Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information: X-Ray Excited Luminescence Spectroscopy and Imaging with $NaGdF_4$:Eu and Tb

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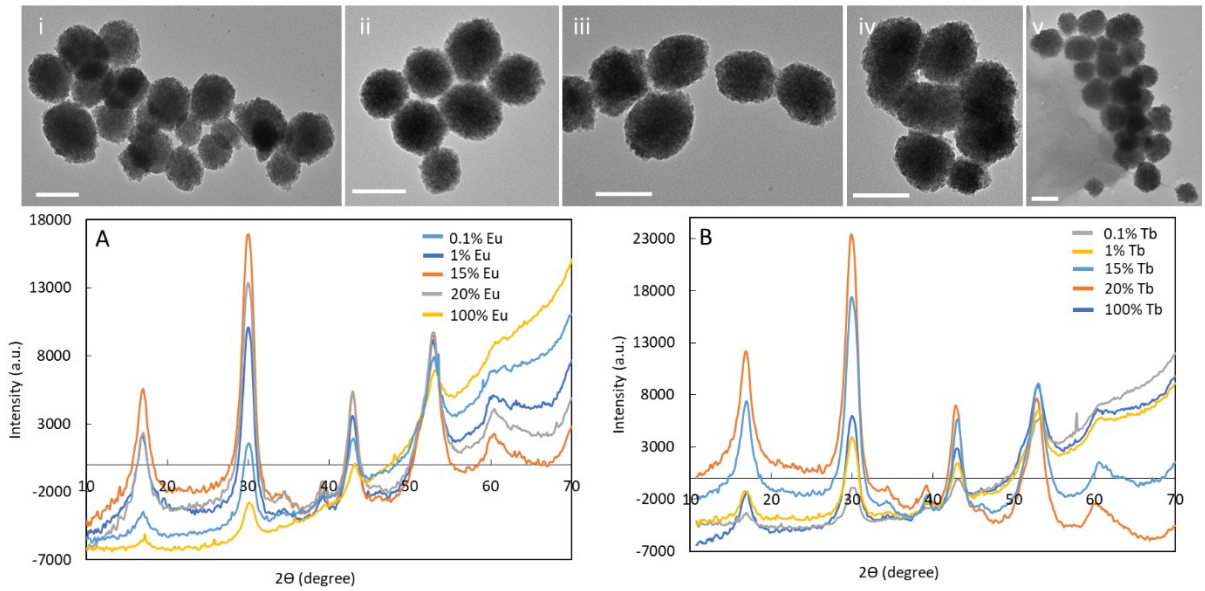

Figure S1. TEM images of $NaGdF_4$ doped with (i) 0.1%, (ii) 1%,(iii) 15%,(iv) 20%,(v) 100% Eu synthesized using the co-precipiate method. Scale bar is equal to 100 nm. XRD patterns of (A) Eu- and (B) Tb-dopped $NaGdF_4$ (Gd: dopant molar ratio= 1: 0.1, 1, 15, 20, 100%). XRD data were collected using single-crystal XRD as an alternative of powder XRD. PDF card is 27-0699.

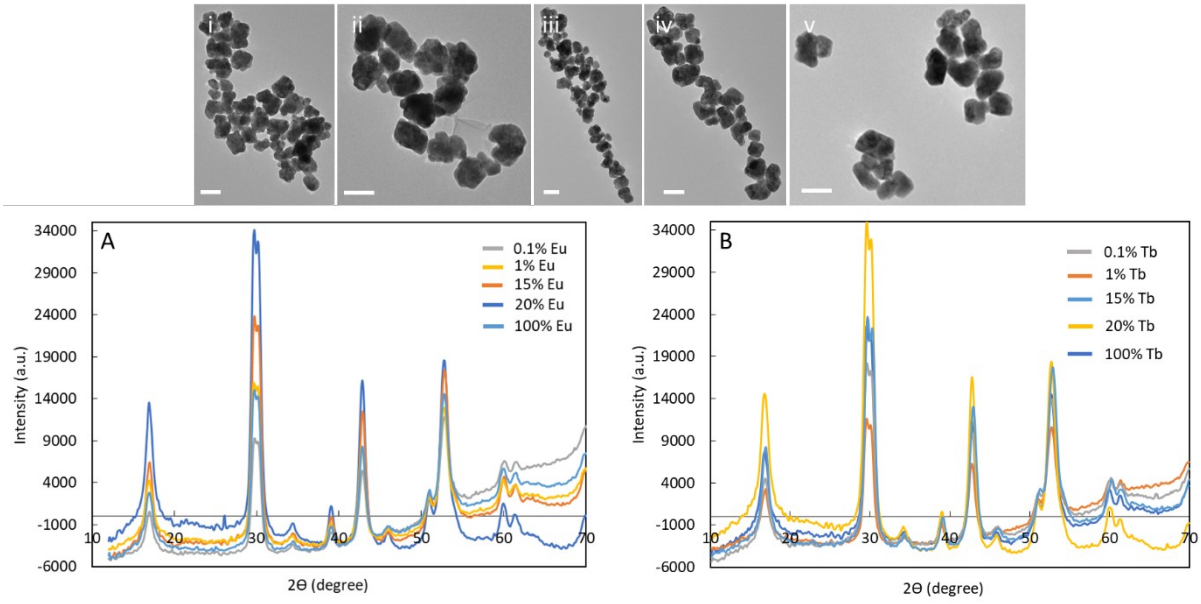

Figure S2. TEM images of $NaGdF_4$ doped with (i) 0.1%, (ii) 1%,(iii) 15%,(iv) 20%,(v) 100% Eu synthesized using the hydrothermal method. Scale bar is equal to 100 nm. XRD patterns of (A) Eu- and (B) Tb-dopped $NaGdF_4$ (Gd: dopant molar ratio= 1: 0.1, 1, 15, 20, 100%). XRD data were collected using single-crystal XRD as an alternative of powder XRD. PDF card is 27-0699

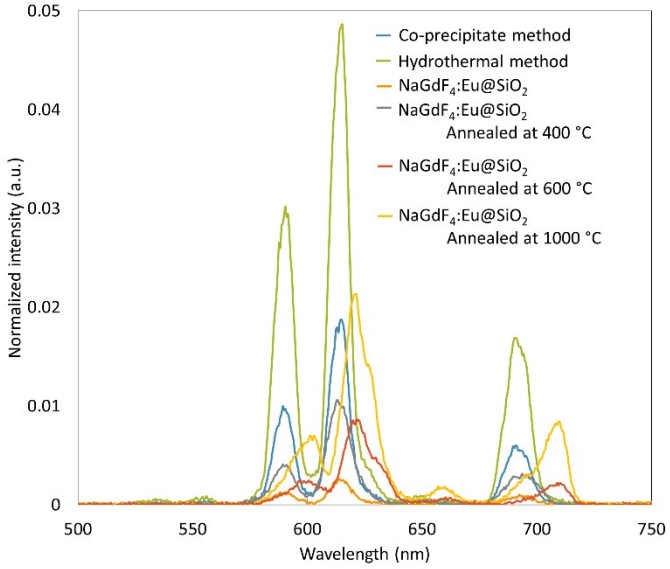

Figure S3. X-ray excited optical luminescence (XEOL) spectra of bare synthesized, silica coated, and silica coated annealed Eu-dopped $NaGdF_4$ NPs.

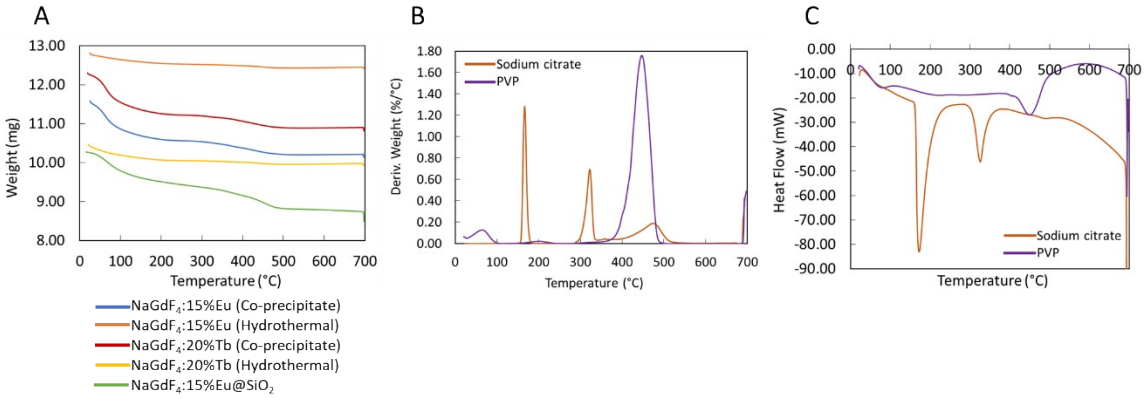

Figure S4. TGA thermograms showing (A) weight loss of synthesized nanophosphors, (B) derivative of weight loss (C) DSC of sodium citrate and PVP.

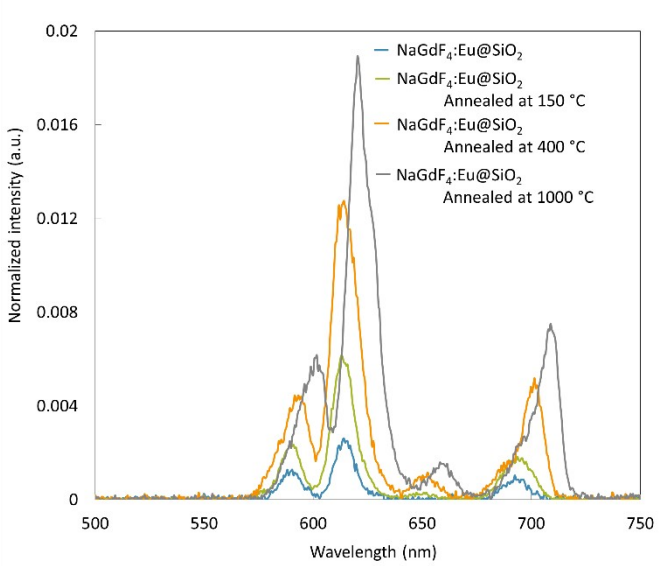

Figure S5. XEOL spectra of $NaGdF_4$:Eu@SiO_2 unannealed and annealed at 150, 400, 1000 °C for 12 hours.

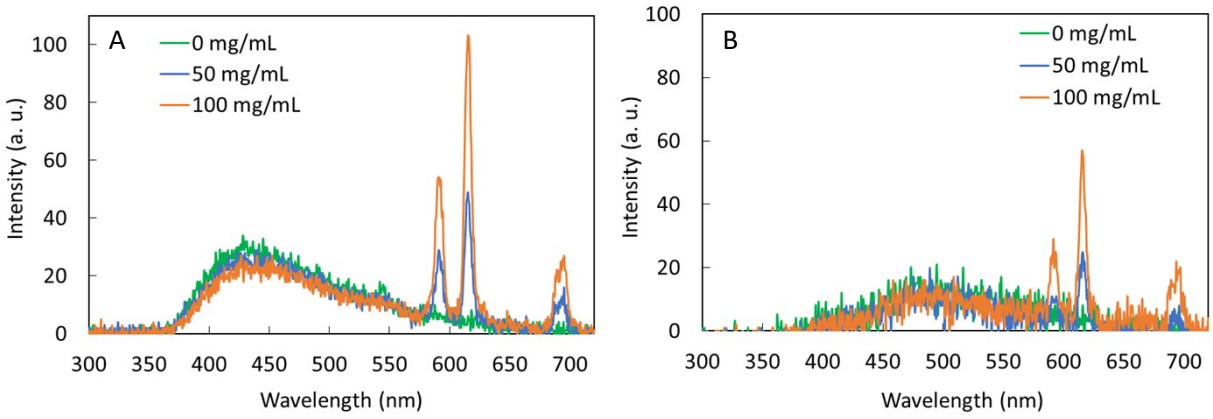

Figure S6. Full-scale XEOL of $NaGdF_4$: Eu in capillaries A) without tissue B) sandwiched between 5 mm slices of porcine tissue.