Supporting information

Tb³⁺/Ce³⁺-codoped LiLuF₄ nanocrystal glasses for highresolution X-ray imaging

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Figure S1 The schematic diagram of synthesis process of LiLuF₄ nanocrystalline

glass



Figure S2 The grain size distribution of TEM image.



Figure S3 Elemental mapping (Al, Si, F, Lu, Tb, and Ce) of TC2 NGs.



Figure S4 PLE spectrums ($\lambda em=544nm$) of TC2 NGs at different temperature.



Figure S5 Peak intensity of TC2 NGs at 544 nm at different temperatures.



Figure S6 Fluorescence decay curves of T1 and TC2 NGs.



Figure S7 XEL spectrums of T1 and TC1 NGs under different X-ray dose rates.



Figure S8 The XEL intensity of TC2 NGs as a function of X-ray dose rate.



Figure S9 The mechanism of Ce³⁺ sensitized Tb³⁺.



Figure S10 X-ray response intensity for the edge of the plate measured as the edge spread function (ESF) and the line spread function (LSF).

| Sample | Composition in mol% | Temperature | Tim |
|------------------------------|--|-------------|------|
| code | | (°C) | e(h) |
| 11.5%LiLuF4:Tb | 39SiO ₂ -11Al ₂ O ₃ -10B ₂ O ₃ - | 610 | 5 |
| NGs | 25.5LiF-11.5LuF ₃ -3TbF ₃ | | |
| 11.5%LiLuF ₄ :Tb, | 39SiO ₂ -11Al ₂ O ₃ -10B ₂ O ₃ - | 610 | 5 |
| Ce NGs | 25.5LiF-11.5LuF ₃ -3TbF ₃ - | | |
| | 0.5CeF ₃ | | |
| 23%LiLuF ₄ :Tb,C | 32.5SiO ₂ -6Al ₂ O ₃ -10B ₂ O ₃ -25LiF- | 630 | 4 |
| e NGs | 23LuF ₃ -3TbF ₃ -0.5CeF ₃ | | |

Table 1. Sample compositions, codes, and thermal treatment parameters