2.5 to 3.3 eV and absorption growth in the range of 590–650 nm. The films obtained can be used for coatings of the solar batteries for the increasing of solar energy absorption.

Keywords: Sol-gel method, SiO₂:Zn⁰target, Thin film, Nanoparticle, Pulsed laser evaporation, Electrical properties, Optical parameters.