

Coordination properties of the diethyl 2-pyridylmethylphosphonate ligand (2-pmpe) with chloride transition-metal salts: X-ray crystal structure of $\text{Cd}_4(2\text{-pmpe})_4\text{Cl}_8$.

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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 $\text{M}(2\text{-pmpe})_2\text{Cl}_2$ ($\text{M} = \text{Ni}, \text{Co}, \text{Mn}$) and $\text{M}(2\text{-pmpe})\text{Cl}_2$ ($\text{M} = \text{Co}, \text{Zn}$) were prepared. The complexes were identified and characterized by elemental analysis, spectroscopic and magnetic studies. For $\text{Cd}_4(2\text{-pmpe})_4\text{Cl}_8$ 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 $\text{Ni}(\text{II})$, $\text{Co}(\text{II})$ and $\text{Mn}(\text{II})$ complexes are isostructural. Geometry of $\text{Zn}(2\text{-pmpe})\text{Cl}_2$ is consistent with a pseudotetrahedral environment of $\text{Zn}(\text{II})$ ion. The spectroscopic properties of $\text{Zn}(\text{II})$, and magnetic behavior of $\text{Ni}(\text{II})$, $\text{Co}(\text{II})$ and $\text{Mn}(\text{II})$ complexes indicate mononuclear structure of all compounds.

Słowa kluczowe

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

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