

STUDY PROJECT

CHEM F266

Instructed by Prof. Ranjan Dey

Scope and Purpose :

The purpose of this study project is to analyze and predict some of the thermophysical properties of binary liquid mixture systems, some of them being ultrasonic velocity, density and viscosity. These thermophysical characteristics have been found in use for a long time due to their frequent use and useful applications in many different sectors. I have been assigned the task to use different predictive models and predict values for ultrasonic velocity and viscosity of different binary liquid mixtures at different states.

Progress :

Post midsem I calculated the ultrasonic velocities of the remaining four binary mixtures using the predictive models using literature data[3]. The systems used were i) isoamyl alcohol(x1) + Benzonitrile(x2), ii) isoamyl alcohol(x1) + Aniline(x2), iii) isoamyl alcohol(x1) + Benzaldehyde(x2), iv) isoamyl alcohol(x1) + Nitrobenzene(x2) . AAPD was then calculated and compared for different temperatures. A final conclusion for the grand AAPD was also drawn considering all the systems at three different temperatures.

References :

1) Dey, R., & Harshavardhan, A. (2014). A Comparative study of Ultrasonic Velocities of Binary and Multicomponent Liquid Mixtures at 298.15 K. *Journal of Energy and Chemical Engineering*, 2(1), 1–7.

- 2) Shukla, R., Shukla, S., Pandey, V. and Awasthi, P., 2008. Excess internal pressure, excess energy of vaporization and excess pseudo-Gruneisen parameter of binary, ternary and quaternary liquid mixtures. *Journal of Molecular Liquids*, 137(1-3), pp.104-109
- 3) Satheesh, B., Sreenu, D. and Jyostna, T.S. (2020). Thermodynamic and spectroscopic studies of intermolecular interactions between isoamyl alcohol and monocyclic aromatic non-ideal binary liquid mixtures. *Chemical Data Collections*, 28, p.100448.
doi:<https://doi.org/10.1016/j.cdc.2020.100448>
- 4) Estimation of molecular radius of liquids and liquid mixtures from sound velocity
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