**Supplementary materials**

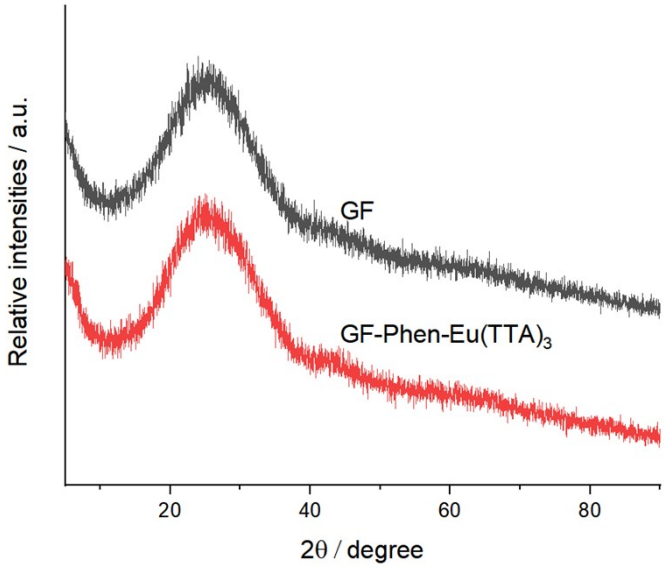


**Figure s1** XRD patterns for the GF and GF-Phen-Eu(TTA)$_3$

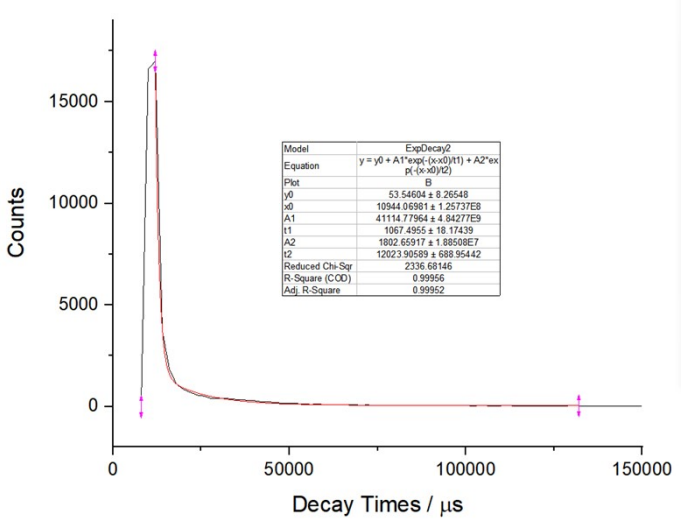


**Figure s2** Luminescent decay curves of GF-Phen-Eu(TTA)$_3$

The quantum efficiency is estimated based on the following formula (Juud–Ofelt theory):

$$A_{0J} = A_{01} \times \frac{I_{0J}}{I_{01}} \times \frac{\nu_{01}}{\nu_{0J}} \quad (1)$$

$$A_r = \sum A_{0J} = A_{01} + A_{02} + A_{03} + A_{04} \quad (2)$$

$$\frac{1}{\tau} = A_r + A_{nr} \quad (3)$$

$$\eta = \frac{A_r}{A_r + A_{nr}} \quad (4)$$

In this context, $A_{01}$ represents the Einstein coefficient of spontaneous emission between $^5D_0$ and $^7F_1$, with a theoretically determined value of 50 $s^{-1}$; $I_{oJ}$ denotes the transition intensity from $^5D_0$ to $^7F_J$ (J=1~4) calculated from the peak values; and $\nu_{0J}$ (J=1~4) signifies the energy barycenter of the corresponding emission peaks. Additionally, $A_r$ refers to the rate of radiative transition, while $A_{nr}$ pertains to non-radiative transitions. Based on these parameters, the luminescence quantum efficiency of europium complexes hybrid materials can be expressed as the ratio of $A_r$ to ($A_r$ + $A_{nr}$). The corresponding statistical information of fluorescence emission spectrum peaks are listed in Table s1.

**Table s1** Statistical Information of Fluorescence Emission Spectrum Peaks

| J | $\nu_{0J}$ | $I_{0J}$ | $A_{0J}$ |
|---|---|---|---|
| 1 | 593 | 44433 | 50 |
| 2 | 615 | 773880 | 840 |
| 3 | 652 | 21347 | 22 |
| 4 | 699 | 60309 | 58 |

**Table s2** The prices of several major reagents (Excerpted from Shanghai Aladdin Biochemical Technology Co., Ltd.)

| • Compound | Purity | Price |
|---|---|---|
| • $EuCl_3 \cdot 6H_2O$ | 99.9% | 70.9 CNY/5g |
| 1,10-Phenanthrolin-5-amine | 97% | 112.9 CNY/1g |
| 3-(triethoxysilyl)propylisocyanate | 95% | 31.9 CNY/5g |
| 2-Thenoyltrifluoroacetone | 98% | 31.9 CNY/5g |