

# Structure and Stability of a Linear Trinuclear Cobalt(II) Complex: $\text{Co}_3(\text{PhCH}=\text{CHCO}_2)_6(\text{bpy})_2$

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A trinuclear cobalt(II) complex,  $[\text{Co}_3(\text{PhCH}=\text{CHCO}_2)_6(\text{bpy})_2]$  (**1**) (bpy = 2,2-bipyridine), was synthesized and structurally characterized by single crystal X-ray diffraction. Complex **1** crystallizes in the triclinic space group  $P\bar{1}$  with cell parameters:  $a = 11.347(6)$ ,  $b = 11.471(6)$ ,  $c = 14.247(8)$  Å,  $\alpha = 69.503(9)$ ,  $\beta = 74.211(9)$ ,  $\gamma = 76.812(11)^\circ$ ,  $V = 1653.2(15)$  Å<sup>3</sup>,  $Z = 1$ , and  $R1(F) = 0.026$ ,  $wR2(F^2) = 0.138$ . Complex **1** has a linear arrangement of three Co(II) centers bridged by six cinnamate carboxylate groups, four of which function in a bidentate *syn-syn* fashion linking the peripheral Co2 atoms, and two as both bidentate bridging and bidentate chelating units. The Co1 atom is located on a crystallographic inversion center and exhibits a slightly distorted octahedral coordination geometry, while the terminal Co atoms (Co2 and Co2<sup>#1</sup>) have a significantly distorted octahedral environment. Hydrogen bonding interactions and  $\pi$ - $\pi$  stacking interactions stabilize the structure.

*Key words:* Crystal Structure, Cobalt(II), Linear Trinuclear Cluster, Thermal Stability