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Effect of Tb³⁺ Concentration on Luminous Properties of

Y_{0.92-x}PO₄:0.08Ce, xTb Microparticles

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Abstract

Uniform Y_{0.92-x}PO₄:0.08Ce, xTb microparticles were fabricated by hydrothermal method, and their structural and luminous properties were characterized. SEM and TEM images confirmed the existence of clavate and prismatic microparticles, with a good lattice structure. XRD analysis showed a pure tetragonal phase of the samples. The growth mechanism and the function of sodium citrate (Na₃C₆H₅O₇·2H₂O, Na₃Cit) on the morphology and size of Y_{0.92-x}PO₄:0.08Ce, xTb microparticles were discussed. The photoluminescence (PL) spectra indicated that the Ce³⁺/Tb³⁺ co-doped YPO₄ exhibits a strong green illumination under the long-wave ultraviolet (UV) excitation. What's More, the PL spectra, decay time and quantum efficiency with different doped concentration of Tb³⁺ were discussed.

Key words: Ce³⁺/Tb³⁺ co-doped YPO₄; hydrothermal synthesis; phosphor; photoluminescence; quantum yield

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