



2D-supramolecular layers built of antiferromagnetically coupled $[\text{Cu}(\text{x-O}_2\text{Nbz})_2(\text{denia})_1(\text{H}_2\text{O})_1]_n$ 1D-polymers with $\text{R}_2^2(10)$ and $\text{R}_2^2(12)$ supramolecular synthons.

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Polymeric complexes of composition $[\text{Cu}(\text{3,5-(O}_2\text{N)}_2\text{bz})_2(\text{di-denia})_1(\text{H}_2\text{O})_1]_n$ (1) ($\text{3,5-(O}_2\text{N)}_2\text{bz} = \text{3,5-dinitrobenzoate}$) and $[\text{Cu}(\text{x-O}_2\text{Nbz})_2(\text{di-denia})_1(\text{H}_2\text{O})_1]_x$ $x = 3$ (2), $x = 4$ (3) (denia = diethylnicotinamide, and $\text{x-O}_2\text{Nbz} = \text{3- or 4-nitrobenzoate}$) have been prepared, characterized by elemental analysis and studied by electronic, infrared and EPR spectra, as well as by magnetization measurements over the temperature range 1.8–300 K, and their structures have been solved. The basic structure unit of all complexes consists of Cu(II) atom monodentately coordinated by the pair of nitrobenzoato anions in trans-positions together with water and diethylnicotinamide molecules, forming nearly tetragonal basal plane of the coordination polyhedron. The axial position of tetragonal-pyramidal coordination polyhedron is occupied by diethylnicotinamide oxygen atom of neighbouring structural unit thus forming spiral polymeric molecule parallel to b-axis. The neighbouring polymeric molecules are stacked by their coordination polyhedron coplanar basal planes and 2-D supramolecular layers are formed by supramolecular synthons R22(10) and R22(12) including pairs of strong $\text{O-H}\cdots\text{O}$ hydrogen bonds between coordinated water molecules and uncoordinated carboxylate oxygen atoms. The shortest $\text{Cu}\cdots\text{Cu}$ interatomic distance of neighbouring copper atoms bridged by those synthons were found 4.606(2) Å for (1), 4.776(2) Å for complex (2) and 4.866(2) Å for (3). Magnetization measurements showed that all complexes (1) – (3) exhibit maximum of magnetic susceptibility about 6–7 K and a fit to Bleaney-Bowers equation gave singlet-triplet energy gap $2J = -6.81 \text{ cm}^{-1}$ for (1), $2J = -7.00 \text{ cm}^{-1}$ for (2) and $2J = -7.84 \text{ cm}^{-1}$ for (3). The results confirm the supramolecular synthons as the paths of antiferromagnetic interactions and magnetically coupled pairs of Cu atoms within the 2-D supramolecular layers as an example of difference between the magnetic dimensionality vs the structural dimensionality of all three complexes.

Słowa kluczowe

Copper complexes, crystal structure, hydrogen bonds, supramolecular structure, magnetic properties

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