

## Supporting information

### Terbium doped $\text{LiLuF}_4$ nanocrystal scintillator-based flexible composite film for high resolution X-ray imaging

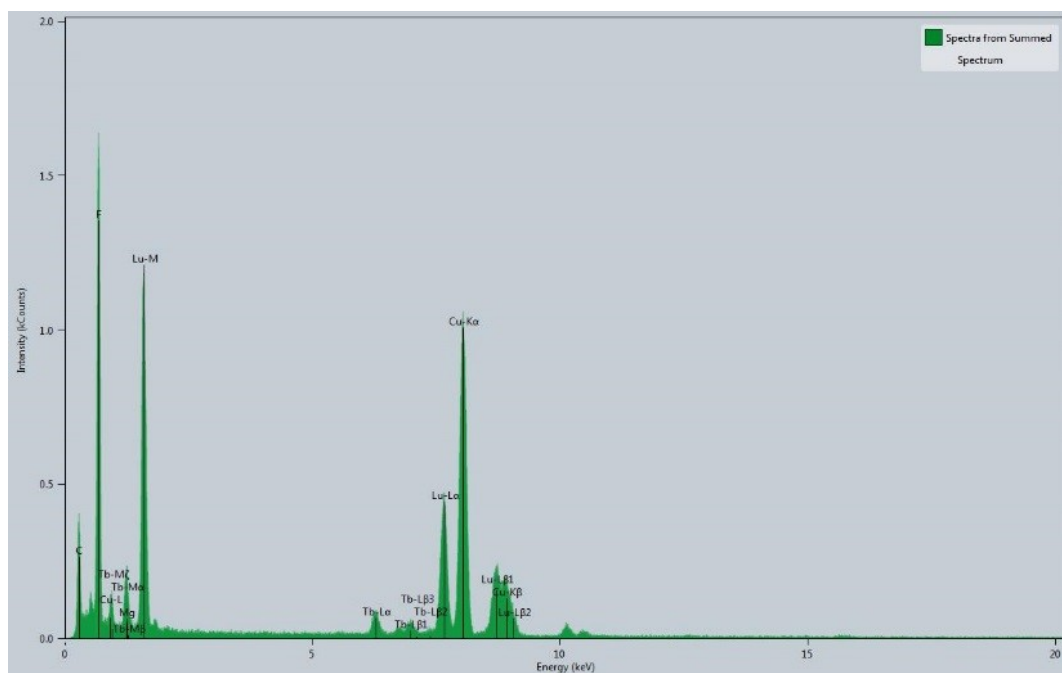
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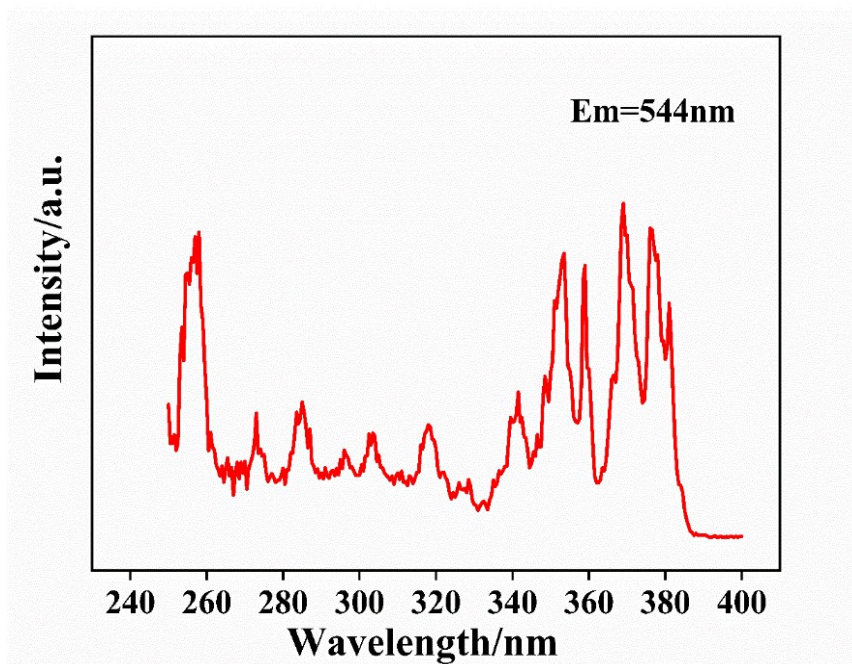
<sup>b</sup> Fujian Science & Technology Innovation Laboratory for Optoelectronic Information of China, Fuzhou, Fujian 350108, P. R. China

<sup>c</sup> Key Laboratory of Optoelectronic Materials Chemistry and Physics, Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, Fuzhou 350002, P. R. China

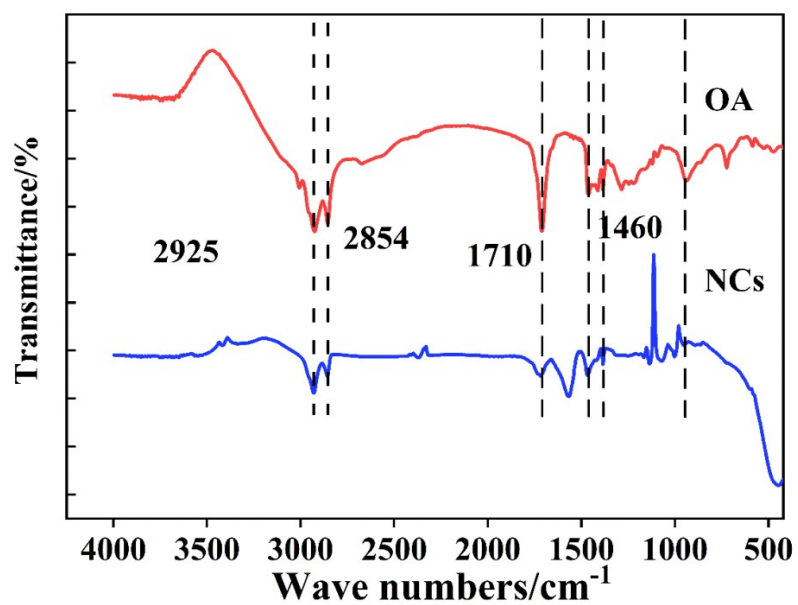
<sup>d</sup> University of Chinese Academy of Sciences, Beijing 100049, P.R. China



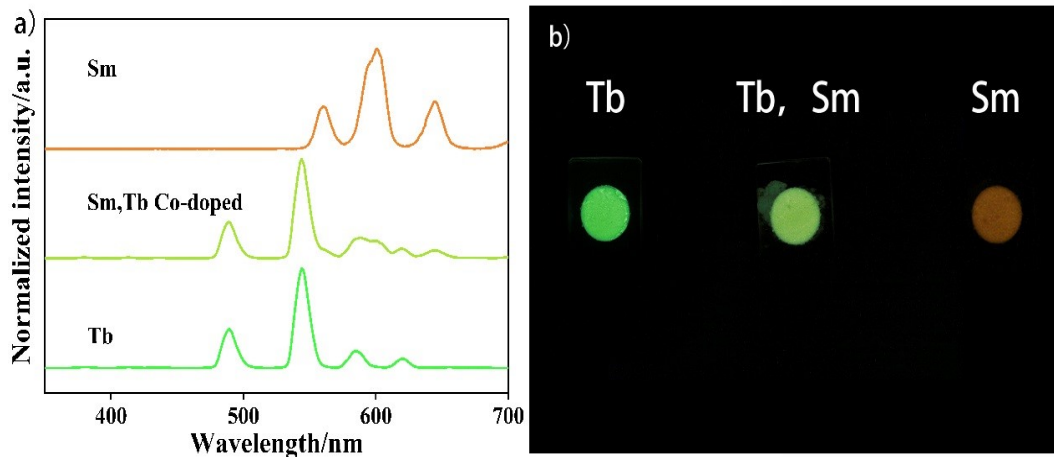
**Fig. S1.** The EDS spectrum of  $\text{LiLuF}_4$ :15%Tb nanocrystals (NCs).



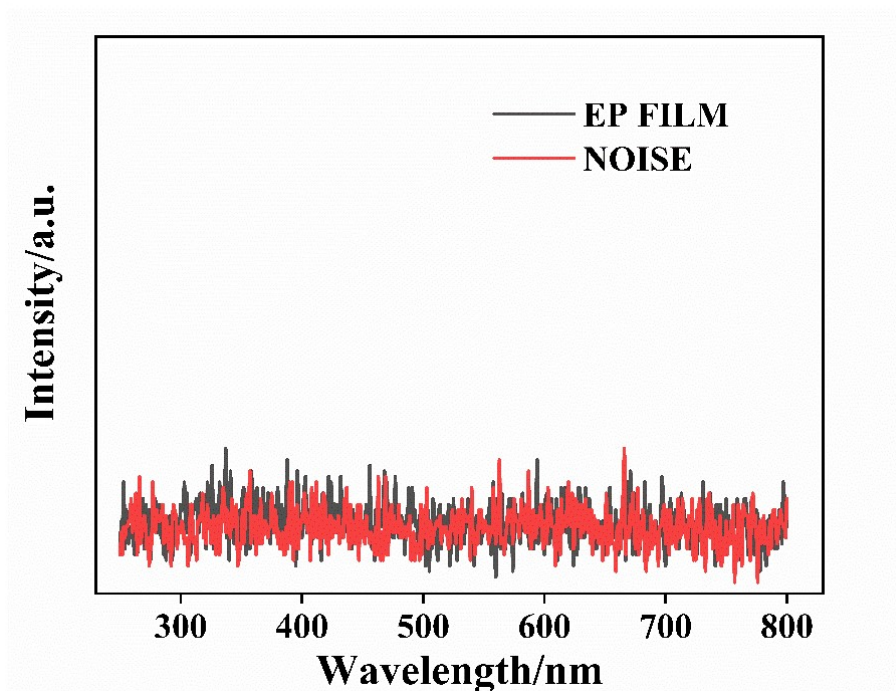
**Fig. S2.** The photoluminescence excitation (PLE) spectra of LiLuF<sub>4</sub>:15%Tb NCs.



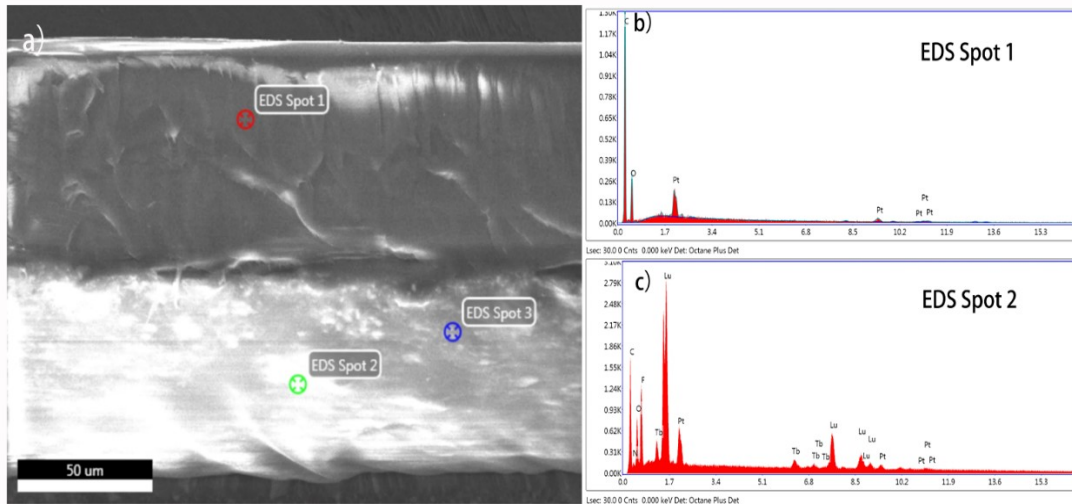
**Fig. S3.** The FT-IR spectrum of LiLuF<sub>4</sub>:15%Tb NCs and oleic acid molecules.



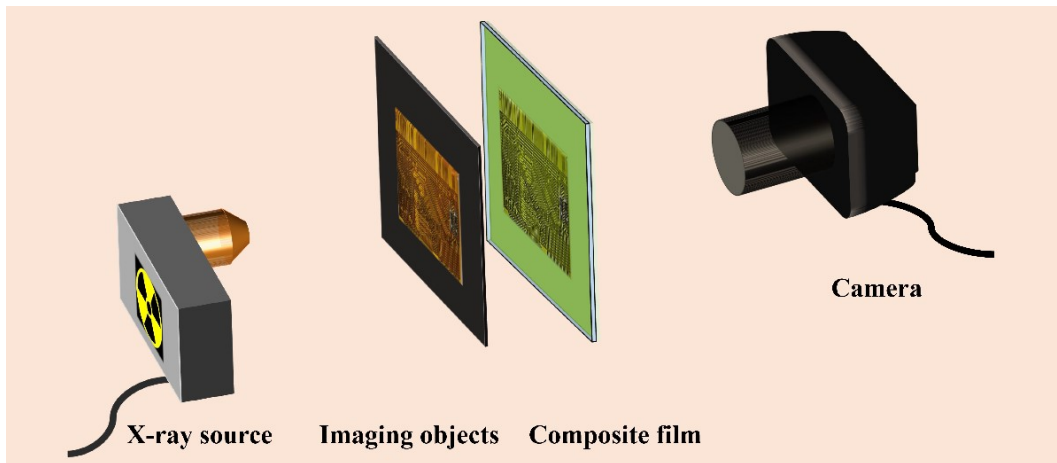
**Fig. S4.** (a) RL spectrum of  $\text{LiLuF}_4$ : 3%Sm,  $\text{LiLuF}_4$ : 15%Tb and  $\text{LiLuF}_4$ :15%Tb, 3%Sm NCs. (b) The photograph of  $\text{LiLuF}_4$ : 3% Sm,  $\text{LiLuF}_4$ :15%Tb and  $\text{LiLuF}_4$ : 15%Tb, 3%Sm NCs under X-ray irradiation.



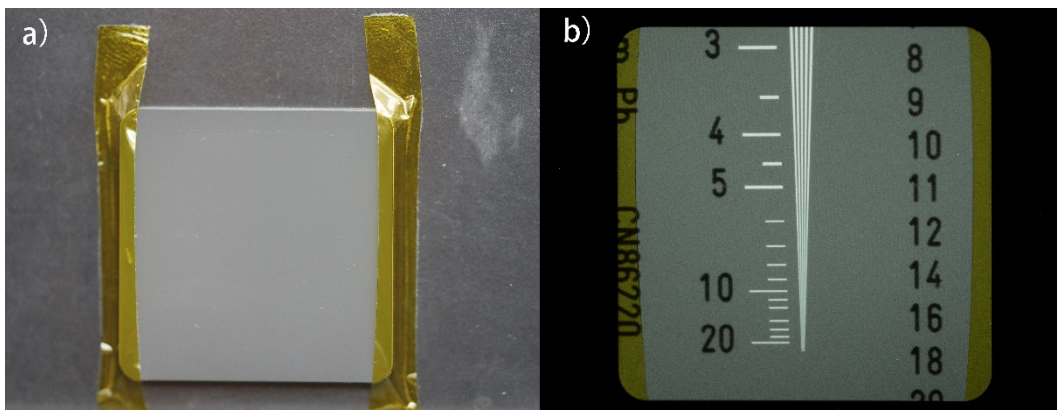
**Fig. S5.** The radioluminescence spectrum of epoxy resin polymer film (black, EP FILM) and instrument noise (red).



**Fig. S6.** (a) The EDS characterization of LiLuF<sub>4</sub>:15%Tb NCs-EP composite film. (b) The EDS spectrum of PET layer. (c) The EDS spectrum of LiLuF<sub>4</sub>:15%Tb NCs-EP composite layer.



**Fig. S7.** The schematic diagram of self-built X-ray imaging device.



**Fig. S8.** (a) The photograph of 135 μm CsI:Tl commercial scintillation sheet; (b) The X-ray image of 135 μm CsI:Tl commercial scintillation sheet.



**Fig. S9.** Biological imaging of  $\text{LiLuF}_4:15\% \text{Tb}$  NCs composite thin films.