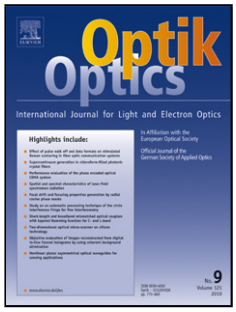

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Authors: Vijay Singh, N. Singh, M.S. Pathak, Vikas Dubey, Pramod K. Singh

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Annealing effects on the luminescence properties of Ce doped $ZnAl_2O_4$ produced by combustion synthesis

Vijay Singh [a,] *, N. Singh [a], M. S. Pathak [a], Vikas Dubey [b], Pramod K. Singh [c]

[a] Department of Chemical Engineering, Konkuk University, Seoul 143-701, Republic of Korea
[b] Department of Physics, Bhilai Institute of Technology, Raipur, Kendri, 49366, India
[c] Materials Research Laboratory, Sharda University, Greater Noida, 201310, India

*Corresponding authors:
Email addresses: vijayjiin2006@yahoo.com (V. Singh)

Abstract

$ZnAl_2O_4$ doped with varying concentrations of cerium phosphors were synthesized by combustion synthesis route. Two types of powder samples were examined: as-prepared and annealed at 800^{o}C in air atmosphere. We investigated the structural, morphological and photoluminescence properties of cerium doped $ZnAl_2O_4$ phosphors. Results of scanning electron microscopy, X-ray diffraction, photoluminescence investigations were presented.

Keywords: Phosphor, Ce^{3+}, $ZnAl_2O_4$, Combustion, Annealing

1. Introduction

Zinc aluminate spinel ($ZnAl_2O_4$) is a naturally available mineral commonly called gahnite. $ZnAl_2O_4$ is a mixed oxide of aluminum and zinc and its crystal structure belongs to spinel group. A general formula of spinels is AB_2O_4, where A and B denote di and tri valent cations, respectively [1, 2]. $ZnAl_2O_4$ has been widely used as catalyst [3], ceramic [4] and electronic [5] material. Moreover, several studies have found the incorporation of rare earth and transition metal into the $ZnAl_2O_4$ lattice [6-10]. For application in display technologies, $ZnAl_2O_4$ was studied as host lattice for trivalent rare-earth ions such as Tb^{3+}, [11] Eu^{3+} [12]