The Use of Acoustic Parameters of Halo Substituted Chalconeimine for Determination of Ion Solvent Interaction

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Abstract: In this present investigation author enlighten the certain acoustic parameter of chloro, fluro Substituted chalconeimine [CFC] by measuring ultrasonic velocity at 2 MHz, with concentration range of 0.01 M at 32 °C. The ultrasonic velocity (u), adiabatic compressibility (βs), intermolecular free length, (Lf). Apparent molal volume (Φv), Apparent molal Compressibility(Φk ), are the acoustic parameters investigated in the study.

Keywords: ultrasonic velocity, chalconeimine, molal volume, compressibility, Solute –Solvent Interaction.

1. Introduction

Acoustical properties are the properties of materials that determine how they interact with sound. For determination of acoustic properties the ultrasonic waves with high frequency is used. The interaction of waves with systems involved to study certain parameter which is called as acoustic parameters. Ultrasonic waves, in recent years, have acquired the status of an important probe for the study of structure and properties of matter in basic science. Ultrasonic techniques are best suited for physicochemical studies of a system. Some of the phenomenon analyzed in recent past, are the acoustic attenuation due to phonon-phonon interactions, the nuclear spin interactions, and electron spin interaction with the acoustic waves and phonon electron magnetic field interactions.

In the field of technology, the waves are being used for detection of flaws, testing of materials, mechanical cleaning of surface etc. It is used to find out the cracks in objects etc. In medicinal science too, the waves are being used to detect bone fractures. cardiology, Cancer, bloodless surgery, tumors, fetal conditions and in physiotherapy, gynaecology 1-3 acoustic properties of substituted chalcones in binary solvent mixtures have been studied by A.S. Burghate 4 Acoustical Studies on Heterocyclic Drugs In 1,4- Dioxane at 303.15 K studied by Swati Kolhe, Dipak Patil5 et.al.

2. Experimental

Material and Methods

Synthesis of substituted chalconeimine Chloro Fluro Substituted Chalconeimines CFC

The halosubstituted chalconeimine are synthesized by amination of chalone with halo substituted amines ,this chalone are synthesized by using general claisen Schmidt method . For evaluating the acoustic properties the very pure and analytical grade solvent and extra pure double distilled water is used. The densities of pure solvent and solutions are determined by using specific gravity bottle. The ultrasonic velocity measurements were made using a crystal controlled variable path ultrasonic interferometer (Mittal Enterprise, Model F-05) of 2MHz with accuracy of (+) 0.03 %

3. Results and Discussion

The ultrasonic velocity of the ligand is going to decrease with decrease in percentage of dioxane this indicates decrease the cohesion which is caused due to hydrogen bonding. The value of adiabatic compressibility increase (βs) with decrease in percentage of solution may be due to departure of solvent molecules around ions supporting weak ion-solvent interactions. The value of apparent molal volume (Φv) is high in case of more polar substituent than less polar substituents. The apparent molal volume Φv values increases with decrease in concentration of chalconeimine in binary mixtures this represents strong solute –solute and solute solvent interactions.

<table>
<thead>
<tr>
<th>% Dioxane</th>
<th>Mole fraction of Dioxane</th>
<th>Ultrasonic Velocity (u) s (m/sec)×10^3</th>
<th>Adiabatic compressibility (βs) (bar-1)×10^-7</th>
<th>Intermolecular free length L (Å)×10^-9</th>
<th>Apparent molal volume Φv (m3/mole)×10^3</th>
<th>Apparent molal Compressibility (Φk)(m3mol-1 k(s)-1)×10^-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>1</td>
<td>1792.8</td>
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<td>0.6563</td>
<td>1554.8</td>
<td>1.025177</td>
<td>4.0350</td>
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<tr>
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<td>0.967003</td>
<td>4.6982</td>
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<tr>
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<td>1407.6</td>
<td>0.923398</td>
<td>5.4657</td>
<td>3.04297</td>
<td>70</td>
</tr>
</tbody>
</table>

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The value of apparent molal compressibility (Фk ) increases with decrease in percentage of all systems. Showing weak electrostatic attractive force in the vicinity of ions causing electrostatic salvation of ions. Compressibility is more in case of bulky substituents.

4. Conclusion

From the experimental data, density and compressibility data have been determined for halo substituted chalconeimine in binary liquid (dioxane+water) at 32°C the results have been used to study the ion-solvent interaction exists in the mixture.

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References