INTERNATIONAL SYMPOSIUM ON CRYSTALLOGRAPHY
100 YEARS OF HISTORY FORTALEZA 2014

Blucher Physics Proceedings
Janeiro de 2015, Número 3, Volume 1

INFLUENCE OF DOPANT CONCENTRATION ON THE LUMINESCENT AND STRUCTURAL PROPERTIES OF $SrB_xAl_{2-x}O_4$:Eu,Dy LASER SINTERED CERAMIC

Alves, Y. G. S.[*]; Sampaio, D. V.; Souza, N. R. S.; da Silva, R. S.

Grupo de materiais cerâmicos avançados, Departamento de Física, Universidade Federal de Sergipe, São Cristóvão, Sergipe, Brazil

ylla.ufs@gmail.com

Strontium aluminate ($SrAl_2O_4$) co-doped with $Eu^{2+}$and Dy^{3+} ions has been considered one of the best long-lasting phosphorescent materials. Due to this propertie it shows a largest potential of applications, such as, electronic displays, detecting high energy rays (UV, X-rays and rays), digital radiography, optical memories and image storage. Frequently, the boron has been used as an excellent flux agent in order to optimize the long-lasting phosphorescence ($SrAl_2O_4$). By replacing B in Al site can be possible accelerate the grain growth, improve the mass diffusion, increases the relative density and decreases the pores amount. In this work the $SrB_xAl_{2-x}O_4$:*Eu;Dy* powders were synthesized by the polymeric precursor method and sintered using a new method. In this method a CO_2 laser is used as the main heating source for sintering. To sintering, the powders were uniaxially pressed in discs of 4 mm in diameter by 1 mm thick and the laser radiation was focused on the sample providing very high heating and cooling rates, which are estimated at 2000 °C/min. The characterization was done by Differential Thermal Analysis, Thermogravimetry, X-rays diffraction, Scanning Electron Microscopy and Photoluminescent techniques. The synthesized powders were calcined at 600 °C for 5 h using a heating rate of 10 °C/min under open atmosphere, at concentrations of 0.1/0.1, 0.5/0.5, and 2.0/1.0 mol% of Eu and Dy respectively, and 3.0 mol% of boron. The structural characterization was made by the Rietveld method in some samples. Finally, the laser sintered ceramics presented long-lasting phosphorescence visible to “naked eye” for 2h with emission band centred at 513 nm.