Structure and Magnetic Properties of a Three-dimensional Metal-organic Framework: $[Co(L)(H_2O)_2]\cdot H_2O$

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A unique 3D fourfold interpenetrated metal-organic framework, $[Co(L)(H_2O)_2]\cdot H_2O$ (**1**), has been synthesized by the solvothermal reaction of H_2L with $Co(NO_3)_2\cdot 6H_2O$ (H_2L = 5-(isonicotinamido)isophthalic acid). Compound **1** crystallizes in the monoclinic space group $P2_1/c$, with the cell parameters: a = 81301(8), b = 107711(11), c = 167697(16) Å, β = 92.656(2)°, V = 14669(3) Å^3, R_1 = 0.0325 and wR_2 = 0.0833. Its framework has (10,3)-b topology, where the cobalt atoms are alternately bridged by the pyridyl and the carboxylate groups of the L^{2-} ligands into a three-dimensional network. Compound **1** displays antiferromagnetic interactions. Above 40 K, $\chi_m{}^{-1}$ obeys the Curie-Weiss law with C = 3.28 emu K mol^{-1} and Θ = −0.66 K.

Key words: Cobalt(II), Metal-organic Framework, Crystal Structure, Magnetic Property