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SYNTHESIS AND CRYSTAL STRUCTURE OF NEW POLY(ORGANIC-INORGANIC) POLYMERS POLY[Cu(NO₂-ACAC)₂]_n

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Coordination polymers are a class of polymers whose repeated units are coordination complexes. A subclass of these is the metal organic frameworks that are coordinated with organic ligands containing potential voids. Coordination polymers are relevant to many fields such as organic, inorganic, bio, electro chemistry; material science and pharmacology. Many potential applications led to extensive studies in the past few decades. Coordination polymers have many applications such as dyes, molecular storages, catalysts, ion exchange, electrical conductors, bioactive molecules, sensors, and single molecule magnet. Also, they can be used in the fields of molecular electronics, medicine, luminescence and optics. Herein, we report the synthesis of the poly{bis (3 nitro 2,4 pentanediono) copper(II)} linked via nitro group as bridging agent. Thus, we believe that this moiety can be functioned as a channel for energy and electron transference, presenting the X ray single crystal structure of [Cu {Cu(NO₂ acac)₂}₃ Cu]_n. The organo inorganic polymer, poly{bis (3 nitro 2,4 pentanediono) copper(II)}, [Cu(NO₂ acac)₂]₃n, has been prepared and its crystal structure was determined. The structure consists of a trimeric unit in which,

acetylacetone ligated symmetrically to copper atoms that pose in the center of octahedrons. The three octahedral fragments of the trimer are linked to each other through nitro group. Crystal Data: C₁₀H₁₂CuN₂O₈, Mr = 351.76, triclinic, P 1 (No. 2), a = 5.8237(2) Å, b = 7.7963(3) Å, c = 7.8847(3) Å, α = 81.988(2)°, β = 75.294(2)°, γ = 72.217(2)°, V = 328.98(2) Å³, T = 143(2) K, Z = 1, Z' = 0.5, μ(Mo Kα) = 1.703, 3021 reflections measured, 1421 unique (Rint = 0.0156) which were used in all calculations. The final wR2 was 0.0686 (all data) and R1 was 0.0217 (I > 2σ(I)). The three repeating units are linked via the nitro group as bridged moiety attached to a position of the acetylacetonato ligand. The base plane of each monomeric unit being formed with the four oxygen atoms, namely O1, Oi1, O2 and Oi2 belongs to the acac ligand coordinated to the central Cu atom. Cu atom is bonded axially to Oii3 and Oiii3 of the nitro groups whose belong to the prepared monomers adopting distorted octahedral geometry in each monomer. Thus, it seems that the axial Cu Oii3 and Cu Oiii3 are longer than the equatorial Cu1 O11.9233(13) Å and Cu1 O2 (1.9195(13) Å) led to distorted octahedral geometry, in which the Cu atom is located at its center.

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