

Ferromagnetic exchange coupling in phosphonato-bridged dinuclear copper (II) compound with monoethyl (pyridyn-2-ylmethyl)phosphonate ligand (2-mpmpe): $\text{Cu}_2(2\text{-mpmpe})_2(\text{H}_2\text{O})_2(\text{NO}_3)_2$.

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The interaction of diethyl (pyridyn-2-ylmethyl)phosphonate (2-mpmpe) with $\text{Cu}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ leads to a partial hydrolysis of the starting ligand and formation of the compound of the formula $\text{Cu}_2(2\text{-mpmpe})_2(\text{H}_2\text{O})_2(\text{NO}_3)_2$, where 2-mpmpe = monoethyl (pyridyn-2-ylmethyl)phosphonate. The crystal and molecular structure of a copper(II) compound was determined by single X-ray diffraction method. Its structure consists of five-coordinated in distorted square planar geometry (CuNO_4 chromophore) copper(II) ions doubly bridged by OPO from phosphonate. The $\text{Cu}\cdots\text{Cu}$ distance is 4.69 Å. The crystal packing is determined by the interdimer hydrogen bond system, which leads to a three-dimensional (3D) H-bonds network. The compound was characterized by infrared, ligand field, EPR spectroscopy, and magnetic studies. The magnetic properties of the title compound investigated over the 1.8–300 K, revealed the occurrence of a weak ferromagnetic coupling through phosphonate bridge ($J = 1.86 \text{ cm}^{-1}$) and interdimer superexchange coupling through H-bond network ($zJ' = -0.17 \text{ cm}^{-1}$). Spectroscopic and magnetic properties are presented in the light of crystal structure.

Słowa kluczowe

Copper(II) compound, Phosphonato-bridge, Crystal structure, Spectroscopy, Magnetism

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