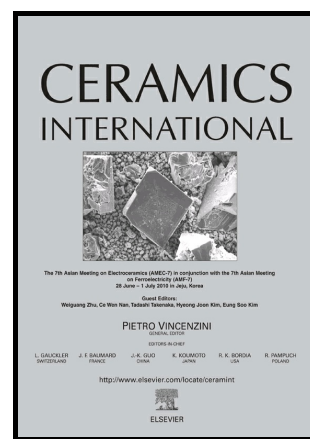


Influence of Na & F doping on microstructures,
optical and magnetic properties of ZnO films
synthesized by sol-gel method

Huan Yuan, Ming Xu



www.elsevier.com/locate/ceri

PII: S0272-8842(18)31345-2
DOI: <https://doi.org/10.1016/j.ceramint.2018.05.214>
Reference: CERI18389

To appear in: *Ceramics International*

Received date: 1 May 2018
Revised date: 21 May 2018
Accepted date: 23 May 2018

Cite this article as: Huan Yuan and Ming Xu, Influence of Na & F doping on microstructures, optical and magnetic properties of ZnO films synthesized by sol-gel method, *Ceramics International*, <https://doi.org/10.1016/j.ceramint.2018.05.214>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Influence of Na & F doping on microstructures, optical and magnetic properties of ZnO films synthesized by sol-gel method

Huan Yuan*, Ming Xu*

Key Laboratory of Information Materials of Sichuan Province & School of Electrical and Information Engineering, Southwest Minzu University, Chengdu, China

Electronic mail: yuanhuanwill@126.com,

hsuming_2001@aliyun.com

* Author to whom correspondence should be addressed.

Abstract

Undoped, Na-doped, and Na-F codoped ZnO films were synthesized using sol-gel method. Na⁺ and F⁺ ions were used as two different dopants that yielded a synergistic doping effect. This effect was measurable using XRD, accompanied by a redshift in the optical bandgap from 3.284 to 3.261 eV in ZnO, ZnO-F, and ZnO-Na-F thin films, respectively. We then studied the resulting photoluminescent changes, which were attributed to O-related defects. Ferromagnetism measurements revealed that magnetic orderings decreased significantly with F doping. However, increased Na doping enhanced the oxygen-vacancy mediated ferromagnetic state.

Keywords: Defects; Sol-gel preparation; Thin films; Microstructure

1. Introduction

Recently, researchers have focused on ZnO as a promising material with broad applications; this is primarily due to its wide room temperature bandgap (3.37 eV) and high electron binding energy (60 meV) [1]. However, accomplishing p-type doping remains a challenge due to the self-compensatory effect arising from native defects [2, 3]. Therefore, several research groups have tried to advance group-V and group-I doping to achieve p-type ZnO. For instance, Park and colleagues [4] have argued that it is theoretically possible for a group I element to substitute on Zn sites as a shallow

Download English Version:

<https://daneshyari.com/en/article/7886393>

Download Persian Version:

<https://daneshyari.com/article/7886393>

[Daneshyari.com](https://daneshyari.com)