

$\text{Al}_{2-x}\text{Me}_x(\text{WO}_4)_3$, Me=Sc or In as new potential phosphors for white LED

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Abstract

$\text{Al}_{2-x}\text{Me}_x(\text{WO}_4)_3$, (Me=Sc, In) solid solutions are multifunctional materials in 3 main potential applications. Doped by Cr^{3+} they can be used as laser active media with a width range of emission between 700 - 1000 nm. They also possess near to zero thermal expansion and have application in specific ceramic devices. Due to their quasilayer structure and high mobility of Al^{3+} ions, they have application as ionic conductors, sensors, etc.

In the present study is proven one new potential application of these solid solutions – phosphors for LED. The samples were obtained by precipitation technique and by classical solid-state synthesis. The materials were doped with different concentration of rare earth elements. It has been shown that emission spectra of these solid solutions is in visible region – from blue to yellow, depending on the number of parameters such as: composition of solid solutions, particle's size, type of rare earth ion and its concentration. By varying these parameters, could be obtained phosphors with different area of emission in visible region. The results have been discussed and compared with other phosphors for LED applications.