

Role of yttrium in thermoluminescence of LYSO:Ce crystals

Thursday 21 September 2017 10:31 (1 minute)

This paper aims at an improved understanding of thermoluminescence of $(\text{Lu}_{1-x}\text{Y}_x)_2\text{SiO}_5\text{:Ce}$ ($x=0$ at.%, 9 at.%, 26 at.%, 45 at.%, 66 at.%, 88 at.% and 100 at.%). Wavelength-resolved thermally stimulated luminescence (TSL) spectra and vacuum ultraviolet excitation spectra as well as transmittance spectra of $(\text{Lu}_{1-x}\text{Y}_x)_2\text{SiO}_5\text{:Ce}$ were investigated as a function of yttrium (shortened as Y) content in it. Obtained thermal depth of electron traps E_t indicates that: with the increase of Y content, E_t corresponding to the higher temperature peak (~ 336 K) increases, while E_t corresponding to the lower temperature peak (~ 100 K) presents a slight decrease and then increase trend. Besides, it was found that: with the increase of Y content, band gap presents an obvious increase trend. The kinetic process and recombination mechanism of de-trapped electrons are discussed.

Has accepted

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Session Classification: Poster Session 3

Track Classification: P5_characterization