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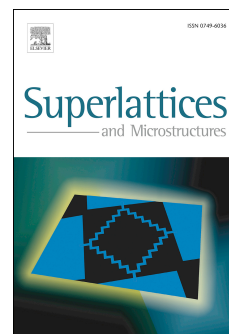
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Influence of triethanolamine in the deposition of Mn-doped ZnO thin films by the successive ionic layer adsorption and reaction process

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Abstract

The successive ionic layer adsorption and reaction method was used to prepare Mn-doped ZnO whose deposition was achieved by the complexation action of triethanolamine with Mn in the adsorption bath. The resulting films had the hexagonal wurtzite structure of ZnO with a remarkable poly-crystallization as consequence of the substitution of Mn in Zn sites, as confirmed by the X-ray Photoelectron Spectroscopy technique. The presence of Mn²⁺ and Mn⁴⁺ produced a change on the growth kinetics of the ZnO films. Undoped ZnO films were formed by flower-like particles. Meanwhile those doped with Mn were formed by the homogeneous distribution of packed spherical particles. These films were specular and had good optical transparency with average transmittances in the range of 79.26 to 83.35 %. In addition, the optical band gap values of the Mn-doped ZnO films were in the range of 3.15 to 3.32 eV.

Keywords: Manganese Doping, Zinc Oxide, Thin Films, Polycrystalline Structure, Morphology, Optical Properties.

1. Introduction

Oxide materials have a great technological potential for a broad range of applications. Specifically, zinc oxide (ZnO) is an n-type semiconductor which has attracted special interest because of its low cost, nontoxicity, abundance in earth and wide band gap (3.38 eV). The electrical and optical properties of this material are improved when metallic elements are

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