



Spectroscopic properties of Sm^{3+} in $\text{KZnLa}(\text{PO}_4)_2$ in IR-VUV region.

Autorzy

Piotr Solarz

Marcin Sobczyk

Rok wydania

2012

Czasopismo

Optical Materials

Numer woluminu

34

Strony

1826-1832

DOI

10.1016/j.optmat.2012.05.011

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

The $\text{KZnLa}_{100\%-x}\text{Sm}_x(\text{PO}_4)_2$ ($x = 0.1, 1, 5, 10$ at.%) compounds have been synthesized by a conventional solid-state method. The powder pattern of sample was indexed on the basis of a monoclinic cell, space group P_121/A , with the lattice parameters: $a = 6.839$, $b = 7.703$, $c = 6.511$ Å, $z = 4$ and $V = 254.3$ Å³. The emission spectra recorded at low temperature are composed of transitions from the $^4\text{G}_{5/2}$ multiplet to the $^6\text{H}_{5/2}$ (17 566, 17 656, 17 858 cm⁻¹), $^6\text{H}_{7/2}$ (16 472, 16 540, 16 723, 16 770 cm⁻¹), $^6\text{H}_{9/2}$ (15 281, 15 320, 15 406, 15 531, 15 569 cm⁻¹) and $^6\text{H}_{11/2}$ (13 961, 13 995, 14 045, 14 114, 14 223, 14 259 cm⁻¹). The spectroscopic properties were investigated in the range IR–VUV. It was found that the Sm^{3+} ions occupy position with one point symmetry site. The decay curves were pure exponential for 0.1–1 at.% of samarium and become non-exponential for higher Sm^{3+} concentrations. The Inokuti–Hirayama energy transfer process fit returns $R_0 = 10.96$ Å, $C_{da} = 4.04 \times 10^{-52}$ m⁶ s⁻¹ for $S = 6$. The electron–phonon coupling parameter α was found to be in the range 554–608 cm⁻¹ for lines centred at 17 858, 16 770, 16 723 and 15 569 cm⁻¹.

Słowa kluczowe

Samarium, luminescence, VUV, Electron–phonon coupling, Energy transfer, Inokuti–Hirayama

Adres publiczny

<https://doi.org/10.1016/j.optmat.2012.05.011>

Strona internetowa wydawcy

<http://www.elsevier.com>