Acoustical Properties Analysis of synthesized Schiff Base of Pyrazolone Moiety in Mix Solvent at 303K Using Interferometer

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ABSTRACT

The density and ultrasonic velocity of synthesized Schiff base using (5-hydroxy -3-methyl-1-(2, 4 dinitrophenyl)-pyrazol-4-yl)(phenyl)methanone and 2-Amino 3-Hydroxy Pyridine are analyzed using interferometer. Dioxane-water solvent is used for investigation at 303k. Data obtained are used to calculate different Acoustical parameter such as solvation number (Sn).Relative association (RA) specific acoustic impedance (Z), apparent molalcompressibility (ϕk), intermolecular free length (Lf), Partial molal volume (ϕv), and adiabatic compressibility(βs).

KEYWORDS: Schiff base, Interferometry, 5-hydroxy 3-methy 1-[(2, 4-dinitrophenyl) pyrazol 4-yl] (phenyl) methanone, Acoustical parameter.

INTRODUCTION

In aqueous and non-aqueous medium interaction between ions of solute and solvent are studied by using Interferometer. The device interferometer issimple and direct technique to determine ultrasonic velocity with high precision[1-5]. Form recentperiod solvent mixture show anomalously massive impact in determination of the ultrasonic absorption coefficient (Willard, 1941; Willis, 1947; Burton,1948).The information about the physicochemical properties of metal ligand complex solution are very important with the knowledge of theoretical importance for many industries, viz. the fuel,petrochemical etc. These industries involved the process to designing accurate equipment for handling many type of lethal Chemical mixture Viz. hydrocarbons, ketones, Alcohols, aldehydes etc. Itis essential to understand the Ion-solvent interaction[5-8].

Literature review show that the many researchersinvestigate ultrasonic properties of pyrazoline, amino acid and its derivative in mixture of solvent at different concentration and different temperature[6]. Also structural properties of complex are studied by measuring ultrasonic properties and density[7]. The thermodynamic studies also take place with the help of interferometry technique[8].

Butunder the similar investigational condition there is no study are observed for Pyrazolone Schiff base with 2-Amino 3-Hydroxy Pyridine. It draw our interest toward the study of ultrasonic properties of Schiff base of (5-hydroxy-3-methyl-1-(2,4dinitrophenyl)-pyrazol-4-yl)(phenyl)methanone and 2-Amino 3-Hydroxy Pyridinein mix solvent and 303k temperature.

EXPERIMENTAL

The ligand of Schiff base was synthesis according to literature process by known technique. Theone pot synthesis are carried out for ligand synthesis by using (5-hydroxy-3-methyl-1-(2,4dinitrophenyl)-pyrazol-4yl)(phenyl) methanone and 2-Amino 3-Hydroxy Pyridineand it will be purified by Vogel's method**[9]**. Double distilled dioxane solvent use with water for preparation of ligand solution of different concentration. The relative measurement method is use to determine the density is measure with accuracy 0.00001gm/cm^3. Ultrasonic properties are determined by using the ultrasonic interferometer, the frequency of instrument is 3MHz.The steel Made double wall cell measurement unit is use and temperature is maintained by circulating

water of constant temperature through the cell. In thisinvestigation, the different ultrasonic properties are evaluated such as specific acoustic impedance, apparent molal compressibility, apparent molal volume, relative association, intermolecular free length, adiabatic compressibility, solvation number, apparent molal compressibility, limiting apparent molal volume, and solvation number constant (Sk, Sv) have been evaluated

RESULTS AND DISCUSSION

The investigationaldata of ultrasonic velocity and density are used to determine the acoustical properties and related records reported in table 1-3 at 303K temperature. From this statistical information, we can say that as concentration of solution in system is increase the value of intermolecular free length are decreases while the value of ultrasonic velocity are increase. With concentration the value of specificacoustic impedance also increases in 1,4 dioxane.As the concentration of solution are increase adiabatic compressibility value is decreases, it show that there is solute-solvent interact with each other and this interaction is very strong between solute and solvent molecule in solution. The evidence for strong interaction between ions in solution is also due to apparent molal volume increase as the concentration increases. The decrease in apparent molal compressibility value is observed with increase in Schiff base concentration; it indicates that weak electrostatic attraction force among the close vicinities of ions. Solvation number was a decrease when the concentration of ligand solution increases it is due to the strong coordination bond forms between solventmolecules in primary level layer. The adverse value forSk are observed which indicates the weak interactions between solute and solvent. The positive sign forlimiting apparent molal volume value indicates that the solute-solvent interaction between dioxane andligand of Schiff base shown in table-3.The positive sign for Sv are focusedin the direction to interaction between dioxane and ligand moleculeis strong. The Sv and Skvalue has been detected from fig. 1 and 2.

Table-1 Ultrasonic velocity, density, adiabatic compressibility (β_S), Specific acoustic impedance (Z) Intermolecular free length (L_f).

Schiff base of (5-hydroxy-3-methyl-1-(2,4dinitrophenyl)-pyrazol-4yl)(phenyl) methanone and 2-Amino 3-Hydroxy Pyridine + 1,4 Dioxane					
Concentration moles lit^{-1} (m)	Density (ds) kg m^{-3}	Ultrasonic velocity (Us) m s^{-1}	Adiabatic compressibiliy (β_S) $x10^{-10}$ m^2N^{-1}	Intermolecular free length (L_f) $x10^{-11}$ m	Specific acoustic impedance ($Zx10^6$) kg m^{-2} s^{-1}
$1x10^{-3}$	1019.9	1487.40	4.43252	4.23431	1.5168
$2x10^{-3}$	1020.04	1492.20	4.4034	4.22038	1.5219
$3x10^{-3}$	1020.17	1497.60	4.3711	4.20487	1.5276
$4x10^{-3}$	1020.29	1504.20	4.33228	4.18616	1.5345
$5x10^{-3}$	1020.4	1511.40	4.2906	4.16597	1.5421
$6x10^{-3}$	1020.49	1521.00	4.23615	4.13945	1.5520
$7x10^{-3}$	1020.58	1527.00	4.20255	4.123	1.5583
$8x10^{-3}$	1020.66	1537.80	4.14337	4.09387	1.5694
$9x10^{-3}$	1020.72	1545.00	4.10452	4.07463	1.5769

Table-2 Concentration (m), Relative association (R_A), apparent molal compressibility (ϕ_k), Apparent molal volume (ϕ_v), Solvation number (S_n)

Concentration (m) moles lit^{-1}	Apparent molal volume (ϕ_v) m^3mole^{-1}	Apparent molar compressibility (ϕ_k) $x10^{-10}$ m^2 N^{-1}	Relative association (R_A)	Solvation number (S_n)
$1x10^{-3}$	0.3069	1.9864	0.9993	0.9933
$2x10^{-3}$	0.3117	1.9715	0.9969	0.9858
$3x10^{-3}$	0.3164	1.9536	0.9948	0.9769
$4x10^{-3}$	0.3212	1.9345	0.9926	0.9673
$5x10^{-3}$	0.3260	1.9097	0.9895	0.9549
$6x10^{-3}$	0.3324	1.8943	0.9877	0.9472
$7x10^{-3}$	0.3369	1.8673	0.9843	0.9337
$8x10^{-3}$	0.3415	1.8495	0.9821	0.9248
$9x10^{-3}$	0.3472	1.8236	0.9787	0.9119

Table-3 Limiting Apparent molal compressibility (□□□), Limiting Apparent molal volume(□□v), Sv and Sk

Ligand	Limiting Apparent molal volume (ϕ^0_v) m^3mole^{-1}	Limiting Apparent molal compressibility (ϕ^0_k)$x10^{-10}$ m^2 N^{-1}	$S_v m^3kg^{1/2}mole^{-3/2}$	$S_k m^3mole^{-2}kg.N^{-1}$
Schiff base of pyrazolone	0.3015	2.0126	5.0475	-20.500

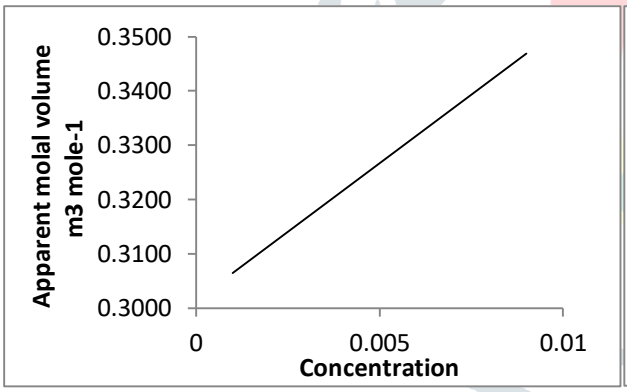

Fig.-1 -Apparent molal volume (m^3mole^{-1}) Vs Concentration (mole lit^{-1})

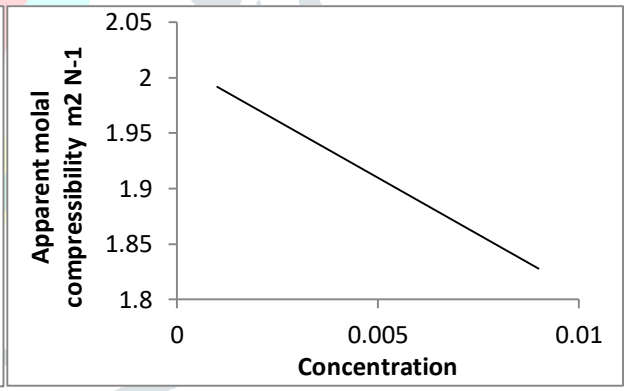

Fig.-2- Aparent molar compressibility10^{-9}(m^2 N^{-1}) Vs Concentration (mole lit^{-1})

CONCLUSION

In present investigation the ultrasonic properties were evaluated from experimental information, it proves that there are interaction betweenmetal and Schiff base ligand of (5-hydroxy - 3-methyl-1-(2, 4dinitrophenyl)- pyrazol-4-yl)(phenyl) methanone and 4-amino antipyrine in 1,4-dioxane-water solvent. And from the investigational insights it is settled that there are cooperation among the solute and dissolvable particle in Schiff base of benzoyl Pyrazolone and dioxane-water frameworks are solid.

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REFERENCES

1. R.Velavan, P.Myvizhi,International Journal of Innovative Research in Science, Engineering and Technology **(2015)** Vol. 4, Issue 8.
2. K. P. Jumde International Journal of Chemical and Physical Sciences, **(2013),** 2(5): 31-37.
3. M. P Wadekar., A. S Shrirao. and R. R., Tayade J. Chem. Bio. Phy. Sci., Section A, **2015**, 5(1): 81-90.
4. S.K. Thakur and S.Chauhan, J.Chem. Pharm.Res.,**2011,**Vol.3(2) :657.
5. A. Solanki and I. Thakur Indian Journal of Chemistry, **(2007),** 45B.
6. C. M. Saxena, Chemical Science Transactions (**2015**), 4(4),955-960
7. R. Palani and S. Saravanan, Research J. Phy., **2008**, 2(1):13-21.
8. A. Tadkalkar, P.Pawar and G.K. Bichile, J.Chem. Pharm.Res., **2011,**Vol.3(3) :165
9. K. D. Tayade Journal of Medicinal Chemistry and Drug Discovery, (2016), 1(2): 15-19.
10. D. Ubagaramary, , Journal of Applied Chemistry, **2012**, Volume 2, Issue 5 , PP 01-19
11. S.J. Kharat, J. Chem. Eng. Data, **(2008)** Vol.53:1292
12. G. R. Bedare, Science park, **2013**, Volume-1, Issue-4, 15:1-32.
13. R. Palani, Rasayan J. Chem., **(2008)** Vol. 1(3): 495.
14. D. V. Jahagirdar ,J.Molecular Liq. **, 1998**,75: 33-43.
15. B. B Baldaniya E- Journal of Chemistry, **(2009),** 6(3): 673-680B.
16. Shilpa A. Mirikar, ,American Journal of Pharmacology and Pharmacotherapeutics,**2015**, Vol.2(1):2-7.
17. A.P. Mishra and D.K. Mishra, J.Chem. Pharm.Res. **2011,** Vol.3 (3):489.
18. M. Arvinthraj , S. Venktesan and D. Meera, J.Chem. Pharm.Res, **2011,** Vol.3 (2):623.