

SUPPORTING INFORMATIONS

Laser Dye Doped Nanoparticles for Highly Photostable Optical Nanoamplifiers

Angelo Monguzzi,* Michel Frigoli, Chantal Larpent, and Francesco Meinardi

In the following are reported additional results of the Pyr567-NP particles set studied.

Table S1 Encapsulation of PM567 in the nanoparticles

Entry	Size NP nm	NP content[a]	[C] mmol.L ⁻¹	dye added μmol / g	dye entrapped μmol / g	dye entrapped mmol / L	Dye / NP	Dye Concentration solid state (dye cm ⁻³)	PLQY (±5%)
1	18	8.89	5.44	5.44	4.83	4.83	8.89	2.53×10 ¹⁸	0.8118
2	18	17.47	10.88	10.88	9.50	9.50	17.47	4.06×10 ¹⁸	0.8437
3	18	29.20	21.77	21.77	15.89	15.89	29.20	8.29×10 ¹⁸	0.7922
4	27	37.29	5.44	5.44	6.18	6.18	37.29	3.62×10 ¹⁸	0.8035
5	27	60.74	10.88	10.88	10.07	10.07	60.74	5.90×10 ¹⁸	0.8313
6	27	87.90	21.76	21.76	14.57	14.57	87.90	8.53×10 ¹⁸	0.8105

[a] determined from the value of absorbance at 523 nm ($\epsilon = 86000 \text{ mol}^{-1}\cdot\text{L}\cdot\text{cm}^{-1}$) for PM567-doped NPs (diluted in pure water 20 times) and assuming a NP average of 18 or 27 nm and a density of 1.

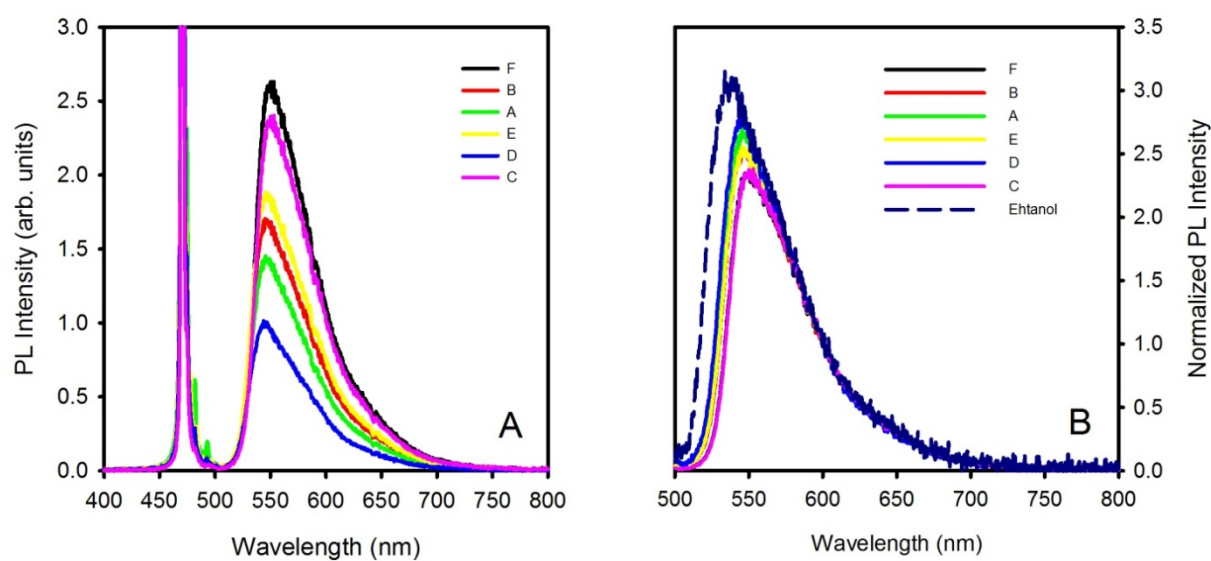


Fig. S2 (left) PL spectrum of Py567 doped NPs in aqueous suspension, under 473 nm CW excitation (10 mW) in a 1 mm optical path cuvette. (right) NP emission spectra compared to solution PL (red line), normalized to enlighten the self-absorption effect

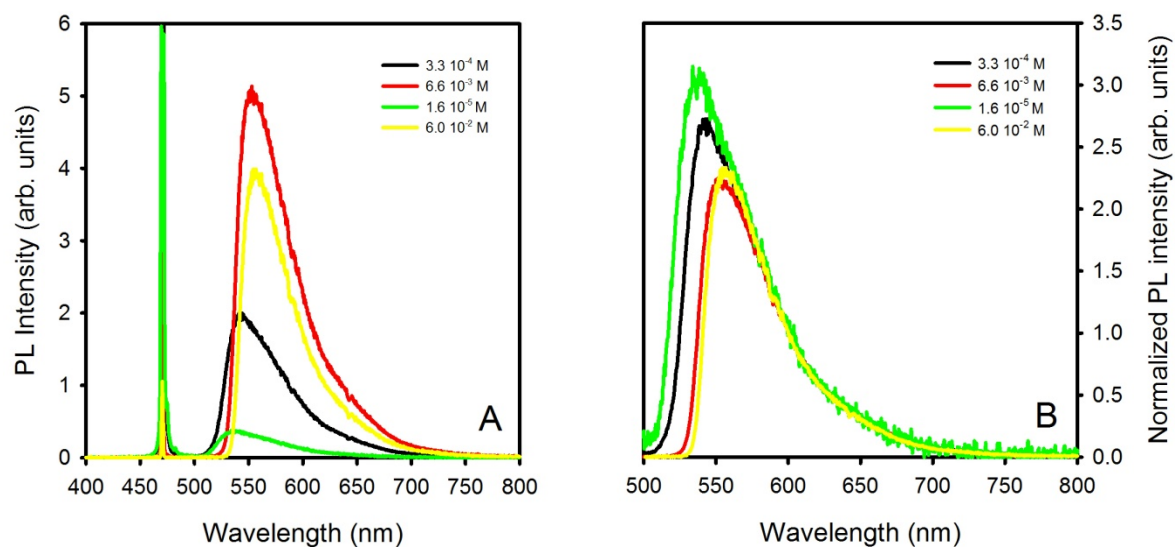


Fig. S3 (left) PL spectrum of Py567 solution in ethanol at different concentrations, under 473 nm CW excitation (10 mW) in 1 mm optical path cuvette. (right) Normalized PL spectra.

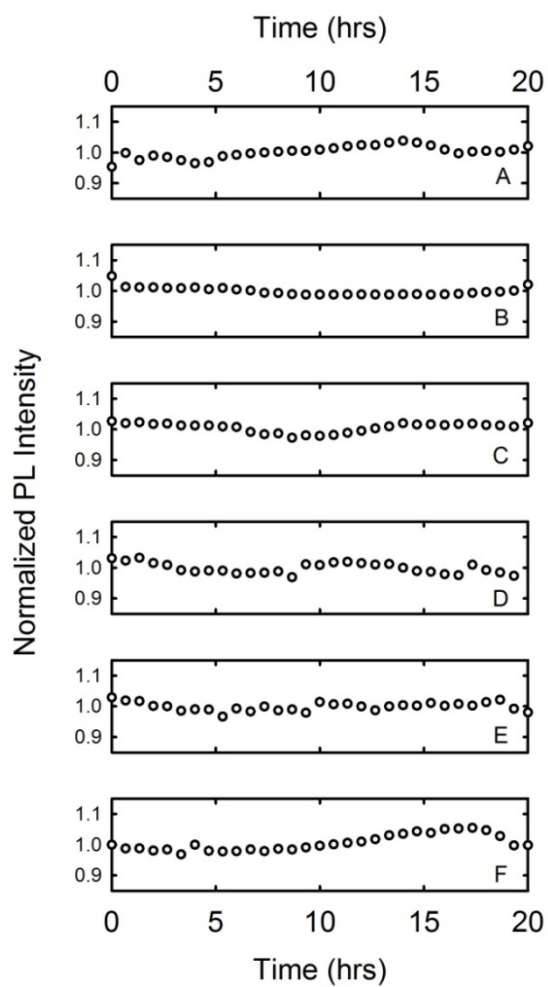


Fig. S4 PL spectrum of Py567 doped NP series as a function of time, under air exposition and $31.25 \text{ mW /cm}^{-2}$ CW laser excitation at 532 nm.

Preparation of rubrene doped NPs and rubrene nanocrystals: 40 μL of a DCM solution containing 0.0108 mol.L^{-1} of rubrene were added to 2 mL of an aqueous suspension of the nanoparticles (2% wt; 15% DTAB) or to 2 mL of 15 wt % DTAB aqueous solution. The resulting mixtures were stirred at room temperature for 3 h in a capped sample tube. The tube was then uncapped and the solution was stirred for an additional 12 h to allow evaporation of the DCM. The solutions were filtered through a 0.2 μm MF-MilliporeTM filter before use. Absorption spectra were recorded for solutions diluted 20 times in water.

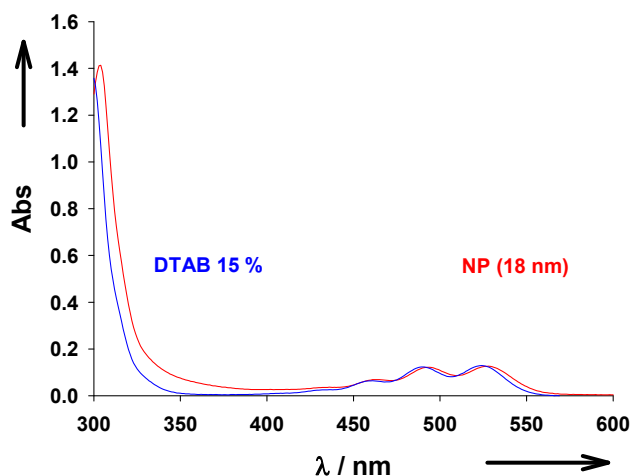


Fig. S5 Absorption spectra of Rubrene doped NPs in red (18 nm) containing 20 rubrene per particle and rubrene nanocrystals in blue.

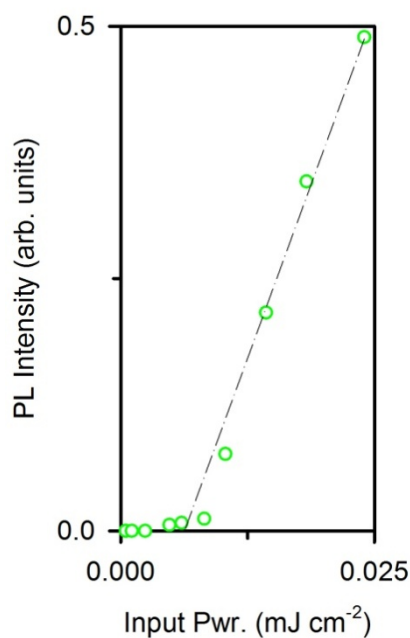


Fig. S6 PL intensity as a function of the excitation pulse energy of Film-Al sample (green circles)