

## Author's Accepted Manuscript

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

S Gardelis, V. Gianneta, A.G Nassiopoulou



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>

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 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

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

S. Gardelis<sup>1,2\*</sup>, V. Gianneta<sup>1</sup> and A.G. Nassiopoulou<sup>1</sup>

<sup>1</sup>NCSR Demokritos INN, Terma Patriarchou Grigoriou, Aghia Paraskevi, 15310

Athens, Greece

<sup>2</sup>Solid State Physics Section, Physics Department, National and Kapodistrian University of Athens, Panepistimioupolis, Zografos, 15784 Athens, Greece

**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.

---

\*Author to whom correspondence should be addressed.  
Electronic mail: sgardelis@phys.uoa.gr

Download English Version:

<https://daneshyari.com/en/article/5399090>

Download Persian Version:

<https://daneshyari.com/article/5399090>

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