

## Dependence of ZnCl<sub>2</sub> Precursor Concentrations on Structural, Optical, and Cathodoluminescence Properties of Spin-Coated ZnO Thin Films

© E. Elmahboub<sup>1</sup>, A. El Hamidi<sup>1</sup>, A. El Hichou<sup>1,¶</sup>, M. Mansori<sup>2</sup>

<sup>1</sup> IMED-Lab. : Groupe d'Étude des Matériaux Optoélectroniques,  
Faculté des Sciences et Techniques, Université Cadi Ayyad, Av. A. Khattabi,  
B.P.549, 40000, Marrakech, Morocco

<sup>2</sup> IMED-Lab. : Laboratoire de Chimie des Matériaux et d'Environnement, Faculté des Sciences et Techniques,  
Université Cadi Ayyad, Av. A. Khattabi, B.P.549, 40000, Marrakech, Morocco

¶ E-mail: a.elhichou@uca.ma

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The zinc chloride precursor has been used to deposit the zinc oxide (ZnO) thin films by sol-gel spin-coating technique from aqueous solution onto glasses substrates at optimum conditions. The effect of the zinc precursor concentration on the structural, optical, and cathodoluminescence properties of ZnO thin films has been investigated. The X-ray diffraction analysis showed typical patterns of the hexagonal ZnO structure for all films, and the increase of the crystalline size from 22 to 43 nm. The films were polycrystalline with the (002) preferred orientation. The optical transmittance measurements of ZnO thin films has shown that they are all transparent in the visible region and then decrease with the rise of precursor content up to 0.4 M. At room temperature, the cathodoluminescence spectra show three emissions characteristics of ZnO thin film positioned at  $\lambda = 386, 527, \text{ and } 650 \text{ nm}$  labelled near-ultraviolet (UV), green, and red bands, respectively.

**Keywords:** zinc oxide, thin films, zinc chloride, cathodoluminescence, sol-gel.

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