

Supporting Information

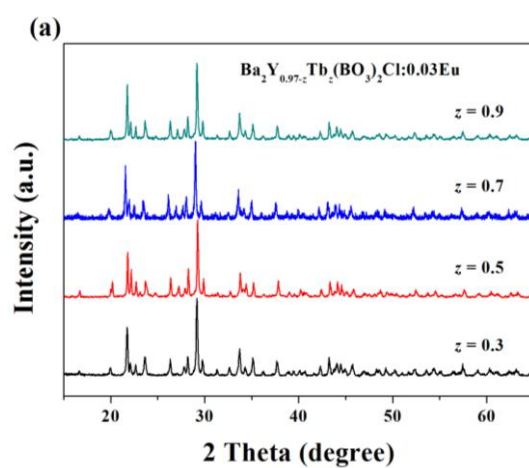
Host Composition Dependent Tunable Multicolor Emission in the Single-Phase $\text{Ba}_2(\text{Ln}_{1-z}\text{Tb}_z)(\text{BO}_3)_2\text{Cl}:\text{Eu}$ Phosphors

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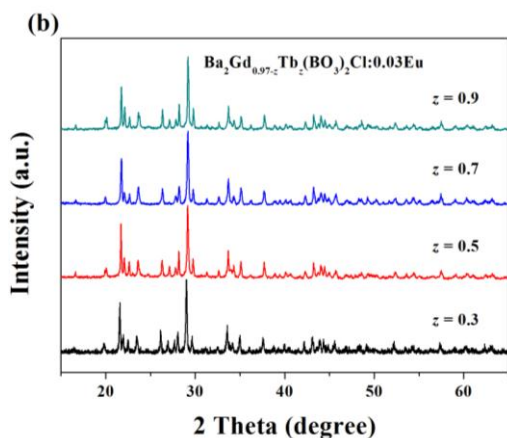


Figure S1 XRD patterns of $\text{Ba}_2(\text{Y}_{0.97-z}\text{Tb}_z)(\text{BO}_3)_2\text{Cl}:0.03\text{Eu}$ (a) and $\text{Ba}_2(\text{Gd}_{0.97-z}\text{Tb}_z)(\text{BO}_3)_2\text{Cl}:0.03\text{Eu}$ phosphors with different Tb content (z values).

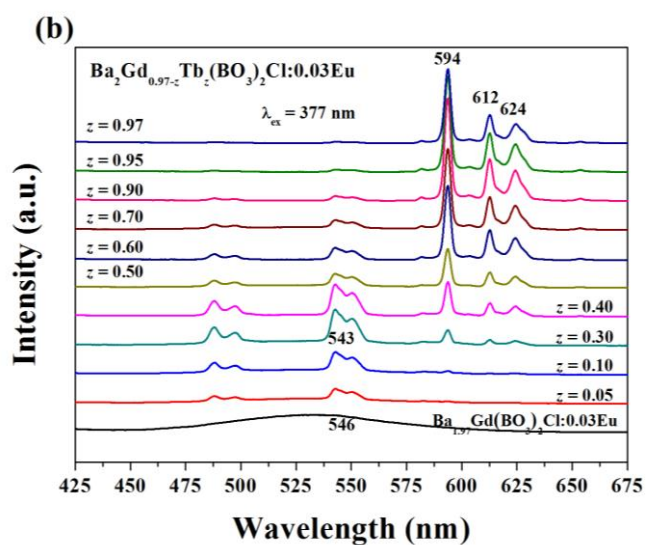
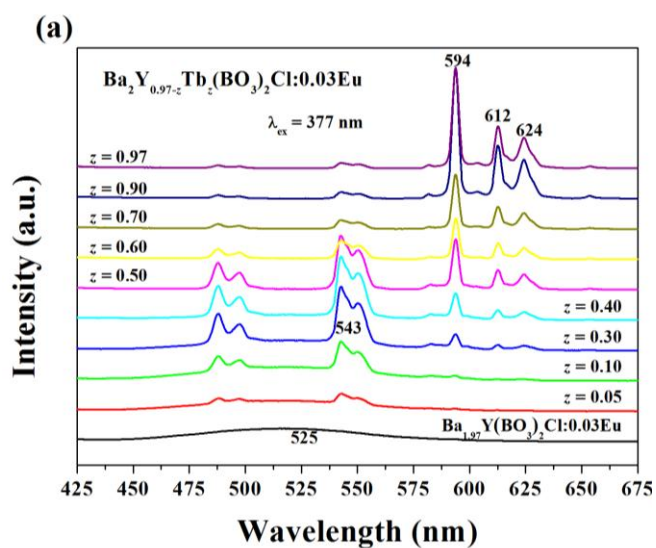


Figure S2 Emission spectra excited by 377 nm of $\text{Ba}_{1.97}\text{Y}(\text{BO}_3)_2\text{Cl}:0.03\text{Eu}$, $\text{Ba}_2(\text{Y}_{0.97-z}\text{Tb}_z)(\text{BO}_3)_2\text{Cl}:0.03\text{Eu}$ phosphors (a) and $\text{Ba}_{1.97}\text{Gd}(\text{BO}_3)_2\text{Cl}:0.03\text{Eu}$, $\text{Ba}_2(\text{Gd}_{0.97-z}\text{Tb}_z)(\text{BO}_3)_2\text{Cl}:0.03\text{Eu}$ phosphors.

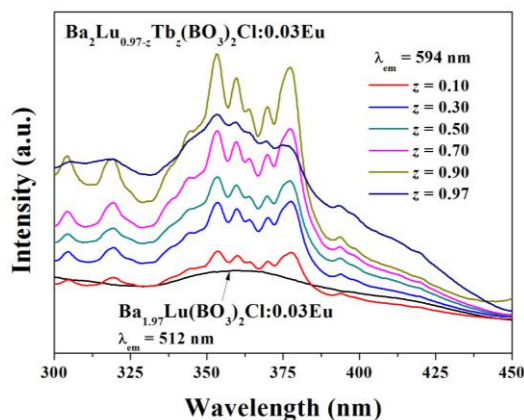


Figure S3 Excitation spectra excited by 594 nm of $\text{Ba}_2\text{Lu}_{0.97}\text{Tb}_z(\text{BO}_3)_2\text{Cl}:0.03\text{Eu}$ and $\text{Ba}_2(\text{Lu}_{0.97-z}\text{Tb}_z)(\text{BO}_3)_2\text{Cl}:0.03\text{Eu}$ phosphors with different Tb content (z values).

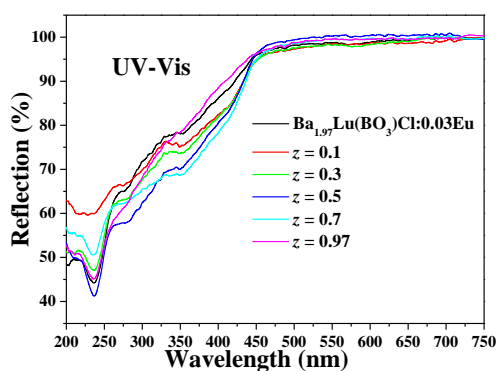


Figure S4 UV-vis diffuse reflectance spectra of $\text{Ba}_{1.97}\text{Lu}(\text{BO}_3)_2\text{Cl}:0.03\text{Eu}$ and $\text{Ba}_2(\text{Lu}_{0.97-z}\text{Tb}_z)(\text{BO}_3)_2\text{Cl}:0.03\text{Eu}$ phosphors with different Tb content (z values).

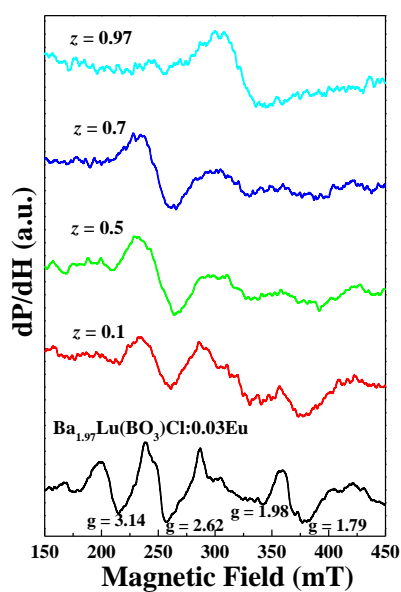


Figure S5. ESR spectra of $\text{Ba}_{1.97}\text{Lu}(\text{BO}_3)_2\text{Cl}:0.03\text{Eu}$ and $\text{Ba}_2(\text{Lu}_{0.97-z}\text{Tb}_z)(\text{BO}_3)_2\text{Cl}:\text{Eu}$ phosphors with different Tb content (z values).

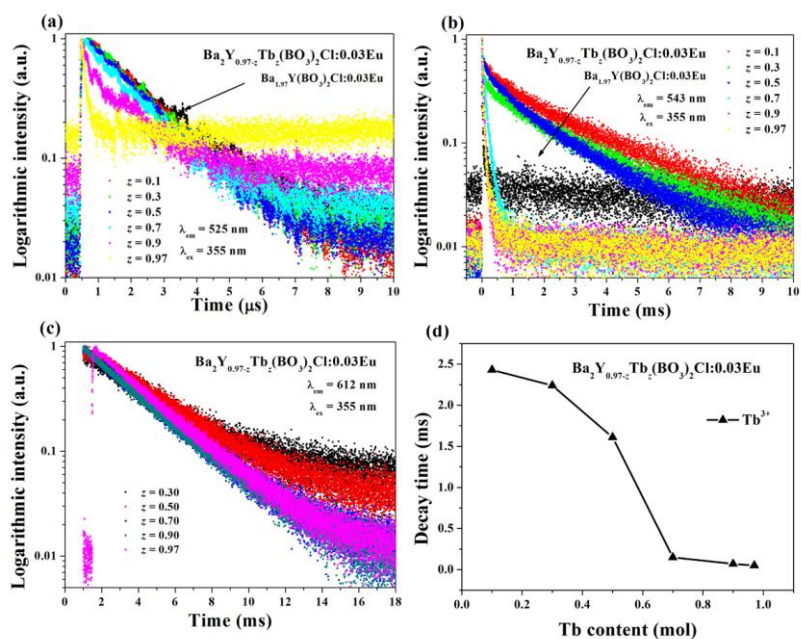


Figure S6 The decay curves of Eu²⁺ (4f-5d) (a), Tb³⁺ (⁵D₄-⁷F₅) (b) and Eu³⁺ (⁵D₀-⁷F₂) (c) transitions for Ba₂(Y_{0.97-z}Tb_z)(BO₃)₂Cl:0.03Eu phosphors with different Tb content (*z* values), and the variation of the lifetimes of Eu²⁺, Tb³⁺ and Eu³⁺ as a function of Tb content is also given (d).

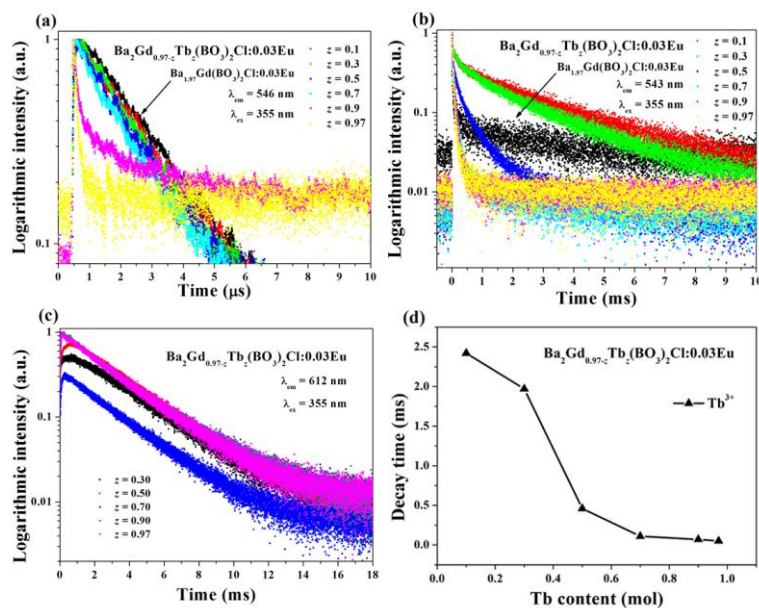


Figure S7 The decay curves of Eu²⁺ (4f-5d) (a), Tb³⁺ (⁵D₄-⁷F₅) (b) and Eu³⁺ (⁵D₀-⁷F₂) (c) transitions for Ba₂(Gd_{0.97-z}Tb_z)(BO₃)₂Cl:0.03Eu phosphors with different Tb content (*z* values), and the variation of the lifetimes of Eu²⁺, Tb³⁺ and Eu³⁺ as a function of Tb content is also given (d).