Research paper

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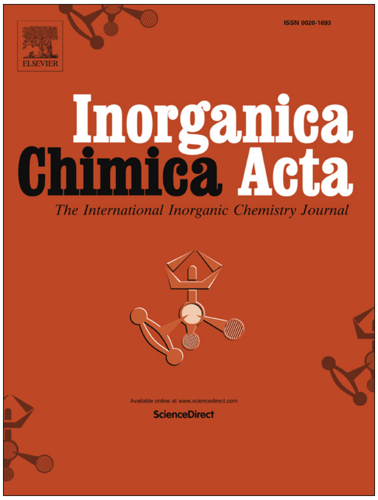

PII: S0020-1693(17)30771-5
DOI: https://doi.org/10.1016/j.ica.2017.11.059
Reference: ICA 18029

To appear in: *Inorganica Chimica Acta*

Received Date: 17 May 2017
Revised Date: 6 November 2017
Accepted Date: 26 November 2017

Please cite this article as: A. Pushpaveni, S. Packiaraj, S. Govindarajan, G.T. McCandless, C.F. Fronczek, F.R. Fronczek, Structural resemblance and variation in transition metal complexes derived from dipicolinic acid and guanylhydrazine, *Inorganica Chimica Acta* (2017), doi: https://doi.org/10.1016/j.ica.2017.11.059

Structural resemblance and variation in transition metal complexes derived from dipicolinic acid and guanylhydrazine

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Abstract

New aminoguanidinium transition metal dipicolinates of the formula $(AgunH)[M^{III}(dip)_2].xH_2O$, M = Cr, x = 1.5; Fe, x = 2, $(AgunH)_2[M^{II}(dip)_2].nH_2O$, where M = Mn, n = 2; Co or Ni, n = 0 and Zn, n = 1, and $[Cu(Agun)_2][Cu_3(dip)_4(Agun)_2].4H_2O$ have been prepared by the reaction of respective metal nitrates with aqueous mixture of dipicolinic acid (H_2dip) and aminoguanidine bicarbonate ($AgunH.HCO_3$) in appropriate mole ratios. These compounds have been characterized by various physico-chemical techniques. Among them Ni, Cu, Cr and Fe complexes have been structurally characterized. The asymmetric units of the Ni and Cr structures contain two independent molecules, whereas Fe has four. Unlike these, the copper compound has a unique structure with a tri-nuclear centrosymmetric anionic complex and cationic bis(aminoguanidine)copper(II). In all of these compounds, the dipicolinate dianion is acting as a tridentate (O,N,O) donor ligand, except copper in-which one of the dipicolinates is tetradentate (O,N,O,O). Cytotoxicity and DPPH scavenging activity studies reveal that the copper complex exhibits superior activity to that of cobalt and nickel.

Key words: Transition metal, Crystal structure, Dipicolinic acid, Cytotoxicity and DPPH scavenging activities

1. Introduction

In general hetero-aromatic dicarboxylic acids, particularly pyridine-2,6-dicarboxylic acid also called as dipicolinic acid (H_2dip) is dominantly present in natural products such as alkaloids, vitamins and coenzymes. This is mainly used in medicinal chemistry to study the physiological properties of natural and synthetic acids [1]. A number of structural architecture has been built up using dipicolinate ligand with different metal ions [2-5] in solid states. It has energetic nitrogen and two carboxylic groups which permits the dipicolinate anion to act as tridentate