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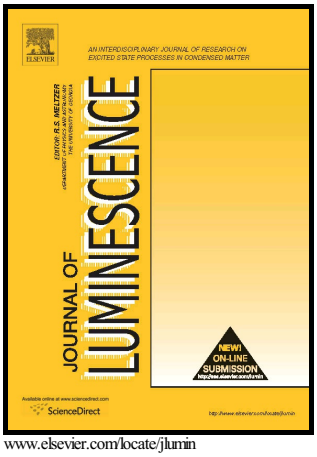

www.elsevier.com/locate/jlumin

PII: S0022-2313(15)30297-0
DOI: http://dx.doi.org/10.1016/j.jlumin.2015.10.029
Reference: LUMIN13652

To appear in: *Journal of Luminescence*

Received date: 24 July 2015
Revised date: 7 October 2015
Accepted date: 14 October 2015

Cite this article as: S Gardelis, V. Gianneta and A.G Nassiopoulou, Twenty-fold plasmon-induced enhancement of radiative emission rate in silicon nanocrystal embedded in silicon dioxide, *Journal of Luminescence* http://dx.doi.org/10.1016/j.jlumin.2015.10.029

Twenty-fold plasmon-induced enhancement of radiative emission rate in silicon nanocrystals embedded in silicon dioxide.

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ABSTRACT

We report on a 20-fold enhancement of the integrated photoluminescence (PL) emission of silicon nanocrystals, embedded in a matrix of silicon dioxide, induced by excited surface plasmons from silver nanoparticles, which are located in the vicinity of the silicon nanocrystals and separated from them by a silicon dioxide layer of a few nanometers. The electric field enhancement provided by the excited surface plasmons increases the absorption cross section and the emission rate of the nearby silicon nanocrystals, resulting in the observed enhancement of the photoluminescence, mainly attributed to a 20-fold enhancement in the emission rate of the silicon nanocrystals. The observed remarkable improvement of the PL emission makes silicon nanocrystals very useful material for photonic, sensor and solar cell applications.

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