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# Study of Sonochemical in Mixture of Acetone with O – Benzo Quinone

**Abstract**

Ultra sound velocity, density and viscosity are Experimently Determind in the mixture of acetone with o – Benzo quinone over entire range of compostion at 303. ook and 308k These measerements have been used to evaluate some important parameter such as isentropic compressibility, specific acoustic impetonce, intermolecular free length, molar sound velocity, apparent molal compressibility, specific viscosity, reduced and relative viscosity and some other parameters for the same conentrations and temperature range. These parameters have been discussed in the terms of solute solvents interaction ons. The Ultrasound velacity increases on increasing concentration of solute.

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**Introduction**

Investigations of the physicochemical properties of the denatured state of o – benzo quinone are required to identify and characterize the contribution of various non-bonding interactions1-2 between different functional groups of o – benzoquinone and acetone – solvent interactions which are the driving force of covalent process the study of ultra sonic leads to a better understanding of the nature of interactions between the solute – solovent3 in recent years these have been as increasing interest in the study of non – electrolity components in equeous and non aqueous solutions4 The physical properties of dilute solutions of non – electrolyles depends that the solute in a Acetone structure breaker or maker the influence of small quantity of o – benzoquinone on hydrogen bonded structure of acetone in the soluction in order to study the nature of molecular interactions in the above solutions the results have been discussed in tems of various interactons operating in these system.

**Experimental**

The Ultrasound velocities of the solutions were measured with a multi frequency ultrasonic interferometer of model f – 81.Quarts crystal have different frequency and have the accuracy of about ≠ 0.05% the average of ten reading's treated as a final value of ultrasound velocity the temperature around the cell was controlled with in ± 0.01 by circulating the water from thermostat density measeerement were reformed with a pre collaborated bicapillary pycknometer. The accuracy of density measurements was up to ± 0. 0001 gm/cm3 visosities were measured using an ubbelohde type capillary viscometer. Which was calliborated with doubly distilled water at three temperatures. The efflux time was measured using an electronic watch with a resolution of 0.01 see. An overaze of four the meassered viscoties was 0.005 cp The ultrasonic parameter such as molar sound relocity (R), Apparent molal compressibility (ϕk), insetropic pressibility, (βs), specific aeoustic impedance (z), Specific viscosity (ηsp) and reduced viscosity, (ηred) were computed in there solutions using the deseribed standend formulae5.

**Molar Sound Velocity (R)**

$R = M/\rho \quad v1/3$ ……..…(i).

Apparent molal compressibility

$\phi k = (\rho 0.\beta s - \beta s0\rho) + \beta s0\ M/\rho 0$ …… .(2)

Isentropic compressibility

$\beta s = \frac{1000}{C \times \rho_0}$ ……..(3)

Specific acoustic impecdance

$Z = V.\ \rho$……(4).

Relative association $R = M/\rho$ …× 1/3……(5).

Where M = n1 m1 + n2 m2 is ettctive molecular, weight. Where n1 and n2 are the number of moles of solvent and solute and m1 and m2 are their molecular weight respectivity. P and P0 are there donsities of solution and solvent and V and V0 are their U.V respectivity. βs and Bs0

are the isentropic compressility of solution and solvent and c is the concentration of solvte in mole/litre.

The present work the chemical o – benzo quinone and Acetone used of AR (BHD) quality.

**Aim of the Study**

The Ultra Sound Study of Somochemical in mixture Acetone with O-Benzo Quinone. The Spectral study also have been carried out by I R Spectroscopy.

**Result and Discussion**

It can be seen from there data that the ultrasound velocity of solutions increases with increasing the concentration of o – benzo quinone in the solution of acetone at different - temperature. The ultrasound velocities of some sample decreases on increming temperature this trend of variation of ultrasound velocity also obseved for this solute.

The viscosity and reduced viscocity are given for the sample of o – benzo quinine with acetone solvent is tabulated in table and the volue of malar sound velocity and isentropic compressibility is given in the table and the value of specific acostic impedance and appaent molar compressibility ($\phi k$) are given in the table.

The viscosity of solutions for the given sample inceases with increase in the concentration of o-benzo quinone. The variation of density, vicosities of the present work also agreed with singh at.al.6 The linear results of desity and ultrasound velocity have also been reported for glucose in binary aqueous solution of mannose maltose and raffinose by pal A and chauhan N 7 Linear result for molar volume for the electrolyte in aqueous solution of alcohals also shown by parmer M Lard guleria M.K and others8-9

| | Viscosity | | Specific viscosity | |
|---|---|---|---|---|
| Molar Cone. O- benzo. Quinone (mole/Lit) | 303.K | 308K | 303K | 308K |
| 0.0216 | 0.3175 | 0.2804 | 0.0037 | 0.0042 |
| 0.0432 | 0.3196 | 0.2825 | 0.0105 | 0.0119 |
| 0.0649 | 0.3218 | 0.2847 | 0.0174 | 0.0197 |
| 0.0865 | 0.3240 | 0.2869 | 0.0243 | 0.0275 |
| 0.1081 | 0.3261 | 0.2890 | 0.0311 | 0.0353 |
| 0.1297 | 0.3283 | 0.2912 | 0.0380 | 0.0430 |
| 0.1513 | 0.3304 | 0.2933 | 0.0448 | 0.0508 |
| 0.1730 | 0.3326 | 0.2955 | 0.0517 | 0.0586 |
| 0.1946 | 0.3348 | 0.2977 | 0.0585 | 0.0664 |
| 0.2162 | 0.3369 | 0.2998 | 0.0654 | 0.0741 |

the results are also agreed with kumar P. et. Al10 the physicochemical behariour of liquid mixture is also studied by R. Mehra and gaur A.K11 and the results agreed with the present work.

| | Ultrasound velocity | | Density (gm/ml)) | |
|---|---|---|---|---|
| Molar Cone. O- benzo. Quinone (mole/Lit) | 303.K | 308K | 303K | 308K |
| 0.0216 | 1162 | 1132 | 0.7796 | 0.7608 |
| 0.0432 | 1164 | 1134 | 0.7817 | 0.7629 |
| 0.0649 | 1166 | 1136 | 0.7839 | 0.7651 |
| 0.0865 | 1168 | 1138 | 0.7861 | 0.7673 |
| 0.1081 | 1170 | 1140 | 0.7882 | 0.7694 |
| 0.1297 | 1172 | 1142 | 0.7904 | 0.7716 |
| 0.1513 | 1174 | 1144 | 0.7925 | 0.7737 |
| 0.1730 | 1176 | 1146 | 0.7947 | 0.7759 |
| 0.1946 | 1178 | 1148 | 0.7969 | 0.7781 |
| 0.2162 | 1180 | 1150 | 0.7990 | 0.7802 |

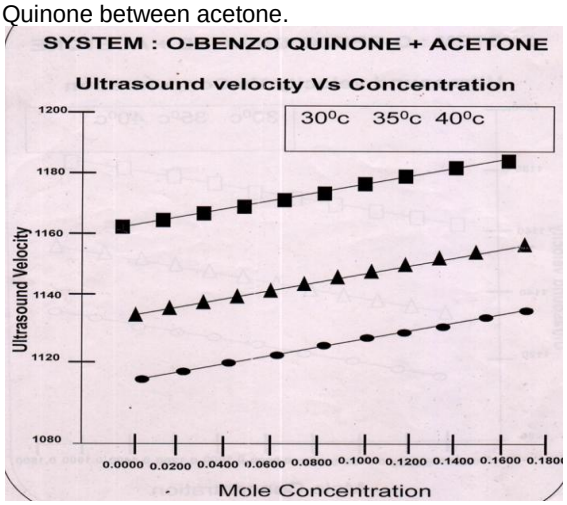
| | Isentropic compressibility | | Lowering compressiblity | |
|---|---|---|---|---|
| Molar Cone. O- benzo. Quinone (mole/Lit) | 303.K | 308K | 303K | 308K |
| 0.0216 | 95.00 | 102.58 | 0.59 | 0.65 |
| 0.0432 | 94.42 | 101.93 | 1.17 | 1.30 |
| 0.0649 | 93.83 | 101.28 | 1.76 | 1.95 |
| 0.0865 | 93.25 | 100.64 | 2.34 | 2.59 |
| 0.1081 | 92.68 | 100.01 | 2.41 | 3.22 |
| 0.1297 | 92.11 | 99.38 | 3.48 | 3.85 |
| 0.1513 | 91.55 | 98.75 | 4.04 | 4.48 |
| 0.1730 | 90.99 | 98.14 | 4.60 | 5.09 |
| 0.1946 | 90.43 | 97.52 | 5.16 | 5.71 |
| 0.2162 | 89.88 | 96.91 | 5.71 | 6.32 |

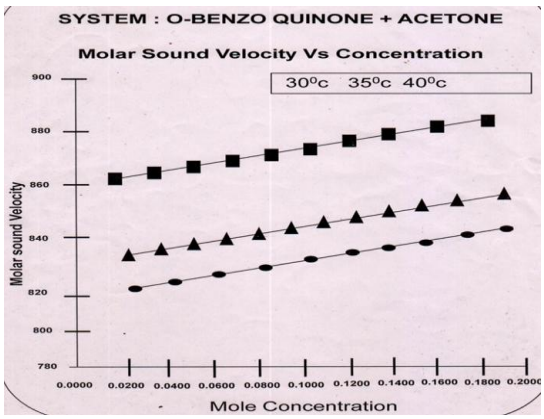
Depending on the polarity of side chain o – benzo Quinone vary in their hydrophilic or hydrophobic character. These properties are impotent in o – benzo quinine stru stone and o – benzo quinine – Acetone interoetions. The importance of the

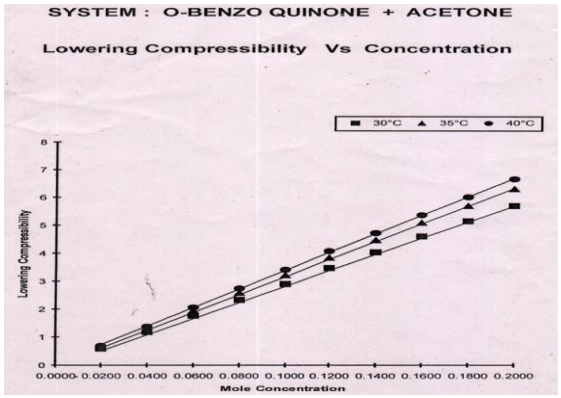
| | Reduce viscosity (η) | | Molar sound vilocity | |
|---|---|---|---|---|
| Molar Cone. O- benzo. Quinone (mole/Lit) | 303.K | 308K | 303K | 308K |
| 0.0216 | 0.1703 | 0.1930 | 862.77 | 1.0034 |
| 0.0432 | 0.2437 | 0.2762 | 865.66 | 1.0069 |
| 0.0649 | 0.2683 | 0.3041 | 868.56 | 1.0103 |
| 0.0865 | 0.2805 | 0.3179 | 871.45 | 1.0138 |
| 0.1081 | 0.2878 | 0.3262 | 874.34 | 1.0172 |
| 0.1297 | 0.2927 | 0.3317 | 877.24 | 1.0207 |
| 0.1513 | 0.2962 | 0.3357 | 880.13 | 1.0241 |
| 0.1730 | 0.2988 | 0.3387 | 883.05 | 1.0276 |
| 0.1946 | 0.3009 | 0.3410 | 885.95 | 1.0311 |
| 0.2162 | 0.3025 | 0.3428 | 888.85 | 1.0345 |

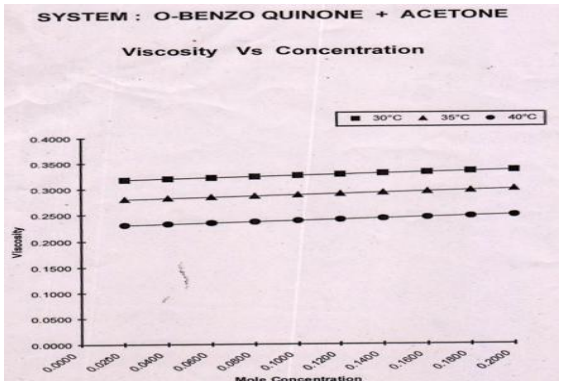
| | Solvation Number (Sn) | | Apparent Molar volume (k) | |
|---|---|---|---|---|
| Molar Cone. O- benzo. Quinone (mole/Lit) | 303.K | 308K | 303K | 308K |
| 0.0216 | 0.1023 | 0.1051 | 10.7758 | 11.0518 |
| 0.0432 | 0.2048 | 0.2102 | 11.1302 | 11.4240 |
| 0.0649 | 0.3066 | 0.3146 | 11.4843 | 11.7958 |
| 0.0865 | 0.4074 | 0.4179 | 11.8349 | 12.1637 |
| 0.1081 | 0.5074 | 0.5203 | 12.1835 | 12.5296 |
| 0.1297 | 0.6065 | 0.6218 | 12.5302 | 12.8935 |
| 0.1513 | 0.7048 | 0.7225 | 12.8751 | 13.2553 |
| 0.1730 | 0.8025 | 0.8226 | 13.2196 | 13.6168 |
| 0.1946 | 0.8991 | 0.9215 | 13.5607 | 13.9745 |
| 0.2162 | 0.9950 | 0.0197 | 13.8999 | 14.3304 |

Side chain come from the influence, this has on the O – benzo quinone residues interaction with other structures, both with in a single o – benzo Quinone between acetone.




**Conclusion**

These measurements have been used to evaluate some important parameter such as isentropic compressibility, specific acoustic impetonce,etc.

Investigations of the physicochemical properties of the denatured state of O-benzoquinone are required to identify and characteristics the contribution of various non bonding interaction between different functional groups of O-benzoquinone and acetone solvent interaction which are the driving force of co-valent process.The study nature of molecular interactions in the above solutions the results.

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