**SUPPLEMENTARY INFORMATION**

**Eu3+:YF3 and Eu3+, Nd3+:YF3 nanoparticles for optical temperature sensing: the influence of annealing on temperature dependence of the spectral-kinetic characteristics**

\*Ekaterina I. Oleynikova1, Oleg. A. Morozov1,2, Stella L. Korableva1, and \*\*Maksim S. Pudovkin1

*1Kazan Federal University, Institute of physics, Department of quantum electronics and radiospectroscopy, 18 Kremlyovskaya str, Kazan, 420008, Russian Federation*

*2FRC Kazan Scientific Center of RAS, Sibirsky Trakt str. 10, 420029, Kazan, Russia*

**Corresponding author:**

Ekaterina I. Oleynikova, kate15-05@mail.ru

Maksim S. Pudovkin, jaz7778@list.ru

**Full postal address**: 18th Kremlyovskaya street. Kazan 420008, Russian Federation, Institute of physics, Department of quantum electronics and radiospectroscopy, office 168

**Keywords**

Lifetime thermometry, Nd3+/Yb3+, Nd3+/Yb3+:YF3, down-conversion, optical temperature sensors, thermal expansion

**YF3: Eu3+**



Table S1. The sample classification (the only “green” sample Eu3+ (2.5%), Nd3+(4.0%) :YF3 was chosen for further investigation

****

**Figure 1.** XRD patterns of YF3: Eu3+ (2.5 mol.%) nanoparticles before and after annealing in air (400 °C, 4 hours)

|  |  |
| --- | --- |
| D:\Новое наука окт 2023\SCIENCE 2023 GO!\YF3-Eu-Tb\Картинки от Кати\SUBMISSION TO MATERIALS\For suppl kin single-doped Eu\2.5.jpg | D:\Новое наука окт 2023\SCIENCE 2023 GO!\YF3-Eu-Tb\Картинки от Кати\SUBMISSION TO MATERIALS\For suppl kin single-doped Eu\5.0.jpg |
| (a) | (b) |
| D:\Новое наука окт 2023\SCIENCE 2023 GO!\YF3-Eu-Tb\Картинки от Кати\SUBMISSION TO MATERIALS\For suppl kin single-doped Eu\7.5.jpg |  |
| **Figure S2.** Luminescence decay curves at 589.5 nm (5D0 – 7F1 transition) for YF3: Eu3+ (a) 2.5; b) 5.0 and c) 7.5 mol.%) samples annealed in air in the temperature range 80-320 K |

|  |  |
| --- | --- |
| D:\Новое наука окт 2023\SCIENCE 2023 GO!\YF3-Eu-Tb\Картинки от Кати\YF3 Eu 2.5 nd 4 before and after ann.png | D:\Новое наука окт 2023\SCIENCE 2023 GO!\YF3-Eu-Tb\Картинки от Кати\YF3 Eu 2.5 Nd 2 and 4 sp RT.png |
| (a) | (b) |
| D:\Новое наука окт 2023\SCIENCE 2023 GO!\YF3-Eu-Tb\Картинки от Кати\YF3 Eu 2.5 Nd 2 sp RT (hydro and air).png |  |
| (c) |  |

Figure S3.



**Figure S4.** The schematic representation of LIR choice