

**Density, Speed of Sound and Refractive Index for the Ternary Systems
Di-Butyl Ether + 1-Propanol + Heptane or Cyclohexane at 298.15 K**

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The increasing worldwide use of bio-fuels constitutes one of the measures considered to reduce greenhouse gas emissions. Bio-fuels also have an important part to play in promoting the security of energy supply, and promoting technological development and innovation. 1-propanol is used as blending agent in reformulated gasoline and has been included in international regulations on the promotion of the use of energy from renewable sources for transport [1]. The 1-propanol acts as non-polluting, high octane number blending agent. Di-butyl ether (DBE) is also used as blending agent in reformulated gasoline. DBE could be also used as cetane enhancer in bio-diesel fuel, and can be obtained as an added valued additive to second generation bio-fuels [3]. Recently 1-propanol has been proposed as a new alternative to conventional gasoline and diesel fuels [2]. Interest in propanols as second-generation bio-fuels has increased because they have many advantages over other potential alternative fuel candidates such as ethanol, as they can be produced from biomass by microbial fermentation of biomass (cellulose). Experimental densities, speeds of sound and refractive indexes for the ternary systems dibutyl ether + 1-propanol + heptane, or cyclohexane, and its respective constituent binary systems have been measured at 298.15 K and at atmospheric pressure. The excess molar volumes and the deviations in isentropic compressibility upon mixing have been correlated by the Redlich-Kister polynomial.

References

- [1] Directive 2009/28/EC of the European Parliament and of the Council on the promotion of the use of energy from renewable sources.
- [2] R. Luque, J. Campelo, J. Clark, Handbook of biofuels production: Processes and technologies, Woodhead Publishing Series in Energy No 15, Cambridge, UK, 2011.
- [3] R. Kotrba, Ethanol Producer Magazine, 2005, November.