Supplementary Information

Red and near-infrared emitting phosphors based on Eu^{3+}- or Nd^{3+}-doped lanthanum niobates prepared by the sol–gel route

Mateus Grecco Manfré[a], Hayra do Prado Labaki[a], Vítor dos S. de Souza[a], and Rogéria R. Gonçalves[*a]

[a] Laboratório de Materiais Luminescentes Micro e Nanoestruturados – Mater Lumen, Departamento de Química, FFCLRP, Universidade de São Paulo, SP, Brazil.

*rrgoncalves@ffclrp.usp.br

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Equation S1. Probability of transition $^5D_0 \rightarrow {}^7F_1$ (A_{01})

$$A_{01} = 3.1.10^{-12}\gamma_{01}{}^3 n^3$$

where γ_{01} is the baricenter of the $^5D_0 \rightarrow {}^7F_1$ transition and n the refractive index[1,2].

Equation S2. Probability of transition $^5D_0 \rightarrow {}^7F_2$ (A_{02})

$$A_{02} = \frac{S_{02}\gamma_{01}A_{01}}{S_{01}\gamma_{02}}$$

where S_{02} is the integrated area of the $^5D_0 \rightarrow {}^7F_2$ transition, S_{01} the integrated area of the $^5D_0 \rightarrow {}^7F_1$ transition, A_{01} is the probability of the transition $^5D_0 \rightarrow {}^7F_1$, γ_{01} the baricenter of the $^5D_0 \rightarrow {}^7F_1$ transition and γ_{02} the baricenter of the $^5D_0 \rightarrow {}^7F_2$ transition[1,2].

Equation S3. Probability of transition $^5D_0 \rightarrow {}^7F_4$ (A_{04})

$$A_{04} = \frac{S_{04}\gamma_{01}A_{01}}{S_{01}\gamma_{04}}$$

where S_{04} is the integrated area of the $^5D_0 \rightarrow {}^7F_4$ transition, S_{01} the integrated area of the $^5D_0 \rightarrow {}^7F_1$ transition, A_{01} is the probability of the transition $^5D_0 \rightarrow {}^7F_1$, γ_{01} the baricenter of the $^5D_0 \rightarrow {}^7F_1$ transition and γ_{04} the baricenter of the $^5D_0 \rightarrow {}^7F_4$ transition[1,2].

Equation S4. $^5D_0$ radiative transition probability (A_T)

$$A_T = A_{01} + A_{02} + A_{04}$$

where A_{01} is the probability of the transition $^5D_0 \rightarrow {}^7F_1$, A_{02} is the probability of the transition $^5D_0 \rightarrow {}^7F_2$ and A_{04} is the probability of the transition $^5D_0 \rightarrow {}^7F_4$ [1,2].

Equation S5. Radiative Lifetime (t_{rad})

$$t_{rad} = \frac{1}{A_T}$$

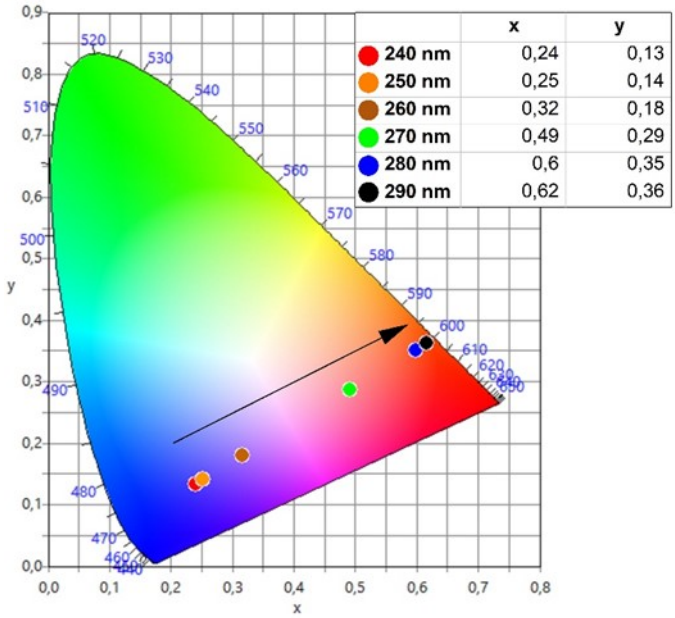
where A_T is the $^5D_0$ radiative transition probability[1,2].

Equation S6. Quantum Efficiency (q)

$$q = \frac{t_{exp}}{t_{rad}}$$

where t_{exp} is the experimental lifetime and t_{rad} the radiative lifetime[1,2].

Figure S1- Color tunability for sample **E05**



References

1 L. D. Carlos, R. A. S. Ferreira, V. De Zea Bermudez and S. J. L. Ribeiro, *Adv. Mater.*, 2009, **21**, 509–534.

2 M. H. V. Werts, R. T. F. Jukes and J. W. Verhoeven, *Phys. Chem. Chem. Phys.*, 2002, **4**, 1542–1548.