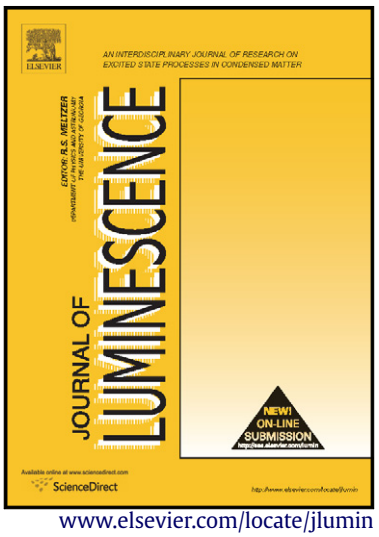

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PII: S0022-2313(14)00332-9
DOI: http://dx.doi.org/10.1016/j.jlumin.2014.05.040
Reference: LUMIN12725

To appear in: *Journal of Luminescence*

Received date: 24 March 2014
Revised date: 28 May 2014
Accepted date: 29 May 2014

Cite this article as: J.Y. Jung, G.A. Hirata, G. Gundiah, S. Derenzo, W. Wrasidio, S. Kesari, M.T. Makale, J. McKittrick, Identification and development of nanoscintillators for biotechnology applications, *Journal of Luminescence,* http://dx.doi.org/10.1016/j.jlumin.2014.05.040

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ABSTRACT

The purpose of this work is to investigate the radioluminescence emission properties in the range 300-400 nm of 15 nanoscintillators for potential application in radiation-triggered photodynamic therapy, and compare to those reported for single crystals with same composition. Garnet structures, silicates and an oxide activated with Pr^{3+} or Ce^{3+} were prepared by combustion synthesis and subsequently annealed at 1200˚C. The $(Y_{1-x}Pr_x)_3Al_5O_{12}$ (x = 0.0075, 0.01, 0.0125, 0.015, 0.0175) compositions have the highest luminosity, showing concentration behavior for x > 0.01. The average particle size of $(Y_{0.99}Pr_{0.01})_3Al_5O_{12}$ is 80 nm, which was obtained by post-annealing high power ultrasonic processing. These results demonstrate that $(Y_{1-x}Pr_x)_3Al_5O_{12}$ is an excellent candidate for nanoscintillators-based biomedical applications. Comparisons to single crystal data indicate a general trend cannot be established between the radioluminescence emission intensity of nanoscintillators and single crystals with the same composition.

Keywords: Nanoscintillators, drug delivery, biomedical application, UV-emitting

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