Ligand chirality effect on the structure and its spectroscopic consequences in $[Ln_2(Ala)_4(H_2O)_8](ClO_4)6$ crystals.

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Streszczenie

Single crystals of $[Ln_2(Ala)_4(H_2O)_8](Cl0_4)_6$ (where Ln = Eu, Nd and Ala = l-, dl-alanine) were grown from aqueous solutions and the neodymium complex has been studied by single-crystal X-ray diffraction. The space groups are triclinic *P*1 and monoclinic *C2/c* for l- and dl-alanine, respectively, and *Z* = 1 and 4. The crystal structures consist of non-centrosymmetric and centrosymmetric dimer units in the complexes with l and dl ligand forms. In other words, in the latter two the lanthanide ions in the dimer are equivalent but in the former they are not. Thus the chirality of the ligand is responsible for the subtle differences in the structure. Each neodymium ion is coordinated by four carboxylate oxygens of the amino acids and four water molecules. The coordination polyhedra around the neodymium ions are distorted square antiprisms. Well-resolved absorption luminescence measurements down to 5 K are reported. The probabilities of electronic transitions were investigated. An attempt has been made to elucidate the dimer (centrosymmetric and noncentrosymmetric) structure reflection in the splitting pattern of the optical lines. The temperature effect on the spectra was studied and analysed in terms of the cooperative interaction of coupled ions. It is the first, to our knowledge, X-ray evidence of the ligand chirality effect on the dimer structure of lanthanide compounds.

Adres publiczny

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