*MAREA P7* **PL PROPERTIES OF THE COORDINATION COMPOUND $Eu(DBM)_3(PH_3PO)H_2O$**

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A new coordination compound *Eu(DBM)$_3$(Ph$_3$PO)H$_2$O* was synthesized and charcaterized by photoluminescent (PL) spectroscopy (*DBM* stands for dibenzoylmethane and *Ph$_3$PO* for triphenylphosphine oxide). PL spectra have been investigated at room temperature under excitation of light beam 337 and 405 nm. PL relaxation characteristics were registered under excitation of nitrogen pulsed laser, with the time resolution of 50 μs. The PL quantum yield (QY) was measured by the integration sphere.

PL emission spectra of *Eu(DBM)$_3$(Ph$_3$PO)H$_2$O* powder and solution samples show a number of emission bands associated with the $^5D_0 \rightarrow {}^7F_j$ ($j$ = 0,1,2,3,4) transitions of $Eu^{3+}$ ion under the excitation of UV light [1,2]. The emission bands can be observed at 580, 590, 612 - 615, 651, and 700 nm. The dominant PL emission band is registered around ~ 612 nm. These PL bands can be attributed to internal *4f* <-> *4f* transitions $^5D_0 \rightarrow {}^7F_j$. These transitions can be interpreted from the viewpoint of the surrounding environment of $Eu^{3+}$ ion and removal of internal interdiction for transitions in electronic shields of $Eu^{3+}$ ion as a result of ligands interactions [1-3]. Deconvolution of the PL band at 612 nm shows that the FWHM of the main emission band at 611.2 nm is less than 3 nm. The integrated intensity ratio has been calculated both for powder samples as well as for solution samples and represents $I_2(^5D_0 \rightarrow {}^7F_2)/I_1(^5D_0 \rightarrow {}^7F_1)$ = 6.9. The splitting of the $^5D_0 \rightarrow {}^7F_1$ transition appears to have three components with almost the same intensity. This feature suggests that the *Eu(DBM)$_3$(Ph$_3$PO)H$_2$O* compound belongs to low triclinic symmetry crystal system [2].

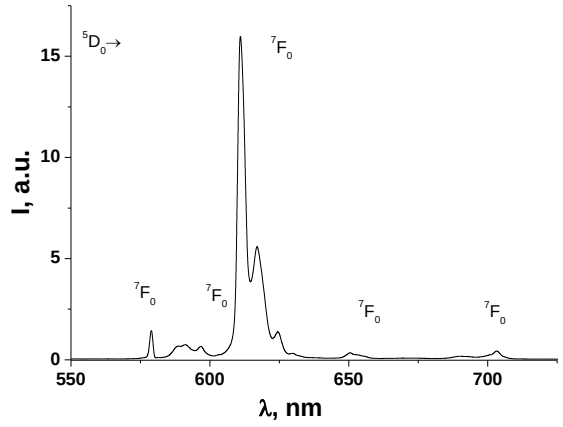


Fig. 1. PL spectrum of *Eu(DBM)$_3$(Ph$_3$PO)H$_2$O* under excitation 405 nm at room temperature.

The temporal characteristics of PL relaxation were registered under excitation of nitrogen pulsed laser, with the time resolution of 50 μs. The PL decay profile registered at 612 nm exhibits a single exponential behavior with the characteristic time 0.37 ms.

The experimental results of PL and its kinetics were analyzed using the Judd-Ofelt method from which PL parameters were obtained: the quantum yield, life time, and the oscillator force of the electrical dipole, etc. The new compound *Eu(DBM)$_3$(Ph$_3$PO)H$_2$O* is an attractive candidate for various applications in biology, medicine, and optoelectronics.

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[1]. K. Binnemans, Review: Interpretation of europium(III) spectra, Coordination Chemistry Reviews 295 (2015) 1–45.
[2]. Basics of Lanthanide Photophysics, Jean-Claude G. Bunzli and Svetlana V. Eliseeva, in: Lanthanide Luminescence, Photophysical, Analytical and Biological Aspects, Volume Editors: Pekka Hanninen, Harri Harma. Springer-Verlag, Berlin, Heidelberg, 2011.
[3]. Bordian Olga, Verlan Victor,Culeac Ion et all. Technology and optical characterization of luminophore coordination compound Eu(o-MBA)3Phen and nanocomposite Eu(o-MBA)3Phen/PEPC. The 8th edition of the International Conference "Advanced Topics in Optoelectronics, Microelectronics and Nanotechnologies". ATOM-N 2016, 25 - 28 august 2016, Constanta, Romania. PS1-14. Paper No.: OMN100-40.