#### **International Journal of Management, IT & Engineering** Vol. 9 Issue 1, January 2019,

VOI. 9 ISSUE 1, January 2019,

ISSN: 2249-0558 Impact Factor: 7.119

Journal Homepage: <u>http://www.ijmra.us</u>, Email: editorijmie@gmail.com Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

# Symthesis and characterination of a Za() complex with salicylaldehyde based Sehiff base ligand

Dr. Raj Kamal Sahu P.G Dept. of Chem, T.M.B.U Bhagalpur Mahesh kumar, Dept. of Chem. M.M College Bhagalpur

**Abstract**: A Zn(II) complex with Schiff base was synthesized and characterized on the basis of elemental analysis, spectral studies and conductivity measurement. Schiff base behaves in a monobasic tridentate manner utilizing phenolic oxYgen, Thompson et.al.6 for the first time reported theazomethinic nitrogen & amino nitrogen. Zn(I1)complex of a 1+1 condensed Schif base3-cholorosalicylaldehyde and diaminomaleonitrileL) derived from DAMN and salicyladehyde andhas been synthesized and characterized. Electronic some metal complexes of DAMN related Schiffand photo-luminescence spectral properties of the bases.complexes as well as the free ligand have been Investigated.

### Introduction

The present communication deals with and its luminescence property. Syntheses of Zn(11)synthesis & characterization of Zn(1) complex with complex of this Schiff base, their characterization Schiff base derived from 3-chlorosalicylaldehyde and fluorescence propertyand diaminomaleonitrile. Diaminomaleonitrile(DAMN, 2, 3-diamino-cis-2-butene-dinitrile) with Experimentalthe formula (H,N) (NC)ECCN)(NH,) appears Materials and Methods:to be symmetric and has been known as anunsaturated electron rich ligand as well as atetramer of hydrogen cyanide, resulting from the commercial sources and used as received Solventspolymerization of HCN under basic conditions were dried according to standard procedures and The reaction of DAMN with aromatic aldehydesis very interesting as in every case 1+1 condensed 2-butenedinitrile (DAMN) and 3-cho lorosalicy-Schilf base is obtained even in presence of excess aldehyde.

However, these compounds are important as synthetic intermediates and recently being used in various fields such as in pharmacology, synthesis of conjugated linear polymers and in the thermostable optical material industry. Interestingly, coordination chemistryof Schifbesesderlved from DAMN is not wellexplored. Only a few well characterized complexes

of DAMN-based Schif bases are known to us. Thompson ctal.6 for the first time reported the crystal structures of 1+1 condensed Schiff base(HL) derived from DAMN and salicyladehyde and some metal complexes of DAMN related Schiffbases.

However, inspite of the highlyconjugated nature of HL, photolumine-scenceproperty of theligand(HL) as well as its do metalcomplexes is not yet evaluated. In this report we present the synthesis and solution phase characterization of 1t+1 condensed Schiff basederived from DAMN and 3-chlorosalicylaldehyde and its luminescence property. Syntheses of Zn(11)complex of this Schiffbase, their characterization and fluorescence property.

#### International Journal of Management, IT & Engineering

Vol. 9 Issue 1, January 2019,

ISSN: 2249-0558 Impact Factor: 7.119

Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com

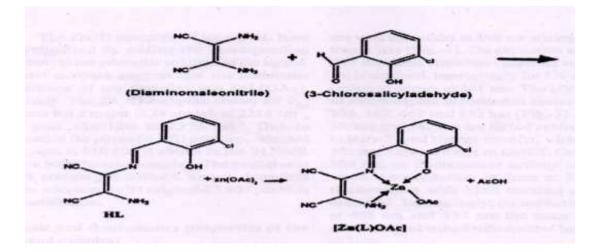
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

# Experimenta

#### **Materials and Methods:**

All chemicals were obtained fromcommercial sources and used as received Solventswere dried according to standard procedures and distilled prior to use. High purity 2, 3-diamino-cis-2-butenedinitrile (DAMN) and 3-cho lorosalicylaldehyde were purchased from Aldrich ChemicalCompany inc. and used as received. All otherchemicals were AR grade.

Elemental analyses (Carbon, hydrogen, nitrogen, chlorine and zinc) were performed usingelemental analyzer. Infrared spectra (4000-400cm") were recorded in KBr at 300 K using a FTIR.



Electronic spectra (1500-300 nm) were obtained at25°C using a spectrophotometer in methanol.Fluorescence spectra of the ligand and complexwere recorded in solution using methanol as asolvent with a luminescence spectrometer.HNMR spectra (300 MHz) were recorded(CD,),SO solvent on a NMR spectrometer using the solvent signal as.the internal standard in a5mm prode.

#### Synthesis of the ligand (HL):

To an ethanolic solution (10 ml) of 3-holorosalicylaldehyde (2mmol), an ethanolicsolution (5ml) of DAMN (2 mmol) was added dropwise with constant stirring. The stirring wascontinued further overnight. The yellowmonoamine which precipitated out, was filtered, washed with ethanol and dried under vacuum(Yield: 45%).

#### **Preparation of Zn(11) complex:**

An ethanolic solution (20ml) of Zn(OAc), 2.10 mmol) was added to an ethanolic solution of the ligand, HL(2 mmol) with constant stirring. The resulting mixture was then refluxed for 4 hrs. The intense red-purple solution deposited a deep purple solid, which was filteredoff, washed with ethanol and dried under vacuum.Yield: 86%. Anal.(%): Calcd for [C H,N,O,CIZn](1):C,42.40; H, 2.44; N, 15.22. C1, 9.58, Zn: 17.77Found: C, 42.32; H, 2.46; N, 15.28. Ci, 9.58. Zn,17.68

## International Journal of Management, IT & Engineering Vol. 9 Issue 1, January 2019, ISSN: 2249-0558 Impact Factor: 7.119 Journal Homepage: <u>http://www.ijmra.us</u>, Email: editorijmie@gmail.com

Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

#### Results and Discussion Synthesis and characterization

The Schiff base ligand HL has beensynthesized by 1+1 condensation of DAMN and3cholorosalicylaldehyde in ethanol. It has beencharacterized by common physicochemicaltechniques. IR spectrum of the half-condensedligand shows major NH stretches at 3416, 3307and 3193 cm and a strong CN stretching band at2203 cm', with a sharp, weak shoulder at veryhigh energy 2363 cm". The bands at 1627 cm' and1566 cm are due to the imine (C=N) and skeletalvibrations, respectively. 'H NMR spectrum of theligand exhibits the peaks at & 10.400 (s, 1H; forphenolic -OH), 8 8.548 (s, 1H, for imine H), 87.996(m, 1H, aromatic H), 87.803 (s, 2H, for -NH,),87.2.86 (m, 1H, aromatic H) and 56.876 (m, IH,aromatio H), which corroborate well with theproposed structure of HL.

The Zn(II) complex of ligand HL have been synthesized by sdding the comespondinacetale salts to the ethanolic solution of the ligandsElemental analyses suggest that the moleculacom positonsot the complex are ZnLOAc]respectiveby. The Zn() complex shows noabsorption but a major 8CN stretch at 2214 cmwith a peak shoulder at 2374 cm. Due tecomplexation the phenolic -OH gets deprotonated and the peak at 810.400 is absent in the "H NMR spectra in both the zinc complex. The peak due to two NH, protons gets shifted to a much downfieldregion as compared to its original 87.803 positionaue to metallation.

# Electronic and fluorescence properties of the ligands and complex:

The ligand in methanol medium shows

three absorption band maxima at 207,259 and 379 nm with a shoulder at 396 nm arising due to w naitions (Fig-1). On etcitationet 207 m and 259 nm smeennision spectrum with t 294 nm is obtained. Interestingly for 379 nm ecitation, emission occurs at 441 an. The UV-vis spectrum of zinc complex in methanol shows four bands at 306, 362, 468 and 553 nm (Fig-2). The bands at 306nm and 362 nm are ligand centred arising due to intra-lgand charge transfer, whereas, 468 and 553 nm bands are due to LMCT. On excitation at 306 nm, no fluorescence activity is noticed, but

when the excitation is done at 362 nm, blue fluorescence with band maxima at 423 nm is observed. Interestingly, on excitation separately at 468 nm and 553 nm the same fluorescence spectrum is obtained with emitted band maxima at 632 nm.

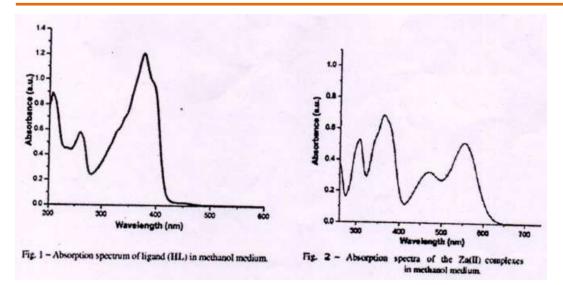
#### **International Journal of Management, IT & Engineering**

Vol. 9 Issue 1, January 2019,

ISSN: 2249-0558 Impact Factor: 7.119

Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com

Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A



#### Conclusion

A Schiff base ligand, HL, has beensynthesized by 1 condensation of diarminomal conitrile and 3-chlorosaliey lalidehy de. Thesolution phase structure of the ligand has been valuated. They lenic double bond. Our study proves that the ligandhighly tluorescent and the fluorescence is due to transition Zn(ll) complex of the ligand wasepured and cnaracterized by routaneplysiochemical studies.

#### References

1. Gryszkiewics-Trochimowski E, RoczChem, 165, 6. MJMac Lachlan, MK Park &LK Thompson,(1928)

2. PSRobertson & Vaughan J, JAmChemSoc, 80 7 RE Stratmann, GE. Scusezia & MJFrisch, J2691 (1958).

3. H. Holger & B. Benedikt, Eur Pat Appl, 88- 8. Avei Guha, Jay deep Adhikary, indian J. Chem., 116980 (1989).

4. DM Johnson, SE, Reybuck, R G Lawton & PG 9.M iossi, Regan, G scalmani& V BaroneRamussen, Macromoircules, 38, 3615, (2005)

5. MY Antipin, V N Nesterov, B G Penm, D OFrazier & TV Timofeeva, Crystal Growth Des, 4,521(2004

6. MJ Mac Lachlan, MK Park and L K Thompson, InorgChem, 35, 5492 (1996)

7. RE Stratmann, G.E.Scusezia and M J Frisch, JChemPhy 109, 8218(1998)

8. AveiGuha, JaydeepAdhikary, Indian J. Chem., Vo! 594,1463 (2011)

9. M Cossi, Regan, G. scalmani& V Barone, Jcompuichem, 24, 669 (2003).