

Opto-Electronics Review, 2015, volume 23, issue 4, pp. 239-251

Synthesis and characterization of YAG:Ce phosphors for white LEDs

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DOI: <https://doi.org/10.1515/oere-2015-0038>

Abstract:

Worldwide commercial interest in the production of cerium doped yttrium aluminium garnet (YAG:Ce) phosphors is reflected in the widespread use of white light emitting devices. Despite of the fact that YAG:Ce is considered a “cool phosphor” it is the most important in white LED technology. This article reviews the developed techniques for producing phosphors with superior photoluminescence efficiency, including solid-state reaction, sol-gel and (co)precipitation methods. Also, by co-doping with rare earth elements, a red/blue shift is reached in the spectrum. The characteristics of YAG:Ce phosphors are investigated because the properties of the phosphors are strongly influenced by the synthesis routes and the sintering temperature treatment. After the phase analysis, morphology and emission studies of the phosphors there may be seen the conditions when the transition from the amorphous phase to the crystalline phase appears, when luminescent properties are influenced by the crystalline form, purity, average size of the particles, co-doping and so on.