Synthesis, crystal structure and catalytic activity of a new organic-inorganic hybrid cobalt phosphite

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A new cobalt phosphite templated by diprotonated ethylendiamine molecule $(C_2N_2H_{10})[Co(H_2O)_6](HPO_3)_2$ has been prepared via slow evaporation method. The hybrid material crystallizes in the orthorhombic system, space group *Pbca*, with the cell parameters: *a* = 11.1518(9), *b* = 9.8014(8), *c* = 13.3782(8) Å, V = 1462.28(19) Å^3, and Z = 4. The compound exhibits a bidimensional crystal structure formed by an anionic layer with the formula $[Co(H_2O)_6(HPO_3)_2]^{2-}$ along the a-axis. The ethylenediammonium cations are located within the anionic cavities, through establishing hydrogen bonds network. The layers are made upon isolated $Co(H_2O)_6$ octahedra and $(HPO_3)^{2-}$ tetrahedral phosphite anions, which interact through hydrogen bonds. The Infrared spectroscopy presents the characteristic bands of the hydrogenophosphite anion, ethylenediammonium cation, and water molecule. Thermogravimetric analysis (TGA) and catalytic efficiency data for the hybrid compound are investigated and it was found to be very efficient as a catalyst.

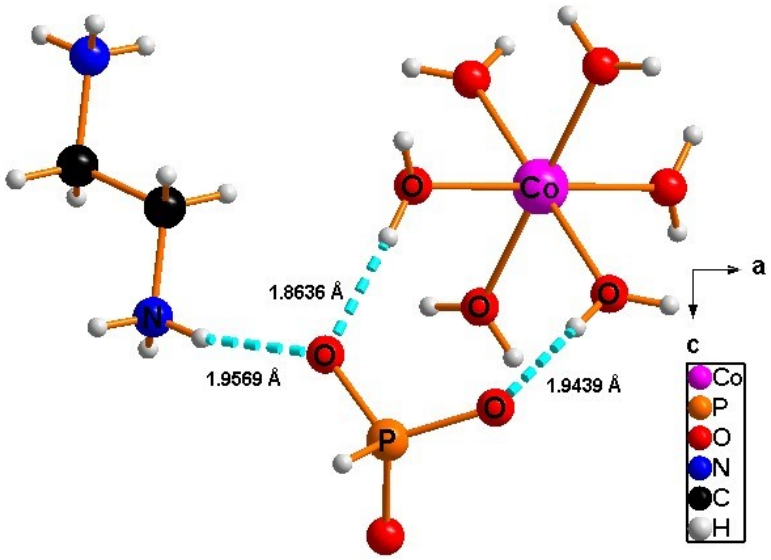

Figure. ORTEP drawing of the asymmetric unit of $(C_2N_2H_{10})[Co(H_2O)_6](HPO_3)_2$.