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Structure and optical spectroscopy of Yb(III) complex with o-phenylenedioxydiacetic acid.

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Streszczenie

The $Na[Ln(C_{10}H_8O_6)_2(H_2O)_2]\cdot 2H_2O$ (where Ln = Yb(III), Lu(III)) monocrystals have been obtained and the crystal structure has been solved. The Yb(III) complex forms a structure with the space group $P2_1/c$ and a = 15.528(1) Å, b = 21.098(1) Å, c = 7.766(1) Å, and β = 92.58(2)°. Optical properties of this complex have been investigated using the methods of absorption (293 K, 4 K), luminescence (77 K) and IR spectroscopy. The ligand-field splitting in the relevant states can be determined from low-temperature high-resolution absorption and luminescence. The split of $^2F_{5/2}$ and $^2F_{7/2}$ has been determined as 540 and 592 cm^{-1}, respectively. The f–f luminescence has not been induced by exciting into the $^1\pi$–$^1\pi^*$ absorption band of the ligand but only by exciting into Yb(III) level with a very short $^2F_{5/2}$ level decay time equal to 0.32 and 0.69 μs at 293 and 77 K, respectively.

Słowa kluczowe

crystal structure, Yb(III, Absorption, luminescence, O-phenylenedioxydiacetic acid

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