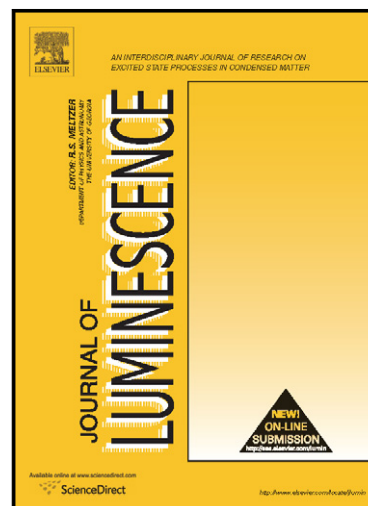


Author's Accepted Manuscript

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J.R. Jayaramaiah, B.N. Lakshminarasappa, K.R. Nagabhushana



www.elsevier.com/locate/jlumin

PII: S0022-2313(14)00439-6
DOI: <http://dx.doi.org/10.1016/j.jlumin.2014.08.003>
Reference: LUMIN12816

To appear in: *Journal of Luminescence*

Received date: 23 February 2014
Revised date: 20 June 2014
Accepted date: 1 August 2014

Cite this article as: J.R. Jayaramaiah, B.N. Lakshminarasappa, K.R. Nagabhushana, Luminescence performance of europium doped yttrium oxide thin films, *Journal of Luminescence*, <http://dx.doi.org/10.1016/j.jlumin.2014.08.003>

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Luminescence performance of europium doped yttrium oxide thin films

J.R. Jayaramaiah^{a,b}, B.N. Lakshminarasappa^{a*}, K.R. Nagabhushana^c

^aDepartment of Physics, Bangalore University, Bangalore-560 056, India

^bDepartment of Physics, Government First Grade College, Nargund-582 207, India

^cDepartment of Physics, PES University, BSK 3rd stage, Bangalore-560 085, India

*Corresponding author: Tel.: +91 9448116281. Fax: +91 80 23219295.

E-mail address: bnlarasappa@rediffmail.com (B.N. Lakshminarasappa)

Abstract

Europium doped yttrium oxide thin films have been deposited by spray pyrolysis method. The crystallite sizes are calculated ~ 50 nm using Scherrer's formula. Fourier transformed infrared spectroscopy (FTIR) reveals the broad absorption with peak at 875 cm^{-1} . Surface morphology and elemental composition of the thin films are studied by field-emission scanning electron microscope (FESEM) equipped with an energy dispersive X-ray spectroscopy (EDS). The energy gap (E_g) of the thin film sample is found to be $\sim 5.37\text{ eV}$. The film exhibits photoluminescence (PL) emission at 525-550 nm, 585-601 nm, 612 nm and 620-632 nm under the excitation of 240 nm. Gamma (γ) irradiated films exhibits two well resolved thermoluminescent (TL) glows with peaks at 460 and 570 K. The TL glow curves are analyzed by glow curve shape method. The activation energy and the frequency factor are found to be $\sim 0.6\text{ eV}$, $\sim 3 \times 10^6\text{ s}^{-1}$ for 460 K and $\sim 0.53\text{ eV}$, $\sim 46.72 \times 10^3\text{ s}^{-1}$ for 570 K.

Keywords: Oxide thin film; Morphology; Energy gap; Activation energy;

Photoluminescence; Thermoluminescence.

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