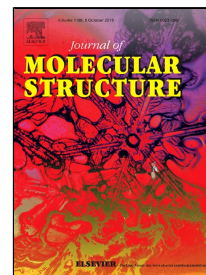


Accepted Manuscript

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PII: S0022-2860(18)30711-7
DOI: 10.1016/j.molstruc.2018.06.010
Reference: MOLSTR 25297
To appear in: *Journal of Molecular Structure*
Received Date: 16 February 2018
Accepted Date: 04 June 2018

Please cite this article as: N.K. Gondia, S.K. Sharma, Spectroscopic characterization and photophysical properties of Schiff base metal complex, *Journal of Molecular Structure* (2018), doi: 10.1016/j.molstruc.2018.06.010

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Spectroscopic characterization and photophysical properties of Schiff base metal complex

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Abstract:

In the present work, Schiff base ligand N,N-bis(salicylidene)-(3,3'-diaminobenzidine) and its zinc complex were synthesized. The coordination of Schiff base ligand with zinc metal ion seems to occur via N- azomethine followed by the deprotonation of OH group. The nuclear magnetic resonance peaks as well as important bands in the Fourier transform infra-red spectra are discussed in relation to the structure of the ligand and complex. The optical properties like absorption and fluorescence were studied to get the idea about the transition among molecular orbitals as well as quantum yield. Colour coordinates of complex fall in the blue region. HOMO-LUMO energy gap was used to determine various parameters. Thermal studies were also performed to determine the thermal stability of the complex in the range from room temperature to 500°C.

Keywords: Schiff base, Absorption, Fluorescence, HOMO-LUMO**1. INTRODUCTION**

During the past decades metal complexes of Schiff base are widely studied due to having good luminescence properties, high conductivity and thermal stability. Schiff-base ligands coordinated with metals usually linked to the imine nitrogen and aldehyde group. Luminescence properties of the aromatic bridged azomethine metal complexes have already been reported. Among many of the coordination compounds, zinc metal based Schiff base complexes have been found to show the good luminescence properties due to d^{10} electronic configuration [1,2]. Salicylaldehyde schiff base Zn complex generally exhibit photoluminescence as well as electroluminescence properties and formed the basis of materials used in various display and lighting devices either as electron transport layer or emissive layer.

The structures of salicylaldehyde Schiff bases are similar to those of 8-hydroxyquinoline ligands, which have at least one hydroxyl group, a coordination nitrogen atom and a delocalized system. The salicylaldimine ligand forms the basis of an extensive class of chelating ligands that has very popular use in the coordination chemistry of transition and main group elements [3]. Metal complexes particularly having transition metal ions at inner coordination sphere play an important role in achieving color tunable properties with high value of luminous efficacy of radiation [4,5]. Schiff base complexes of transition and non-transition metals have been used extensively for various optoelectronic applications due to their ease of synthesis, wide range of complexation ability and many useful properties like electron transportation, higher thermal stability and ease of sublimation. These complexes have ability to show the tunable properties by varying the substituent derivatives of the coordinated metal ion and enhance their activities [6].

The fluorescence intensity and quantum yield of metal complexes change with respect to ligand after complexation with various metals. The coordination complex derived from condensation reaction of diamines and salicylaldehyde generally exhibit good luminescence properties [7] and can be used as light emitting material in organic light emitting diodes and fluorescent sensors.

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