Coordination properties of diethyl (pyridin-2-ylmethyl)phosphate (2-pmOpe) ligand with perchlorate transition metal salts: crystal structure of $[Co(2\text{-}pmOpe)_2(H_2O)_2](ClO_4)_2$.

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Streszczenie

A new series of the perchlorate transition-metal complexes containing the diethyl (pyridin-2-ylmethyl)phosphate (2-pmOpe) ligand of general formula $[M(2\text{-}pmOpe)_2(H_2O)_2](ClO_4)_2$ (M = Cu, Ni, Co) were prepared. The complexes were identified and characterized by elemental analysis, spectroscopic and magnetic studies. The ligand containing two donor atoms, heterocyclic pyridyl nitrogen and phosphoryl oxygen atoms, binds in a bidentate chelate manner in all complexes. The crystal structure for $[Co(2\text{-}pmOpe)_2(H_2O)_2](ClO_4)_2$ was determined by the X-ray diffraction method. The geometry of CoN_2O_4 chromophore shows an elongated octahedron, resulting from the bidentate N,O-bonded two chelate ligands and two coordinated water molecules. Every mononuclear unit is linked to other ones via two extended CoOH⋯OClO⋯HOCo bridges, forming one-dimensional (1D) hydrogen bond system. Additionally, weak CH⋯O and π–π interactions link the chains resulting in a three-dimensional (3D) (supramolecular architecture) polymeric network arrangement. Spectroscopic and magnetic results are presented in the light of the crystal structure. Magnetic data of mononuclear Co(II) compound indicate an influence of a large zero-field splitting (ZFS) and very weak intermolecular exchange interaction ($zJ' = -0.48\ cm^{-1}$) on magnetic behavior. The spectroscopic and magnetic properties of Cu(II) and Ni(II) complexes indicate octahedral and mononuclear structure of both compound

Słowa kluczowe

Transition-metal complexes, N, O-donor ligand, Crystal structure, Spectroscopy, Magnetism

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