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A novel white-light emitting BaBi₂Nb₂O₉: Li⁺/Tm³⁺/Er³⁺/Yb³⁺ upconversion phosphor

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ABSTRACT

BaBi₂Nb₂O₉:Li⁺/Tm³⁺/Er³⁺/Yb³⁺ phosphors were successfully synthesized by the high-temperature solid-state method and up-conversion white-light emission has been achieved by tuning of the Tm³⁺ and Li⁺ contents. X-ray diffraction and room temperature photoluminescence were used, respectively, to investigate the structural and optical properties of the luminescent systems. Decay dynamics of ⁴F_{9/2} levels in BBN:Tm³⁺/Er³⁺/Yb³⁺ and BBN:Er³⁺/Yb³⁺ phosphors have been analyzed to study the energy-transfer mechanism between Er³⁺ and Tm³⁺ ions. The introduction of Li⁺ ions into the BBN:0.5%Tm³⁺0.05%Er³⁺8%Yb³⁺ has induced an adjustment of tristimulus values shifting the chromaticity color coordinates of the phosphor towards to the ideal white region ($x = 0.31$ and $y = 0.34$). Furthermore, the high color purity white-light

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