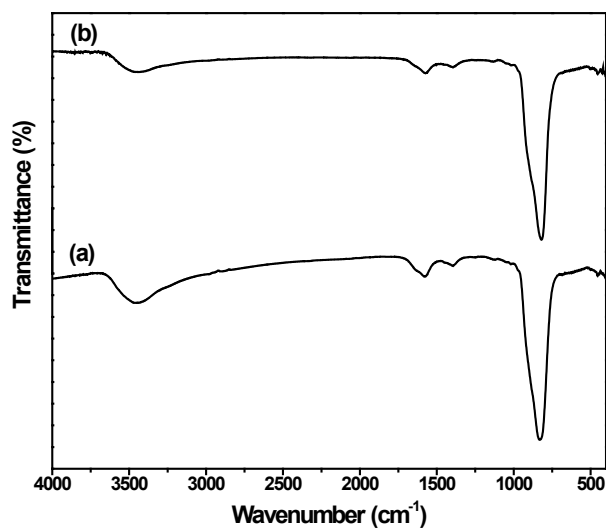
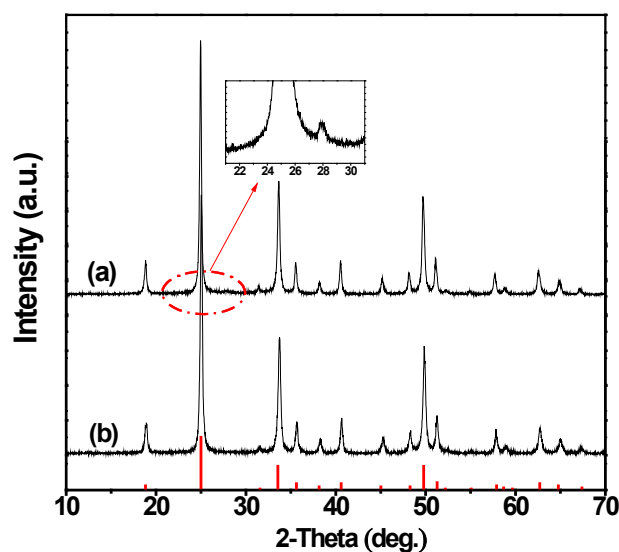


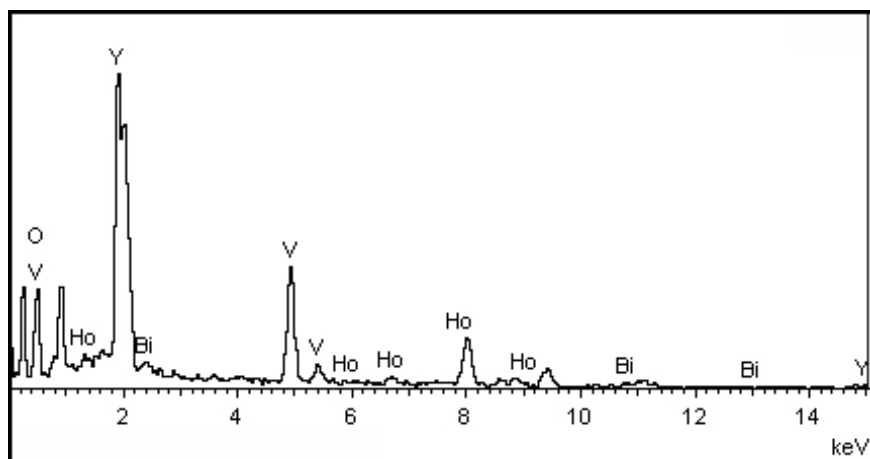
## Supporting Information



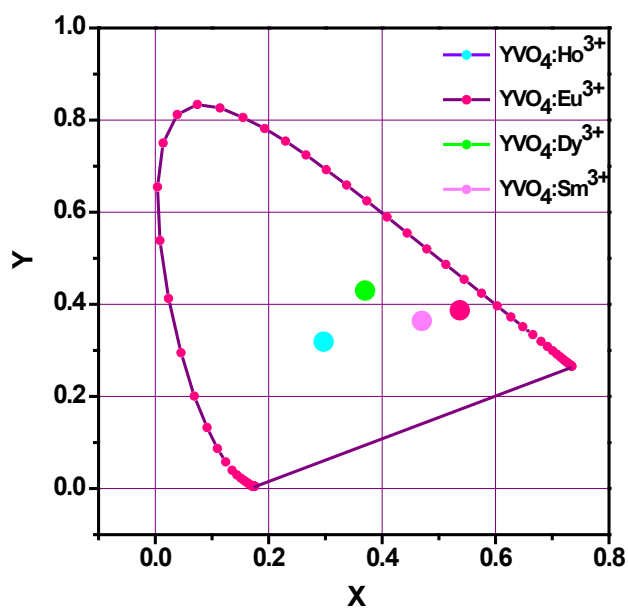
**Fig. S1** FT-IR spectra of the assembled spheres  $Y_{1-x}Ho_xVO_4$  (a) and (b)  $Y_{0.99-x}Bi_{0.01}Ho_xVO_4$  ( $x=0.05$ ).



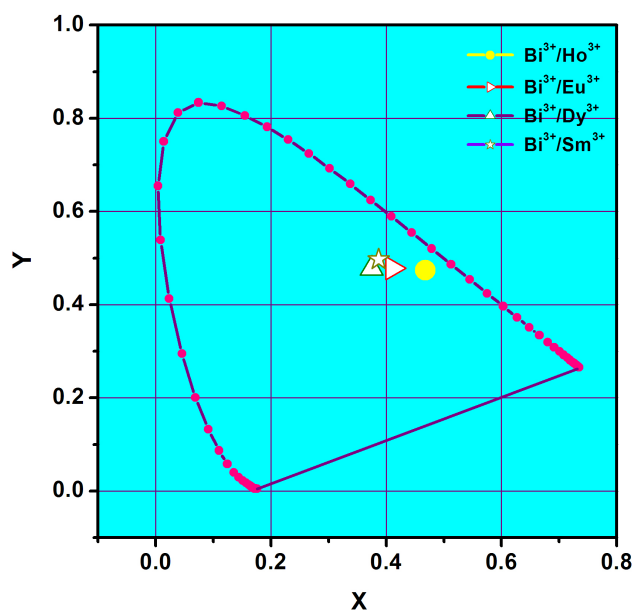
**Fig. S2** XRD patterns of  $Y_{0.99}Bi_{0.01}VO_4$  prepared using (a) 2 mL deionized water and (b) 2 mL ethylene glycol to dissolve  $Bi(NO_3)_3$ . Vertical bars represent the standard diffraction data for bulk  $YVO_4$ . The presence of a second minor phase  $\alpha$ - $Bi_2O_3$  was detected in the sample prepared directly using deionized water to dissolve  $Bi(NO_3)_3$ . Maybe the following chemical reaction occurs:  $2Bi(NO_3)_3 + 6OH^- \rightarrow Bi_2O_3 + 6NO_3^- + 3H_2O$  (basic medium).



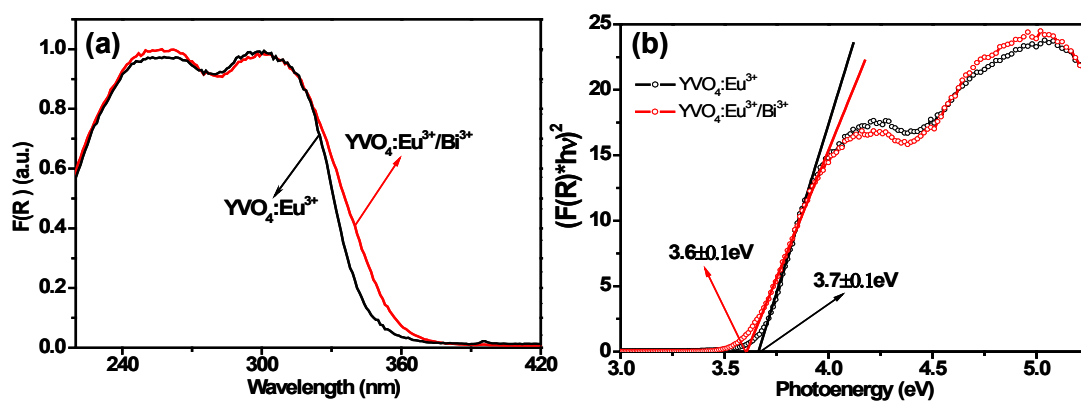
**Fig. S3** EDS data of the assembled spheres  $Y_{0.99-x}Bi_{0.01}Ho_xVO_4$  ( $x=0.05$ ).



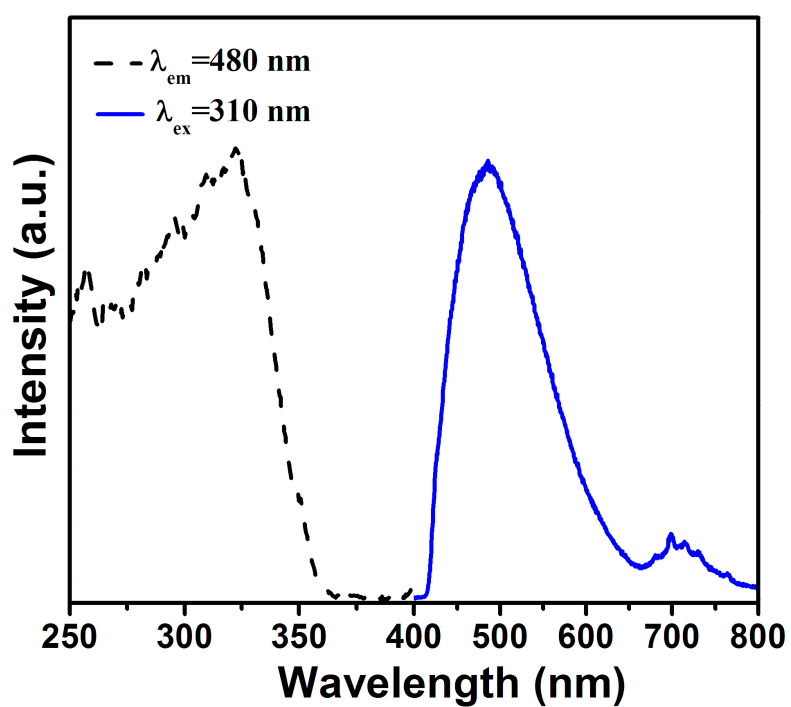
**Fig. S4** CIE chromaticity diagram of  $Ln^{3+}$ -doped  $YVO_4$  ( $Ln=Ho, Eu, Dy, Sm$ ) microarchitectures when excited using a single wavelength light of 310 nm.



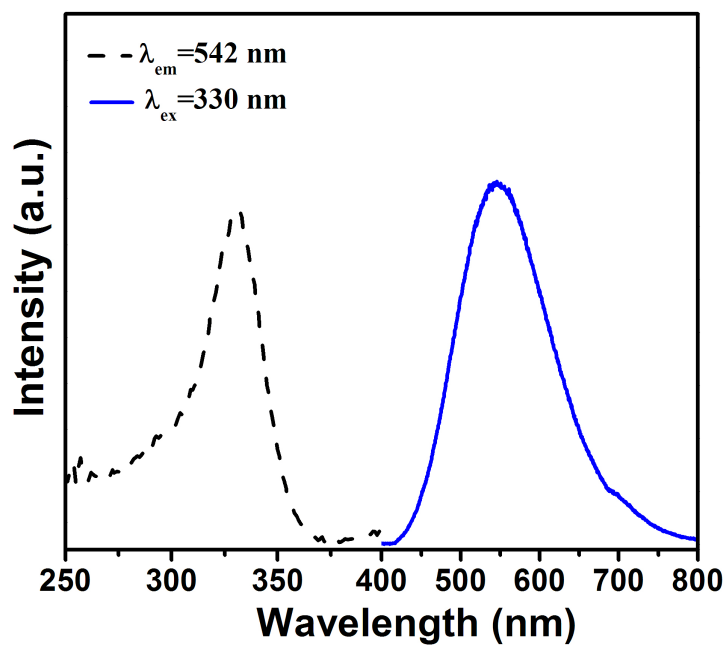
**Fig. S5** CIE chromaticity diagram for assembled-spheres  $\text{YVO}_4$  co-doped with  $\text{Ln}^{3+}/\text{Bi}^{3+}$  ( $\text{Ln}=\text{Eu}, \text{Dy}, \text{Sm}$ ) when excited using a single wavelength light of 330 nm.



**Fig. S6** Typical UV-vis diffuse reflectance spectra for (a)  $\text{YVO}_4:\text{Eu}^{3+}$  and (b)  $\text{YVO}_4:\text{Eu}^{3+}/\text{Bi}^{3+}$ .



**Fig. S7** Excitation (dash line) and emission spectra (solid line) of the assembled spheres YVO<sub>4</sub>.



**Fig. S8** Excitation (dash line) and emission spectra (solid line) of the assembled spheres YVO<sub>4</sub>:Bi<sup>3+</sup>.