Characteristics of Y3Al5O12:Ce phosphor powders prepared by spray pyrolysis from ethylenediaminetetraacetic acid solution

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Nanometer and submicron-sized YAG:Ce phosphor powders were prepared by spray pyrolysis from the spray solutions with ethylenediaminetetraacetic acid. The precursor powders with hollow and thin wall structure turned to the fine-sized YAG:Ce phosphor powders after post-treatment at high temperatures of 1400 and 1500 oC. The phosphor powders prepared from spray solution with appropriate molar ratio of EDTA and metal components as 0.9 had slightly aggregated morphology of the primary powders with nanometer size. The mean size of the phosphor powders post-treated at a temperature of 1500 oC was 0.72 nm. The the white LEDs formed from the YAG:Ce phosphor powders post-treated at 1400 and 1500 oC showed (0.2781, 0.2871) and (0.2731, 0.2795) on the CIE chromaticity diagram, and about 78.20 and 79.04 of Ra. the luminous efficiencies of the white LEDs formed from the YAG:Ce phosphor powders post-treated at 1400 and 1500 oC were 47.74 and 76.64 lm/W.