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Morphological and Luminescence Studies on KGdF<sub>4</sub>:Yb<sup>3+</sup>/Tb<sup>3+</sup> Up-Conversion Nanophosphors

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## Figure Captions

### Fig. 1. Morphological Analysis

(a) XRD Analysis of un-doped KGdF<sub>4</sub> and doped KGdF<sub>4</sub>:Yb<sup>3+</sup> (x=5, 10, 15 and 20%)/Tb<sup>3+</sup> (3%) samples. Data peaks of standard JCPDS 27-0697 are also given for reference

(b) TEM Image of KGdF<sub>4</sub>:Yb<sup>3+</sup> (20%)/Tb<sup>3+</sup> (3%) sample

### Fig. 2. Optimization of Tb<sup>3+</sup>: Emission Spectra recorded under 384nm excitation

**Fig. 3.** UC Spectra of KGdF<sub>4</sub>:Yb<sup>3+</sup> (x=5, 10, 15 and 20%)/Tb<sup>3+</sup> (3%) samples under 980nm excitation. Inset pictures show the actual photographs of intense green luminescence from the as prepared samples

**Fig. 4.** UC Spectra of KGdF<sub>4</sub>:Yb<sup>3+</sup> (x=5, 10, 15 and 20%)/Tb<sup>3+</sup> (3%) samples under varying powers of 980nm CW laser source

**Fig. 5.** Power Dependence of KGdF<sub>4</sub>:Yb<sup>3+</sup> (x=5, 10, 15 and 20%)/Tb<sup>3+</sup> (3%) samples: log I vs log P graph recorded for <sup>5</sup>D<sub>4</sub>→<sup>7</sup>F<sub>5</sub> transition of Tb<sup>3+</sup> ions in the lattice under 980nm excitation

**Fig. 6.** Schematic Energy Level Diagram for the energy transfer processes between Yb<sup>3+</sup> and Tb<sup>3+</sup> ions during up-conversion process

**Fig. 7.** Decay Kinetics along with the function fitting for KGdF<sub>4</sub>:Yb<sup>3+</sup> (x=5, 10, 15 and 20%)/Tb<sup>3+</sup> (3%) samples

### Fig. 8. Excitation and Emission Spectra:

(a) Excitation Spectra at 545nm emission wavelength for KGdF<sub>4</sub>:Yb<sup>3+</sup> (10%)/Tb<sup>3+</sup> (3%)

(b) UV Emission Spectra under 292nm excitation for KGdF<sub>4</sub>:Yb<sup>3+</sup> (x=5, 10, 15 and 20%)/Tb<sup>3+</sup> (3%) samples

**Fig. 9.** CIE Chromaticity Diagram for NIR UC studies on KGdF<sub>4</sub>:Yb<sup>3+</sup> (x=5, 10, 15 and 20%)/Tb<sup>3+</sup> (3%) samples

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