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Coordination properties of the diethyl 2-pyridylmethylphosphonate ligand (2-pmpe) with chloride transition-metal salts: X-ray crystal structure of $Cd_4(2\text{-pmpe})_4Cl_8$.

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Streszczenie

A new series of the chloride transition-metal complexes containing the ligand diethyl 2-pyridylmethylphosphonate (2-pmpe) of general formula $M(2\text{-pmpe})_2Cl_2$ (M = Ni, Co, Mn) and $M(2\text{-pmpe})Cl_2$ (M = Co, Zn,) were prepared. The complexes were identified and characterized by elemental analysis, spectroscopic and magnetic studies. For $Cd_4(2\text{-pmpe})_4Cl_8$ X-ray crystal structure was determined. The structure is based on a chloro-bridged tetranuclearcadmium quasi cubane cluster, in which each cadmium atom is chelated by one N,O-chelate 2-pmpe ligand and coordinated with four bridging chloride atoms. The ligand containing two donor atoms, heterocyclic pyridyl nitrogen and phosphoryl oxygen atoms binds in a didentate chelate manner in all complexes. Two compounds were obtained with cobalt chloride salt, exhibiting tetrahedral (1:1) and octahedral (1:2 metal to ligand molar ratio) arrangements of cobalt ions. The octahedral Ni(II), Co(II) and Mn(II) complexes are izostructural. Geometry of $Zn(2\text{-pmpe})Cl_2$ is consistent with a pseudotetrahedral environment of Zn(II) ion. The spectroscopic properties of Zn(II), and magnetic behavior of Ni(II), Co(II) and Mn(II) complexes indicate mononuclear structure of all compounds.

Słowa kluczowe

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

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