First examples of carbacylamidophosphate pentanuclear hydroxo-complexes : synthesis, structure, luminescence and magnetic properties.

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The first representatives of pentanuclear carbacylamidophosphate complexes of composition $Ln_5L_6(\mu\text{-}L)_4(\mu_3\text{-}OH)_4(\mu_4\text{-}OH)$ (Ln^{III}=Eu (1), Gd (2), Tb (3), L^-=dimethylbenzoylamidophosphate ion $[C_6H_5C(O)\text{-}N\text{-}P(O)(OCH_3)_2]^-$) were obtained. The single crystal X-ray analysis revealed that polynuclear core of**1**contains five europium ions, connected by the μ_3- and μ_4-hydroxo groups and carbacylamidophosphate ligands. Compounds**1**-**3**were found to be isostructural. Temperature dependencies of magnetic susceptibility (χ_M) of the compounds**1**and**2**could be explained by spin-orbit coupling of Eu^{III}ions or antiferromagnetic exchange interactions of four Gd^{III}ions located in the base of Gd_5pyramid, respectively. In the case of 3, the value of$\chi_M$increases with temperature decreasing from 300K to 50K, and then falls down during temperature decrease till 2K. Such behavior can be explained by comparable contribution of spin-orbit coupling and exchange interactions. No signs of single-molecule magnet behavior for**3**were found at 2K. Phosphorescence, emission and excitation spectra at 298K and 77K for the complexes were measured, as well as luminescence decay times were determined. The compounds**1**and**3**showed intense luminescence with decay time at 298K equal to 0.66 and 1.44ms respectively. Intrinsic quantum yield for**1**determined from its emission spectrum was found to be 25%.

Słowa kluczowe

lanthanides, carbacylamidophosphates, Polynuclear complexes, luminescence, magnetic properties

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