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Photoluminescence properties of PVP/Eu(TTA)2(Phen3PO)2NO3 nanocomposites

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Abstract

Thin films (1–10μm thickness) of nanocomposites (NC) based on organic coordinated compound (OCC) Eu(TTA)2(Phen3PO)2NO3 (where TTA is thenoyltrifluoroacetonate (C8H5F3O2S), Phen – 1,10-phenanthroline (C12H8N2)) and polymer – polyvinylpyrrolidone ((C6H9NO)n) (PVP)) were obtained by chemical methods. NC were characterized by measurements of optical transmission, and photoluminescence (PL) at different concentrations of Eu(TTA)2(Phen3PO)2NO3 in NC. Using the optical transmission spectra, the characteristic parameters of NC such as threshold of absorbance and the position of the absorption edge on the concentration of the OOC in NC, etc., were determined. The light displacement of threshold absorption to infrared region was observed with increasing of concentration of coordinated material in NC. It was established that the excitation spectrum at which the photoluminescence in NC take place cover the range of wavelength from 200 to 410nm. The PL of nanocomposites was detected as specific for internal transitions 4f–4f of the Eu3+ ion 5D0→7Fi (i=0,1,2,3 and 4) centred at 537, 580, 615, 650 and 702nm, respectively at T=300K. The dominant PL was observed at 615nm and its halfwidth is less than 10nm. The intensity of photoluminescence at 615nm of NC is 2 times higher than the value of intensity of PL of Eu(TTA)2(Phen3PO)2NO3 powders at equal conditions of excitation.