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A Study On The Ultrasonic Behaviour Of Some Chalcones And Their Mixtures

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ABSTRACT

Ion-solvent or solvent-solvent interaction involved in a binary mixture system can be studied by various methods.Ultrasonic studies in organic liquids and their binary mixtures have been of considerable research interest during the last few decades. A liquid mixture is said to show ideal behaviour if the variations in density and sound velocity etc., with mole fraction of the solute are linear. Ultrasonic velocity and adiabatic compressibility, which can be measured accurately. Thermodynamic parameters like molar volume, adiabatic compressibility, appar molal volume, molar adiabatic compressibility acoustic impedance and adiabatic bulk modulus have been evaluated from the measured values of ultrasonic velocity and density for pure dielectric liquids of Chalcone of P-Chlorobezaldehyde,Salicylaldehyde,& Benzaldeyde and also their mixtures. It is observed that apparent molal volume, molar adiabatic compressibility increase with increasing the concentration of ligands & adiabatic compressibility decrease with decreasing the concentration of ligands.

1. INTRODUCTION

Ion-solvent or solvent-solvent interaction involved in a binary mixture system can be studied by various methods.There are three techniques which are generally used for the measurement of ultrasonic velocity viz.optical diffraction technique,Echo pulse technique & interferometric technique. Ultrasonic studies in organic liquids and their binary mixtures have been of considerable research interest during the last few decades. A liquid mixture is said to show ideal behaviour if the variations in density and sound velocity etc., with mole fraction of the solute are linear. Ultrasonic velocity and adiabatic compressibility, which can be measured accurately. Chalcone of P - Chlorobezaldehyde, Salicylaldehyde, & Benzaldeyde have been chosen for ultrasonic study .ultrasonic velocity, density,measurements have been made and some acoustical parameters like adiabatic compressibility, appear molal volume,molar adiabatic compressibility ,intermolecular free length (Lf), etc., are evaluated. Ultrasonics is the branch of physics dealing with the study and applications of sound waves having frequencies which are beyond the range

2.Principle of Interferometric Technique

There are the three techniques which are the generally used for the measurement of ultrasonic velocity viz. optical diffraction technique,Echo pulse technique, Interferometric Technique.In the present study , Interferometric Technique has been used for the determination of ultrasonic velocity.The principle used in the measurement of velocity (v) in the based on accurate determination of wavelength (λ) in the medium ultrasonic waves of known frequency (f) are the produced by quartz crystal fix at the bottom of cell.The interferometer is an instrument for exact measurement of wavelength of any wave motion. One of the most accurate ways of measuring ultrasonic constants in fluids or gasses is, to set up stationary wave resonances. This is usually done in a column at one end of which the source is located and at the other end of which is placed a reflector. This is known as single interferometer and was originally proposed by Perrin.

3.MATERIALS AND METHODS

Commercially available AR grade DMSO & chalcone of various compound were used as such. Densities were measured with the help of bicapillary pyknometer. All the weighings were made using single pan digital balance. The binary mixtures were prepared by volume, by mixing selected volumes of liquid components in air tight glass bottles. A 10 ml. specific gravity bottle and electronic balance were used for the determination of density measurements.To prepare concentration of various molar solutions.& calculate the various parameters :-

1]To calculate the adiabatic compressilbility :-

$$\beta=1/V^2 \times d$$

2. To calculate the Apparent molal volume:-

$$\Phi v= 1000(do-ds)/c.ds.do +m/ds$$

3. To calculate the molar adiabatic compressilbility:-

$$\Phi k =1000(\beta s.do- \beta 0.ds)/ c.ds.do + \beta s.m/ ds$$

4. RESULTS AND DISCUSSTION

The values of molar refraction and polarizability constants of some ligand systems at different concentrations are presented in Table. It is observed that adibatic compressibility, appar molal volume, molar adiabatic compressibility increase with increasing the concentration of ligands & adiabatic compressibility decrease with decreasing the concentration of ligands .The values different concentrations of ligands in different percentage of ethanol- mixtures are presented in following tables:-

Table 1: concentration Vs apparent molal volume **Of various chalcones at different concentration**

Conc.	Ligand A	Ligand B	Ligand C
0.7	4.84	6.325	5.826
0.54	3.63	5.362	4.562
0.4	2.365	4.253	3.256
0.3	1.236	3.05	2.356

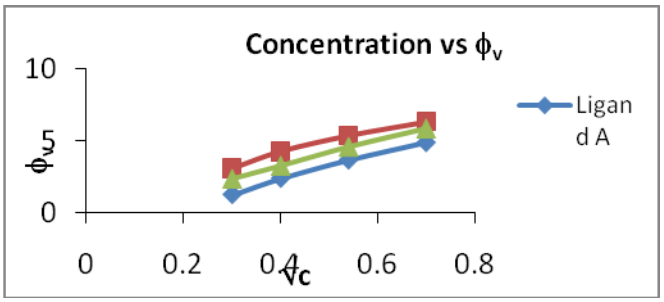
Table 2: concentration Vs adiabatic compressilbility **Of various chalcones at different concentration**

	Ligand A	Ligand B	Ligand C
0.7	6.0679	2.536	4.326
0.54	8.365	4.365	6.326
0.4	10.236	6.325	8.365
0.3	12.624	8.236	10.358

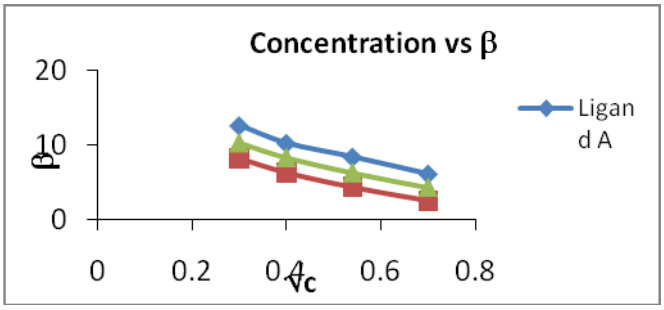
Table 3: concentration Vs molar adiabatic compressilbility **of various chalcones at different concentration**

Conc.	Ligand A	Ligand B	Ligand C
0.7	-14466	-10615	-12200
0.54	-15634	-11616	-13400
0.4	-16363	-13563	-14910
0.3	-17896	-14791	-16420

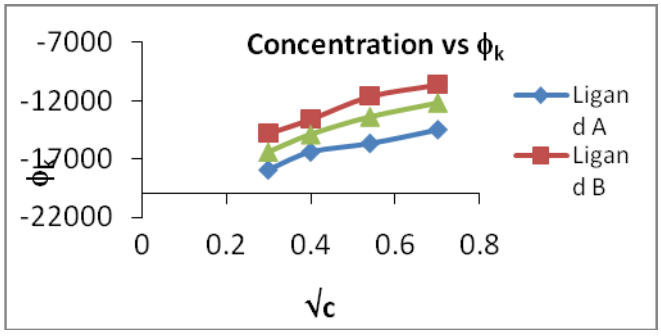
Graph 1



Graph 2



Graph 3



6. CONCLUSION

Thermodynamic parameters like molar volume, adiabatic compressibility, appar molal volume, molar adiabatic compressibility acoustic impedance and adiabatic bulk modulus have been evaluated from the measured values

of ultrasonic velocity and density for pure dielectric liquids of Chalcone of P-Chlorobezaldehyde, Salicylaldehyde, & Benzaldeyde and also their mixtures. Some acoustical parameters like adiabatic compressibility Intermolecular Free length (Lf) are evaluated for the chosen materials and their mixtures

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