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Facile synthesis of Cu(II) complexes of mono- and bicondensed N donor Schiff base 1*H*-pyrazolate ligands: crystal structures, spectroscopic and magnetic properties.

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Streszczenie

Two [2 × 2] grid-like complexes, $[Cu_4(\mathbf{L^1})_4]\cdot 2MeOH\cdot 2H_2O\cdot dmf$ (**1**) and $[Cu_4(\mathbf{L^2})_4]\cdot 2NaClO_4\cdot 2MeOH$ (**2**) based on new substituted pyrazole ligands 5-(1-((2-aminoethyl)imino)ethyl)-4-methyl-1*H*-pyrazole-3-carboxylic ($H_2\mathbf{L^1}$) acid and 5-(1-((3-aminopropyl)imino)ethyl)-4-methyl-1*H*-pyrazole-3-carboxylic acid ($H_2\mathbf{L^2}$) have been synthesized and characterized spectroscopically and crystallographically. It was found that the ligand $H_2\mathbf{L^2}$ condenses with 3-acetyl-4-methyl-pyrazole-5 carbonic acid ($H_2\mathbf{L}$) to produce a new dinuclear Cu(II) complex upon reaction with $Cu(ClO_4)_2\cdot 6H_2O$ and $CuAc_2\cdot 2H_2O$. In the grid complexes the four Cu(II) atoms are in square-pyramidal environment formed by two pyrazole, imine and amine N atoms, and the carboxylate O atom and occupy the corners of a [2 × 2] grid with the Cu···Cu separations, varying from 3.998(1) to 4.2049(9) and 4.794(1) to 5.091(1) Å for the adjacent and diagonal atoms, respectively. In the dinuclear complex **3** the metal ions are found in square planar environment with their coordination planes lying roughly within the plane of the pyrazolate heterocycle. The separation between Cu(II) centers is 3.921(1) Å. Magnetic susceptibility measurements of **3** revealed the presence of strong antiferromagnetic interaction, with a *J* value of −207.5 cm^{-1}. This is larger than the *J* values found for the **1** and **2** grid complexes, which are −20.2 and −18.3 cm^{-1}, respectively.

Słowa kluczowe

Pyrazole ligands, Copper(II), Grid complexes, magnetic properties, Template reaction

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