

SEMICONDUCTOR MATERIALS

Influence of growth time on crystalline structure, conductivity and optical properties of ZnO thin films

Benramache Said¹, Chabane Foued², Benhaoua Boubaker³ and Lemmadi Fatima Z.²

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¹ Material Sciences Laboratory, Faculty of Science, University of Biskra, 07000, Algeria

² Mechanical Engineering, Faculty of Technology, University of Biskra, 07000, Algeria

³ Physics Laboratory, Institute of Technology, University of El-oued, 39000, Algeria

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Abstract

This paper examines the growth of ZnO thin films on glass substrate at 350 °C using an ultrasonic spray technique. We have investigated the influence of growth time ranging from 1 to 4 min on structural, optical and electrical properties of ZnO thin films. The as-grown films exhibit a hexagonal structure wurtzite and are (002) oriented. The maximum value of grain size $G = 63.99$ nm is attained for ZnO films grown at 2 min. The average transmittance is about 80%, thus the films are transparent in the visible region. The optical gap energy is found to increase from 3.26 to 3.37 eV with growth time increased from 1 to 2 min. The minimum value of electrical resistivity of the films is $0.13 \Omega \cdot \text{cm}$ obtained at 2 min. A systematic study on the influence of growth time on the properties of ZnO thin films deposited by ultrasonic spray at 350 °C has been reported.

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