2012, Volume 7, Number 7, pag. 735-736

Optical and Photoluminescence Properties of Nanocomposites Polymer-Compounds Coordinated with Eu^{+3} Ions

Verlan V. I., Iovu M. S., Culeac I. P., Turta C. I., Zubareva V. E.

https://doi.org/10.1166/jno.2012.1418

Abstract

Thin films (1–3 μm thickness) of nanocomposites (NCs) based on organic compounds with Eu3+ ions (Eu(TTA)3H2O, Eu(TTA)3 Phen, Eu(DBM)3 Phen and Eu(TTA)2(Ph3PO)2NO3 and polymer polyvinylpyrrolidone (PVP) or copolymer styrene-butylmethacrilate in ratio of 1:1 (SBMA) were obtained by chemical methods and with different molar ratios into organic polymer matrix. NCs have been characterized by measurements of optical transmission and photoluminescence (PL) spectra. The PL of nanocomposites in all type of compounds with Eu3+ ions detected the same spectra specific for internal transitions 4f → 4f of the Eu3+ ion 5D0 → 7 F i (i = 0, 1, 2, 3 and 4) centered at 580, 590, 615, 650, and 705 nm, respectively at T = 300 K. The dominant PL attributed to the transition 5 D 0 → 7 F 2 is at 612–615 nm and the halfwidth is less than 10 nm. It was found that with the increase of the coordination number and reduction of the symmetry of Eu3+ ions, the intensity of the photoluminescence increases. In nanocomposites, the effect of energy transfer from the polymer matrix towards the coordinated compound with subsequent transfer to Eu3+ ion was identified.