Supramolecular assemblies in $[Cu(L\text{-}Arg)_2(H_2O)]C_2O_4 \cdot 6H_2O$ complex : structural, spectroscopic, magnetic and thermal behavior.

Autorzy

Agnieszka Wojciechowska

Andrzej Kochel

Marek Duczmal

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Streszczenie

The reaction of L-arginine and oxalate ions with copper(II) salts yields a new complex with formula of [Cu(L-Arg)(2)(H2O)]center dot C2O4 center dot 6H(2)O (1) (where L-Arg = L-arginine). Single crystals of I were synthesized by crystallization from aqueous solution. The complex properties were characterized by X-ray diffraction, spectroscopy (FT-IR, FT-Raman, NIR-Vis-IJV and EPR) as well as thermal and magnetic methods. The square pyramidal (SP) geometry around Cu(II) ions in [Cu(L-Arg)(2)(H2O)](2+) cation complex is formed by two cis-chelated L-arginine zwitterions and a water molecule coordinated in the apex of square pyramid. The trigonality distortion of SP geometry is relatively small, tau = 0.0087. The solid state EPR spectrum showed broad hyperfine splitting with g(perpendicular to)= 2.061 at 77 K. The copper centres distanced at 7.558(5) angstrom are joined in a single zig-zag structure via a chain based on the combination of Cu-O(5)-H(29)center dot center dot center dot O(2)-C1-O1-Cu hydrogen bonds along the b axis (d (O2 center dot center dot center dot O5) = 2.812 angstrom). Taking into account the structural features, the magnetic susceptibility data were best-fitted, giving the exchange parameter J = -0.16 cm(-1). Complex 1 is thermally stable up to 66 degrees C, where it was observed to lose the crystallization water molecules with an 11.7% mass loss (calc. 11.5%).

Słowa kluczowe

Thermogravimetric analysis, crystal structure, infrared spectroscopy, inorganic compounds, magnetic materials

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