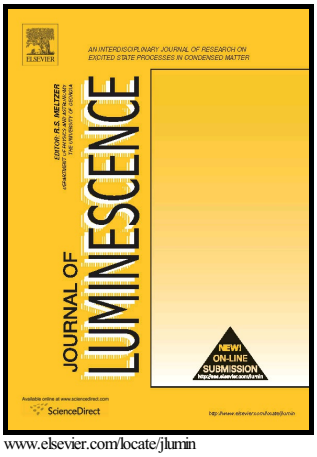

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Effect of temperature on the structure and luminescence properties of $Ag_{0.05}Ga_{0.05}Ge_{0.95}S_2$-$Er_2S_3$ glasses

V.V. Halyan[1], I.V. Kityk[2], A.H. Kevshyn[3], I.A. Ivashchenko[4], G. Lakshminarayana[5], M.V. Shevchuk[6], A. Fedorchuk[7], M. Piasecki[8,*]

[1]Department of General Physics, Eastern European National University, Lutsk, Ukraine
[2]Faculty of Electrical Engineering, Czestochowa University of Technology, Armii Krajowej 17, Czestochowa, Poland
[3]Volyn National University, Voli Ave 13, 43025 Lutsk, Ukraine
[4]Department of Inorganic and Physical Chemistry, Eastern European National University, Lutsk, Ukraine
[5]Wireless and Photonic Networks Research Centre, Faculty of Engineering, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia
[6]Lutsk National Technical University, Lutsk, Ukraine
[7]Department of Inorganic and Organic Chemistry, Lviv National University of Veterinary Medicine and Biotechnologies, 50 Pekarska Street, 79010 Lviv, Ukraine
[8]Institute of Physics, J.Dlugosz University Częstochowa, Armii Krajowej 13/15, Częstochowa, PL-42-217, Poland
[*]corresponding author: m.piasecki@ajd.czest.pl

Abstract

In this article, we present the investigations of temperature dependent luminescence for the $Ag_{0.05}Ga_{0.05}Ge_{0.95}S_2$-$Er_2S_3$ glass system. The possibility to use temperature dependences of the photoluminescence of synthesized glasses for thermo sensors is considered. It is shown that logarithm of ratio of the integrated photoluminescence intensities for 980 and 600 nm (ln (I_{980}/I_{660})) emission bands possess excellent linear dependence of temperature. At the same time, the nonlinear optical effects of two-photon absorption show substantial divergence from the sublinear dependences. These phenomena provide an opportunity to utilize $Ag_{0.05}Ga_{0.05}Ge_{0.95}S_2$-$Er_2S_3$ glasses for the fabrication of highly sensitive temperature sensor devices.

Keywords: Er^{3+}-doped glasses; luminescence; optical sensors

1. Introduction

Recently, there has been a great deal of interest among researchers in studying the amorphous [1–4] and crystalline [5–11] semiconductors doped with rare earth (RE) metal