

Electronic Supplementary Information

RSC Advances

Synthesis of $\text{Y}_2\text{O}_3:\text{Bi}^{3+},\text{Eu}^{3+}$ Nanosheets from Layered Yttrium Hydroxide Precursor and their Photoluminescence Properties

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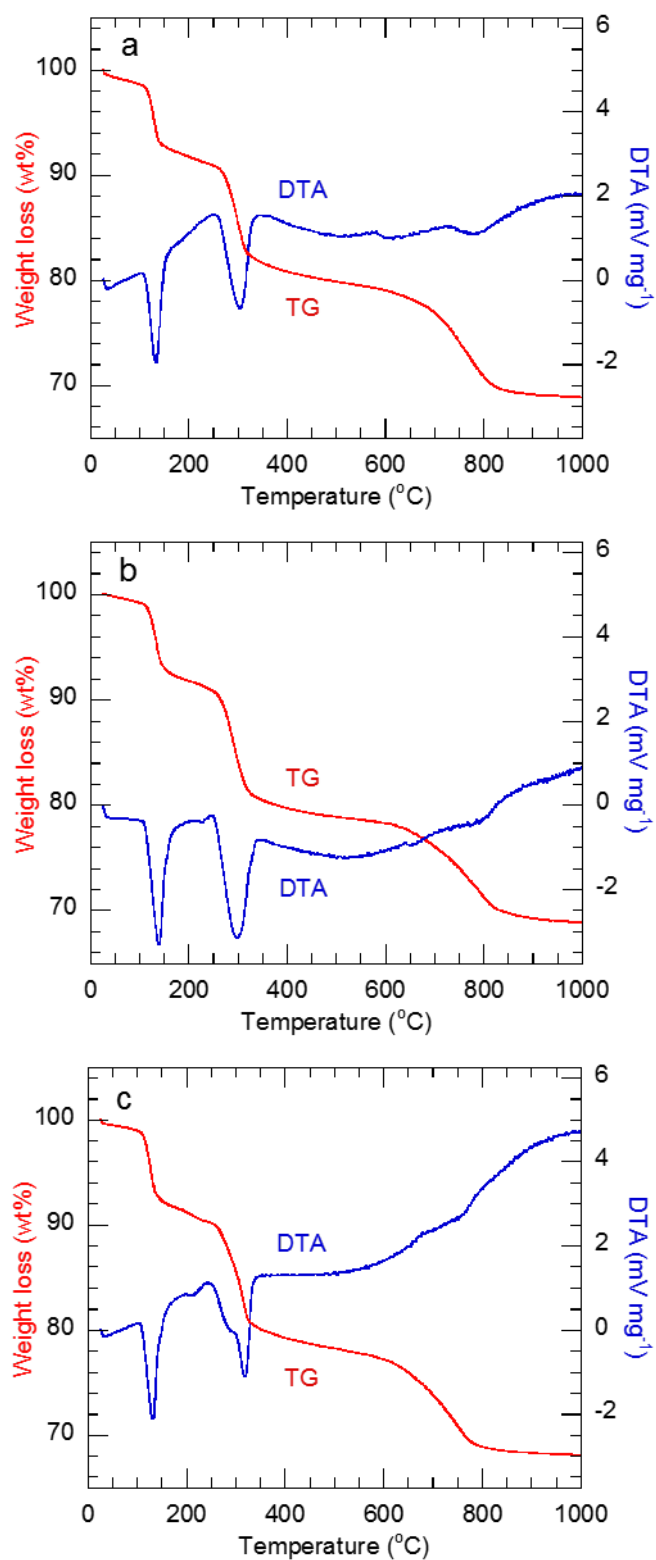


Fig. S1 TG-DTA thermograms of (a) undoped, (b) 10 at% Bi³⁺-doped, and (c) 2 at% Eu³⁺-doped precursors.

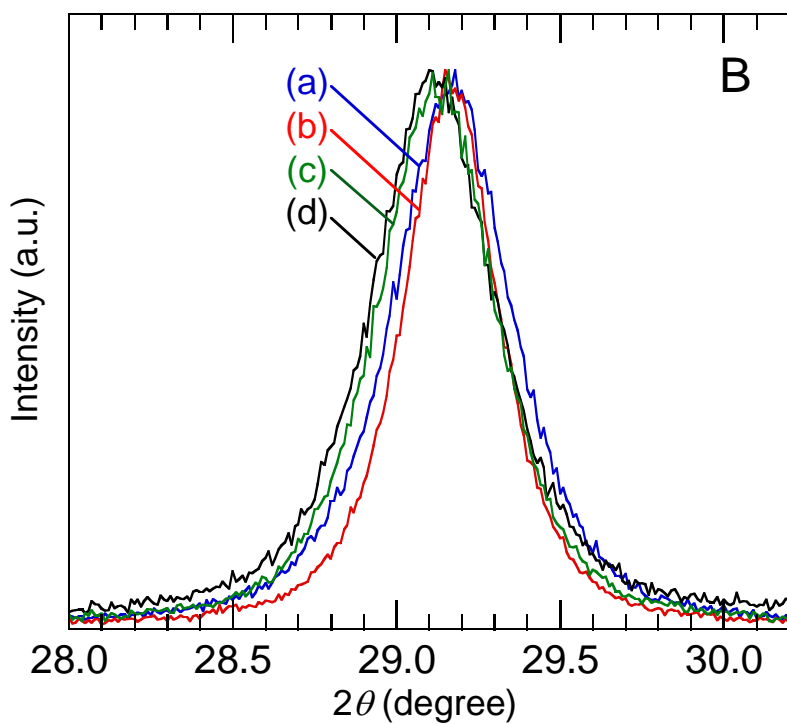
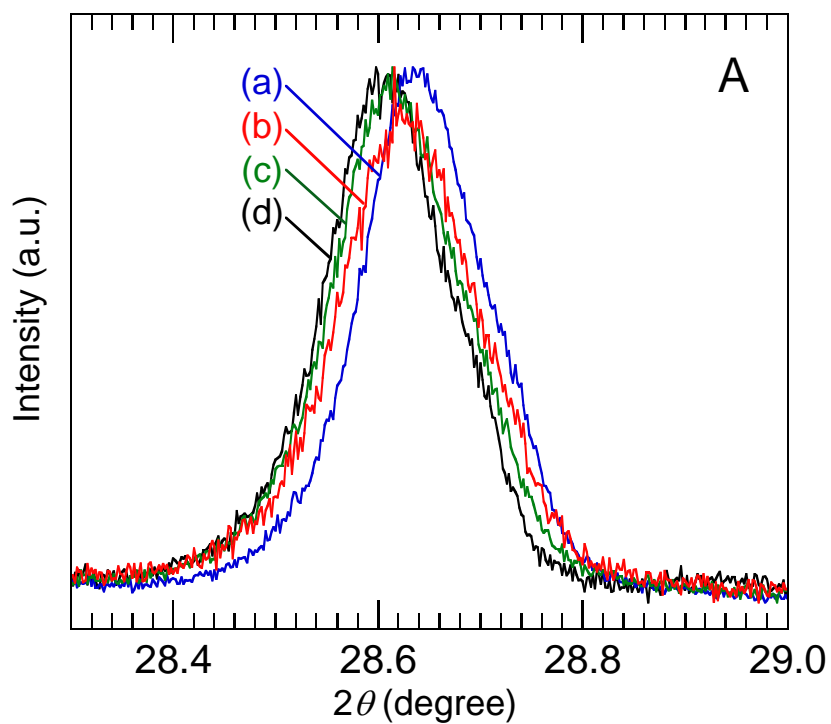


Fig. S2 High-precision (A) (220) XRD peaks of LYH precursors and (B) (222) XRD peaks of Y_2O_3 samples. (a) undoped, (b) 10 at% Bi^{3+} -doped, (c) 2 at% Eu^{3+} -doped, and (d) Bi^{3+}, Eu^{3+} -codoped precursors.

Table S1 d-Spacing of (220) facets ($d_{(220)}$) and crystallite sizes calculated from XRD profiles of precursors.

Dopant(s)	2θ ($^{\circ}$)	$d_{(220)}$ (nm)	Crystallite size (nm)
None	28.64	3.115	68.4
Eu ³⁺	28.62	3.117	60.5
Bi ³⁺	28.61	3.117	64.2
Bi ³⁺ , Eu ³⁺	28.60	3.119	71.6

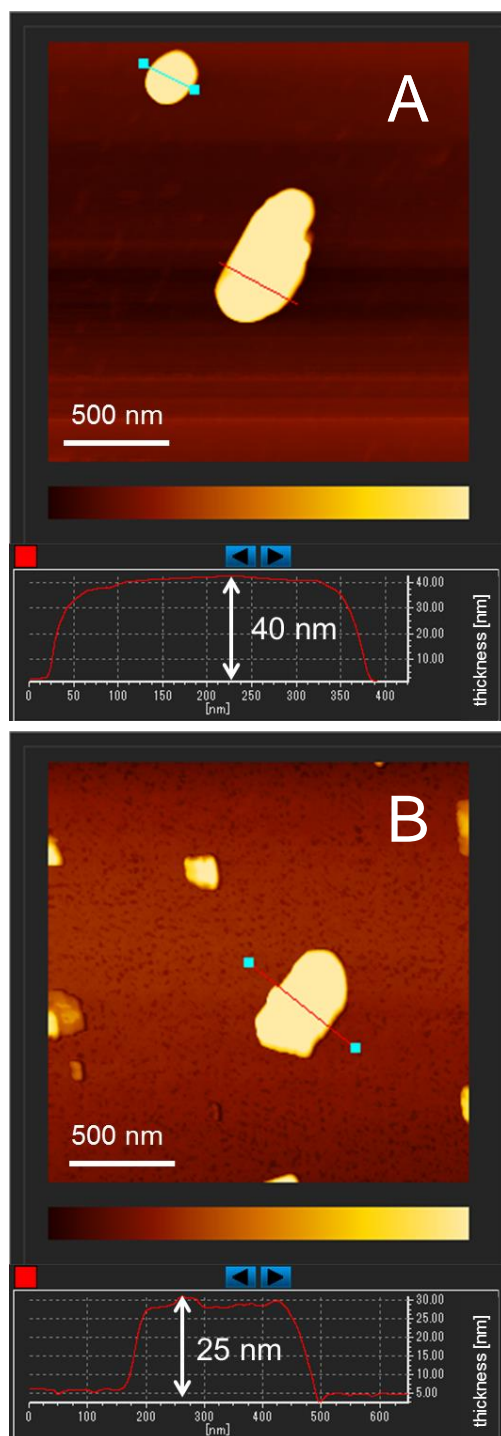


Fig. S3 AFM images of (A) an LYH precursor nanosheet and (B) a Y₂O₃ nanosheet, codoped with 10 at% Bi³⁺ and 2 at% Eu³⁺.

Table S2 d-Spacing of (222) facets ($d_{(222)}$) and crystallite sizes calculated from XRD profiles of the calcined samples.

Dopant(s)	2θ ($^{\circ}$)	$d_{(220)}$ (nm)	Crystallite size (nm)
None	29.14	3.062	19.9
Eu ³⁺	29.10	3.066	20.0
Bi ³⁺	29.09	3.067	18.6
Bi ³⁺ , Eu ³⁺	29.07	3.070	18.9

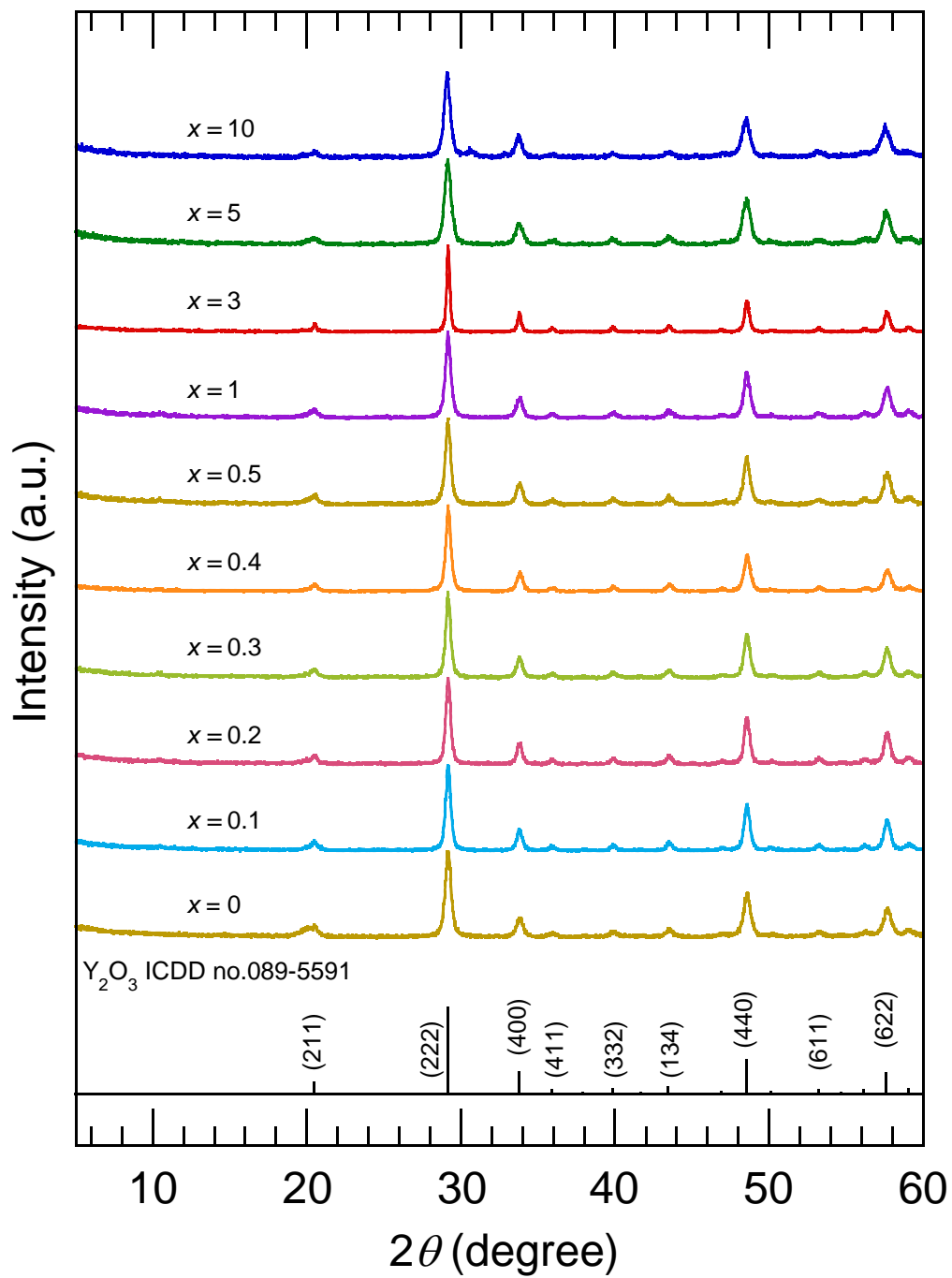


Fig. S4 XRD profiles of x at% Bi³⁺, 2 at% Eu³⁺-codoped calcined samples.

Table S3 Atomic compositions of x at% Bi³⁺, 2 at% Eu³⁺-codoped Y₂O₃ samples determined by XRF.

	Y (at%)	Bi (at%)	Eu (at%)
Nominal	97.9	0.1	2.0
Actual	97.2	0.1	2.6
Nominal	97.8	0.2	2.0
Actual	97.6	0.1	2.3
Nominal	97.7	0.3	2.0
Actual	95.5	0.2	4.3
Nominal	97.6	0.4	2.0
Actual	96.2	0.5	3.3
Nominal	97.5	0.5	2.0
Actual	95.2	0.6	4.2
Nominal	97.0	1.0	2.0
Actual	94.2	1.4	4.4
Nominal	95.0	3.0	2.0
Actual	93.0	2.7	4.3
Nominal	93.0	5.0	2.0
Actual	89.7	5.5	4.8
Nominal	88.0	10.0	2.0
Actual	86.2	9.0	4.8

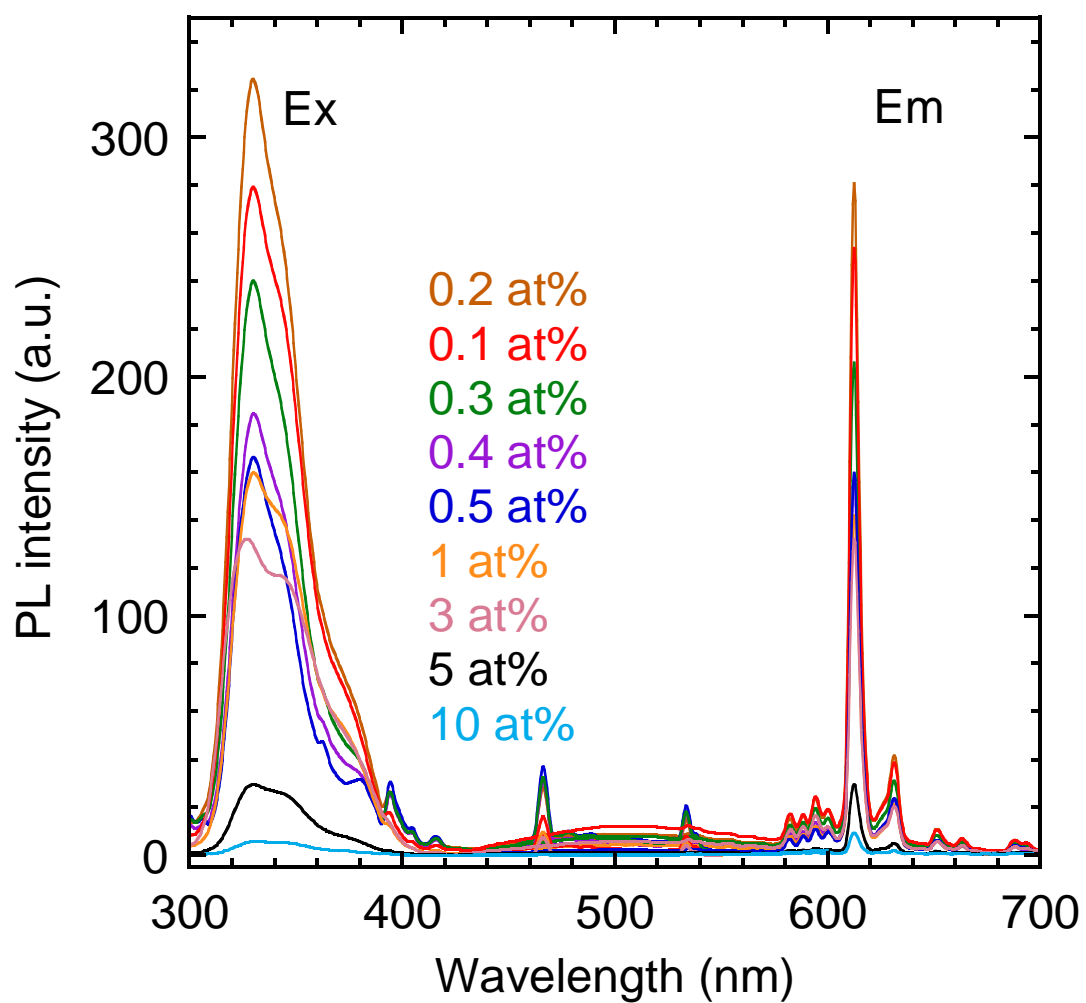


Fig. S5 PL and PLE spectra of 0.1–10 at% Bi³⁺, 2 at% Eu³⁺-codoped Y₂O₃ samples. $\lambda_{\text{ex}} = 332$ nm and $\lambda_{\text{em}} = 612$ nm.