

Synthesis, Crystal Structure, Spectral and Thermal Studies of a New Organic-Inorganic Hybrid Cobalt(II) Complex of 2,2'-Bipyridine and Nitrate with Squarate

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The $[\text{Co}(\text{NO}_3)(\text{bipy})_2](\text{sq})_{1/2} \cdot 4\text{H}_2\text{O}$ complex (**I**) (bipy: 2,2'-bipyridine, sq^{2-} : squarate) has been prepared and characterized by elemental analysis, IR, UV/vis spectra, thermal analysis, and single crystal X-ray diffraction. The title compound crystallizes in the triclinic system, space group $P\bar{1}$, with $a = 7.6302(9)$, $b = 12.0426(15)$, $c = 14.2271(14)$ Å, $\alpha = 107.252(9)^\circ$, $\beta = 98.755(9)^\circ$, $\gamma = 103.363(9)^\circ$ and $Z = 2$. The Co(II) ion in its octahedral complex is chelated by the nitrogen atoms of the two 2,2'-bipyridine, and by two oxygen atoms of the nitrate group. The anionic squarate behaves as a counter ion. Thermal analysis has shown that the title compound decomposes in three stages over the range 20 – 1000 °C on heating in a static air atmosphere. The final decomposition product is CoO.

Key words: Squarate, 2,2'-Bipyridine, Thermal Decomposition