

## Luminescence efficiency of aromatic carboxylates of europium and terbium when methylene bridges and nitro groups are present in the ligands.

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### Streszczenie

We discuss the possibility of optimizing the brightness of luminescence for phenylcarboxylates, naphthylcarboxylates, and indolylcarboxylates of europium and terbium and their adducts with 1,10-phenanthroline and 2,2'-bipyridine by modifying the ligands. We have studied the efficiency of luminescence and luminescence excitation. We consider the effect of blocking energy transfer from the ligands to the  $\text{Eu}^{3+}$  and  $\text{Tb}^{3+}$  ions by methylene ( $-\text{CH}_2-$ ) bridges dividing the  $\pi$ -electron system of the ligands into two parts and by the electronacceptor nitro group ( $-\text{NO}_2$ ). We have analyzed the pathways for transfer and degradation of the excitation energy at 77 K and 300 K. From the phosphorescence spectra of gadolinium salts, we have determined the energies of the lowest excited triplet states of the ligands. We consider the effect of the relative positions of the triplet levels of the ligands and the excited levels of the  $\text{Eu}^{3+}$  and  $\text{Tb}^{3+}$  ions on the luminescence efficiency. We found channels for dissipation of the excitation energy via the  $\pi\pi^*$  and  $n\pi^*$  states of the aromatic system of the carboxylate and the  $\text{NO}_2$  group.

### Słowa kluczowe

$\text{Eu}^{3+}$  ion,  $\text{Tb}^{3+}$  ion, luminescence and luminescence excitation spectra, luminescence efficiency, aromatic carboxylates.

### Strona internetowa wydawcy

<http://link.springer.com>