

## **SUPPLEMENTARY INFORMATION**

### **Effect of the vanadium(V) concentration on the spectroscopic properties of nanosized europium-doped yttrium phosphates**

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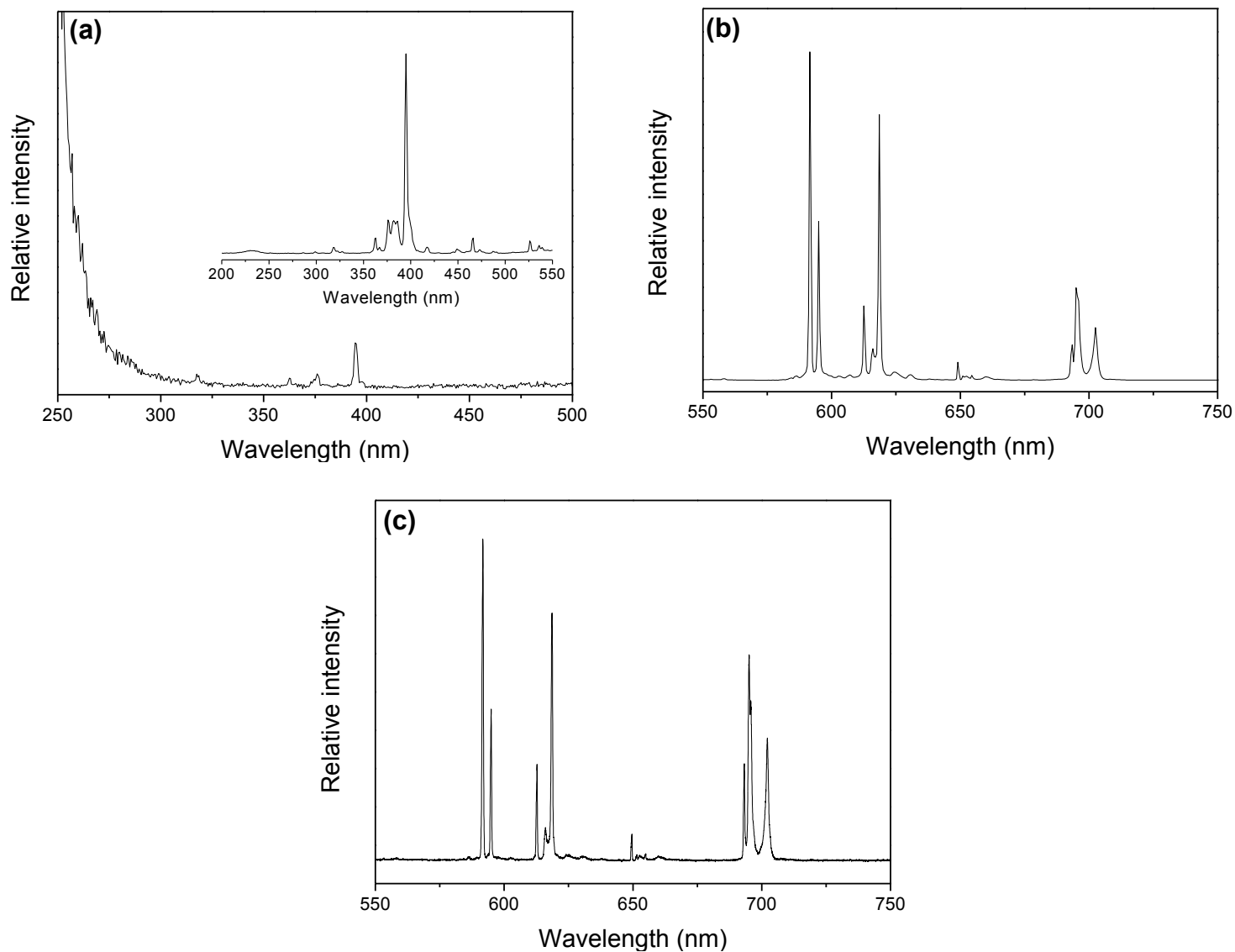
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Phone: +55-16-3602-4376.

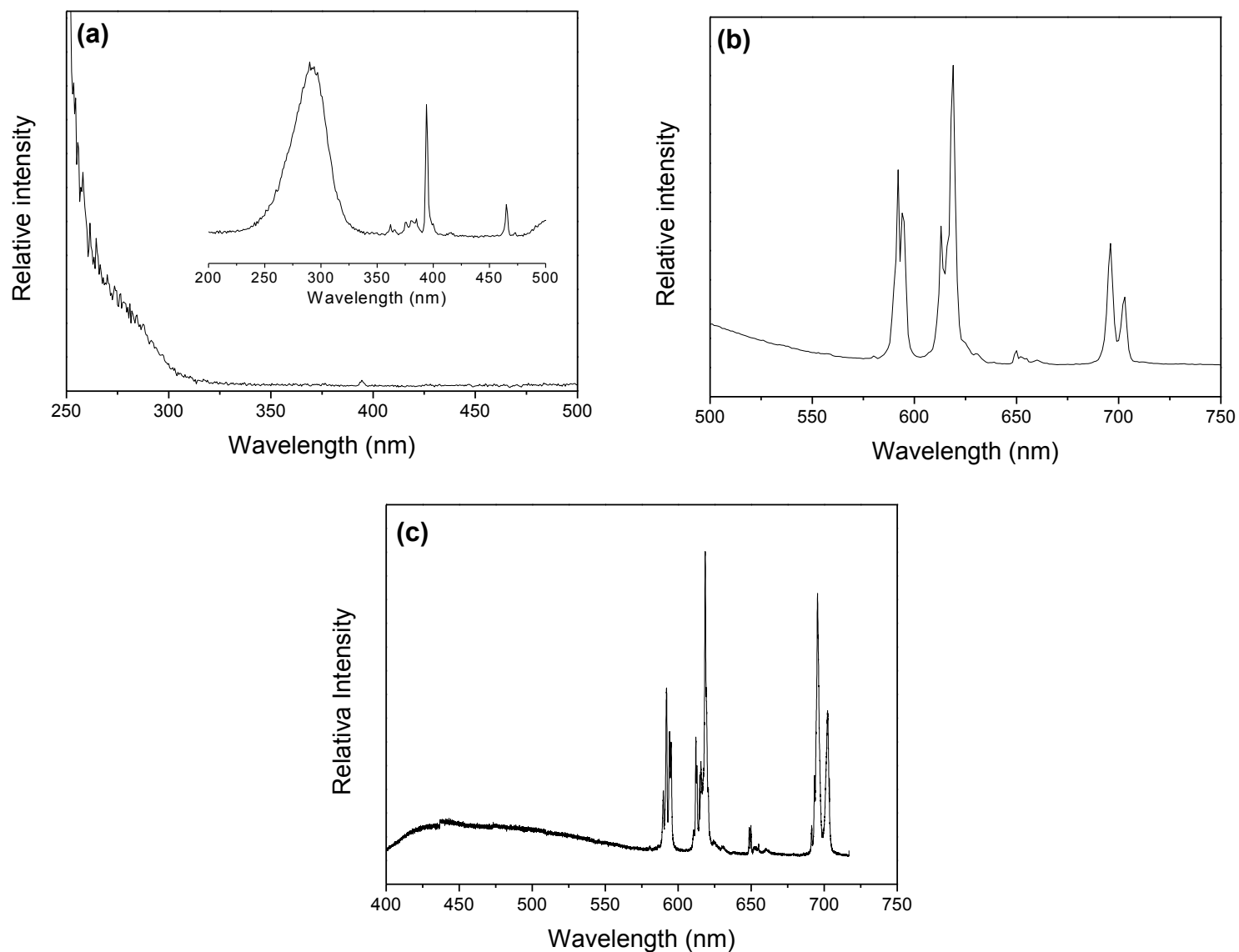
E-mail: [pcsfilho@usp.br](mailto:pcsfilho@usp.br)

## I) Additional Luminescence Spectra

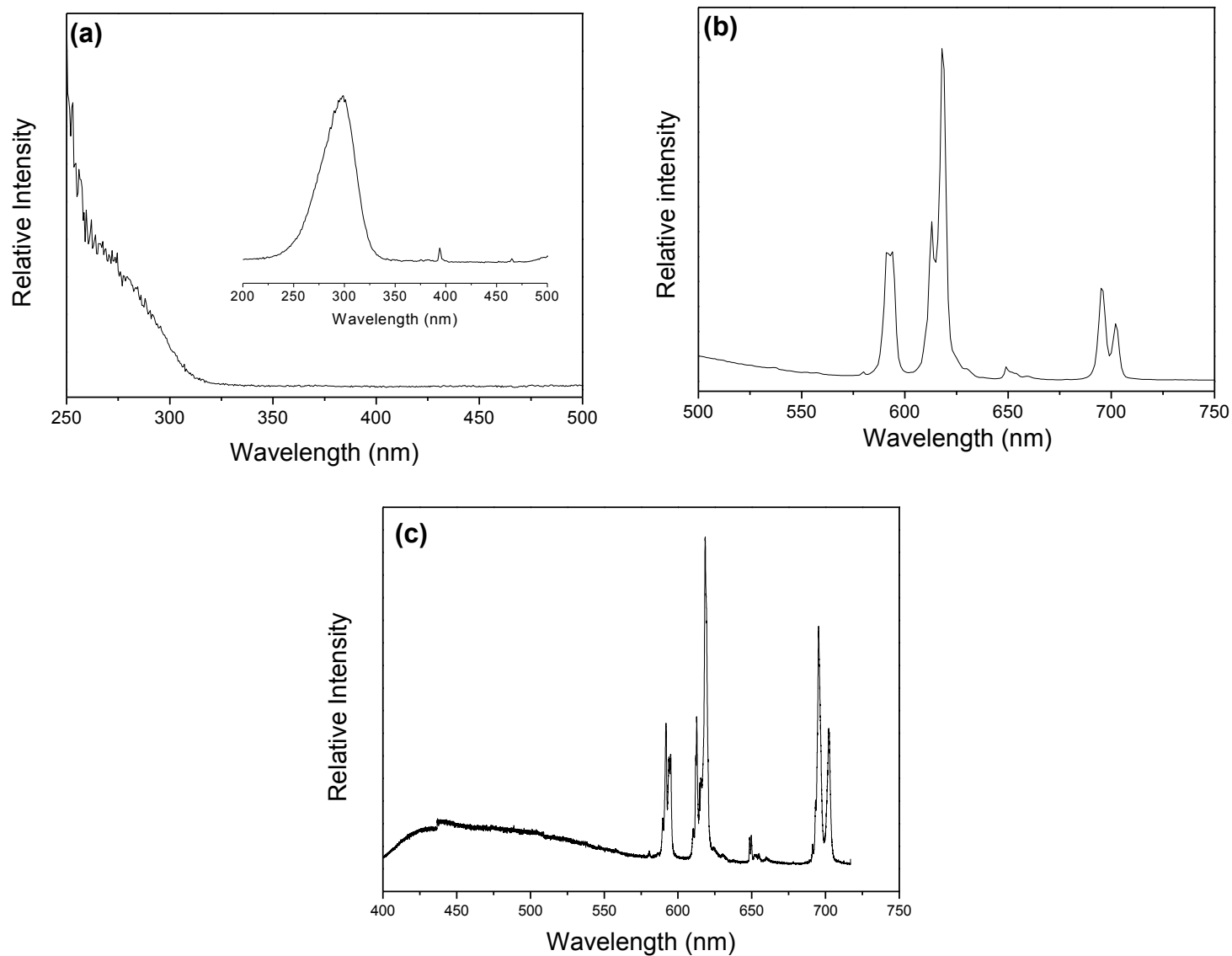
(Obs.: The excitation spectra here presented are corrected with regard to the Xe lamp intensity through the software apparatus. The correction is performed only at wavelengths longer than 250 nm. The insets in the excitation spectra display the real spectral acquisitions).



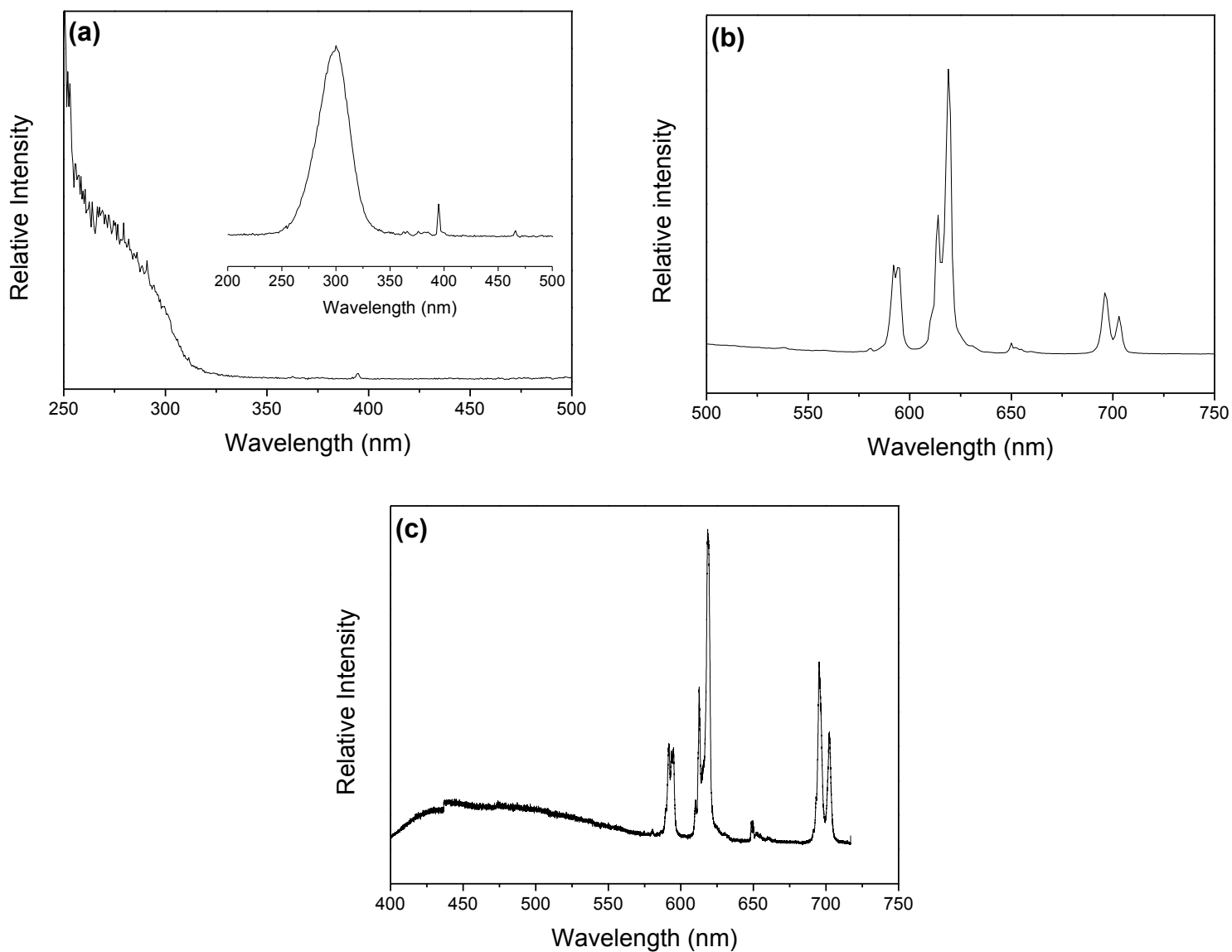
**Figure S1.** Room temperature (a) excitation ( $\lambda_{em}=616$  nm) and (b) emission spectra ( $\lambda_{exc}=394$  nm) of the  $YPO_4:Eu^{3+}$  sample. (c) Emission spectrum ( $\lambda_{exc}=394$  nm) at 77 K.



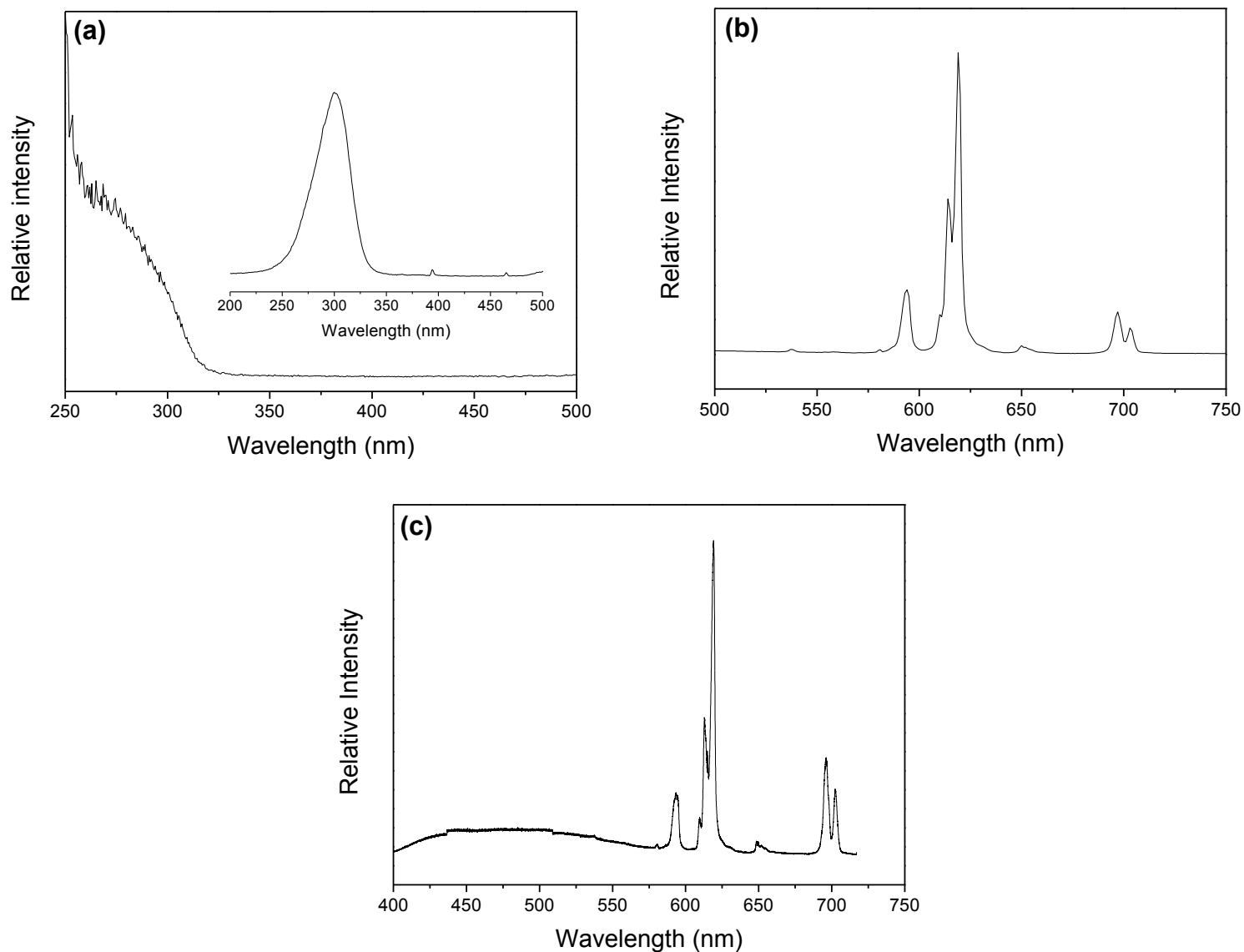
**Figure S2.** Room temperature (a) excitation ( $\lambda_{\text{em}}=616$  nm) and (b) emission spectra ( $\lambda_{\text{exc}}=290$  nm) of the  $\text{Y}(\text{P}_{0.99}\text{V}_{0.01})\text{O}_4:\text{Eu}^{3+}$  sample. (c) Emission spectrum ( $\lambda_{\text{exc}}=290$  nm) at 77 K.



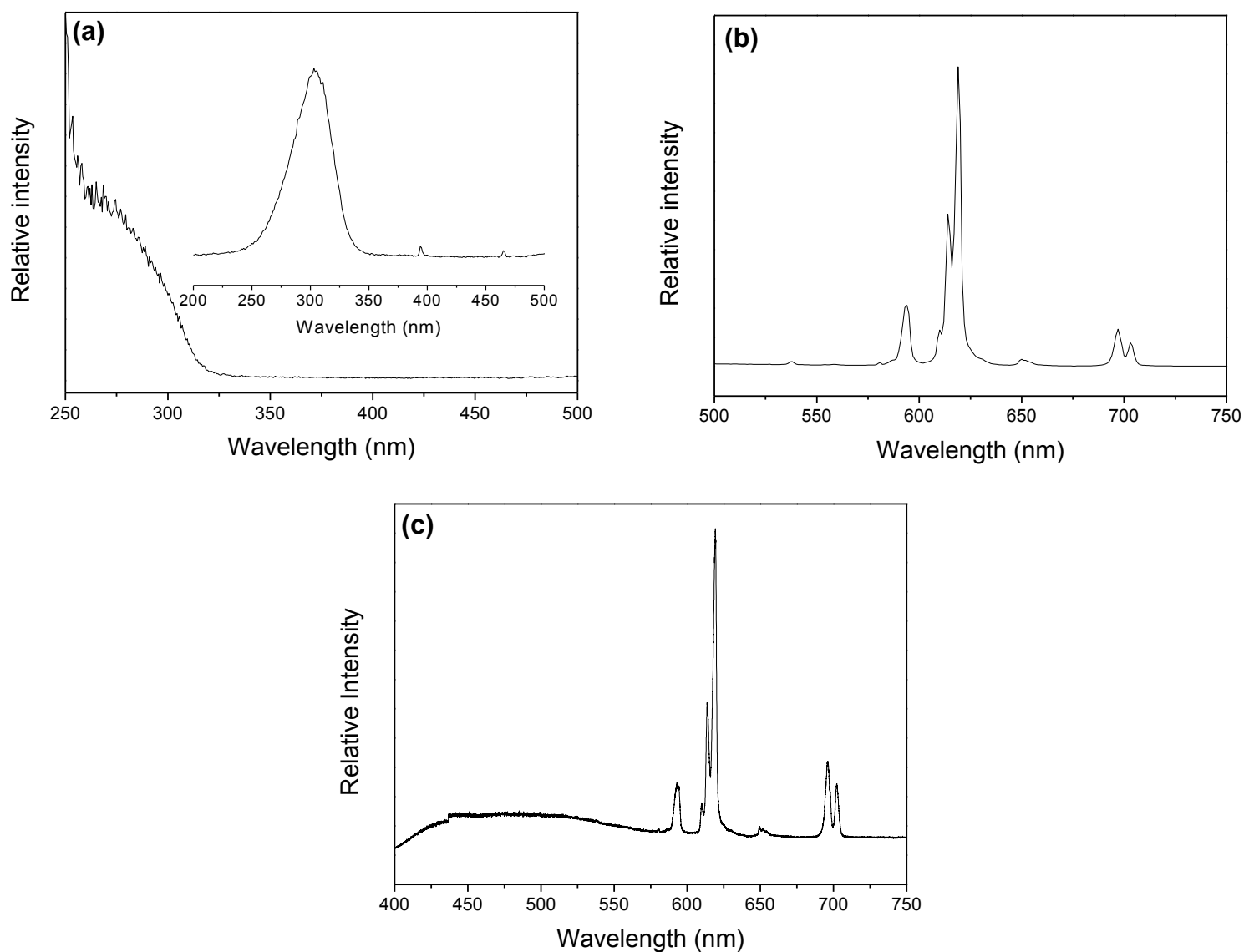
**Figure S3.** Room temperature (a) excitation ( $\lambda_{\text{em}}=616$  nm) and (b) emission spectra ( $\lambda_{\text{exc}}=300$  nm) of the  $\text{Y}(\text{P}_{0.95}\text{V}_{0.05})\text{O}_4:\text{Eu}^{3+}$  sample. (c) Emission spectrum ( $\lambda_{\text{exc}}=300$  nm) at 77 K.



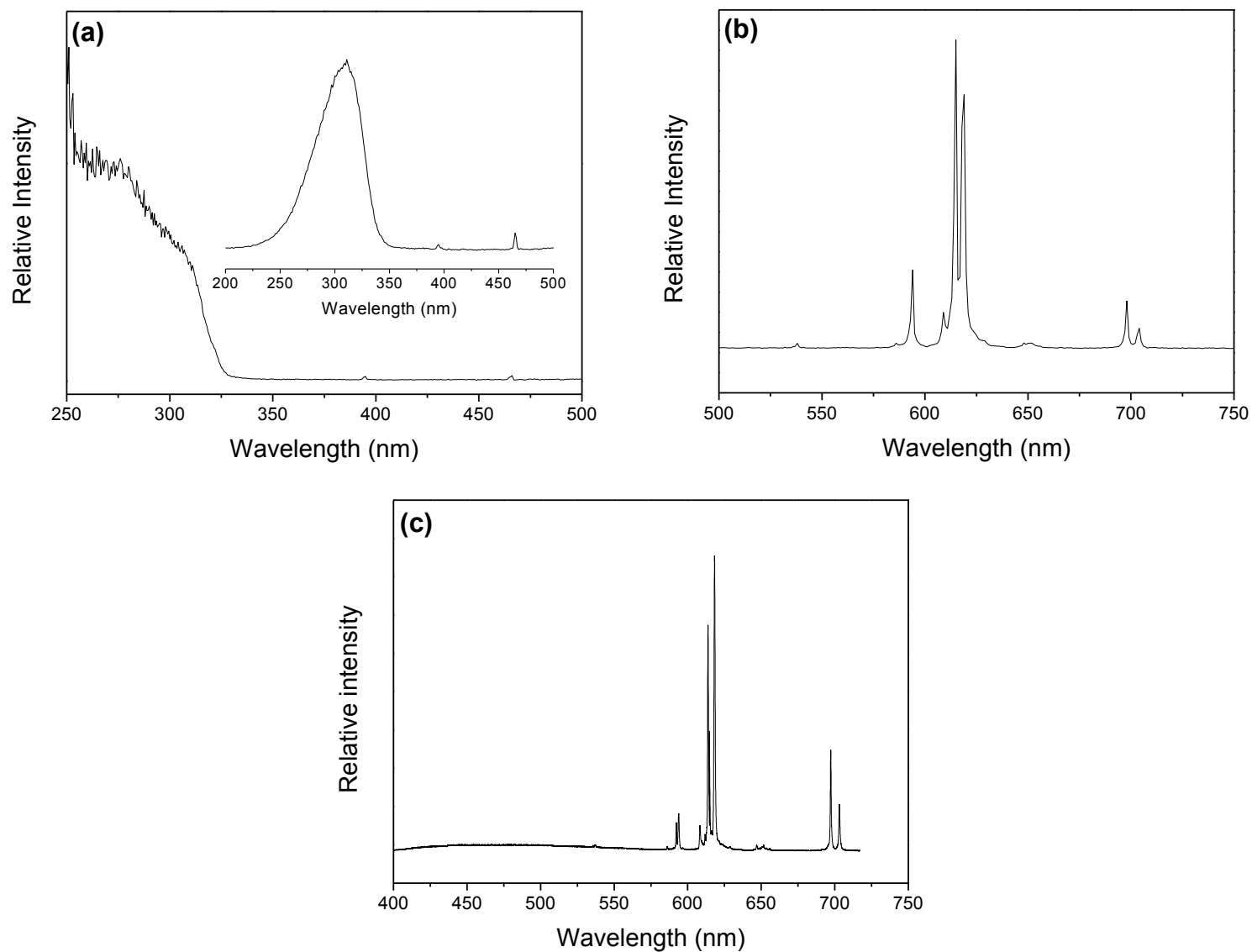
**Figure S4.** Room temperature (a) excitation ( $\lambda_{em}=616$  nm) and (b) emission spectra ( $\lambda_{exc}=300$  nm) of the Y(P<sub>0.90</sub>V<sub>0.10</sub>)O<sub>4</sub>:Eu<sup>3+</sup> sample. (c) Emission spectrum ( $\lambda_{exc}=300$  nm) at 77 K.



**Figure S5.** Room temperature (a) excitation ( $\lambda_{em}=616$  nm) and (b) emission spectra ( $\lambda_{exc}=300$  nm) of the Y(P<sub>0.80</sub>V<sub>0.20</sub>)O<sub>4</sub>:Eu<sup>3+</sup> sample. (c) Emission spectrum ( $\lambda_{exc}=300$  nm) at 77 K.



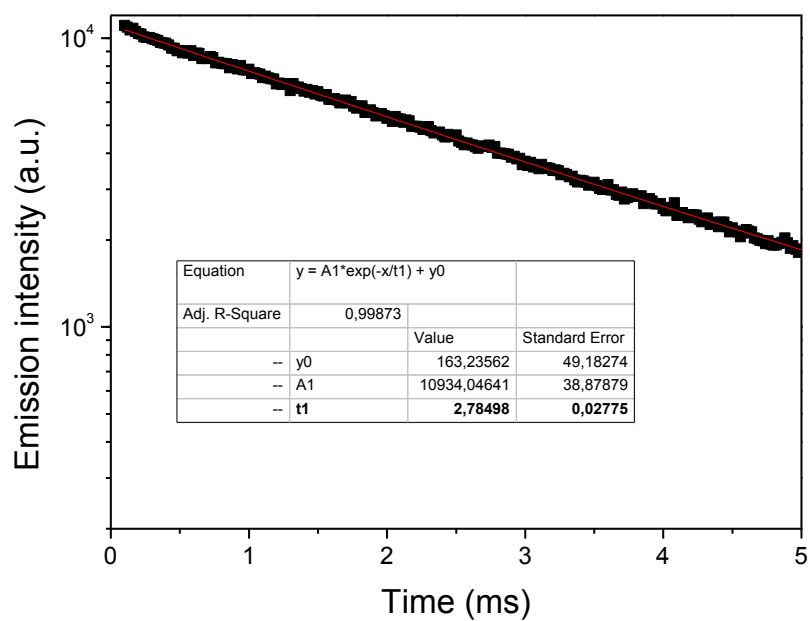
**Figure S6.** Room temperature (a) excitation ( $\lambda_{em}=616$  nm) and (b) emission spectra ( $\lambda_{exc}=305$  nm) of the Y(P<sub>0.50</sub>V<sub>0.50</sub>)O<sub>4</sub>:Eu<sup>3+</sup> sample. (c) Emission spectrum ( $\lambda_{exc}=305$  nm) at 77 K.



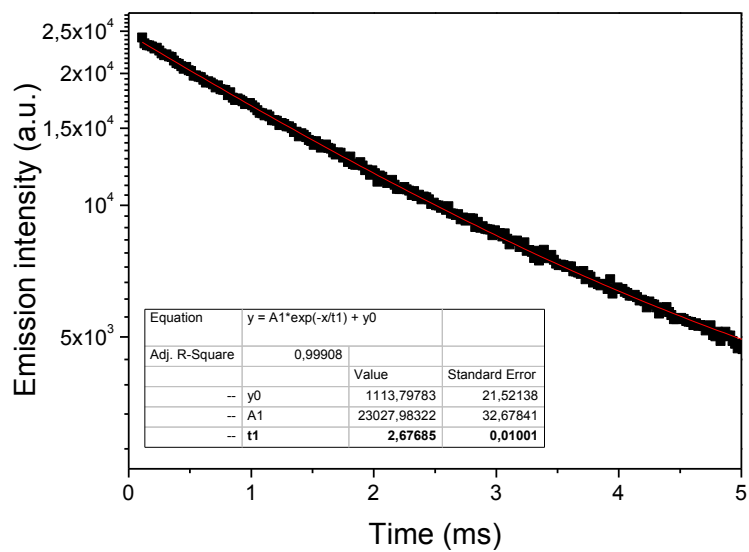
**Figure S7.** Room temperature (a) excitation ( $\lambda_{em}=616$  nm) and (b) emission spectra ( $\lambda_{exc}=310$  nm) of the YVO<sub>4</sub>:Eu<sup>3+</sup> sample. (c) Emission spectrum ( $\lambda_{exc}=310$  nm) at 77 K.



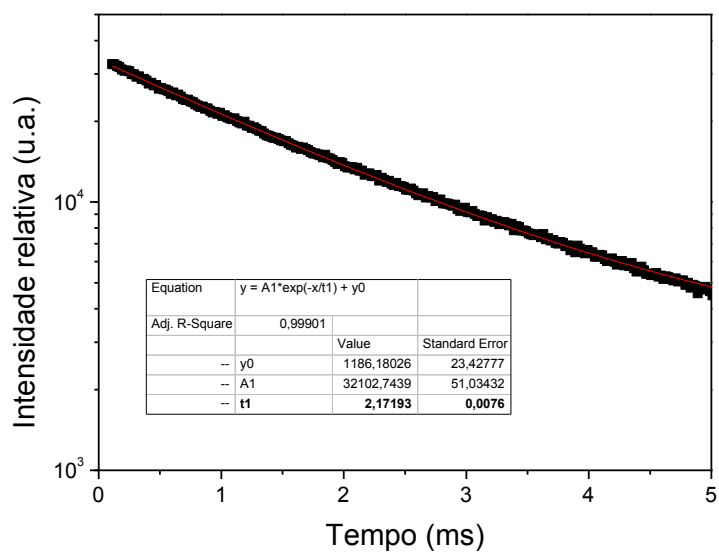
## Luminescence Decay Curves



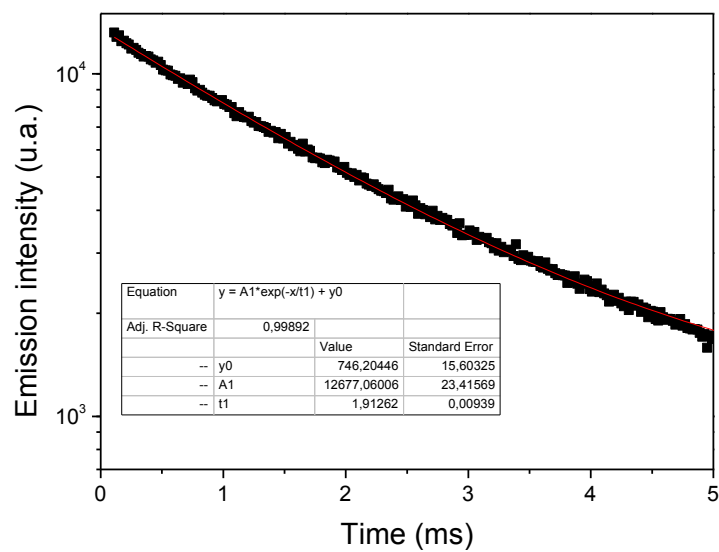
**Figure S8.** Luminescence decay curve of the  $\text{YPO}_4:\text{Eu}^{3+}$  sample ( $\lambda_{\text{exc}}=394$  nm,  $\lambda_{\text{em}}=616$  nm) at room temperature.



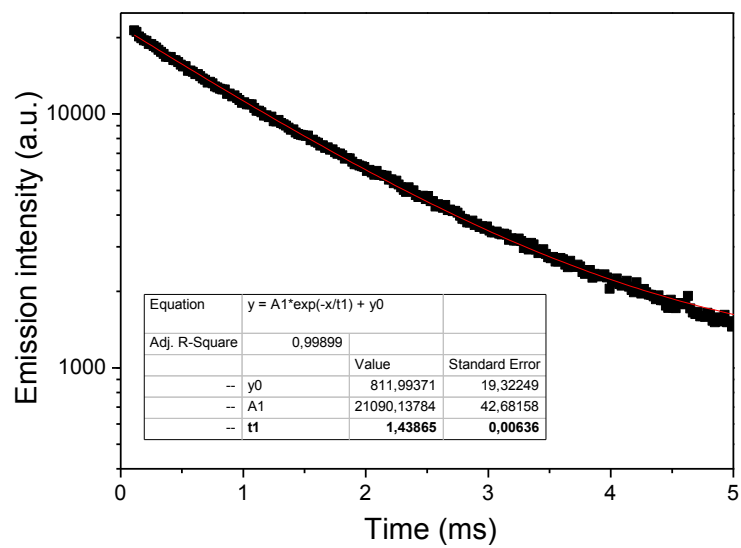
**Figure S9.** Luminescence decay curve of the  $Y(P_{0.99}V_{0.01})O_4:Eu^{3+}$  sample ( $\lambda_{exc}=290$  nm,  $\lambda_{em}=616$  nm) at room temperature.



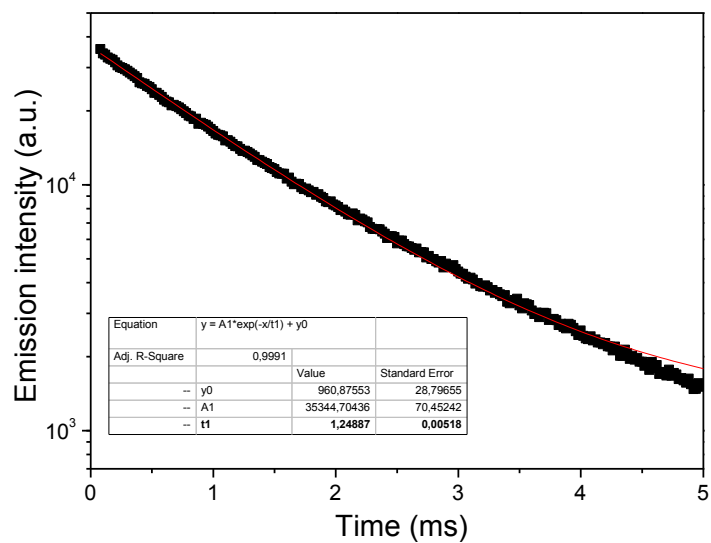
**Figure S10.** Luminescence decay curve of the  $\text{Y}(\text{P}_{0.95}\text{V}_{0.05})\text{O}_4:\text{Eu}^{3+}$  sample ( $\lambda_{\text{exc}}=300$  nm,  $\lambda_{\text{em}}=616$  nm at room temperature).



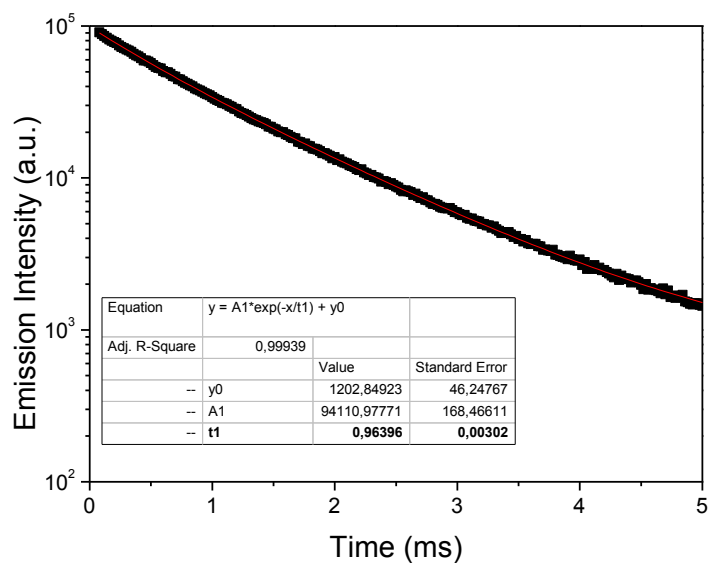
**Figure S11.** Luminescence decay curve of the  $\text{Y}(\text{P}_{0.90}\text{V}_{0.10})\text{O}_4:\text{Eu}^{3+}$  sample ( $\lambda_{\text{exc}}=300$  nm,  $\lambda_{\text{em}}=616$  nm) at room temperature.



**Figure S12.** Luminescence decay curves of the  $\text{Y}(\text{P}_{0.80}\text{V}_{0.20})\text{O}_4:\text{Eu}^{3+}$  sample ( $\lambda_{\text{exc}}=300$  nm,  $\lambda_{\text{em}}=616$  nm).

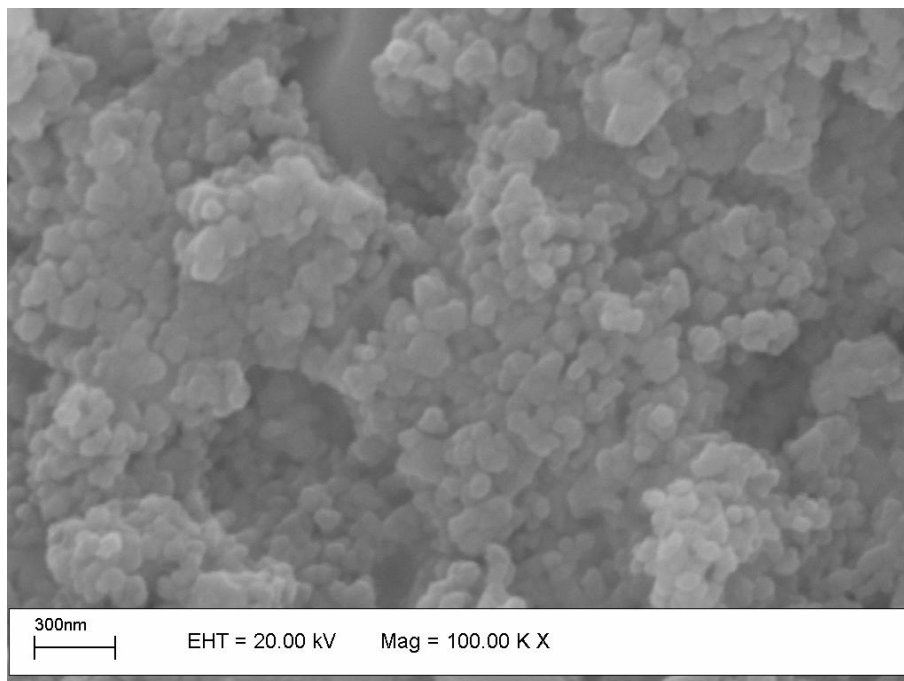


**Figure S13.** Luminescence decay curve of the  $\text{Y}(\text{P}_{0.50}\text{V}_{0.50})\text{O}_4:\text{Eu}^{3+}$  sample ( $\lambda_{\text{exc}}=305$  nm,  $\lambda_{\text{em}}=616$  nm) at room temperature.



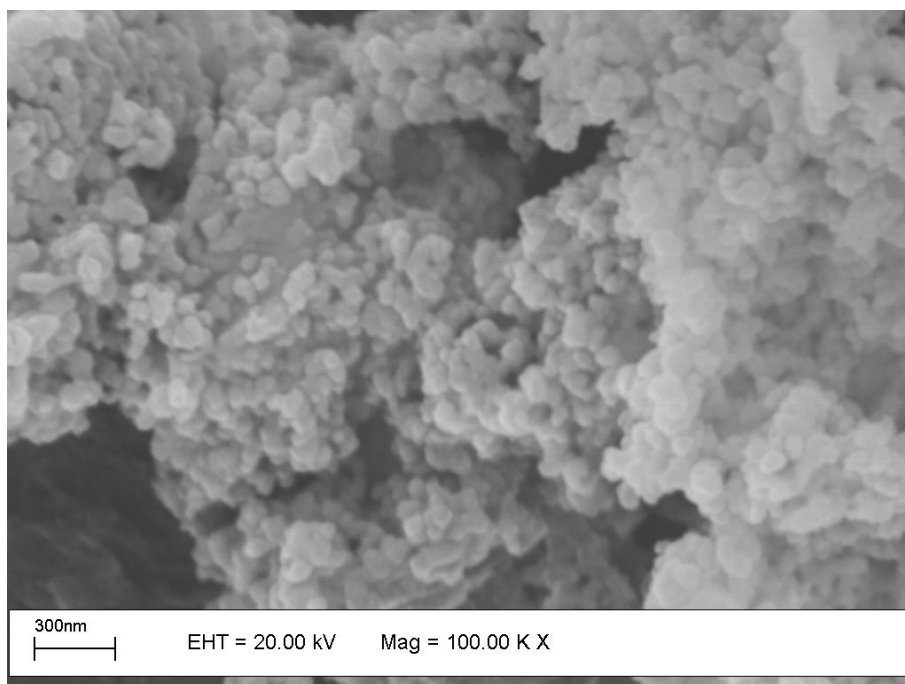
**Figure S14.** Luminescence decay curve of the  $\text{YVO}_4:\text{Eu}^{3+}$  sample ( $\lambda_{\text{exc}}=310$  nm,  $\lambda_{\text{em}}=616$  nm) at room temperature.

## II) Additional Scanning Electron Micrographs

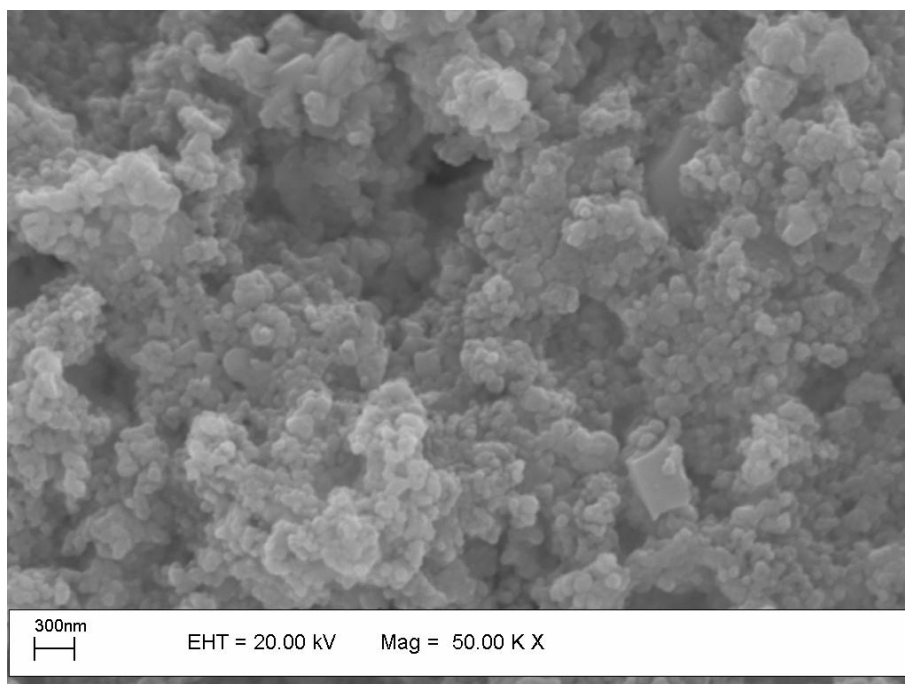


**Figure S15.** SEM micrograph of the YPO<sub>4</sub>:Eu<sup>3+</sup> sample.

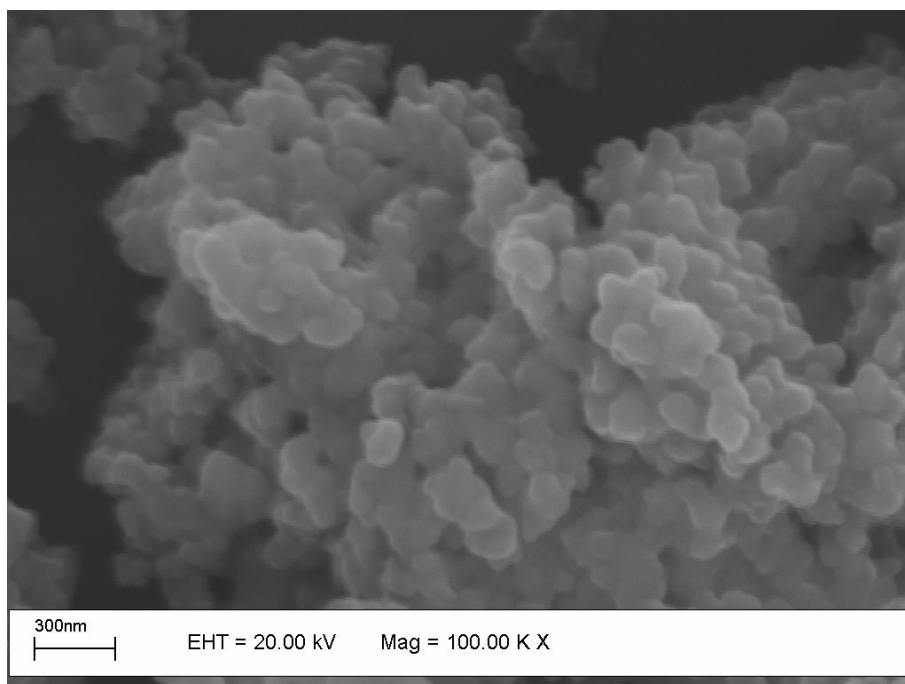




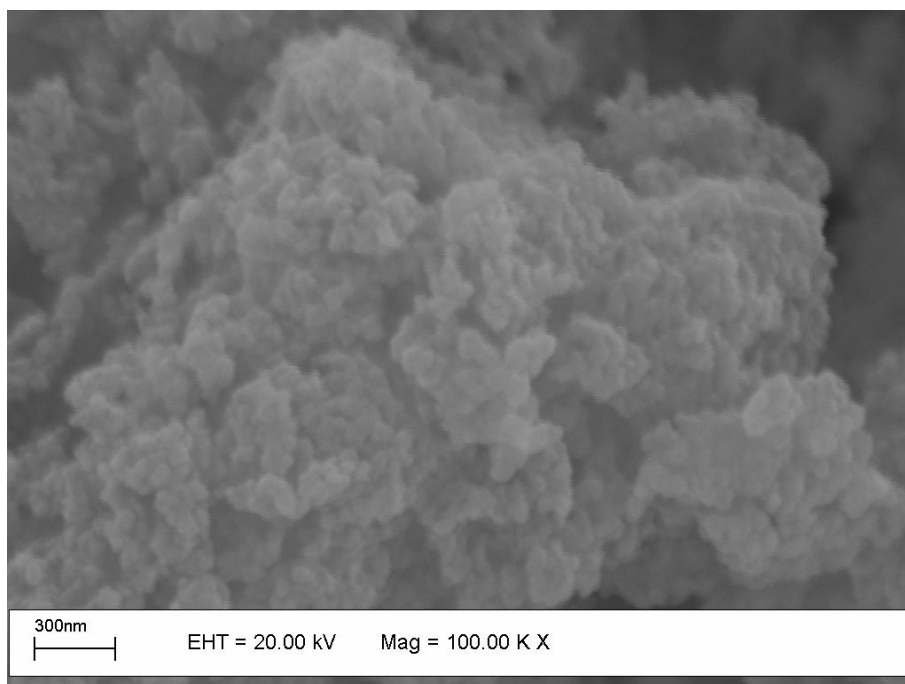
**Figure S16.** SEM micrograph of the Y(P<sub>0.99</sub>V<sub>0.01</sub>)O<sub>4</sub>:Eu<sup>3+</sup> sample.



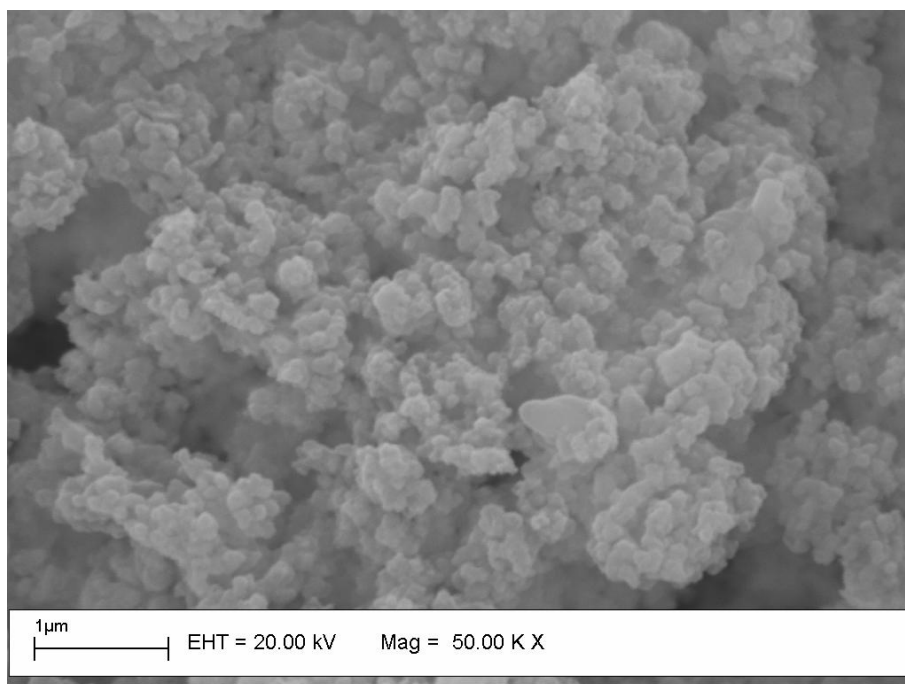
**Figure S17.** SEM micrograph of the  $\text{Y}(\text{P}_{0.95}\text{V}_{0.05})\text{O}_4:\text{Eu}^{3+}$  sample.



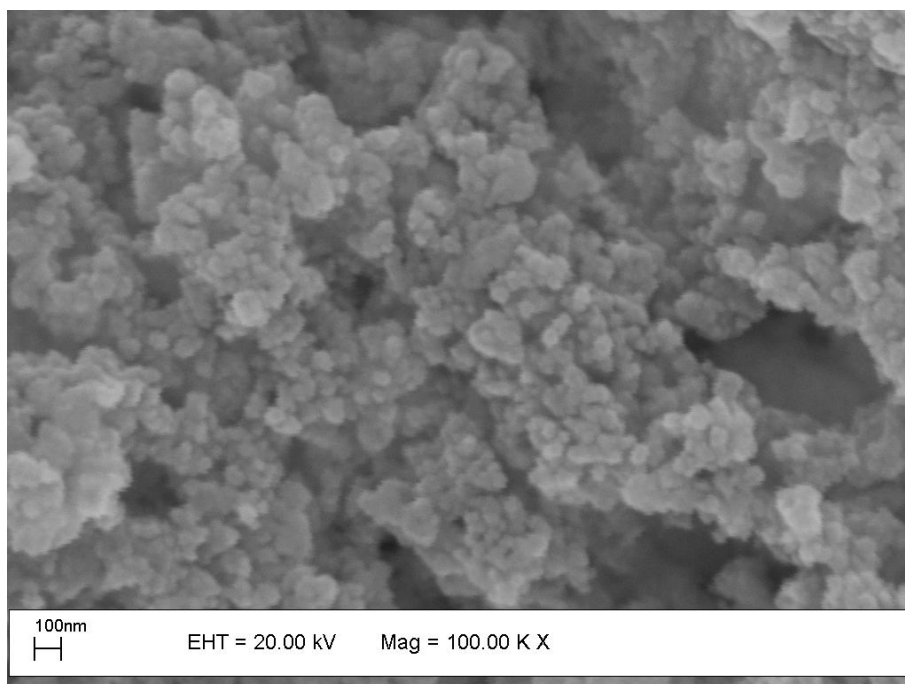
**Figure S18.** SEM micrograph of the Y(P<sub>0.90</sub>V<sub>0.10</sub>)O<sub>4</sub>:Eu<sup>3+</sup> sample.



**Figure S19.** SEM micrograph of the Y(P<sub>0.80</sub>V<sub>0.20</sub>)O<sub>4</sub>:Eu<sup>3+</sup> sample.



**Figure S20.** SEM micrograph of the  $\text{Y}(\text{P}_{0.50}\text{V}_{0.50})\text{O}_4:\text{Eu}^{3+}$  sample.



**Figure S21.** SEM micrograph of the YVO<sub>4</sub>:Eu<sup>3+</sup> sample.