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Research Article

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Verification of suggested formula (ADJ) by homologous alcohol series at 30°C

S. S. Andher

Department of Chemistry, The H. N. S. B. Ltd. Science College, Himatnagar, Gujarat, India

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ABSTRACT

Refractive indices and Densities of homologous Alcohol series have been studied at 30°c temperature. The data obtained is utilized to determine specific refraction, molar refraction .On comparison the specific refraction and molar refraction for the homologous alcohol series increasing.

Key words: Refractive Indices, Densities, Specific Refraction Molar Refraction.

INTRODUCTION

Refractive index is one of the most important properties of liquid. The measurement of the refractive index of liquids is an important work in engineering and science. Transmission and reflection detections near critical angles related to total internal reflections are common methods in refractive index measurement. When a ray of light passes from one medium to another, it suffers refraction, that is change in direction. If it passes from a less dense to a denser medium, it is refracted towards the normal so that the angle of refraction (r) is less than the angle of incidence (i) the refractive index (n) of the medium is the ratio of velocity of light in vacuum to the velocity of light in the medium. Refractive index is an important additive property of the structural arrangement of atom in molecule Refractive index can be measured easily with high degree of accuracy. The values of refractive index depend on the temperature as well as on wavelength of light used. Oswal et.al[1]have been studied refractivity properties of some homologues series such as nethanoate, methyl alkanoats, ethyl alkanoates ete. A.N. Sona[2]and N.S. Pawar have studied the molar refraction and polarizability constant of substituted heterocyclic compounds in different media from refractive indices. Burghate et.al[3] have studied the molar refraction and polarizabitity constant of substituted chalcones in different percentage of acetone-water mixture. D. Pandey et.al[4] have studied the refractometric and dielectric studies of binary liquid mixtures at different temperature. J. Padova[5] have studied the ion-solvent interaction in mixed solvent using ethanol and acetone medium. R.A. Synowicki et.al[6] implemented two different fluid measurement techniques to determine the refractive index of fluids on a commercial spectroscopic ellipsometer system. In first technique they use roughened glass to which liquid is applied. And in second they use the prism minimum deviation technique in a hollow prism cell. The advantages and disadvantages of both the techniques discussed. K.P.Damor et.al [7] studied the Refractometric study of binary mixture of benzene and carbon tetrachloride. The present work deals with the study of specific refraction and molar refraction of homologous alcohol series.

EXPERIMENTAL SECTION

Homologous alcohol series solvents taken the extra pure. For density measurement, all the weightings were made on contech balance having accuracy (0.001gm). The refractive index of solvent solutions was measured using by Abbe's refractometer ranging reading from 1.3000 to 1.70. The temperature of prism box was maintained constant by circulating water from thermostat at 30°c. (± 0.1°c). The refractometer was calibrated using glass test pieces of known refractive index supplied with the instrument. The Specific Refraction and molar refraction of solvent and solution were determined using Lorentz-Lorenz [7] equation and Andher Desai and Joshi's [8] Formula.

$$R_M = \frac{n^2 - 1}{n^2 + 2} \cdot \frac{M...}{d} .....(1)$$

$$R_M = \frac{1}{9}\left[\frac{3n - 2.47}{d} + 0.557\right] * M .....(2)$$

The calculated values of specific refraction and molar refraction are shown in Table 1

Table 1: Experimental Refractive Index (n), Densities (d), Specific Refraction(R), Molar Refraction (Rm) at 30° C

Alcohol Series	Density (d)	Refractive Index (n)	M.F.	M.W.	Specific Refraction L & L	Specific Refraction ADJ	Molar Refraction (Rm) L & L	Molar Refraction (Rm) ADJ
Methanol	0.7861	1.3277	CH_4O	32.04	0.2578	0.2785	8.2	8.9
Ethanol	0.7862	1.358	C_2H_6O	46.07	0.2793	0.2914	12.8	13.4
Propanol	0.7901	1.3751	C_3H_8O	60.11	0.2897	0.2974	17.4	17.8
Butanol	0.8042	1.3983	$C_4H_{10}O$	74.14	0.3003	0.3029	22.2	22.4
Pantanol	0.8122	1.4111	$C_5H_{12}O$	88	0.3057	0.3058	26.9	26.9
Hexanol	0.8134	1.4152	$C_6H_{14}O$	102	0.3079	23071	31.4	31.3

RESULTS AND DISCUSSION

The present investigation considers the refractive indices and densities measurement of homologous alcohol series. The results obtained of specific refraction and molar refraction is reported in Table 1. Respective graphical representation is shown in Figure 1 and 2. From the results it may be predicted that for homologues alcohol series increase the refractive indices, densities, specific refraction and molar refraction. This may be due to the fact that the addition of $-CH_2$ group attach in the homologous alcohol series.

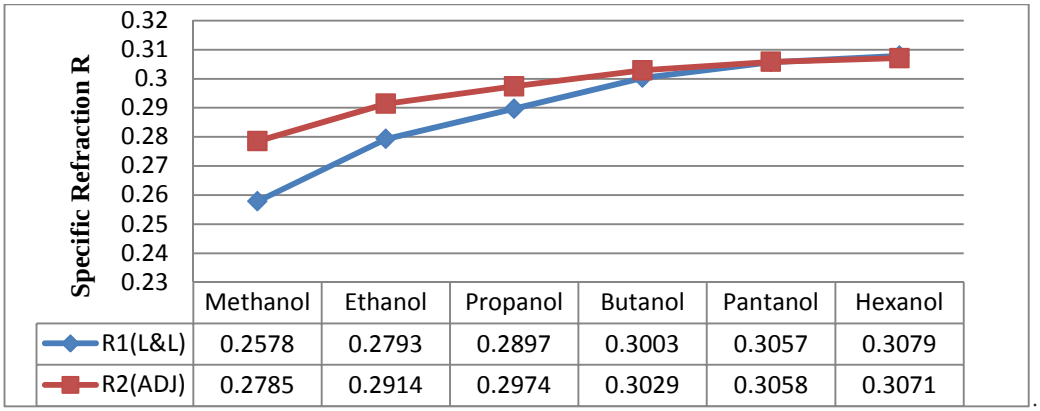

Fig 1 Homologous alcohol series

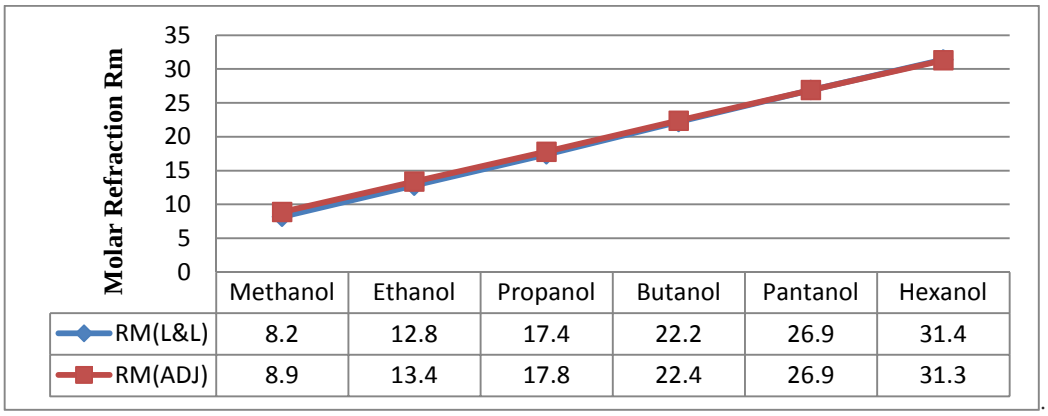

Fig 2 Homologous alcohol series

CONCLUSION

Densities and Refractive Index of the Homologous Alcohol series were measured at 30^0c.Specific refraction and molar refraction were calculated using Lorentz and Lorenz and Andher Desai and Joshi's formula. It can be concluded that the specific refraction and molar refraction increasing for the homologous alcohol series.

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