

Nanocomposites and nanomaterials

Photoluminescent properties of complex metal oxide nanopowders for gas sensing

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In this work carried out research the features of photoluminescence of the complex metal oxide nanopowders (ZnTiO_3 , ZnGa_2O_4 , $\text{Zn}_2\text{SiO}_4\text{:Mn}$) in vacuum and various gaseous ambient. The nanopowders were obtained using pulsed laser reactive technology [1]. The influence of gas environment (air, O_2 , N_2 , H_2 , CO , CO_2) on the photoluminescent intensity was investigated. Photoluminescent study was carried out at room temperature, excitation was performed using 375 nm UV LED. A change of gas pressure leads to a rather significant change in the intensity of the photoluminescence spectrum and deformation its (fig.1). The most significant changes in photoluminescent spectrum was observed for ZnTiO_3 nanopowders. This obviously is the result of a redistribution of existing centers of luminescence and the appearance of new adsorption centers of luminescence on the surface of nanopowders. The investigated nanopowders can be effectively used as sensing materials for the construction of the multi-component photoluminescent sensing matrix [2].

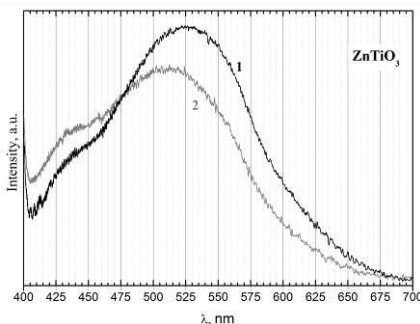


Fig.1. Photoluminescent spectrum of ZnTiO_3 nanopowders in air (1) and vacuum (2).

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2. *Zhyrovetsky V.M., Popovych D.I., Savka S.S., Serednytski A.S. Nanopowder Metal Oxide for Photoluminescent Gas Sensing // Nanoscale Research Letters. -2017.-12. -P.132(5pp).*