

Author's Accepted Manuscript

Thermal window of constant luminescence quantum efficiency of Nd³⁺-doped phosphate glass

José C. Filho, Sidney A. Lourenço, Pâmela Z. Ferreira, Viviane Pilla, Djaldir N. Messias, Anielle C. Almeida Silva, Noelio O. Dantas, Acácio A. Andrade



PII: S0022-2313(16)30476-8
DOI: <http://dx.doi.org/10.1016/j.jlumin.2016.08.018>
Reference: LUMIN14179

To appear in: *Journal of Luminescence*

Received date: 13 April 2016
Revised date: 14 June 2016
Accepted date: 6 August 2016

Cite this article as: José C. Filho, Sidney A. Lourenço, Pâmela Z. Ferreira Viviane Pilla, Djaldir N. Messias, Anielle C. Almeida Silva, Noelio O. Dantas and Acácio A. Andrade, Thermal window of constant luminescence quantum efficiency of Nd³⁺-doped phosphate glass, *Journal of Luminescence* <http://dx.doi.org/10.1016/j.jlumin.2016.08.018>

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 a 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.

Thermal window of constant luminescence quantum efficiency of Nd³⁺-doped phosphate glass

José C. Filho¹, Sidney A. Lourenço^{2*}, Pâmela Z. Ferreira¹, Viviane Pilla¹, Djaldir N. Messias¹, Anielle C. Almeida Silva³, Noelio O. Dantas³ and Acácio A. Andrade¹

¹Grupo de Propriedades Ópticas e Térmicas de Materiais (GPOTM), Instituto de Física, Universidade Federal de Uberlândia. CP 593, 38400-902, Uberlândia – MG, Brazil

²Grupo de Fotônica e Materiais Nanoestruturados (GFMN), Departamento de Física, Universidade Tecnológica Federal do Paraná, 86036-370, Londrina – PR, Brazil

³Laboratório de Novos Materiais Isolantes e Semicondutores (LNMIS), Instituto de Física, Universidade Federal de Uberlândia, CP 593, 38400-902, Uberlândia – MG, Brazil

*Correspondent author: lourenco-sidney@hotmail.com

Abstract

In this work was investigated the luminescence quantum efficiency, η , of Nd-doped phosphate glasses, as a function of temperature (298 - 438 K), using the normalized lifetime thermal lens technique. This system presents high quantum efficiency at low Nd³⁺ concentration and at ambient temperature, 98%. In the temperature interval from 298 to 313 K, η , presents a decrease and then becomes constant until 393 K. Above this temperature it decrease again. This thermal quenching process was ascribed to thermally activated low energy phonons, associated to rocking motions of the corner-shared PO₄ tetrahedron cluster (order-disorder phase transformation), inducing changing on non-radiative transition that leave to a reduction of luminescence quantum efficiency at 298 and 393 K. From 313 to 393 K occurs a constant window of luminescence quantum efficiency in the PANK_xNd³⁺ system. This assumption is supported by Differential Scanning Calorimetry and Raman measurements.

Keywords

Glasses, non-crystalline materials, optical properties, luminescence, photoluminescence spectroscopy, concentration and lifetime

Download English Version:

<https://daneshyari.com/en/article/5398134>

Download Persian Version:

<https://daneshyari.com/article/5398134>

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