Article

Uniform Spheres of $\alpha$-NaYF$_4$:RE$^{3+}$ (RE=Eu, Tb, Ce, Er, Tm): Template-Free Synthesis, Multi-Color Photoluminescence, and Their Application in Cellular Imaging

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Figure S1. FE-SEM micrographs showing morphologies of the Eu$^{3+}$-doped $\alpha$-NaYF$_4$ samples synthesized at 180 °C for (a) 6h, (b) 12h, (c) 18h.

Figure S2. XRD patterns of the Eu$^{3+}$-doped $\alpha$-NaYF$_4$ samples synthesized at 180 °C for (a) 6h, (b) 12h, (c) 18h, (d) 24h.
Figure S3. FE-SEM micrographs showing morphologies of the Eu\(^{3+}\)-doped \(\alpha\)-NaYF\(_4\) samples synthesized at (a) 100 °C, (b) 120 °C, (c) 150 °C for 24h.

Figure S4. XRD patterns of the Eu\(^{3+}\)-doped \(\alpha\)-NaYF\(_4\) samples synthesized at (a) 100 °C, (b) 120 °C, (c) 150 °C, and (d) 180 °C for 24h.
Figure S5. FE-SEM micrographs showing morphologies of (a) Eu\(^{3+}\), (b) Tb\(^{3+}\), (c) Ce\(^{3+}\), (d) Er\(^{3+}\), (e) Tm\(^{3+}\)-doped α-NaYF\(_4\) samples calcined at 600 °C.
Figure S6. Emission spectra of colloidal solution at room temperature with (a) NH$_2$-NaYF$_4$:Eu$^{3+}$ and (b) NH$_2$-NaYF$_4$:Tb$^{3+}$. 