Novel polynuclear compound of europium with *N*-phosphonomethylglycine; spectroscopy and structure.

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Streszczenie

Phosphonic acid analogues of amino acids display interesting biological activities, the possible applications of which range from medicine to agriculture. Aminophosphonates are found in tissues as free compounds but their most frequent forms of occurrence include complex structures, such as lipids, proteins and polysaccharides [1]. For the first time, to our knowledge, lanthanide compounds with *N*-phosphonomethylglycine were obtained and analyzed by X-ray diffraction methods. The compound is polynuclear, with unexpected architecture, and crystallizes in the $P2_1/c$ space group (cell parameters a=17.788(4) Å, b=10.706(2) Å, c=18.560(4) Å, β=113.37(3)°, Z=4). Two nonequivalent metal sites exist in the structure. Both carboxyl and phosphonate groups of the ligand are involved in metal ion coordination forming two centrosymmetric dimers: one by the carboxyl (simple and chelating) bridges, and one by phosphonate groups. Moreover, in the latter dimer, coordination of metal ion is completed by three water molecules and one oxygen of perchlorate ion, thus the coordination number is 8. In the former dimer, additional water molecules are bonded and the coordination number of Eu becomes 9, with a little different distortion. The M–M distances are 4.012 and 5.940 Å for carboxyl and phosphonic dimers, respectively. The compound was characterized by IR and electron spectroscopy methods. Absorption, excitation and emission spectra were measured down to 77 K. Electron transition probabilities and splitting of levels were analyzed and compared to the structural data. Assignment of the vibronic components in electronic transitions, which obey the selection rule ΔJ=0.2 was made on the basis of IR spectra.

Słowa kluczowe

Spectroscopy, Luminescence, Absorption, Eu(III), N-Phosphonomethylglycine