# Synthesis, spectroscopy and magnetic properties of transition-metal complexes with diethyl [(η-butylamino-*N*)(pyridin-2-yl)]methylphosphonate (2-pmape):structure of [Co(2-pmape)$_2$](ClO$_4$)$_2$ complex.

Autorzy

Bogumiła Żurowska

Katarzyna Ślepokura

Urszula Kalinowska-Lis

Bogdan Boduszek

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The compounds of general formula [ML$_2$](ClO$_4$)$_2$ [M = Cu(II), Ni(II), Co(II), Zn(II)]; L = diethyl [(*n*-butylamino-*N*)(pyridin-2-yl)]methylphosphonate (2-pmape) were prepared. The stoichiometry and stereochemistry of the complexes were confirmed by elemental analysis, infrared, electronic spectral, $^1$H NMR, $^{31}$P NMR studies and magnetic measurements in the temperature range 1.8–300 K. The molecular structure of cobalt(II) complex, i.e. [Co(2-pmape)$_2$](ClO$_4$)$_2$ was determined by the X-ray diffraction method. The complexes are six coordinate. The 2-pmape acts as *N*,*N*,*O*-chelate ligand. Metal ions are octahedrally surrounded by two pyridine nitrogens, two amine nitrogens and two oxygens of the phosphoryl groups from two chelating 2-pmape organic ligands. The results of the magnetic studies indicate weak intermolecular antiferromagnetic interaction between magnetic centers. The magnetic behavior of octahedral Co(II) complex is characteristic of cobalt(II) system with an important orbital contribution via spin–orbit coupling.

Słowa kluczowe

Aminophosphonate ligand, ransition-metal complexes, spectroscopy, magnetism

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