

Nanocomposites and nanomaterials

Synthesis and luminescent properties of polymer Tb (III) complexes with β -diketone

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Lanthanide ions and their complexes are excellent chromophores because of their excellent luminescent properties such as narrow emission bands and long radiative lifetimes. These special characters render their usage for extensive applications such as light-emitting diodes, optical communications, luminescent probes for analyses [1-4]. Luminescent lanthanide complexes are known as the emitters with the highest color purity, owing to their photoluminescence peaks attributed to characteristic f-f transitions from lanthanide ions.

Polymers of Tb and Eu complexes with 2-methyl-5-phenylpenten-1-3,5-dione were synthesized by free-radical polymerization in DMF at the first time.

As a result, the type of coordination was determined and the structure of coordination polyhedra was assumed. It is notable, that the structure and symmetry of coordination polyhedra were found to depend only on ligand type and remain unchanged when going from monomer to metalopolymer

The method of dynamic light scattering and the results of electronic microscopy showed that the obtained polymer systems are nanoscale.

It was established that all complexes are able to show effective luminescence.

1. Lu Yu, Gong Zhong, Gao Hong, Zhou Shu, Lu Kui-lin, Wang Ying, A Du, Du Hao-ran, Zhang Li, Zhang Fu. Synthesis and luminescent properties of ternary complex Eu(UVA)₃Phen in nano-TiO₂. //Optoelectronics Letters. - 2015. - **11**, No.1. - P. 0041-0044
2. Bin Chen, Guian Wen, Jiajie Wu, Jiachun Feng. Preparation of Lanthanide-Polymer Composite Material via Click Chemistry. //Macromol. Rapid Commun. - 2015.- **36**. - p. 1836-1840.
3. Fangyi Cao, Tongcun Huang, Yifei Wang, Fei Liu, Lumin Chen, Jun Ling, Jihong Sun. Novel lanthanide-polymer complexes for dye-free dual modal probes for MRI and fluorescence imaging. // Polym. Chem.- 2015.- **6**. - p. 7949-7957
4. Rui-Rui Su, Peng Tao, Yi Han, Cheng-Hui Zeng, Sheng-Liang Zhong. Lanthanide Coordination Polymer Nanosheet Aggregates: Solvothermal Synthesis and Downconversion Luminescence. // J. of Nanomater. - 2016. - **2016**. - p. 1-5.