Spectroscopic and magnetic properties of diethyl (pyridin-4-ylmethyl)phosphate (4-pmOpe) ligand with perchlorate transition metal salts. Crystal structure of [Cu(4-pmOpe)$_2$(ClO$_4$)$_2$].

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Streszczenie

The perchlorate M(II) (M = Cu, Ni, Co) complexes with the diethyl (pyridin-4-ylmethyl)phosphate (4-pmOpe) ligand of the composition [M(4-pmOpe)$_2$ (H$_2$O)$_2$](ClO$_4$)$_2$ (M = Ni, Co) and [Cu(4-pmOpe)$_2$(ClO$_4$)$_2$] were prepared and studied. The ligand contains two donor atoms, i.e. pyridine nitrogen and phosphoryl oxygen atoms. In particular, the crystal structure of [Cu(4-pmOpe)$_2$(ClO$_4$)$_2$] was determined by the X-ray method. Its structure consists of a one-dimensional polymeric chain in which copper(II) ions are N,O-bridged by two 4-pmOpe organic ligands in a *trans* arrangement. Two perchlorate ions occupy the fifth and the sixth coordination sites. The Cu⋯Cu distance is 9.180 Å. The crystal packing is determined by the weak intermolecular C–H⋯O hydrogen contacts. The coordination compounds were identified and characterized by elemental analysis, spectroscopic and magnetic studies. Spectroscopic and magnetic results of the copper(II) compound are presented in the light of the crystal structure. The magnetic data indicate very weak intra- and interchain magnetic exchange interactions (J' = −0.43 and zJ' = 0.29 cm^{-1}, respectively). The spectroscopic and magnetic properties of the Co(II) and Ni(II) complexes indicate octahedral and polymeric structure of both compounds in which 4-pmOpe ligand also acts as N,O-bridge between metal ions.

Słowa kluczowe

Transition metal complexes, N-Heterocyclic phosphate, Crystal structure, Spectroscopy, Magnetism

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