Novel copper complexes based on the thiocyanate bridge - synthesis, X-ray studies and magnetic properties.

Autorzy

Barbara Machura

Anna Świtlicka

I. Nawrot

Jerzy Mroziński

Rafał Kruszyński

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Streszczenie

Three novel compounds {[Cu(bpzm)(SCN)][Cu(bpzm)(MeOH)][Cu(SCN)$_4$]}$_n$ (**1a**), {[Cu$_2$(bpzm)$_2$(μ-SCN)(SCN)$_3$]}$_n$ (**1b**) and [Cu$_2$(μ-SCN)$_2$(SCN)$_2$(dpa)$_2$] (**2**) have been obtained in one-step self-assembly reaction of copper dichloride, a suitable N–N ligand (bis(pyrazol-1-yl)methane and 2,2′-dipyridylamine) and ammonium thiocyanate. For the reaction involving bis(pyrazol-1-yl)methane, an unprecedented *in situ* reduction of some Cu(II) ions to Cu(I) has been observed. The compound {[Cu(bpzm)(SCN)][Cu(bpzm)(MeOH)][Cu(SCN)$_4$]}$_n$ (**1a**) belongs to a relatively scarce group of mixed-valence Cu^{II}/Cu^{I} coordination polymers with interesting polymeric architecture. It creates infinite two-dimensional structure consisting of layers extending along crystallographic plane (0 0 1), in which the cations [Cu^{II}(bpzm)(SCN)]$^+$ and [Cu^{II}(bpzm)(MeOH)]$^{2+}$ are connected by ions [Cu^{I}(SCN)$_4$]$^{3-}$ through single end-to-end thiocyanato bridges. Structure **1b** consists two crystallographically independent chains. The chain A has a zig-zag form and extends along the crystallographic direction [0 0 1], whereas the second chain is linear and runs along the crystallographic direction [0 1 0]. The structure **2** consists of dinuclear [Cu$_2$(dpa)$_2$(μ-SCN)$_2$(SCN)$_2$] units. Variable-temperature magnetic susceptibility measurements show very weak antiferromagnetic interactions between the paramagnetic centres Cu(II) centers inside the crystal lattices of three novel compounds.

Słowa kluczowe

coordination polymers, copper, Thiocyanate bridge, X-ray, magnetic measurements