

## Supporting Information

### Facile synthesis and color-tunable properties of monodisperse $\beta$ -

### $\text{NaYF}_4: \text{Ln}^{3+}$ (Ln=Eu, Tb, Tm, Sm, Ho) microtubes

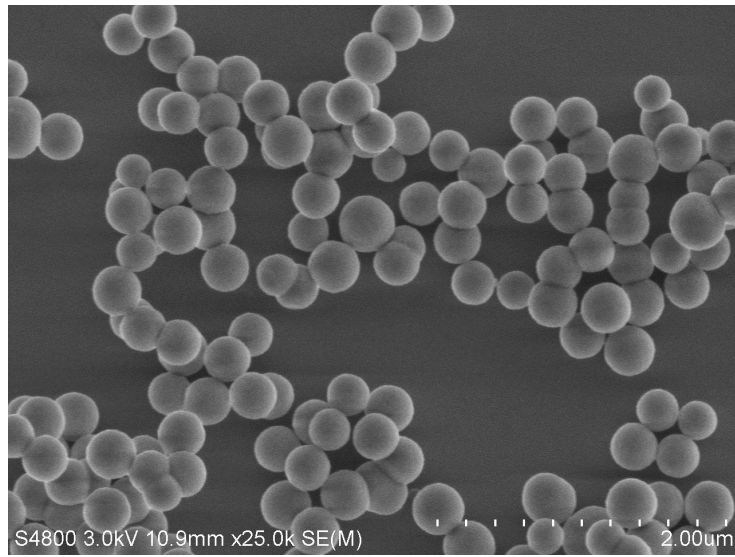
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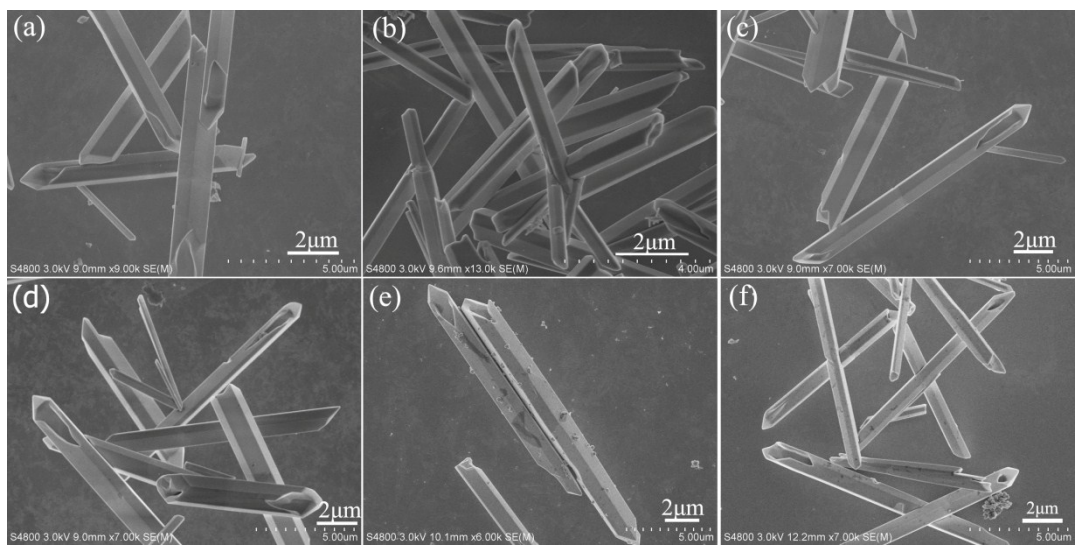
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**Fig. S1 SEM images of the  $Y(OH)CO_3$  precursors**



**Fig. S2 SEM images of  $\beta$ -NaYF<sub>4</sub>:0.07 Tb<sup>3+</sup> (a),  $\beta$ -NaYF<sub>4</sub>:0.05 Eu<sup>3+</sup> (b),  $\beta$ -NaYF<sub>4</sub>:0.03 Sm<sup>3+</sup> (c),  $\beta$ -NaYF<sub>4</sub>:0.03 Tm<sup>3+</sup> (d),  $\beta$ -NaYF<sub>4</sub>:0.03 Ho<sup>3+</sup> (e),  $\beta$ -NaYF<sub>4</sub>:0.07 Tb<sup>3+</sup>, 0.05 Eu<sup>3+</sup> (f).**

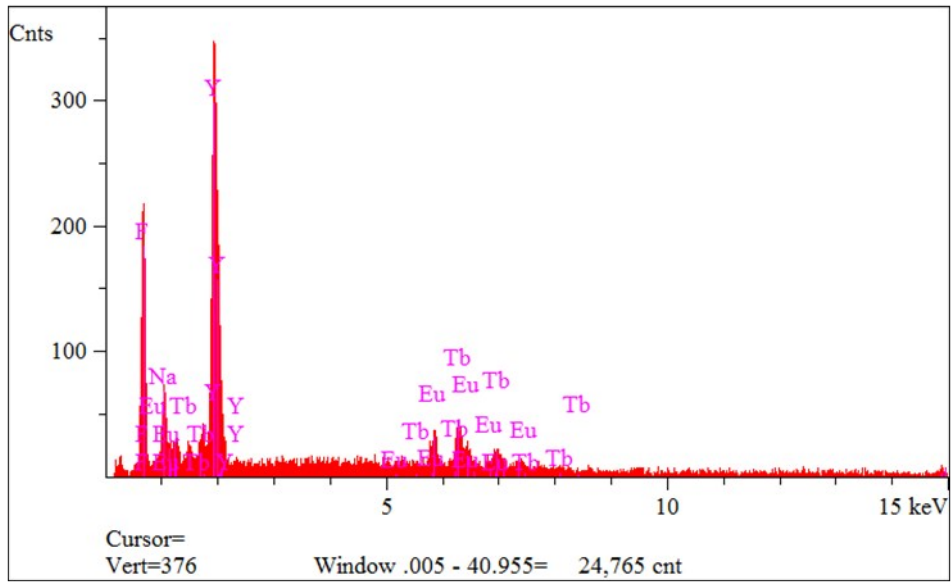
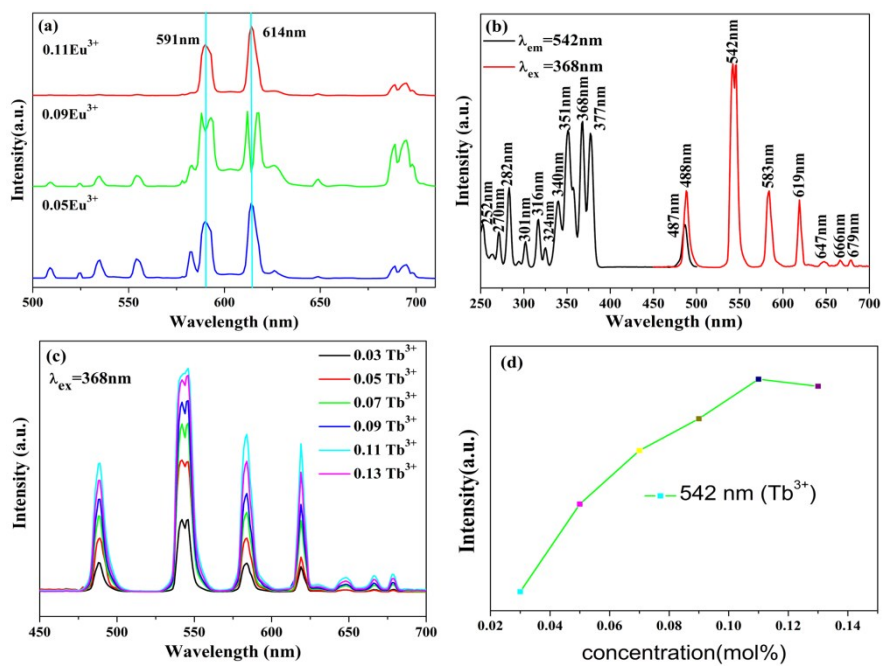


Fig.S3 EDS spectrum  $\beta$ -NaYF<sub>4</sub>: 0.07 Tb<sup>3+</sup>, 0.05 Eu<sup>3+</sup>.



**Fig. S4** PL spectra of  $\beta$ -NaYF<sub>4</sub>:0.05 Eu<sup>3+</sup>, 0.09 Eu<sup>3+</sup>, 0.11 Eu<sup>3+</sup> (a), PLE and PL spectra of  $\beta$ -NaYF<sub>4</sub>:0.05 Tb<sup>3+</sup> (b), PL spectra of  $\beta$ -NaYF<sub>4</sub>:Tb<sup>3+</sup> samples under 368 nm excitation (c), the intensity of 542nm (Tb<sup>3+</sup>) as a function of Tb<sup>3+</sup> concentration (d).

Table S1 Experimental weight percentage obtained using ICP-OES (theoretical=th, real=re).

Samples	Y <sub>th</sub> (wt%)	Y <sub>re</sub> (wt%)	Tb <sub>th</sub> (wt%)	Tb <sub>re</sub> (wt%)	Eu <sub>th</sub> (wt%)	Eu <sub>re</sub> (wt%)
$\beta$ -NaYF <sub>4</sub> : 0.07 Tb <sup>3+</sup>	42.91	41.67	5.77	5.19	-	-
$\beta$ -NaYF <sub>4</sub> : 0.05 Eu <sup>3+</sup>	44.23	43.49	-	-	3.97	3.64
$\beta$ -NaYF <sub>4</sub> : 0.07 Tb <sup>3+</sup> , 0.05 Eu <sup>3+</sup>	39.95	39.17	5.68	5.01	3.88	3.47