"Interaction on The Basis of Acoustic Properties of Di Methyl Phenyl Amine with Aqueous Di Ethyl Ether''

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***Abstract:-*Density, viscosity and Ultrasonic velocity measurements have been used to calculate Isentropic Compressibility (βS) , Intermolecular free length (Lf) , Ultrasound velocity (V) , Density (ρ) , Excess Viscosity (η) , Shear's Relaxation Time (τs) of solution of Di Methyl Phenyl Amine in aqueous organic solvent as Di ethyl Ether. In each case ultrasound velocity increase and isentropic compressibility (βS) Decreases, Intermolecular free length (Lf) Decreases, Density (ρ) increase and viscosity increases with increases in molar concentration of Di Methyl Phenyl Amine. The Result has been interpreted in terms of ion-solvent interaction on the basis of acoustic properties.**

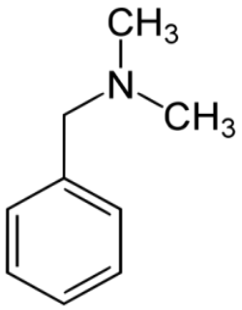
***Key Words*: - Di Methyl Phenyl Amine, Di Ethyl Ether**

I. INTRODUCTION

Di Methyl Phenyl Amine - Any class of Aromatic yellow compounds including several that are important as anti-oxidants; use in making dyes. Present work covers extensive survey of physio-chemical and solvolytic studies of Di Methyl Phenyl Amine in aqueous organic solvent Di ethyl Ether. Present work is reporting of the dissolved ion with water molecules and reporting the finding of a study of a ultrasound velocity, density and viscosity measurement to calculate isentropic compressibility (βS) , intermolecular free length (Lf) , molar volume (Mv) , Shear's Relaxation Time (τs) of Di Methyl Phenyl Amine in Di Ethyl Ether.

Such Solvent (Di Ethyl Ether) system study at various temp. (20^0C, 25^0C, 30^0C) with various parameter.

Wave interferometric technique was employed for the measurement of ultrasonic Velocity. The Density and Viscosity were determined using a Pyknometer. The Experiment was Repeated and result were reproducible with experimental error of 0.0002 KgM^{-3} and 0.0002 mPas respectively



Di Methyl Phenyl Amine

II. RESULT AND DISCUSSION

Present work covers an extensive survey of Solvolytic study of Di Methyl Phenyl Amine in aqueous organic solvent. All the system studied at Different temperatures (20, 25, 30^0C).we have reported ultrasound velocity (V) and Viscosity (η) of binary liquid mixture with experimental data, The following thermodynamic and acoustic properties like Isentropic compressibility (βS) , intermolecular free length (Lf) , Molar Volume (Mv) , Shear's Relaxation Time (τs) have been calculated.

The ultrasound velocity, Viscosity, Lowering Compressibility, Shear's Relaxation Time and concentration and Molar sound velocity Reported in Table 1-3 as well on Fig. 1-5. The ultrasound velocity of the solution of Di Methyl Phenyl Amine in Di Ethyl Ether increase with increasing Molar Concentration of Di Methyl Phenyl Amine in Solvent.

Table 1 : Di Methyl Phenyl amine + Di Ethyl Ether at 20^0 C

C (mole/L)	ρ (gm/ml)	V (m/sec)	β_S (cm^2/dyne.10^{12})	β_S- β_{SO} (cm^2/dyne.10^{12})	η (CP)	τs (Sec.)	$Zx10^{-5}$	L_f	M_v
0.0000	*0.7174*	*1008*	*137.18*	0.00	0.2331	42.6355	0.7238	0.7238	103.3175
0.0831	*0.7412*	*1050*	122.37	-07.60	0.3384	55.2133	0.7782	0.6836	105.2760

0.1693	*0.7649*	*1090*	*110.03*	-12.45	0.4435	65.0644	0.8337	0.6482	107.3174
0.2590	*0.7887*	*1132*	*98.94*	-15.77	0.5487	72.3845	0.8928	0.6147	109.4313
0.3521	*0.8128*	*1180*	*88.35*	-18.28	0.6538	77.0175	0.9591	0.5808	111.5768
0.4491	*0.8365*	*1220*	*80.31*	-17.91	0.7592	81.2951	1.0205	0.5538	113.8728
0.5502	*0.8604*	*1260*	*73.20*	-16.25	0.8641	84.3361	1.0841	0.5287	116.2393
0.6555	*0.8843*	*1305*	*66.40*	-13.92	0.9654	85.4700	1.1540	0.5035	118.7014
0.7653	*0.9082*	*1350*	*60.41*	-10.38	1.0645	85.7419	1.2260	0.4803	121.2672
0.8801	*0.9321*	*1396*	*55.05*	-05.78	1.1756	86.2890	1.3012	0.4585	123.9538
1.0000	*0.9560*	*1440*	*50.44*	0.00	1.2849	86.4138	1.3766	0.4389	126.7573

Table 2 : Di Methyl Phenyl amine + Di Ethyl Ether at 25 ^{0} C

C (mole/L)	ρ (gm/ml)	V (m/sec)	β_S ($cm^2/dyne.10^{12}$)	$\beta_S - \beta_{SO}$ ($cm^2/dyne.10^{12}$)	η (CP)	τ_S (Sec.)	$Zx10^{-5}$	L_f	M_v
0.0000	*0.7154*	*984*	*144.36*	0.00	0.2193	42.2120	0.7039	0.7509	103.6063
0.0831	*0.7395*	*1028*	127.96	- 8.66	0.3147	53.6921	0.7602	0.7069	105.5180
0.1693	*0.7634*	*1070*	*114.41*	- 14.18	0.4106	62.6379	0.8168	0.6685	107.5282
0.2590	*0.7867*	*1115*	*102.32*	- 17.92	0.5053	68.9397	0.8771	0.6322	109.7095
0.3521	*0.8106*	*1160*	*91.68*	- 19.90	0.6015	73.5277	0.9402	0.5984	111.8797
0.4491	*0.8345*	*1205*	*82.53*	- 20.02	0.6963	76.6186	1.0055	0.5677	114.1457
0.5502	*0.8585*	*1250*	*74.55*	- 16.58	0.7921	78.7332	1.0731	0.5396	116.4965
0.6555	*0.8824*	*1292*	*67.89*	- 15.44	0.8814	79.7849	1.1400	0.5149	118.9570
0.7653	*0.9060*	*1338*	*61.65*	- 11.45	0.9730	79.9854	1.2122	0.4907	121.5616
0.8801	*0.9301*	*1380*	*56.46*	- 5.96	1.0693	80.1301	1.2835	0.4695	124.2204
1.0000	*0.9540*	*1430*	*51.26*	0.00	1.1738	80.2254	1.3642	0.4474	127.0230

Table 3 : Di Methyl Phenyl amine + Di Ethyl Ether at 30 ^{0} C

C (mole/L)	ρ (gm/ml)	V (m/sec)	β_S ($cm^2/dyne.10^{12}$)	$\beta_S - \beta_{SO}$ ($cm^2/dyne.10^{12}$)	η (CP)	τs (Sec.)	$Zx10^{-5}$	L_f	M_v
0.0000	*0.7132*	*970*	*149.02*	0.00	0.2051	40.7520	0.6918	0.7702	103.9259
0.0831	*0.7371*	*1014*	131.95	- 9.01	0.2926	51.4780	0.7474	0.7248	105.8616
0.1693	*0.7611*	*1062*	*116.49*	- 16.11	0.3825	59.4127	0.8082	0.6810	107.8532
0.2590	*0.7848*	*1102*	*104.92*	- 18.68	0.4698	65.7218	0.8648	0.6463	109.4313
0.3521	*0.8087*	*1150*	*93.50*	- 21.39	0.5578	69.5390	0.9300	0.6101	112.1425
0.4491	*0.8325*	*1190*	*84.82*	- 20.66	0.6458	73.0356	0.9906	0.5811	114.4199
0.5502	*0.8564*	*1245*	*75.33*	- 20.35	0.7336	73.6827	1.0662	0.5426	116.7822
0.6555	*0.8928*	*1280*	*68.36*	- 17.12	0.8150	74.2845	1.1264	0.5217	117.5713
0.7653	*0.9042*	*1332*	*62.33*	- 12.50	0.8980	74.6297	1.2043	0.4981	121.8036
0.8801	*0.9224*	*1375*	*57.34*	- 6.50	0.9837	75.2071	1.2761	0.4778	125.2573
1.0000	*0.9520*	*1420*	*52.09*	0.00	1.0807	75.0785	1.3518	0.4554	127.2899

System : Di Methyl Phenyl Amine + Di Ethyl Ether

Molar Velocity Vs Concentration

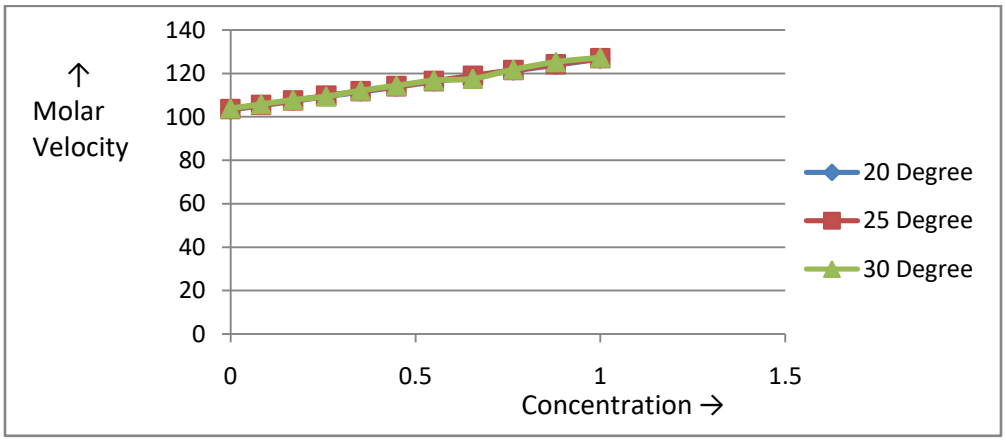


Fig.-1

System : Di Methyl Phenyl Amine + Di Ethyl Ether

Ultra Sound Velocity Vs Concentration

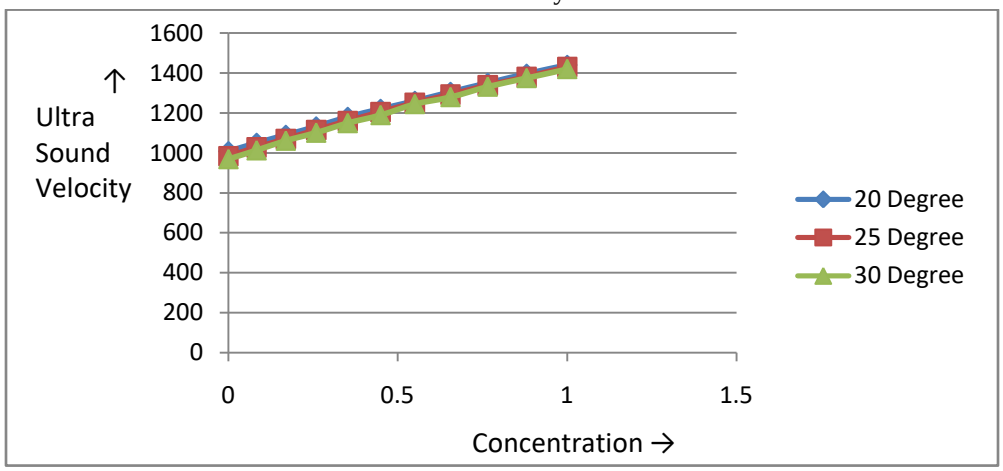


Fig.-2

System : Di Methyl Phenyl Amine + Di Ethyl Ether

Viscosity Vs Concentration

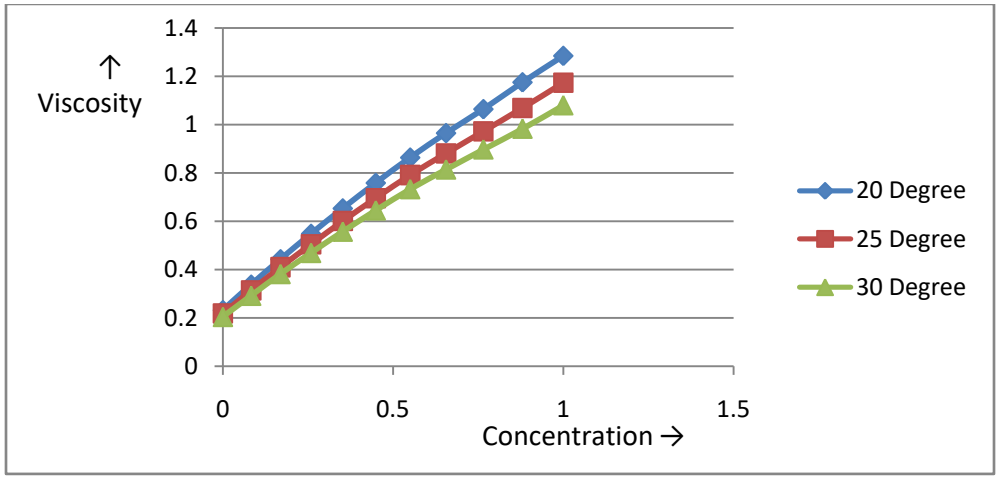


Fig.-3

System : Di Methyl Phenyl Amine + Di Ethyl Ether

Lowering Compressibility Vs Concentration

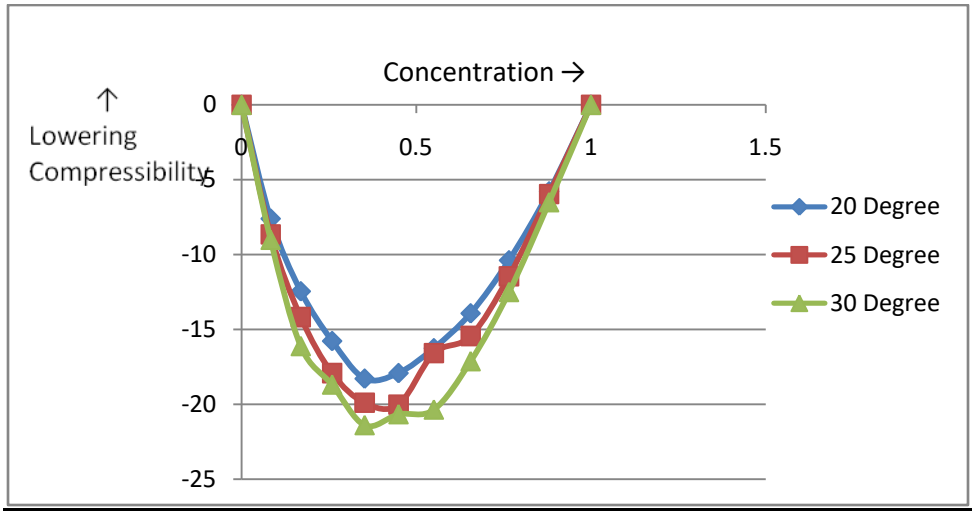


Fig.-4

System : Di Methyl Phenyl Amine + Di Ethyl Ether

Shear's Relaxation Time Vs Concentration

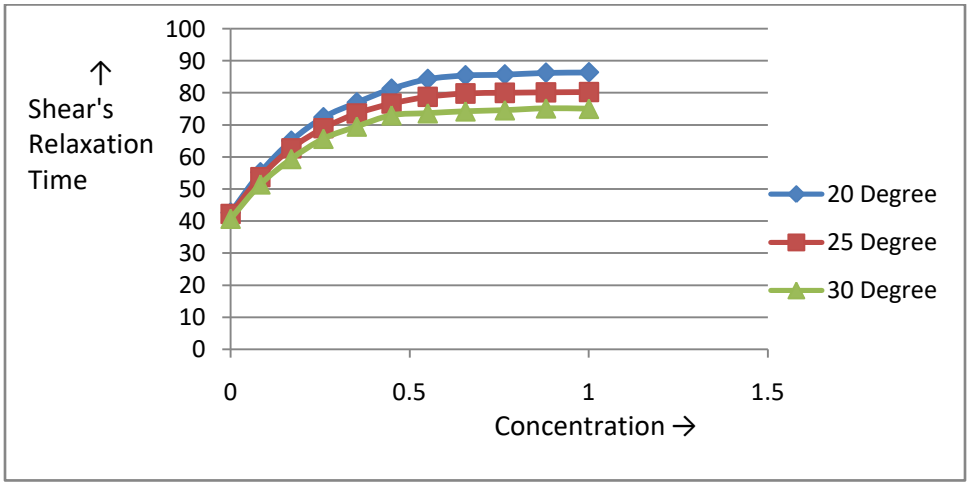


Fig.-5

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