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Supporting Information

Toward a new generation of white phosphors for solid state lighting using glassy yttrium aluminoborates

In order to evaluate the PL emission of g-YAB phosphors in transmission, thin pellets of 1 mm thick were prepared by pressing powders calcinated at 740 °C, using NUV-LEDs as excitation sources. A typical emission spectrum recorded under λ_{exc} = 405 nm is shown in Figure S1. It exhibits a very broad PL band in the whole visible region (450 - 750 nm) with strong components in the yellow-red range that is a great advantage to produce warm lighting. However, the pellet was unable to sufficiently absorb the incident excitation, as shown by the presence of intense peak at 405 nm of the blue LED

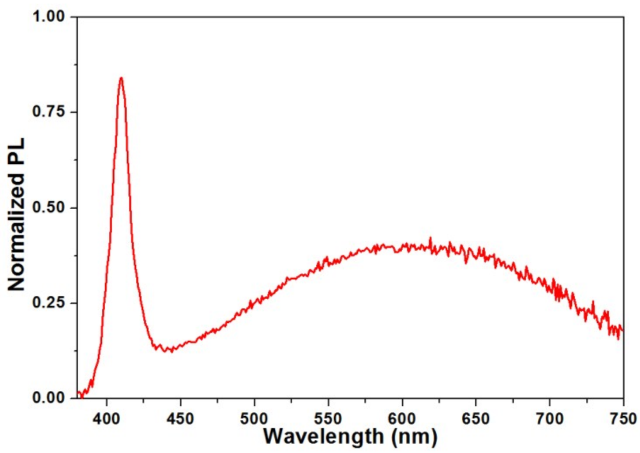

Figure S1: PL emission spectrum recorded in the transmission mode for a g-YAB powder calcinated at 740 °C and excited with a NUV-LED emitting at λ_{exc} = 405 nm. The normalization of the PL spectrum was arbitrary based on the maximum of the transmitted blue LED, at 405 nm.

The thermos-stability properties were measured using a spectrometer SAFAS – Flx Xenius XC and a sample holder equipped with a homemade heater. The sample used in this experiment was previously calcinated at T_{ca} = 740 °C. Then, the g-YAB powder was pressed inside the sample holder cavity (2 mm thick, 6 mm in diameter) with a thermocouple placed directly inside the sample. The PL spectra were recorded between 390 and 700 nm, using an excitation of 375 nm at temperatures ranging from 25 to 300 °C. The PL spectra recorded from room temperature until 275 °C are displayed in Figure S2a, while Figure S2b shows the integrated PL intensity referred to that at 25°C as a function of temperature under heating and cooling cycles. We can observe that the PL intensity rises gradually up to 275 °C, by around 25%, and then decreases at higher temperatures.

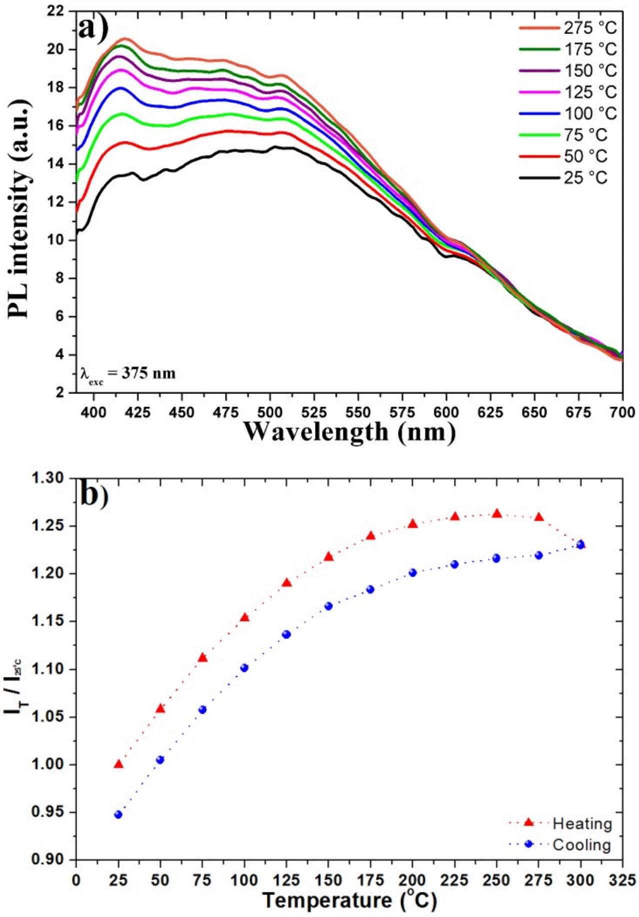

Figure S2: (a) PL spectra versus temperature. (b) Thermal evolution of the integrated PL intensity referred to that at 25°C in heating and cooling cycles. The excitation wavelength is 375 nm.

Figure S3 shows the variation of integrated PL band of the g-YAB sample (T_{ca} = 740°C) as a function of time, under a continuous irradiation at λ_{exc}=385 nm provided by a NUV-LED operating at 1 mW. The integrated PL emission decreased of about 3% in the first six hours of excitation and then, the PL emission was stabilized staying perfectly constant during 24h of irradiation. The integrated PL emission returns to the same initial intensity when the excitation stopped. So, this fading effect is a reversible phenomenon.

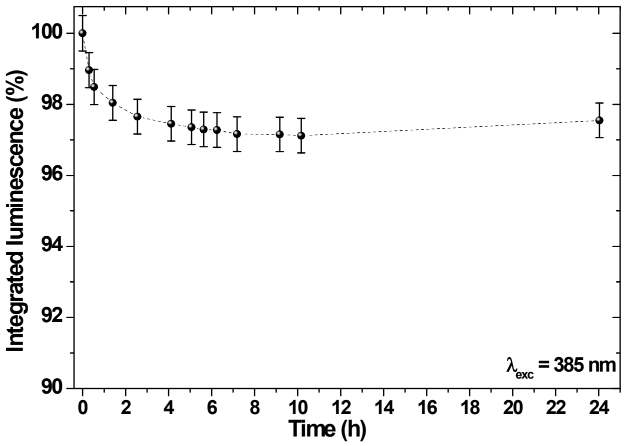

Figure S3: Photo-stability of integrated PL as a function of time.