

Accepted Manuscript

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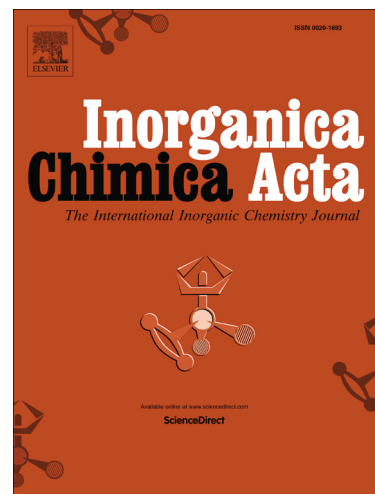
PII: S0020-1693(16)30946-X
DOI: <http://dx.doi.org/10.1016/j.ica.2017.03.001>
Reference: ICA 17460

To appear in: *Inorganica Chimica Acta*

Received Date: 25 November 2016
Revised Date: 21 February 2017
Accepted Date: 1 March 2017

Please cite this article as: L. Pogány, J. Moncol, M. Gál, I. Šalitraš, R. Boča, Four Cobalt(III) Schiff base complexes – structural, spectroscopic and electrochemical studies, *Inorganica Chimica Acta* (2017), doi: <http://dx.doi.org/10.1016/j.ica.2017.03.001>

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Four Cobalt(III) Schiff base complexes – structural, spectroscopic and electrochemical studies

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Abstract

Four new complexes of the general formula $[\text{Co}(\text{L}_n)\text{Cl}]$ (where L_n is dianion of pentadentate Schiff base ligand N,N' -bis(2-hydroxybenzylidene)-1,6-diamino-3-azahexane= H_2L_1 , N,N' -bis(2-hydroxy-3-methoxy-benzylidene)-1,6-diamino-3-azahexane= H_2L_2 , N,N' -bis(3-ethoxy-2-hydroxy-benzylidene)-1,6-diamino-3-azahexane= H_2L_3 or N,N' -bis(2-hydroxybenzylidene)-1,7-diamino-4-methyl-4-azaheptane= H_2L_4) have been synthesized and characterized by elemental analyses, IR, UV–VIS. The redox properties have been studied by cyclic voltammetry. Moreover, the crystal structures of **1**, **2** and **3** have been determined by X-ray diffraction and ^1H NMR spectrum of **4** has been obtained.

Keywords: Schiff base; Cobalt(III) complexes; Crystal structure; Spectral properties; Cyclic voltammetry

1. Introduction

Schiff base ligands with imine groups ($-\text{RC}=\text{N}-$) capable to coordinated with metal ions have many advantages and they are very popular up to now. These ligands can be easily prepared by a one-pot condensation reaction of an aldehyde or ketone with primary amines usually in an alcohol as a solvent. Generally, even a small modification of the ligand structure can significantly change properties of the corresponding complexes [1-3]. However, simplicity of preparation of Schiff base ligands allows one a fast and systematic preparation of a wide range of ligands with various substituents and tuning of physical properties can be studied easier. Schiff bases represent a very important class of compounds that are applied in many fields of research [4-10]. However, they are often coordinated to various transition metal ions in order to improve or modify their properties. Cobalt(III) complexes with pentadentate N_3O_2 ligands and their reactivity and structural properties have been extensively investigated for their miscellaneous applications, such as antifungal and antimicrobial agents as well as hypoxia-activated transporter of bioactive small molecules [11-17], production of redox-active sensors [18], ionic ferroelectrics [19], highly efficient catalysts in various fields of synthesis, as a precursor for preparation of Co_3O_4 nanoparticles and other useful reactions [20-25].

In the case when pentadentate N_3O_2 Schiff base is coordinated to cobalt(II) ion there is a tendency of this ion to oxidise and one arrives to cobalt(III) Schiff base complex. In order to prevent

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