Electronic Supplementary Material (ESI) for CrystEngComm

Supporting information

Hydrothermal synthesis of lanthanide orthovanadate: EuVO4 particles and their fluorescence application

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Figure S1 shows the SEM image and EDS element mapping of $EuVO_4$-His composite. The EDS element mapping clearly shows that the elements of Eu, V, C and N evenly distributed in the $EuVO_4$-His composite.

Figure S2 is the Raman mapping spectrum of $EuVO_4$-His composite. Figure S2a is the optical photograph. Figure S2b is the Raman mapping spectrum of $EuVO_4$ at peak of 871 cm^{-1}. Figure S2c is the Raman mapping spectrum of His at peak of 1326 cm^{-1}. There was a corresponding relation between combinative structure morphology and the false color plot of Raman intensity. The Raman mapping spectrum could be employed to monitor the concentration distribution of $EuVO_4$ and His. In Figures S2b and S2c, the concentration distribution of $EuVO_4$ and His correspond with the composite morphology, which further confirmed $EuVO_4$ and His evenly distributed in $EuVO_4$-His composite.

Figure S3 shows the SEM image and EDS element mapping of $EuVO_4$-BSA composite. The EDS element mapping clearly shows that the elements of Eu, V, C and N evenly distributed in the $EuVO_4$-BSA composite.

Figure S4 is the Raman mapping spectrum of $EuVO_4$-BSA composite. Figure S4a is the optical photograph. Figure S4b is the Raman mapping spectrum of $EuVO_4$

at peak of 873 cm^{-1}. Figure S4c is the Raman mapping spectrum of BSA at peak of 1332 cm^{-1}. There was also a corresponding relation between combinative morphology and the false color plot of Raman intensity. The Raman mapping spectra could serve as monitor for the concentration distribution of $EuVO_4$ and BSA. In Figures S4b and S4c, the concentration distribution of $EuVO_4$ and BSA correspond with the combinative morphology, which further confirmed that $EuVO_4$ and BSA evenly distributed in the combinative structure.

Figure S5 shows the auto-fluorescence of the cell, which was observed with confocal laser scanning microscopy. Figure S5a is the bright field image of a Hela cell and there were no addition of $EuVO_4$ particles. Figure S5b shows the red auto-fluorescence upon excitation at 401 nm. Its auto-fluorescence was mainly evenly distributed in the whole cell rather than gathering on the cell membrane. Apart from the distribution, the fluorescence was weaker than the cell combined with $EuVO_4$ particles (Figure 4). And Figure S5c is the superposition of fluorescence and transillumination image, which intuitively performs the auto-fluorescence of the cell. The auto-fluorescence is much weaker, which shows little difference with the noise.

Figure S6 shows the cellular viability of Hela cells with different concentrations. The viability of untreated cells was assumed to be 100%. The $EuVO_4$ particles exhibit a negligible cytotoxic profile even after 24 h. Furthermore, over 65% cell viability was obtained when treated with 1.0×10^{-3} mol/l of $EuVO_4$. This suggests that $EuVO_4$ particles exhibits good biocompatibility and would be practicable in application in bio-relatedfields.

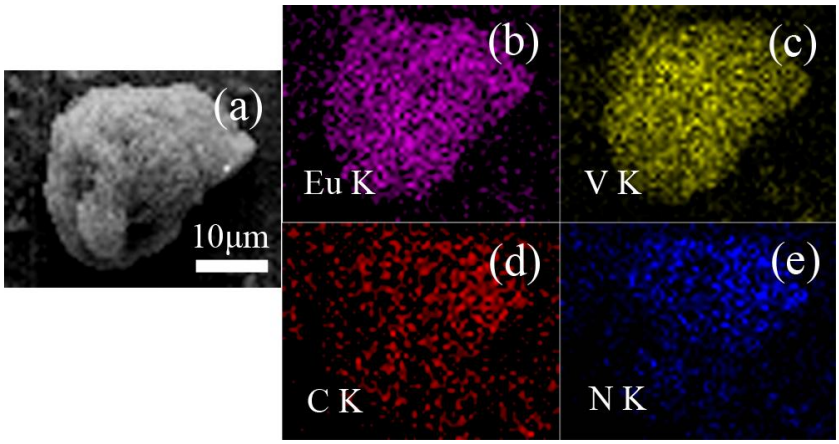

Figure S1. (a) SEM image of $EuVO_4$-His composite; and EDS element mapping data of (b) Eu, (c) V, (d) C, and (e) N elements throughout the $EuVO_4$-His composite.

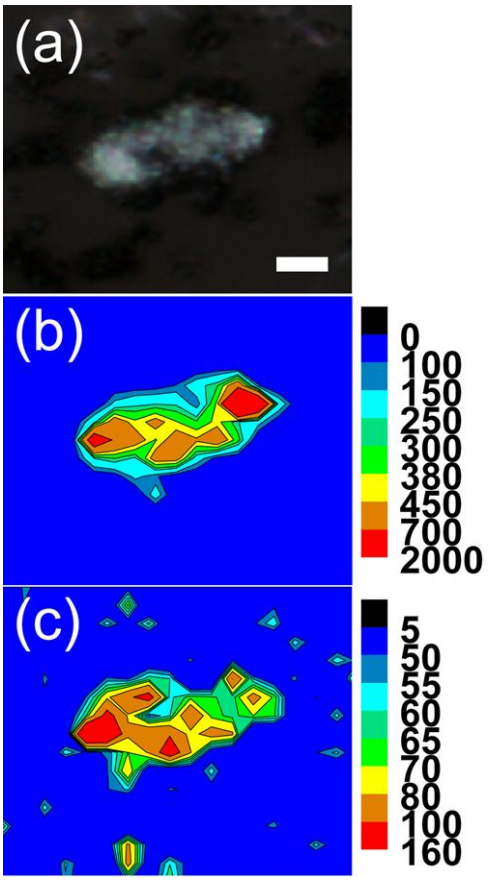

Figure S2. (a) The optical photograph of $EuVO_4$ combined with 1.0×10^{-2} M His. The scale bar is 2 μm; (b) the Raman mapping spectrum of $EuVO_4$ at peak of 871 cm^{-1}; and (c) the Raman mapping spectrum of His at peak of 1326 cm^{-1}.

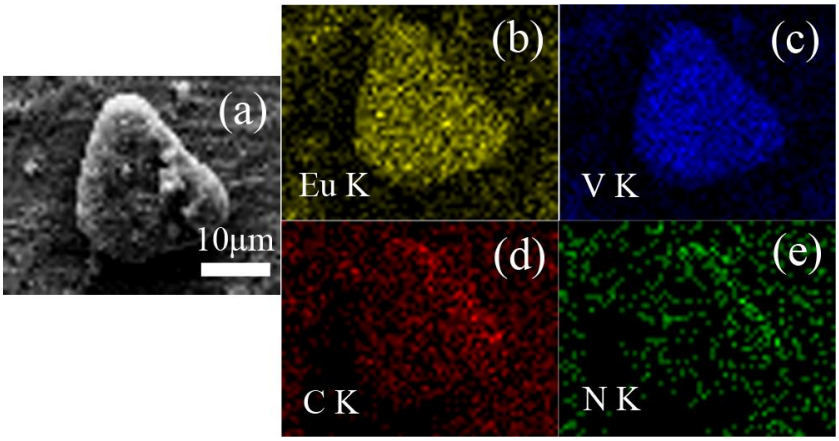

Figure S3. (a) SEM image of $EuVO_4$-BSA composite; and EDS element mapping data of (b) Eu, (c) V, (d) C, and (e) N elements throughout the $EuVO_4$-BSA composite.

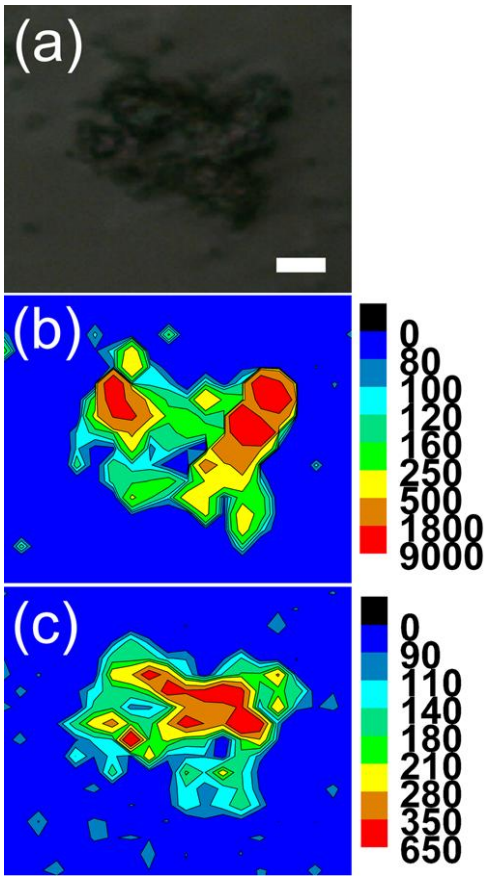

Figure S4. (a) The optical photograph of $EuVO_4$ combined with 1.0×10^{-2} M BSA; (b) The Raman mapping spectrum of $EuVO_4$ at peak of 873 cm^{-1}; (c) the Raman mapping spectrum of BSA at peak of 1332 cm^{-1}. The scale bar is 2 μm.

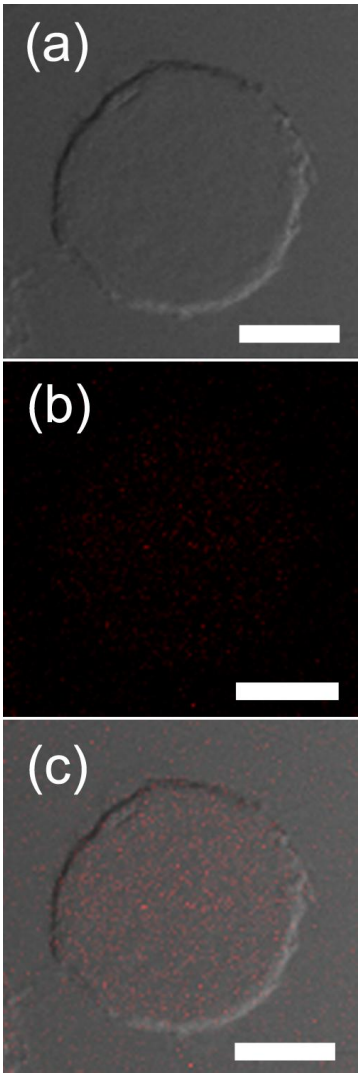

Figure S5. Photos of cell imaging captured by laser-scanning confocal microscopy: (a) bright-field image, (b) fluorescence image, and (c) superposition of fluorescence and transillumination images. The scale bar is 10 μm.

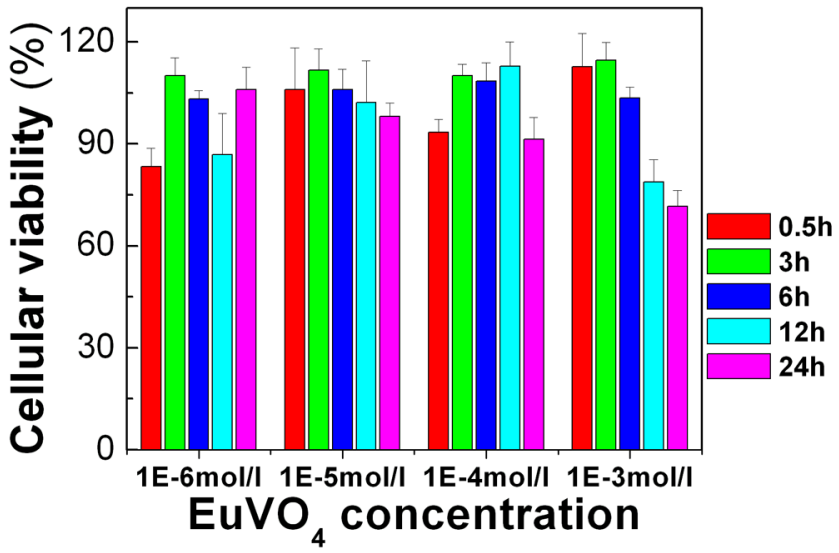

Figure S6. Cytotoxicity of the $EuVO_4$ against Hela cell at concentrations of 1.0×10^{-6} to 1.0×10^{-3} mol/l after 0.5, 3, 6, 12, 24 h.