

Nanooptics and photonics

Size and concentration effect on the energy transfer and near infrared emission in $\text{GdVO}_4:\text{Bi}^{3+}$, Ln^{3+} ($\text{Ln}=\text{Nd}^{3+}$ and Yb^{3+}) nanophosphors

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The present studies focus on the impact of a nanocrystals size and a concentration of dopant ions on luminescence properties of GdVO_4 co-doped with Bi^{3+} ions and rare earth ions (Nd^{3+} , Yb^{3+}), especially on an energy transfer between the dopants. We showed in our previous work an impact of the nanocrystals grain size and the concentration of dopant ions on the luminescence properties of GdVO_4 co-doped with Bi^{3+} and Eu^{3+} ions [1]. In this study we investigate the impact of the size effect on the energy transfer in $\text{GdVO}_4:\text{Bi}^{3+}$, Nd^{3+} and $\text{GdVO}_4:\text{Bi}^{3+}$, Yb^{3+} nanophosphors. In result of the energy transfer, a near infrared emission both from the Nd^{3+} and Yb^{3+} ions was recorded due to so-called downconversion process (conversion of 1 near-UV photon into 2 infrared photons) [2,3].

1. *Lenczewska K., Gerasymchuk Y., Vu N., Liem N. Q., Boulon G., Hreniak D.* The size effect on the energy transfer in Bi^{3+} - Eu^{3+} co-doped GdVO_4 nanocrystals // *J. Mater. Chem. C*.-2017.-**5**.-P. 3014-3023.
2. *Lenczewska K., Stefanski M., Hreniak D.* Synthesis, structure and NIR luminescence properties of Yb^{3+} and Bi^{3+} -activated vanadate GdVO_4 // *J. Rare Earths*.-2016.-**34**, N 8.-P. 837-842.
3. *Lenczewska K., Tomala R., Hreniak D.* Near-UV sensitized NIR emission in Nd^{3+} and Bi^{3+} co-doped GdVO_4 phosphors // *Opt. Mater.*-2017.-DOI: 10.1016/j.optmat.2017.04.015.