Eu$^{3+}$ Local Site Analysis and Emission Characteristics of Novel Nd$_2$Zr$_2$O$_7$:Eu phosphor-
An Insight into the Effect of Europium Concentration on its Photoluminescence Properties

Santosh K. Gupta$^a$, C. Reghukumar$^b$, R.M. Kadam$^a$

a. Radiochemistry Division, Bhabha Atomic Research Centre Trombay, Mumbai-400085, India
b. Institute of science education and research Centre, Santiniketan, West Bengal -731235, India

*Corresponding Author- santoshg@barc.gov.in, santufrnd@gmail.com

Telephone- +91-22-25590636
Fax- +91-22-25505151

Figure S1: Effect of europium ion concentration on excitation spectra of Nd$_2$Zr$_2$O$_7$: Eu$^{3+}$

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Figure S2: Emission spectrum of Nd$_2$Zr$_2$O$_7$: Eu$^{3+}$ (0.01 %) under 395 nm excitation

I-1: Procedure data slicing in TRES

- Supposing there are two components A (short lived) and B (long lived), first we record the composite spectrum (A+B) with very short delay (just to avoid the lamp profile).

- Then give sufficient delay and record with identical integration times so that there is only B component in the spectrum (let’s say B’; A is already decayed).

- But the intensity of the B’ which we would get is not the same as the original B in the composite spectrum (A+B).

- So we multiply a suitable multiplying factor (exp factor, $e^{\frac{-t}{\tau}}$) so as to get the original intensity of B.

- Then if we subtract this B from the composite spectrum (A+B), it is possible to get the short lived component A.

- One has to maintain however same gate widths while dealing with this type of procedure.
Figure S3: Lifetime decay profile Nd$_2$Zr$_2$O$_7$: Eu$^{3+}$ (5.0 \%) under 256 nm excitation and 611 nm emission.