Preparation and persistent luminescence in rare earth doped $Ca_2Si_5N_8$ nanoparticles

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Focusing our research on the use of nanophosphors for *in vivo* imaging and diagnosis applications, improved nanomaterials, excitable with UV light, and displaying the most intense afterglow in the near-infrared region are investigated. For this purpose persistent nanophosphors used as a probe should able to emit in the red and near infrared range long-lasting phosphorescence (LLP) for hours following a previous *ex vivo* excitation [1]. It has been demonstrated that $Ca_2Si_5N_8$:Eu,Tm is well suitable for such application and can present outstanding long lasting luminescence at about 590 nm [2]. To go further in the application the particle size should be decrease in order to be well accepted by the organism. Second, the long lasting phosphorescence should be maintained in solution.

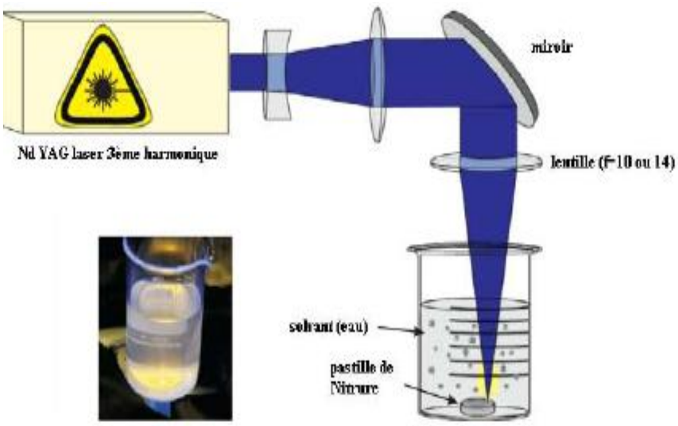

Figure 1: Principle of the PLAL method (from [3])

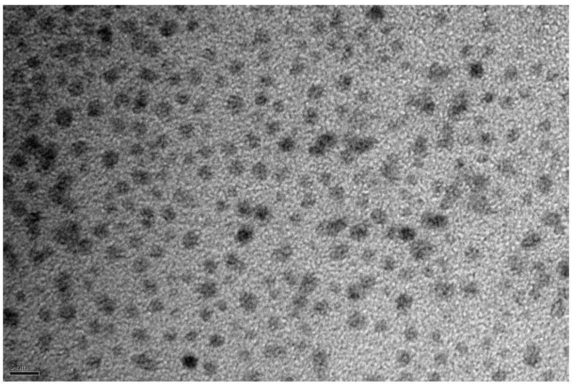

Figure 2: TEM picture of the $Ca_2Si_5N_8$:Eu,Tm NPs (bar scale 5 nm)

In order to obtain nanoparticles (NPs), laser ablation in liquid is used (see ref. [3] and the principle is presented fig. 1). With such procedure and using "surfactant" very small NPs are obtained (see figure 2).

The aim of this presentation is to describe (i) the first results obtained for the NPs preparation with pulsed laser ablation in liquid (PLAL) as well as the characterization of the nanomaterials, and then (ii) the investigation of the luminescence properties of the nanosize material. Potential for *in-vivo* imaging will be discussed.

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