

## Supporting Information

### **Mechanism investigation on up and down conversion of Er<sup>3+</sup> and Gd<sup>3+</sup> co-doped YTiNbO<sub>6</sub> phosphors**

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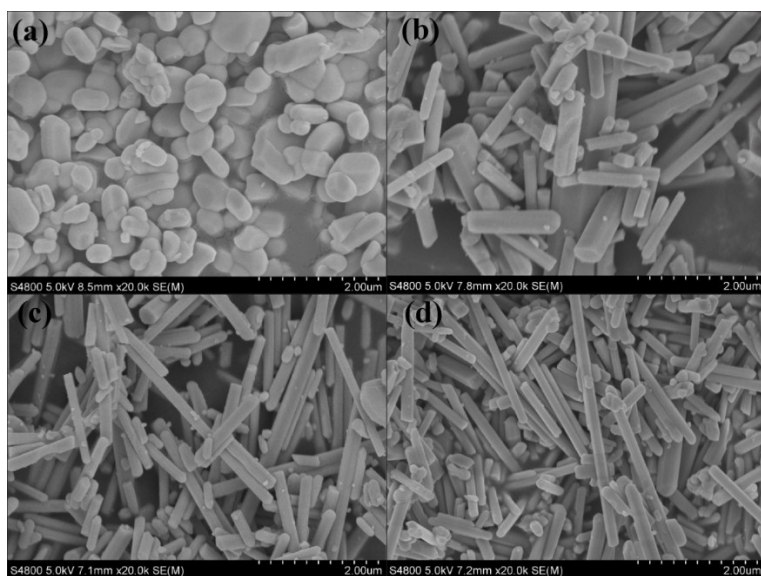


Fig. S1. SEM micrographs of the as-synthesized phosphors prepared with different concentration of  $Gd^{3+}$  ions: (a)  $YNbTiO_6:4\%Er,0.5\%Gd$ , (b)  $YNbTiO_6:4\%Er,1\%Gd$ , (c)  $YNbTiO_6:4\%Er,2\%Gd$ ,(d)  $YNbTiO_6:4\%Er,3\%Gd$ .

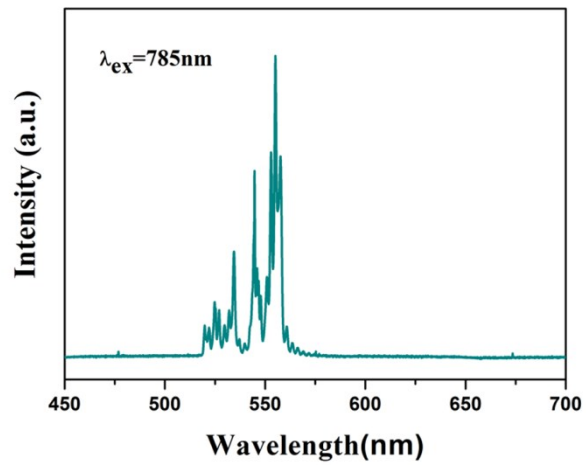


Fig.S2. The UC emission spectra with 785 nm excitation.

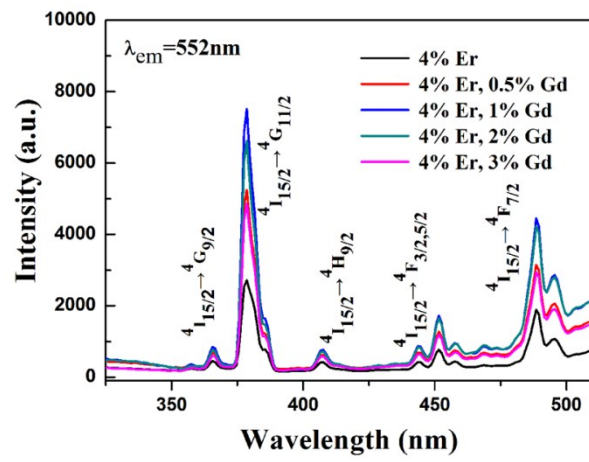


Fig.S3. Excitation spectra of YNbTiO<sub>6</sub>: 4%Er doped with different concentration of Gd<sup>3+</sup> ions ( $\lambda_{em}=552\text{ nm}$ ).