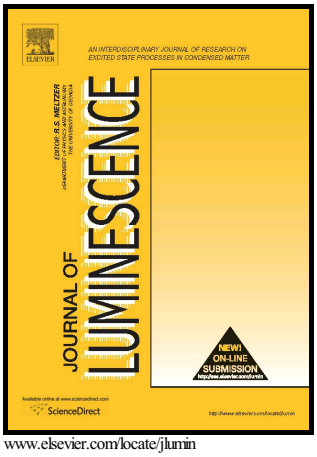

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YAG:Dy – Based Single White Light Emitting Phosphor Produced by Solution Combustion Synthesis

J. F. C. Carreira*, N. Ben Sedrine, T. Monteiro, L. Rino

Departamento de Física & I3N, Universidade de Aveiro, Campus Universitário de Santiago, 3810-193 Aveiro, Portugal

*Corresponding author: correiacarreira@ua.pt

Abstract

Dysprosium-doped yttrium aluminum garnet (YAG:Dy) phosphor was successfully produced by a Solution Combustion Synthesis (SCS) using a mixture of two fuels (urea and glycine). The effects of Dy concentration and annealing temperature were studied by X-ray diffraction (XRD), Raman spectroscopy (RS), photoluminescence (PL) and photoluminescence excitation (PLE). X-ray diffraction results show that the phosphors are single phase YAG with crystallite size ranging from 45 to 82 nm. Raman spectroscopy corroborates these results and show that the introduction of Dy ions in the YAG lattice results in additional Raman modes. Room temperature photoluminescence results confirm the introduction of the ion in the host lattice and its optical activation for all the Dy concentrations. CIE1931 color coordinates show that the samples' emission lays in the near white region. The highest intraionic emission intensity was achieved for a Dy concentration of 2 mol% and annealing temperature of 1400 ^{o}C. Photoluminescence excitation results show that the ions luminescence is preferential excited with 351.8 and 365.8 nm wavelength photons.

Graphical Abstract