

Poster Presentations

[MS24-P19] Three novel Cu(II)-Mn(II) heterobimetallic complexes based on $[\text{MnCl}_4]^-$ anion.

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Previously it was demonstrated that hydrogen bonds (HBs) can be responsible for observed differences in structural and magnetic dimensionalities in structurally one-dimensional (1D) Cu(II) complexes [1]. The study of magnetic and thermodynamic properties of structurally 1D compound $\text{Cu}(\text{en})_2\text{Ni}(\text{CN})_4$ (*en* = ethane-1,2-diamine) in the very low temperature region (below 0.5 K) corroborated its magnetically 2D character (square Heisenberg plane); as additional exchange paths to the covalent bonds the present HBs of the $\text{NH}\cdots\text{N}(\text{C})\cdots\text{H}-\text{N}$ type were suggested [2]. Weak character of the magnetic exchange interactions is in line with long exchange path through the diamagnetic -NC-M-CN-five-atomic bridge. In order to shorten this five-atomic bridge we have undertaken a study of a series copper(II) compounds in which $[\text{M}(\text{CN})_4]^{2-}$ bridging species with square coordinated diamagnetic M(II) atoms were replaced by $[\text{MnCl}_4]^{2-}$ anion. The use of $[\text{MnCl}_4]^-$ anion as a bridging unit enhances the attractiveness of these Cu(II)-Mn(II) bimetallic chain systems from magnetic properties point of view as they represent potential starting blocks in the synthesis of molecular-based ferromagnets. As the result of our experimental work we have prepared and structurally characterized three novel compounds $\text{Cu}(\text{men})_2\text{MnCl}_4$ (**1**), $\text{Cu}(\text{bmen})_2\text{MnCl}_4$ (**2**) and $\text{Cu}(\text{dmen})_2\text{MnCl}_4$ (**3**) (*men* = *N*-methylethane-1,2-diamine; *bmen* = *N,N'*-dimethylethane-1,2-diamine; *dmen* = *N,N,N'*-dimethylethane-1,2-diamine). Two of them, **1** and **2** exhibit chain-like structures analogous to the already reported $\text{Cu}(\text{en})_2\text{MnCl}_4$ [3] in which the hexa-coordinated Cu(II) atom is surrounded by two chelate bonded blocking ligands and two *trans*-2-chlorido ligands placed in the *trans* positions; these chloride ligands link Cu(II) and

Mn(II) atoms. On the other hand, the use of the unsymmetrical *dmen* ligand leads to a dinuclear compound **3** with molecular structure in which the pentacoordinated Cu(II) and tetrahedrally coordinated Mn(II) atoms are linked by one bridging *trans*-2-chlorido ligand. Further details on the syntheses, characterizations and crystal structures will be given. This work was supported by the Slovak grant agency APVV under contract Nos. APVV-0132-11 and by grant agency VEGA (grant 1/0075/13).

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