

Multinuclear Ni(II) and Cu(II) complexes of a *meso* 6 + 6 macrocyclic amine derived from *trans*-1,2-diaminocyclopentane and 2,6-diformylpyridine

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Streszczenie

Four hexanuclear chloride and sulphate Ni(II) and Cu(II) complexes **1**, **2**, **4** and **5** and one tetranuclear nitrate Cu(II) complex **3** have been synthesised from appropriate metal salts and 6 + 6 octadecaaza macrocyclic ligands. All obtained coordination compounds have been characterised by elemental analysis, spectroscopic methods (ESI MS, NMR and EPR), magnetic susceptibility measurements and X-ray crystallography. Their X-ray crystal structures reveal different coordination modes of metal cations involved in the obtained centro-symmetrical coordination compounds. The conformational folding of the macrocyclic ligand adopted in the respective complexes depends on the number of metal cations bound within the macrocycle but not on their type. The cavities of these multinuclear complexes might be occupied by solvent molecules and counter anions bound by hydrogen bonds or might be empty in the case where the macrocyclic ring of the ligand is squeezed in the middle. All obtained Ni(II) and Cu(II) coordination compounds are paramagnetic. This has been proved by their ^1H NMR and EPR spectra and magnetic measurements. Direct current (DC) variable-temperature magnetic susceptibility measurements on the polycrystalline samples of **1–5** were carried out in the temperature range of 1.8–300 K. The magnetic behaviour of **1** and **2** is dominated by the magnetic anisotropy of the nickel(II) ion masking the magnetic interactions between magnetic centres. The magnetic data of **3–5** reveal small antiferromagnetic interactions within the Cu_4 and Cu_6 units. EPR experiments for **3–5** show, at 9.6 and 34 GHz frequencies, that the predominant contribution to the orbitals occupied by the unpaired electrons in the ground state originates from $d_{x^2-y^2}$.

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