

Regulation of excitation and luminescence efficiencies of europium and terbium benzoates and 8-oxyquinolates by modification of ligands.

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The opportunities of optimisation of luminance of the lanthanide compounds by modification of ligands are discussed. Variations of the excitation and luminescence efficiencies at introduction of nitro- (NO_2), sulfo- (SO_3^-), hydroxy- (OH), amino- (NH_2), and phenylamino- (NHC_6H_5) groups in the aromatic ligands were studied. Investigation of luminescence and luminescence excitation spectra of europium and terbium compounds with 10 derivatives of benzoic acid, 2-furancarboxylic acid and their adducts with 1,10-phenanthroline and 2,2'-bipyridine was undertaken. Study of the spectra of lanthanide 8-oxyquinolates was carried out also. Luminescence efficiencies were measured at 77 and 300 K. Paths of the energy transfer from the ligands to Ln^{3+} ion were examined. Influence of radicals on the energies of the ligand triplet states and on the energies of the ligand-metal charge transfer states (LM CTS) of europium compounds was analysed. High luminescence efficiencies of europium and terbium benzoates, and terbium anthranylates and salicylates were obtained. Effect of increasing the luminescence efficiencies of europium salicylates and 8-oxyquinolates at introduction of acceptor nitro- and sulfo-groups in the ligand was revealed. Channel of dissipation of the excitation energy through the ligand $\pi^* \rightarrow n$ transition of europium and terbium nitro- and dinitrobenzoates was found. Influence of relative positions of the lowest triplet levels of two non-equivalent ligands of compound on the energy transfer to Eu^{3+} and Tb^{3+} ions was considered.

Słowa kluczowe

Eu^{3+} , Tb^{3+} , Benzoates, Anthranylates, Salicylates, 8-Oxyquinolates, Luminescence excitation spectra, Luminescence efficiency, Ligand-metal charge transfer

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