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White light color tuning ability of hybrid Dibenzoylmethane/YAG:Ce nanophosphor

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Abstract

In this study, we have considered the synthesis of a novel hybrid material consisting of cerium-doped yttrium aluminium garnet (YAG:Ce) nanophosphor surface decorated by UV/blue sensitizing Dibenzoylmethane (DBM) organic molecule. A comparative evaluation of synthesized hybrid material YAG:Ce/DBM nanophosphor and YAG:Ce nanophosphors was made using a combination of different analytical techniques like X-ray diffraction, Scanning electron microscopy, UV-Visible-Infrared absorption, Photoluminescence techniques etc. Due to the presence of organic ligand, the hybrid nanophosphor has extended excitation. We have monitored the emission spectra at excitation with 355 nm, 375 nm, 405 nm, and 465 nm. The synthesized luminescent hybrid material was characterized by various spectroscopic techniques and its photophysical properties were thoroughly investigated. The color perception of hybrid YAG:Ce/DBM nanophosphor is significantly modified due to the mixing of blue color in the green-yellow emission of YAG:Ce nanophosphor at different excitations which yield CIE coordinates (0.37, 0.59).

Keywords: Luminescence; White light diode; YAG:Ce Nanophosphor; Antenna effect.

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