EPR and Magnetic Studies of New Halo-Bridged Copper Dimers

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Four new halo-bridged copper(||) dimers: $[\{CuL^1\}(\mu\text{-}Cl)]_2 \cdot CH_3OH$ (**1**), $[\{CuL^2\}(\mu\text{-}Cl)]_2$ (**2**), $[\{CuL^1\}(\mu\text{-}Br)]_2$ (**3**) and $[\{CuL^2\}(\mu\text{-}Br)]_2$ (**4**), where ligands L^1 and L^2 stand for *N*-(L-leucine methyl ester)-*N'*-((2-pyridin-2-yl)methyl)oxalamide and *N*-benzyl-*N'*-((2-pyridin-2-yl)methyl)oxalamide, respectively, have been synthesized and their crystal structures have been solved. All structures consist of dimeric molecules, in which copper(||) ions are bridged by X ions (where X = Cl, Br) and distances between the copper ions are about 3.5 Å.

Magnetic interactions in the compounds **1–4** have been investigated by electron paramagnetic resonance (EPR) spectroscopy and SQUID magnetization measurements. Single crystals and powder samples of the compounds have been studied by X-band EPR (microwave frequency $\nu \approx 9.6$ GHz), from room down to liquid helium temperature. The crystals were rotated round three arbitrary, mutually perpendicular axes and angular dependences of *g*-factor and linewidths have been recorded. In addition to the EPR spectroscopy, investigation of the new complexes has been accomplished by SQUID magnetization measurements on the powder samples, from room temperature down to 2 K.

The obtained results will be discussed in terms of the structure of $Cu(\mu\text{-}X_2)Cu$ magnetic cores and the copper ions coordination. The conclusions about magnetic interactions (exchange and dipolar) in **1–4** will be presented and compared with values reported for similar compounds.