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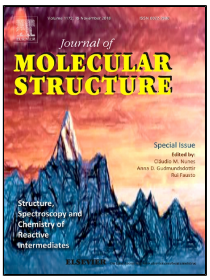


Investigation of Structural, Spectral and Thermal Properties of One-Dimensional Polymer Containing Pyromellitic acid and Isonicotinamide

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ACCEPTED MANUSCRIPT

# Investigation of Structural, Spectral and Thermal Properties of One-Dimensional Polymer Containing Pyromellitic acid and Isonicotinamide

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## Abstract

The coordination polymer with mixed ligand $[Cu_2(H_2O)_2(pm)(ina)_2]_n.3nH_2O$ (pm= tetraanion of pyromellitic acid, ina=isonicotinamide) was studied mostly on its supramolecular architecture. Single crystals were synthesized and structural properties of the 1D polymer were characterized by Single Crystal X-ray diffraction (SCXRD), different spectroscopic methods (Infrared (IR) spectroscopy, UV-Vis spectroscopy and EPR spectroscopy), Thermal and Elemental analysis. It has been observed that complex has crystallized in the monoclinic space group $P2_1/c$. The geometric environment of Cu(II) ion is five-coordinated in slightly distorted square pyramidal geometry and τ value have found 0.13. The pyromellitate ligands connecting the metal centers act as bridge and form 1D polymer chains of *2,4 ribbon* type [1]. The ladder-like polymer is connected by O–H···O and N–H···O hydrogen bonds to form supramolecular building. This complex consists of a 3D polymeric structure with containing planar hexacyclic and dimeric water rings. It was mainly focused on the characteristic $(COO)_{as}$ and $(COO)_s$ stretching vibrations of pyromellitate anion in the FT-IR investigation of the complex.

**Keywords:** Pyromellitic acid, Single Crystal X-ray Diffraction, Spectroscopic methods, Coordination polymer

## 1 Introduction

The metal-organic frameworks (MOFs) are attracting more attention due to their intriguing architectures and molecular topologies such as herringbones, rectangular grid, honeycombs, ladders, boxes, diamondoids, brick walls and rings. (MOF)s that have porosity, luminescence, chirality, conductivity, optoelectronic, magnetic properties also have potential applications as non-linear optics, ion-exchange,catalysis, gas storage, selective binding of molecules through absorption, molecular recognition, molecular sieves and molecular sensing [2-22]. The structural pattern of coordination polymers can significantly alternate by structural changes in

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