Monomeric, dimeric and polymeric lanthanide(III) complexes of a hexaazamacrocyclic imine derived from 2,6-diformylpyridine and ethylenediamine.

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Streszczenie

A series of mononuclear Ln(III) complexes of a hexaaza Schiff base has been obtained in a template condensation reaction of 2,6-diformylpyridine, ethylenediamine and the appropriate lanthanide nitrate salt. The X-ray crystal structures of the Ce(III), Pr(III), Eu(III) and Y(III) complexes, recrystallized from water or methanol, have been determined. The reaction of the obtained complexes with hydroxide anions results in formation of dinuclear hydroxo-bridged species. In particular, the reaction of sodium hydroxide with a mixture of the starting Eu(III) and Y(III) mononuclear complexes results in the formation of two homodinuclear hydroxo derivatives as well as a mixed Y(III)–Eu(III) hydroxo dimer, as indicated by NMR spectroscopy. The formation of dinuclear hydroxo species was confirmed by the X-ray crystal structure of the $[Y_2L_2(\mu\text{-}OH)_2(H_2O)_2](NO_3)_4\cdot 4H_2O$ complex. On the other hand, an attempt to crystallize a hydroxo derivative of the La(III) macrocyclic complex resulted in the fixation of atmospheric carbon dioxide and formation of a carbonate derivative. The X-ray crystal structure of this compound reveals a 1-D coordination polymer, where the macrocyclic $[LaL]^{3+}$ units are linked by bridging carbonate anions.

Słowa kluczowe

macrocyclic complexes, lanthanides, coordination polymers, carbonate, crystal structure

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