

Supporting Information for

Plastic scintillation fiber with europium complexes for low-dose X-ray detection and long-distance imaging

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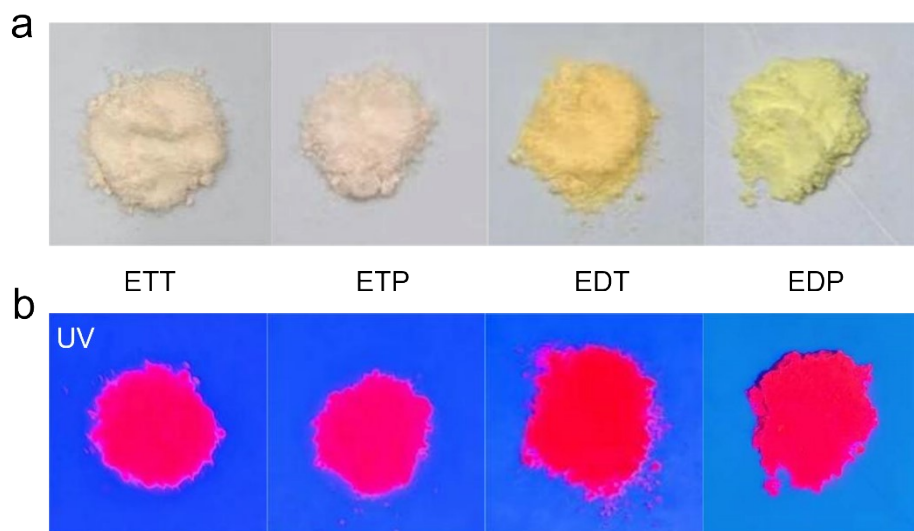


Figure S1. Photographs of the four complexes under natural light (a) and UV light (b).

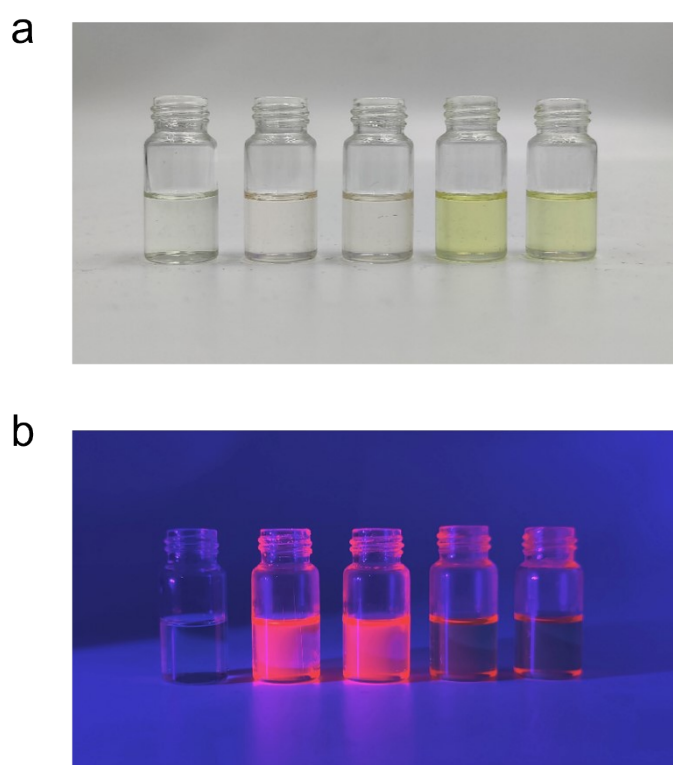


Figure S2. Photographs of five solutions under natural (a) and UV light (b), from left to right: EuCl_3 solution, ETT solution, ETP solution, EDT solution, and EDP solution.

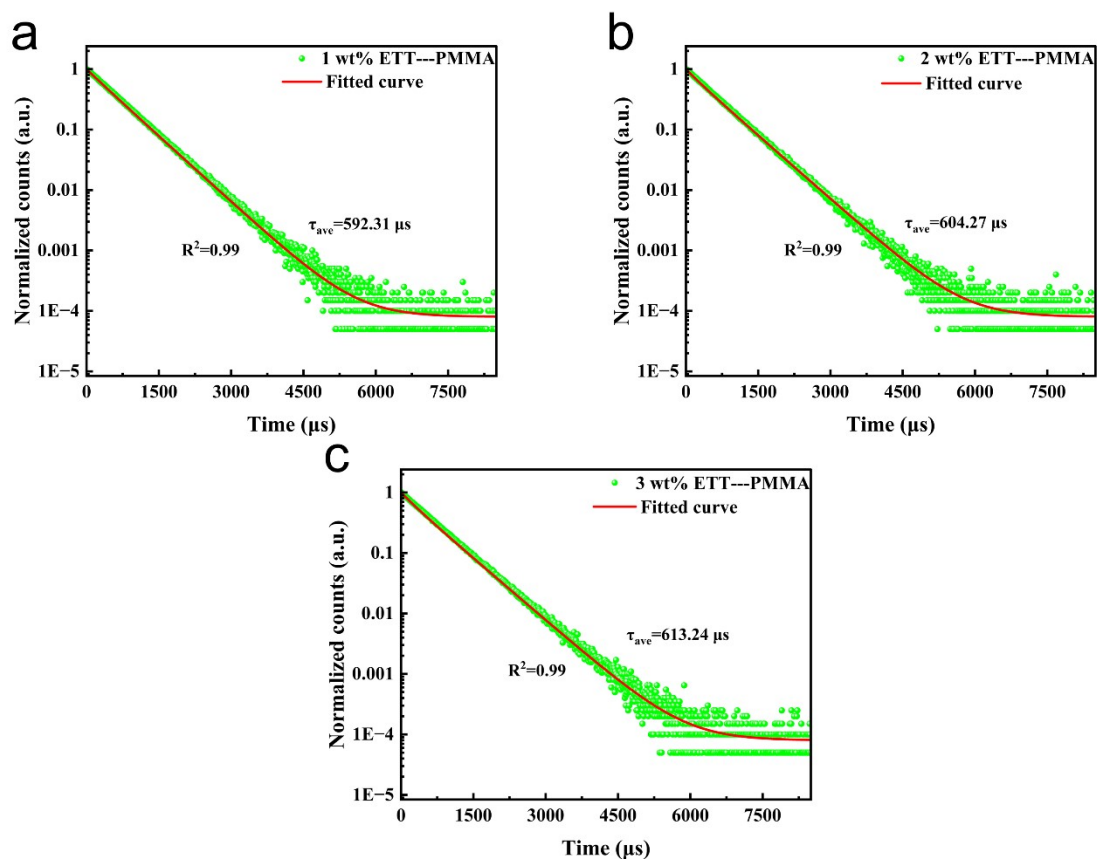


Figure S3. PL decay curves for 1 wt% ETT (a), 2 wt% ETT (b), and 3 wt% ETT (c) scintillators and their respective double-exponential function fit curves ($\lambda_{\text{ex}}=367$ nm).

Table S1. Fitting parameters for ETT, 1 wt% ETT, 2 wt% ETT, 3 wt% ETT, 4 wt% ETT. τ_1 and τ_2 , denoting radiative and non-radiative transitions. A_1 and A_2 represent the weights of τ_1 and τ_2 respectively. The lifetime of the sample can be calculated using the following formula:

Sample	A_1	A_2	τ_1 (μs)	τ_2 (μs)	τ_{avg} (μs)	R^2
ETT	0.97	0.03	560.00	189.00	556.17	0.99
1 wt% ETT	0.95	0.05	600.00	300.00	592.31	0.99
2 wt% ETT	0.90	0.10	620.00	243.00	604.27	0.99
3 wt% ETT	0.87	0.13	635.00	267.00	613.24	0.99

4 wt% ETT	0.86	0.14	655.00	293.00	630.41	0.99
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$$\tau_{avg} = \frac{A_1\tau_1^2 + A_2\tau_2^2}{A_1\tau_1 + A_2\tau_2}$$

(1)

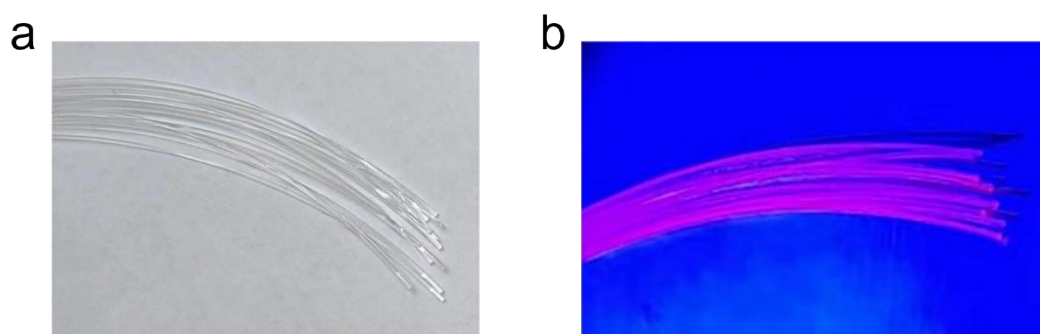


Figure S4. Photographs of Eu-PSF in natural (a) and UV light (b).

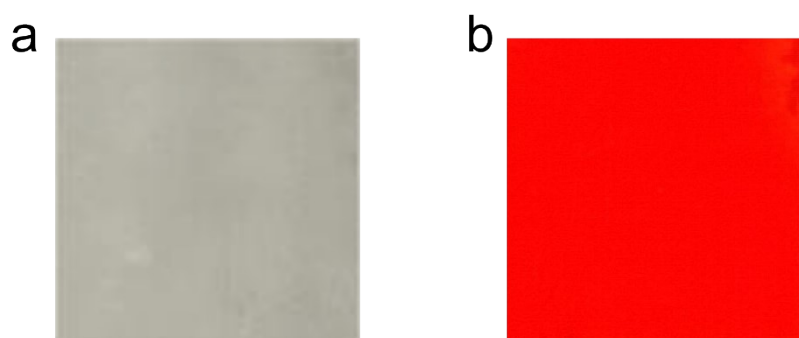


Figure S5. Scintillator film under natural (a) and UV light (b).

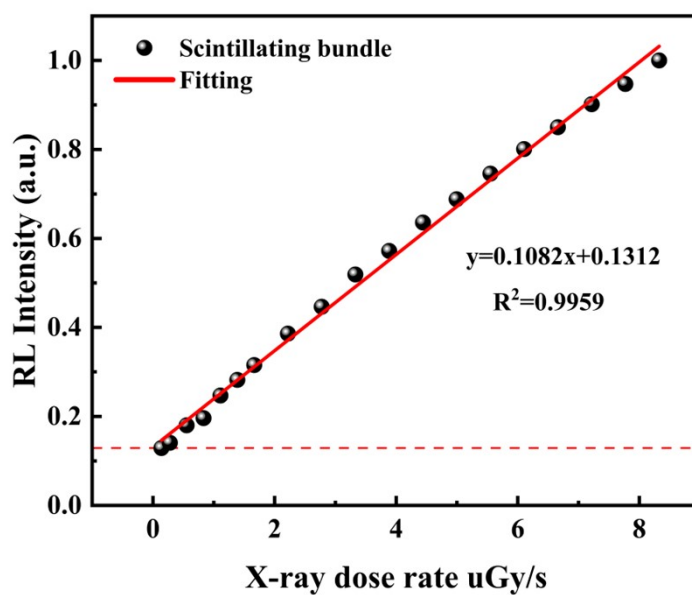


Figure S6. Dependence of RL intensity of scintillator membranes on X-ray dose rate.

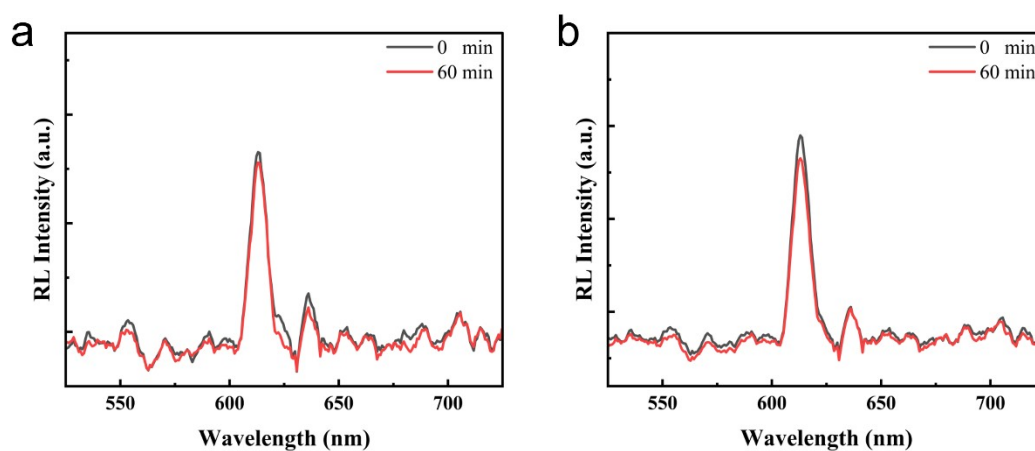


Figure S7. a) RL spectra of Eu-PSF for 0 min and 60 min at an X-ray dose of 0.555 $\mu\text{Gy/s}$. b) RL spectra of Eu-PSF for 0 min and 60 min at an X-ray dose of 8.325 $\mu\text{Gy/s}$.

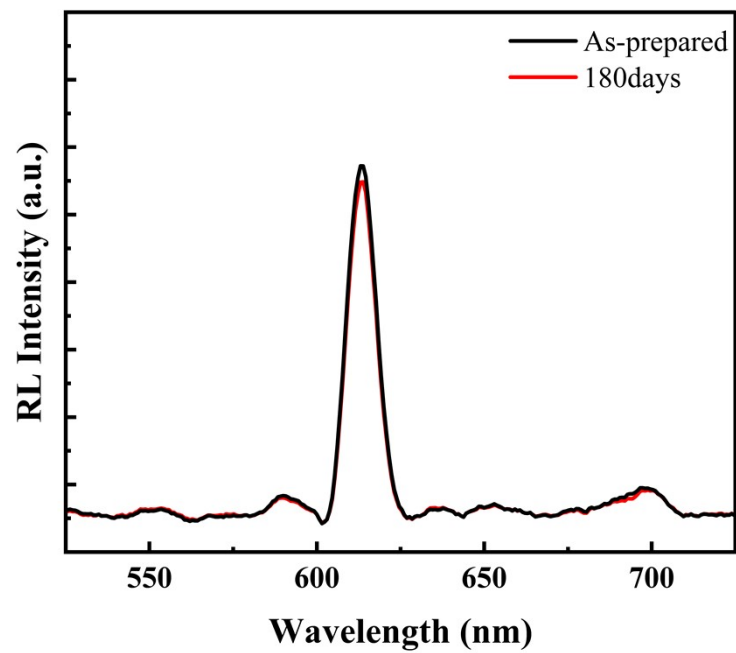


Figure S8. RL spectra of Eu-PSF at the start and 180 days later.

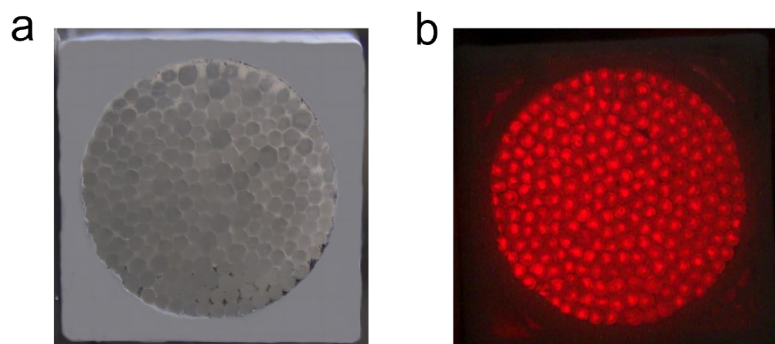


Figure S9. a) Photograph of fiber array. b) Fiber array under X-ray excitation.