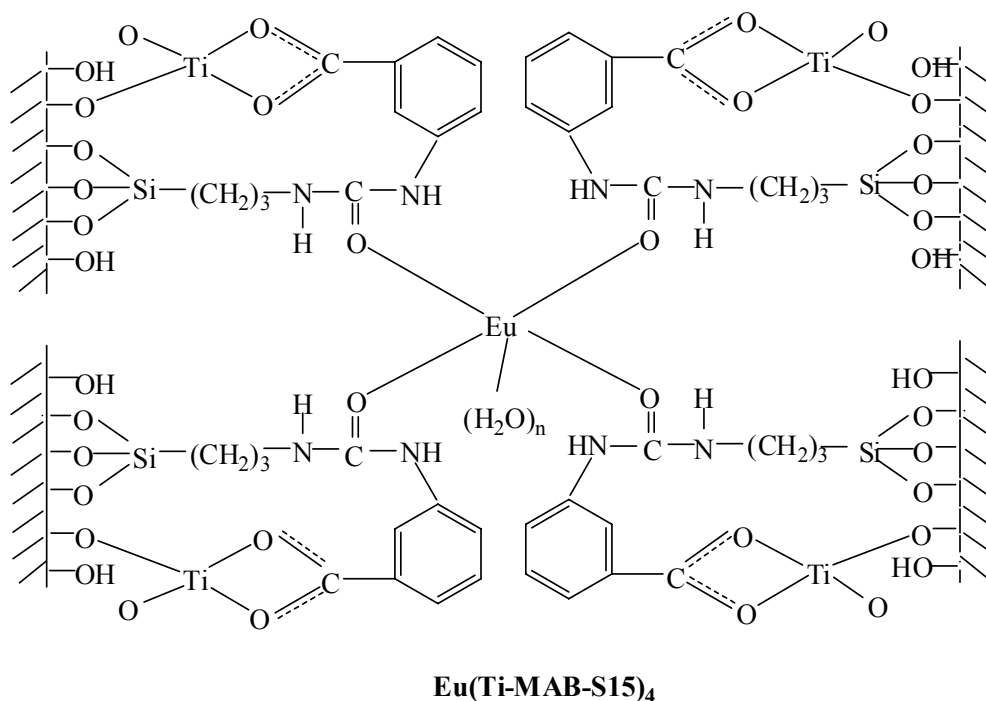


Supporting Information



Scheme S1. The predicted structure of the binary mesoporous hybrid titania materials $\text{Eu}(\text{Ti-MAB-S15})_4$.

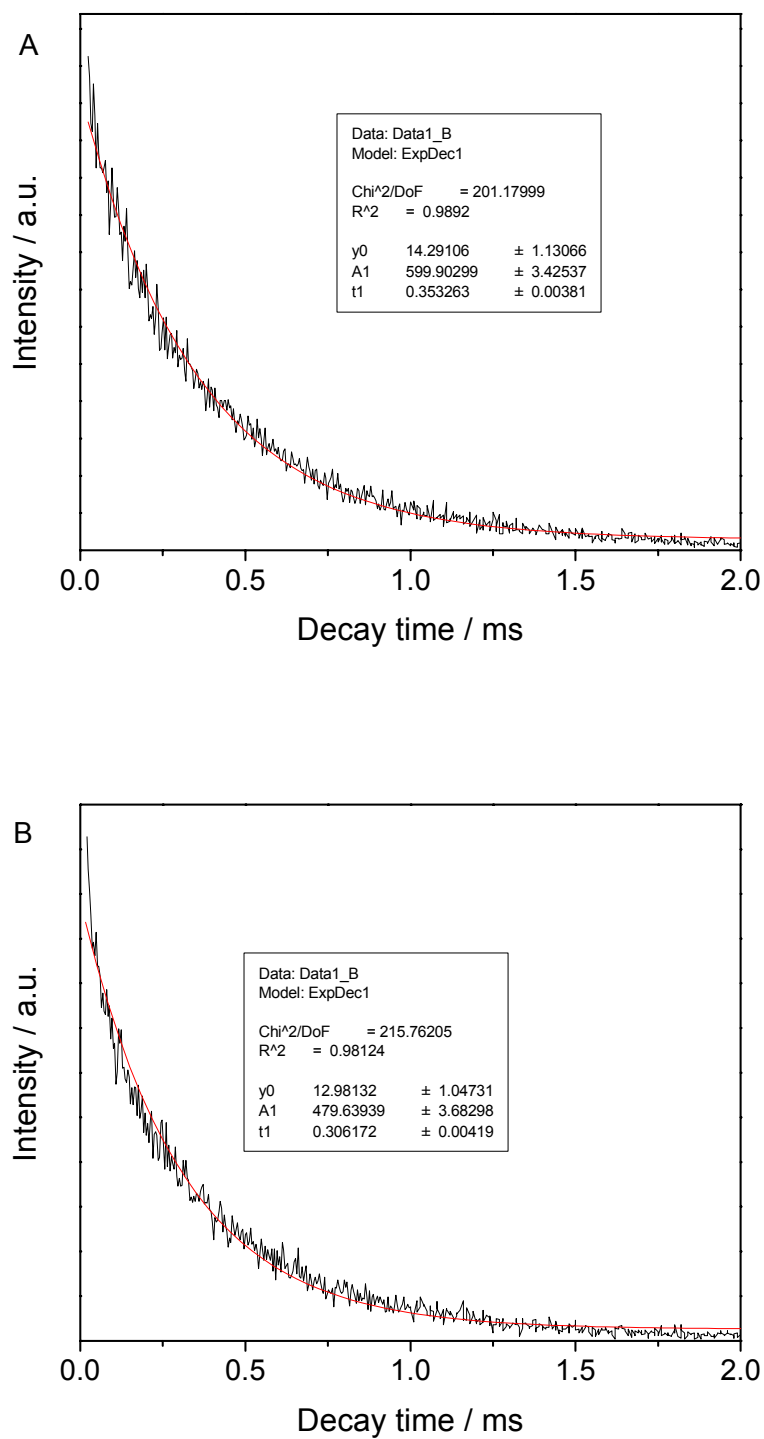


Figure S1. Luminescence decay curve of the pure complex $\text{Eu}(\text{NTA})_3 \cdot 2\text{H}_2\text{O}$ (A), and binary mesoporous hybrid titania material $\text{Eu}(\text{Ti-MAB-S15})_4$ (B).

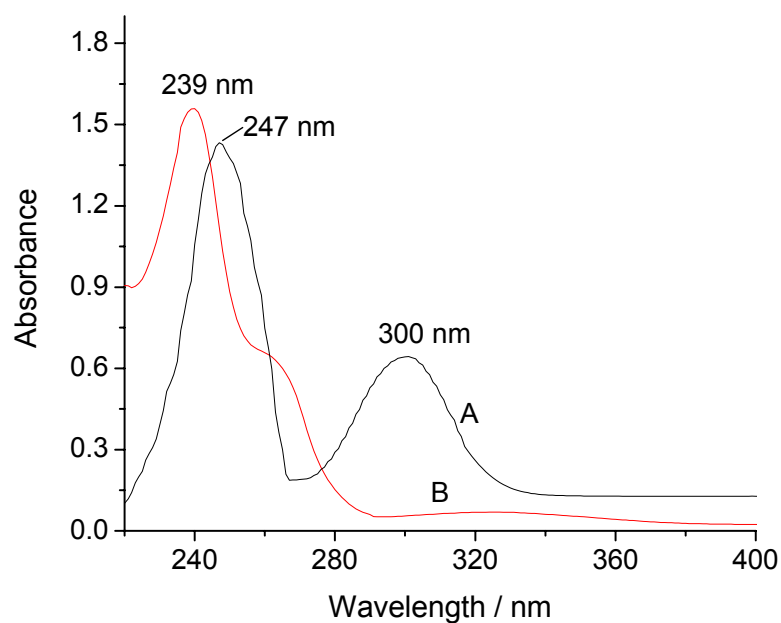


Figure S2. Ultraviolet absorption spectra of MAB (A) and MAB-Si (B).

Figure S2 shows ultraviolet absorption spectra of MAB(A) and MAB-Si (B). From the spectra, it can be observed that a obvious blue shift of the major π - π^* electronic transitions A \rightarrow B (from 247 to 239 nm) occurred and a broad band at 300 nm appeared, which indicates that the electron distribution of the modified MAB-Si has changed compared to free ligand MAB due to the introduction of carbonyl group and 3-(triethoxysilyl)-propyl isocyanate has been grafted to the ligand MAB successfully.

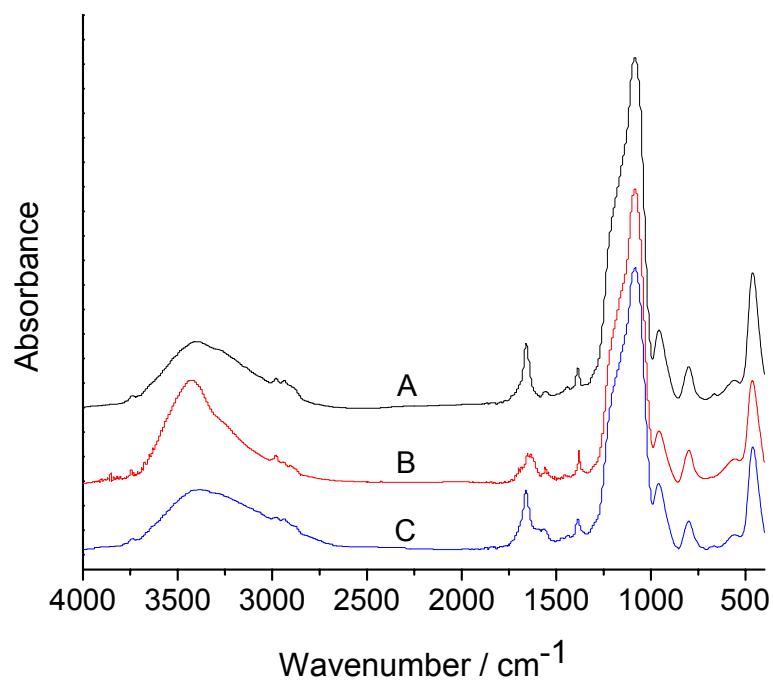


Figure S3. The infrared spectra mesoporous hybrid titania materials of $\text{Eu}(\text{Ti-MAB-S15})_2(\text{NTA})_3$ (A), $\text{Eu}(\text{Ti-MAB-S15})_2(\text{NTA})_3$ (B) and $\text{Eu}(\text{Ti-MAB-S15})_4$ (C).

The FTIR spectra of all obtained mesoporous hybrid titania were measured and are shown in Figure S3. The appearance of the -CONH- group at about 1556 and 1648 cm⁻¹ for all samples demonstrates that the functionalized organic groups MAB-Si remain intact after the hydrolysis / condensation reaction and complex-grafting process.

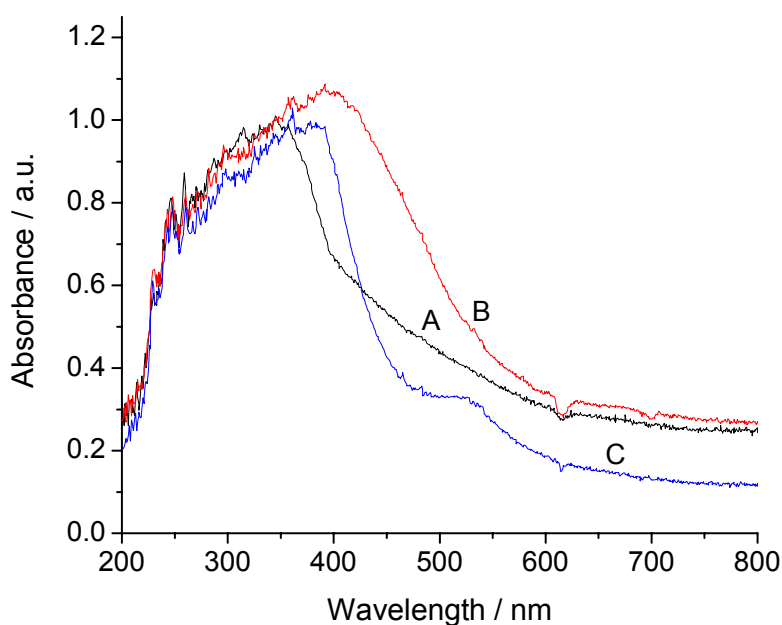


Figure S4. Ultraviolet-visible diffuse reflection absorption spectra of (A) pure complex $\text{Eu}(\text{NTA})_3 \cdot 2\text{H}_2\text{O}$, (B) ternary europium mesoporous hybrid titania material $\text{Eu}(\text{Ti-MAB-S15})_2(\text{NTA})_3$, and (C) binary europium mesoporous hybrid titania material $(\text{Ti-MAB-S15})_4$.

The ultraviolet-visible diffuse reflection absorption spectra of the hybrid materials are given in Figure S4 (A for $\text{Eu}(\text{NTA})_3 \cdot 2\text{H}_2\text{O}$, B for $\text{Eu}(\text{Ti-MAB-S15})_2(\text{NTA})_3$, and C for $\text{Eu}(\text{Ti-MAB-S15})_4$). All of the spectra exhibit a broad absorption band in the range of about 280 - 420 nm, which partially overlap with the luminescence excitation spectra. It can be primarily predicted that in the hybrid materials the central Eu ions can be efficiently sensitized by the ligand through the so-called “antenna effect”. Then, the final hybrid materials can be expected to have good luminescence properties through the intramolecular energy transfer process, which is proved in the luminescence spectra in Figure 6. The lines A, B and C have the inverse peaks at about 614 nm owing to the characteristic emission of Eu^{3+} , and compared with A, line B has an obvious red shift, which may be owing to the addition of the ligand Ti-MAB-S15, which leads to the change in the coordination environment around Eu^{3+} .