

Effect of Annealing Temperature on Growth Particles of YAG: Ce⁺³ Phosphor and White Light Chromaticity Values

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Abstract. In the present work white-emitting Y₃Al₅O₁₂:xCe³ (x = 0.04) nanophosphor in the form of powder were synthesized by a microwave-induced combustion synthesis method (MW) using metal nitrates as precursors and urea as fuel. By covering blue light-emitting diodes (blue-LED, 445 nm) white light emission (WLED) was generated. The sintering temperature with fixed time (5 hours) for phosphor powder was optimized and found to be 1050 °C. The crystallinity structure, luminescent properties and chromaticity were characterized by X-ray diffraction (XRD), field emission-scanning electron microscope (FE-SEM), electroluminescence (EL) and standard CIE 1931 chromaticity diagram. The results show that the obtained YAG:Ce⁺³ phosphor sintered at 1050 °C has good crystallinity with pure phase, low agglomeration particles and strong yellow emission that offering daylight white LED with tuneable correlated color temperature (CCT) and a good colour rendering index (CRI) compared to those sintered at 950 °C, 850 °C and non-sintered phosphor powders.