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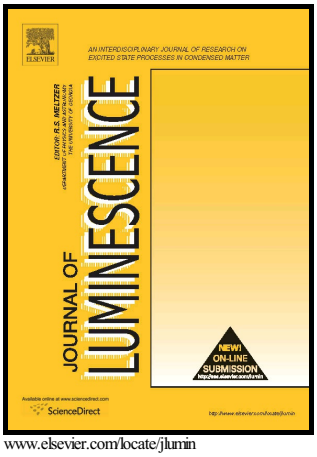

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Abstract

Oxygen impurities played a pivotal role by affecting the optical and structural properties of Nd:YF_3 phosphor, mainly when annealing procedure at high temperature is applied on it. In this work, it was demonstrated that luminescence decay, excitation and emission spectra of Nd:YF_3 phosphor were greatly influenced by quenching sites and crystal bulk and surface defects induced by the presence of oxygen impurities incorporated into its structure. The excitation spectra presented a broad band from 200 to 550 nm, related to oxygen impurities, showing an alternative pathway to identify its presence. To overcome this recurrent problem, fluorine excess was used to reduce the oxygen contamination, allowing improvement of both crystallinity and luminescence efficiency of the Nd:YF_3 phosphor. Despite this outstanding result, it was found that the fluorine content cannot be applied indiscriminately above of the stoichiometric proportion and its optimum quantity in excess was found to be at around 20%.

Keywords: phosphors; fluoride; rare-earth; precipitation; luminescence; impurities.